2013 CHRYSLER 300

SERVICE & REPAIR MANUAL

ENGINE

3.0L Turbo Diesel - Service Information - Chrysler 300

DESCRIPTION

3.0L COMMON RAIL DIESEL ENGINE

The 3.0L (183 C.I.D.) six - cylinder "common rail" direct injection engine is a 60° overhead valve design. The engine utilize a cast iron cylinder block. The engine has aluminum cross flow cylinder heads, four valves per cylinder, central injectors and dual overhead camshafts. The 3.0L is turbocharged, intercooled, and also equipped with a EGR cooler.

Additional features are:

- Finger Follower Actuated Valves with Hydraulic Adjusters
- Turbocharger and intercooler
- Oil Jet Cooled Pistons
- Swirl Intake Ports
- Water cooled exhaust gas recirculation, Compliance with EURO V emission regulations
- Chain driven D.O.H.C. per bank of cylinders, with 4 valves per cylinder

The engine identification stamp (3) for the 3.0L is located on the right side of the engine block, by the generator behind its mounting bracket.

DIAGNOSIS AND TESTING

ENGINE DIAGNOSIS - MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTION
LUBRICATING OIL PRESSURE LOW	1. Low oil level.	1. (a) Check and fill with clean engine oil.
		(b) Check for a severe oil leak, worn rings (burning oil), oil leaking from the turbocharger to the intake, or other root causes for low oil level.
	2. Oil viscosity thin, diluted or wrong specification.	2. (a) Verify the correct engine oil is being used.
		(b) Look for reduced viscosity from fuel dilution.
	3. Improperly operating pressure switch/gauge.	3. Verify the pressure switch is functioning correctly. If not, replace switch/gauge.
	4. Relief valve stuck open.	4. Check/replace valve.

	5. If cooler was replaced, shipping plugs may have been left in cooler	5. Check/remove shipping plugs.
	6. Worn oil pump.	6. Check and replace oil pump.
	7. Suction tube loose or seal leaking.	7. Check and replace seal.
	8. Loose main bearing cap.	8. Check and install new bearing. Tighten cap to proper torque.
	9. Worn bearings or wrong bearings installed.	9. Inspect and replace connecting rod or main bearings. Check and replace directed piston cooling nozzles.
	10. Directed piston cooling nozzles under piston, bad fit into main carrier.	10. Check directed piston cooling nozzles position.
	12. Loose directed piston cooling nozzle.	12. Tighten directed piston cooling nozzle.
LUBRICATING OIL PRESSURE TOO HIGH	1. Pressure switch/gauge not operating properly.	1. Verify pressure switch is functioning correctly. If not, replace switch/gauge.
	2. Engine running too cold.	2. Coolant Temperature Below Normal
	3. Oil viscosity too thick.	3. Make sure the correct oil is being used.
	4. Oil pressure relief valve stuck closed or binding	4. Check and replace valve.
LUBRICATING OIL LOSS	1. External leaks.	1. Visually inspect for oil leaks. Repair as required.
	2. Crankcase overfilled.	2. Verify that the correct dipstick is being used.
	3. Incorrect oil specification or viscosity.	3. (a) Make sure the correct oil is being used.
		(b) Look for reduced viscosity from dilution with fuel.
		(c) Review/reduce oil change intervals.
	4. Oil cooler leak	4. Check and replace the oil cooler.
	5. High blow-by forcing oil out the breather.	5. Check the breather tube area for signs of oil loss. Perform the required repairs.
	6. Turbocharger leaking oil to the air intake.	6. Inspect the air ducts for evidence of oil transfer. Repair as required (slight oil residue is normal).
COMPRESSION KNOCKS	1. Air in the fuel system.	1. Identify location of air leak and

		repair. Do not bleed high pressure fuel system.
	2. Poor quality fuel or water/gasoline contaminated fuel.	2. Verify by operating from a temporary tank with good fuel. Clean and flush the fuel tank. Replace fuel/water separator filter.
	3. Engine overloaded.	3. Verify the engine load rating is not being exceeded.
	4. Improperly operating injectors.	4. Check and replace misfiring/inoperative injectors.
EXCESSIVE VIBRATION	1. Loose or broken engine mounts.	1. Replace engine mounts.
	2. Damaged fan or improperly operating accessories.	2. Check and replace the vibrating components.
	3. Improperly operating vibration damper	3. Inspect/replace vibration damper.
	4. Improperly operating balance shaft	4. Inspect/replace balance shaft.
	5. Improperly operating electronically controlled viscous fan drive.	5. Inspect/replace fan drive.
	6. Worn or damaged generator bearing.	6. Check/replace generator.
	7. Flywheel housing misaligned.	7. Check/correct flywheel alignment.
	8. Loose or broken power component.	8. Inspect the crankshaft and rods for damage that causes an unbalance condition. Repair/replace as required.
	9. Worn or unbalanced driveline components.	9. Check/repair driveline components.
EXCESSIVE ENGINE NOISES	1. Drive belt squeal, insufficient tension or abnormally high loading.	1. Check the automatic tensioner and inspect the drive belt. Make sure water pump, tensioner pulley, fan hub, generator and power steering pump turn freely.
	2. Intake air or exhaust leaks.	2. Refer to Excessive Exhaust Smoke. Refer to **SMOKE DIAGNOSIS CHARTS**.
	3. Excessive valve lash.	3. Adjust valves. Make sure the rocker arms are not bent. Replace bent or severely worn components.
	4. Turbocharger noise.	4. Check turbocharger impeller and turbine wheel for housing contact.

		Repair/replace as required.
	5. Gear train noise.	5. Visually inspect and measure gear backlash. Replace gears as required.
	6. Power function knock.	6. Check/replace rod and main bearings.

SMOKE DIAGNOSIS CHARTS

The following charts include possible causes and corrections for **excess or abnormal** exhaust smoke. Small amounts of exhaust smoke (at certain times) are to be considered normal for a diesel powered engine.

EXCESSIVE BLACK SMOKE	
POSSIBLE CAUSE	**CORRECTION**
Air filter dirty or plugged.	Check and replace the filter if necessary.
Air intake system restricted.	Check entire air intake system including all hoses and tubes for restrictions, collapsed parts or damage. Repair/replace as necessary.
Air Leak in Intake System.	Check entire air intake system including all hoses and tubes for collapse, cracks, loose clamps, or holes in rubber ducts. Also check intake manifold for loose mounting hardware.
Diagnostic Trouble Codes (DTC's) active or multiple, intermittent DTC's.	Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Engine Control Module (ECM) has incorrect calibration.	Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Exhaust system restriction is above specifications.	Check exhaust pipes for damage/restrictions. Repair as necessary.
Fuel grade is not correct or fuel quality is poor.	Temporarily change fuel brands and note condition. Change brand if necessary.
Fuel injection pump malfunctioning.	A DTC may have been set. If so refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Fuel injector malfunctioning.	A DTC may have been set. Perform "Injector Classification Programming" using scan tool. Also refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article and Return Fuel Quantity Test.
Fuel injector lower washer doubled or missing.	Remove and inspect injector washer.
Fuel return system restricted.	Check fuel return lines for restriction.
Intake manifold restricted.	Remove restriction.
Manifold Air Pressure (Boost) Sensor or sensor circuit malfunctioning.	A DTC should have been set. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Turbocharger air intake restriction.	Remove restriction.

Turbocharger damaged.	Refer to **TURBOCHARGER, DIAGNOSIS AND TESTING**.
Turbocharger has excess build up on compressor wheel or diffuser vanes.	Refer to **TURBOCHARGER, DIAGNOSIS AND TESTING**.
Turbocharger wheel clearance out of specification.	Refer to **TURBOCHARGER, DIAGNOSIS AND TESTING**.

EXCESSIVE WHITE SMOKE	
POSSIBLE CAUSE	**CORRECTION**
Air in fuel supply: Possible leak in fuel supply side.	Inspect fuel system
Coolant leaking into combustion chamber.	Perform pressure test of cooling system.
Diagnostic Trouble Codes (DTC's) active or multiple, intermittent DTC's.	Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
In very cold ambient temperatures, engine block heater is malfunctioning (if equipped).	Refer to **HEATER, ENGINE BLOCK, DIAGNOSIS AND TESTING** .
Engine coolant temperature sensor malfunctioning.	A DTC should have been set. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article. Also check thermostat operation.
Engine Control Module (ECM) has incorrect calibration.	A DTC should have been set. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Fuel filter plugged.	Refer to **DIAGNOSIS AND TESTING** .
Fuel grade not correct or fuel quality is poor.	Temporarily change fuel brands and note condition. Change brand if necessary.
Fuel injector malfunctioning.	A DTC should have been set. Perform "Injector Identification Programming" or "Cylinder Cutout Test" using scan tool to isolate individual cylinders. Also refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Fuel injector hold-down(s) loose.	Replace the copper washer(s) (shim) and tighten to specifications.
Fuel injector protrusion not correct.	Check washer (shim) at bottom of fuel injector for correct thickness.
Fuel injection pump malfunctioning.	A DTC should have been set. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Fuel supply side restriction.	For fuel system testing. Refer to **DIAGNOSIS AND TESTING** .
Intake manifold air temperature sensor malfunctioning.	A DTC should have been set. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Intake manifold heater circuit not functioning correctly in cold weather.	A DTC should have been set. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article. Also check heater elements for correct operation.
Intake manifold heater elements not functioning	A DTC should have been set if heater

correctly in cold weather.	elements are malfunctioning. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** article.
Internal engine damage (scuffed cylinder).	Analyze engine oil and inspect oil filter to locate area of probable damage.
Restriction in fuel supply side of fuel system.	For fuel system testing. Refer to **DIAGNOSIS AND TESTING** .

EXCESSIVE BLUE SMOKE	
POSSIBLE CAUSE	**CORRECTION**
Dirty air cleaner or restricted turbocharger intake duct.	Check Air Cleaner Housing for debris and replace filter as necessary
Air leak in boost system between turbocharger compressor outlet and intake manifold.	Service charge air system.
Obstruction in exhaust manifold.	Remove exhaust manifold and inspect for blockage.
Restricted turbocharger drain tube.	Remove turbocharger drain tube and remove obstruction.
Crankcase ventilation system plugged.	Inspect oil separator system for function and clear drain back hole in cylinder head cover/intake manifold
Valve seals are worn, brittle, or improperly installed.	Replace valve stem oil seals
Valve stems or guides are worn.	Remove valves and inspect valves and guides.
Broken or Improperly installed piston rings.	Tear down engine and inspect piston rings.
Excessive piston ring end gap.	Remove pistons and measure piston ring end gap.
Excessive cylinder liner wear and taper.	Remove pistons and measure cylinder liner wear and taper.
Cylinder damage.	Remove pistons and inspect cylinder liner for cracks or porosity. Repair with new cylinder liner if necessary.
Piston damage.	Remove pistons and inspect for cracks, holes. Measure piston for out-of-round and taper.
Turbocharger failure.	Refer to **TURBOCHARGER, DIAGNOSIS AND TESTING**.

STANDARD PROCEDURE

COMPRESSION TEST

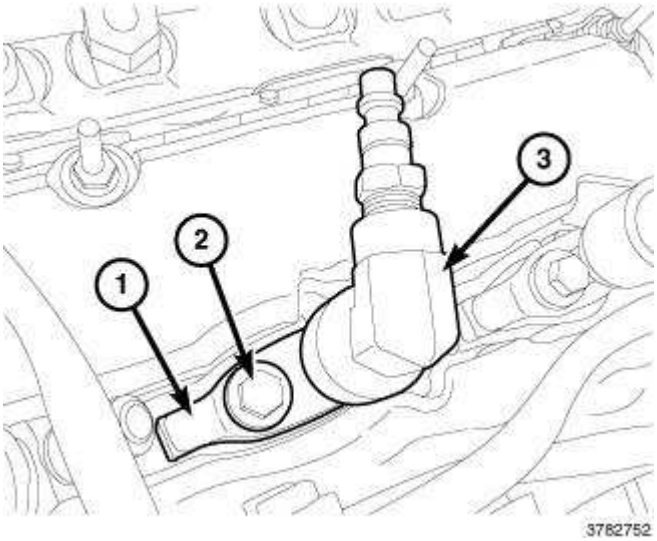


Fig. 1: Fuel Injector Clamp, Compression Test Adapter & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Warm up engine to operating temperature (approximately 80 °C, 176 °F).
2. Shut off engine.
3. Disable the low pressure fuel pump.
4. Remove the fuel injector. Refer to **INJECTOR(S), FUEL, REMOVAL** .
5. Crank engine several times with the starter to eliminate combustion residues in the cylinders.
6. Insert the (special tool #VM.10357, Adapter, Compression Test) (3) into fuel injector hole of cylinder to be tested. Install fuel injector clamp (1), bolt (2) and securely tighten.
7. Test compression pressure by cranking engine with starter for at least 8 revolutions.

Cylinder Compression Difference Between Cylinders	**5 Bar (73 psi)**

8. Carry out test procedure at the remaining cylinders in the same way.
9. Remove the (special tool #VM.10357, Adapter, Compression Test) from cylinder head.
10. Install the fuel injector. Refer to **INJECTOR(S), FUEL, INSTALLATION** .

DUST COVERS AND CAPS

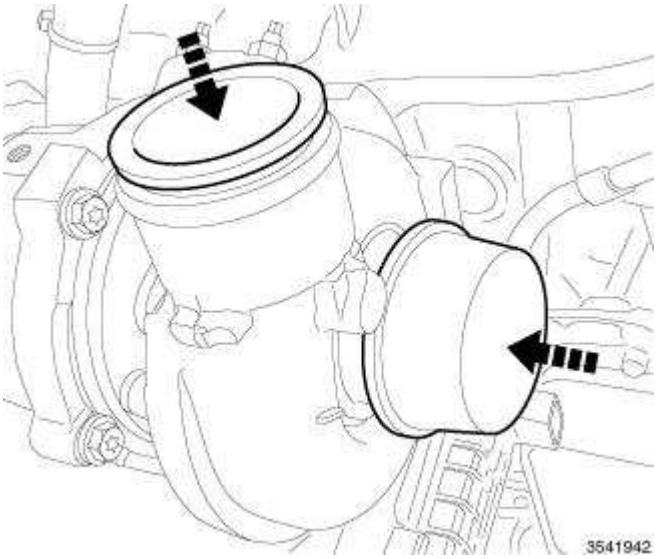


Fig. 2: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

Due to the high amounts of failures cased by dust, dirt, moisture and other foreign debris being introduced to the engine during service. Covers or caps are needed to reduce the possible damage that can be caused or created.

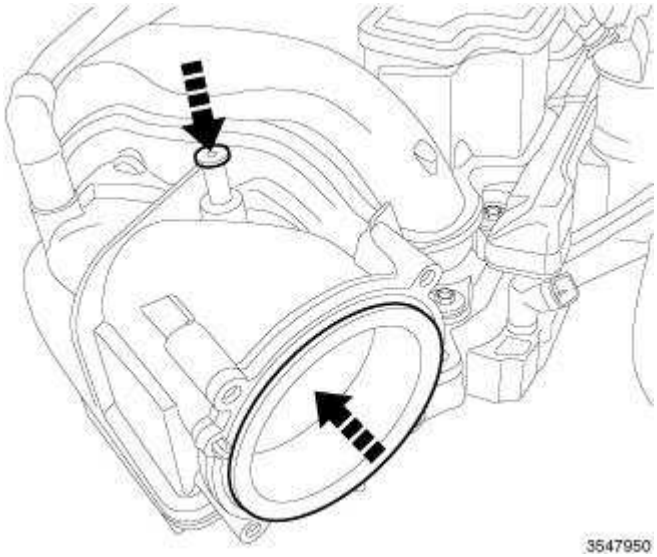


Fig. 3: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers over openings will reduce any possibilities for foreign materials to enter the engine systems. Using miller tool (special tool #10368, Set, Universal Protective Cap), Select the appropriated cover needed to the procedure.

ENGINE GASKET SURFACE PREPARATION

Fig. 4: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

Fig. 5: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- High speed power tool with a plastic bristle brush style disc.

Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent).

FORM-IN-PLACE GASKETS AND SEALERS

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket.

There are numerous types of form-in-place gasket materials that are used in the engine area. Mopar® Engine RTV GEN II, Mopar® ATF-RTV, and Mopar® Gasket Maker gasket materials, each have different properties and can not be used in place of the other.

MOPAR® ENGINE RTV GEN II

Mopar® Engine RTV GEN II is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF RTV

Mopar® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER

Mopar® Gasket Maker is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® GASKET SEALANT

Mopar® Gasket Sealant is a slow drying, permanently soft sealer. This material is recommended for

sealing threaded fittings and gaskets against leakage of oil and coolant. Can be used on threaded and machined parts under all temperatures. This material is used on engines with multi-layer steel (MLS) cylinder head gaskets. This material also will prevent corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or 4 oz. / 16 oz. can with applicator.

MOPAR® THREEBOND ENGINE RTV SEALANT

MOPAR® THREEBOND ENGINE RTV SEALANT is a unique gasket material that is specially made to retain adhesion and sealing properties when used to seal components exposed to engine oil.

FORM-IN-PLACE GASKET AND SEALER APPLICATION

Assembling parts using a form-in-place gasket requires care but it's easier than using precut gaskets.

Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Engine RTV GEN II or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Gasket Sealant in an aerosol can should be applied using a thin, even coat sprayed completely over both surfaces to be joined, and both sides of a gasket. Then proceed with assembly. Material in a can with applicator can be brushed on evenly over the sealing surfaces. Material in an aerosol can should be used on engines with multi-layer steel gaskets.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Be sure that the tapped holes maintain the original center line.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads.
- Tapping the hole with a special Heli-Coil Tap, or equivalent.
- Installing an insert into the tapped hole to bring the hole back to its original thread size.

HYDROSTATIC LOCK

CAUTION: DO NOT use the starter motor to rotate the crankshaft. Severe damage could occur.

When an engine is suspected of hydrostatic lock (regardless of what caused the problem), follow the steps below.

1. Disconnect the negative cable(s) from the battery.
2. Inspect air cleaner, induction system, and intake manifold to ensure system is dry and clear of foreign material.
3. Place a shop towel around the fuel injectors to catch any fluid that may possibly be under pressure in the cylinder head. Remove the fuel injectors. Refer to **INJECTOR(S), FUEL, REMOVAL** .

CAUTION: DO NOT use the starter motor to rotate the crankshaft. Severe damage could occur.

4. With all injectors removed, rotate the crankshaft using the crankshaft.
5. Identify the fluid in the cylinders (coolant, fuel, oil, etc.).
6. Be sure all fluid has been removed from the cylinders.
7. Repair engine or components as necessary to prevent this problem from occurring again.
8. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This will prevent damage on restart.
9. Install fuel injectors. Refer to **INJECTOR(S), FUEL, INSTALLATION** .
10. Drain engine oil. Remove and discard the oil filter.
11. Install the drain plug. Tighten the plug to 50 N.m (37 ft. lbs.).
12. Install a new oil filter and tighten to 10 N.m 88 in. lbs.).
13. Fill engine crankcase with the specified amount and grade of oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
14. Connect the negative cable(s) to the battery.
15. Start the engine, allow to warm, turn engine off and check for any leaks.

SPECIFICATIONS

ENGINE SPECIFICATIONS

GENERAL DESCRIPTION

DESCRIPTION	SPECIFICATION
Displacement 3.0L	3.0L (2987 cc) (182 CID)
Bore	83 mm (3.26 in.)
Stroke	92 mm (3.62)
Compression Ratio	16.5 :1
Valves Per Cylinder	4
Weight	229 Kg (505 Lbs.)

Power Output	176 Kw (240 CV) @ 4000 RPM
Torque	550 N.m (406 Ft. Lbs.) @ 1600 RPM
Idle Speed - Warm	650 RPM
Max RPM in Gear	4200
Max RPM in Neutral	4800
Ribbed V-Belt Tension	Automatic Belt Tensioner Roller
Thermostat Opening	88°C (190°F)
Cooling System Capacity	4.6 Liters (4.9 Qt.)
Engine Oil Capacity	9.2 L (9.7 Qt.) W/Filter Change
Timing System	Chain Driven Dual Overhead Camshafts
Air Intake	Dry Filter With Turbocharger and Charge Air Cooler
Fuel Supply	Electric Pump In The Fuel Tank
Fuel System	Direct Fuel Injection Common Rail System
Combustion Cycle	4 Stroke Diesel
Cylinder Compression Difference Between Cylinders	5 Bar (73 psi.)
Cooling System	Water Cooling
Engine Pre Heat	Glow Plug
Glow Plug Type	GPL2-4
Glow Plug Voltage	4.4 Volts
Emission Standards	Euro 5
Injector Opening Pressure	230 Bar (3, 335 psi)
Injection Pressure	1800 Bar (26, 106 psi)
Injection Pump	Bosch CP4.2, 2000 Bar (29008 psi)
Injection Order	1-4-2-5-3-6
Injector Type	CRI 2-18
Lubrication	Pressure Lubricated By Rotary Pump
Oil Quantity With Filter Change	9.2 Liters (9.7 Quarts)
Oil Pressure 80°C (176°F)	0.7 Bar (10 psi.) at Idle 2.5 Bar (36 psi) at 3800 RPM
Engine Rotation	Clockwise Viewed From Front Cover

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Crankshaft Journal Diameter		
Tolerance Class A	67.500 - 67.494 mm	2.6574 - 2.6572 in.
Tolerance Class B	67.494 - 67.488 mm	2.6572 - 2.657 in.
Tolerance Class C	67.488 - 67.482 mm	2.657 - 2.6567 in.
Main Bearing Journal Diameter		

1 - 4		
Tolerance Class A	73.958 - 73.952 mm	2.9117 - 2.9114 in.
Tolerance Class B	73.952 - 73.946 mm	2.9114 - 2.9112 in.
Tolerance Class C	73.946 - 73.940 mm	2.9112 - 2.9110 in.
Axial play of crankshaft	0.12 - 0.31 mm	0.004 - 0.0122 in.

CRANKSHAFT BEARINGS

Block Bearing Tolerance Class	Cylinder Block Bearing Diameter		Crankshaft Bearing diameter Tolerance Class	Crankshaft Bearing Diameter		Crankshaft Bearing Tolerance Class	Crankshaft Bearing Shell Thickness	
A	78.000 - 78.006 mm	3.0708 - 3.0710	A	73.958 - 73.952 mm	2.9117 - 2.9114 in.	Red Red	1.982 - 1.988 1.982 - 1.988	0.0780 - 0.0782 0.0780 - 0.0782
			B	73.952 - 73.946 mm	2.9114 - 2.9112 in.	Red Blue	1.982 - 1.988 1.988 - 1.994	0.0780 - 0.0782 0.0782 - 0.0785
			C	73.946 - 73.940 mm	2.9112 - 2.9110 in.	Blue Blue	1.988 - 1.994 1.988 - 1.994	0.0782 - 0.0785 0.0782 - 0.0785
B	78.006 - 78.012	3.0710 - 3.0713	A	73.958 - 73.952 mm	2.9117 - 2.9114 in.	Red Blue	1.982 - 1.988 1.988 - 1.994	0.0780 - 0.0782 0.0782 - 0.0785
			B	73.952 - 73.946 mm	2.9114 - 2.9112 in.	Blue Blue	1.988 - 1.994 1.988 - 1.994	0.0782 - 0.0785 0.0782 - 0.0785
			C	73.952 - 73.946 mm	2.9112 - 2.9110 in.	Blue Yellow	1.988 - 1.994 1.994 - 2.000	0.0782 - 0.0785 0.0785 - 0.0787
C	78.012 - 78.018	3.0713 - 3.0715	A	73.958 - 73.952 mm	2.9117 - 2.9114 in.	Blue Blue	1.988 - 1.994 1.988 - 1.994	0.0782 - 0.0785 0.0782 - 0.0785
			B	73.952 - 73.946 mm	2.9114 - 2.9112 in.	Blue Yellow	1.988 - 1.994 1.994 - 2.000	0.0782 - 0.0785 0.0785 - 0.0787
				73.952	2.9112			0.0785 -

			C	- 73.946 mm	- 2.9110 in.	Yellow Yellow	1.994 - 2.000 1.994 - 2.000	0.0787 0.0785 - 0.0787

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cylinder Head Height	133 ± 0.06 mm	5.236 ± 0.002 in.
Cylinder Head Flatness deformation Tolerance	0.1 - 0.04 mm	0.003 - 0.001 in.
Valve Seat Width in Cylinder Head		
Exhaust valve	0.7 - 1.1 mm	0.0276 - 0.0434 in.
Intake valve	1.0 - 1.4 mm	0.0394 - 0.0552 in.
Cylinder Head Bolts		
Thread Diameter	14 x 1.5 mm	NA

HEAD GASKET SELECTION CHART

	Millimeters	Inches
PISTON CLEARANCE	0.130 - 0.220	0.0051 - 0.0086
CYLINDER HEAD GASKET THICKNESS	0.96	0.0377
GASKET IDENTIFICATION	NO HOLE	
PISTON CLEARANCE	0.221 - 0.310	0.0087 - 0.0122
CYLINDER HEAD GASKET THICKNESS	1.06	0.0417
GASKET IDENTIFICATION	ONE HOLE	
PISTON CLEARANCE	0.311 - 0.402	0.0122 - 0.0158
CYLINDER HEAD GASKET THICKNESS	1.16	0.0456
GASKET IDENTIFICATION	TWO HOLES	

CYLINDER BORE

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cylinder Bore Diameter	82.995 - 83.025 mm	3.267 - 3.268 in.
Roundness Tolerance	0.006 mm	0.0002 in
Honing angle	40 - 60°	40 - 60°

CAMSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cylinder Head On Right Valve Timing At 2 mm Valve Lift And A New Timing Chain		
Inlet valve opens after TDC	19.6°	19.6°
Inlet valve closes after BDC	5.6°	5.6°
Outlet valve opens after TDC	17.9°	17.9°
Outlet valve closes after BDC	27.9°	27.9°
Cylinder Head On Right Valve Timing At 2 mm Valve Lift And Used Timing Chain		
Inlet valve opens after TDC	21.5°	21.5°
Inlet valve closes after BDC	3.7°	3.7°
Outlet valve opens after TDC	16.0°	16.0°
Outlet valve closes after BDC	26.0°	26.0°
Cylinder Head On Left Valve Timing At 2 mm Valve Lift And A New Timing Chain		
Inlet valve opens after TDC	20.7°	20.7°
Inlet valve closes after BDC	4.5°	4.5°
Outlet valve opens after TDC	16.8°	16.8°
Outlet valve closes after BDC	26.8°	26.8°
Cylinder Head On Left Valve Timing At 2 mm Valve Lift And Used Timing Chain		
Inlet valve opens after TDC	21.5°	21.5°
Inlet valve closes after BDC	3.7°	3.7°
Outlet valve opens after TDC	16.0°	16.0°
Outlet valve closes after BDC	26.0°	26.0°

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Valve Disk Diameter		

Exhaust	25.3 - 25.5 mm	0.9961 - 1.004 in.
Intake	28.4 - 28.6 mm	1.1182 - 1.126 in.
Height Of Valve Disk		
Exhaust	1.4 - 1.6 mm	0.0552 - 0.063 in.
Intake	1.3 - 1.5 mm	0.0512 - 0.0591
Valve Seat Face Angle		
Exhaust	45° (+ 0.5°)	45° (+ 0.5°)
Intake	45° (+ 0.5°)	45° (+ 0.5°)
Valve Seat Back-cut Angle		
Exhaust	30° (±15')	30° (±15')
Intake	30° (±15')	30° (±15')
Valve Stem Diameter		
Exhaust	5.945 - 5.975 mm	0.2341 - 0.2353 in.
Intake	5.960 - 5.975 mm	0.2347 - 0.2353 in.
Length Of Valve		
Exhaust	102.1 - 102.5 mm	4.0197 - 4.0355 in.
Intake	102.1 - 102.5 mm	4.0197 - 4.0355 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Piston Diameter		
Tolerance Class A	82.930 - 82.940 mm	3.2649 - 3.2653 in.
Tolerance Class B	82.940 - 82.950 mm	3.2653 - 3.2657 in.
Tolerance Class C	82.950 - 82.960 mm	3.2657 - 3.2661 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
No 1 Piston Ring		
Height	2 -0.01 / -0.03 mm	-0.000 - -0.001 in.
Gap	0.32 - 0.45 mm	0.01259 - 0.01771 in.
Vertical Play	0.13 - 0.17 mm	0.0051 - 0.0066 in.
Piston Ring End Gap		
Groove 1	0.12 - 0.16 mm	0.0048 - 0.0063
Groove 2	0.065 -- 0.110 mm	0.0026 - 0.0044
Groove 3	0.03 -- 0.07 mm	0.0012 - 0.0028
Dimensions Of The Piston Rings		
Keystone ring	NA	NA
Taper-faced ring	NA	NA

Bevel-edged ring	NA	NA
Piston Pin		
Diameter Bearing	29.975 - 29.980 mm	
Play in Piston	0.013 - 0.023 mm	in.

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Connecting Rod Bolt		
Thread diameter	8 mm	0.315 in.
Shank length when new	47 mm	1.8504 in.
Maximum shank length	48 mm	1.8898 in.
Distance From Center Of Connecting Rod Bearing Bore To Connecting Rod Bushing Bore	167.97 - 168.03 mm	6.613 - 6.6154 in.
Width Of Connecting Rod At Connecting Rod Bearing Bore	17.90 - 18.10 mm	0.7048 - 0.7126 in.
Width Of Connecting Rod At Connecting Rod Bushing Bore	21.94 - 22.00 mm	0.8638 - 0.8662 in.
Connecting Rod Bushing Inner	30.038 - 30.044 mm	1.1826 - 1.1829 in.
Connecting Rod Bushing Outer Diameter	32.500 - 32.525 mm	1.2796 - 1.2806 in.
Piston Pin Play In Connecting Rod Bushing	0.028 - 0.034 mm	0.0012 - 0.0014 in.
Peak-To-Valley Height (Rz) Of Connecting Rod Bushing On Inside	5 mm	0.1969 in.
Connecting Rod Bearing Shell Basic Bore	67.600 - 67.614 mm	2.6615 - 2.662 in.
Permissible Out-Of-Roundness And Concentricity Of Basic Bore	0.020 mm	0.0008 in.
Permissible Twist Of Connecting Rod Bearing Bore To Connecting Rod Bush Bore Over A Length Of 100 mm	0.1 mm	0.004 in.
Permissible Variation Of Axial Parallelism Of Connecting rod Bearing Bore To Connecting rod Bushing Bore Over A Length Of 100 mm	0.045 mm	0.0018 in.
Permissible Difference In Weight Of Complete	2 grams	0.07 oz.

Connecting Rod Of An Engine		

TORQUE SPECIFICATIONS

ENGINE BLOCK

DESCRIPTIONS	N.m	In. Lbs.	Ft. Lbs.
A/C Compressor Bolts	30	-	22
A/C Compressor Nut	30	-	22
A/C Compressor Stud	11	97	-
A/C Compressor Bracket Bolts	45	-	33
A/C Liquid Line Nuts	22	-	16
A/C Suction Line Nuts	22	-	16
Bedplate Bolts	Refer to **CRANKSHAFT, INSTALLATION**.		
Connecting Rod	Refer to **ROD, PISTON AND CONNECTING, INSTALLATION**.		
Dipstick Tube Bolt (head)	11	97	-
Dipstick Tube Bolt (sump)	11	97	-
Engine Block Timing Plug	30	-	-
Engine Lifting Brackets	45	-	33
Generator Bolts	28	-	21
Generator Nut	28	-	21
Generator Stud	12	106	-
Generator Bracket Bolts	45	-	33
Generator B+ Cable Nut	11	97	-
Lower Oil Pan Bolts	Refer to **PAN, OIL, INSTALLATION**.		
Oil Cooler Bolts	30	-	22
Oil Cooler/Oil Filter Housing Adapter Bolts	30	-	22
Oil Drain Plug	45	-	33
Oil Filter Cap	25	-	18

Oil Filter Housing Bolts M6	15	133	-
Oil Filter Housing Bolts M8	30	-	22
Oil Filter Housing Bracket Bolts	15	133	-
Oil Jet Bolt (piston)	11	97	-
Oil Jet Bolt (timing chain)	11	97	-
Oil Pickup Tube Bolts	11	97	-
Oil Pressure Sensor	33	-	24
Oil Pump	14	124	-
Upper Oil Pan Bolts	Refer to **PAN, OIL, INSTALLATION**.		
Timing Chain Slide Rail Bolts	30	-	22
Timing Chain Tensioner	14	124	-
Transmission to Engine Bolts	39	-	29
Transmission to Oil Pan Bolts	39	-	29
Windage Tray	11	97	-

CYLINDER HEAD

DESCRIPTIONS	N.m	In. Lbs.	Ft. Lbs.
Camshaft Bearing Cap Bolts	11	97	-
Camshaft Drive Gear Bolt	100	-	74
Coolant Tube-to-Fuel Line Bracket Bolt	25	-	18
Cylinder Head Bolts (M14)	30	-	22
	Stage 2 - 75 Degrees	Stage 2 - 75 Degrees	Stage 2 - 75 Degrees
	Stage 3 - 75 Degrees	Stage 3 - 75 Degrees	Stage 3 - 75 Degrees
	Stage 4 - 75	Stage 4 - 75	Stage 4 - 75

	Degrees	Degrees	Degrees
Cylinder Head Cover Bolts	10	89	-
EGR Air Flow Control Valve Bolts	9	-	80
EGR Cooler Adapter Bolts	45	-	33
EGR Cooler Coolant Feed Pipe Bolt	18	-	159
EGR Support Bracket Bolt	25	-	18
EGR Support Bracket Nut	25	-	18
Exhaust Manifold Nut	15	133	-
	Stage 2 - 40	-	30
Fuel Injector Clamp Bolt	33	-	24
Fuel Rail Bolts	25	-	18
Fuel Tube Bracket Bolt	11	97	-
Fuel Tubes Union Nut at Fuel Injector	11 + 75°	-	-
Fuel Tubes Union Nut at Fuel Injection Pump	11 + 75°	-	-
Fuel Tubes Union Nut at Fuel Rail	5 + 75°	-	-
Glow Plug	11	97	-
Intake Manifold Bolt	12	106	-

FRONT ENGINE

DESCRIPTIONS	N.m	In. Lbs.	Ft. Lbs.
Camshaft Position Sensor Bolt	8	71	-
Fuel Injection Pump Blocker Plate Bolts	25	-	18
Fuel Injection Pump Bolts	25	-	18
Oil Breather/Camshaft Seal Housing Bolts	14	124	-
Serpentine Belt Tensioner	45	-	33
Serpentine Belt Tensioner Bracket Bolts (M6)	11	97	-
Serpentine Belt Tensioner Bracket Bolts (M10)	45	-	33
Vacuum Pump	9	80	-
Vibration Damper Bolt	100 + 125°	-	74 + 125°
Vibration Damper Cover Bolts	11	97	-

REAR ENGINE

DESCRIPTION	N.m	In. Lbs.	Ft. Lbs.
Crankshaft Position Sensor	6	53	-
Crankshaft Position Sensor Bracket	8	71	-
Flex Plate (ATX)	Refer to **FLEXPLATE, INSTALLATION**.		

TURBOCHARGER

	N.m	In. Lbs.	Ft.

DESCRIPTION			Lbs.
Turbocharger to Engine Block Bolt	55	-	41
Turbocharger to Cylinder Head Bolt	25	-	18
Turbocharger Heat Shield Bolt	11	97	-
Turbocharger Oil Feed Line at Engine Block Banjo Bolt	35	-	26
Turbocharger Oil Feed Line at Turbocharger Banjo Bolt	25	-	18
Turbocharger Oil Return Line Bolts	15	133	-

ENGINE MOUNTING

DESCRIPTION	N.m	In. Lbs.	Ft. Lbs.
Engine Mount Bracket Bolts	61	-	45
Engine Mount to Bracket Nut	61	-	45
Engine Mount to Cradle Bolts	61	-	45
Rear Mount Bracket Bolts	33	-	24
Rear Mount Bolts	61	-	45

REMOVAL

REMOVAL

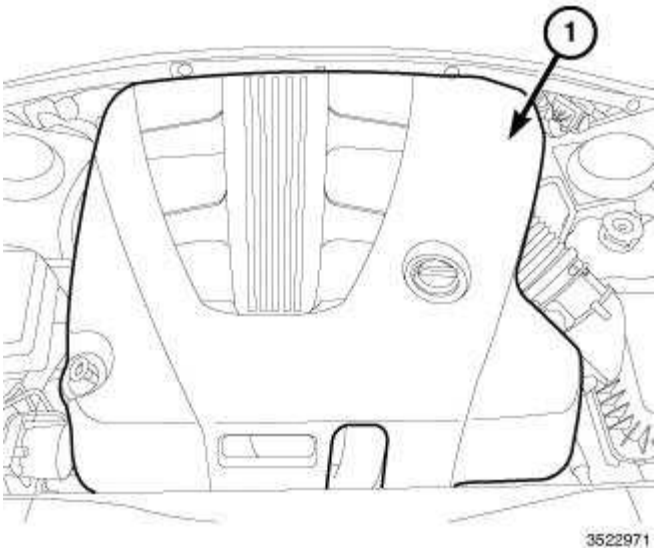


Fig. 6: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

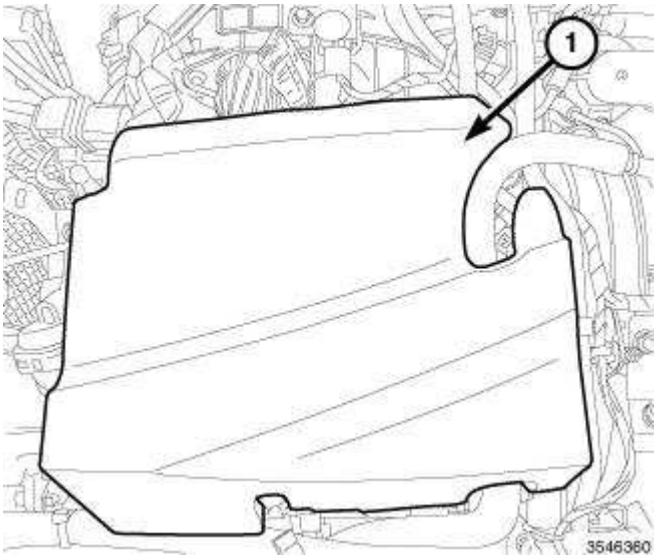


Fig. 7: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

3. Remove the right side fuel injector silencer (1).
4. Recover the A/C refrigerant. Refer to **PLUMBING, STANDARD PROCEDURE** .
5. Remove the hood. Refer to **HOOD, REMOVAL** .

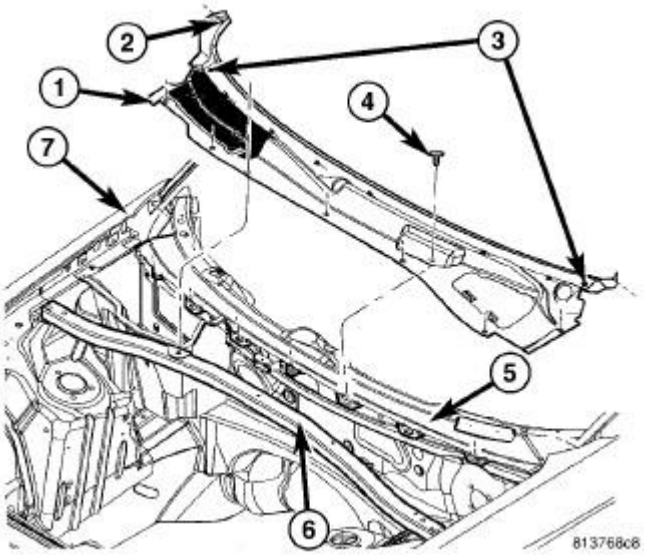


Fig. 8: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Remove the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, REMOVAL** .
7. Remove bolts and the strut support brace (6).
8. Remove air cleaner body and turbocharger inlet hose. Refer to **BODY, AIR CLEANER, REMOVAL**.

9. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .
10. Remove the transmission belly pan.
11. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
12. Drain the engine oil. Using a new sealing washer, install and tighten the drain plug to 45 N.m (33 ft. lbs.).

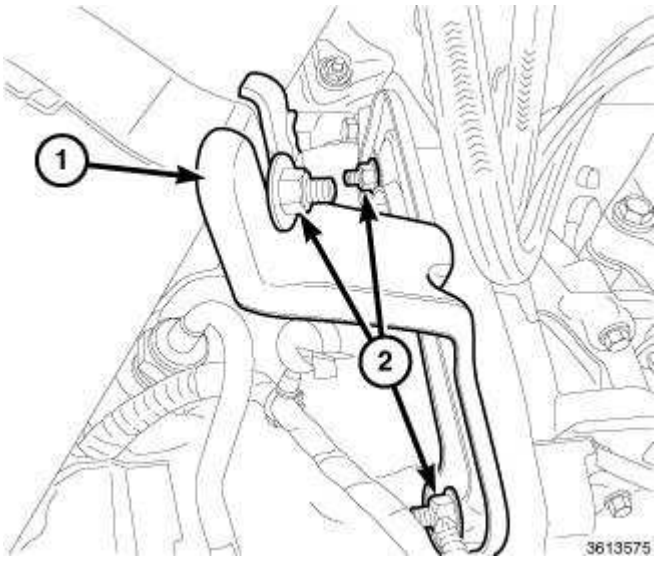


Fig. 9: Exhaust Steady Rest Bracket & Nuts
Courtesy of CHRYSLER GROUP, LLC

13. Detach the wire harness retainer from exhaust steady rest bracket.
14. Remove nuts (2) and the exhaust steady rest bracket (1).
15. Remove the left side Charge Air Cooler (CAC) hose at cooler.
16. Remove the right side CAC hose at cooler.
17. Remove the right side splash shield.
18. Remove the left side splash shield.
19. Lower the vehicle.

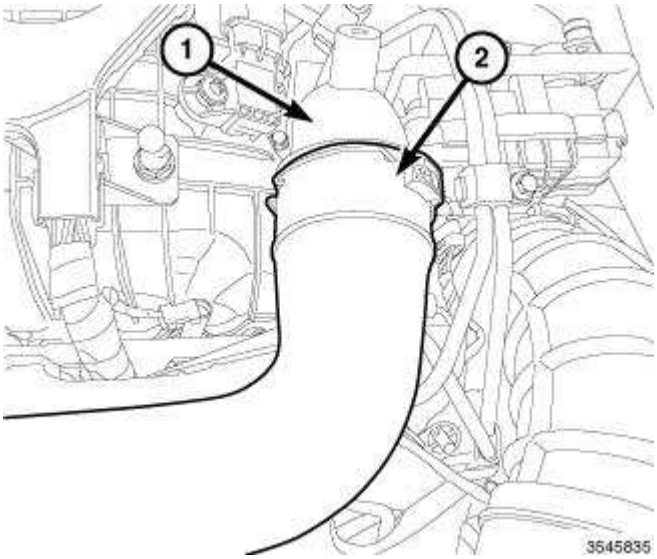


Fig. 10: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

20. Disconnect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).
21. Remove the two bolts securing the CAC hose to timing cover.

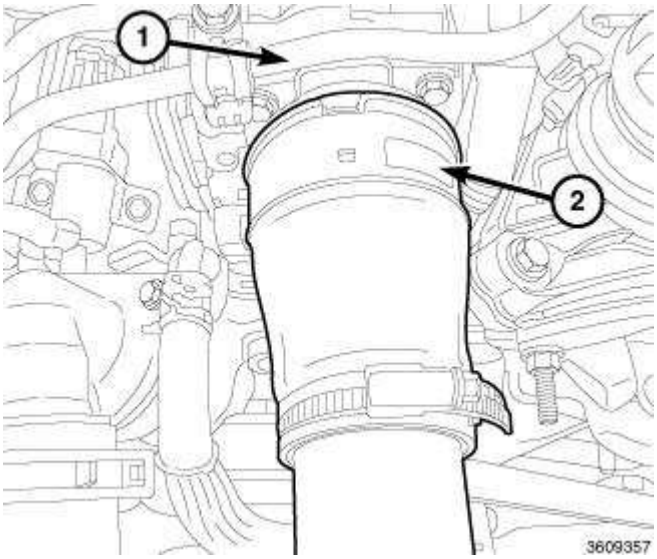


Fig. 11: EGR Air Flow Control Valve & CAC Hose
Courtesy of CHRYSLER GROUP, LLC

22. Disconnect the CAC hose (1) from the EGR air flow control valve.
23. Remove bolt securing CAC hose to lower timing cover.

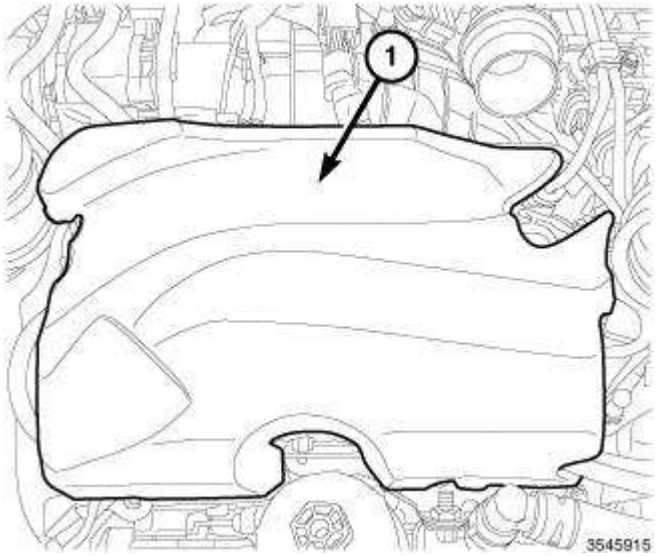


Fig. 12: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

24. Remove the left side fuel injector silencer (1).
25. Remove the upper radiator hose.
26. Remove the lower radiator hose.
27. Remove the degas hose at thermostat housing.

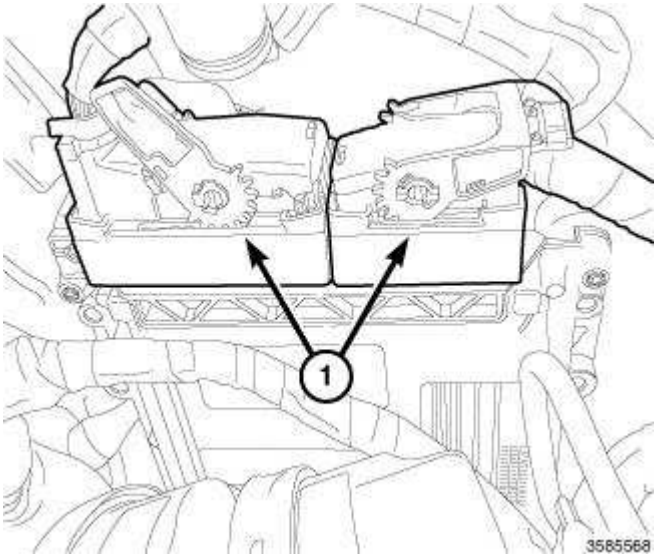


Fig. 13: Powertrain Control Module (PCM) Connectors
Courtesy of CHRYSLER GROUP, LLC

28. Disconnect the engine wire harness at the Powertrain Control Module (PCM).
29. Disconnect the second engine wire harness near master cylinder.
30. Remove the oxygen sensor. Refer to **SENSOR, OXYGEN, REMOVAL** .

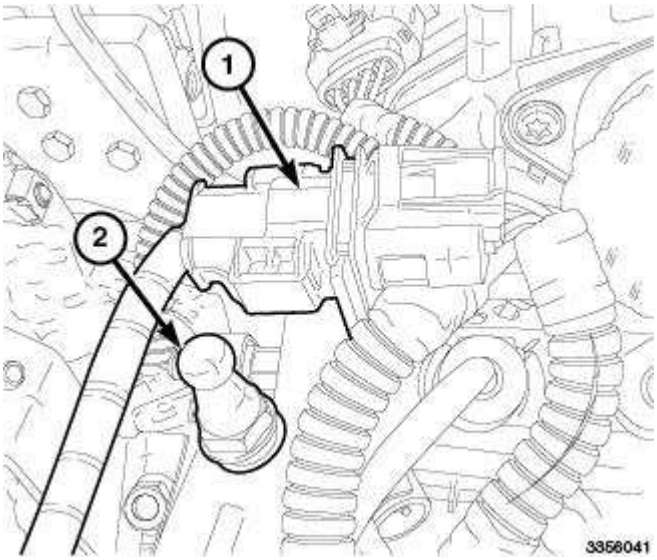


Fig. 14: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

31. Remove the ball stud bolt (2) securing the transmission fill tube.

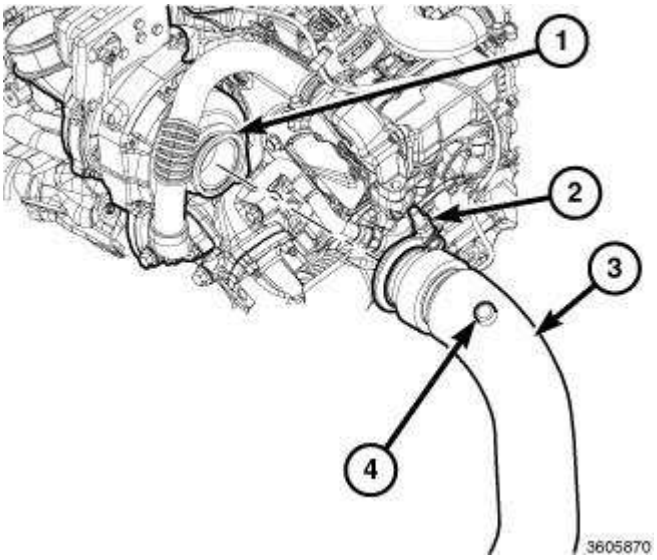


Fig. 15: Turbocharger Flange, Band Clamp & Down-Pipe
Courtesy of CHRYSLER GROUP, LLC

32. Remove the band clamp (2) and separate the down-pipe (3) from the turbocharger flange (1).
33. Disconnect the differential pressure sensor hoses.
34. Disconnect the upstream stream exhaust temperature sensor.
35. Disconnect both heater hoses at engine.
36. Disconnect the brake booster vacuum hose.

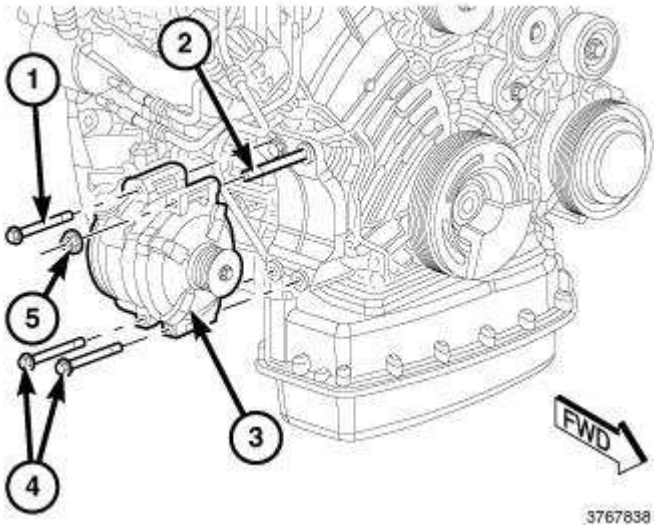


Fig. 16: Generator & Fasteners
Courtesy of CHRYSLER GROUP, LLC

37. Remove the generator (3). Refer to **GENERATOR, REMOVAL** .

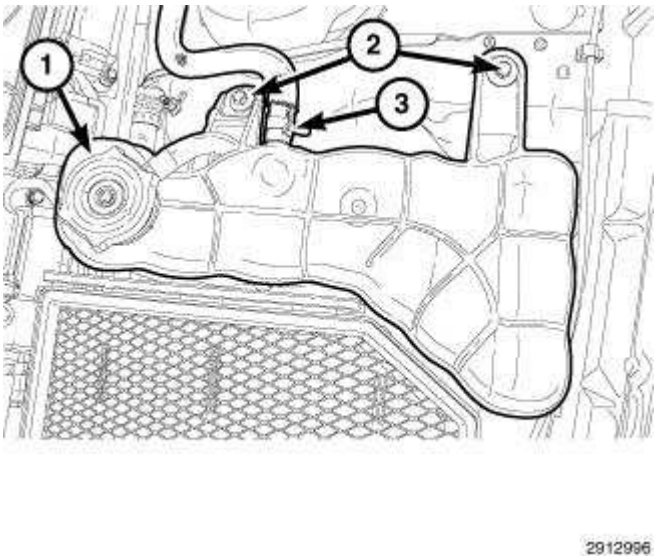


Fig. 17: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

38. Remove the coolant recovery bottle. Refer to **BOTTLE, COOLANT RECOVERY, REMOVAL** .

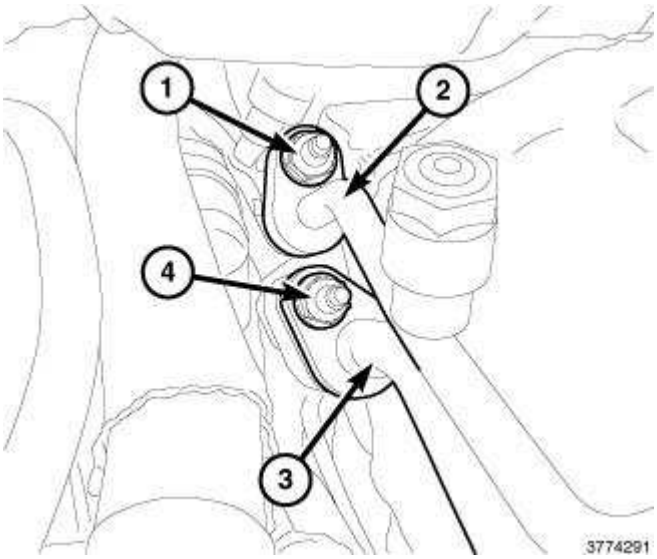


Fig. 18: A/C Liquid Line, A/C Suction Line & Fasteners
Courtesy of CHRYSLER GROUP, LLC

39. Remove nut and disconnect the A/C line junction near left strut tower. Install protective cap in openings.
40. Remove nut (4) and disconnect the A/C suction line (3). Install protective cap in openings.

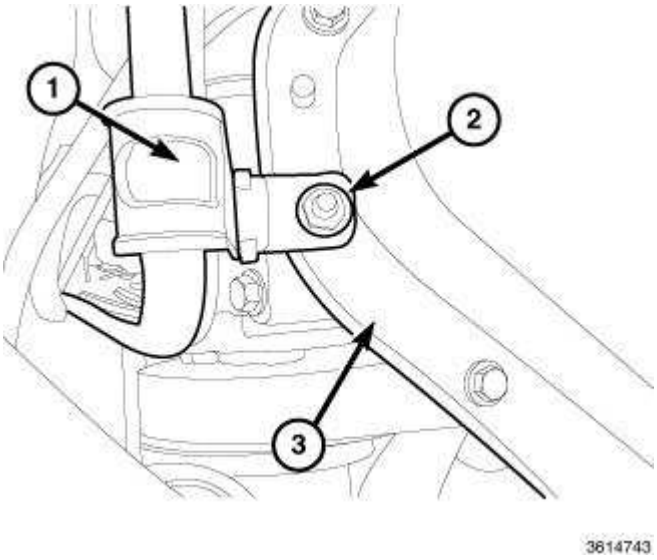


Fig. 19: Transmission Cooler Line Bracket, Nut & Oil Pan
Courtesy of CHRYSLER GROUP, LLC

41. Raise the vehicle.
42. Remove nut (2) securing the transmission cooler line bracket (1) to oil pan (3).
43. Lower the vehicle.

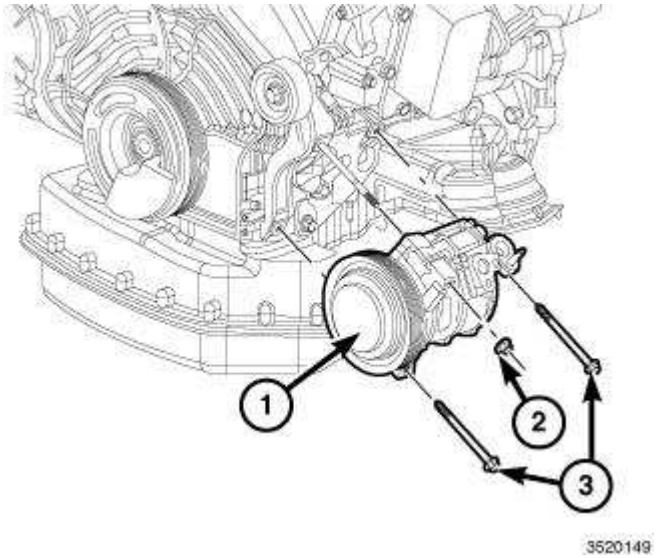


Fig. 20: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

44. Disconnect the A/C compressor wire harness connector.
45. Remove nut and the A/C suction line at compressor. Install protective cap in openings.
46. Remove nut and the A/C discharge line at compressor. Install protective cap in openings.
47. Remove the nut (2) and stud securing the A/C compressor (1).
48. Remove bolts (3) securing the A/C compressor and position aside the A/C compressor.

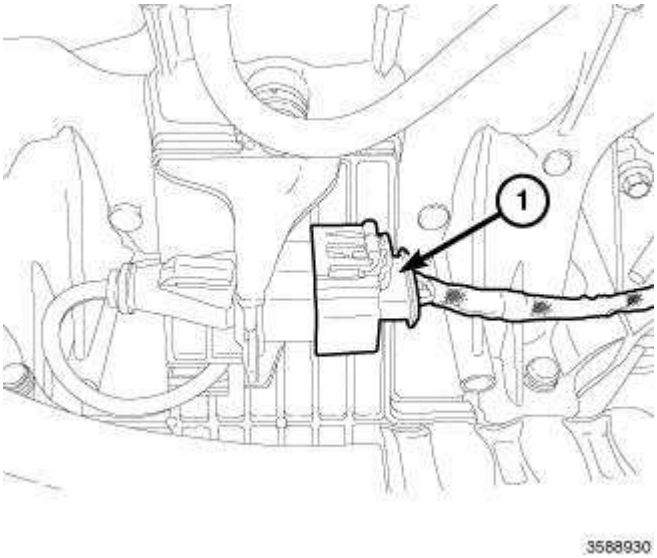


Fig. 21: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

49. Raise the vehicle.
50. Disconnect the Crankshaft Position Sensor (CKP) wiring harness connector (1).
51. Remove the starter. Refer to **STARTER, REMOVAL** .

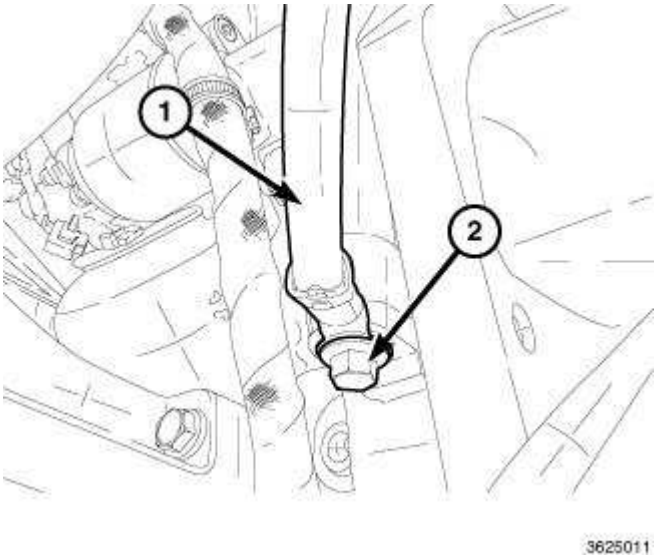


Fig. 22: Engine Ground Cable & Bolt
Courtesy of CHRYSLER GROUP, LLC

52. Remove bolt (2) and the engine ground cable (1).

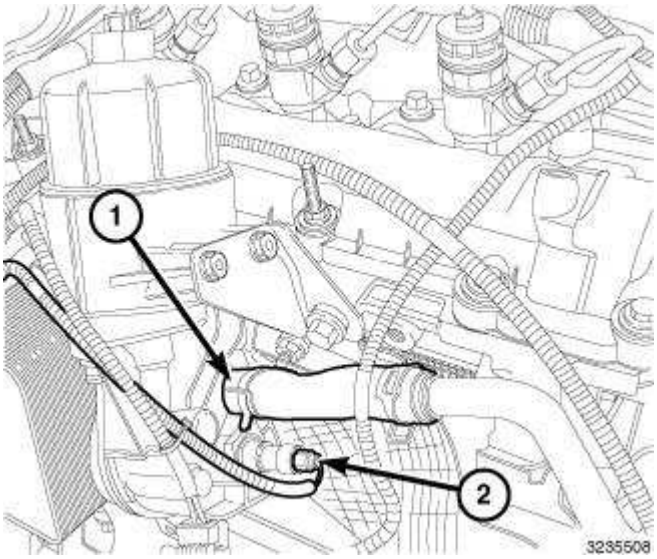


Fig. 23: Coolant Hose & Oil Pressure Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

53. Detach the wire harness retainer and disconnect the oil pressure switch wire harness connector (2).

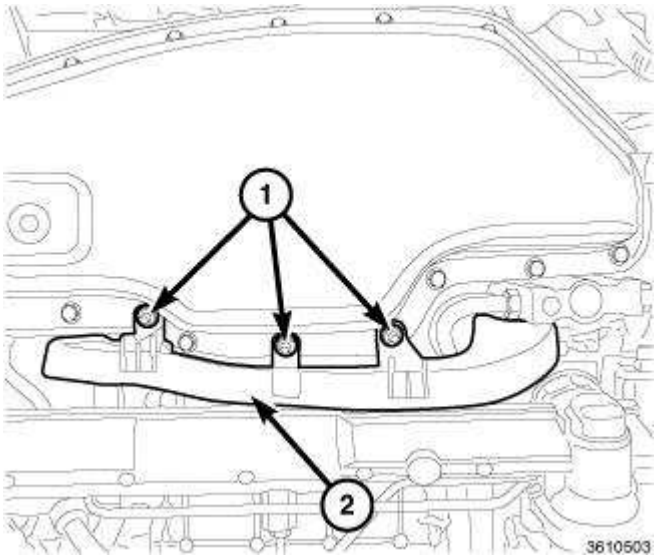


Fig. 24: Lower Engine Wire Harness & Nuts
Courtesy of CHRYSLER GROUP, LLC

54. Remove nuts (1) and allow wire harness (2) to drop down for clearance.
55. Detach the lower engine wire harness from upper oil pan.
56. Detach the wire harness retainer from oil dipstick tube.
57. Remove the torque converter bolts.

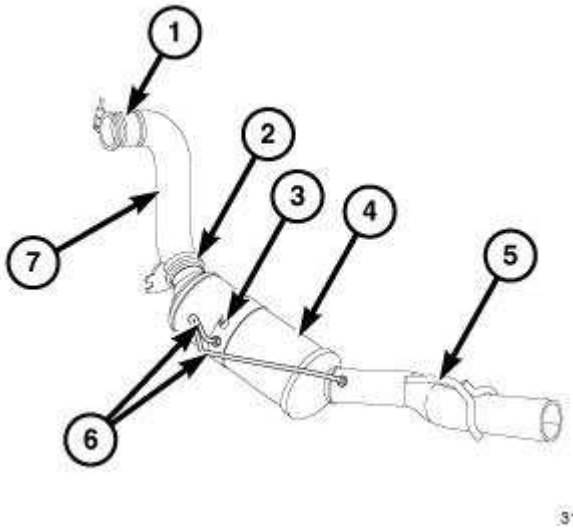


Fig. 25: Differential Pressure Sensor Tubing & Diesel Particulate Filter
Courtesy of CHRYSLER GROUP, LLC

58. Remove the diesel particulate filter. Refer to **FILTER, DIESEL PARTICULATE, REMOVAL** .

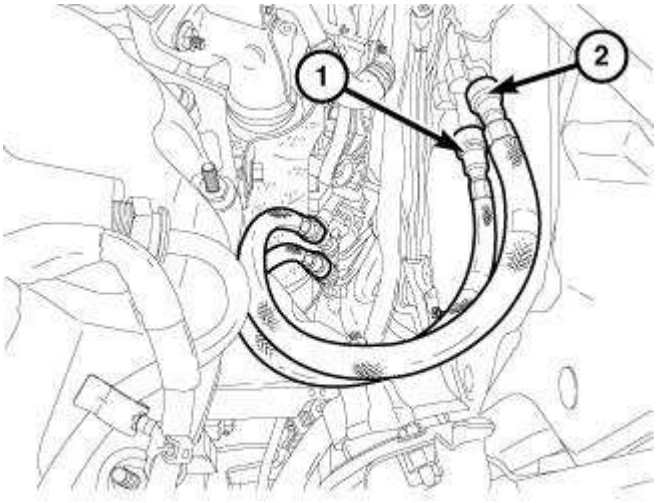


Fig. 26: Low Pressure Supply & Return Line
Courtesy of CHRYSLER GROUP, LLC

59. Disconnect the low pressure supply (1) and return (2) lines. Refer to **FITTING, QUICK CONNECT** .
60. Remove the four transmission-to-oil pan bolts.
61. Lower the vehicle.

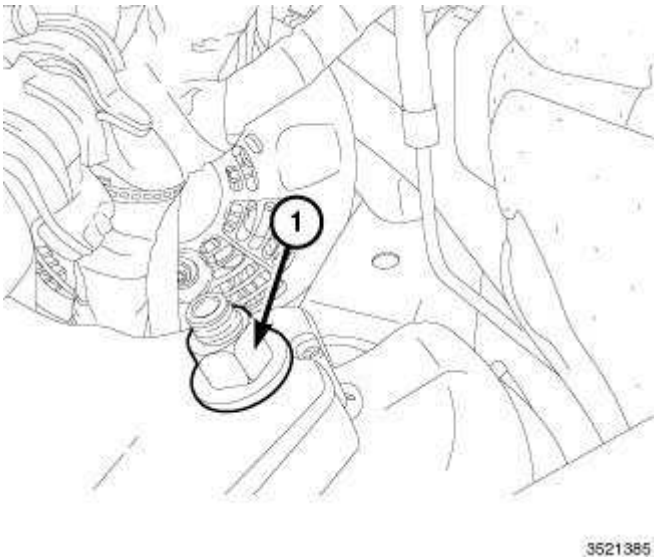


Fig. 27: Engine Mount Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

62. Remove the right and left engine mount retaining nuts (1).

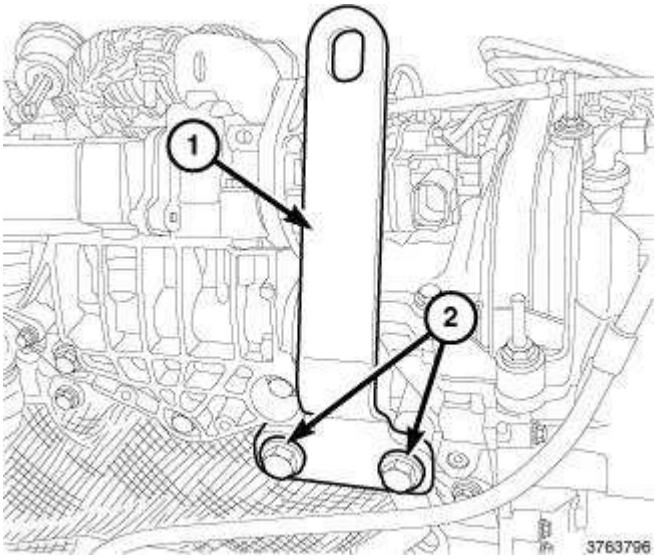


Fig. 28: Engine Lifting Bracket & Bolts - Right
Courtesy of CHRYSLER GROUP, LLC

63. Install the (special tool #VM.10360-2, Bracket, Engine Lifting (Right)) (1) and securely tighten bolts (2).

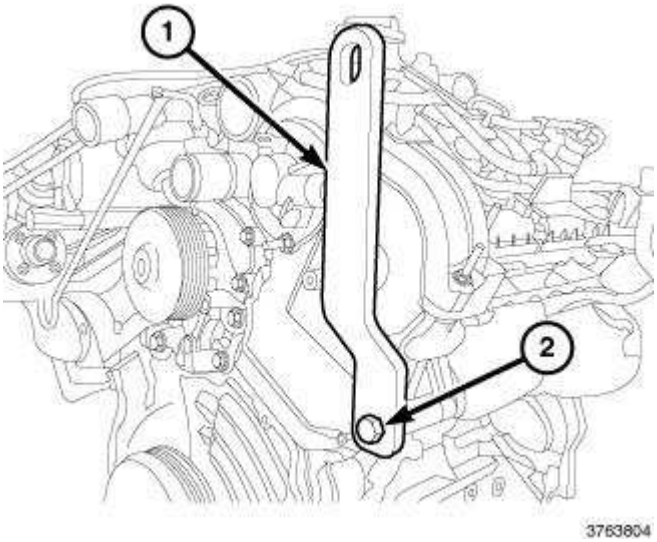


Fig. 29: Engine Lifting Bracket & Bolts - Left Front
Courtesy of CHRYSLER GROUP, LLC

64. Install the (special tool #VM.10360-3, Bracket, Engine Lifting (Left Front)) (1) and securely tighten bolt (2).

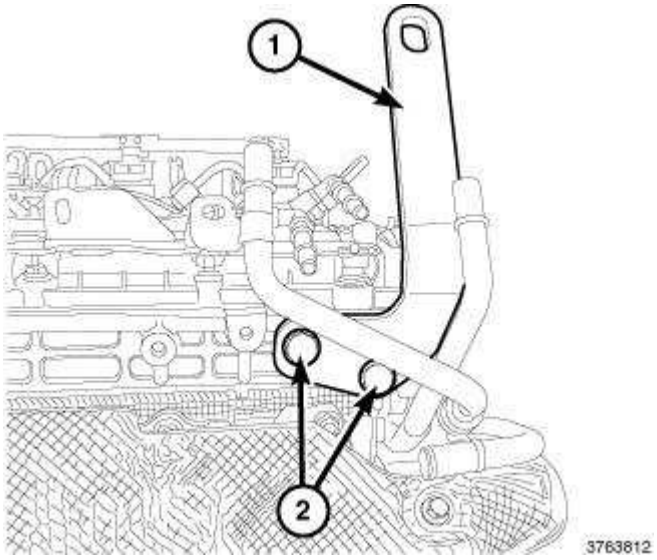


Fig. 30: Engine Lifting Bracket & Bolts - Left Rear
Courtesy of CHRYSLER GROUP, LLC

65. Install the (special tool #VM.10360-1, Bracket, Engine Lifting (Left Rear)) (1) and securely tighten bolts (2).
66. Position the engine hoist and connect engine lift chain to engine lift fixtures.
67. Position floor jack under the transmission.
68. Remove the upper five transmission-to-engine bolts.
69. Slightly raise the transmission.
70. Remove engine from vehicle.

INSTALLATION

INSTALLATION

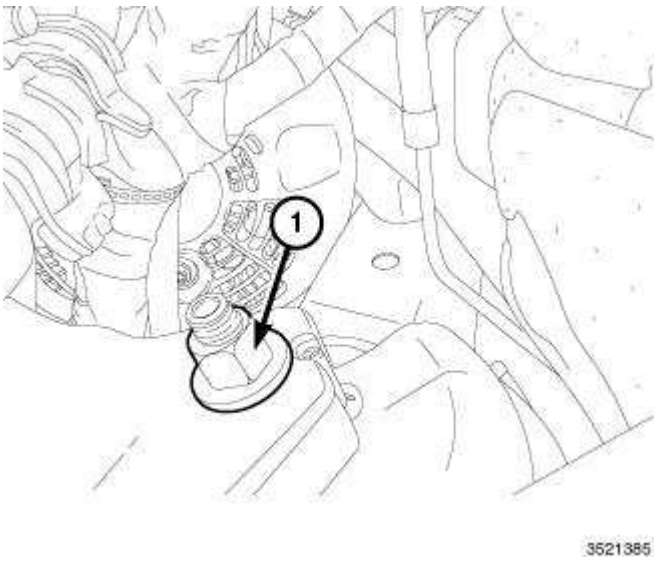


Fig. 31: Engine Mount Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Carefully align the engine assembly in the engine bay area and align with the transmission, **Do Not** lower the engine.
2. Align the engine to transmission, and lower the engine mounts into position.

NOTE: Right side shown in illustration, left side similar.

3. Install the right and left engine mount retaining nuts (1) and tighten to 61 N.m (45 ft. lbs.).
4. Remove engine lifting device.
5. Lower the transmission and remove floor jack from under transmission.
6. Install the upper five transmission-to-engine bolts and tighten to 39 N.m (29 ft. lbs.).

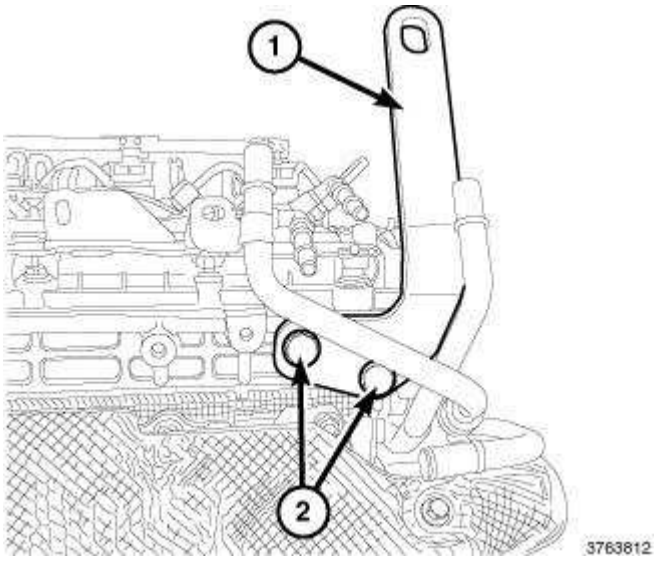


Fig. 32: Engine Lifting Bracket & Bolts - Left Rear
Courtesy of CHRYSLER GROUP, LLC

7. Remove bolts (2) and the (special tool #VM.10360-1, Bracket, Engine Lifting (Left Rear)) (1).

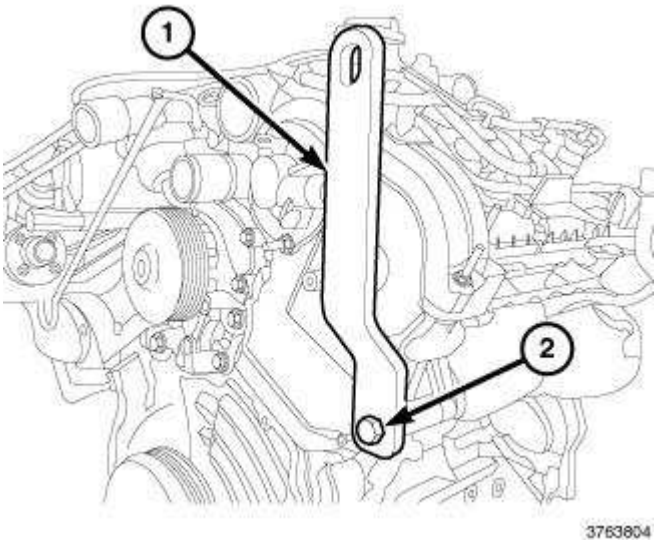


Fig. 33: Engine Lifting Bracket & Bolts - Left Front
Courtesy of CHRYSLER GROUP, LLC

8. Remove bolt (2) and the (special tool #VM.10360-3, Bracket, Engine Lifting (Left Front)) (1).

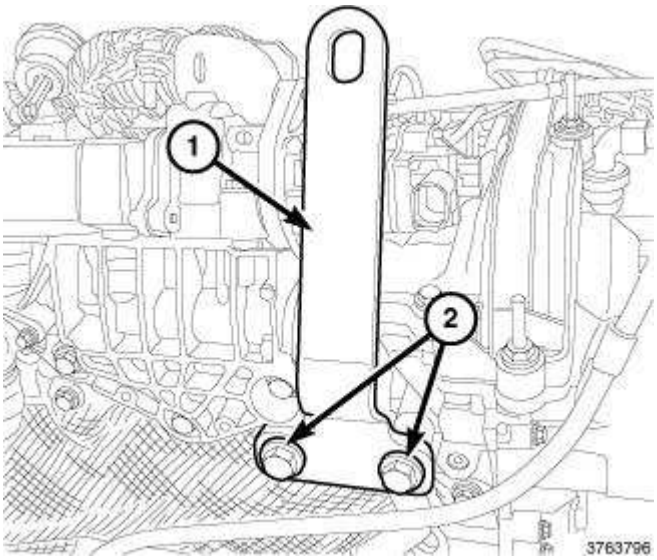


Fig. 34: Engine Lifting Bracket & Bolts - Right
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolts (2) and the (special tool #VM.10360-2, Bracket, Engine Lifting (Right)) (1).
10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
11. Install the four transmission-to-oil pan bolts and tighten to 39 N.m (29 ft. lbs.).

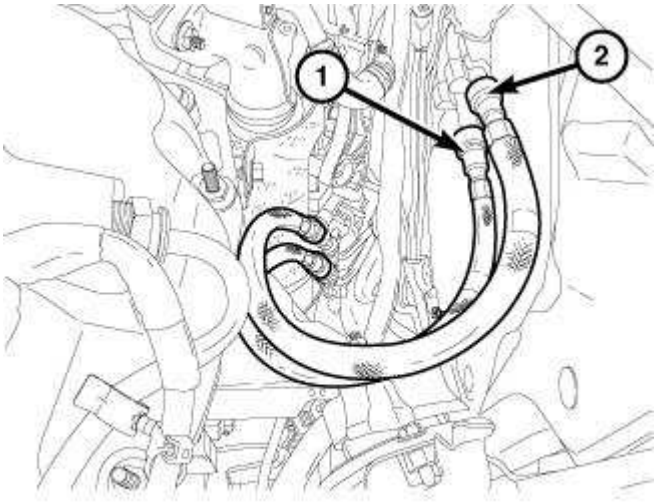


Fig. 35: Low Pressure Supply & Return Line
Courtesy of CHRYSLER GROUP, LLC

12. Connect the low pressure supply (1) and return (2) lines.
13. Install bolts securing the transmission cooler liner to oil pan and securely tighten bolts.

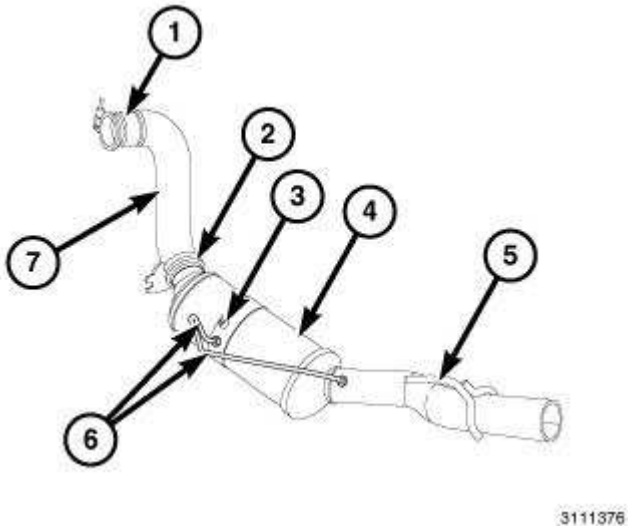


Fig. 36: Differential Pressure Sensor Tubing & Diesel Particulate Filter
Courtesy of CHRYSLER GROUP, LLC

14. Install the diesel particulate filter. Refer to **FILTER, DIESEL PARTICULATE, INSTALLATION** .

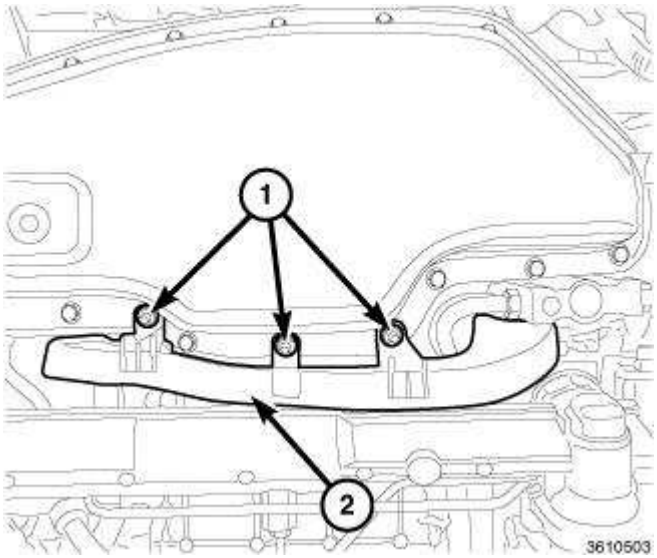


Fig. 37: Lower Engine Wire Harness & Nuts
Courtesy of CHRYSLER GROUP, LLC

15. Verify that the torque converter is pulled flush to the flexplate. Tighten bolts to 42 N.m (31 ft. lbs.).
16. Attach the wire harness retainer to the oil dipstick tube.
17. Attach the lower engine wire harness from upper oil pan.
18. Install the wire harness (2). Tighten nuts (1) to 11 N.m (97 in. lbs.).

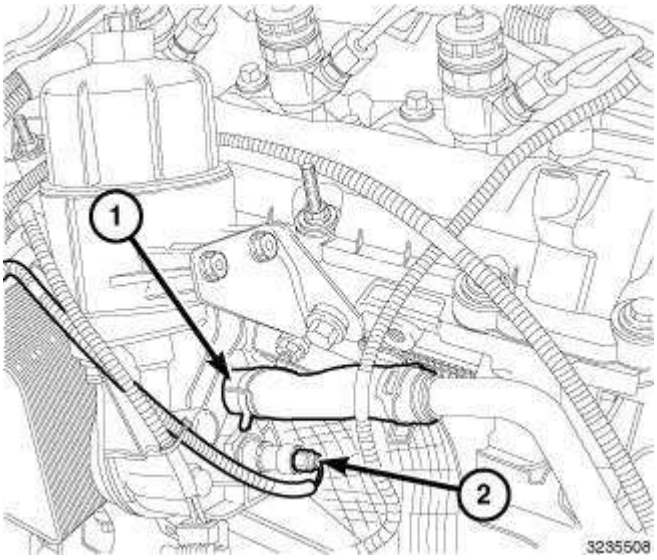


Fig. 38: Coolant Hose & Oil Pressure Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

19. Connect the oil pressure switch wire harness connector (2) and attach the wire harness retainer.

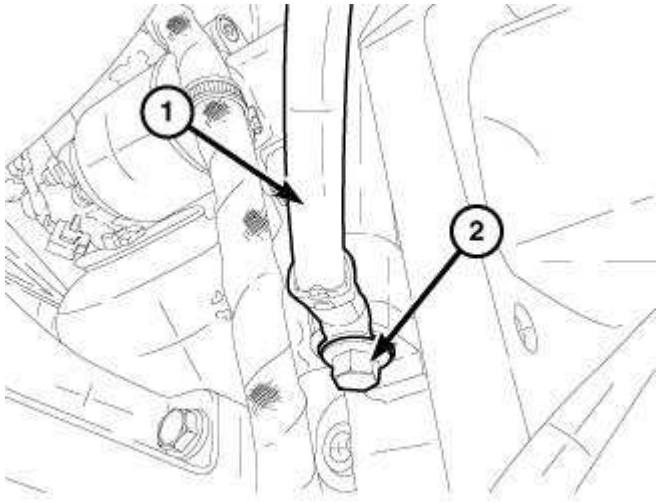


Fig. 39: Engine Ground Cable & Bolt
Courtesy of CHRYSLER GROUP, LLC

20. Install the engine ground cable (1). Tighten bolt (2) to 30 N.m (22 ft. lbs.).

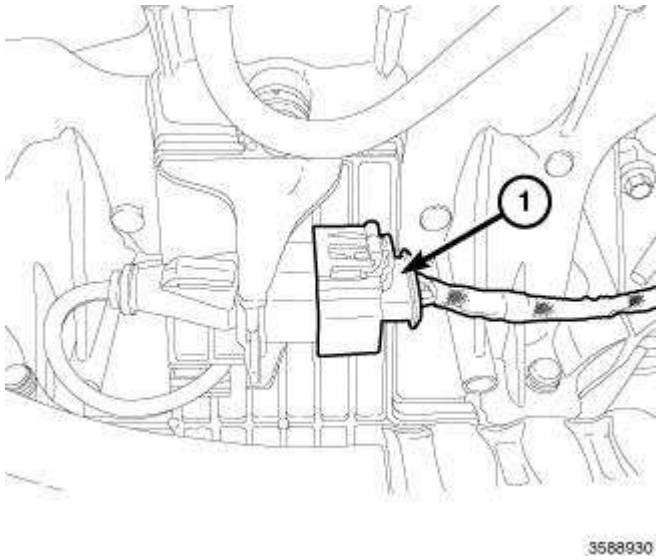


Fig. 40: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

21. Install the starter. Refer to **STARTER, INSTALLATION** .
22. Disconnect the Crankshaft Position Sensor (CKP) wiring harness connector (1).
23. Lower the vehicle.

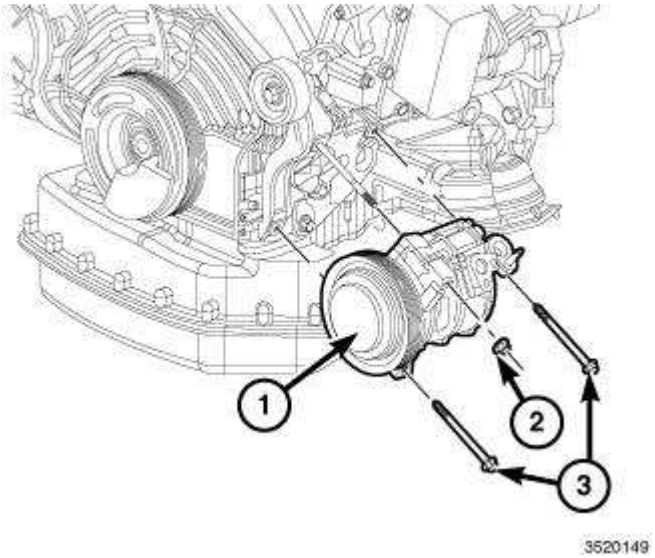


Fig. 41: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

24. Install the A/C compressor. Tighten bolts (3) to 30 N.m (22 ft. lbs.).
25. Install the A/C compressor mounting stud and tighten to 11 N.m (97 in. lbs.).
26. Install the A/C compressor mounting nut (2) and tighten to 30 N.m (22 ft. lbs.).
27. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
28. Remove protective cap and install the A/C discharge line at compressor. Tighten nut to 22 N.m (16 ft. lbs.).
29. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
30. Remove protective cap and install the A/C suction line at compressor. Tighten nut to 22 N.m (16 ft. lbs.).
31. Connect the A/C compressor wire harness connector.

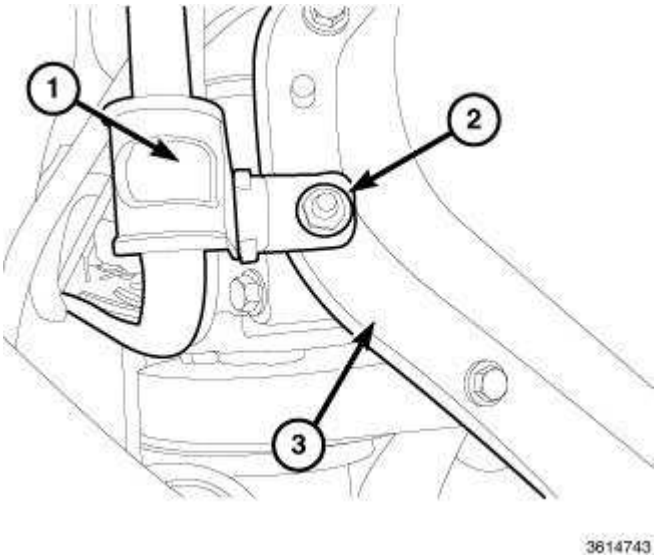


Fig. 42: Transmission Cooler Line Bracket, Nut & Oil Pan
Courtesy of CHRYSLER GROUP, LLC

32. Raise the vehicle.
33. Install the transmission cooler line bracket (1) and tighten nuts (2) to 11 N.m (97 in. lbs.).
34. Lower the vehicle.

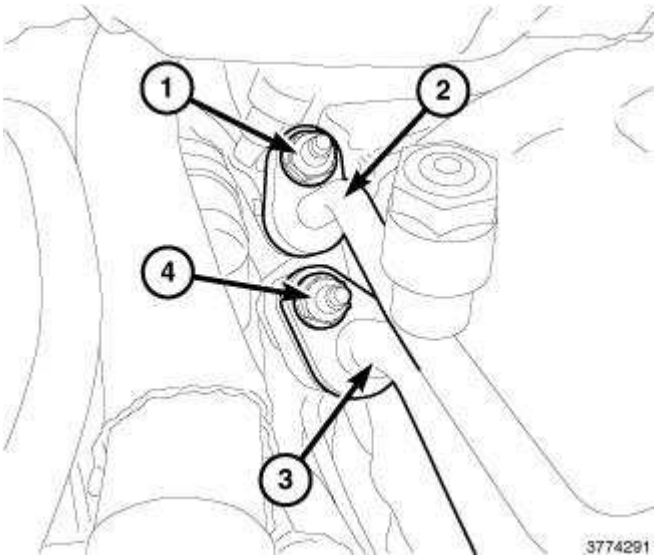


Fig. 43: A/C Liquid Line, A/C Suction Line & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

35. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use

only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

36. Remove the protective caps from opening and connect the A/C suction line (3). Tighten nut (4) to 22 N.m (16 ft. lbs.).
37. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
38. Remove the protective caps from opening and connect the A/C liquid line (2). Tighten nut (4) to 22 N.m (16 ft. lbs.).

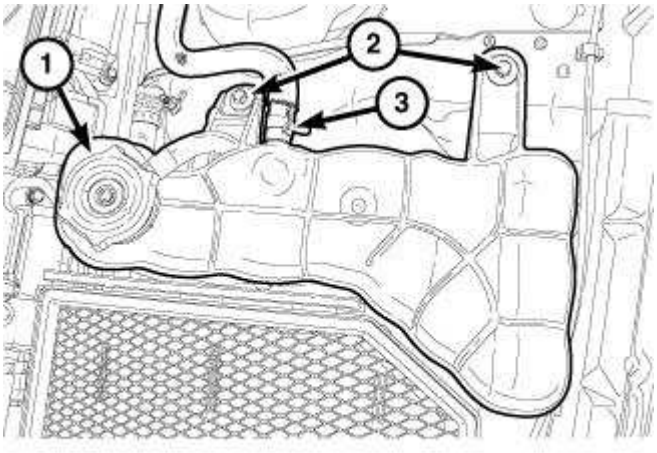


Fig. 44: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

39. Install the coolant recovery bottle. Refer to **BOTTLE, COOLANT RECOVERY, INSTALLATION** .

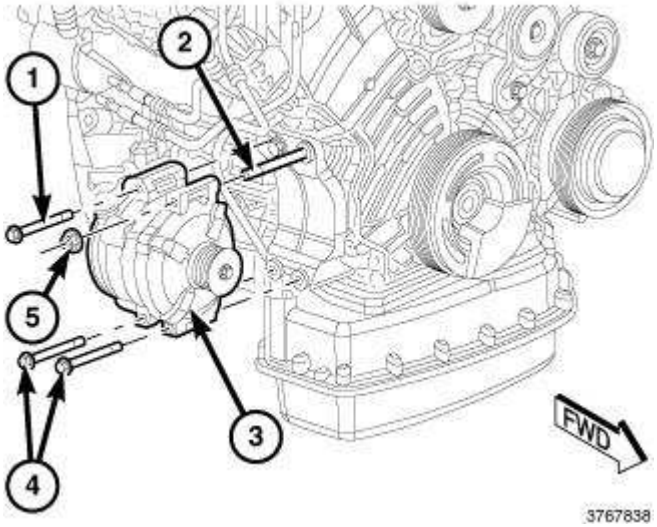


Fig. 45: Generator & Fasteners

Courtesy of CHRYSLER GROUP, LLC

40. Install the generator (3). Refer to **GENERATOR, INSTALLATION** .

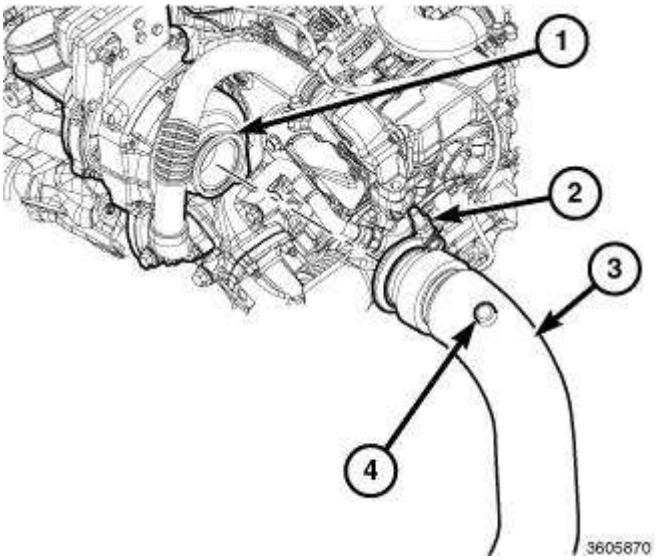


Fig. 46: Turbocharger Flange, Band Clamp & Down-Pipe
Courtesy of CHRYSLER GROUP, LLC

41. Connect the brake booster vacuum hose.
42. Connect both heater hoses at engine.
43. Connect the upstream stream exhaust gas temperature sensor.
44. Connect the differential pressure sensor hoses.
45. Connect the down-pipe (3) to the turbocharger flange (1) and install the band clamp (2). Tighten band clamp to (2) to 25 N.m (18 ft. lbs.).

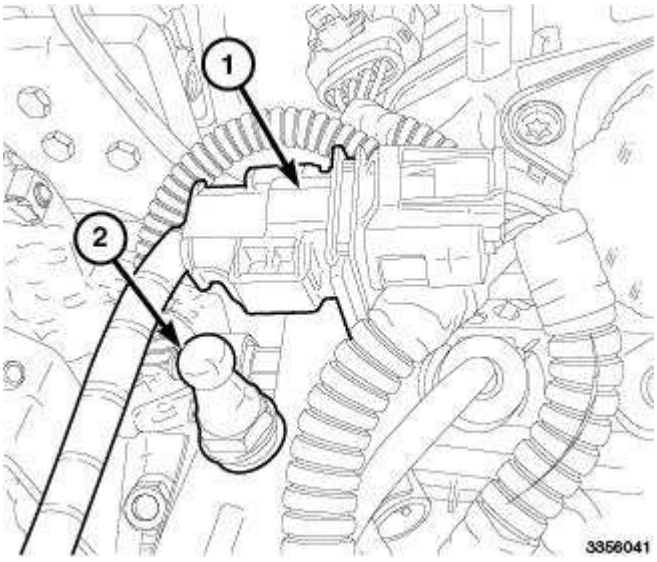


Fig. 47: Oxygen Sensor Connector & Ball Stud Fastener

Courtesy of CHRYSLER GROUP, LLC

46. Install the ball stud bolt (2) securing the transmission fill tube and securely tighten.

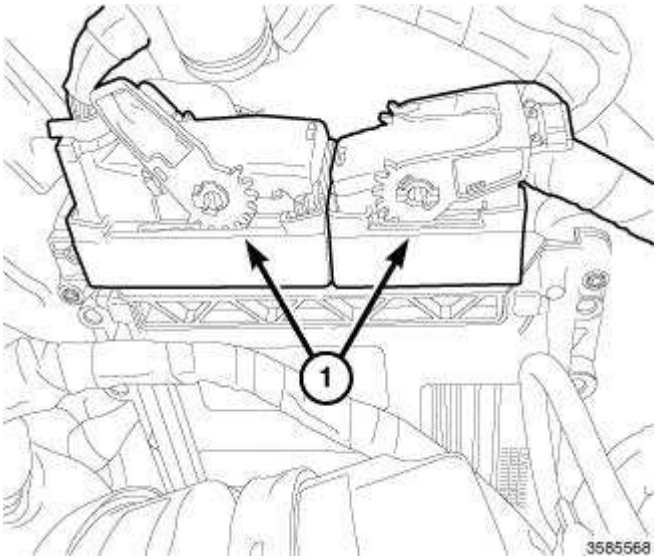


Fig. 48: Powertrain Control Module (PCM) Connectors
Courtesy of CHRYSLER GROUP, LLC

47. Install the oxygen sensor. Refer to **SENSOR, OXYGEN, INSTALLATION** .
48. Connect the second engine wire harness near master cylinder.
49. Connect the engine wire harness at the Powertrain Control Module (PCM).

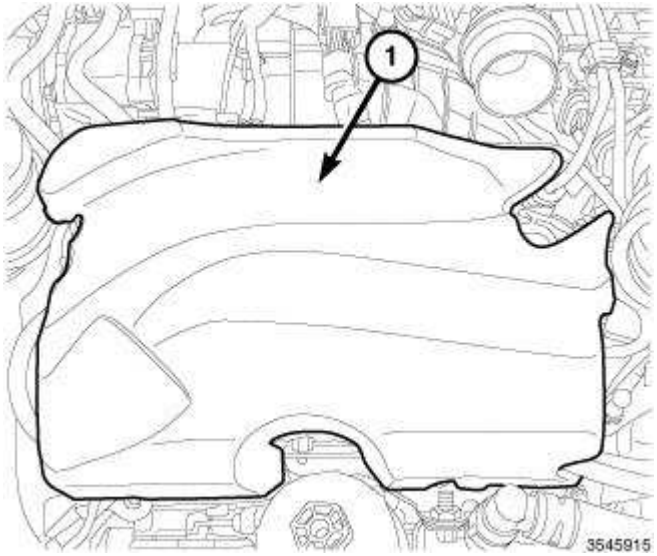


Fig. 49: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

50. Install the degas hose at thermostat housing.
51. Install the lower radiator hose.

52. Install the upper radiator hose.
53. Install the left side fuel injector silencer (1).

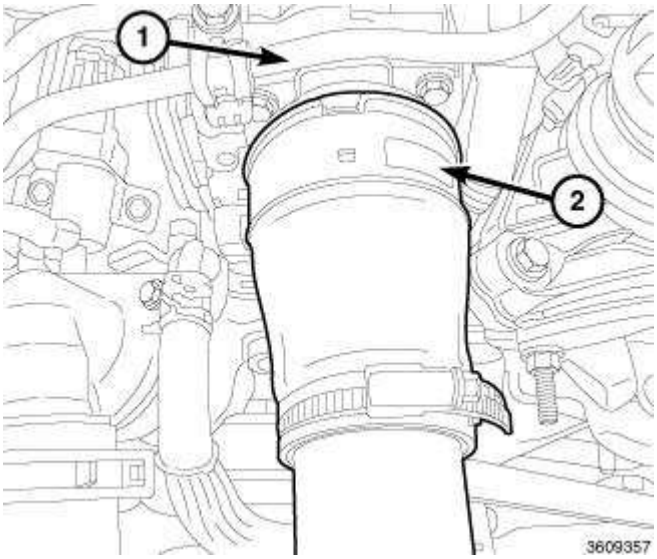


Fig. 50: EGR Air Flow Control Valve & CAC Hose
Courtesy of CHRYSLER GROUP, LLC

54. Install bolt securing CAC hose to lower timing cover and securely tighten.
55. Connect the CAC hose (2) from the EGR air flow control valve.

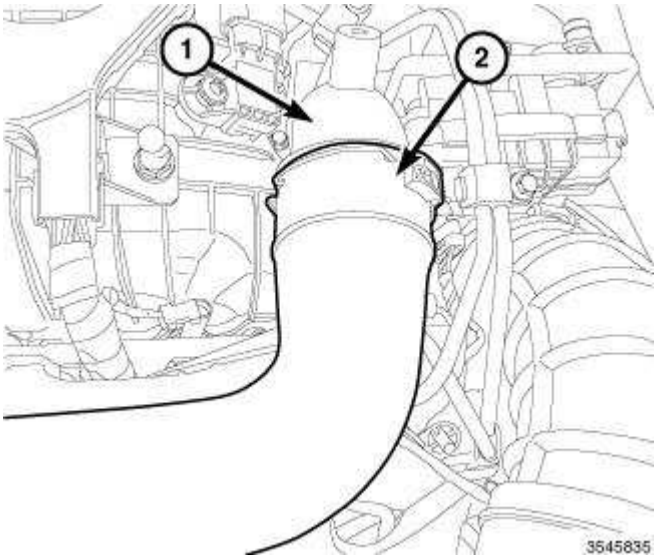


Fig. 51: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

56. Install the two bolts securing the CAC hose to timing cover and securely tighten.
57. Connect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).

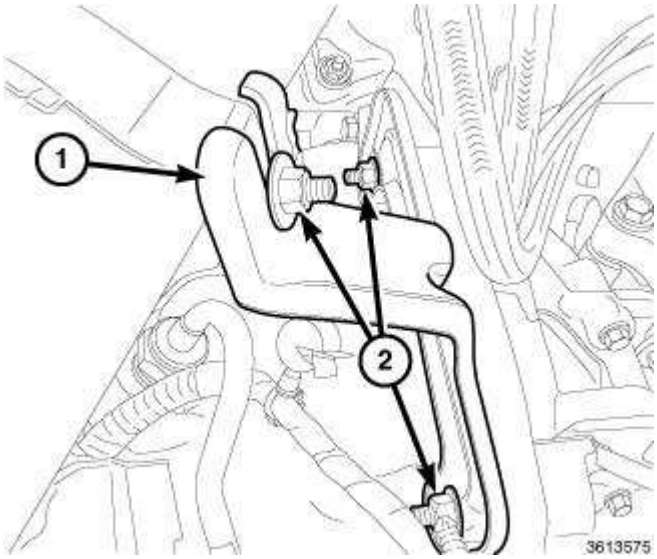


Fig. 52: Exhaust Steady Rest Bracket & Nuts
Courtesy of CHRYSLER GROUP, LLC

58. Raise the vehicle.
59. Install the lower generator bolt, nut, and ground wire:
    - Tighten bolt to 28 N.m (21 ft. lbs.).
    - Tighten nut to 28 N.m (21 ft. lbs.).
60. Install the left side splash shield.
61. Install the right side splash shield.
62. Install the right side CAC hose at cooler.
63. Install the left side Charge Air Cooler (CAC) hose at cooler.
64. Install the exhaust steady rest bracket (1). Tighten nuts (2) to 26 N.m (19 ft. lbs.).
65. Attach the wire harness retainer from exhaust steady rest bracket.
66. Install the transmission belly pan.
67. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, INSTALLATION** .

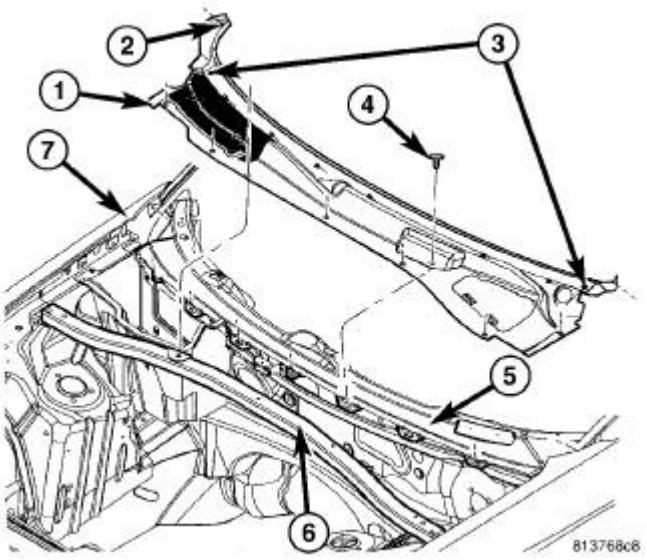


Fig. 53: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

68. Install air cleaner body and intake air tube. Refer to **BODY, AIR CLEANER, INSTALLATION**.
69. Install the strut support brace (6). Tighten bolts to 38 N.m (28 ft. lbs.).
70. Install the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .

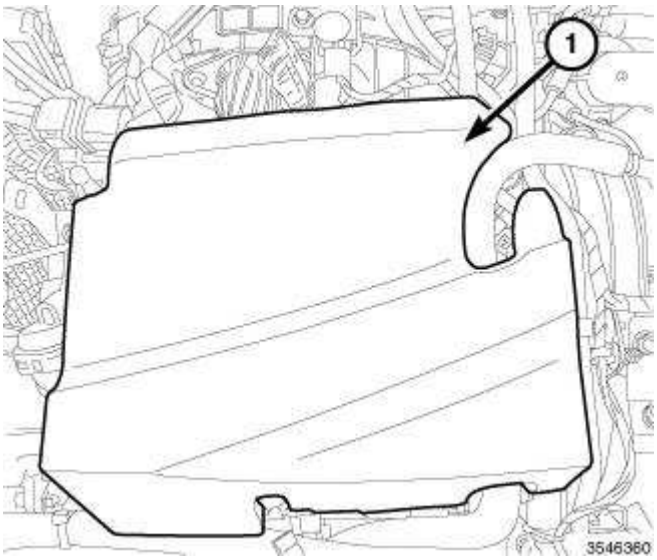


Fig. 54: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

71. Install the hood. Refer to **HOOD, INSTALLATION** .
72. Charge the A/C system with refrigerant. Refer to **PLUMBING, STANDARD PROCEDURE** .
73. Install the right side fuel injector silencer (1).
74. Install a new oil filter. Refer to **FILTER, ENGINE OIL, INSTALLATION**.

75. Fill engine with the recommended engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
76. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
77. Install the hood. Refer to **HOOD, INSTALLATION** .

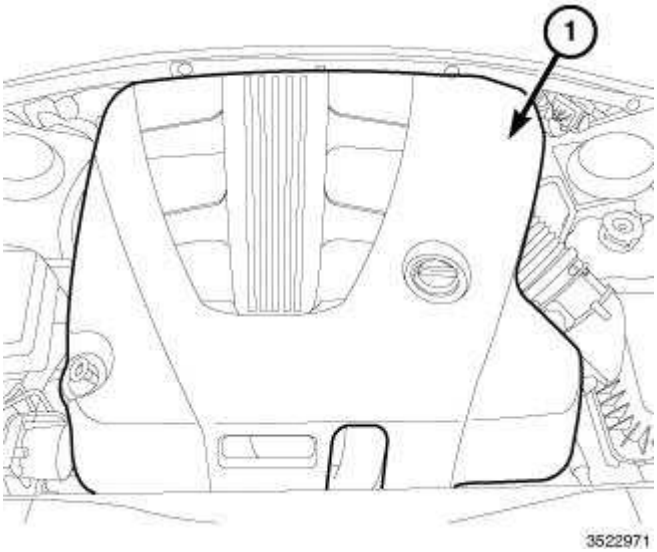


Fig. 55: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

78. Connect the negative battery cable.
79. Start engine and inspect for leaks.
80. Install engine cover (1).

SPECIAL TOOLS

SPECIAL TOOLS

	10224 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 10223.) 10368 - Set, Universal Protective Cap 8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.) C-3339A - Set, Dial Indicator (Originally Shipped In Kit Number(s) 9202.) C-3422-D - Compressor, Valve Spring VM.10338 - Tool, Camshaft Timing VM.10338-1 - Timing Tool, Camshaft (Right) VM.10338-2 - Timing Tool, Camshaft (Left) VM.10339 - Tool, Crankshaft Timing VM.10340-1 - Guide, Front Seal

VM.10340-2 - Installer Tool, Front Seal VM.10341-1 - Guide, Rear Seal VM.10341-2 - Installer Tool, Rear Seal VM.10342 - Tool, Crankshaft Bearing Positioning VM.10343-1 - Alignment Tool, Cylinder Head (Right Intake) VM.10343-2 - Alignment Tool, Cylinder Head (Left Intake) VM.10343-3 - Alignment Tool, Cylinder Head (Left Exhaust) VM.10343-4 - Alignment Tool, Cylinder Head (Right Exhaust) VM.10344 - Tool, Oil Separator Remover/Installer VM.10357 - Adapter, Compression Test VM.10359 - Pin, Tensioner VM.10360-1 - Bracket, Engine Lifting (Left Rear) VM.10360-2 - Bracket, Engine Lifting (Right) VM.10360-3 - Bracket, Engine Lifting (Left Front) VM.10362 - Tool, Bedplate Removal

COVER, ENGINE

DESCRIPTION

DESCRIPTION

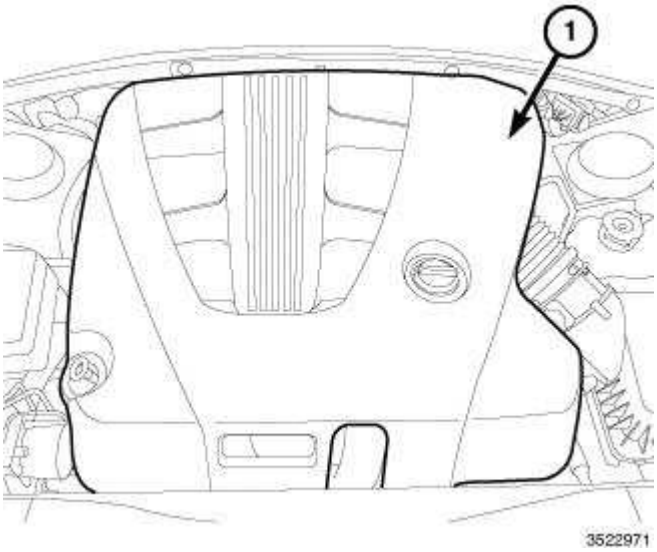


Fig. 56: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

The insulated engine cover (1) is made of composite material and used cosmetically to cover the top of the engine and greatly reduce engine noise. Four brackets secure the cover to the engine. Also there is an insulated pad on the each of the cylinder head covers to insulate the fuel injectors.

REMOVAL

REMOVAL

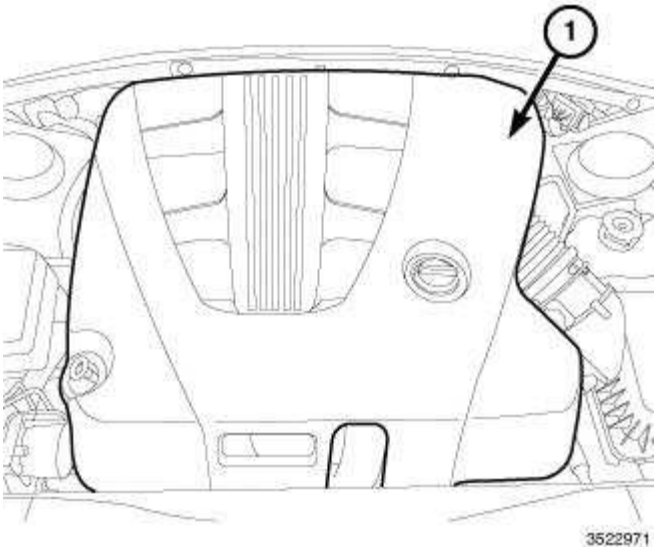


Fig. 57: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Pull upward on the engine cover (1) to release from mounting brackets and remove the engine cover (1).

INSTALLATION

INSTALLATION

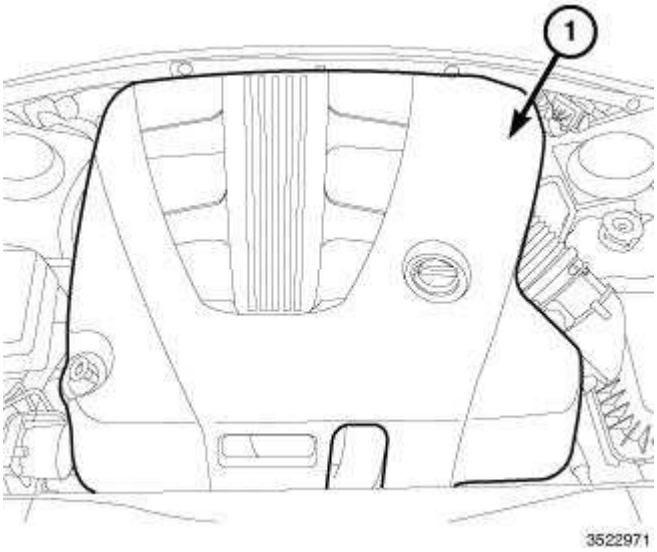


Fig. 58: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Align the engine cover (1) with the mounting bracket and push down to seat the cover.

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

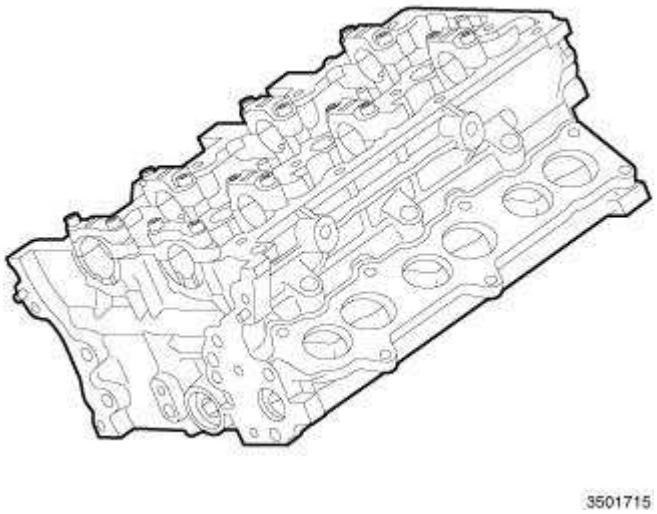


Fig. 59: Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

The cylinder heads on the 3.0L V-6 are of a cross-flow design and have the following features:

- High-Strength Cast Aluminum Alloy Construction.
- Four Valves per Cylinder.
- Roller Finger Followers/Lifter Assemblies.
- Pressed-in Valve Guides and Valve Seats.

The 3.0L aluminum, overhead valve cylinder heads are made of high strength aluminum alloy and are each equipped with two camshafts, roller finger followers/lifter assemblies and four valve technology. The cylinder head can not be resurfaced. The cylinder head uses a Multi-layered Steel gasket for sealing.

The valve seats and valve guides are not serviceable.

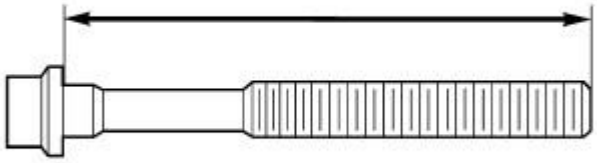
STANDARD PROCEDURE

INSPECTION

1. Measure cylinder head bolts between points shown.

Cylinder Head Bolts	Thread Diameter	14 x 1.5 mm

	Length When New	155 mm



80e214d0

Fig. 60: Measuring Cylinder Head Bolts
Courtesy of CHRYSLER GROUP, LLC

2. The cylinder head bolts are a one time use bolt that needs to be replace anytime they have been removed from the cylinder head.

REMOVAL

LEFT BANK

1. Disconnect the negative and positive battery cables.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Remove the glow plugs.
4. Remove the left side intake and exhaust camshafts. Refer to **CAMSHAFT, ENGINE, REMOVAL**.
5. Remove the rocker arms and lifters and note their original position.
6. Remove the water pump housing assembly. Refer to **PUMP, WATER, REMOVAL** .

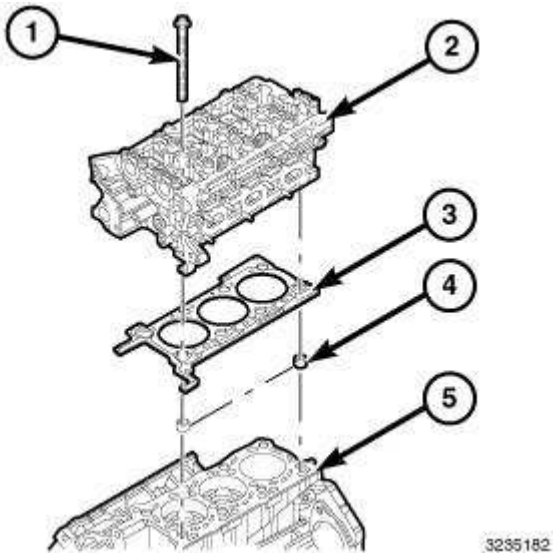


Fig. 61: Cylinder Head, Head Gasket, Engine Block & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do Not store the cylinder head on the sealing surface.

7. Remove and discard bolts (1) and the cylinder head (2) from the engine block (5).
8. Remove and discard the head gasket (3).

RIGHT BANK

1. Disconnect the negative and positive battery cables.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Remove the glow plugs.
4. Remove the right side intake and exhaust camshaft shafts. Refer to **CAMSHAFT, ENGINE, REMOVAL**.
5. Remove the rocker arms and lifters and note their original position.
6. Remove the water pump housing assembly. Refer to **PUMP, WATER, REMOVAL** .

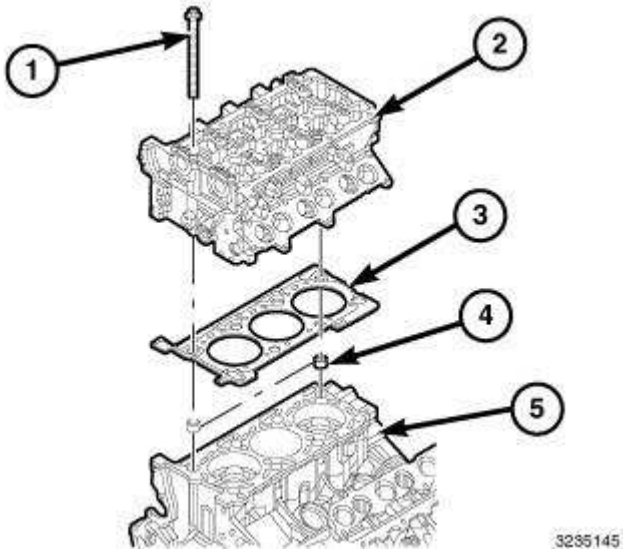


Fig. 62: Cylinder Head, Head Gasket, Engine Block & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do Not store the cylinder head on the sealing surface.

7. Remove bolts (1) and the cylinder head (2) from the engine block (5).
8. Remove and discard the head gasket (3).

CLEANING

CLEANING

Thoroughly clean the engine cylinder head and cylinder block mating surfaces. Clean the intake and exhaust manifold and engine cylinder head mating surfaces. Clean the injector bores. Remove all gasket material and carbon. Refer to **Engine - Standard Procedure**.

Check to ensure that no fuel injector washer seals are left in the injector bores.

Check to ensure that no coolant or foreign material has fallen into the tappet bore area.

Remove the carbon deposits from the combustion chambers and top of the pistons.

INSPECTION

INSPECTION

Use a straightedge and feeler gauge to check the flatness of the engine cylinder head and engine block mating surfaces.

The cylinder head thickness is 133 ± 0.06 mm (5.2362 ± 0.0023 in.).

Cylinder head flatness tolerance 0.1 mm (0.0039 in.).

INSTALLATION

LEFT BANK

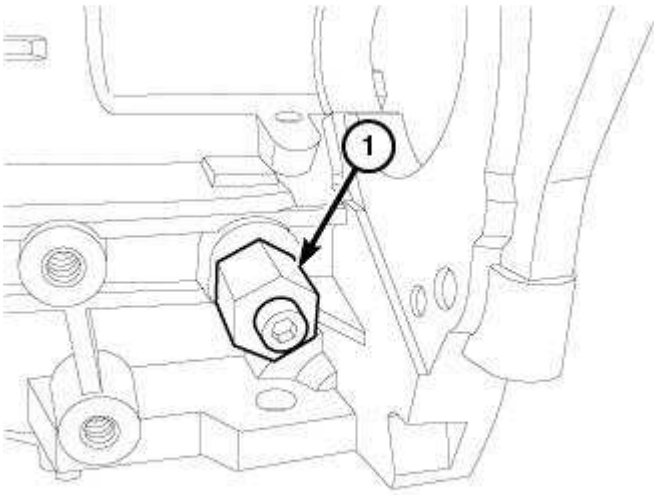


Fig. 63: Crankshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect gasket mating surfaces. Refer to **Engine/Cylinder Head - Cleaning**.
2. Remove the (special tool #VM.10339, Tool, Crankshaft Timing) (1).

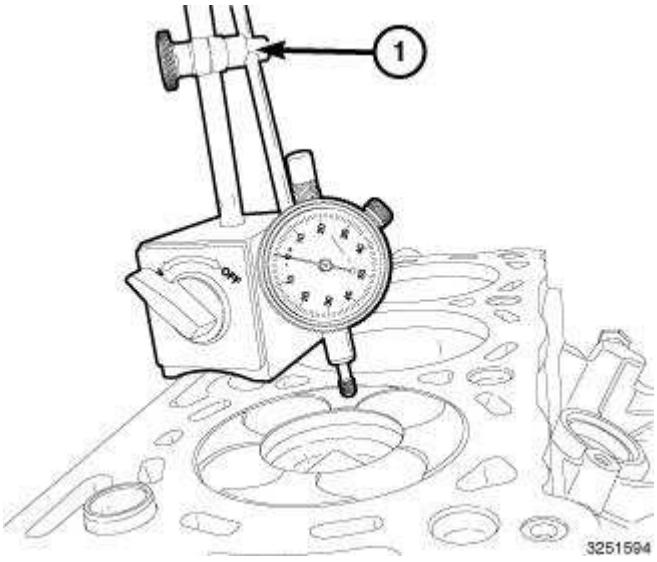


Fig. 64: Setting Number One Piston At Top Dead Center Using Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

3. Set the number one piston to top dead center (TDC).

4. Using the (special tool #C-3339A, Set, Dial Indicator) (1), assemble as illustrated.

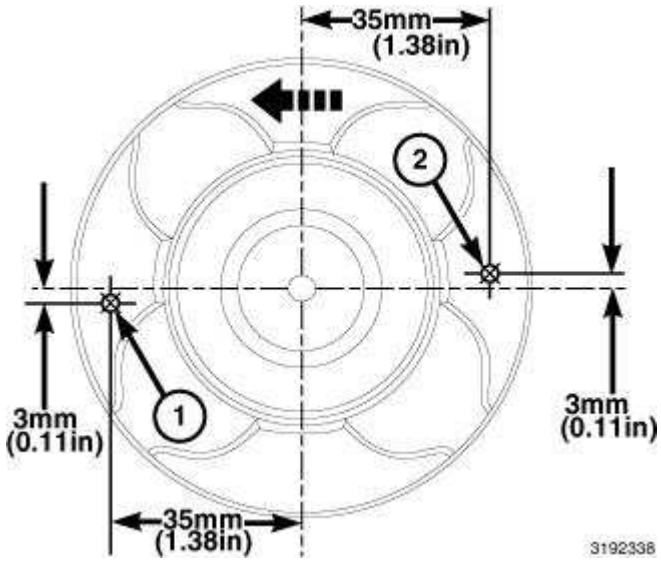


Fig. 65: Measuring Height Of The Piston At Top Dead Center
Courtesy of CHRYSLER GROUP, LLC

5. Zero the dial indicator on the top of the piston at location shown in illustration (1).
6. Use the dial indicator to measure the height of the piston at top dead center to the cylinder block and record measurements.
7. Zero the dial indicator on the top of the piston at location shown in illustration (2).
8. Use the dial indicator to measure the height of the piston at top dead center to cylinder block and record measurements.
9. Repeat the procedure for each cylinder.
10. Average the 3 piston protrusion readings to determine the required gasket thickness.

HEAD GASKET SELECTION CHART		
	Millimeters	Inches
PISTON CLEARANCE	0.130 - 0.220	0.0051 - 0.0086
CYLINDER HEAD GASKET THICKNESS	0.96	0.0377
GASKET IDENTIFICATION	NO HOLE	
PISTON CLEARANCE	0.221 - 0.310	0.0087 - 0.0122
CYLINDER HEAD GASKET THICKNESS	1.06	0.0417

GASKET IDENTIFICATION	ONE HOLE	
PISTON CLEARANCE	0.311 - 0.402	0.0122 - 0.0158
CYLINDER HEAD GASKET THICKNESS	1.16	0.0456
GASKET IDENTIFICATION	TWO HOLES	

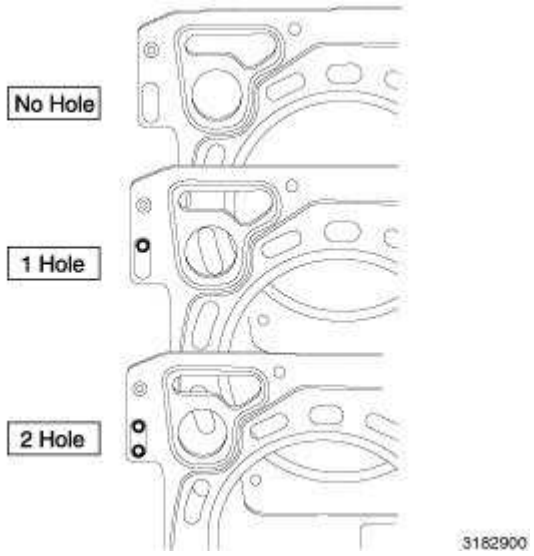


Fig. 66: Cylinder Head Gasket Identification
Courtesy of CHRYSLER GROUP, LLC

NOTE: The illustration shows gasket identification marks.

11. Select the appropriate cylinder head gasket from the cylinder head gasket chart.

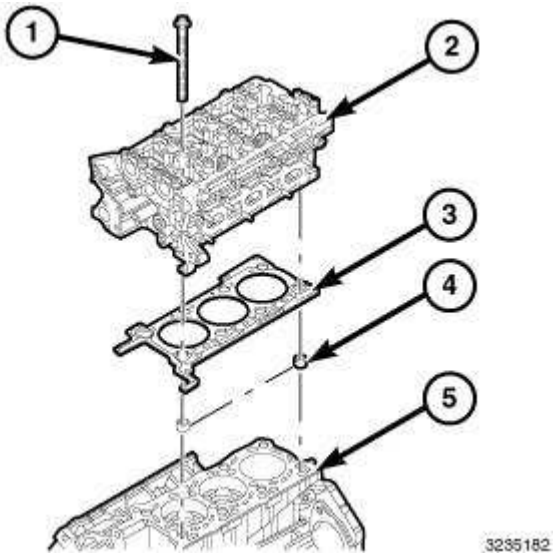


Fig. 67: Cylinder Head, Head Gasket, Engine Block & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the head gasket (3) onto the engine block (5). Be sure the coolant passages align (part number should be facing up).
13. Install the cylinder head (2) onto the engine block (5) and install bolts (1) finger tight.

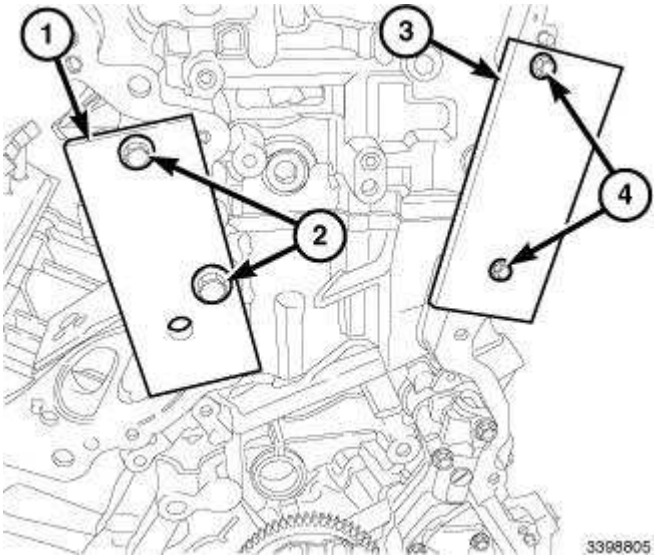


Fig. 68: Cylinder Head Alignment Tools & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install the (special tool #VM.10343-2, Alignment Tool, Cylinder Head (Left Intake)) (1) an securely tighten bolts (2).
15. Install the (special tool #VM.10343-3, Alignment Tool, Cylinder Head (Left Exhaust)) (3) an securely tighten bolts (4).

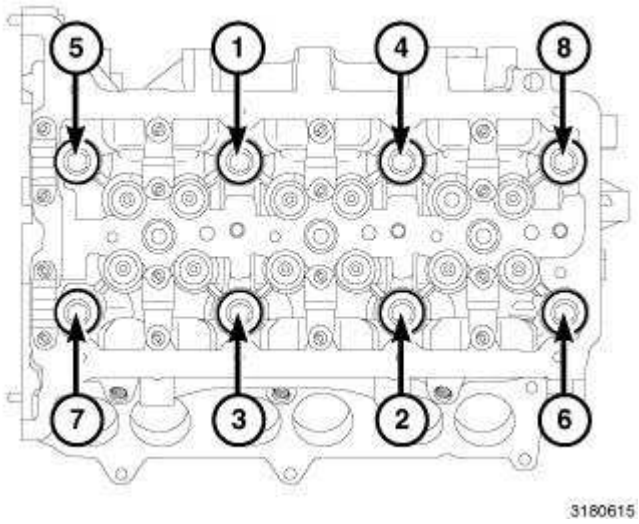


Fig. 69: Cylinder Head Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

16. Using the tighten sequence shown in illustration, tighten the cylinder head bolts to:
    - 30 N.m (22 ft. lbs.).
    - Tighten bolts an additional 75° turn.
    - Tighten bolts an additional 75° turn.
    - Tighten bolts an additional 75° turn.

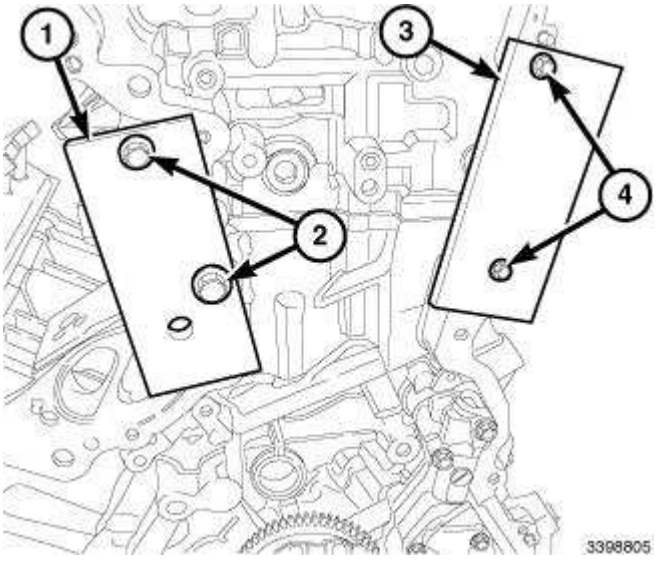


Fig. 70: Cylinder Head Alignment Tools & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove bolts (2) and (special tool #VM.10343-3, Alignment Tool, Cylinder Head (Left Exhaust)) (1).
18. Remove bolts (4) and (special tool #VM.10343-2, Alignment Tool, Cylinder Head (Left Intake))

(3).

19. Install the water pump housing assembly. Refer to **PUMP, WATER, INSTALLATION** .

NOTE: Follower and tappet assemblies must be installed in same location as when removed.

20. Install the lifters and rocker arms into their original position as noted during removal.
21. Install the left side intake and exhaust camshafts. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.
22. Install the glow plugs and tighten to 11 N.m (97 in. lbs.).
23. Install the oil cooler adapter. Refer to **ADAPTER, OIL COOLER, INSTALLATION**.
24. Install the intake manifold (4). Refer to **MANIFOLD, INTAKE, INSTALLATION**.

RIGHT BANK

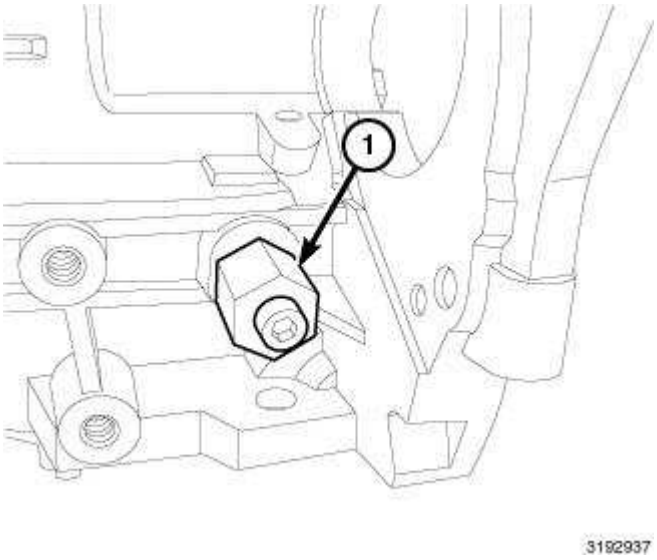


Fig. 71: Crankshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect gasket mating surfaces. Refer to **Engine/Cylinder Head - Cleaning**.
2. Remove the (special tool #VM.10339, Tool, Crankshaft Timing) (1).

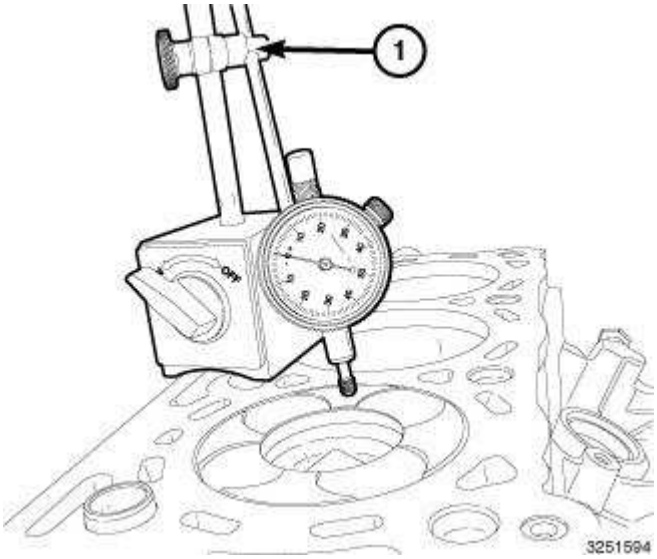


Fig. 72: Setting Number One Piston At Top Dead Center Using Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

3. Set the number one piston to top dead center (TDC).
4. Using the (special tool #C-3339A, Set, Dial Indicator) (1), assemble as illustrated.

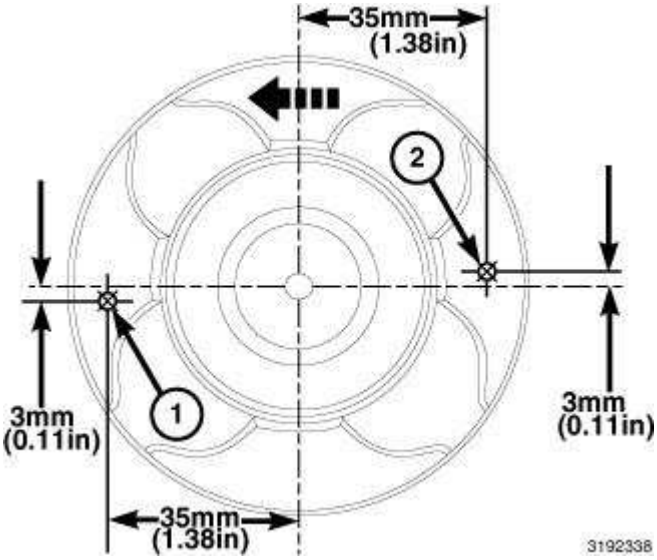


Fig. 73: Measuring Height Of The Piston At Top Dead Center
Courtesy of CHRYSLER GROUP, LLC

5. Zero the dial indicator on the top of the piston at location shown in illustration (1).
6. Use the dial indicator to measure the height of the piston at top dead center to the cylinder block and record measurements.
7. Zero the dial indicator on the top of the piston at location shown in illustration (2).
8. Use the dial indicator to measure the height of the piston at top dead center to cylinder block and record measurements.

9. Repeat the procedure for each cylinder.
10. Average the 3 pistons protrusion readings to determine the required gasket thickness.

HEAD GASKET SELECTION CHART		
	Millimeters	Inches
PISTON CLEARANCE	0.130 - 0.220	0.0051 - 0.0086
CYLINDER HEAD GASKET THICKNESS	0.96	0.0377
GASKET IDENTIFICATION	NO HOLE	
PISTON CLEARANCE	0.221 - 0.310	0.0087 - 0.0122
CYLINDER HEAD GASKET THICKNESS	1.06	0.0417
GASKET IDENTIFICATION	ONE HOLE	
PISTON CLEARANCE	0.311 - 0.402	0.0122 - 0.0158
CYLINDER HEAD GASKET THICKNESS	1.16	0.0456
GASKET IDENTIFICATION	TWO HOLES	

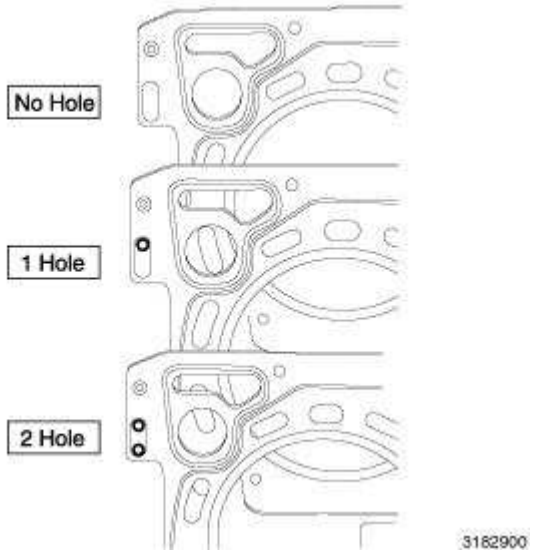


Fig. 74: Cylinder Head Gasket Identification
Courtesy of CHRYSLER GROUP, LLC

NOTE: The illustration shows gasket identification marks.

11. Select the appropriate cylinder head gasket from the cylinder head gasket chart.

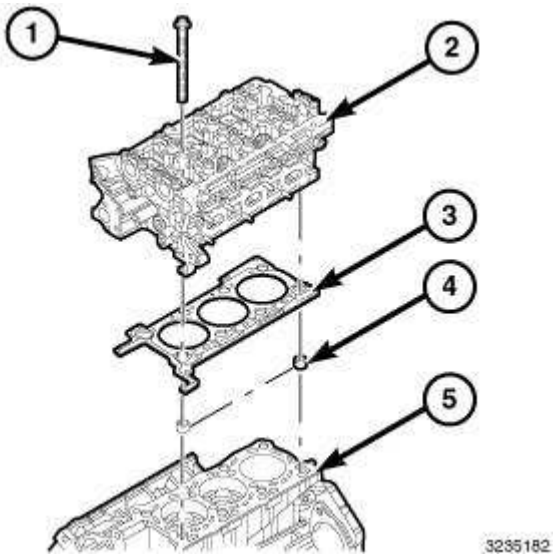


Fig. 75: Cylinder Head, Head Gasket, Engine Block & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the head gasket (3) onto the engine block (5). Be sure the coolant passages align (part number should be facing up).
13. Install the cylinder head (2) onto the engine block (5) and install bolts (1) finger tight.

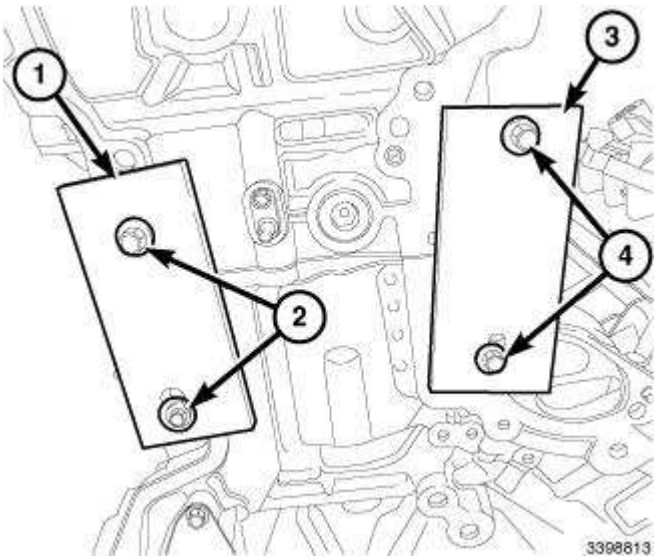


Fig. 76: Cylinder Head Alignment Tools & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install the (special tool #VM.10343-4, Alignment Tool, Cylinder Head (Right Exhaust)) (1) an securely tighten bolts (2).
15. Install the (special tool #VM.10343-1, Alignment Tool, Cylinder Head (Right Intake)) (3) an securely tighten bolts (4).

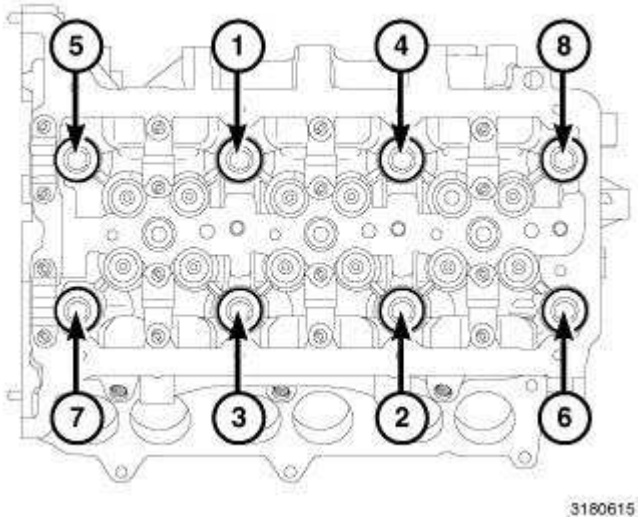


Fig. 77: Cylinder Head Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

16. Using the tighten sequence shown in illustration, tighten the cylinder head bolts to:
    - 30 N.m (22 ft. lbs.).
    - Tighten bolts an additional 75° turn.
    - Tighten bolts an additional 75° turn.
    - Tighten bolts an additional 75° turn.

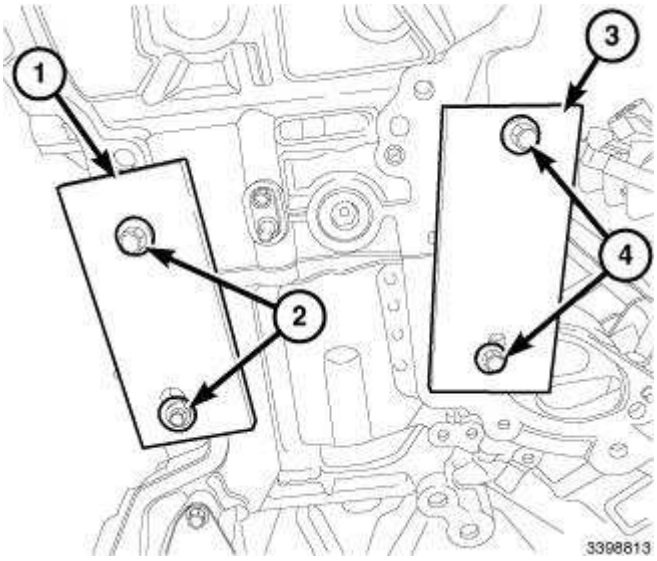


Fig. 78: Cylinder Head Alignment Tools & Bolts

Courtesy of CHRYSLER GROUP, LLC

17. Remove bolts (4) and (special tool #VM.10343-1, Alignment Tool, Cylinder Head (Right Intake)) (3).
18. Remove bolts (2) and (special tool #VM.10343-4, Alignment Tool, Cylinder Head (Right Exhaust)) (1).
19. Install the water pump housing assembly. Refer to **PUMP, WATER, INSTALLATION** .

NOTE: Follower and tappet assemblies must be installed in same location as when removed.

20. Install the lifters and rocker arms into their original position as noted during removal.
21. Install the right side intake and exhaust camshafts. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.
22. Install the glow plugs and tighten to 11 N.m (97 in. lbs.).
23. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

CAMSHAFT, ENGINE

DESCRIPTION

DESCRIPTION

The camshafts are multiple-piece components with six machined lobes that are mounted to a hollow shaft with an interference fit. The cam lobes are induction hardened. Each camshaft has four bearing journals except for the right-bank intake camshaft. Due to the longer length needed to accommodate the centrifugal oil separator, the right-bank intake camshaft has five bearing journals. The camshaft journals have the same diameter and are supplied with oil pressure through lubrication passages in the cylinder head journals.

OPERATION

OPERATION

Each cylinder has two intake and two exhaust valves, and one glow plug. Valve lash is controlled by hydraulic lifter/roller finger followers inside the cylinder head, in bores under the camshafts. The finger followers transfer the camshaft lobe movement into vertical valve movement. The valve moves by the lobe of the camshaft pressing down on the finger follower roller.

The finger followers are located on top of the hydraulic lifters and the valves. The finger followers are not held rigidly into position; instead, they are held in position by resting on top of the valve and the hydraulic lifter pivoting ball.

WARNING: When the hydraulic lash adjusters are removed from the engine, they must be stored upright and in clean conditions. Install the finger followers and hydraulic lifters in the same location as removed.

WARNING: Replacement of the camshaft will also require replacement of the finger followers and hydraulic lifters.

REMOVAL

LEFT BANK

1. Disconnect the negative battery cable.
2. Remove the high pressure pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, REMOVAL** .
3. Remove the timing chain and sprockets. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

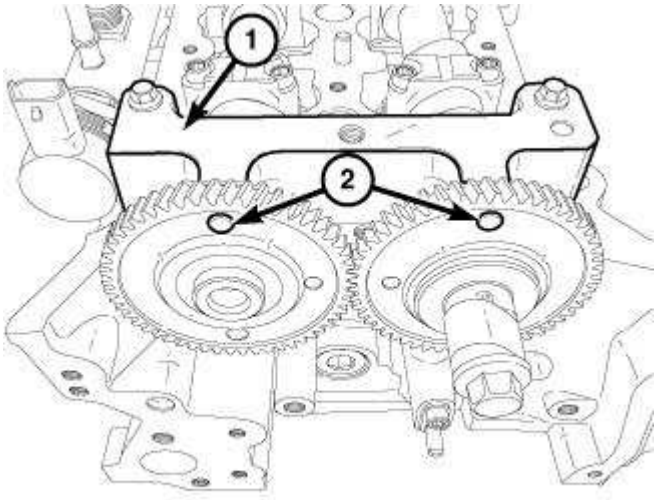


Fig. 79: Camshaft Timing Tool & Sprockets Holes - Left
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts and the left (special tool #VM.10338-2, Timing Tool, Camshaft (Left)) (1).
5. **Check the camshafts end play using (special tool #C-3339A, Set, Dial Indicator). End play should be between 0.1 mm - 0.3 mm (0.003 in. - 0.011 in.). If the camshaft endplay is not within specification, replace the cylinder head.**

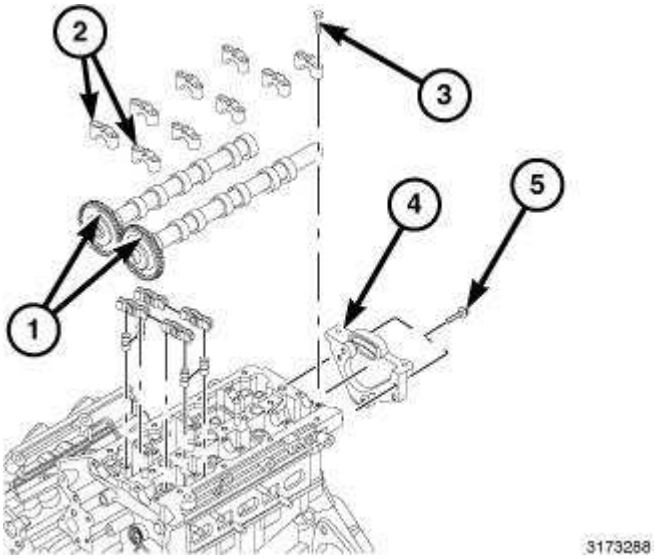


Fig. 80: Left Side Intake & Exhaust Camshaft, Camshaft Bearing Caps & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make a reference in the order the camshaft bearing caps were removed.

6. Remove bolts (3) and the intake and exhaust camshaft bearing caps (2).
7. Remove the left side intake and exhaust camshaft (1).

RIGHT BANK

1. Disconnect the negative battery cable.
2. Remove the right timing chain and sprocket. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

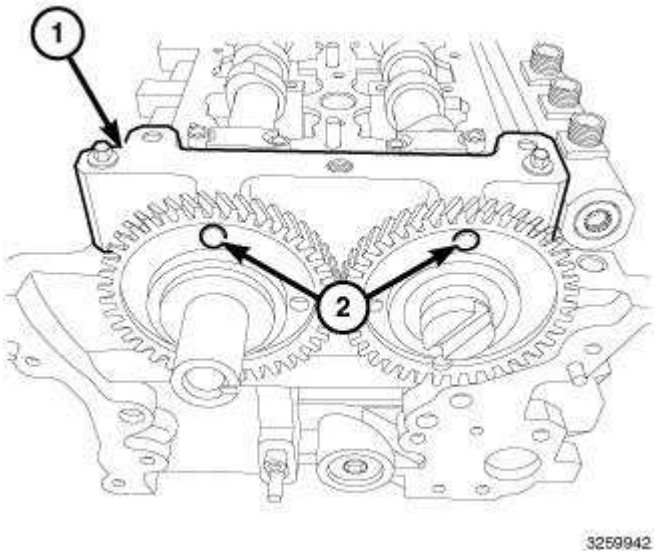


Fig. 81: Camshaft Timing Tool & Sprockets Holes - Right
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts and the right (special tool #VM.10338-1, Timing Tool, Camshaft (Right)) (1).
4. **Check the camshafts end play using (special tool #C-3339A, Set, Dial Indicator). End play should be between 0.1 mm - 0.3 mm (0.003 in. - 0.011 in.). If the camshaft endplay is not within specification, replace the cylinder head.**

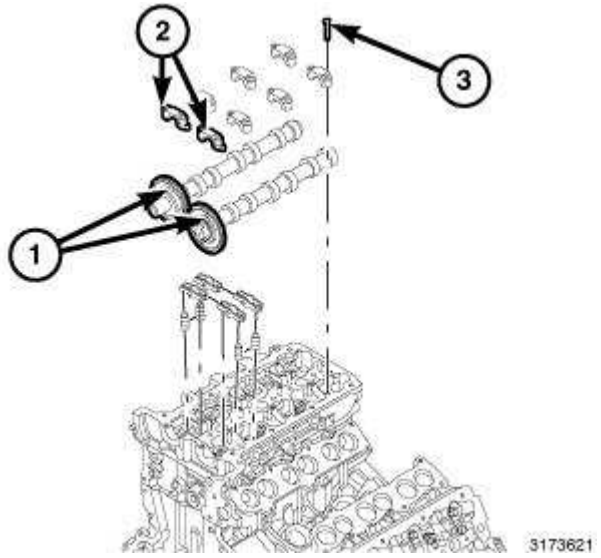


Fig. 82: Right Side Intake & Exhaust Camshaft, Camshaft Bearing Caps & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make a reference in the order the camshaft bearing caps were removed.

5. Remove bolts (3) and the intake and exhaust camshaft bearing caps (2).
6. Remove the right side intake and exhaust camshaft (1).

INSTALLATION

LEFT BANK

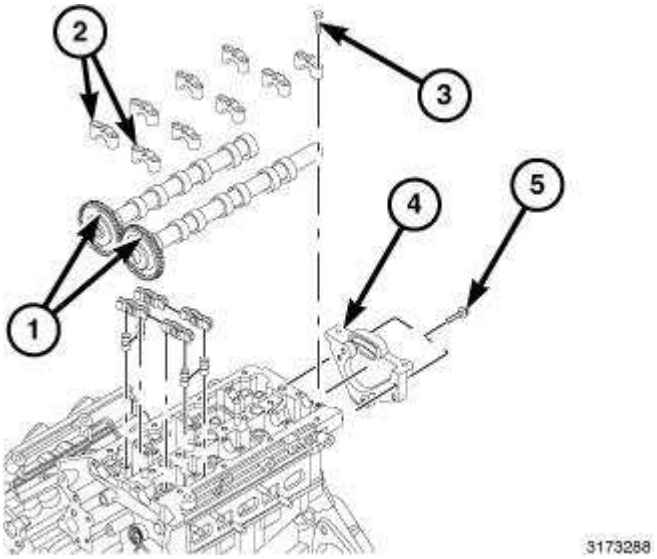


Fig. 83: Left Side Intake & Exhaust Camshaft, Camshaft Bearing Caps & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean all gasket sealing and mating surfaces.
2. Lubricate camshafts with Mopar® Engine Oil Supplement, or equivalent. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
3. Carefully install camshafts (1) onto cylinder head journals.

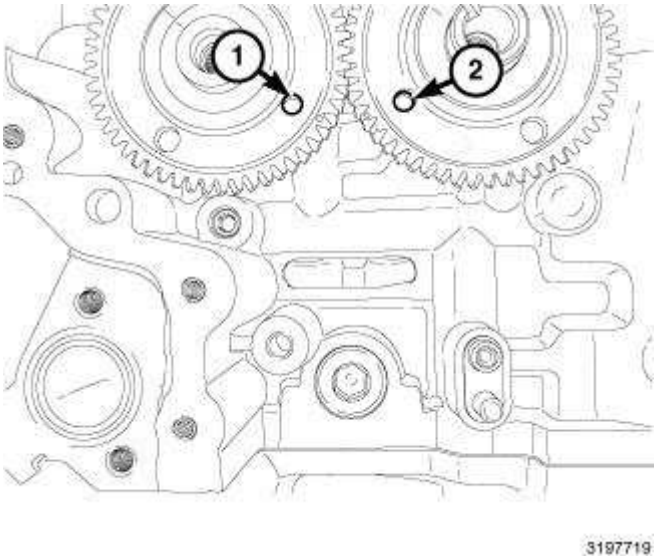


Fig. 84: Intake Camshaft Gear Timing Mark & Exhaust Camshaft Timing Gear Mark
Courtesy of CHRYSLER GROUP, LLC

4. Set the intake camshaft gear timing mark (1) at the four O'clock position and the exhaust camshaft timing gear mark (2) to the eight O'clock position as shown in illustration.

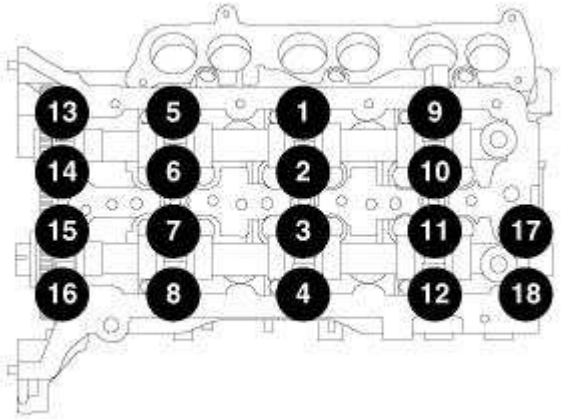


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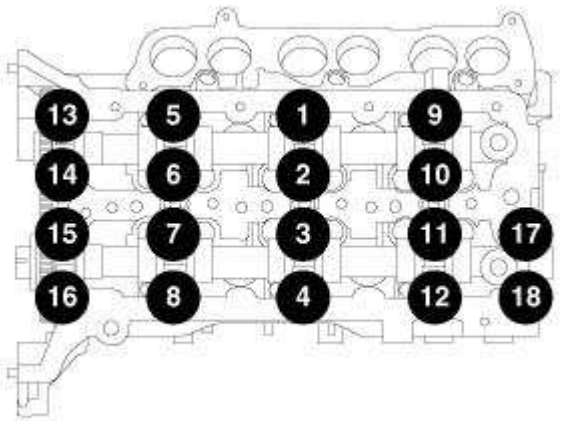
Fig. 85: Camshaft Bearing Cap Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing the bearing caps, be sure to install the "A" is on the intake side and the "S" is on the exhaust side in the rightful order.

5. Install the camshaft bearing caps 1 through 12, 17 and 18 in the rightful order and tighten each retaining bolt finger tight.
6. Check the camshaft for proper timing. Refer to **Engine/Valve Timing - Standard Procedure**.



3173223

Fig. 86: Camshaft Bearing Cap Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

7. Using the tightening sequence shown in illustration, tighten bolts to 11 N.m (97 in. lbs.).
8. Install the timing chain and sprocket. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.

9. Install the high pressure pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, INSTALLATION** .
10. Connect the negative battery cable.
11. Start engine and inspect for leaks.

RIGHT BANK

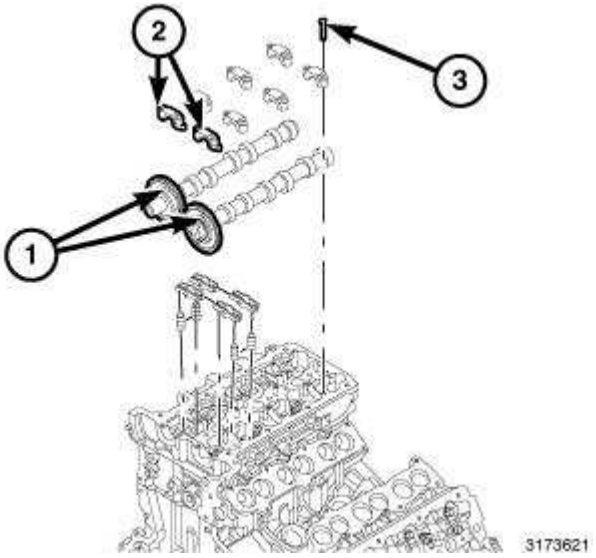


Fig. 87: Right Side Intake & Exhaust Camshaft, Camshaft Bearing Caps & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean all mating surfaces.
2. Lubricate camshafts with Mopar® Engine Oil Supplement, or equivalent. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
3. Carefully install camshafts (1) onto cylinder head journals.

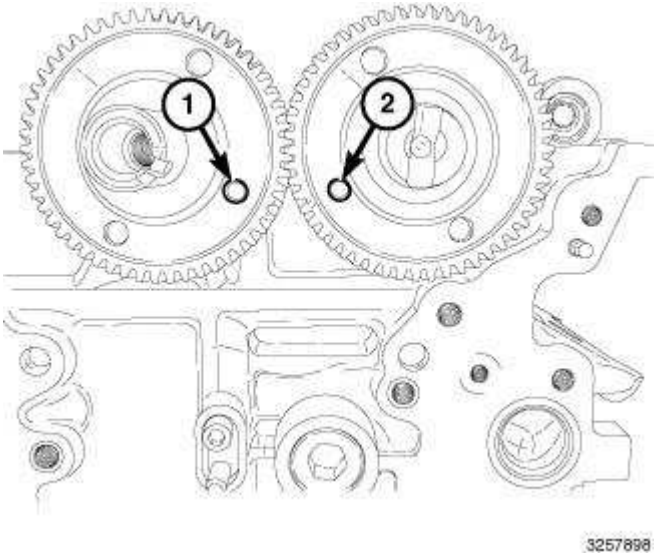


Fig. 88: Exhaust Camshaft Gear Timing Mark & Intake Camshaft Timing Gear Mark
Courtesy of CHRYSLER GROUP, LLC

4. Set the exhaust camshaft gear timing mark (1) at the four O'clock position and the intake camshaft timing gear mark (2) to the eight O'clock position.

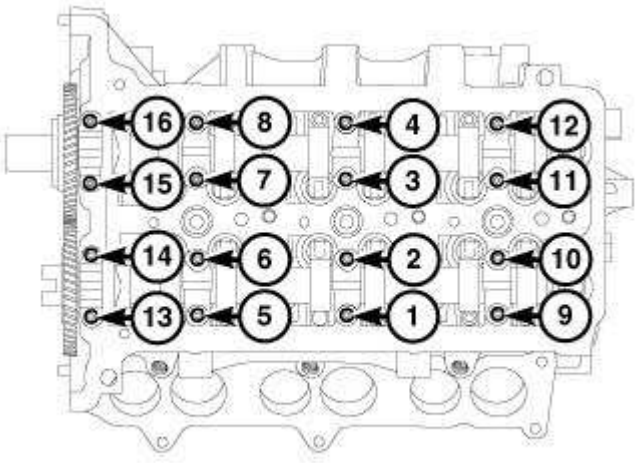


Fig. 89: Camshaft Bearing Cap Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing the bearing caps, be sure to install the "A" is on the intake side and the "S" is on the exhaust side in the rightful order.

5. Install the camshaft bearing caps 1 through 12, in the rightful order and tighten each retaining bolt finger tight.
6. Check the camshaft for proper timing. Refer to **Engine/Valve Timing - Standard Procedure**.

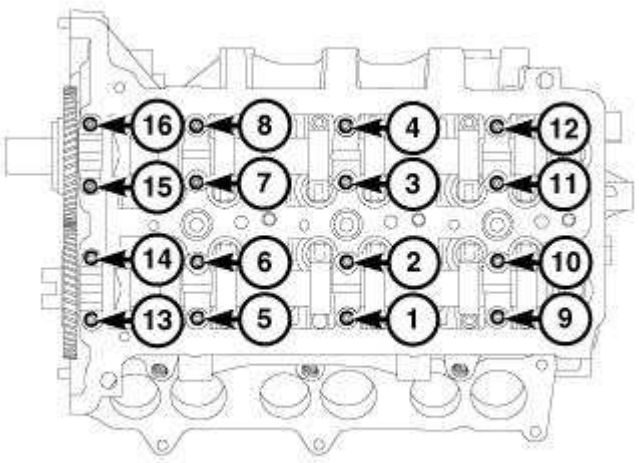


Fig. 90: Camshaft Bearing Cap Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

7. Using the tightening sequence shown in illustration, tighten bolts to 11 N.m (97 in. lbs.).
8. Install the right timing chain sprocket. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.
9. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
10. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, INSTALLATION** .
11. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
12. Connect the negative battery cable.
13. Start engine and inspect for leaks.

COVER(S), CYLINDER HEAD

DESCRIPTION

DESCRIPTION

The 3.0L cylinder head cover is made of an injection molded composite and is used to cover the camshafts, lifters and followers.

REMOVAL

RIGHT BANK

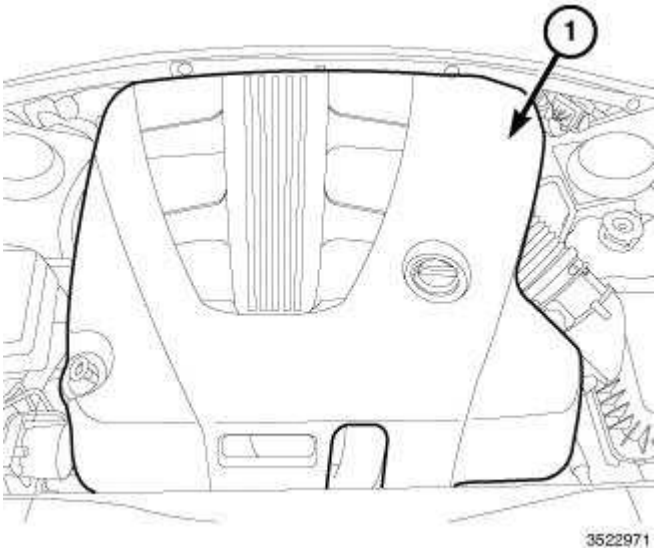


Fig. 91: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .
5. Remove the lower engine oil dipstick bolt.
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
7. Lower the vehicle.

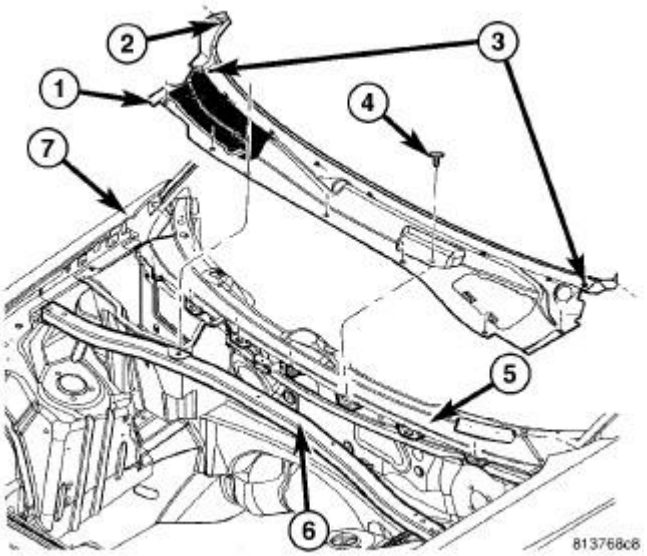


Fig. 92: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Remove the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, REMOVAL** .
9. Remove bolts and the strut support brace (6).
10. Remove fasteners and the rear engine compartment heat shield.

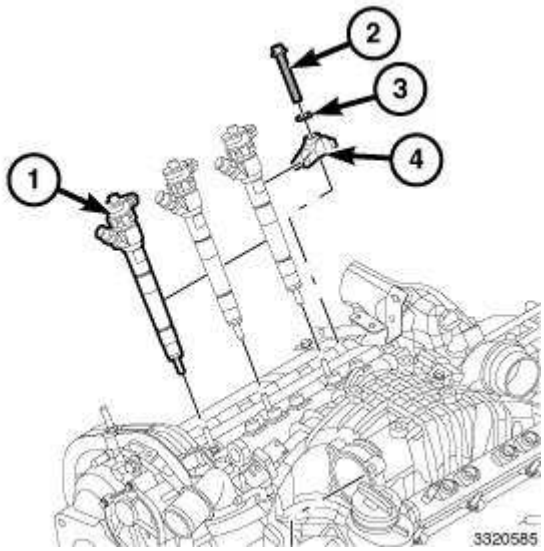


Fig. 93: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

11. Remove the right side fuel injectors. Refer to **INJECTOR(S), FUEL, REMOVAL** .
12. Remove the generator. Refer to **GENERATOR, REMOVAL** .

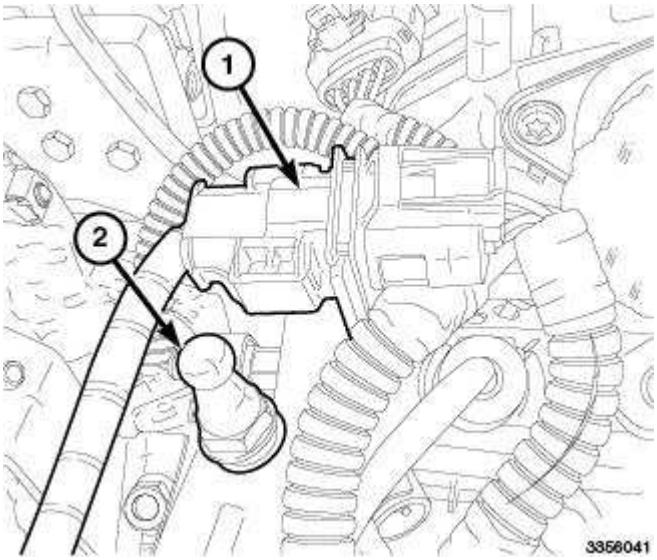


Fig. 94: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the oxygen sensor wiring harness connector (1).
14. Remove the ball stud fastener (2) securing upper trans fill tube bracket.
15. Remove nut and the engine oil dip stick.

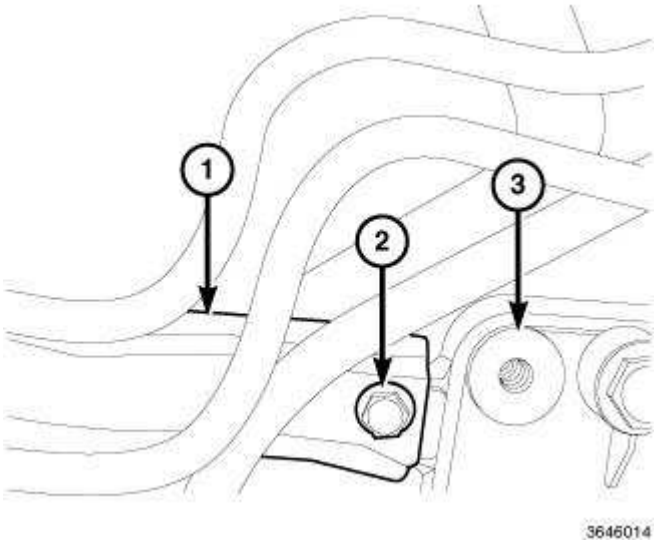


Fig. 95: Fuel Line Support Bracket, Generator Mounting Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

16. Remove bolt (2) securing the fuel line support bracket (1) to generator mounting bracket (3).

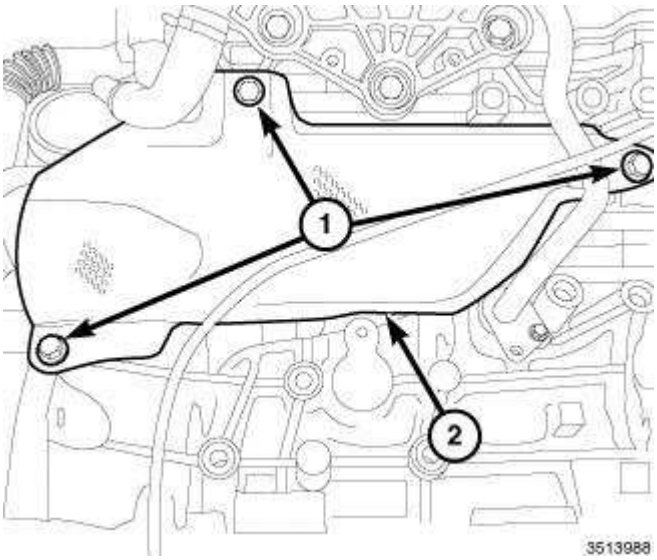


Fig. 96: Right Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove bolts (1) and the right exhaust manifold heat shield (2).

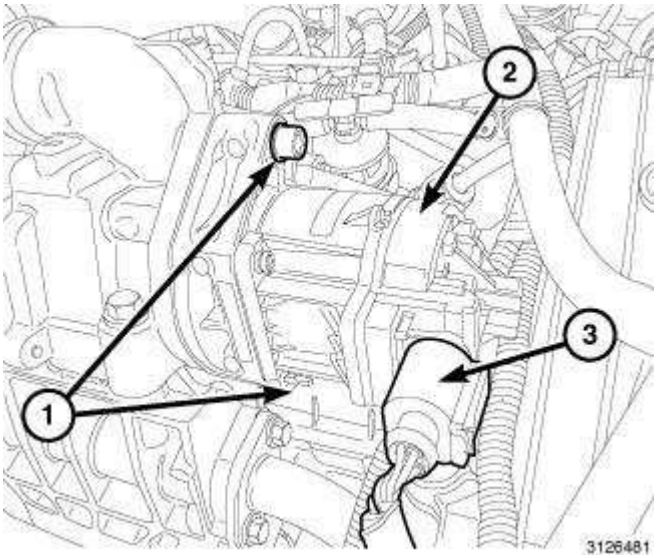


Fig. 97: EGR Valve, Bolts & Connector
Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the EGR valve harness connector (2).

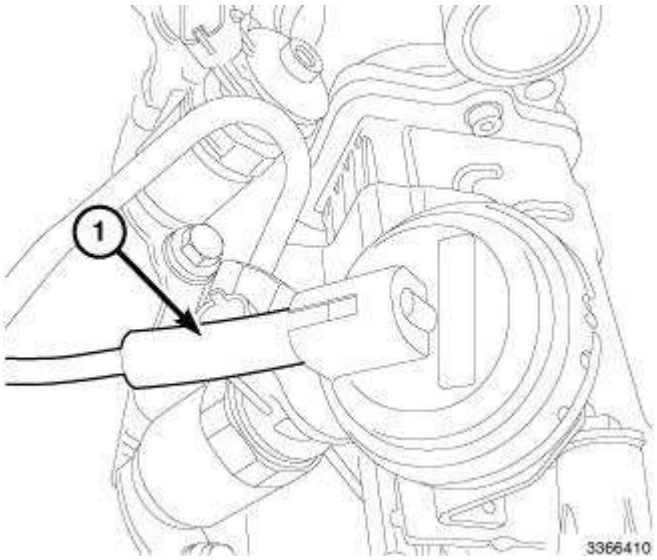


Fig. 98: EGR Cooler Vacuum Bypass Hose
Courtesy of CHRYSLER GROUP, LLC

19. Disconnect the EGR cooler vacuum bypass hose (1).

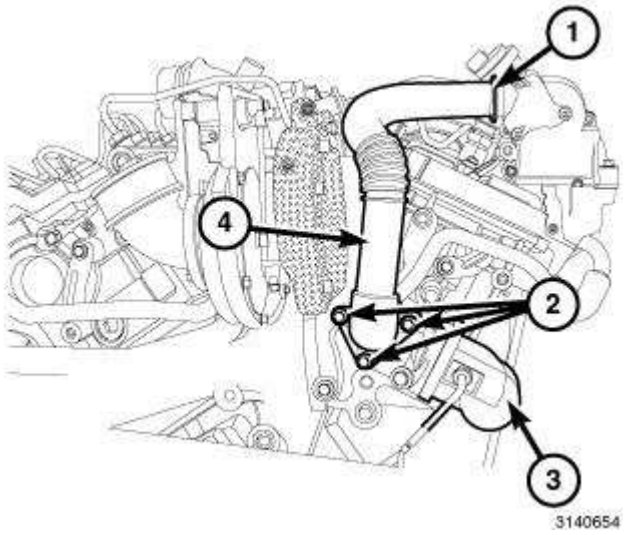


Fig. 99: Turbocharger-To-EGR Cooler Tube Clamp
Courtesy of CHRYSLER GROUP, LLC

20. Remove the turbocharger-to-EGR cooler tube clamp (1).

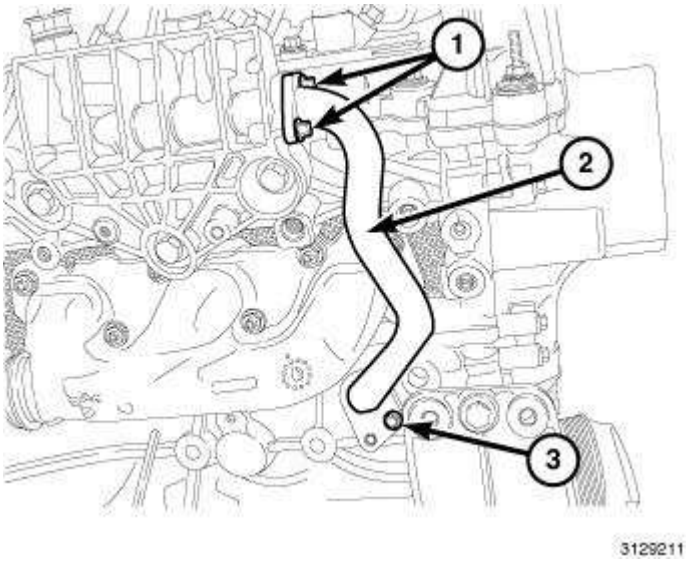


Fig. 100: EGR Cooler Coolant Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove bolts (1 and 3) and the EGR cooler coolant tube (2).

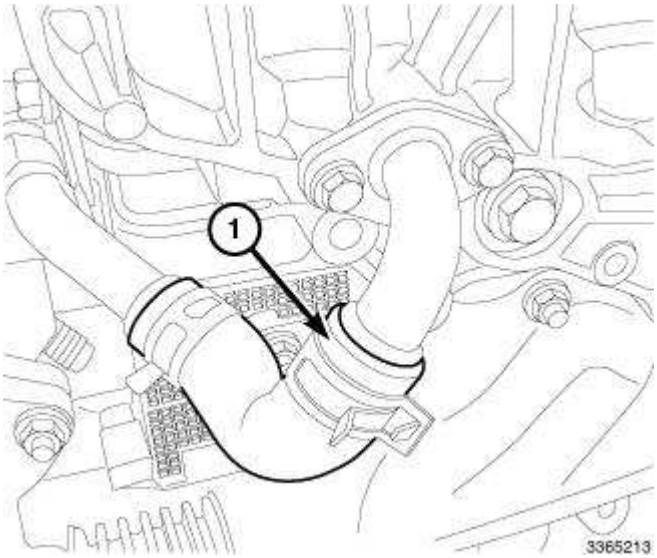


Fig. 101: EGR Cooler Supply Hose
Courtesy of CHRYSLER GROUP, LLC

22. Disconnect the EGR cooler supply hose (1).

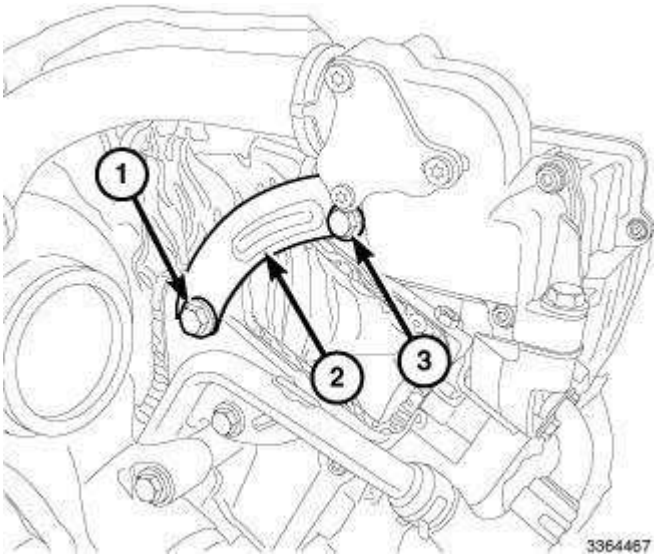


Fig. 102: EGR Cooler Bypass Valve Support Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

23. Loosen bolt (1) securing EGR cooler bypass valve support bracket (2).
24. Remove bolt (3) at the rear EGR cooler bypass valve support bracket (2).

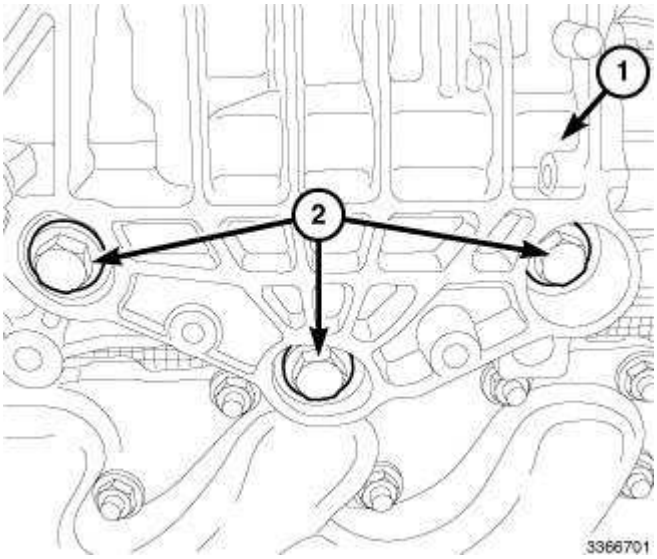


Fig. 103: Cooler Assembly Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

25. Remove bolts (2) and the EGR and cooler assembly bracket (1).

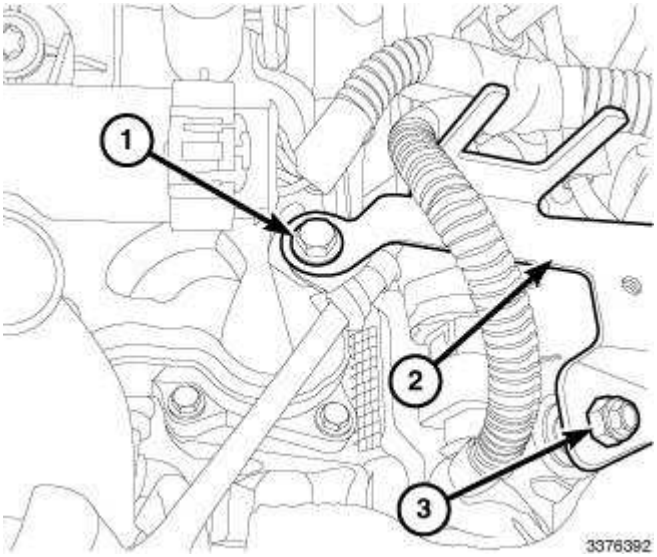


Fig. 104: Oxygen Sensor Harness Connector Bracket & Fasteners
Courtesy of CHRYSLER GROUP, LLC

26. Remove the engine cover ball stud bracket at front of right cylinder head cover.
27. Remove bolt (1), nut (3) and the oxygen sensor harness connector bracket (2).

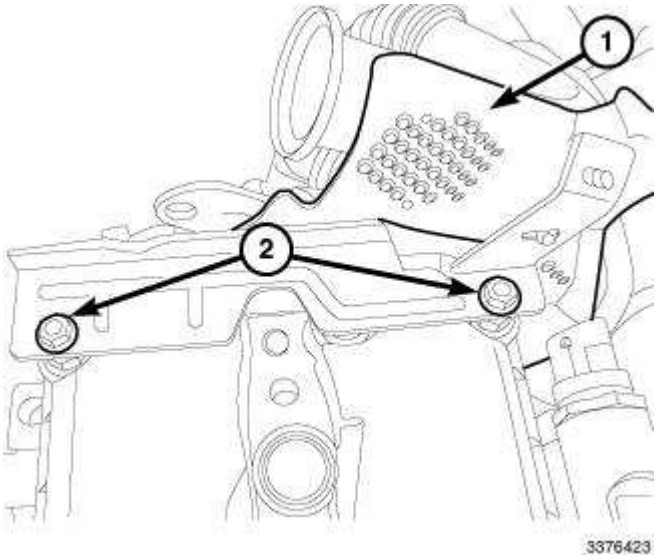


Fig. 105: Turbocharger-To-EGR Supply Tube Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

28. Remove nuts (2) and the turbocharger-to-EGR supply tube heat shield (1).

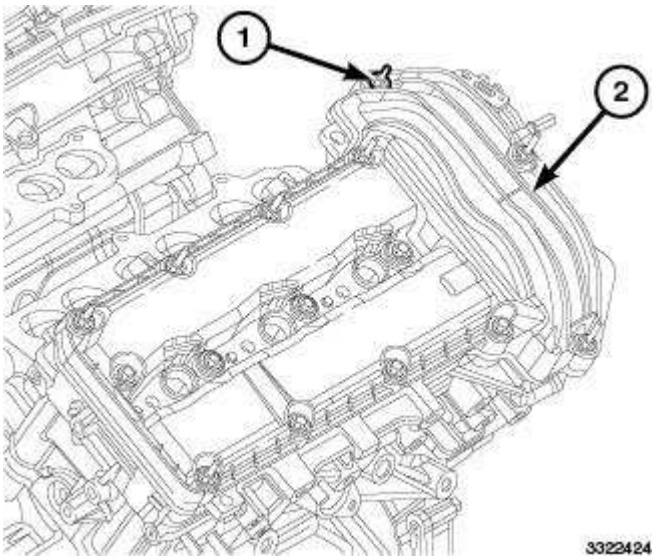


Fig. 106: Cylinder Head Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

29. Remove bolts (1) and the cylinder head cover (2).

LEFT BANK

1. Disconnect the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .

4. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
5. Lower the vehicle.

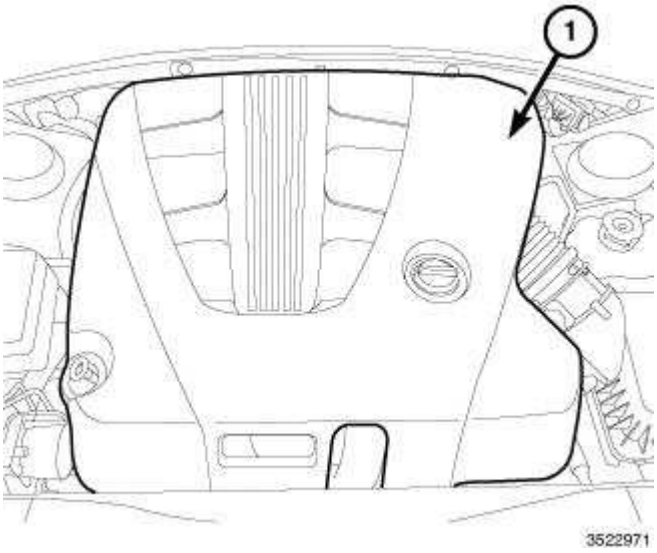


Fig. 107: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

6. Remove the engine cover (1).

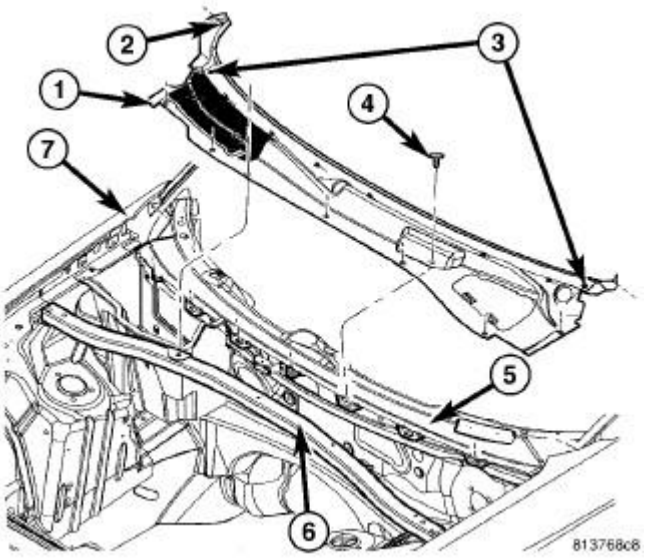


Fig. 108: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Remove the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, REMOVAL** .
8. Remove bolts and the strut support brace (6).
9. Remove fasteners and the rear engine compartment heat shield.

10. Remove air cleaner body and intake air tube. Refer to **BODY, AIR CLEANER, REMOVAL**.

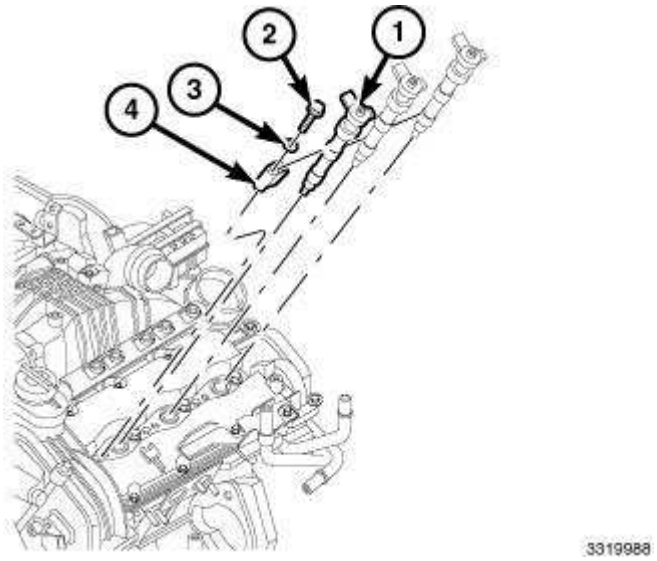


Fig. 109: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

11. Remove the fuel injectors. Refer to **INJECTOR(S), FUEL, REMOVAL** .

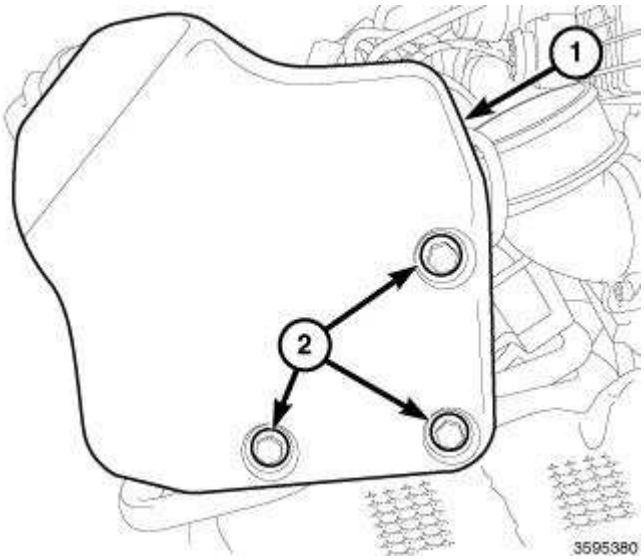


Fig. 110: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove bolts (2) and the high pressure pump blocker (1).

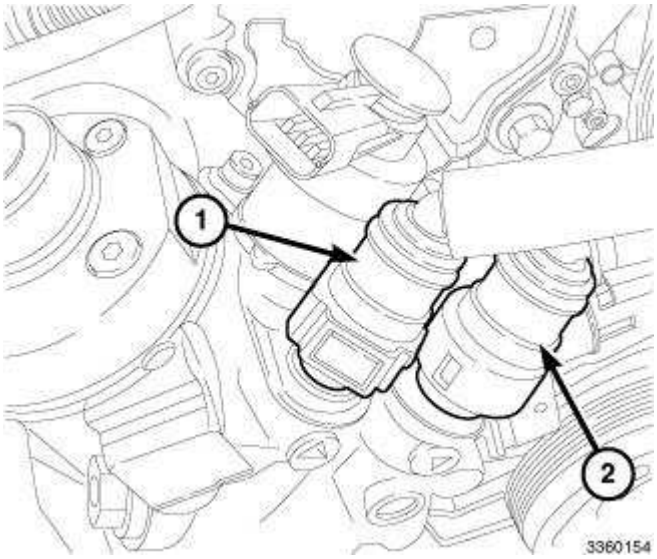


Fig. 111: Return Line & Low Pressure Supply Line
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the low pressure supply (2) and return (1) lines from high pressure pump. Refer to **FITTING, QUICK CONNECT** .
14. Disconnect the brake booster vacuum hose.
15. Disconnect the two heater hoses at bulk head.
16. Remove nuts and the support bracket securing coolant tube, brake booster hose, and fuel lines.

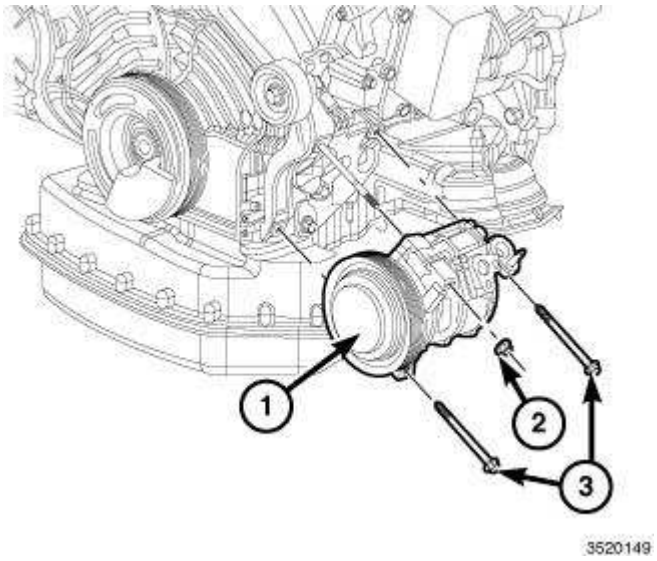


Fig. 112: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the A/C compressor (1) wire harness connector.

NOTE: Removal of the A/C compressor does not require the refrigerant to be

evacuated.

18. Remove nut (2) and two bolts (3) and position aside A/C compressor (1).

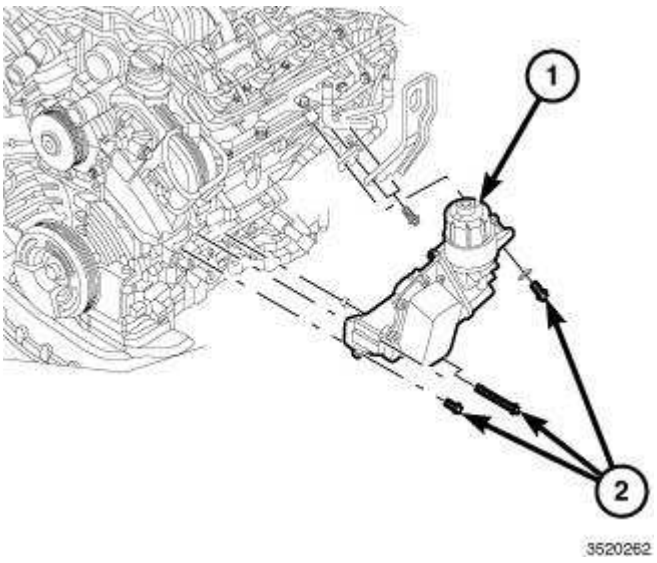


Fig. 113: Oil Cooler Adapter Assembly
Courtesy of CHRYSLER GROUP, LLC

19. Remove the oil cooler adapter assembly. Refer to **ADAPTER, OIL COOLER, REMOVAL**.

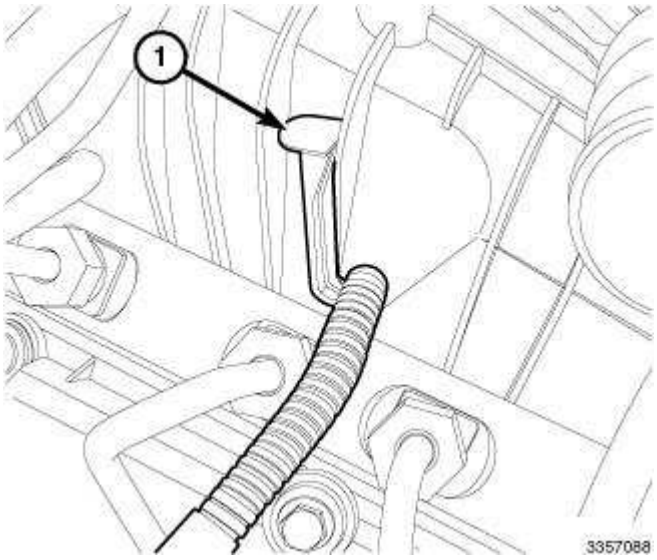


Fig. 114: Glow Plug Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

20. Disconnect glow plug wire harness connector (1).

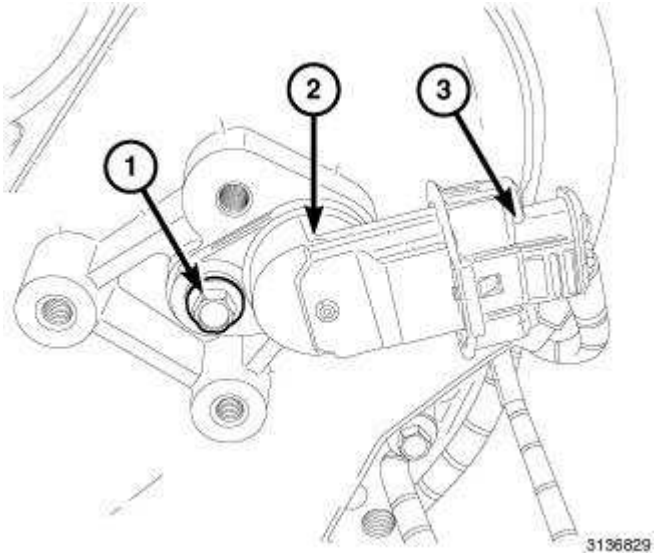


Fig. 115: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

21. Disconnect Camshaft Position (CMP) sensor wire harness connector (3).

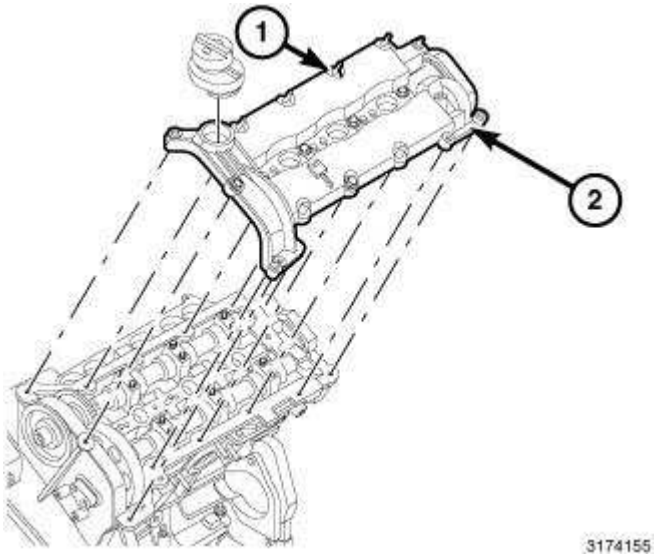


Fig. 116: Left Cylinder Head Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

22. Loosen bolts (1) and remove the left cylinder head cover (2).

INSTALLATION

RIGHT BANK

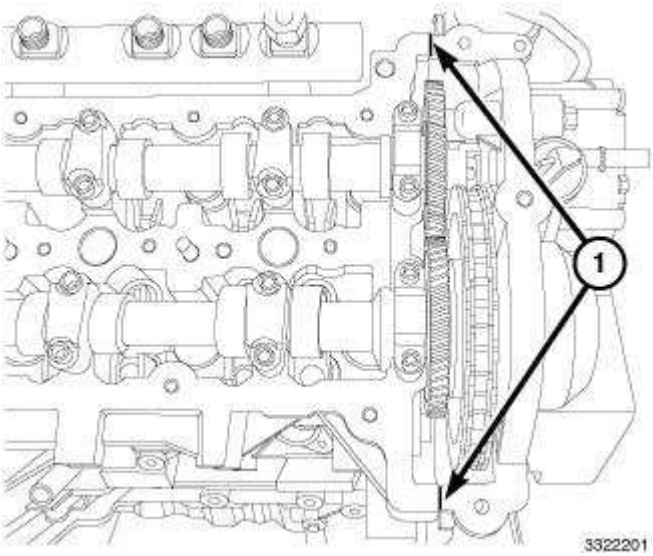


Fig. 117: RTV Sealant At The T-Joints
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect all sealing surfaces. Refer to **Engine - Standard Procedure**.
2. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant at the T-joint (1). Refer to **Engine - Standard Procedure**.

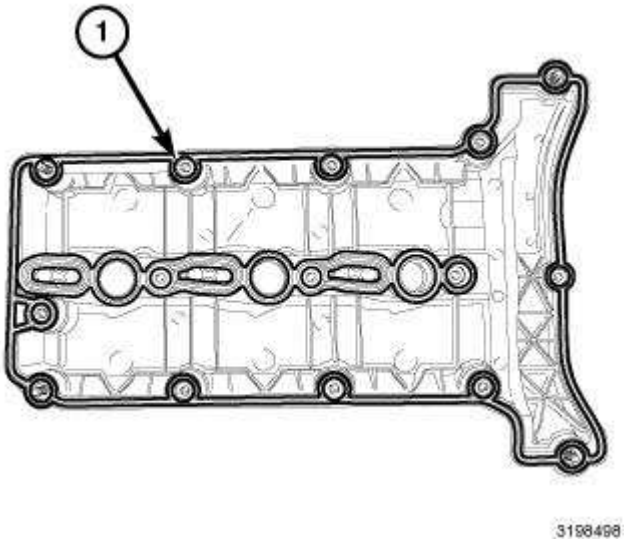


Fig. 118: Cylinder Head Cover Gasket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Cylinder head cover gasket is not a serviceable item.

3. Inspect the cylinder head cover gasket (1), if damaged replace the cylinder cover.

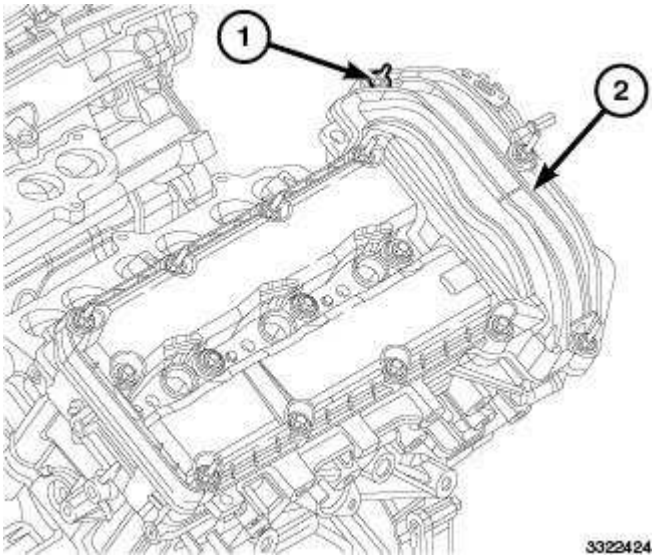


Fig. 119: Cylinder Head Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the cylinder head cover (2) and tighten bolts finger tight (1).

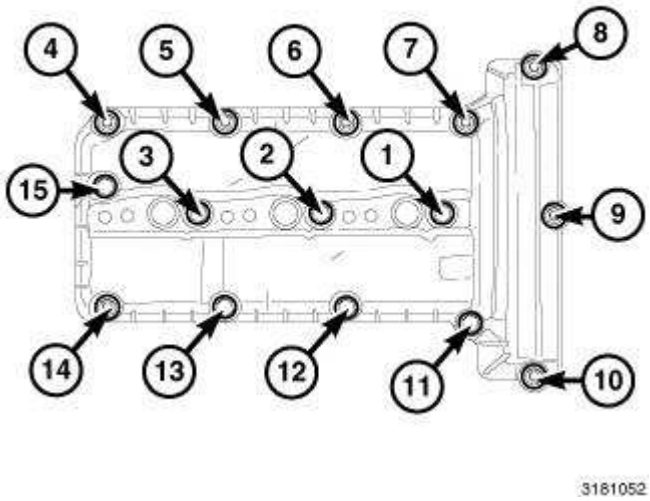


Fig. 120: Cylinder Head Cover Bolt Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

5. Using the tightening sequence shown in illustration, tighten the bolts to 10 N.m (89 in. lbs.).

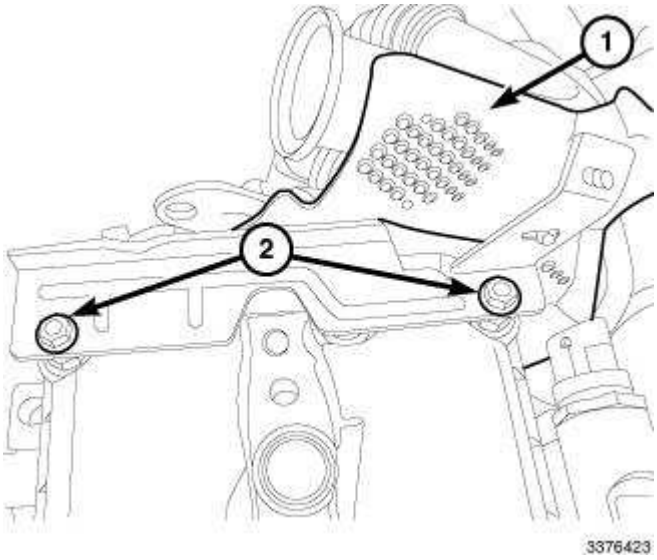


Fig. 121: Turbocharger-To-EGR Supply Tube Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the turbocharger-to-EGR supply tube heat shield (1). Tighten nuts (2) to 11 N.m (97 in. lbs.).

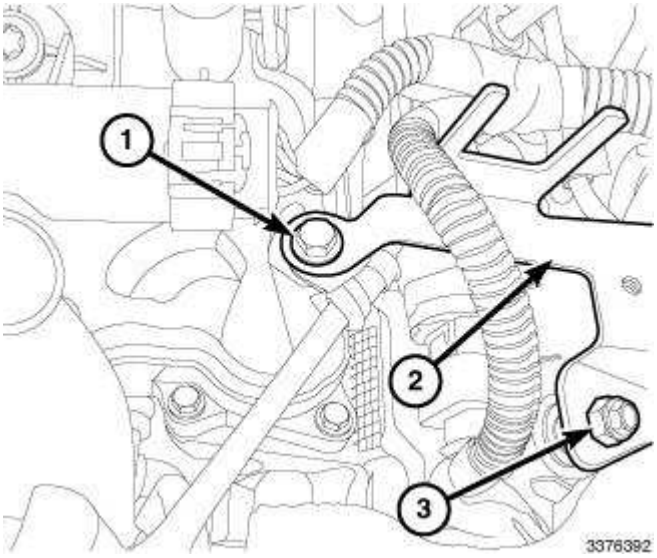


Fig. 122: Oxygen Sensor Harness Connector Bracket & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Install the oxygen sensor harness connector bracket (2). Tighten nut (3) and bolt (1) to 11 N.m (97 in. lbs.).
8. Remove the engine cover ball stud bracket at front of right cylinder head cover and tighten to 11 N.m (97 in. lbs.).

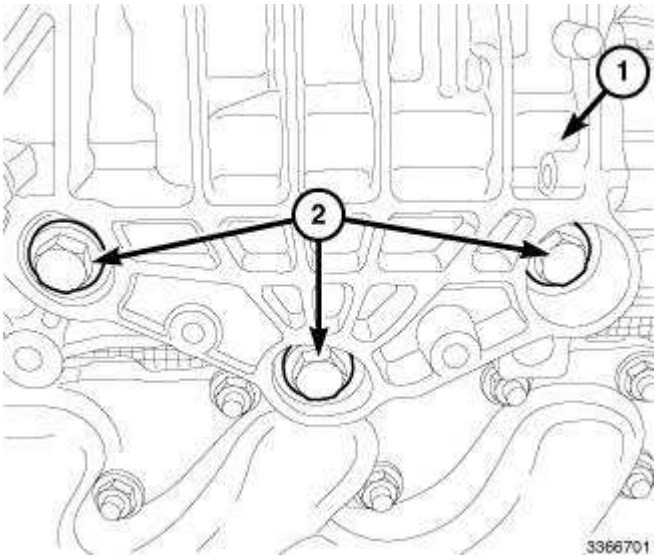


Fig. 123: Cooler Assembly Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the EGR and cooler assembly bracket (2). Tighten bolts to 45 N.m (33 ft. lbs.).

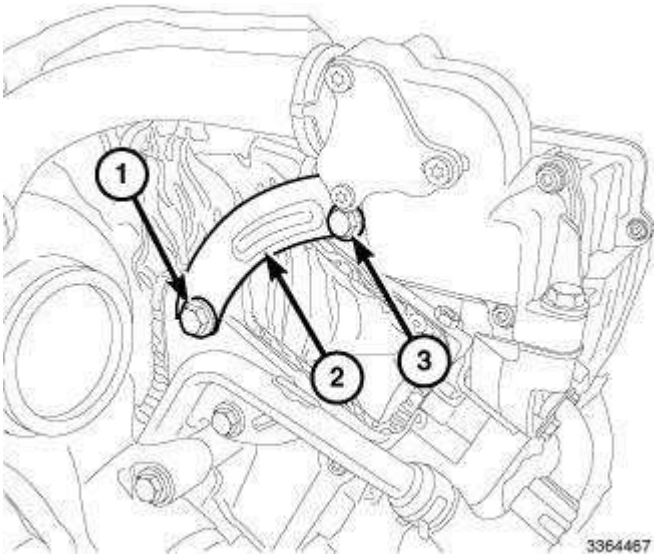


Fig. 124: EGR Cooler Bypass Valve Support Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Install bolt (3) at the rear EGR cooler bypass valve support bracket (2) and tighten to 25 N.m (18 ft. lbs.).
11. Tighten bolt (1) securing EGR cooler bypass valve support bracket (2) to 25 N.m (18 ft. lbs.).

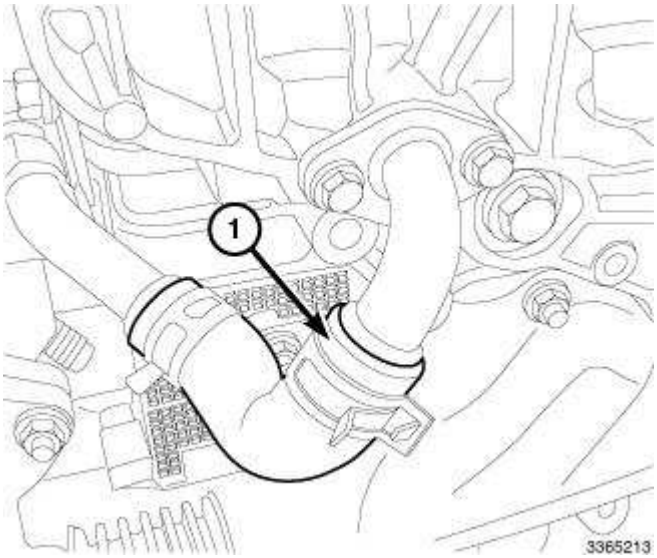


Fig. 125: EGR Cooler Supply Hose
Courtesy of CHRYSLER GROUP, LLC

12. Connect the EGR cooler supply hose (1).

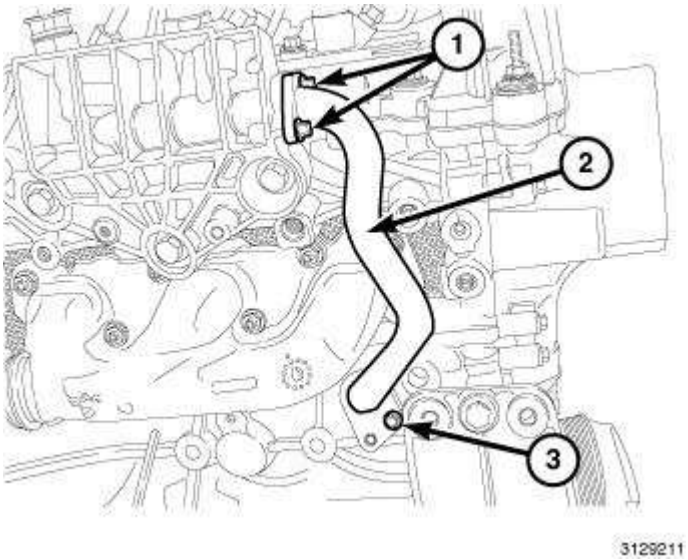


Fig. 126: EGR Cooler Coolant Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Using a new O-ring seal and gasket install the EGR cooler coolant tube (2). Tighten bolts (1 and 3) to 18 N.m (159 in. lbs.).

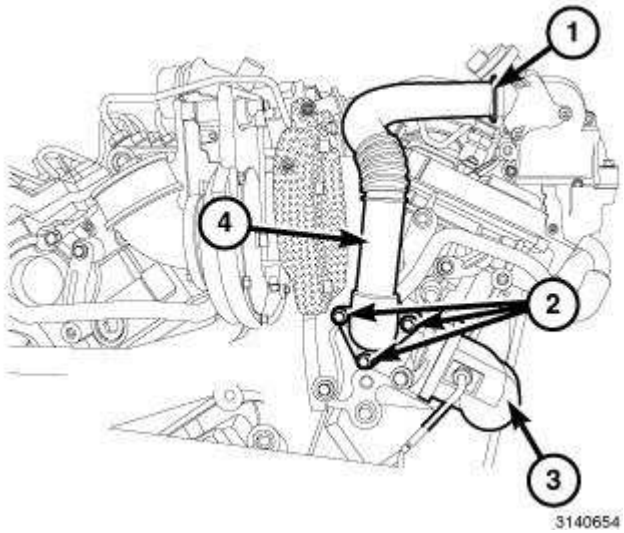


Fig. 127: Turbocharger-To-EGR Cooler Tube Clamp
Courtesy of CHRYSLER GROUP, LLC

14. Using a new gasket the turbocharger-to-EGR cooler tube and securely tighten clamp (1).

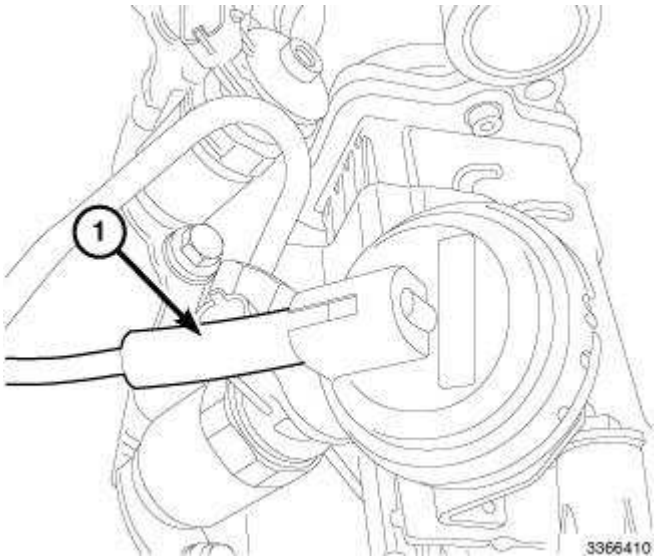


Fig. 128: EGR Cooler Vacuum Bypass Hose
Courtesy of CHRYSLER GROUP, LLC

15. Connect the EGR cooler vacuum bypass hose (1).

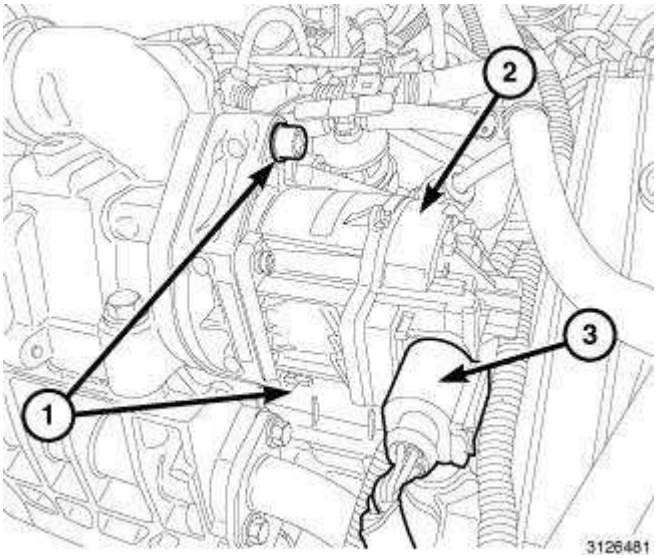


Fig. 129: EGR Valve, Bolts & Connector
Courtesy of CHRYSLER GROUP, LLC

16. Connect the EGR valve harness connector (2).

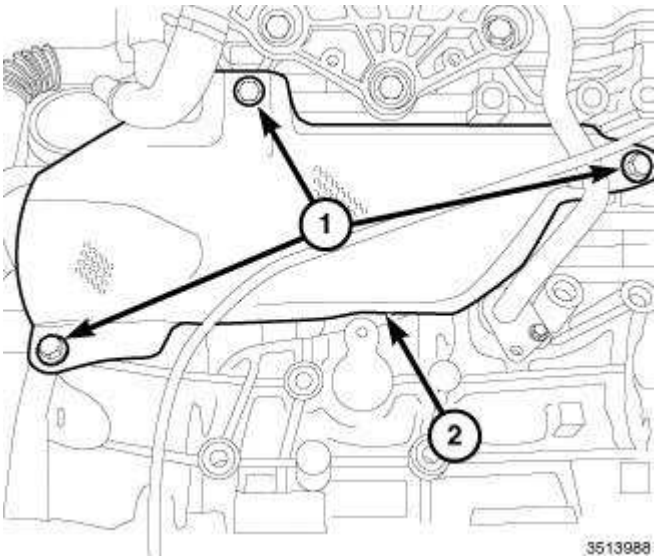


Fig. 130: Right Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Install the right exhaust manifold heat shield (2). Tighten bolts (1) to 15 N.m (133 in. lbs.).

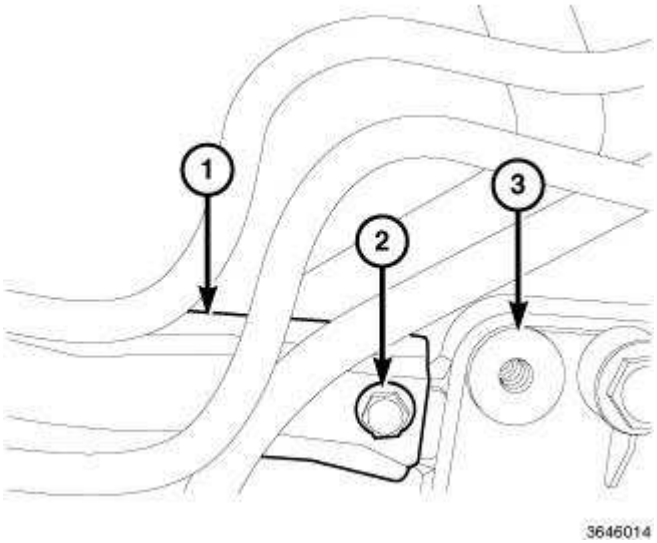


Fig. 131: Fuel Line Support Bracket, Generator Mounting Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

18. Install bolt (2) securing the fuel line support bracket (1) to generator mounting bracket (3) and tighten to 11 N.m (97 in. lbs.).

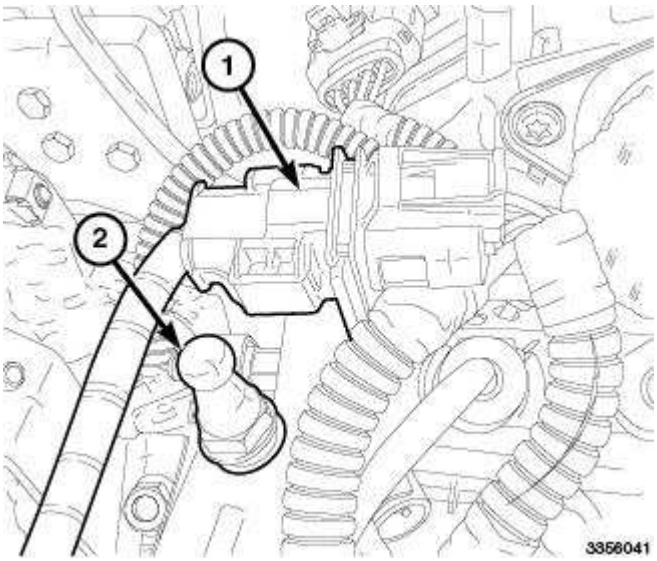


Fig. 132: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

19. Install the engine oil dip stick. Tighten nut to 11 N.m (97 in. lbs.).
20. Install the ball stud fastener (2) securing upper trans fill tube and tighten to 11 N.m (97 in. lbs.).
21. Connect the oxygen sensor wiring harness connector (1).
22. Install the generator. Refer to **GENERATOR, INSTALLATION** .

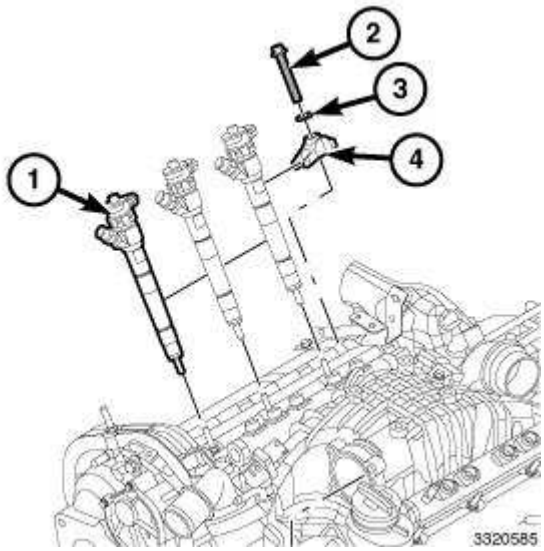


Fig. 133: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

23. Install the right side fuel injector. Refer to **INJECTOR(S), FUEL, INSTALLATION** .

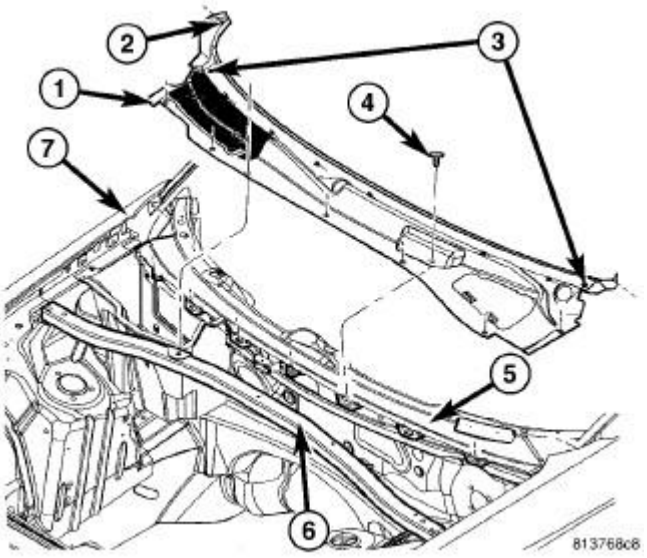


Fig. 134: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

24. Install the rear engine compartment heat shield and securely tighten the fasteners.
25. Install the strut support brace (6). Tighten bolts to 38 N.m (28 ft. lbs.).
26. Install the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .
27. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
28. Install the lower engine oil dipstick bolt. Tighten bolt to 11 N.m (97 in. lbs.).
29. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY**

PAN, INSTALLATION .

30. Lower the vehicle.

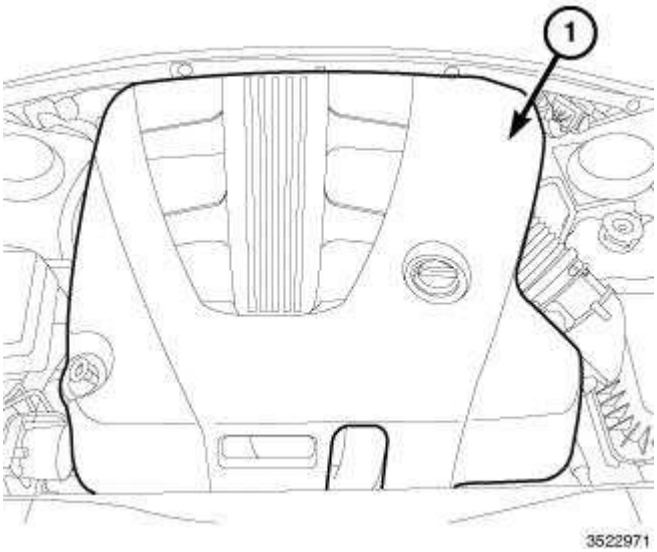


Fig. 135: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

31. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
32. Start the engine and inspect for leaks.
33. Install the engine cover (1).

LEFT BANK

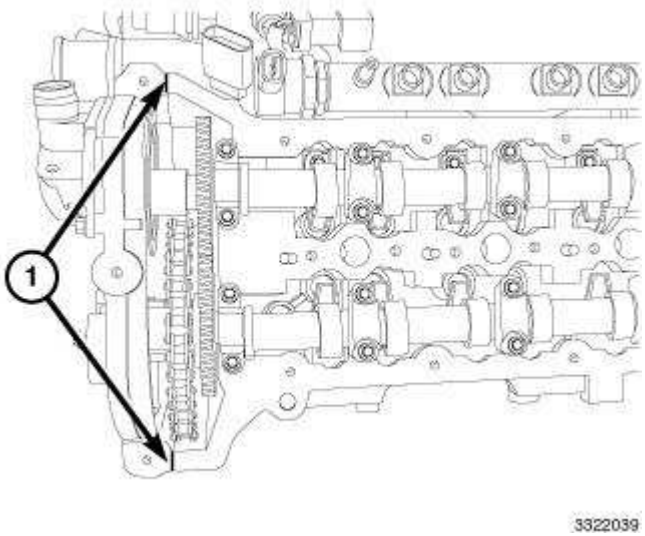


Fig. 136: Left Upper Timing Cover Excess RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect all sealing surfaces.

2. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant at the T-joint (1).

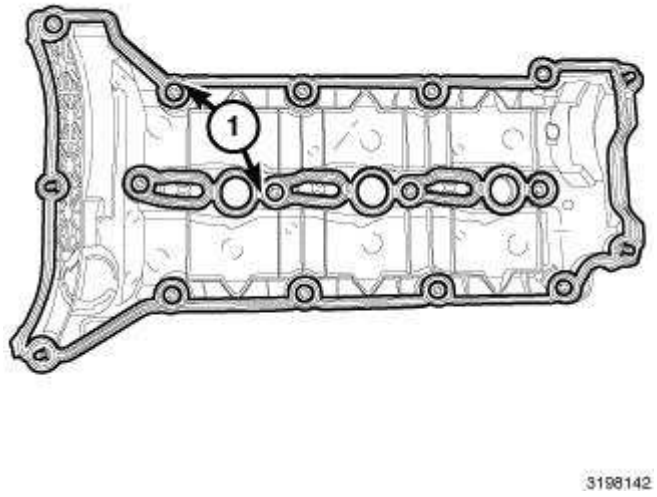


Fig. 137: Cylinder Head Cover Gasket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Cylinder head cover gasket is not a serviceable item.

3. Inspect the cylinder head cover gasket (1), if damaged replace the cylinder cover.

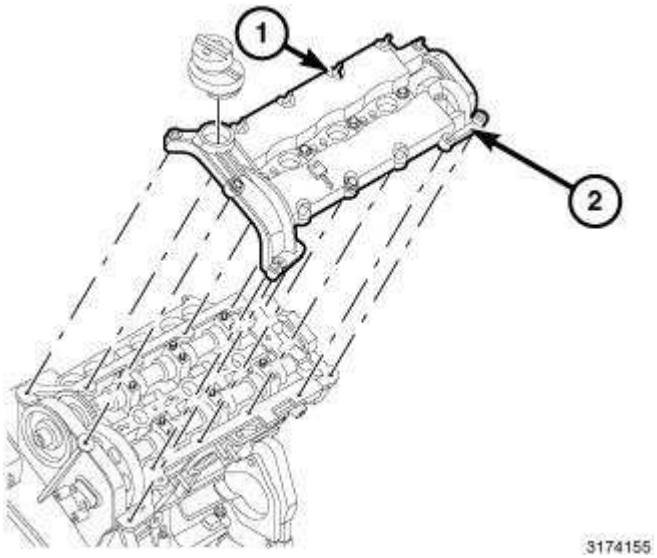


Fig. 138: Left Cylinder Head Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the cylinder head cover (2) and tighten bolts (1) finger tight.

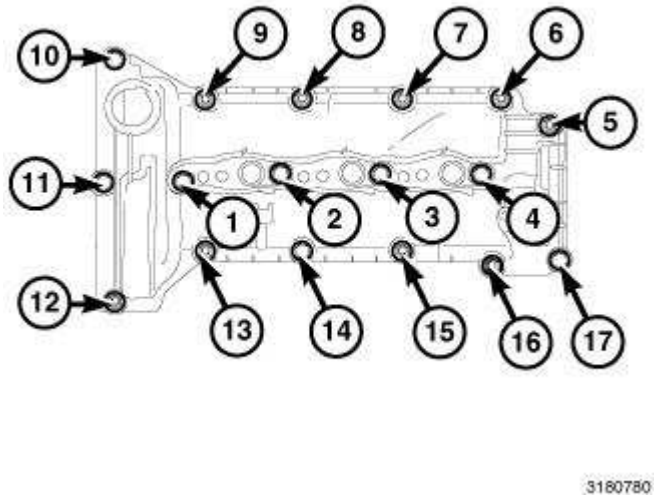


Fig. 139: Cylinder Head Cover Bolt Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

5. Using the tightening sequence shown in illustration, tighten bolts to 10 N.m (89 in. lbs.).

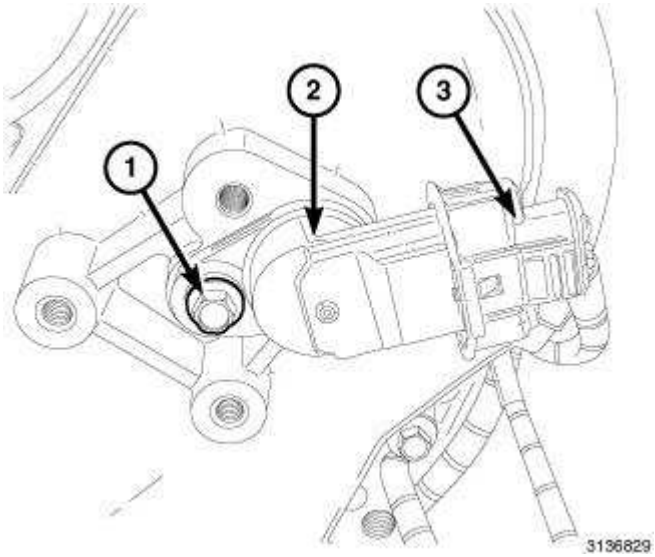


Fig. 140: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Connect Camshaft Position (CMP) sensor wire harness connector (3).

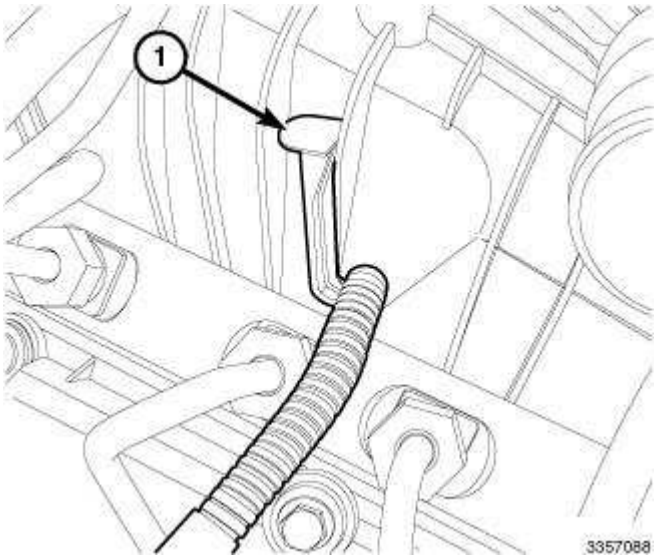


Fig. 141: Glow Plug Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. Connect glow plug wire harness connector (1).

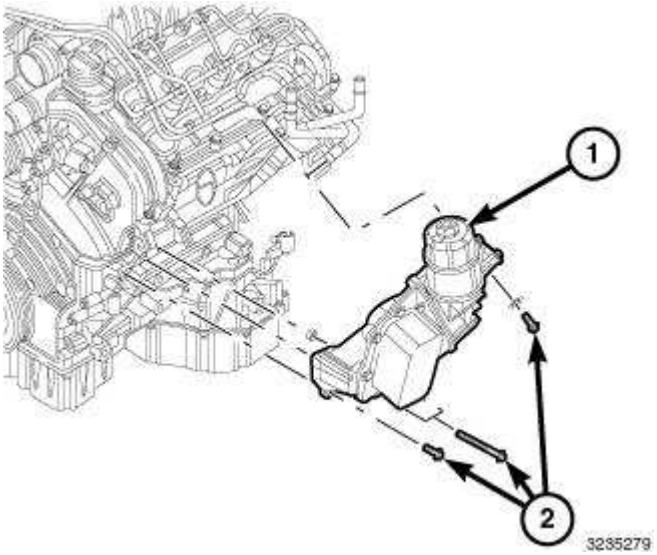


Fig. 142: Oil Cooler Adapter Assembly
Courtesy of CHRYSLER GROUP, LLC

8. Install the oil cooler adapter assembly. Refer to **ADAPTER, OIL COOLER, INSTALLATION**.

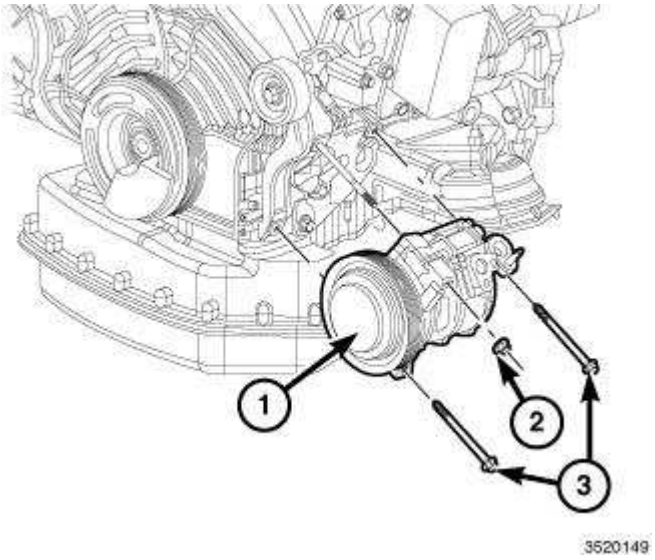


Fig. 143: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Install the A/C compressor (1). Tighten bolts (3) to 28 N.m (21 ft. lbs.).
10. Install the A/C compressor mounting stud. Tighten nut (2) to 28 N.m (21 ft. lbs.).
11. Connect the A/C compressor (1) wire harness connector.

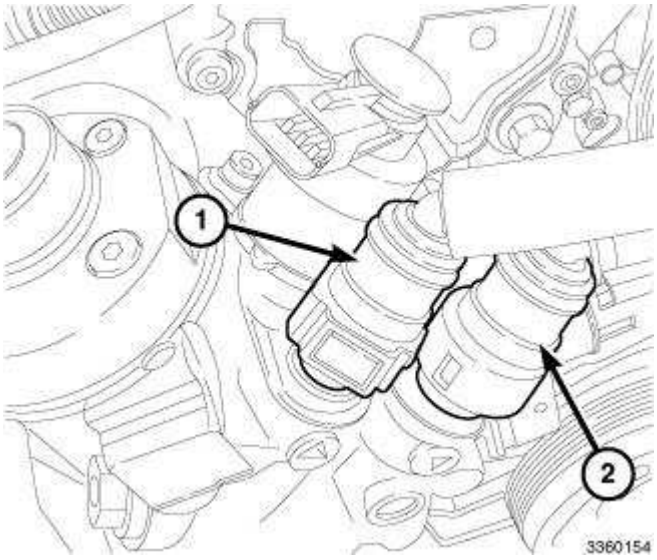


Fig. 144: Return Line & Low Pressure Supply Line
Courtesy of CHRYSLER GROUP, LLC

12. Install the support bracket securing coolant tube, brake booster hose, and fuel lines. Tighten nuts (2) to 11 N.m (97 in. lbs.).
13. Connect the two heater hoses at bulk head.
14. Connect the brake booster vacuum hose.
15. Connect the low pressure supply (2) and return (1) lines to the high pressure pump.

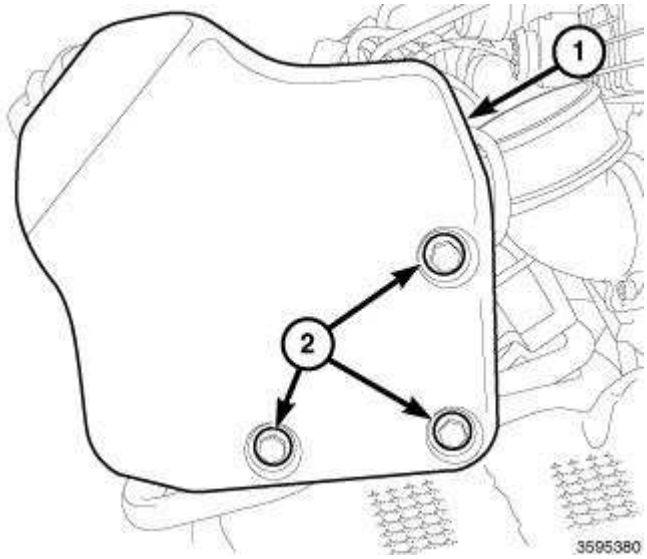


Fig. 145: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Install the fuel pump blocker (1). Tighten bolts (2) to 25 N.m (18 ft. lbs.).

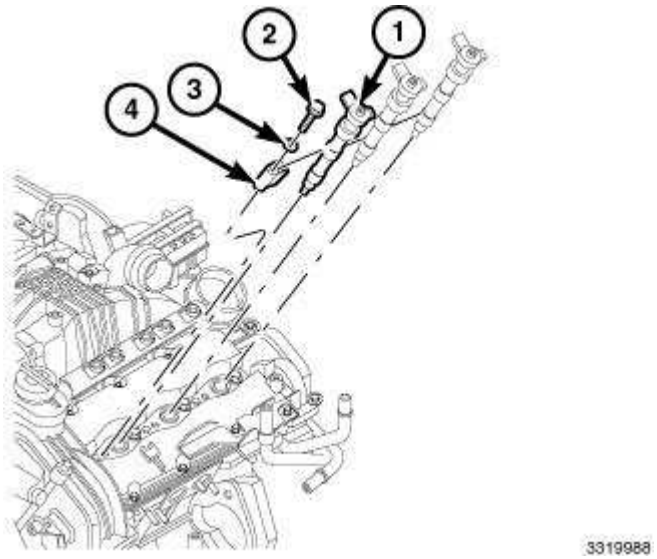


Fig. 146: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

17. Install the fuel injector. Refer to **INJECTOR(S), FUEL, INSTALLATION** .

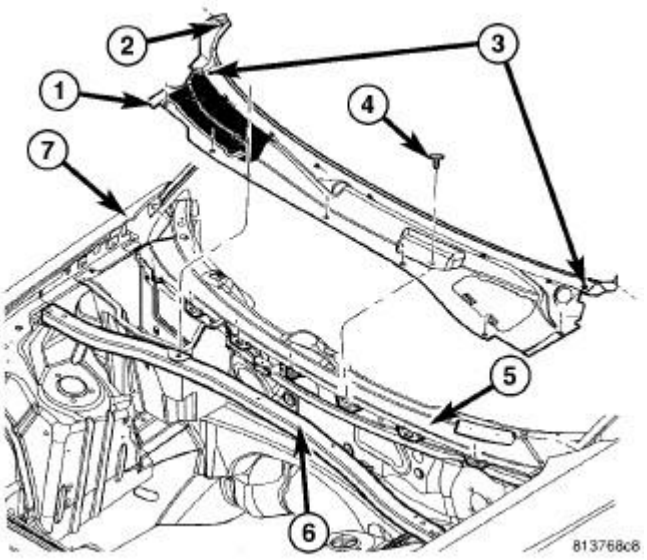


Fig. 147: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

18. Install air cleaner body and turbocharger inlet hose. Refer to **BODY, AIR CLEANER, INSTALLATION**.
19. Install the rear engine compartment heat shield and securely tighten the fasteners.
20. Install the strut support brace (6). Tighten bolts to 38 N.m (28 ft. lbs.).
21. Install the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .
22. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
23. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .
24. Lower the vehicle.

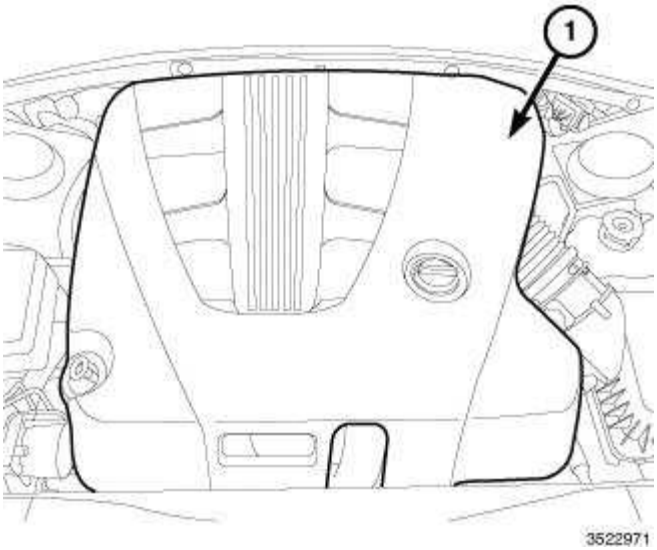


Fig. 148: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

25. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
26. Connect the negative battery cable.
27. Start the engine and inspect for leaks.
28. Install the engine cover (1).

LIFTER(S), HYDRAULIC

DESCRIPTION

DESCRIPTION

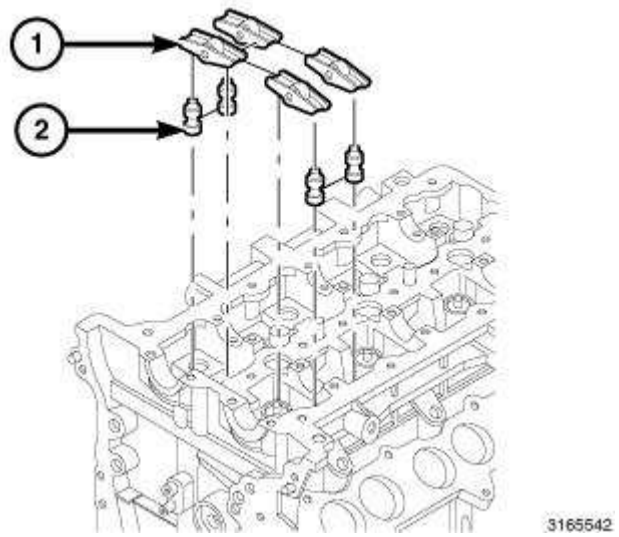


Fig. 149: Rocker Arms & Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

Valve lash is controlled by hydraulic lifters located inside the cylinder head, in tappet bores below the camshafts.

REMOVAL

REMOVAL

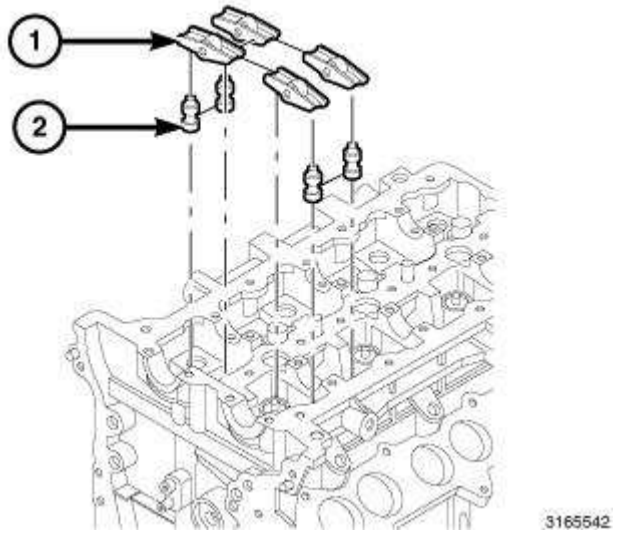


Fig. 150: Rocker Arms & Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

1. Remove the appropriate camshafts. Refer to **CAMSHAFT, ENGINE, REMOVAL**.

NOTE: When the lifters are removed from the engine, they must be stored upright and in clean conditions.

2. Remove the rocker arm (1) and lifter (2) assembly.

INSPECTION

INSPECTION

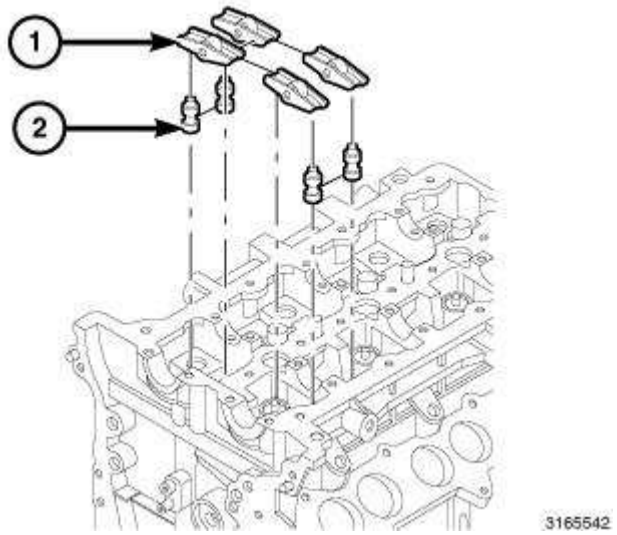


Fig. 151: Rocker Arms & Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

1. Clean each lifter assembly in cleaning solvent to remove all varnish and sludge deposits. Inspect for indications of scuffing on the side and base of each lifter body (2).
2. Squeeze the lifter and be sure that the spring returns the lifter to its correct position.
3. Inspect the rocker arm (1) roller for damage or excessive wear.
4. Replace any worn or damaged components.

INSTALLATION

INSTALLATION

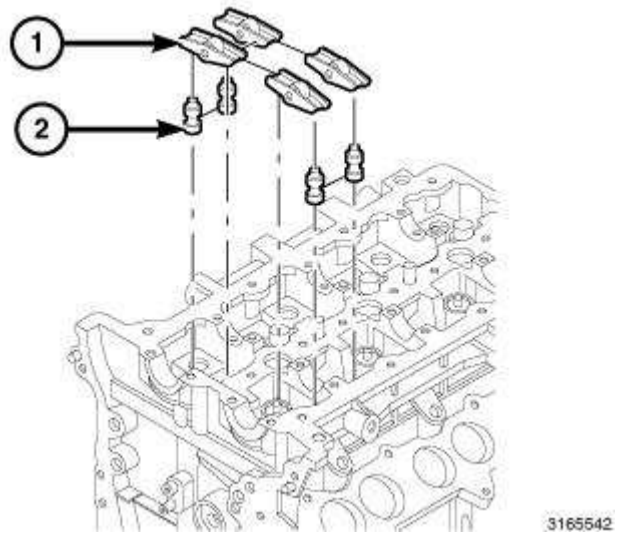


Fig. 152: Rocker Arms & Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When the lifters are removed from the engine, they must be stored upright and in clean conditions. Install the rocker arms and lifters in the same location as when removed.

CAUTION: Replacement of the camshaft will also require replacement of the rocker arms and lifters.

NOTE: Rocker arms and lifters must be installed in the same location as when removed.

1. Install the lifter (2) and the rocker arm (1) in the same location as noted during removal.
2. Install the camshaft(s). Refer to **CAMSHAFT, ENGINE, INSTALLATION**.

ROCKER ARM, VALVE

DESCRIPTION

DESCRIPTION

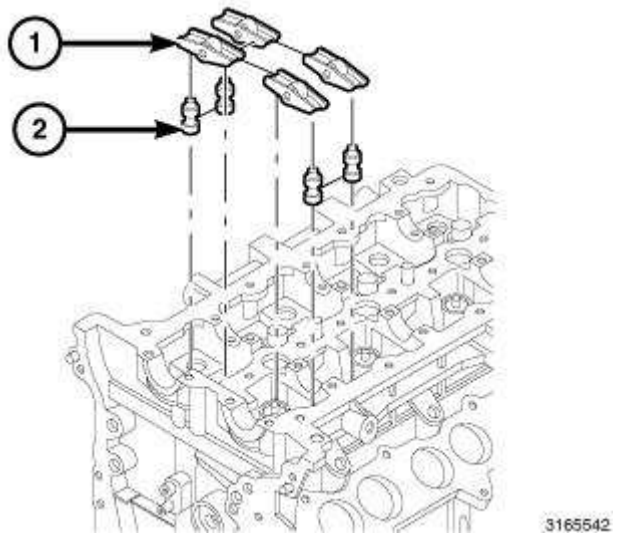


Fig. 153: Rocker Arms & Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

The rocker arms (1) are located on the top of the hydraulic lifters (2) and the valves. The rocker arms are held in position by resting on top of the valve and the hydraulic lifter pivoting ball. There is a spring clip that holds the rocker arm to the hydraulic lifters pivoting ball.

OPERATION

OPERATION

The rocker arms are used as a link between the camshaft and valves. As the camshaft rotates, the lobes of the camshafts apply downward pressure on the rocker arms. This pressure is then transmitted to the valves which causes the valves to open.

REMOVAL

REMOVAL

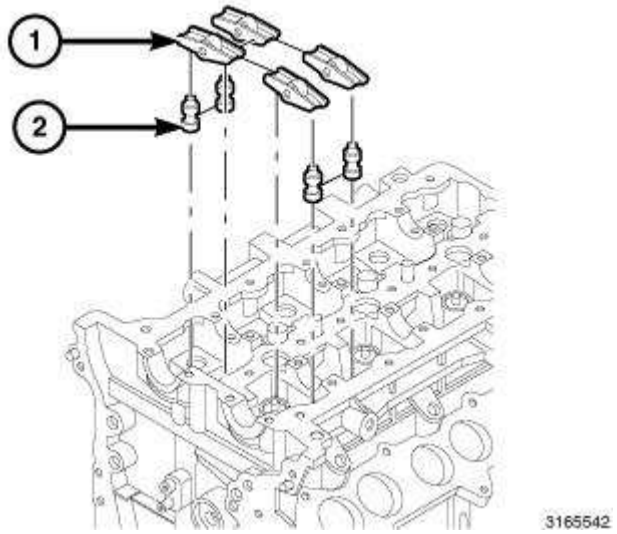


Fig. 154: Rocker Arms & Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

1. Remove the appropriate camshafts. Refer to **CAMSHAFT, ENGINE, REMOVAL**.

   NOTE: Rocker arms and lifters must be installed in the same location as when removed and stored in the up right position.

2. Remove the rocker arm (1) and lifter (2) assembly.

INSTALLATION

INSTALLATION

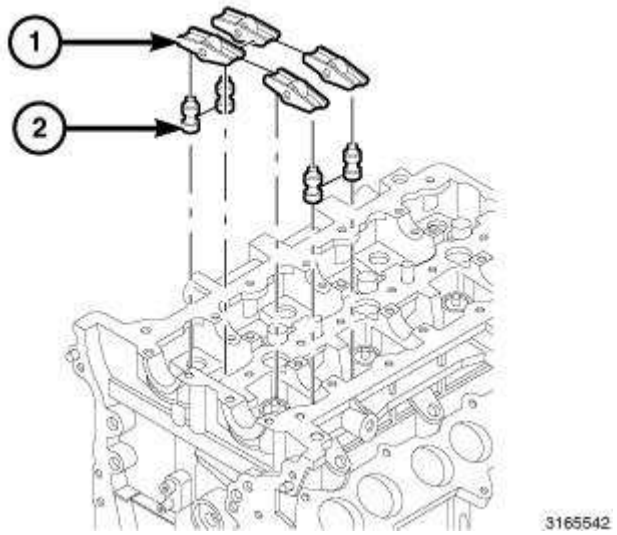


Fig. 155: Rocker Arms & Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Rocker arms and lifters must be installed in the same location as when removed.**

1. Install the rocker arm (1) and lifter (2) assembly in the same location as noted during removal.
2. Install the camshaft. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.

SEAL(S), CAMSHAFT

REMOVAL

REMOVAL

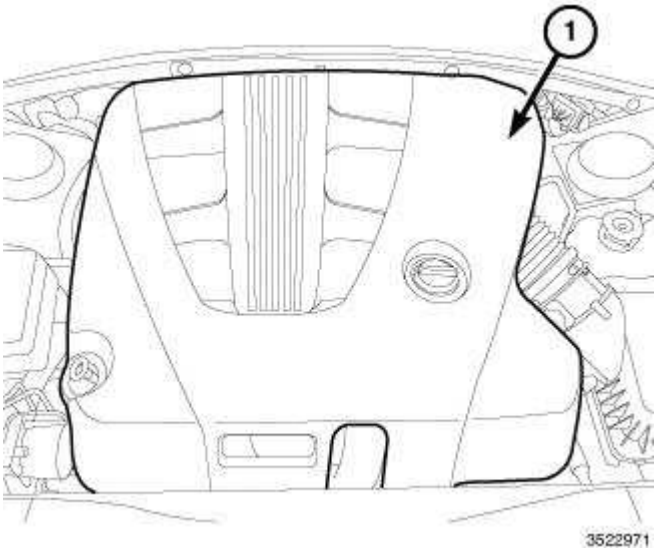


Fig. 156: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine cover (1).

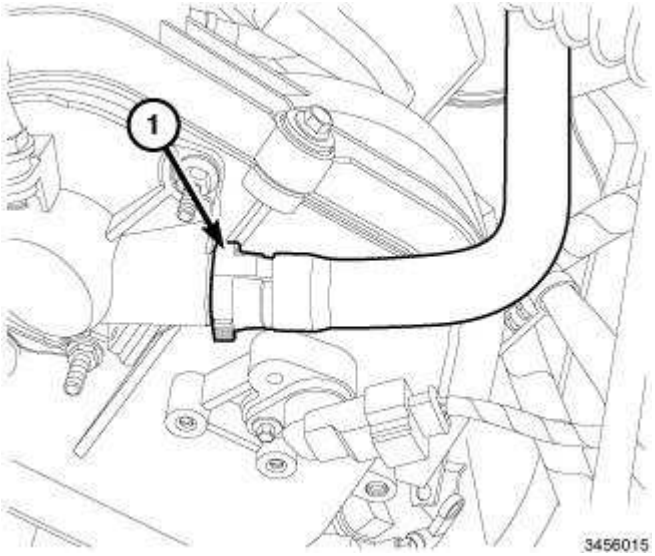


Fig. 157: CCV Hose
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the CCV hose (1) from oil breather/camshaft seal housing.

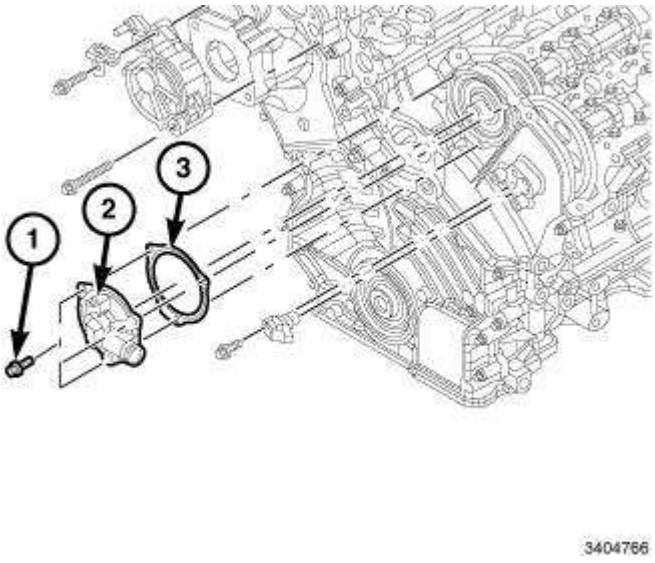


Fig. 158: Oil Breather/Camshaft Seal Housing, Gasket & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts (1) and the oil breather/camshaft seal housing (2).
4. Remove and discard gasket (3).

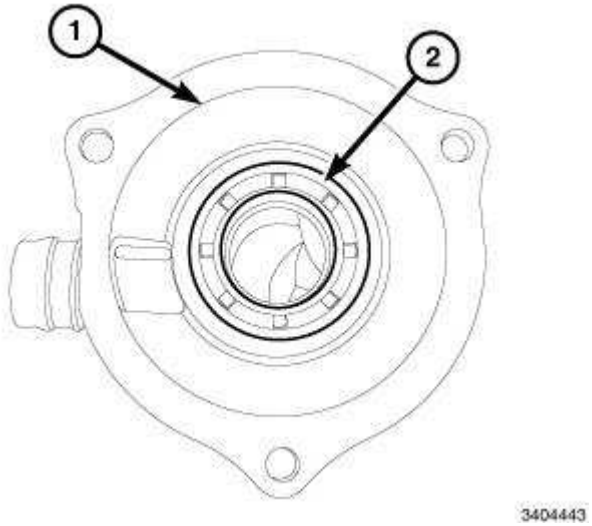


Fig. 159: Oil Breather/Camshaft Seal Housing & Camshaft Seals
Courtesy of CHRYSLER GROUP, LLC

5. Using a suitable tool remove the camshaft oil seal (2).

INSTALLATION

INSTALLATION

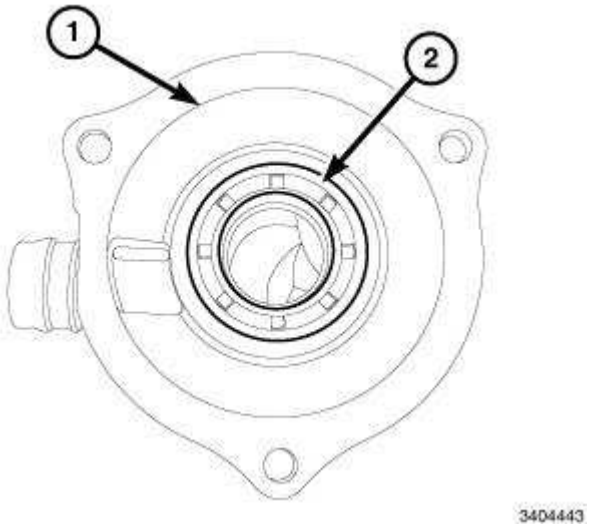


Fig. 160: Oil Breather/Camshaft Seal Housing & Camshaft Seals
Courtesy of CHRYSLER GROUP, LLC

1. Clean all gasket sealing mating surfaces.
2. Install the camshaft seals (2) into oil breather/camshaft seal housing (1).

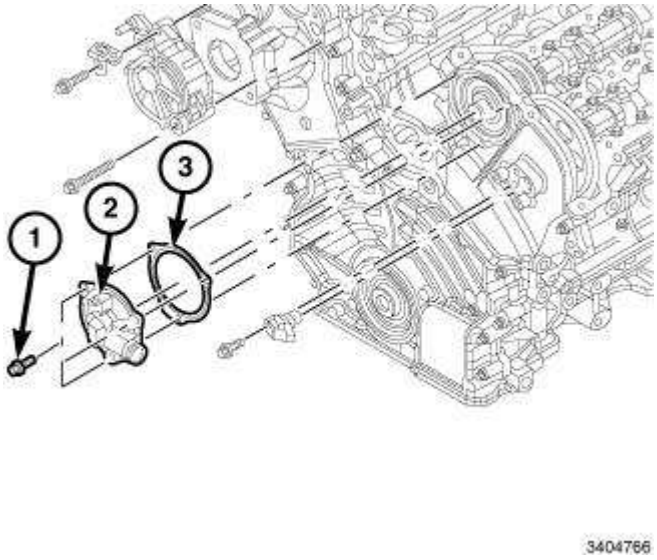


Fig. 161: Oil Breather/Camshaft Seal Housing, Gasket & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Using a new gasket (3), install the oil breather/camshaft seal housing (2). Tighten bolts (1) to 14 N.m (124 in. lbs.).

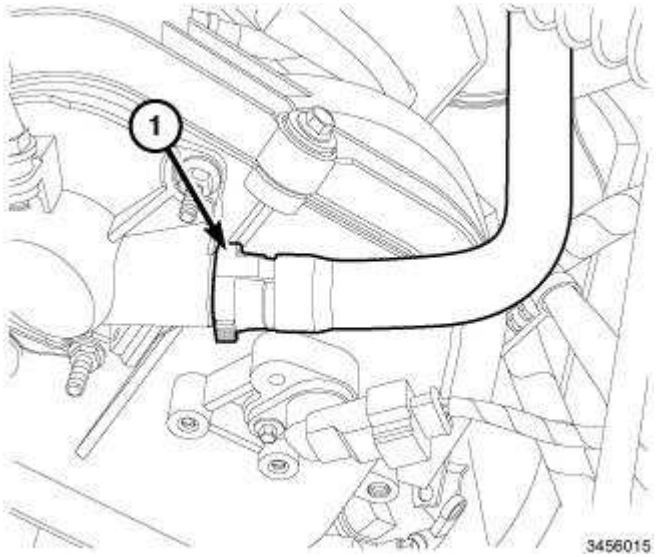


Fig. 162: CCV Hose
Courtesy of CHRYSLER GROUP, LLC

4. Connect the CCV hose (1) to the oil breather/camshaft seal housing.

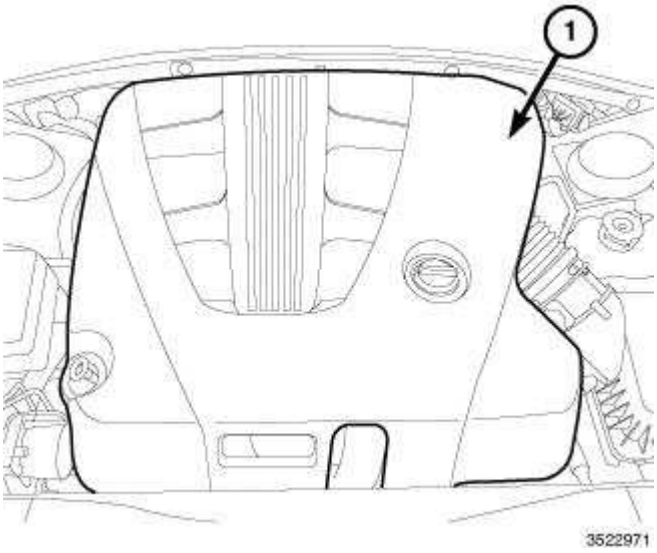


Fig. 163: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine cover (1).

VALVES, INTAKE AND EXHAUST

STANDARD PROCEDURE

VALVE SEALS

1. Disconnect the negative battery cable.
2. Remove the cylinder head and place on work bench. Refer to **CYLINDER HEAD, REMOVAL**.

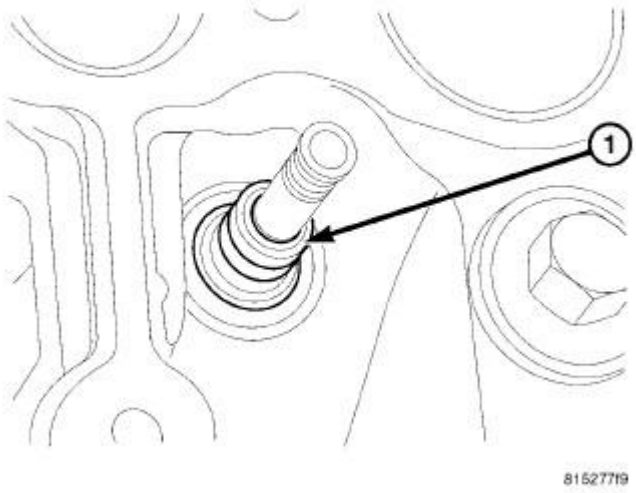


Fig. 164: Valve Seal

Courtesy of CHRYSLER GROUP, LLC

3. Use (special tool #C-3422-D, Compressor, Valve Spring) and (special tool #10224, Adapter, Valve Spring) and compress each valve spring.
4. Remove the valve locks, retainers, and springs.
5. Remove the valve seal (1).
6. Repeat this procedure for all cylinders.

VALVE SERVICE

This procedure is done with the engine cylinder head removed from the block.

DISASSEMBLY

1. Remove the engine cylinder head from the cylinder block. Refer to **CYLINDER HEAD, REMOVAL**.
2. Use (special tool #C-3422-D, Compressor, Valve Spring) and (special tool #10224, Adapter, Valve Spring) and compress each valve spring.
3. Remove the valve locks, retainers, and springs.
4. Use a smooth stone or a jewelers file to remove any burrs on the top of the valve stem, especially around the groove for the locks.
5. Remove the valves, and place them in a rack in the same order as removed.

VALVE CLEANING

1. Clean all carbon deposits from the combustion chambers, valve ports, valve stems, valve stem guides and head.
2. Clean all residue and gasket material from the engine cylinder head machined gasket surface.

INSPECTION

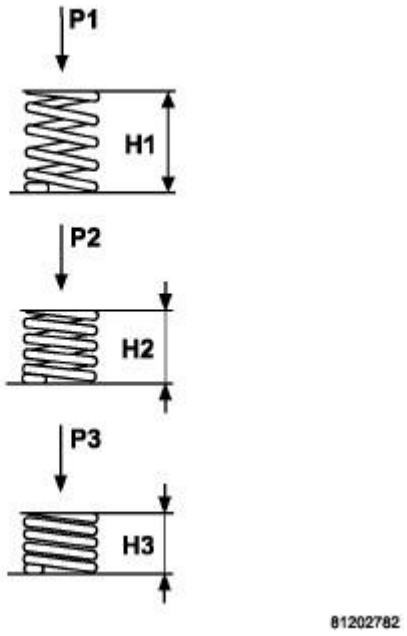


Fig. 165: Valve Spring Chart
Courtesy of CHRYSLER GROUP, LLC

1. Inspect for cracks in the combustion chambers and valve ports.
2. Inspect for cracks on the exhaust seat.
3. Inspect for cracks in the gasket surface at each coolant passage.
4. Inspect valves for burned, cracked or warped heads.
5. Inspect for scuffed or bent valve stems.
6. Replace valves displaying any damage.
7. Check valve spring height. Free length: 44.1 mm (1.736 in.); Closed valve: 34 mm (1.338 in.); Valve open 25.5 mm (1.003 in.).

VALVE SEAT REFACING

1. Install a pilot of the correct size in the valve guide bore. Reface the valve seat to the specified angle with a good dressing stone. Remove only enough metal to provide a smooth finish.
2. Use tapered stones to obtain the specified seat width when required.

VALVE GUIDES

Valve Guides Stem Clearance	Min	Max
Intake Valve Guide Stem Clearance	0.382 mm (0.150 in.)	0.6 mm (0.023 in.)
Exhaust Valve Guide Stem Clearance	0.382 mm (0.150 in.)	0.6 mm (0.023 in.)

VALVE STEM-TO-GUIDE CLEARANCE MEASUREMENT

1. Measure and record internal diameter of valve guides. Valve guide internal diameter is 6.0 to 6.012 mm (0.2362 to 0.2366 in.).
2. Measure valve stems and record diameters. Intake valve stem diameter 5 mm (0.1968 in.). Exhaust valve stem diameter 5 mm (0.1968 in.).
3. Subtract diameter of valve stem from internal diameter of its respective valve guide to obtain valve stem clearance in valve guide. Clearance of inlet valve stem in valve guide is 0.03 to 0.06 mm (.0011 to.0023 in). Clearance of exhaust valve stem in valve guide is 0.04 to 0.07 mm (.0015 to.0027 in).
4. If valve stem clearance in valve guide exceeds tolerances, new valve guides must be installed.

ENGINE BLOCK

DESCRIPTION

DESCRIPTION

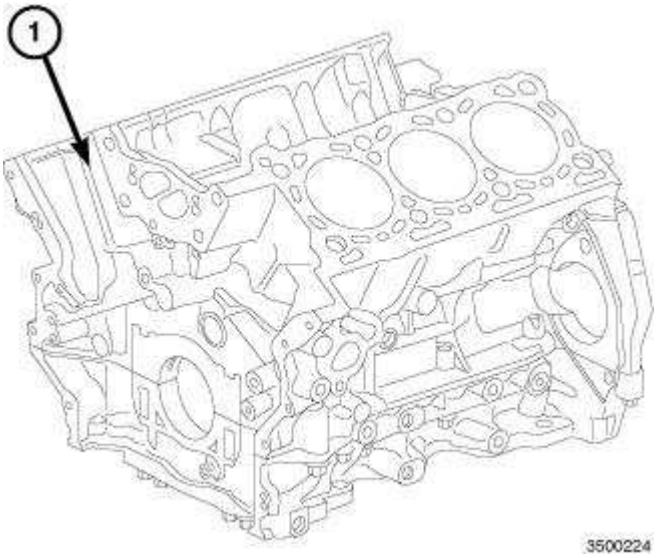


Fig. 166: 3.0L Engine Block
Courtesy of CHRYSLER GROUP, LLC

The 3.0L engine utilizes a cast Iron cylinder block (1) with a bedplate design. The cylinder angle is 60 degrees V block design. The cylinder block has increased rigidity that reduces structural flexing, plus a fractured connecting rod cap design that can not distort connecting rod cap fit.

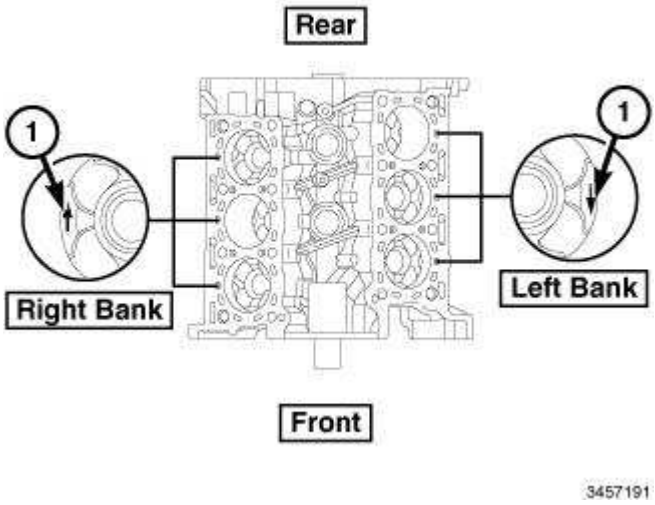


Fig. 167: Arrow Stamped On Piston Crown
Courtesy of CHRYSLER GROUP, LLC

Cylinders are numbered front to back, beginning with the right bank. The right bank cylinders are numbered 1, 2, 3. The left bank cylinders 4, 5, 6. The injection order of the engine is 1-4-2-5-3-6.

STANDARD PROCEDURE

STANDARD PROCEDURE - BEARING SELECTION CHARTS

CONNECTING ROD BEARINGS - LARGE END

Connecting Rod Journal Diameter - Connecting Rod Large End	Bearing Half	Connecting Rod Journal Diameter - Crankshaft		
		A	B	C
		67.500 - 67.494	67.494 - 67.488	67.488 - 67.482
A 71.000 - 71.006	Upper Bearing Shell	Red	Red	Blue
	Lower Bearing Shell	Red	Blue	Blue
B 71.006 - 71.012	Upper Bearing Shell	Red	Blue	Blue
	Lower Bearing Shell	Blue	Blue	Yellow
C 71.012 - 71.018	Upper Bearing Shell	Blue	Blue	Yellow
	Lower Bearing Shell	Blue	Yellow	Yellow

CRANKSHAFT BEARINGS

Cylinder Block Seat Diameter (Bed Plate)	Bearing Half	Crankshaft Main Journal Diameter		
		A	B	C
		73.958 - 73.952	73.952 - 73.946	73.946 - 73.940
A 78.000 - 78.006	Upper Bearing Shell	Red	Red	Blue
	Lower Bearing Shell	Red	Blue	Blue
B 78.006 - 78.012	Upper Bearing Shell	Red	Blue	Blue
	Lower Bearing Shell	Blue	Blue	Yellow
C 78.012 - 78.018	Upper Bearing Shell	Blue	Blue	Yellow
	Lower Bearing Shell	Blue	Yellow	Yellow

BEARING(S), CONNECTING ROD

REMOVAL

REMOVAL

1. Disconnect negative battery cable.
2. Remove the engine from vehicle and mount on suitable engine stand. Refer to **REMOVAL**.
3. Remove the oil pump pickup tube. Refer to **PICK-UP, OIL PUMP, REMOVAL**.

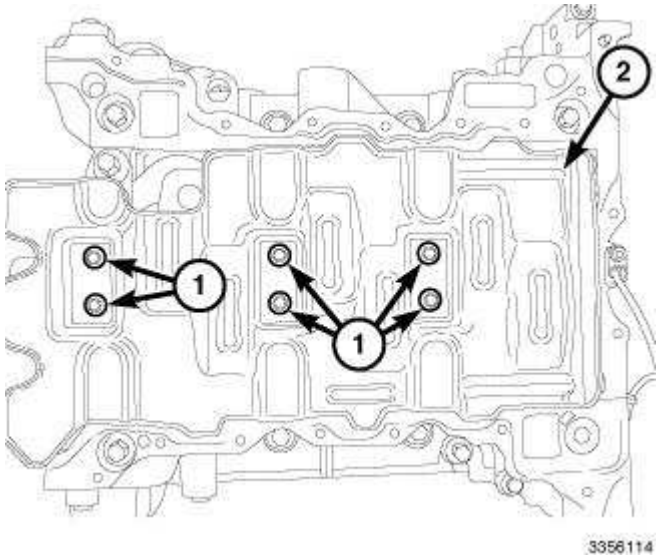


Fig. 168: Windage Tray & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts (1) and the windage tray (2).

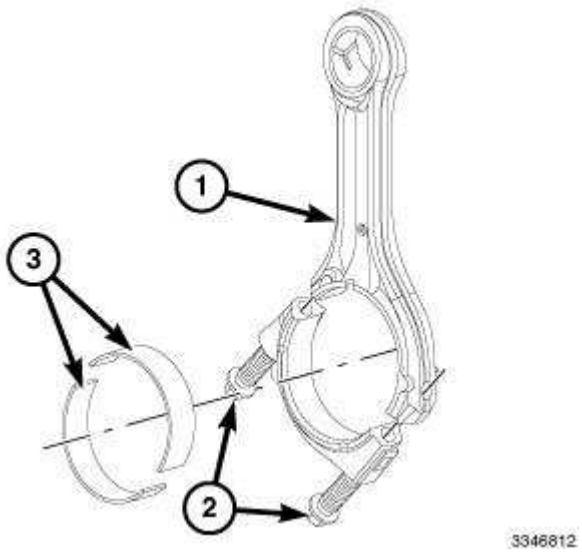
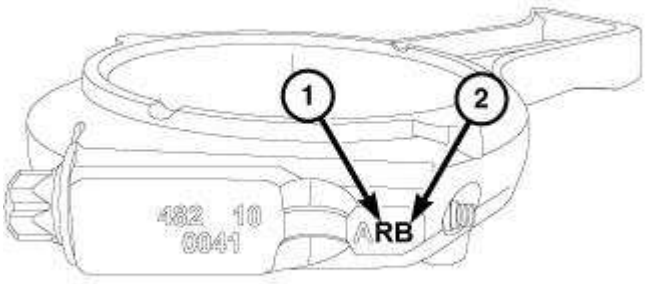


Fig. 169: Connecting Rod, Bearings & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the connecting rod bearing caps one at a time and discard bolts (2).
6. Carefully remove the upper half and lower bearing half (3) from the connecting rod.

INSTALLATION

INSTALLATION



3346447

Fig. 170: Connecting Rod Shaft & Class Identification Mark
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the connecting rod has to be replaced only use connecting rod of the same weight, recognizable by a letter stamped on connecting rod shaft (1).

1. Each connecting rod has its own letter class identification mark (2) on connecting rod for bearing selection.

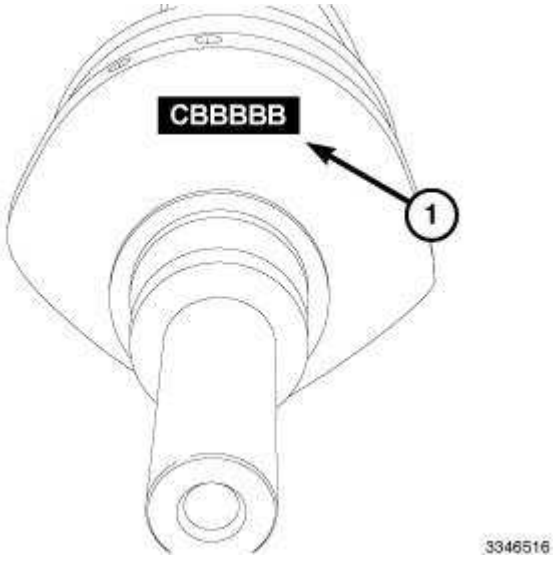


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Fig. 171: Letters Stamped Into Crankshaft
Courtesy of CHRYSLER GROUP, LLC

2. Letter class identification mark on crankshaft (1).

Cylinder No.	1	2	3	4	5	6

Crankshaft Letter	C	B	B	B	B	B
Connecting Rod Letter	B	B	A	A	A	A

3. Choose the correct connecting rod bearings size from the above table. To determine the correct bearing size for each cylinder, each connecting rod "letter class", (letter stamped on each connecting rod), must be matched with crankshaft "letter class" (6 digits letters stamped on the first crankshaft counter weight). The letters stamped on the crankshaft are in the same orders as the cylinders. The first letter correspond to the first cylinder (timing system side), the second letter to the second one, etc. See bearing selection chart. Refer to **Engine/Engine Block - Standard Procedure**.

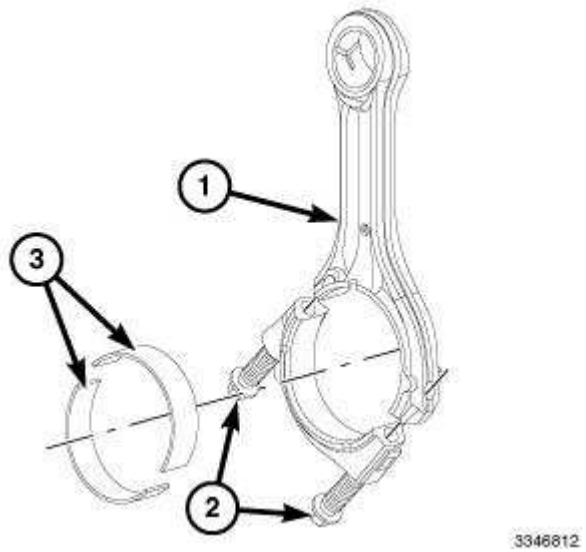


Fig. 172: Connecting Rod, Bearings & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Assemble connecting rod bearings (3) and bearing caps to their respective connecting rods (2) ensuring that the serrations on the cap and reference marks are aligned.
5. Using new bolts, tighten the connecting rod cap bolts to:
   - Step 1: Tighten to 10 N.m (88 in. lbs.).
   - Step 2: Tighten each bolt to 25 N.m (18 ft. lbs.).
   - Step 3: Tighten each bolt an additional 75 degrees turn.
   - Step 4: With the torque wrench set at 50 N.m (37 ft. lbs.) to check the tightening of each bolt.

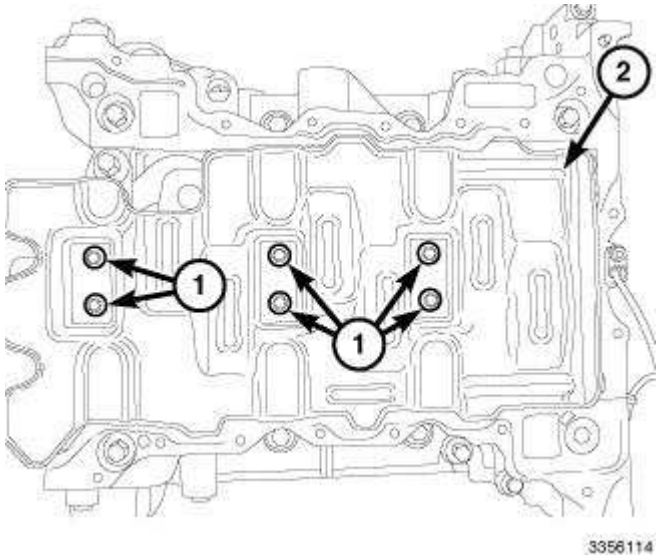


Fig. 173: Windage Tray & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the windage tray (2). Tighten bolts (1) to 11 N.m (97 in. lbs.).
7. Install the oil pump pickup tube. Refer to **PICK-UP, OIL PUMP, INSTALLATION**.
8. Install the engine into vehicle. Refer to **INSTALLATION**.
9. Connect the negative battery cable.

BEARING(S), CRANKSHAFT, MAIN

DESCRIPTION

DESCRIPTION

The bottom of the cylinder block has provisions for mounting the bedplate and the oil jets. The bedplate houses the other half of the main bearing shell. The bedplate is made of cast iron and bolts to the cylinder block. There is twenty six M12 mounting bolts, and three M8 mounting bolts.

The number four main bearing serves as the thrust washer location.

The upper main bearings have a oil supply holes and center grooves for lubrication of the main journals. The lower main bearings provide strength where it is needed.

The upper main bearings are available in three different thicknesses bearings. A color coded mark on the side of the bearing is used to identify it's thickness. Each color coded bearing is matched to it's respective journal. The select fit is obtained by matching the color coded bearings to grade identification marks on the cylinder block and crankshaft. Letters marked on the cylinder block identify the color of each upper-half main bearing, while letters marked on the front end of the crankshaft indicate the color of each lower half main bearing.

REMOVAL

REMOVAL

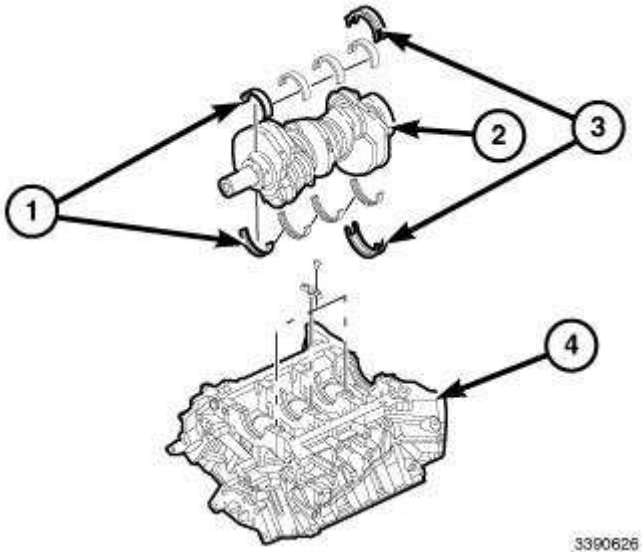


Fig. 174: Crankshaft, Bearings, Thrust Bearing & Engine Block
Courtesy of CHRYSLER GROUP, LLC

1. Remove the crankshaft (2). Refer to **CRANKSHAFT, REMOVAL**.

INSTALLATION

INSTALLATION

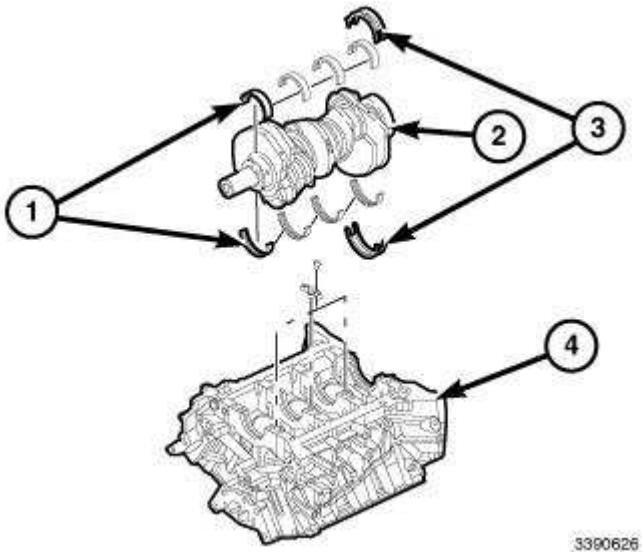


Fig. 175: Crankshaft, Bearings, Thrust Bearing & Engine Block
Courtesy of CHRYSLER GROUP, LLC

1. Install the crankshaft (2). Refer to **CRANKSHAFT, INSTALLATION**.

CRANKSHAFT

DESCRIPTION

DESCRIPTION

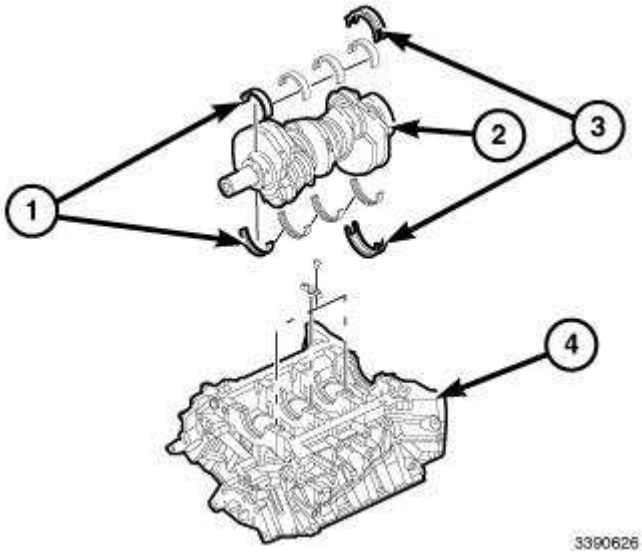


Fig. 176: Crankshaft, Bearings, Thrust Bearing & Engine Block
Courtesy of CHRYSLER GROUP, LLC

The crankshaft (1) for the 3.0L is a forged steel type design with four main bearing journals. The fourth crankshaft support controls crankshaft thrust.

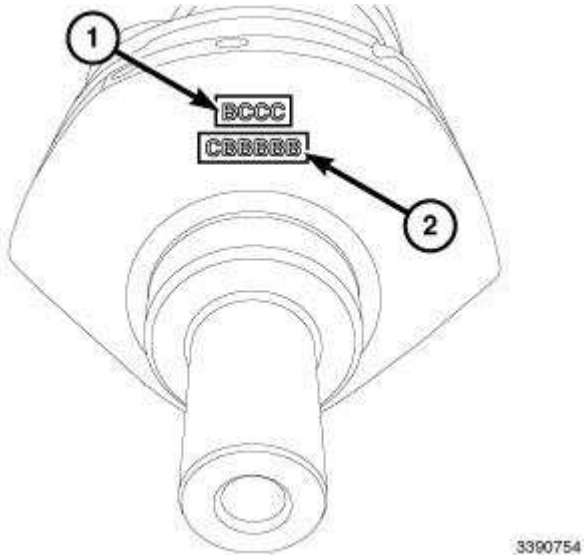


Fig. 177: Bearing Identification & Letters Stamped Into Crankshaft
Courtesy of CHRYSLER GROUP, LLC

The bearing identification for the upper crankshaft main journals is etched into the lower right side of engine block and the proper lower bearing selection can be found etched in the front of the crankshaft (1).

OPERATION

OPERATION

The crankshaft transfers force generated by combustion within the cylinder bores to the flexibility. The crankshaft has six separate throws arranged at different angles (splayed) to reduce second order free movements of inertia. Following the injection order 1-4-2-5-3-6, the crankshaft throw angles alternate between 46°.

STANDARD PROCEDURE

MEASURE CRANKSHAFT AND BLOCK JOURNALS

NOTE: After any bearing damage occurred, remove all debris which is present in the main oil gallery, connecting rod bores, and in the crankshaft and oil galleries.

1. Remove the crankshaft.
2. Clean all engine parts thoroughly.
3. Inspect the crankshaft, replace as necessary.
4. Inspect the crankcase for damage.
5. Inspect the crankshaft main bearing bedplate for damage.
6. Install the crankshaft main bearing caps and check for out of round. Replace as necessary.
7. Remove the main bearing caps and install the crankshaft with the correct selected bearings.

NOTE: Radial mounting of the main bearings of standard size crankshaft is possible by assigning the color-coded bearing shells. The upper main bearings can be identified by the four digit mark etched on the engine block below the high pressure pump. The lower main bearings can be identified by the code etched on the front of the crankshaft hub.

ASSIGNING CRANKSHAFT MAIN BEARING SHELLS

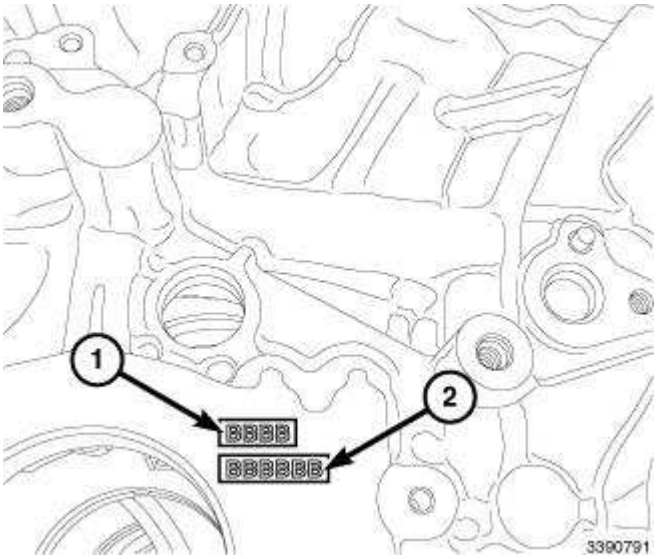


Fig. 178: Upper Main Bearing Identification
Courtesy of CHRYSLER GROUP, LLC

The upper main bearings can be identified by the four digit mark etched in the block (1) next to the oil pump.

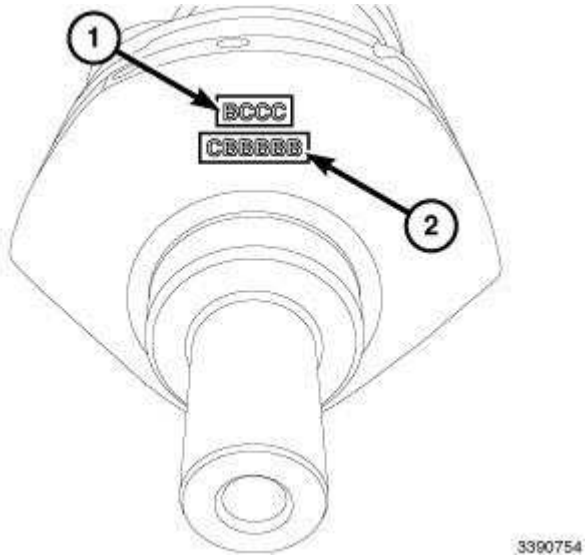


Fig. 179: Bearing Identification & Letters Stamped Into Crankshaft
Courtesy of CHRYSLER GROUP, LLC

The lower main bearings can be identified by the code etched on the front of the crankshaft counter weight (1). This color code indicates which bearing shell halves are to be used.

8. Select the correct bearing shells based upon the crankcase and crankshaft identification marks.
9. Mount the crankshaft axially using the thinnest thrust washer.
10. Inspect the crankshaft end play. If the crankshaft end play is out of specification, remove the crankshaft and install the larger thrust shim. repeat the procedure until crankshaft end play is

within specification.

11. Mount the crankshaft axially again and check each main bearing oil clearance with plasti-gauge. For bearing clearance specifications. Refer to **Engine - Specifications**.

CHECKING CRANKSHAFT END PLAY

1. Mount the (special tool #C-3339A, Set, Dial Indicator) to a stationary point at rear of engine. Locate the probe perpendicular against the rear of the crankshaft.
2. Move the crankshaft all the way to the front of its travel.
3. Zero the dial indicator.
4. Move the crankshaft all the way to the rear of it's travel and record the reading on the dial indicator. For crankshaft end play clearances, refer to the **Engine - Specifications**.

REMOVAL

REMOVAL

1. Remove the engine from the vehicle and mount engine on a suitable engine stand. Refer to **REMOVAL**.
2. Mount the engine onto a suitable engine stand.
3. Remove both cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.

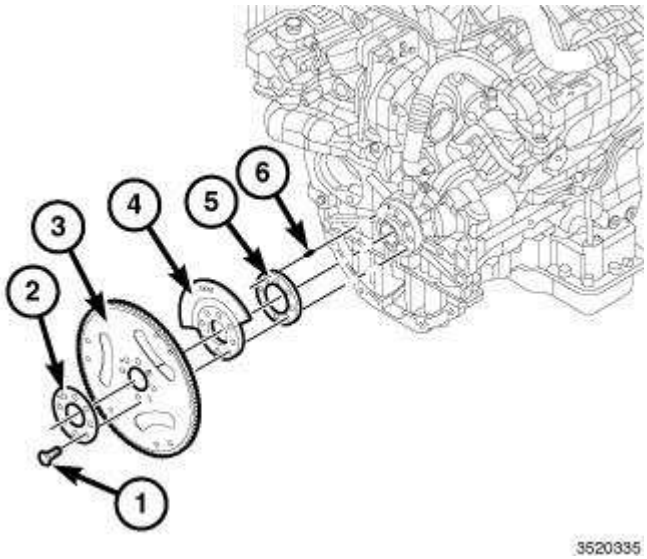


Fig. 180: Backing Plate, Flex Plate, Counter Weight, Tone Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts (1) and flex plate (3).
5. Remove the counter weight (4) and tone wheel (5).
6. Check the crankshaft end play. Refer to **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.

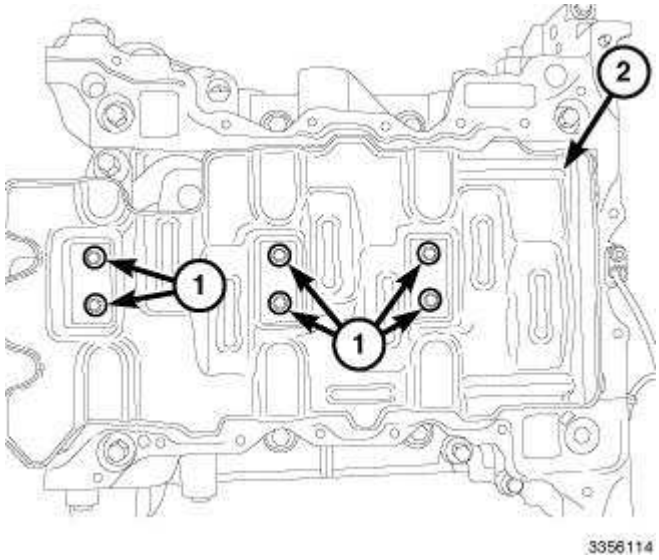


Fig. 181: Windage Tray & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
8. Remove bolts (1) and the windage tray (2).

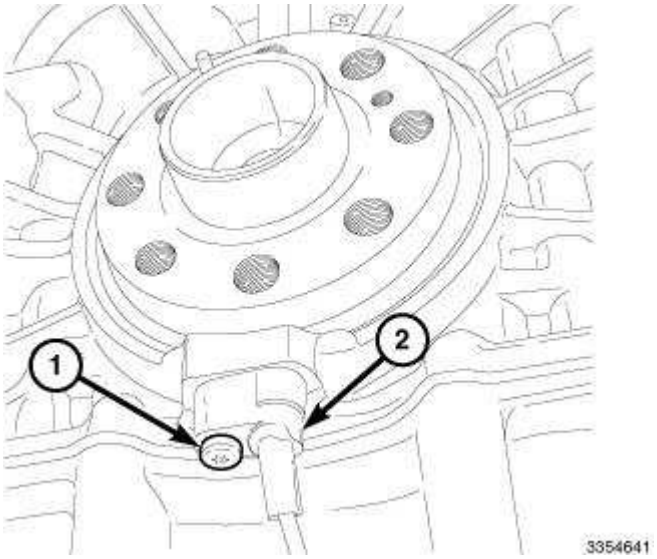


Fig. 182: Crankshaft Position Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolt (1) and the Crankshaft Position Sensor (CKP) (2).

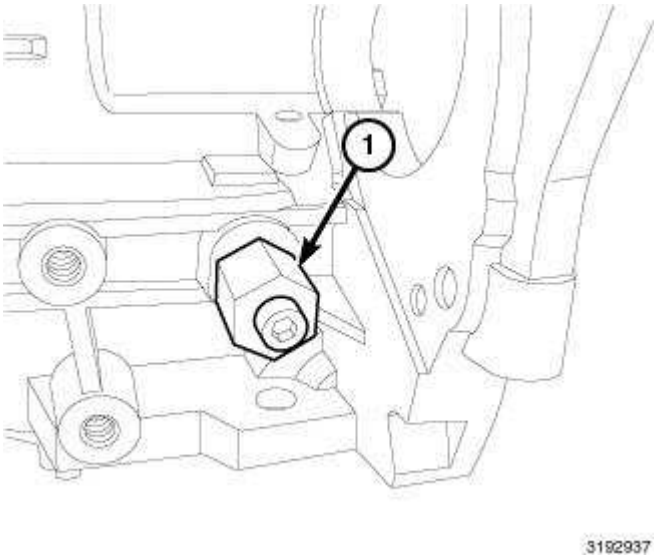


Fig. 183: Crankshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

10. Remove the (special tool #VM.10339, Tool, Crankshaft Timing) (1).

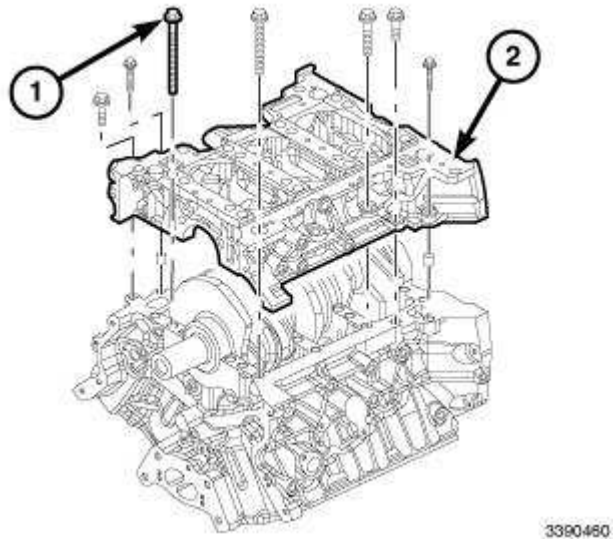


Fig. 184: Bed Plate & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove bolts (1) securing the bed plate (2) to engine block.

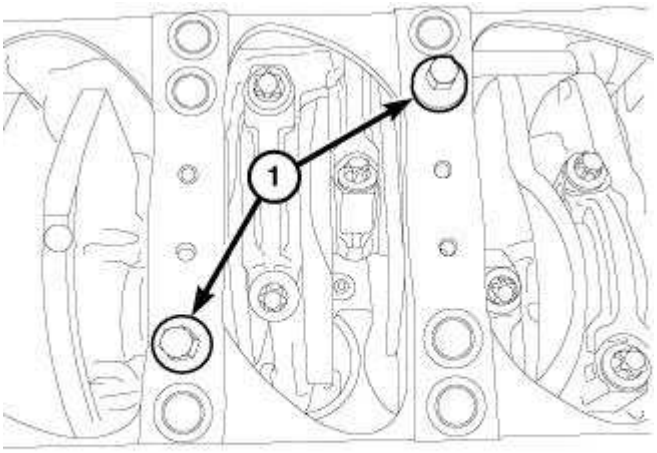


Fig. 185: Bed Plate Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install two bed plate bolts (1) finger tight.

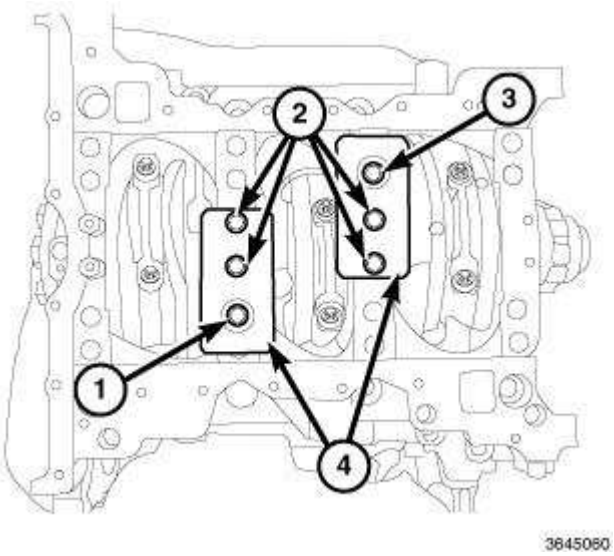


Fig. 186: Bedplate Removal Tools & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Install the (special tool #VM.10362, Tool, Bedplate Removal) (4) and securely tighten bolts (2).
14. Loosen bolts (1 and 3) in half turn increments until seal is broken.
15. Removal bolts (2) and the (special tool #VM.10362, Tool, Bedplate Removal) (4).
16. Remove bolts (1 and 3) and the bed plate.

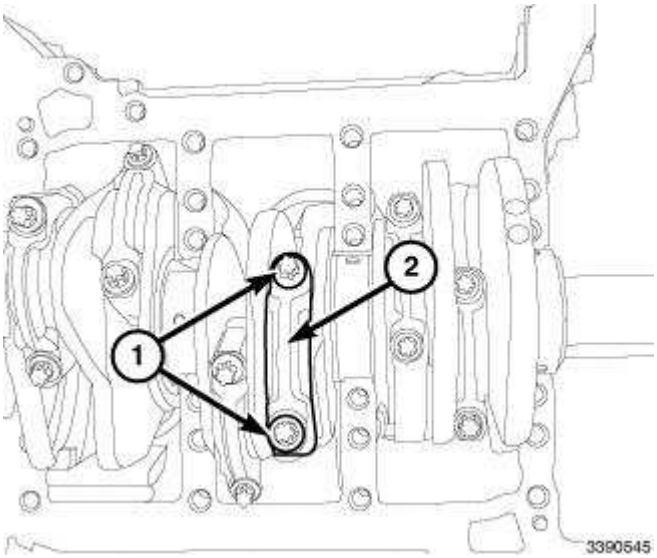


Fig. 187: Connecting Rods Bearing Cap & Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not allow the connecting rods to nick or score the crankshaft during assembly or disassembly.

CAUTION: Do not allow the connecting rod to bend or dent the oil jet. Serious engine damage may result from a misaligned oil jet.

17. Remove bolts (1) and the connecting rods bearing cap (2).

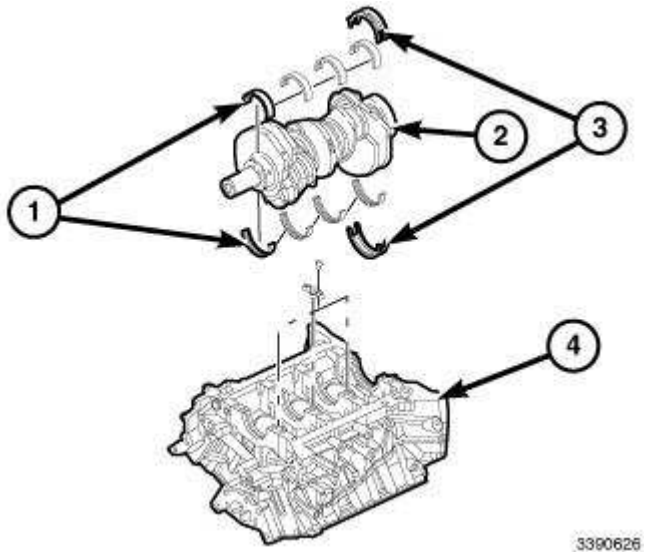


Fig. 188: Crankshaft, Bearings, Thrust Bearing & Engine Block
Courtesy of CHRYSLER GROUP, LLC

18. Remove the crankshaft (2).

19. Remove the thrust washer (3).
20. Remove the crankshaft bearings (1).

INSTALLATION

INSTALLATION

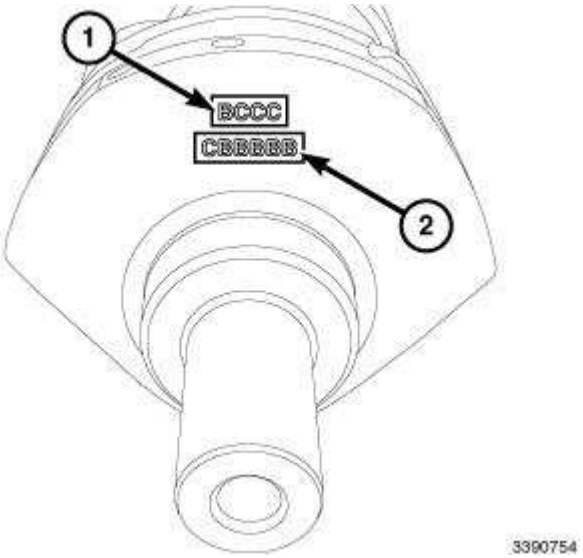


Fig. 189: Bearing Identification & Letters Stamped Into Crankshaft
Courtesy of CHRYSLER GROUP, LLC

1. Clean all sealing and mating surfaces. Be sure that the sealing and mating surfaces are free of oil and debris. Refer to **Engine - Standard Procedure**.

   NOTE: If any bearing damage has occurred, remove all debris from the connecting rod bores, crankshaft, and oil galleries. Remove the steel ball from the main oil gallery before cleaning.

2. Clean and inspect the crankshaft and bearings journals. Replace the bearings as necessary.
3. Locate the crankshaft bearing journal letter class (1) stamp on the crankshaft weight.

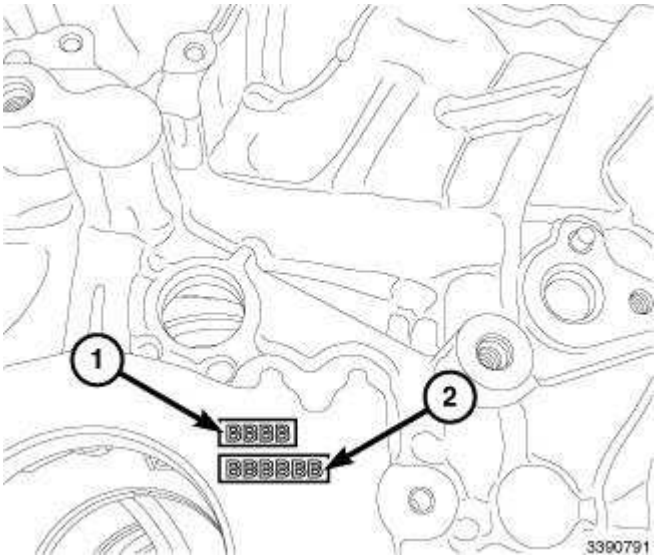


Fig. 190: Upper Main Bearing Identification
Courtesy of CHRYSLER GROUP, LLC

4. Locate the engine block crankshaft journal letter class stamp on the engine block (1).

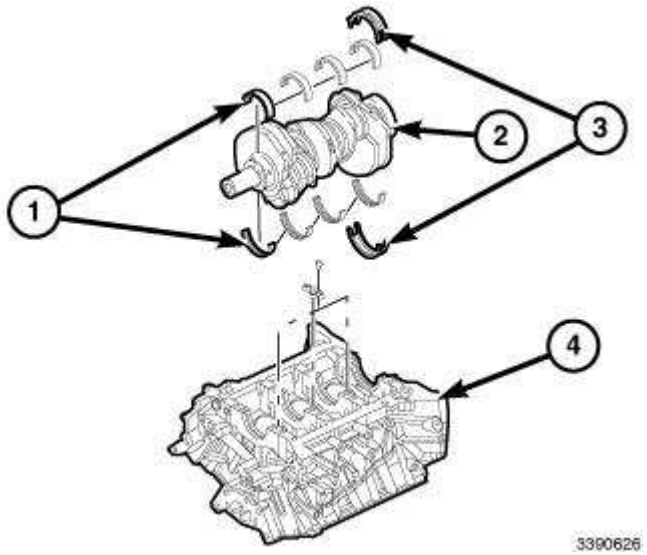


Fig. 191: Crankshaft, Bearings, Thrust Bearing & Engine Block
Courtesy of CHRYSLER GROUP, LLC

5. To determine the correct crankshaft journal letter class, each cylinder block seat diameter letter class must be matched with the crankshaft main journal diameter letter class. Both letter classes stamped on the cylinder block as well as on the crankshaft weight are in a progressive order starting from the front of the engine. The first letter corresponds to the first cylinder, the second to the second, etc. Use the crankshaft bearing selection chart to determine the half shell color. Refer to **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.
6. Select the correct and install top half of the crankshaft bearings (1) and the top half of the crankshaft thrust bearing (3) into engine block (4).

7. Using the bearing selection chart from step five, select the correct bearing and install lower half of the crankshaft bearings (1) and the lower half of the crankshaft thrust bearing (3) into bed plate.

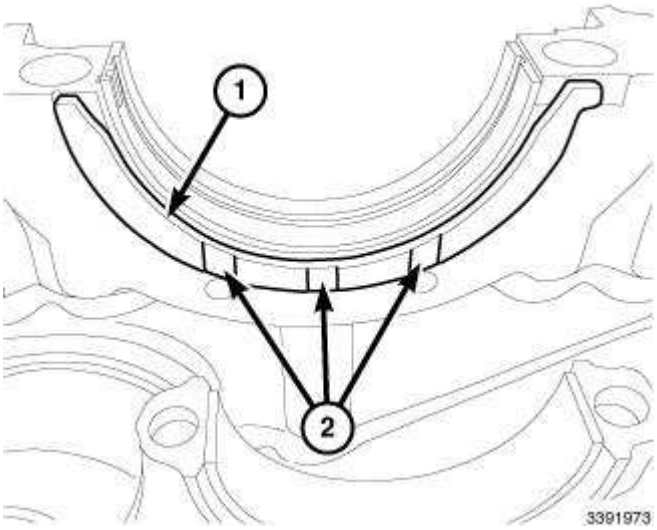


Fig. 192: Thrust Bearings & Oil Discharge Groves
Courtesy of CHRYSLER GROUP, LLC

8. When installing the thrust bearings (1) in the engine block and bed plate, make sure the oil discharge groves (2) face towards the crankshaft.

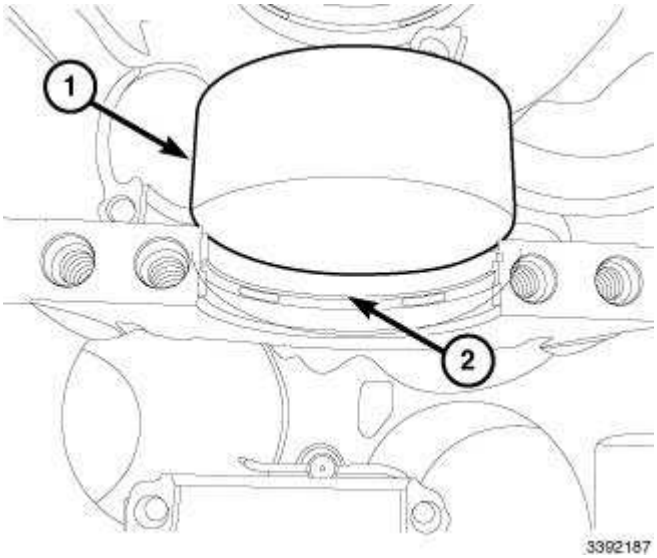


Fig. 193: Crankshaft Bearing Positioning Tool & Main Bearing
Courtesy of CHRYSLER GROUP, LLC

9. Using the (special tool #VM.10342, Tool, Crankshaft Bearing Positioning) (1) check the alignment of the first three main bearings (2) in engine block and bed plate.

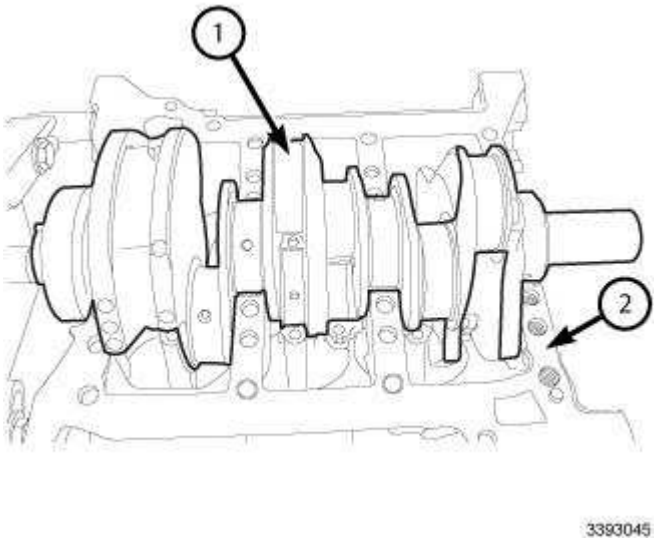


Fig. 194: Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not allow the connecting rods to nick or score the crankshaft during assembly or disassembly.

10. Set the crankshaft (2) into the engine block.

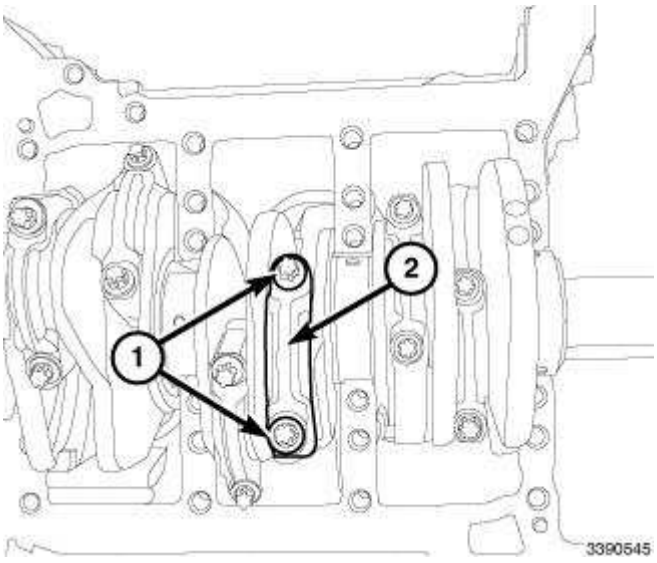


Fig. 195: Connecting Rods Bearing Cap & Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not allow the connecting rod to bend or dent the oil jet. Serious engine damage may result from a misaligned oil jet.

11. Using new bearings and bolts (1), install the connecting rod bearing caps (2). Refer to

BEARING(S), CONNECTING ROD, INSTALLATION.

12. Install the lower half of the crankshaft bearings and the lower half of the crankshaft thrust bearing into bed plate.

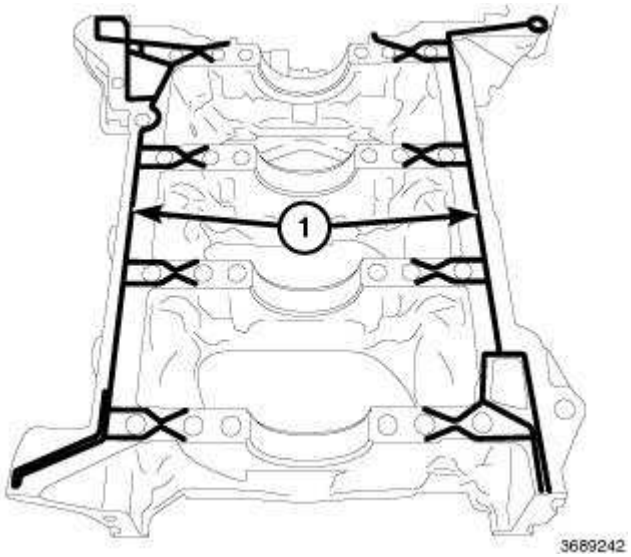


Fig. 196: RTV Sealant Compound On Bed Plate
Courtesy of CHRYSLER GROUP, LLC

13. Clean the gasket sealing surfaces. Refer to **Engine - Standard Procedure**.
14. Using Mopar® Threebond Engine RTV Sealant, apply a 1.5 mm thick bead of sealing compound to bedplate as illustrated (1) and **DO NOT** spread the sealing bead.

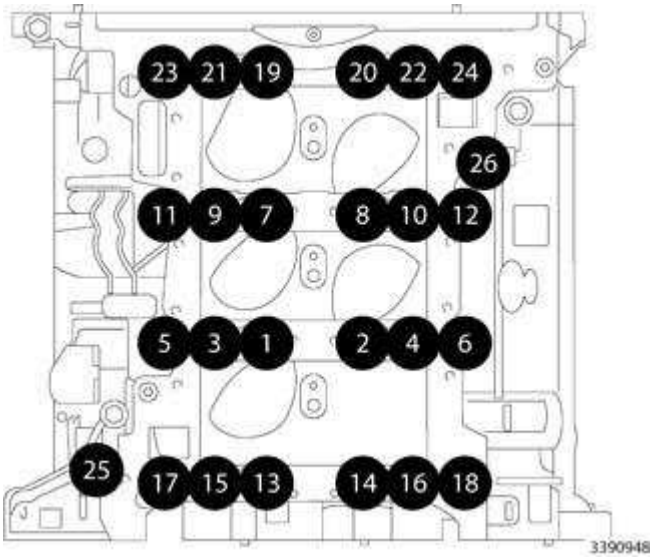


Fig. 197: Bed Plate Onto Engine Block Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

15. Install the bed plate onto the engine block.
16. Using new bolts, install the twenty six M12 bolts (1 - 26) and the three M8 bolts finger tight.

17. Using the tightening shown in illustration, tighten all M12 bolts to 45 N.m (33 ft. lbs.).

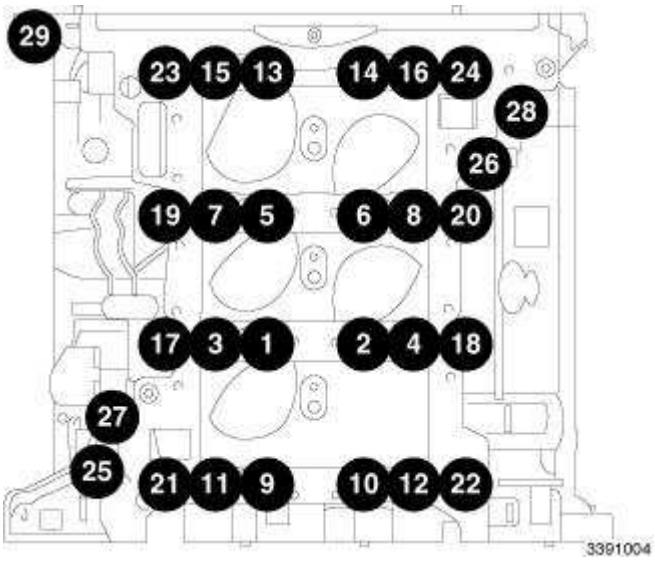


Fig. 198: Bed Plate Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

18. Using the tighten sequence shown in illustration to the following torque values:
    - Step 1: Using a torque angle gauge, tight the internal bed plate bolts (1 - 16) an additional 110 degrees turn.
    - Step 2: Tight the external bed plate bolts (17 - 26) to 120 N.m (89 ft. lbs.).
    - Step 3: Tighten the three M8 bolts (27 - 29) to 30 N.m 22 ft. lbs.).
    - Step 4: Check the torque of the M12 bolts (1 - 26) in a counterclockwise direction with the torque wrench set at 115 N.m (85 ft. lbs.).
19. The crankshaft should turn freely. If the crankshaft does not turn freely loosen and re-torque the bearing caps.

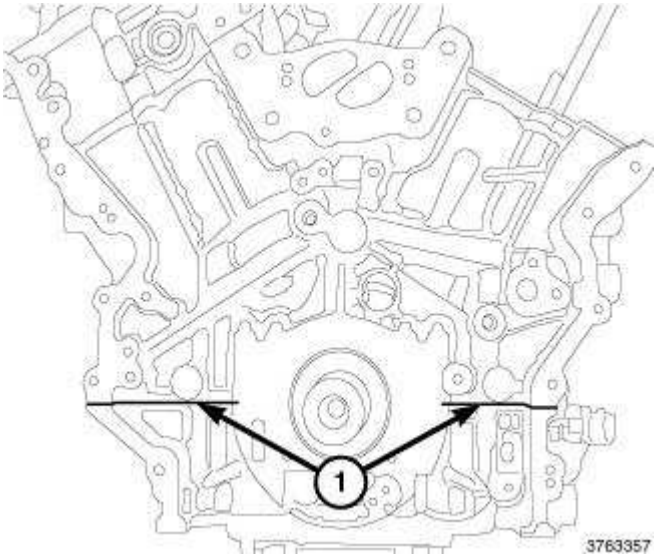


Fig. 199: RTV Sealant Excess Locations
Courtesy of CHRYSLER GROUP, LLC

20. Remove any excess Mopar® Threebond Engine RTV Sealant (1) that may have squeezed out in the front of engine.

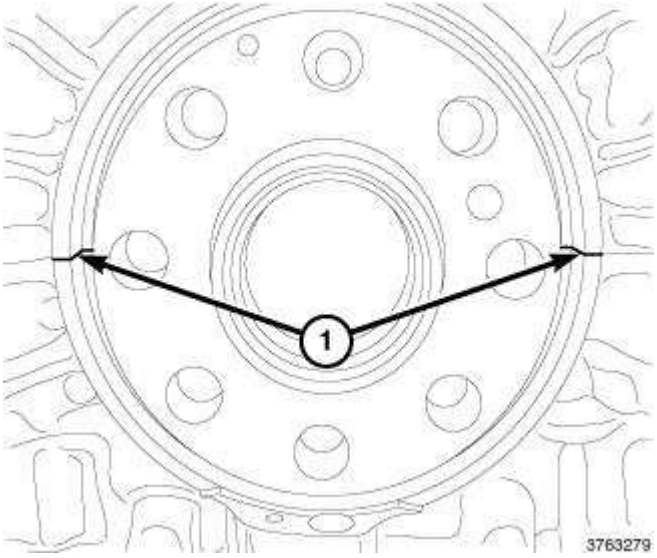


Fig. 200: Rear Oil Seal Excess RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

21. Remove any excess Mopar® Threebond Engine RTV Sealant (1) that may have squeezed out in rear oil seal bay.
22. Check the crankshaft end play. Refer to **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.

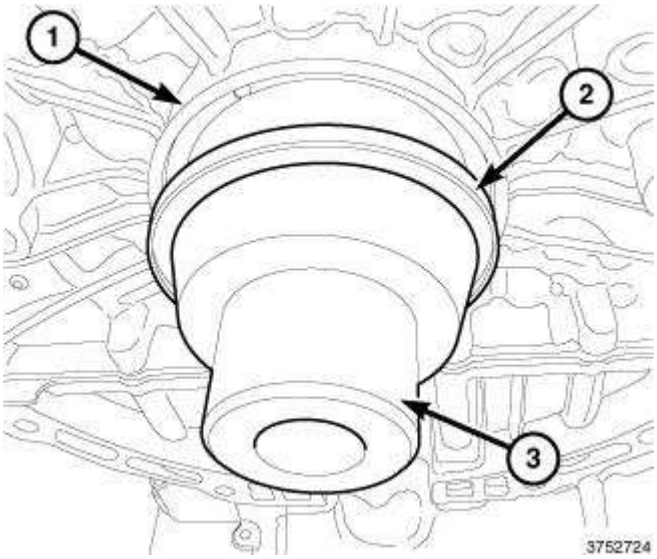


Fig. 201: Rear Seal Guide, Rear Oil Seal & Crankshaft
Courtesy of CHRYSLER GROUP, LLC

23. Install the (special tool #VM.10341-1, Guide, Rear Seal) (3) and slide the rear oil seal (2) onto the crankshaft.
24. Remove the (special tool #VM.10341-1, Guide, Rear Seal) (3).

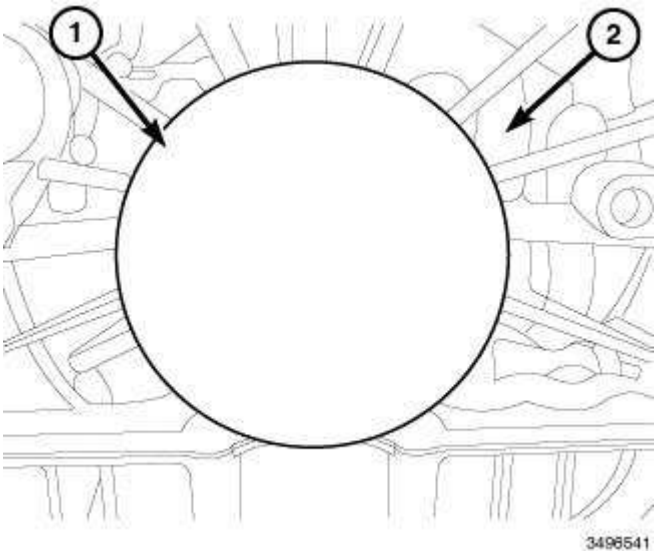


Fig. 202: Rear Seal Installer & Crankshaft Position Sensor (CKP) Boss
Courtesy of CHRYSLER GROUP, LLC

NOTE: Position the flat portion of the Rear Seal Installer should be facing down giving you clearance by the Crankshaft Position Sensor (CKP) boss.

25. Using the (special tool #VM.10341-2, Installer Tool, Rear Seal) (1) install the rear main oil seal into the engine block.

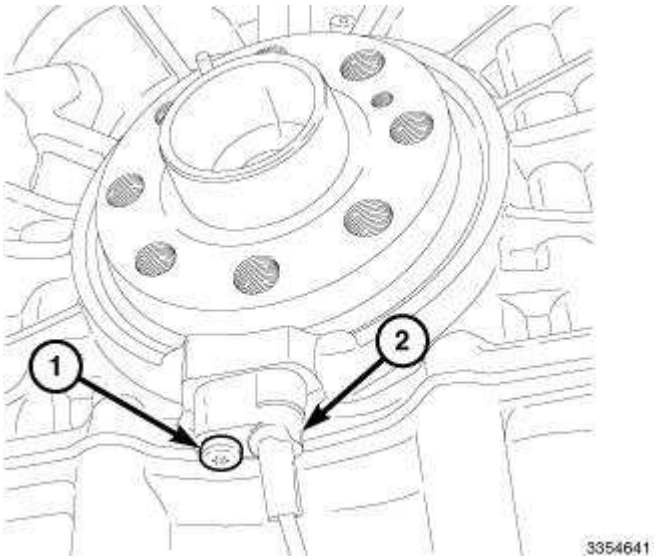


Fig. 203: Crankshaft Position Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

26. Install the Crankshaft Position Sensor (CKP) (2). Tighten bolt (1) to 6 N.m (53 in. lbs.).

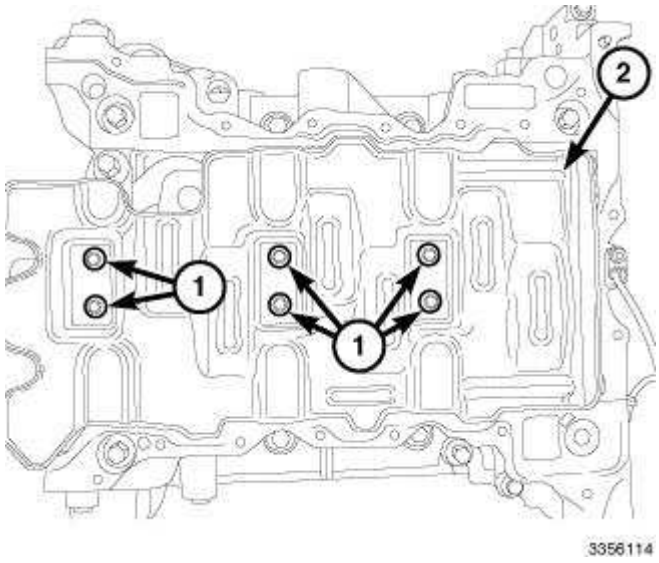


Fig. 204: Windage Tray & Bolts
Courtesy of CHRYSLER GROUP, LLC

27. Install the windage tray (2). Tighten bolts (1) to 11 N.m (97 in. lbs.).
28. Install the oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION**.

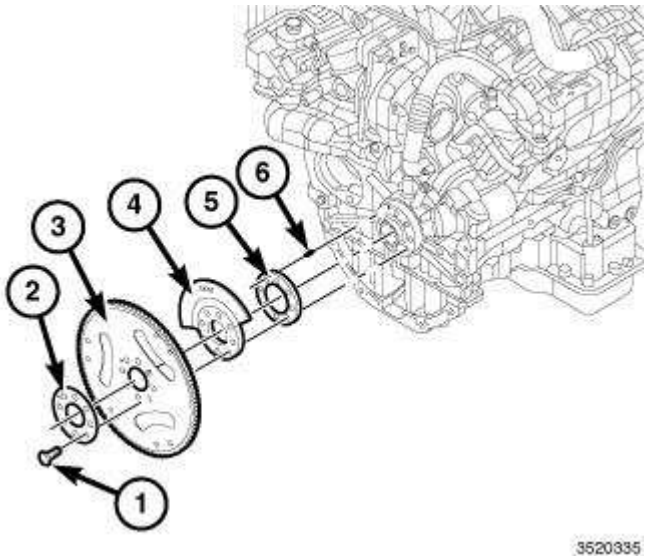


Fig. 205: Backing Plate, Flex Plate, Counter Weight, Tone Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

29. Install the tone wheel (5), counter weight (4), and the flex plate (3). Refer to **FLEXPLATE, INSTALLATION**.
30. Install both cylinder heads. Refer to **CYLINDER HEAD, INSTALLATION**.
31. Install the engine into vehicle. Refer to **INSTALLATION**.

DAMPER, VIBRATION

REMOVAL

REMOVAL

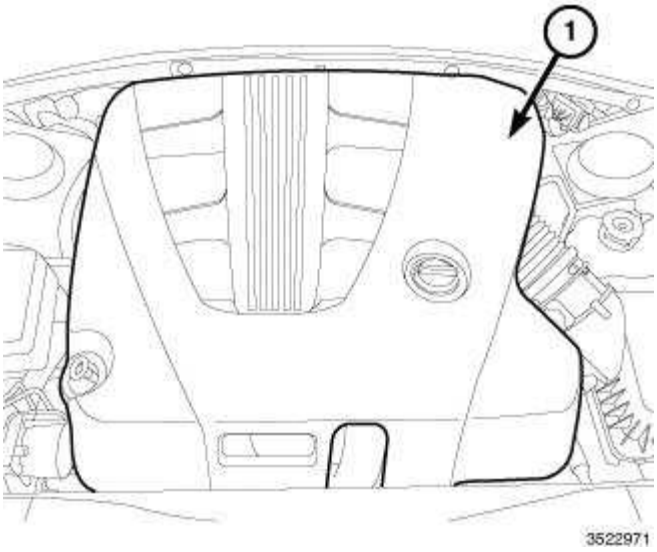


Fig. 206: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

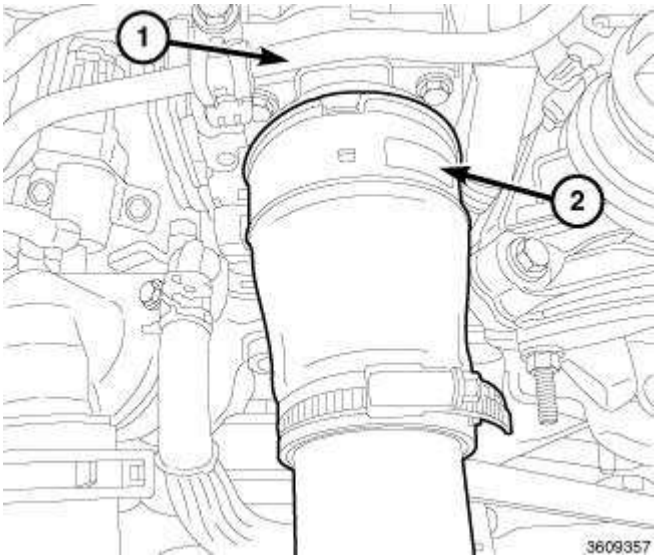


Fig. 207: EGR Air Flow Control Valve & CAC Hose
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Charge Air Cooler (CAC) hose (2) from the EGR air flow control valve and

position aside.

4. Remove bolt and position aside the CAC hose assembly.

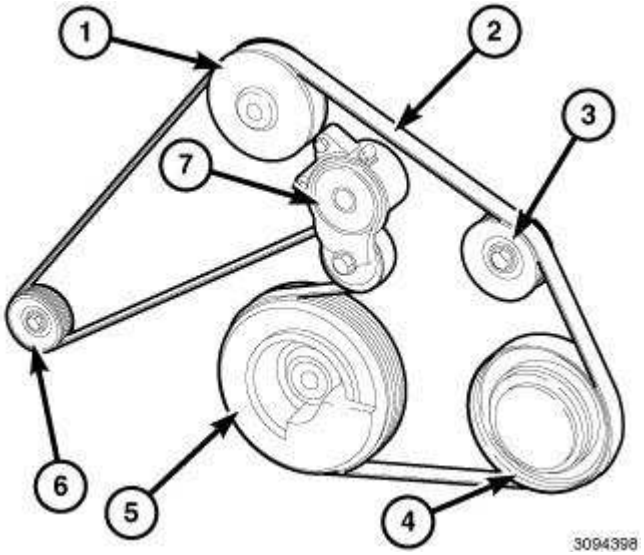


Fig. 208: Pulleys, Tensioner & Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

5. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
7. Lock the engine 30 degrees ATDC. Refer to **Engine/Valve Timing - Standard Procedure**.

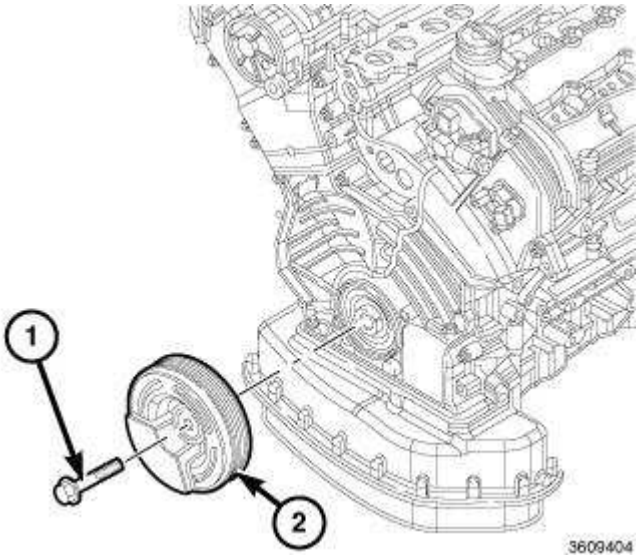


Fig. 209: Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Lower the vehicle.

NOTE: The crankshaft damper bolt is a left hand thread.

9. Remove bolt (1) and the vibration damper (2).

INSTALLATION

INSTALLATION

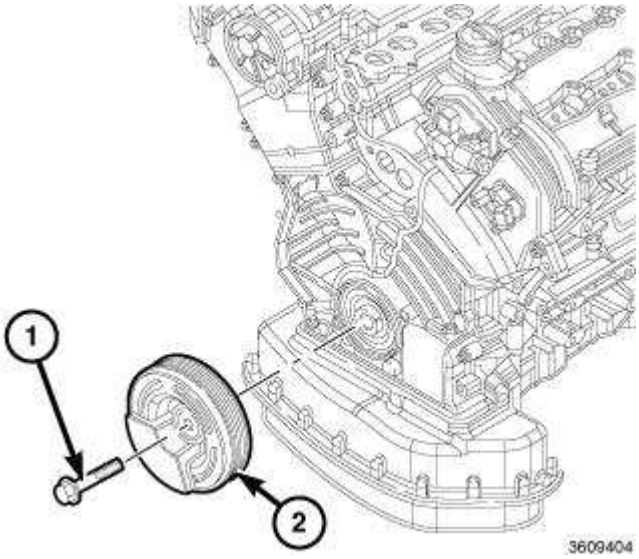


Fig. 210: Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft damper bolt is a left hand thread.

1. Install the vibration damper (2). Tighten bolt (1) to 100 N.m (74 ft. lbs.) plus an additional 125 degrees turn.

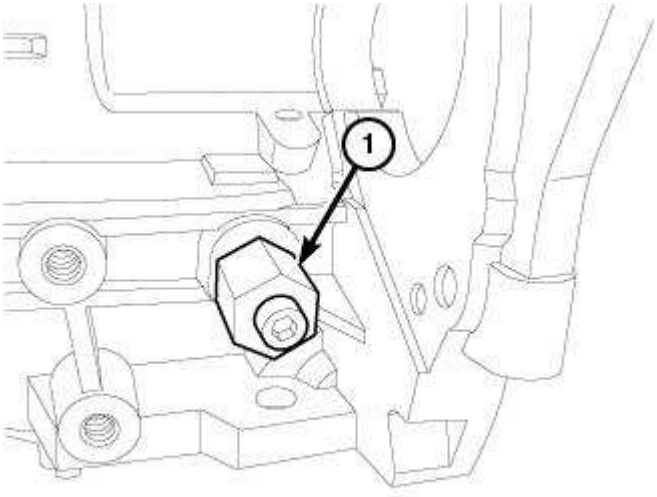


Fig. 211: Crankshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the (special tool #VM.10339, Tool, Crankshaft Timing) (1).

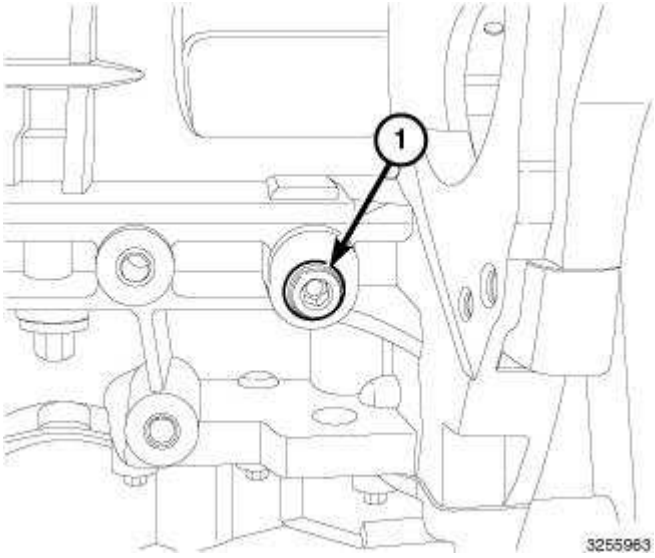


Fig. 212: Engine Block Plug
Courtesy of CHRYSLER GROUP, LLC

4. Install engine block plug (1). Tighten 30 N.m (22 ft. lbs.).
5. Lower the vehicle.

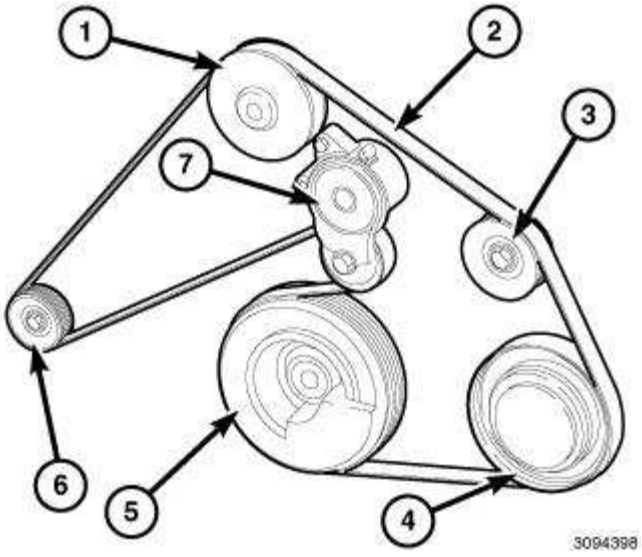


Fig. 213: Pulleys, Tensioner & Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

6. Installed the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

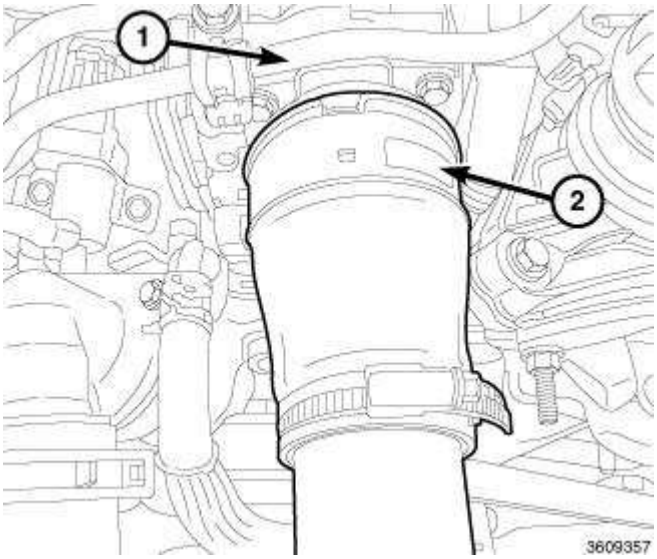


Fig. 214: EGR Air Flow Control Valve & CAC Hose
Courtesy of CHRYSLER GROUP, LLC

7. Position the Charge Air Cooler (CAC) hose assembly and tighten bolts (1) to 11 N.m (97 in. lbs.).
8. Connect the CAC hose (2) to the EGR air flow control valve.

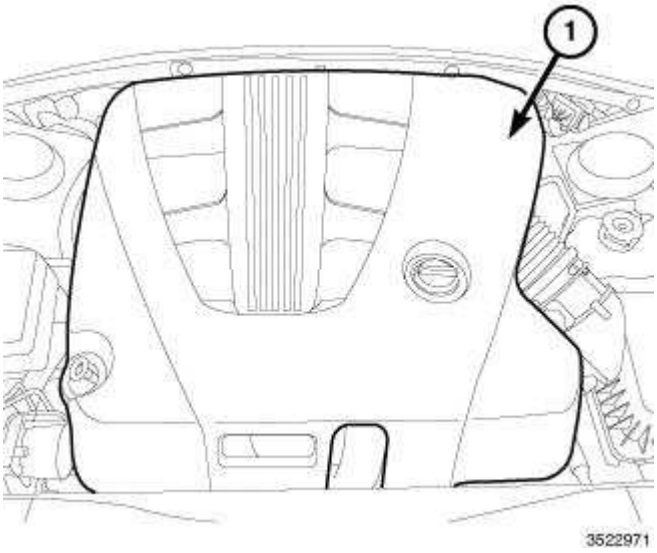


Fig. 215: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine cover (1).
10. Connect the negative battery cable.

FLEXPLATE

DESCRIPTION

DESCRIPTION

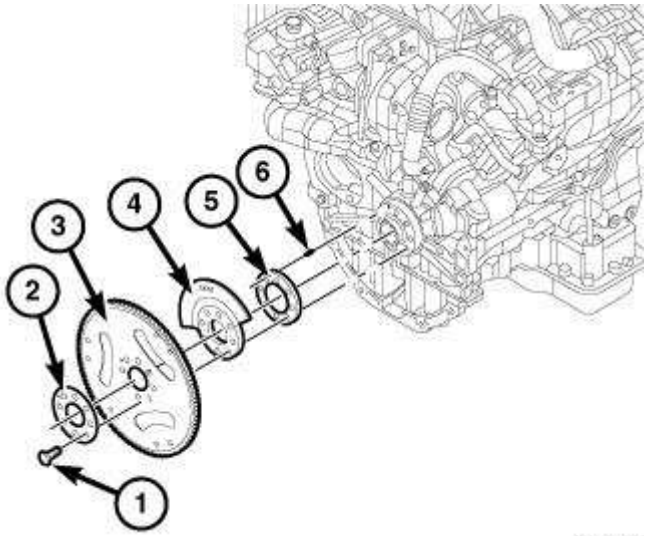


Fig. 216: Backing Plate, Flex Plate, Counter Weight, Tone Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

The flex plate is fastened to the crankshaft and can only be installed one way. The crankshaft has a dowel locating pin that is used to align the magnetic tone wheel and the counter weight. The stamped-steel flex plate has a segment ring to provide engine speed and crankshaft position information to the Power Control Module (PCM). The crankshaft position sensor is mounted next to the segment ring and sends electrical pulses to the PCM.

REMOVAL

REMOVAL

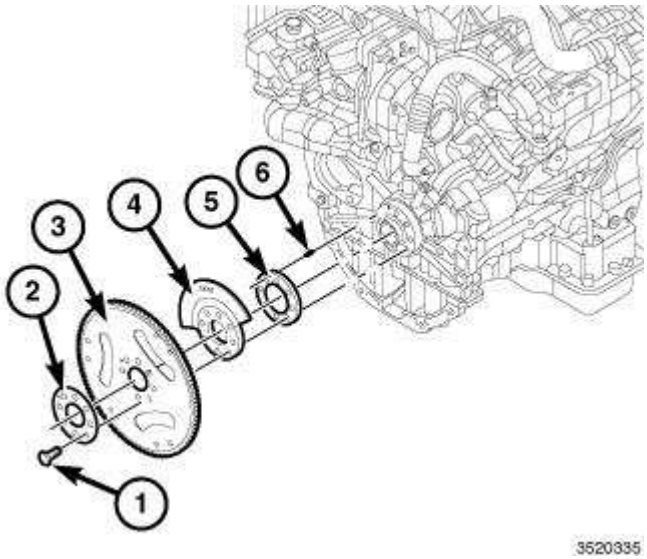


Fig. 217: Backing Plate, Flex Plate, Counter Weight, Tone Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Paint mark the flex plate hub to flex plate relation.
3. Remove bolts (1) and flex plate (3).
4. If necessary, remove the counter weight (4) and tone wheel (5).
5. Inspect flex plate for damage.

INSTALLATION

INSTALLATION

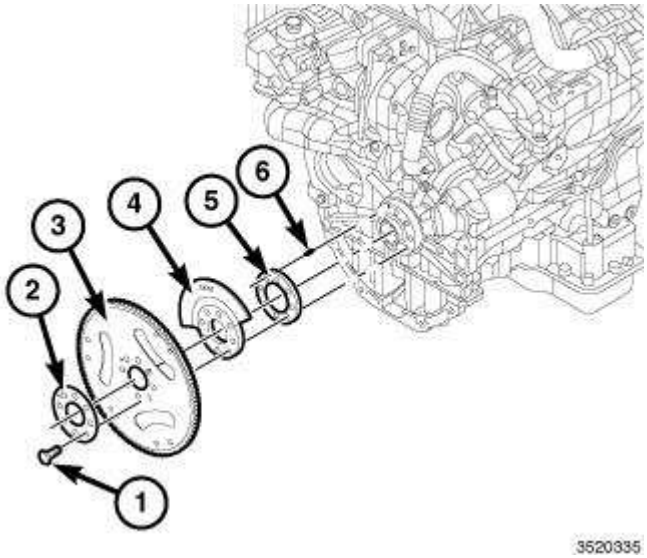


Fig. 218: Backing Plate, Flex Plate, Counter Weight, Tone Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do Not lubricate new bolts as they are already coated with an anti-scuff treatment. Align the flex plate to hub paint marks, where applicable.

NOTE: Always use new flex plate bolts when ever the existing bolts have been removed

1. If removed, install the tone wheel (5) and counter weight (4).
2. Install the flex plate (3).

NOTE: With clean engine oil, lubricate the bolt side of backing plate (2).

3. Lubricate and install the backing plate (2) and tighten bolts (1) finger tight.

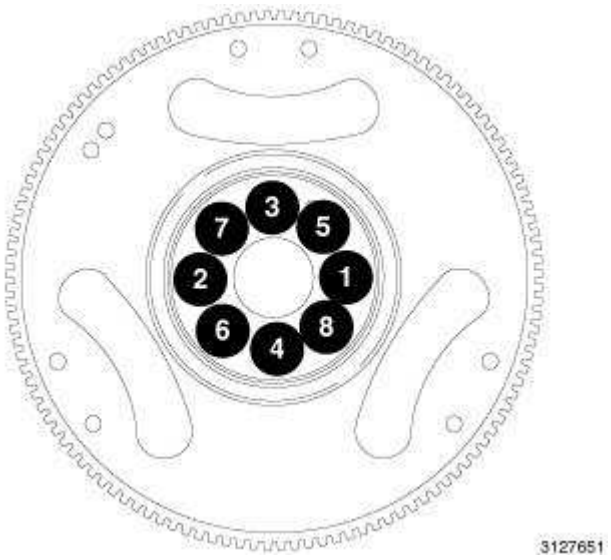


Fig. 219: Flex Plate Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the tightening sequence shown in illustration, Tighten bolts to:
   - Tighten bolts 50 N.m (37 ft. lbs.).
   - Loosen one bolt at a time and retighten bolt in a clockwise cross pattern to 125 N.m (92 ft. lbs.).
   - Using a torque angle gauge, tighten each bolt an additional 30 degrees in a clockwise cross pattern.
5. Install the transmission. Refer to **INSTALLATION** .

PUMP, VACUUM

DESCRIPTION

DESCRIPTION

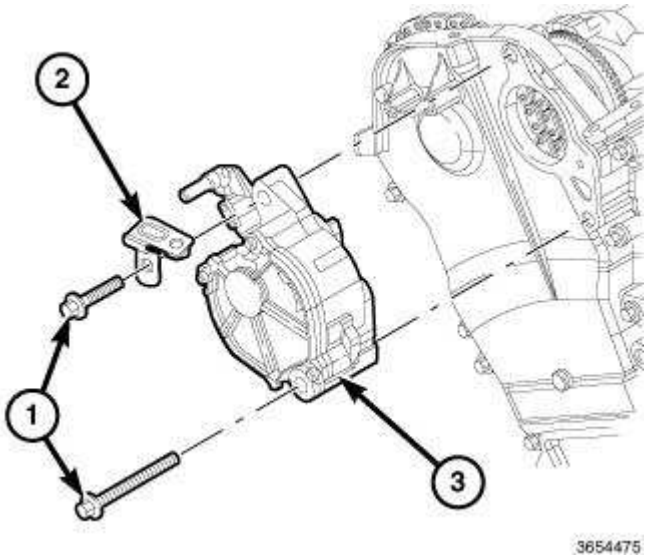


Fig. 220: Vacuum Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

The vacuum pump is a constant displacement, vane-type pump. Vacuum is generated by vanes mounted in the pump rotor. The rotor is located in the pump housing and is pressed onto the pump shaft.

The vacuum pump operates by a slotted extension attached to the vacuum pump shaft. The vacuum pump shaft slotted extension fits into, and is driven by, the intake camshaft gear.

The vacuum pump rotating components are internally lubricated and the vacuum pump has no serviceable parts. Do not disassemble or attempt to repair the pump.

OPERATION

OPERATION

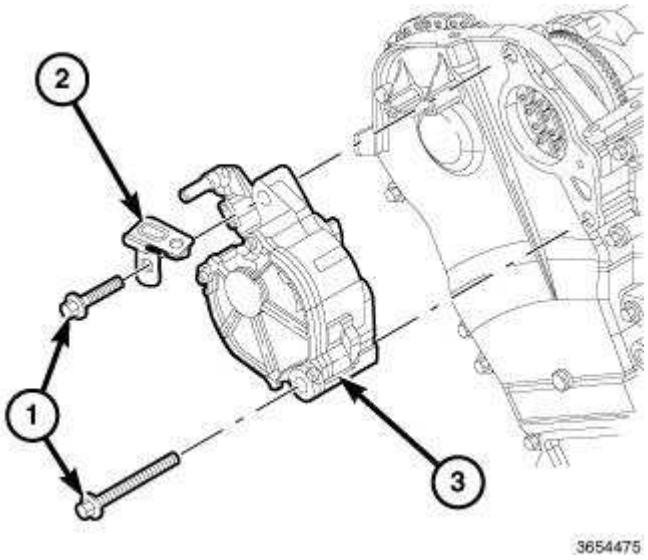


Fig. 221: Vacuum Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

Vacuum pump output is transmitted to the EGR vacuum bypass solenoid and brake vacuum booster, systems through a supply hose. The hose is connected to an outlet port on the pump housing and uses an in-line check valve to retain system vacuum when vehicle is not running.

Pump output ranges from a minimum of 8.5 to 25 inches vacuum.

The pump rotor and vanes are rotated by the slotted pump drive gear which fits into the camshaft drive gear.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

1. Connect a vacuum gauge to the booster check valve with a short length of hose and T-fitting.
2. Start the engine allowing the engine to run for 30 seconds. Vacuum should be 18 inches HG (609 millibars). Verify the vacuum line is not leaking. If no leak is present replace vacuum pump. Refer to **PUMP, VACUUM, REMOVAL** and **PUMP, VACUUM, INSTALLATION**.

REMOVAL

REMOVAL

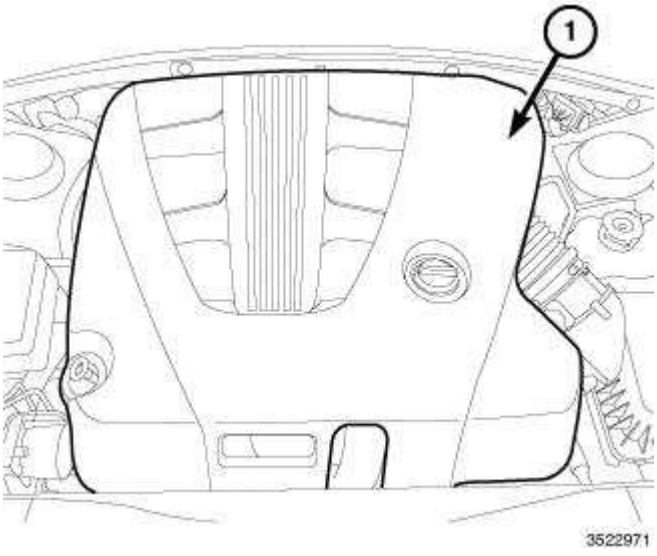


Fig. 222: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Remove the engine cover (1).

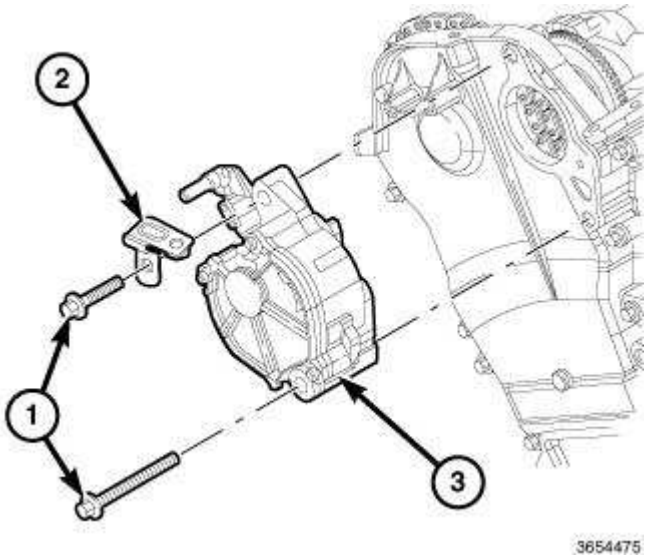


Fig. 223: Vacuum Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the vacuum line from vacuum pump.

NOTE: Observe position of driver on rear of pump upon removal.

4. Remove bolts (1) and the vacuum pump (2).

INSTALLATION

INSTALLATION

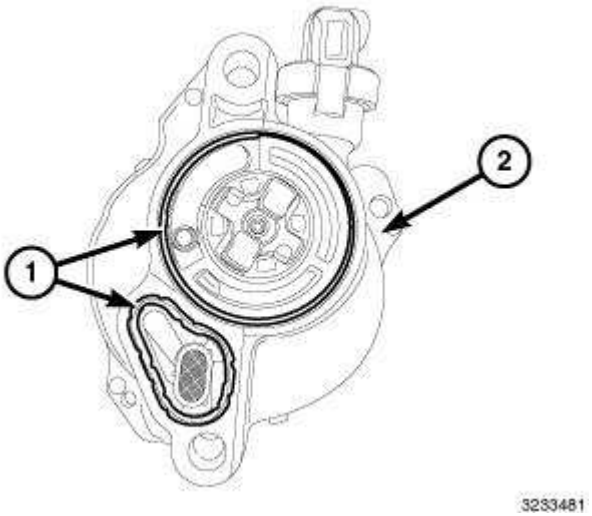


Fig. 224: Vacuum Pump & O-Ring Seals
Courtesy of CHRYSLER GROUP, LLC

1. Clean all sealing surfaces.
2. Install new O-ring seals (1) onto the vacuum pump (2).

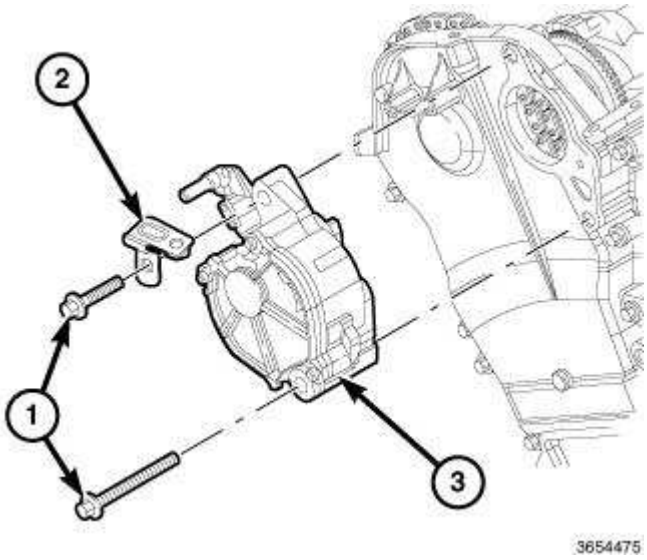


Fig. 225: Vacuum Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Position the slotted drive gear on rear of pump with the slot on the camshaft drive gear.
4. Install vacuum pump (2). Tighten bolts (1) to 30 N.m (22 ft. lbs.).
5. Install vacuum line onto the vacuum pump.

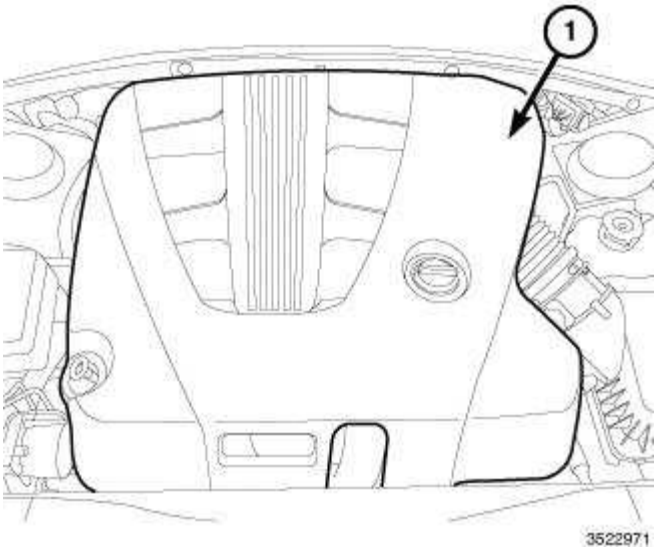


Fig. 226: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

6. Connect the negative battery cable.
7. Start the engine and inspect for leaks.

8. Install the engine cover (1).

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

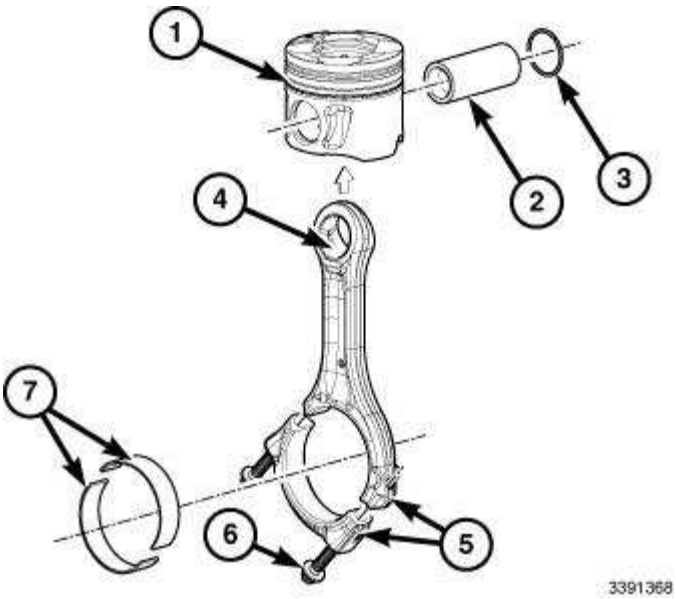


Fig. 227: Piston & Connecting Rod Components
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the connecting rod bolts are ever loosened, replace all of the connecting rods.

The pistons (1) are made of a high strength Aluminum Alloy B2+Phosphate and Graphite Coating. Conventional Cooling Gallery. Insert Ring + Parallel Type Groove. The piston crown consists of a combustion bowl and four recesses machined for the valves. Circlips (3) secure a full floating piston pin (2). The pistons have a phosphate surface treatment and the piston skirts have a graphite treatment for scuff resistance. The piston skirts have notches to provide the necessary clearance for the oil jets when the pistons are at BDC. The connecting rod (5) that are forged steel I-shaped with a diagonal slit and a tapered faced small end. The connecting rod (5) is a fracture split type rod.

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the engine from the vehicle and mount on suitable engine stand. Refer to **REMOVAL**.
3. Remove both cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.

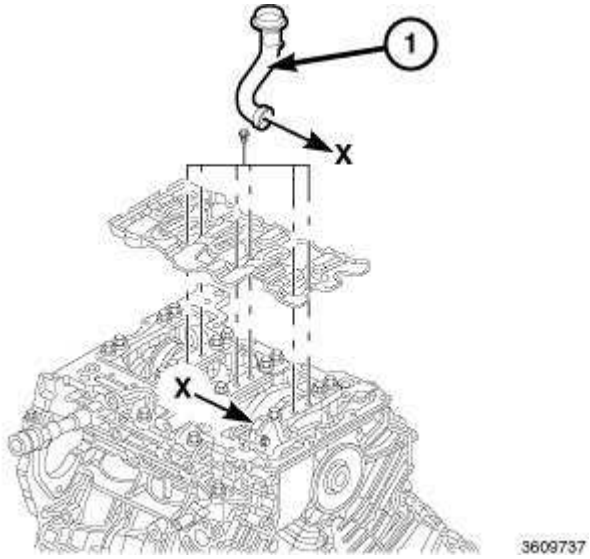


Fig. 228: Oil Pump Pickup Tube
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil pump and pickup tube (1). Refer to **PUMP, ENGINE OIL, REMOVAL**.

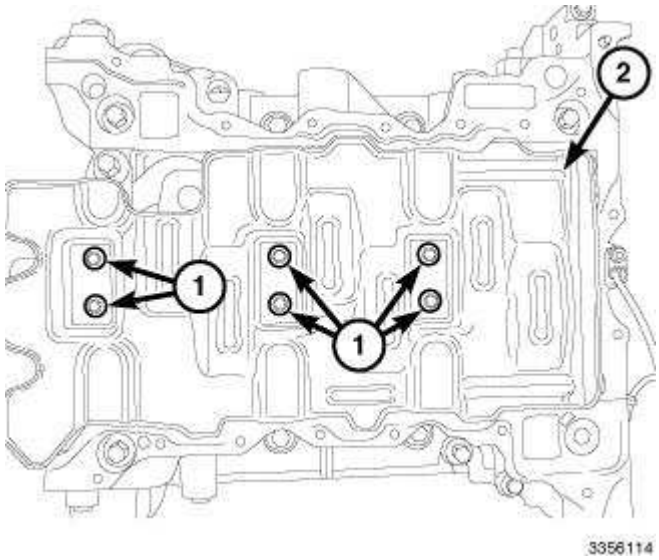


Fig. 229: Windage Tray & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (1) and the windage tray (2).

CAUTION: To prevent damage to the oil jets, remove the oil jets before removing the pistons.

CAUTION: Use caution when removing and installing oil jets. Damage to oil jet nozzle could cause severe engine damage. Care must be taken not to

damage the crankshaft tone ring when removing cylinder number four oil jet.

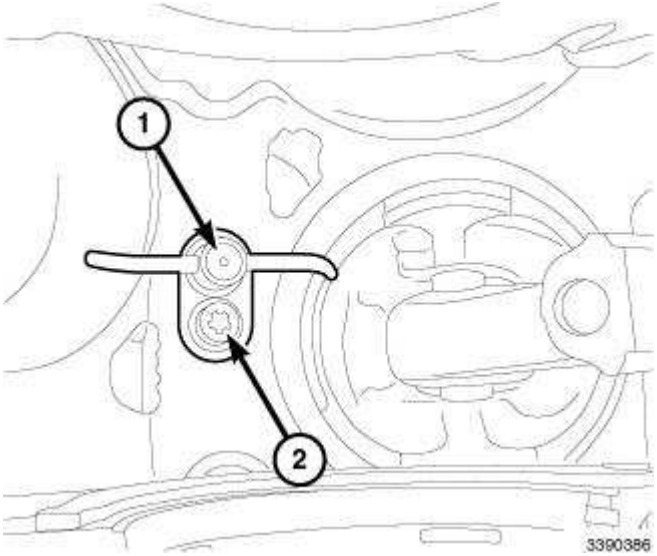


Fig. 230: Oil Jet & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the appropriate oil jet retaining bolt (2) and remove oil jet (1) from the engine block.

NOTE: The piston and connecting rod assembly must be removed through the top of cylinder block.

7. Remove the ridge from the top of the cylinder bores with a ridge reamer before removing pistons from cylinder block. **Be sure to keep the top of pistons covered during this operation.**
8. Rotate the crankshaft so the connecting rod is centered in the cylinder bore.
9. Remove the connecting rod cap bolts and remove the fracture-split rod cap.

NOTE: Use care not to nick or scratch the crankshaft journal or cylinder bore during removal.

10. Carefully remove the piston and connecting rod assembly out through the top of the cylinder block.
11. Mark the pistons with the matching cylinder number after removal.
12. Repeat this procedure for the remaining pistons and connecting rod assemblies.

PISTON PIN

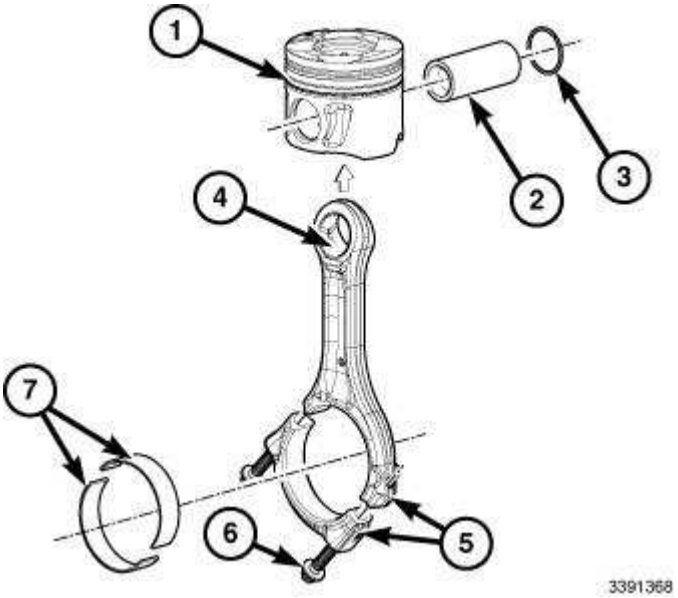


Fig. 231: Piston & Connecting Rod Components
Courtesy of CHRYSLER GROUP, LLC

1. Secure the connecting rod (5) in a soft jawed vice.
2. Remove the two snap rings (3) securing the piston pin (2).
3. Push the piston pin (2) out of the piston (1) and the connecting rod (5).
4. Remove the piston (1) from the connecting rod (5).
5. Measure the diameter of the piston pin in the center and on both ends. Refer to **Engine - Specifications**.
6. Repeat this procedure for the remaining pistons and connecting rod assemblies.

PISTON RING

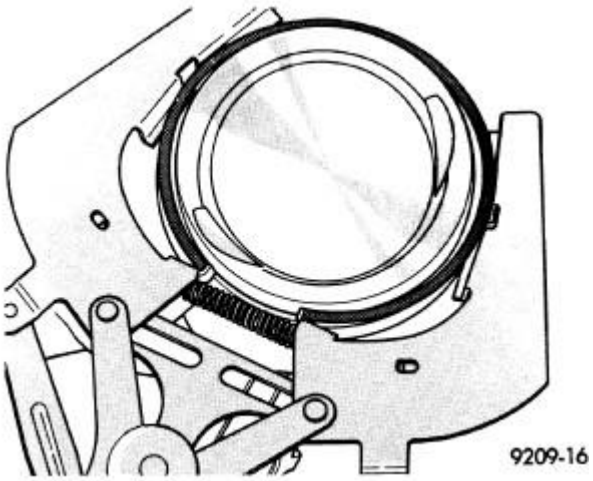


Fig. 232: Piston Rings - Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1. The ID mark on the face of the top and second piston rings must point toward the piston crown.
2. Using a suitable ring expander, remove the top and second piston rings.
3. Remove the upper oil ring side rail, lower oil ring side rail and then the oil expander from the piston.
4. Carefully clean carbon from the piston crowns, skirts and ring grooves ensuring the 4 oil holes in the oil control ring groove are clear.
5. Repeat this procedure for the remaining pistons and connecting rod assemblies.

INSPECTION

INSPECTION

PISTONS

1. Check the piston pin bores in piston for roundness. Make 3 checks at 120° intervals. Maximum out of roundness.020 mm (.0008 in.).
2. The piston diameter should be measured approximately 10 mm (.394 in.) up from the base.
3. Skirt wear should not exceed 0.1 mm (.00039 in.).

PISTON PINS

1. Measure the diameter of piston pin in the center and both ends. Refer to **Engine - Specifications**.

CONNECTING RODS

CAUTION: Connecting rods must be replaced once the end caps are loosened. All six must have the same weight and the same number. Replacement connecting rods will only be supplied in sets of six. When assembling the connecting rod, be sure to paint mark or scribe mark each of the connecting rods and caps before installation, for alignment purposes later.

NOTE: Do Not lubricate the new connecting rod bolts. They are already coated with a anti scuff treatment.

Connecting rods are supplied in sets of six since they all must be of the same weight category.

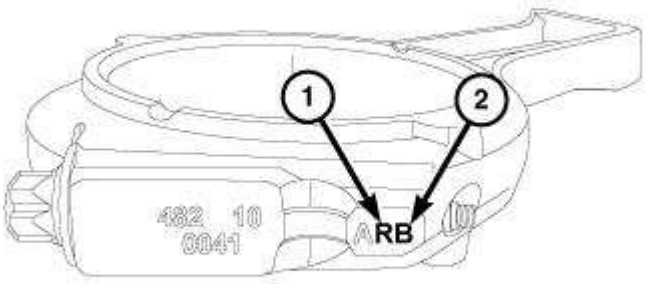
1. Assemble bearing shells and bearing caps to their respective connecting rods ensuring that the serrations on the cap and reference marks are aligned.
2. Using new bolts, tighten the connecting rod cap bolts to:
   - Step 1: Tighten to 10 N.m (88 in. lbs.).
   - Step 2: Tighten each bolt to 25 N.m (18 ft. lbs.).
   - Step 3: Tighten each bolt an additional 75 degrees turn.
   - Step 4: With the torque wrench set at 50 N.m (37 ft. lbs.) to check the tightening of each

bolt.

INSTALLATION

INSTALLATION

WARNING: All six connecting rods must have the same weight and letter classification. The connecting rod bolts are a one time use, and must be replaced every time they are loosened or removed.



3346447

Fig. 233: Connecting Rod Shaft & Class Identification Mark
Courtesy of CHRYSLER GROUP, LLC

Each connecting rod has its own letter weight class identification mark (1) on connecting rod. Only use connecting rods that are of the same weight class. (R = Rosso, V = Verde)

PISTON PIN

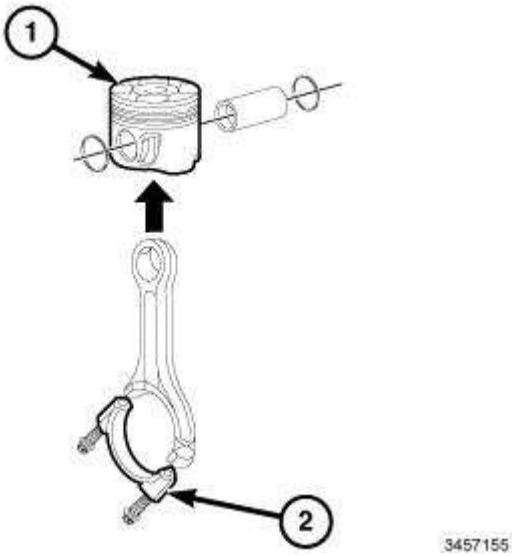


Fig. 234: Piston Crown & Connecting Rod Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: During piston assembly with the connecting rod, pay attention concerning the arrow position on the piston crown (1) and the stamping on the connecting rod cap (2): the arrow and the stamping must oppose one another and cannot be on the same side.

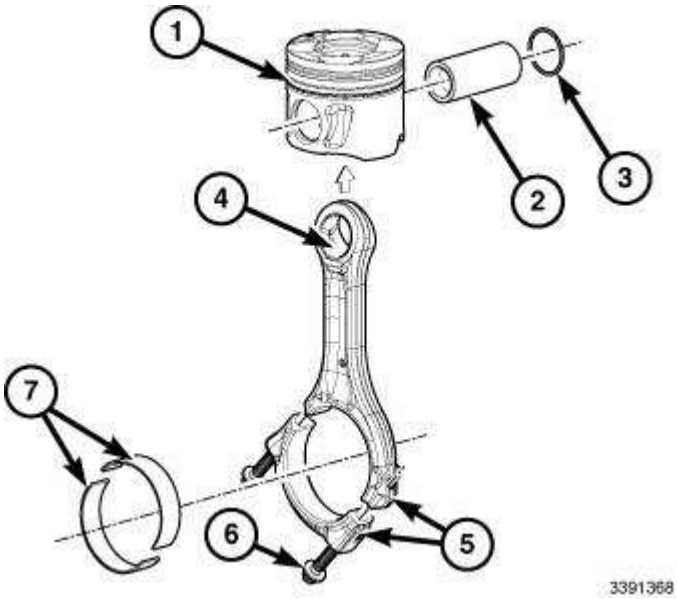


Fig. 235: Piston & Connecting Rod Components
Courtesy of CHRYSLER GROUP, LLC

1. Secure connecting rod (5) in soft jawed vice.
2. Lubricate piston pin (2) and piston (1) with clean engine oil.
3. Position piston (1) on connecting rod (5).

4. Install piston pin (2).
5. Install snap ring (3) in piston (1) to retain piston pin (2).
6. Remove connecting rod (5) from vice.

PISTON RINGS

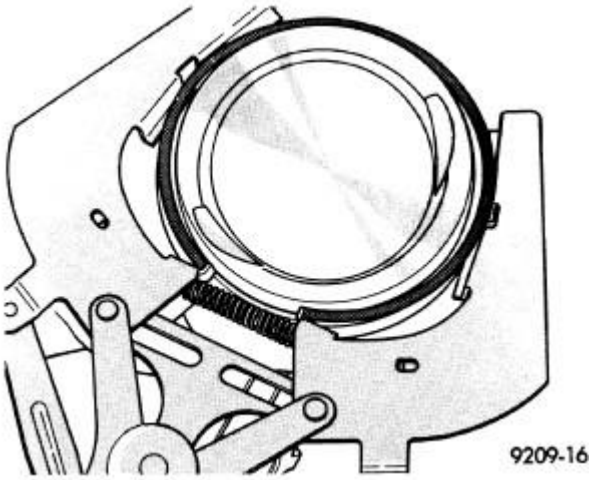


Fig. 236: Piston Rings - Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1. Install rings on the pistons using a suitable ring expander.

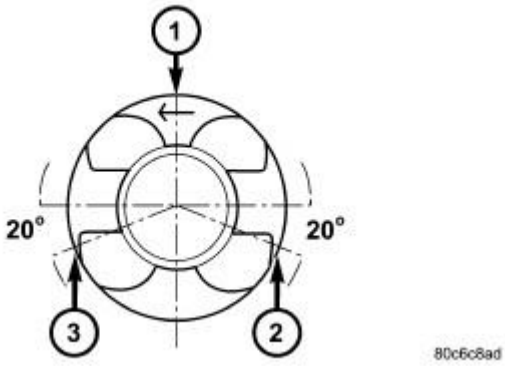


Fig. 237: Piston Ring Gap Location
Courtesy of CHRYSLER GROUP, LLC

1 - SECOND COMPRESSION RING GAP POSITION
2 - OIL CONTROL RING GAP POSITION
3 - TOP COMPRESSION RING GAP POSITION

2. Top compression ring is tapered and chromium plated. The second ring is of the scraper type and must be installed with scraping edge facing bottom of the piston. The third is an oil control ring. Ring gaps must be positioned, before inserting piston into the liners, as follows:

- Top ring gap must be positioned at the No. 3 position (looking at the piston crown from above).
- Second piston ring gap should be positioned at the No. 1 position.
- Oil control ring gap should be positioned at the No. 2 position.

PISTON

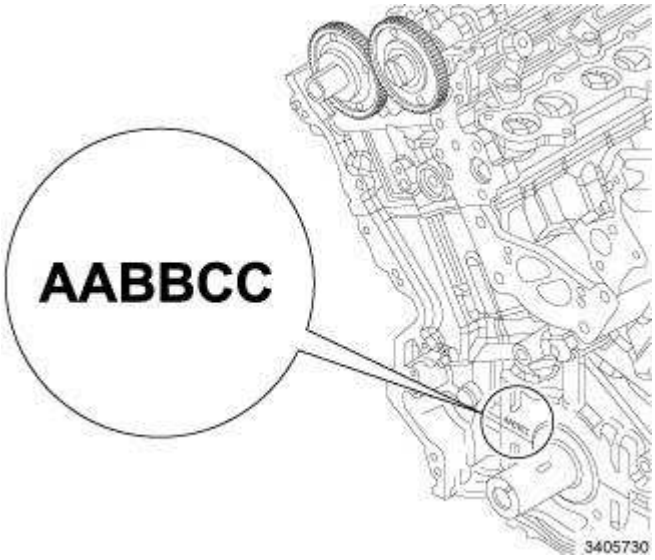


Fig. 238: Cylinder Identification Location
Courtesy of CHRYSLER GROUP, LLC

1. Identify the correct piston to cylinder location on left front of engine block.

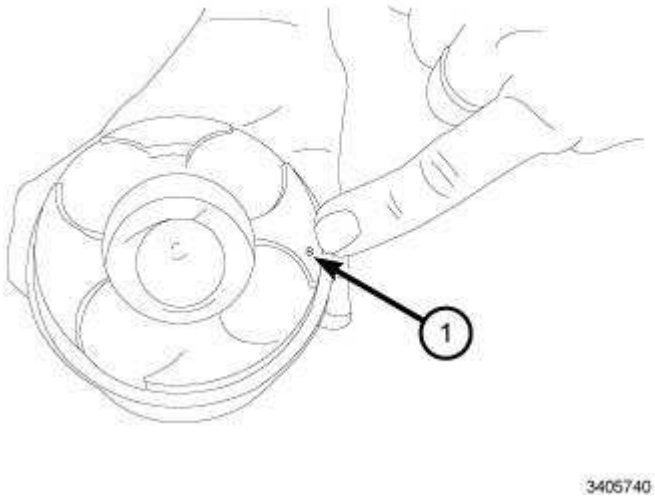


Fig. 239: Piston Lettering Identification
Courtesy of CHRYSLER GROUP, LLC

2. Identify the piston by the lettering shown in illustration on piston crown.

3. Using the reference table below select the correct piston to location.

NOTE: **The first letter correspond to the first cylinder, the second letter to the second one etc.**

Piston Letter On Crown	A	A	B	B	C	C
Cylinder Piston Location	1	2	3	4	5	6

4. Before installing the Piston Installer, make sure the oil ring expander ends are butted together.
5. Immerse the piston head and rings in clean engine oil, slide the piston installer over the piston and tighten. **Ensure position of rings does not change during this operation** .

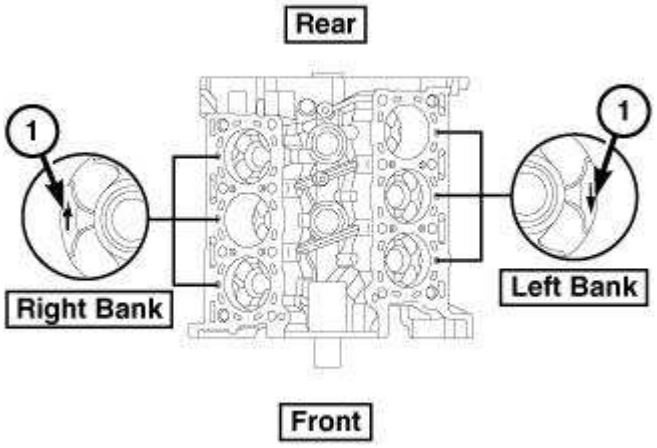


Fig. 240: Arrow Stamped On Piston Crown
Courtesy of CHRYSLER GROUP, LLC

6. When installing the pistons and connecting rod assembly, making sure that the arrow stamped on the piston crown (1) is turned toward the back side of the engine (flywheel side) for the right bank pistons 1 2 3 and toward the front side of the engine (timing chain side) for the left bank pistons 4 5 6.

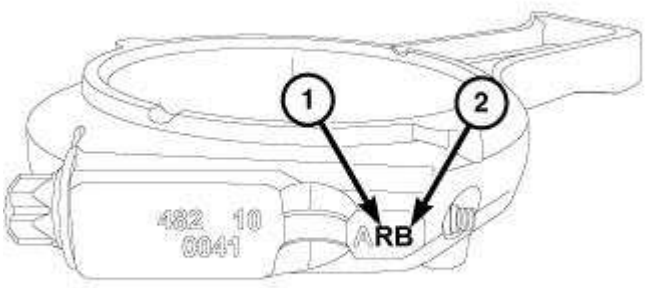


Fig. 241: Connecting Rod Shaft & Class Identification Mark
Courtesy of CHRYSLER GROUP, LLC

7. Each connecting rod has its own letter class identification mark (2) on connecting rod for bearing selection.

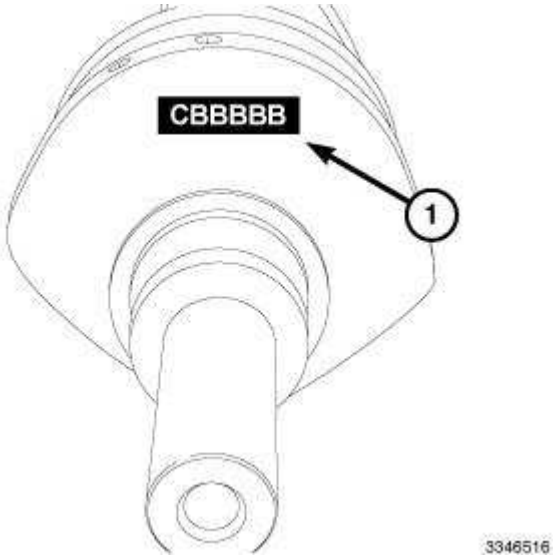


Fig. 242: Letters Stamped Into Crankshaft
Courtesy of CHRYSLER GROUP, LLC

8. To determine the correct bearing size for each cylinder. Each connecting rod letter class must be matched with the crankshaft letter class (1) with the bearing selection chart to determine the correct bearing color for each cylinder. The letters stamped into the crankshaft (1) are in the same order as the cylinders. The first letter corresponds to the first cylinder, the second to the second, etc. See bearing selection chart. Refer to **Engine/Engine Block - Standard Procedure**.

CAUTION: Care must be taken not to nick the crankshaft journal or cylinder bore when installing the pistons.

9. Rotate crankshaft so that the connecting rod journal is on the center of the cylinder bore. Insert rod and piston into cylinder bore and guide rod over the crankshaft journal.
10. Guide the piston down in cylinder bore, using a hammer handle. At the same time, guide connecting rod into position on connecting rod journal.

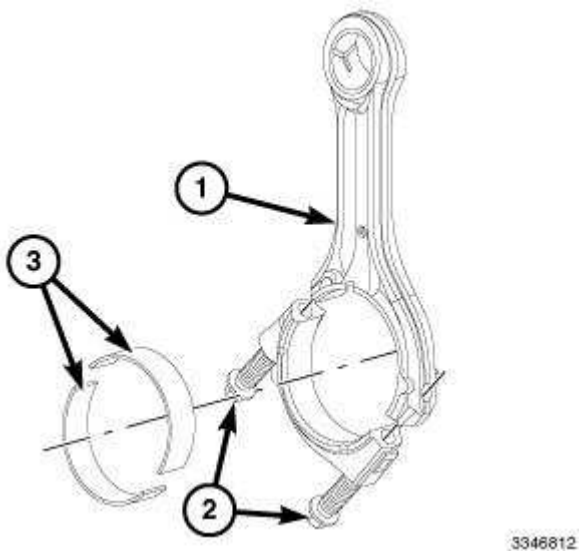


Fig. 243: Connecting Rod, Bearings & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Assemble connecting rod bearings (3) and bearing caps to their respective connecting rods (2) ensuring that the serrations on the cap and reference marks are aligned.

NOTE: The connecting rod bolts must be replaced every time they are loosened or removed.

12. Using new bolts, tighten the connecting rod cap bolts to:
    - Step 1: Tighten to 10 N.m (88 in. lbs.).
    - Step 2: Tighten each bolt to 25 N.m (18 ft. lbs.).
    - Step 3: Tighten each bolt an additional 75 degrees turn.
    - Step 4: With the torque wrench set at 50 N.m (37 ft. lbs.) to check the tightening of each bolt.

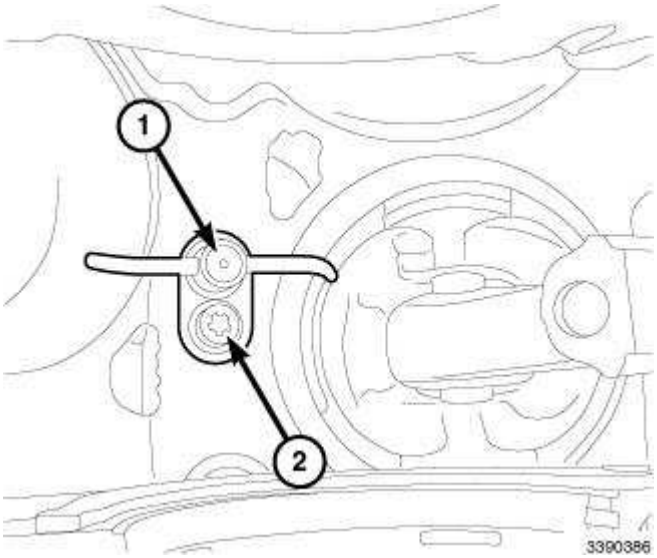


Fig. 244: Oil Jet & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Install the oil jets. Refer to **JET, PISTON OIL COOLER, INSTALLATION**.

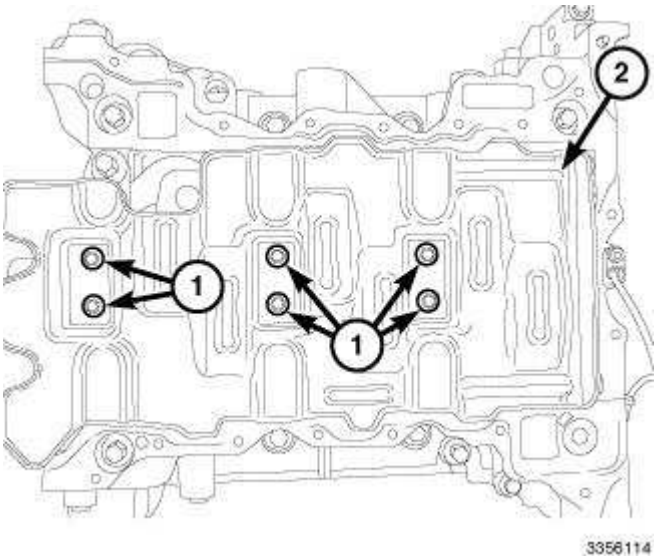


Fig. 245: Windage Tray & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install the windage tray (2). Tighten bolts (1) to 11 N.m (97 in. lbs.).

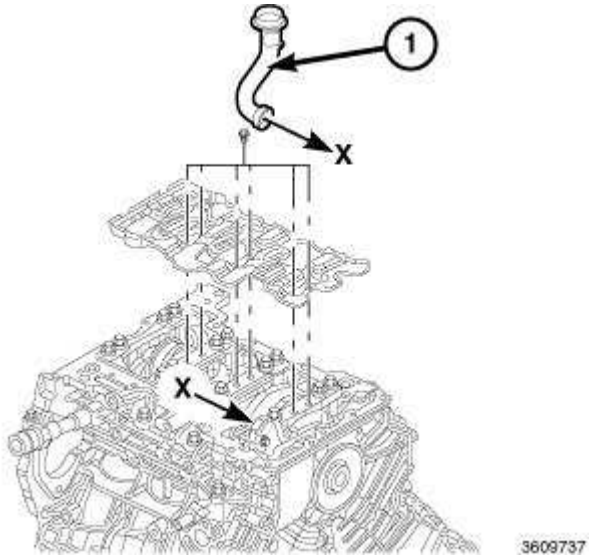


Fig. 246: Oil Pump Pickup Tube
Courtesy of CHRYSLER GROUP, LLC

15. Install the oil pump pickup tube (1). Refer to **PICK-UP, OIL PUMP, INSTALLATION**.
16. Install both cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.
17. Connect negative battery cable.

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

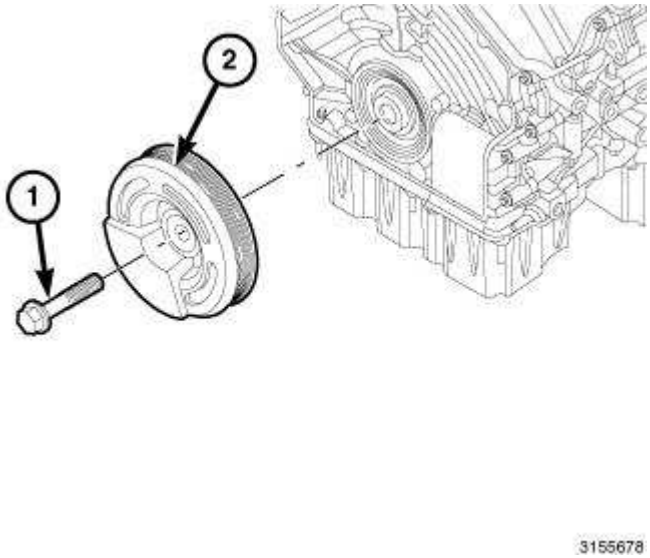


Fig. 247: Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.

CAUTION: Care must be taken when removing the crankshaft seal. DO NOT damage or gouge the timing chain cover.

3. Using suitable seal puller, remove the front crankshaft seal.

INSTALLATION

INSTALLATION

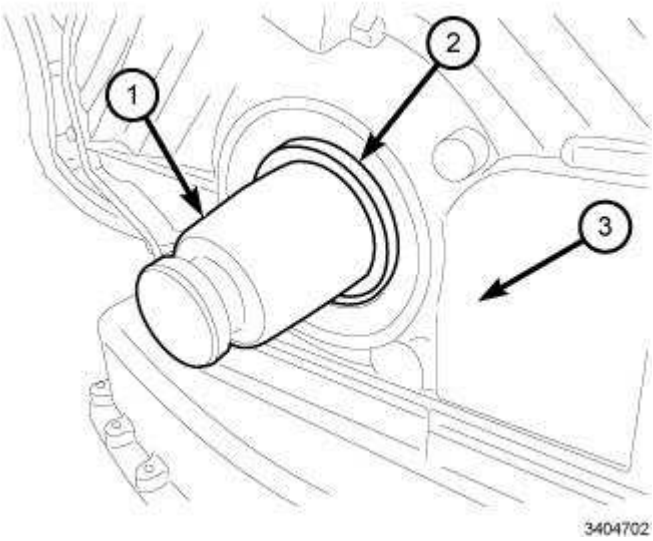


Fig. 248: Front Seal Guide & Oil Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean timing chain cover seal surface.

NOTE: The lip of the front oil seal faces away from the engine on installation.

2. Install the (special tool #VM.10340-1, Guide, Front Seal) (1) and position the front seal (2) in place.
3. Remove the (special tool #VM.10340-1, Guide, Front Seal) (1).

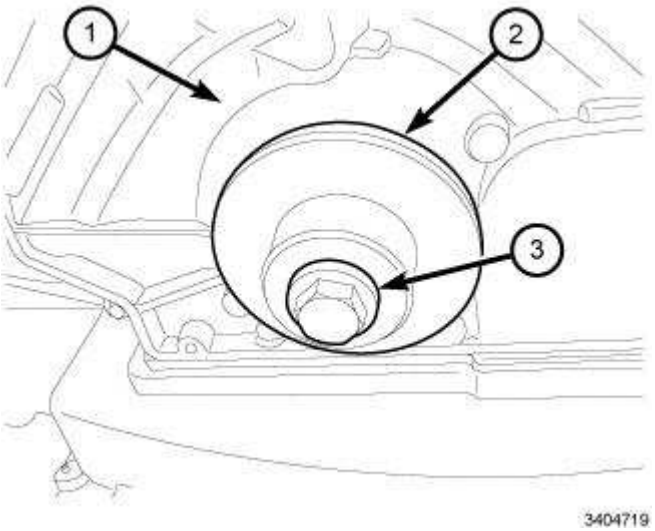


Fig. 249: Front Seal Installer Tool & Vibration Damper Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Using the (special tool #VM.10340-2, Installer Tool, Front Seal) (2), install the front crankshaft oil seal using the vibration damper bolt to draw the seal in place.
5. Remove bolt (3) and the (special tool #VM.10340-2, Installer Tool, Front Seal) (2).

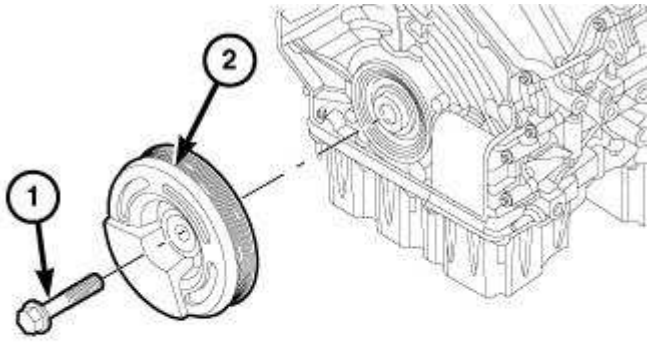


Fig. 250: Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION**.
7. Connect negative battery cable.

SEAL, CRANKSHAFT OIL, REAR

REMOVAL

REMOVAL

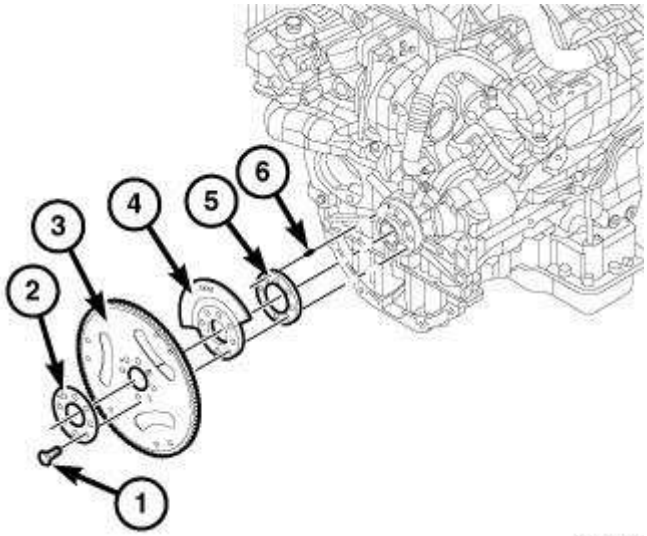


Fig. 251: Backing Plate, Flex Plate, Counter Weight, Tone Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the flex plate (3), counter weight (4), and tone wheel (5). Refer to **FLEXPLATE, REMOVAL**.

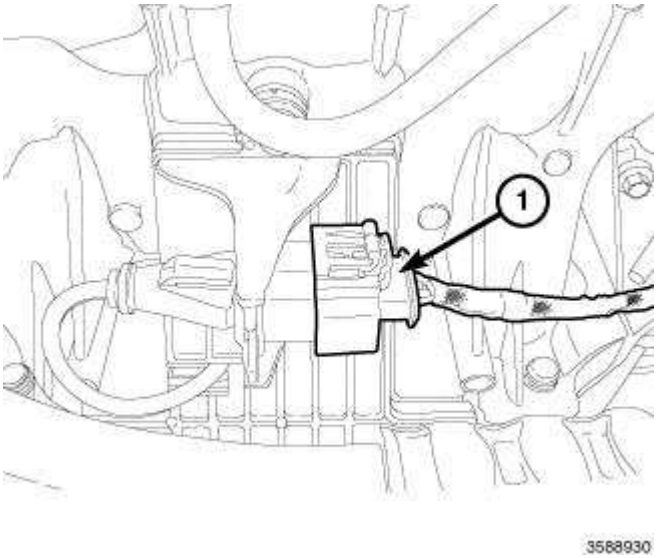


Fig. 252: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the Crankshaft Position Sensor (CKP) wire harness connector (1).

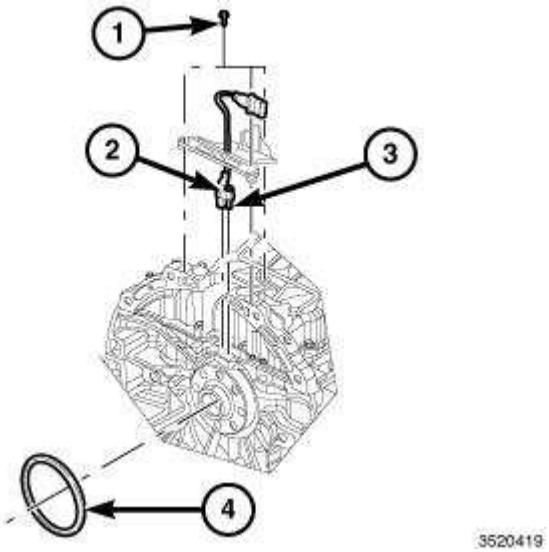


Fig. 253: CKP Sensor, Seal & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts (1) and the CKP cover.
4. Remove bolt (3) CKP sensor (2).

NOTE: Use care not to damage the rear main oil seal sealing surface.

5. Using suitable seal puller, remove the rear main oil seal (4).

INSTALLATION

INSTALLATION

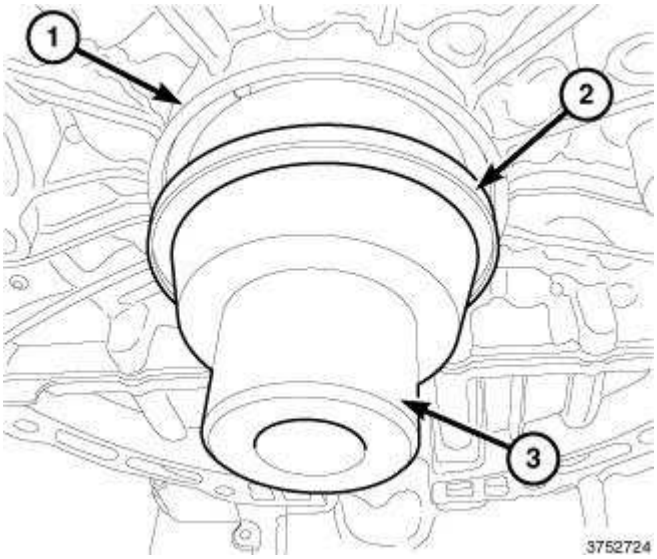


Fig. 254: Rear Seal Guide, Rear Oil Seal & Crankshaft
Courtesy of CHRYSLER GROUP, LLC

1. Clean around seal surface area.

NOTE: The lip of the front oil seal faces away from the engine on installation.

2. Install the (special tool #VM.10341-1, Guide, Rear Seal) (3) and slide the rear oil seal (2) onto the crankshaft.
3. Remove the (special tool #VM.10341-1, Guide, Rear Seal) (3).

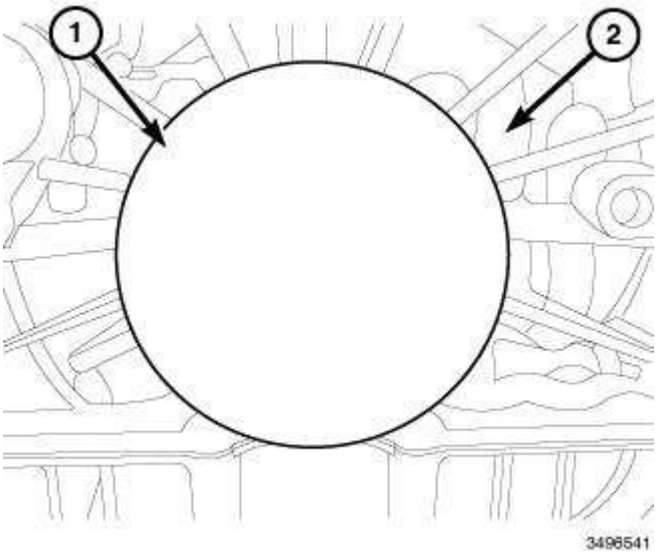


Fig. 255: Rear Seal Installer & Crankshaft Position Sensor (CKP) Boss
Courtesy of CHRYSLER GROUP, LLC

NOTE: Position the flat portion of the Rear Seal Installer should be facing down giving you clearance by the Crankshaft Position Sensor (CKP) boss.

4. Using the (special tool #VM.10341-2, Installer Tool, Rear Seal) (1) install the rear main oil seal into the engine block.

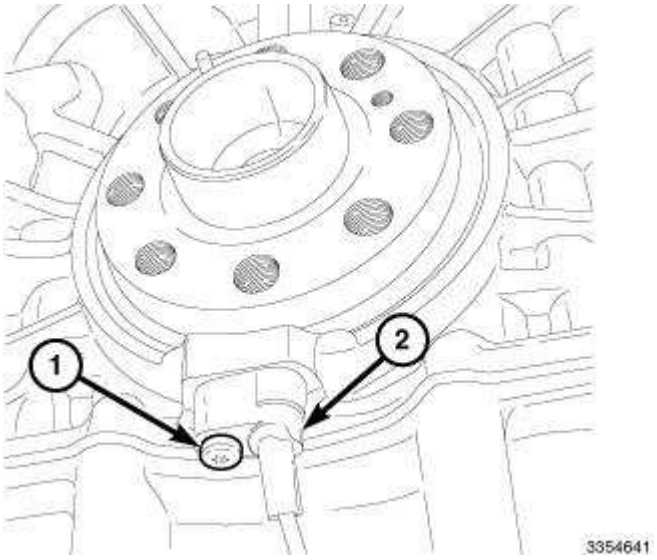


Fig. 256: Crankshaft Position Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Clean the area and bore around CKP.
6. Install the Crankshaft Position Sensor (CKP) (2). Tighten bolt (1) to 6 N.m (53 in. lbs.).

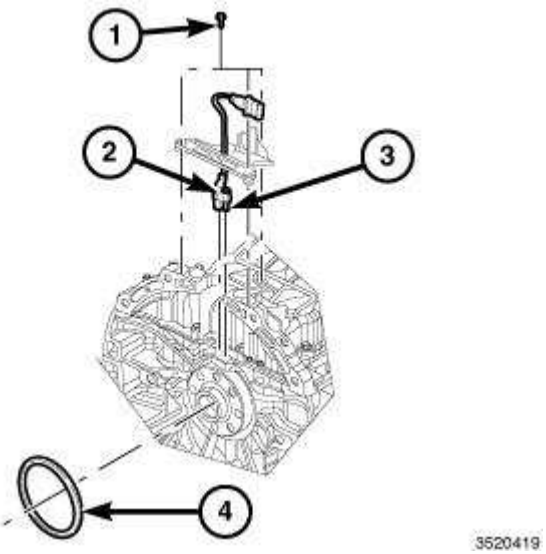


Fig. 257: CKP Sensor, Seal & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Install the CKP sensor cover. Tighten bolts (1) to 8 N.m (71 in. lbs.).

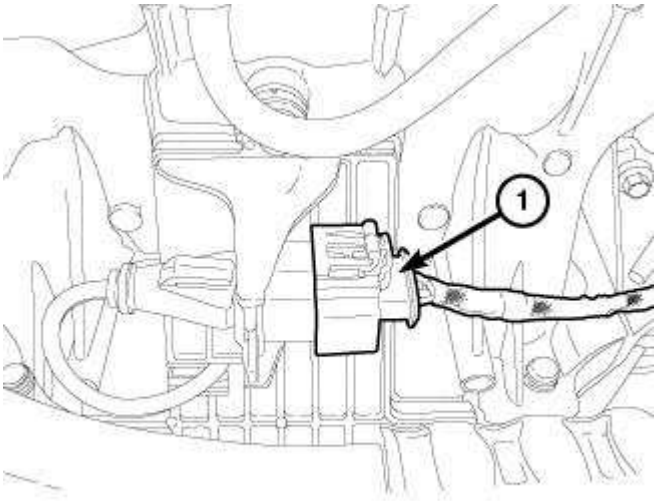


Fig. 258: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Connect the CKP wire harness connector (1).

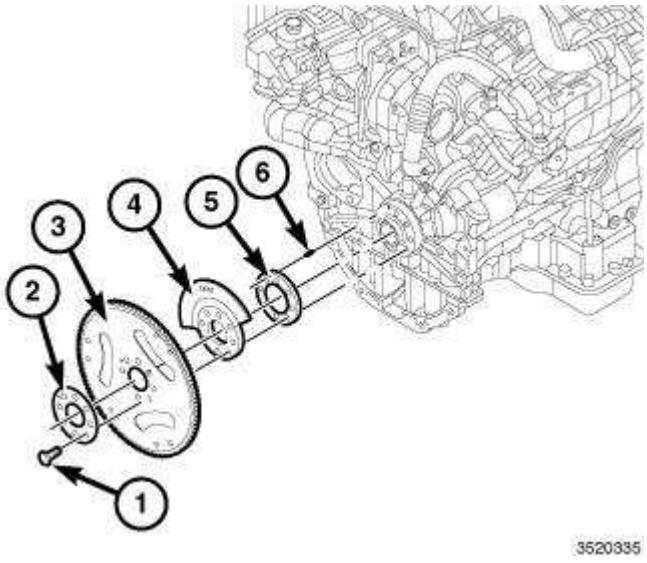


Fig. 259: Backing Plate, Flex Plate, Counter Weight, Tone Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the tone wheel (5), counter weight (4), and flex plate (3). Refer to **FLEXPLATE, INSTALLATION**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, REAR MOUNT

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the transmission belly pan.

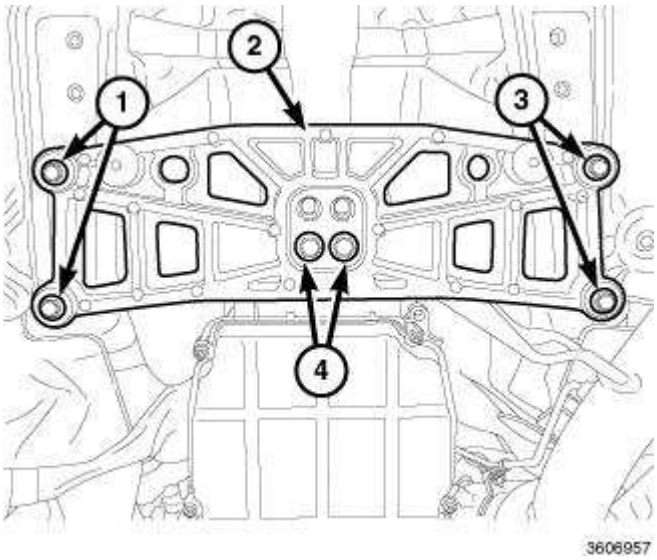


Fig. 260: Rear Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the two bolts (4) from the rear engine mount isolator.
4. Using a suitable transmission jack, positioned under the transmission oil pan, raise the transmission until the weight is off of the isolator.
5. Remove bolts (1, 3) and the rear crossmember (2).

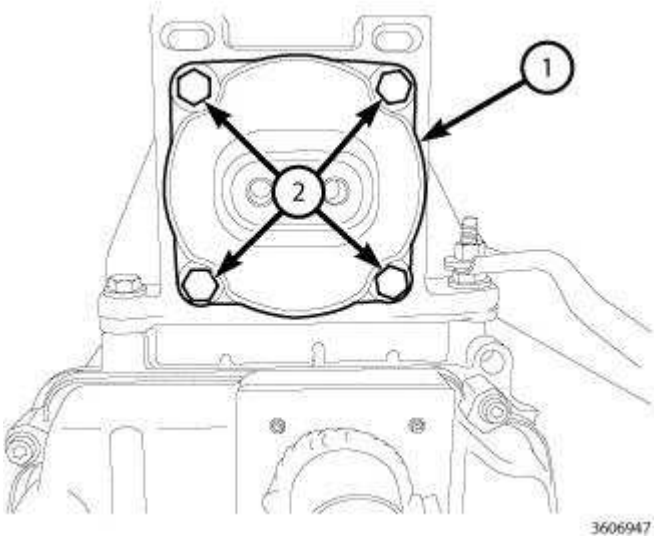


Fig. 261: Rear Engine Mount Isolator & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove bolts (2) and the rear engine mount isolator (1).

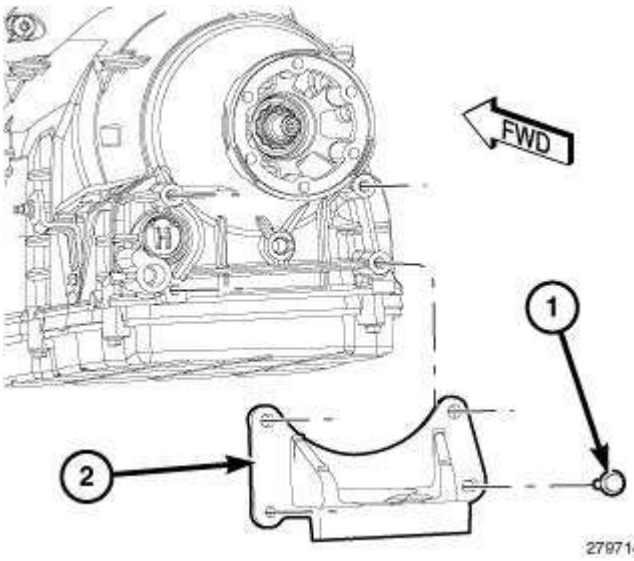


Fig. 262: Rear Engine Mount Bracket & Bolts (4x2)
Courtesy of CHRYSLER GROUP, LLC

7. If required, remove four bolts (1) and the rear engine mount bracket (2).

INSTALLATION

INSTALLATION

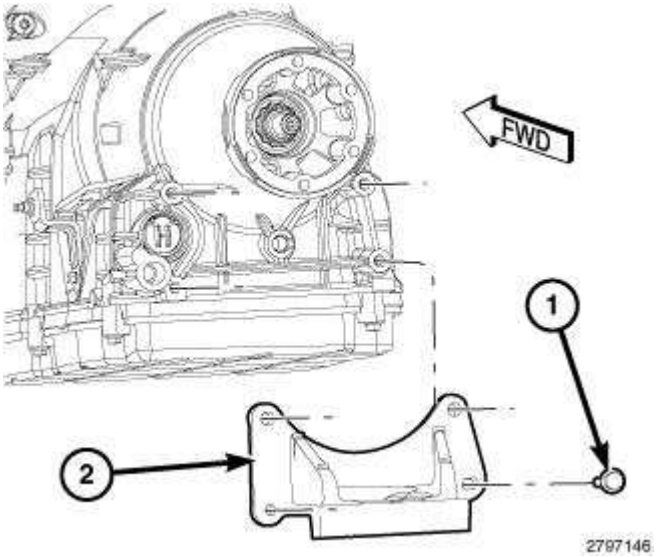


Fig. 263: Rear Engine Mount Bracket & Bolts (4x2)
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the rear engine mount bracket (2). Tighten bolts (1) to 33 N.m (24 ft. lbs.).

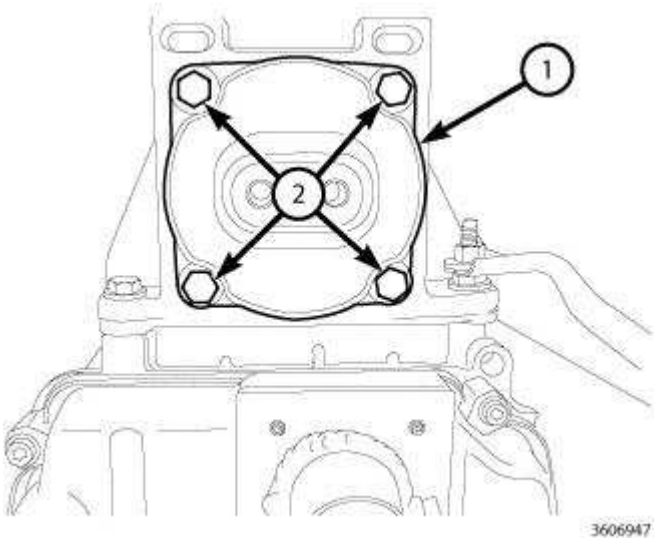


Fig. 264: Rear Engine Mount Isolator & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear engine mount isolator (1) Tighten bolts (2) to 61 N.m (45 ft. lbs.).

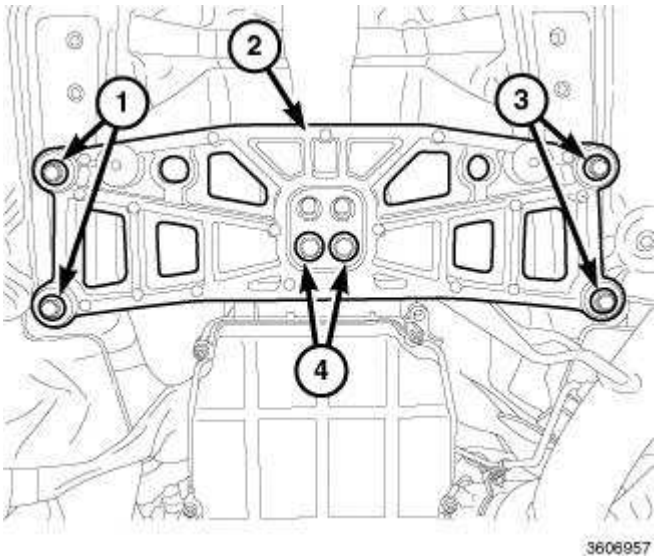


Fig. 265: Rear Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the crossmember (2). Tightened bolts (1 and 3) to 55 N.m (41 ft. lbs.).
4. Lower the transmission so the weight is resting on the isolator.
5. Install the rear engine mount isolator bolts (4) and tighten to 61 N.m (45 ft. lbs.).
6. Install the transmission belly pan.
7. Lower the vehicle.

INSULATOR, ENGINE MOUNT, LEFT

REMOVAL

REMOVAL

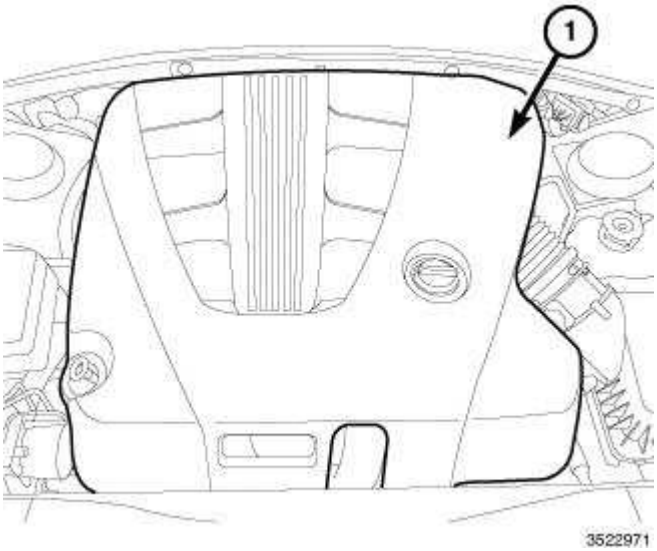


Fig. 266: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.

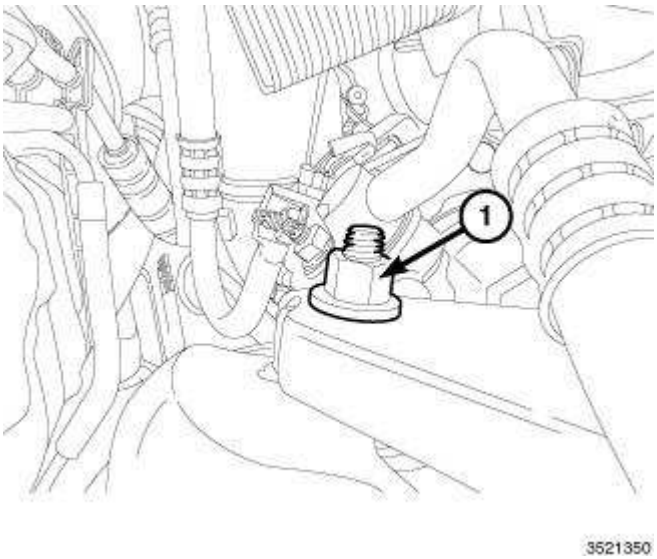


Fig. 267: Engine Mount Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

4. Remove the left and right engine mount retaining nut (1).
5. Using (special tool #8534B, Fixture, Driveline Support) lift engine enough to gain access to the

engine mount without damaging the turbocharger.

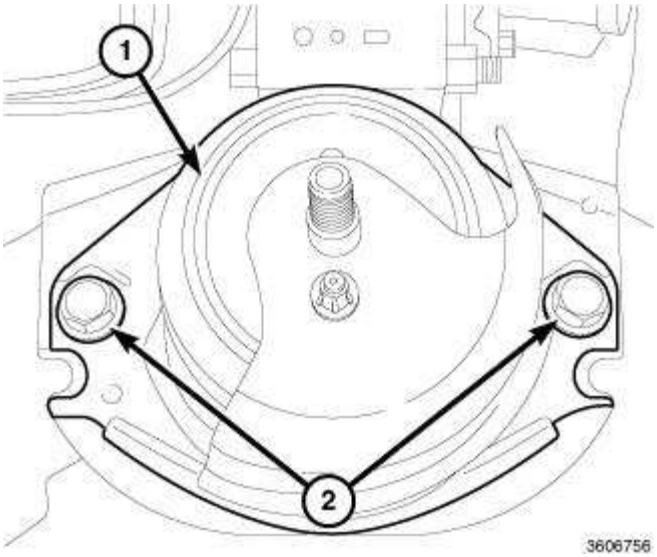


Fig. 268: Left Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
7. Removed the belly pan. Refer to **BELLY PAN, REMOVAL** .
8. Remove bolts (2) and the left engine mount (1).

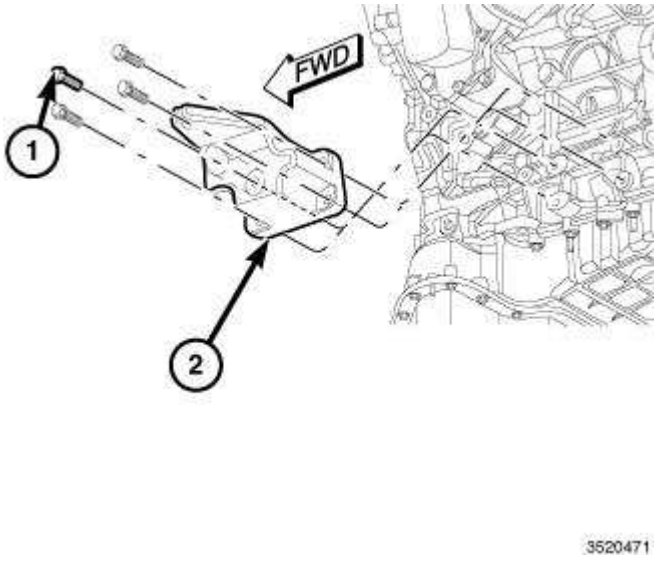


Fig. 269: Left Engine Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If necessary, remove bolts (1) and the left engine mount bracket (2).

INSTALLATION

INSTALLATION

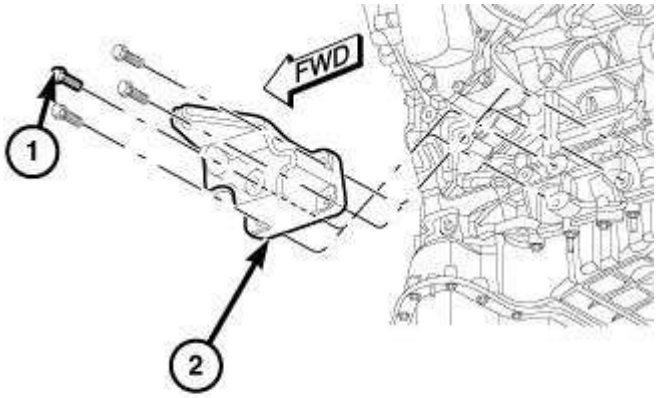


Fig. 270: Left Engine Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, Install the left engine mount bracket (2). Tighten Bolts (1) to 61 N.m (45 ft. lbs).

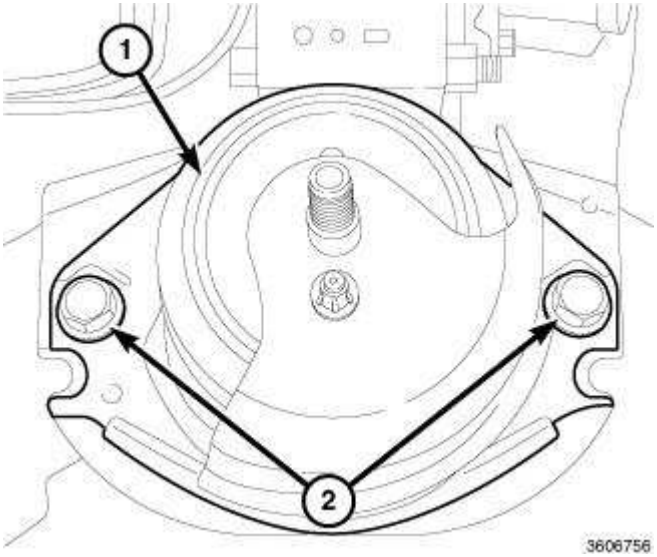


Fig. 271: Left Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the left engine mount (1). Tighten bolts (2) to 61 N.m (45 ft. lbs.).
3. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .
4. Lower the vehicle.
5. Lower the engine into position and remove (special tool #8534B, Fixture, Driveline Support).

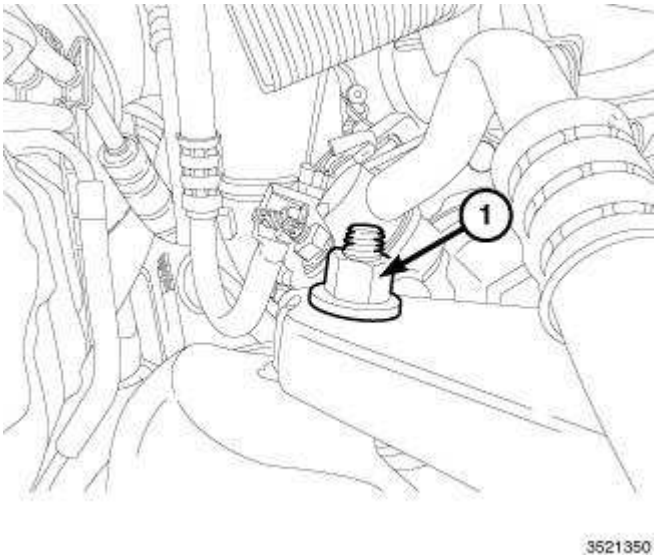


Fig. 272: Engine Mount Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

6. Install the left and right engine mount retaining nuts (1) and tighten to 61 N.m (45 ft. lbs.).
7. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.

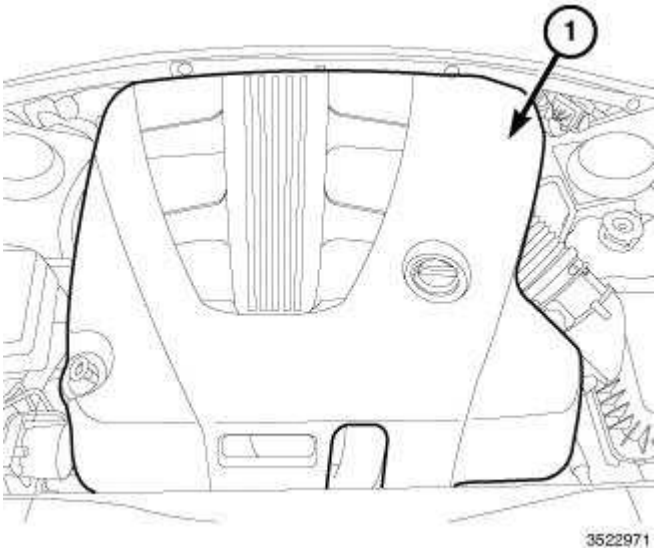


Fig. 273: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

8. Install the engine cover (1).
9. Connect the negative battery cable.

INSULATOR, ENGINE MOUNT, RIGHT

REMOVAL

REMOVAL

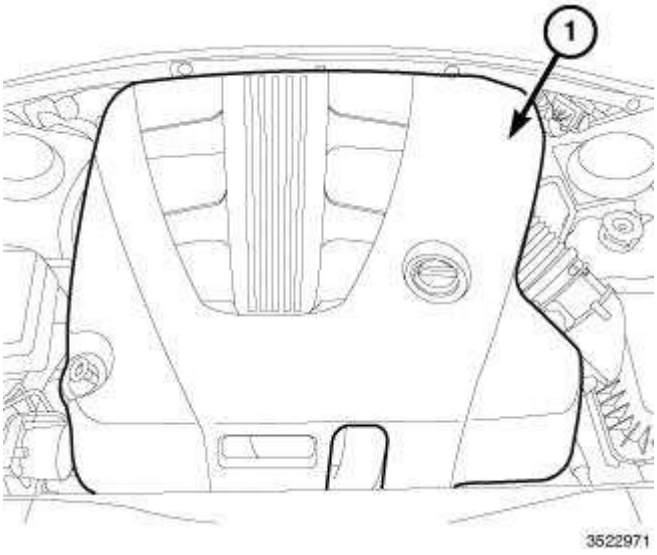


Fig. 274: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.
4. Remove the generator. Refer to **GENERATOR, REMOVAL** .

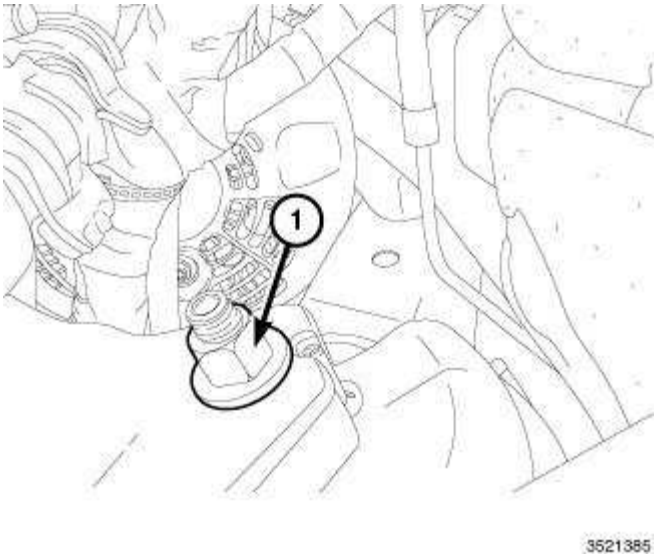


Fig. 275: Engine Mount Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the right and left engine mount retaining nut (1).
6. Using (special tool #8534B, Fixture, Driveline Support) lift engine enough to gain access to the engine mount.

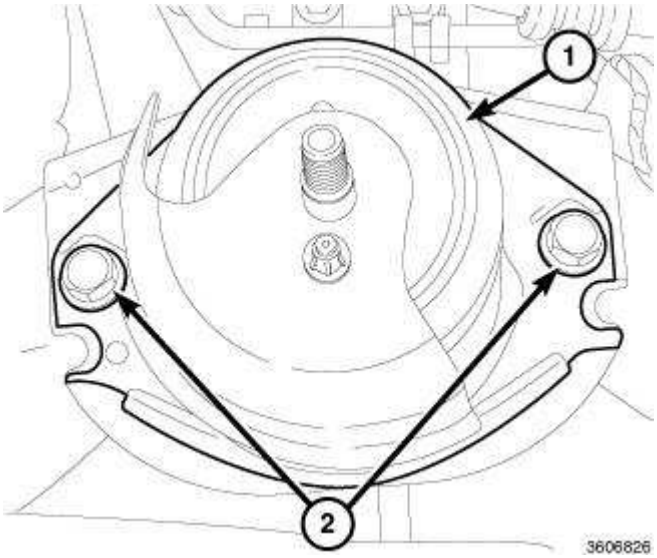


Fig. 276: Right Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
8. Removed the belly pan. Refer to **BELLY PAN, REMOVAL** .
9. Remove bolts (2) and the right engine mount (1).

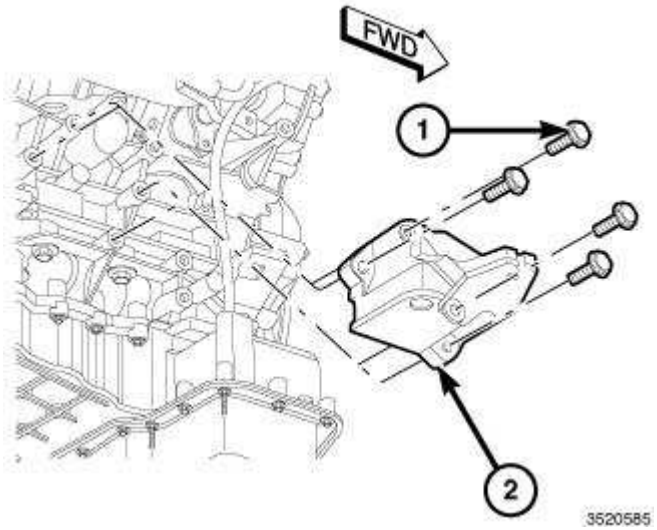


Fig. 277: Engine Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. If necessary, remove bolts (1) and the engine mount bracket (2).

INSTALLATION

INSTALLATION

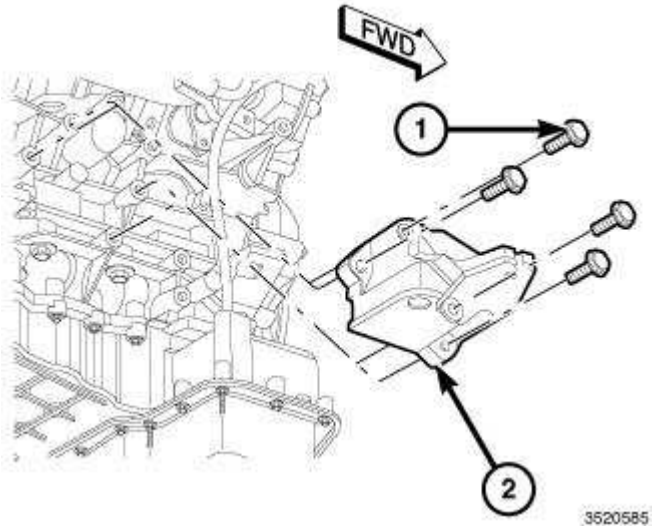


Fig. 278: Engine Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, Install the engine mount bracket (2). Tighten bolts (1) to 61 N.m (45 ft. lbs.).

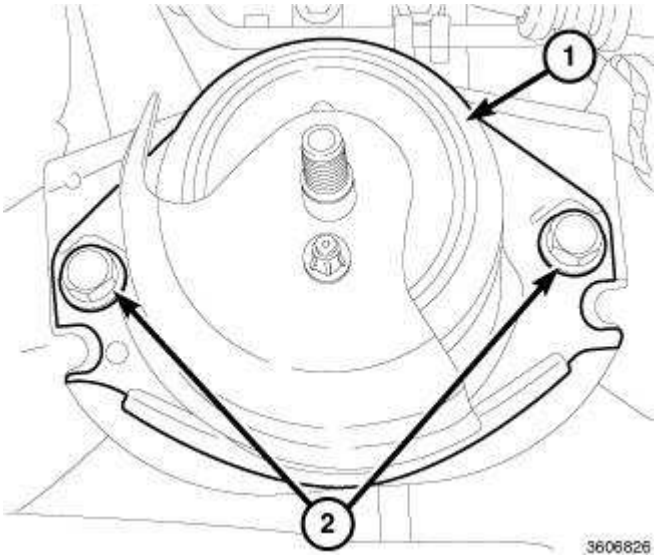


Fig. 279: Right Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the right engine mount (1). Tighten bolts (2) to 61 N.m (45 ft. lbs.).
3. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .
4. Lower the vehicle.
5. Lower the engine into position and remove (special tool #8534B, Fixture, Driveline Support).

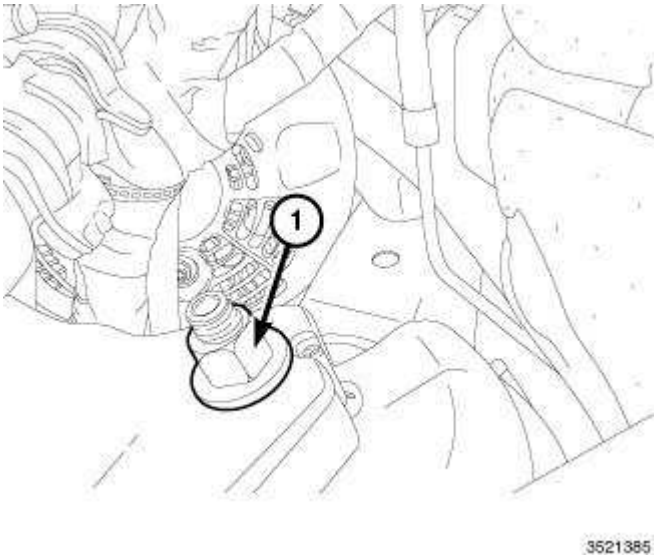


Fig. 280: Engine Mount Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

6. Install the right and left engine mount retaining nuts (1) and tighten to 61 N.m (45 ft. lbs.).
7. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
8. Install the generator. Refer to **GENERATOR, INSTALLATION** .

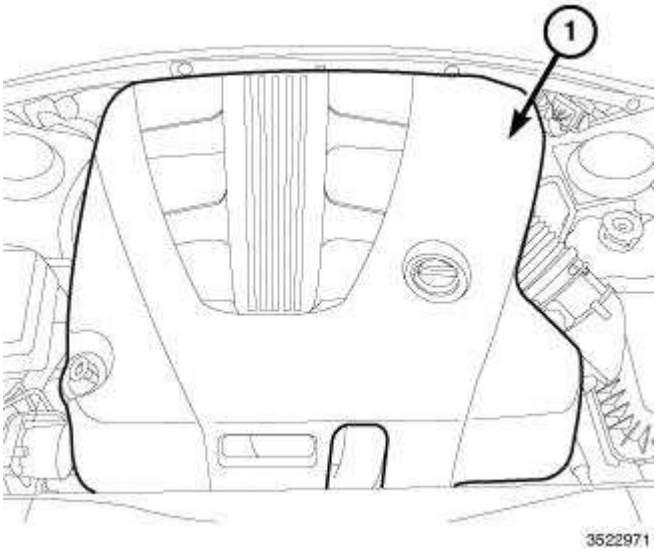


Fig. 281: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine cover (1).
10. Connect the negative battery cable.

LUBRICATION

ADAPTER, OIL COOLER

REMOVAL

REMOVAL

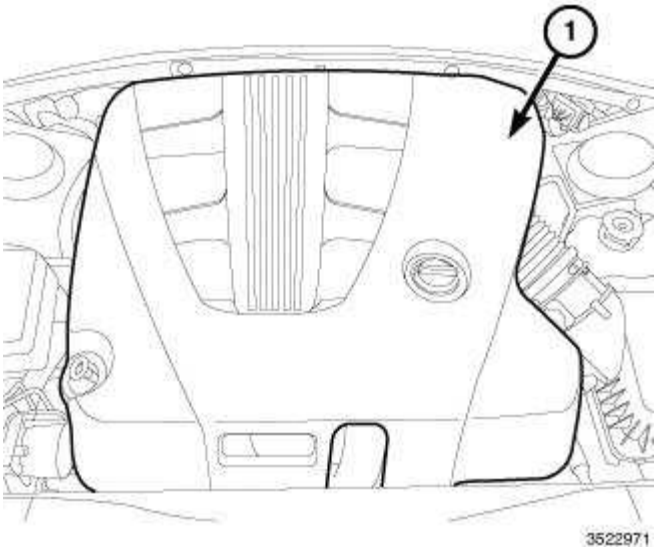


Fig. 282: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove engine cover (1).
3. Remove the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, REMOVAL**.
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
7. Drain the engine oil. Using a new sealing washer, install and tighten drain plug to 45 N.m (33 ft. lbs.).

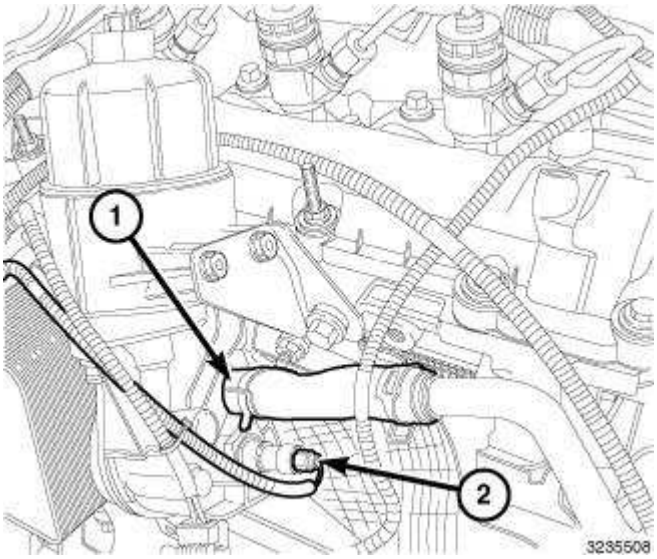


Fig. 283: Coolant Hose & Oil Pressure Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Lower the vehicle.
9. Disconnect the coolant hose (1) from oil cooler adapter.
10. Disconnect the oil pressure sensor harness connector (2).

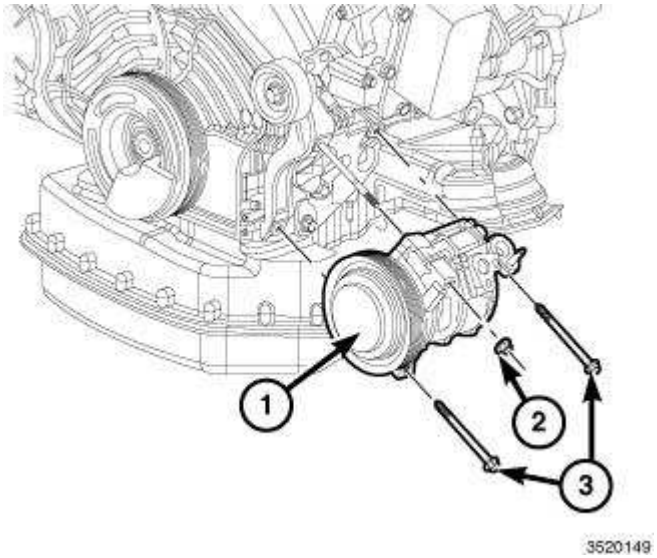


Fig. 284: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Removal of the A/C compressor does not require the refrigerant to be evacuated.

11. Remove the A/C compressor and position aside. Refer to **COMPRESSOR, A/C, REMOVAL** .

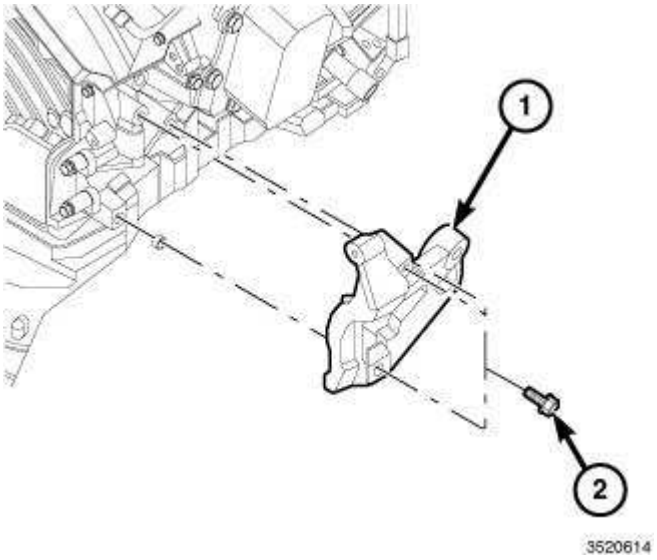


Fig. 285: A/C Compressor Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove bolts (2), and the A/C compressor bracket (1).

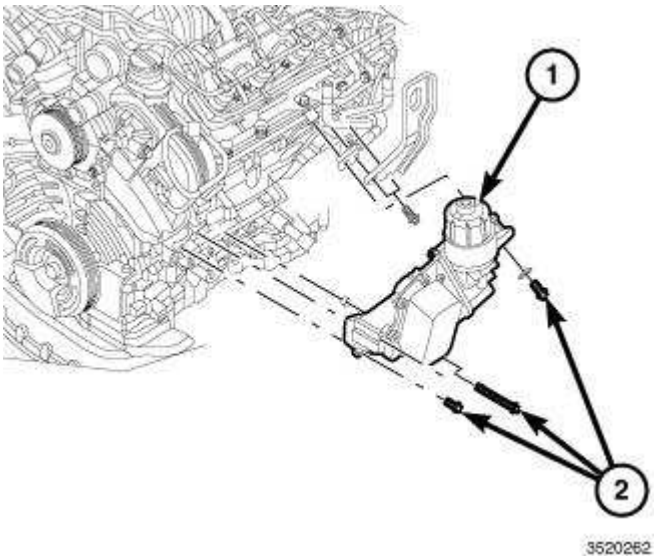


Fig. 286: Oil Cooler Adapter Assembly
Courtesy of CHRYSLER GROUP, LLC

13. Remove bolts (2) and the oil cooler adapter (1).

INSTALLATION

INSTALLATION

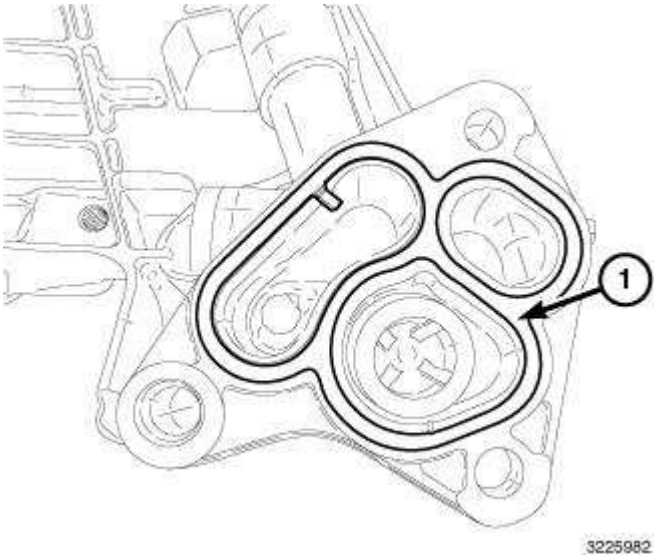


Fig. 287: Oil Cooler Adapter O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean the gasket sealing surfaces.
2. Install a new O-ring seal (1).

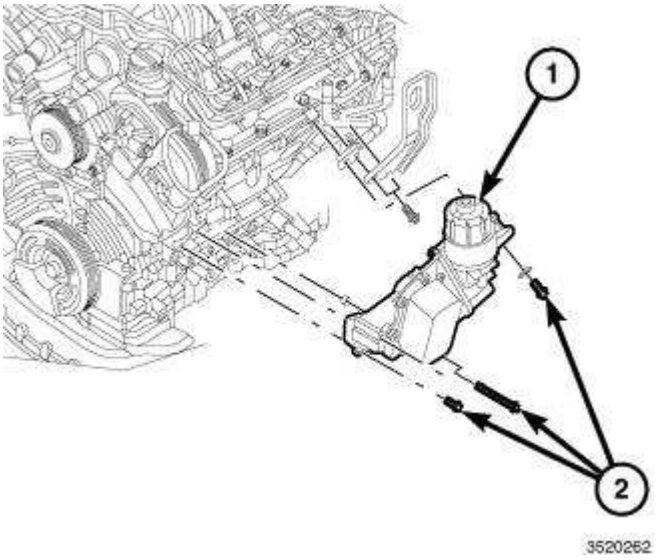


Fig. 288: Oil Cooler Adapter Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Install the oil cooler adapter (1). Tighten bolts (2) 30 N.m (22 ft. lbs.).

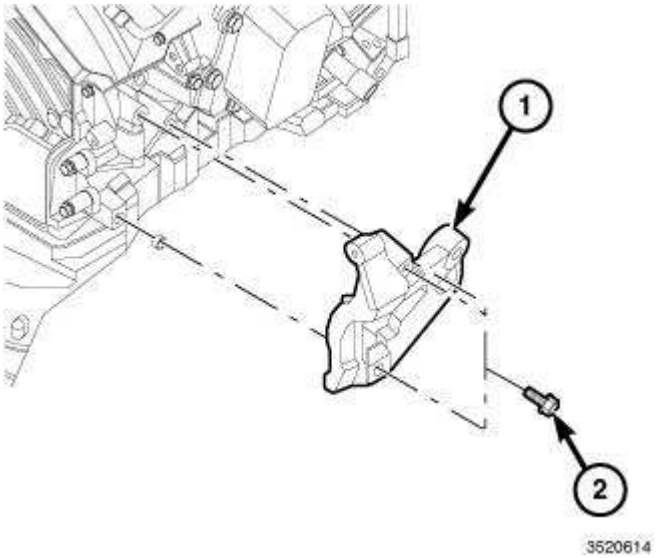


Fig. 289: A/C Compressor Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the A/C compressor bracket (1). Tighten bolts (2) 45 N.m (33 ft. lbs.).

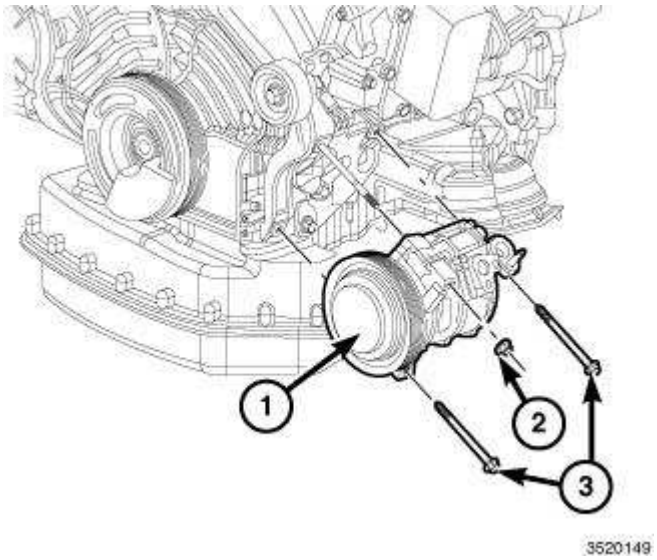


Fig. 290: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .

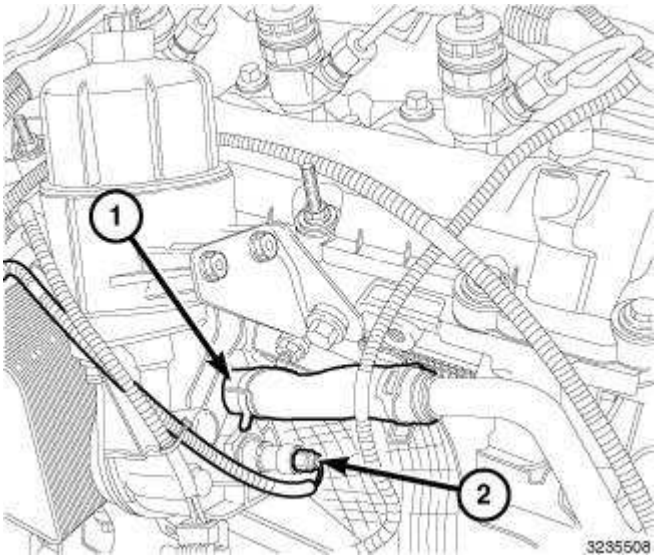


Fig. 291: Coolant Hose & Oil Pressure Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Connect the oil pressure sensor harness connector (2).
7. Connect the coolant hose (1) from oil cooler adapter.
8. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
9. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, INSTALLATION** .
10. Lower the vehicle.
11. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
12. Change the oil filter and fill the engine with recommended engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
13. Install the air tube and air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
14. Connect the negative battery cable.
15. Start the engine and check for leaks.

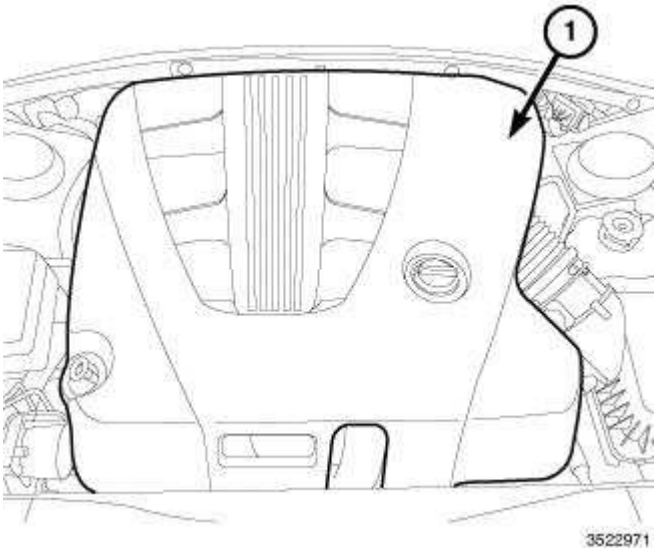


Fig. 292: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Install the engine cover (1).

COOLER, OIL

DESCRIPTION

DESCRIPTION

Engine coolant is used to cool the oil. A plate-style external heat exchanger is located on the left side of the engine block. A single O-ring style gaskets seal the oil cooler to the oil cooler adapter. Replace the O-ring style gaskets whenever the oil cooler is removed or replaced. The oil is fed to the oil cooler through the oil filter. After the oil cooler, the oil is fed back to the main oil gallery of the cylinder block. The oil cooler and adapter is located on the left side of the engine block.

REMOVAL

REMOVAL

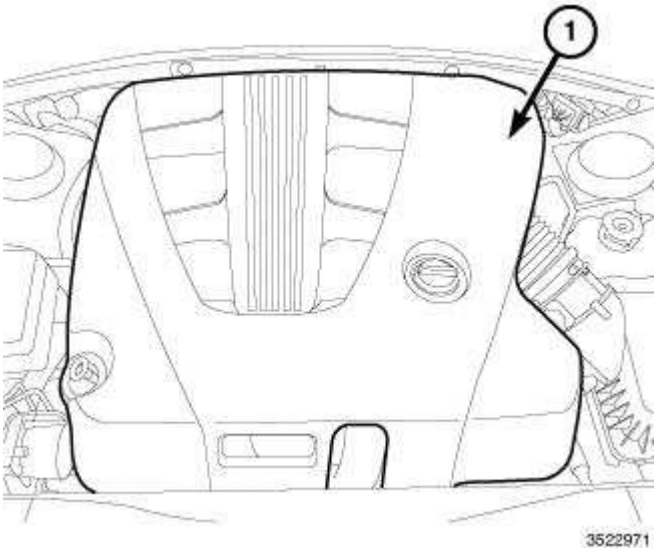


Fig. 293: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .
5. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

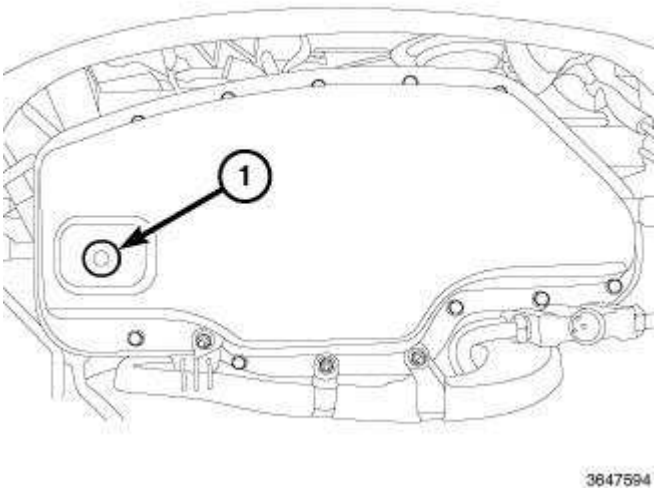


Fig. 294: Oil Pan Drain Plug
Courtesy of CHRYSLER GROUP, LLC

6. Drain the engine oil. Using a new sealing washer, install and tighten drain plug (1) to 45 N.m (33 ft. lbs.).

7. Lower the vehicle.
8. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.
9. Remove the serpentine drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

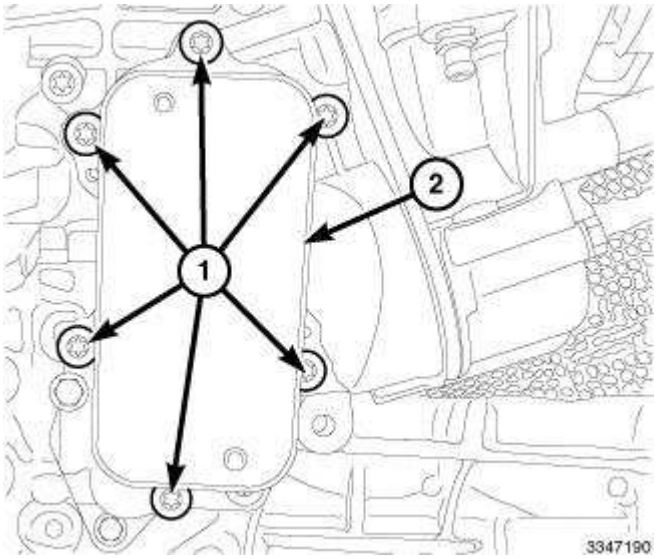


Fig. 295: Oil Cooler & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove bolts (1) and the engine oil cooler (2).

INSTALLATION

INSTALLATION

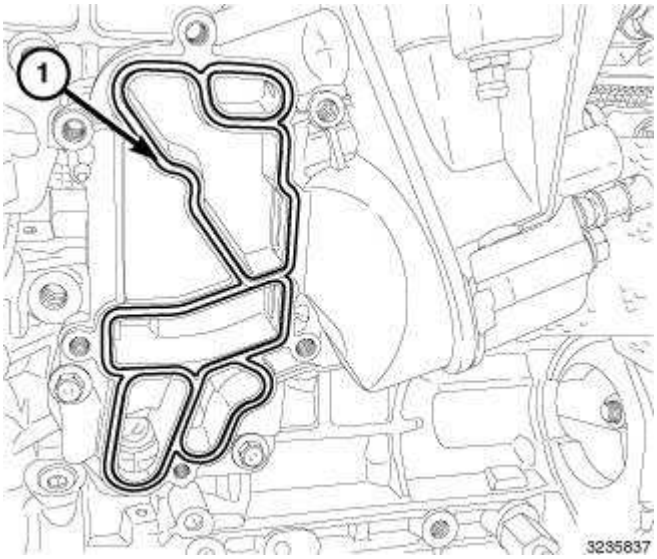


Fig. 296: Oil Cooler Adapter O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean all gasket mating surfaces. Refer to **Engine - Standard Procedure**.
2. Install a new O-ring seal onto the oil cooler adapter.

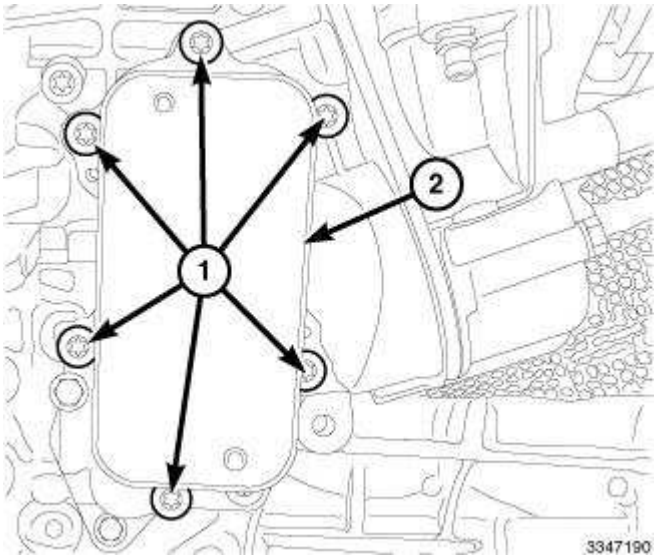


Fig. 297: Oil Cooler & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine oil cooler. Tighten bolts to 30 N.m (22 ft. lbs.).
4. Install the serpentine drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
5. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
7. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, INSTALLATION** .
8. Lower the vehicle.
9. Change the oil filter and fill the engine with recommended engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
10. Fill the cooling system. Refer to **STANDARD PROCEDURE** .

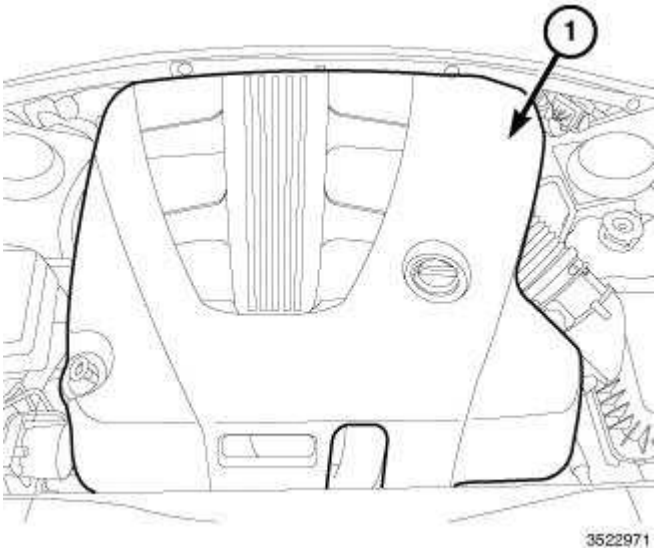


Fig. 298: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

11. Install the engine cover (1).
12. Connect the negative battery cable.

FILTER, ENGINE OIL

REMOVAL

REMOVAL

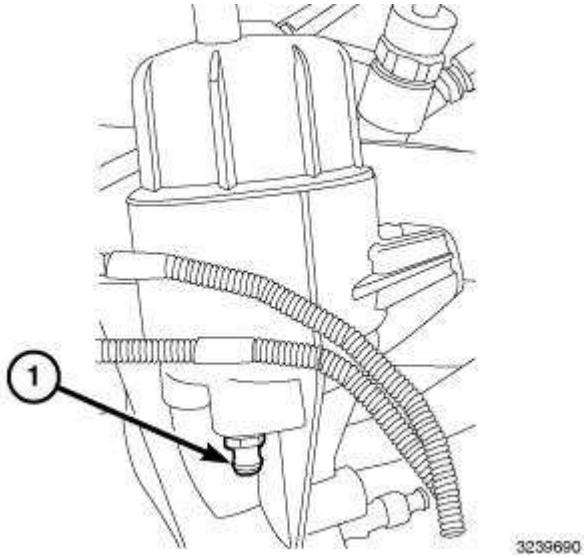


Fig. 299: Oil Filter Housing Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

1. Open the vent screw on top of oil cap.

2. Open the bleeder screw (1) and drain the oil filter housing and securely tighten bleeder screw.
3. Remove the oil filter cap.

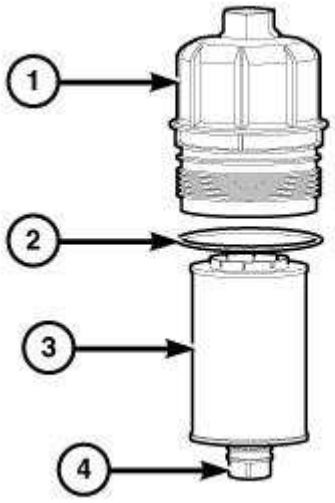


Fig. 300: Oil Filter Cover, O-Ring Gasket, Oil Filter & Base Oil Filter
Courtesy of CHRYSLER GROUP, LLC

4. While holding the oil filter cover (1), pushdown on base oil filter (4) to separate from cover and remove the oil filter (3).
5. Remove and discard O-ring gasket (2). Clean and inspect cap.

INSTALLATION

INSTALLATION

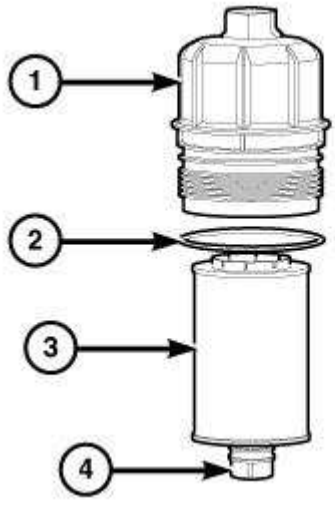


Fig. 301: Oil Filter Cover, O-Ring Gasket, Oil Filter & Base Oil Filter
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate and install the new oil filter cap O-ring gasket (2). Make sure the oil filter cap O-ring is in the correct location.
2. Install the oil filter (3) into oil filter cap (1).
3. Install oil filter cap (1) and tighten to 25 N.m (18 ft. lbs.).
4. Securely tighten the vent screw on top of the oil filter cap.

HOUSING, OIL FILTER

REMOVAL

REMOVAL

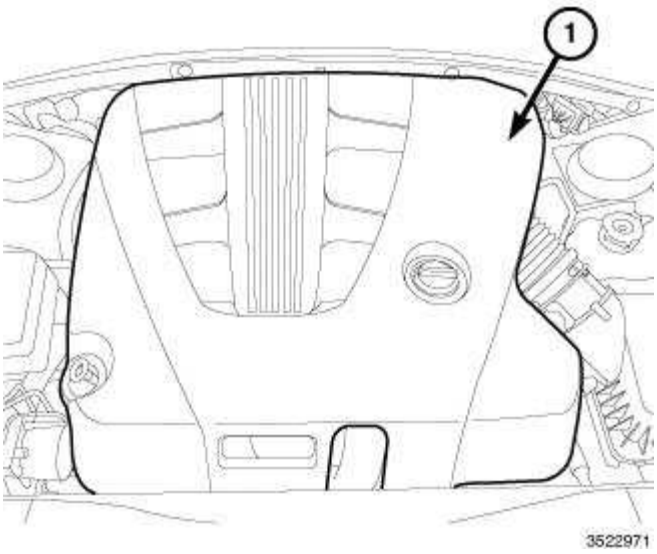


Fig. 302: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Remove the oil cooler adapter. Refer to **ADAPTER, OIL COOLER, REMOVAL**.

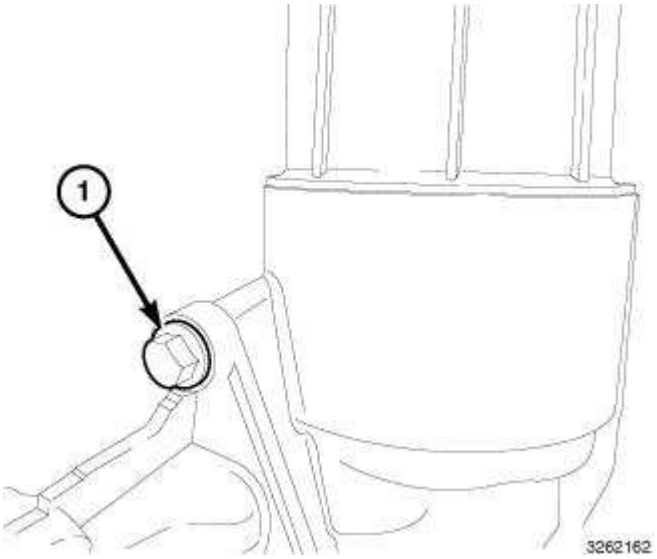


Fig. 303: Upper Oil Filter Housing Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove the upper oil filter housing bolt (1).

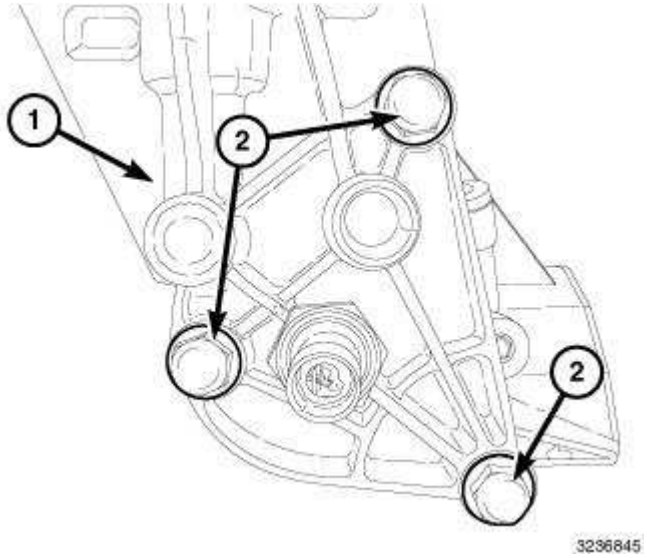


Fig. 304: Oil Filter Housing & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (2) and the oil filter housing (1).

INSTALLATION

INSTALLATION

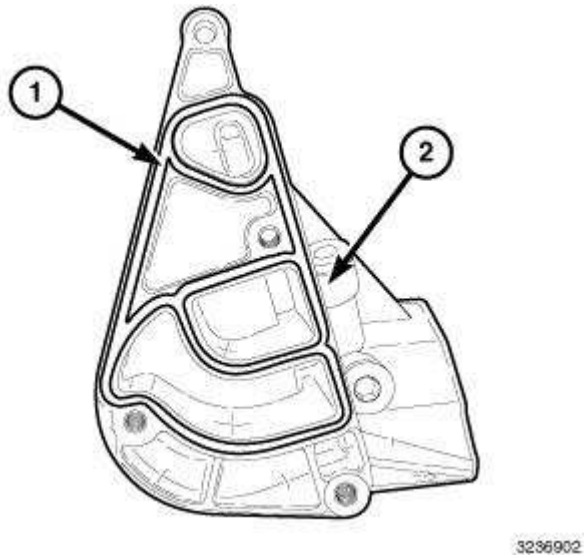


Fig. 305: Oil Filter Housing & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean the gasket sealing surfaces.
2. Install new O-ring seal (1) onto the oil filter housing (2).

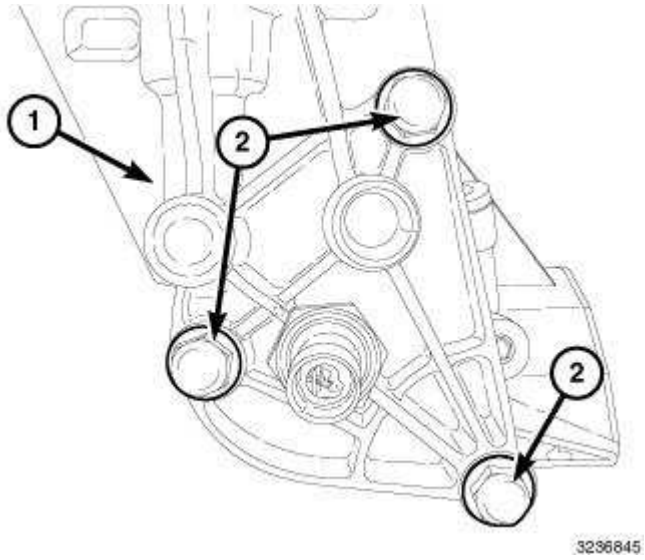


Fig. 306: Oil Filter Housing & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install oil filter housing (1). Tighten bolts (2) to 30 N.m (22 ft. lbs.).

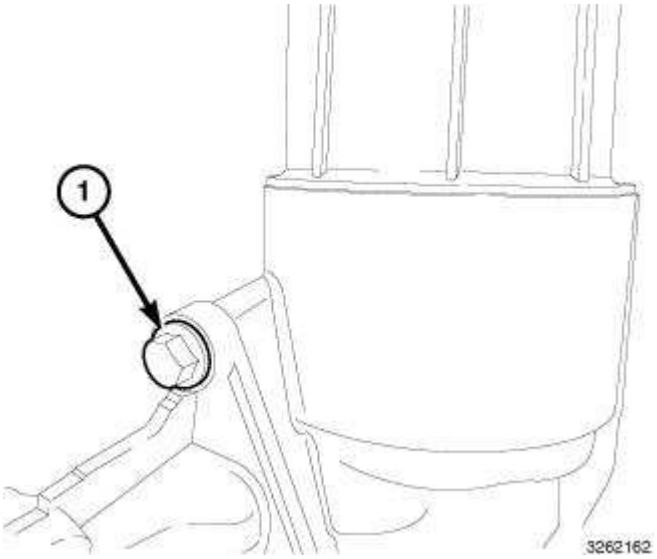


Fig. 307: Upper Oil Filter Housing Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Install the front oil filter housing bolt and tighten to 15 N.m (133 in. lbs.).

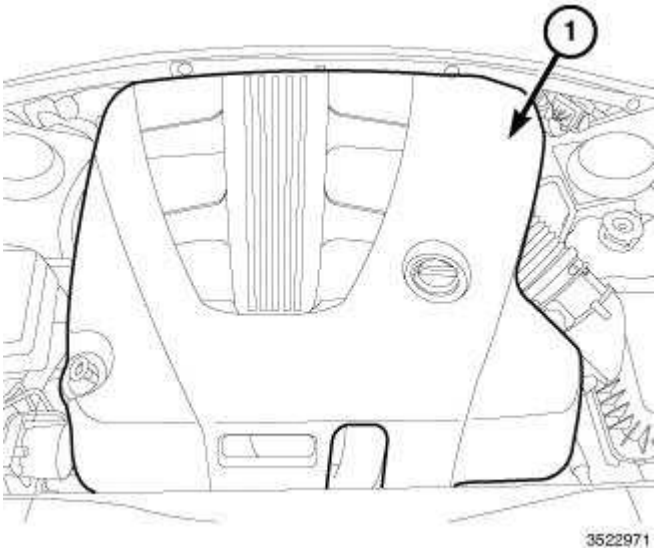


Fig. 308: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the oil cooler adapter. Refer to **ADAPTER, OIL COOLER, INSTALLATION**.
6. Connect the negative battery cable.
7. Start the engine and check for leaks.
8. Install the engine cover (1).

JET, PISTON OIL COOLER

DESCRIPTION

DESCRIPTION

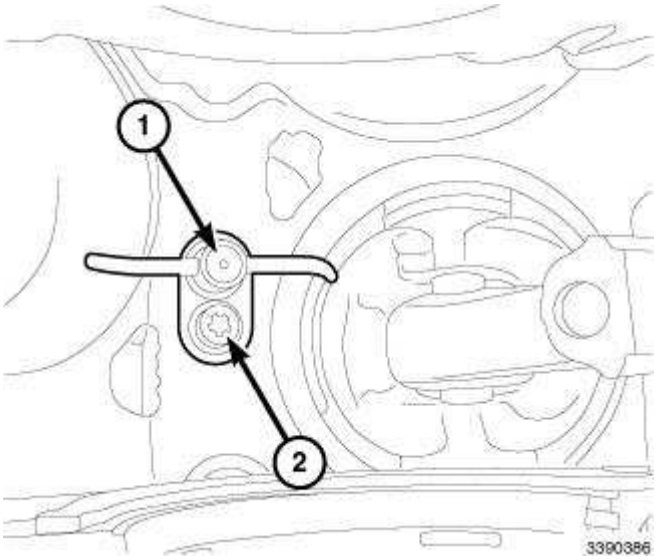


Fig. 309: Oil Jet & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

Three dual-nozzle oil jets (1) are bolted to the cylinder block underneath the main oil gallery. The jets connect with an oil-tight fit to the main gallery through lubrication passages. Each oil jet helps cool two opposite pistons. Proper oil jet alignment is important. Each nozzle is designed to alternatively spray oil through both cooling galleries within the piston. The oil spray is aimed at one of the cooling galleries as the piston approaches TDC. As the piston approaches BDC, the oil spray is aimed at the adjacent cooling gallery.

REMOVAL

REMOVAL

CAUTION: Use caution when removing and installing oil jets. Damage to oil jet nozzle could cause severe engine damage.

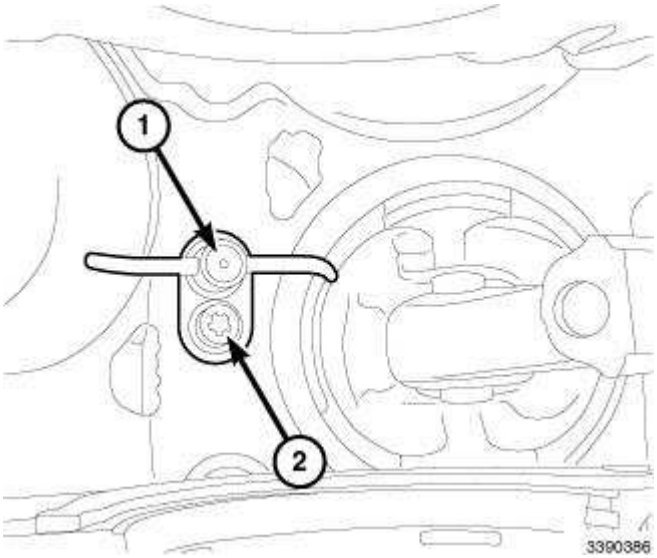


Fig. 310: Oil Jet & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the crankshaft. Refer to **CRANKSHAFT, REMOVAL**.
3. Remove bolt (2) and oil jet (1) from engine block.

INSTALLATION

INSTALLATION

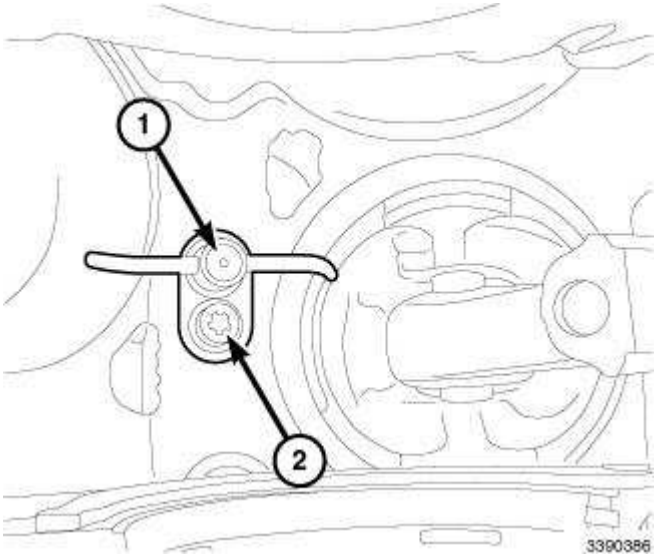


Fig. 311: Oil Jet & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use caution when removing and installing oil jets. Damage to oil jet nozzle could cause severe engine damage.

1. Install oil jet (1) in engine block. Tighten bolt (2) to 11 N.m (97 in. lbs.).
2. Install the crankshaft. Refer to **CRANKSHAFT, INSTALLATION**.
3. Connect the negative battery cable.

JET, TIMING CHAIN OIL

REMOVAL

REMOVAL

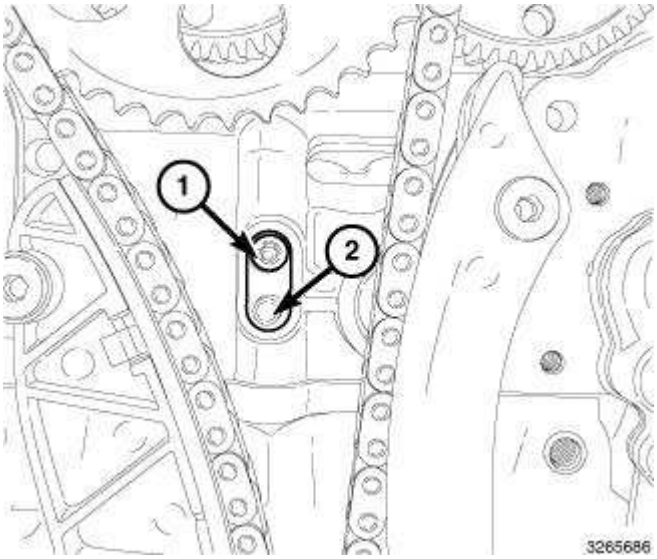


Fig. 312: Timing Chain Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

1. Disconnect the negative battery cable.
2. Remove the upper timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
3. Remove bolt (1) and the timing chain oil jet (2).
4. Remove and discard O-ring seal.

INSTALLATION

INSTALLATION

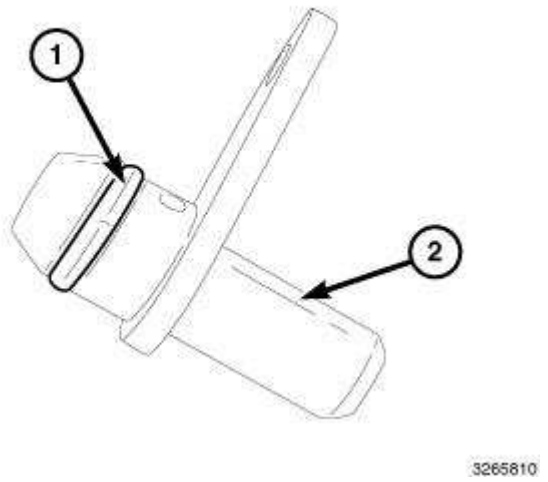


Fig. 313: Timing Chain Oil Jet & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install a new O-ring seal (1) onto the timing chain oil jet (2).

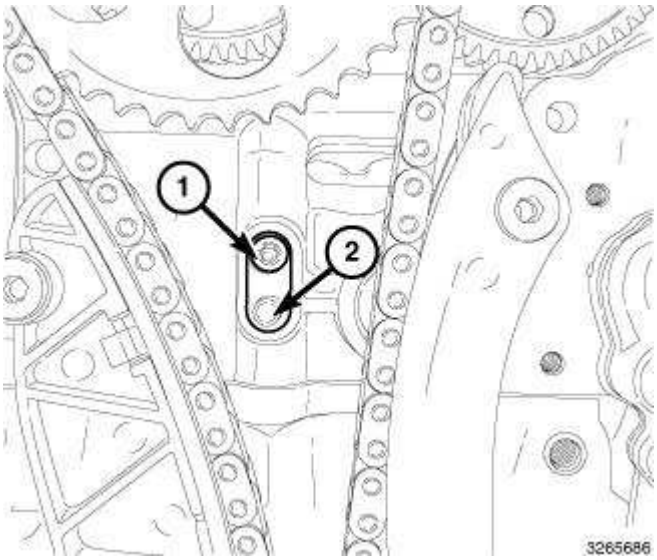


Fig. 314: Timing Chain Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

2. Install the timing chain oil jet (2). Tighten bolt (1) to 11 N.m (97 in. lbs.).
3. Install the upper timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
4. Fill engine oil to proper level.
5. Connect the negative battery cable.

OIL

DESCRIPTION

DESCRIPTION

Refer to the Lube and Maintenance information for oil specifications. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, DESCRIPTION** .

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL AND FILTER CHANGE

WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.

Change the engine oil and filter at mileage and time intervals described in the Maintenance Schedule. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

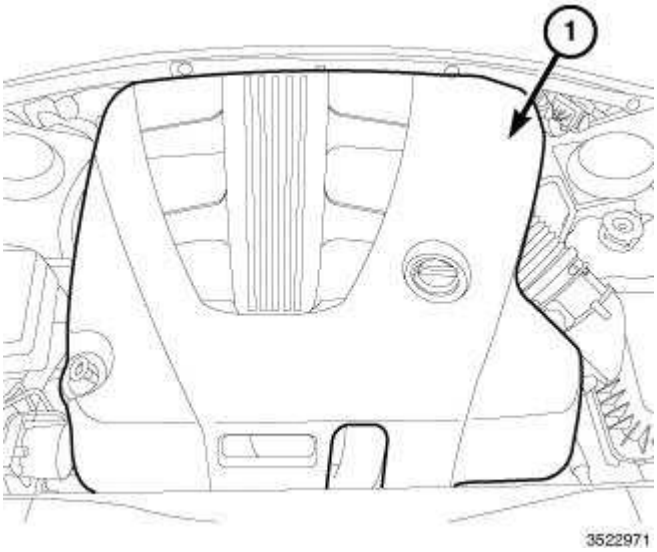


Fig. 315: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Run the engine until achieving normal operating temperature.
2. Position the vehicle on a level surface and turn the engine off.
3. Remove the engine cover (1).

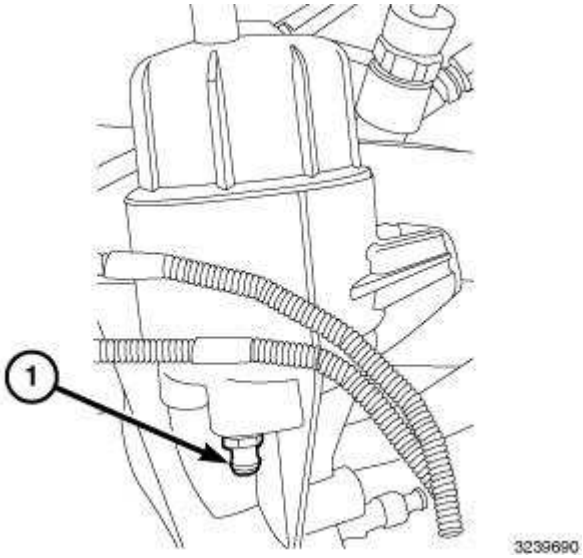


Fig. 316: Oil Filter Housing Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

4. Open the vent screw on top of oil cap.
5. Place an oil absorbent cloth around the oil filter housing at the base.
6. Open the bleeder screw (1) and drain the oil filter housing and securely tighten bleeder screw.
7. Rotate the oil filter cap (1) counterclockwise and remove the oil filter and cap.

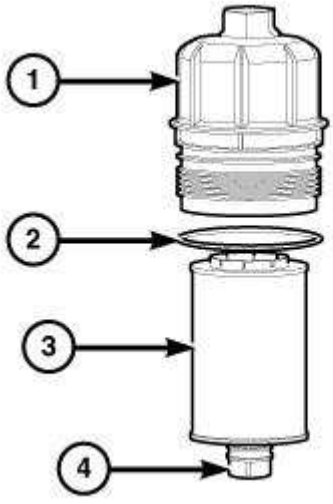


Fig. 317: Oil Filter Cover, O-Ring Gasket, Oil Filter & Base Oil Filter
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When performing an engine oil change, the oil filter cap must be removed. Removing the oil filter cap releases oil held within the oil filter cavity and allows it to drain into the sump. Failure to remove the cap prior to reinstallation of the drain plug will not allow complete

draining of the used engine oil.

NOTE: The oil filter (3) is attached to the oil filter cap (1).

8. While holding the oil filter cover (1), pushdown on base oil filter (4) to separate from cover and remove the oil filter (3).
9. Remove and discard O-ring gasket (2). Clean and inspect cap.

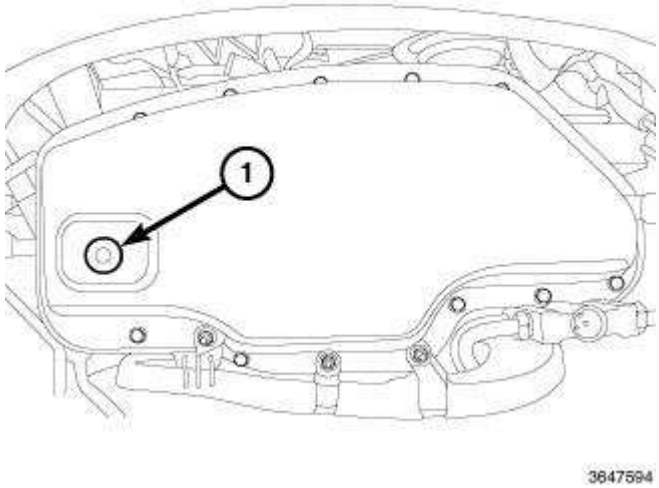


Fig. 318: Oil Pan Drain Plug
Courtesy of CHRYSLER GROUP, LLC

10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
11. Place a suitable drain pan under the crankcase drain plug (1).
12. Drain the engine oil. Inspect the drain plug threads for stretching or other damage. Replace the drain plug (1) if damaged.
13. Using a new sealing washer, install and tighten the drain plug (1) to 45 N.m (33 ft. lbs.).

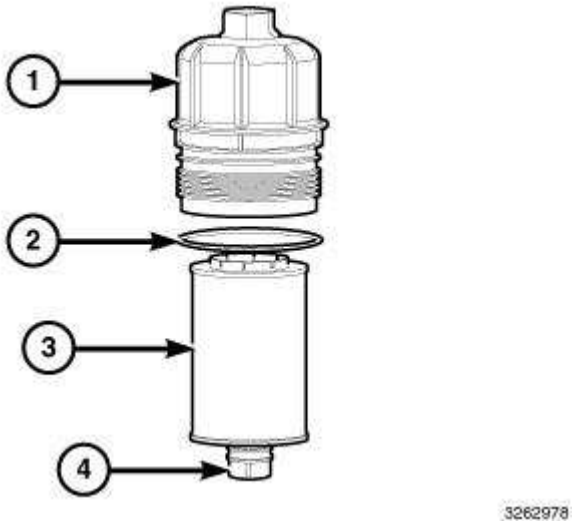


Fig. 319: Oil Filter Cover, O-Ring Gasket, Oil Filter & Base Oil Filter
Courtesy of CHRYSLER GROUP, LLC

14. Lower the vehicle.

NOTE: It is not necessary to pre-oil the oil filter or fill the oil filter housing.

15. Lubricate and install the new oil filter cap O-ring gasket (2). Make sure the oil filter cap O-ring is in the correct location.
16. Install the oil filter (3) into oil filter cap (1).
17. Install oil filter cap (1) and tighten to 25 N.m (18 ft. lbs.).
18. Securely tighten the vent screw on top of the oil filter cap.
19. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

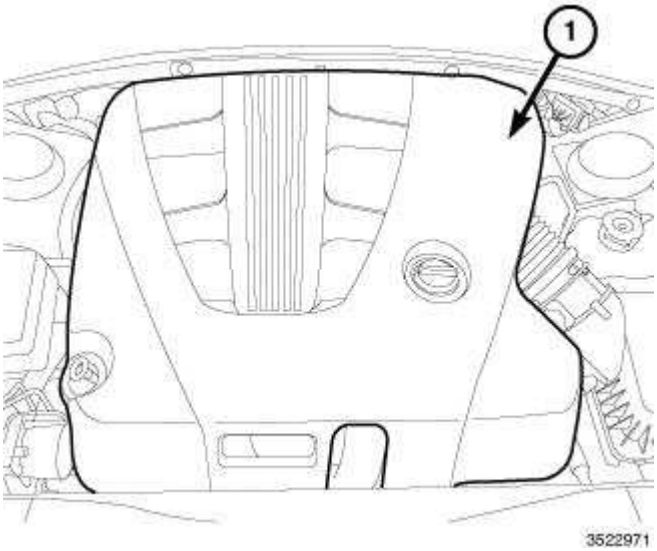


Fig. 320: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

20. Start the engine and inspect for leaks.
21. Stop the engine and check the oil level.
22. Install the engine cover (1).

OIL FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. When replacing oil filter, use a Mopar® filter or equivalent.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing of used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

PAN, OIL

REMOVAL

UPPER OIL PAN

1. Disconnect the negative battery cable.
2. Center and lock the steering wheel.
3. Remove bolts and the oil level indicator tube.

NOTE: The lower oil pan must be removed to access all of the upper oil pan retaining bolts.

4. Remove the lower oil pan. Refer to **PAN, OIL, REMOVAL**.

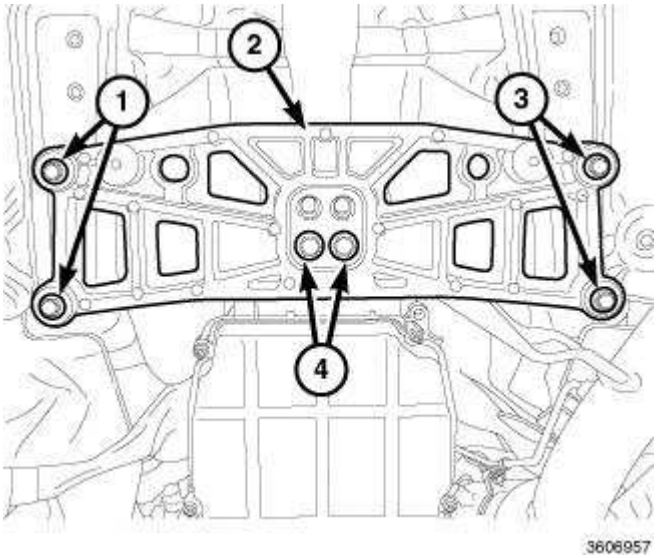


Fig. 321: Rear Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the transmission belly pan.
6. Remove the two bolts (4) from the rear engine mount isolator.
7. Using a suitable transmission jack, positioned under the transmission oil pan, raise the transmission to gain enough clearance to remove the CKP sensor cover.

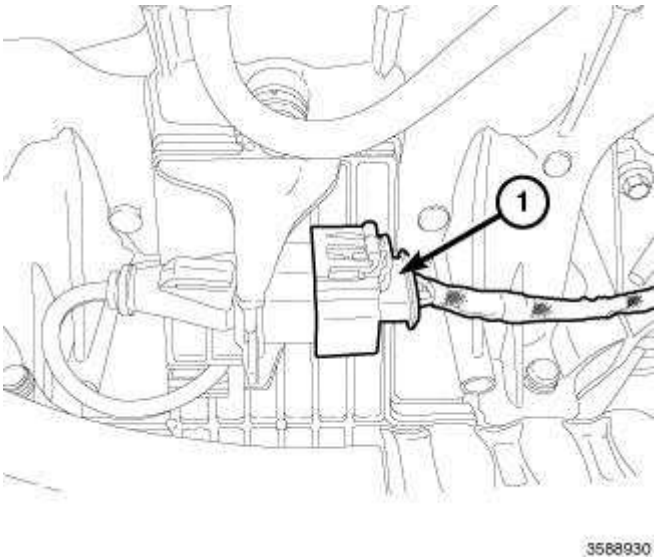


Fig. 322: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the Crankshaft Position Sensor (CKP) sensor wiring harness connector (1).

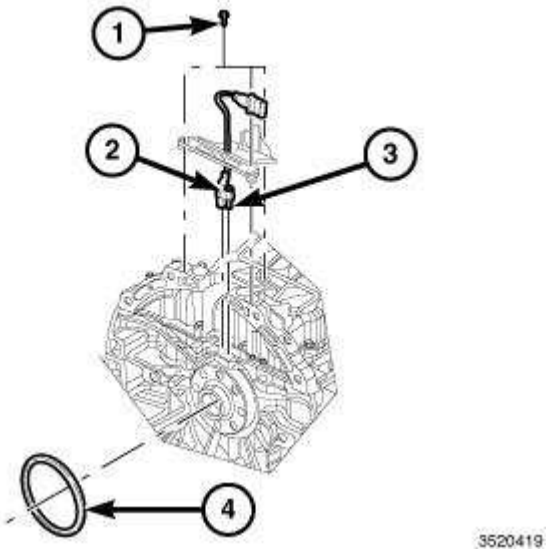


Fig. 323: CKP Sensor, Seal & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolts (1) and the CKP sensor cover.

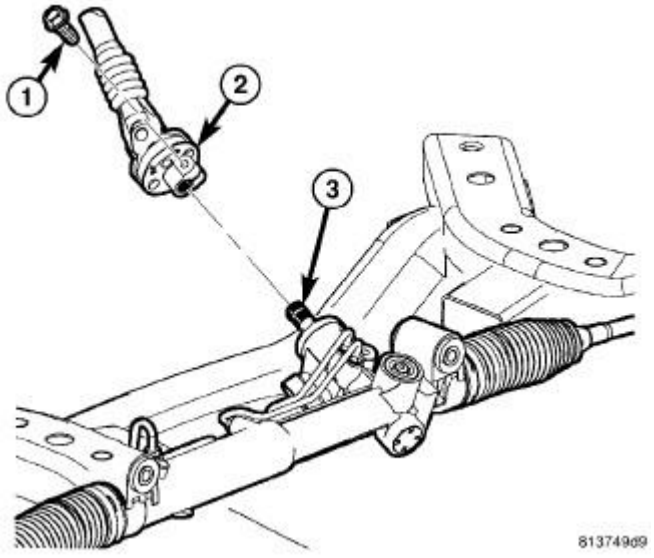


Fig. 324: Lower Intermediate Coupling Pinch Bolt, Lower Intermediate Shaft & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

10. Remove lower intermediate coupling pinch bolt (1) at steering gear (3). Separate lower intermediate shaft (2) from steering gear shaft (3).

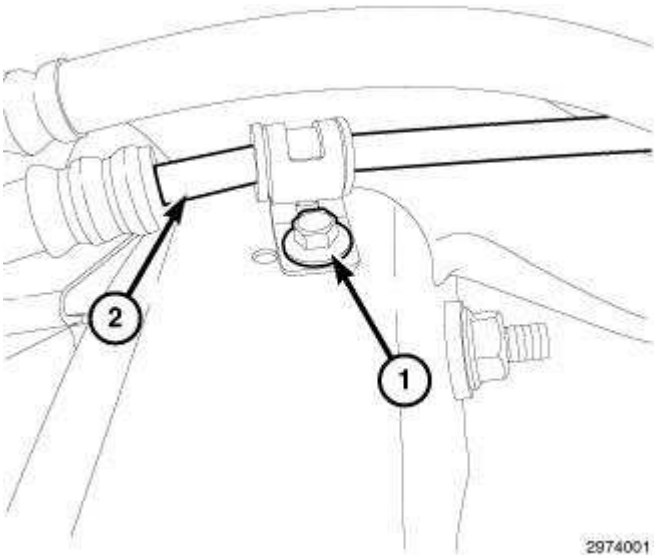


Fig. 325: Retaining Bolt & Return Line
Courtesy of CHRYSLER GROUP, LLC

11. Remove bolt (1) securing the return hose (2) to engine cradle.

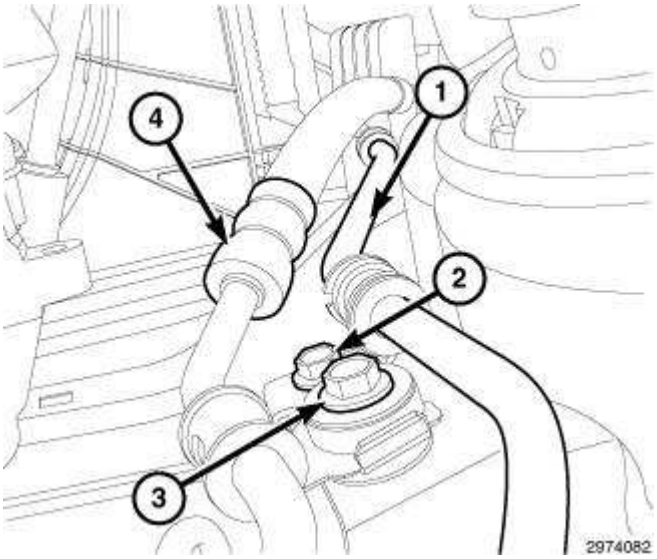


Fig. 326: Pressure Line, Return Line & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove bolt (3) securing pressure line (4) to right side of cradle.

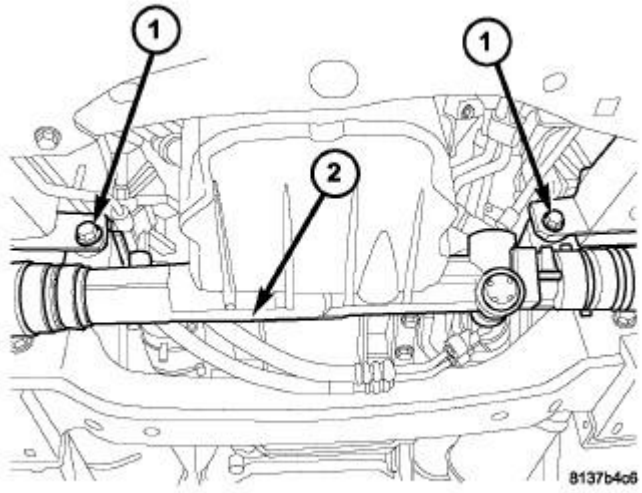


Fig. 327: Steering Gear & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove bolts (1) and allow the steering gear (2) to drop down out of mounts.

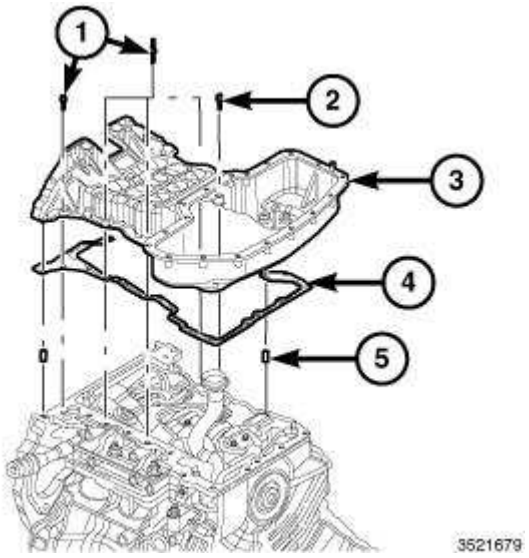


Fig. 328: Upper Oil Pan, Gasket & Fasteners
Courtesy of CHRYSLER GROUP, LLC

14. Remove bolt (2) and the oil pump pick-up tube.
15. Remove the four upper oil pan-to-transmission bolts.
16. Remove bolts (1) and the upper oil pan (3).
17. Remove and discard gasket (4).

LOWER OIL PAN

1. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** .
2. Drain the engine oil. Using a new sealing washer, install and tighten drain plug to 45 N.m (33 ft. lbs.).

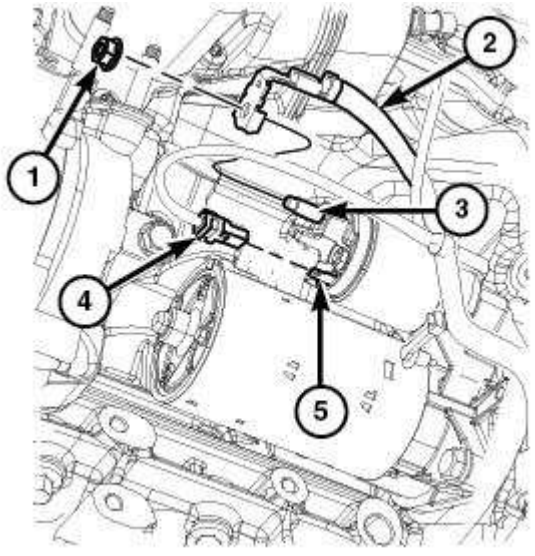


Fig. 329: Starter Cables, Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove nut (1) and the B+ cable (2) from the stud (3) and position aside.
4. Disconnect the solenoid wire harness connector (4) from the terminal (5).

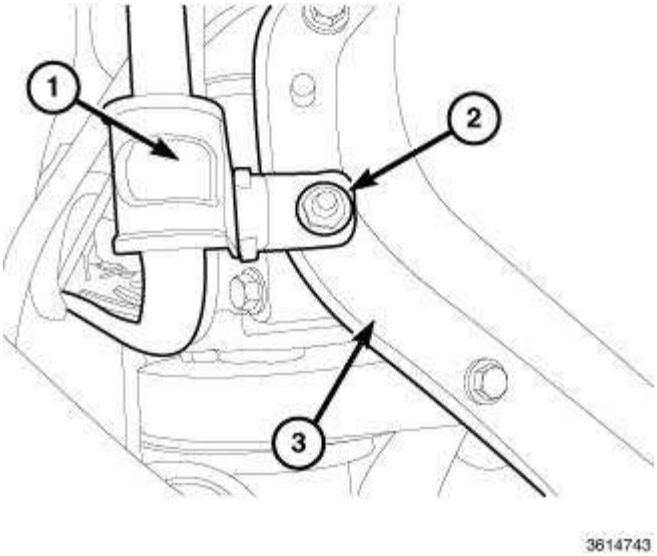


Fig. 330: Transmission Cooler Line Bracket, Nut & Oil Pan
Courtesy of CHRYSLER GROUP, LLC

5. Remove nut (2) securing the transmission cooler line bracket (1) to oil pan (3).

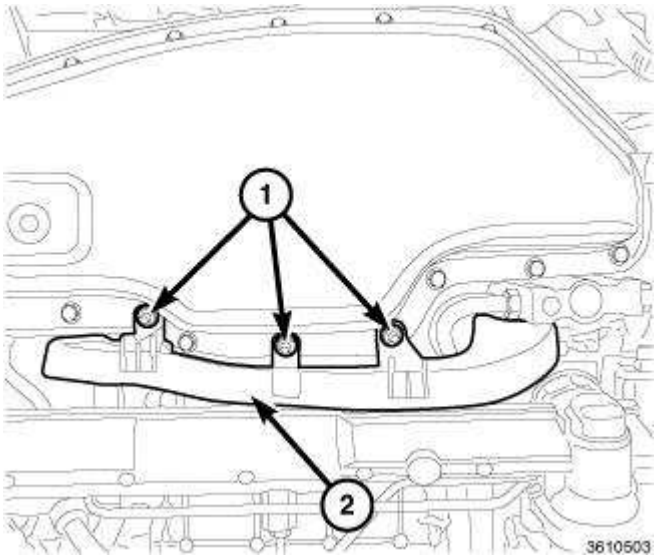


Fig. 331: Lower Engine Wire Harness & Nuts
Courtesy of CHRYSLER GROUP, LLC

6. Remove nuts (1) and allow wire harness (2) to drop down for clearance.

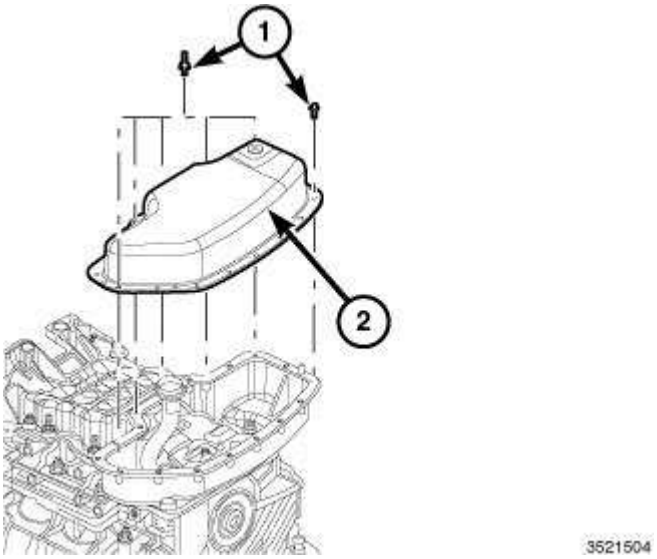


Fig. 332: Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove bolts (1) and the oil pan (2).

CLEANING

CLEANING - OIL PAN

CAUTION: Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing)

alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.

1. Clean the oil pan in solvent and wipe dry with a clean cloth.
2. Remove all residual sealant (1) from the upper and lower oil pans. Refer to **Engine - Standard Procedure**.

INSTALLATION

UPPER OIL PAN

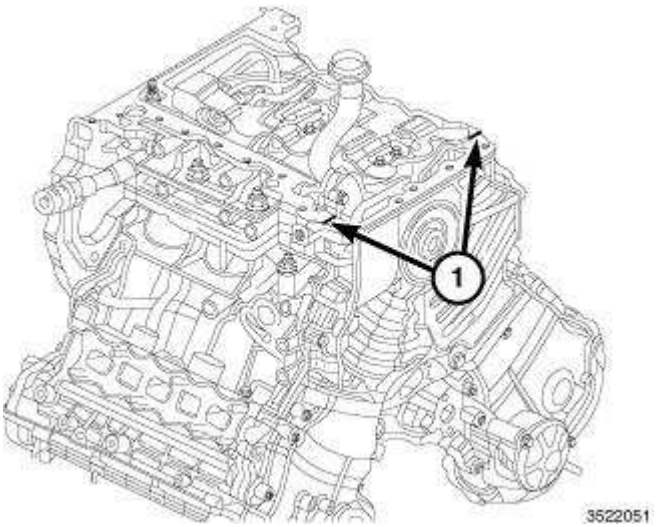


Fig. 333: RTV Sealant To Timing Cover To Engine Block T-Joints
Courtesy of CHRYSLER GROUP, LLC

1. Clean and gasket sealing surfaces. Refer to **Engine - Standard Procedure**.

NOTE: Clean the oil pan sealing surfaces with isopropyl alcohol in preparation for sealant application.

2. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to the timing cover to engine block T-joints (1).

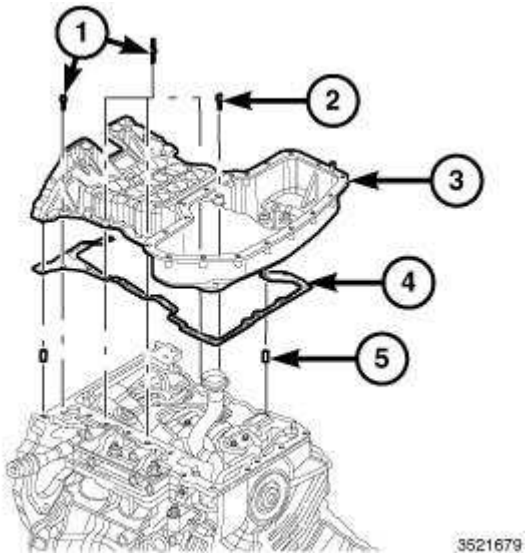


Fig. 334: Upper Oil Pan, Gasket & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Install a new oil pan gasket (4).

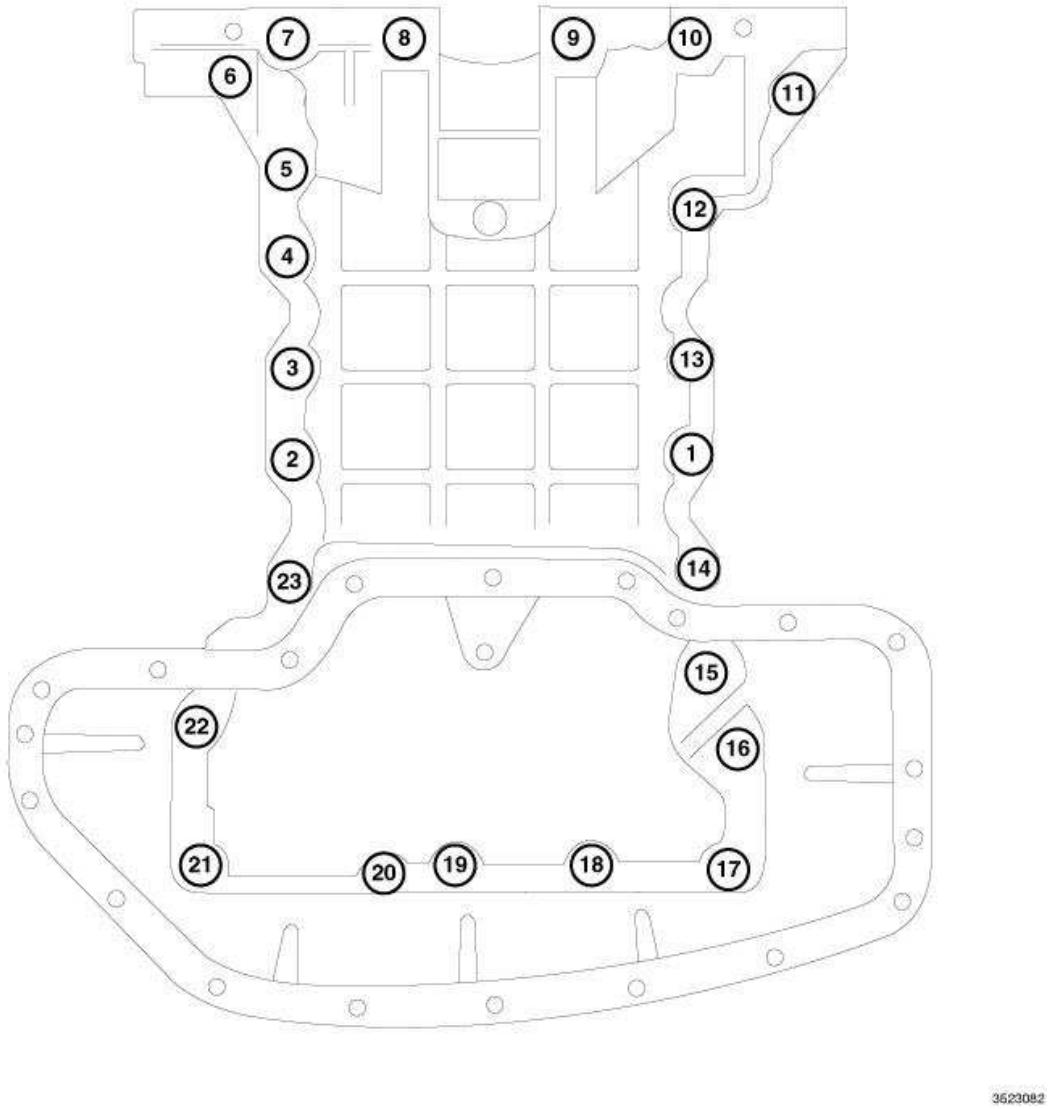


Fig. 335: Upper Oil Pan Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Bolts in the following positions are stud bolts (4, 14, 17, 19, 21, and 23).

4. Install the upper oil pan and tighten bolts finger tight:
   - Using the tightening sequence shown in illustration, tighten bolts to 15 N.m (133 in. lbs.).
   - Loosen each bolt one at a time 90 degrees, then using the tightening sequence shown in illustration tighten bolts to 15 N.m (133 in. lbs.).

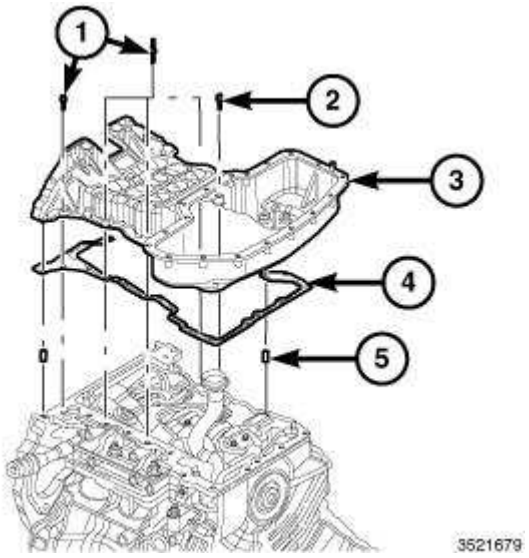


Fig. 336: Upper Oil Pan, Gasket & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Install the four upper oil pan-to transmission to bolts and tighten to 39 N.m (29 ft. lbs.).
6. Install the oil pump pick-up tube. Tighten bolt (2) to 11 N.m (97 in. lbs.).

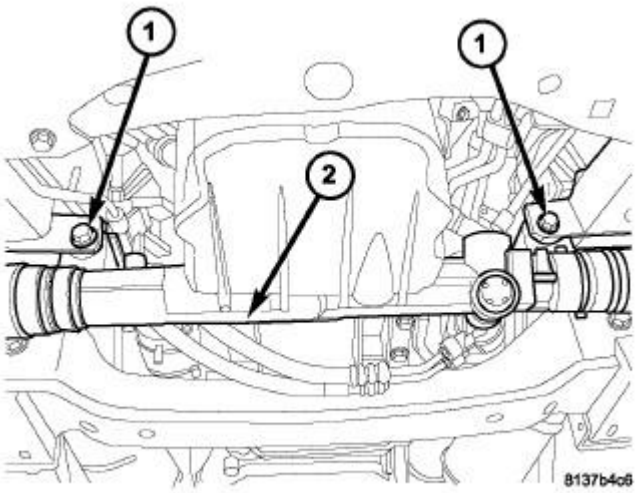


Fig. 337: Steering Gear & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Lift steering gear (2) into mounted position and install steering gear mounting bolts (1). Tighten bolts to 95 N.m (70 ft. lbs.).

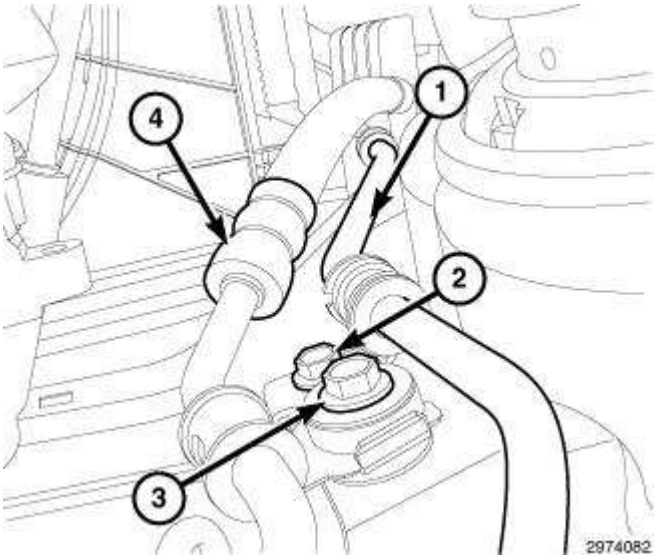


Fig. 338: Pressure Line, Return Line & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install bolt (2) securing return line (1) to right side of cradle and tighten to 19 N.m (168 in. lbs.).
9. Install bolt (3) securing pressure line (4) to right side of cradle and tighten to 19 N.m (168 in. lbs.).

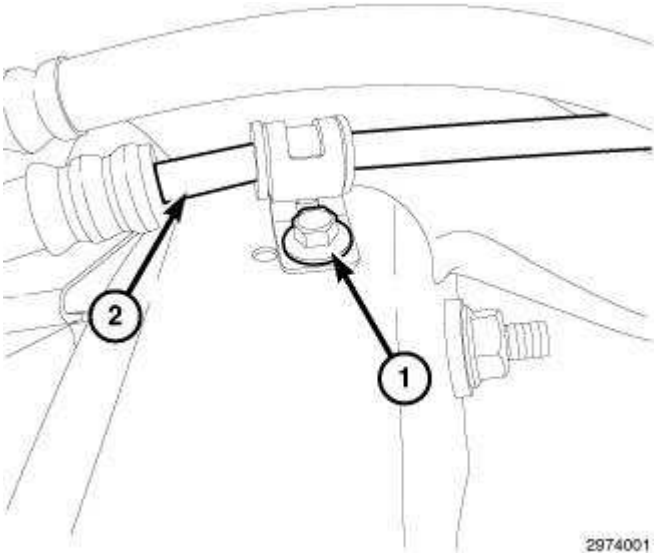


Fig. 339: Retaining Bolt & Return Line
Courtesy of CHRYSLER GROUP, LLC

10. Install bolt (1) securing the return hose (2) to engine cradle. Tighten bolt to 19 N.m (168 in. lbs.).

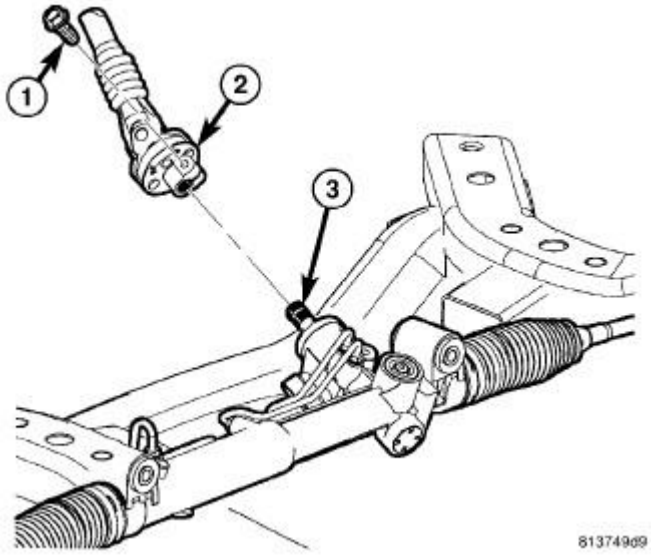


Fig. 340: Lower Intermediate Coupling Pinch Bolt, Lower Intermediate Shaft & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Prior to coupling installation, make sure gear is centered in its travel to match clockspring centering in steering column.

11. Align lower intermediate shaft (2) with input shaft (3) and install steering coupling. Install NEW pinch bolt and tighten to 45 N.m (33 ft. lbs.).

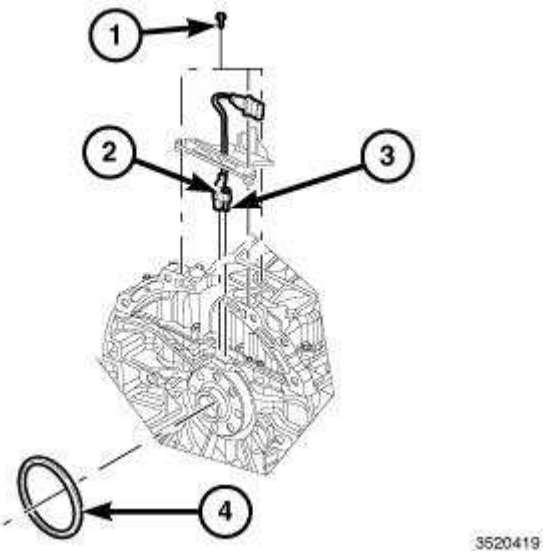


Fig. 341: CKP Sensor, Seal & Fasteners
Courtesy of CHRYSLER GROUP, LLC

12. Install the Crankshaft Position Sensor (CKP) sensor cover. Tighten bolts (1) to 8 N.m (71 in.

lbs.).

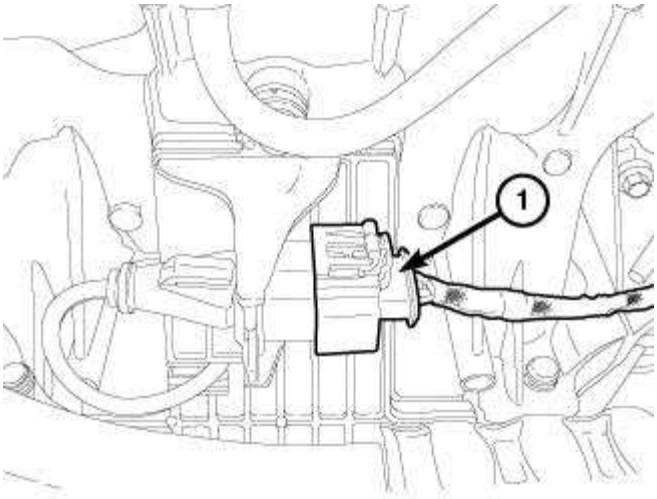


Fig. 342: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

13. Connect the CKP wire harness connector (1).

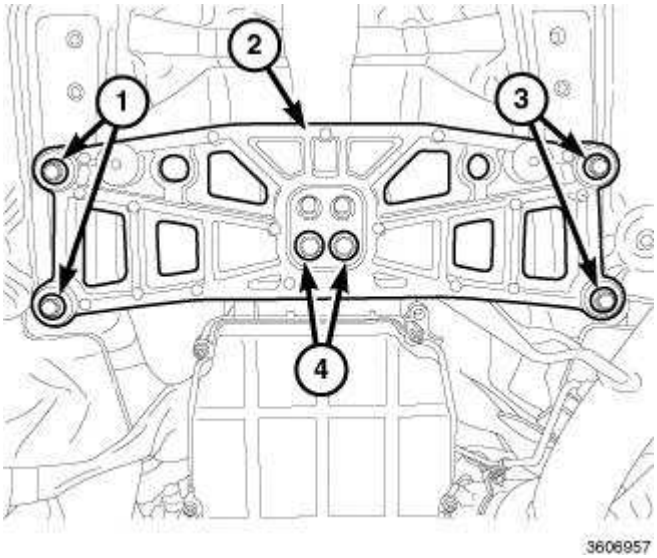


Fig. 343: Rear Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Lower the transmission so the weight is resting on the isolator.
15. Install the rear engine mount isolator bolts (4) and tighten to 61 N.m (45 ft. lbs.).
16. Install the transmission belly pan.
17. Install the lower oil pan. Refer to **PAN, OIL, INSTALLATION**.
18. Install the oil level indicator tube. Tighten bolts to 11 N.m (97 in. lbs.).

19. Replace the oil filter and fill the engine with recommended engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
20. Remove the steering wheel lock.
21. Connect the negative battery cable.

LOWER OIL PAN

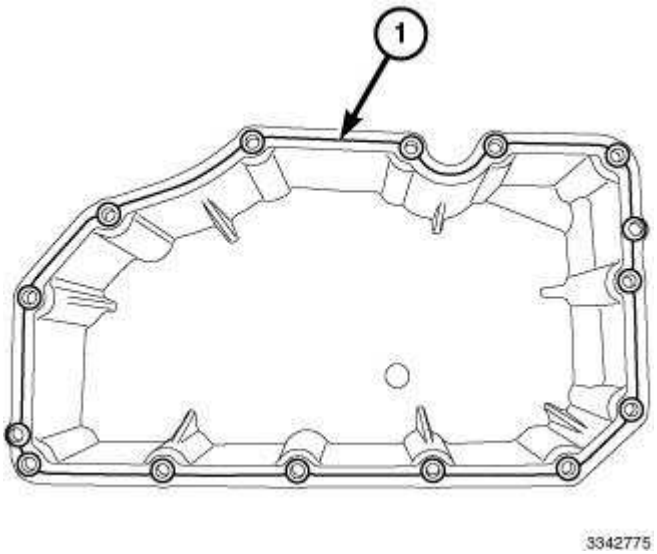


Fig. 344: Lower Oil Pan Gasket Sealing Surfaces
Courtesy of CHRYSLER GROUP, LLC

1. Clean and gasket sealing surfaces. Refer to **Engine - Standard Procedure**.

CAUTION: Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

NOTE: Sealing surfaces must be free of a gasket material and oil residue. Clean the oil pan sealing surfaces with isopropyl alcohol in preparation for sealant application.

2. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to the lower oil pan as shown in illustration (1).

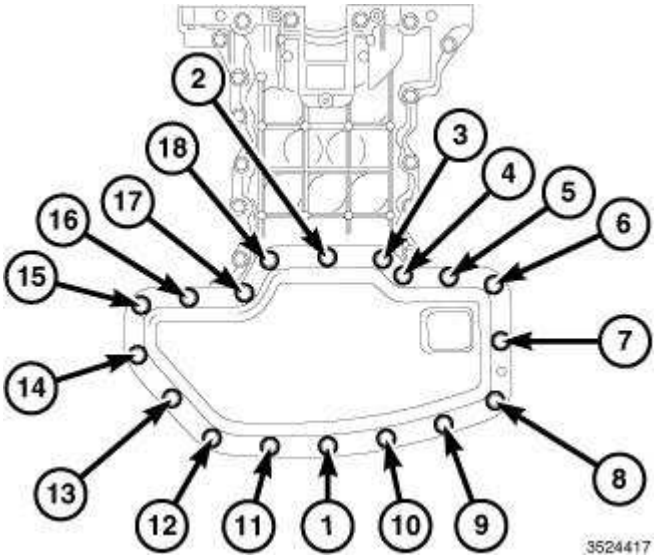


Fig. 345: Oil Pan To Engine Block Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Stud bolts go in the following locations: 2, 4, 6, 14, and 18.

3. Position the oil pan to engine block and install the oil pan bolts finger tight.
   - Using the tightening sequence shown in illustration, tighten the oil pan bolts to 15 N.m (133 in. lbs.).
   - Loosen each bolt one at a time 90 degrees, then using the tightening sequence shown in illustration tighten bolts to 15 N.m (133 in. lbs.).

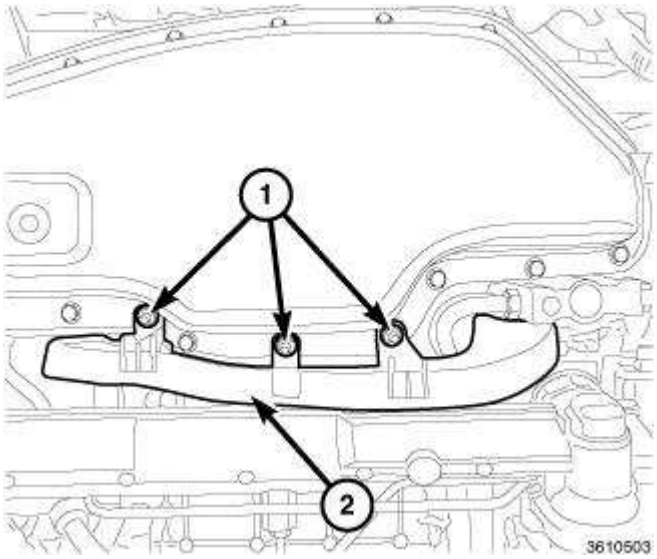


Fig. 346: Lower Engine Wire Harness & Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Install the wire harness (2). Tighten nuts (1) to 11 N.m (97 in. lbs.).

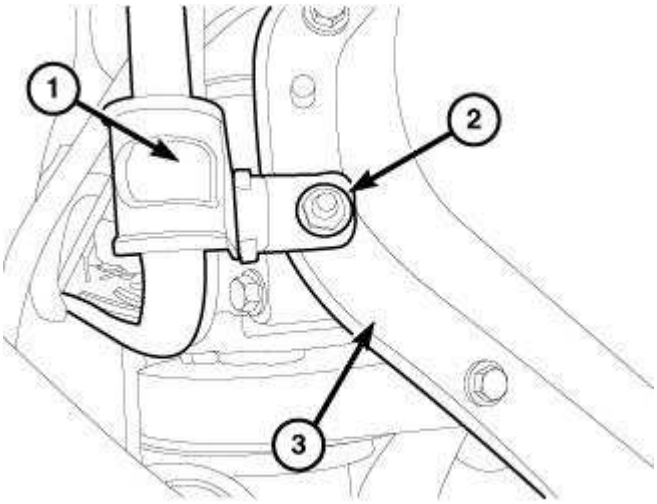


Fig. 347: Transmission Cooler Line Bracket, Nut & Oil Pan
Courtesy of CHRYSLER GROUP, LLC

5. Install the transmission cooler line bracket (1) and tighten nuts (2) to 11 N.m (97 in. lbs.).

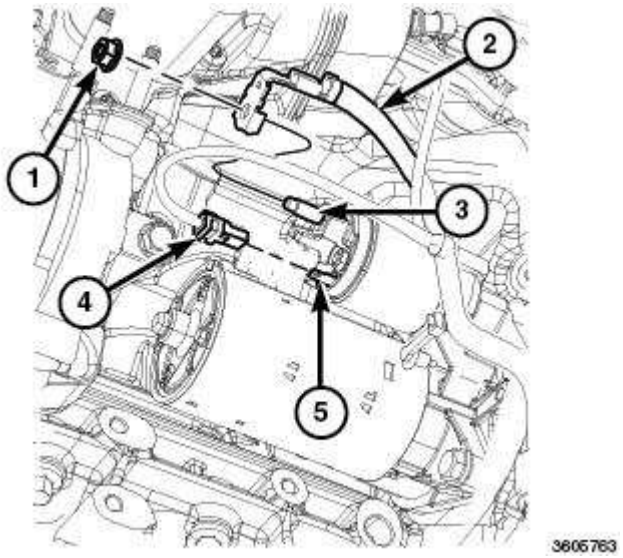


Fig. 348: Starter Cables, Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Connect the solenoid wire harness connector (4) to the solenoid terminal (5).
7. Install the B+ cable (2) to the solenoid stud (3). Tighten nut (1) to 11 N.m (97 in. lbs.).
8. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .
9. Fill the engine with recommended engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

PICK-UP, OIL PUMP

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the lower oil pan. Refer to **PAN, OIL, REMOVAL**.

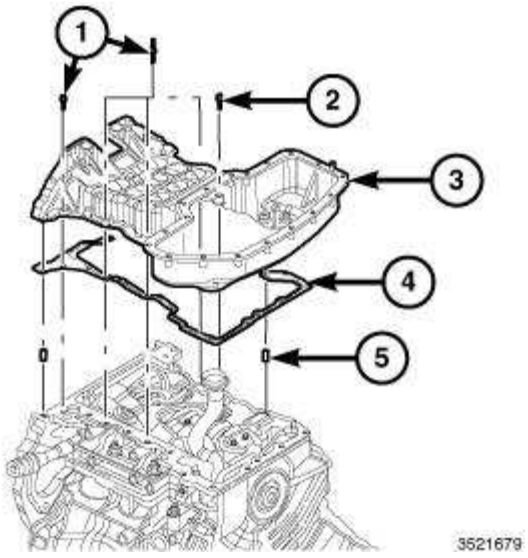


Fig. 349: Upper Oil Pan, Gasket & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil pump pickup tube bolt (2).

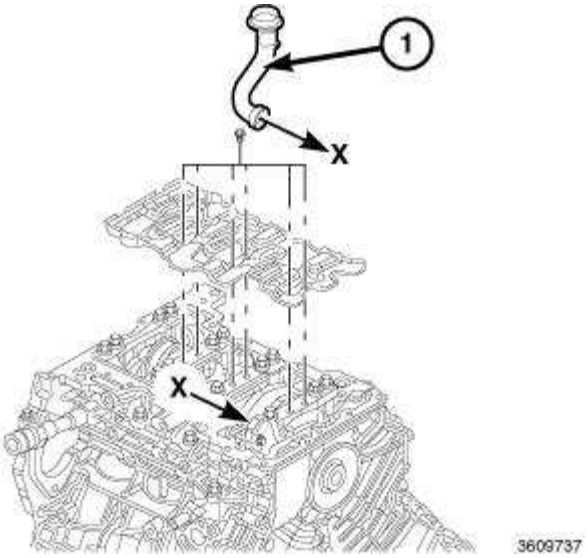


Fig. 350: Oil Pump Pickup Tube
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil pump pickup tube (1) from oil pump.

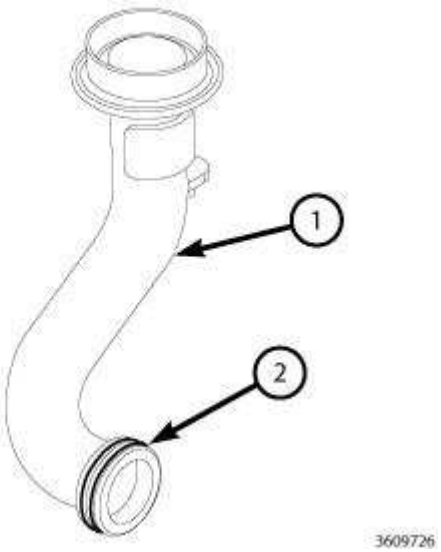


Fig. 351: Oil Pump Pickup Tube & O-Ring
Courtesy of CHRYSLER GROUP, LLC

5. Remove and discard O-ring (2).

INSTALLATION

INSTALLATION

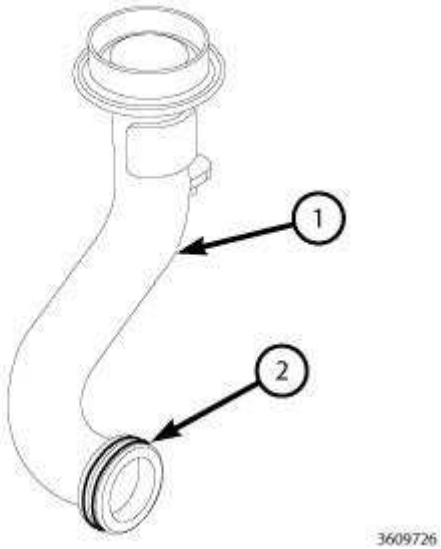


Fig. 352: Oil Pump Pickup Tube & O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate and install a new O-ring (2) on oil pump pickup tube (1).

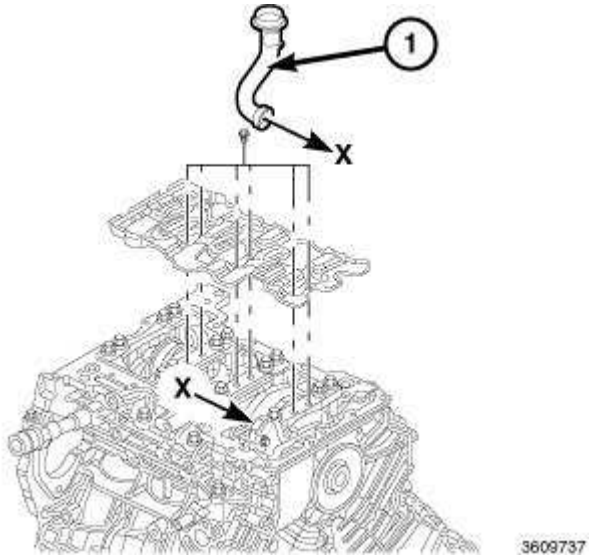


Fig. 353: Oil Pump Pickup Tube
Courtesy of CHRYSLER GROUP, LLC

2. Install pickup tube (2) into oil pump.

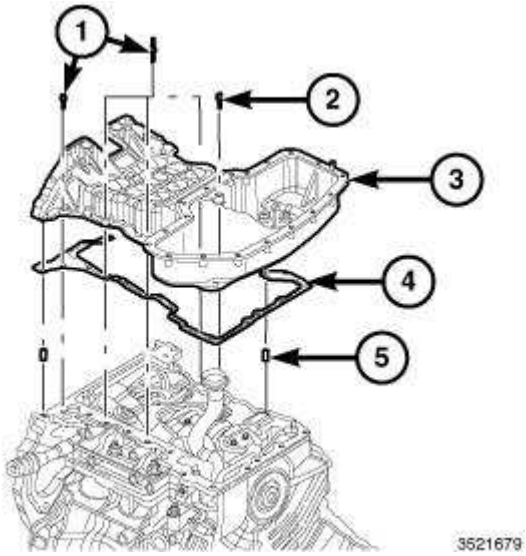


Fig. 354: Upper Oil Pan, Gasket & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Tighten the oil pump pickup tube bolts (1) to 11 N.m (97 in. lbs.).
4. Install the lower oil pan. Refer to **PAN, OIL, INSTALLATION**.
5. Fill the engine to proper level with recommended engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
6. Connect the negative battery cable.

PUMP, ENGINE OIL

REMOVAL

REMOVAL

1. Remove the oil pump pick-up tube. Refer to **PICK-UP, OIL PUMP, REMOVAL**.
2. Remove the lower timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

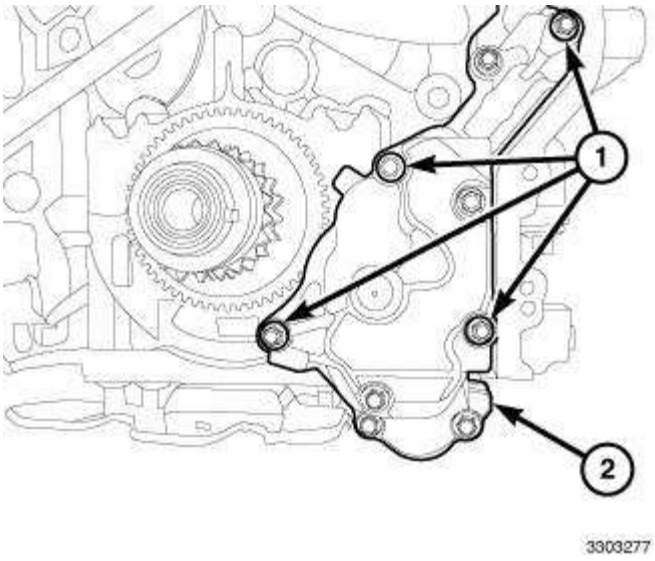


Fig. 355: Engine Oil Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts and the engine oil pump (1).

INSTALLATION

INSTALLATION

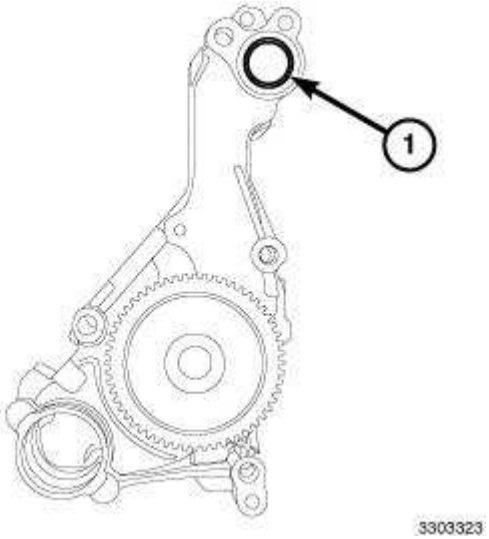


Fig. 356: Engine Oil Pump O-Ring Gasket

Courtesy of CHRYSLER GROUP, LLC

1. Clean the gasket sealing surfaces. Refer to **Engine - Standard Procedure**.
2. Install a new O-ring gasket (1) onto the oil pump.

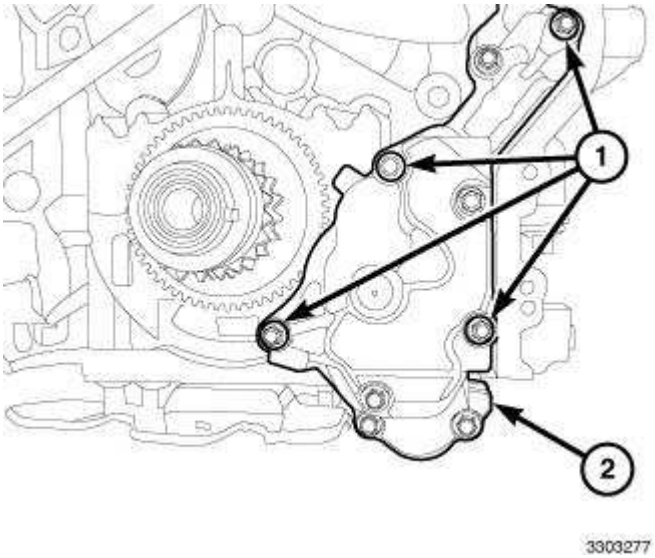


Fig. 357: Engine Oil Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the oil pump. Tighten bolts to 14 N.m (124 in. lbs.).
4. Install the lower timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
5. Install oil pump pick-up tube. Refer to **PICK-UP, OIL PUMP, INSTALLATION**.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

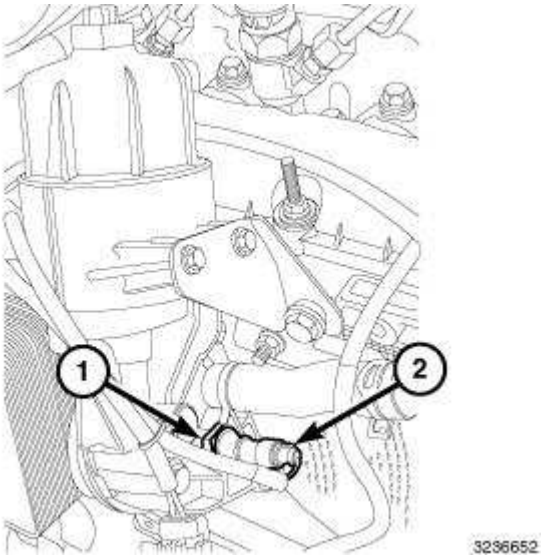


Fig. 358: Engine Oil Pressure Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

The engine oil pressure sensor (1) is mounted on the oil cooler adapter housing. The sensor provides an output voltage to the PCM that corresponds to the engine oil pressure. Under certain operating conditions, for example low oil pressure, it may be necessary for the PCM to increase the engine idle speed to ensue adequate engine lubrication.

The engine oil pressure sensor (1) is a single wire sensor with a threaded pressure port. The pressure port is mounted to the oil cooler adapter housing through an access hole. An aluminum seal ring seals the engine oil pressure sensor to the oil cooler adapter housing.

OPERATION

OPERATION

The engine oil pressure sensor receives a 5- volt reference from the PCM. The sensor ground is also provided by the PCM. The sensor output voltage varies from 0.5 to 4.5 volts depending on engine oil pressure.

REMOVAL

REMOVAL

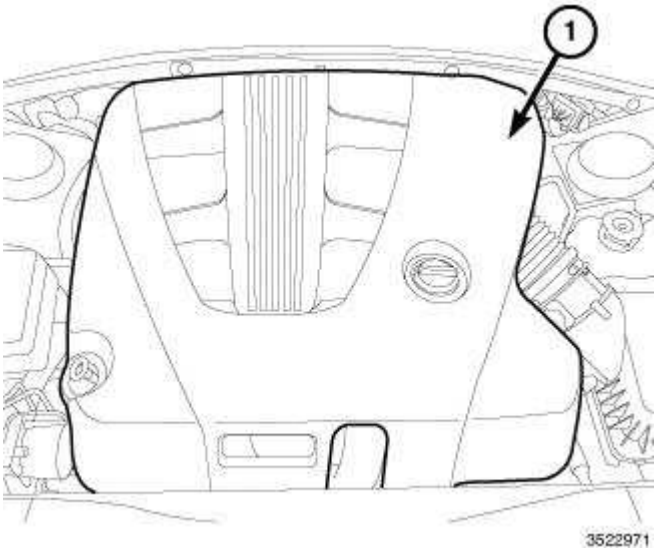


Fig. 359: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

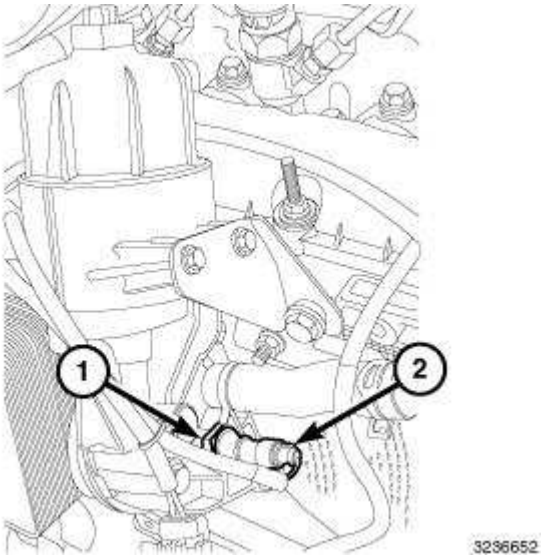


Fig. 360: Engine Oil Pressure Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect engine oil pressure sensor harness connector (2).
4. Remove engine oil pressure sensor (1).

INSTALLATION

INSTALLATION

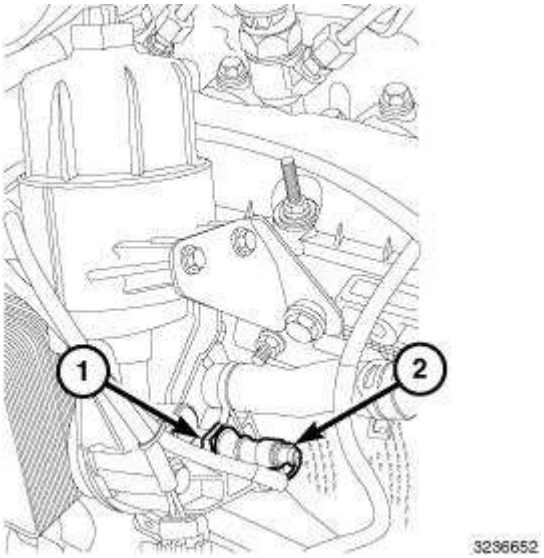


Fig. 361: Engine Oil Pressure Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Install the engine oil pressure sensor (1). Tighten sensor (1) to 33 N.m (24 ft. lbs.).
2. Connect engine oil pressure sensor harness connector (2).

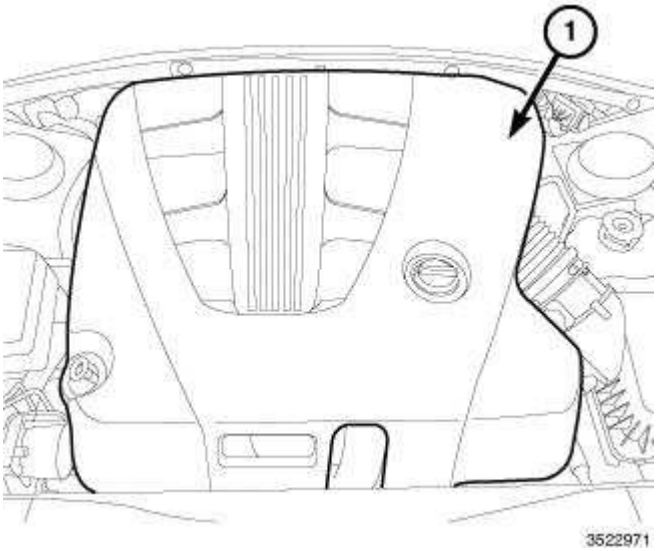


Fig. 362: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine cover (1).
4. Connect the negative battery cable.
5. Start vehicle and inspect for leaks.

MANIFOLDS

ACTUATOR, SWIRL VALVE

DESCRIPTION

DESCRIPTION

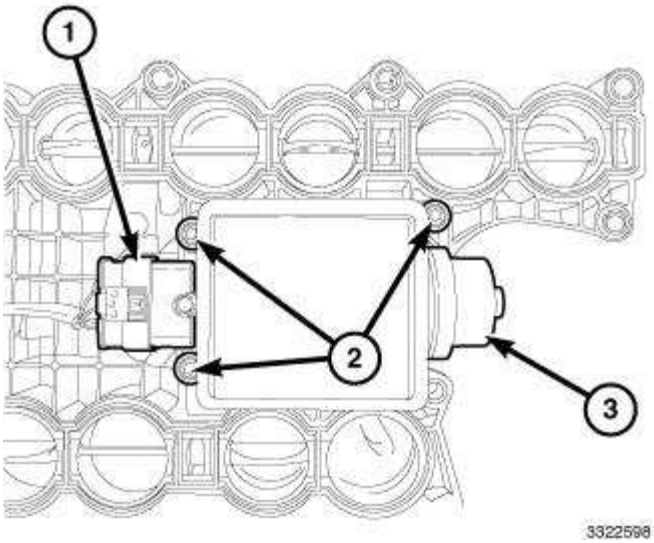


Fig. 363: Swirl Valve Actuator, Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

The intake manifolds feature swirl intake ports to reduce particulates at low engine speeds. Each cylinder incorporates one swirl port and one charge port. The swirl ports can be closed by the swirl valves. The valves are connected together via a linkage which is operated by the swirl valve actuator (3). The swirl valves are normally open by spring tension. The spring is integral with the swirl valve actuator. In the lower engine speed and load range, the swirl valves are closed by the swirl valve actuator (3). The entire air mass flows through the charge ports only, which results in greater swirling. The increased swirling produces uniform combustion for better engine performance and reduction of particulates. As rotational speed and load increases, the swirl valves open, so that optimal swirling and the required air mass are provided for the current operating conditions.

REMOVAL

REMOVAL

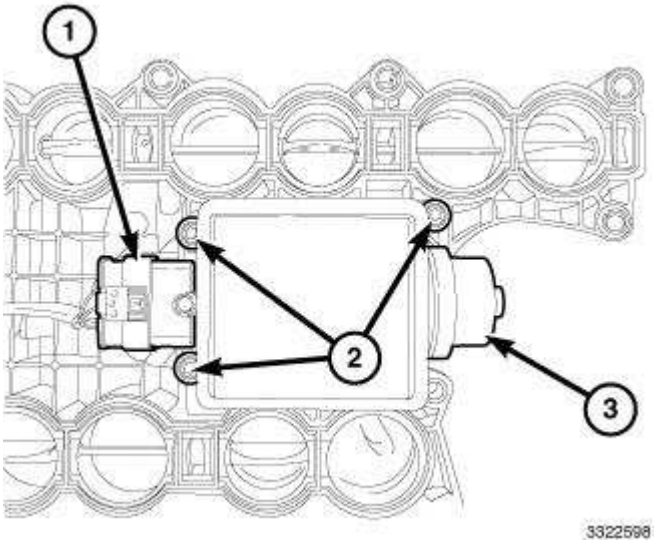


Fig. 364: Swirl Valve Actuator, Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Disconnect the swirl valve actuator harness connector (1).
4. Remove fasteners (2) and the swirl valve actuator (3).

INSTALLATION

INSTALLATION

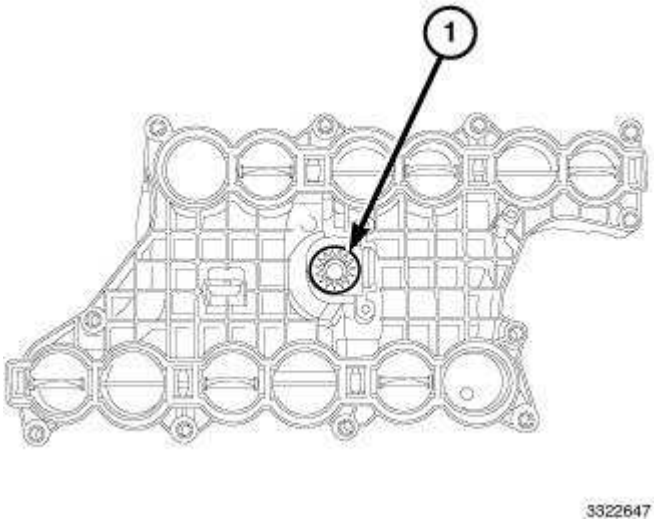


Fig. 365: Swirl Valve Gear
Courtesy of CHRYSLER GROUP, LLC

1. Inspect the swirl valve gear (1) for damage.

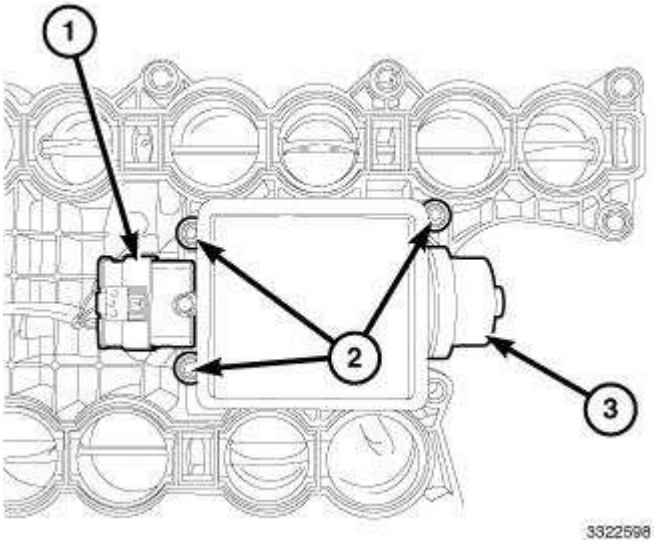


Fig. 366: Swirl Valve Actuator, Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Install the swirl valve actuator (3) and securely tighten fasteners (2).
3. Connect the swirl valve harness connector (1).
4. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
5. Connect the negative battery cable.

MANIFOLD, EXHAUST

REMOVAL

RIGHT BANK

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it has cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

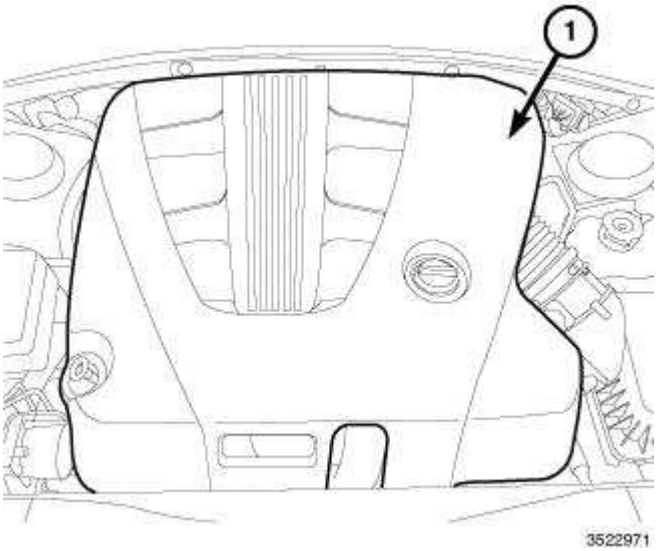


Fig. 367: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

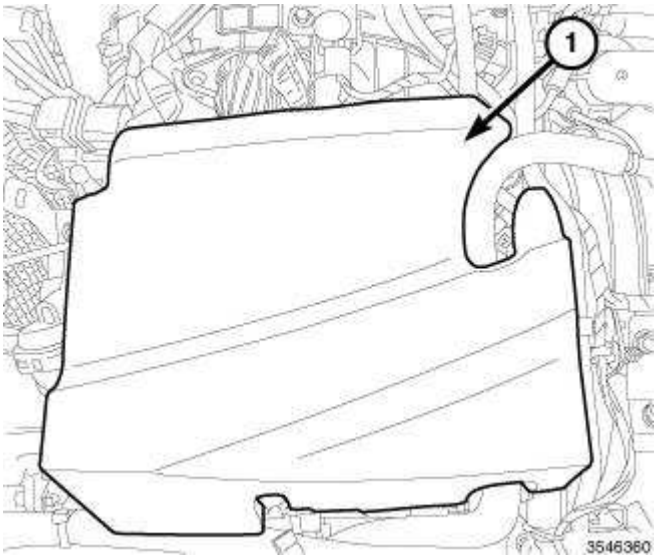


Fig. 368: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

3. Remove the right side fuel injector silencer (1).

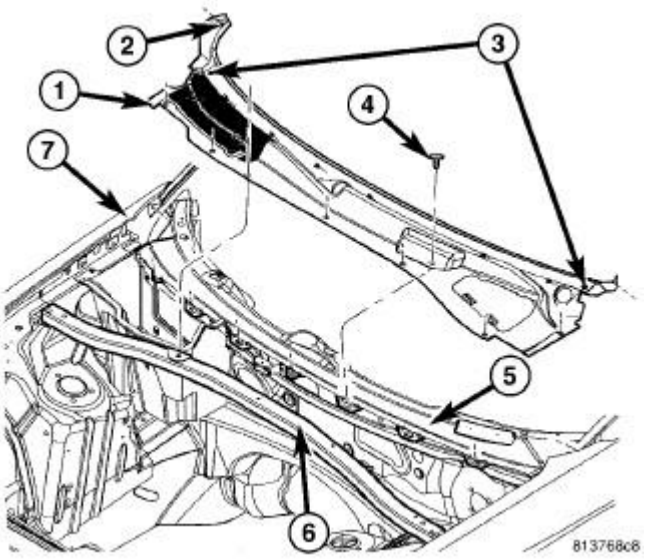


Fig. 369: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, REMOVAL** .
5. Remove bolts and the strut support brace (6).
6. Remove fasteners and the rear engine compartment heat shield.
7. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
8. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .
9. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
10. Remove the lower oil dipstick tube bolt.
11. Remove the generator. Refer to **GENERATOR, REMOVAL** .

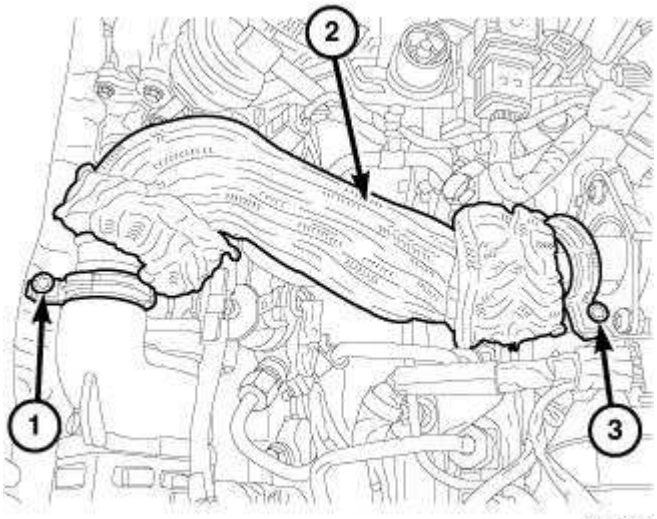


Fig. 370: EGR Tube & Clamps
Courtesy of CHRYSLER GROUP, LLC

12. Remove the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), REMOVAL** .

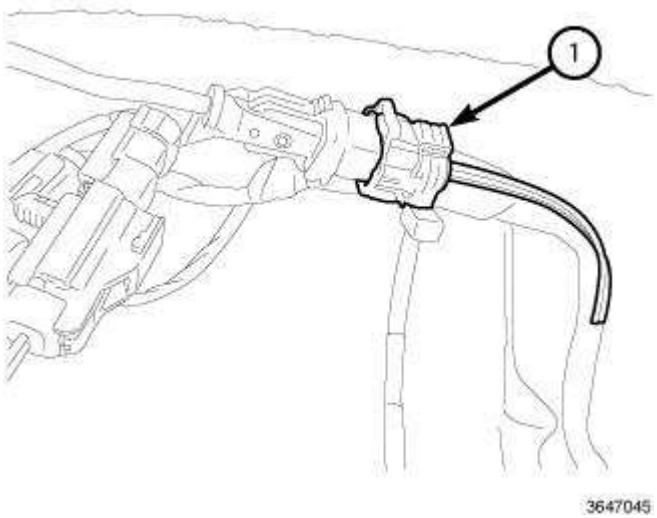


Fig. 371: Exhaust Temperature Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the exhaust temperature sensor wire harness connector (1).
14. Remove nut and the engine oil dip stick.

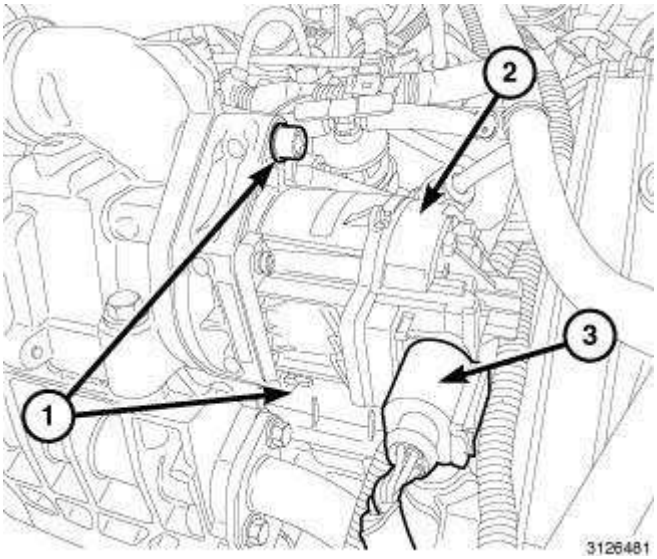


Fig. 372: EGR Valve, Bolts & Connector
Courtesy of CHRYSLER GROUP, LLC

15. Disconnect the EGR valve wire harness connector (2).

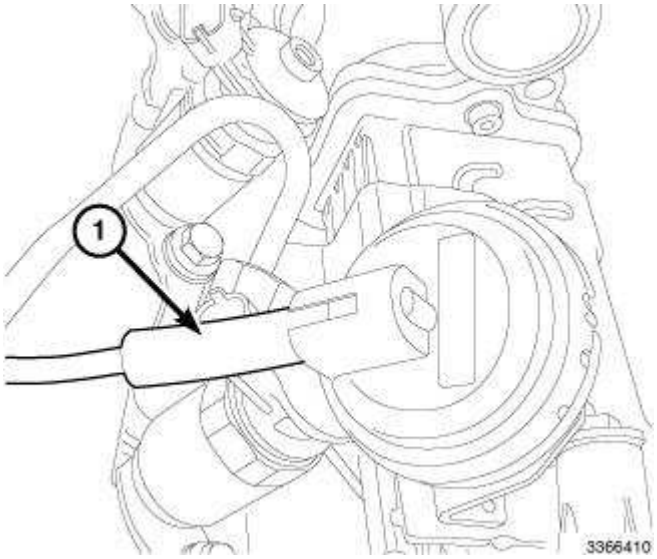


Fig. 373: EGR Cooler Vacuum Bypass Hose
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the EGR cooler vacuum bypass hose (1).

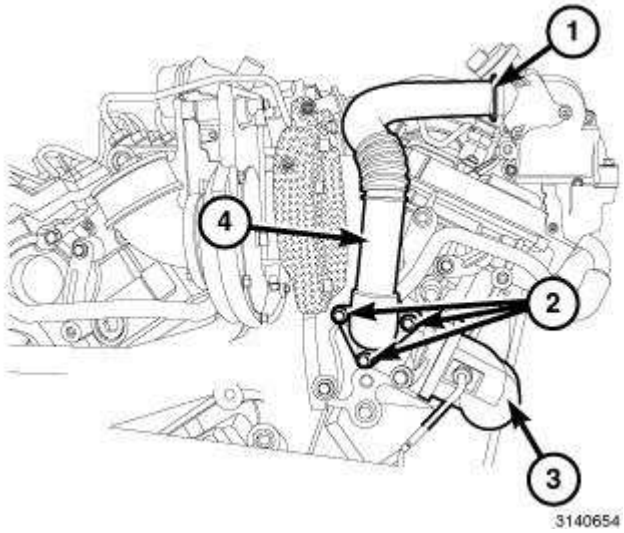


Fig. 374: Turbocharger-To-EGR Cooler Tube Clamp
Courtesy of CHRYSLER GROUP, LLC

17. Remove the turbocharger-to-EGR cooler tube clamp (1).

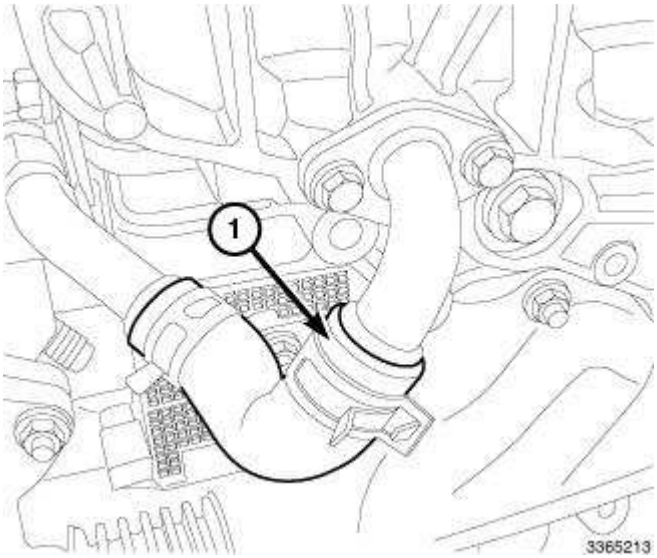


Fig. 375: EGR Cooler Supply Hose
Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the EGR cooler supply hose (1).

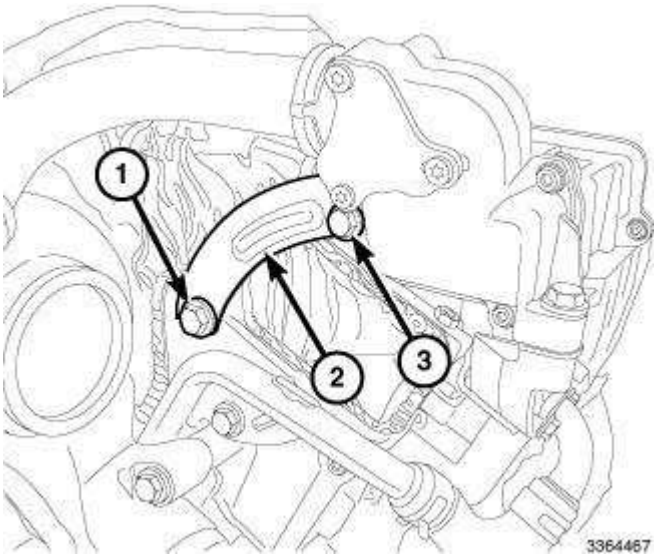


Fig. 376: EGR Cooler Bypass Valve Support Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Remove bolt (3) at the rear EGR cooler bypass valve support bracket (2).

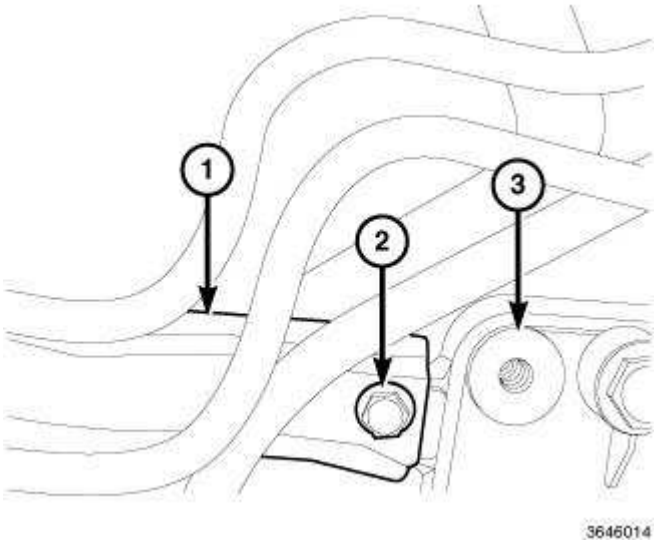


Fig. 377: Fuel Line Support Bracket, Generator Mounting Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

20. Remove bolt (2) securing the fuel line support bracket (1) to generator mounting bracket (3).

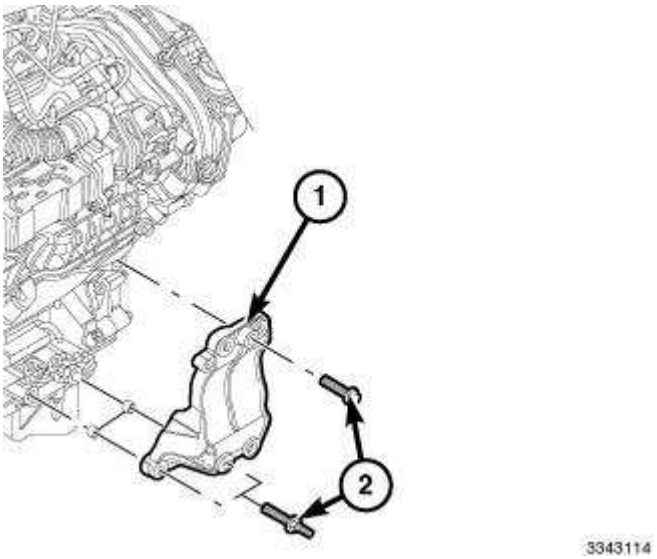


Fig. 378: Generator Mounting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove bolts (2) and the generator mounting bracket (1).

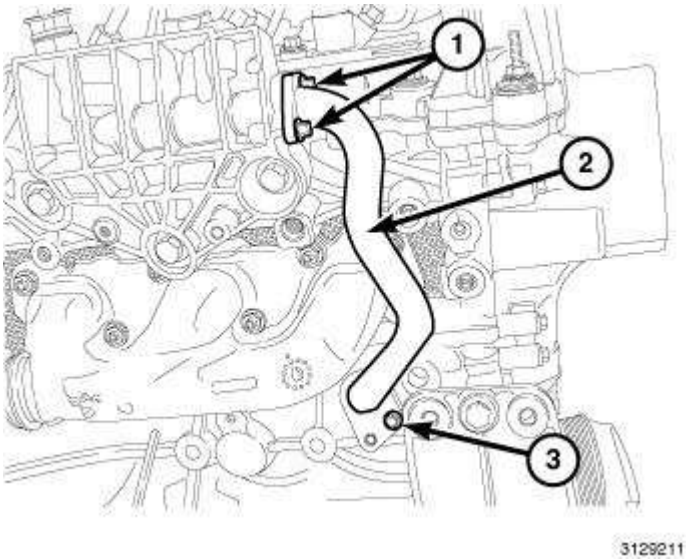


Fig. 379: EGR Cooler Coolant Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

22. Remove bolts (1 and 3) and the EGR cooler coolant tube (2).

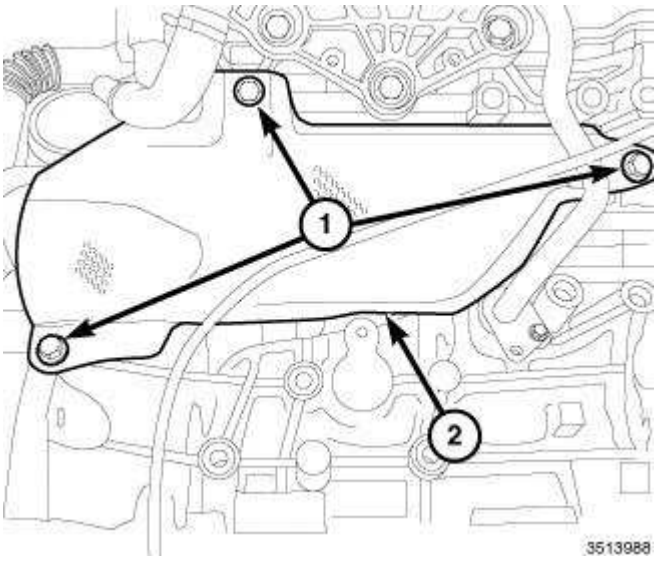


Fig. 380: Right Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

23. Remove bolts (1) and the right exhaust manifold heat shield (2).

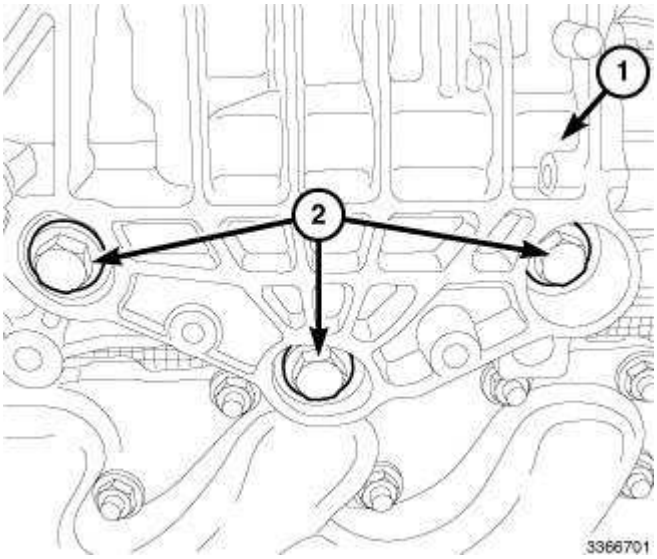


Fig. 381: Cooler Assembly Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

24. Remove bolts (2) and the EGR and cooler assembly bracket (1).

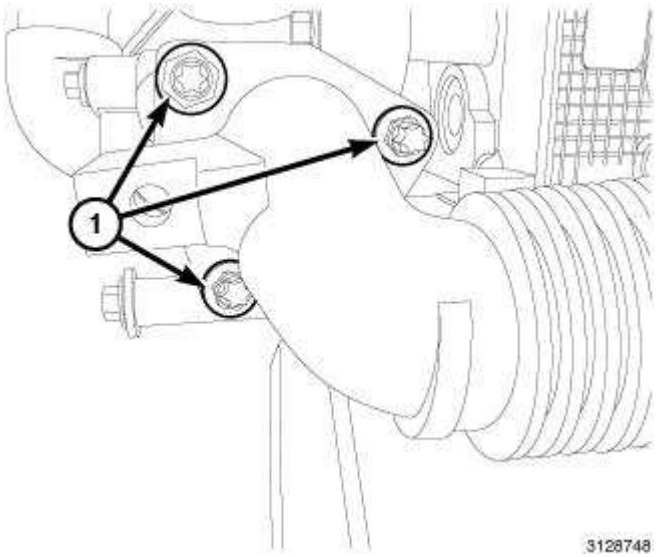


Fig. 382: Right Exhaust Manifold To Turbocharger Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

25. Raise the vehicle.
26. Remove the right exhaust manifold to turbocharger retaining nuts (1).

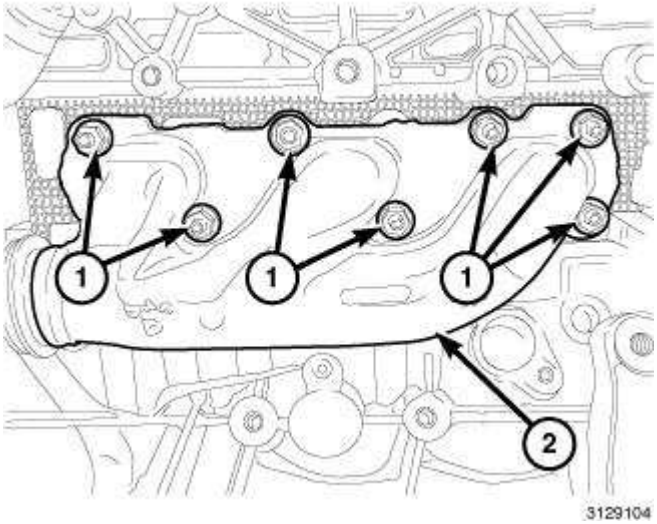


Fig. 383: Right Exhaust Manifold & Nuts
Courtesy of CHRYSLER GROUP, LLC

27. Remove the nuts (1) and right exhaust manifold (2).

LEFT BANK

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it has cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

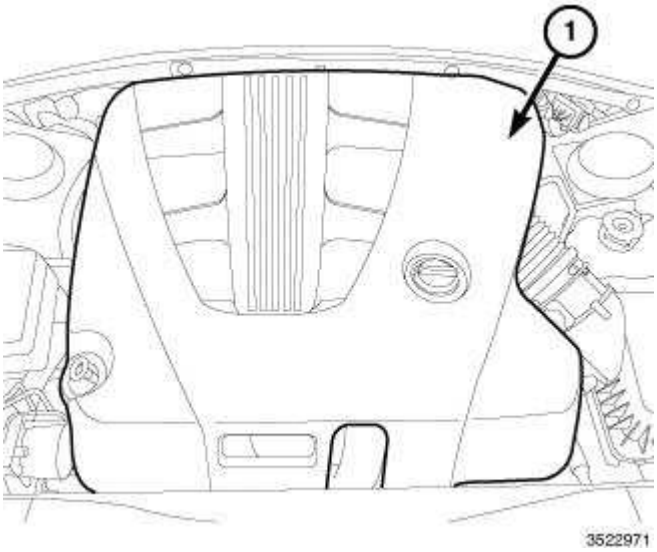


Fig. 384: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

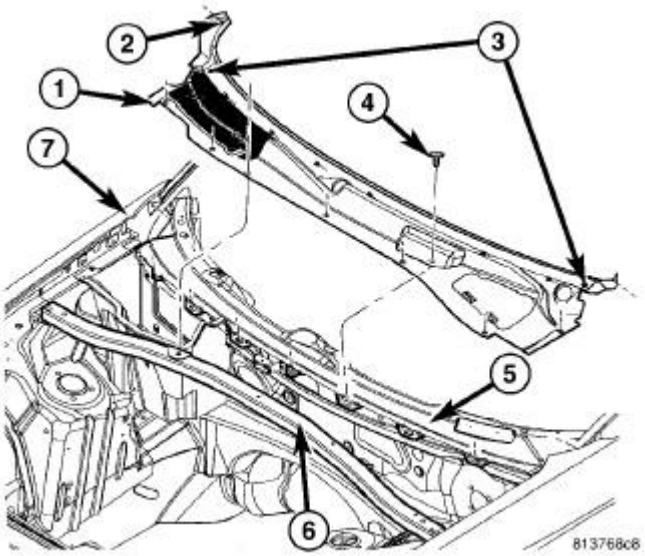


Fig. 385: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, REMOVAL** .
4. Remove bolts and the strut support brace (6).
5. Remove fasteners and the rear engine compartment heat shield.
6. Remove the air cleaner body and intake air tube. Refer to **BODY, AIR CLEANER, REMOVAL**.
7. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
8. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .
9. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
10. Lower the vehicle.

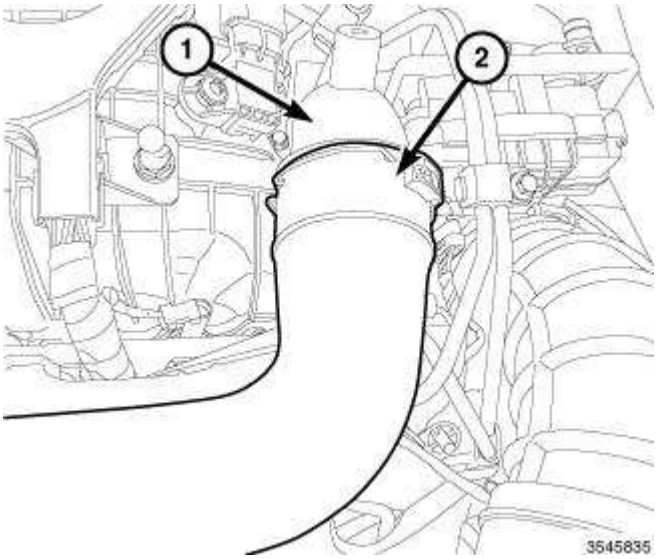


Fig. 386: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).

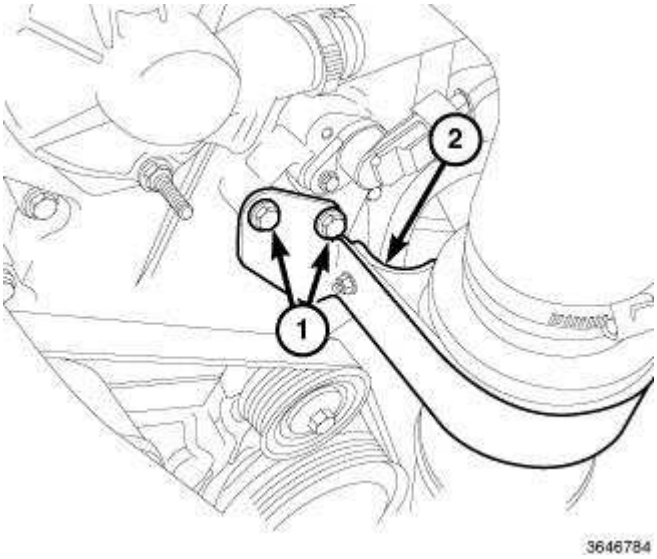


Fig. 387: CAC Hose Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the two (1) bolts securing the CAC hose and bracket (2) to timing cover and position aside.

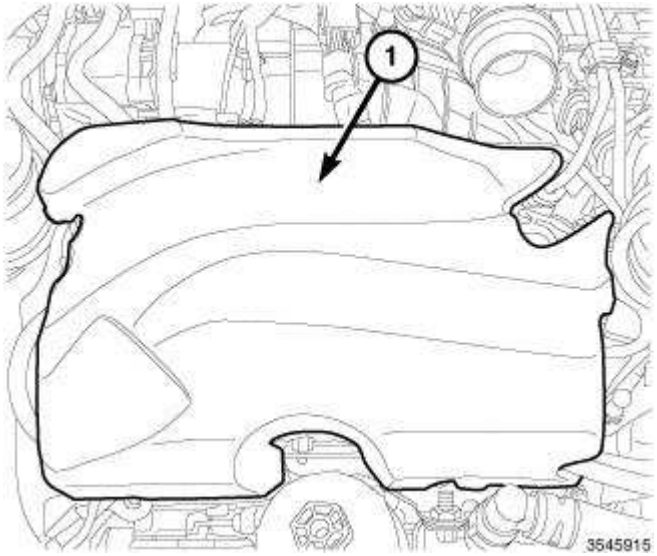


Fig. 388: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

13. Remove the left side fuel injector silencer (1).

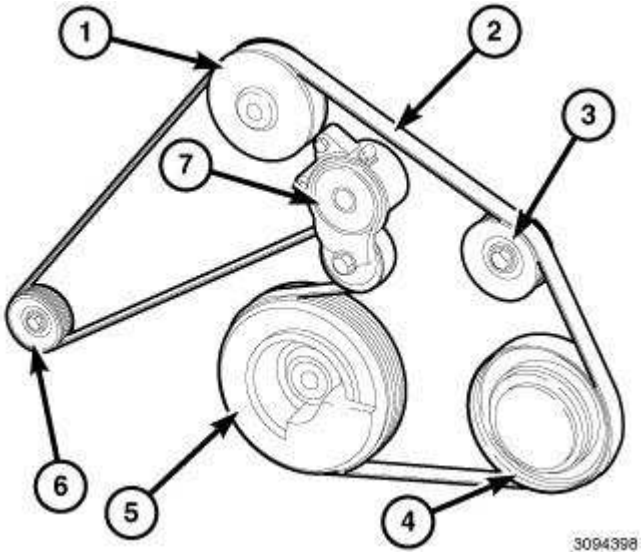
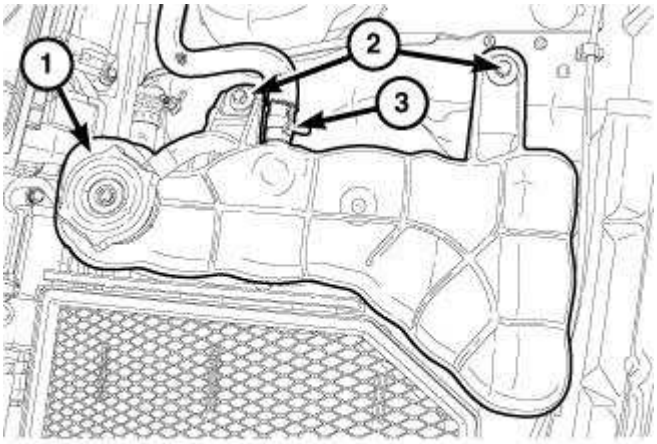


Fig. 389: Pulleys, Tensioner & Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

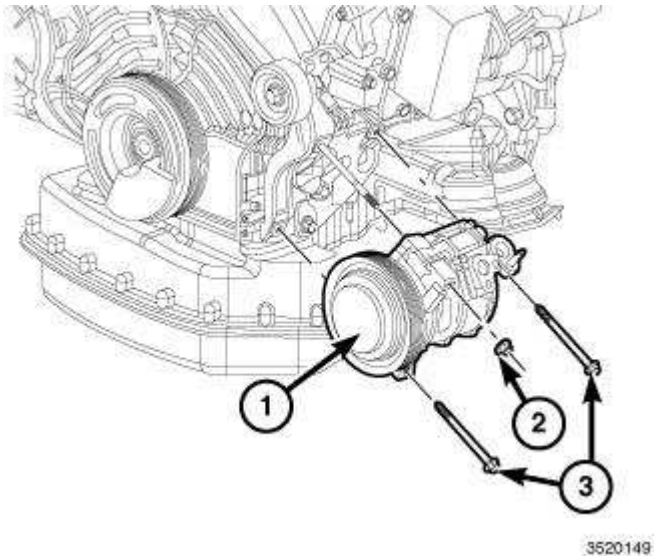
14. Partially remove the accessory drive belt (2).



2912996

Fig. 390: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

15. Remove the coolant recovery bottle. Refer to **BOTTLE, COOLANT RECOVERY, REMOVAL** .



3520149

Fig. 391: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the A/C compressor wire harness connector.
17. Remove the nut (2) and stud securing the A/C compressor (1).
18. Remove bolts (3) securing the A/C compressor and position the A/C compressor aside.

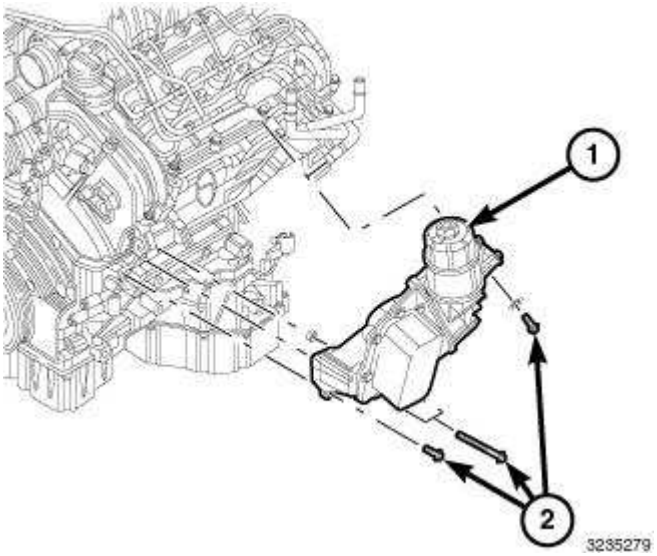


Fig. 392: Oil Cooler Adapter Assembly
Courtesy of CHRYSLER GROUP, LLC

19. Remove the oil cooler adapter. Refer to **ADAPTER, OIL COOLER, REMOVAL**.
20. Remove the fuel injection pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, REMOVAL** .

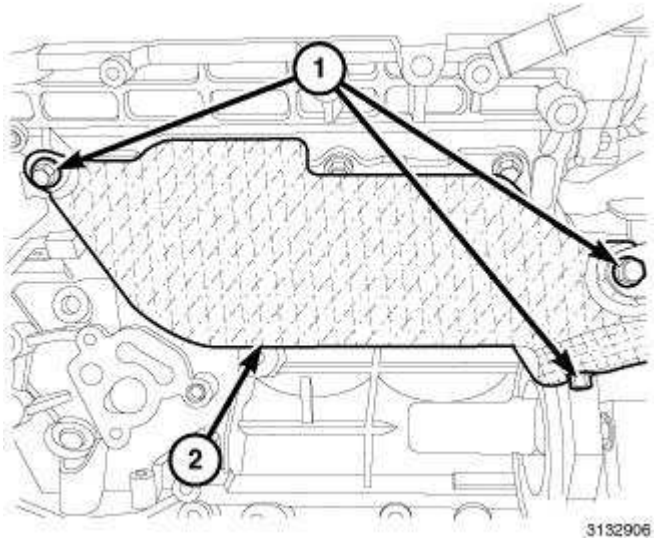


Fig. 393: Left Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove bolts (1) and the left exhaust manifold heat shield (2).

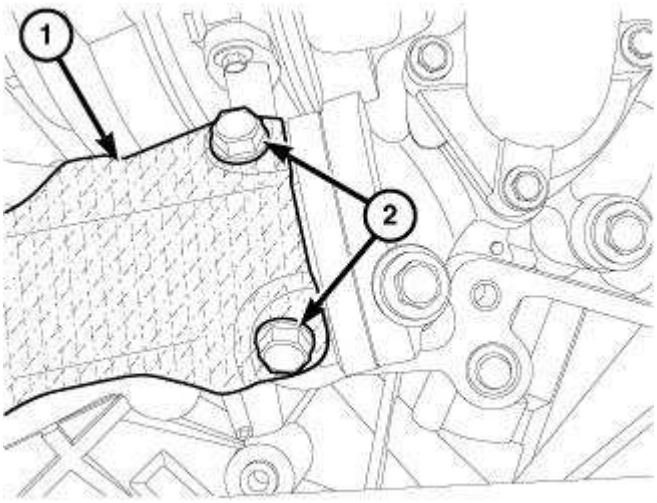


Fig. 394: Exhaust Manifold Pipe To Turbocharger Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

22. Remove bolts (2) and the exhaust manifold pipe to turbocharger heat shield (1).
23. Remove the turbocharger-to-cowl extension heat shield.

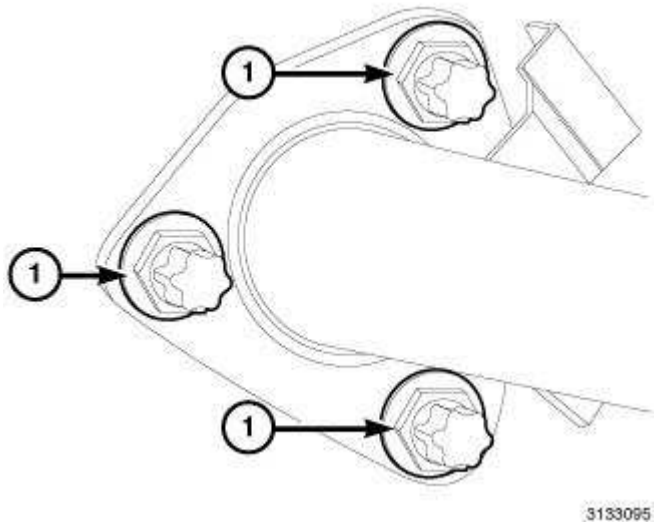


Fig. 395: Exhaust Manifold Pipe To Turbocharger Nuts
Courtesy of CHRYSLER GROUP, LLC

24. Remove the three nuts (1) from exhaust manifold pipe to turbocharger.

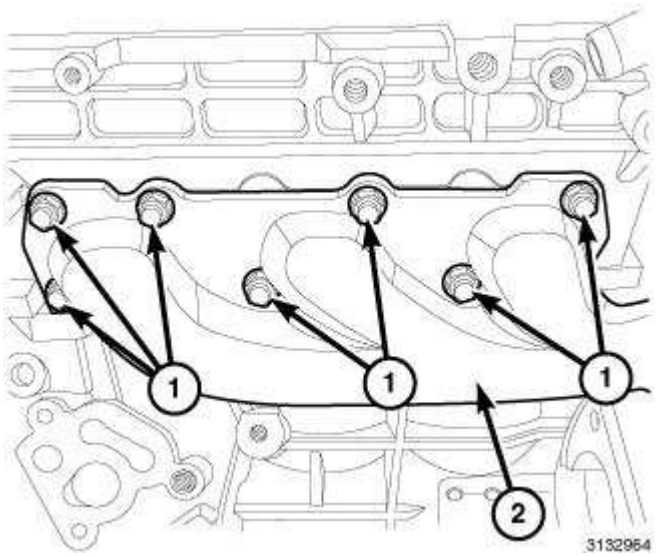


Fig. 396: Left Exhausts Manifold & Nuts
Courtesy of CHRYSLER GROUP, LLC

25. Remove nuts (1) and the left exhausts manifold (2).
26. Remove and discard gaskets.

INSTALLATION

RIGHT BANK

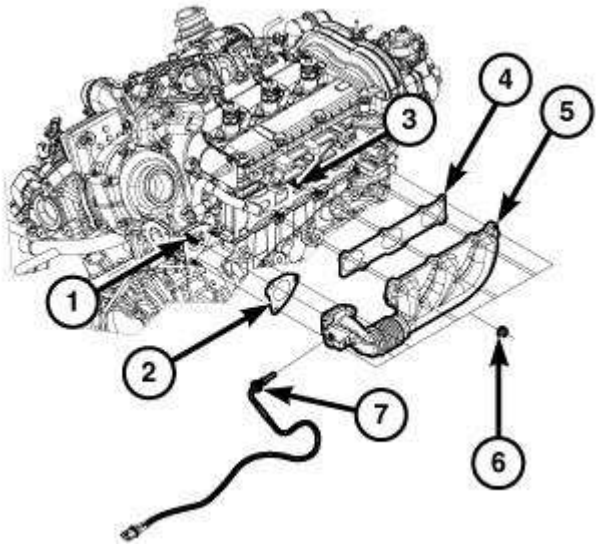
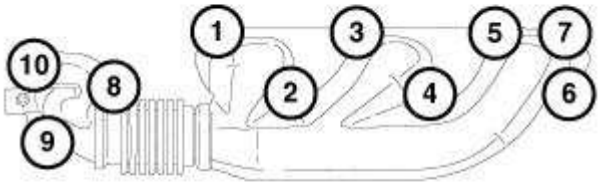


Fig. 397: Exhaust Manifold, Gaskets, Turbocharger, Cylinder Head & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Clean the cylinder head, exhaust manifold and turbocharger sealing surfaces. Refer to **Engine - Standard Procedure**.
2. Install new exhaust manifold gaskets (2 and 4) to turbocharger (1) and the cylinder head (3).

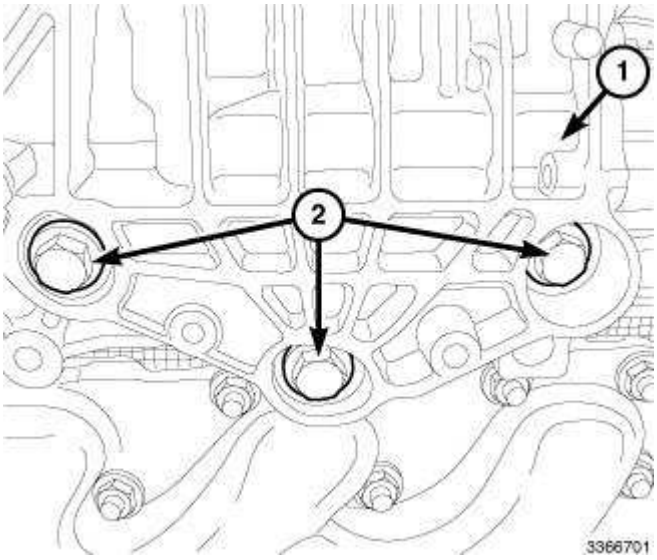
3. Install the exhaust manifold (5) and the retaining nuts (6) finger tight.



3129463

Fig. 398: Right Bank Exhaust Manifold Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the tightening sequence shown in illustration tighten nuts to:
   - Tighten nuts to 15 N.m (133 in. lbs.).
   - Tighten nuts to 40 N.m (30 ft. lbs.).



3366701

Fig. 399: Cooler Assembly Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the EGR and cooler assembly bracket (2). Tighten bolts to 45 N.m (33 ft. lbs.).

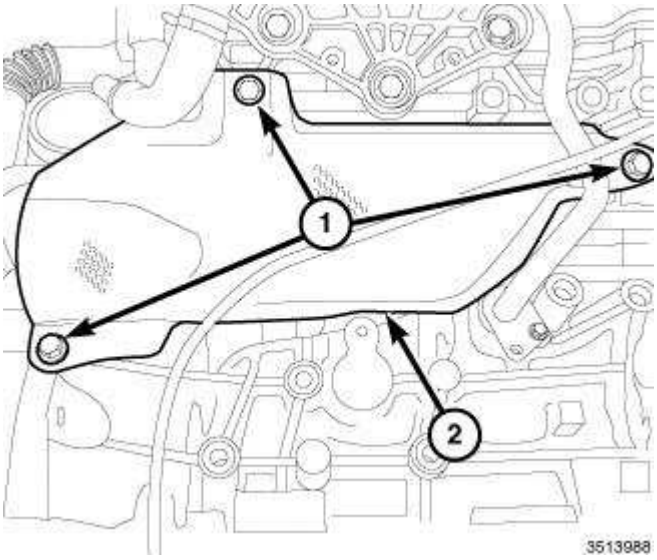


Fig. 400: Right Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the right exhaust manifold heat shield (2). Tighten bolts (1) to 15 N.m (133 in. lbs.).

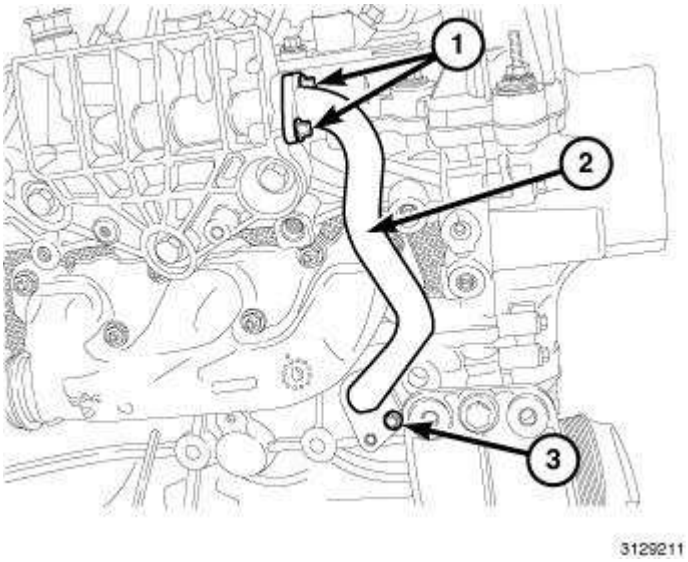


Fig. 401: EGR Cooler Coolant Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Using a new O-ring seal and gasket install the EGR cooler coolant tube (2). Tighten bolts (1 and 3) to 18 N.m (159 in. lbs.).

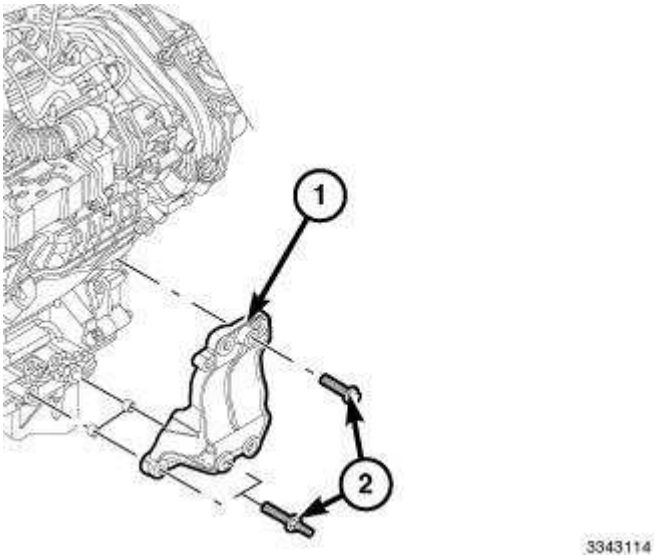


Fig. 402: Generator Mounting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the generator mounting bracket (1). Tighten bolts (2) to 45 N.m (33 ft. lbs.).

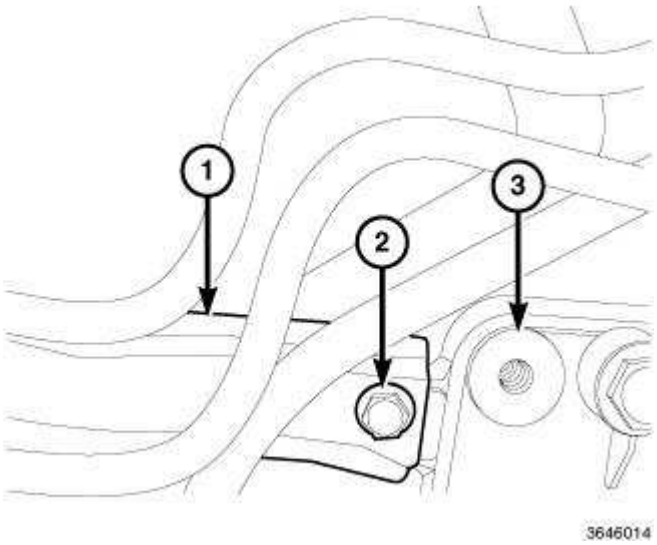


Fig. 403: Fuel Line Support Bracket, Generator Mounting Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Install bolt (2) securing the fuel line support bracket (1) to generator mounting bracket (3) and tighten to 11 N.m (97 in. lbs.).

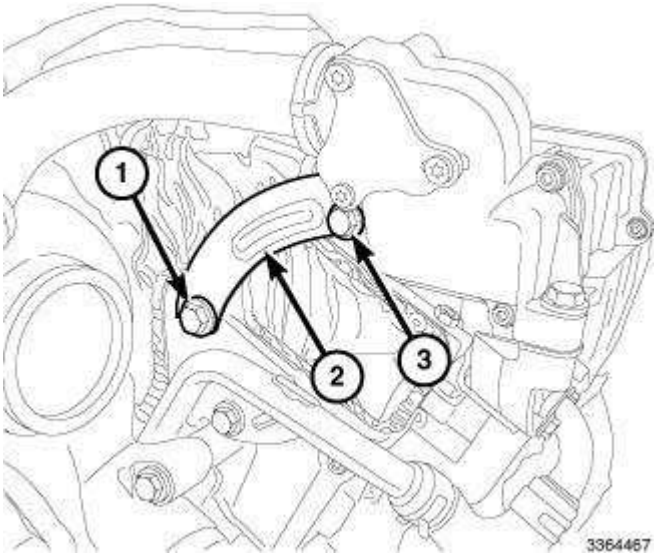


Fig. 404: EGR Cooler Bypass Valve Support Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Install bolt (3) at the rear EGR cooler bypass valve support bracket (2) and tighten to 25 N.m (18 ft. lbs.).

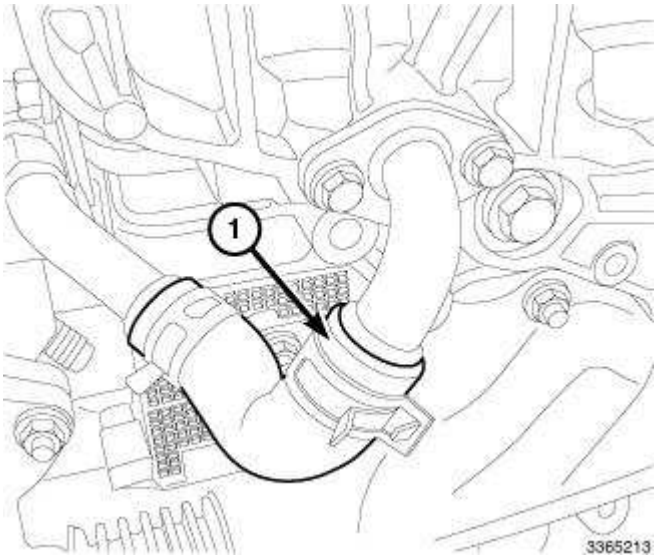


Fig. 405: EGR Cooler Supply Hose
Courtesy of CHRYSLER GROUP, LLC

11. Connect the EGR cooler supply hose (1).

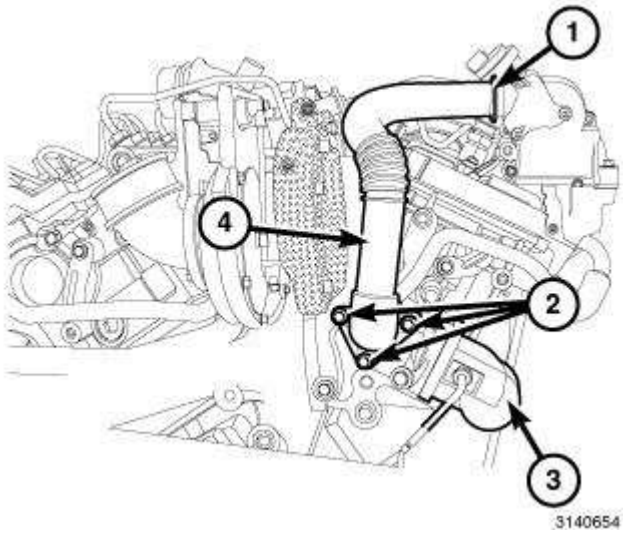


Fig. 406: Turbocharger-To-EGR Cooler Tube Clamp
Courtesy of CHRYSLER GROUP, LLC

12. Using a new gasket the turbocharger-to-EGR cooler tube and securely tighten clamp (1).

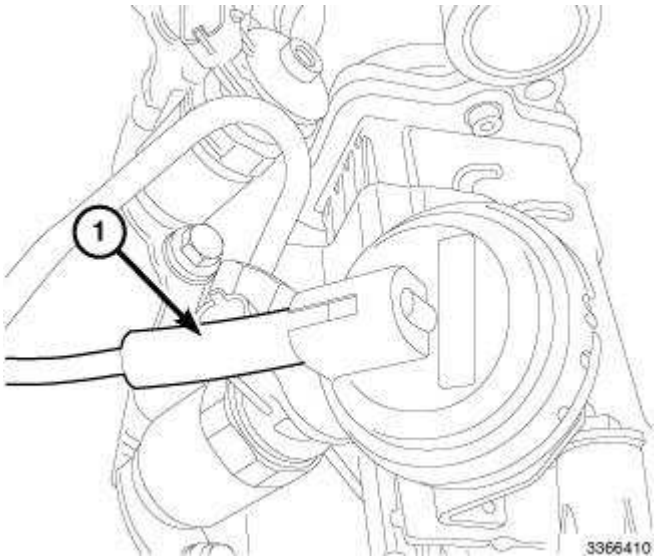


Fig. 407: EGR Cooler Vacuum Bypass Hose
Courtesy of CHRYSLER GROUP, LLC

13. Connect the EGR cooler vacuum bypass hose (1).

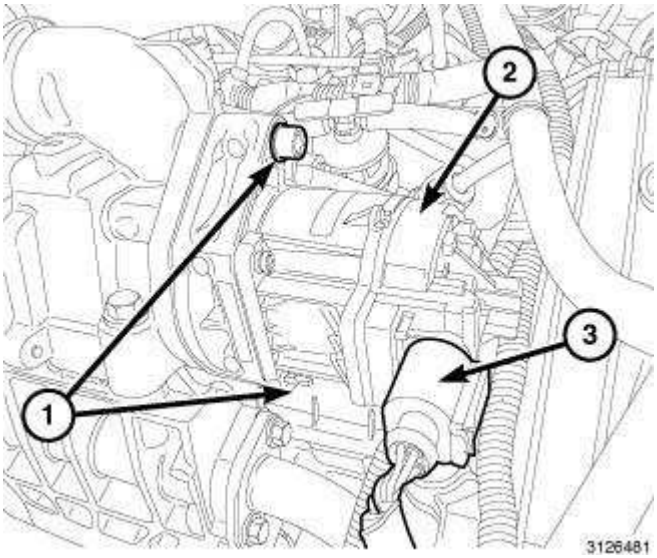


Fig. 408: EGR Valve, Bolts & Connector
Courtesy of CHRYSLER GROUP, LLC

14. Connect the EGR valve wire harness connector (2).

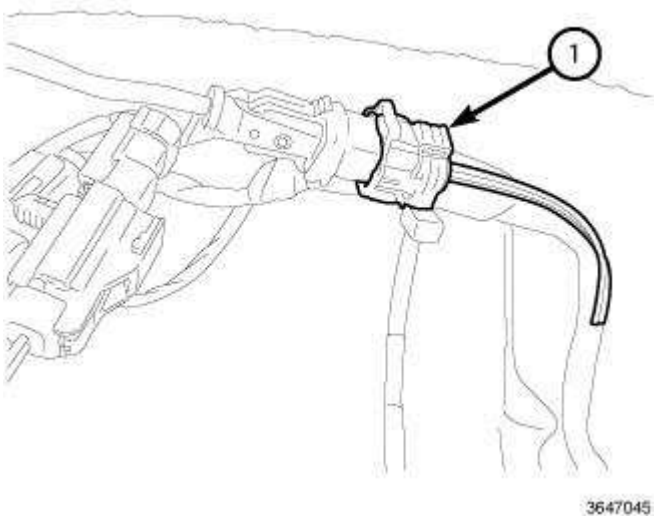


Fig. 409: Exhaust Temperature Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

15. Using a new O-ring seal, install the oil dipstick tube. Tighten upper nut to 11 N.m (97 in. lbs.).
16. Connect the exhaust temperature sensor wire harness connector (1).

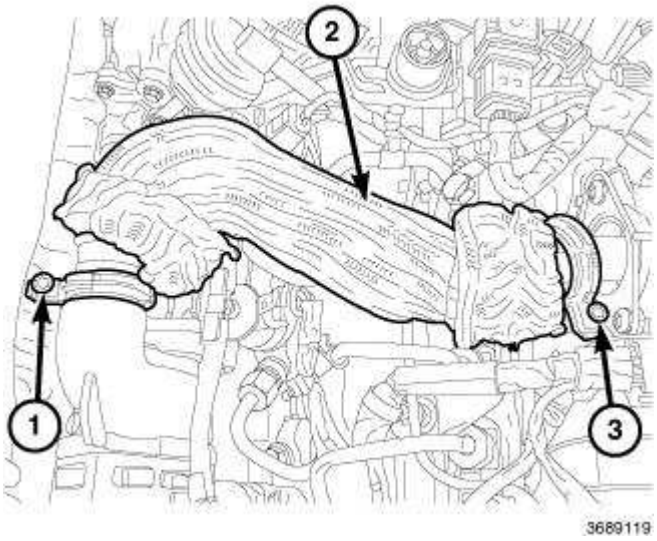


Fig. 410: EGR Tube & Clamps
Courtesy of CHRYSLER GROUP, LLC

17. Install the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), INSTALLATION** .
18. Install the generator. Refer to **GENERATOR, INSTALLATION** .
19. Install the lower oil dipstick tube bolt. Tighten bolt to 11 N.m (97 in. lbs.).
20. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, INSTALLATION** .
21. Lower the vehicle.

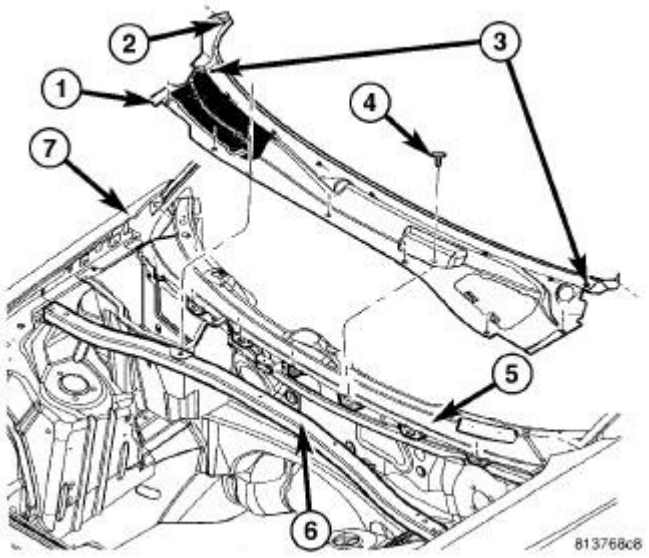


Fig. 411: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

22. Install the rear engine compartment heat shield and securely tighten the fasteners.
23. Install the strut support brace (6). Tighten bolts to 38 N.m (28 ft. lbs.).
24. Install the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .

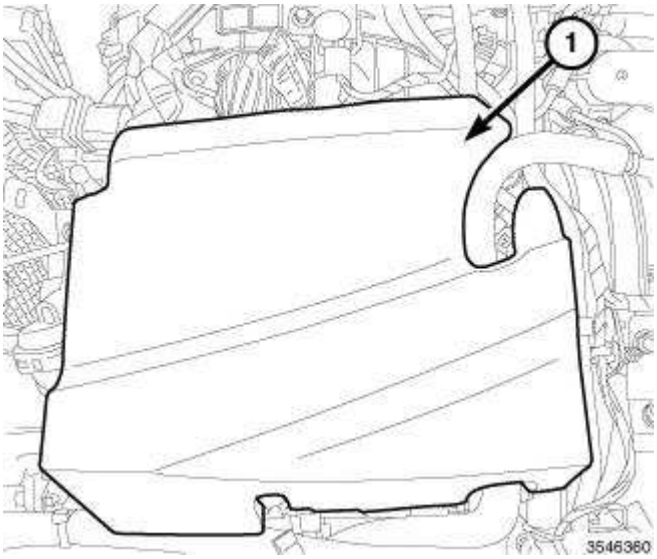


Fig. 412: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

25. Install the right side fuel injector silencer (1).

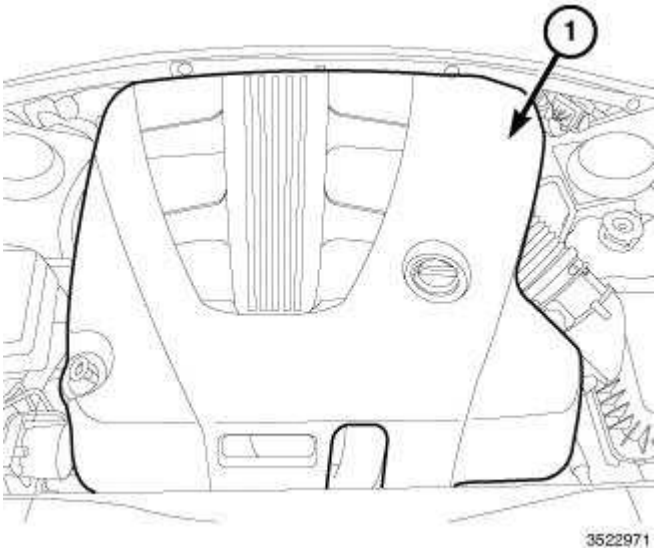


Fig. 413: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

26. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
27. Connect the negative battery cable.
28. Start the engine and check for leaks.

29. Install the engine cover (1).

LEFT BANK

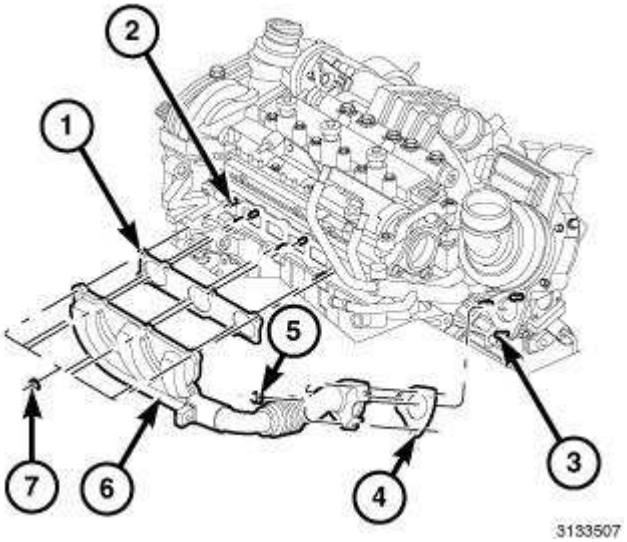


Fig. 414: Exhaust Manifold, Gaskets, Turbocharger, Cylinder Head & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Clean the cylinder head and exhaust manifold sealing surfaces. Refer to **Engine - Standard Procedure**.
2. Install new exhaust manifold gaskets (1 and 4), to the cylinder head (2) and the turbocharger (3).
3. Install the exhaust manifold (6) and the retaining nuts (5 and 7) finger tight.

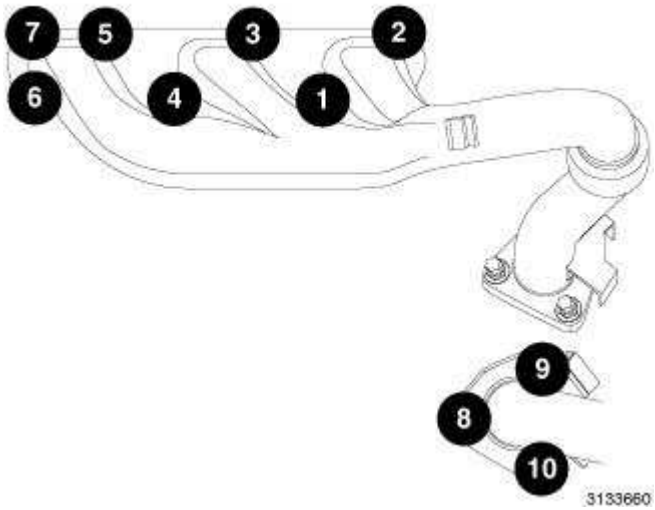


Fig. 415: Left Bank Exhaust Manifold Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the tightening sequence shown in illustration tighten nuts to:
    - Step 1: tighten nuts to 15 N.m (133 in. lbs.).
    - Step 2: Tighten nuts to 40 N.m (30 ft. lbs.).

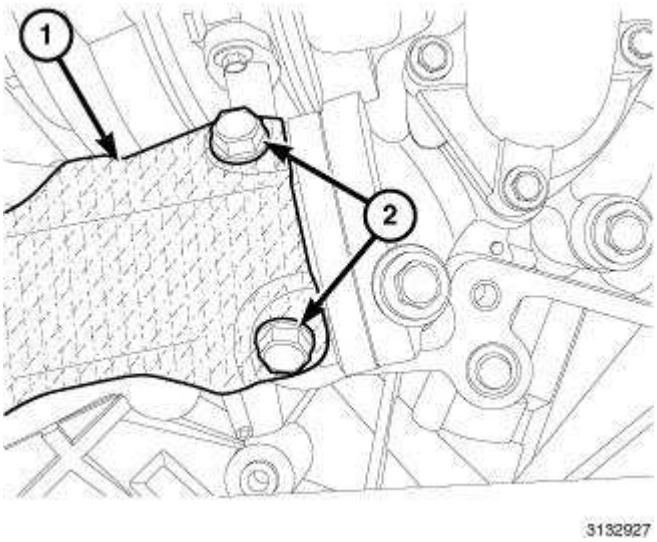


Fig. 416: Exhaust Manifold Pipe To Turbocharger Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the turbocharger-to-cowl extension heat shield.
6. Install the exhaust heat shield (1). Tighten bolt (2) to 15 N.m (133 in. lbs.).

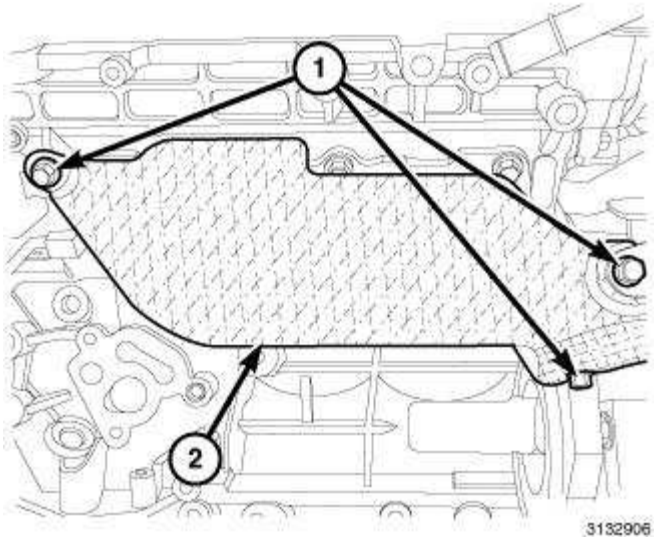


Fig. 417: Left Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the left exhaust manifold heat shield (2). Tighten bolts (1) to 15 N.m (133 in. lbs.).
8. Install the fuel injection pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE,**

INSTALLATION .

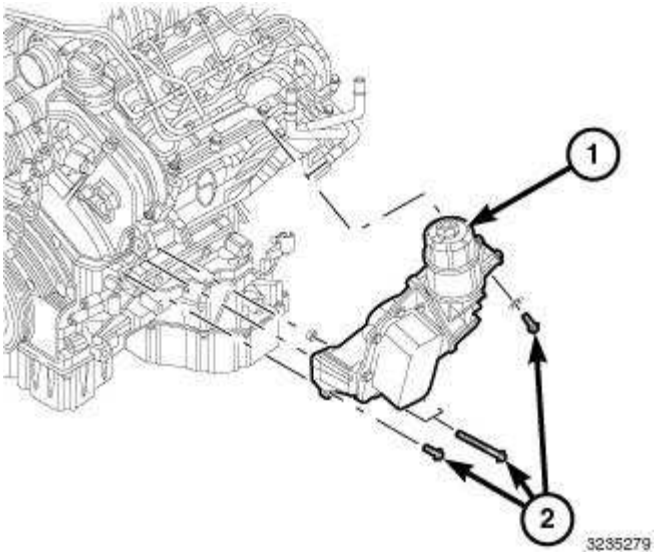


Fig. 418: Oil Cooler Adapter Assembly
Courtesy of CHRYSLER GROUP, LLC

9. Install the oil cooler adapter. Refer to **ADAPTER, OIL COOLER, INSTALLATION**.

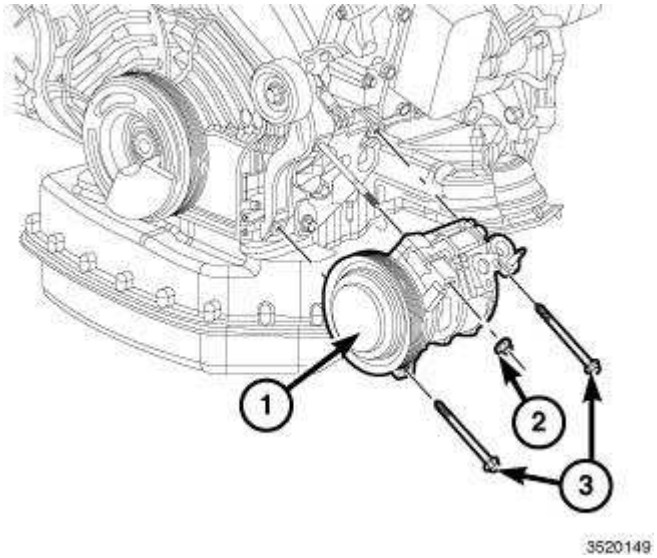


Fig. 419: A/C Compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Install the A/C compressor (1). Tighten bolts (3) to 30 N.m (22 ft. lbs.).
11. Install the A/C compressor mounting stud and tighten to 11 N.m (97 in. lbs.).
12. Install the A/C compressor mounting nut (2) and tighten to 30 N.m (22 ft. lbs.).
13. Connect the A/C compressor wire harness connector.

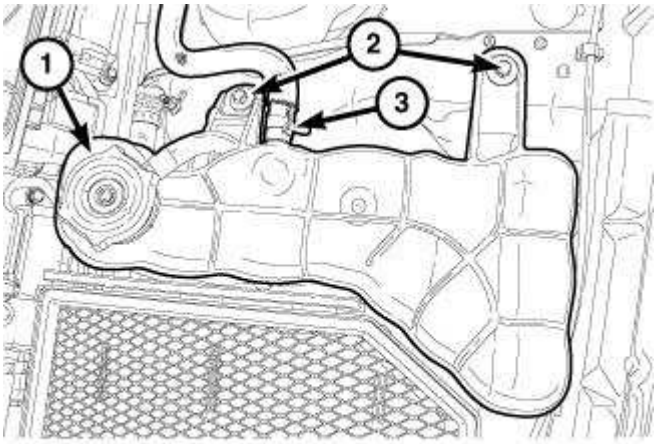


Fig. 420: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

14. Install the coolant recovery bottle. Refer to **BOTTLE, COOLANT RECOVERY, INSTALLATION** .

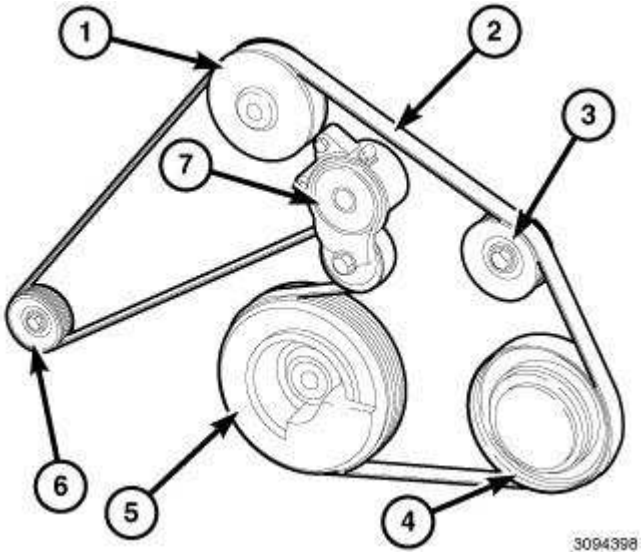


Fig. 421: Pulleys, Tensioner & Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

15. Install the accessory drive belt (2).

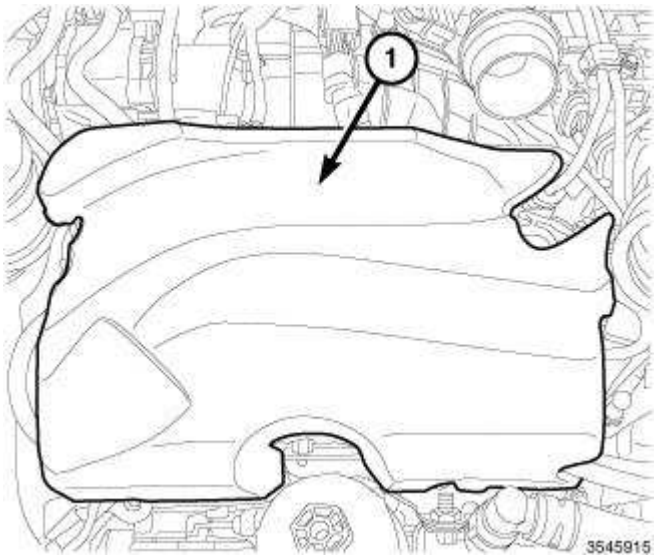


Fig. 422: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

16. Install the left side fuel injector silencer (1).

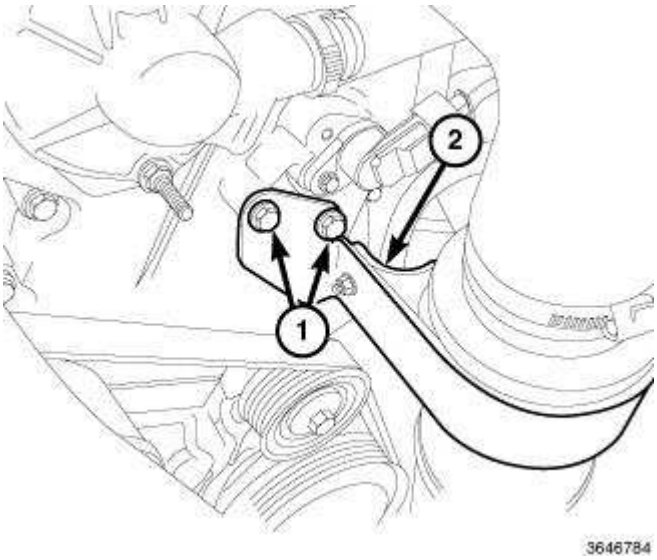


Fig. 423: CAC Hose Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Position the CAC hose and bracket (2) to timing cover. Tighten bolts (1) to 11 N.m (97 in. lbs.).

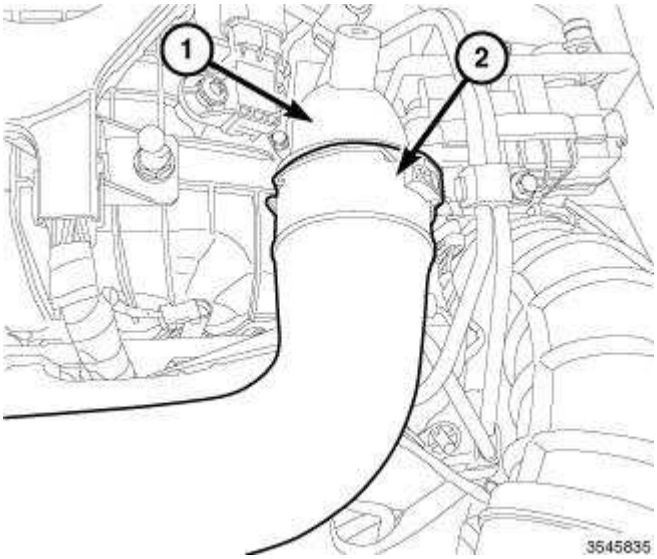


Fig. 424: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

18. Connect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).
19. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
20. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, INSTALLATION** .
21. Lower the vehicle.
22. Install the air cleaner body and intake air tube. Refer to **BODY, AIR CLEANER, INSTALLATION**.

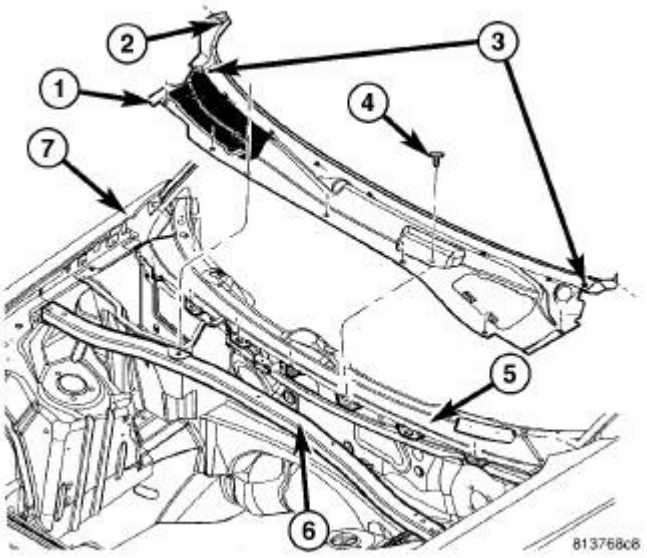


Fig. 425: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

23. Install the rear engine compartment heat shield and securely tighten the fasteners.
24. Install the strut support brace (6). Tighten bolts to 38 N.m (28 ft. lbs.).
25. Install the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .

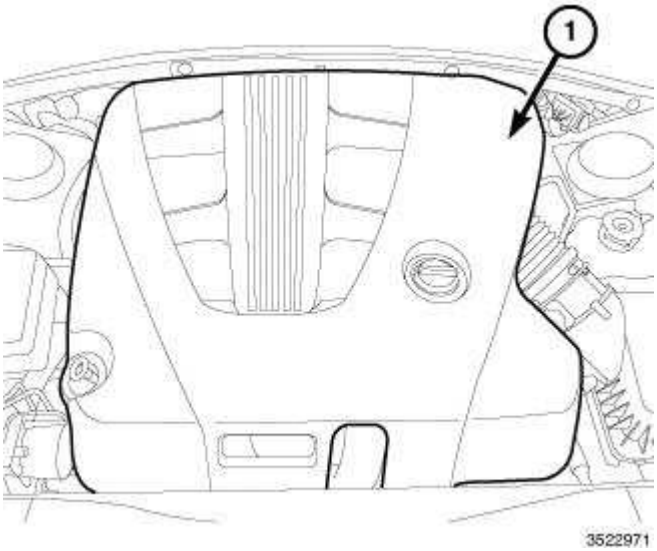


Fig. 426: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

26. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
27. Connect the negative battery cable.
28. Start the engine and check for leaks.
29. Install the engine cover (1).

MANIFOLD, INTAKE

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the turbocharger. Refer to **TURBOCHARGER, REMOVAL**.

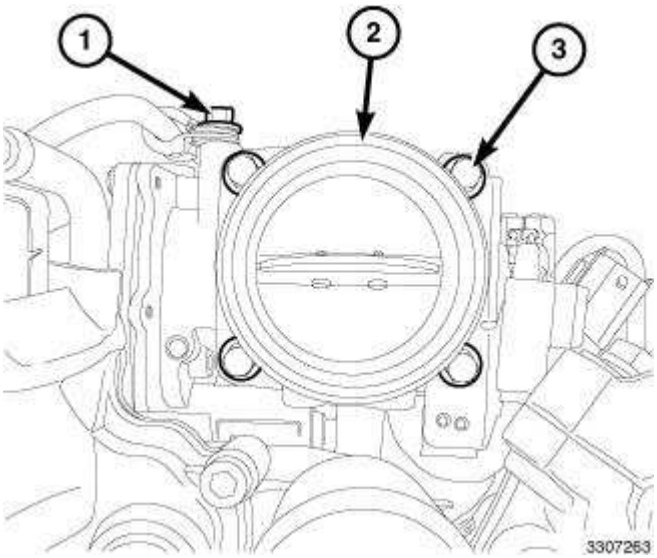


Fig. 427: (EGR) Air Flow Control Valve
Courtesy of CHRYSLER GROUP, LLC

3. Remove the EGR air flow control valve (2). Refer to **VALVE, EXHAUST GAS RECIRCULATION (EGR) AIRFLOW CONTROL, REMOVAL** .
4. Remove the fuel tubes. Refer to **TUBE(S), FUEL, REMOVAL** .
5. Disconnect the engine wire harness connectors.
6. Remove the ball stud fastener, bolts and position aside engine wiring harness.

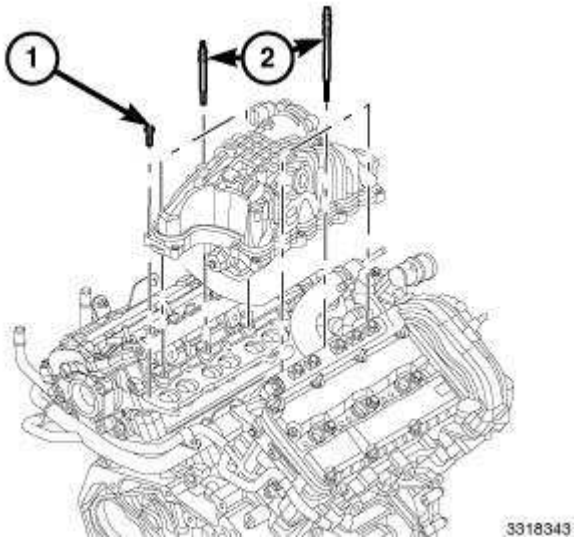


Fig. 428: Glow Plugs & Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do Not rest the intake manifold on the swirl valve actuator. Care must be taken when handling the swirl valve assembly.

7. Remove bolts (1) and the intake manifold.
8. Remove and discard gasket.

INSTALLATION

INSTALLATION

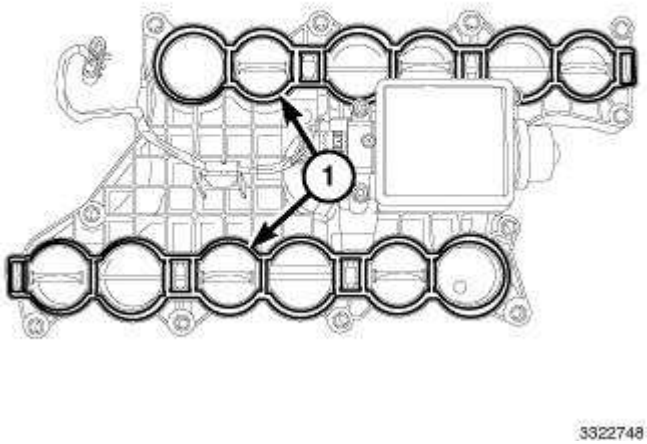


Fig. 429: Intake Manifold Gasket
Courtesy of CHRYSLER GROUP, LLC

1. Clean the gasket sealing surfaces. Refer to **Engine - Standard Procedure**.
2. Install a new intake manifold gasket (1).

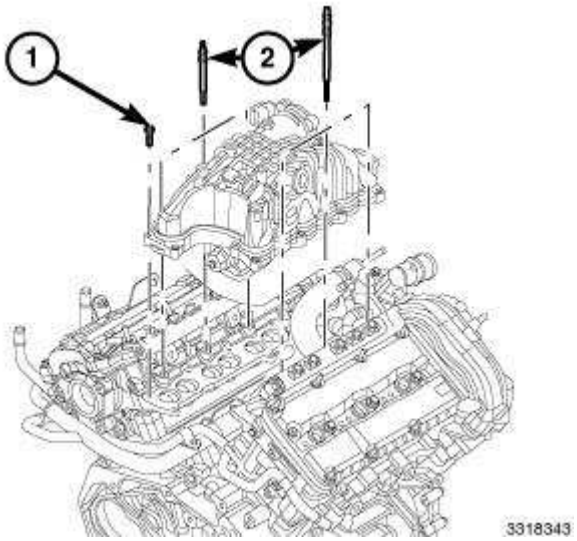


Fig. 430: Glow Plugs & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the intake manifold and tighten bolts finger tight.

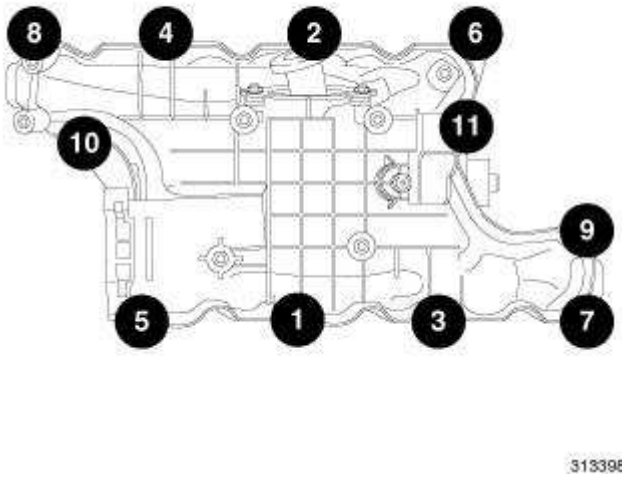


Fig. 431: Intake Manifold Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the tightening sequence shown in illustration, tighten bolts to 12 N.m (106 in. lbs.).

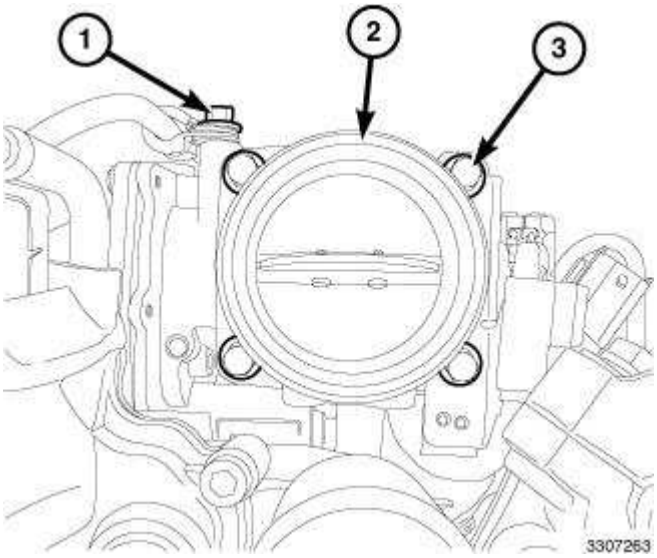


Fig. 432: (EGR) Air Flow Control Valve
Courtesy of CHRYSLER GROUP, LLC

5. Position and properly route and install the engine wiring harness.
6. Install the ball stud fastener and bolts and securely tighten.

NOTE: Fuel tubes are a one time only use and must be replaced anytime they have been removed.

7. Install the fuel tubes. Refer to **TUBE(S), FUEL, INSTALLATION** .
8. Install the EGR air flow control valve (2). Refer to **VALVE, EXHAUST GAS RECIRCULATION (EGR) AIRFLOW CONTROL, INSTALLATION** .
9. Install the turbocharger. Refer to **TURBOCHARGER, INSTALLATION**.
10. Connect the negative battery cable.
11. Start the engine, allow to warm, turn the engine off and inspect for leaks.

TURBOCHARGER SYSTEM

ACTUATOR, TURBOCHARGER

DESCRIPTION

DESCRIPTION

The turbocharger boost pressure servomotor is bolted to the side of the turbocharger housing and is responsible for controlling turbocharger boost pressure. It controls the boost pressure by varying the position of the guide vanes. The servomotor operates in response to a PWM signal from the Powertrain Control Module (PCM).

The turbocharger boost pressure servomotor is serviced with the turbocharger and **is not** serviceable separately. To replace the servomotor, replace the turbocharger. Refer to **TURBOCHARGER, REMOVAL**.

COOLER AND HOSES, CHARGE AIR

DESCRIPTION

DESCRIPTION

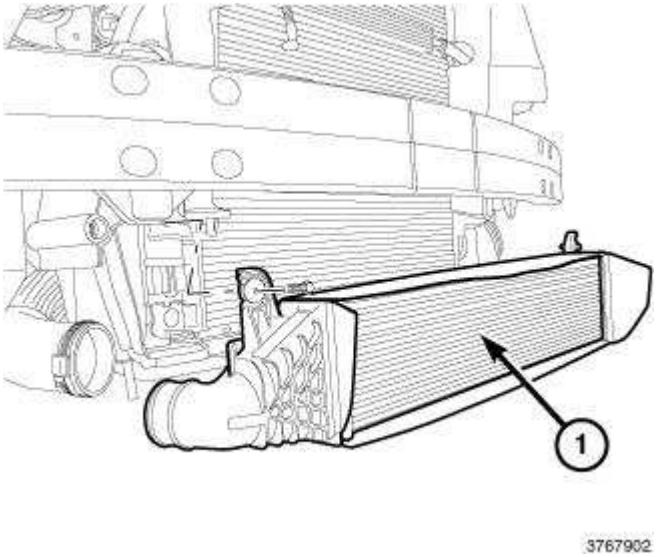


Fig. 433: Charge Air Cooler

Courtesy of CHRYSLER GROUP, LLC

The charge air system consists of a inlet air compressor which is part of the turbocharger housing, charge air cooler (1) located in front of the radiator, and charge air cooler plumbing.

The charge air cooler is a heat exchanger that uses air flow from vehicle motion to dissipate heat from the intake air. As the turbocharger increases air pressure, the air temperature increases. Lowering the intake air temperature increases engine efficiency and power.

REMOVAL

REMOVAL

WARNING: If the engine was just turned off, the air intake system tubes may be hot.

NOTE: Note the location of the rubber air charge cooler to A/C condenser and air charger cooler to radiator air seals. The seals are use to prevent overheating and improve charge air and A/C efficiency.

1. Disconnect the battery negative cable.
2. Raise and support the vehicle.

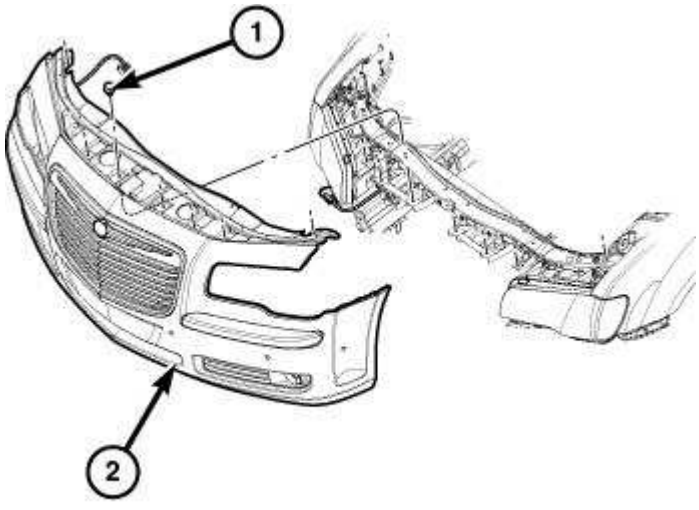


Fig. 434: Front Bumper Fascia & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove the front bumper fascia hardware (1) and the fascia (2). Refer to **FASCIA, FRONT, REMOVAL** .

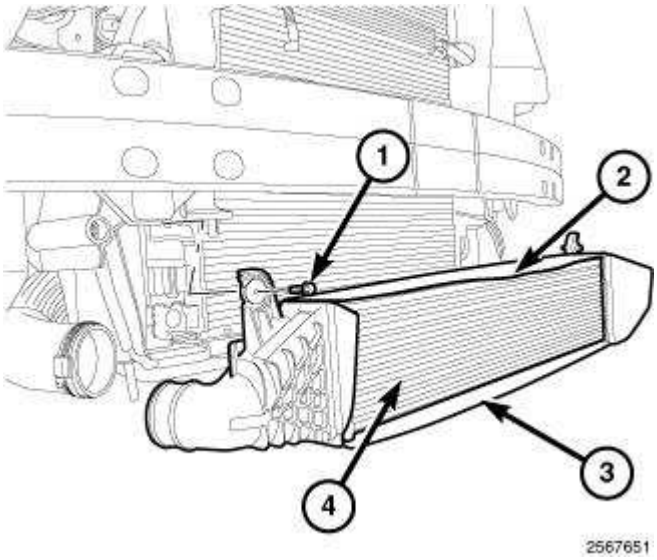


Fig. 435: Charge Air Cooler & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the hoses from the charge air cooler (4).

NOTE: Care must be taken not to damage the charge air cooler fins and the fins of other ancillary cooler components.

5. Remove the two mount bolts (1).
6. Lift the cooler up and then forward to allow the lower locators to clear the mount bushings.

CHARGE AIR COOLER HOSES

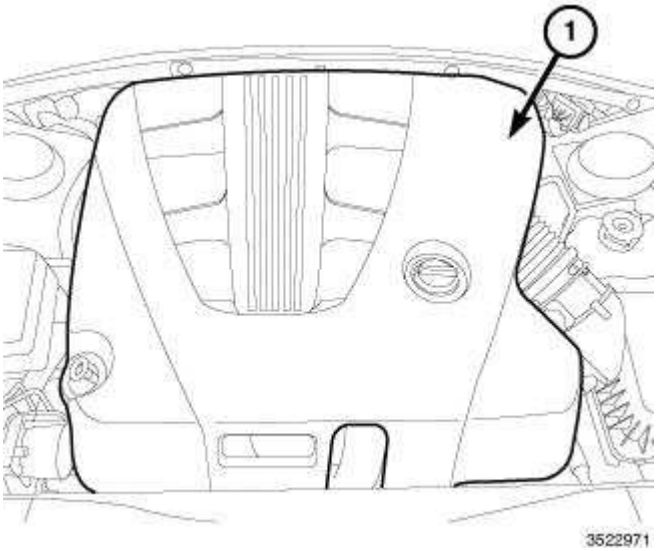


Fig. 436: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine cover (1).

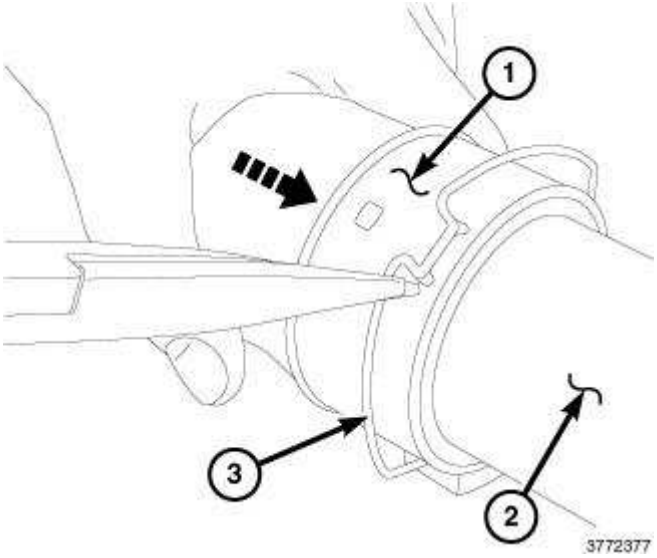


Fig. 437: Charge Air Cooler (CAC) Hose, Flange & Retainer
Courtesy of CHRYSLER GROUP, LLC

2. Remove the Charge Air Cooler (CAC) hose (1) by pushing the hose into the cooler flange (2) while pulling the retainer (3) to the unseated position.

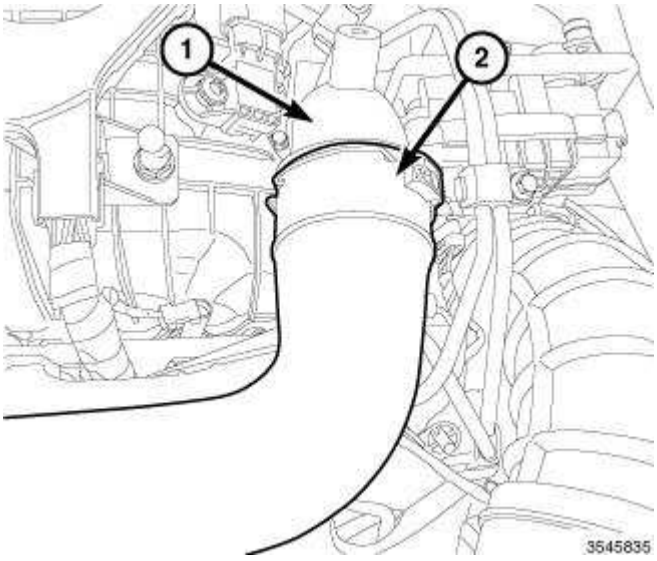


Fig. 438: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the CAC hose (2) from turbocharger (1).

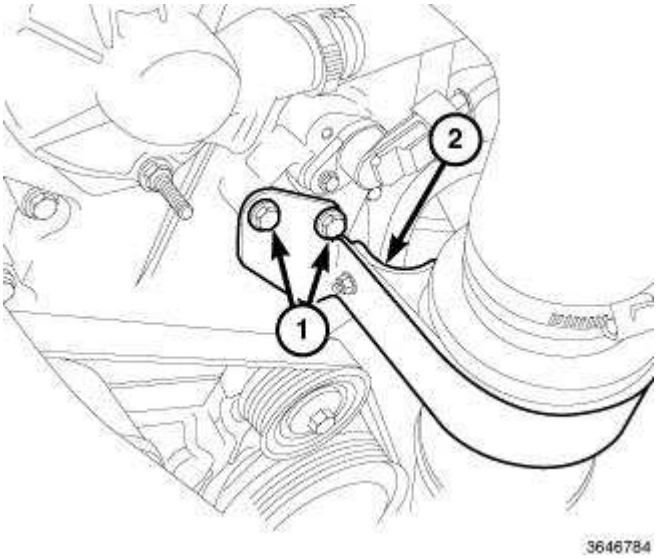


Fig. 439: CAC Hose Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the two CAC bracket to timing cover bolts (1) and set the CAC hose assemble aside.
5. Disconnect and remove the left Charge Air Cooler (CAC) hose as an assembly.

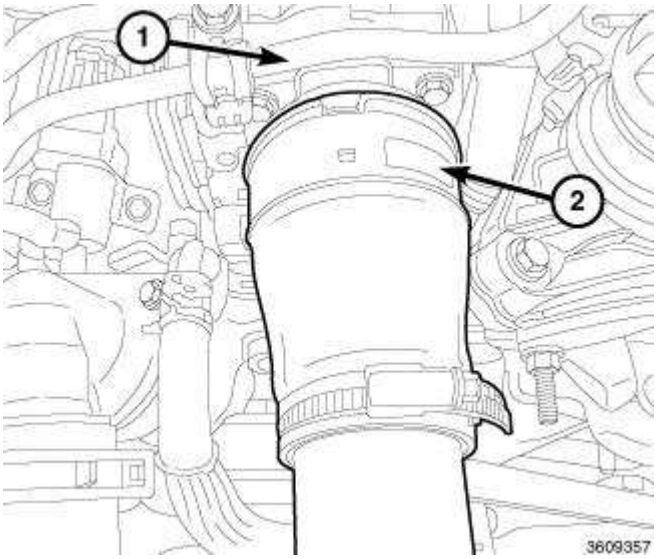


Fig. 440: EGR Air Flow Control Valve & CAC Hose
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the right CAC hose (2) from the EGR air flow control valve.
7. Remove bolt securing the right CAC hose to lower timing cover.
8. Disconnect and remove the right CAC hose from the cooler.

INSPECTION

INSPECTION

Visually inspect the charge air cooler and plumbing for cracks, holes, loose clamps, or damage. Inspect the tubes, fins, and welds for tears, breaks, or other damage. Replace the charge air cooler if damage is found.

INSTALLATION

INSTALLATION

NOTE: Note the location of the rubber air charge cooler to A/C condenser and air charger cooler to radiator air seals. The seals are use to prevent overheating and improve charge air and A/C efficiency.

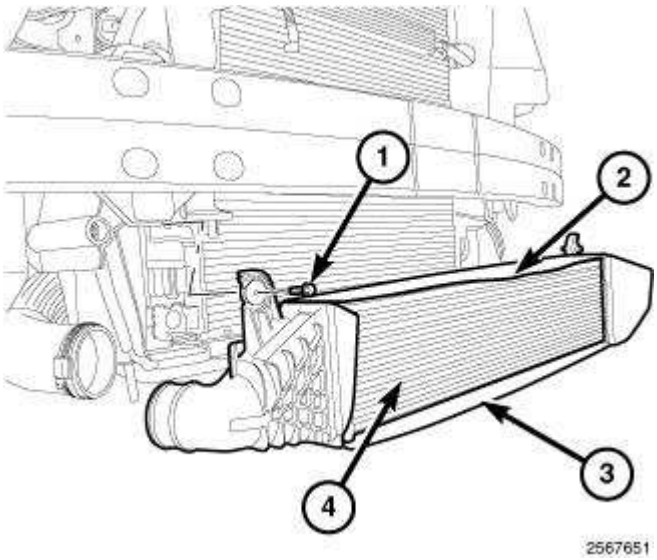


Fig. 441: Charge Air Cooler & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the charge air cooler (2) into the vehicle.
2. Press the charge air cooler to the radiator support till it clicks into place.
3. Install the two cooler bolts (1). Tighten the bolts to 14 N.m (124 in. lbs.)
4. Install the outlet hose to the charge air cooler with the clamp in position. Tighten the outlet clamp to 11 N.m (95 in. lbs.)

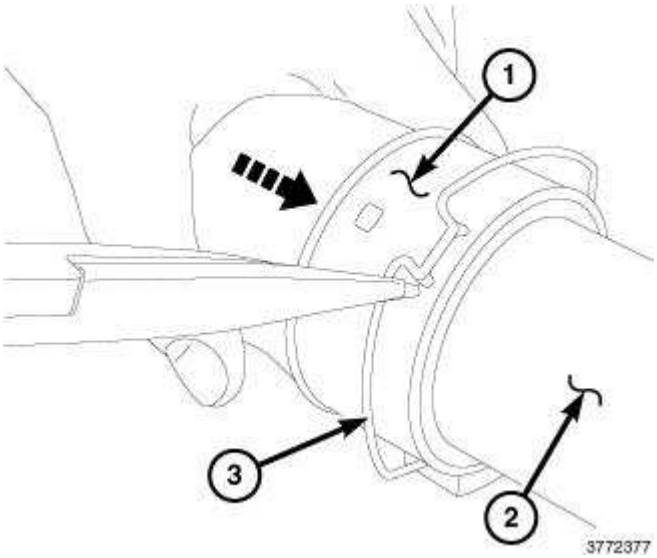


Fig. 442: Charge Air Cooler (CAC) Hose, Flange & Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make sure the hose is fully seated before locking the hose retainer.

5. Install the inlet hose (1) onto the cooler inlet (2) and lock the hose retainer (3) into position.

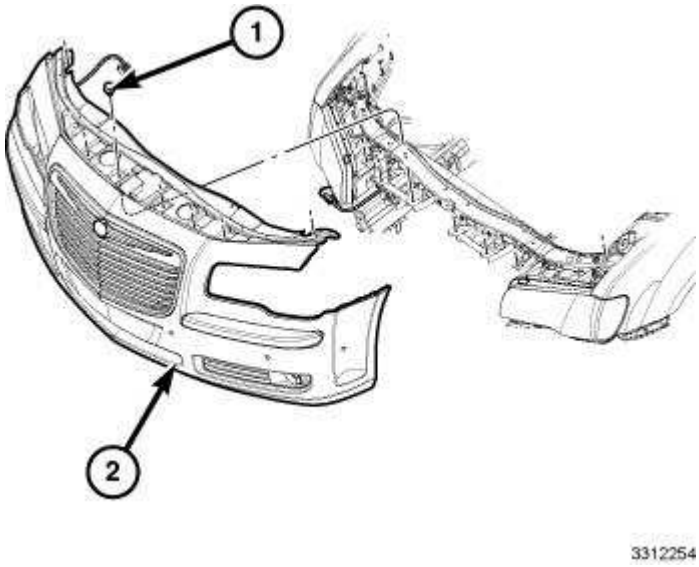


Fig. 443: Front Bumper Fascia & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Install the front bumper fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
7. Lower the vehicle.
8. Connect the battery negative cable.
9. Start engine and check for leaks.

CHARGE AIR COOLER HOSES

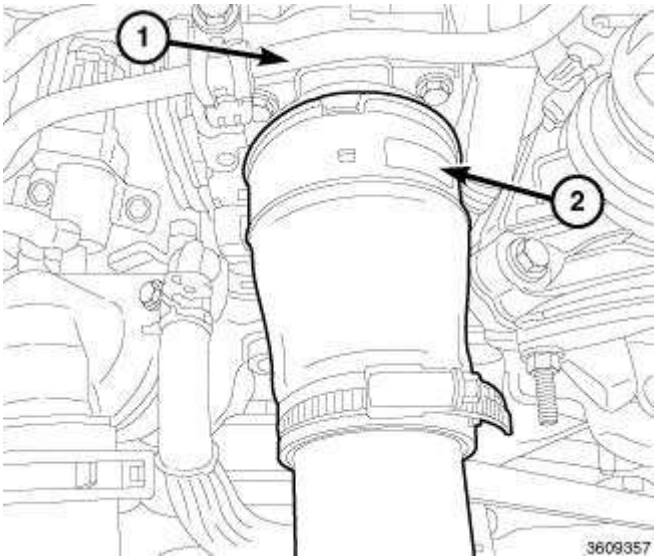


Fig. 444: EGR Air Flow Control Valve & CAC Hose
Courtesy of CHRYSLER GROUP, LLC

1. Install and connect the right Charge Air Cooler (CAC) hose to the cooler.
2. Install the bolt that secures the CAC hose to the timing cover and tighten to 10 N.m (88.5 in. lbs.).
3. Connect the right CAC hose (2) to the EGR air flow control valve.

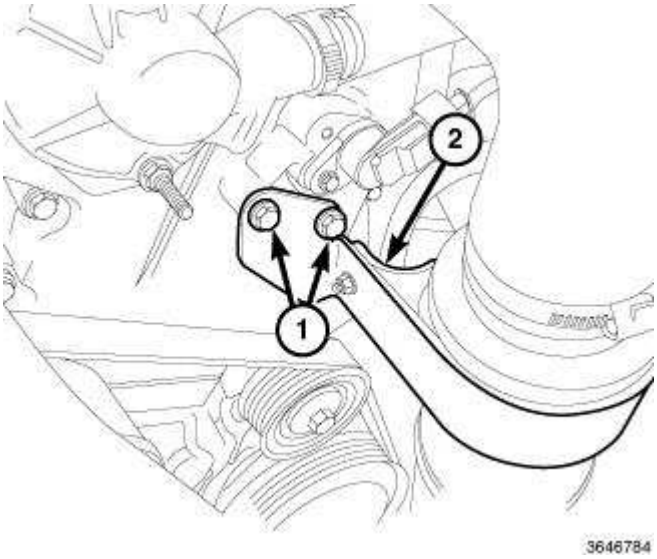


Fig. 445: CAC Hose Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install and connect the left CAC hose as an assembly.
5. Install the two bolts (1) securing the CAC hose and bracket (2) to timing cover and tighten to 10 N.m (88.5 in. lbs.).

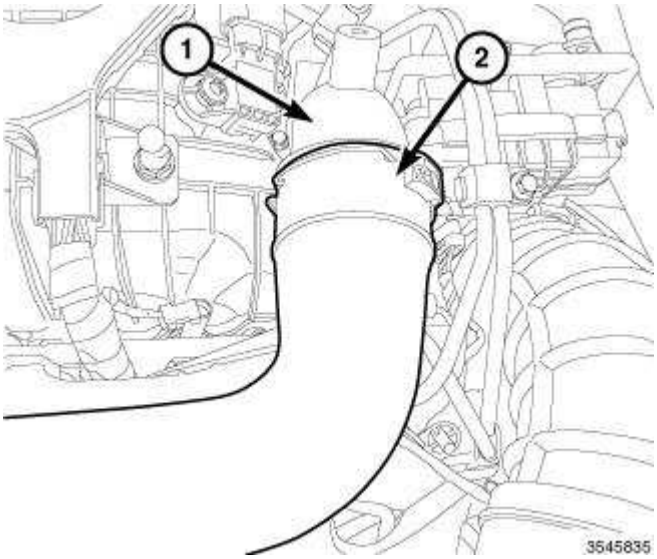


Fig. 446: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

6. Connect the CAC hose (2) to the turbocharger (1).

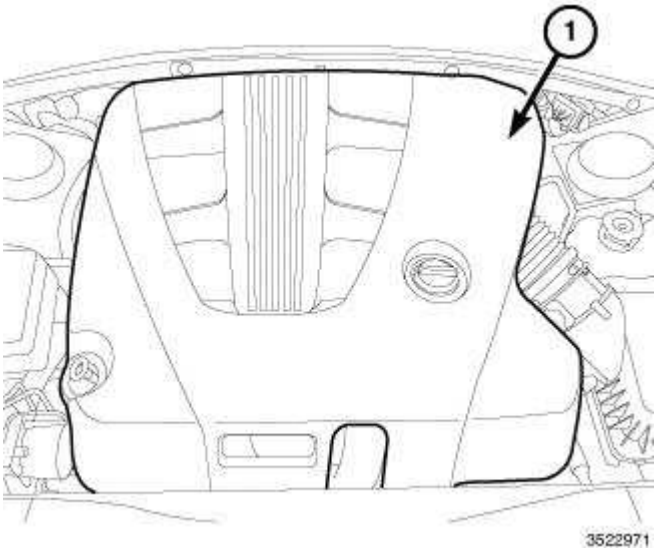


Fig. 447: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

7. Install the engine cover (1).

TURBOCHARGER

DESCRIPTION

DESCRIPTION

CAUTION: The turbocharger is a performance part and must not be tampered with. The actuator bracket is an integral part of the turbocharger. Tampering with the actuator or other components can reduce durability by increasing cylinder pressure and thermal loading due to incorrect inlet and exhaust manifold pressure. Poor fuel economy and failure to meet regulatory emissions laws may result. Increasing the turbocharger boost WILL NOT increase engine power.

The turbocharger used on this vehicle is of the variable turbine type. These turbochargers use the entire exhaust energy to boost efficiency of the turbocharger and the engine.

The advantages of a turbocharger with variable turbine geometry are:

- Higher charge pressure already in the lower and in upper engine speed ranges.
- Higher torque as a result of improved cylinder charge.
- Reduction in exhaust emissions as a result of an improvement in the air supply of the engine.
- Increased power output as a result of the higher charge pressure combined with a reduced exhaust back pressure and thus improved charge cycle.

OPERATION

OPERATION

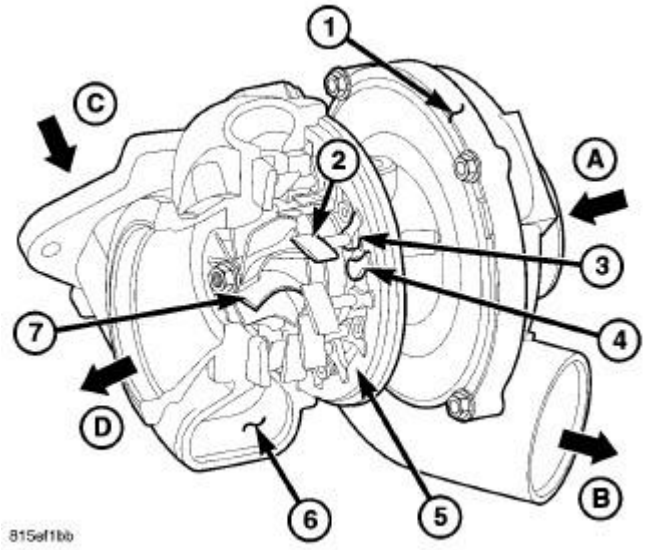


Fig. 448: Turbocharger Components
Courtesy of CHRYSLER GROUP, LLC

1 - COMPRESSOR HOUSING
2 - GUIDE VANE
3 - GUIDE STUD OF GUIDE VANE

4 - GUIDE STUD OF CONTROL LINKAGE
5- ADJUSTING RING
6 - TURBINE HOUSING
7 - TURBINE WHEEL
A - TURBO INLET (FRESH AIR)
B - TURBO OUTLET (COMPRESSED AIR)
C - EXHAUST GASES TO TURBINE WHEEL
D - EXHAUST OUTLET

The exhaust gases of the engine are directed through the exhaust manifold into the turbine housing (6) onto the turbine wheel (7). The flow energy of the exhaust gases cause the turbine wheel (7) to rotate. Consequently, the compressor wheel, which is connected through the turbine shaft with the turbine wheel (7), is driven at the same speed. The fresh air (A) inducted by the compressor wheel is compressed and passed to the engine.

The charge pressure is controlled by varying the position of the guide vanes (2). The guide stud (3) of the control linkage of the boost pressure actuator turns the adjusting ring (5) in the turbine housing (6). As a result, all the guide vanes (3) whose guide studs (4) likewise mesh into the adjusting ring (5), are also turned.

At low speeds, the flow cross-section is reduced by closing the guide vanes (2). Consequently the speed at which the exhaust gas impacts on the turbine wheel (7) is increased, as a result of which the speed of the turbocharger and thus the charge pressure rises.

At high engine speeds the guide vanes (2) are increasingly opened and the flow cross-section is thus enlarged, as a result of which the speed of the turbocharger reduces and the charge pressure drops.

The turbocharger guide vanes are controlled by the electronic actuator. The Powertrain Control Module (PCM) monitors the boost and charge air changes to the turbocharger system during operation. The PCM sends a PWM signal to the actuator. The actuator will then respond to the signal adjusting the guide vanes.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - TURBOCHARGER

The turbocharger, charge air cooler and exhaust gas recirculation systems operate with one another and must be tested as a complete system. It is important that all components of the air intake system be thoroughly tested any time a symptom is present for one of these components.

It is typical to notice a small amount of engine oil in the air intake system. This comes from the crankcase ventilation and may weep out of hose connections that are not clamped properly. This does not mean that the turbocharger requires replacement.

If DTC's or the performance of the vehicle lead to the determination that the boost pressure and/or mass air flow values are out of range, the systems listed below should be inspected. If a DTC for the

inlet or intake air temperature has been stored, refer to the appropriate diagnostics.

NOTE: Also a continuous air leak may result in an intermittent symptom. The Powertrain Control Module (PCM) monitors the sensor readings continuously but only sets a DTC or reduces the engine torque when these readings are outside of the tolerances, which may occur under certain driving conditions.

Inspect the following:

- Air intake system plumbing: Loose or broken hoses or fittings may create an air leak resulting in a loss of pressure and mass air flow. (A smoke machine does not create enough pressure to find a leak in the air intake system).
- Turbo Resonator: Inspect the resonator (muffler, connected to the turbocharger) for air leaks at the seam between the two shells.
- Charge Air Cooler: A charge air cooler damaged by tools or external debris may leak air.
- Exhaust Gas Recirculation (EGR) valve: A sticking EGR valve influences the mass air flow causing implausibility with MAF, which displays one or more DTC's. Don't replace the EGR valve if no DTC's are present. Use the actuator test in the scan tool to move the EGR valve at idle speed. The MAF value should alternate between 500 to 600 mg/strk at 5% ratio (almost closed) and 200 to 300 mg/strk at 95% ratio (almost opened) when the "EGR Positioner" is being actuated by the scan tool.
- Mass Air Flow Sensor (MAF): The mass air flow, measured and provided by the MAF is critical for calculations performed by the PCM and may result in several DTC's related to the air intake system if not accurate.
- Boost Pressure Sensor: Make sure that the correct part number, or superseding part number, is installed. Refer to MOPAR® for the correct part number information.
- Turbocharger: Refer to **TURBOCHARGER DIAGNOSTIC PROCEDURE**. Consider that an operating turbocharger creates a flow sound, which is normal and does not require replacement. Other sounds like whistling are potentially caused by the resonator or improper line connections.

TURBOCHARGER DIAGNOSTIC PROCEDURE

1. Visually inspect all the blades of the turbocharger compressor and turbine wheel for damage which may have been caused by foreign particles. For example if the air filter was improperly installed or an incorrect air filter was installed.

   CAUTION: Do NOT try to move the actuator mechanism by pushing or pulling the connecting rod. There is a worm gear attached to the actuator mechanism, which doesn't allow any movement from its output side.

2. If the actuator mechanism doesn't move at all check power and ground supply of the actuator.
3. If the actuator mechanism doesn't move even though the electrical connection has been verified or moves erratically the turbocharger assembly is defective and must be replaced.

REMOVAL

REMOVAL

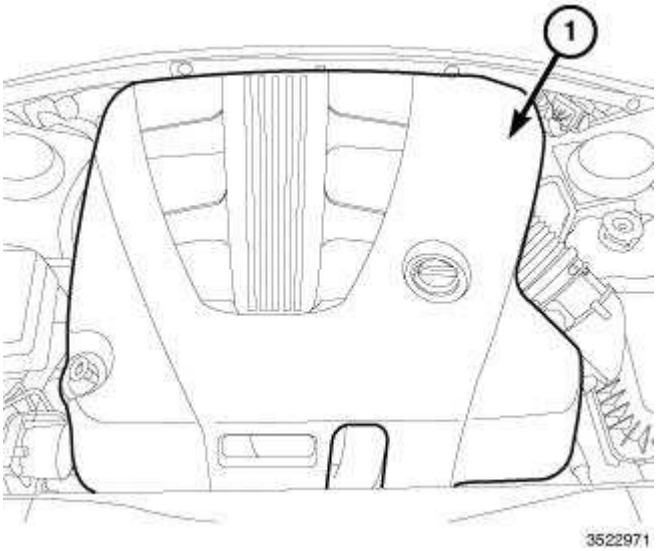


Fig. 449: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery.
2. Remove the engine cover (1).

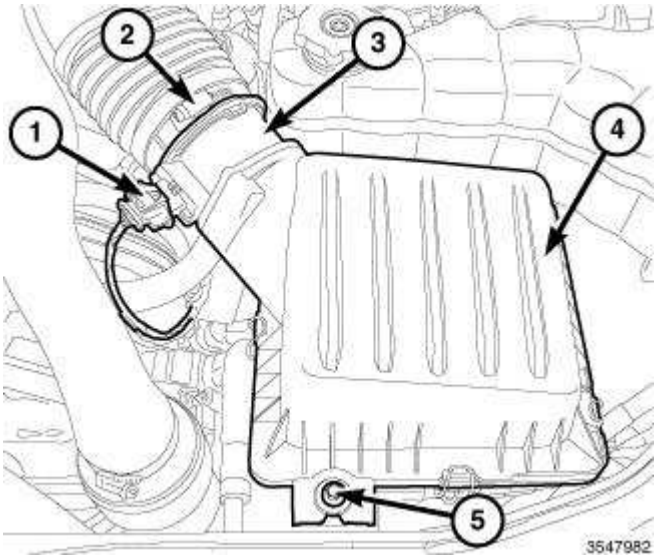


Fig. 450: Mass Air Flow (MAF) Sensor, Connector, Clamp, Air Cleaner Body & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, REMOVAL**.

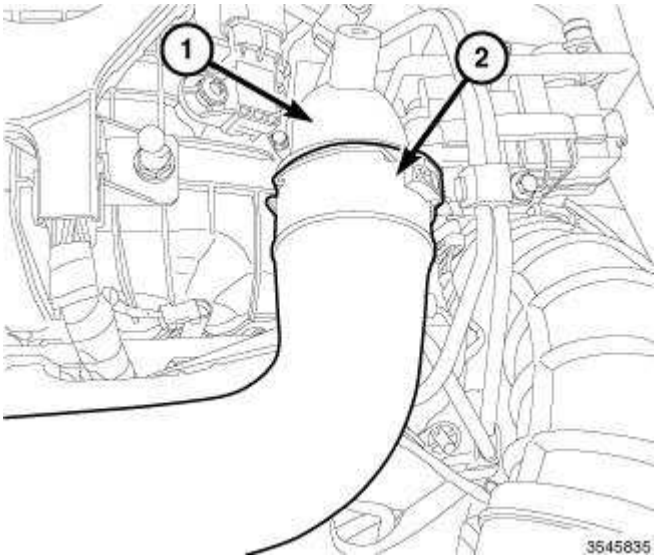


Fig. 451: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).
5. Remove the CAC hose at the resonator.
6. Raise and support vehicle.

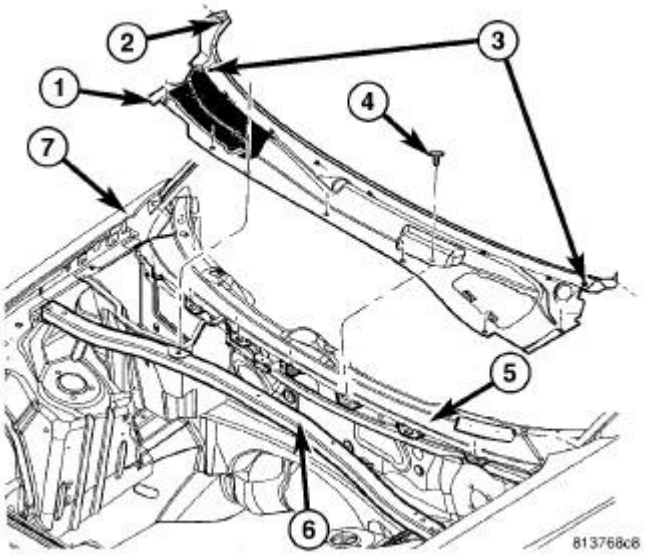


Fig. 452: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Remove the cowl. Refer to **COVER, COWL PANEL, REMOVAL** .

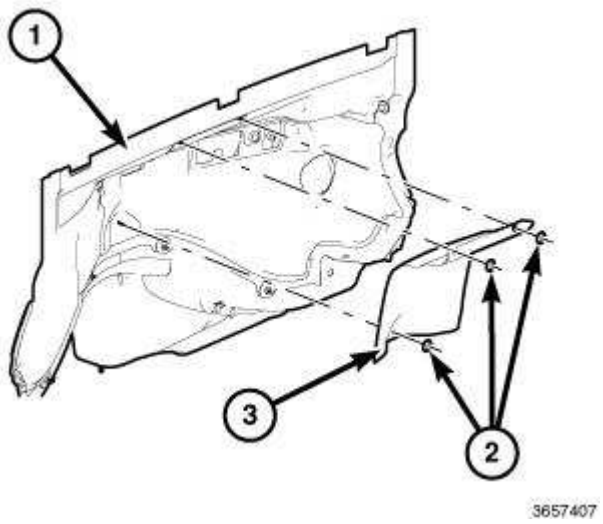


Fig. 453: Dash Extension, Heatshield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Remove the heatshield (3) from the dash extension (1).

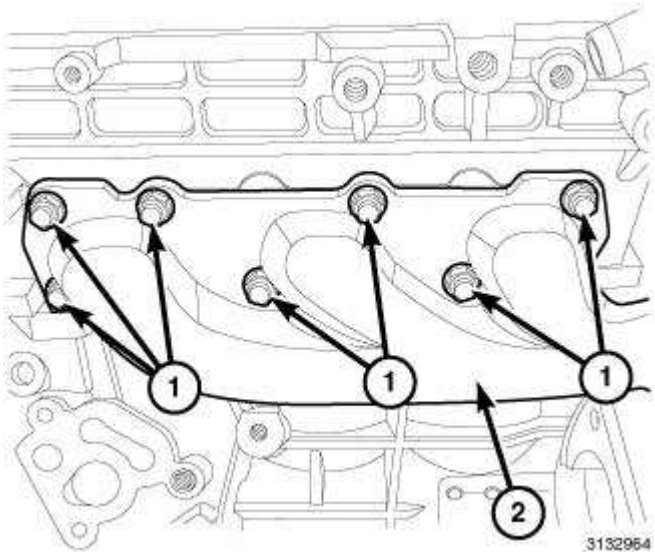


Fig. 454: Left Exhausts Manifold & Nuts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the left side exhaust manifold. Refer to **MANIFOLD, EXHAUST, REMOVAL**.

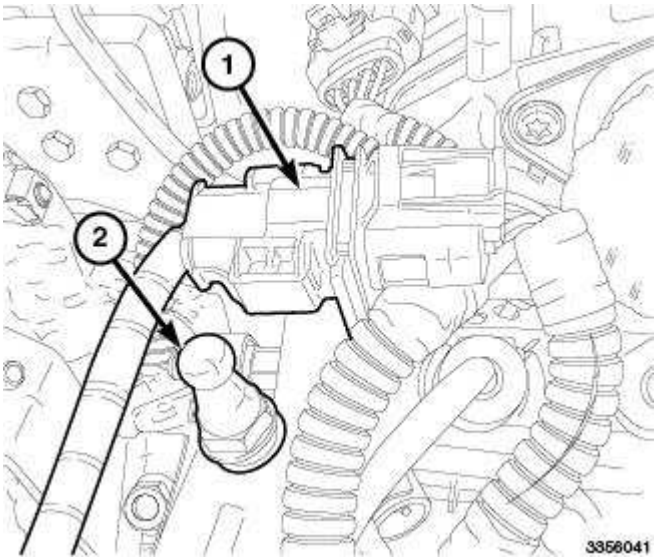


Fig. 455: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the O2 sensor wiring harness connector (1).
11. Remove the upper transmission indicator tube ball stud fastener (2).
12. Remove the transmission oil indicator tube mounting bracket.

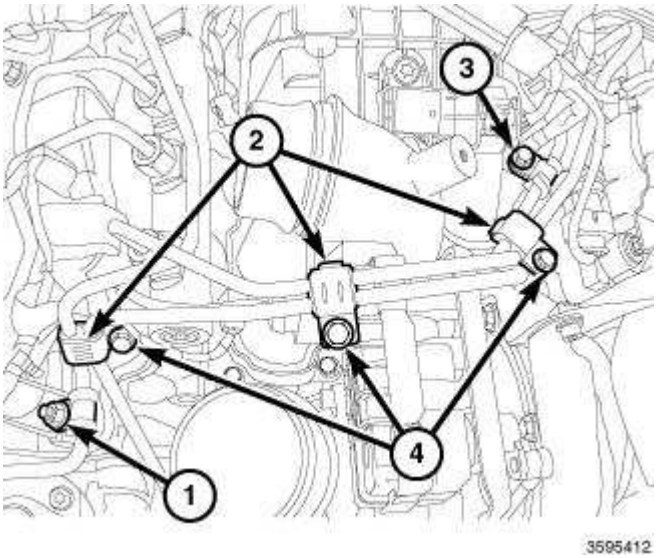


Fig. 456: Fuel Tube Securing Bolts & Bracket
Courtesy of CHRYSLER GROUP, LLC

13. Remove nut (1) securing the fuel tube.
14. Remove bolt (3) securing the fuel tube.
15. Remove bolts (4) and the bracket (2) securing the fuel tubes.

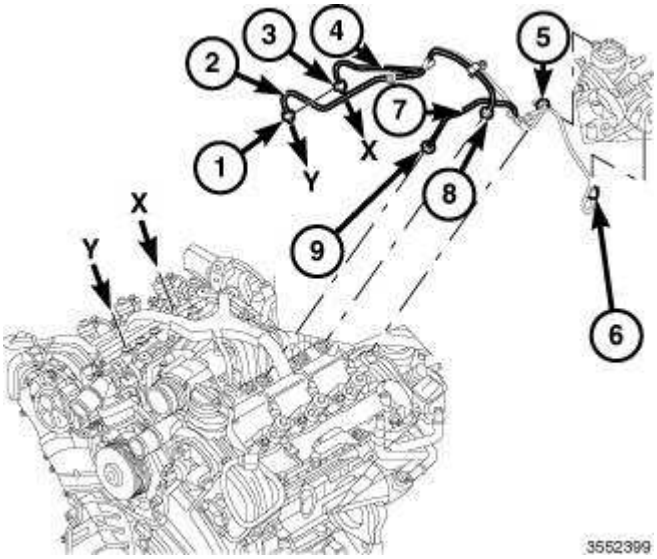


Fig. 457: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fuel lines are a one time use only. The fuel lines must be discarded and a new line must be installed.

16. Loosen union nuts (3, 8) and remove the high pressure fuel crossover tube (4) and discard fuel tube.
17. Loosen union nuts (6, 9) and remove the left high pressure fuel tube (7) and discard fuel tube.

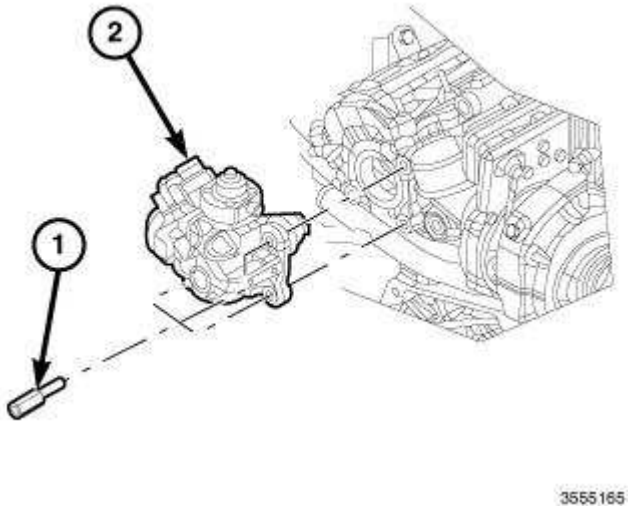


Fig. 458: Fuel Injection Pump
Courtesy of CHRYSLER GROUP, LLC

18. Remove the fuel injection pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, REMOVAL** .

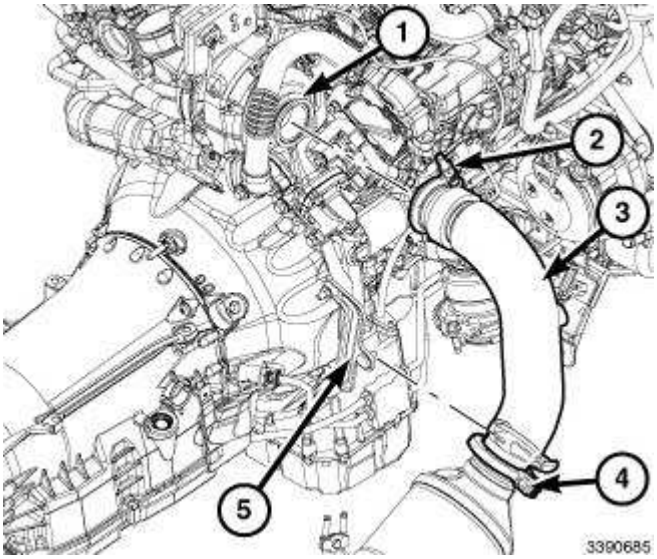


Fig. 459: Turbocharger Outlet, Exhaust Down Pipe & Clamps
Courtesy of CHRYSLER GROUP, LLC

19. Disconnect the turbocharger actuator electrical connector.
20. Loosen the clamp (2) for the exhaust down pipe (4) from the turbocharger outlet (1) and separate the downpipe from the outlet flange.
21. Raise and support the vehicle.
22. Loosen the nut that mounts the downpipe (3) to the transmission mount bracket (5).
23. Loosen the upper Diesel Particulate Filter (DPF) clamp (4) from the down pipe (3).
24. Lower the vehicle.
25. Remove the down pipe from the engine compartment.

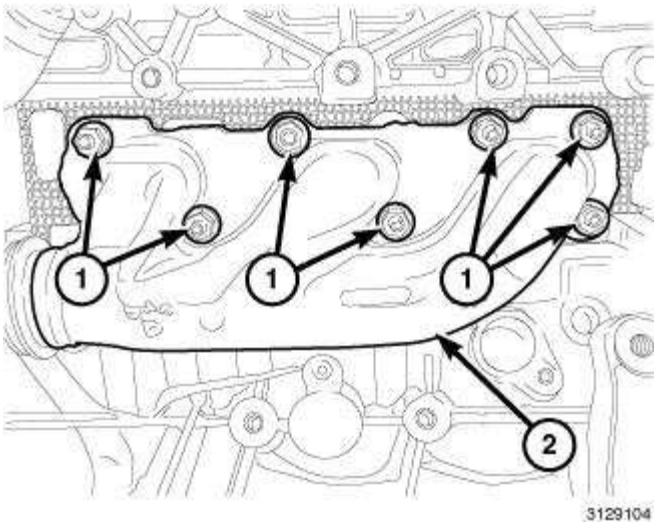


Fig. 460: Right Exhaust Manifold & Nuts
Courtesy of CHRYSLER GROUP, LLC

26. Remove the right side exhaust manifold (2). Refer to **MANIFOLD, EXHAUST, REMOVAL**.

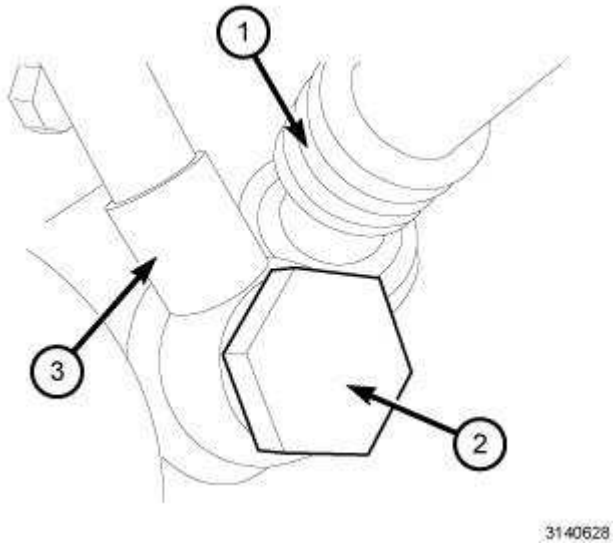


Fig. 461: Upper Banjo Bolt & Turbocharger Supply Lines
Courtesy of CHRYSLER GROUP, LLC

27. Remove the banjo bolt (2) at the engine block for the turbocharger supply line (3).

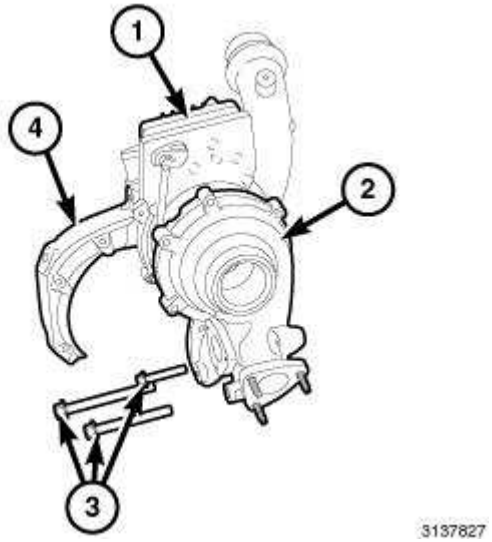


Fig. 462: Actuator, Turbo, Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

28. Remove the turbo mounting bolts (3).

NOTE: The turbocharger oil return line is fitted into a rubber grommet on the engine block. Care must be used when removing the turbocharger, that the return line is not damaged.

29. With care, lift the turbo upwards and away from the engine block, to remove the turbocharger oil return tube from the engine block.
30. If needed, remove the heat shield (4).
31. If needed, remove the actuator (1).

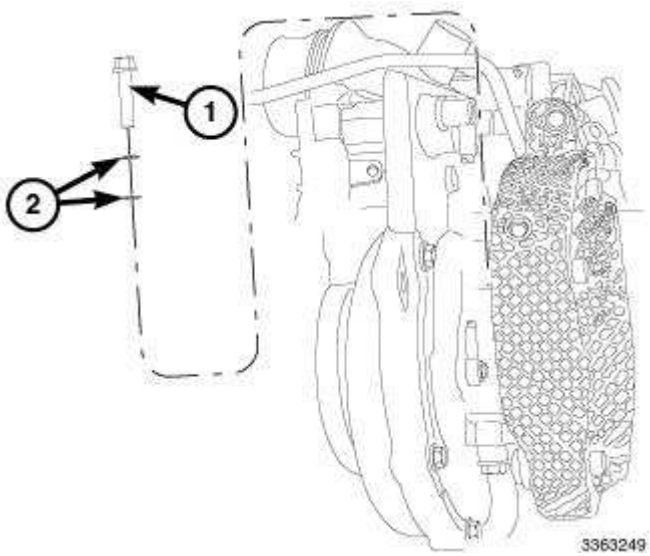


Fig. 463: Upper Turbocharger Supply Line Banjo Bolt & Copper Washers
Courtesy of CHRYSLER GROUP, LLC

32. Remove the upper turbocharger supply line banjo bolt (1).
33. Remove the supply line from the turbocharger.

INSPECTION

INSPECTION

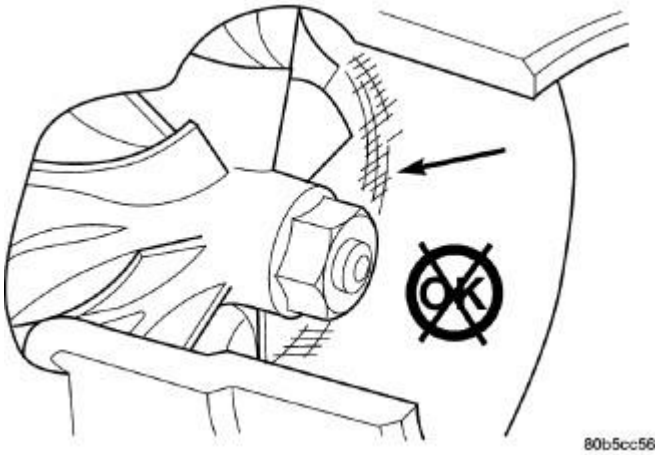


Fig. 464: Inspect Compressor Housing For Impeller Rubbing Condition
Courtesy of CHRYSLER GROUP, LLC

Visually inspect the turbocharger and exhaust manifold gasket surfaces. Replace stripped or eroded mounting studs.

1. Visually inspect the turbocharger for cracks. The following cracks are NOT acceptable:
   - Cracks in the turbine and compressor housing that go completely through.
   - Cracks in the mounting flange that are longer than 15 mm (0.6 in.).
   - Cracks in the mounting flange that intersect bolt through-holes.
   - Two (2) Cracks in the mounting flange that are closer than 6.4 mm (0.25 in.) together.
2. Visually inspect the impeller and compressor wheel fins for nicks, cracks, or chips. Note: Some impellers may have a factory placed paint mark which, after normal operation, appears to be a crack. Remove this mark with a suitable solvent to verify that it is not a crack.
3. Visually inspect the turbocharger compressor housing for an impeller rubbing condition. Replace the turbocharger if the condition exists.

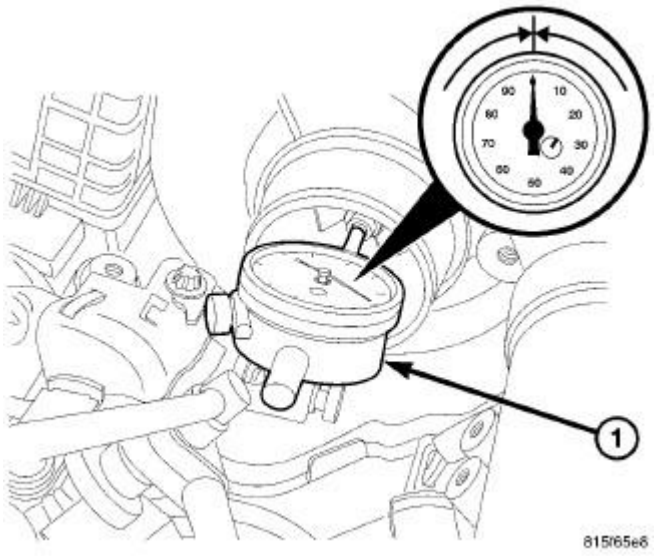


Fig. 465: Measuring Turbocharger End Play
Courtesy of CHRYSLER GROUP, LLC

1 - DIAL INDICATOR

4. Measure the turbocharger end play:
   1. Install a dial indicator (1) as shown in illustration. Zero the indicator at one end of travel.
   2. Move the impeller shaft fore and aft and record the measurement. Allowable end play is 0.026 mm (0.0001 in.) MIN. and 0.127 mm (0.005 in.) MAX. If the recorded measurement falls outside these parameters, replace the turbocharger assembly.

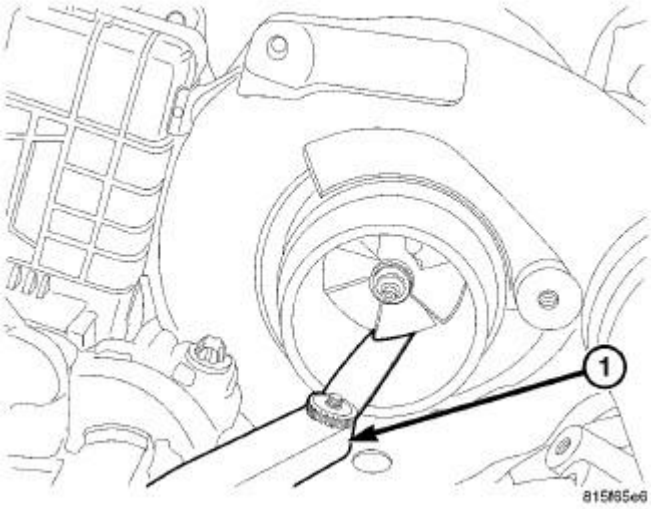


Fig. 466: Measuring Turbocharger Radial Bearing Clearance
Courtesy of CHRYSLER GROUP, LLC

1 - FEELER GAGE

5. Measure the turbocharger bearing radial clearance:
    1. Insert a narrow blade or wire style feeler gauge (1) between the compressor wheel and the housing.
    2. Gently push the compressor wheel toward the housing and record the clearance.
    3. With the feeler gauge in the same location, gently push the compressor wheel away from the housing and again record the clearance.
    4. Subtract the smaller clearance from the larger clearance. This is the radial bearing clearance.
    5. Allowable radial bearing clearance is 0.076 mm (0.003 in.) MIN. and 0.102 mm (0.040 in.) MAX. If the recorded measurement falls outside these specifications, replace the turbocharger assembly.

INSTALLATION

INSTALLATION

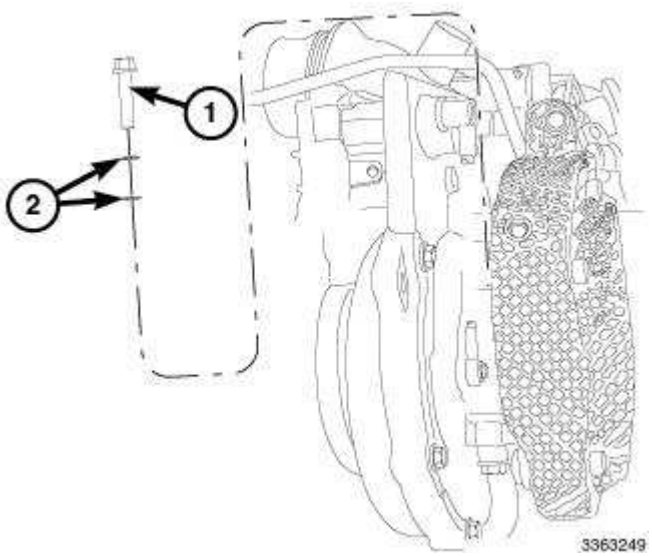


Fig. 467: Upper Turbocharger Supply Line Banjo Bolt & Copper Washers
Courtesy of CHRYSLER GROUP, LLC

1. Install new copper washers (2) for the oil supply line at the turbocharger. **Loosely** install the banjo bolt.

   NOTE: Do to tight clearances. To aid in installation. Use a petroleum based gel to hold a new copper washer to the engine block to allow installation of the oil supply line banjo bolt when the turbocharger is positioned into place.

2. Using a new copper washer for the oil supply line. Apply a petroleum base gel to one side of the washer and press it into the engine block side of the turbocharger supply port.

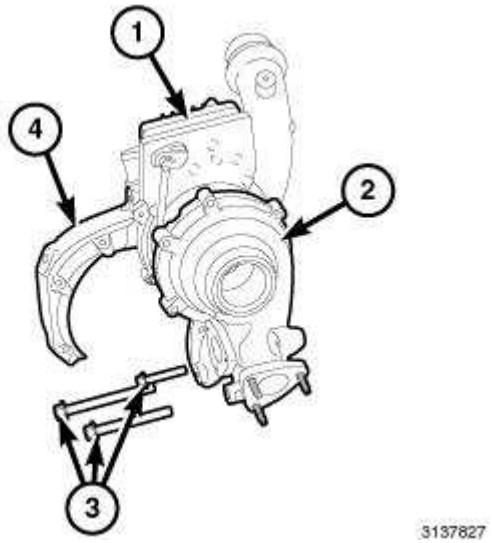


Fig. 468: Actuator, Turbo, Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install new oil return line grommet into the engine block.
4. Using care, position the turbo on to the engine block while guiding the oil return tube into the grommet.
5. Install the M10 mounting bolts to the engine block. Tighten M10 bolts to 55 N.m (41 ft. lbs.).
6. Install the M8 mounting bolt to the cylinder head. Tighten M8 bolts to 25 N.m (18 ft. lbs.).

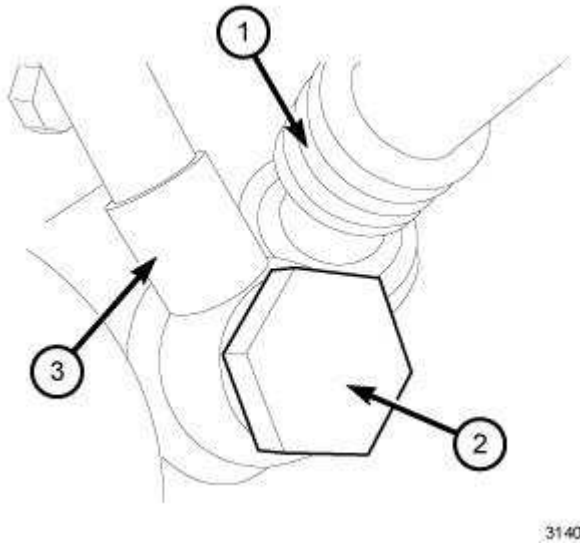


Fig. 469: Upper Banjo Bolt & Turbocharger Supply Lines
Courtesy of CHRYSLER GROUP, LLC

7. Install a new copper washer onto the supply line banjo bolt (2).
8. Tighten the oil supply line banjo bolt (2) at the engine block to 35 N.m (26 ft. lbs.).
9. Tighten the upper banjo bolt (1) to 25 N.m (18 ft. lbs.).

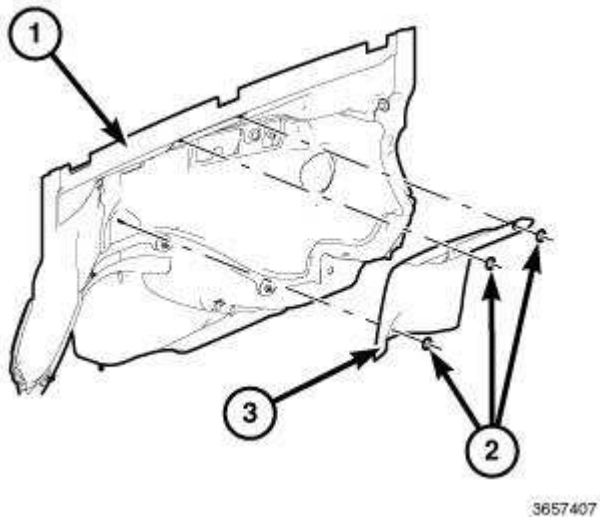


Fig. 470: Dash Extension, Heatshield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Install the dash extension heat shield (3). Tighten the nuts (2) to 3 N.m (27 in. lbs.).

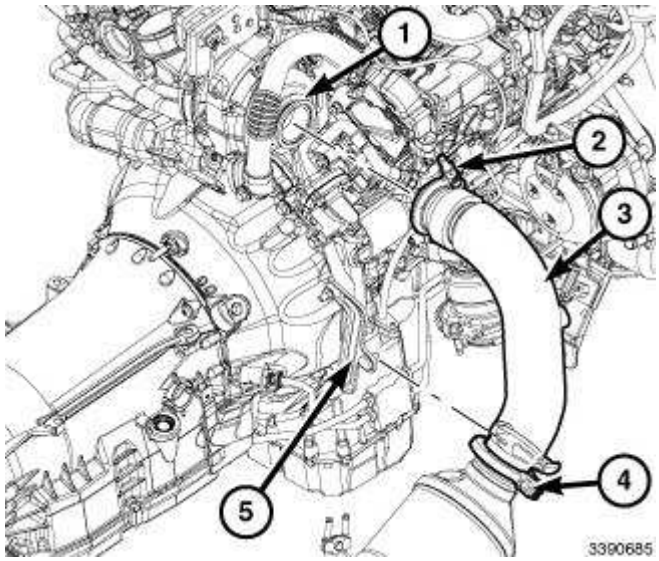


Fig. 471: Turbocharger Outlet, Exhaust Down Pipe & Clamps
Courtesy of CHRYSLER GROUP, LLC

11. Position the exhaust downpipe (3) onto the turbocharger outlet nozzle (1) and tighten the clamp (2) to 25 N.m (18 ft. lbs.).
12. Raise and support the vehicle.
13. Align the downpipe (3) to the Diesel Particulate Filter (DPF).
14. Mount the exhaust to the transmission mounting bracket (5). Tighten the nut to 26 N.m (19 ft. lbs.).
15. Lower the vehicle.

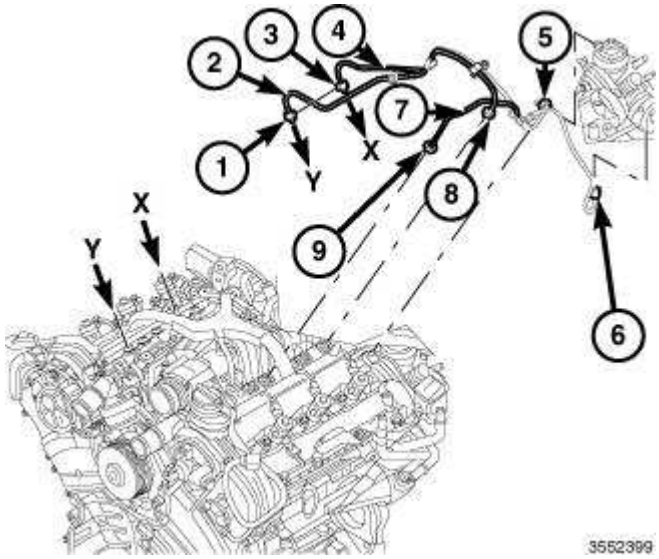


Fig. 472: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fuel lines are a one time use only. The fuel lines must be discarded and a new line must be installed.**

16. Install a new fuel cross over line (4). Tighten the union nuts (3 and 8) to 5 N.m (44 in. lbs.) plus an additional 75 degrees turn.
17. Install a new left high pressure fuel tube (7). Tighten union nut (6 and 9) to 5 N.m (44 in. lbs.) plus an additional 75 degrees turn.

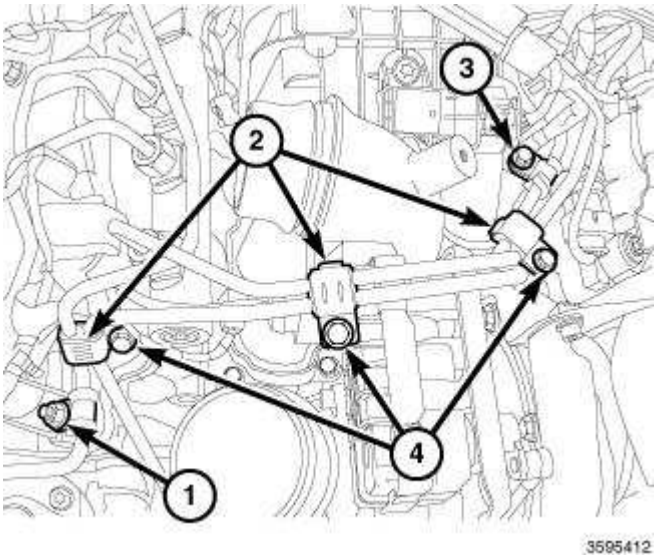


Fig. 473: Fuel Tube Securing Bolts & Bracket
Courtesy of CHRYSLER GROUP, LLC

18. Install the bolts (4) to the brackets (2) that secure the fuel tubes. Tighten to 11 N.m (97 in. lbs.).
19. Install the bolt securing the fuel line to the intake manifold (3). Tighten to 11 N.m (97 in. lbs.).
20. Install the nut (1) that secures the fuel line to the valve cover stud. Tighten to 11 N.m (97 in. lbs.).

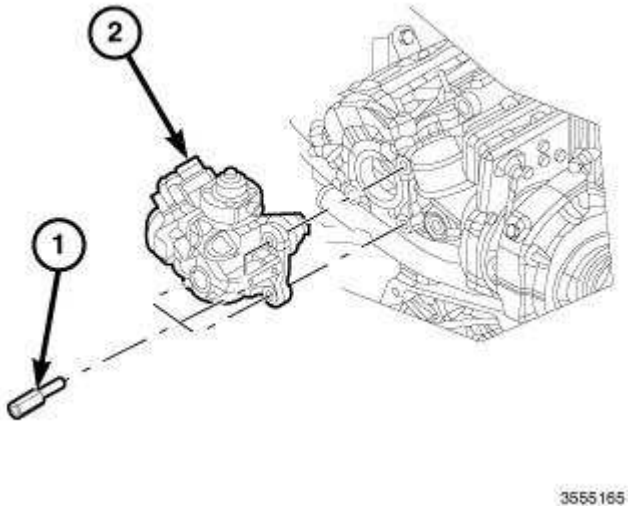


Fig. 474: Fuel Injection Pump
Courtesy of CHRYSLER GROUP, LLC

21. Install the fuel injection pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, INSTALLATION** .

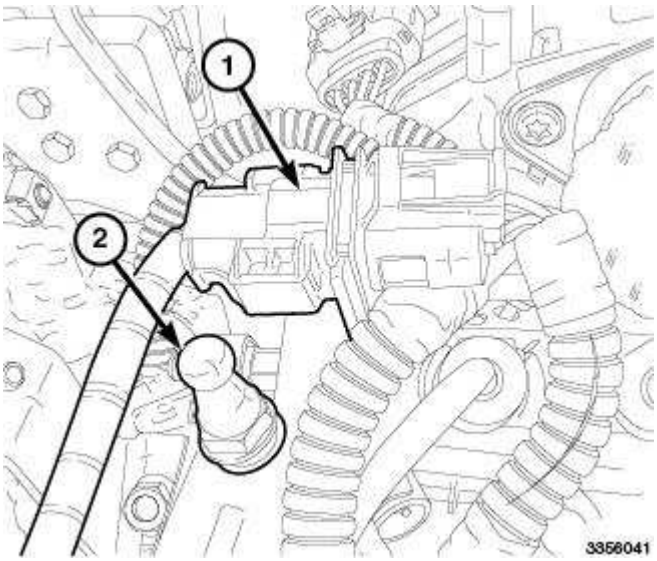


Fig. 475: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

22. Install the upper transmission indicator tube bracket. Tighten the stud (2) to 15 N.m (11 ft. lbs.).
23. Connect the O2 sensor wiring harness connector (1) and install it into the bracket.

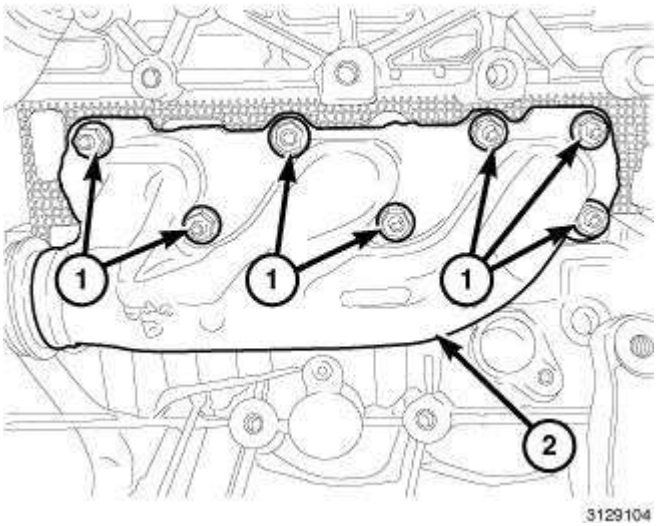


Fig. 476: Right Exhaust Manifold & Nuts
Courtesy of CHRYSLER GROUP, LLC

24. Install the right side exhaust manifold. Refer to **MANIFOLD, EXHAUST, INSTALLATION**.

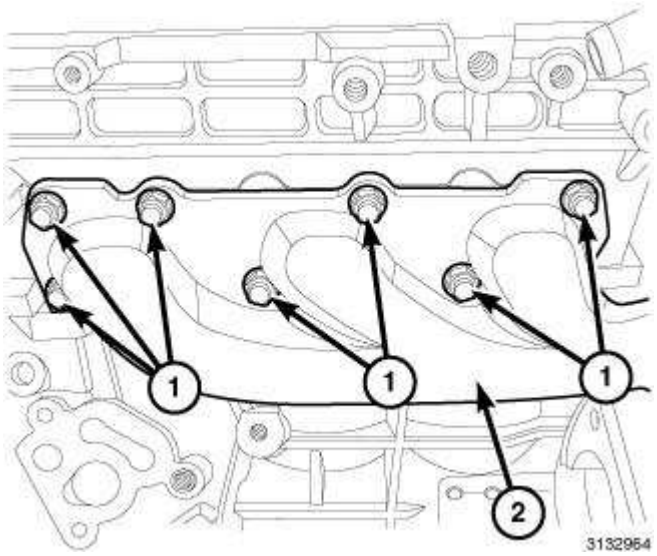


Fig. 477: Left Exhausts Manifold & Nuts
Courtesy of CHRYSLER GROUP, LLC

25. Install the left side exhaust manifold. Refer to **MANIFOLD, EXHAUST, INSTALLATION**.

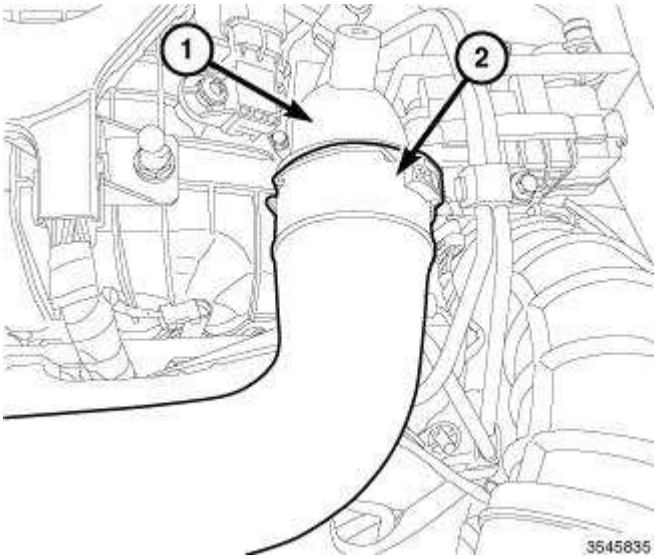


Fig. 478: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

26. Install the CAC to the resonator.
27. Install the CAC hose (2) to the turbocharger (1).

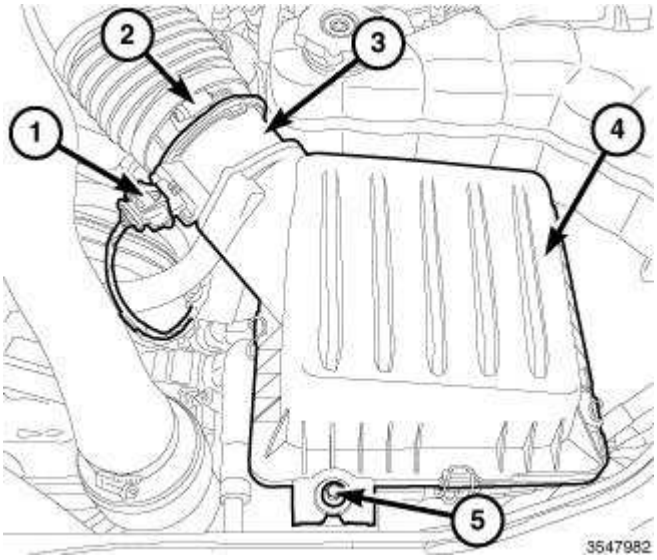


Fig. 479: Mass Air Flow (MAF) Sensor, Connector, Clamp, Air Cleaner Body & Fasteners
Courtesy of CHRYSLER GROUP, LLC

28. Install the air cleaner and air tube assembly. Refer to **BODY, AIR CLEANER, INSTALLATION**.
29. Connect the negative battery cable.

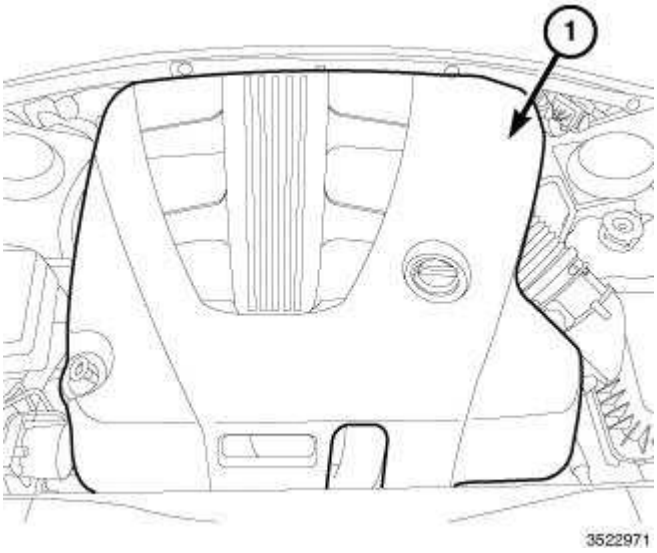


Fig. 480: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

30. Install the engine cover.

VALVE TIMING

STANDARD PROCEDURE

CAMSHAFT TIMING PROCEDURE

LEFT CAMSHAFT

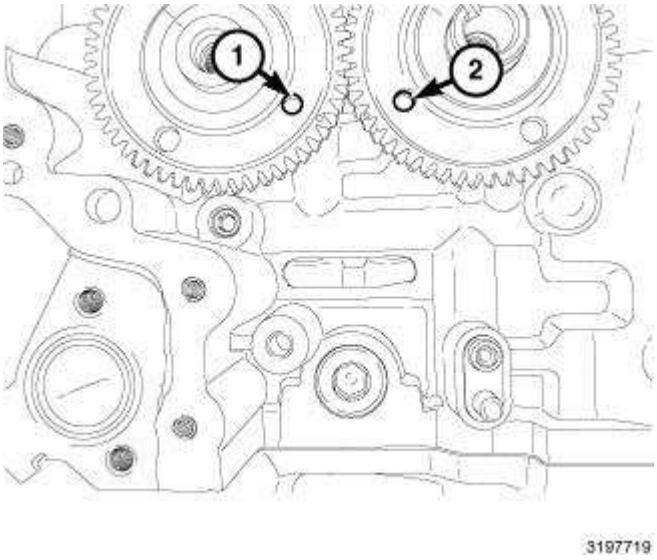


Fig. 481: Intake Camshaft Gear Timing Mark & Exhaust Camshaft Timing Gear Mark
Courtesy of CHRYSLER GROUP, LLC

1. The intake camshaft gear timing mark (1) should be at the four O'clock position and the exhaust camshaft timing gear mark (2) should be at the seven O'clock position.

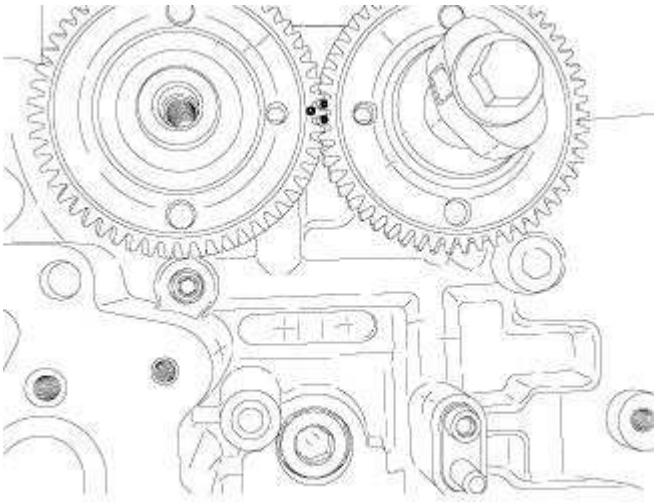


Fig. 482: Left Camshaft Gear Dots
Courtesy of CHRYSLER GROUP, LLC

2. Rotate the camshafts to line up the three camshaft gear dots and install the left (special tool #VM.10338-2, Timing Tool, Camshaft (Left)) (1).

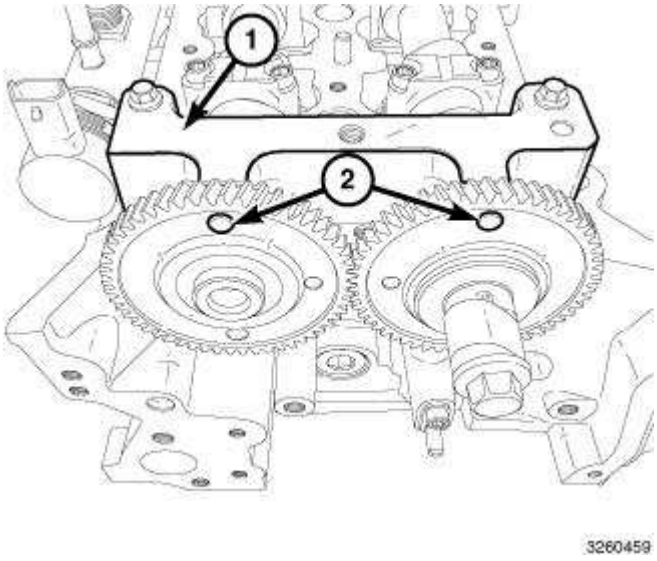


Fig. 483: Camshaft Timing Tool & Sprockets Holes - Left
Courtesy of CHRYSLER GROUP, LLC

3. If the (special tool #VM.10338-2, Timing Tool, Camshaft (Left)) (1) locking pins don't align up and fit into the holes (2) on the camshaft gears then the camshafts are not timed properly.

RIGHT CAMSHAFT

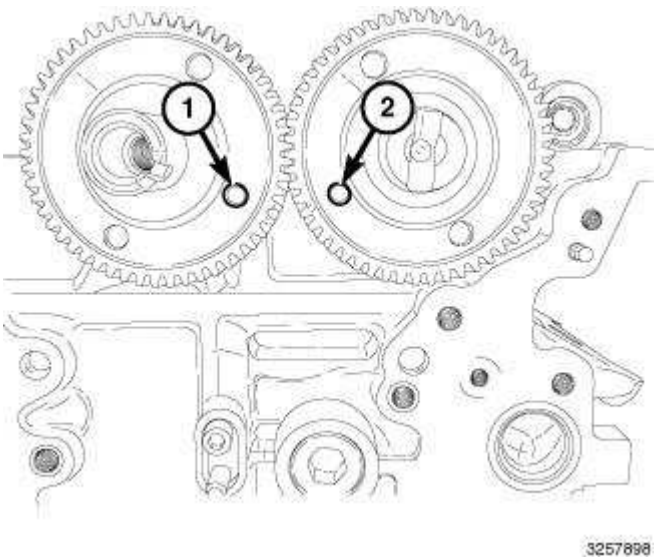


Fig. 484: Exhaust Camshaft Gear Timing Mark & Intake Camshaft Timing Gear Mark
Courtesy of CHRYSLER GROUP, LLC

1. The exhaust camshaft gear timing mark (1) should be at the four O'clock position and the intake camshaft timing gear mark (2) should be at the seven O'clock position.

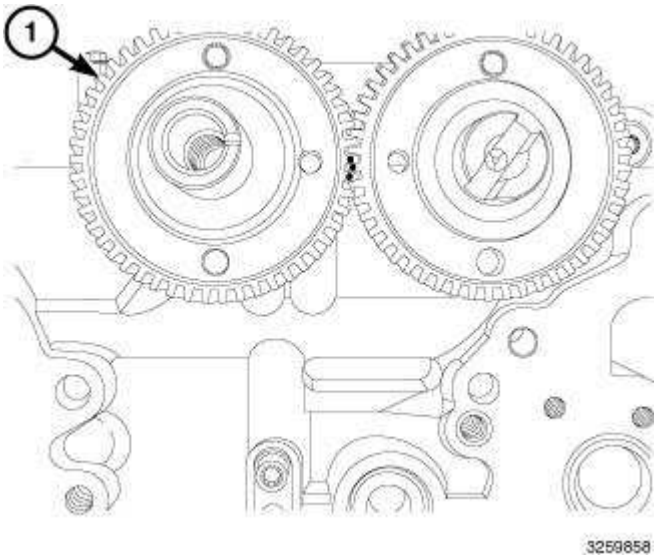


Fig. 485: Right Camshaft Gear Dots
Courtesy of CHRYSLER GROUP, LLC

2. Rotate the camshafts to line up the three camshaft gear dots and install the right (special tool #VM.10338-1, Timing Tool, Camshaft (Right)) (1).

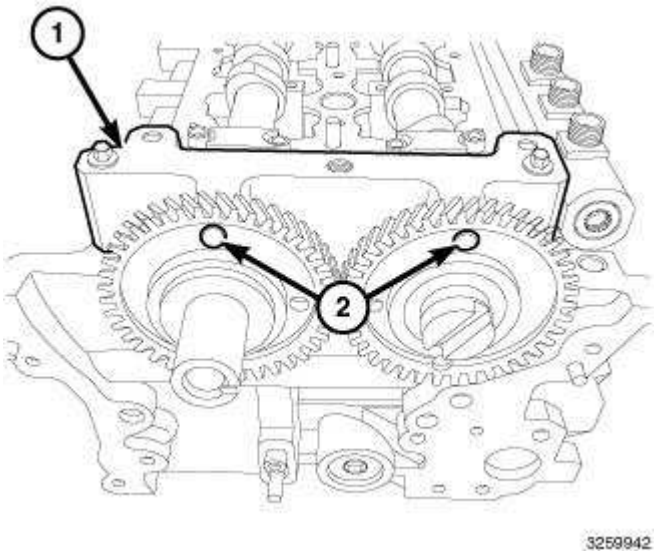


Fig. 486: Camshaft Timing Tool & Sprockets Holes - Right
Courtesy of CHRYSLER GROUP, LLC

3. If the (special tool #VM.10338-1, Timing Tool, Camshaft (Right)) (1) locking pins don't align up and fit into the holes (2) on the camshaft gears then the camshafts are not timed properly.

LOCKING ENGINE 30 DEGREES AFTER TDC

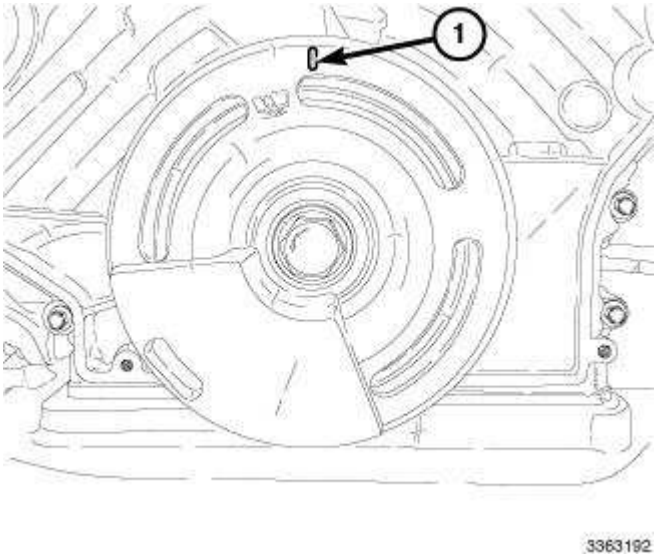


Fig. 487: Crankshaft At 12 O'clock Position
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Rotate the engine until timing mark (1) on the crankshaft is at the 12 O'clock position, (this is 30° ATDC).

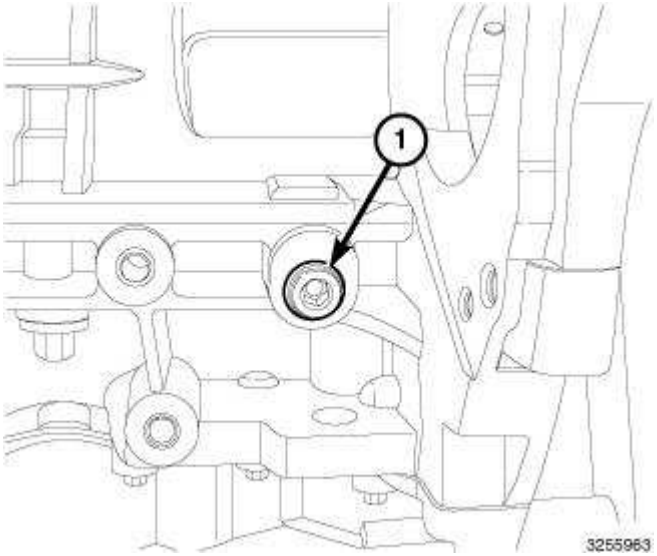


Fig. 488: Engine Block Plug
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine block plug (1).

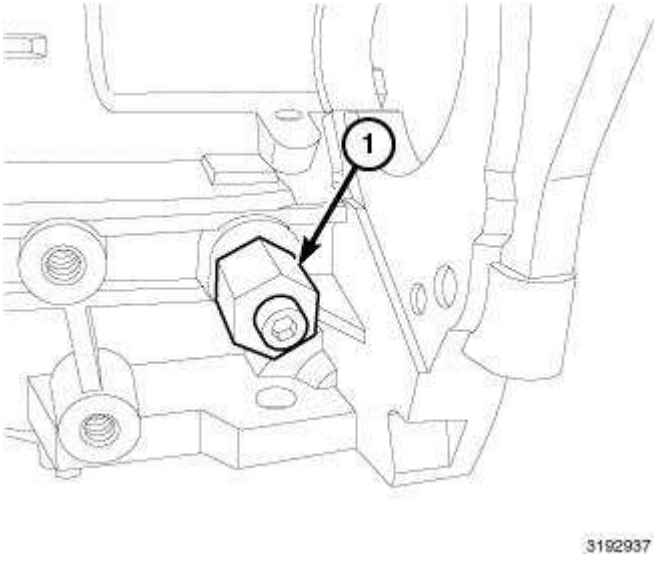


Fig. 489: Crankshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

4. Install the (special tool #VM.10339, Tool, Crankshaft Timing) (1) into the starter side of the engine block. If the (special tool #VM.10339, Tool, Crankshaft Timing) does not fully go into the engine block and stops short, the engine is not properly set to 30° ATDC. Rotate the engine so the (special tool #VM.10339, Tool, Crankshaft Timing) fully engages into engine block and crankshaft. Once full engaged thread tool into engine block and install the bolt. The crankshaft is now set at 30° ATDC.

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the lower timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
3. Lock the engine to 30 degrees ATDC. Refer to **Engine/Valve Timing - Standard Procedure**.

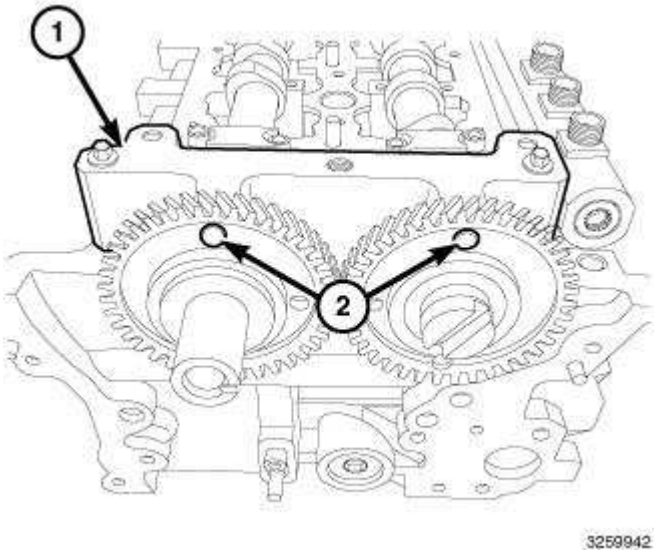


Fig. 490: Camshaft Timing Tool & Sprockets Holes - Right
Courtesy of CHRYSLER GROUP, LLC

4. Install the right (special tool #VM.10338-1, Timing Tool, Camshaft (Right)) (1) and securely tighten bolts.

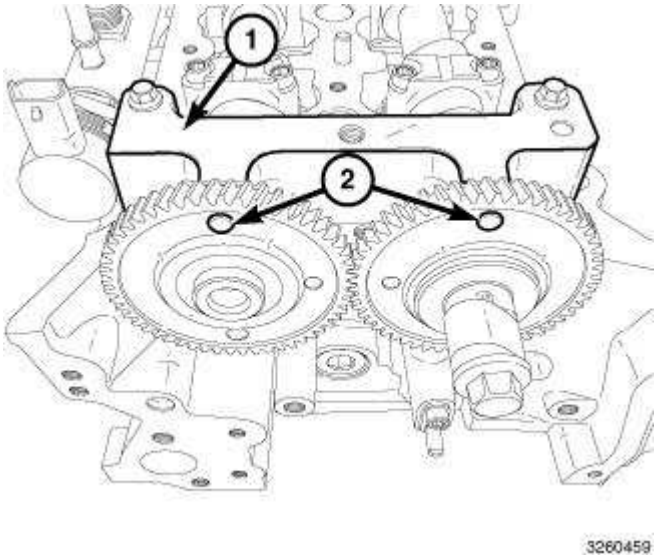


Fig. 491: Camshaft Timing Tool & Sprockets Holes - Left
Courtesy of CHRYSLER GROUP, LLC

5. Install the left (special tool #VM.10338-2, Timing Tool, Camshaft (Left)) (1) and securely tighten bolts.

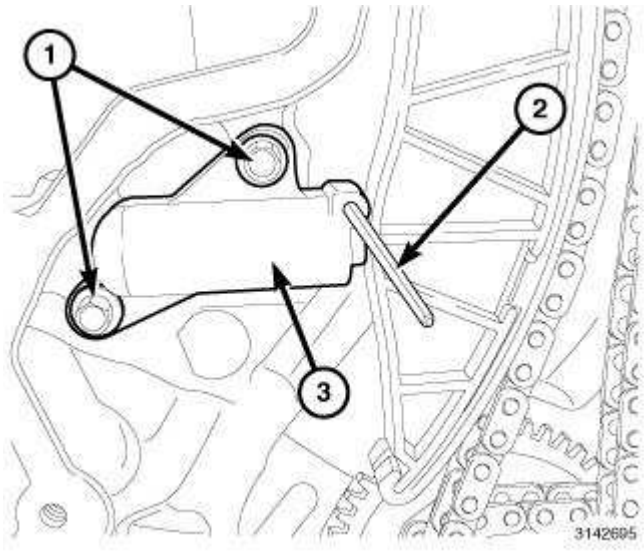


Fig. 492: Pin, Right Timing Chain Tensioner & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the (special tool #VM.10359, Pin, Tensioner) (2) into timing chain tensioner (3).
7. Remove bolts (1) and the right timing chain tensioner (3).

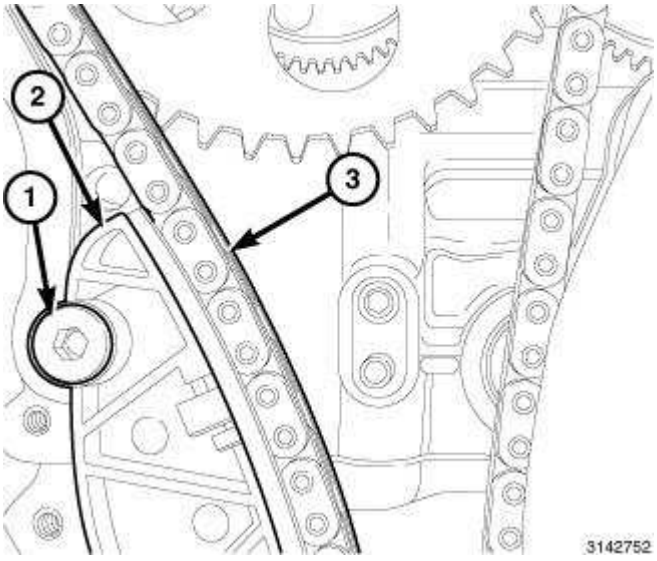


Fig. 493: Right Outer Timing Chain Guide & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove bolt (1) and the right outer timing chain guide (2).

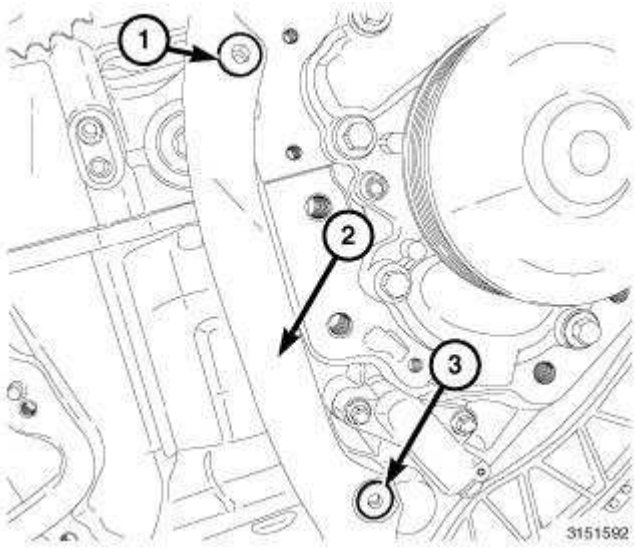


Fig. 494: Right Inner Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If necessary, remove bolt (1 and 3) and the right inner timing chain guide (2).

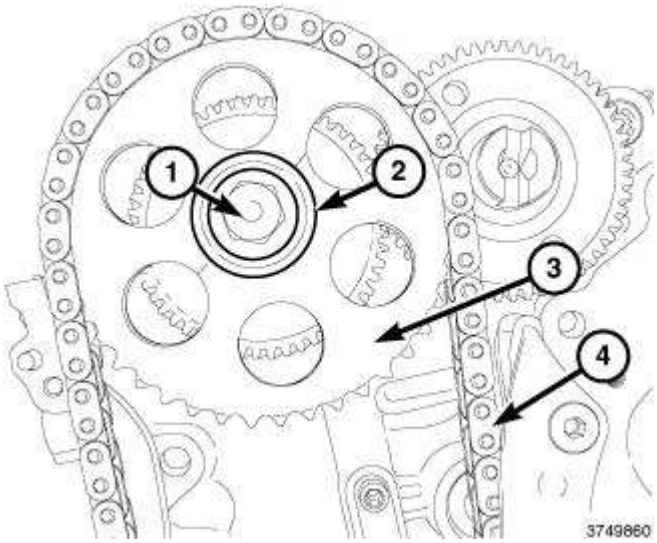


Fig. 495: Bolt, Washer, Timing Chain & Right Timing Chain Sprocket
Courtesy of CHRYSLER GROUP, LLC

10. Remove bolt (1) and washer (2).
11. Remove the right timing chain sprocket (4) and timing chain (3).

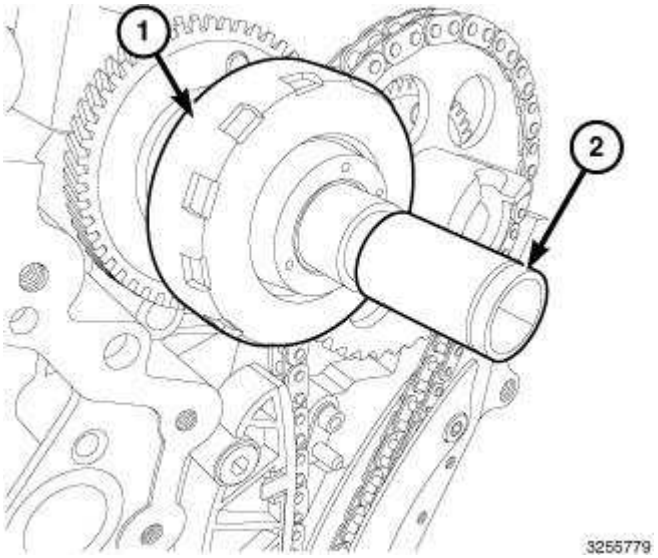


Fig. 496: Oil Separator & Oil Separator Remover/Installer Tool
Courtesy of CHRYSLER GROUP, LLC

12. Using the (special tool #VM.10344, Tool, Oil Separator Remover/Installer) (2), remove the oil separator (1) from the left intake camshaft.

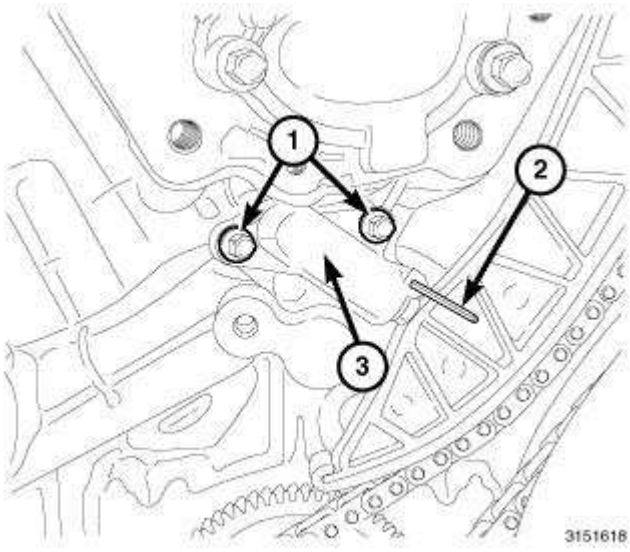


Fig. 497: Left Timing Chain Tensioner, Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Install the (special tool #VM.10359, Pin, Tensioner) (2) into the timing chain tensioner (3).
14. Remove bolts (1) and the left timing chain tensioner (3).

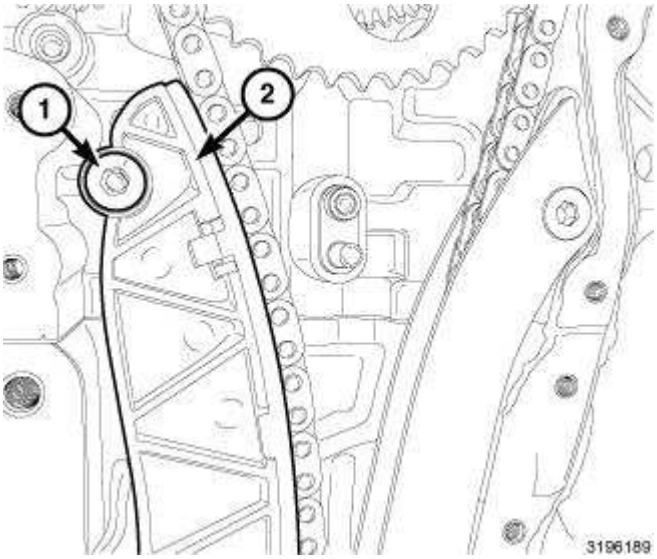


Fig. 498: Left Inner Timing Chain Guide & Bolt
Courtesy of CHRYSLER GROUP, LLC

15. Remove bolt (1), and the left inner timing chain guide (2).

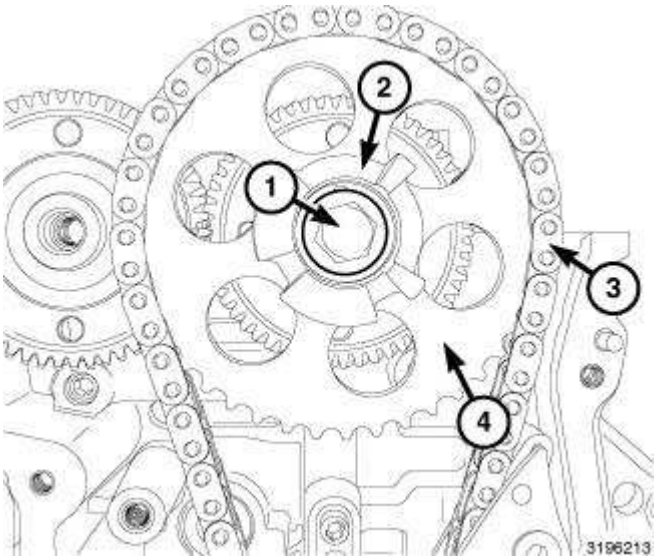


Fig. 499: Camshaft Position Sensor (CMP) Reluctor Wheel, Left Camshaft Timing Chain Sprocket, Timing Chain & Bolt
Courtesy of CHRYSLER GROUP, LLC

16. Remove bolt (1) and the Camshaft Position Sensor (CMP) reluctor wheel (2).
17. Remove the left camshaft timing chain sprocket (3) and timing chain (4).

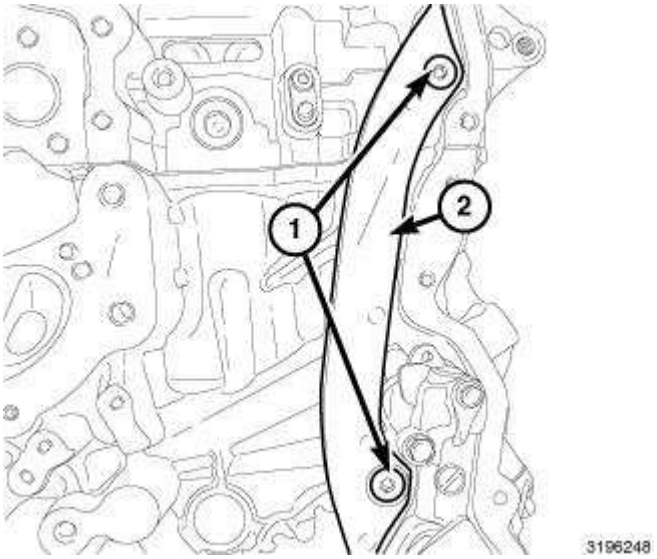


Fig. 500: Left Outer Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

18. If necessary, remove bolts (1) and the left outer timing chain guide (2).
19. If necessary, remove the crankshaft timing chain sprocket.
20. If necessary, remove the oil pump drive gear.

INSPECTION

INSPECTION

Inspect the following valve timing components:

- Sprockets for excessive tooth wear. Some tooth markings are normal and not a cause for sprocket replacement.
- Idler sprocket assembly bushing and shaft for excessive wear.
- Chain guides and tensioner arms. Replace these parts if grooving in plastic face is more than 1 mm (0.039 in.) deep.
- Secondary chain tensioner piston and ratcheting device. Inspect for evidence of heavy contact between tensioner piston and tensioner arm. If this condition exist the tensioner arm and chain should be replaced.
- Primary chain tensioner plastic faces. Replace as required.

INSTALLATION

INSTALLATION

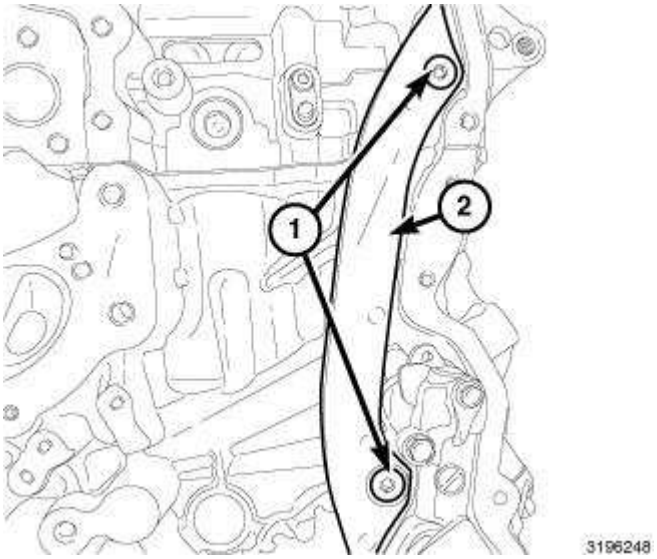


Fig. 501: Left Outer Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Camshafts should already be timed with dots facing each other and the (special tool #VM.10338, Tool, Camshaft Timing) installed.

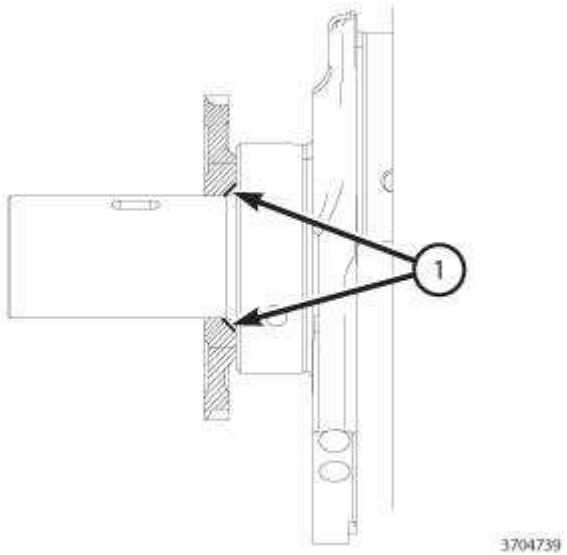


Fig. 502: Crankshaft Timing Chain Sprocket With Beveled Edge
Courtesy of CHRYSLER GROUP, LLC

NOTE: The oil pump drive gear bevel edge (1) should be facing the engine.

1. If removed, install the oil pump drive gear with beveled edge (1) facing the engine.
2. If removed, install the crankshaft timing chain sprocket.
3. If removed, install the left outer timing chain guide (2). Tighten bolts (1) to 30 N.m (22 ft. lbs.).

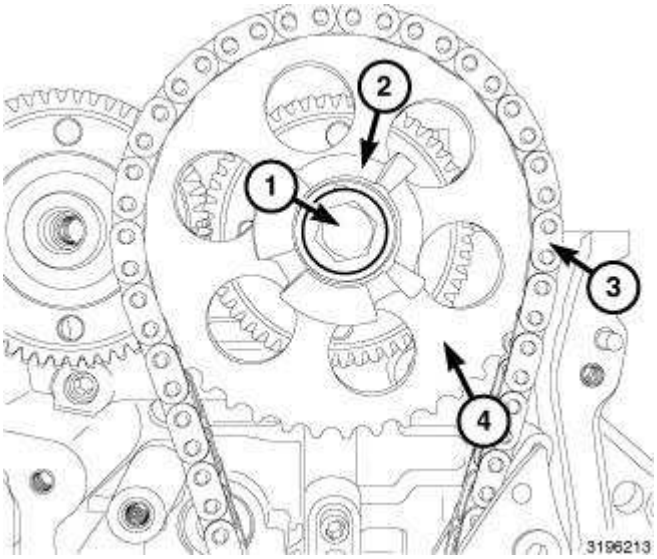


Fig. 503: Camshaft Position Sensor (CMP) Reluctor Wheel, Left Camshaft Timing Chain Sprocket, Timing Chain & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Install the left timing chain (3) and camshaft timing chain sprocket (4).
5. Install the reluctor wheel (2). Tighten bolt (1) finger tight.

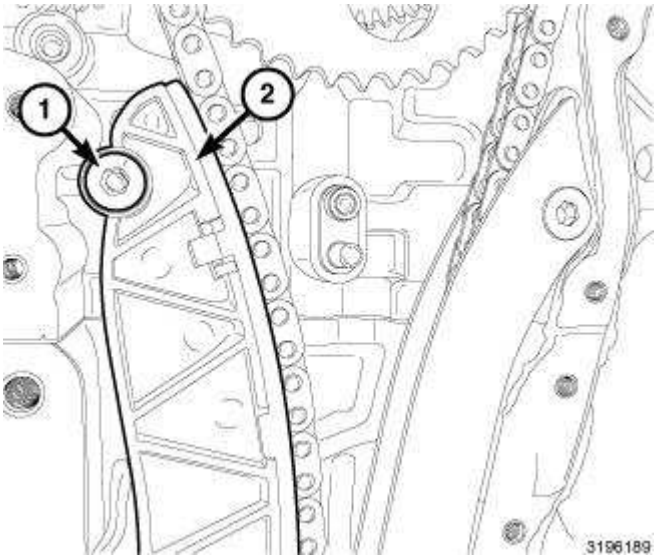


Fig. 504: Left Inner Timing Chain Guide & Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the left inner timing chain guide (2). Tighten bolt (1) to 30 N.m (22 ft. lbs.).

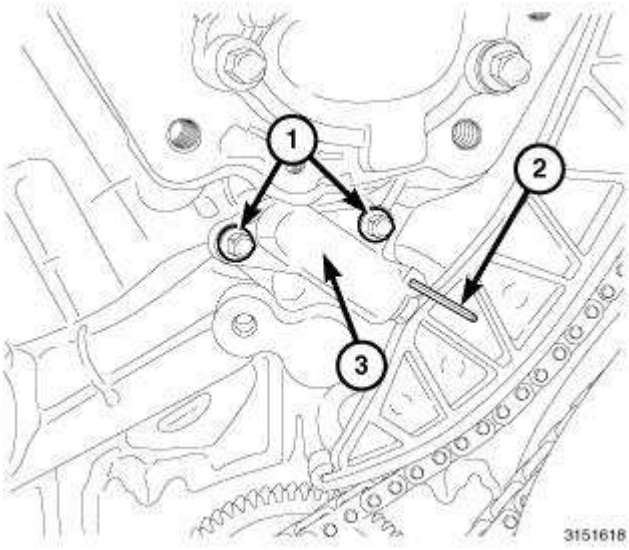


Fig. 505: Left Timing Chain Tensioner, Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Install the left timing chain tensioner (3). Tighten bolts (1) to 14 N.m (124 in. lbs.).
8. Remove the (special tool #VM.10359, Pin, Tensioner) (2) from timing chain tensioner (3).

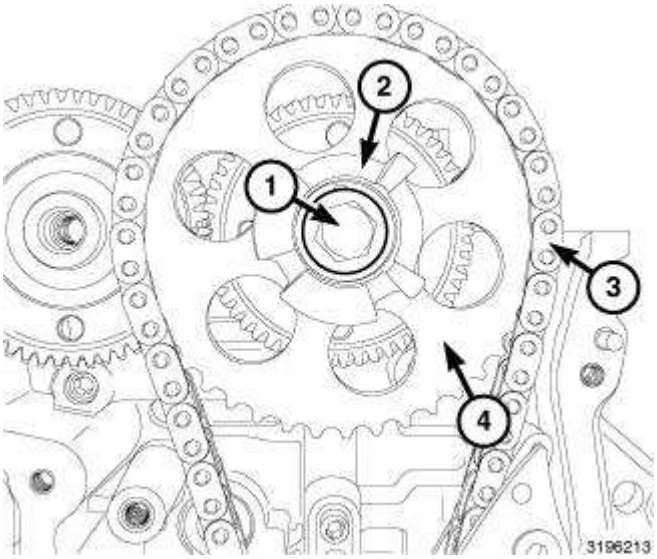


Fig. 506: Camshaft Position Sensor (CMP) Reluctor Wheel, Left Camshaft Timing Chain Sprocket, Timing Chain & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Tighten the reluctor wheel (2) bolt (1) to 100 N.m (74 ft. lbs.).

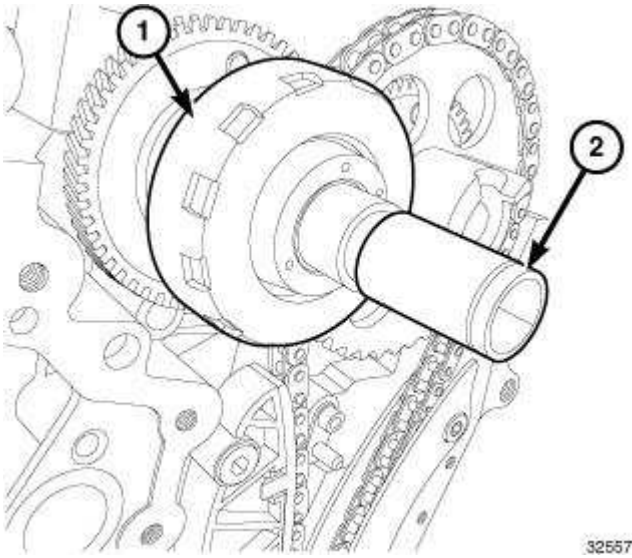


Fig. 507: Oil Separator & Oil Separator Remover/Installer Tool
Courtesy of CHRYSLER GROUP, LLC

10. Using the (special tool #VM.10344, Tool, Oil Separator Remover/Installer) (2), install the oil separator (1) and tighten to 30 N.m (22 ft. lbs.).

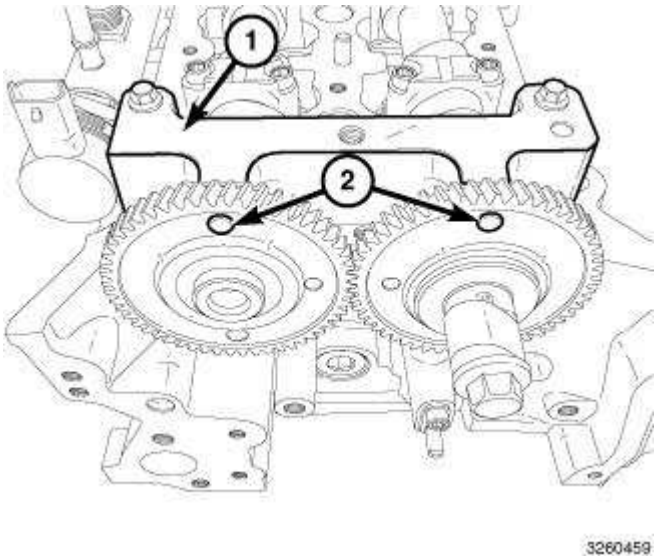


Fig. 508: Camshaft Timing Tool & Sprockets Holes - Left
Courtesy of CHRYSLER GROUP, LLC

11. Remove the (special tool #VM.10338-2, Timing Tool, Camshaft (Left)) (1).

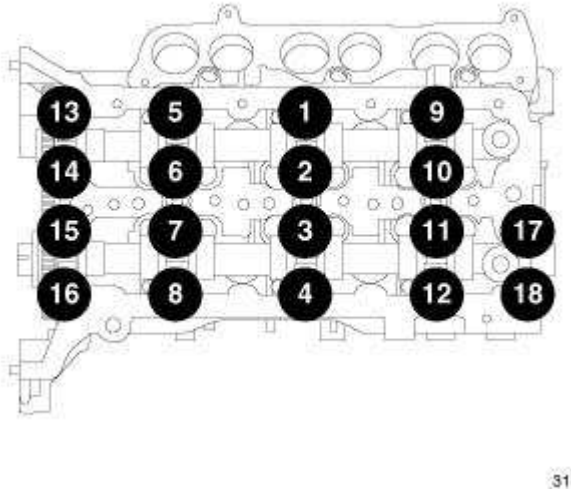


Fig. 509: Camshaft Bearing Cap Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

12. Install the left camshaft bearing caps 13 through 16 and tighten bolts to 11 N.m (97 in. lbs.).

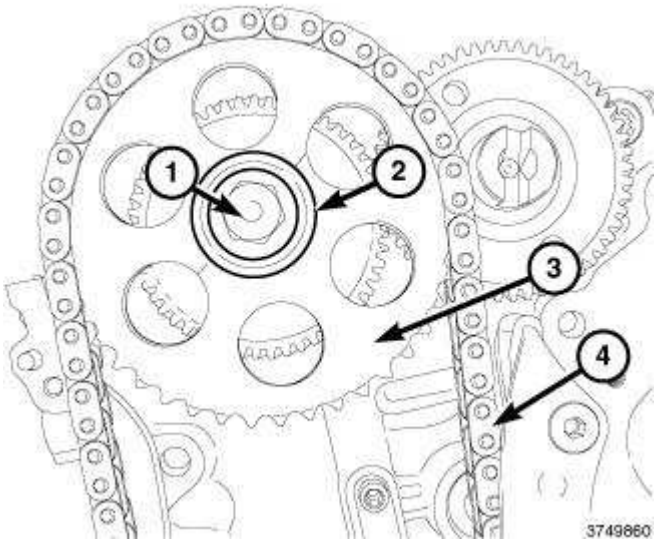


Fig. 510: Bolt, Washer, Timing Chain & Right Timing Chain Sprocket
Courtesy of CHRYSLER GROUP, LLC

13. Install the right timing chain (4) and timing chain sprocket (3).
14. Install the bolt (1) and washer (2) and tighten bolt (1) finger tight.

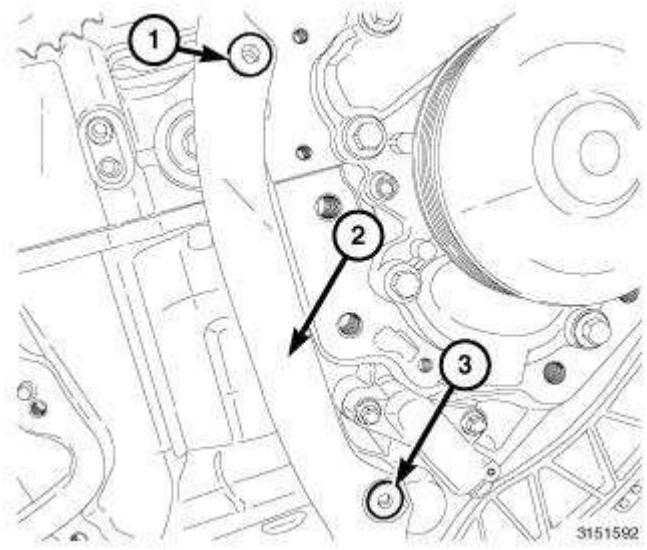


Fig. 511: Right Inner Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

15. If removed install the right inner timing chain guide (2). Tighten bolts (1 and 3) to 30 N.m (22 ft. lbs.).

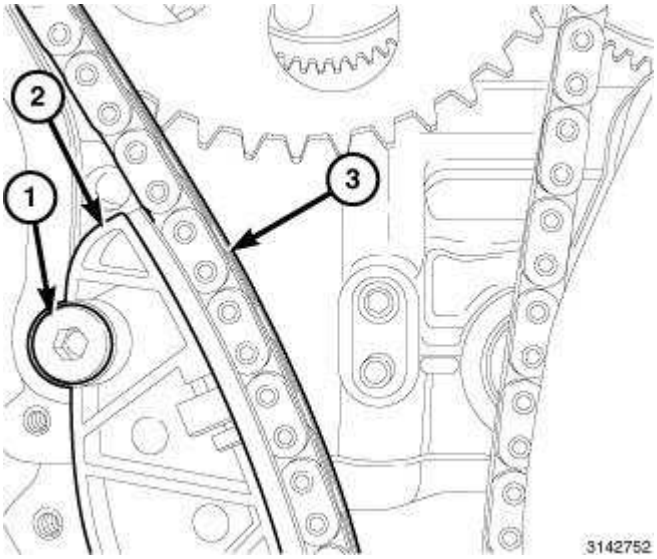


Fig. 512: Right Outer Timing Chain Guide & Bolt
Courtesy of CHRYSLER GROUP, LLC

16. Install the right outer timing chain guide (2). Tighten bolt (1) to 30 N.m (22 ft. lbs.).

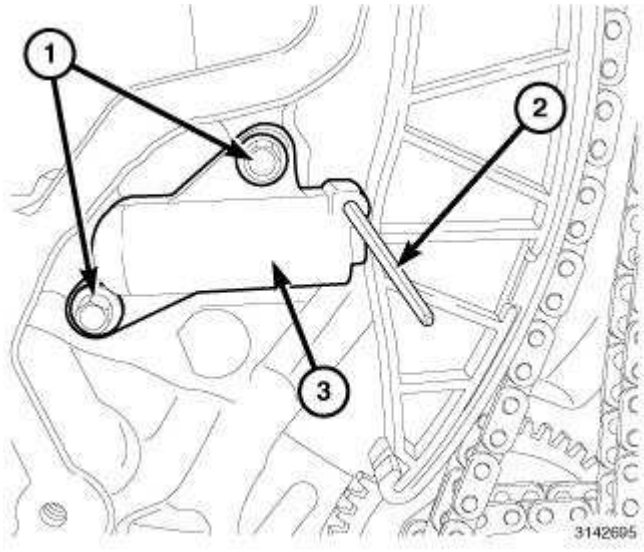


Fig. 513: Pin, Right Timing Chain Tensioner & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Install the right timing chain tensioner (3). Tighten bolts (1) to 14 N.m (124 in. lbs.).
18. Remove (special tool #VM.10359, Pin, Tensioner) (2) from timing chain tensioner (3).

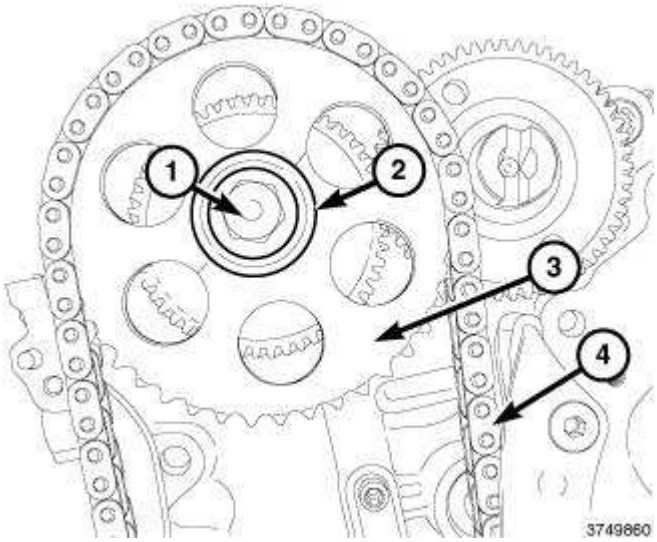


Fig. 514: Bolt, Washer, Timing Chain & Right Timing Chain Sprocket
Courtesy of CHRYSLER GROUP, LLC

19. Tighten the timing chain sprocket bolt (1) to 100 N.m (74 ft. lbs.).

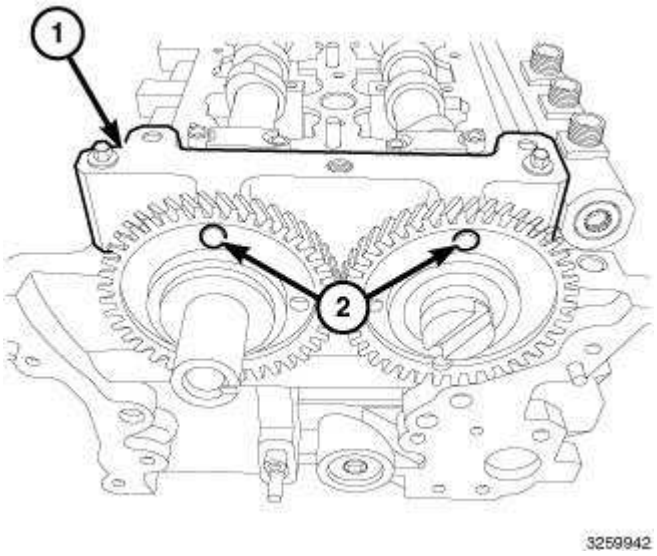


Fig. 515: Camshaft Timing Tool & Sprockets Holes - Right
Courtesy of CHRYSLER GROUP, LLC

20. Remove the (special tool #VM.10338-1, Timing Tool, Camshaft (Right)) (1).

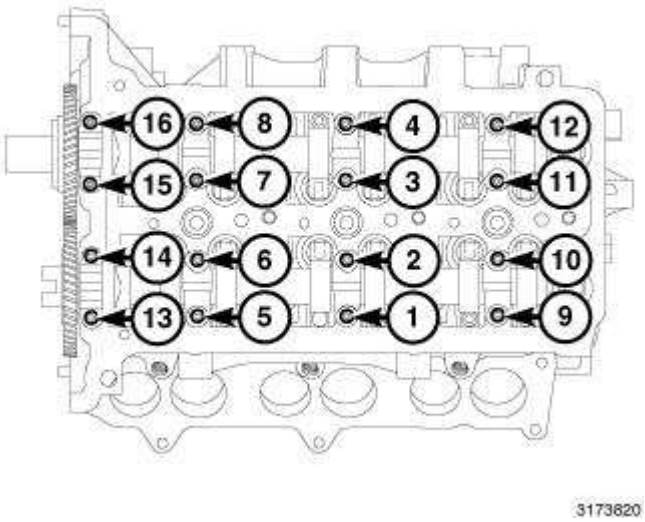


Fig. 516: Camshaft Bearing Cap Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

21. Install the right camshaft bearing caps 13 through 16 and tighten bolts to 11 N.m (97 in. lbs.).

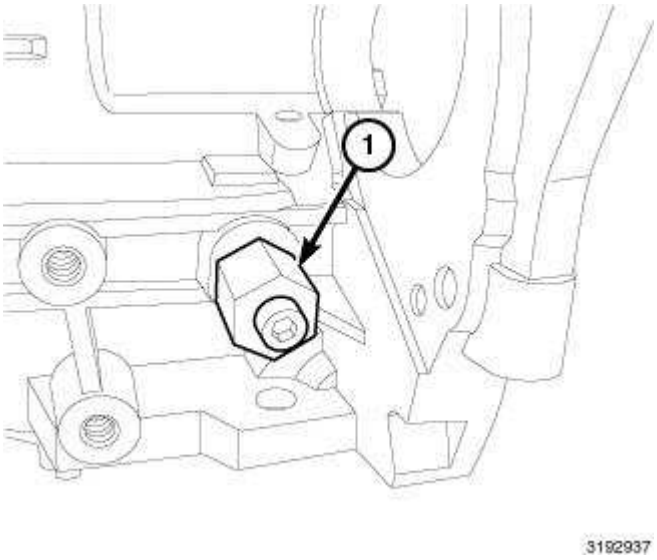


Fig. 517: Crankshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

22. Remove the (special tool #VM.10339, Tool, Crankshaft Timing) (1).

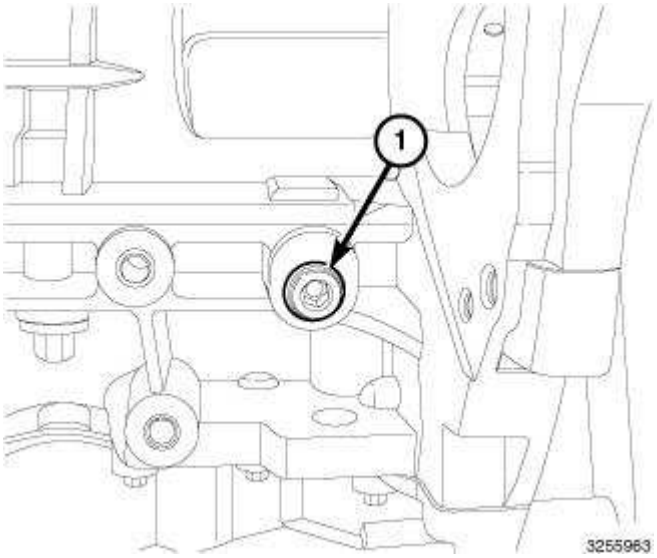


Fig. 518: Engine Block Plug
Courtesy of CHRYSLER GROUP, LLC

23. Install engine block plug (1). Tighten 30 N.m (22 ft. lbs.).
24. Install the lower timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
25. Install the right upper timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
26. Install the left upper timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
27. Install the right and left cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
28. Connect negative battery cable.

29. Start engine and inspect for leaks. Care must be taken to observe the fuel system warnings.

COVER(S), ENGINE TIMING

REMOVAL

UPPER TIMING COVER

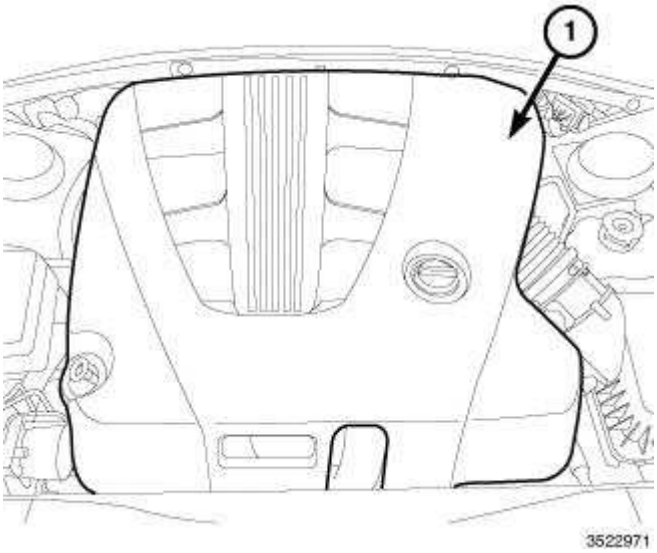


Fig. 519: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, REMOVAL** .
5. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
6. Lower the vehicle.
7. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.
8. Remove the charge air outlet tube.
9. Remove the upper and lower radiator hoses.
10. Remove the high pressure fuel injection pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, REMOVAL** .
11. Remove the vacuum pump. Refer to **PUMP, VACUUM, REMOVAL**.
12. Remove the right and left cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

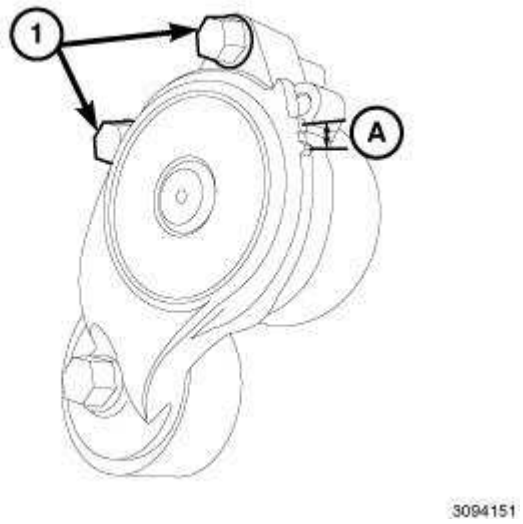


Fig. 520: Belt Wear Indicator (Measurement A)
Courtesy of CHRYSLER GROUP, LLC

13. Remove the serpentine belt tensioner. Refer to **TENSIONER, BELT, REMOVAL** .

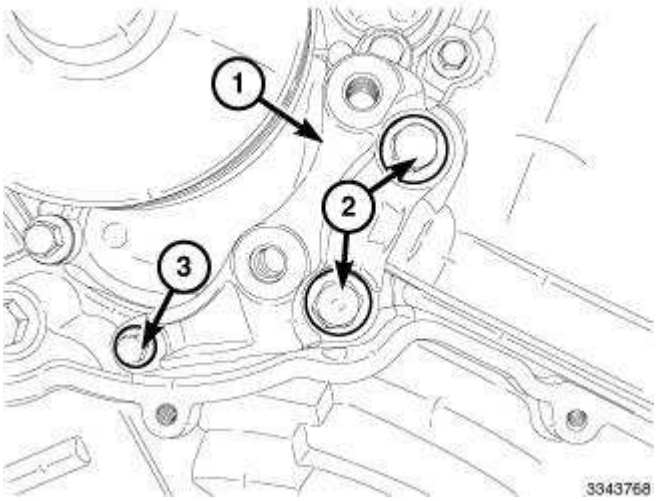


Fig. 521: Serpentine Belt Tensioner Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Remove bolts (2 and 3) and the serpentine belt tensioner bracket (1).

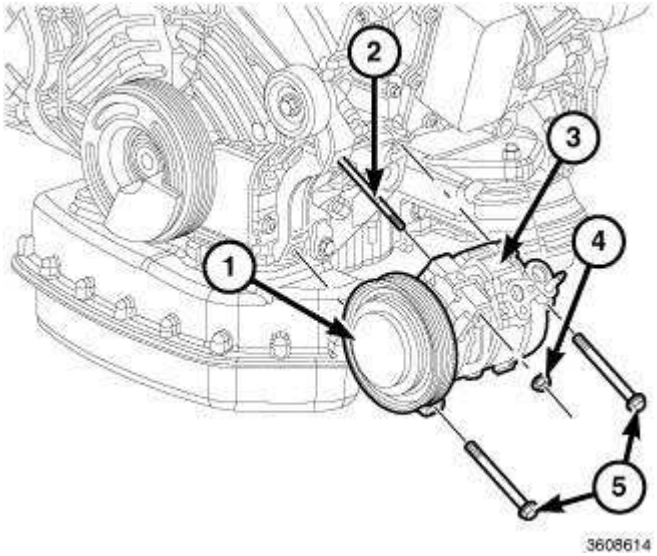


Fig. 522: A/C compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Removal of the A/C compressor does not require the refrigerant to be evacuated.

15. Disconnect the A/C compressor wire harness connector (3).
16. Remove nut (4), bolts (5) and position the aside A/C compressor (1).

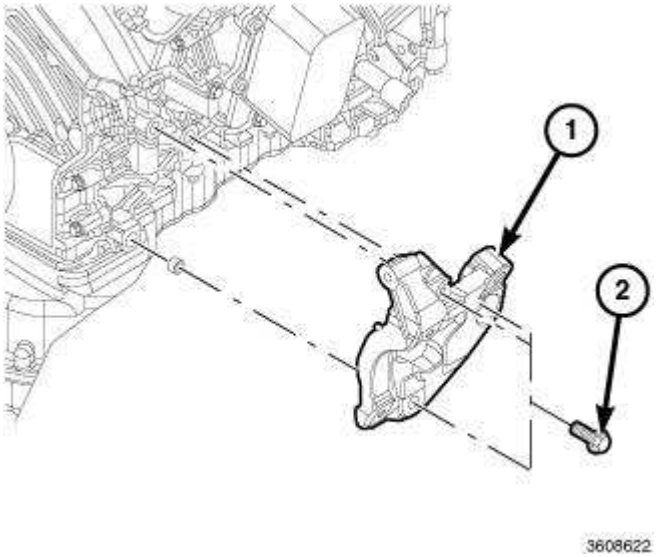


Fig. 523: A/C Compressor Mounting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove bolts (2) and the A/C compressor mounting bracket (1).

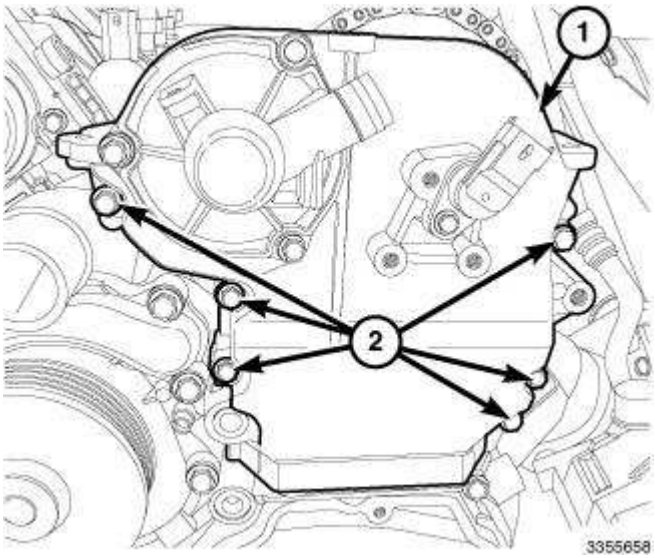


Fig. 524: Left Timing Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the breather hose from left timing cover (1).
19. Remove bolts (2) and the left timing cover (1).

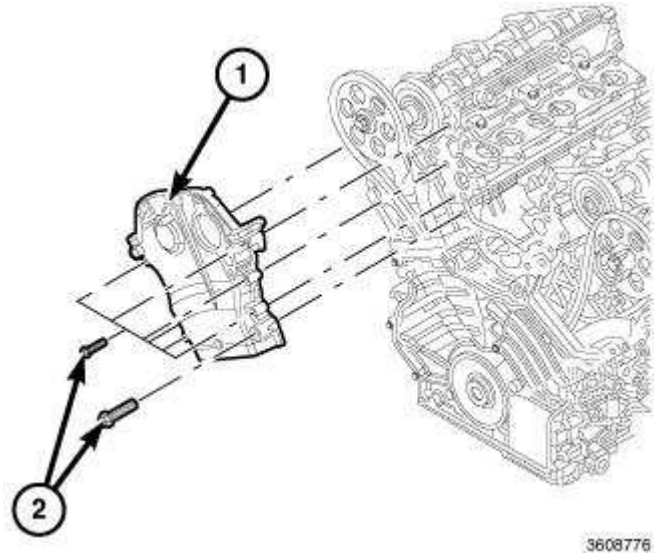


Fig. 525: Right Upper Timing Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

20. Remove bolts (2) and the right upper timing cover (1).

LOWER TIMING COVER

1. Disconnect the negative battery cable.
2. Remove the right and left upper timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

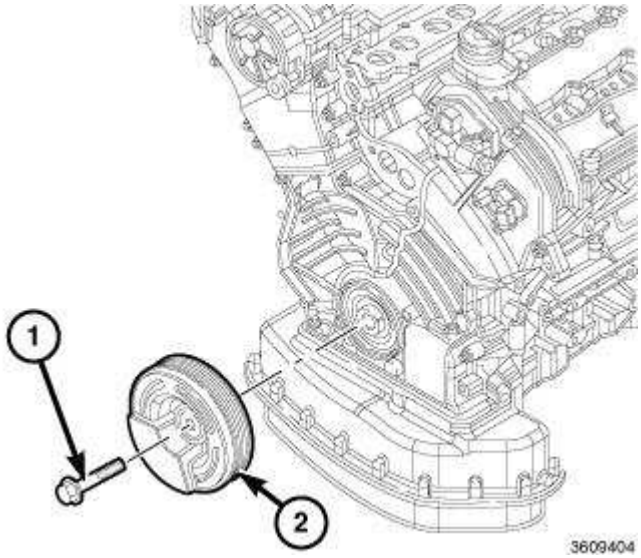


Fig. 526: Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft damper bolt is a left hand thread.

3. Remove the vibration damper (2). Refer to **DAMPER, VIBRATION, REMOVAL**.

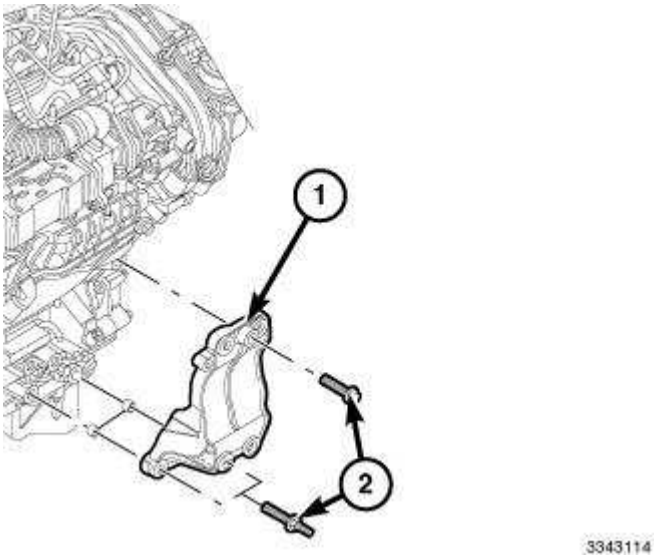


Fig. 527: Generator Mounting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the generator. Refer to **GENERATOR, REMOVAL** .
5. Remove bolts (2) and the generator mounting bracket (1).

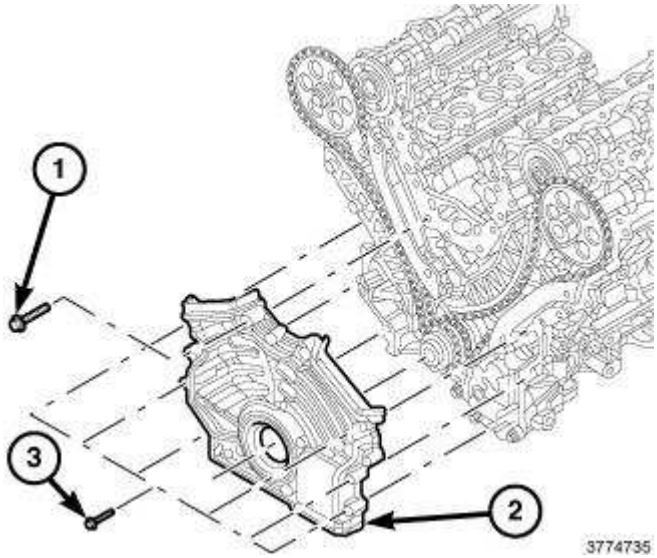


Fig. 528: Lower Timing Chain Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the lower oil pan. Refer to **PAN, OIL, REMOVAL**.
7. Remove bolts (1 and 3) and the lower timing chain cover (2).

INSTALLATION

UPPER TIMING COVER

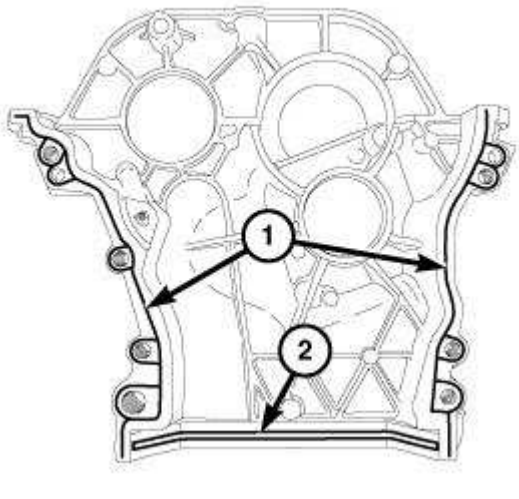


Fig. 529: RTV Sealant Locations To Right Upper Timing Cover
Courtesy of CHRYSLER GROUP, LLC

1. Clean and gasket sealing surfaces. Refer to **Engine - Standard Procedure**.

CAUTION: Engine assembly requires the use of a unique sealant that is

compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

NOTE: Sealing surfaces must be free of a gasket material and oil residue. Clean the oil pan sealing surfaces with isopropyl alcohol in preparation for sealant application.

2. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to locations 1 and 2 of the right upper timing cover.
3. Install the right upper timing cover and tighten bolts finger tight.

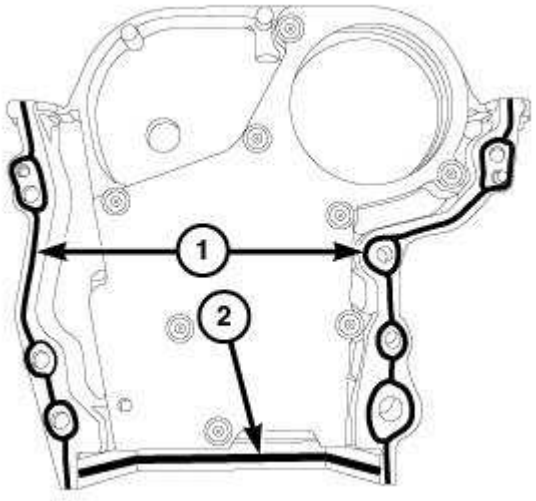


Fig. 530: RTV Sealant Locations To Left Upper Timing Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: Sealing surfaces must be free of a gasket material and oil residue. Clean the oil pan sealing surfaces with isopropyl alcohol in preparation for sealant application.

4. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to locations 1 and 2 of the left upper timing cover.
5. Install the left upper timing cover and tighten bolts finger tight.

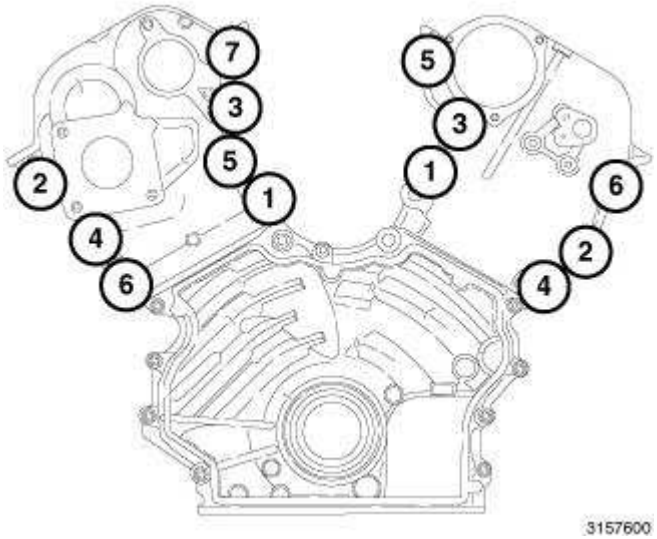


Fig. 531: Left & Right Upper Timing Cover Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Using the sequence shown in illustration, tighten right and left side bolts to:
   - M10 to 25 N.m (18 ft. lbs.).
   - M6 to 9 N.m (80 in. lbs.).
   - Loosen M10 bolt 60 degrees and retighten to 45 N.m (33 ft. lbs.).
   - Loosen M6 bolts 60 degrees and retighten to 15 N.m (133 in. lbs.).

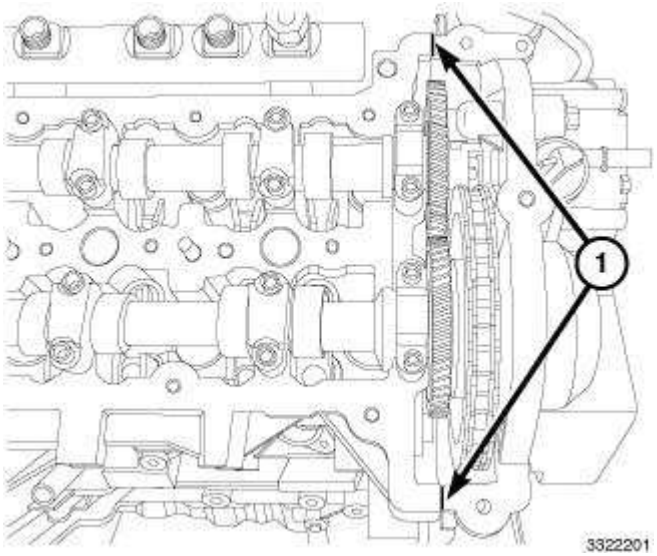


Fig. 532: RTV Sealant At The T-Joints
Courtesy of CHRYSLER GROUP, LLC

7. Remove any of Mopar® Threebond Engine RTV Sealant that may have squeezed out of the right upper timing cover T-joint (1).

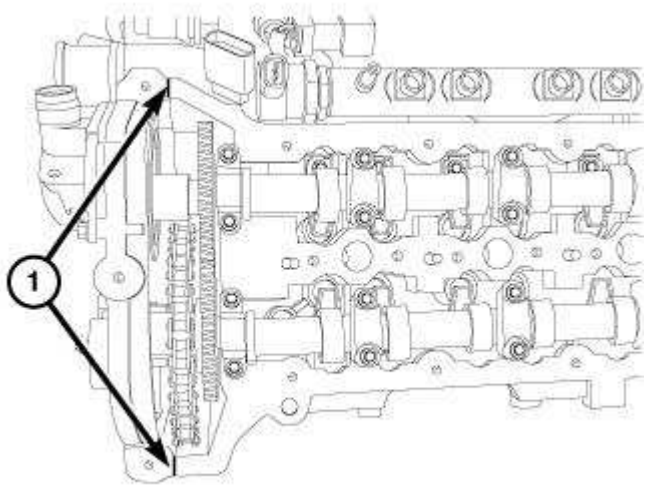


Fig. 533: Left Upper Timing Cover Excess RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

8. Remove any of Mopar® Threebond Engine RTV Sealant that may have squeezed out of the left upper timing cover T-joint (1).

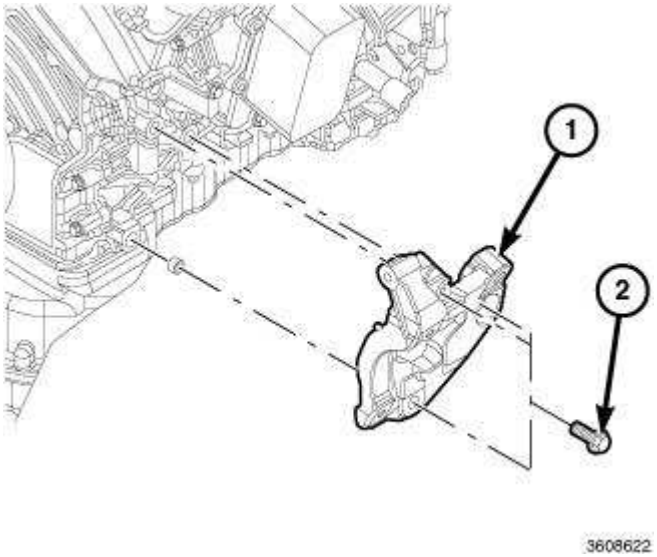


Fig. 534: A/C Compressor Mounting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the A/C compressor mounting bracket (1). Tighten bolts (2) to 45 N.m (33 ft. lbs.).

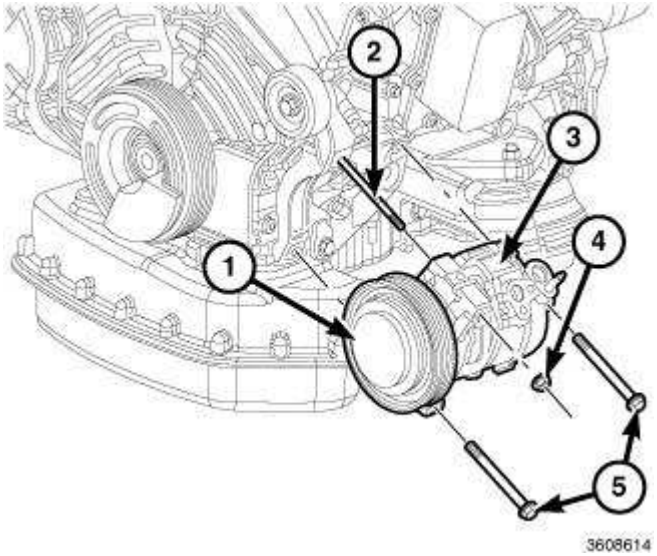


Fig. 535: A/C compressor & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Install the A/C compressor and tighten fasteners using the following sequence to:
    - Bolt at the rear of compressor to 28 N.m (21 ft. lbs.).
    - Bolt at the front of compressor to 28 N.m (21 ft. lbs.).
    - Nut at the front of the compressor to 28 N.m (21 ft. lbs.).

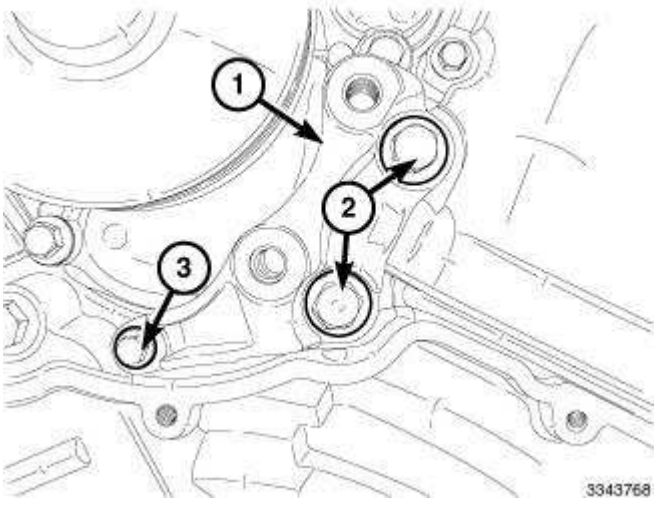


Fig. 536: Serpentine Belt Tensioner Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the serpentine belt tensioner bracket (1) and tighten bolts to:
    - M10 bolts to 45 N.m (33 ft. lbs.).
    - M6 bolt to 11 N.m (97 in. lbs.).

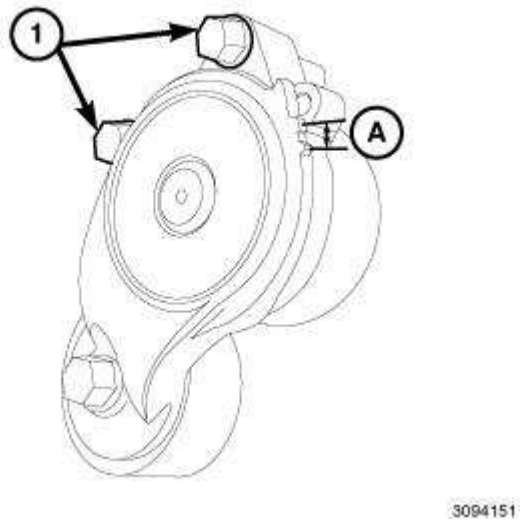


Fig. 537: Belt Wear Indicator (Measurement A)
Courtesy of CHRYSLER GROUP, LLC

12. Install the serpentine belt tensioner. Refer to **TENSIONER, BELT, INSTALLATION** .
13. Install the right and left cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
14. Install the vacuum pump. Refer to **PUMP, VACUUM, INSTALLATION**.
15. Install the lower and upper radiator hoses.
16. Install the charge air outlet tube.
17. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
18. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
19. Install the belly pan and lower fascia to suspension cradle close out panel. Refer to **BELLY PAN, INSTALLATION** .
20. Lower the vehicle.

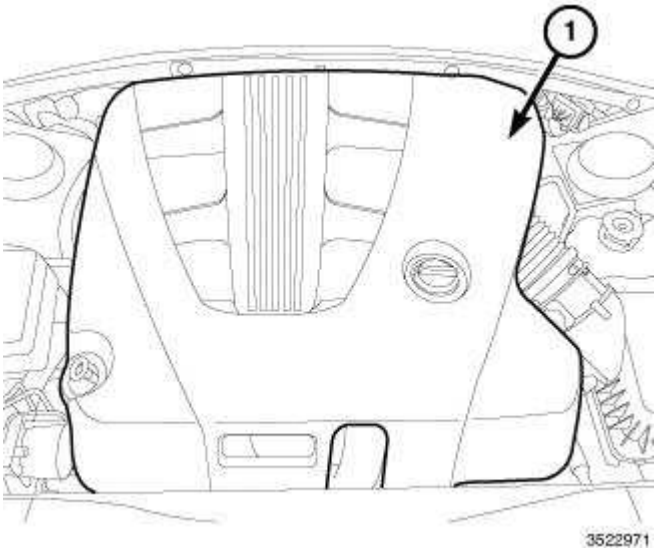


Fig. 538: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

21. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
22. Install the engine cover (1).
23. Connect the negative battery cable.
24. Start the engine and check for leaks.

LOWER TIMING COVER

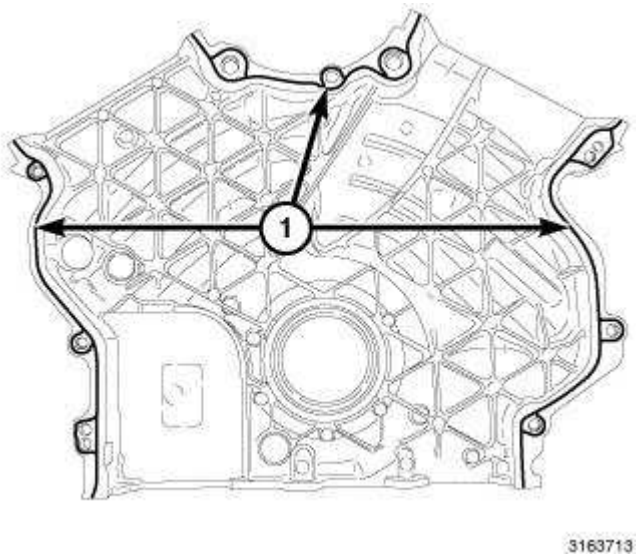


Fig. 539: Lower Timing Chain Cover RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

1. Clean the oil pan sealing surfaces with isopropyl alcohol in preparation for sealant application. Refer to **Engine - Standard Procedure**.

CAUTION: Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

2. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to the following locations (1).

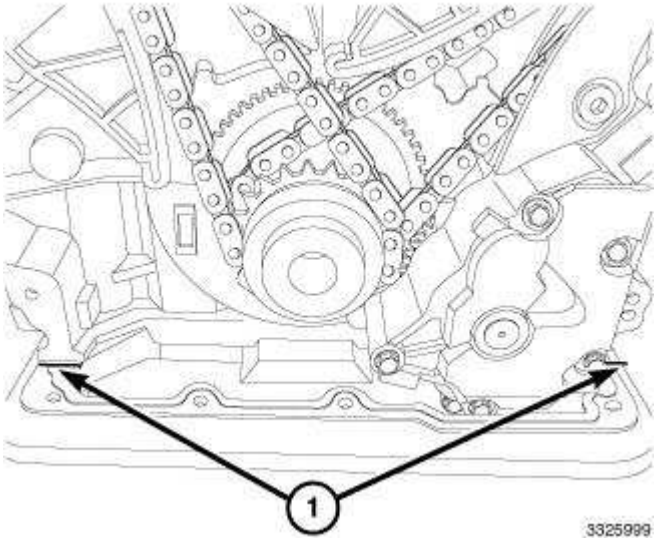


Fig. 540: Lower Timing Chain Cover RTV Sealant T-Joint Locations
Courtesy of CHRYSLER GROUP, LLC

3. Apply a 3 mm wide bead of Mopar® Threebond Engine RTV Sealant at the T-joint (1).

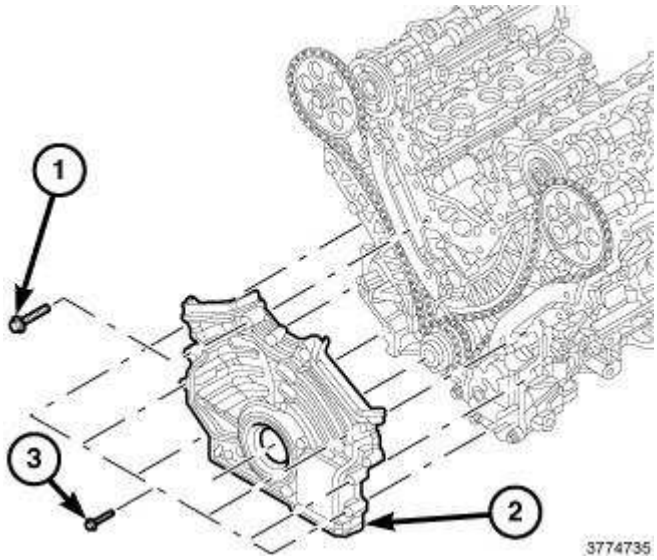


Fig. 541: Lower Timing Chain Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the timing chain cover (2) and tighten bolts (1 and 3) finger tight.

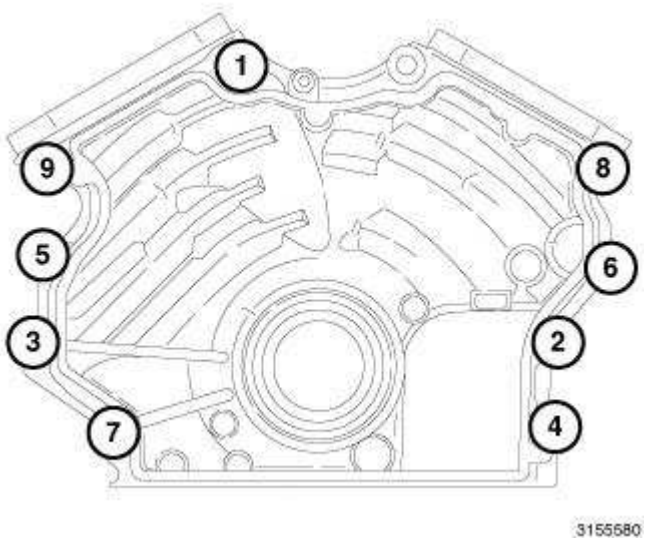


Fig. 542: Lower Timing Chain Cover Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Using the sequence shown in illustration, tighten bolts to:
   - M10 bolts (1) 25 N.m (18 ft. lbs.).
   - M6 to 9 N.m (80 in. lbs.).
   - Loosen M10 bolt 60 degrees and retighten to 45 N.m (33 ft. lbs.).
   - Loosen M6 bolts 60 degrees and retighten to 15 N.m (133 in. lbs.).

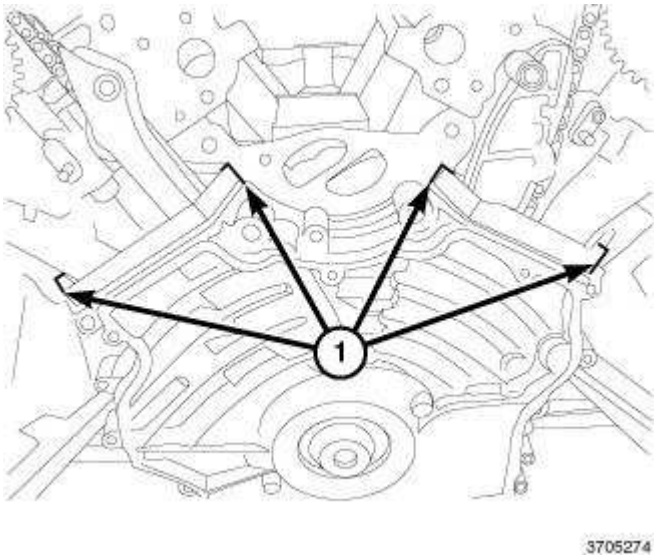


Fig. 543: Lower Timing Cover Excess RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

6. Remove any of Mopar® Threebond Engine RTV Sealant that may have squeezed out of the lower timing cover joints (1).
7. Install the lower oil pan. Refer to **PAN, OIL, INSTALLATION**.

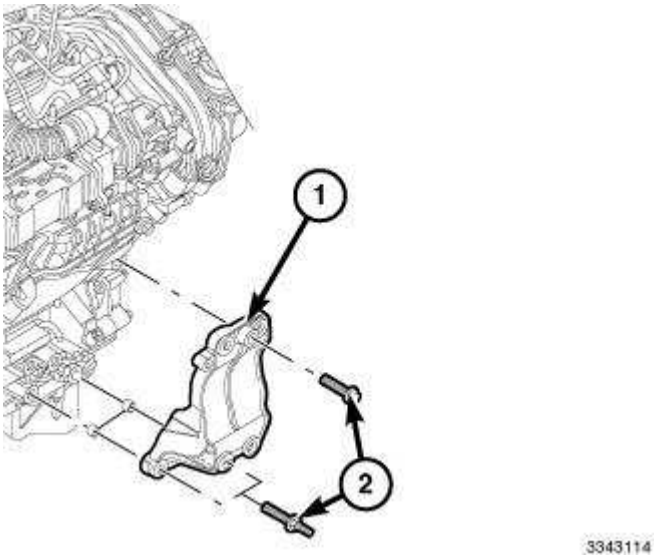


Fig. 544: Generator Mounting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the generator mounting bracket (1). Tighten bolts (2) to 45 N.m (33 ft. lbs.).
9. Install the generator. Refer to **GENERATOR, INSTALLATION** .

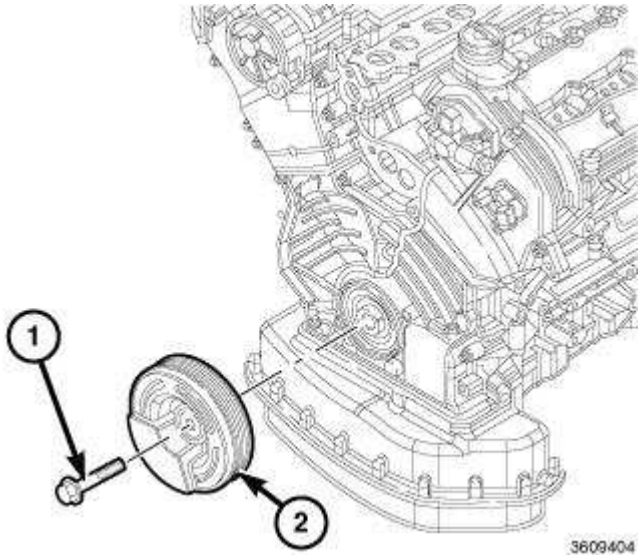


Fig. 545: Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft damper bolt is a left hand thread.

10. Install the vibration damper (2). Refer to **DAMPER, VIBRATION, INSTALLATION**.
11. Install the left and right upper timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
12. Connect the negative battery cable.

TENSIONER, ENGINE TIMING

DESCRIPTION

DESCRIPTION

Both timing chain tensioner is located on the engine block. The tensioner is hydraulically operated with the adjusting portion riding on the right timing chain guide. Hydraulic support for the tensioner is supplied by forward oil passages in the engine block.

REMOVAL

REMOVAL

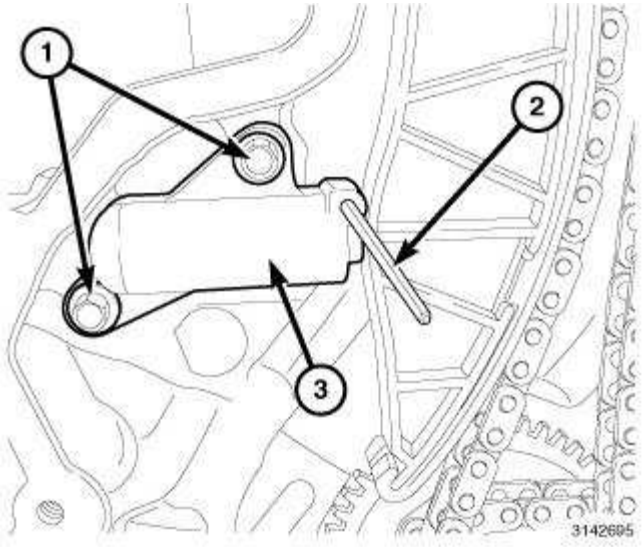


Fig. 546: Pin, Right Timing Chain Tensioner & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the lower timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
3. Pushing back the tensioner piston, and install (special tool #VM.10359, Pin, Tensioner) (2).
4. Remove bolts (1) and the right timing chain tensioner (3).

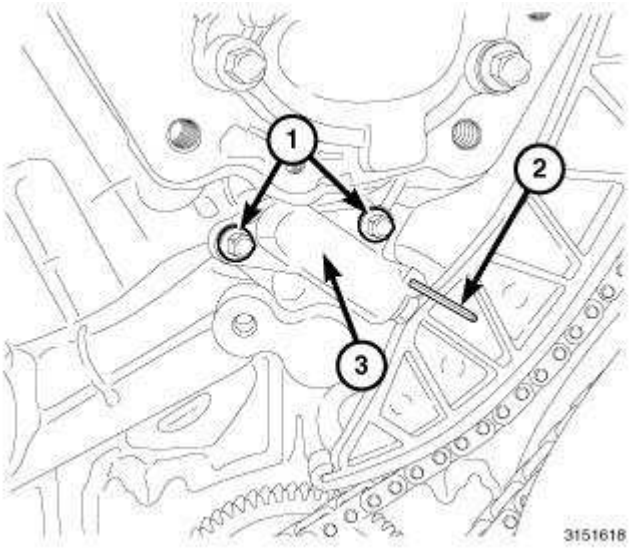


Fig. 547: Left Timing Chain Tensioner, Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Pushing back the piston, and install (special tool #VM.10359, Pin, Tensioner) (2).
6. Remove bolts (1) and the left timing chain tensioner (3).

INSTALLATION

INSTALLATION

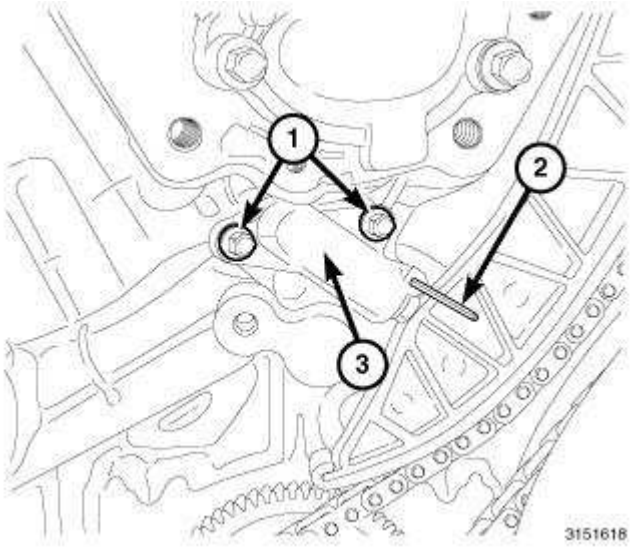


Fig. 548: Left Timing Chain Tensioner, Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install the left timing chain tensioner (3). Tighten bolts (1) to 11 N.m (97 in. lbs.).

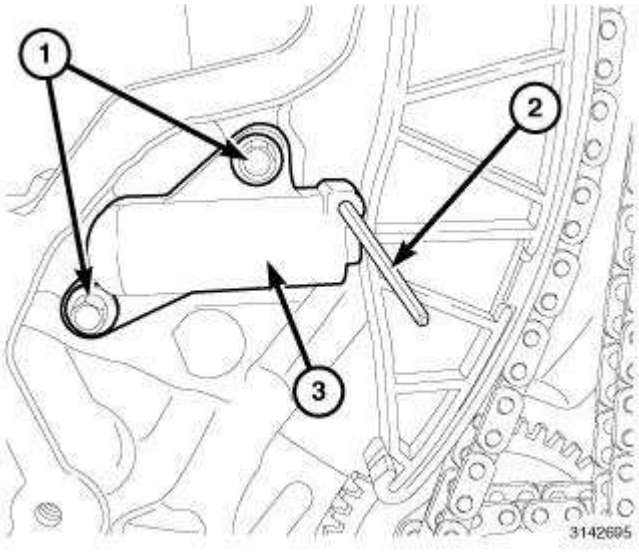


Fig. 549: Pin, Right Timing Chain Tensioner & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the right timing chain tensioner (3). Tighten bolts (1) to 11 N.m (97 in. lbs.).
3. Remove both (special tool #VM.10359, Pin, Tensioner) (2).
4. Install the lower timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
5. Connect the negative battery cable.
6. Start the engine and inspect for leaks.

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

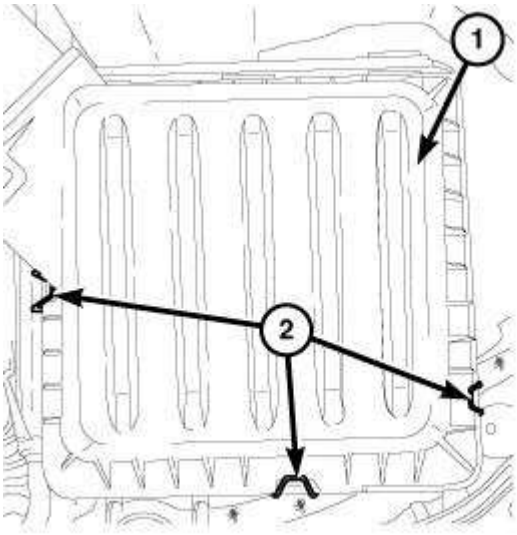


Fig. 550: Air Housing Cover & Spring Clips
Courtesy of CHRYSLER GROUP, LLC

NOTE: Housing removal is not necessary for element (filter) replacement.

1. Release the three spring clips (2) and remove the housing cover (1).

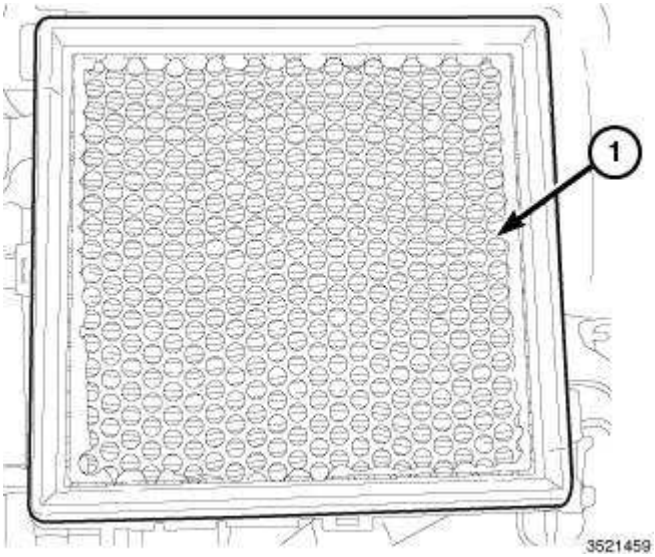


Fig. 551: Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

2. Remove air cleaner element (1) from housing.

INSTALLATION

INSTALLATION

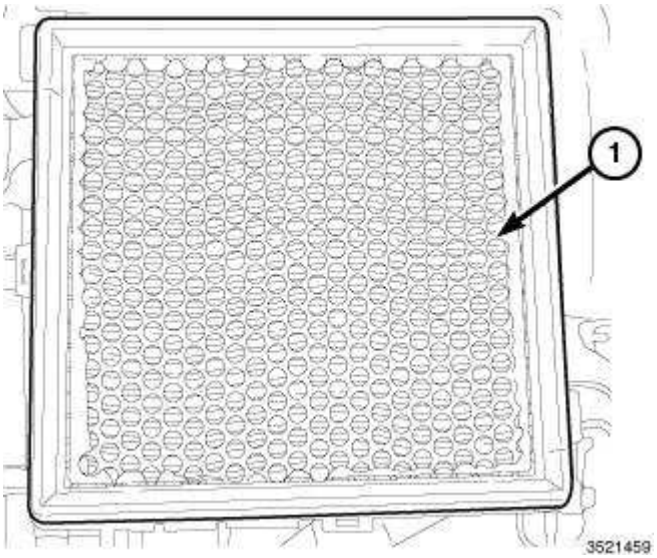


Fig. 552: Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, clean out the air cleaner body.
2. Install the air cleaner element (1) into housing.

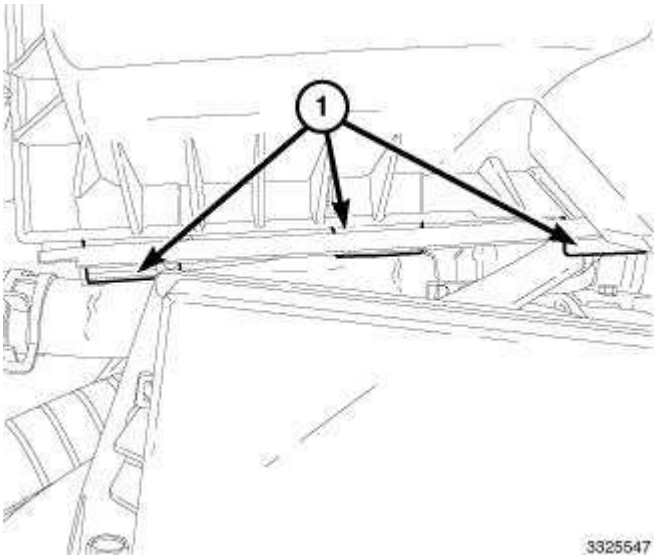


Fig. 553: Housing Cover Locating Tabs
Courtesy of CHRYSLER GROUP, LLC

3. Position housing cover locating tabs (1) into rear housing and seat cover onto housing.

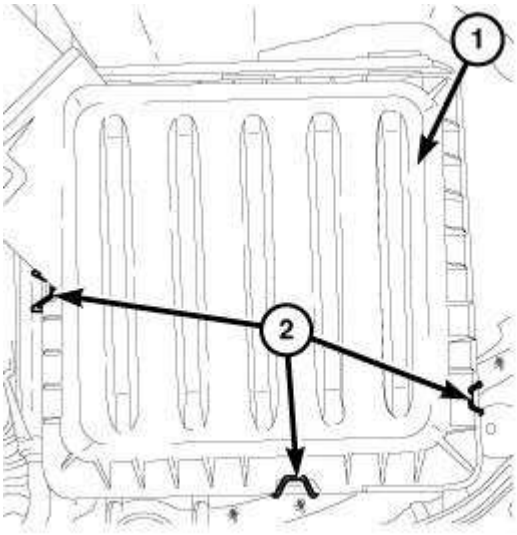


Fig. 554: Air Housing Cover & Spring Clips
Courtesy of CHRYSLER GROUP, LLC

4. Lock the spring clips (2) onto housing cover (1).

BODY, AIR CLEANER

REMOVAL

REMOVAL

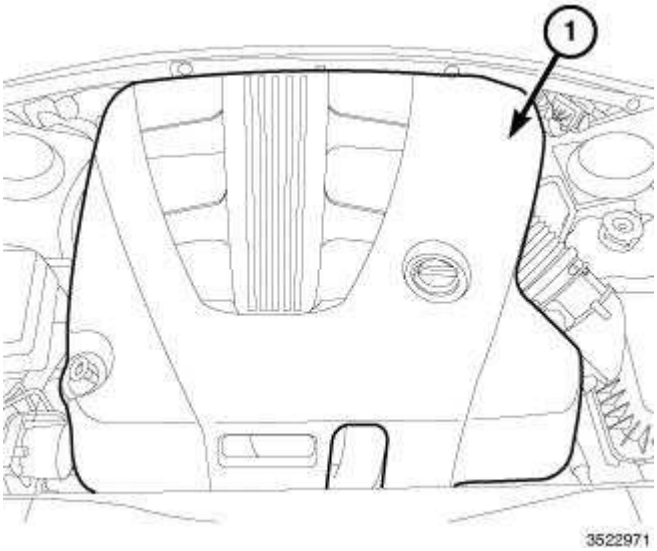


Fig. 555: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

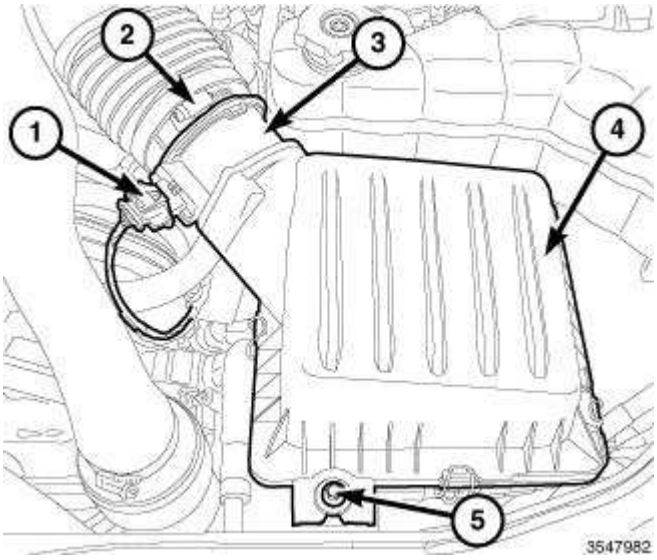


Fig. 556: Mass Air Flow (MAF) Sensor, Connector, Clamp, Air Cleaner Body & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Mass Air Flow (MAF) sensor harness connectors (2).
4. Loosen screw clamp (1) and remove the air outlet tube from the MAF sensor.
5. Remove the bolt (4) securing the air cleaner body.
6. Pulling upward, remove the air cleaner body (3).

INTAKE AIR TUBE

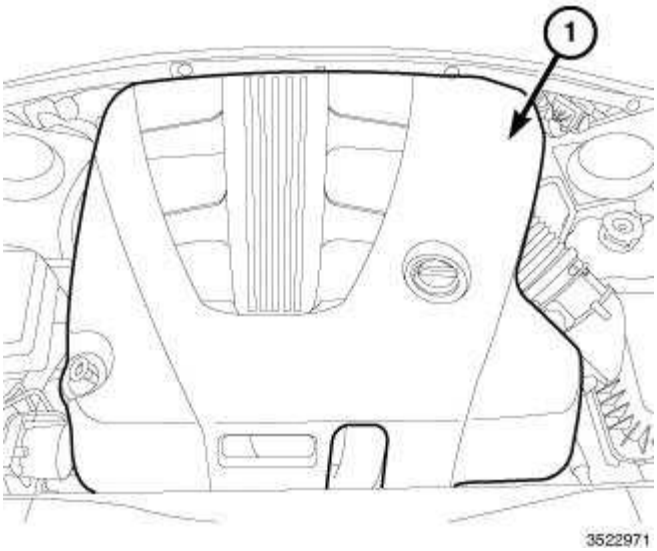


Fig. 557: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

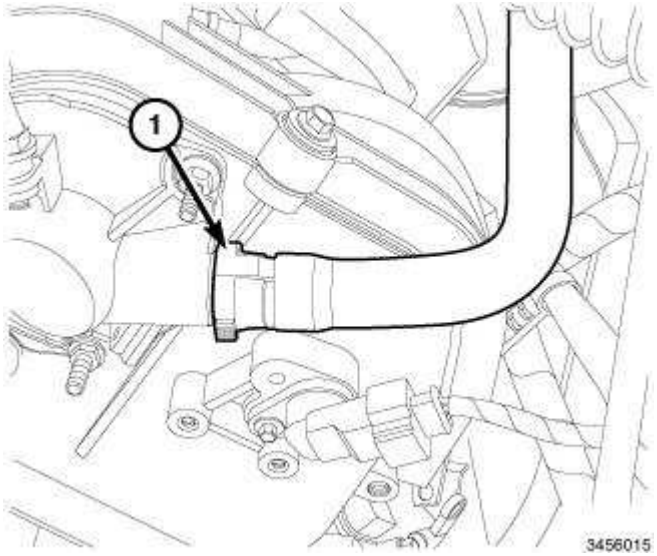


Fig. 558: CCV Hose
Courtesy of CHRYSLER GROUP, LLC

3. Remove the CCV hose (1) from upper timing cover. (During removal of the CCV hose do NOT disconnect CCV hose at the Air Tube.)

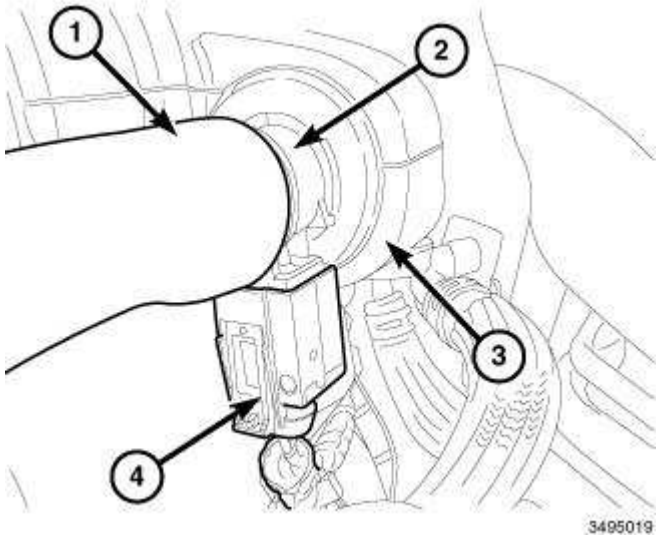


Fig. 559: Crankcase Vent Heater, Air Inlet Hose, Breather Hose & Connector
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the CCV hose heater wire harness connector (4).
5. Loosen clamp and remove intake air tube from air cleaner body.
6. Loosen clamp and remove intake air tube from turbocharger.

INSTALLATION

INSTALLATION

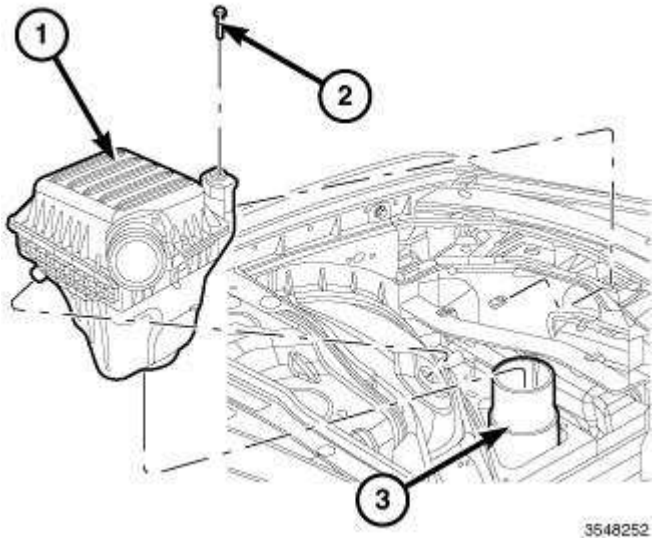


Fig. 560: Air Cleaner Body
Courtesy of CHRYSLER GROUP, LLC

1. Position the air cleaner body (3) onto the air inlet duct and push down to lock in place.

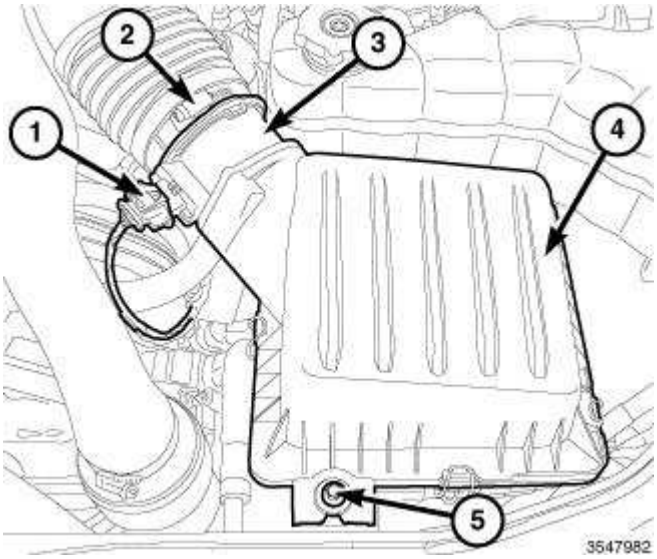


Fig. 561: Mass Air Flow (MAF) Sensor, Connector, Clamp, Air Cleaner Body & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Install the bolt and securely tighten. (4)
3. Install the air outlet tube (1) onto Mass Air Flow (MAF) sensor and securely tighten screw clamp.
4. Connect the MAF sensor harness connectors (2).

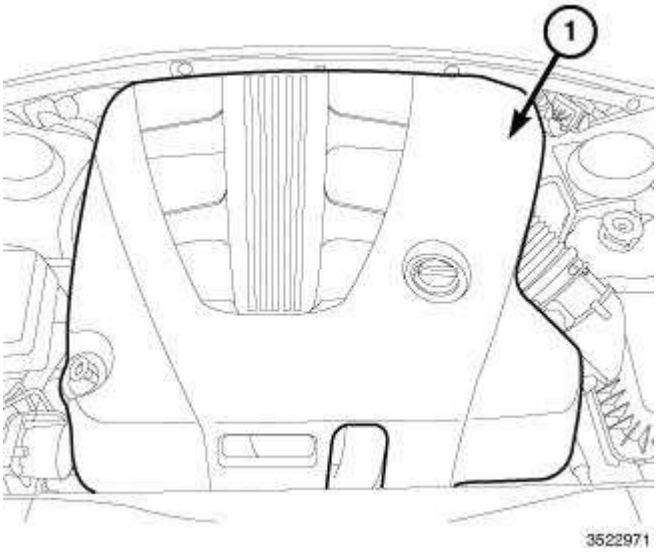


Fig. 562: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine cover (1).
6. Connect the negative battery cable.

INTAKE AIR TUBE

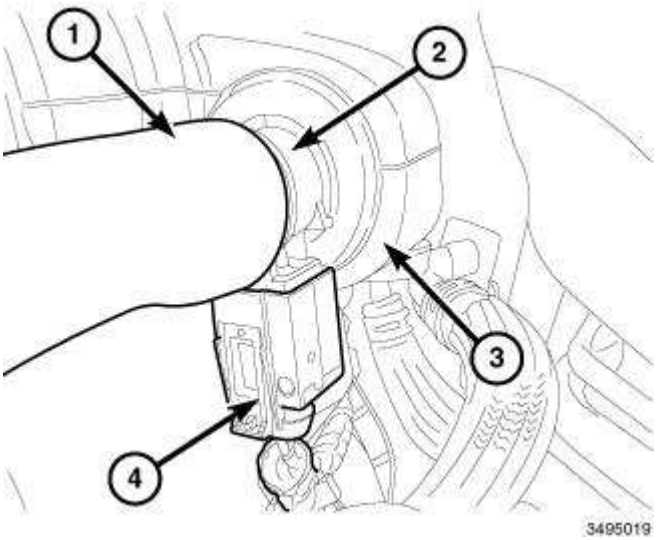


Fig. 563: Crankcase Vent Heater, Air Inlet Hose, Breather Hose & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Install the intake air tube to turbocharger and securely tighten clamp.
2. Install the intake air tube to air cleaner body and securely tighten clamp.
3. Connect the CCV hose heater wire harness connector (4).

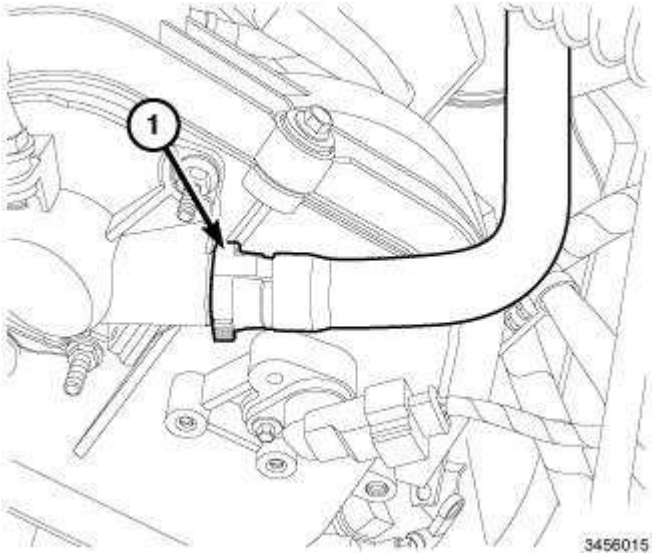


Fig. 564: CCV Hose
Courtesy of CHRYSLER GROUP, LLC

4. Install the CCV hose (1) to upper timing cover.
5. Connect the negative battery cable.

ENGINE

3.6L - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

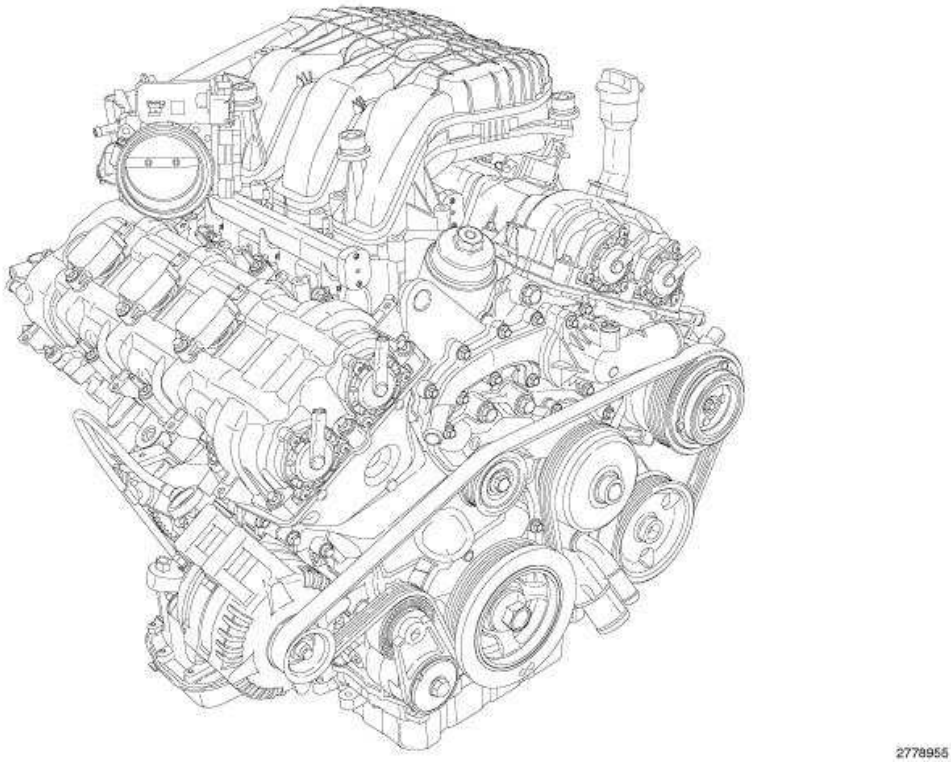


Fig. 1: 3.6L (219.7 CID) Flexible Fuel V-6 Engine
Courtesy of CHRYSLER GROUP, LLC

The 3.6 liter (219.7 CID) flexible fuel V-6 engine features Variable Valve Timing (VVT), Dual Overhead Camshafts (DOHC) and a high-pressure die-cast aluminum cylinder block with steel liners in a 60° configuration. The 3.6 liter engine has a chain driven variable discharge oil pump with a two-stage pressure regulator for improved fuel economy. The exhaust manifolds are integrated into the cylinder heads for reduced weight. The cylinders are numbered from front to rear. The right bank is numbered 1, 3, 5 and the left bank is numbered 2, 4, 6. The firing order is 1-2-3-4-5-6. The engine serial number is located on the left side of the cylinder block at the transmission flange.

DIAGNOSIS AND TESTING

ENGINE DIAGNOSIS - INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either performance (e.g., engine idles rough and stalls) or mechanical (e.g., a strange noise).

Refer to **ENGINE PERFORMANCE DIAGNOSTIC TABLE** and **ENGINE MECHANICAL DIAGNOSTIC TABLE** for possible causes and corrections of malfunctions.

Refer to **FUEL SYSTEM** article.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that can not be isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following diagnosis:

- Cylinder Compression Pressure Test. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.
- Cylinder Combustion Pressure Leakage Test. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.
- Engine Cylinder Head Gasket Failure Diagnosis. Refer to **CYLINDER HEAD GASKET**.
- Intake Manifold Leakage Diagnosis. Refer to **DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKS**.

ENGINE PERFORMANCE DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery	1. Charge or replace as necessary. Refer to **BATTERY, DIAGNOSIS AND TESTING** .
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Refer to **CLEANING** .
	3. Faulty engine starting system.	3. Diagnose engine starting system. Refer to **DIAGNOSIS AND TESTING** .
	4. Faulty coil or control unit.	4. Replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
	5. Incorrect spark plug gap.	5. Correct as necessary.
	6. Incorrect cam timing.	6. Verify cam timing. Refer to **Engine/Valve Timing - Standard Procedure**.
	7. Dirt or water in fuel system.	7. Clean fuel system.
	8. Faulty fuel pump or wiring.	8. Repair or replace as necessary.
	9. Faulty Camshaft Position (CMP) sensor.	9. Replace sensor. Refer to **SENSOR, CAMSHAFT POSITION, REMOVAL** .
	10. Faulty Crankshaft Position (CKP) sensor.	10. Replace sensor. Refer to **SENSOR, CRANKSHAFT POSITION, REMOVAL** .
ENGINE STALLS OR ROUGH IDLE	1. Vacuum leak.	1. Inspect intake manifold and vacuum hoses, repair or replace as necessary.

	2. Faulty Crankshaft Position (CKP) sensor.	2. Replace sensor. Refer to **SENSOR, CRANKSHAFT POSITION, REMOVAL** .
	3. Faulty ignition coil.	3. Replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
	4. Incorrect cam timing.	4. Verify cam timing. Refer to **Engine/Valve Timing - Standard Procedure**.
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs.	1. Correct as necessary. Refer to **SPARK PLUG, REMOVAL** .
	2. Dirt or water in fuel system.	2. Clean fuel system.
	3. Faulty fuel pump.	3. Replace fuel pump. Refer to **MODULE, FUEL PUMP, REMOVAL** .
	4. Leaking cylinder head gasket.	4. Replace cylinder head gasket. Refer to **CYLINDER HEAD, REMOVAL**.
	5. Low compression.	5. Determine the cause and repair as necessary. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.
	6. Burned, warped or pitted valves.	6. Replace as necessary. Refer to **VALVES, INTAKE AND EXHAUST, REMOVAL**.
	7. Plugged or restricted exhaust system.	7. Inspect and replace as necessary.
	8. Faulty ignition coil.	8. Replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
	9. Incorrect cam timing.	9. Verify cam timing. Refer to **Engine/Valve Timing - Standard Procedure**.
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs.	1. Correct as necessary. Refer to **SPARK PLUG, REMOVAL** .
	2. Dirt in fuel system.	2. Clean fuel system.
	3. Burned, warped or pitted valves.	3. Replace as necessary. Refer to **VALVES, INTAKE AND EXHAUST, REMOVAL**.
	4. Faulty ignition coil.	4. Replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrectly gapped spark plugs.	1. Correct as necessary. Refer to **SPARK PLUG, REMOVAL** .
	4. Faulty ignition coil.	2. Replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
	3. Dirt or water in fuel system.	3. Clean fuel system.

ENGINE MECHANICAL DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTIONS
NOISY VALVES	1. High or low oil level in	1. Refer to **Engine/Lubrication/OIL -**

	crankcase.	**Standard Procedure**.
	2. Thin or diluted oil.	2. Change oil and filter.
	3. Low oil pressure.	3. Check oil pump, if Ok, check rod and main bearings for excessive wear.
	4. Dirt in lash adjusters.	4. Replace as necessary.
	5. Worn rocker arms.	5. Replace as necessary.
	6. Worn lash adjusters	6. Replace as necessary.
	7. Worn valve guides.	7. Inspect the valve guides for wear, cracks or looseness. If either condition exists, replace the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.
	8. Excessive runout of valve seats on valve faces.	8. Refer to **Engine/Cylinder Head/VALVES, Intake and Exhaust - Standard Procedure**.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	2. Low oil pressure.	2. Check oil pump, if OK, check rod and main bearings for excessive wear.
	3. Thin or diluted oil.	3. Change oil and filter.
	4. Excessive bearing clearance.	4. Replace as necessary.
	5. Connecting rod journal out-of-round.	5. Service or replace crankshaft.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	2. Low oil pressure.	2. Check oil pump, if OK, check rod and main bearings for excessive wear.
	3. Thin or diluted oil.	3. Change oil and filter.
	4. Excessive bearing clearance.	4. Replace as necessary.
	5. Excessive end play.	5. Check thrust washers for wear.
	6. Crankshaft journal out-of round.	6. Service or replace crankshaft.
	7. Loose flywheel or torque converter.	7. Tighten to correct torque

CYLINDER COMPRESSION PRESSURE LEAKAGE

NOTE: **The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.**

NOTE: **Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.**

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plugs and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Disable the fuel system and perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the 3rd revolution. Continue the test for the remaining cylinders.

   NOTE: **The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.**

7. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
8. If one or more cylinders have abnormally low compression pressures, repeat the compression test.

   NOTE: **If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question.**

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.

CYLINDER COMBUSTION PRESSURE LEAKAGE

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
3. Remove the spark plugs.
4. Remove the oil filler cap.
5. Remove the air cleaner hose.
6. Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1, 379 kPa (200 psi) maximum and 552 kPa (80 psi) recommended.
7. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set piston of cylinder to be tested at TDC compression. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with no more than 25% leakage.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART**.

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
AIR ESCAPES THROUGH THROTTLE BODY	Intake valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH TAILPIPE	Exhaust valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH RADIATOR	Head gasket leaking or cracked cylinder head or block	Remove cylinder head and inspect. Replace defective part
MORE THAN 50% LEAKAGE FROM ADJACENT CYLINDERS	Head gasket leaking or crack in cylinder head or block between adjacent cylinders	Remove cylinder head and inspect. Replace gasket, head, or block as necessary
MORE THAN 25% LEAKAGE AND AIR ESCAPES THROUGH OIL FILLER CAP OPENING ONLY	Stuck or broken piston rings; cracked piston; worn rings and/or cylinder wall	Inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary

OIL CONSUMPTION TEST AND DIAGNOSIS

Diagnostic Procedures

The following diagnostic procedures are used to determine the source of excessive internal oil Consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: Engine oil consumption may be greater than normal during engine break-in. Repairs should be delayed until vehicle has been driven at least 7, 500 miles.

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, ensure no external engine oil leaks are present.

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and/or correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.
2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPAR® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.
4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, re-check for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the positive crankcase ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a **CYLINDER COMPRESSION PRESSURE LEAKAGE** test and **CYLINDER-TO-CYLINDER LEAKAGE TEST** using the standard leak down gauge following manufacturers suggested best practices.

   NOTE: Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or valve guides are at fault.

3. If one or more cylinders have more than 15% leak down further engine tear down and inspection will be required.

TOP 19 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings, also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of "PCV "system**

   The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

   The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not

flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

   When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption;

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

    Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus

leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and/or ambient temperatures.

12. **Dirty Engine Oil**

    Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

    Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick in this incorrect position which will actually make the oil level too high. If the oil level is so high that the lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

    A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

    Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

    Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

    There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated

plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

    Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption, an extremely dirty air filter would be one example of this situation.

19. **Intake Manifold port seals**

    Engines that have a "V" configuration and a "wet valley" (3.3/3.8L) could draw oil into the intake ports due to improper sealing between the intake manifold ports and cylinder head. Causes may include improper torque of intake manifold bolts, corrosion (aluminum intake manifold) and or warped sealing surface.

ENGINE LUBRICATION DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-rings. Misaligned or damaged.	1. Replace as necessary.
	(a) Loose fasteners, broken or porous metal parts.	(a) Tighten fasteners, Repair or replace metal parts.
	2. Crankshaft rear oil seal.	2. Replace rear crankshaft oil seal. Refer to **SEAL, CRANKSHAFT OIL, REAR, REMOVAL**.
	3. Crankshaft seal flange. Scratched, nicked or grooved.	3. Polish or replace crankshaft.
	4. Oil pan flange cracked.	4. Replace oil pan. Refer to **PAN, OIL, REMOVAL**.
	5. Engine timing cover seal, damaged or misaligned.	5. Replace seal. Refer to **SEAL, CRANKSHAFT OIL, FRONT, REMOVAL**.
	6. Scratched or damaged vibration damper hub.	6. Polish or replace damper.
OIL PRESSURE DROP	1. Low oil level.	1. Check and correct oil level.
	2. Faulty oil pressure sensor.	2. Replace sensor. Refer to **SENSOR, OIL PRESSURE, REMOVAL**.
	3. Low oil pressure.	3. Check main bearing clearance. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**. 3. Check rod bearing clearance.

		Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
	4. Clogged oil filter.	4. Replace oil filter. Refer to **FILTER, ENGINE OIL, REMOVAL**.
	5. Worn oil pump.	5. Replace oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
	6. Thin or diluted oil.	6. Change oil and filter. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	7. Excessive bearing clearance.	7. Replace crankshaft bearings. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**. 7. Replace rod bearings. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
	8. Oil pump relief valve stuck.	8. Replace oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
	9. Oil pump pick-up tube loose, damaged or clogged.	9. Replace oil pump pick-up. Refer to **PICK-UP, OIL PUMP, REMOVAL**.
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings.	1. Hone cylinder bores and replace rings. Refer to **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
	2. Carbon in oil ring slots.	2. Replace rings. Refer to **ROD, PISTON AND CONNECTING, REMOVAL**.
	3. Worn valve guides.	3. Replace cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.
	4. Leaking valve guide seals.	4. Replace valve guide seals. Refer to **SEAL(S), VALVE GUIDE, REMOVAL**.

STANDARD PROCEDURE

ENGINE GASKET SURFACE PREPARATION

Fig. 2: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

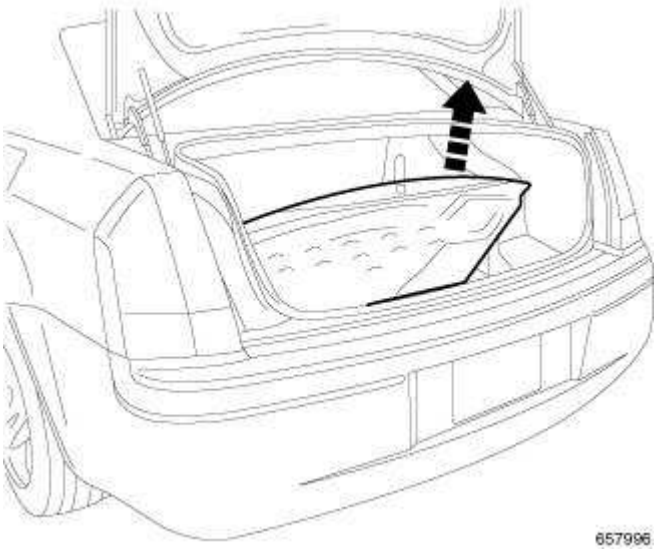


Fig. 3: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- High speed power tool with a plastic bristle brush style disc.

Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent).

DUST COVERS AND CAPS

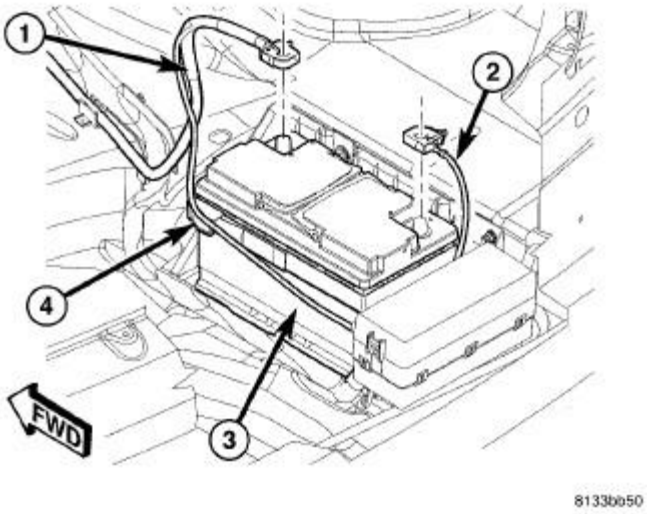


Fig. 4: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

Due to the high amounts of failures cased by dust, dirt, moisture and other foreign debris being introduced to the engine during service. Covers or caps are needed to reduce the possible damage that can be caused or created.

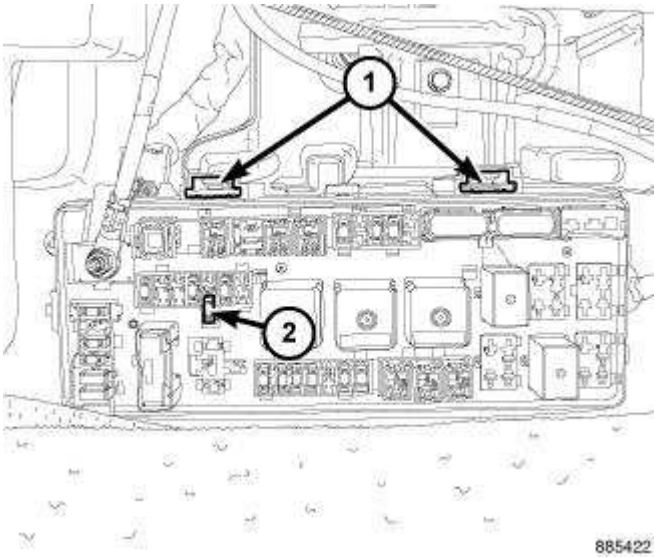


Fig. 5: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers over openings will reduce any possibilities for foreign materials to enter the engine systems. Using miller tool (special tool #10368, Set, Universal Protective Cap), Select the appropriated cover needed to the procedure.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Be sure that the tapped holes maintain the original center line.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads.
- Tapping the hole with a special Heli-Coil Tap, or equivalent.
- Installing an insert into the tapped hole to bring the hole back to its original thread size.

FORM-IN-PLACE GASKETS AND SEALERS

NOTE: All of the sealants mentioned below are not used on every engine, they are listed as a general reference guide. See service information for specific sealer usage.

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. All sealing surfaces that use form-in-place gaskets and sealers **must** free of grease or oil.

Surfaces should be cleaned with Mopar® brake parts cleaner prior to sealer application. After the sealer is applied, the parts should be assembled in no more than 10 minutes.

There are numerous types of form-in-place gasket materials that are used in the engine area. Mopar® Engine RTV GEN II, Mopar® ATF-RTV, and Mopar® Gasket Maker gasket materials, each have different properties and can not be used in place of the other.

MOPAR® ENGINE RTV GEN II is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® BED PLATE SEALANT is a unique (green-in-color) anaerobic type gasket material that is specially made to seal the area between the bed plate and cylinder block without disturbing the bearing clearance or alignment of these components. The material cures slowly in the absence of air when torqued between two metallic surfaces, and will rapidly cure when heat is applied.

MOPAR® THREEBOND ENGINE RTV SEALANT is a unique gasket material that is specially made to retain adhesion and sealing properties when used to seal components exposed to engine oil.

SEALER APPLICATION

Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Engine RTV GEN II or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing and "T" joint locations, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Threebond Engine RTV Sealant gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. The gasket surfaces should be cleaned with isopropyl alcohol wipes in preparation for sealant application. All mounting holes must be circled. For corner

sealing and "T" joint locations, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be assembled within 20 minutes and torqued in place within 45 minutes. The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

ENGINE GASKET SURFACE PREPARATION

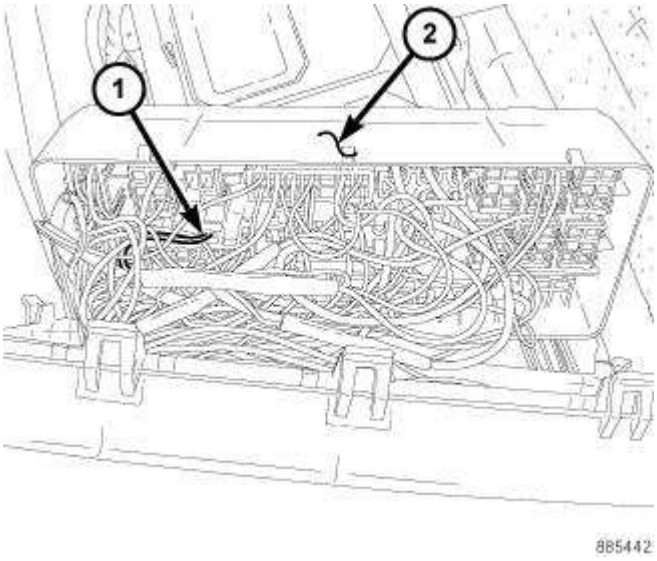


Fig. 6: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

1 - ABRASIVE PAD
2 - 3M ROLOC™ BRISTLE DISC
3 - PLASTIC/WOOD SCRAPER

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper.
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (1).

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (3).
- Drill motor with 3M Roloc™ Bristle Disc (white or yellow) (2).

CAUTION: Excessive pressure or high RPM (beyond the recommended speed), can damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.

SPECIFICATIONS

SPECIFICATIONS

GENERAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION	
Type	60° DOHC V-6 24-Valve	
Compression Ratio	10.2:1	
Lead Cylinder	#1 Right Bank	
Firing Order	1-2-3-4-5-6	
	Metric	**Standard**
Displacement	3.6 Liters	220 Cubic Inches
Bore and Stroke	96.0 x 83.0 mm	3.779 in. x 3.268 in.

CYLINDER BLOCK

Description	Specification	
	Metric	**Standard**
Cylinder Bore Diameter - Grade 1	95.995 mm ± 0.005 mm	3.7793 in. ± 0.0002 in.
Cylinder Bore Diameter - Grade 2	96.005 mm ± 0.005 mm	3.7797 in. ± 0.0002 in.
Cylinder Bore Out-of-Round (Max.)	0.009 mm	0.00035 in.
Cylinder Bore Cylindricity	0.014 mm	0.0006 in.
Crankshaft Bore Taper* (Max.)	0.006 mm	0.0002 in.
*Measured over length of bulkhead		

PISTONS

Description	Specification	
	Metric	**Standard**
Material	Cast Aluminum Alloy	
Piston Diameter (Metal to Metal) - Grade 1	95.955 mm ± 0.005 mm	3.7778 in. ± 0.0002 in.
Piston Diameter (Metal to Metal) - Grade 2	95.965 mm ± 0.005 mm	3.7781 in. ± 0.0002 in.
Piston Diameter (Metal to Coating) - Grade 1	95.970 - 96.000 mm	3.7783 - 3.7795 in.
Piston Diameter (Metal to Coating) - Grade 2	95.980 - 96.010 mm	3.7787 - 3.7835 in.
Clearance at Size Location (Metal to Metal)	0.030 - 0.050 mm	0.0012 - 0.0020 in.

Clearance at Size Location (Metal to Coating)	0.010 - 0.030 mm	0.0004 - 0.0012 in.
Piston Weight	354 - 364 grams	12.487 - 12.840 oz.
Piston Pin Offset	0.8 mm	0.031 in.
Piston Ring Groove Diameter - No. 1	88.24 - 88.44 mm	3.474 - 3.482 in.
Piston Ring Groove Diameter - No. 2	86.54 - 86.74 mm	3.407 - 3.415 in.
Piston Ring Groove Diameter - No. 3	89.16 - 89.36 mm	3.510 - 3.518 in.

PISTON PINS

Description	Specification	
	Metric	Standard
Type	Full Floating	
Pin Diameter	21.9985 ± 0.0015 mm	0.86608 ± 0.00006 in.
Clearance in Piston	0.002 - 0.011 mm	0.0001 - 0.0004 in.
Clearance in Rod	0.011 - 0.024 mm	0.0004 - 0.0009 in.

PISTON RINGS

Description	Specification	
	Metric	Standard
Ring Gap - Number 1 Ring (Top)	0.25 - 0.40 mm	0.010 - 0.016 in.
Ring Gap - Number 2 Ring (Center)	0.30 - 0.45 mm	0.012 - 0.018 in.
Ring Gap - Oil Control Ring (Steel Rails)	0.15 - 0.66 mm	0.006 - 0.026 in.

PISTON RING SIDE CLEARANCE

Description	Specification	
	Metric	Standard
Number 1 Ring (Top)	0.025 - 0.083 mm	0.0010 - 0.0033 in.
Number 2 Ring (Center)	0.030 - 0.078 mm	0.0012 - 0.0031 in.
Oil Control Ring (Steel Rails)	0.007 - 0.173 mm	0.0003 - 0.0068 in.

PISTON RING WIDTH

Description	Specification	
	Metric	Standard
Number 1 Ring (Top)	3.00 - 3.20 mm	0.118 - 0.126 in.
Number 2 Ring (Center)	3.59 - 3.85 mm	0.141 - 0.152 in.
Oil Control Ring (Steel Rails)	1.930 - 2.083 mm	0.076 - 0.082 in.

CONNECTING RODS

	Specification	

Description	Metric	Standard
Bearing Clearance (With Crush)	0.023 - 0.064 mm	0.0009 - 0.0025 in.
Side Clearance	0.070 - 0.370 mm	0.0028 - 0.0146 in.
Side Clearance (Max.)	0.370 mm	0.0146 in.
Piston Pin Bore Diameter	22.016 ± 0.005 mm	0.8668 ± 0.0002 in.
Bearing Bore Out of Round (Max.)	0.008 mm	0.0003 in.
Total Weight (Less Bearing)	546.7 ± 8 grams	19.28 ± 0.28 oz.

CRANKSHAFT MAIN BEARING JOURNALS

Description	Specification	
	Metric	Standard
Diameter	71.996 ± 0.009 mm	2.8345 ± 0.0035 in.
Bearing Clearance	0.024 - 0.050 mm	0.0009 - 0.0020 in.
Bearing Clearance (Max.)	0.050 mm	0.0020 in.
Out of Round (Max.)	0.005 mm	0.0002 in.
Taper (Max.)	0.005 mm	0.0002 in.
End Play	0.050 - 0.290 mm	0.0020 - 0.0114 in.
End Play (Max.)	0.290 mm	0.0114 in.

CONNECTING ROD JOURNALS

Description	Specification	
	Metric	Standard
Diameter	59.0 ± 0.009 mm	2.3228 ± 0.0035 in.
Bearing Clearance	0.023 - 0.064 mm	0.0009 - 0.0025 in.
Out of Round (Max.)	0.005 mm	0.0002 in.
Taper (Max.)	0.005 mm	0.0002 in.

CAMSHAFT

Description	Specification	
	Metric	Standard
Bore Diameter - No. 1 Cam Towers	32.020 - 32.041 mm	1.2606 - 1.2615 in.
Bore Diameter - No. 2, 3, 4 Cam Towers	24.020 - 24.041 mm	0.9457 - 0.9465 in.
Bearing Journal Diameter - No. 1	31.976 - 31.995 mm	1.2589 - 1.2596 in.
Bearing Journal Diameter - No. 2, 3, 4	23.977 - 23.996	0.9440 - 0.9447 in.
Bearing Clearance - No. 1	0.025 - 0.065 mm	0.00010 - 0.0026 in.
Bearing Clearance - No. 2, 3, 4	0.024 - 0.064 mm	0.0009 - 0.0025 in.
End Play	0.075 - 0.251 mm	0.003 - 0.010 in.

VALVE TIMING-INTAKE VALVES

Description	Specification

Opens	2° (ATDC)
Closes	82° (ABDC) or 262° (ATDC)
Duration	260°
Centerline	128°
Note: Units are in crank degrees, using 0.1524 mm (0.006 in.) valve lift as the threshold.	

VALVE TIMING-EXHAUST VALVES

Description	Specification
Opens	59° (BBDC) or 239° (BTDC)
Closes	12° (ATDC)
Duration	251°
Valve Overlap	10°
Note: Units are in crank degrees, using 0.1524 mm (0.006 in.) valve lift as the threshold.	

CYLINDER HEAD

Description	Specification	
	Metric	Standard
Gasket Thickness* (Compressed)	0.48 - 0.60 mm	0.019 - 0.024 in.
Flatness (Head Gasket Surface)	0.09 mm	0.0035 in.
Valve Seat Angle	44.75° ± 0.25° from the valve guide axis	
Valve Seat Runout (relative to the valve guide axis) - Intake and Exhaust	0.050 mm	0.002 in.
Intake Valve Seat Width	1.0 - 1.2 mm	0.04 - 0.05 in.
Exhaust Valve Seat Width	1.41 - 1.61 mm	0.055 - 0.063 in.
Guide Bore Diameter (Std.)	6.00 - 6.02 mm	0.236 - 0.237 in.
Valve Guide Height** - Intake and Exhaust	16.05 - 16.55 mm	0.632 - 0.652 in.
*Measured at the fire ring, not at the outer edge **Measured from cylinder head valve spring seat surface to top of guide		

VALVES

Description	Specification	
	Metric	Standard
Face Angle	45.25° ± 0.25°	
Head Diameter - Intake	39.0 ± 0.100 mm	1.535 ± 0.004 in.
Head Diameter - Exhaust	30.0 ± 0.100 mm	1.181 ± 0.004 in.
Length-Intake (Overall)	116.54 ± 0.23 mm	4.588 ± 0.009 in.
Length-Exhaust (Overall)	115.6 ± 0.23 mm	4.551 ± 0.009 in.
Stem Diameter - Intake	5.968 ± 0.009 mm	0.2350 ± 0.0004 in.
Stem Diameter - Exhaust	5.961± 0.009 mm	0.2347 ± 0.0004 in.
Stem-to-Guide Clearance - Intake (New)	0.023 - 0.061 mm	0.0009 - 0.0024 in.
Stem-to-Guide Clearance - Exhaust		

(New)	0.030 - 0.068 mm	0.0012 - 0.0027 in.
Stem-to-Guide Clearance-Intake (Max., Rocking Method)	0.29 mm	0.011 in.
Stem-to-Guide Clearance - Exhaust (Max., Rocking Method)	0.37 mm	0.015 in.
Valve Lift-Intake (Zero Lash)	10.3 mm	0.406 in.
Valve Lift-Exhaust (Zero Lash)	10.0 mm	0.394 in.
Valve Stem Tip Height* - Intake	52.4 - 53.5 mm	2.063 - 2.106 in.
Valve Stem Tip Height* - Exhaust	51.8 - 52.9 mm	2.039 - 2.083 in.
*Valve tip to aluminum spring seat boss		

VALVE SPRING

Description	Specification	
	Metric	Standard
Free Length - Intake AND Exhaust (Approx.)	52.5 mm	2.067 in.
Spring Force - Intake AND Exhaust (Valve Closed)	295 ± 13 N @ 40.0 mm	66 ± 3 lbs. @ 1.57 in.
Spring Force - Intake (Valve Open)	688 ± 31 N @ 10.3 mm	155 ± 7 lbs. @ 0.4055 in.
Spring Force - Exhaust (Valve Open)	676 ± 30 N @ 10.0 mm	152 ± 6 lbs. @ 0.3937 in.
Number of Coils - Intake AND Exhaust	9.35	
Wire Diameter - Intake AND Exhaust	3.18 x 3.99 mm (ovate)	0.125 x 0.157 in. (ovate)
Installed Height - Intake AND Exhaust (Spring seat top to bottom of retainer)	40.0 mm	1.575 in.

OIL PRESSURE

Description	Specification	
	Metric	Standard
(NOTE: At Normal Operating Temperatures)		
Pressure @ Curb Idle Speed*	34.7 kPa Min.	5 psi Min.
Pressure @ 600 - 1200 RPM	34.7 (warm) - 958.0 (cold) kPa	5 (warm) - 139 (cold) psi
Pressure @ 1201 - 3500 RPM	206.8 (warm) - 958.0 (cold) kPa	30 (warm) - 139 (cold) psi
Pressure @ 3501 - 6400 RPM	427.0 (warm) - 958.0 (cold) kPa	62 (warm) - 139 (cold) psi
*CAUTION: If oil pressure is zero at idle, DO NOT run engine at 3000 RPM.		

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.

Air Inlet Hose - Band Clamps	4	-	35
A/C Compressor to Engine - M8 Bolts	25	18	-
Camshaft Chain Tensioner (Primary) - M6 T30	12	-	106
Camshaft Chain Guide (Primary) - M6 T30	12	-	106
Camshaft Chain Idler Sprocket - M8 T45	25	18	-
Camshaft Chain LH Tensioner (Secondary) - M6 T30	12	-	106
Camshaft Chain LH Guide (Secondary) - M6 T30	12	-	106
Camshaft Chain RH Tensioner (Secondary) - M6 T30	12	-	106
Camshaft Chain RH Guide (Secondary) - M6 T30	12	-	106
Camshaft Position (CMP) Sensor to Cylinder Head - 6M T30	9	-	80
Camshaft Bearing Cap -	9.5	-	84

M6 T30			
Connecting Rod Cap - M9 Bolts	20 + 90° Turn	15 + 90° Turn	-
Coolant Pump to Engine Timing Cover - M6 Bolts	12	-	106
Coolant Crossover Housing to Engine Timing Cover - M6 Bolts	12	-	106
Coolant Pump to Engine Timing Cover - M10 Bolt	55	40	-
Crankshaft Target Wheel to Counterweight - M6 T30	10	-	89
Crankshaft Outer Main Bearing Cap and Windage Tray - M8 Bolts	21 + 90° Turn	16 + 90° Turn	-
Crankshaft Inner Main Bearing Cap - M11 Bolts	20 + 90° Turn	15 + 90° Turn	-
Crankshaft Side Main Bearing Cap (Tie Bolt) - M8 Bolts	28	-	250
Crankshaft Vibration Damper - M16 Bolt	40 + 105° Turn	30 + 105° Turn	-
Crankshaft Position (CKP) Sensor to Engine Block - M6 Bolt	12	-	106

Crankshaft Rear Oil Seal Retainer - M6 T30	12	-	106
Cylinder Head Oil Restrictor - M8 Plug	15	-	133
Cylinder Head to Engine Block - M12 Bolts in Sequence	See **INSTALLATION** Procedure		
Cylinder Head Cover - M6 Bolts	12	-	106
Catalytic Converter to Cylinder Head - M8 Bolts	23	17	-
Engine Coolant Temperature (ECT) Sensor	11	-	97
Engine Block Heater - M6 Bolt	12	-	106
Left/Right Engine Mount Bracket to Engine Block - M10 Bolts	61	45	-
Left/Right Engine Mount Isolator to Engine Mount Bracket - M10 Nuts	61	45	-
Left/Right Engine Mount Heatshield to Engine Mount Bracket - M6 Bolts	12	-	106
Left/Right Engine Mount Isolator to	61	45	-

Frame - M10 Bolts			
Flexplate to Crankshaft - M10 Bolts	95	70	-
Fuel Rail to Lower Intake Manifold - M6 Bolts	7	-	62
Generator - M8 Bolts	25	18	-
Heater Core Supply Tube to Cylinder Head - M8 Bolt	12	-	106
Idler Pulley to Engine Timing Cover - Accessory Drive M8 Bolt	25	18	-
Ignition Capacitor to Cylinder Head - M6 Bolts	10	-	89
Ignition Coil to Cylinder Head Cover - M6 Bolts	8	-	71
Intake Manifold (Upper) - M6 Bolts	8	-	71
Intake Manifold (Lower) - M6 Bolts	8	-	71
Knock Sensor to Engine Block - M8 T40	22	16	-
Negative Battery Cable to Battery	5	-	45
Engine Block Oil Gallery - M24 Plugs	10 + 1250° Turn	-	89 + 1250° Turn
Oil Control Valve - Cam	150	111	-

Phaser M18			
Upper Oil Pan to Engine Block - M8 Bolts	25	18	-
Transmission to Upper Oil Pan - M10 Bolts	55	41	-
Transmission to Starter - M10 Bolts	55	41	-
Torque Converter Dust Shield - M8 Bolt	12	-	106
Oil Cooler to Oil Filter Housing Screws	4	-	35
Upper Oil Pan to Rear Seal Retainer - M6 Bolts	12	-	106
Oil Pan Drain - Plug M14	27	20	-
Oil Pressure Sensor to Oil Filter Housing	20	-	177
Oil Temperature Sensor to Oil Filter Housing	20	-	177
Lower Oil Pan to Upper Oil Pan - M6 Bolts	10.5	-	93
Piston Oil Cooler Jet to Engine Block - M5	6	-	53
Oil Filter Housing/Oil Cooler to Engine Block - M6 Bolts	12	-	106

Oil Filter Housing Cap	25	18	-
Oil Pump to Block - M6 Bolts	12	-	106
Oil Level Indicator to Engine Block - M10 Bolt	35	26	-
Oil Level Indicator to Cylinder Head - M6 Bolt	12	-	106
Oil Pump Sprocket - M8 T45	25	18	-
Oil Pump Pick Up Tube Bracket to Windage Tray - M6 Bolt	12	-	106
Oil Pump Pick Up Tube to Oil Pump - M6 Bolt	12	-	106
Oxygen Sensor to Exhaust Pipe - M18	50	37	-
PCV Valve - M5 T25	4	-	35
Power Steering Pump to Bracket - M8 Bolts	25	18	-
Power Steering Pump Bracket to Engine - M8 Bolts	25	18	-
Spark Plug to Cylinder Head - M12	17.5	13	-
Starter Mounting - M10 Bolts	55	41	-

Tensioner to Engine Timing Cover - Accessory Drive M10 Bolt	55	41	-
Thermostat Housing to Coolant Crossover - M6 Bolts	12	-	106
Throttle Body - M6 Bolts	7	-	62
Engine Timing Cover - M6 Bolts	12	-	106
Engine Timing Cover - M8 Bolt	25	18	-
Engine Timing Cover - M10 Bolts	55	41	-
Transmission to Engine Block - M10 Bolts	55	41	-
Transmission Fluid Indicator to Transmission - M6 Bolt	12	-	106
Torque Converter - M8 Bolts	42	31	-
Upper Intake Manifold Support Bracket to Cylinder Head - M8 Bolt	20	-	177
Upper Intake Manifold Support Bracket to Upper Intake Manifold - M6 Nuts	10	-	89

Variable Valve Timing Solenoid to Cylinder Head Cover - M5 T25	4	-	35
Wire Harness Retainer Bracket to LH Cylinder Head - M6 T30	12	-	106
Rear Engine Mount Bracket to Transmission - M8 Bolts	33	24	-
Rear Engine Mount Isolator to Rear Engine Mount Bracket - M10 Bolts	61	45	-
Rear Engine Mount Crossmember to Frame - M10 Bolts	55	41	-
Rear Engine Mount Isolator to Crossmember - M10 Bolts	61	45	-
Left/Right Crossmember Brace to Crossmember - M8 Bolts	55	41	-
Left/Right Crossmember Brace to Frame - M8 Bolts	55	41	-

REMOVAL

REMOVAL

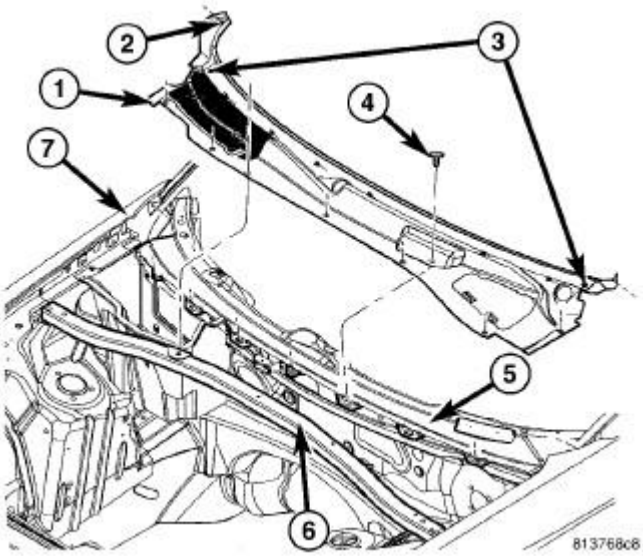


Fig. 7: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Remove the hood. Refer to **HOOD, REMOVAL** .
2. Remove the cowl panel cover (2). Refer to **COVER, COWL PANEL, REMOVAL** .
3. Remove the strut tower support (6).

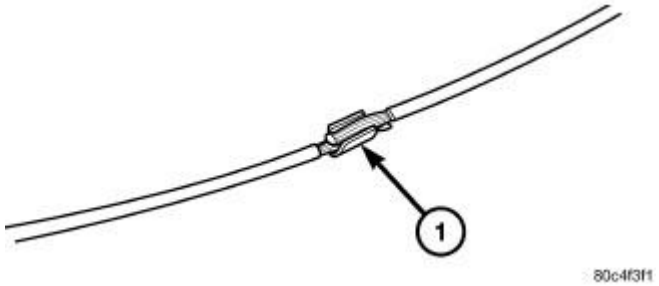


Fig. 8: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

4. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
5. Disconnect and isolate the negative battery cable (1).
6. Perform the Refrigerant System Recovery procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .

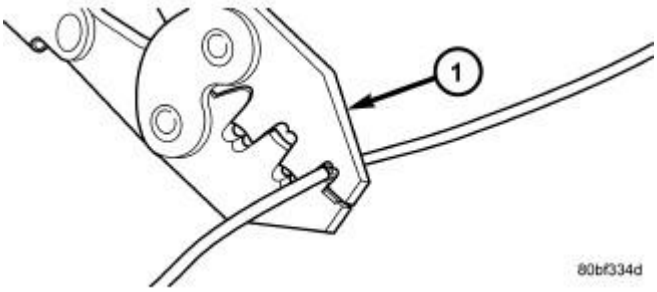


Fig. 9: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

7. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

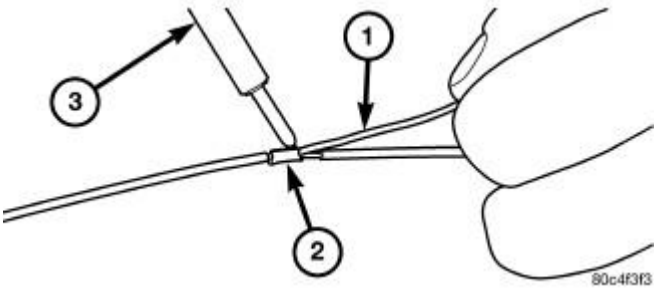


Fig. 10: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
9. Loosen the clamp (2) at the throttle body.
10. Loosen the clamp (3) at the air cleaner housing.
11. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
12. Remove the air inlet hose assembly (5).

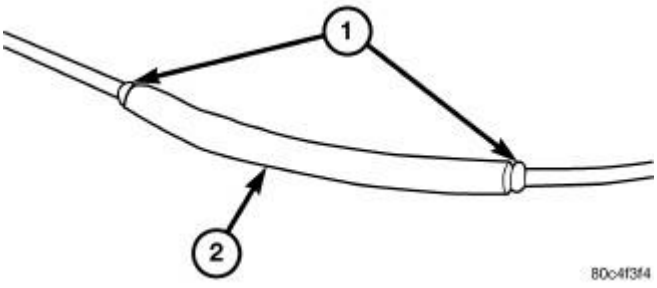


Fig. 11: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the fresh air makeup hose (1) from the air cleaner housing.
14. Remove the air cleaner housing retaining bolt (2).

15. Remove the air cleaner housing (3).

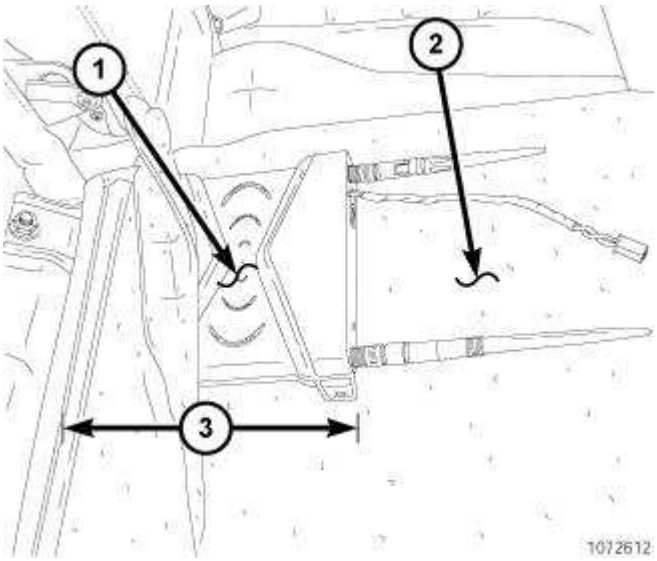


Fig. 12: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

16. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
17. Remove the belly pan retainers (1) and remove the belly pan.
18. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
19. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

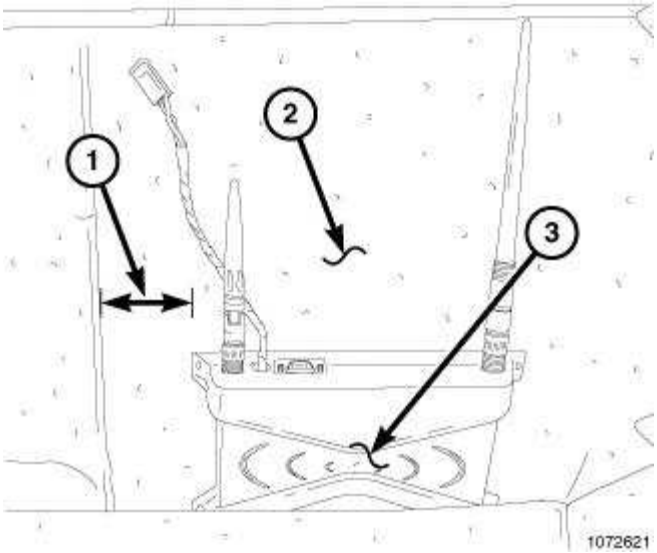


Fig. 13: Removing/Installing Front Axle
Courtesy of CHRYSLER GROUP, LLC

20. If equipped with AWD, remove the front axle assembly (1). Refer to **REMOVAL** .

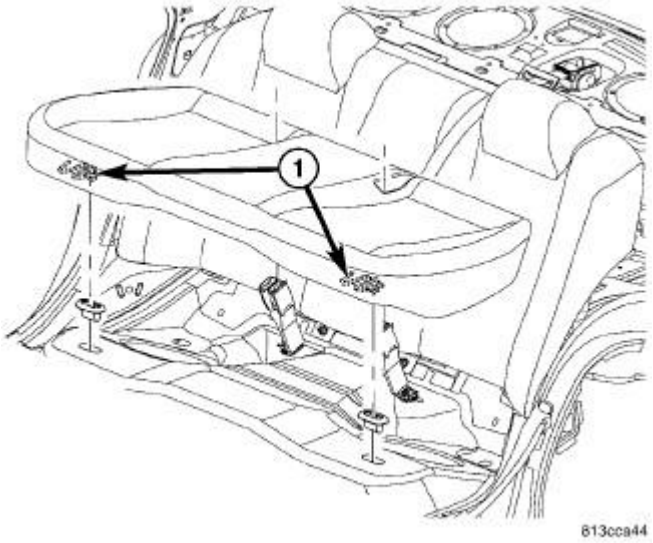


Fig. 14: Upstream Oxygen Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

21. Disconnect both left and right upstream oxygen sensor (2) electrical connectors (1).

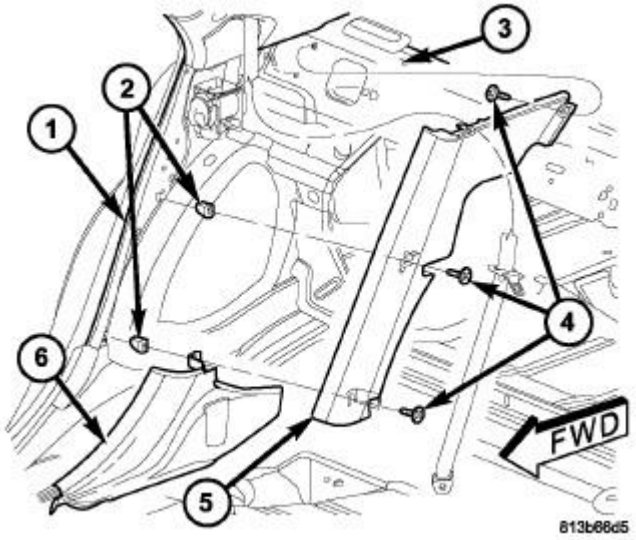


Fig. 15: Exhaust Down Pipe & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

22. Remove the exhaust down pipe (1) to catalytic converter retaining nuts (2) from both left and

right down pipes.

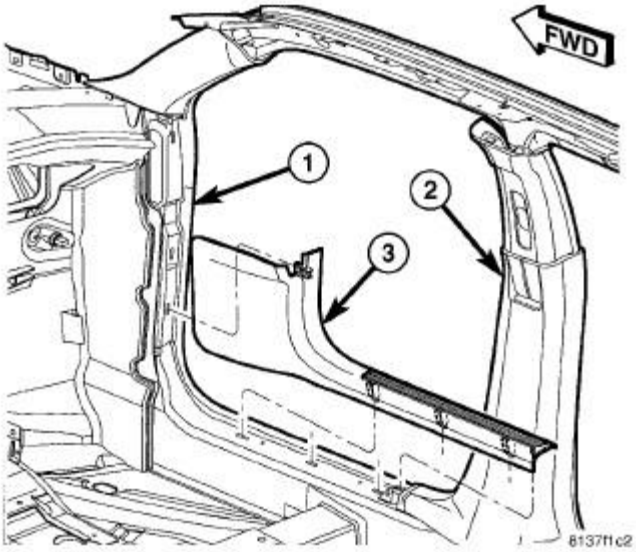


Fig. 16: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

23. Remove the starter motor. Refer to **STARTER, REMOVAL** .
24. Rotate the crankshaft in a clockwise direction until the torque converter bolts (1) are accessible through the starter mounting hole and remove the six torque converter bolts (1).
25. Lower the vehicle.

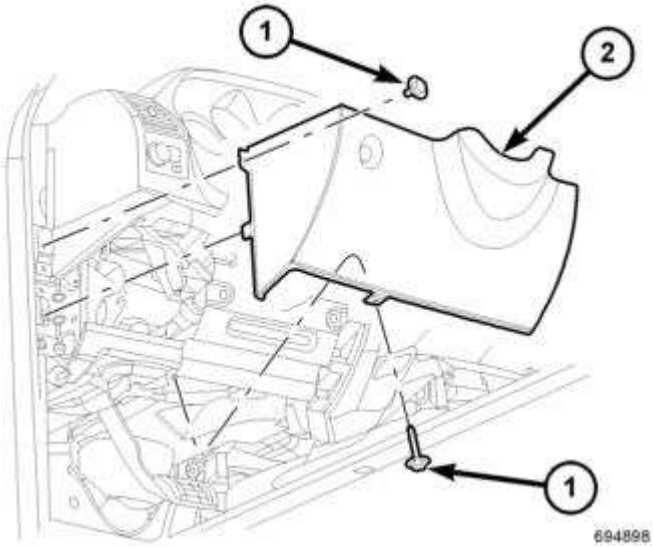


Fig. 17: Coolant Bottle Return Hose
Courtesy of CHRYSLER GROUP, LLC

26. Remove the coolant bottle return hose (1).

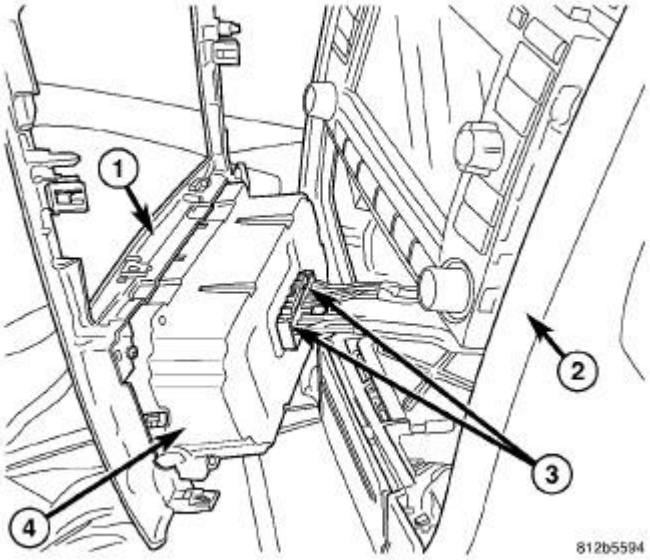


Fig. 18: Heater Core Purge Hose, Coolant Bottle Retaining Bolts & Coolant Bottle
Courtesy of CHRYSLER GROUP, LLC

27. Remove the heater core purge hose (1) from the coolant bottle.
28. Remove the coolant bottle retaining bolts (2).
29. Remove the coolant bottle (3).

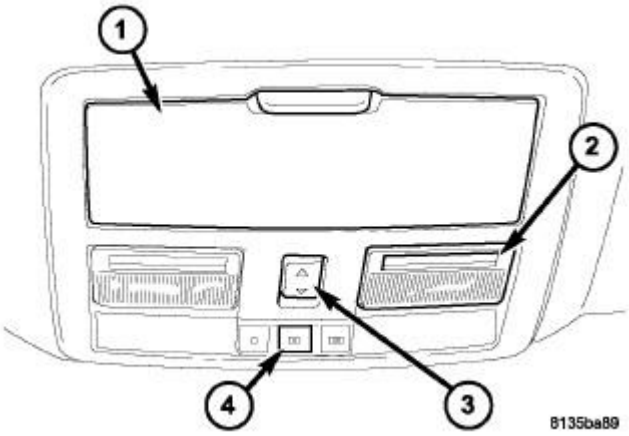


Fig. 19: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

30. Disconnect the vacuum line (3) at the EVAP purge solenoid (1).
31. Disconnect the EVAP purge solenoid vacuum line (4) at the intake manifold and remove the vacuum line.

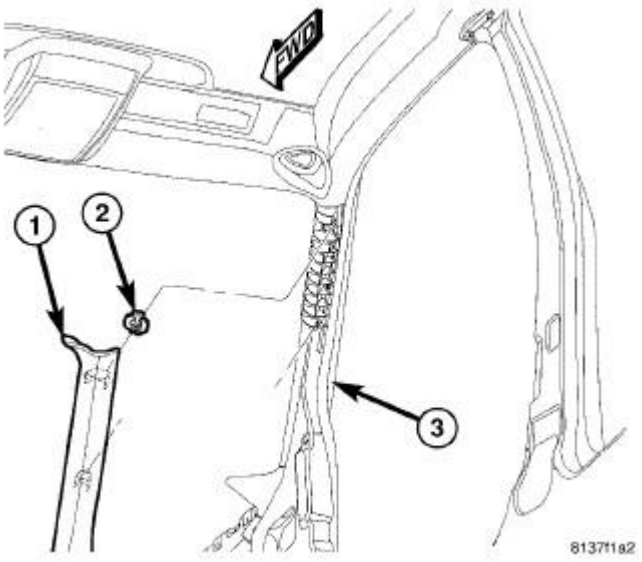


Fig. 20: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

32. Disconnect the PCV hose from the PCV valve (1) and the intake manifold (2) and remove hose.
33. Disconnect the brake booster vacuum hose (3) and position aside.
34. Disconnect the electrical connector at the Manifold Absolute Pressure (MAP) Sensor (4).
35. Disconnect the electrical connector at the Electronic Throttle Control (ETC) (5).
36. Disconnect the electrical connector at the Camshaft Position Sensor (CMP) (6) and position harness aside.

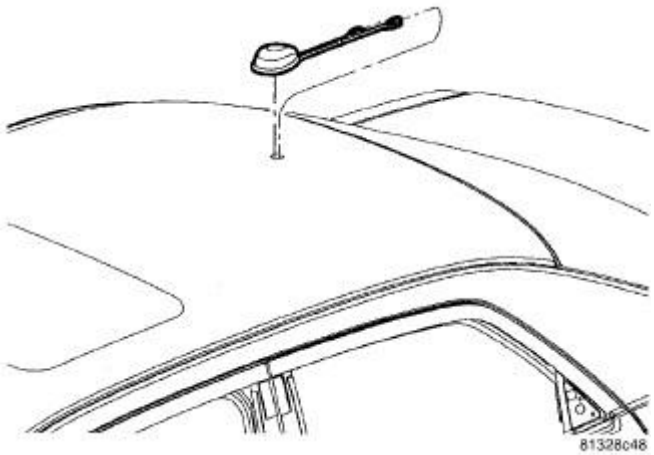


Fig. 21: Fresh Air Makeup Hose At Rear Of Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

37. Remove the fresh air makeup hose (2) from the rear of the intake manifold (1).

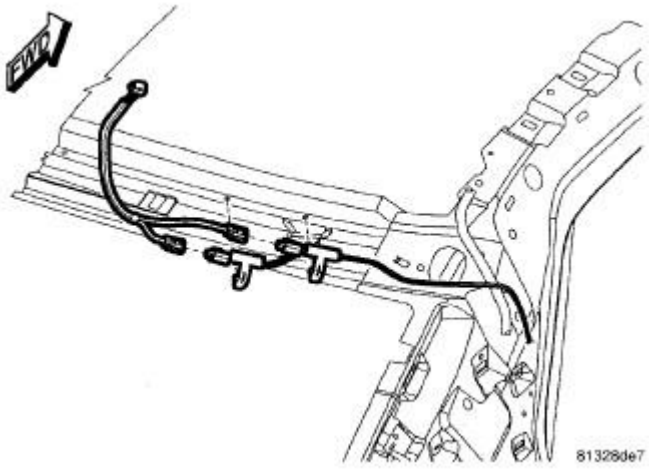


Fig. 22: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

38. Remove the upper intake manifold (2) and insulator. Refer to **MANIFOLD, INTAKE, REMOVAL**.

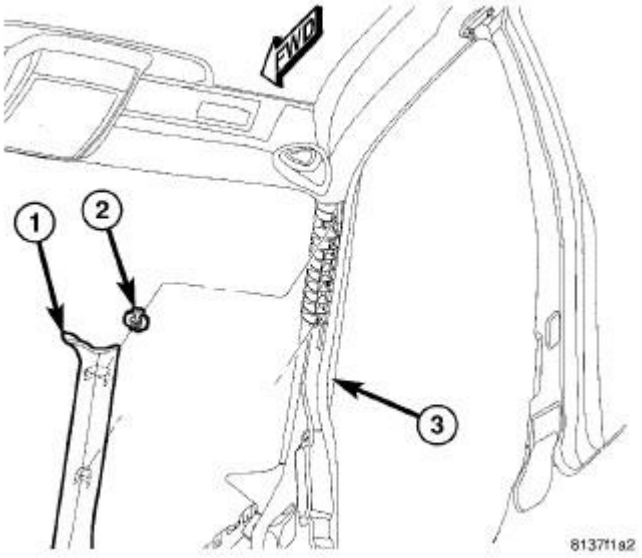


Fig. 23: Fuel Supply Hose At Underbody Fuel Supply Tube
Courtesy of CHRYSLER GROUP, LLC

39. Disconnect the fuel supply hose (1) from the underbody fuel supply tube (2). Refer to **FITTING, QUICK CONNECT** .

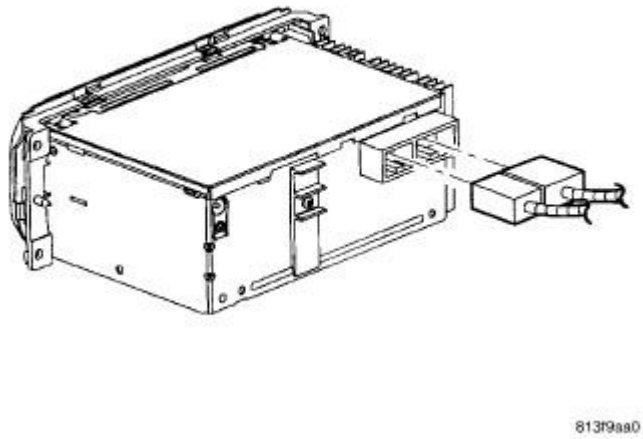


Fig. 24: Cooling Fan Module Components
Courtesy of CHRYSLER GROUP, LLC

40. Remove the cooling fan module. Refer to **FAN, COOLING, REMOVAL** .

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

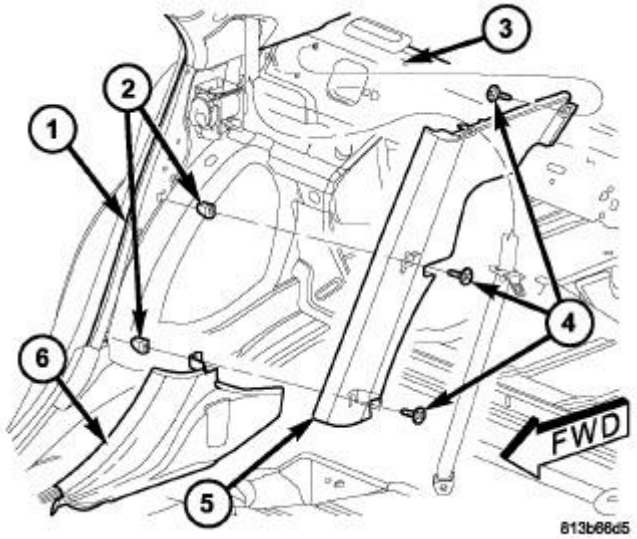


Fig. 25: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

41. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and remove the accessory drive belt (3), then slowly rotate the tensioner into the freearm position.

42. Remove the generator (1). Refer to **GENERATOR, REMOVAL** .

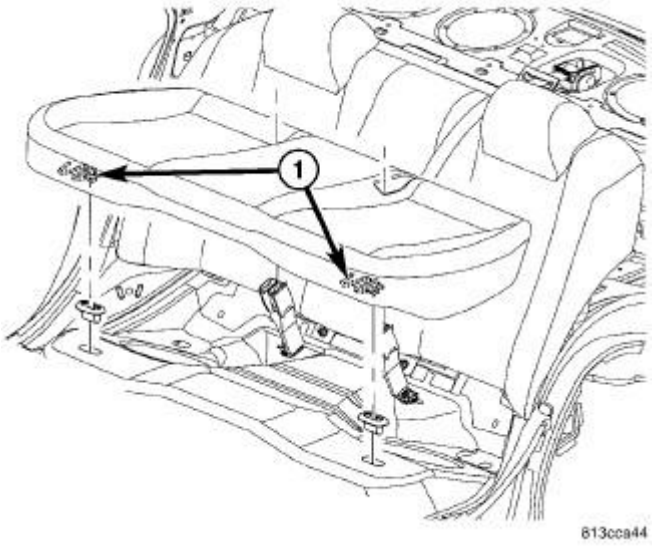


Fig. 26: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mark the variable valve timing solenoid connectors (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.

43. Disconnect the electrical connectors (2) from the variable valve timing solenoids on the right cylinder head.
44. Unfasten the starter harness to main harness retainer (3).
45. Unfasten the two starter wire harness retainers (1) from the right cylinder head cover.

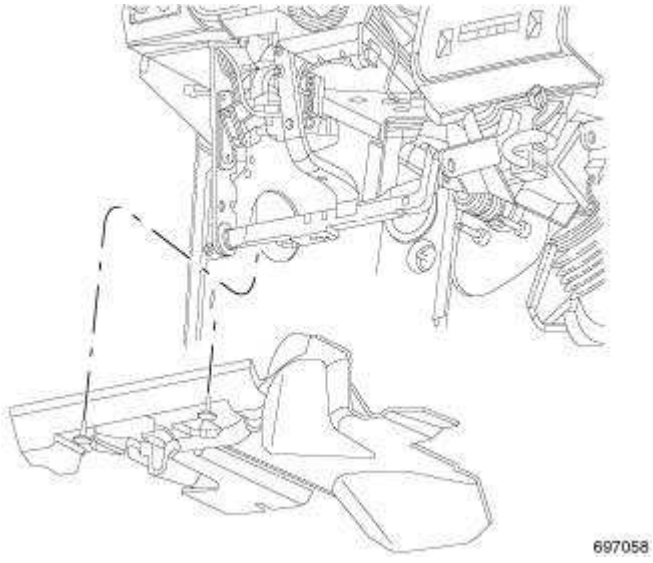


Fig. 27: Main Wire Harness Retainer & Connector

Courtesy of CHRYSLER GROUP, LLC

46. Unfasten the main wire harness retainer (2) from the right cylinder head cover mounting stud.

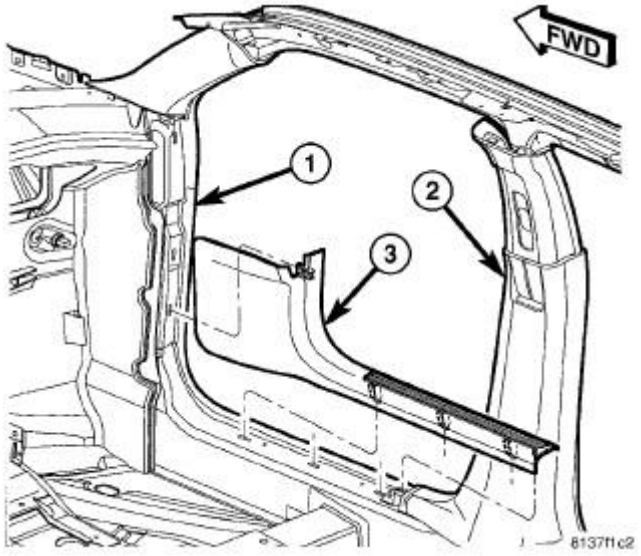


Fig. 28: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

47. Unfasten the four main wire harness retainers (1) from the right cylinder head cover.

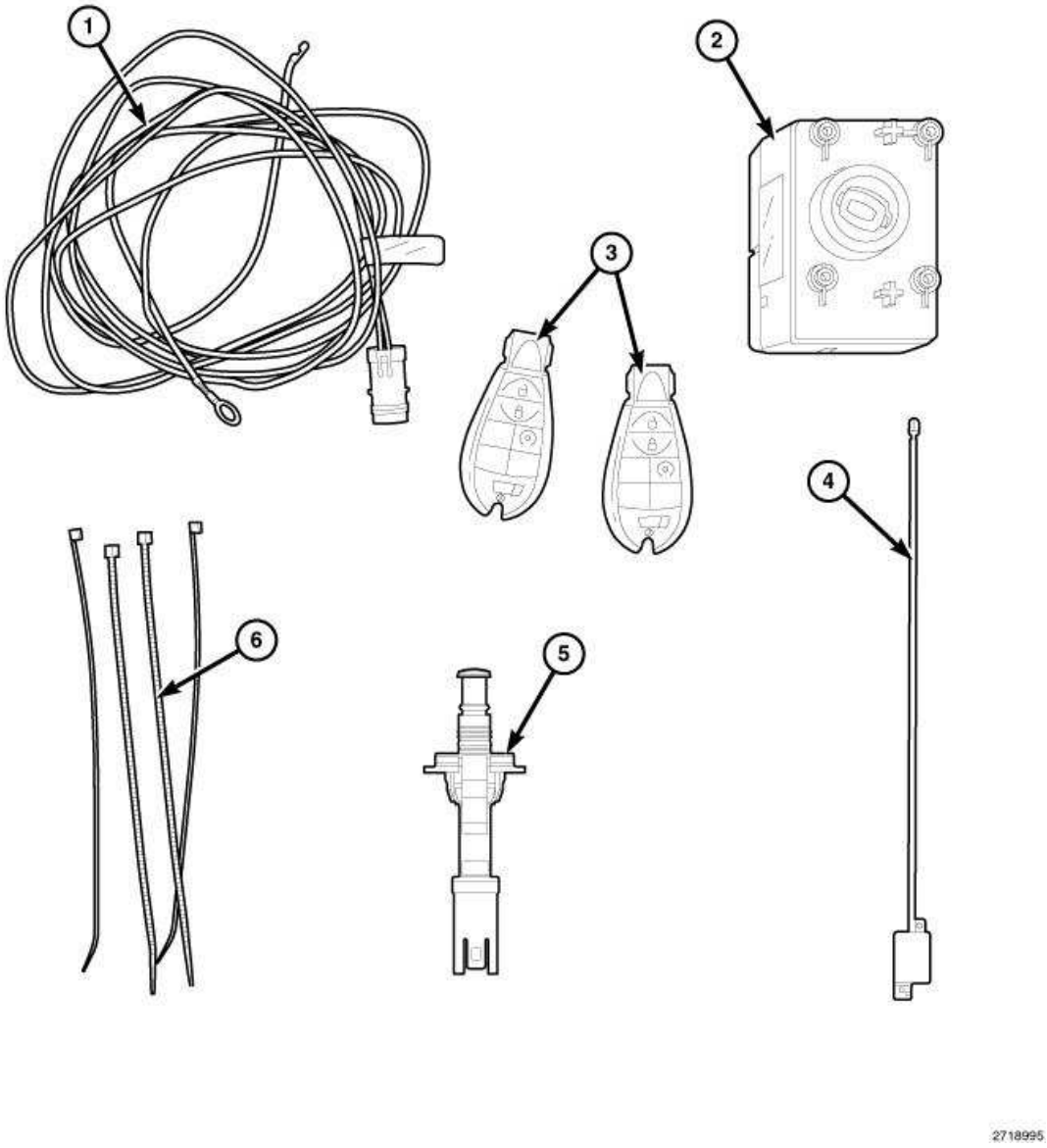


Fig. 29: Wire Harness Retainers, Oil Pump Solenoid Electrical Connector & Ground Strap
Courtesy of CHRYSLER GROUP, LLC

48. Disconnect the oil pump solenoid electrical connector (2).
49. Unfasten the four wire harness retainers (1).
50. Remove the ground strap (3) from the right engine mount bracket.

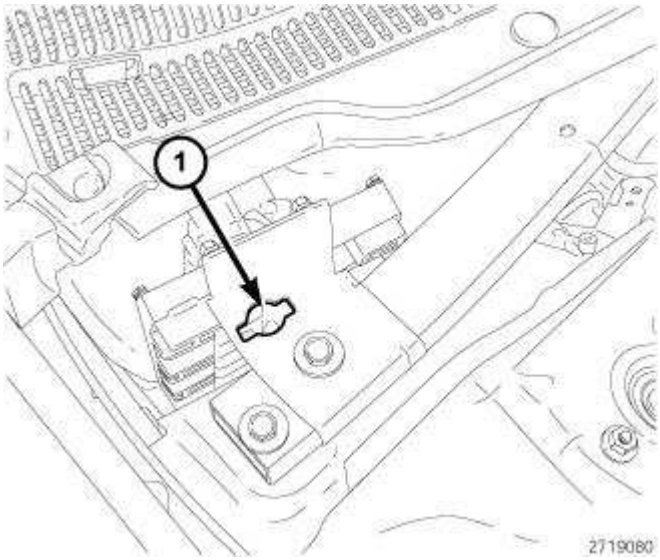


Fig. 30: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mark the variable valve timing solenoid connectors (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.

51. Disconnect the electrical connectors (2) from the left variable valve timing solenoids.
52. Unfasten the two starter wire harness retainers (1) from the left cylinder head cover.

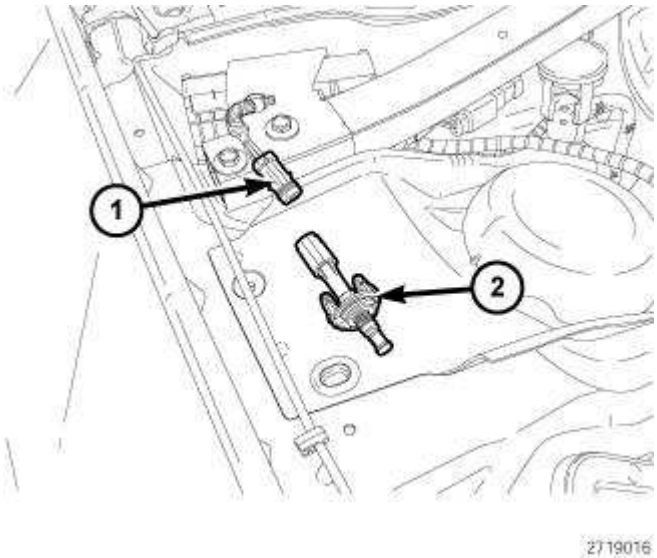


Fig. 31: A/C Compressor Electrical Connector & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

53. Disconnect the A/C compressor electrical connector (1) and unfasten the wire harness retainer (2) from the A/C compressor discharge line.

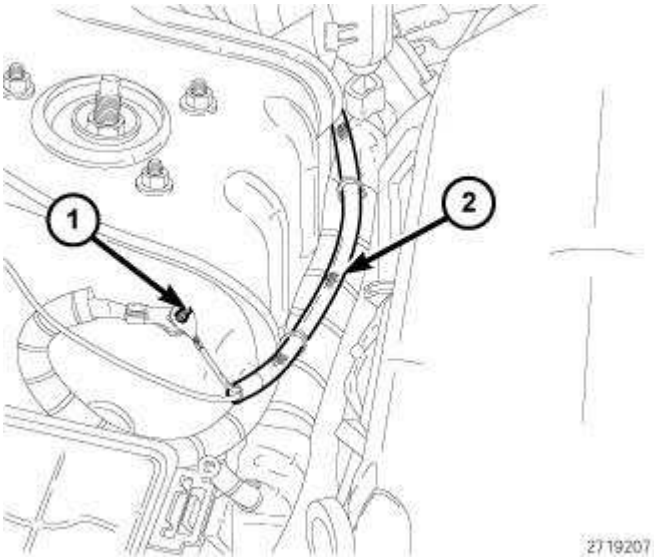


Fig. 32: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

54. Unfasten the two starter wire harness retainers (1) from the upper intake manifold support brackets.
55. Unfasten the main wire harness retainer (3) from the left cylinder head cover and two retainers (2) from the upper intake manifold support brackets.

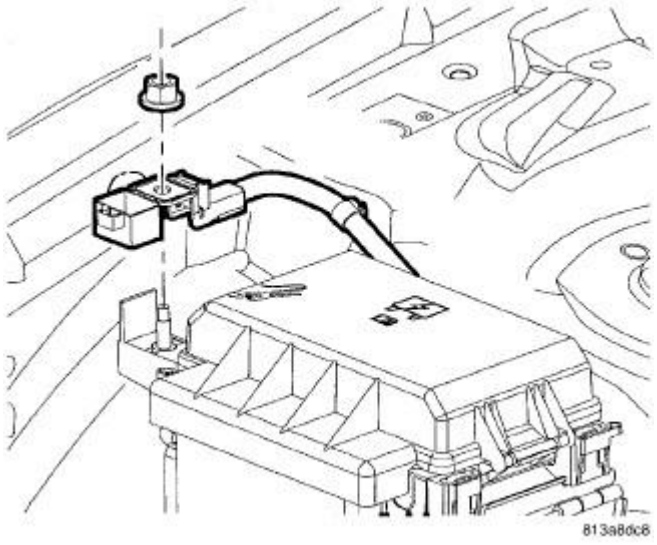


Fig. 33: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

56. Disconnect the Engine Coolant Temperature (ECT) sensor connector (3).
57. Disconnect the left Camshaft Position (CMP) sensor (5).

58. Unfasten the main wire harness retainer (2) from the cylinder head cover and one main wire harness retainer (4) from the cylinder head cover mounting stud.
59. Unfasten the main wire harness retainer (1) form the rear of the lower intake manifold.

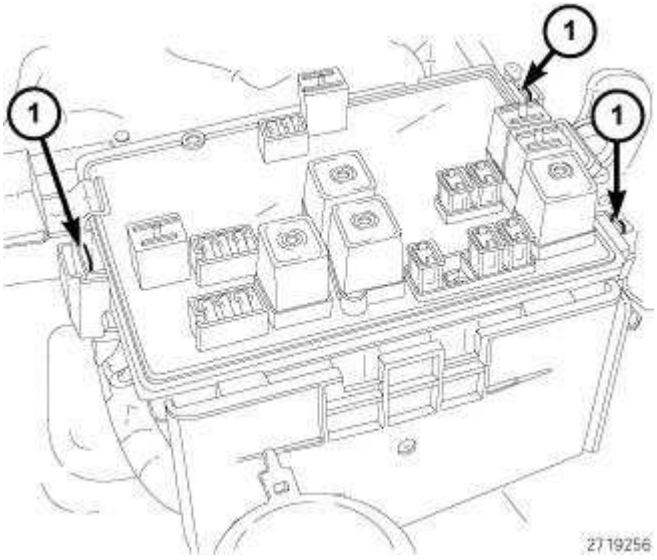


Fig. 34: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

60. Remove the upper radiator hose (1) from the engine thermostat housing.

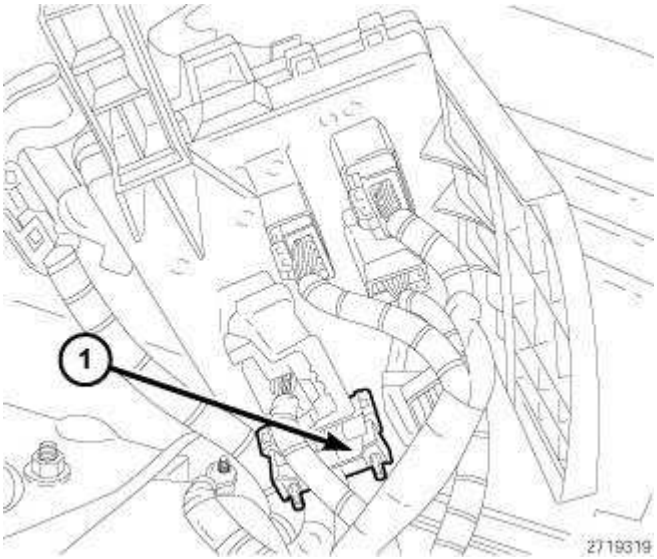


Fig. 35: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

61. Remove the lower heater core return hose (1) from the engine coolant pump housing.
62. Remove the lower radiator hose (2) from the engine coolant pump housing.

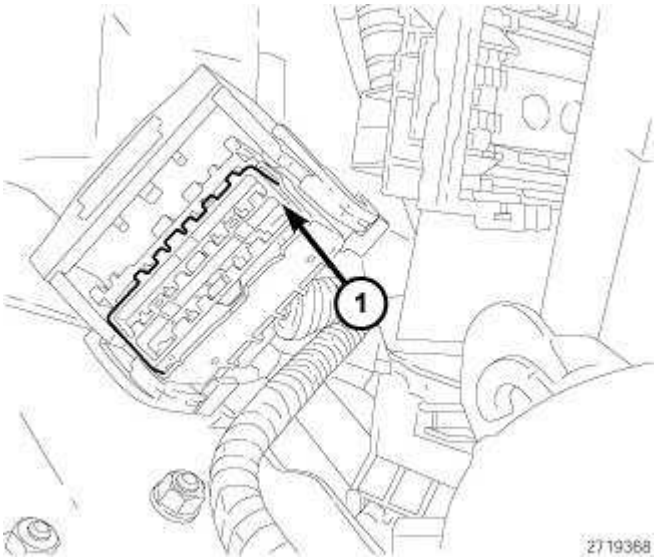


Fig. 36: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

63. Remove the heater core return tube lower support bracket retaining nut (1).

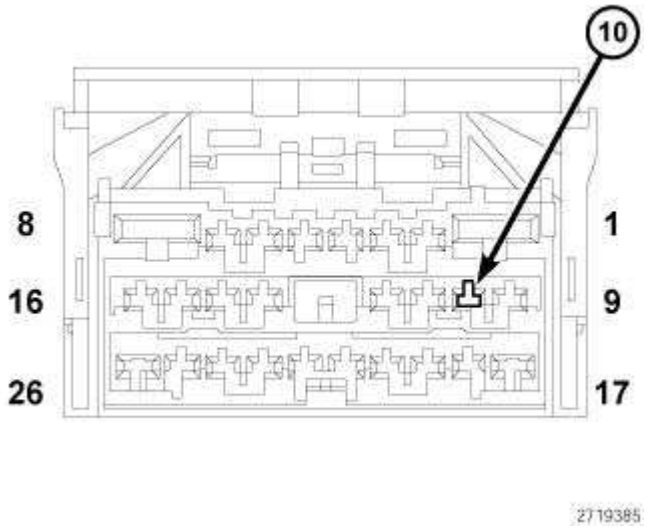


Fig. 37: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

64. Disconnect the heater core return hose (1).

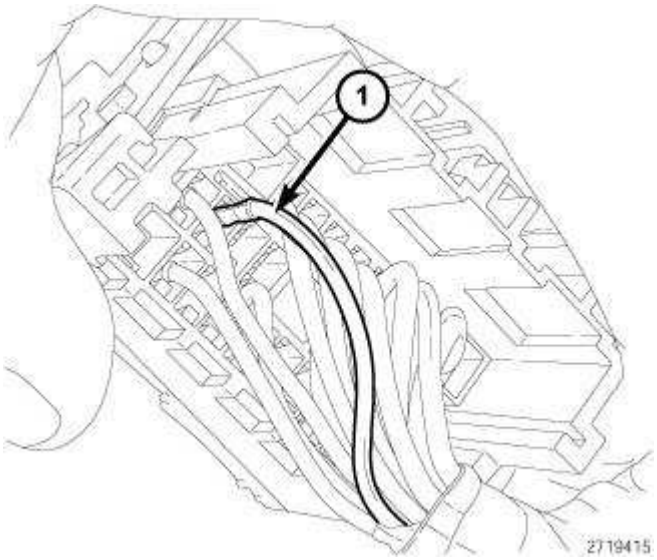


Fig. 38: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

65. Remove the heater core return tube upper support bracket retaining nut (2) and remove tube (1).

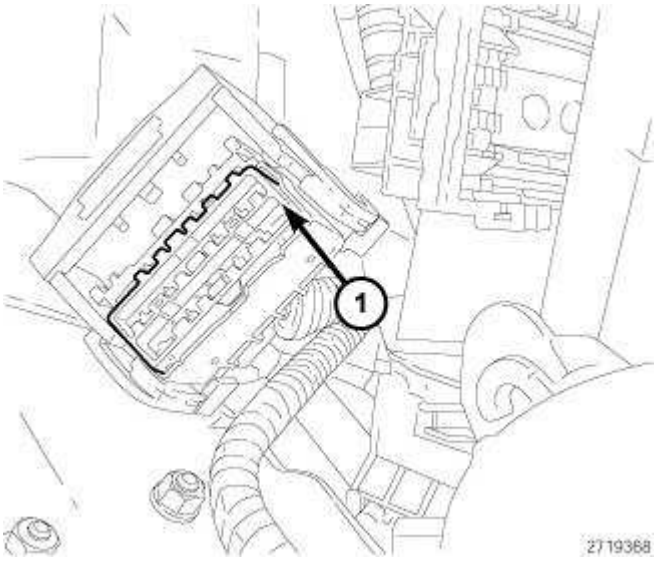


Fig. 39: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

66. Remove the A/C compressor (2). Refer to **COMPRESSOR, A/C, REMOVAL** .
67. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

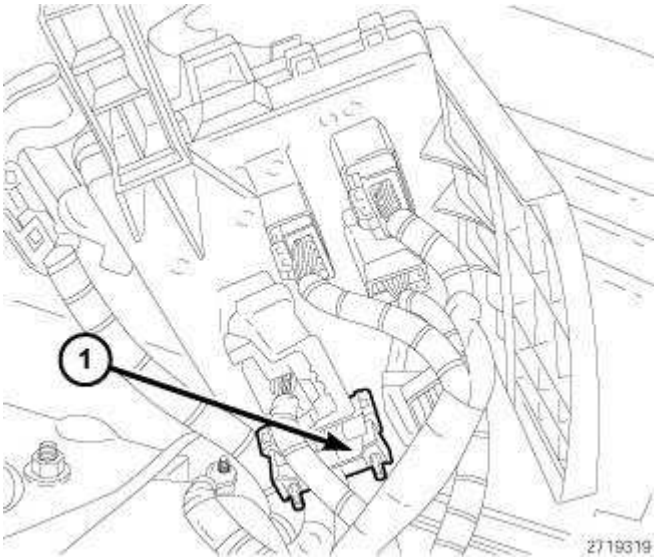


Fig. 40: Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

68. Remove the starter. Refer to **STARTER, REMOVAL** .
69. Unfasten the starter wire harness retainer (2) and the main wire harness retainer (1) from the engine block.

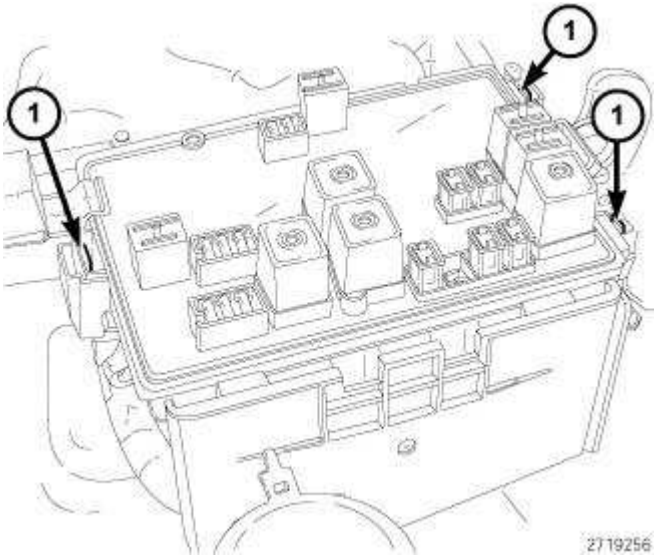


Fig. 41: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

70. Remove the bolt (1) and reposition the transmission cooling lines (2).

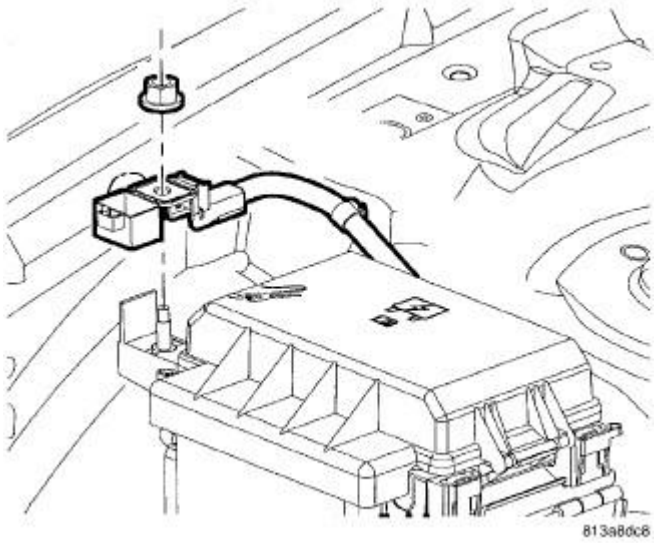


Fig. 42: CKP Sensor Heat Shield
Courtesy of CHRYSLER GROUP, LLC

71. Push back the heat shield (1) from the crankshaft position (CKP) sensor.

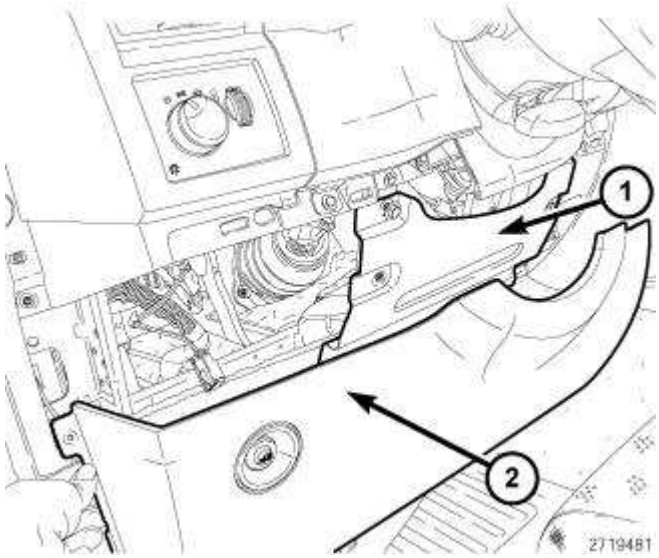


Fig. 43: Main Wire Harness Retainers & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

72. Disconnect the main wire harness from the Crankshaft Position (CKP) sensor (3).
73. Unfasten the main wire harness retainer (1) from the engine block and one main wire harness retainer (2) from the right engine mount bracket.
74. Disconnect and reposition the power cord from the engine block heater (if equipped).

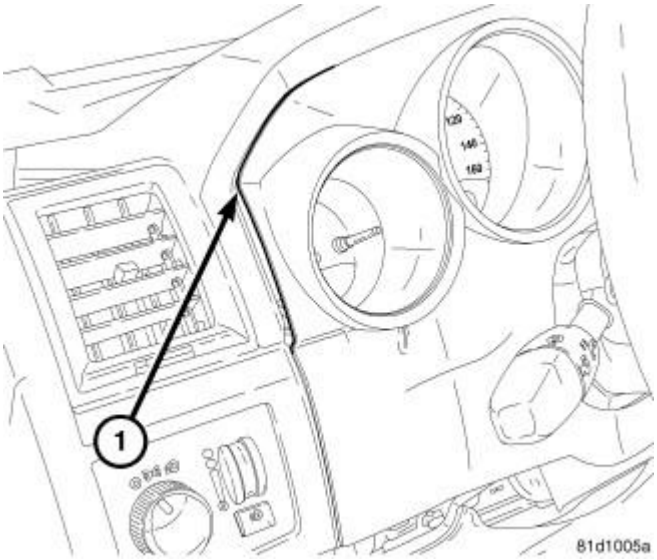


Fig. 44: Upper Side Transmission-To-Engine Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

75. Remove the two upper side transmission to engine retaining bolts (1).

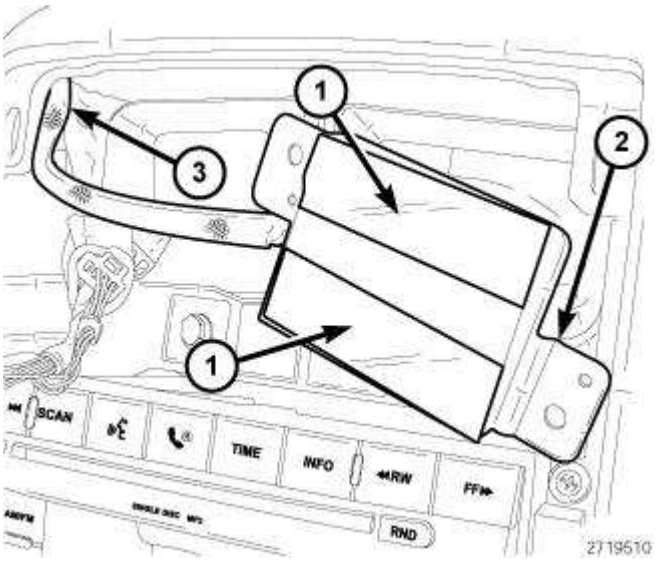


Fig. 45: Engine Injection/Ignition Harness & Engine Oil Pressure/Temperature Harness
Courtesy of CHRYSLER GROUP, LLC

76. Disconnect the main harness from the engine injection/ignition harness (1) at the rear of the left cylinder head.
77. Disconnect the main harness from the engine oil pressure/temperature harness (2) at the rear of the left cylinder head.

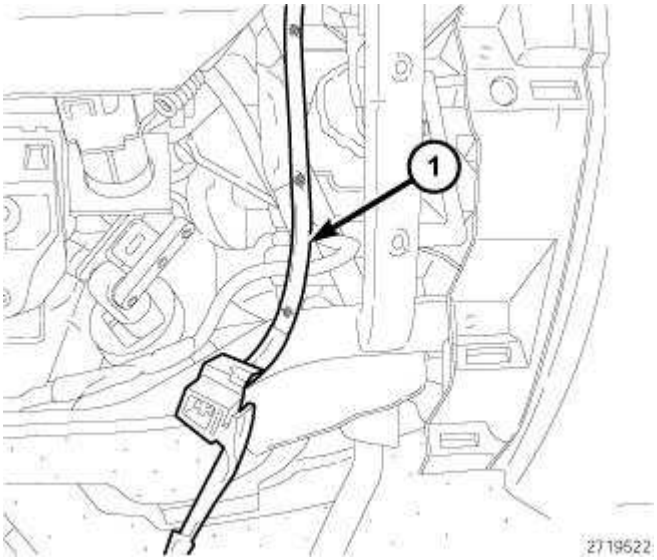


Fig. 46: Side Engine-To-Transmission Bolt, Transmission Dust Shield Retaining Bolt & Dust Shield
Courtesy of CHRYSLER GROUP, LLC

78. Remove the side engine to transmission bolt (1).

    Remove the transmission dust shield retaining bolt (2) and remove the dust shield (3)

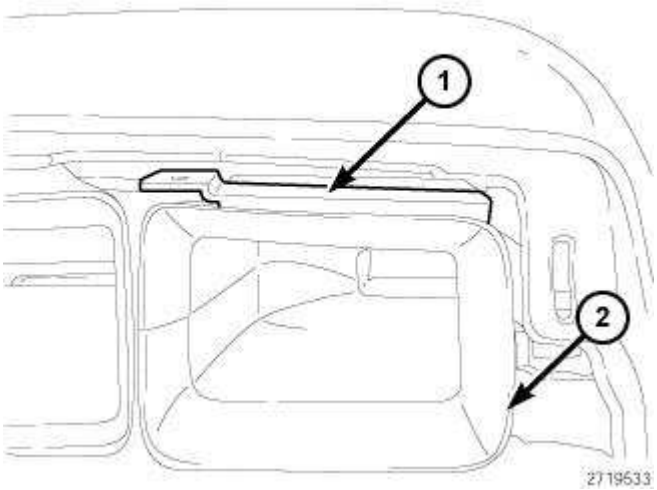


Fig. 47: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

79. Remove the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

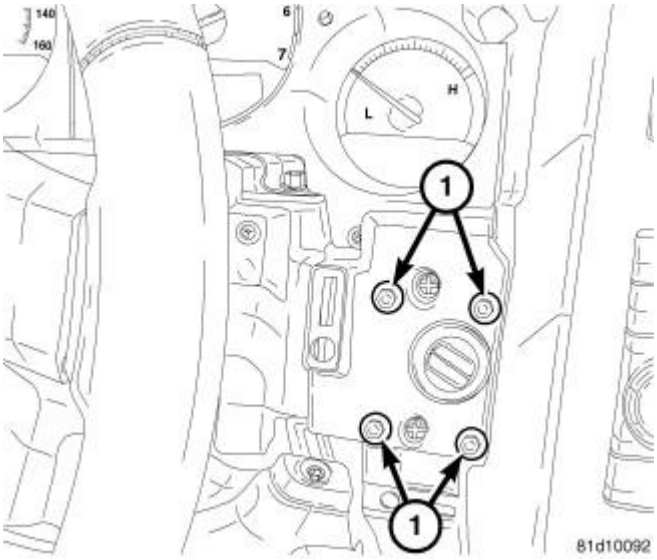


Fig. 48: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

80. Remove four transmission to the engine oil pan bolts (1).

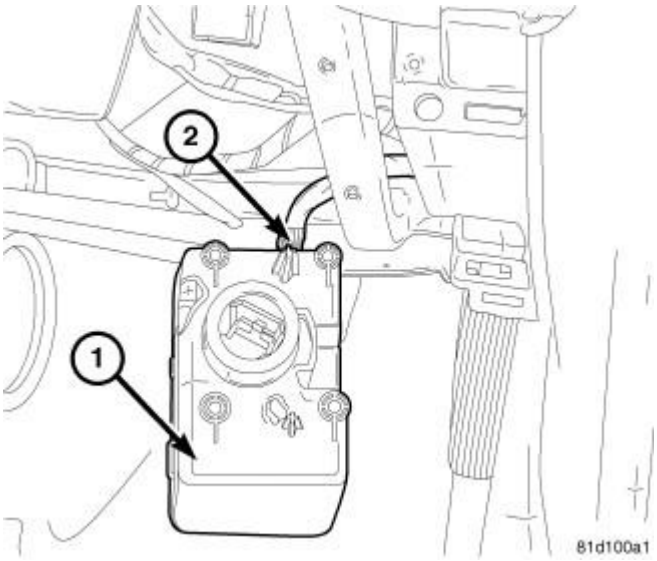


Fig. 49: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

81. Lower the vehicle.
82. Remove two bolts (3) and remove the heater core inlet tube (4).
83. Remove the bolt (1) and remove the oil level indicator (2).

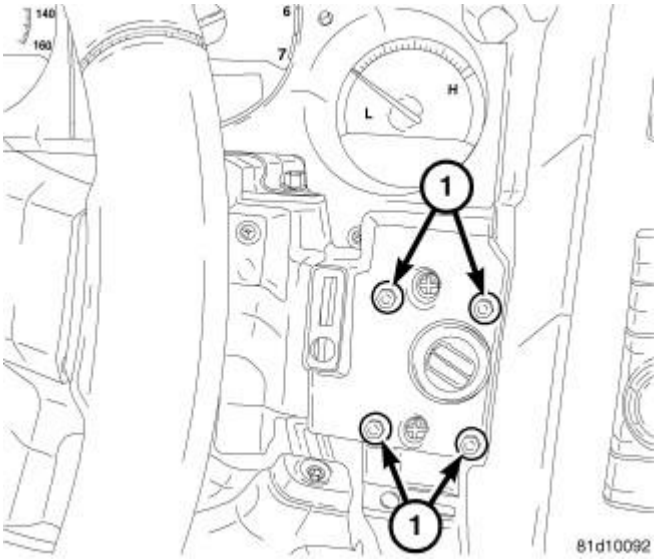


Fig. 50: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

84. Remove the left intake manifold support bracket retaining bolts (2) and remove the support brackets (1).

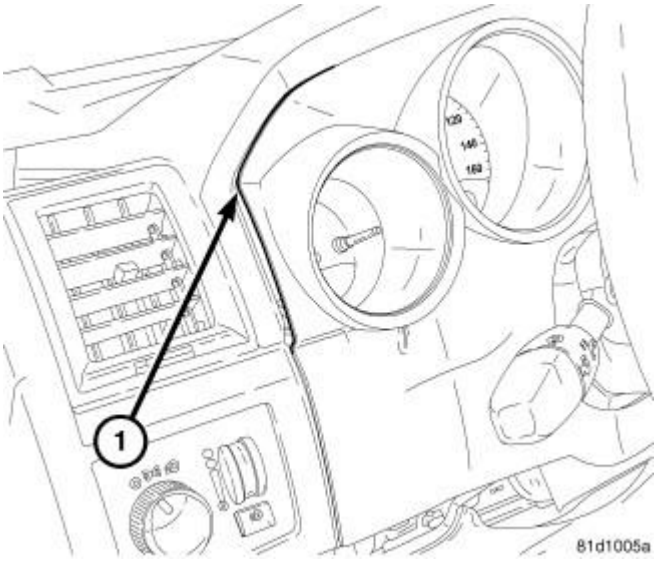


Fig. 51: Driver Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

85. Install the Driver Side Engine Lifting Bracket (special tool #10242-1, Brackets, Engine Lifting, Left Side) (1) on the left cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to 21 N.m (15 ft. lbs.).

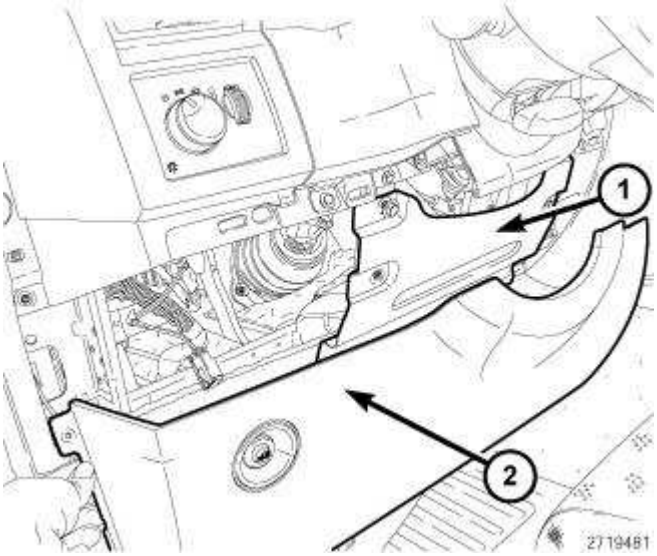


Fig. 52: Passenger Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

86. Install the Passenger Side Engine Lifting Bracket (special tool #10242-2, Brackets, Engine Lifting, Right Side) (1) on the right cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to 21 N.m (15 ft. lbs.).

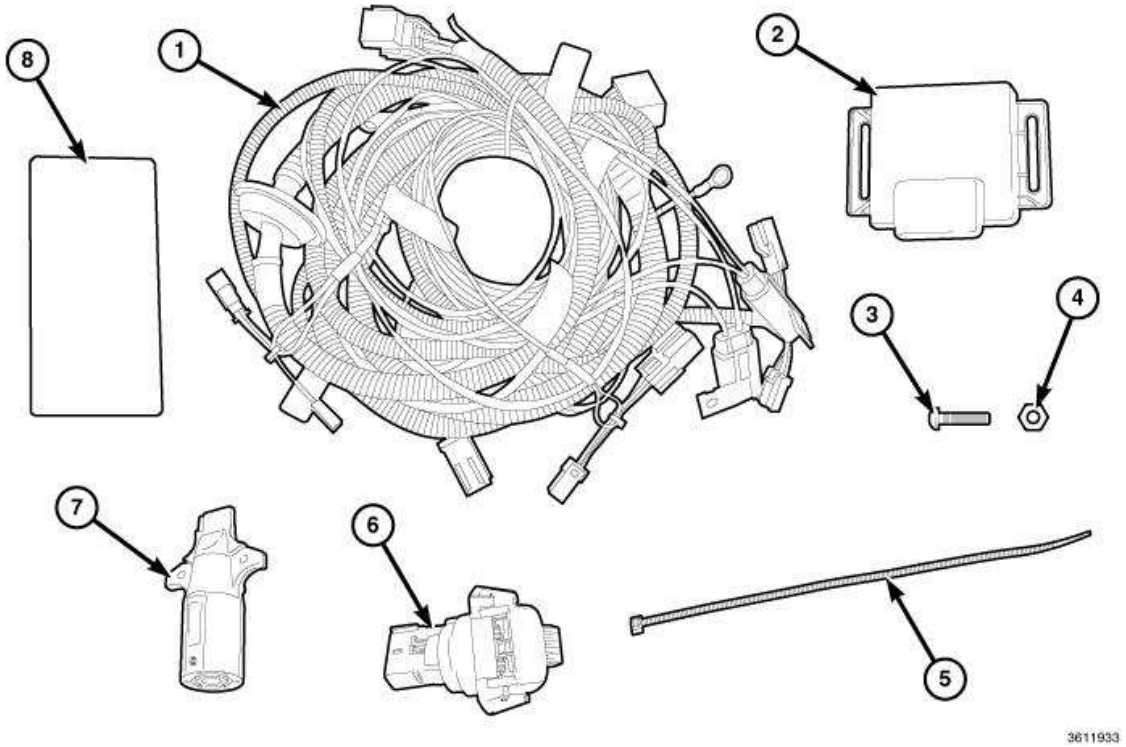


Fig. 53: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

87. Reposition the starter wire harness and the main wire harness to the rear of the engine compartment.
88. Position a load-leveling lifting sling (2), such as OTC® 4305 Engine Load Leveler or equivalent, between the engine lifting brackets (3) and an engine hoist (1).
89. Support the transmission with a suitable jack.

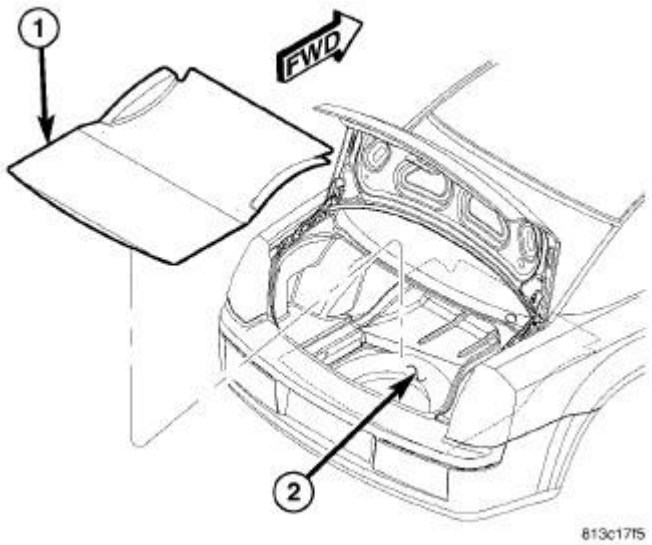


Fig. 54: Electrical Connector, Harness Connector, Hose & Vacuum Pump
Courtesy of CHRYSLER GROUP, LLC

90. Unfasten the harness retainer (4) from the electric vacuum pump mounting bracket.
91. Disconnect the electrical connector (1) from the electric vacuum pump (3).
92. Remove the quick connect vacuum hose (2) from the electric vacuum pump (3).

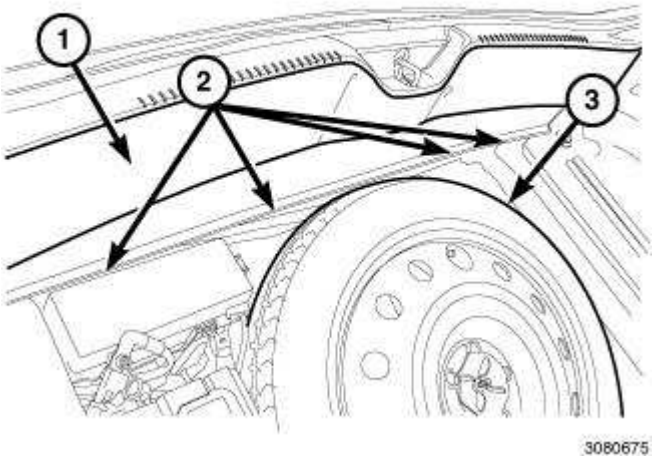


Fig. 55: Electric Vacuum Pump, Bolts & Studs

Courtesy of CHRYSLER GROUP, LLC

93. Remove the two upper transmission to engine retaining bolts (2) and remove the electric vacuum pump (3).

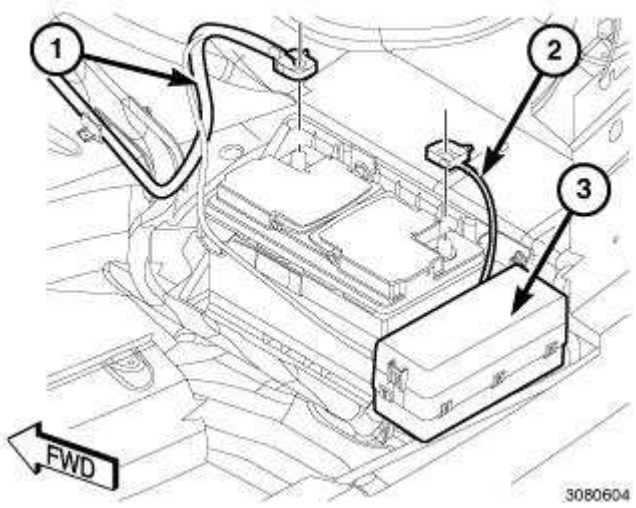


Fig. 56: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

94. Remove both left and right engine mount heat shield retaining nuts (3) and remove the heat shields (4).
95. Remove both left and right engine mount lower retaining bolts (2).

CAUTION: While slowly separating the engine from the vehicle, constant checks must be made to assure proper positioning and that no damage to other components or wiring harnesses occur during separation.

96. Carefully remove the engine from the engine compartment.
97. If required, remove the following components for installation on the replacement engine:

- Left exhaust down pipe
- Right exhaust down pipe
- Left engine mount bracket
- Left engine mount
- Right engine mount bracket
- Right engine mount
- Accessory drive belt tensioner

- Upper intake manifold support bracket
- Block heater (if equipped)

INSTALLATION

INSTALLATION

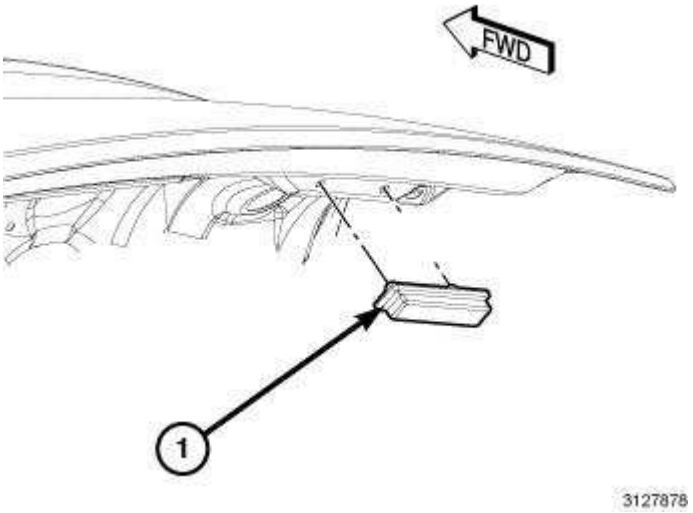


Fig. 57: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: If installing a replacement engine, transfer components such as engine mount brackets, block heater, accessories, heater hoses and tubes to the replacement engine.

1. If required, transfer the following components onto the replacement engine:
   - Left exhaust down pipe
   - Right exhaust down pipe
   - Left engine mount bracket
   - Left engine mount
   - Right engine mount bracket
   - Right engine mount
   - Accessory drive belt tensioner
   - Upper intake manifold support bracket
   - Block heater (if equipped)
2. If required, remove the upper intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

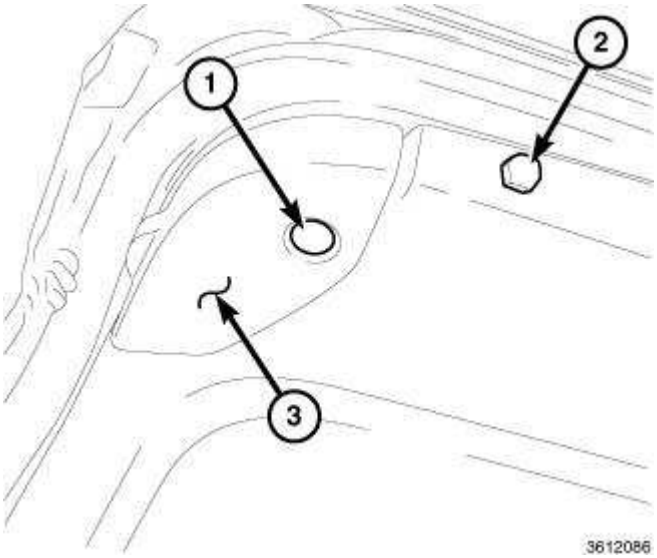


Fig. 58: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the left intake manifold support bracket retaining bolts (2) and remove the support brackets (1).

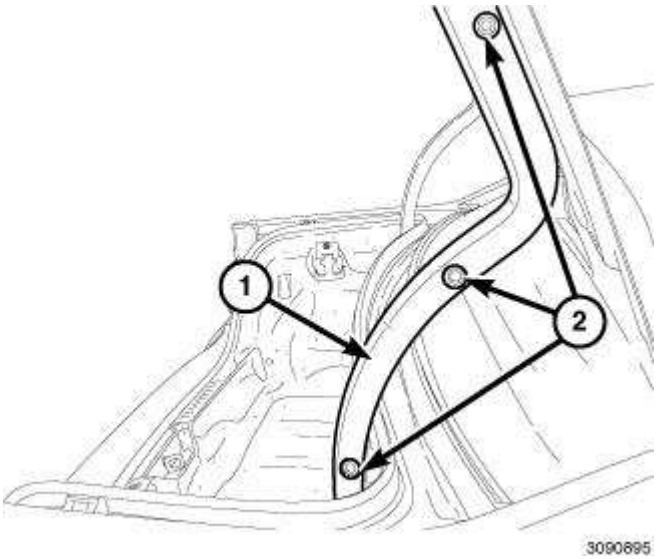


Fig. 59: Driver Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the Driver Side Engine Lifting Bracket (special tool #10242-1, Brackets, Engine Lifting, Left Side) (1) on the left cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to 21 N.m (15 ft. lbs.).

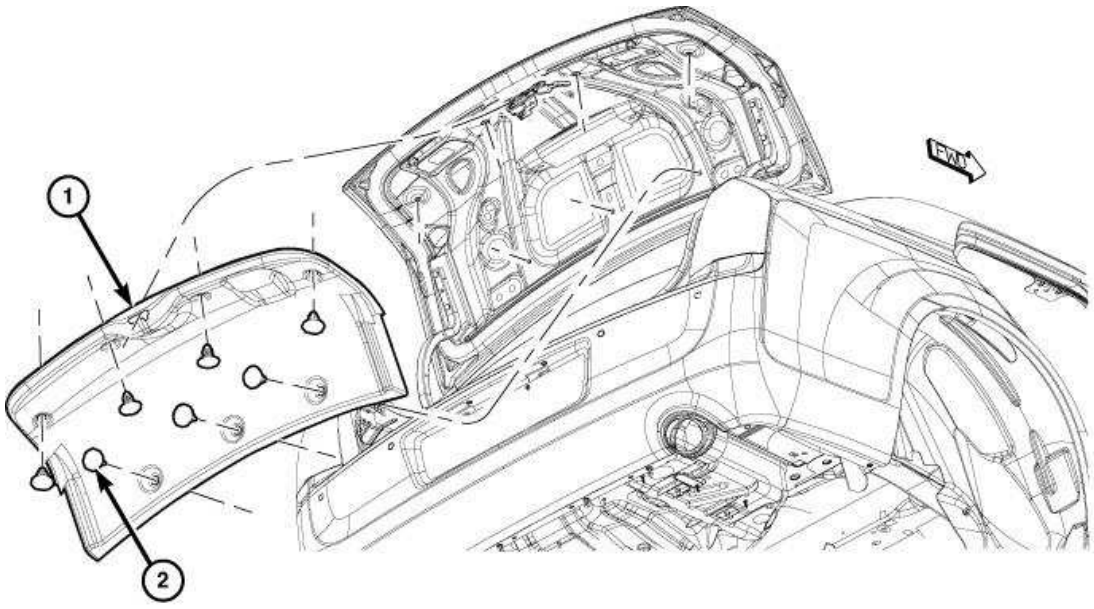


Fig. 60: Passenger Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the Passenger Side Engine Lifting Bracket (special tool #10242-2, Brackets, Engine Lifting, Right Side) (1) on the right cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to 21 N.m (15 ft. lbs.).

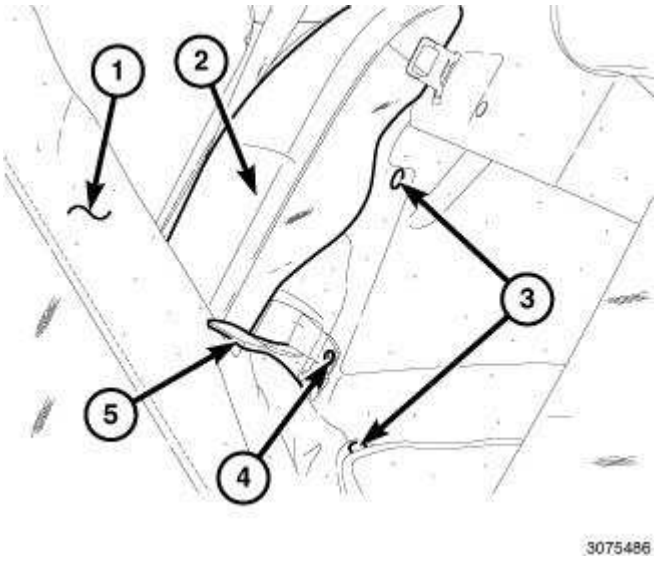


Fig. 61: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

6. Position a load-leveling lifting sling (2), such as OTC® 4305 Engine Load Leveler or equivalent, between the engine lifting brackets (3) and an engine hoist (1).

7. Reposition the starter wire harness and the main wire harness to the rear of the engine compartment.

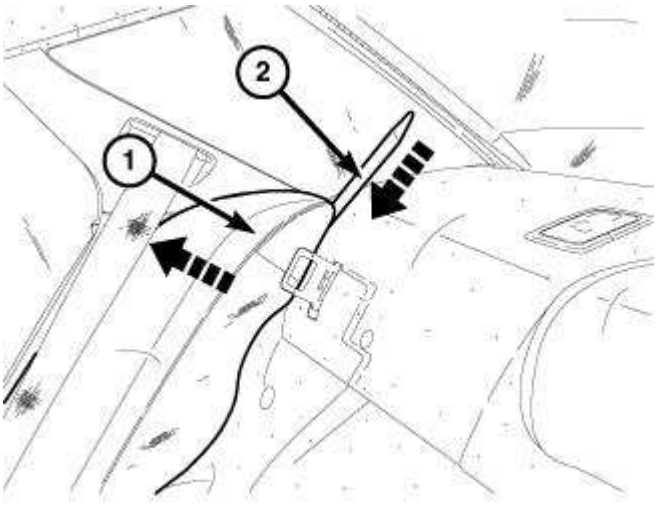


Fig. 62: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

8. Carefully lower the engine into the engine compartment while aligning the two locator dowels into the transmission housing.
9. Align the engine mounts, install both left and right engine mount lower retaining bolts (2) and tighten to 68 N.m (50 ft. lbs.).
10. Position both left and right engine mount heat shields (4), install the retaining nuts (3) and tighten to 12 N.m (9 ft. lbs.).

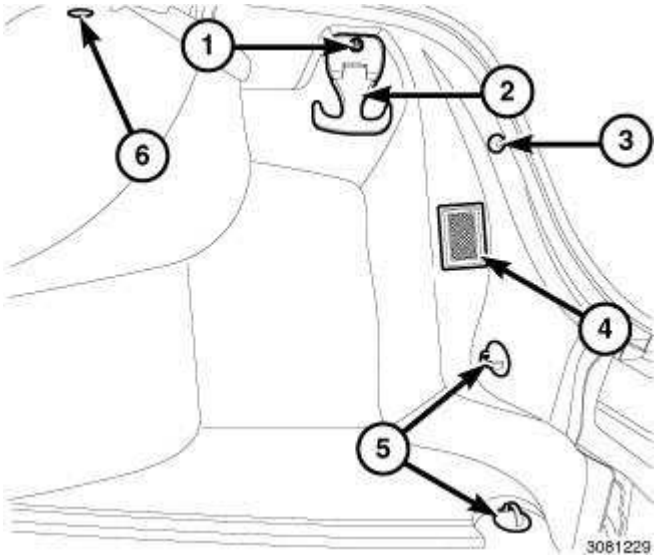


Fig. 63: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

11. Position the electric vacuum pump (3), install the two transmission to engine retaining bolts (2) and tighten to 55 N.m (41 ft. lbs.).

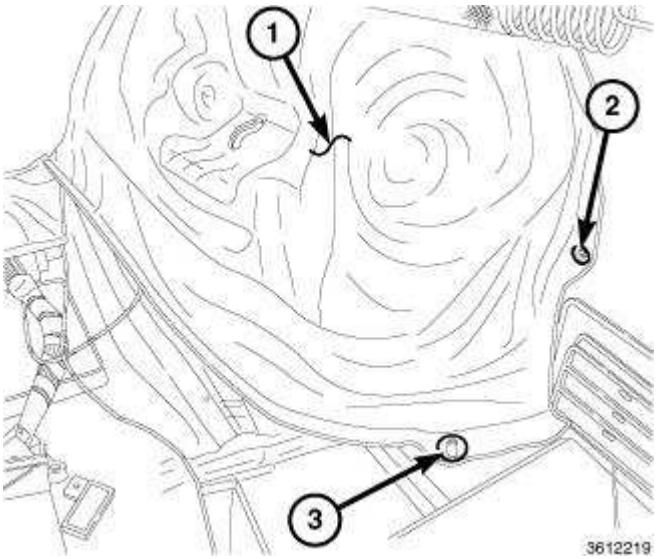


Fig. 64: Electrical Connector, Harness Connector, Hose & Vacuum Pump
Courtesy of CHRYSLER GROUP, LLC

12. Install the quick connect vacuum hose (2) to the electric vacuum pump (3).
13. Connect the electrical connector (1) to the electric vacuum pump (3).
14. Secure the harness retainer (4) to the mounting bracket.

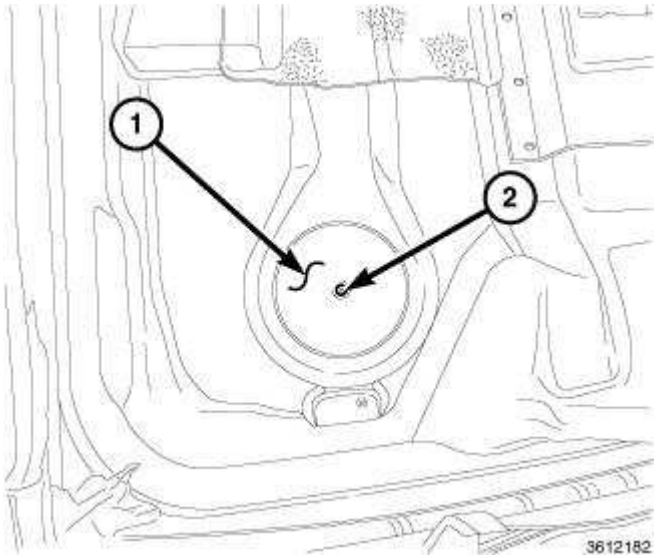


Fig. 65: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove the engine lifting brackets and position the left upper intake manifold support brackets (1) and install the retaining studs (2) finger tight.

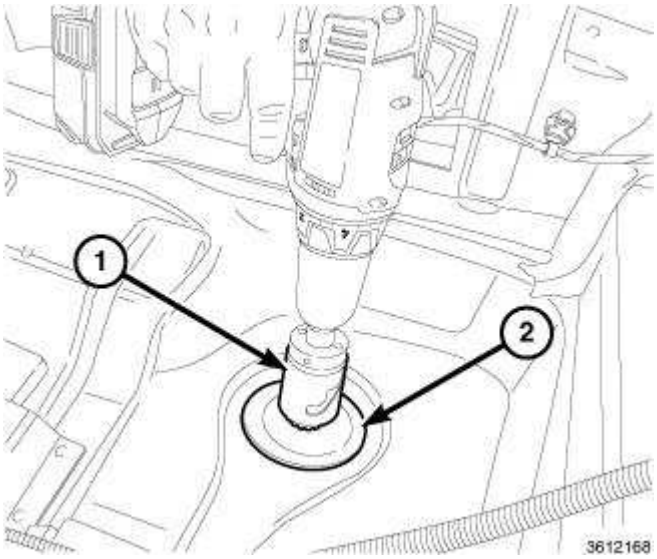


Fig. 66: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

16. Route the main wire harness and starter wire harness on the engine.
17. Secure the two starter wire harness retainers (1) to the upper intake manifold support brackets.
18. Secure the main wire harness retainer (3) to the left cylinder head cover and two retainers (2) to the upper intake manifold support brackets.

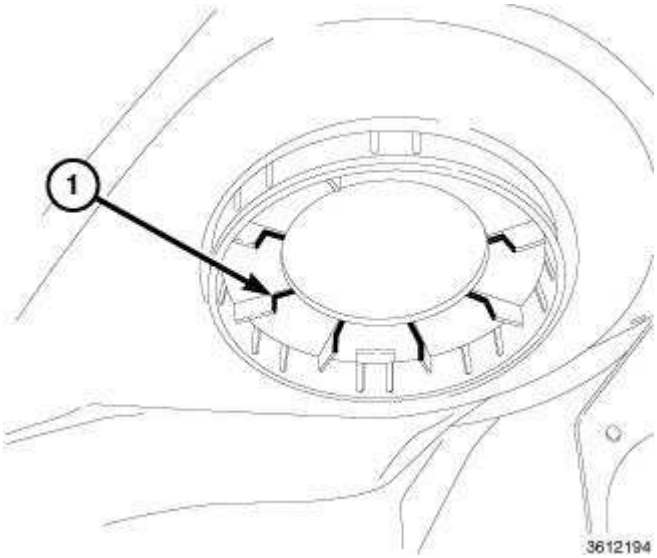


Fig. 67: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

19. Connect the Engine Coolant Temperature (ECT) sensor connector (3).
20. Connect the left Camshaft Position (CMP) sensor (5).
21. Secure the main wire harness retainer (2) to the cylinder head cover and one main wire harness retainer (4) to the cylinder head cover mounting stud.
22. Secure the main wire harness retainer (1) to the rear of the lower intake manifold.

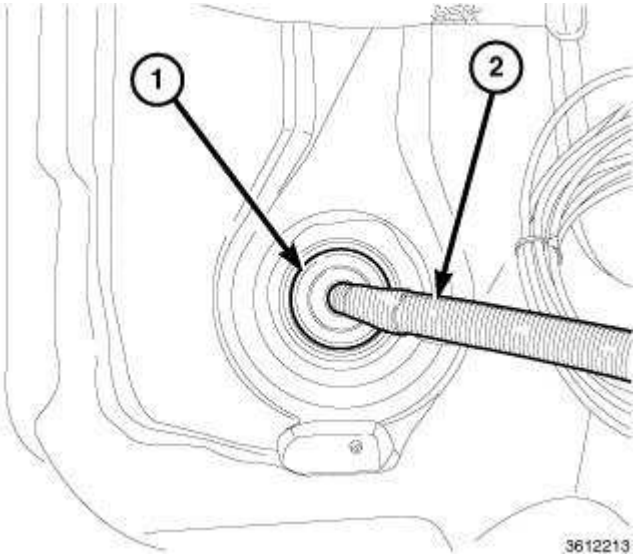


Fig. 68: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

23. Secure the four main wire harness retainers (1) to the right cylinder head cover.

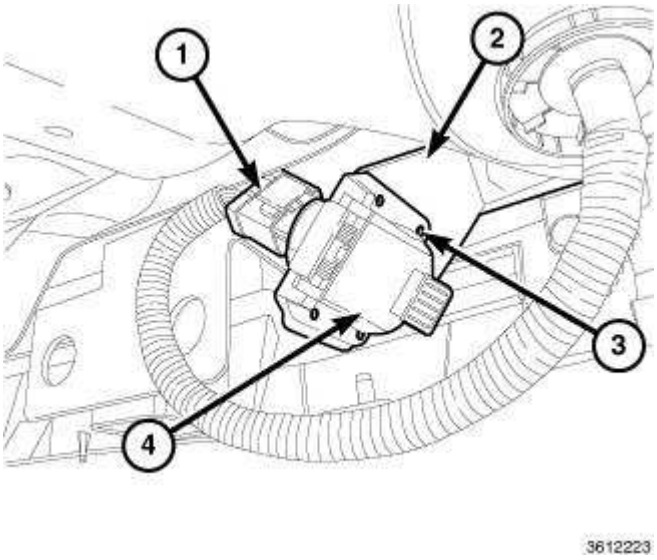


Fig. 69: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

24. Connect the electrical connectors (2) to the variable valve timing solenoids on the right cylinder head.
25. Secure the two starter wire harness retainers (1) to the right cylinder head cover.
26. Secure the starter harness to main harness retainer (3).

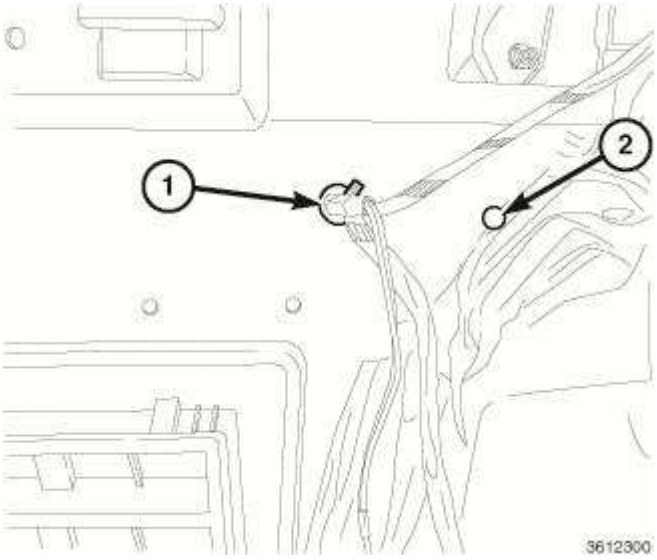


Fig. 70: Wire Harness Retainers, Oil Pump Solenoid Electrical Connector & Ground Strap
Courtesy of CHRYSLER GROUP, LLC

27. Connect the oil pump solenoid electrical connector (2).
28. Secure the four wire harness retainers (1).
29. Install the ground strap (3) to the right engine mount bracket.

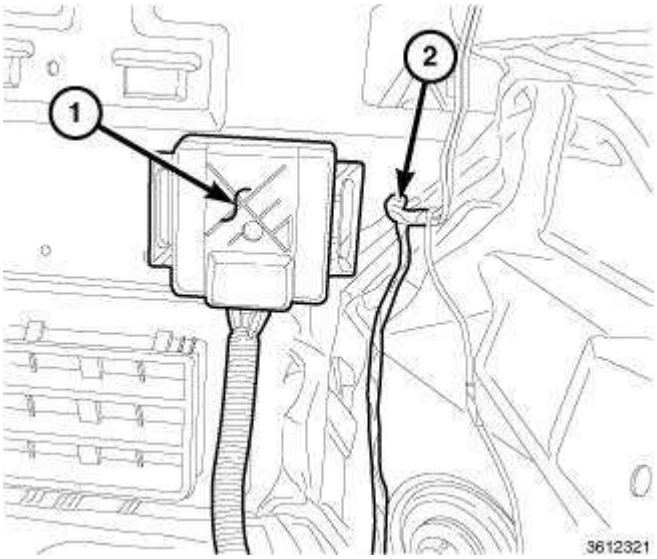


Fig. 71: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

30. Remove the jack supporting the transmission.
31. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
32. Install the four transmission to the engine oil pan retaining bolts (1) and tighten to 55 N.m (41 ft. lbs.).

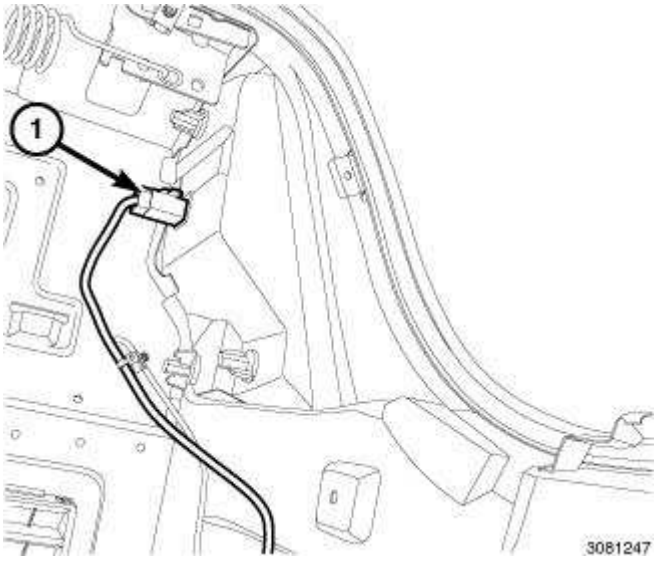


Fig. 72: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

33. Install the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

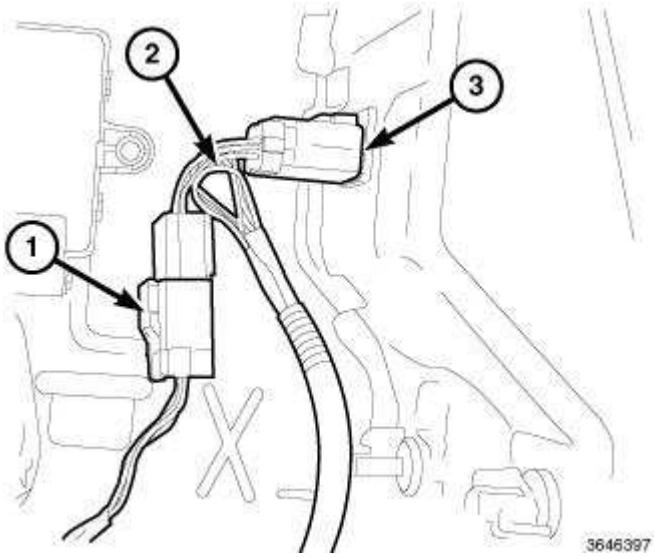


Fig. 73: Side Engine-To-Transmission Bolt, Transmission Dust Shield Retaining Bolt & Dust Shield
Courtesy of CHRYSLER GROUP, LLC

34. Install the side engine to transmission retaining bolt (1) and tighten to 55 N.m (41 ft. lbs.).
35. Position the torque converter dust shield (3), install the retaining bolt (2) and tighten to 12 N.m (9 ft. lbs.).

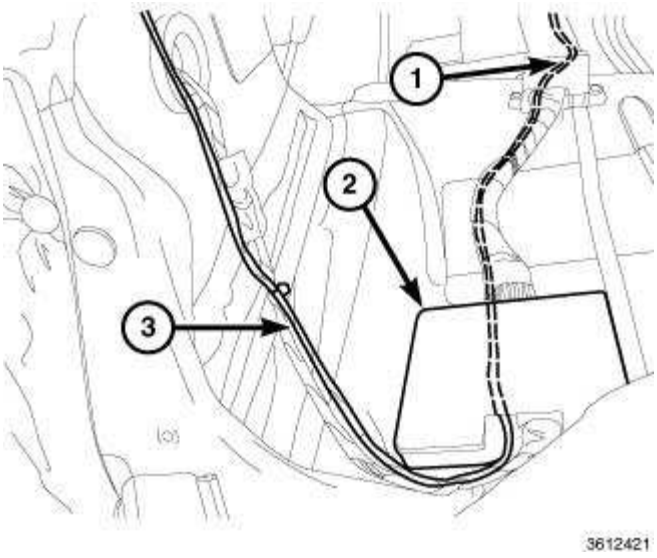


Fig. 74: Upper Side Transmission-To-Engine Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

36. Install the two upper side transmission to engine retaining bolts (1) and tighten to 55 N.m (41 ft. lbs.).

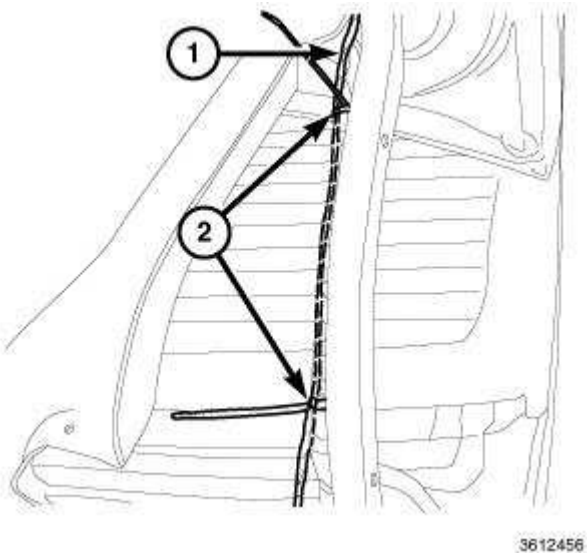


Fig. 75: Engine Injection/Ignition Harness & Engine Oil Pressure/Temperature Harness
Courtesy of CHRYSLER GROUP, LLC

37. Connect the main harness to the engine injection/ignition harness (1) at the rear of the left cylinder head.
38. Connect the main harness to the engine oil pressure/temperature harness (2) at the rear of the left cylinder head.

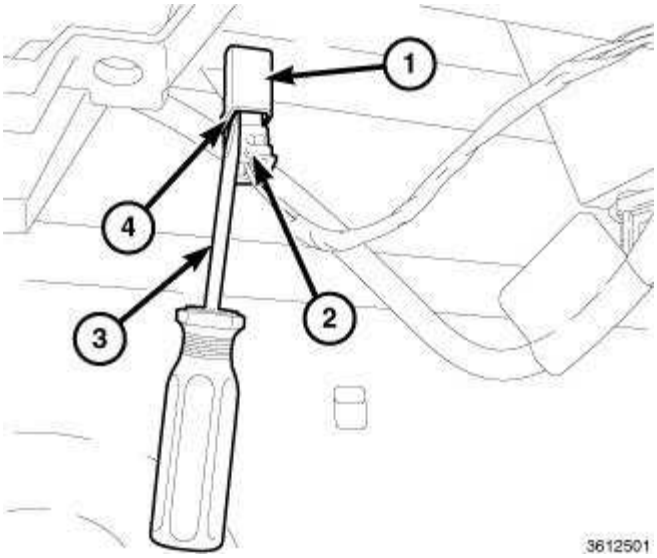


Fig. 76: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

39. Rotate the crankshaft in a clockwise direction and install the six torque converter bolts (1) through the starter mounting hole and tighten to 42 N.m (31 ft. lbs.).

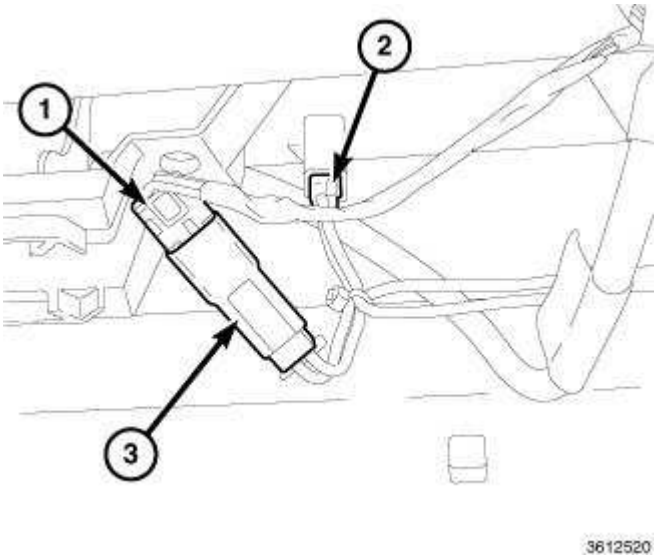


Fig. 77: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

40. Install the transmission cooling lines (2) and tighten the bolt (1) to 12 N.m (106 in. lbs.).

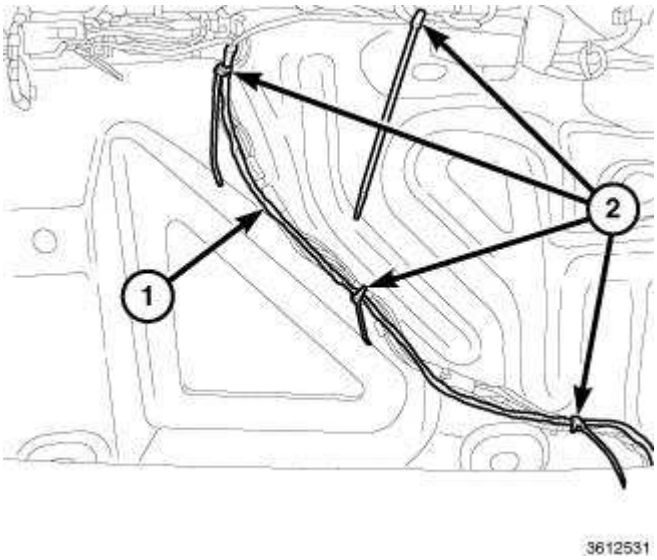


Fig. 78: Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

41. Secure the starter wire harness retainer (2) and the main wire harness retainer (1) to the engine block.
42. Install the starter. Refer to **STARTER, INSTALLATION** .

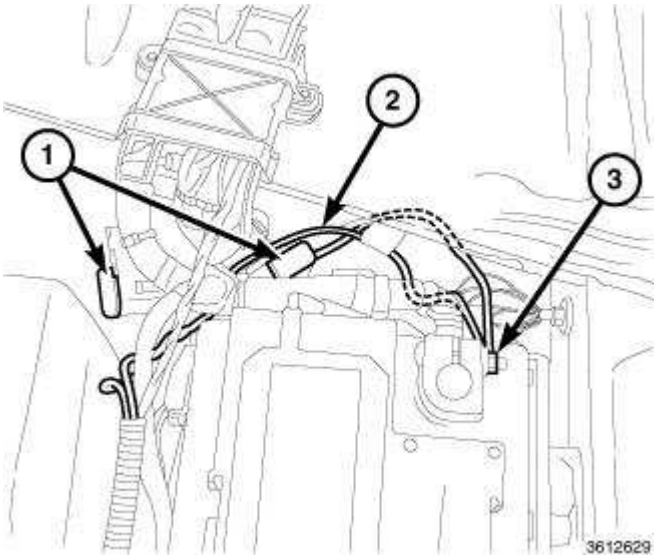


Fig. 79: Main Wire Harness Retainers & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

43. Connect the power cord to the engine block heater (if equipped).
44. Connect the main wire harness to the Crankshaft Position (CKP) sensor (3).
45. Secure the main wire harness retainer (1) to the engine block and one main wire harness retainer (2) to the right engine mounting bracket.

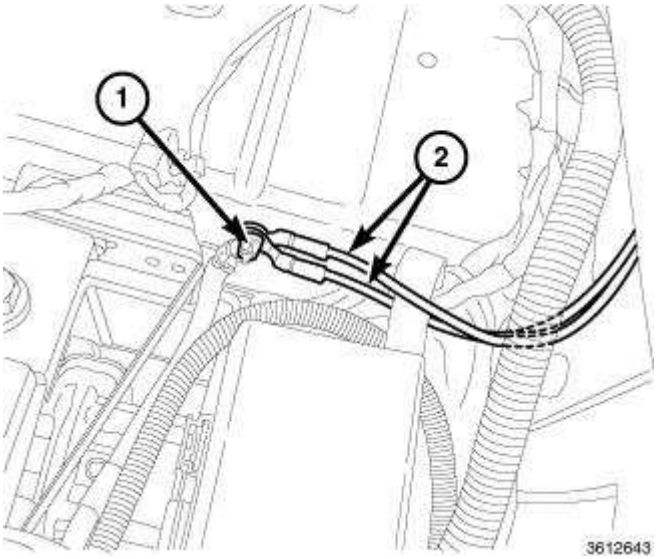


Fig. 80: CKP Sensor Heat Shield
Courtesy of CHRYSLER GROUP, LLC

46. Position the heat shield (1) over the crankshaft position (CKP) sensor.

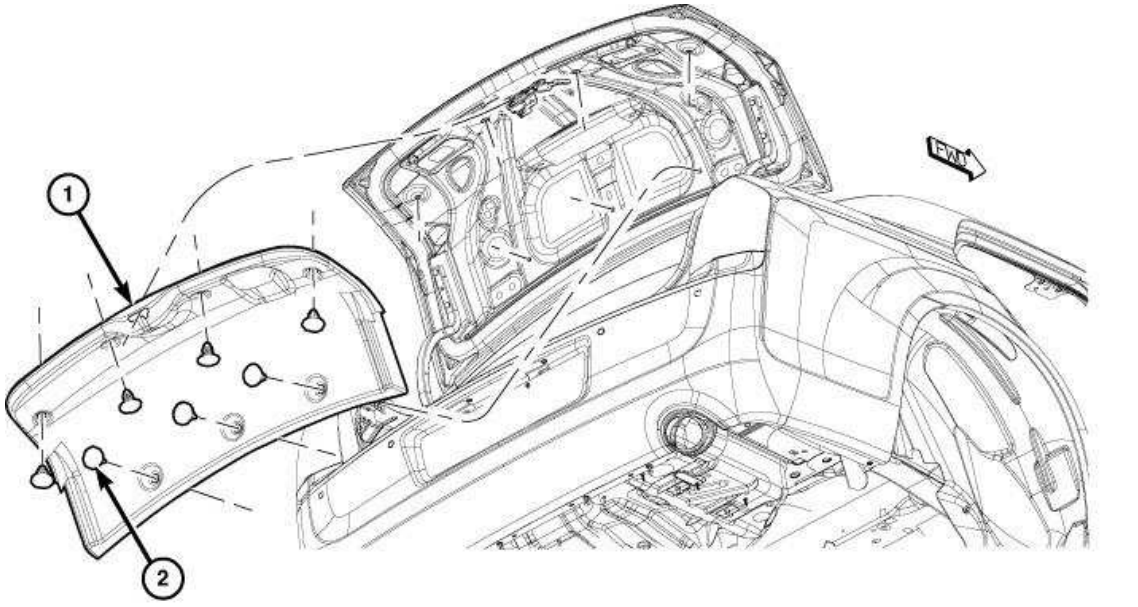


Fig. 81: Removing/Installing Front Axle
Courtesy of CHRYSLER GROUP, LLC

47. If equipped with AWD, install the front axle assembly (1) with propeller shaft, intermediate shaft, halfshafts, wheels and tires. Refer to **INSTALLATION** .
48. If required, fill the front axle with the specified type and amount of gear lubricant.

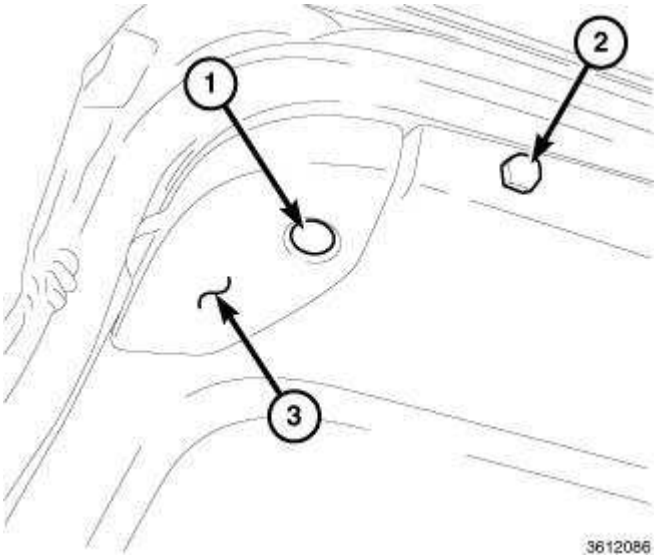


Fig. 82: Exhaust Down Pipe & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

49. Position both left and right exhaust down pipes (1) to the catalytic converters, install the retaining nuts (2) and tighten to 30 N.m (22 ft. lbs.)

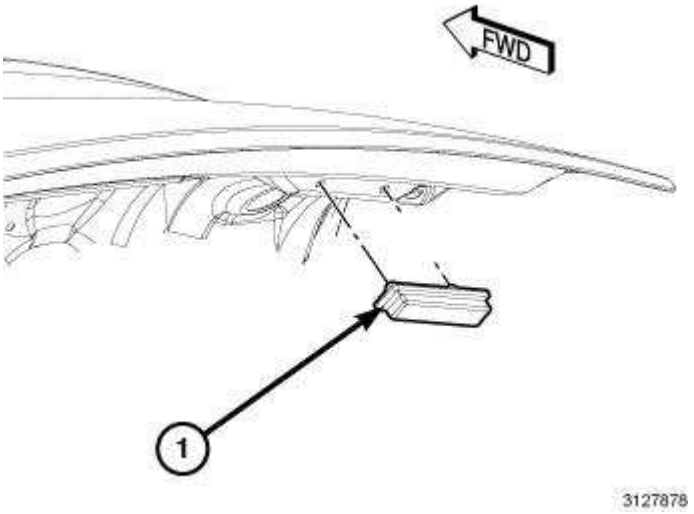


Fig. 83: Upstream Oxygen Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

50. Connect both left and right upstream oxygen sensor (2) electrical connectors (1) to the main wire harness.

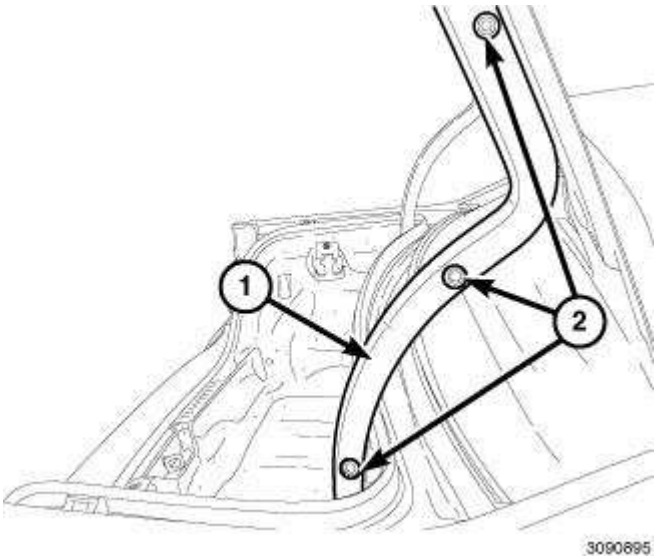


Fig. 84: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

51. Position the belly pan and install the retainers (1).
52. Lower the vehicle.

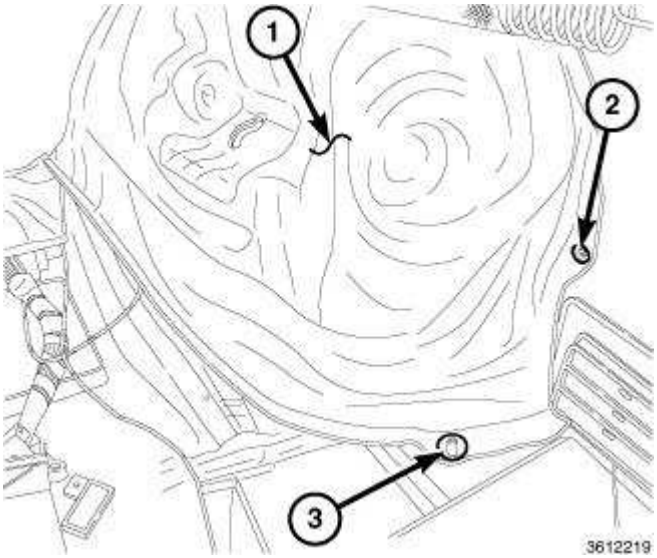


Fig. 85: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

53. Install the upper intake manifold and insulator. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

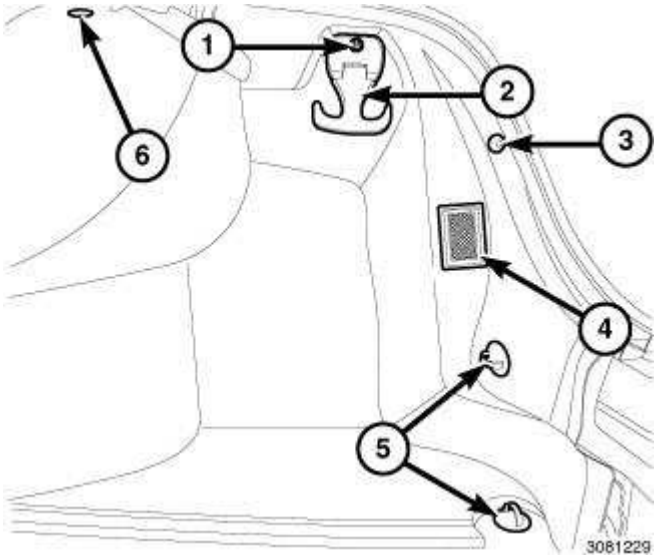


Fig. 86: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

54. Install the oil level indicator (2) with bolt (1) tightened to 12 N.m (106 in. lbs.).
55. Position the heater core inlet tube (4) and install two bolts (3) tightened to 12 N.m (106 in. lbs.).

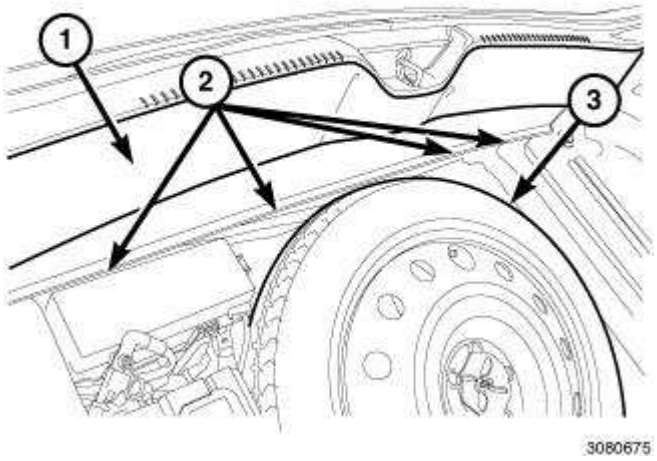


Fig. 87: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

56. Install the A/C compressor (2). Refer to **COMPRESSOR, A/C, INSTALLATION** .

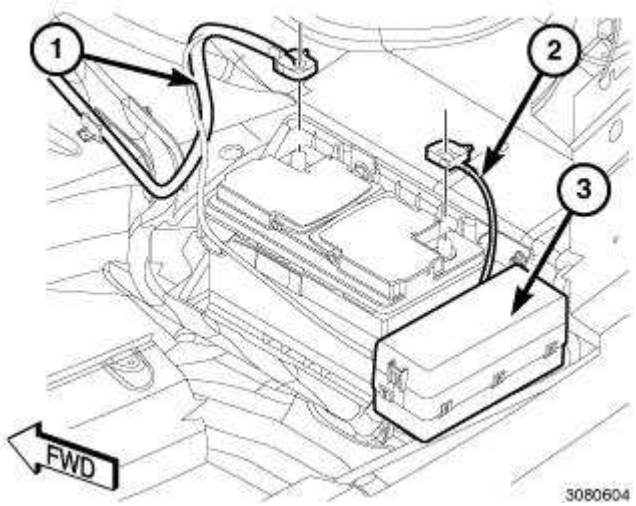


Fig. 88: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

57. Position the heater core return tube (1), install the upper support bracket retaining nut (2) and tighten to 12 N.m (9 ft. lbs.).

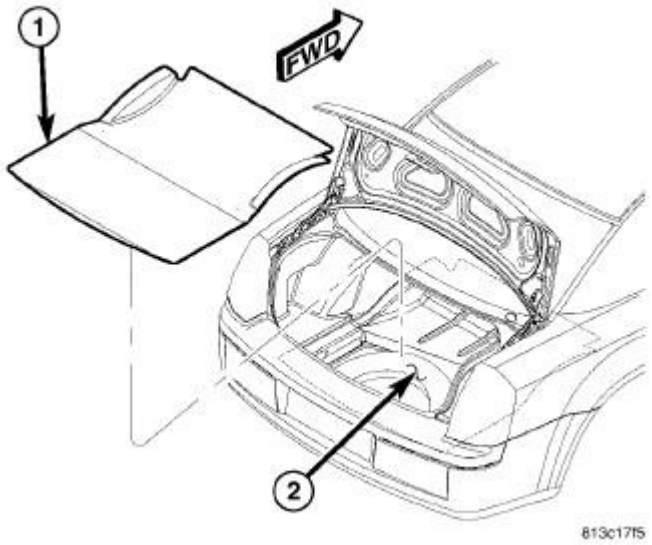


Fig. 89: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

58. Connect the heater core return hose (1).

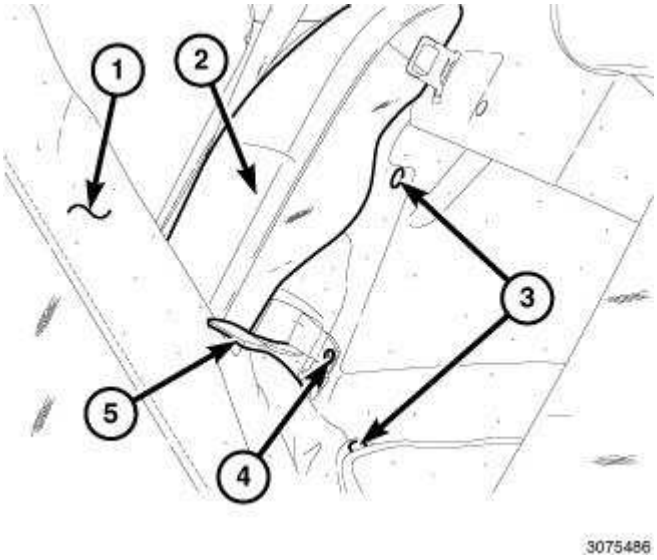


Fig. 90: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

59. Position the heater core return tube lower support bracket onto the A/C lower retaining stud, install the retaining nut (1) and tighten to 12 N.m (9 ft. lbs.).

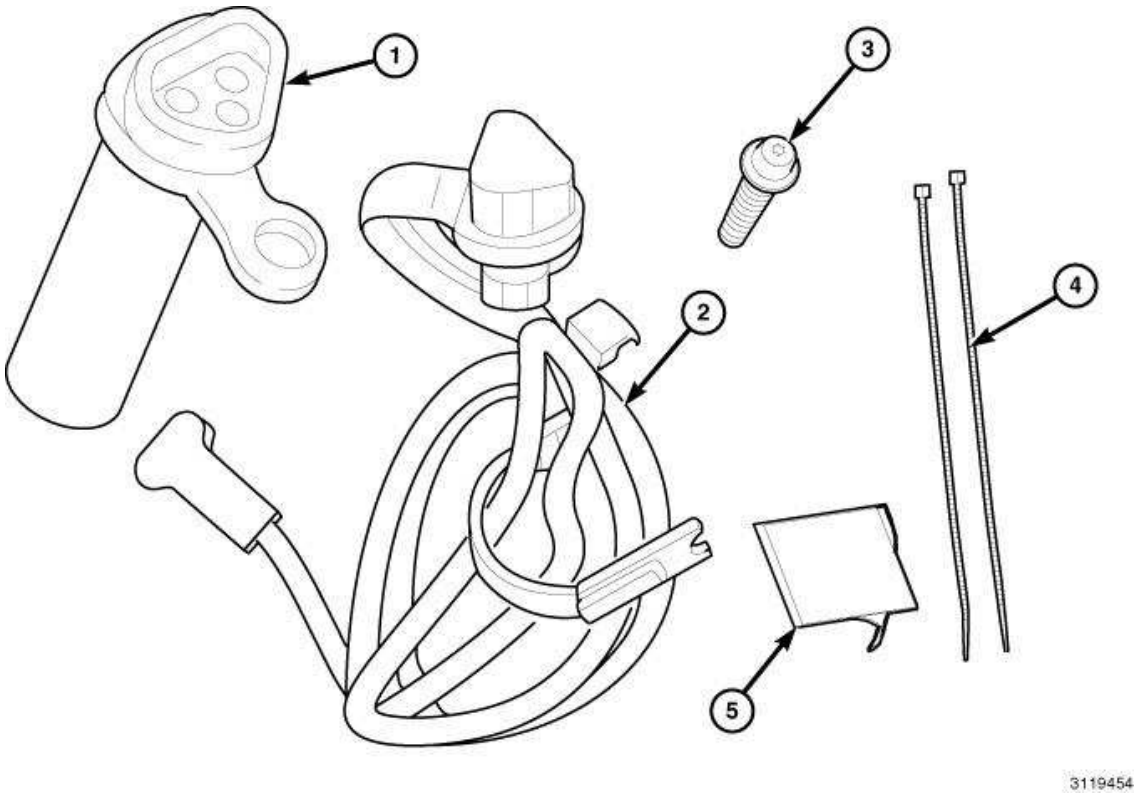


Fig. 91: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

60. Install the lower heater core return hose (1) to the engine coolant pump housing.
61. Install the lower radiator hose (2) to the engine coolant pump housing.

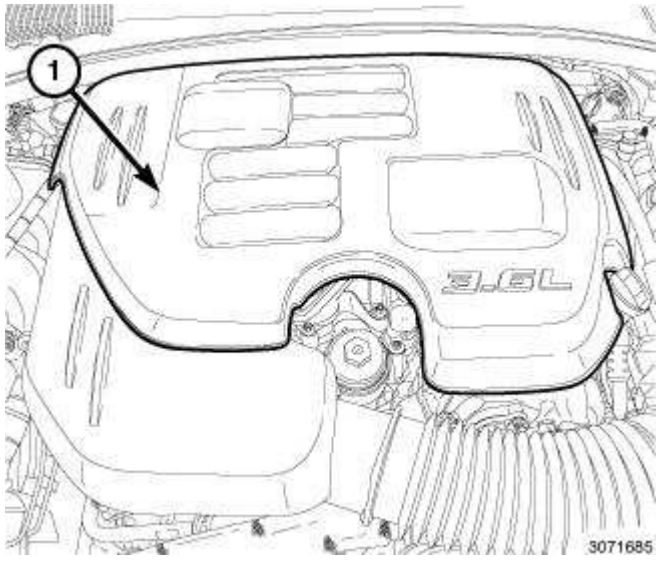


Fig. 92: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

62. Install the upper radiator hose (1) to the engine thermostat housing.

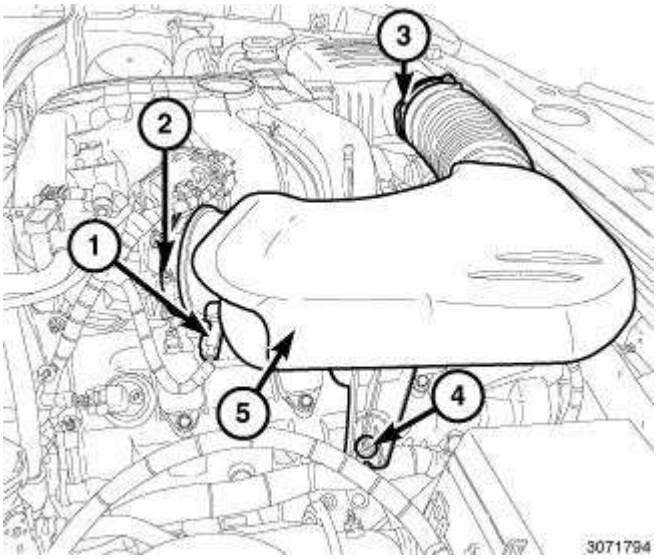


Fig. 93: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

63. Connect the electrical connectors (2) to the left variable valve timing solenoids.
64. Secure the two starter wire harness retainers (1) to the left cylinder head cover.

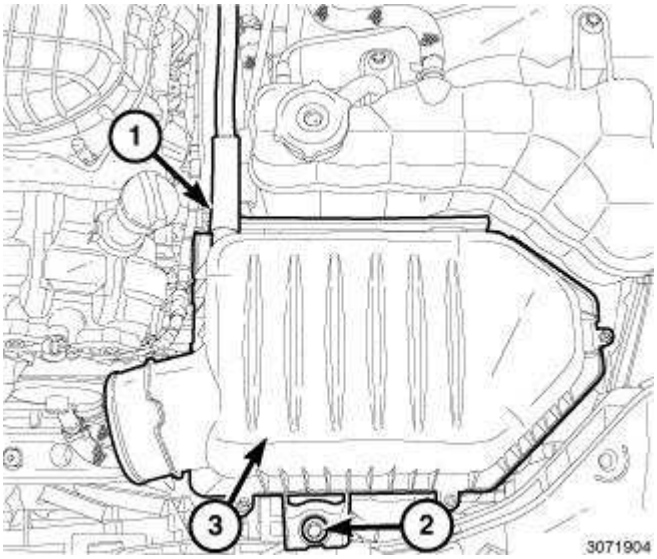


Fig. 94: A/C Compressor Electrical Connector & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

65. Connect the A/C compressor electrical connector (1) and secure the wire harness retainer (2) to the A/C compressor discharge line.

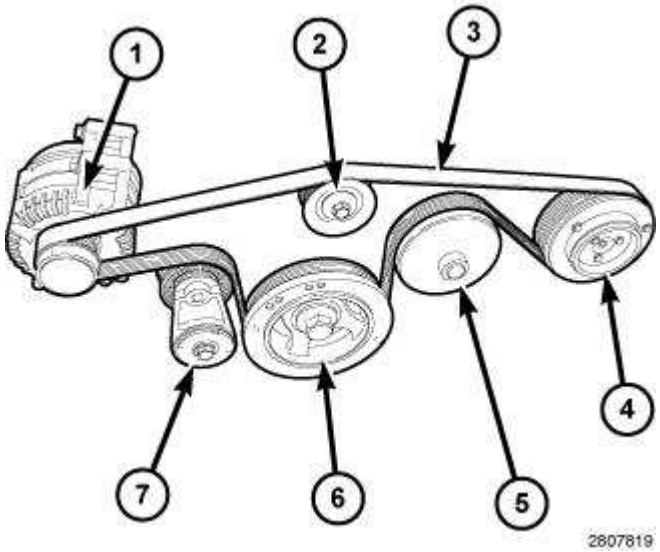


Fig. 95: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

66. Install the generator (1). Refer to **GENERATOR, INSTALLATION** .
67. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and install the accessory drive belt (3), then slowly rotate the tensioner into position.

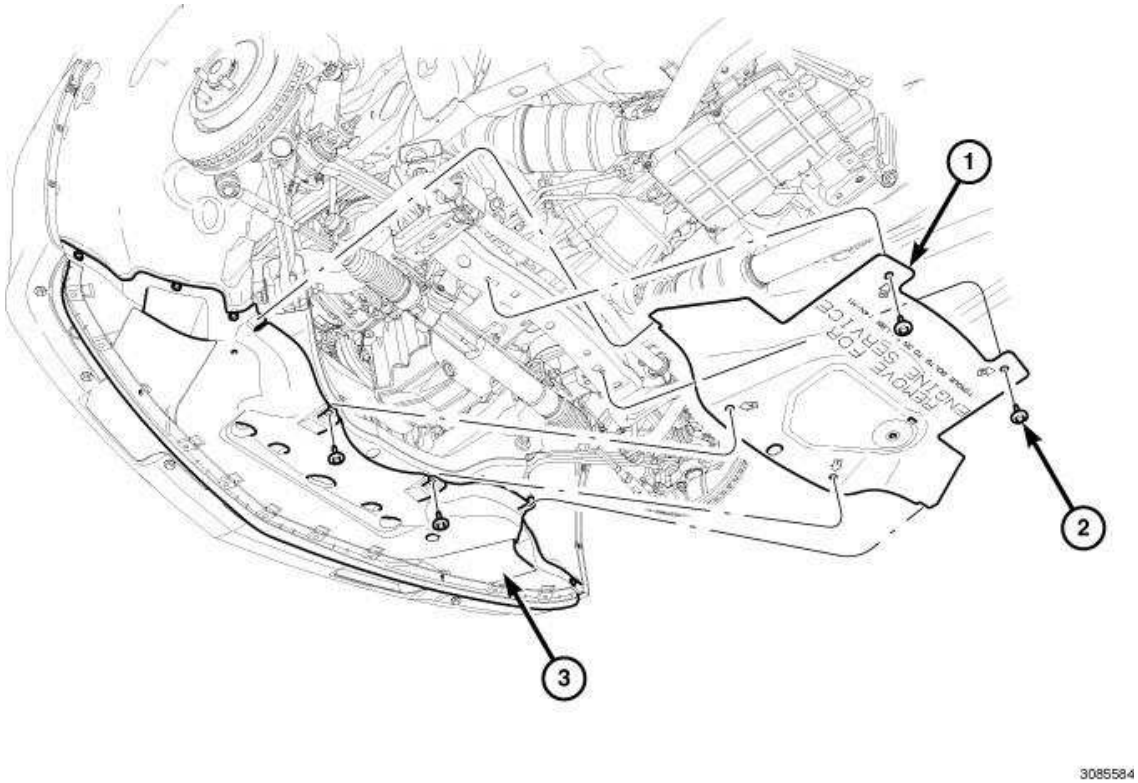


Fig. 96: Cooling Fan Module Components
Courtesy of CHRYSLER GROUP, LLC

68. Install the cooling fan module. Refer to **FAN, COOLING, INSTALLATION** .

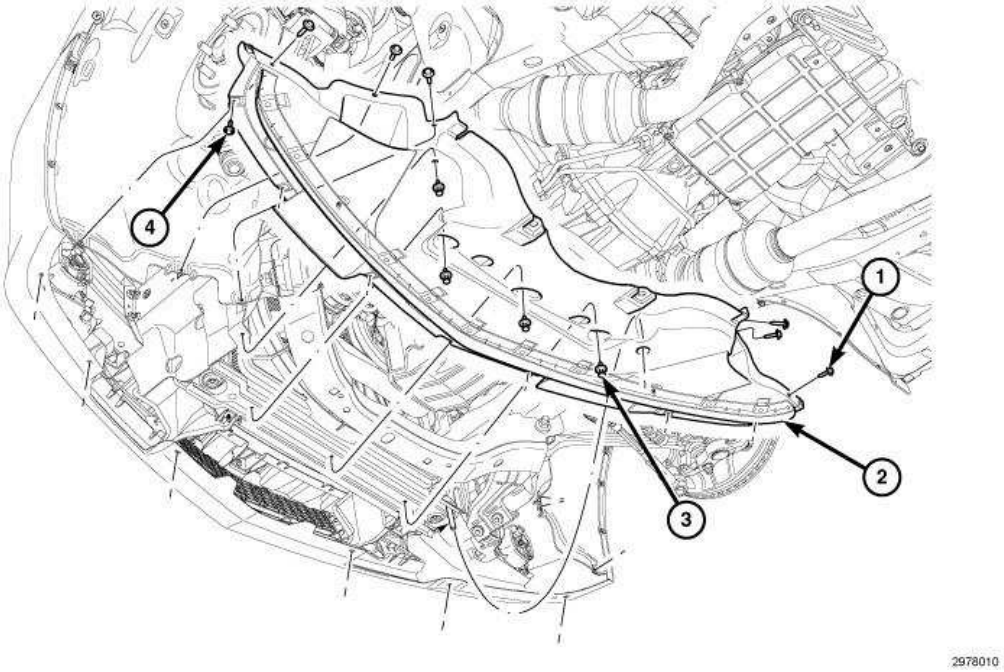


Fig. 97: Fuel Supply Hose At Underbody Fuel Supply Tube
Courtesy of CHRYSLER GROUP, LLC

69. Connect the fuel supply hose (1) to the underbody fuel tube (2). Refer to **FITTING, QUICK CONNECT** .

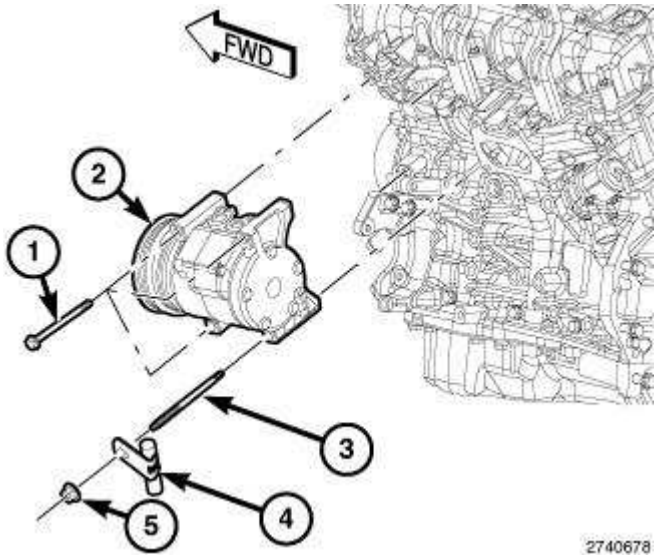


Fig. 98: Fresh Air Makeup Hose At Rear Of Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

70. Connect the fresh air makeup hose (2) to the rear of the intake manifold (1).

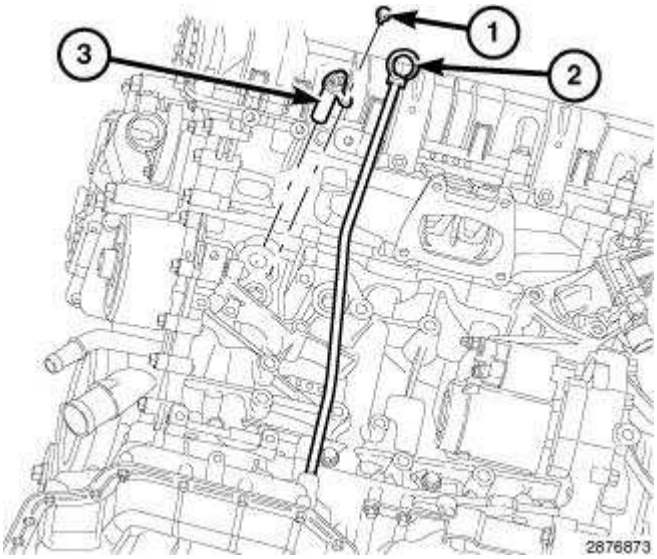


Fig. 99: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

71. Connect the electrical connector to the right Camshaft Position Sensor (CMP) (6).
72. Secure the main wire harness retainer to the right cylinder head cover mounting stud.
73. Connect the electrical connector to the Electronic Throttle Control (ETC) (5).
74. Connect the electrical connector to the Manifold Absolute Pressure (MAP) Sensor (4).
75. Connect the brake booster vacuum hose (3).
76. Connect the PCV hose to the PCV valve (1) and to the intake manifold (2).

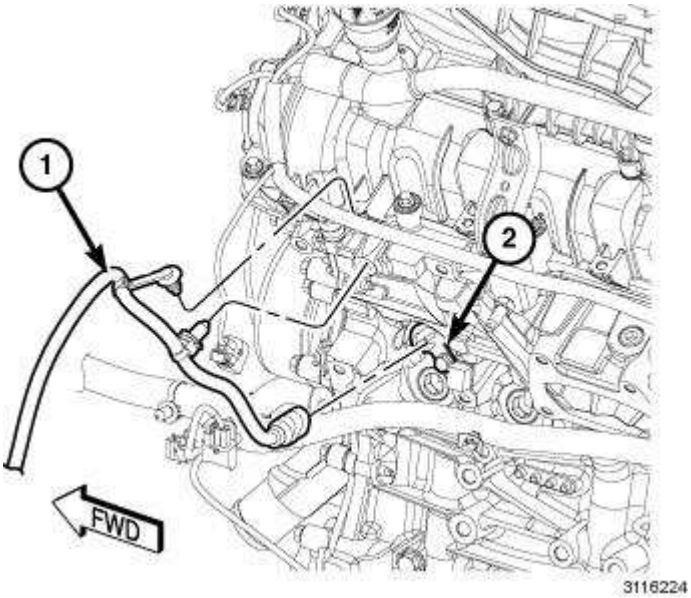


Fig. 100: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

77. Position the EVAP purge solenoid (1) vacuum line (4) and connect the vacuum line to the intake manifold.
78. Connect the other end of the vacuum line (3) to the EVAP purge solenoid (1).

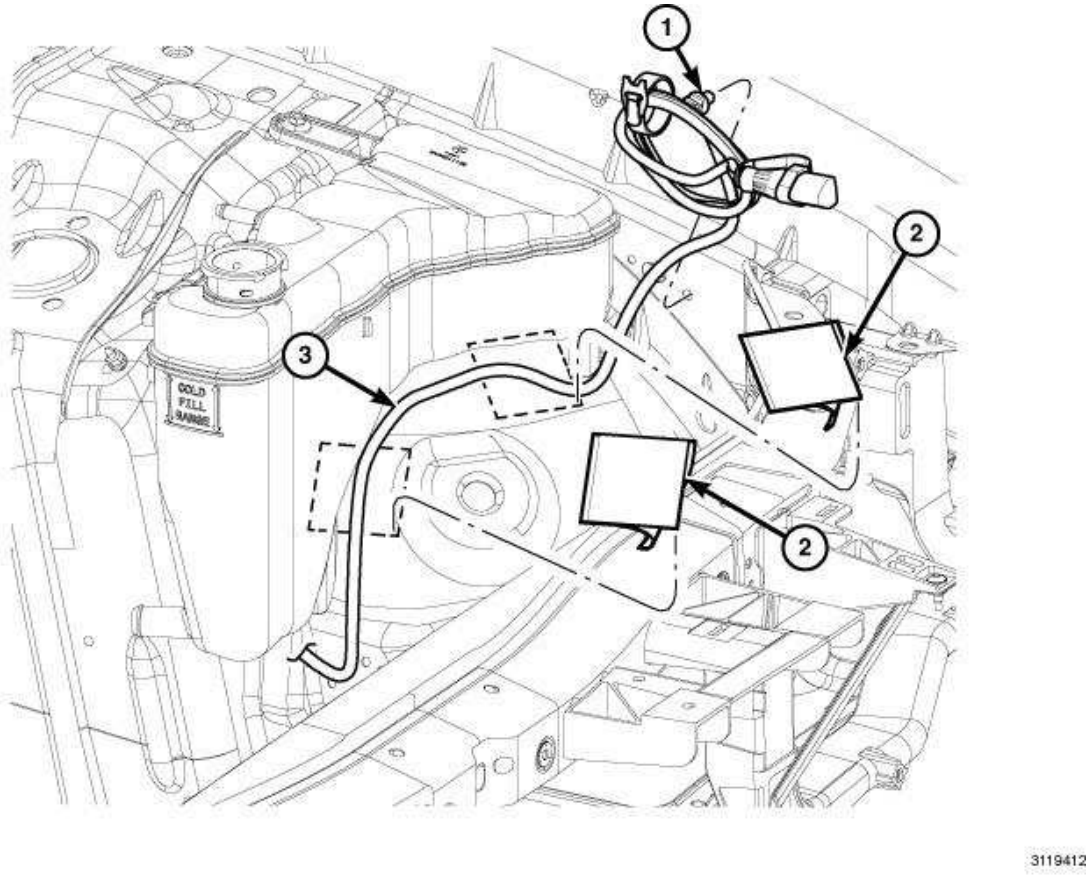


Fig. 101: Heater Core Purge Hose, Coolant Bottle Retaining Bolts & Coolant Bottle
Courtesy of CHRYSLER GROUP, LLC

79. Position the coolant bottle (3) into the engine compartment.
80. Install the coolant bottle retaining bolts (2) and tighten to 12 N.m (9 ft. lbs.).
81. Connect the heater core purge hose (1) to the coolant bottle.

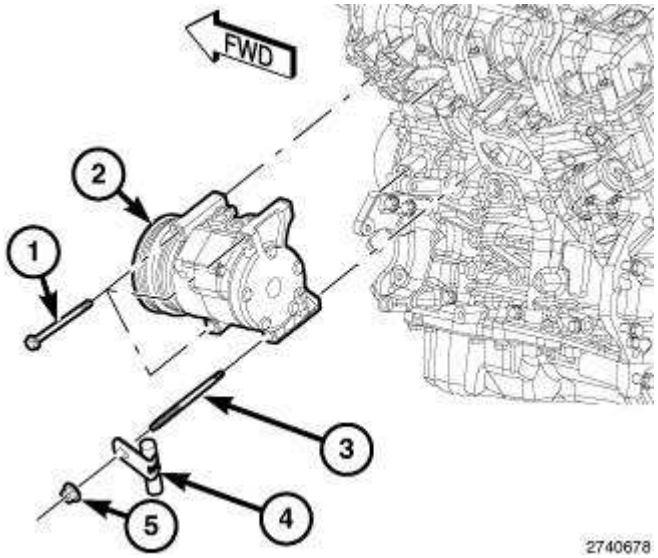


Fig. 102: Coolant Bottle Return Hose
Courtesy of CHRYSLER GROUP, LLC

82. Connect the coolant bottle return hose (1).

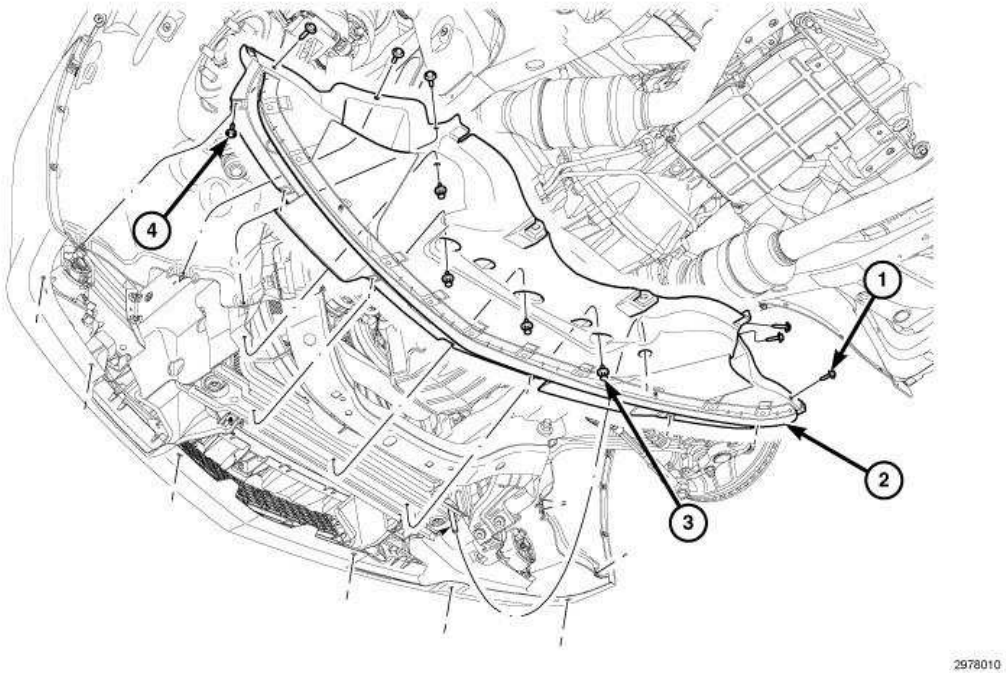


Fig. 103: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

83. Position the air cleaner housing (3) into the vehicle.
84. Install the air cleaner housing retaining bolt (2) and tighten to 12 N.m (9 ft. lbs.).
85. Connect the fresh air makeup hose (1) to the air cleaner housing.

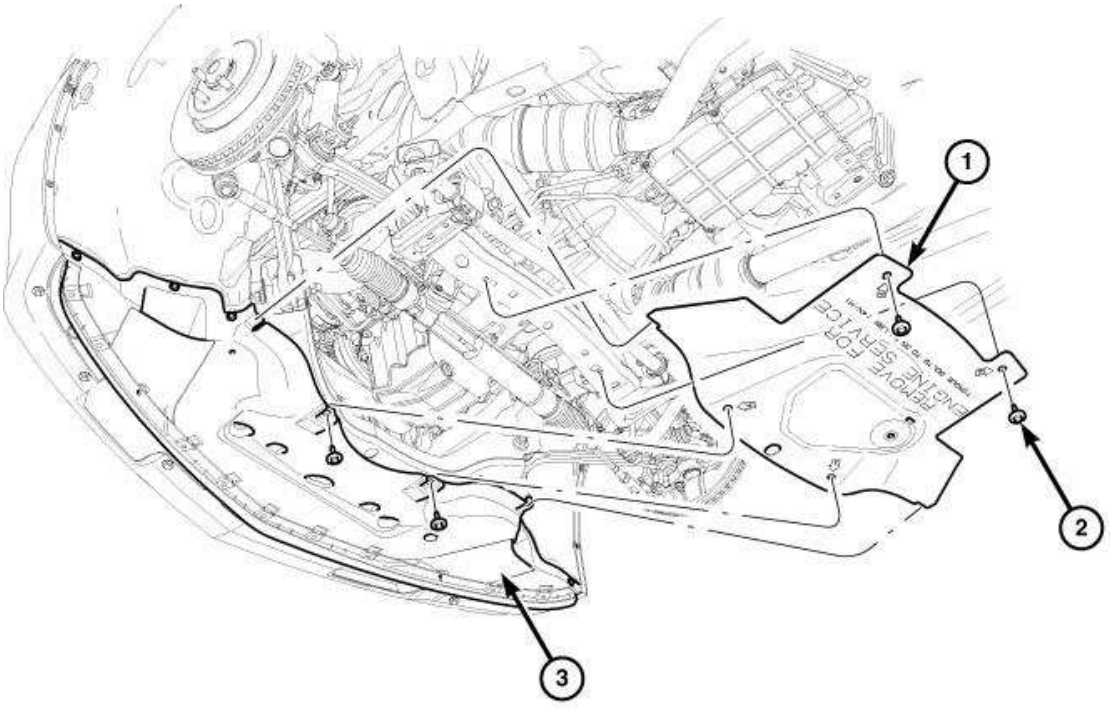


Fig. 104: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

86. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
87. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
88. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
89. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
90. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

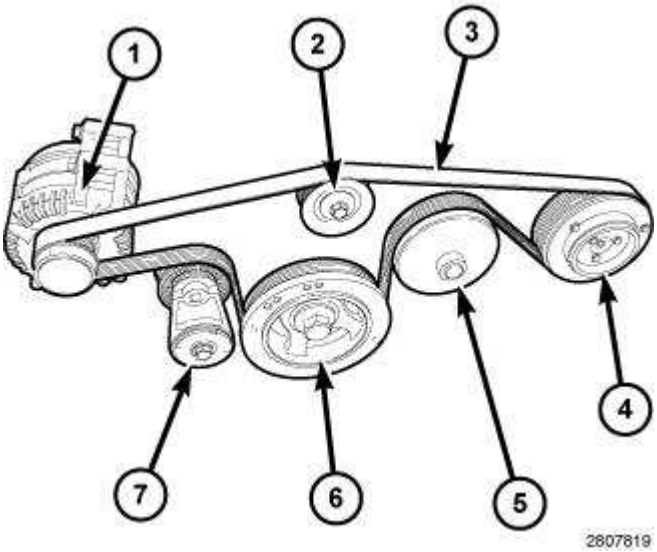


Fig. 105: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

91. Install the strut tower support (6).
92. Install the cowl panel cover (2). Refer to **COVER, COWL PANEL, INSTALLATION** .
93. Install the hood. Refer to **HOOD, INSTALLATION** .

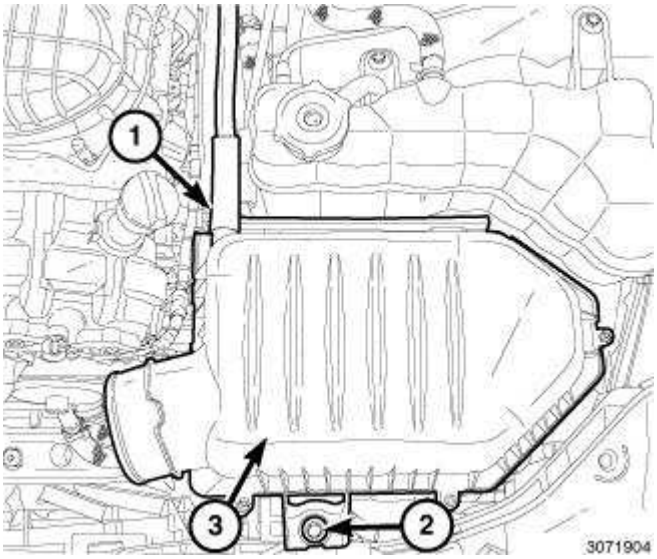


Fig. 106: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

94. If removed, install the oil filter and fill the engine crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
95. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
96. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD**

PROCEDURE .

97. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

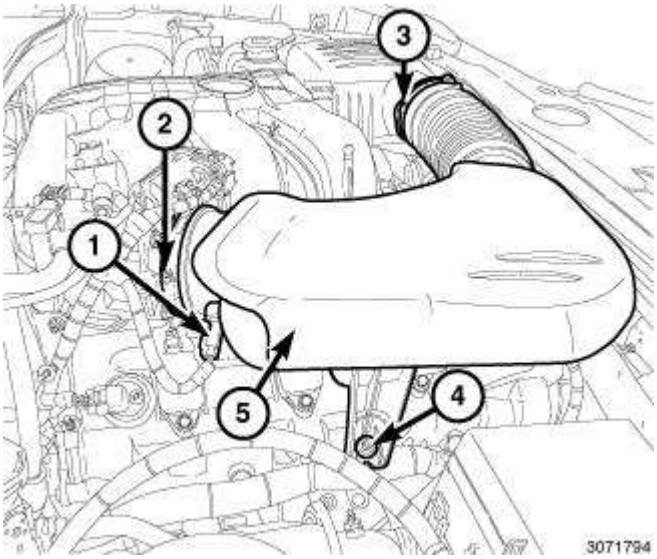


Fig. 107: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

98. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
99. Run the engine until it reaches normal operating temperature and check for leaks.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

SPECIAL TOOLS

SPECIAL TOOLS

10198 - Holder, Vibration Damper (Originally Shipped In Kit Number(s) 10223.)
10199 - Installer, Crankshaft Front Oil Seal (Originally Shipped In Kit Number(s) 10223.)
10200-1 - Holder, Timing Chain, Left Side
10200-3 - Pin
10202 - Locks, Camshaft/Phaser
10202-1 - Lock, Camshaft/Phaser, Right Side
10202-2 - Lock, Camshaft/Phaser, Left Side
10224 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 10223.)
10242-1 - Brackets, Engine Lifting, Left Side

(Originally Shipped In Kit Number(s) 10223.)
10242-2 - Brackets, Engine Lifting, Right Side
(Originally Shipped In Kit Number(s) 10223.)
10255 - Installer, Spark Plug Tube
10256 - Installer, Cam Installer, Cam Sensor/ Spark Plug Tube Seal
(Originally Shipped In Kit Number(s) 10256.)
10368 - Set, Universal Protective Cap
10369 - Holder, Timing Chain
7700-A - Tester, Cooling System
8189 - Guide Pins
(Originally Shipped In Kit Number(s) 8180, 8180CC, 8263, 8263CC.)
8511 - Remover, Seal
(Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
8514 - Pins, Tensioner
(Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
C-119 - Cylinder Indicator
C-3292A - Gauge, Pressure
C-3339A - Set, Dial Indicator
(Originally Shipped In Kit Number(s) 9202.)
C-3422-D - Compressor, Valve Spring
C-3685-A - Bloc-Chek Kit
C-385 - Compressor, Piston
MD998772A - Compressor, Valve Spring
(Originally Shipped In Kit Number(s) 8678, 8853, 8854.)

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

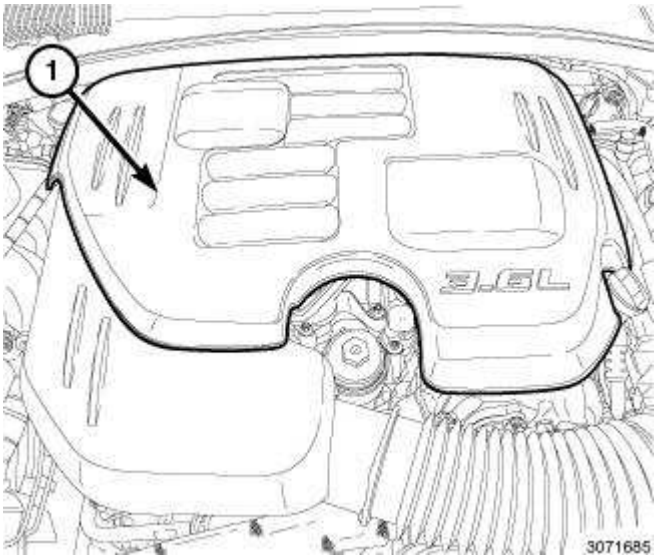


Fig. 108: Fresh Air Makeup Hose, Air Cleaner Housing & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the fresh air makeup hose (1) at the air cleaner housing (3).
2. Remove the air cleaner housing cover retaining bolts (2).

CAUTION: Do not use compressed air to clean out the air cleaner housing without first covering the air inlet to the throttle body. Dirt or foreign objects could enter the intake manifold causing engine damage.

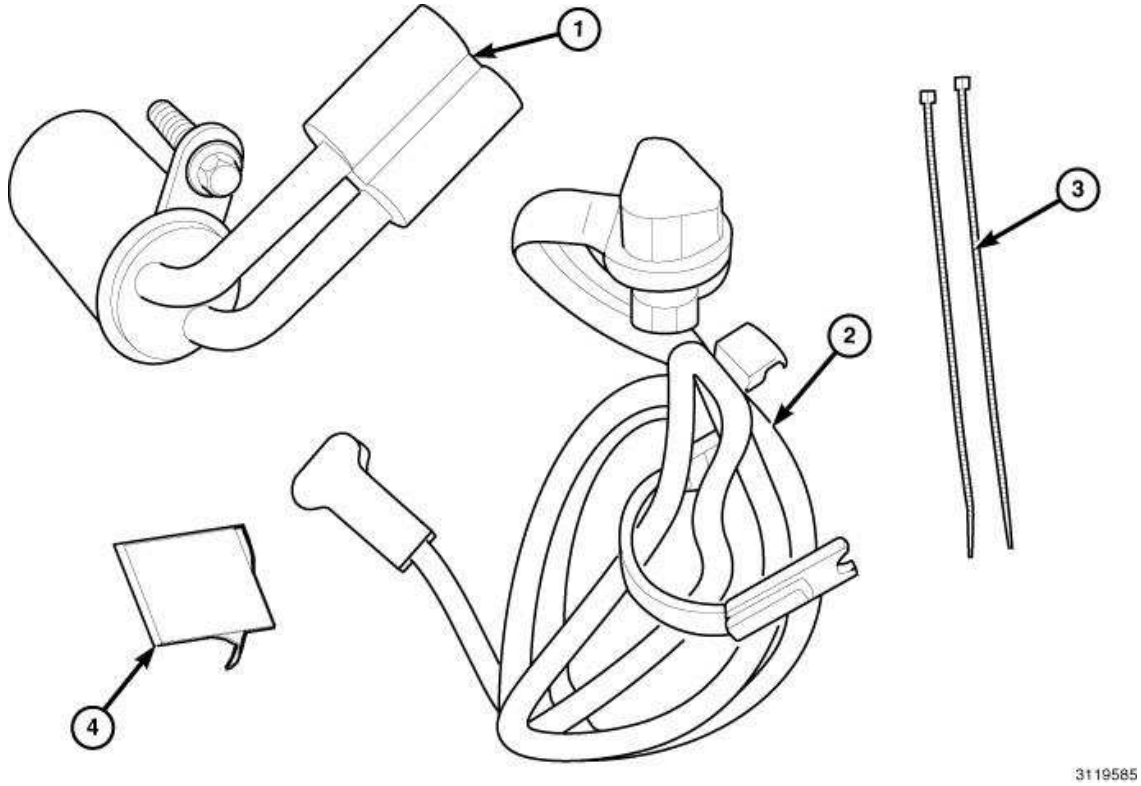


Fig. 109: Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

3. Lift the air cleaner housing cover off the housing and position aside.
4. Remove the air cleaner element (1).
5. Remove any dirt or debris from the bottom of the air cleaner housing.

INSTALLATION

INSTALLATION

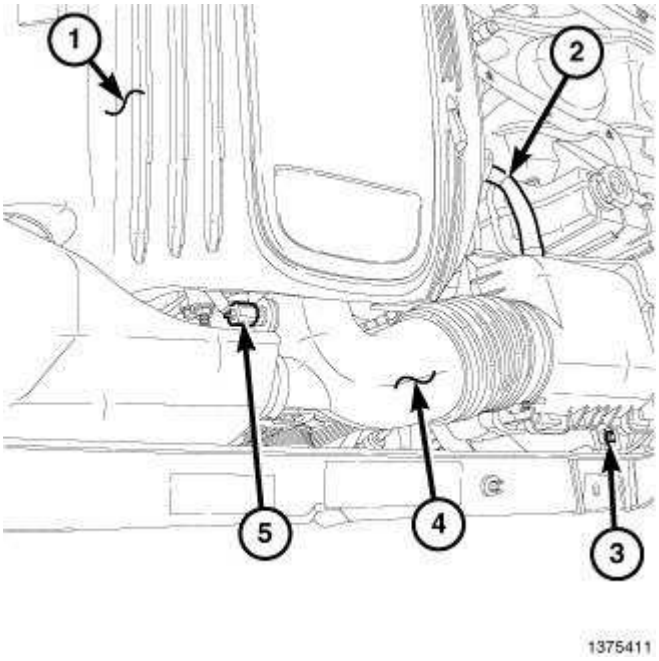


Fig. 110: Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

1. Install a new air cleaner element (1) into the air cleaner housing.
2. Position the air cleaner housing cover so that the alignment tabs insert into the lower housing.

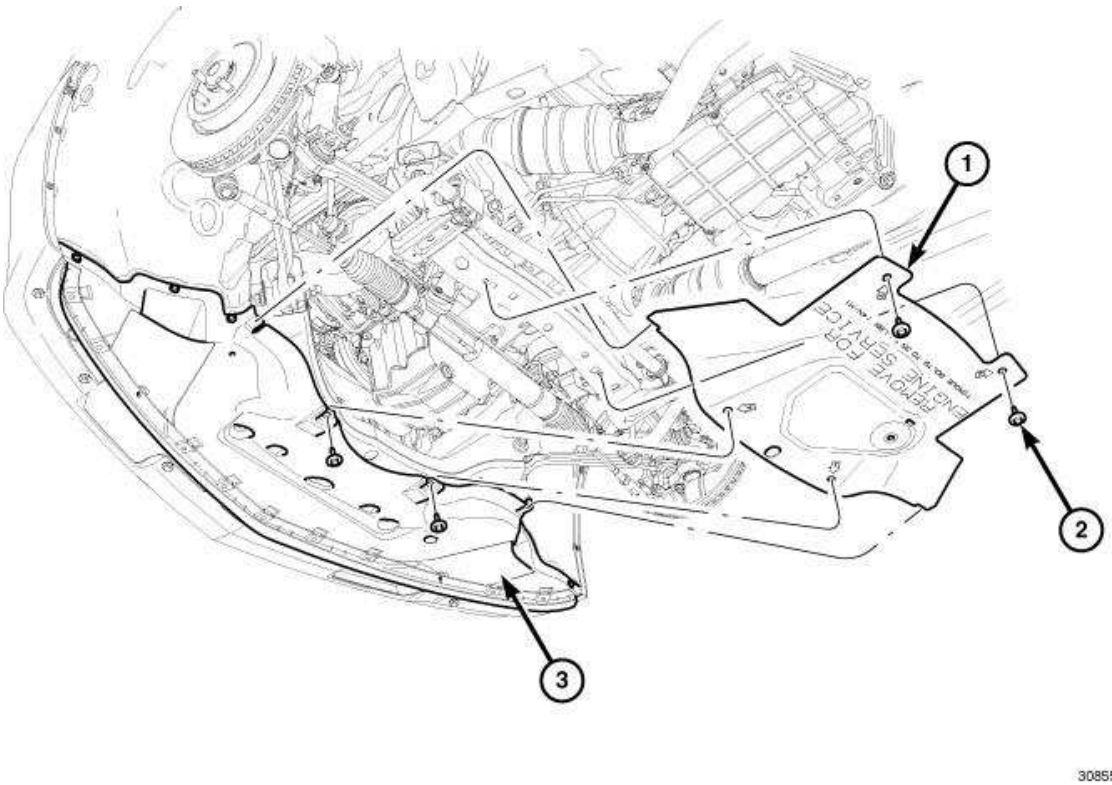


Fig. 111: Fresh Air Makeup Hose, Air Cleaner Housing & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Seat the cover (3) onto the housing and install the retaining bolts (2) and tighten to 4 N.m (35 in. lbs.).
4. Connect the fresh air makeup hose (1) onto the air cleaner housing.

BODY, AIR CLEANER

REMOVAL

REMOVAL

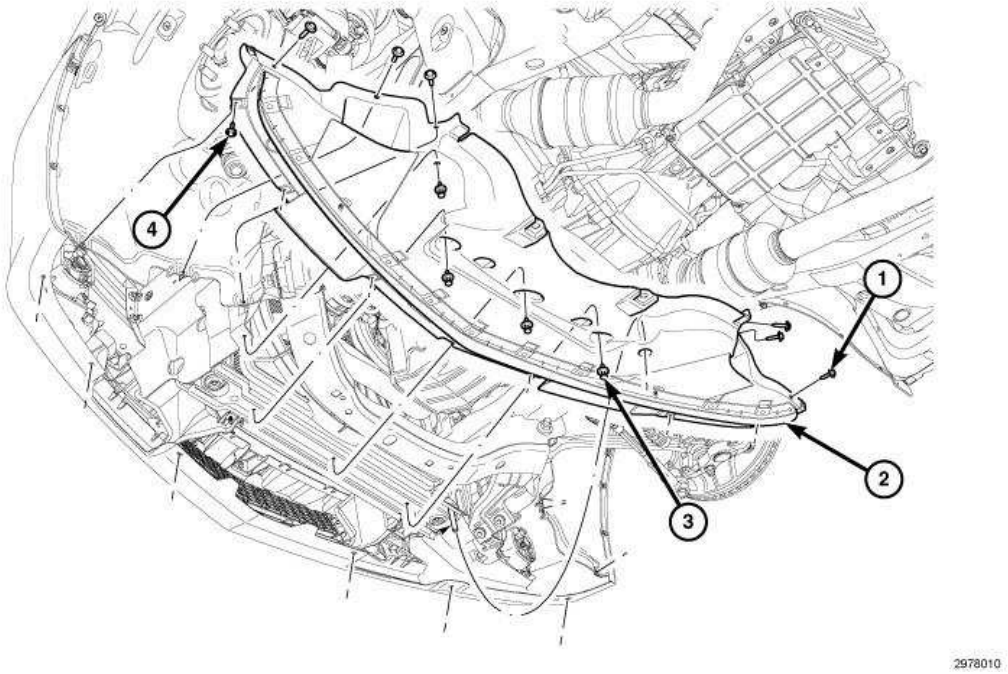


Fig. 112: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.

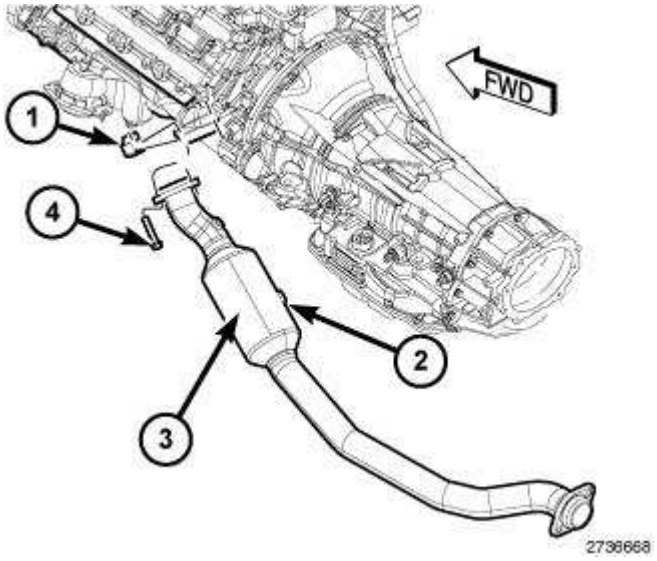


Fig. 113: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

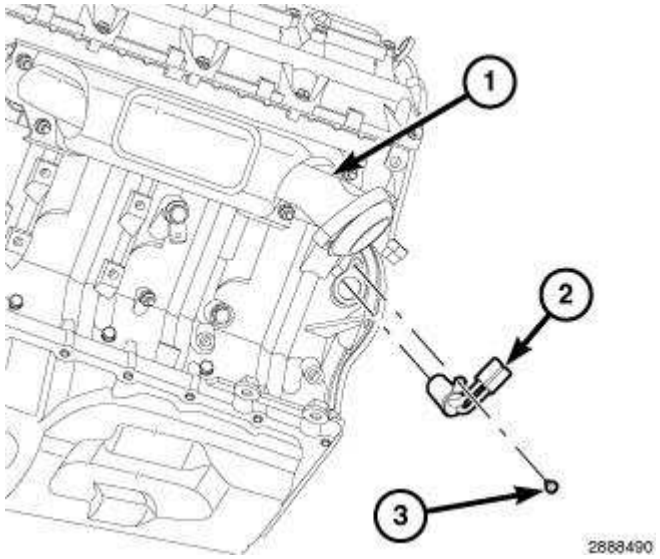


Fig. 114: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

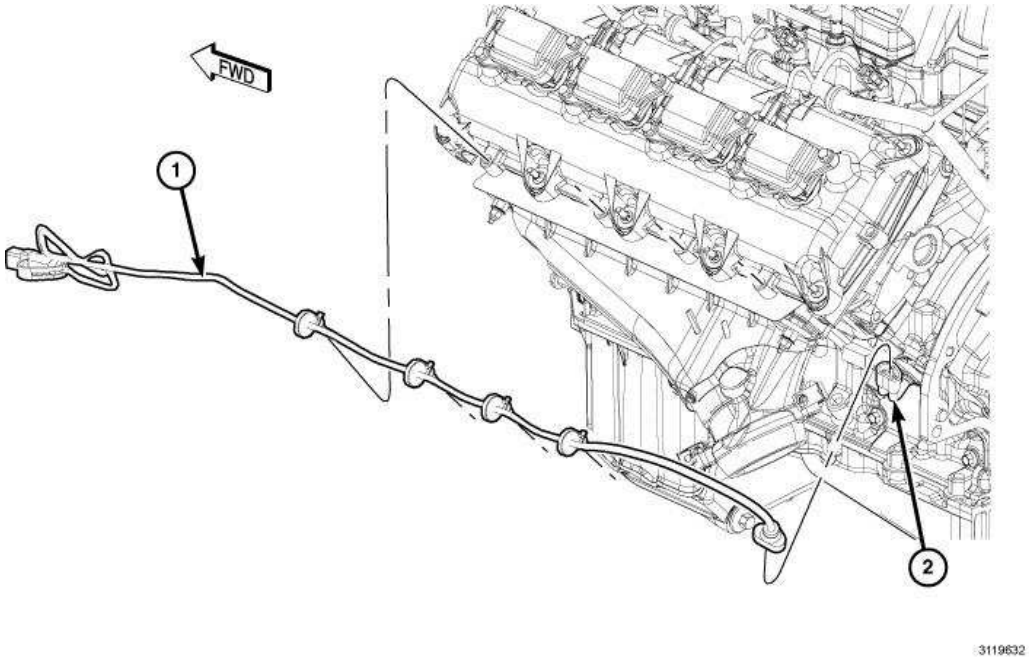


Fig. 115: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the fresh air makeup hose (1) from the air cleaner housing.
9. Remove the air cleaner housing retaining bolt (2).
10. Remove the air cleaner housing (3).

INSTALLATION

INSTALLATION

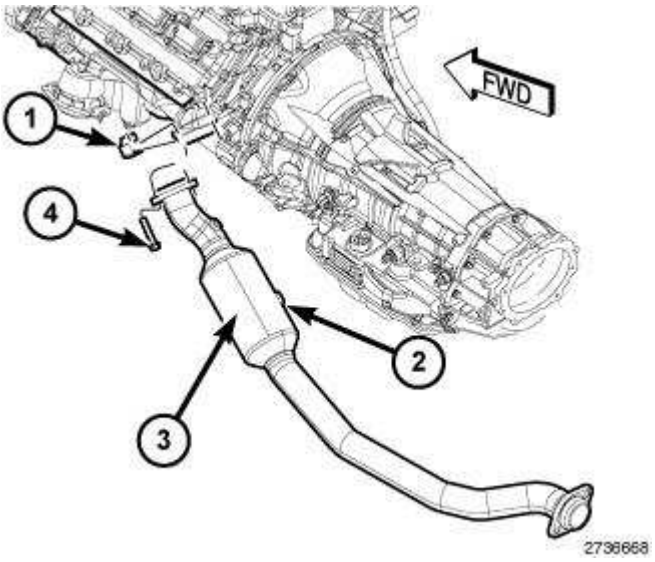


Fig. 116: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the air cleaner housing (3) into the vehicle.
2. Install the air cleaner housing retaining bolt (2) and tighten to 4 N.m (35 in. lbs.).
3. Connect the fresh air makeup hose (1) onto the air cleaner housing.

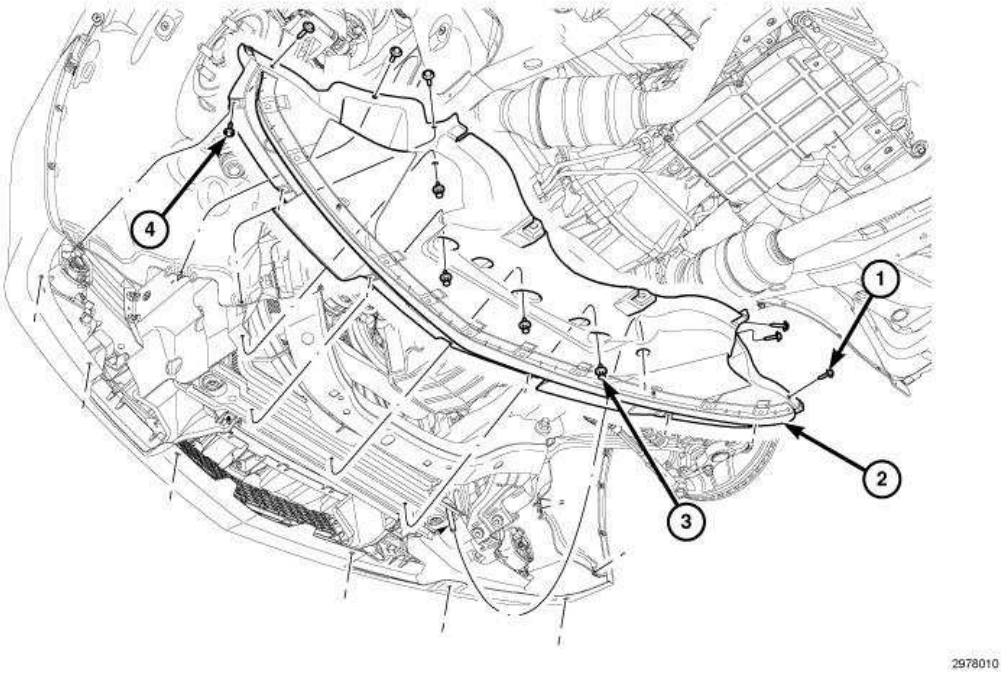


Fig. 117: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Position the air inlet hose assembly (5), connect the air inlet hose to the throttle body and the air cleaner housing.
5. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
6. Tighten the clamp (3) at the air cleaner housing to 4 N.m (35 in. lbs.).
7. Tighten the clamp (2) at the throttle body to 4 N.m (35 in. lbs.).
8. Connect the electrical connector (1) to the Inlet Air Temperature (IAT) sensor.

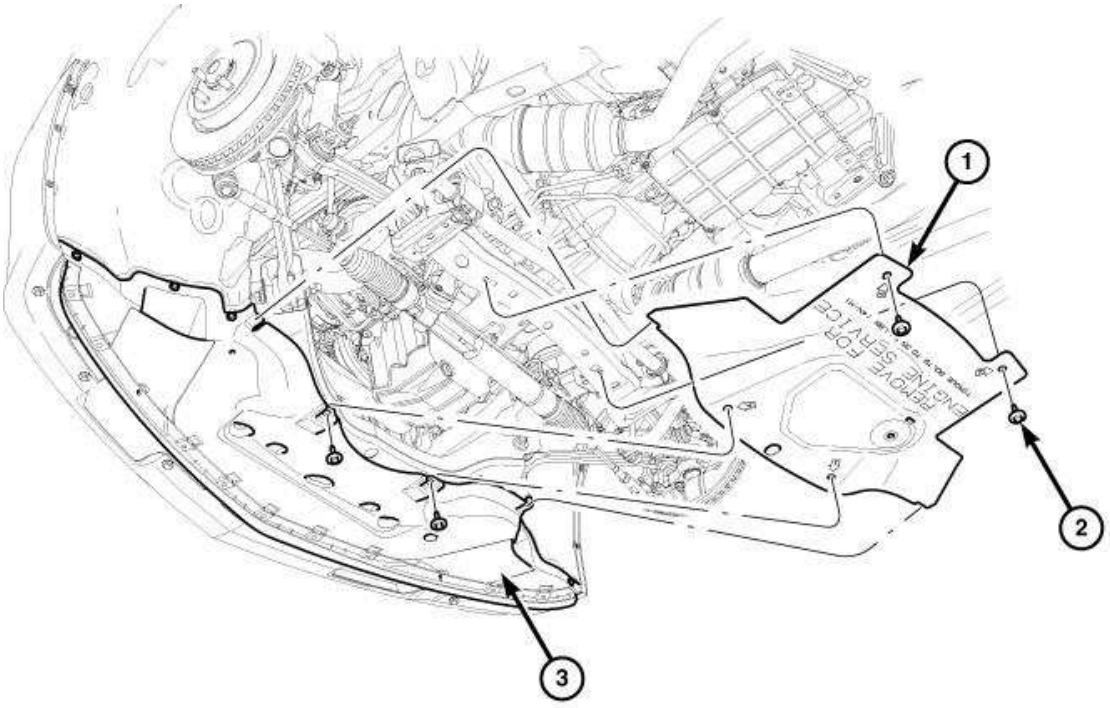


Fig. 118: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

9. Position the engine cover (1) and secure the retaining grommets to the ball studs.

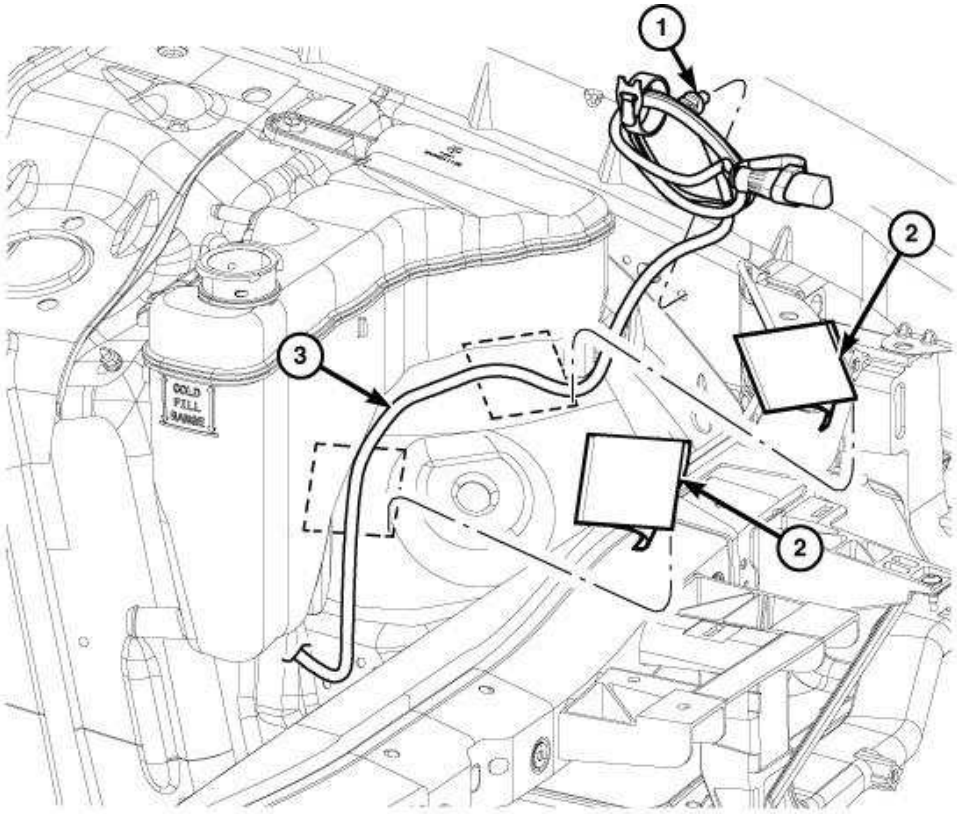


Fig. 119: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

10. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

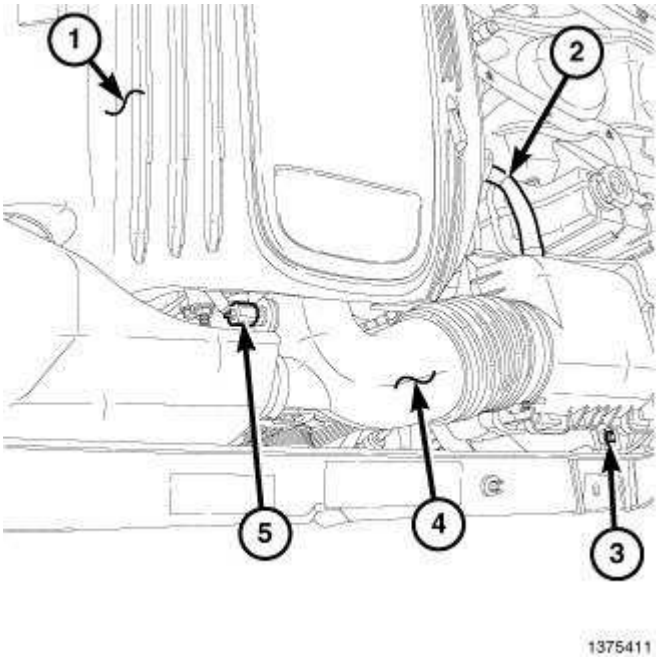


Fig. 120: Aluminum Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

The 3.6L aluminum cylinder heads are a unique design with left and right castings. The exhaust manifolds are integrated into the cylinder heads. The cylinder head features four valves per cylinder with pressed in powdered metal valve guides. The valve guides are not serviceable. The DOHC valvetrain uses roller rocker arms with hydraulic lifters. The cylinder head's camshaft bearing caps are made of powdered metal and the location and direction of each cap is marked on the side of the caps. The spark plug tubes are pressed into the cylinder heads and sealed in place. The tubes are a thin wall design and caution must be taken when working in the spark plug tube area.

DIAGNOSIS AND TESTING

CYLINDER HEAD GASKET

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

Possible indications of the cylinder head gasket leaking between adjacent cylinders are:

- Loss of engine power
- Engine misfiring
- Poor fuel economy

Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:

- Engine overheating

- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in Cylinder Compression Pressure Test. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50 - 70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING WITH COOLANT PRESSURE CAP REMOVED.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

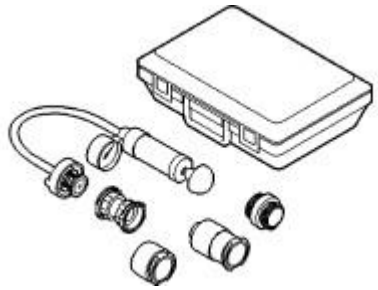


Fig. 121: Cooling System Pressure Tester - 7700-A
Courtesy of CHRYSLER GROUP, LLC

WARNING: WITH COOLING SYSTEM TESTER IN PLACE, PRESSURE WILL BUILD UP FAST. EXCESSIVE PRESSURE BUILT UP, BY CONTINUOUS ENGINE OPERATION, MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

Install Cooling System Tester (special tool #7700-A, Tester, Cooling System) or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Fig. 122: Bloc-Chek Kit C-3685-A
Courtesy of CHRYSLER GROUP, LLC

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform test following the procedures supplied with the tool kit.

HYDRAULIC LASH ADJUSTER

A tappet-like noise may be produced from several items. Check the following items.

1. Engine oil level too high or too low. This may cause aerated oil to enter the adjusters and cause them to be spongy.
2. Insufficient running time after rebuilding cylinder head. Low speed running up to 1 hour may be required.
3. Turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
4. Low oil pressure.
5. The oil restrictor in cylinder head gasket or the oil passage to the cylinder head is plugged with debris.
6. Air ingested into oil due to broken or cracked oil pump pick up.
7. Worn valve guides.
8. Rocker arm ears contacting valve spring retainer.
9. Rocker arm loose, adjuster stuck or at maximum extension and still leaves lash in the system.
10. Oil leak or excessive cam bore wear in cylinder head.
11. Faulty lash adjuster.

a. Check lash adjusters for "sponginess" while installed in cylinder head and cam on camshaft at base circle. Depress part of rocker arm over adjuster. Normal adjusters should feel firm when pressed quickly. When pressed very slowly, lash adjusters should collapse.
b. Remove suspected lash adjusters, and replace.
c. Before installation, make sure adjusters are full of oil. This can be verified by little plunger travel when lash adjuster is depressed quickly.

REMOVAL

LEFT

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets

(pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

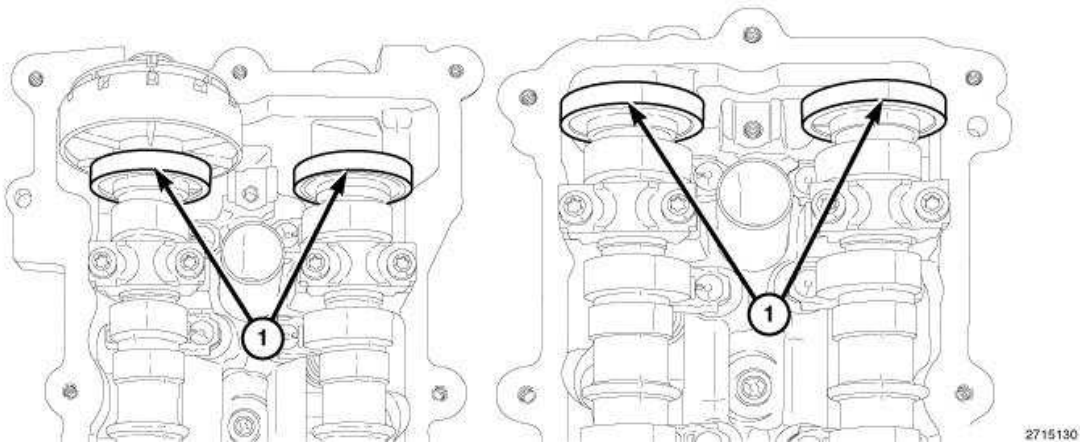


Fig. 123: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

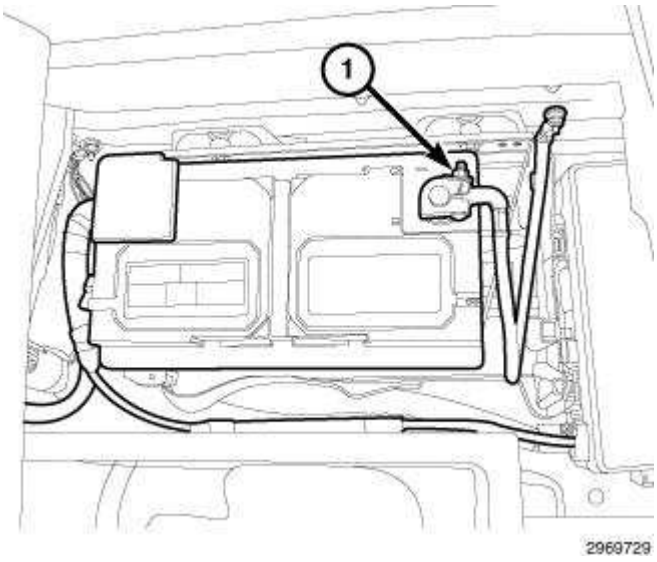


Fig. 124: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable (1).

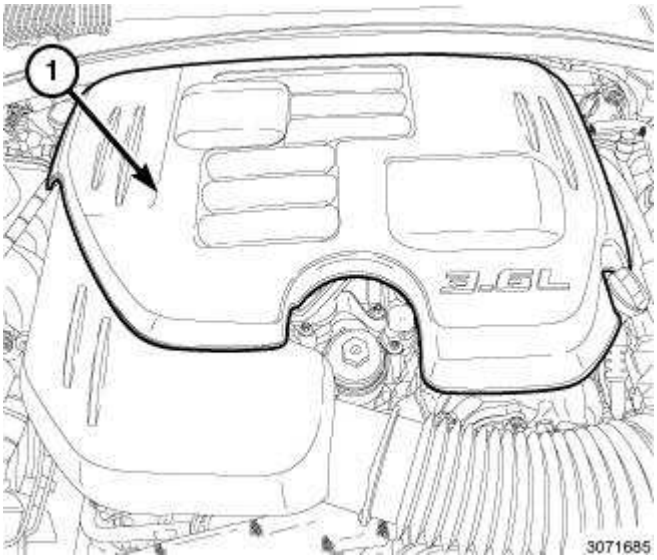


Fig. 125: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

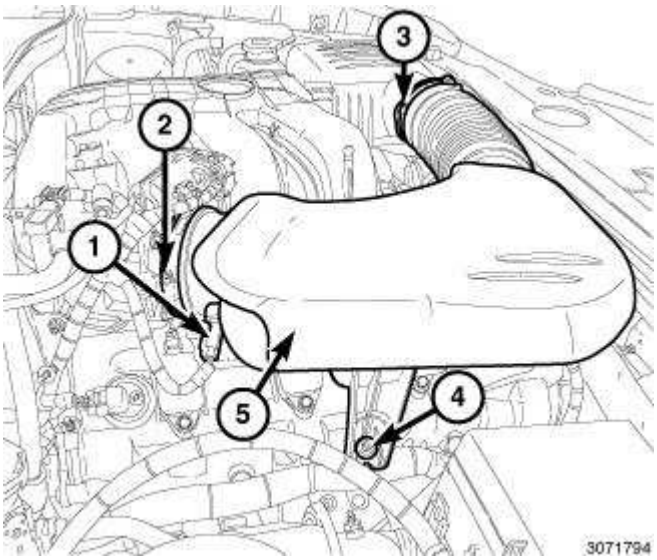


Fig. 126: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
5. Loosen the clamp (2) at the throttle body.
6. Loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
8. Remove the air inlet hose assembly (5).

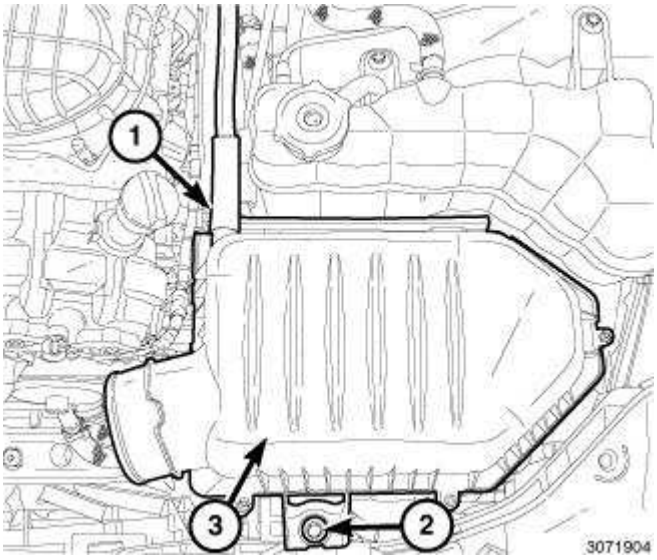


Fig. 127: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the fresh air makeup hose (1) from the air cleaner housing.
10. Remove the air cleaner housing retaining bolt (2).
11. Remove the air cleaner housing (3).

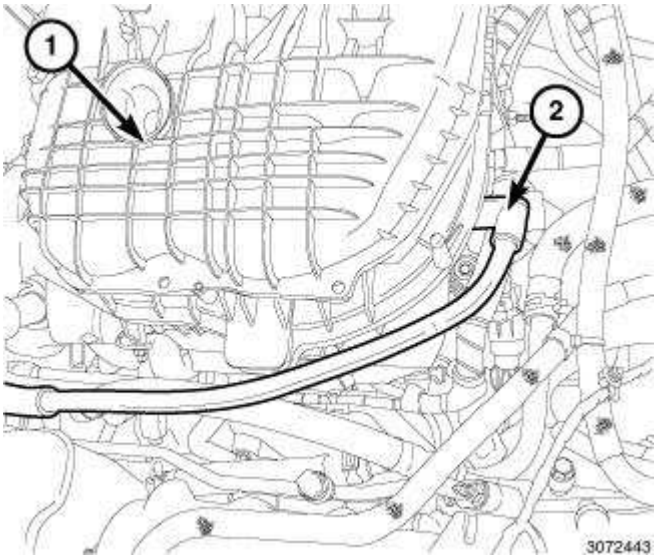


Fig. 128: Fresh Air Makeup Hose At Rear Of Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

12. Remove the fresh air makeup hose (2) from the rear of the intake manifold (1).

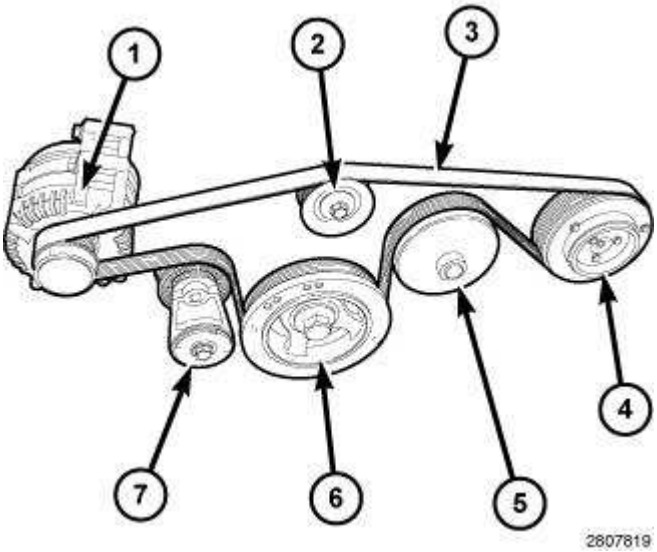


Fig. 129: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

13. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and remove the accessory drive belt (3), then slowly rotate the tensioner into the freearm position.

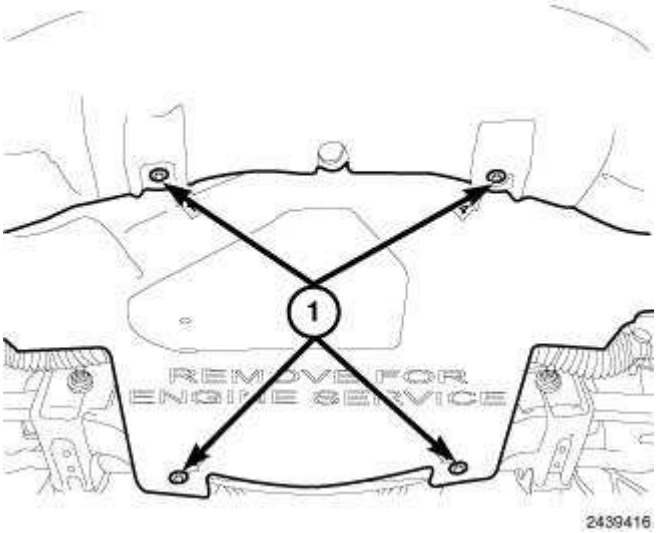


Fig. 130: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

14. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
15. Remove the belly pan retainers (1) and remove the belly pan.
16. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
17. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

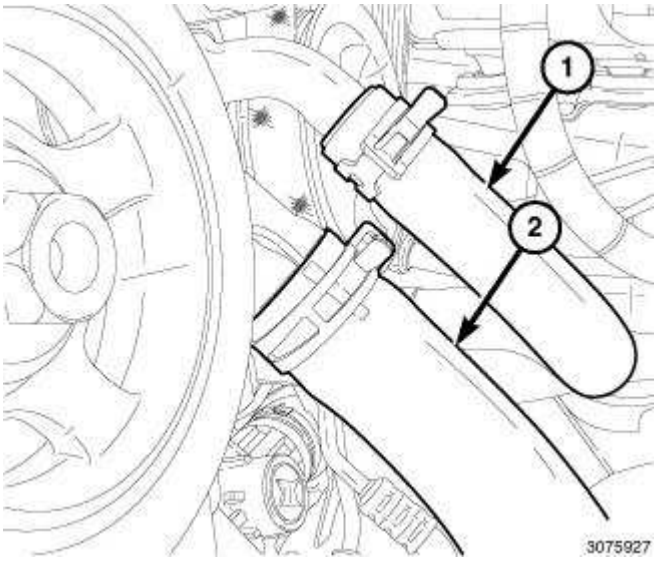


Fig. 131: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

18. Remove the lower heater core return hose (1) from the engine coolant pump housing.

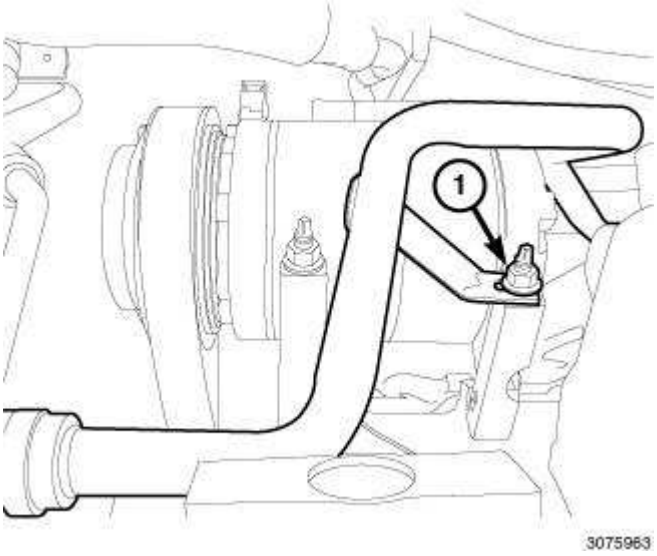


Fig. 132: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

19. Remove the heater core return tube lower support bracket retaining nut (1).

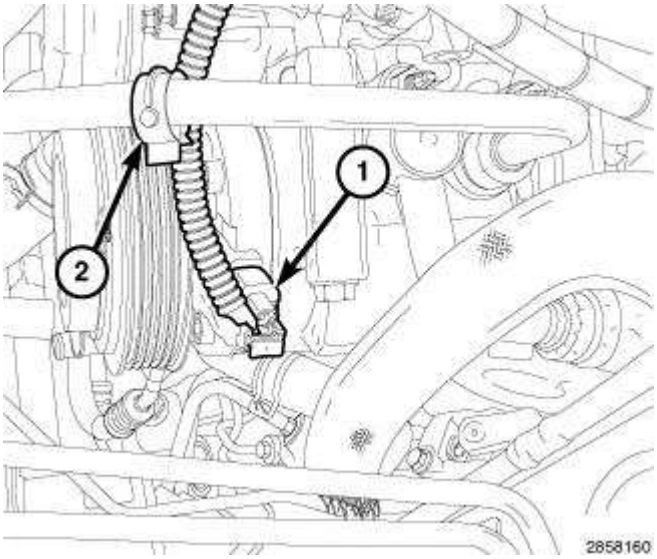


Fig. 133: A/C Compressor Electrical Connector & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

20. Disconnect the A/C compressor electrical connector (1) and disengage the wire harness retainer (2) from the A/C compressor discharge line.

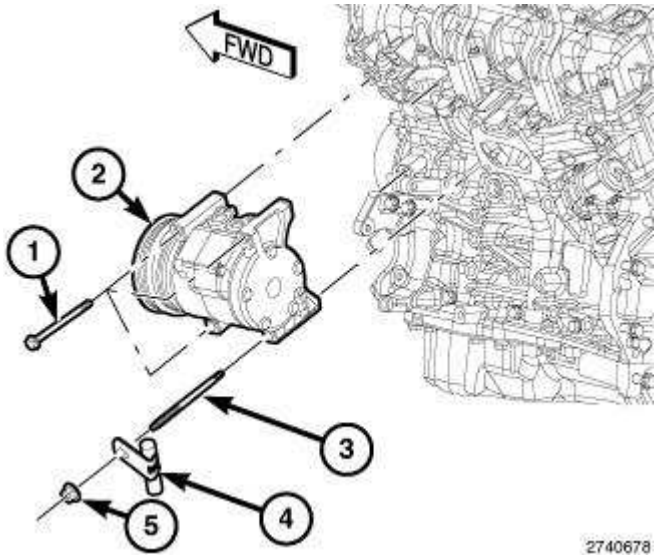


Fig. 134: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove the A/C compressor lower retaining studs (3).
22. Lower the vehicle.
23. Remove the A/C compressor upper retaining bolts (1) and reposition the A/C compressor aside (2).

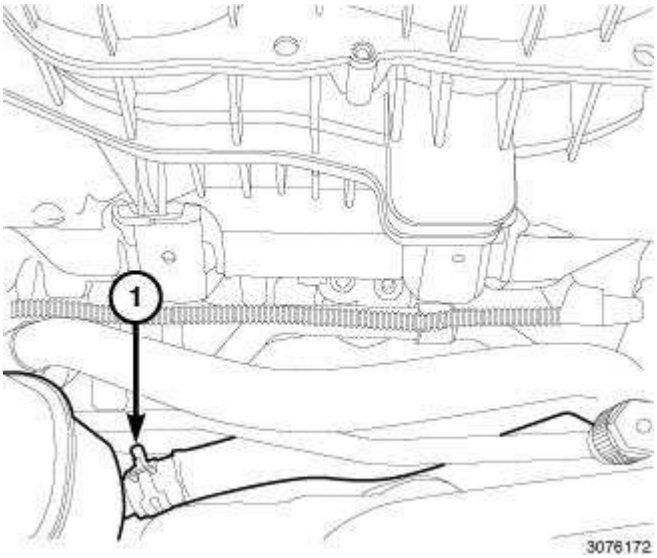


Fig. 135: Coolant Bottle Return Hose
Courtesy of CHRYSLER GROUP, LLC

24. Remove the coolant bottle return hose (1).

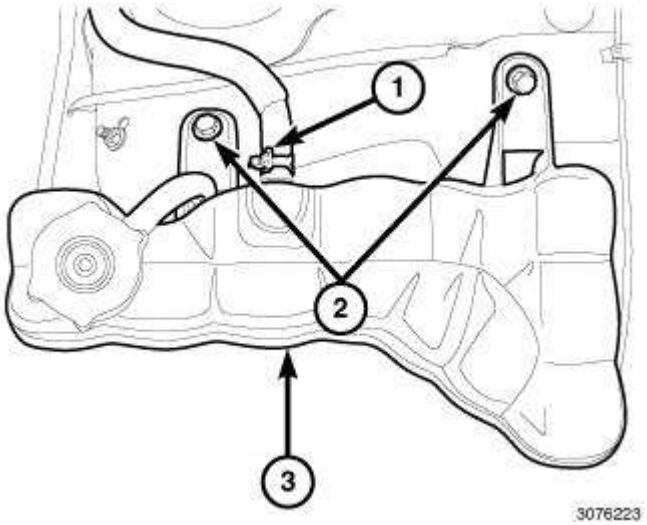


Fig. 136: Heater Core Purge Hose, Coolant Bottle Retaining Bolts & Coolant Bottle
Courtesy of CHRYSLER GROUP, LLC

25. Remove the heater core purge hose (1) from the coolant bottle.
26. Remove the coolant bottle retaining bolts (2).
27. Remove the coolant bottle (3).

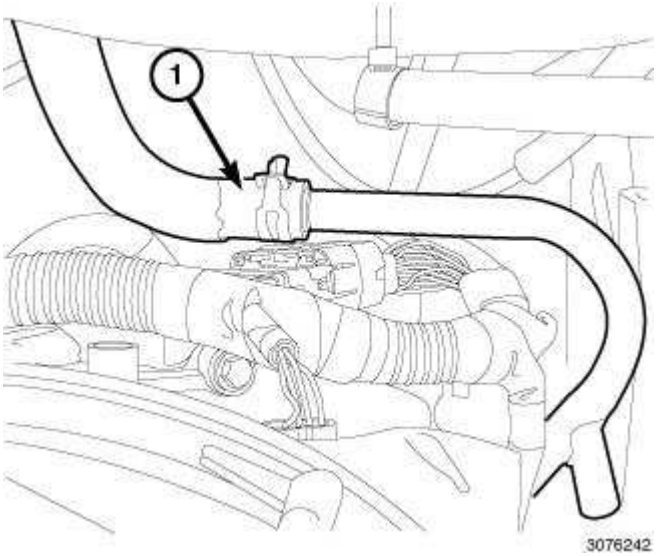


Fig. 137: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

28. Disconnect the heater core return hose (1).

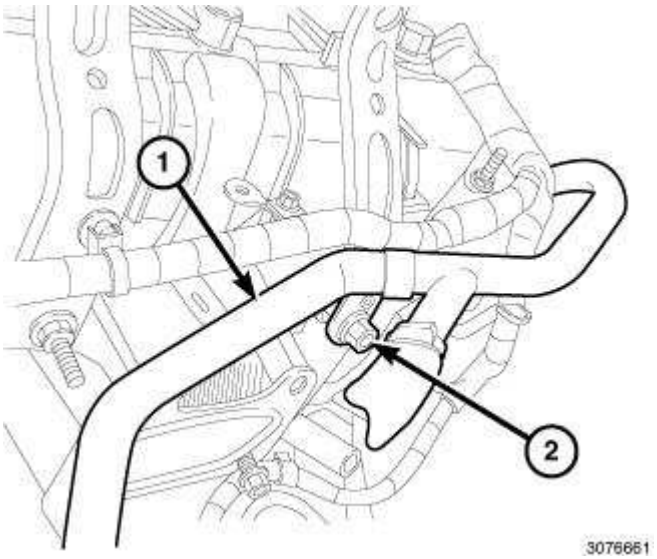


Fig. 138: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

29. Remove the heater core return tube upper support bracket retaining nut (2) and remove the tube (1).

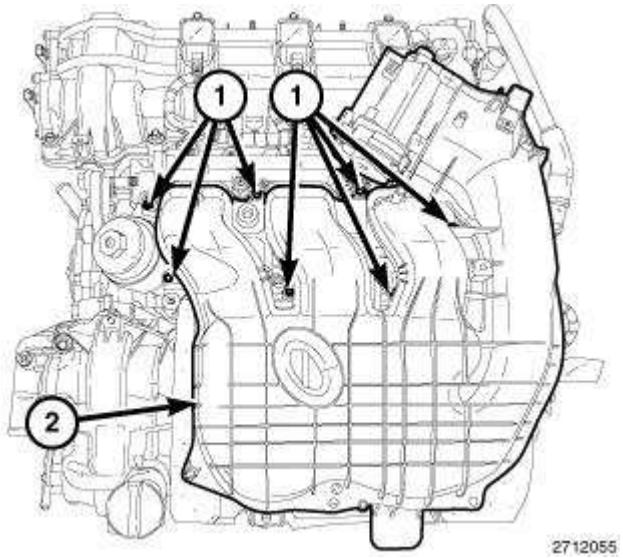


Fig. 139: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

30. Remove the upper and lower intake manifolds (2) and insulator. Refer to **MANIFOLD, INTAKE, REMOVAL**.

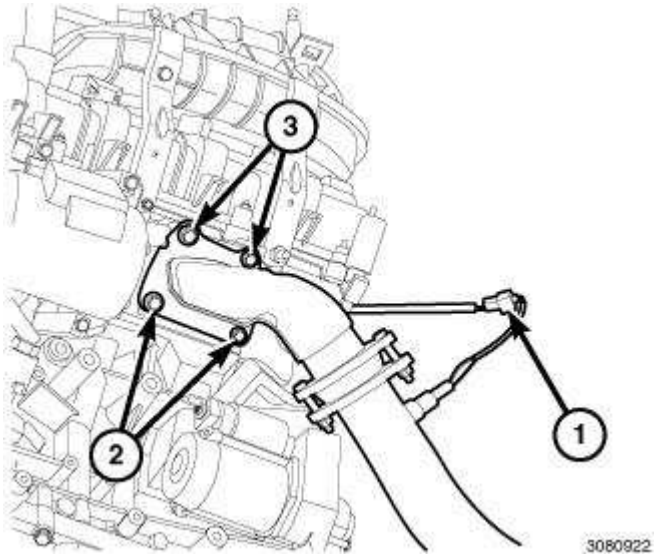


Fig. 140: Left Upstream Oxygen Sensor Electrical Connector & Down Pipe Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

31. Disconnect the left upstream oxygen sensor electrical connector (1) from the main wire harness.
32. Loosen the lower down pipe flange bolts (2).
33. Remove the upper down pipe flange bolts (3) and position the down pipe and catalytic converter aside.

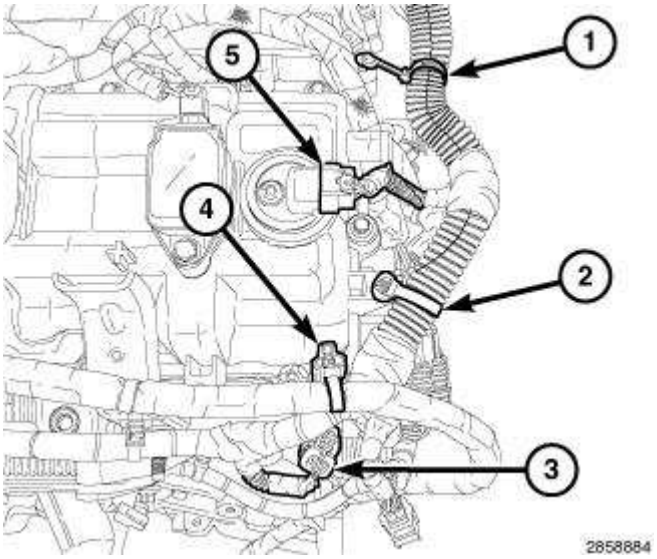


Fig. 141: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

34. Disconnect the Engine Coolant Temperature (ECT) sensor electrical connector (3).

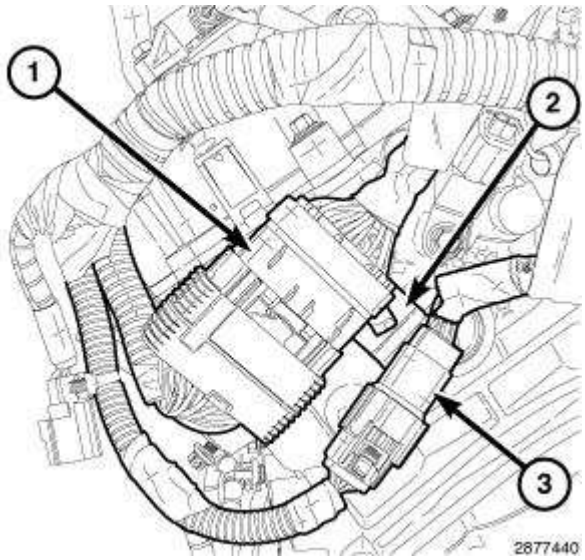


Fig. 142: Injection/Ignition Electrical Connector & Engine Oil Pressure/Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

35. Disconnect the ignition coil capacitor electrical connector.
36. Disconnect the injection/ignition electrical connector (1).
37. Disconnect the engine oil pressure/temperature sensor electrical connector (3).
38. Unfasten the injection/ignition wire harness and the oil pressure/temperature sensor wire harness from the retainer bracket (2) on the rear of the left cylinder head.

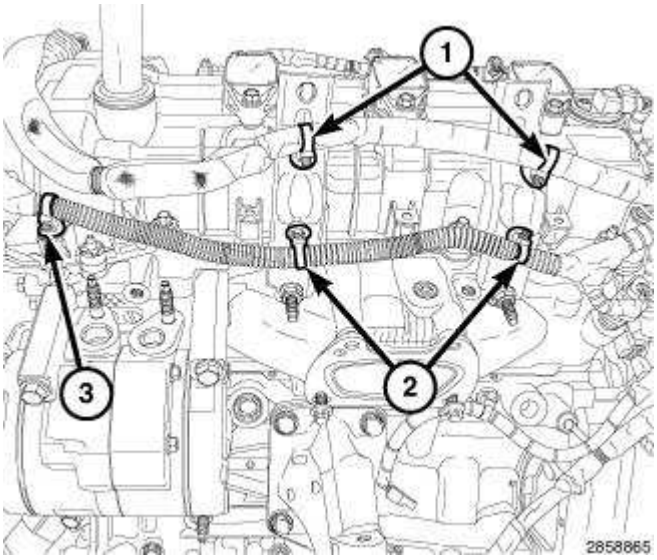


Fig. 143: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

39. Unfasten two starter wire harness retainers (1) from the upper intake manifold support brackets.
40. Unfasten one main wire harness retainer (3) from the left cylinder head cover and two retainers (2) from the upper intake manifold support brackets.

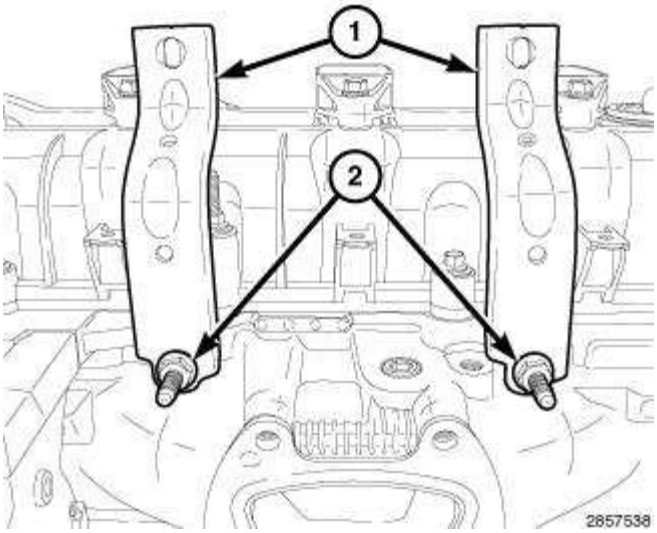
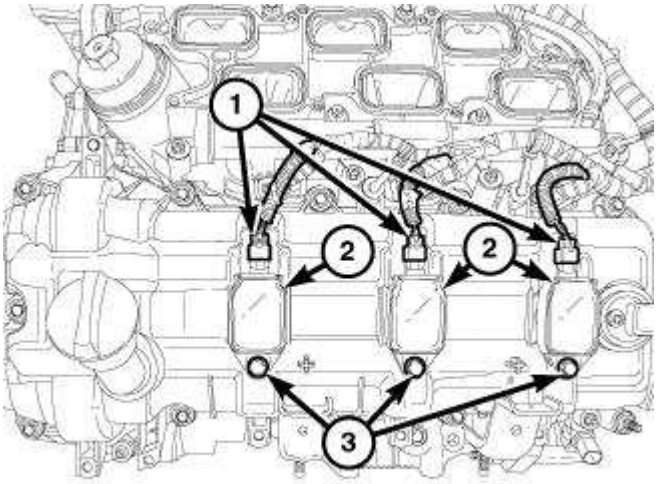


Fig. 144: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

41. Remove the bolts (2) and remove the left upper intake manifold support brackets (1).



2726572

Fig. 145: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

42. Remove the ignition coils (2). Refer to **COIL, IGNITION, REMOVAL** .
43. Remove the cylinder head covers, lower and upper oil pans, crankshaft vibration damper and engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

NOTE: **Take this opportunity to measure timing chain wear. Refer to Engine/Valve Timing - Standard Procedure.**

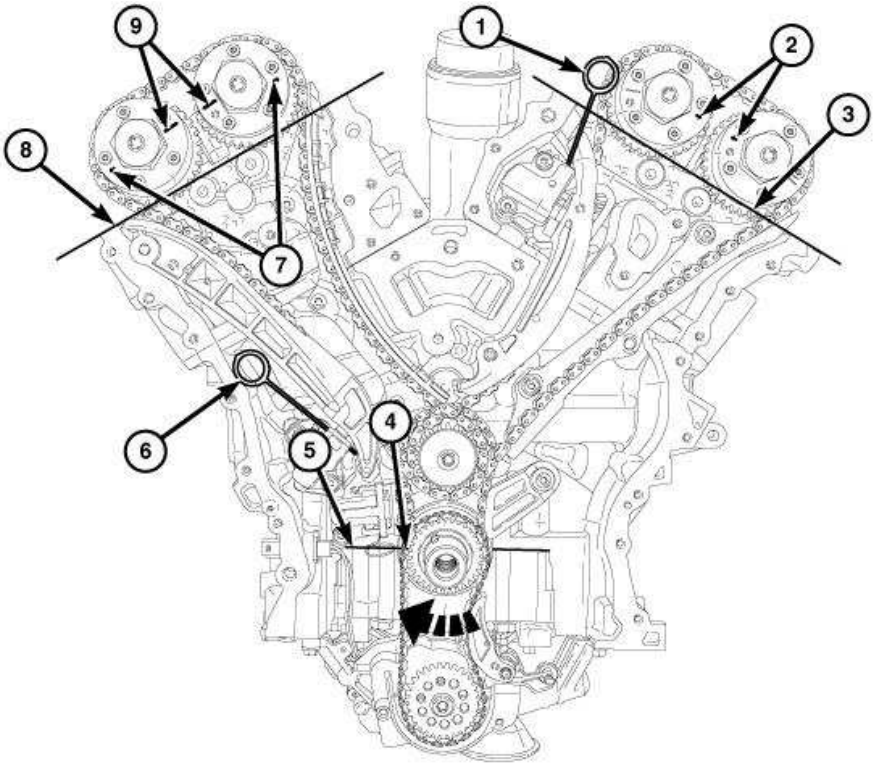


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Fig. 146: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

44. Rotate the crankshaft clockwise to place the number one piston at TDC on the exhaust stroke by aligning the dimple (4) on the crankshaft with the block/bearing cap junction (5). The left side cam phaser arrows (2) should point toward each other and be parallel to the valve cover sealing surface (3). The right side cam phaser arrows (7) should point away from each other and the scribe lines (9) should be parallel to the valve cover sealing surface (8).

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

45. Mark the direction of rotation on the timing chain using a paint pen or equivalent to aid in reassembly.

CAUTION: When the timing chains are removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

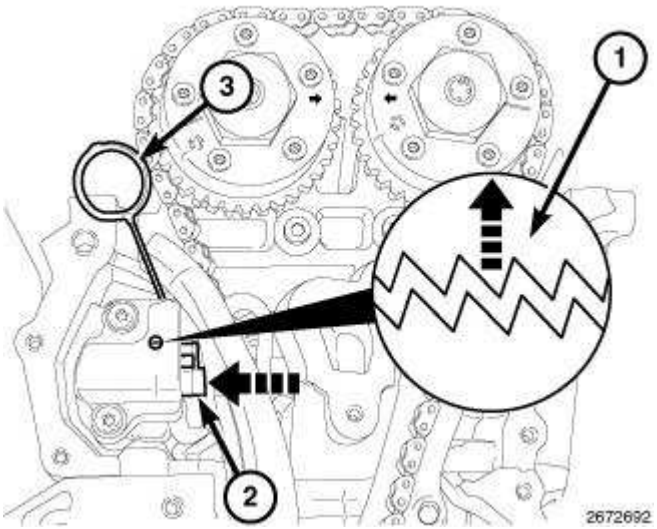

Fig. 147: Resetting Left Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

46. Reset the left cam chain tensioner by lifting the pawl (1), pushing back the piston (2) and

installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3). Refer to **Engine/Valve Timing - Standard Procedure**.

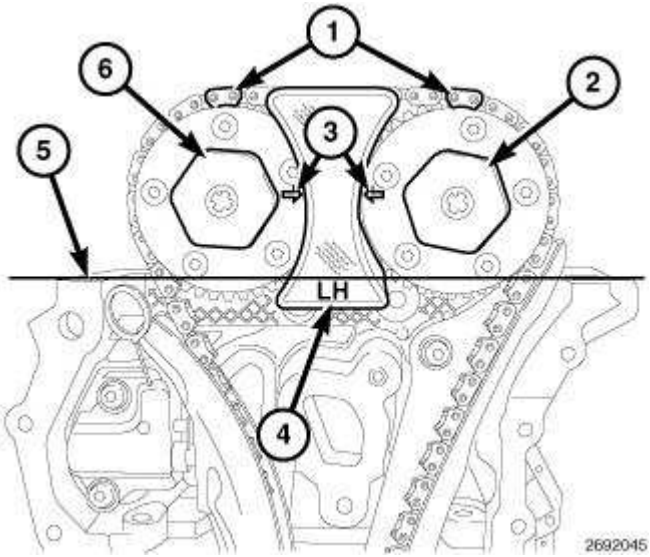

Fig. 148: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser lock.

47. Install the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (4).
48. Loosen both the intake oil control valve (6) and exhaust oil control valve (2).
49. Remove the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (4).
50. Remove the oil control valve (2) from the left side exhaust cam phaser and pull the phaser off of the camshaft.
51. Remove the oil control valve (6) from the left side intake cam phaser and pull the phaser off of the camshaft.

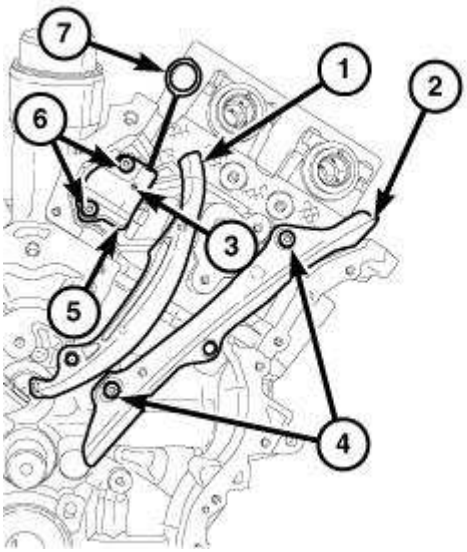

Fig. 149: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

52. Remove the left cam chain tensioner arm (1).
53. Remove two T30 bolts (6) and the left cam chain tensioner (5).
54. Remove two T30 bolts (4) and the left cam chain guide (2).

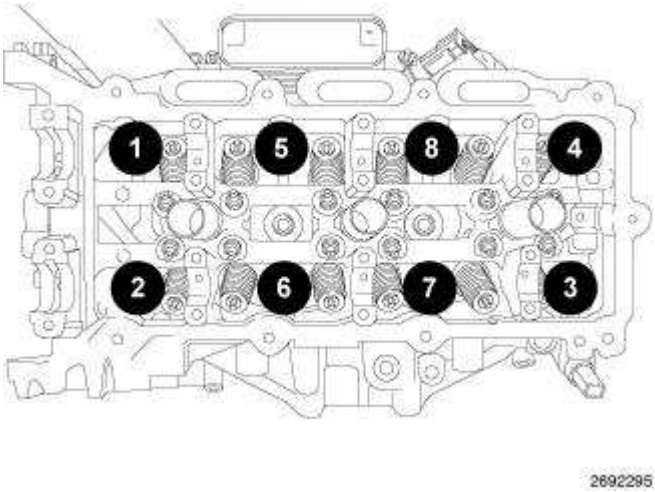

Fig. 150: Cylinder Head Retaining Bolt Removal Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

55. Remove the left camshafts. Refer to **CAMSHAFT, ENGINE, REMOVAL**.

NOTE: **If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.**

56. Remove the rocker arms. Refer to **ROCKER ARM, VALVE, REMOVAL**.

NOTE: If the hydraulic lifters are to be reused, identify their positions so that they can be reassembled into their original locations.

57. If required, remove the hydraulic lifters. Refer to **LIFTER(S), HYDRAULIC, REMOVAL**.
58. Using the sequence shown in illustration, remove the cylinder head retaining bolts.

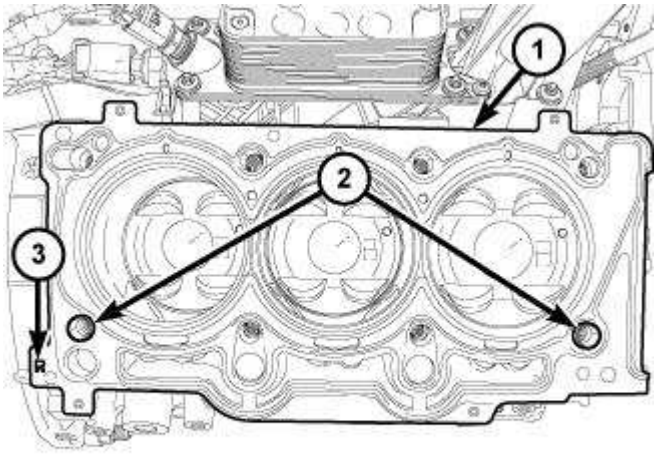

Fig. 151: Head Gasket & Locating Dowels
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right head gasket shown in illustration, left head gasket similar.

WARNING: The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.

CAUTION: Do not lay the cylinder head on its gasket sealing surface, due to the design of the cylinder head gasket, any distortion to the cylinder head sealing surface may prevent the gasket from properly sealing resulting in leaks.

NOTE: The head gasket (1) crimps the locating dowels (2) and the dowels may pull out of the engine block when the head gasket is removed.

59. Remove the cylinder head and gasket (1) and discard the gasket.

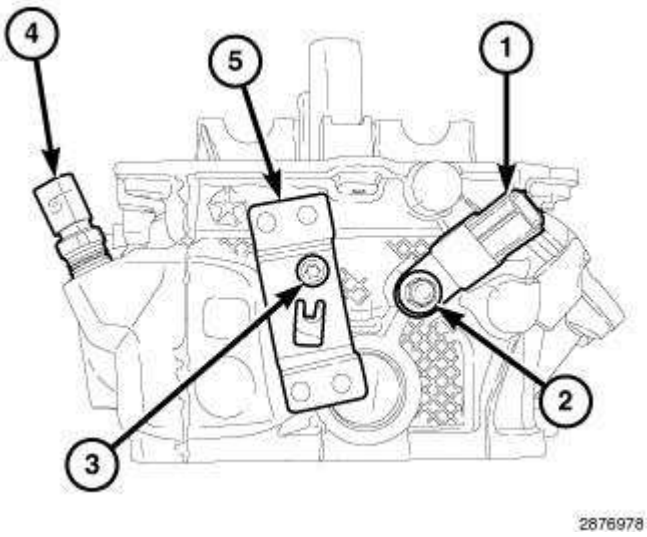

Fig. 152: ECT Sensor, Ignition Coil Capacitor, Engine Wire Harness Retainer Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

60. If required, remove the Engine Coolant Temperature (ECT) sensor (4).
61. If required, remove the bolt (2) and the ignition coil capacitor (1).
62. If required, remove the bolt (3) and the engine wire harness retainer bracket (5).

RIGHT

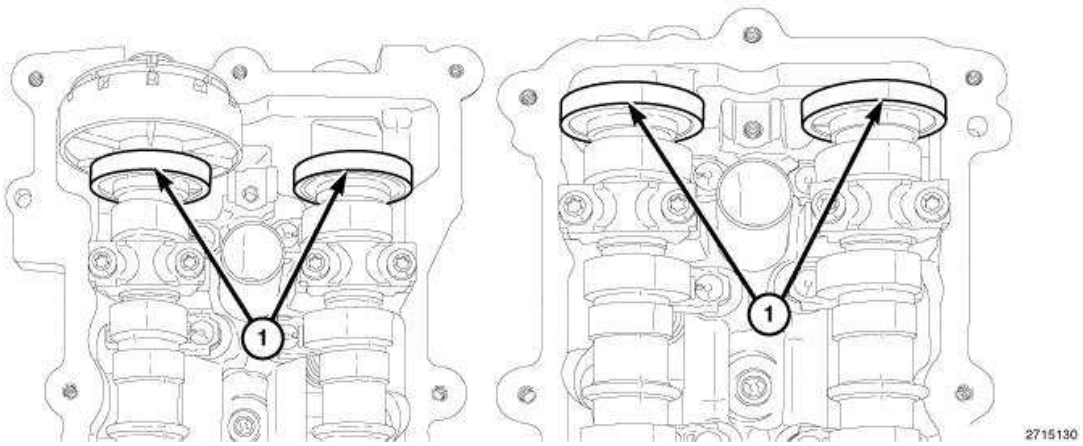

Fig. 153: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

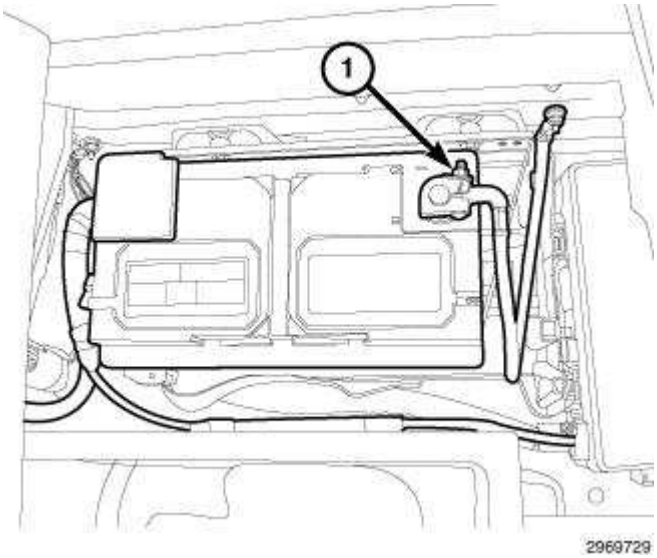

Fig. 154: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable (1).

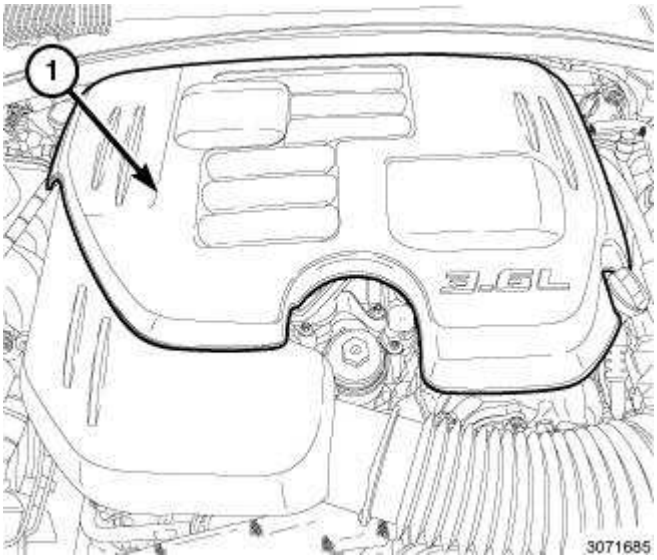

Fig. 155: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

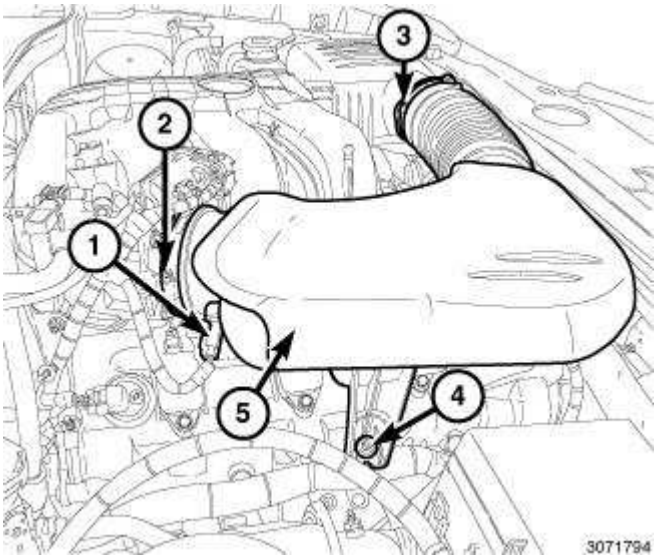

Fig. 156: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
5. Loosen the clamp (2) at the throttle body.
6. Loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
8. Remove the air inlet hose assembly (5).

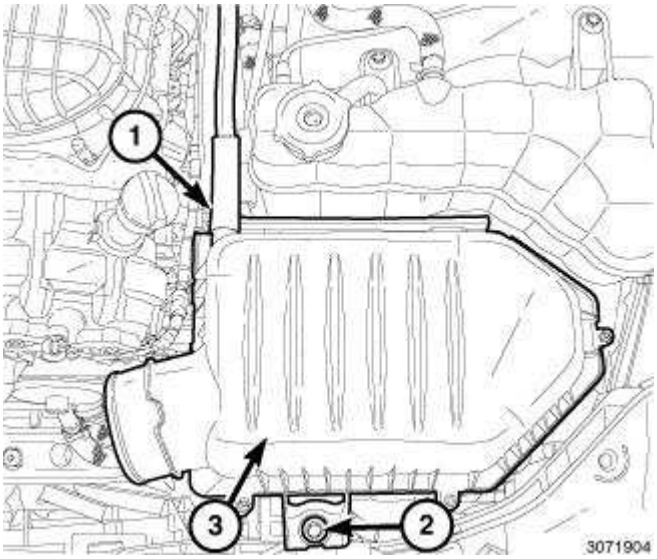

Fig. 157: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the fresh air makeup hose (1) from the air cleaner housing.
10. Remove the air cleaner housing retaining bolt (2).

11. Remove the air cleaner housing (3).

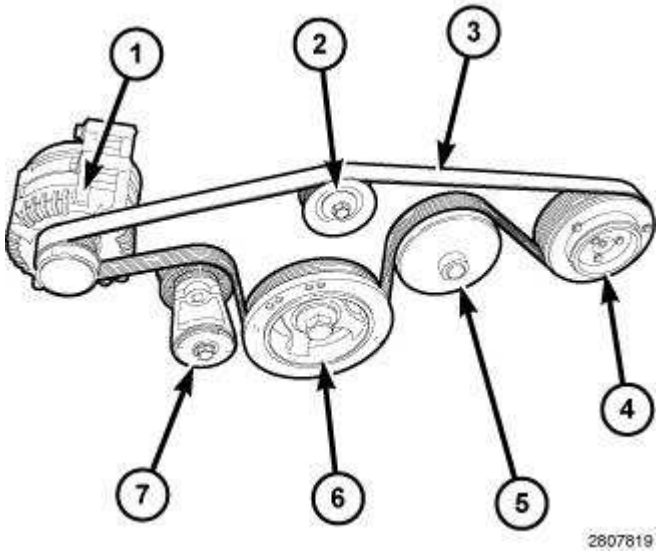

Fig. 158: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

12. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and remove the accessory drive belt (3), then slowly rotate the tensioner into the freearm position.
13. Remove the generator (1). Refer to **GENERATOR, REMOVAL** .

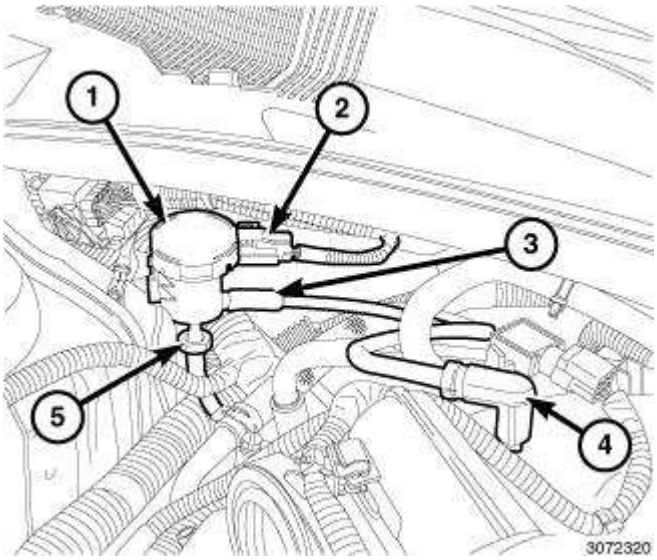

Fig. 159: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the vacuum line (3) at the EVAP purge solenoid (1).
15. Disconnect the EVAP purge solenoid vacuum line (4) at the intake manifold and remove the vacuum line.

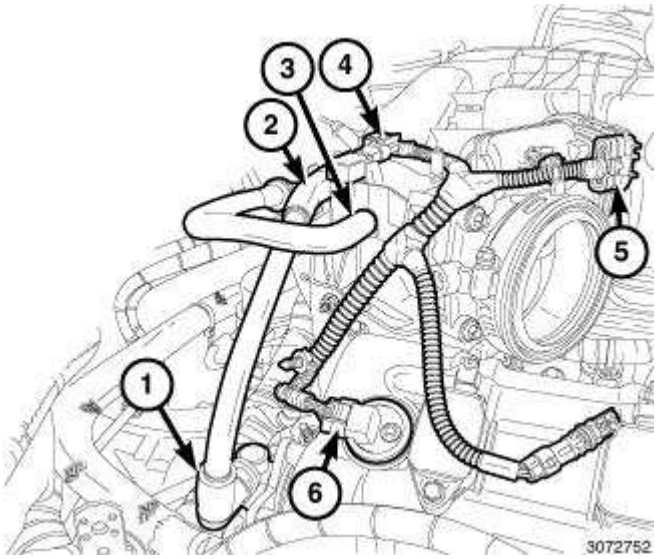

Fig. 160: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the PCV hose from the PCV valve (1) and the intake manifold (2) and remove hose.
17. Disconnect the brake booster vacuum hose (3) and position aside.
18. Disconnect the electrical connector at the Manifold Absolute Pressure (MAP) Sensor (4).
19. Disconnect the electrical connector at the Electronic Throttle Control (ETC) (5).
20. Disconnect the electrical connector at the Camshaft Position Sensor (CMP) (6) and position harness aside.

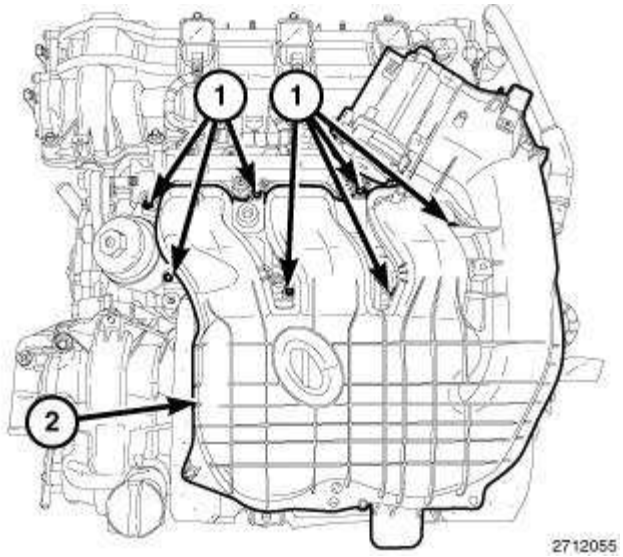

Fig. 161: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove the upper and lower intake manifolds (2) and insulator. Refer to **MANIFOLD, INTAKE,**

REMOVAL.

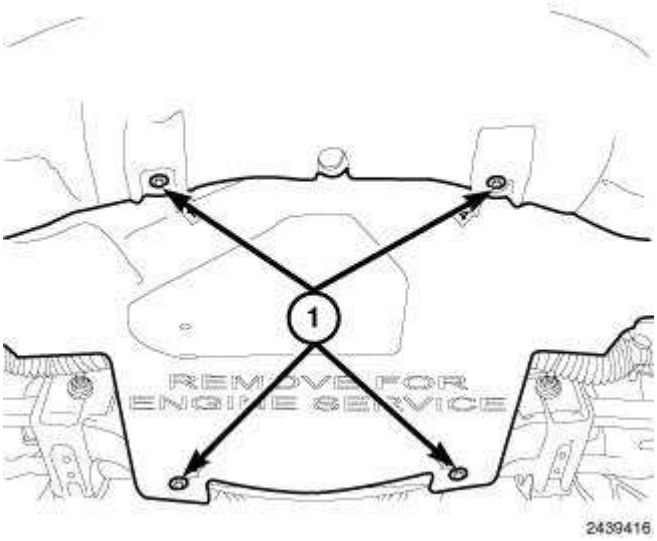

Fig. 162: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

22. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
23. Remove the belly pan retainers (1) and remove the belly pan.
24. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
25. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

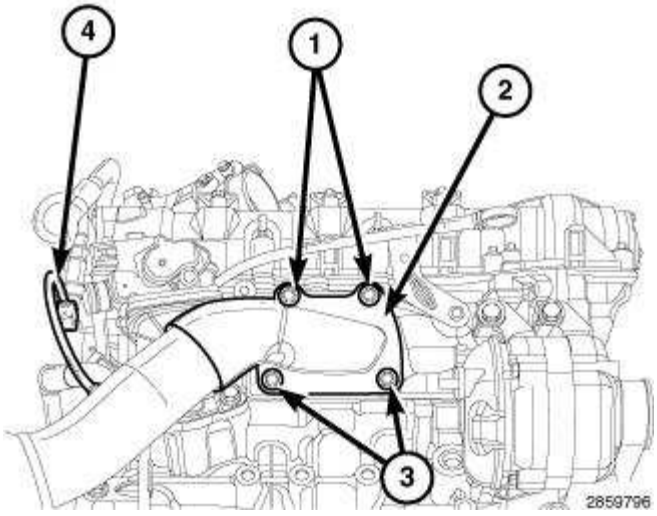

Fig. 163: Right Upstream Oxygen Electrical Sensor Connector, Down Pipe Flanges & Bolts
Courtesy of CHRYSLER GROUP, LLC

26. Disconnect the right upstream oxygen electrical sensor connector (4) from the main wire harness.

27. Loosen the lower down pipe flange bolts (3).
28. Remove the upper down pipe flange bolts (1) and position the down pipe and catalytic converter aside.

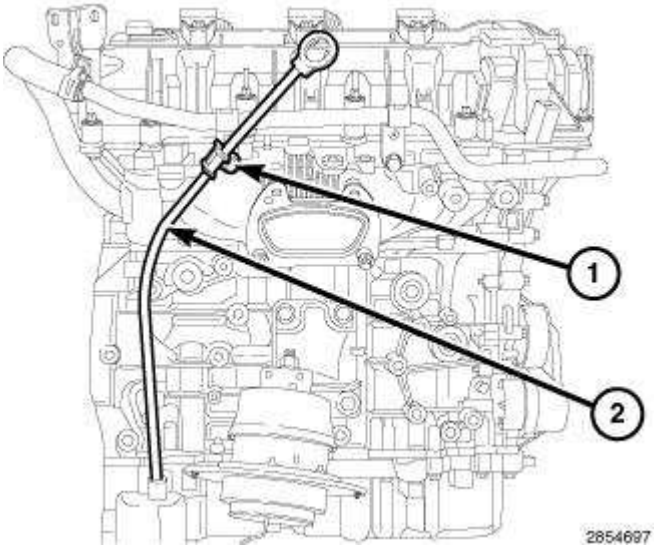

Fig. 164: Oil Level Indicator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

29. Remove the oil level indicator (2) retaining bolt (1) and remove the oil level indicator.

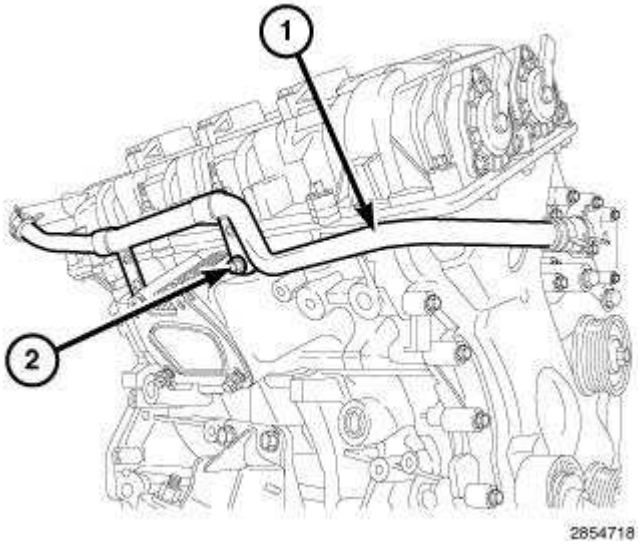

Fig. 165: Heater Core Supply Tube Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

30. Remove the heater core supply tube (1) support bracket retaining bolt (2) and remove the heater core supply tube (1).

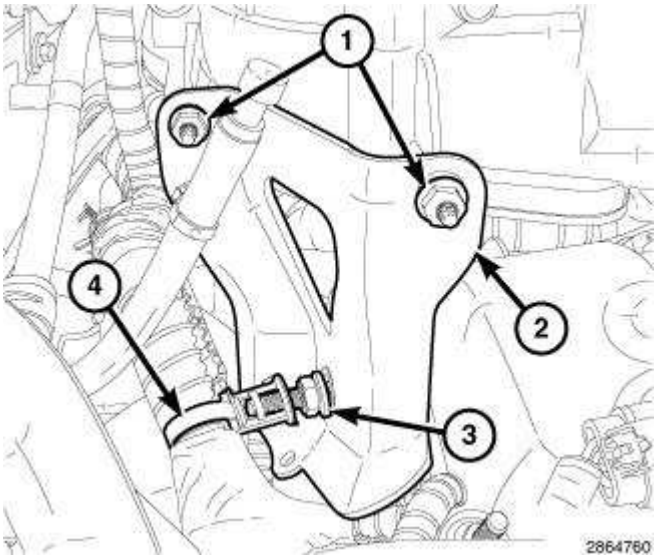

Fig. 166: Upper Intake Manifold Support Bracket, Stud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

31. Disconnect the ignition coil capacitor electrical connector.
32. Remove the stud (3) and remove the upper intake manifold support bracket (2).
33. Remove the cylinder head covers, lower and upper oil pans, crankshaft vibration damper and engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

NOTE: Take this opportunity to measure timing chain wear. Refer to Engine/Valve Timing - Standard Procedure.

34. Lower the vehicle.

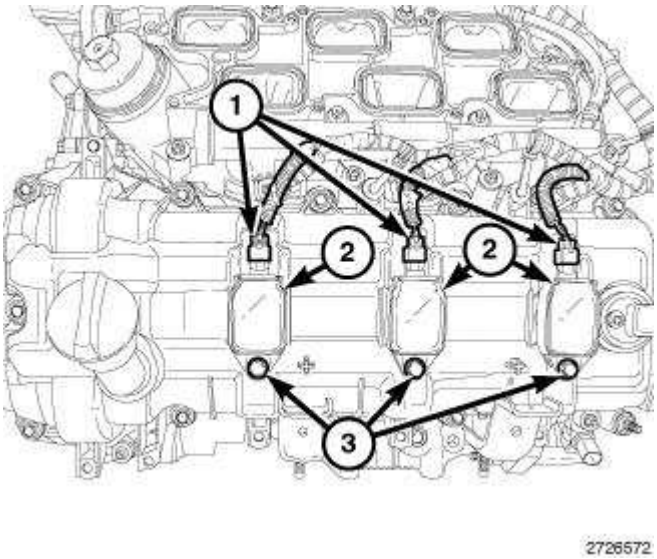

Fig. 167: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The left side ignition coils are shown in illustration, the right side ignition coils are similar.**

35. Remove the ignition coils (2). Refer to **COIL, IGNITION, REMOVAL** .

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

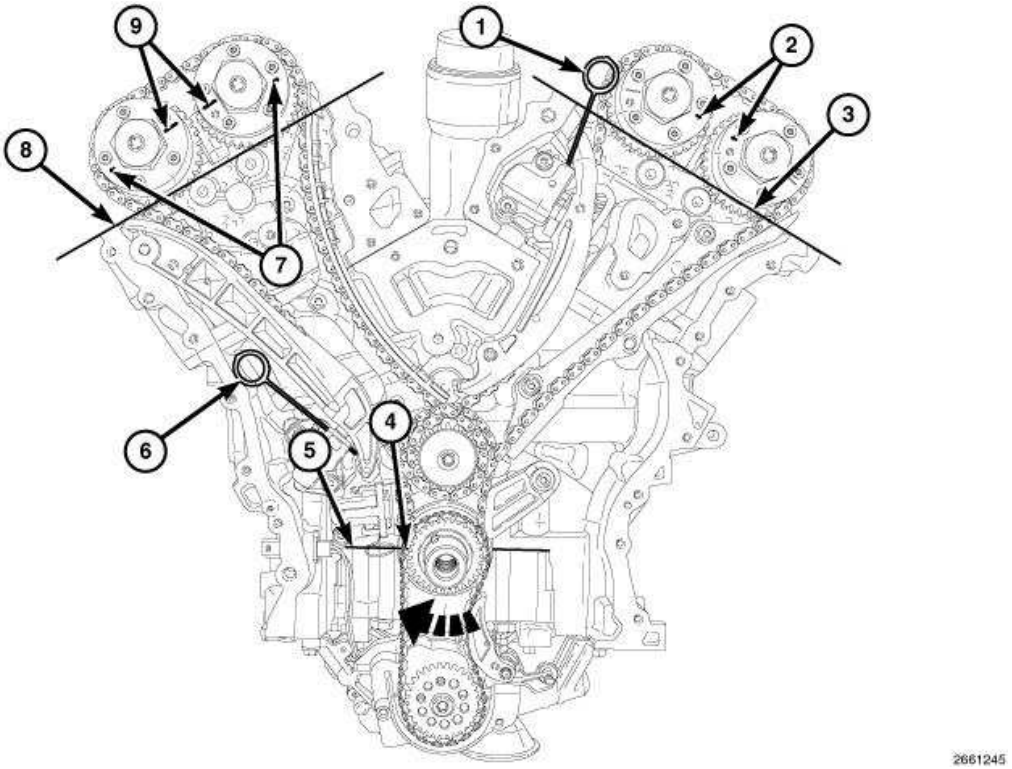

Fig. 168: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

36. Rotate the crankshaft clockwise to place the number one piston at TDC on the exhaust stroke by aligning the dimple (4) on the crankshaft with the block/bearing cap junction (5). The left side cam phaser arrows (2) should point toward each other and be parallel to the valve cover sealing surface (3). The right side cam phaser arrows (7) should point away from each other and the scribe lines (9) should be parallel to the valve cover sealing surface (8).
37. Mark the direction of rotation on the timing chain using a paint pen or equivalent to aid in reassembly.

CAUTION: When the timing chains are removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

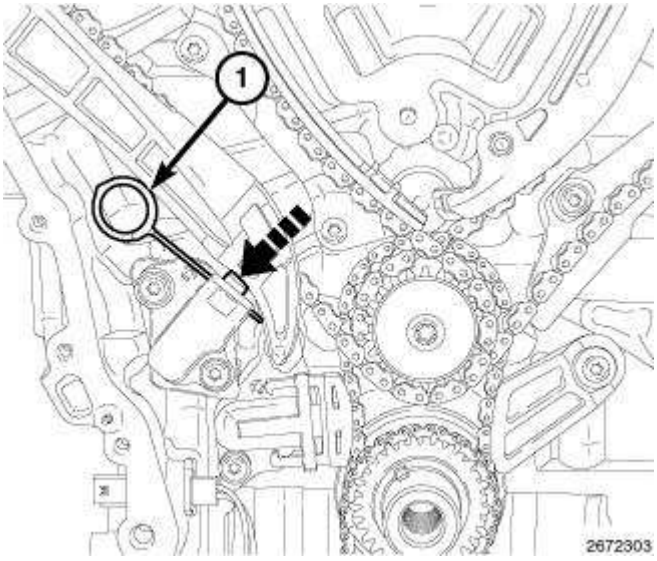

Fig. 169: Resetting Right Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

38. Reset the right cam chain tensioner by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

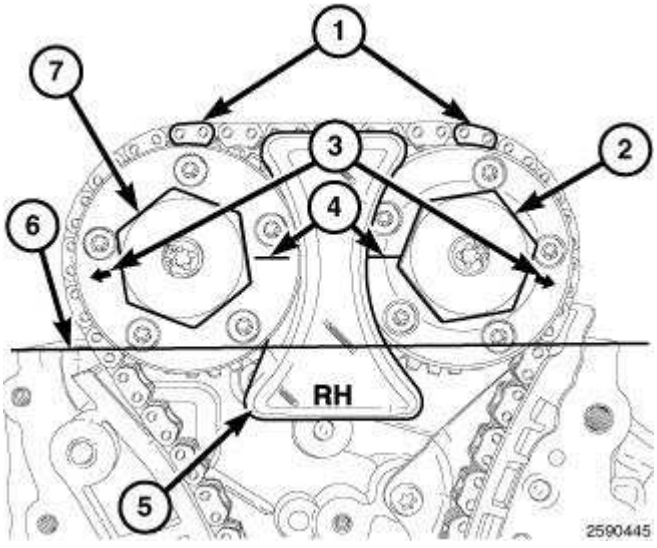

Fig. 170: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser lock.

39. Install the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (5).
40. Loosen both the intake oil control valve (2) and exhaust oil control valve (7).
41. Remove the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (5).
42. Remove the oil control valve (2) from the right side intake cam phaser and pull the phaser off of the camshaft.
43. Remove the oil control valve (7) from the right side exhaust cam phaser and pull the phaser off of the camshaft.

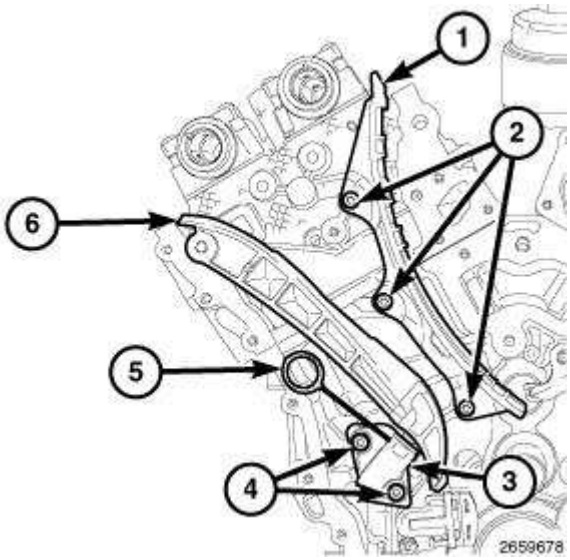

Fig. 171: Right Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

44. Remove the right cam chain tensioner arm (6).
45. Remove two T30 bolts (4) and the right cam chain tensioner (3).
46. Remove three T30 bolts (2) and the right cam chain guide (1).

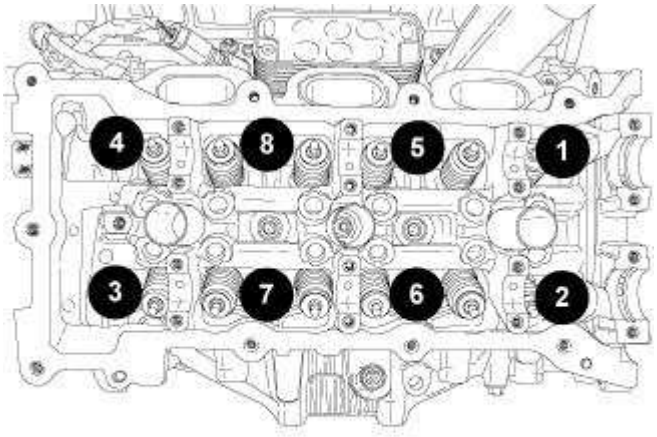

Fig. 172: Cylinder Head Retaining Bolt Removal Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

47. Remove the right camshafts. Refer to **CAMSHAFT, ENGINE, REMOVAL**.

NOTE: If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.

48. Remove the rocker arms. Refer to **ROCKER ARM, VALVE, REMOVAL**.

NOTE: If the hydraulic lifters are to be reused, identify their positions so that they can be reassembled into their original locations.

49. If required, remove the hydraulic lifters. Refer to **LIFTER(S), HYDRAULIC, REMOVAL**.
50. Using the sequence shown in illustration, remove the cylinder head retaining bolts.

WARNING: The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.

CAUTION: Do not lay the cylinder head on its gasket sealing surface, due to the design of the cylinder head gasket, any distortion to the cylinder head sealing surface may prevent the gasket from properly sealing resulting in leaks.

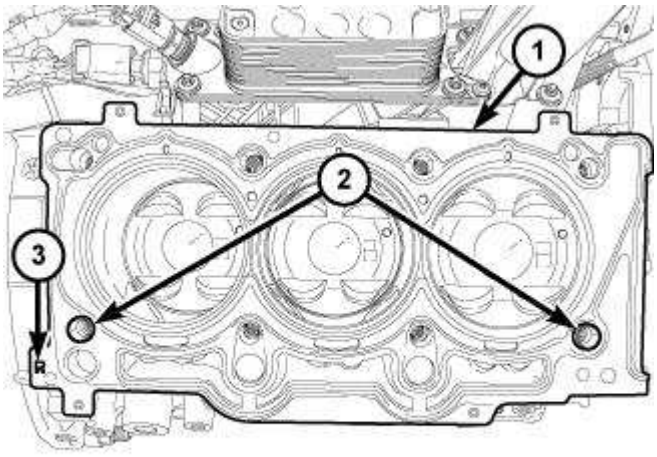

Fig. 173: Head Gasket & Locating Dowels
Courtesy of CHRYSLER GROUP, LLC

NOTE: The head gasket (1) crimps the locating dowels (2) and the dowels may pull out of the engine block when the head gasket is removed.

51. Remove the cylinder head and gasket. Discard the gasket.

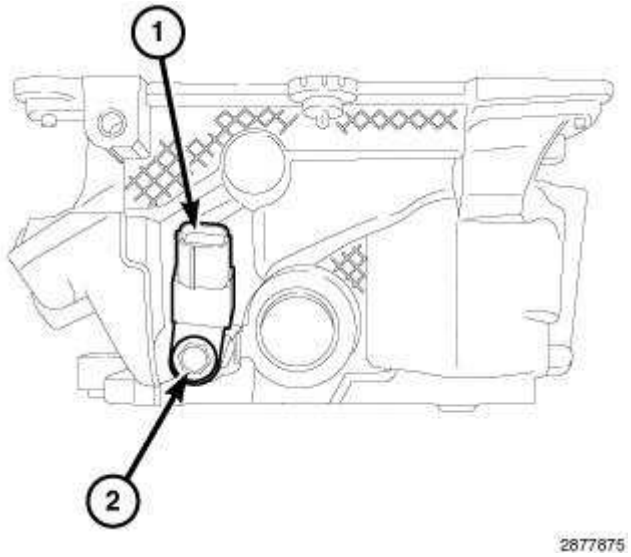

Fig. 174: Ignition Coil Capacitor & Bolt
Courtesy of CHRYSLER GROUP, LLC

52. If required, remove the bolt (2) and the ignition coil capacitor (1).

CLEANING

CLEANING

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

1. Remove all gasket material from cylinder head and block. Refer to **Engine - Standard Procedure**. Be careful not to gouge or scratch the aluminum head sealing surface.
2. Clean all engine oil passages.

CAUTION: Non-compressible debris such as oil, coolant or RTV sealants that are not removed from bolt holes can cause the aluminum casting to crack when tightening the bolts.

3. Clean out the cylinder head bolt holes in the engine block.

INSPECTION

INSPECTION

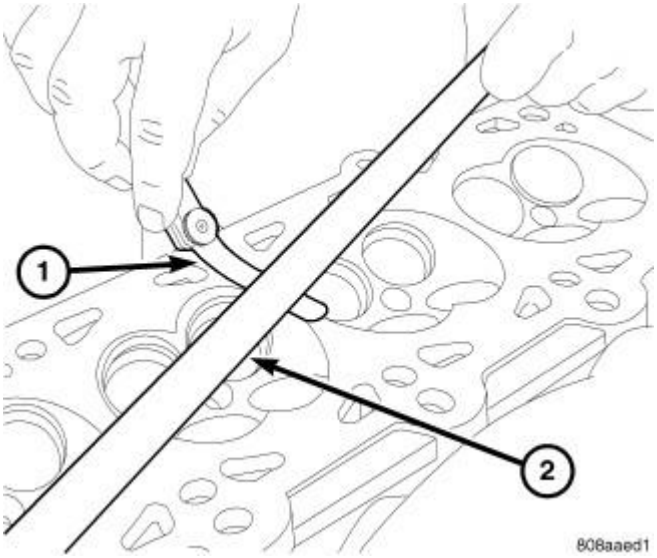

Fig. 175: Checking Cylinder Head Flatness
Courtesy of CHRYSLER GROUP, LLC

1. Check cylinder head warpage with a straight edge (2) and feeler gauge (1).
2. Cylinder head must be flat within specification. Refer to **Engine - Specifications**.
3. Verify that the valve tappets move freely in theirs bores and that they have been rotating.
4. Inspect camshaft bearing journals for scoring.
5. Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.
6. Inspect the following components and verify that they are within specification : Refer to **Engine - Specifications**.
    - Camshafts
    - Valve Tappets
    - Springs
    - Valve Seats
    - Valve Guides
    - Valves

INSTALLATION

LEFT

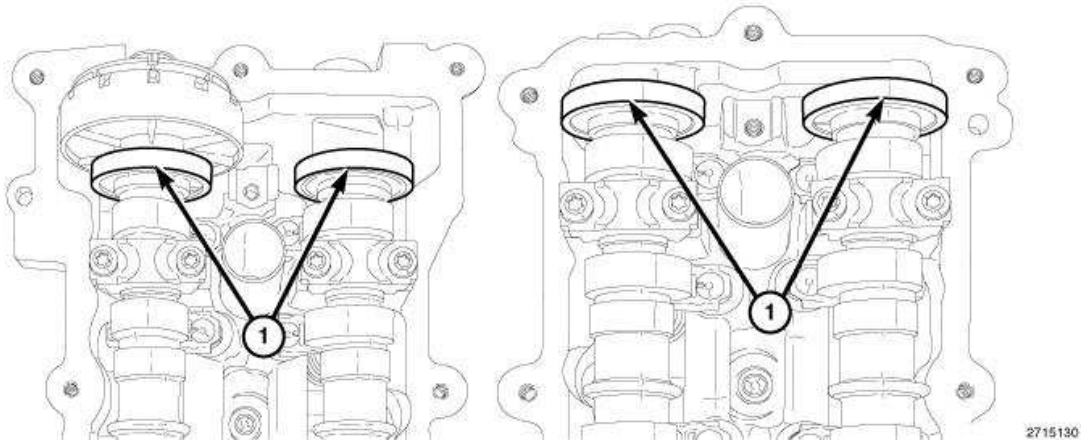

Fig. 176: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

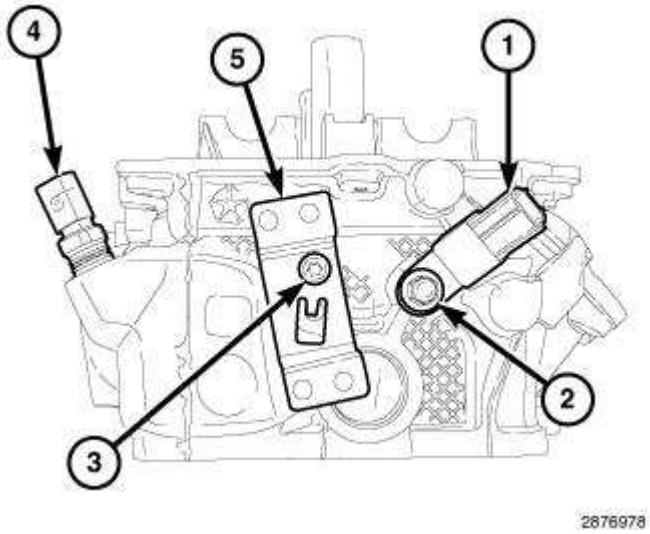

Fig. 177: ECT Sensor, Ignition Coil Capacitor, Engine Wire Harness Retainer Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the Engine Coolant Temperature (ECT) sensor (4) and tighten to 11 N.m (97 in. lbs.).
2. If removed, install the ignition coil capacitor (1) with a M6 bolt (2) and tightened to 10 N.m (89 in. lbs.).
3. If removed, install the engine wire harness retainer bracket (5) with a T30 bolt (3) and tightened to 12 N.m (106 in. lbs.).

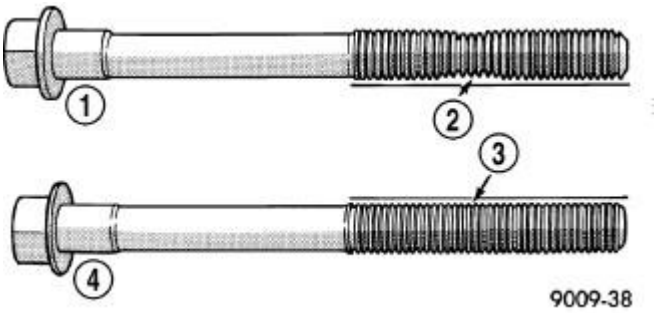

Fig. 178: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

NOTE: Typical cylinder head bolt shown in illustration.

4. Check cylinder head bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

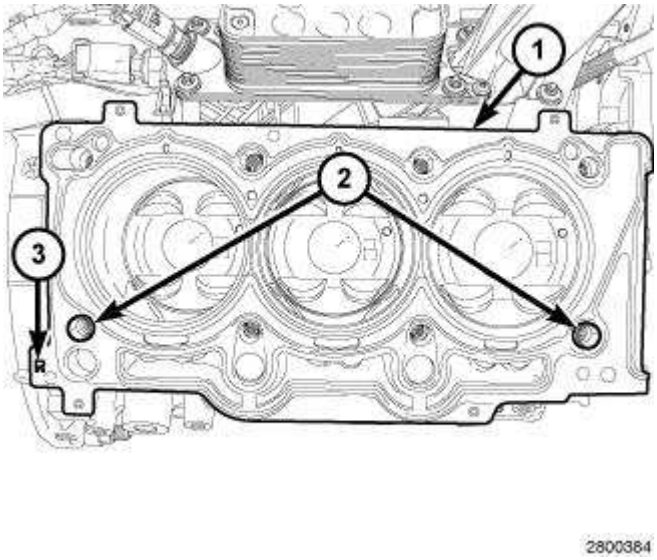

Fig. 179: Head Gasket & Locating Dowels
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right head gasket shown in illustration, left head gasket similar.

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

5. Clean and prepare the gasket sealing surfaces of the cylinder head and block. Refer to **Engine - Standard Procedure**.

CAUTION: Non-compressible debris such as oil, coolant or RTV sealants that are not removed from bolt holes can cause the aluminum casting to crack when tightening the bolts.

6. Clean out the cylinder head bolt holes in the engine block.

WARNING: The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.

CAUTION: The cylinder head gaskets are not interchangeable between the left and right cylinder heads and are clearly marked (3) with "R" for right and "L" for left.

7. Position the new cylinder head gasket (1) onto the locating dowels (2).

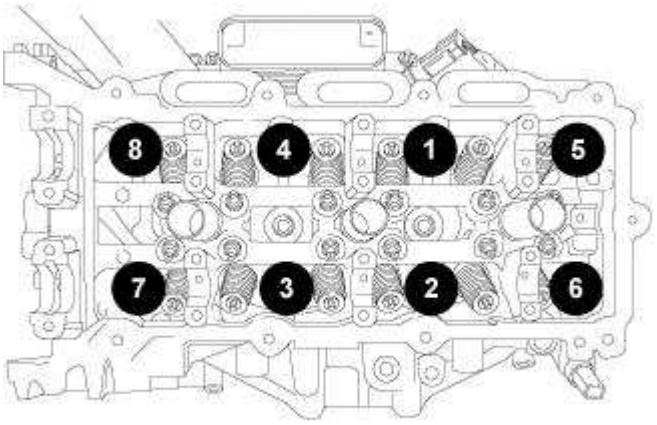

Fig. 180: Cylinder Head Retaining Bolt Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

8. Position the cylinder head onto the cylinder block. Make sure the cylinder head seats fully over the locating dowels.

NOTE: Do not apply any additional oil to the bolt threads.

9. Install the eight cylinder head bolts finger tight.
10. Tighten the cylinder head bolts in the sequence shown in illustration, following this 9 step torque plus angle method. Tighten according to the following torque values:

- Step 1: All to 30 N.m (22 ft. lbs.)
- Step 2: All to 45 N.m (33 ft. lbs.)
- Step 3: All + 75° Turn **Do not use a torque wrench for this step.**
- Step 4: All + 50° Turn **Do not use a torque wrench for this step.**
- Step 5: Loosen all fasteners in reverse of sequence shown in illustration
- Step 6: All to 30 N.m (22 ft. lbs.)
- Step 7: All to 45 N.m (33 ft. lbs.)
- Step 8: All + 70° Turn **Do not use a torque wrench for this step.**
- Step 9: All + 70° Turn **Do not use a torque wrench for this step.**

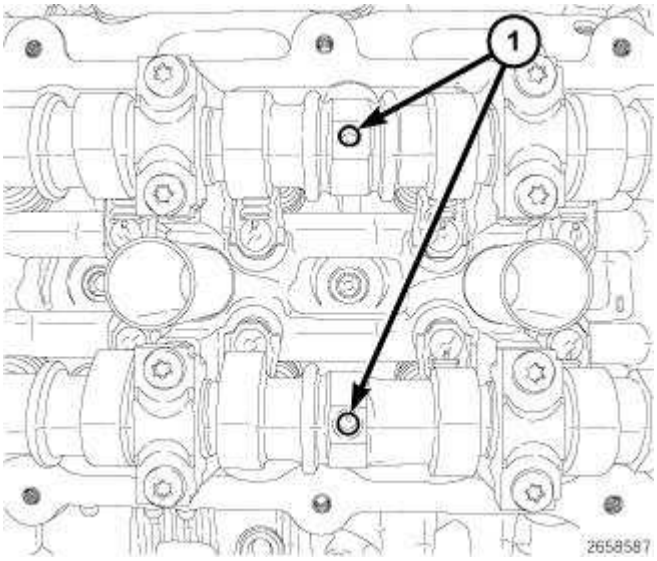

Fig. 181: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the crankshaft clockwise to return the crankshaft to top-dead-center.

NOTE: If the hydraulic lifters are being reused, reassemble them into their original locations.

11. If removed, install the hydraulic lifters. Refer to **LIFTER(S), HYDRAULIC, INSTALLATION**.

NOTE: If the rocker arms are being reused, reassemble them into their original

locations.

12. Install the rocker arms and camshafts. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.
13. Rotate the camshafts clockwise to TDC by positioning the alignment holes (1) vertically.

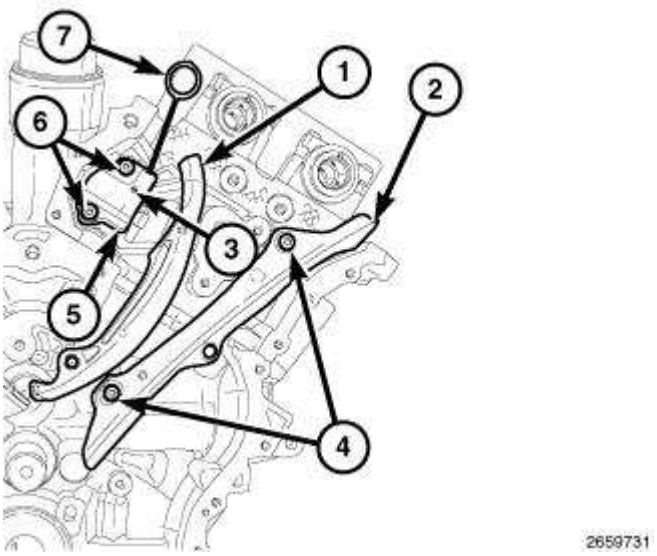

Fig. 182: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install the left cam chain guide (2) with two bolts (4) and tighten the T30 bolts (4) to 12 N.m (9 ft. lbs.).
15. Install the left cam chain tensioner (5) to the cylinder head with two bolts (6) and tighten the T30 bolts (6) to 12 N.m (9 ft. lbs.).
16. Reset the left cam chain tensioner (5) by lifting the pawl (3), pushing back the piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (7). Refer to **Engine/Valve Timing - Standard Procedure**.
17. Install the left tensioner arm (1).

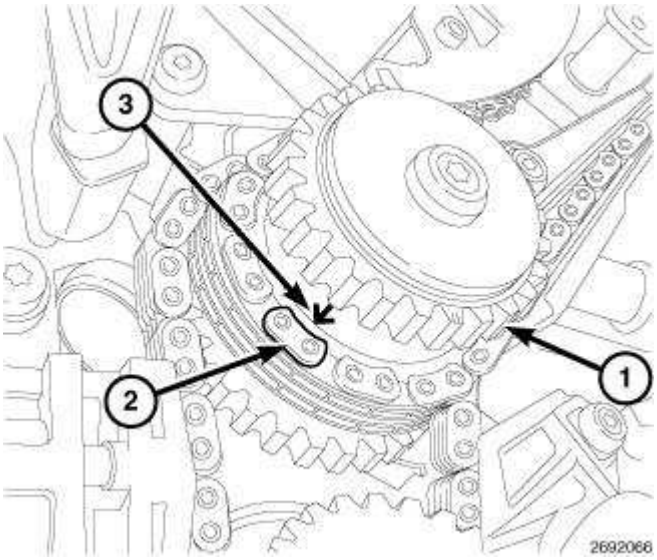

Fig. 183: Idler Sprocket, Plated Link & Arrow
Courtesy of CHRYSLER GROUP, LLC

18. Press the left intake cam phaser onto the intake camshaft, install and hand tighten the oil control valve.

> **CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.**

19. Drape the left side cam chain over the left intake cam phaser and onto the idler sprocket (1) so that the arrow (3) is aligned with the plated link (2) on the cam chain.

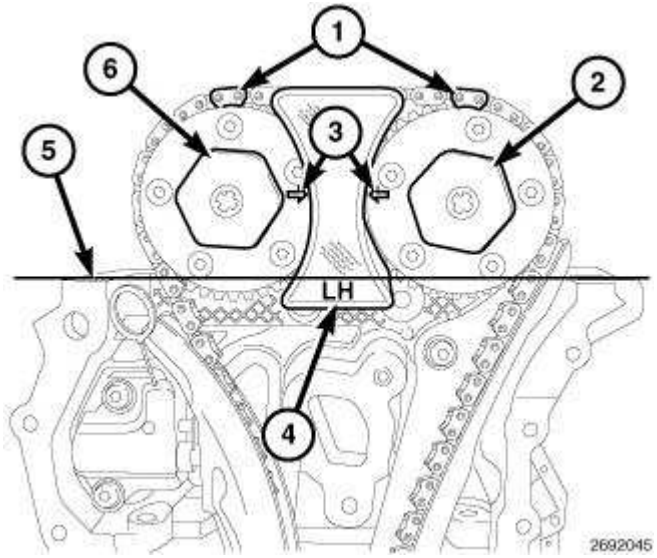

Fig. 184: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

20. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the left side cam phasers so that the arrows (3) point toward each other and are parallel to the valve cover sealing surface (5). Press the exhaust cam phaser onto the exhaust cam, install and hand tighten the oil control valve (2).

NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.

21. Install the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (4) and tighten the oil control valves (2) and (6) to 150 N.m (110 ft. lbs.).

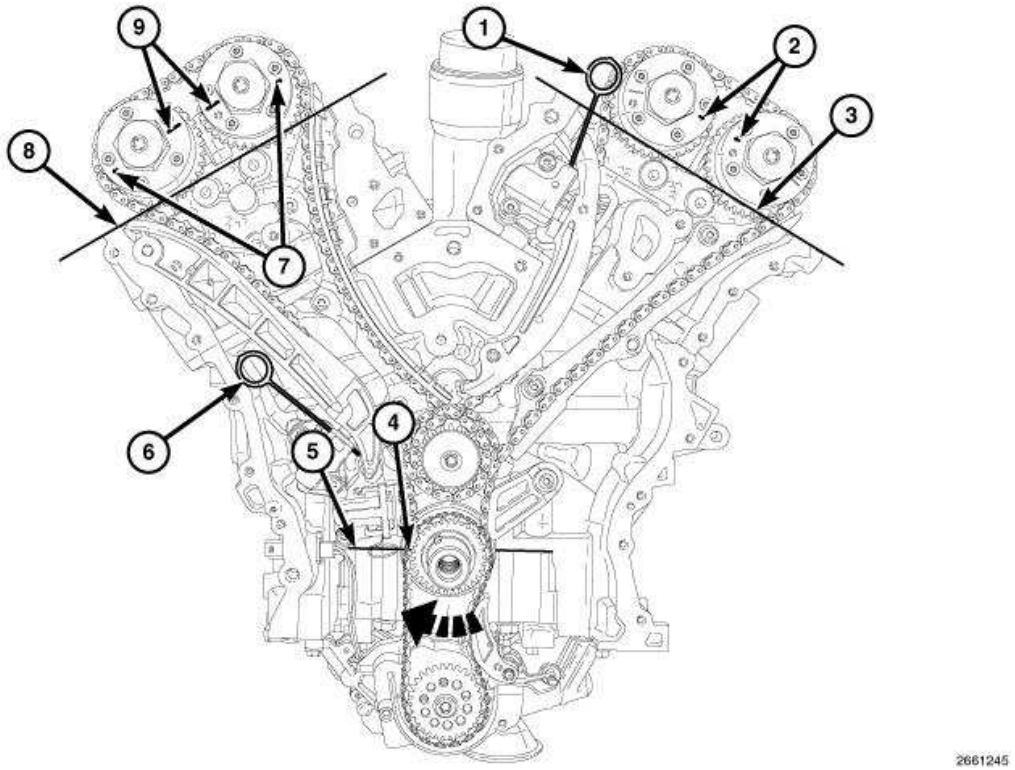

Fig. 185: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

22. Remove the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser).
23. Remove the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) from the left cam chain tensioner.
24. Rotate the crankshaft clockwise two complete revolutions stopping when the dimple (4) on the crankshaft is aligned the with the block/bearing cap junction (5).
25. While maintaining this alignment, verify that the arrows on the left side cam phasers (2) point toward each other and are parallel to the valve cover sealing surface (3) and that the right side cam phaser arrows (7) point away from each other and the scribe lines (9) are parallel to the valve cover sealing surface (8).

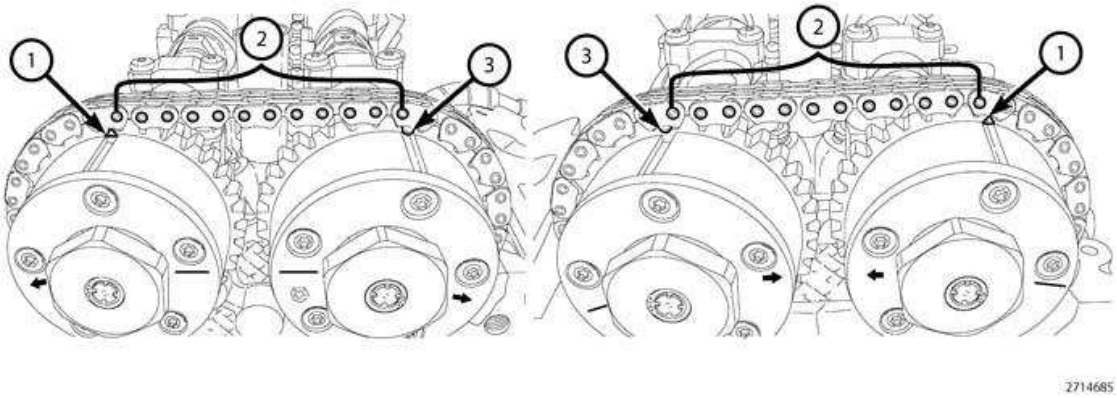

Fig. 186: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

26. There should be 12 chain pins (2) between the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).
27. If the engine timing is not correct, repeat this procedure.
28. Install the engine timing cover, crankshaft vibration damper, upper and lower oil pans and cylinder head covers. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.

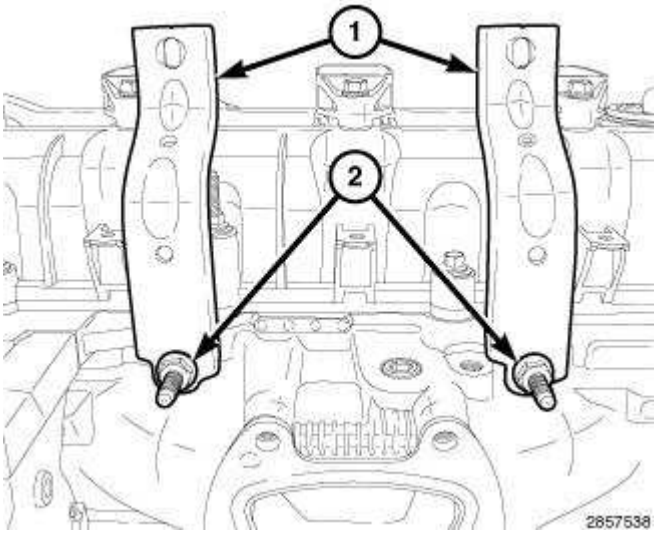

Fig. 187: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

29. Install the left upper intake manifold support brackets (1) and tighten the stud (2) finger tight.

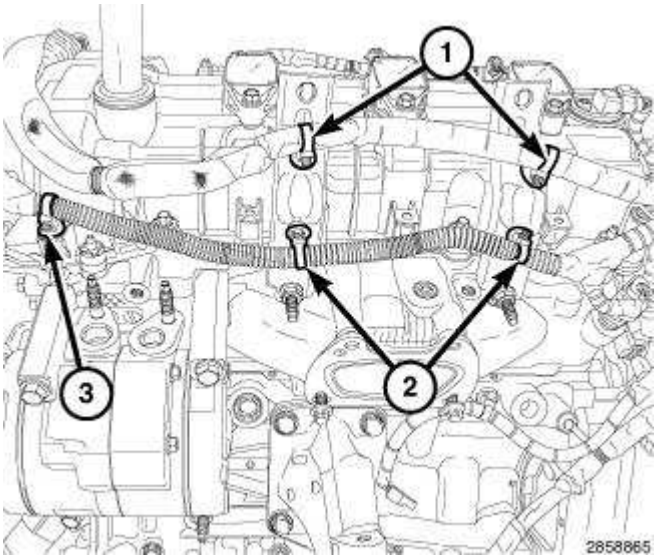

Fig. 188: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

30. Fasten two starter wire harness retainers (1) to the upper intake manifold support brackets.
31. Fasten one main wire harness retainer (3) to the left cylinder head cover and two retainers (2) to the upper intake manifold support brackets.

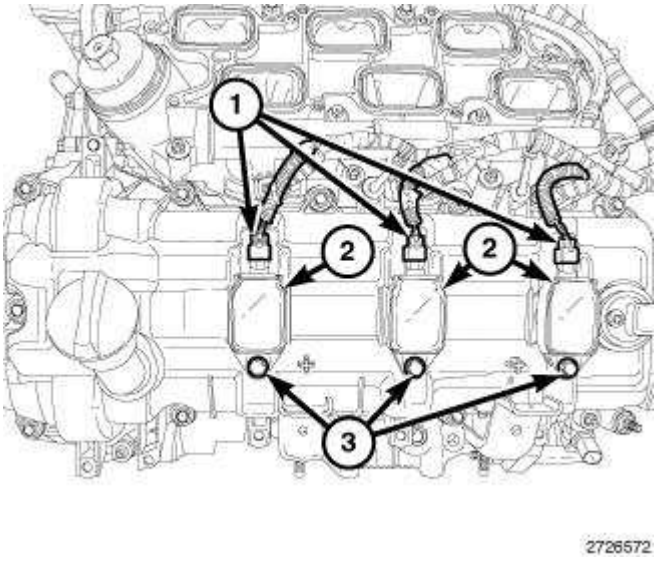

Fig. 189: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

32. Install the spark plugs and tighten to 18 N.m (13 ft. lbs.). Refer to **SPARK PLUG, INSTALLATION** .
33. Install the ignition coils (2). Refer to **COIL, IGNITION, INSTALLATION** .

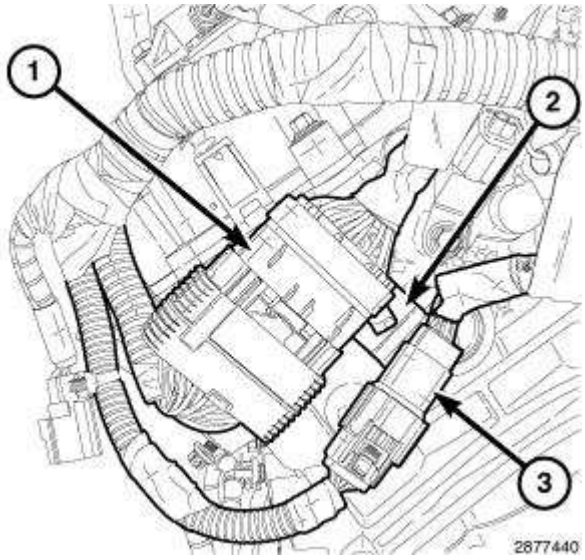

Fig. 190: Injection/Ignition Electrical Connector & Engine Oil Pressure/Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

34. Connect the ignition coil capacitor electrical connector.
35. Connect the injection/ignition electrical connector (1).
36. Connect the engine oil pressure/temperature sensor electrical connector (3).
37. Fasten the injection/ignition wire harness and the oil pressure/temperature sensor wire harness from the retainer bracket (2) on the rear of the left cylinder head.

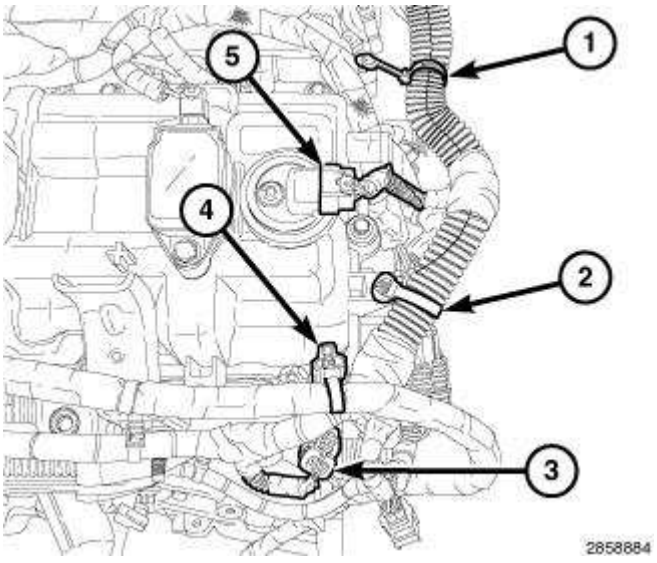

Fig. 191: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

38. Connect the Engine Coolant Temperature (ECT) sensor electrical connector (3).

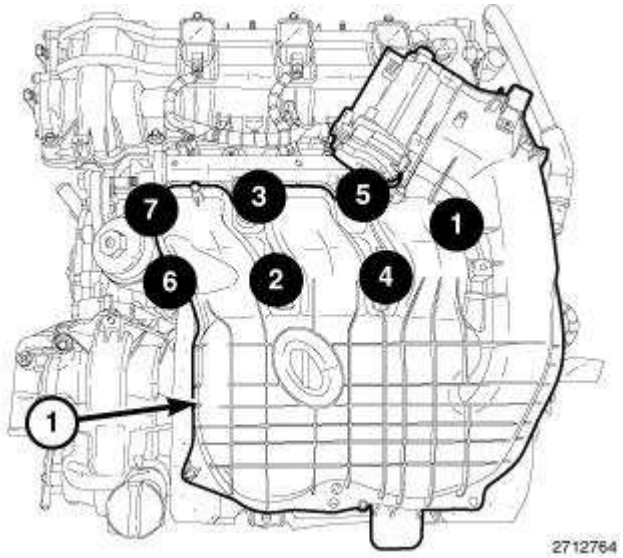

Fig. 192: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

39. Install the upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

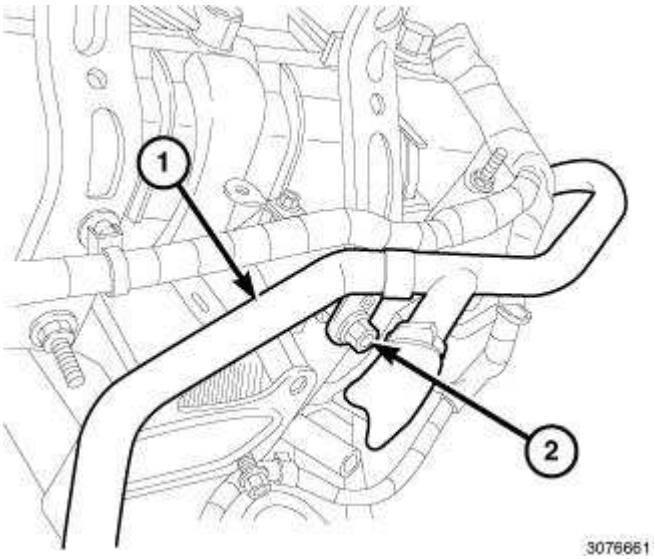

Fig. 193: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

40. Position the heater core return tube (1) onto the upper support bracket, install the retaining nut (2) and tighten to 12 N.m (9 ft. lbs.).

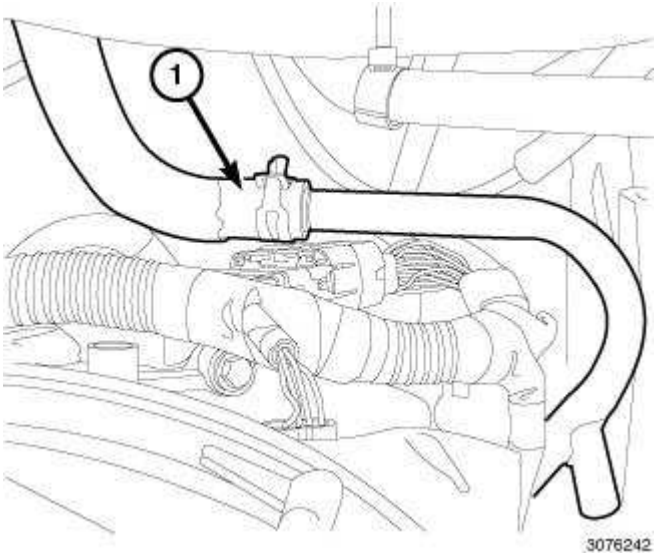

Fig. 194: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

41. Connect the heater core return hose (1).

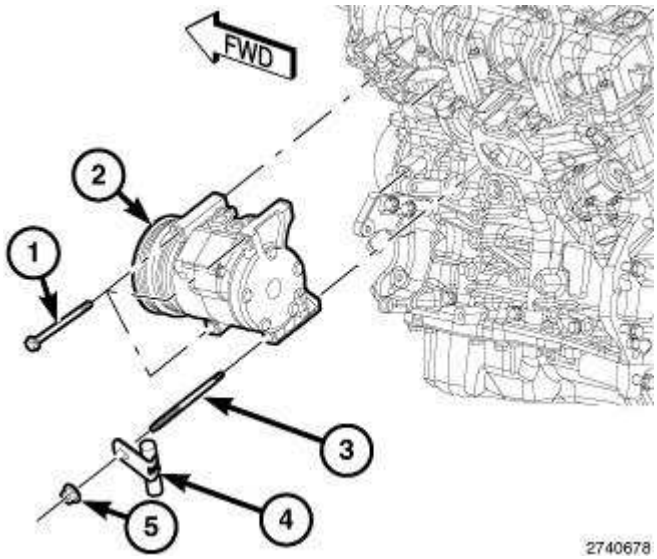

Fig. 195: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

42. Position the A/C compressor (2), install the upper bolts (1) finger tight.
43. Install the lower A/C compressor retaining studs (3) finger tight
44. Tightened the A/C compressor upper bolts (1) to 25 N.m (18 ft. lbs.).
45. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

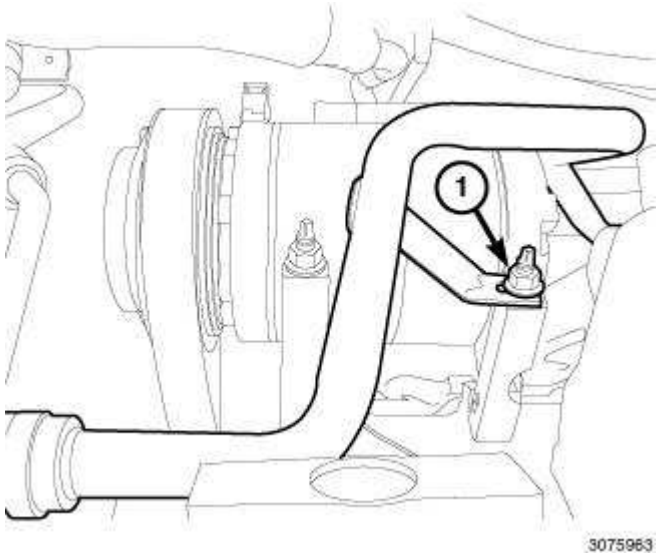

Fig. 196: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

46. Position the heater core return tube lower support bracket onto the A/C compressor lower retaining stud, install the nut (1) and tighten both A/C compressor lower retaining nuts to 25 N.m (18 ft. lbs.).

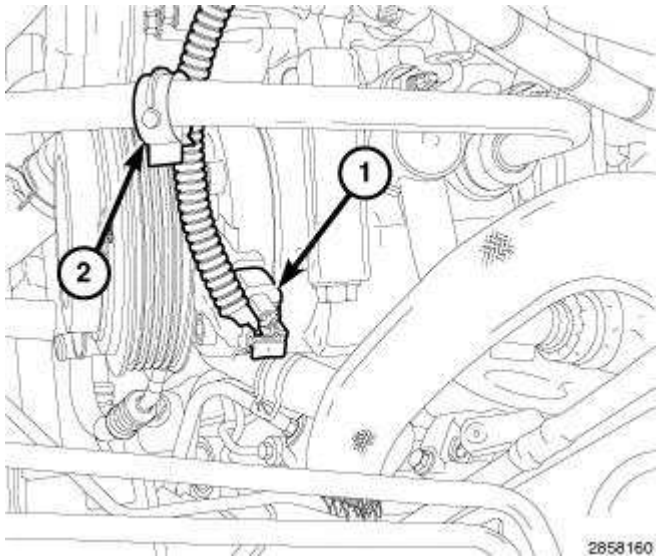

Fig. 197: A/C Compressor Electrical Connector & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

47. Connect the A/C compressor electrical connector (1) and fasten the wire harness retainer (2) to the A/C compressor discharge line.

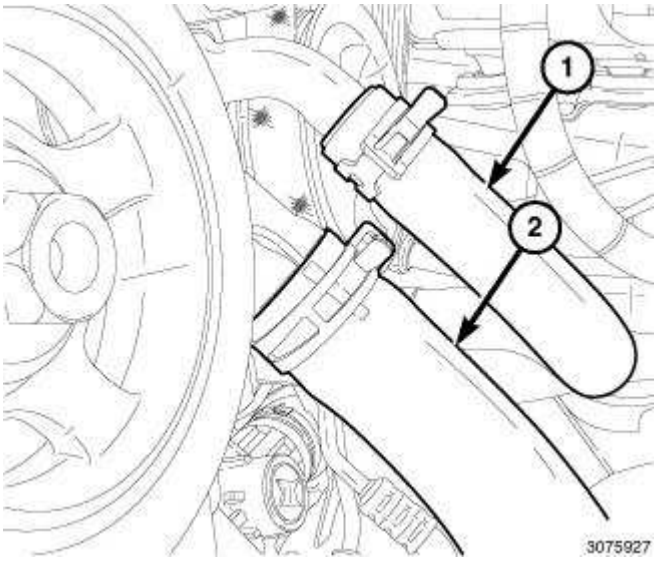

Fig. 198: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

48. Connect the lower heater core return hose (1) to the engine coolant pump housing.

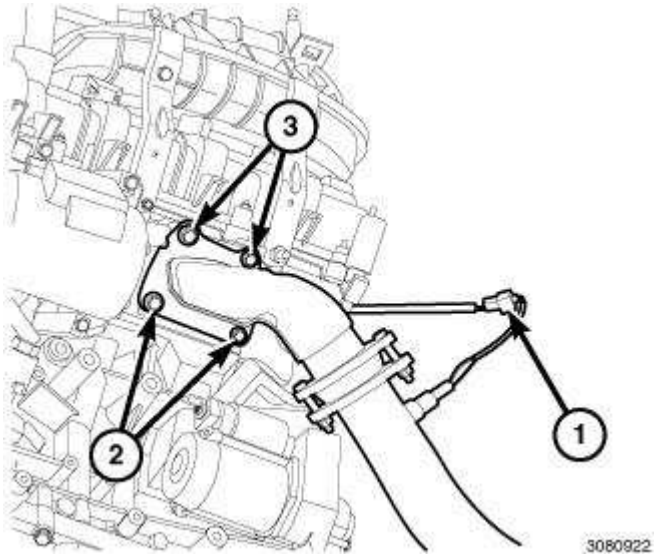

Fig. 199: Left Upstream Oxygen Sensor Electrical Connector & Down Pipe Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

49. Position the left down pipe onto the partially installed lower flange bolts (2).
50. Install the upper down pipe flange bolts (1) and tighten to 23 N.m (17 ft. lbs.).
51. Tighten the lower down pipe flange bolts (2) to 23 N.m (17 ft. lbs.).
52. Connect the left upstream oxygen sensor electrical connector (4) to the main wire harness.

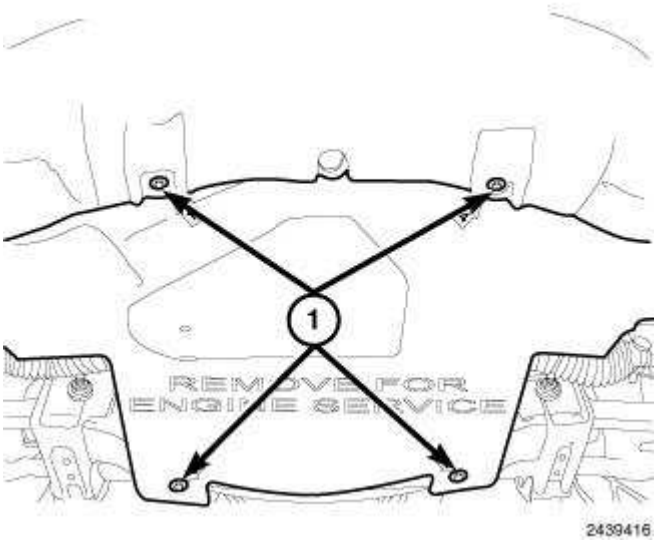

Fig. 200: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

53. If removed, install the oil filter.
54. Position the belly pan and install the retainers (1).
55. Lower the vehicle.

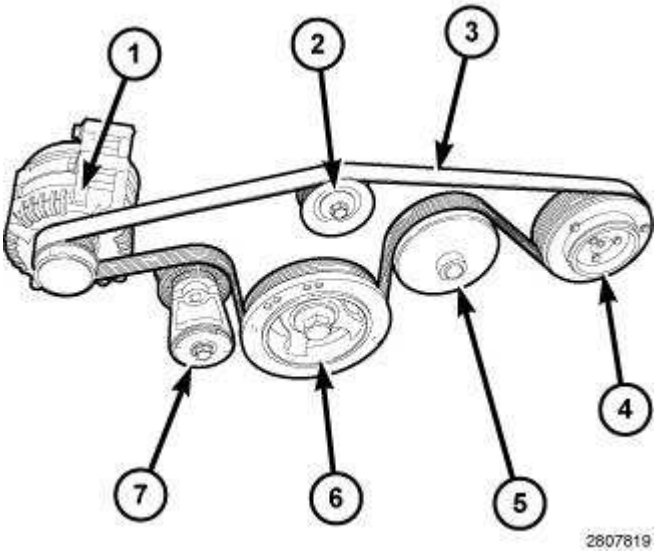

Fig. 201: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

56. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and install the accessory drive belt (3), then slowly rotate the tensioner into position.

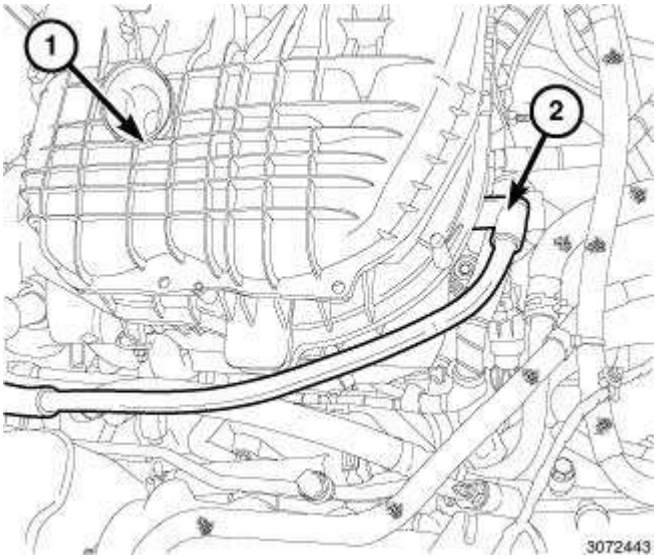

Fig. 202: Fresh Air Makeup Hose At Rear Of Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

57. Connect the fresh air makeup hose (2) to the rear of the intake manifold (1).

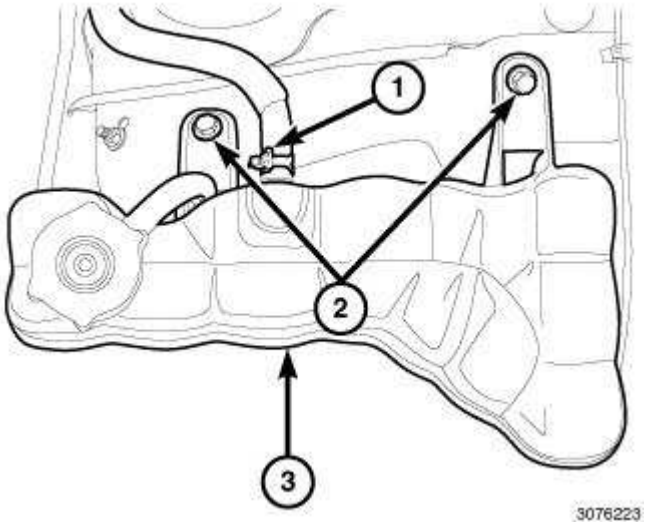

Fig. 203: Heater Core Purge Hose, Coolant Bottle Retaining Bolts & Coolant Bottle
Courtesy of CHRYSLER GROUP, LLC

58. Position the coolant bottle (3) into the engine compartment.
59. Install the coolant bottle retaining bolts (2) and tighten to 12 N.m (9 ft. lbs.).
60. Connect the heater core purge hose (1) to the coolant bottle.

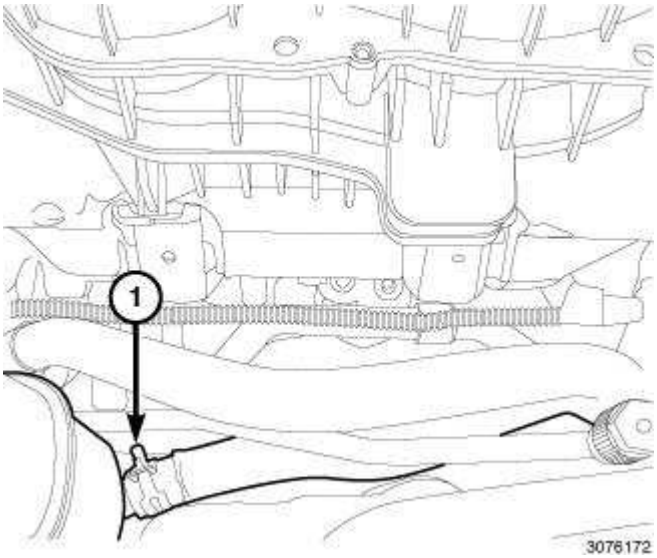

Fig. 204: Coolant Bottle Return Hose
Courtesy of CHRYSLER GROUP, LLC

61. Connect the coolant bottle return hose (1).

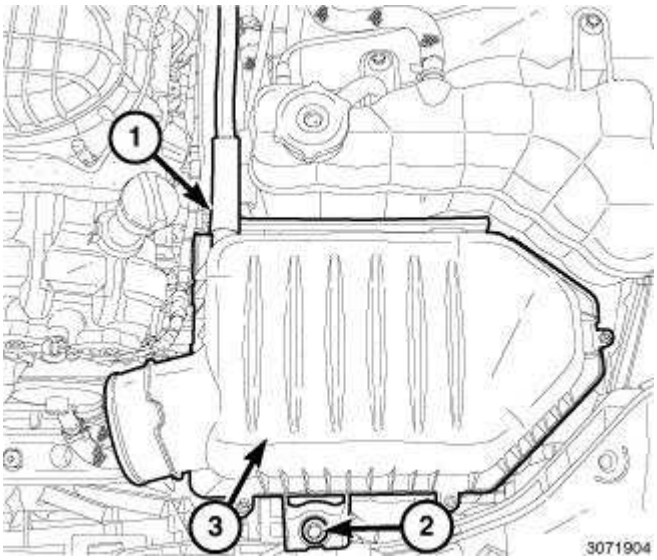

Fig. 205: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

62. Position the air cleaner housing (3) into the vehicle.
63. Install the air cleaner housing retaining bolt (2) and tighten to 12 N.m (9 ft. lbs.).
64. Connect the fresh air makeup hose (1) to the air cleaner housing.

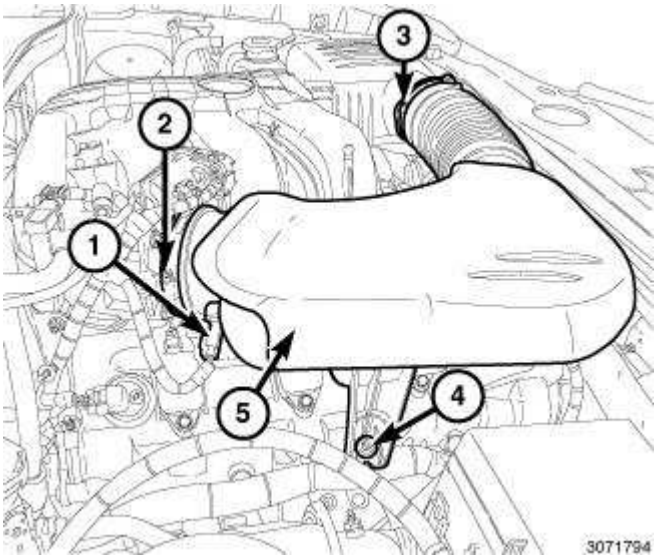

Fig. 206: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

65. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
66. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
67. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
68. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
69. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

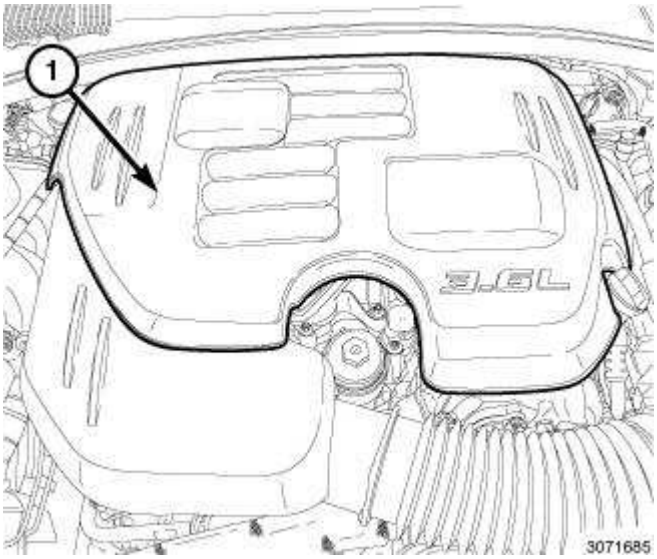

Fig. 207: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

70. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

71. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
72. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

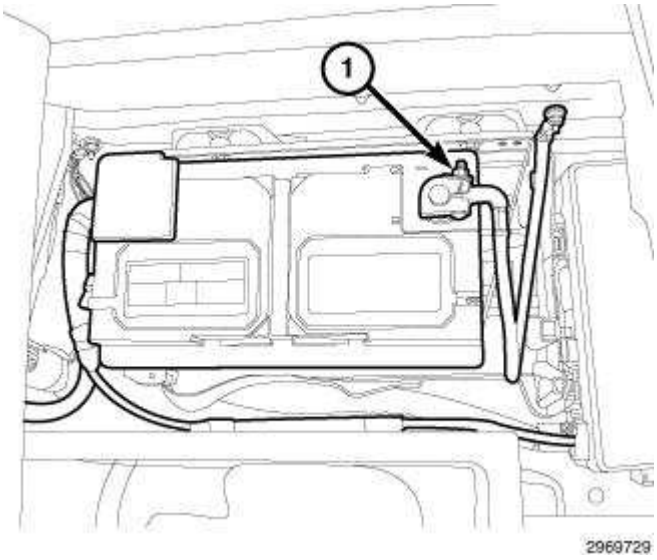

Fig. 208: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

73. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
74. Run the engine until it reaches normal operating temperature and check for leaks.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

RIGHT

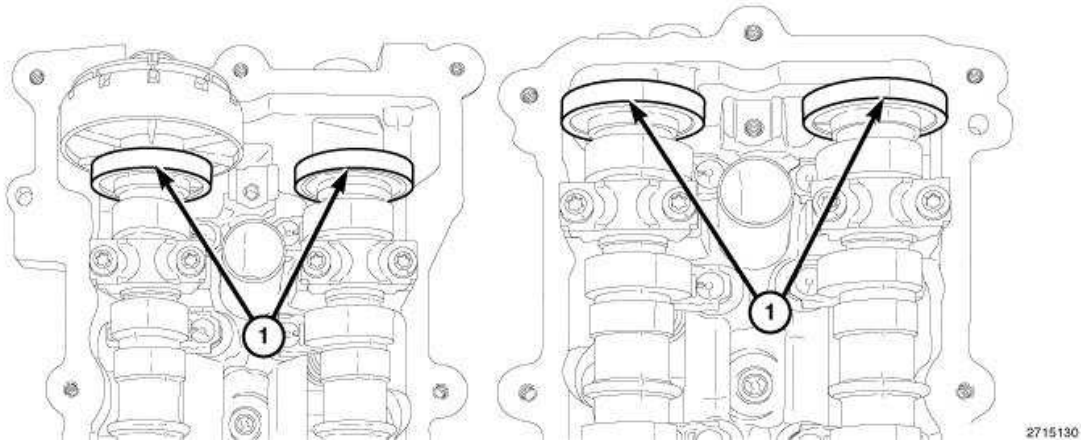

Fig. 209: Magnetic Timing Wheels

Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

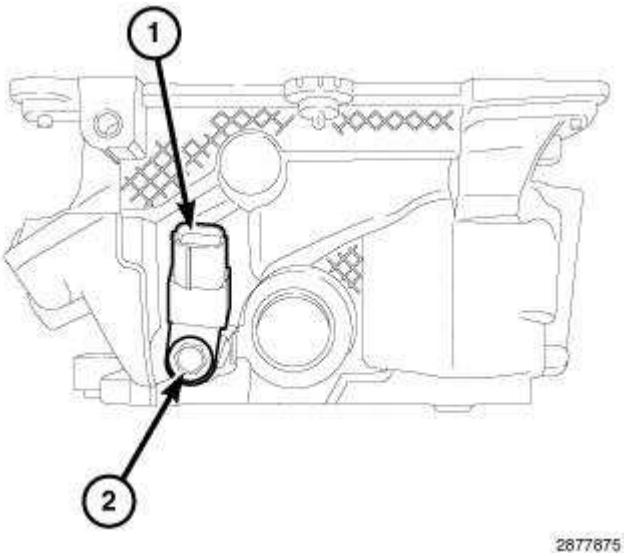

Fig. 210: Ignition Coil Capacitor & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the ignition coil capacitor (1) with an M6 bolt (2) tightened to 10 N.m (89 in. lbs.).

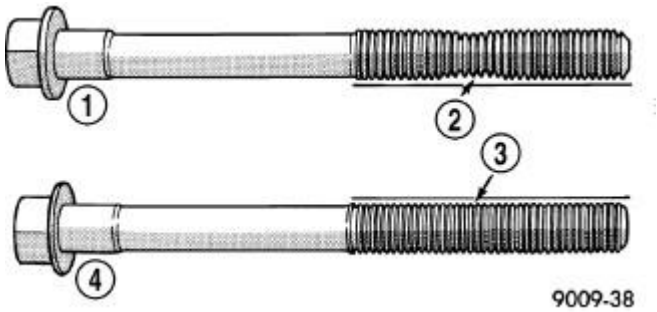

Fig. 211: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

NOTE: Typical cylinder head bolt shown in illustration.

2. Check the cylinder head bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

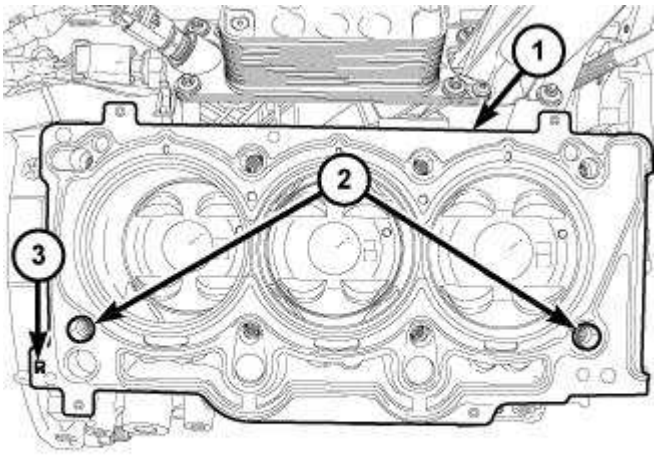

Fig. 212: Head Gasket & Locating Dowels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

3. Clean and prepare the gasket sealing surfaces of the cylinder head and block. Refer to **Engine - Standard Procedure**.

CAUTION: Non-compressible debris such as oil, coolant or RTV sealants that are not removed from bolt holes can cause the aluminum casting to crack when tightening the bolts.

4. Clean out the cylinder head bolt holes in the engine block.

WARNING: The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.

CAUTION: The cylinder head gaskets are not interchangeable between the left and right cylinder heads and are clearly marked (3) with "R" for right and "L" for left.

5. Position the new cylinder head gasket (1) on the locating dowels (2).

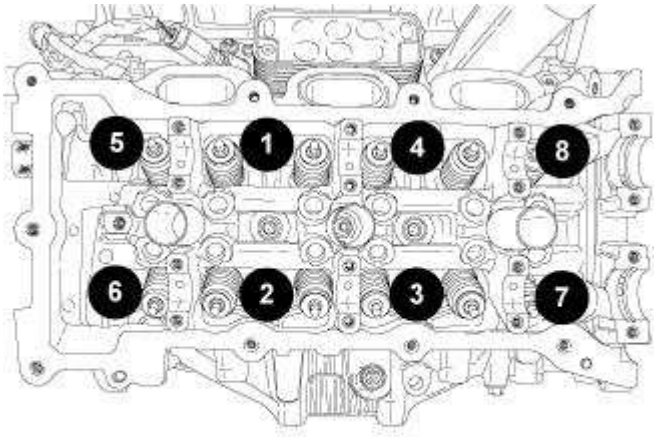

Fig. 213: Cylinder Head Retaining Bolt Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

6. Position the cylinder head onto the cylinder block. Make sure the cylinder head seats fully over the locating dowels.

NOTE: Do not apply any additional oil to the bolt threads.

7. Install the eight cylinder head bolts finger tight.
8. Tighten the cylinder head bolts in the sequence shown in illustration, following this 9 step torque plus angle method. Tighten according to the following torque values:
   - Step 1: All to 30 N.m (22 ft. lbs.)
   - Step 2: All to 45 N.m (33 ft. lbs.)
   - Step 3: All + 75° Turn **Do not use a torque wrench for this step.**
   - Step 4: All + 50° Turn **Do not use a torque wrench for this step.**
   - Step 5: Loosen all fasteners in reverse of sequence shown in illustration
   - Step 6: All to 30 N.m (22 ft. lbs.)
   - Step 7: All to 45 N.m (33 ft. lbs.)
   - Step 8: All + 70° Turn **Do not use a torque wrench for this step.**
   - Step 9: All + 70° Turn **Do not use a torque wrench for this step.**

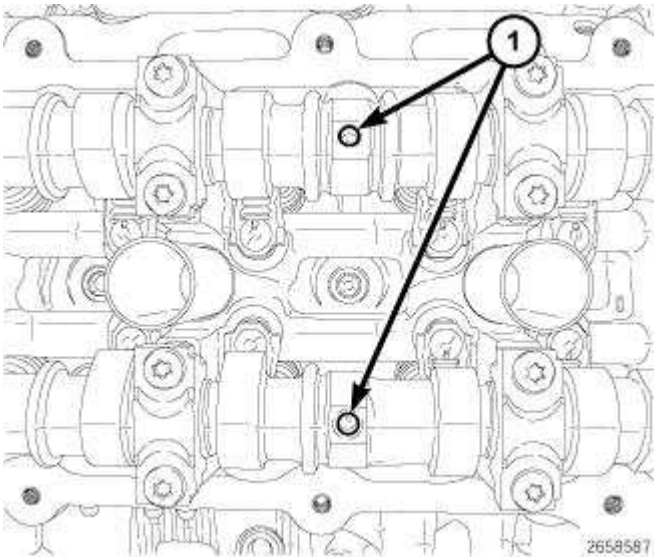

Fig. 214: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the hydraulic lifters are being reused, reassemble them into their original locations.

9. If removed, install the hydraulic lifters. Refer to **LIFTER(S), HYDRAULIC, INSTALLATION**.

NOTE: If the rocker arms are being reused, reassemble them into their original locations.

10. Install the rocker arms and camshafts. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the crankshaft clockwise to return the crankshaft to top-dead-center.

11. Verify that the camshafts are set at TDC by positioning the alignment holes (1) vertically.

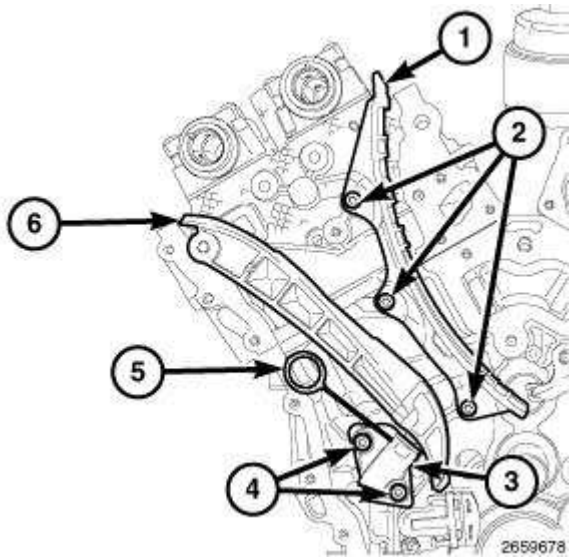

Fig. 215: Right Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the right cam chain guide (1) with three bolts (2). Tighten the T30 bolts (2) to 12 N.m (106 in. lbs.).
13. Install the right cam chain tensioner (3) to the engine block with two bolts (4). Tighten the T30 bolts (4) to 12 N.m (106 in. lbs.).
14. Reset the right cam chain tensioner (3) by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (5).
15. Install the right tensioner arm (6).

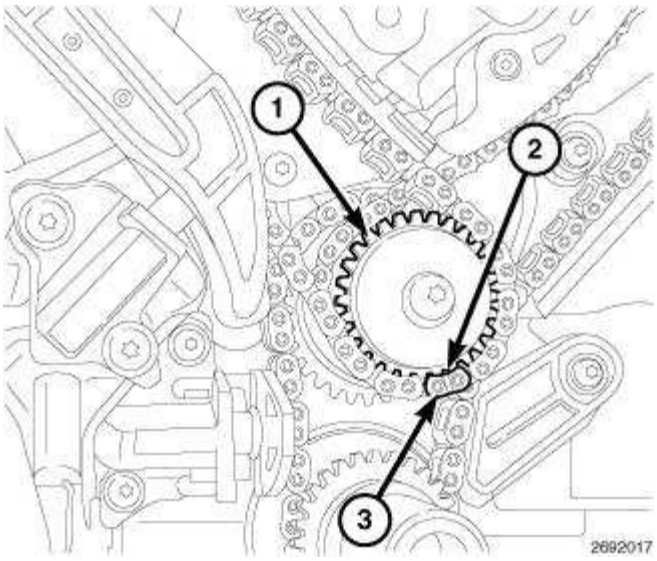

Fig. 216: Idler Sprocket, Dimple & Plated Link
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always reinstall timing chains so that they maintain the same

direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

16. Press the right exhaust cam phaser onto the exhaust camshaft. Install and hand tighten the oil control valve.
17. Drape the right side cam chain over the right exhaust cam phaser and onto the idler sprocket (1) so that the dimple (2) is aligned with the plated link (3) on the cam chain.

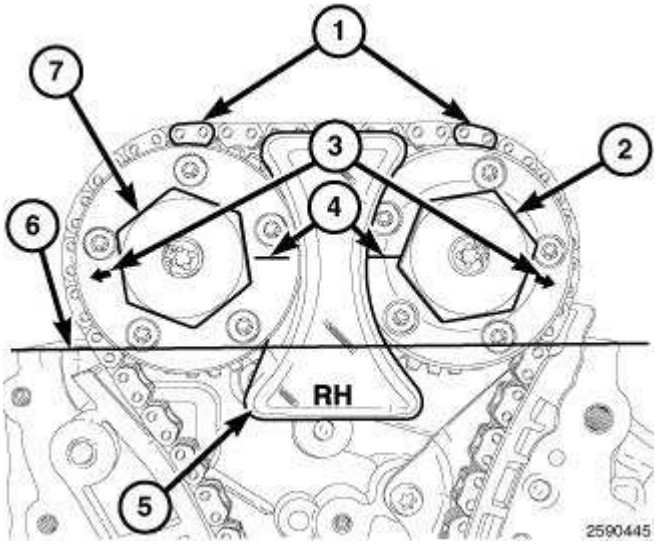

Fig. 217: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

18. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the right side cam phasers so that the arrows (3) point away from each other and the scribe lines (4) are parallel to the valve cover sealing surface (6). Press the intake cam phaser onto the intake cam, install and hand tighten the oil control valve (2).

NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.

19. Install the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (5) and tighten the oil control valves (2) and (7) to 150 N.m (110 ft. lbs.).

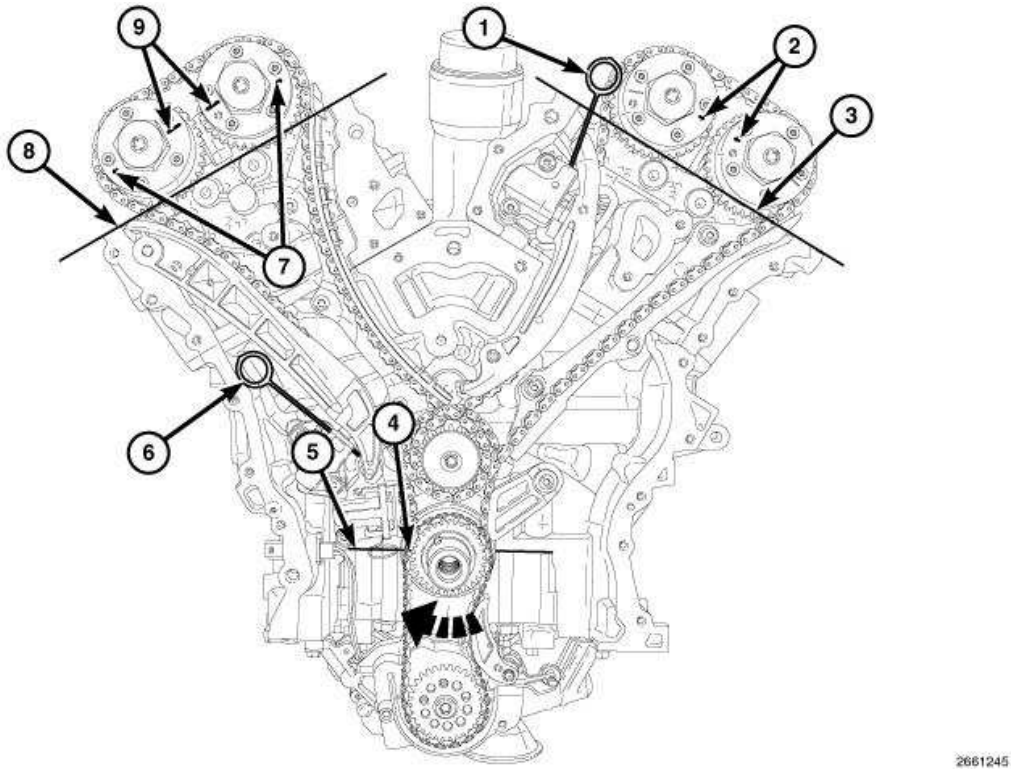

Fig. 218: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

20. Remove the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser).
21. Remove the Tensioner Pin (special tool #8514, Pins, Tensioner) (6) from the RH cam chain tensioner.
22. Rotate the crankshaft clockwise two complete revolutions stopping when the dimple (4) on the crankshaft is aligned the with the block/bearing cap junction (5).
23. While maintaining this alignment, verify that the arrows on the left side cam phasers (2) point toward each other and are parallel to the valve cover sealing surface (3) and that the right side cam phaser arrows (7) point away from each other and the scribe lines (9) are parallel to the valve cover sealing surface (8).

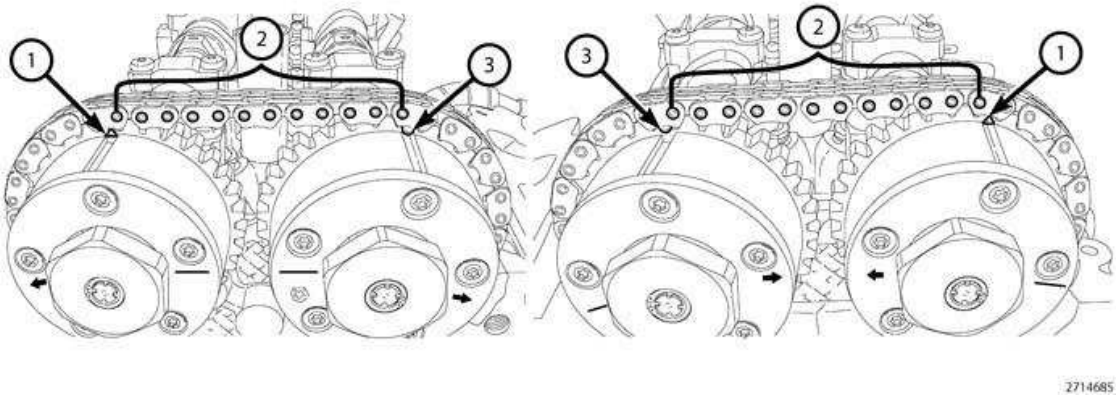

Fig. 219: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

24. There should be 12 chain pins (2) between the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).
25. If the engine timing is not correct, repeat this procedure.
26. Install the engine timing cover, crankshaft vibration damper, upper and lower oil pans and cylinder head covers. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.

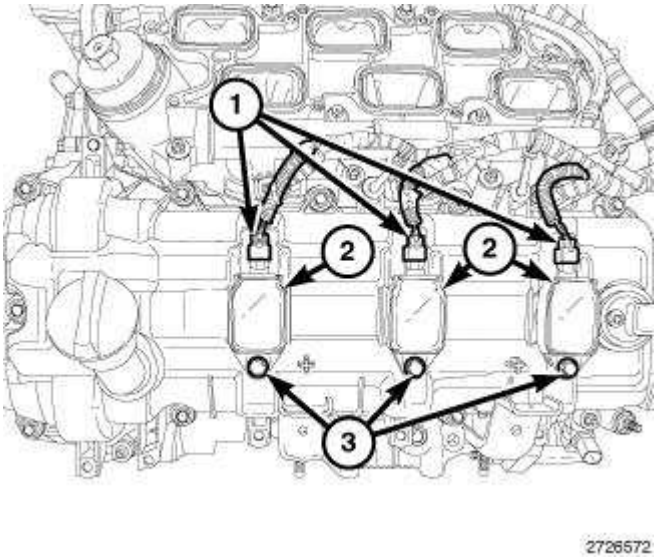

Fig. 220: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left side ignition coils are shown in illustration, the right side ignition coils are similar.

27. Install the spark plugs and tighten to 18 N.m (13 ft. lbs.). Refer to **SPARK PLUG, INSTALLATION** .
28. Install the ignition coils (2). Refer to **COIL, IGNITION, INSTALLATION** .

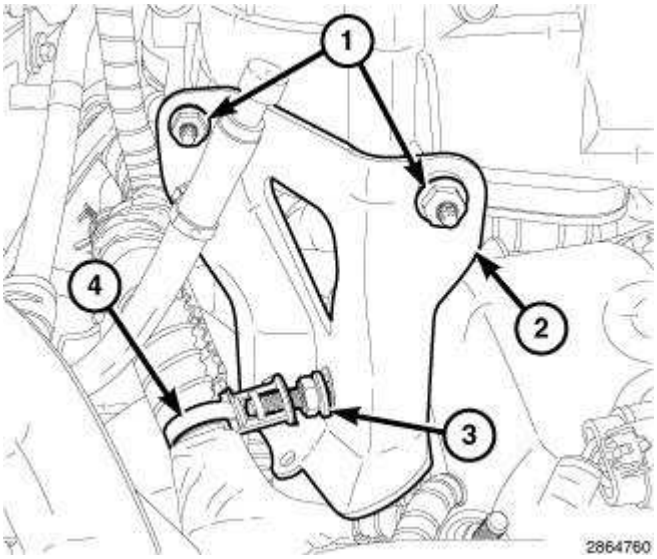

Fig. 221: Upper Intake Manifold Support Bracket, Stud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

29. Position the upper intake manifold support bracket (2) and install the retaining stud (3) finger tight.

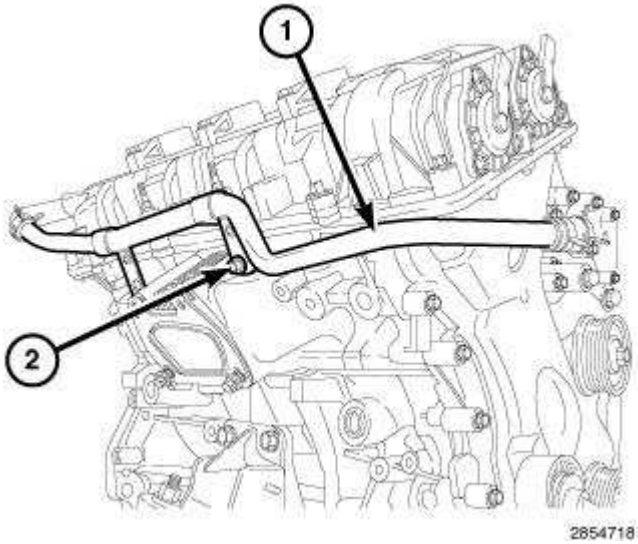

Fig. 222: Heater Core Supply Tube Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

30. Install the heater core supply tube (1) with one bolt (2) tightened to 12 N.m (106 in. lbs.).

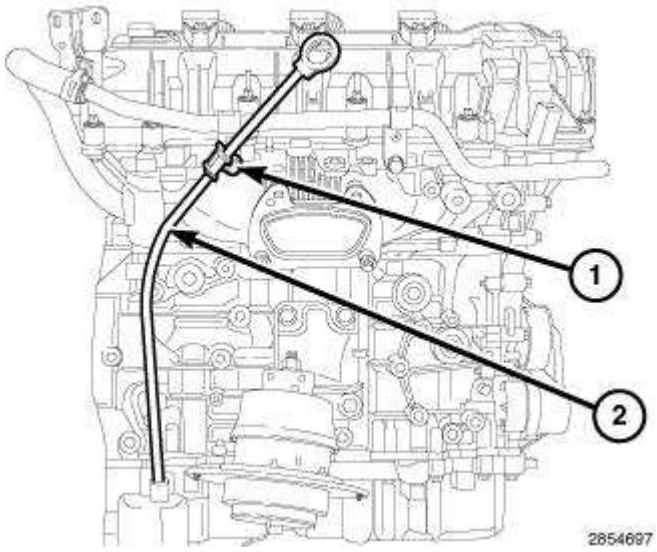

Fig. 223: Oil Level Indicator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

31. Position the oil level indicator (2), install the retaining bolt (1) and tighten to 12 N.m (106 in. lbs.).

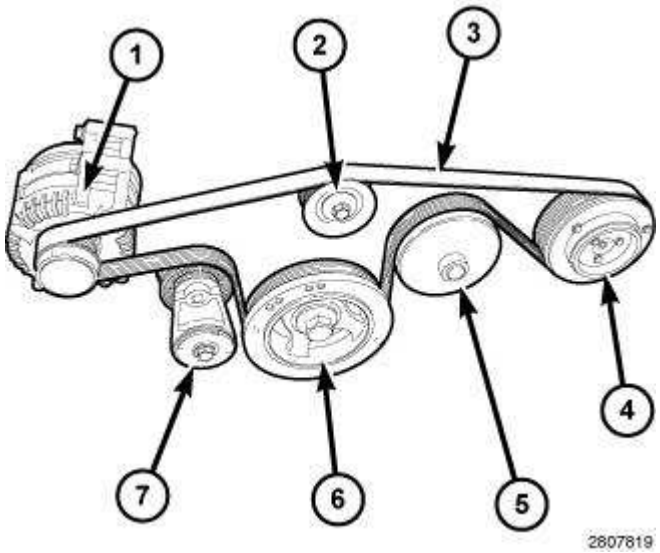

Fig. 224: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

32. Install the generator (1). Refer to **GENERATOR, INSTALLATION** .
33. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and install the accessory drive belt (3), then slowly rotate the tensioner into position.

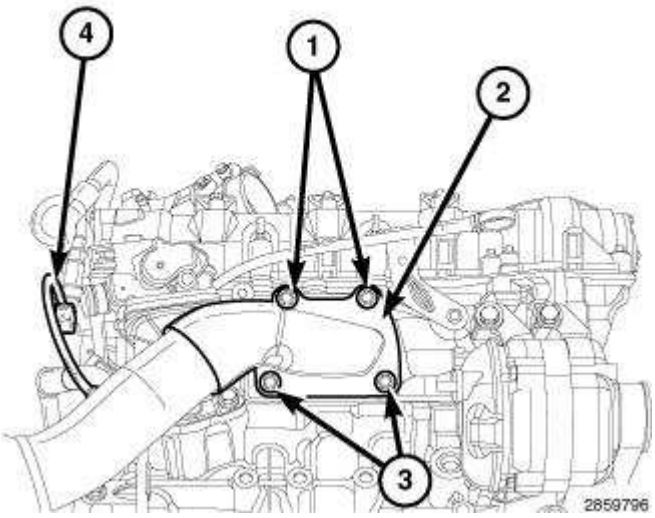

Fig. 225: Right Upstream Oxygen Electrical Sensor Connector, Down Pipe Flanges & Bolts
Courtesy of CHRYSLER GROUP, LLC

34. Install the right down pipe (2) onto the partially installed lower flange bolts (3).
35. Install the upper down pipe flange bolts (1) and tighten all M8 bolts to 23 N.m (17 ft. lbs.).
36. Connect the right upstream oxygen sensor connectors (4) to the main wire harness.

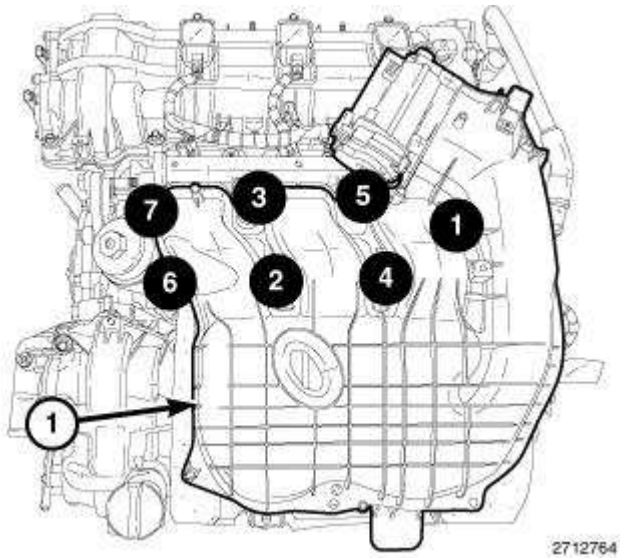

Fig. 226: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

37. Install the upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

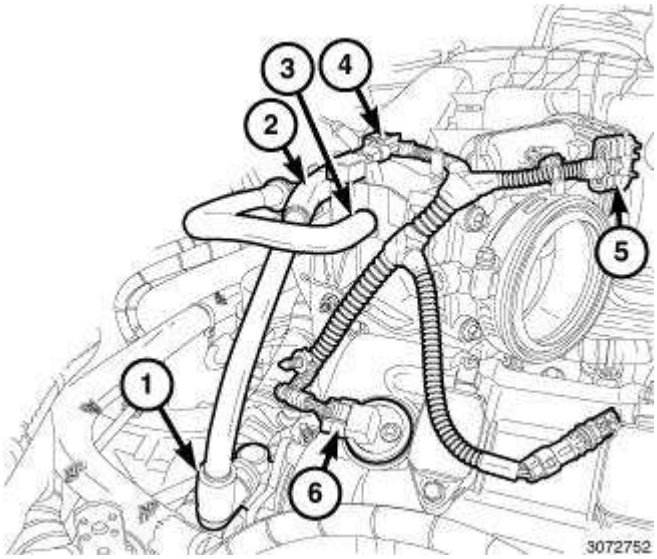

Fig. 227: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

38. Connect the electrical connector at the Camshaft Position Sensor (CMP) (6).
39. Connect the electrical connector at the Electronic Throttle Control (ETC) (5).
40. Connect the electrical connector at the Manifold Absolute Pressure (MAP) Sensor (4).
41. Connect the brake booster vacuum hose (3).
42. Connect the PCV hose to the PCV valve (1) and to the intake manifold (2).

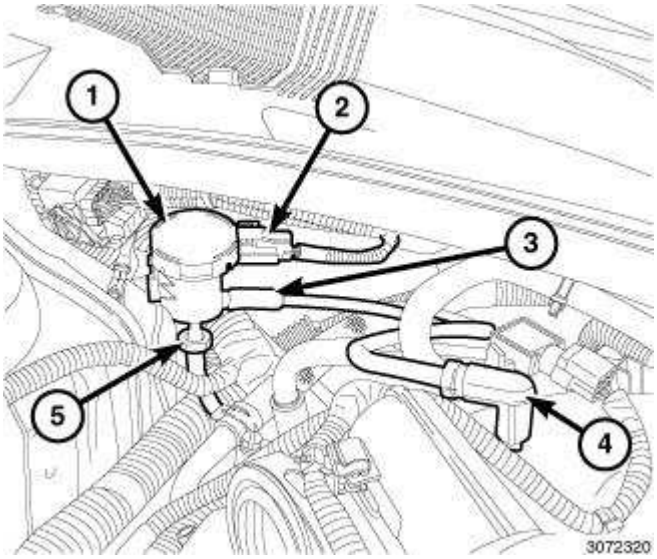

Fig. 228: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

43. Connect the EVAP purge solenoid vacuum line (4) to the intake manifold.
44. Connect the vacuum line (3) to the EVAP purge solenoid (1).

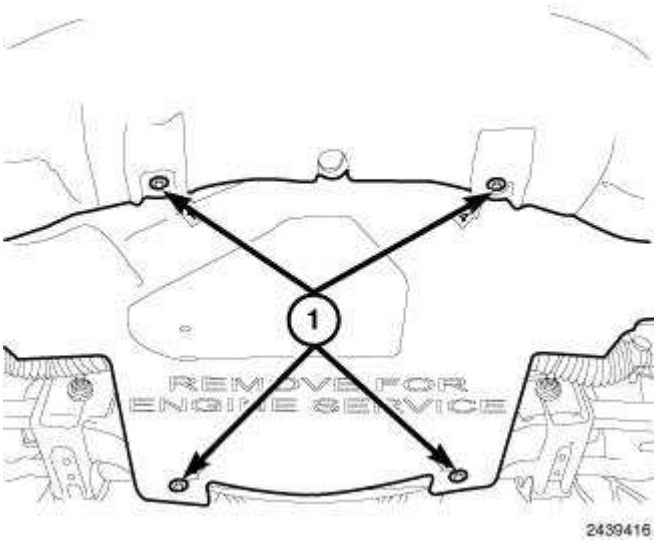

Fig. 229: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

45. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
46. If removed, install the oil filter.
47. Position the belly pan and install the retainers (1).
48. Lower the vehicle.

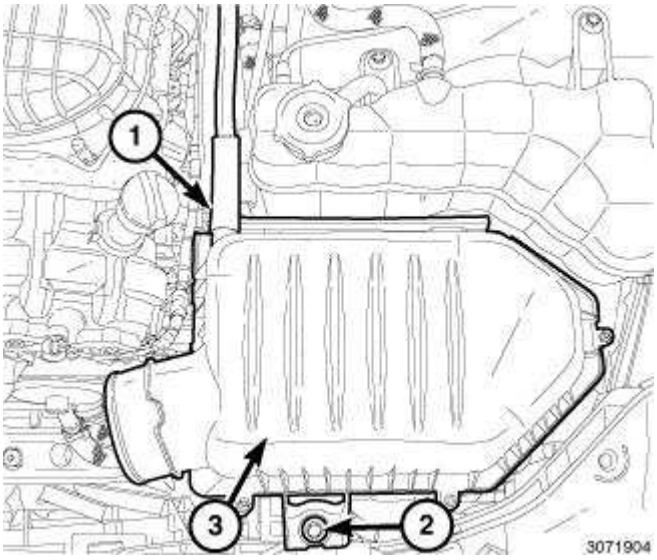

Fig. 230: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

49. Position the air cleaner housing (3) into the vehicle.
50. Install the air cleaner housing retaining bolt (2) and tighten to 12 N.m (9 ft. lbs.).
51. Connect the fresh air makeup hose (1) to the air cleaner housing.

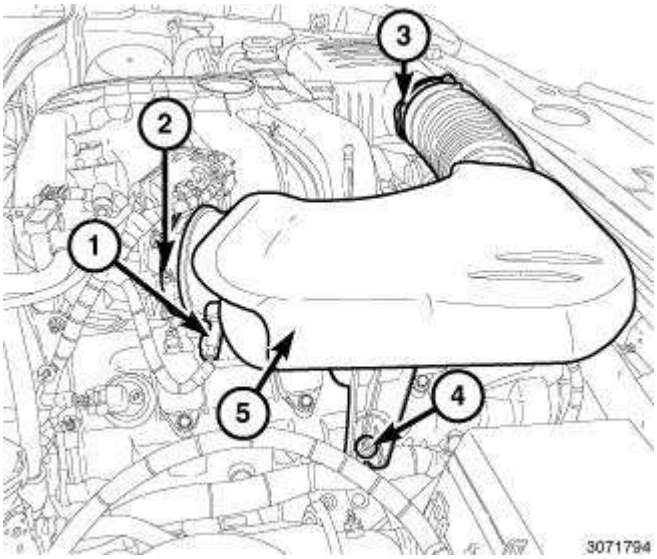

Fig. 231: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

52. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
53. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
54. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
55. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
56. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

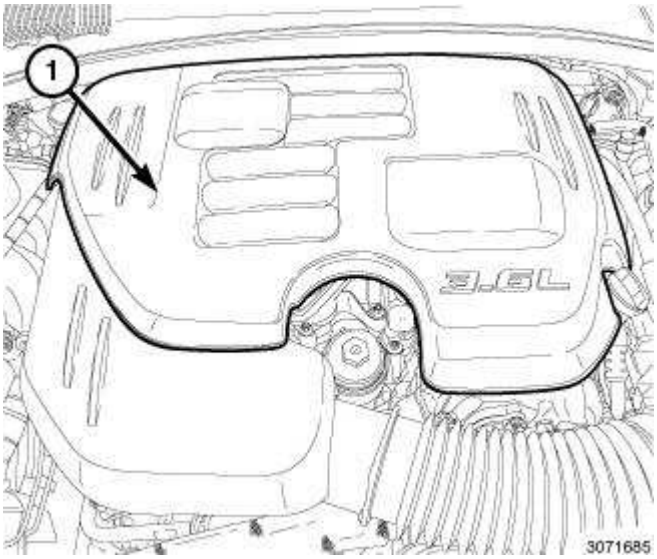

Fig. 232: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

57. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

58. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
59. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

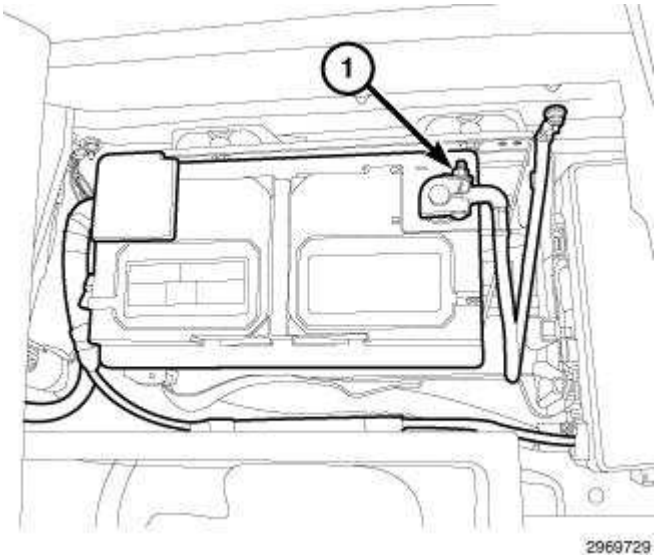

Fig. 233: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

60. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
61. Run the engine until it reaches normal operating temperature and check for leaks.

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE

DESCRIPTION

DESCRIPTION

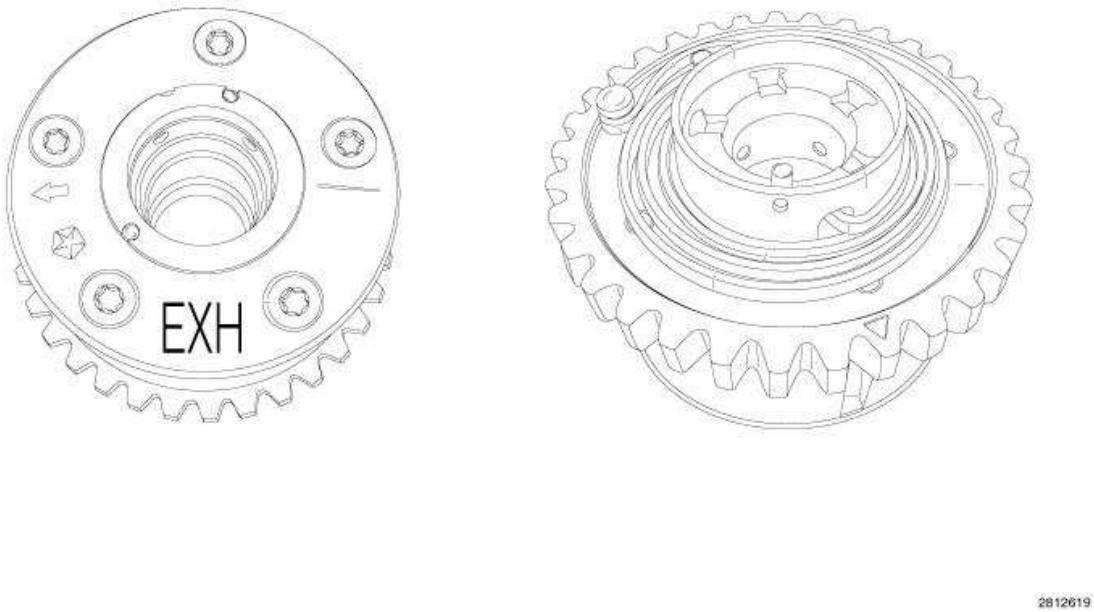

Fig. 234: Exhaust Phaser Assembly
Courtesy of CHRYSLER GROUP, LLC

The 3.6L engine is equipped with Variable Valve Timing (VVT). This system adjusts the timing of all four camshafts independently using solenoids and oil control valves to direct oil pressure into the camshaft phaser assemblies. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The four phasers are located on the front of the camshafts, behind the VVT solenoids, inside of the engine timing cover. The exhaust phasers are identified with EXH and the intake phasers are identified with INT. The exhaust phaser has a clockspring, the intake phaser does not. The camshaft sprockets are integrated with the camshaft phaser and are serviced as an assembly. Do not attempt to disassemble the phasers, they are not serviceable. Phasers are interchangeable between the right and left cylinder heads but should be installed in the same location as removed.

The 3.6L engine has an Oil Control Valve (OCV) for each phaser. The OCV also acts as a bolt for mounting the Phaser to the camshaft. The OCVs spool valve is spring loaded and should move freely within the OCV body. The four OCVs are identical but should be installed in the same location as removed.

OPERATION

OPERATION

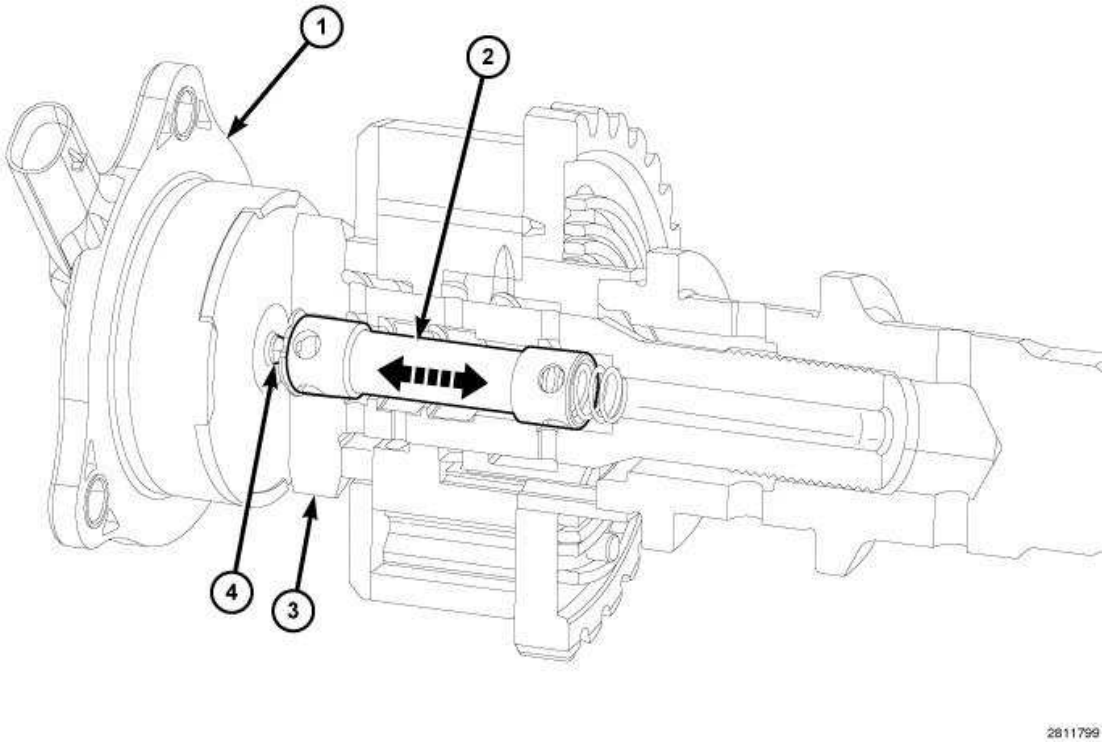

Fig. 235: Oil Control Valve (OCV), VVT Solenoid, Solenoid Pintle & Internal Spool Valve
Courtesy of CHRYSLER GROUP, LLC

Each phaser position is adjusted using regulated oil pressure through the Oil Control Valve (OCV) (3). To begin phaser movement, a voltage signal is applied to the VVT solenoid (1) to extend or retract the solenoid pintle (4). The pintle pushes against an internal spool valve (2) within the OCV moving the valve forwards and backwards to direct oil flow.

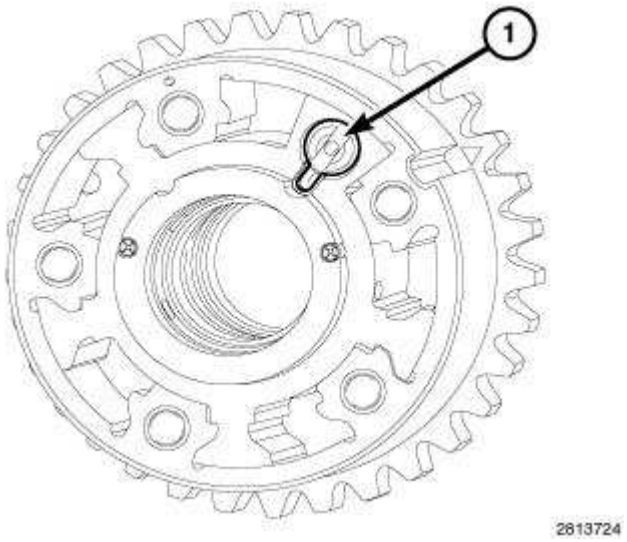

Fig. 236: Phasers In Lock-Pin Position
Courtesy of CHRYSLER GROUP, LLC

At engine startup, system oil pressure overcomes spring pressure and unlocks the phaser lock-pin (1) in preparation for phasing. The phasers remain in this position until a PCM signal is given to pulse-width modulate the VVT solenoid. At engine shutdown, as oil pressure is reduced, both Phasers return to their lock-pin position (1). However, because the exhaust Phaser needs to travel to a position above and beyond the standard camshaft clockwise rotation, the assistance of a clock spring is required. The intake Phaser on the other hand, simply relies on the torsional resistance from the valvetrain to push it back towards lock-pin position.

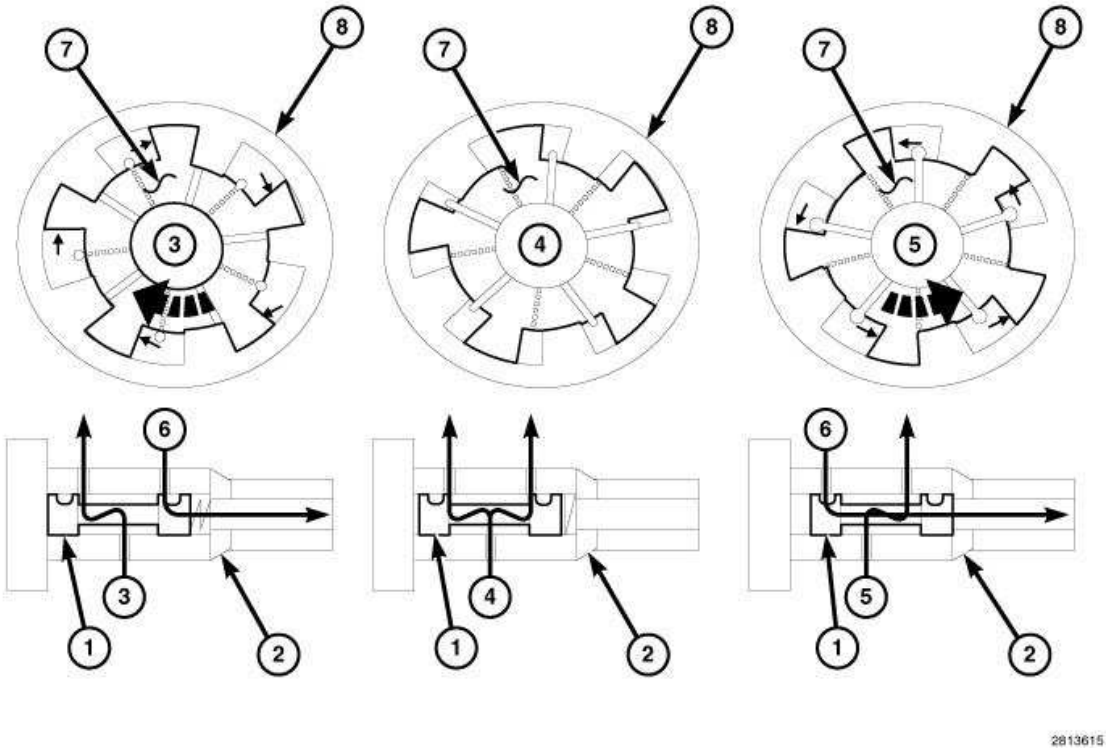

Fig. 237: Spool Valve, Vanes, OCV & Advance, Hold Or Retard Position
Courtesy of CHRYSLER GROUP, LLC

The position of the spool valve (1) inside the OCV (2) determines which ports and chambers inside the phaser are being fed, either to advance (3), hold (4) or retard (5) the timing of the phaser sprocket relative to the camshaft. The spool valve also returns oil from the chambers to the sump (6). The Camshaft Position (CMP) sensor monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM. As oil pressure pushes against the vanes (6) of the phaser rotor, the rotor begins to move. Since this rotor is physically attached to the camshaft, rotor rotation causes the camshaft position to rotate relative to the standard sprocket (7) position.

REMOVAL

LEFT

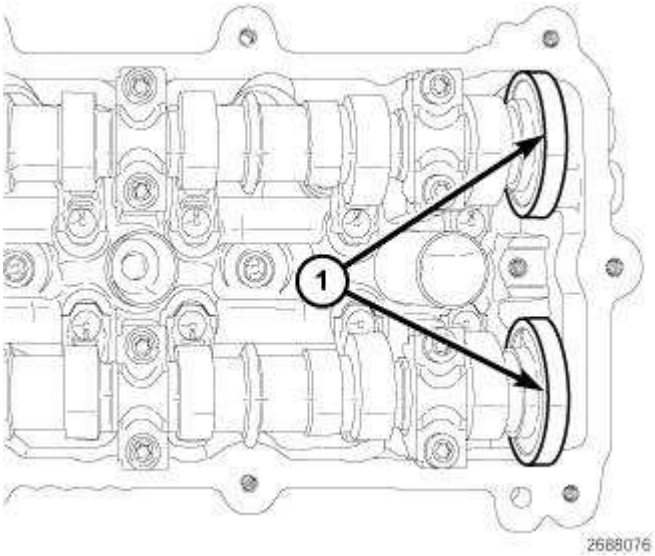

Fig. 238: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

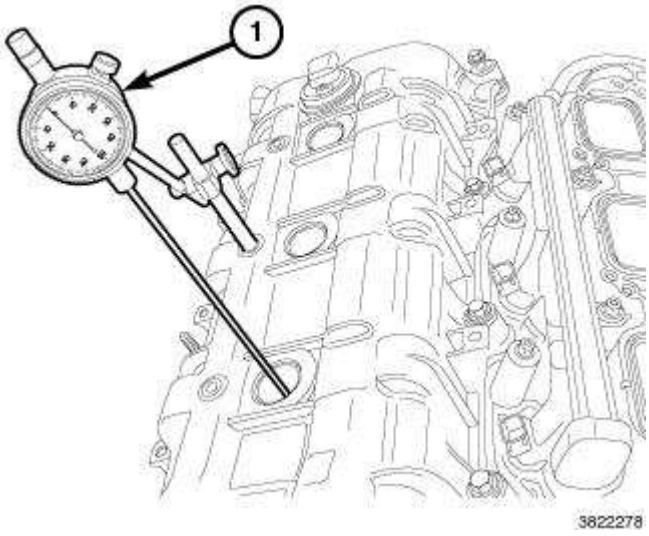

Fig. 239: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

1. Remove the upper intake manifold, left ignition coils and left cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
2. Remove the right ignition coils and all spark plugs. Refer to **SPARK PLUG, REMOVAL** .

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

3. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point on the engine, such as the number three cylinder ignition coil mount. Position the indicator probe into the number one cylinder, rotate the crankshaft clockwise (as viewed from the front) to place the number one cylinder piston at top-dead-center on the exhaust stroke and set the indicator dial to zero.

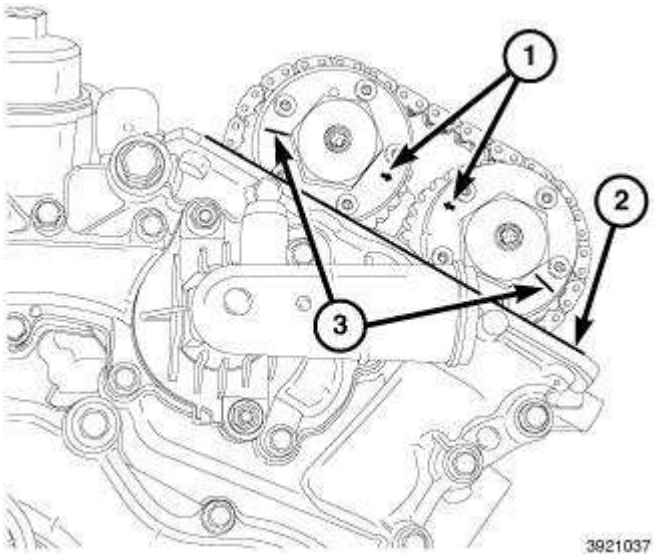

Fig. 240: Arrows, Scribe Lines & Cylinder Head Cover Mounting Surface
Courtesy of CHRYSLER GROUP, LLC

4. The left side cam phaser **SCRIBE LINES** (3) should face away from each other and the **ARROWS** (1) should point toward each other and be parallel to the cylinder head cover mounting surface (2) when the number one cylinder piston is positioned at top-dead-center on the exhaust stroke.

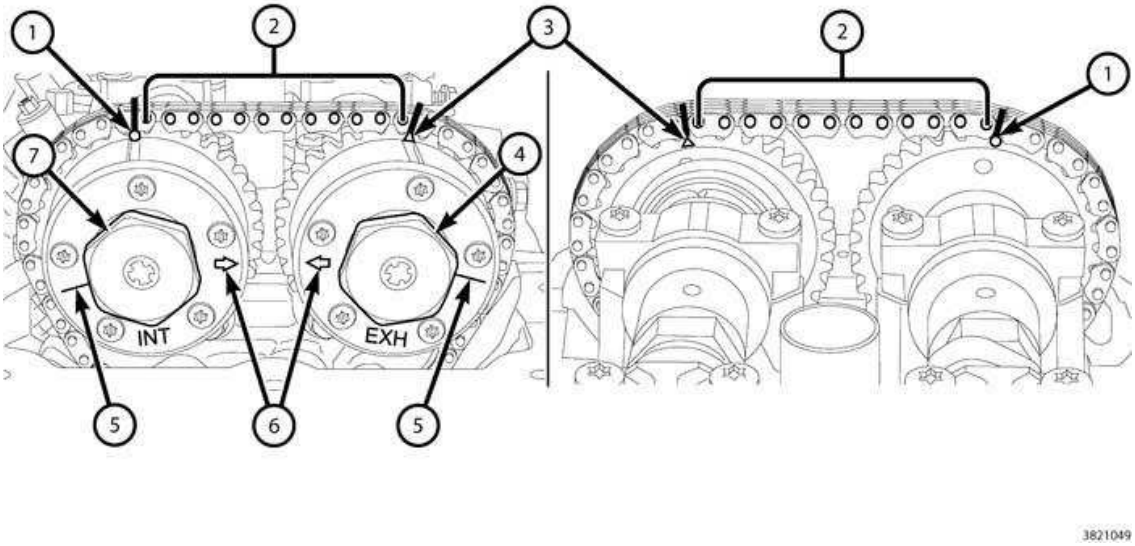

Fig. 241: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows
Courtesy of CHRYSLER GROUP, LLC

NOTE: The phaser markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are twelve chain pins between the markings.

5. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (3) and the intake cam phaser circle marking (1) as viewed from either the front or rear of the cam phasers.
6. Mark both sides of the cam chain at the phaser timing marks (1 and 3) using a paint pen or equivalent to aid in reassembly.

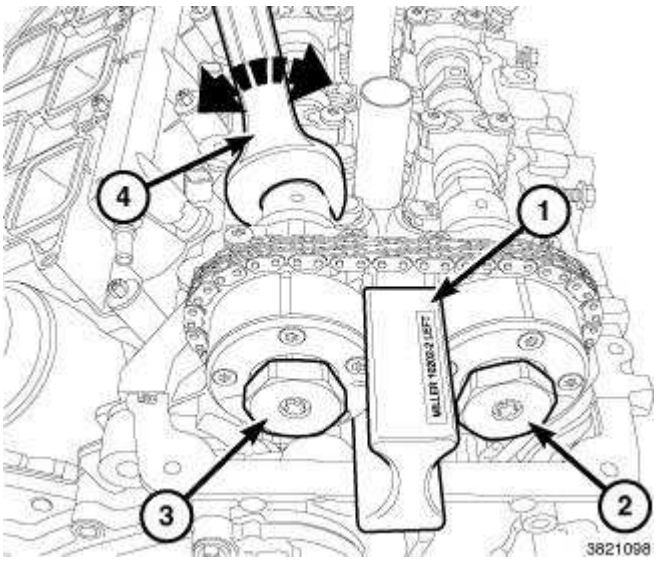

Fig. 242: Camshaft Phaser Lock, Oil Control Valves & Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

7. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
8. Loosen, but do not remove, the exhaust oil control valve (2) and the intake oil control valve (3).
9. Remove the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1).

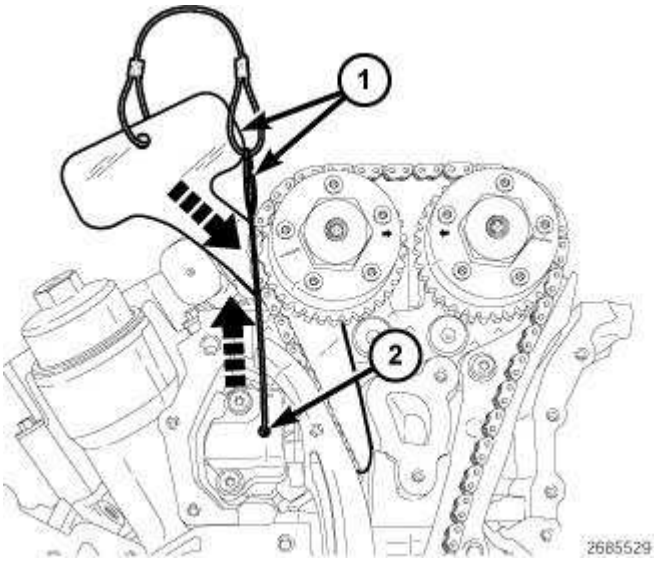

Fig. 243: Pin, Rack & Timing Chain Holder
Courtesy of CHRYSLER GROUP, LLC

NOTE: Graphic shows engine timing cover removed for clarity.

10. Using (special tool #10200-3, Pin) (2), lift the pawl off of the rack (3). While holding the pawl off of the rack, push (special tool #10200-1, Holder, Timing Chain, Left Side) (1) into place between the cylinder head and the cam chain guide to force the rack and piston back into the tensioner body. The holder remains in place while the phasers are removed. Refer to **Engine/Valve Timing - Standard Procedure**.

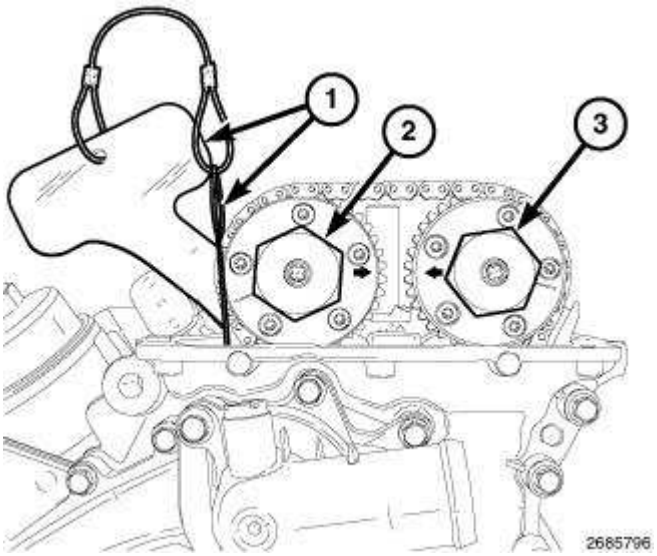

Fig. 244: Pin, Rack, Timing Chain Holder & Oil Control Valves
Courtesy of CHRYSLER GROUP, LLC

11. Remove the oil control valve (4) and pull the left side exhaust cam phaser off of the camshaft.
12. Remove the oil control valve (3) and pull the left side intake cam phaser off of the camshaft.

RIGHT

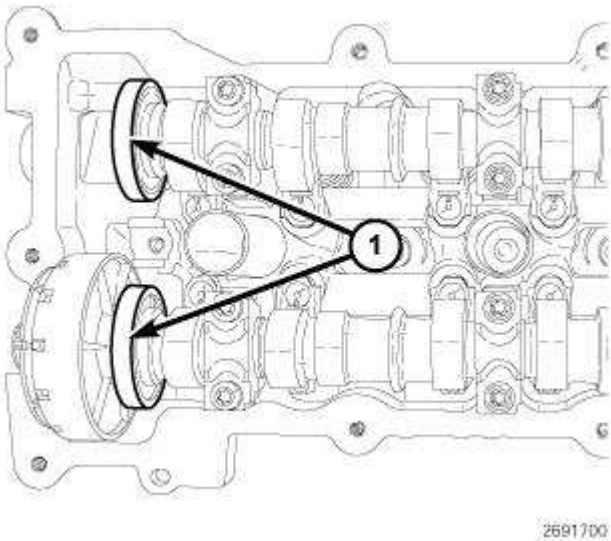

Fig. 245: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

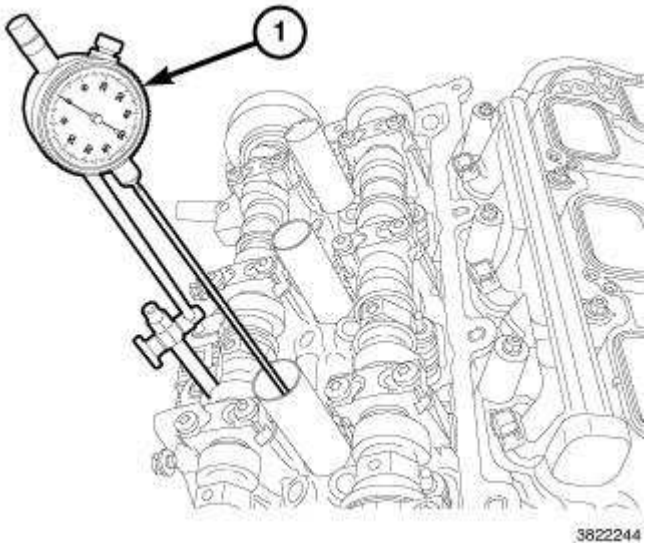

Fig. 246: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

1. Remove the upper intake manifold, right ignition coils and right cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
2. Remove the left ignition coils and all spark plugs. Refer to **SPARK PLUG, REMOVAL** .

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

3. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point on the engine, such as the cylinder head cover mounting surface. Position the indicator probe into the number one cylinder, rotate the crankshaft clockwise (as viewed from the front) to place the number one piston at top-dead-center on the exhaust stroke and set the indicator dial to zero.

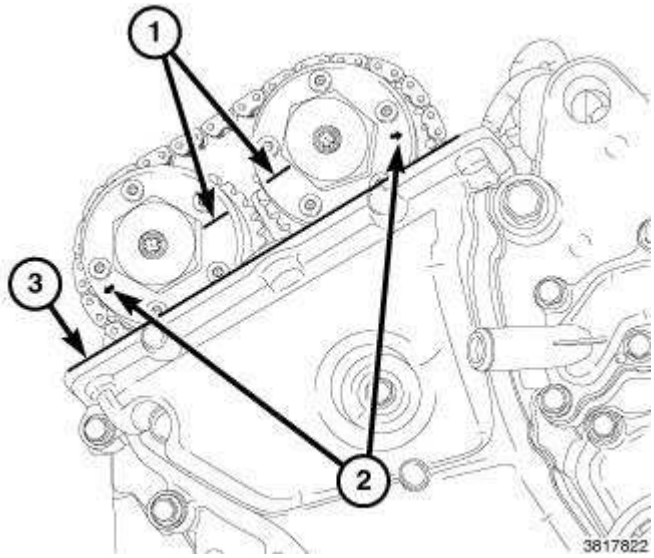

Fig. 247: Arrows, Scribe Lines & Cylinder Head Cover Mounting Surface
Courtesy of CHRYSLER GROUP, LLC

4. The right side cam phaser **ARROWS** (2) should point away from each other and the **SCRIBE LINES** (1) should be parallel to the cylinder head cover mounting surface (3) when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.

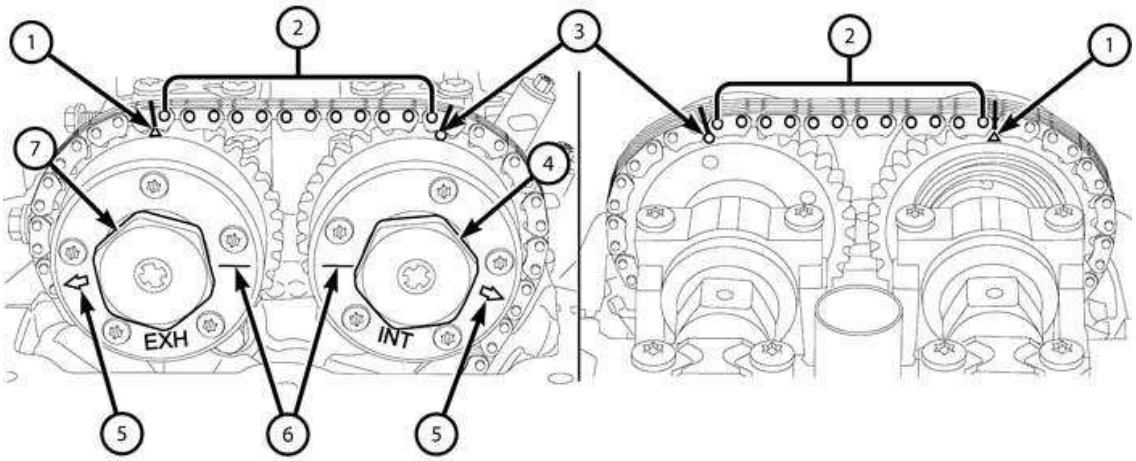

Fig. 248: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows
Courtesy of CHRYSLER GROUP, LLC

NOTE: The phaser markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are twelve chain pins between the markings.

5. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.
6. Mark both sides of the cam chain at the phaser timing marks (1 and 3) using a paint pen or equivalent to aid in reassembly.

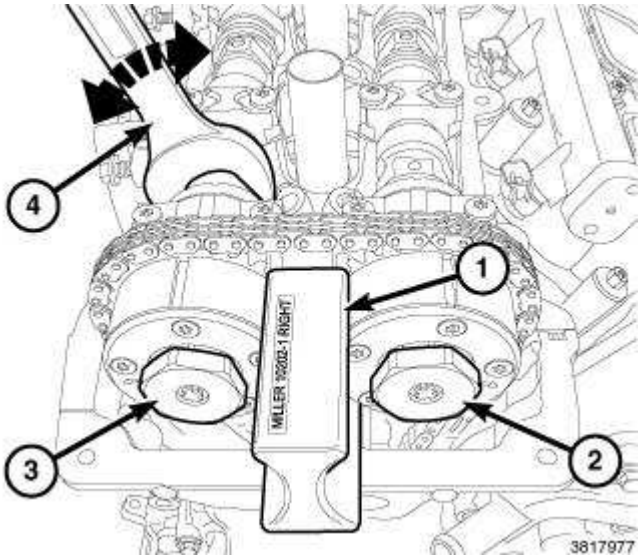

Fig. 249: Camshaft Phaser Lock, Oil Control Valves & Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

7. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
8. Loosen, but do not remove, the exhaust oil control valve (3) and the intake oil control valve (2).
9. Remove the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1).

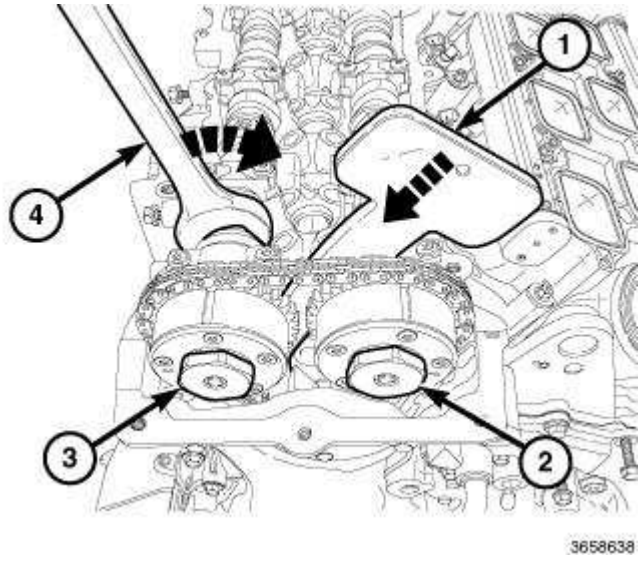

Fig. 250: Compressing Tensioner By Slightly Rotating Exhaust Camshaft Clockwise
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not insert the Timing Chain Holder into position without first

compressing the tensioner. The Timing Chain Holder is not designed to compress the tensioner and excessive force can damage the timing chain tensioner arm.

10. Use the timing chain to compress the tensioner by slightly rotating the exhaust camshaft clockwise (4). Insert (special tool #10369, Holder, Timing Chain) (1) into place between the cylinder head boss and the tensioner arm to hold the tensioner in the compressed position. The Timing Chain Holder remains in place while the phasers are removed.

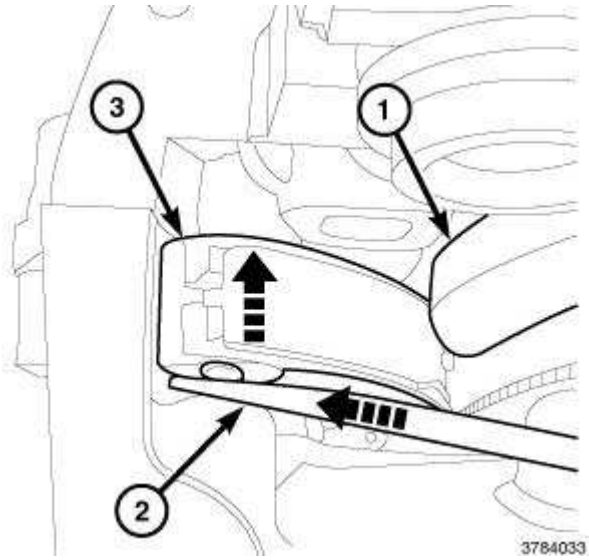

Fig. 251: Timing Chain Holder, Trim Stick & Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the Timing Chain Holder (1) does not engage or slips from position, wedge a trim stick (2) or equivalent between the front cover and the tensioner arm (3) to push the tensioner arm towards the rear of the engine and then repeat the previous step.**

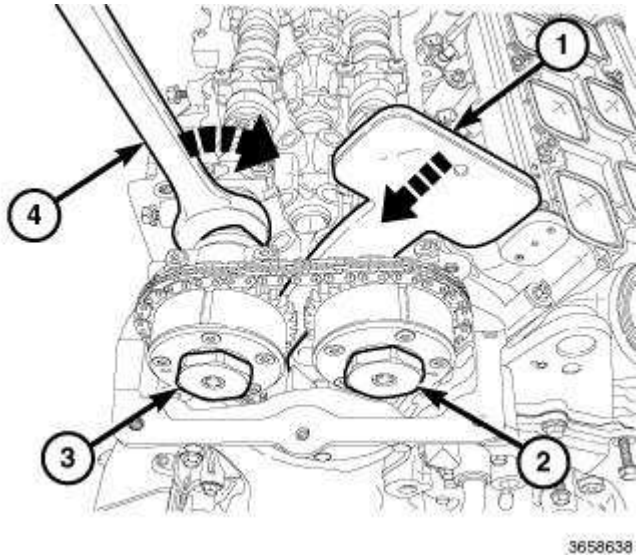

Fig. 252: Compressing Tensioner By Slightly Rotating Exhaust Camshaft Clockwise
Courtesy of CHRYSLER GROUP, LLC

11. Remove the oil control valve (3) and pull the right side exhaust cam phaser off of the camshaft.
12. Remove the oil control valve (2) and pull the right side intake cam phaser off of the camshaft.

INSTALLATION

LEFT

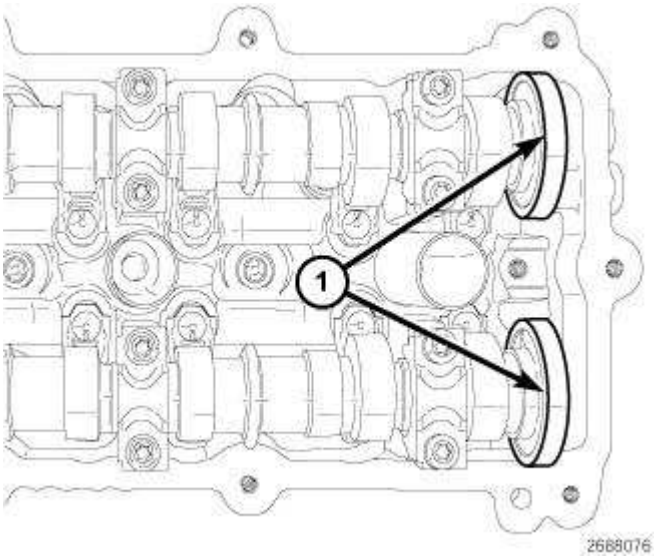

Fig. 253: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the

camshaft position sensor.

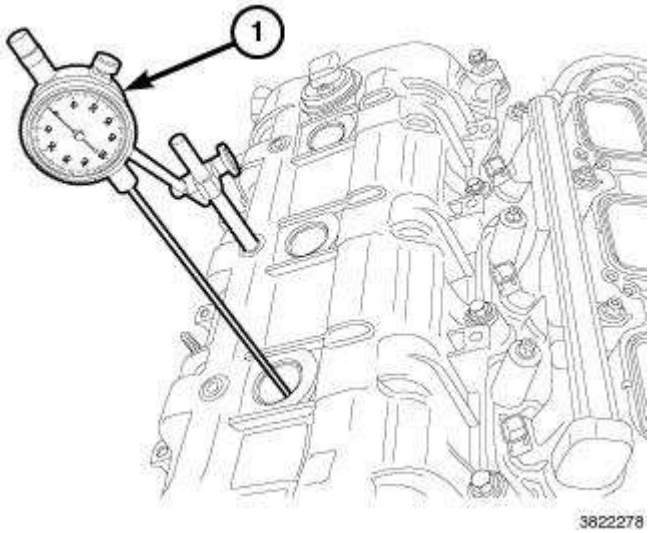

Fig. 254: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the crankshaft more than a few degrees independently of the camshafts. Piston to valve contact could occur resulting in possible valve damage. If the crankshaft needs to be rotated more than a few degrees, first remove the camshafts. Refer to CAMSHAFT, ENGINE, REMOVAL.

1. Verify that the indicator dial (1) is set to zero when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.

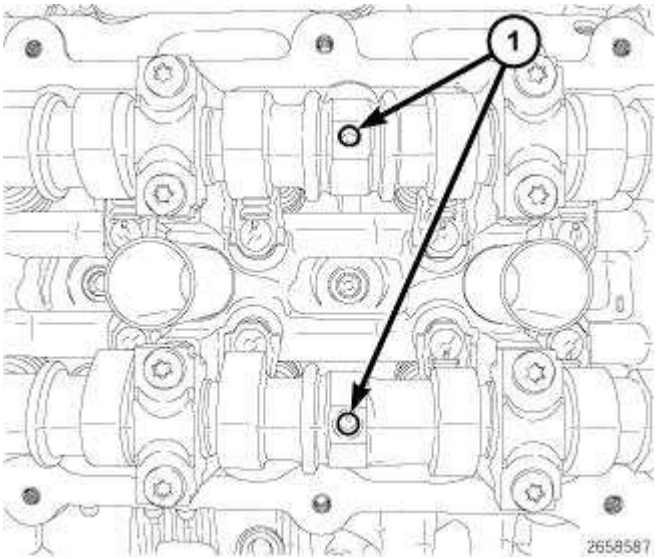

Fig. 255: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage.

2.

3. Verify that the camshafts are set at top-dead-center by positioning the alignment holes (1) vertically.

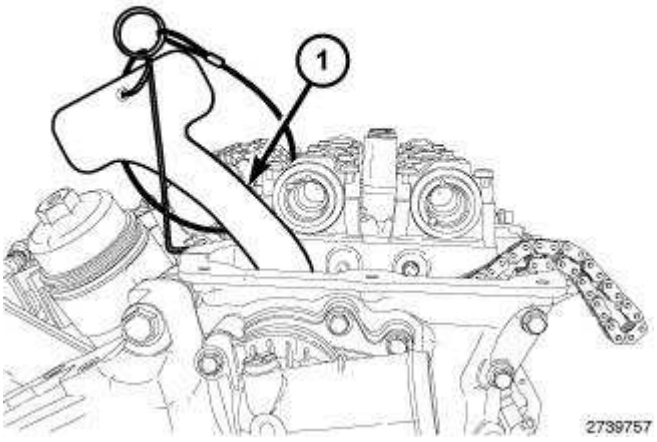

Fig. 256: Timing Chain Holder
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Timing Chain Holder (1) should still be in place as inserted during the Removal procedure. If required, the Timing Chain Holder can be reinserted by repeating Step 10 of the Removal procedure. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, REMOVAL.

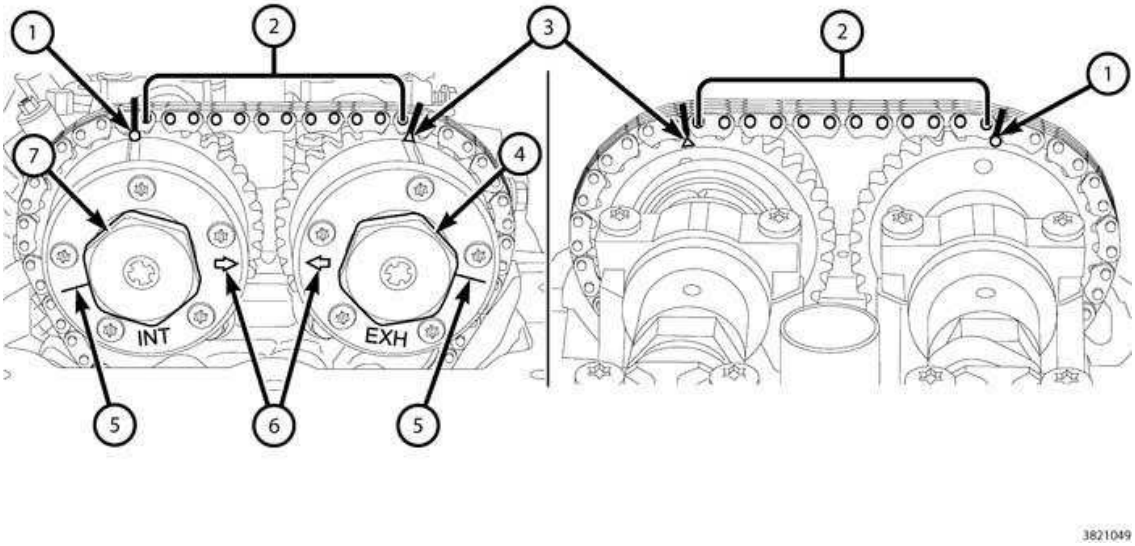

Fig. 257: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows
Courtesy of CHRYSLER GROUP, LLC

NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser.

4. Route the cam chain around the left intake cam phaser while aligning the paint mark with the phaser timing mark (1). Press the left intake cam phaser onto the intake camshaft. Install and hand tighten the oil control valve (7).
5. While maintaining this alignment, route the cam chain around the exhaust cam phaser so that the paint mark is aligned with the phaser timing mark (3). Press the exhaust cam phaser onto the exhaust cam, install and hand tighten the oil control valve (4).
6. The **SCRIBE LINES** (5) on the cam phasers should face away from each other and the **ARROWS** (6) should point toward each other and be parallel to the cylinder head cover mounting surface. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (3) and the intake cam phaser circle marking (1).

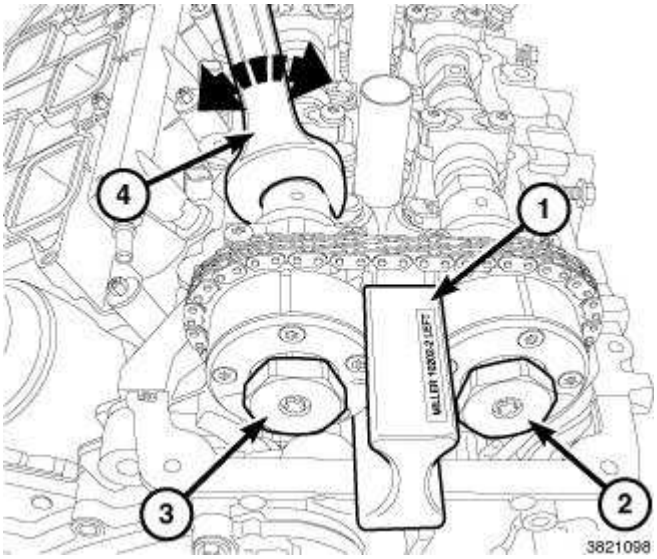

Fig. 258: Camshaft Phaser Lock, Oil Control Valves & Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

7. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
8. Tighten the oil control valves (2) and (3) to 150 N.m (110 ft. lbs.).
9. Remove the Camshaft Phaser Lock (1) and the Timing Chain Holder.

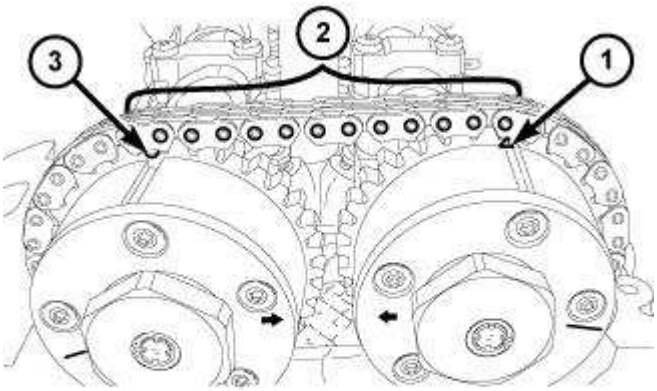

Fig. 259: Chain Pins, Arrows, Scribe Lines, Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

10. Rotate the crankshaft clockwise two complete revolutions stopping when the right side number one cylinder piston is again positioned at top-dead-center on the exhaust stroke. To assure correct engine timing, verify the following;
    - The indicator dial is set to **ZERO** when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.
    - The **SCRIBE LINES** (3) on the left side cam phasers face away from each other.
    - The **ARROWS** (4) on the left side cam phasers point toward each other and are parallel to the cylinder head cover mounting surface.
    - There are twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).
11. If the engine timing is not correct, repeat this procedure.
12. Install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
13. Install the right ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .
14. Install the left cylinder head cover and left ignition coils. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
15. Install the upper intake manifold and air cleaner housing assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
16. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
17. Start the engine and perform the appropriate POWERTRAIN VERIFICATION TESTS : Refer to appropriate Electrical Diagnostics article.
    - Cam/Crank Variation Relearn
    - Target Coefficient Relearn

NOTE: **Following the first restart after a DTC driven phaser replacement, clear all DTCs and verify that subsequent restarts do not set any additional codes. For any DTCs that reset, refer to appropriate Electrical Diagnostics DIAGNOSTIC CODE INDEX article.**

RIGHT

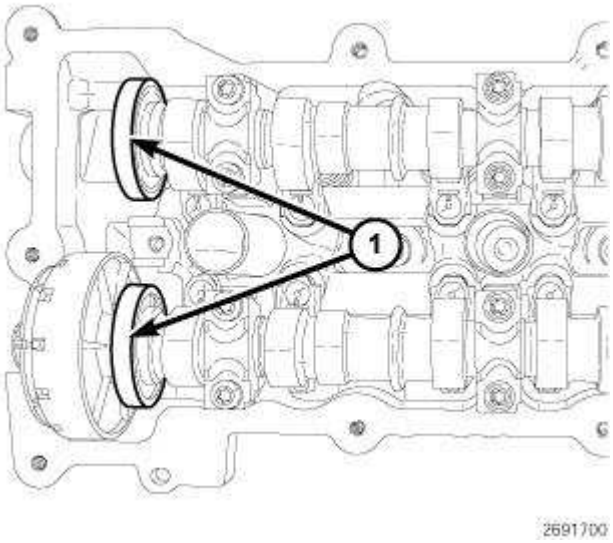

Fig. 260: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

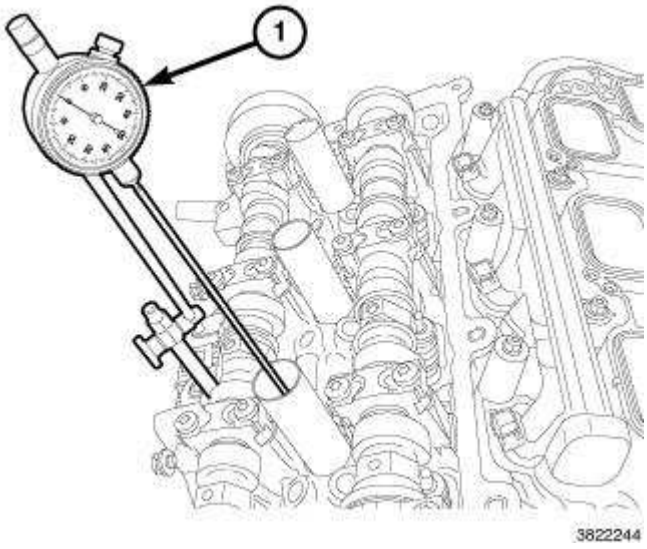

Fig. 261: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the crankshaft more than a few degrees independently of the camshafts. Piston to valve contact could occur resulting in possible valve damage. If the crankshaft needs to be rotated more than a few degrees, first remove the camshafts. Refer to CAMSHAFT, ENGINE, REMOVAL.

1. Verify that the indicator dial (1) is set to zero when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.

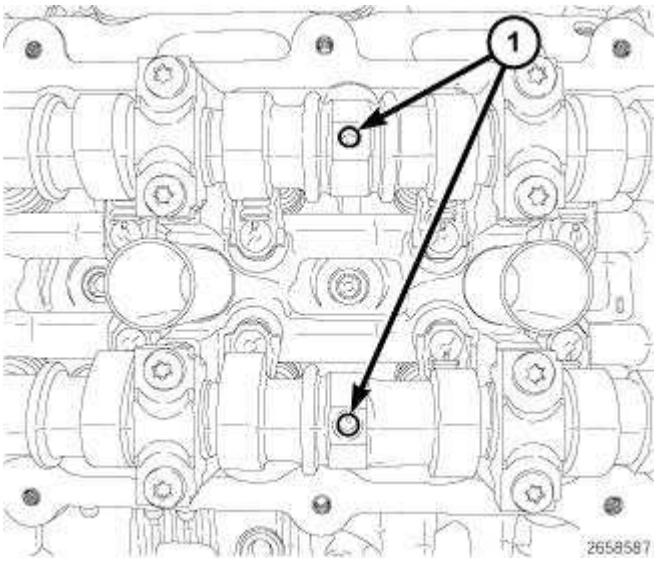

Fig. 262: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage.

2.

3. Verify that the camshafts are set at top-dead-center by positioning the alignment holes (1) vertically.

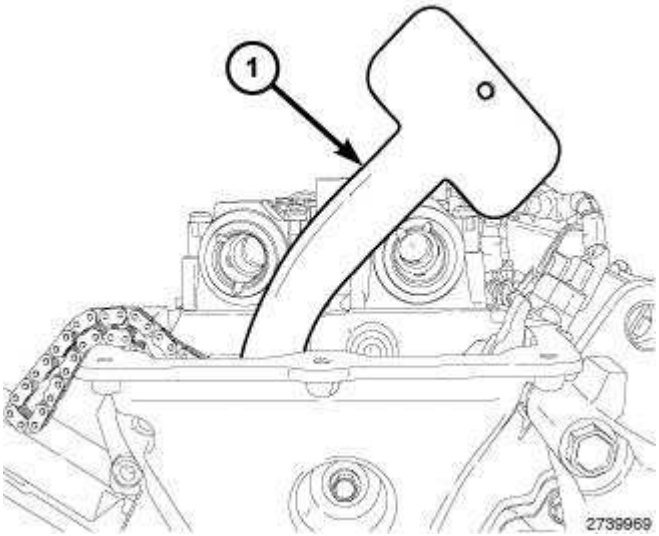

Fig. 263: Timing Chain Holder

Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Timing Chain Holder (1) should still be in place as inserted during the Removal procedure. If required, the Timing Chain Holder can be reinserted by installing the exhaust cam phaser and repeating Step 10 of the Removal procedure. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, REMOVAL.**

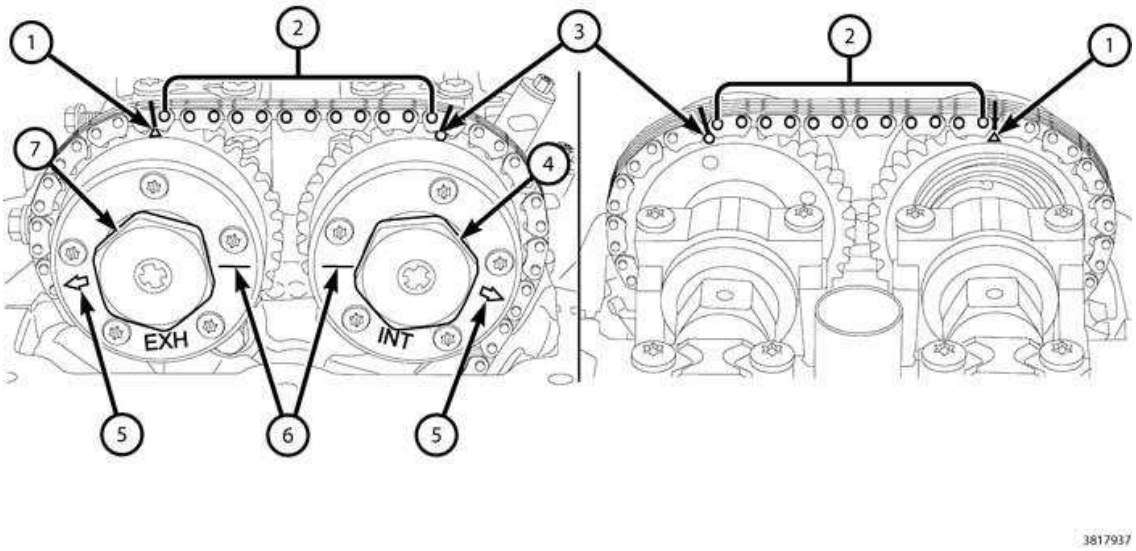

Fig. 264: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser.**

4. Route the cam chain around the right exhaust cam phaser while aligning the paint mark with the phaser timing mark (1). Press the right exhaust cam phaser onto the exhaust camshaft. Install and hand tighten the oil control valve (7).
5. While maintaining this alignment, route the cam chain around the intake cam phaser so that the paint mark is aligned with the phaser timing mark (3). Press the intake cam phaser onto the intake cam, install and hand tighten the oil control valve (4).
6. The **ARROWS** (5) on the cam phasers should point away from each other and the **SCRIBE LINES** (6) should be parallel to the cylinder head cover mounting surface. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).

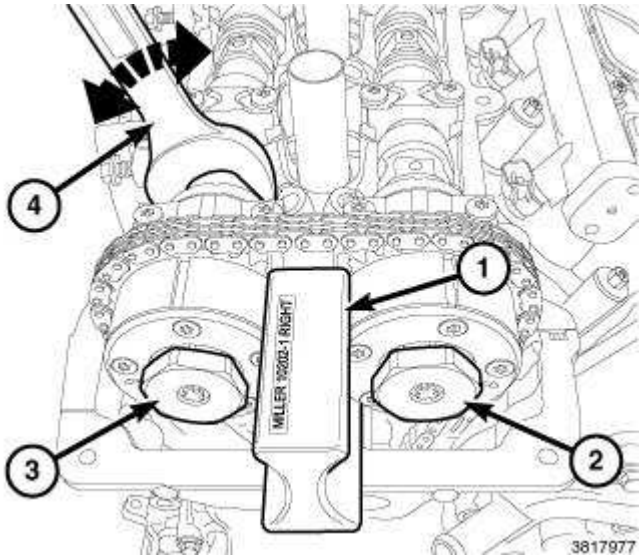

Fig. 265: Camshaft Phaser Lock, Oil Control Valves & Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

7. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
8. Tighten the oil control valves (2) and (3) to 150 N.m (110 ft. lbs.).
9. Remove the Camshaft Phaser Lock (1) and the Timing Chain Holder.

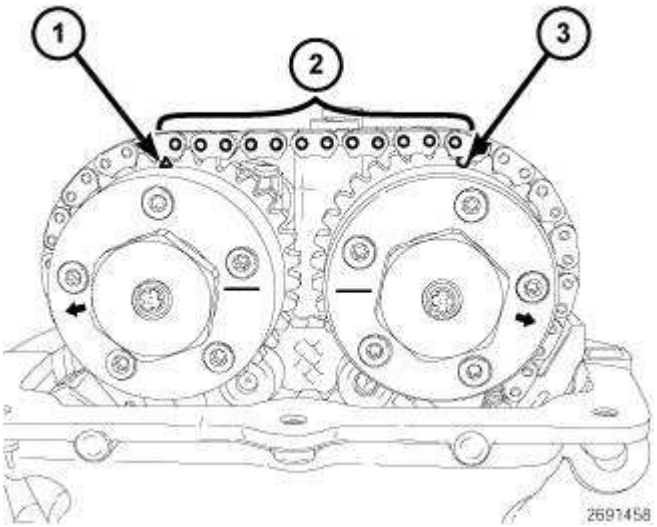

Fig. 266: Chain Pins, Arrows, Scribe Lines, Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

10. Rotate the crankshaft clockwise two complete revolutions stopping when the right side number one cylinder piston is again positioned at top-dead-center on the exhaust stroke. To assure correct engine timing, verify the following;
    - The indicator dial is set to **ZERO** when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.
    - The **ARROWS** (4) on the right side cam phasers point away from each other.
    - The **SCRIBE LINES** (5) on the right side cam phasers are parallel to the cylinder head cover mounting surface.
    - There are twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).
11. If the engine timing is not correct, repeat this procedure.
12. Install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
13. Install the left ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .
14. Install the right cylinder head cover and right ignition coils. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
15. Install the upper intake manifold and air cleaner housing assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
16. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
17. Start the engine and perform the appropriate POWERTRAIN VERIFICATION TESTS : Refer to appropriate Electrical Diagnostics article.
    - Cam/Crank Variation Relearn
    - Target Coefficient Relearn

NOTE: **Following the first restart after a DTC driven phaser replacement, clear all DTCs and verify that subsequent restarts do not set any additional codes. For any DTCs that reset, refer to appropriate Electrical Diagnostics DIAGNOSTIC CODE INDEX article.**

CAMSHAFT, ENGINE

DESCRIPTION

DESCRIPTION

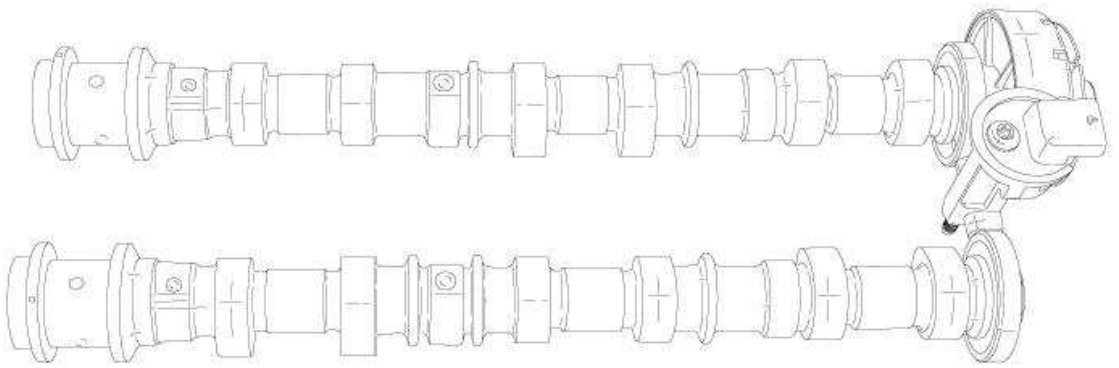

Fig. 267: Dual Over Head Camshaft (DOHC) Configuration
Courtesy of CHRYSLER GROUP, LLC

The 3.6L engine uses a Dual Over Head Camshaft (DOHC) configuration. The camshafts are a nodular cast iron design and have a pressed on magnetic timing wheel that is magnetic encoded. The two Camshaft Position (CMP) sensors are located between the timing wheels. Attached to the rear of the right exhaust camshaft is a centrifuge which is part of the crankcase ventilation system. The centrifuge is used to separate oil droplets from the crankcase gases before they enter the PCV valve. Four bearing journals are machined into the camshaft. Camshaft end play is controlled by two thrust walls that border the nose piece journal.

OPERATION

OPERATION

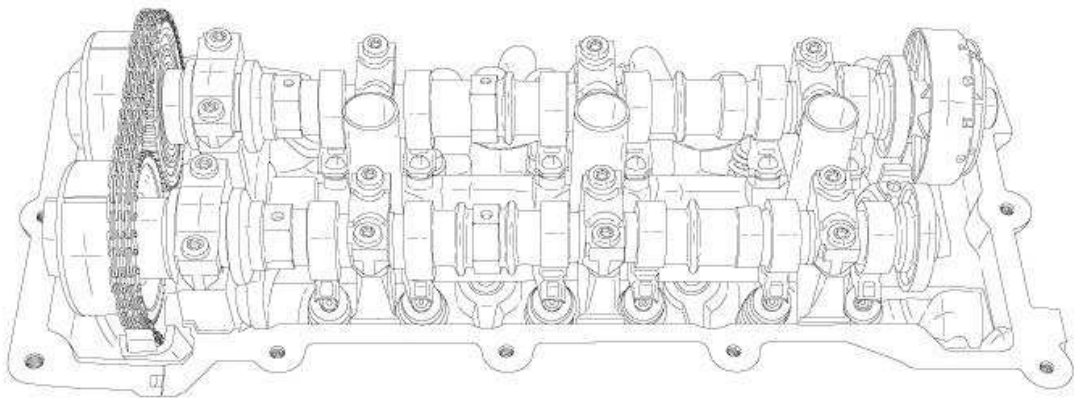

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Fig. 268: Right Hand Camshafts
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH camshafts shown in illustration, LH camshafts similar.

The camshaft has precisely machined (egg shaped) lobes to provide accurate valve timing and duration. The camshaft is driven by the crankshaft via drive sprockets and chains.

STANDARD PROCEDURE

STANDARD PROCEDURE - CAMSHAFT END PLAY

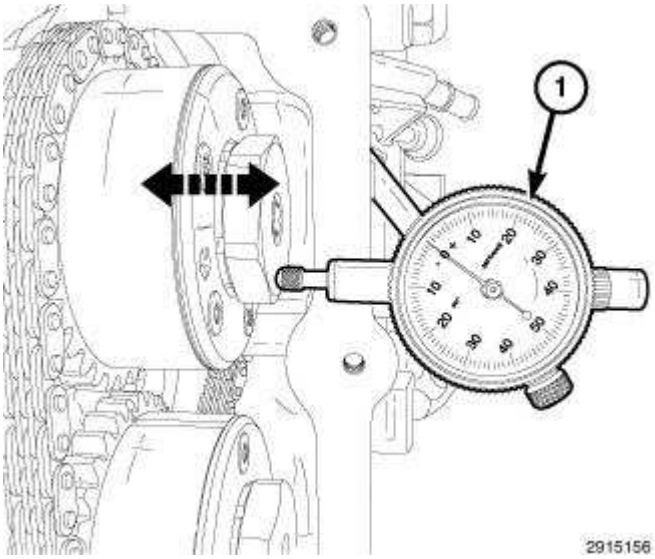


Fig. 269: Measuring Camshaft End Play Using Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right intake camshaft shown in illustration, other camshafts similar.

1. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
2. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point at the front of the engine. Locate the probe perpendicular against the nose of the camshaft.
3. Move the camshaft all the way to the rear of its travel.
4. Zero the dial indicator.
5. Move the camshaft forward to the limit of travel and read the dial indicator. Compare the measured end play to the specification. Refer to **Engine - Specifications**.

REMOVAL

LEFT

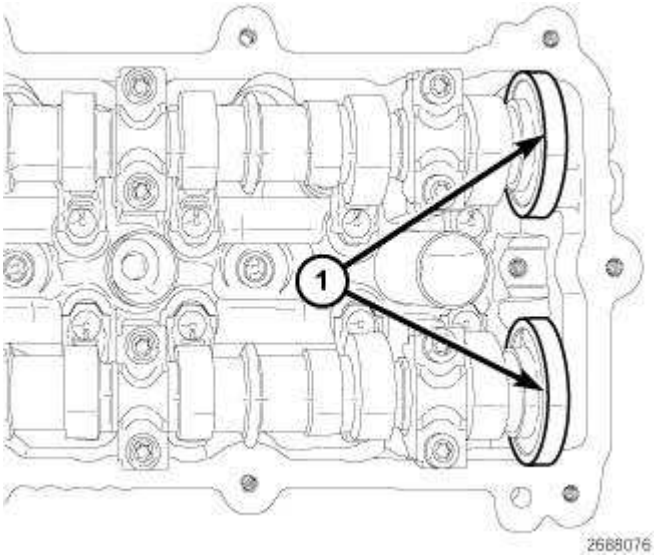


Fig. 270: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

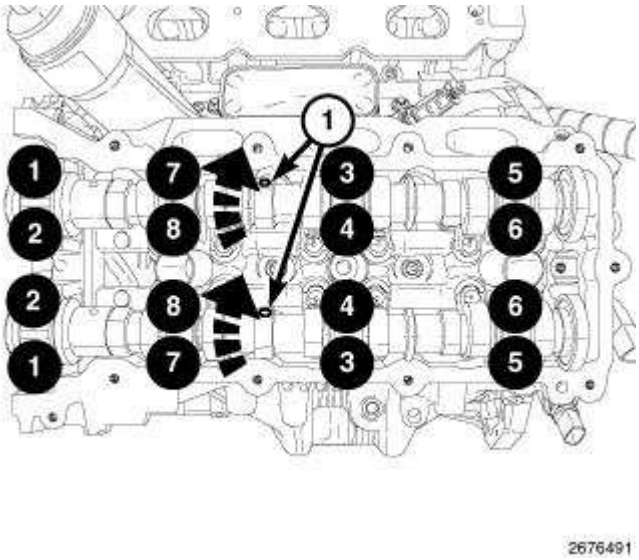


Fig. 271: Camshaft Bearing Cap Bolts Removal Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When the timing chain is removed and the cylinder heads are still installed, Do not forcefully rotate the camshafts or crankshaft independently of each other. Severe valve and/or piston damage can occur.

CAUTION: DO NOT STAMP OR STRIKE THE CAMSHAFT BEARING CAPS. SEVERE DAMAGE WILL OCCUR TO THE BEARING CAPS.

1. Remove the upper intake manifold, all ignition coils, all spark plugs, left cylinder head cover and left cam phasers. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, REMOVAL**.
2. Rotate the camshafts counterclockwise to position the alignment holes (1) approximately 30° before top-dead-center. This places the camshafts in the neutral position (no valve load).

NOTE: Camshaft bearing caps should have been marked during engine manufacturing. For example, the number one exhaust camshaft bearing cap is marked "1E->". The caps should be installed with the notch forward.

3. Loosen the camshaft bearing cap bolts in the sequence shown in illustration.

NOTE: When the camshaft is removed the rocker arms may slide downward, mark the rocker arms before removing the camshaft.

4. Remove the camshaft bearing caps and the camshafts.

RIGHT

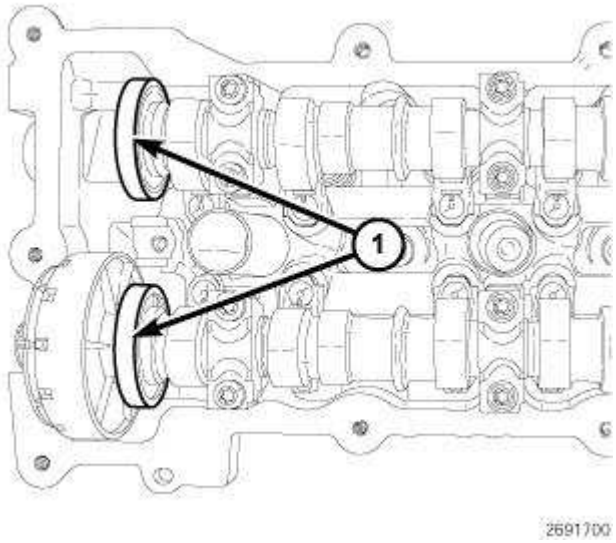


Fig. 272: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

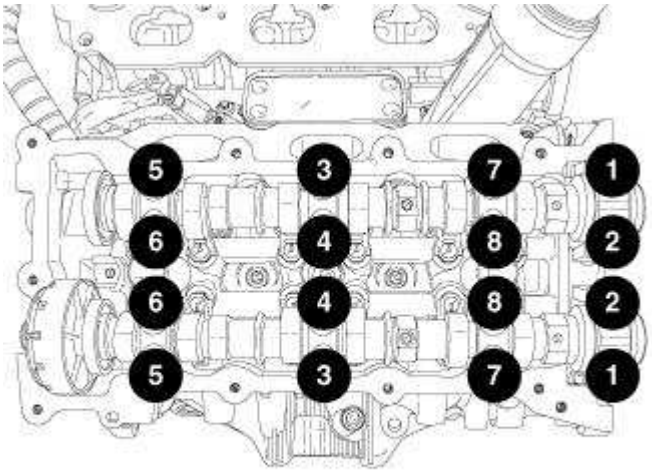


Fig. 273: Camshaft Bearing Cap Bolts Removal Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When the timing chain is removed and the cylinder heads are still installed, Do not forcefully rotate the camshafts or crankshaft independently of each other. Severe valve and/or piston damage can occur.

CAUTION: DO NOT STAMP OR STRIKE THE CAMSHAFT BEARING CAPS. SEVERE DAMAGE WILL OCCUR TO THE BEARING CAPS.

1. Remove the upper intake manifold, all ignition coils, all spark plugs, right cylinder head cover and right cam phasers. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, REMOVAL**.

   NOTE: Camshaft bearing caps should have been marked during engine manufacturing. For example, the number one exhaust camshaft bearing cap is marked "1E->". The caps should be installed with the notch forward.

2. Loosen the camshaft bearing cap bolts in the sequence shown in illustration.

   NOTE: When the camshaft is removed the rocker arms may slide downward, mark the rocker arms before removing the camshaft.

3. Remove the camshaft bearing caps and the camshafts.

INSPECTION

INSPECTION

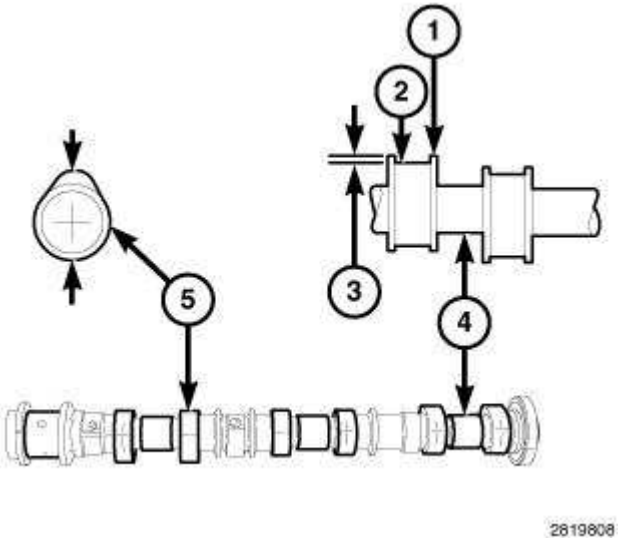


Fig. 274: Inspecting Camshaft Bearing Journals & Cam Lobes
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH intake camshaft shown in illustration, other camshafts similar.

1. Inspect camshaft bearing journals (4) for damage and binding. If journals are binding, check the cylinder head for damage. Also check cylinder head oil holes for clogging.
2. Check the surface of the cam lobes (5) for abnormal wear (3). Measure and compare the unworn area (1) to the worn area (2). Replace camshafts that are not within specification. Refer to **Engine - Specifications**.

INSTALLATION

LEFT

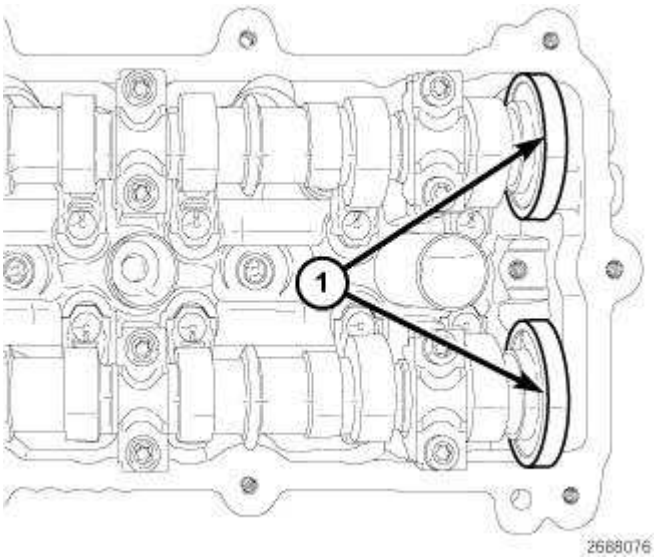


Fig. 275: Magnetic Timing Wheels

Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

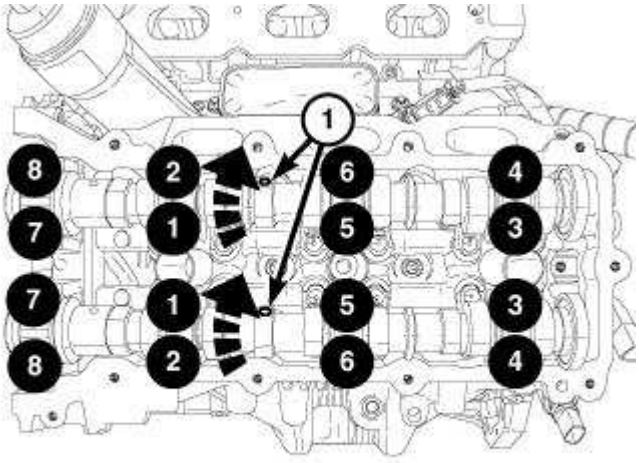


Fig. 276: Bearing Cap Retaining Bolts Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the camshaft journals with clean engine oil.
2. Install the left side camshaft(s) with the alignment holes (1) positioned approximately 30° before top-dead-center. This will place the camshafts at the neutral position (no valve load) easing the installation of the camshaft bearing caps.
3. Install the camshaft bearing caps and hand tighten the retaining bolts to 2 N.m (18 in. lbs.).

NOTE: Caps are identified numerically (1 through 4), intake or exhaust (I or E) and should be installed from the front to the rear of the engine. All caps should be installed with the notch forward so that the stamped arrows (<) on the caps point toward the front of the engine.

4. Tighten the bearing cap retaining bolts in the sequence shown in illustration to 9.5 N.m (84 in. lbs.).

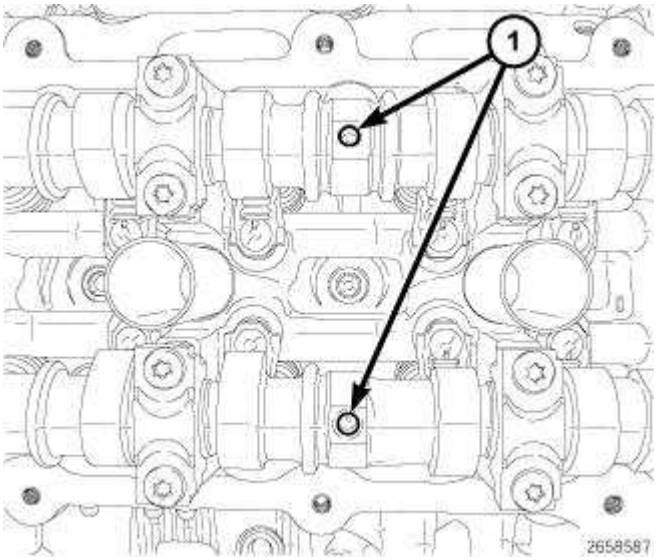


Fig. 277: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

5. Rotate the camshafts clockwise to top-dead-center by positioning the alignment holes (1) vertically.
6. Install the left cam phasers, cylinder head cover, spark plugs, ignition coils and the upper intake manifold. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, INSTALLATION**.

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

RIGHT

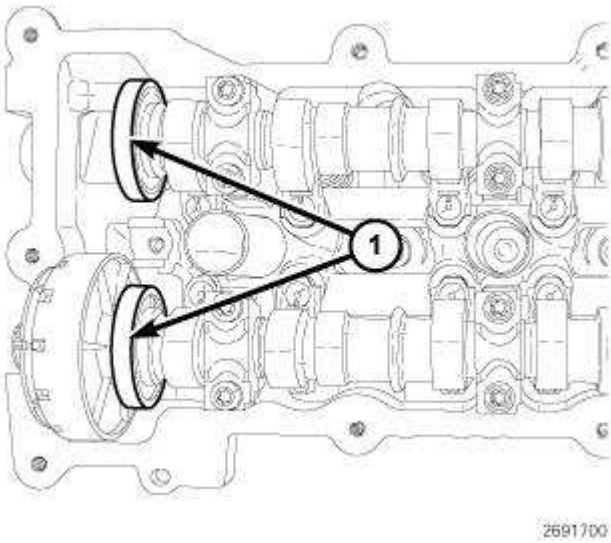


Fig. 278: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

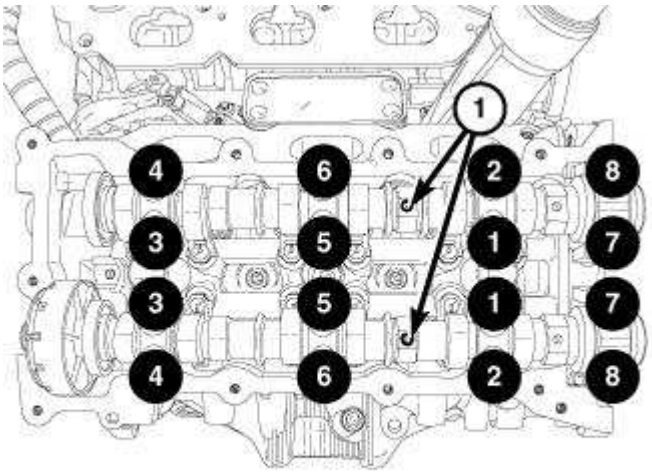


Fig. 279: Bearing Cap Retaining Bolts Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate camshaft journals with clean engine oil.
2. Install the right side camshaft(s) at top-dead-center by positioning the alignment holes (1) vertically. This will place the camshafts at the neutral position (no valve load) easing the installation of the camshaft bearing caps.
3. Install the camshaft bearing caps and hand tighten the retaining bolts to 2 N.m (18 in. lbs.).

NOTE: Caps are identified numerically (1 through 4), intake or exhaust (I or E) and should be installed from the front to the rear of the engine. All caps should be installed with the notch forward so that the stamped arrows (<) on the caps point toward the front of the engine.

4. Tighten the bearing cap retaining bolts in the sequence shown in illustration to 9.5 N.m (84 in. lbs.).
5. Install the right cam phasers, cylinder head cover, spark plugs, ignition coils and the upper intake manifold. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, INSTALLATION**.

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system,

for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

COVER(S), CYLINDER HEAD

DESCRIPTION

DESCRIPTION

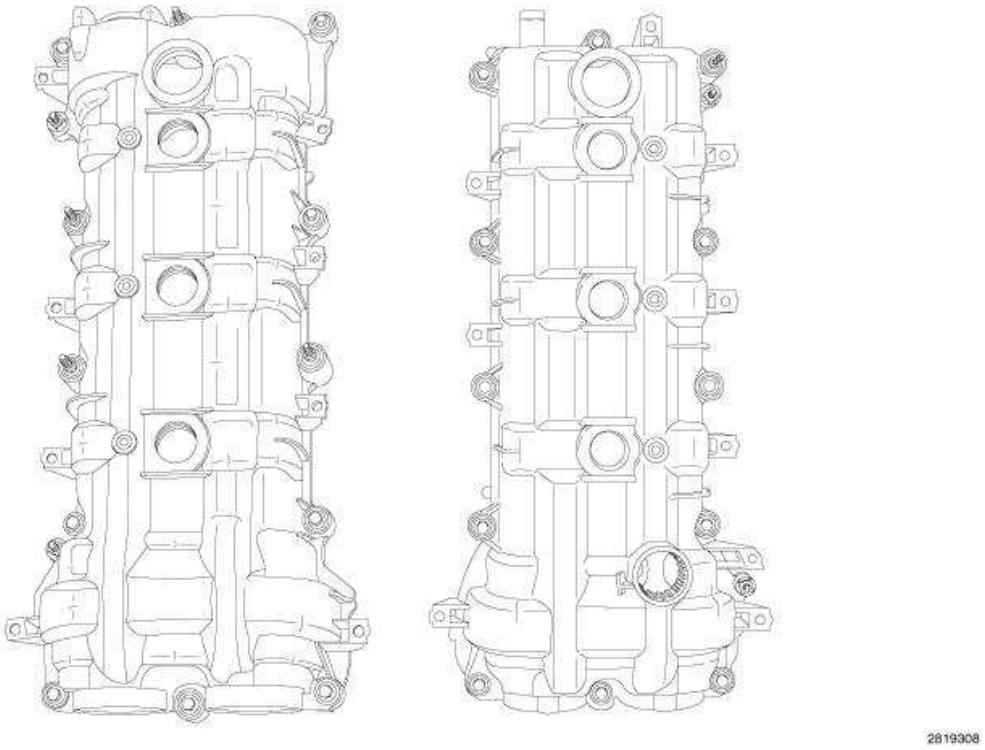


Fig. 280: Cylinder Head Covers
Courtesy of CHRYSLER GROUP, LLC

The cylinder head covers are made of a carbon and fiberglass composite. The cylinder head covers are not interchangeable from side-to-side. The cylinder head covers are sealed with a press-in-place gasket that is designed to isolate the cover from the cylinder head for improved NVH. There are two dowel pins on the outboard side of the cover flange to locate the cover to holes in the cylinder head. RTV is used to seal the T-joint at the timing cover, cylinder head and cylinder head cover.

REMOVAL

LEFT

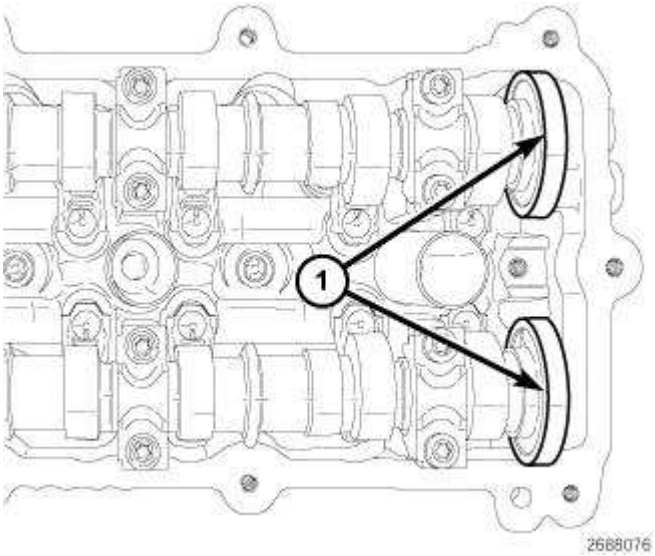


Fig. 281: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

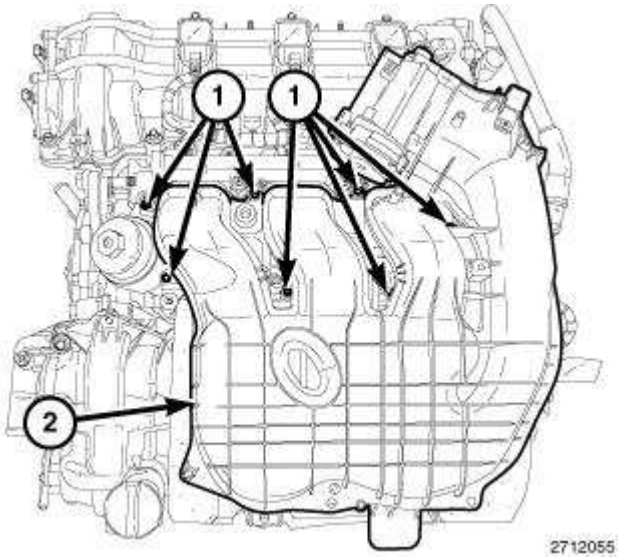


Fig. 282: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air inlet hose and upper intake manifold (2). Refer to **MANIFOLD, INTAKE, REMOVAL**.

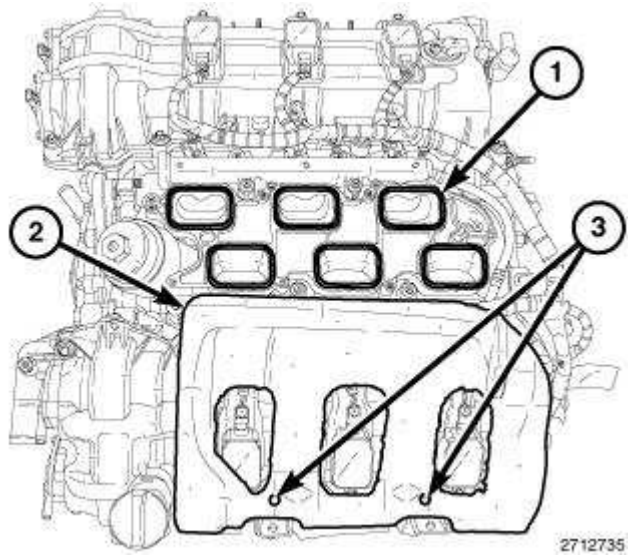


Fig. 283: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

3. Cover the open intake ports (1) to prevent debris from entering the engine.
4. Remove the insulator (2) from the LH cylinder head cover.

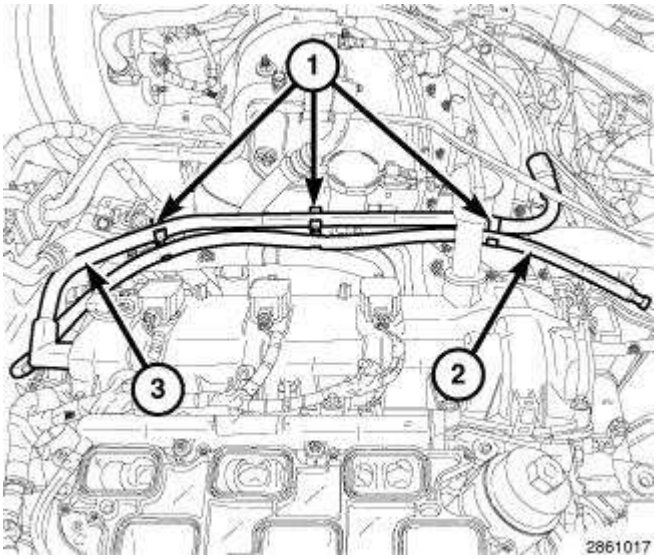


Fig. 284: Transmission Breather Hose, Make-Up Air Tube & Clips
Courtesy of CHRYSLER GROUP, LLC

5. Disengage the clips (1), remove the make-up air tube (3) from the left cylinder head cover and reposition the transmission breather hose (2).

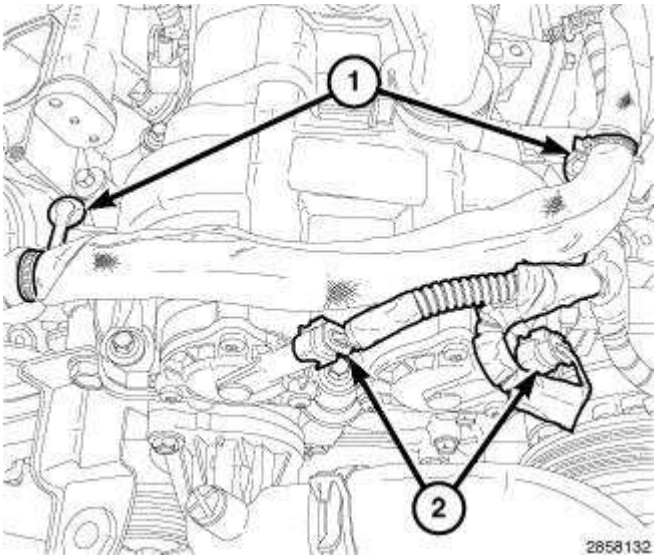


Fig. 285: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mark the variable valve timing solenoid connectors (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.

6. Disconnect the electrical connectors (2) from the left variable valve timing solenoids.
7. Disengage two starter wire harness retainers (1) from the left cylinder head cover.

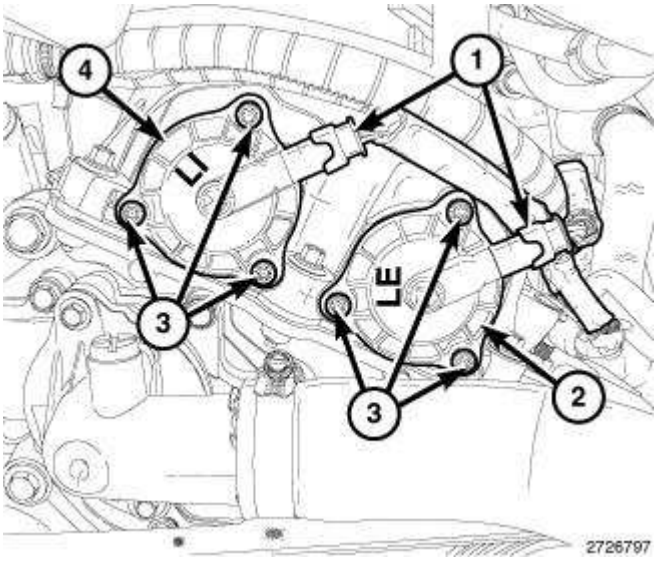


Fig. 286: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Mark the variable valve timing solenoids (2 and 4) with a paint pen or equivalent so that they may be reinstalled in their original locations.
9. Remove the variable valve timing solenoids. Refer to **SOLENOID, VARIABLE VALVE TIMING,**

REMOVAL .

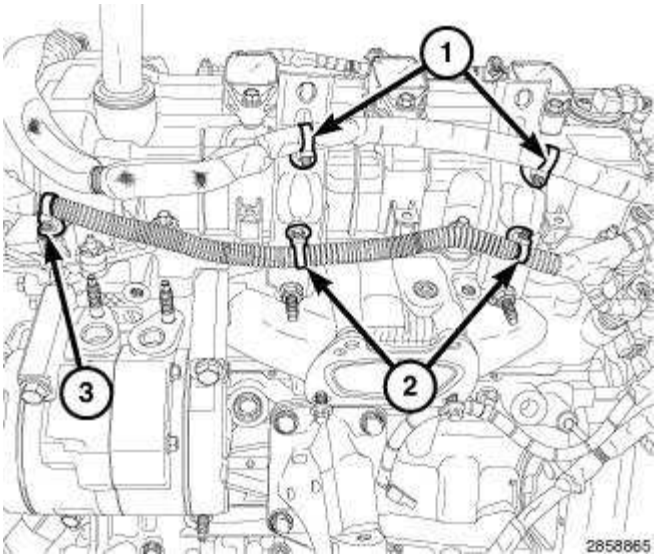


Fig. 287: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

10. Disengage one main wire harness retainer (3) from the left cylinder head cover.

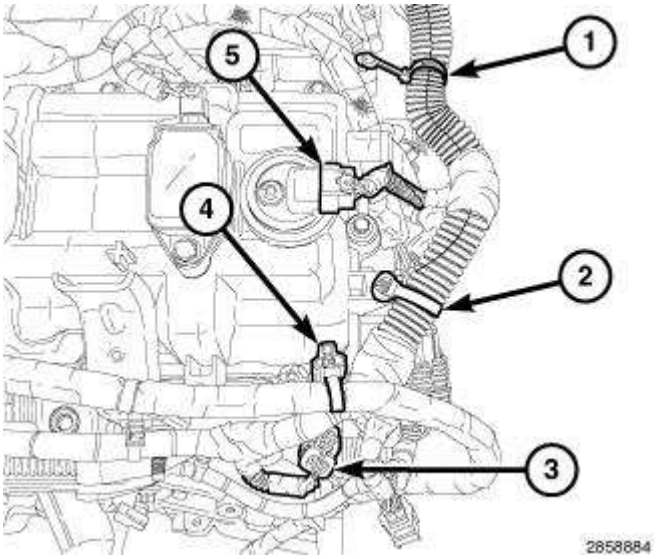


Fig. 288: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the left Camshaft Position (CMP) sensor (5).
12. Disengage one main wire harness retainer (2) from the cylinder head cover and one main wire harness retainer (4) from the cylinder head cover mounting stud.

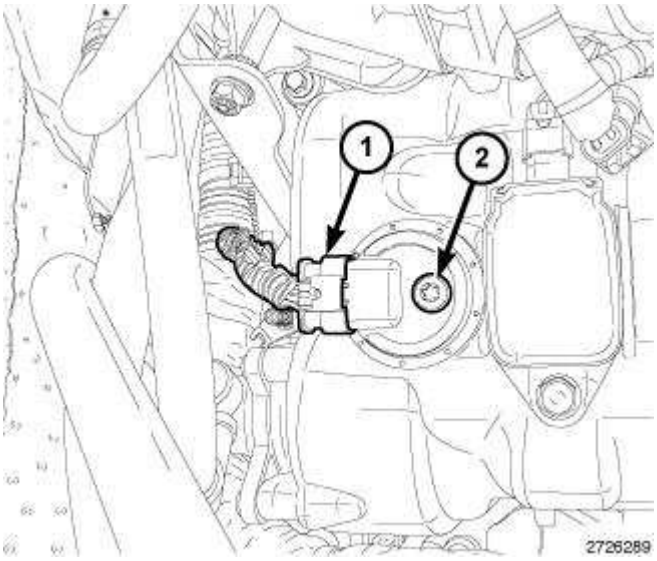


Fig. 289: CMP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The RH CMP sensor is shown in illustration, the LH CMP sensor is similar. If removing both RH and LH CMP sensors, mark the sensors so they can be installed in their original locations.

13. Remove the camshaft position sensor. Refer to **SENSOR, CAMSHAFT POSITION, REMOVAL** .

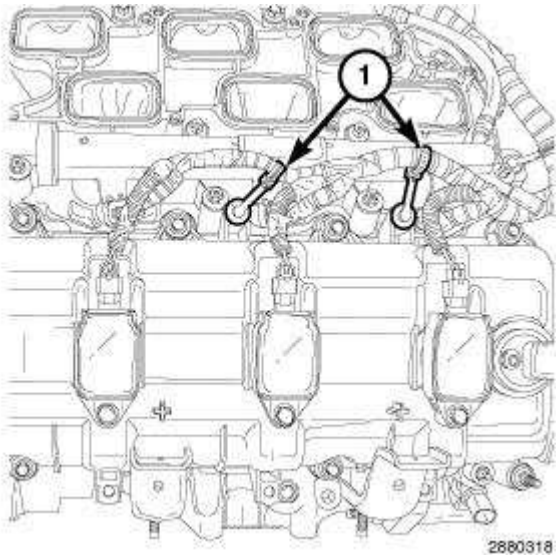


Fig. 290: Injection/Ignition Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

14. Disengage two injection/ignition harness retainers (1) from the left cylinder head cover.

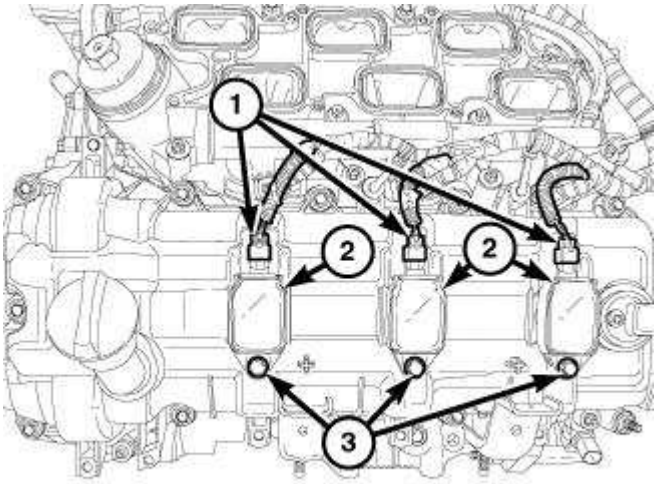


Fig. 291: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove the ignition coils (2). Refer to **COIL, IGNITION, REMOVAL** .

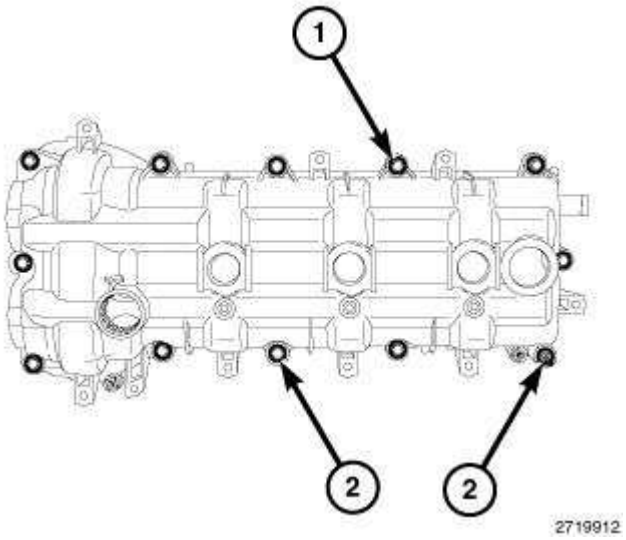
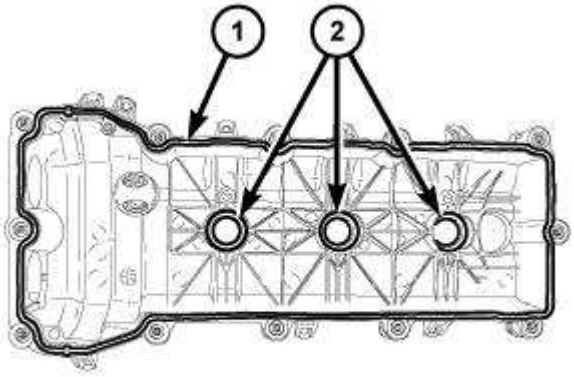


Fig. 292: Cylinder Head Cover Mounting Bolts & Studbolts
Courtesy of CHRYSLER GROUP, LLC

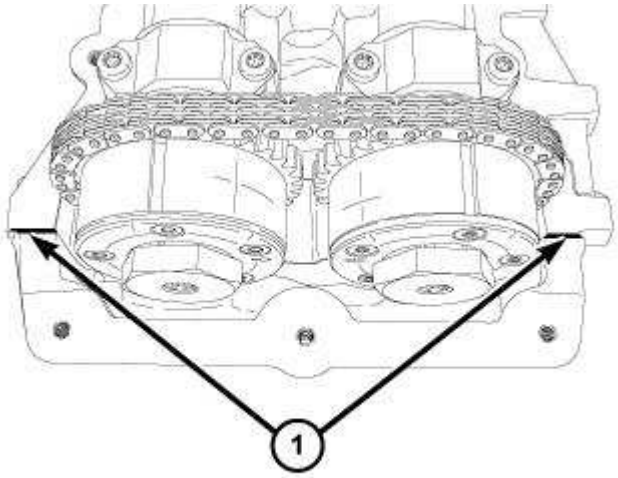
16. Loosen ten cylinder head cover mounting bolts (1) and two studbolts (2) and remove the cylinder head cover.



2776066

Fig. 293: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

17. Remove and discard the cylinder head cover gasket (1).
18. The spark plug tube seals (2) can be reused if not damaged.



2776075

Fig. 294: RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing) alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.

19. Remove all residual sealant (1) from the cylinder head, timing chain cover and cylinder head cover mating surfaces. Refer to **Engine - Standard Procedure**.

RIGHT

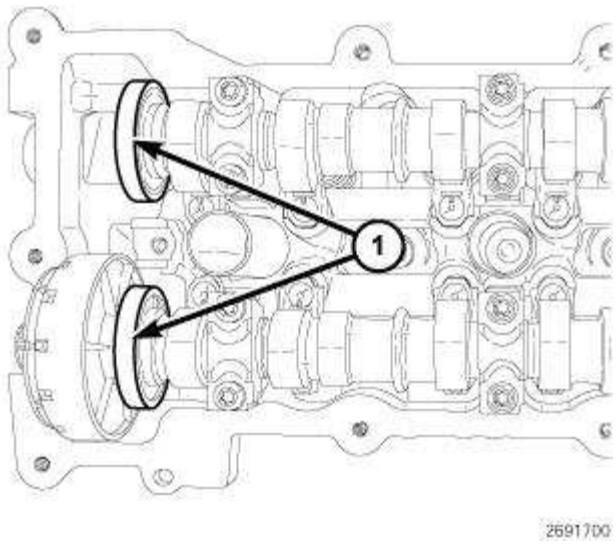


Fig. 295: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

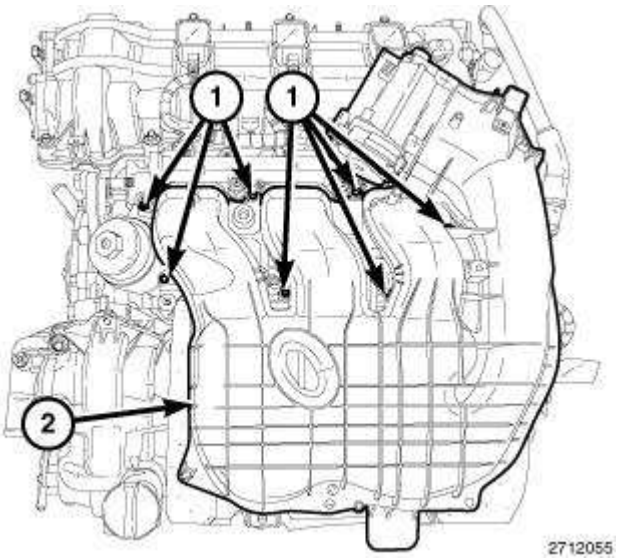


Fig. 296: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air inlet hose and upper intake manifold (2). Refer to **MANIFOLD, INTAKE, REMOVAL**.

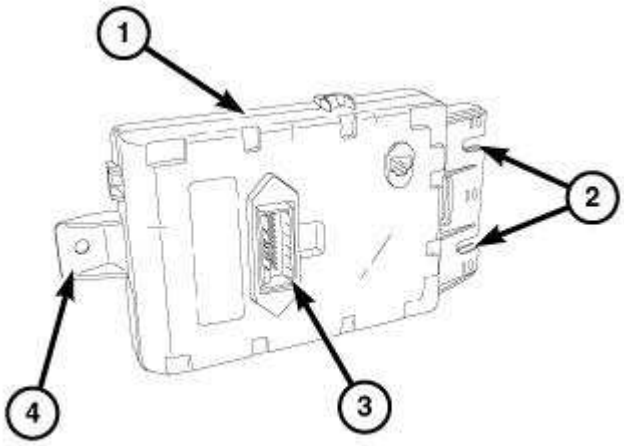


Fig. 297: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

3. Cover the open intake ports (1) to prevent debris from entering the engine.

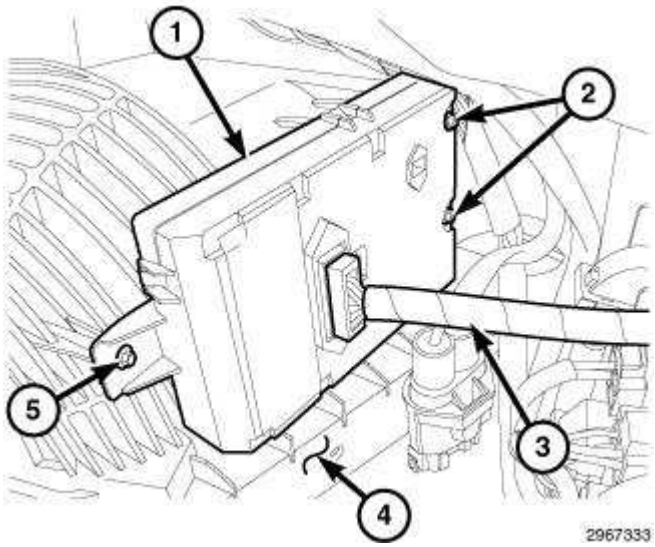


Fig. 298: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mark the variable valve timing solenoid connectors (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.

4. Disconnect the electrical connectors (2) from the variable valve timing solenoids on the right cylinder head.
5. Disengage the starter harness to main harness retainer (3).
6. Disengage two starter wire harness retainers from the right cylinder head cover (1).

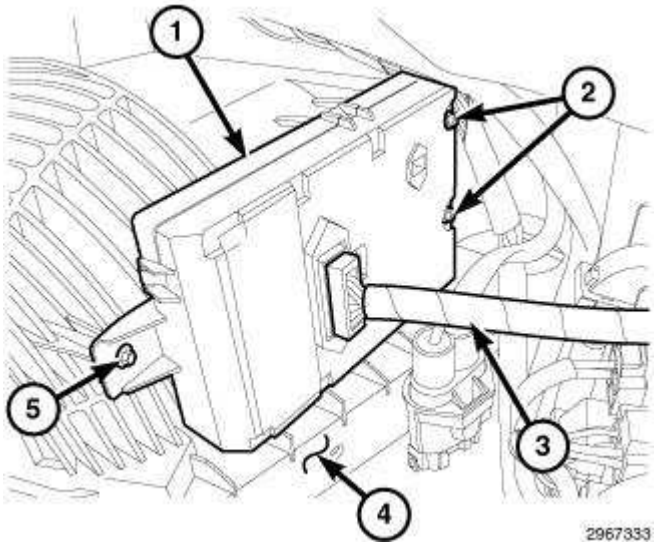


Fig. 299: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Mark the variable valve timing solenoids (2 and 4) with a paint pen or equivalent so that they may be reinstalled in their original locations.
8. Remove the variable valve timing solenoids. Refer to **SOLENOID, VARIABLE VALVE TIMING, REMOVAL** .

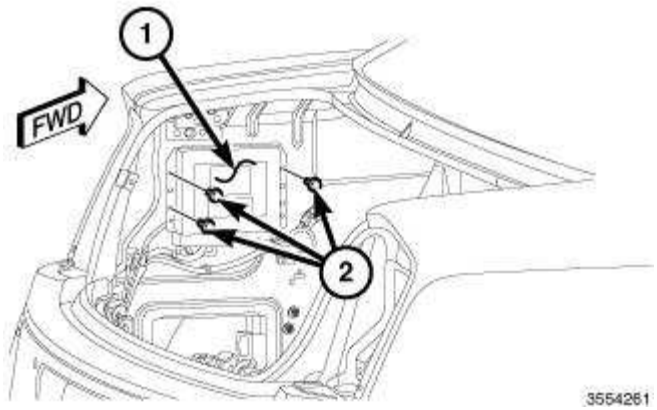


Fig. 300: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

9. Disengage four main wire harness retainers (1) from the right cylinder head cover.

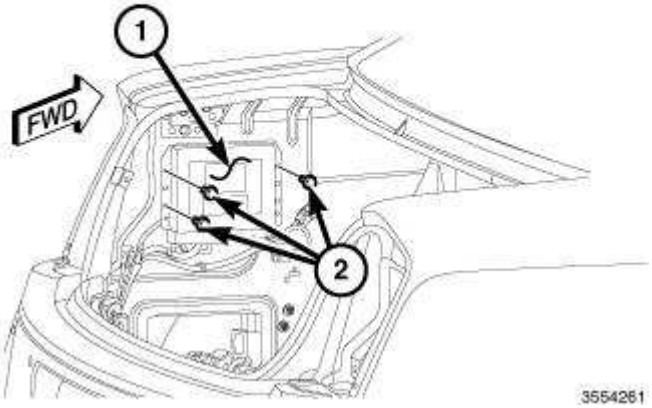


Fig. 301: Main Wire Harness Retainer & Connector
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the electrical connector (1) from the right Camshaft Position (CMP) sensor.
11. Disengage the main wire harness retainer (2) from the right cylinder head cover mounting stud.

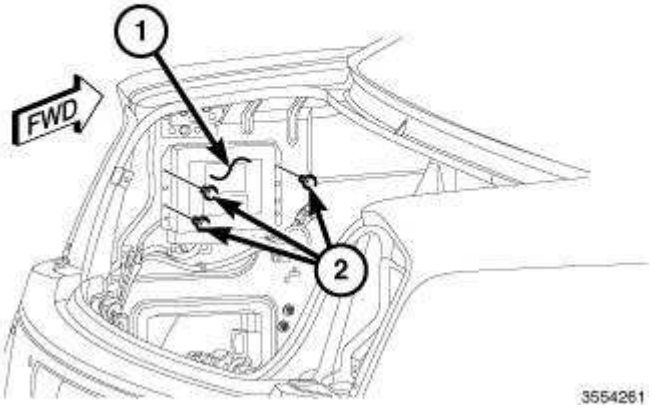


Fig. 302: CMP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: If removing both RH and LH CMP sensors, mark the sensors so they can be installed in their original locations.

12. Remove the camshaft position sensor. Refer to **SENSOR, CAMSHAFT POSITION, REMOVAL** .

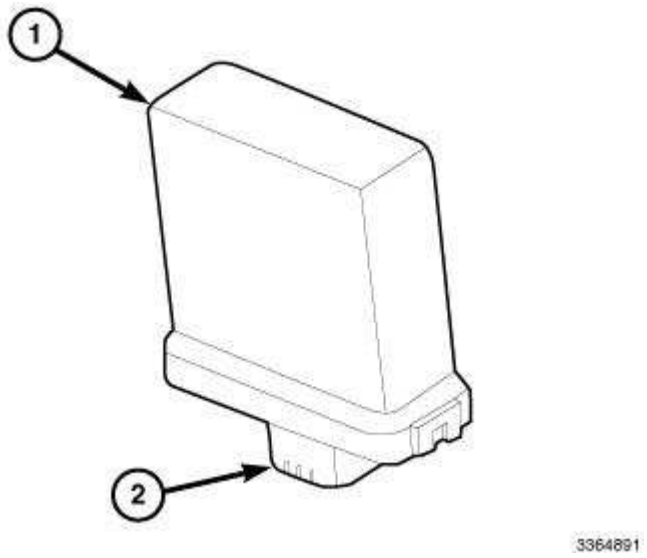


Fig. 303: Injection/Ignition Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

13. Disengage three injection/ignition harness retainers (1) from the right cylinder head cover.

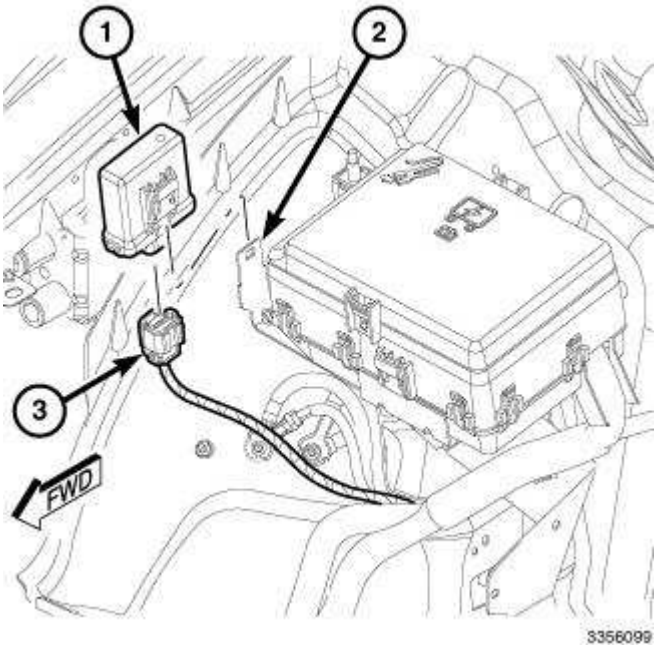


Fig. 304: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH ignition coils are shown in illustration, the RH ignition coils are similar.

14. Remove the ignition coils (2). Refer to **COIL, IGNITION, REMOVAL** .

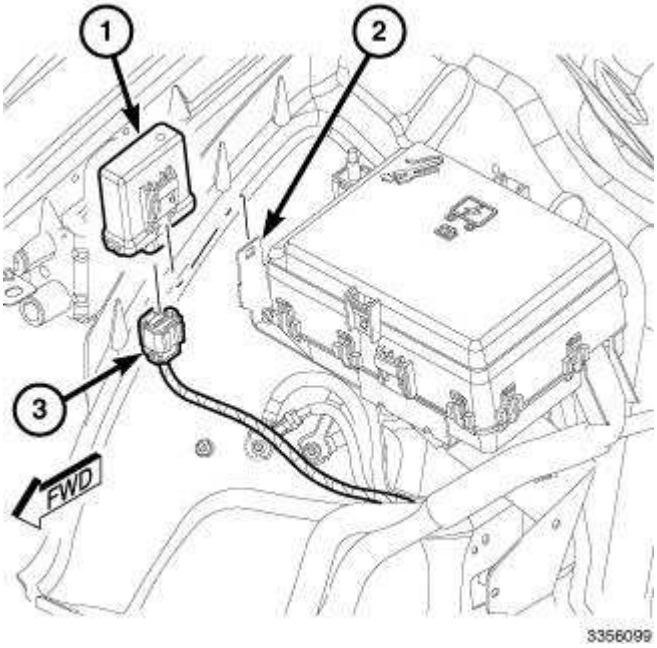


Fig. 305: Transmission Fluid Level Indicator Tube & Bolt
Courtesy of CHRYSLER GROUP, LLC

15. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
16. Loosen the bolt (1) securing the transmission fluid level indicator tube (2) to the transmission housing.

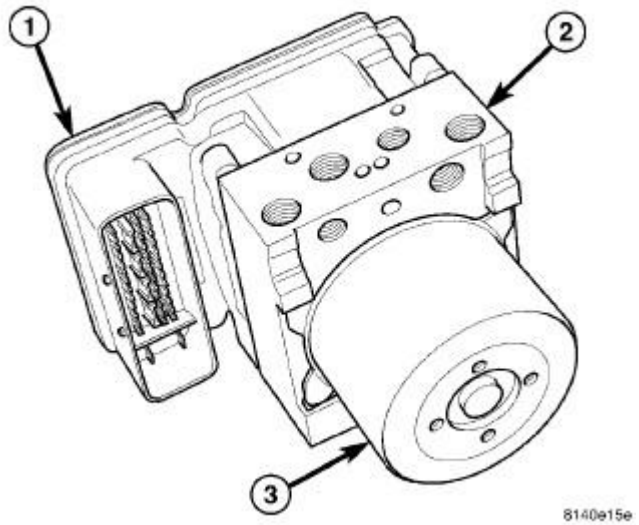


Fig. 306: Upper Transmission-To-Engine Bolt & Transmission Oil Level Indicator Tube
Courtesy of CHRYSLER GROUP, LLC

17. Remove the upper transmission to engine bolt (1) and reposition the transmission oil level indicator tube (2).

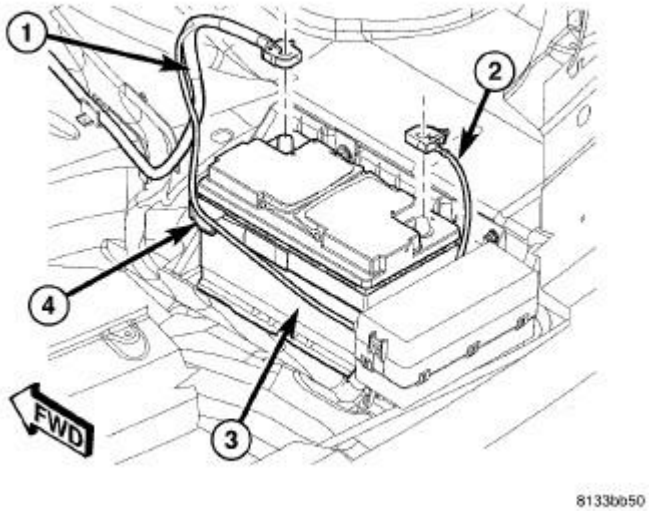


Fig. 307: PCV Valve & Screws
Courtesy of CHRYSLER GROUP, LLC

18. Lower the vehicle.
19. Remove the PCV valve (1). Refer to **VALVE, POSITIVE CRANKCASE VENTILATION (PCV), REMOVAL** .

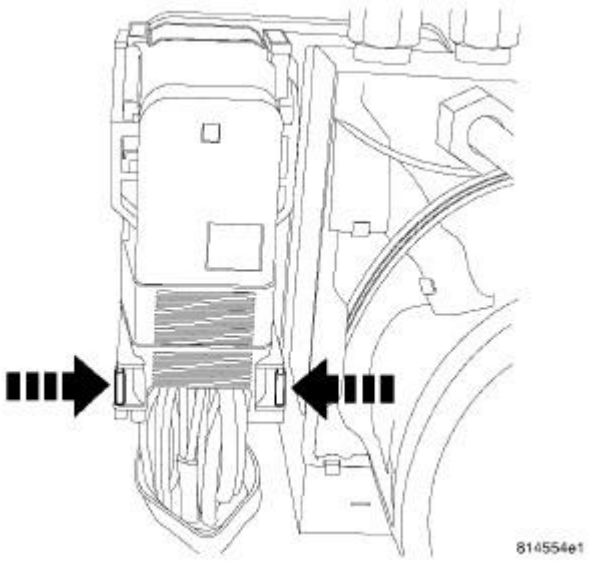


Fig. 308: Cylinder Head Cover Mounting Bolts & Studbolts
Courtesy of CHRYSLER GROUP, LLC

20. Loosen nine cylinder head cover mounting bolts (1) and three studbolts (2) and remove the cylinder head cover.

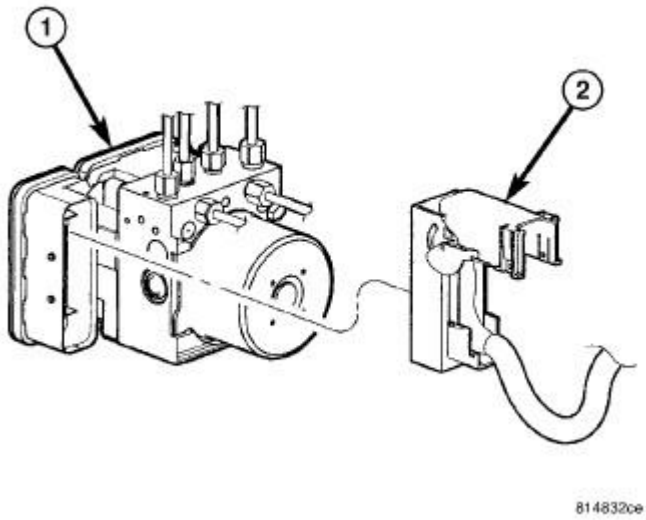


Fig. 309: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head cover is shown in illustration, the RH cylinder head cover is similar.

21. Remove and discard the cylinder head cover gasket (1).
22. The spark plug tube seals (2) can be reused if not damaged.

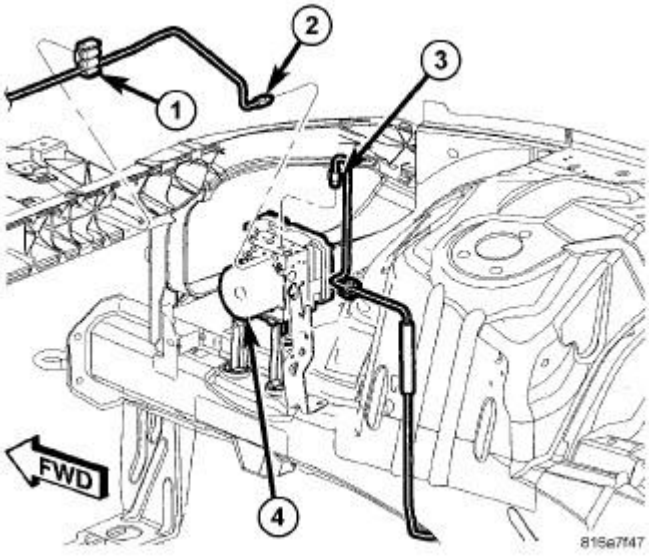


Fig. 310: RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head cover T-joints are shown in illustration, the RH

cylinder head cover T-joints are similar.

CAUTION: Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing) alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.

23. Remove all residual sealant (1) from the cylinder head, timing chain cover and cylinder head cover mating surfaces. Refer to **Engine - Standard Procedure**.

INSTALLATION

LEFT

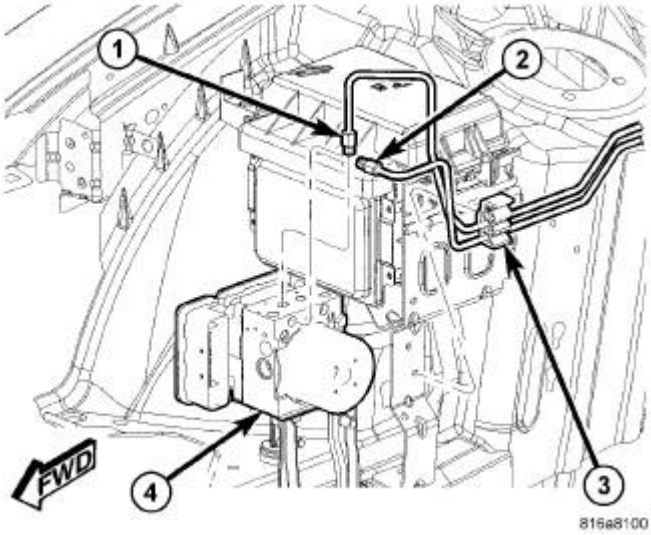


Fig. 311: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

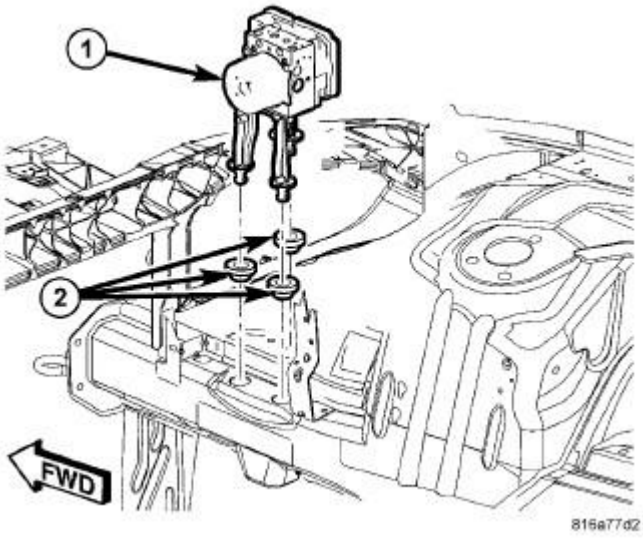


Fig. 312: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

1. Install the cylinder head cover gasket (1).
2. The spark plug tube seals (2) can be reused if not damaged.

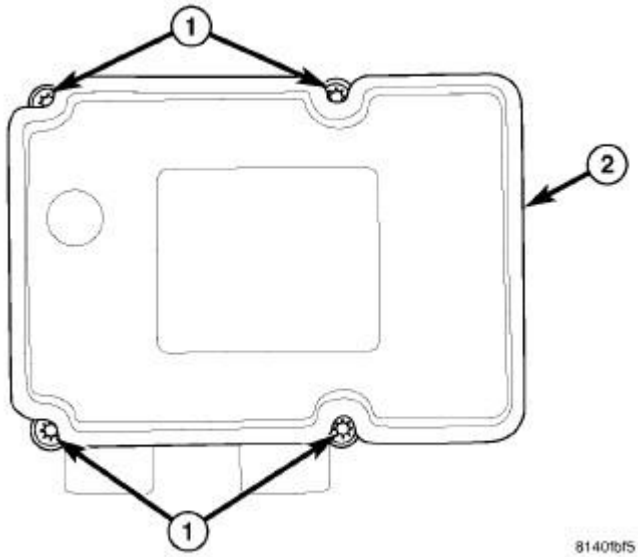


Fig. 313: Spark Plug Tube Seal & Installer
Courtesy of CHRYSLER GROUP, LLC

3. If required, install new spark plug tube seals (2) in the cylinder head cover:
    - Lubricate the spark plug tube seal inner and outer diameters with clean engine oil.
    - Place the spark plug tube seal (2) on the Cam Sensor/Spark Plug Tube Seal Installer (special tool #10256, Installer, Cam Installer, Cam Sensor/ Spark Plug Tube Seal) (1).

- Push the seal into the cylinder head cover until the base of the seal is seated.
- Remove the tool.

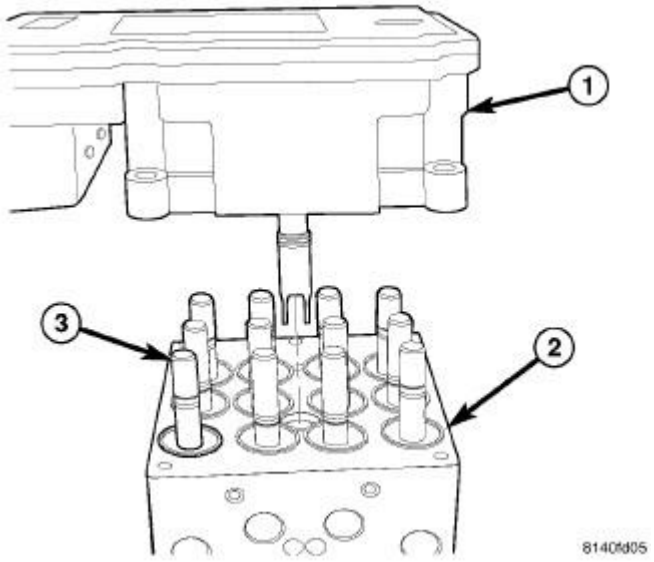


Fig. 314: RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

4. Clean the timing engine timing cover, cylinder head and cylinder head cover mating surfaces with isopropyl alcohol in preparation for sealant application.

CAUTION: Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

5. Apply a 2 to 3 mm wide bead of Mopar® Threebond Engine RTV Sealant (1) to the two engine timing cover to cylinder head T-joints as shown in illustration.

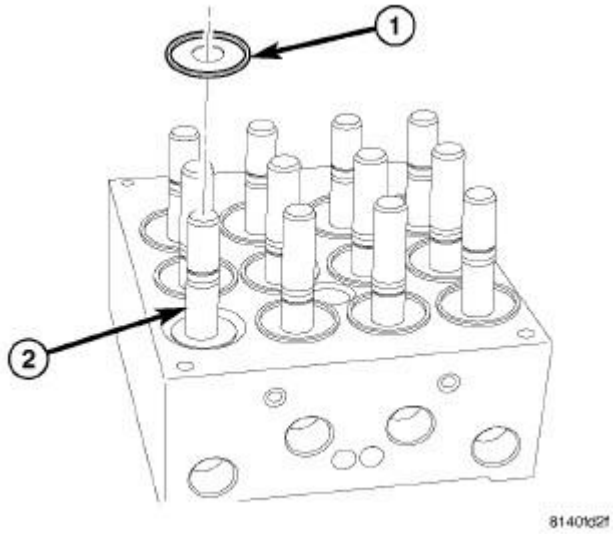


Fig. 315: Cylinder Head Cover Bolts & Double Ended Studs Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

6. Align the locator pins (1) to the cylinder head and install the cylinder head cover.
7. Tighten the cylinder head cover bolts and double ended studs in the sequence shown in illustration to 12 N.m (106 in. lbs.).

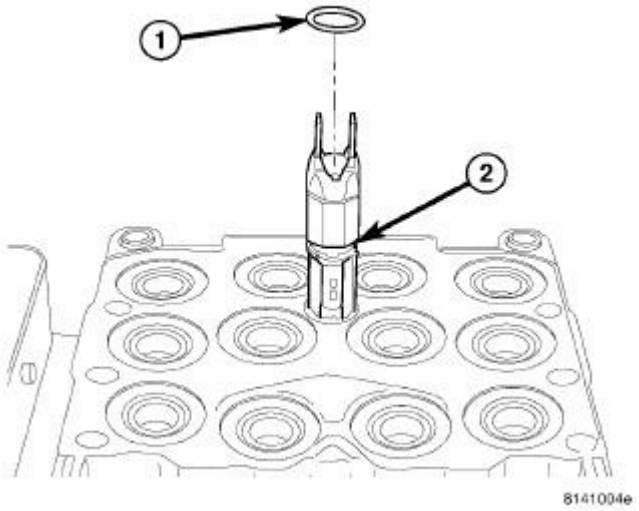


Fig. 316: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

8. If removed, install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
9. Install the ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .

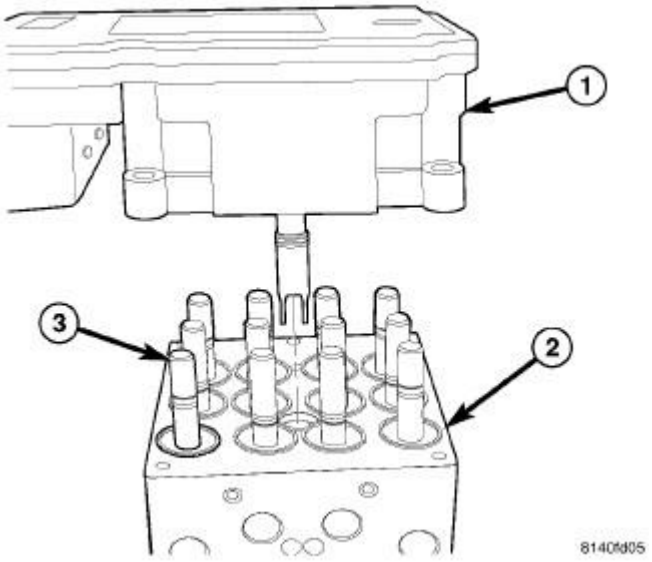


Fig. 317: Injection/Ignition Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

10. Engage two injection/ignition harness retainers (1) to the left cylinder head cover.

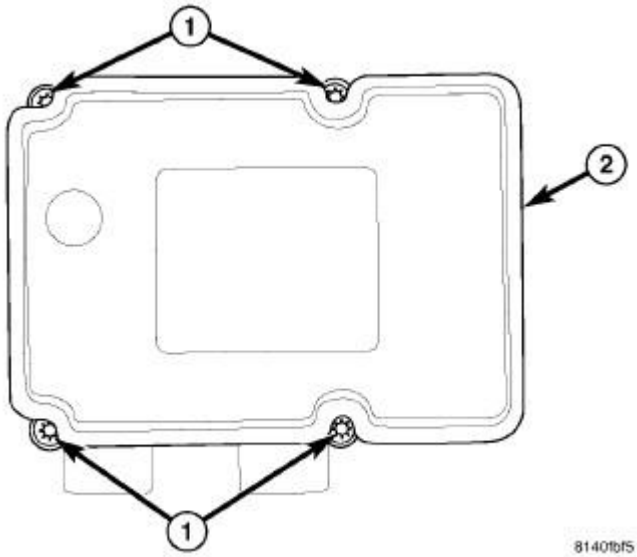


Fig. 318: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Refer to the markings made at disassembly and install the variable valve timing solenoids (2 and 4) in their original locations. Refer to **SOLENOID, VARIABLE VALVE TIMING, INSTALLATION** .

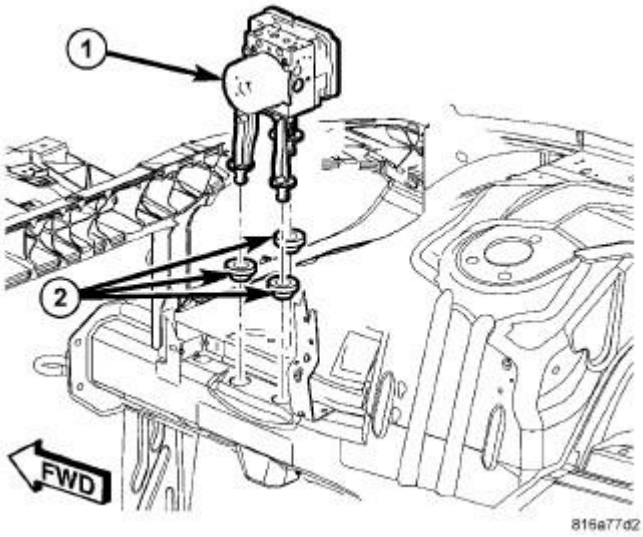


Fig. 319: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

12. Connect the electrical connectors (2) to the left variable valve timing solenoids.
13. Engage two starter wire harness retainers (1) to the left cylinder head cover.

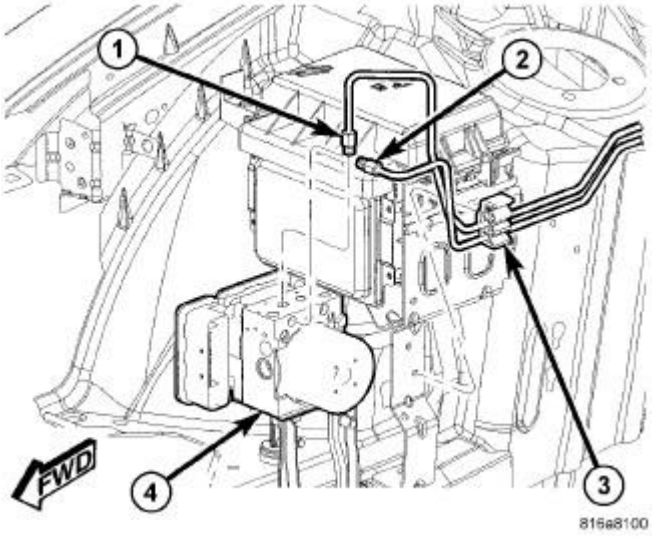


Fig. 320: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

14. Engage one main wire harness retainer (3) to the left cylinder head cover.

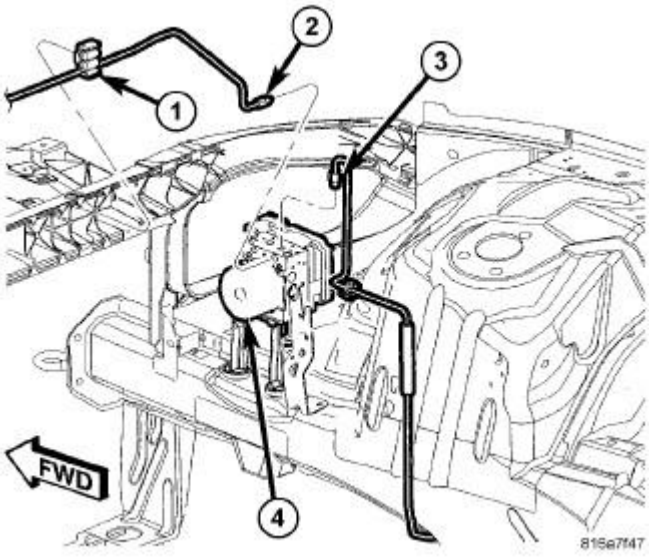


Fig. 321: CMP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The RH CMP sensor is shown in illustration, the LH CMP sensor is similar. If both RH and LH CMP sensors where removed, install them into their original locations.

15. Install the camshaft position sensor. Refer to **SENSOR, CAMSHAFT POSITION, INSTALLATION** .

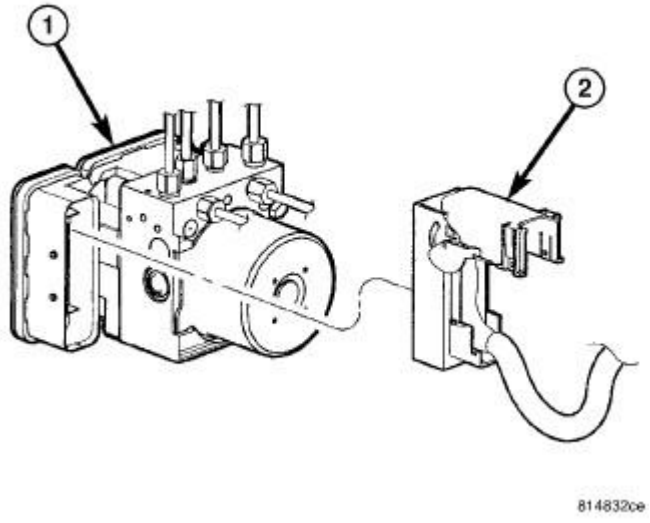


Fig. 322: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

16. Connect the electrical connector (5) to the left Camshaft Position (CMP) sensor.
17. Engage one main wire harness retainer (2) to the cylinder head cover and one main wire harness retainer (4) to the cylinder head cover mounting stud.

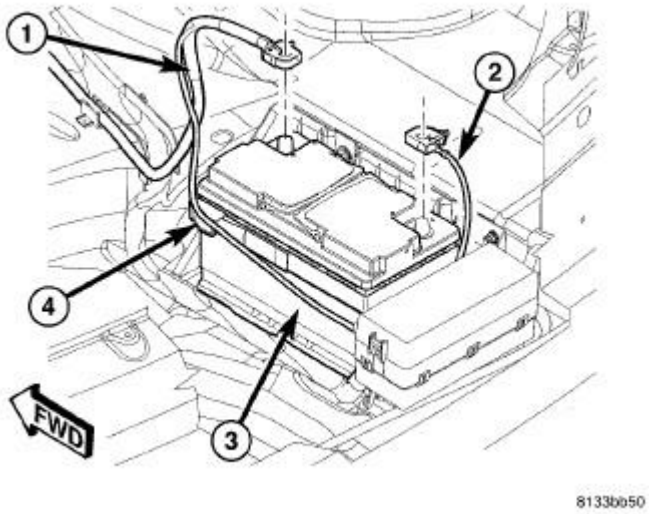


Fig. 323: Transmission Breather Hose, Make-Up Air Tube & Clips
Courtesy of CHRYSLER GROUP, LLC

18. Install the make-up air tube (3) to the left cylinder head cover and engage the clips (1) to the transmission breather hose (2).

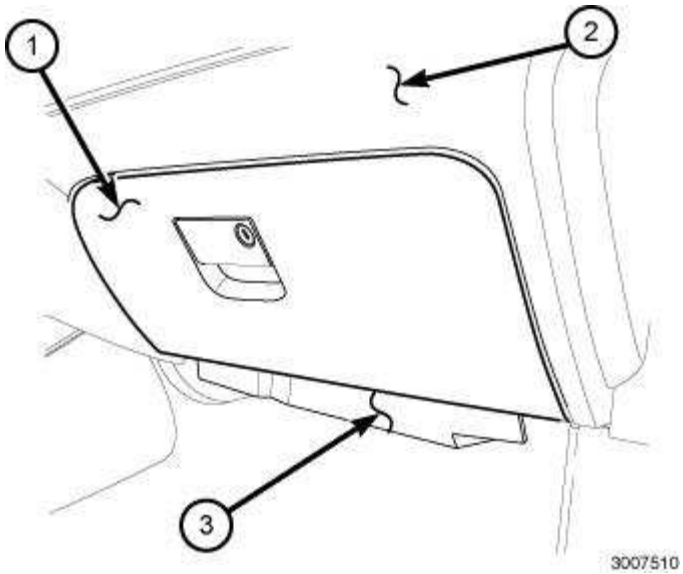


Fig. 324: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

19. Install the insulator (2) to the two alignment posts (3) on top of the LH cylinder head cover.

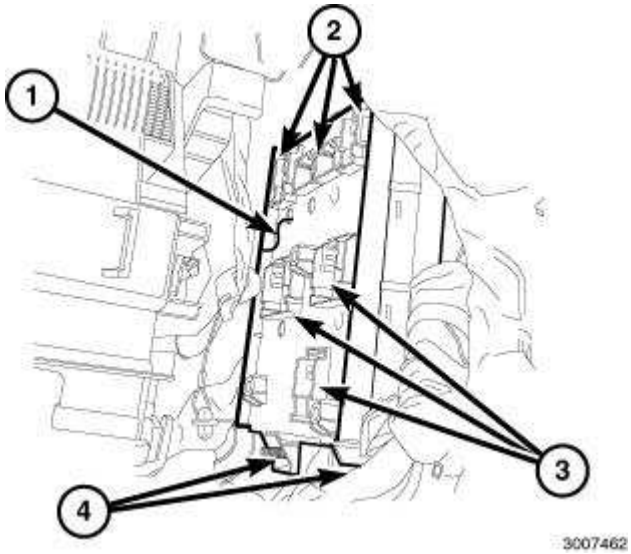


Fig. 325: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

20. Install the upper intake manifold (1), support brackets and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
21. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

RIGHT

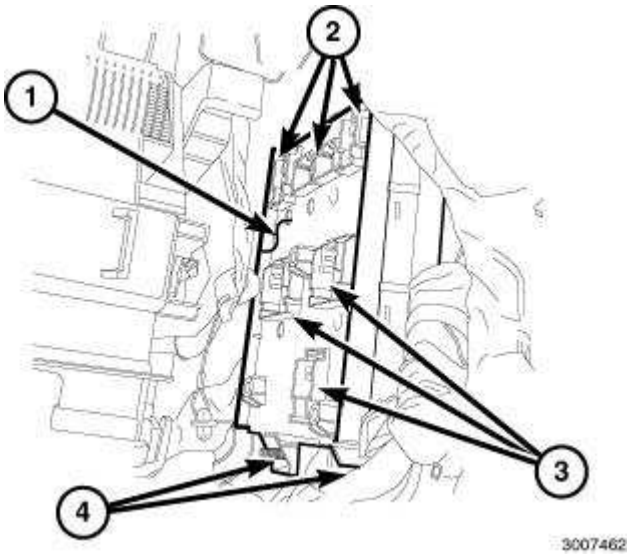


Fig. 326: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

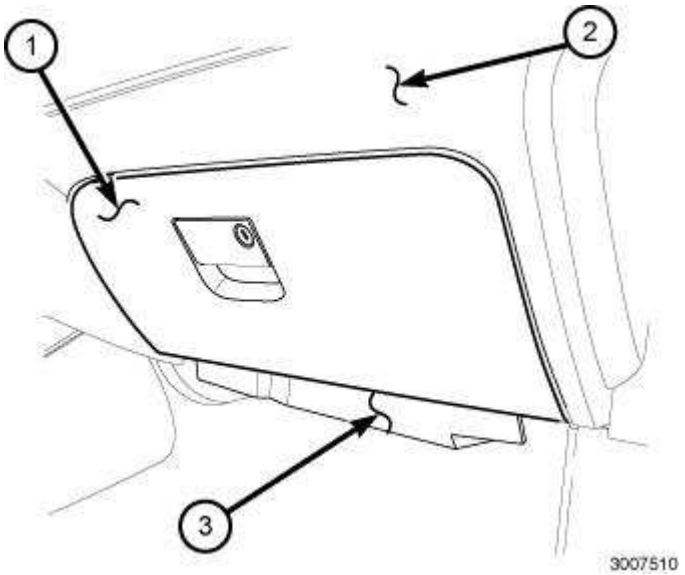


Fig. 327: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head cover is shown in illustration, the RH cylinder head cover is similar.

1. Install the cylinder head cover gasket (1).
2. The spark plug tube seals (2) can be reused if not damaged.

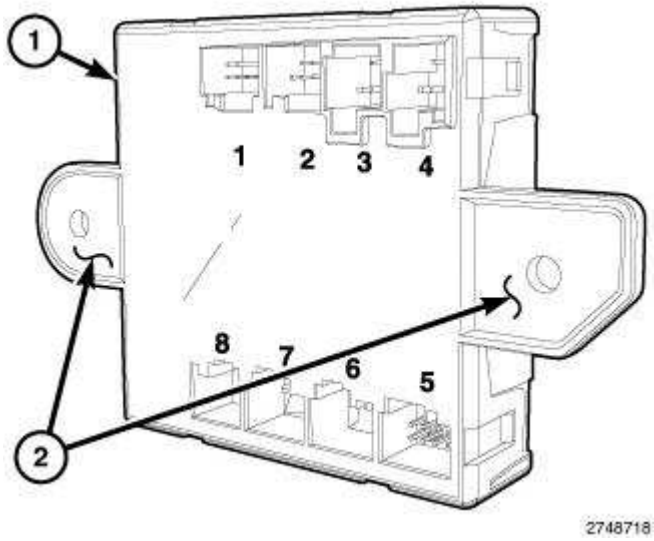


Fig. 328: Spark Plug Tube Seal & Installer

Courtesy of CHRYSLER GROUP, LLC

3. If required, install new spark plug tube seals (2) in the cylinder head cover:
   - Lubricate the spark plug tube seal inner and outer diameters with clean engine oil.
   - Place the spark plug tube seal (2) on the Cam Sensor/Spark Plug Tube Seal Installer (special tool #10256, Installer, Cam Installer, Cam Sensor/ Spark Plug Tube Seal) (1).
   - Push the seal into the cylinder head cover until the base of the seal is seated.
   - Remove the tool.

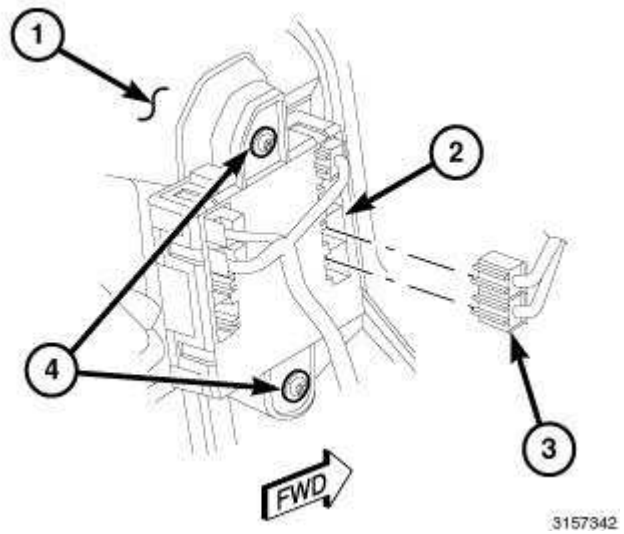


Fig. 329: RTV Sealant Locations
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head cover T-joint is shown in illustration, the RH cylinder head cover T-joint is similar.

4. Clean the timing engine timing cover, cylinder head and cylinder head cover mating surfaces with isopropyl alcohol in preparation for sealant application.

CAUTION: Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

5. Apply a 2 to 3 mm wide bead of Mopar® Threebond Engine RTV Sealant (1) to the two engine timing cover to cylinder head T-joints as shown in illustration.

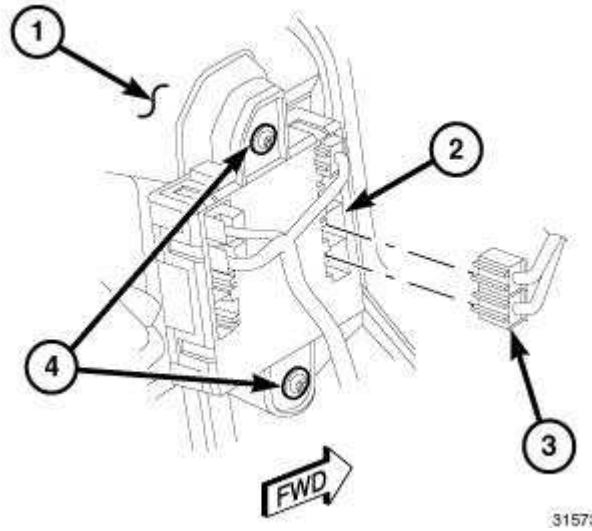


Fig. 330: Cylinder Head Cover Bolts & Double Ended Studs Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

6. Align the locator pins (1) to the cylinder head and install the cylinder head cover.
7. Tighten the cylinder head cover bolts and double ended studs in the sequence shown in illustration to 12 N.m (106 in. lbs.).

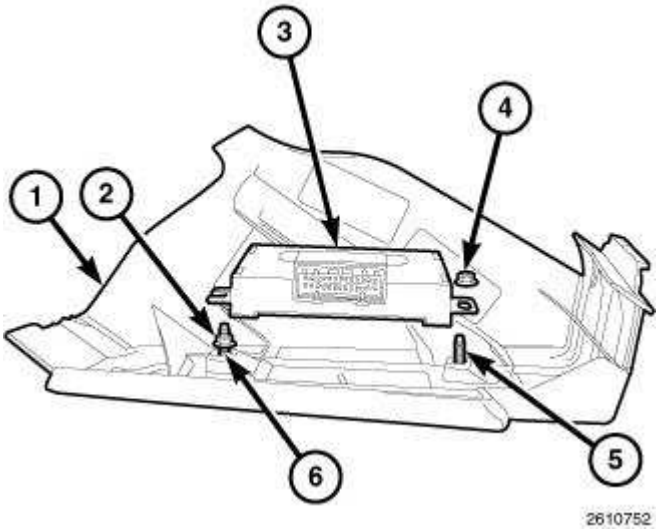


Fig. 331: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH ignition coils are shown in illustration, the RH ignition coils are similar.

8. If removed, install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
9. Install the ignition coils (2). Refer to **COIL, IGNITION, INSTALLATION** .

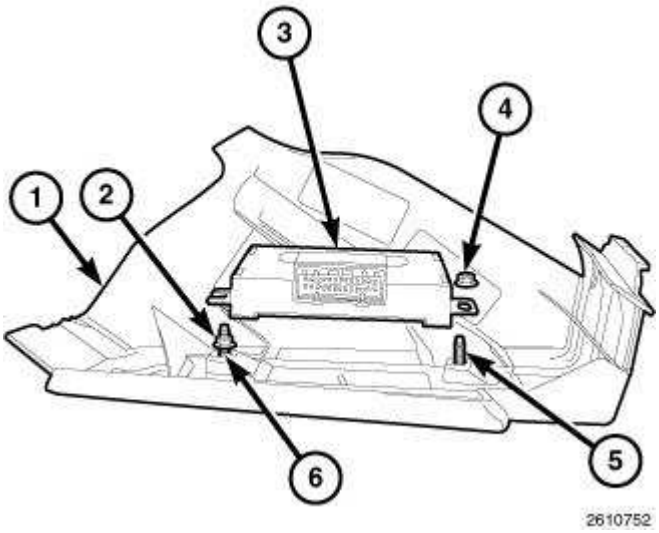


Fig. 332: Injection/Ignition Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

10. Engage three injection/ignition harness retainers (1) to the right cylinder head cover.

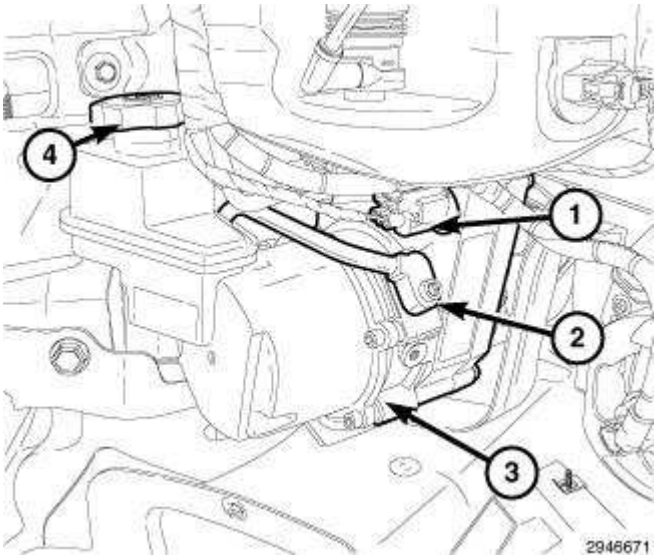


Fig. 333: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Refer to the markings made at disassembly and install the variable valve timing solenoids (2 and 4) in their original locations. Refer to **SOLENOID, VARIABLE VALVE TIMING, INSTALLATION** .

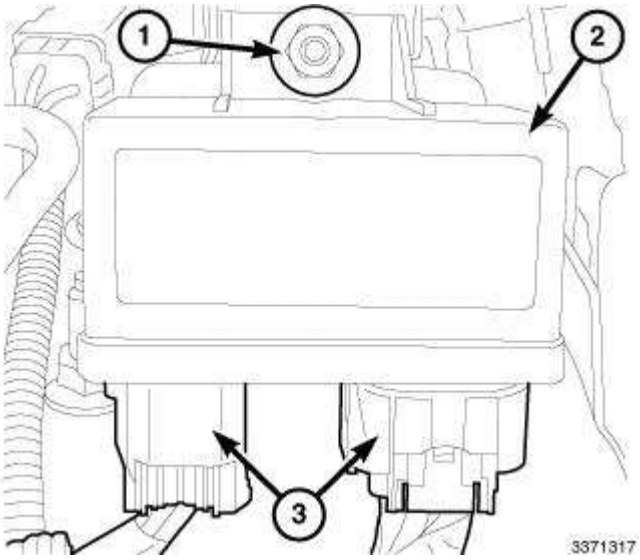


Fig. 334: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

12. Connect the electrical connectors (2) to the variable valve timing solenoids on the right cylinder head.
13. Engage two starter wire harness retainers to the right cylinder head cover (1).
14. Engage the starter harness to main harness retainer (3).

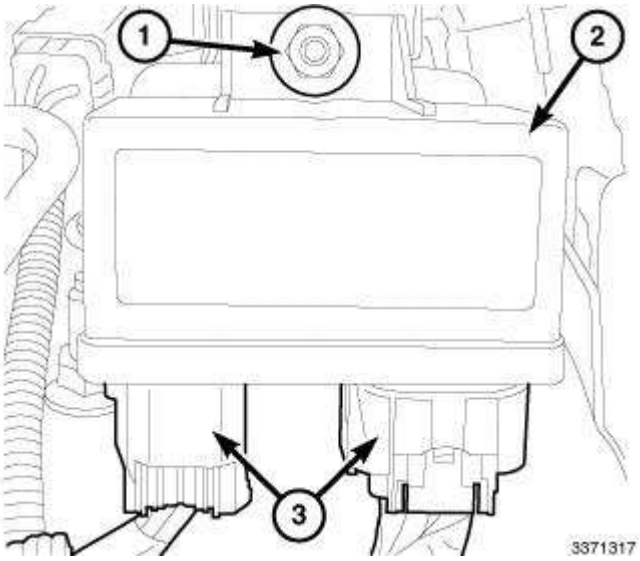


Fig. 335: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

15. Engage four main wire harness retainers (1) to the right cylinder head cover.

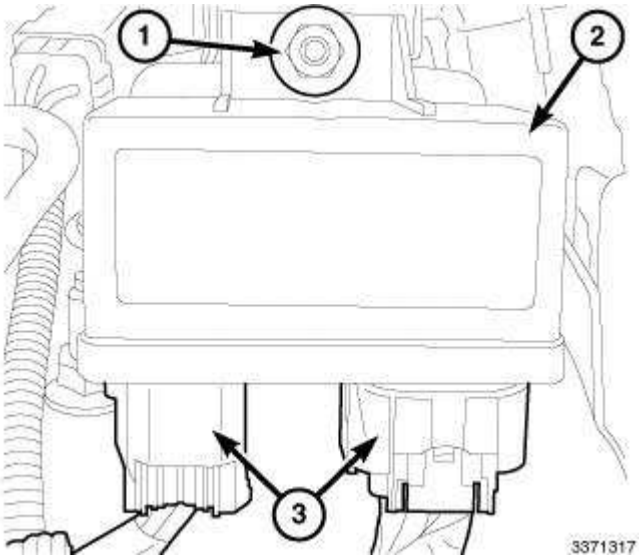


Fig. 336: CMP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: If both RH and LH CMP sensors where removed, install them into their original locations.

16. Install the camshaft position sensor. Refer to **SENSOR, CAMSHAFT POSITION, INSTALLATION** .

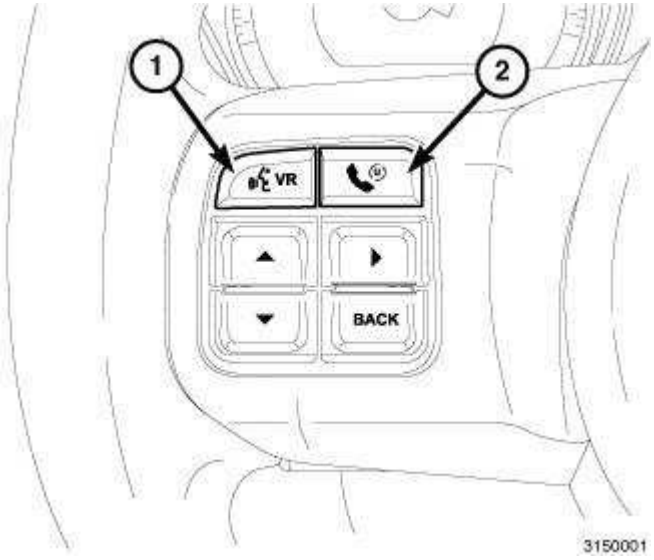


Fig. 337: Main Wire Harness Retainer & Connector
Courtesy of CHRYSLER GROUP, LLC

17. Connect the electrical connector (1) to the right Camshaft Position (CMP) sensor.
18. Engage the main wire harness retainer (2) to the right cylinder head cover mounting stud.

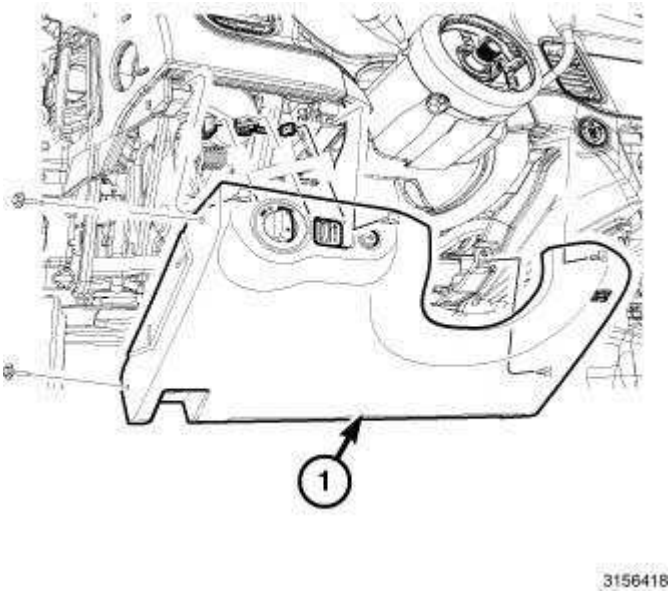


Fig. 338: PCV Valve & Screws
Courtesy of CHRYSLER GROUP, LLC

19. Install the PCV valve (1). Refer to **VALVE, POSITIVE CRANKCASE VENTILATION (PCV), REMOVAL** .

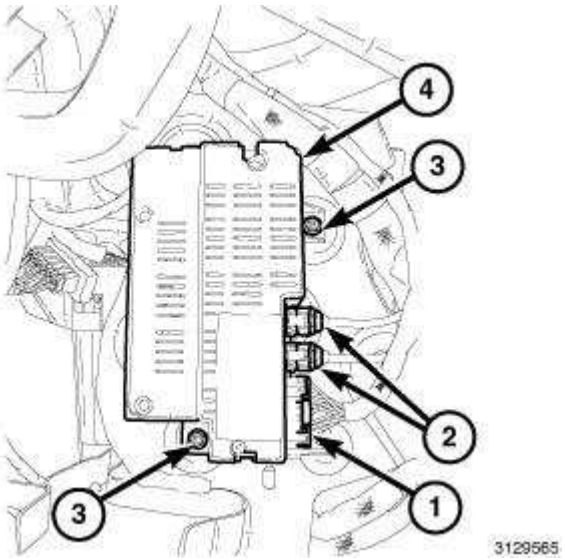


Fig. 339: Upper Transmission-To-Engine Bolt & Transmission Oil Level Indicator Tube
Courtesy of CHRYSLER GROUP, LLC

20. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
21. Install the transmission oil level indicator tube (2) with the upper transmission to engine bolt (1) tightened to 55 N.m (41 ft. lbs.).

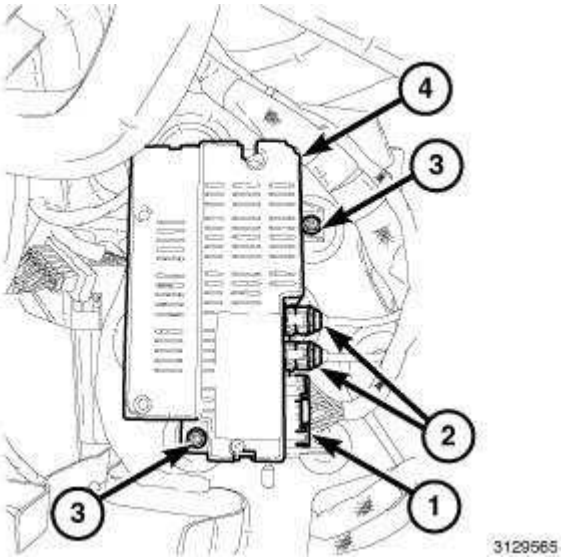


Fig. 340: Transmission Fluid Level Indicator Tube & Bolt
Courtesy of CHRYSLER GROUP, LLC

22. Install the bolt (1) securing the transmission fluid level indicator tube (2) to the transmission housing and tighten to 12 N.m (106 in. lbs.).

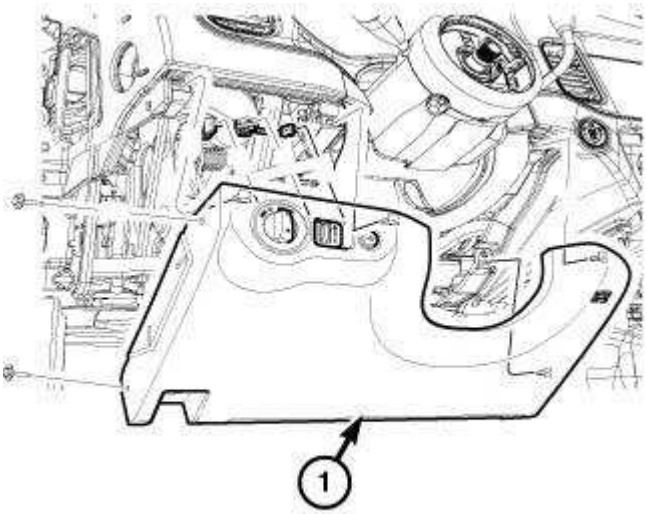


Fig. 341: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

23. Lower the vehicle.
24. If removed, install the insulator (2) to the two alignment posts (3) on top of the LH cylinder head cover.

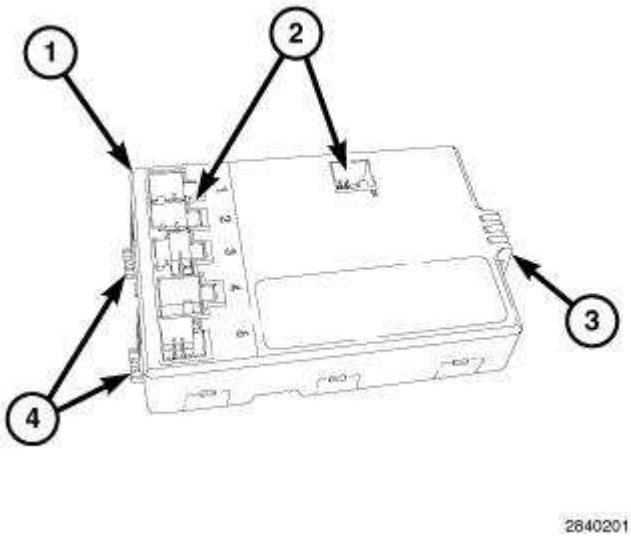


Fig. 342: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

25. Install the upper intake manifold (1), support brackets and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
26. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

LIFTER(S), HYDRAULIC

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HYDRAULIC LIFTER(S) NOISE DIAGNOSIS

Proper noise diagnosis is essential in locating the source of an NVH complaint. Locating a lash adjuster (tappet) type noise can sometimes be difficult. As a result, an initial misdiagnosis may occur.

Refer to the following chart for possible causes and correction of a lash adjuster (tappet) type noise.

LASH ADJUSTER (TAPPET) NOISE CHART

POSSIBLE CAUSES	CORRECTION
1. Engine oil level-too high or too low. This may allow aerated oil to enter the adjusters and cause them to be spongy.	1. Check and correct the engine oil level.
2. Insufficient running time after rebuilding a cylinder head.	2. Low speed running of up to 1 hour may be required to fully evacuate trapped air from the valve train system. During this time, turn engine

	off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
3. Air trapped in the lash adjuster (after 1 hour of run time).	3. See below: (a) Check lash adjusters for sponginess while installed in the cylinder head. Depress the rocker arm over the adjuster. Normal adjusters should feel very firm. Very spongy adjusters can be bottomed out easily. (b) If the lash adjuster(s) are still spongy, replace the lash adjuster(s). Refer to **LIFTER (S), HYDRAULIC, REMOVAL**.
4. Low oil pressure.	4. See below: (a) Check and correct the engine oil level. (b) Check the engine oil pressure. Refer to **Engine/Lubrication - Diagnosis and Testing**. (c) Check for excessive main bearing clearance and correct. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**. (d) Check for a worn oil pump. Refer to **Engine/Lubrication/PUMP, Engine Oil - Inspection**.
5. Oil passage to the cylinder head(s) plugged with debris.	5. Check cylinder head oil passages for blockage. Clean or replace as necessary.
6. Worn valve guide(s).	6. Measure valve stem-to-guide clearance. Refer to **VALVES, INTAKE AND EXHAUST, INSPECTION**.
7. Air ingested into oil due to broken or cracked oil pump pickup tube.	7. Inspect pickup tube and replace as necessary. Refer to **PICK-UP, OIL PUMP, REMOVAL**.
8. Collapsed lash adjuster due to debris ingestion.	8. Clean debris from engine and replace lash adjuster(s). Refer to **LIFTER(S), HYDRAULIC, REMOVAL**.

REMOVAL

REMOVAL

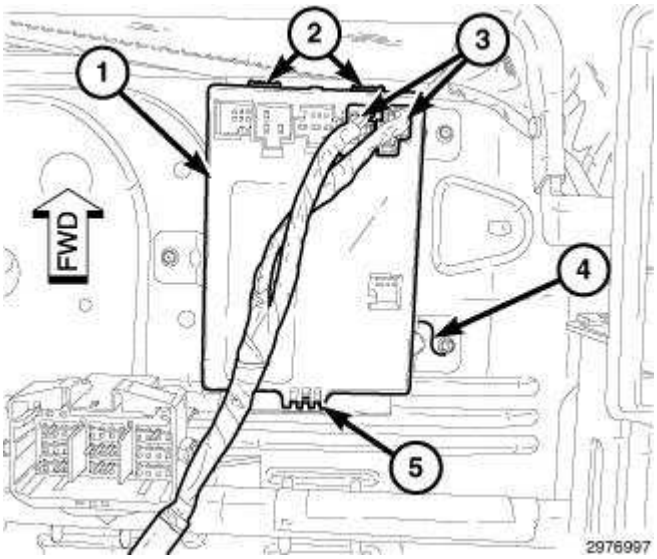


Fig. 343: Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head hydraulic lifters are shown in illustration, the RH cylinder head hydraulic lifters are similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the camshaft(s). Refer to **CAMSHAFT, ENGINE, REMOVAL**.

   NOTE: If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.

3. Remove the rocker arm(s). Refer to **ROCKER ARM, VALVE, REMOVAL**.

   NOTE: If the hydraulic lifters are to be reused, identify their positions so that they can be reassembled into their original locations.

4. Remove the hydraulic lifter(s) (1).

INSTALLATION

INSTALLATION

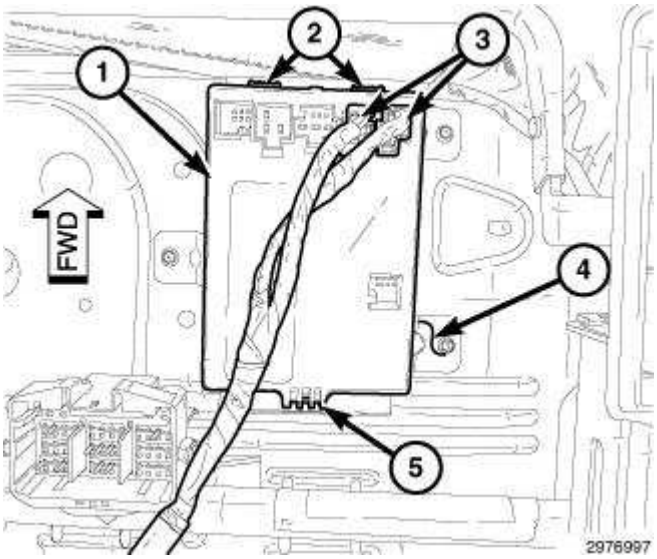


Fig. 344: Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head hydraulic lifters are shown in illustration, the RH cylinder head hydraulic lifters are similar. If the hydraulic lifters are being reused, reassemble them into their original locations.

1. Verify that the hydraulic lifters are at least partially full of oil. There should be little or no plunger travel when the hydraulic lifter is depressed.
2. Install the hydraulic lifter(s) (1).

NOTE: If the rocker arms are being reused, reassemble them into their original locations.

3. Install the rocker arm(s). Refer to **ROCKER ARM, VALVE, INSTALLATION**.
4. Install the camshaft(s), phasers, cylinder head cover(s) and upper intake manifold. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.
5. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

ROCKER ARM, VALVE

DESCRIPTION

DESCRIPTION

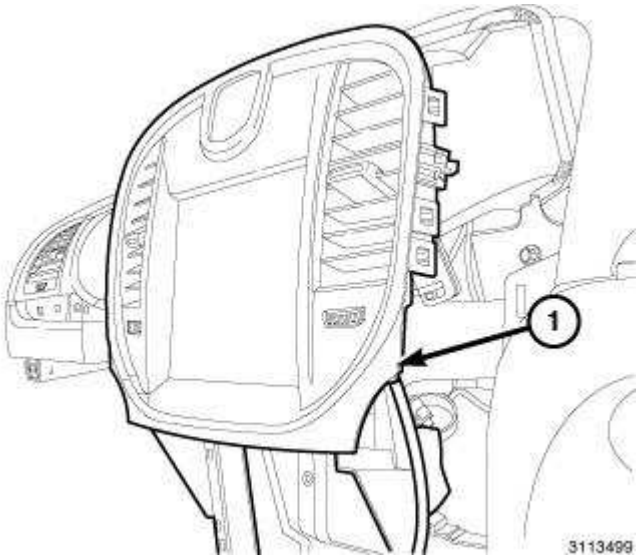


Fig. 345: Rocker Arm
Courtesy of CHRYSLER GROUP, LLC

The rocker arms are steel stampings with an integral roller bearing. The rocker arms incorporate a 0.5 mm oil hole in the lash adjuster socket for roller and camshaft lubrication.

REMOVAL

REMOVAL

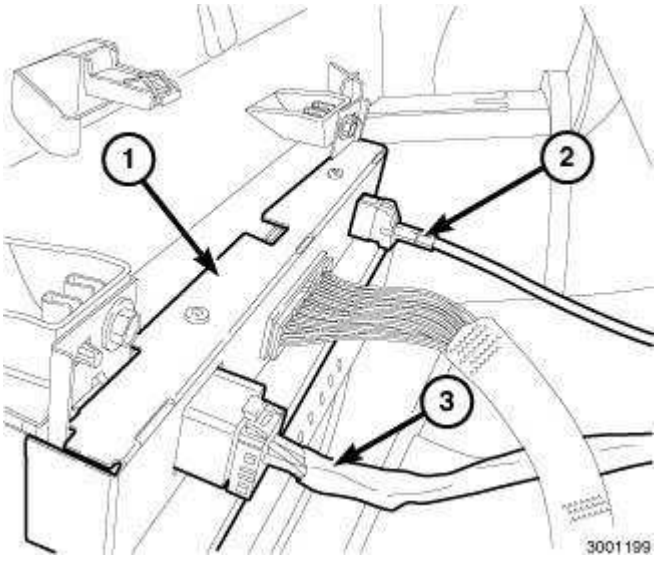


Fig. 346: Locating Rocker Arms
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the camshaft(s). Refer to **CAMSHAFT, ENGINE, REMOVAL**.

NOTE: If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.

3. Remove the rocker arm(s) (1).

INSPECTION

INSPECTION

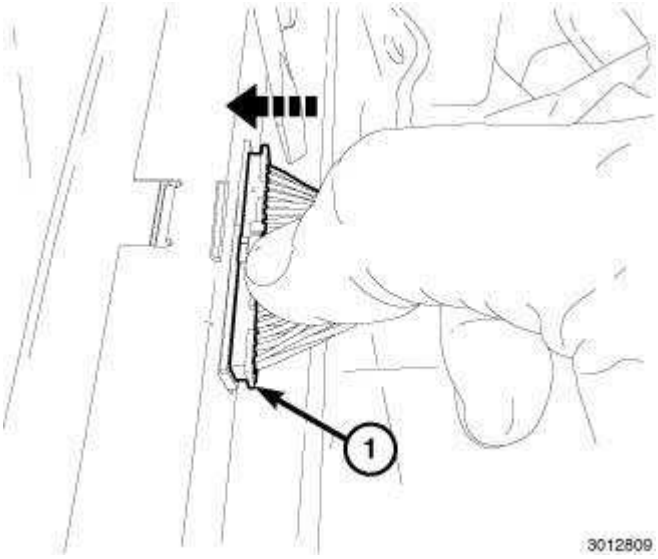


Fig. 347: Rocker Arm
Courtesy of CHRYSLER GROUP, LLC

Inspect the cam follower assembly for wear or damage. Refer to **Fig. 347**. Replace as necessary.

INSTALLATION

INSTALLATION

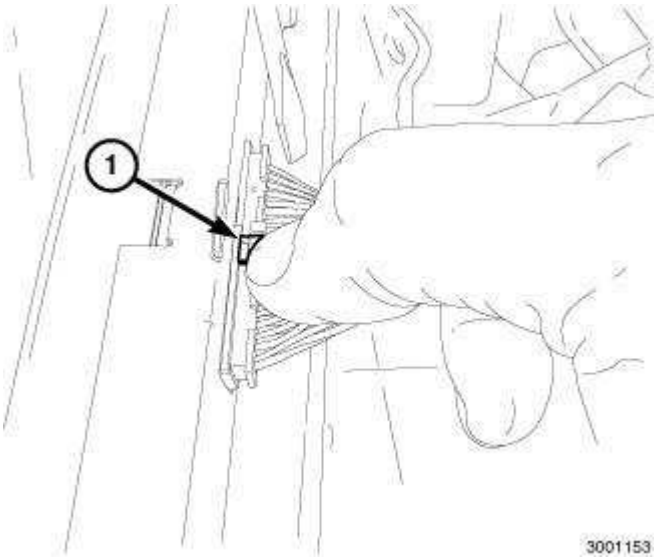


Fig. 348: Locating Rocker Arms
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar. If the rocker arms are being reused, reassemble them into their original locations.

1. Lubricate the rocker arms with clean engine oil before installation.
2. Install the rocker arm(s) (1).
3. Install the camshaft(s), phasers, cylinder head cover(s) and upper intake manifold. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

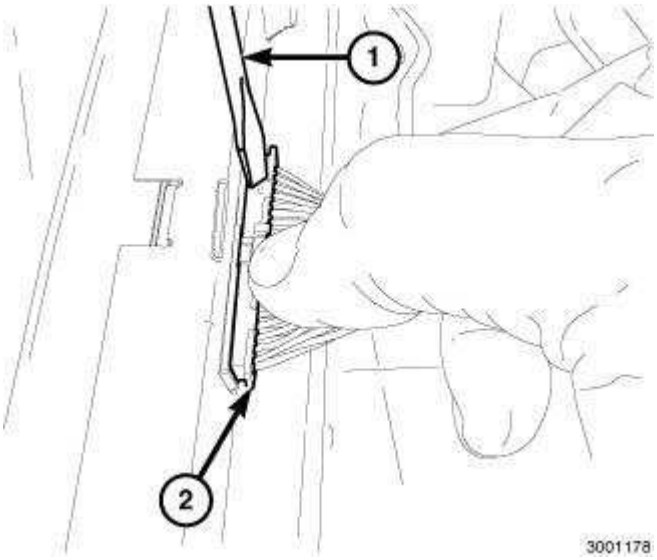


Fig. 349: Valve Stem Oil Seal, Valve Spring & Valve Guide
Courtesy of CHRYSLER GROUP, LLC

The valve stem oil seals (1) are made of elastomer over-molded steel in a non-integrated type guide mounted configuration. The seal is not held in place by the valve spring (2). The valve stem seals are not reusable if removed from the valve guides (3), they must be replaced. Always coat the valve seals with clean engine oil before installing the valves.

REMOVAL

REMOVAL

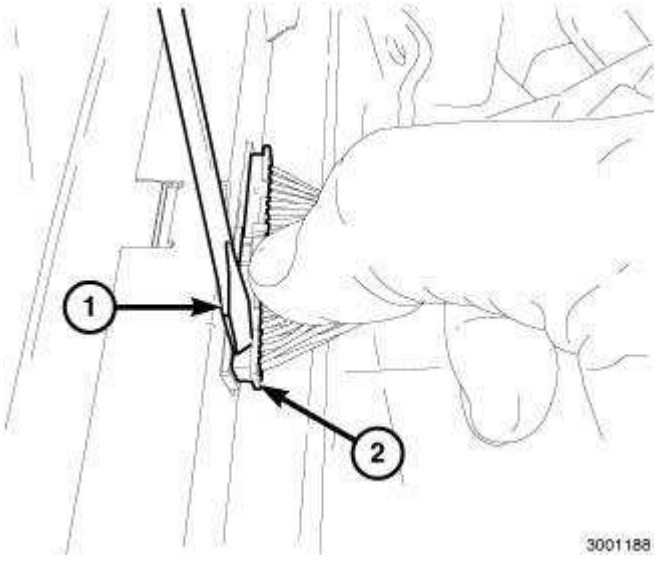


Fig. 350: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the springs are to be reused, identify their positions so that they can be

reassembled into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valve springs similar.

1. Remove the valve spring(s) (2). Refer to **SPRING(S), VALVE, REMOVAL**.

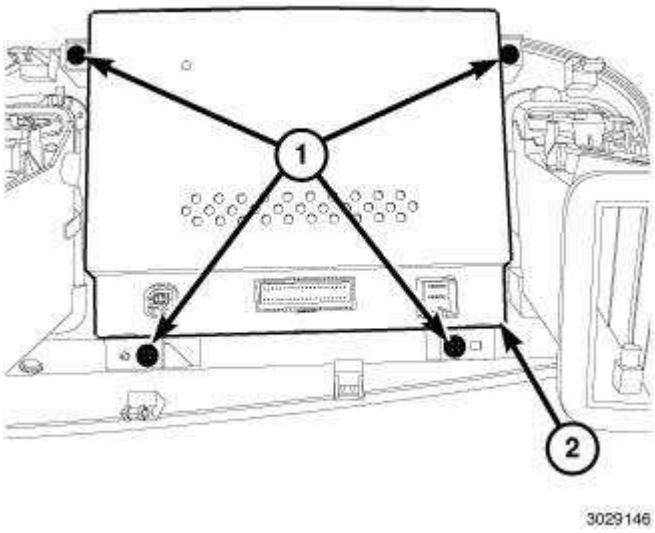


Fig. 351: Valve Guide Seal & Valve Seal Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 5 cylinder exhaust valve guide seal shown in illustration, all other valve guide seals similar.

2. Remove the valve guide seal (1) using a valve seal tool (2). Discard the removed seal.

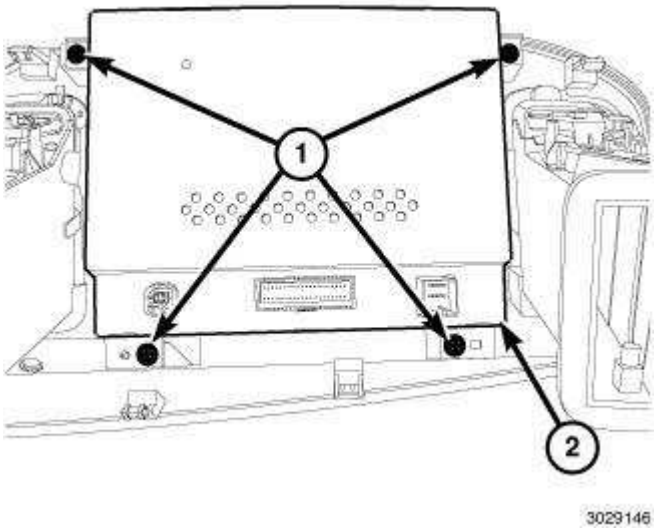


Fig. 352: Valve Spring Seat
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 5 cylinder exhaust valve spring seat shown in illustration, all other valve spring seats similar.**

3. If required, remove the valve spring seat (1).
4. If required, remove the valve(s). Refer to **VALVES, INTAKE AND EXHAUST, REMOVAL**.

INSTALLATION

INSTALLATION

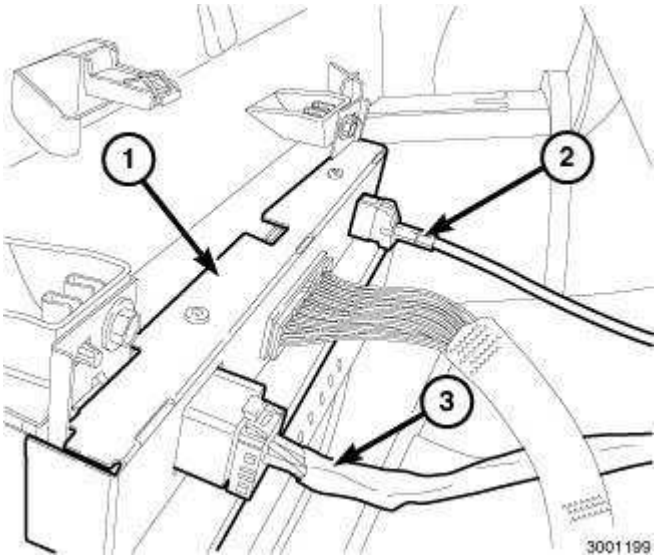


Fig. 353: Valve Spring Seat
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the valve(s). Refer to **VALVES, INTAKE AND EXHAUST, INSTALLATION**.

NOTE: **Reassemble the valves into their original locations. If the valves or valve seats have been refinished, verify that the valve stem tip height is within specification. Refer to Engine - Specifications. Number 5 cylinder exhaust valve shown in illustration, all other valves similar.**

2. If removed, install the spring seat (1) over the valve guide.

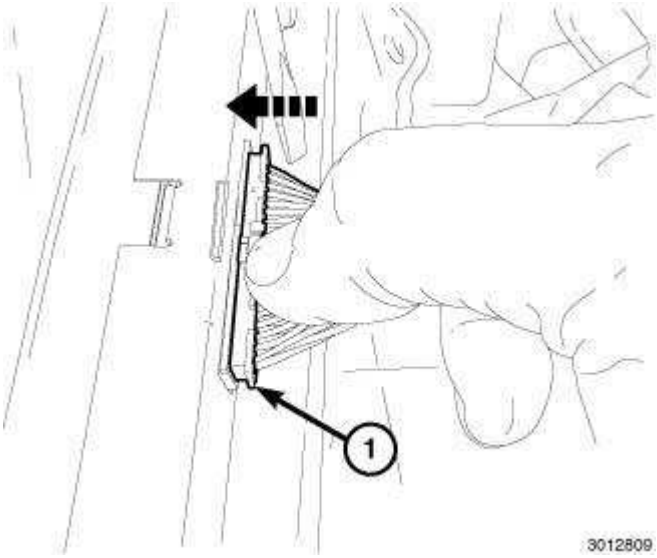


Fig. 354: Installing Valve Guide Seal
Courtesy of CHRYSLER GROUP, LLC

3. Apply engine oil to the lip of the valve guide seal (3). Install the valve guide seal (3) over the valve stem. Using an appropriate driver (1), push the seal firmly and squarely over the valve guide. **Do Not Force** the seal against the top of guide.

NOTE: **Ensure that the garter spring (2) is intact around the top of the valve guide seal (3). Number 5 cylinder exhaust valve guide seal shown in illustration, all other valves similar.**

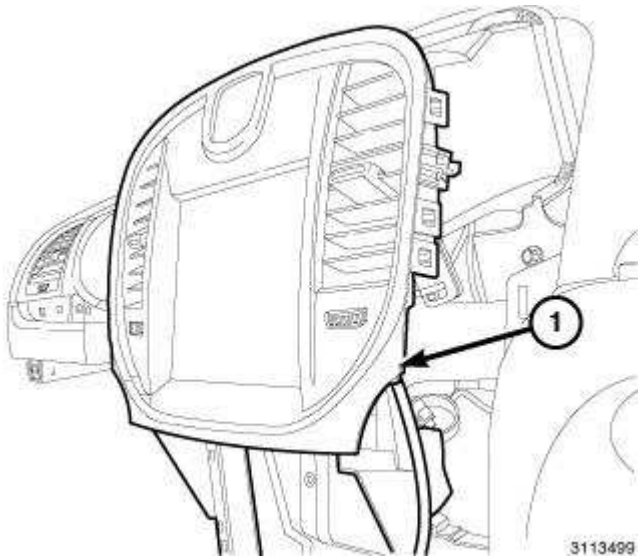


Fig. 355: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the valve springs are being reused, reassemble them into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all**

other valves similar.

4. Install the valve spring(s) (2). Refer to **SPRING(S), VALVE, INSTALLATION**.

SPRING(S), VALVE

DESCRIPTION

DESCRIPTION

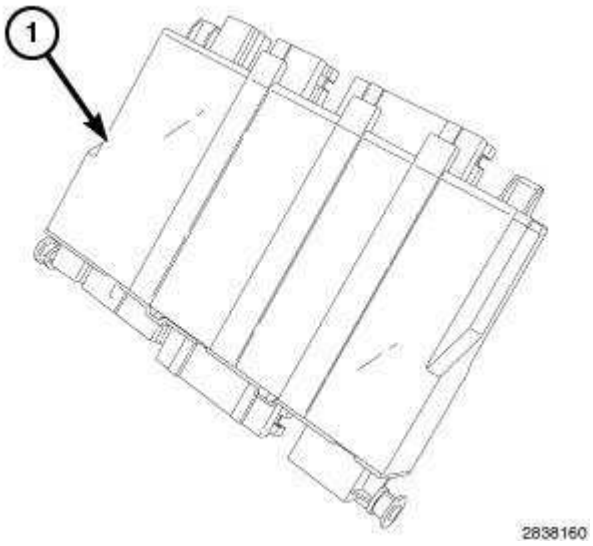


Fig. 356: Valve Spring Components
Courtesy of CHRYSLER GROUP, LLC

The valve springs are a beehive design and made from high strength chrome silicon steel. The springs are common for intake and exhaust applications. Valve guide seals are rubber overmolded on a steel support cylinder with a garter spring at the seal lip. The seals are not integrated with the valve spring seat. The valve spring seat is a flat steel washer. The steel valve spring retainers are designed for use with beehive springs and the valve spring retainer locks are a three bead Butt type design.

REMOVAL

IN VEHICLE

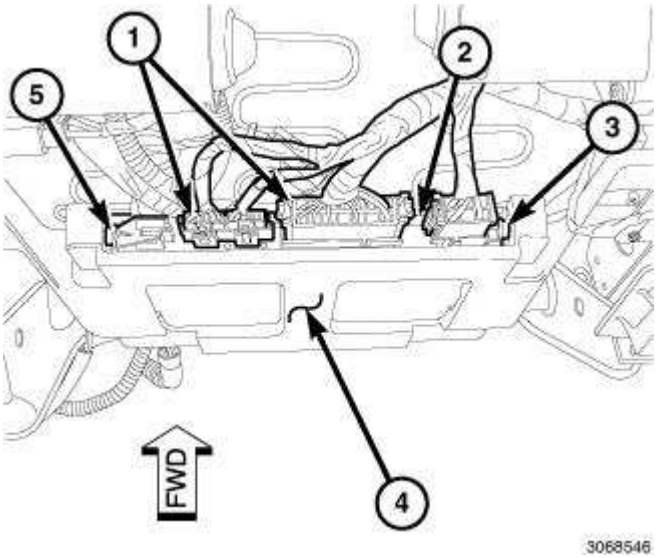


Fig. 357: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

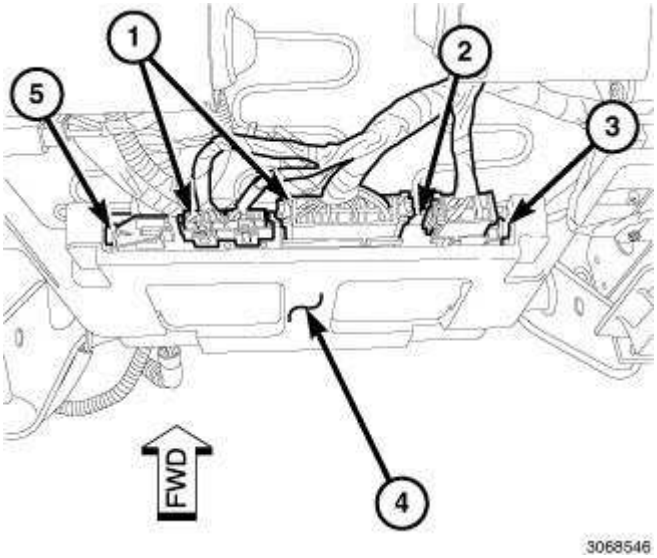


Fig. 358: A/C Suction & Liquid Line Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. If removing the LH exhaust valve springs, recover the refrigerant from the refrigerant system and remove the A/C suction and liquid line assembly (1). Refer to **LINE, A/C SUCTION, REMOVAL** .

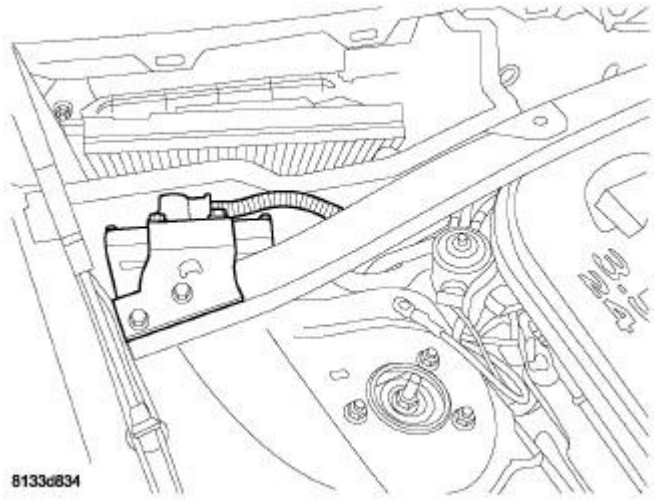


Fig. 359: Heater Core Return Tube, Nut & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Power steering pump not shown in illustration.

3. If removing the LH exhaust valve springs, remove the nut (1) and bolt (4) from the support brackets of the heater core return tube (3) and reposition the tube.

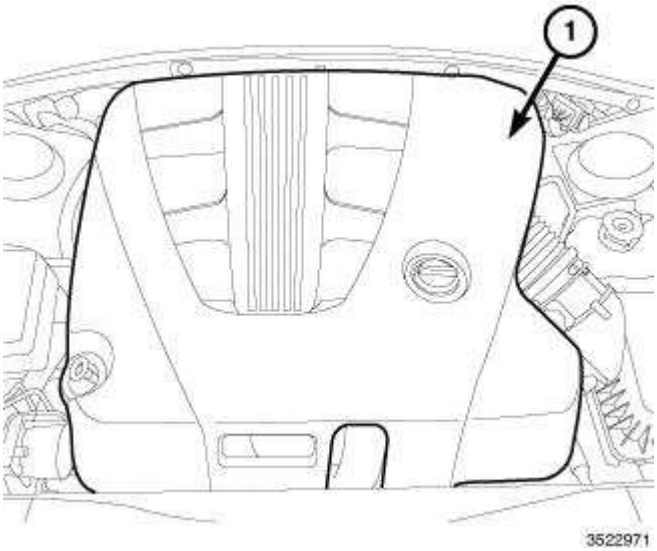


Fig. 360: Transmission Fluid Level Indicator Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

4. If removing the RH valve springs, remove the transmission fluid level indicator tube (2). Refer to **SEAL, FILL TUBE, REMOVAL** , **SEAL, OUTPUT SHAFT, REMOVAL** and **SEAL, TORQUE CONVERTER HUB, REMOVAL** .

5. Remove both cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

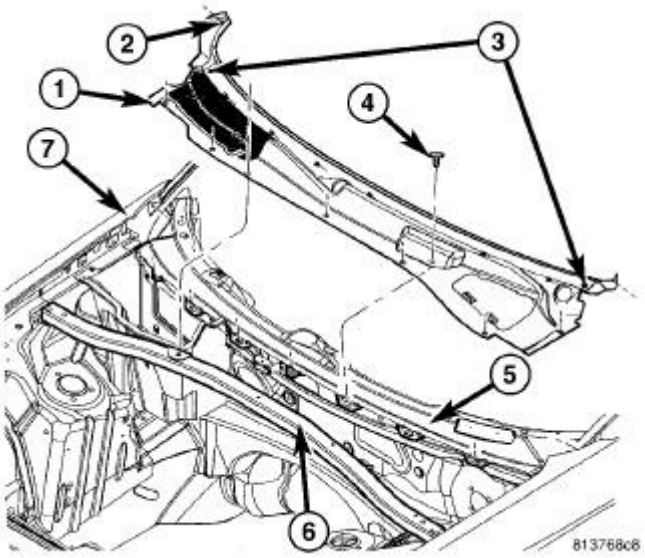


Fig. 361: Locating Rocker Arms
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar.

NOTE: Only remove the camshafts from one head at a time. The opposite head must remain assembled in order to lock the crankshaft against rotation.

6. Remove the camshaft(s). Refer to **CAMSHAFT, ENGINE, REMOVAL**.

NOTE: If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.

7. Remove the rocker arm(s) (1). Refer to **ROCKER ARM, VALVE, REMOVAL**.

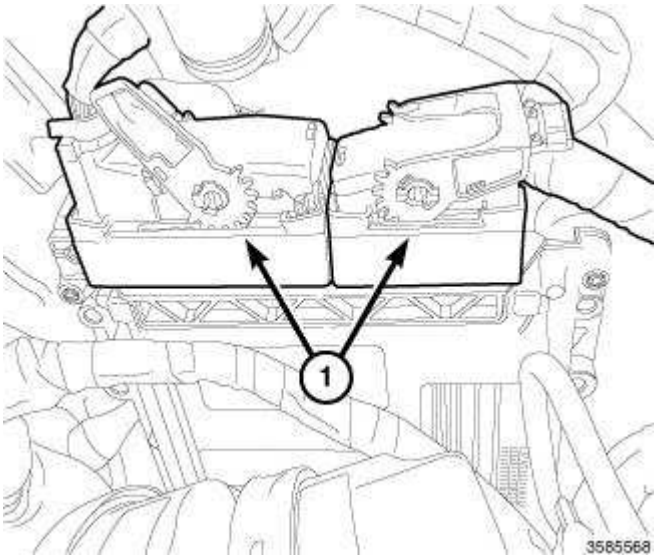


Fig. 362: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH camshaft phaser lock shown in illustration, LH camshaft phaser lock similar.

CAUTION: Air pressure applied to the cylinder holds the valves in place. This air pressure also has a tendency to force the piston down and rotate the crankshaft. Do not allow the crankshaft to rotate. Crankshaft rotation may damage the timing chain or front timing cover and affect camshaft timing.

8. If removing the LH camshafts, install the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser)-1 (5) to lock the crankshaft against rotation. If removing the RH camshafts, install the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser)-2 to lock the crankshaft against rotation.

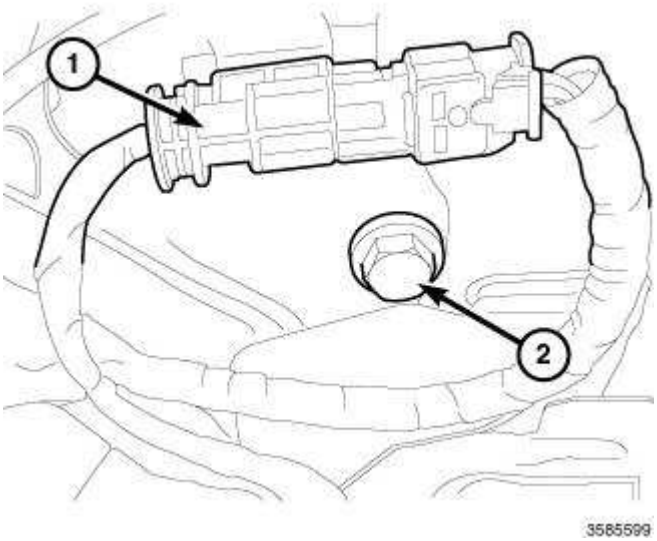


Fig. 363: Shop Air Supply & Valve Spring Compressor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 4 cylinder intake valve spring compression shown in illustration, all other valves similar.

9. Remove the spark plug. Refer to **SPARK PLUG, REMOVAL** .
10. Install Valve Spring Compressor (special tool #MD998772A, Compressor, Valve Spring) (2) onto the cylinder head.
11. Install a spark plug adapter attached to a regulated shop air supply (1). Pressurize the cylinder being serviced to 620.5 - 689 kPa (90 - 100 psi) to hold the valves in place.

CAUTION: Air pressure must be maintained as long as the valve springs are removed to prevent the valves from dropping into the cylinders.

12. Using Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (3), compress valve spring (4) and remove valve retaining locks (5).

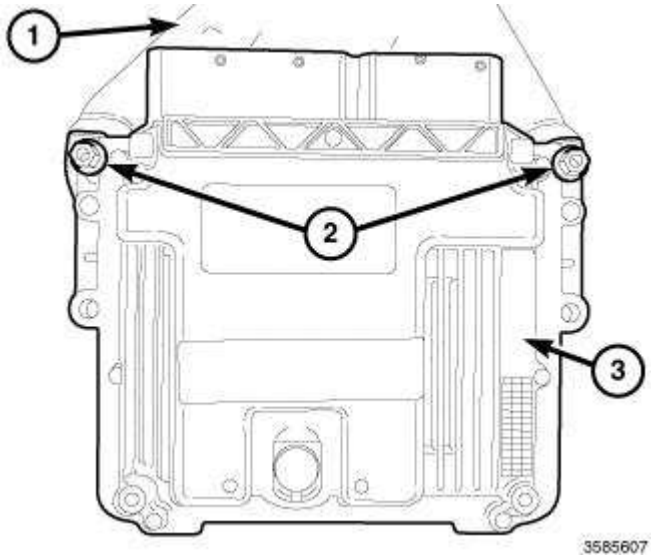


Fig. 364: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the springs are to be reused, identify their positions so that they can be reassembled into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valve springs similar.

13. Release the valve spring compression and remove the valve spring retainer (1) and valve spring (2).
14. If required, remove the valve guide seal and spring seat. Refer to **SEAL(S), VALVE GUIDE, REMOVAL**.

OFF VEHICLE

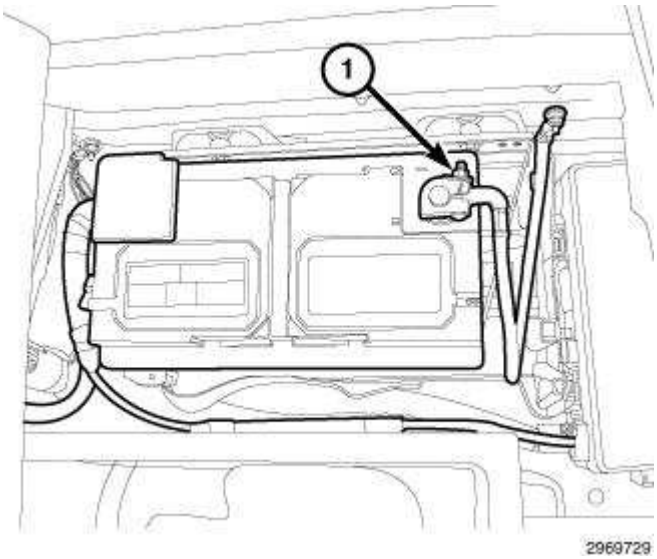


Fig. 365: Valve Spring Compressor Components
Courtesy of CHRYSLER GROUP, LLC

1. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL**.
2. Position the Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (2) in the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1).

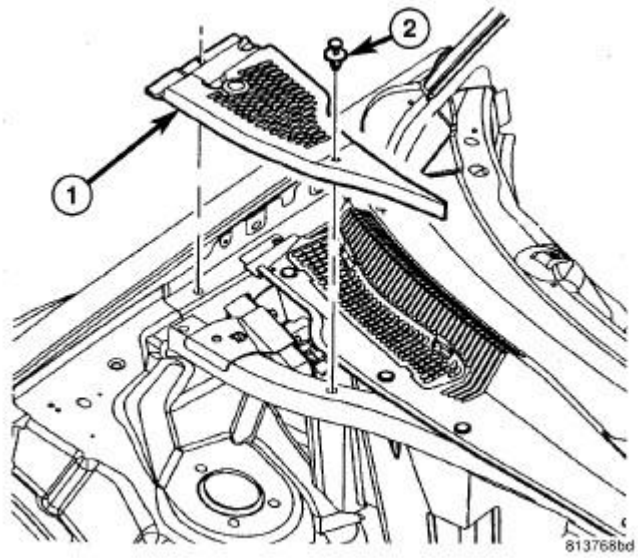


Fig. 366: Compressing Valve Spring & Locating Valve Retaining Locks
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 3 cylinder intake valve spring compression shown in illustration, all other valves similar.

3. Compress the valve spring (3) and remove the valve retaining locks (4).

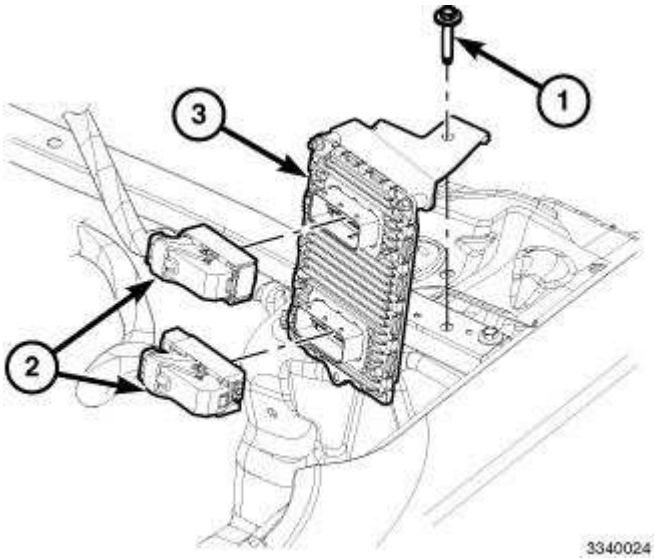


Fig. 367: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the springs are to be reused, identify their positions so that they can be reassembled into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.**

4. Release the valve spring compression and remove the valve spring retainer (1) and valve spring (2).
5. If required, remove the valve(s). Refer to **VALVES, INTAKE AND EXHAUST, REMOVAL**.
6. If required, remove the valve guide seal and spring seat. Refer to **SEAL(S), VALVE GUIDE, REMOVAL**.

INSPECTION

INSPECTION

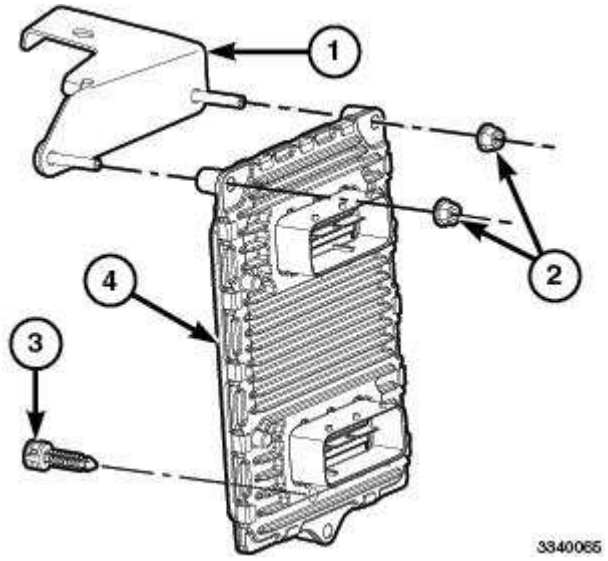


Fig. 368: Testing Valve Spring
Courtesy of CHRYSLER GROUP, LLC

When valves have been removed for inspection, reconditioning or replacement, valve springs should be checked against specifications for free-length, spring force and spring installed height. Refer to **Engine - Specifications**.

Spring force can be measured with a test fixture (2). Follow the tool manufactures instructions. Replace any springs that do not meet specifications.

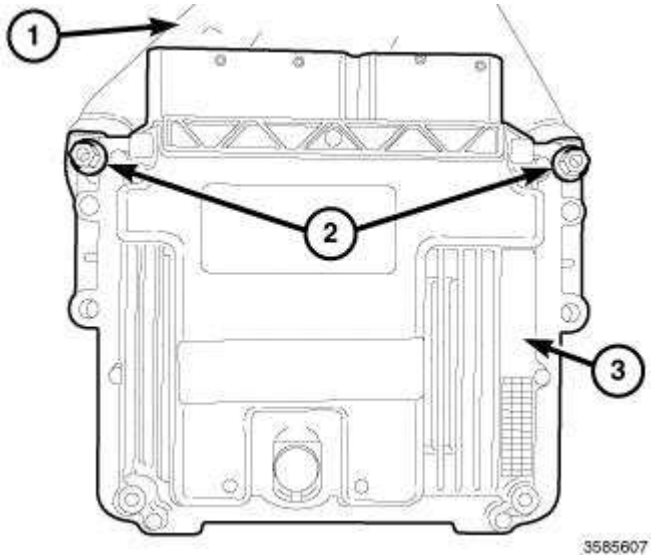


Fig. 369: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

Installed height of the valve spring must be checked with the valve assembled into the cylinder head. Refer to **SPRING(S), VALVE, INSTALLATION**.

If the valves or valve seats have been refinished and the installed valve spring height (4) is greater than 40.0 mm (1.575 in.), install an additional spring seat (8) in the head counterbore under the original valve spring seat (8) to bring the spring height back within specification. Make sure the measurement is taken from the top of spring seat (6) to the bottom surface of spring retainer (1).

INSTALLATION

IN VEHICLE

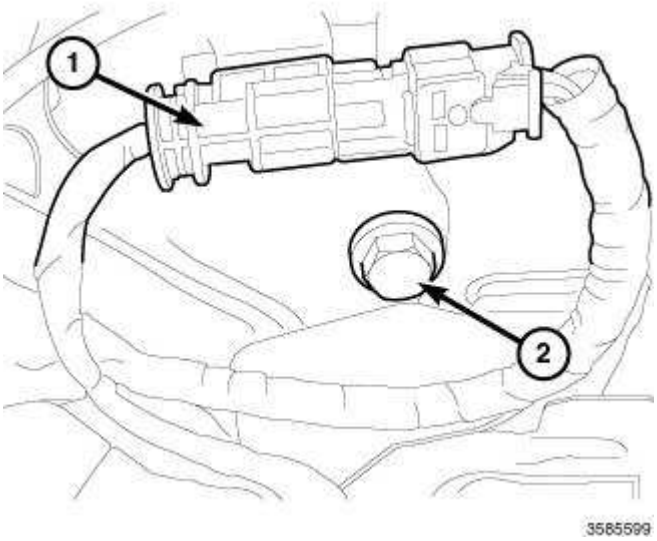


Fig. 370: Spring Seat, Valve Guide Seal & Garter Spring
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the spring seat (3) and valve guide seal (1) over the valve guide. Refer to **SEAL(S), VALVE GUIDE, INSTALLATION**.

NOTE: **Ensure that the garter spring (2) is intact around the top of the valve guide seal (1). Number 5 cylinder exhaust valve guide seal shown in illustration, all other valves similar.**

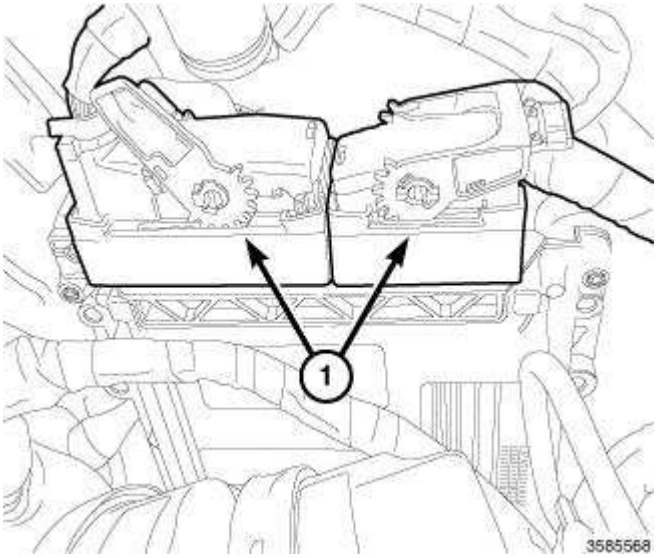


Fig. 371: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the valve springs are being reused, reassemble them into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.**

2. Install the valve spring (2) and valve spring retainer (1).

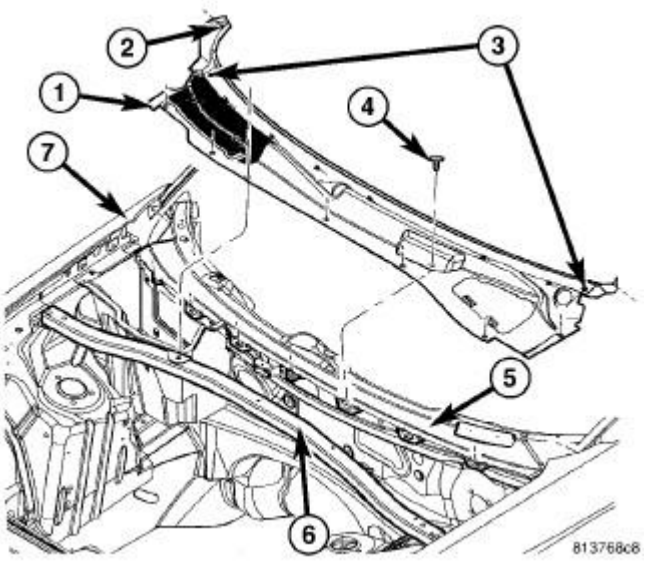


Fig. 372: Shop Air Supply & Valve Spring Compressor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 4 cylinder intake valve spring compression shown in illustration, all other valves similar.

3. Using Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (3) with Valve Spring Compressor (special tool #MD998772A, Compressor, Valve Spring) (2), compress the valve spring (4) **only enough** to install the valve retaining locks (5).
4. Relieve the air pressure and remove the spark plug adapter.
5. Install the spark plug and tighten to 17.5 N.m (13 ft. lbs.). Refer to **SPARK PLUG, INSTALLATION** .

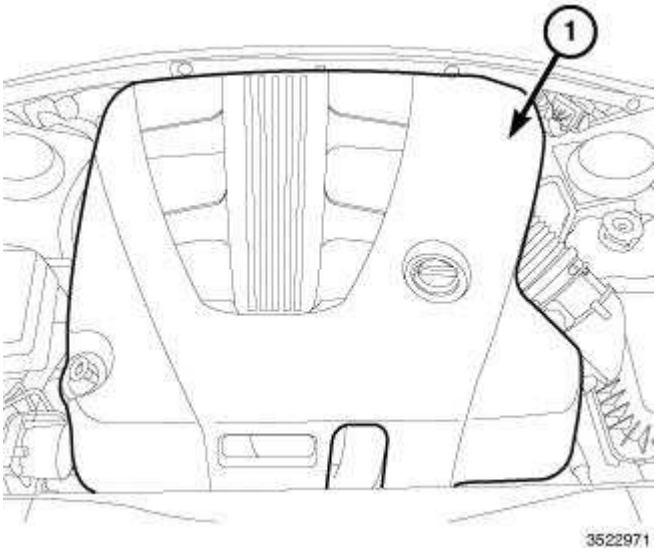


Fig. 373: Locating Rocker Arms

Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar. If the rocker arms are being reused, reassemble them into their original locations.

6. Install the rocker arm(s) (1). Refer to **ROCKER ARM, VALVE, INSTALLATION**.
7. Install the camshaft(s), phasers, cylinder head cover(s) and upper intake manifold. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.

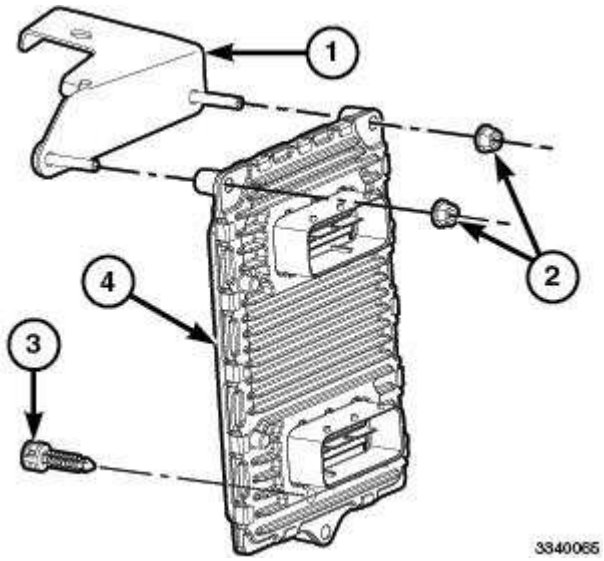


Fig. 374: Transmission Fluid Level Indicator Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

8. If removed, install the transmission fluid level indicator tube (2). Refer to **SEAL, FILL TUBE, INSTALLATION** , **SEAL, OUTPUT SHAFT, INSTALLATION** and **SEAL, TORQUE CONVERTER HUB, INSTALLATION** .

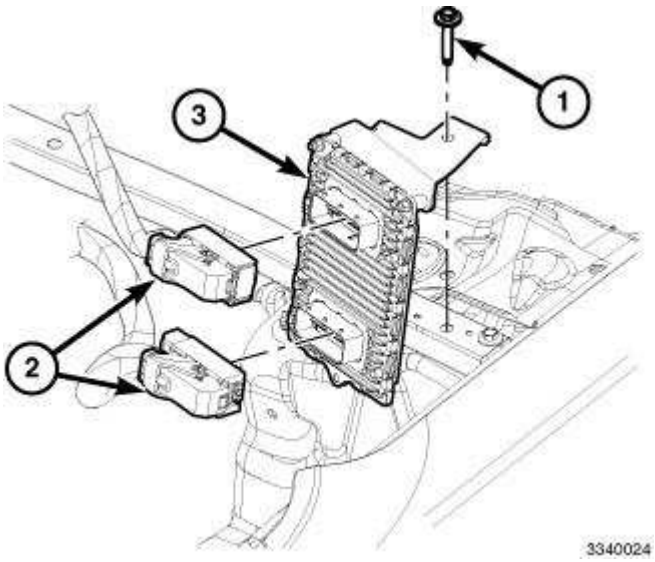


Fig. 375: Heater Core Return Tube, Nut & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Power steering pump not shown in illustration.

9. If removed, install the nut (1) and bolt (4) to the support brackets of the heater core return tube (3). Tighten the fasteners to 12 N.m (106 in. lbs.).

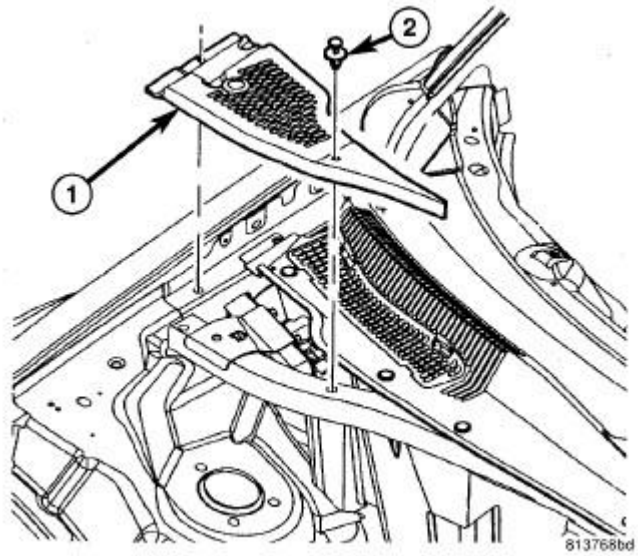


Fig. 376: A/C Suction & Liquid Line Assembly
Courtesy of CHRYSLER GROUP, LLC

10. If removed, install the A/C suction and liquid line assembly (1). Refer to **LINE, A/C SUCTION, INSTALLATION** .
11. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

OFF VEHICLE

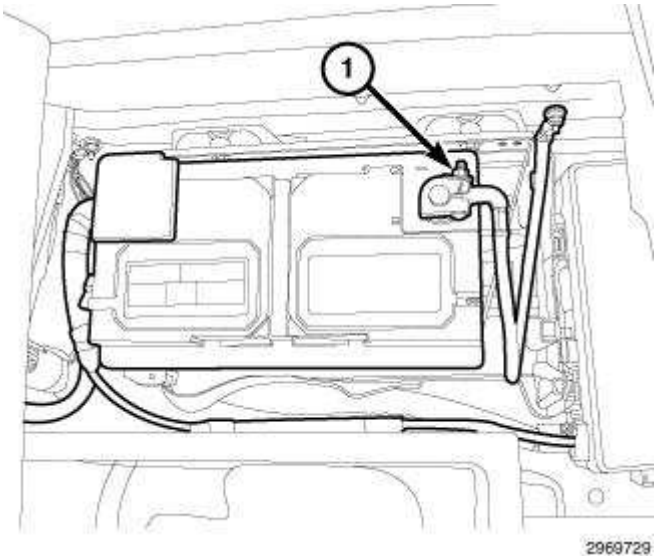


Fig. 377: Spring Seat, Valve Guide Seal & Garter Spring
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the valve(s). Refer to **VALVES, INTAKE AND EXHAUST, INSTALLATION**.

   NOTE: Reassemble the valves into their original locations. If the valves or valve seats have been refinished, verify that the valve stem tip height is within specification. Refer to Engine - Specifications. Number 5 cylinder exhaust valve shown in illustration, all other valves similar.

2. If removed, install the spring seat (3) and valve guide seal (1) over the valve guide. Refer to **SEAL(S), VALVE GUIDE, INSTALLATION**.

   NOTE: Ensure that the garter spring (2) is intact around the top of the valve guide seal (1). Number 5 cylinder exhaust valve guide seal shown in illustration, all other valves similar.

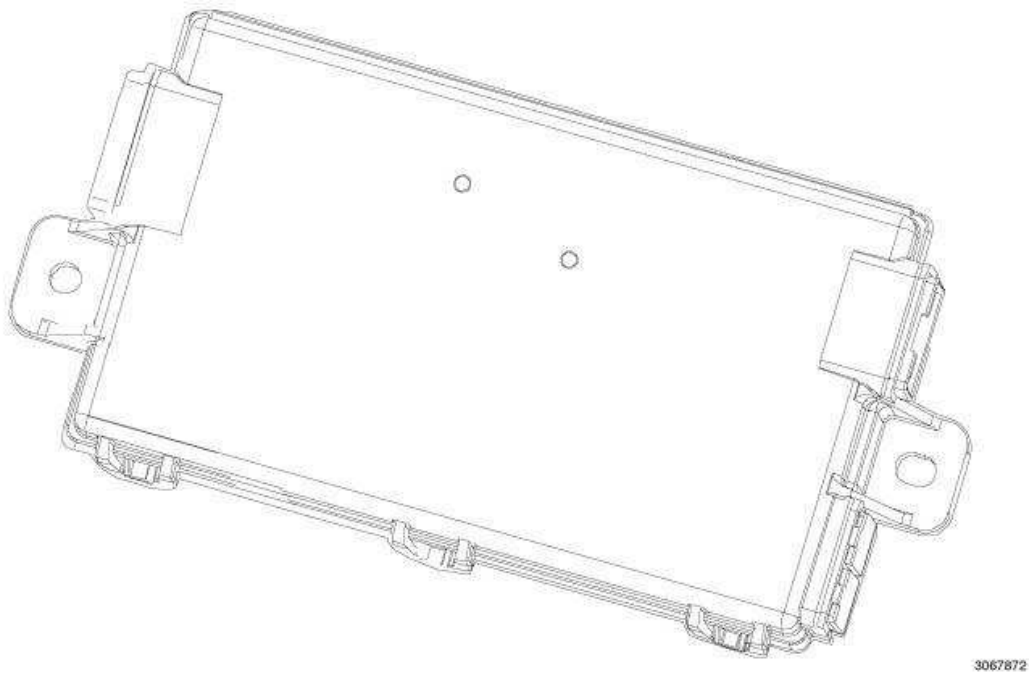


Fig. 378: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the valve springs are being reused, reassemble them into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.

3. Install the valve spring (2) and valve spring retainer (1).

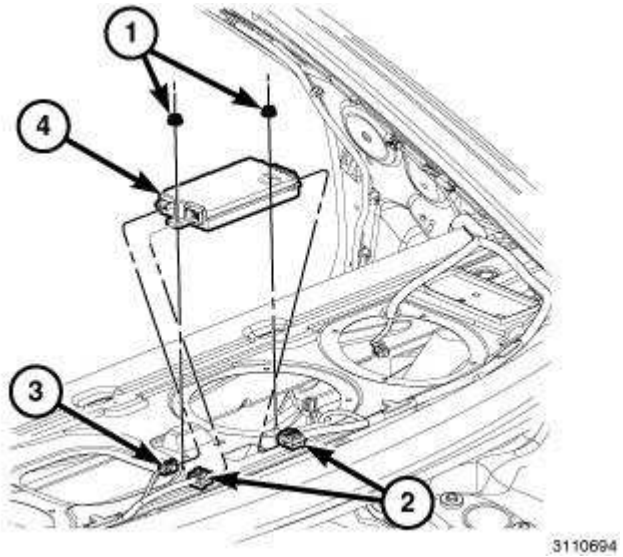


Fig. 379: Compressing Valve Spring & Locating Valve Retaining Locks
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 3 cylinder intake valve spring compression shown in illustration, all other valves similar.**

4. Compress valve springs (3) with the Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (2) mounted in the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1). Install the retaining locks (4) and release the valve spring compression.

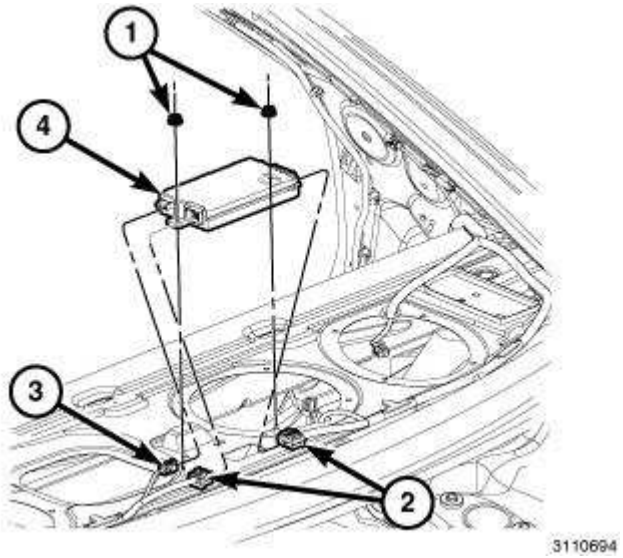


Fig. 380: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

5. If the valves or valve seats have been refinished, check the installed height of the valve springs (4). If the installed valve spring height (4) is greater than 40.0 mm (1.575 in.), install an additional spring seat (8) in the head counterbore under the original valve spring seat (8) to bring the spring height back within specification. Make sure the measurement is taken from the top of spring seat (6) to the bottom surface of spring retainer (1).
6. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION**.

TUBE, SPARK PLUG

REMOVAL

REMOVAL

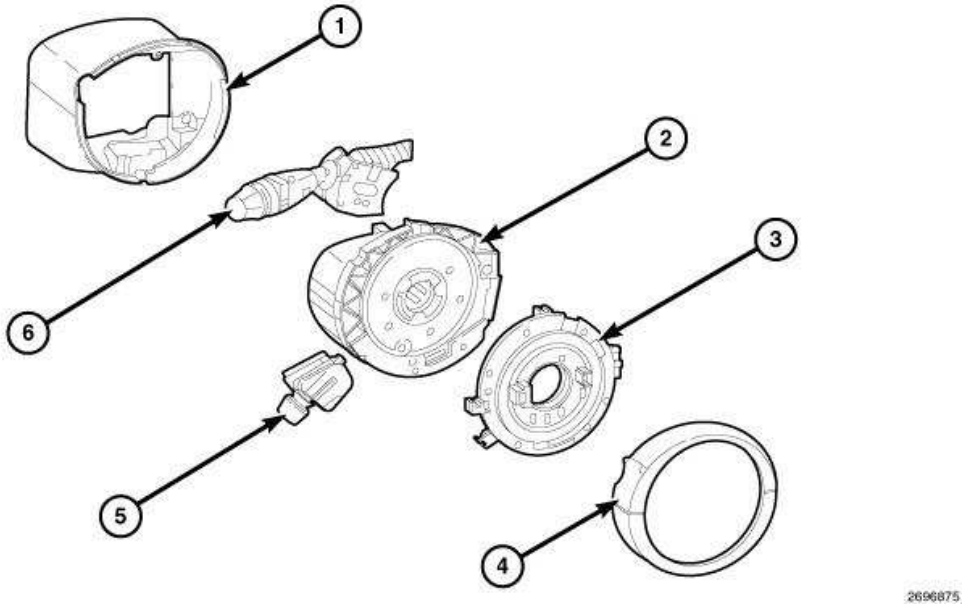


Fig. 381: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

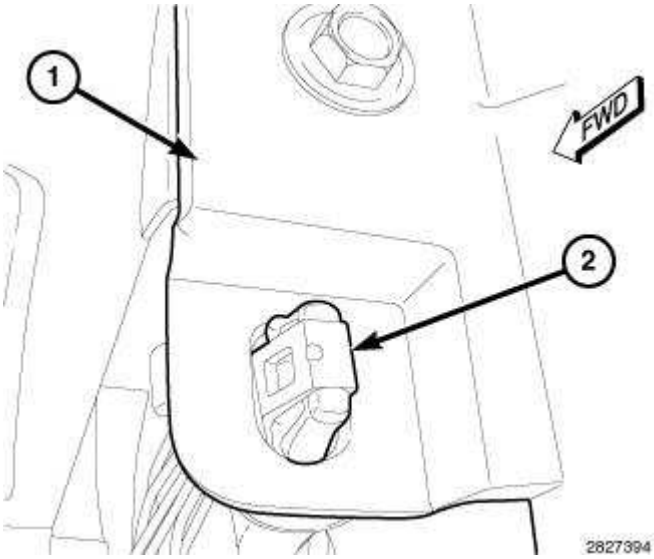


Fig. 382: Spark Plug Tube Installer & Spark Plug Tube
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the ignition coils. Refer to **COIL, IGNITION, REMOVAL** .
3. Using compressed air, blow out any dirt or contaminates from around the top of the spark plugs.

4. Remove the cylinder head cover(s). Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
5. Install the top half of Spark Plug Tube Installer (special tool #10255, Installer, Spark Plug Tube) (1) into the spark plug tube to be removed (2).

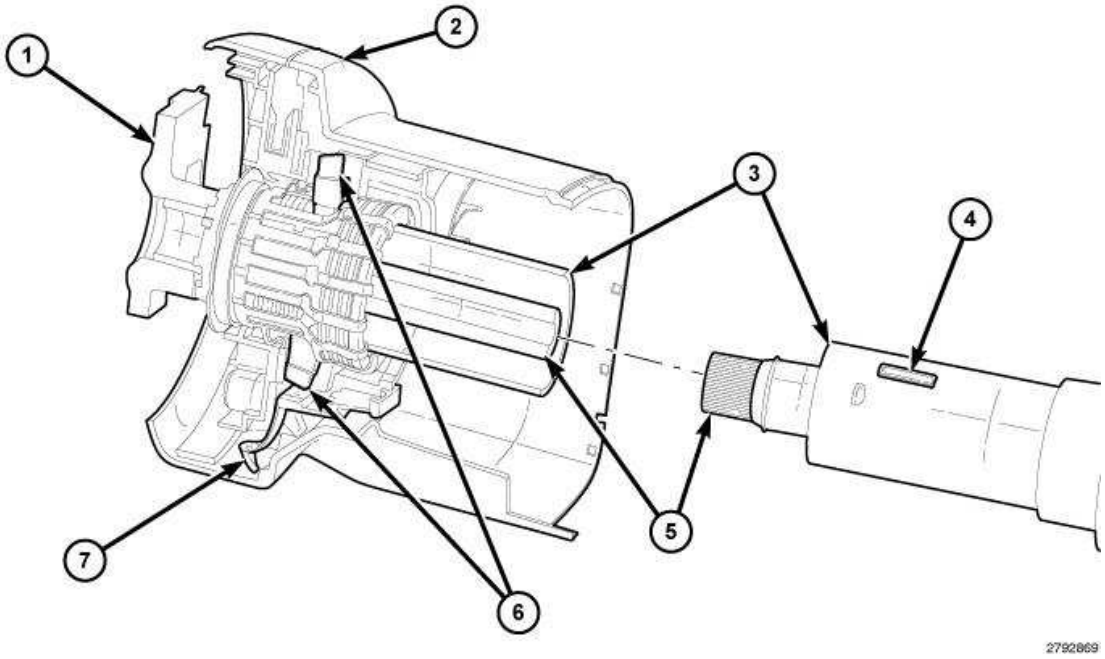


Fig. 383: Locking Pliers & Spark Plug Tube
Courtesy of CHRYSLER GROUP, LLC

6. Using suitable locking pliers (1), remove the spark plug tube (2) from the cylinder head and discard the tube.
7. Clean the area around the spark plug tube mounting with Mopar® Parts Cleaner or equivalent.

INSTALLATION

INSTALLATION

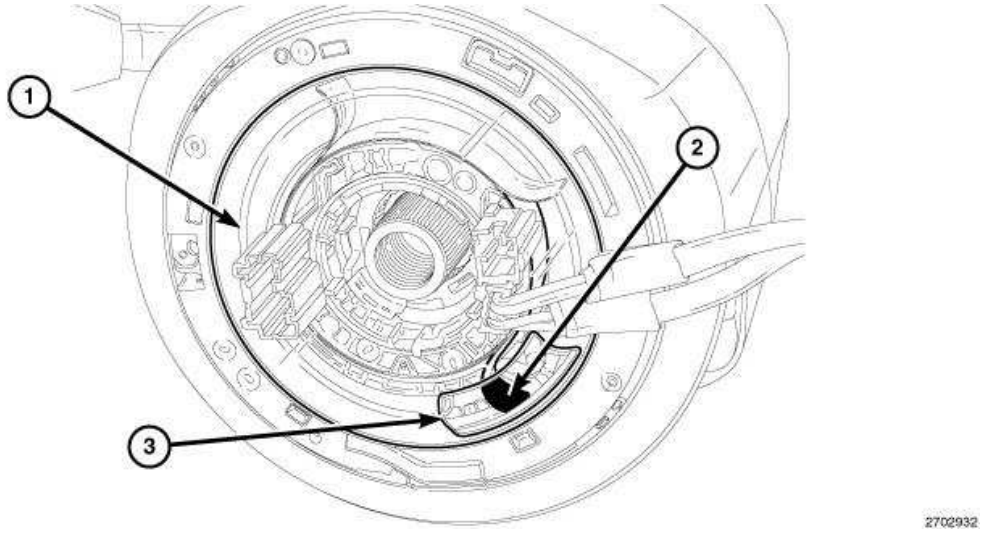


Fig. 384: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

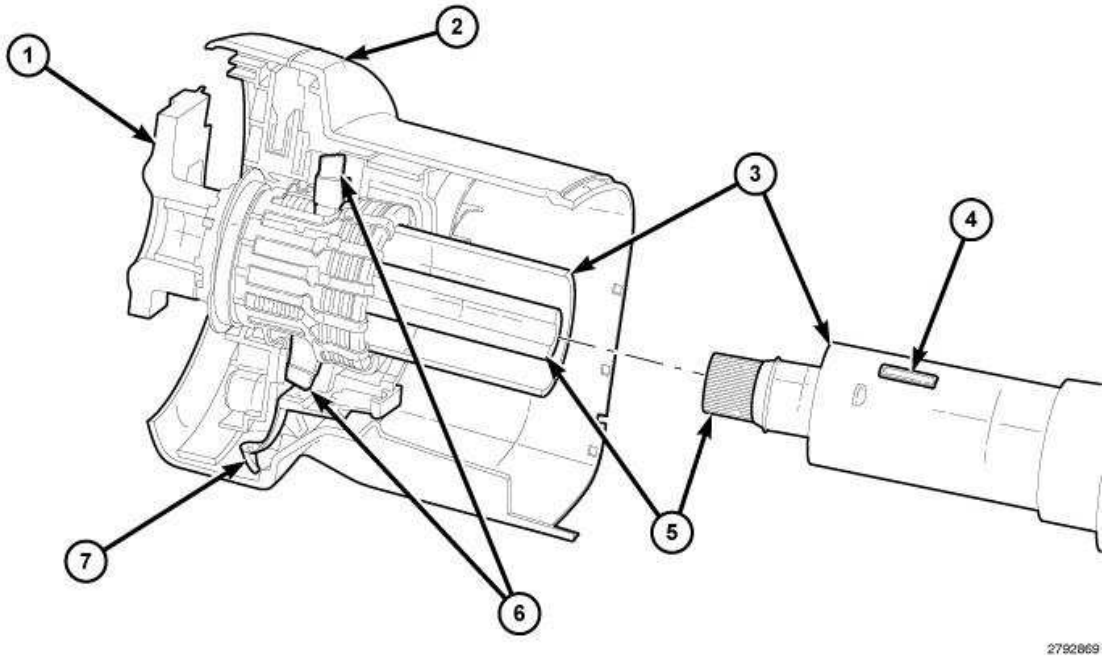


Fig. 385: Spark Plug Tube Installer
Courtesy of CHRYSLER GROUP, LLC

1. Remove the spark plug. Refer to **SPARK PLUG, REMOVAL** .
2. Install the lower half of Spark Plug Tube Installer (special tool #10255, Installer, Spark Plug

Tube) (1) into the cylinder head and tighten to 17.5 N.m (13 ft. lbs.).

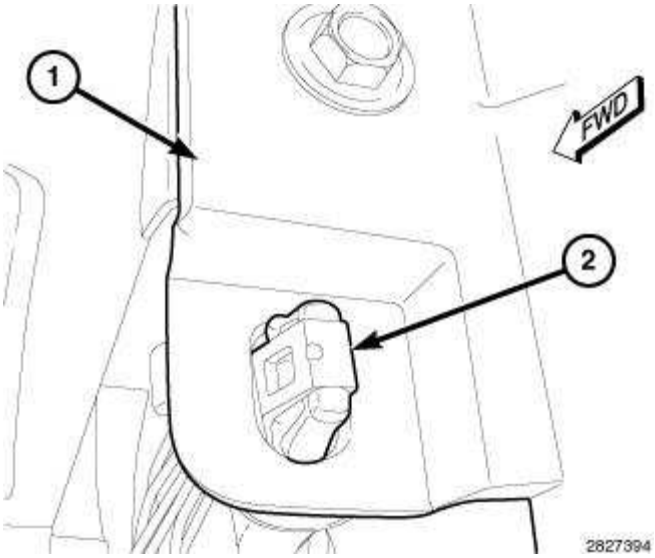


Fig. 386: Applying Stud & Bearing Mount Bead To Spark Plug Tube
Courtesy of CHRYSLER GROUP, LLC

3. Apply Mopar® Stud and Bearing Mount to the new spark plug tube approximately 3 mm (0.118 in.) from the end of the tube, in a 2 mm (0.078 in.) wide bead (1).

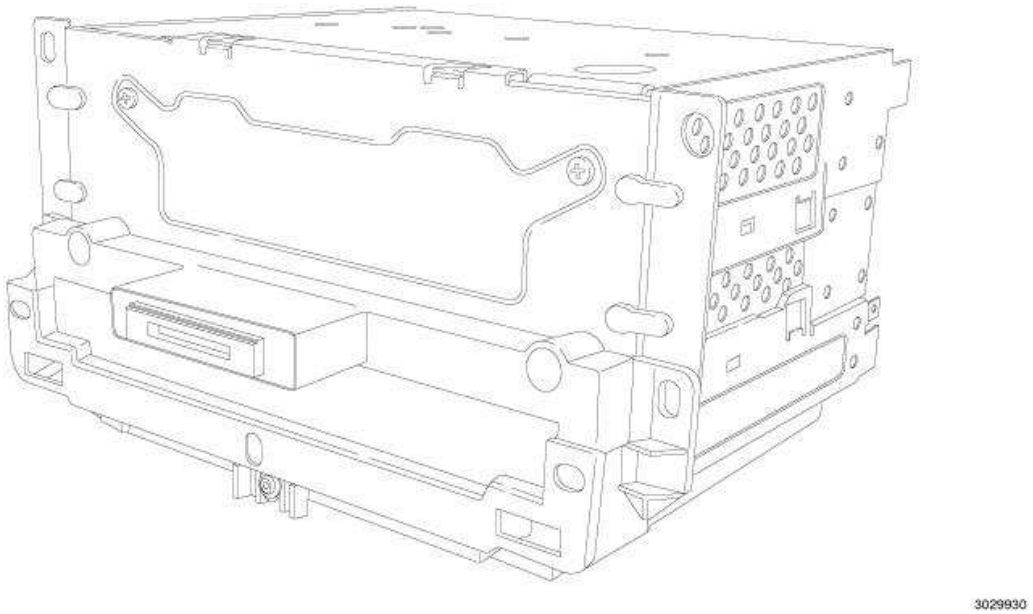


Fig. 387: Spark Plug Tube, Thrust Washers, Spark Plug Tube Installer & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Position the spark plug tube (3) on the top half of Spark Plug Tube Installer (special tool #10255, Installer, Spark Plug Tube) (2) and assemble the tool on the cylinder head. Make sure

there are two thrust washers (4) installed.

CAUTION: Do not overtighten the bolt (1). Overtightening can damage the cylinder head spark plug threads.

5. Tighten the bolt (1) to draw the spark plug tube into position. When the top half of the tool contacts the bottom half of the tool, the tube is installed.

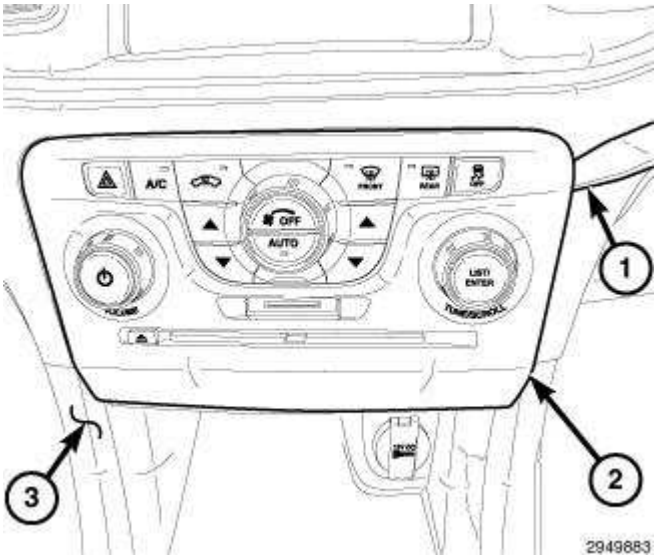


Fig. 388: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH cylinder head cover shown in illustration, RH cylinder head cover similar.

CAUTION: Spark plug torque is critical and must not exceed the specified value. Overtightening stretches the spark plug shell reducing its heat transfer capability resulting in possible catastrophic engine failure.

6. Install the spark plug and tighten to 17.5 N.m (13 ft. lbs.). Refer to **SPARK PLUG, INSTALLATION** .
7. If required, install a new spark plug tube seal (2). Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
8. Install the cylinder head cover(s). Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

VALVES, INTAKE AND EXHAUST

DESCRIPTION

DESCRIPTION

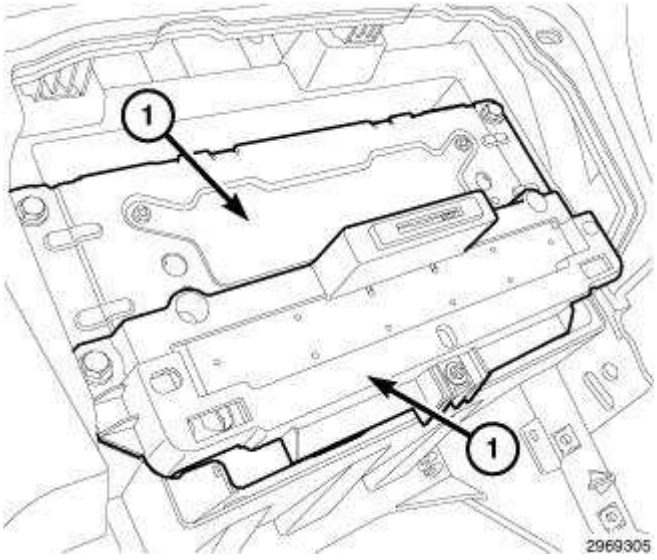


Fig. 389: Intake Valve & Exhaust Valve Component Configuration
Courtesy of CHRYSLER GROUP, LLC

The intake valve (6) is made from a one piece forged heat resistant (martensitic) steel. The exhaust valve (7) is a two piece construction with a forged (austenitic) head welded to the (martensitic) stem. Both valves have a nitrided surface treatment to prevent scuffing except at the tip and lock grooves. The four valves per cylinder are actuated by roller rocker arms, which pivot on stationary lash adjusters. All valves use three bead lock keepers (1) to retain springs (3) and to promote valve rotation.

STANDARD PROCEDURE

STANDARD PROCEDURE - REFACING INTAKE AND EXHAUST VALVES

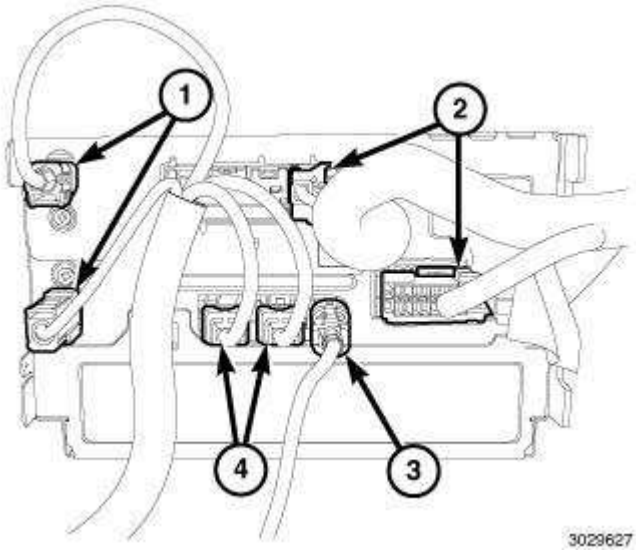


Fig. 390: Valve Face & Seat

Courtesy of CHRYSLER GROUP, LLC

1 - SEAT WIDTH
2 - FACE ANGLE
3 - SEAT ANGLE
4 - SEAT CONTACT AREA

The intake and exhaust valves have a 45.25 ± 0.25 degree face angle (1). The valve seats (2) have a 44.75 ± 0.25 degree face angle.

VALVES

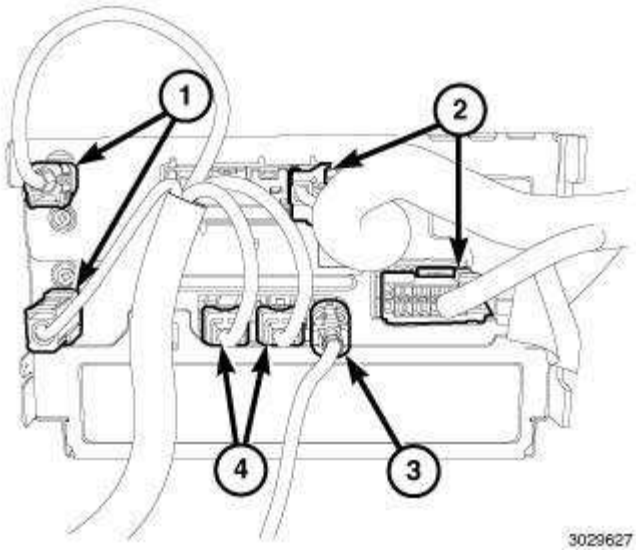


Fig. 391: Inspecting Valve Margin
Courtesy of CHRYSLER GROUP, LLC

Inspect the remaining margin (5) after the valves are refaced. Refer to **Engine - Specifications**.

VALVE SEATS

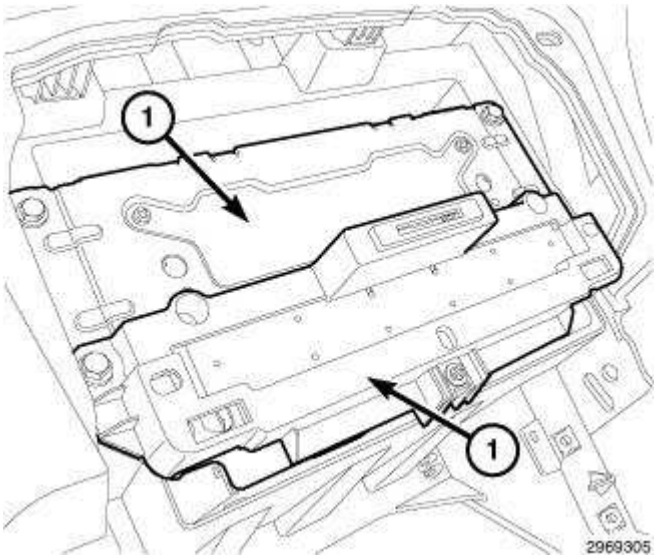


Fig. 392: Valve Face & Seat
Courtesy of CHRYSLER GROUP, LLC

1 - SEAT WIDTH
2 - FACE ANGLE
3 - SEAT ANGLE
4 - SEAT CONTACT AREA

NOTE: When refacing the valve seats, it is important that the correct size valve guide pilot be used for the reseating stones. A true and complete surface must be obtained.

1. Measure the concentricity of the valve seat using a dial indicator. Total runout should not exceed 0.050 mm (0.002 inch.) total indicator reading.
2. Inspect the valve seat (3) with Prussian blue to determine where the valve contacts the seat. To do this, coat the valve seat (3) **LIGHTLY** with Prussian blue then set the valve in place. Rotate the valve with light pressure. If the blue is transferred to the center of the valve face (4), contact is satisfactory. If the blue is transferred to the top edge of the valve face, then lower the valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, then raise the valve seat with a 65 degree stone.

   NOTE: Valve seats which are worn or burned can be reworked, provided that the correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.

3. When the seat is properly positioned the width of the intake seat should be 1.0 - 1.2 mm (0.04 - 0.05 in.) and the exhaust seats should be 1.41 - 1.61 mm (0.055 - 0.063 in.).

VALVE AND SPRING INSTALLED HEIGHT

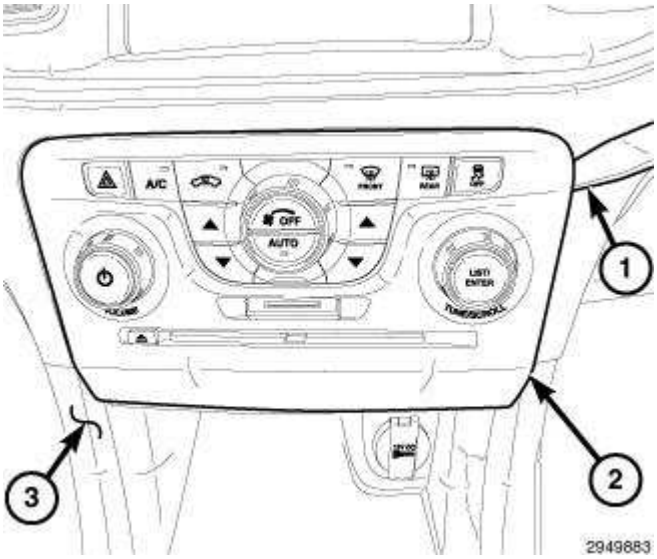


Fig. 393: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

1. Coat the valve stems (2) with clean engine oil and install the valves into the cylinder head.

   NOTE: If the valves are being reused, reassemble them into their original locations.

2. If the valves or valve seats have been refinished, check the valve tip height (5). If the valve tip height (5) exceeds the specification, grind the valve tip until it is within specification. Refer to **Engine - Specifications**. Make sure the measurement is taken from the cylinder head surface (7) to the top of the valve stem (2).

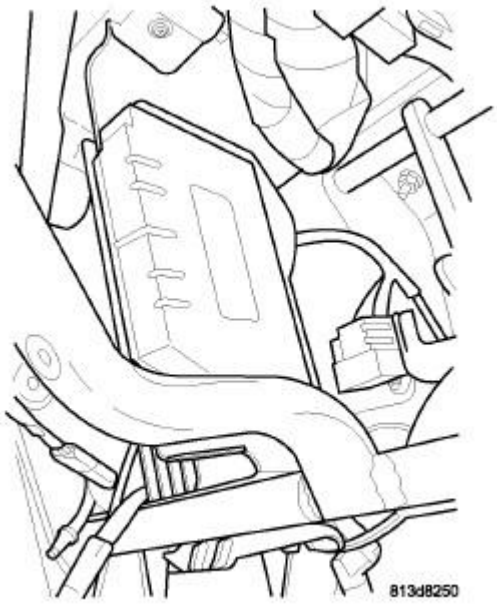


Fig. 394: Spring Seat, Valve Guide Seal & Garter Spring
Courtesy of CHRYSLER GROUP, LLC

3. If removed, install the spring seat (3) and valve guide seal (1) over the valve guide. Refer to **SEAL(S), VALVE GUIDE, INSTALLATION**.

NOTE: **Ensure that the garter spring (2) is intact around the top of the valve guide seal (1). Number 5 cylinder exhaust valve guide seal shown in illustration, all other valves similar.**

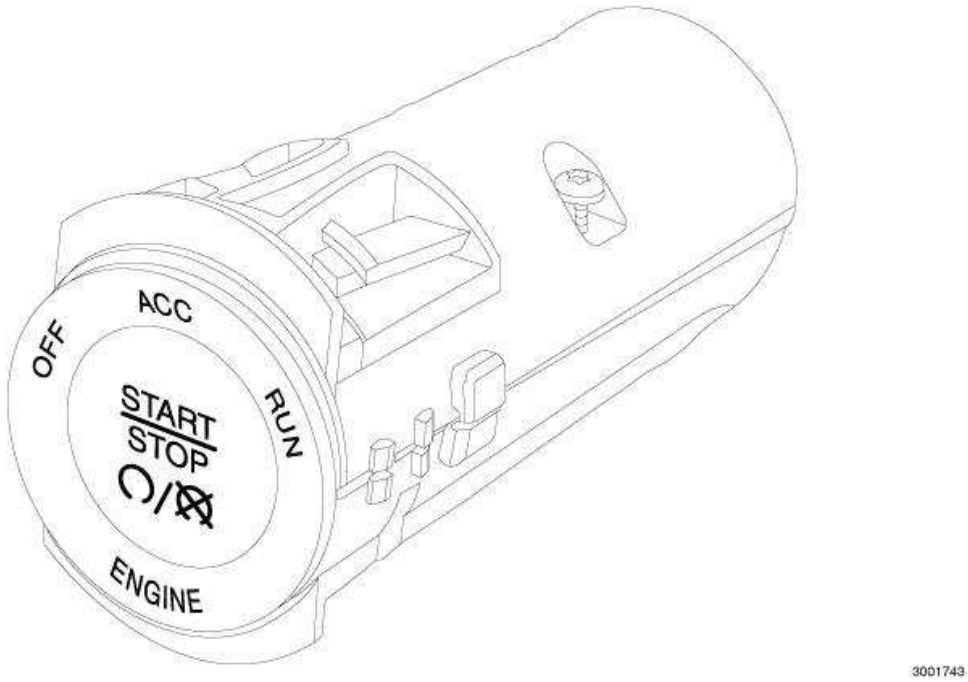


Fig. 395: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the valve springs are being reused, reassemble them into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.

4. Install the valve spring (2) and valve spring retainer (1).

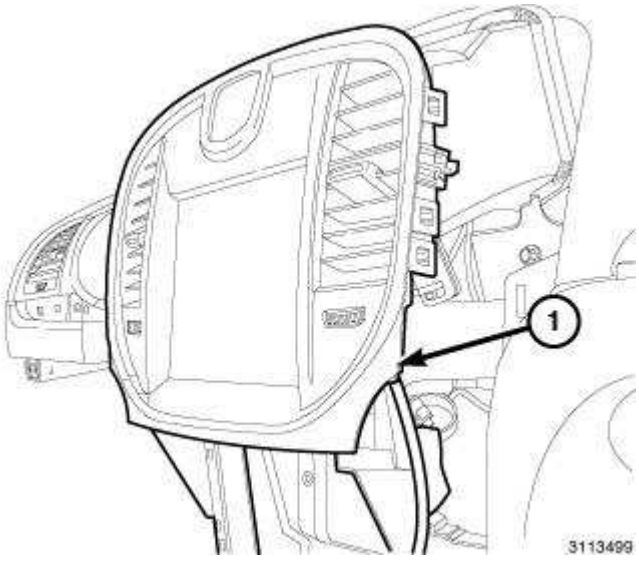


Fig. 396: Compressing Valve Spring & Locating Valve Retaining Locks
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 3 cylinder intake valve spring compression shown in illustration, all other valves similar.**

5. Compress valve springs (3) with the Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (2) mounted in the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1). Install the retaining locks (4) and release the valve spring compression.

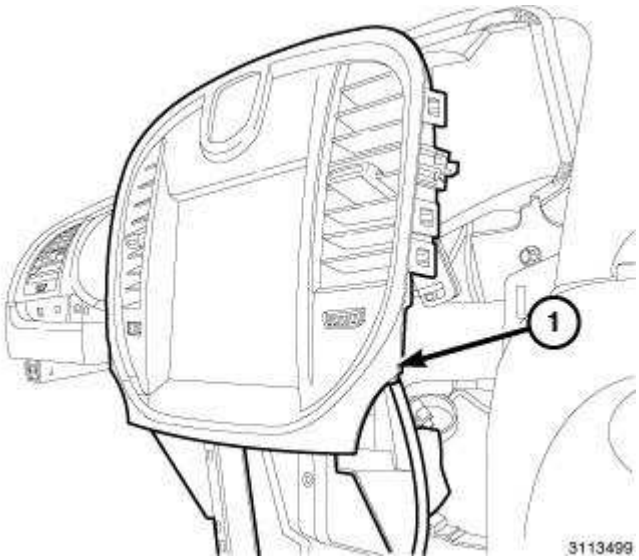


Fig. 397: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

6. If the valves or valve seats have been refinished, check the installed height of the valve springs (4). If the installed valve spring height (4) is greater than 40.0 mm (1.575 in.), install a second spring seat (8) in the head counterbore under the valve spring seat (8) to bring the spring height back within specification. Make sure the measurement is taken from the top of spring seat (6) to the bottom surface of spring retainer (1).

REMOVAL

REMOVAL

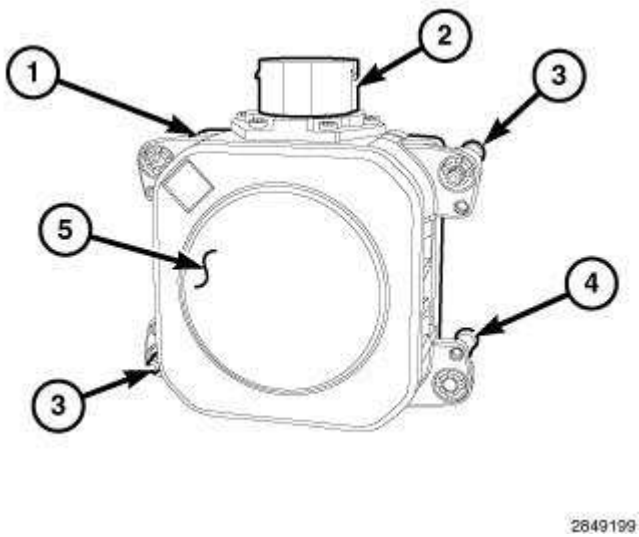


Fig. 398: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL**.

   NOTE: If the springs are to be reused, identify their positions so that they can be reassembled into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valve springs similar.

2. Remove the valve spring(s) (2). Refer to **SPRING(S), VALVE, REMOVAL**.

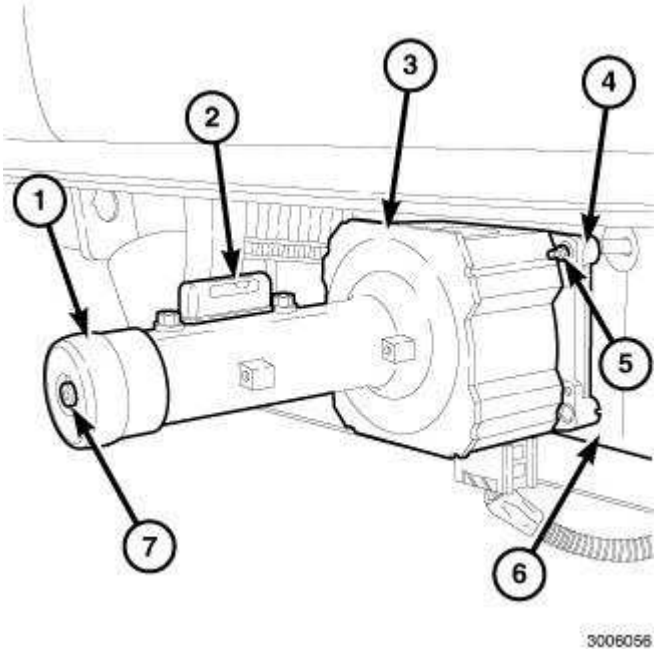


Fig. 399: Inspecting Valve Margin
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before removing the valves, remove any burrs from the valve stem retainer lock grooves (2) and stem tip (1) to prevent damage to the valve guides.

3. Remove the valve(s) (3). Identify each valve to ensure installation in the original location.

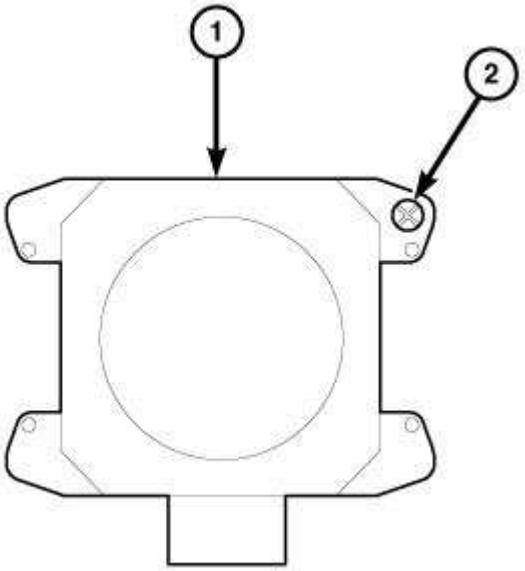


Fig. 400: Spring Seat, Valve Guide Seal & Garter Spring
Courtesy of CHRYSLER GROUP, LLC

4. If required, remove the valve guide seal (1) and spring seat (3). Refer to **SEAL(S), VALVE GUIDE, REMOVAL**.

INSPECTION

INSPECTION

VALVES

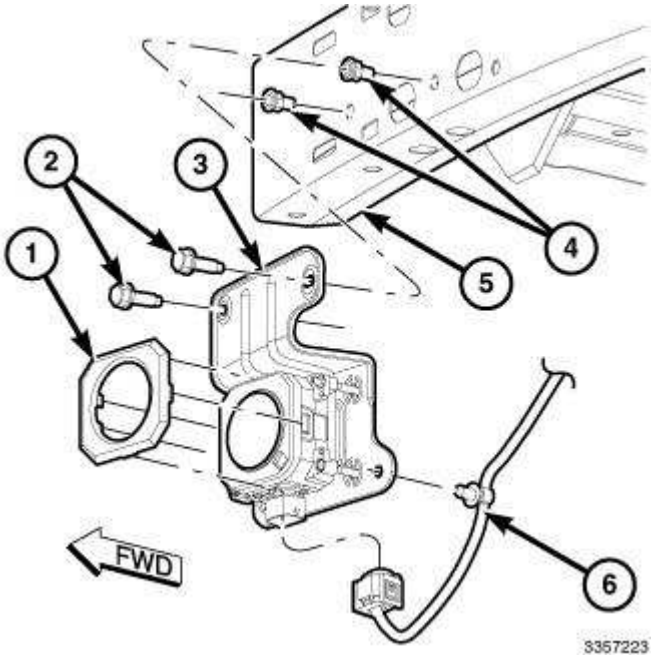


Fig. 401: Inspecting Valve Margin
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the valves thoroughly. Replace burned, warped and cracked valves.
2. Inspect the retainer lock grooves for wear or damage (2).
3. Inspect the valve face (4) for wear and pitting.
4. Measure the valve stems (3) and margins (5) for wear. Refer to **Engine - Specifications**.

VALVE GUIDES

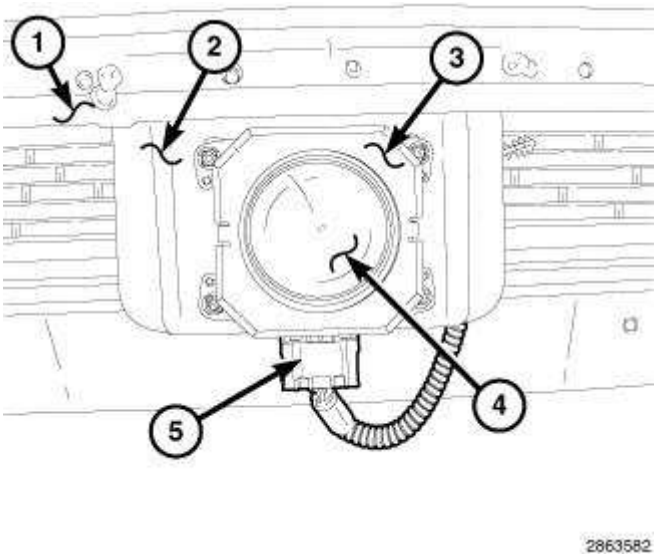


Fig. 402: Measuring Valve Guide Wear
Courtesy of CHRYSLER GROUP, LLC

1. Remove carbon and varnish deposits from inside of the valve guides with a reliable guide cleaner.
2. Measure valve stem-to-guide clearance as follows:
3. Install the valve (2) into the cylinder head so that it is 15 mm (0.590 inch.) off of the valve seat. A small piece of hose may be used to hold the valve in place.
4. Attach the Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to the cylinder head and set it at a right angle to the valve stem being measured.
5. Move the valve to and from the indicator. Compare this reading to the specification. Refer to **Engine - Specifications**.

NOTE: If stem-to-guide clearance exceeds specifications, you must measure the valve stem. If the valve stem is within specification or if the valve guide is loose in the cylinder head, replace the cylinder head.

INSTALLATION

INSTALLATION

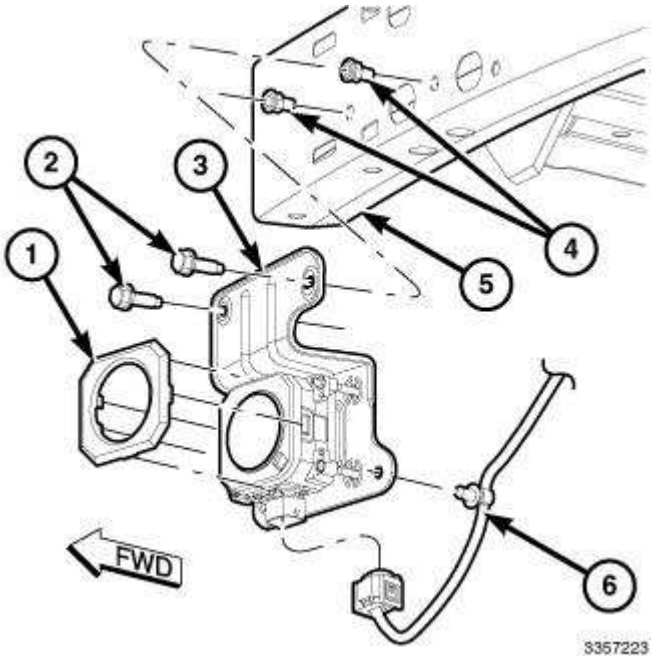


Fig. 403: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

1. Coat the valve stems (2) with clean engine oil and install the valves into the cylinder head.

NOTE: If the valves are being reused, reassemble them into their original locations.

2. If the valves or valve seats have been refinished, check the valve tip height (5). If the valve tip

height (5) exceeds the specification, grind the valve tip until it is within specification. Refer to **Engine - Specifications**. Make sure the measurement is taken from the cylinder head surface (7) to the top of the valve stem (2).

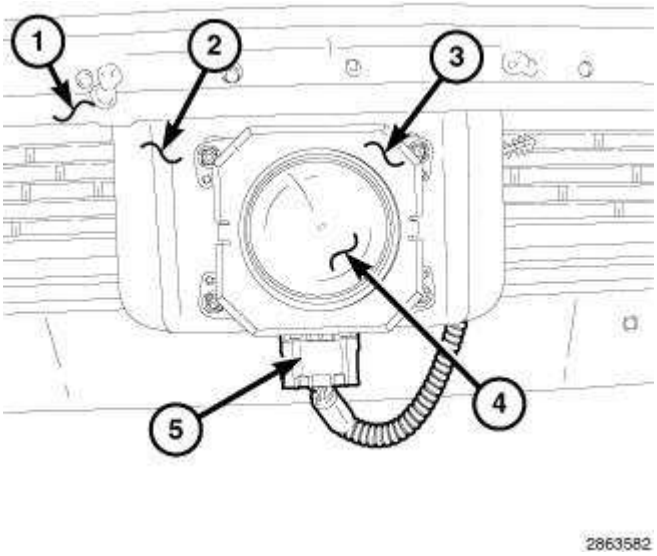


Fig. 404: Spring Seat, Valve Guide Seal & Garter Spring
Courtesy of CHRYSLER GROUP, LLC

3. If removed, install the spring seat (3) and valve guide seal (1) over the valve guide. Refer to **SEAL(S), VALVE GUIDE, INSTALLATION**.

NOTE: Ensure that the garter spring (2) is intact around the top of the valve guide seal (1). Number 5 cylinder exhaust valve guide seal shown in illustration, all other valves similar.

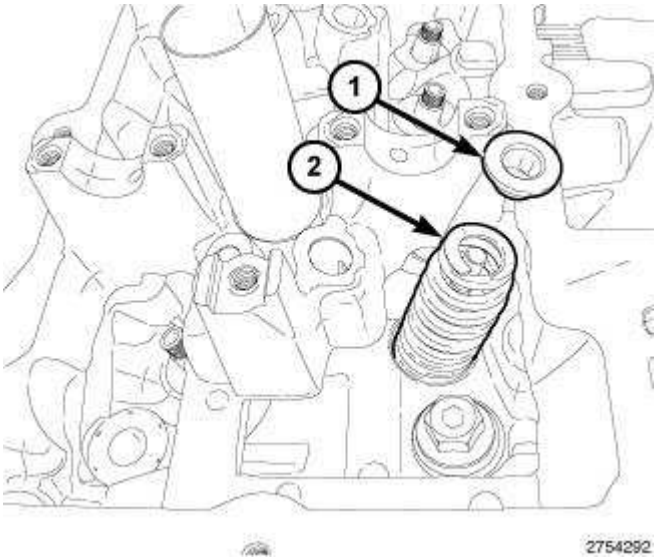


Fig. 405: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve spring(s) (2). Refer to **SPRING(S), VALVE, INSTALLATION**.

NOTE: **Reassemble the valves springs into their original locations. If the valves or valve seats have been refinished, verify that the valve spring installed height is within specification. Refer to Engine - Specifications. Number 5 cylinder exhaust valve spring shown in illustration, all other valves springs similar.**

5. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION**.

ENGINE BLOCK

DESCRIPTION

DESCRIPTION

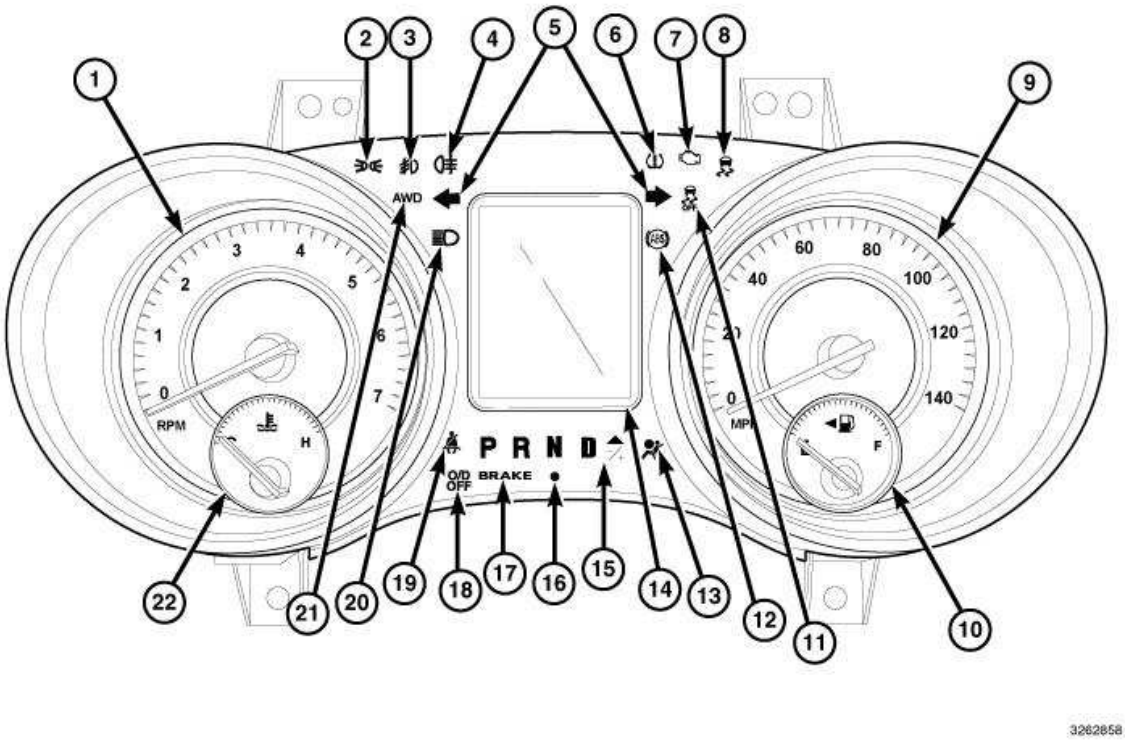


Fig. 406: Cylinder Block & Main Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

The cylinder block is a 60 degree high-pressure die cast aluminum design with cast steel cylinder liners. The leading side of the block is on the right side and houses cylinders 1, 3 and 5. The cylinder block is an open deck design with cut slots between each cylinder. Two knock sensors are located in the block valley. The cylinder block has three sets of piston cooling jets which are attached to the main oil gallery. The four powdered metal main bearing caps are a cross-bolted design and have directional arrows molded into the caps. The number 2 main bearing is the location for the two piece

upper half thrust bearings. The thrust bearings are installed with the oil groves facing outward. The main bearing caps are a 6-bolt design and cross-bolted for improved lower end strength. There are three oil drain back drillings located on each of the cylinder banks.

STANDARD PROCEDURE

MEASURING BEARING CLEARANCE USING PLASTIGAGE

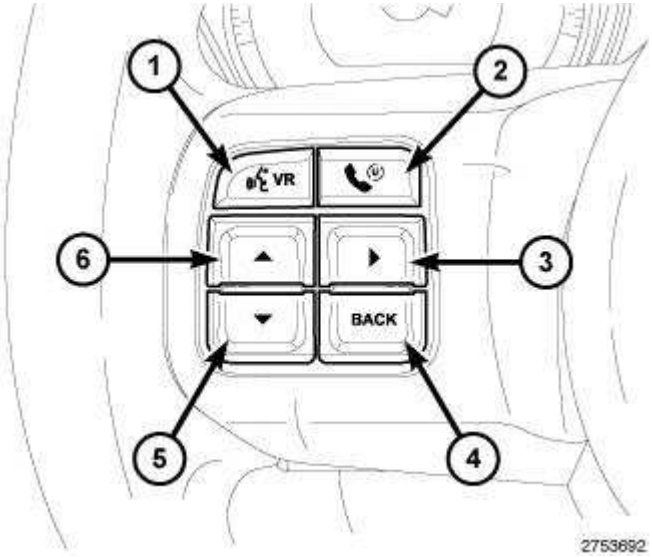


Fig. 407: Plastigage Placed In Lower Shell
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical crankshaft journal shown in illustration.

Engine crankshaft and connecting rod bearing clearances can be determined by the use of Plastigage or equivalent. The following is the recommended procedure for the use of Plastigage:

1. Remove the oil film from surface to be checked. Plastigage is soluble in oil.
2. Place a piece of Plastigage (1) across the entire width of the journal (In addition, suspected areas can be checked by placing the Plastigage in the suspected area). Plastigage must not crumble in use. If brittle, obtain fresh stock.
3. Torque the bearing cap bolts of the bearing being checked to the proper specifications. Refer to **Engine - Specifications**.

NOTE: DO NOT rotate the crankshaft. Plastigage will smear, causing inaccurate results.

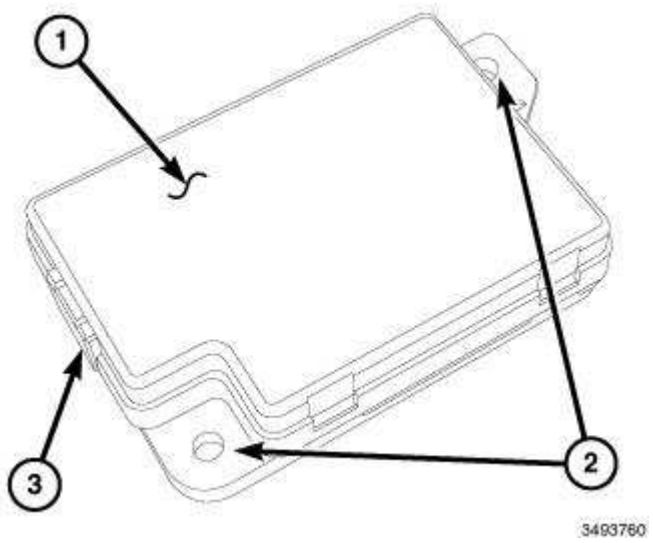


Fig. 408: Measuring Bearing Clearance With Plastigage
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical connecting rod cap shown in illustration.

4. Remove the bearing cap and compare the width of the flattened Plastigage (2) with the scale provided on the package (1). Locate the band closest to the same width. This band shows the amount of clearance. Differences in readings between the ends indicate the amount of taper present or the possibility of foreign material trapped under the bearing insert.
5. Record all readings taken. Compare clearance measurements to engine specifications. Refer to **Engine - Specifications**.

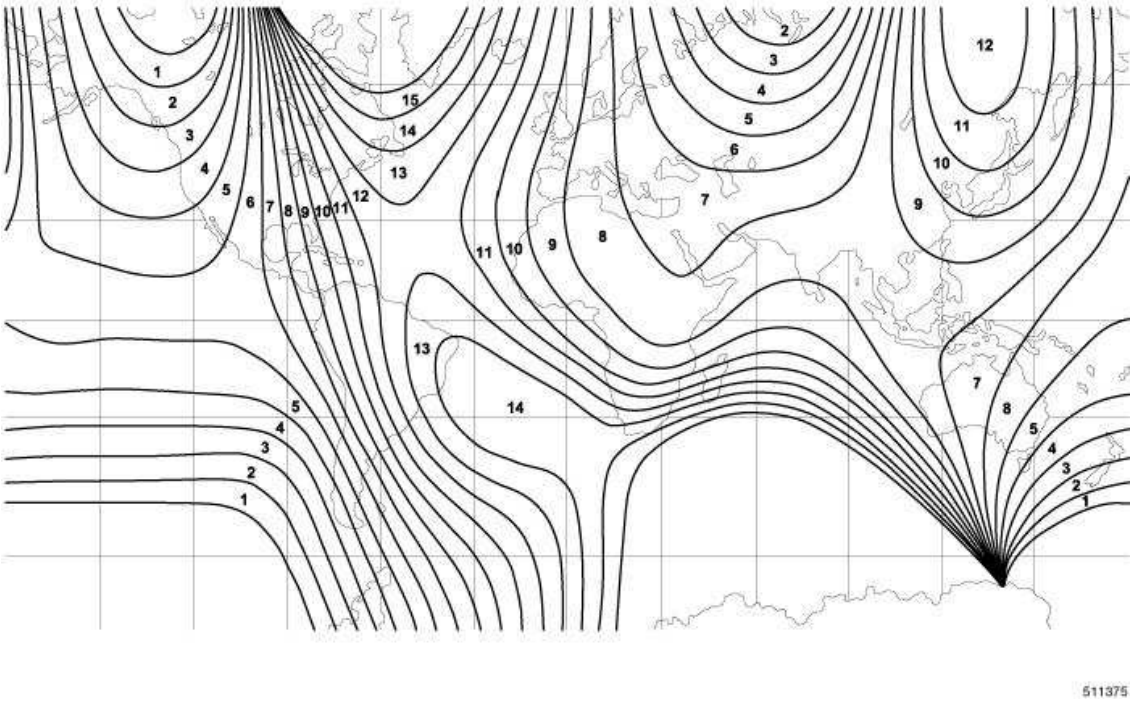


Fig. 409: Checking Connecting Rod Bearing Clearance With Plastigage
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical connecting rod journal shown in illustration.**

NOTE: **Plastigage is available in a variety of clearance ranges. Use the most appropriate range for the specifications you are checking. Plastigage generally is accompanied by two scales. One scale is in inches, the other is a metric scale.**

6. Install the proper bearings to achieve the specified bearing clearances.
7. Repeat the Plastigage measurement to verify your bearing selection prior to final assembly.

CYLINDER BORE HONING

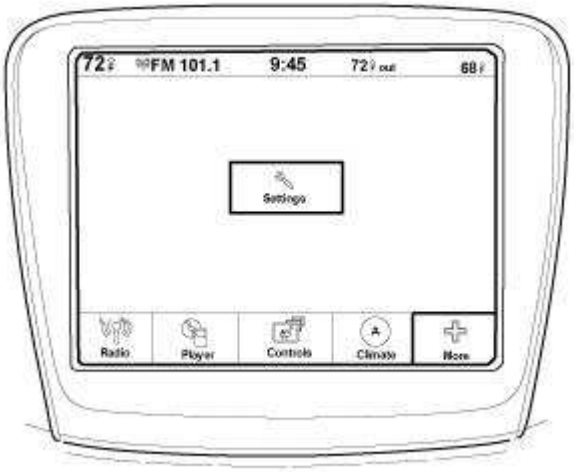


Fig. 410: Cylinder Bore Crosshatch Pattern
Courtesy of CHRYSLER GROUP, LLC

Before honing, stuff plenty of clean shop towels under the bores and over the crankshaft to keep abrasive materials from entering the crankshaft area.

1. Used carefully, a cylinder bore sizing hone equipped with 220 grit stones, is the best tool for this job. In addition to deglazing, it will reduce taper and out-of-round, as well as removing light scuffing, scoring and scratches. Usually, a few strokes will clean up a bore and maintain the required limits.

   CAUTION: DO NOT use rigid type hones to remove cylinder wall glaze.

2. Deglazing of the cylinder walls may be done if the cylinder bore is straight and round. Use of a cylinder surfacing hone equipped with 280 grit stones, about 20-60 strokes, depending on the bore condition, will be sufficient to provide a satisfactory surface. Use a light honing oil, available from major oil distributors.

   CAUTION: DO NOT use engine or transmission oil, mineral spirits, or kerosene.

3. Honing should be done by moving the hone up and down fast enough to get a crosshatch pattern. The hone marks should INTERSECT at 50° to 60° for proper seating of rings.
4. A controlled hone motor speed between 200 and 300 RPM is necessary to obtain the proper crosshatch angle (1). The number of up and down strokes per minute can be regulated to get the desired 50° to 60° angle (2). Faster up and down strokes increase the crosshatch angle.
5. After honing, it is necessary that the block be cleaned to remove all traces of abrasive. Use a brush to wash parts with a solution of hot water and detergent. Dry parts thoroughly. Use a

clean, white, lint-free cloth to check that the bore is clean. Oil the bores after cleaning to prevent rusting.

INSPECTION

INSPECTION

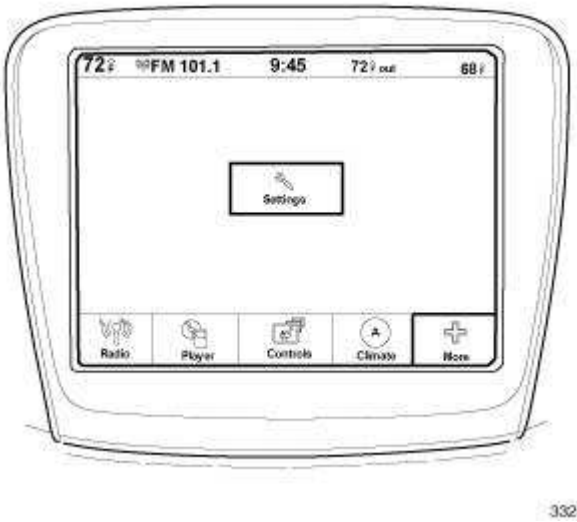


Fig. 411: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the main bearing inserts (1 and 2) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes, or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, wear or blueing.
6. Replace any bearing that shows abnormal wear. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the cylinder block main bearing bores show damage the engine block must be replaced.

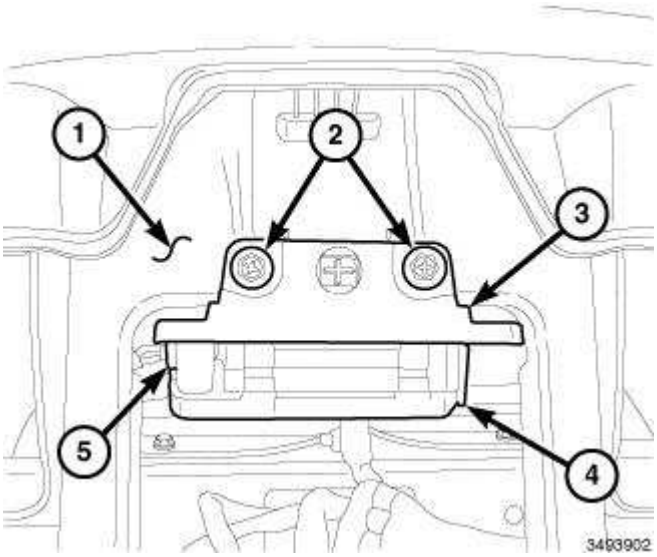


Fig. 412: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

9. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) INCREMENTS is required. If a bore gauge is not available, do not use an inside micrometer.
10. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90 degrees) to the axis of the crankshaft at point A (1).
11. Repeat the measurement near the middle of the bore, then repeat the measurement near the bottom of the bore.
12. Determine taper by subtracting the smaller diameter from the larger diameter.
13. Rotate measuring device 90° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specifications. Refer to **Engine - Specifications**.
14. Determine out-of-roundness by comparing the difference between A and B at each of the three levels. Verify that the maximum out of round is within specifications. Refer to **Engine - Specifications**.
15. If cylinder bore taper and out-of-roundness are within specification, the cylinder bore can be honed. Refer to **Engine/Engine Block - Standard Procedure**. If the cylinder bore taper or out-of-round condition exceeds the maximum limits, the cylinder block must be replaced.

NOTE: A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.

BEARING(S), CONNECTING ROD

STANDARD PROCEDURE

CONNECTING ROD BEARING FITTING

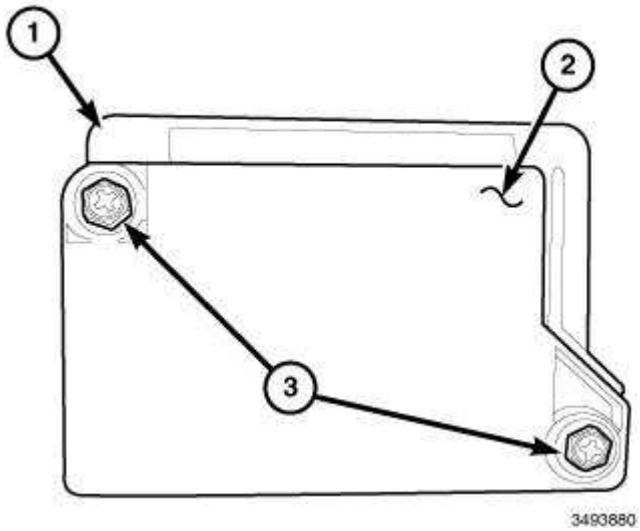


Fig. 413: Connecting Rod Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

The connecting rod bearings are "select fit" to achieve proper oil clearance. Connecting rod bearing journal diameter grade markings (2) are stamped into the front crankshaft counterweight. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4, 5, 6. Select the bearing size that corresponds to the crankshaft markings for each rod bearing journal.

Connecting rod bearing journal diameter grade markings correspond to specific journal diameters. The chart below identifies the three crankshaft grade markings and their associated journal diameters.

Crankshaft Marking	Journal Size mm (in.)
1	58.9910 - 58.9969 mm (2.3225 - 2.3227 in.)
2	58.9970 - 59.0029 mm (2.3227 - 2.3229 in.)
3	59.0030 - 59.0090 mm (2.3229 - 2.3232 in.)

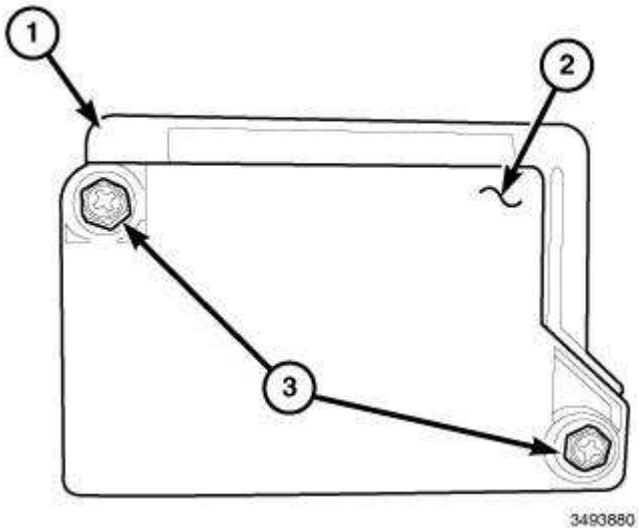


Fig. 414: Connecting Rod Bearing Shells & Bearing Size
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the rod bearings in pairs. Do not mix sizes or use a new bearing half with an old bearing half.

The connecting rod bearing shells (1) are marked with the bearing size (2) on the bearing lining surface. The bearings are available in three different sizes in order to achieve the desired oil clearance.

Rod bearing shells are available in three sizes. The chart below identifies the three bearing sizes.

Bearing Marking	Size mm (in.)
1	1.583 - 1.580 mm (0.0623 - 0.0622 in.)
2	1.580 - 1.577 mm (0.0622 - 0.0621 in.)
3	1.577 - 1.574 mm (0.0621 - 0.0620 in.)

Bearing oil clearance can also be determined by using Plastigage or equivalent. Refer to **Engine/Engine Block - Standard Procedure**.

CONNECTING ROD BEARING REPLACEMENT

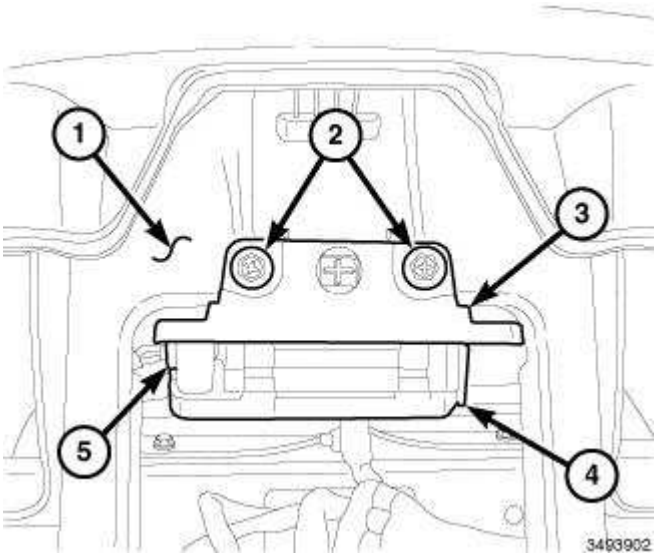


Fig. 415: Connecting Rod Bearing Shells & Bearing Size
Courtesy of CHRYSLER GROUP, LLC

The connecting rod bearings (1) are serviced in-vehicle. They must be replaced one-at-a-time in order to prevent the pistons from contacting the valves. The connecting rod bearings are "select fit" to achieve proper oil clearances. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.

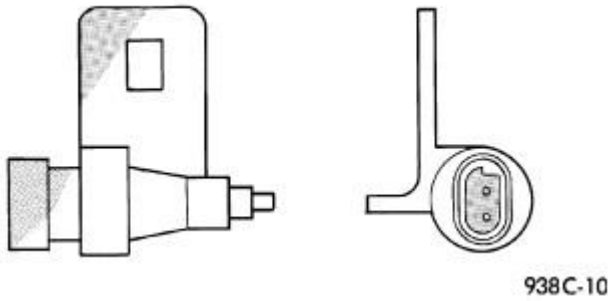


Fig. 416: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
3. Remove the oil pan, oil pump pick-up and engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
4. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).

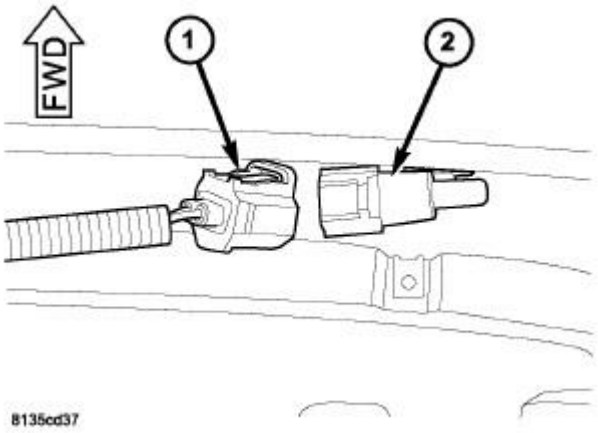


Fig. 417: Connecting Rod To Cylinder Identification
Courtesy of CHRYSLER GROUP, LLC

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

5. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

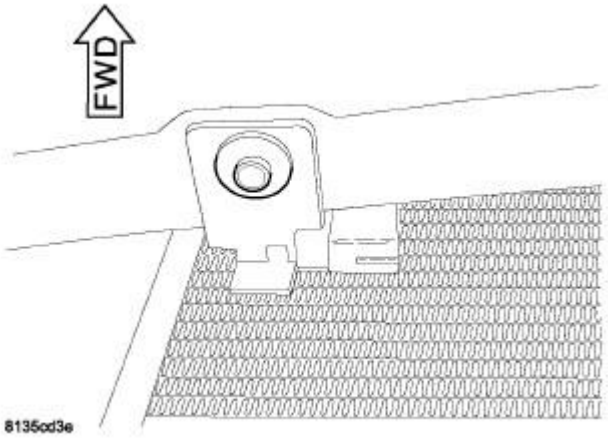


Fig. 418: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

CAUTION: Replace only one connecting rod bearing at a time while all other connecting rod bearing caps remain properly tightened. If all

connecting rod bearing caps are removed, crankshaft rotation will result in valve and/or piston damage.

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

6. Remove the connecting rod cap bolts (5) and the connecting rod cap (4). Discard the cap bolts.
7. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod being removed.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

8. Rotate the crankshaft away from the connecting rod and remove the bearing shell.
9. If required, select and fit new bearings to the connecting rod. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
10. Install the bearing shell (8) on the connecting rod with the tang inserted into the machined groove in the rod. Lubricate the bearing surface with clean engine oil.
11. Rotate the crankshaft while guiding the connecting rod into position over the rod journal.

CAUTION: The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.

12. Install the bearing shell (6) on the connecting rod cap (4) with the tang inserted into the machined groove in the cap. Lubricate the bearing surface with clean engine oil.

NOTE: Do not lubricate the threads of the connecting rod cap bolts (5).

13. Install the connecting rod cap and bearing with the tang on the same side as the rod. Tighten the **NEW** connecting rod cap bolts (5) to 20 N.m (15 ft. lbs.) plus 90°.
14. If required, check the connecting rod side clearance. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.
15. Repeat the previous steps for each connecting rod bearing being replaced.

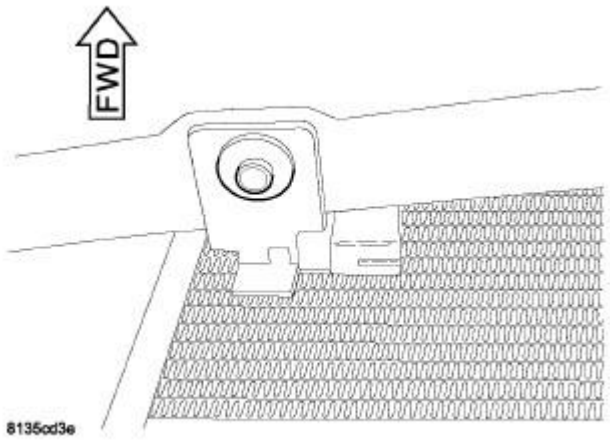


Fig. 419: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

16. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

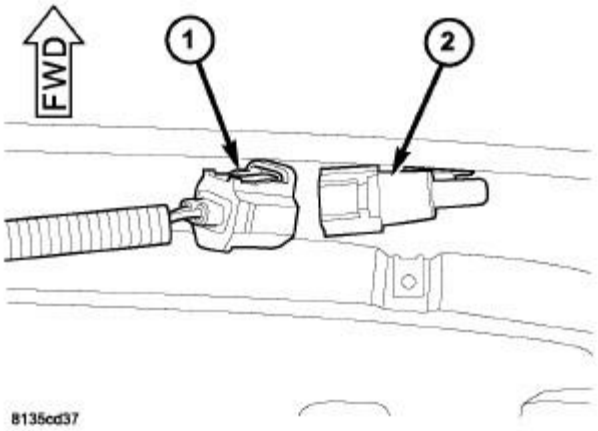


Fig. 420: Windage Tray With Main Bearing Cap Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

17. Install the windage tray with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to 21 N.m (16 ft. lbs.) plus 90°.
18. Install the engine oil pump, oil pump pick-up and oil pan. Refer to **PUMP, ENGINE OIL, INSTALLATION**.
19. Install the spark plugs and ignition coils. Refer to **SPARK PLUG, INSTALLATION** .

20. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
21. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
22. Operate the engine until it reaches normal operating temperature.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

MAIN BEARING FITTING

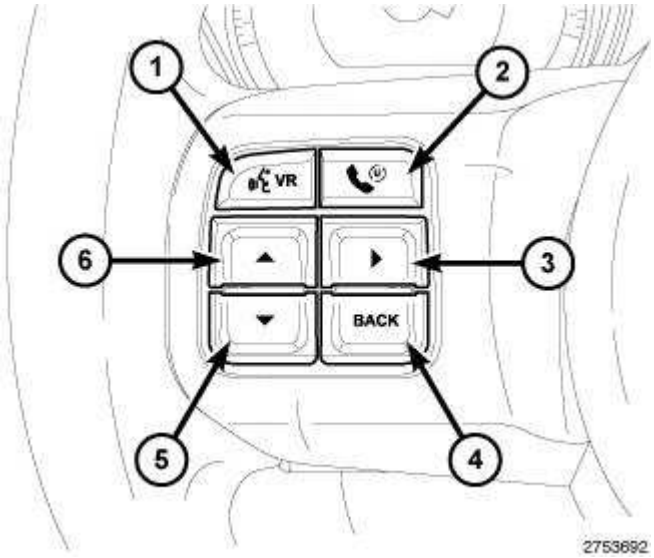


Fig. 421: Connecting Rod Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

The upper and lower main bearings are "select fit" to achieve proper oil clearances. Crankshaft main bearing journal diameter grade markings (1) are stamped into the front crankshaft counterweight. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4.

Crankshaft main bearing journal diameter grade markings correspond to specific journal diameters. The chart below identifies the five crankshaft grade markings and their associated journal diameters.

Crankshaft Marking	Journal Size mm (in.)
1	71.9870 - 71.9905 mm (2.8341 - 2.8343 in.)
2	71.9906 - 71.9941 mm (2.8343 - 2.8344 in.)
3	71.9942 - 71.9977 mm (2.8344 - 2.8345 in.)
4	71.9978 - 72.0013 mm (2.8346 - 2.8347 in.)
5	72.0014 - 72.0050 mm (2.8347 - 2.8348 in.)

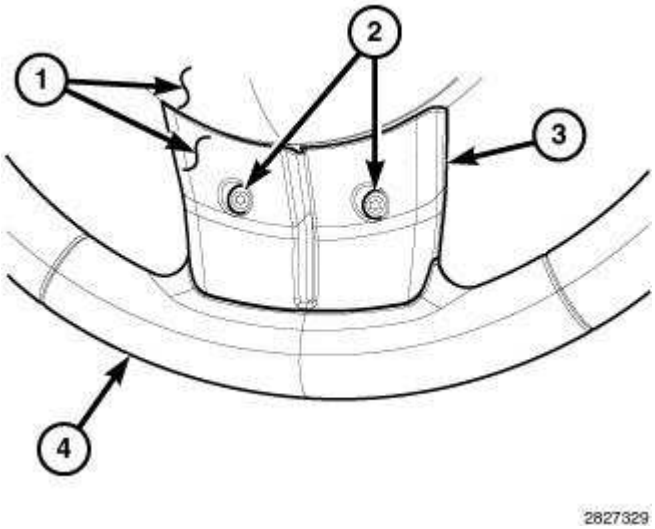


Fig. 422: Engine Block Main Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

Engine block main bearing journal diameter grade markings (2) are stamped into the left side of the engine block. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4.

Engine block main bearing journal grade markings correspond to specific journal diameters. The chart below identifies the five engine block grade markings and their associated journal diameters.

Engine Block Marking	Journal Size mm (in.)
1	77.0055 - 77.0090 mm (3.0317 - 3.0318 in.)
2	77.0019 - 77.0054 mm (3.0316 - 3.0317 in.)
3	76.9983 - 77.0018 mm (3.0314 - 3.0316 in.)
4	76.9947 - 76.9982 mm (3.0313 - 3.0314 in.)
5	76.9910 - 76.9946 mm (3.0311 - 3.0313 in.)

For upper and lower main bearing selection, obtain the grade identification marks from the crankshaft and engine block. Main bearings are available in five sizes. Upper and lower sizes can be mixed on a journal in order to achieve the desired oil clearance. The chart below identifies the five sizes available and how they should be selected based on crankshaft and engine block grade markings.

Engine Block Marking	Crankshaft Marking				
	1	**2**	**3**	**4**	**5**
1	1/1	1/2	2/2	2/3	3/3
2	1/2	2/2	2/3	3/3	3/4
3	2/2	2/3	3/3	3/4	4/4
4	2/3	3/3	3/4	4/4	4/5
5	3/3	3/4	4/4	4/5	5/5
	UPPER/LOWER Main Bearings to Achieve 0.024 - 0.050 mm (0.0009 -				

	0.0020 in.) Oil Clearance

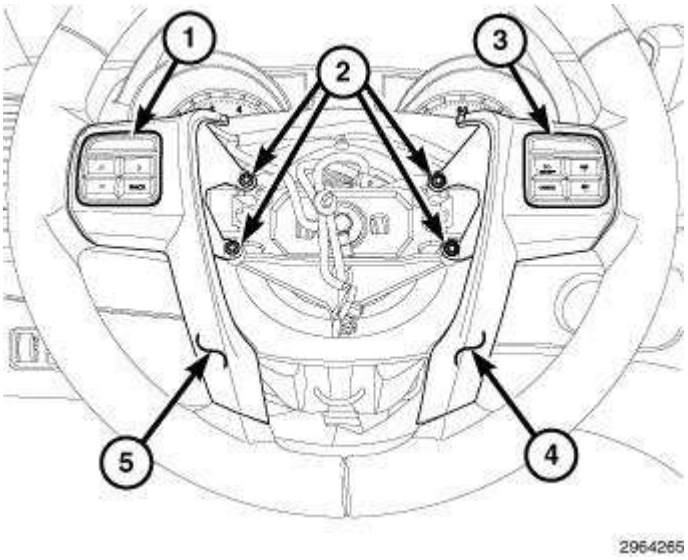


Fig. 423: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

The upper main bearing shell (2) and lower main bearing shell (1) are marked with the bearing size (3) on the bearing lining surface. The upper and lower bearings are available in five different sizes and can be mixed on a journal in order to achieve the proper oil clearance.

Upper and lower main bearing shells are available in five sizes. The chart below identifies the five bearing sizes.

Bearing Marking	Size mm (in.)
1	2.4951 - 2.4987 mm (0.0982 - 0.0984 in.)
2	2.4915 - 2.4951 mm (0.0981 - 0.0982 in.)
3	2.4879 - 2.4915 mm (0.0979 - 0.0981 in.)
4	2.4843 - 2.4879 mm (0.0978 - 0.0979 in.)
5	2.4807 - 2.4843 mm (0.0977 - 0.0978 in.)

NOTE: Crankshaft thrust washers are not selectable and are only available in a single thickness.

Bearing oil clearance can also be determined by using Plastigage or equivalent. Refer to **Engine/Engine Block - Standard Procedure**.

MAIN BEARING REPLACEMENT

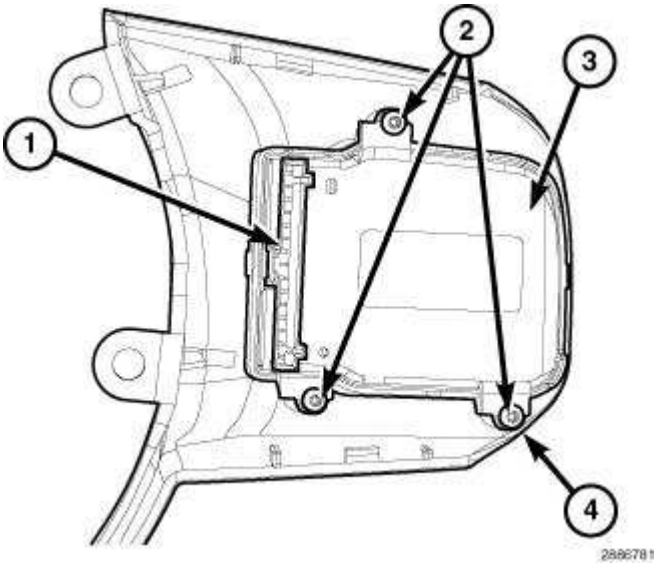


Fig. 424: Main Bearing Identification
Courtesy of CHRYSLER GROUP, LLC

The main bearings are serviced in-vehicle. They must be replaced one-at-a-time in order to properly support the crankshaft. The upper and lower main bearing shells are NOT interchangeable. The upper and lower main bearings are "select fit" to achieve proper oil clearances. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.

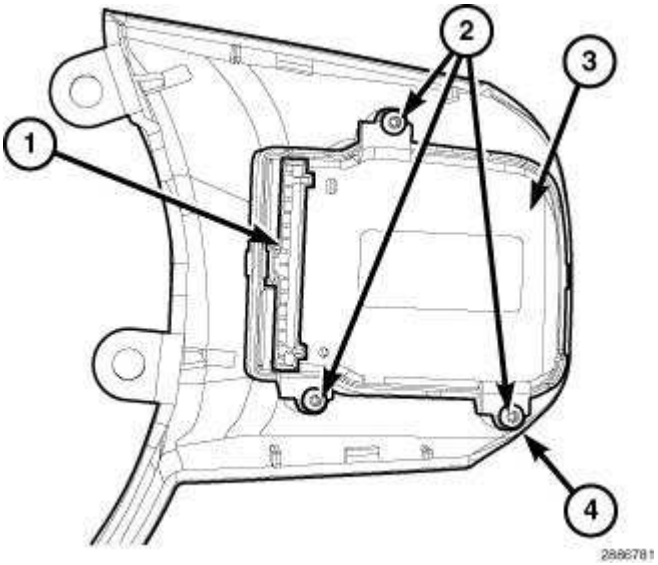


Fig. 425: Power Steering Pump Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Late production vehicles are equipped with Electro-Hydraulic Power Steering (EHPS) and do not have an engine mounted power steering pump.

1. Disconnect and isolate the negative battery cable.

2. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
3. If equipped with an engine mounted power steering pump, remove the serpentine drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

NOTE: Only two power steering pump mounting bolts are shown in illustration. Another bolt is on the lower end of the pump near the pulley.

4. Remove the three power steering pump mounting bolts (1) and reposition the power steering pump, if equipped.

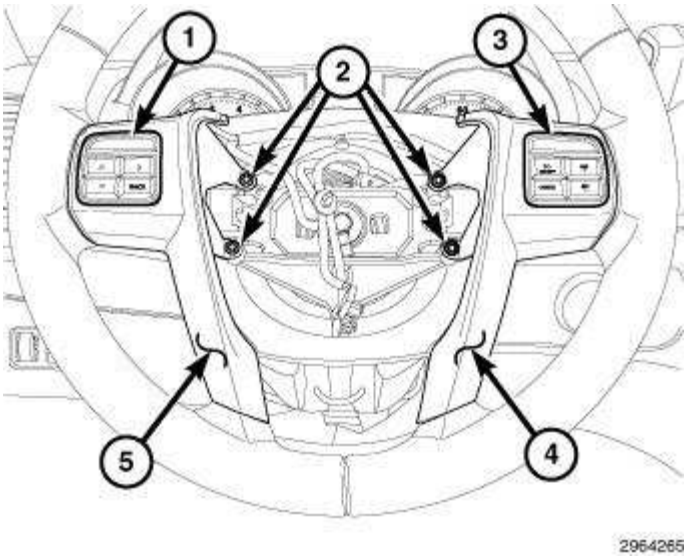


Fig. 426: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Remove the oil pan, oil pump pick-up and engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
6. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).

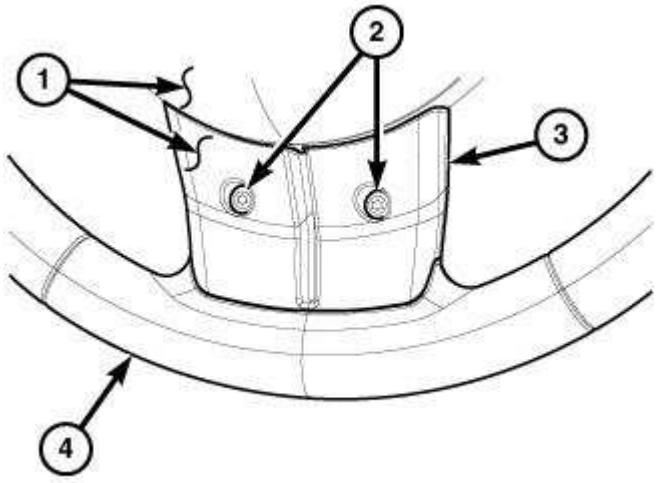


Fig. 427: Main Bearing Tie Bolts Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

7. Remove the eight main bearing tie bolts in the sequence shown in illustration.

CAUTION: DO NOT use a number stamp or a punch to mark main bearing caps, as damage to main bearings could occur.

NOTE: Main bearing caps are not interchangeable and are marked to insure correct assembly.

8. Mark the main bearing cap positions using a permanent ink marker or a scribe tool.

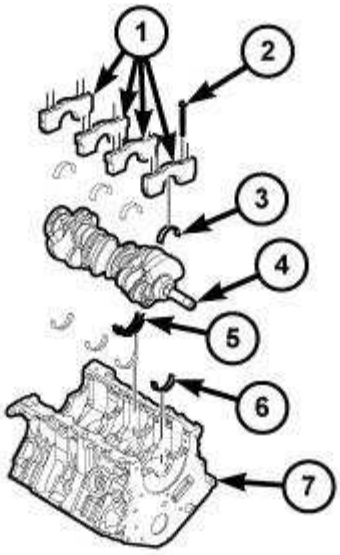


Fig. 428: Main Bearing Caps, Bolts, Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

CAUTION: Replace only one main bearing at a time while all other main bearing caps remain properly tightened. If all main bearing caps are removed, the weight of the unsupported crankshaft will damage the crankshaft oil seals.

NOTE: Replace the main bearings in the following order; 2, 3, 1, 4.

9. Remove the two cap bolts (2) and remove the main bearing cap (1).
10. When removing the No. 2 bearing cap, also remove the thrust washers (5).
11. Slide the upper main bearing half (6) out from between the crankshaft and the engine block.
12. If required, select fit new main bearings to the engine block. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
13. Lubricate the upper main bearing half (6) with clean engine oil and slide the bearing into position.

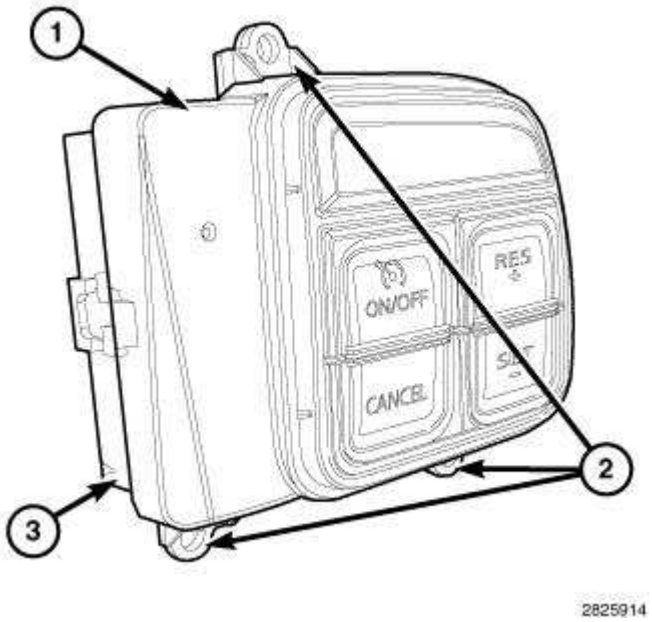


Fig. 429: Thrust Washer Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

14. When installing thrust washers (1) at the No. 2 main bearing location, use the following procedure:

1. Move the crankshaft forward to the limit of travel. Lubricate and install the front thrust washer (1) by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.
2. Move the crankshaft rearward to the limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

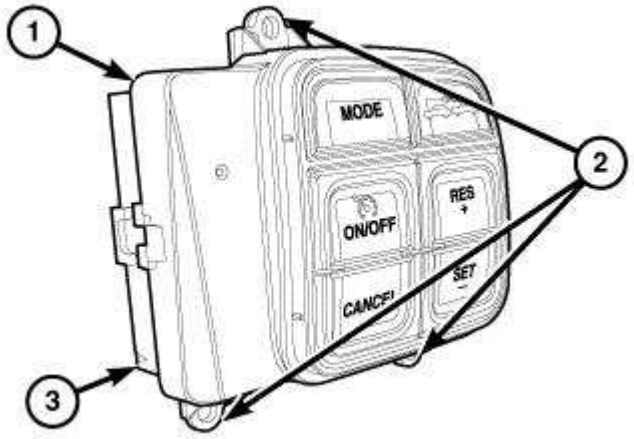


Fig. 430: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

15. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

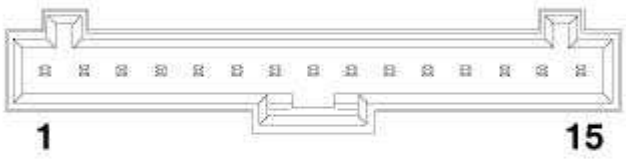


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Fig. 431: Main Bearing Caps, Bolts, Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

16. Lubricate and install the lower bearing half (3) onto the main cap (1).
17. Install the main bearing cap (1) with two inner main bearing cap bolts (2) tightened to 20 N.m (15 ft. lbs.) plus 90°.
18. Repeat the previous steps for main bearings 3, 1 and 4.
19. Measure crankshaft end play. Refer to **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.

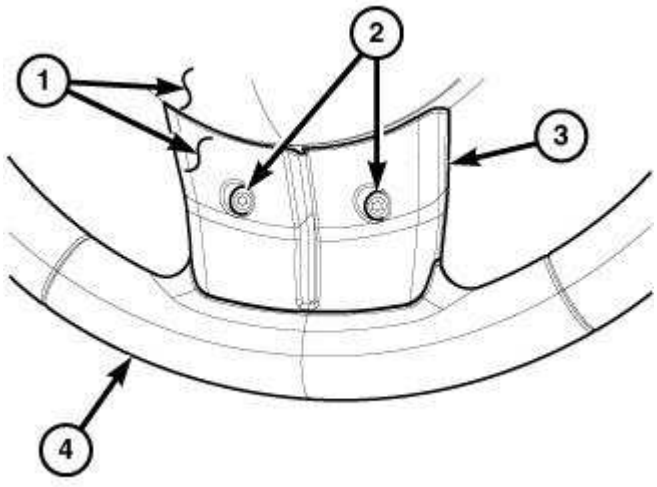

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Fig. 432: Windage Tray With Main Bearing Cap Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

20. Install the windage tray with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to 21 N.m (16 ft. lbs.) plus 90°.

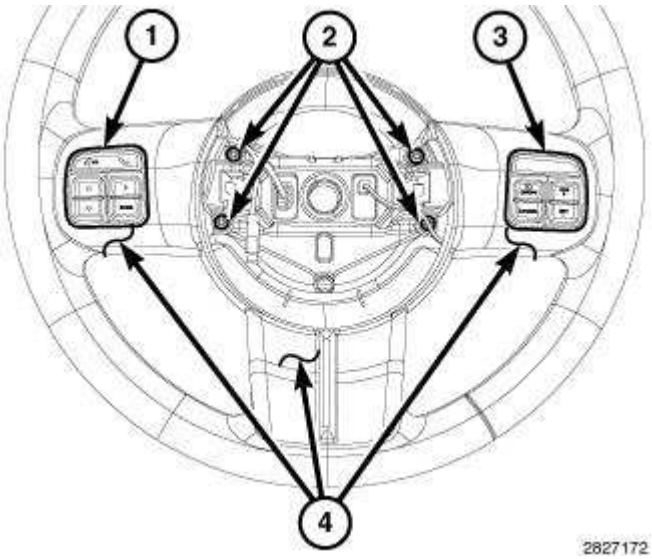

Fig. 433: Main Bearing Tie Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

21. Install the eight main bearing tie bolts. Tighten the bolts in the sequence shown in illustration to 28 N.m (21 ft. lbs.).
22. Install the engine oil pump, oil pump pick-up and oil pan. Refer to **PUMP, ENGINE OIL, INSTALLATION**.

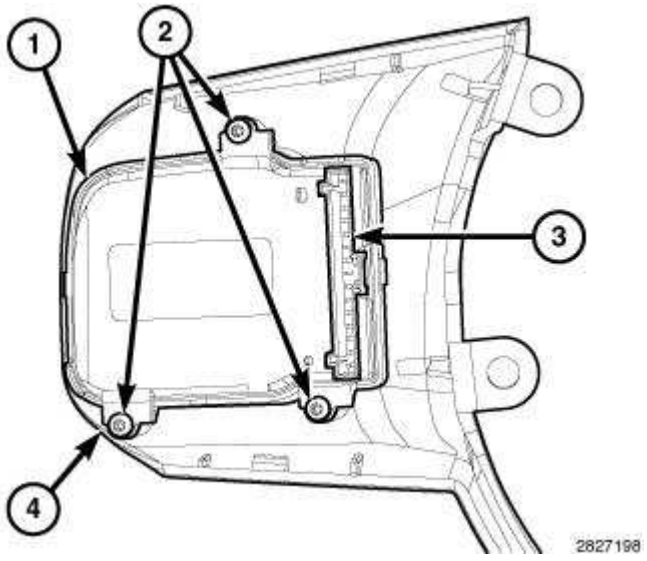

Fig. 434: Power Steering Pump Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Only two power steering pump mounting bolts are shown in illustration. Another bolt is on the lower end of the pump near the pulley.**

23. If removed, position the power steering pump (4) to the engine block. Install the three pump mounting bolts (1) and tighten to 25 N.m (18 ft. lbs.).
24. If removed, install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
25. Install the spark plugs and ignition coils. Refer to **SPARK PLUG, INSTALLATION** .
26. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
27. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
28. Operate the engine until it reaches normal operating temperature.

CRANKSHAFT

DESCRIPTION

DESCRIPTION

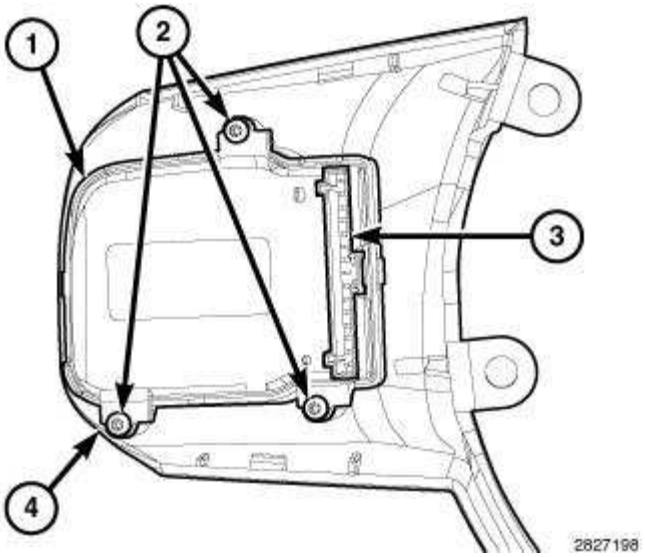

Fig. 435: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

The crankshaft is a cast design and is constructed using ductile iron. The crankshaft is a three throw split pin design with counterweights for balancing purposes. The main journals are crossed drilled for rod bearing lubrication. The crankshaft is supported by four select fit main bearings with number 2 serving as the thrust washer location. The rear counterweight has provisions for crankshaft position sensor target wheel mounting. Both the front and rear seals are a single piece design and are mounted to the timing cover and cylinder block.

STANDARD PROCEDURE

STANDARD PROCEDURE - END PLAY

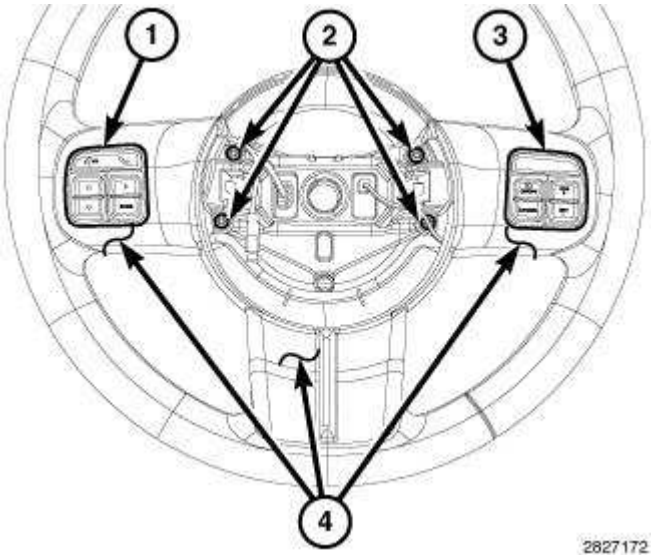

Fig. 436: Checking Crankshaft End Play
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine shown in illustration.

1. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) to a stationary point at the front of the engine. Locate the probe perpendicular against the nose of the crankshaft.
2. Move the crankshaft all the way to the rear of its travel.
3. Zero the dial indicator.
4. Move the crankshaft forward to the limit of travel and read the dial indicator. Compare the measured end play to the specification. Refer to **Engine - Specifications**.

NOTE: Crankshaft thrust washers are not selectable and are only available in a single thickness.

REMOVAL

REMOVAL

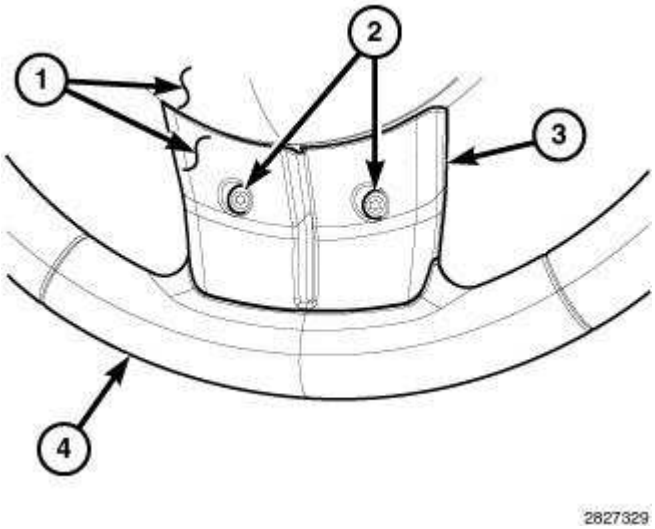

Fig. 437: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove the crankshaft from the engine, the engine must be removed from the vehicle.

1. Remove the engine. Refer to **REMOVAL**.

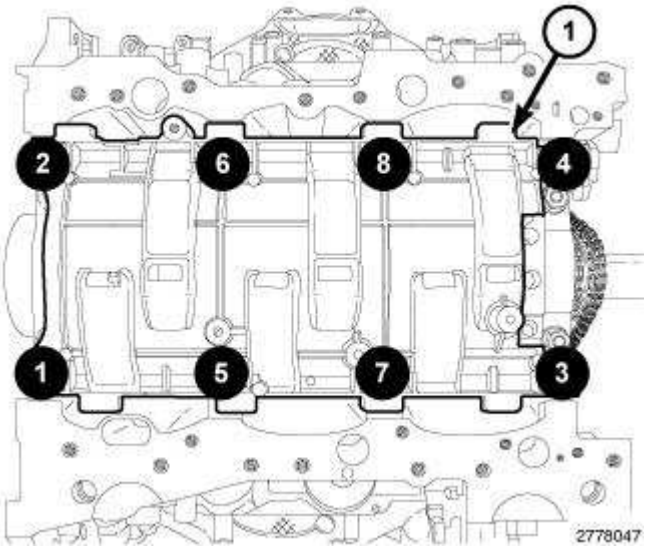

Fig. 438: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Remove the cylinder head covers, spark plugs, upper oil pan, engine timing cover, timing chain and sprockets. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.
3. Remove the flexplate and the rear crankshaft oil seal. Refer to **SEAL, CRANKSHAFT OIL, REAR, REMOVAL**.

4. Remove the oil pump pick-up and engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
5. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).

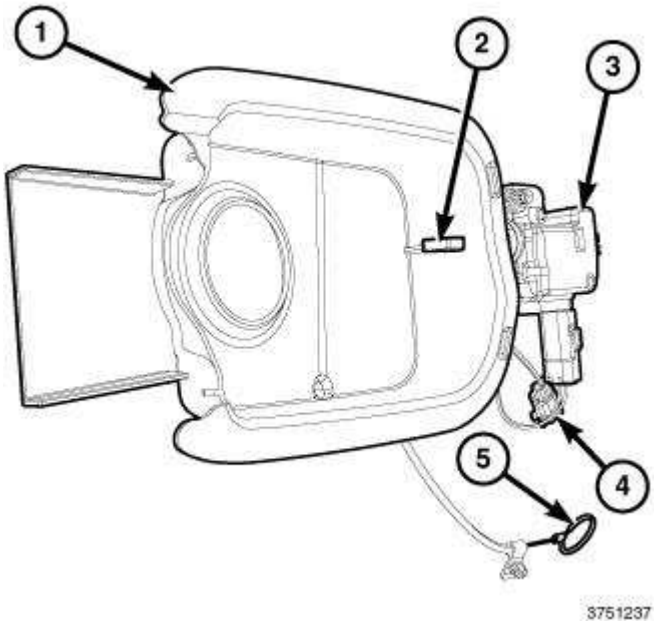

Fig. 439: Connecting Rod To Cylinder Identification
Courtesy of CHRYSLER GROUP, LLC

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

6. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

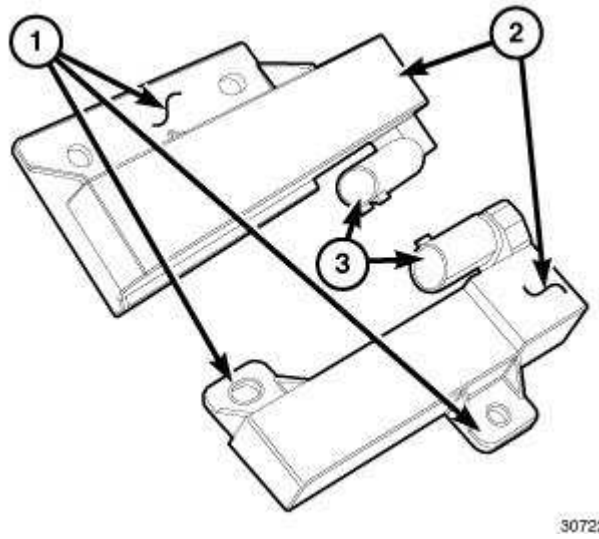

Fig. 440: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

7. Remove the connecting rod cap bolts (5) and the connecting rod caps (4). Discard the cap bolts.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

8. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod.

CAUTION: Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

9. Push the connecting rod and piston into the cylinder until the connecting rod is clear of the crankshaft journal. Remove the guide pins. Repeat this procedure at each cylinder until all of the connecting rods are clear of the crankshaft.

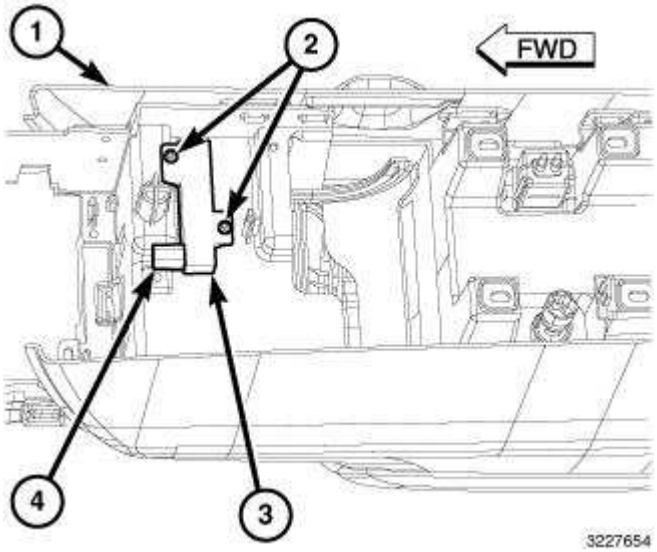

Fig. 441: Main Bearing Tie Bolts Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

Remove the main bearing cross bolts in the sequence shown in illustration.

CAUTION: DO NOT use a number stamp or a punch to mark main bearing caps, as damage to main bearings could occur.

NOTE: Main bearing caps are not interchangeable and are marked to insure correct assembly.

10. Mark the main bearing cap positions using a permanent ink marker or a scribe tool.

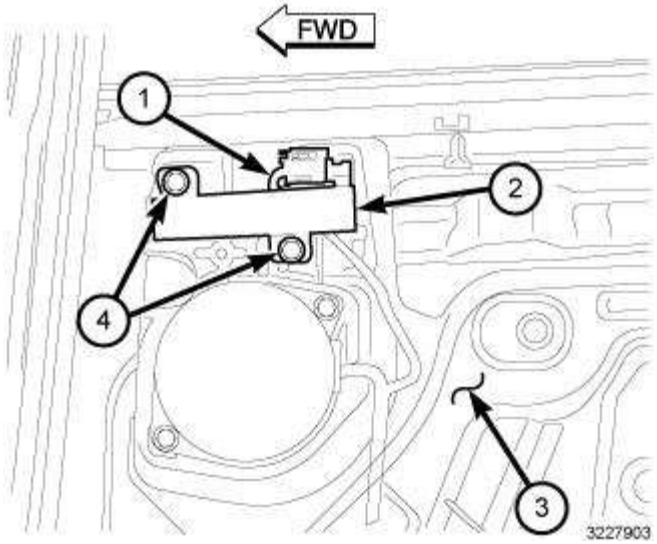

Fig. 442: Main Bearing Cap Bolts Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

11. Remove the eight main bearing cap bolts in the sequence shown in illustration and remove the main bearing caps.

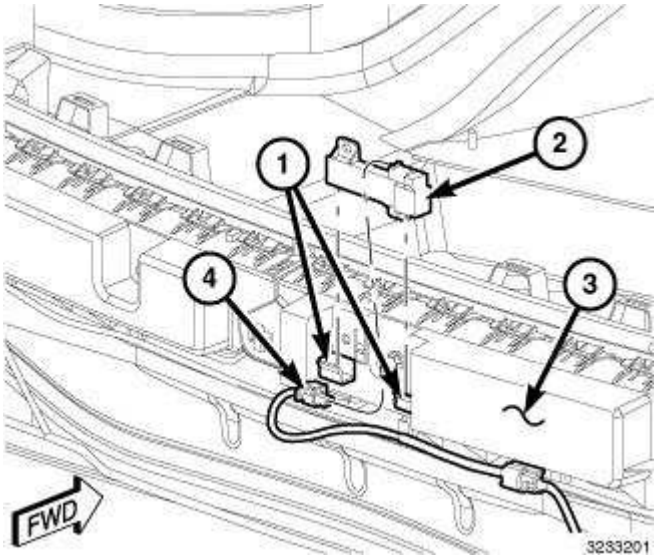

Fig. 443: Target Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rest the crankshaft on the target wheel (1). Damaged or bent target wheel teeth will destroy the target wheels ability to correctly relay crankshaft position to the crankshaft position sensor.

12. Remove the crankshaft from the engine block.
13. If required, remove the four bolts (2) and the target wheel (1). Discard the four bolts.

INSPECTION

INSPECTION

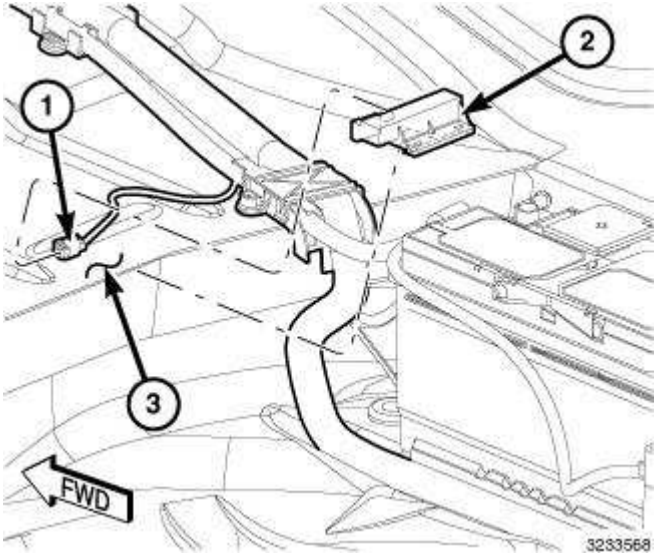

Fig. 444: Measuring Crankshaft Journal
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical crankshaft journal measurements shown in illustration.

1. Clean the oil off the bearing journals.
2. Determine the maximum diameter of the journals with a micrometer. Measure at two locations 90° apart at each end of the journals.
3. Compare the measured rod journal diameter to the crankshaft connecting rod bearing journal diameter grade marking chart Select the bearing size that corresponds to the crankshaft markings for each rod bearing journal that will provide the proper oil clearance. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
4. Compare the measured main bearing journal diameter to the crankshaft main bearing journal diameter grade marking chart Obtain the main bearing journal grade identification marks from the engine block and select the upper and lower main bearing sizes that will provide the proper oil clearance. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
5. For connecting rod journals, verify that the maximum taper and maximum out of round are within specifications. Refer to **Engine - Specifications**.
6. For main bearing journals, verify that the maximum taper and maximum out of round are within specifications. Refer to **Engine - Specifications**.

INSTALLATION

INSTALLATION

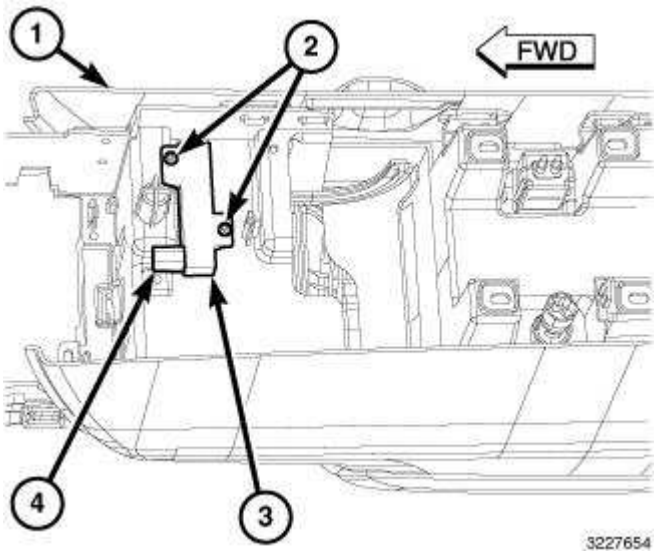

Fig. 445: Target Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If required, select and fit new crankshaft main bearings to the engine block. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
2. If required, select and fit new bearings to the connecting rod. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
3. If removed, install the target wheel (1) to the crankshaft with four new bolts (2). Ensure the threaded holes in the crankshaft are free of residual thread lock adhesive. Tighten the bolts to 10 N.m (89 in. lbs.).

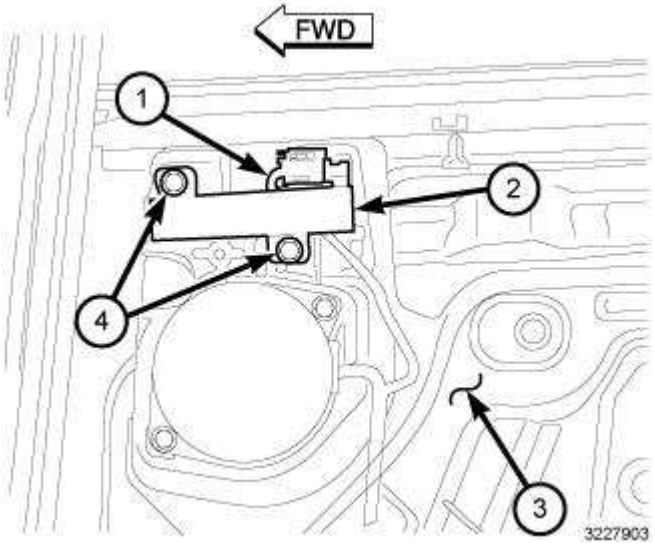

Fig. 446: Main Bearing Caps, Bolts, Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

4. If removed, lubricate and install the upper main bearing halves (6) into the engine block (7).

CAUTION: When installing the crankshaft, use care not to damage bearing surfaces on the crankshaft.

5. Install the crankshaft (4) into the engine block (7).

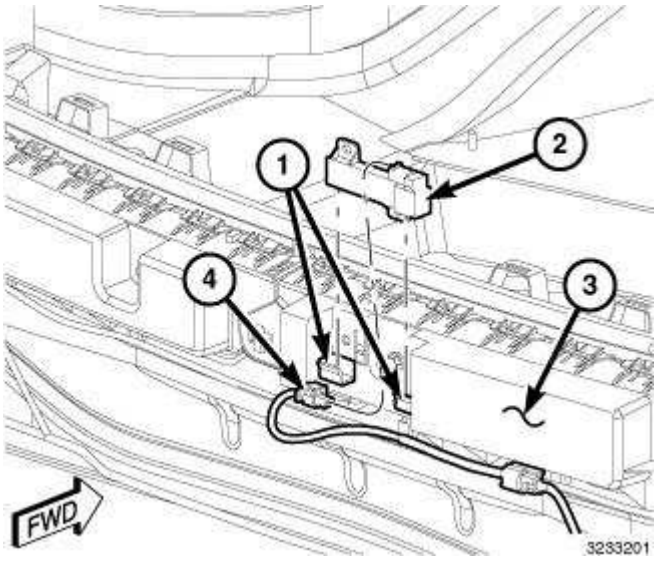

Fig. 447: Thrust Washer Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

6. Installing thrust washers (1) at the No. 2 main bearing location, using the following procedure:
    1. Move the crankshaft forward to the limit of travel. Lubricate and install the front thrust washer (1) by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.
    2. Move the crankshaft rearward to the limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

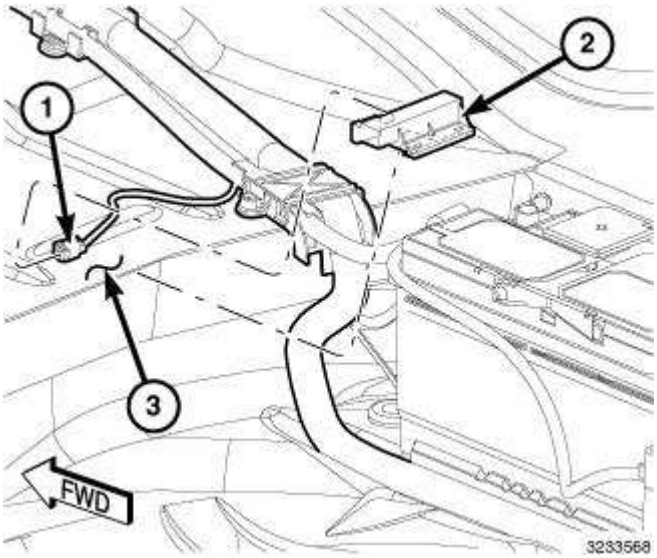

Fig. 448: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

7. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

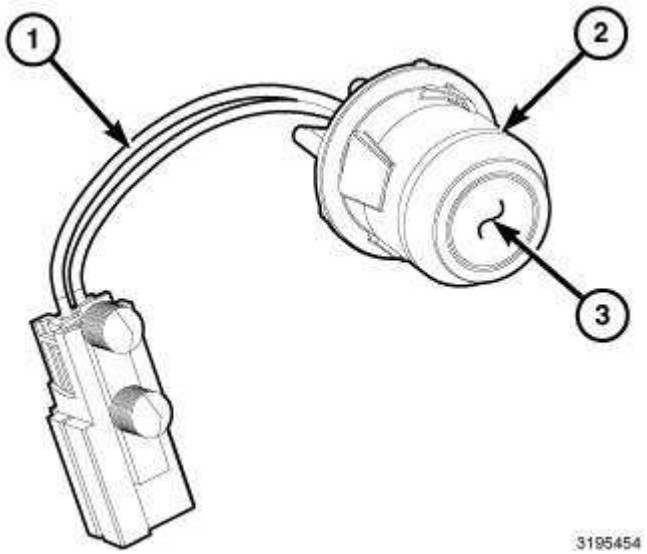

Fig. 449: Main Bearing Caps, Bolts, Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

8. If removed, lubricate and install the lower main bearing halves (3) onto the main caps (1).

9. Install the main bearing caps (1) with two inner main bearing cap bolts (2).

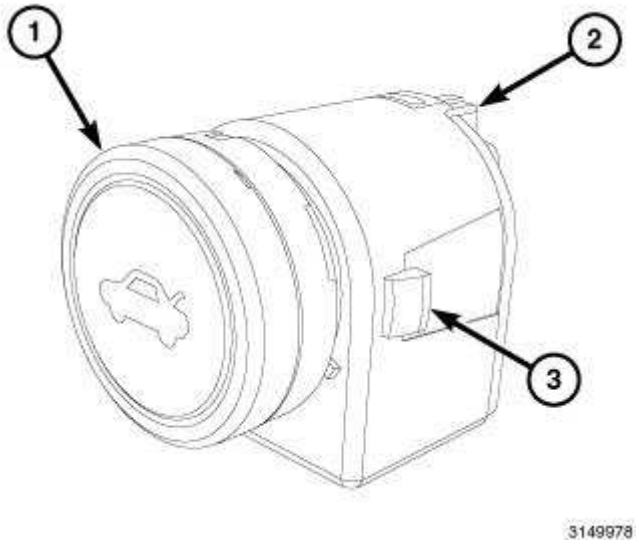

Fig. 450: Inner Main Bearing Cap Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the inner main bearing cap bolts in the sequence shown in illustration to 20 N.m (15 ft. lbs.) plus 90°.
11. Measure crankshaft end play. Refer to **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.

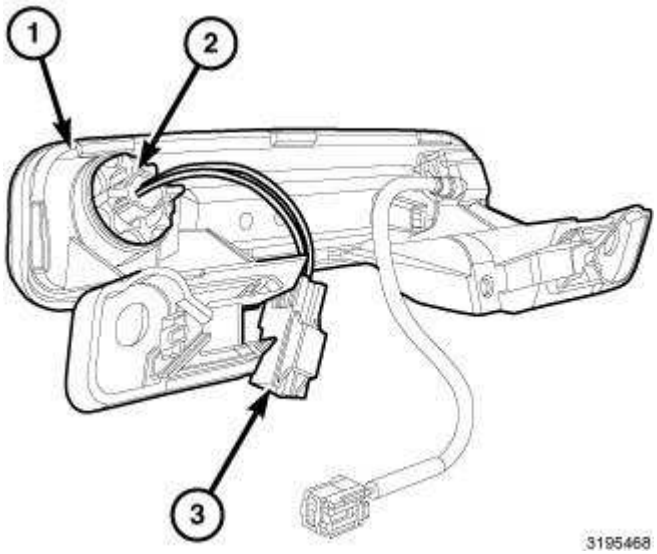

Fig. 451: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

12. If removed, install the bearing shell (8) on the connecting rod with the tang inserted into the

machined groove in the rod. Lubricate the bearing surface with clean engine oil.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

13. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod.

CAUTION: Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

14. Pull the connecting rod and piston toward the crankshaft until the connecting rod is seated on the crankshaft journal. Remove the guide pins.

CAUTION: The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.

15. If removed, install the bearing shell (6) on the connecting rod cap (4) with the tang inserted into the machined groove in the cap. Lubricate the bearing surface with clean engine oil.

NOTE: Do not lubricate the threads of the connecting rod cap bolts (5).

16. Install the connecting rod cap and bearing with the tang on the same side as the rod. Tighten the **NEW** connecting rod cap bolts (5) to 20 N.m (15 ft. lbs.) plus 90°.
17. If required, check the connecting rod side clearance. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.
18. Repeat the previous steps for the remaining connecting rods.

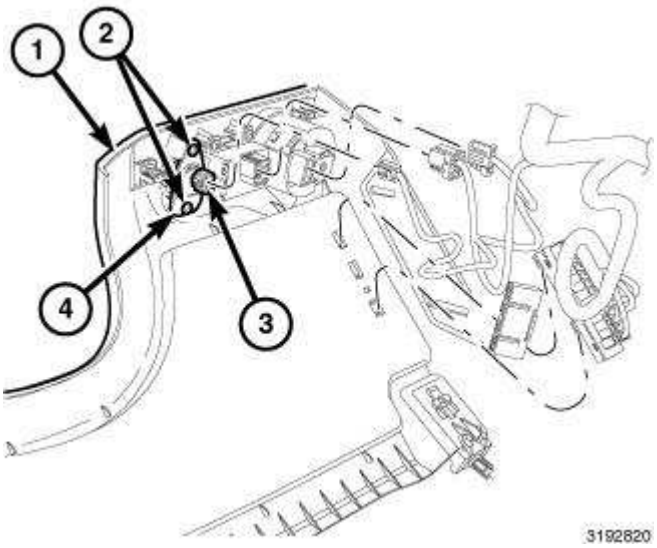

Fig. 452: Windage Tray With Main Bearing Cap Bolts Installation Sequence

Courtesy of CHRYSLER GROUP, LLC

19. Install the windage tray (1) with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to 21 N.m (16 ft. lbs.) plus 90°.

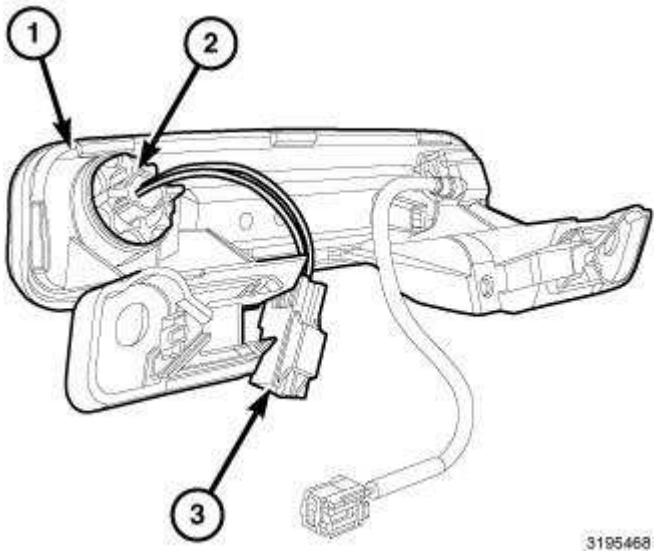

Fig. 453: Main Bearing Tie Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

20. Install the eight main bearing tie bolts. Tighten the bolts in the sequence shown in illustration to 28 N.m (21 ft. lbs.).
21. Install the engine oil pump and oil pump pick-up. Refer to **PUMP, ENGINE OIL, INSTALLATION**.
22. Install the rear crankshaft oil seal and flexplate. Refer to **SEAL, CRANKSHAFT OIL, REAR, INSTALLATION**.
23. Install the timing chain and sprockets, engine timing cover, oil pans, spark plugs and cylinder head covers. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.

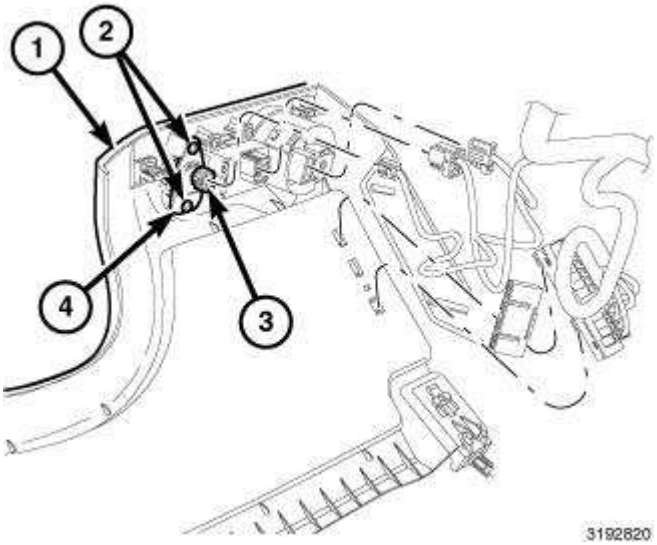

Fig. 454: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

24. Install the engine. Refer to **INSTALLATION**.
25. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
26. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
27. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
28. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

DAMPER, VIBRATION

REMOVAL

REMOVAL

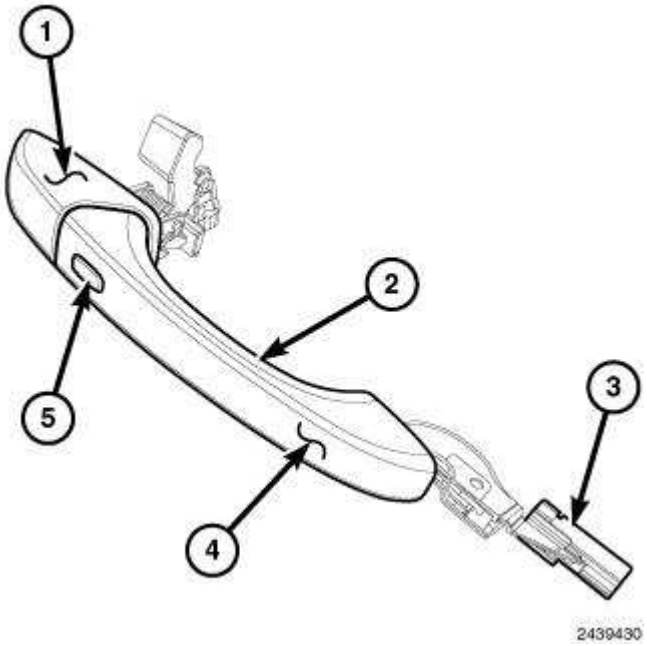

Fig. 455: Crankshaft Vibration Damper & Vibration Damper Holder
Courtesy of CHRYSLER GROUP, LLC

1. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

NOTE: A force greater than 350 N.m (260 ft. lbs.) may be required to remove the crankshaft vibration damper bolt.

2. Hold the crankshaft vibration damper (1) with Vibration Damper Holder (special tool #10198, Holder, Vibration Damper) (2) and remove the crankshaft vibration damper bolt.
3. Pull the crankshaft vibration damper (1) off of the crankshaft.

INSTALLATION

INSTALLATION

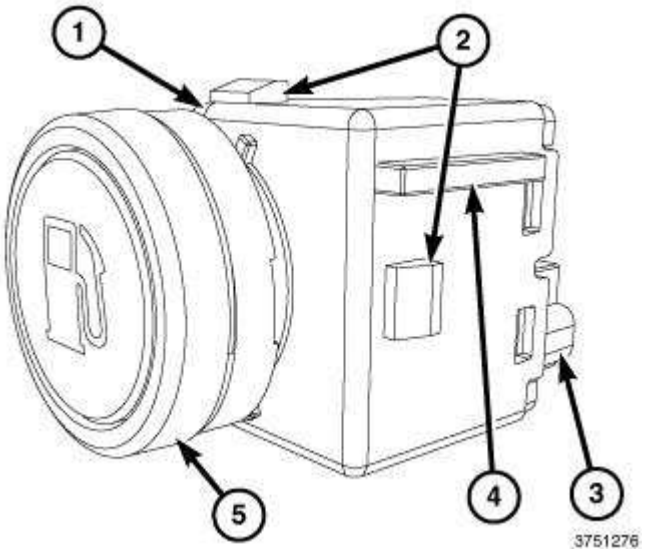

Fig. 456: Front Crankshaft Seal Surface
Courtesy of CHRYSLER GROUP, LLC

1. Apply a light coating of engine oil to the front crankshaft seal surface (1).

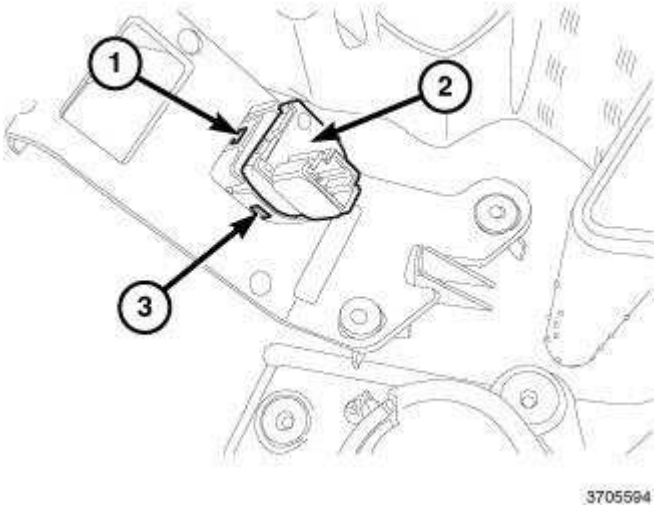

Fig. 457: Crankshaft Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Align the crankshaft vibration damper (1) to the flywheel key on the crankshaft and install the damper. Seat the damper on the crankshaft sprocket.
3. Install and hand tighten the crankshaft vibration damper bolt (2).

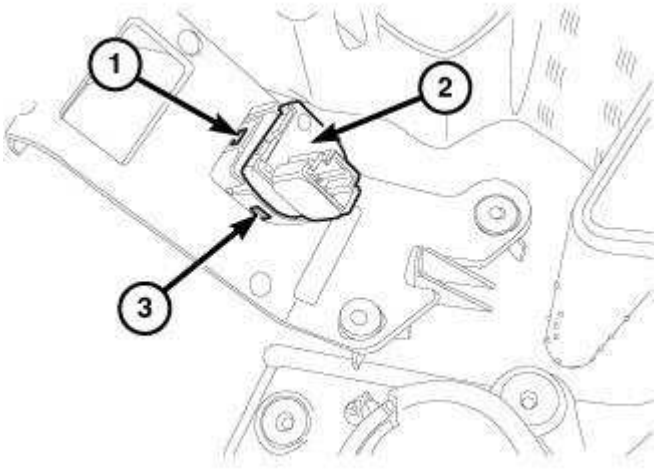

Fig. 458: Crankshaft Vibration Damper & Vibration Damper Holder
Courtesy of CHRYSLER GROUP, LLC

4. Hold the crankshaft vibration damper (1) with Vibration Damper Holder (special tool #10198, Holder, Vibration Damper) (2) and tighten the crankshaft vibration damper bolt to 40 N.m + 105° (30 ft. lbs. + 105°).
5. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

FLEXPLATE

REMOVAL

REMOVAL

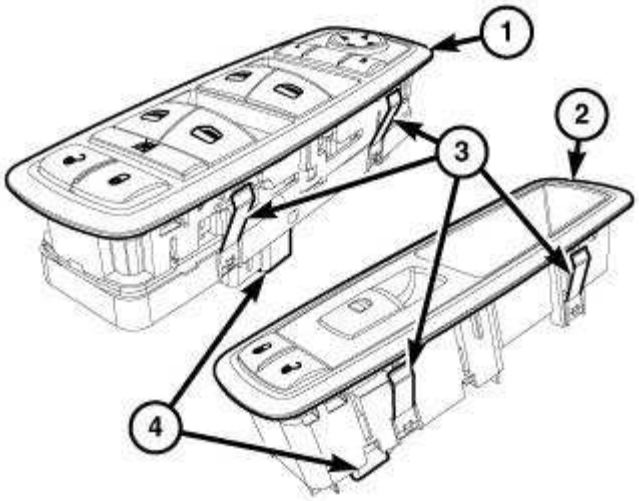

Fig. 459: Flexplate, Spacer Plate & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Remove the bolts (1) and the spacer plate (2).
3. Remove the flexplate (3).

INSTALLATION

INSTALLATION

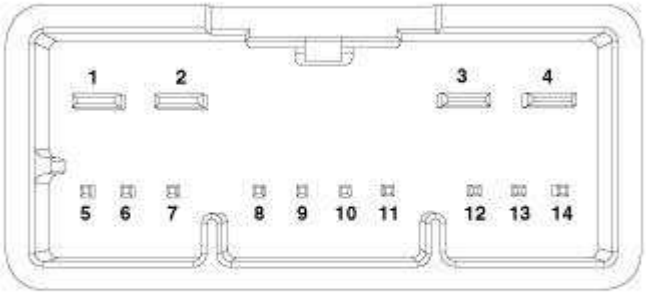

Fig. 460: Flexplate, Spacer Plate & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the flexplate (3) onto the crankshaft.
2. Install the spacer (2) and the bolts (1) hand tight.
3. Tighten the flexplate retaining bolts (1) to 95 N.m (70 ft. lbs.) in a criss-cross pattern.
4. Install the transmission. Refer to **INSTALLATION** .

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON RING FITTING

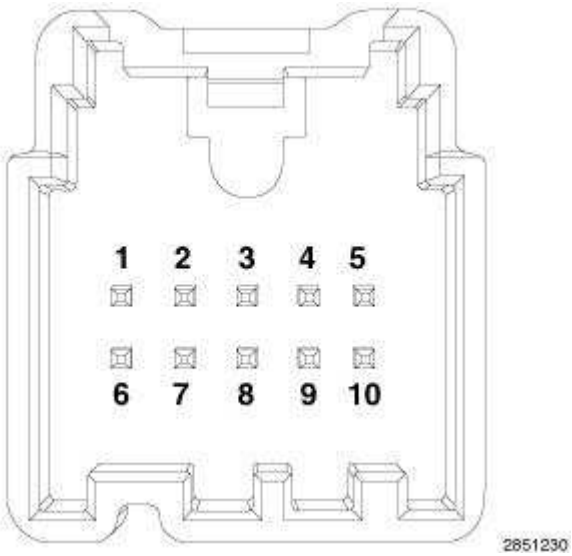

Fig. 461: Measuring Piston Ring End Gap
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the cylinder bore clean.
2. Using a piston, to ensure that the ring is squared in the cylinder bore, slide the ring downward into the cylinder to a position 12 mm (0.50 in.) from the bottom of the cylinder bore.
3. Using a feeler gauge (1), check the ring end gap. Replace any rings not within specification.

Ring Position	Ring End Gap
No. 1 (top) Ring	0.25 - 0.40 mm (0.010 - 0.016 in.)
No. 2 (center) Ring	0.30 - 0.45 mm (0.012 - 0.018 in.)
Oil Control Ring (Steel Rail)	0.15 - 0.66 mm (0.006- 0.26 in.)

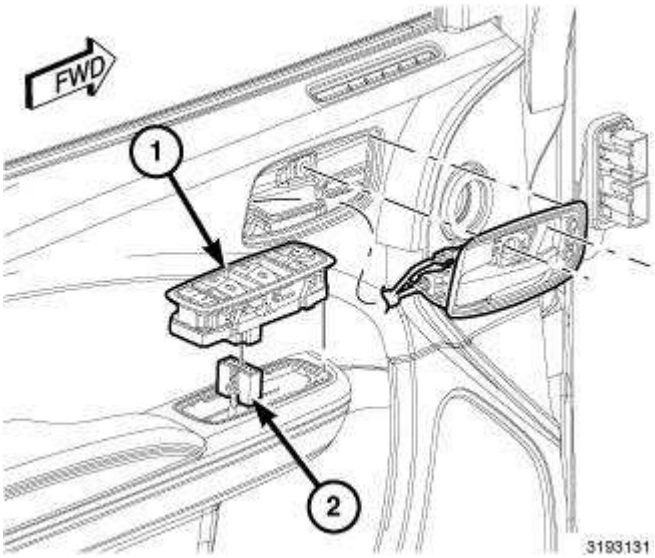

Fig. 462: Checking Piston Ring Grooves Clearances
Courtesy of CHRYSLER GROUP, LLC

4. Clean the piston ring grooves. Remove any nicks or burrs.
5. Measure the ring side clearance as shown in illustration. Make sure the feeler gauge (1) fits snugly between the ring land and the ring. Replace any ring not within specification.

Ring Position	Ring Side Clearance
No. 1 (top) Ring	0.025 - 0.033 mm (0.0010 - 0.0013 in.)
No. 2 (center) Ring	0.030 - 0.078 mm (0.0012 - 0.0031 in.)
Oil Control Ring (Steel Rails)	0.007 - 0.173 mm (.0003 - 0.0068 in.)

REMOVAL

REMOVAL

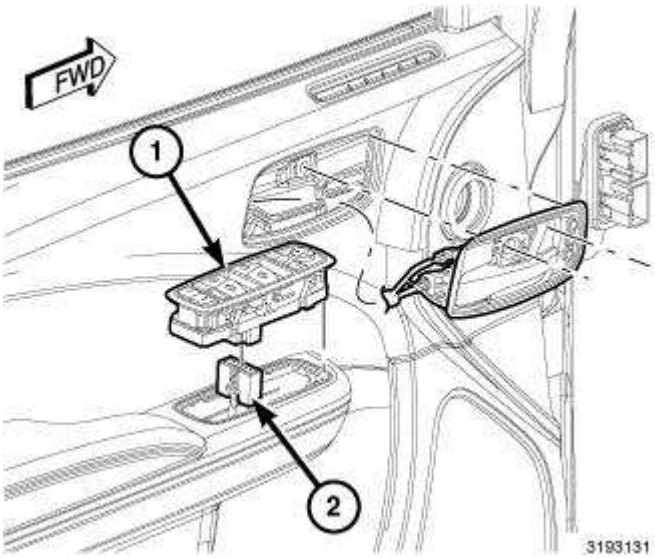

Fig. 463: Piston Ring Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical piston shown in illustration.

1. Remove the piston and connecting rod(s). Refer to **ROD, PISTON AND CONNECTING, REMOVAL**.

CAUTION: To avoid damage to the piston rings, they must be removed in the following order:

- **No. 1 (upper) piston ring (1)**
- **No. 2 (intermediate) piston ring (2)**
- **Oil ring upper side rail (3)**
- **Oil ring lower side rail (4)**
- **Oil ring expander (5)**

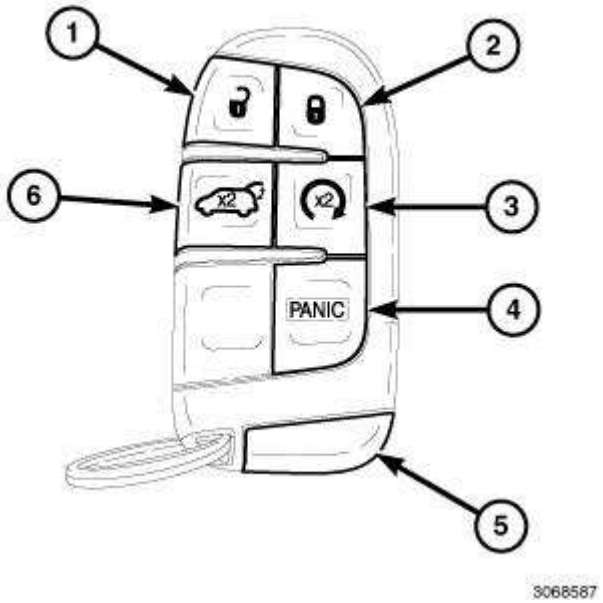

Fig. 464: Removing/Installing Upper & Intermediate Rings
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical piston shown in illustration.

2. Remove the No. 1 (upper) piston ring using a ring expander tool.
3. Remove the No. 2 (intermediate) piston ring using a ring expander tool.

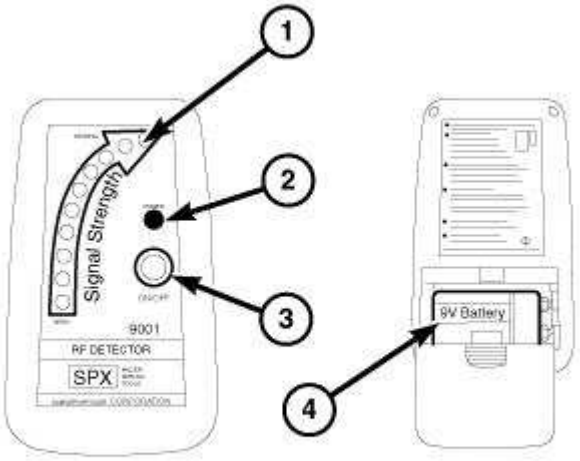

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Fig. 465: Removing/Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical piston shown in illustration. Do not use a piston ring expander to remove the oil ring side rails.

4. Remove the oil ring upper side rail.
5. Remove the oil ring lower side rail.
6. Remove the oil ring expander (1).

INSTALLATION

INSTALLATION

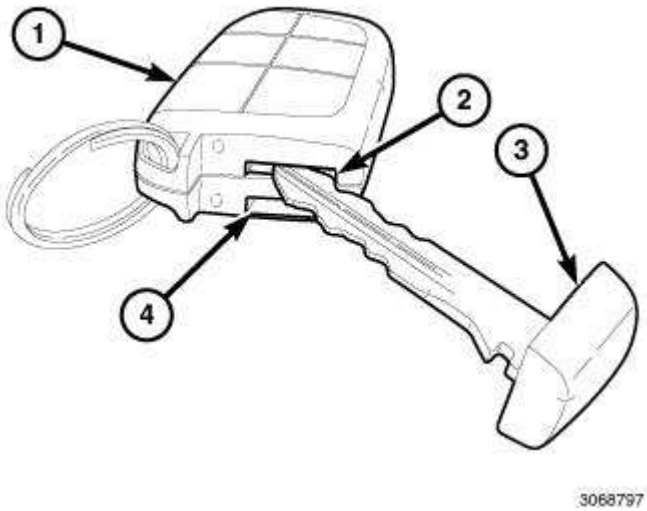

Fig. 466: Piston Ring Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical piston shown in illustration.

1. If required, fit new rings to the piston. Refer to **Engine/Engine Block/RING(S), Piston - Standard Procedure**.

CAUTION: To avoid damage to the piston rings, they must be installed in the following order:

- **Oil ring expander (5)**
- **Oil ring lower side rail (4)**
- **Oil ring upper side rail (3)**
- **No. 2 (intermediate) piston ring (2)**
- **No. 1 (upper) piston ring (1)**

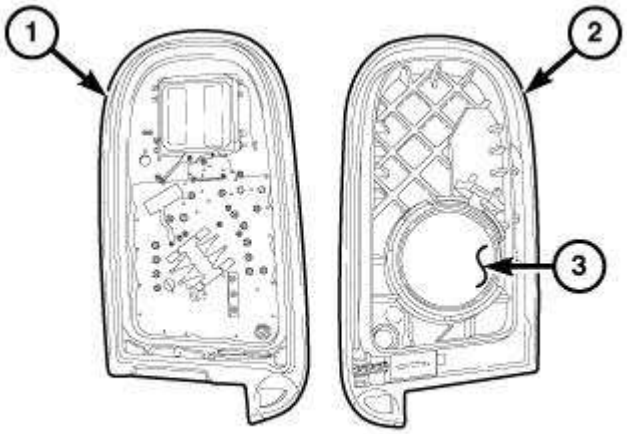

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Fig. 467: Removing/Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical piston shown in illustration. Do not use a piston ring expander to install the oil ring side rails.

2. Install the oil ring expander (1).
3. Install the oil ring lower side rail by placing one end between the piston ring groove and the oil ring expander. Hold this end firmly and press down the portion to be installed until the side rail is in position.
4. Install the oil ring upper side rail in the same manner as the lower side rail.

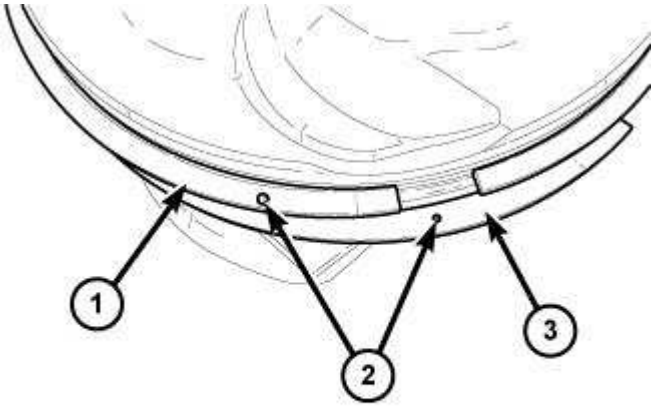

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Fig. 468: Dot Marks On Piston Rings
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The No. 1 (upper) piston ring (1) and No. 2 (intermediate) piston ring (3) have a different cross section. Install the rings with manufacturers I.D. mark (dot) (2) facing up, towards the top of the piston.**

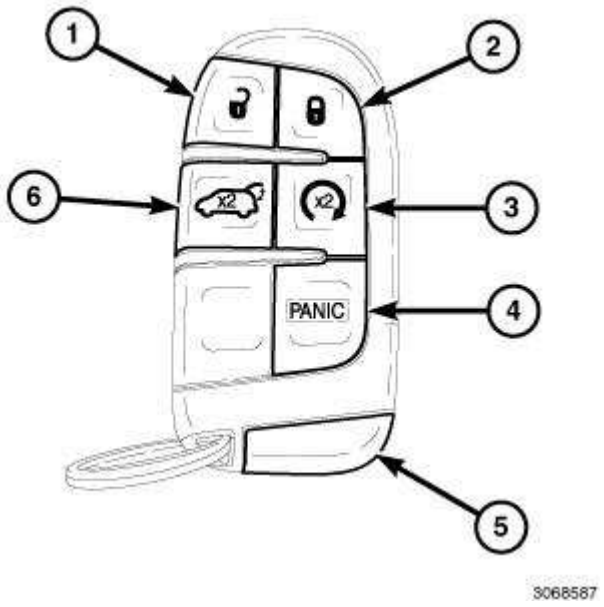


Fig. 469: Removing/Installing Upper & Intermediate Rings
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical piston shown in illustration.**

5. Install the No. 2 (intermediate) piston ring using a ring expander tool.
6. Install the No. 1 (upper) piston ring using a ring expander tool.
7. Rotate the rings around the piston, the rings must rotate in the grooves with out binding.

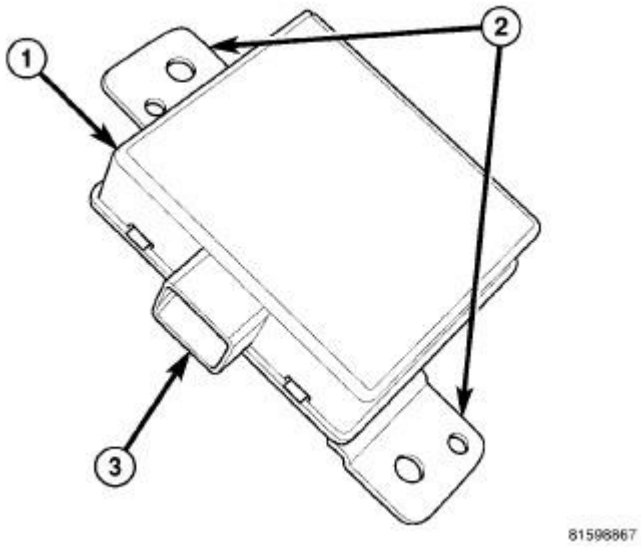


Fig. 470: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

8. Position the piston ring end gaps as follows:
    - Oil ring expander gap (5)
    - Oil ring lower side rail end gap (4)
    - Oil ring upper side rail end gap (1)
    - No. 2 (intermediate) ring end gap (5)
    - No. 1 (upper) ring end gap (2)
9. Install the piston and connecting rod(s). Refer to **ROD, PISTON AND CONNECTING, INSTALLATION**.

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

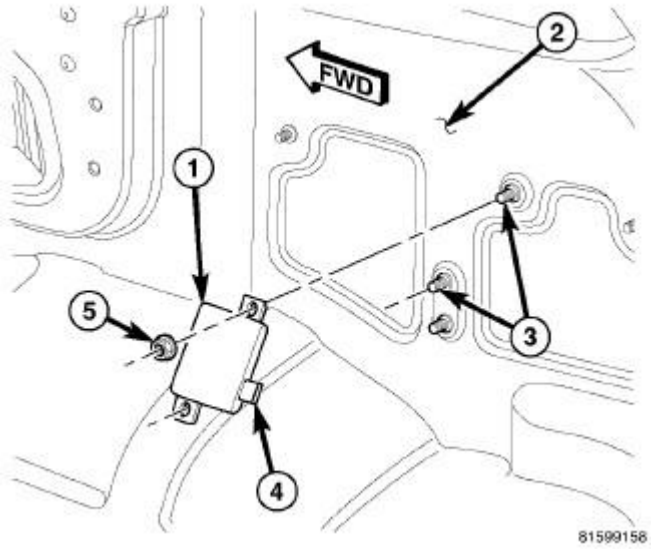


Fig. 471: Piston & Connecting Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are a lightweight design with ultra low tension piston rings for improved fuel economy. The pistons are made of a high strength aluminum alloy and the piston skirt has a Moly® coating. The top piston ring land has an anodized coating for improved wear. The piston is connected to the rod using a full floating pin with two locking clips. The connecting rod is forged steel with a bolted cracked cap design. The connecting rod bolts are not reusable. Pistons are available in two different diameters with grade markings for each bore indicated on the side of the cylinder block. The upper compression ring is a 1.2 mm steel ring with a spray coating. The intermediate compression ring is 1.2 mm micro napier design. Both compression rings have a dot or a mark on the piston ring. The marked side of the ring must face the top of the piston. The 2 mm three piece oil control ring is very thin. These are chrome plated rings and have a stainless steel expander.

STANDARD PROCEDURE

PISTON FITTING

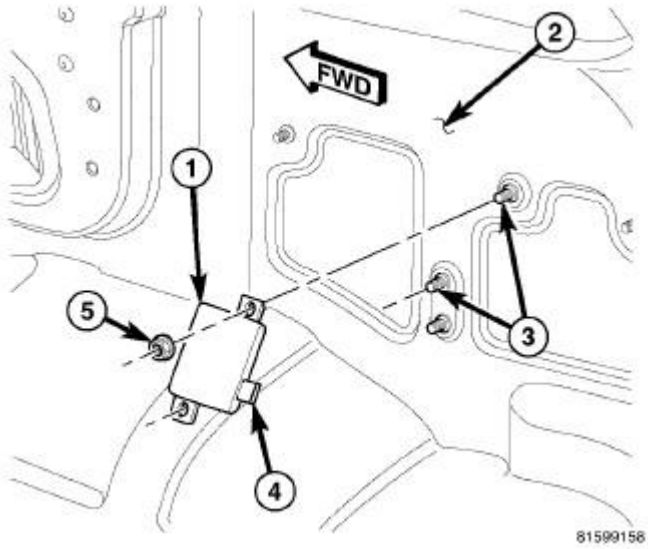


Fig. 472: Engine Block Main Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

The pistons are "select fit" to achieve proper oil clearance. Engine block cylinder bore diameter grade markings (1) are stamped into the left side of the engine block. These marks are read from left to right, corresponding with cylinder number 1, 2, 3, 4, 5, 6.

Engine block cylinder bore diameter grade markings correspond to specific cylinder bore diameters. The chart below identifies the two engine block grade markings and their associated cylinder bore diameters.

Engine Block Marking	Cylinder Bore Size mm (in.)
1	95.995 ± 0.005 mm (3.7793 ± 0.0002 in.)
2	96.005 ± 0.005 mm (3.7797 ± 0.0002 in.)

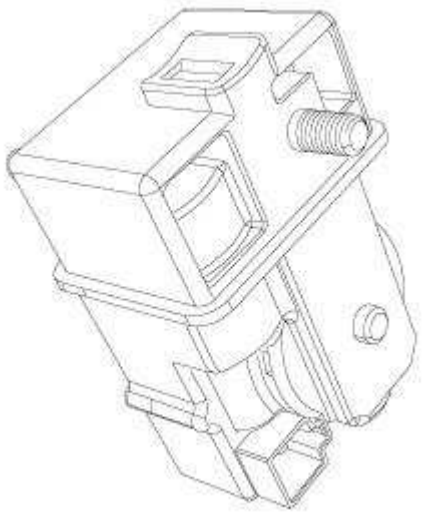
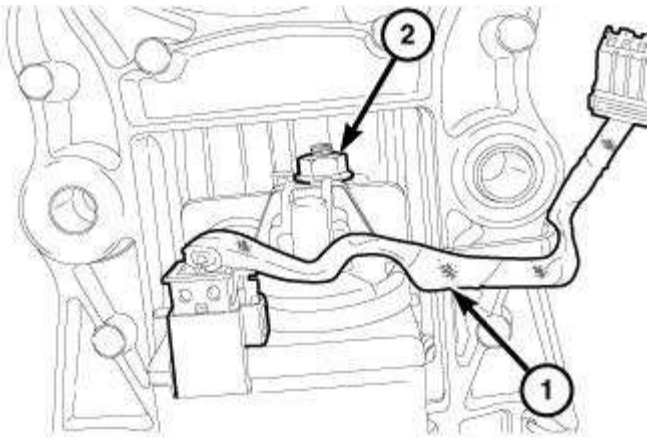


Fig. 473: Piston Size Located On Piston Crown
Courtesy of CHRYSLER GROUP, LLC

The piston is marked with the piston size (1 and 2) on the piston crown. The pistons are available in two different sizes in order to achieve the desired oil clearance. Select the piston size that corresponds to the engine block cylinder bore diameter grade markings for each cylinder.

Pistons are available in two sizes. The chart below identifies the two piston sizes.

Piston Marking	Size mm (in.)	
	Metal to Metal	Metal to Coating
1	95.995 ± 0.005 mm (3.7793 ± 0.0002 in.)	95.970 - 96.000 mm (3.7783 - 3.7795 in.)
2	95.965 ± 0.005 mm (3.7781 ± 0.0002 in.)	95.980 - 96.010 mm (3.7787 - 3.7835 in.)



3476879

Fig. 474: Coating Material On Piston
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical coated piston shown in illustration.

The coated pistons are serviced with the piston pin and connecting rod pre-assembled. The coating material (1 and 2) is applied to the piston after the final piston machining process. Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.

CONNECTING ROD SIDE CLEARANCE

DIAL INDICATOR

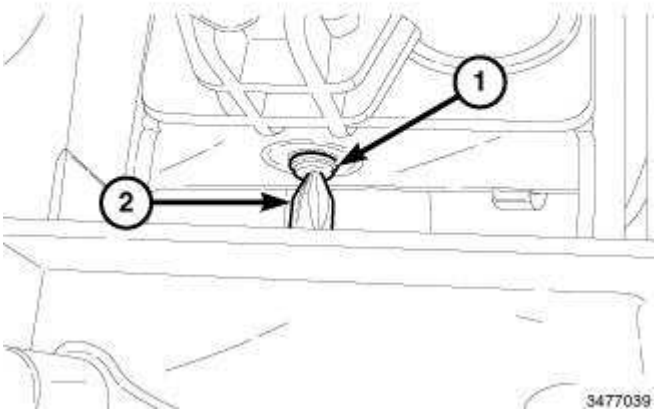


Fig. 475: Measuring Connecting Rod Side Clearance
Courtesy of CHRYSLER GROUP, LLC

1. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) to a stationary point on the engine. Locate the probe perpendicular to and resting against the connecting rod cap being checked.
2. Move the connecting rod all the way to the rear of its travel.
3. Zero the dial indicator.
4. Move the connecting rod forward to the limit of travel and read the dial indicator. Compare the measured side clearance to the specification. Refer to **Engine - Specifications**.
5. Repeat this procedure for each connecting rod. Rotate the crankshaft for connecting rod accessibility.

FEELER GAUGE

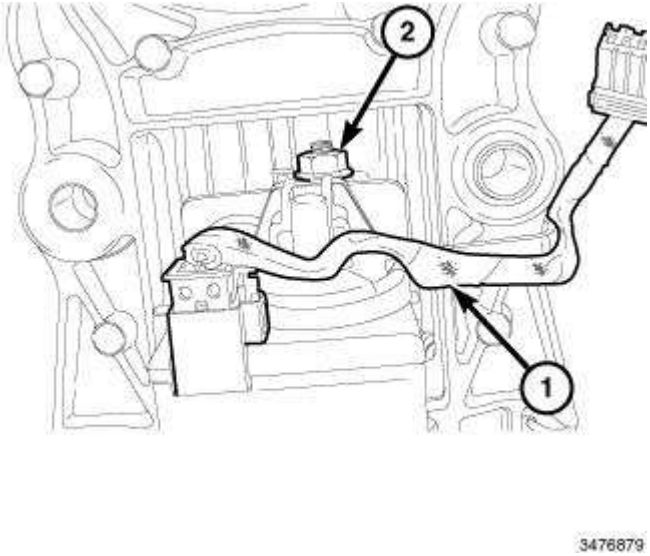


Fig. 476: Measuring Gap Between Connecting Rod & Crankshaft Journal Flange

Courtesy of CHRYSLER GROUP, LLC

1. Slide a snug-fitting feeler gauge between the connecting rod and crankshaft journal flange. Compare the measured side clearance to the specification. Refer to **Engine - Specifications**.
2. Repeat this procedure for each connecting rod. Rotate the crankshaft for connecting rod accessibility.

REMOVAL

REMOVAL

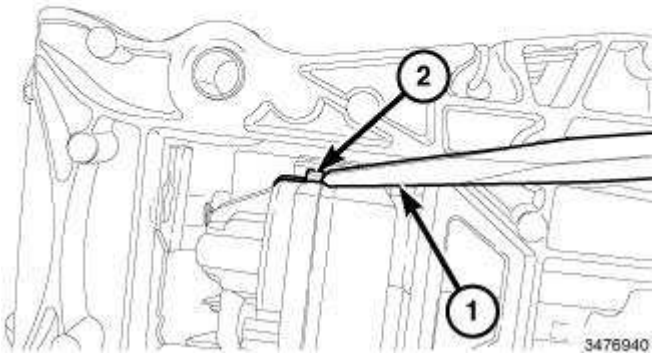


Fig. 477: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the oil pans, engine timing cover and cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.
3. Remove the engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
4. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).

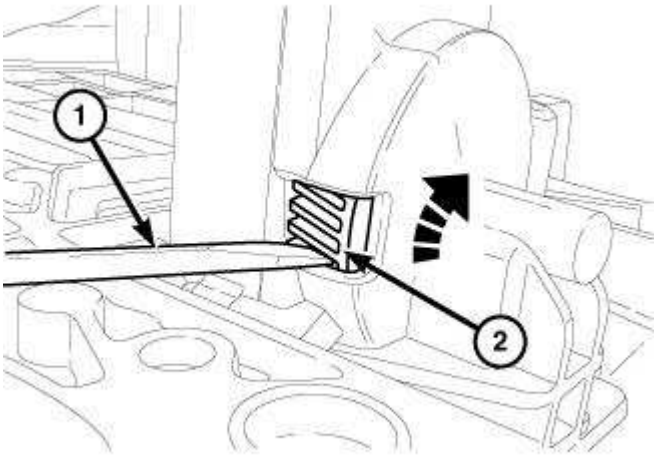


Fig. 478: Connecting Rod To Cylinder Identification
Courtesy of CHRYSLER GROUP, LLC

5. If necessary, remove the top ridge of the cylinder bores with a reliable ridge reamer before removing the pistons from the engine block. **Be sure to keep the tops of pistons covered during this operation.** Pistons and connecting rods must be removed from the top of the engine block. When removing piston and connecting rod assemblies from the engine, rotate the crankshaft CW so that each connecting rod is centered in the cylinder bore.

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

6. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

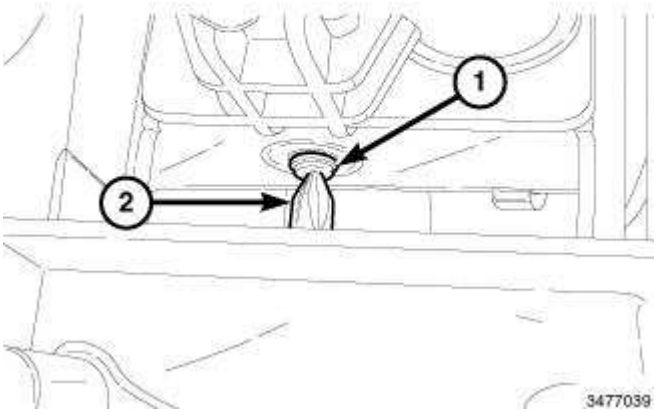


Fig. 479: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

7. Remove the connecting rod cap bolts (5) and the connecting rod cap (4). Discard the cap bolts.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

8. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod being removed.

CAUTION: Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

9. Remove the piston and connecting rod (1) from cylinder bore.
10. Repeat the previous steps for each piston being removed.
11. Immediately after piston and connecting rod removal, reinstall the bearing cap (4) on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
12. If required, remove the piston rings. Refer to **RING(S), PISTON, REMOVAL**.
13. Repeat the previous steps for each piston being removed.

CLEANING

CLEANING

CAUTION: DO NOT use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a Moly coating, this coating must not be damaged.

CAUTION: Do not remove the piston pin from the piston and connecting rod assembly.

1. Using a suitable cleaning solvent clean the pistons in warm water and towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

INSPECTION

INSPECTION

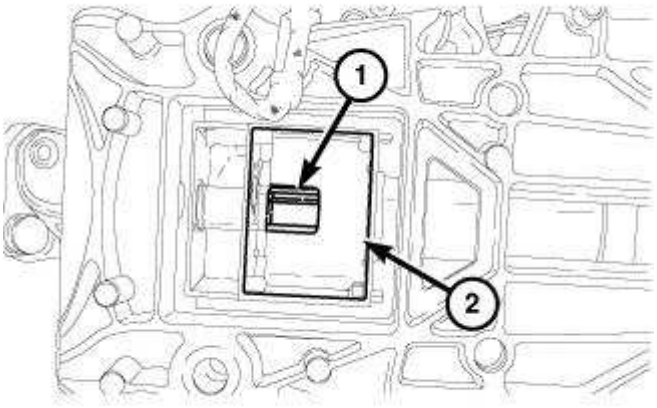


Fig. 480: Connecting Rod Bearing Shells & Bearing Size
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the inserts (1) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes, or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Replace any bearing that shows abnormal wear. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.

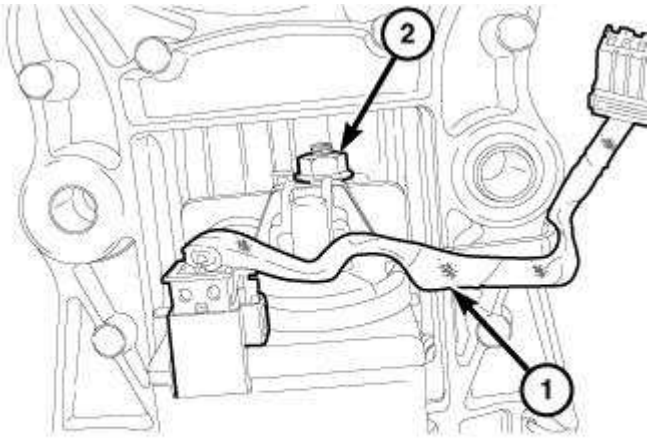


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Fig. 481: Connecting Rod To Cylinder Identification
Courtesy of CHRYSLER GROUP, LLC

6. Inspect the connecting rod bearing bores for signs of scoring, nicks and burrs.

NOTE: Misaligned or bent connecting rods can cause abnormal wear on pistons, piston rings, cylinder walls, connecting rod bearings and crankshaft connecting rod journals. If wear patterns or damage to any of these components indicate the probability of a misaligned connecting rod, inspect it for correct rod alignment.

7. Replace misaligned, bent or twisted connecting rods.

NOTE: Connecting rods are serviced with the piston pre-assembled. The pistons are "select fit" to achieve proper oil clearance. Refer to Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure.

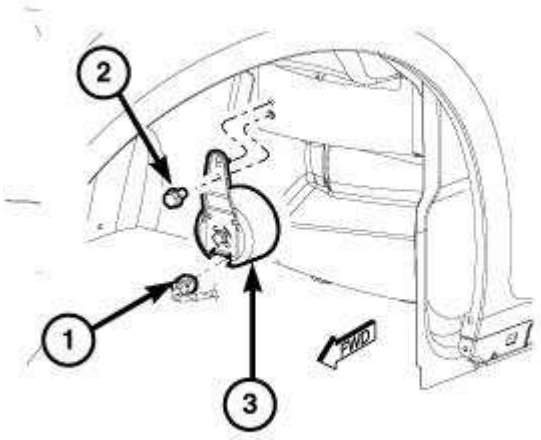

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Fig. 482: Coating Material On Piston
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical coated piston shown in illustration.

8. Inspect the piston for scoring or scraping marks in the piston skirts. Check the ring lands for cracks and/or deterioration.
9. Check the piston for taper and out of round shape.

NOTE: The coating material (1 and 2) is applied to the piston after the final piston machining process. Measuring the outside diameter of a coated piston will not provide accurate results. Therefore measuring the inside diameter of the cylinder bore with a dial Bore Gauge is MANDATORY . Refer to Engine/Engine Block - Inspection.

10. Compare the measured cylinder bore diameter to the engine block cylinder bore grade marking chart Select the piston size that corresponds to the engine block markings for each cylinder to provide the proper oil clearance. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.

NOTE: Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.

NOTE: The coated pistons will be serviced with the piston pin and connecting rod pre-assembled.

INSTALLATION

INSTALLATION

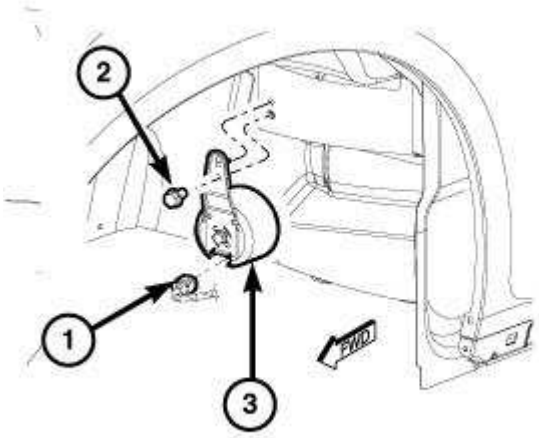

Fig. 483: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

1. If required, select and fit new piston and connecting rod assemblies to the engine block. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.
2. If required, select and fit new bearings to the connecting rod. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
3. If required, hone the cylinder bores. Refer to **Engine/Engine Block - Standard Procedure**.
4. If removed, install the piston rings. Refer to **RING(S), PISTON, INSTALLATION**.
5. Position the piston ring end gaps as follows:
    - Oil ring expander gap (5)
    - Oil ring lower side rail end gap (4)
    - Oil ring upper side rail end gap (1)
    - No. 2 (intermediate) ring end gap (5)
    - No. 1 (upper) ring end gap (2)

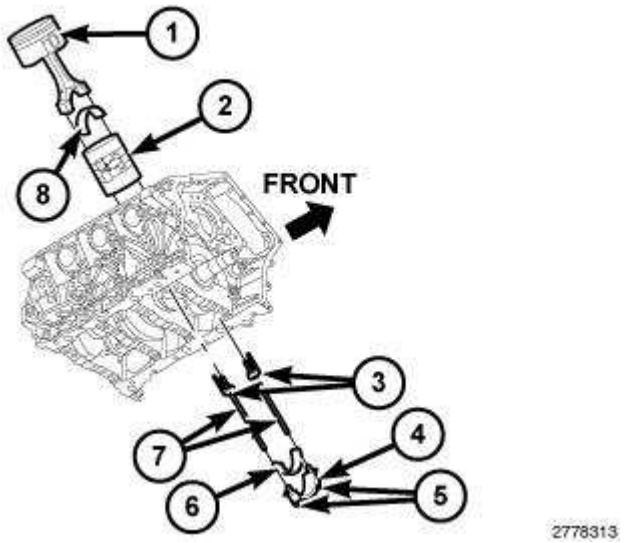

Fig. 484: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

NOTE: Ensure the position of the ring end gaps does not change when installing the ring compressor.

6. Lubricate the piston rings with clean engine oil. Position Piston Compressor (special tool #C-385, Compressor, Piston) (2) over the piston and rings. Tighten the compressor (2).

NOTE: Install the rod bearings in pairs. Do not mix sizes or use a new bearing half with an old bearing half.

7. Install the bearing shell (8) on the connecting rod with the tang inserted into the machined groove in the rod. Lubricate the bearing surface with clean engine oil.
8. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod being installed.

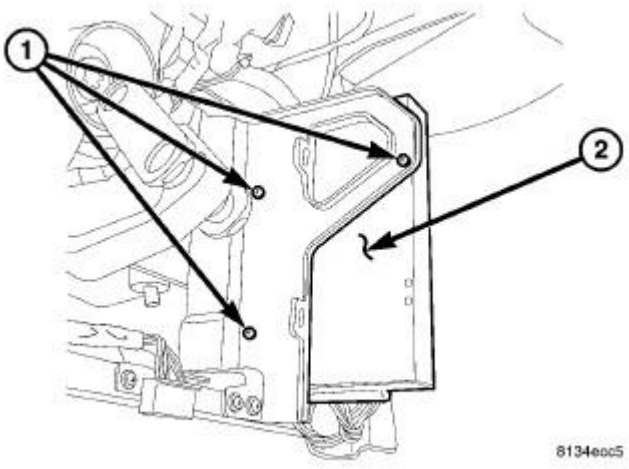

Fig. 485: Piston Installation Position
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right cylinder bank shown in illustration, left cylinder bank similar.

9. The pistons crowns are stamped with a mark (1) indicating installation position. This mark must be positioned toward the front of engine on both cylinder banks.
10. Wipe the cylinder bore clean and lubricate with clean engine oil.
11. Rotate the crankshaft until the connecting rod journal is on the center of cylinder bore.

CAUTION: Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

12. Insert the piston and connecting rod into the cylinder bore and carefully position the guide pins over the crankshaft journal.
13. Tap the piston down in the cylinder bore using a hammer handle while guiding the connecting rod into position over the rod journal.

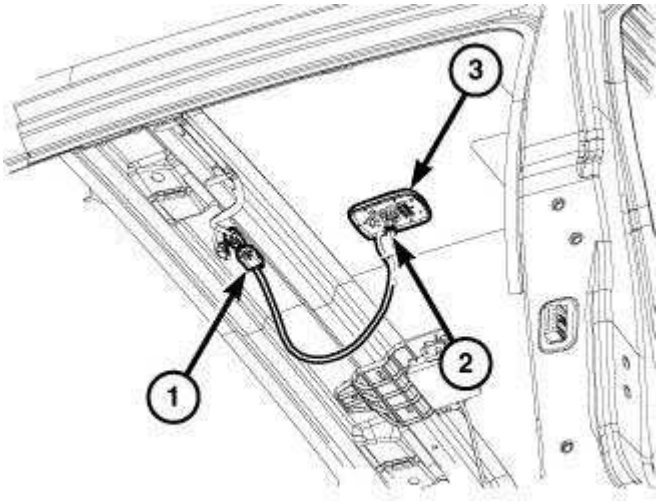

Fig. 486: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

CAUTION: The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.

14. Install the bearing shell (6) on the connecting rod cap (4) with the tang inserted into the machined groove in the cap. Lubricate the bearing surface with clean engine oil.

NOTE: Do not lubricate the threads of the connecting rod cap bolts (5).

15. Install the connecting rod cap and bearing with the tang on the same side as the rod. Tighten the **NEW** connecting rod cap bolts (5) to 20 N.m (15 ft. lbs.) plus 90°.
16. If required, check the connecting rod side clearance. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.
17. Repeat the previous steps for each piston being installed.

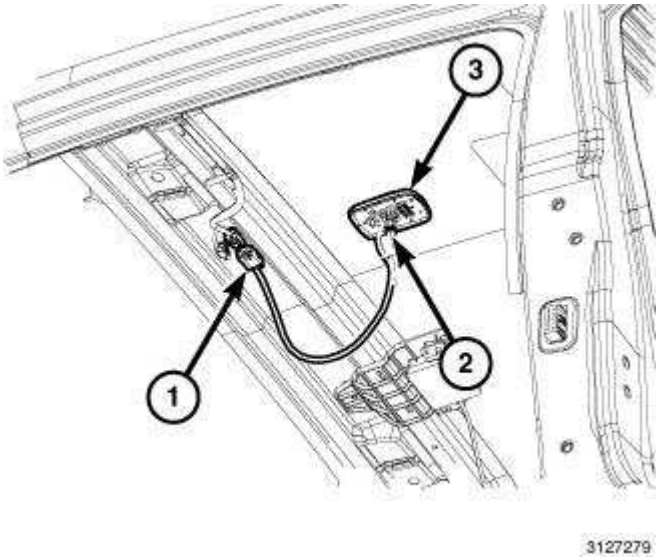

Fig. 487: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

18. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

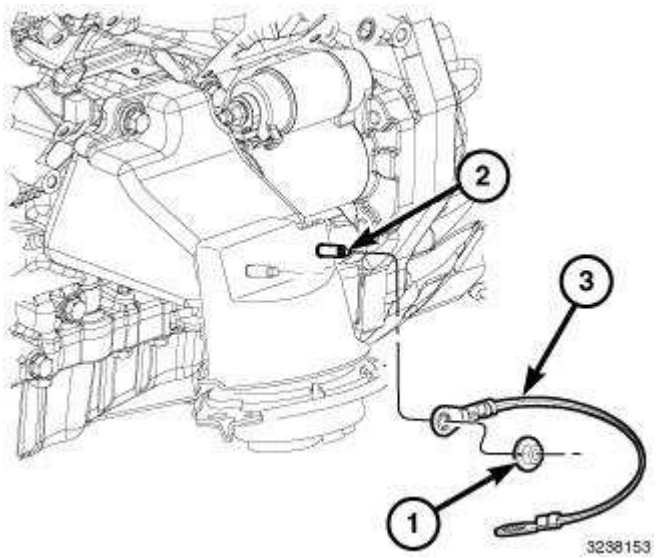

Fig. 488: Windage Tray With Main Bearing Cap Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

19. Install the windage tray with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to 21 N.m (16 ft. lbs.) plus 90°.
20. Install the engine oil pump and oil pump pick-up. Refer to **PUMP, ENGINE OIL,**

INSTALLATION.

21. Install the cylinder heads, engine timing cover and oil pans. Refer to **CYLINDER HEAD, INSTALLATION**.
22. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
23. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
24. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
25. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

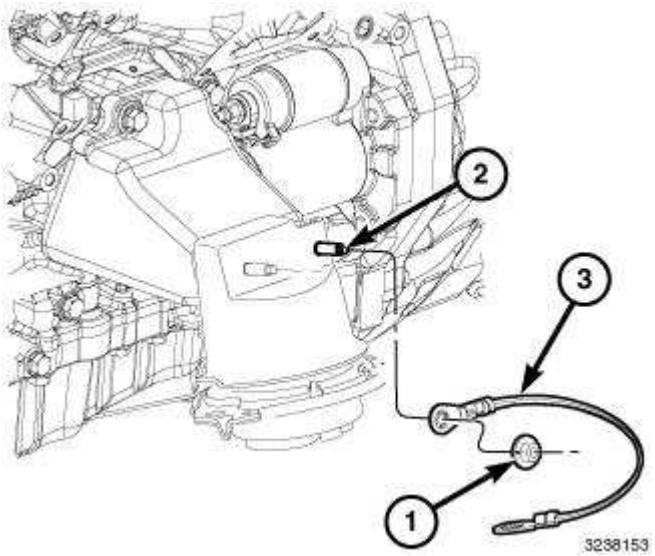

Fig. 489: Sleeve & Flywheel Key
Courtesy of CHRYSLER GROUP, LLC

1. Remove the accessory drive belt and the crankshaft vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.
2. Install the sleeve (2) from Seal Remover (special tool #8511, Remover, Seal) around the flywheel key (1) and onto the nose of the crankshaft.

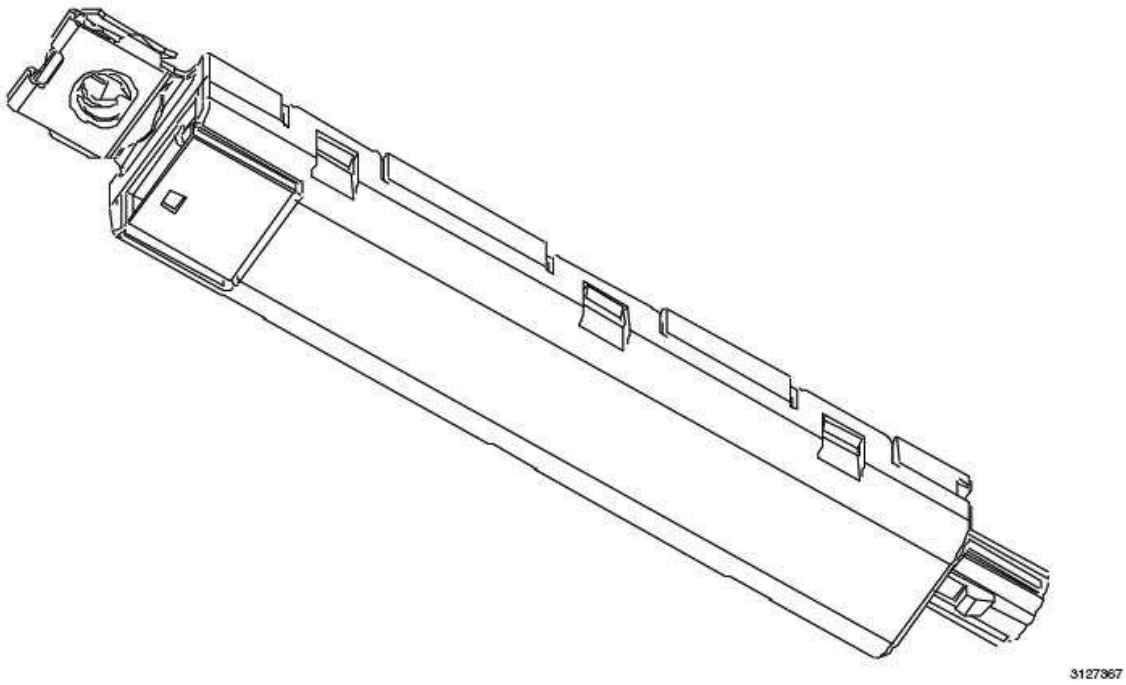

Fig. 490: Seal Remover & Front Crankshaft Oil Seal
Courtesy of CHRYSLER GROUP, LLC

3. Screw Seal Remover (special tool #8511, Remover, Seal) (1) into the front crankshaft oil seal (2).

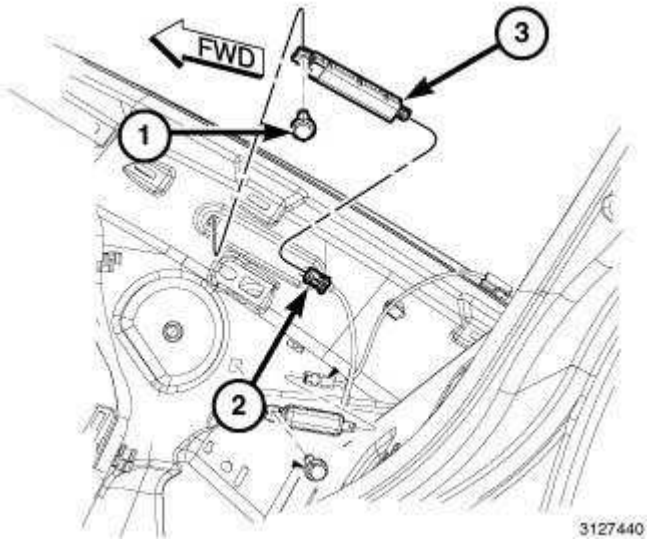

Fig. 491: Extractor Screw, Seal Remover & Front Crankshaft Oil Seal
Courtesy of CHRYSLER GROUP, LLC

4. Install the extractor screw (2) into the Seal Remover (special tool #8511, Remover, Seal) (1). Hold the seal remover stationary and tighten the extractor screw against the sleeve until the front crankshaft oil seal (3) is removed from the engine timing cover.

INSTALLATION

INSTALLATION

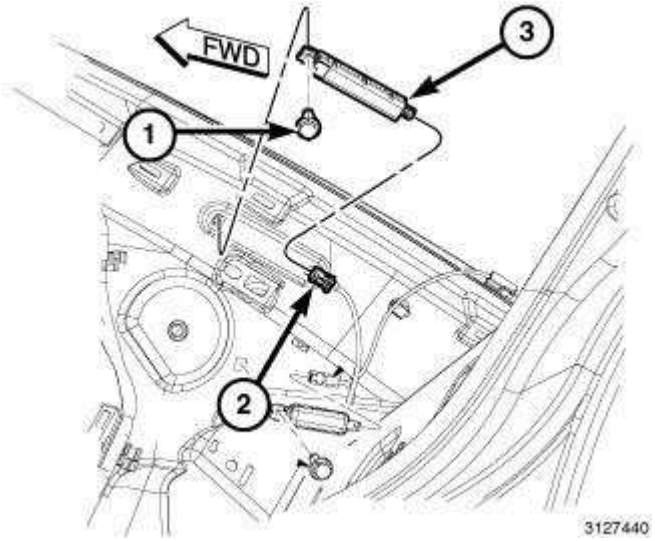

Fig. 492: Front Crankshaft Seal Installer & Oil Seal
Courtesy of CHRYSLER GROUP, LLC

1. Position the front crankshaft oil seal (3) into place on the engine timing cover.
2. Align the Front Crankshaft Seal Installer (special tool #10199, Installer, Crankshaft Front Oil Seal) (1) to the flywheel key on the crankshaft and against the front crankshaft oil seal (3).

CAUTION: Only tighten the crankshaft vibration damper bolt until the oil seal is seated in the cover. Overtightening of the bolt can crack the front timing cover.

3. Install and tighten the crankshaft vibration damper bolt (2) until the Crankshaft oil seal is seated in the engine timing cover.
4. Install the crankshaft vibration damper and accessory drive belt. Refer to **DAMPER, VIBRATION, INSTALLATION**.

SEAL, CRANKSHAFT OIL, REAR

REMOVAL

REMOVAL

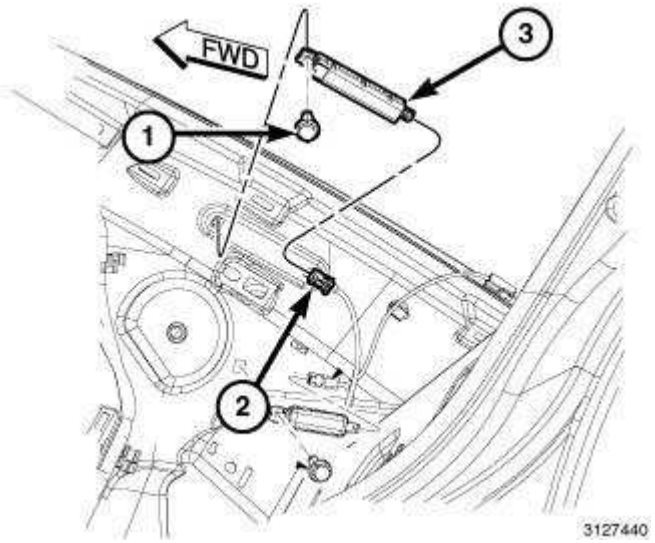

Fig. 493: Seal Retainer & Attaching Screws
Courtesy of CHRYSLER GROUP, LLC

The rear crankshaft oil seal is incorporated into the seal retainer (2) and can not be removed from the retainer. The rear crankshaft oil seal and seal retainer (2) are serviced as an assembly.

1. Remove the transmission. Refer to **REMOVAL** .
2. Remove the flexplate. Refer to **FLEXPLATE, REMOVAL**.
3. Remove the upper oil pan. Refer to **PAN, OIL, REMOVAL**.
4. Remove the eight seal retainer attaching screws (1).
5. Remove and discard the seal retainer (2).

INSTALLATION

INSTALLATION

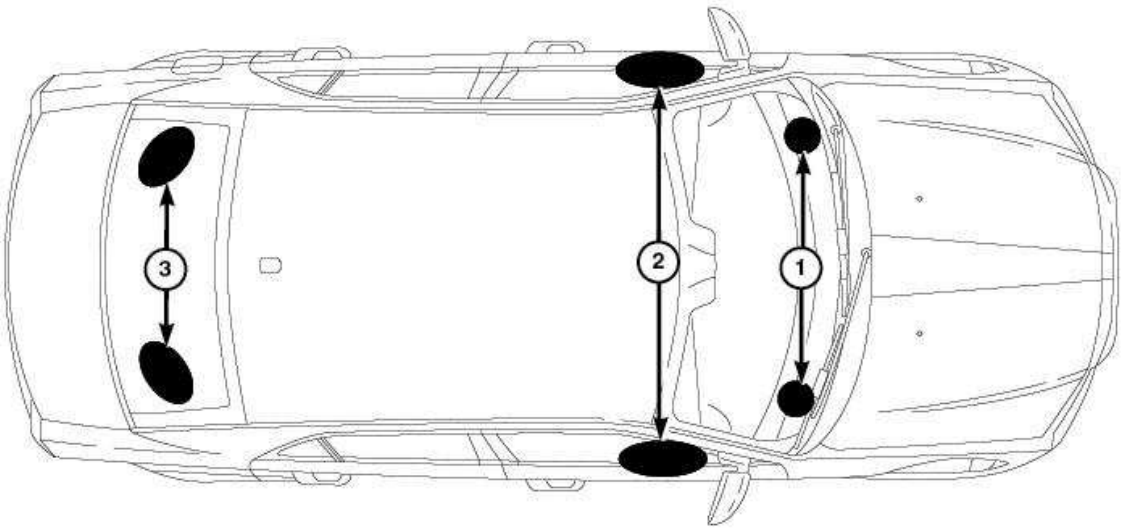

Fig. 494: Rear Crankshaft Oil Seal, Retainer & Seal Protector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rear crankshaft oil seal (2) and retainer (1) are an assembly. To avoid damage to the seal lip, DO NOT remove the seal protector (3) from the rear crankshaft oil seal before installation onto the engine.

CAUTION: Whenever the crankshaft is replaced, the rear crankshaft oil seal must also be replaced. Failure to do so may result in engine fluid leakage.

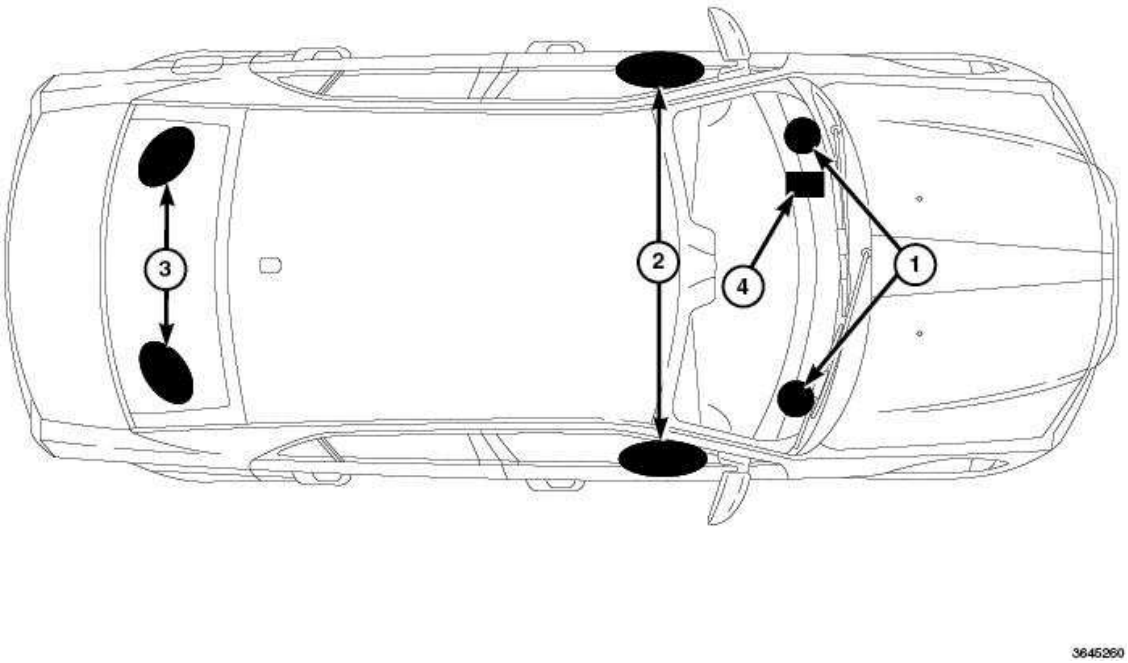

Fig. 495: Oil Seal Retainer Assembly & Seal Protector
Courtesy of CHRYSLER GROUP, LLC

1. Inspect the crankshaft to make sure there are no nicks or burrs on the seal surface.
2. Clean the engine block sealing surfaces thoroughly.

NOTE: **It is not necessary to lubricate the seal or the crankshaft when installing the seal retainer. Residual oil following installation can be mistaken for seal leakage.**

3. Carefully position the oil seal retainer assembly (2), and seal protector (1) on the crankshaft and push firmly into place on the engine block (during this step, the seal protector will be pushed from the rear oil seal assembly as a result of installing the rear oil seal).

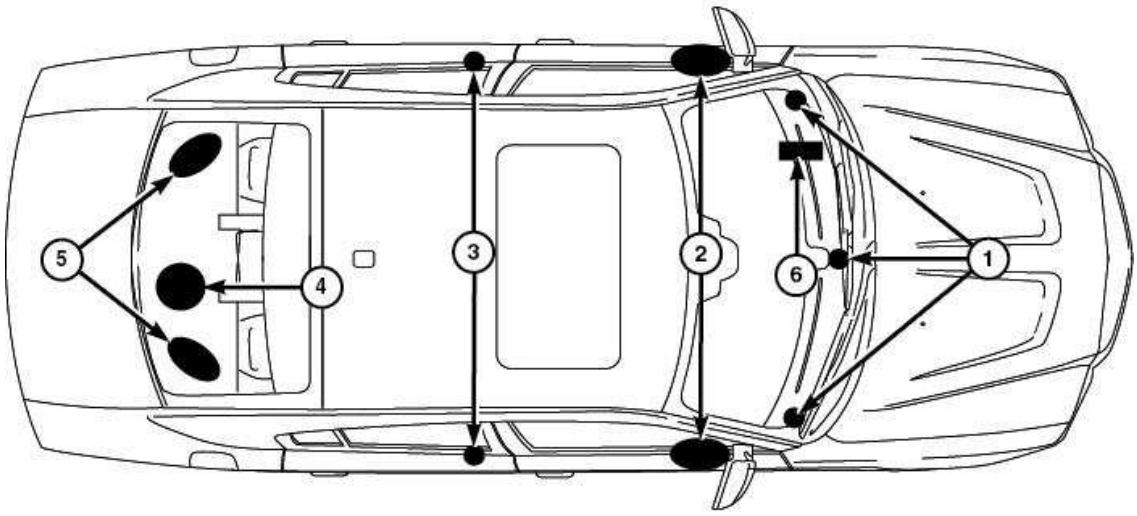

Fig. 496: Rear Seal Installed
Courtesy of CHRYSLER GROUP, LLC

4. Verify that the seal lip (2) on the retainer is uniformly curled inward toward the engine on the crankshaft (1).

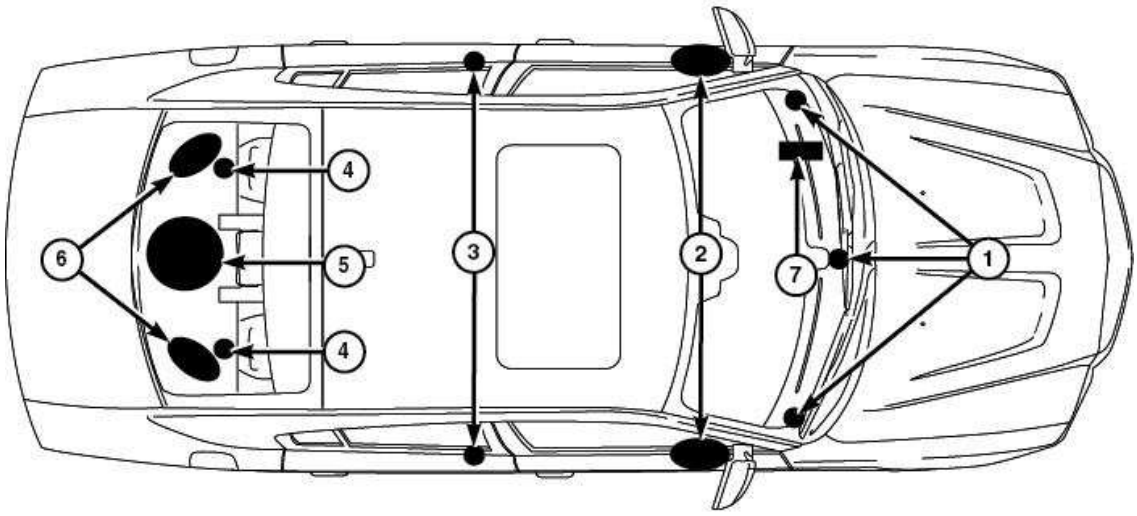

Fig. 497: Seal Retainer & Attaching Screws
Courtesy of CHRYSLER GROUP, LLC

5. Install the eight seal retainer bolts (1) and tighten to 12 N.m (106 in. lbs.).

NOTE: Make sure that the seal retainer flange is flush with the engine block oil pan sealing surface.

6. Install the upper oil pan. Refer to **PAN, OIL, INSTALLATION**.
7. Install the flexplate. Refer to **FLEXPLATE, INSTALLATION**.
8. Install the transmission. Refer to **INSTALLATION** .
9. Fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, LEFT

REMOVAL

REMOVAL

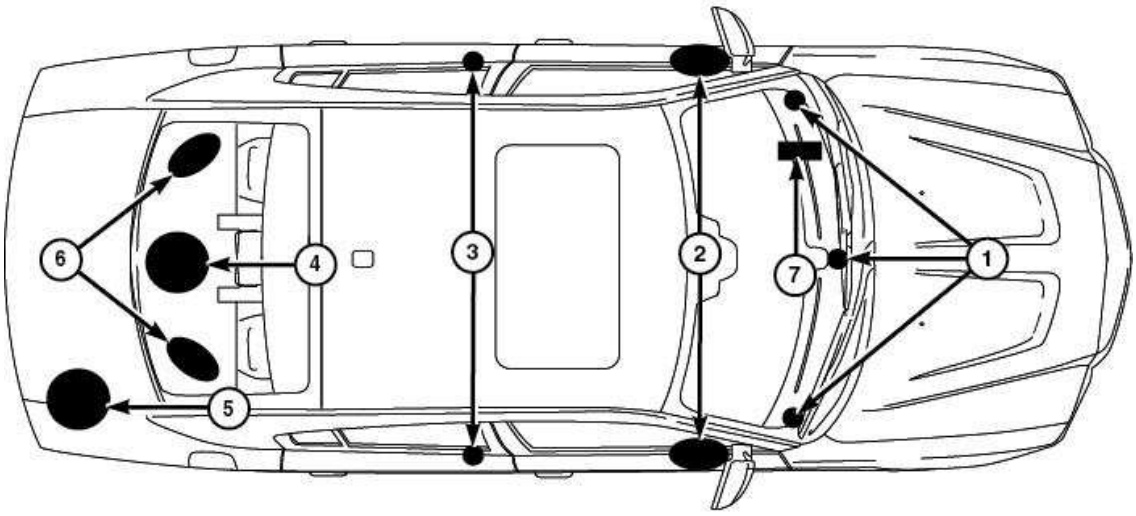

Fig. 498: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

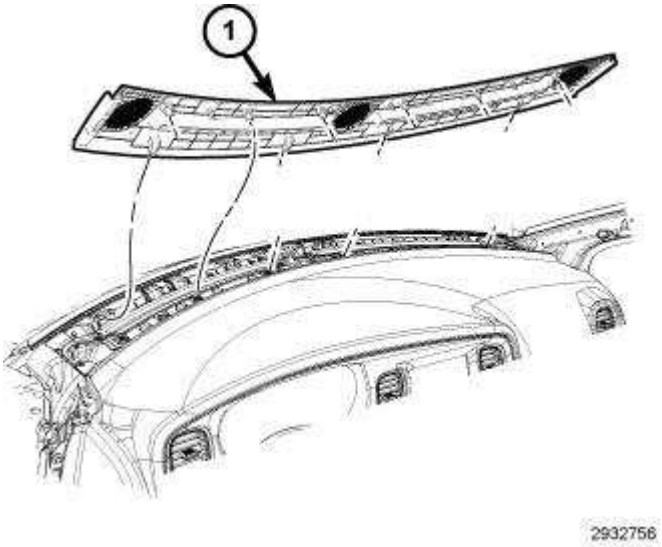

Fig. 499: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

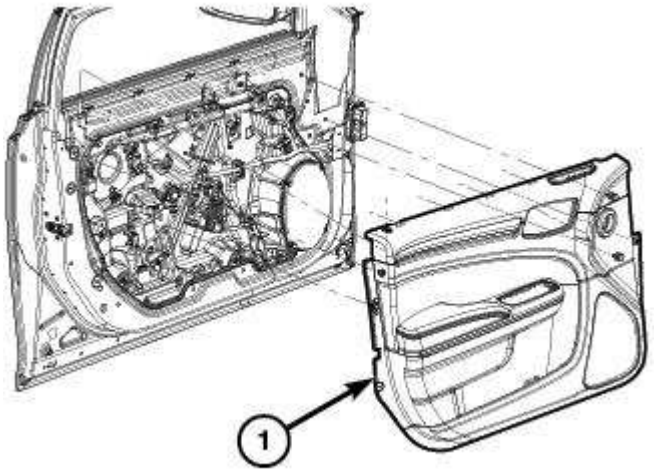

Fig. 500: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

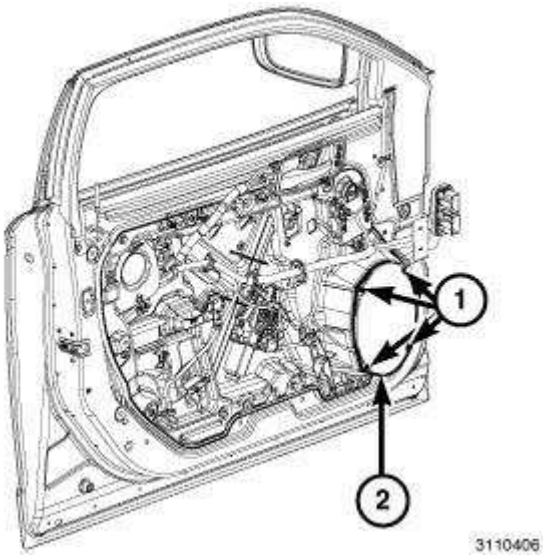

Fig. 501: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

8. Remove the left engine mount isolator heat shield retaining nuts (3) and remove the heat shield (4).
9. Remove both left and right engine mount isolator to frame retaining bolts (2).

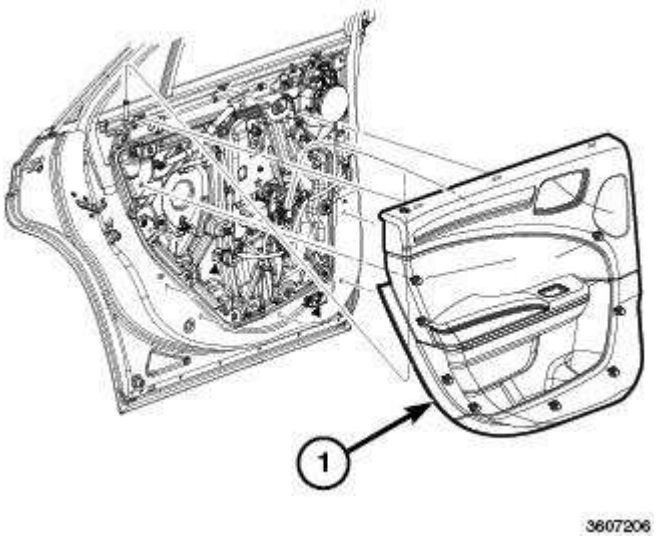

Fig. 502: Left Engine Mount Isolator & Upper Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

10. Remove the left engine mount isolator (3) upper retaining nut (1).

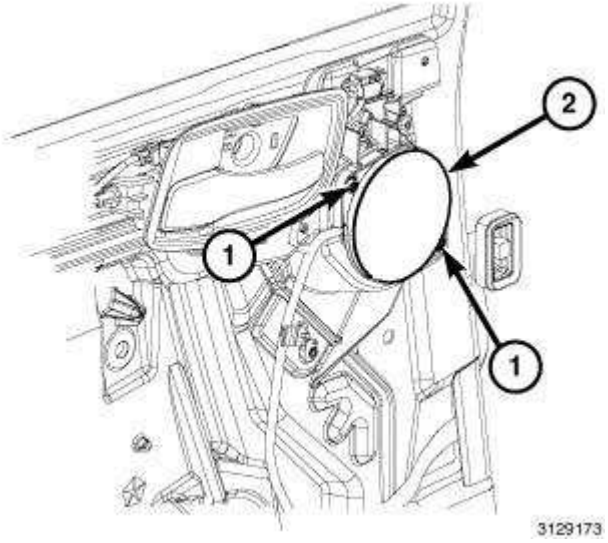

Fig. 503: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
12. Remove the belly pan retainers (1) and remove the belly pan.
13. Using a suitable screw jack, raise the engine to gain clearance for engine mount isolator

removal.

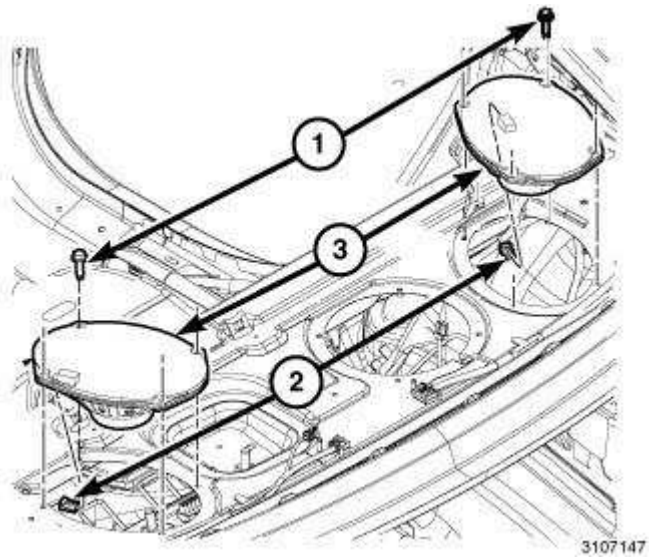

Fig. 504: Engine Mount Isolator, Left Engine Mount Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Remove the engine mount isolator (4) from the vehicle.
15. If required, remove the left engine mount bracket (1) four retaining bolts (5) and remove the left engine mount bracket.

INSTALLATION

INSTALLATION

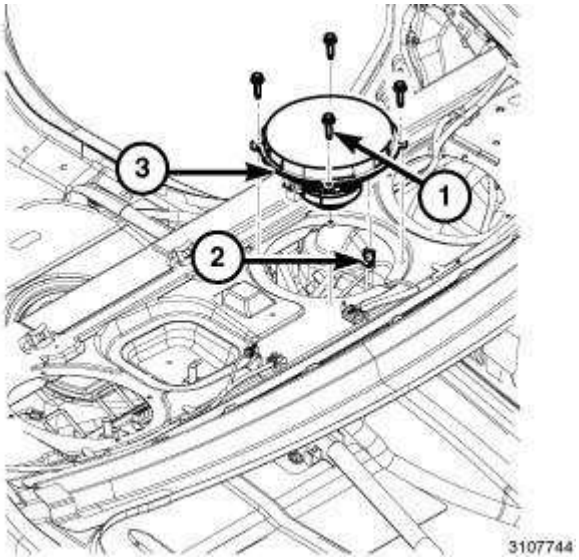

Fig. 505: Engine Mount Isolator, Left Engine Mount Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the left engine mount bracket (1), install the four retaining bolts (5) and tighten to 61 N.m (45 ft. lbs.).
2. Position the left engine mount isolator (4) stud into the bracket, align the tab on the isolator with the notch in the engine mount bracket, install the retaining nut (2) finger tight.
3. Lower the screw jack until both engine mount isolators are in position.
4. Install both left and right engine mount isolator to frame bolts (3) finger tight.
5. Lower the engine so the weight is resting on the isolators and remove the screw jack.

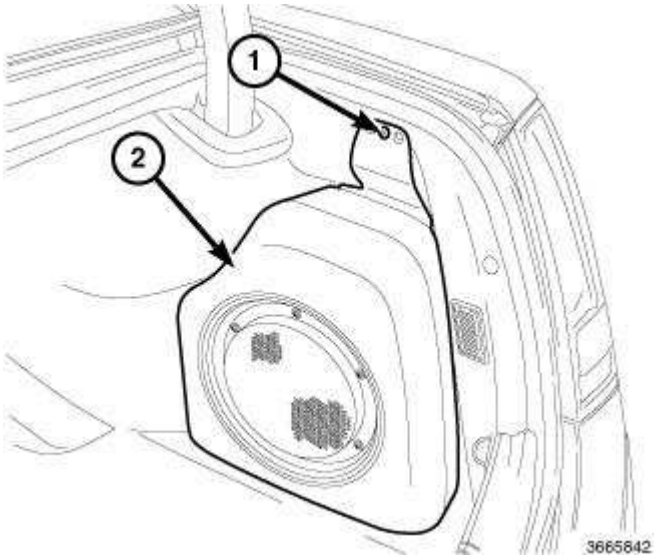

Fig. 506: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Position the belly pan and install the retainers (1).
7. Lower the vehicle.

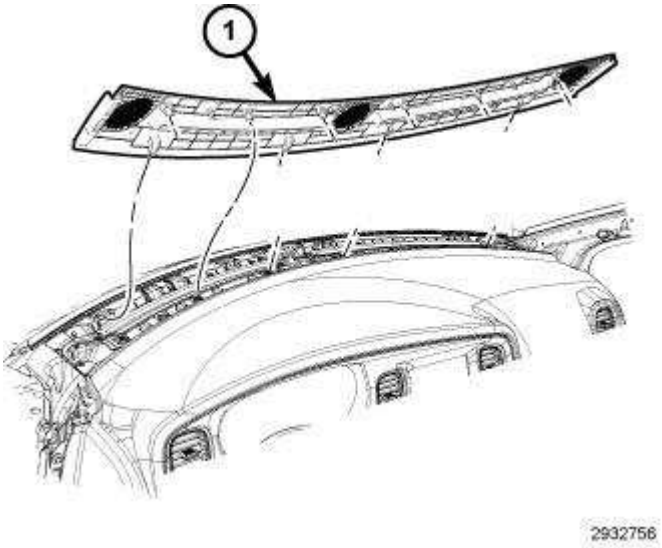

Fig. 507: Left Engine Mount Isolator & Upper Retaining Nut

Courtesy of CHRYSLER GROUP, LLC

8. Tighten the left engine mount isolator (3) upper retaining nut (1) 61 N.m (45 ft. lbs.).

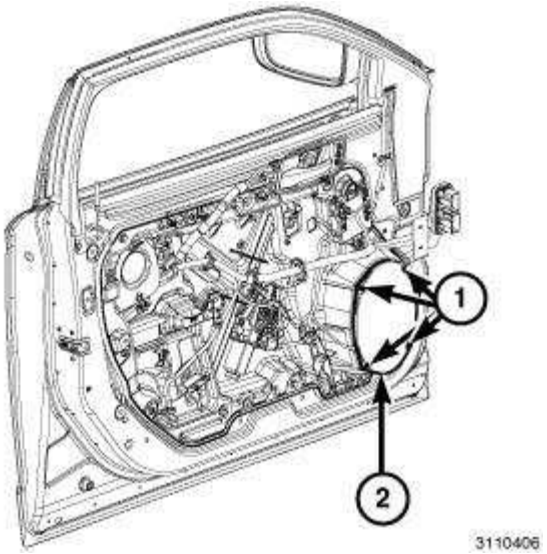

Fig. 508: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

9. Tighten both left and right engine mount isolator to frame bolts (2) to 61 N.m (45 ft. lbs.).
10. Position the left engine mount isolator heat shield (4), install the retaining nuts and tighten to 12 N.m (9 ft. lbs.).

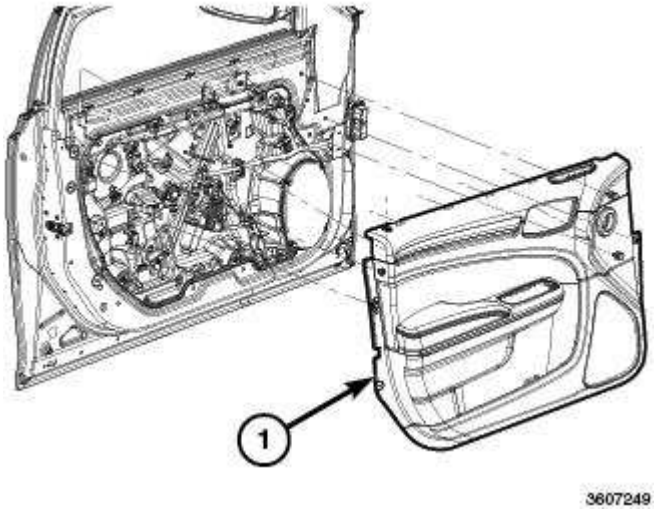

Fig. 509: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners

Courtesy of CHRYSLER GROUP, LLC

11. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
12. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
13. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
14. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
15. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

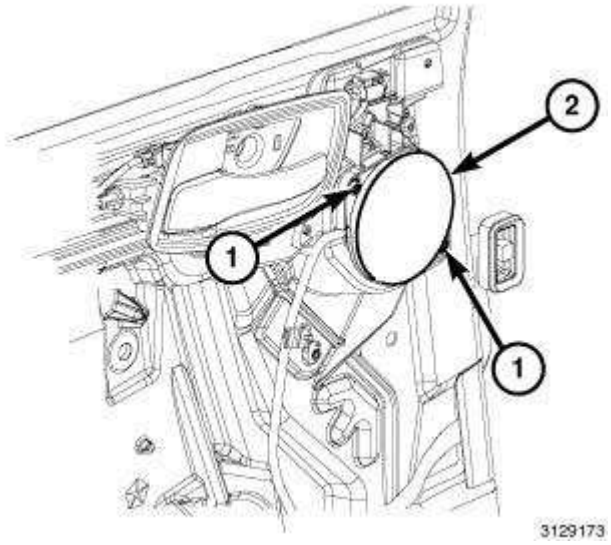

Fig. 510: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

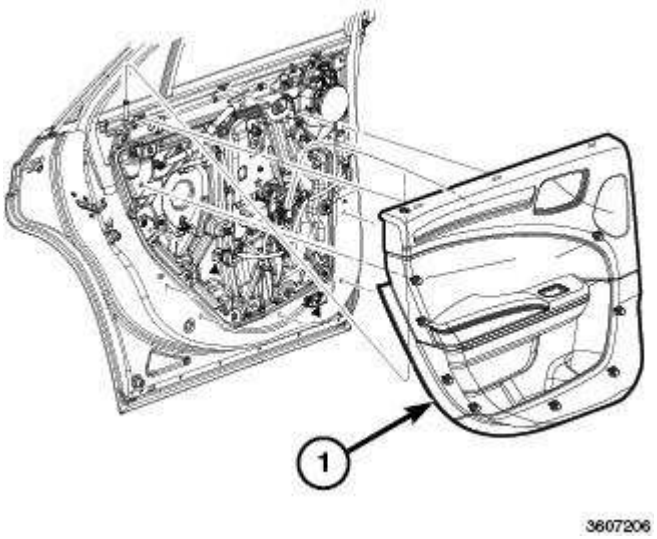

Fig. 511: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

17. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).

INSULATOR, ENGINE MOUNT, RIGHT

REMOVAL

REMOVAL

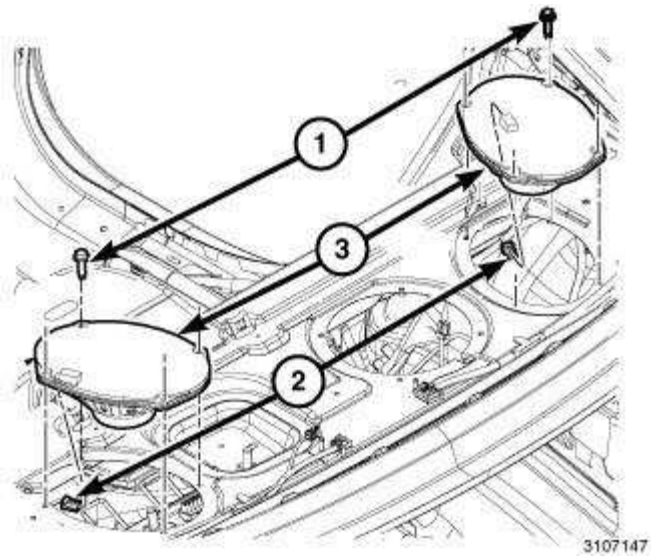

Fig. 512: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

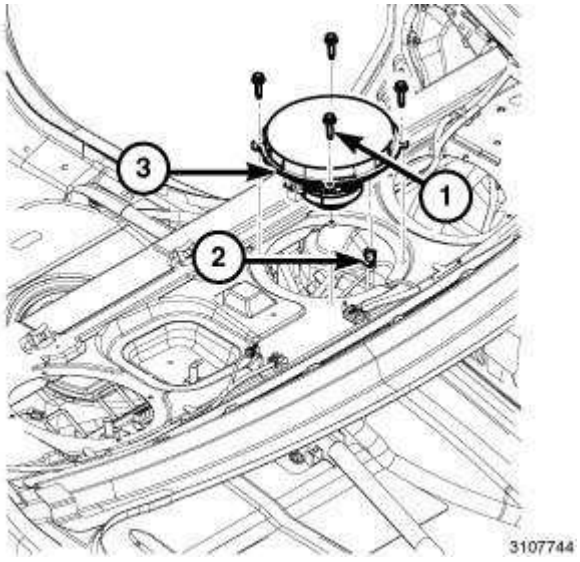

Fig. 513: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

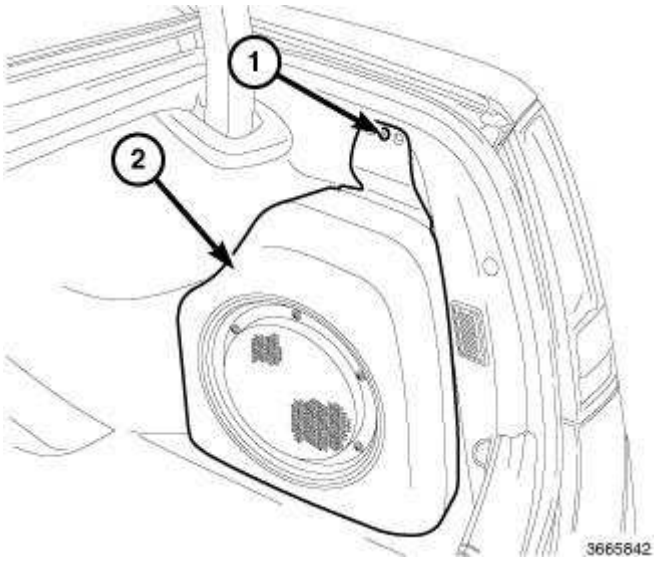

Fig. 514: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

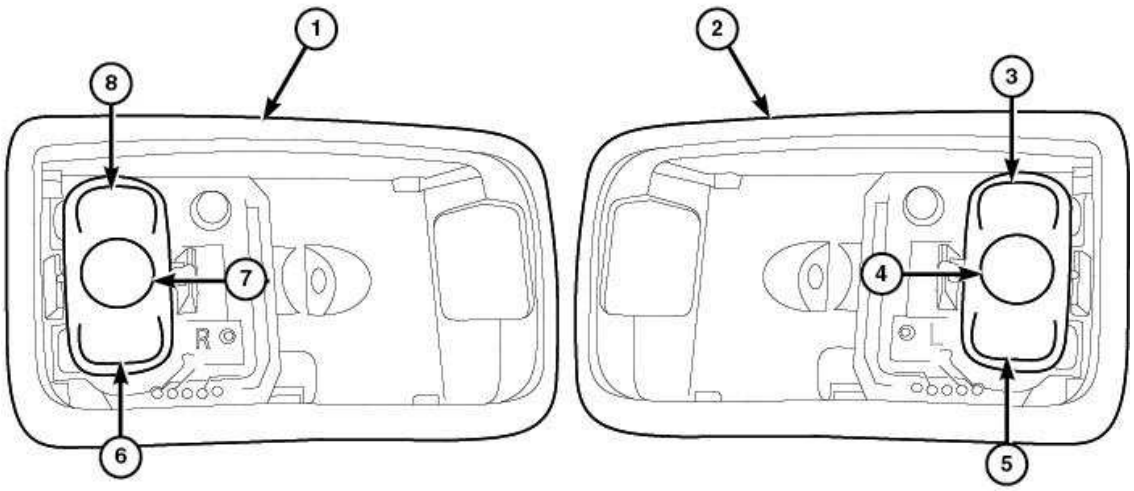

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Fig. 515: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

8. Remove the right engine mount isolator heat shield retaining nuts (3) and remove the heat shield (4).
9. Remove both left and right engine mount isolator to frame retaining bolts (2).

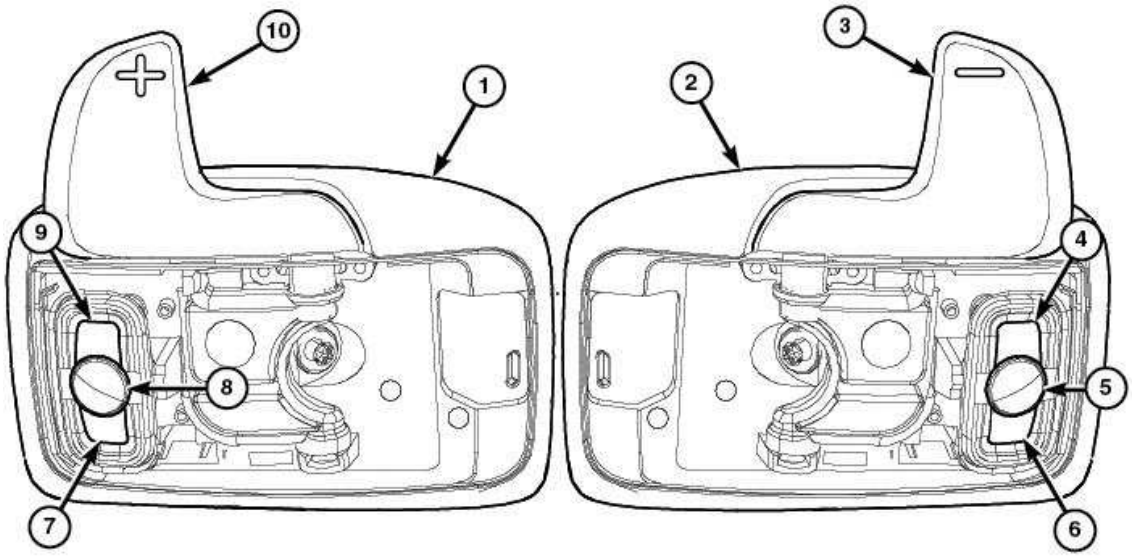


Fig. 516: Left Engine Mount Isolator & Upper Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

10. Remove the right engine mount isolator (3) upper retaining nut (1).

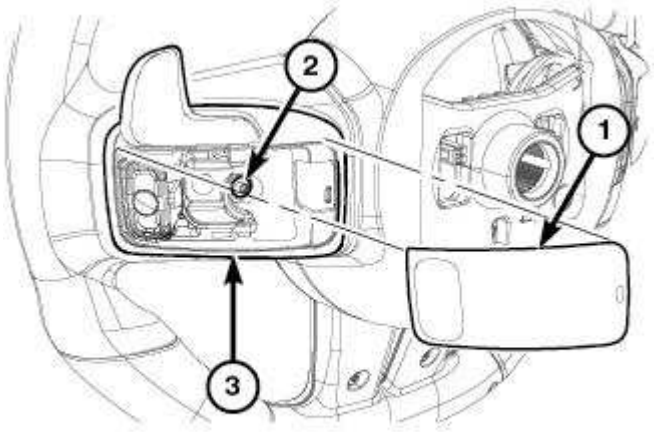


Fig. 517: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
12. Remove the belly pan retainers (1) and remove the belly pan.
13. Using a suitable screw jack, raise the engine to gain clearance for engine mount isolator removal.

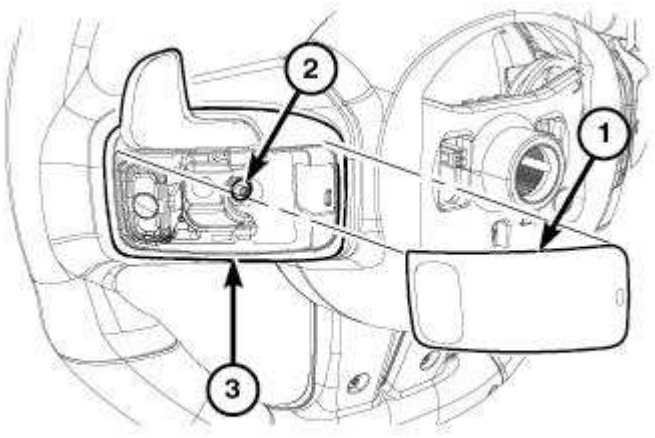


Fig. 518: Main Wire Harness Retainers & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

14. If required, disconnect the main wire harness from the Crankshaft Position (CKP) sensor (3).
15. If required, unfasten the main wire harness retainer (1) from the engine block and one main wire harness retainer (2) from the right engine mount bracket and position harness aside.

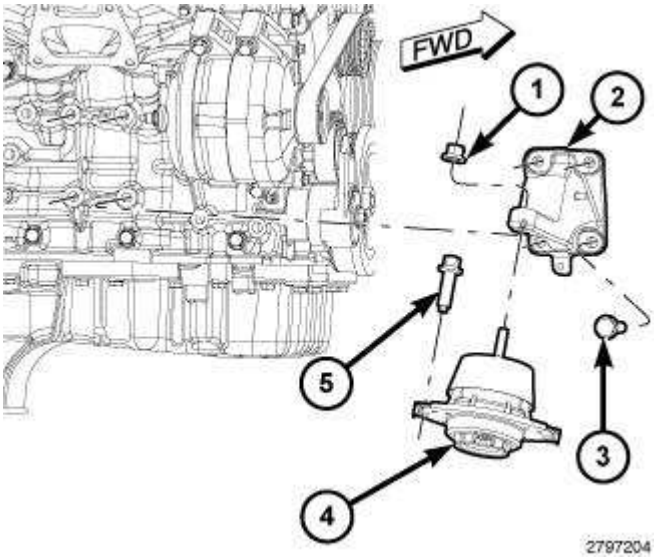


Fig. 519: Engine Mount Isolator, Right Engine Mount Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Remove the engine mount isolator (4) from the vehicle.
17. If required, remove the right engine mount bracket (2) four retaining bolts (3) and remove the right engine mount bracket.

INSTALLATION

INSTALLATION

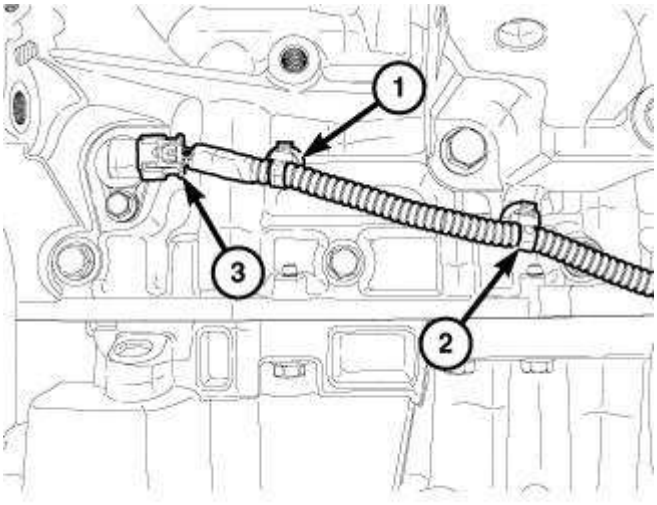


Fig. 520: Main Wire Harness Retainers & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

1. If removed, connect the main wire harness to the Crankshaft Position (CKP) sensor (3).
2. If removed, fasten the CKP main wire harness retainer (1) to the engine block and one main wire harness retainer (2) to the right engine mount bracket.

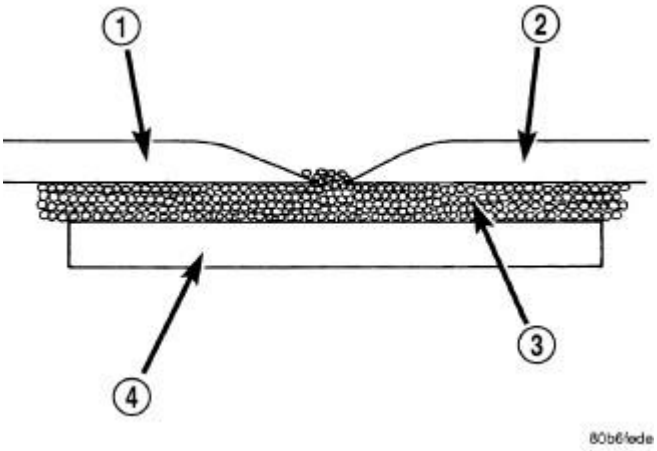


Fig. 521: Engine Mount Isolator, Right Engine Mount Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. If removed, position the right engine mount bracket (2), install the four retaining bolts (5) and tighten to 61 N.m (45 ft. lbs.).
4. Position the right engine mount isolator (4) stud into the bracket, align the tab on the isolator with the notch in the engine mount bracket, install the retaining nut (1) finger tight.
5. Lower the screw jack until both engine mount isolators are in position.
6. Install the both left and right engine mount isolator to frame bolts (3) finger tight.

7. Lower the engine so the weight is resting on the isolators and remove the screw jack.

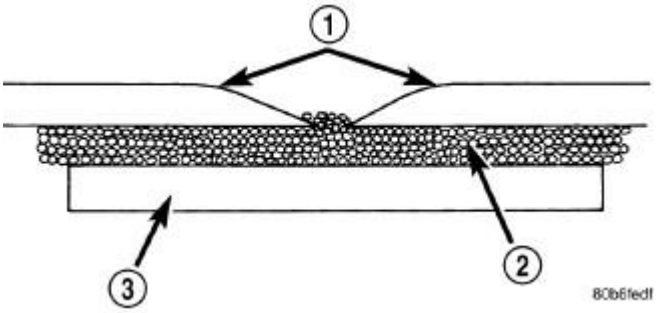


Fig. 522: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Position the belly pan and install the retainers (1).
9. Lower the vehicle.

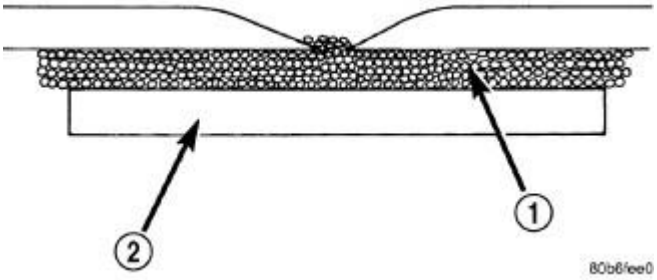


Fig. 523: Left Engine Mount Isolator & Upper Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

10. Tighten the right engine mount isolator (3) upper retaining nut (1) 61 N.m (45 ft. lbs.).

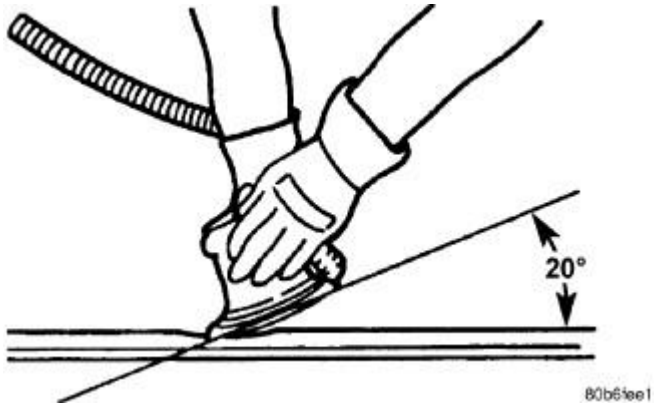


Fig. 524: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

11. Tighten both left and right engine mount isolator to frame bolts (2) to 61 N.m (45 ft. lbs.).
12. Position the right engine mount isolator heat shield (4), install the retaining nuts and tighten to 12 N.m (9 ft. lbs.).

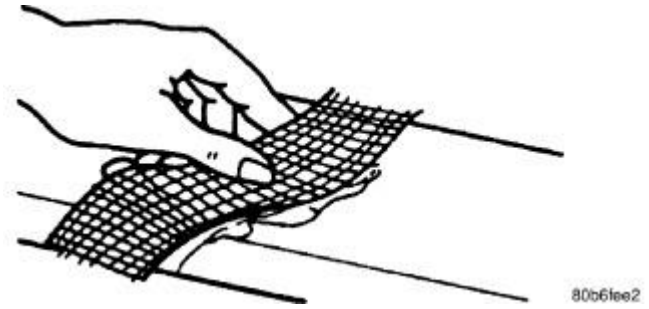


Fig. 525: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
14. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
15. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
16. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
17. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

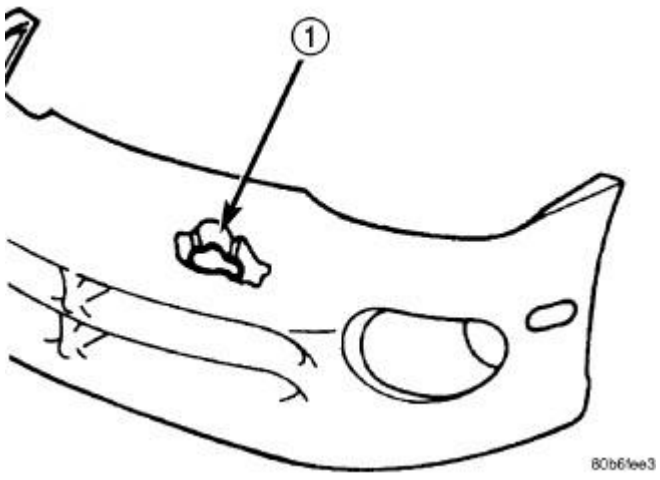


Fig. 526: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

18. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

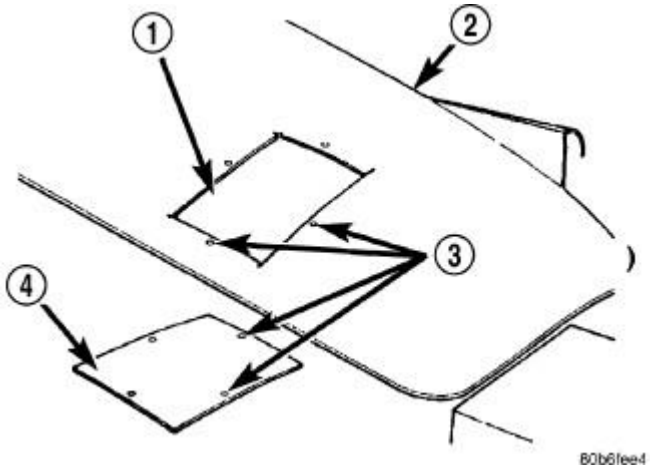


Fig. 527: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

19. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

RWD

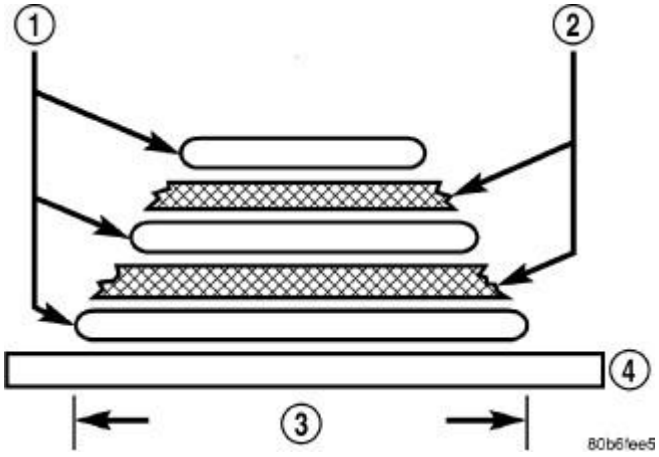


Fig. 528: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the two bolts (2) from the rear engine mount isolator.
3. Using a suitable jack stand and a block of wood positioned under the transmission oil pan, raise the transmission until the weight is off of the isolator (approximately 5 mm).
4. Remove four bolts (3) and the crossmember (1).

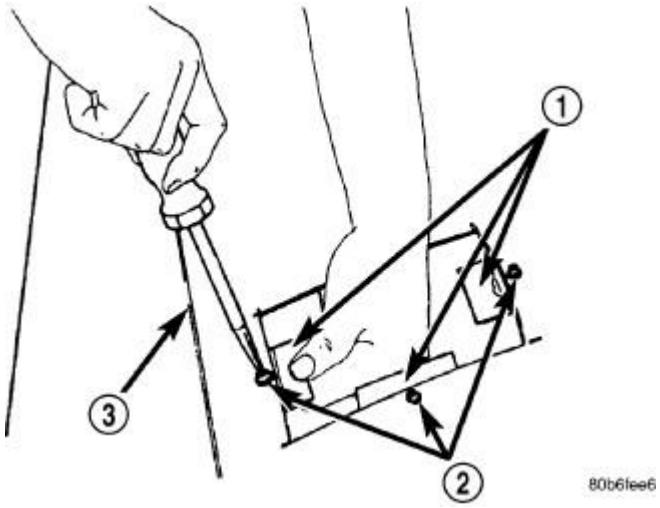


Fig. 529: Rear Engine Mount Isolator & Bolts (4x2)
Courtesy of CHRYSLER GROUP, LLC

5. Remove four bolts (2) and the rear engine mount isolator (1).

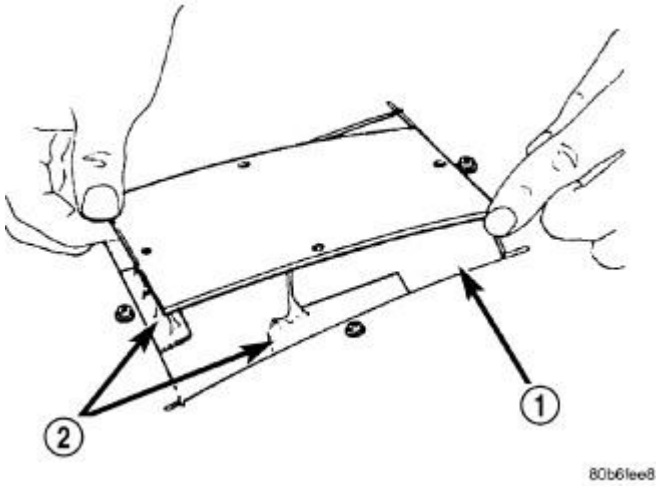


Fig. 530: Rear Transmission Mount Bracket
Courtesy of CHRYSLER GROUP, LLC

6. If required, remove four bolts (1) and the rear engine mount bracket (2).

AWD

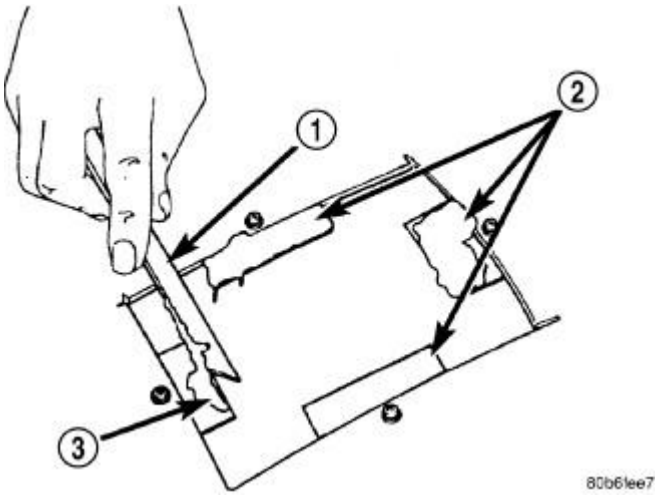


Fig. 531: Crossmember & Bolts (AWD)
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the two bolts (2) from the rear engine mount isolator.
3. Using a suitable jack stand and a block of wood positioned under the transfer case, raise the transmission until the weight is off of the isolator (approximately 5 mm).
4. Remove four bolts (3) and the crossmember (1).

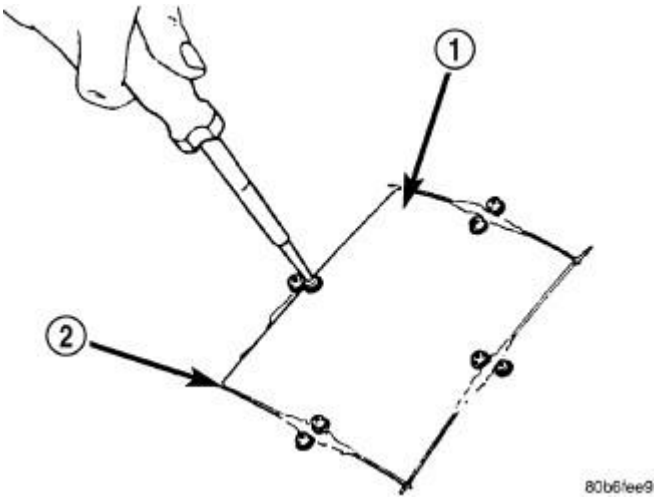


Fig. 532: Rear Engine Mount Isolator & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove four bolts (2) and the rear engine mount isolator (1).

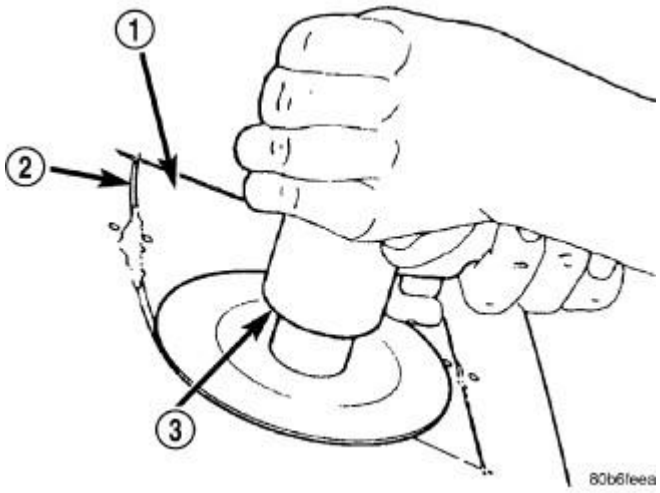


Fig. 533: Rear Engine Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. If required, remove four bolts (2) and the rear engine mount bracket (1).

INSTALLATION

INSTALLATION

RWD

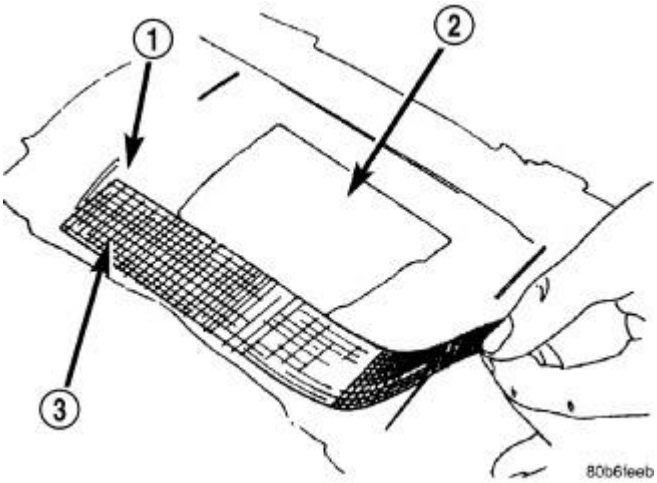


Fig. 534: Rear Transmission Mount Bracket
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the rear engine mount bracket (2) with four bolts (1) tightened to 33 N.m (24 ft. lbs.).

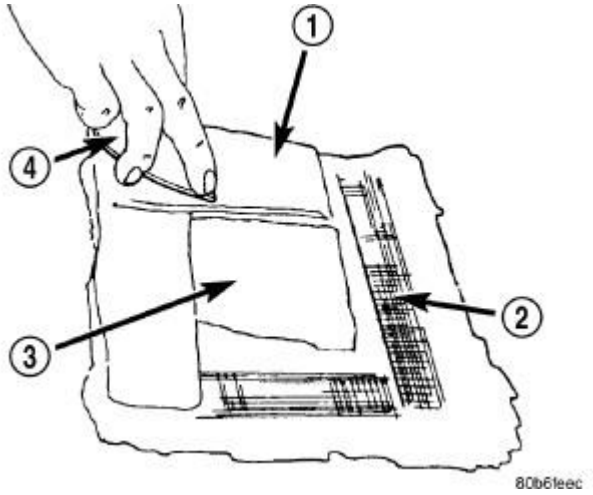


Fig. 535: Rear Engine Mount Isolator & Bolts (4x2)
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear engine mount isolator (1) with four bolts (2) tightened to 33 N.m (24 ft. lbs.).

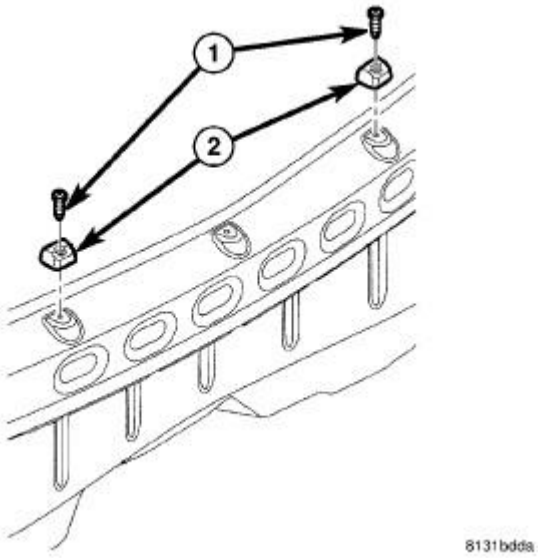


Fig. 536: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the crossmember (1) with four bolts (3) tightened to 65 N.m (48 ft. lbs.).
4. Lower the transmission so the weight is resting on the isolator.
5. Install two bolts (2) to the rear engine mount isolator and tighten to 65 N.m (48 ft. lbs.).
6. Lower the vehicle.

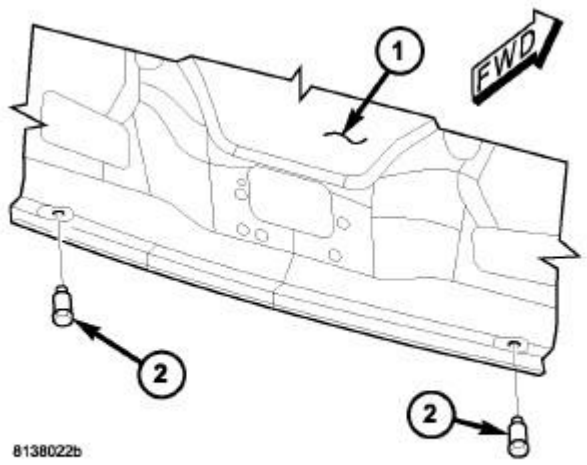


Fig. 537: Rear Engine Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the rear engine mount bracket (1) with four bolts (2) tightened to 33 N.m (24 ft. lbs.).

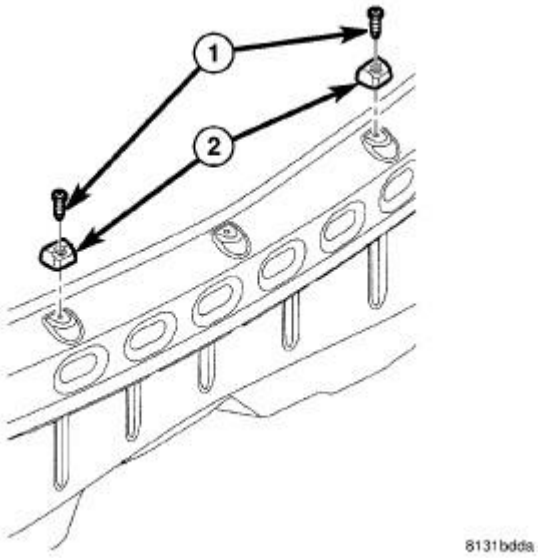


Fig. 538: Rear Engine Mount Isolator & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear engine mount isolator (1) with four bolts (2) tightened to 33 N.m (24 ft. lbs.).

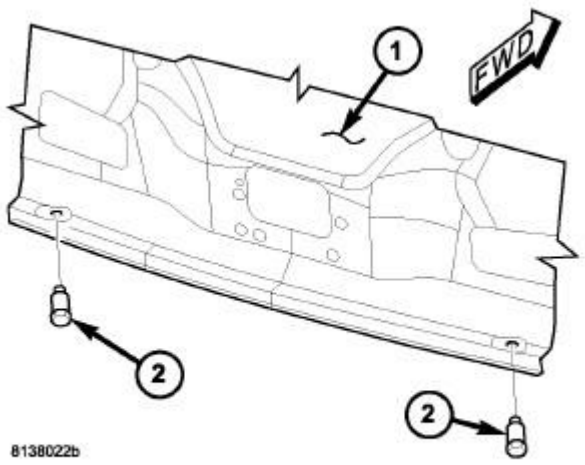


Fig. 539: Crossmember & Bolts (AWD)
Courtesy of CHRYSLER GROUP, LLC

3. Install the crossmember (1) with four bolts (3) tightened to 65 N.m (48 ft. lbs.).
4. Lower the transmission so the weight is resting on the isolator.
5. Install two bolts (2) to the rear engine mount isolator and tighten to 65 N.m (48 ft. lbs.).
6. Lower the vehicle.

LUBRICATION

DESCRIPTION

DESCRIPTION

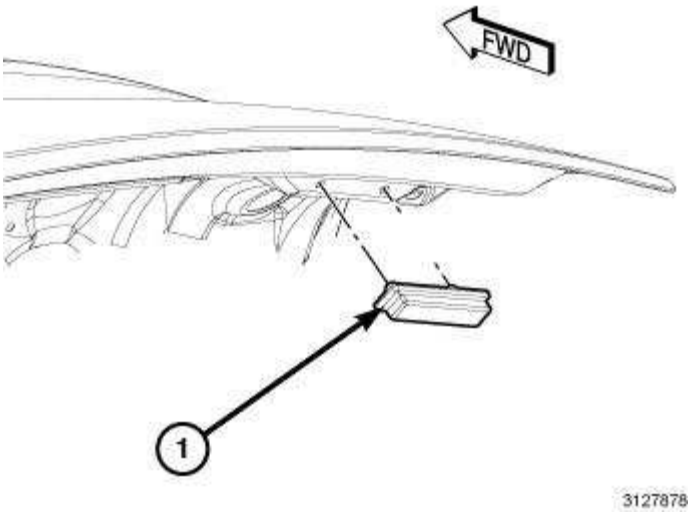


Fig. 540: 3.6L Engine
Courtesy of CHRYSLER GROUP, LLC

The lubrication system is a full flow filtration, pressure feed type lubrication system. The oil pump is mounted to the bottom of the cylinder block and chain driven by the crankshaft sprocket. The oil pump pick-up tube is attached to the oil pump and supported at the windage tray. There are three oil gallery plugs installed in the engine block. A system oil pressure sensor allows oil pressure to be monitored with a diagnostic scan tool. The oil pressure and oil temperature sensors are located on the oil filter housing assembly which is mounted to the top of the engine block between the cylinder heads. The oil cooler is mounted to the oil filter housing. There is a pressure relief valve in the oil pump that is only activated on a cold start or for emergency relief since the oil pump output is self-regulating. There are three piston oil cooler jets mounted to the engine block. Each jet cools two pistons.

OPERATION

OPERATION

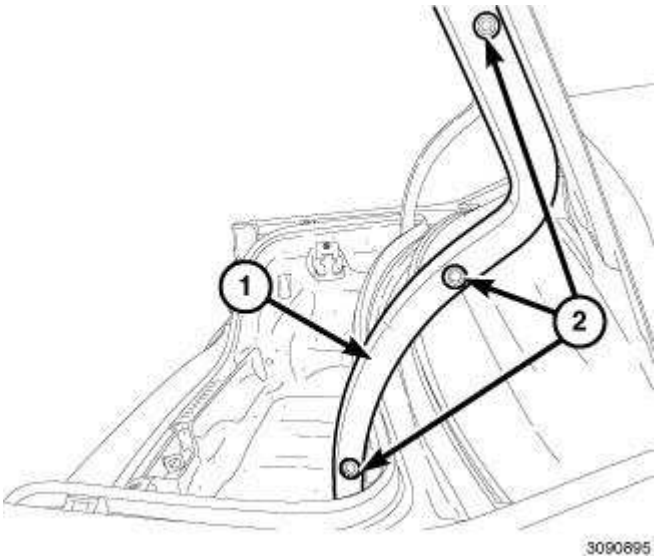


Fig. 541: Engine Lubrication Flow
Courtesy of CHRYSLER GROUP, LLC

The oil from the oil pan is pumped by a vane type oil pump mounted to the bottom of the cylinder block that is chain driven by the crankshaft sprocket. The oil from the pump travels to the oil filter element and then to the oil cooler assembly. After the oil has been filtered and cooled, the oil enters the main oil gallery. The pressurized oil travels through the main gallery to the four main journals to lubricate the crankshaft main bearings. The pressurized oil travels through the crankshaft main journals to cross-drilling supplying oil to the connecting rod journals. From the number one main bearing gallery, oil travels to the right secondary chain tensioner and to the primary chain idler shaft. The main oil gallery also supplies oil to three sets of piston oil cooling jets. From the cylinder block the oil flows through drillings into the left and right cylinder heads. Left cylinder head oil is supplied to the left secondary timing chain tensioner, camshaft journals and hydraulic lash adjusters. Right cylinder hear oil is supplied to the right camshaft journals and hydraulic lash adjusters. The camshaft valve

lobes and rocker arms are lubricated through a small hole in the rocker arm; oil flows through the lash adjuster then through the rocker arm and onto the camshaft lobe. Oil also flows through each of the four forward camshaft bearings into the camshafts and phasers.

ENGINE LUBRICATION FLOW CHART

FROM	TO
Oil Pickup Tube	Oil Pump
Oil Pump	Oil Filter
Oil Filter	Oil Cooler
Oil Cooler	Block Main Oil Gallery
Block Main Oil Gallery	1. Crankshaft Main Journals 2. Left Cylinder Head 3. Right Cylinder Head 4. Piston Cooling Jets
Crankshaft Number One Main Journal	1. Primary Chain Idler Shaft 2. Right Secondary Chain Tensioner 3. Oil Pump Feedback
Crankshaft Main Journals	Crankshaft Rod Journals
Left Cylinder Head	1. Left Secondary Chain Tensioner 2. Hydraulic Lash Adjusters 3. Camshaft Journals 4. Phaser Oil Control Valves
Right Cylinder Head	1. Hydraulic Lash Adjusters 2. Camshaft Journals 3. Phaser Oil Control Valves
Hydraulic Lash Adjusters	1. Rocker Arms 2. Cam Lobes

DIAGNOSIS AND TESTING

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or de-grease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of the oil leak. If the oil leak is found and identified, repair per service information instructions.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles),

and repeat the inspection.

If the oil leak source is not positively identified at this time, proceed with the AIR LEAK DETECTION TEST METHOD below.

AIR LEAK DETECTION TEST METHOD

1. Disconnect the make-up air hose from the cylinder head cover. Cap or plug the make-up air hose nipple.
2. Remove the PCV hose from the PCV valve. Cap or plug the PCV valve nipple.
3. Attach an air hose with a pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

4. Gradually increase air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected leak source. Adjust the regulator to a suitable test pressure within this range that provides the best bubble generation which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
5. If the leakage occurs at the rear oil seal area, follow the procedures for rear seal area leaks. Refer to **Engine/Lubrication - Diagnosis and Testing**.
6. If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve and make-up air hoses.
7. Clean the oil off of the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

CHECKING ENGINE OIL PRESSURE

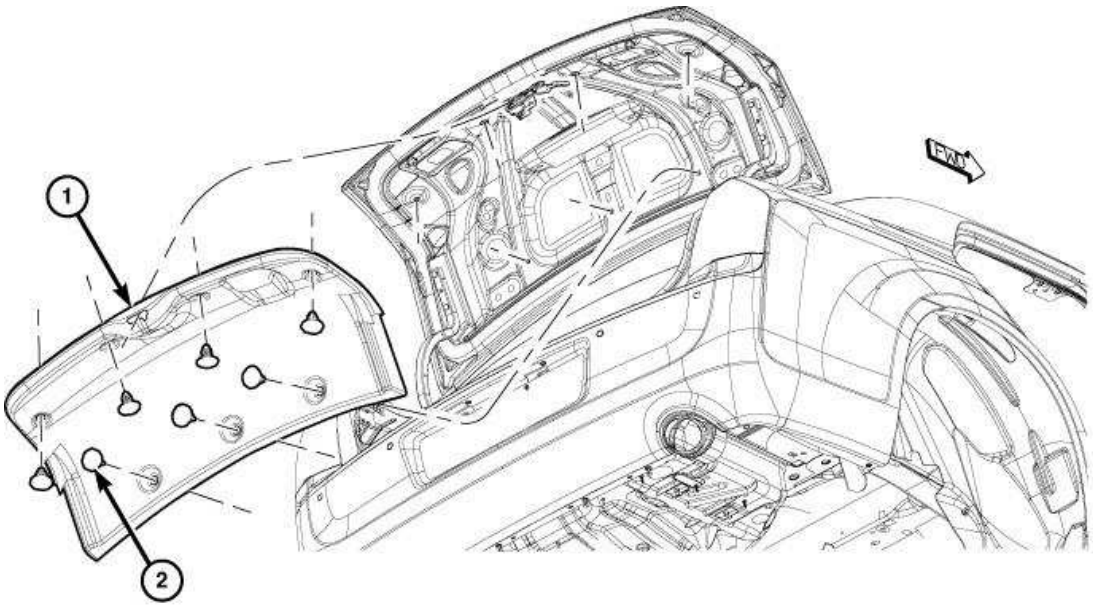


Fig. 542: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the oil pressure sensor (2) from the oil filter housing (3). Refer to **SENSOR, OIL PRESSURE, REMOVAL**.

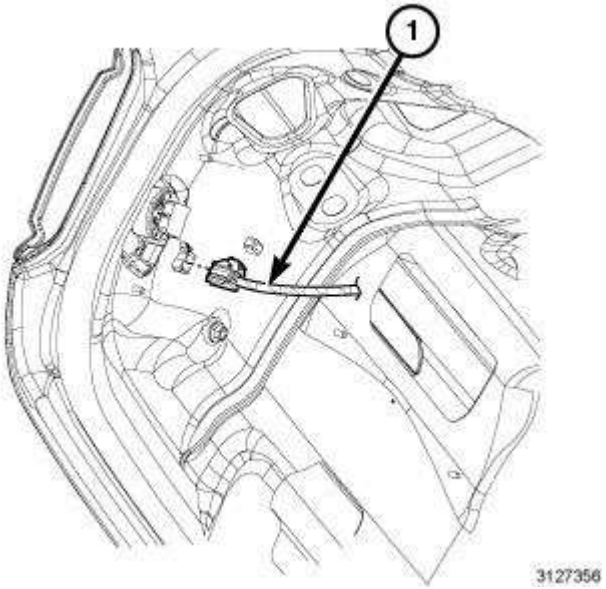


Fig. 543: Pressure Gauge Installed To Oil Pressure Port
Courtesy of CHRYSLER GROUP, LLC

3. Install Pressure Gauge (special tool #C-3292A, Gauge, Pressure) (1) to the oil pressure port. Tighten to 20 N.m (177 in. lbs.).
4. Install the upper and lower intake manifolds and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
5. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
6. Start and idle the engine. If oil pressure is 0 at idle, shut off the engine and consult the Engine Lubrication and Diagnostic Table. Refer to **ENGINE LUBRICATION DIAGNOSTIC TABLE**.
7. Run the engine until it reaches normal operating temperature.
8. Verify that the engine has acceptable oil pressure. Refer to **Engine - Specifications**.

REAR SEAL AREA LEAKS

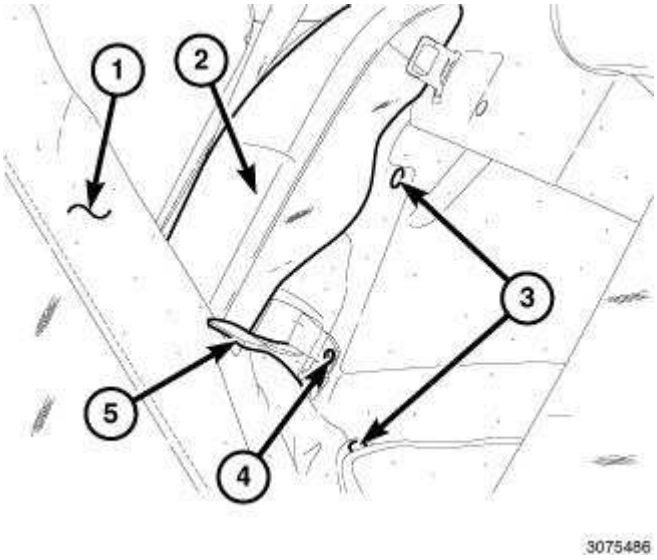


Fig. 544: Side Engine-To-Transmission Bolt, Transmission Dust Shield Retaining Bolt & Dust Shield
Courtesy of CHRYSLER GROUP, LLC

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the bolt (2) and the torque converter dust shield (3).

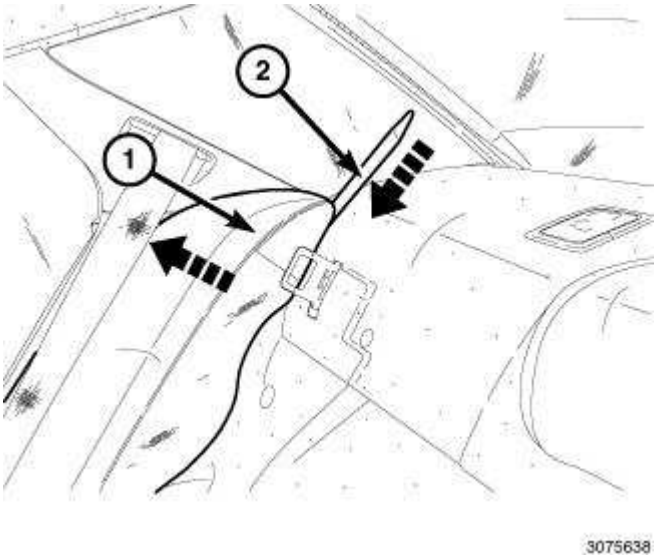


Fig. 545: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

4. Remove two rubber plugs (1) covering the rear oil seal retainer flange bolts.
5. Inspect the flexplate and rear of the block for evidence of oil. Use a black light to check for the oil leak:
    1. Circular spray pattern generally indicates seal leakage or crankshaft damage.
    2. Where leakage tends to run straight down, possible causes are a porous block, rear oil seal retainer, oil galley pipe plug and rear seal retainer to oil pan mating surfaces.
6. If no leaks are detected, use the Air Leak Detection Method as outlined in Engine Oil Leak. Refer to **AIR LEAK DETECTION TEST METHOD**.

    CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

7. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

    CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

8. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled. Refer to **SEAL, CRANKSHAFT OIL, REAR, REMOVAL**.

COOLER, OIL

DESCRIPTION

DESCRIPTION

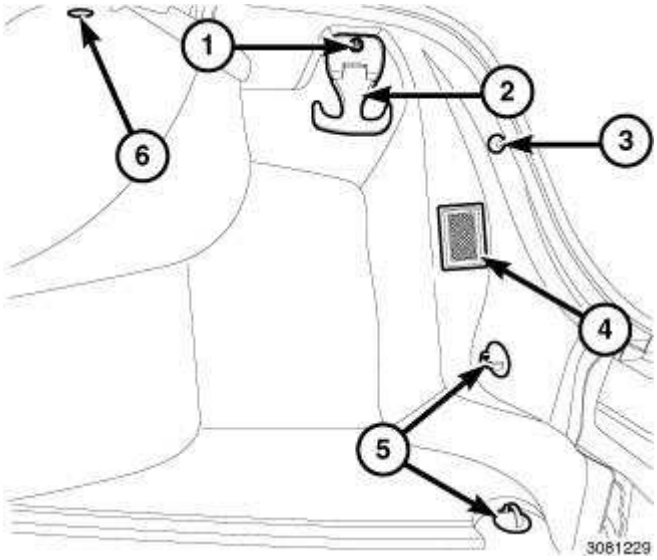


Fig. 546: Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

The oil cooler is attached to the top of the oil filter housing which is located in the V of the cylinder block. The oil cooler is a plate style coolant-to-oil heat exchanger.

OPERATION

OPERATION

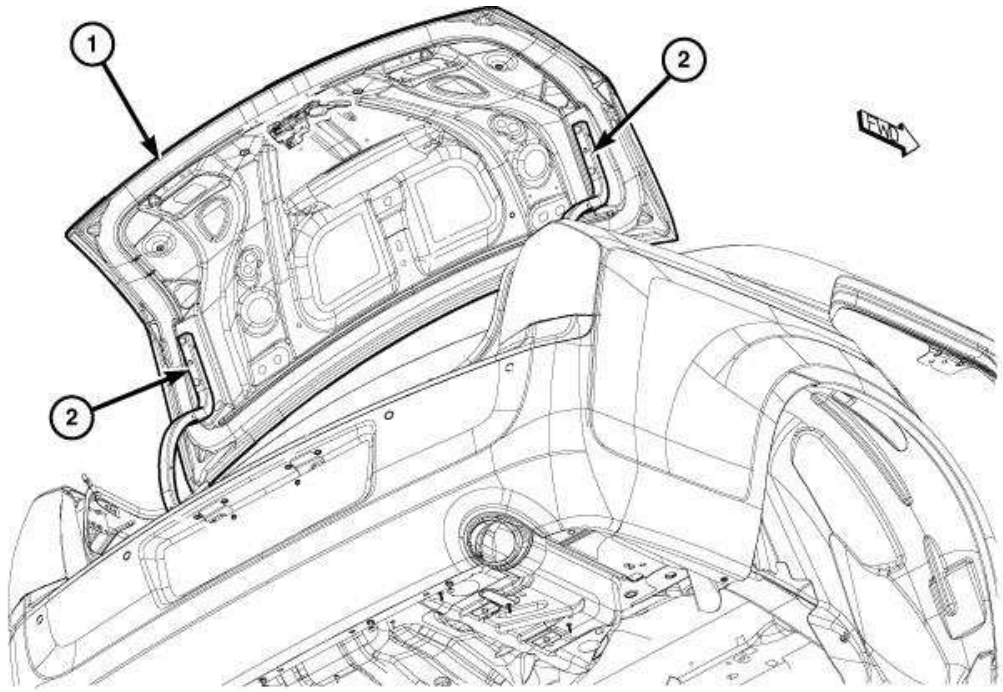


Fig. 547: Oil Flow & Coolant Flow Locations
Courtesy of CHRYSLER GROUP, LLC

Oil flows from the engine oil pump to the oil filter housing inlet (1) and to the oil filter element located within the oil filter housing. After the oil is filtered it travels internally through the engine oil cooler and then to the main oil gallery (5).

Coolant flows from the right cylinder block water jacket (3) and from the left cylinder block water jacket (4) into the housing. The coolant flows through the oil cooler and exits the housing from the rear hose nipple (6) where it is returned to the water pump. A coolant by-pass in the housing is designed to direct excessive coolant flow around the oil cooler for continuous circulation.

REMOVAL

REMOVAL

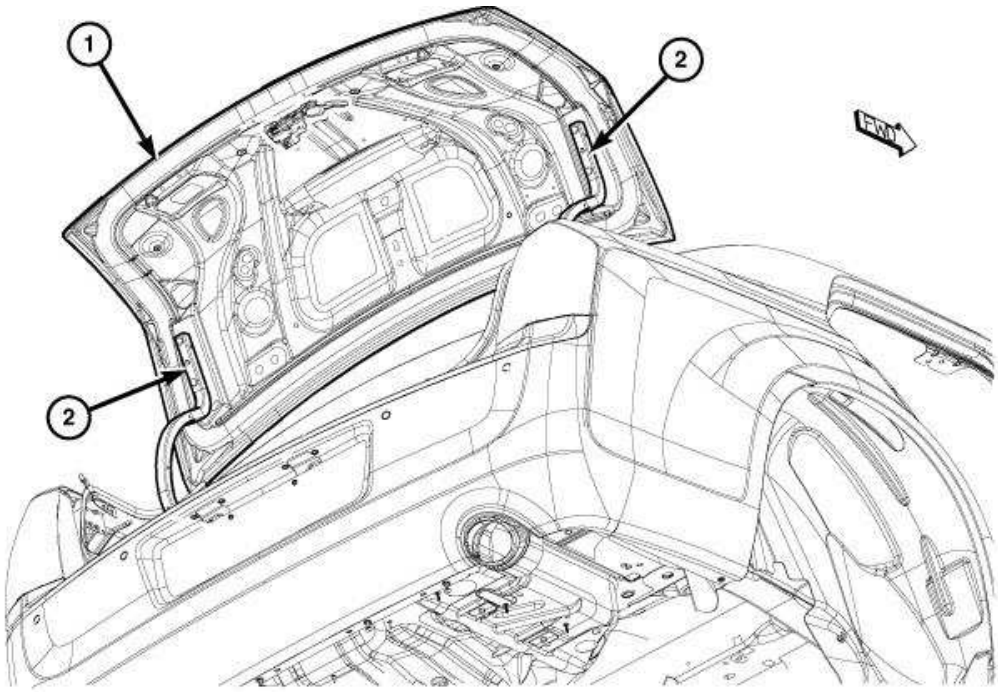


Fig. 548: Oil Cooler & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: The oil cooler can not be cleaned out. In the event that the engine requires rebuilding or replacement, replace the oil cooler.

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable.
3. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
4. Remove the air cleaner housing assembly, upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, REMOVAL**.
5. Remove four bolts (2) and two screws (1) and (3).
6. Remove the oil cooler (4).

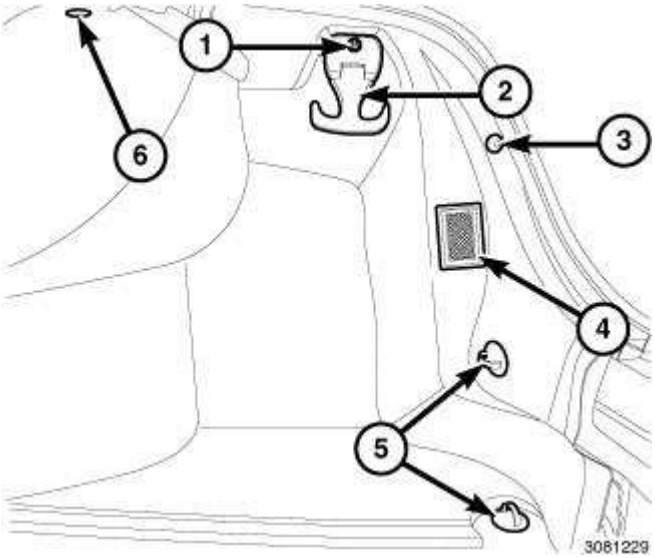


Fig. 549: Oil Cooler Seals & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

7. Remove and discard the oil cooler seals (1).

INSTALLATION

INSTALLATION

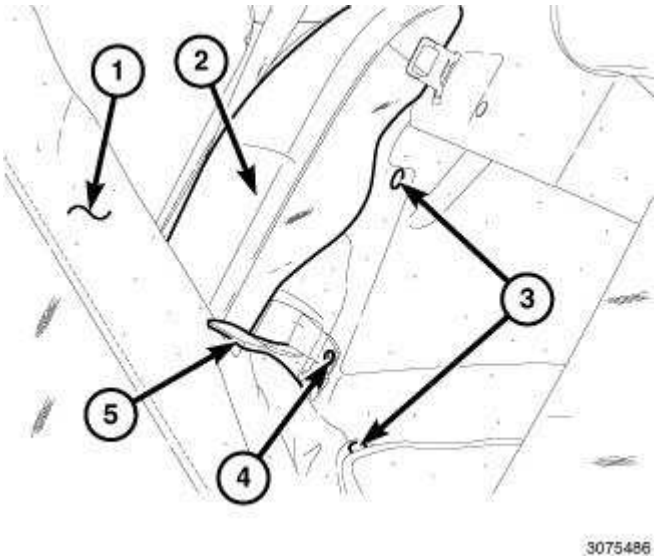


Fig. 550: Oil Cooler Seals & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use new dry seals (1) when installing the oil cooler. Do not lubricate the seals.

1. Install the new oil cooler seals (1) onto the oil filter housing (2).

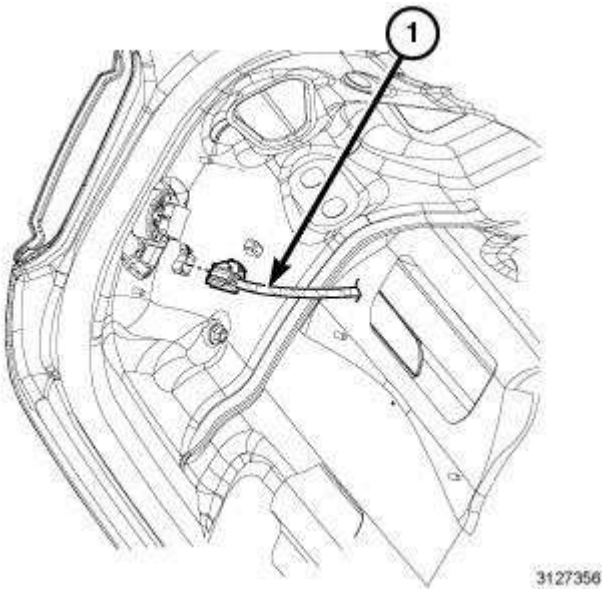


Fig. 551: Oil Cooler & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Position the oil cooler (4) on the oil filter housing.
3. Install two screws (1) and (3). Tighten the screws to 4 N.m (35 in. lbs.).
4. Install four bolts (2) and tighten to 12 N.m (106 in. lbs.).
5. Install the upper and lower intake manifolds and air cleaner housing assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
6. Fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
7. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
8. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
9. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

FILTER, ENGINE OIL

REMOVAL

REMOVAL

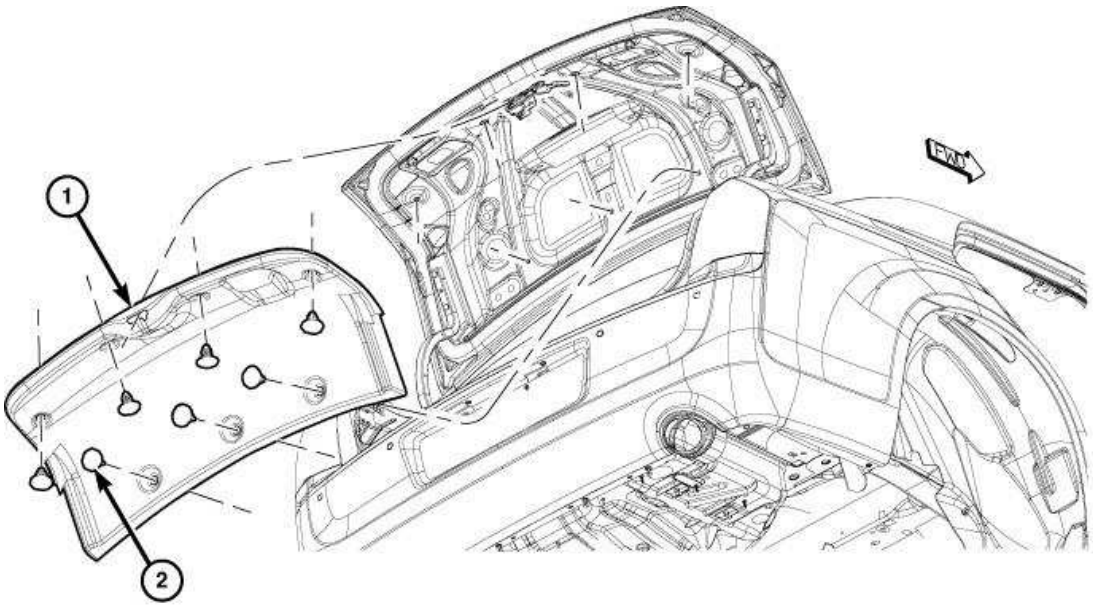


Fig. 552: Oil Filter Cap, O-Ring Seal & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

All engines are equipped with a high quality full-flow, disposable type oil filter. Chrysler Corporation recommends a Mopar® or equivalent oil filter be used.

CAUTION: When performing an engine oil change, the oil filter cap must be removed. Removing the oil filter cap releases oil held within the oil filter cavity and allows it to drain into the sump. Failure to remove the cap prior to reinstallation of the drain plug will not allow complete draining of the used engine oil.

1. Place an oil absorbent cloth around the oil filter housing at the base of the oil filter cap.

NOTE: The oil filter (3) is attached to the oil filter cap (2).

2. Rotate the oil filter cap (1) counterclockwise and remove the cap (1) and filter (3) from the oil filter housing.

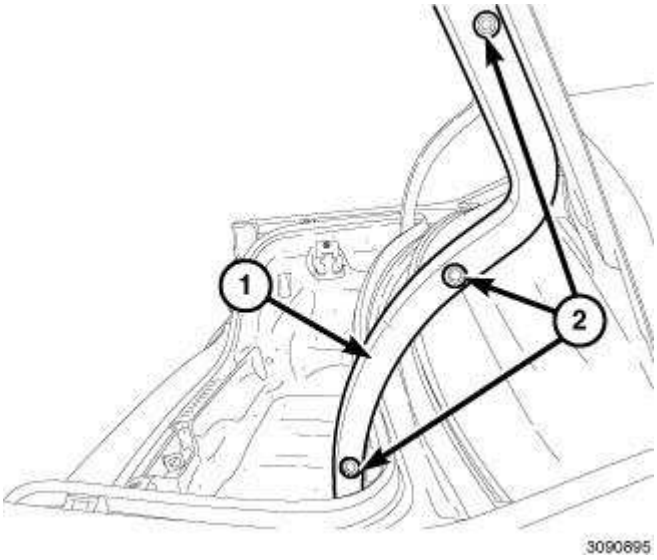


Fig. 553: O-Ring Seal, Oil Filter Cap & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil filter (3) from the oil filter cap (2).
4. Remove and discard the O-ring seal (1).

INSTALLATION

INSTALLATION

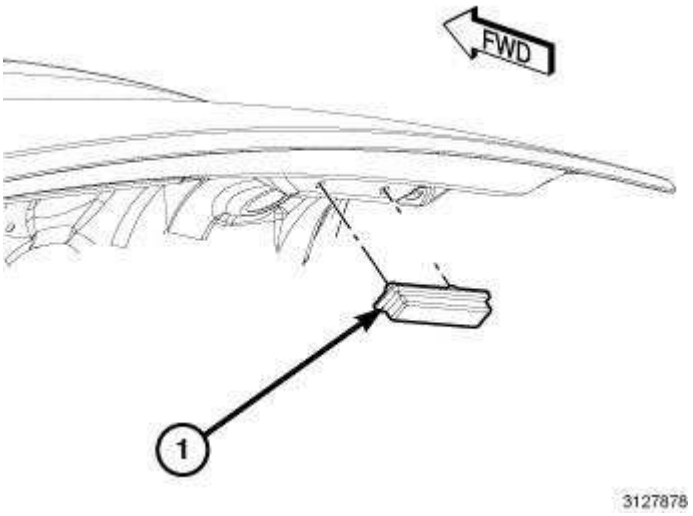


Fig. 554: O-Ring Seal, Oil Filter Cap & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to pre-oil the oil filter or fill the oil filter housing.

1. Lightly lubricate the new O-ring seal (1) with clean engine oil.

2. Install the O-ring seal (1) on the filter cap (2).
3. Install the new oil filter (3) into the oil filter cap (2).

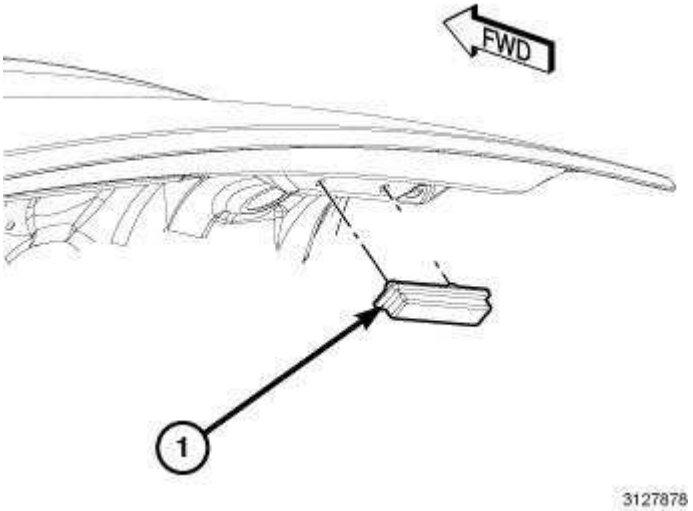


Fig. 555: Oil Filter Cap, O-Ring Seal & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

4. Thread the oil filter cap (1) into the oil filter housing and tighten to 25 N.m (18 ft. lbs.).
5. Add oil, verify crankcase oil level and start engine. Inspect for oil leaks. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

HOUSING, OIL FILTER

DESCRIPTION

DESCRIPTION

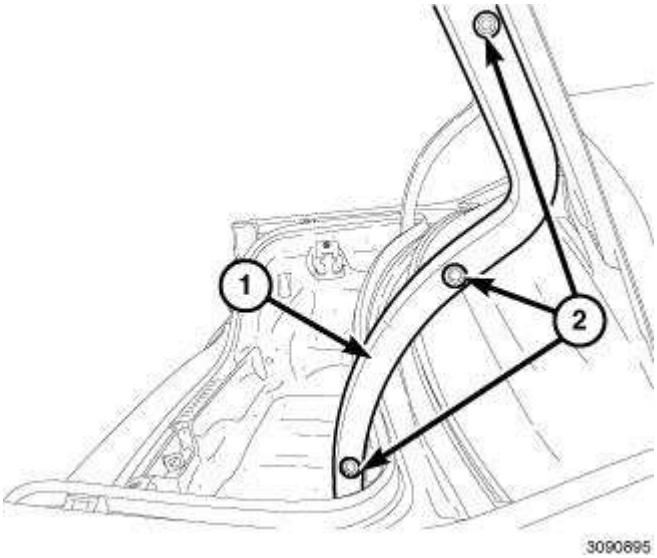


Fig. 556: Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

The oil filter housing is located in the V of the cylinder block. The oil filter element is located within the housing and the engine oil cooler is attached to the top of the housing. Both the oil pressure and oil temperature sensors are located at the rear of the housing.

OPERATION

OPERATION

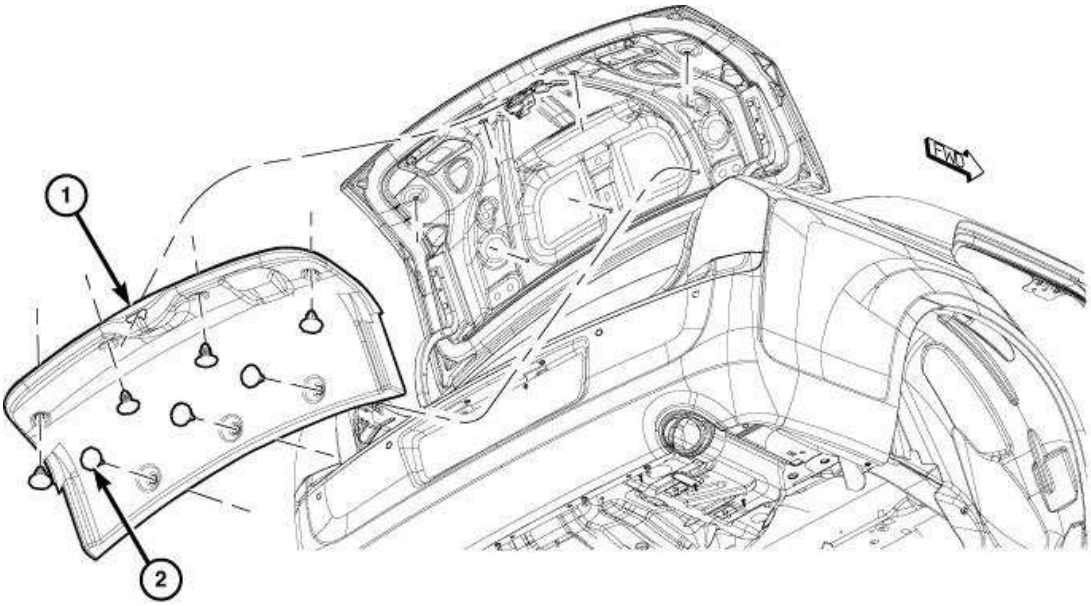


Fig. 557: Oil Flow & Coolant Flow Locations
Courtesy of CHRYSLER GROUP, LLC

Oil flows from the engine oil pump to the oil filter housing inlet (1) and to the oil filter element located within the oil filter housing. After the oil is filtered and then cooled it travels to the main oil gallery (5). An oil filter by-pass is built into the housing and is not serviceable. Removing the oil filter cap from the housing allows oil to drain from the oil filter cavity into to the crankcase (2).

Coolant flows from the right cylinder block water jacket (3) and from the left cylinder block water jacket (4) into the housing. The coolant flows through the oil cooler and exits the housing from the rear hose nipple (6) where it is returned to the water pump. A coolant by-pass in the housing is designed to direct excessive coolant flow around the oil cooler for continuous circulation.

REMOVAL

REMOVAL

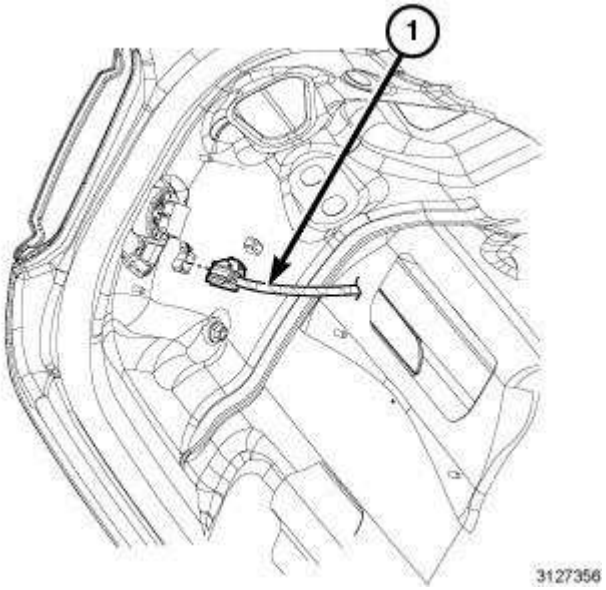


Fig. 558: Oil Temperature Sensor Electrical Connector, Oil Pressure Sensor Electrical Connector, Oil Filter Housing, Heater Hose & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable.
3. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
4. Remove the air cleaner housing assembly, upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, REMOVAL**.
5. Disconnect the oil temperature sensor electrical connector (5).
6. Disconnect the oil pressure sensor electrical connector (4).
7. Remove five bolts (2) and remove the oil filter housing (1).
8. Lift the oil filter housing (1) and remove the heater hose (3).

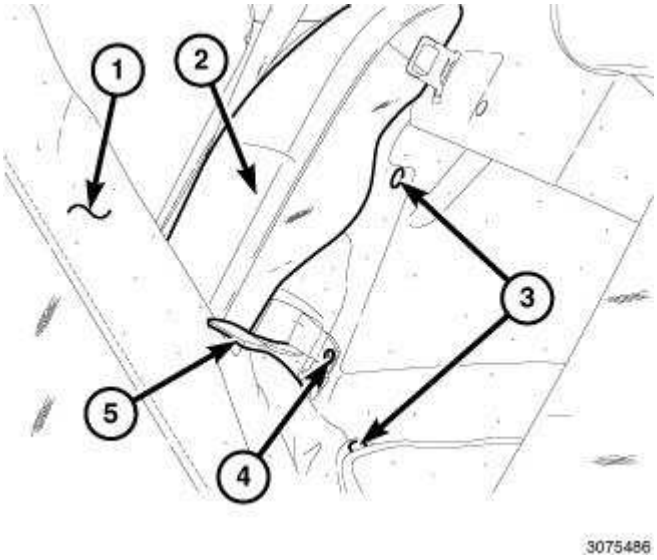


Fig. 559: Oil Filter Housing Seals & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

9. Remove and discard the oil filter housing seals (2). The O-ring seal (1) can be reused.

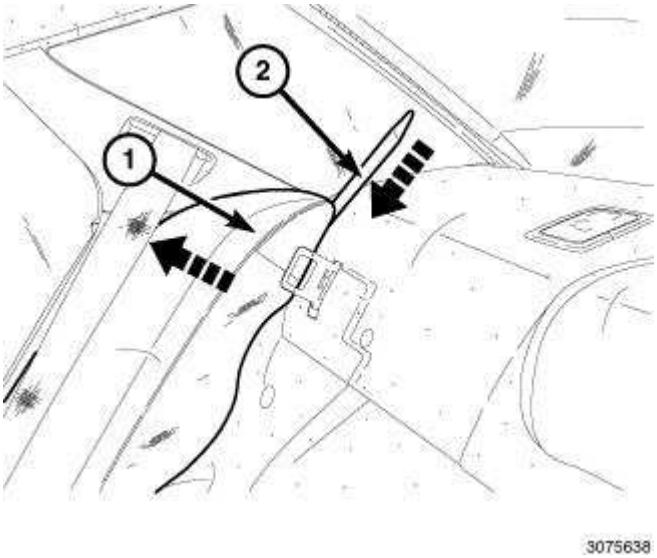


Fig. 560: Oil Cooler & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. If required, remove two screws (1) and (3) and remove the oil cooler (4) from the oil filter housing.

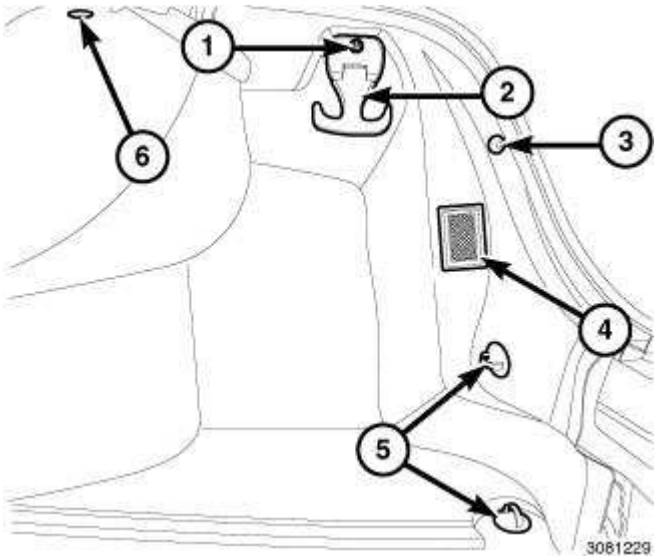


Fig. 561: Oil Cooler Seals & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

11. Remove and discard the oil cooler seals (1).

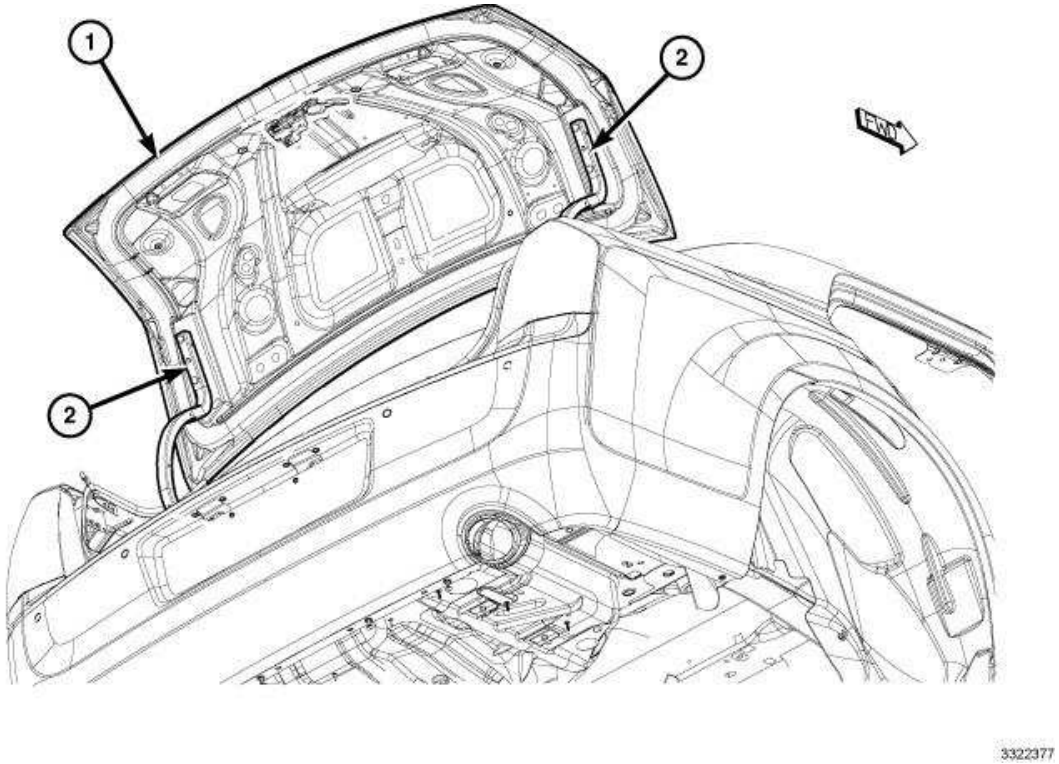


Fig. 562: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

12. If required, remove the oil temperature sensor (1) from the oil filter housing (3).
13. If required, remove the oil pressure sensor (2) from the oil filter housing (3).

INSTALLATION

INSTALLATION

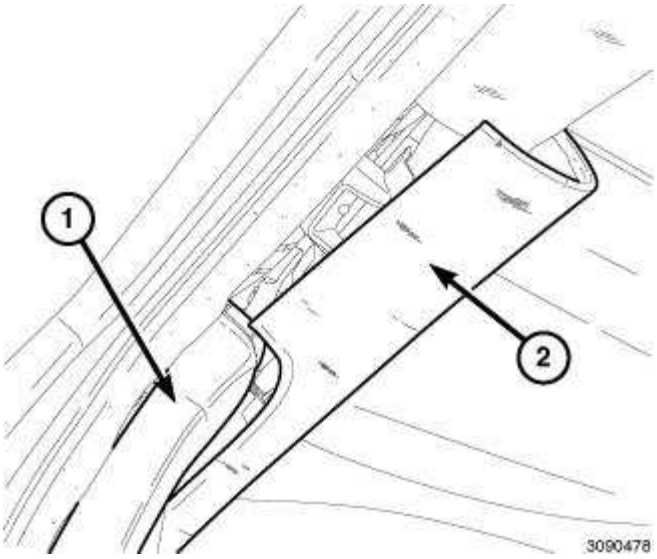


Fig. 563: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing

Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the oil pressure sensor (2) and tighten to 20 N.m (177 in. lbs.).
2. If removed, install the oil temperature sensor (1) and tighten to 20 N.m (177 in. lbs.).

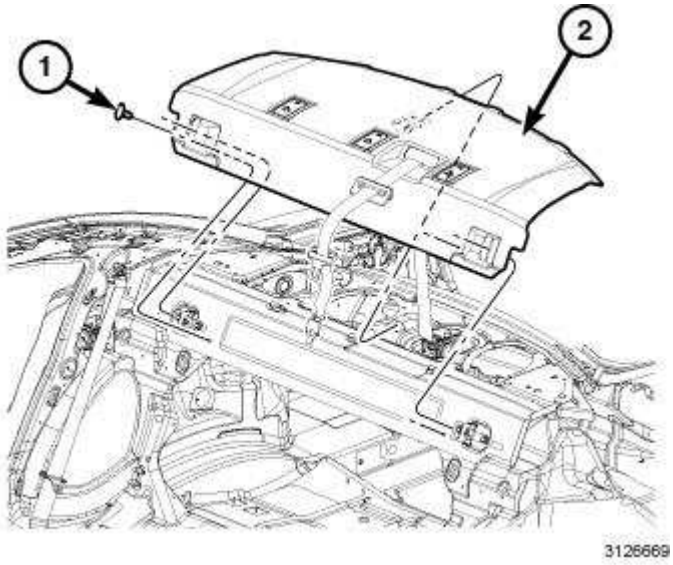


Fig. 564: Oil Cooler Seals & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use new dry seals (1) when installing the oil cooler. Do not lubricate the seals.

3. If removed, install the new oil cooler seals (1) onto the oil filter housing (2).

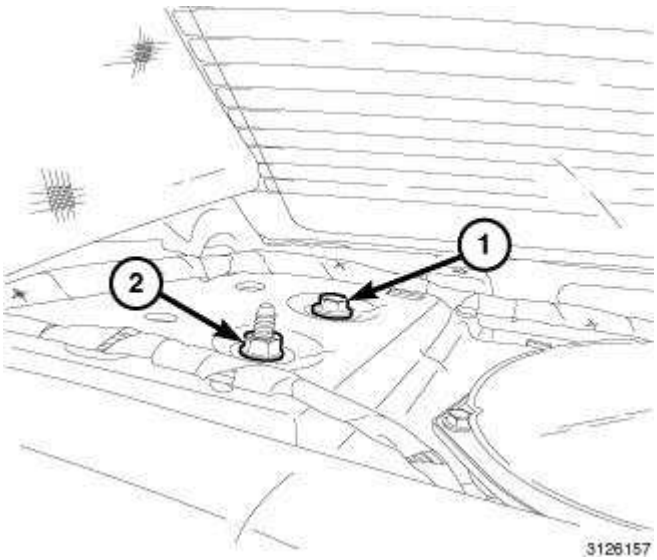


Fig. 565: Oil Cooler & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. If removed, position the oil cooler (4) on the oil filter housing and install two screws (1) and (3). Tighten the screws to 4 N.m (35 in. lbs.).

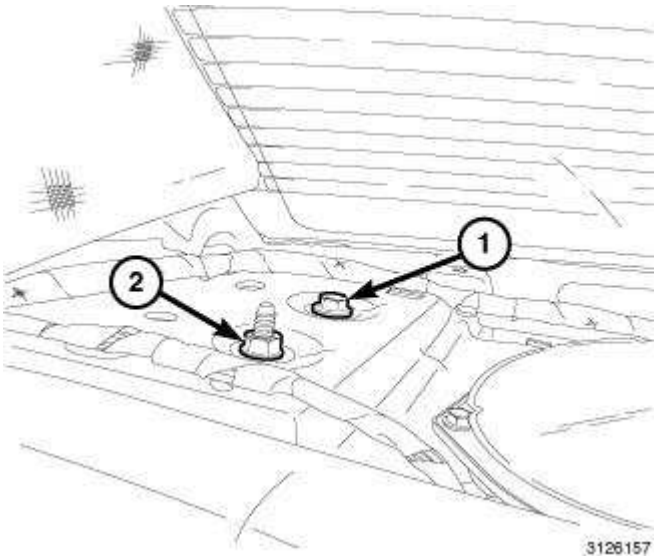


Fig. 566: Oil Filter Housing Seals & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use new dry seals (2) when installing the oil filter housing. Do not lubricate the seals. The O-ring seal (1) can be reused. Lubricate the O-ring seal with clean engine oil prior to installation.

5. Install new oil filter housing seals (2) onto the oil filter housing.

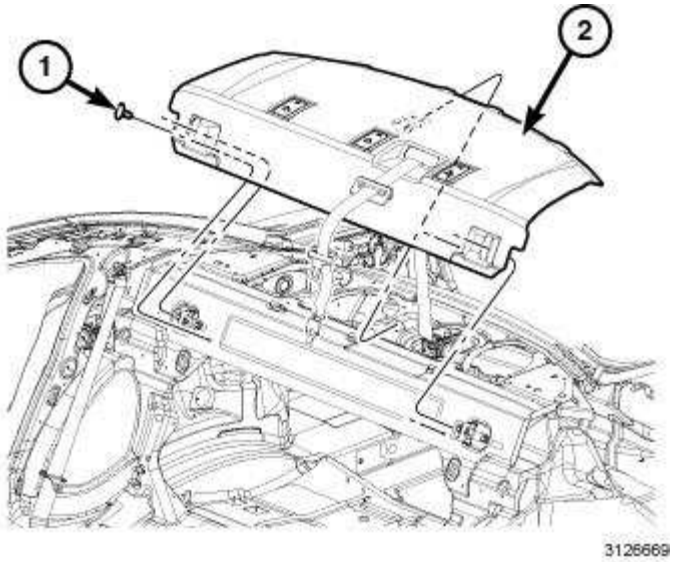


Fig. 567: Heater Hose, Electrical Connectors, Oil Filter Housing & Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Install the heater hose (2) to the oil filter housing (1).
7. Position the oil filter housing (1) on the engine block.
8. Install five bolts and tighten in the sequence shown in illustration to 12 N.m (106 in. lbs.).
9. Connect the oil pressure sensor electrical connector (3).
10. Connect the oil temperature sensor electrical connector (4).
11. Install the upper and lower intake manifolds and air cleaner housing assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
12. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
13. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
14. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
15. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

JET, PISTON OIL COOLER

DESCRIPTION

DESCRIPTION

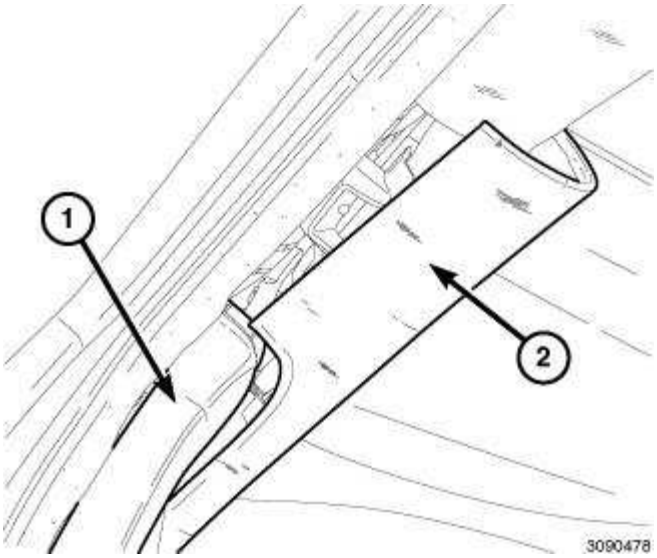


Fig. 568: Engine Blocked-Mounted Oil Jets
Courtesy of CHRYSLER GROUP, LLC

The 3.6 liter engine has three engine blocked-mounted oil jets (1) installed to cool the underside of each piston. The oil jets are fed by the main oil gallery, and spray upward on the bottom of the pistons and cylinder walls. Each set of jets has a check valve which closes below 2.5 bar (35 psi) to maintain ample oil pressure at idle. All three sets of oil jets are identical and seal to the engine block using an o-ring and fastener.

REMOVAL

REMOVAL

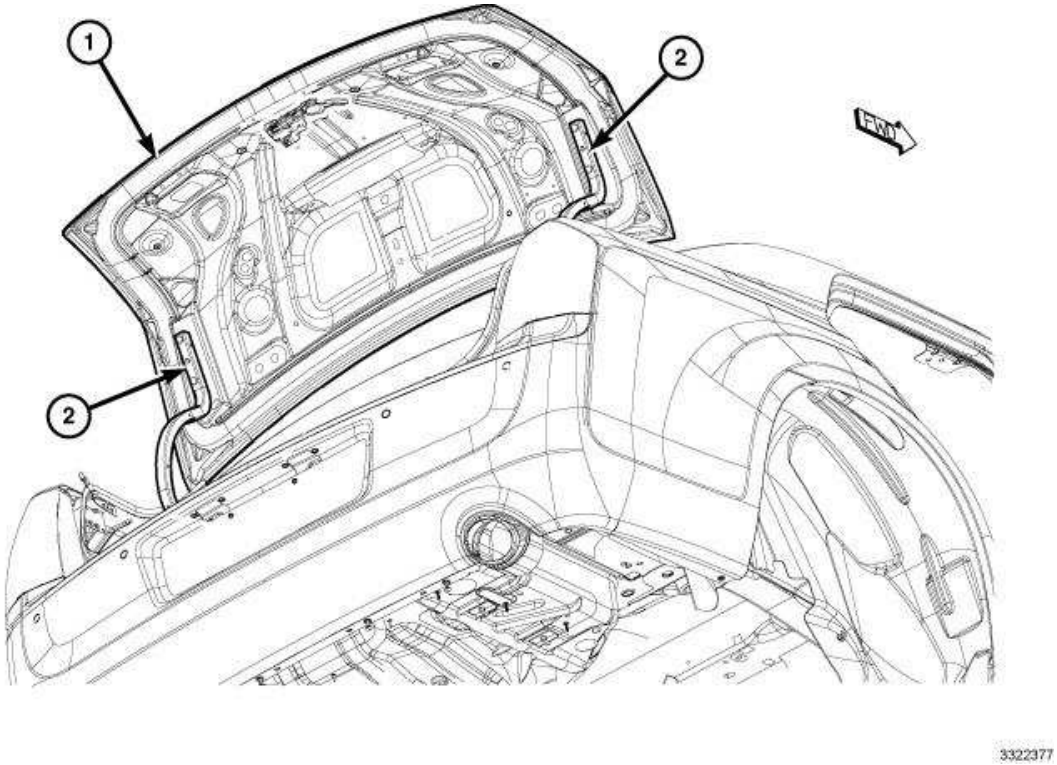


Fig. 569: Piston Oil Cooler Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Piston oil cooler jet for cylinders one/two shown in illustration. Piston oil cooler jets for cylinders three/four and five/six are similar.

1. Remove the crankshaft. Refer to **CRANKSHAFT, REMOVAL**.
2. Remove the bolt (1) and the piston oil cooler jet(s) (2) from the engine block.

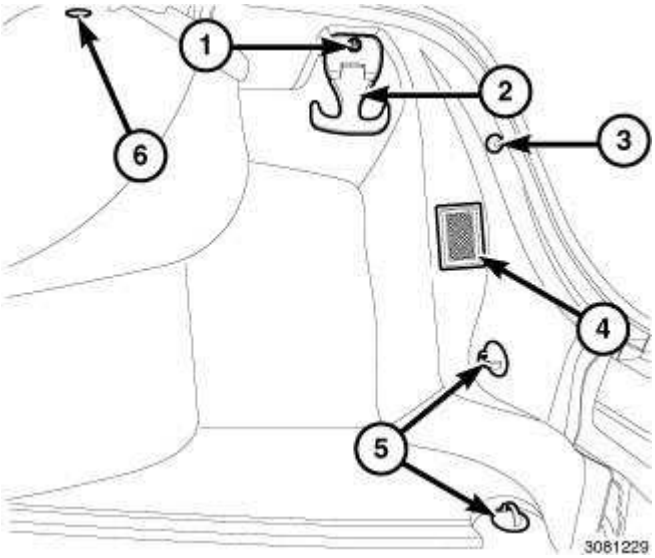


Fig. 570: Piston Oil Cooler Jet O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

3. Remove and discard the O-ring seal (1) from the piston oil cooler jet(s).

INSTALLATION

INSTALLATION

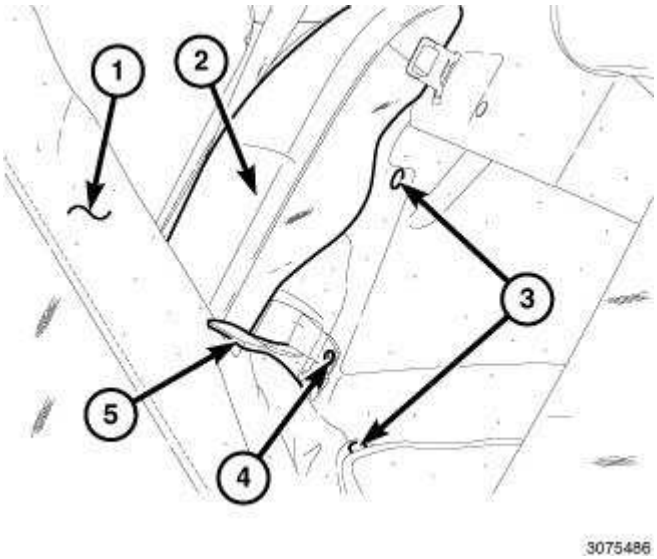


Fig. 571: Piston Oil Cooler Jet O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate a new O-ring seal (1) with engine oil and install on the piston oil cooler jet(s).

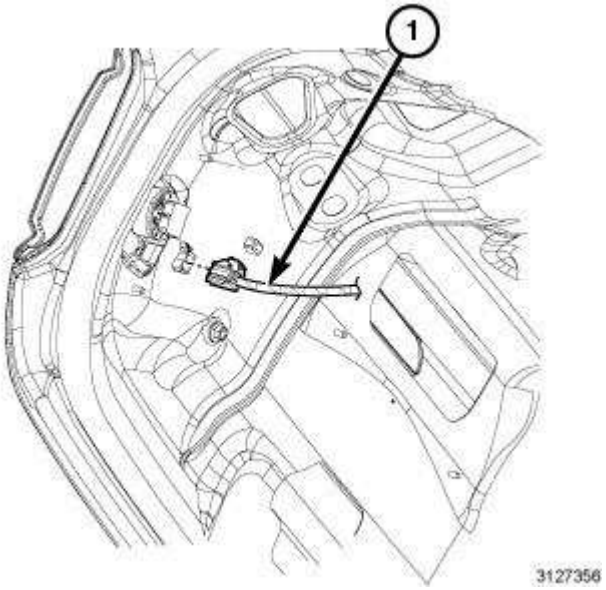


Fig. 572: Piston Oil Cooler Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Piston oil cooler jet for cylinders one/two shown in illustration. Piston oil cooler jets for cylinders three/four and five/six are similar.

2. Install the piston oil cooler jet(s) (2) into the engine block and tighten the retaining bolt (1) to 6 N.m (53 in. lbs.).
3. Install the crankshaft. Refer to **CRANKSHAFT, INSTALLATION**.
4. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
5. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
6. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
7. Run the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL AND FILTER CHANGE

WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.

Change the engine oil and filter at mileage and time intervals described in the Maintenance Schedule. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

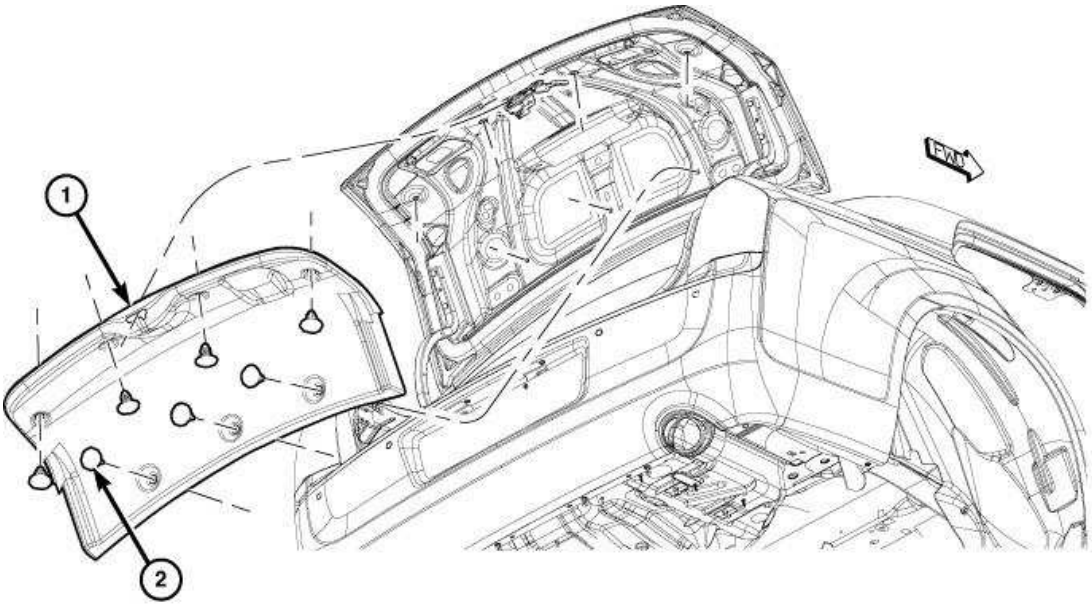


Fig. 573: Oil Filter Cap, O-Ring Seal & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Graphic shows engine cover removed for clarity.

CAUTION: When performing an engine oil change, the oil filter cap must be removed. Removing the oil filter cap releases oil held within the oil filter cavity and allows it to drain into the sump. Failure to remove the cap prior to reinstallation of the drain plug will not allow complete draining of the used engine oil.

1. Run the engine until achieving normal operating temperature.
2. Position the vehicle on a level surface and turn the engine off.
3. Place an oil absorbent cloth around the oil filter housing at the base of the oil filter cap.

NOTE: The oil filter (3) is attached to the oil filter cap (2).

4. Rotate the oil filter cap (1) counterclockwise and remove the cap (1) and filter (3) from the oil filter housing.

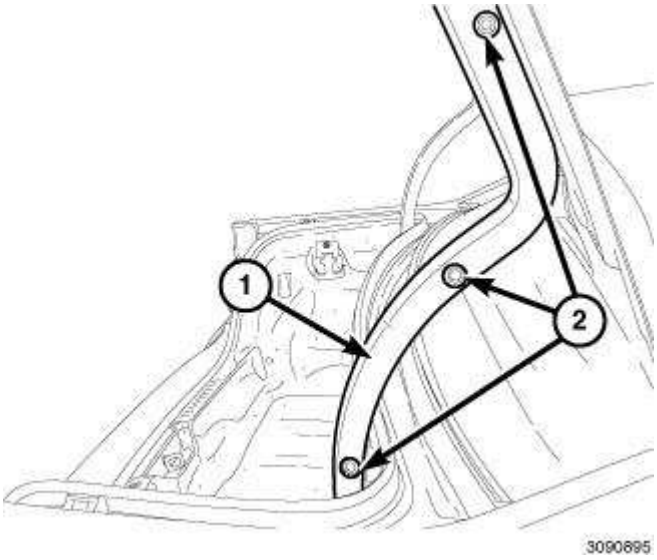


Fig. 574: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Remove the belly pan retainers (1) and remove the belly pan.

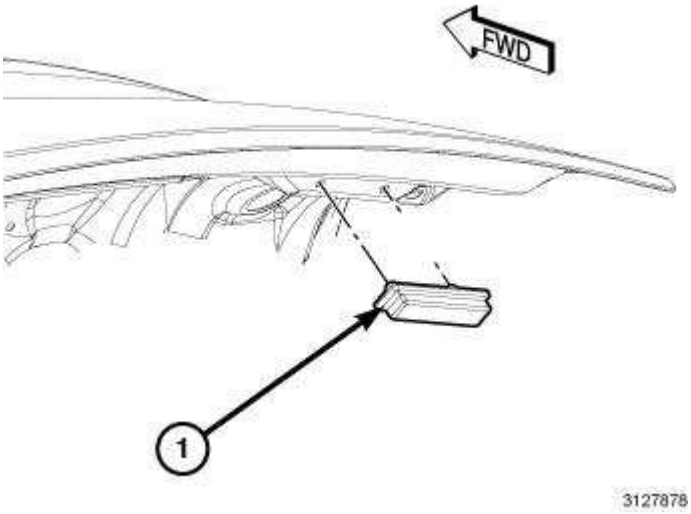


Fig. 575: Crankcase Drain Plug
Courtesy of CHRYSLER GROUP, LLC

7. Place a suitable drain pan under the crankcase drain plug (1).
8. Remove the drain plug (1) from oil pan and allow the oil to drain into the pan. Inspect the drain plug threads for stretching or other damage. Replace the drain plug and gasket if damaged.
9. Install the drain plug (1) in the oil pan and tighten to 27 N.m (20 ft. lbs.).

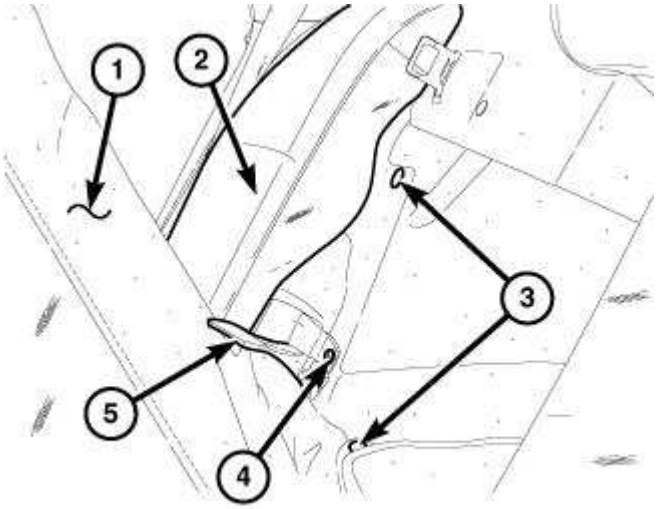


Fig. 576: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Position the belly pan and install the retainers (1).

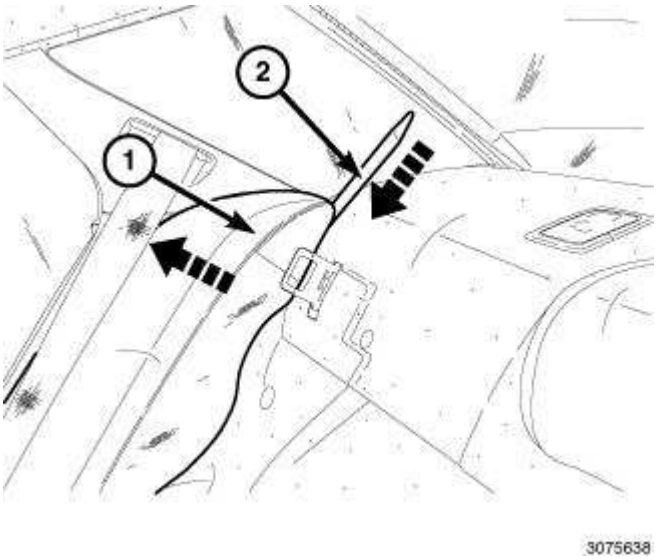


Fig. 577: O-Ring Seal, Oil Filter Cap & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

11. Lower the vehicle.
12. Remove the oil filter (3) from the oil filter cap (2).
13. Remove and discard the O-ring seal (1).

NOTE: It is not necessary to pre-oil the oil filter or fill the oil filter housing.

14. Lightly lubricate the new O-ring seal (1) with clean engine oil.

15. Install the O-ring seal (1) on the filter cap (2).
16. Install the new oil filter (3) into the oil filter cap (2).

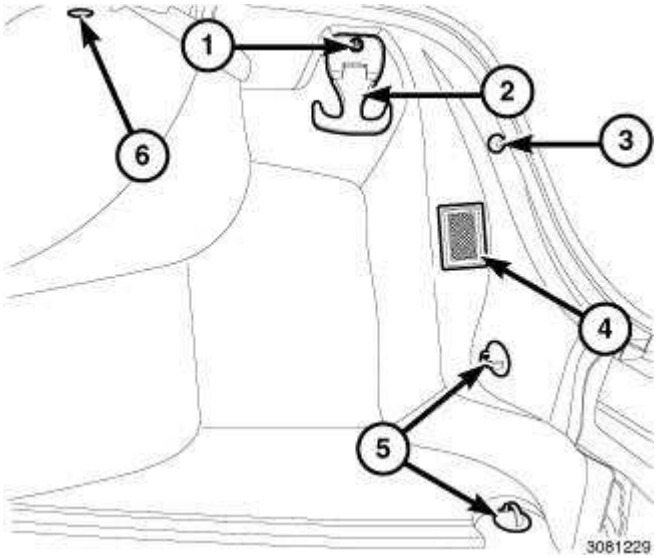


Fig. 578: Oil Filter Cap, O-Ring Seal & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Graphic shows engine cover removed for clarity.

17. Thread the oil filter cap (1) into the oil filter housing and tighten to 25 N.m (18 ft. lbs.).

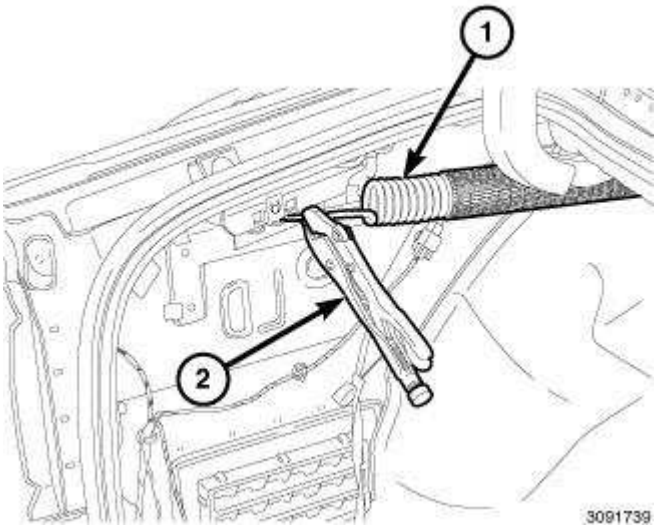


Fig. 579: Oil Fill Cap & Oil Level Gauge
Courtesy of CHRYSLER GROUP, LLC

18. Remove the oil fill cap (2). Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

19. Install the oil fill cap (2).
20. Start the engine and inspect for leaks.
21. Stop the engine and check the oil level (1).

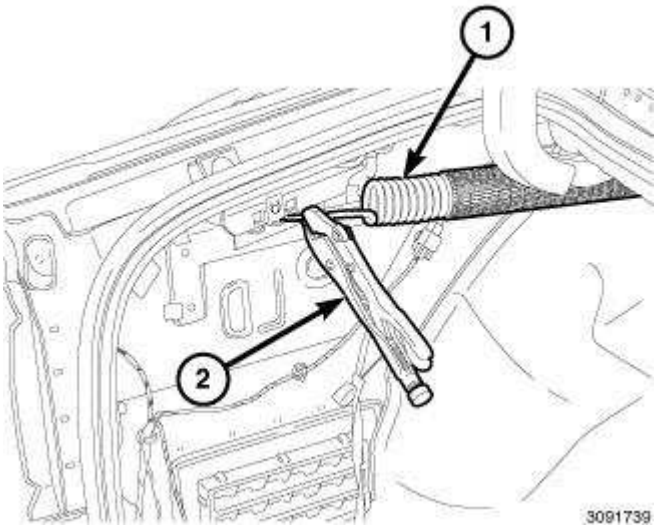


Fig. 580: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

22. Install the engine cover (1), if removed.

OIL FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. When replacing oil filter, use a Mopar® filter or equivalent.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing of used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

PAN, OIL

DESCRIPTION

DESCRIPTION

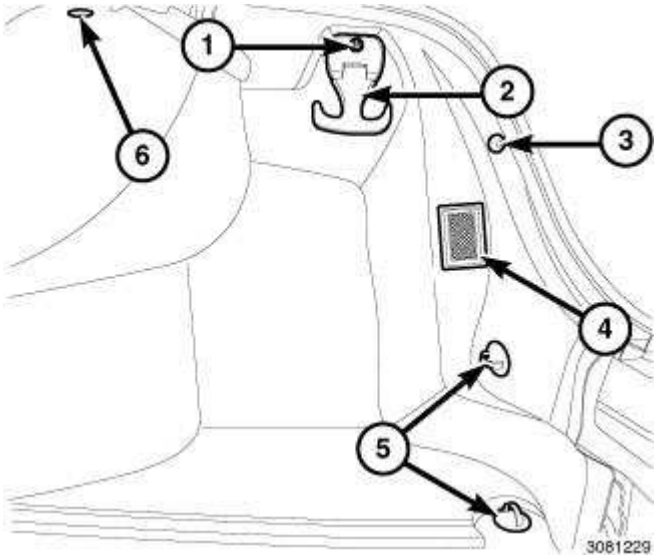


Fig. 581: Upper & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

There is an upper and lower oil pan. The upper oil pan is cast aluminum and also serves as the lower end structural support. The lower pan is a stamped steel design. Both upper and lower oil pans are sealed using Mopar® Threebond Engine RTV Sealant. The lower oil pan must be removed in order to access all of the upper oil pan attaching bolts.

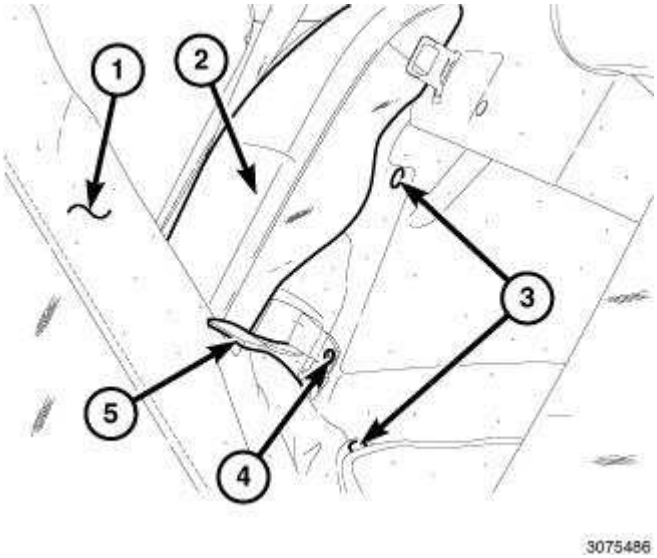


Fig. 582: Windage Tray
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not attempt to support the weight of the engine on the windage tray. The windage tray is a thin cast aluminum construction and can be easily damaged.

The high pressure die cast aluminum windage tray is mounted to the main bearing caps and is

designed to keep oil off of the connecting rods as the crankshaft rotates. When the oil is kept off the connecting rods, the engine rotates easier and oil foaming decreases. Like the oil pan, the windage tray is designed to stiffen the lower end of the engine. The tray is directional and the main bearing cap bolts hold it in place.

REMOVAL

AWD

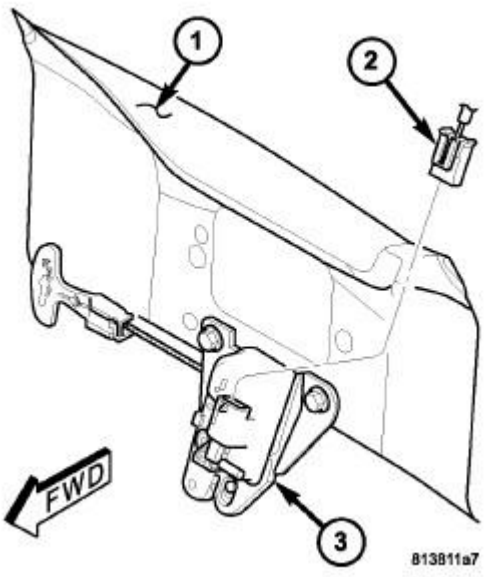


Fig. 583: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

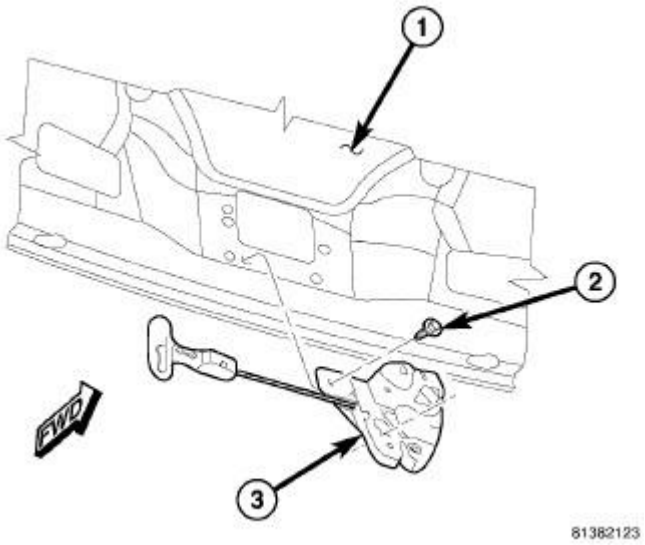


Fig. 584: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

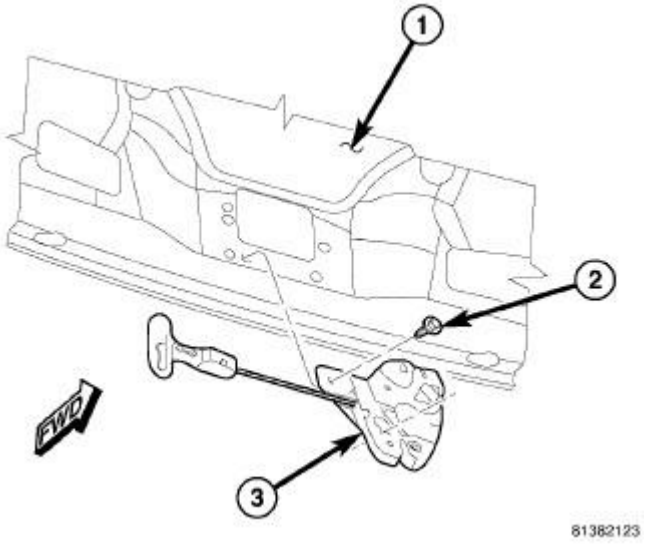


Fig. 585: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove two bolts (3) from the heater core inlet tube (4) and reposition the tube.
9. Remove the bolt (1) and remove the oil level indicator (2).

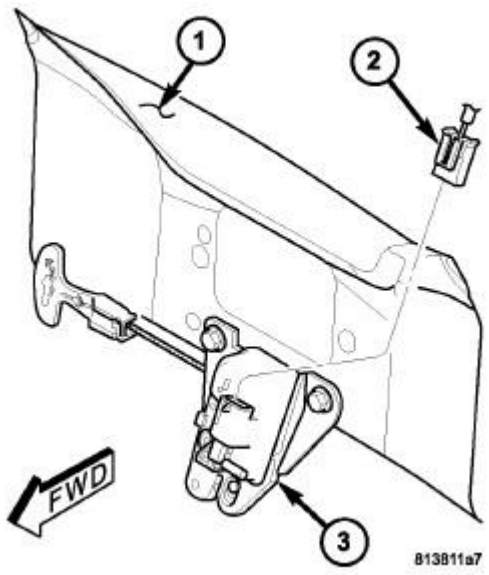


Fig. 586: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
11. Remove the belly pan retainers (1) and remove the belly pan.
12. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

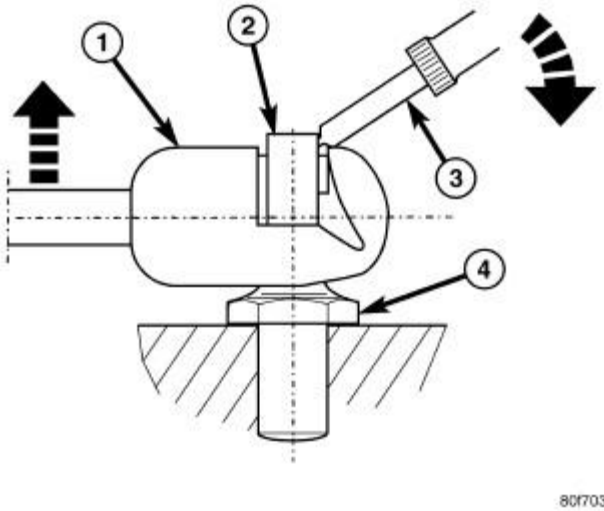


Fig. 587: Removing/Installing Front Axle
Courtesy of CHRYSLER GROUP, LLC

13. Remove the front axle assembly (1). Refer to **REMOVAL** .

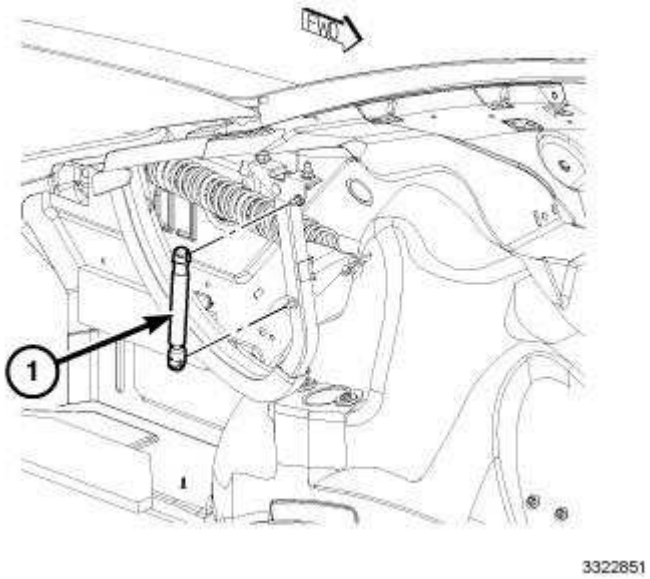


Fig. 588: Stabilizer Bar Bushing & Retainer
Courtesy of CHRYSLER GROUP, LLC

14. Remove the front stabilizer bar with isolators and retainers. Refer to **STABILIZER BAR, FRONT, REMOVAL** .

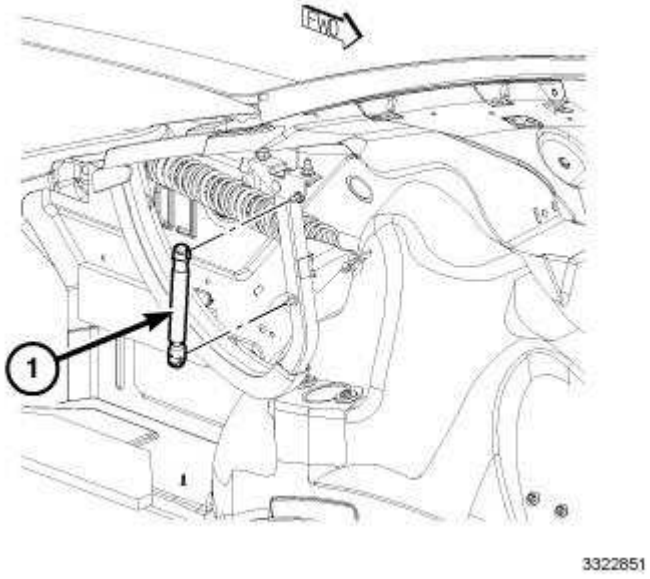


Fig. 589: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

15. Remove the lower intermediate shaft coupling pinch bolt (1) from the lower intermediate shaft

(2). Separate the lower intermediate shaft (2) from the steering gear shaft (3).

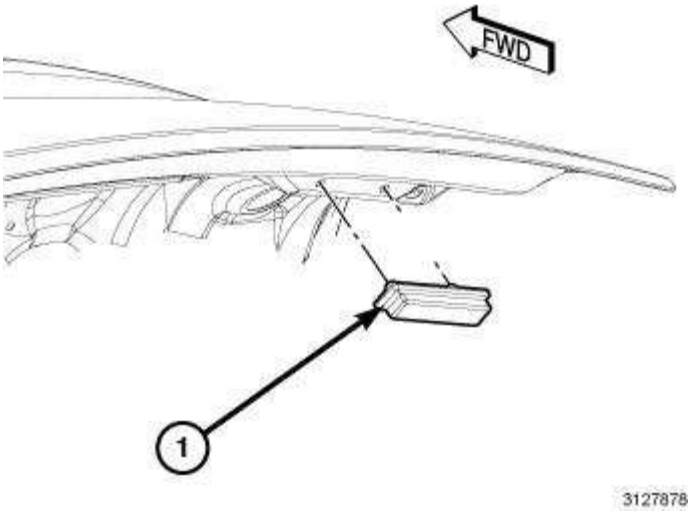


Fig. 590: Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Remove the steering gear upper mounting bolt (4) and nut.
17. Remove the steering gear lower mounting bolts (2 and 3) and reposition the steering gear (1).

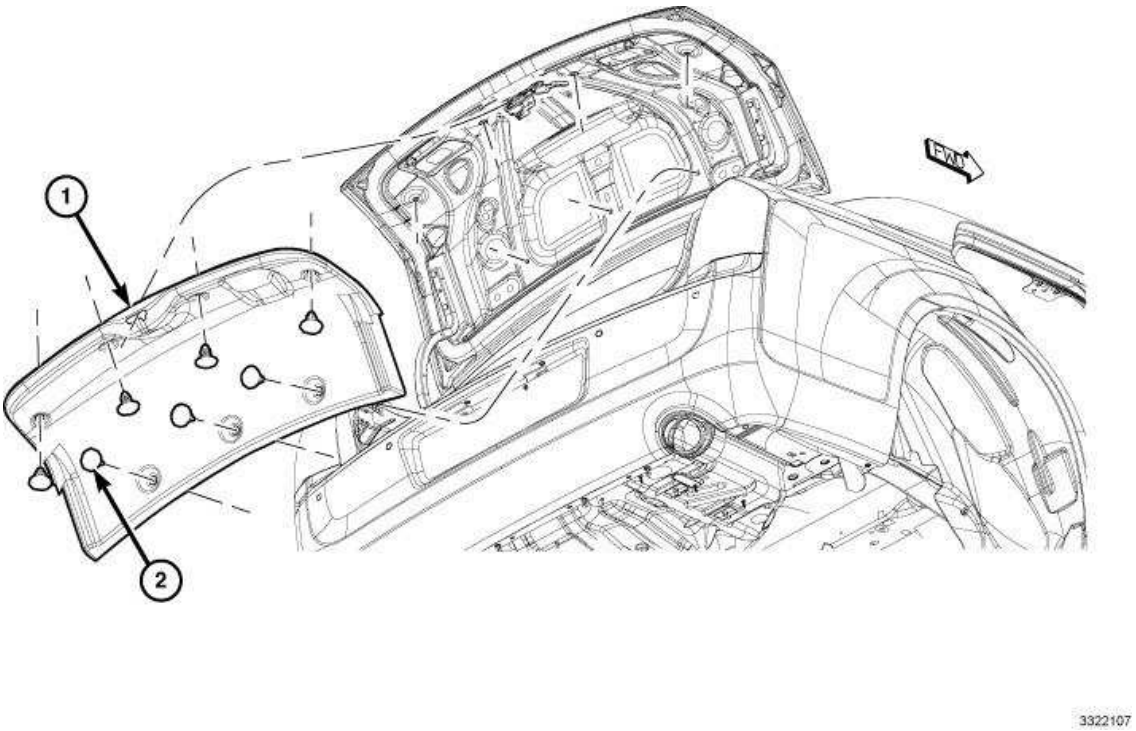


Fig. 591: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

18. Remove the bolt (1) and reposition the transmission cooling lines (2).

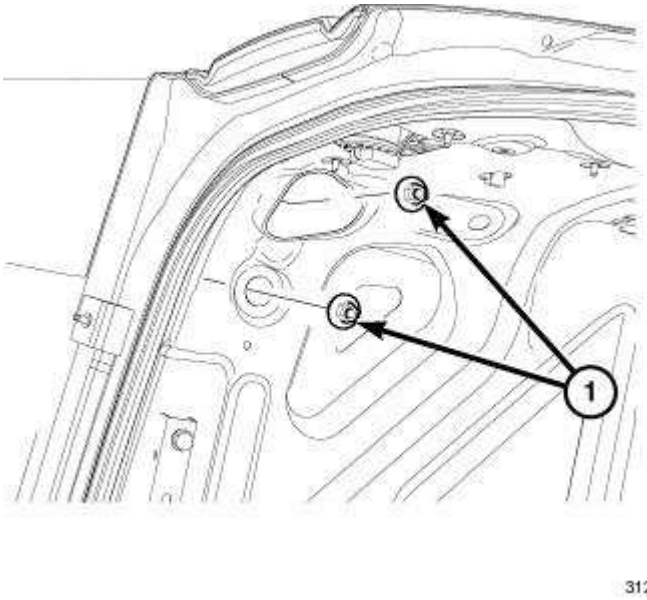


Fig. 592: Crossmember & Bolts (AWD)
Courtesy of CHRYSLER GROUP, LLC

19. Remove the two bolts (2) from the rear engine mount isolator.
20. Using a suitable jack stand and a block of wood positioned under the transfer case, raise the rear of the engine.

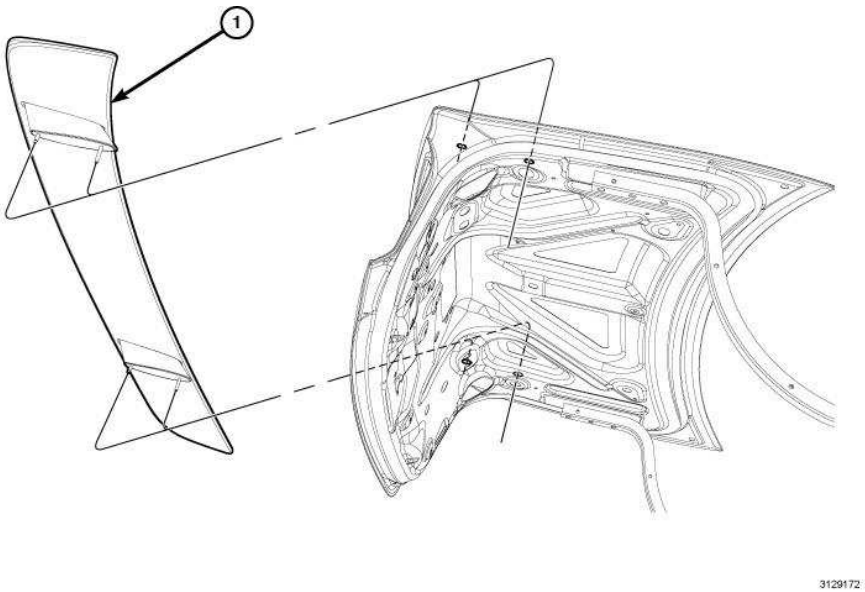


Fig. 593: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove the four transmission to the engine oil pan bolts (1).

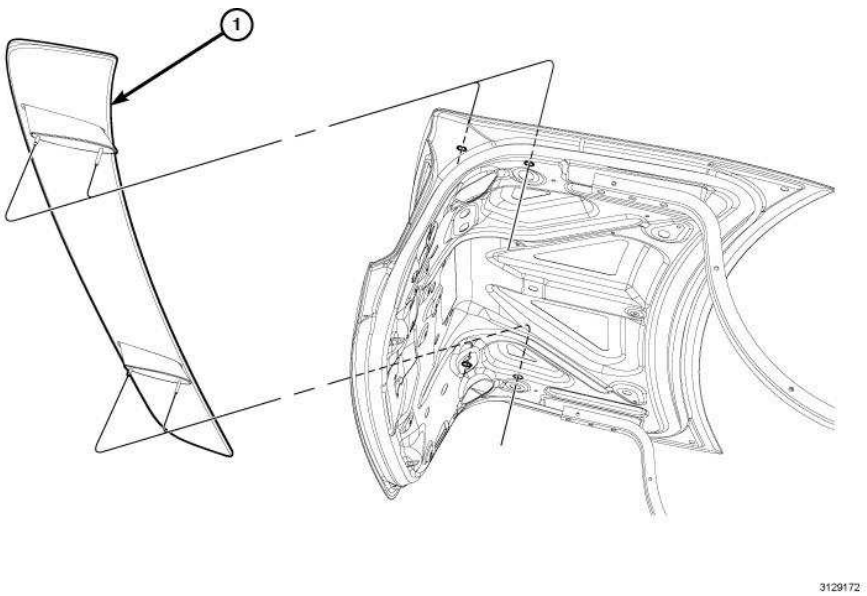


Fig. 594: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

22. Remove the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

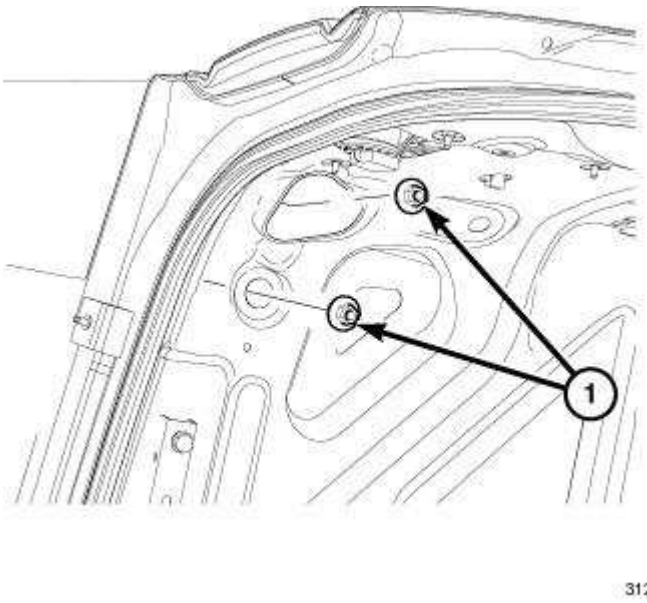


Fig. 595: Rear Oil Seal Retainer Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with transmission removed for clarity.

CAUTION: There are two hidden M6 bolts that must be removed from the rear of the upper oil pan flange. If these bolts are not removed, the rear oil seal retainer flange will be severely damaged.

23. Remove two M6 bolts (1) from the rear oil seal retainer flange.

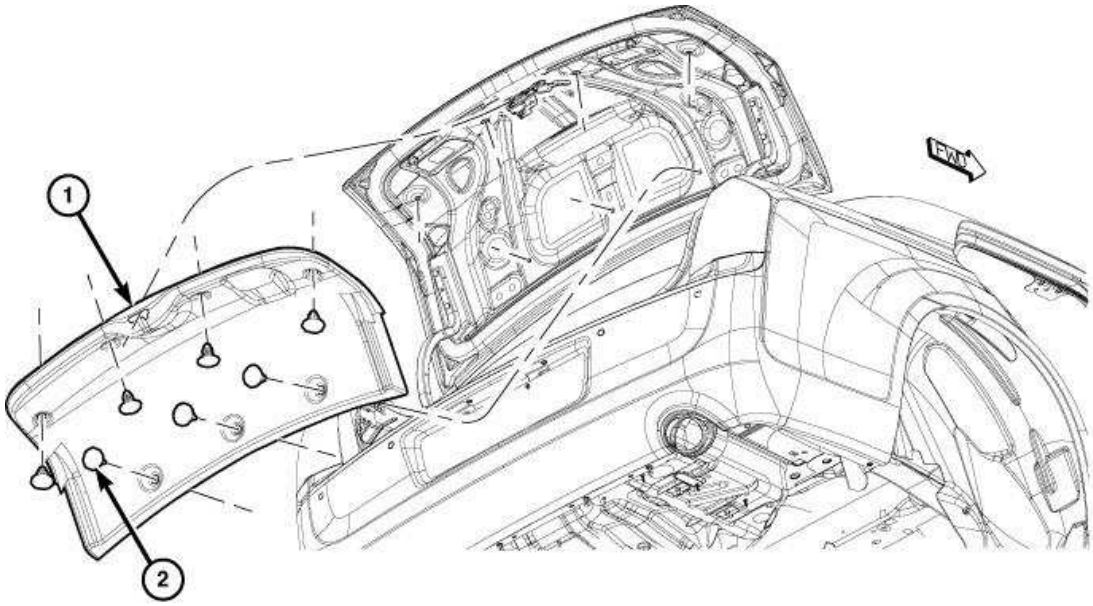


Fig. 596: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

24. Remove nineteen M8 oil pan mounting bolts (1).

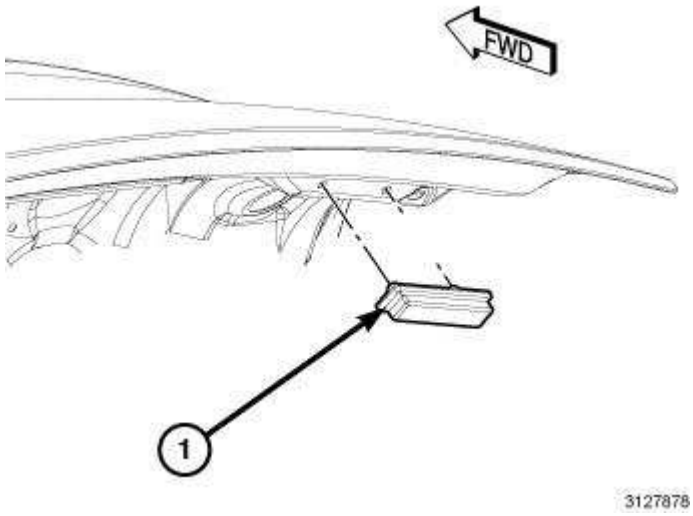


Fig. 597: Oil Pan Pry Points
Courtesy of CHRYSLER GROUP, LLC

25. Using the four indicated pry points, carefully remove the oil pan.

26. Remove all residual sealant from the oil pan, timing chain cover, rear seal retainer and engine block mating surfaces. Refer to **Engine/Lubrication/PAN, Oil - Cleaning**.

RWD LOWER

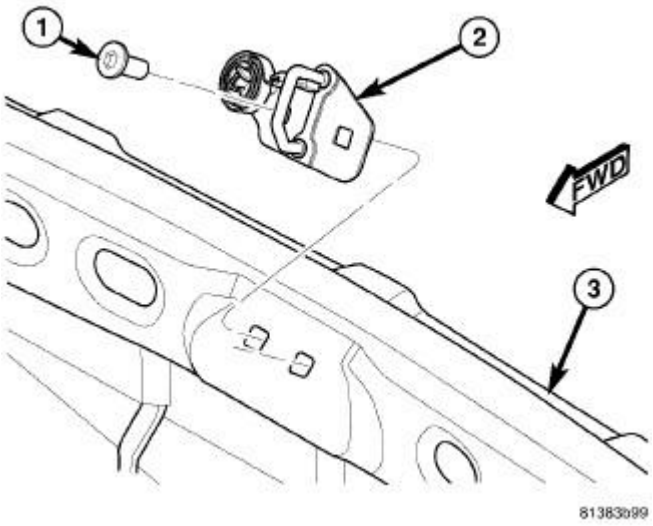


Fig. 598: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the belly pan retainers (1) and remove the belly pan.
3. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

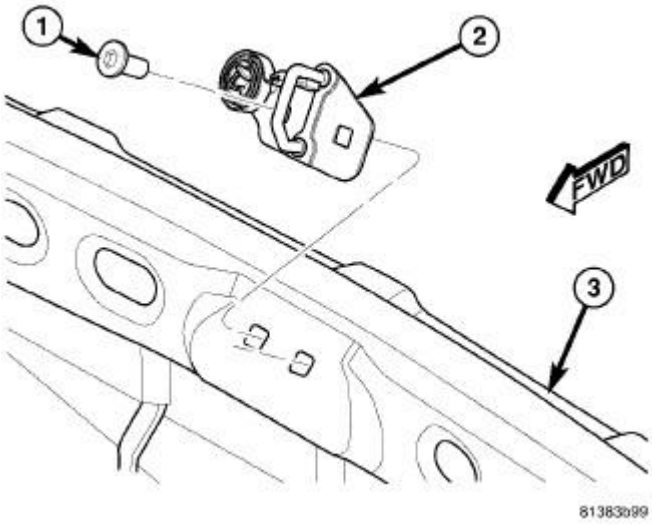


Fig. 599: Bolts, Studs, Nuts & Lower Oil Pan

Courtesy of CHRYSLER GROUP, LLC

NOTE: The lower oil pan must be removed to access all of the upper oil pan retaining bolts.

4. Remove twelve bolts (4), two studs (2) and two nuts (3) from the flange of the lower oil pan (1).

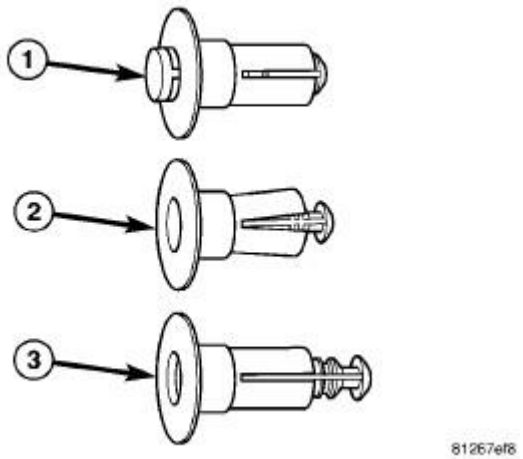


Fig. 600: Using Pry Bar To Remove Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry on the lower oil pan flange. There are no designated pry points for lower oil pan removal. Prying on only one or a few locations could bend the flange and damage the pan.

5. Using a pry bar (1), apply side force to the lower oil pan (2) in order to sever the sealant bond and remove the pan.
6. Remove all residual sealant from the upper and lower oil pans. Refer to **Engine/Lubrication/PAN, Oil - Cleaning**.

RWD UPPER

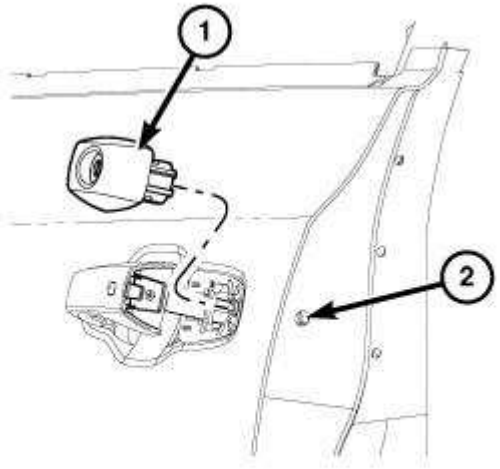


Fig. 601: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

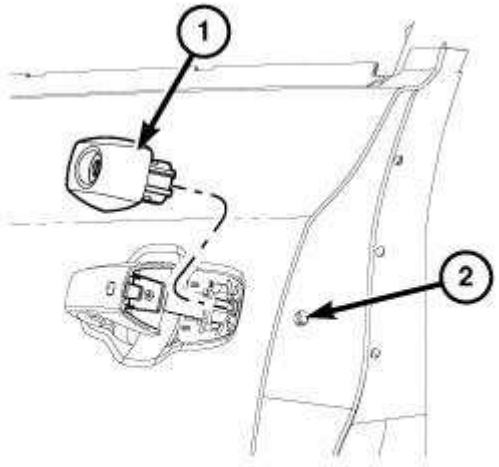


Fig. 602: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.

6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

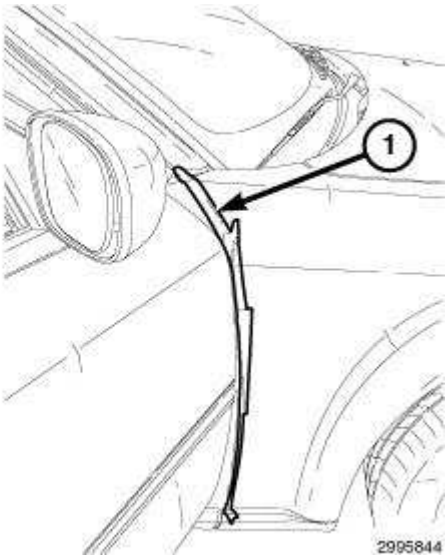


Fig. 603: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove two bolts (3) from the heater core inlet tube (4) and reposition the tube.
9. Remove the bolt (1) and remove the oil level indicator (2).

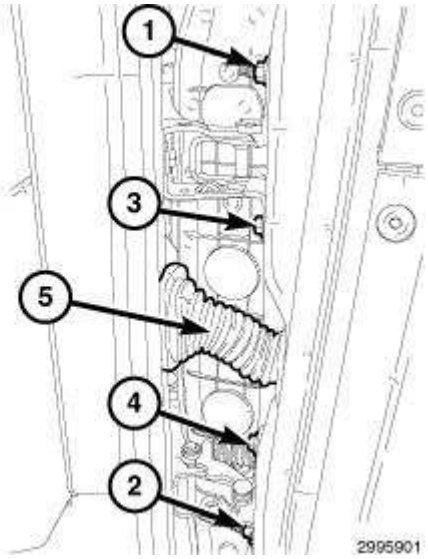


Fig. 604: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
11. Remove the belly pan retainers (1) and remove the belly pan.
12. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

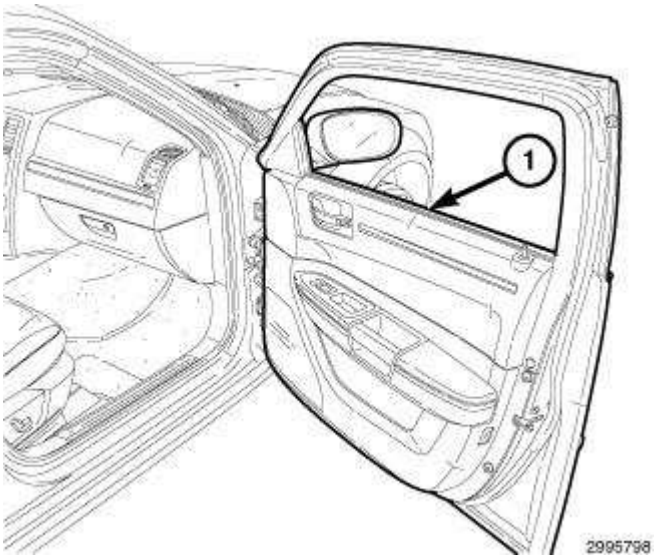


Fig. 605: Bolts, Studs, Nuts & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: The lower oil pan must be removed to access all of the upper oil pan retaining bolts.

13. Remove the lower oil pan (1). Refer to **PAN, OIL, REMOVAL**.

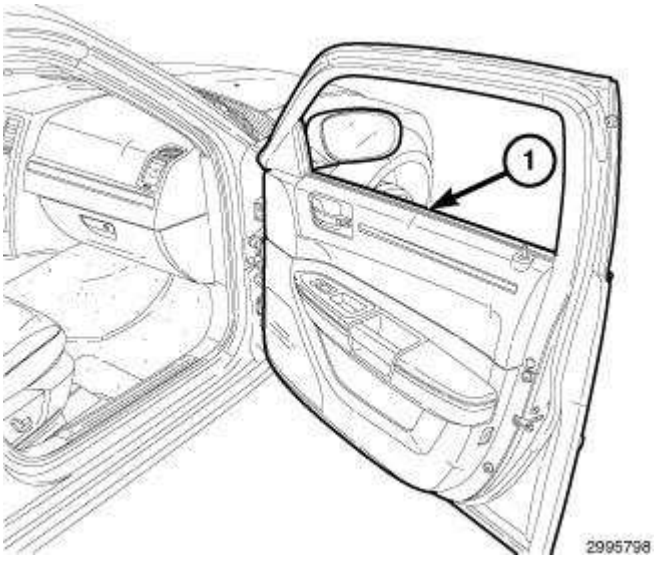


Fig. 606: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

14. Remove the lower intermediate coupling pinch bolt (1) at the steering gear (3). Separate the lower intermediate shaft (2) from the steering gear shaft (3).

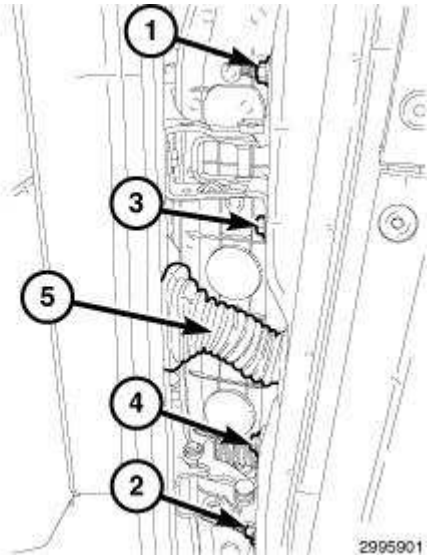


Fig. 607: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

15. Remove the steering gear mounting bolts (1) and reposition the steering gear (2).

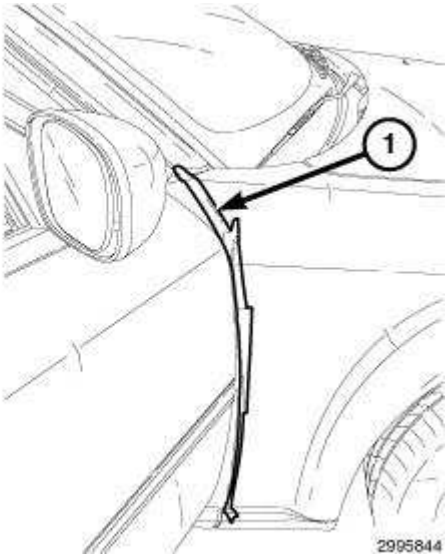


Fig. 608: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

16. Remove the bolt (1) and reposition the transmission cooling lines (2).

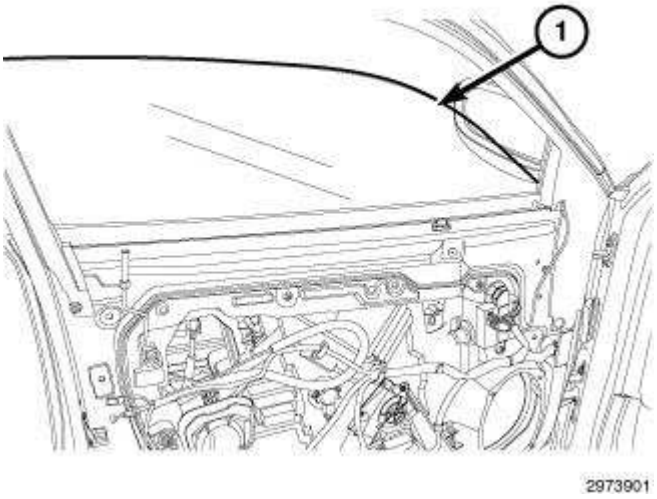


Fig. 609: Rear Engine Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove the two bolts (2) from the rear engine mount isolator.
18. Using a suitable jack stand and a block of wood positioned under the transmission oil pan, raise the rear of the engine.

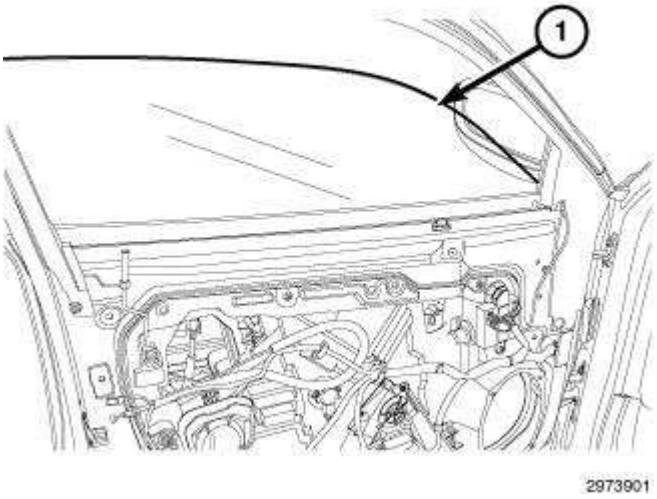


Fig. 610: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Remove the four transmission to the engine oil pan bolts (1).

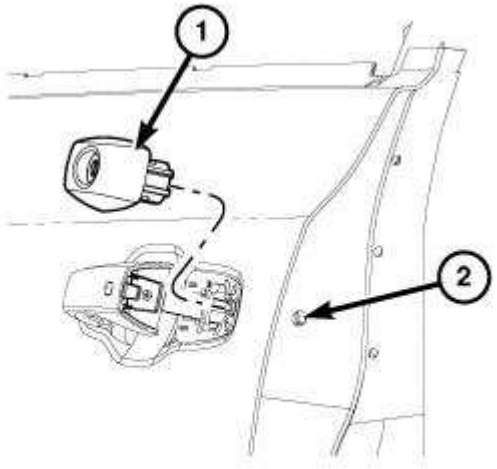


Fig. 611: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

20. Remove the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

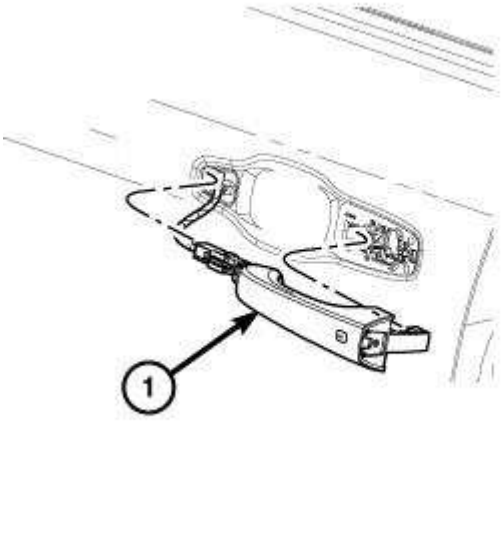


Fig. 612: Rear Oil Seal Retainer Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with transmission removed for clarity.

CAUTION: There are two hidden M6 bolts that must be removed from the rear of the upper oil pan flange. If these bolts are not removed, the rear oil seal retainer flange will be severely damaged.

21. Remove two M6 bolts (1) from the rear oil seal retainer flange.

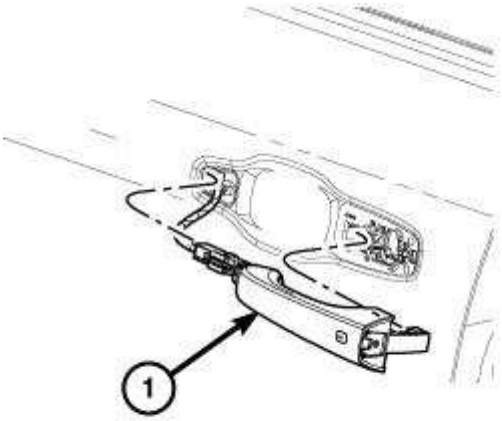


Fig. 613: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

22. Remove nineteen M8 oil pan mounting bolts (1).

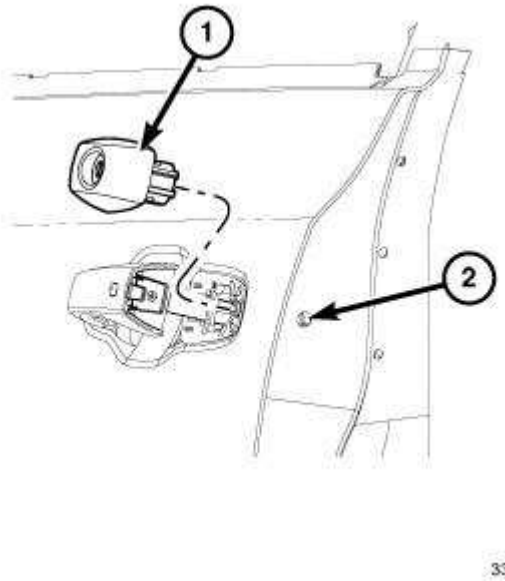


Fig. 614: Locating Pry Points To Remove Oil Pan
Courtesy of CHRYSLER GROUP, LLC

23. Using the four indicated pry points, carefully remove the upper oil pan.
24. Remove all residual sealant from the upper and lower oil pans, timing chain cover, rear seal retainer and engine block mating surfaces. Refer to **Engine/Lubrication/PAN, Oil - Cleaning**.

CLEANING

CLEANING

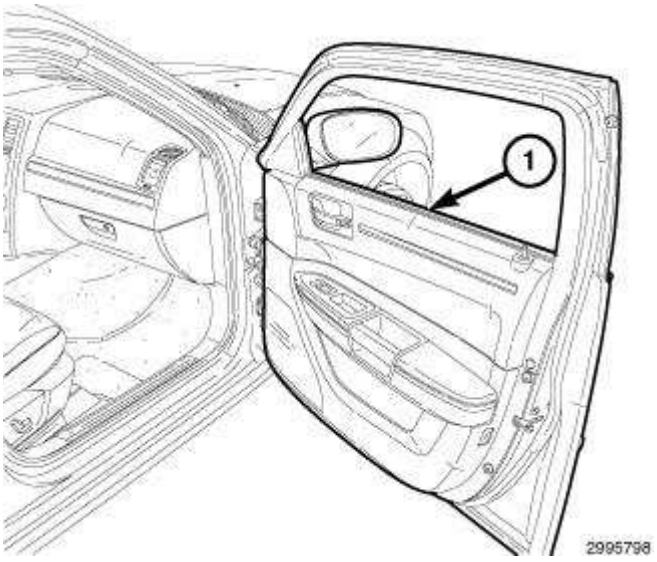


Fig. 615: Locating Sealant On Upper Oil Pan
Courtesy of CHRYSLER GROUP, LLC

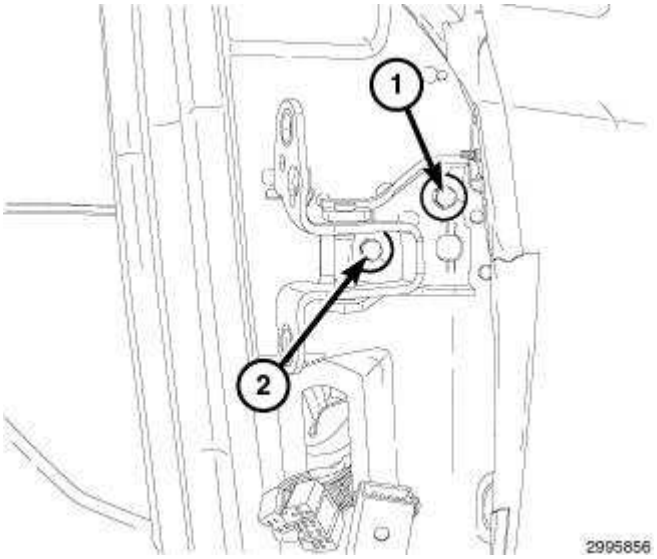


Fig. 616: Locating Sealant On Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

1. Clean the oil pan in solvent and wipe dry with a clean cloth.

CAUTION: Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing) alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.

2. Remove all residual sealant (1) from the upper and lower oil pans. Refer to **Engine - Standard**

Procedure.

INSTALLATION

AWD

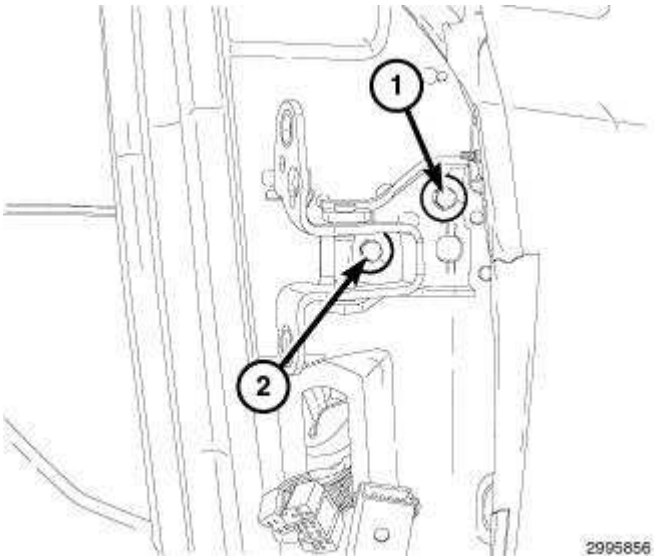


Fig. 617: Locating Sealant On Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

1. Clean the oil pan, timing chain cover, rear seal retainer and engine block mating surfaces with isopropyl alcohol in preparation for sealant application.
2. Apply a 2 to 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to the oil pan as shown in illustration, in the following locations:
   - Oil pan to engine block flange (1)
   - Two timing cover to engine block T-joints (2)
   - Two rear seal retainer to engine block T-joints (3)

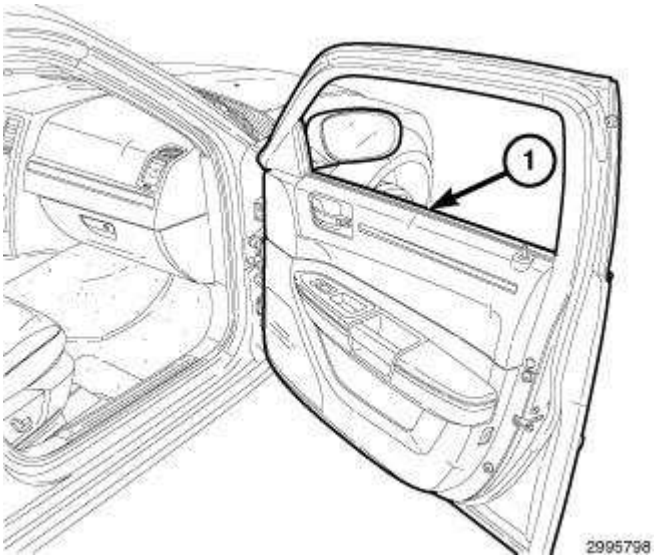


Fig. 618: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Make sure that the rear face of the oil pan is flush to the transmission bell housing before tightening any of the oil pan mounting bolts. A gap between the oil pan and the transmission could crack the oil pan or transmission casting.

3. Install the oil pan to the engine block making sure the oil pan is flush to the transmission bell housing. Secure the oil pan to the engine block with nineteen M8 oil pan mounting bolts (1) finger tight.

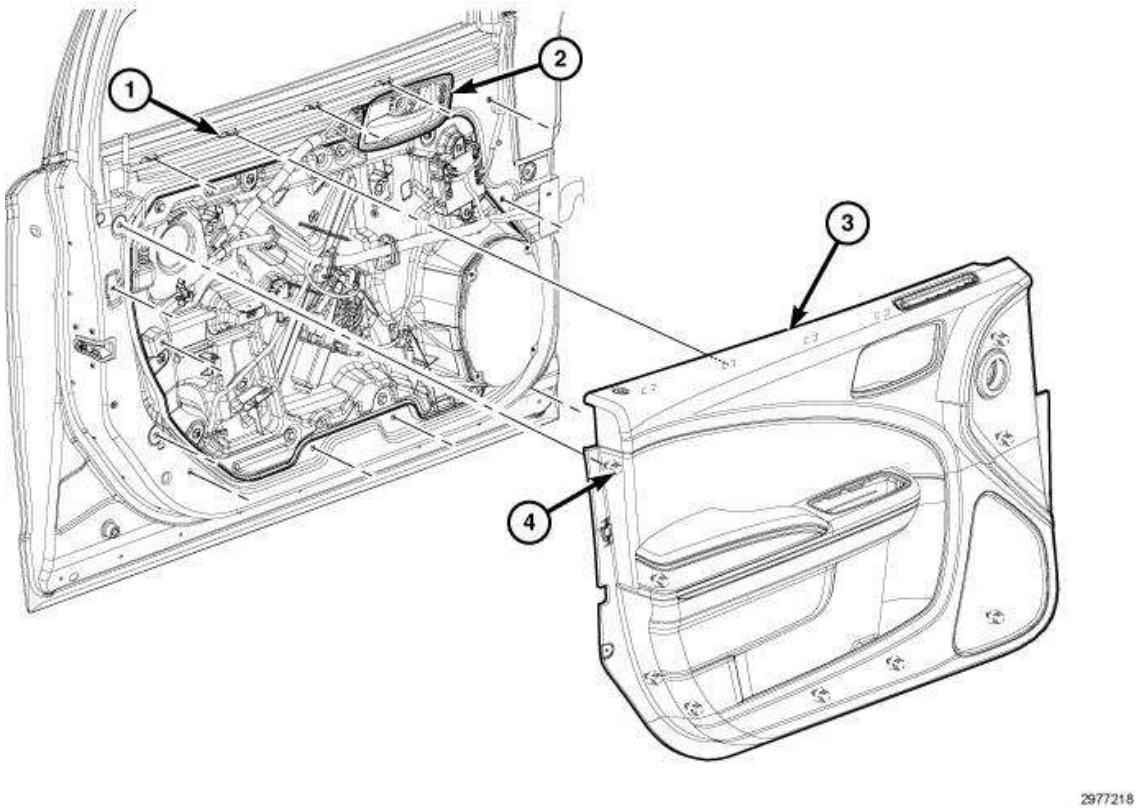


Fig. 619: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the four transmission to the engine oil pan bolts (1) and tighten to 55 N.m (41 ft. lbs.).

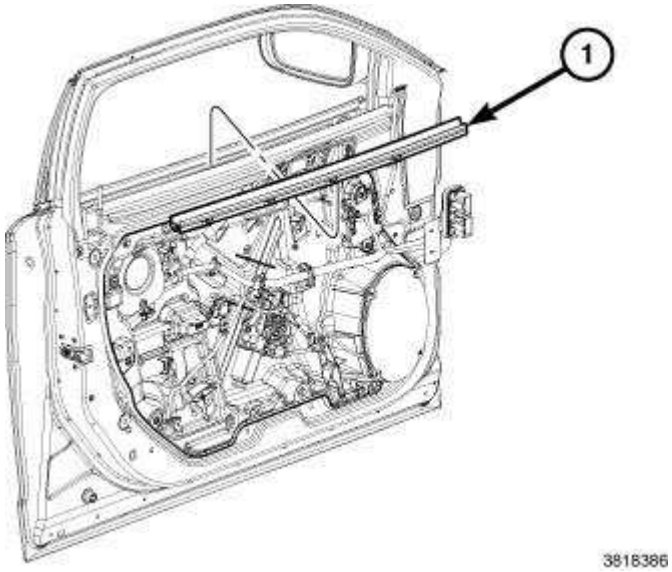


Fig. 620: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

5. Tighten the nineteen previously installed M8 oil pan mounting bolts (1) to 25 N.m (18 ft. lbs.).

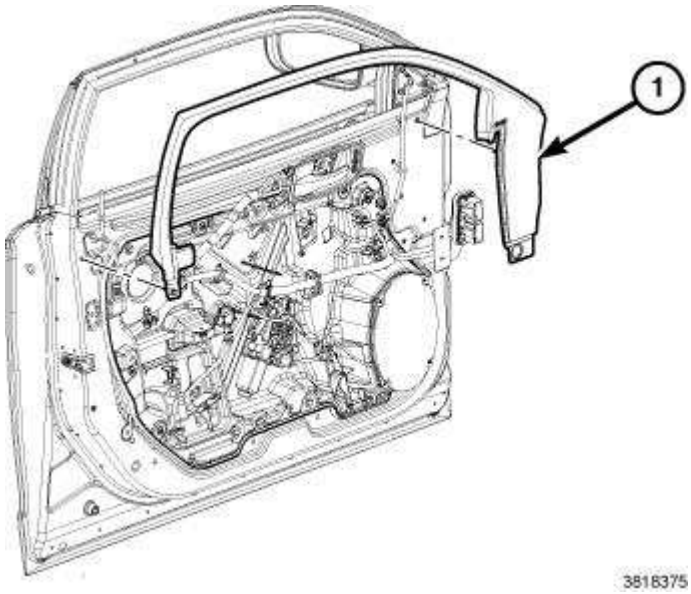


Fig. 621: Rear Oil Seal Retainer Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with transmission removed for clarity.

6. Install the two M6 bolts (1) to the rear oil seal retainer flange and tighten to 12 N.m (9 ft. lbs.).

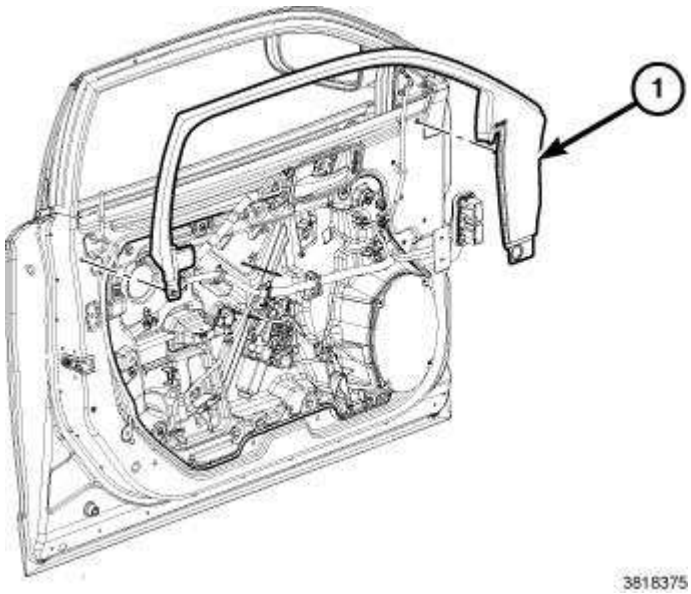


Fig. 622: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

7. Install the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

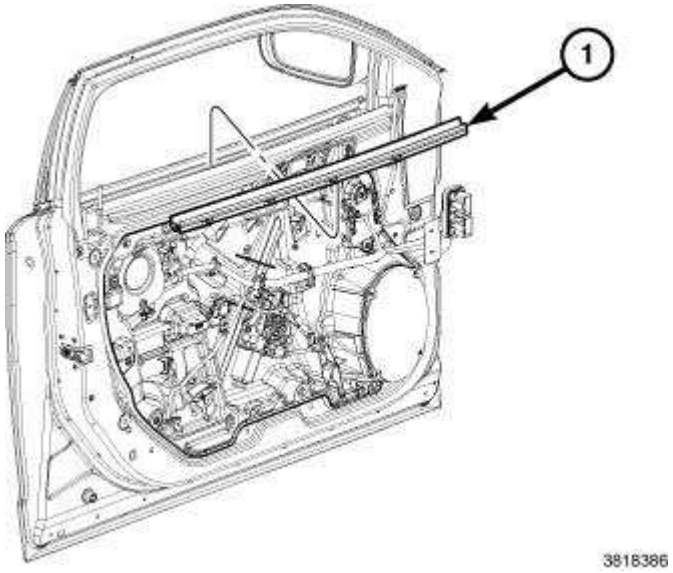


Fig. 623: Crossmember & Bolts (AWD)
Courtesy of CHRYSLER GROUP, LLC

8. Lower the rear of the engine and install the two bolts (2) to the rear engine mount isolator. Tighten the bolts to 65 N.m (48 ft. lbs.).

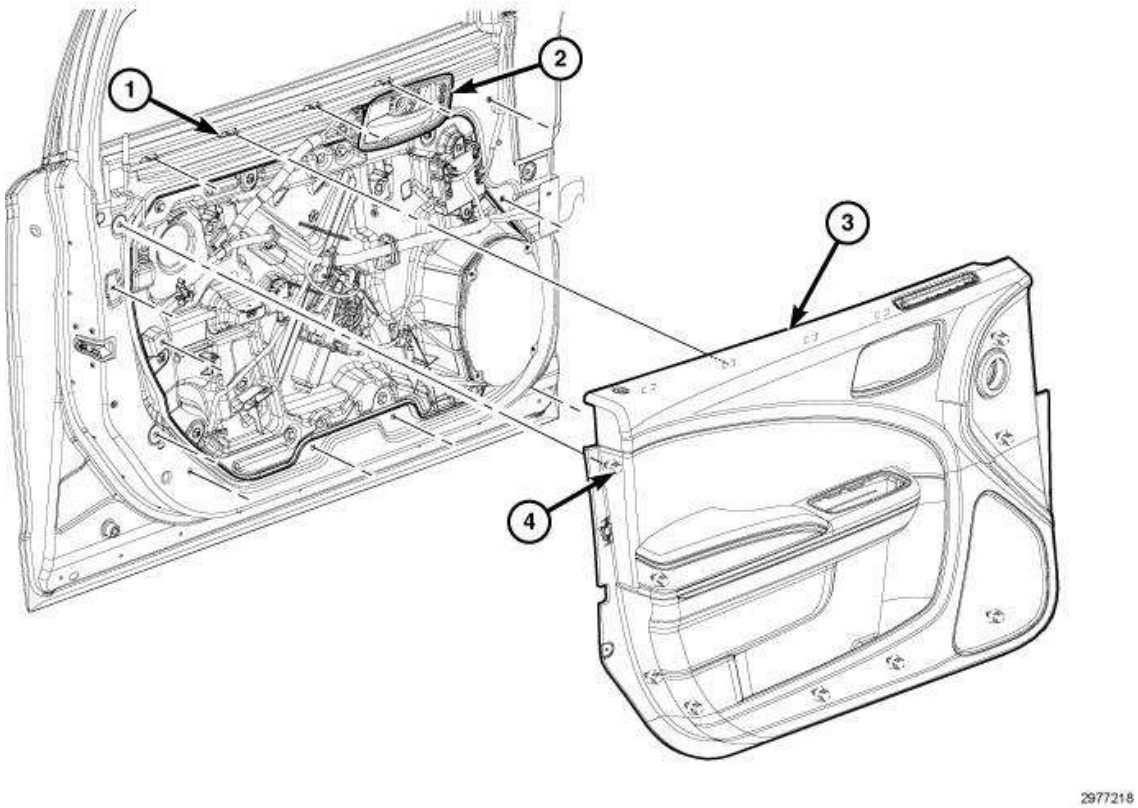


Fig. 624: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

9. Install the transmission cooling lines (2) and tighten the bolt (1) to 12 N.m (106 in. lbs.).

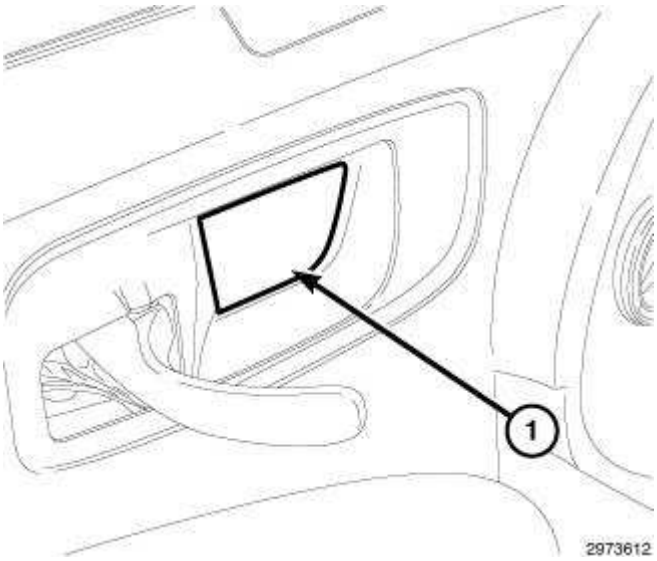


Fig. 625: Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Lift the steering gear (1) into the mounted position and install the steering gear lower mounting bolts (2 and 3). Install the upper mounting bolt (4) and nut. Tighten all bolts to 102 N.m (75 ft. lbs.).

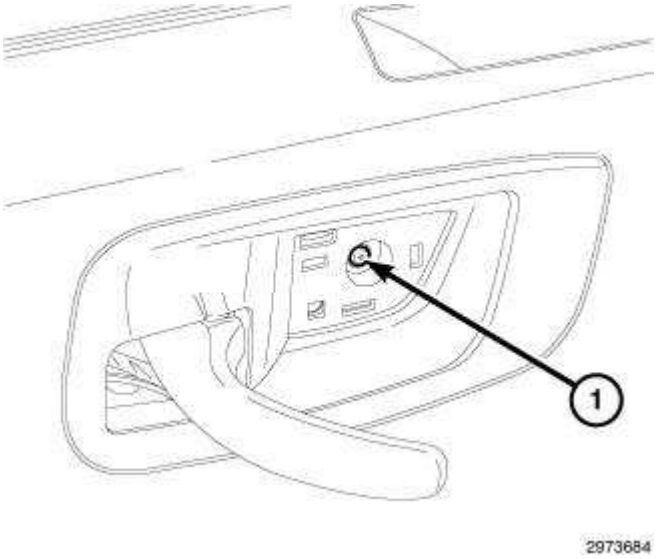


Fig. 626: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

Align splines and install the lower intermediate shaft coupling (2) to the steering gear shaft (3). Install a **NEW** pinch bolt and tighten to 45 N.m (33 ft. lbs.).

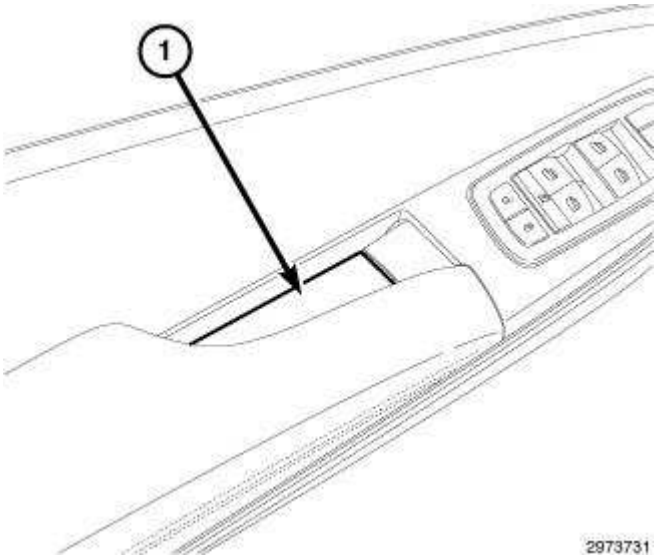


Fig. 627: Stabilizer Bar Bushing & Retainer
Courtesy of CHRYSLER GROUP, LLC

11. Raise the stabilizer bar to the engine cradle, placing bushings (1) into the mounted position.
12. Install the bolts (2) securing each stabilizer bar isolator retainer (3) to the cradle. Tighten the bolts to 60 N.m (44 ft. lbs.).

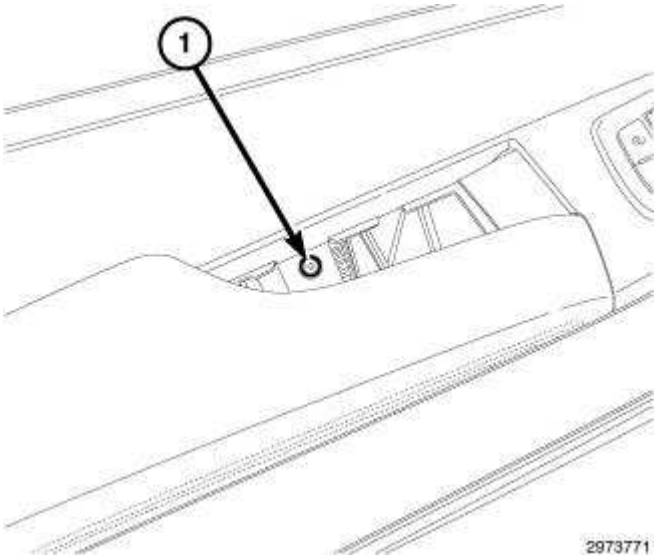


Fig. 628: Removing/Installing Front Axle
Courtesy of CHRYSLER GROUP, LLC

13. Install the front axle assembly (1) with propeller shaft, intermediate shaft, halfshafts, wheels, tires and exhaust pipe. Refer to **INSTALLATION** .
14. If required, fill the front axle with the specified type and amount of gear lubricant.

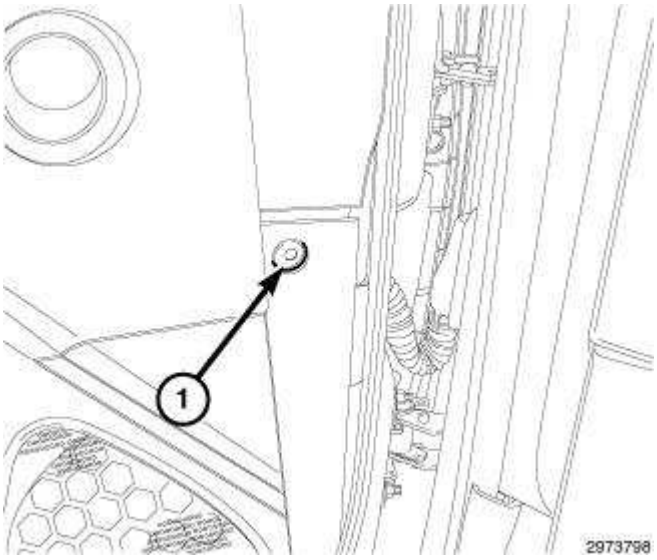


Fig. 629: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

15. Position the belly pan and install the retainers (1).
16. Lower the vehicle.

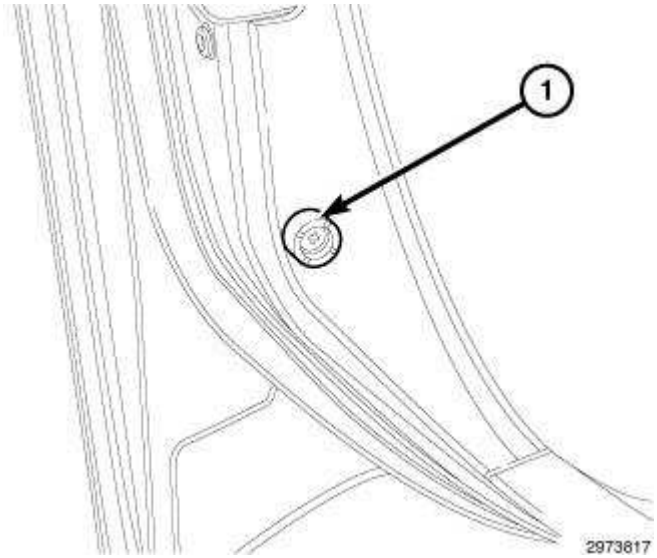


Fig. 630: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Install the oil level indicator (2) with bolt (1) tightened to 12 N.m (106 in. lbs.).
18. Position the heater core inlet tube (4) and install two bolts (3) tightened to 12 N.m (106 in. lbs.).
19. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

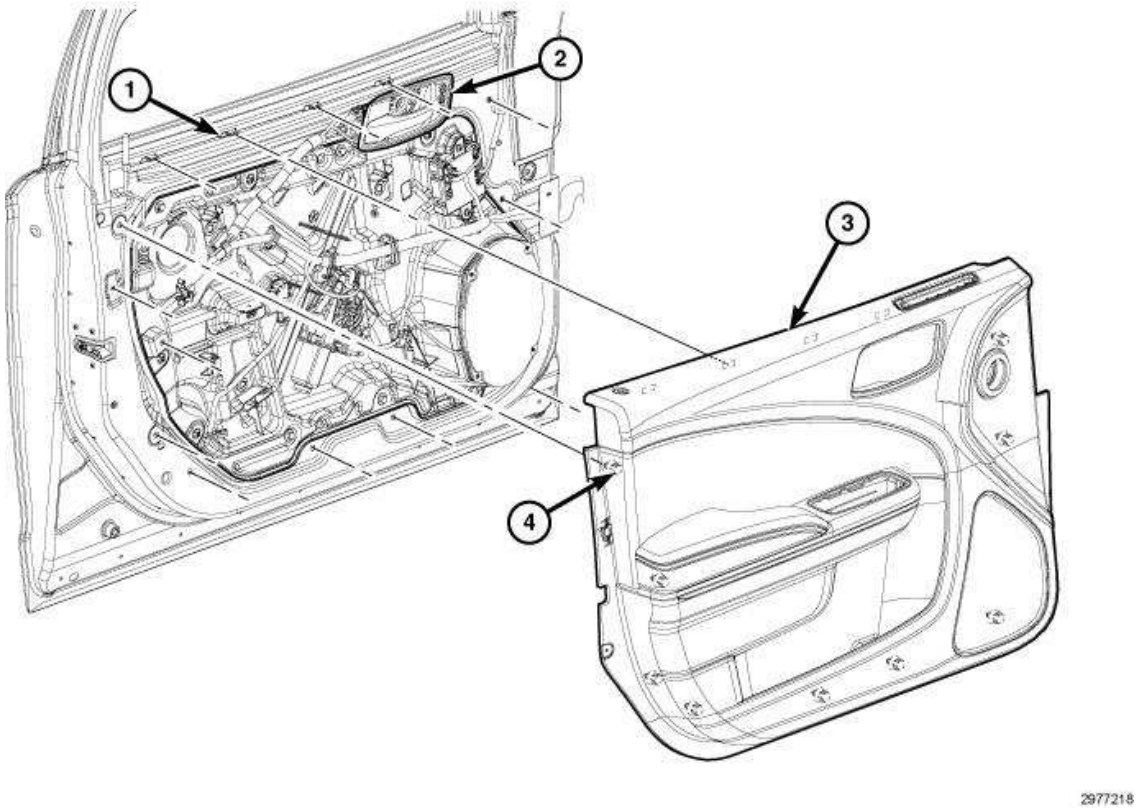


Fig. 631: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

20. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
21. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
22. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
23. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
24. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

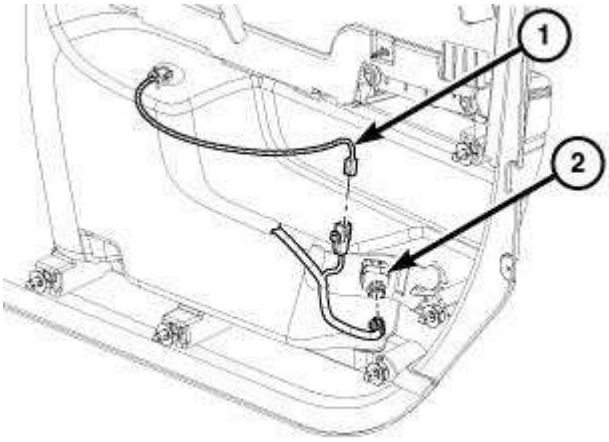


Fig. 632: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

25. Position the engine cover (1) and secure the retaining grommets onto the ball studs.
26. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
27. Start and run the engine until it reaches normal operating temperature and check for leaks.

RWD LOWER

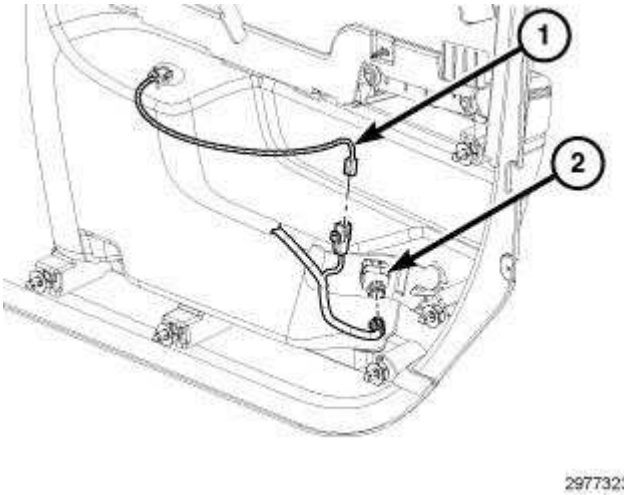


Fig. 633: Locating Sealant On Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45

minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

1. Clean the upper and lower oil pan mating surfaces with isopropyl alcohol in preparation for sealant application.
2. Apply a 2 to 3 mm wide bead of Mopar® Threebond Engine RTV Sealant (1) to the lower oil pan as shown in illustration.

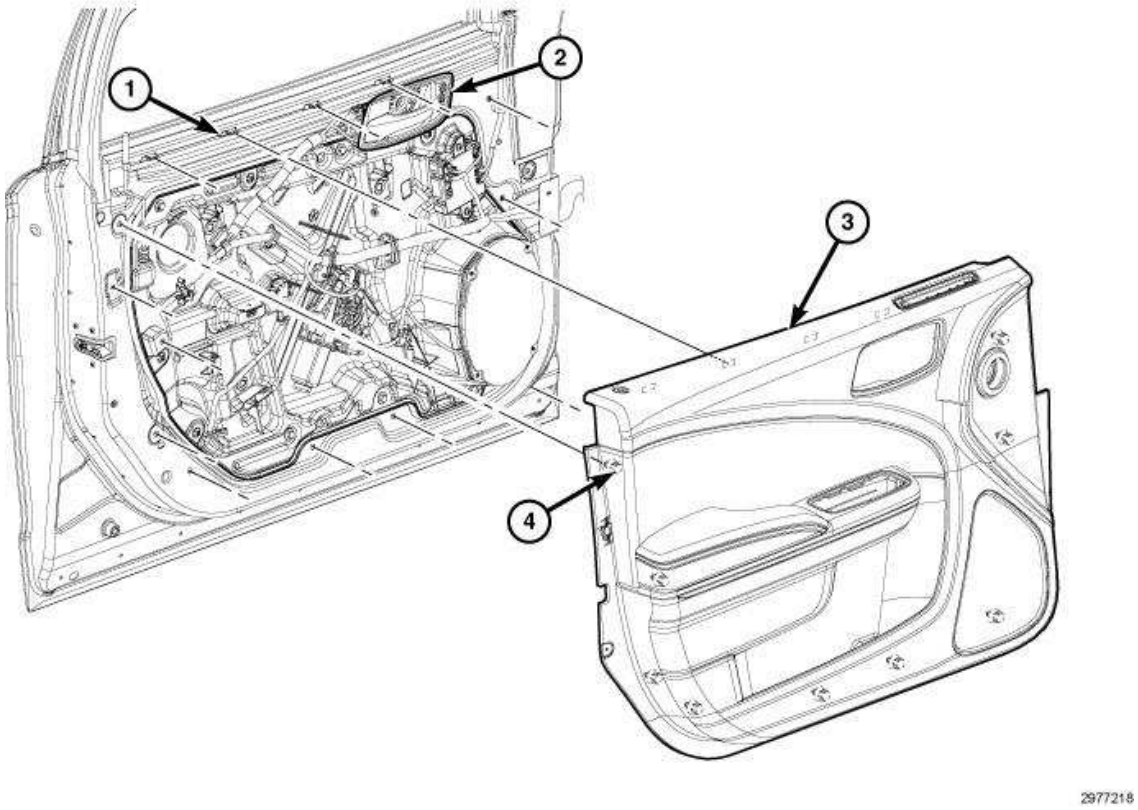


Fig. 634: Bolts, Studs, Nuts & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Following assembly, the Mopar® Threebond Engine RTV Sealant must be allowed to dry for 45 minutes prior to adding oil and engine operation. Premature exposure to oil prior to drying may result in engine fluid leakage.

3. Install two studs (2) into the upper oil pan flange.
4. Install the lower oil pan (1) to the upper oil pan with twelve bolts (4) and two nuts (3) tightened to 11 N.m (8 ft. lbs.).

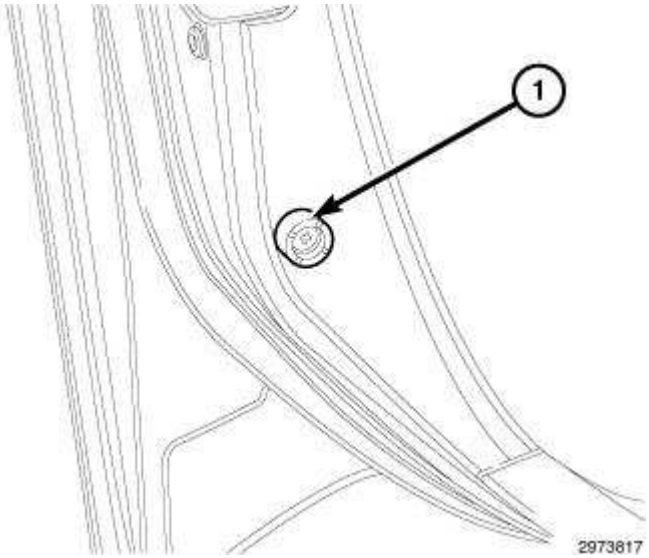


Fig. 635: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Position the belly pan and install the retainers (1).
6. Lower the vehicle.
7. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
8. Start and run the engine until it reaches normal operating temperature and check for leaks.

RWD UPPER

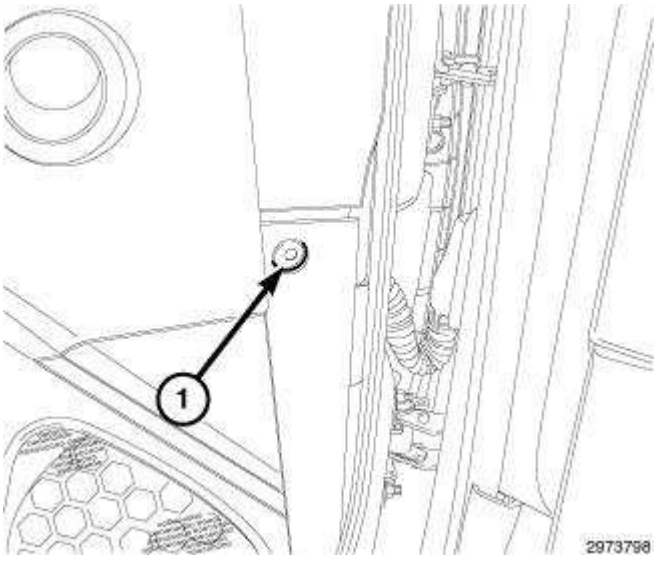


Fig. 636: Locating Sealant On Upper Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Engine assembly requires the use of a unique sealant that is compatible

with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

1. Clean the upper and lower oil pans, timing chain cover, rear seal retainer and engine block mating surfaces with isopropyl alcohol in preparation for sealant application.
2. Apply a 2 to 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to the upper oil pan as shown in illustration, in the following locations:
   - Oil pan to engine block flange (1)
   - Two timing cover to engine block T-joints (2)
   - Two rear seal retainer to engine block T-joints (3)

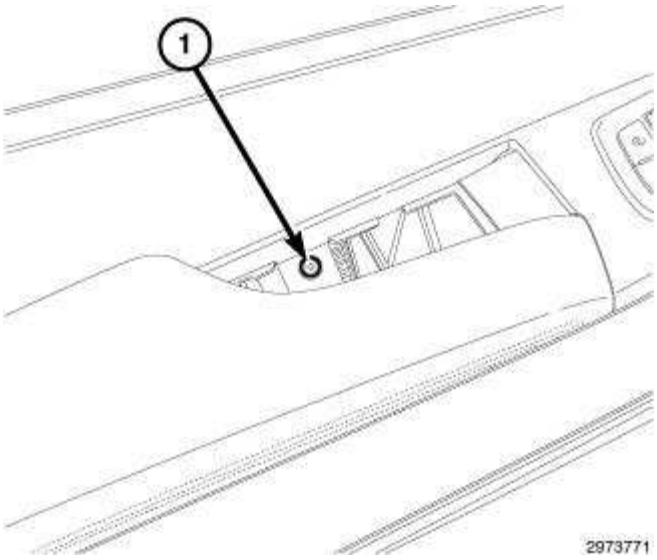


Fig. 637: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Make sure that the rear face of the oil pan is flush to the transmission bell housing before tightening any of the oil pan mounting bolts. A gap between the oil pan and the transmission could crack the oil pan or transmission casting.

3. Install the oil pan to the engine block making sure the oil pan is flush to the transmission bell housing. Secure the oil pan to the engine block with nineteen M8 oil pan mounting bolts (1) finger tight.

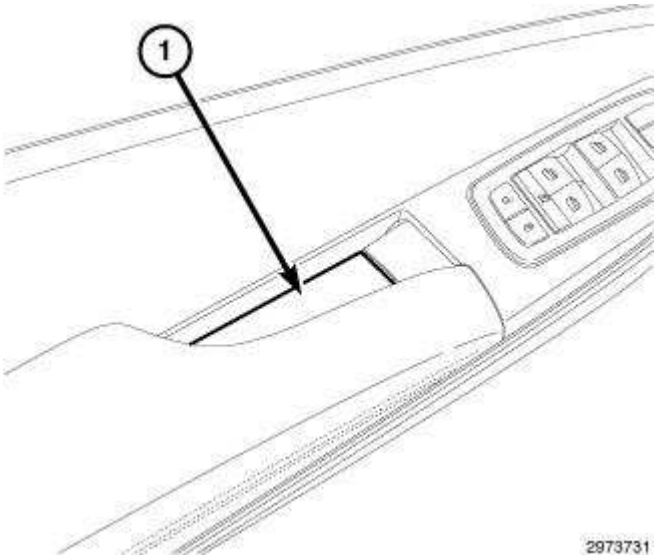


Fig. 638: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the four transmission to the engine oil pan bolts (1) and tighten to 55 N.m (41 ft. lbs.).

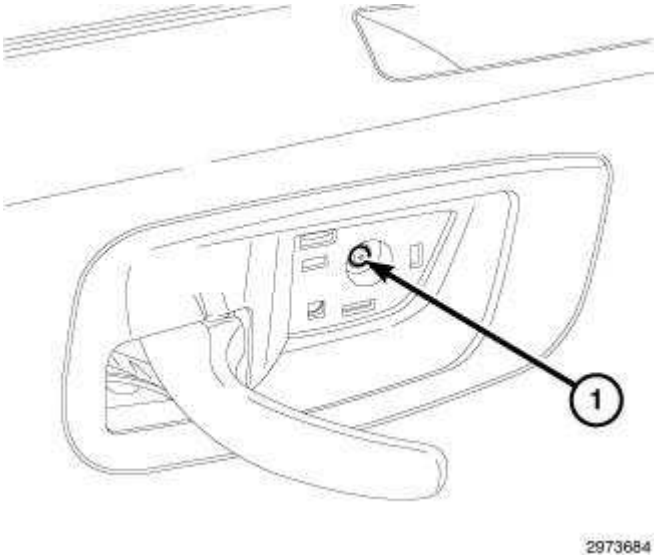


Fig. 639: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

5. Tighten the nineteen previously installed M8 oil pan mounting bolts (1) to 25 N.m (18 ft. lbs.).

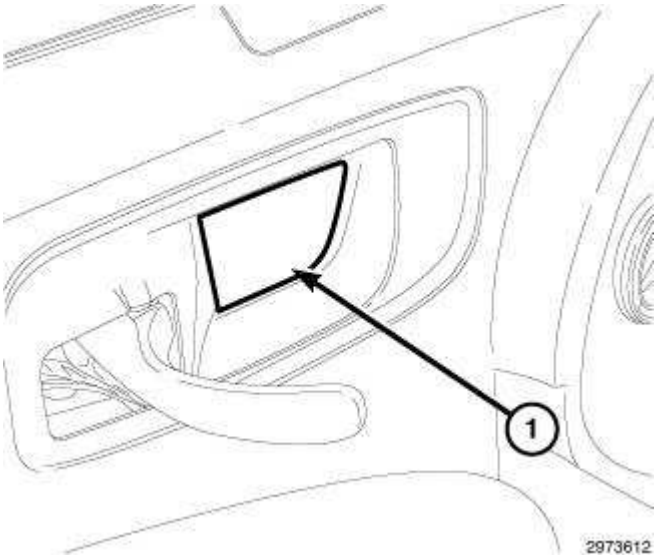


Fig. 640: Rear Oil Seal Retainer Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with transmission removed for clarity.

6. Install the two M6 bolts (1) to the rear oil seal retainer flange and tighten to 12 N.m (9 ft. lbs.).

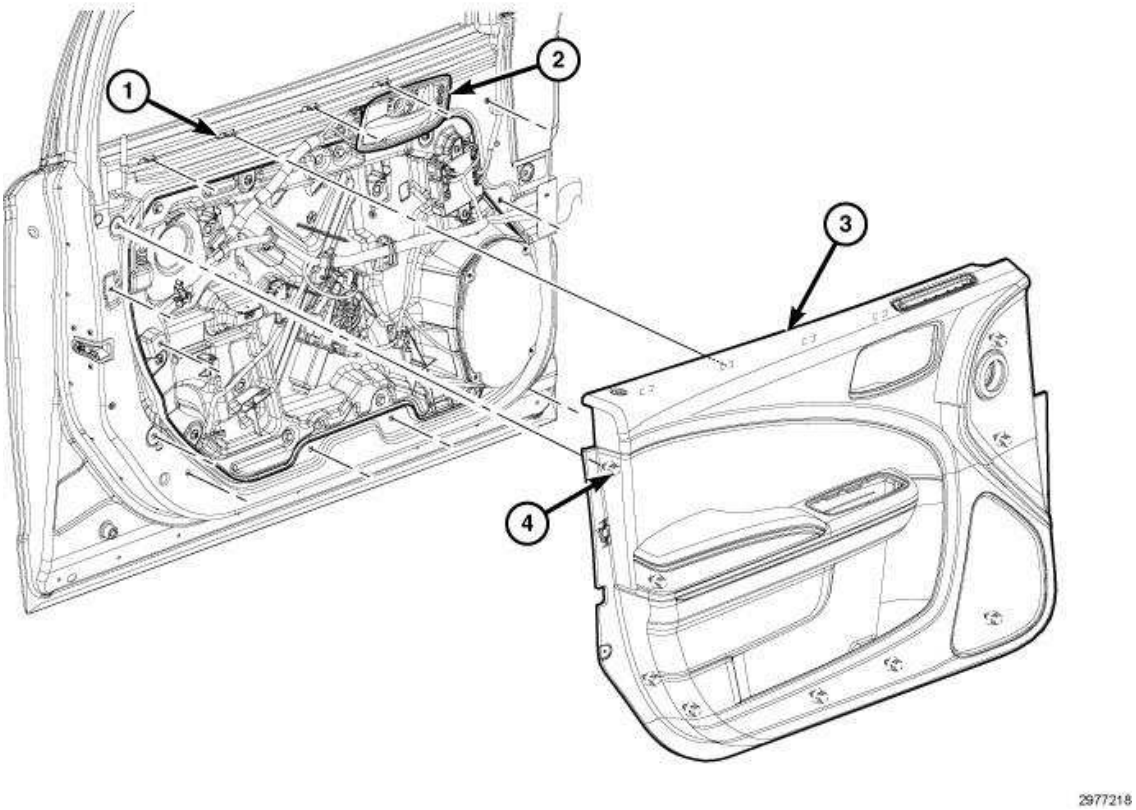


Fig. 641: Rubber Plugs

Courtesy of CHRYSLER GROUP, LLC

7. Install the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

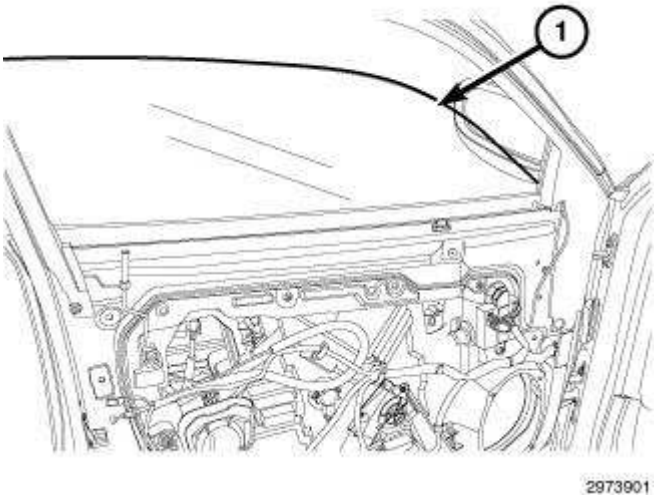


Fig. 642: Rear Engine Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Lower the rear of the engine and install the two bolts (2) to the rear engine mount isolator. Tighten the bolts to 65 N.m (48 ft. lbs.).

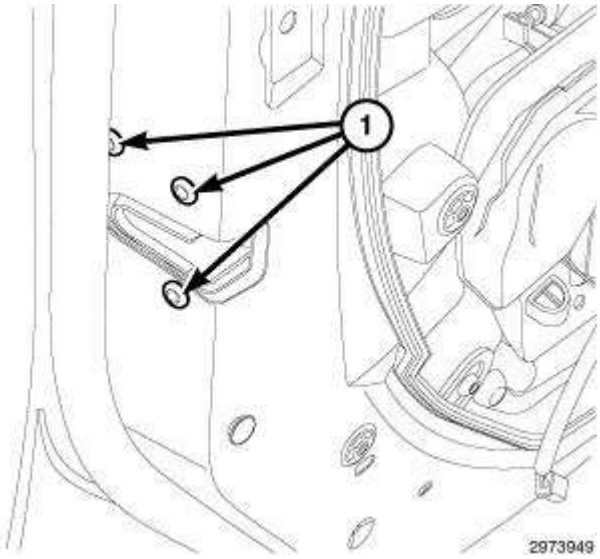


Fig. 643: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

9. Install the transmission cooling lines (2) and tighten the bolt (1) to 12 N.m (106 in. lbs.).

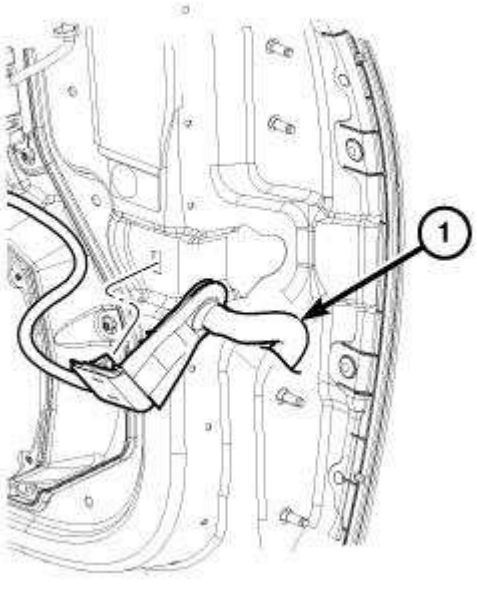


Fig. 644: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

10. Lift the steering gear (2) into the mounted position and install the steering gear mounting bolts (1). Tighten the bolts to 95 N.m (70 ft. lbs.).

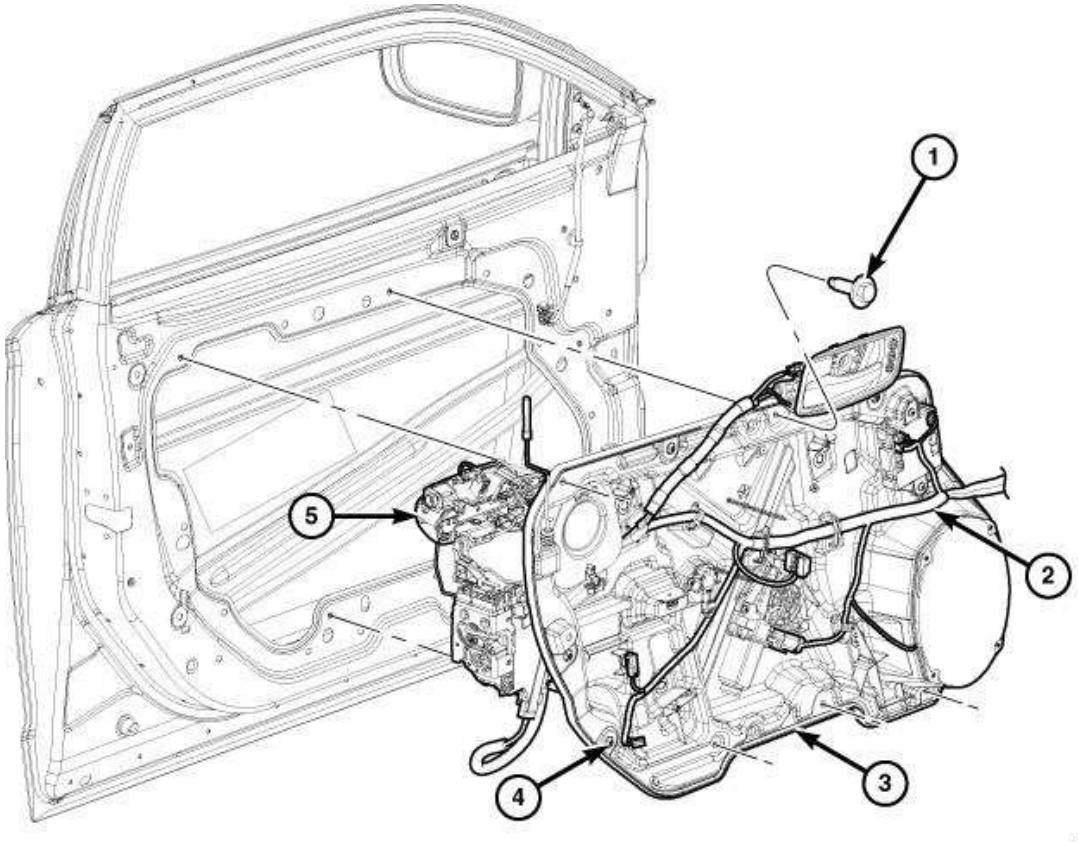


Fig. 645: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

11. Align the lower intermediate shaft (2) with the input shaft (3) and install the steering coupling. Install a NEW pinch bolt (1) and tighten to 45 N.m (33 ft. lbs.).

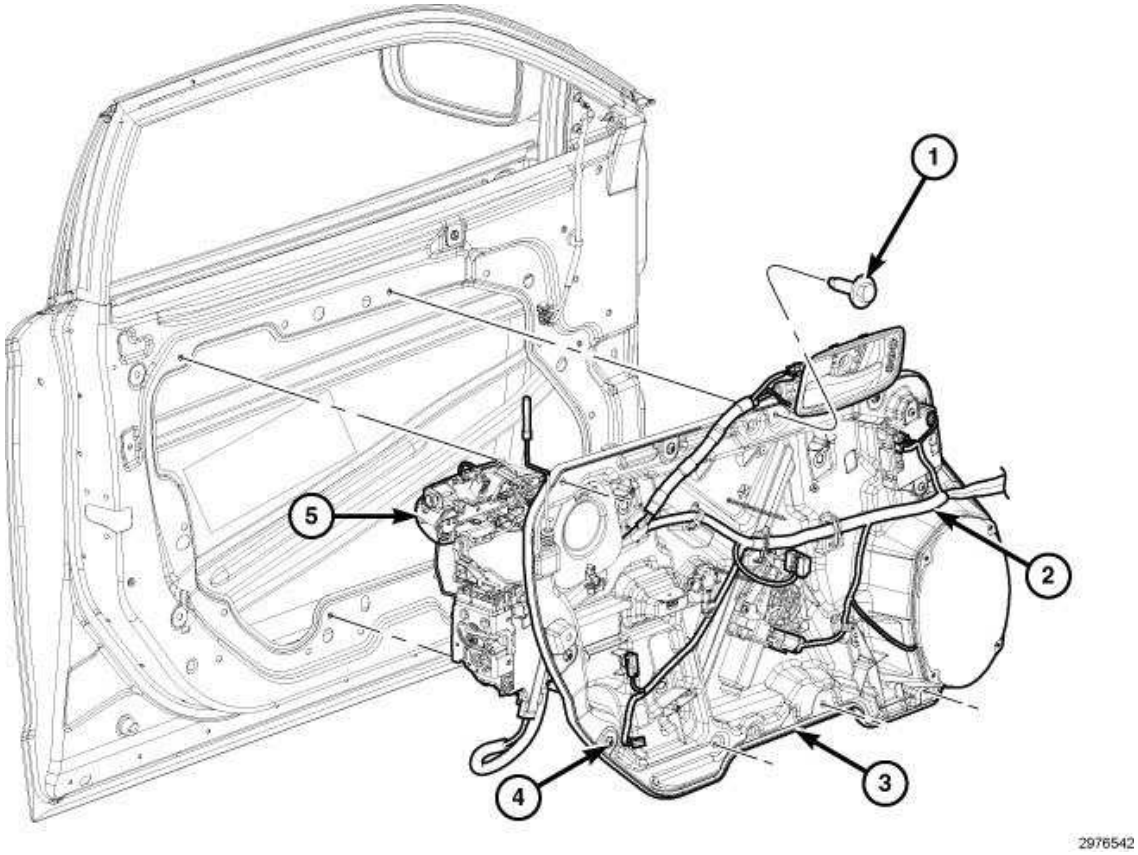


Fig. 646: Bolts, Studs, Nuts & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

12. Install the lower oil pan. Refer to **PAN, OIL, INSTALLATION**.

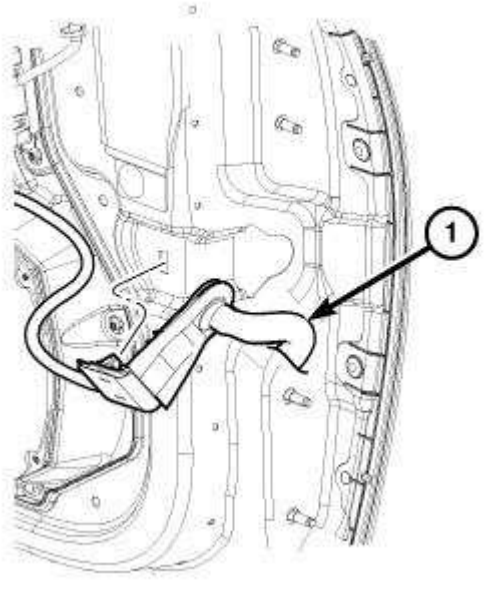


Fig. 647: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Position the belly pan and install the retainers (1).
14. Lower the vehicle.

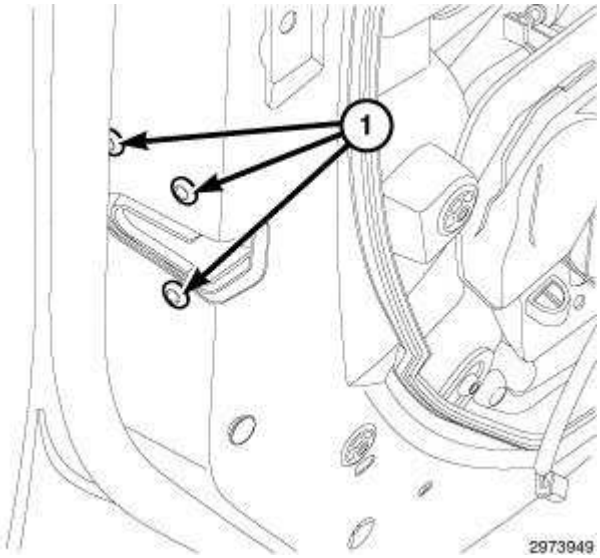


Fig. 648: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install the oil level indicator (2) with bolt (1) tightened to 12 N.m (106 in. lbs.).
16. Position the heater core inlet tube (4) and install two bolts (3) tightened to 12 N.m (106 in. lbs.).
17. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

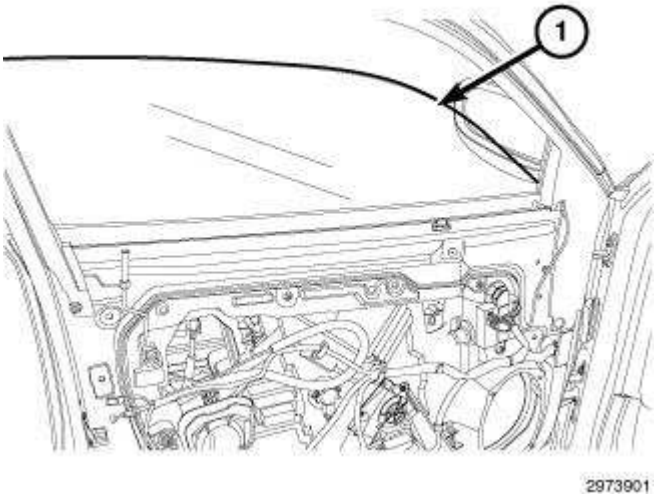


Fig. 649: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

18. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
19. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
20. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
21. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
22. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

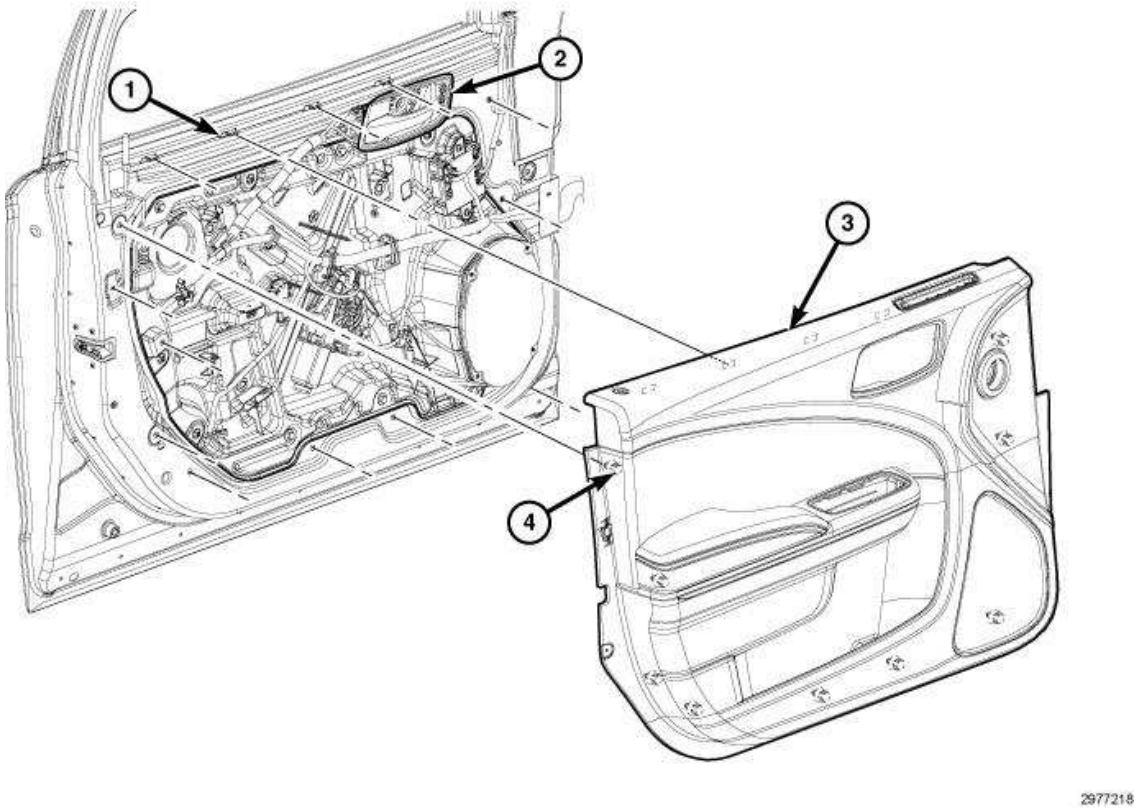


Fig. 650: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

23. Position the engine cover (1) and secure the retaining grommets onto the ball studs.
24. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
25. Start and run the engine until it reaches normal operating temperature and check for leaks.

PICK-UP, OIL PUMP

REMOVAL

REMOVAL

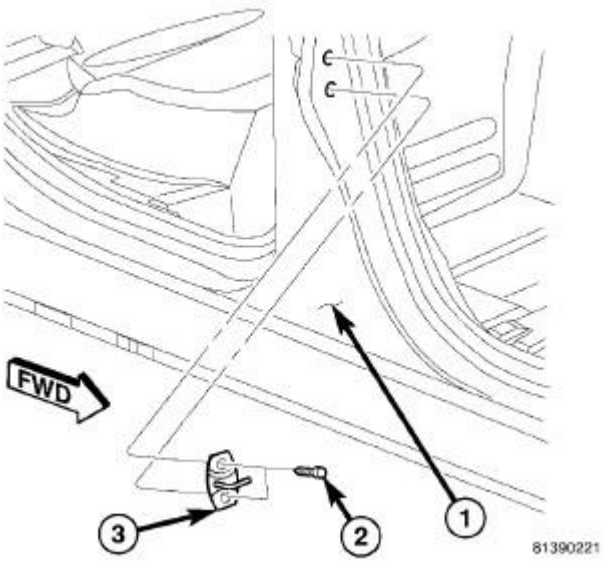


Fig. 651: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

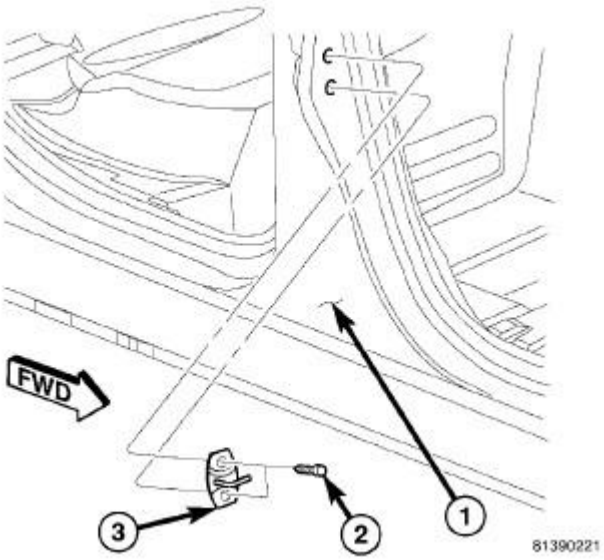


Fig. 652: Oil Pump Pick-Up Tube & Support Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove the upper oil pan. Refer to **PAN, OIL, REMOVAL**.
3. Remove the oil pump pick-up tube support bracket retaining bolt (3).
4. Remove the oil pump pick-up tube retaining bolt (2) and remove the pick-up tube (1) from the oil pump.

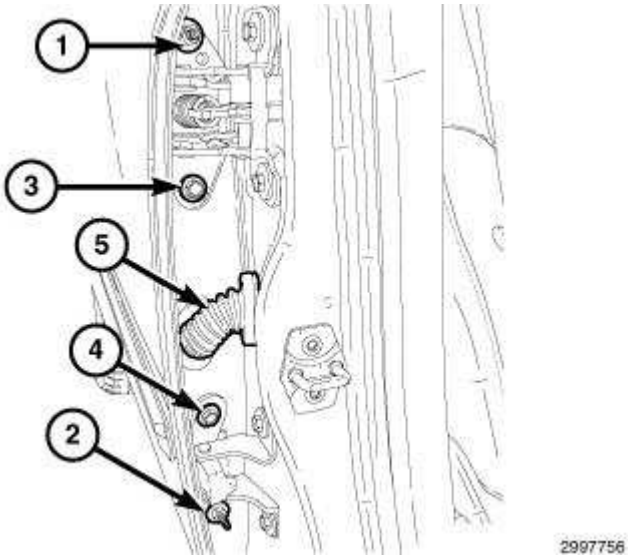


Fig. 653: Oil Pump Pick-Up Tube O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

5. Remove and discard the O-ring seal (1) from the oil pump pick-up tube.

INSTALLATION

INSTALLATION

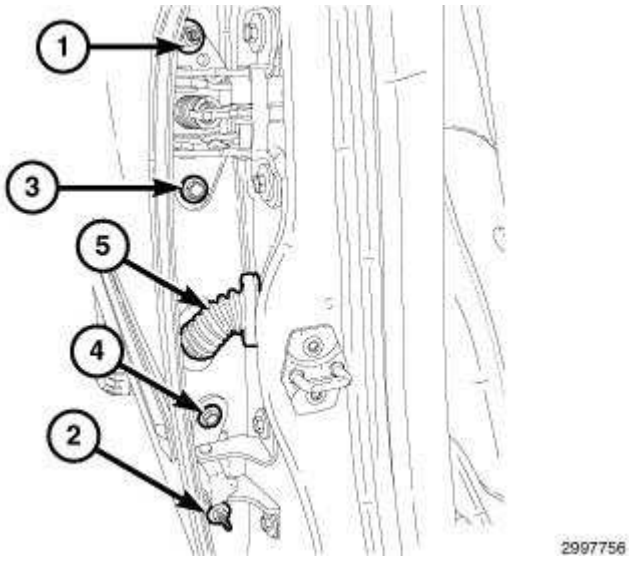


Fig. 654: Oil Pump Pick-Up Tube O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the new O-ring seal (1) with clean engine oil and install the O-ring onto the oil pump pick-up tube.

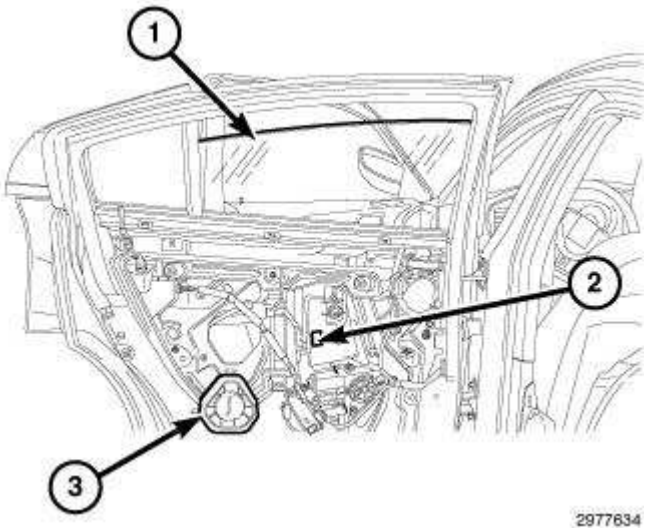


Fig. 655: Oil Pump Pick-Up Tube & Support Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the oil pump pick-up tube (1) onto the oil pump and install the retaining bolt (2) finger tight.
3. Install the oil pump pick-up tube support bracket retaining bolt (3) and tighten to 12 N.m (9 ft. lbs.).
4. Tighten the oil pump pick-up tube retaining bolt (2) to 12 N.m (9 ft. lbs.).
5. Install the oil pan. Refer to **PAN, OIL, INSTALLATION**.
6. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

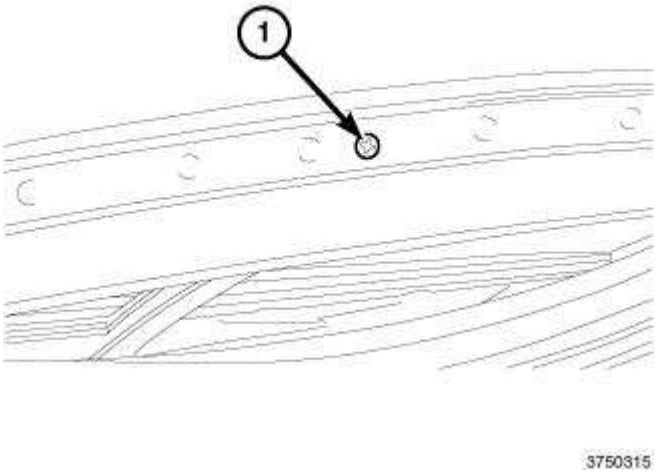


Fig. 656: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

7. Connect the negative battery cable (1) and tighten nut to 5 N.m (45 in. lbs.).
8. Run the engine until it reaches normal operating temperature and check for leaks.

PUMP, ENGINE OIL

DESCRIPTION

DESCRIPTION

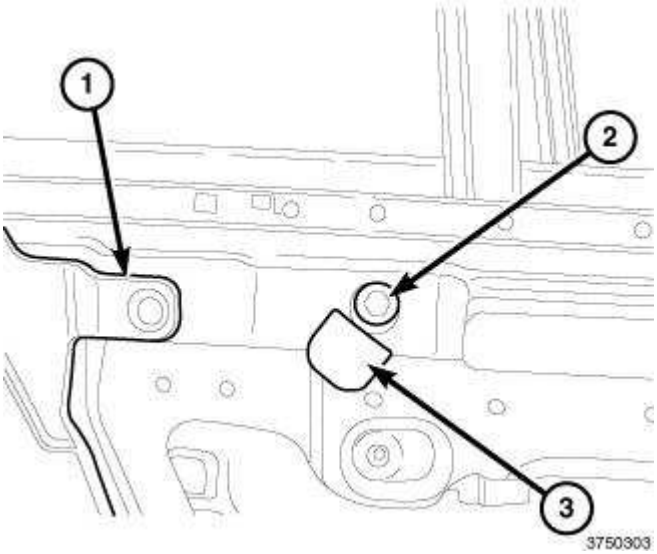


Fig. 657: Oil Pump Chain
Courtesy of CHRYSLER GROUP, LLC

The vane type engine oil pump is mounted to the underside of the cylinder block and is driven by the oil pump chain off the crankshaft at a 1:1 drive ratio. This pump location improves efficiency compared to an on-crankshaft location. The pump is driven with a silent chain which is tensioned using a spring loaded tensioner. The pump is not timed to the engine.

An internal mechanical ball and spring type relief valve prevents excess pressure in the engine by dumping oil into the sump and provides emergency protection at conditions such as a cold start with high engine speed.

The pump has a moving slide mechanism for variable displacement capability and an on-off solenoid for two-stage pressure regulation. The pump and the solenoid are not to be disassembled. Both are non-serviceable items and are to be replaced as a complete assembly.

OPERATION

OPERATION

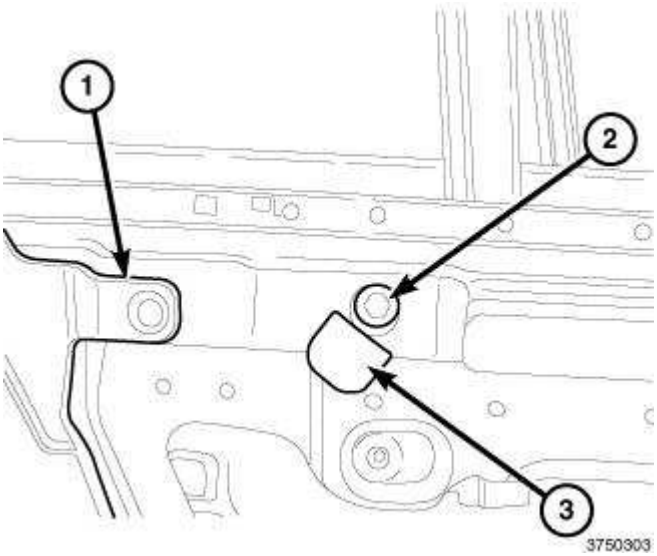


Fig. 658: Moving Element, On/Off Solenoid & Relief Valve
Courtesy of CHRYSLER GROUP, LLC

The engine oil pump features seven vanes and a moving element (1) that continuously adjusts to maintain a regulated oil pressure supply by varying the displacement of the pump. The pump has two regulated pressure stages of operation controlled by an on/off solenoid (2). Low pressure mode regulation (solenoid on) is approximately 200 kPa (29 psi) and high pressure mode regulation (solenoid off) is approximately 450 kPa (65 psi). The Powertrain Control Module (PCM) switches the pump between stages based on engine operating conditions, oil and coolant temperatures, speed and load. Under most typical conditions, the pump will run in low mode from idle up to around 3000 rpm, and switch from low to high mode between 3000 and 4000 rpm.

The maximum oil pressure in the engine is limited to 1000 kPa (145 psi) by the relief valve (3). Pressure in the main oil gallery of the engine can be monitored with diagnostic equipment through the oil pressure sensor mounted on the rear of the oil filter module. The minimum pressure for the engine is 41 kPa (6 psi) at any operating condition. Anything under this pressure could result in damage to critical moving parts.

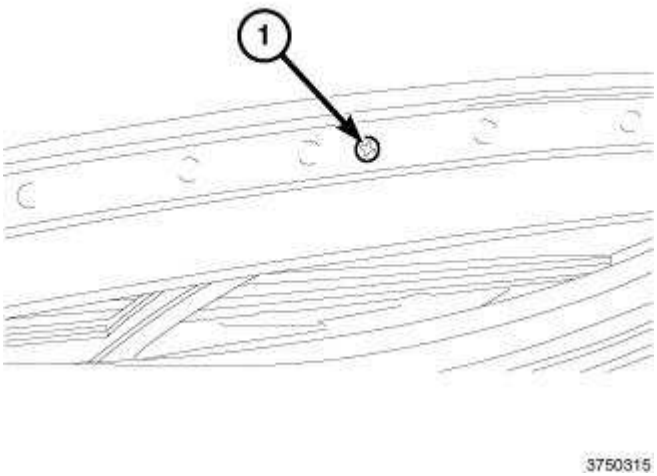


Fig. 659: Moving Element, Main Gallery Oil Pressure, Spring Pressure & Pump Driveshaft
Courtesy of CHRYSLER GROUP, LLC

In high pressure mode regulation (solenoid off) main gallery oil pressure (2) is applied to the moving element (1). The main gallery oil pressure works against spring pressure (3) to move the element to a more concentric location about the pump driveshaft (4) thus reducing displacement and pump output.

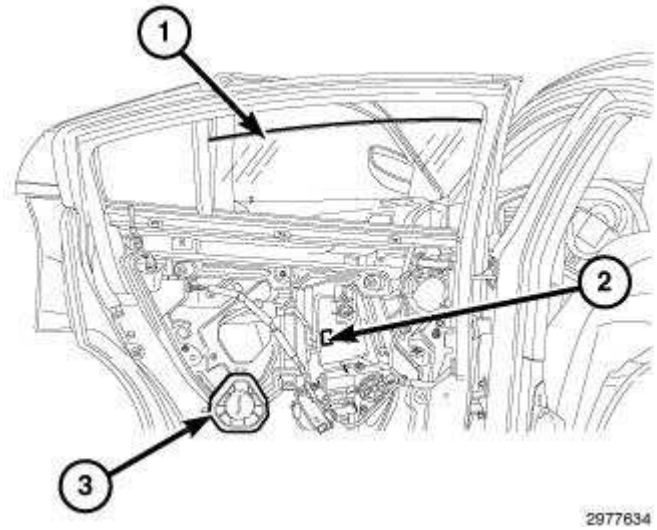
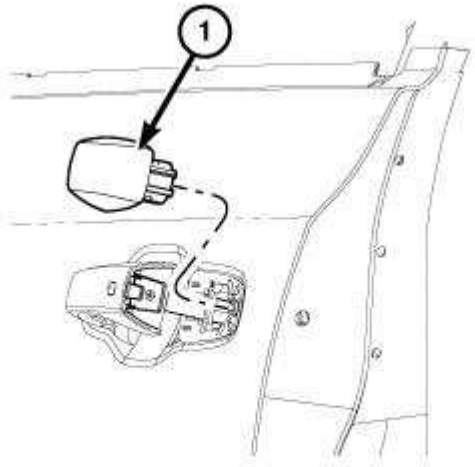


Fig. 660: Chamber & Spring
Courtesy of CHRYSLER GROUP, LLC

In low pressure mode regulation (solenoid on) the energized solenoid opens an additional chamber (1) to main gallery oil pressure increasing the force on the spring (2) to further reduce displacement and output pressure.

REMOVAL

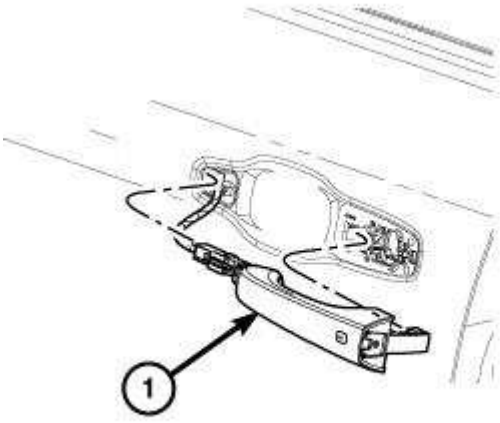
REMOVAL



3329280

Fig. 661: Oil Pump Pick-Up Tube & Support Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

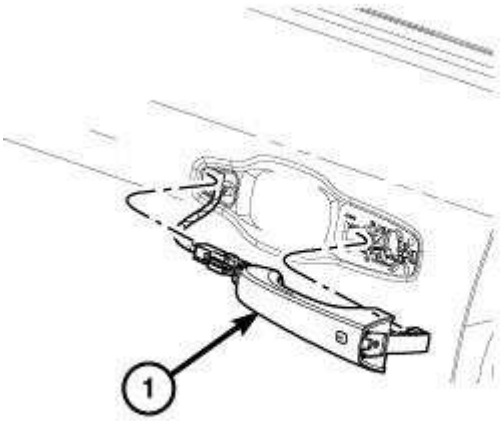
1. Disconnect and isolate the negative battery cable.
2. Remove the upper oil pan. Refer to **PAN, OIL, REMOVAL**.
3. Remove the oil pump pick-up (1). Refer to **PICK-UP, OIL PUMP, REMOVAL**.



3329122

Fig. 662: Oil Pump Solenoid Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

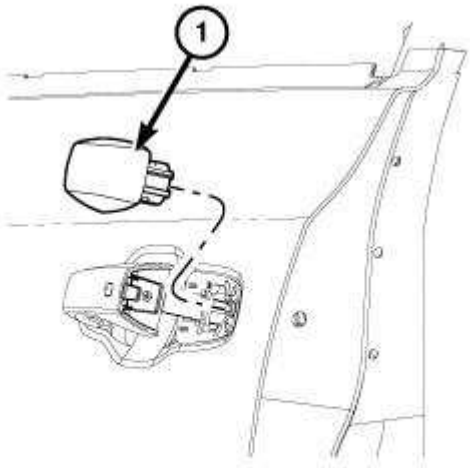
4. Disconnect the engine wire harness from the oil pump solenoid electrical connector (1).



3329122

Fig. 663: Oil Pump Solenoid Electrical Connector Retention Lock Tab
Courtesy of CHRYSLER GROUP, LLC

5. Depress the connector retention lock tab (1) to disengage the oil pump solenoid electrical connector from the engine block.



3329280

Fig. 664: Timing Gear Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove bolts (2) and the timing gear splash shield (1).

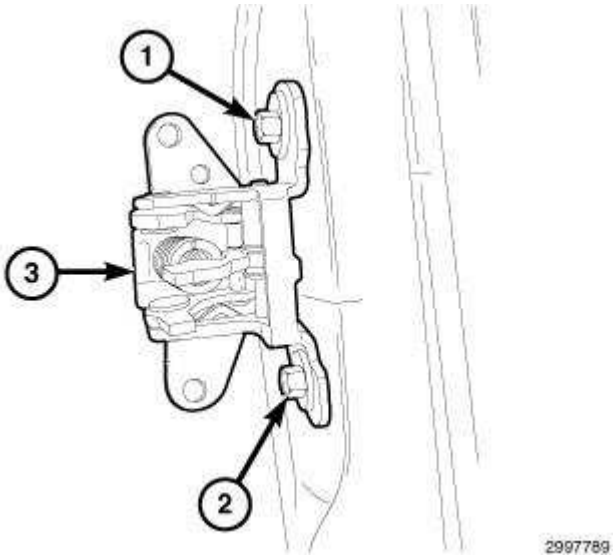


Fig. 665: Oil Pump Solenoid Electrical Connector & Primary Chain Tensioner Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Graphic shows the engine timing cover removed for clarity.

7. Push the oil pump solenoid electrical connector into the engine block, rotate the connector slightly CW, push it past the primary chain tensioner mounting bolt (1) and into the engine.

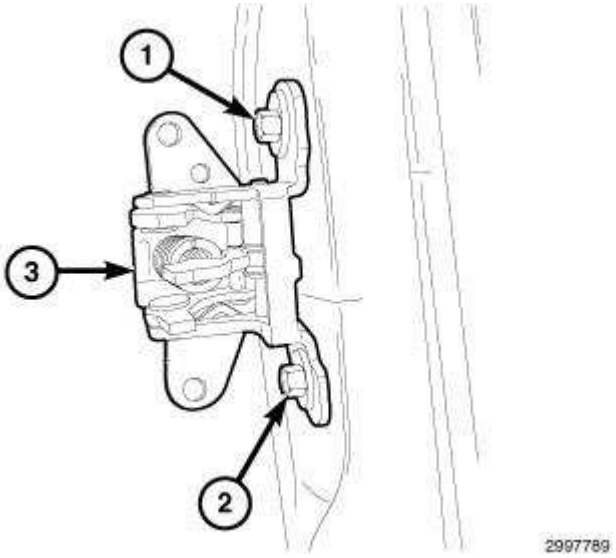


Fig. 666: Oil Pump Chain Tensioner & Retaining Pin
Courtesy of CHRYSLER GROUP, LLC

8. Push back the oil pump chain tensioner (2) and insert a suitable retaining pin (1) such as a 3 mm Allen wrench.

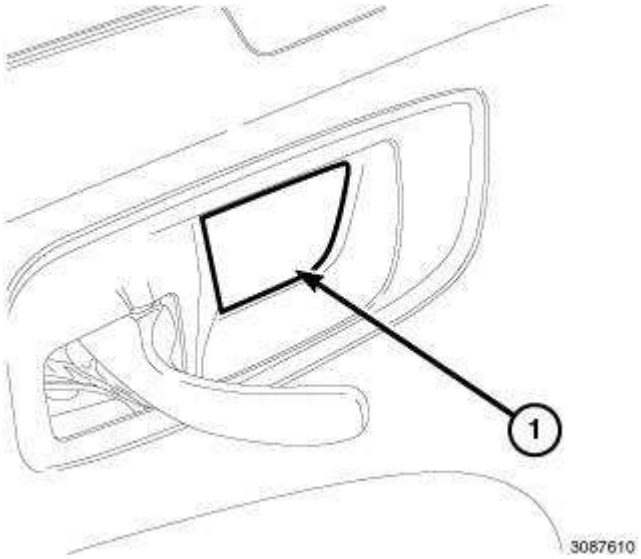


Fig. 667: Retaining Pin, Retaining Bolt, Oil Pump Chain & Sprocket
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

9. Mark the direction of rotation on the oil pump chain (3) and sprocket (4) using a paint pen or equivalent to aid in reassembly.

NOTE: There are no timing marks on the oil pump gear or chain. Timing of the oil pump is not required.

10. Remove the oil pump sprocket T45 retaining bolt (2) and remove the oil pump sprocket (4).

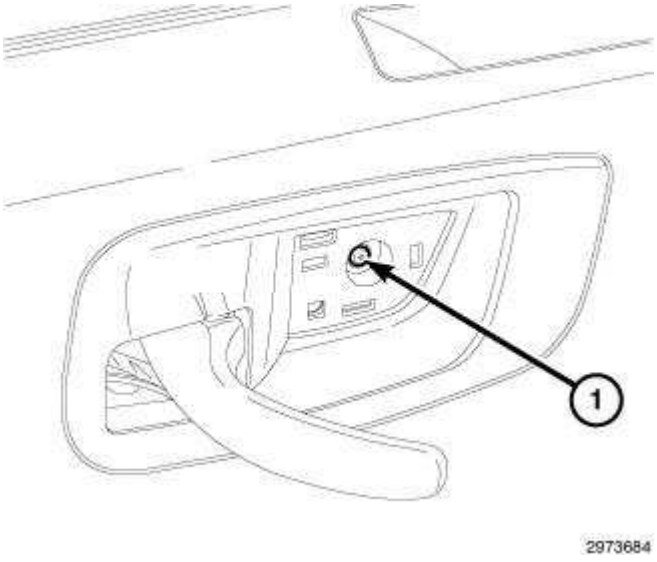


Fig. 668: Retaining Pin, Oil Pump Chain Tensioner Spring & Dowel Pin
Courtesy of CHRYSLER GROUP, LLC

11. Remove the retaining pin (3) and disengage the oil pump chain tensioner spring (1) from the dowel pin (2).
12. Remove the oil pump chain tensioner from the oil pump.

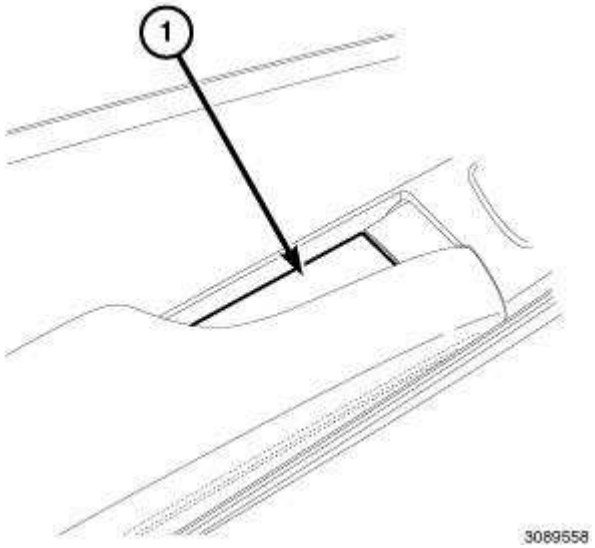


Fig. 669: Oil Pump, Locator Pins & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the four oil pump bolts (1) and remove the oil pump (3).

INSPECTION

INSPECTION

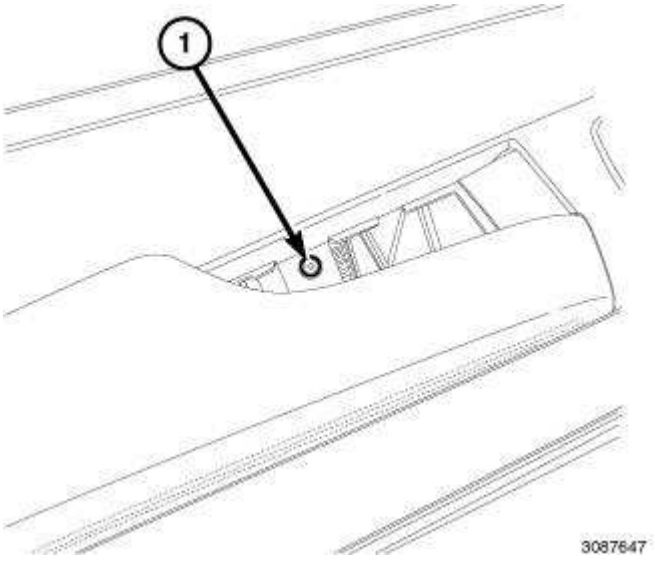


Fig. 670: Solenoid Wires, Connector Retention Lock Tab & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: The 3.6L Oil pump is released as an assembly. The assembly includes both the pump and the solenoid. There are no serviceable sub-assembly components. In the event the oil pump or solenoid are not functioning or out of specification they must be replaced as an assembly.

1. Inspect the solenoid wires (1) for cuts or chaffing.
2. Inspect the condition of the connector O-ring seal (3).
3. Inspect the connector retention lock tab (2) for fatigue or damage.

INSTALLATION

INSTALLATION

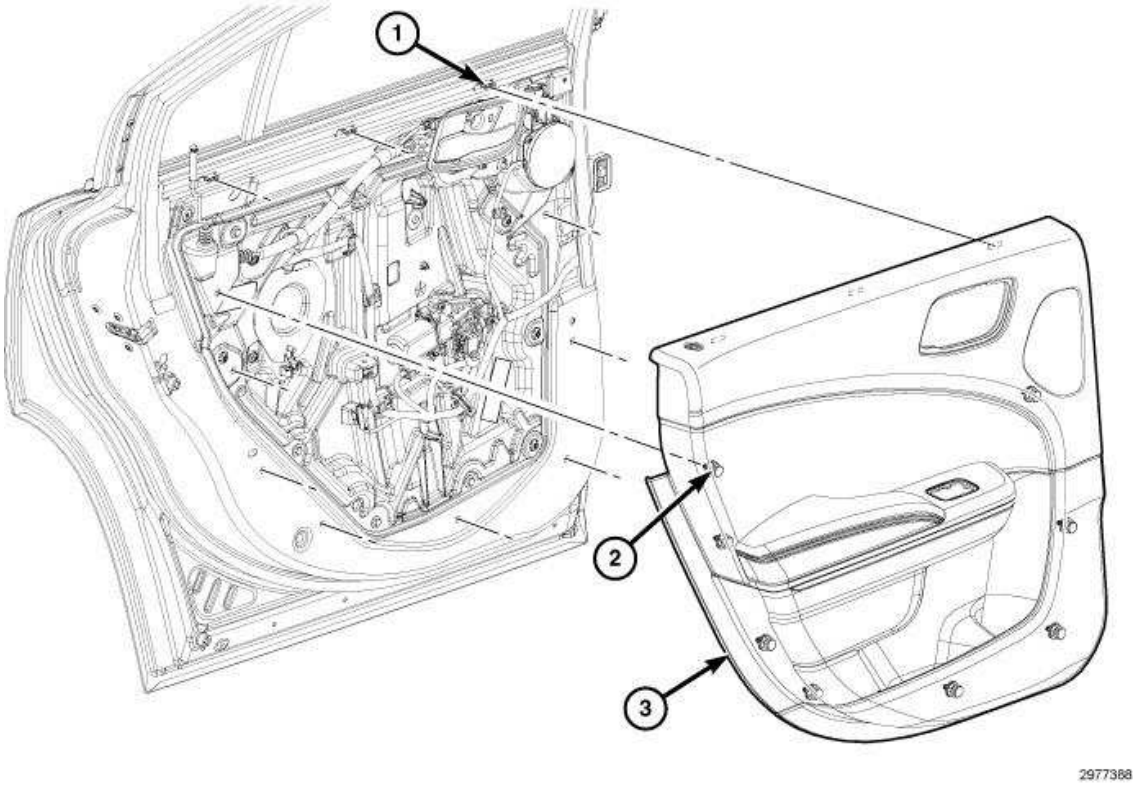


Fig. 671: Oil Pump, Locator Pins & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Align the locator pins (2) to the engine block and install the oil pump (3) with four bolts (1).

Tighten the bolts to 12 N.m (106 in. lbs.).

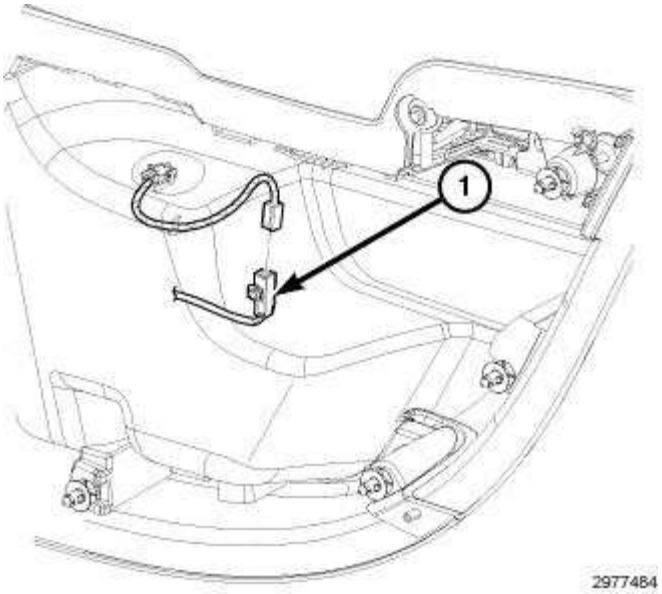


Fig. 672: Retaining Pin, Oil Pump Chain Tensioner Spring & Dowel Pin
Courtesy of CHRYSLER GROUP, LLC

2. Install the oil pump chain tensioner on the oil pump.
3. Position the oil pump chain tensioner spring (1) above the dowel pin (2).
4. Push back the oil pump chain tensioner and insert a suitable retaining pin (3) such as a 3 mm Allen wrench.

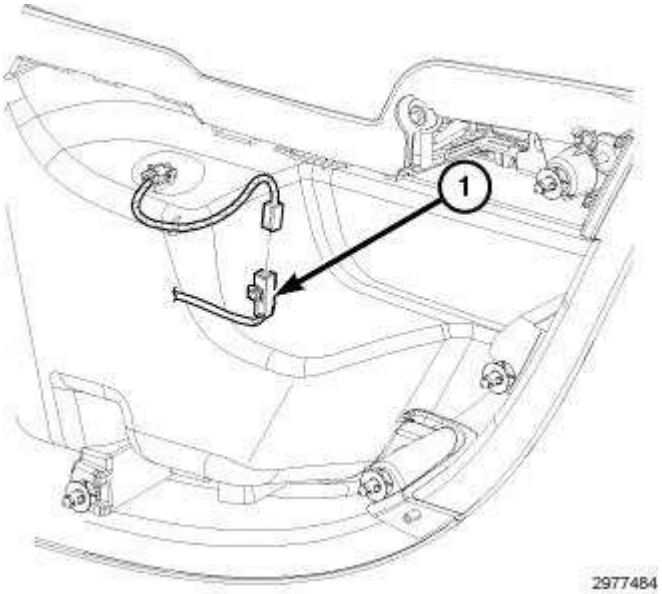


Fig. 673: Retaining Pin, Retaining Bolt, Oil Pump Chain & Sprocket
Courtesy of CHRYSLER GROUP, LLC

NOTE: **There are no timing marks on the oil pump gear or chain. Timing of the oil pump is not required.**

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

5. Place the oil pump sprocket (4) into the oil pump chain (3). Align the oil pump sprocket with the oil pump shaft and install the sprocket. Install the T45 retaining bolt (2) and tighten to 25 N.m (18 ft. lbs.).
6. Remove the retaining pin (1). Verify that the oil pump chain is centered on the tensioner and crankshaft sprocket.
7. Rotate the crankshaft CW one complete revolution to verify proper oil pump chain installation.

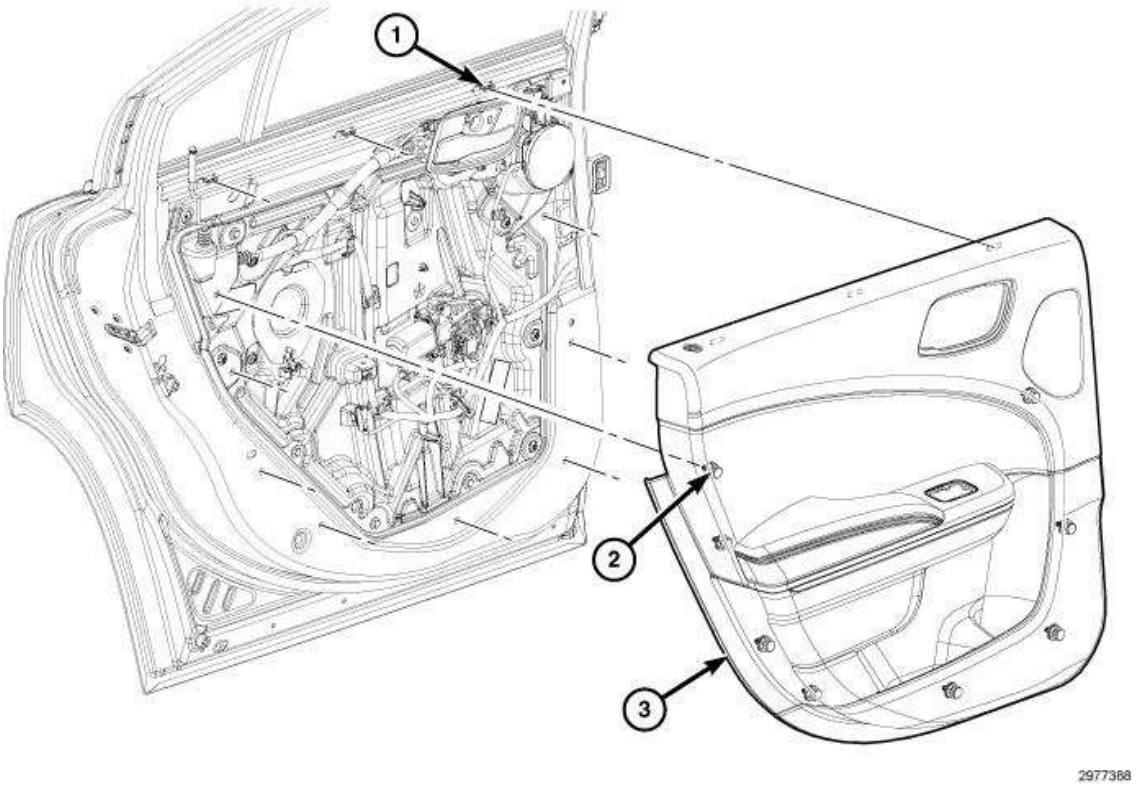


Fig. 674: Oil Pump Solenoid Electrical Connector & Primary Chain Tensioner Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Graphic shows the engine timing cover removed for clarity.

8. Position the oil pump solenoid electrical connector (2) into the engine block. Rotate the connector so that it can be pushed past the primary chain tensioner mounting bolt (1). Then rotate the connector slightly CCW and push it into the engine block until it locks in place.

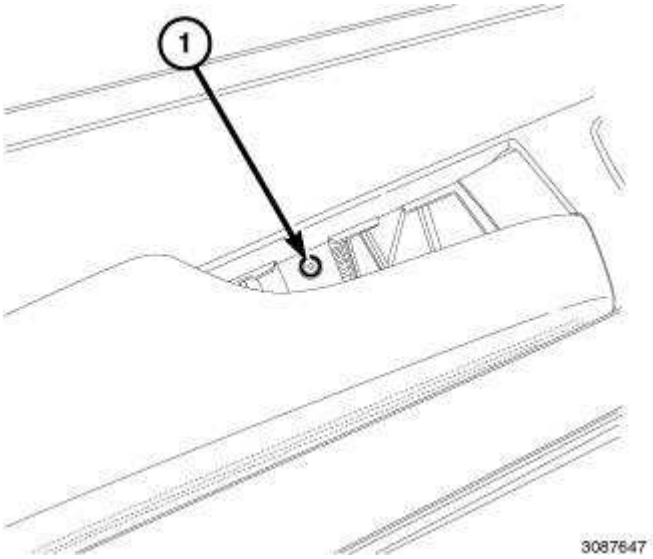


Fig. 675: Timing Gear Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the timing gear splash shield (1). Tighten bolts (2) to 5 N.m (35 in. lbs.).

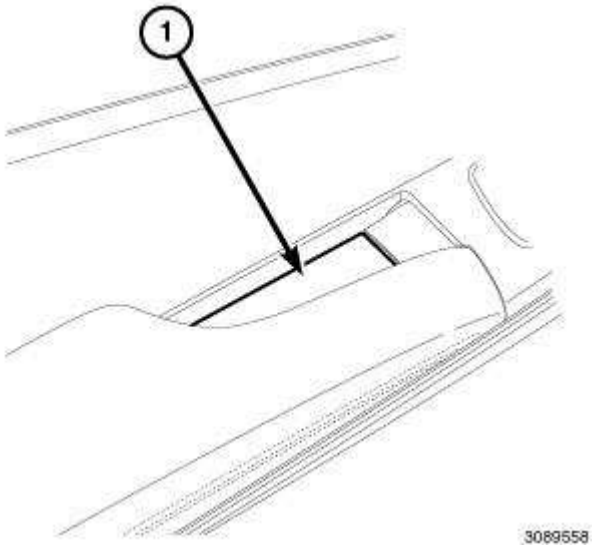


Fig. 676: Oil Pump Solenoid Electrical Connector Retention Lock Tab
Courtesy of CHRYSLER GROUP, LLC

10. Verify that the oil pump solenoid electrical connector retention lock tab (1) is engaged to the engine block.

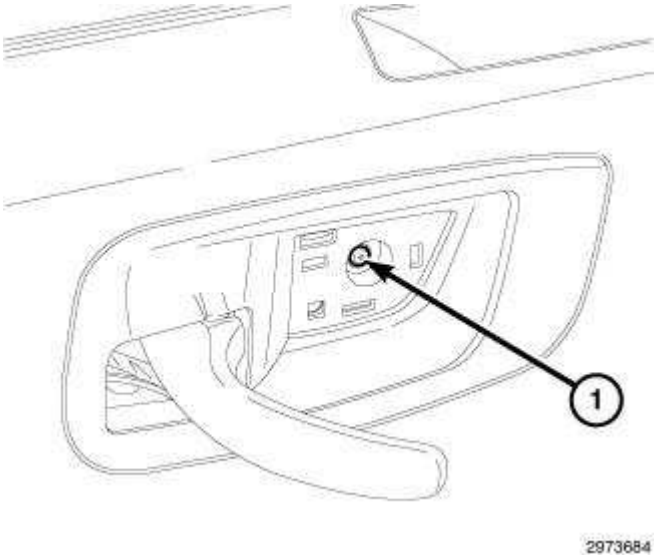


Fig. 677: Oil Pump Solenoid Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

11. Connect the engine wire harness to the oil pump solenoid electrical connector (1).

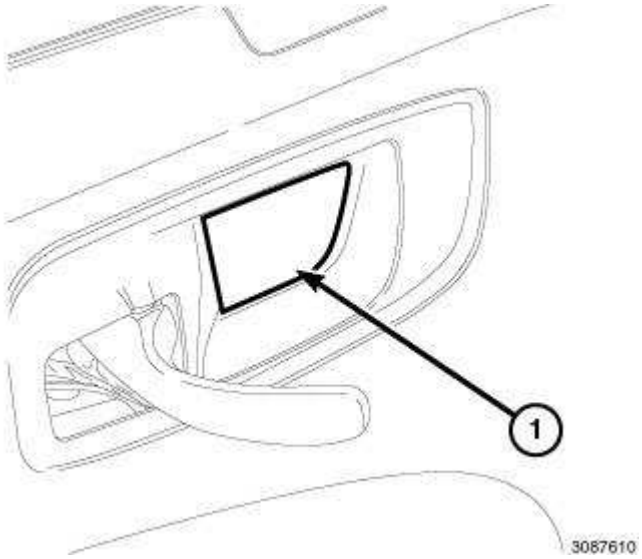


Fig. 678: Oil Pump Pick-Up Tube & Support Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the oil pump pick-up (1). Refer to **PICK-UP, OIL PUMP, INSTALLATION**.
13. Install the oil pan. Refer to **PAN, OIL, INSTALLATION**.
14. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
15. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

CAUTION: A MIL or low oil pressure indicator that remains illuminated for more

than 2 seconds may indicate low or no engine oil pressure. Stop the engine and investigate the cause of the indication.

16. Start and run the engine until it reaches normal operating temperature.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

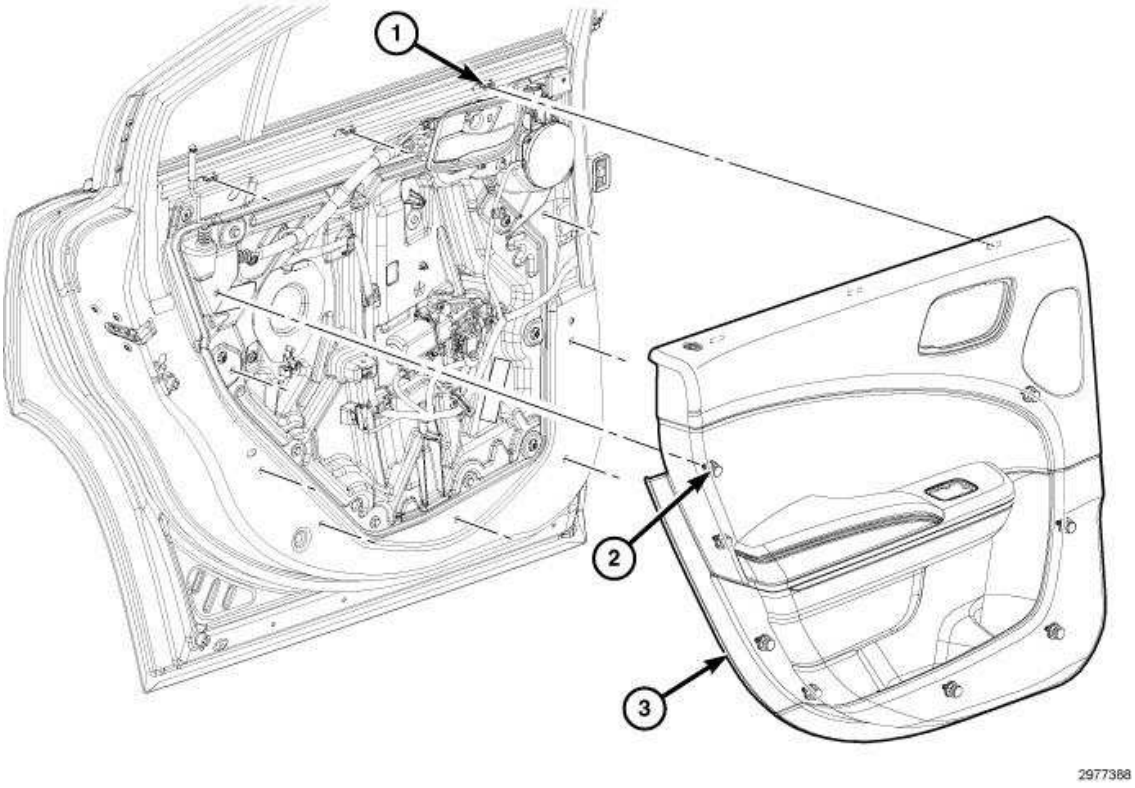


Fig. 679: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

The oil pressure sensor (2) is located on the oil filter housing (3). The oil pressure sensor is a three wire sensor with a tapered threaded sensor port. The sensor port is mounted to the oil filter housing through an access hole. A thread lock patch seals the oil pressure sensor to the oil filter housing.

OPERATION

OPERATION

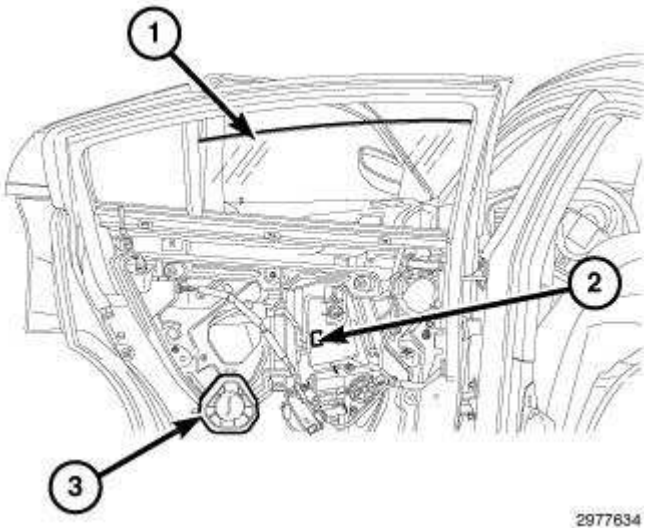


Fig. 680: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

The oil pressure sensor is a silicon based sensing unit that measures the pressure of the engine oil. The Powertrain Control Module (PCM) supplies a 5 volt reference and a ground to the sensor. The input to the PCM occurs on the signal return circuit. The oil pressure sensor is a linear sensor; as pressure changes, voltage changes proportionately and returns a voltage signal to the PCM that reflects oil pressure. The zero pressure reading is 0.5 volt and full scale is 4.5 volt.

REMOVAL

REMOVAL

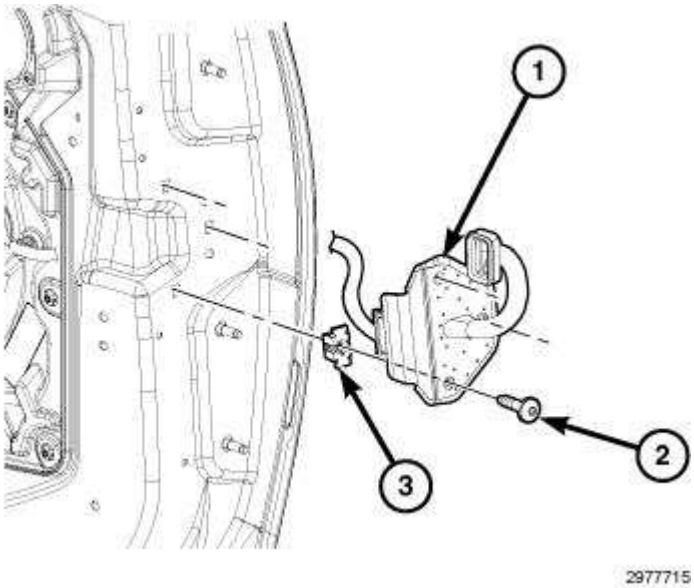


Fig. 681: Lower Intake Manifold & Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Release fuel system pressure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the air inlet hose, upper intake manifold and lower intake manifold with the fuel injectors and fuel rail (2). Refer to **MANIFOLD, INTAKE, REMOVAL**.

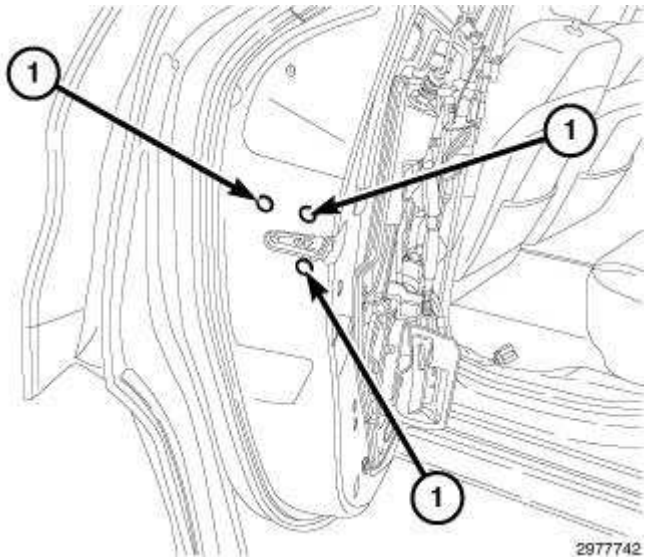


Fig. 682: Oil Temperature Sensor Electrical Connector, Oil Pressure Sensor Electrical Connector, Oil Filter Housing, Heater Hose & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the oil pressure sensor electrical connector (4).

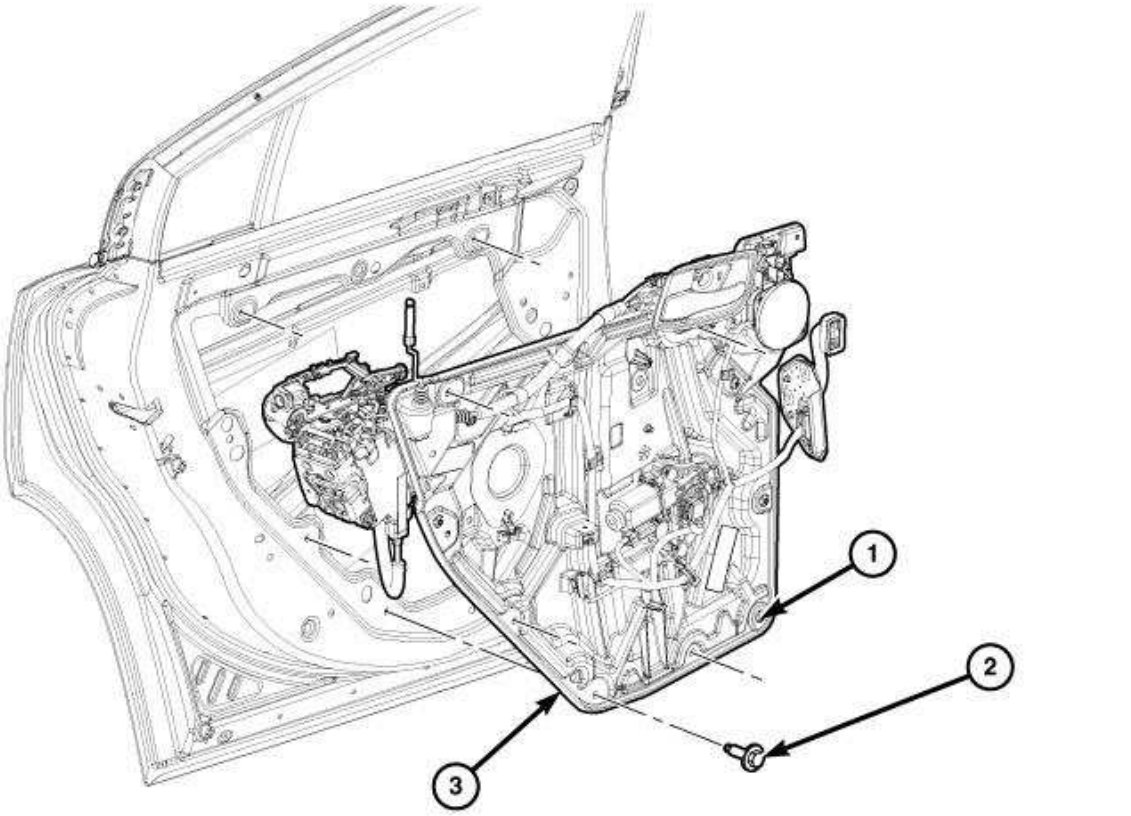


Fig. 683: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

5. Remove the oil pressure sensor (2) from the oil filter housing (3).

INSTALLATION

INSTALLATION

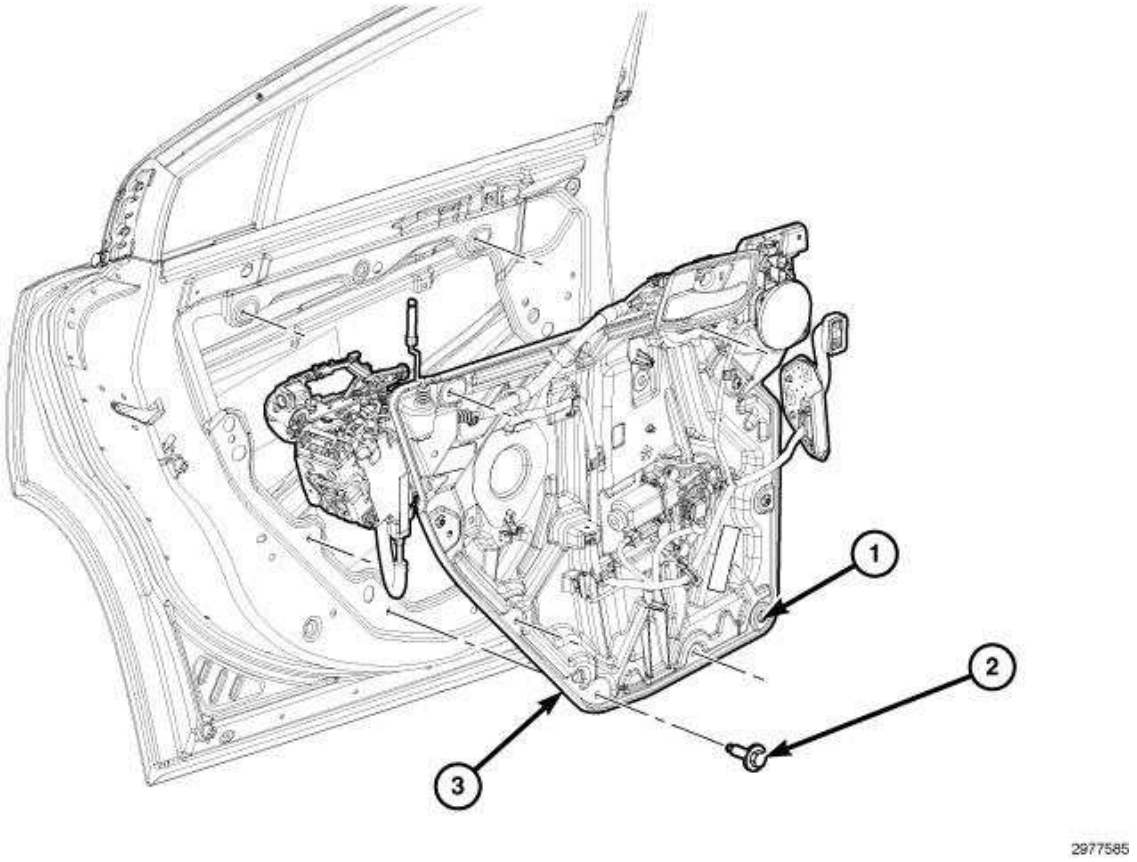


Fig. 684: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

1. Install the oil pressure sensor (2) and tighten to 20 N.m (177 in. lbs.).

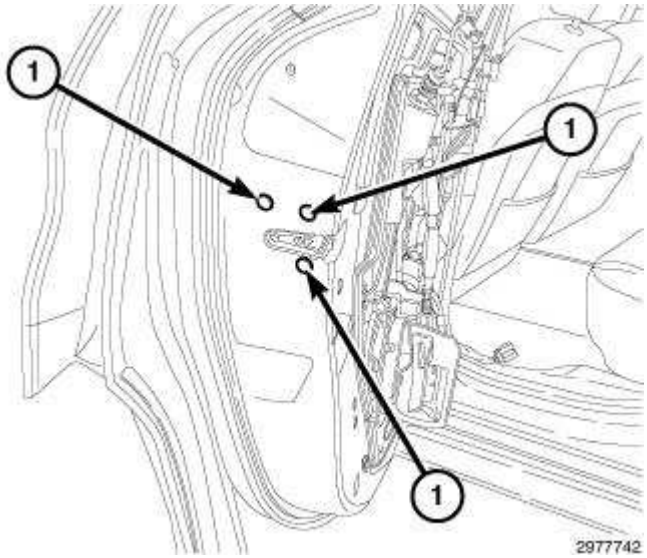


Fig. 685: Heater Hose, Electrical Connectors, Oil Filter Housing & Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil pressure sensor electrical connector (3).
3. Install the upper and lower intake manifolds and air cleaner housing assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

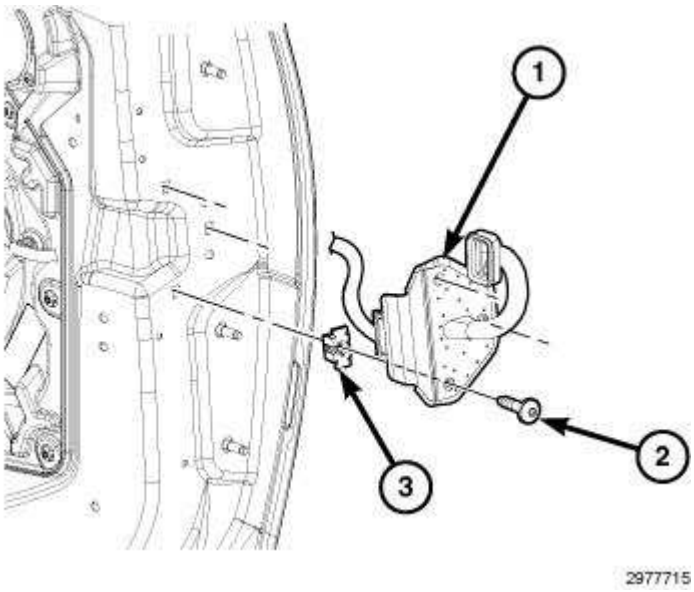


Fig. 686: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

The oil temperature sensor (1) is located on the oil filter housing (3). The oil temperature sensor is a two wire sensor with a tapered threaded sensor probe. The sensor probe is mounted to the oil filter housing through an access hole. A thread lock patch seals the oil temperature sensor to the oil filter housing.

OPERATION

OPERATION

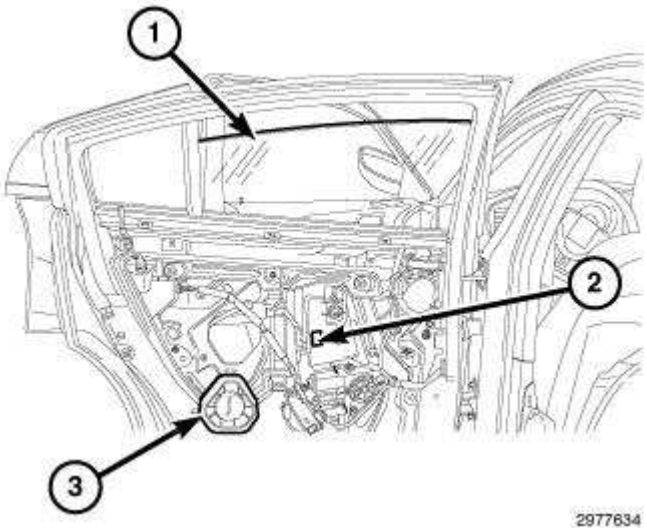


Fig. 687: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

The oil temperature sensor is a variable resistor that measures the temperature of the engine oil. The Powertrain Control Module (PCM) supplies a 5 volt reference and a ground to the sensors low reference signal circuit. When the oil temperature is low, the sensor resistance is high. When the oil temperature is high, the sensor resistance is low.

REMOVAL

REMOVAL

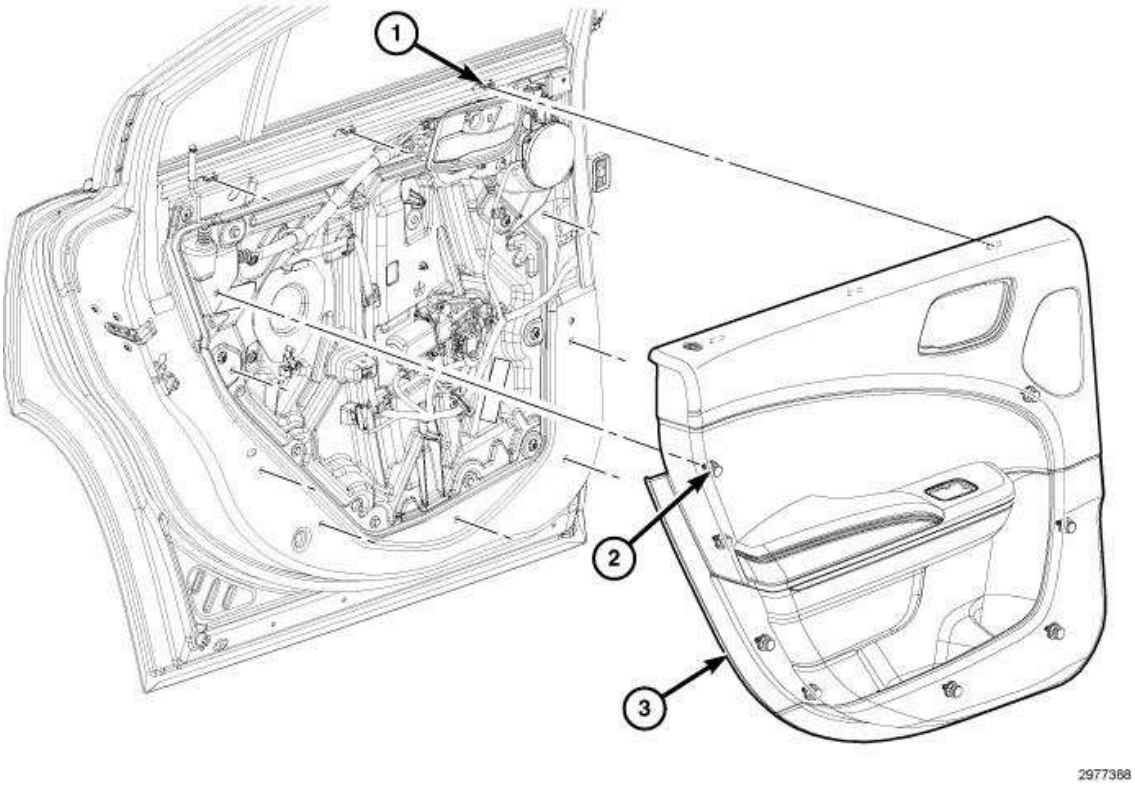


Fig. 688: Lower Intake Manifold & Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Release fuel system pressure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the air inlet hose, upper intake manifold and lower intake manifold with the fuel injectors and fuel rail (2). Refer to **MANIFOLD, INTAKE, REMOVAL**.

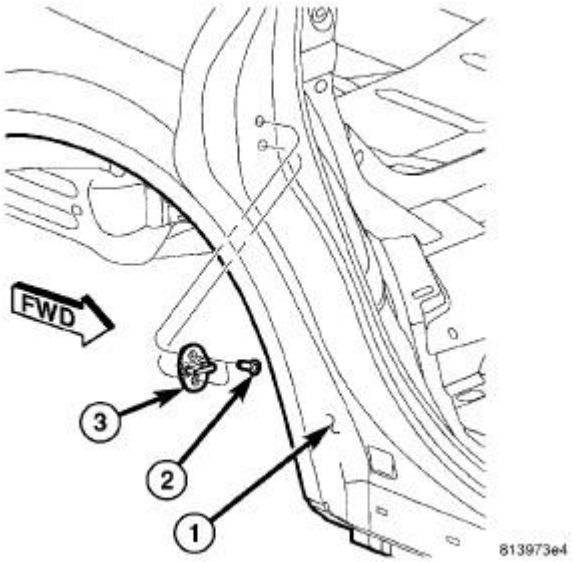


Fig. 689: Oil Temperature Sensor Electrical Connector, Oil Pressure Sensor Electrical Connector, Oil Filter Housing, Heater Hose & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the oil temperature sensor electrical connector (5).

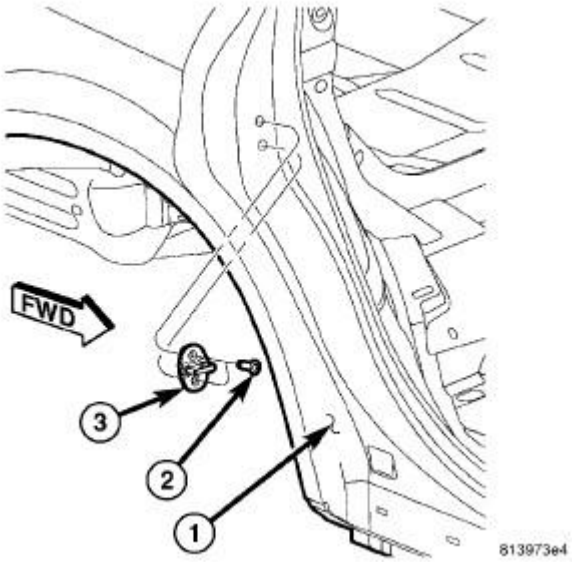


Fig. 690: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

5. Remove the oil temperature sensor (1) from the oil filter housing (3).

INSTALLATION

INSTALLATION

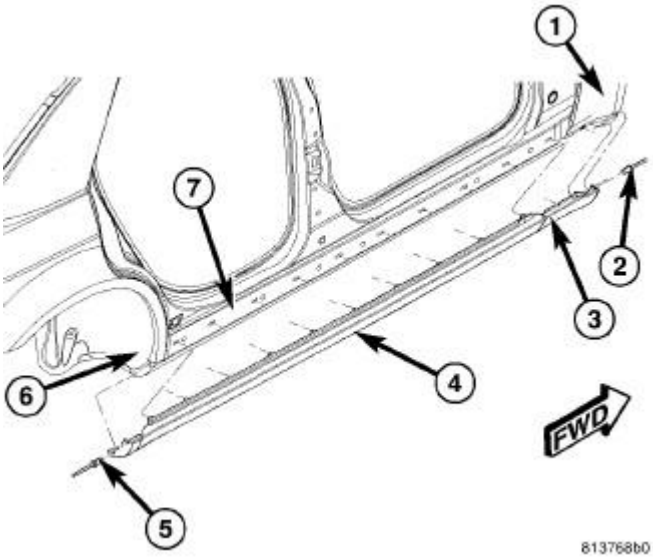


Fig. 691: Oil Temperature Sensor, Oil Pressure Sensor & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

Install the oil temperature sensor (1) and tighten to 20 N.m (177 in. lbs.).

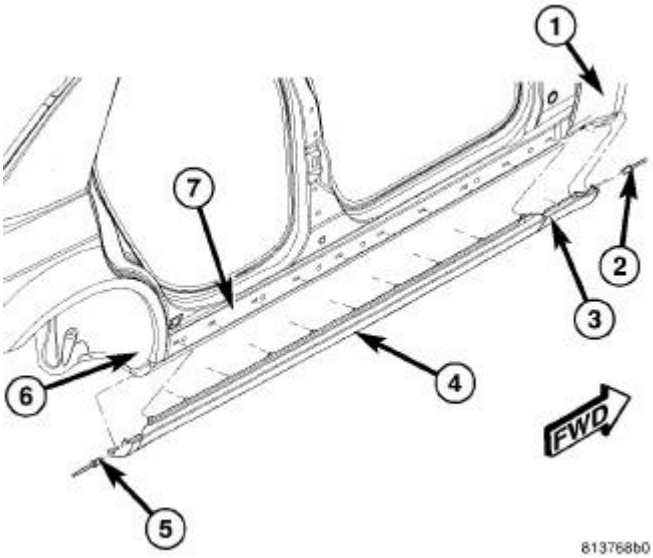


Fig. 692: Heater Hose, Electrical Connectors, Oil Filter Housing & Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Connect the oil temperature sensor electrical connector (4).
2. Install the upper and lower intake manifolds and air cleaner housing assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
3. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

MANIFOLDS

MANIFOLD, EXHAUST

DESCRIPTION

DESCRIPTION

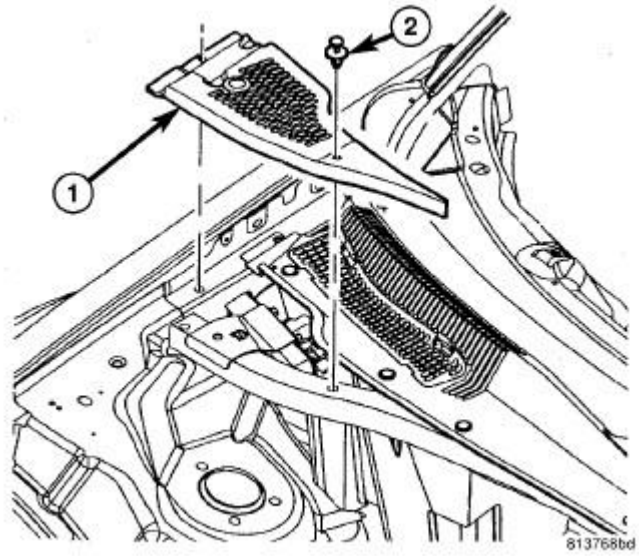


Fig. 693: Aluminum Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

The 3.6L aluminum cylinder heads are a unique design with left and right castings. The exhaust manifolds are integrated into the cylinder heads. If any damaged is found to the exhaust manifold portion, the cylinder head must be removed for repair or replacement. Refer to **CYLINDER HEAD, REMOVAL**.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

UPPER INTAKE MANIFOLD

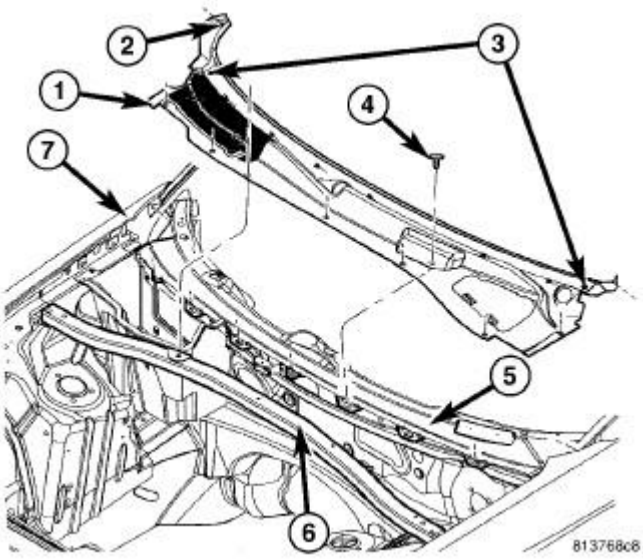


Fig. 694: Upper Intake Manifold Design
Courtesy of CHRYSLER GROUP, LLC

The upper intake manifold is an injection molded nylon composite design. The upper intake manifold is sealed to the lower intake manifold using six individual press-in-place port silicone gaskets. Replace the gaskets whenever the upper intake manifold is removed from the engine. There is a silencer pad positioned between the upper and lower intake manifolds for improved noise, vibration and harshness (NVH). The left cylinder head cover has two alignment posts to aid proper installation of the silencer pad. The seven upper intake manifold fasteners thread directly into the composite lower intake manifold and are a self-taping design. If the upper intake manifold is damaged or cracked, it must be replaced.

The Electronic Throttle Control (ETC) and Manifold Air Pressure (MAP) sensor are attached directly to the upper intake manifold. The upper intake manifold also provides vacuum ports for brake booster, positive crankcase ventilation (PCV) and emissions control.

LOWER INTAKE MANIFOLD

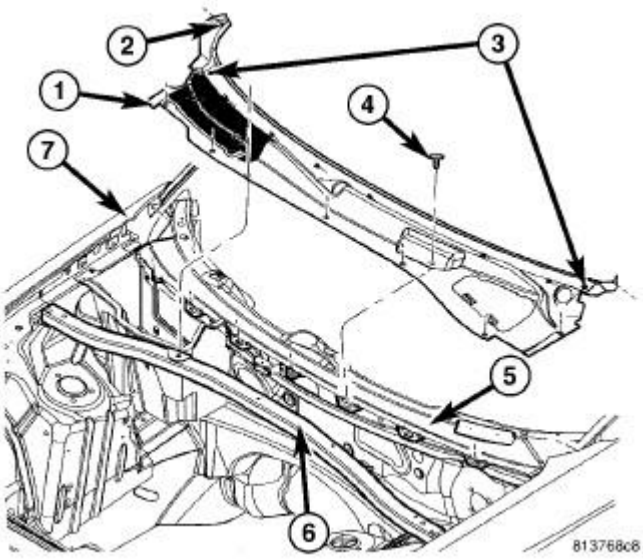


Fig. 695: Lower Intake Manifold Design
Courtesy of CHRYSLER GROUP, LLC

The lower intake manifold is an injection molded nylon composite design. The lower intake manifold is sealed to the cylinder heads using six individual press-in-place port silicone gaskets. Replace the gaskets whenever the lower intake manifold is removed from the engine. The seven upper intake manifold fasteners thread directly into the composite lower intake manifold and are a self-taping design.

The fuel injection fuel rail is also a composite design. The four fuel rail fasteners thread directly into the composite lower intake manifold and are a self-taping design. The lower intake manifold can be serviced without removing the fuel injector rail. The fuel rail and fuel injectors must be installed into the lower intake manifold as an assembly. Do not attempt to install the fuel rail when the injectors are in the manifold. Always install new O-rings on the fuel injectors.

If the lower intake manifold is damaged or cracked, it must be replaced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKS

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

> **WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing.**

1. Start the engine.
2. Spray a small stream of water (spray bottle) at the suspected leak area.

3. If engine RPM'S change, the area of the suspected leak has been found.
4. Repair as required.

REMOVAL

UPPER

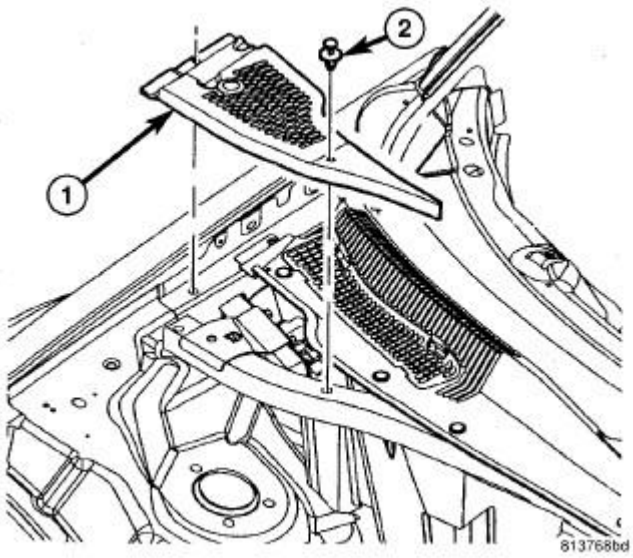


Fig. 696: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

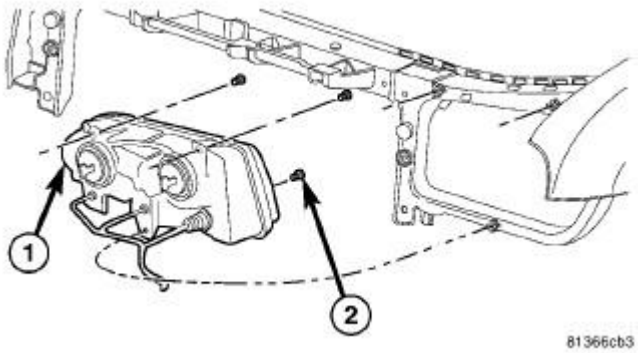


Fig. 697: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

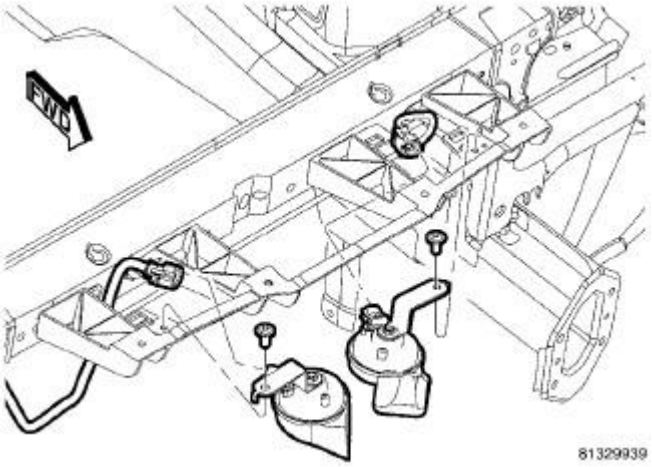


Fig. 698: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

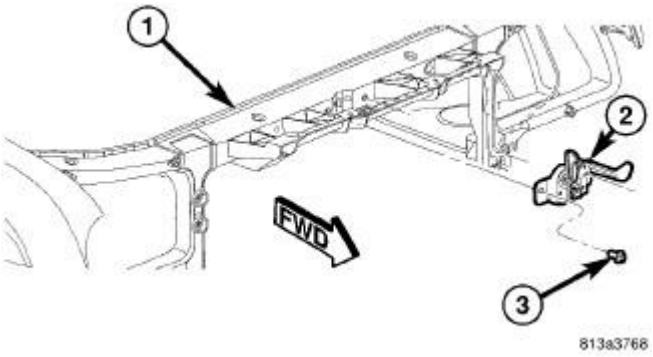


Fig. 699: Brake Booster Hose Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Disengage the brake booster hose retainer (1) from the upper intake manifold.

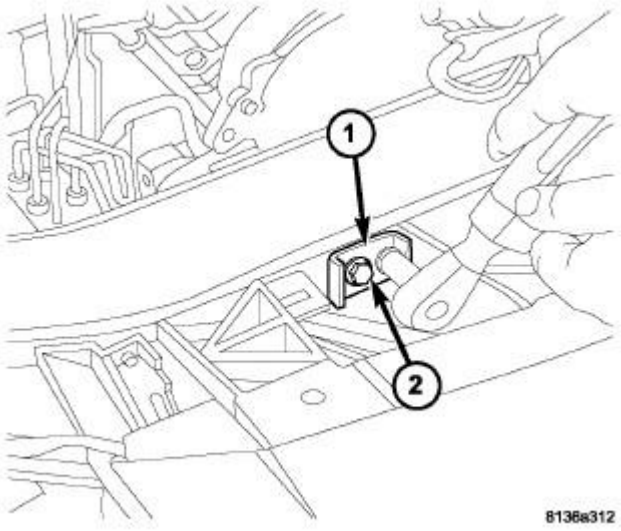


Fig. 700: MAP Sensor, ETC, PCV Hose, Brake Booster Vacuum Hose, EVAP Vapor Purge Line, Clip & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the electrical connectors from the Manifold Absolute Pressure (MAP) sensor (2) and the Electronic Throttle Control (ETC) (4).
10. Disengage the ETC harness from the clip (5) on the throttle body and unfasten the wire harness retainer (1) from the upper intake manifold near the MAP sensor and reposition the wire harness.
11. Disconnect the following hoses from the upper intake manifold:
    - Positive Crankcase Ventilation (PCV) (7)
    - Brake booster vacuum hose (6)
    - EVAP vapor purge line (3)

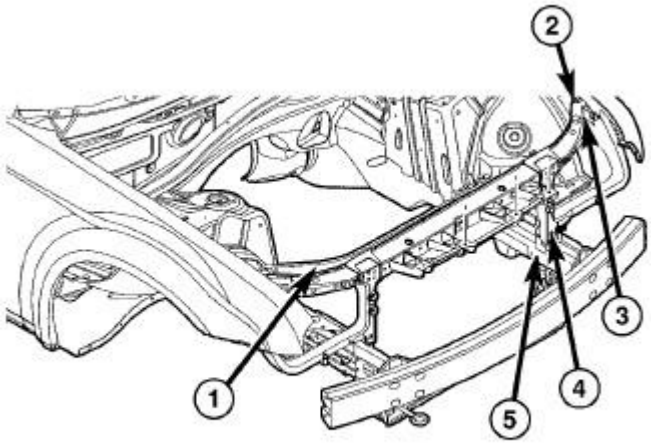


Fig. 701: Upper Intake Manifold Support Bracket, Stud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

12. Unfasten the wire harness retainer (4) from the upper intake manifold support bracket (2) stud retainer (3).
13. Remove the two nuts (1), loosen the stud (3) and reposition the upper intake manifold support bracket (2).

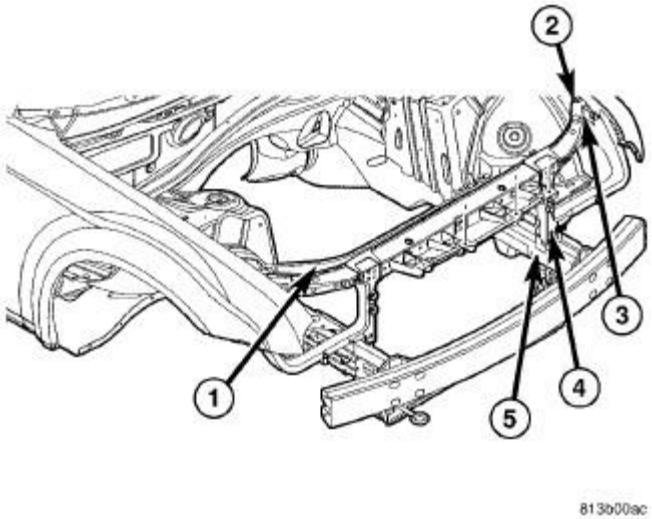


Fig. 702: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

14. Remove the heater core return tube upper support bracket retaining nut (2) and reposition tube (1).

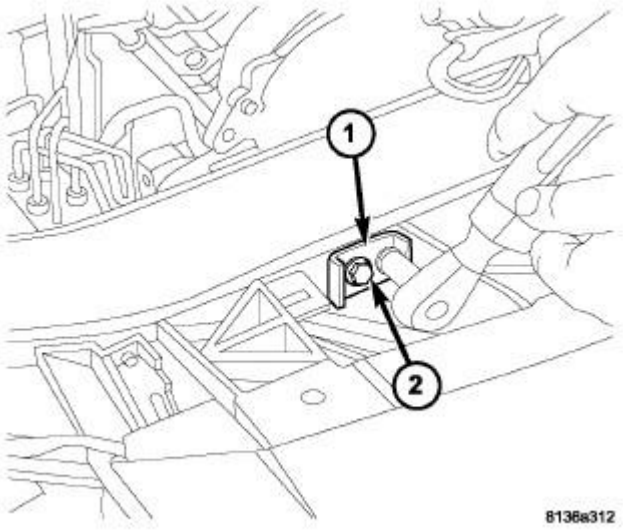


Fig. 703: Nuts, Stud Retainers & Upper Intake Manifold Support Brackets
Courtesy of CHRYSLER GROUP, LLC

15. Remove the two nuts (1), loosen two stud retainers (3) and reposition the two upper intake manifold support brackets (2).

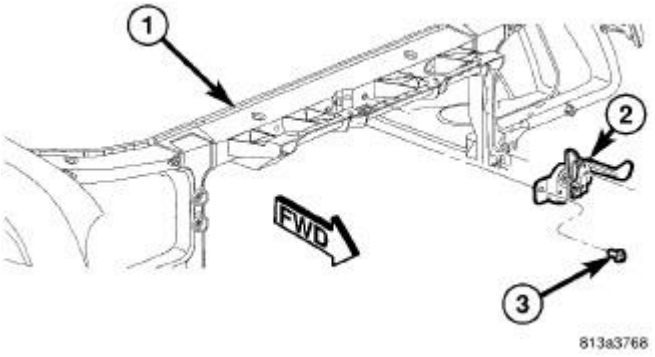


Fig. 704: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The upper intake manifold attaching bolts are captured in the upper intake manifold. Once loosened, the bolts will have to be lifted out of the lower intake manifold and held while removing the upper intake manifold.

NOTE: Exercise care not to inadvertently loosen the two fuel rail attachment bolts that are in close proximity of the upper intake manifold attaching bolts.

16. Remove the seven manifold attaching bolts (1) and remove the upper intake manifold (2).

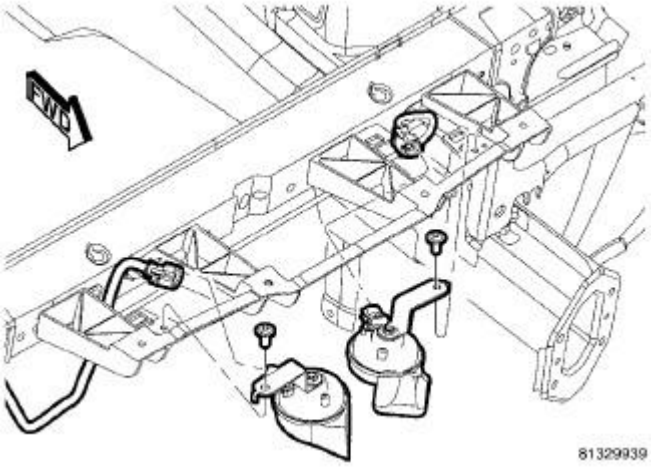


Fig. 705: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

17. Remove and discard the six upper to lower intake manifold seals (1).
18. Cover the open intake ports to prevent debris from entering the engine.
19. If required, remove the insulator (2) from the left cylinder head cover.

LOWER

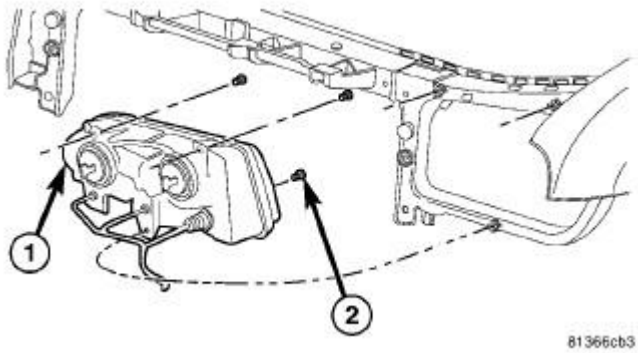


Fig. 706: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable (1).

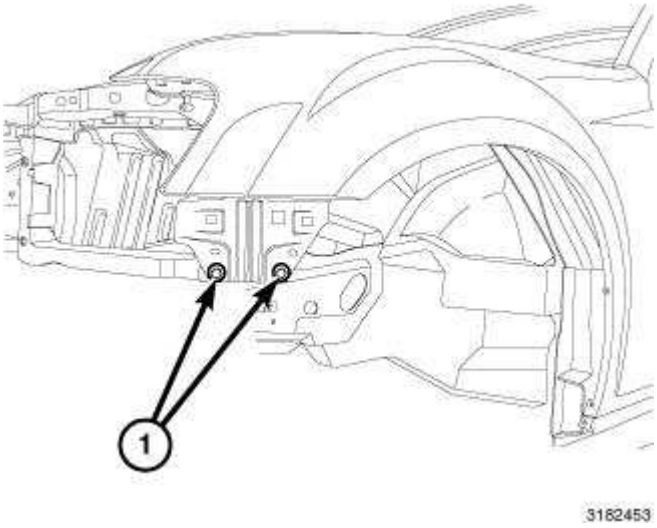


Fig. 707: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

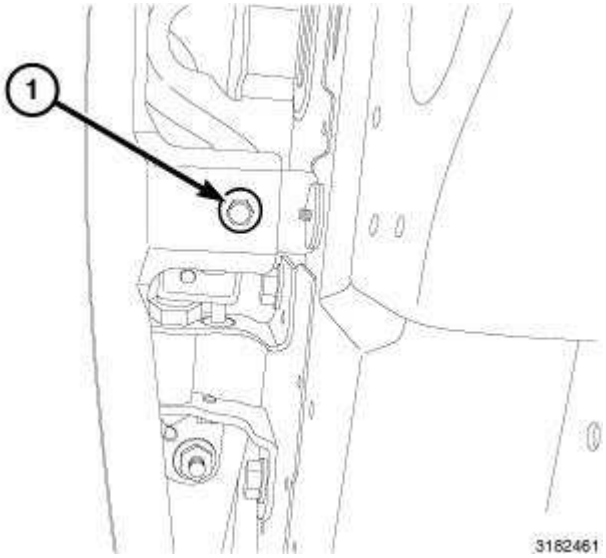


Fig. 708: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
5. Loosen the clamp (2) at the throttle body.
6. Loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
8. Remove the air inlet hose assembly (5).

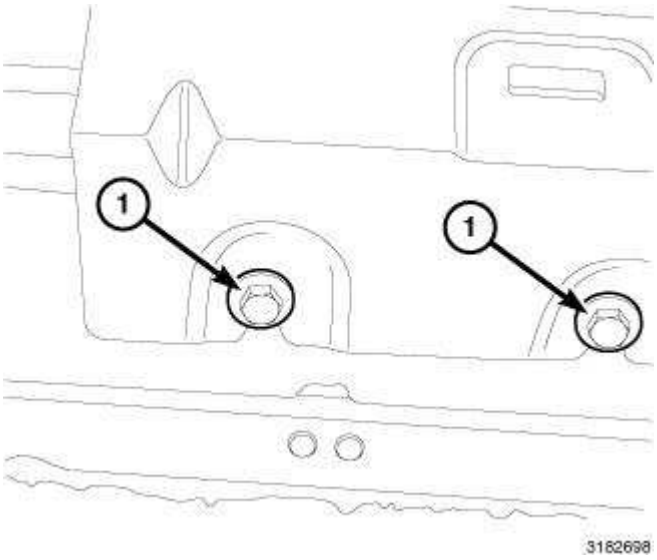


Fig. 709: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

9. Remove the upper intake manifold (2) and support brackets. Refer to **MANIFOLD, INTAKE, REMOVAL**.

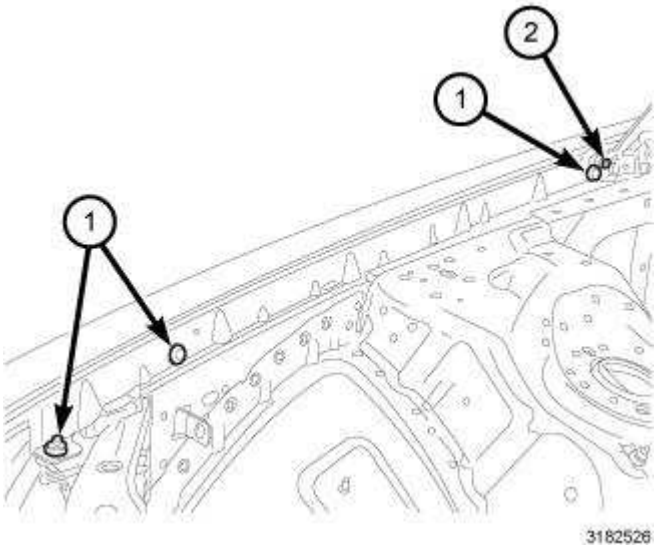


Fig. 710: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the insulator (2) from the left cylinder head cover.

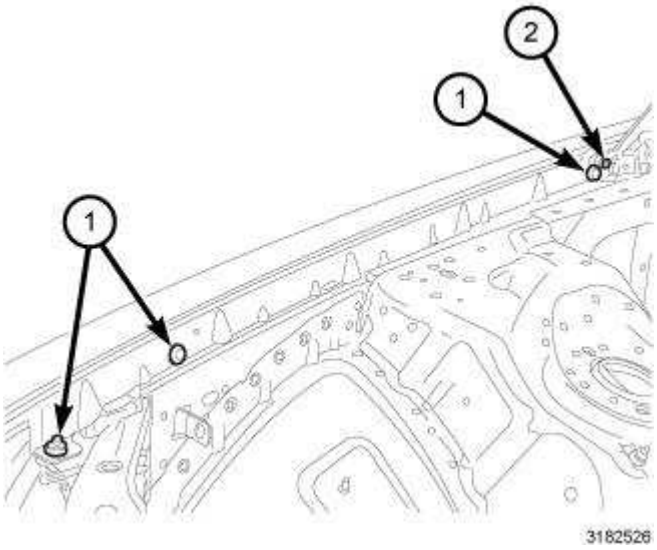


Fig. 711: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the fuel supply hose (1) from the fuel rail. Refer to **FITTING, QUICK CONNECT** .
12. Disconnect the fuel injector electrical connectors (2).

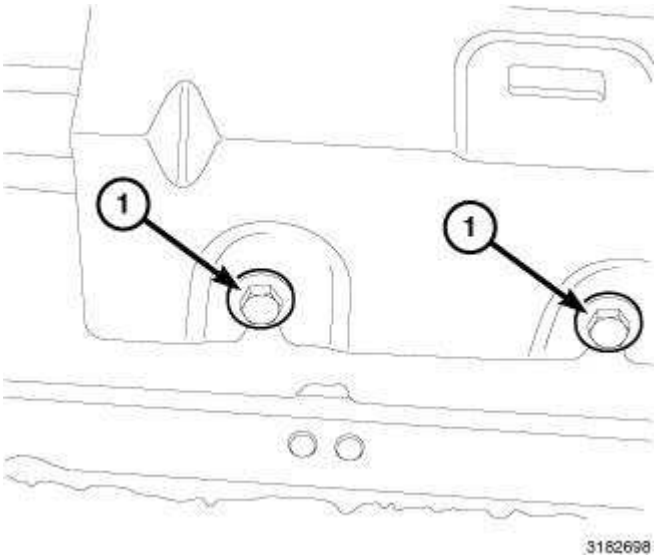


Fig. 712: Injection/Ignition Harness Retainer & Main Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

13. Unfasten the injection/ignition harness retainer (1) from the rear of the lower intake manifold.
14. Disengage the main wire harness retainer (2) form the rear of the lower intake manifold.

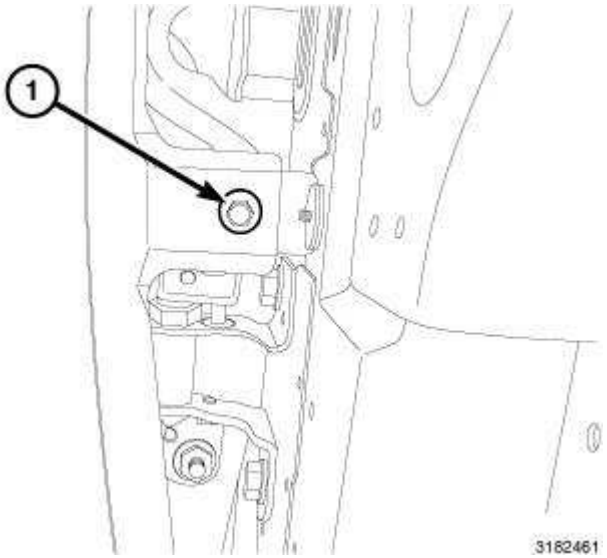


Fig. 713: Lower Intake Manifold & Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove the eight lower intake manifold attaching bolts (1).
16. Remove the lower intake manifold (2) with the fuel injectors and fuel rail as an assembly.

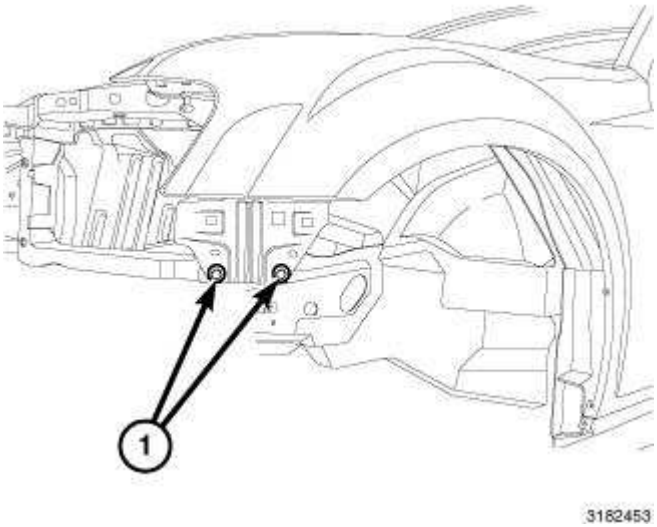


Fig. 714: Lower Intake Manifold To Cylinder Head Seals
Courtesy of CHRYSLER GROUP, LLC

17. Remove and discard the six lower intake manifold to cylinder head seals (1).

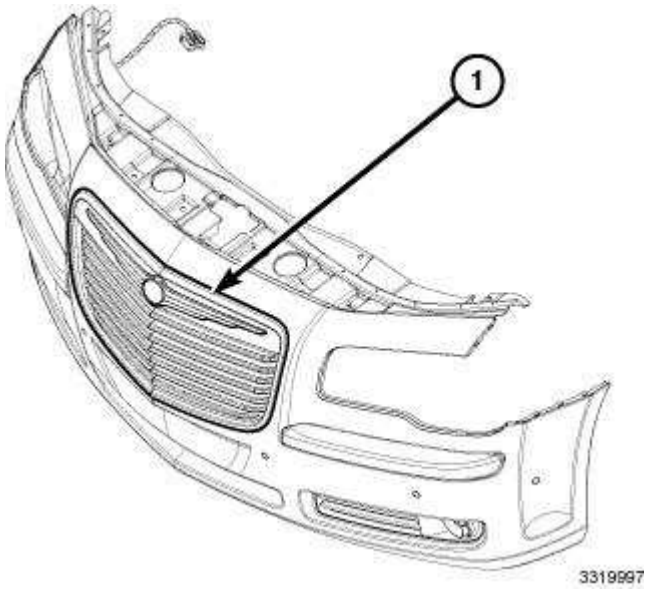


Fig. 715: Fuel Rail & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

18. If required, remove the fuel rail (2) and fuel injectors from the lower intake manifold. Refer to **RAIL, FUEL, REMOVAL** .

INSPECTION

INSPECTION

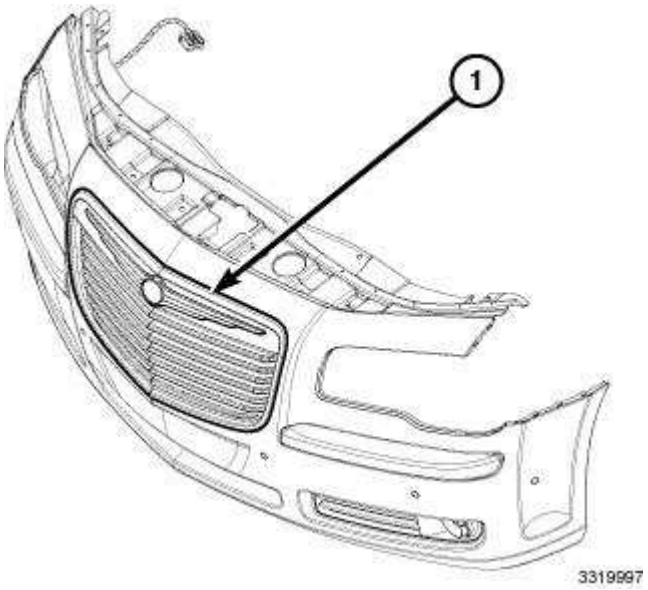


Fig. 716: Non-Repairable Damage To Lower Intake Manifold Due To Cross Threading Of An Upper Intake Manifold Attaching Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When the upper intake manifold (3) and lower intake manifold (1) are not aligned properly, cross threading of the upper intake manifold attaching bolts can occur. The graphic shows non-repairable damage to the lower intake manifold (1) due to cross threading of an upper intake manifold attaching bolt (2).**

Check both the upper and lower intake manifolds for:

- Damage and cracks
- Gasket surface damage or warping

Check the lower intake manifold for:

- Damaged fuel injector ports

If either the upper or lower manifold exhibits any damaged or warped conditions, replace the manifold.

INSTALLATION

UPPER

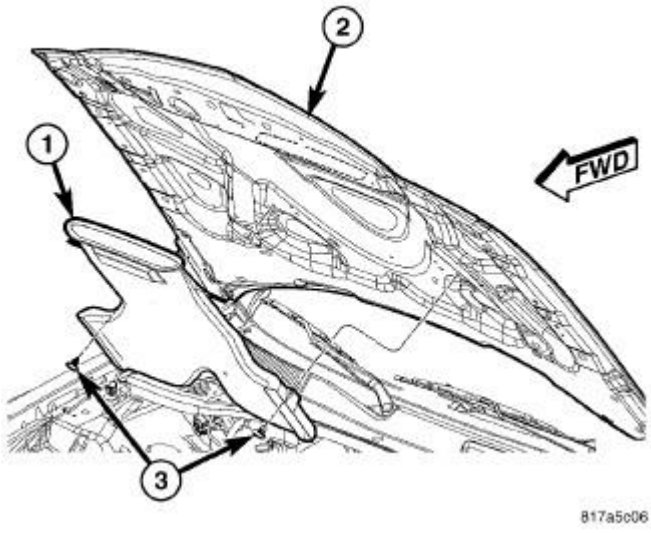


Fig. 717: Fuel Rail Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Prior to installing the upper intake manifold, verify that the four fuel rail bolts were not inadvertently loosened. The bolts must tightened in the sequence shown in illustration, to 7 N.m (62 in. lbs.). Refer to RAIL, FUEL, INSTALLATION .**

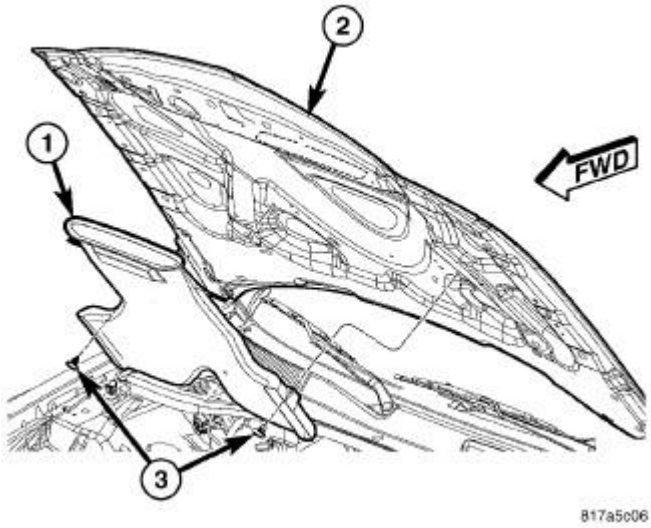


Fig. 718: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the sealing surfaces. Install new upper to lower intake manifold seals (1).

   NOTE: Make sure the fuel injectors and wiring harnesses are in the correct position so that they don't interfere with the upper intake manifold installation.

2. If removed, position the insulator (2) onto the two alignment posts (3) on top of the left cylinder head cover.

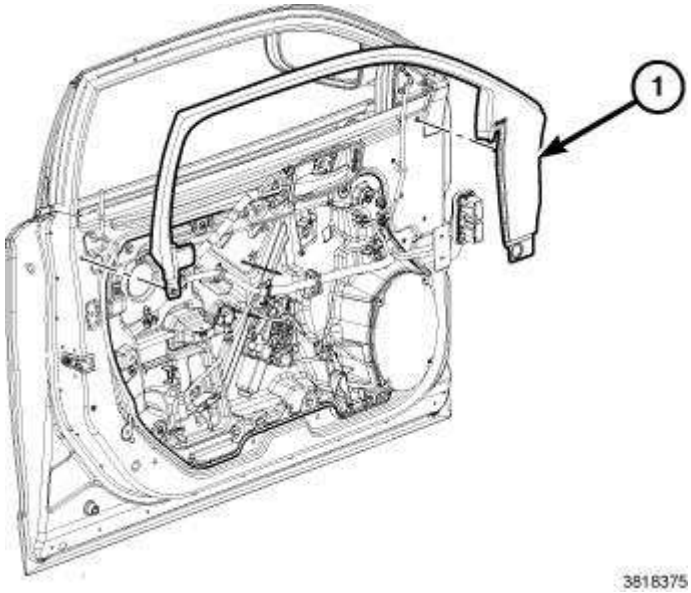


Fig. 719: Upper Intake Attaching Bolts, Locating Posts & Holes
Courtesy of CHRYSLER GROUP, LLC

3. Lift and hold the seven upper intake attaching bolts (1) clear of the mating surface. Back the bolts out slightly or if required, use an elastic band to hold the bolts clear of the mating surface.
4. Position the upper intake manifold (1) onto the lower intake manifold so that the two locating posts (2) on the upper intake manifold align with corresponding holes (3) in the lower intake manifold.

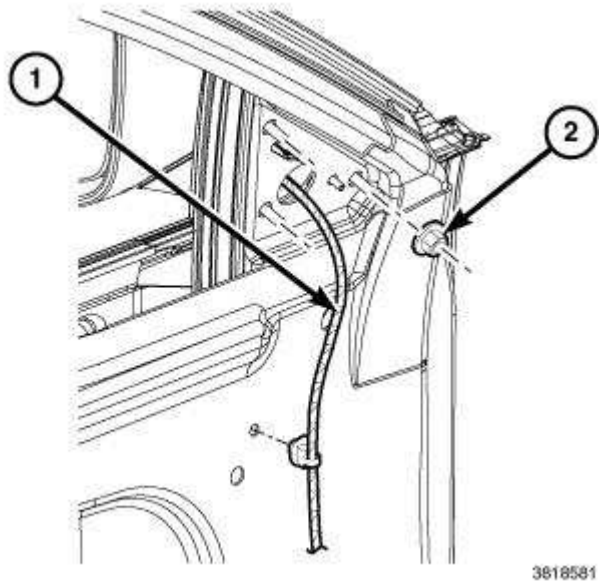


Fig. 720: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Install the seven upper intake manifold attaching bolts. Tighten the bolts in the sequence shown in illustration, to 8 N.m (71 in. lbs.).

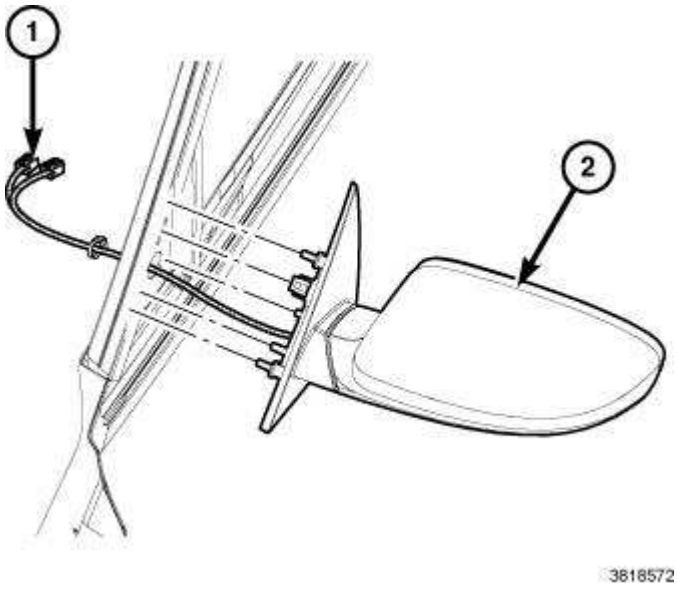


Fig. 721: Upper Intake Manifold Support Bracket, Stud & Fasteners

Courtesy of CHRYSLER GROUP, LLC

6. Install two nuts (1) to the upper intake manifold support bracket (2). Tighten the nuts (1) to 10 N.m (89 in. lbs.) and tighten the stud (3) to 20 N.m (15 ft. lbs.)
7. Engage the wire harness retainer (4) to the stud (3).

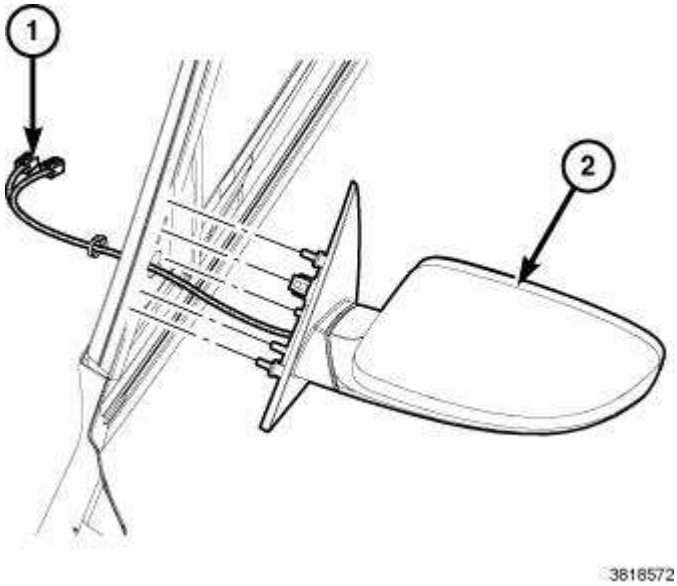


Fig. 722: Nuts, Stud Retainers & Upper Intake Manifold Support Brackets
Courtesy of CHRYSLER GROUP, LLC

8. Install the two upper intake manifold support brackets (2) with two stud retainers (3) and two nuts (1). Tighten the stud retainers (3) to 20 N.m (15 ft. lbs.) and tighten the nuts (1) to 10 N.m (89 in. lbs.).

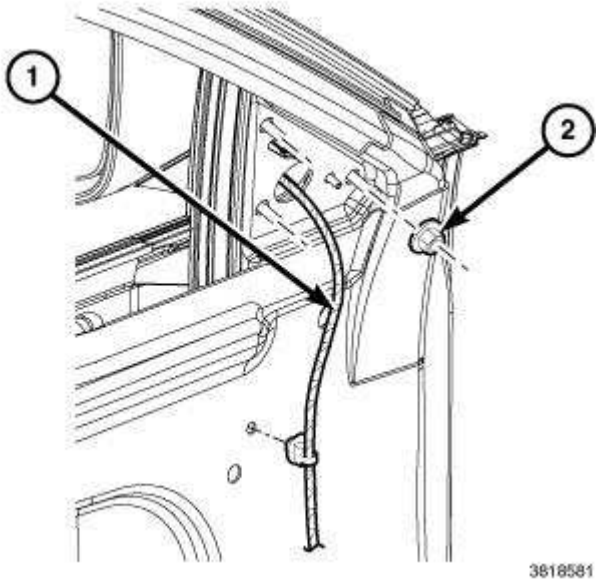


Fig. 723: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

9. Position the heater core return tube (1), install the retaining nut (2) and tighten to 12 N.m (9 ft. lbs.).

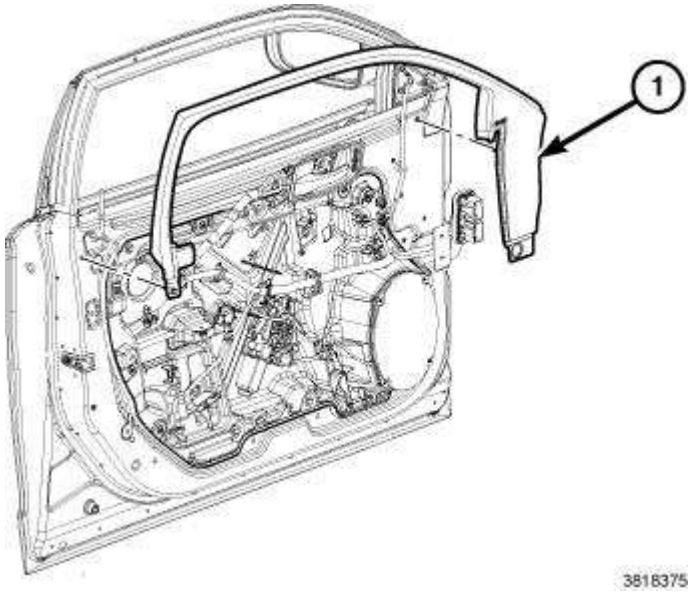


Fig. 724: MAP Sensor, ETC, PCV Hose, Brake Booster Vacuum Hose, EVAP Vapor Purge Line, Clip & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

10. Connect the following hoses to the upper intake manifold:
    - Positive Crankcase Ventilation (PCV) (7)
    - Brake booster vacuum hose (6)
    - EVAP vapor purge line (3)
11. Connect the electrical connectors to the Manifold Absolute Pressure (MAP) sensor (2) and the Electronic Throttle Control (ETC) (4).
12. Secure the ETC harness to the clip (5) on the throttle body and fasten the wire harness retainer (1) to the upper intake manifold near the MAP sensor.

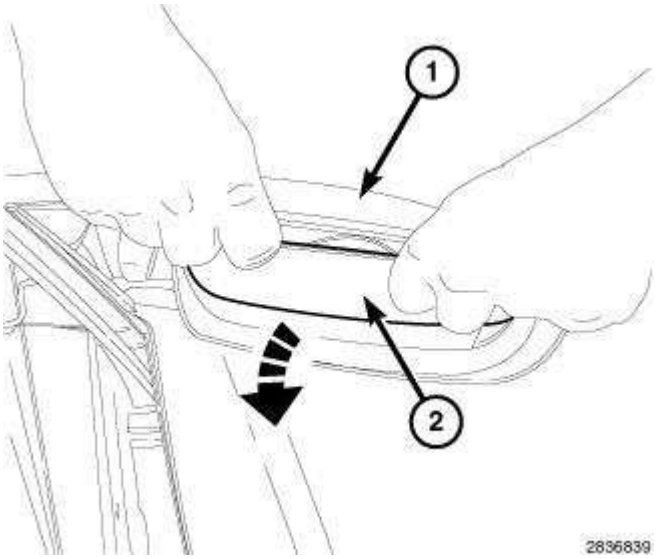


Fig. 725: Brake Booster Hose Retainer
Courtesy of CHRYSLER GROUP, LLC

13. Fasten the brake booster vacuum hose retainer (1) to the upper intake manifold.

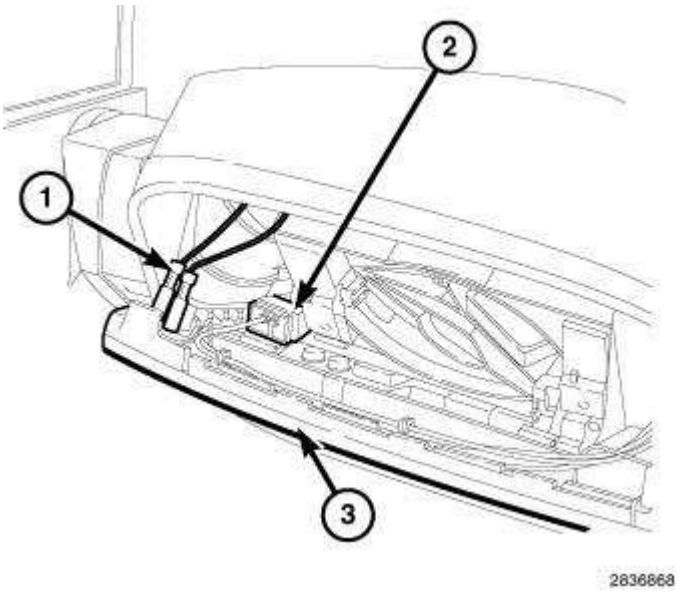


Fig. 726: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

14. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
15. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
16. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
17. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
18. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

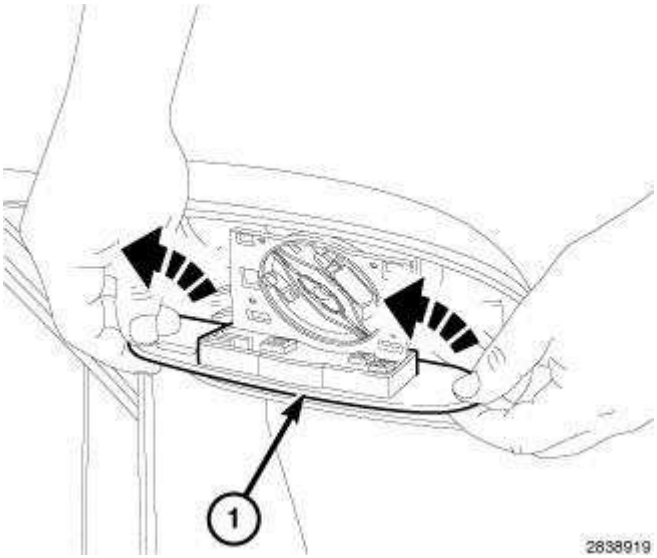


Fig. 727: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

19. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

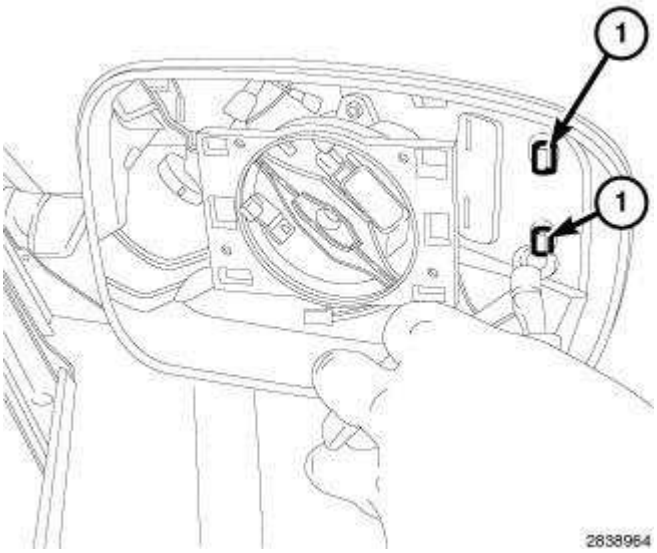


Fig. 728: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

20. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
21. Start the engine and check for leaks.

LOWER

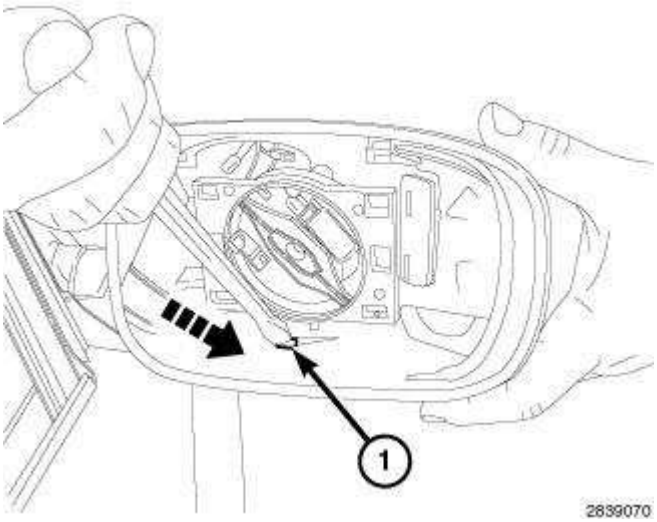


Fig. 729: Lower Intake Manifold To Cylinder Head Seals
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the sealing surfaces. Install new lower intake manifold to cylinder head seals (1).

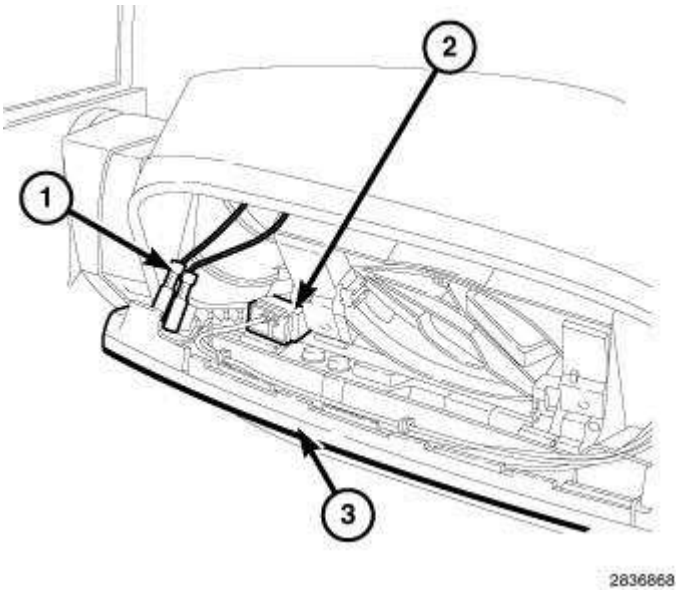


Fig. 730: Fuel Rail Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

2. If removed, install the fuel injectors and the fuel rail (1) to the lower intake manifold. Tighten the four bolts in the sequence shown in illustration, to 7 N.m (62 in. lbs.). Refer to **RAIL, FUEL, INSTALLATION** .

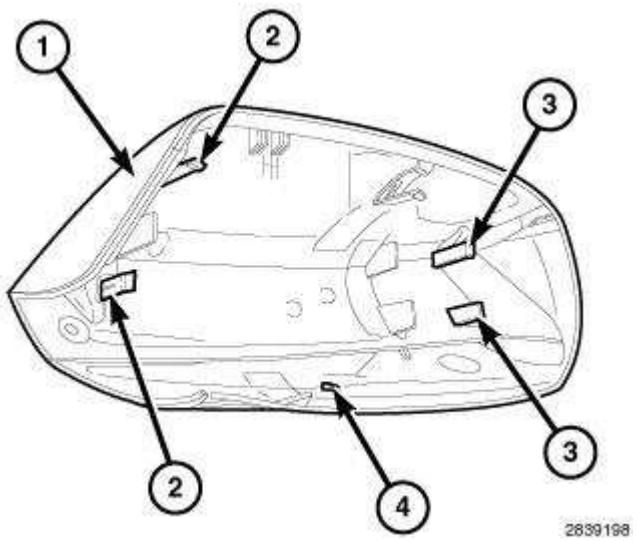


Fig. 731: Intake Manifold Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Position the lower intake manifold (1) onto the cylinder head surfaces.
4. Install the intake manifold retaining bolts and tighten in the sequence shown in illustration, to 8 N.m (71 in. lbs.).

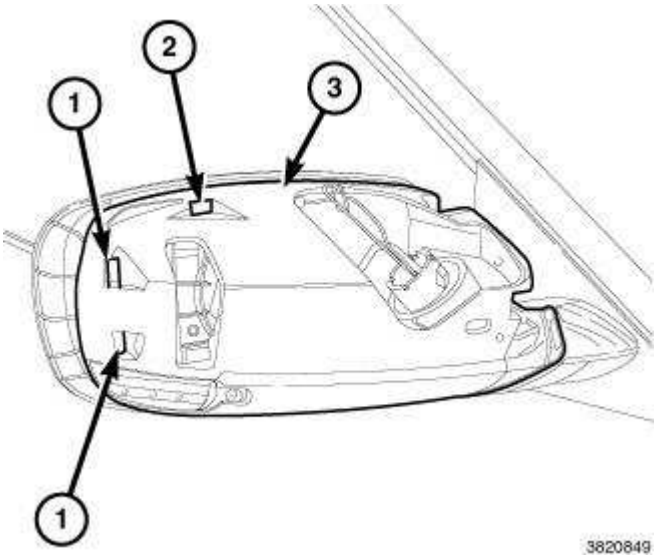


Fig. 732: Injection/Ignition Harness Retainer & Main Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Fasten the main wire harness retainer (2) to the rear of the lower intake manifold.
6. Fasten the injection/ignition harness retainer (1) to the rear of the lower intake manifold.

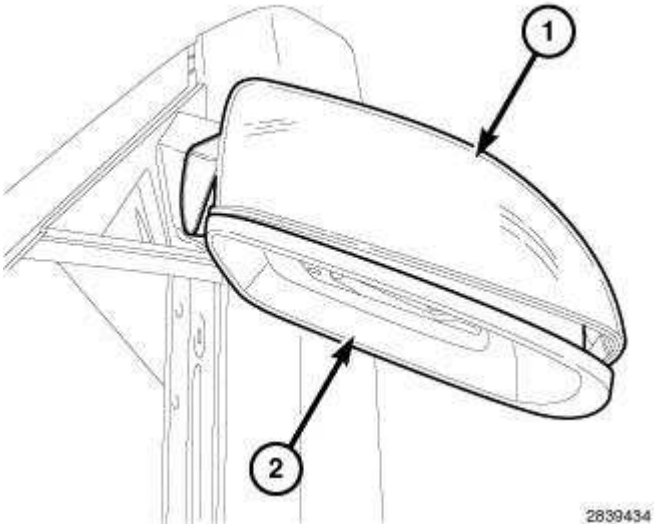


Fig. 733: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

7. Connect the fuel injector electrical connectors (2).
8. Connect the fuel supply hose to the fuel rail (1). Refer to **FITTING, QUICK CONNECT** .

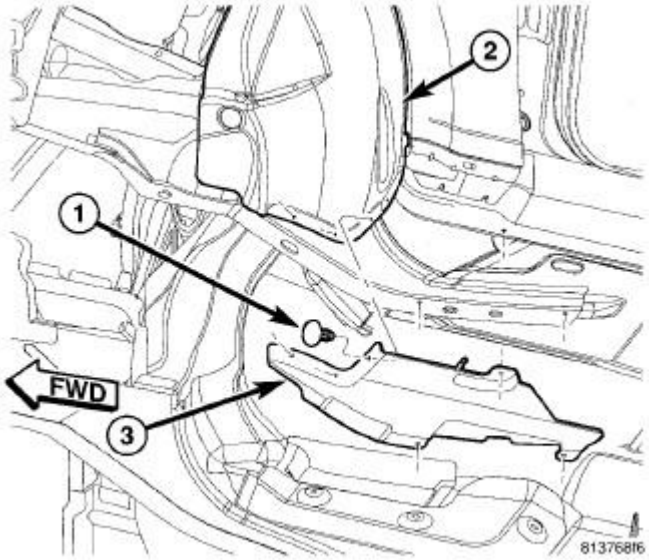


Fig. 734: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

9. Install the insulator (2) to the two alignment posts (3) on top of the left cylinder head cover.

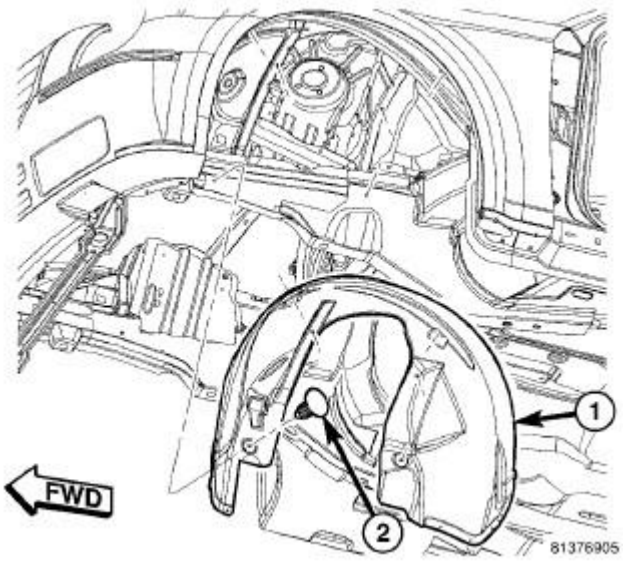


Fig. 735: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

10. Install the upper intake manifold (1) and support brackets. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

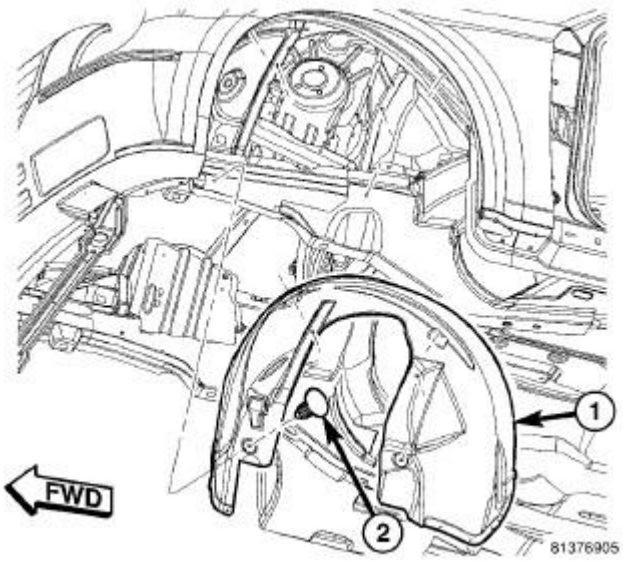


Fig. 736: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
12. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
13. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).

14. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
15. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

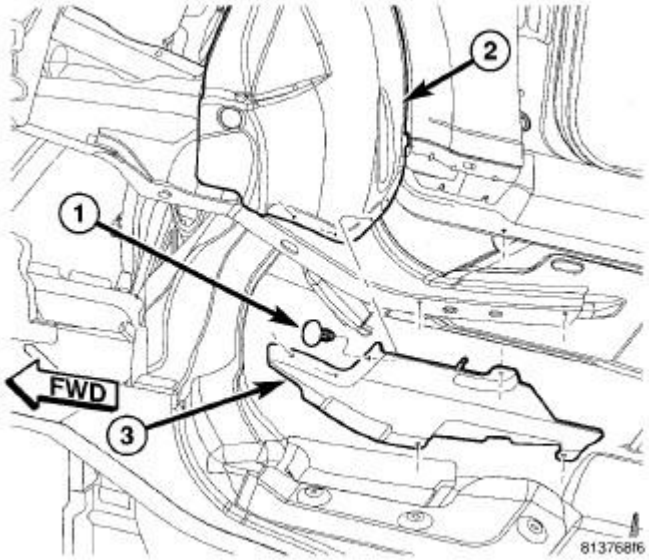


Fig. 737: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

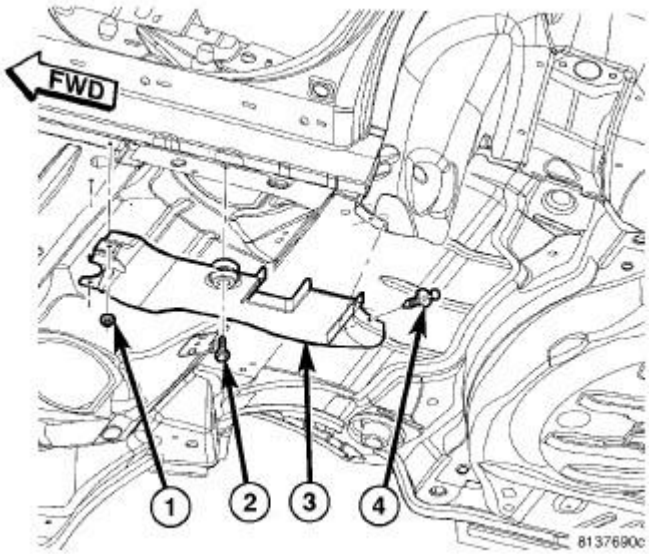


Fig. 738: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

17. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
18. Start the engine and check for leaks.

VALVE TIMING

DESCRIPTION

DESCRIPTION

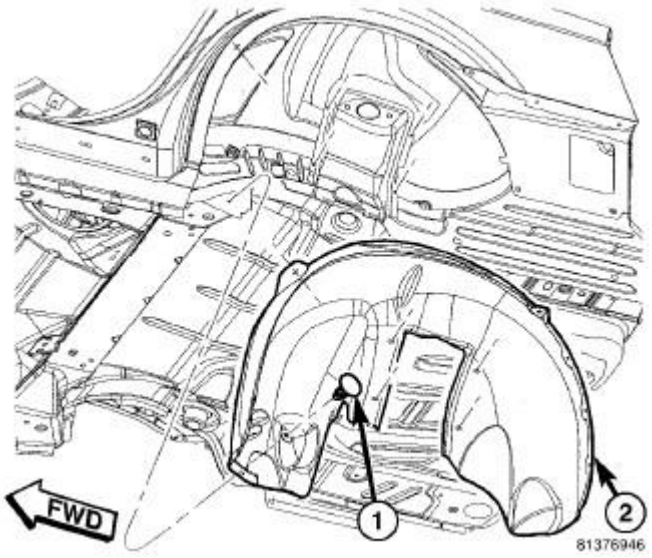


Fig. 739: Valve Timing System Components
Courtesy of CHRYSLER GROUP, LLC

The timing drive uses four silent chains. The silent chain link design improves sprocket engagement and reduces noise, vibration and harshness (NVH). One chain (5) drives the oil pump (4) and three chains drive the camshafts in a two stage design. The left secondary camshaft chain (1) uses an oil pressure controlled chain tensioner (9) with a ratcheting device. The right secondary camshaft chain (8) uses an oil pressure controlled tensioner (7) without a ratchet. The primary chain (2) also uses an oil pressure controlled tensioner (6) without a ratchet. A spring loaded tensioner (3) takes up the slack in the oil pump chain (5). The chain guides and tensioner arms are made of glass filled nylon with nylon wear faces.

OPERATION

OPERATION

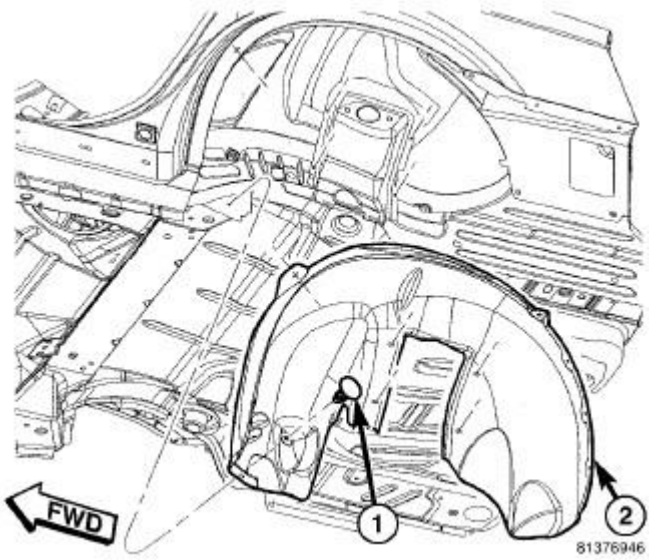


Fig. 740: Primary Chain, Idler Sprocket & Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

The primary timing chain is a silent type. The primary chain drives the 28 tooth idler sprocket directly from a 21 tooth crankshaft sprocket. This results in a 75% speed reduction to the idler sprocket. The idler sprocket assembly connects the primary chain drive and the secondary chain drive. The idler sprocket assembly consists of two integral 22 tooth sprockets a 28 tooth sprocket. The idler sprocket assembly spins on a stationary idler shaft. The idler shaft is a light press-fit into the cylinder block. A large washer on the idler shaft bolt and the rear flange of the idler shaft are used to control sprocket thrust movement. Pressurized oil is routed through the center of the idler shaft to provide lubrication for the bushings used in the idler sprocket assembly. Primary chain motion is controlled by a hydraulic oil damped tensioner and a fixed guide. The tensioner and the guide both use nylon plastic wear faces for low friction and long wear. The primary chain receives oil splash lubrication.

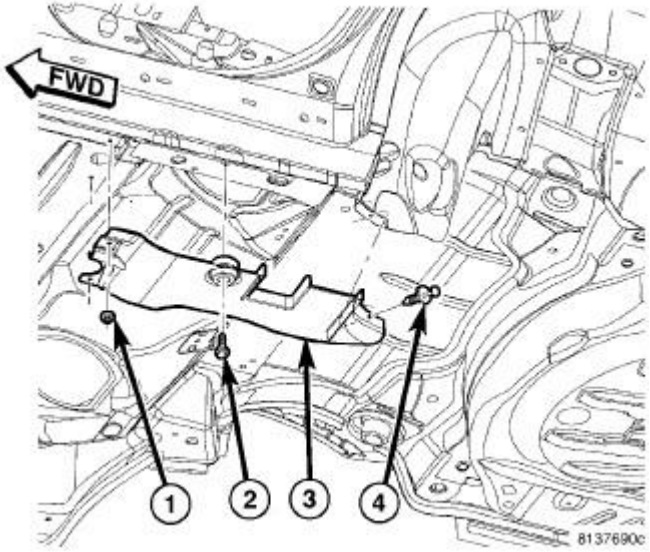


Fig. 741: Secondary Drive Chains
Courtesy of CHRYSLER GROUP, LLC

There are two identical secondary drive chains, both are silent type, one to drive the camshafts in each double overhead cam (DOHC) cylinder head. The secondary chains drive the 33 tooth camshaft sprockets directly from the 22 tooth idler sprockets. This speed reduction combined with the crankshaft to idler sprocket speed reduction produces the required 2:1 camshaft drive ratio. A fixed chain guide and a hydraulic oil damped tensioner are used to maintain tension in each secondary chain system. The left hydraulic secondary chain tensioner is fed from the main oil gallery through the cylinder head. The right hydraulic secondary chain tensioner is fed from the number one main bearing journal. Each tensioner incorporates a controlled leak path through a device known as a vent disc located in the nose of the piston to manage chain loads. Only the left tensioner has a mechanical ratchet system that limits chain slack if the tensioner piston bleeds down after engine shut down. The tensioner arms and guides also utilize nylon wear faces for low friction and long wear. The two secondary timing chains are lubricated by holes in the oil controlled tensioners that spray oil through an opening in the tensioner arms. The holes are protected from clogging by a fine mesh screen which is located on the back of the hydraulic tensioners.

STANDARD PROCEDURE

RESETTING LEFT CAM CHAIN TENSIONER

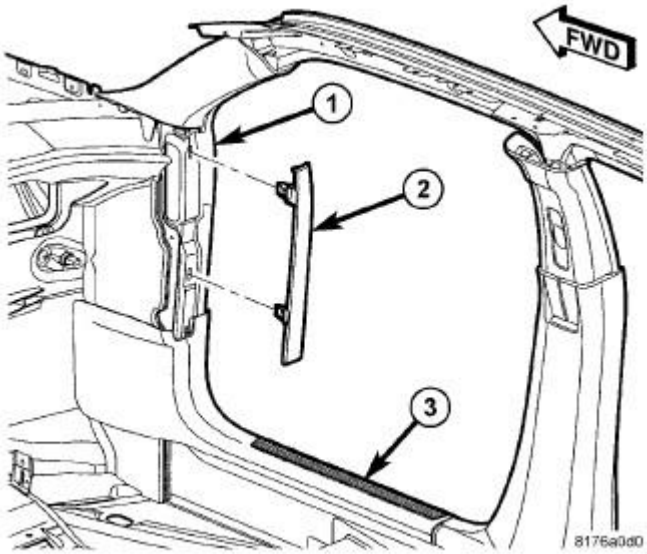


Fig. 742: Left Side Cam Chain Tensioner Ratchet Components
Courtesy of CHRYSLER GROUP, LLC

The left side cam chain tensioner used on the 3.6L engine is equipped with a ratchet. The ratchet consists of a rack (2) and a pawl (1). In use, the rack (2) extends with the piston (3) from the tensioner body. The pawl (1) will not allow the rack (2) to retract back into the tensioner body. In order to reset the tensioner, the pawl (1) must be disengaged from the rack (2) so that the piston (3) and rack (2) can be pushed back (4) into the tensioner body.

WITH ENGINE TIMING COVER REMOVED

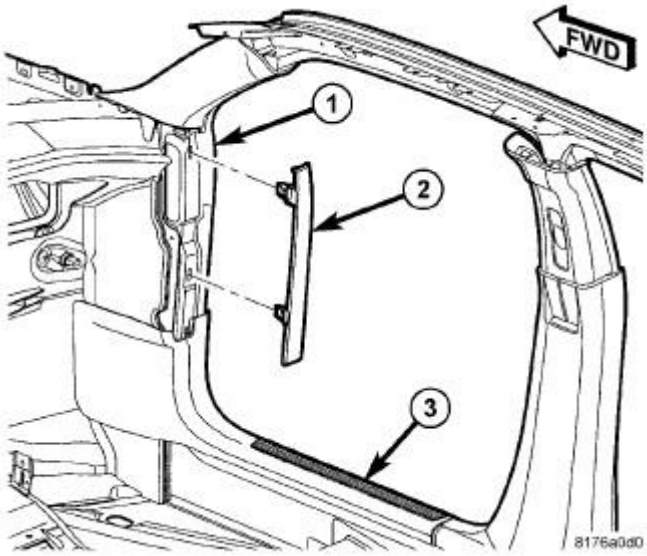


Fig. 743: Locating Slot In Rack & Allen Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: The slot (2) in the rack provides an anchor point for a pin that holds the rack in the retracted position.

1. Using a suitable tool, such as an allen wrench (1), lift the pawl off of the rack.
2. While holding the pawl off of the rack, push the rack and the piston into the tensioner body.

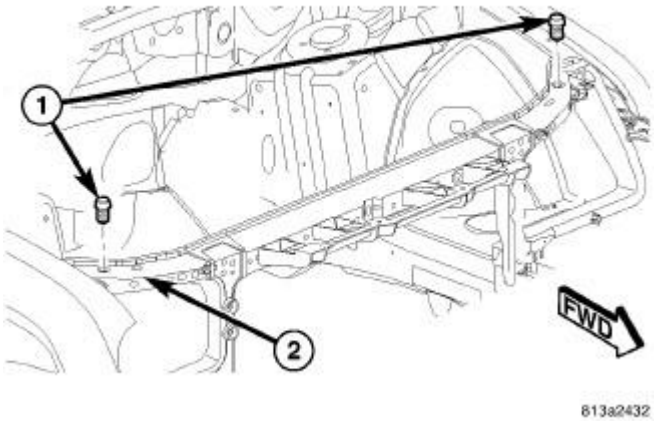


Fig. 744: Inserting Tensioner Pin To Hold Rack & Piston In Retracted Position
Courtesy of CHRYSLER GROUP, LLC

3. When the slot is aligned with the hole in the tensioner body, insert Tensioner Pin (special tool #8514, Pins, Tensioner) (1) to hold the rack and piston in the retracted position.

WITH ENGINE TIMING COVER INSTALLED

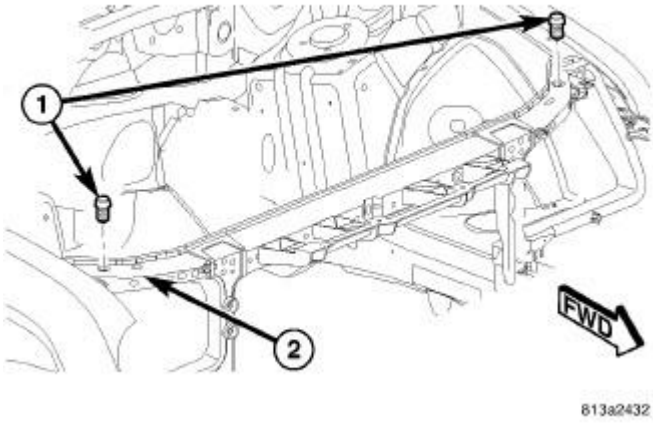


Fig. 745: Pin, Rack & Timing Chain Holder
Courtesy of CHRYSLER GROUP, LLC

NOTE: Graphic shows timing cover removed for clarity.

1. Using (special tool #10200-3, Pin) (2), lift the pawl off of the rack (3).

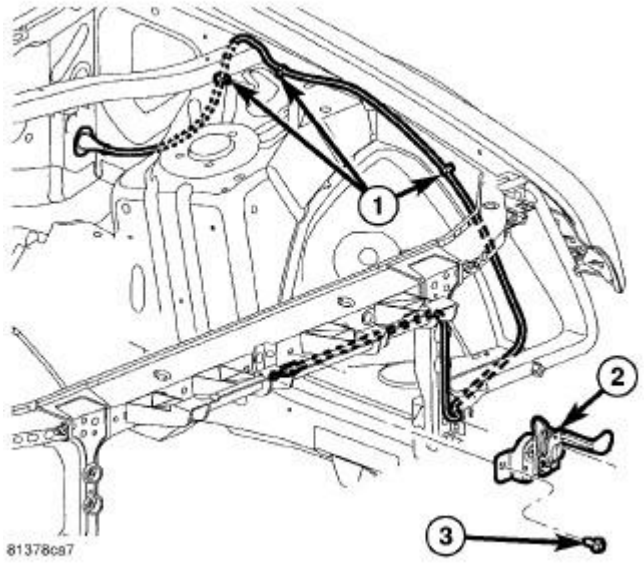


Fig. 746: Positioning Timing Chain Holder To Force Rack & Piston Back Into Tensioner Body
Courtesy of CHRYSLER GROUP, LLC

2. While holding the pawl off of the rack, push (special tool #10200-1, Holder, Timing Chain, Left Side) (1) into place between the cylinder head and the cam chain guide to force the rack and piston back into the tensioner body. The holder must remain in place during service to keep the

rack and piston in the retracted position.

MEASURING TIMING CHAIN WEAR

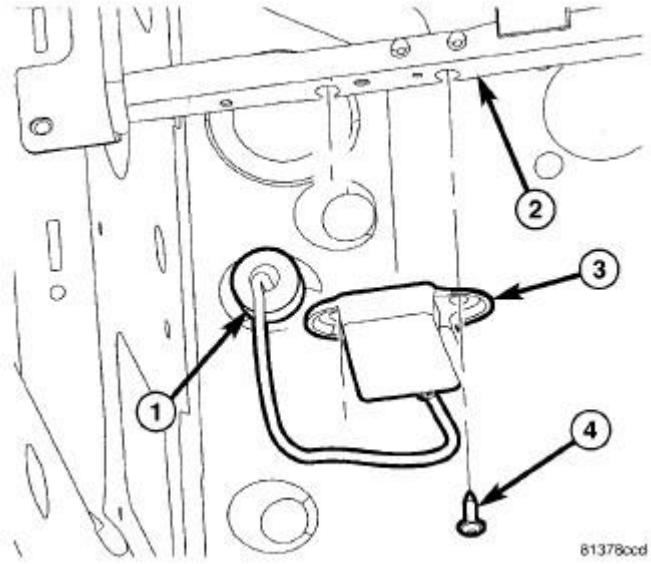


Fig. 747: Piston Extension & RH Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
2. To determine if the timing chains are worn, rotate the crankshaft clockwise until maximum tensioner piston extension (1) is obtained on the RH cam chain tensioner (2). Measure the distance between the secondary timing chain tensioner housing and the step ledge on the tensioner piston (1). Piston extension (1) must be less than 16 mm (0.630 in.).
3. Piston extension greater than 16 mm (0.630 in.) indicates that all timing chains are worn and require replacement. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

ENGINE TIMING VERIFICATION

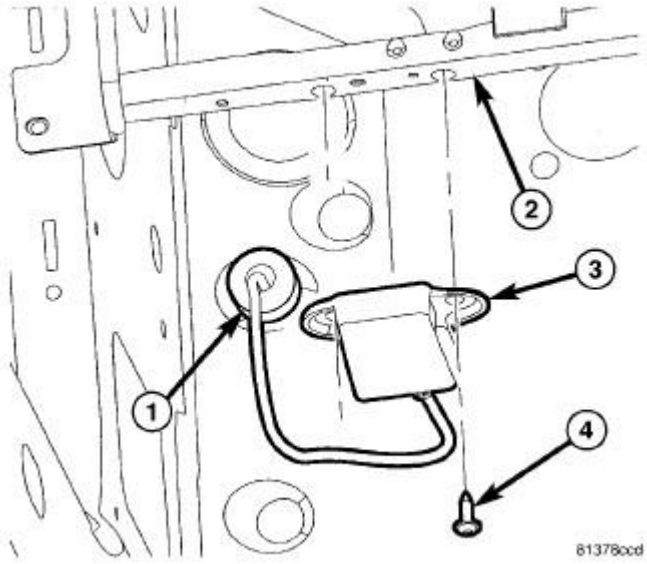


Fig. 748: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

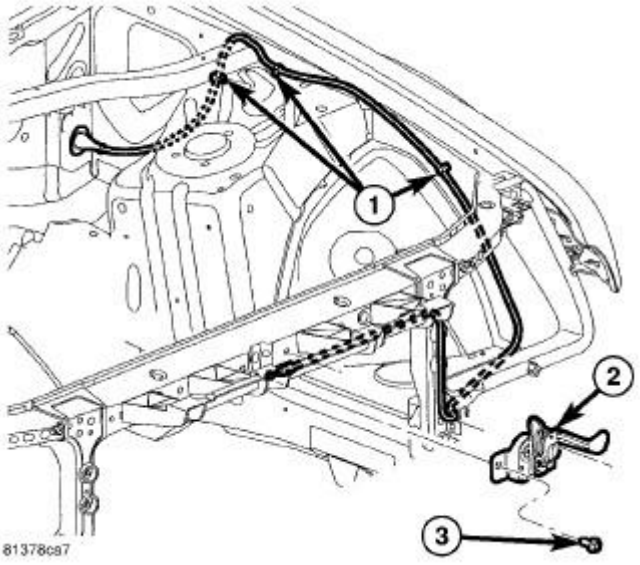


Fig. 749: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

Correct timing is critical for the NON free-wheeling designed, 3.6L engine. Engine timing can be verified by using the following procedures:

1. Remove the upper intake manifold and both cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
2. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

3. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point on the engine, such as the cylinder head cover mounting surface. Position the indicator probe into the number one cylinder, rotate the crankshaft clockwise (as viewed from the front) to place the number one piston at top-dead-center on the exhaust stroke and set the indicator dial to **ZERO** .

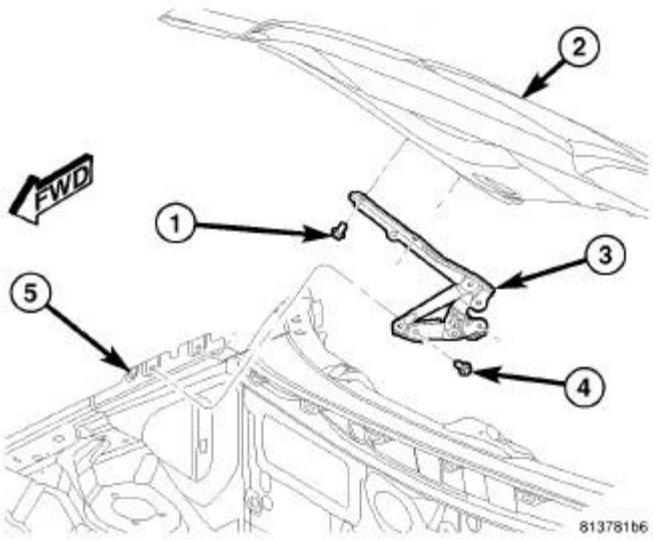


Fig. 750: Arrows, Scribe Lines & Cam Phasers
Courtesy of CHRYSLER GROUP, LLC

4. While maintaining this alignment, verify that the **ARROWS** (1) on the left side cam phasers point toward each other and are parallel to the cylinder head cover mounting surface (2) and that the right side cam phaser **ARROWS** (3) point away from each other and the **SCRIBE LINES** (5) are parallel to the cylinder head cover mounting surface (4).

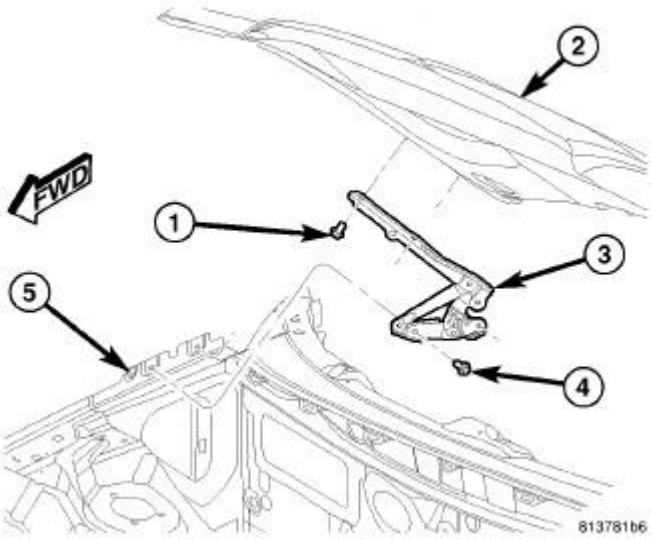


Fig. 751: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

NOTE: The phaser markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are twelve chain pins between the markings.

5. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.
6. If the engine timing is not correct, proceed to Timing Chain and Sprockets for service procedures. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

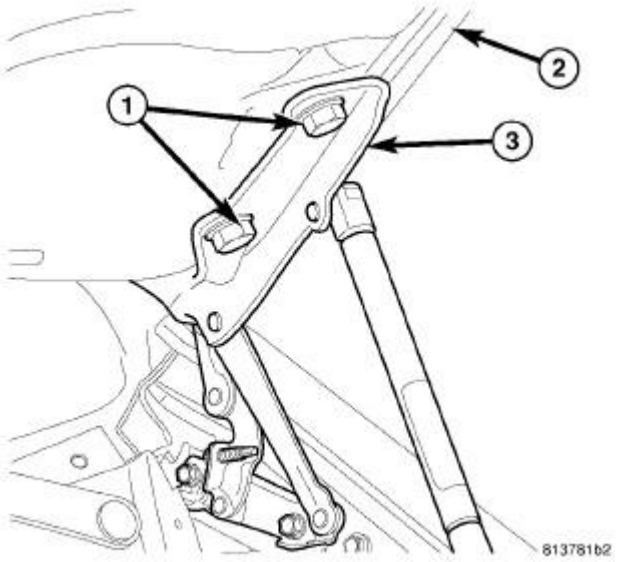


Fig. 752: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

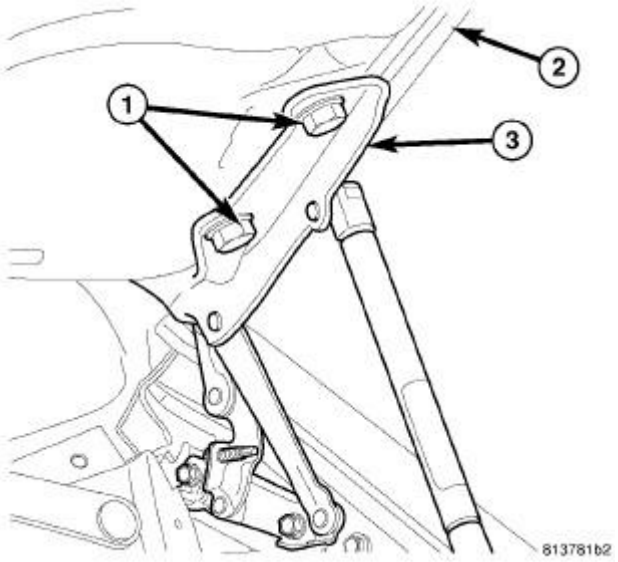


Fig. 753: Piston Extension & RH Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When the timing chains are removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating

the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

NOTE: The Variable Valve Timing (VVT) assemblies (Phasers) and Oil Control Valves (OCVs) can be serviced without removing the engine timing cover. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, REMOVAL.

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner housing assembly and upper intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Remove both cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
4. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
7. Remove the oil pan, accessory drive belts, crankshaft vibration damper and engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

NOTE: Take this opportunity to measure timing chain wear. Refer to Engine/Valve Timing - Standard Procedure.

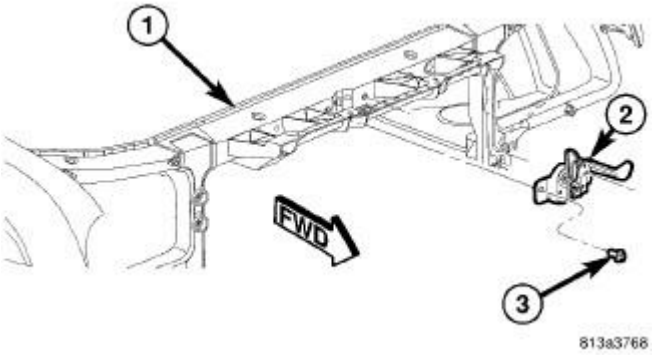


Fig. 754: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

8. Rotate the crankshaft clockwise (as viewed from the front) to place the number one cylinder piston at top-dead-center on the exhaust stroke by aligning the dimple (4) on the crankshaft with the block/bearing cap junction (5).
9. While maintaining this alignment, verify that the **ARROWS** (2) on the left side cam phasers point

toward each other and are parallel to the cylinder head cover mounting surface (3) and that the right side cam phaser **ARROWS** (7) point away from each other and the **SCRIBE LINES** (9) are parallel to the cylinder head cover mounting surface (8).

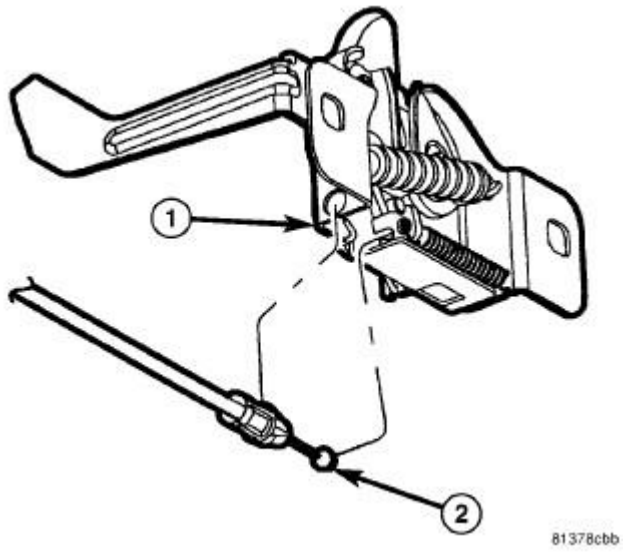


Fig. 755: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

NOTE: The phaser markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are twelve chain pins between the markings.

10. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

11. Mark the direction of rotation on the following timing chains using a paint pen or equivalent to aid in reassembly:
    - Left side cam chain
    - Right side cam chain
    - Oil pump chain
    - Primary chain

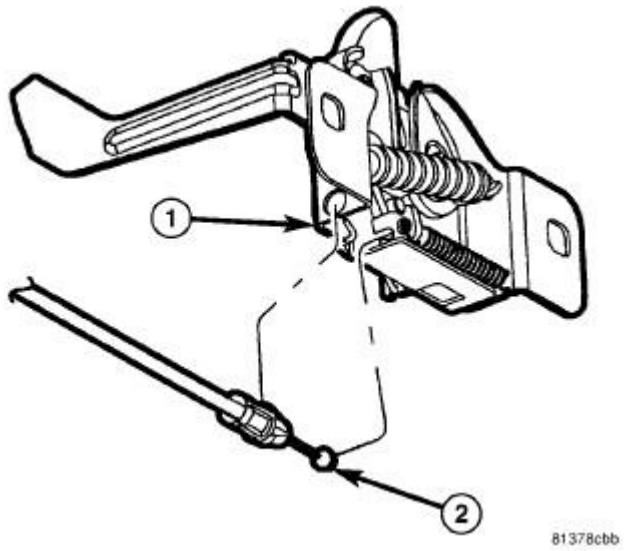


Fig. 756: Resetting Right Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

12. Reset the right side cam chain tensioner by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

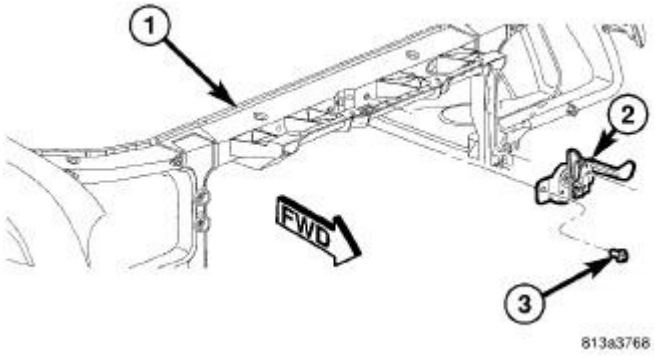


Fig. 757: Resetting Left Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

13. Reset the left side cam chain tensioner by lifting the pawl (1), pushing back the piston (2) and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3). Refer to **Engine/Valve Timing - Standard Procedure**.

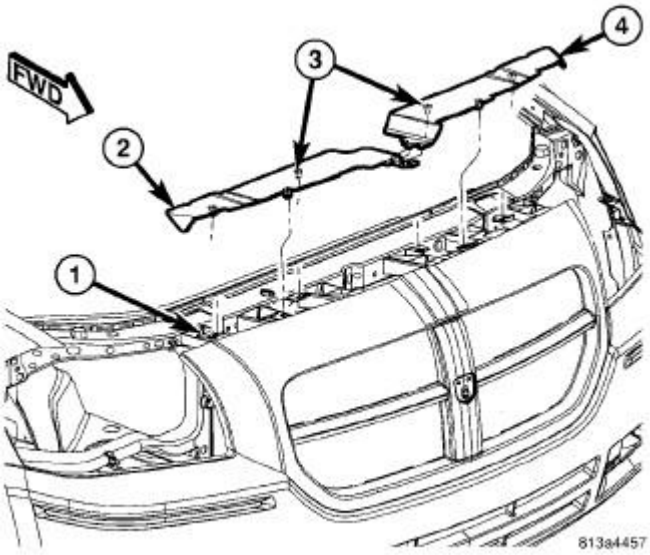


Fig. 758: Oil Pump Chain Tensioner, Spring, Retaining Bolt, Dowel Pin, Oil Pump Sprocket & Oil Pump Chain
Courtesy of CHRYSLER GROUP, LLC

14. Disengage the oil pump chain tensioner spring (3) from the dowel pin (2) and remove the oil pump chain tensioner (1).
15. Remove the oil pump sprocket T45 retaining bolt (4) and remove the oil pump sprocket (5) and oil pump chain (6).

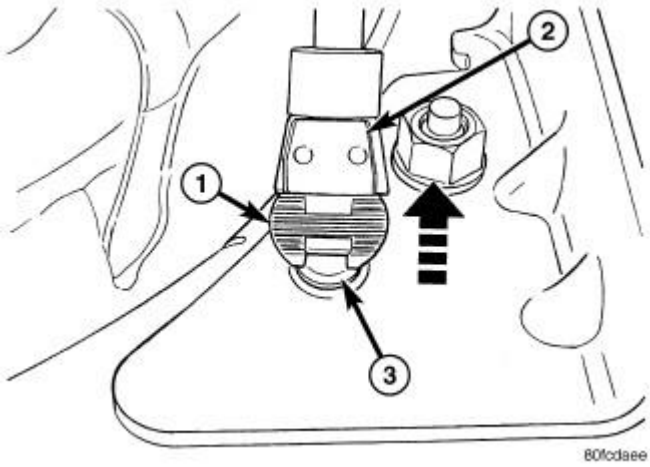


Fig. 759: Camshaft Phaser Lock, Oil Control Valves & Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

16. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1) with the tool number

facing up.

17. Loosen, but do not remove, the exhaust oil control valve (3) and the intake oil control valve (2).
18. Remove the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1).
19. Remove the oil control valve (2) from the right side intake cam phaser.
20. Pull the right side intake cam phaser off of the camshaft and remove the right side cam chain.
21. If required, remove the oil control valve (3) and pull the right side exhaust cam phaser off of the camshaft.

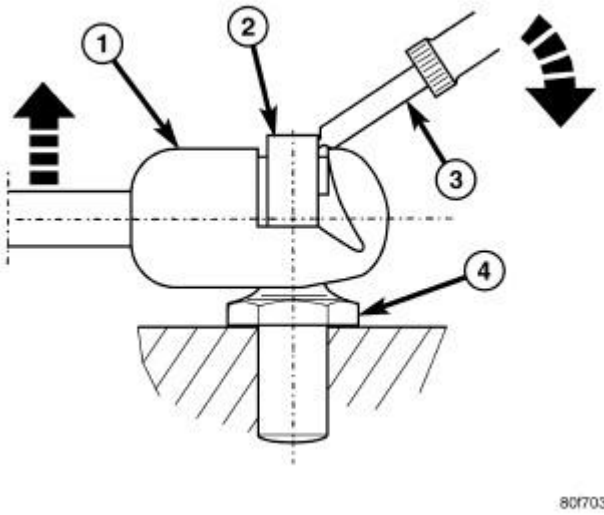


Fig. 760: Camshaft Phaser Lock, Oil Control Valves & Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

22. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1) with the tool number facing up.
23. Loosen, but do not remove, the exhaust oil control valve (2) and the intake oil control valve (3).
24. Remove the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1).
25. Remove the oil control valve (2) from the left side exhaust cam phaser.
26. Pull the left side exhaust cam phaser off of the camshaft and remove the left side cam chain.
27. If required, remove the oil control valve (3) and pull the left side intake cam phaser off of the camshaft.

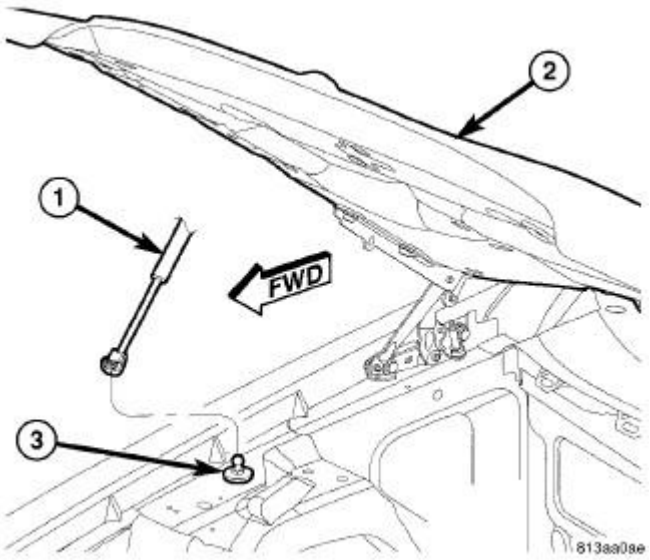


Fig. 761: Primary Chain Tensioner, Tensioner Pin, Primary Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

28. Reset the primary chain tensioner (5) by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3). Remove two T30 bolts (4) and remove the primary chain tensioner.
29. Remove the T30 bolt (1) and the primary chain guide (2).

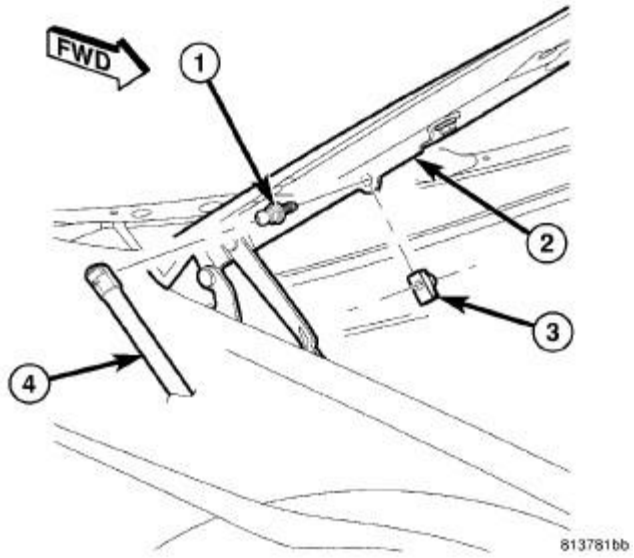


Fig. 762: Timing Chain Plated Link At 12 O'Clock, Washer, Retaining Bolt, Block/Bearing Cap Junction & Dimple
Courtesy of CHRYSLER GROUP, LLC

30. Remove the idler sprocket T45 retaining bolt (2) and washer (3).

31. Remove the primary chain, idler sprocket and crankshaft sprocket as an assembly.

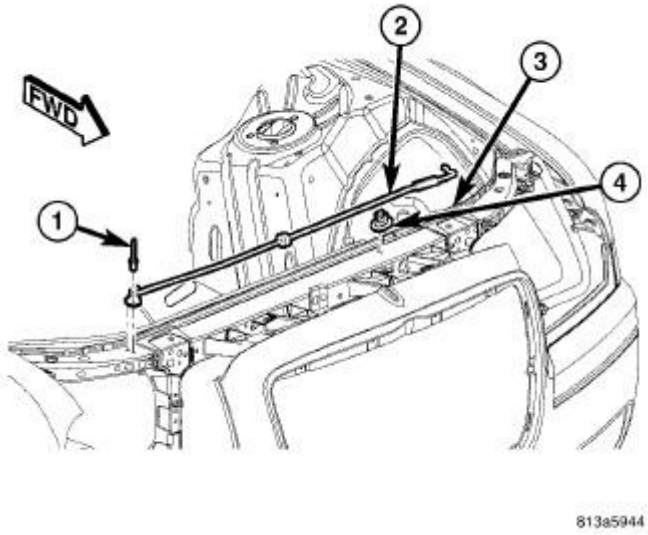


Fig. 763: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

32. If required, remove two T30 bolts (6) and the left side cam chain tensioner (5).
33. If required, remove two T30 bolts (4) and the left side cam chain guide (2) and tensioner arm (1).

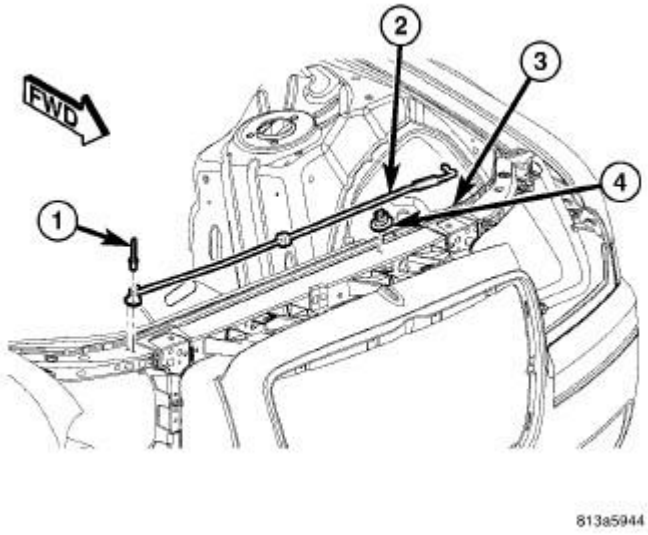


Fig. 764: Right Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

34. If required, remove two T30 bolts (4) and the right side cam chain tensioner (3).

35. If required, remove three T30 bolts (2) and the right side cam chain guide (1) and tensioner arm (6).
36. Inspect all sprockets and chain guides. Replace if damaged.

INSPECTION

INSPECTION

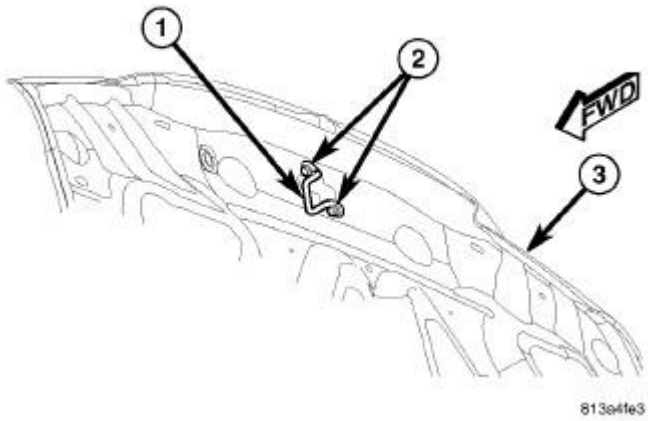


Fig. 765: Piston Extension & RH Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

Prior to disassembly of the timing chains and sprockets, measure the timing chain wear (1). Refer to **Engine/Valve Timing - Standard Procedure**.

Inspect the following valve timing components:

- Sprockets for excessive tooth wear. Some tooth markings are normal and not a cause for sprocket replacement.
- Idler sprocket assembly bushing and shaft for excessive wear.
- Chain guides and tensioner arms. Replace these parts if grooving in plastic face is more than 1 mm (0.039 in.) deep.
- Secondary chain tensioner piston and ratcheting device. Inspect for evidence of heavy contact between tensioner piston and tensioner arm. If this condition exist the tensioner arm and chain should be replaced.
- Primary chain tensioner plastic faces. Replace as required.

INSTALLATION

INSTALLATION

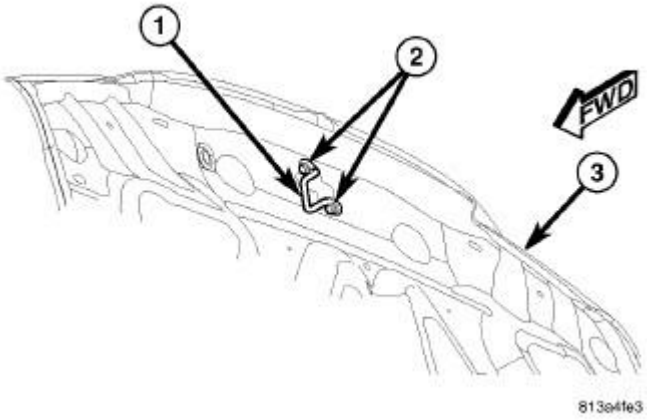


Fig. 766: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

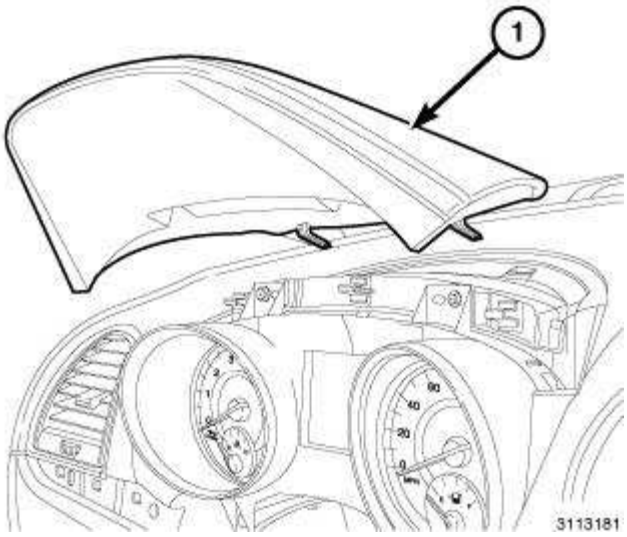


Fig. 767: Right Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Inspect all sprockets and chain guides. Replace if damaged.
2. If removed, install the right side cam chain guide (1) and tensioner arm (6). Tighten attaching T30 bolts (2) to 12 N.m (106 in. lbs.).
3. If removed, install the right side cam chain tensioner (3) to the engine block with two bolts (4). Tighten the T30 bolts (4) to 12 N.m (106 in. lbs.).
4. Reset the right side cam chain tensioner (3) by pushing back the tensioner piston and installing

Tensioner Pin (special tool #8514, Pins, Tensioner) (5).

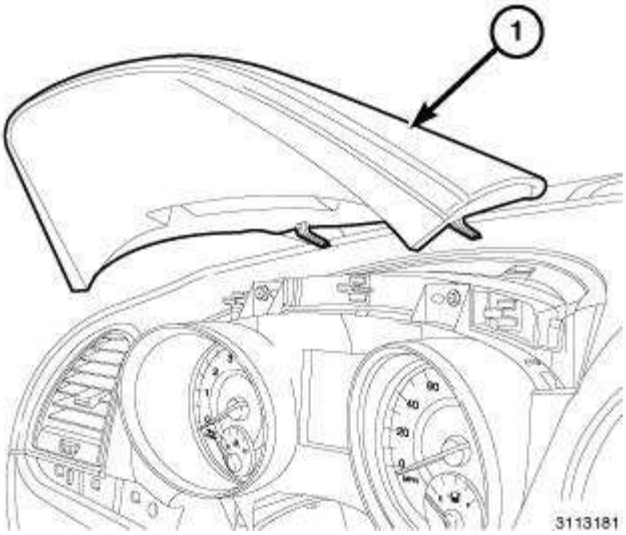


Fig. 768: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. If removed, install the left side cam chain guide (2) and tensioner arm (1). Tighten attaching T30 bolts (4) to 12 N.m (106 in. lbs.).
6. If removed, install the left side cam chain tensioner (5) to the cylinder head with two bolts (6). Tighten the T30 bolts (6) to 12 N.m (106 in. lbs.).
7. Reset the left side cam chain tensioner (5) by lifting the pawl (3), pushing back the piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (7). Refer to **Engine/Valve Timing - Standard Procedure**.

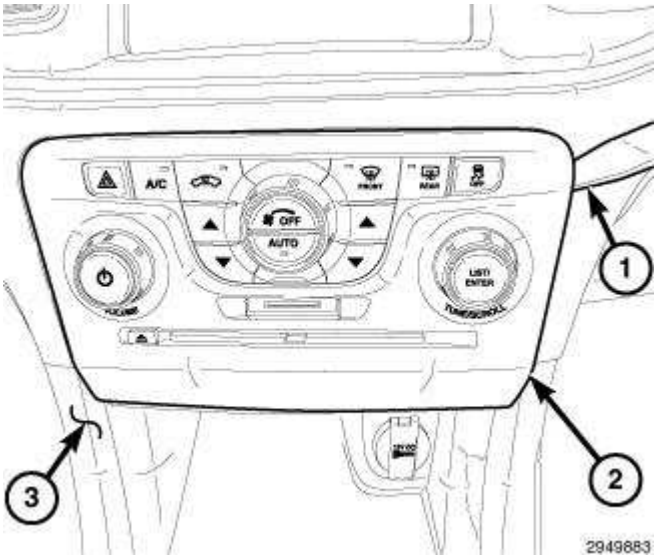


Fig. 769: Crankshaft Key, Dimple & Block/Bearing Cap Junction
Courtesy of CHRYSLER GROUP, LLC

8. Verify that the key (3) is installed in the crankshaft.

CAUTION: Do not rotate the crankshaft more than a few degrees independently of the camshafts. Piston to valve contact could occur resulting in possible valve damage. If the crankshaft needs to be rotated more than a few degrees, first remove the camshafts. Refer to CAMSHAFT, ENGINE, REMOVAL.

9.

10. Verify that the number one cylinder piston is positioned at top-dead-center by aligning the dimple (2) on the crankshaft with the block/bearing cap junction (1).

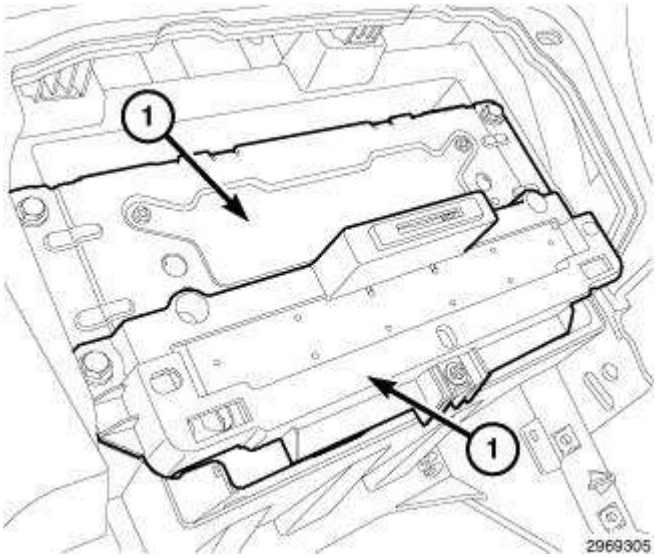


Fig. 770: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the crankshaft clockwise to return the crankshaft to top-dead-center.

11.

12. Verify that the camshafts are set at top-dead-center by positioning the alignment holes (1) vertically.

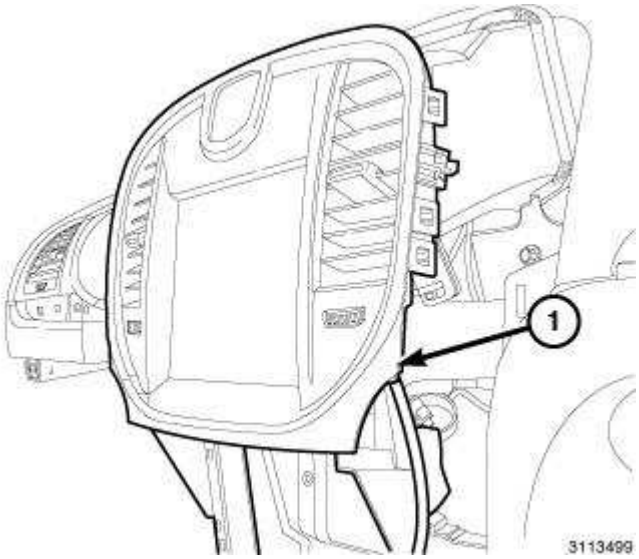


Fig. 771: Aligning Arrow With Plated Link On Primary Chain
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

13. Place the primary chain onto the crankshaft sprocket (3) so that the arrow (2) is aligned with the plated link (1) on the timing chain.

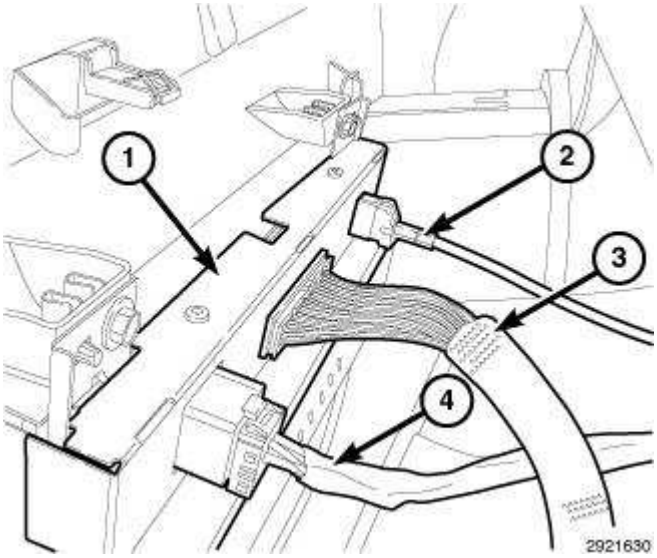


Fig. 772: Placing Idler Sprocket Into Timing Chain So That Dimple Is Aligned With Plated Link On Timing Chain
Courtesy of CHRYSLER GROUP, LLC

14. While maintaining this alignment, invert the crankshaft sprocket and timing chain and place the

idler sprocket (4) into the timing chain so that the dimple (2) is aligned with the plated link (1) on the timing chain.

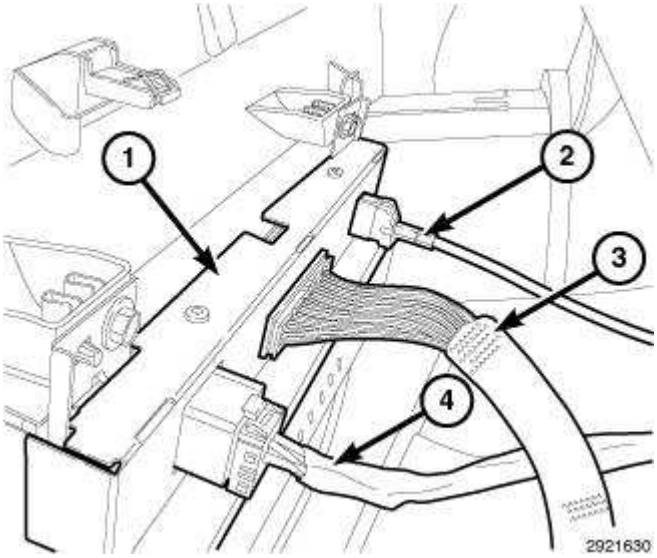


Fig. 773: Timing Chain Plated Link At 12 O'Clock, Washer, Retaining Bolt, Block/Bearing Cap Junction & Dimple
Courtesy of CHRYSLER GROUP, LLC

15. While maintaining this alignment, lubricate the idler sprocket bushing with clean engine oil and install the sprockets and timing chain on the engine. To verify that the timing is still correct, the timing chain plated link (6) should be located at 12:00 (1) when the dimple (5) on the crankshaft is aligned with the block/bearing cap junction (4).
16. Install the idler sprocket retaining bolt (2) and washer (3). Tighten the T45 bolt (2) to 25 N.m (18 ft. lbs.).

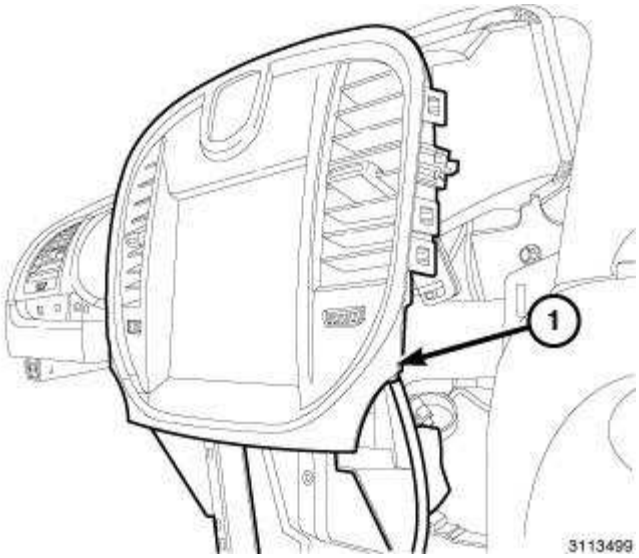


Fig. 774: Primary Chain Tensioner, Tensioner Pin, Primary Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Install the primary chain guide (2). Tighten attaching T30 bolt (1) to 12 N.m (106 in. lbs.).
18. Reset the primary chain tensioner (5) by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3).
19. Install the primary chain tensioner (5) to the engine block with two bolts (4). Tighten the T30 bolts (4) to 12 N.m (106 in. lbs.) and remove the Tensioner Pin (special tool #8514, Pins, Tensioner) (3).

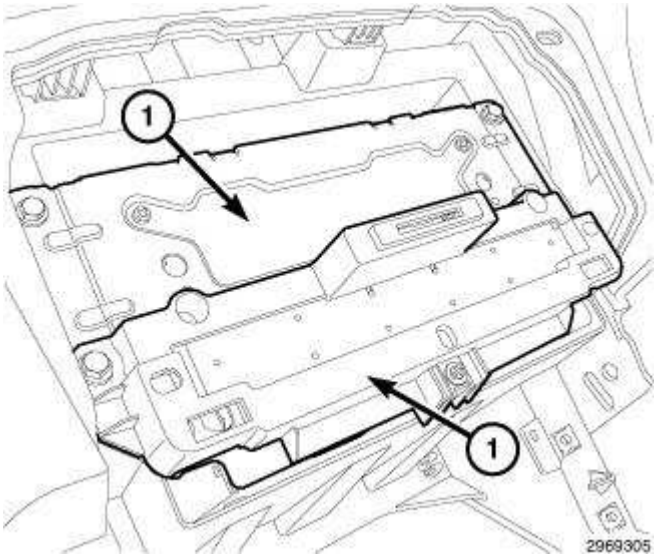


Fig. 775: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

20. Press the left side intake cam phaser onto the intake camshaft. Install and hand tighten the oil control valve (6).

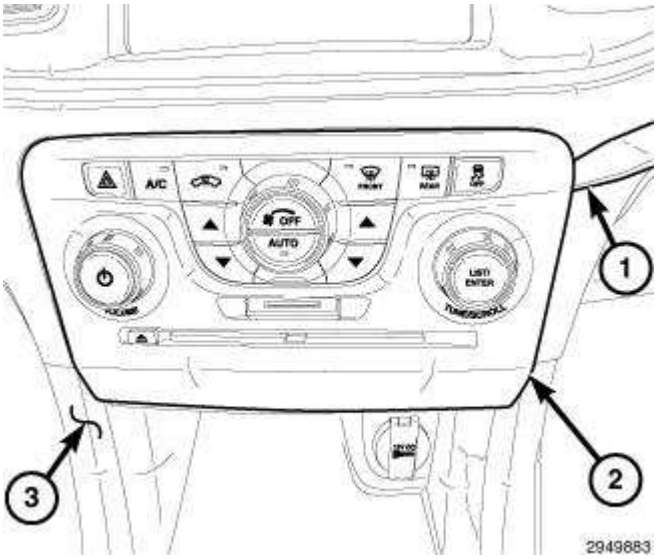


Fig. 776: Idler Sprocket, Plated Link & Arrow
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The left side and right side cam chains are identical.**

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

21. Drape the left side cam chain over the left side intake cam phaser and onto the idler sprocket (1) so that the arrow (3) is aligned with the plated link (2) on the cam chain.

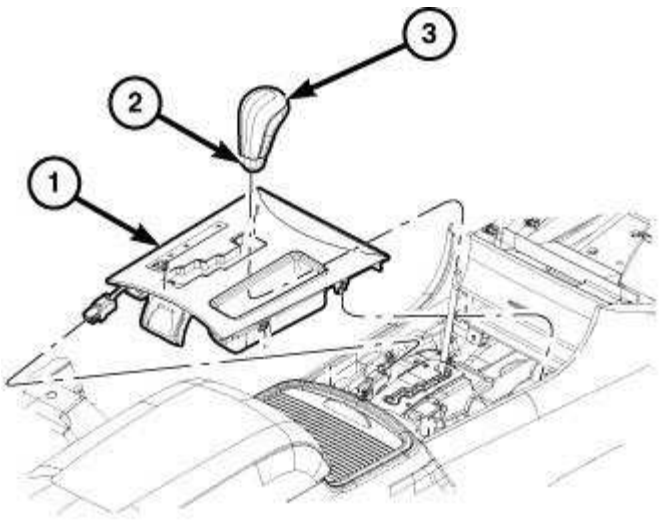


Fig. 777: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

22. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the left side cam phasers so that the arrows (3) point toward each other and are parallel to the cylinder head cover mounting surface (5). Press the exhaust cam phaser onto the exhaust cam, install and hand tighten the oil control valve (2).

NOTE: **Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.**

23. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (4) with the tool number facing up.
24. Tighten the oil control valves (2) and (6) to 150 N.m (110 ft. lbs.).
25. Remove the Camshaft Phaser Lock (4).

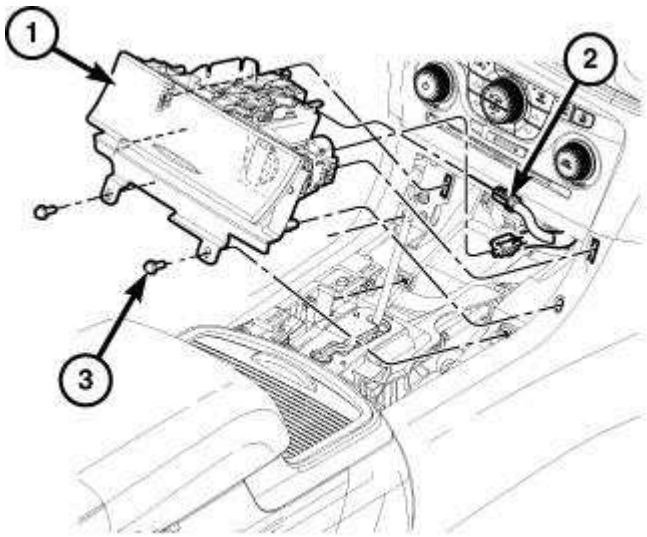


Fig. 778: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

26. Press the right side exhaust cam phaser onto the exhaust camshaft. Install and hand tighten the oil control valve (7).

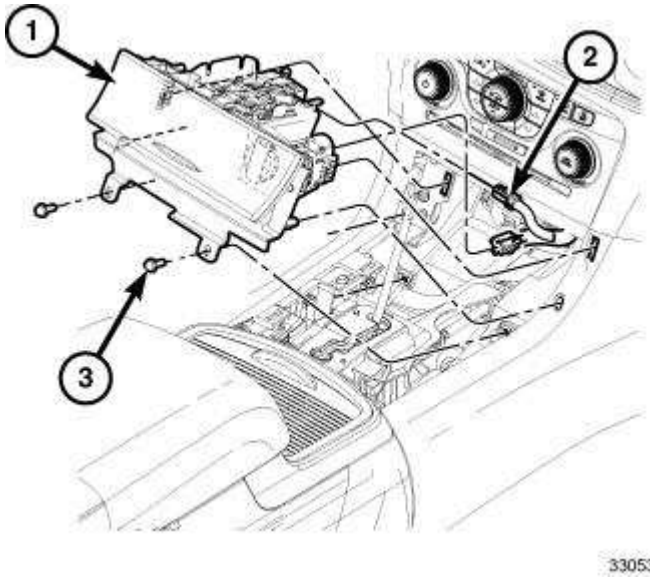


Fig. 779: Idler Sprocket, Dimple & Plated Link
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

27. Drape the right side cam chain over the right side exhaust cam phaser and onto the idler

sprocket (1) so that the dimple (2) is aligned with the plated link (3) on the cam chain.

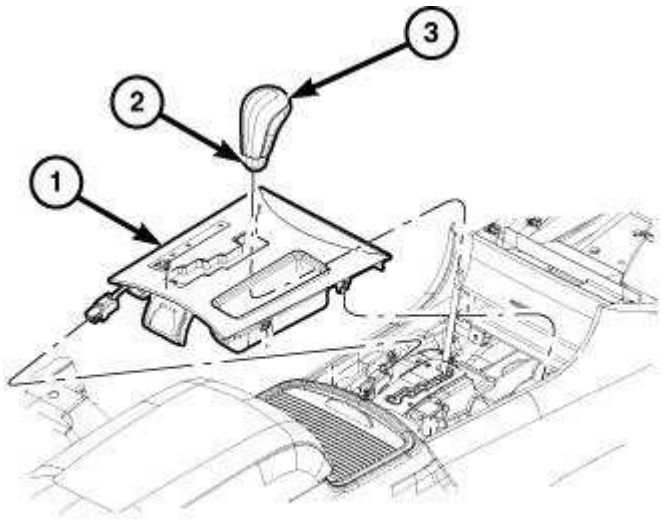


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Fig. 780: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

28. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the right side cam phasers so that the arrows (3) point away from each other and the scribe lines (4) are parallel to the cylinder head cover mounting surface (6). Press the intake cam phaser onto the intake cam, install and hand tighten the oil control valve (2).

    NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.

29. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (5) with the tool number facing up.
30. Tighten the oil control valves (2) and (7) to 150 N.m (110 ft. lbs.).
31. Remove the Camshaft Phaser Lock (5).

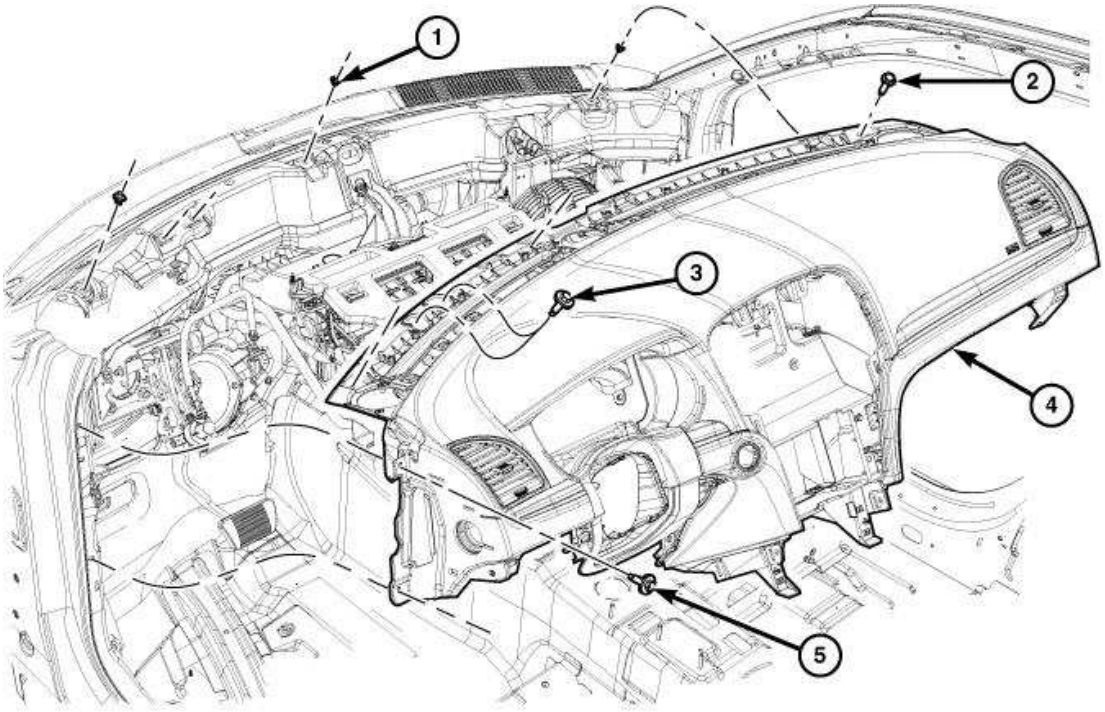

Fig. 781: Oil Pump Chain Tensioner, Spring, Retaining Bolt, Dowel Pin, Oil Pump Sprocket & Oil Pump Chain
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are no timing marks on the oil pump gear or chain.

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

32. Place the oil pump sprocket (5) into the oil pump chain (6). Place the oil pump chain onto the crankshaft sprocket while aligning the oil pump sprocket with the oil pump shaft. Install the oil pump sprocket T45 retaining bolt (4) and tighten to 25 N.m (18 ft. lbs.).
33. Install the oil pump chain tensioner (1). Insure that the spring (3) is positioned above the dowel pin (2).

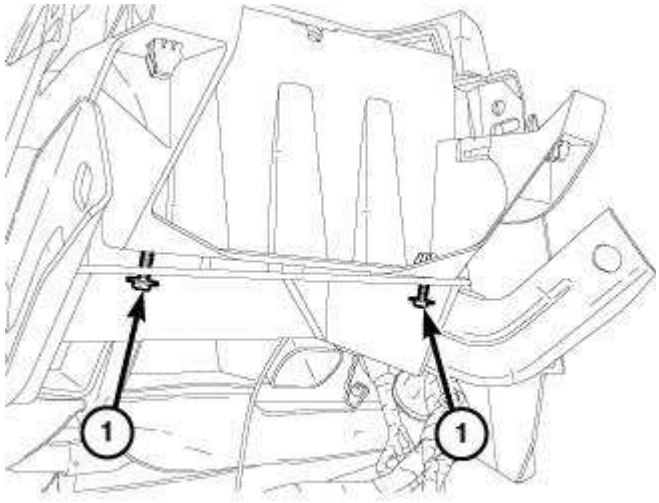

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Fig. 782: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

34. Remove the Tensioner Pins (special tool #8514, Pins, Tensioner) (1) and (6) from the right side and left side cam chain tensioners.
35. Rotate the crankshaft clockwise (as viewed from the front) two complete revolutions stopping when the dimple (4) on the crankshaft is aligned with the block/bearing cap junction (5).
36. While maintaining this alignment, verify that the **ARROWS** (2) on the left side cam phasers point toward each other and are parallel to the cylinder head cover mounting surface (3) and that the right side cam phaser **ARROWS** (7) point away from each other and the **SCRIBE LINES** (9) are parallel to the cylinder head cover mounting surface (8).

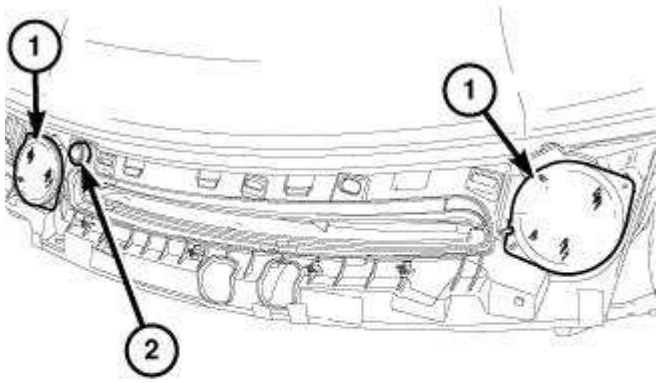

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Fig. 783: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

37. There should be 12 chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.
38. If the engine timing is not correct, repeat this procedure.
39. Install the engine timing cover, crankshaft vibration damper, accessory drive belts and oil pan. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
40. Install the spark plugs. Tighten to 17.5 N.m (13 ft. lbs.). Refer to **SPARK PLUG, INSTALLATION** .
41. Install the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
42. Install the upper intake manifold and air cleaner housing assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
43. Fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
44. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
45. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
46. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

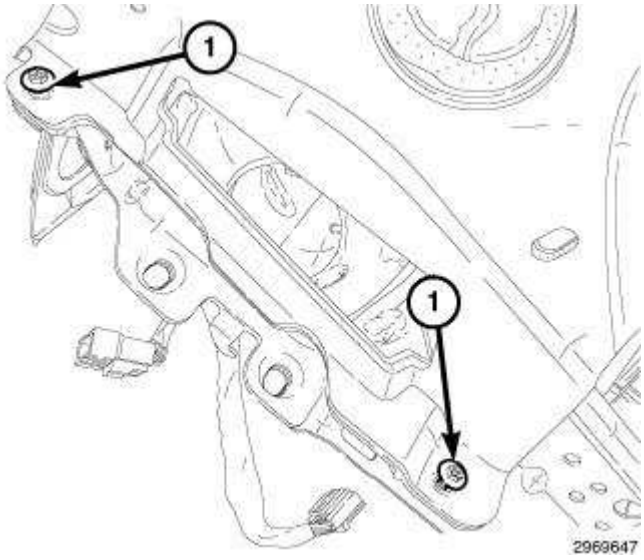

Fig. 784: Upper Radiator Hose & Thermostat Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
3. Remove the upper radiator hose (2) and thermostat housing (1). Refer to **THERMOSTAT, REMOVAL** .

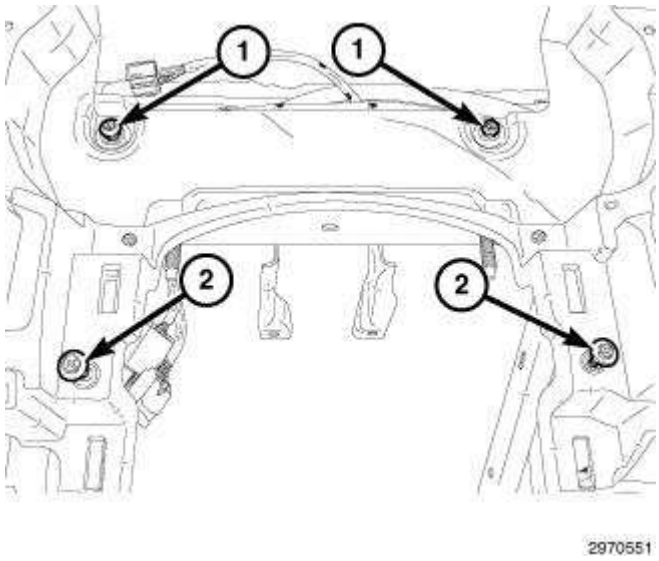

Fig. 785: Radiator Hose & Heater Hose
Courtesy of CHRYSLER GROUP, LLC

4. Remove the heater core return hose (1) from the water pump housing.
5. Remove the lower radiator hose (2) from the water pump housing.

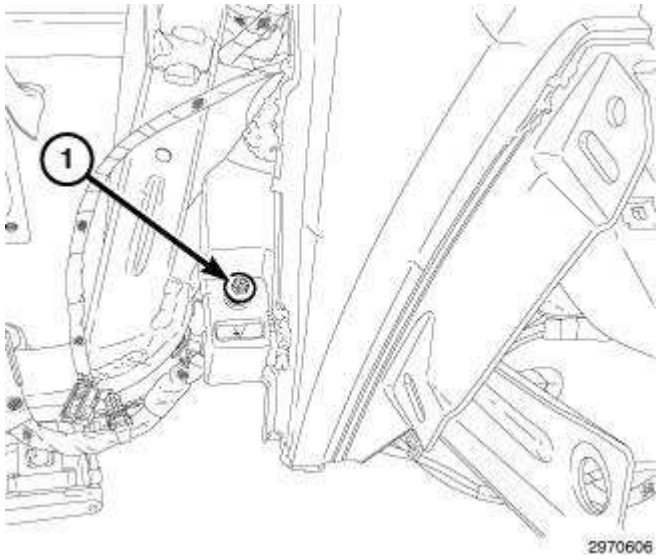

Fig. 786: Heater Core Supply Hose & Coolant Outlet Housing
Courtesy of CHRYSLER GROUP, LLC

6. Remove the heater core supply hose (1) from the coolant outlet housing (2).

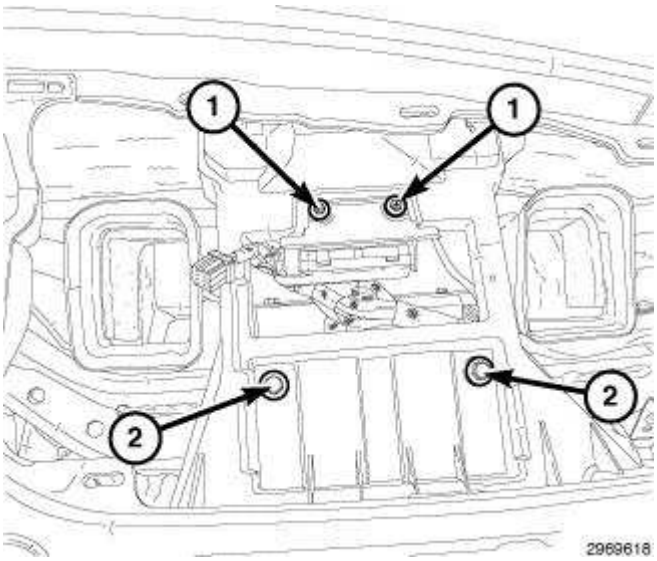

Fig. 787: Heater Core Supply Tube Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Remove the bolt (2) and reposition the heater core supply tube (1).

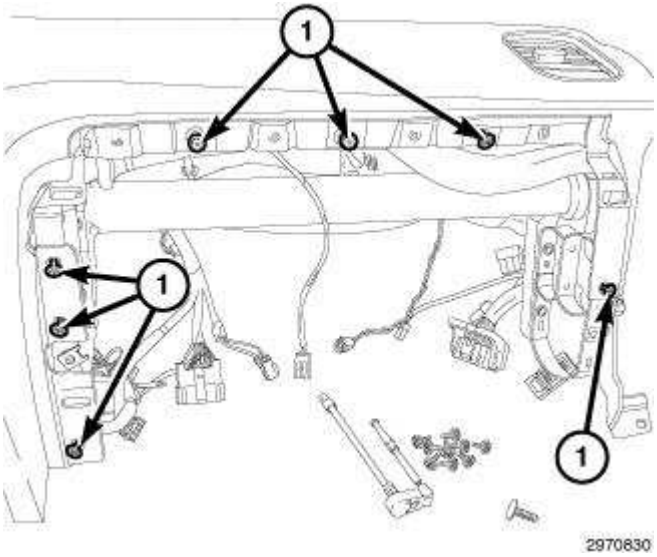

Fig. 788: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

8. Remove the accessory drive belt (3). Refer to **BELT, SERPENTINE, REMOVAL** .
9. Remove the accessory drive belt tensioner (7). Refer to **TENSIONER, BELT, REMOVAL** .
10. Remove the accessory idler pulley (2). Refer to **PULLEY, IDLER, REMOVAL** .
11. Remove the crankshaft vibration damper (6). Refer to **DAMPER, VIBRATION, REMOVAL**.
12. Remove the right and left cylinder head covers. Refer to **COVER(S), CYLINDER HEAD,**

REMOVAL.

13. Remove the upper and lower oil pans. Refer to **PAN, OIL, REMOVAL**.

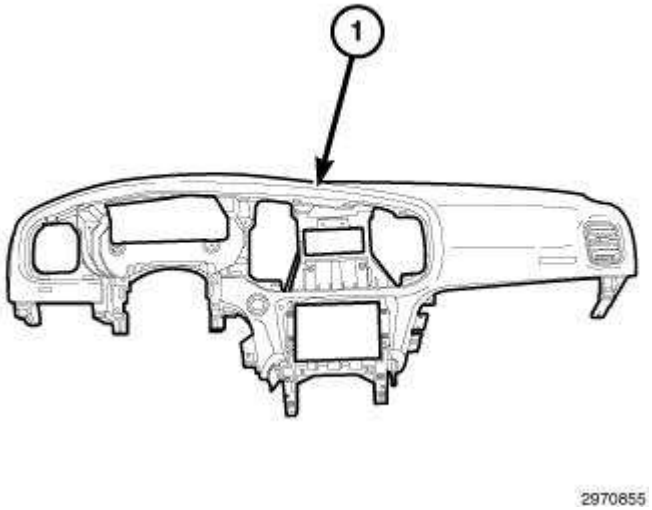

Fig. 789: Timing Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove the water pump or the coolant outlet housing for engine timing cover removal.

14. Remove the following timing cover attaching bolts:
    - Three M10 bolts (1)
    - Two M8 bolts (2)
    - Twenty-two M6 bolts (3)

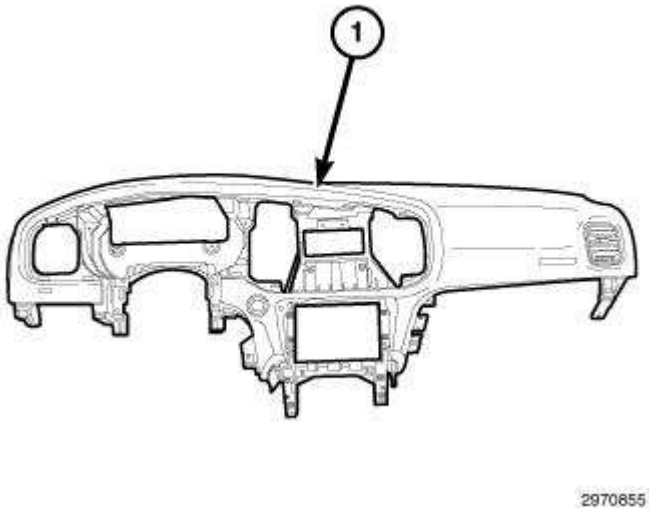

Fig. 790: Timing Cover Removal Pry Points

Courtesy of CHRYSLER GROUP, LLC

15. Using the seven indicated pry points, carefully remove the timing cover.

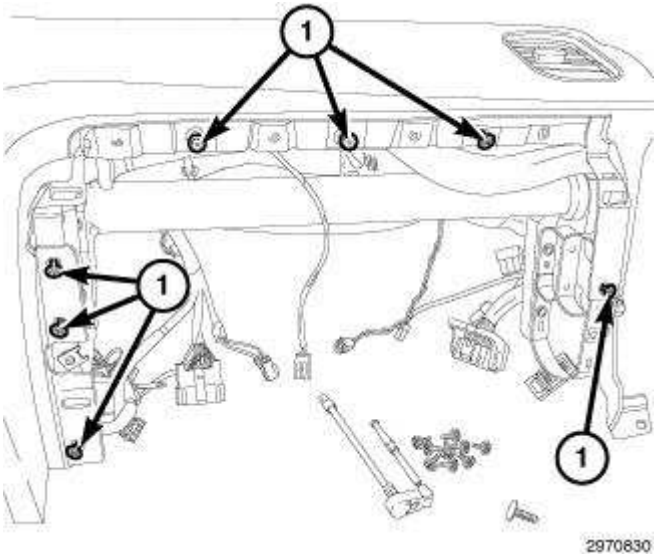

Fig. 791: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

16. If required, remove the remaining four M6 bolts (2) and the coolant outlet housing (1) from the engine timing cover.
17. If required, remove the remaining four M6 bolts (4) and the water pump (3) from the engine timing cover.

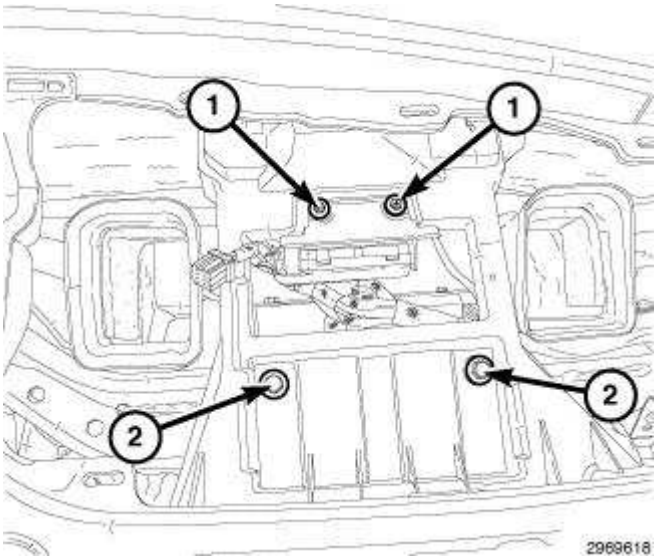

Fig. 792: Sealant At Cylinder Head Bosses, Right & Left Flanges, Cylinder Head-To-Engine Block T-Joints & Cover To Right Cam Chain Tensioner Gap
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing) alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.

18. Remove all residual sealant from the timing chain cover, cylinder head and engine block mating surfaces. Refer to **Engine - Standard Procedure**.

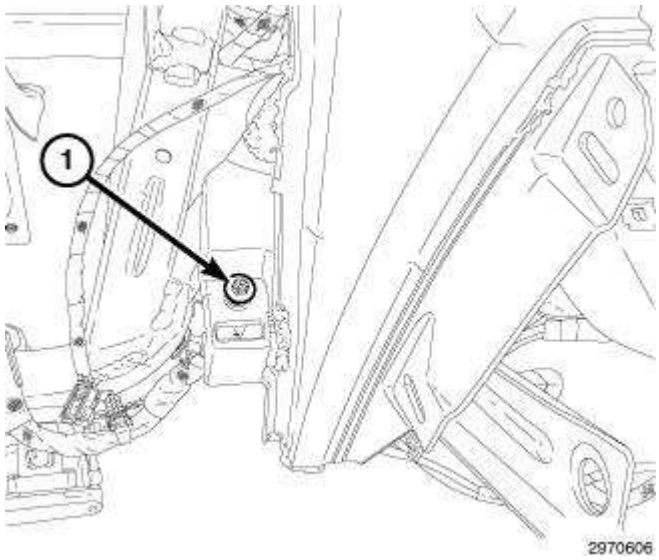

Fig. 793: Coolant Outlet Housing Gasket & Water Pump Gasket
Courtesy of CHRYSLER GROUP, LLC

19. Remove and discard the coolant outlet housing gasket (1) and the water pump gasket (2).

INSTALLATION

INSTALLATION

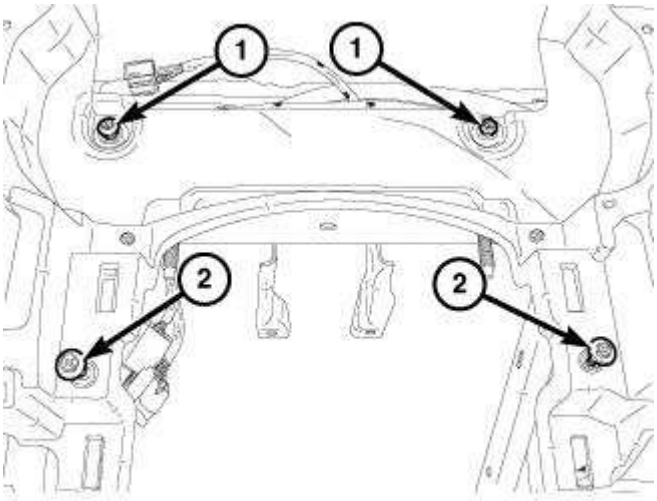

Fig. 794: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the coolant outlet housing (1) to the timing cover with a new gasket using only the four bolts (2) shown in illustration, tightened to 12 N.m (106 in. lbs.).
2. If removed, install the water pump (3) to the timing cover using only the four bolts (4) shown in illustration, tightened to 12 N.m (106 in. lbs.). Refer to **PUMP, WATER, INSTALLATION** .

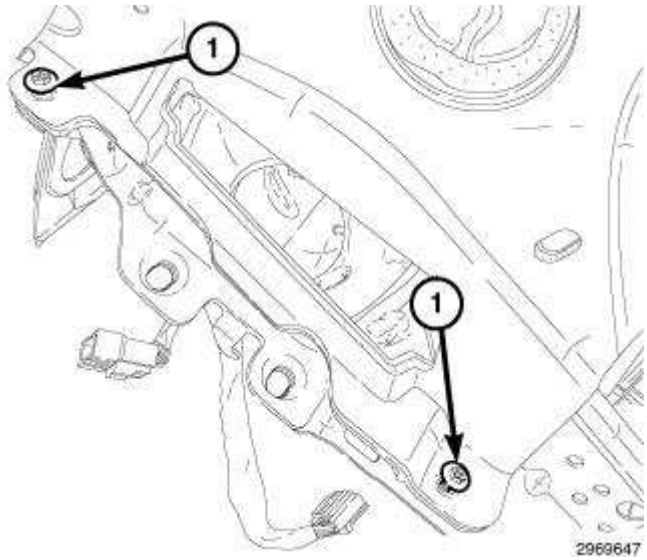

Fig. 795: Coolant Outlet Housing Gasket & Water Pump Gasket
Courtesy of CHRYSLER GROUP, LLC

3. Install the coolant outlet housing gasket (1) and the water pump gasket (2).

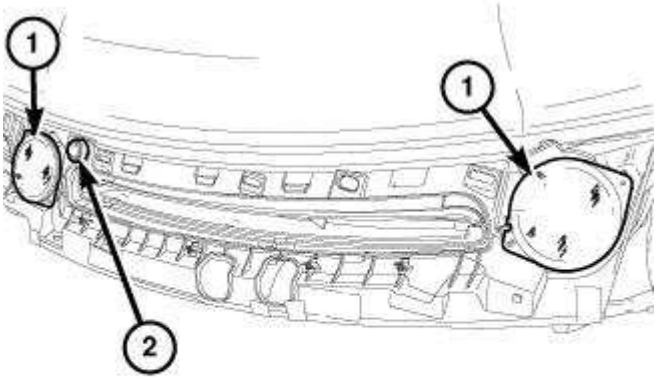

Fig. 796: Sealant At Cylinder Head Bosses, Right & Left Flanges, Cylinder Head-To-Engine Block T-Joints & Cover To Right Cam Chain Tensioner Gap
Courtesy of CHRYSLER GROUP, LLC

4. Clean the engine timing cover, cylinder head and block mating surfaces with isopropyl alcohol in preparation for sealant application.

CAUTION: Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Threebond Engine RTV Sealant may result in engine fluid leakage.

CAUTION: Following the application of Mopar® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

5. Apply a 2 to 3 mm wide bead of Mopar® Threebond Engine RTV Sealant to the front cover as shown in illustration, in the following locations:
   - Three cylinder head bosses (1)
   - Right and left flanges (2)
   - Four cylinder head to engine block T-joints (3)
   - Cover to right cam chain tensioner gap (4)

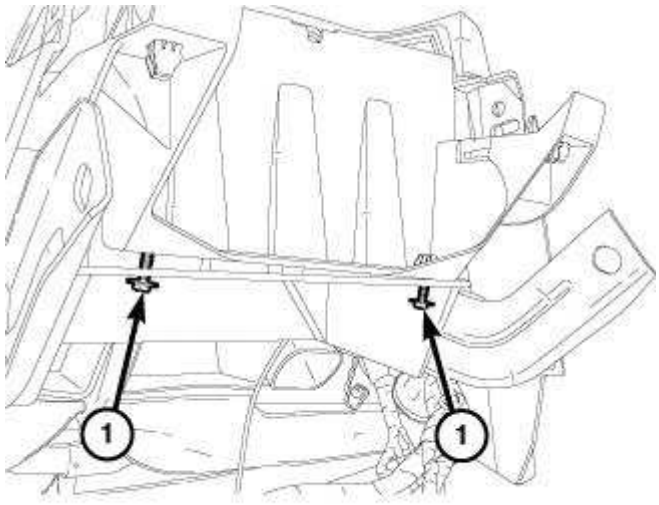

Fig. 797: Timing Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Align the locator pins (4) on the engine block to the engine timing cover and install the cover.
7. Install and tighten the timing cover attaching bolts:
   - Twenty-two M6 bolts (3) to 12 N.m (106 in. lbs.).
   - Two M8 bolts (2) to 25 N.m (18 ft. lbs.).
   - Three M10 bolts (1) to 55 N.m (41 ft. lbs.)

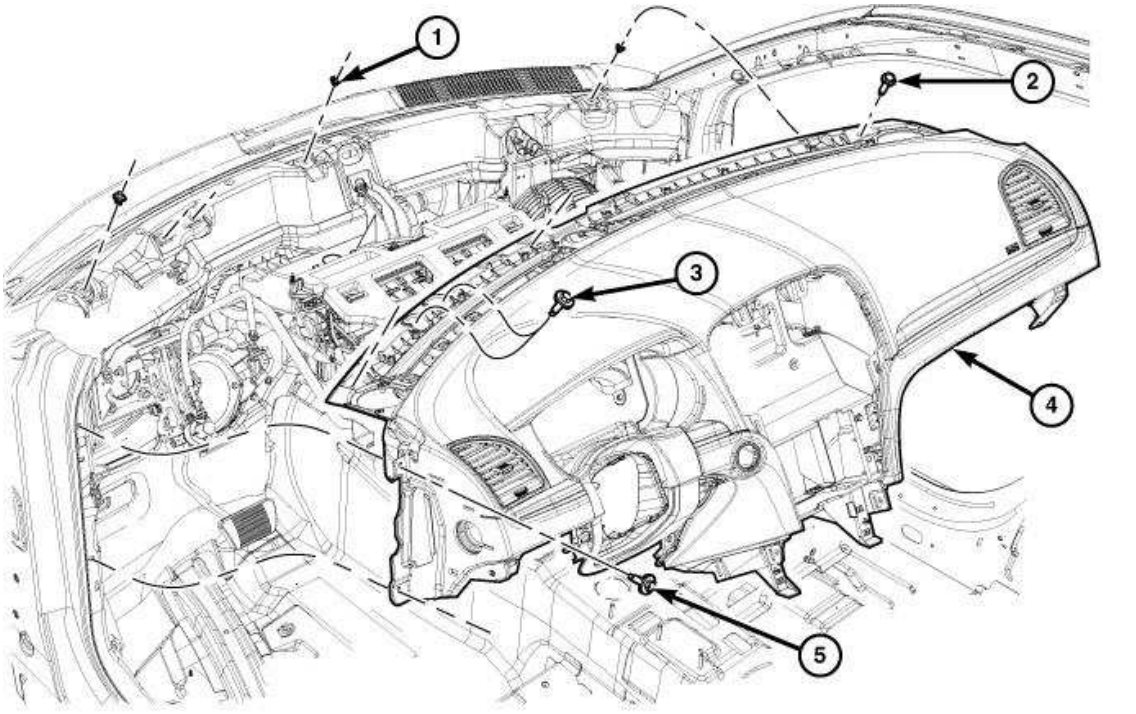

Fig. 798: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

8. Install the upper and lower oil pans. Refer to **PAN, OIL, INSTALLATION**.
9. Install the right and left cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
10. Install the crankshaft vibration damper (6). Refer to **DAMPER, VIBRATION, INSTALLATION**.
11. Install the accessory idler pulley (2). Refer to **PULLEY, IDLER, INSTALLATION** .
12. Install accessory drive belt tensioner (7). Refer to **TENSIONER, BELT, INSTALLATION** .
13. Install the accessory drive belt (3). Refer to **BELT, SERPENTINE, REMOVAL** .

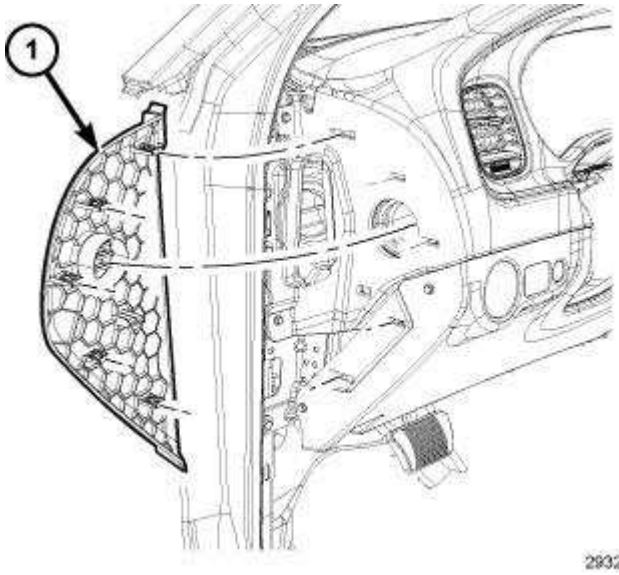

Fig. 799: Heater Core Supply Tube Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Install the heater core supply tube (1) with one bolt (2) tightened to 12 N.m (106 in. lbs.).

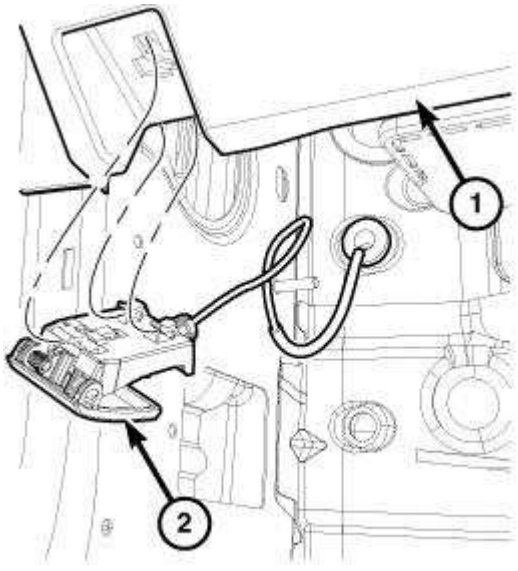

Fig. 800: Heater Core Supply Hose & Coolant Outlet Housing
Courtesy of CHRYSLER GROUP, LLC

15. Install the heater core supply hose (1) to the coolant outlet housing (2).

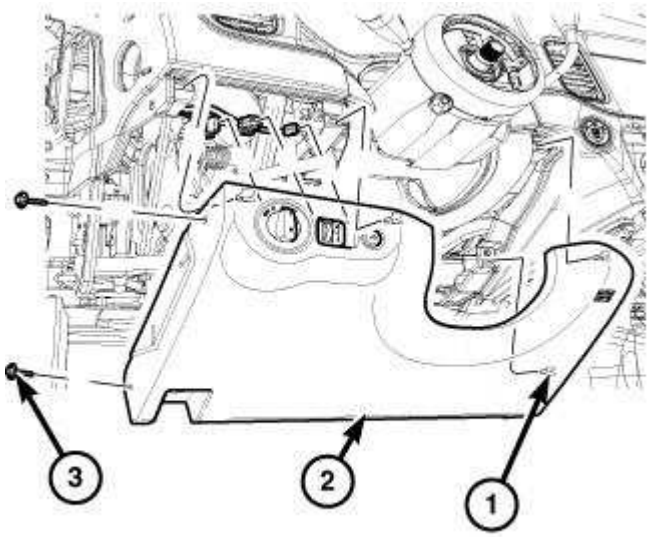

Fig. 801: Radiator Hose & Heater Hose
Courtesy of CHRYSLER GROUP, LLC

16. Install the lower radiator hose (2) to the water pump housing.
17. Install the heater core return hose (1) to the water pump housing.

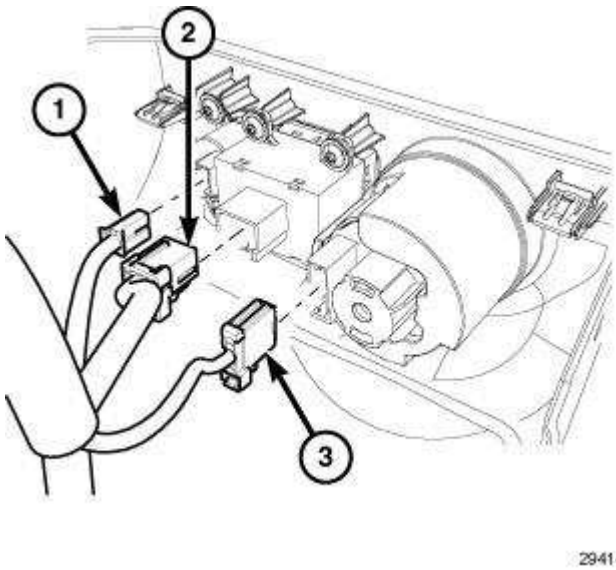

Fig. 802: Upper Radiator Hose & Thermostat Housing
Courtesy of CHRYSLER GROUP, LLC

18. Install the thermostat housing (1) and upper radiator hose (2). Refer to **THERMOSTAT, REMOVAL** .
19. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
20. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

21. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
22. Run the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

ENGINE

5.7L - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

The 5.7L engine (345 CID) eight-cylinder engine is a 90° V-Type lightweight, deep skirt cast iron block, aluminum heads, single cam, overhead valve engine with hydraulic roller tappets. The heads incorporate splayed valves with a hemispherical style combustion chamber and dual spark plugs. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2.

DIAGNOSIS AND TESTING

INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either performance (e.g., engine idles rough and stalls) or mechanical (e.g., a strange noise).

For possible causes and corrections of malfunctions. Refer to **PERFORMANCE** and **MECHANICAL**.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that can not be isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following diagnosis:

- Cylinder Compression Pressure Test. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.
- Cylinder Combustion Pressure Leakage Test. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.
- Engine Cylinder Head Gasket Failure Diagnosis. Refer to **DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE**.
- Intake Manifold Leakage Diagnosis. Refer to **DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKAGE**.

PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION	
ENGINE WILL NOT START	1. Weak battery.	1. Charge or replace as	

		necessary.	
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to the terminals.	
	3. Faulty starter.	3. Refer to **DIAGNOSIS AND TESTING** .	
	4. Incorrect spark plug gap.	4. Refer to **SPECIFICATIONS** .	
	5. Dirt or water in fuel system.	5. Clean system and replace fuel filter.	
	6. Faulty fuel pump, relay or wiring.	6. Refer to **FUEL SYSTEM** article.	
ENGINE STALLS OR ROUGH IDLE	1. Idle speed set to low.	1. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.	
	2. Vacuum leak.	2. Inspect intake manifold and vacuum hoses, repair or replace as necessary.	
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs.	1. Replace spark plugs.	
	2. Dirt or water in fuel system.	2. Clean system and replace fuel filter.	
	3. Blown cylinder head gasket.	3. Replace cylinder head gasket.	
	4. Low compression.	4. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.	
	5. Burned, warped or pitted valves.	5. Replace as necessary.	
	6. Plugged or restricted exhaust	6. Inspect and replace as	

	system.	necessary.	

MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTIONS
NOISY VALVES	1. High or low oil level in crankcase.	1. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
	2. Thin or diluted oil.	2. Change oil and filter.
	3. Low oil pressure.	3. Check oil pump, if Ok, check rod and main bearings for excessive wear.
	4. Dirt in lash adjusters.	4. Replace as necessary.
	5. Worn rocker arms.	5. Replace as necessary.
	6. Worn lash adjusters	6. Replace as necessary.
	7. Worn valve guides.	7. Replace cylinder head.
	8. Excessive runout of valve seats on valve faces.	8. Refer to **Engine/Cylinder Head/SEAL(S), Valve Guide - Description**.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
	2. Low oil pressure.	2. Check oil pump, if Ok, check rod and main bearings for excessive wear.
	3. Thin or diluted oil.	3. Change oil and filter.
	4. Excessive bearing clearance.	4. Replace as necessary.
	5. Connecting rod journal out-of-round.	5. Replace crankshaft.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
	2. Low oil pressure.	2. Check oil pump, if Ok, check rod and main bearings for excessive wear.
	3. Thin or diluted oil.	3. Change oil and filter.
	4. Excessive bearing clearance.	4. Replace as necessary.
	5. Excessive end play.	5. Check thrust washers for wear.
	6. Crankshaft journal out-of round.	6. Replace crankshaft.

	7. Loose flywheel or torque converter.	7. Tighten to correct torque

CYLINDER COMPRESSION PRESSURE LEAKAGE

NOTE: The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

NOTE: Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plugs and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Disable the fuel system and perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the 3rd revolution. Continue the test for the remaining cylinders.

   NOTE: The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.

7. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
8. If one or more cylinders have abnormally low compression pressures, repeat the compression test.

   NOTE: If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question.

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.

CYLINDER COMBUSTION PRESSURE LEAKAGE

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
3. Remove the spark plugs.
4. Remove the oil filler cap.
5. Remove the air cleaner hose.
6. Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1, 379 kPa (200 psi) maximum and 552 kPa (80 psi) recommended.
7. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set piston of cylinder to be tested at TDC compression, While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with no more than 25% leakage.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART**.

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
AIR ESCAPES THROUGH THROTTLE BODY	Intake valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH TAILPIPE	Exhaust valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH RADIATOR	Head gasket leaking or cracked cylinder head or block	Remove cylinder head and inspect. Replace defective part
MORE THAN 50% LEAKAGE FROM ADJACENT CYLINDERS	Head gasket leaking or crack in cylinder head or block between adjacent cylinders	Remove cylinder head and inspect. Replace gasket, head, or block as necessary
MORE THAN 25% LEAKAGE AND AIR ESCAPES	Stuck or broken piston rings; cracked piston; worn rings	Inspect for broken rings or piston. Measure ring gap and

THROUGH OIL FILLER CAP OPENING ONLY	and/or cylinder wall	cylinder diameter, taper and out-of-round. Replace defective part as necessary

LUBRICATION

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-Rings.	1. Replace as necessary.
	a. Misaligned or damaged.	a. Replace as necessary.
	b. Loose fasteners, broken or porous metal parts.	b. Tighten fasteners, Repair or replace metal parts.
	2. Crankshaft rear seal.	2. Replace as necessary.
	3. Crankshaft seal flange. Scratched, nicked or grooved.	3. Polish or replace crankshaft.
	4. Oil pan flange cracked.	4. Replace oil pan.
	5. Front cover seal, damaged or misaligned.	5. Replace seal.
	6. Scratched or damaged vibration damper hub.	6. Polish or replace damper.
	7. Crankshaft Rear Flange Microporosity.	7. Replace Crankshaft.
OIL PRESSURE DROP	1. Low oil level.	1. Check and correct oil level.
	2. Faulty oil pressure sending unit.	2. Replace sending unit.
	3. Low oil pressure.	3. Check pump and bearing clearance.
	4. Clogged oil filter.	4. Replace oil filter.
	5. Worn oil pump.	5. Replace as necessary.
	6. Thin or diluted oil.	6. Change oil and filter.
	7. Excessive bearing clearance.	7. Replace as necessary.
	8. Oil pump relief valve stuck.	8. Replace oil pump.
	9. Oil pickup tube loose or damaged.	9. Replace as necessary.
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings.	1. Hone cylinder bores and replace rings.
	2. Carbon in oil ring slots.	2. Replace rings.
	3. Incorrect ring size installed.	3. Replace rings.
	4. Worn valve guides.	4. Ream guides and replace valves.
	5. Leaking intake gasket(s).	5. Replace intake gasket(s).

	6. Leaking valve guide seals.	6. Replace valve guide seals.

ENGINE DIAGNOSIS - MECHANICAL

ENGINE MECHANICAL DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase	1. Check for correct oil level. Adjust oil level by draining or adding as needed
	2. Thin or diluted oil	2. Change oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	3. Low oil pressure	3. Check engine oil level. If ok, Perform oil pressure test. for engine oil pressure test/specifications. Refer to **Engine/Lubrication - Diagnosis and Testing**.
	4. Dirt in tappets/lash adjusters	4. Clean/replace hydraulic tappets/lash adjusters
	5. Bent push rod(s)	5. Install new push rods
	6. Worn rocker arms	6. Inspect oil supply to rocker arms and replace worn arms as needed
	7. Worn tappets/lash adjusters	7. Install new hydraulic tappets/lash adjusters
	8. Worn valve guides	8. Inspect all valve guides and replace as necessary
	9. Excessive runout of valve seats or valve faces	9. Grind valves and seats
CONNECTING ROD NOISE	1. Insufficient oil supply	1. Check engine oil level.
	2. Low oil pressure	2. Check engine oil level. If ok, Perform oil pressure test. engine oil pressure test/specifications. Refer to **Engine/Lubrication - Diagnosis and Testing**.
	3. Thin or diluted oil	3. Change oil to correct viscosity. for correct procedure/engine oil specifications. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	4. Excessive connecting rod bearing clearance	4. Measure bearings for correct clearance with plasti-gage. Repair as necessary
	5. Connecting rod journal out of round	5. Replace crankshaft or grind journals
	6. Misaligned connecting	6. Replace bent connecting rods

	rods	
MAIN BEARING NOISE	1. Insufficient oil supply	1. Check engine oil level.
	2. Low oil pressure	2. Check engine oil level. If ok, Perform oil pressure test. Refer to **Engine/Lubrication - Diagnosis and Testing**.
	3. Thin or diluted oil	3. Change oil to correct viscosity.
	4. Excessive main bearing clearance	4. Measure bearings for correct clearance. Repair as necessary
	5. Excessive end play	5. Check crankshaft thrust bearing for excessive wear on flanges
	6. Crankshaft main journal out of round or worn	6. Grind journals or replace crankshaft
	7. Loose flywheel or torque converter	7. Inspect crankshaft, flexplate/flywheel and bolts for damage. Tighten to correct torque
LOW OIL PRESSURE	1. Low oil level	1. Check oil level and fill if necessary
	2. Faulty oil pressure sending unit	2. Install new sending unit
	3. Clogged oil filter	3. Install new oil filter
	4. Worn oil pump	4. Replace oil pump assembly.
	5. Thin or diluted oil	5. Change oil to correct viscosity.
	6. Excessive bearing clearance	6. Measure bearings for correct clearance
	7. Oil pump relief valve stuck	7. Remove valve to inspect and verify, replace oil pump assembly.
	8. Oil pickup tube loose, broken, bent or clogged	8. Inspect oil pickup tube and pump, and clean or replace if necessary
	9. Oil pump cover warped or cracked	9. Install new oil pump
OIL LEAKS	1. Misaligned or deteriorated gaskets	1. Replace gasket
	2. Loose fastener, broken or porous metal part	2. Tighten, repair or replace the part
	3. Front or rear crankshaft oil seal leaking	3. Replace seal
	4. Leaking oil gallery plug or cup plug	4. Remove and reseal threaded plug. Replace cup style plug
EXCESSIVE OIL CONSUMPTION OR SPARK PLUGS OIL FOULED	1. CCV System malfunction	1. Refer to **OPERATION** .
	2. Defective valve stem seal (s)	2. Repair or replace seal(s)
	3. Worn or broken piston rings	3. Hone cylinder bores. Install new rings

	4. Scuffed pistons/cylinder walls	4. Hone cylinder bores and replace pistons as required
	5. Carbon in oil control ring groove	5. Remove rings and de-carbon piston
	6. Worn valve guides	6. Inspect/replace valve guides as necessary
	7. Piston rings fitted too tightly in grooves	7. Remove rings and check ring end gap and side clearance. Replace if necessary

OIL CONSUMPTION TEST AND DIAGNOSIS

Diagnostic Procedures

The following diagnostic procedures are used to determine the source of excessive internal oil Consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: Engine oil consumption may be greater than normal during engine break-in. Repairs should be delayed until vehicle has been driven at least 7, 500 miles.

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, ensure no external engine oil leaks are present.

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and/or correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.

2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPAR® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.
4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, re-check for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a **CYLINDER COMPRESSION PRESSURE LEAKAGE** test and **CYLINDER-TO-CYLINDER LEAKAGE TEST** using the standard leak down gauge following manufacturers suggested best practices.

   NOTE: Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or valve guides are at fault.

3. If one or more cylinders have more than 15% leak down further engine tear down and inspection will be required.

TOP 19 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings, also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of "PCV "system**

The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

   When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption;

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

    Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and/or ambient temperatures.

12. **Dirty Engine Oil**

    Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

    Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick in this incorrect position which will actually make the oil level too high. If the oil level is so high that the lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

    A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

    Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

    There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

    Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption, an extremely dirty air filter would be one example of this situation.

STANDARD PROCEDURE

ENGINE GASKET SURFACE PREPARATION

Fig. 1: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

Fig. 2: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- High speed power tool with a plastic bristle brush style disc.

Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent).

DUST COVERS AND CAPS

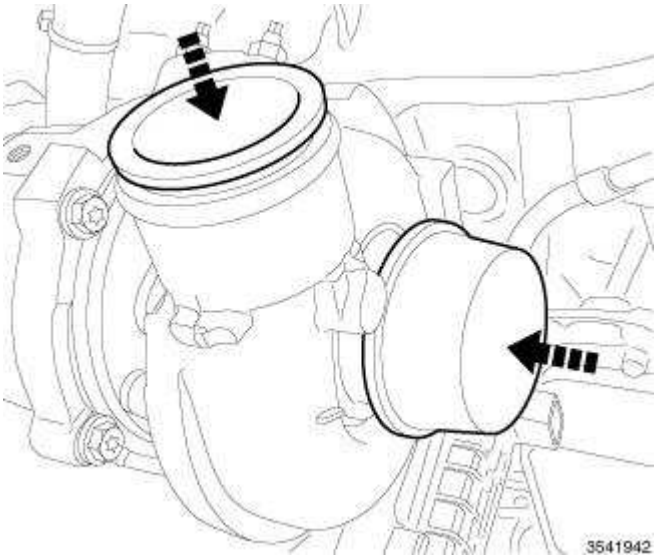

Fig. 3: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

Due to the high amounts of failures cased by dust, dirt, moisture and other foreign debris being introduced to the engine during service. Covers or caps are needed to reduce the possible damage that can be caused or created.

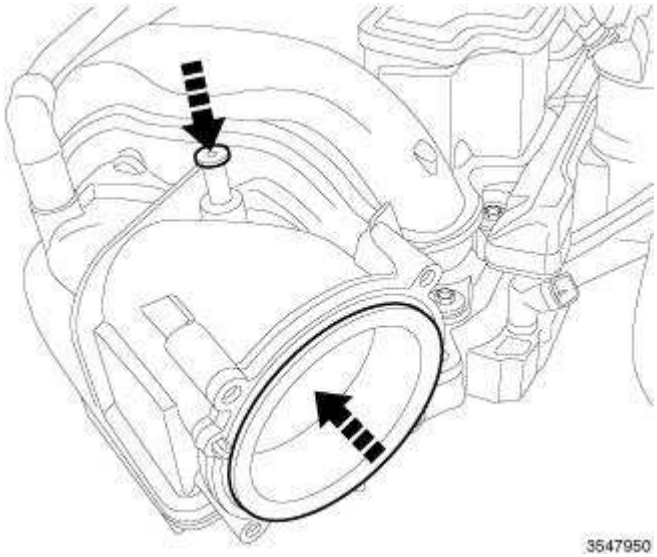

Fig. 4: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers over openings will reduce any possibilities for foreign materials to enter the engine systems. Using miller tool (special tool #10368, Set, Universal Protective Cap), Select the appropriated cover needed to the procedure.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Be sure that the tapped holes maintain the original center line.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads.
- Tapping the hole with a special Heli-Coil Tap.
- Installing an insert into the tapped hole to bring the hole back to its original thread size.

HYDROSTATIC LOCK

CAUTION: Do not attempt to run engine. Severe damage could occur.

When an engine is suspected of hydrostatic lock (regardless of what caused the problem), follow the steps below.

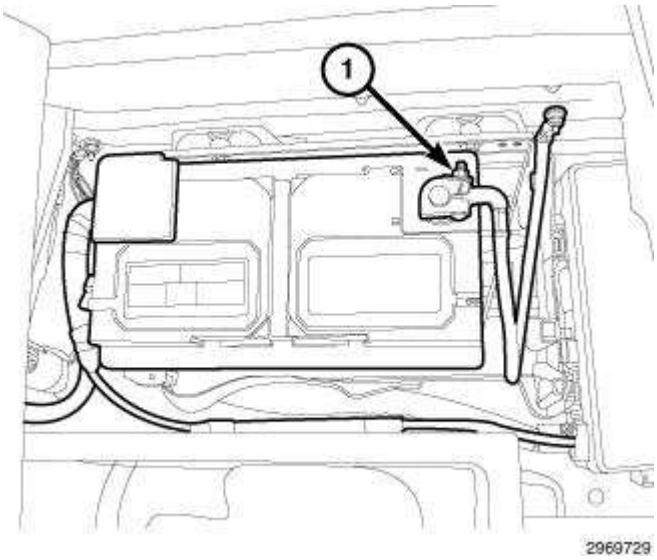

Fig. 5: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

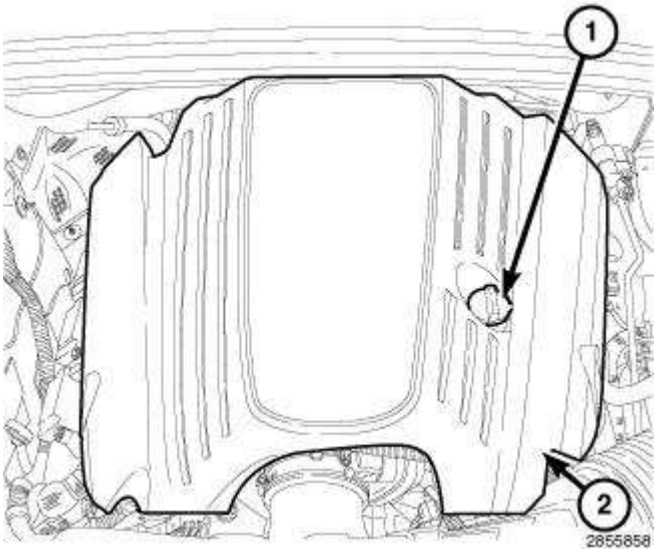

Fig. 6: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).
3. Place a shop towel around the fuel supply line Quick Connect Fitting to catch any fuel that may be under pressure and disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .

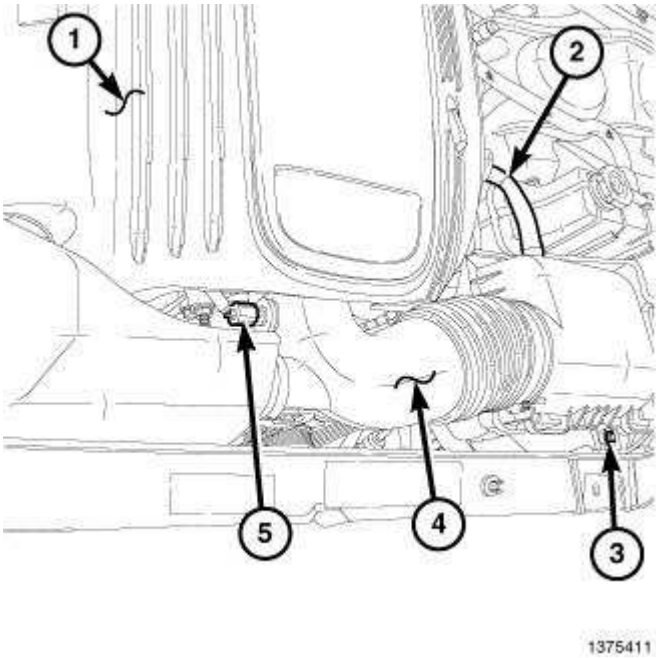

Fig. 7: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the intake air temperature (IAT) sensor (5) electrical connector.
5. Loosen the air duct retaining clamps at the throttle body and the air cleaner housing and remove the air duct (4).

6. Disconnect the make up air hose (MUA) (2).
7. Remove the air cleaner housing retaining bolt (3).
8. Remove the air cleaner housing from the vehicle.
9. Inspect the air duct, air cleaner housing and the intake manifold to make sure the system is dry and clear of any foreign material.
10. Place a shop towel around the spark plugs to catch any fluid that may possibly be under pressure in the cylinder head.
11. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
12. With the spark plugs removed, rotate the crankshaft using a breaker bar and socket.
13. Identify the fluid in the cylinders (coolant, fuel, oil).
14. Make sure all fluid has been removed from the cylinders.
15. Repair engine or components as necessary to prevent this problem from occurring again.
16. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This will help prevent engine damage on restart.
17. Install new spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
18. Perform the Engine Oil Service procedure. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
19. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
20. Start the engine and check for leaks.

FORM-IN-PLACE GASKETS AND SEALERS

NOTE: All sealants mentioned below are not used on every engine, they are listed as general reference guide. See service information for specific sealer usage.

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin of a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. All sealing surfaces that use form-in-place gaskets and sealers must be free of grease or oil. Clean surfaces with Mopar® brake parts cleaner prior to sealer application. After the sealer is applied, assemble the parts within 10 minutes.

Numerous types of form-in-place gasket materials are used in the engine area. Mopar® Sealant RTV Silicone Rubber Adhesive, MOPAR® Silicone Rubber RTV, Mopar® ATF-RTV and Mopar® Gasket Maker gasket materials, each have different properties and cannot be used in place of the other.

MOPAR® SEALANT RTV SILICONE RUBBER ADHESIVE is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® SILICONE RUBBER RTV is used to seal components exposed to engine oil, gear lubricant, and coolant. This material is a specially designed gray silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil, gear lubricant and coolant. Excellent adhesion even on oily surfaces, withstands temperatures to 330° C (626° F). Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF-RTV is a specially designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® GASKET SEALANT is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. It can be used on threaded and machined parts under all temperatures. This material also prevents corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or in a 4 oz. or 6 oz. can with applicator.

SEALER APPLICATION

Apply 1 mm (0.040 in.) diameter or less of Mopar® Gasket Maker material to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Tighten the components in place within 15 minutes. Use a locating dowel during assembly to prevent smearing material off the location.

Apply Mopar® RTV or ATF-RTV gasket material in a continuous bead approximately 3 mm (0.120 in.) in diameter. For corner sealing and "T-Joint" locations and waffle pad area, a 0.635 mm (0.025 in.) drop is placed in the center of the gasket contact area. Remove uncured sealant with a shop towel. Tighten the components in place while the sealant is still wet to the touch (within 10 minutes). Use a locating dowel during assembly to prevent smearing material off the location.

SPECIFICATIONS

SPECIFICATIONS

ENGINE SPECIFICATIONS

EAGLE ENGINE - 90° V-8 OHV

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Displacement	5.7 Liters	348 CID
Bore	99.5 mm	3.92 in.

Stroke	90.9 mm	3.58 in.
Compression Ratio	10.5:1	
Max. Variation Between Cylinders	25%	
Firing Order	1-8-4-3-6-5-7-2	
Lubrication	Pressure Feed - Full Flow Filtration	
Cooling System	Liquid Cooled	
Cylinder Block	Cast Iron	
Cylinder Head	Aluminum	
Crankshaft	Nodular Iron	
Camshaft	Cast Iron	
Pistons	Aluminum Alloy	
Connecting Rods	Powdered Metal	

CYLINDER BLOCK

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Cylinder Bore Diameter	99.50 mm	3.92 in.
Out of Round (MAX)	0.0076 mm	0.0003 in.
Taper (MAX)	0.0127 mm	0.0005 in.
Lifter Bore Diameter	21.45 - 21.425 mm	0.8444 - 0.8435 in.

PISTONS & PINS

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Clearance Measured at 38.0 mm (1.5 in.) Below Deck	0.031 - 0.058 mm	0.012 - 0.023 in.
Ring Groove Diameter		
Top Groove	90.4 - 90.6 mm	3.56 - 3.57 in.
Second Groove	88.4 - 88.7 mm	3.48 - 3.49 in.
Weight	413 grams	14.56 oz
Piston Length	53.3 mm	2.10 in.
Ring Groove Width		
No. 1	1.23 - 1.26 mm	0.048 - 0.0496 in
No. 2	1.23 - 1.25 mm	0.048 - 0.0492 in.
No. 3	2.03 - 2.05 mm	0.079 - 0.080 in.

PISTON PINS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Clearance In Piston	0.005 - 0.014 mm	0.0001 - 0.0005 in.
Diameter	24.004 - 24.007 mm	0.945 - 0.9451 in.
Length	62.99 - 63.21 mm	2.47 - 2.48 in.

PISTON RINGS

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Ring Gap		
Top Compression Ring	0.40 - 0.55 mm	0.015 - 0.021 in.
Second Compression Ring	0.24 - 0.51 mm	0.009 - 0.020 in.
Oil Control Rails	0.15 - 0.66 mm	0.0059 - 0.0259 in.
Side Clearance		
Top Compression Ring	0.04 - 0.09 mm	0.001 - 0.0035 in.
Second Compression Ring	0.04 -.08 mm	0.001 - 0.0031 in.
Oil Control Rails	0.06 - 0.21 mm	0.002 - 0.008 in.
Ring Width		
Top Compression Ring	1.17 - 1.19 mm	0.0460 - 0.0468 in.
Second Compression Ring	1.17 - 1.19 mm	0.0460 - 0.0468 in.
Oil Control Rails	0.387 - 0.413 mm	0.015 - 0.016 in.

CONNECTING RODS

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Piston Pin Bore Diameter	24.014 - 24.024 mm	0.9454 - 0.9458 in.
Side Clearance	0.10 - 0.35 mm	0.003 - 0.0137 in.

CRANKSHAFT

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Main Bearing Journal Diameter - Orange	64.988 - 64.9960 mm	2.5586 - 2.5589 in.
Main Bearing Journal Diameter - Black	64.9960 - 65.0040 mm	2.5589 - 2.5592 in.
Main Bearing Journal Diameter		

- Green	65.0040 - 65.0120 mm	2.5592 - 2.5595 in.
Bearing Clearance	0.013 - 0.041 mm	0.000512 - 0.00161 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.
End Play	0.052 - 0.282 mm	0.002 - 0.011 in.
End Play (MAX)	0.282 mm	0.011 in.
Connecting Rod Journal Diameter	53.992 - 54.008 mm	2.126 in.
Bearing Clearance	0.041 - 0.066 mm	0.00161 - 0.0026 in.
Out of Round (MAX)	0.018 mm	0.0007 in.
Taper (MAX)	0.003 mm	0.0001 in.

CAMSHAFT

CAMSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Bearing Journal Diameter		
No. 1	61.67 mm	2.428 in.
No. 2	57.79 mm	2.275 in.
No. 3	57.390 mm	2.26 in.
No. 4	56.990 mm	2.24 in.
No. 5	43.623 mm	1.72 in.
Bearing To Journal Clearance Standard		
No. 1	0.030 - 0.070 mm	.0012 -.0028 in.
No. 2	0.050 -0.090 mm	0.0019 -.0035 in.
No. 3	0.040 - 0.080 mm	.0015 -.003 in.
No. 4	0.050 - 0.090 mm	0.0019 -.0035 in.
No. 5	0.040 - 0.080 mm	.0015 -.003 in.
Camshaft End Play	.080 - 0.290 mm	0.0031 - 0.0114 in.

VALVE TIMING

VALVE TIMING

DESCRIPTION	SPECIFICATION
Intake	
Opens (BTDC)	21.7°
Closes (ATDC)	236.3°
Duration	258°
Exhaust	
Opens (BTDC)	270.2°

Closes (ATDC)	17.8°
Duration	288°
Valve Overlap	39.5°

CYLINDER HEAD

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Valve Seat Angle	44.5° - 45.0°	
Valve Seat Runout (MAX)	0.05 mm	0.0019 in.
Valve Seat Width (finish)		
Intake	1.18 - 1.62 mm	.0638 in.
Exhaust	1.48 - 1.92 mm	0.0583 - 0.0756 in.
Guide Bore Diameter (Std.)	7.975 - 8.00 mm	0.3134 - 0.315 in.

HYDRAULIC TAPPETS

HYDRAULIC TAPPETS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Body Diameter	21.387 - 21.405 mm	0.8420 - 0.8427 in.
Clearance (to bore)	0.020 - 0.063 mm	0.0008 - 0.0025 in.
Dry Lash	3.0 mm (at the valve)	0.1181 in. (at the valve)

VALVES

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Face Angle	45.0° - 45.5°	
Head Diameter		
Intake	50.67 - 50.93 mm	1.99 - 2.01 in.
Exhaust	39.27 - 39.53 mm	1.55 - 1.56 in.
Length (overall)		
Intake	123.38 - 123.76 mm	4.857 - 4.872 in.
Exhaust	120.475 - 120.855 mm	4.743 - 4.758 in.
Stem Diameter		
Intake	7.935 - 7.953 mm	0.312 - 0.313 in.
Exhaust	7.932 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance		
Intake	0.022 - 0.065 mm	0.0008 - 0.0025 in.

Exhaust	0.025 - 0.065 mm	0.0009 - 0.0025 in.
Valve Lift (@ zero lash)		
Intake	12.0 mm	0.472 in.
Exhaust	11.70 mm	0.460 in.

VALVE SPRING

VALVE SPRING

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Spring Force (valve closed)	520.0 N @ 50.50 mm	116.9 lbs @ 1.99 in.
Spring Force (valve open)	1475.0 N @ 37.25 mm.	331.6 lbs. @ 1.47 in.
Free Length (approx).	60.2 mm	2.37 in.
Number of Coils	8.35	
Wire Diameter	5.65 X 4.51 mm	0.222 - 0.178 in.
Installed Height (spring seat to bottom of retainer)	50.50 mm	1.99 in.

OIL PUMP

OIL PUMP

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Clearance Over Rotors (MAX)	0.095 mm	0.0038 in.
Outer Rotor to Pump Body Clearance (MAX)	.235 mm	0.009 in.
Tip Clearance Between Rotors (MAX)	0.150 mm	0.006 in.

OIL PRESSURE

OIL PRESSURE

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
At Curb Idle Speed (MIN)*	25 kPa	4 psi
@ 3000 rpm	170 - 758 kPa	25 - 110 psi
*** CAUTION: If pressure is zero at curb idle, DO NOT run engine.**		

TORQUE SPECIFICATIONS

TORQUE CHART 5.7L ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Block Pipe Plugs	20	15	-

(1/4 NPT)			
(3/8 NPT)	27	20	-
Camshaft Sprocket Bolt	122	90	-
Camshaft Tensioner Plate Bolts	28	21	-
Coil to Cylinder Head Cover Bolts	7	-	62
Timing Chain Case Cover Bolts	28	21	-
Lifting Stud	55	41	-
Connecting Rod Cap Bolts	21 plus 90° Turn	15 plus 90° Turn	-
Main Bearing Cap Bolts - M12	28 plus 90° Turn	20 plus 90° Turn	-
Crossbolts - M8	31	23	-
Cylinder Head Bolts - M12			
Step 1	34	25	-
Step 2	54	40	-
Step 3	Turn 90°	Turn 90°	-
M8 Bolts			
Step 1	20	15	-
Step 2	34	25	-
Cylinder Head Cover Bolts	8	-	71
Exhaust Manifold to Cylinder Head	25	18	-
Flexplate to Crankshaft Bolts	95	70	-
Flywheel to Crankshaft Bolts	75	55	-
Front Insulator Through bolt/nut	95	70	-
Front Insulator to Block Bolts	95	70	-
Generator Mounting Bolt	55	41	-
Intake Manifold Bolts	12	9	-
Lifter Guide Holder	12	9	-
Oil Pan Bolts	12	9	-
Oil Dipstick Tube	12	9	-
Oil Pan Drain Plug	27	20	-
Oil Pump Attaching Bolts	28	21	-
Oil Pump Pickup Tube Bolt and Nut	28	21	-
Rear Seal Retainer Attaching Bolts	15	11	-
Rear Insulator to Bracket	68	50	-
Rear Insulator to Crossmember	41	30	-
Rear Insulator to Transmission	68	50	-
Rear Insulator Bracket Bolts	68	50	-
Rocker Arm Bolts	22	16	-

Thermostat Housing Bolts	13	-	115
Throttle Body Bolts	12	9	-
Vibration Damper Bolt	176	130	-
Water Pump to Timing Chain	28	21	-
Case Cover Bolts	28	21	-

REMOVAL

REMOVAL

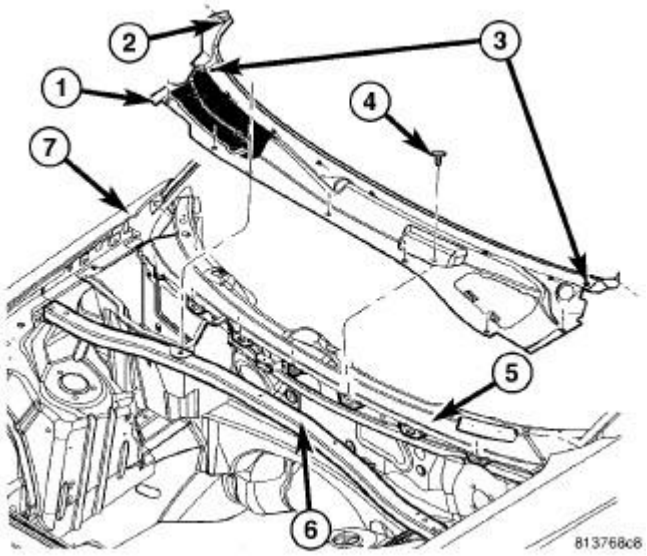

Fig. 8: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Remove the hood. Refer to **HOOD, REMOVAL** .
2. Remove the cowl panel cover (1). Refer to **COVER, COWL PANEL, REMOVAL** .
3. Remove the strut tower support (6).

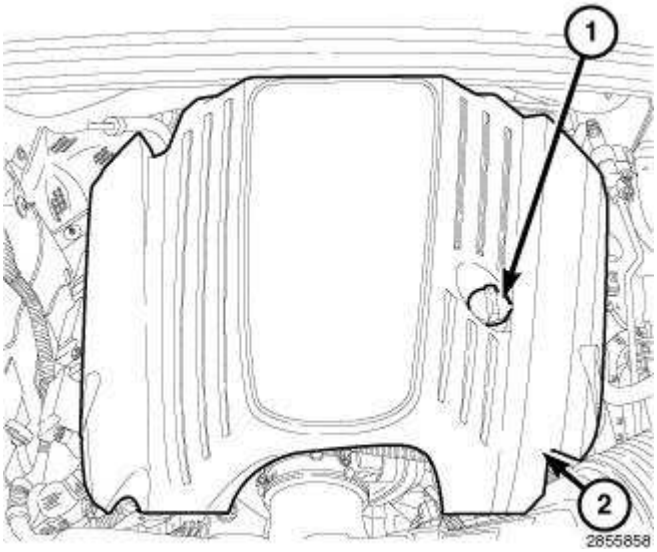

Fig. 9: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

4. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).
5. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .

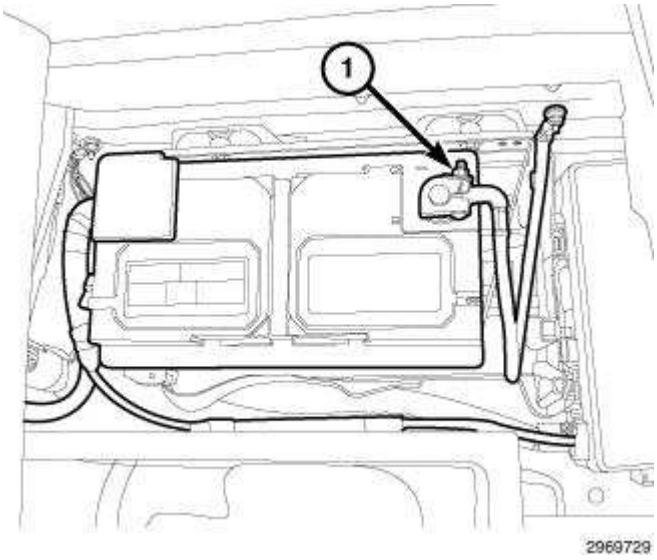

Fig. 10: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect and isolate the negative battery cable (1).

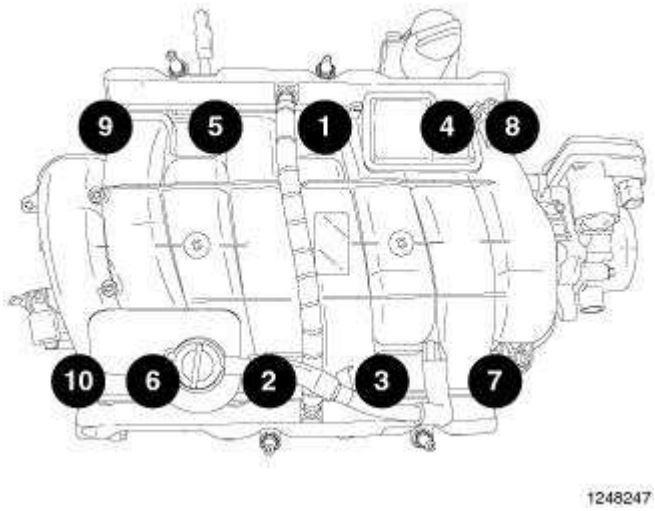

Fig. 11: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Remove the intake manifold and throttle body as an assembly.

7. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

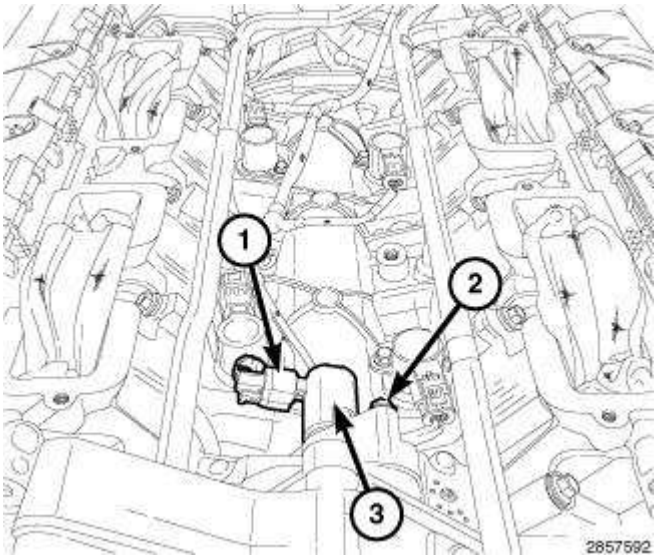

Fig. 12: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The engine must be at room temperature before removing the oil control valve.

8. Disconnect the oil control valve electrical connector (1).
9. Remove the oil control valve retaining bolt (2).

10. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

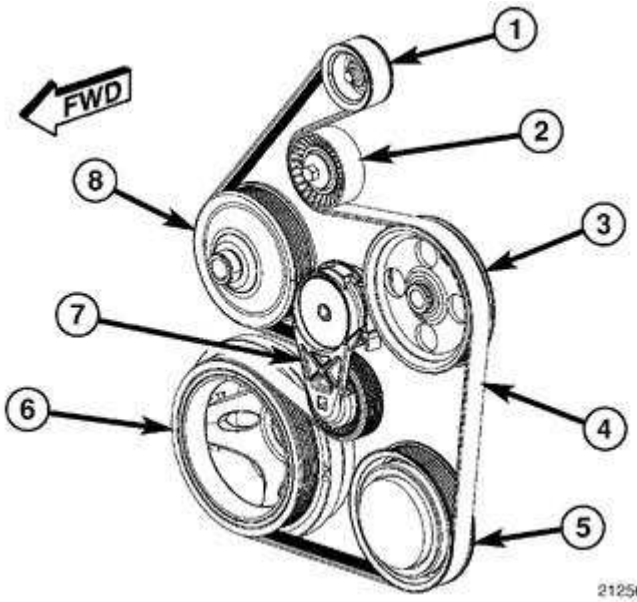

Fig. 13: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

11. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and remove the accessory drive belt (2), then slowly rotate the tensioner into the freearm position.

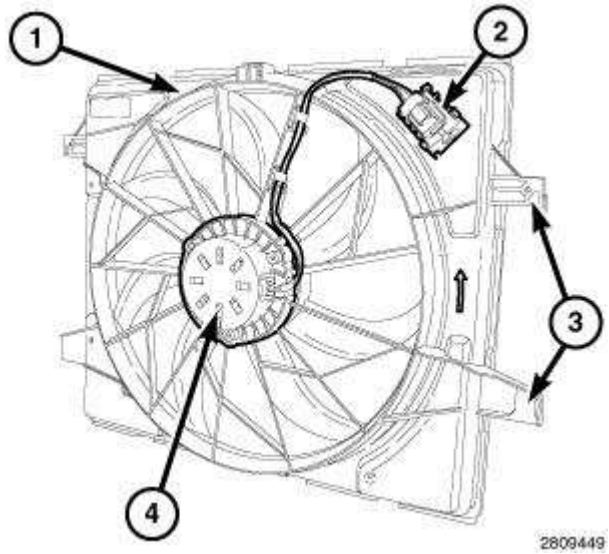

Fig. 14: Cooling Fan Module Components
Courtesy of CHRYSLER GROUP, LLC

12. Remove the cooling fan (1). Refer to **FAN, COOLING, REMOVAL** .

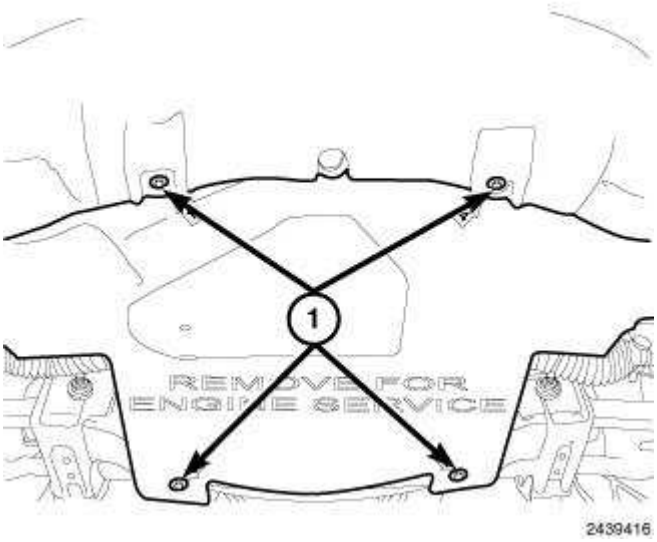

Fig. 15: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
14. Remove the belly pan retainers (1) and remove the belly pan.
15. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
16. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

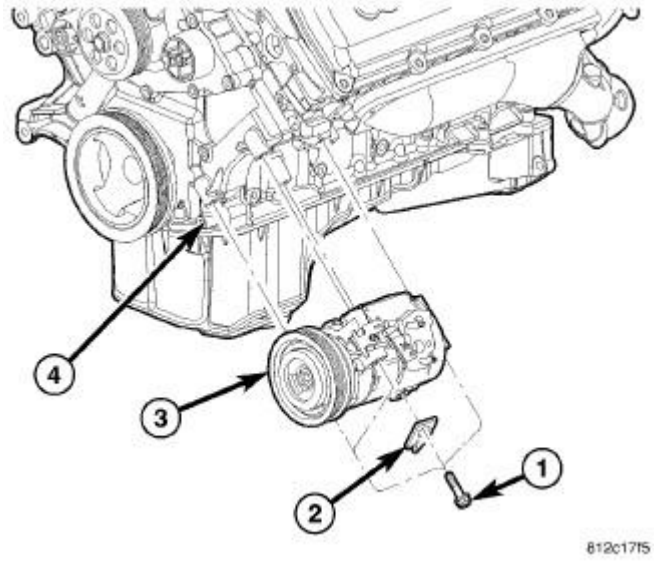

Fig. 16: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

17. Remove the A/C compressor (3). Refer to **COMPRESSOR, A/C, REMOVAL** .

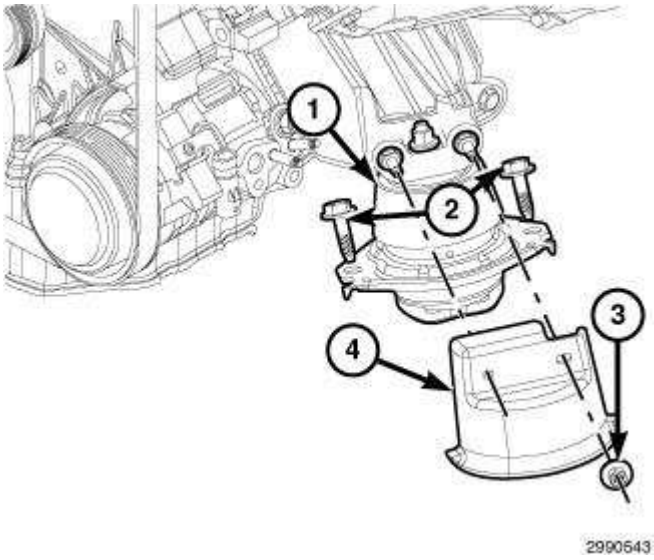

Fig. 17: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

18. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields.
19. Remove both left/right engine mount to frame retaining bolts (2).
20. Disconnect the transmission oil cooler lines from their retainers at the oil pan.

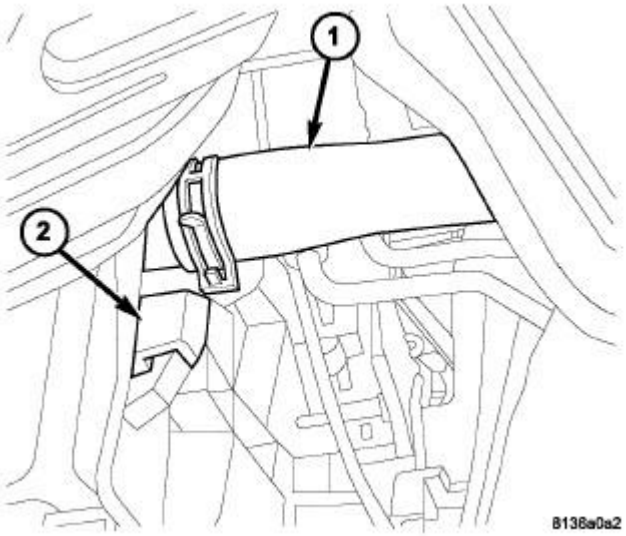

Fig. 18: Lower Radiator Hose & Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

21. Remove the lower radiator hose (1).

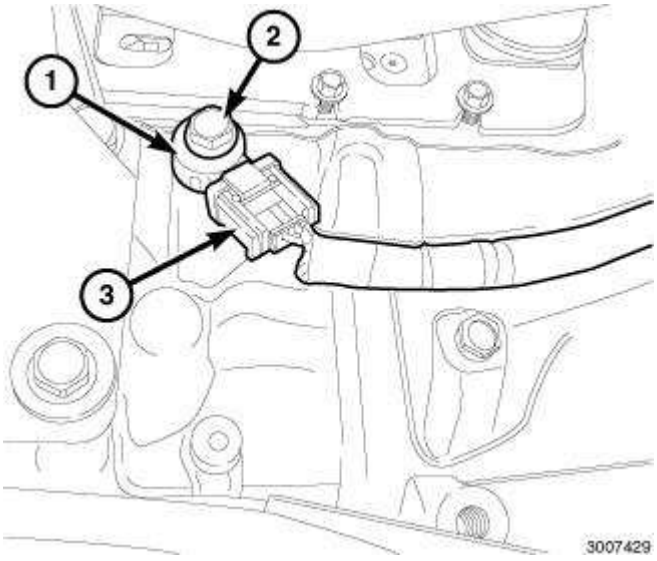

Fig. 19: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Two knock sensors are used. Each sensor is bolted to the outside of the engine block below the exhaust manifold.

NOTE: Left side shown in illustration, right side similar.

22. Remove the heat shields from both knock sensors (shield snaps on/off sensor).
23. Disconnect the knock sensor electrical connectors (3).

CAUTION: When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters hanging from the oxygen sensor wires damages the harness and/or sensors.

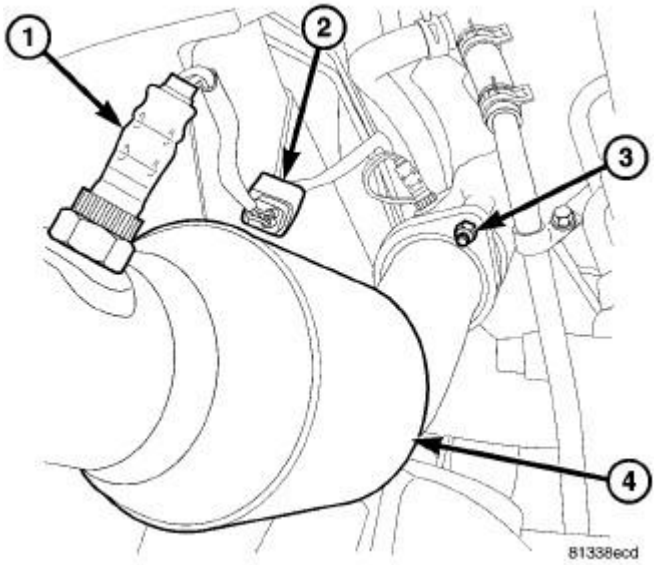

Fig. 20: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

24. Disconnect all oxygen sensor electrical connectors (2).
25. Saturate all exhaust bolts and nuts (3) with Mopar® Rust Penetrant. Allow five minutes for penetration.
26. Remove the both catalytic converter to manifold flange nuts (3) and separate the catalytic converters (4) from the exhaust manifolds.

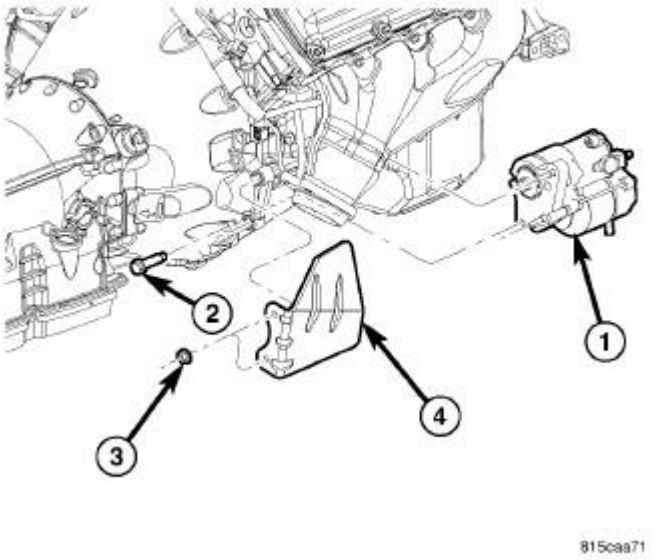

Fig. 21: Removing/Installing Starter
Courtesy of CHRYSLER GROUP, LLC

27. Remove the starter motor (1) heat shield (4).
28. Disconnect the starter wires, remove the starter motor retaining bolts (2) and remove the starter (1). Refer to **STARTER, REMOVAL** .

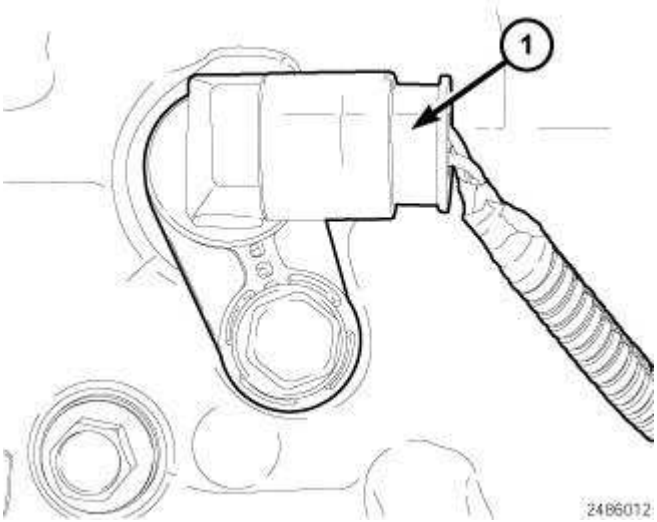

Fig. 22: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block.

29. Remove the CKP sensor electrical connector (1).

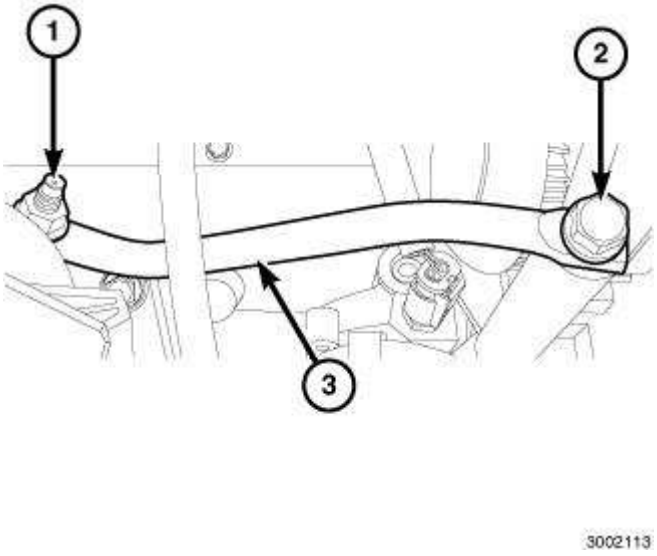

Fig. 23: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

30. Remove the generator support bracket to engine mount retaining nut (1).
31. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).
32. Lower the vehicle.

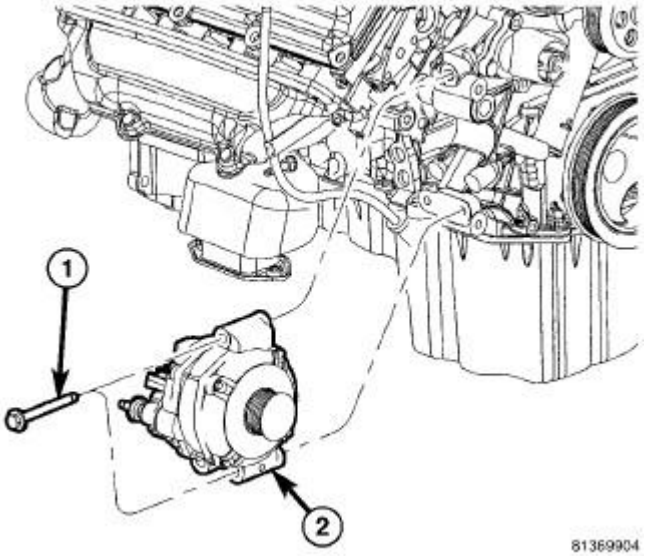

Fig. 24: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

33. Unsnap the plastic insulator cap from the B+ output terminal.
34. Remove the B+ terminal mounting nut at the rear of the generator and remove the B+ terminal.

35. Depress the field wire connector tab at the rear of the generator and disconnect the field wire connector.
36. Remove the two generator retaining bolts (1) and remove the generator (2).

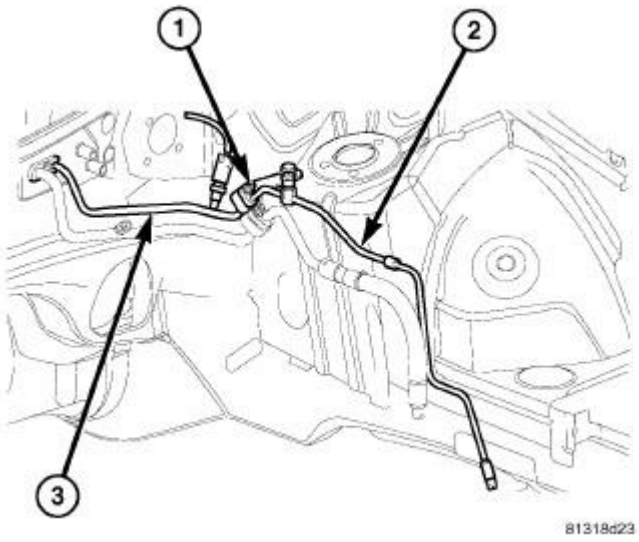

Fig. 25: Removing/Installing A/C Liquid Line
Courtesy of CHRYSLER GROUP, LLC

37. Remove the nut (1) from the front section of the A/C liquid line (2) to the rear section of the liquid line (3), separate the lines, remove and discard the dual plane seal.
38. Install plugs or tape over the opened liquid line fittings.
39. Remove the front section of the A/C liquid line (2) from the engine compartment.

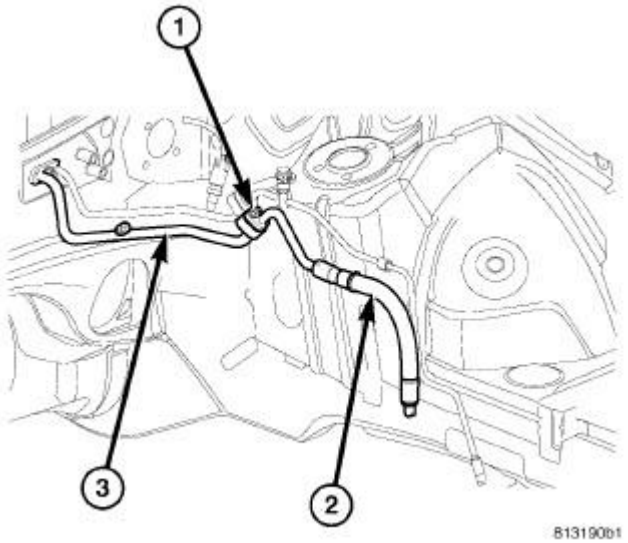

Fig. 26: Removing/Installing A/C Suction Lines

Courtesy of CHRYSLER GROUP, LLC

40. Remove the nut (1) from the front section of the A/C suction line (2) to the rear section of the suction line (3), separate the lines, remove and discard the dual plane seal.
41. Install plugs or tape over the opened suction line fittings.
42. Remove the front section of the A/C suction line (2) from the engine compartment.

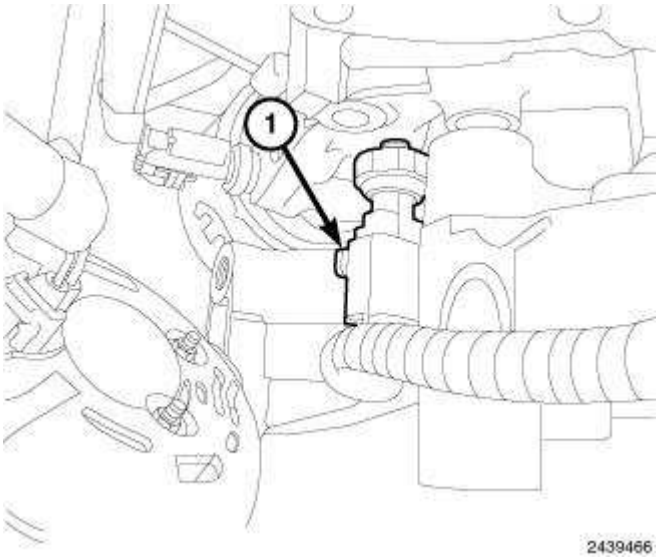

Fig. 27: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

43. Remove the oil pressure sensor electrical connector (1).
44. Remove the oil temperature sensor electrical connector.

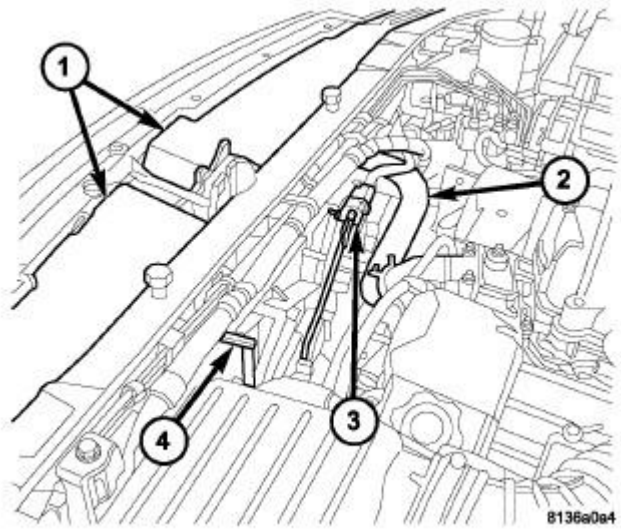

Fig. 28: Upper Radiator Closure Panel, Hose, Radiator Fan Electrical Connector & Fan

Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - UPPER RADIATOR CLOSURE PANELS
2 - UPPER RADIATOR HOSE
3 - RADIATOR FAN ELECTRICAL CONNECTOR
4 - RADIATOR FAN ASSEMBLY

45. Remove upper radiator hose (2).

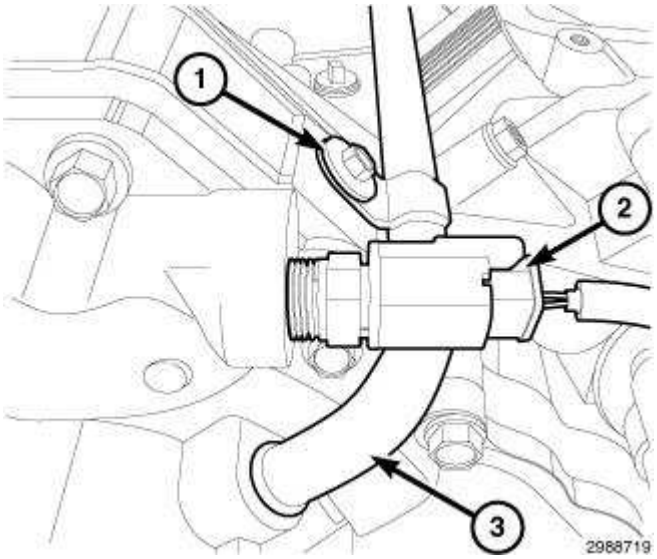

Fig. 29: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

46. Remove the heater tube retaining bolt (1).
47. Remove the coolant temperature (ECT) sensor electrical connector (2).
48. Lift the heater tube (3) out of the water pump and remove the heater tube from the vehicle.

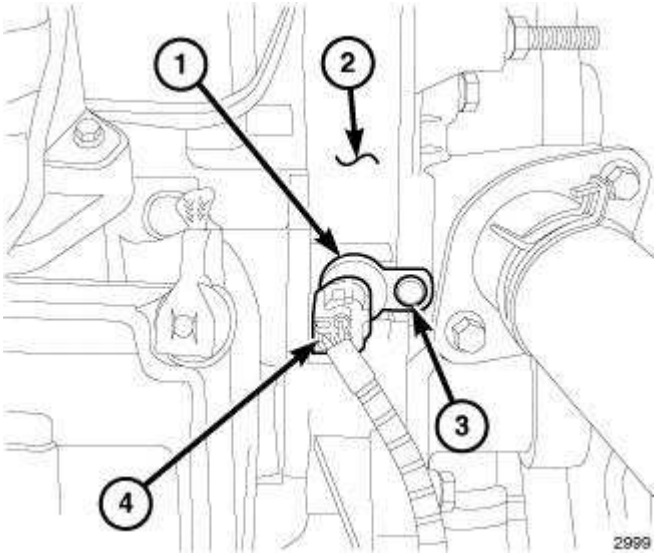

Fig. 30: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

49. Disconnect the camshaft position (CMP) sensor electrical connector (4).

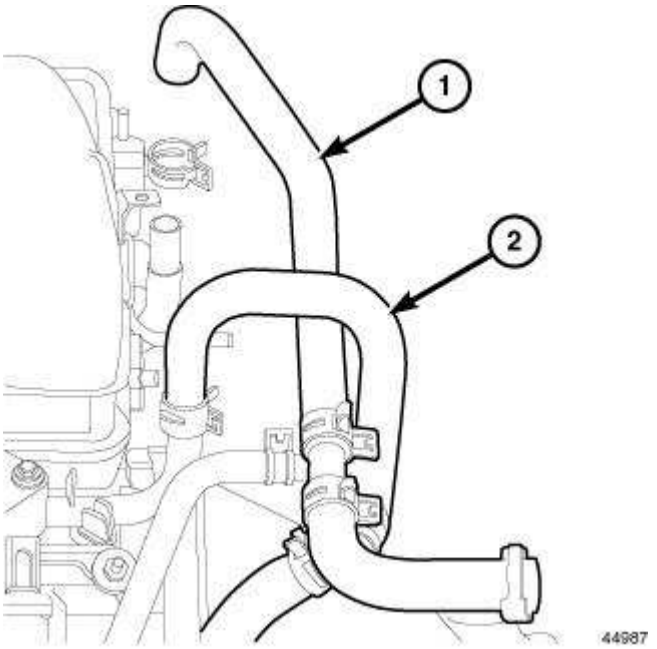

Fig. 31: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

50. Remove the heater hoses (1, 2).

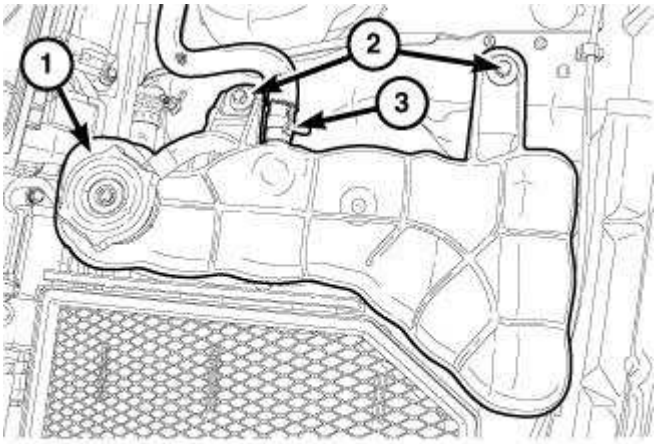

Fig. 32: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove the hoses from the coolant bottle for coolant bottle removal.

51. Remove the coolant bottle retaining bolts (2) and position the coolant bottle (1) aside.

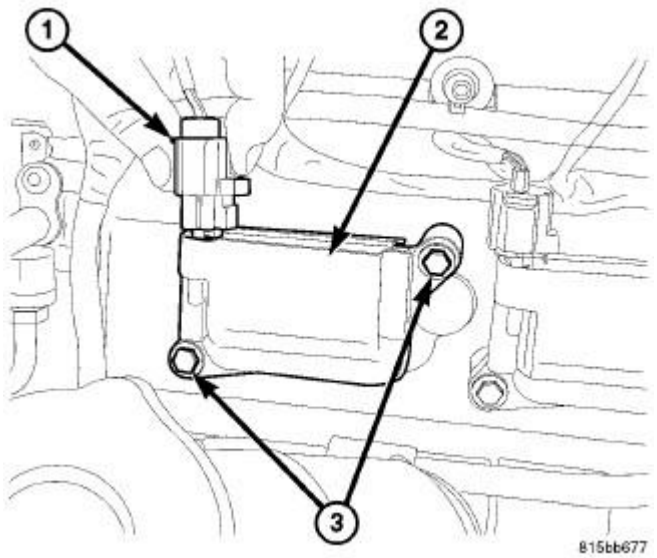

Fig. 33: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

52. Remove all ignition coil electrical connectors (1) and position the harness aside.

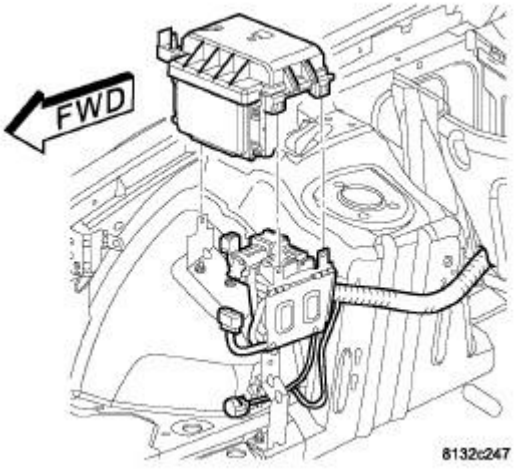

Fig. 34: TIPM/PDC Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

53. Remove the Power Distribution Center (PDC) and mounting bracket.
54. Unfasten the wire harness mounted on the right hand inner fender panel and position aside.

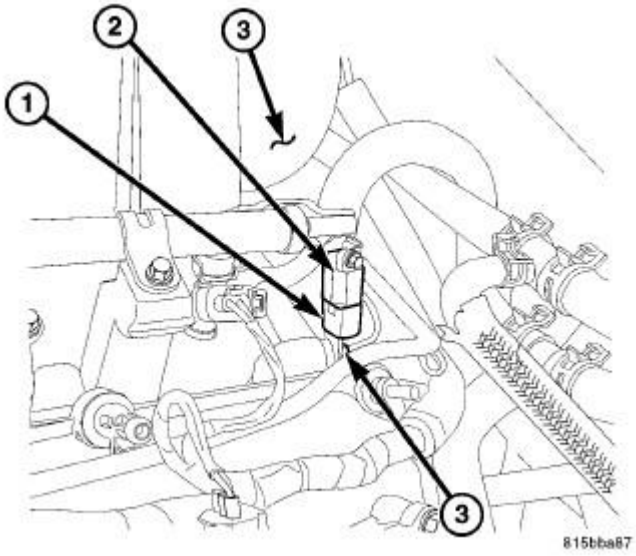

Fig. 35: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: The ignition capacitor (2) is attached to the left rear corner of the intake manifold (3).

55. Remove the ignition capacitor (2) electrical connector (1).
56. Remove the ground wires from the rear of each cylinder head.
57. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

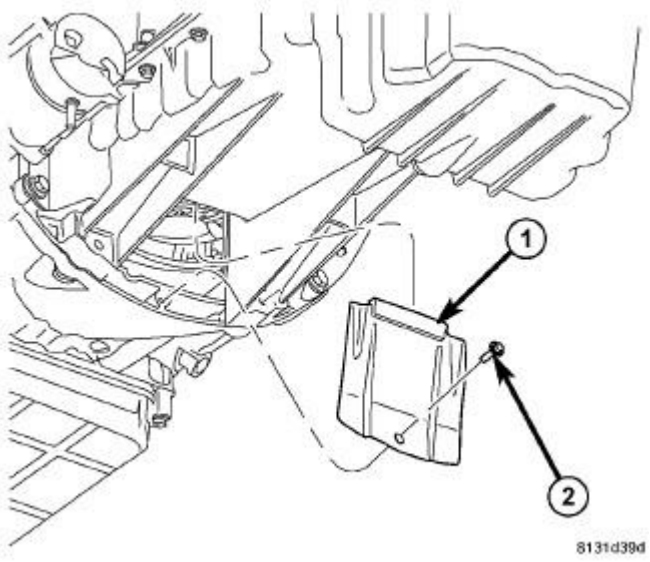

Fig. 36: Remove/Install Torque Converter Access Cover
Courtesy of CHRYSLER GROUP, LLC

58. Remove the inspection cover (1).

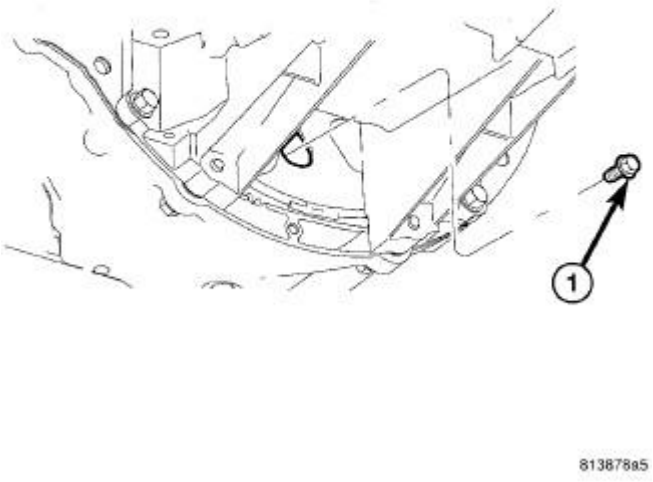

Fig. 37: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

59. Rotate the crankshaft in clockwise direction until converter bolts (1) are accessible and remove the flexplate to converter bolts (1).

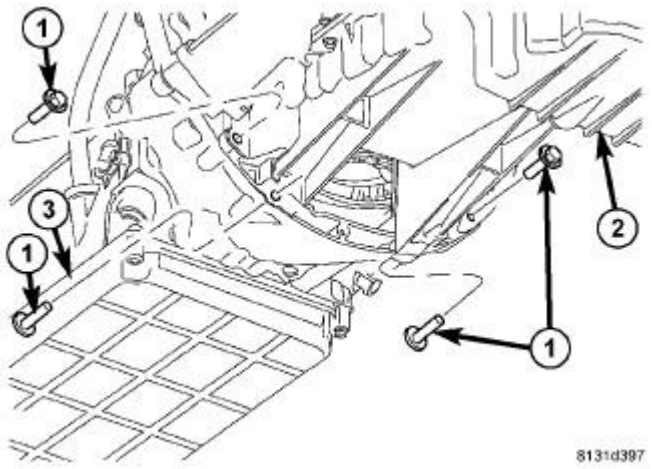

Fig. 38: Remove/Install Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

60. Remove the oil pan to transmission bolts (1).

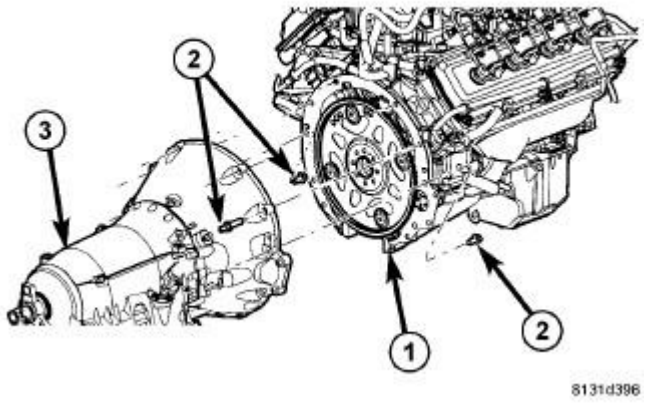

Fig. 39: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

61. Remove the transmission bell housing to engine block bolts (2).

CAUTION: While carefully separating the engine from the transmission and removing the engine from the vehicle, constant checks must be made to ensure no damage to other components or wiring harnesses occur throughout the removal procedure.

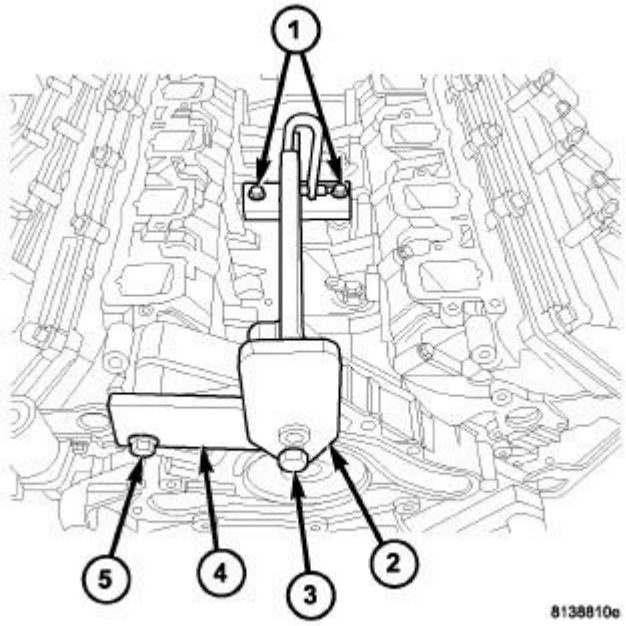

Fig. 40: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

62. Lower the vehicle.
63. Using a suitable jack, support the transmission.

NOTE: Do not use air tools to install engine lift fixture.

64. Install the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
65. Using a suitable engine hoist, separate the engine from the transmission and carefully remove the engine from the engine compartment.
66. Secure the engine onto a suitable engine stand.

INSTALLATION

INSTALLATION

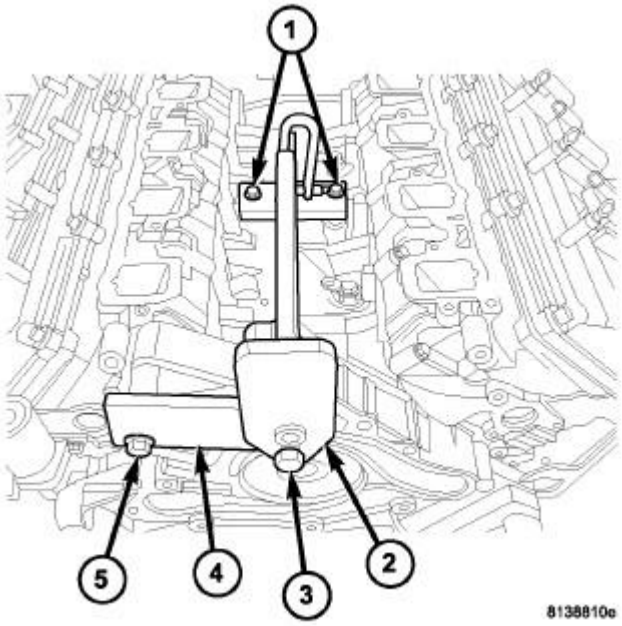

Fig. 41: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install Engine Lift Fixture and Adapter (special tool #8984B, Fixture, Engine Lifting) (2, 3).

1. Install the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
2. Using a suitable engine hoist, lower the engine into in the engine compartment.
3. Align the engine with the transmission.
4. Install two transmission to engine block mounting bolts finger tight.
5. Lower the engine assembly until the engine mounts rest in the engine cradle crossmember.

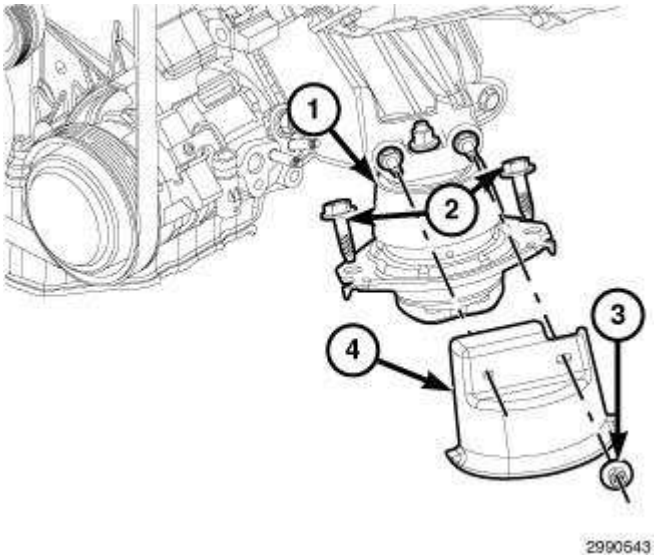

Fig. 42: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

6. Align the engine mounts, install both left and right engine mount to frame retaining bolts (2) and tighten to 68 N.m (50 ft. lbs.).
7. Position both left and right engine mount heat shields (4), install the retaining nuts (3) and tighten to 27 N.m (20 ft. lbs.).
8. Remove the engine hoist and the jack supporting the transmission.
9. Raise and support the vehicle.

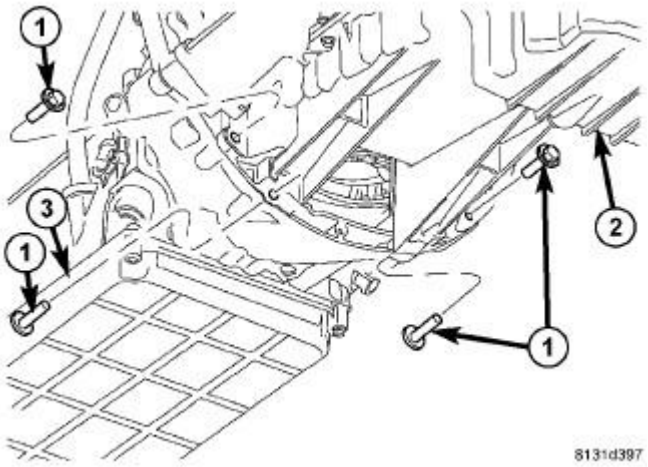

Fig. 43: Remove/Install Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Install the transmission to oil pan bolts (1) and tighten to 54 N.m (40 ft. lbs.).

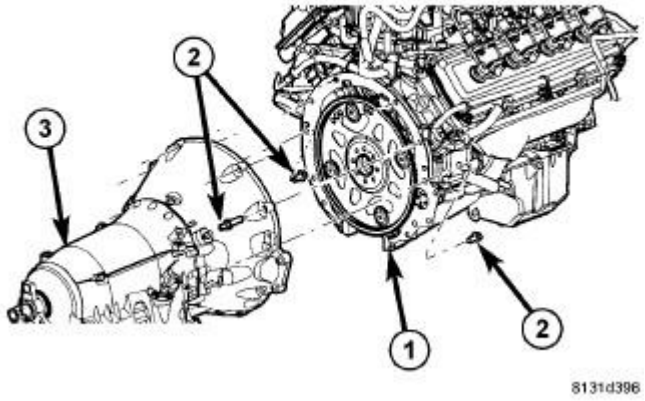

Fig. 44: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the remaining transmission bell housing to engine block bolts (2) and tighten to 68 N.m (50 ft. lbs.).

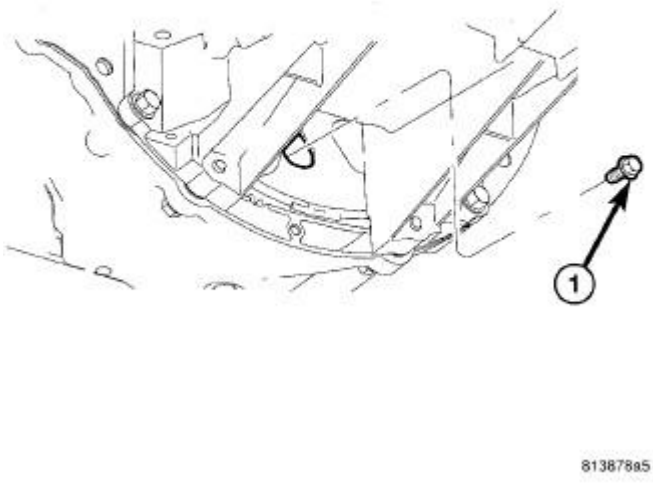

Fig. 45: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is essential that the correct length bolts are used to attach the converter to the flexplate. Bolts that are too long will damage the clutch surface inside the torque converter.

12. Rotate the crankshaft in clockwise direction and install all torque converter to flexplate bolts (1) finger tight.
13. Verify that the torque converter is pulled flush to the flexplate and tighten bolts to 88 N.m (65 ft. lbs.).

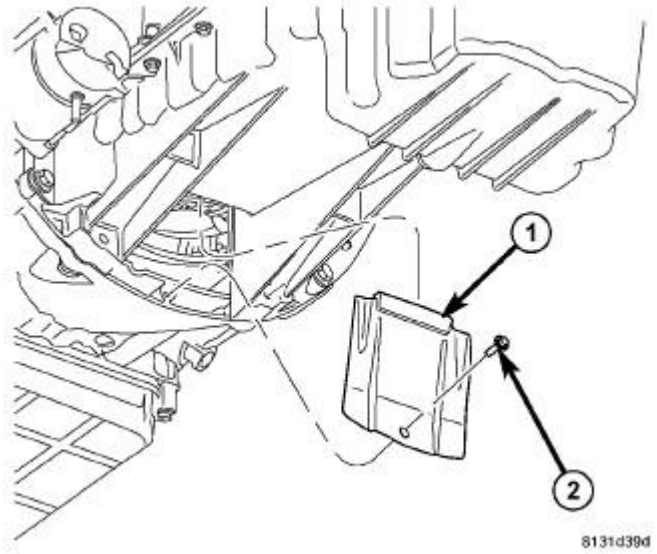

Fig. 46: Remove/Install Torque Converter Access Cover
Courtesy of CHRYSLER GROUP, LLC

14. Install the inspection cover (1) and tighten the retaining bolt (2) to 11 N.m (8 ft. lbs.).

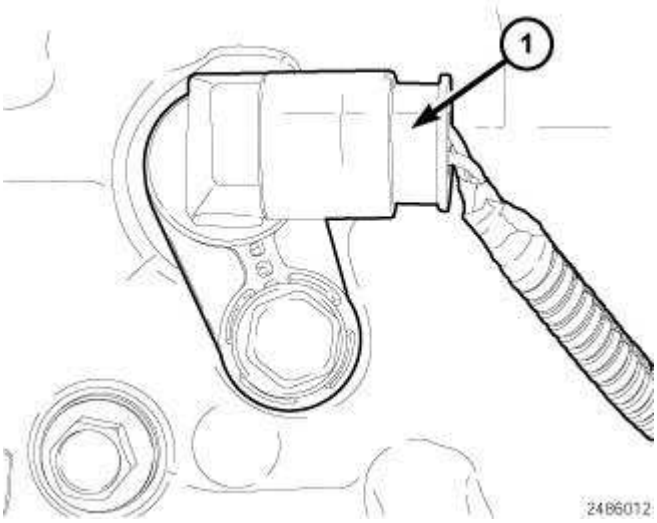

Fig. 47: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Crankshaft Position (CKP) sensor is located at the right rear side of

the engine block.

15. Connect the CKP sensor electrical connector (1).

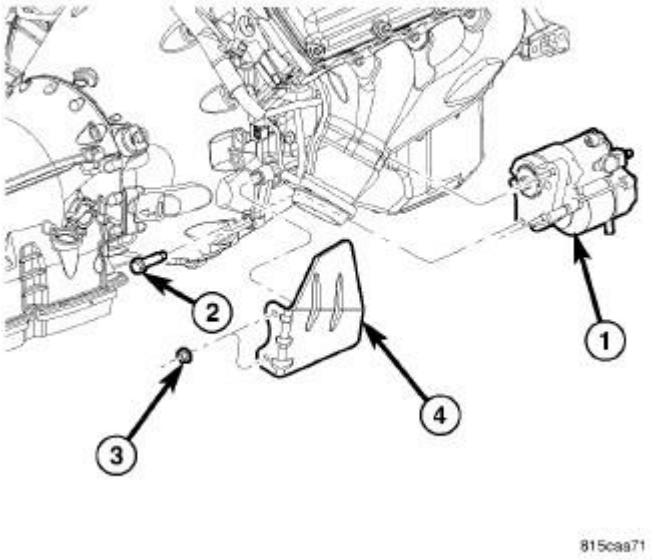

Fig. 48: Removing/Installing Starter
Courtesy of CHRYSLER GROUP, LLC

16. Position the starter motor (1) into the transmission.
17. Install the three starter motor retaining bolts (2) and tighten to 54 N.m (40 ft. lbs.).
18. Connect the solenoid wire to the starter motor (snaps in place).
19. Position the battery cable to the solenoid stud, install the battery cable eyelet nut and tighten to 11 N.m (8 ft. lbs.).
20. Position the starter heat shield (4) and install the retaining nuts (3).

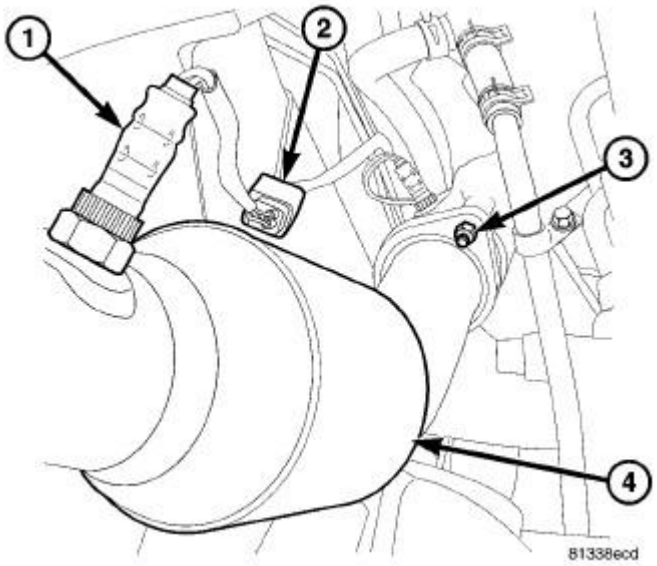

Fig. 49: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

21. Position the catalytic converters (4) onto the exhaust manifold flanges, install the flange nuts (3) and tighten to 41 N.m (30 ft. lbs.).
22. Connect the oxygen sensor electrical connectors (2).

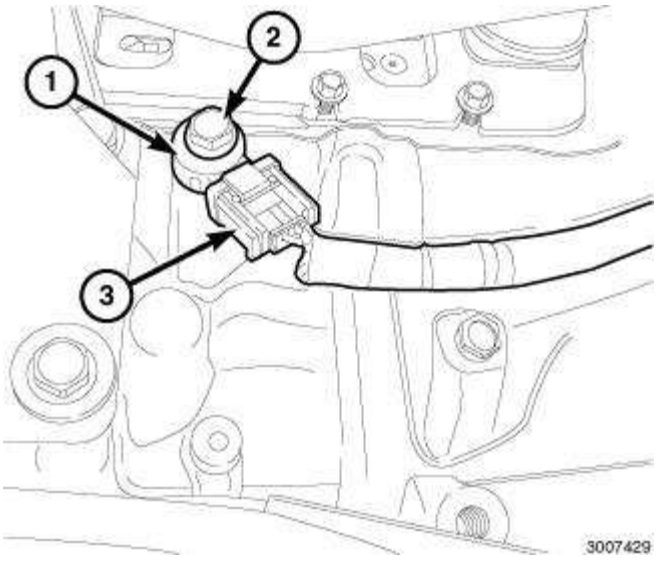

Fig. 50: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

23. Connect the right and left knock sensor (1) electrical connectors (5).
24. Install the heat shields onto both knock sensors (shield snaps on/off sensor).

25. Connect the transmission oil cooler lines to their retainers at the oil pan.

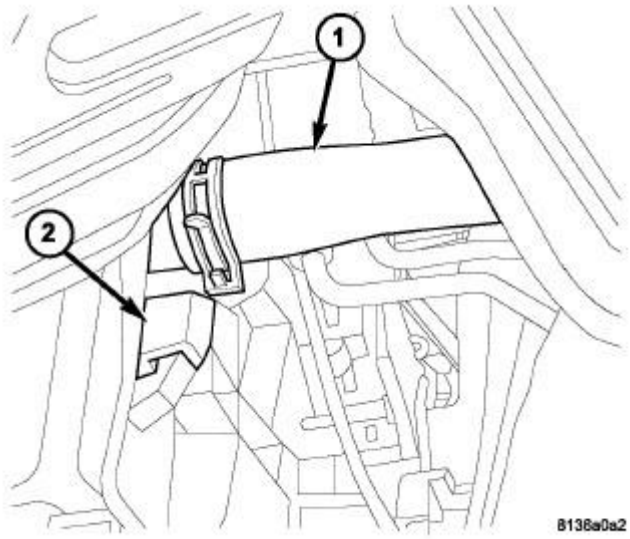

Fig. 51: Lower Radiator Hose & Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

26. Install the lower radiator hose (1).
27. Lower the vehicle.

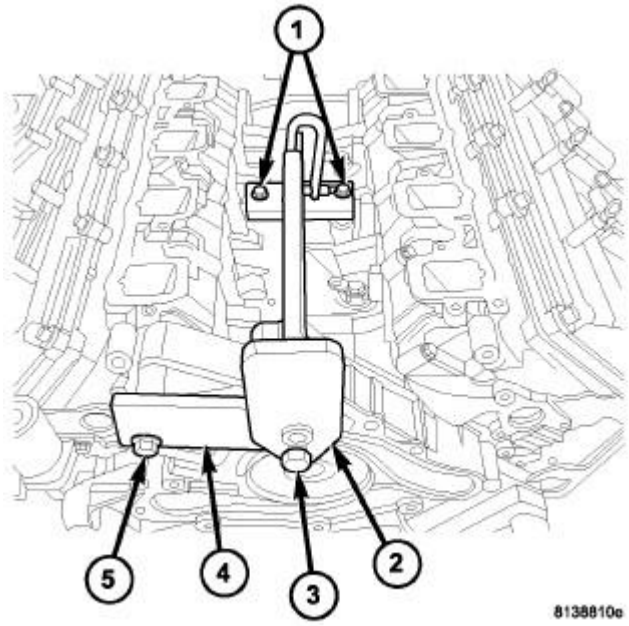

Fig. 52: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

28. Remove the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
29. Position the left and right side wiring harness.

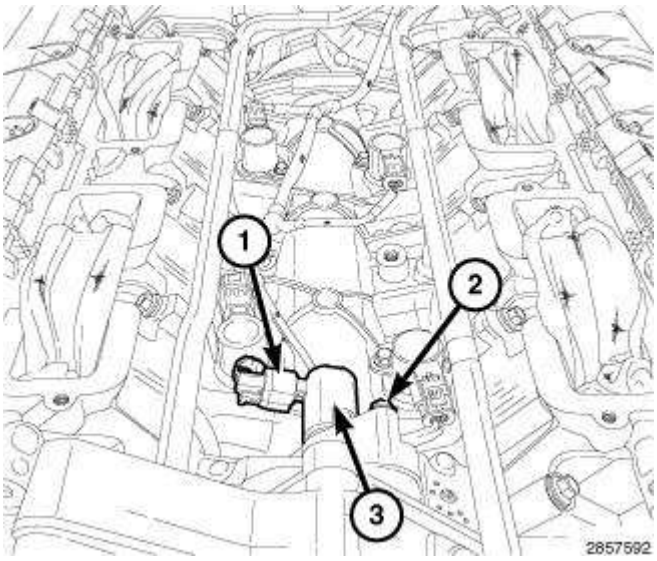

Fig. 53: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

30. Lubricate the oil control valve (OCV) rubber O-ring seal with clean engine oil.
31. Install the OCV (3) and rotate into position.

32. Install the OCV retaining bolt (2) and tighten to 11 N.m (8 ft. lbs.).
33. Connect the OCV electrical connector (1).

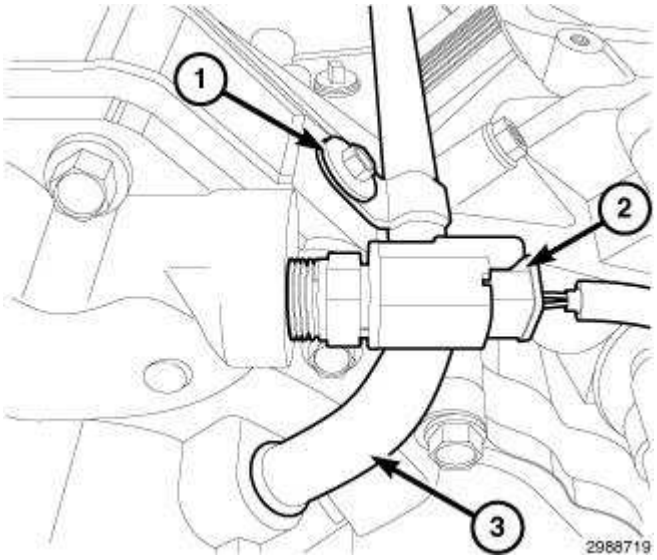

Fig. 54: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

34. Install the heater core tube (3) into the water pump.
35. Install the heater core tube retaining bolt (1) and tighten to 11 N.m (8 ft. lbs.).
36. Connect the electrical connector to the coolant temperature (ECT) sensor (2).

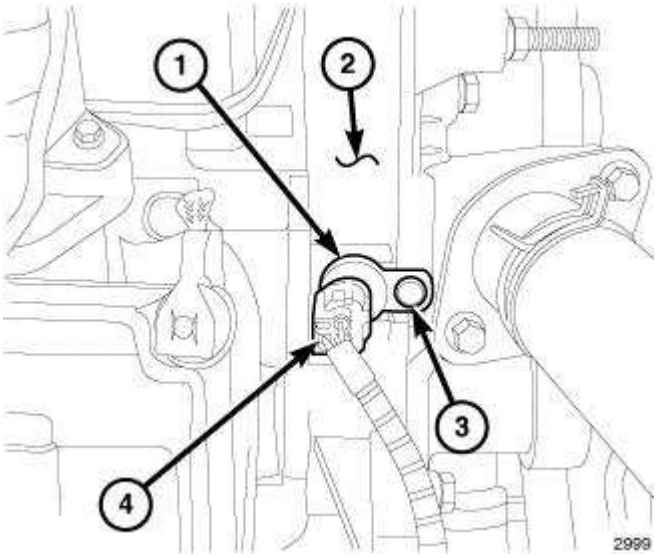

Fig. 55: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

37. Connect the camshaft position sensor electrical connector (4).

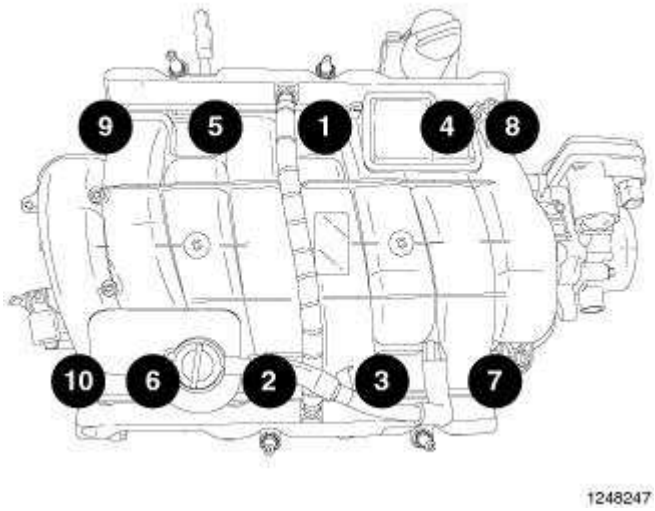

Fig. 56: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the intake manifold and throttle body as an assembly.

38. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

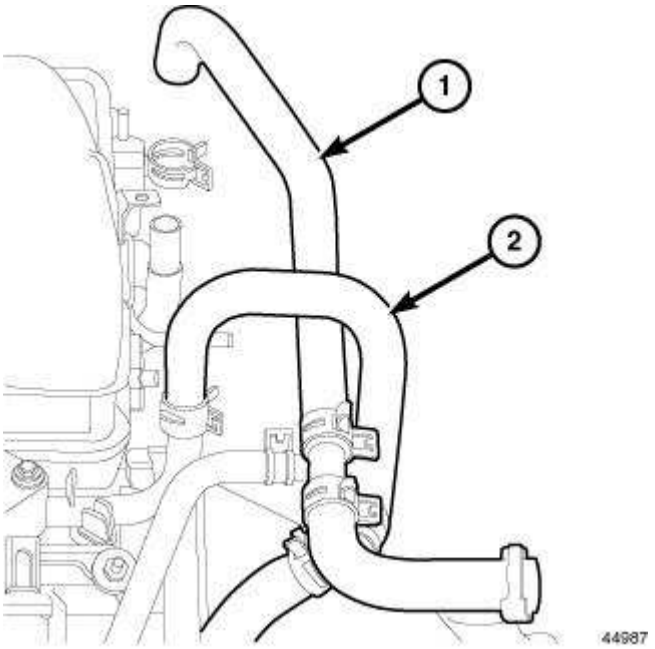

Fig. 57: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

39. Connect the heater hoses (1, 2).
40. Connect the ground wires to the rear of each cylinder head.

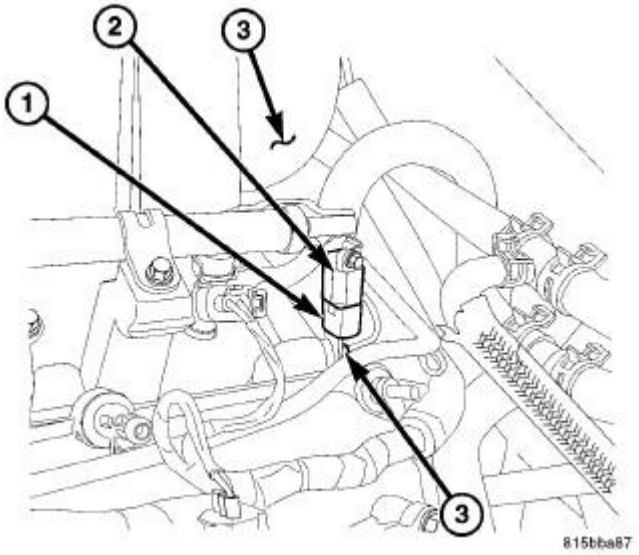

Fig. 58: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: The ignition capacitor (2) is attached to the rear of the left cylinder head.

41. Connect the ignition capacitor (2) electrical connector (1).

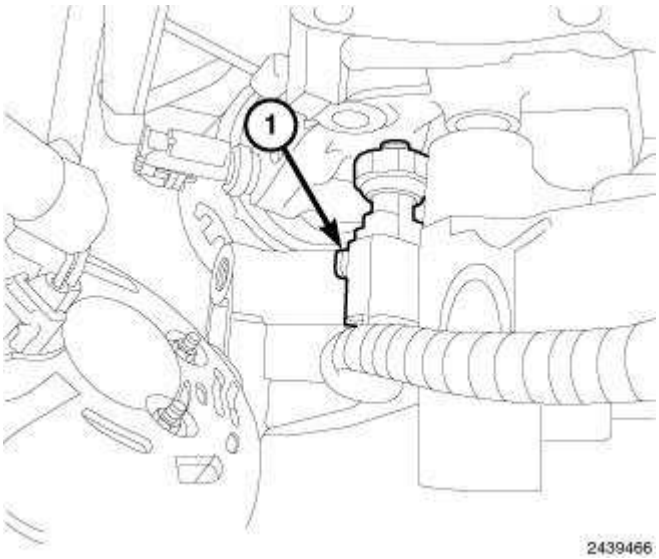

Fig. 59: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

42. Connect the oil pressure sensor electrical connector (1).
43. Connect the oil temperature sensor electrical connector.

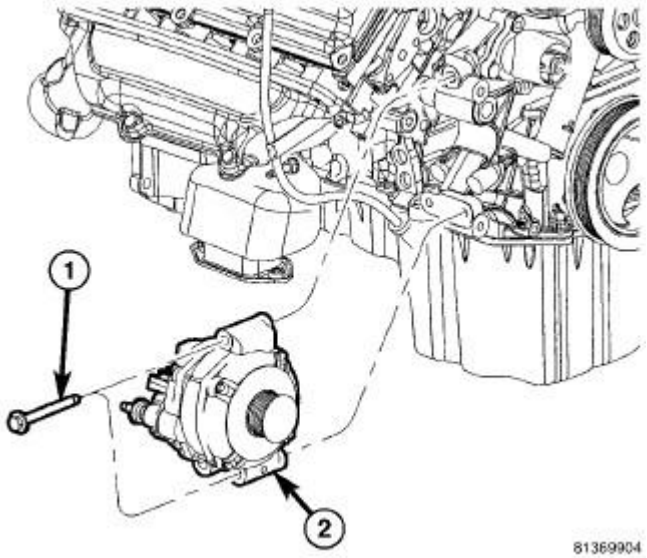

Fig. 60: Generator & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

44. Position the generator (2) and install two generator mounting bolts (1) finger tight.
45. Raise and support the vehicle.

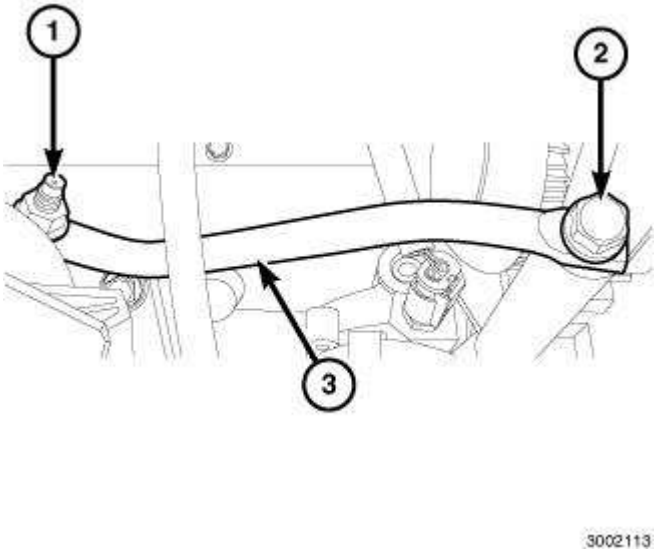

Fig. 61: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

46. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) finger tight.
47. Position the generator support bracket (3) to the generator, install the retaining bolt (2) and tighten to 65 N.m (48 ft. lbs.).
48. Tighten the generator support bracket (3) to engine mount retaining nut (1) to 28 N.m (21 ft.

lbs.).

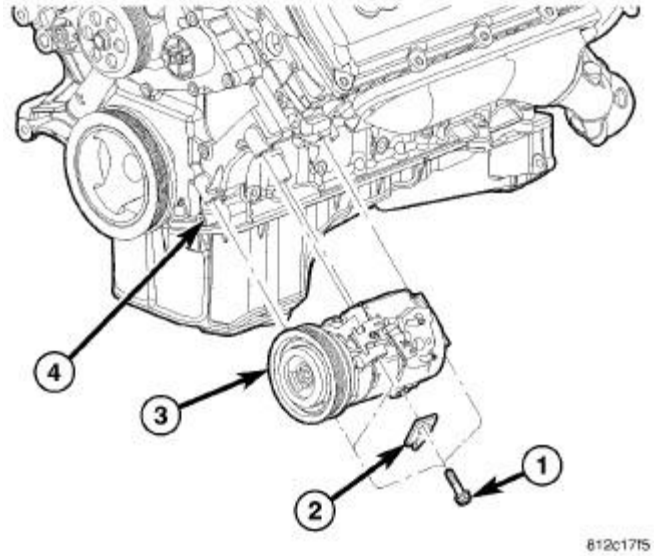

Fig. 62: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

49. Install the A/C compressor (3). Refer to **COMPRESSOR, A/C, REMOVAL** .

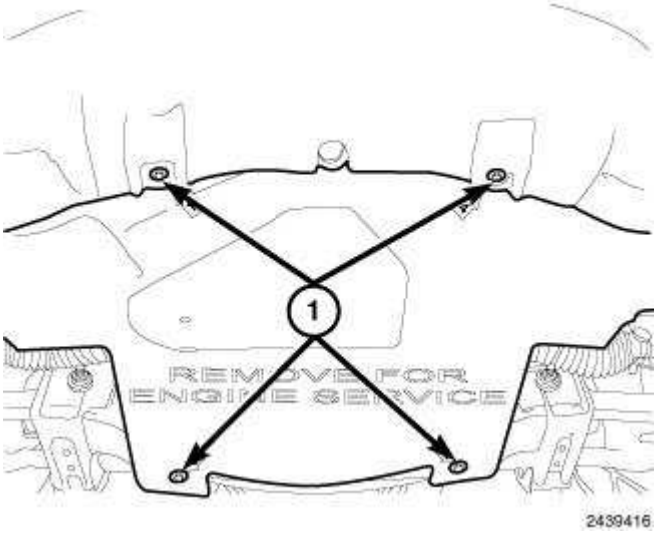

Fig. 63: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

50. Position the belly pan and install the belly pan retainers (1).
51. Lower the vehicle.

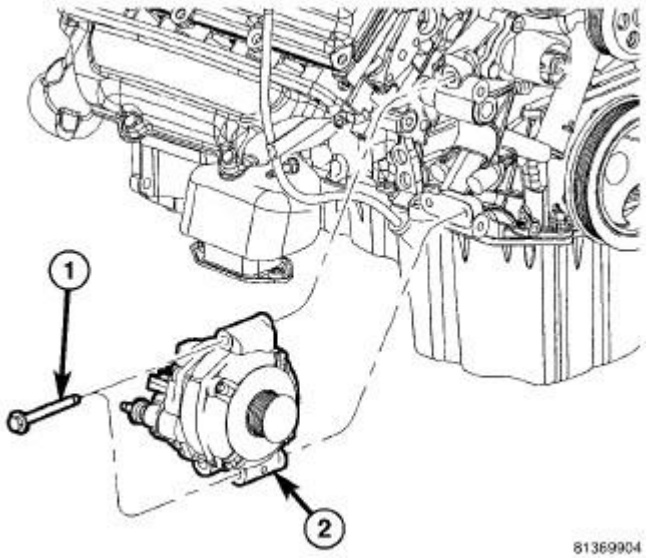

Fig. 64: Generator & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

52. Tighten two generator mounting bolts (1) to 65 N.m (48 ft. lbs.).
53. Snap the field wire connector into the rear of the generator.
54. Position the generator B+ terminal eyelet to the generator output stud, install the retaining nut and tighten to 13 N.m (10 ft. lbs.).
55. Snap the plastic insulator cap onto the B+ output terminal.

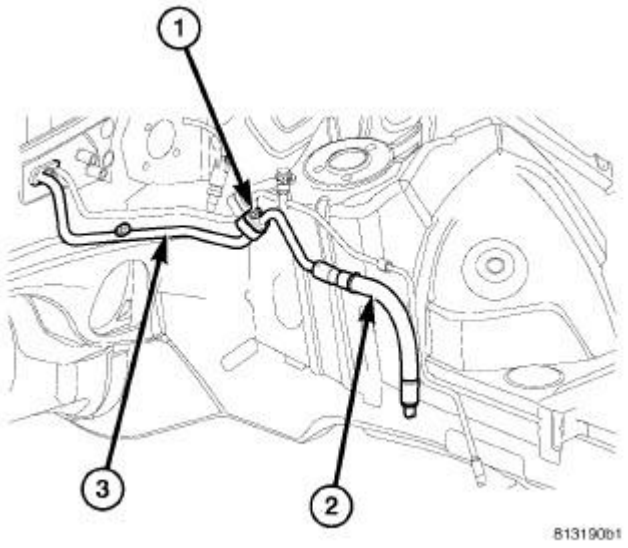

Fig. 65: Removing/Installing A/C Suction Lines
Courtesy of CHRYSLER GROUP, LLC

56. Position the front section of the A/C suction line (2) into the engine compartment.

57. Remove the tape or plugs from the fittings that connect the front section of the A/C suction line to the rear section of the A/C suction line (3).

NOTE: Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

58. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
59. Connect the front section of the A/C suction line to the rear section of the A/C suction line.
60. Install the nut (1) that secures the front section of the A/C suction line to the rear section of the A/C suction line and tighten the nut to 22 N.m (16 ft. lbs.).

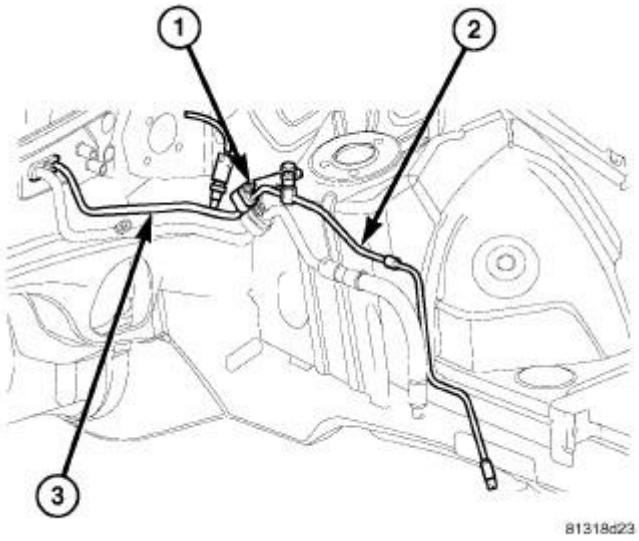

Fig. 66: Removing/Installing A/C Liquid Line
Courtesy of CHRYSLER GROUP, LLC

61. Position the front section of the A/C liquid line into the engine compartment.
62. Remove the tape or plugs from the fittings that connect the front section of the A/C liquid line to the rear section of the A/C liquid line (3).

NOTE: Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

63. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
64. Connect the front section of the A/C liquid line to the rear section of the A/C liquid line.

65. Install the nut (1) that secures the front section of the A/C liquid line to the rear section of the A/C liquid line and tighten the nut to 22 N.m (16 ft. lbs.).

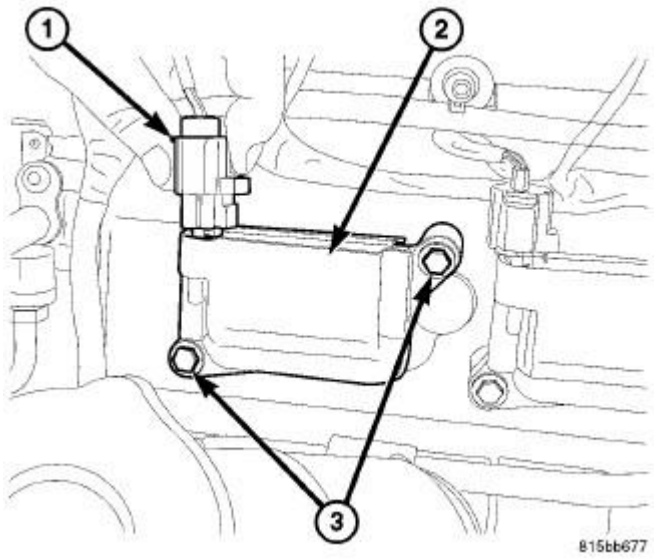

Fig. 67: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

66. Position the ignition coil electrical harness and connect all ignition coil electrical connectors (1).

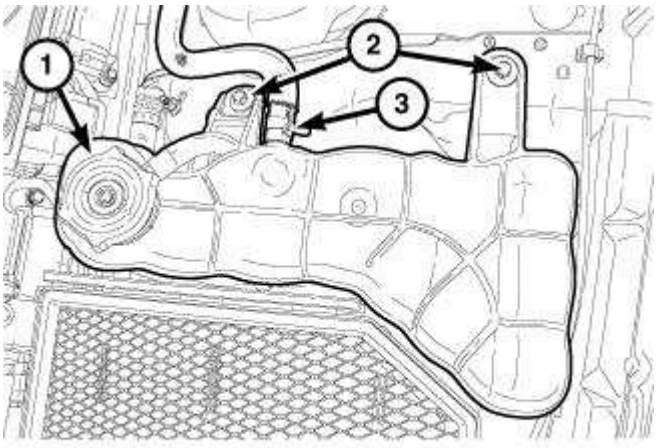

Fig. 68: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

67. Position the coolant bottle (1) and install the coolant bottle retaining bolts (2).

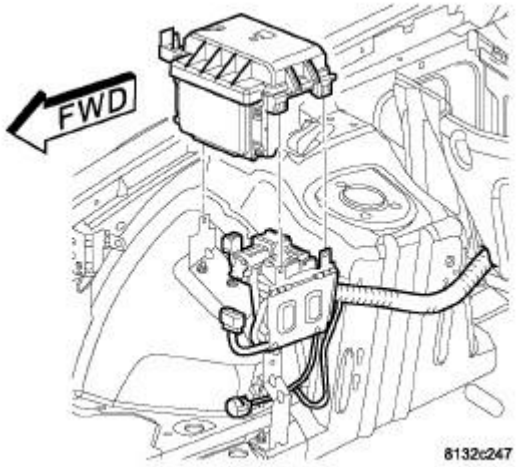

Fig. 69: TIPM/PDC Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

68. Install the Power Distribution Center (PDC) and mounting bracket.
69. Position the wire harness and secure to the right hand inner fender panel.

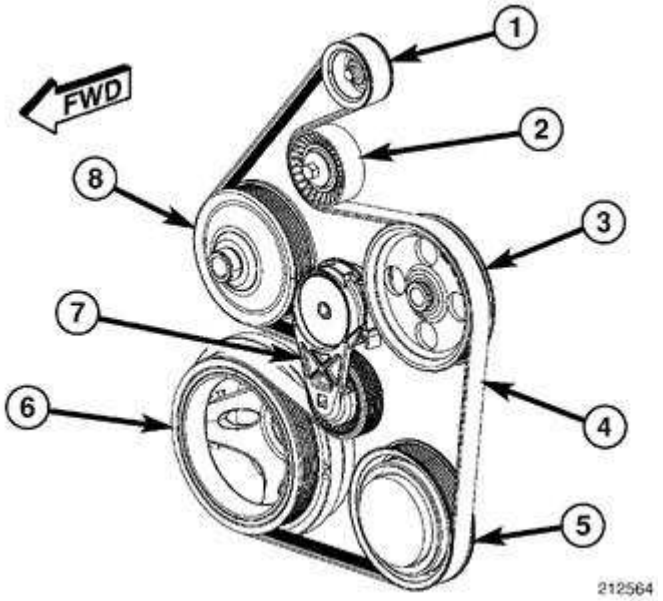

Fig. 70: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

70. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and install the accessory drive belt (2) onto the pulleys, then slowly release the tensioner.

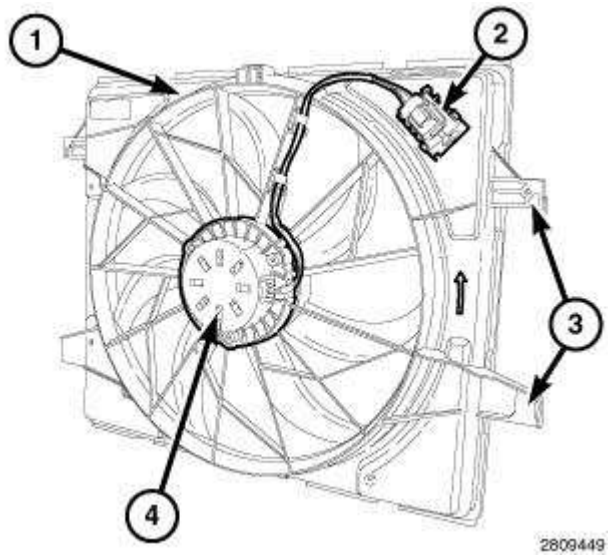

Fig. 71: Cooling Fan Module Components
Courtesy of CHRYSLER GROUP, LLC

71. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

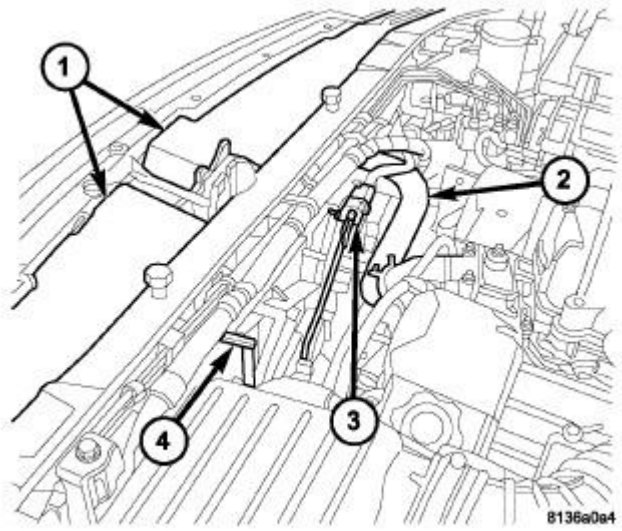

Fig. 72: Upper Radiator Closure Panel, Hose, Radiator Fan Electrical Connector & Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - UPPER RADIATOR CLOSURE PANELS
2 - UPPER RADIATOR HOSE
3 - RADIATOR FAN ELECTRICAL CONNECTOR
4 - RADIATOR FAN ASSEMBLY

72. Install the upper radiator hose (2).

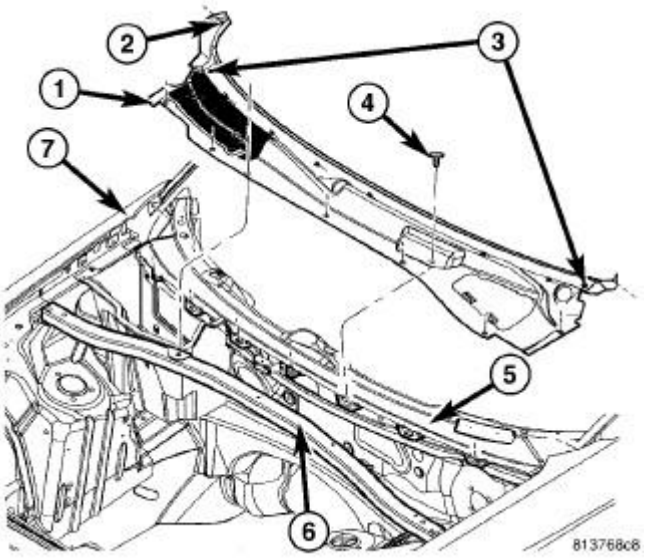

Fig. 73: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

73. Install the strut tower support (6) and tighten bolts to 38 N.m (28 ft. lbs.).
74. Install the cowl panel cover (1). Refer to **COVER, COWL PANEL, INSTALLATION** .
75. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
76. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

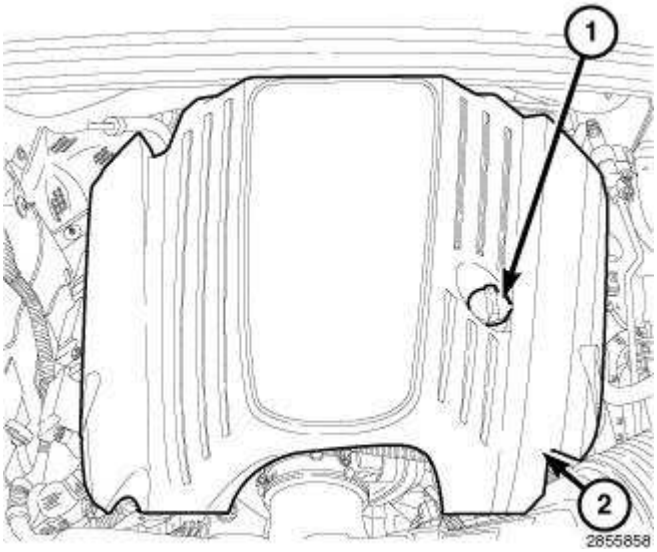

Fig. 74: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

77. Position the engine cover (2) and secure the retaining grommets onto the ball studs.

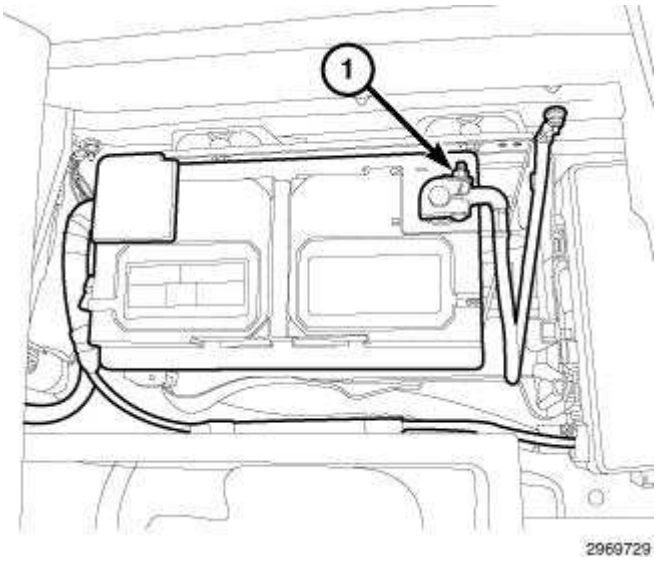

Fig. 75: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

78. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).
79. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
80. Start the engine and check for leaks.

SPECIAL TOOLS

SPECIAL TOOLS

	1023 - Puller (Originally Shipped In Kit Number(s) 8678.) 10368 - Set, Universal Protective Cap 10386 - Holder, Vibration Damper 10387 - Installer, Vibration Damper 6871 - Installer, A/C Hub (Originally Shipped In Kit Number(s) 6896.) 7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.) 8464 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 8664, 8665, 8665CC, 8702, 9577.) 8507 - Guides, Connecting Rod (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC.) 8512A - Installer, Damper (Originally Shipped In Kit Number(s) 8283, 8527, 8575, 8575CC, 8660, 8661.) 8514 - Pins, Tensioner

	(Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.) 8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.) 8984-UPD - Adapter, Engine Lift (Originally Shipped In Kit Number(s) 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519.) 8984B - Fixture, Engine Lifting (Originally Shipped In Kit Number(s) 8849CC, 9329, 9515, 9516, 9518, 9519, 9540, 9541, 9577.) 9065B - Compressor, Valve Spring 9070 - Retainer, Push Rod (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.) 9071 - Remover, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.) 9072 - Installer, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577, 9975, 9976.) C-119 - Cylinder Indicator C-3292A - Gauge, Pressure C-3422-D - Compressor, Valve Spring C-3685-A - Bloc-Chek Kit

MDS SYSTEM

DESCRIPTION

DESCRIPTION

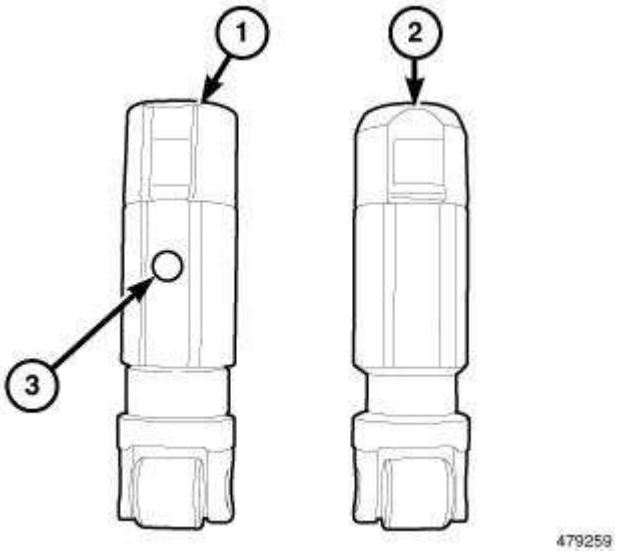

Fig. 76: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) selectively deactivates cylinders 1, 4, 6 and 7 during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

The MDS can provide a 5 to 20% fuel economy benefit when operating in four-cylinder mode. Depending on driving habits and vehicle usage. For EPA rating purposes the fuel economy is 8 to 15% higher than if the engine was operating on eight-cylinders at all times.

The MDS deactivating lifter (1) can be distinguished from the non-MDS lifter (2) by the disconnecting pin (3) on the side of the MDS lifter.

MDS is integrated into the basic engine architecture requiring these additional components:

- Unique MDS camshaft
- 8 deactivating roller lifters
- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

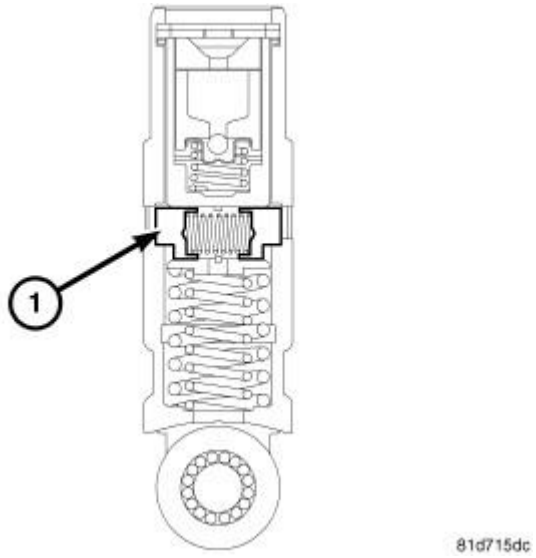

Fig. 77: MDS Lifter Cross Section
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages

drilled into the cylinder block. The MDS solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: It is critical to use the recommended oil viscosity in engines that use MDS.

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No fuel/air enters or leaves during subsequent piston strokes, this high pressure gas is repeatedly compressed and expanded like an air spring.

MDS SYSTEM

DESCRIPTION

DESCRIPTION

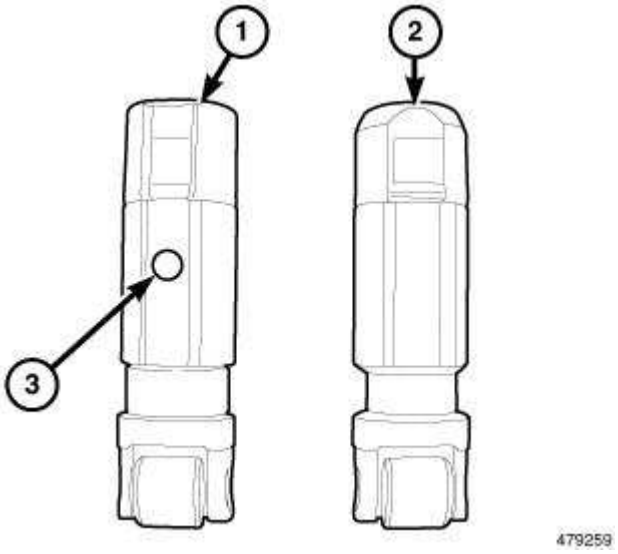

Fig. 78: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

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- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

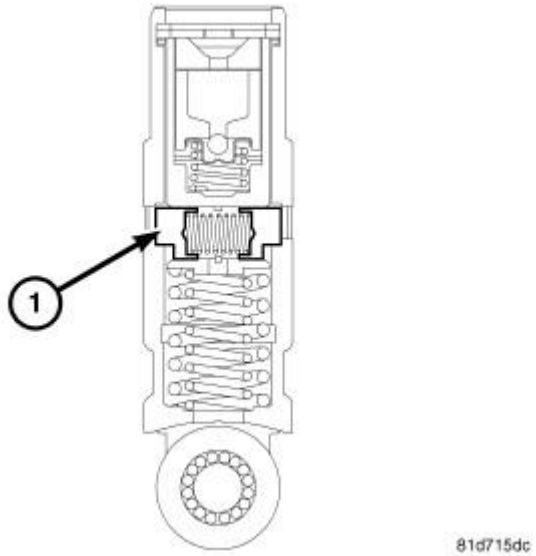

Fig. 79: MDS Lifter Cross Section
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages drilled into the cylinder block. The MDS solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: It is critical to use the recommended oil viscosity in engines that use MDS.

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high

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AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

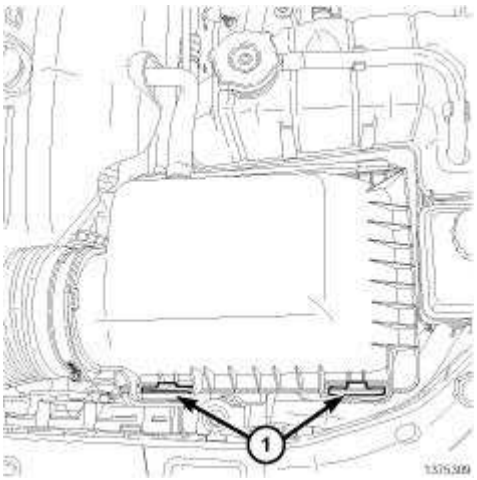


Fig. 80: Air Cleaner Retaining Clamps
Courtesy of CHRYSLER GROUP, LLC

1. Disengage the two retaining clamps (1) and lift the cover upwards.
2. Remove the air cleaner element from the inside of the air cleaner housing.

INSTALLATION

INSTALLATION

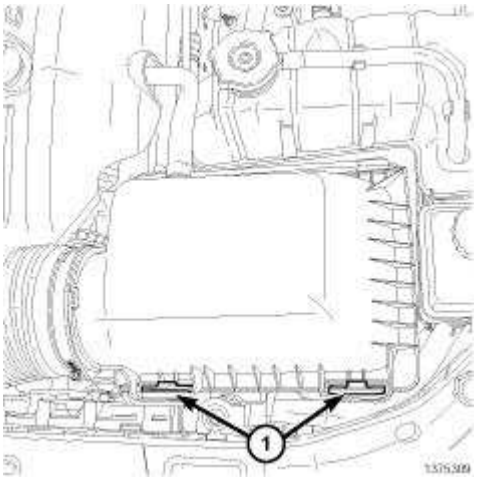


Fig. 81: Air Cleaner Retaining Clamps
Courtesy of CHRYSLER GROUP, LLC

1. Clean any dirt or foreign matter from the inside of the air cleaner housing.

NOTE: The air cleaner element must be properly seated for the air cleaner housing cover to fit correctly.

2. Install the air cleaner element into the air cleaner housing.
3. Position the air cleaner housing cover in place and secure the two retainer clips (1).

BODY, AIR CLEANER

REMOVAL

REMOVAL

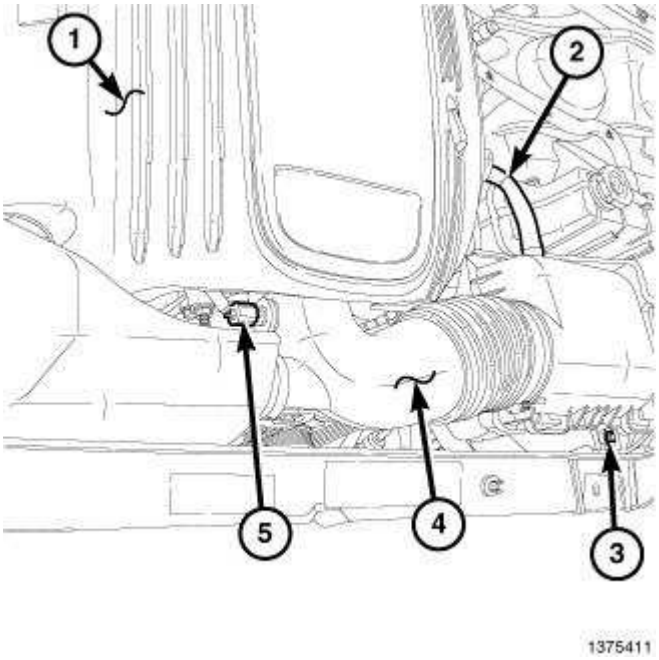


Fig. 82: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).
2. Disconnect the intake air temperature (IAT) sensor (5) electrical connector.
3. Loosen the air duct retaining clamps at the throttle body and the air cleaner housing and remove the air duct (4).
4. Disconnect the make up air hose (MUA) (2).
5. Remove the air cleaner housing retaining bolt (3).
6. Remove the air cleaner housing from the vehicle.

INSTALLATION

INSTALLATION

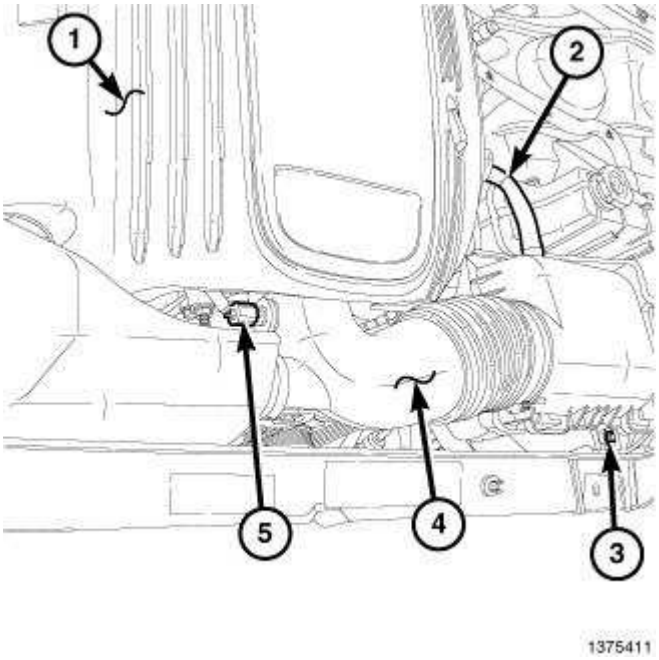


Fig. 83: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Position the air cleaner housing into the engine compartment.
2. Install the air cleaner housing retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
3. Connect the air duct to the throttle body and the air cleaner housing and tighten clamps to 3 N.m (30 in. lbs.).
4. Connect the make up air hose (MUA) (2).
5. Connect the intake air temperature (IAT) sensor (5) electrical connector.
6. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

CYLINDER HEAD

OPERATION

OPERATION

The cylinder head closes the combustion chamber allowing the pistons to compress the air fuel mixture to the correct ratio for ignition. The valves located in the cylinder head open and close to either allow clean air into the combustion chamber or to allow the exhaust gases out, depending on the stroke of the engine.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

- Possible indications of the cylinder head gasket leaking between adjacent cylinders are:
  - Loss of engine power
  - Engine misfiring
  - Poor fuel economy
- Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:
  - Engine overheating
  - Loss of coolant
  - Excessive steam (white smoke) emitting from exhaust
  - Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in the **CYLINDER COMPRESSION PRESSURE LEAKAGE** Test in this information. An engine cylinder head gasket leaking between adjacent cylinders will results in approximately a 50 - 70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: Use extreme care when the engine is operating with the coolant pressure cap removed. Failure to follow these instructions may result in possible serious or fatal injury.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

CAUTION: With the cooling system tester in place, pressure builds up fast. Excessive pressure built up by continuous engine operation must be released to a safe pressure point. Never permit pressure to exceed 138 Kpa (20 psi).

Install the Cooling System Tester (special tool #7700, Tester, Cooling System) or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If the gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using the Bloc-Chek Kit (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform the test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

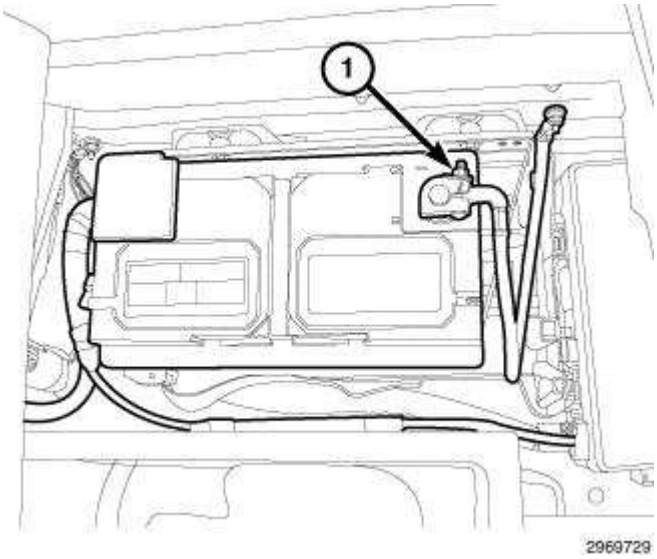


Fig. 84: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the negative battery cable (1).

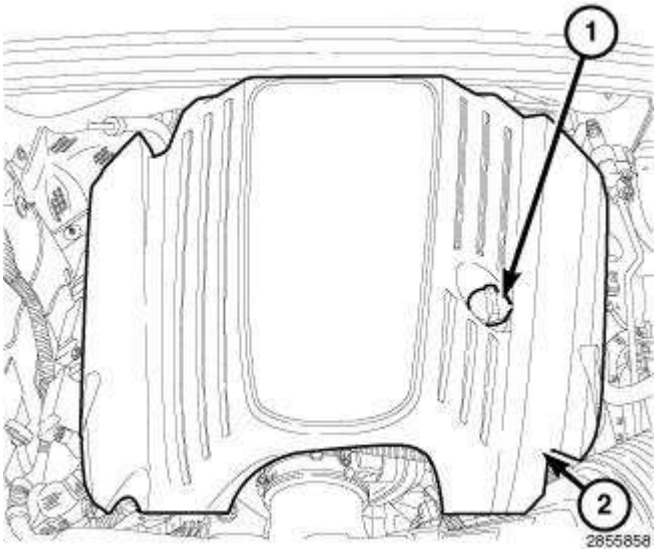


Fig. 85: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).

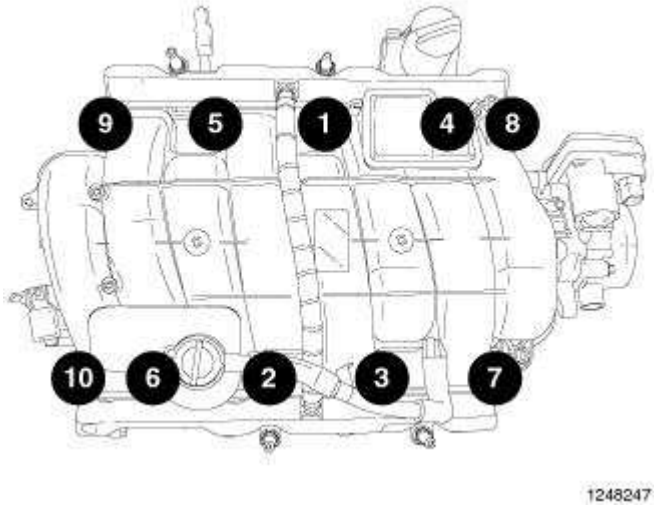


Fig. 86: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Remove the intake manifold and throttle body as an assembly.

3. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

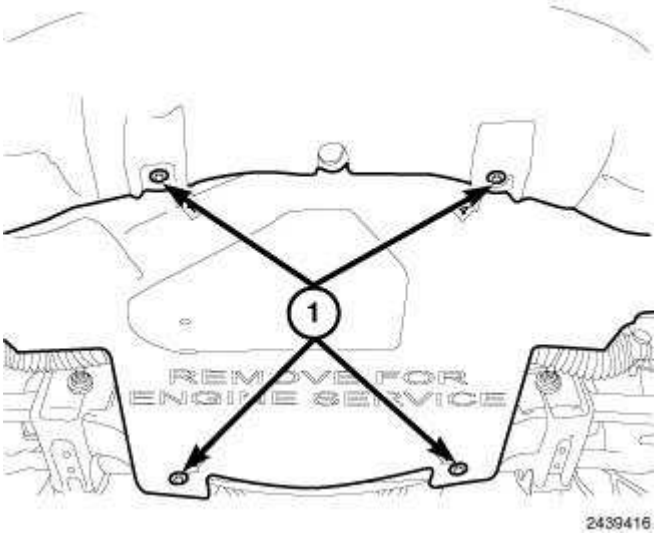


Fig. 87: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

5. Remove the belly pan retainers (1) and remove the belly pan.
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

CAUTION: When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters hanging from the oxygen sensor wires damages the harness and/or sensors.

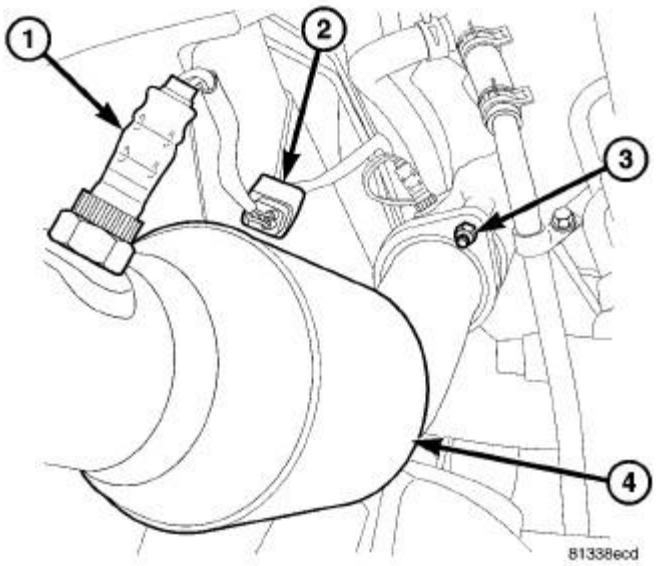


Fig. 88: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

7. Disconnect all oxygen sensor electrical connectors (2).
8. Saturate all exhaust bolts and nuts (3) with Mopar® Rust Penetrant. Allow five minutes for penetration.
9. Remove the both catalytic converter to manifold flange nuts (3) and separate the catalytic converters (4) from the exhaust manifolds.
10. Lower the vehicle.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

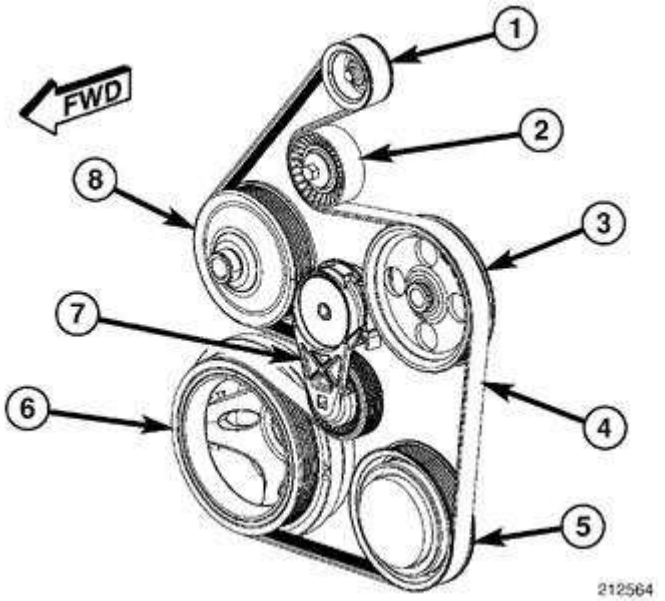


Fig. 89: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

11. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and remove the accessory drive belt (2), then slowly rotate the tensioner into the freearm position.

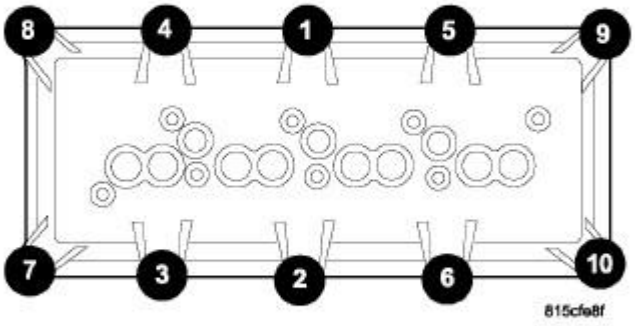
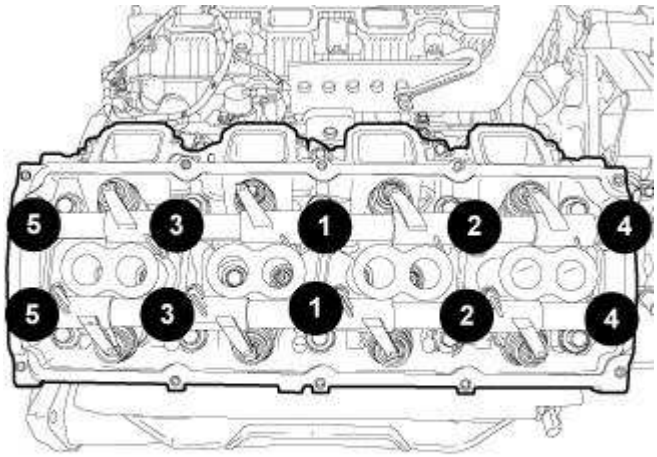


Fig. 90: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

12. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts and remove cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

13. If removing the right cylinder head, remove the engine oil dip stick tube retaining nut at the exhaust manifold and remove the oil dip stick tube.



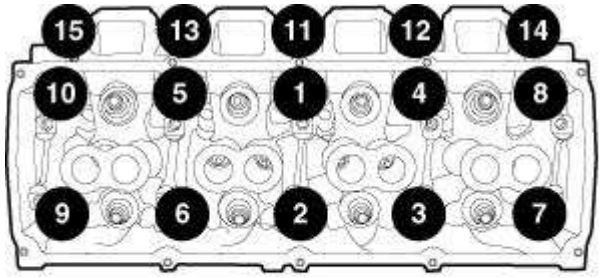
921225

Fig. 91: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Pushrods and rocker arm assemblies must be installed in their original locations or engine damage could result.

NOTE: Make sure to identify the original location of the rocker arms and push rods for correct assembly.

14. Remove the rocker arms and pushrods. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.



88745

Fig. 92: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

NOTE: It is not necessary to remove the exhaust manifolds to remove the cylinder heads.

15. Using the sequence shown in illustration, remove the cylinder head bolts and remove the cylinder head(s).
16. Discard the cylinder head gasket (1).
17. Inspect and clean the cylinder head (2) mating surface.

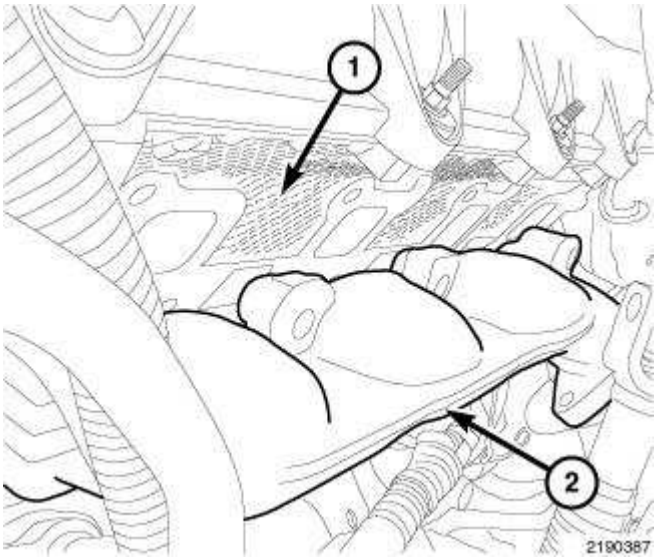


Fig. 93: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

18. If necessary, using the sequence shown in illustration, remove the exhaust manifold bolts and remove the manifold.

CLEANING

CLEANING

Clean all sealing surfaces of the cylinder block and cylinder heads using Mopar® Brake Parts Cleaner (or equivalent).

INSPECTION

INSPECTION

1. Inspect the cylinder head for out-of-flatness using a straightedge and a feeler gauge. If tolerances exceed 0.0508 mm (0.002 in.) replace the cylinder head.
2. Inspect the valve seats for damage. Service the valve seats as necessary.

3. Inspect the valve guides for wear, cracks or looseness. If either condition exist, replace the cylinder head.
4. Inspect the pushrods. Replace worn or bent pushrods.

INSTALLATION

INSTALLATION

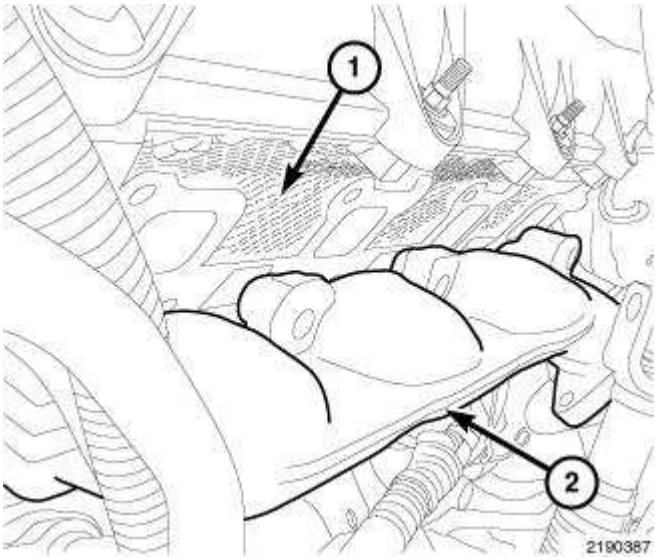
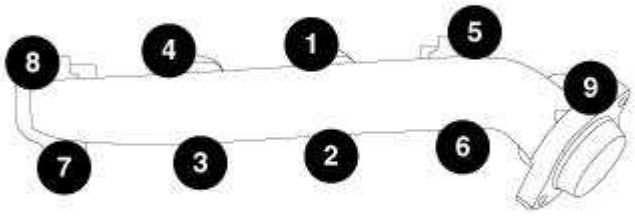


Fig. 94: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

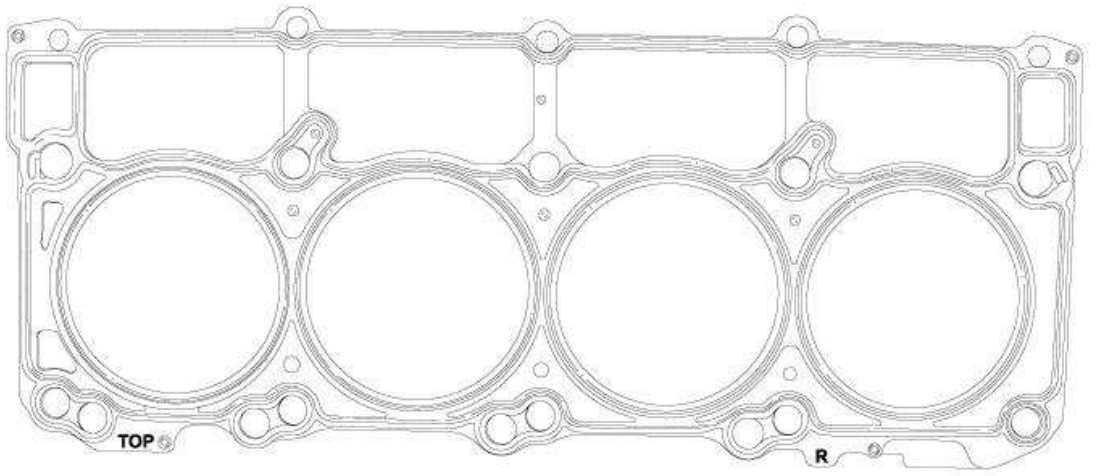
1. If replacing the cylinder head, transfer the valves, valve seals and valve springs to the new cylinder head. Refer to **VALVES, INTAKE AND EXHAUST, INSTALLATION, 5.7L**. If valve refacing is necessary, refer to **Engine/Cylinder Head/VALVES, Intake and Exhaust - Standard Procedure**.
2. If replacing the cylinder head, transfer the spark plugs to the new cylinder head. Refer to **SPARK PLUG, INSTALLATION** .



2463854

Fig. 95: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER GROUP, LLC

3. If replacing the cylinder head, transfer the exhaust manifold to the new cylinder head using a new gasket.
4. Using the sequence shown in illustration, tighten the exhaust manifold bolts/studs to 25 N.m (18 ft. lbs.).



983987

Fig. 96: Cylinder Head Gasket Markings
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The cylinder head gaskets are not interchangeable between the left and right sides. They are marked with an "L" and "R" to indicate the left or right side and they are marked "TOP" to indicate which side goes up.

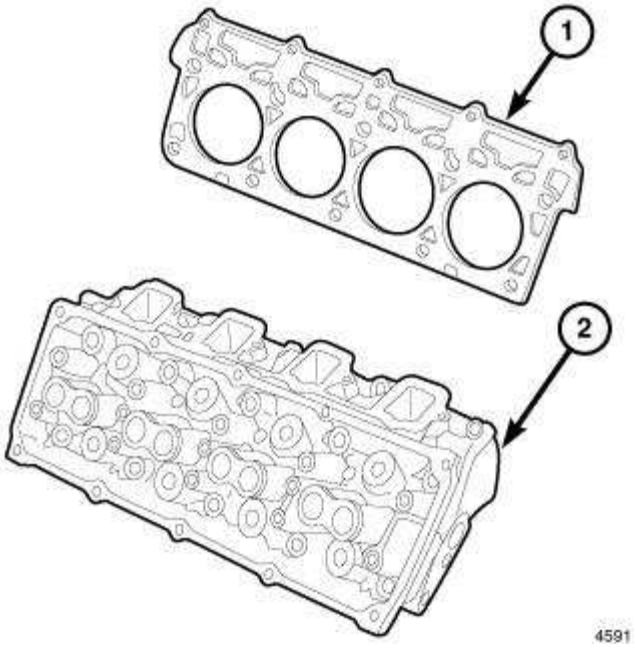


Fig. 97: Cylinder Head & Gasket
Courtesy of CHRYSLER GROUP, LLC

5. Clean all gasket sealing surfaces of the cylinder block and cylinder heads using a suitable solvent.

NOTE: Left side shown in illustration, right side similar.

6. Position the new cylinder head gaskets (5) onto the cylinder block.
7. Position the cylinder heads (4) onto the head gaskets (5) and the cylinder block.

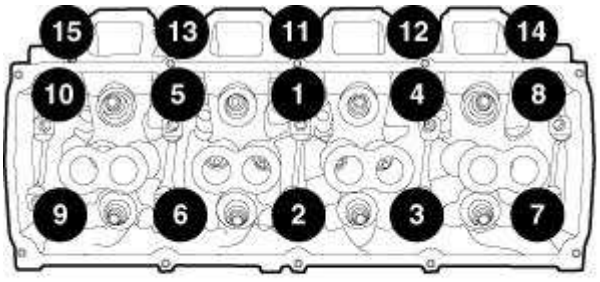


Fig. 98: Cylinder Head Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

8. Using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 34 N.m (25 ft. lbs.).
9. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
10. Using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 54 N.m (40 ft. lbs.).
11. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
12. Using the sequence shown in illustration, rotate the cylinder head bolts 1 through 10 an additional 90° turn.
13. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 34 N.m (25 ft. lbs.).

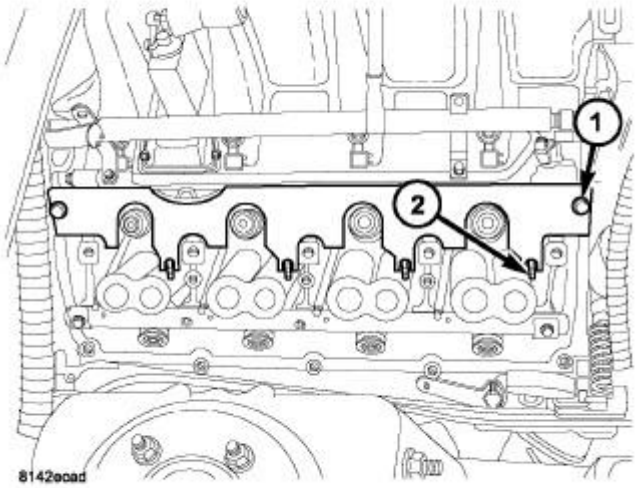


Fig. 99: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

14. Install the push rods and rocker arm assemblies in their original position, using Pushrod Retainer (special tool #9070, Retainer, Push Rod) (1). Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.
15. If Install the right cylinder head, position the engine oil dip stick tube and install the retaining nut at the exhaust manifold.

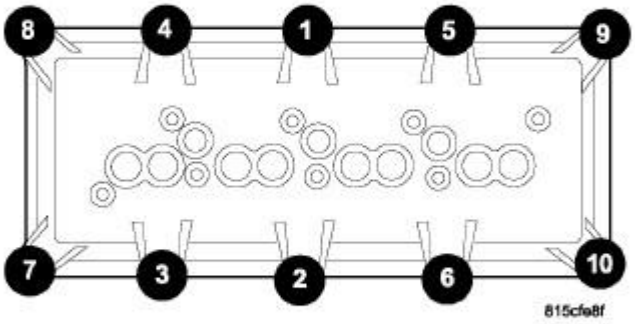


Fig. 100: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

16. Position the cylinder head covers (1), using the sequence shown in illustration, tighten the retaining bolts to 8 N.m (70 in. lbs.).

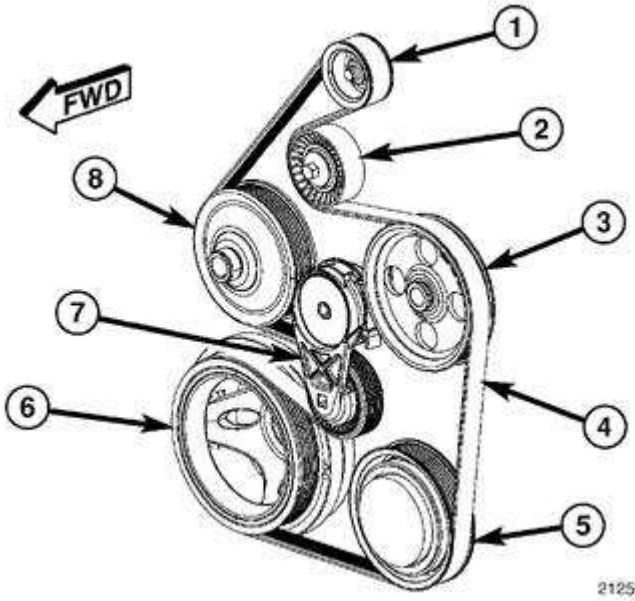


Fig. 101: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

17. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and install the accessory drive belt (2) onto the pulleys, then slowly release the tensioner.

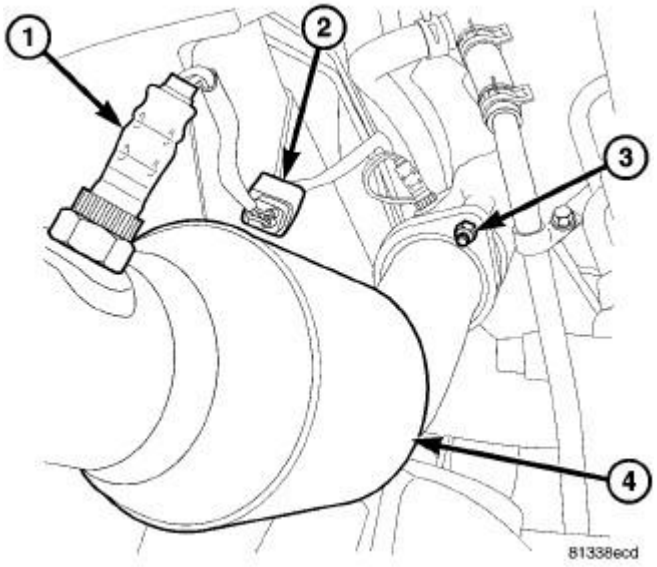


Fig. 102: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

18. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
19. Position the catalytic converters (4) onto the exhaust manifold flanges, install the flange nuts (3) and tighten to 41 N.m (30 ft. lbs.).
20. Connect the oxygen sensor electrical connectors (2).

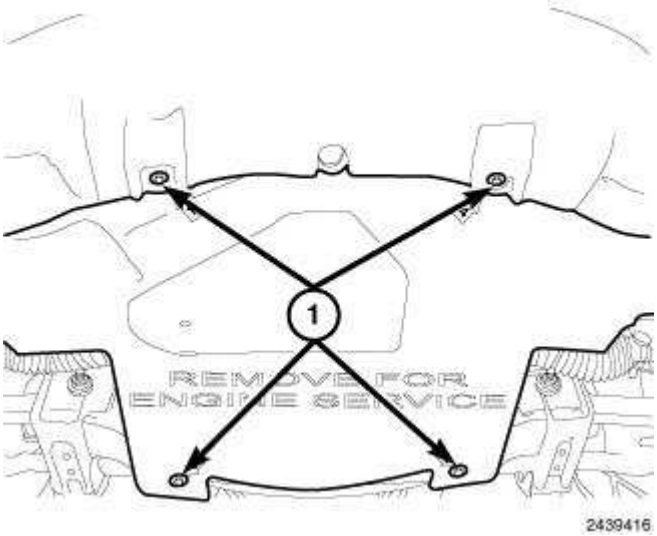


Fig. 103: Lower Splash Shield & Fasteners

Courtesy of CHRYSLER GROUP, LLC

21. Position the belly pan and install the belly pan retainers (1).
22. Lower the vehicle.

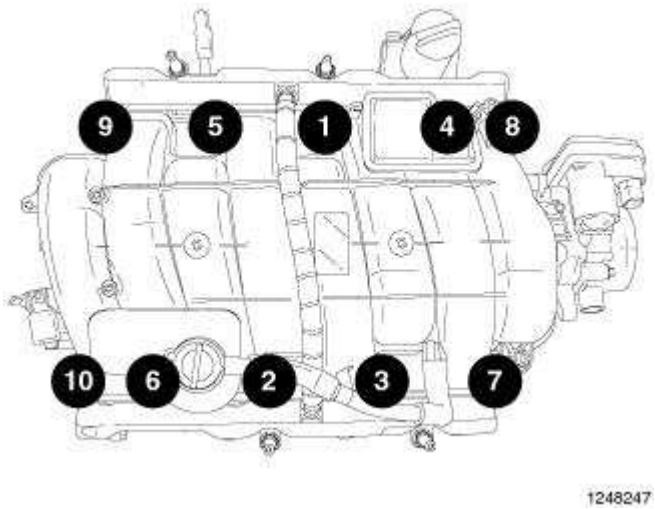


Fig. 104: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the intake manifold and throttle body as an assembly.

23. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.
24. Change the engine oil and oil filter. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
25. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

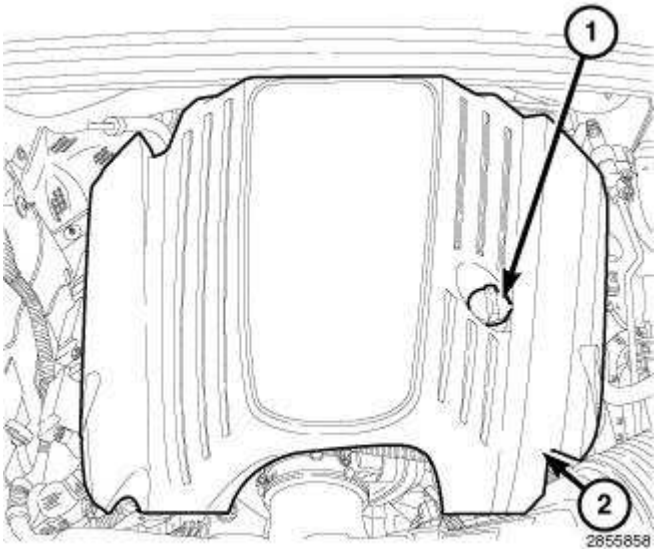


Fig. 105: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

26. Position the engine cover (2) and secure the retaining grommets onto the ball studs.

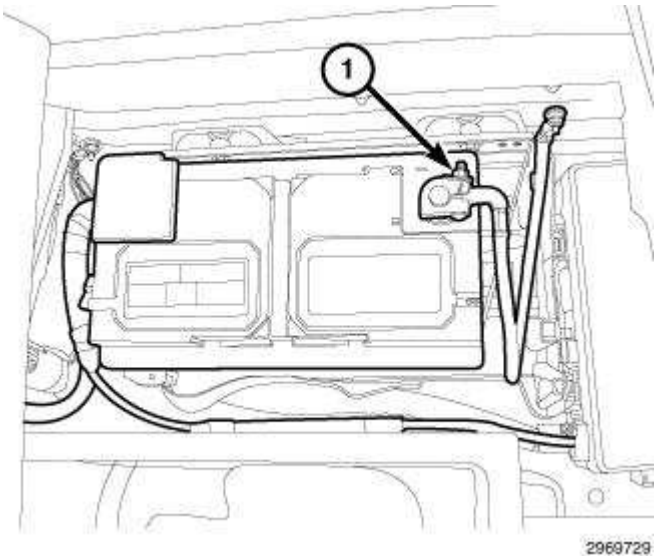


Fig. 106: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

27. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).
28. Start the engine and check for leaks.

COVER(S), CYLINDER HEAD

REMOVAL

REMOVAL

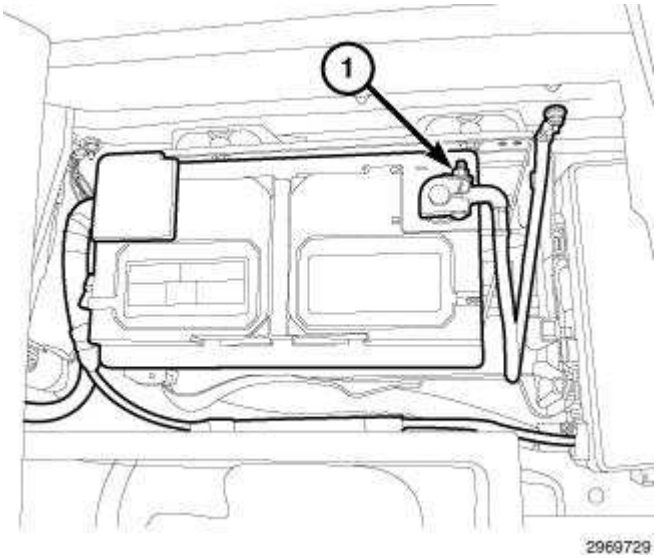


Fig. 107: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).
2. Remove the engine cover.

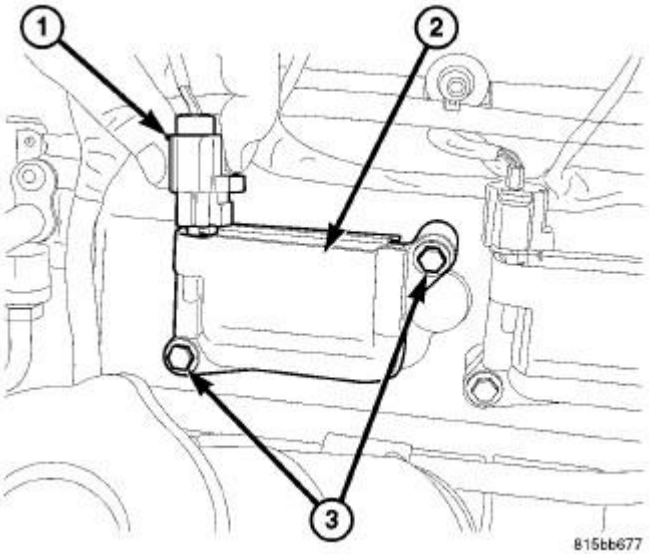


Fig. 108: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the ignition coil electrical connectors (1).
4. Remove the ignition coil retaining bolts (3) and remove the ignition coils (2).

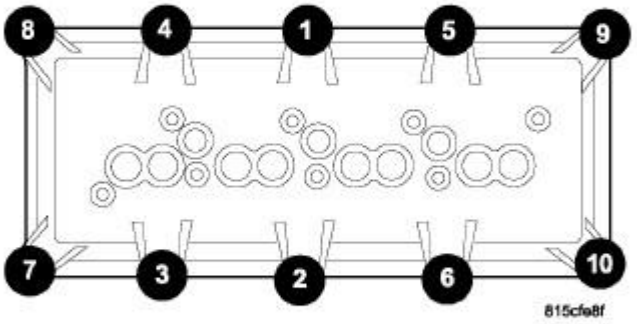


Fig. 109: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts.

CAUTION: Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.

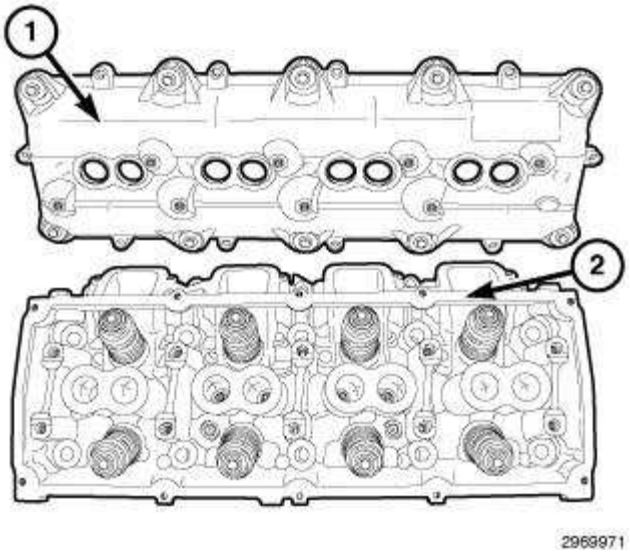


Fig. 110: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

6. Remove the cylinder head cover (1).

7. Clean the sealing surface of the cylinder head (2).

NOTE: The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.

INSTALLATION

INSTALLATION

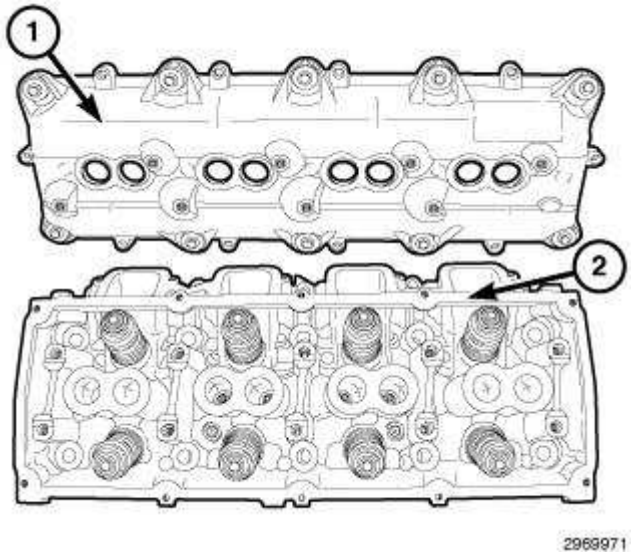


Fig. 111: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.

CAUTION: Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.

NOTE: The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.

1. Clean cylinder head cover (1) and sealing surfaces (2). Inspect and replace the cylinder head cover gasket if necessary.
2. Install cylinder head cover and hand start all fasteners. Verify that all double ended studs are in the correct location.

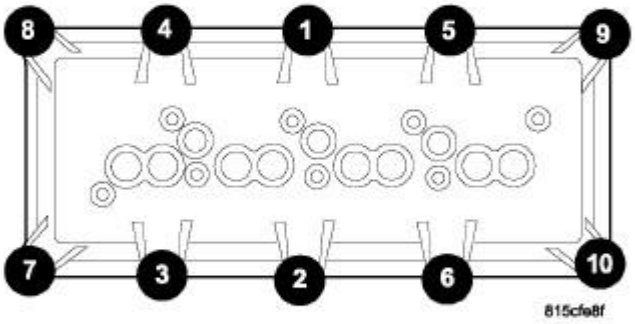


Fig. 112: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, tighten the cylinder head cover bolts and double ended studs to 8 N.m (70 in. lbs.).

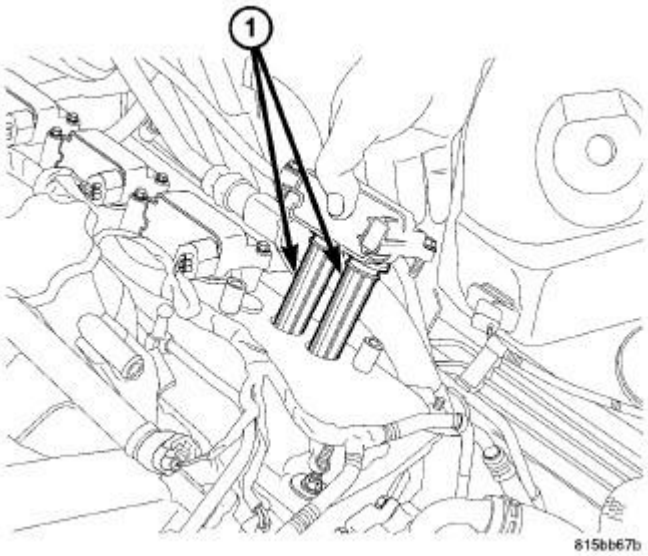


Fig. 113: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

4. Before installing the ignition coils, apply dielectric grease to the inside of spark plug boots (1).
5. Install the ignition coils.

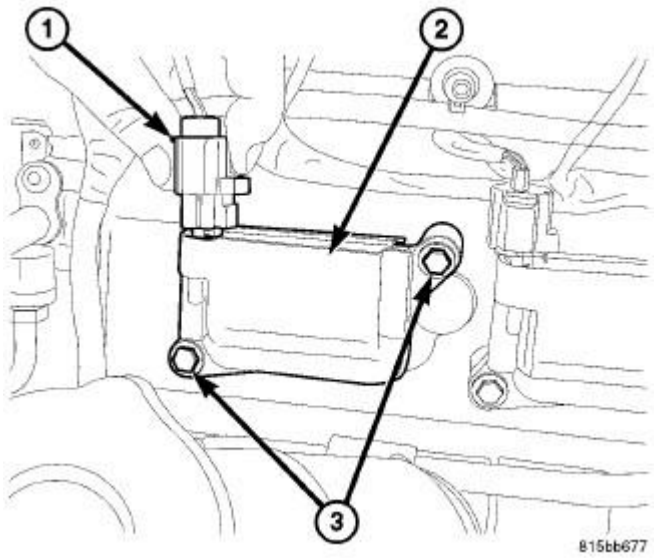


Fig. 114: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the ignition coil retaining bolts (3) to 7 N.m (62 in. lbs.).
7. Connect the ignition coil electrical connectors (1).

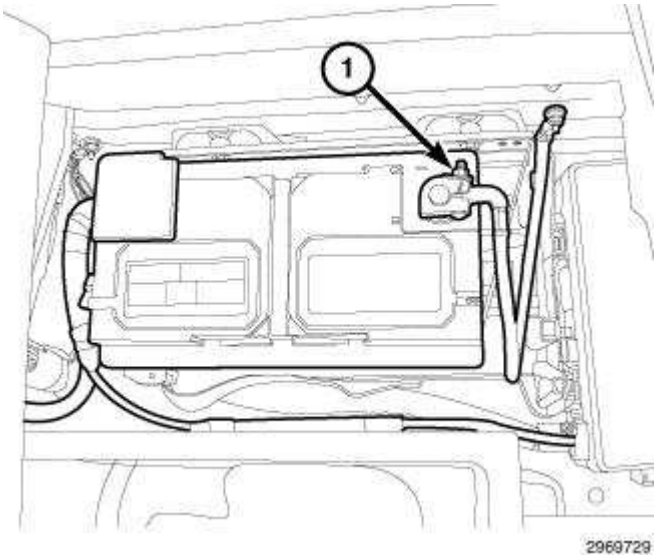


Fig. 115: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

8. Install the engine cover.
9. Connect the negative battery cable (1).

ROCKER ARM, VALVE

REMOVAL

REMOVAL

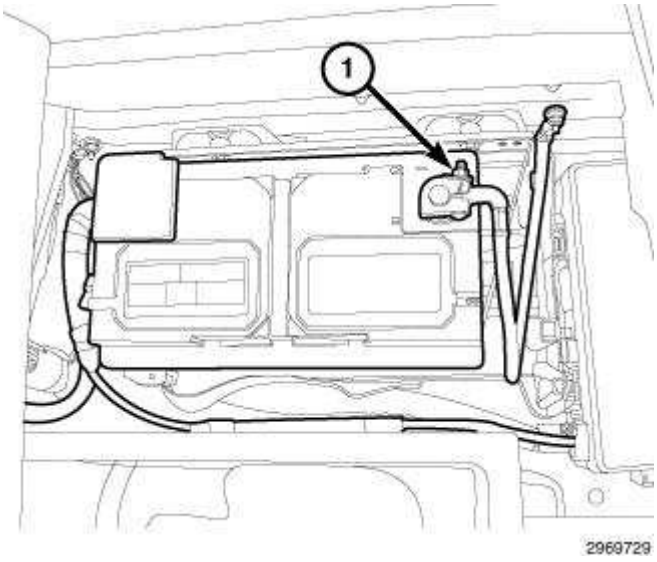


Fig. 116: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).

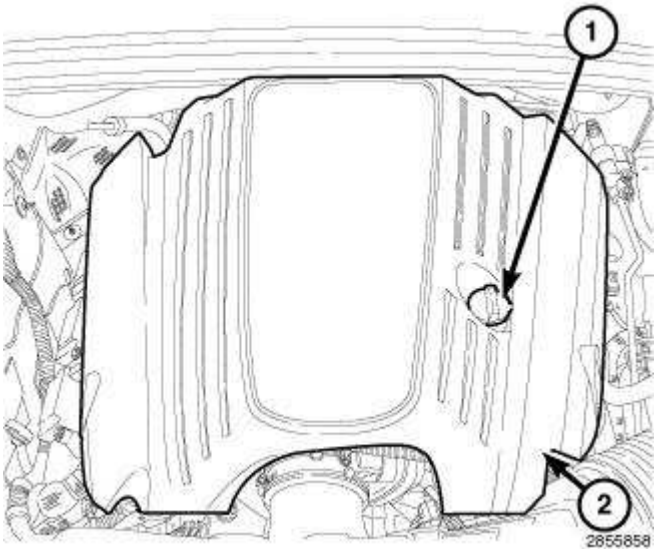


Fig. 117: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (2).

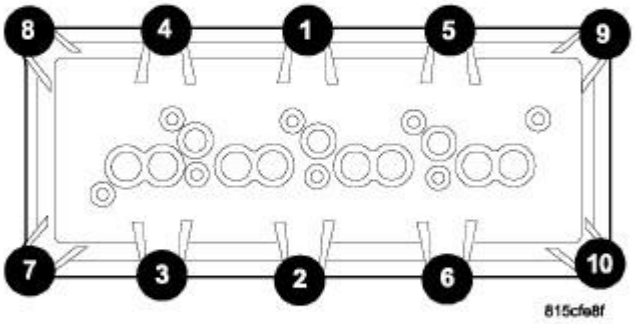


Fig. 118: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

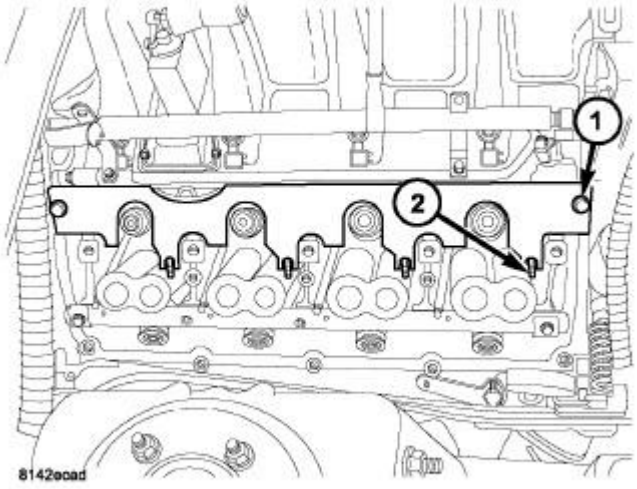


Fig. 119: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

4. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

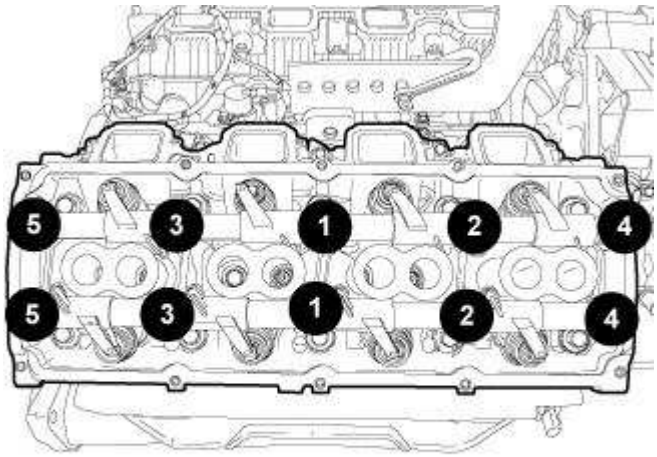


Fig. 120: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Using the sequence shown in illustration, loosen the rocker shafts retaining bolts.

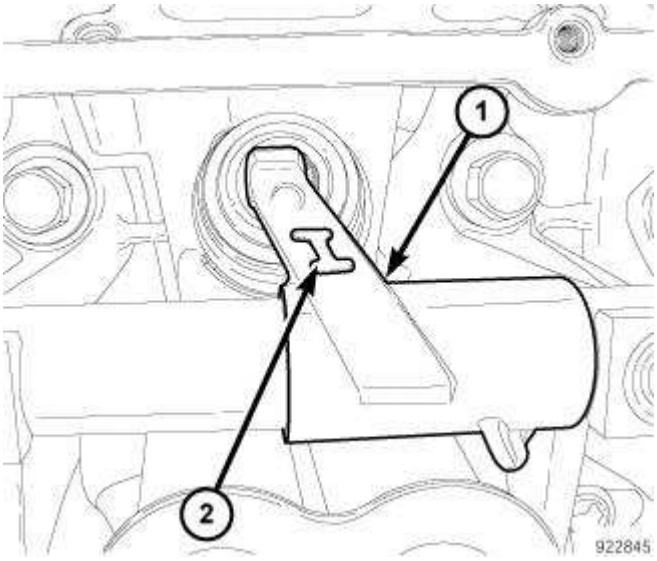


Fig. 121: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

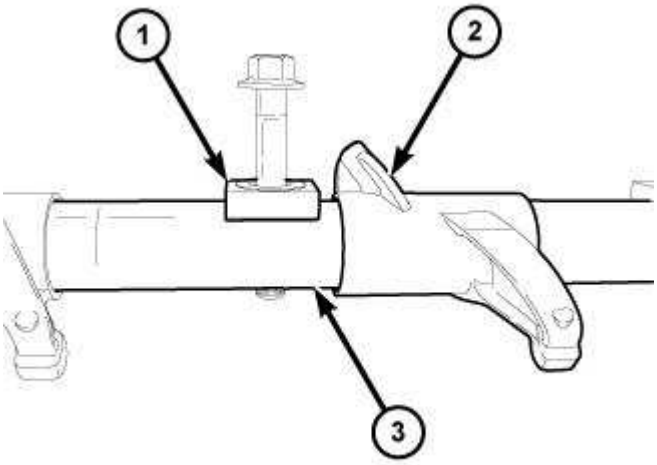


Fig. 122: Retainers, Rocker Arm & Rocker Shaft
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove the retainers (1) from the rocker shaft (3).

6. Remove the rocker shaft (3). Note the rocker shaft location for reassembly.

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

7. Remove the pushrods. Note the pushrod location for reassembly.

INSTALLATION

INSTALLATION

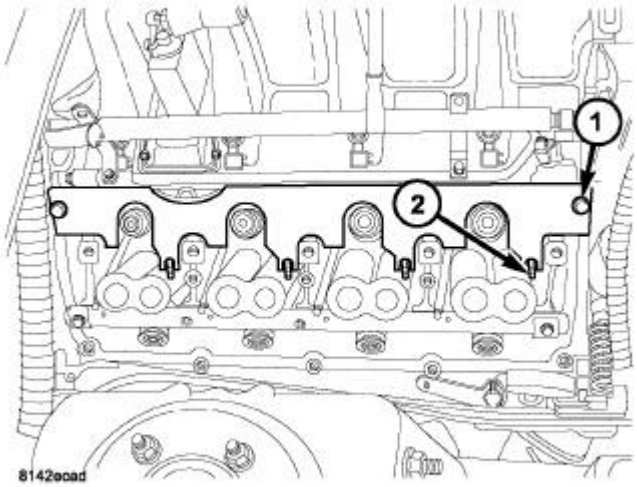


Fig. 123: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

1. Install the pushrods in the same order as removed.
2. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

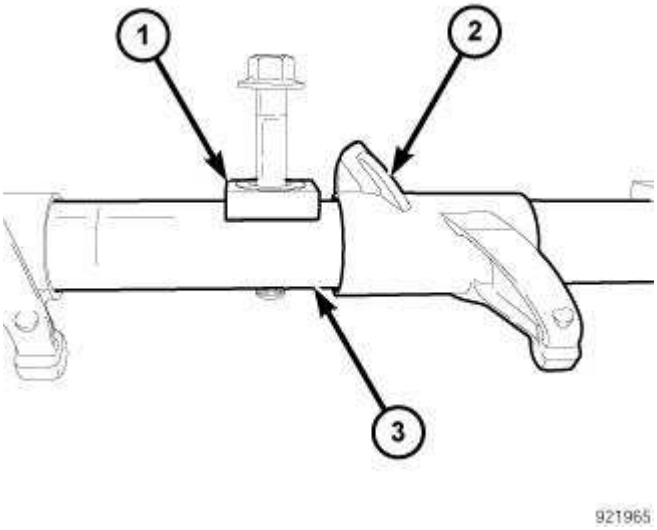


Fig. 124: Retainers, Rocker Arm & Rocker Shaft
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Make sure that the retainers (1) and the rocker arms (2) are not overlapped when tightening bolts or engine damage could result.

CAUTION: Due to the changes in the pushrod clearance holes in the Eagle 5.7L cylinder heads, close attention must be given when installing the pushrod(s) into the tappet(s). Once the pushrod(s) have been installed, use a suitable light to look down through the pushrod hole (s). This will allow you to verify the pushrod(s) are centered properly in the tappet(s) and avoid engine damage. Recheck after the rocker shaft assembly has been installed and tightened to specification.

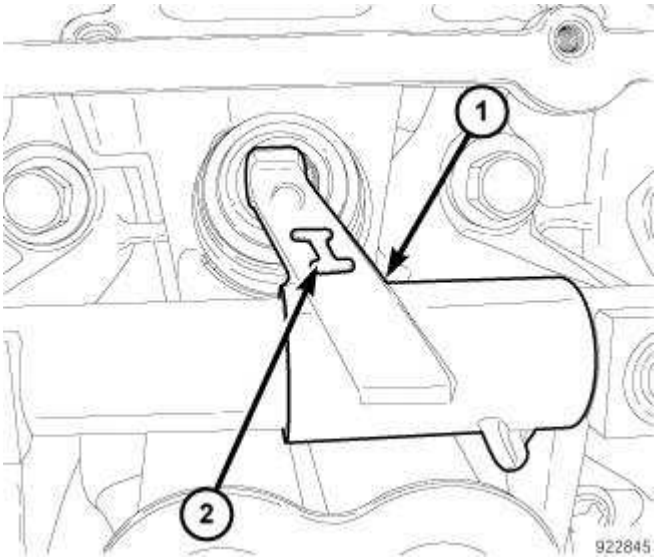


Fig. 125: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

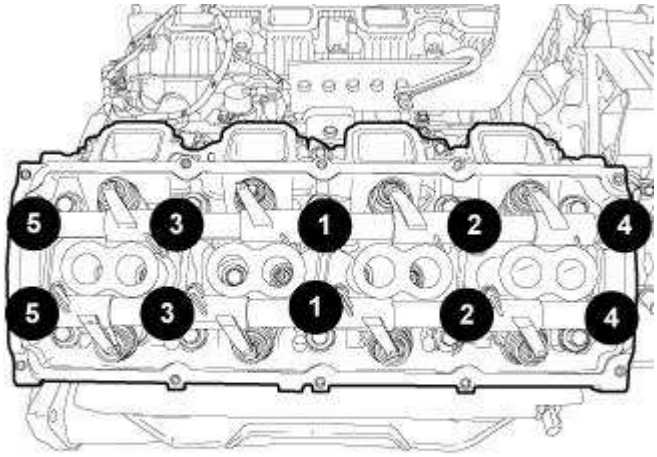


Fig. 126: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Install the rocker shaft assemblies in the same order as removed.
4. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

CAUTION: Do Not rotate or crank the engine during or immediately after rocker arm installation. Allow the hydraulic roller tappets adequate time to bleed down (about five minutes).

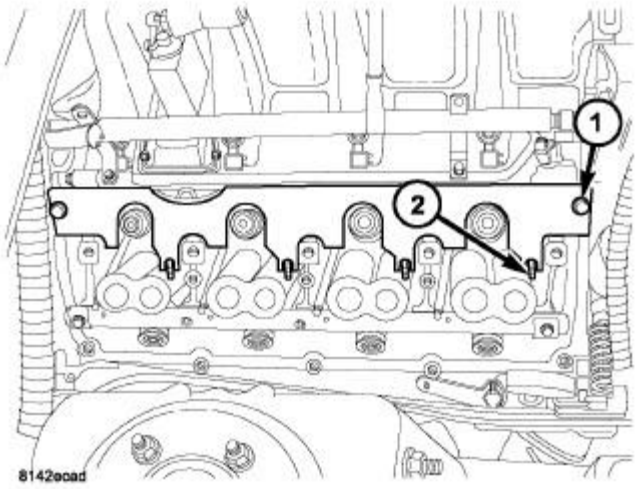


Fig. 127: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

5. Remove pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

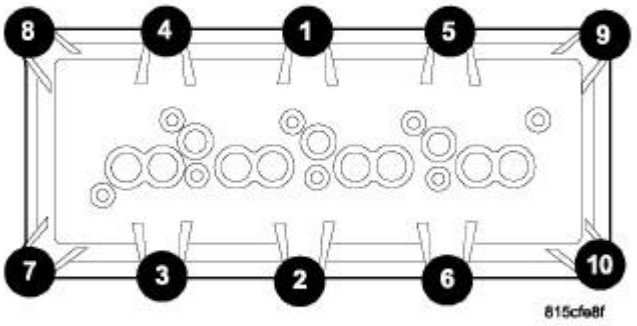


Fig. 128: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

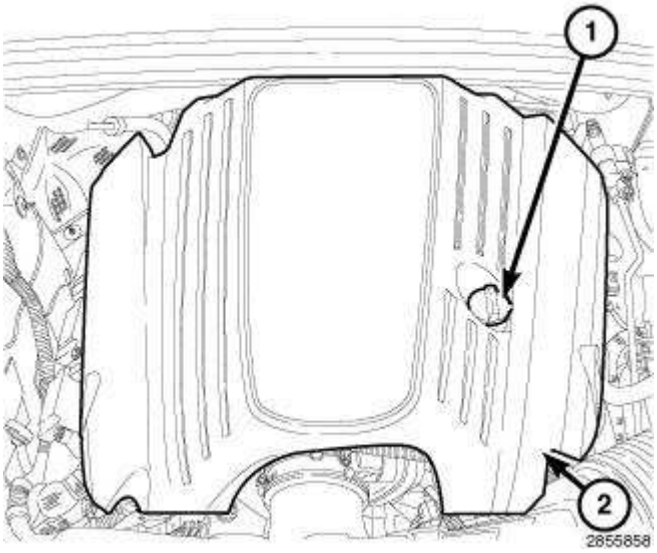


Fig. 129: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

7. Install the engine cover (2).

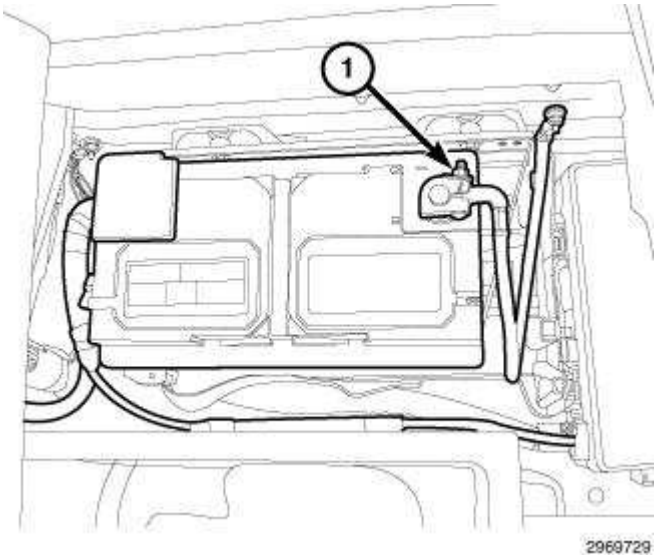


Fig. 130: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

8. Connect the negative battery cable (1).

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

The valve guide seals are made of rubber and incorporate an integral steel valve spring seat. The integral garter spring maintains consistent lubrication control to the valve stems.

SPRING(S), VALVE

REMOVAL

REMOVAL

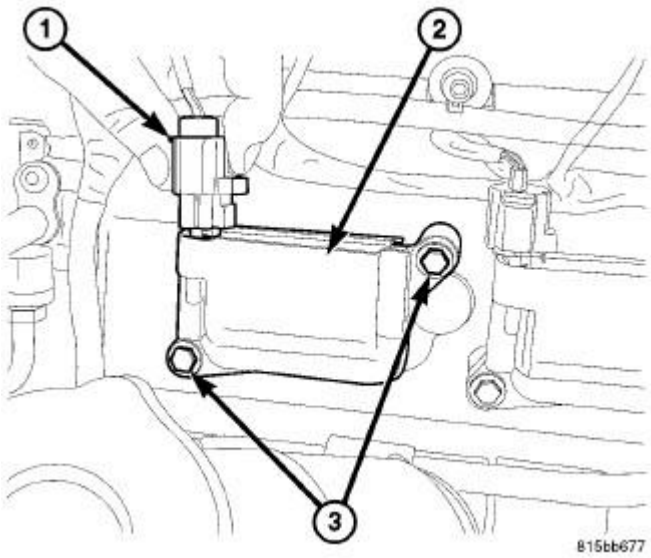


Fig. 131: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly and the air intake resonator. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
3. Remove the ignition coil electrical connectors (1).
4. Remove the ignition coils (2).
5. Remove the spark plugs.

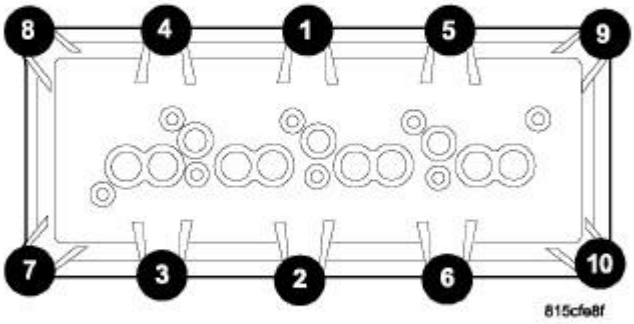


Fig. 132: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts and remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

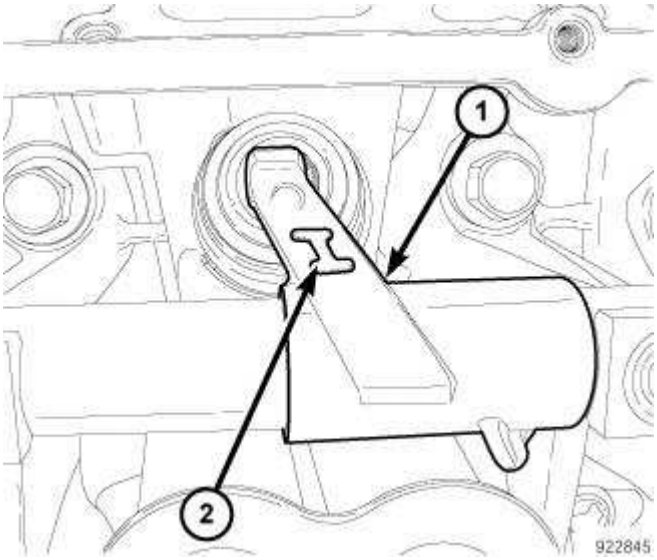


Fig. 133: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

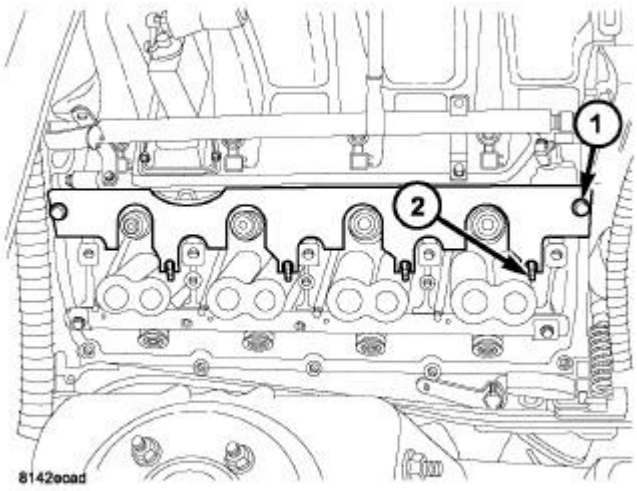


Fig. 134: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The piston must be at TDC and both valves closed on the cylinder to be serviced.

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

NOTE: Pushrods must be installed in the same order as removed.

NOTE: If removing the intake valve spring, install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

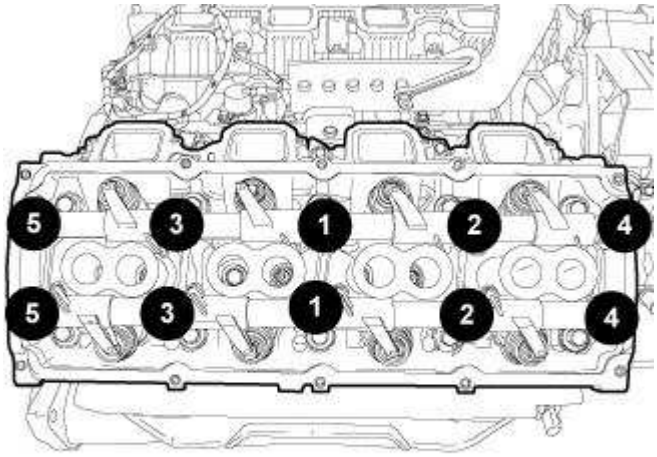


Fig. 135: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Using the sequence shown in illustration, remove the exhaust/intake rocker arm shaft retaining bolts.

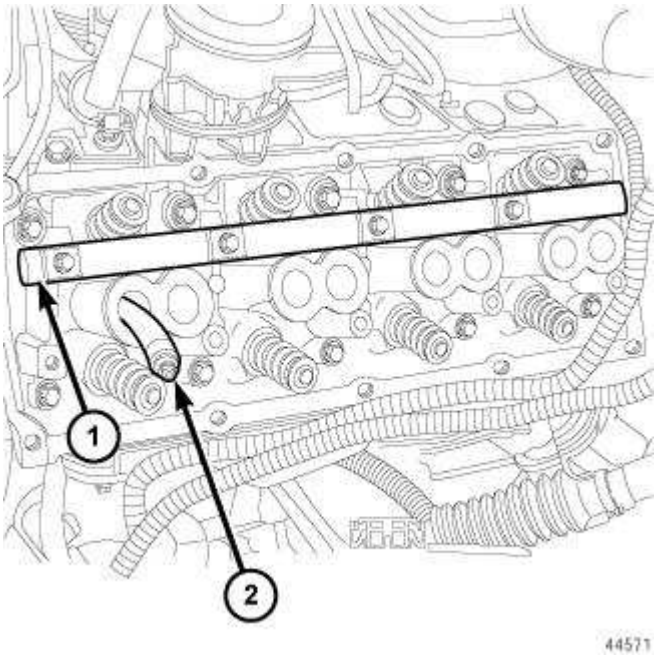


Fig. 136: Rocker Arm Valve Spring Compressor Shaft & Air Hose
Courtesy of CHRYSLER GROUP, LLC

NOTE: Tap the top of the valve spring retainer to loosen the spring retainers locks.

8. Install the rocker arm valve spring compressor shaft (special tool #9065B, Compressor, Valve

Spring) (1).

9. Install the spring compressor adapter arm (special tool #9065B, Compressor, Valve Spring) if needed.
10. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

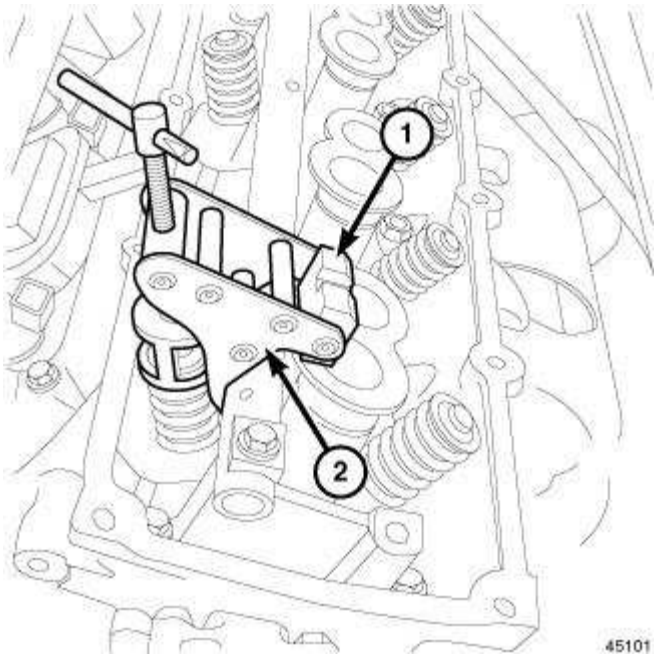


Fig. 137: Intake Valve Spring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: A fulcrum assembly (1) must be rotated to the appropriate setting as marked on the tool for proper valve spring alignment.

NOTE: Tap the top of the valve spring retainer to loosen the spring retainers locks.

11. Compress the valve spring with valve spring compressor (1) and remove the valve retainer locks.
12. Release the spring compressor and remove valve spring.

NOTE: All valve springs and seals are removed in the same manner and are interchangeable between intake and exhaust.

13. Remove the valve seal.

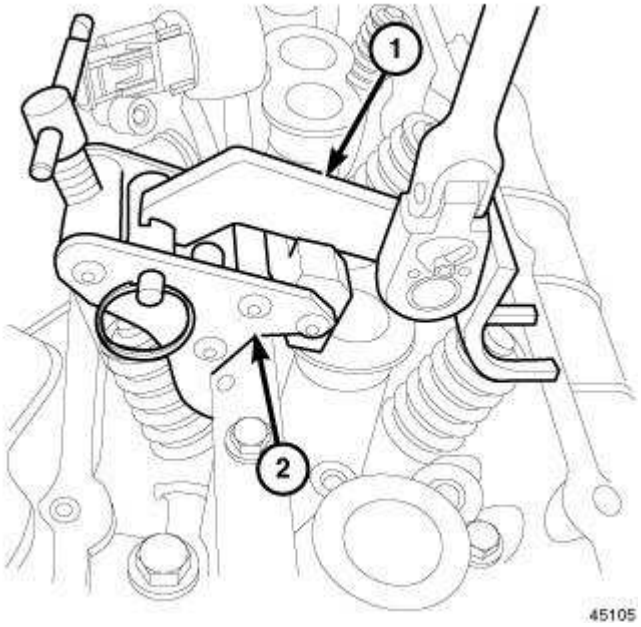


Fig. 138: Valve Spring Tool & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the exhaust spring, seal or valve needs servicing. The exhaust adapter arm (1) must be installed to the spring compressor clamp (3).

14. Install tool (special tool #9065B, Compressor, Valve Spring), exhaust adapter arm (1) to the spring compressor (3) for servicing the exhaust side.

INSTALLATION

INSTALLATION

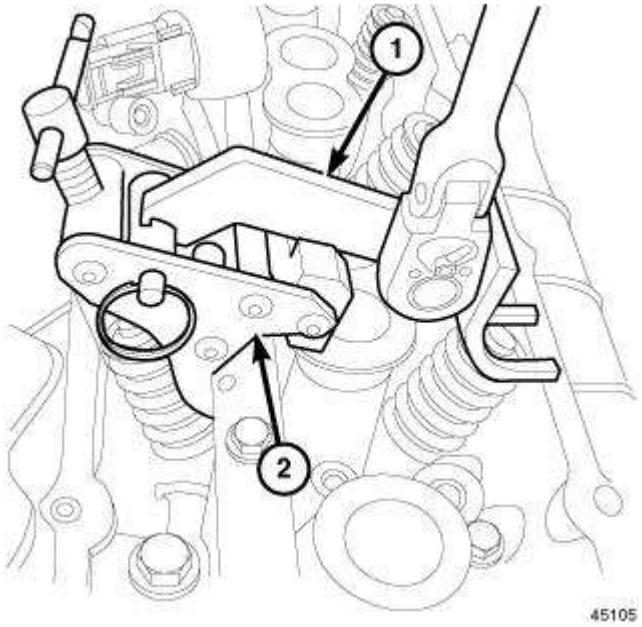


Fig. 139: Valve Spring Tool & Adapter
Courtesy of CHRYSLER GROUP, LLC

1. Install the valve seal.
2. Install the valve spring.
3. Using the valve spring compressor (special tool #9065B, Compressor, Valve Spring) (1), compress the valve spring and install the valve spring retainer and locks.
4. Remove the exhaust extension arm (1).

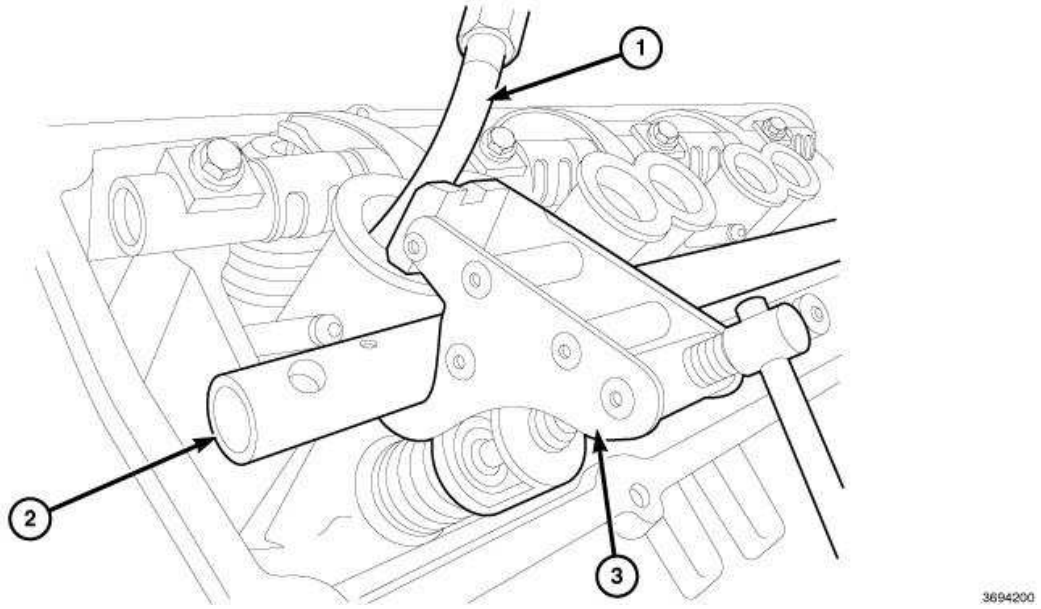


Fig. 140: Air Charge, Valve Spring Compressor & Adapter
Courtesy of CHRYSLER GROUP, LLC

5. Remove the spring compressor (3).
6. Remove the air hose from the spark plug hole.

NOTE: All valve springs and seals are installed in the same manner.

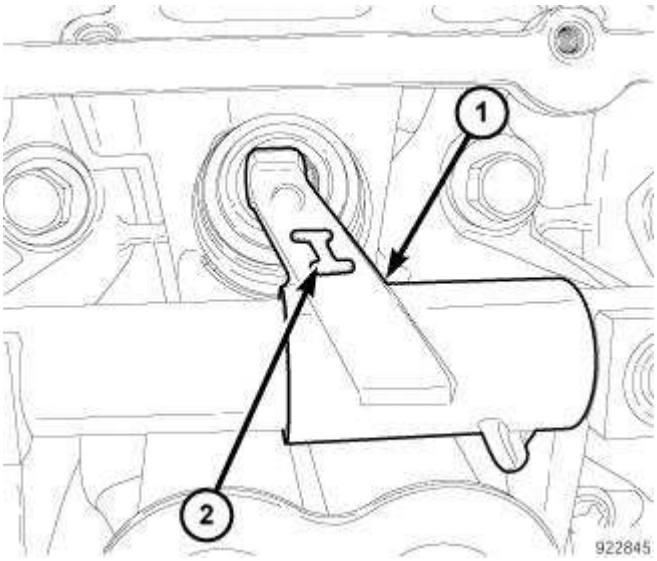


Fig. 141: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

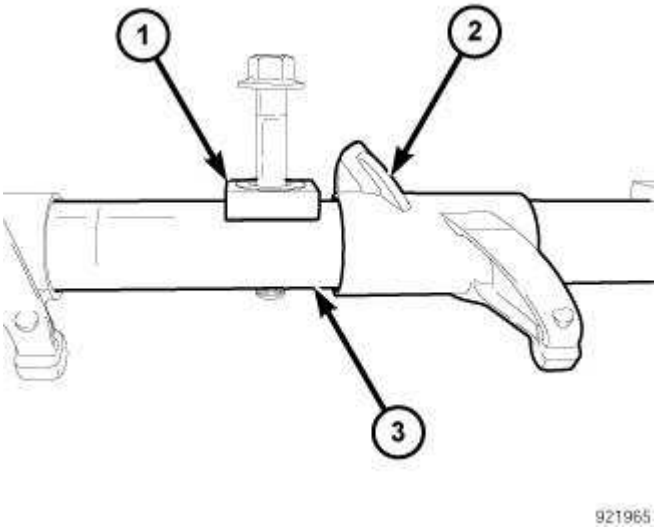


Fig. 142: Retainers, Rocker Arm & Rocker Shaft
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Make sure that the retainers (1) and the rocker arms (2) are not overlapped when tightening bolts or engine damage could result.

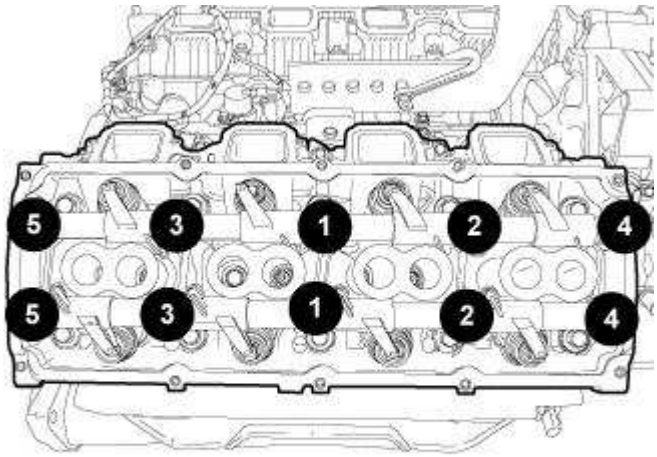


Fig. 143: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Due to the changes in the pushrod clearance holes in the Eagle 5.7L cylinder heads, close attention must be given when installing the pushrod(s) into the tappet(s). Once the pushrod(s) have been installed, use a suitable light to look down through the pushrod hole (s). This will allow you to verify the pushrod(s) are centered properly in the tappet(s) and avoid engine damage. Recheck after the rocker shaft assembly has been installed and tightened to specification.

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

NOTE: Pushrods must be installed in the same order as removed.

7. Install the rocker arm shaft and pushrods. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.
8. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

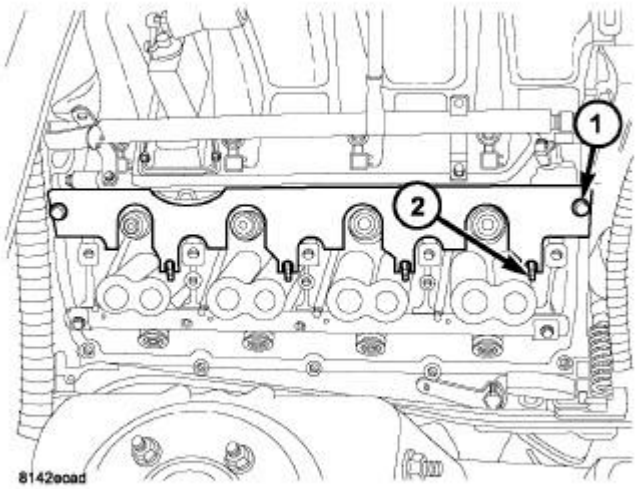


Fig. 144: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

9. If used, remove the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

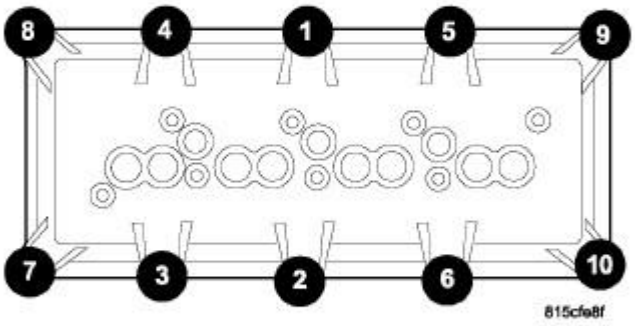


Fig. 145: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.

CAUTION: Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.

10. Clean the cylinder head cover and both sealing surfaces, inspect and replace the gasket as necessary.
11. Install the cylinder head cover and hand start all fasteners. Verify that all double ended studs are in the correct location.
12. Using the sequence shown in illustration, tighten the cylinder head cover retaining bolts to 8 N.m (71 in. lbs.).
13. Install the spark plugs.

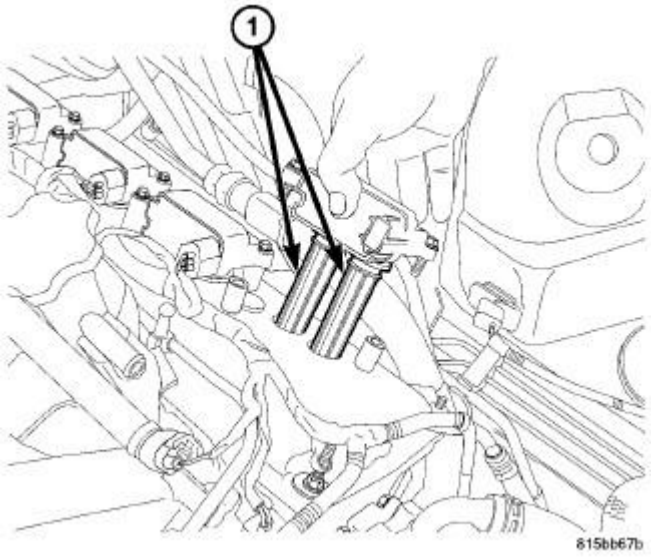


Fig. 146: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

14. Before installing the ignition coils, apply dielectric grease to the inside of the spark plug boots.

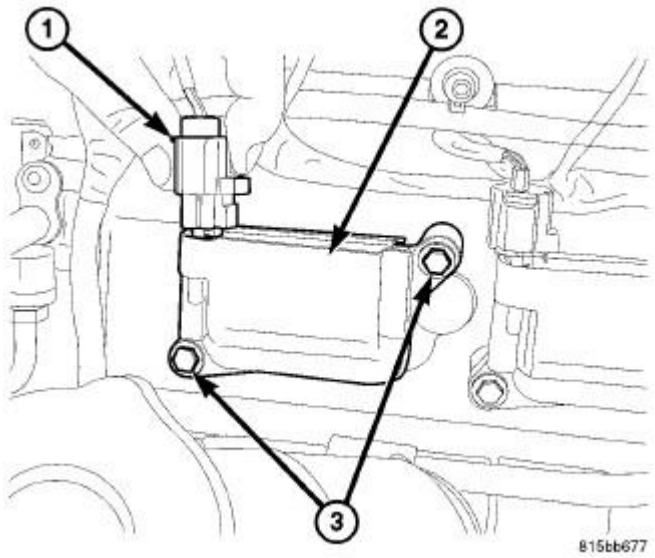


Fig. 147: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install the ignition coil (2) on the plugs and tighten the fasteners (3) to 7 N.m (62 in. lbs).
16. Connect the ignition coil electrical connectors (1).
17. Install the air intake resonator and the air cleaner assembly. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
18. Connect the negative battery cable.

VALVES, INTAKE AND EXHAUST

DESCRIPTION

VALVE GUIDES

The valve guides are made of powdered metal and pressed into the cylinder head. The guides are not replaceable or serviceable, and valve guide reaming is not recommended. If the guides are worn beyond acceptable limits, replace the cylinder heads.

VALVES

Both the intake and the exhaust valves are made of steel. The intake valve is 50.93 mm (2.00 inches) in diameter and the exhaust valve is 39.53 mm (1.55 inches) in diameter. All valves use three-bead lock keepers to retain the springs and promote valve rotation.

STANDARD PROCEDURE

STANDARD PROCEDURE - REFACING

NOTE: Valve seats that are worn or burned can be reworked, provided that correct

angle and seat width are maintained. Otherwise the cylinder head must be replaced.

NOTE: When refacing valves and valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

1. Using a suitable dial indicator measure the center of the valve seat Total run out must not exceed 0.051 mm (0.002 in).
2. Apply a small amount of Prussian blue to the valve seat, insert the valve into the cylinder head, while applying light pressure on the valve rotate the valve. Remove the valve and examine the valve face. If the blue is transferred below the top edge of the valve face, lower the valve seat using a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, raise the valve seat using a 65 degree stone.
3. When the seat is properly positioned the width of the intake seat must be 1.18 - 1.62 mm (0.0464 - 0.0637 in.) and the exhaust seat must be 1.48 - 1.92 mm (0.058 - 0.075 in.).
4. Check the valve spring installed height after refacing the valve and seat. The installed height for both intake and exhaust valve springs must not exceed 46.0 mm (1.81 in.).

VALVE FACE AND VALVE SEAT ANGLE CHART

DESCRIPTION	SPECIFICATION
SEAT WIDTH	
INTAKE	1.18 - 1.62 mm
	(0.0464 - 0.0637 in.)
EXHAUST	1.48 - 1.92 mm
	(0.058 - 0.075 in.)
FACE ANGLE	
(INT. AND EXT.)	45° - 45 1/2 °
SEAT ANGLE	
(INT. AND EXT.)	44 1/2 ° - 45°

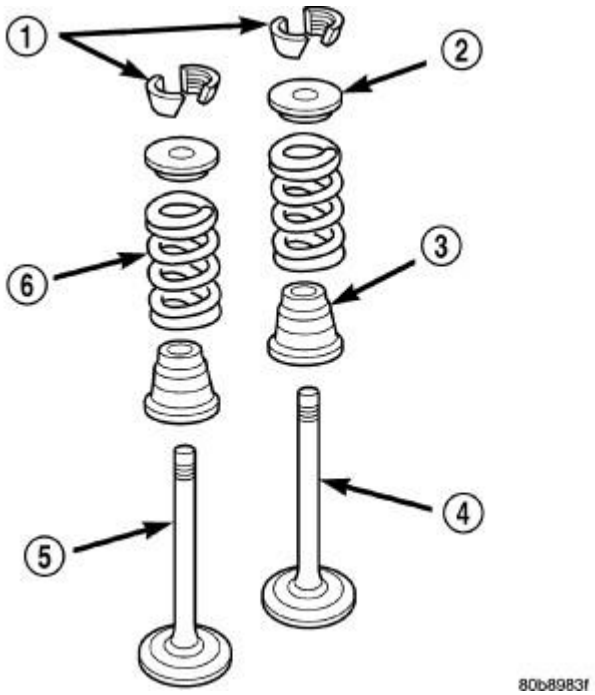


Fig. 148: Valve Assembly Configuration
Courtesy of CHRYSLER GROUP, LLC

1 - VALVE LOCKS (3-BEAD)
2 - RETAINER
3 - VALVE STEM OIL SEAL
4 - INTAKE VALVE
5 - EXHAUST VALVE
6 - VALVE SPRING

5. The valve seat must maintain an angle of 44.5 - 45.0 degrees angle.
6. The valve face must maintain a face angle of 45.0 - 45.5 degrees angle. Refer to **Fig. 148**.

REMOVAL

REMOVAL

1. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.

2. Compress valve springs using Valve Spring Compressor Tool (special tool #C-3422-D, Compressor, Valve Spring) and Adapter (special tool #8464, Adapter, Valve Spring).
3. Remove valve retaining locks, valve spring retainers, valve stem seals and valve springs.
4. Before removing valves, remove any burrs from valve stem lock grooves to prevent damage to the valve guides. Identify valves to ensure installation in original location.

INSTALLATION

INSTALLATION

1. Clean valves thoroughly. Discard burned, warped and cracked valves.
2. Remove the carbon and varnish deposits from the inside of the valve guides with a reliable guide cleaner.
3. Measure the valve stems for wear. If the wear exceeds 0.051 mm (0.002 inch), replace the valve.
4. Coat the valve stems with clean engine oil and insert them into the cylinder head.
5. If the valves or seats are ground, check the valve stem height. If the valve stem is too long, replace the cylinder head.
6. Install new seals on all valve guides. Install the valve springs and valve retainers.
7. Compress the valve springs with the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) and Valve Spring Adapter (special tool #8464, Adapter, Valve Spring). Install the locks and release the tool. If the valves and/or seats are ground, measure the installed height of the springs. Make sure the measurement is taken from the bottom of the spring seat in the cylinder head to the bottom surface of the spring retainer.
8. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.

ENGINE BLOCK

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean:

- Gallery at the oil filter adaptor hole
- Front and rear oil gallery holes
- Multiple Displacement System (MDS) oil gallery holes in the valley
- Oil feed holes for the crankshaft main bearings

Drilled and tapped holes should be free of debris upon assembly.

Once the block has been completely cleaned, apply Loctite® PST pipe sealant with Teflon 592 to the

threads of the front and rear oil gallery plugs and coolant drain plugs. Tighten the oil gallery 1/4 inch x 18 NPT plugs to 20 N.m (15 ft. lbs.). Tighten the coolant drain 1/4 inch x 18 NPT plugs to 34 N.m (25 ft. lbs.). Tighten the 3/8 inch x 18 NPT plugs to 27 N.m (20 ft. lbs.).

INSPECTION

INSPECTION

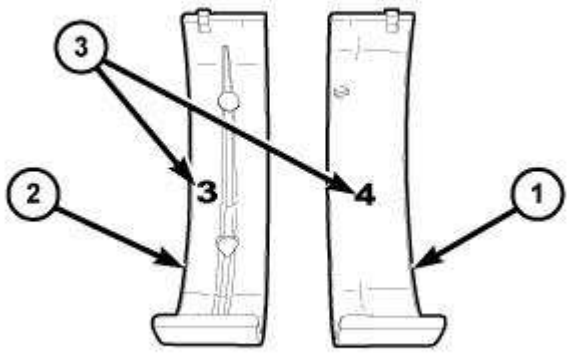


Fig. 149: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the main bearing inserts (1, 2) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, wear or blueing.
6. Replace any bearing that shows abnormal wear.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the cylinder block main bearing bores show damage, replace the engine block.

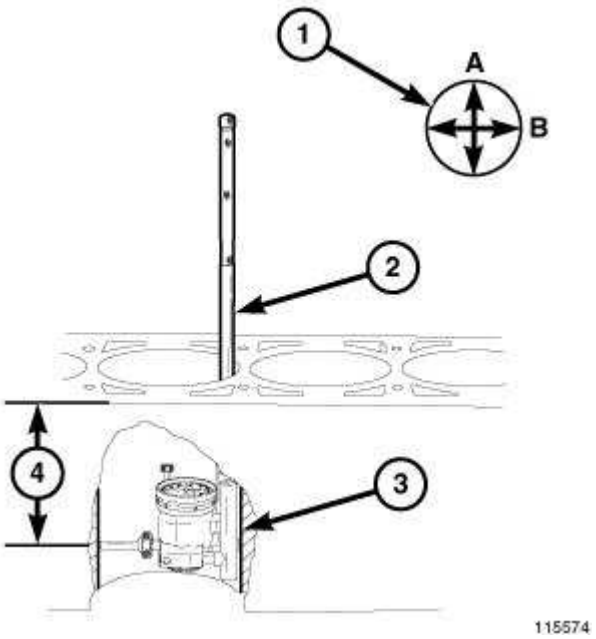


Fig. 150: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

9. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) Increments is required. If a bore gauge is not available, do not use an inside micrometer.
10. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90°) to the axis of the crankshaft at point A (1).
11. Repeat the measurement near the middle of the bore then repeat the measurement near the bottom of the bore.
12. Determine the taper by subtracting the smaller diameter from the larger diameter.
13. Rotate the measuring device 90° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specifications.
14. Determine out-of-roundness by comparing the difference between each measurement.
15. If the cylinder bore taper does not exceed 0.025 mm (0.001 inch) and out-of-roundness does not exceed 0.015 mm (0.0006 inch) then the cylinder bore can be honed. If the cylinder bore taper or out- of-round condition exceeds the maximum limits, replace the cylinder block.

NOTE: A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

STANDARD PROCEDURE - CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

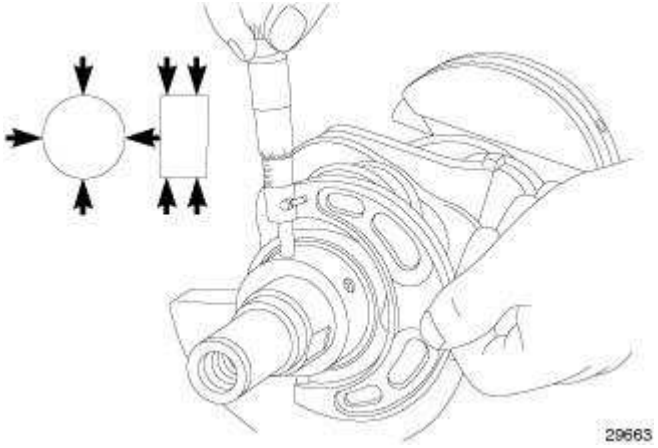


Fig. 151: Measuring Main Bearing Journal Diameter
Courtesy of CHRYSLER GROUP, LLC

With the crankshaft removed from the cylinder block.

Clean the oil off the main bearing journal.

Determine the maximum diameter of the journal with a micrometer. Measure at two locations 90° apart at each end of the journal.

The maximum allowable taper is 0.008 mm (0.0004 inch.) and maximum out of round is 0.005 mm (0.0002 inch). Compare the measured diameter with the journal diameter specification (Main Bearing Fitting Chart). Select the inserts required to obtain the specified bearing-to-journal clearance.

CRANKSHAFT MAIN BEARING SELECTION

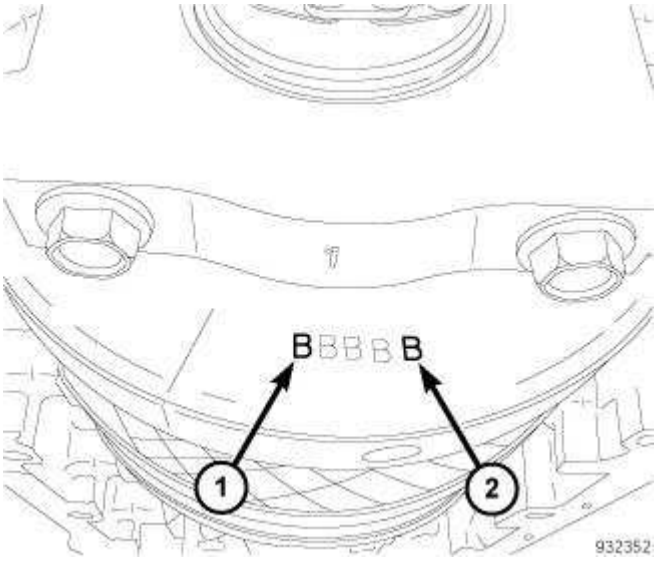


Fig. 152: Crankshaft Counterweight Stamped Grade Identification Marks
Courtesy of CHRYSLER GROUP, LLC

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft counterweight has grade identification marks stamped into it. These marks are read from left to right. The left letter (1) refers to the number one main journal and the right letter (2) refers to the number 5 journal.

NOTE: Service main bearings are coded. These codes identify what size or grade of the bearing.

MAIN BEARING SELECTION CHART - 5.7L

GRADE MARKING	BEARING SIZE		FOR USE WITH JOURNAL SIZE	
	METRIC	STANDARD	METRIC	STANDARD
A	0.008 mm U/S	0.0004 in. U/S	64.988 - 64.995 mm	2.5585 - 2.5588 in.
B	NOMINAL		64.996 - 65.004 mm	2.5588 - 2.5592 in.
C	0.008 mm O/S	0.0004 in. O/S	65.005 - 65.012 mm	2.5592 - 2.5595 in.

INSPECTION

INSPECTION

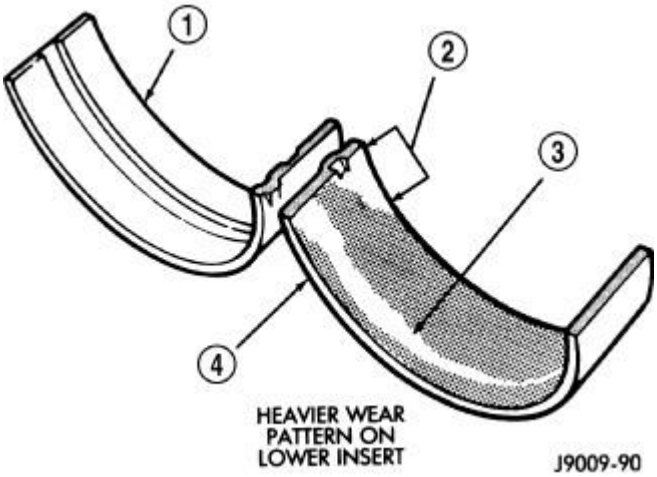


Fig. 153: Main Bearing Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

Wipe the inserts clean and inspect for abnormal wear patterns and for metal or other foreign material imbedded in the lining. Normal main bearing insert wear patterns are illustrated.

NOTE: If any crankshaft journals are scored, the crankshaft must be repaired or replaced.

Inspect the back of the inserts for fractures, scrapings or irregular wear patterns.

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

REMOVAL

5.7L / 6.4L - CAMSHAFT CORE HOLE PLUG

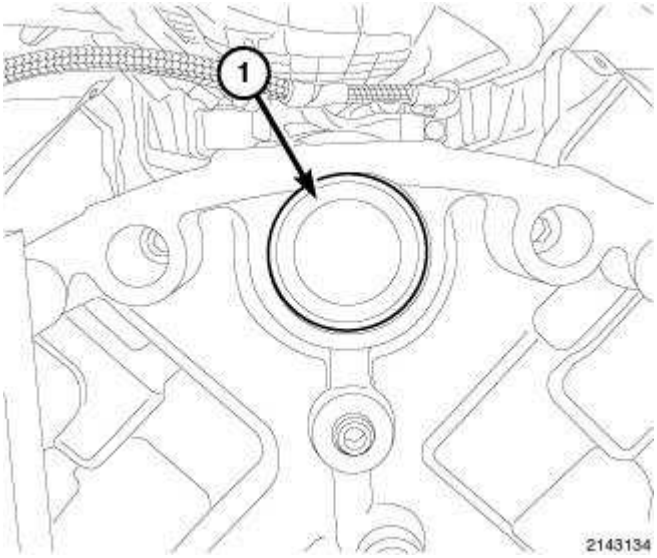


Fig. 154: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove the engine from the vehicle. Refer to **REMOVAL, 5.7L**.
3. Remove the flexplate. Refer to **FLEXPLATE, REMOVAL, 5.7L**.

CAUTION: Do not damage the rear surface of the camshaft or the core plug sealing surface, when removing the core plug.

4. Using a suitable sharp punch, punch a small hole in the camshaft core hole plug (1).
5. Insert a short sheet metal screw into the small hole in the camshaft core hole plug.
6. Using a suitable slide hammer puller, remove the rear camshaft core hole plug.

CAMSHAFT

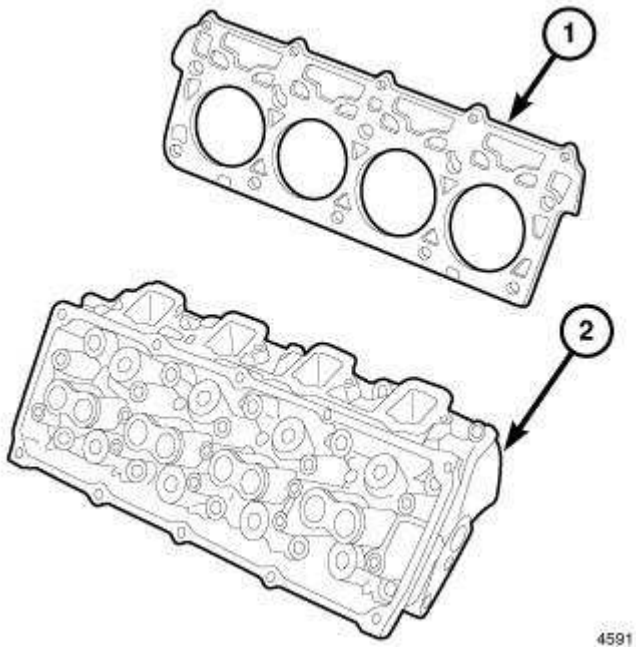


Fig. 155: Cylinder Head & Gasket
Courtesy of CHRYSLER GROUP, LLC

1. Remove both cylinder heads (2). Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.

CAUTION: The 5.7L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

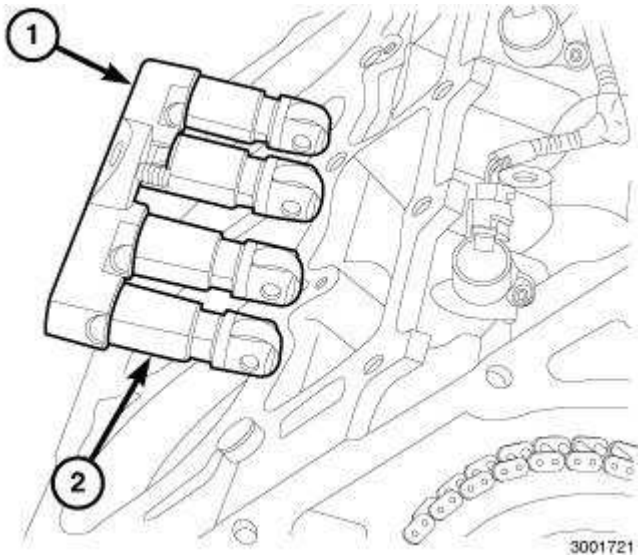


Fig. 156: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

2. Remove the lifters (2) and retainer (1) as an assembly. Refer to **LIFTER(S), HYDRAULIC, ROLLER, REMOVAL, 5.7L**.

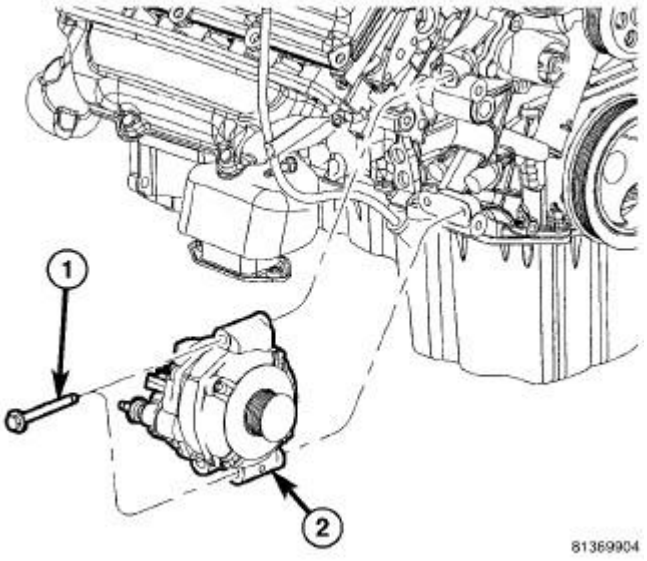


Fig. 157: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Remove the generator. Refer to **GENERATOR, REMOVAL** .

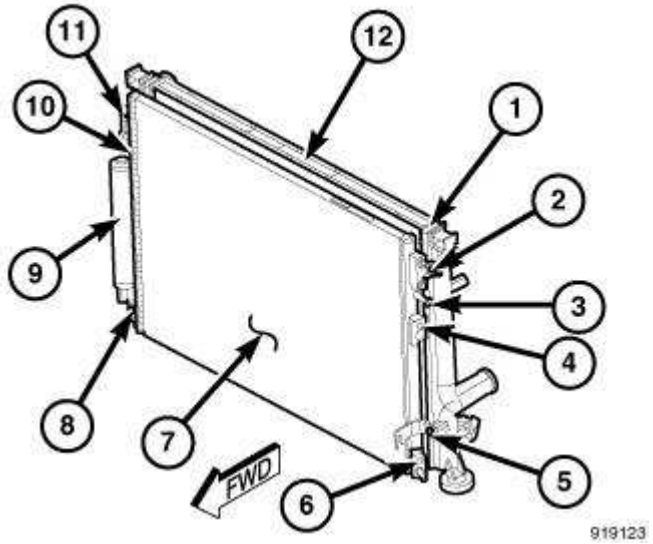


Fig. 158: A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

4. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .
5. Remove the radiator (12). Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .
6. Remove the A/C condenser (7). Refer to **CONDENSER, A/C, REMOVAL** .
7. Raise and support vehicle.

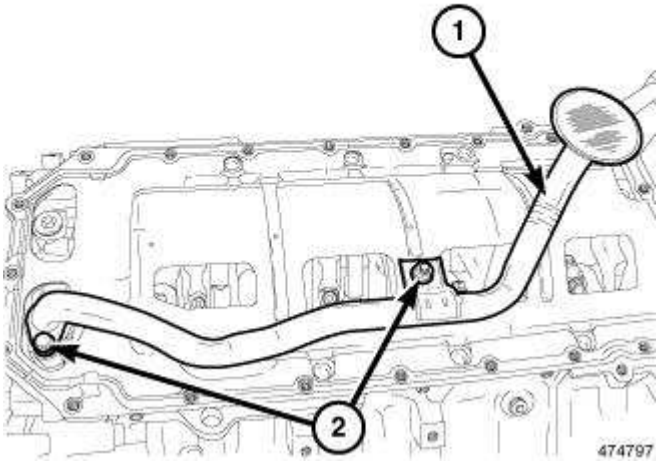


Fig. 159: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

8. Remove the oil pan and oil pump pickup tube (1). Refer to **PAN, OIL, REMOVAL, 5.7L** and **PAN, OIL, AWD, REMOVAL, 5.7L**.

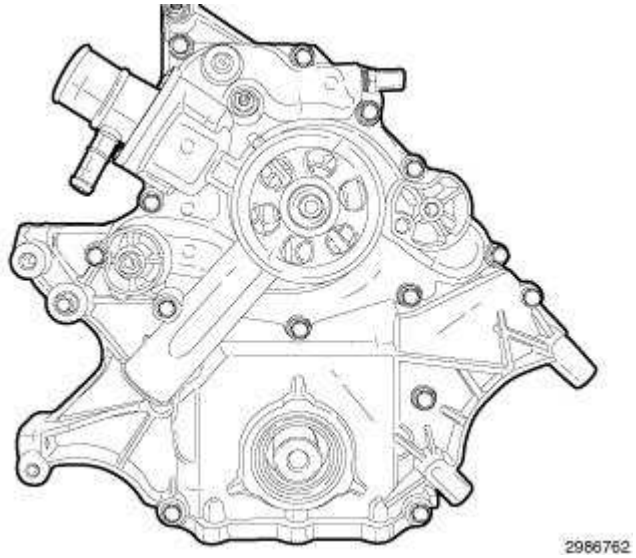


Fig. 160: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove the water pump for timing cover removal.

9. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.

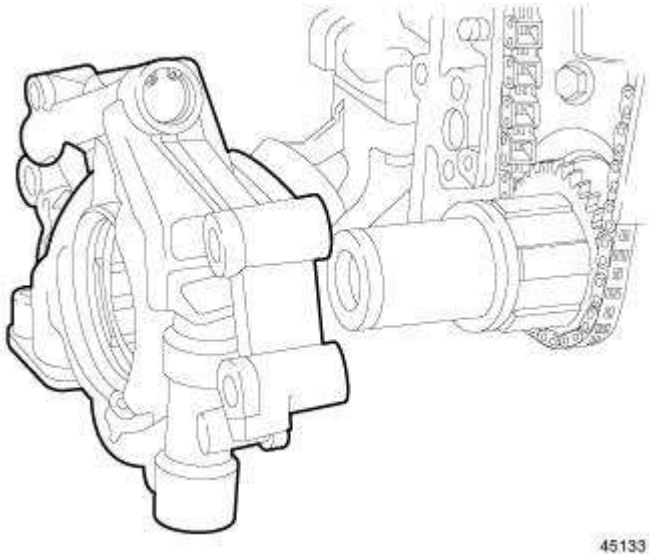


Fig. 161: Remove/Install Oil Pump
Courtesy of CHRYSLER GROUP, LLC

10. Remove the oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.

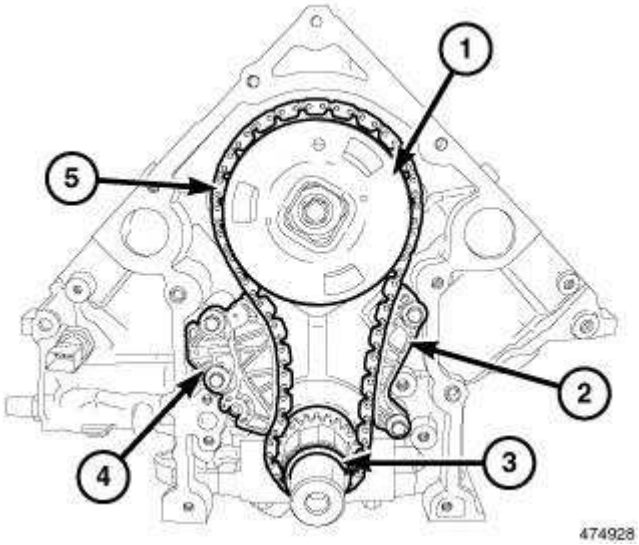


Fig. 162: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER GROUP, LLC

11. Remove the timing chain (5) and camshaft phaser (1). Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL, 5.7L**.

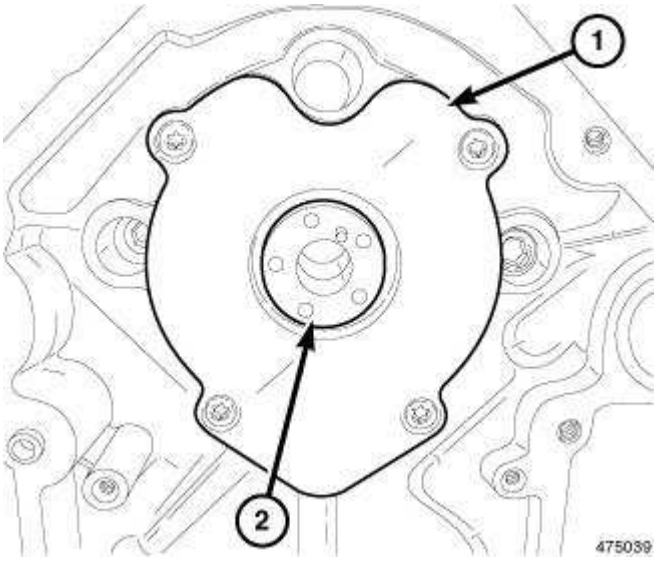


Fig. 163: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

12. Remove the camshaft thrust plate (1).

CAUTION: Use care when removing the camshaft, do not damage the camshaft bearings with the camshaft lobes.

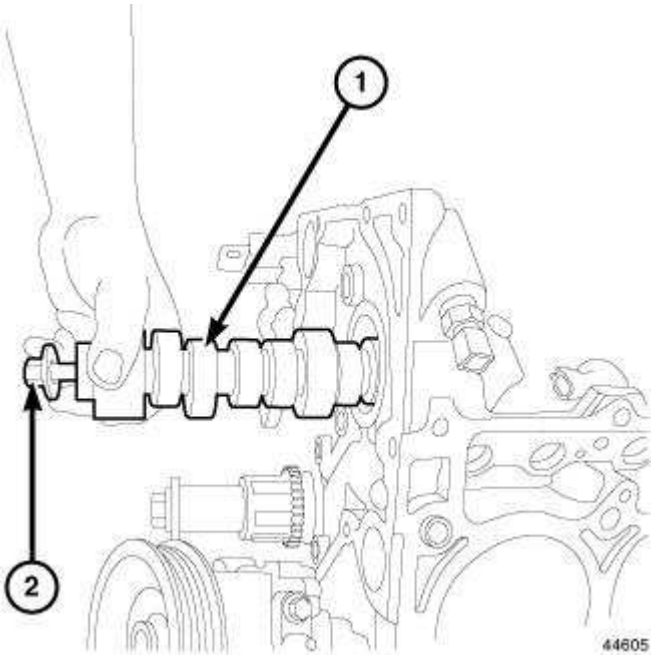


Fig. 164: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

13. Install a long bolt (2) into the front of the camshaft to aid in removal.
14. Remove the camshaft using care not to damage the camshaft bearings with the camshaft lobes (1).

INSPECTION

INSPECTION

The cam bearings are not serviceable. Do not attempt to replace cam bearings for any reason. If the cam bearings are damaged, the cylinder block must be replaced.

INSTALLATION

5.7L / 6.4L - CAMSHAFT CORE HOLE PLUG

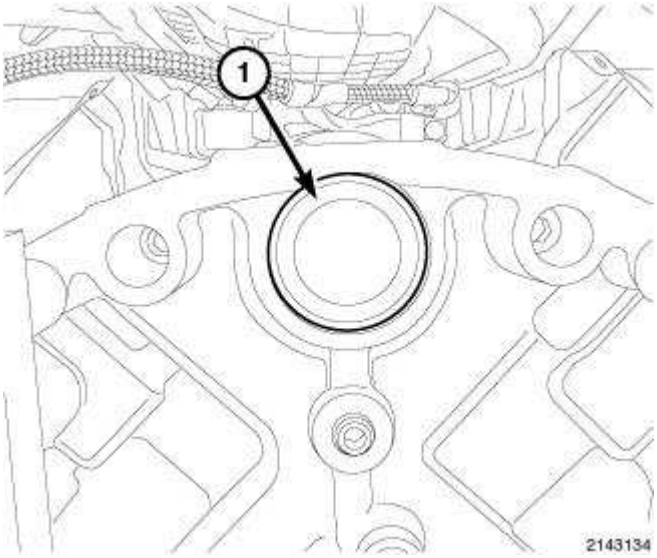


Fig. 165: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Clean the core hole in the cylinder block.

NOTE: Do not apply adhesive to the new camshaft core hole plug. A new plug has adhesive pre-applied.

2. Install a new camshaft core hole plug (1) located at the rear of cylinder block, using a suitable flat faced tool. The plug must be fully seated on the cylinder block shoulder.
3. Install the flexplate. Refer to **FLEXPLATE, INSTALLATION, 5.7L**.
4. Install the engine. Refer to **INSTALLATION, 5.7L**.

CAMSHAFT

CAUTION: The 5.7L engine uses a unique camshaft for use with the Multi Displacement System (MDS). When installing a new camshaft, the replacement camshaft must be compatible with MDS.

CAUTION: Use care when installing the camshaft into the engine block, do not damage the camshaft bearings with the camshaft lobes.

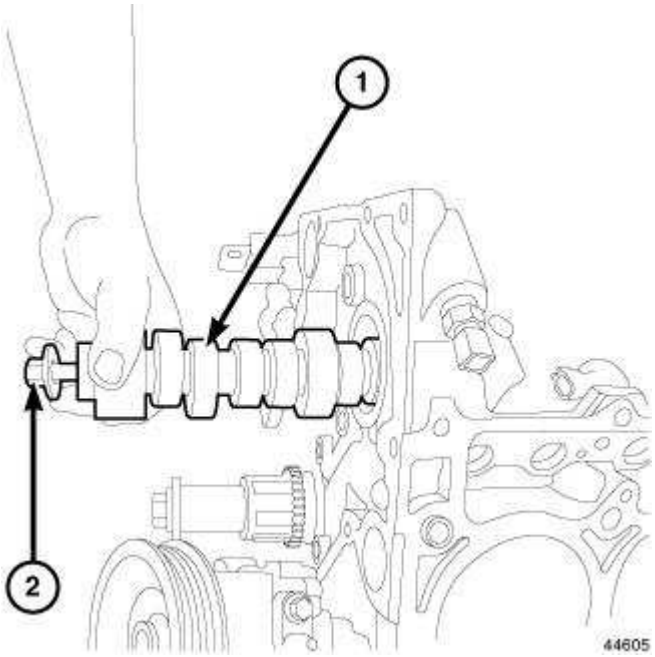


Fig. 166: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the camshaft lobes (1) and the camshaft bearing journals with clean engine oil.
2. Install a long bolt (2) into the front of the camshaft to aid in the installation, carefully install the camshaft into the engine block.

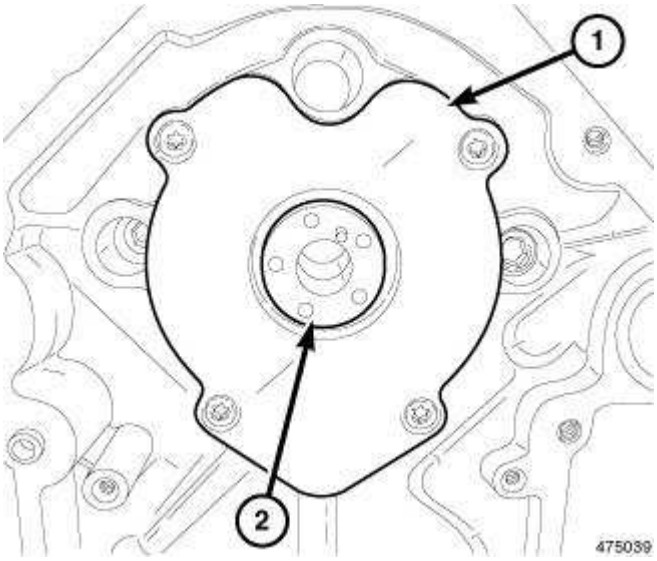


Fig. 167: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the camshaft thrust plate (1) and tighten retaining bolts to 12 N.m (106 in. lbs.).

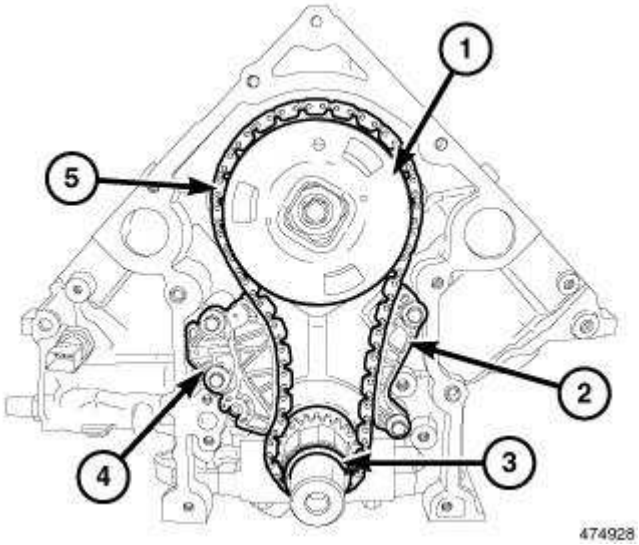


Fig. 168: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER GROUP, LLC

4. Install the timing chain (5) and camshaft phaser (1). Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION, 5.7L**.
5. Using a suitable dial indicator, measure the camshaft end play. Refer to **Engine - Specifications**. If not within specification, install a new thrust plate.

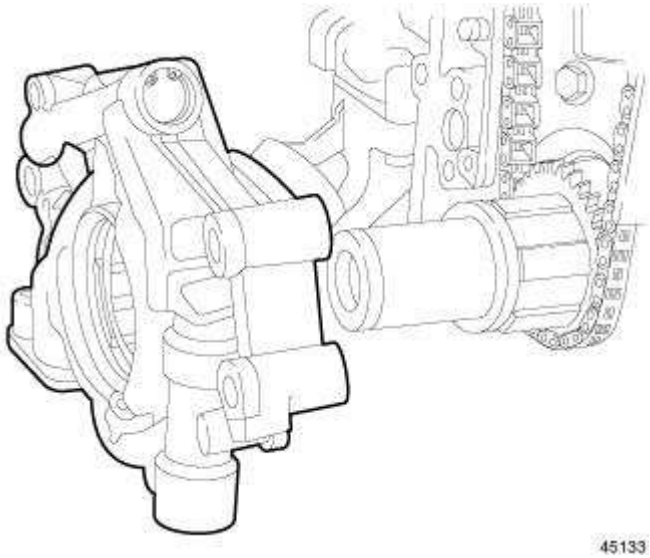


Fig. 169: Remove/Install Oil Pump
Courtesy of CHRYSLER GROUP, LLC

6. Install the oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION, 5.7L**.

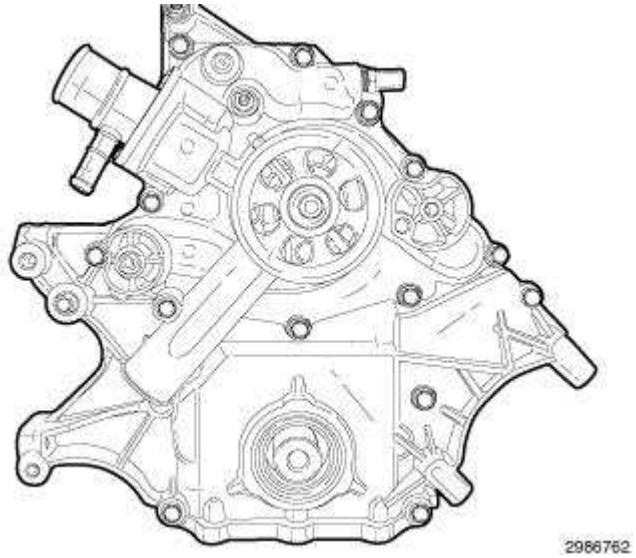


Fig. 170: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

7. Install the engine timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
8. Raise and support vehicle.

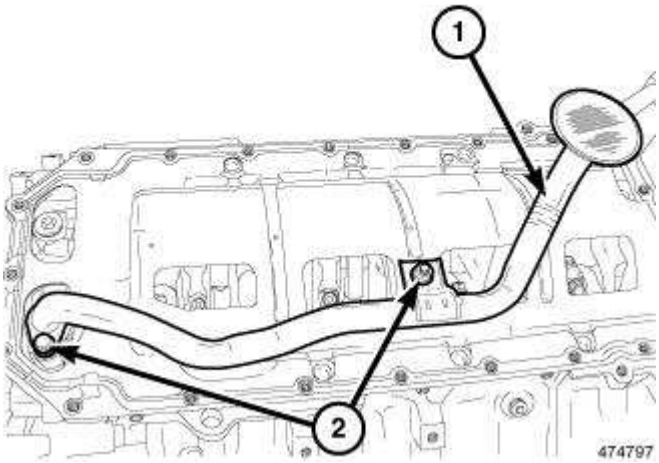


Fig. 171: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

9. Install the oil pump pickup tube (1) and oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L** and **PAN, OIL, AWD, INSTALLATION, 5.7L**.

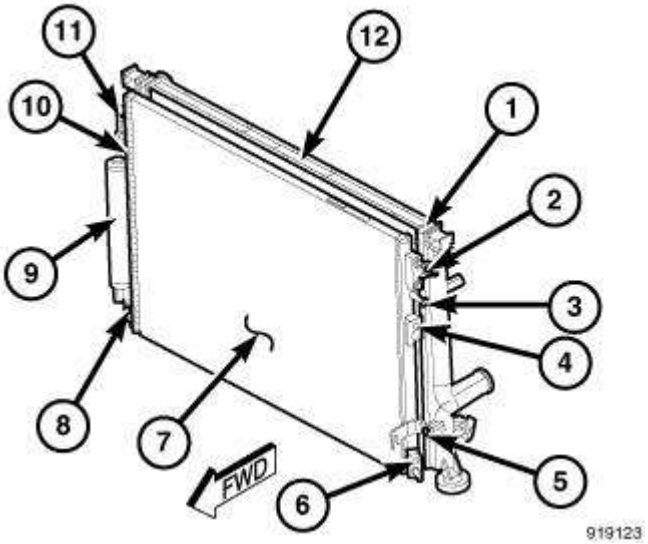


Fig. 172: A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

10. Install the A/C condenser (7). Refer to **CONDENSER, A/C, INSTALLATION** .
11. Install the radiator (12). Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** .
12. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .

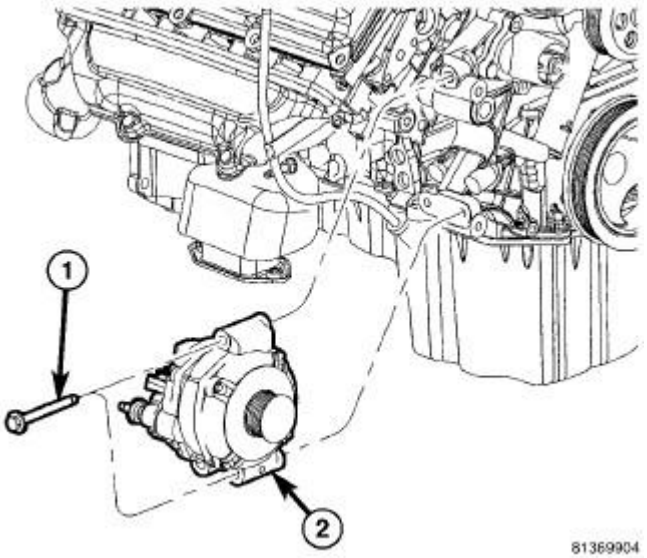


Fig. 173: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Install the generator. Refer to **GENERATOR, INSTALLATION** .

CAUTION: The 5.7L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating

roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

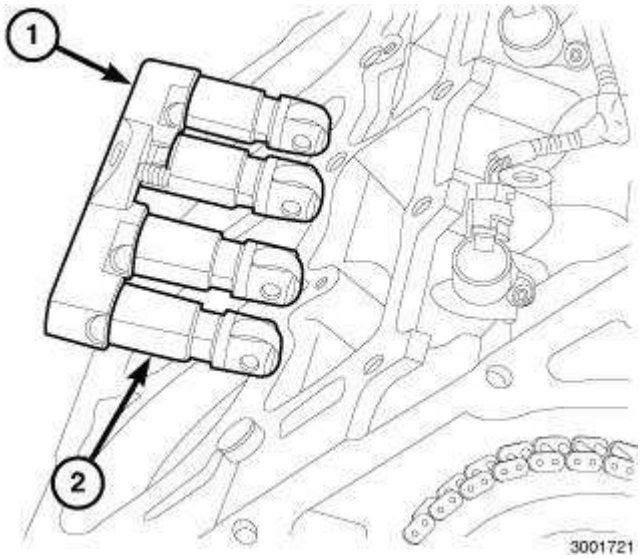


Fig. 174: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

14. Install the lifters (2) and retainer (1) as an assembly into their original location. Refer to **LIFTER (S), HYDRAULIC, ROLLER, INSTALLATION, 5.7L**.

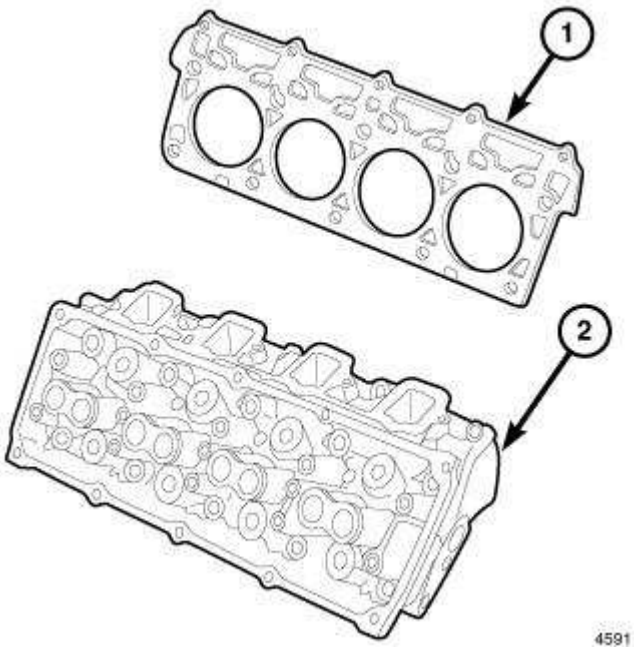


Fig. 175: Cylinder Head & Gasket
Courtesy of CHRYSLER GROUP, LLC

15. Install both cylinder heads (2). Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.
16. Install the pushrods in the same location as removed.
17. Install the rocker arms. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.

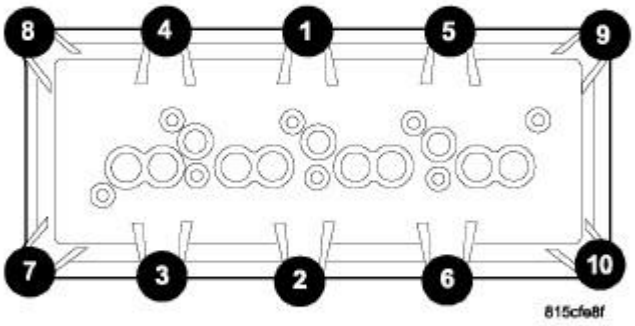


Fig. 176: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

18. Install the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

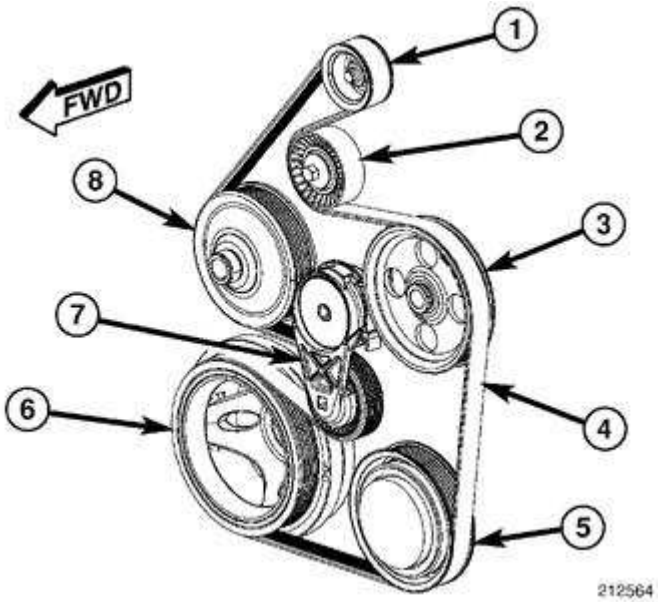


Fig. 177: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

19. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop, install the accessory drive belt (2) onto the pulleys and slowly release the tensioner.

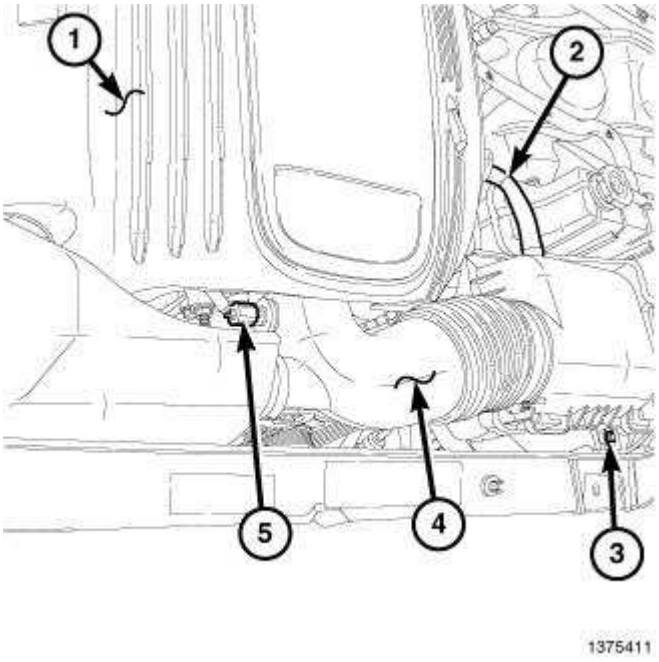


Fig. 178: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

20. Position the air filter housing into the engine compartment.
21. Install the air filter housing retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
22. Connect the clean air tube to the throttle body and the air filter assembly and tighten clamps to 3 N.m (30 in. lbs.).
23. Connect the make up air hose (MUA) (2).
24. Connect the intake air temperature (IAT) sensor (5) connector.

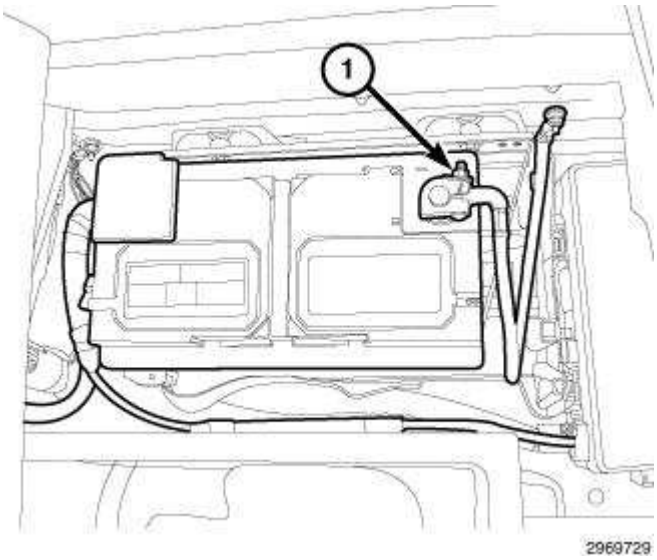


Fig. 179: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

25. Connect the negative battery cable and tighten the nut (1) to 5 N.m (45 in. lbs.).
26. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

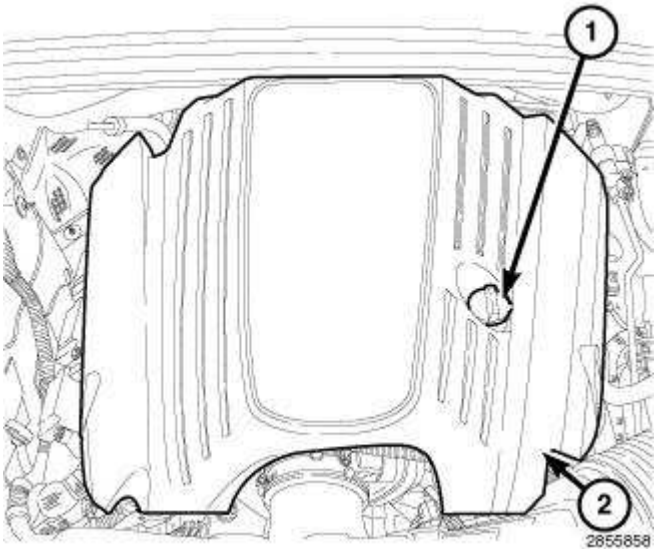


Fig. 180: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

27. Fill the crankcase with the specified type and amount of engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
28. Position the engine cover (2) and secure the retaining grommets onto the ball studs.
29. Start the engine and check for leaks.

COVER, STRUCTURAL DUST

DESCRIPTION

DESCRIPTION

The structural dust cover is made of die cast aluminum and joins the lower half of the transmission bell housing to the engine.

OPERATION

OPERATION

The structural cover provides additional powertrain stiffness and reduces noise and vibration.

REMOVAL

REMOVAL

1. Raise and support the vehicle.

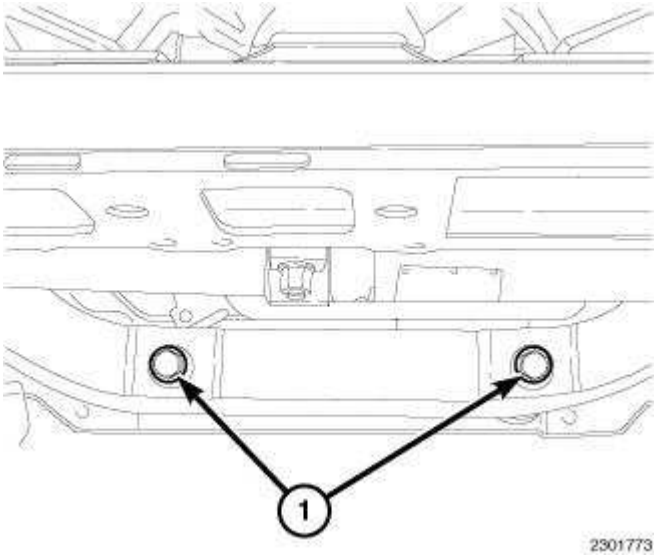


Fig. 181: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove the steering rack to frame mounting bolts (1) and lower the steering rack enough to gain clearance for the structural dust cover removal.

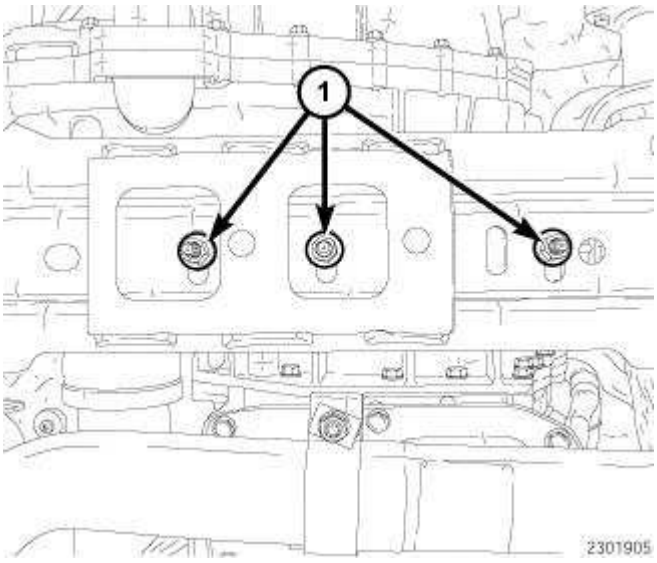


Fig. 182: Transmission Mount To Crossmember Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the transmission mount to crossmember retaining nuts (1).
4. Using a suitable jack, lift the transmission enough to gain clearance for the structural dust cover removal.

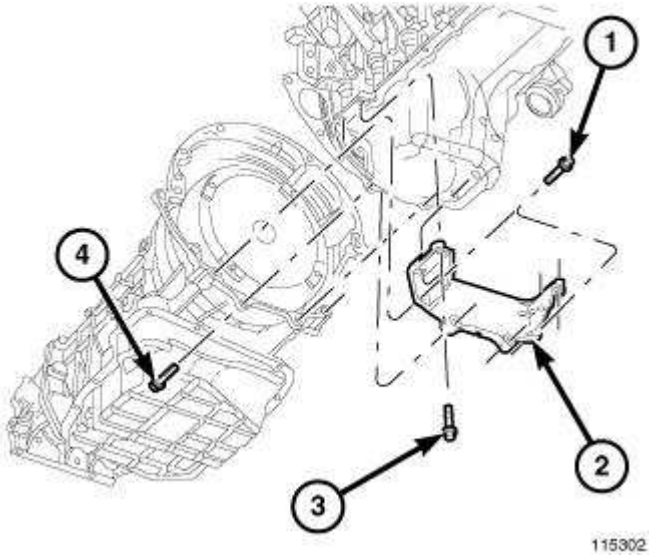


Fig. 183: Structural Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the structural dust cover retaining bolts (1, 3 & 4).
6. Remove the structural dust cover (2).

INSTALLATION

INSTALLATION

CAUTION: The structural dust cover must be installed as described in the following steps. Failure to do so may cause severe damage to the cover.

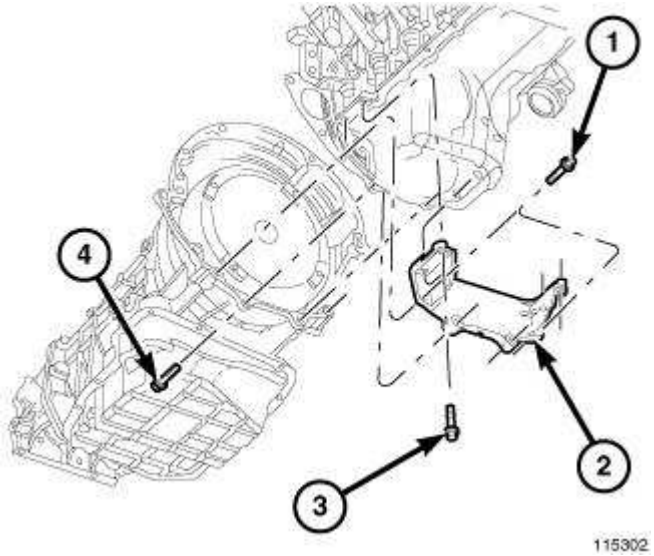


Fig. 184: Structural Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the structural dust cover in the vehicle
2. Install all four bolts retaining the structural dust cover to the engine (3) hand tight.
3. Install the four cover to transmission bolts (1, 2 & 4) hand tight.

CAUTION: The structural dust cover must be held tightly against both the engine and the transmission bell housing during the tightening sequence. Failure to do so may cause severe damage to the cover.

4. Tighten the structural dust cover-to-transmission bolts (1, 2 & 4) to 9 N.m (80 in. lbs.).
5. Tighten the structural dust cover-to-engine block bolts (3) to 9 N.m (80 in. lbs.).
6. Retighten the structural dust cover-to-transmission bolts to 54 N.m (40 ft. lbs.).
7. Retighten the structural dust cover-to-engine block bolts to 54 N.m (40 ft. lbs.).

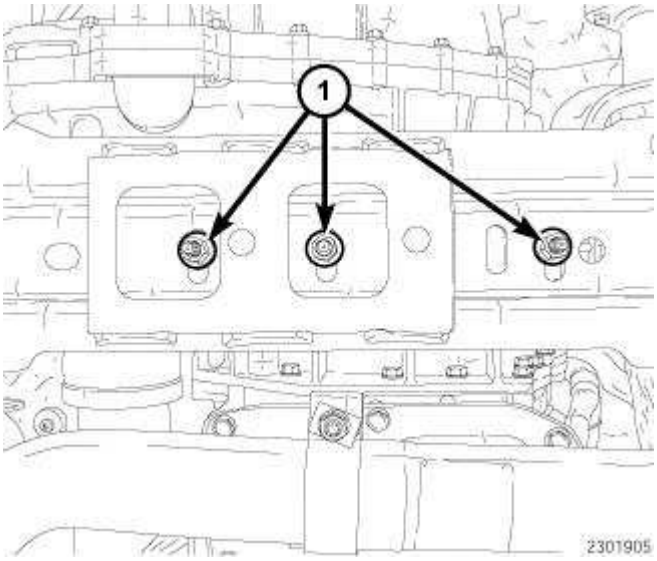


Fig. 185: Transmission Mount To Crossmember Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

8. Lower the transmission onto the crossmember and remove the jack.
9. Install the transmission mount to crossmember retaining nuts (1) and tighten to 54 N.m (40 ft. lbs.).

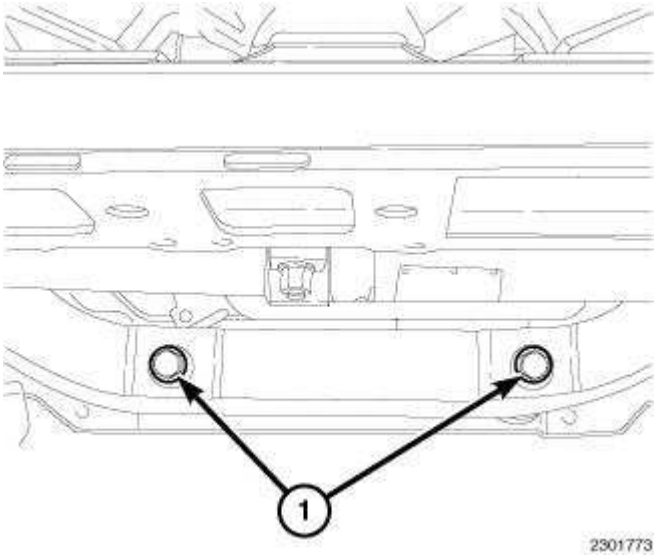


Fig. 186: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Position the steering rack to the frame, install the bolts (1) and tighten bolts/nuts to 258 N.m (190 ft. lbs.).
11. Lower the vehicle.

CRANKSHAFT

REMOVAL

REMOVAL

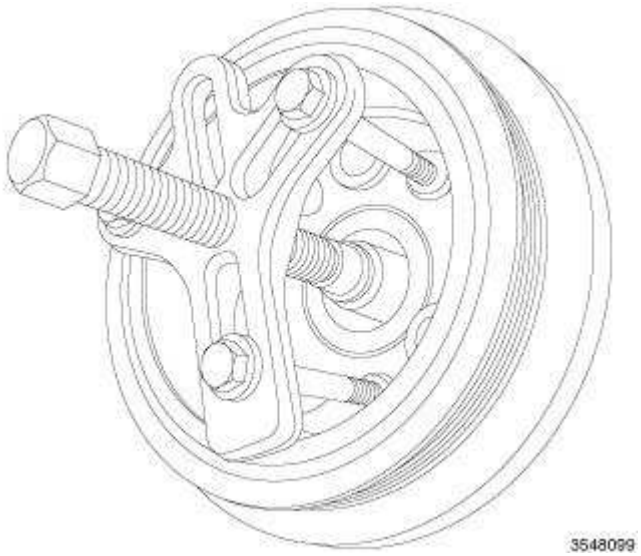


Fig. 187: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the vibration damper (1). Refer to **DAMPER, VIBRATION, REMOVAL, 5.7L**.

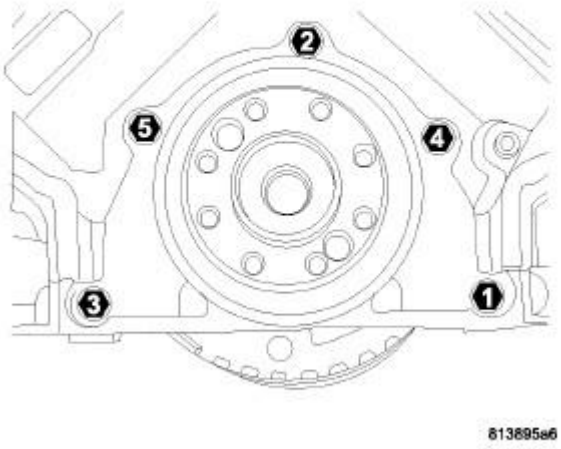


Fig. 188: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Remove the rear oil seal retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L** and **PAN, OIL, AWD, REMOVAL, 5.7L**.
5. Remove the oil pump pickup.
6. Remove the windage tray/oil pan gasket.

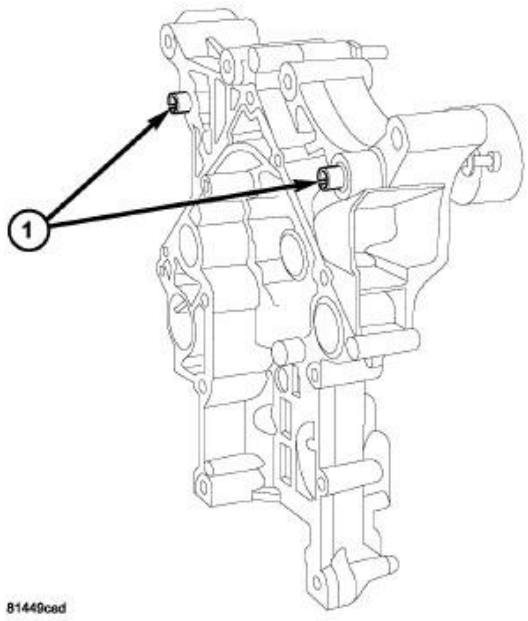


Fig. 189: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

7. Remove the timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.

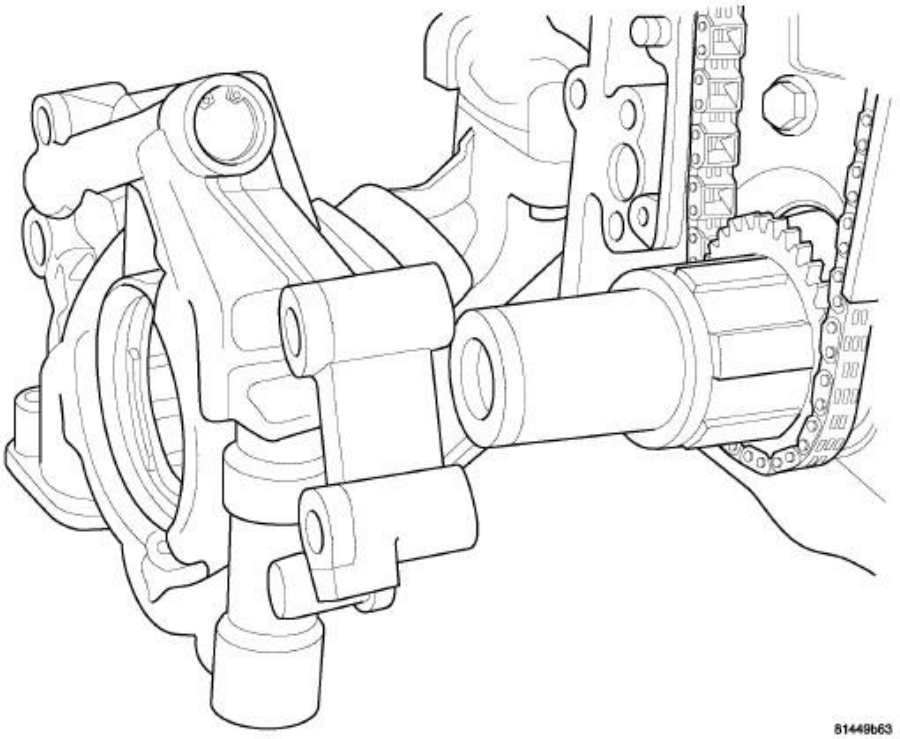


Fig. 190: Removing/Installing Oil Pump
Courtesy of CHRYSLER GROUP, LLC

8. Remove the oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.

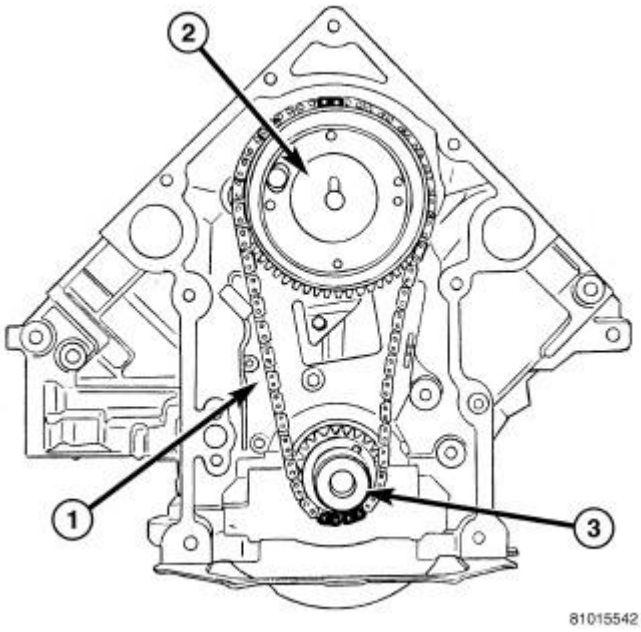


Fig. 191: Crankshaft Sprocket, Camshaft Sprocket & Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

1 - Chain Tensioner
2 - Camshaft Sprocket
3 - Crankshaft Sprocket

9. Remove the timing drive (2). Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL, 5.7L**.

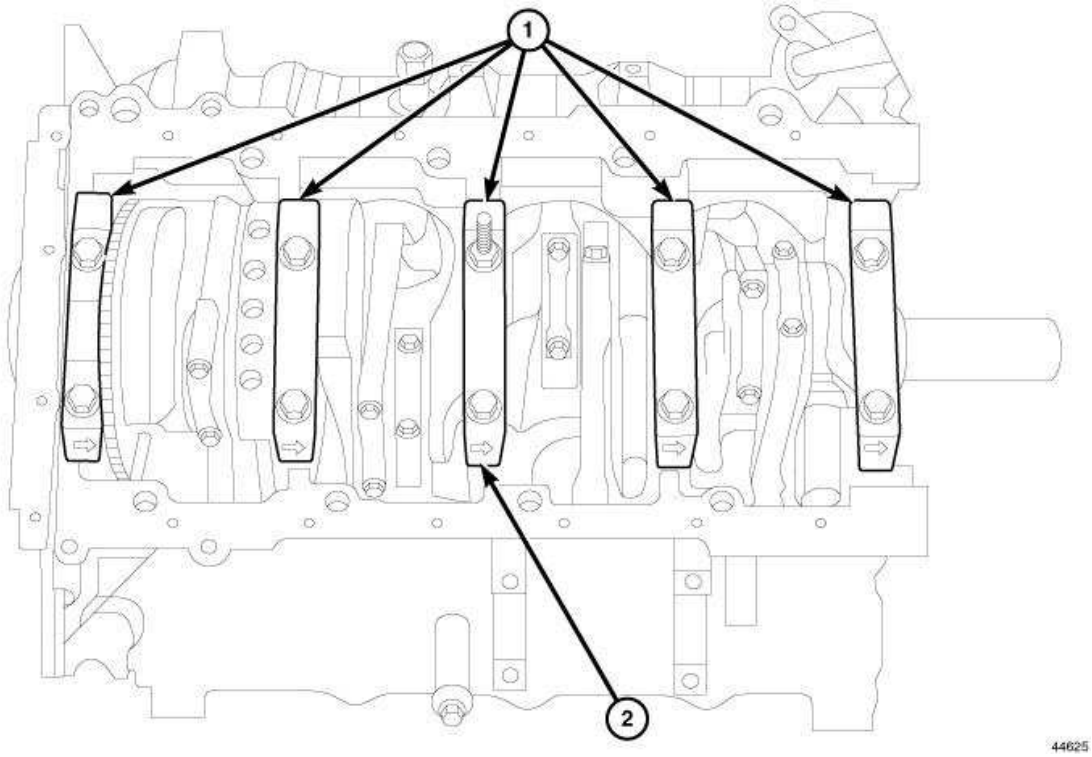


Fig. 192: Main Bearing Caps & Arrows
Courtesy of CHRYSLER GROUP, LLC

1 - MAIN BEARING CAPS

10. Identify rod bearing caps before removal. Remove rod bearing caps with bearings.
11. Identify main bearing caps (1) before removal.

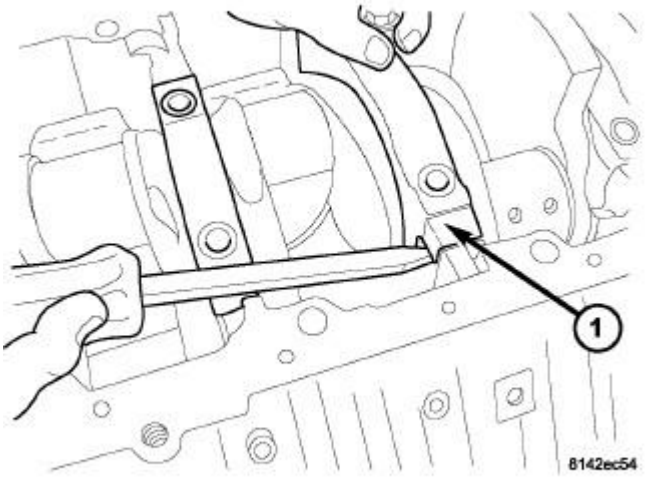


Fig. 193: Removing/Installing Main Cap
Courtesy of CHRYSLER GROUP, LLC

1 - MAIN CAP

12. Remove main bearing caps (1) and bearings one at a time.

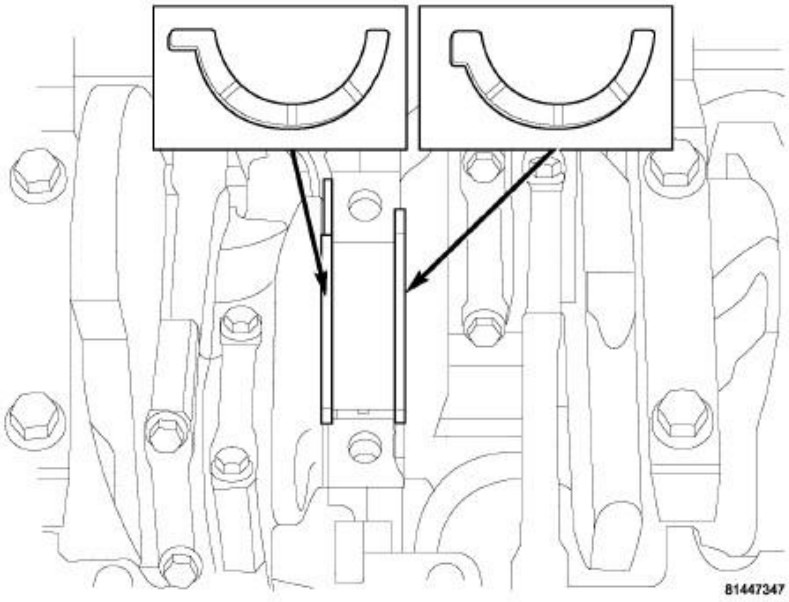


Fig. 194: Thrust Washer Locations
Courtesy of CHRYSLER GROUP, LLC

13. Remove the thrust washers.
14. Remove the crankshaft out of the block.

INSTALLATION

INSTALLATION

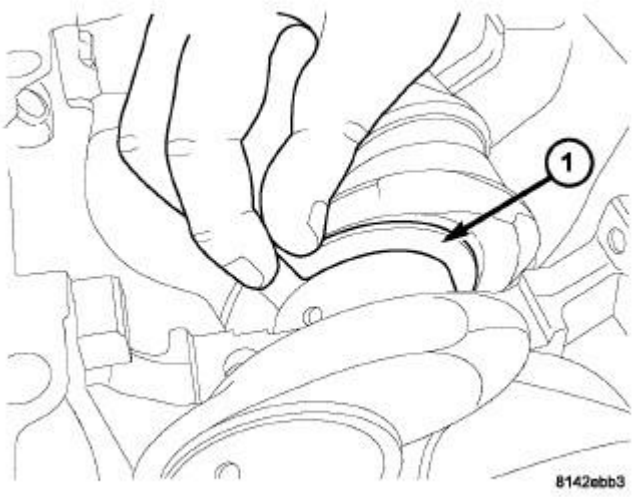


Fig. 195: Removing/Installing Thrust Washer
Courtesy of CHRYSLER GROUP, LLC

1. Select the proper main bearings. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
2. Install main bearings in block and caps, and lubricate bearings.
3. Position the crankshaft into the cylinder block.
4. Install the thrust washers (1).

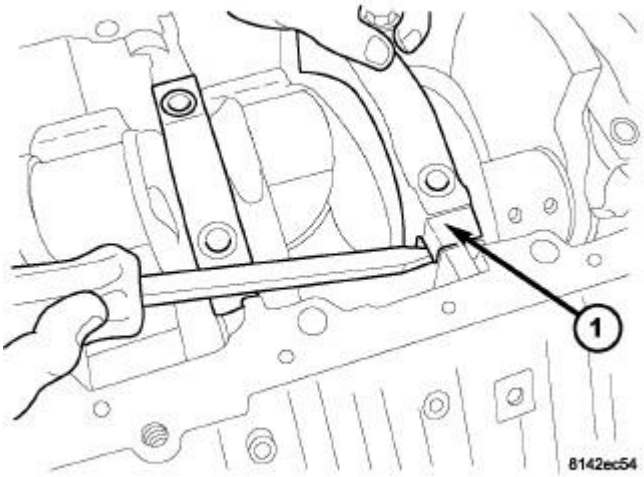


Fig. 196: Removing/Installing Main Cap
Courtesy of CHRYSLER GROUP, LLC

1 - MAIN CAP

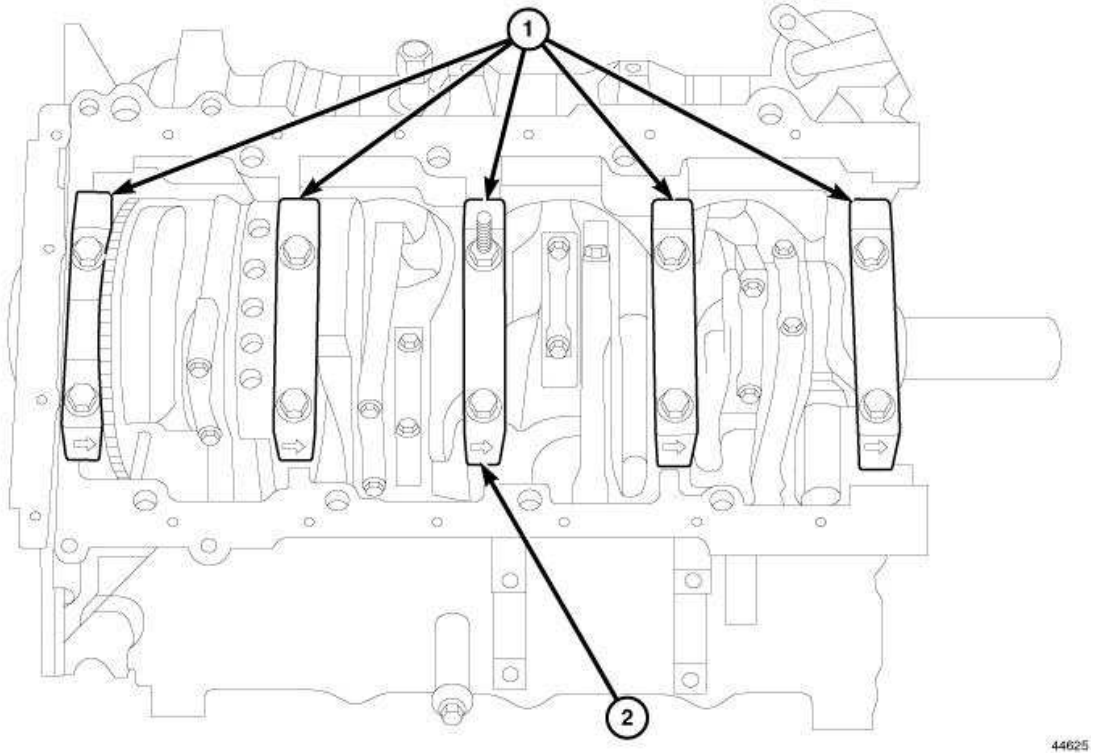


Fig. 197: Main Bearing Caps & Arrows

Courtesy of CHRYSLER GROUP, LLC

1 - MAIN BEARING CAPS

CAUTION: The overuse of oils on the threads may cause a Hydro-Lock condition at which may cause inaccurate readings. Incorrect torque values may occur.

NOTE: The main cap crossbolts are torqued after final torque of the main cap bolts. Always use a new crossbolts.

5. Clean and apply a light oil film to all cap bolts. Install all main bearing caps (1). Install all M12 cap bolts and alternately tighten in two steps using the following sequence.

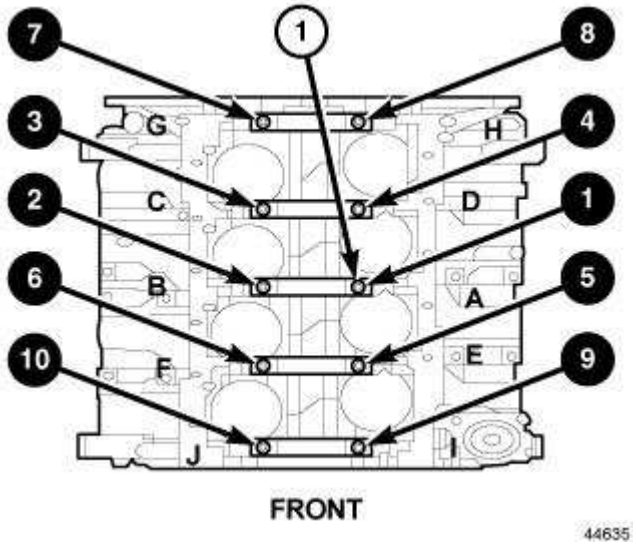


Fig. 198: Main Cap Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. • Step 1 - 28 N.m (20 ft. lbs.).
7. • Step 2 - Turn main cap bolts an additional 90°.
8. Install the M8 crossbolts with attached washer/gasket. Starting with crossbolt A, tighten each crossbolt to 31 N.m (23 ft. lbs.).
9. Repeat crossbolt tightening procedure.
10. Measure crankshaft end play. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.

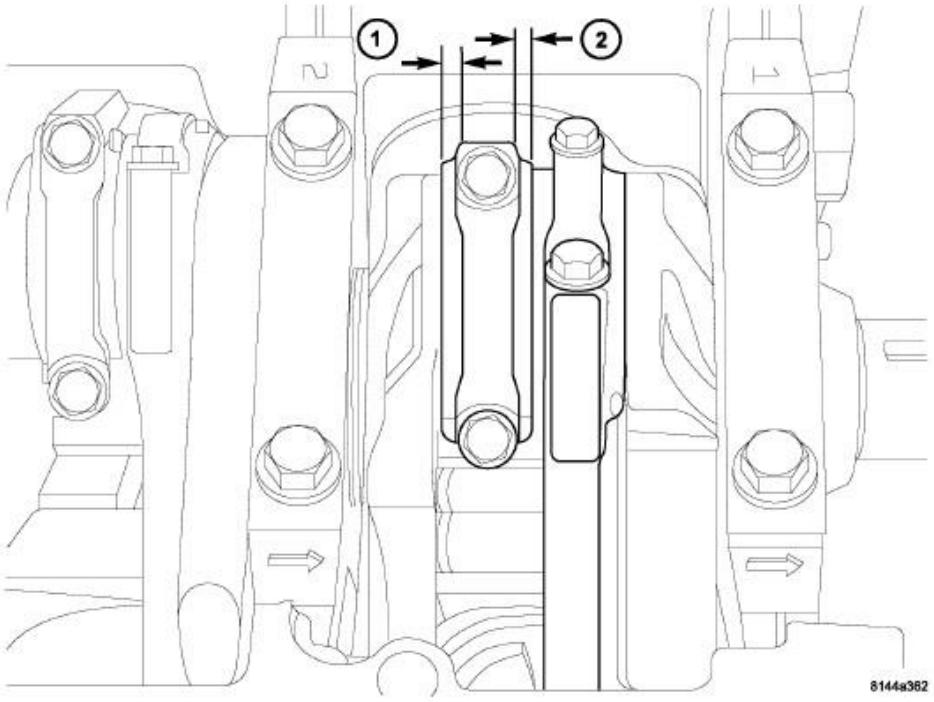


Fig. 199: Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

11. Position the connecting rods onto the crankshaft and install the rod bearing caps. Refer to **ROD, PISTON AND CONNECTING, INSTALLATION, 5.7L**.

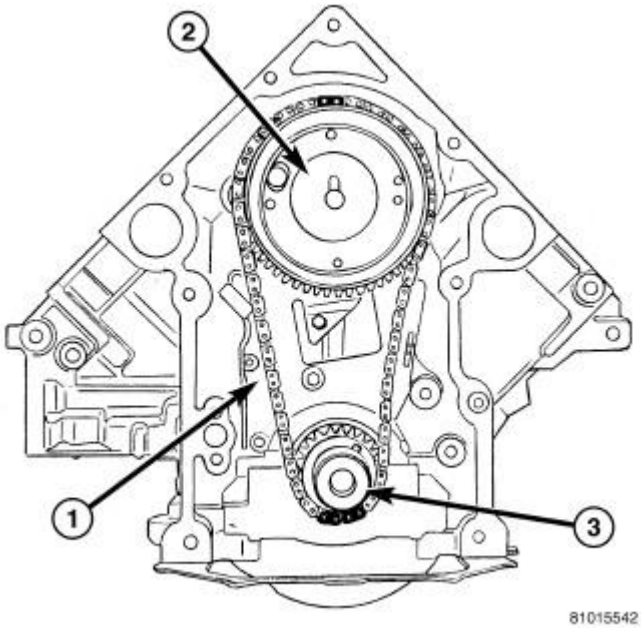


Fig. 200: Crankshaft Sprocket, Camshaft Sprocket & Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

1 - Chain Tensioner
2 - Camshaft Sprocket
3 - Crankshaft Sprocket

12. Install timing drive (2). Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION, 5.7L**.

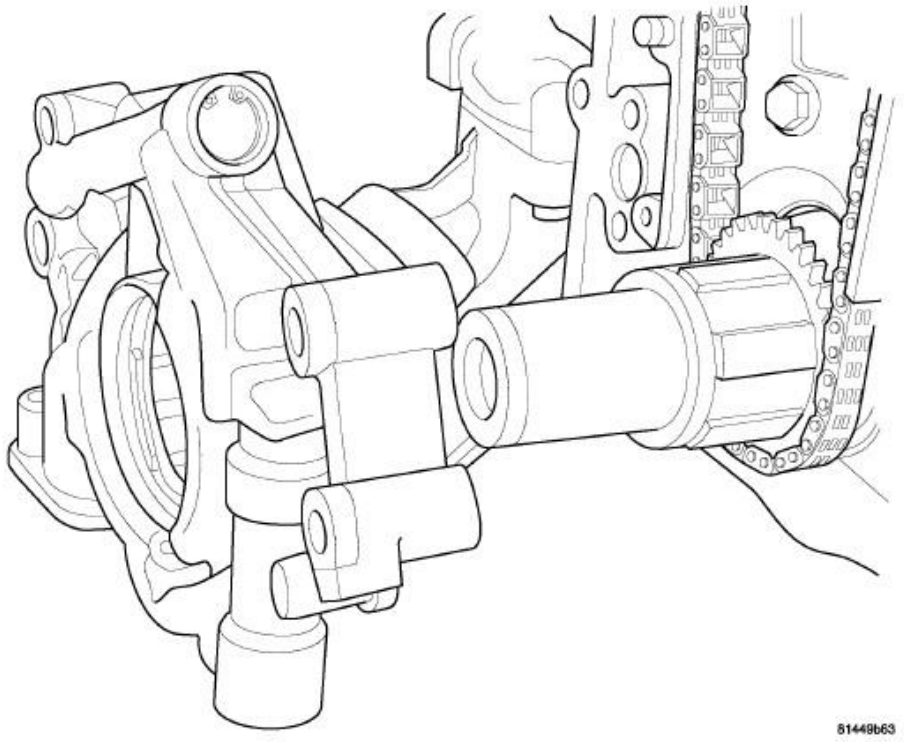


Fig. 201: Removing/Installing Oil Pump
Courtesy of CHRYSLER GROUP, LLC

13. Install oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION, 5.7L**.

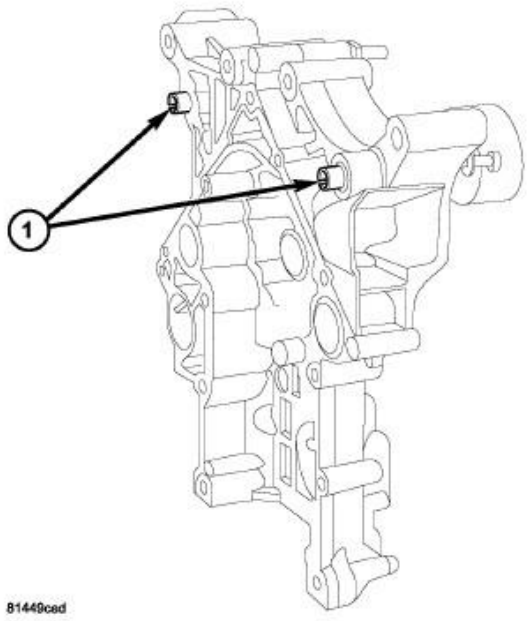


Fig. 202: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

14. Install the timing chain case cover (1). Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.

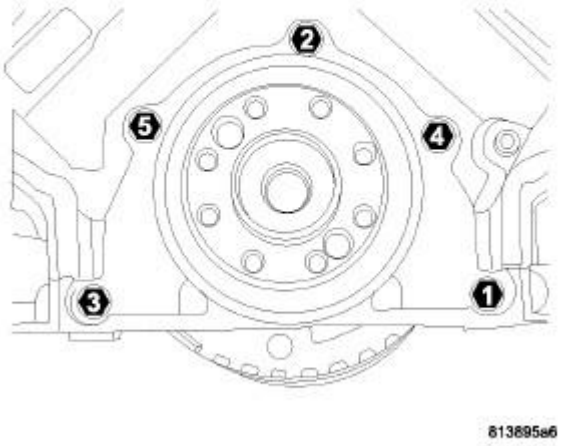


Fig. 203: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

15. Install the rear main seal and retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL,**

INSTALLATION, 5.7L.

16. Install the windage tray/oil pan gasket.
17. Install the oil pick up tube.
18. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L** and **PAN, OIL, AWD, INSTALLATION, 5.7L**.

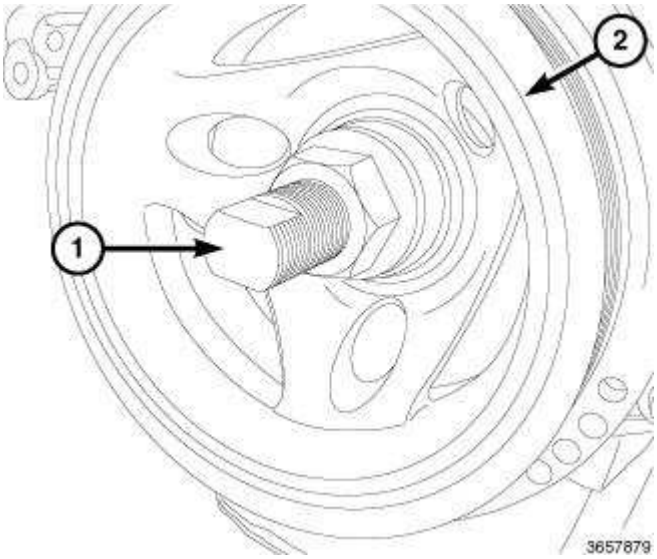


Fig. 204: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

19. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.
20. Install the engine. Refer to **INSTALLATION, 5.7L**.
21. Connect the negative battery cable.

DAMPER, VIBRATION

DESCRIPTION

DESCRIPTION

The crankshaft damper is used to control the resonance that is produced by the engine. The Noise, Vibration, and Harshness (NVH) created from the crankshaft can be controlled by dissipating the torque energy through the damper.

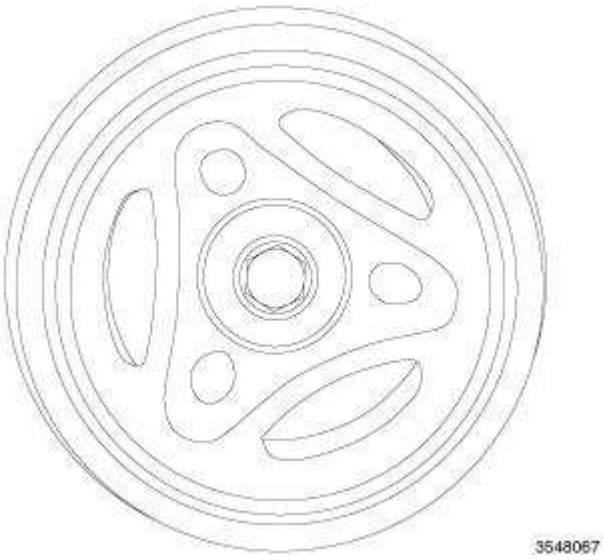


Fig. 205: Crankshaft Damper & Harden Steel Bolt
Courtesy of CHRYSLER GROUP, LLC

The crankshaft damper on the engines is held to the crankshaft by means of a harden steel bolt. The damper is pressed onto a specific machined surface of the crankshaft.

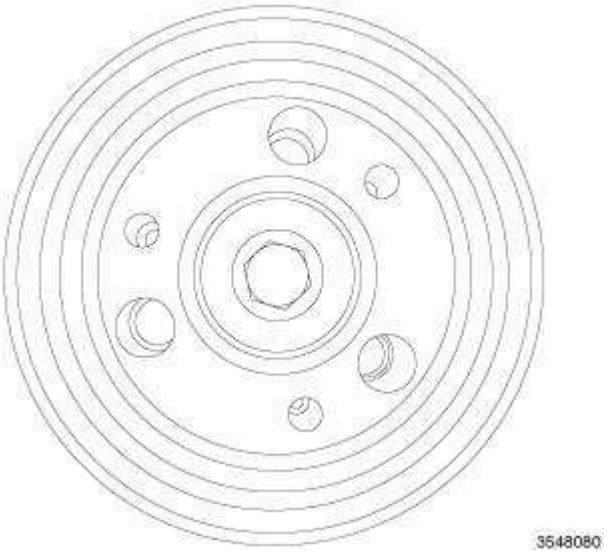


Fig. 206: HEMI® Engine Crankshaft Damper
Courtesy of CHRYSLER GROUP, LLC

The HEMI® Engines incorporate various crankshaft vibration dampers depending on the engine application. And can be removed depending on the application used.

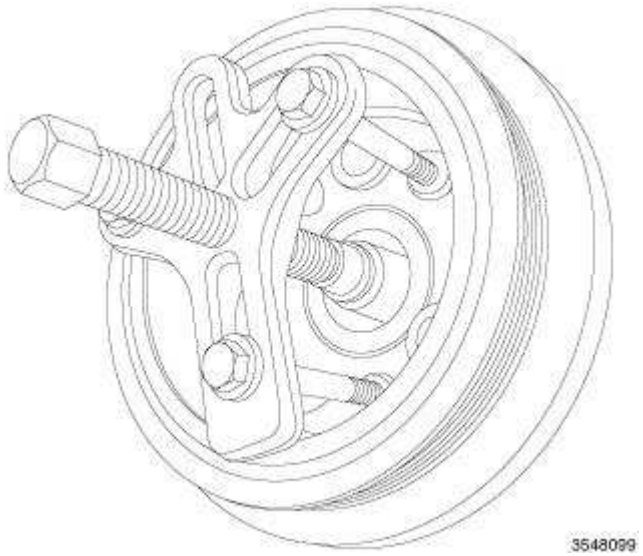


Fig. 207: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

Finding the proper puller for the application will ensure no damage will come to the damper. The flange puller is used by installing 3 bolts into the pre-tapped holes in the damper.

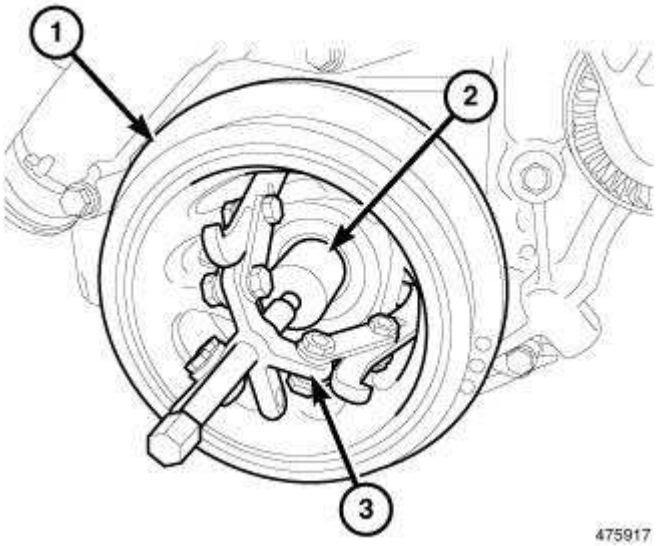


Fig. 208: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

Some pulleys that do not have bolt holes can be removed with a three jaw style (special tool #1023, Puller).

REMOVAL

REMOVAL

1. Disconnect negative cable from battery.

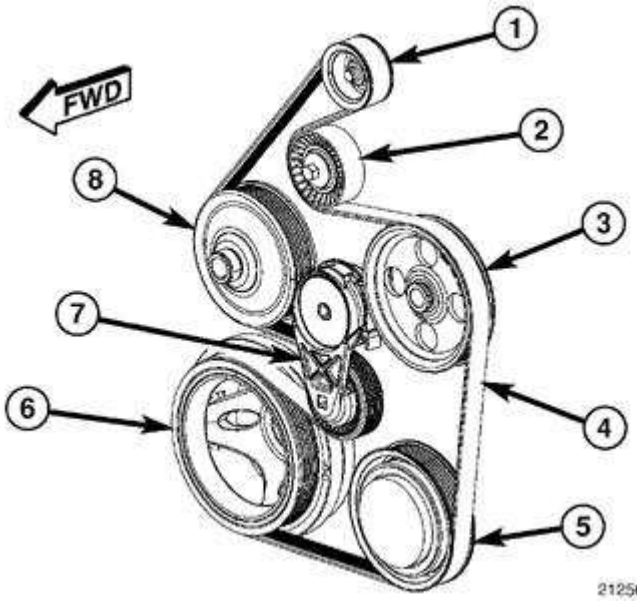


Fig. 209: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

2. Remove accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

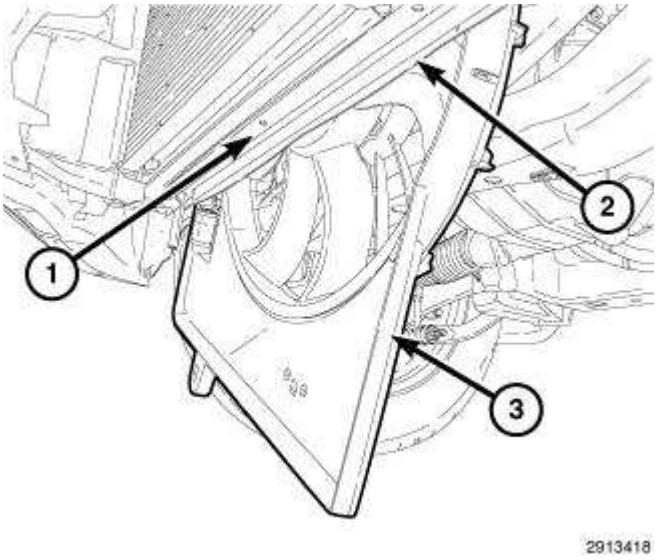


Fig. 210: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Remove the cooling fan. Refer to **FAN, COOLING, REMOVAL** .

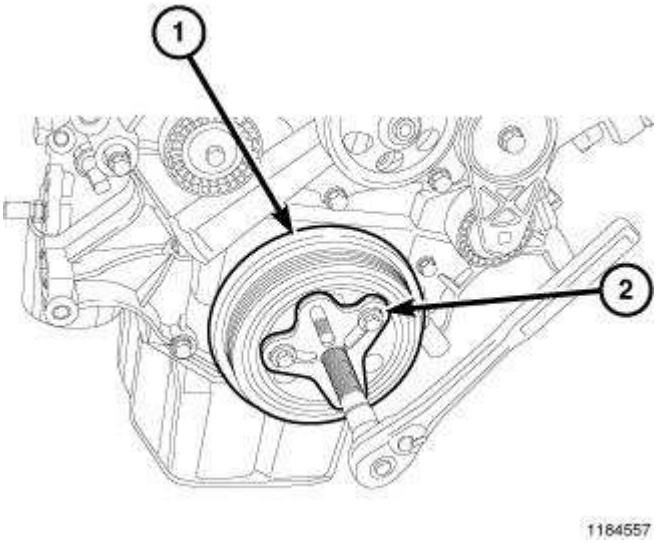


Fig. 211: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

4. Remove crankshaft damper bolt.
5. Install a flange puller (2) and remove the damper (1).

INSTALLATION

INSTALLATION

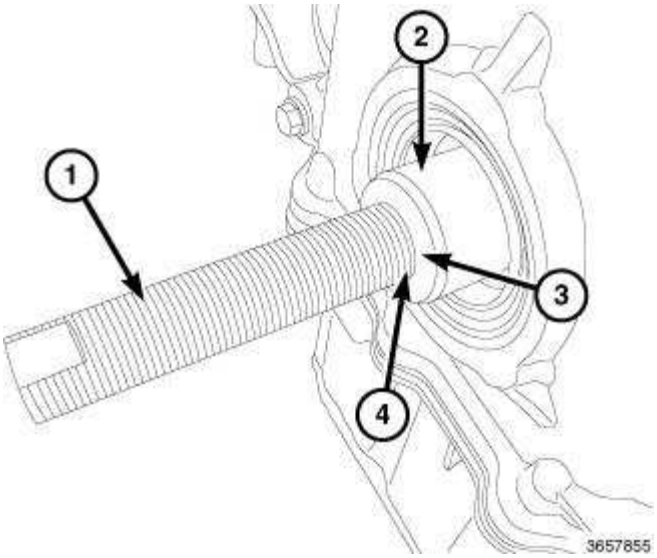


Fig. 212: Installing Vibration Damper Onto Crankshaft Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

1. Position damper onto crankshaft.
2. Using (special tool #10387, Installer, Vibration Damper), install the threaded rod (1) onto the crankshaft (2).

3. Tighten the threaded rod (4) until it is seated to the face (3) of the crankshaft.
4. Install the press washer, bearing, washer, and the press nut onto the threaded rod.
5. Press the vibration damper on till seated.

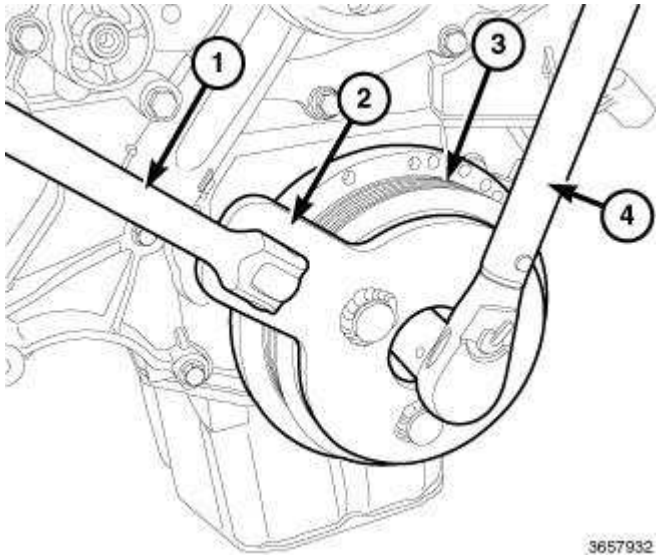


Fig. 213: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

6. Install crankshaft damper bolt.
7. Position the (special tool #10386, Holder, Vibration Damper) (2), onto the vibration damper (3).
8. Tighten bolt to 176 N.m (129 ft. lbs.).

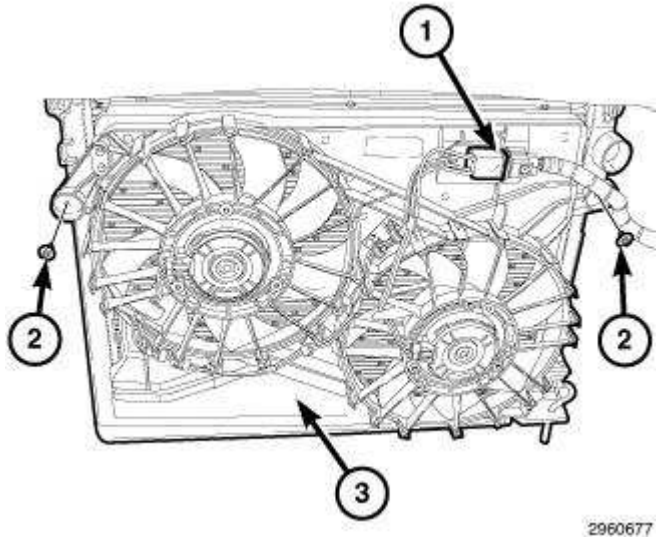


Fig. 214: Cooling Fan Electrical Connector, Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

9. Install cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

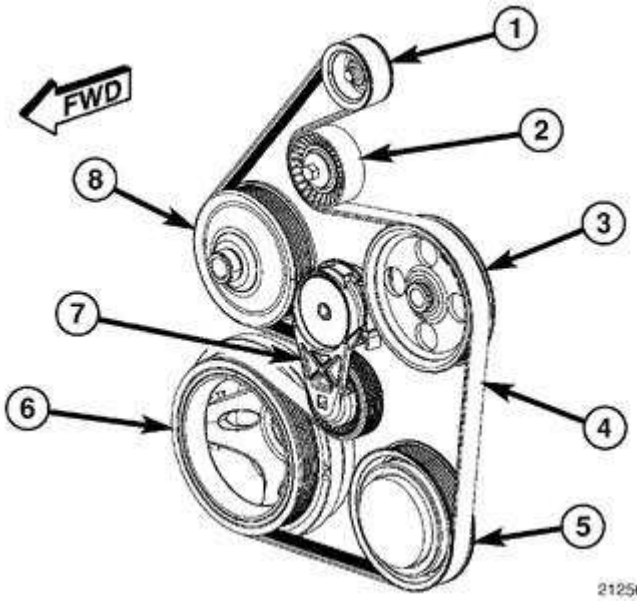


Fig. 215: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

10. Install accessory drive belt (1). Refer to **BELT, SERPENTINE, INSTALLATION** .
11. Refill cooling system. Refer to **STANDARD PROCEDURE** .
12. Connect negative cable to battery.

FLEXPLATE

REMOVAL

REMOVAL

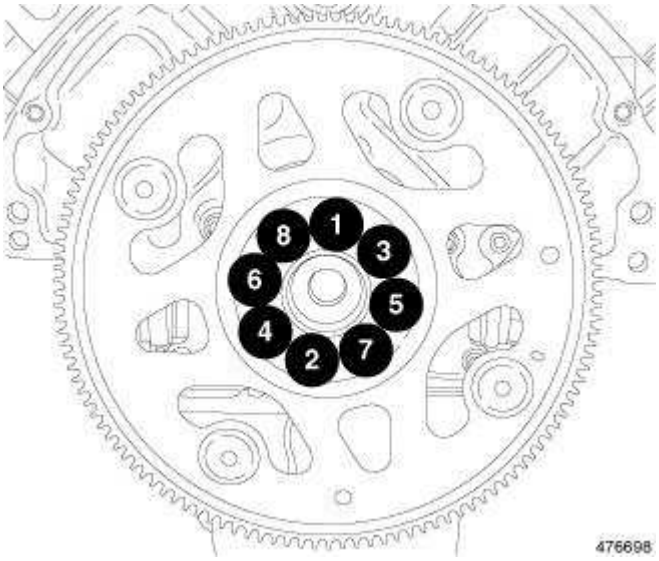


Fig. 216: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Using the sequence shown in illustration, remove the flexplate retaining bolts.
3. Remove the flexplate.

INSTALLATION

INSTALLATION

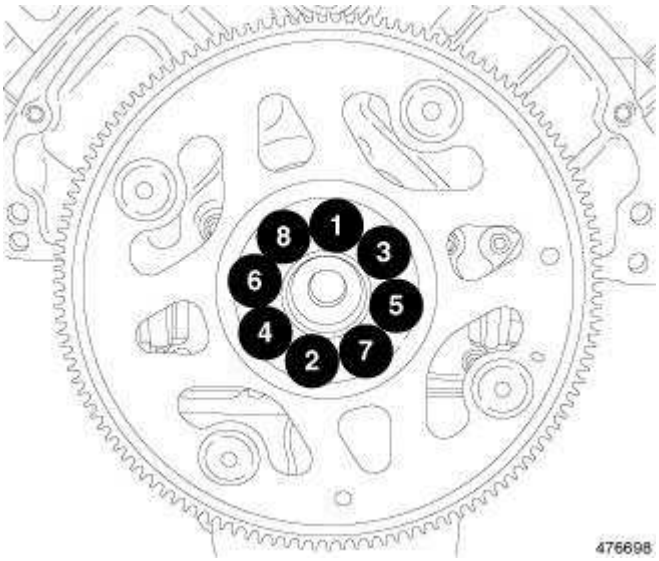


Fig. 217: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Position the flexplate onto the crankshaft and install the retaining bolts hand tight.
2. Using the sequence shown in illustration, tighten the flexplate retaining bolts to 95 N.m (70 ft. lbs.).
3. Install the transmission. Refer to **INSTALLATION** .

LIFTER(S), HYDRAULIC, ROLLER

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HYDRAULIC TAPPETS

Check the oil pressure before disassembling any part of the engine to correct tappet noise. If vehicle has no oil pressure gauge, install a reliable gauge at the pressure sending-unit. The pressure should be between 207-552 kPa (30-80 psi) at 3, 000 RPM.

Check the oil level after the engine reaches normal operating temperature. Allow five minutes for the oil level to stabilize before checking the oil level. The oil level in the pan should never be above the FULL mark or below the ADD OIL mark on the dipstick. Either of these two conditions could be responsible for noisy tappets.

HIGH

If the oil level is above the FULL mark, it is possible for the connecting rods to dip into the oil. With the engine running, this condition could create foam in the oil pan. Foam in the oil pan would be fed to the hydraulic tappets by the oil pump causing them to lose length and allow the valves to seat noisily.

LOW

Low oil level may allow the oil pump to take in air. When air is fed to the tappets, they lose length, which allows valves to seat noisily. Any leaks on the intake side of the oil pump through which air can be drawn creates the same tappet action. Check the lubrication system from the intake strainer to the pump cover, including the relief valve retainer cap. When tappet noise is due to aeration, it may be intermittent or constant, and usually more than one tappet will be noisy. When the oil level and leaks have been corrected, operate the engine at fast idle. Run the engine for a sufficient amount of time to allow all of the air inside the tappets to be bleed out.

TAPPET NOISE DIAGNOSIS

1. To determine the source of tappet noise, crank the engine over with the cylinder head covers removed.
2. Feel each valve spring or rocker arm to detect the noisy tappet. The noisy tappet will cause the affected spring and/or rocker arm to vibrate or feel rough in operation.

   NOTE: Worn valve guides or cocked springs are sometimes mistaken for noisy tappets. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not appreciably reduced, it can be assumed the noise is in the tappet. Inspect the rocker arm pushrod sockets and pushrod ends for wear.

3. Valve tappet noise ranges from light noise to a heavy click. A light noise is usually caused by excessive leak-down around the unit plunger, or by the plunger partially sticking in the tappet body cylinder. The tappet should be replaced. A heavy click is caused by a tappet check valve not seating, or by foreign particles wedged between the plunger and the tappet body. This will cause the plunger to stick in the down position. This heavy click will be accompanied by excessive clearance between the valve stem and rocker arm as valve closes. In either case, tappet assembly should be removed for inspection and cleaning.
4. The valve train generates a noise very much like a light tappet noise during normal operation. Care must be taken to ensure that tappets are making the noise. If more than one tappet seems to be noisy, it's probably not the tappets.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.

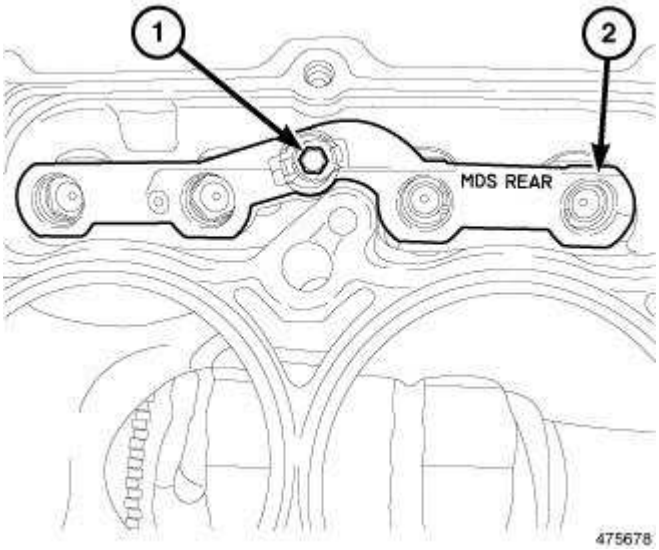


Fig. 218: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Remove the tappet guide holder retaining bolt (1) from the tappet guide holder assembly (2).

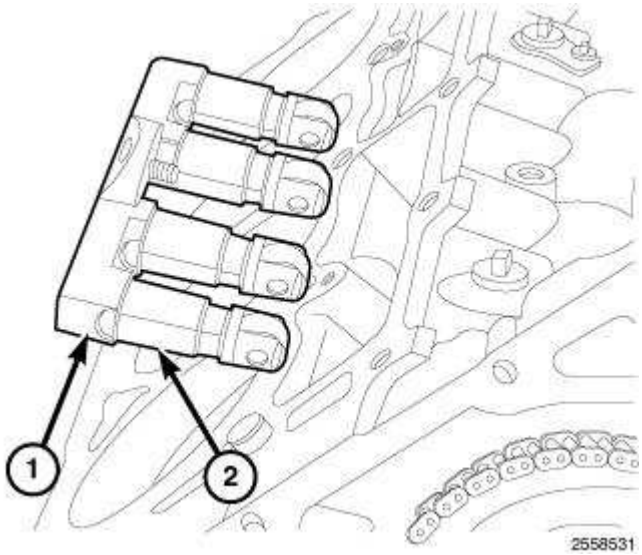


Fig. 219: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The lifter and retainer assembly must be installed as a unit.

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

4. Remove the tappet guide holder (1) and tappets (2) as an assembly.
5. Check the camshaft lobes for abnormal wear.

INSTALLATION

INSTALLATION

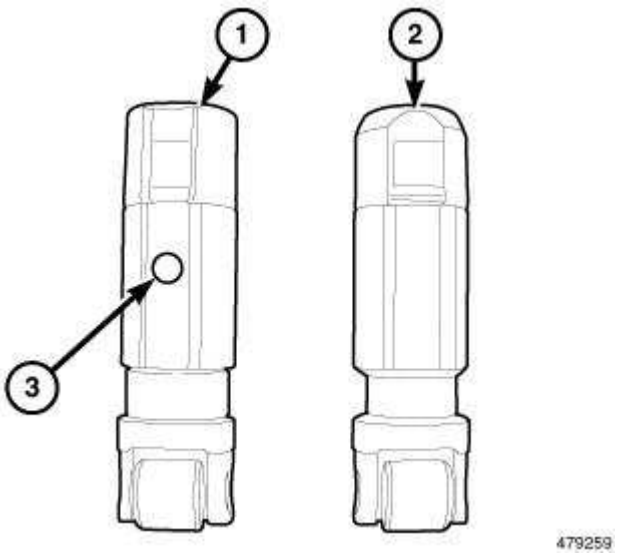


Fig. 220: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

CAUTION: Engines equipped with MDS use both standard roller lifters (2) and deactivating roller lifters (1). The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body (3), for the latching pins.

CAUTION: The lifter and retainer assembly must be installed as a unit.

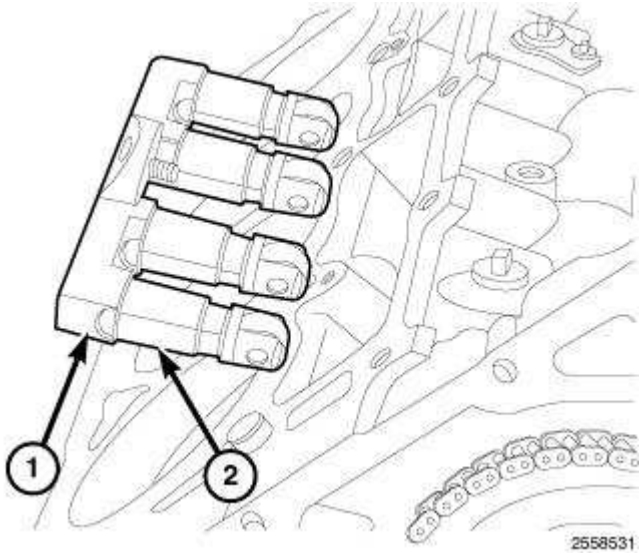


Fig. 221: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the tappet guide holder (1) and tappets (2).

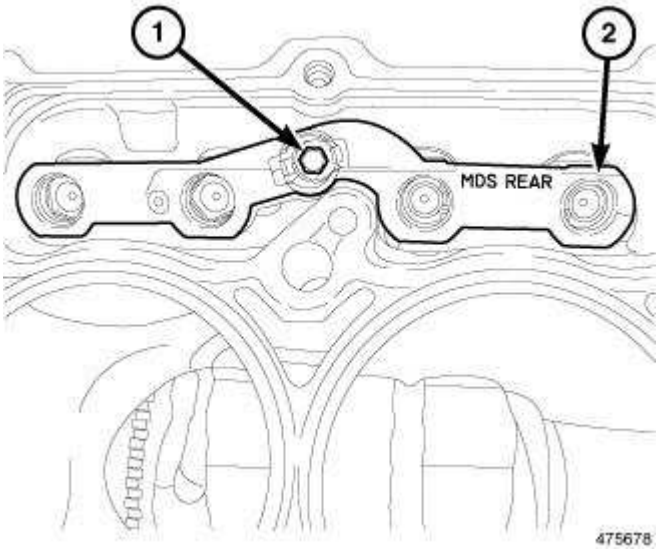


Fig. 222: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lifters and guide holder assembly are to be reused, they must me installed in their original location.

2. Install the tappet guide holder (2) and tappets.
3. Tighten the tappet retainer bolt (1) to 12 N.m (9 ft. lbs.).
4. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.
5. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic lifters have filled with oil and have become quiet.

6. Start the engine and check for leaks.
7. Road test the vehicle.

RETAINER, CRANKSHAFT REAR OIL SEAL

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR SEAL AREA LEAKS

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and cannot be serviced separately.

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
3. Inspect the rear of the cylinder block for evidence of oil leakage, note the following:
   - Circular spray pattern generally indicates seal leakage or crankshaft damage.
   - Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil gallery pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces. See appropriate Engine information, for proper repair procedures of these items.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

   CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out using an emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.

REMOVAL

REMOVAL

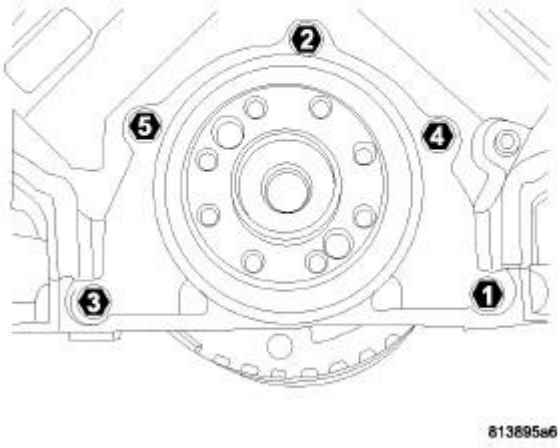


Fig. 223: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

NOTE: This procedure can be performed in vehicle.

1. Disconnect the negative battery cable.
2. Remove the transmission. Refer to appropriate Transmission article.
3. Remove the flexplate. Refer to **FLEXPLATE, REMOVAL, 5.7L**.
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L** and **PAN, OIL, AWD, REMOVAL, 5.7L**.
5. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.
6. Carefully remove the retainer from the engine block.

INSTALLATION

INSTALLATION

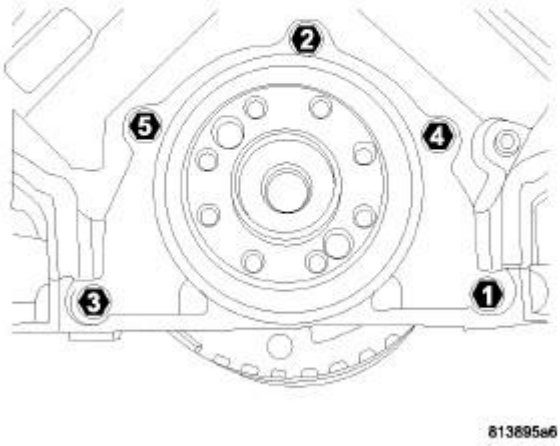


Fig. 224: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

1. Thoroughly clean all gasket residue from the engine block.
2. Position the gasket onto the new crankshaft rear oil seal retainer.
3. Position the crankshaft rear oil seal retainer onto the engine block.
4. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to 15 N.m (11 ft. lbs.).
5. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L** and **PAN, OIL, AWD, INSTALLATION, 5.7L**.
6. Install the flexplate. Refer to **FLEXPLATE, INSTALLATION, 5.7L**.
7. Install the transmission. Refer to appropriate Transmission article.
8. Fill the engine with oil.
9. Start the engine and check for leaks.

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON RING FITTING

PISTON RING END GAP

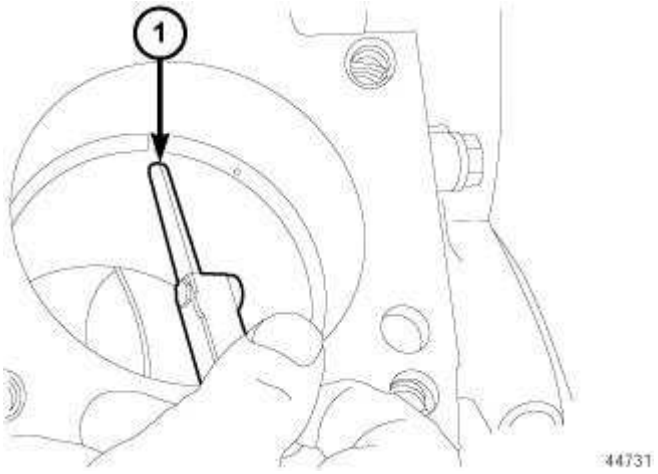


Fig. 225: Checking Piston Ring End Gap Using Feeler Gauge
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before reinstalling used rings or installing new rings, the ring clearances must be checked.

1. Wipe the cylinder bore clean.
2. Insert the ring in the cylinder bore.

NOTE: The ring gap measurement must be made with the ring positioned at least 12 mm (0.50 inch.) from bottom of cylinder bore.

3. Using a piston, to ensure that the ring is squared in the cylinder bore, slide the ring downward into the cylinder.
4. Using a feeler gauge check the ring end gap. Replace any rings not within specification.

PISTON RING SIDE CLEARANCE

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

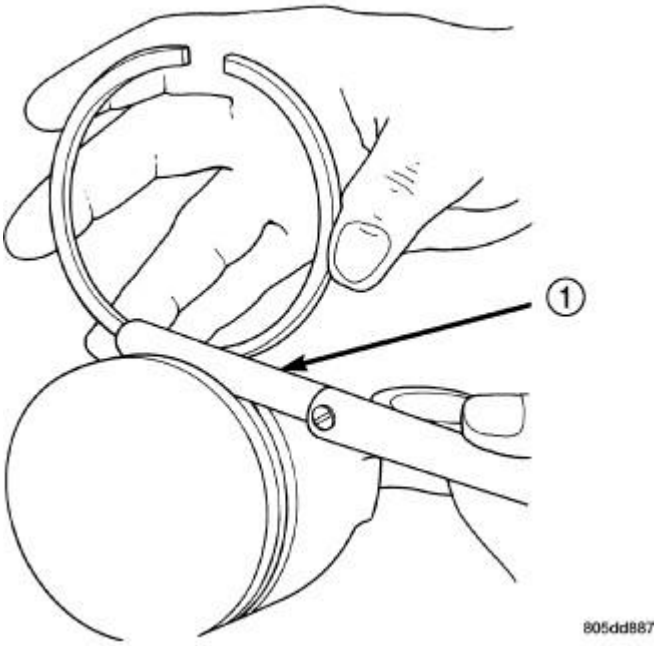


Fig. 226: Measuring Piston Ring Side Clearance
Courtesy of CHRYSLER GROUP, LLC

1. Measure the ring side clearance as shown in illustration make sure the feeler gauge (1) fits snugly between the ring land and the ring. Replace any ring not within specification.
2. Rotate the ring around the piston, the ring must rotate in the groove with out binding.

PISTON RING SPECIFICATION CHART

Piston Ring Position	Piston Ring Side Clearance	Maximum Clearance
Upper Ring		
Metric	0.04 - 0.09 mm	0.11 mm
Standard	0.0015 - 0.0035 in.	0.004 in.
Intermediate Ring		
Metric	0.04 - 0.08 mm	0.10 mm
Standard	0.0015 - 0.0031 in.	0.004 in.
Piston Ring Position	**Piston Ring End Gap**	**Wear Limit**
Upper Ring		
Metric	0.40 - 0.55 mm	0.43 mm
Standard	0.0157 - 0.0216 in.	0.017 in.
Intermediate Ring		
Metric	0.24 - 0.51 mm	0.74 mm
Standard	0.0094 - 0.0200 in.	0.029 in.
Oil Control Ring (Steel Rail)		
Metric	0.015 - 0.66 mm	0.76 mm
Standard	0.0059 - 0.0259 in.	0.030 in.

PISTON RING INSTALLATION

Fig. 227: Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: The No. 1 and No. 2 piston rings have a different cross section. Ensure No. 2 ring is installed with manufacturers I.D. mark (Dot) facing up, towards top of the piston.

NOTE: Piston rings are installed in the following order:

- **Oil ring expander.**
- **Lower oil ring side rail.**
- **Upper oil ring side rail.**
- **No. 2 Intermediate piston ring.**
- **No. 1 Upper piston ring.**

1. Install the oil ring expander.
2. Install upper side rail by placing one end between the piston ring groove and the expander ring. Hold end firmly and press down the portion to be installed until side rail is in position. Repeat this step for the lower side rail.

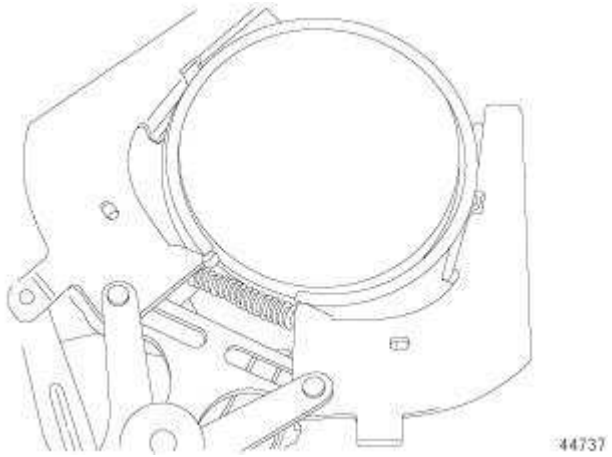


Fig. 228: Installing Upper & Intermediate Rings
Courtesy of CHRYSLER GROUP, LLC

3. Install No. 2 intermediate piston ring using a piston ring installer.
4. Install No. 1 upper piston ring using a piston ring installer.

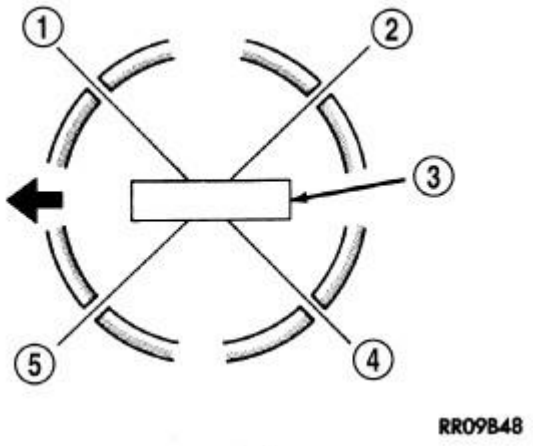


Fig. 229: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the piston rings so the gaps positioned as indicated with the piston viewed from the top.

NOTE: Staggering ring gap is important for oil control.

5. Install the oil expander so the ring gap is located in the (1) position.
6. Install the oil ring rails so the ring gap is located in the (2, 4) position.
7. Install the second compression ring so the ring gap is located in the (3) position.
8. Install the top compression so the ring gap is located in the (1) position.

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are made of a high strength aluminum alloy. Piston skirts are coated with a solid lubricant (Molykote®) to reduce friction and provide scuff resistance. The piston top ring groove and land is anodized. The connecting rods are made of forged powdered metal, with a fractured cap design.

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON FITTING

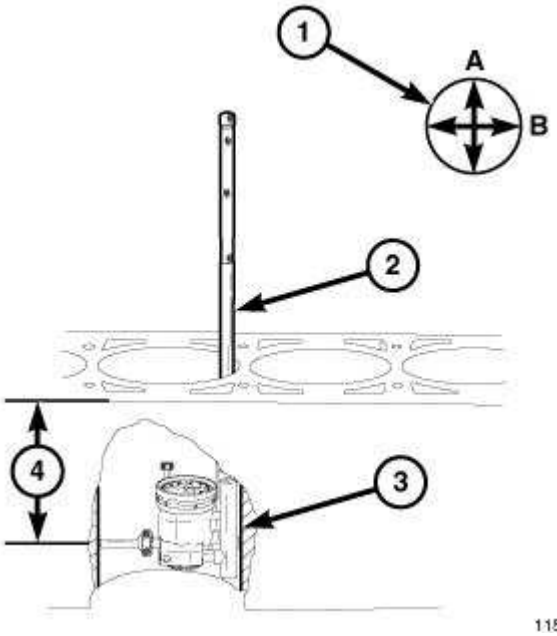


Fig. 230: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

1. To correctly select the proper size piston, use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) Increments is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at a point 38.0 mm (1.5 inches) below the top of bore (4). Start perpendicular (across or at 90°) to the axis of the crankshaft at point A (1) and then take an additional bore reading 90° at point B (1).
3. The coated pistons will be serviced with the piston pin and connecting rod pre-assembled. The piston-rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder

bank (even numbered) and must not be interchanged.

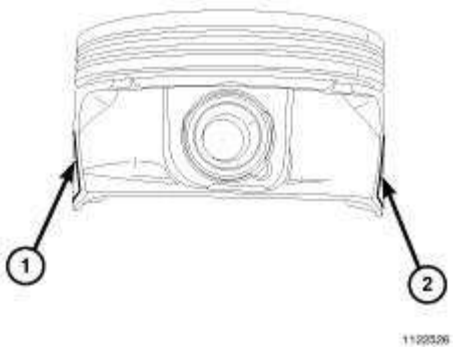


Fig. 231: Piston Diameter Measuring Points
Courtesy of CHRYSLER GROUP, LLC

4. Measure the piston diameter with a micrometer at points (1, 2).

REMOVAL

REMOVAL

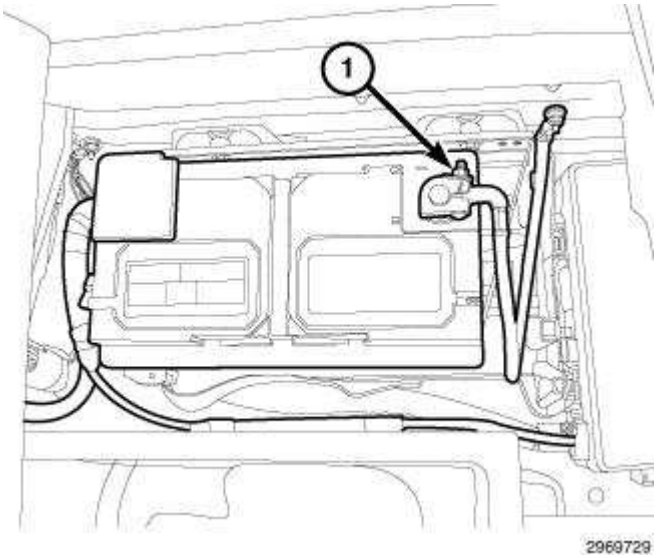


Fig. 232: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable (1).

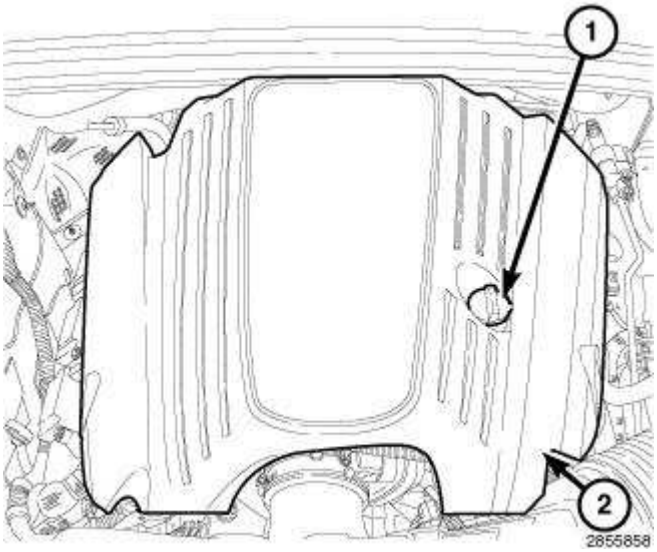


Fig. 233: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine cover (2).

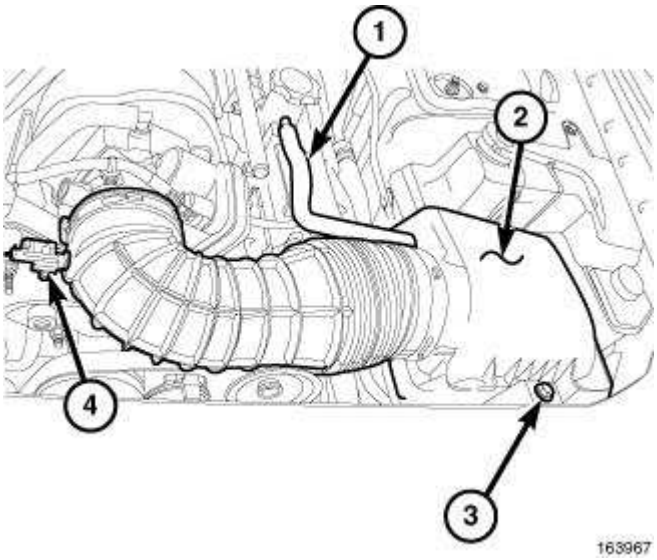


Fig. 234: Makeup Air Hose, Air Cleaner Housing, Retaining Bolt & Intake Air Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Loosen clamp and disconnect the air duct at throttle body.
5. Disconnect the intake air temperature sensor (4) electrical connector.
6. Remove the makeup air hose (1).
7. Remove the air cleaner housing retaining bolt (3) and remove the air cleaner housing (2).
8. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.
9. Raise and support the vehicle.

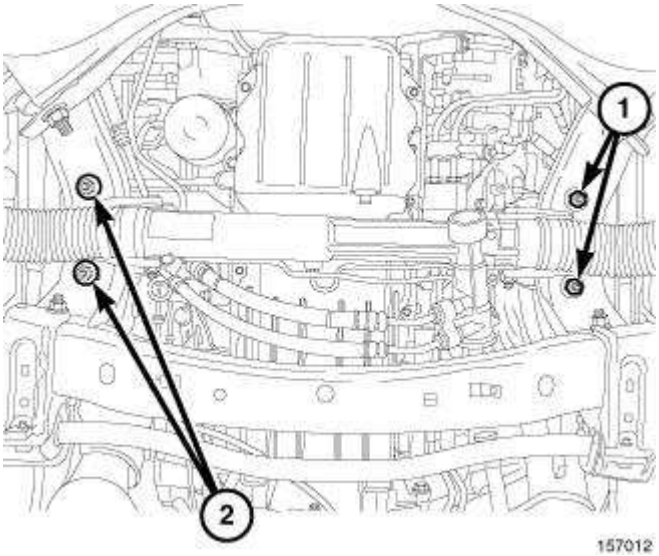


Fig. 235: Engine Mount Nuts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the engine mount nuts (1, 2).

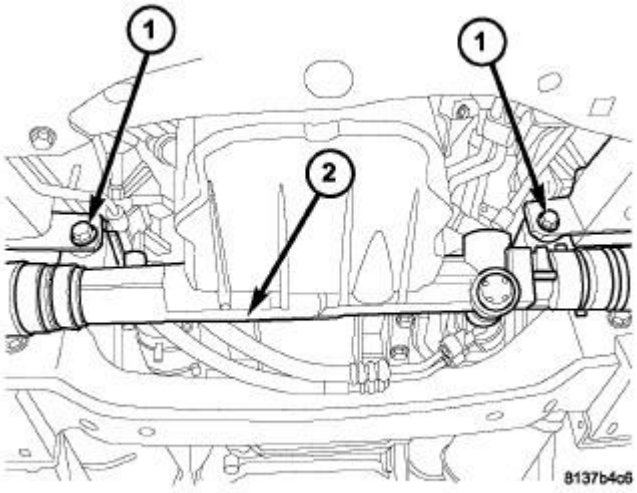


Fig. 236: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

11. Remove the steering gear mounting bolts (1) and position the steering gear (2) aside.
12. Remove the engine oil dipstick and tube from the oil pan.
13. Lower the vehicle.

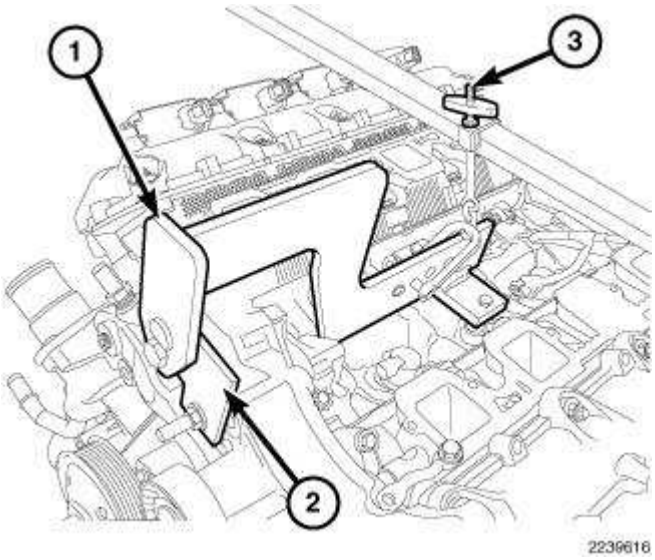


Fig. 237: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install engine lift fixture.

14. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
15. Raise the engine to provide clearance to remove the oil pan.
16. Raise and support the vehicle.
17. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L** and **PAN, OIL, AWD, REMOVAL, 5.7L**.
18. Lower the vehicle.
19. Remove the timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.
20. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing the pistons from the cylinder block. **Be sure to keep the tops of the pistons covered during this operation.**

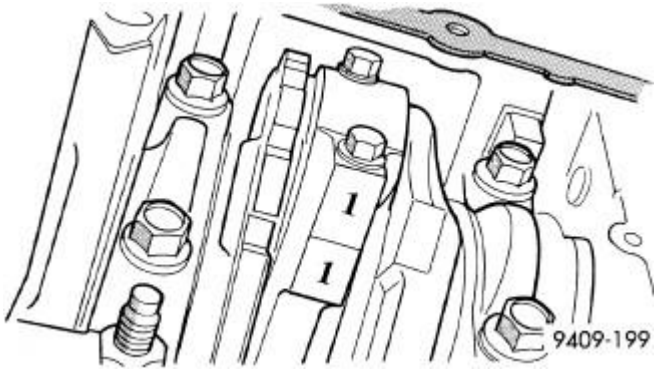


Fig. 238: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.

21. Raise and support the vehicle.
22. Mark the connecting rod and bearing cap positions using a permanent ink marker or scribe tool.

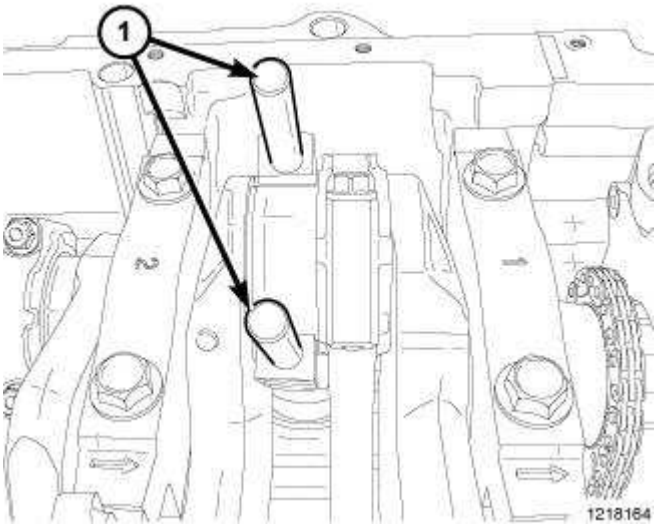


Fig. 239: Connecting Rod Guides
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

NOTE: Pistons and connecting rods assemblies must be removed from the top of cylinder block. When removing the piston and connecting rod assemblies from the engine, rotate the crankshaft so each connecting rod is centered in the cylinder bore.

23. Remove the connecting rod cap, install the Connecting Rod Guides (special tool #8507, Guides, Connecting Rod) (1) and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
24. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.

25. Carefully remove the piston rings from the piston(s), starting from the top ring down.

CLEANING

CLEANING

CAUTION: Do not use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a moly coating, this coating must not be damaged.

1. Using a suitable cleaning solvent, clean the pistons in warm water and towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

CAUTION: Do not remove the piston pin from the piston and connecting rod assembly.

INSPECTION

INSPECTION

Check the connecting rod journal for excessive wear, taper and scoring. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.

Check the connecting rod for signs of twist or bending.

Check the piston for taper and elliptical shape before it is fitted into the cylinder bore. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.

Check the piston for scoring or scraping marks in the piston skirts. Check the ring lands for cracks and/or deterioration.

INSTALLATION

INSTALLATION

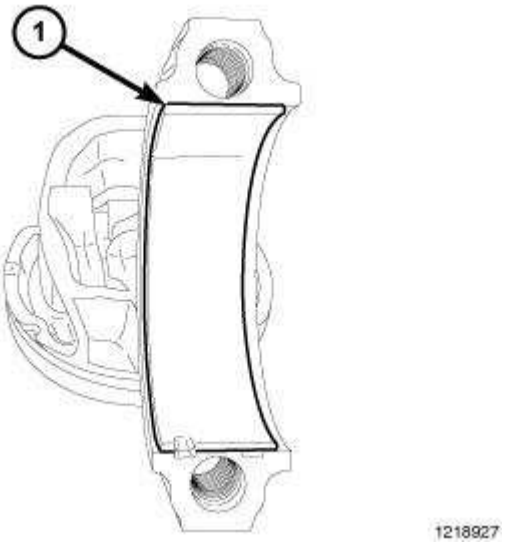


Fig. 240: Rod Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before reinstalling used rings or installing new rings, the ring clearances must be checked.

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

1. Check piston ring clearance. Refer to **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
2. Before installing piston and connecting rod assemblies into the bore, install the piston rings. Refer to **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
3. Immerse the piston head and rings in clean engine oil and position a ring compressor over the piston and rings and tighten the ring compressor. **Ensure the position of rings do not change during this operation.**
4. Position the rod bearing (1) onto the connecting rod and lubricate bearing surface with clean engine oil.

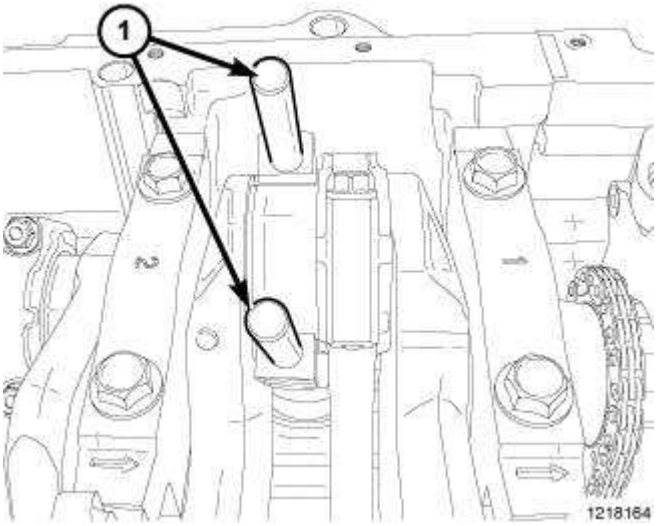


Fig. 241: Connecting Rod Guides
Courtesy of CHRYSLER GROUP, LLC

5. Install Connecting Rod Guides (special tool #8507, Guides, Connecting Rod) (1) into the connecting rod bolt threads.

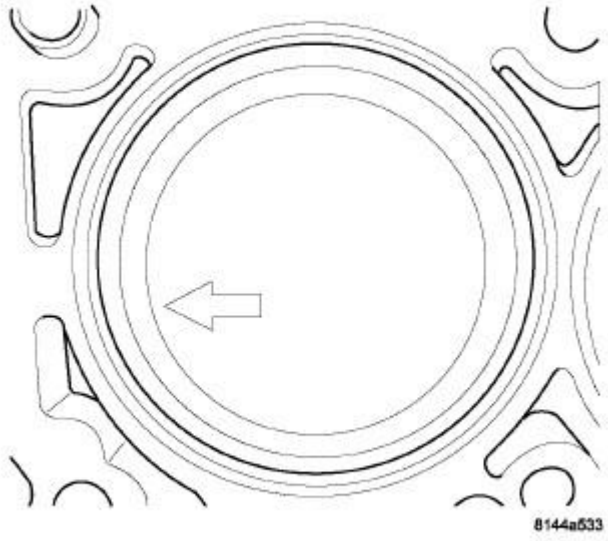


Fig. 242: Piston Direction Arrow
Courtesy of CHRYSLER GROUP, LLC

6. The pistons are marked on the piston pin bore surface with an raised "F" or arrow on top of piston indicating installation position. This mark must be pointing toward the front of engine on both cylinder banks.

7. Wipe cylinder bore clean and lubricate with clean engine oil.
8. Rotate the crankshaft until the connecting rod journal is centered with the cylinder bore.
9. Insert the piston and rod assembly into the cylinder bore and carefully position the connecting rod over the crankshaft journal.
10. Tap the piston down into the cylinder bore using a hammer handle while guiding the connecting rod into position on the rod journal.

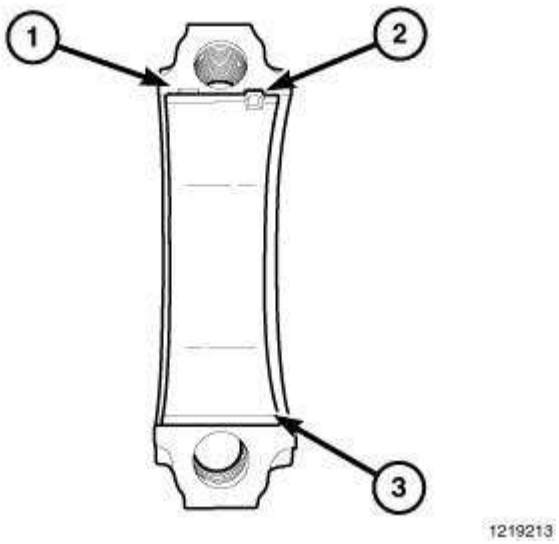


Fig. 243: Connecting Rod Cap & Bearing
Courtesy of CHRYSLER GROUP, LLC

11. Remove the Connecting Rod Guides (special tool #8507, Guides, Connecting Rod).
12. Wipe the connecting rod cap (1) clean and lubricate with clean engine oil and install the bearing (3).

NOTE: The connecting rods and bearing caps are not interchangeable, line up the previously marked bearing caps and connecting rods to ensure assembly to their original location.

13. Lubricate the bearing surfaces with clean engine oil and position the rod cap in place.

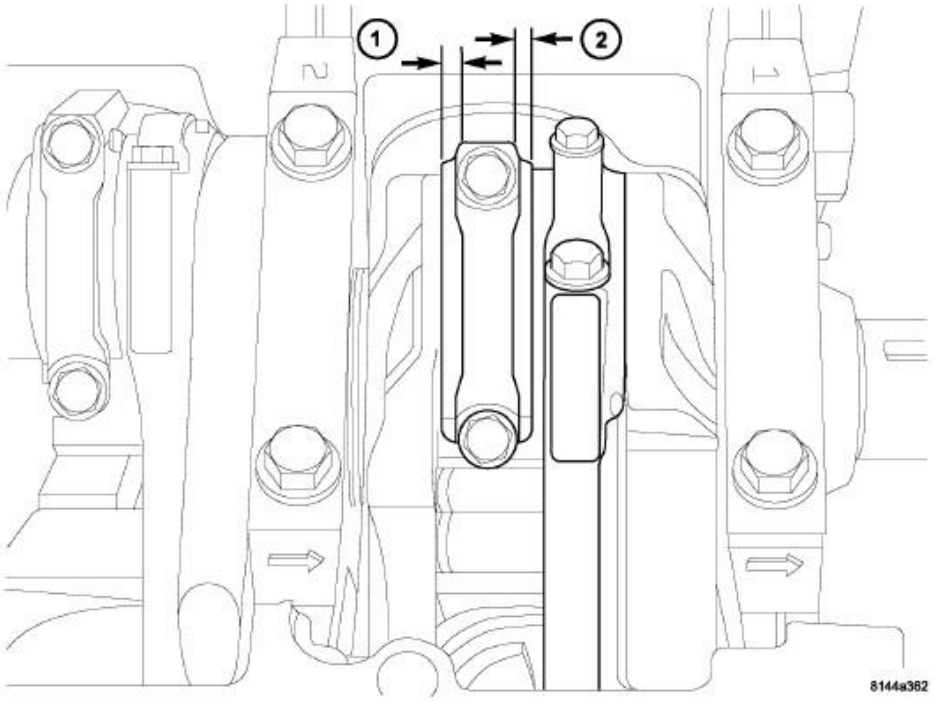


Fig. 244: Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing the connecting rods, make sure the wide side of the connecting rod faces the crankshaft and the narrow sides face each other.

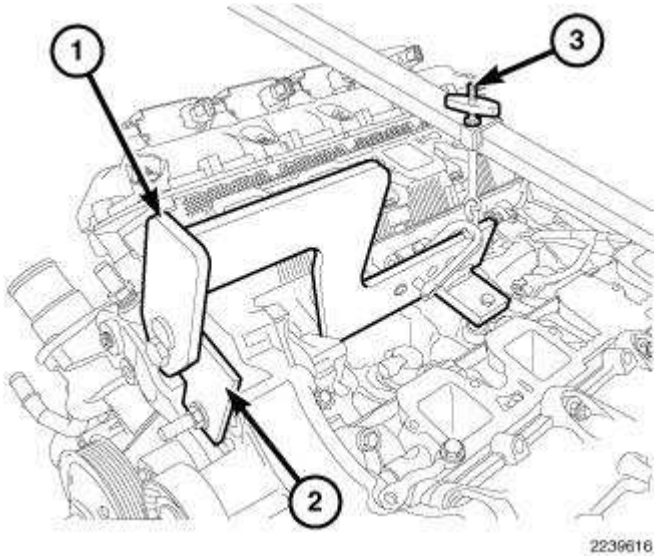


Fig. 245: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always replace the connecting rod bolts whenever they are loosened or removed.

14. Lubricate the new rod cap bolts with clean engine oil, install and tighten to 21 N.m (15 ft. lbs.) plus 90°.
15. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
16. Install the new oil pan gasket/windage tray and oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L** and **PAN, OIL, AWD, INSTALLATION, 5.7L**.
17. Install the engine oil dipstick tube and dipstick.
18. Lower the vehicle.
19. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) lower the engine into position and remove.
20. Raise and support the vehicle.

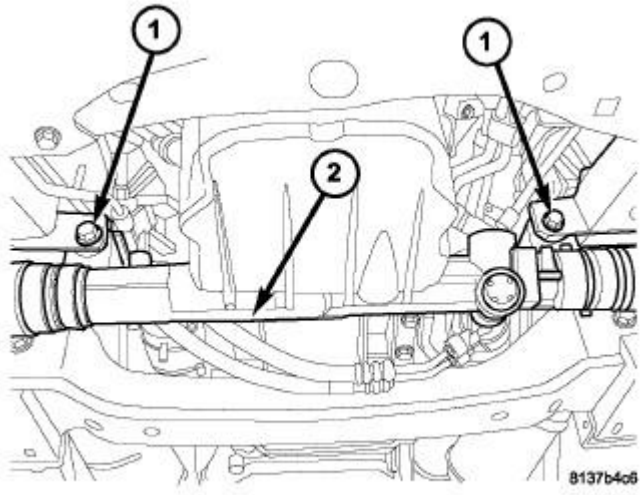


Fig. 246: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

21. Position the steering gear (2), install mounting bolts (1) and tighten to 95 N.m (70 ft. lbs.).

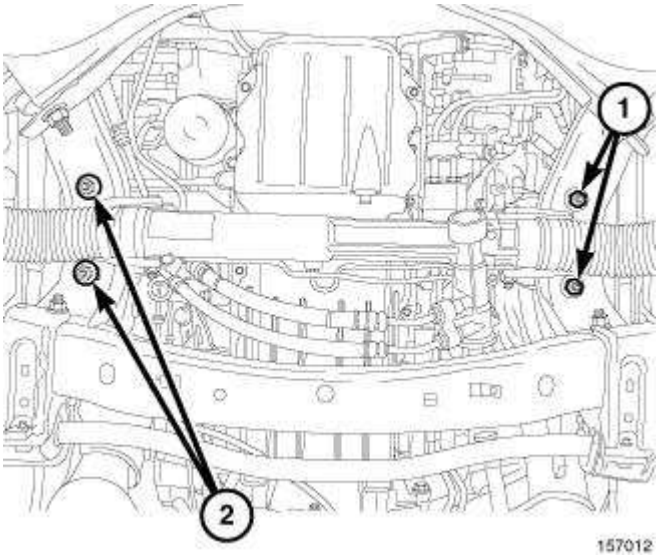


Fig. 247: Engine Mount Nuts
Courtesy of CHRYSLER GROUP, LLC

22. Install the engine mount nuts (1, 2) and tighten to 95 N.m (70 ft. lbs.).
23. Lower the vehicle.
24. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.

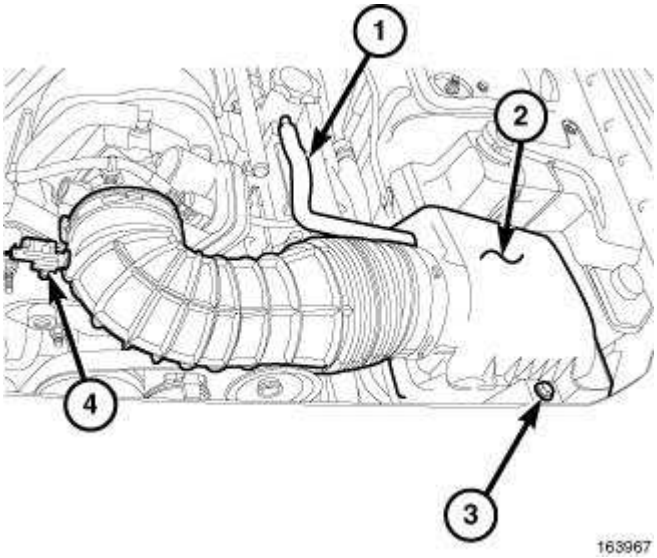


Fig. 248: Makeup Air Hose, Air Cleaner Housing, Retaining Bolt & Intake Air Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

25. Position the air cleaner housing (2), install the air cleaner housing retaining bolt (3) and securely tighten.
26. Connect the makeup air hose (1).
27. Connect the intake air temperature sensor (4) electrical connector.

28. Connect the air duct to the throttle body and tighten clamp to 3 N.m (30 in. lbs.).
29. Fill the engine with oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

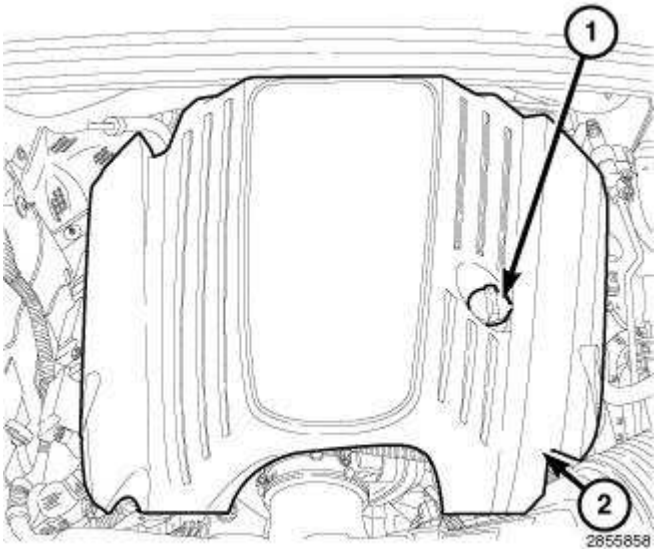


Fig. 249: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

30. Install the engine cover (2).

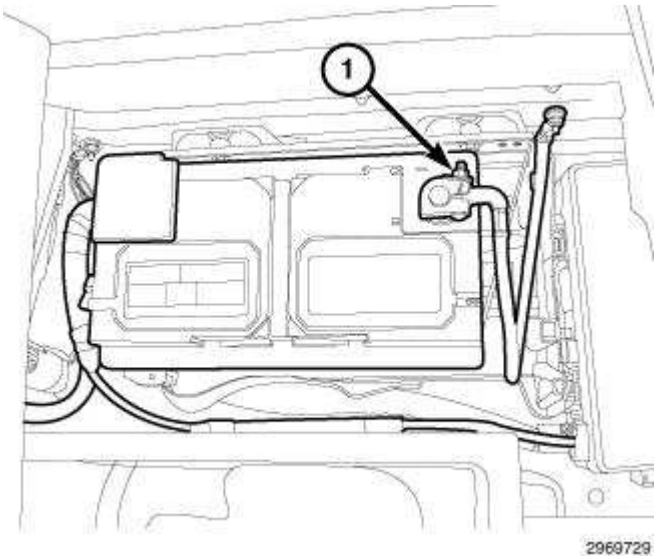


Fig. 250: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

31. Connect the negative battery cable (1).

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

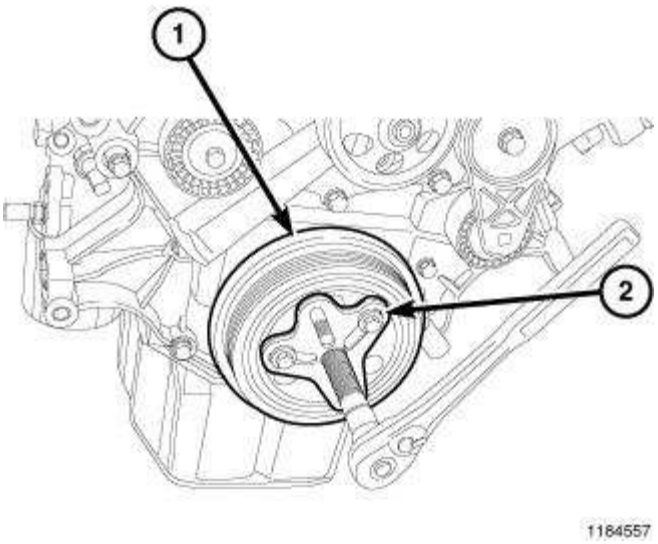


Fig. 251: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative cable from battery.
2. Remove radiator cooling fan. Refer to **FAN, COOLING, REMOVAL** .
3. Remove the vibration damper (1). Refer to **DAMPER, VIBRATION, REMOVAL, 5.7L**.

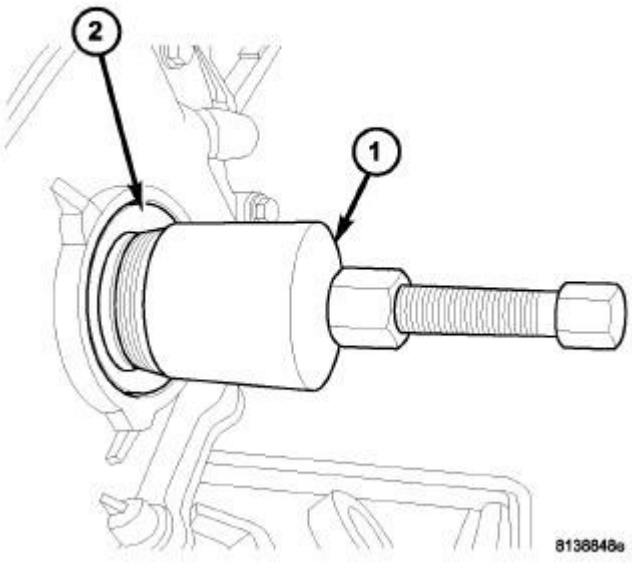


Fig. 252: Front Crankshaft Seal Removal
Courtesy of CHRYSLER GROUP, LLC

4. Using Seal Remover (special tool #9071, Remover, Seal) (1), remove crankshaft front seal (2).

INSTALLATION

INSTALLATION

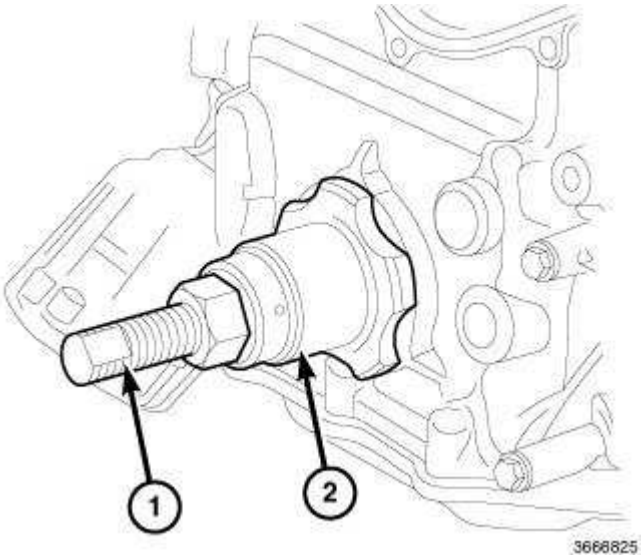


Fig. 253: Front Seal Installation
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The front crankshaft seal must be installed dry. Do not apply lubricant to the sealing lip or the outer edge.

1. Using Crankshaft Front Oil Seal Installer (special tool #9072, Installer, Seal) (2) and (special tool #10387, Installer, Vibration Damper) (1), install crankshaft front seal.

CAUTION: To prevent severe damage to the crankshaft or damper, thoroughly clean the damper bore and the crankshaft nose before installing damper.

2. Install vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.
3. Install radiator cooling fan. Refer to **FAN, COOLING, INSTALLATION** .
4. Refill cooling system. Refer to **STANDARD PROCEDURE** .
5. Connect negative cable to battery.

SEAL, CRANKSHAFT OIL, REAR

DESCRIPTION

DESCRIPTION

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer. For more information, refer to the following;

- **Diagnosis and Testing:** Refer to **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Diagnosis and Testing**.
- **Removal:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.
- **Installation:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION, 5.7L**.

SOLENOID, MULTIPLE DISPLACEMENT

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MDS SOLENOID

The Multi-Displacement System (MDS) has the following detectable issues:

- solenoid circuit
- fail to deactivate a cylinder(s)
- fail to reactivate a cylinder(s)
- low oil pressure

CONDITION	POSSIBLE CAUSES	CORRECTION
MDS does not activate	1. Low oil pressure.	1. Check for proper oil pressure.
	2. Bad oil temperature sensor.	2. Replace the oil temperature sensor.
	3. Malfunctioning MDS solenoid.	3. Replace the solenoid.
	4. Malfunctioning MDS tappet.	4. Replace tappet (s).
MDS does not deactivate	1. Low oil pressure.	1. Check or proper oil pressure.
	2. Bad oil temperature sensor.	2. Replace the oil temp sensor.
	3. Malfunctioning MDS solenoid.	3. Replace the solenoid.
	4. Malfunctioning MDS tappet.	4. Replace tappet(s).

REMOVAL

REMOVAL

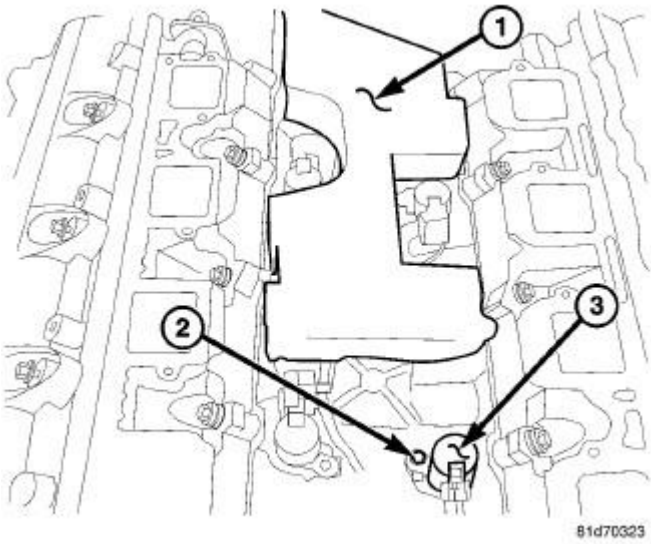


Fig. 254: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.
3. Remove foam insulator pad (1).

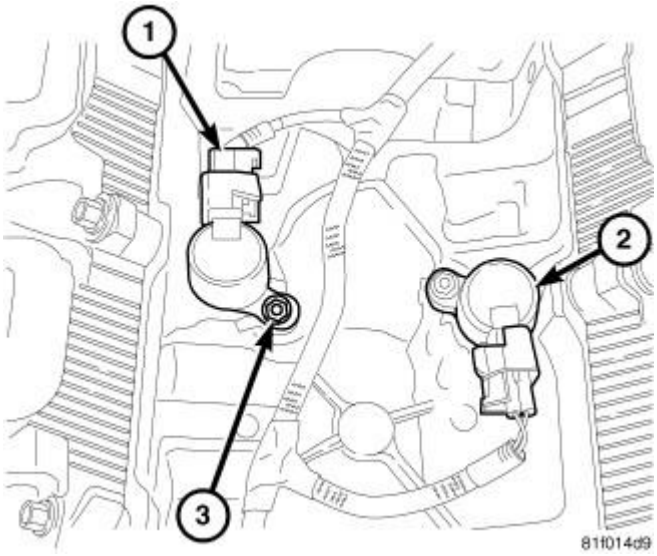


Fig. 255: MDS Solenoids, Electrical Connectors & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the Multiple Displacement Solenoid (MDS) (2) electrical connector(s) (1).
5. Remove the MDS solenoid (2) retaining bolt(s) (3).

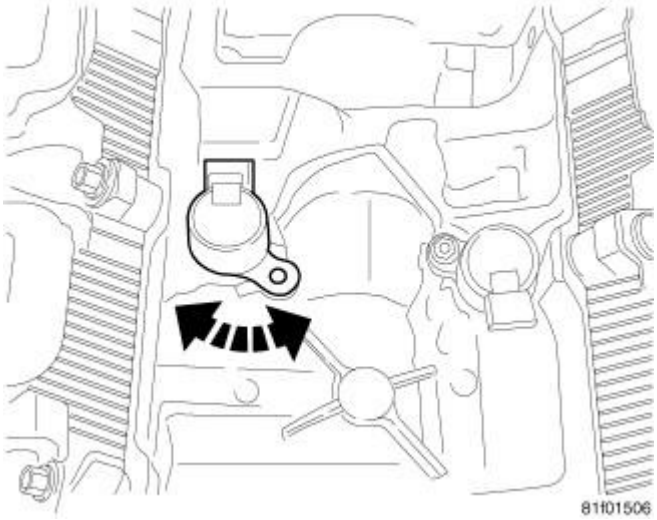


Fig. 256: MDS Solenoid Removal
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not try to pry the solenoid out. This could lead to breakage and contamination of the lubrication system.

6. Lightly tap on the MDS solenoid(s) with a rubber mallet. Rotate the MDS solenoid(s) from side to side to break the seal.
7. Remove the MDS solenoid(s).

INSTALLATION

INSTALLATION

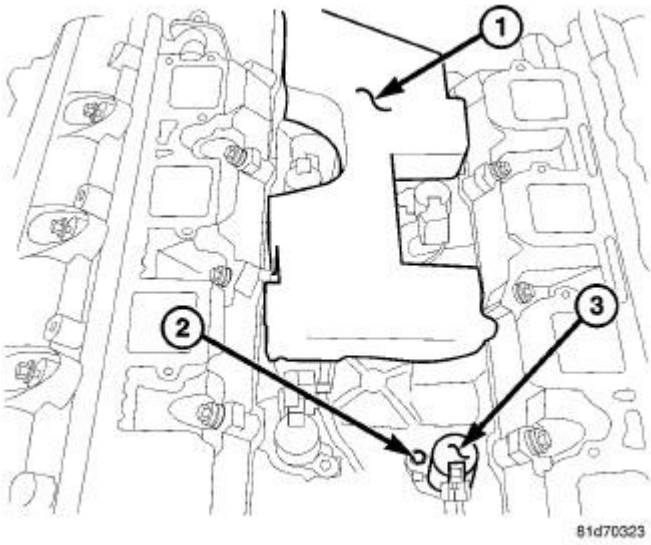


Fig. 257: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Verify the MDS solenoid bores are free of debris before installing the MDS solenoid into the engine block.
2. Install the MDS solenoid(s) (3), ensure the seal is fully seated into the engine block.
3. Install the retaining bolt(s) (2) and tighten to 11 N.m (8 ft. lbs.).
4. Connect the MDS electrical connector to the solenoid(s) (3).
5. Install the foam insulator pad (1).
6. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, FRONT

REMOVAL

REMOVAL

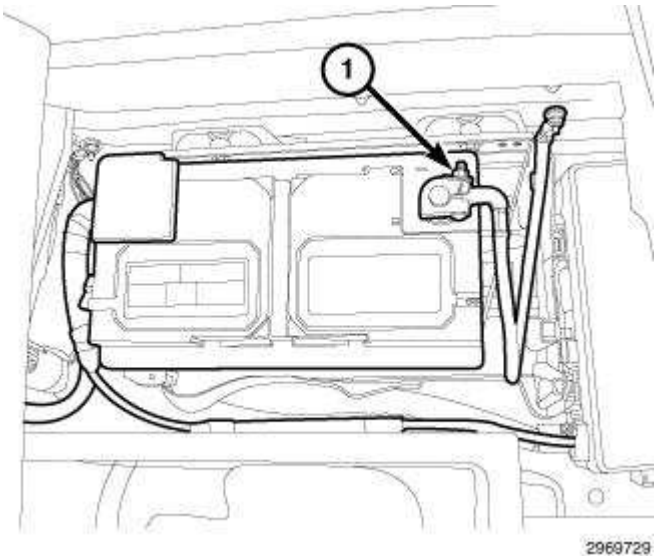


Fig. 258: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

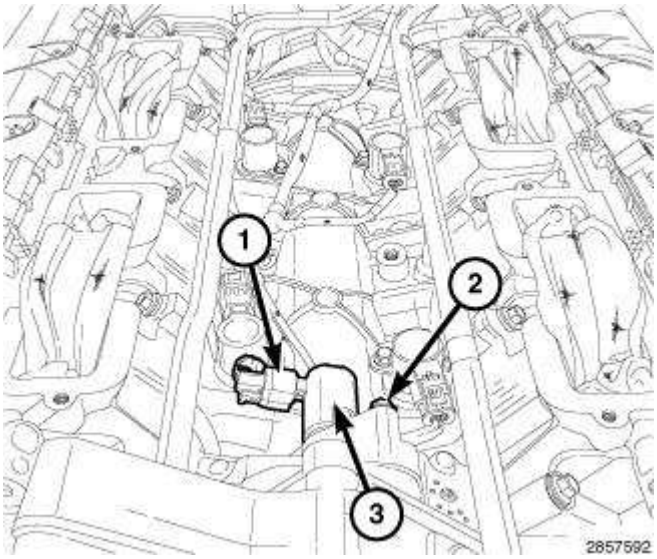


Fig. 259: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Oil Control Valve (OCV) (3) is located under the intake manifold.

3. Disconnect OCV electrical connector (1).
4. Remove OCV retaining bolt (2).

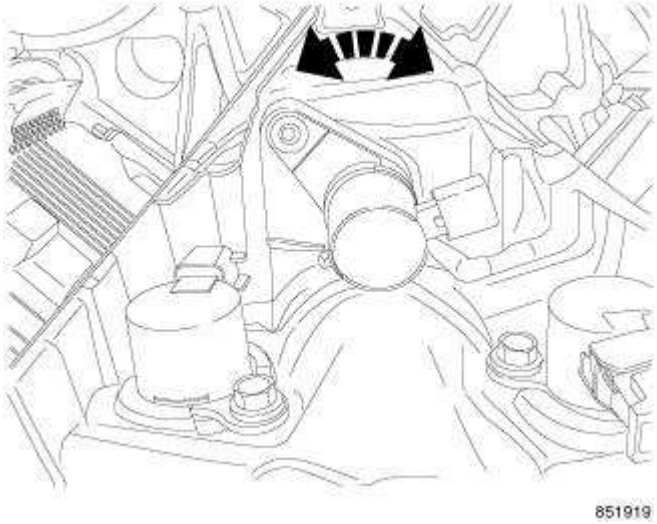


Fig. 260: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove the OCV, the engine must be at room temperature.

5. While rotating the OCV back and forth to break the seal, remove the OCV.
6. Remove the engine oil dipstick tube retaining nut at the right exhaust manifold and remove the

dipstick tube.

7. Raise and support the vehicle.

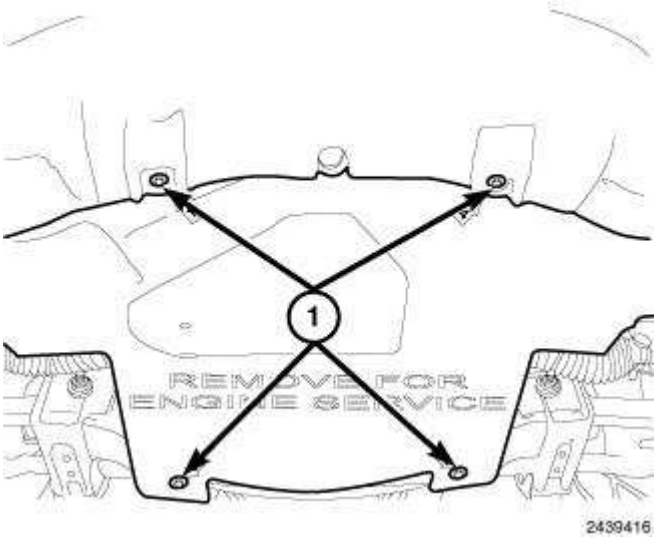


Fig. 261: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Remove the belly pan retainers (1) and remove the belly pan.

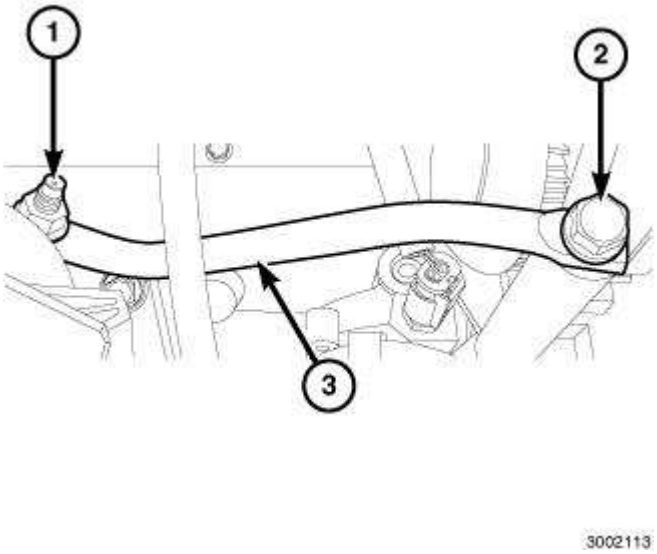


Fig. 262: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

9. Remove the generator support bracket to engine mount retaining nut (1).
10. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).
11. Lower the vehicle.

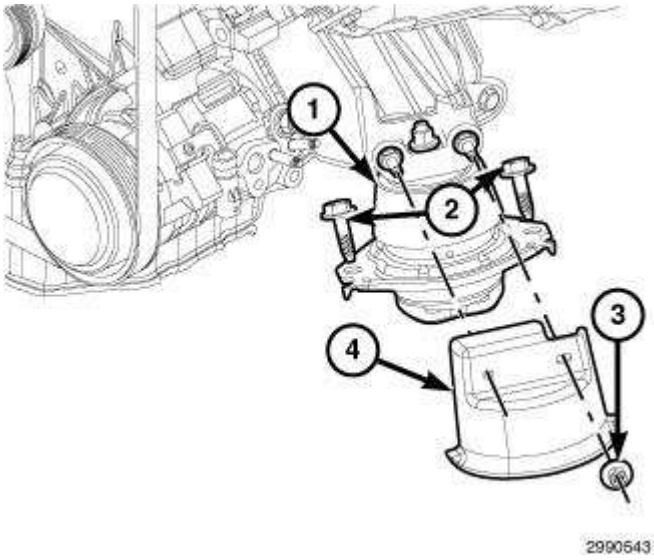


Fig. 263: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

12. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields
13. Remove both left/right engine mount to frame retaining bolts (2).

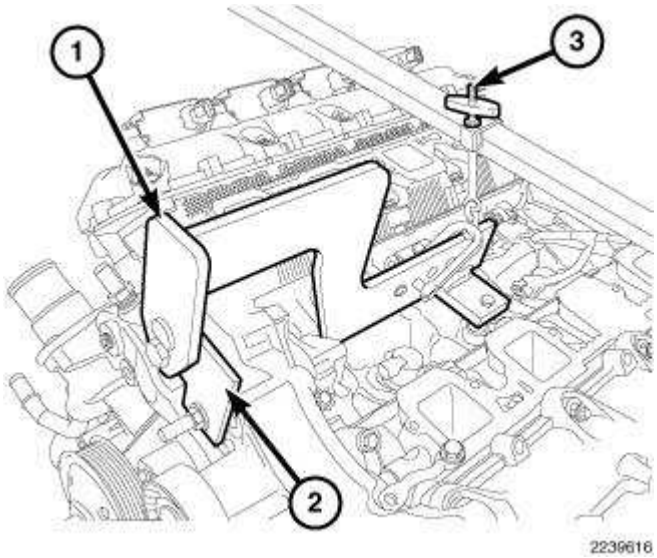


Fig. 264: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install the engine lift fixture.

14. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
15. Raise the engine to provide clearance to remove the engine mounts.

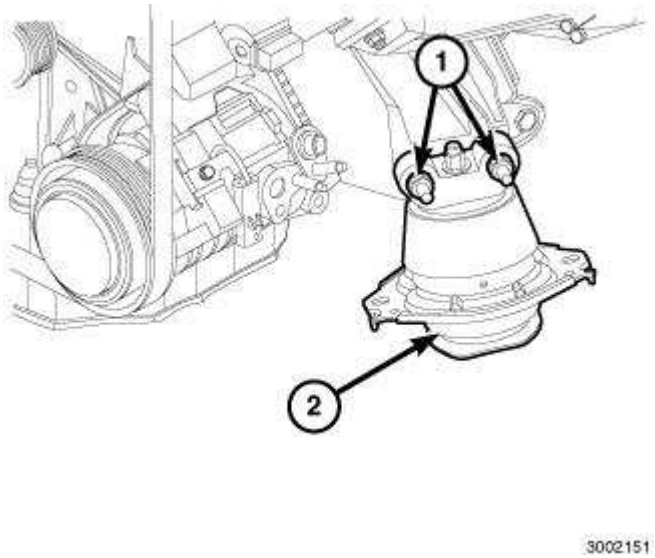


Fig. 265: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

16. Remove both left/right engine mount retaining bolts (1) and remove the engine mounts (2).

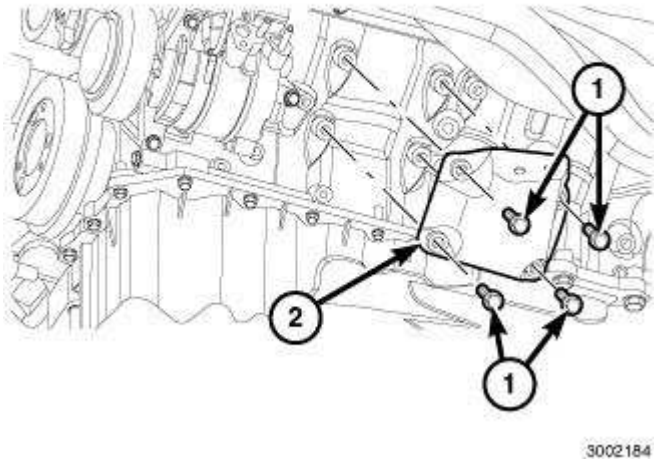


Fig. 266: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

17. If required, remove the engine mount to engine block mounting bracket(s) retaining bolts (1) and remove the mounting bracket(s) (2).

AWD - REMOVAL

ENGINE MOUNT ISOLATORS

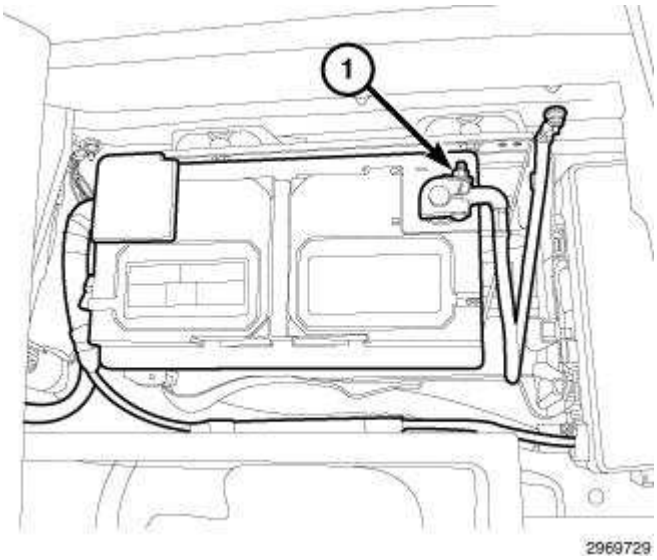


Fig. 267: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

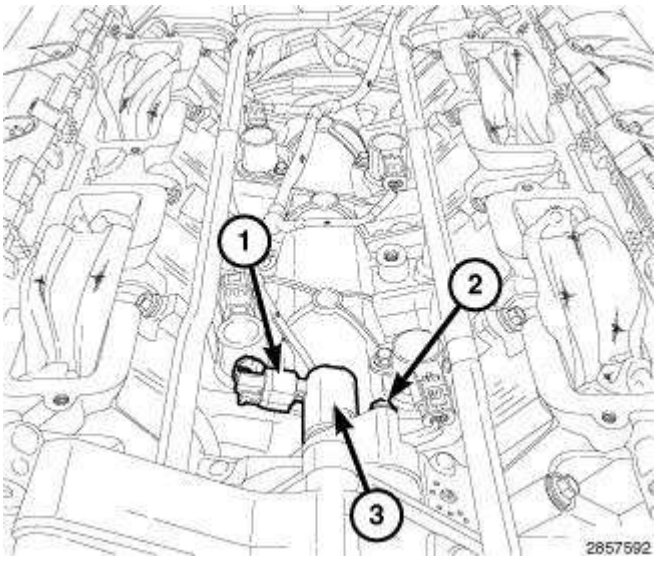


Fig. 268: Oil Control Valve, Electrical Connector & Retaining Bolt

Courtesy of CHRYSLER GROUP, LLC

NOTE: The Oil Control Valve (OCV) (3) is located under the intake manifold.

3. Disconnect OCV electrical connector (1).
4. Remove OCV retaining bolt (2).

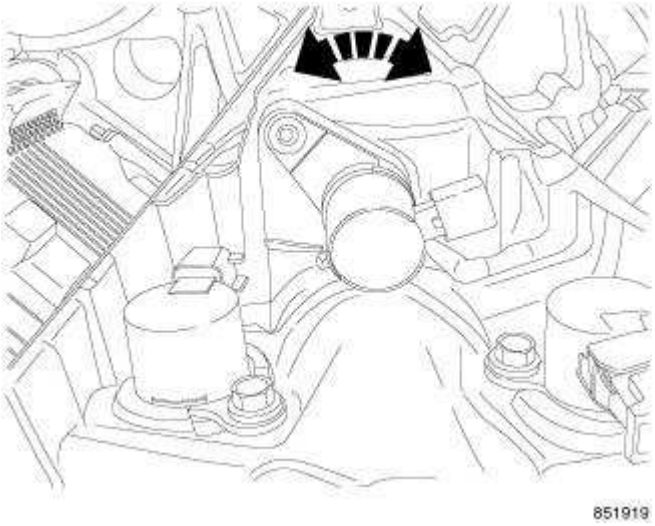


Fig. 269: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove the OCV, the engine must be at room temperature.

5. While rotating the OCV back and forth to break the seal, remove the OCV.
6. Remove the engine oil dipstick tube retaining nut at the right exhaust manifold and remove the dipstick tube.
7. Raise and support the vehicle.

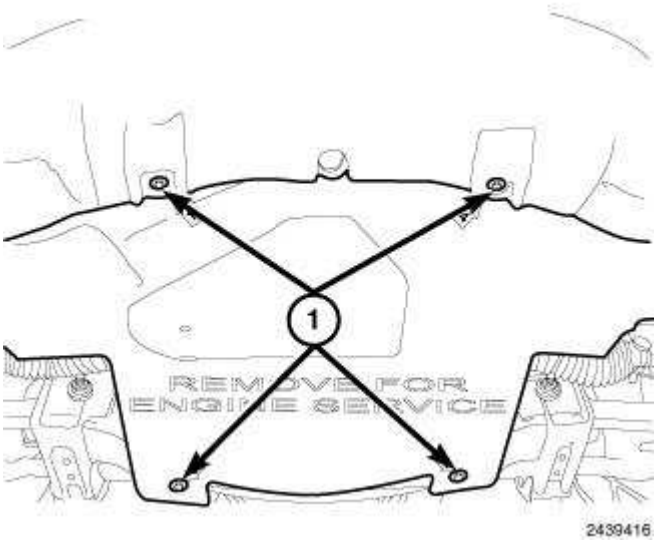


Fig. 270: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Remove the belly pan retainers (1) and remove the belly pan.
9. Remove both left/right front axle half shafts from the vehicle. Refer to **REMOVAL** and **REMOVAL** .

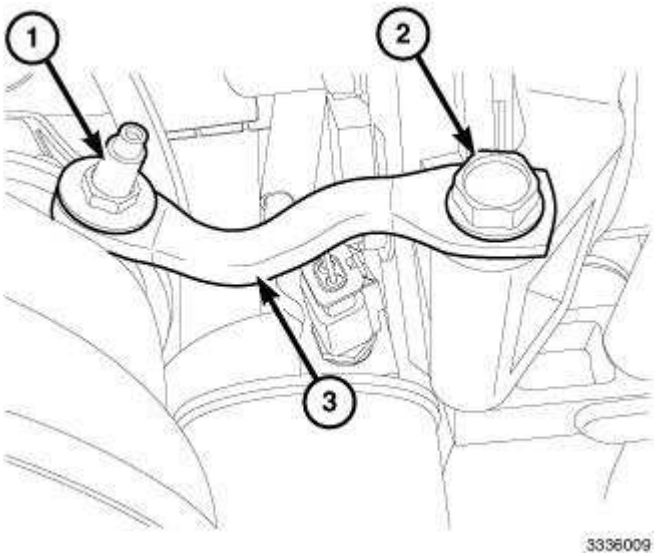


Fig. 271: Engine Mount Isolator Retaining Nut, Generator Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Remove the generator support bracket to engine mount isolator retaining nut (1).
11. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).
12. Remove the engine oil filter. Refer to **FILTER, ENGINE OIL, REMOVAL, 5.7L**.
13. Lower the vehicle.

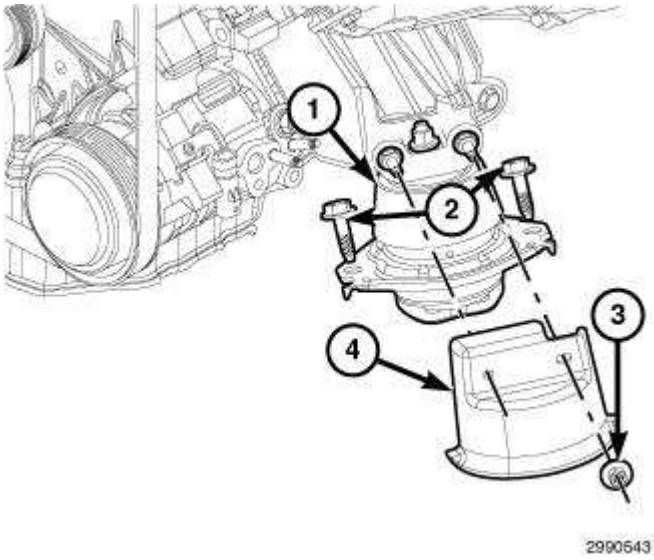


Fig. 272: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

14. Remove both left/right engine mount isolator heat shield (4) retaining nuts (3) and remove the heat shields
15. Remove both left/right engine mount isolator to engine cradle retaining bolts (2).

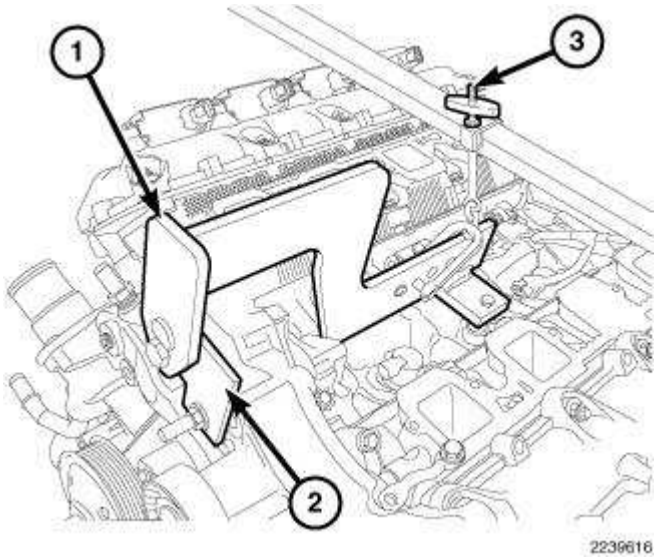


Fig. 273: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install the engine lift fixture.

16. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
17. Raise the engine to provide clearance to remove the engine mounts.

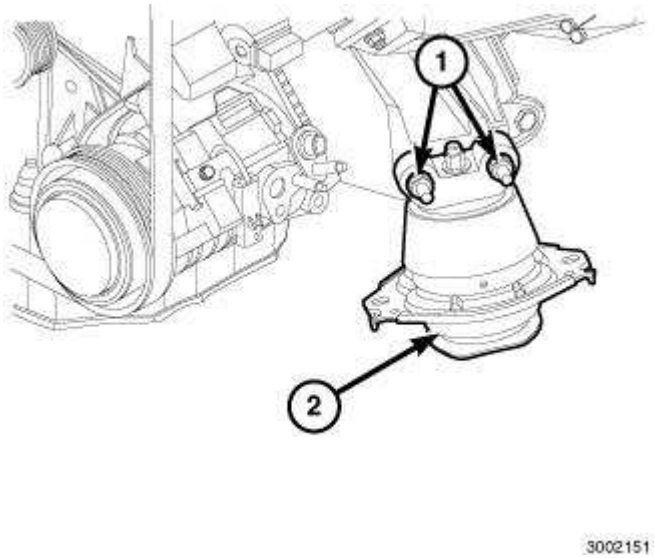


Fig. 274: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

18. Remove both left/right engine mount isolator retaining bolts (1) and remove isolators (2).

ENGINE MOUNT ISOLATOR BRACKETS

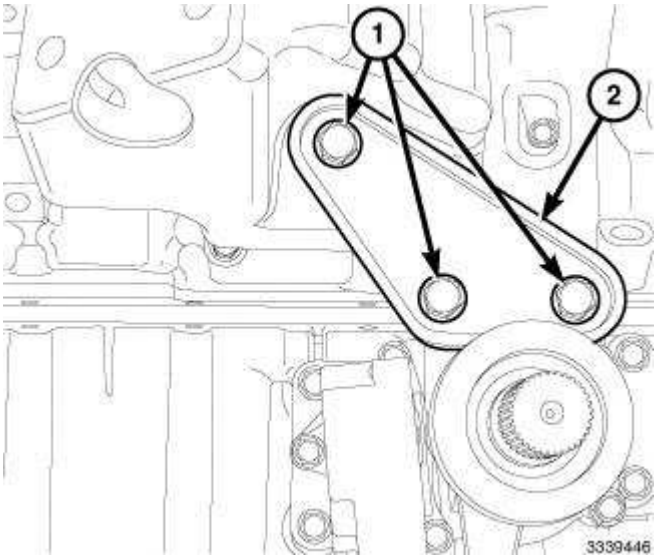


Fig. 275: Differential Support Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove both left/right engine mount isolators, in the above procedure. Refer to **ENGINE MOUNT ISOLATORS**.

NOTE: Left Engine Mount Isolator Bracket;

2. Remove the differential support bracket retaining bolts (1) and remove the support bracket (2).

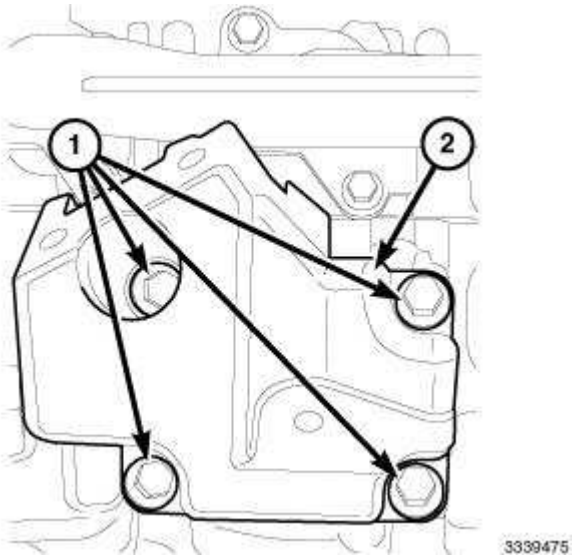


Fig. 276: Engine Mount Isolator Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine mount isolator bracket retaining bolts (1) and remove the bracket (2).

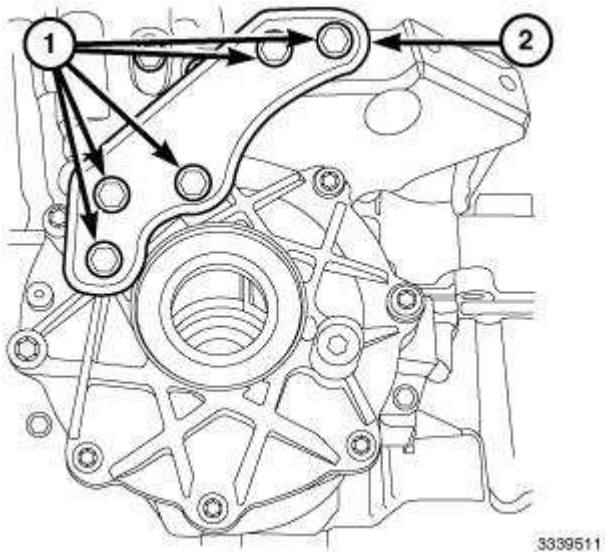


Fig. 277: Differential Support Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right Engine Mount Isolator Bracket;

4. Remove the differential support bracket retaining bolts (1) and remove the support bracket (2).

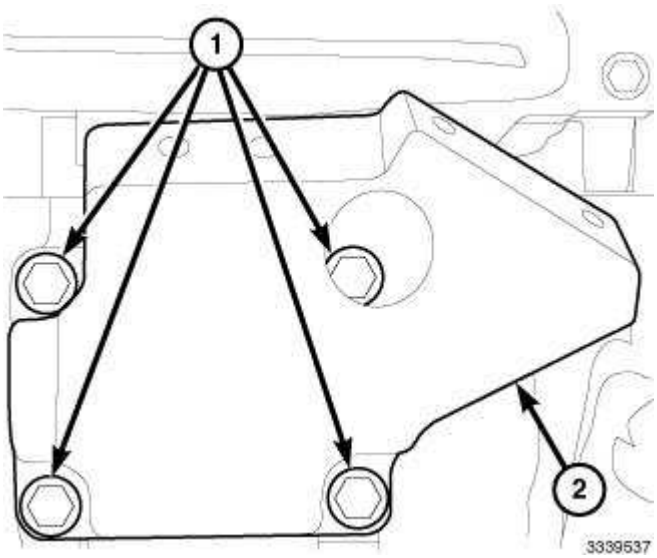


Fig. 278: Engine Mount Isolator Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the engine mount isolator bracket retaining bolts (1) and remove the bracket (2).

INSTALLATION

INSTALLATION

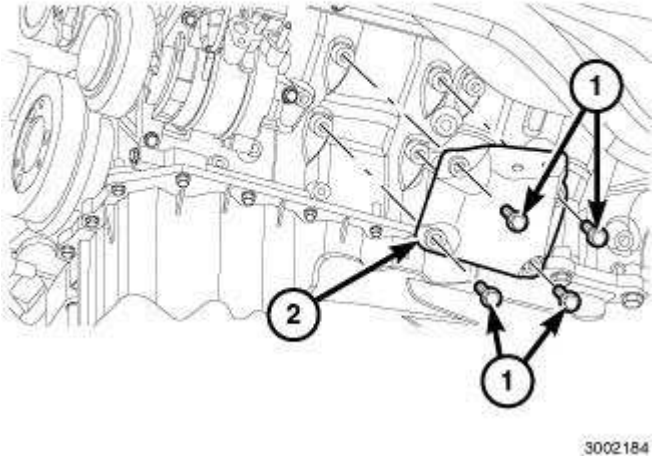


Fig. 279: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

1. If removed, position the engine mount to engine block mounting brackets, install the retaining bolts and tighten to 61 N.m (45 ft. lbs.).

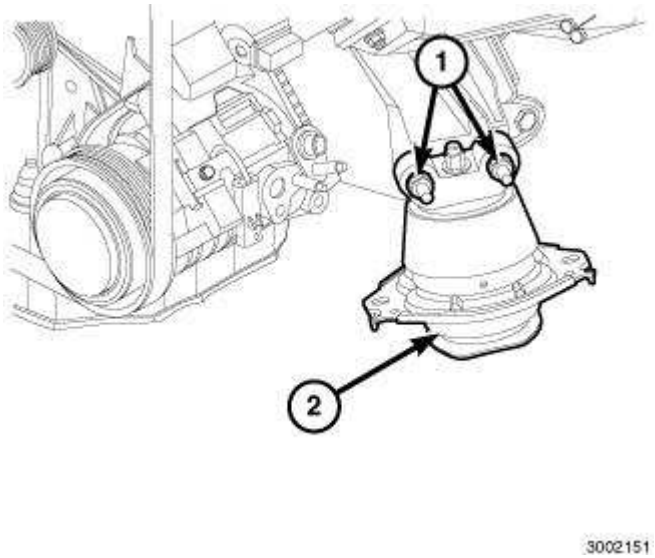


Fig. 280: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

2. Position the engine mounts (2), Install the retainers (1) and tighten to 61 N.m (45 ft. lbs.).
3. Lower the vehicle.

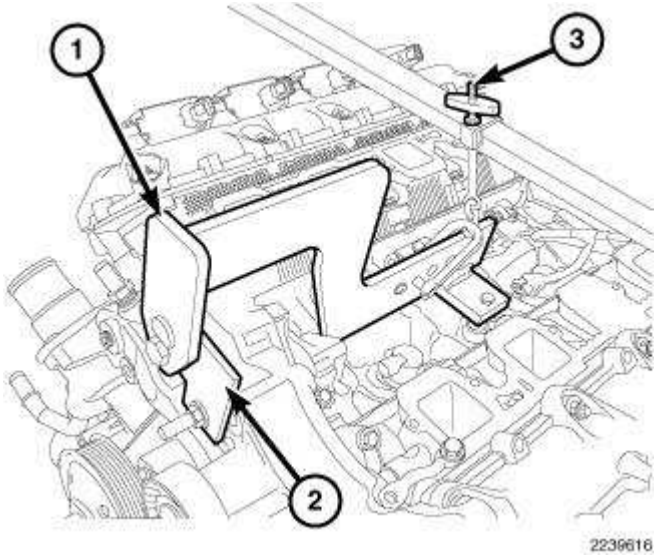


Fig. 281: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

4. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3), lower the engine until the engine mounts are seated on the engine cradle.
5. Remove the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).

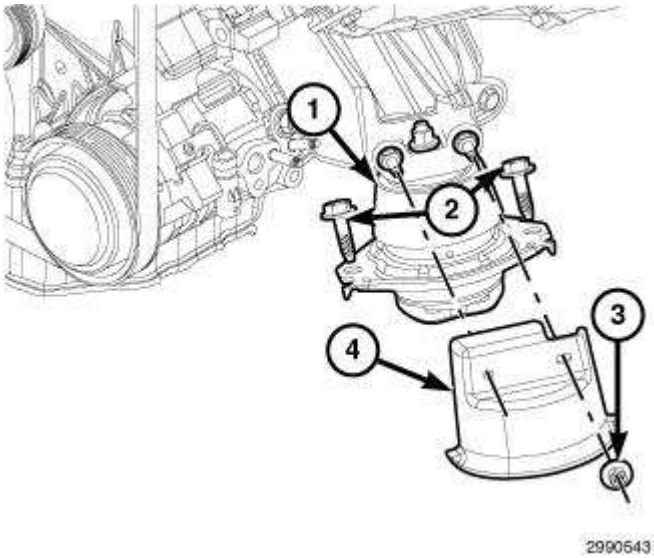


Fig. 282: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

6. Install both left/right engine mount isolators to engine cradle retaining bolts (2) and tighten to 61 N.m (45 ft. lbs.).
7. Position both left/right engine mount heat shields (4), install the retaining nuts (3) and tighten to 25 N.m (18 ft. lbs.).

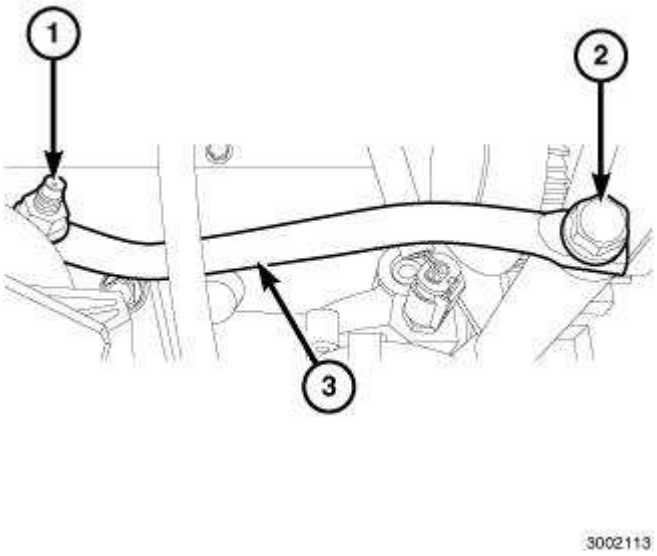


Fig. 283: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

8. Raise and support the vehicle.
9. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) and tighten finger tight.
10. Position the generator support bracket (3) to the generator, install the retaining bolt (2) and tighten to 65 N.m (48 ft. lbs.).
11. Tighten the generator support bracket (3) to engine mount retaining nut (1) to 28 N.m (21 ft. lbs.).

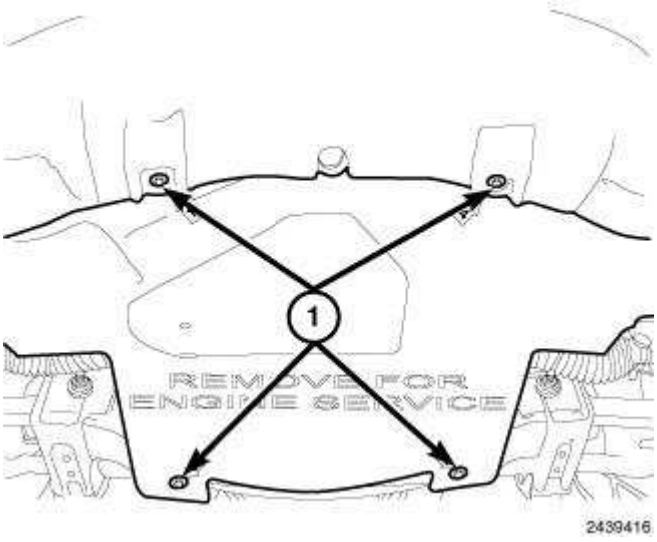


Fig. 284: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

12. Position the belly pan and install the belly pan retainers (1).

13. Lower the vehicle.

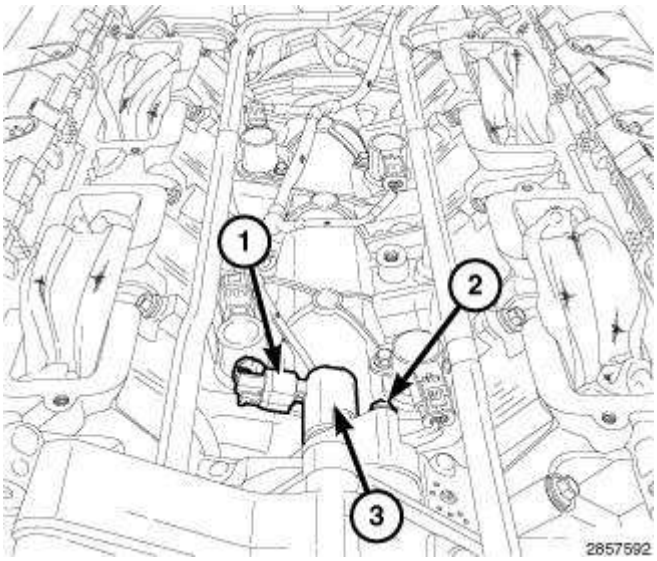


Fig. 285: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Position the engine oil dipstick tube and install retaining nut at the exhaust manifold.
15. Position the OCV (3), install the retaining bolt (2) and tighten to 11 N.m (8 ft. lbs.).
16. Connect OCV electrical connector (1).
17. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

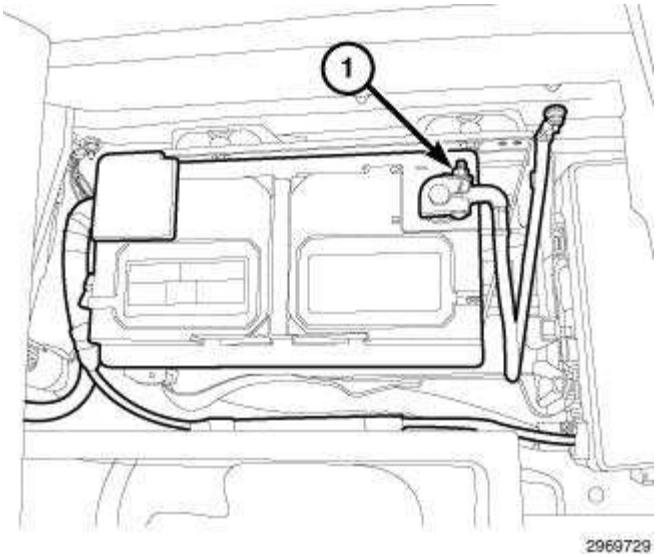


Fig. 286: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

18. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).

AWD - INSTALLATION

ENGINE MOUNT ISOLATOR BRACKETS

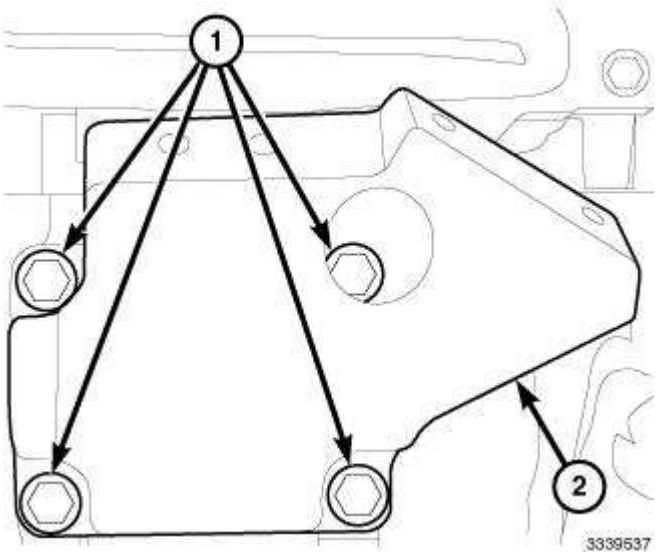


Fig. 287: Engine Mount Isolator Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right Engine Mount Isolator Bracket;

1. Position the engine mount isolator bracket (2), install the retaining bolts (1) and tighten to 61 N.m (45 ft. lbs.).

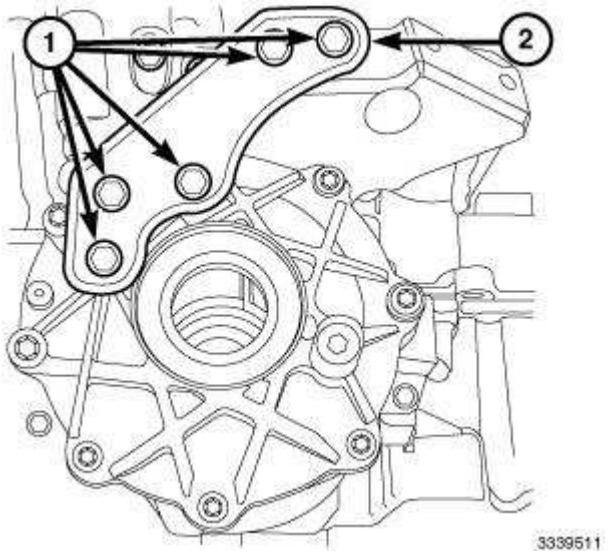


Fig. 288: Differential Support Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the differential support bracket (2), install the retaining bolts (1) and tighten to 28 N.m

(21 ft. lbs.).

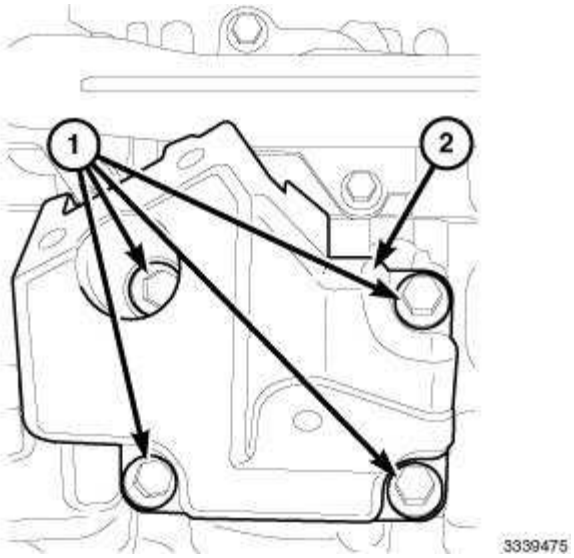


Fig. 289: Engine Mount Isolator Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left Engine Mount Isolator Bracket;

3. Position the engine mount isolator bracket (2), install the retaining bolts (1) and tighten to 61 N.m (45 ft. lbs.).

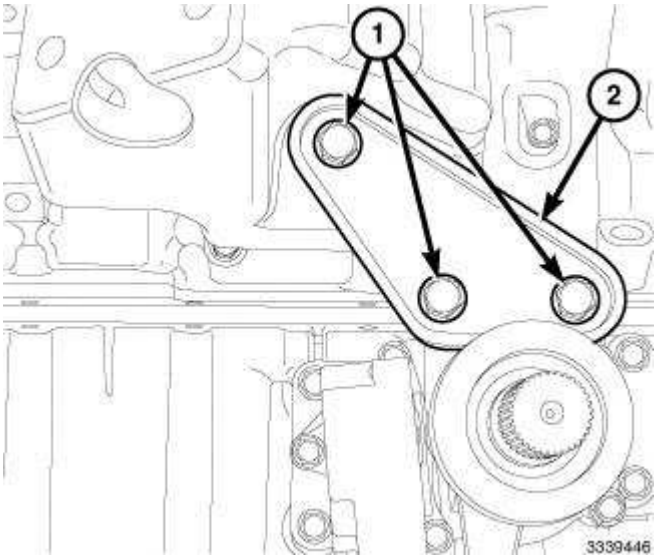


Fig. 290: Differential Support Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Position the differential support bracket (2), install the retaining bolts (1) and tighten to 28 N.m (21 ft. lbs.).
5. Install both left/right engine mount isolators, in the below procedure. Refer to **ENGINE MOUNT**

ISOLATORS.

ENGINE MOUNT ISOLATORS

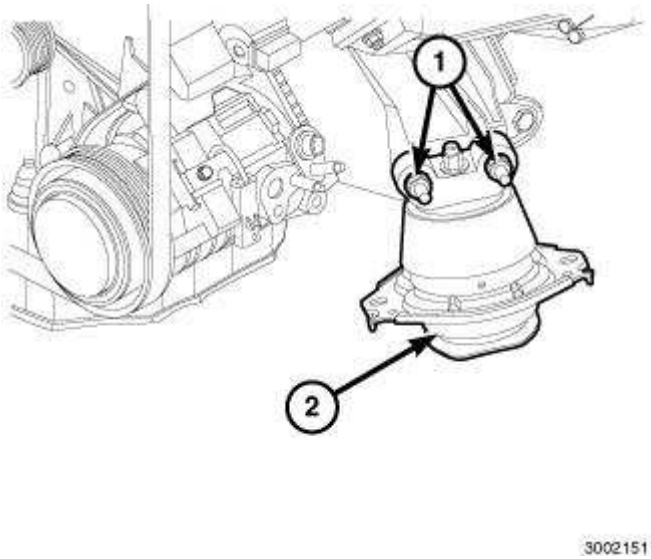


Fig. 291: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

1. Position both left/right engine mount isolators (2), install the retaining bolts (1) and tighten to 61 N.m (45 ft. lbs.).
2. Lower the vehicle.

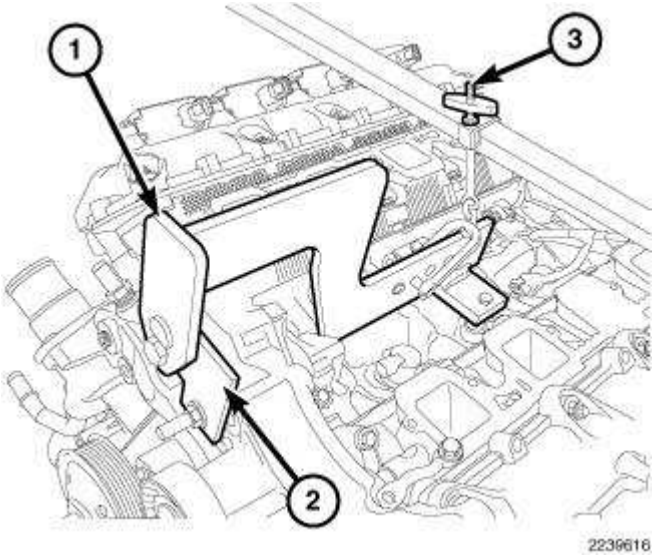


Fig. 292: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

3. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3), lower the engine until the engine mounts are seated onto the engine cradle.

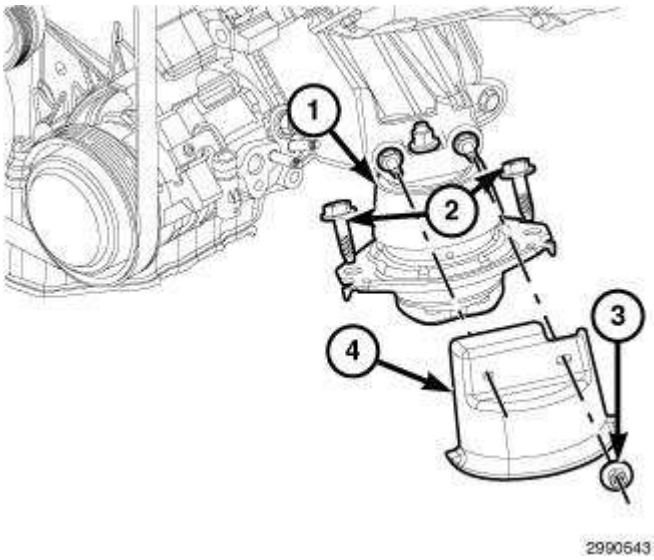


Fig. 293: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

4. Install both left/right engine mount isolators to engine cradle retaining bolts (2) and tighten to 61 N.m (45 ft. lbs.).
5. Position both left/right engine mount heat shields (4), install the retaining nuts (3) and tighten to 25 N.m (18 ft. lbs.).

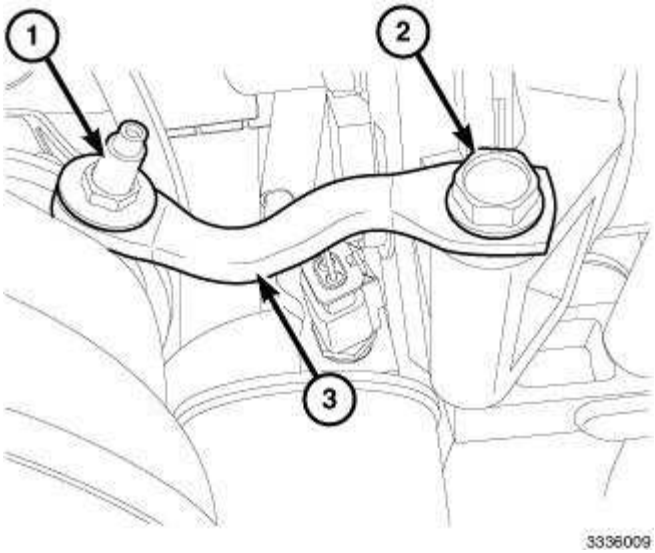


Fig. 294: Engine Mount Isolator Retaining Nut, Generator Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Raise and support the vehicle.
7. Install the engine oil filter. Refer to **FILTER, ENGINE OIL, INSTALLATION, 5.7L**.
8. Position the generator support bracket (3), install the engine mount isolator retaining nut (1) finger tight.
9. Install the generator support bracket retaining bolt (2) and tighten to 65 N.m (48 ft. lbs.).
10. Tighten the generator support bracket to engine mount isolator retaining nut (1) to 25 N.m (18 ft. lbs.).

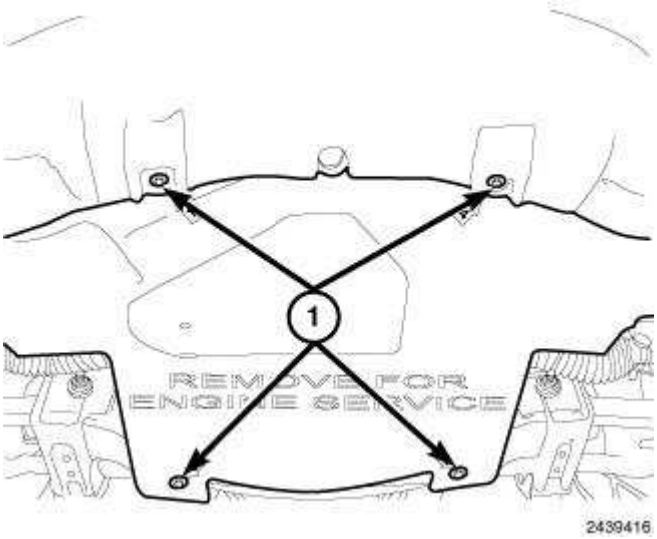


Fig. 295: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Install both left/right front axle half shafts. Refer to **INSTALLATION** and **INSTALLATION** .
12. Position the belly pan and install the belly pan retainers (1).
13. Lower the vehicle.

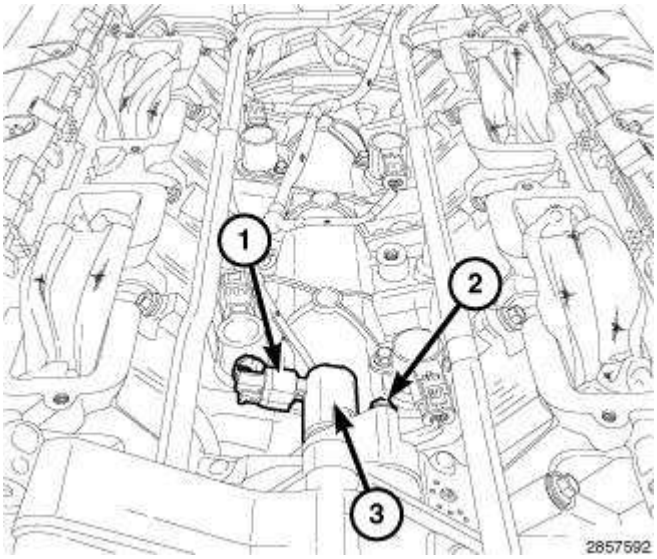


Fig. 296: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Position the engine oil dipstick tube and install retaining nut at the exhaust manifold.
15. Position the OCV (3), install the retaining bolt (2) and tighten to 11 N.m (8 ft. lbs.).
16. Connect OCV electrical connector (1).
17. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

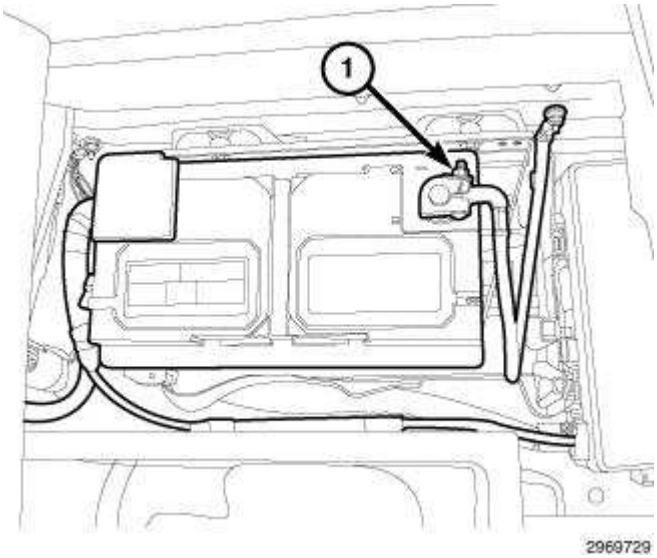


Fig. 297: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

18. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

AUTOMATIC TRANSMISSION

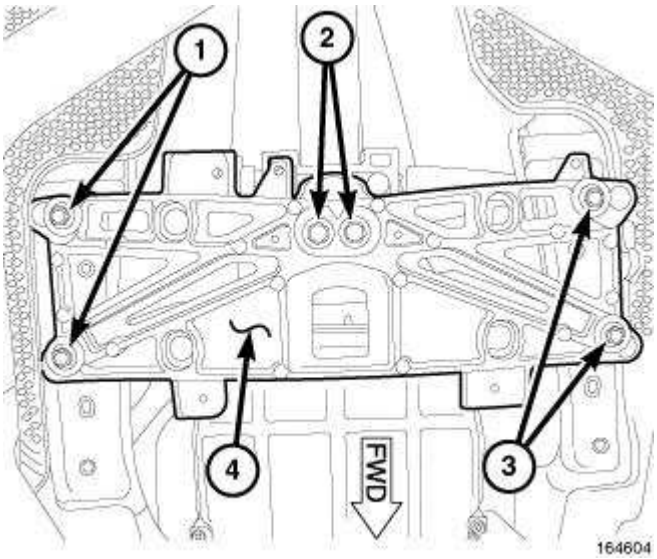


Fig. 298: Rear Cross Member & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator bolts (2).
4. Remove the rear cross member retaining bolts (1, 3) and remove the cross member (4).

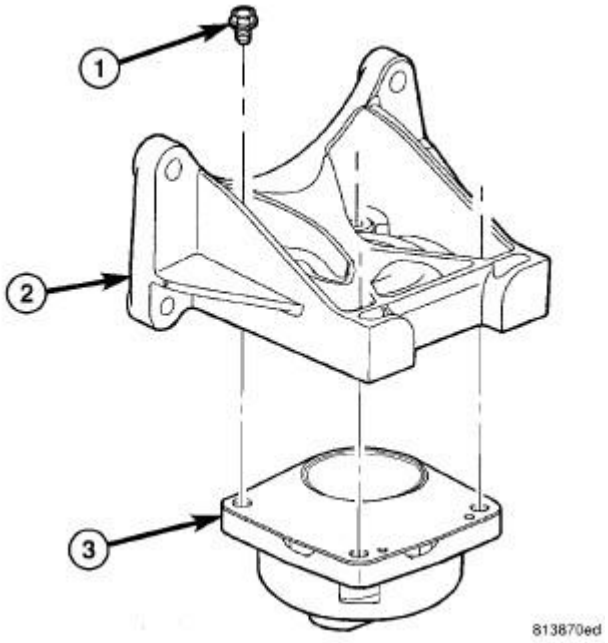
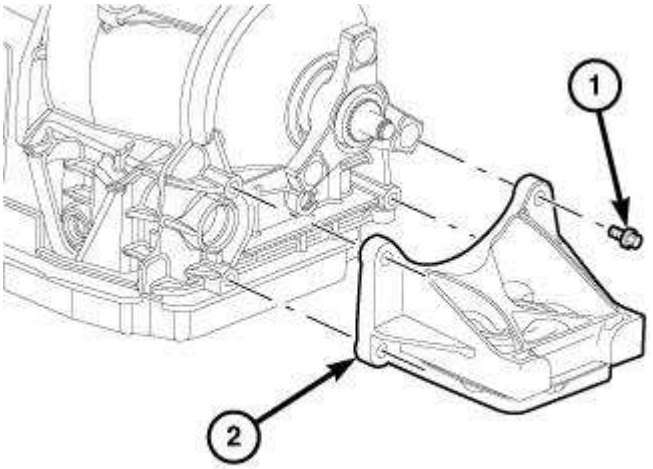


Fig. 299: Rear Transmission Mount Isolator
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear transmission mount isolator (3) retaining bolts (1) and remove the isolator.

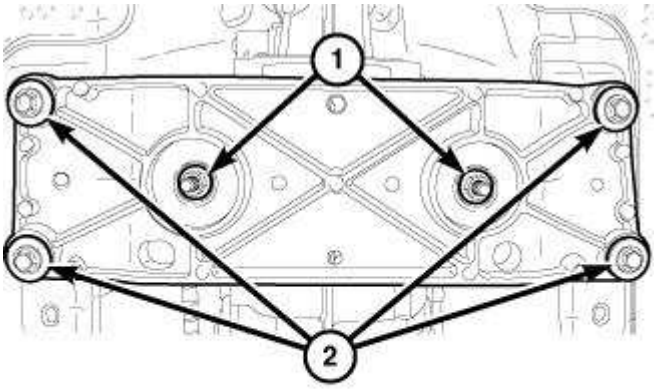


4847

Fig. 300: Rear Transmission Mount Bracket
Courtesy of CHRYSLER GROUP, LLC

6. If required, remove the rear transmission mount bracket (2) retaining bolts (1) and remove the bracket.

MANUAL TRANSMISSION

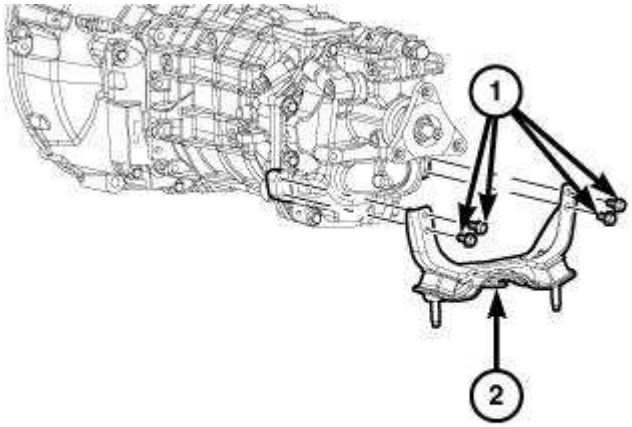


2991684

Fig. 301: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.

2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator nuts (1).
4. Remove the rear cross member retaining bolts (2) and remove the cross member.



2992304

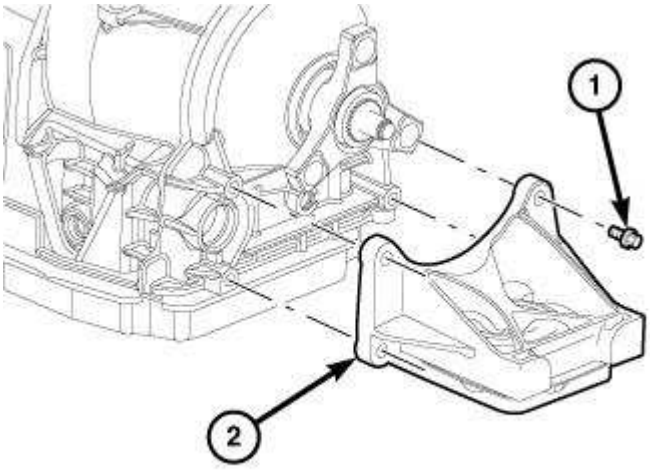
Fig. 302: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear transmission mount isolator (2) retaining bolts (1) and remove the isolator.

INSTALLATION

INSTALLATION

AUTOMATIC TRANSMISSION



4847

Fig. 303: Rear Transmission Mount Bracket

Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the rear transmission mount bracket (2), install the retaining bolts (1) and tighten to 68 N.m (50 ft. lbs.).

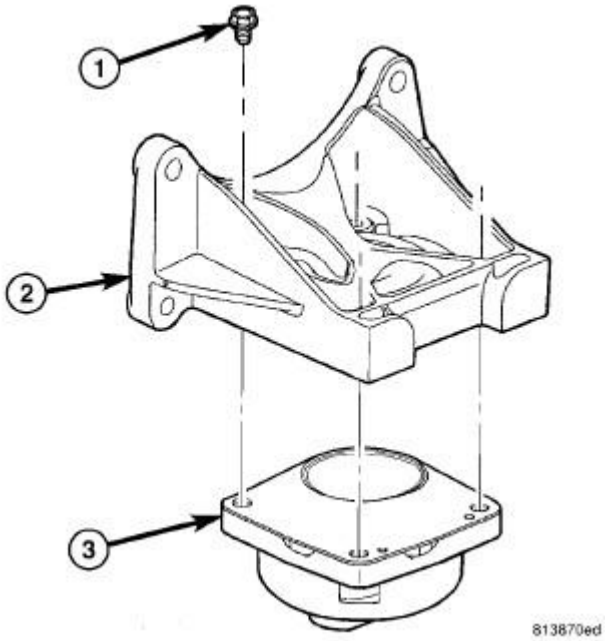


Fig. 304: Rear Transmission Mount Isolator
Courtesy of CHRYSLER GROUP, LLC

2. Position the rear transmission mount isolator (3) to the rear transmission mount bracket (2), install the retaining bolts (1) and tighten to 33 N.m (24 ft. lbs.).

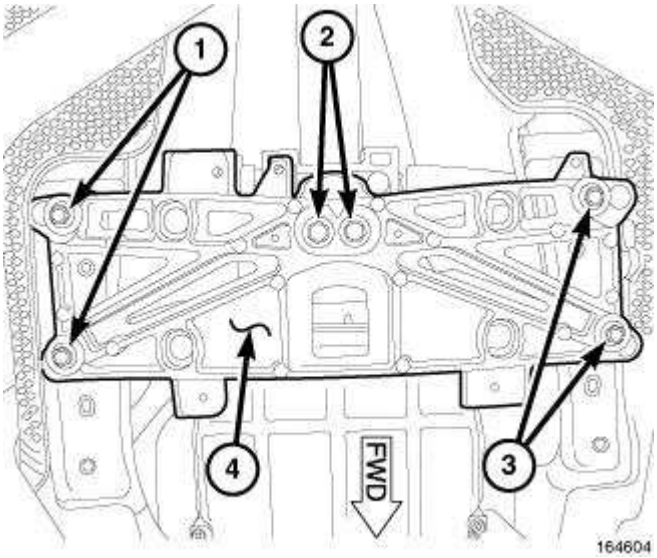
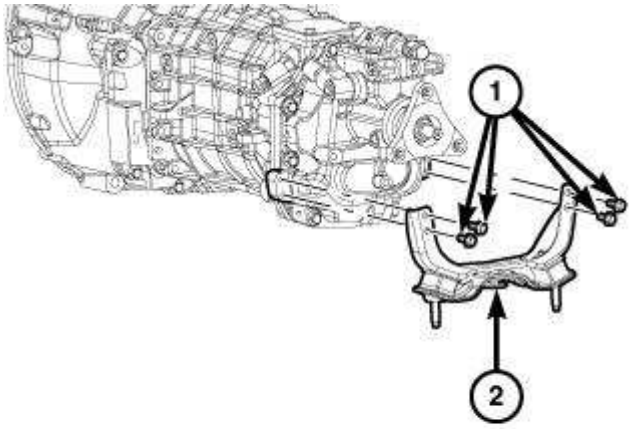


Fig. 305: Rear Cross Member & Bolts

Courtesy of CHRYSLER GROUP, LLC

3. Position the transmission crossmember (4), install the retaining bolts (1, 3) finger tight.
4. Install the rear transmission mount isolator retaining bolts (2) finger tight.
5. Tighten the transmission crossmember retaining bolts (1, 3) to 68 N.m (50 ft. lbs.).
6. Lower the transmission and remove the jack.
7. Tighten the rear transmission mount isolator retaining bolts (2) to 47 N.m (35 ft. lbs.).

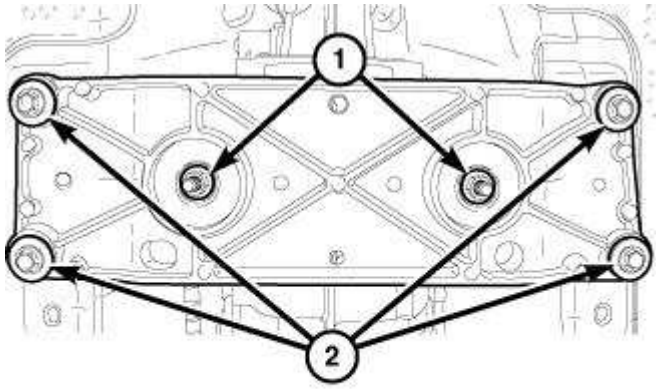
MANUAL TRANSMISSION



2992304

Fig. 306: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear transmission mount isolator (2), install the retaining bolts (1) and tighten to 68 N.m (50 ft. lbs.).



2991684

Fig. 307: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the rear cross member, install the retaining bolts (2) finger tight.
3. Install the rear transmission mount isolator nuts (1) finger tight.
4. Tighten the transmission crossmember retaining bolts (2) to 68 N.m (50 ft. lbs.).
5. Lower the transmission and remove the jack.
6. Tighten the rear transmission mount isolator retaining nuts (1) to 47 N.m (35 ft. lbs.).

LUBRICATION

DESCRIPTION

DESCRIPTION

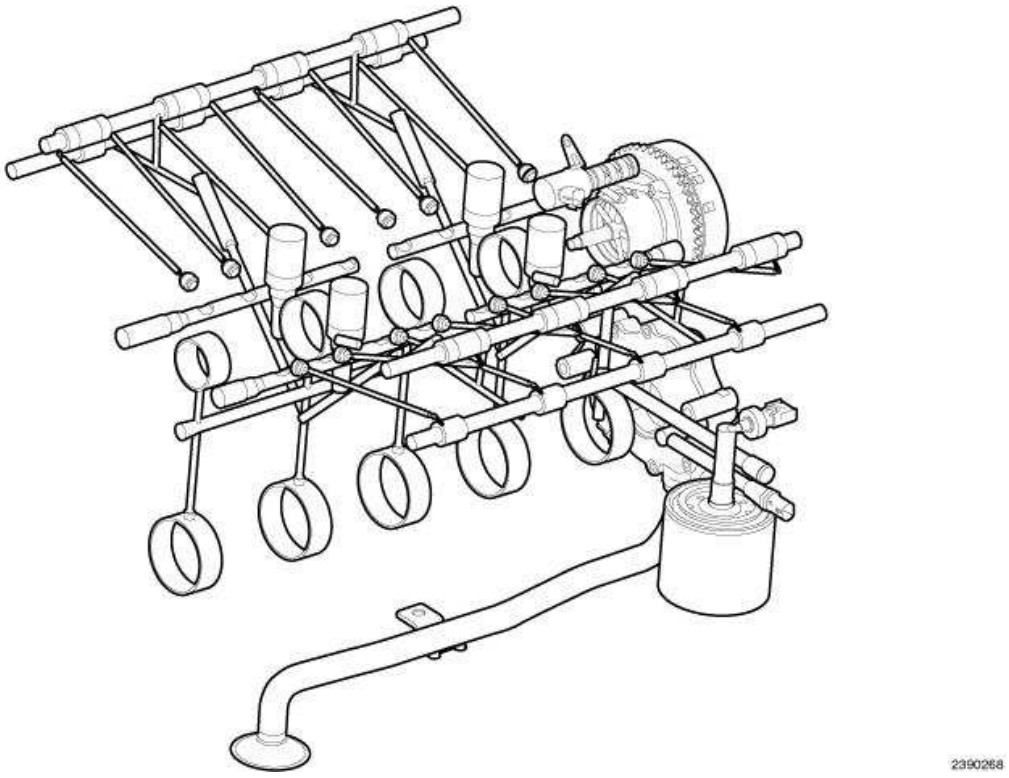


Fig. 308: 5.7L MDS Lubrication System
Courtesy of CHRYSLER GROUP, LLC

The 5.7L MDS lubrication system is a full flow filtration pressure feed type.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove the oil pressure sending unit and install gauge assembly (special tool #C-3292A,

Gauge, Pressure).

2. Run the engine until thermostat opens.
3. Oil Pressure:
   - Curb Idle-25 kPa (4 psi) minimum
   - 3000 rpm-170 - 758 kPa (25 - 110 psi)
4. If oil pressure is 0 at idle, shut off engine. Check for a clogged oil pick-up screen or a pressure relief valve stuck open.

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of the oil leak. If the oil leak is found and identified, repair per service information instructions.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

   If the oil leak source is not positively identified at this time , proceed with the AIR LEAK DETECTION TEST METHOD below.

AIR LEAK DETECTION TEST METHOD

1. Remove the PCV valve from the IAFM. Cap or plug the PCV valve grommet.
2. Attach an air hose with a pressure gauge and regulator to the dipstick tube.

   CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
4. If the leakage occurs at the rear oil seal area, refer to the information, INSPECTION FOR REAR SEAL AREA LEAK below.
5. If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve.
6. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various

speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect the battery.
2. Raise the vehicle.
3. Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak:
    1. Circular spray pattern generally indicates seal leakage or crankshaft damage.
    2. Where leakage tends to run straight down, possible causes are a porous block, distributor seal, camshaft bore cup plugs oil gallery pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

    CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

    CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

CONTROL VALVE, OIL INTAKE

DESCRIPTION

DESCRIPTION

The 5.7L engine is equipped with Variable Valve Timing (VVT). This system uses an oil control valve to direct oil pressure into the camshaft phaser assembly. The camshaft phaser assembly advances

and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The oil control valve is located under the intake manifold.

OPERATION

OPERATION

The Variable Valve Timing (VVT) assembly is actuated with engine oil pressure. The oil flow to the VVT assemblies are controlled by an Oil Control Valve (OCV). The OCV consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the OCV to control oil flow through the spool valve into the VVT assemblies. The VVT assembly consists of a rotor, stator, and sprocket. The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VVT assembly rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable valve timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

REMOVAL

REMOVAL

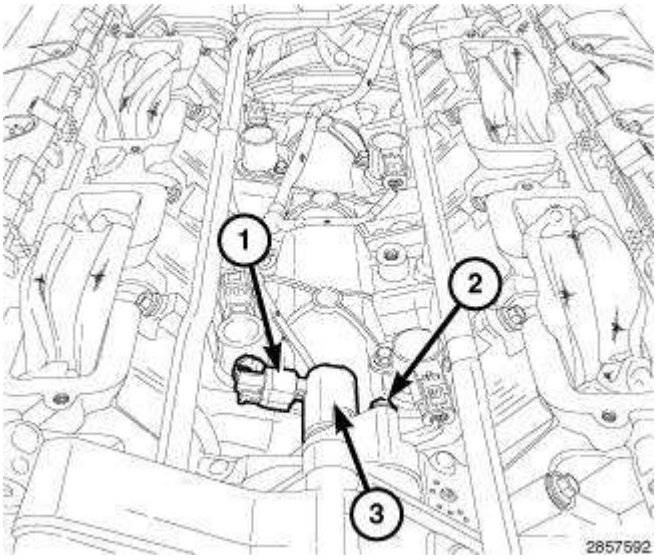


Fig. 309: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Oil Control Valve (OCV) (3) is located under the intake manifold.

1. Remove intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.
2. Disconnect OCV electrical connector (1).
3. Remove OCV retaining bolt (2).

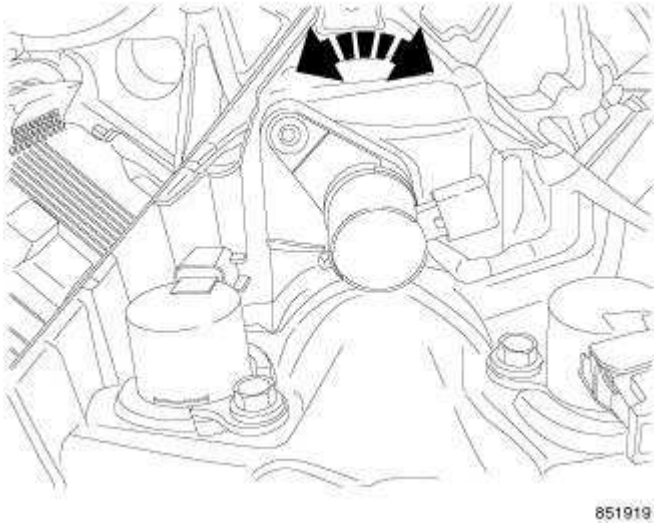


Fig. 310: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove the oil control valve, the engine must be at room temperature.

4. Rotate the OCV to break the seal and remove.

INSTALLATION

INSTALLATION

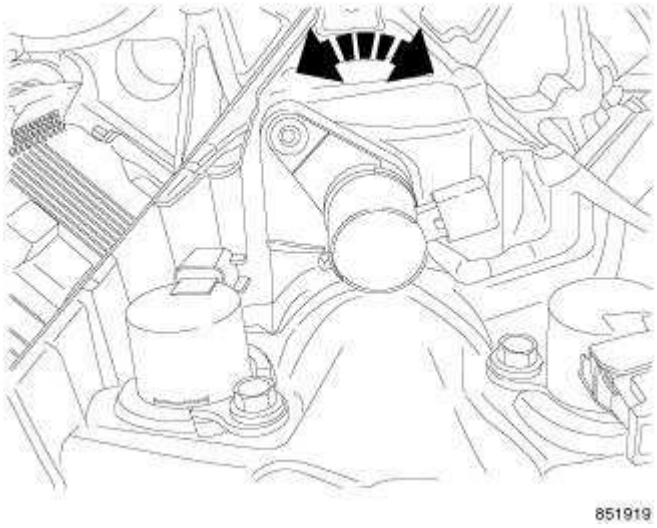


Fig. 311: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the oil control valve (OCV) rubber O-ring seal with clean engine oil.
2. Install the OCV and rotate into position.

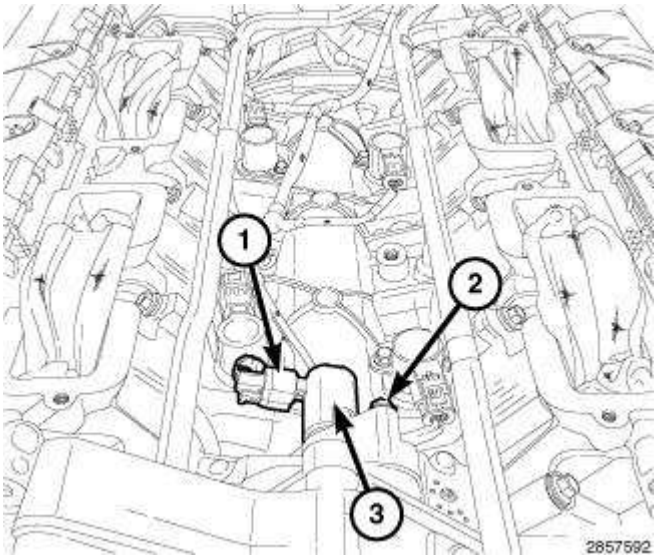


Fig. 312: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the OCV (3) retaining bolt (2) and tighten to 11 N.m (8 ft. lbs.).
4. Connect the OCV electrical connector (1).
5. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

COOLER AND LINES, OIL

DESCRIPTION

DESCRIPTION

An engine oil cooler is used on the 5.7L engine, equipped with the police package. The cooler is a coolant-to-oil type and mounted between the oil filter and oil filter adapter.

REMOVAL

REMOVAL

1. Raise vehicle on hoist.
2. Drain cooling system. Refer to **STANDARD PROCEDURE** .
3. Disconnect oil cooler coolant hoses.
4. Remove oil filter.
5. Remove oil cooler connector bolt.
6. Remove oil cooler.

INSTALLATION

INSTALLATION

1. Replace oil cooler seal.
2. Lubricate seal and position oil cooler to oil filter adapter, aligning notch to tab.
3. Install oil cooler connector bolt. Torque connector bolt to 55 N.m (41 ft. lbs.).
4. Install oil filter.
5. Connect oil cooler coolant hoses.
6. Lower vehicle.
7. Fill cooling system. Refer to **STANDARD PROCEDURE** .

FILTER, ENGINE OIL

REMOVAL

REMOVAL

All engines are equipped with a high quality full-flow, disposable type oil filter.

1. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .
2. Position a drain pan under the oil filter.
3. Using a suitable oil filter wrench loosen filter.
4. Rotate the oil filter counterclockwise to remove it from the cylinder block oil filter boss.
5. When filter separates from cylinder block oil filter boss, tip gasket end upward to minimize oil spill. Remove filter from vehicle.

NOTE: Make sure filter gasket was removed with filter.

6. With a wiping cloth, clean the gasket sealing surface of oil and grime.

INSTALLATION

INSTALLATION

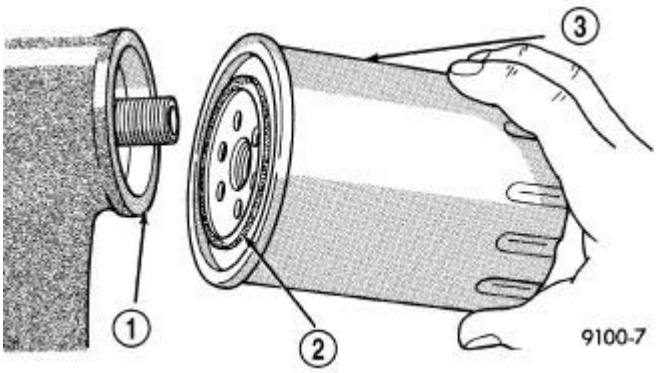


Fig. 313: Installing Engine Oil Filter
Courtesy of CHRYSLER GROUP, LLC

1 - SEALING SURFACE
2 - RUBBER GASKET
3 - OIL FILTER

1. Lightly lubricate oil filter gasket (2) with engine oil.
2. Thread filter onto adapter nipple. When gasket makes contact with sealing surface, hand tighten filter one half turn, or 180°, do not over tighten.
3. Add oil, verify crankcase oil level and start engine. Inspect for oil leaks.
4. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL SERVICE

The engine oil level indicator is located at the right hand of the engine on the 5.7L engines.

CRANKCASE OIL LEVEL INSPECTION

CAUTION: Do not overfill crankcase with engine oil, pressure loss or oil foaming can result.

Inspect engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about ten minutes before checking oil level. Checking engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil dipstick.

1. Position vehicle on level surface.
2. With engine OFF, allow approximately five minutes for oil to settle to bottom of crankcase, remove engine oil dipstick.
3. Wipe dipstick clean.
4. Install dipstick and verify it is seated in the tube.
5. Remove dipstick, with handle held above the tip, take oil level reading.
6. Add oil only if level is below the ADD mark on dipstick.

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in Maintenance Schedules. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

Run engine until achieving normal operating temperature.

1. Position the vehicle on a level surface and turn engine off.
2. Remove oil fill cap.
3. Hoist and support vehicle on safety stands.
4. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** .
5. Place a suitable drain pan under crankcase drain.
6. Remove drain plug from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug if damaged.
7. Install drain plug in crankcase. Torque to 27 N.m (20 ft. lbs.).
8. Lower vehicle and fill crankcase with specified type and amount of engine oil described in this information.
9. Install oil fill cap.
10. Start engine and inspect for leaks.
11. Stop engine and inspect oil level.
12. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .

NOTE: Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING at beginning of this information.

PAN, OIL

REMOVAL

REMOVAL

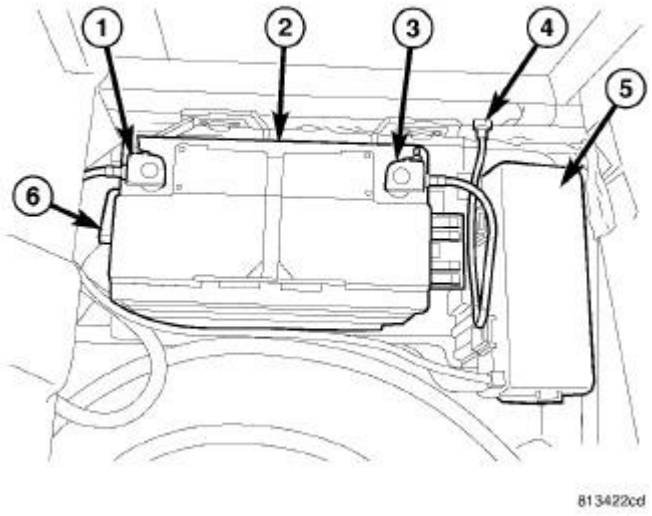


Fig. 314: Battery System Components & PDC Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (3).
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.
3. Raise and support the vehicle.

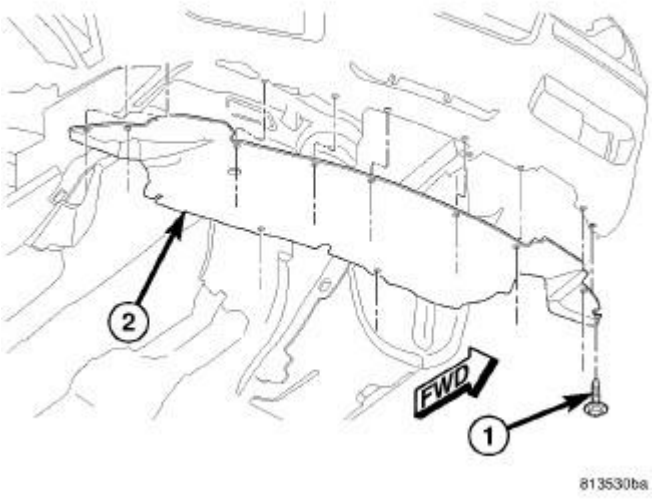


Fig. 315: Front Belly Pan & Screws
Courtesy of CHRYSLER GROUP, LLC

4. Remove the belly pan (2).
5. Drain the engine oil and remove the oil filter.

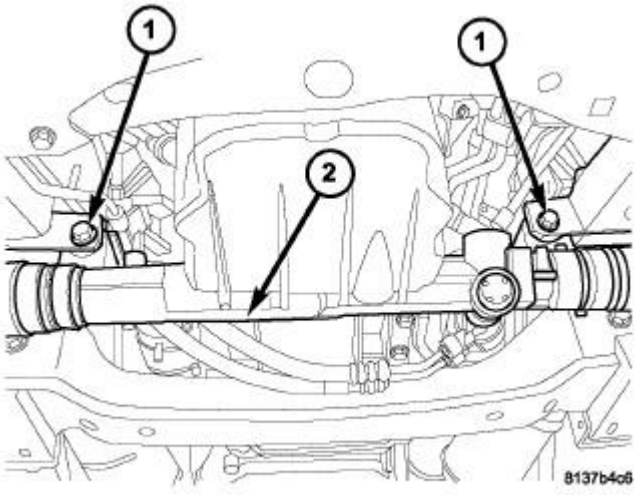


Fig. 316: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not remove P/S hoses, tie rod ends or disconnect steering column coupler.**

6. Remove the steering gear mounting bolts (1) and position the steering gear (2) aside.

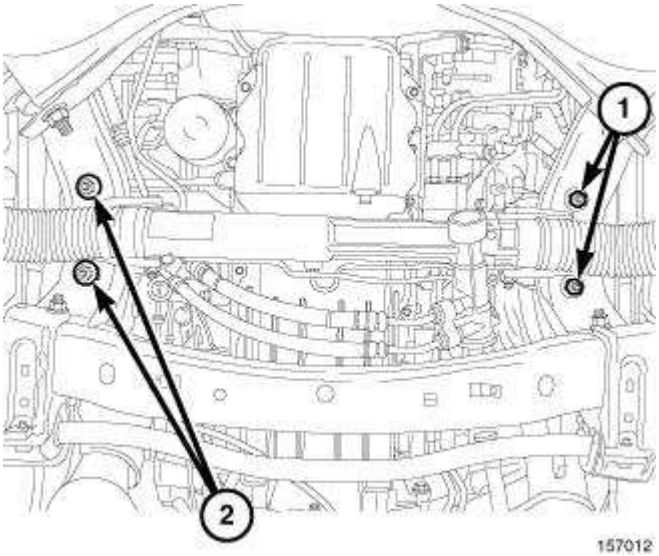


Fig. 317: Engine Mount Nuts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the engine mount nuts (1, 2).
8. Remove the engine oil dipstick and tube from the oil pan.
9. Lower the vehicle.

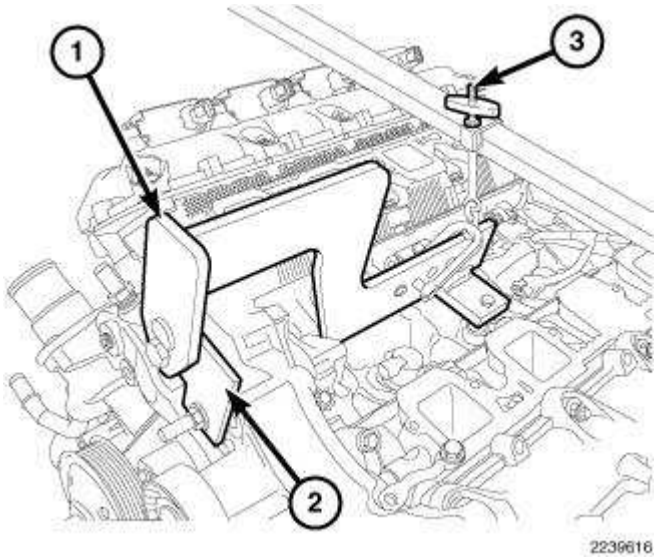


Fig. 318: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install engine lift fixture.

10. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
11. Raise the engine to provide clearance to remove the oil pan.

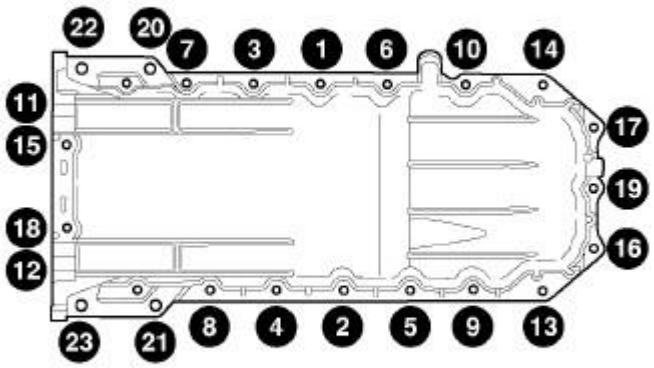


Fig. 319: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not pry on oil pan or oil pan gasket. The gasket is integral to engine windage tray and does not come out with oil pan.

NOTE: The horizontal M10 fasteners are 5 mm longer in length, and must be reinstalled in original locations.

12. Remove the M10 fasteners (vertical and horizontal) from the rear of the oil pan to the transmission.
13. Using the sequence shown in illustration, the oil pan mounting bolts and remove the oil pan.

NOTE: When the oil pan is removed a new oil pan gasket/windage tray assembly must be installed, the old gasket cannot be reused.

14. Remove and discard the integral windage tray and gasket.

INSTALLATION

INSTALLATION

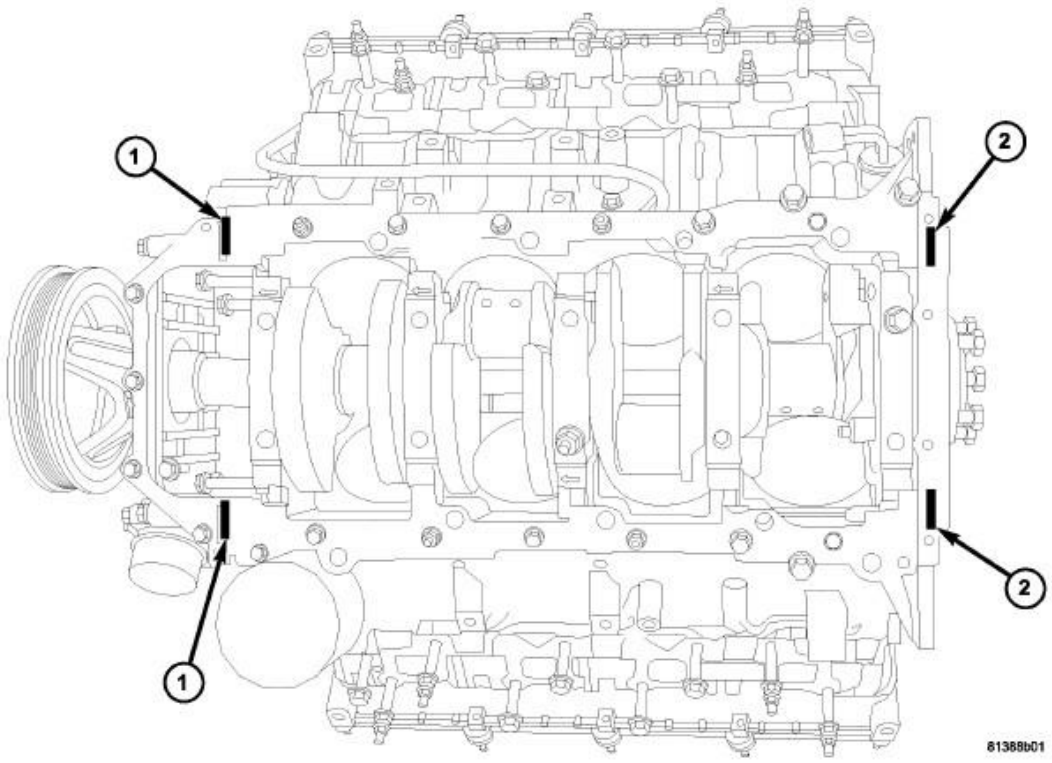


Fig. 320: T-Joint RTV Sealant Application Locations
Courtesy of CHRYSLER GROUP, LLC

1 - Front Cover T-Joints
2 - Rear Oil Retainer T-Joints

1. Clean the oil pan gasket mating surface of the engine block and oil pan.

   NOTE: Mopar® Engine RTV must be applied to the 4 T-joints, (area where the front cover, rear retainer and oil pan gasket meet). The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the 4 T-joint locations.

2. Apply Mopar® Engine RTV at the 4 T- joints (1, 2).

   NOTE: When the oil pan is removed, a new oil pan gasket/windage tray assembly must be installed, the old gasket cannot be reused.

3. Install a new oil pan gasket/windage tray assembly.
4. If removed, reinstall the oil pump pickup tube with a new O-ring and tighten the pickup tube retainers to 28 N.m (21 ft. lbs.).

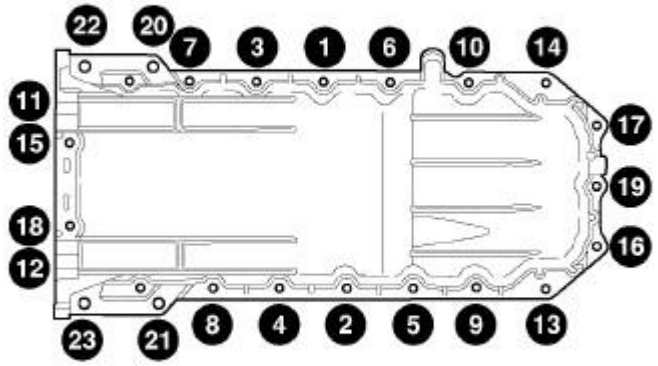


Fig. 321: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: The horizontal M10 fasteners are 5 mm longer in length, and must be reinstalled in original locations.

NOTE: New M6 fasteners must be used when reinstalling the oil pan. Do not reuse the old M6 fasteners.

5. Align the rear of the oil pan with the rear face of the engine block and install the M10 and M6 oil pan retainers finger tight.
6. Using the sequence shown in illustration, tighten the M6 bolts to 5 N.m (44 in. lbs.).
7. Using the sequence shown in illustration, tighten the M10 bolts to 54 N.m (39 ft. lbs.).
8. Using the sequence shown in illustration, tighten the M6 bolts to 12 N.m (9 ft. lbs.).
9. Lower the vehicle.

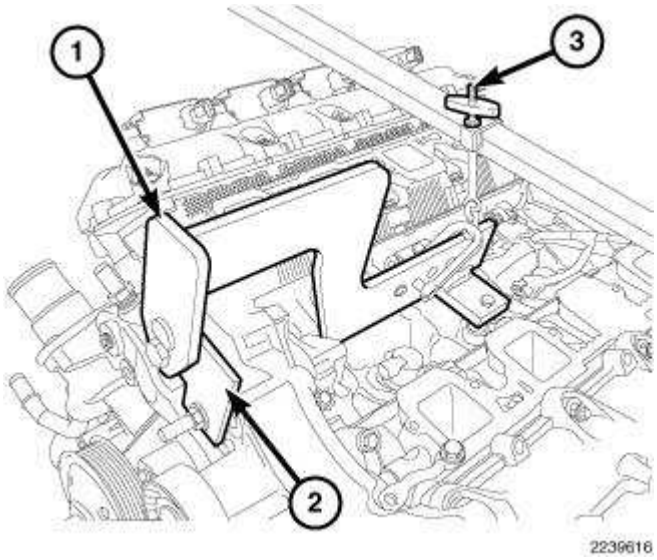


Fig. 322: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

10. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) lower the engine into position and remove.

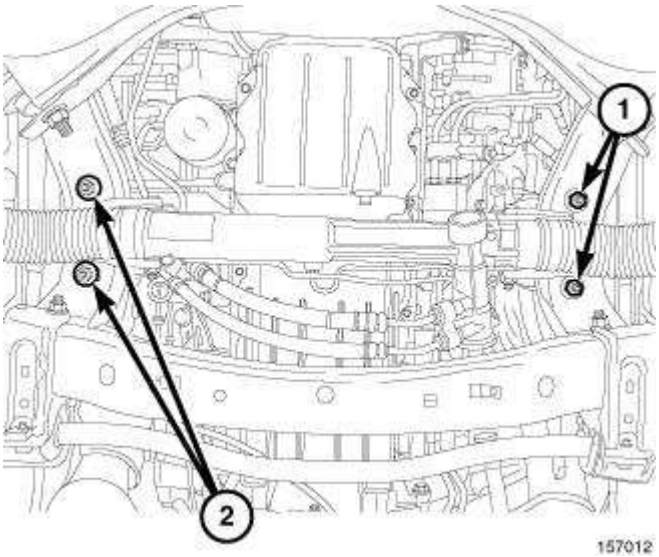


Fig. 323: Engine Mount Nuts
Courtesy of CHRYSLER GROUP, LLC

11. Raise and support the vehicle.
12. Install the engine mount nuts (1, 2) and tighten to 95 N.m (70 ft. lbs.).
13. Install the engine oil dipstick and tube.

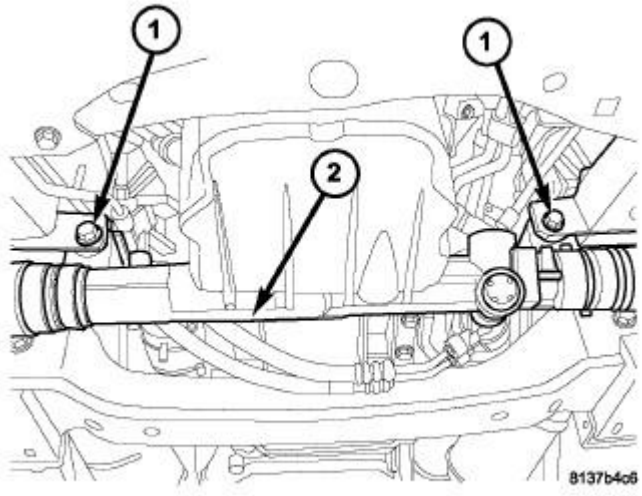


Fig. 324: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

14. Position the steering gear (2), install mounting bolts (1) and tighten to 95 N.m (70 ft. lbs.).
15. Lower the vehicle.
16. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.
17. Fill the engine oil.
18. Install the oil filter.

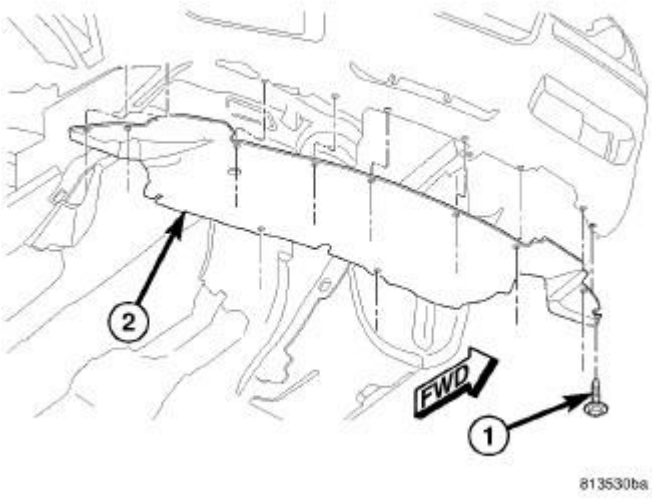


Fig. 325: Front Belly Pan & Screws
Courtesy of CHRYSLER GROUP, LLC

19. Install the belly pan (2).

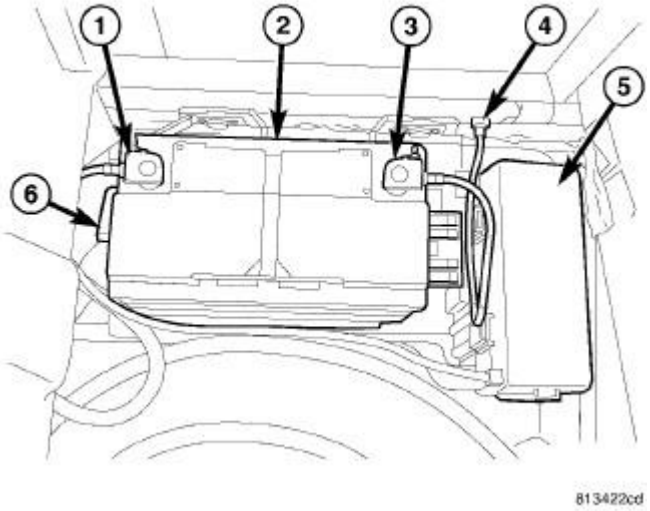


Fig. 326: Battery System Components & PDC Cover
Courtesy of CHRYSLER GROUP, LLC

20. Connect the negative battery cable (3).
21. Start engine and check for leaks.

PAN, OIL, AWD

REMOVAL

REMOVAL

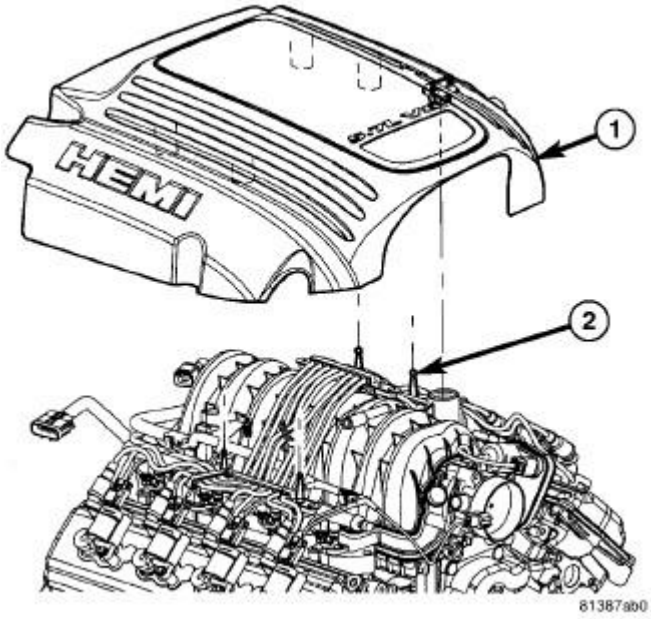


Fig. 327: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1 - Engine Cover
2 - Attaching Studs

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

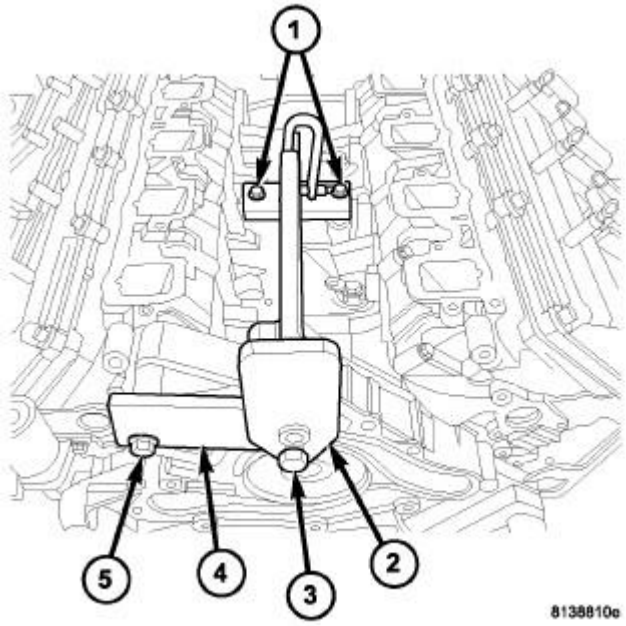


Fig. 328: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

1 - Bolts
2 - Engine Lift Fixture
3 - Adapter Bolt
4 - Adapter
5 - Adapter Nut

CAUTION: Never use air tools when installing fasteners to engine.

4. Install the engine lift fixture (2) special tool (special tool #8984B, Fixture, Engine Lifting) and adapter (special tool #8984-UPD, Adapter, Engine Lift).
5. Raise and support the vehicle.

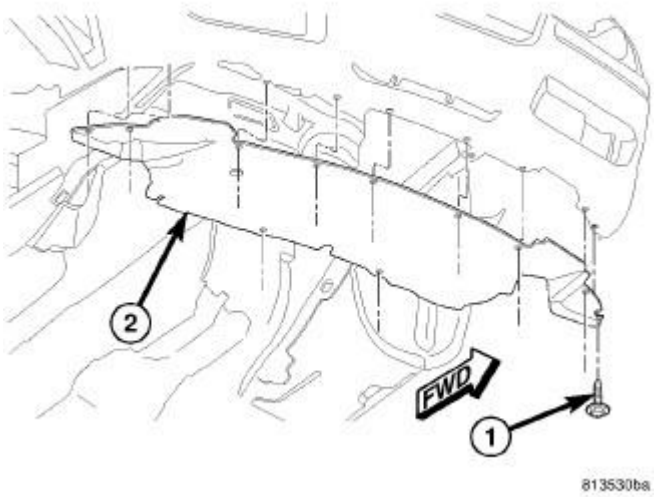


Fig. 329: Front Belly Pan & Screws
Courtesy of CHRYSLER GROUP, LLC

6. Remove the belly pan (2). Refer to **BELLY PAN, REMOVAL** .
7. Drain the engine oil and remove the oil filter.

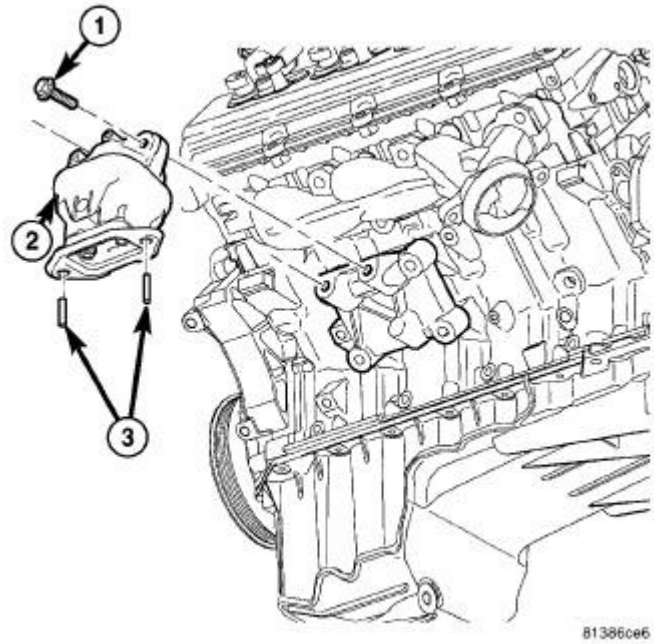


Fig. 330: LH Engine Hydromount & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1 - Bolt

2 - Hydromount
3 - Studs

NOTE: Left side engine mount shown in illustration, right side similar.

8. Remove both left and right side engine mount to frame fasteners.

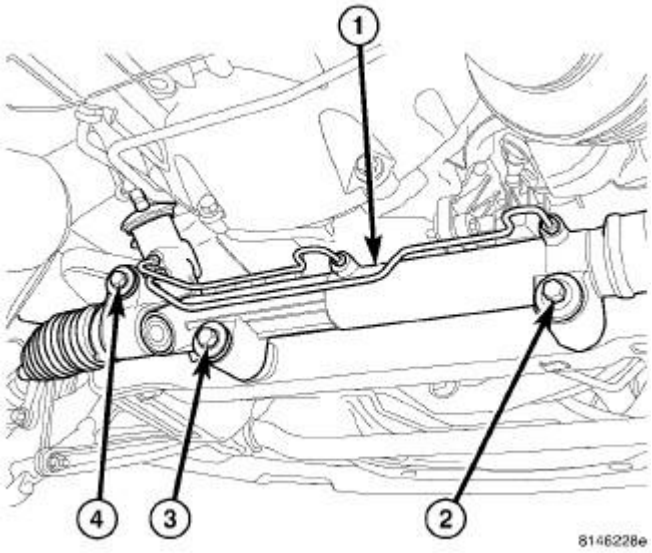


Fig. 331: Steering Gear & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not remove the P/S hoses, tie rod ends or disconnect steering column.

9. Remove the steering rack mounting bolts (2, 3, 4) and lower the steering rack (1).
10. Remove the engine oil dipstick and tube from the oil pan.
11. Remove the left and right side exhaust pipes at the exhaust manifolds. Refer to **CONVERTER, CATALYTIC, REMOVAL** .

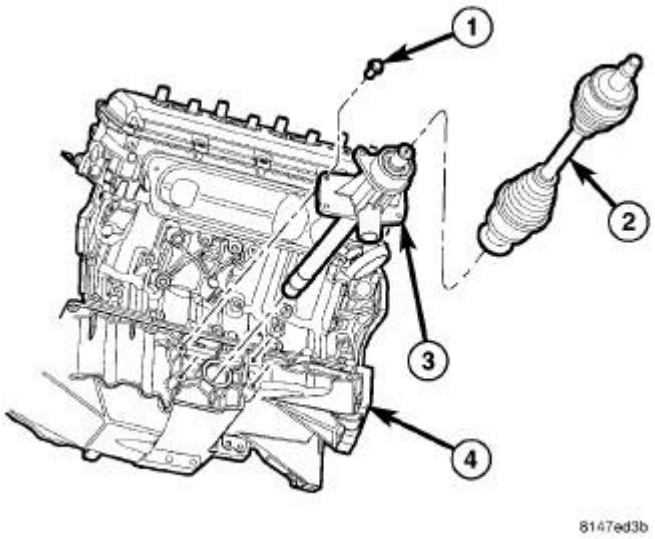


Fig. 332: Left Drive Axle & Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

1 - FASTENER
2 - LEFT FRONT DRIVE AXLE
3 - INTERMEDIATE SHAFT HOUSING
4 - OIL PAN

12. Mark the front driveshaft to the flange at both ends to ensure correct installation.
13. Remove the front drive shaft fasteners from the differential and transfer case and remove the driveshaft from the vehicle.
14. Remove the left (2) and right front drive axles.

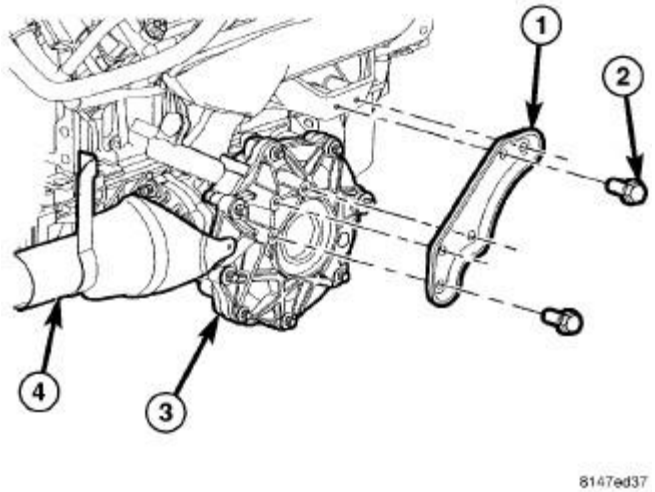


Fig. 333: Front Drive Axle Housing
Courtesy of CHRYSLER GROUP, LLC

1 - BRACKET
2 - BOLT
3 - DRIVE AXLE HOSING
4 - FRONT DRIVE SHAFT SHIELD

15. Remove the differential support bracket (1) from the differential to engine block.

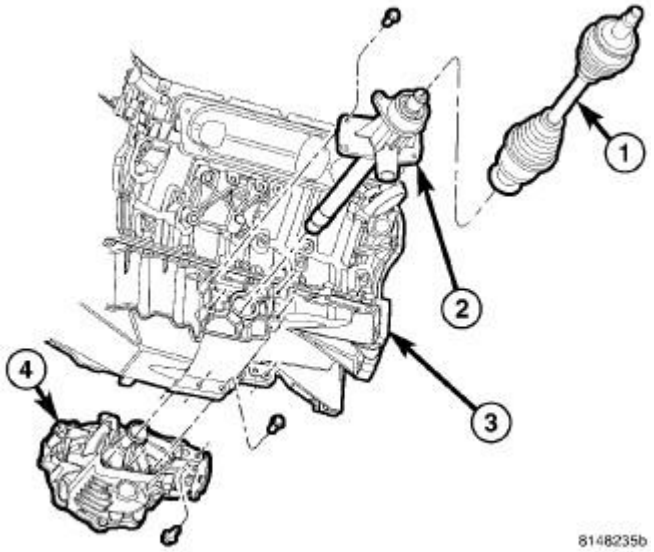


Fig. 334: Front Drive Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LEFT FRONT DRIVE AXLE
2 - INTERMEDIATE SHAFT
3 - OIL PAN
4 - FRONT DRIVE AXLE HOUSING

16. Remove the differential retaining bolts from the oil pan (3).
17. Rotate the differential (4) so the drive flange is facing forward and the oil pan side is facing up and remove the differential out through the opening at the rear of the cradle.

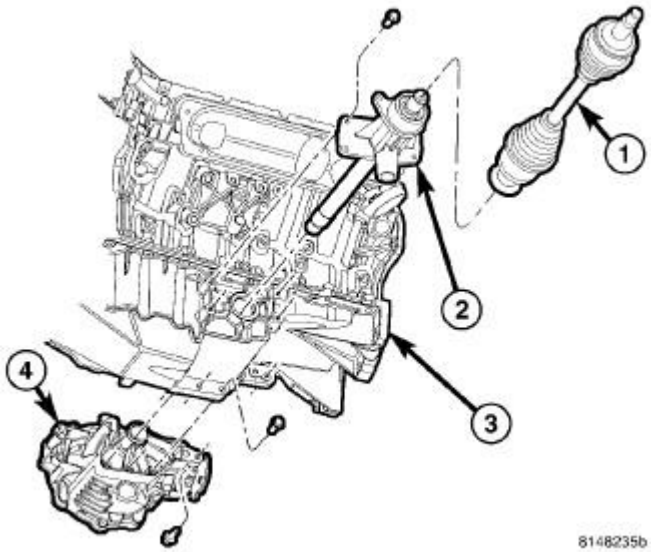


Fig. 335: Front Drive Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LEFT FRONT DRIVE AXLE
2 - INTERMEDIATE SHAFT
3 - OIL PAN
4 - FRONT DRIVE AXLE HOUSING

18. Remove the intermediate shaft (2) from the oil pan (3).
19. Lower the vehicle.

NOTE: Do not attempt to fasten the engine support fixture to vehicle body, or attach the third support leg to the radiator support.

20. Raise the engine using the engine support fixture (special tool #8534B, Fixture, Driveline Support) and adapter (special tool #8984-UPD, Adapter, Engine Lift) to gain clearance to remove oil pan.
21. Raise and support the vehicle.

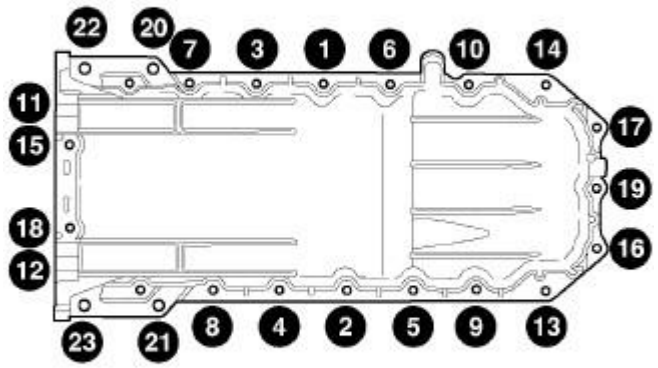


Fig. 336: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not pry on oil pan or oil pan gasket. Gasket is integral to the engine windage tray and does not come out with oil pan.

NOTE: The horizontal M10 fasteners are 5 mm longer in length, and must be reinstalled in the original locations.

22. Using the sequence shown in illustration, remove the M10 fasteners (vertical and horizontal) from the rear of the oil pan to the transmission and engine.
23. Using the sequence shown in illustration, remove the oil pan mounting bolts and oil pan.

NOTE: When the oil pan is removed, a new oil pan gasket/windage tray assembly must be installed. The old gasket cannot be reused.

24. Discard the integral windage tray and gasket.

INSTALLATION

INSTALLATION

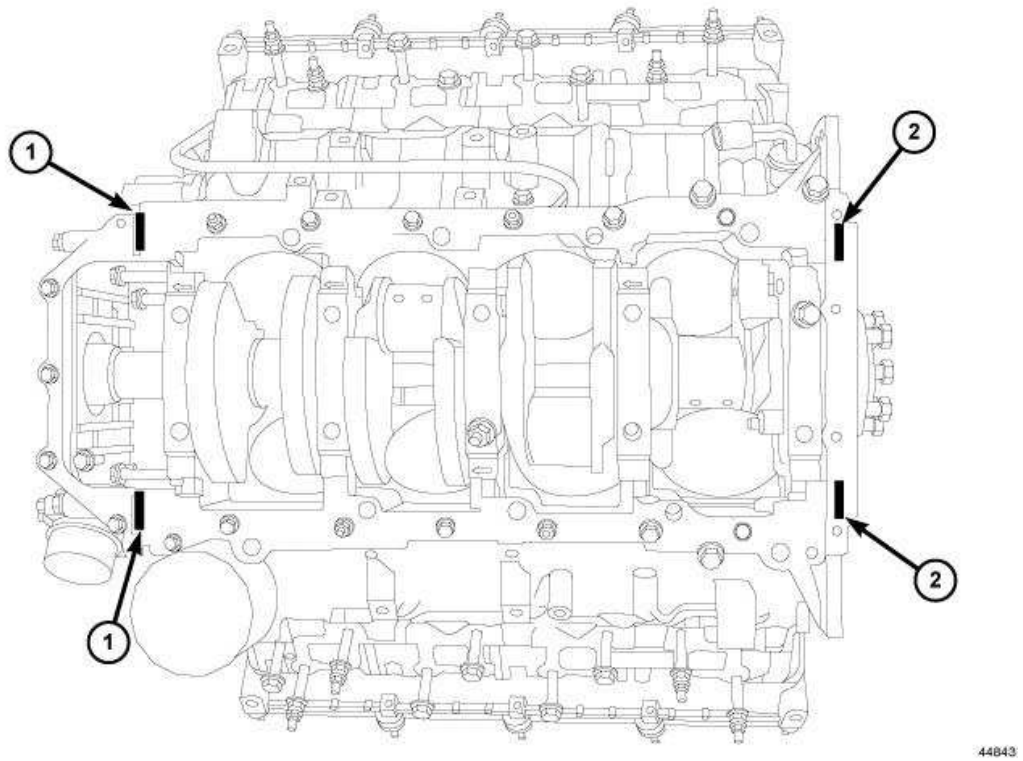


Fig. 337: T-Joint RTV Sealant Application Locations
Courtesy of CHRYSLER GROUP, LLC

1 - Front Cover T-Joints
2 - Rear Oil Retainer T-Joints

1. Clean the oil pan gasket mating surface of the block and oil pan.

NOTE: **Mopar® Engine RTV must be applied to the 4 T-joints, (area where front cover, rear retainer, block, and oil pan gasket meet). The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the 4 T-joint locations.**

2. Apply Mopar® Engine RTV at the 4 T- joints (1, 2).

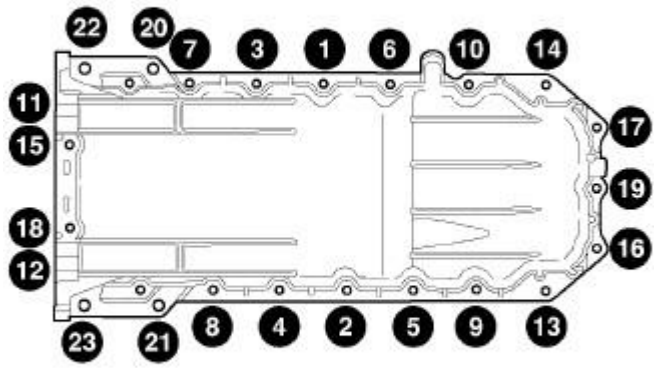


Fig. 338: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed, a new oil pan gasket/windage tray assembly must be installed. The old gasket cannot be reused.

3. Install a new oil pan gasket/windage tray assembly.
4. If removed, install the oil pump pickup tube with a new O-ring and tighten retainers to 28 N.m (21 ft. lbs.).

NOTE: The horizontal M10 fasteners are 5 mm longer in length, and must be reinstalled in original locations.

NOTE: New M6 fasteners must be used when reinstalling the oil pan. Do not reuse the old M6 fasteners.

5. Align the rear of the oil pan with the rear face of the engine block, and install the M10 and M6 oil pan retainers finger tight. Using the sequence shown in illustration, tighten the M6 mounting bolts to 5 N.m (44 in. lbs.).
6. Using the sequence shown in illustration, tighten the M10 oil pan retainers to 54 N.m (40 ft. lbs.).
7. Using the sequence shown in illustration, tighten the M6 oil pan retainers to 12 N.m (9 ft. lbs.).

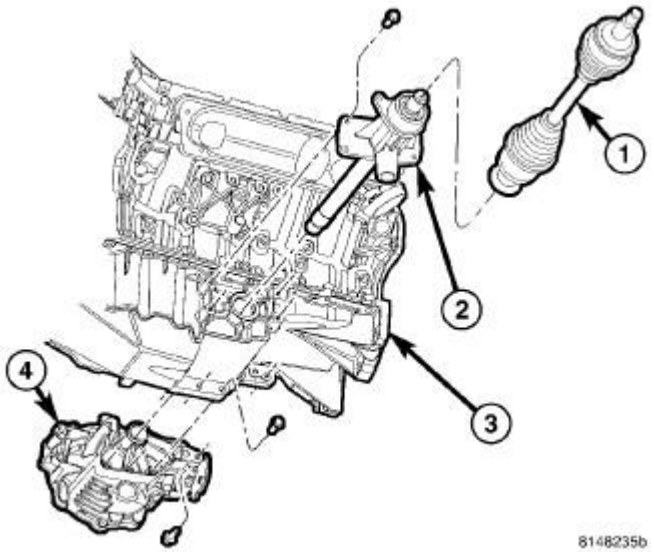


Fig. 339: Front Drive Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LEFT FRONT DRIVE AXLE
2 - INTERMEDIATE SHAFT
3 - OIL PAN
4 - FRONT DRIVE AXLE HOUSING

8. Install the intermediate shaft (2) to the oil pan (3) and tighten retainers to 28 N.m (21 ft. lbs).

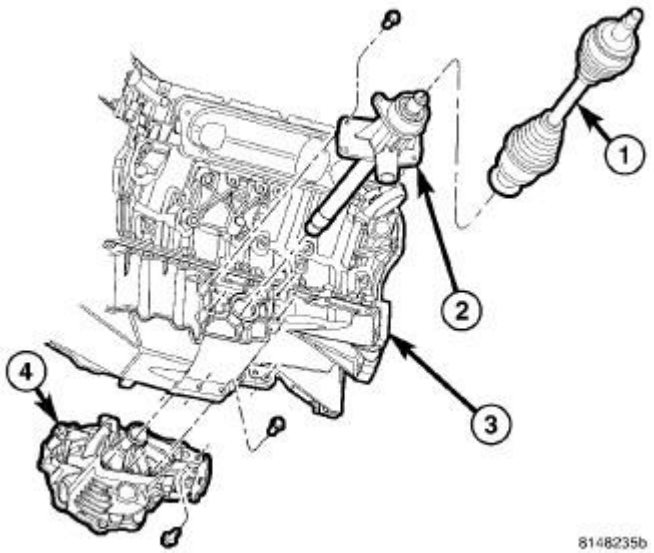


Fig. 340: Front Drive Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LEFT FRONT DRIVE AXLE
2 - INTERMEDIATE SHAFT
3 - OIL PAN
4 - FRONT DRIVE AXLE HOUSING

9. Install the front differential through the opening at the rear of the cradle and attach to the oil pan.
10. Fasten the differential (4) to the oil pan (3) and tighten to 65 N.m (48 ft. lbs).

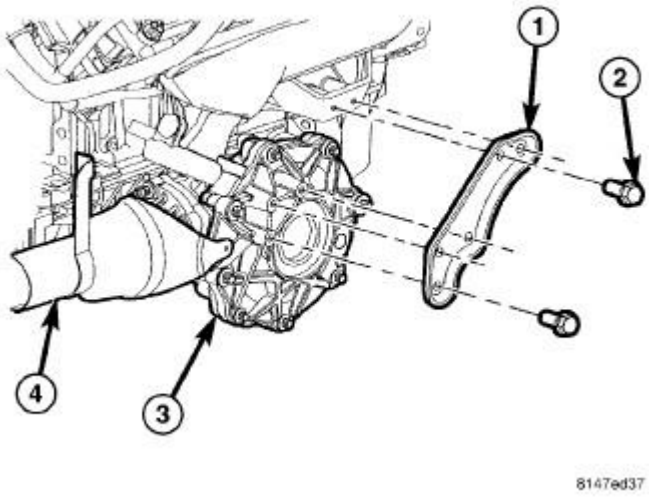


Fig. 341: Front Drive Axle Housing
Courtesy of CHRYSLER GROUP, LLC

1 - BRACKET
2 - BOLT
3 - DRIVE AXLE HOSING
4 - FRONT DRIVE SHAFT SHIELD

11. Install the differential support bracket (1) to the differential and engine block.

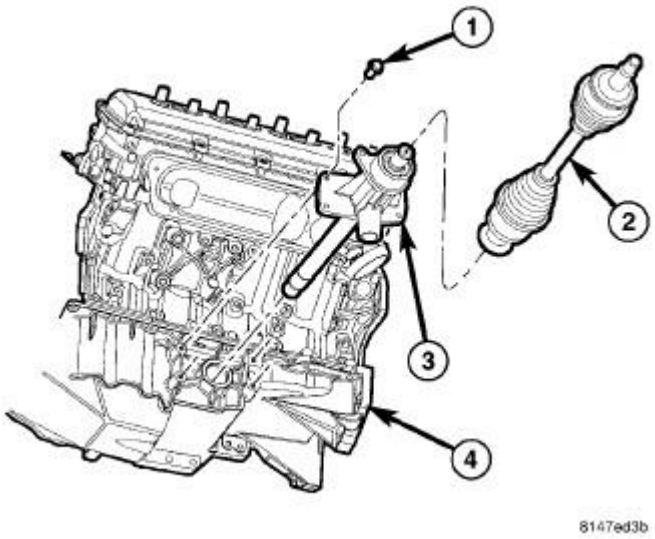


Fig. 342: Left Drive Axle & Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

1 - FASTENER
2 - LEFT FRONT DRIVE AXLE
3 - INTERMEDIATE SHAFT HOUSING
4 - OIL PAN

12. Install the left (2) and right front drive axles. Refer to **INSTALLATION** and **INSTALLATION** .
13. Install the front drive shaft into the differential and transfer case. Refer to **INSTALLATION** .
14. Install the engine oil dipstick and tube.

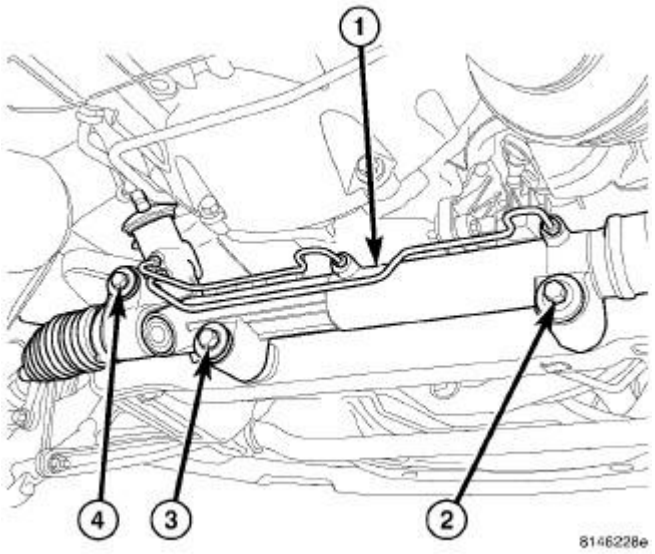


Fig. 343: Steering Gear & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install the steering gear (1). Refer to **GEAR, INSTALLATION** .
16. Lower the engine into the mounts using engine lift fixture (special tool #8534B, Fixture, Driveline Support).
17. Install both the left and right side engine mount studs and nuts.

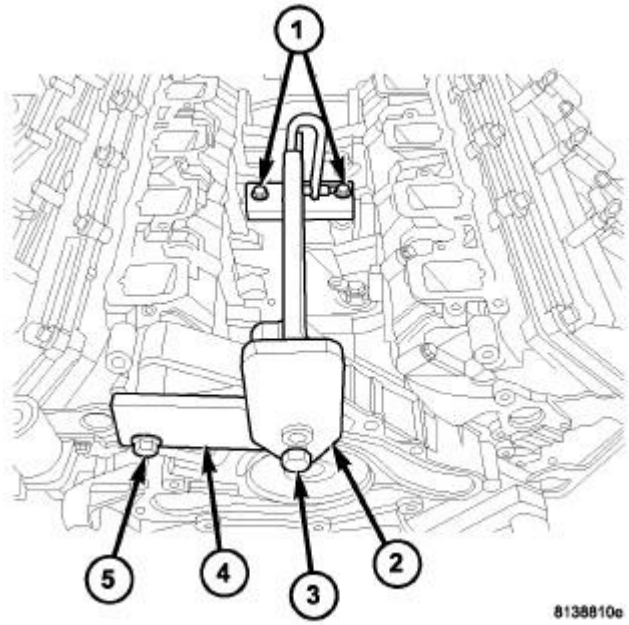


Fig. 344: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

1 - Bolts
2 - Engine Lift Fixture
3 - Adapter Bolt
4 - Adapter
5 - Adapter Nut

18. Remove the engine lift fixture (special tool #8534B, Fixture, Driveline Support) and adapter (special tool #8984-UPD, Adapter, Engine Lift).
19. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.
20. Install the left and right side exhaust pipes at the manifolds. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .
21. Fill the engine with oil.
22. Install the oil filter, if removed.
23. Connect the negative battery cable.

24. Start the engine and check for leaks.

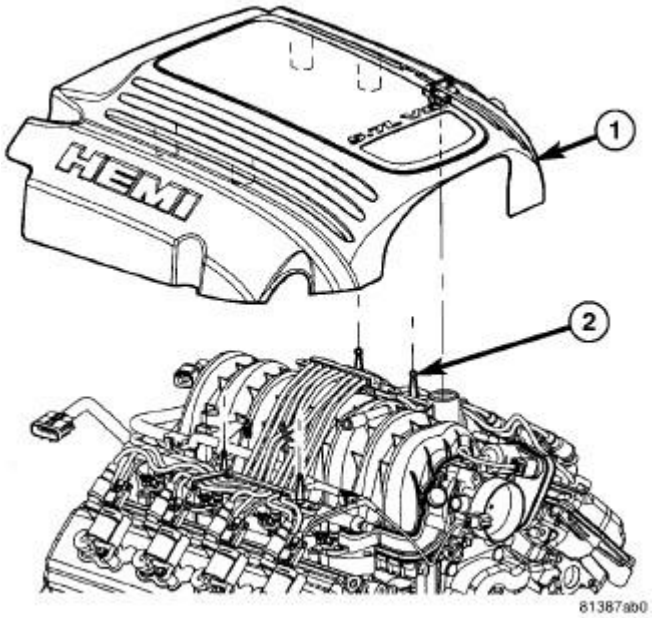


Fig. 345: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1 - Engine Cover
2 - Attaching Studs

25. Install the engine cover (1).

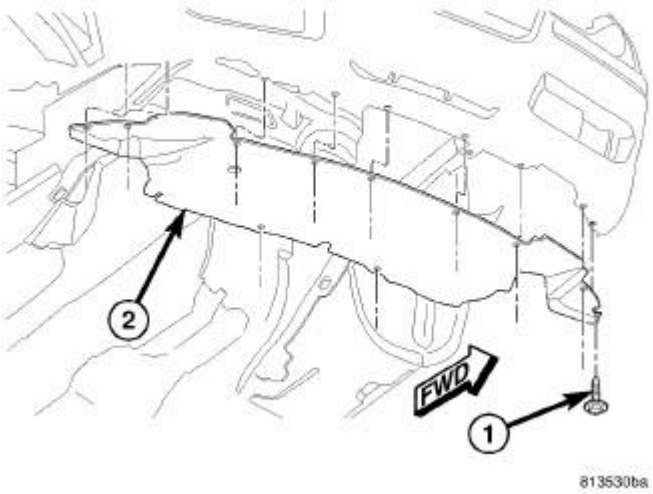


Fig. 346: Front Belly Pan & Screws
Courtesy of CHRYSLER GROUP, LLC

26. Install the belly pan (2). Refer to **BELLY PAN, INSTALLATION** .

PUMP, ENGINE OIL

REMOVAL

REMOVAL

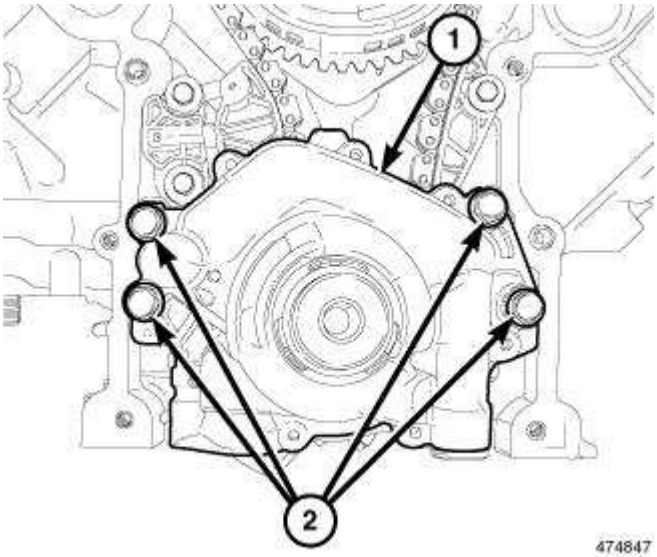


Fig. 347: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L** and **PAN, OIL, AWD, REMOVAL, 5.7L**.
2. Remove the timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.
3. Remove the four bolts (2) and the oil pump (1).

CLEANING

CLEANING

1. Wash all parts in a suitable solvent.

INSPECTION

INSPECTION

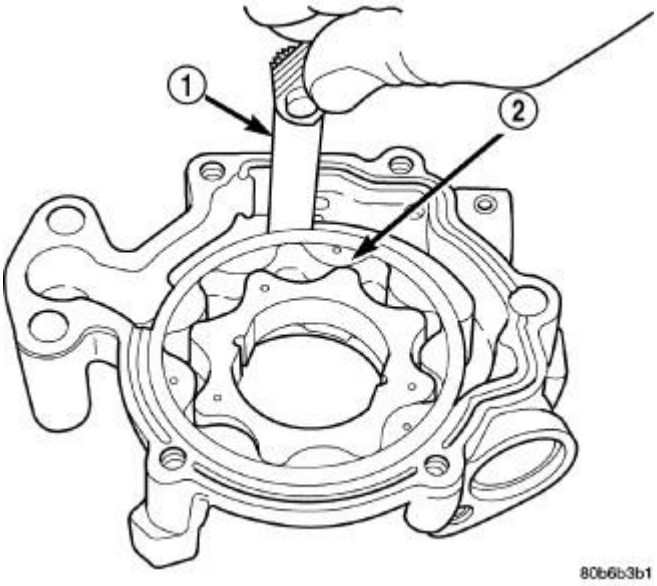


Fig. 348: Measuring Clearance Between Outer Rotor & Body Of Oil Pump
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The oil pump pressure relief valve and spring should not be removed from the oil pump. If these components are disassembled and or removed from the pump the entire oil pump assembly must be replaced.

1. Remove the pump cover.
2. Clean all parts thoroughly. Mating surface of the oil pump housing should be smooth. If the pump cover is scratched or grooved the oil pump assembly should be replaced.
3. Slide outer rotor into the body of the oil pump. Press the outer rotor to one side of the oil pump body and measure clearance between the outer rotor (2) and the body. If the measurement is 0.235 mm (0.009 in.) or more the oil pump assembly must be replaced.

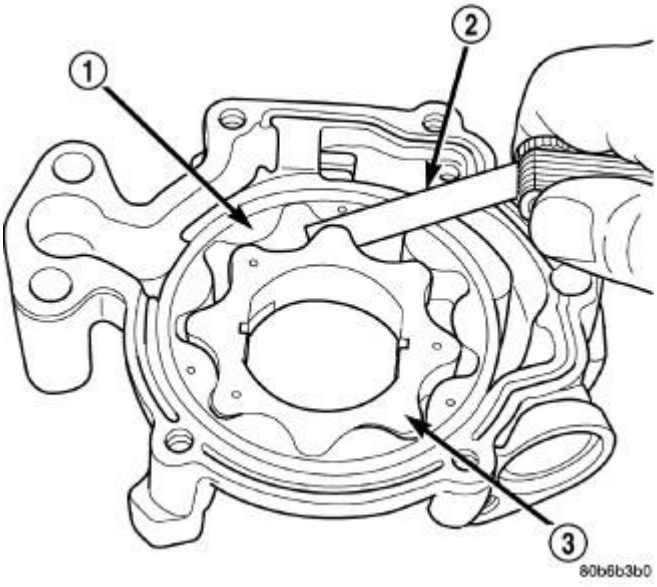


Fig. 349: Measuring Clearance Between Inner & Outer Rotors
Courtesy of CHRYSLER GROUP, LLC

4. Install the inner rotor into the oil pump body. Measure the clearance between the inner (3) and outer rotors (1). If the clearance between the rotors is 0.150 mm (0.006 in.) or more the oil pump assembly must be replaced.

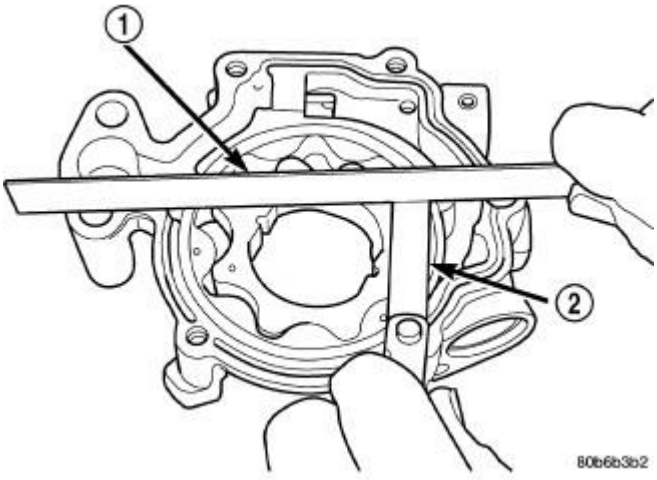


Fig. 350: Measuring Clearance Over Rotors
Courtesy of CHRYSLER GROUP, LLC

5. Place a straight edge (1) across the body of the oil pump (between the bolt holes), if a feeler gauge (2) of 0.095 mm (0.0038 in.) or greater can be inserted between the straightedge and the rotors, the pump must be replaced.
6. Reinstall the pump cover. Tighten fasteners to 15 N.m (132 in. lbs.).

NOTE: **The 5.7 Oil pump is serviced as an assembly. In the event the oil pump is not functioning or out of specification, it must be replaced as an assembly.**

INSTALLATION

INSTALLATION

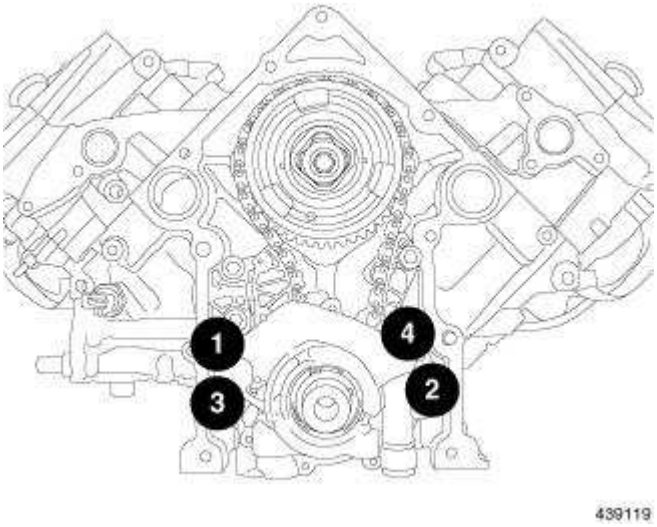


Fig. 351: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Position the oil pump on the crankshaft and install the oil pump retaining bolts finger tight.
2. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).
3. Install the timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
4. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L** and **PAN, OIL, AWD, INSTALLATION, 5.7L**.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit through the PCM
- 5 volt reference circuit from the PCM

The oil pressure sensor returns a voltage signal back to the PCM with reference to oil pressure. Ground for the sensor is supplied by the PCM.

The oil pressure sensor is located on the right side of the engine block. The sensor screws into the engines main oil gallery.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Remove the upper generator mounting bolt.
4. Raise and support the vehicle.

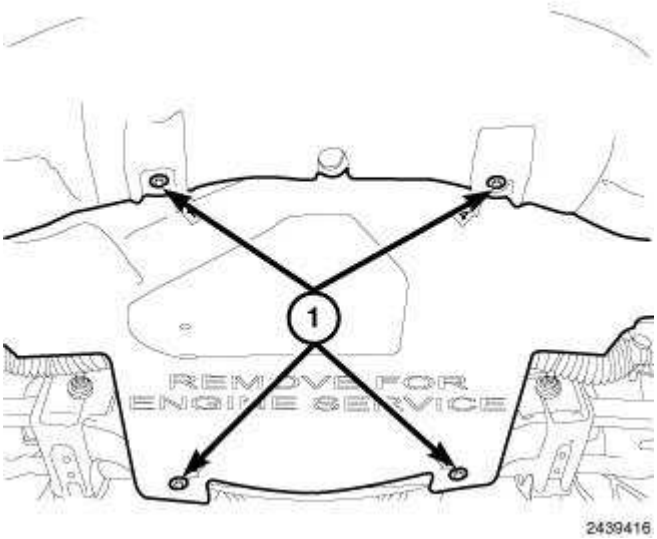


Fig. 352: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the lower splash shield retaining bolts (1) and the splash shield.

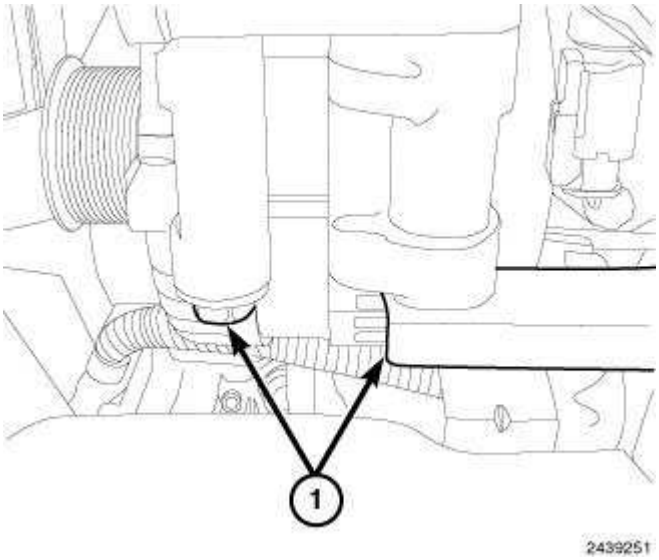


Fig. 353: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the lower generator retaining bolts (1).
7. Lower the vehicle.
8. Position the generator aside to gain access to the oil pressure sensor.

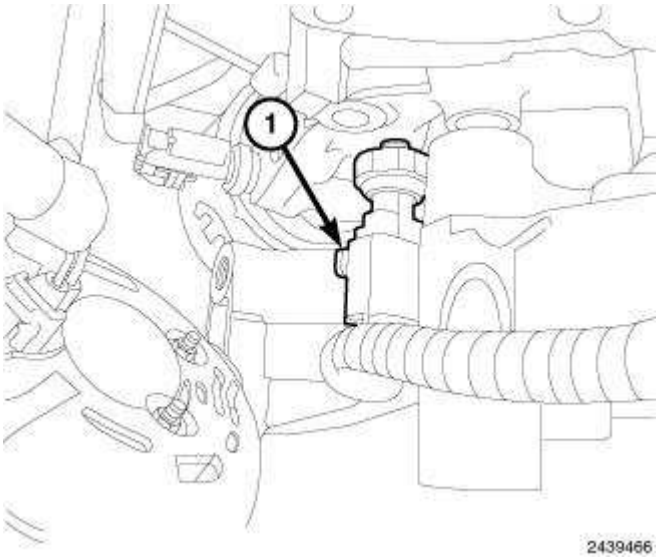


Fig. 354: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the oil pressure sensor electrical connector (1).

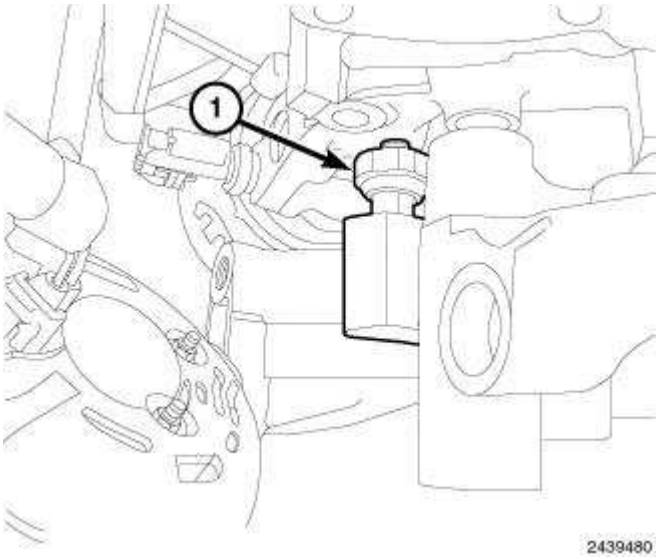


Fig. 355: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

10. Remove the oil pressure sensor (1).

INSTALLATION

INSTALLATION

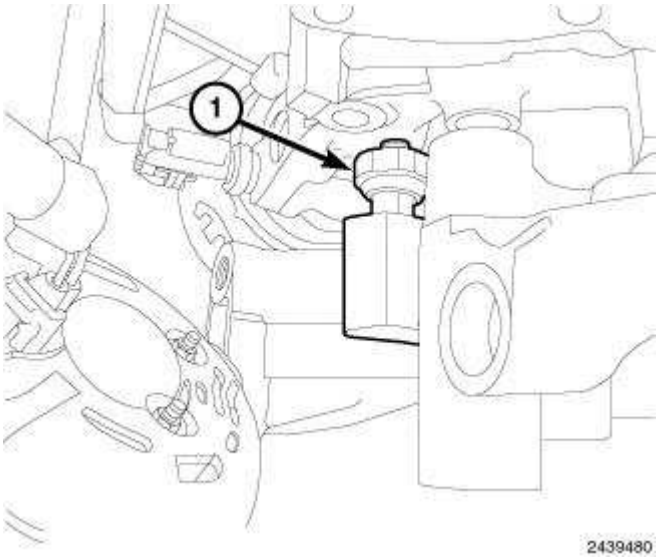


Fig. 356: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply Mopar® Thread Sealant with PTFE to the sensor threads before installing into the engine block.

1. Install the oil pressure sensor (1).

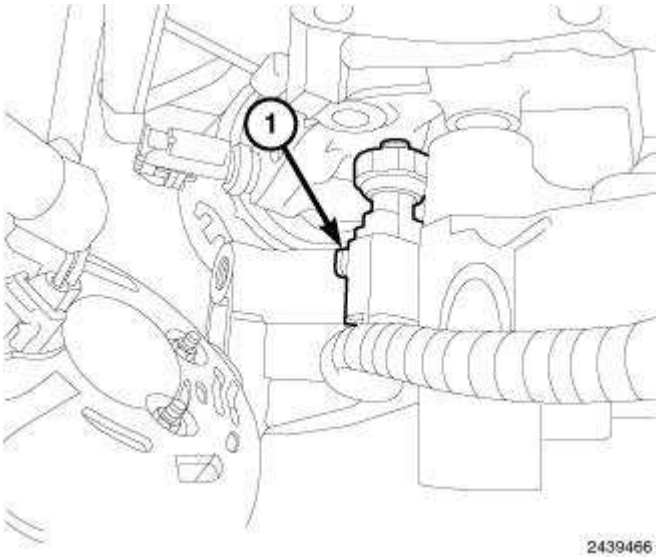


Fig. 357: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil pressure sensor electrical connector (1).
3. Position the generator and install the upper mounting bolt finger tight.
4. Raise and support the vehicle.

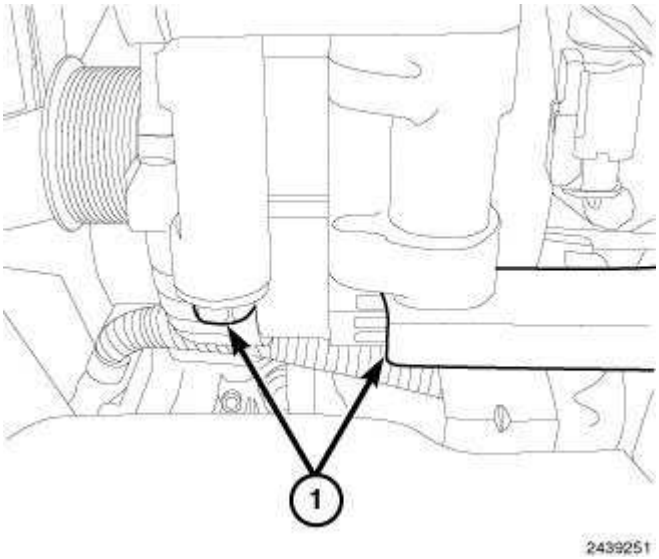


Fig. 358: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the lower mounting bolts (1) and tighten to 55 N.m (41 ft. lbs).

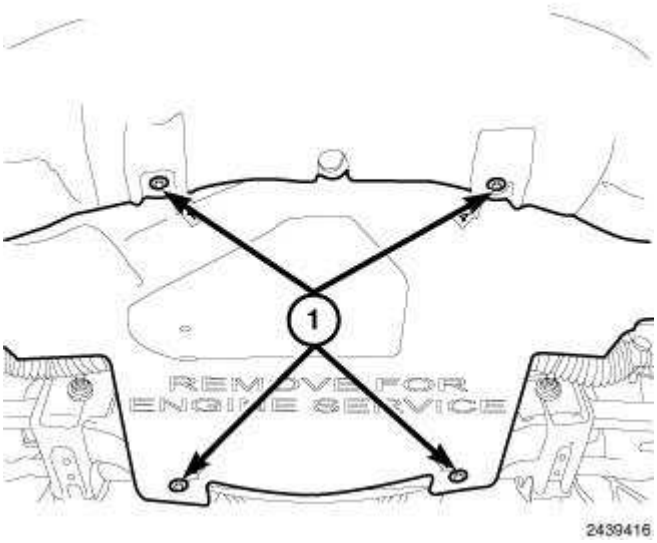


Fig. 359: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Position the lower splash shield and install the retaining bolts (1).
7. Lower the vehicle
8. Tighten the upper generator mounting bolt to 55 N.m (41 ft. lbs).

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.

9. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
10. Connect the negative battery cable.

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

The oil temperature sensor uses the following two circuits:

- Signal circuit to the PCM
- Ground circuit from the PCM

The oil temperature sensor is a Negative Thermal Coefficient sensor. The resistance of the sensor changes as oil temperature changes. This results in different output voltages back to the PCM.

The oil temperature sensor is located on the right side of the engine block.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Remove the generator upper mounting bolt.
4. Raise and support the vehicle.

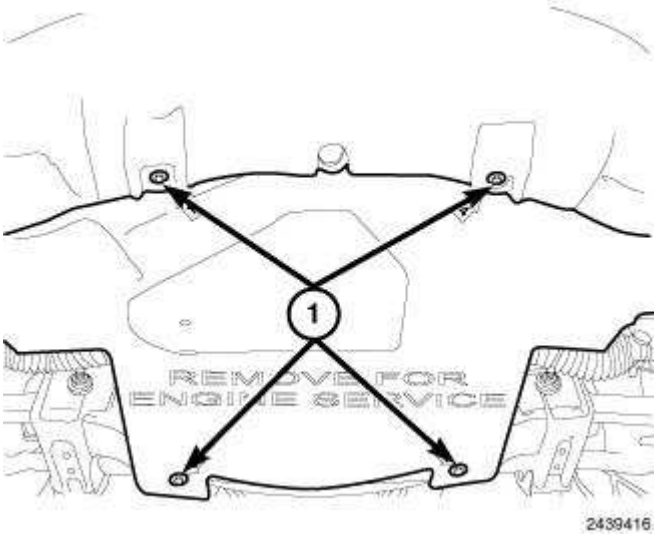


Fig. 360: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the lower splash shield retaining bolts (1) and the splash shield.

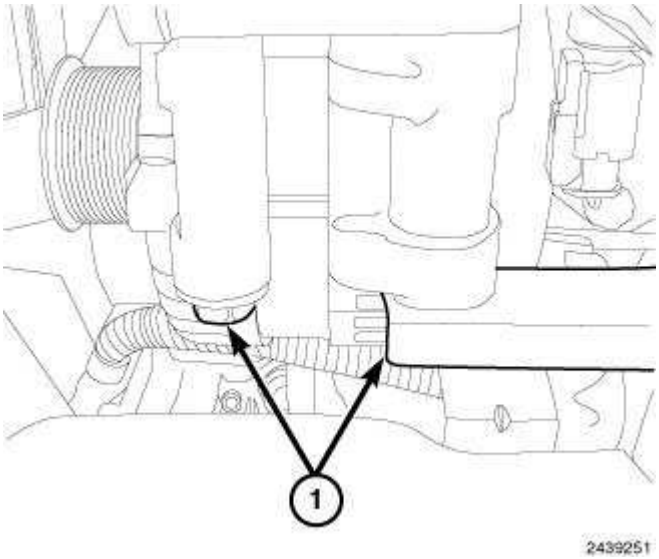


Fig. 361: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the generator lower mounting bolts (1).
7. Lower the vehicle.
8. Position the generator aside to gain access to the oil temperature sensor.

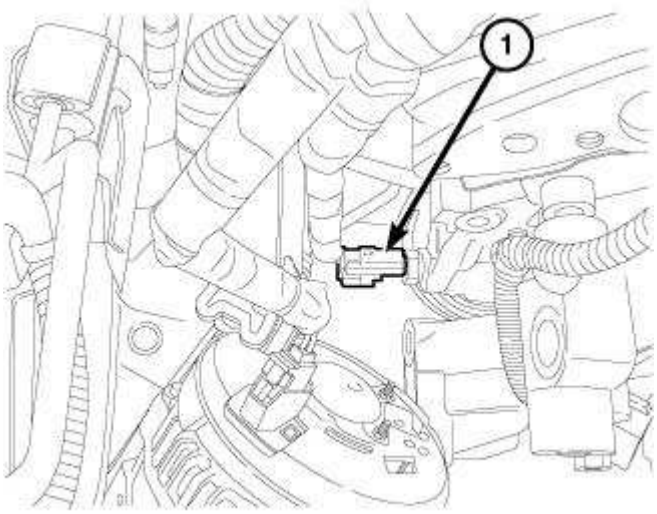


Fig. 362: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the oil temperature sensor electrical connector (1).

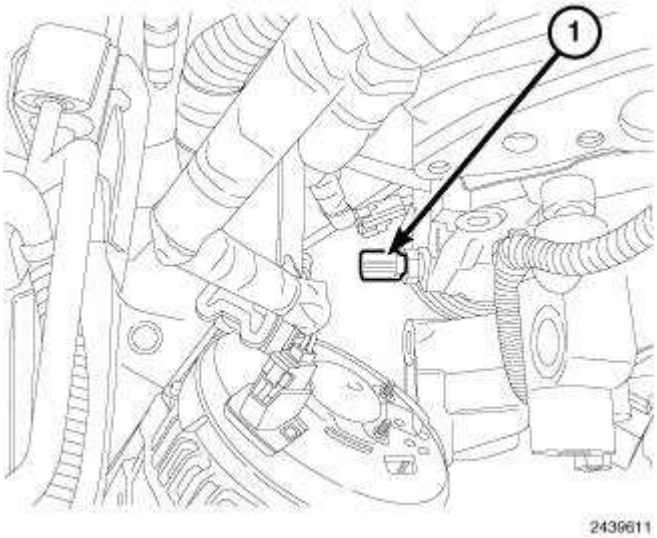


Fig. 363: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

10. Remove the oil temperature sensor (1).

INSTALLATION

INSTALLATION

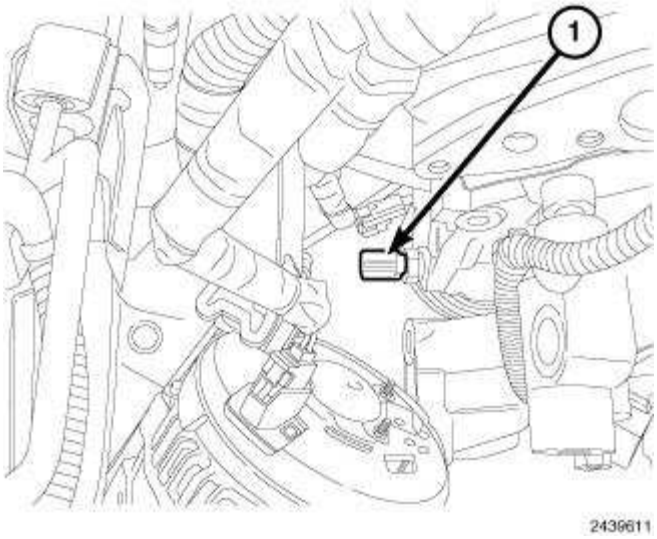


Fig. 364: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply Mopar® Thread Sealant with PTFE to the sensor threads before installing into the engine block.

1. Install the oil temperature sensor (1).

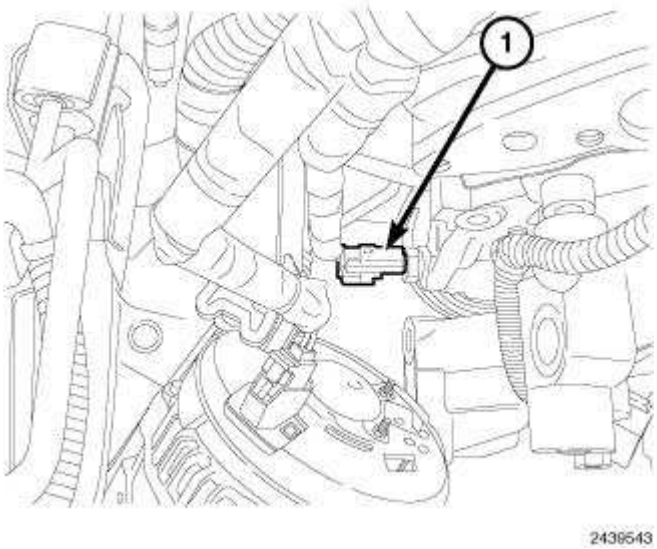


Fig. 365: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil temperature sensor electrical connector (1).
3. Position the generator and install the upper mounting bolt finger tight.
4. Raise and support the vehicle.

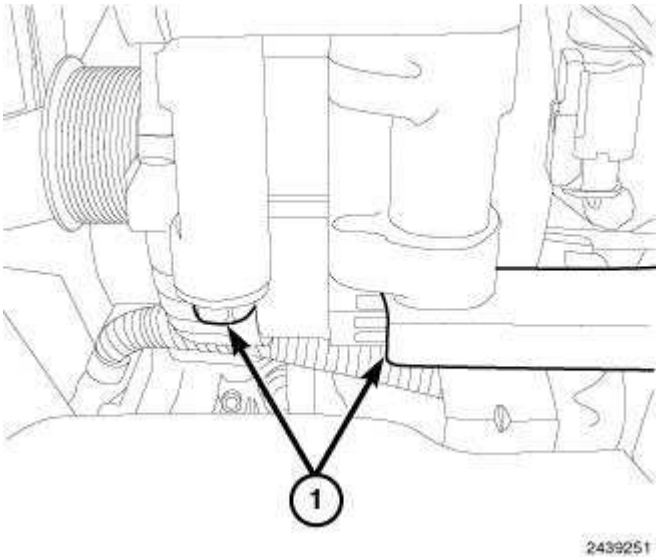


Fig. 366: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the generator lower mounting bolts (1) and tighten to 55 N.m (41 ft. lbs.).

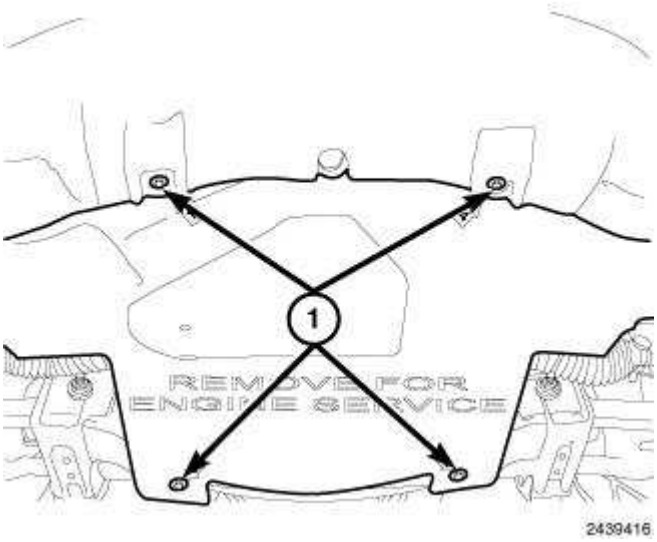


Fig. 367: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Position the lower splash shield and install the splash shield retaining bolts (1).
7. Lower the vehicle.
8. Tighten the generator upper mounting bolt to 55 N.m (41 ft. lbs.).

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to

overheat.

9. Install the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
10. Connect the negative battery cable.

MANIFOLDS

MANIFOLD, EXHAUST

REMOVAL

REMOVAL

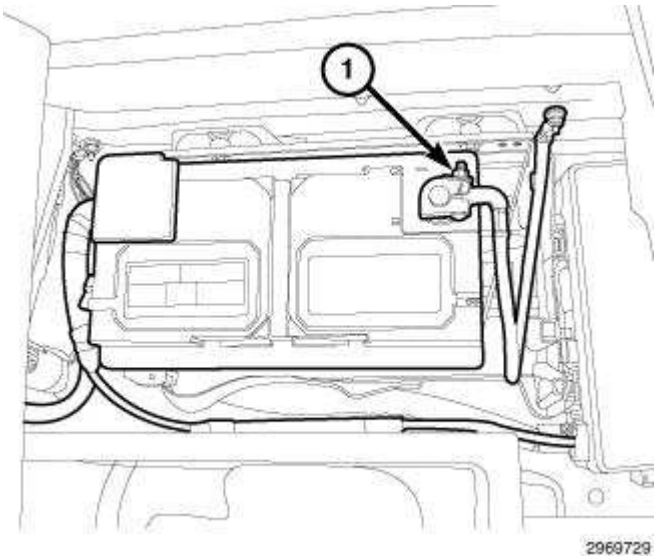


Fig. 368: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

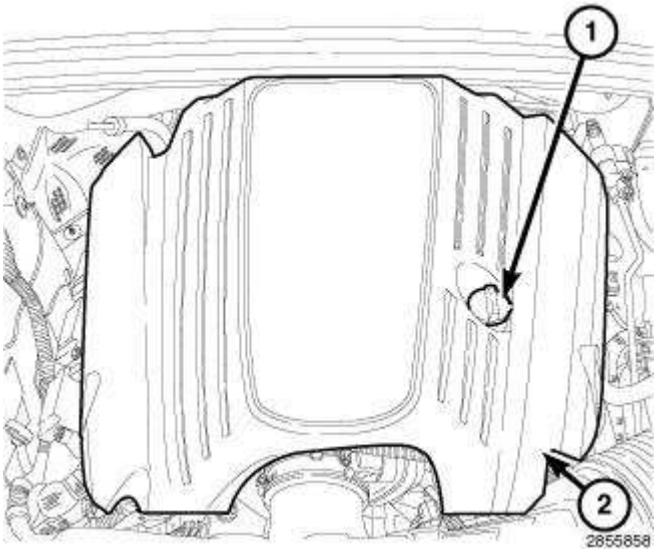


Fig. 369: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (2).

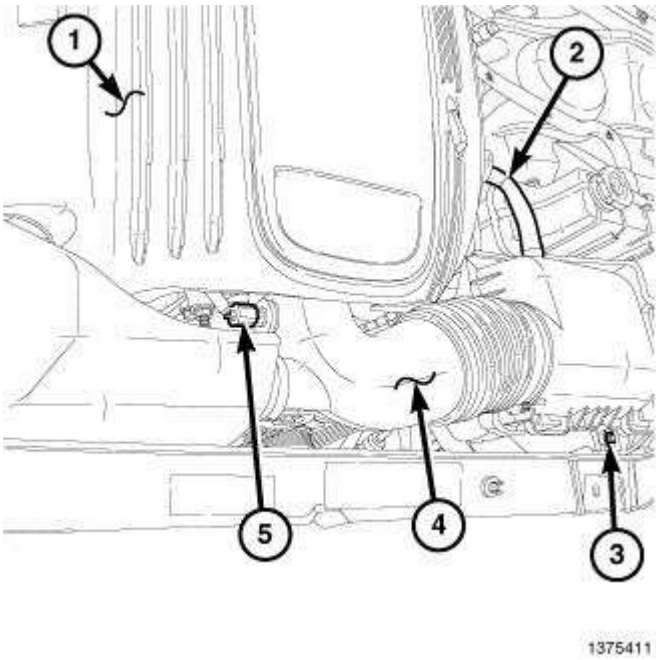


Fig. 370: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the intake air temperature (IAT) sensor (5) connector.
4. Loosen the clamps at the throttle body and the air filter housing and remove the air tube (4).
5. Disconnect the make up air hose (MUA) (2).
6. Remove the air filter housing retaining bolt (3).
7. Remove the air filter housing.

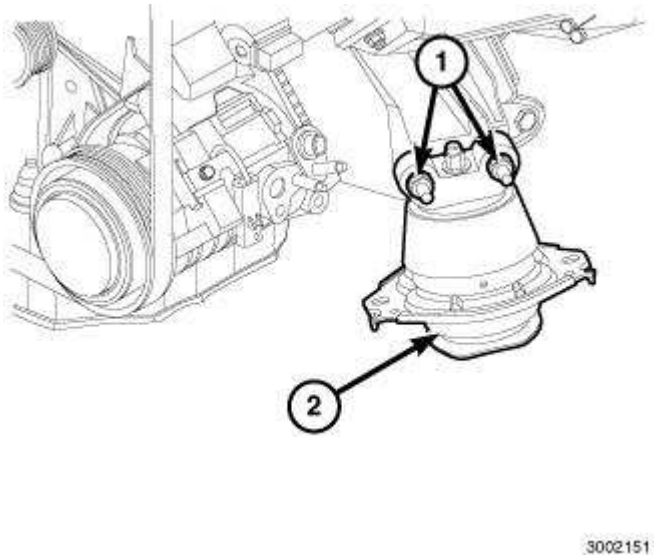


Fig. 371: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove both front engine mounts (2) and mounting brackets. Refer to **INSULATOR, ENGINE MOUNT, FRONT, REMOVAL, 5.7L** and **INSULATOR, ENGINE MOUNT, REAR, REMOVAL, 5.7L**.

CAUTION: When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters hanging from the oxygen sensor wires damages the harness and/or sensors.

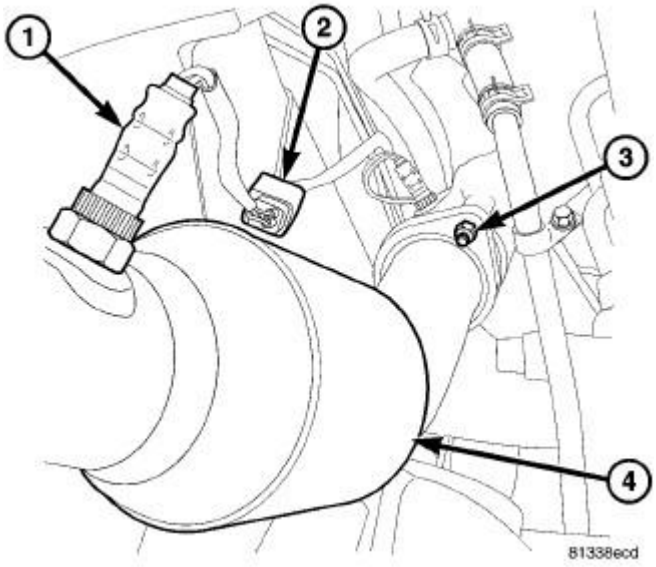


Fig. 372: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

9. Raise and support the vehicle.
10. Disconnect the oxygen sensor electrical connectors (2).
11. Saturate the front exhaust pipe/catalytic converter retaining bolts and nuts with Mopar® Rust Penetrant or equivalent and allow 5 minutes for penetration.
12. Remove both catalytic converters (4). Refer to **CONVERTER, CATALYTIC, REMOVAL** .

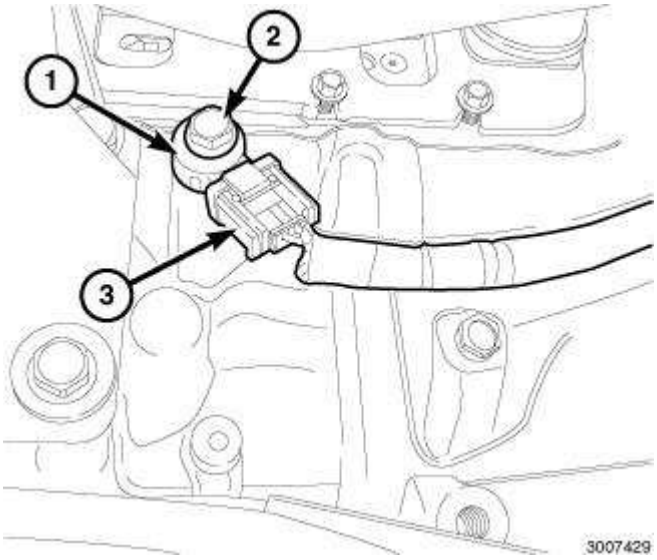


Fig. 373: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Two knock sensors (1) are used, they are bolted to each side of the cylinder block under each exhaust manifold (3).

13. Remove the heat shields from the appropriate knock sensor (shield snaps onto sensor).
14. Disconnect the appropriate knock sensor electrical connector (3).

NOTE: Note the foam strip on the knock sensor retaining bolt threads. This foam is only used to retain the bolts to the knock sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.

15. Remove the appropriate knock sensor retaining bolt (2) and remove knock sensor (1).
16. Lower the vehicle.

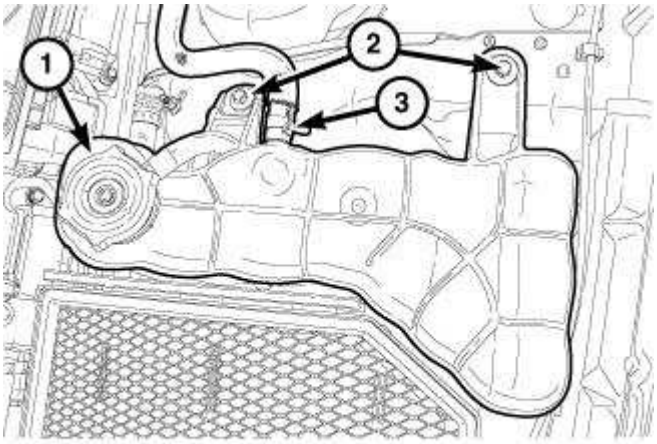


Fig. 374: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

LEFT SIDE:

NOTE: It is not necessary to remove the hoses from the coolant bottle for coolant bottle removal.

17. Remove coolant bottle retaining bolts (2) and position aside.

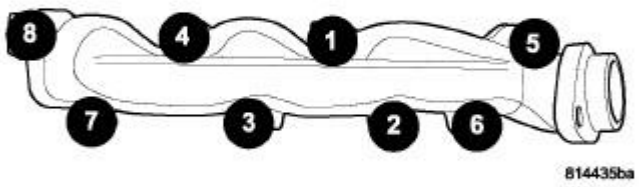


Fig. 375: Exhaust Manifold Bolt Removal/Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

18. Using the sequence shown in illustration, remove the exhaust manifold retaining bolts.

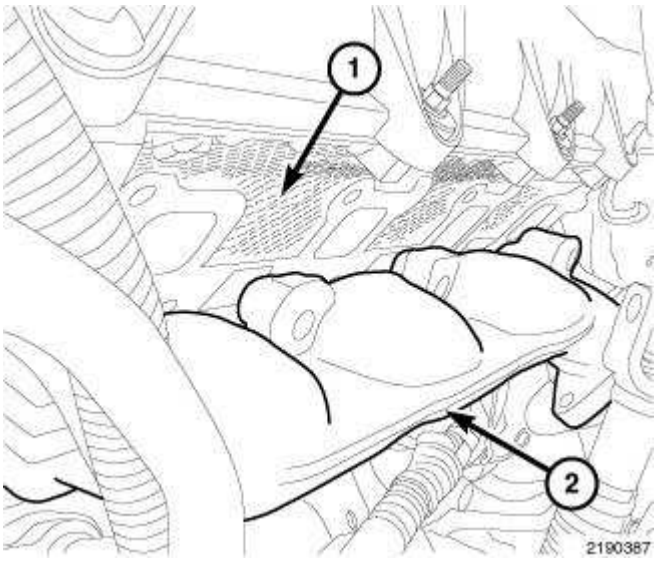


Fig. 376: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

19. Remove the exhaust manifold (2) and gasket.
20. Inspect the exhaust manifold for any damage. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Inspection**.
21. Clean the exhaust manifold mating surfaces (1, 2).

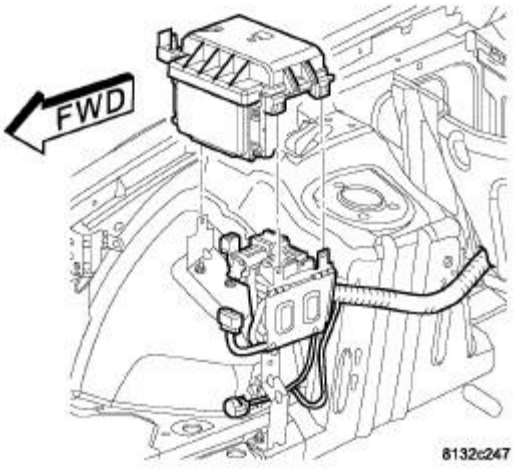


Fig. 377: TIPM/PDC Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

RIGHT SIDE:

22. Remove the Power Distribution Center (PDC) and mounting bracket.
23. Unfasten the wire harness mounted on the right hand inner fender panel and position aside.

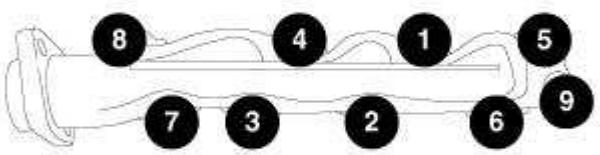


Fig. 378: Exhaust Manifold Bolt Removal/Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

24. Remove the exhaust manifold heat shields.
25. Using the sequence shown in illustration, remove the exhaust manifold retaining bolts.
26. Remove the exhaust manifold (2) and gasket.
27. Inspect the exhaust manifold for any damage. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Inspection**.
28. Clean the exhaust manifold mating surfaces.

CLEANING

CLEANING

Clean mating surfaces on cylinder head and manifold. Wash with solvent and blow dry with compressed air.

INSPECTION

INSPECTION

Inspect manifold for cracks.

Inspect mating surfaces of manifold for flatness with a straight edge. Gasket surfaces must be flat within 0.2 mm per 300 mm (0.008 inch per foot).

INSTALLATION

INSTALLATION

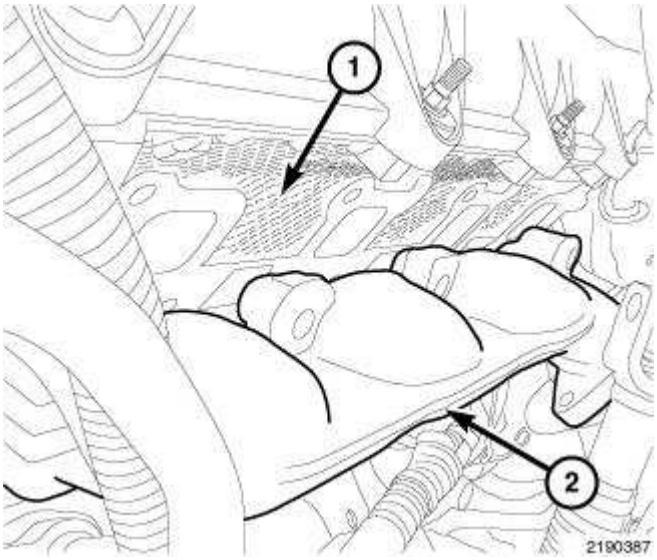


Fig. 379: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

LEFT SIDE:

1. Prior to installation, make sure all gasket mating surfaces (1, 2) are clean and free of any debris.
2. Using a new exhaust manifold gasket, position the exhaust manifold to the cylinder head, align the gasket and start two upper retaining blots finger tight.

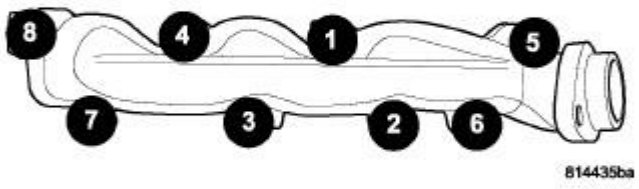


Fig. 380: Exhaust Manifold Bolt Removal/Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, Install the remaining exhaust manifold retaining bolts and tighten to 25 N.m (18 ft. lbs.).
4. Install the heat shield and tighten nuts to 8 N.m (70 in. lbs.).

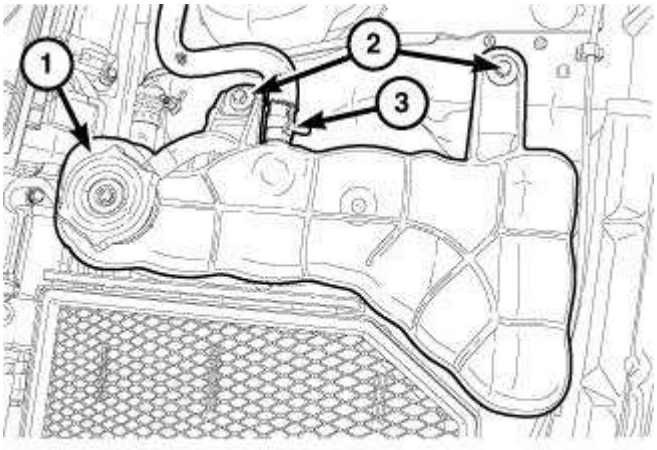


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Fig. 381: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

5. Position the coolant bottle (1) and install the retaining bolts (2).

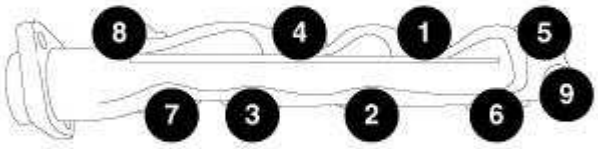

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Fig. 382: Exhaust Manifold Bolt Removal/Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

RIGHT SIDE:

6. Prior to installation, make sure all gasket mating surfaces are clean and free of any debris.
7. Using a new exhaust manifold gasket, position the exhaust manifold to the cylinder head, align the gasket and start two upper retaining blots finger tight.
8. Using the sequence shown in illustration, install the remaining exhaust manifold retaining bolts and tighten to 25 N.m (18 ft. lbs.).
9. Install the heat shield and tighten nuts to 8 N.m (70 in. lbs.).

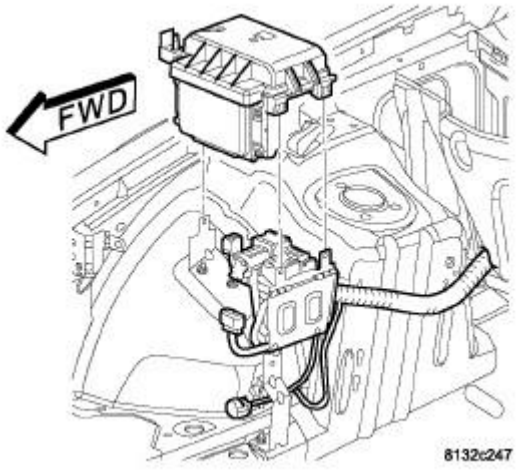


Fig. 383: TIPM/PDC Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

10. Position the wire harness mounted onto the right hand inner fender panel and secure fasteners.
11. Install the Power Distribution Center (PDC) and mounting bracket.

CAUTION: Over or under tightening the knock sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control.

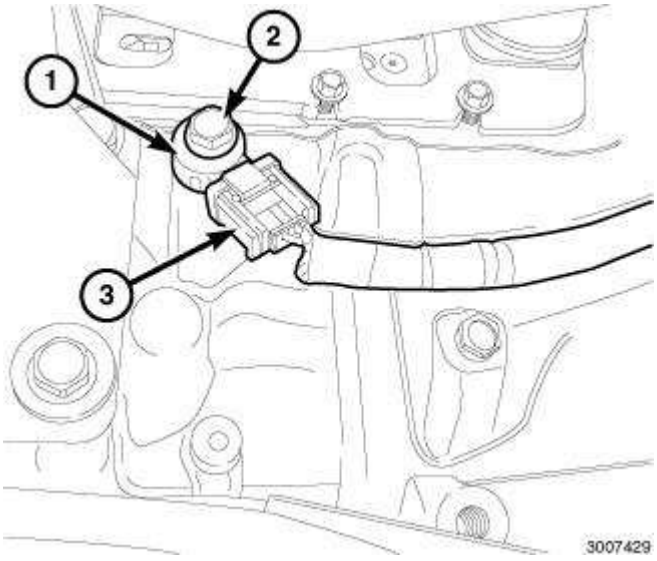


Fig. 384: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Raise and support the vehicle.
13. Position the appropriate knock sensor (1) onto the engine block.

NOTE: The foam strip used on bolt threads is used only to retain the bolts to the sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.

14. Install the appropriate knock sensor retaining bolt (2) and tighten to 20 N.m (15 ft. lbs.).
15. Connect the appropriate knock sensor electrical connector (3).
16. Snap the heat shield onto the appropriate knock sensor.

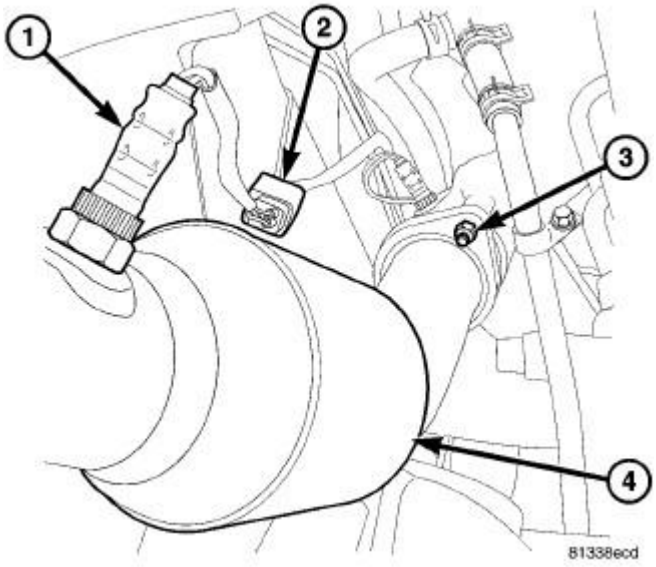


Fig. 385: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

17. Install both catalytic converters (4). Refer to **CONVERTER, CATALYTIC, INSTALLATION** .

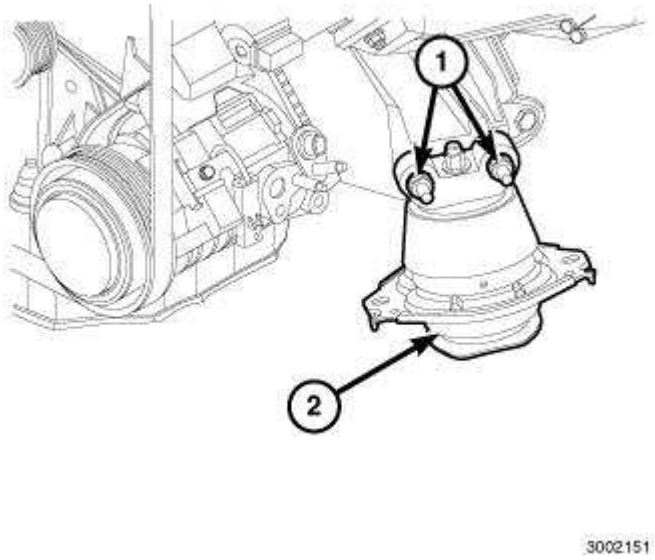


Fig. 386: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

18. Install both front engine mounts (2) and mounting brackets. Refer to **INSULATOR, ENGINE MOUNT, FRONT, INSTALLATION, 5.7L** and **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION, 5.7L**.

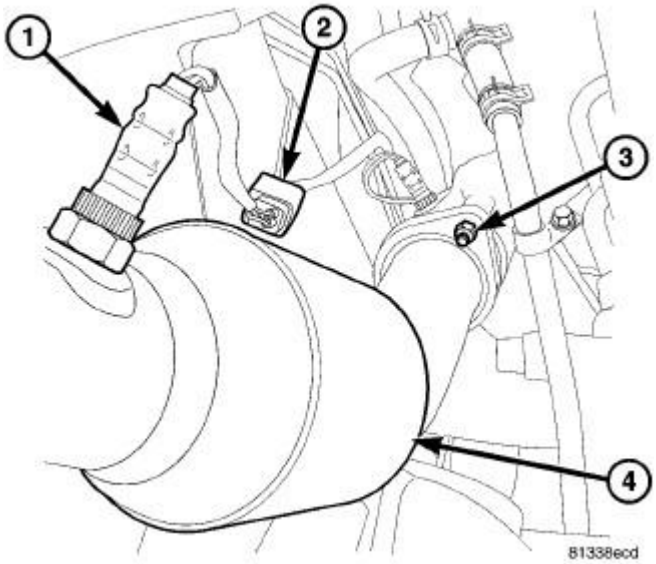


Fig. 387: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

19. Install both catalytic converters (4). Refer to **CONVERTER, CATALYTIC, INSTALLATION** .
20. Connect the oxygen sensor electrical connectors (2).
21. Lower the vehicle.

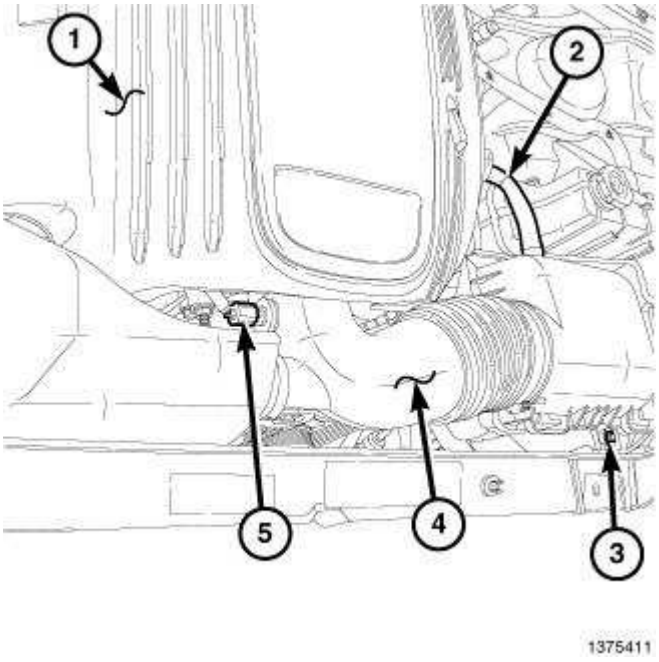


Fig. 388: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

22. Position the air filter housing into the engine compartment.
23. Install the air filter housing retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
24. Connect the clean air tube to the throttle body and the air filter housing and tighten clamps to 3 N.m (30 in. lbs.).
25. Connect the make up air hose (MUA) (2).
26. Connect the intake air temperature (IAT) sensor (5) connector.

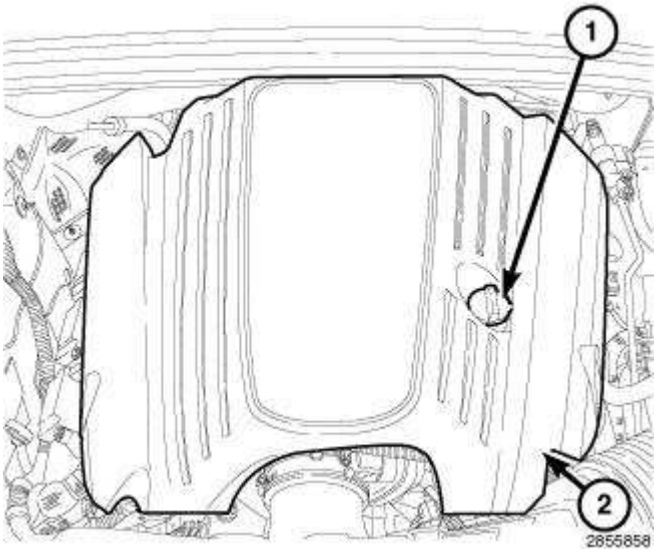


Fig. 389: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

27. Position the engine cover (2) and secure the retaining grommets onto the ball studs.

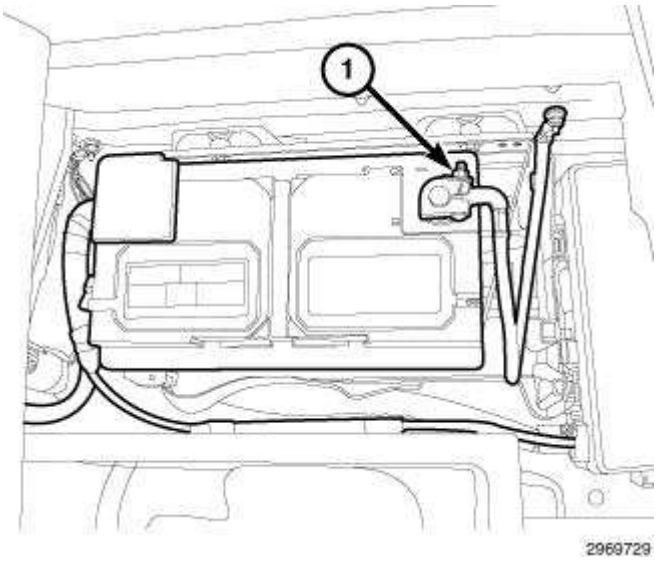


Fig. 390: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

28. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).
29. Start the engine and check for leaks.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

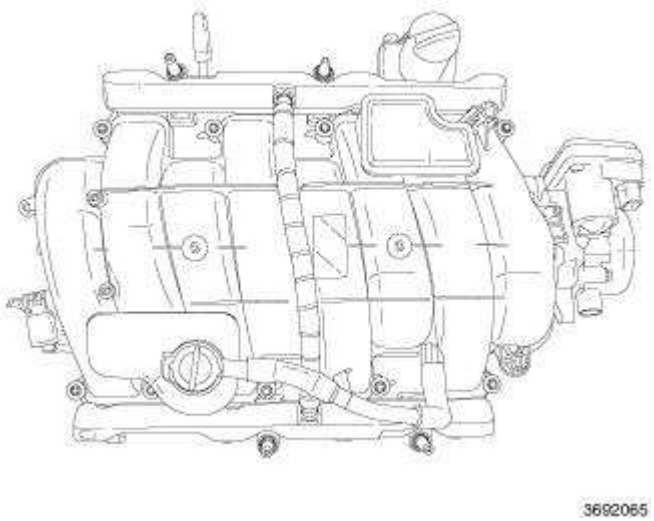


Fig. 391: Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

The intake manifold is made of a composite material with the runners tuned to give the best balance of power and torque. The manifold uses a single plane sealing system and separate PCV port seals to prevent leaks. The screws connecting the manifold to the head use a thread lock patch, and must be replaced when the manifold is serviced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKAGE

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Start the engine.
2. Spray a small stream of water at the suspected leak area.
3. If a change in RPM is observed the area of the suspected leak has been found.
4. Repair as required.

REMOVAL

REMOVAL

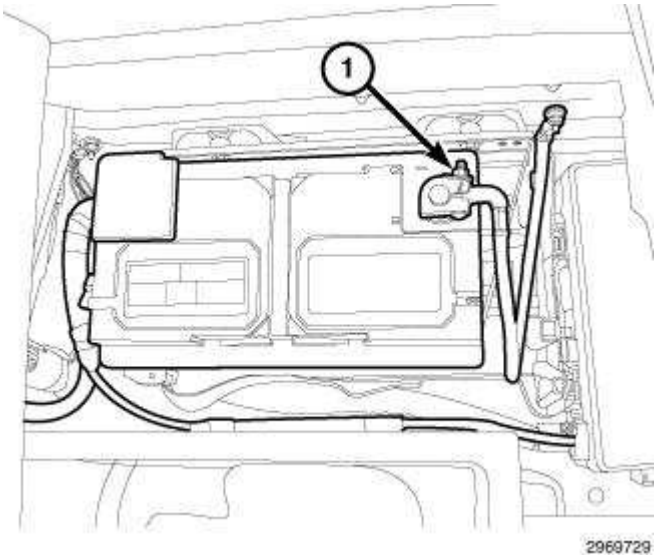


Fig. 392: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .

2. Disconnect and isolate the negative battery cable (1).

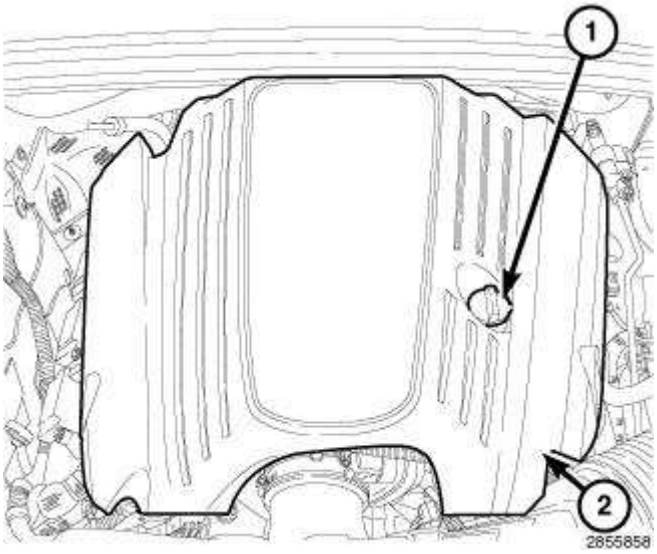


Fig. 393: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).
4. Disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .

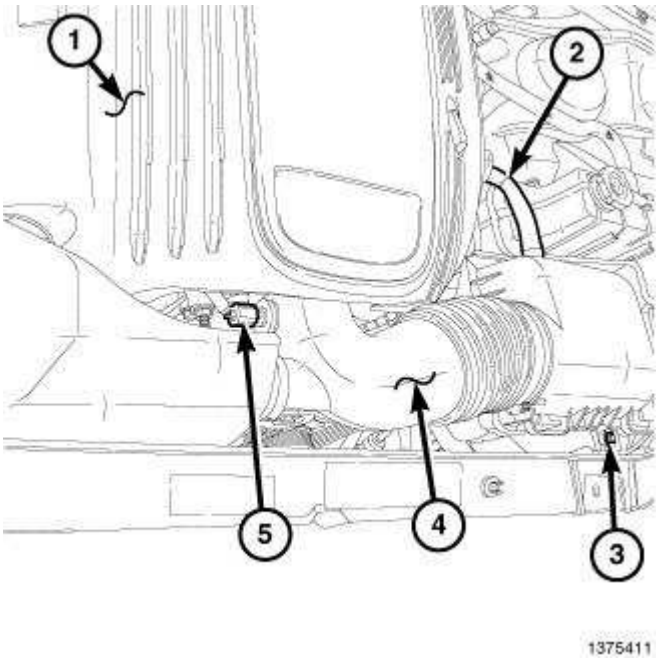


Fig. 394: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the intake air temperature (IAT) sensor (5) electrical connector.
6. Loosen the clamps at the throttle body and the air filter housing and remove the air tube (4).

7. Disconnect the make up air hose (MUA) (2).
8. Remove the air filter housing retaining bolt (3).
9. Remove the air filter housing from the vehicle.
10. Disconnect the brake booster hose and the EVAP purge line.

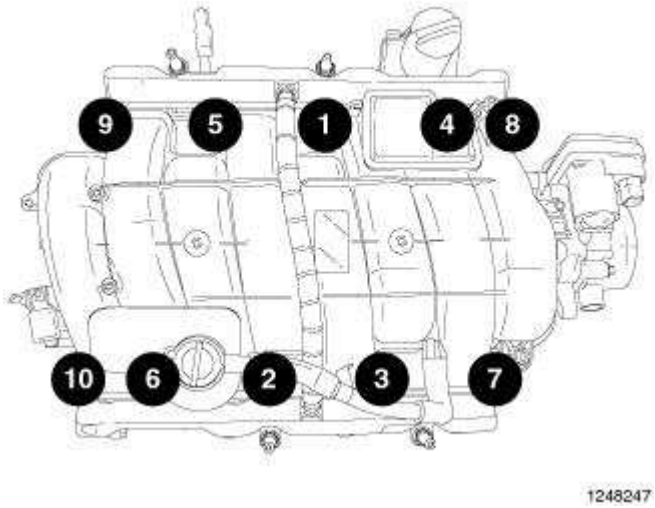


Fig. 395: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the electrical connectors from the following components:
    - Manifold Absolute Pressure (MAP) Sensor
    - Fuel Injectors
    - Electronic Throttle Control (ETC)

NOTE: Remove the intake manifold and throttle body as an assembly.

12. Using the sequence shown in illustration, remove the intake manifold retaining bolts.
13. Remove the intake manifold and throttle body as an assembly from the vehicle.

CLEANING

CLEANING

NOTE: There is NO approved repair procedure for the intake manifold. If severe damage is found during inspection, the intake manifold must be replaced.

Before installing the intake manifold thoroughly clean the mating surfaces. Use a suitable cleaning solvent, then air dry.

INSPECTION

INSPECTION

1. Inspect the intake sealing surface for cracks, nicks and distortion.
2. Inspect the intake manifold vacuum hose fittings for looseness or blockage.

INSTALLATION

INSTALLATION

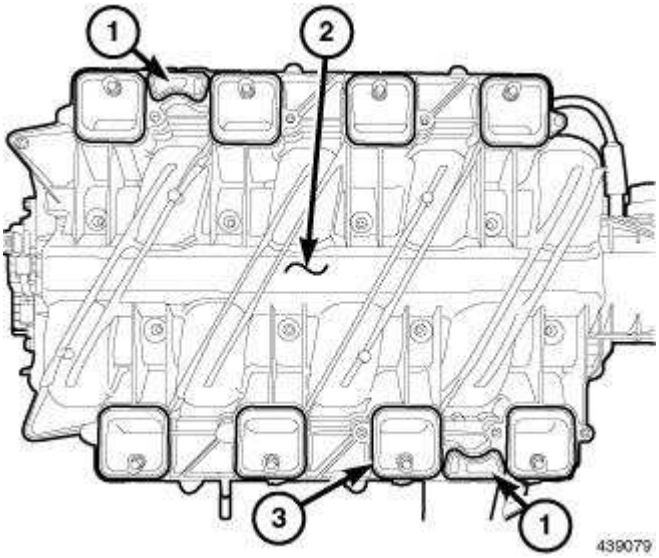


Fig. 396: Intake Manifold & PCV Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: The intake manifold seals (1, 3) may be used again, provided no cuts, tears, or deformation have occurred.

1. Inspect the intake manifold seals and replace if necessary.

NOTE: If reinstalling the original manifold, apply Mopar® Lock & Seal Adhesive to the intake manifold bolts. Not required when installing a new manifold.

2. If required, apply Mopar® Lock & Seal Adhesive to the intake manifold bolts.
3. Position the intake manifold (2).

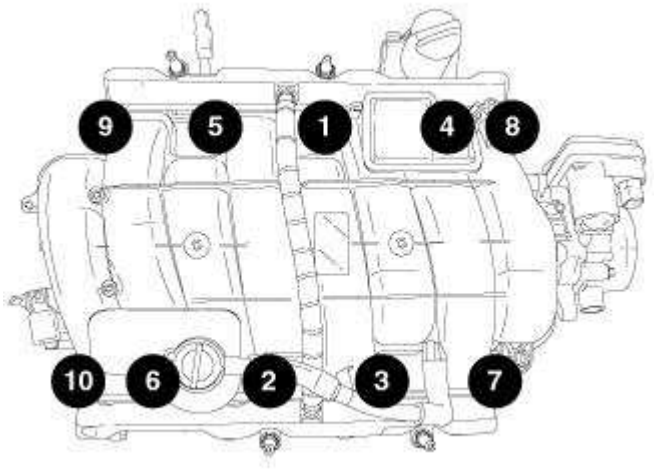


Fig. 397: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, install the intake manifold retaining bolts and tighten to 12 N.m (9 ft. lbs.).
5. Connect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .
6. Connect the brake booster hose and the EVAP purge line.
7. Connect the electrical connectors to the following components:
    - Manifold Absolute Pressure (MAP) Sensor
    - Fuel Injectors
    - Electronic Throttle Control (ETC)

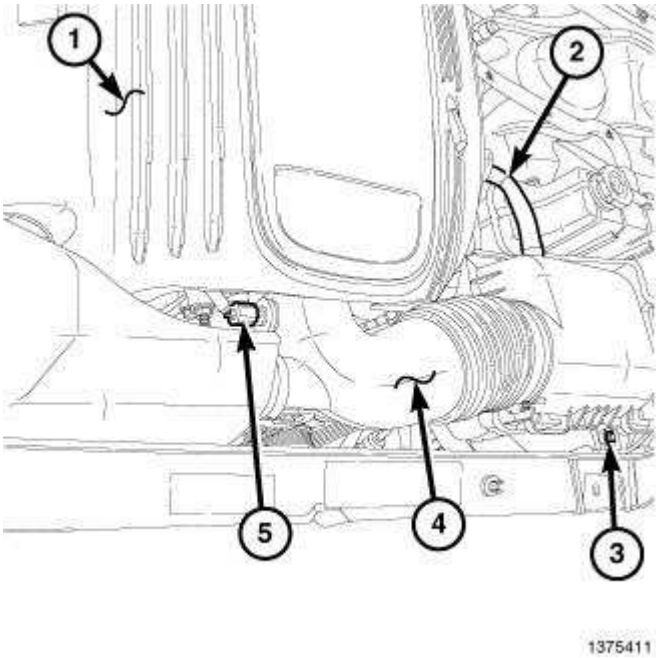


Fig. 398: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

8. Position the air filter housing into the engine compartment.
9. Install the air filter housing retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
10. Connect the clean air tube to the throttle body and the air filter housing and tighten clamps to 3 N.m (30 in. lbs.).
11. Connect the make up air hose (MUA) (2).
12. Connect the intake air temperature (IAT) sensor (5) electrical connector.

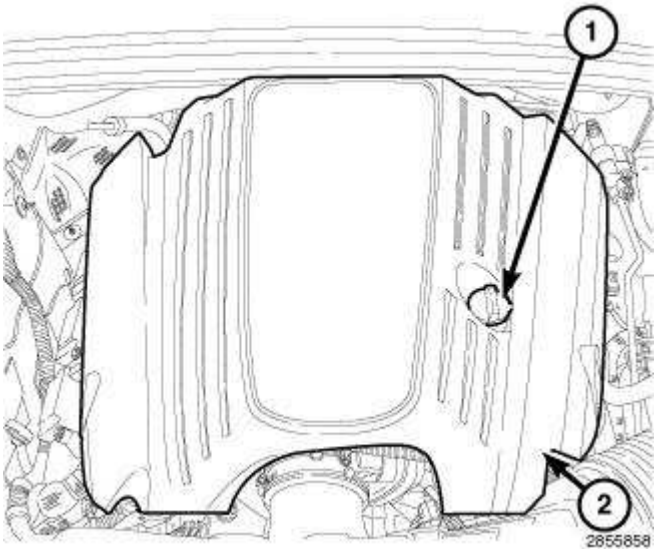


Fig. 399: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

13. Position the engine cover (2) and secure the retaining grommets onto the ball studs.

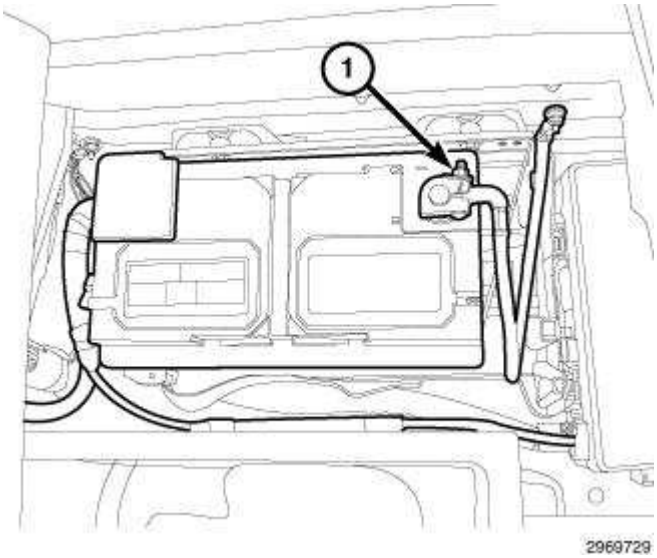


Fig. 400: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

14. Connect the negative battery cable (1).
15. Start the engine and check for leaks.

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

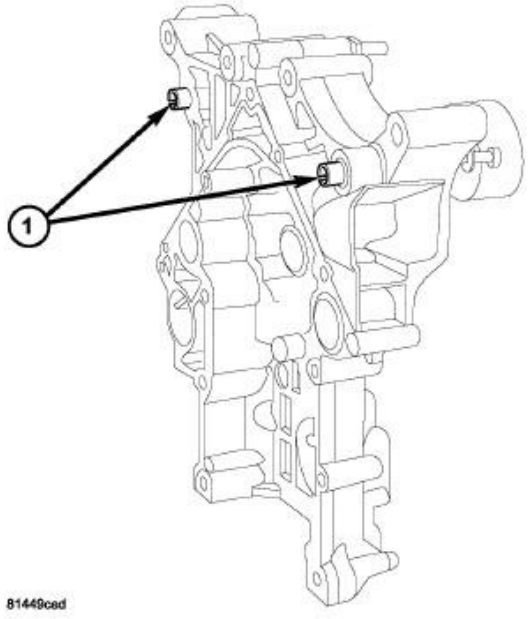


Fig. 401: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove water pump for timing chain cover removal.

3. Remove the timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.
4. Verify the slide bushings (1) remain installed in the timing chain cover during removal.

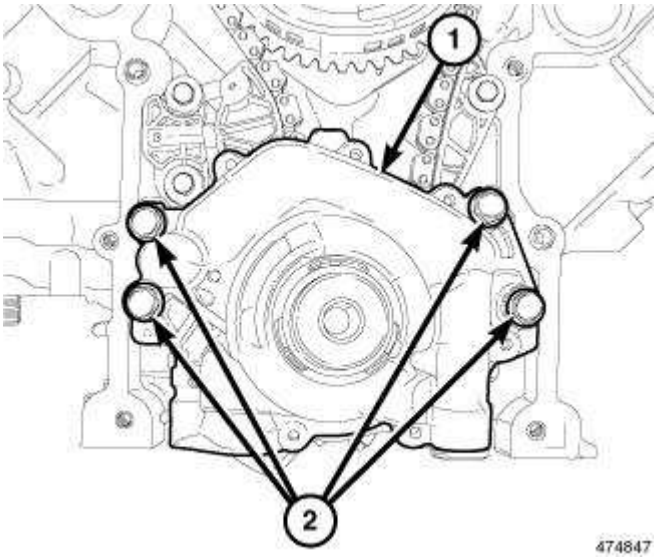


Fig. 402: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

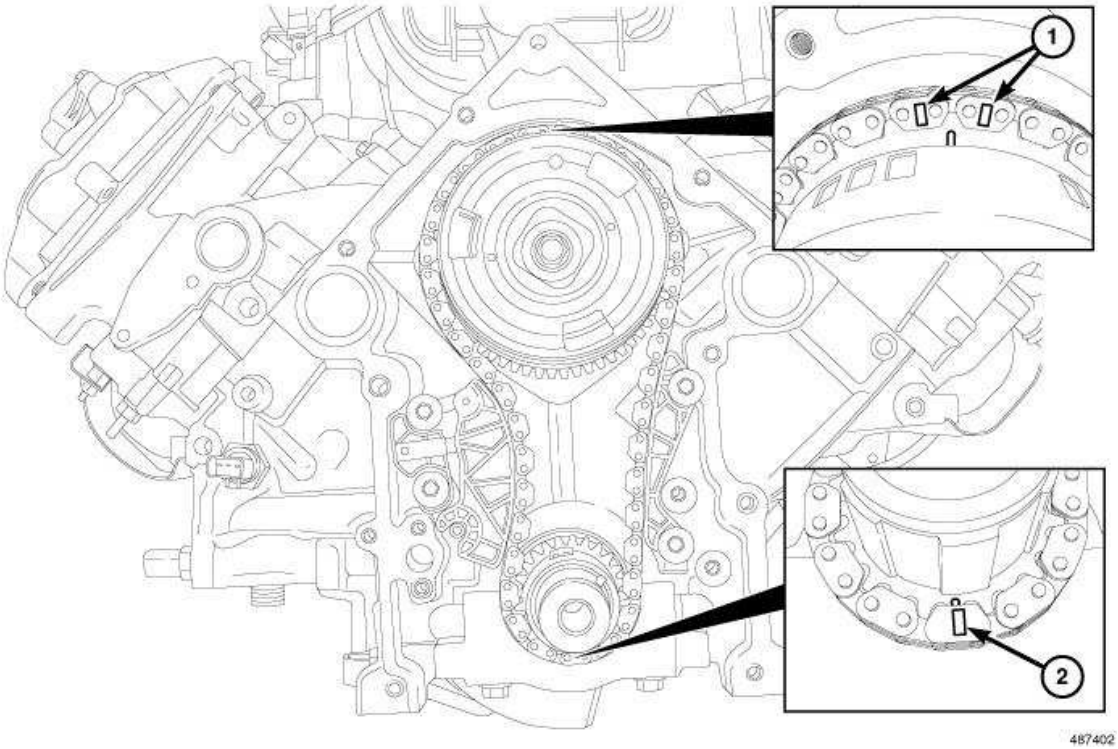


Fig. 403: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

6. Install the vibration damper bolt finger tight. Using a suitable socket and breaker bar, rotate the crankshaft to align the timing marks with the timing chain sprockets (1, 2).

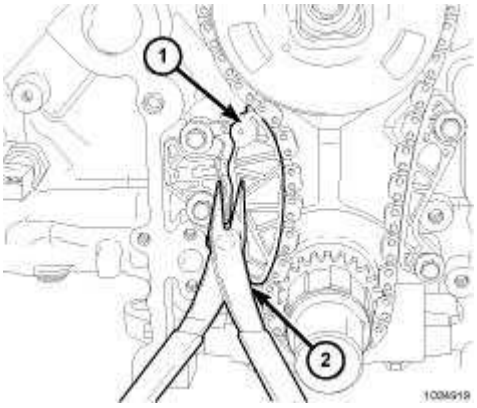


Fig. 404: Retracting Tensioner Shoe Using Pliers
Courtesy of CHRYSLER GROUP, LLC

7. Retract the chain tensioner arm (1) until the hole in the arm lines up with the hole in the bracket.

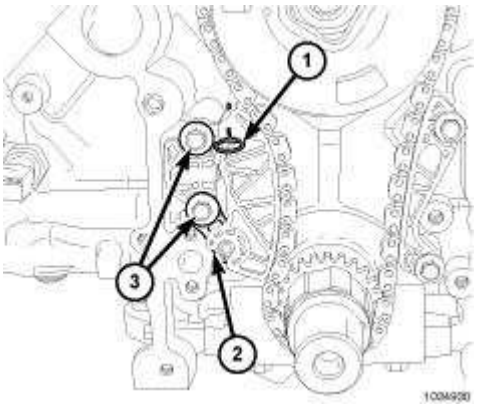


Fig. 405: Timing Chain Tensioner, Pin & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the chain tensioner holes.

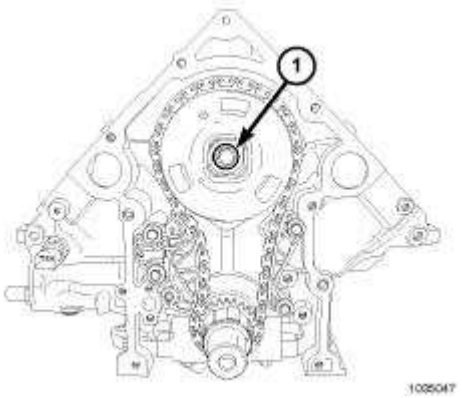


Fig. 406: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

9. Remove the camshaft phaser retaining bolt (1) and remove the timing chain with the camshaft phaser and crankshaft sprocket.

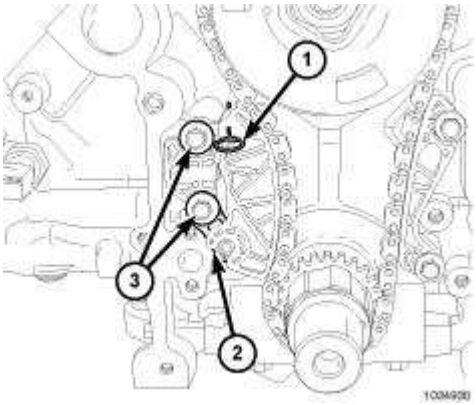


Fig. 407: Timing Chain Tensioner, Pin & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect the timing chain tensioner and timing chain guide shoes for wear and replace as necessary.

10. If the timing chain tensioner is being replaced, remove the retaining bolts (3) and remove the timing chain tensioner (2).

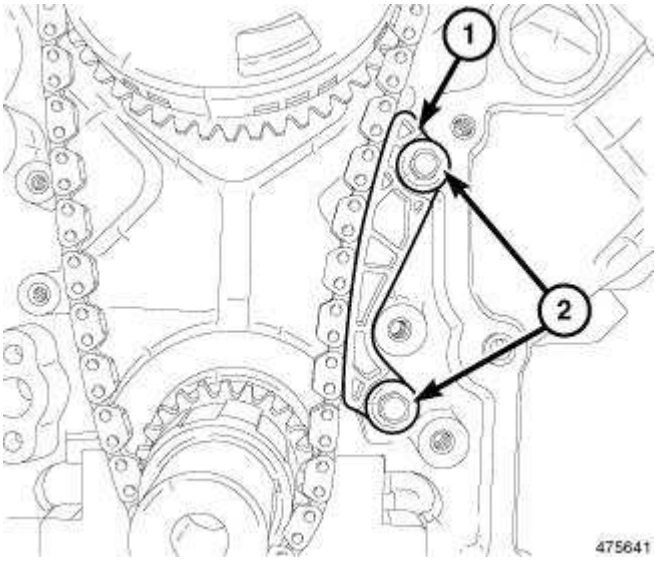


Fig. 408: Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. If the timing chain guide (1) is being replaced, remove the retaining bolts (2) and remove the timing chain guide.

INSTALLATION

INSTALLATION

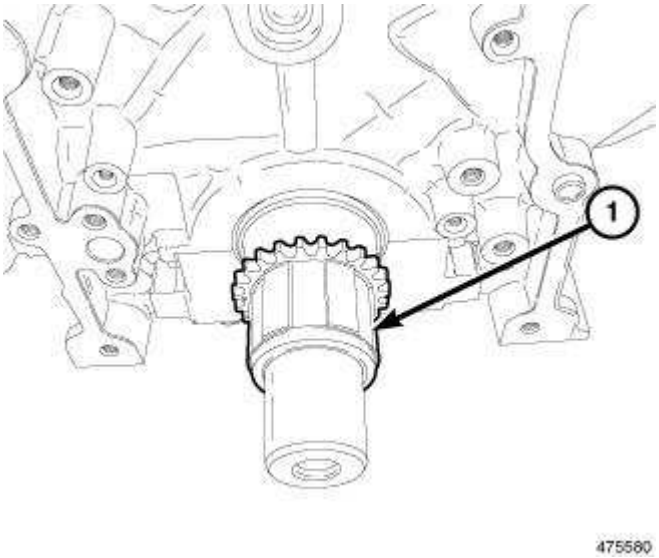


Fig. 409: Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

1. Install the crankshaft sprocket (1) and position halfway onto the crankshaft.

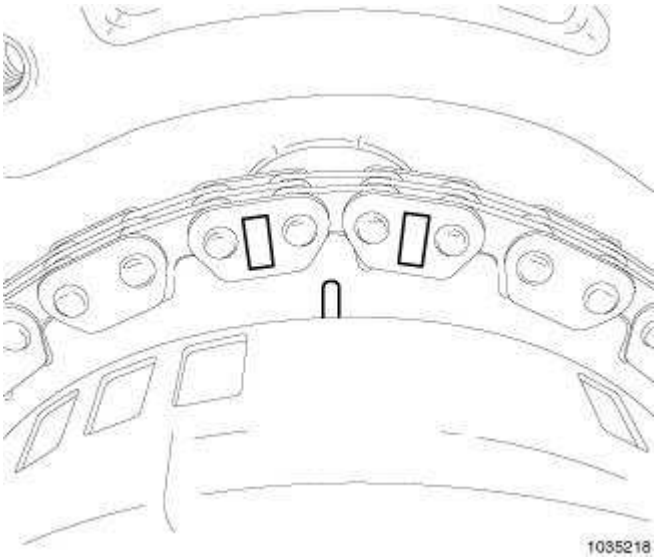


Fig. 410: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER GROUP, LLC

2. While holding the camshaft phaser in hand, position the timing chain on the camshaft phaser and align the timing marks as shown in illustration.

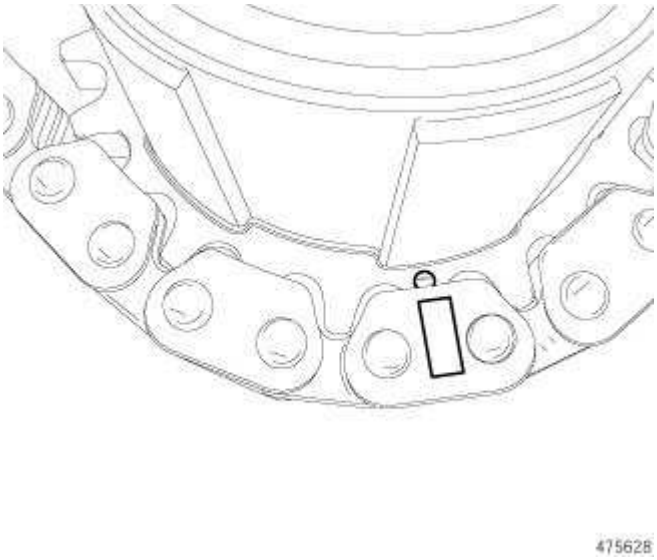


Fig. 411: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER GROUP, LLC

3. While holding the camshaft phaser and timing chain in hand, position the timing chain on the crankshaft sprocket and align the timing mark as shown in illustration.

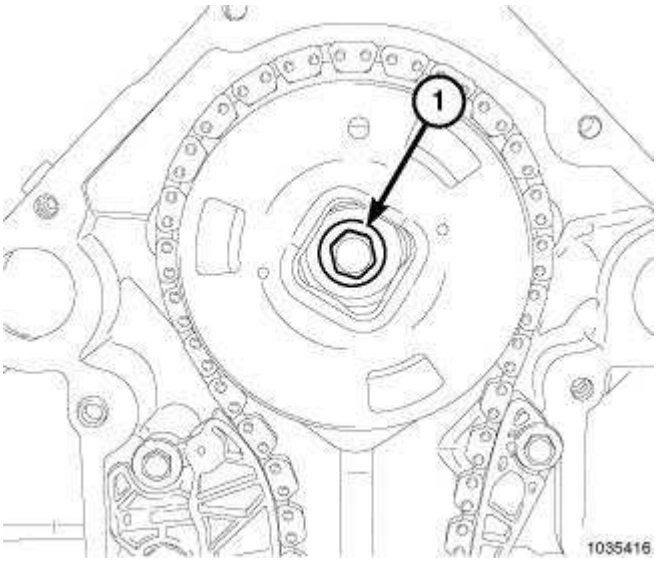


Fig. 412: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Align the slot in the camshaft phaser with the dowel on the camshaft and position the camshaft phaser on the camshaft while sliding the crankshaft sprocket into position.
5. Install the camshaft phaser retaining bolt (1) finger tight.

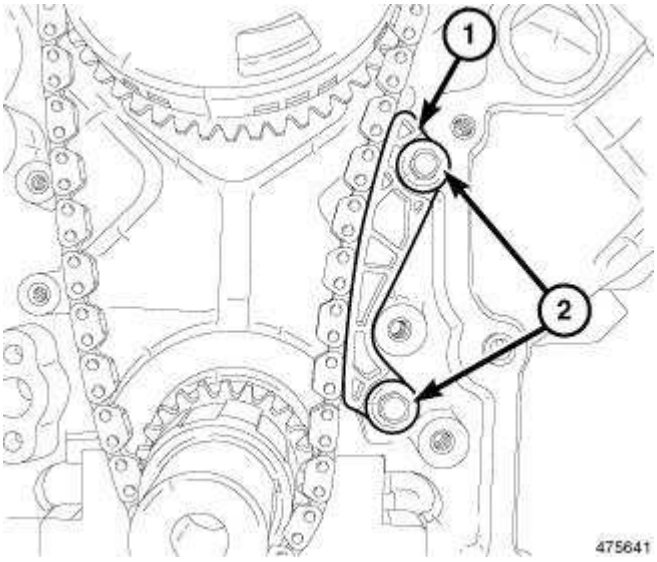


Fig. 413: Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. If removed, install the timing chain guide (1) and tighten the bolts (2) to 11 N.m (8 ft. lbs.).

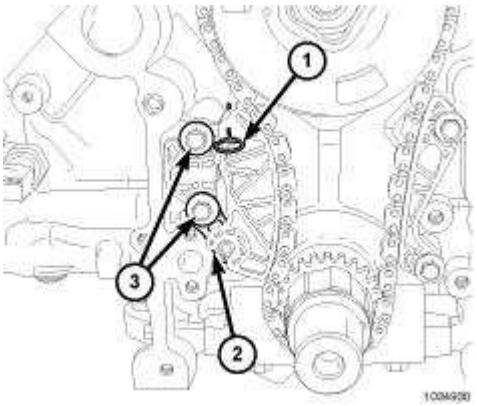


Fig. 414: Timing Chain Tensioner, Pin & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. If removed, install the timing chain tensioner (2) and tighten the bolts (3) to 11 N.m (8 ft. lbs.).
8. Remove the tensioner pin (special tool #8514, Pins, Tensioner) (1).

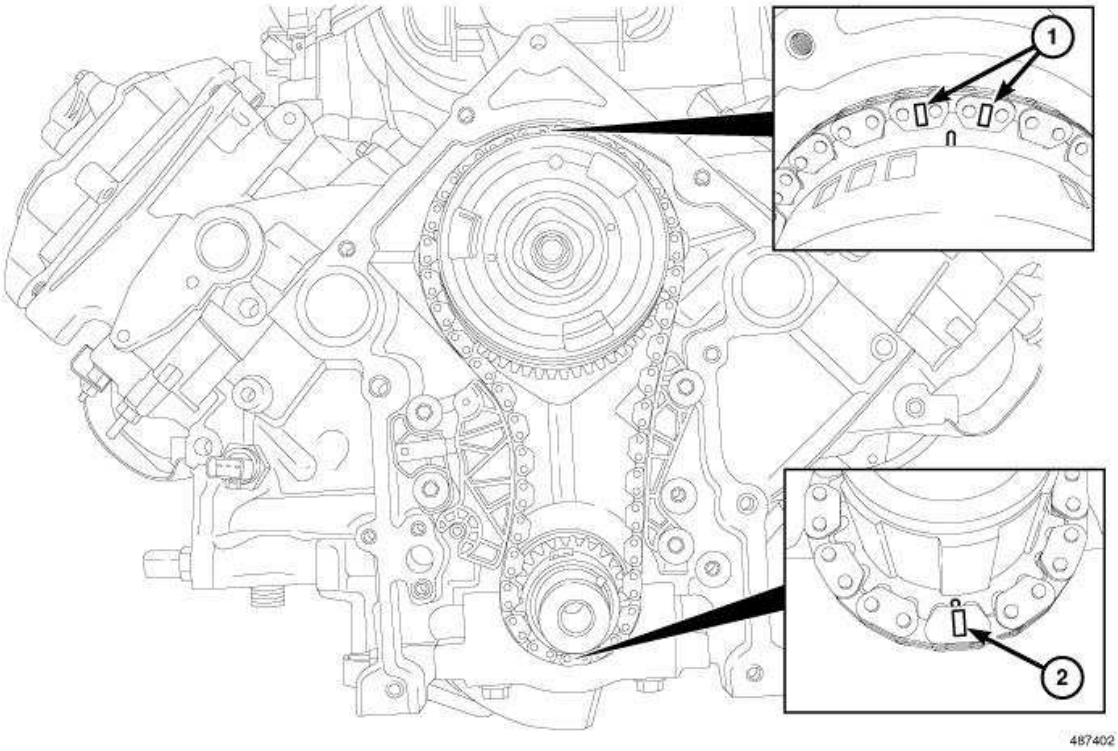


Fig. 415: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the crankshaft two revolutions and verify the alignment of the timing marks (1, 2). If the timing marks do not line up, remove the camshaft sprocket and realign.

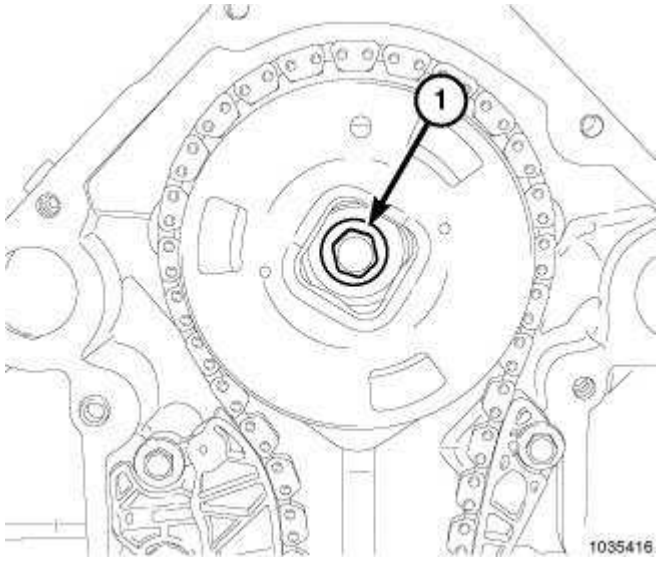


Fig. 416: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the camshaft phaser bolt (1) to 85 N.m (63 ft. lbs.).

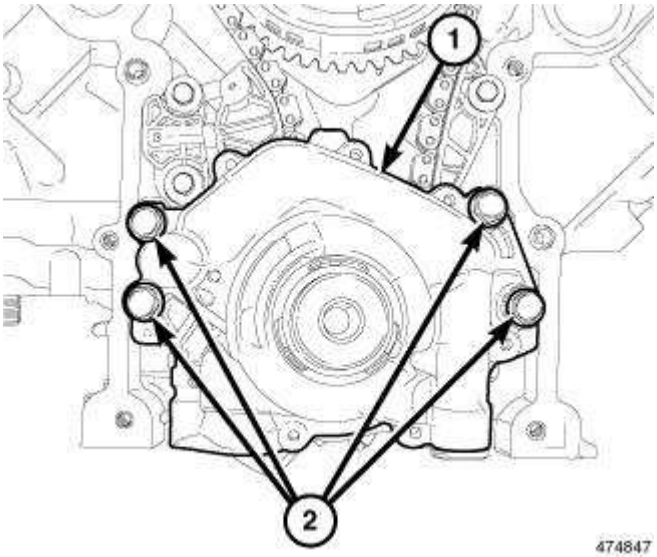


Fig. 417: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Position the oil pump (1) onto the crankshaft and install the oil pump retaining bolts (2) finger tight.

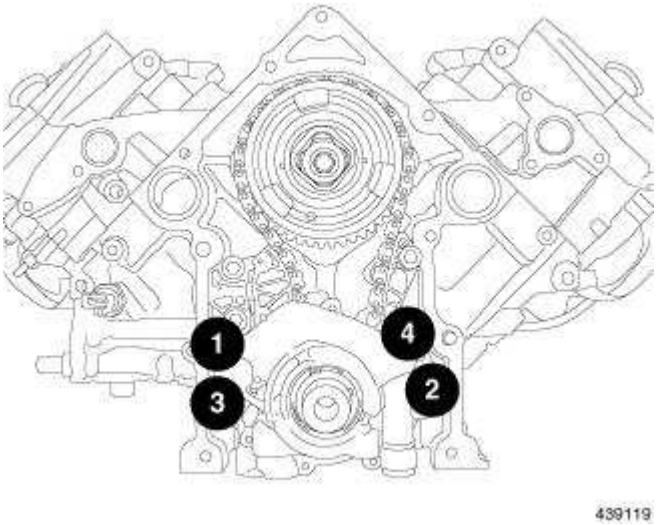


Fig. 418: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

12. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).

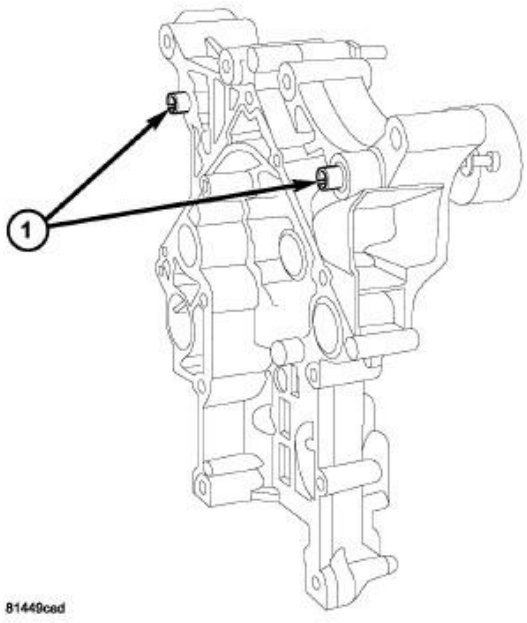


Fig. 419: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

13. Verify the slide bushings (1) are installed in the timing chain cover.
14. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
15. Fill the engine with oil.
16. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
17. Connect the negative battery cable.
18. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

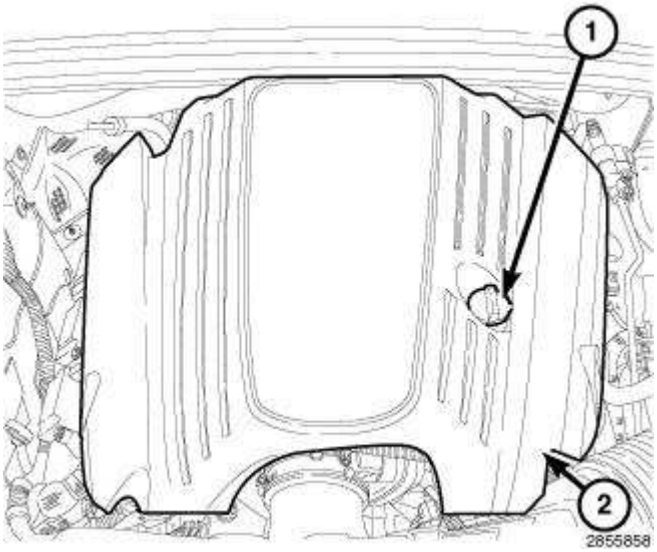


Fig. 420: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).
2. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .

WARNING: Do not remove the radiator pressure cap, cylinder block drain plugs or loosen the radiator draincock with the system hot and under pressure. Serious burns from coolant can occur.

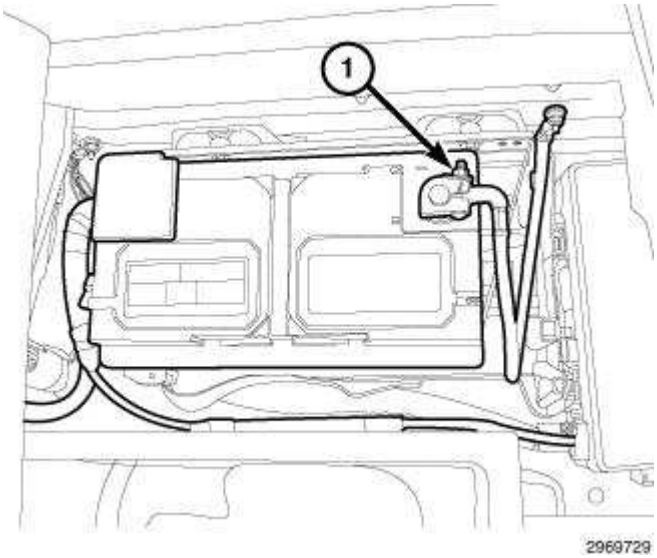


Fig. 421: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect and isolate the negative battery cable (1).
4. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

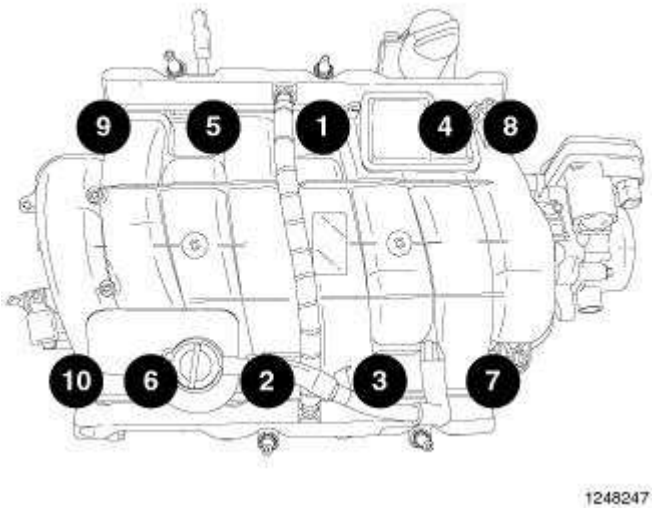


Fig. 422: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Remove the intake manifold and throttle body as an assembly.

5. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

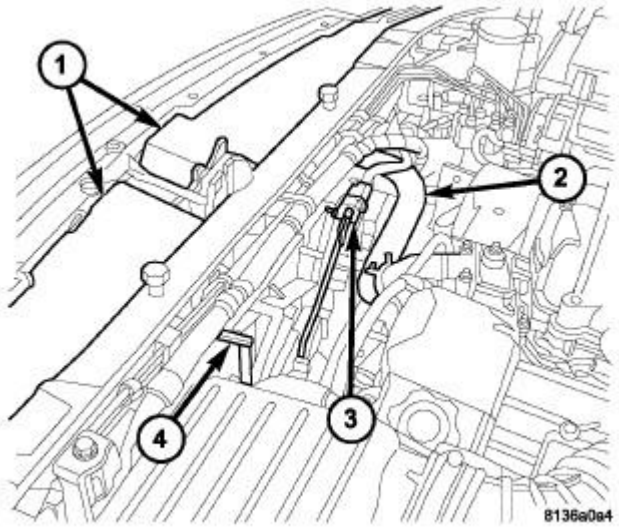


Fig. 423: Upper Radiator Closure Panel, Hose, Radiator Fan Electrical Connector & Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - UPPER RADIATOR CLOSURE PANELS
2 - UPPER RADIATOR HOSE
3 - RADIATOR FAN ELECTRICAL CONNECTOR

4 - RADIATOR FAN ASSEMBLY

6. Remove upper radiator hose (2).

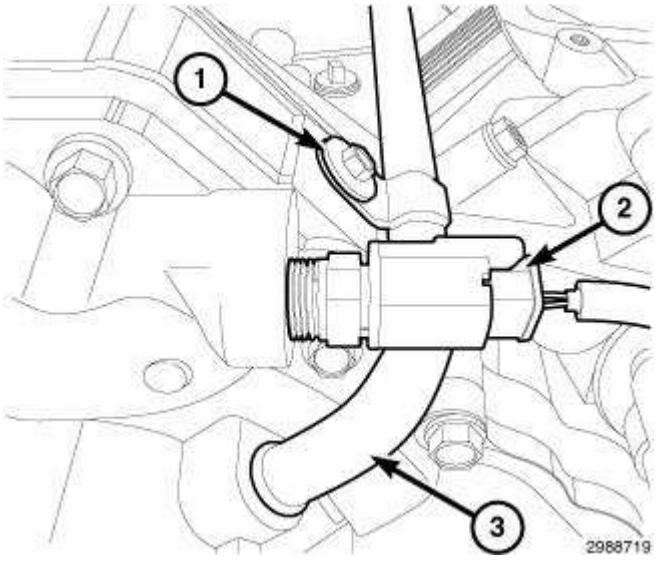


Fig. 424: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Remove the coolant temperature sensor electrical connector (2).
8. Remove the heater tube retaining bolt (1).
9. Lift the heater tube (3) out of the water pump.

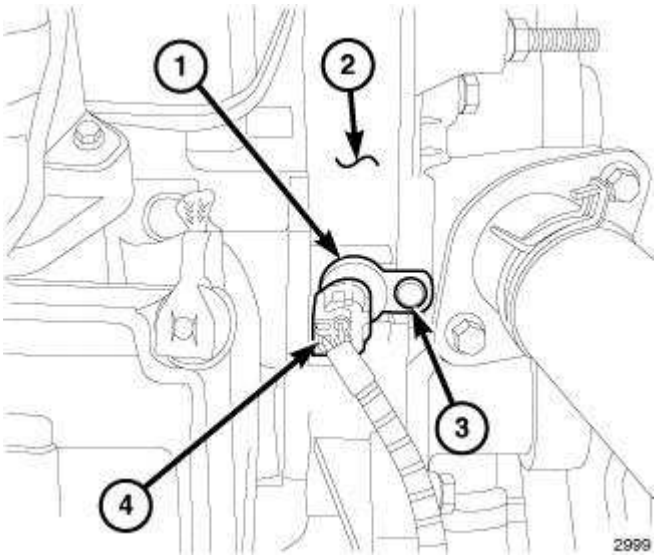


Fig. 425: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the camshaft position (CMP) sensor electrical connector (4).

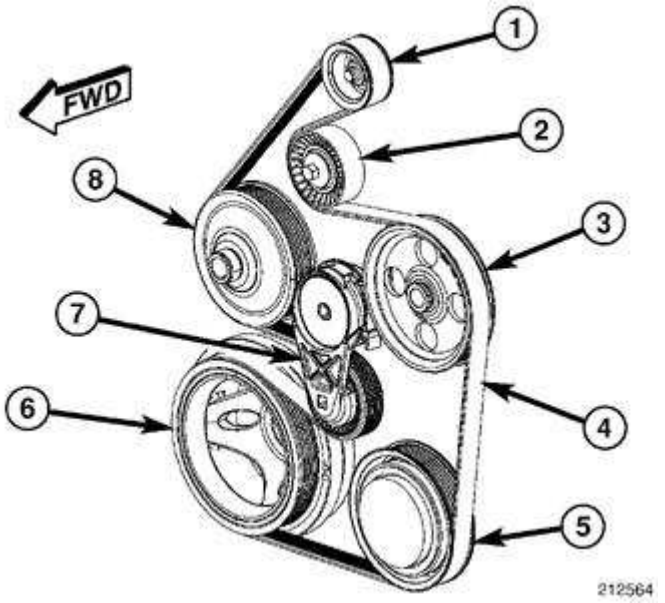


Fig. 426: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

11. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and remove the accessory drive belt (2), then slowly rotate the tensioner into the freearm position.
12. Remove accessory drive belt tensioner (8) and the idler pulley (6).
13. Remove the radiator. Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .
14. Remove the A/C condenser. Refer to **CONDENSER, A/C, REMOVAL** .
15. Remove A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .
16. Remove the generator. Refer to **GENERATOR, REMOVAL** .

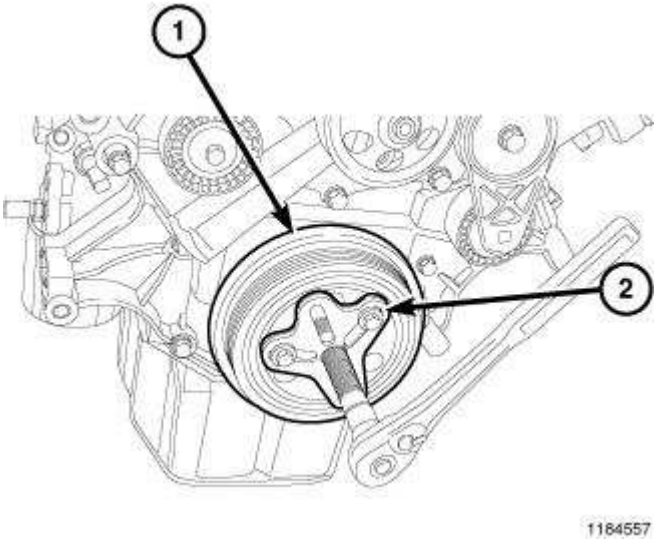


Fig. 427: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.**

17. Remove the crankshaft damper retaining bolt.
18. Install the puller tool (2) making sure the bolts are fully threaded through the entire crankshaft damper and remove the crankshaft damper (1).

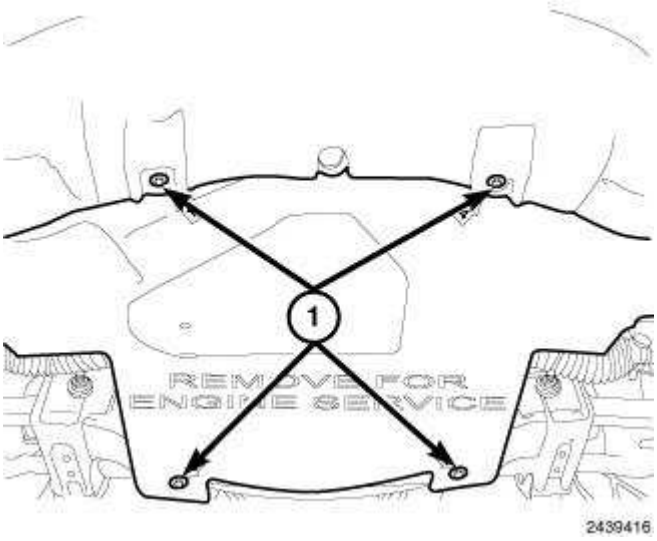


Fig. 428: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

19. Raise and support the vehicle
20. Remove the belly pan retainers (1) and remove the belly pan.
21. Remove the lower radiator hose clamp and remove the lower radiator hose.
22. Drain the engine oil.

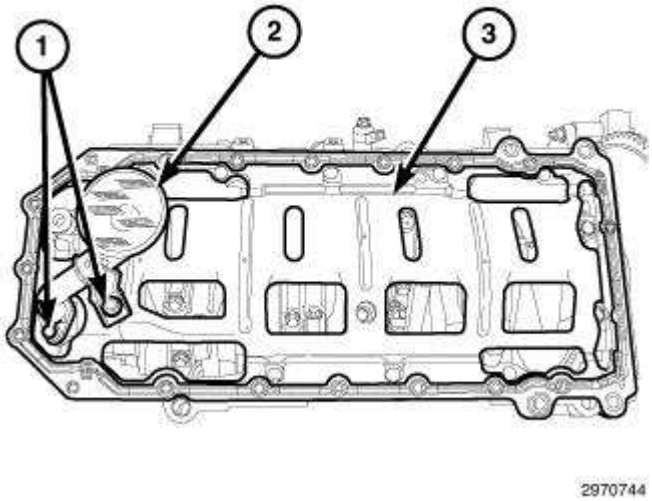


Fig. 429: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.

23. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L** and **PAN, OIL, AWD, REMOVAL, 5.7L**.
24. Remove the oil pump pickup tube retaining bolt and nut (1).
25. Remove the oil pump pickup tube (2).
26. Remove and discard the oil pan gasket/windage tray (3).

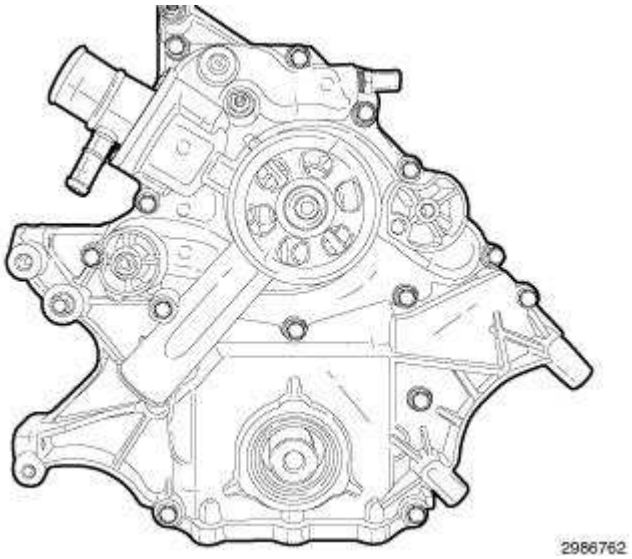


Fig. 430: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove water pump for timing cover removal.

NOTE: 6.4L timing cover shown in illustration, 5.7L timing cover similar.

27. Lower the vehicle.
28. Remove the engine timing cover retaining bolts and remove the engine timing cover.

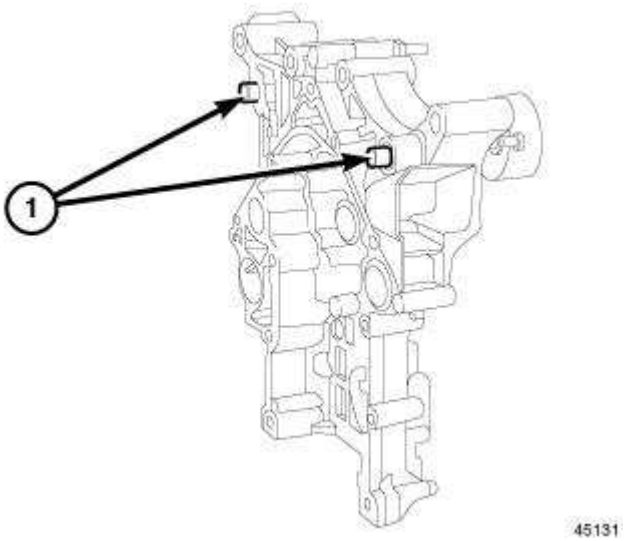


Fig. 431: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

29. Verify that the engine timing cover slide bushings (1) remain located in the engine timing cover.

INSTALLATION

INSTALLATION

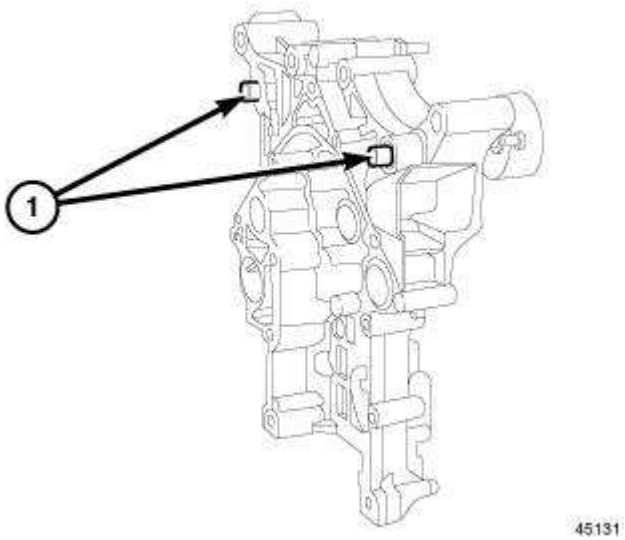


Fig. 432: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

1. Clean the engine timing cover and engine block surface.

NOTE: Always install a new gasket when servicing the engine timing cover.

2. Verify that the engine timing cover slide bushings (1) remain located in the engine timing cover.

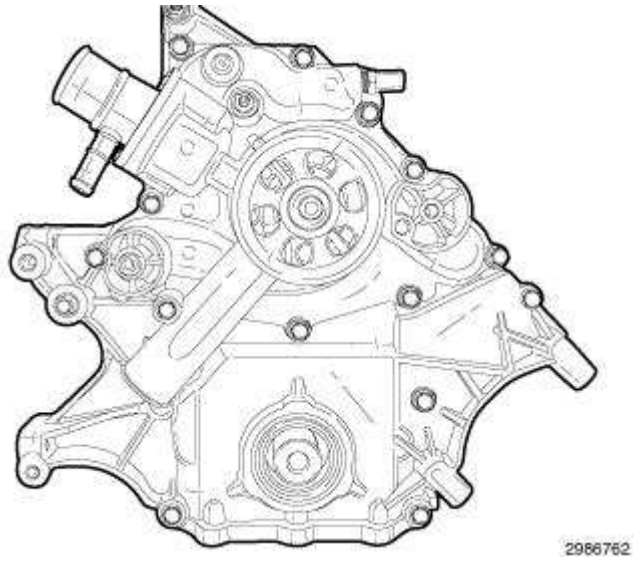


Fig. 433: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: 6.4L timing cover shown in illustration, 5.7L timing cover similar.

3. Using a new gasket, install the engine timing cover and tighten the retaining bolts to 28 N.m (21 ft. lbs.).

NOTE: The large lifting stud is torqued to 55 N.m (40 ft. lbs.).

4. Tighten the large lifting stud to 55 N.m (40 ft. lbs.).

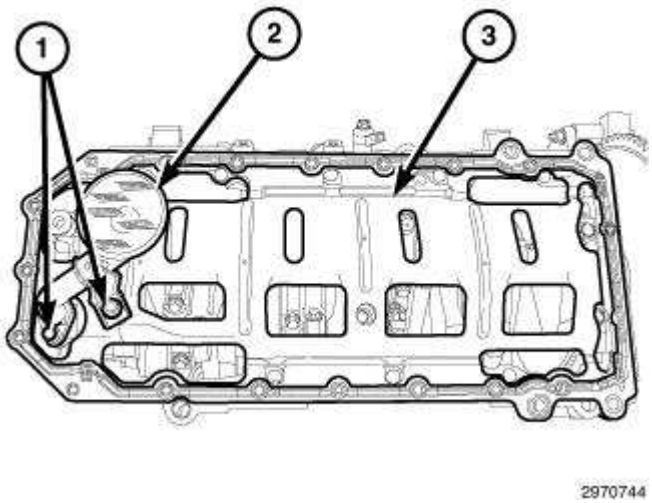


Fig. 434: Integral Windage Tray, Oil Pump Pickup Tube & Bolts

Courtesy of CHRYSLER GROUP, LLC

5. Raise and support the vehicle.
6. Install the oil pump pickup tube (2) and the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L** and **PAN, OIL, AWD, INSTALLATION, 5.7L**.
7. Install the lower radiator hose and clamp.

CAUTION: The Damper Installer (special tool #8512A, Installer, Damper) is assembled in a specific sequence. Failure to assemble this tool in this sequence may result in tool failure and severe damage to either the tool or the crankshaft.

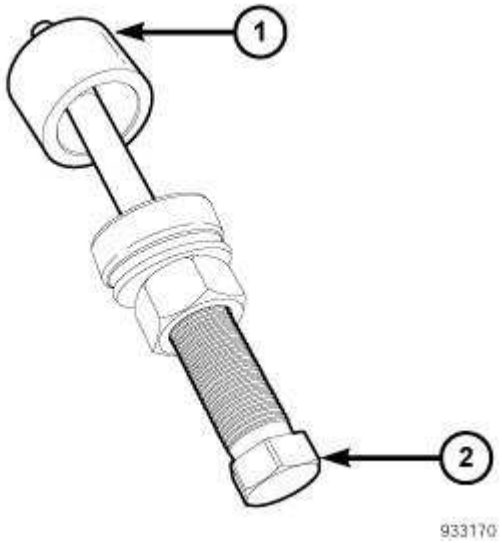


Fig. 435: Pressing Cup & Damper Installer
Courtesy of CHRYSLER GROUP, LLC

8. Assemble the Damper Installer (special tool #8512A, Installer, Damper) (2) as follows:
    1. Install the nut onto the threaded shaft.
    2. Install the roller bearing onto the threaded shaft making sure the hardened bearing surface is facing the nut.
    3. Install the pressing cup (2) from the A/C Hub Installer (special tool #6871, Installer, A/C Hub) onto the threaded shaft.
    4. Coat the threaded shaft with MOPAR® Nickel Anti-Seize or equivalent.

CAUTION: To prevent severe damage to the crankshaft Damper Installer (special tool #8512A, Installer, Damper), thoroughly clean the damper bore and the crankshaft nose before installing damper.

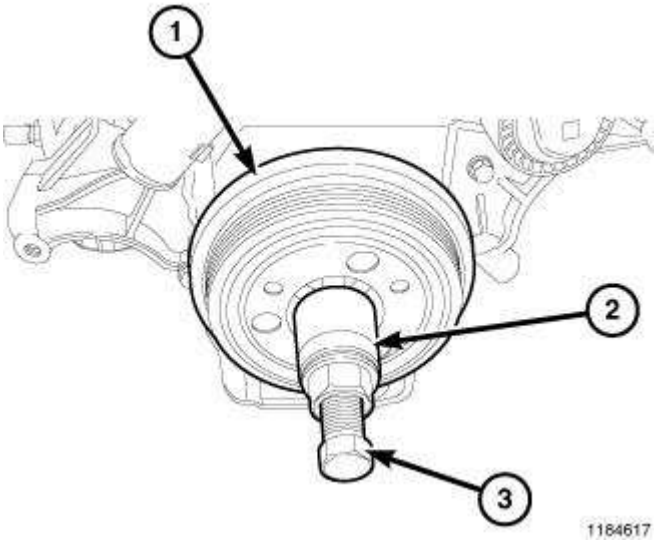


Fig. 436: Pressing Damper Onto Crankshaft
Courtesy of CHRYSLER GROUP, LLC

9. Position the crankshaft damper (1) onto the crankshaft.
10. Using the crankshaft Damper Installer (special tool #8512A, Installer, Damper) (3) and the pressing cup (2) from A/C Hub Installer (special tool #6871, Installer, A/C Hub), press the crankshaft damper (1) onto the crankshaft.
11. Install the crankshaft damper bolt and tighten to 176 N.m (129 ft. lbs.).

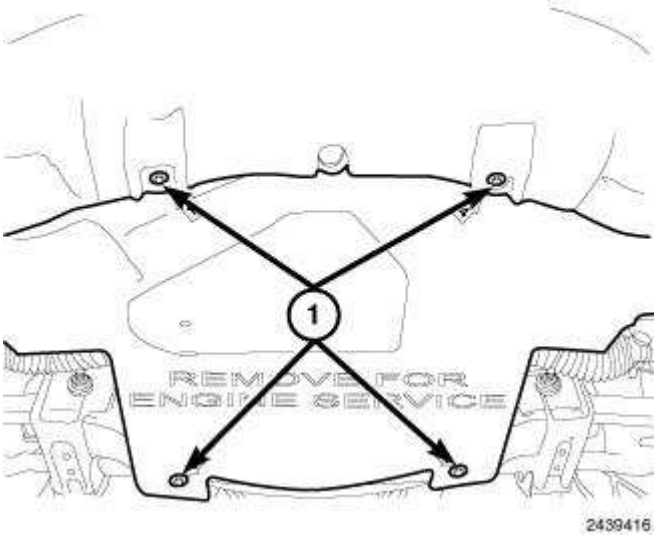


Fig. 437: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

12. Position the belly pan and install the belly pan retainers (1).
13. Lower the vehicle.
14. Install the generator. Refer to **GENERATOR, INSTALLATION** .

15. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .
16. Install the A/C condenser. Refer to **CONDENSER, A/C, INSTALLATION** .
17. Install the radiator. Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** .

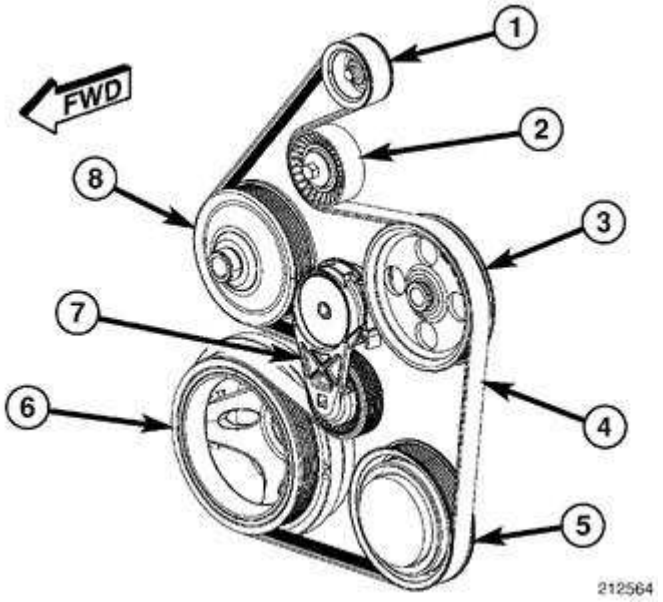


Fig. 438: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

18. Install the accessory drive belt tensioner assembly (8) and idler pulley (6).
19. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and remove the accessory drive belt (2), then slowly rotate the tensioner into the freearm position.
20. Install the oil dipstick tube and retaining nut.

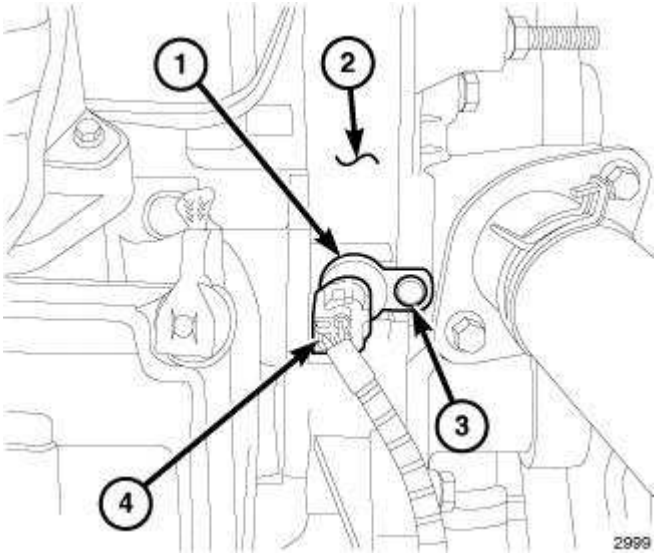


Fig. 439: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

21. Connect the camshaft position (CMP) sensor electrical connector (4).

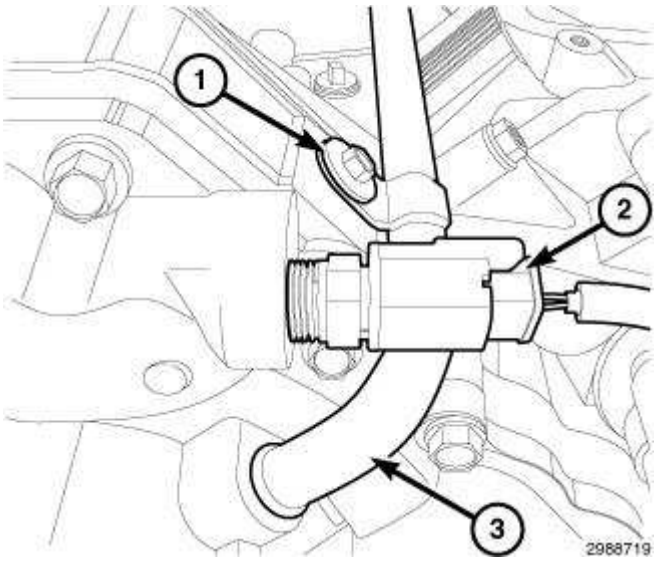


Fig. 440: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

22. Install the heater tube (3) into of the water pump.
23. Install the heater tube retaining bolt (1) and tighten to 12 N.m (9 ft. lbs.).
24. Connect the coolant temperature sensor electrical connector (2).

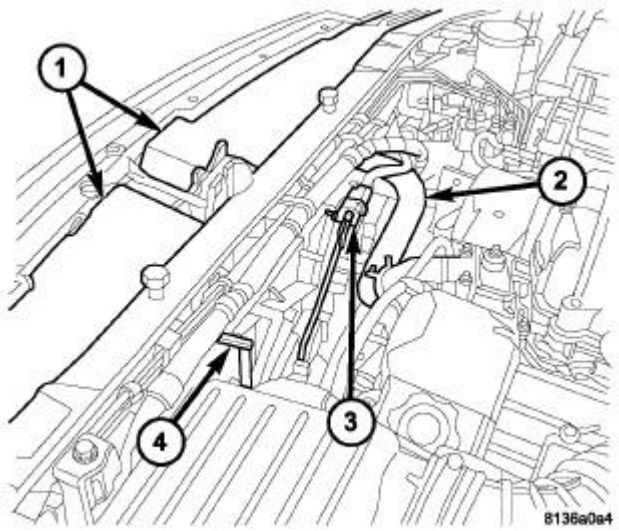


Fig. 441: Upper Radiator Closure Panel, Hose, Radiator Fan Electrical Connector & Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - UPPER RADIATOR CLOSURE PANELS
2 - UPPER RADIATOR HOSE
3 - RADIATOR FAN ELECTRICAL CONNECTOR
4 - RADIATOR FAN ASSEMBLY

25. Install the upper radiator hose (2) and clamp.

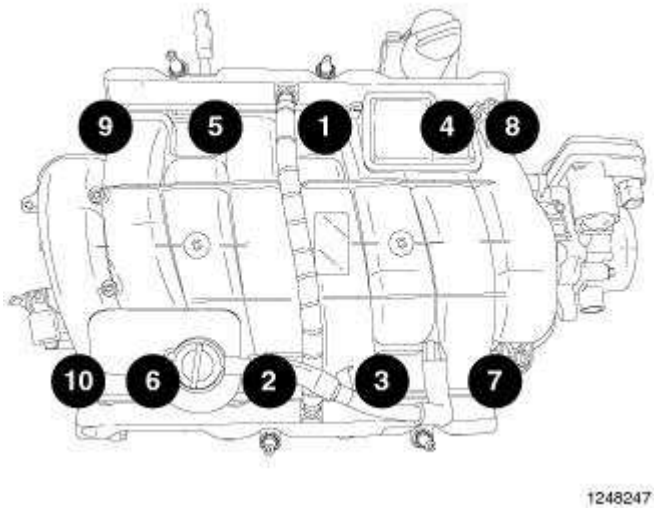


Fig. 442: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

26. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.
27. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
28. Fill the crankcase with the specified type and amount of engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

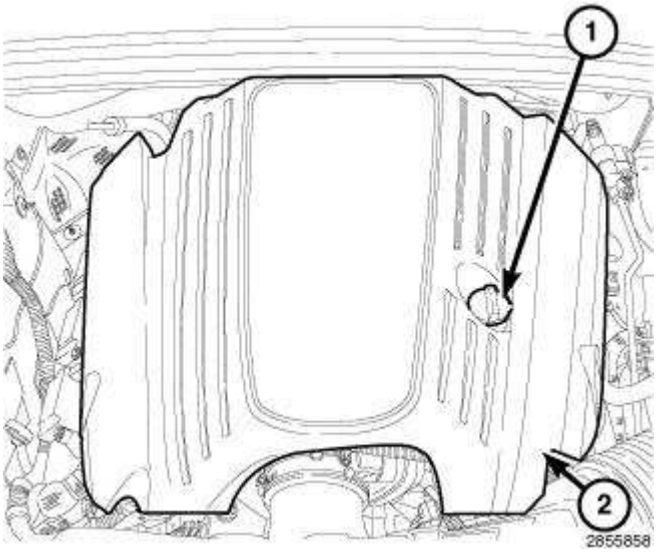


Fig. 443: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

29. Position the engine cover (2) and secure the retaining grommets onto the ball studs.

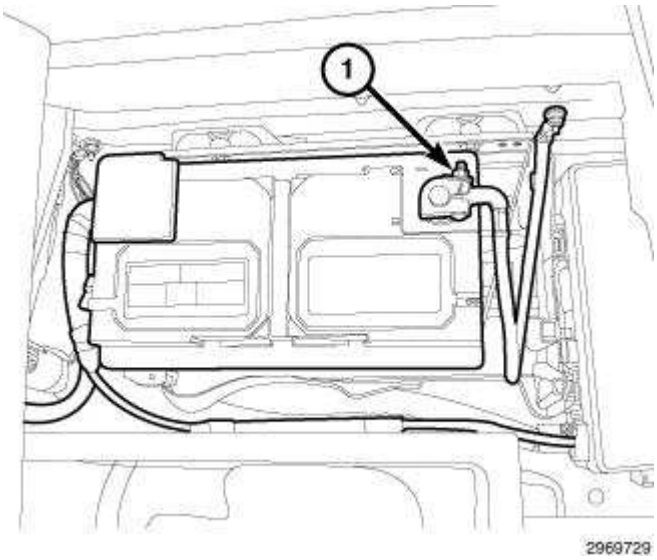


Fig. 444: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

30. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).
31. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
32. Start the engine and check for leaks.

TENSIONER, ENGINE TIMING

STANDARD PROCEDURE

STANDARD PROCEDURE - RESETTING TIMING CHAIN TENSIONER

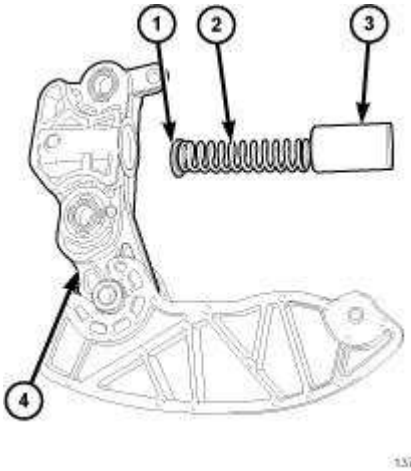


Fig. 445: Tensioner Body, Washer, Spring & Plunger
Courtesy of CHRYSLER GROUP, LLC

NOTE: Verify that the tensioner is assembled correctly.

1. Install the washer (1), spring (2), and plunger (3) inside the tensioner body (4).

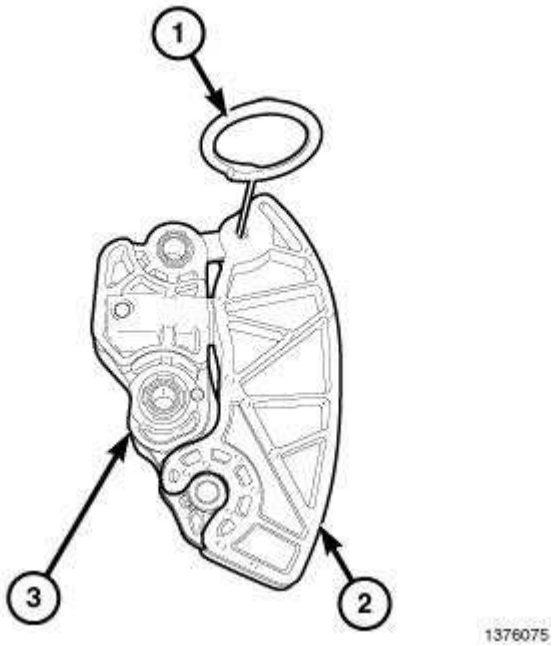


Fig. 446: Tensioner Pin, Guide Shoe & Tensioner Body
Courtesy of CHRYSLER GROUP, LLC

2. Squeeze the tensioner body (3) and movable guide shoe (2) together and install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

ENGINE

6.4L - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

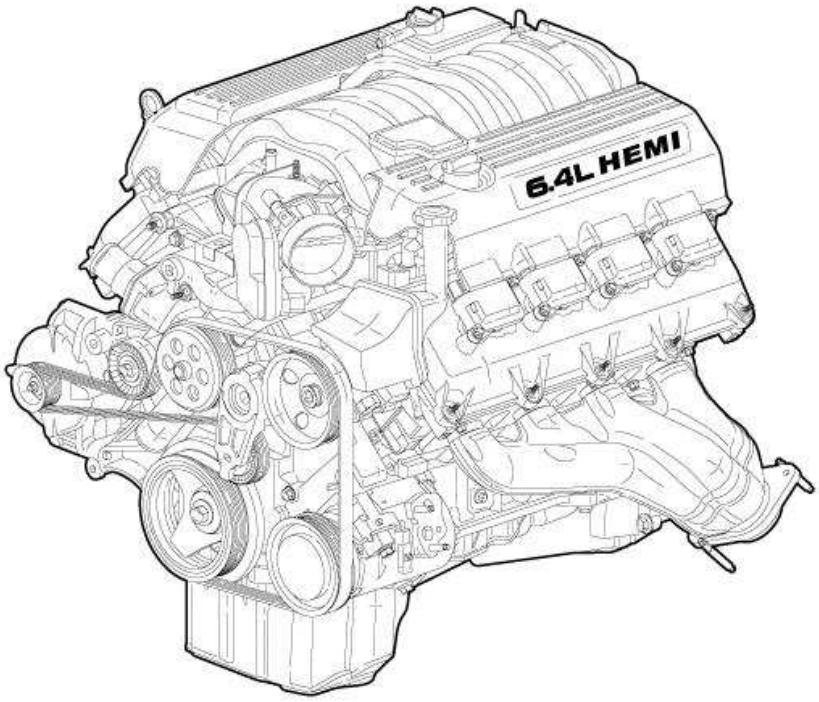


Fig. 1: 6.4L HEMI V-8 Engine
Courtesy of CHRYSLER GROUP, LLC

The 6.4L HEMI eight-cylinder SRT high performance engine is a 90° V-Type, deep skirt, lightweight cast iron block with aluminum heads, single cam, overhead valves, and hydraulic roller lifters. The heads incorporate splayed valves with a hemispherical style combustion chamber and dual spark plugs. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2. The 6.4L HEMI engine is a bored and stroked version of the 5.7L HEMI engine developed for SRT high performance vehicles. This engine shares the same architecture as the 2009 5.7L HEMI with the following Performance Upgrades:

- Increased Bore
- Increased Stoke
- Increased Valve Sizing

The 6.4L HEMI engine also has improved horsepower, torque and fuel economy as compared with the 6.1L HEMI engine. This is achieved with the larger displacement and the following Technical

Improvements:

- Variable Cam Timing (VCT) Cam Phasing System
- Multi-Displacement System (MDS)
- High Flow Ports
- Increased Maximum RPM
- Combustion Chamber Shape
- Higher Compression Ratio

DIAGNOSIS AND TESTING

ENGINE DIAGNOSIS - INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either performance e.g., (engine idles rough and stalls) or mechanical e.g., (a strange noise). For possible causes and corrections of malfunctions, refer to **ENGINE MECHANICAL DIAGNOSIS CHART**.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that can not be isolated with the Service Diagnosis charts. For additional Information on diagnosis and testing, refer to the following tests:

- Cylinder Compression Pressure Leakage. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.
- Cylinder Combustion Pressure Leakage. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.
- Checking Engine Oil Pressure. Refer to **CHECKING ENGINE OIL PRESSURE**.
- Cylinder Head Gasket Failure. Refer to **DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE**.
- Intake Manifold Leakage. Refer to **DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKAGE**.

CYLINDER COMBUSTION PRESSURE LEAKAGE

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating)
- Leaks between adjacent cylinders or into water jacket
- Any causes for combustion and/or compression pressure loss

1. Check the coolant level and fill as required. Do not install the radiator cap.
2. Start and operate the engine until it reaches normal operating temperature, then turn the engine OFF.
3. Remove the spark plugs.
4. Remove the oil filler cap.
5. Remove the air cleaner hose.
6. Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1, 379 kPa (200 psi) maximum and 552 kPa (80 psi) recommended.
7. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Position the piston of cylinder to be tested at TDC compression. While testing, listen for pressurized air escaping through the throttle body, tailpipe, and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with no more than 25% leakage between cylinders.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART**.

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Air escapes through the throttle body	Intake valve bent, burnt, or not seated properly.	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
Air escapes through the tailpipe	Exhaust valve bent, burnt, or not seated properly.	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
Air escapes through the radiator	Cylinder head gasket leaking or cracked in cylinder head or engine block.	Remove cylinder head and inspect. Replace cylinder head gasket, cylinder head or engine block as necessary.
More than 50% leakage from adjacent cylinders	Cylinder head gasket leaking or crack in cylinder head or engine block between adjacent cylinders.	Remove cylinder head and inspect. Replace cylinder head gasket, cylinder head or engine block as necessary.
More than 25% leakage and air escapes through the oil filler cap opening only	Stuck or broken piston rings; cracked piston; worn rings and/or cylinder wall.	Remove cylinder head and inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary.

CYLINDER COMPRESSION PRESSURE LEAKAGE

NOTE: The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

NOTE: Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plugs and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the 3rd revolution. Continue the test for the remaining cylinders.

NOTE: The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.

7. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
8. If one or more cylinders have abnormally low compression pressures, repeat the compression test.

NOTE: If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question.

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.

ENGINE MECHANICAL DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase.	1. Check for correct oil level. Adjust oil level by draining or adding as needed.
	2. Thin or diluted oil.	2. Change oil. Refer to

		Engine/Lubrication/OIL - Standard Procedure.
	3. Low oil pressure.	3. Check engine oil level. If OK, perform oil pressure test. Refer to **Engine/Lubrication - Diagnosis and Testing**.
	4. Dirt in hydraulic lifters.	4. Clean/replace hydraulic lifters.
	5. Bent push rod(s).	5. Install new push rods.
	6. Worn rocker arms.	6. Inspect oil supply to rocker arms and replace worn arms as needed.
	7. Worn hydraulic lifters.	7. Install new hydraulic lifters.
	8. Worn valve guides.	8. Inspect all valve guides and replace as necessary.
	9. Excessive runout of valve seats or valve faces.	9. Grind valves and seats.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. If OK, perform oil pressure test. Refer to **Engine/Lubrication - Diagnosis and Testing**.
	3. Thin or diluted oil.	3. Change oil to correct viscosity. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	4. Excessive connecting rod bearing clearance.	4. Measure bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Connecting rod journal out of round.	5. Replace crankshaft or grind journals.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. If OK, perform oil pressure test. Refer to **Engine/Lubrication - Diagnosis and Testing**.
	3. Thin or diluted oil.	3. Change oil to correct viscosity. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	4. Excessive main bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play.	5. Check crankshaft thrust bearing for excessive wear on flanges.
	6. Crankshaft main journal out of round or worn.	6. Grind journals or replace crankshaft.

	7. Loose flexplate, flywheel or torque converter.	7. Inspect crankshaft, flexplate, flywheel and bolts for damage. Tighten to correct torque.
LOW OIL PRESSURE	1. Low oil level.	1. Check oil level and fill if necessary.
	2. Faulty oil pressure sending unit.	2. Install new sending unit.
	3. Clogged oil filter.	3. Install new oil filter.
	4. Worn oil pump.	4. Replace oil pump assembly.
	5. Thin or diluted oil.	5. Change oil to correct viscosity. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	6. Excessive bearing clearance.	6. Measure bearings for correct clearance.
	7. Oil pump relief valve stuck.	7. Remove valve to inspect, clean and reinstall.
	8. Oil pickup tube loose, broken, bent or clogged.	8. Inspect oil pickup tube and pump, and clean or replace if necessary.
	9. Oil pump cover warped or cracked.	9. Install new oil pump.
	10. Faulty or missing piston cooling jets.	10. Replace piston cooling jets.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket.
	2. Loose fastener or broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Front or rear crankshaft oil seal leaking.	3. Replace seal.
	4. Leaking oil gallery plug or cup plug.	4. Remove and reseal threaded plug. Replace cup style plug.
EXCESSIVE OIL CONSUMPTION OR SPARK PLUGS OIL FOULED	1. PCV System malfunction.	1. Refer to **VALVE, POSITIVE CRANKCASE VENTILATION (PCV), REMOVAL** .
	2. Defective valve stem seal (s).	2. Repair or replace seal(s).
	3. Worn or broken piston rings.	3. Hone cylinder bores. Install new rings.
	4. Scuffed pistons/cylinder walls.	4. Hone cylinder bores and replace pistons as required.
	5. Carbon in oil control ring groove.	5. Remove rings and de-carbon piston.
	6. Worn valve guides.	6. Inspect/replace valve guides as necessary.
	7. Piston rings fitted too tightly in grooves.	7. Remove rings and check ring end gap and side clearance. Replace if

		necessary.

ENGINE LUBRICATION DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-rings a. Misaligned or damaged b. Loose fasteners, broken or porous metal parts 2. Crankshaft rear seal 3. Crankshaft seal flange damaged 4. Oil pan flange cracked 5. Front cover seal damaged/misaligned 6. Damaged vibration damper 7. Crankshaft rear flange microporosity	1. Verify condition a. Replace as necessary b. Tighten fasteners, repair or replace metal parts 2. Replace as necessary 3. Polish or replace crankshaft 4. Replace oil pan 5. Replace seal 6. Polish or replace damper 7. Replace crankshaft
OIL PRESSURE DROP	1. Low oil level 2. Faulty oil pressure sending unit 3. Low oil pressure 4. Clogged oil filter 5. Worn oil pump 6. Thin or diluted oil 7. Excessive bearing clearance 8. Oil pump relief valve stuck 9. Oil pickup tube loose or damaged 10. Faulty or missing piston cooling jets	1. Check and correct oil level 2. Replace sending unit 3. Check pump and bearing clearance 4. Replace oil filter 5. Replace as necessary 6. Change oil and filter 7. Replace as necessary 8. Replace oil pump 9. Replace as necessary 10. Replace piston cooling jets
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings 2. Carbon in oil ring slots 3. Incorrect ring size installed 4. Worn valve guides 5. Leaking intake gasket 6. Leaking valve guide seals	1. Hone cylinder bores and replace rings 2. Replace rings 3. Replace rings 4. Ream guides and replace valves 5. Replace intake gaskets 6. Replace valve guide seals

LUBRICATION

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-rings.	1. Replace as necessary.
	a. Misaligned or damaged.	a. Replace as necessary.
	b. Loose fasteners, broken or porous metal parts.	b. Tighten fasteners, Repair or replace metal parts.
	2. Crankshaft rear seal.	2. Replace as necessary.
	3. Crankshaft seal flange. Scratched, nicked or grooved.	3. Polish or replace crankshaft.
	4. Oil pan flange cracked.	4. Replace oil pan.
	5. Front cover seal, damaged or misaligned.	5. Replace seal.
	6. Scratched or damaged vibration damper hub.	6. Polish or replace damper.
	7. Crankshaft Rear Flange Microporosity.	7. Replace Crankshaft.
OIL PRESSURE DROP	1. Low oil level.	1. Check and correct oil level.
	2. Faulty oil pressure sending unit.	2. Replace sending unit.
	3. Low oil pressure.	3. Check pump and bearing clearance.
	4. Clogged oil filter.	4. Replace oil filter.
	5. Worn oil pump.	5. Replace as necessary.
	6. Thin or diluted oil.	6. Change oil and filter.
	7. Excessive bearing clearance.	7. Replace as necessary.
	8. Oil pump relief valve stuck.	8. Replace oil pump.
	9. Oil pickup tube loose or damaged.	9. Replace as necessary.
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings.	1. Hone cylinder bores and replace rings.
	2. Carbon in oil ring slots.	2. Replace rings.
	3. Incorrect ring size installed.	3. Replace rings.
	4. Worn valve guides.	4. Ream guides and replace valves.
	5. Leaking intake gasket(s).	5. Replace intake gasket(s).
	6. Leaking valve guide seals.	6. Replace valve guide seals.

OIL CONSUMPTION TEST AND DIAGNOSIS

Diagnostic Procedures

The following diagnostic procedures are used to determine the source of excessive internal oil Consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: Engine oil consumption may be greater than normal during engine break-in. Repairs should be delayed until vehicle has been driven at least 7, 500 miles.

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, ensure no external engine oil leaks are present.

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and/or correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.
2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPAR® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.
4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, re-check for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a **CYLINDER COMPRESSION PRESSURE LEAKAGE** test and **CYLINDER-TO-CYLINDER LEAKAGE TEST** using the standard leak down gauge following manufacturers suggested best practices.

   NOTE: Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or valve guides are at fault.

3. If one or more cylinders have more than 15% leak down further engine tear down and inspection will be required.

TOP 19 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings, also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of "PCV "system**

   The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

   The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not

flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

   When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption;

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

    Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus

leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and/or ambient temperatures.

12. **Dirty Engine Oil**

    Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

    Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick in this incorrect position which will actually make the oil level too high. If the oil level is so high that the lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

    A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

    Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

    Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

    There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated

plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

    Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption, an extremely dirty air filter would be one example of this situation.

STANDARD PROCEDURE

ENGINE GASKET SURFACE PREPARATION

Fig. 2: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

Fig. 3: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- High speed power tool with a plastic bristle brush style disc.

Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent).

DUST COVERS AND CAPS

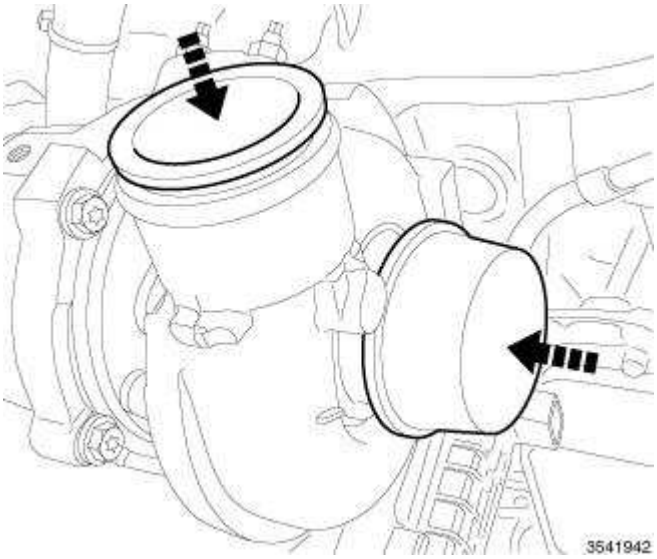


Fig. 4: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

Due to the high amounts of failures cased by dust, dirt, moisture and other foreign debris being introduced to the engine during service. Covers or caps are needed to reduce the possible damage that can be caused or created.

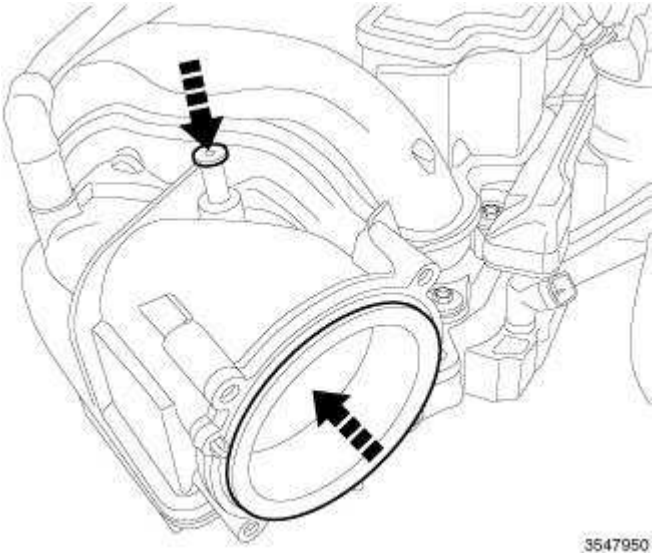


Fig. 5: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers over openings will reduce any possibilities for foreign materials to enter the engine systems. Using miller tool (special tool #10368, Set, Universal Protective Cap), Select the appropriated cover needed to the procedure.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Always maintain the original center line when drilling and/or tapping holes.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads
- Tapping the hole with a special Heli-Coil Tap or equivalent
- Installing a Heli-Coil insert into the tapped hole to bring the hole back to its original thread size

HYDROSTATIC LOCK

CAUTION: Do not attempt to run engine. Severe damage could occur.

When an engine is suspected of hydrostatic lock (regardless of what caused the problem), follow the steps below.

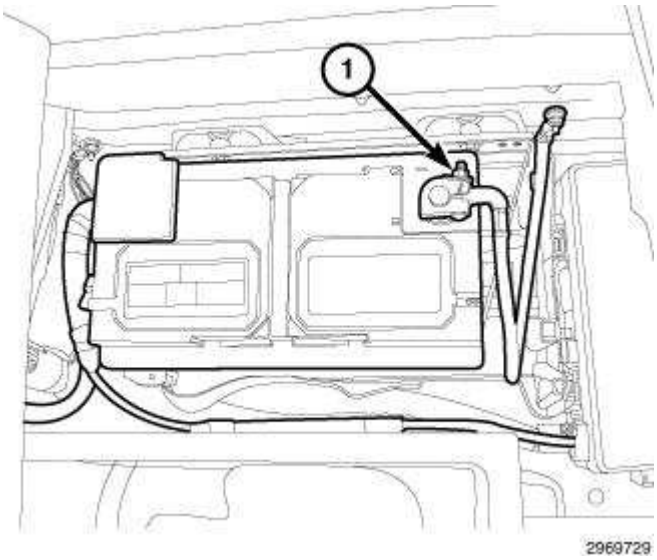


Fig. 6: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

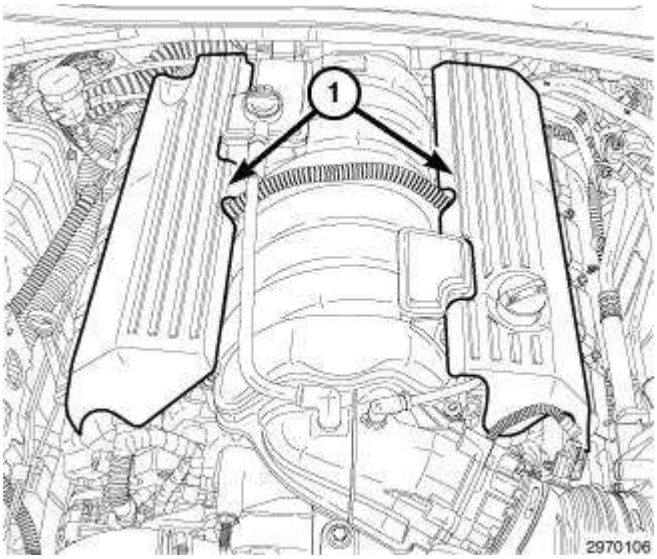


Fig. 7: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).
3. Place a shop towel around the fuel supply line Quick Connect Fitting to catch any fuel that may be under pressure and disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .

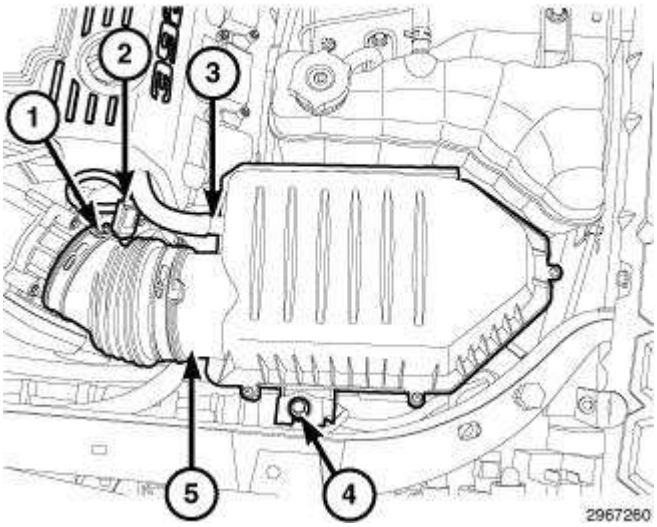


Fig. 8: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

4. Loosen the air duct retaining clamp (1) at the throttle body.
5. Disconnect the intake air temperature sensor electrical connector (2).
6. Remove the makeup air hose (3) at the air cleaner housing.
7. Remove the air cleaner housing retaining bolt (4).
8. While lifting up the air cleaner housing (5), slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.
9. Inspect the air duct, air cleaner housing and the intake manifold to make sure the system is dry and clear of any foreign material.
10. Place a shop towel around the spark plugs to catch any fluid that may possibly be under pressure in the cylinder head.
11. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
12. With the spark plugs removed, rotate the crankshaft using a breaker bar and socket.
13. Identify the fluid in the cylinders (coolant, fuel, oil, etc.).
14. Make sure all fluid has been removed from the cylinders.
15. Repair engine or components as necessary to prevent this problem from occurring again.
16. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This will help prevent engine damage on restart.
17. Install new spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
18. Perform the Engine Oil Service procedure. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
19. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
20. Start the engine and check for leaks.

SPECIFICATIONS

SPECIFICATIONS

GENERAL DESCRIPTION

DESCRIPTION	SPECIFICATION
Engine Type	90° V-8 OHV
Displacement	6.4 Liters 392 (Cubic Inches)
Bore	103.9 mm (4.09 in.)
Stroke	94.6 mm (3.72 in.)
Compression Ratio	10.9:1
Firing Order	1-8-4-3-6-5-7-2
Lubrication	Pressure Feed - Full Flow Filtration
Cooling System	Liquid Cooled - Forced Circulation
Cylinder Block	Cast Iron
Cylinder Head	Aluminum
Crankshaft	Forged Steel
Camshaft	Cast Iron
Pistons	Aluminum Alloy
Connecting Rods	Powdered Metal

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Cylinder Bore Diameter	103.9 mm	4.09 in.
Out of Round (MAX)	0.008 mm	0.0003 in.
Taper (MAX)	0.0127 mm	0.0005 in.
Lifter Bore Diameter	21.45 - 21.425 mm	0.8444 - 0.8435 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Clearance Measured at 38.0 mm (1.5 in.) Below Deck	0.0245 - 0.0515 mm	0.00096 - 0.0020 in.
Ring Groove Diameter		
Groove #1	93.1 - 93.4 mm	3.665 - 3.677 in.
Groove #2	91.6 - 91.8 mm	3.606 - 3.614 in.
Weight	435 grams	15.34 oz.
Piston Length	54.70 - 55.30 mm	2.153 - 2.177 in.
Ring Groove Width		
No. 1	1.2 mm	0.0472 in

No. 2	1.2 mm	0.0472 in
No. 3	2.0 mm	0.0787 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Ring Gap		
Top Compression Ring	0.30 - 0.40 mm	0.0118 - 0.0157 in.
Second Compression Ring	0.35 - 0.60 mm	0.0137 - 0.0236 in.
Oil Control (Steel Rails)	0.20 - 0.71 mm	0.0079 - 0.028 in.
Side Clearance		
Top Compression Ring	0.02 - 0.068 mm	0.0007 - 0.0026 in.
Second Compression Ring	0.02 - 0.058 mm	0.0007 - 0.0022 in.
Oil Ring (Steel Ring)	0.019 - 0.229 mm	0.0007 - 0.0091 in.
Ring Width		
Top Compression Ring	1.472 - 1.490 mm	0.0579 - 0.0586 in.
Second Compression Ring	1.472 - 1.490 mm	0.0579 - 0.0586 in.
Oil Ring (Steel Rails)	0.447 - 0.473 mm	0.0175 - 0.0186 in.

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Side Clearance	0.10 - 0.35 mm	0.003 - 0.0137 in.

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Main Bearing Journal Diameter	65 mm	2.6 in.
Bearing Clearance	0.023 - 0.051 mm	0.0009 - 0.002 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.
End Play	0.052 - 0.282 mm	0.002 - 0.011 in.
End Play (MAX)	0.282 mm	0.011 in.
Connecting Rod Journal Diameter	54 mm	2.126 in.
Bearing Clearance	0.020 - 0.074 mm	0.0007 - 0.0029 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.

CAMSHAFT

DESCRIPTION	SPECIFICATION	

	Metric	Standard
Bearing Journal Diameter		
No. 1	58.2 mm	2.29 in.
No. 2	57.8 mm	2.27 in.
No. 3	57.4 mm	2.26 in.
No. 4	57.0 mm	2.24 in.
No. 5	43.633 mm	1.72 in.
Bearing To Journal Clearance Standard		
No. 1	0.040 - 0.080 mm	0.0015 - 0.003 in.
No. 2	0.050 -0.090 mm	0.0019 - 0.0035 in.
No. 3	0.040 - 0.080 mm	0.0015 - 0.003 in.
No. 4	0.050 - 0.090 mm	0.0019 - 0.0035 in.
No. 5	0.040 - 0.080 mm	0.0015 - 0.003 in.
Camshaft End Play	.080 - 0.290 mm	0.0031 - 0.0114 in.

VALVE TIMING

DESCRIPTION	SPECIFICATION
Intake	
Opens (BTDC)	36.0°
Closes (ATDC)	250.0°
Duration	286.0°
Exhaust	
Opens (BTDC)	278°
Closes (ATDC)	10°
Duration	288.0°
Valve Overlap	46°

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Valve Seat Angle	44.5° - 45.0°	
Valve Seat Runout (MAX)	0.04 mm	0.0016 in.
Valve Seat Width		
Intake	0.94 - 1.04 mm	0.037 - 0.041 in.
Exhaust	1.16 - 1.26 mm	0.046 - 0.050 in.
Guide Bore Diameter		
Intake	7.975 - 7.997 mm	0.314 - 0.315 in.
Exhaust	7.975 - 7.990 mm	0.314 - 0.315 in.

HYDRAULIC TAPPETS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Body Diameter	21.387 - 21.405 mm	0.8420 - 0.8427 in.
Clearance (To Bore)	0.020 - 0.063 mm	0.0007 - 0.0024 in.
Dry Lash (at the valve)	3.0 mm	0.1181 in.

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Face Angle		
Intake	45.5° - 46.0°	
Exhaust	45.0° - 45.5°	
Head Diameter		
Intake	54.14 - 54.46 mm	2.131 - 2.144 in.
Exhaust	41.87 - 42.13 mm	1.648 - 1.659 in.
Length (Overall From Gage Line)		
Intake	128.38 - 128.76 mm	5.054 - 5.069 in.
Exhaust	126.975 - 127.355 mm	4.999 - 5.014 in.
Stem Diameter		
Intake	7.934 - 7.954 mm	0.312 - 0.313 in.
Exhaust	7.930 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance		
Intake	0.021 - 0.066 mm	0.0008 - 0.0025 in.
Exhaust	0.025 - 0.070 mm	0.0010 - 0.0028 in.
Valve Lift (@ Zero Lash)		
Intake	14.65 mm	0.577 in.
Exhaust	13.65 mm	0.537 in.

VALVE SPRING

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Spring Force (Valve Closed)		
Intake	510.0 N ± 26.0 N @ 52.1 mm	114.7 lbs. ± 5.8 lbs. @ 2.051 in.
Exhaust	510.0 N ± 26.0 N @ 52.1 mm	114.7 lbs. ± 5.8 lbs. @ 2.051 in.
Spring Force (Valve Open)		
Intake	1500.0 N ± 70.0 N @ 37.6 mm	337.2 lbs. ± 15.7 lbs. @ 1.480 in.
Exhaust	1500.0 N ± 70.0 N @ 37.6 mm	337.2 lbs. ± 15.7 lbs. @ 1.480 in.

Free Length (approx.)		
Intake	63.9 mm	2.516 in.
Exhaust	63.9 mm	2.516 in.
Number of Coils		
Intake	8.55	
Exhaust	8.55	
Wire Diameter		
Intake and Exhaust	5.65 X 4.51 mm	0.222 - 0.178 in.
Installed Height (Spring Seat to Bottom of Retainer)		
Intake	52.1 mm	2.051 in.
Exhaust	51.2 mm	2.016 in.

OIL PUMP

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Clearance Over Rotors (MAX)	0.095 mm	0.0038 in.
Outer Rotor to Pump Body Clearance (MAX)	0.235 mm	0.009 in.
Tip Clearance Between Rotors (MAX)	0.150 mm	0.006 in.

OIL PRESSURE

SPECIFICATION	SPECIFICATION
At Curb Idle Speed (min.)*	25 kPa (4 psi)
@ 3000 rpm	170 - 758 kPa (25 - 110 psi)
*** CAUTION: If pressure is zero at curb idle, DO NOT run engine**	

TORQUE SPECIFICATIONS

6.4L ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Air Cleaner Housing - Bolt	5	-	44
Block Pipe Plugs			
(1/4 NPT)	20	15	-
(3/8 NPT)	27	20	-
Water Drain Plugs	34	25	-
Camshaft Sprocket - Bolt	122	90	-
Camshaft Thrust Plate - Bolts	12	-	106
Lifting Stud	55	40	-
Connecting Rod Cap - Bolts	45 Plus 60°	33 Plus 60°	-

	Turn	Turn	
Main Bearing Cap - Bolts M-12 Bolts	28 Plus 90° Turn	21 Plus 90° Turn	-
M-8 Bolts (Crossbolts)	31	23	-
Cylinder Head - Bolts (M-12)	Specific torque and fastener pattern required; follow installation sequence. Refer to **CYLINDER HEAD, INSTALLATION**.		
Cylinder Head Cover - Bolts	8	-	70
Engine Mount Bracket to Engine Block - Bolts	61	45	-
Engine Mount Heat Shield - Nuts	27	20	-
Engine Timing Cover - Bolts	28	21	-
Exhaust Manifold to Cylinder Head - Bolts	31	23	-
Flexplate to Crankshaft - Bolts	95	70	-
Flywheel to Crankshaft - Bolts	75	55	-
Front Isolator to Engine Mount Bracket- Bolts	60	44	-
Front Isolator to Engine Cradle Crossmember - Bolts	61	45	-
Generator to Engine Block - Bolts	65	48	-
Generator Support Bracket-to-Engine Mount Nut	28	21	-
Heater Tube - Bolt	11	8	-
Intake Manifold - Bolts	Specific torque and fastener pattern required; follow installation sequence. Refer to **MANIFOLD, INTAKE, INSTALLATION**.		
Lifter Guide Holder - Bolts	12	9	-
MDS Solenoid - Bolts	11	8	-
Oil Control Valve - Bolt	11	8	-
Piston Oil Cooler Jet - Bolts	13	10	-
Power Steering Pump to Engine Block - Bolts	28	21	-
Oil Dipstick Tube - Nut	31	23	-
Oil Pan - Drain Plug	27	20	-
Oil Pan - Bolts	Specific torque and fastener pattern required; follow installation sequence. Refer to **PAN, OIL, INSTALLATION**.		
Oil Pump - Bolts	28	21	-
Oil Pump Pickup Tube - Bolt and Nut	28	21	-
Rear Seal Retainer - Bolts	15	11	-
Rear Isolator Bracket to Transmission - Bolts (Automatic)	33	24	-
Rear Isolator to Bracket - Bolts (Automatic)	54	40	-

Rear Isolator to Crossmember - Bolts (Automatic)	61	45	-
Rear Isolator to Transmission - Bolts (Manual)	56	41	-
Rear Isolator to Crossmember - Bolts (Manual)	54	40	-
Rocker Arm - Bolts	22	16	-
Strut Tower Support - Bolts	32	28	-
Thermostat Housing - Bolts	28	21	-
Throttle Body - Bolts	12	9	-
Torque Converter to Flexplate - Bolts	68	50	-
Transmission to Engine Block - Bolts	68	50	-
Vibration Damper - Bolt	250	184	-
Water Pump to Engine Timing Cover - Bolts	28	21	-

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

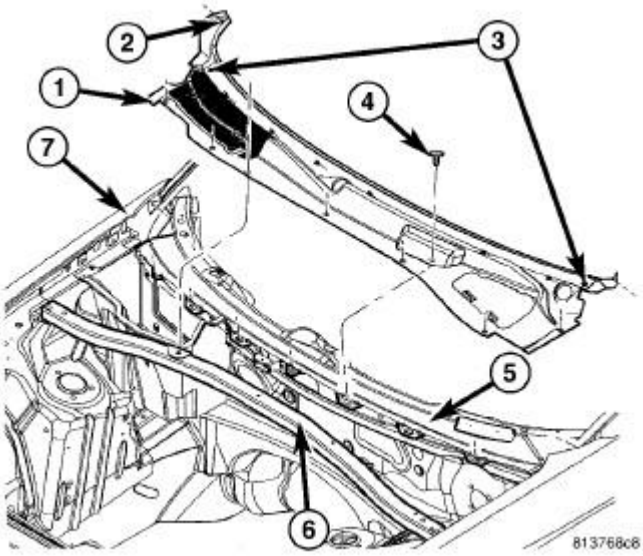


Fig. 9: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Remove the hood. Refer to **HOOD, REMOVAL** .
2. Remove the cowl panel cover (1). Refer to **COVER, COWL PANEL, REMOVAL** .
3. Remove the strut tower support (6).

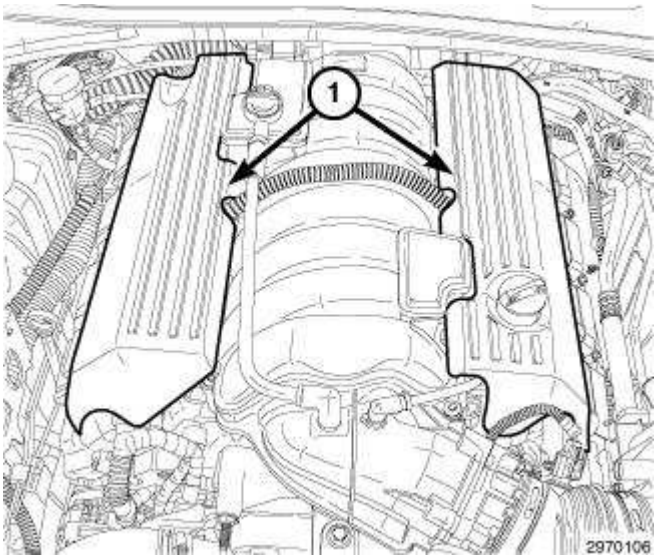


Fig. 10: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

4. Lift the engine cover retaining grommets off the ball studs and remove the engine covers (1).
5. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .

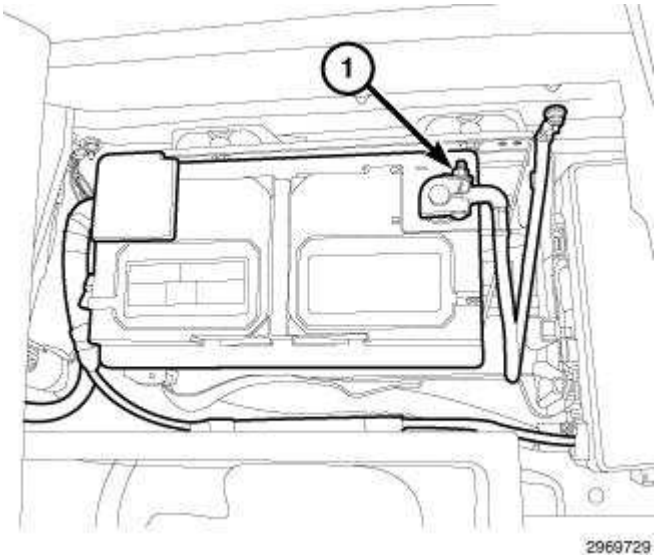


Fig. 11: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect and isolate the negative battery cable (1).

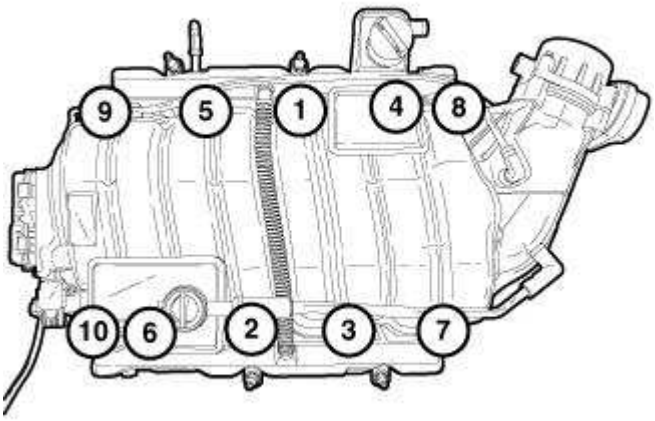


Fig. 12: Intake Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Remove the intake manifold and throttle body as an assembly.

7. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

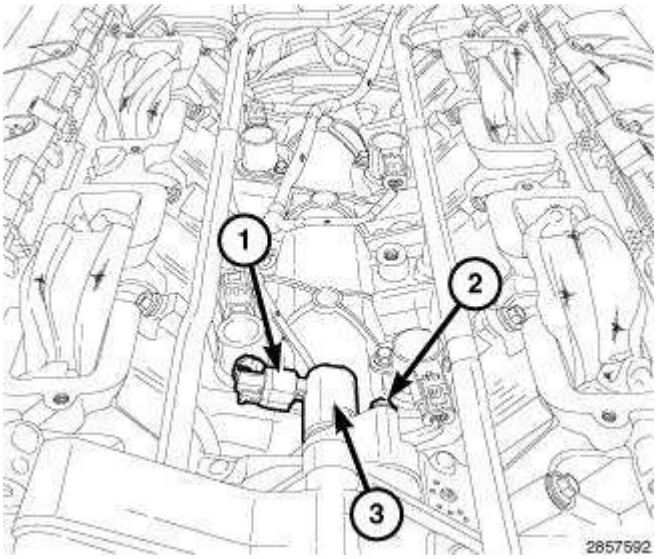


Fig. 13: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The engine must be at room temperature before removing the oil control valve.

8. Disconnect the oil control valve electrical connector (1).
9. Remove the oil control valve retaining bolt (2).

10. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

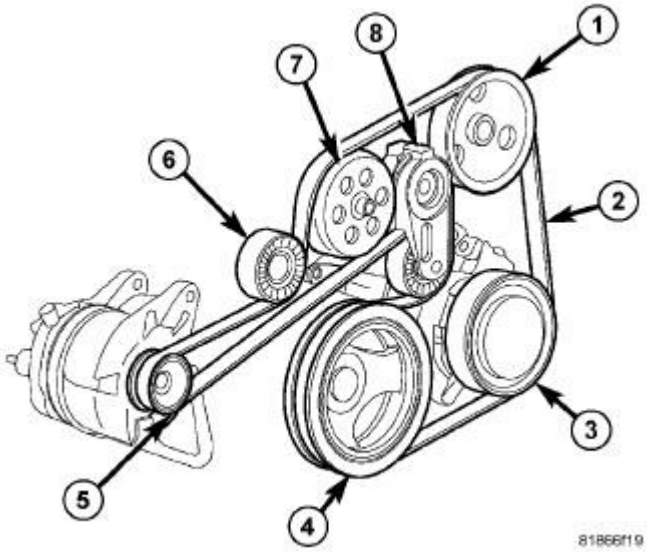


Fig. 14: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

11. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and remove the accessory drive belt (2), then slowly rotate the tensioner into the freearm position.

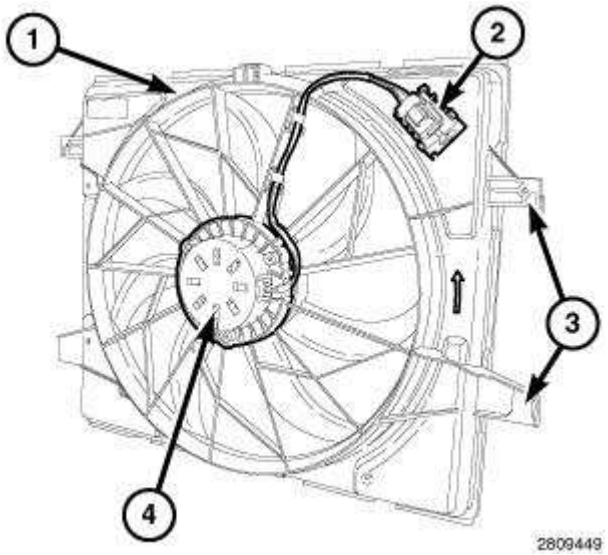


Fig. 15: Cooling Fan Module Components
Courtesy of CHRYSLER GROUP, LLC

12. Remove the cooling fan (1). Refer to **FAN, COOLING, REMOVAL** .
13. Raise and support the vehicle.

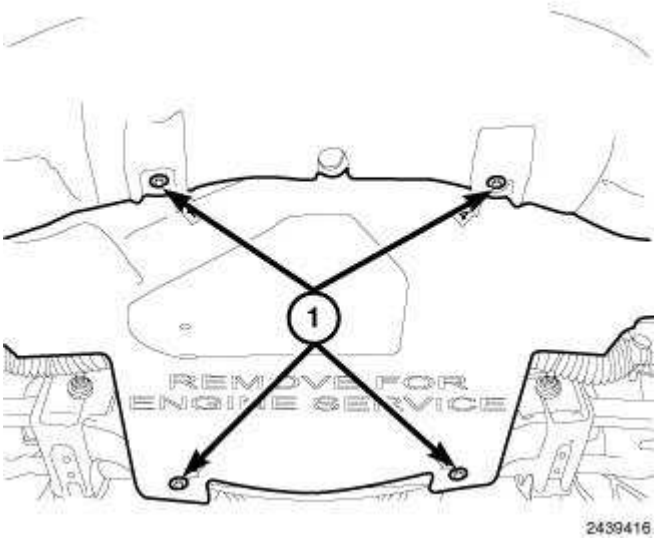


Fig. 16: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

14. Remove the belly pan retainers (1) and remove the belly pan.
15. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
16. Drain the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

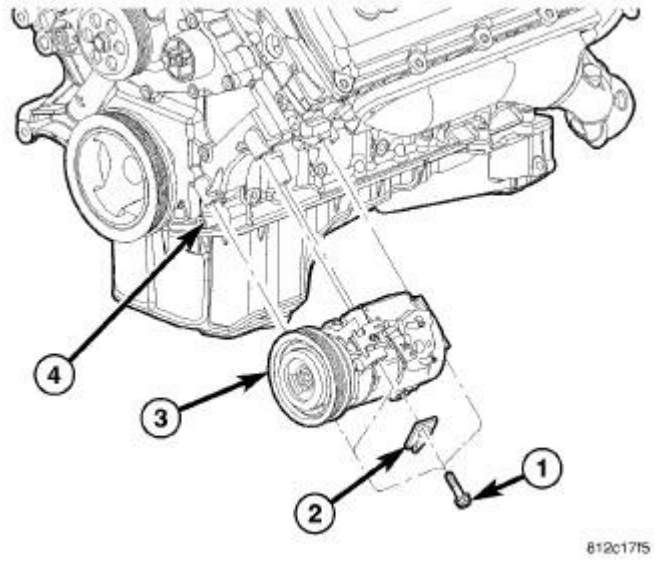


Fig. 17: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

17. Remove the A/C compressor (3). Refer to **COMPRESSOR, A/C, REMOVAL** .

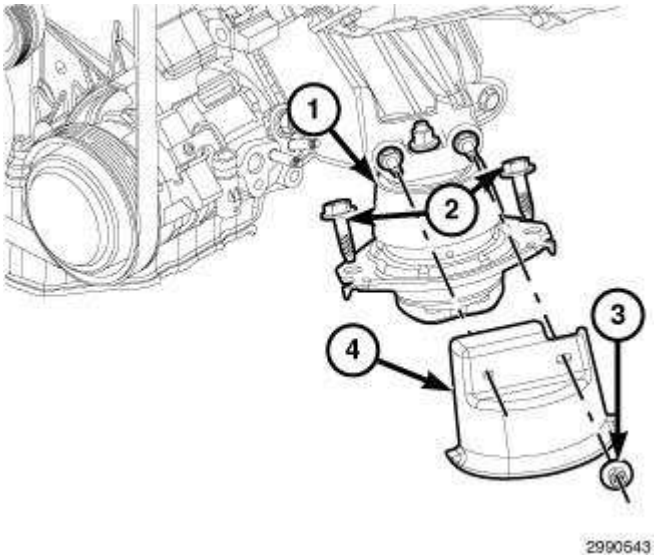


Fig. 18: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

18. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields.
19. Remove both left/right engine mount to frame retaining bolts (2).
20. Disconnect the transmission oil cooler lines from their retainers at the oil pan.

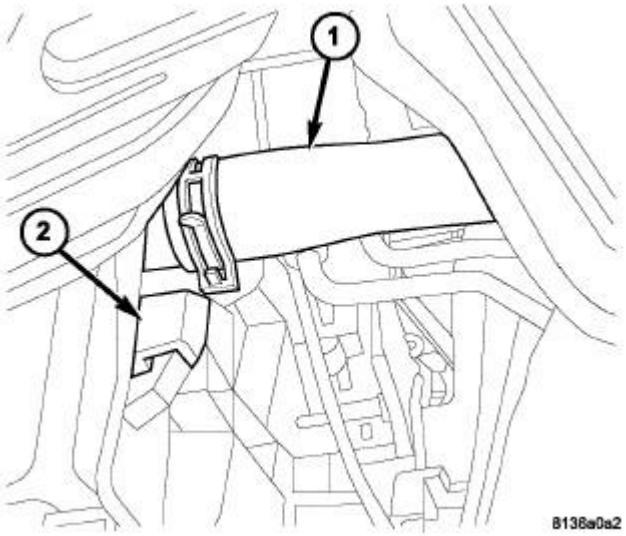


Fig. 19: Lower Radiator Hose & Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

21. Remove the lower radiator hose (1).

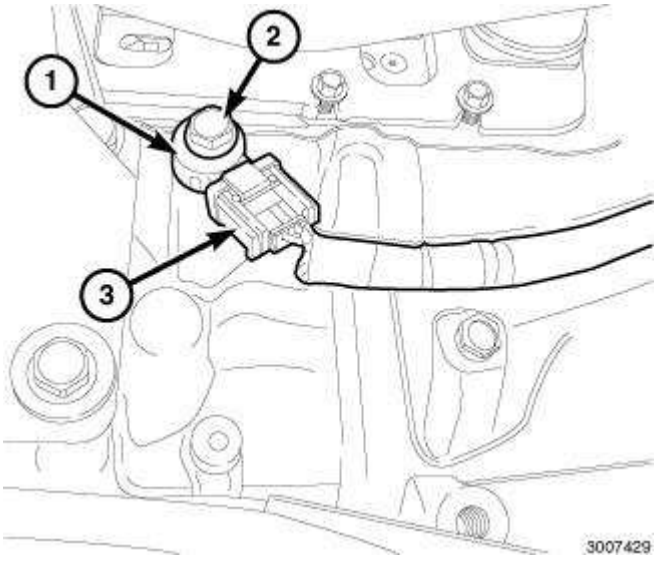


Fig. 20: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Two knock sensors are used. Each sensor is bolted to the outside of the engine block below the exhaust manifold.

NOTE: Left side shown in illustration, right side similar.

22. Remove the heat shields from both knock sensors (shield snaps on/off sensor).
23. Disconnect the knock sensor electrical connectors (3).

CAUTION: When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters hanging from the oxygen sensor wires damages the harness and/or sensors.

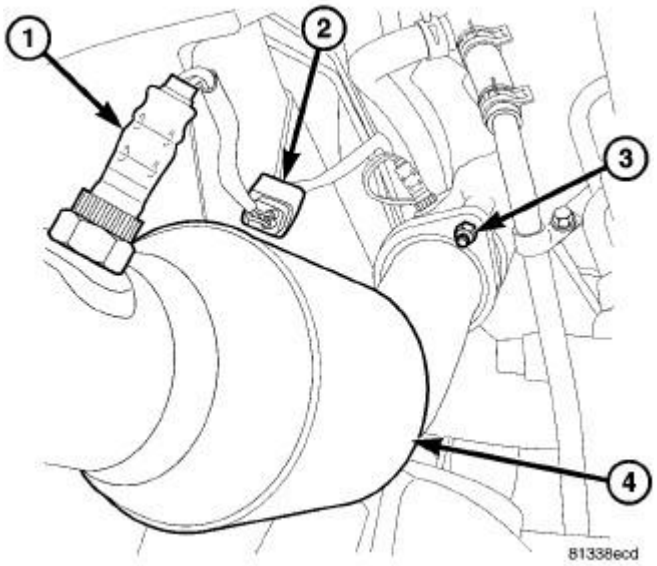


Fig. 21: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

24. Disconnect all oxygen sensor electrical connectors (2).
25. Saturate all exhaust bolts and nuts (3) with Mopar® Rust Penetrant. Allow five minutes for penetration.
26. Remove the both catalytic converter to manifold flange nuts (3) and separate the catalytic converters (4) from the exhaust manifolds.

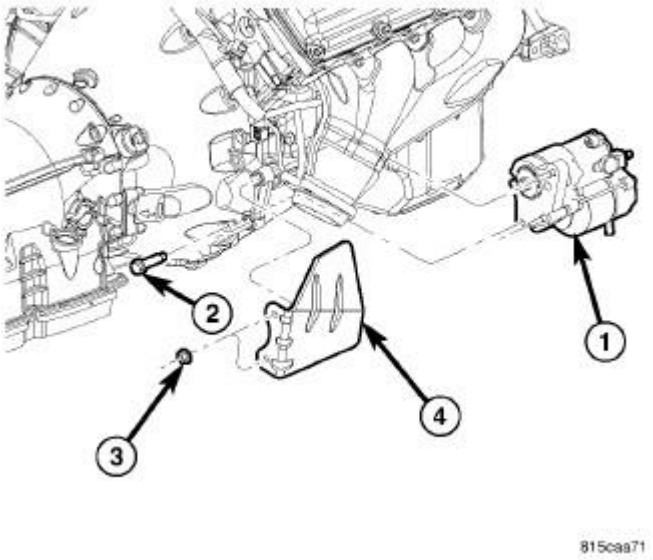


Fig. 22: Removing/Installing Starter
Courtesy of CHRYSLER GROUP, LLC

27. Remove the starter motor (1) heat shield (4).
28. Disconnect the starter wires, remove the starter motor retaining bolts (2) and remove the starter (1). Refer to **STARTER, REMOVAL** .

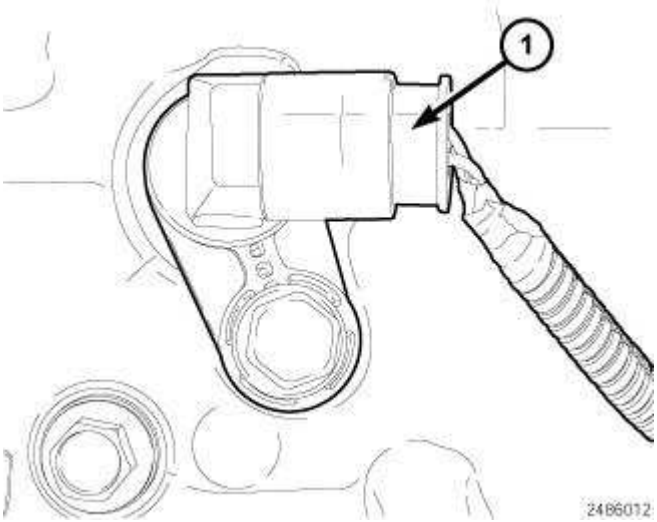


Fig. 23: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block.

29. Remove the CKP sensor electrical connector (1).

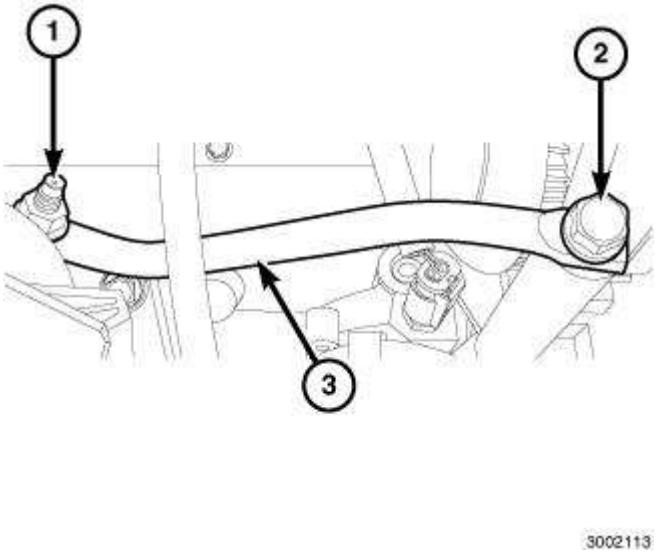


Fig. 24: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

30. Remove the generator support bracket to engine mount retaining nut (1).
31. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).
32. Lower the vehicle.

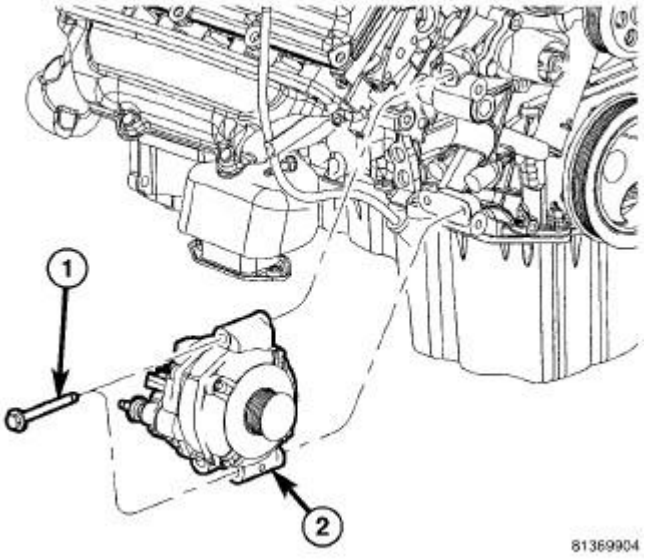


Fig. 25: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

33. Unsnap the plastic insulator cap from the B+ output terminal.
34. Remove the B+ terminal mounting nut at the rear of the generator and remove the B+ terminal.

35. Depress the field wire connector tab at the rear of the generator and disconnect the field wire connector.
36. Remove the two generator retaining bolts (1) and remove the generator (2).

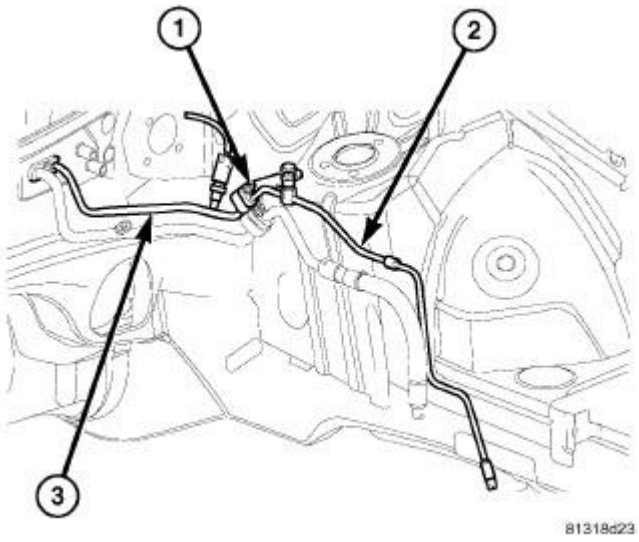


Fig. 26: Removing/Installing A/C Liquid Line
Courtesy of CHRYSLER GROUP, LLC

37. Remove the nut (1) from the front section of the A/C liquid line (2) to the rear section of the liquid line (3), separate the lines, remove and discard the dual plane seal.
38. Install plugs or tape over the opened liquid line fittings.
39. Remove the front section of the A/C liquid line (2) from the engine compartment.

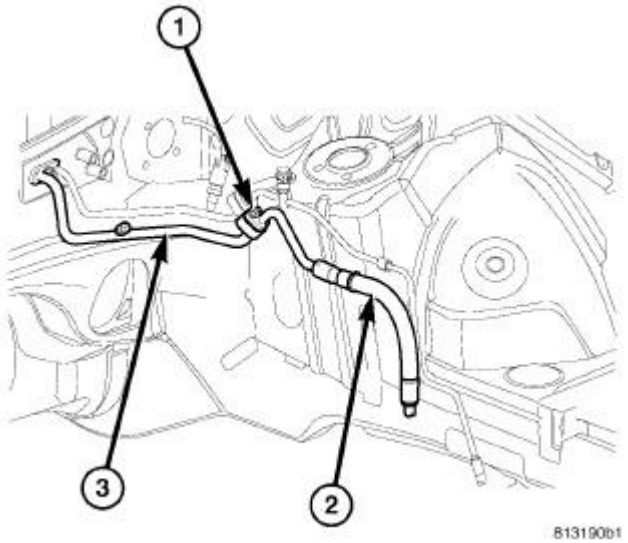


Fig. 27: Removing/Installing A/C Suction Lines

Courtesy of CHRYSLER GROUP, LLC

40. Remove the nut (1) from the front section of the A/C suction line (2) to the rear section of the suction line (3), separate the lines, remove and discard the dual plane seal.
41. Install plugs or tape over the opened suction line fittings.
42. Remove the front section of the A/C suction line (2) from the engine compartment.

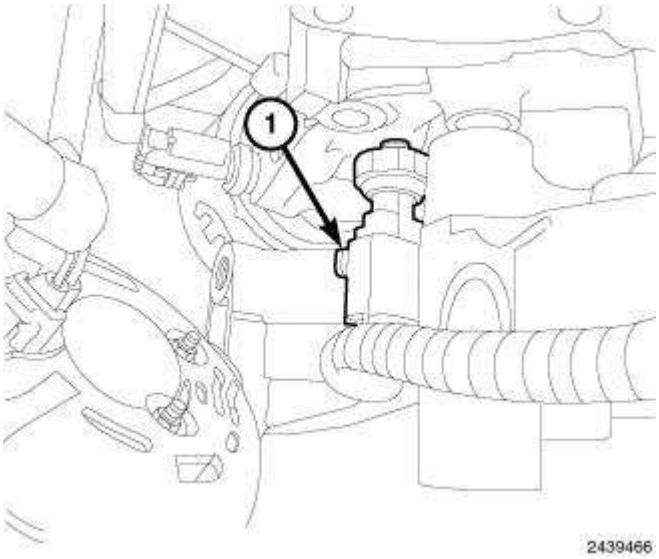


Fig. 28: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

43. Remove the oil pressure sensor electrical connector (1).
44. Remove the oil temperature sensor electrical connector.

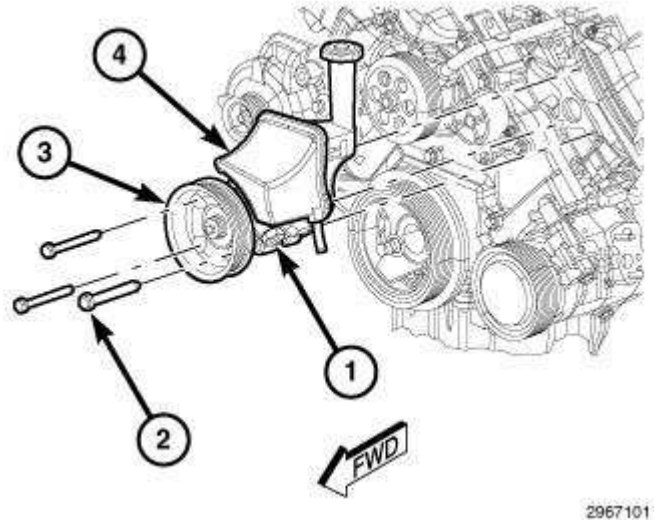


Fig. 29: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to disconnect power steering pump hoses from power steering pump for power steering pump removal.**

45. Remove the three power steering pump (4) mounting bolts (2) through the access holes in the pulley (3) and position the pump aside.

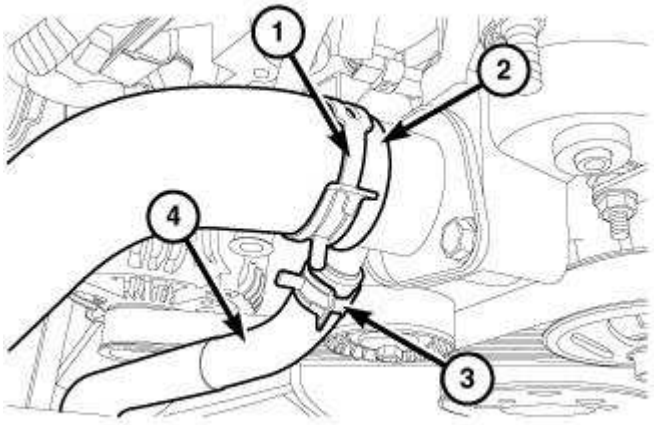


Fig. 30: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

46. Remove the upper radiator hose clamp (1) and remove the upper radiator hose (2).
47. Remove the oil cooler hose clamp (3) and remove the oil cooler hose (4).

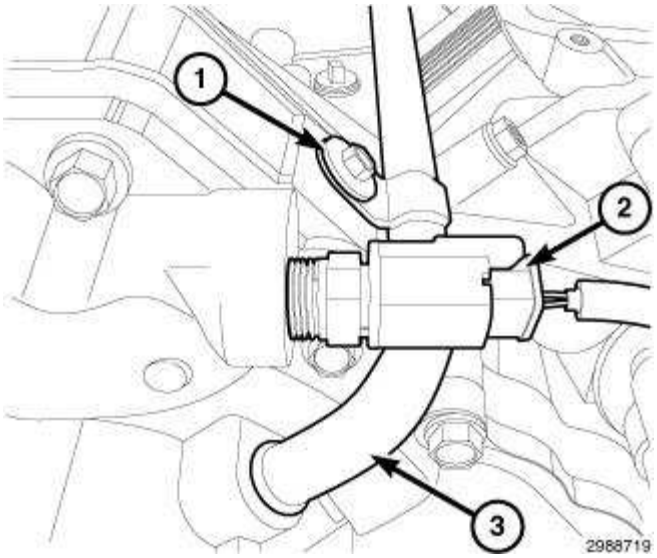


Fig. 31: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

48. Remove the heater tube retaining bolt (1).
49. Remove the coolant temperature sensor electrical connector (2).
50. Lift the heater tube (3) out of the water pump.

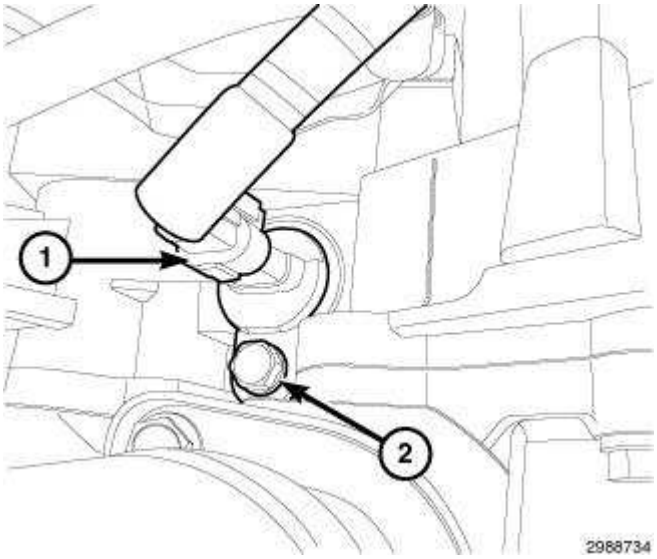


Fig. 32: Camshaft Position Sensor Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

51. Disconnect the camshaft position sensor electrical connector (1).

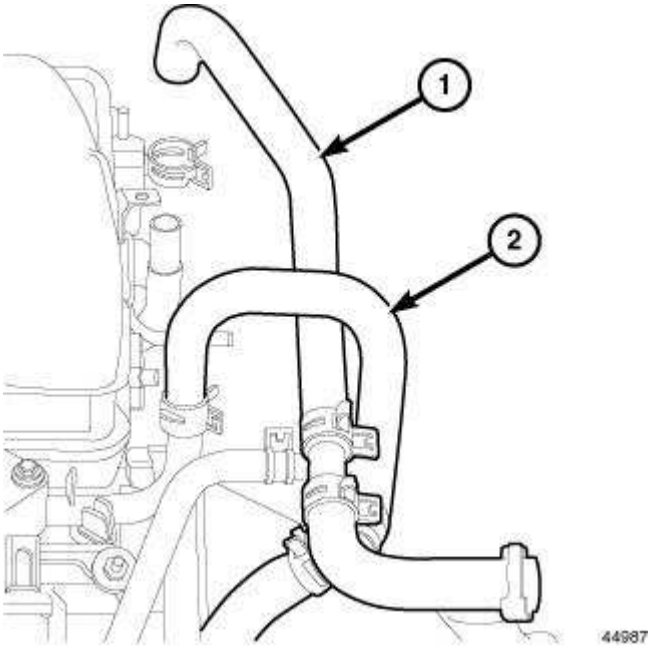


Fig. 33: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

52. Remove the heater hoses (1, 2).

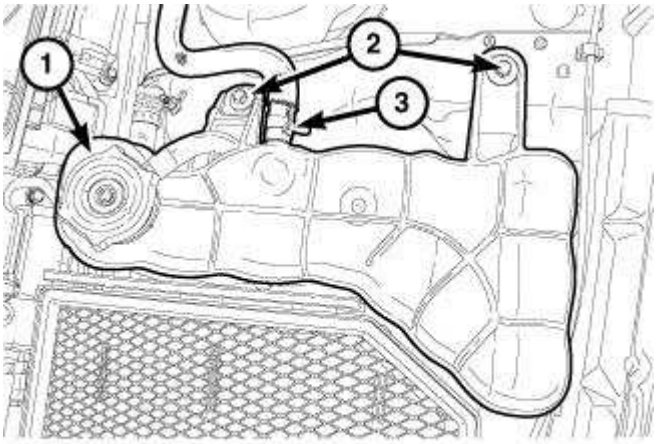


Fig. 34: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove the hoses from the coolant bottle for coolant bottle removal.

53. Remove the coolant bottle retaining bolts (2) and position the coolant bottle (1) aside.

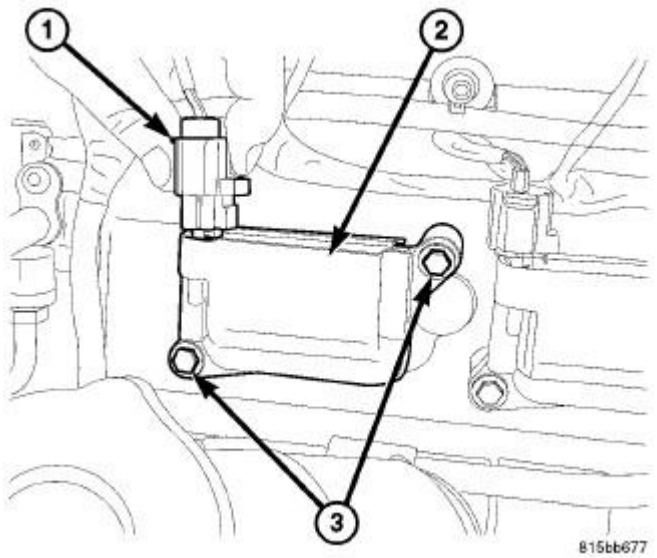


Fig. 35: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

54. Remove all ignition coil electrical connectors (1) and position the harness aside.

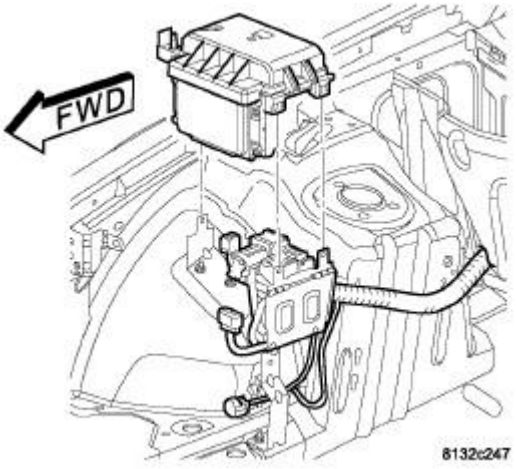


Fig. 36: TIPM/PDC Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

55. Remove the Power Distribution Center (PDC) and mounting bracket.
56. Unfasten the wire harness mounted on the right hand inner fender panel and position aside.

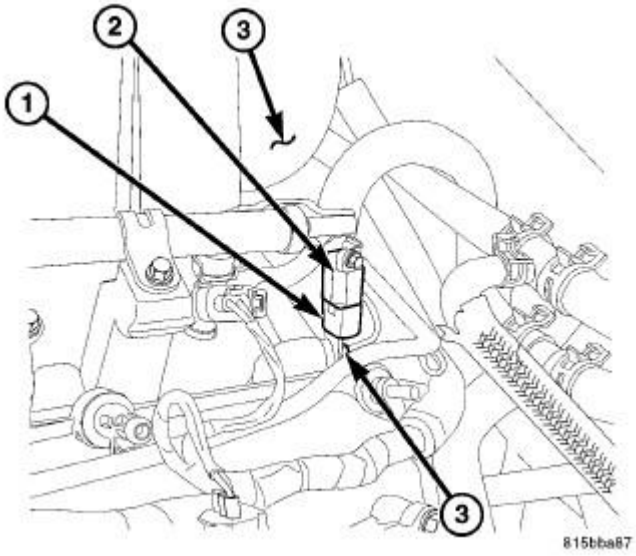


Fig. 37: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: The ignition capacitor (2) is located near the left rear corner of the intake manifold (3).

57. Remove the ignition capacitor (1) electrical connector (2).
58. Remove the ground wires from the rear of each cylinder head.
59. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

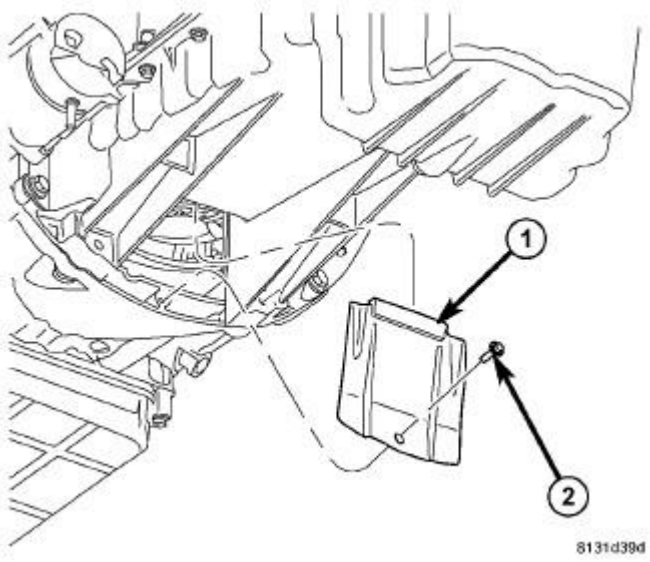


Fig. 38: Remove/Install Torque Converter Access Cover
Courtesy of CHRYSLER GROUP, LLC

60. Remove the transmission inspection cover retaining bolt (2) and remove the inspection cover (1).

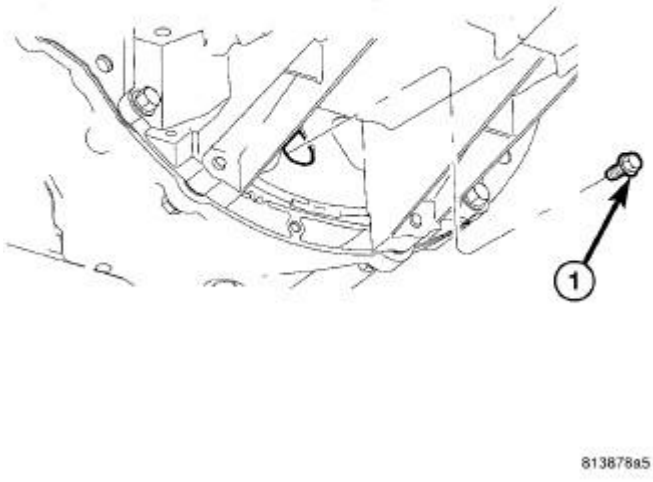


Fig. 39: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

61. Automatic transmission equipped vehicles, rotate the crankshaft in clockwise direction until the torque converter bolts (1) are accessible and remove the flexplate to torque converter bolts (1).

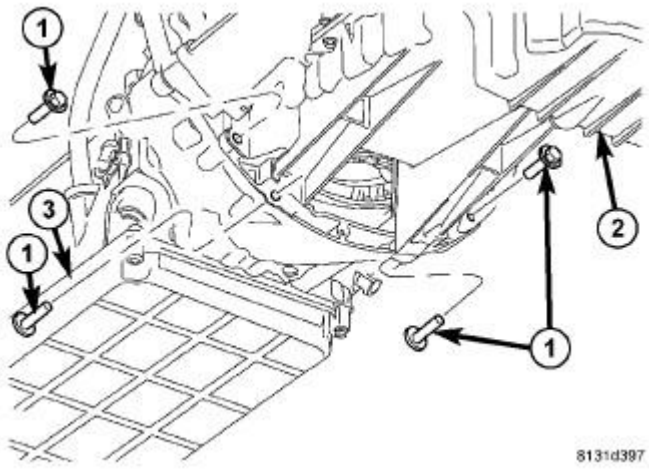


Fig. 40: Remove/Install Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

62. Remove the oil pan to transmission bolts (1).

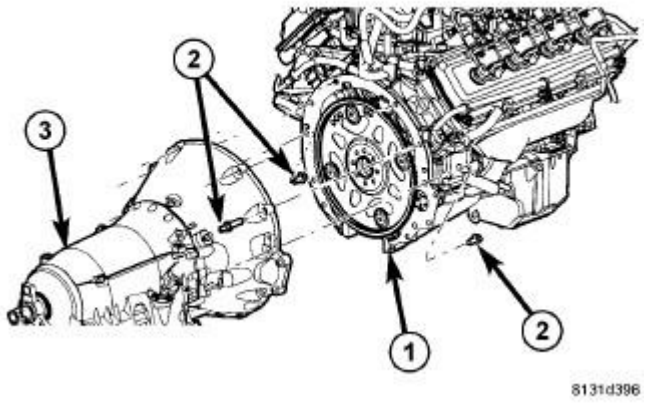


Fig. 41: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

63. Remove the transmission bell housing to engine block bolts (2).

CAUTION: While carefully separating the engine from the transmission and removing the engine from the vehicle, constant checks must be made to ensure no damage to other components or wiring harnesses occur throughout the removal procedure.

64. Lower the vehicle.

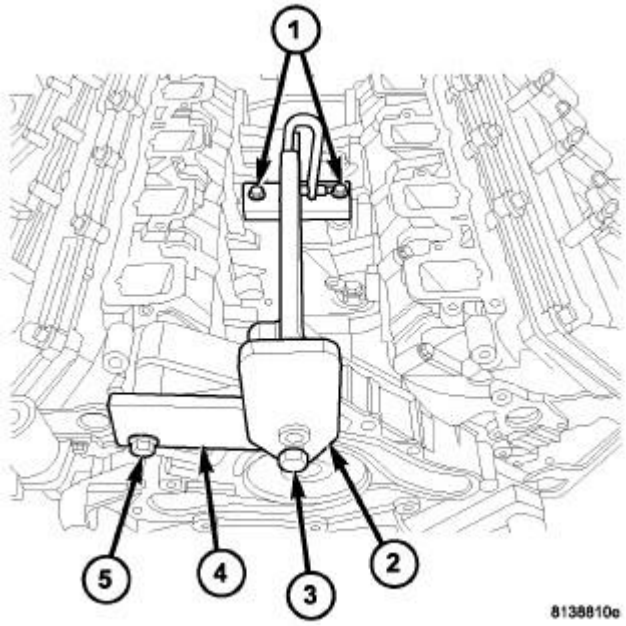


Fig. 42: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

65. Using a suitable jack, support the transmission.

NOTE: Do not use air tools to install engine lift fixture.

66. Install the (special tool #8984B, Fixture, Engine Lifting) (2) and (special tool #8984-UPD, Adapter, Engine Lift) (4).
67. Using a suitable engine hoist, separate the engine from the transmission and remove the engine from the engine compartment.
68. Secure the engine onto a suitable engine stand.

INSTALLATION

INSTALLATION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

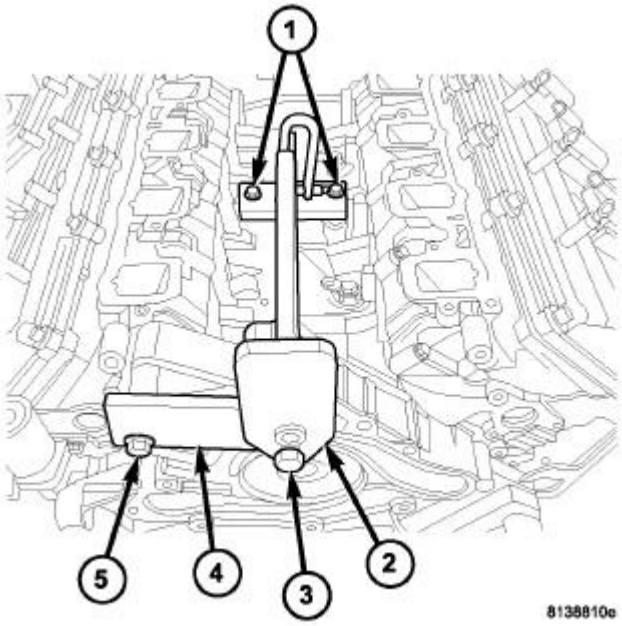


Fig. 43: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install (special tool #8984B, Fixture, Engine Lifting) (2, 3).

1. Install the engine lift fixture (2) (special tool #8984B, Fixture, Engine Lifting) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
2. Using a suitable engine hoist, lower the engine into the engine compartment.
3. Automatic transmission equipped vehicles, align the engine with the transmission.
4. Install two transmission bell housing to engine block bolts finger tight.
5. Lower the engine assembly until the engine mounts rest in the engine cradle crossmember.

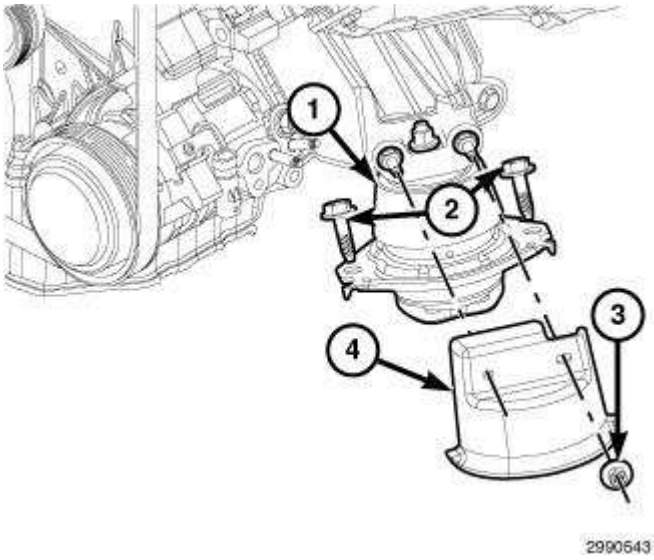


Fig. 44: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

6. Align the engine mounts, install both left/right engine mount to frame retaining bolts (2) and tighten to 68 N.m (50 ft. lbs.).
7. Position both left and right engine mount heat shields (4), install the retaining nuts (3) and tighten to 27 N.m (20 ft. lbs.).
8. Remove the engine hoist and the jack supporting the transmission.
9. Raise and support the vehicle.

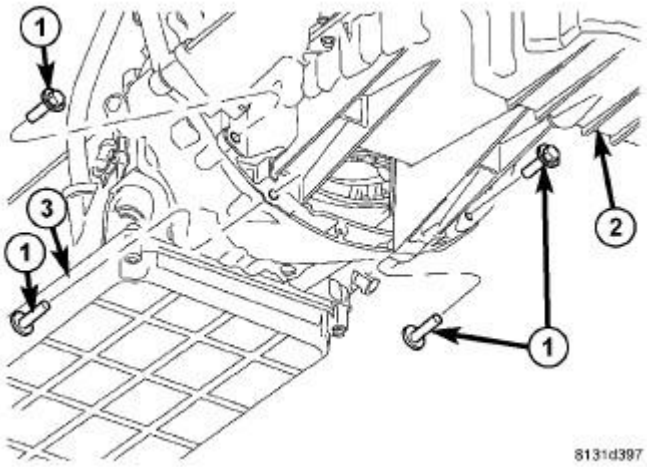


Fig. 45: Remove/Install Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Automatic transmission equipped vehicles, install the oil pan to transmission bolts (1) and

tighten to 54 N.m (40 ft. lbs.).

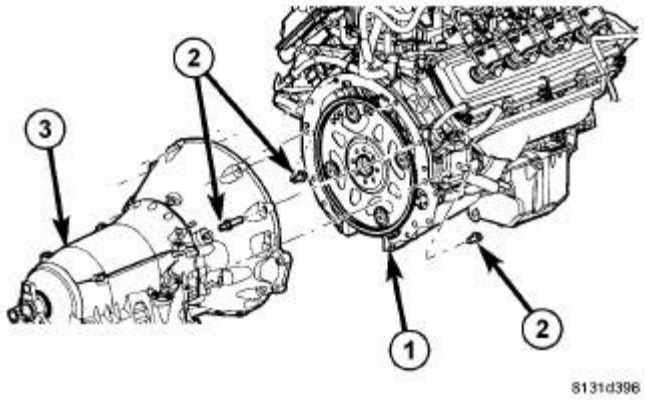


Fig. 46: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the remaining transmission bell housing to engine block bolts (2) and tighten to 68 N.m (50 ft. lbs.).

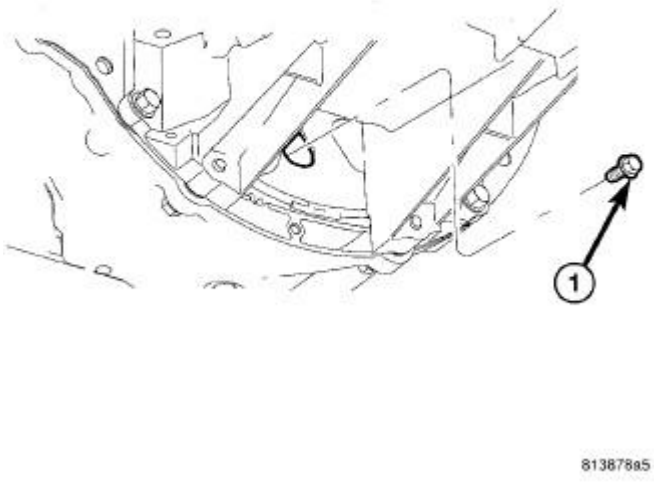


Fig. 47: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is essential that the correct length bolts are used to attach the converter to the flexplate. Bolts that are too long will damage the

clutch surface inside the torque converter.

12. Rotate the crankshaft in clockwise direction and install all torque converter to flexplate bolts (1) finger tight.
13. Verify that the torque converter is pulled flush to the flexplate and tighten bolts to 88 N.m (65 ft. lbs.).

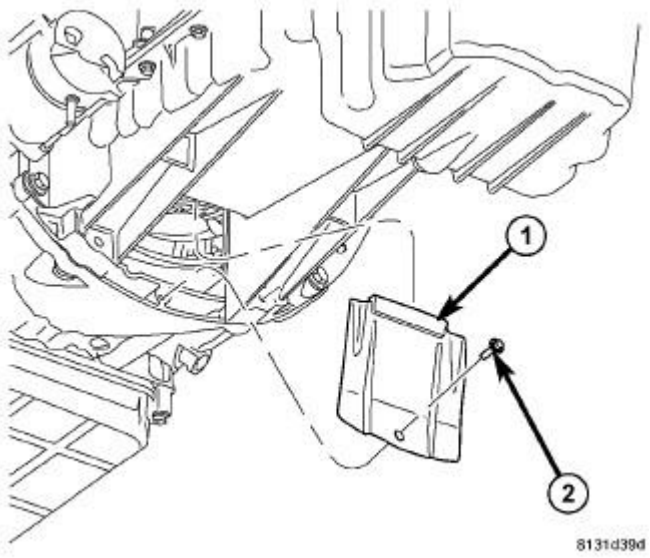


Fig. 48: Remove/Install Torque Converter Access Cover
Courtesy of CHRYSLER GROUP, LLC

14. Install the inspection cover (1) and tighten the retaining bolt (2) to 11 N.m (8 ft. lbs.).

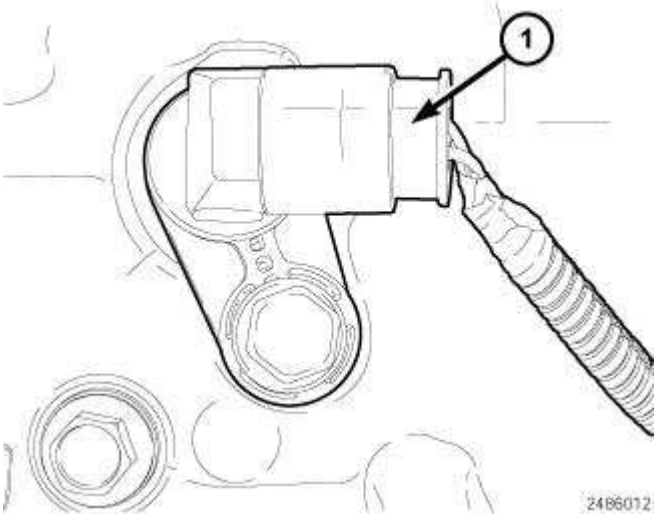


Fig. 49: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Crankshaft Position (CKP) sensor is located at the right rear side of the engine block.**

15. Connect the CKP sensor electrical connector (1).

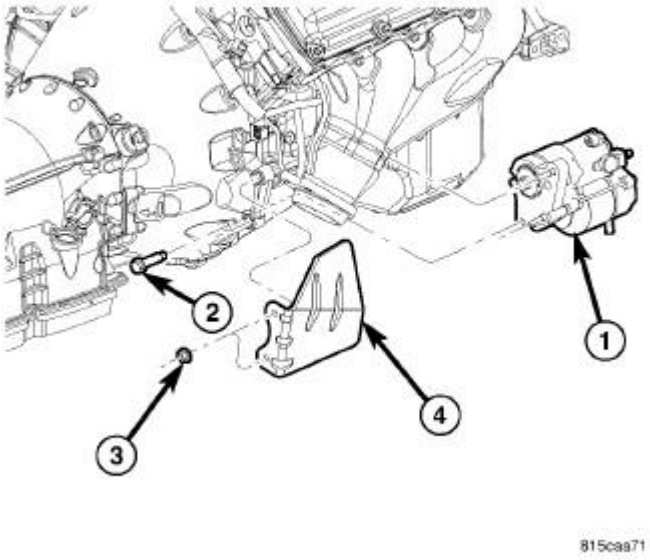


Fig. 50: Removing/Installing Starter
Courtesy of CHRYSLER GROUP, LLC

16. Position the starter motor (1) into the transmission.
17. Install the three starter motor retaining bolts (2) and tighten to 54 N.m (40 ft. lbs.).
18. Connect the solenoid wire to the starter motor (snaps in place).
19. Position the battery cable to the solenoid stud, install the battery cable eyelet nut and tighten to 11 N.m (8 ft. lbs.).
20. Position the starter heat shield (4) and install the retaining nuts (3).

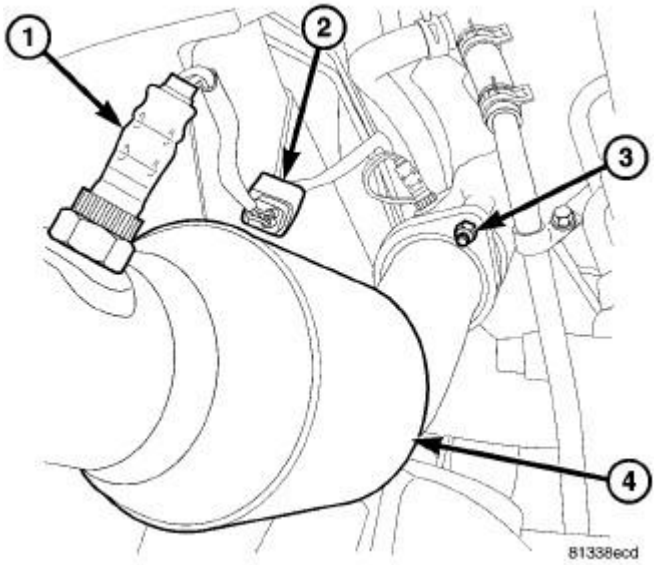


Fig. 51: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

21. Position the catalytic converters (4) onto the exhaust manifold flanges, install the flange nuts (3) and tighten to 41 N.m (30 ft. lbs.).
22. Connect the oxygen sensor electrical connectors (2).

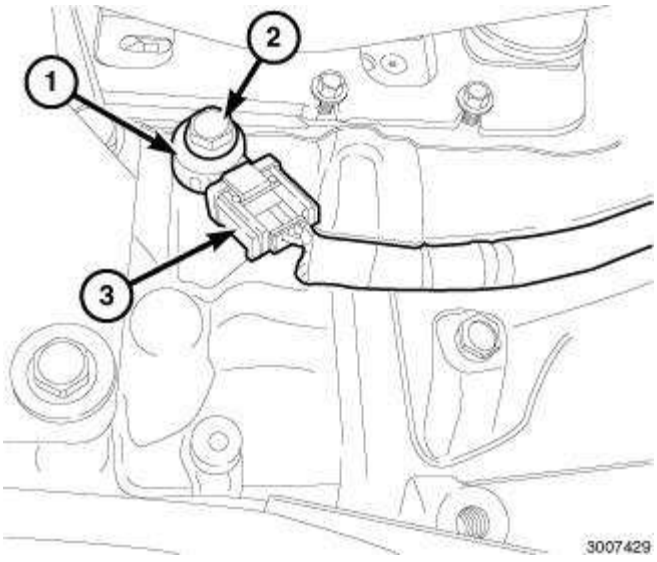


Fig. 52: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

23. Connect the right and left knock sensor (1) electrical connectors (5).
24. Install the heat shields onto both knock sensors (shield snaps on/off sensor).

25. Connect the transmission oil cooler lines to their retainers at the oil pan.

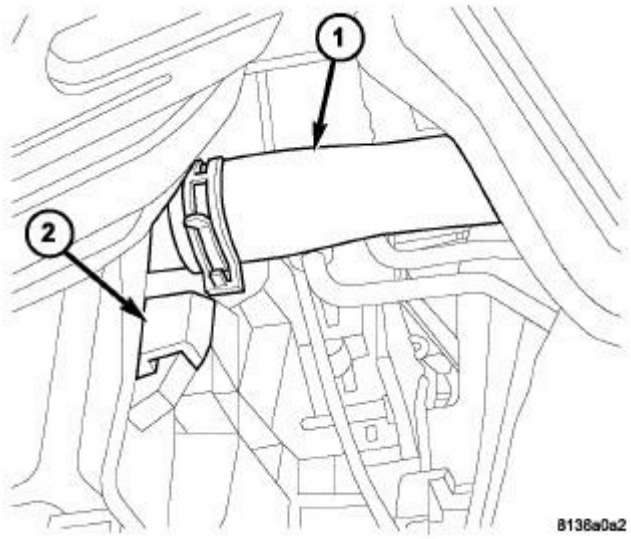


Fig. 53: Lower Radiator Hose & Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

26. Install the lower radiator hose (1).
27. Lower the vehicle.

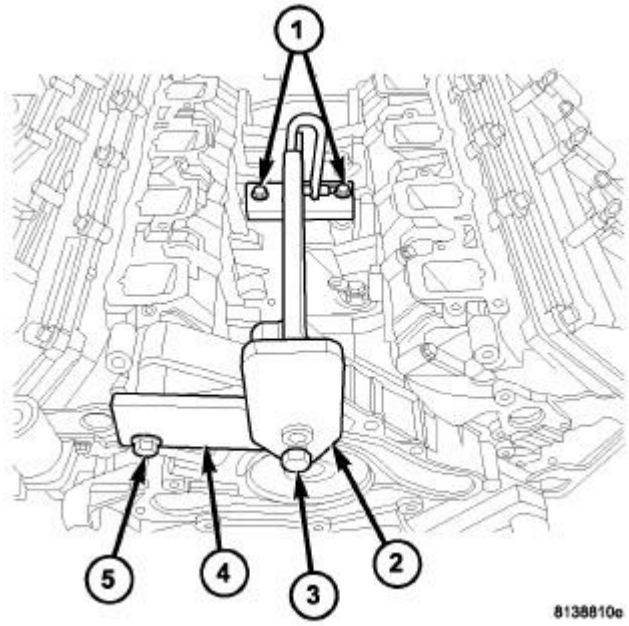


Fig. 54: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

28. Remove the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
29. Position the left and right side wiring harness.

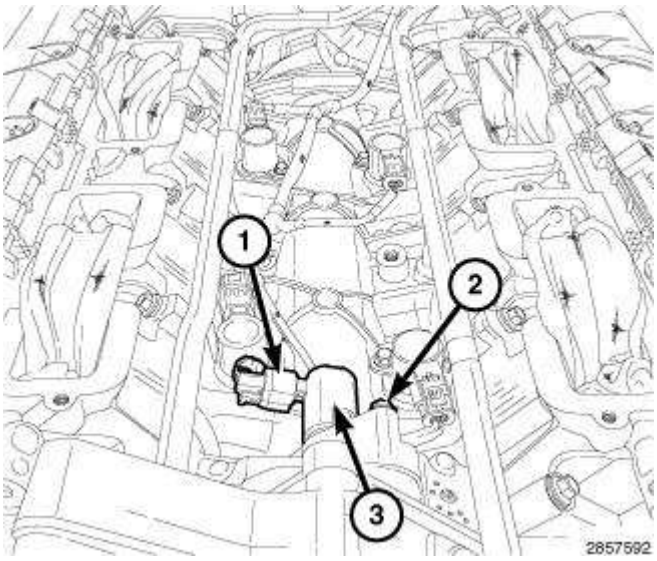


Fig. 55: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

30. Lubricate the oil control valve (OCV) rubber O-ring seal with clean engine oil.
31. Install the OCV (3) and rotate into position.

32. Install the OCV retaining bolt (2) and tighten to 11 N.m (8 ft. lbs.).
33. Connect the OCV electrical connector (1).

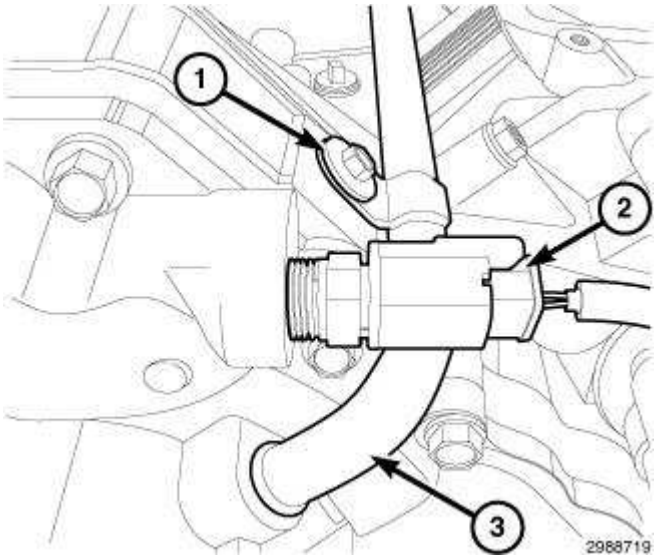


Fig. 56: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

34. Position the heater core tube (3) into the water pump.
35. Install the heater core tube retaining bolt (1) and tighten to 11 N.m (8 ft. lbs.).
36. Connect the electrical connector to the coolant temperature (ECT) sensor (2).

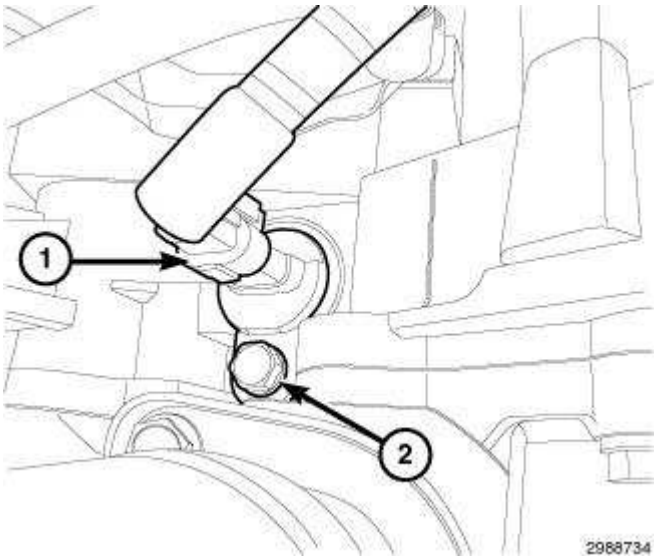


Fig. 57: Camshaft Position Sensor Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

37. Connect the camshaft position sensor electrical connector (1).

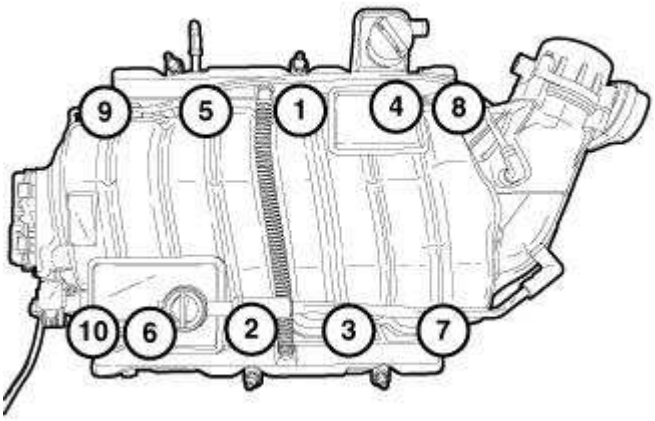


Fig. 58: Intake Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the intake manifold and throttle body as an assembly.

38. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

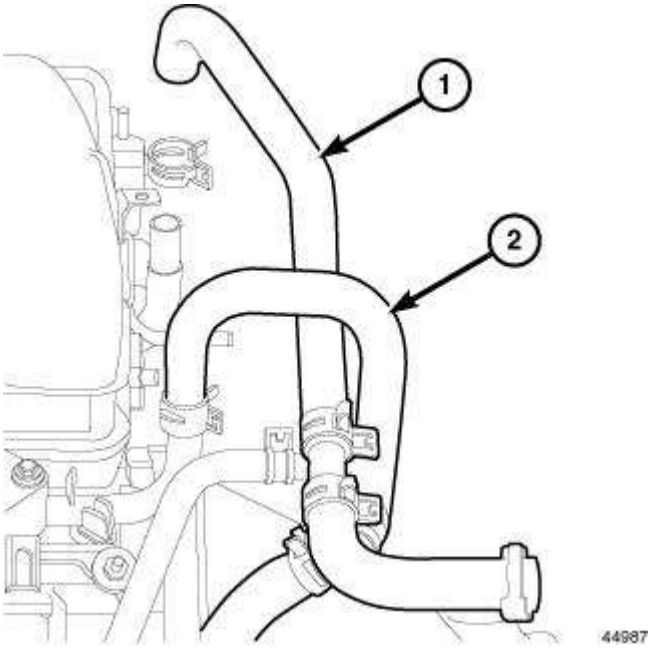


Fig. 59: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

39. Connect the heater hoses (1, 2).
40. Connect the ground wires to the rear of each cylinder head.

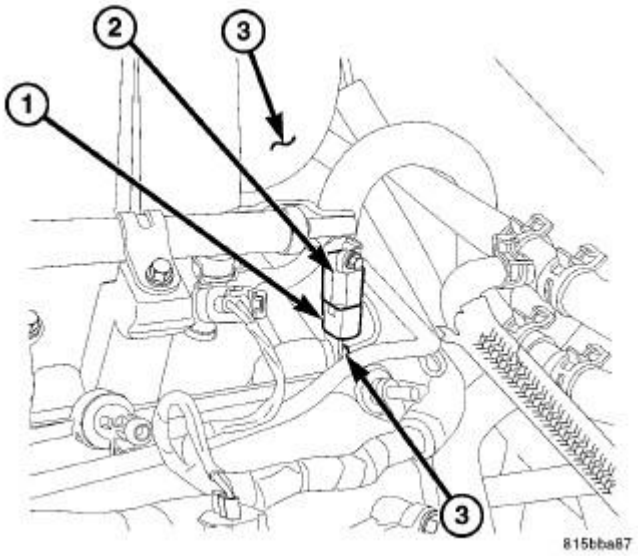


Fig. 60: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: The ignition capacitor (2) is attached to the rear of the left cylinder head.

41. Connect the ignition capacitor (2) electrical connector (1).

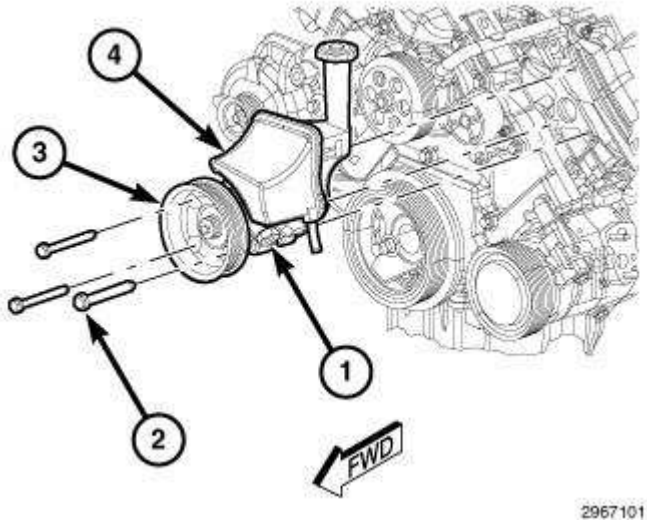


Fig. 61: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

42. Position the power steering pump (4).
43. Install the three power steering pump (4) mounting bolts (2) through the access holes in the pulley and tighten the bolts to 28 N.m (21 ft. lbs.).

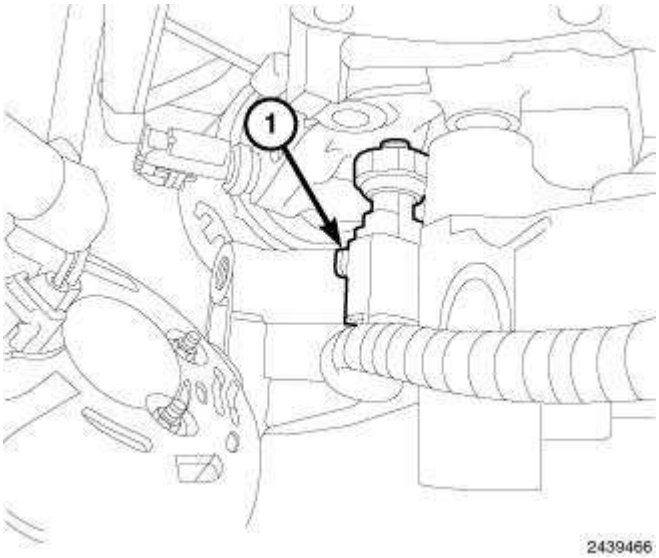


Fig. 62: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

44. Connect the oil pressure sensor electrical connector (1).
45. Connect the oil temperature sensor electrical connector.

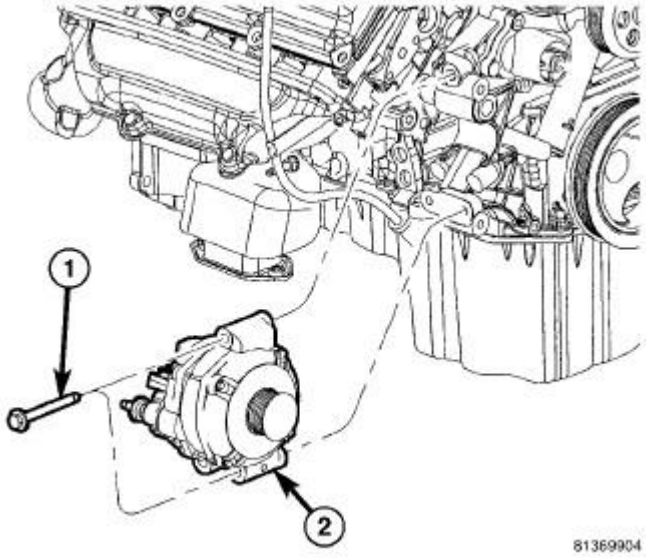


Fig. 63: Generator & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

46. Position the generator (2) and install two generator mounting bolts (1) finger tight.
47. Raise and support the vehicle.

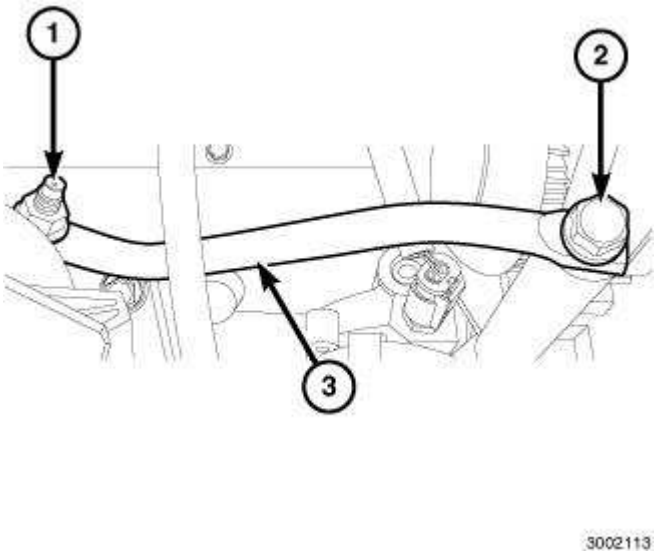


Fig. 64: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

48. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) finger tight.
49. Position the generator support bracket (3) to the generator, install the retaining bolt (2) and tighten to 65 N.m (48 ft. lbs.).
50. Tighten the generator support bracket (3) to engine mount retaining nut (1) to 28 N.m (21 ft. lbs.).

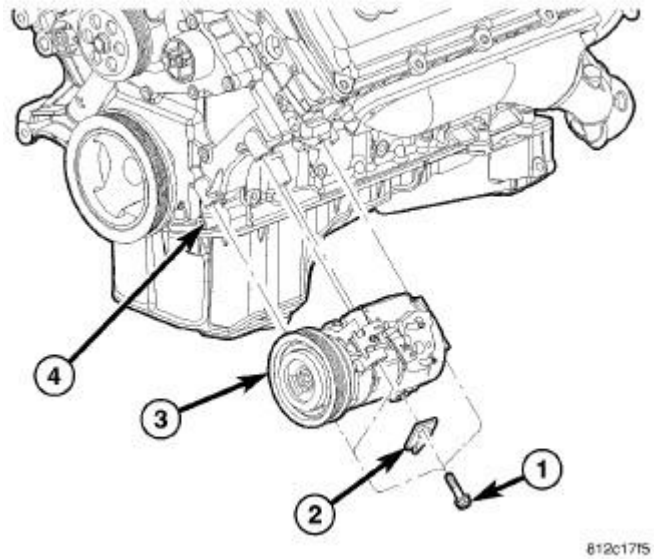


Fig. 65: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

51. Install the A/C compressor (3). Refer to **COMPRESSOR, A/C, REMOVAL** .

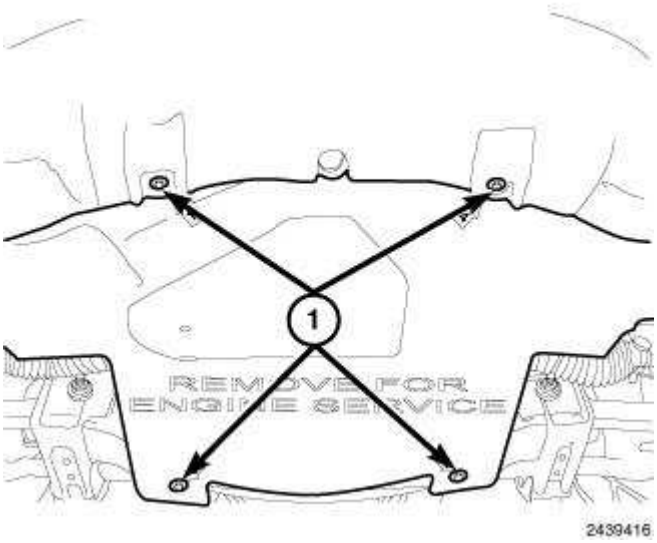


Fig. 66: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

52. Position the belly pan and install the belly pan retainers (1).
53. Lower the vehicle.

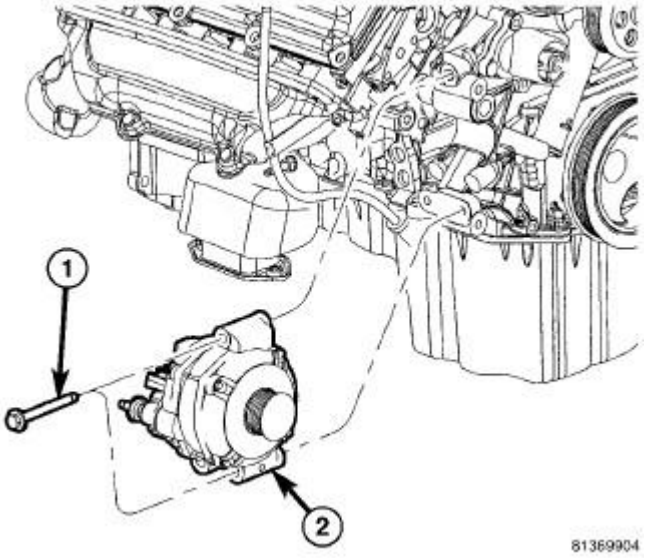


Fig. 67: Generator & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

54. Tighten two generator mounting bolts (1) to 65 N.m (48 ft. lbs.).
55. Snap the field wire connector into the rear of the generator.
56. Position the generator B+ terminal eyelet to the generator output stud, install the retaining nut and tighten to 13 N.m (10 ft. lbs.).
57. Snap the plastic insulator cap onto the B+ output terminal.

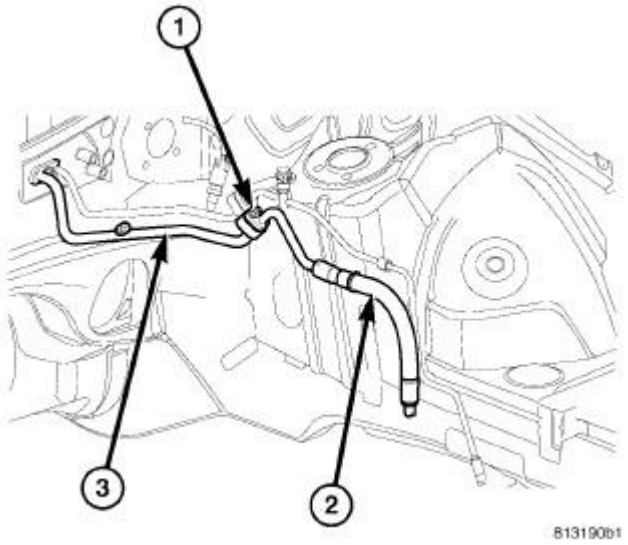


Fig. 68: Removing/Installing A/C Suction Lines
Courtesy of CHRYSLER GROUP, LLC

58. Position the front section of the A/C suction line (2) into the engine compartment.
59. Remove the tape or plugs from the fittings that connect the front section of the A/C suction line to the rear section of the A/C suction line (3).

NOTE: Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

60. Lubricate the new dual plane seal with clean refrigerant oil and position the seal onto the suction line fitting.
61. Connect the front section of the A/C suction line to the rear section of the A/C suction line.
62. Install the nut (1) that secures the front section of the A/C suction line to the rear section of the A/C suction line and tighten the nut to 22 N.m (16 ft. lbs.).

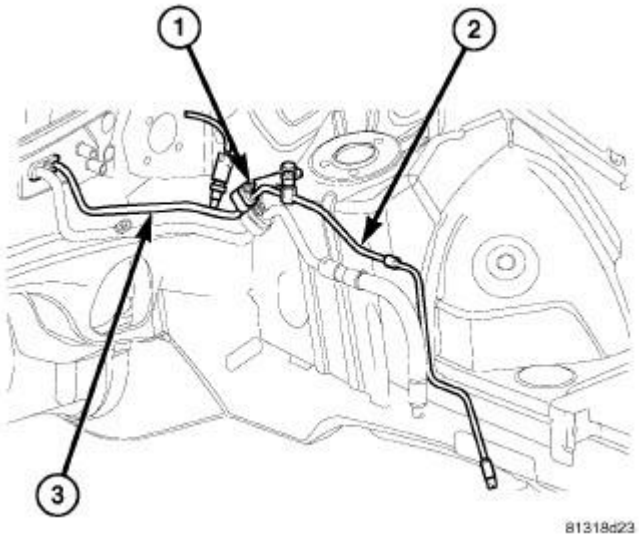


Fig. 69: Removing/Installing A/C Liquid Line
Courtesy of CHRYSLER GROUP, LLC

63. Position the front section of the A/C liquid line into the engine compartment.
64. Remove the tape or plugs from the fittings that connect the front section of the A/C liquid line to the rear section of the A/C liquid line (3).

NOTE: Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

65. Lubricate the new dual plane seal with clean refrigerant oil and position the seal onto the liquid line fitting.
66. Connect the front section of the A/C liquid line to the rear section of the A/C liquid line.
67. Install the nut (1) that secures the front section of the A/C liquid line to the rear section of the A/C liquid line and tighten the nut to 22 N.m (16 ft. lbs.).

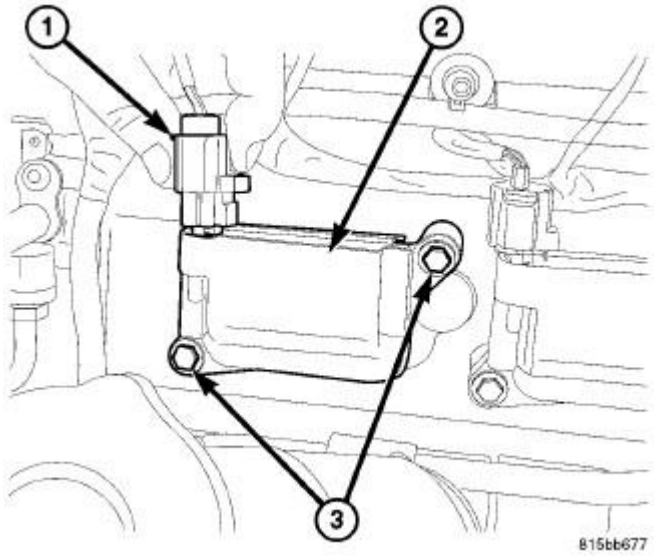


Fig. 70: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

68. Position the ignition coil electrical harness and connect all ignition coil electrical connectors (1).

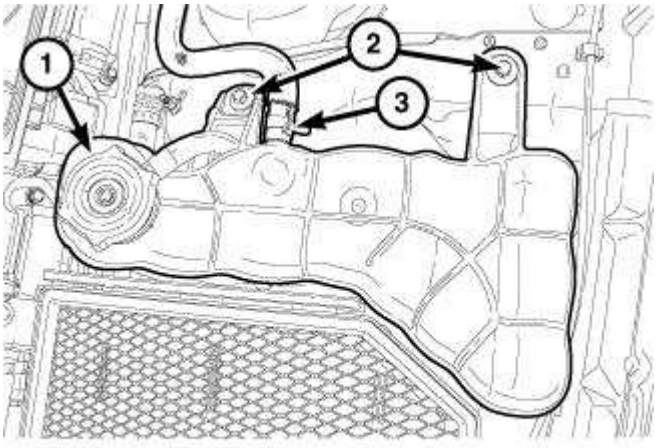


Fig. 71: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

69. Position the coolant bottle (1) and install the coolant bottle retaining bolts (2).

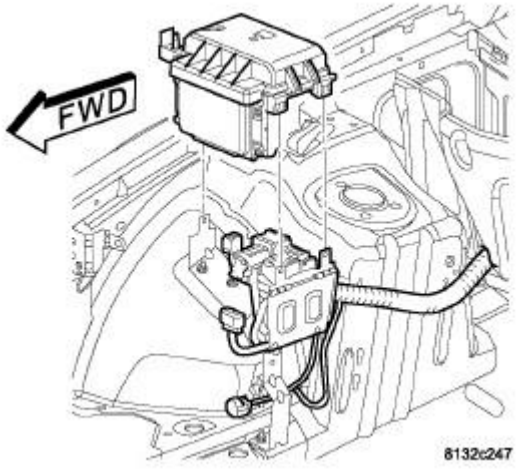


Fig. 72: TIPM/PDC Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

70. Install the Totally Integrated Power Module (TIPM) mounting bracket.
71. Install the PDC bracket.
72. Position the wire harness and secure to the right hand inner fender panel.
73. Secure the PDC to the bracket.

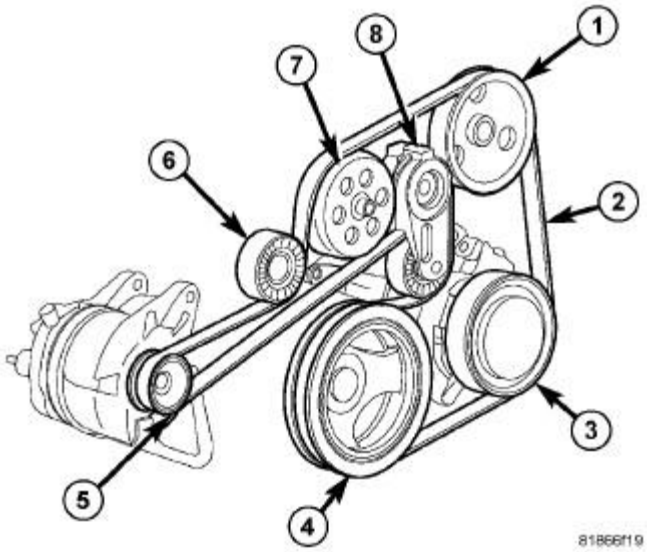


Fig. 73: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

74. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and install the

accessory drive belt (2) onto the pulleys, then slowly release the tensioner.

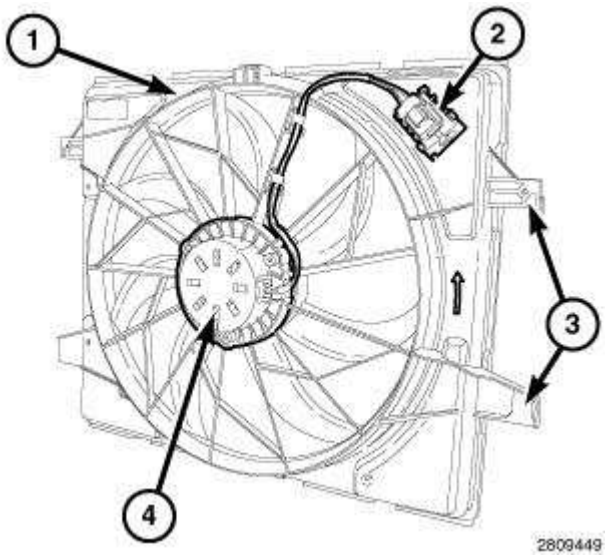


Fig. 74: Cooling Fan Module Components
Courtesy of CHRYSLER GROUP, LLC

75. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

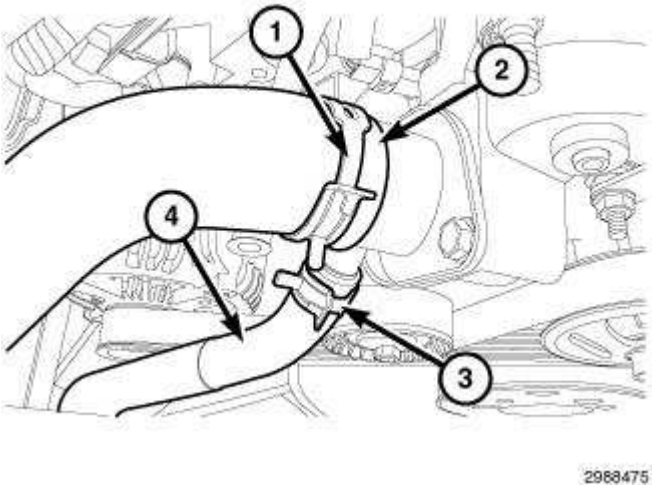


Fig. 75: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

76. Position the oil cooler hose (4) and Install oil cooler hose clamp (3).
77. Position the upper radiator hose (2) and Install the upper radiator hose clamp (1).

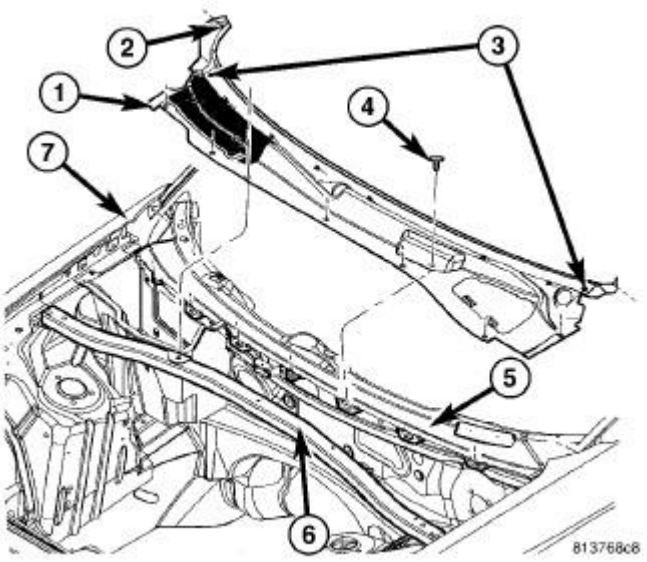


Fig. 76: Cowl Panel, Push-Pins & Fasteners
Courtesy of CHRYSLER GROUP, LLC

78. Install the strut tower support (6) and tighten bolts to 38 N.m (28 ft. lbs.).
79. Install the cowl panel cover (1). Refer to **COVER, COWL PANEL, INSTALLATION** .
80. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
81. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

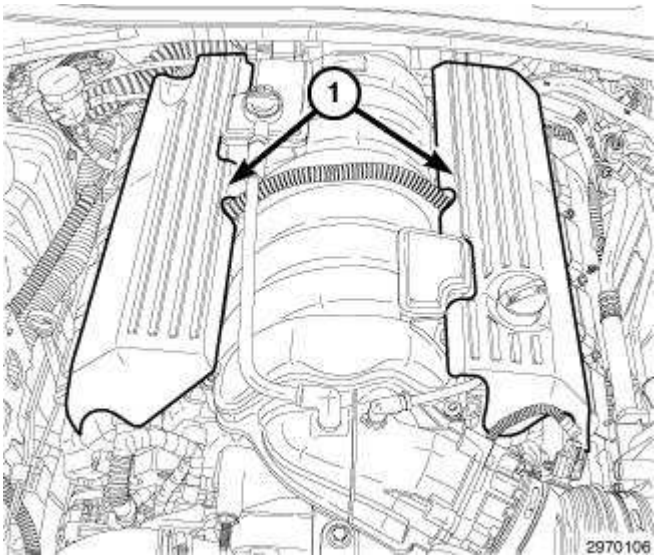


Fig. 77: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

82. Install the engine covers (1) onto the ball studs.

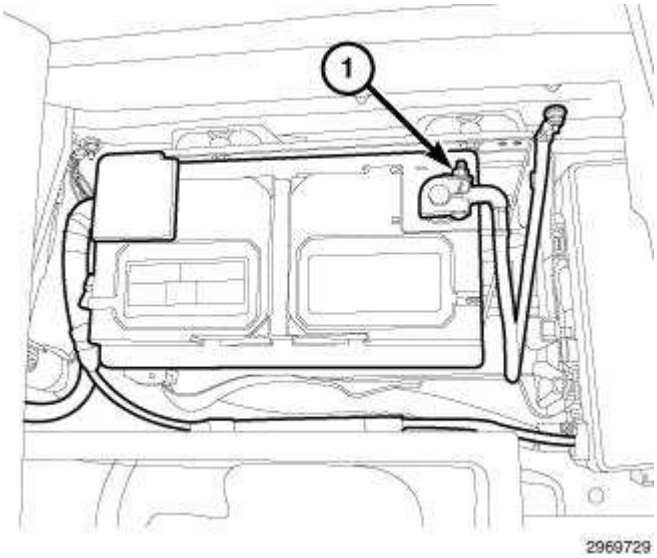


Fig. 78: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

83. Connect the negative battery cable (3).
84. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
85. Start the engine and inspect for leaks.

SPECIAL TOOLS

SPECIAL TOOLS

	1023 - Puller (Originally Shipped In Kit Number(s) 8678.) 10368 - Set, Universal Protective Cap 10386 - Holder, Vibration Damper 10387 - Installer, Vibration Damper 6871 - Installer, A/C Hub (Originally Shipped In Kit Number(s) 6896.) 7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.) 8464 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 8664, 8665, 8665CC, 8702, 9577.) 8507 - Guides, Connecting Rod (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC.) 8512A - Installer, Damper (Originally Shipped In Kit Number(s) 8283, 8527, 8575, 8575CC, 8660, 8661.) 8514 - Pins, Tensioner (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.) 8534B - Fixture, Driveline Support

	(Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.) 8984-UPD - Adapter, Engine Lift (Originally Shipped In Kit Number(s) 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519.) 8984B - Fixture, Engine Lifting (Originally Shipped In Kit Number(s) 8849CC, 9329, 9515, 9516, 9518, 9519, 9540, 9541, 9577.) 9065-3 - Adapter, Valve Spring Compressor (Originally Shipped In Kit Number(s) 9516-CAN, 9517-CAN.) 9065B - Compressor, Valve Spring 9070 - Retainer, Push Rod (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.) 9071 - Remover, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.) 9072 - Installer, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577, 9975, 9976.) C-119 - Cylinder Indicator C-3292A - Gauge, Pressure C-3422-D - Compressor, Valve Spring C-3685-A - Bloc-Chek Kit

MDS SYSTEM

DESCRIPTION

DESCRIPTION

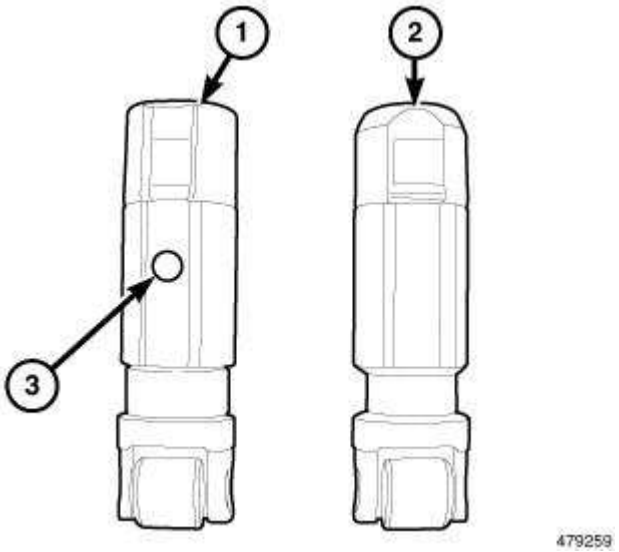


Fig. 79: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) selectively deactivates cylinders 1, 4, 6 and 7 during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

The MDS can provide a 5 to 20% fuel economy benefit when operating in four-cylinder mode. Depending on driving habits and vehicle usage. For EPA rating purposes the fuel economy is 8 to 15% higher than if the engine was operating on eight-cylinders at all times.

The MDS deactivating lifter (1) can be distinguished from the non-MDS lifter (2) by the disconnecting pin (3) on the side of the MDS lifter.

MDS is integrated into the basic engine architecture requiring these additional components:

- Unique MDS camshaft
- 8 deactivating roller lifters
- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

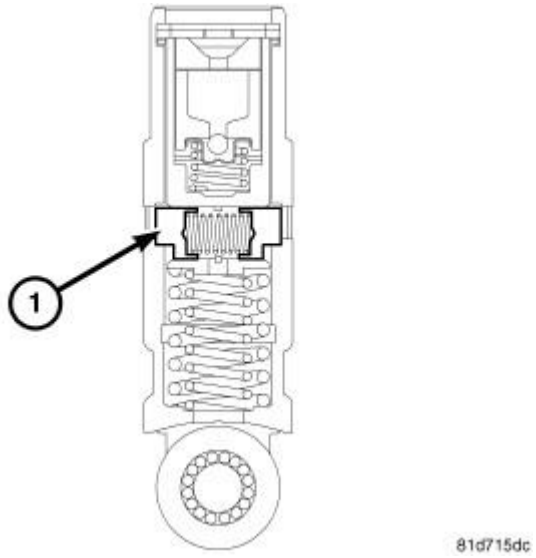


Fig. 80: MDS Lifter Cross Section
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages

drilled into the cylinder block. The MDS solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: It is critical to use the recommended oil viscosity in engines that use MDS.

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No fuel/air enters or leaves during subsequent piston strokes, this high pressure gas is repeatedly compressed and expanded like an air spring.

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

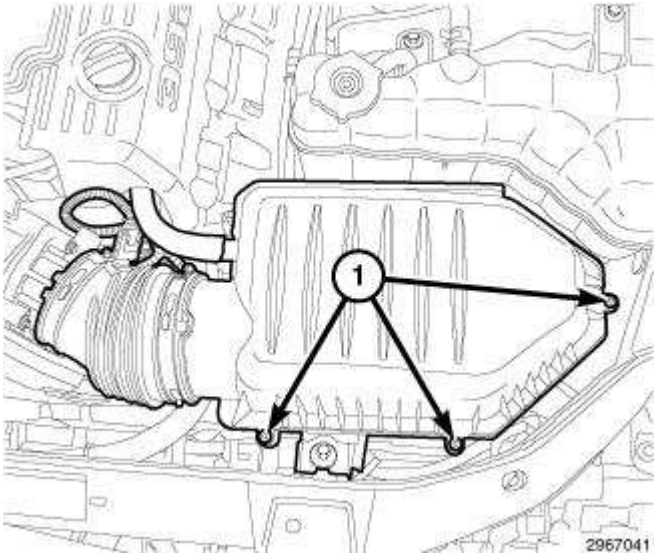


Fig. 81: Air Cleaner Housing Cover Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air cleaner housing cover retaining screws (1).

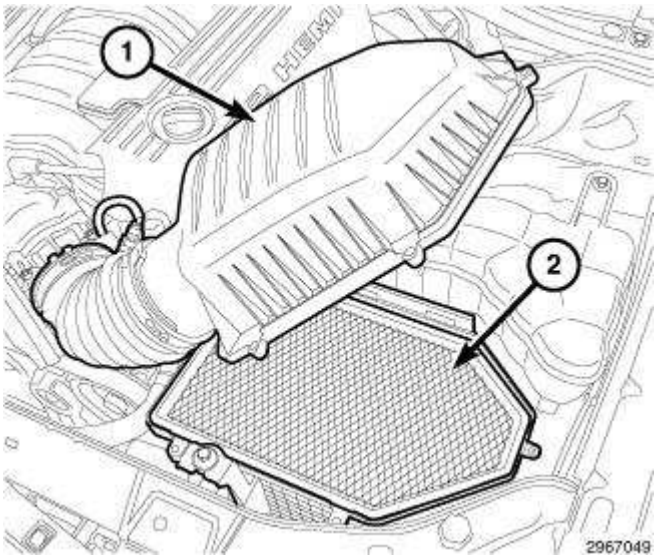


Fig. 82: Air Cleaner Housing Cover & Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

2. Lift the air cleaner housing cover (1) while separating the locating tabs from the housing.
3. Remove air cleaner element (2) from the housing.
4. Clean the inside of air cleaner housing before replacing element.

INSTALLATION

INSTALLATION

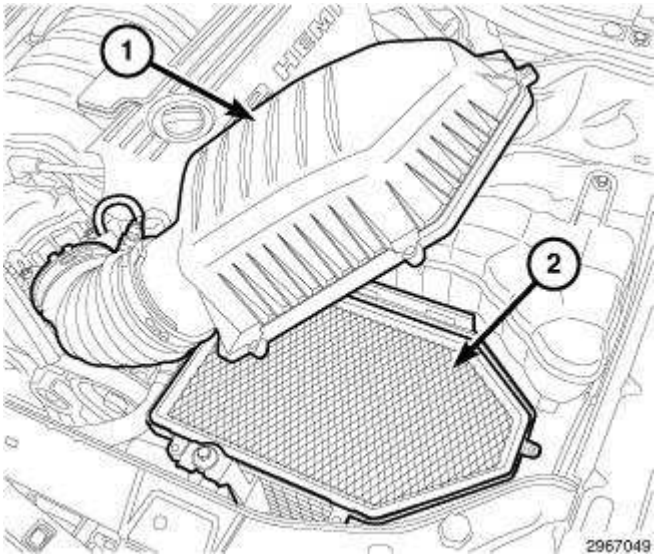


Fig. 83: Air Cleaner Housing Cover & Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

1. Install the air cleaner element (2) into the housing.
2. Align the air cleaner housing cover (1) locating tabs into the housing while lowering the cover

into position.

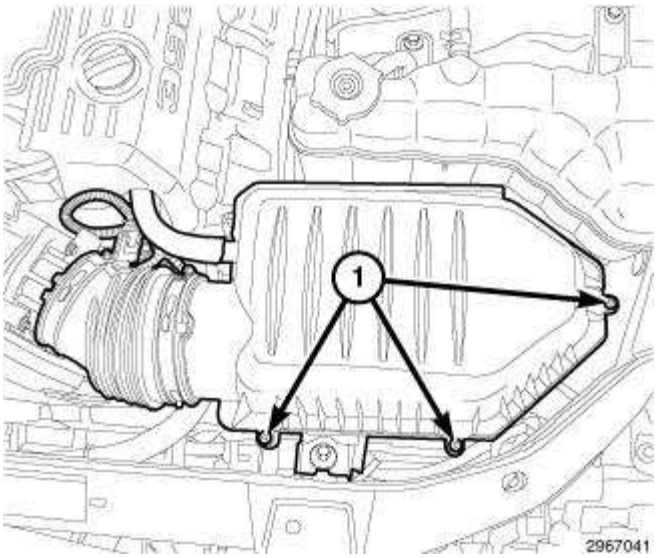


Fig. 84: Air Cleaner Housing Cover Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

3. Install the air cleaner housing cover retaining screws (1) and tighten to 3 N.m (30 in. lbs.).

BODY, AIR CLEANER

REMOVAL

REMOVAL

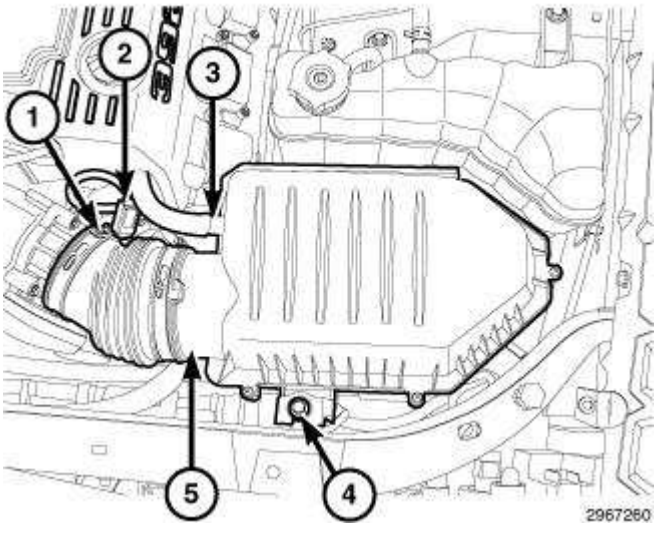


Fig. 85: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

1. Loosen the air duct retaining clamp (1) at the throttle body.
2. Disconnect the intake air temperature sensor electrical connector (2).
3. Remove the makeup air hose (3) at the air cleaner housing.
4. Remove the air cleaner housing retaining bolt (4).
5. While lifting up the air cleaner housing (5), slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.

INSTALLATION

INSTALLATION

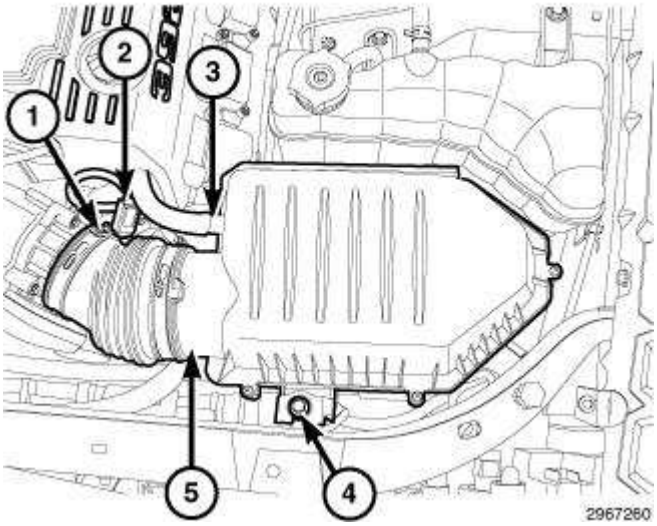


Fig. 86: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

1. While sliding the air duct onto the throttle body, lower the air cleaner housing (5) into position and align the locating pin on the bottom of the housing.
2. Install the air cleaner housing retaining bolt (4) and tighten to 5 N.m (44 in. lbs.).
3. Install the makeup air hose (3) at the air cleaner housing.
4. Connect the intake air temperature sensor electrical connector (2).
5. Position the air duct retaining clamp (1) at the throttle body and tighten to 3 N.m (30 in. lbs.).

CYLINDER HEAD

OPERATION

OPERATION

The cylinder head closes the combustion chamber allowing the pistons to compress the air fuel mixture to the correct ratio for ignition. The valves located in the cylinder head open and close to

either allow clean air into the combustion chamber or to allow the exhaust gases out, depending on the stroke of the engine.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

- Possible indications of the cylinder head gasket leaking between adjacent cylinders are:
  - Loss of engine power
  - Engine misfiring
  - Poor fuel economy
- Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:
  - Engine overheating
  - Loss of coolant
  - Excessive steam (white smoke) emitting from exhaust
  - Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in **CYLINDER COMPRESSION PRESSURE LEAKAGE** test in this information. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50-70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: Use extreme caution when the engine is operating with coolant pressure cap removed. Failure to follow this warning may result in serious or fatal injury.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

WARNING: With cooling system tester in place, pressure will build up fast. Excessive pressure built up, by continuous engine operation, must be released to a

safe pressure level. Never permit pressure to exceed 138 kpa (20 psi). Failure to follow this warning may result in serious or fatal injury.

Install Cooling System Tester (special tool #7700, Tester, Cooling System) or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

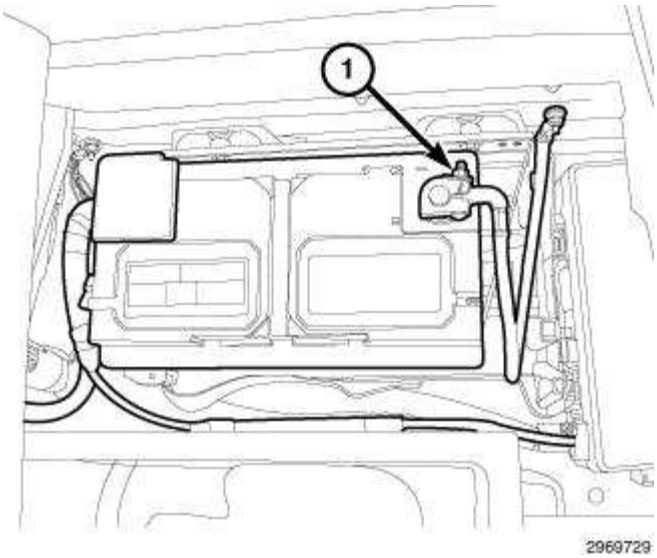


Fig. 87: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the negative battery cable (1).

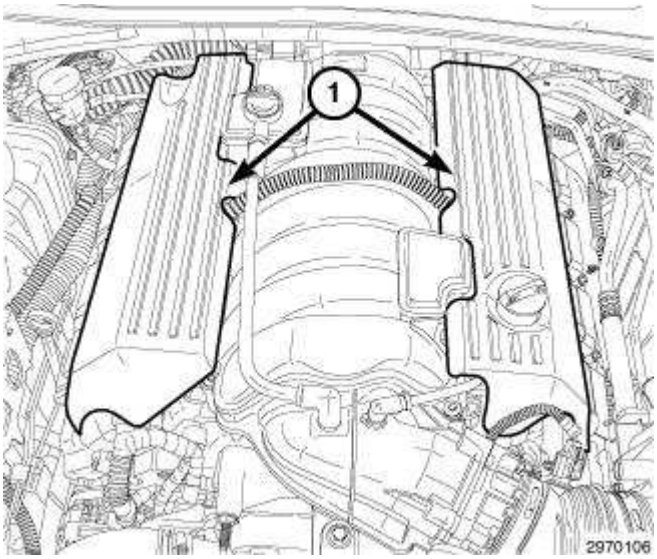


Fig. 88: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine covers (1).
4. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
5. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

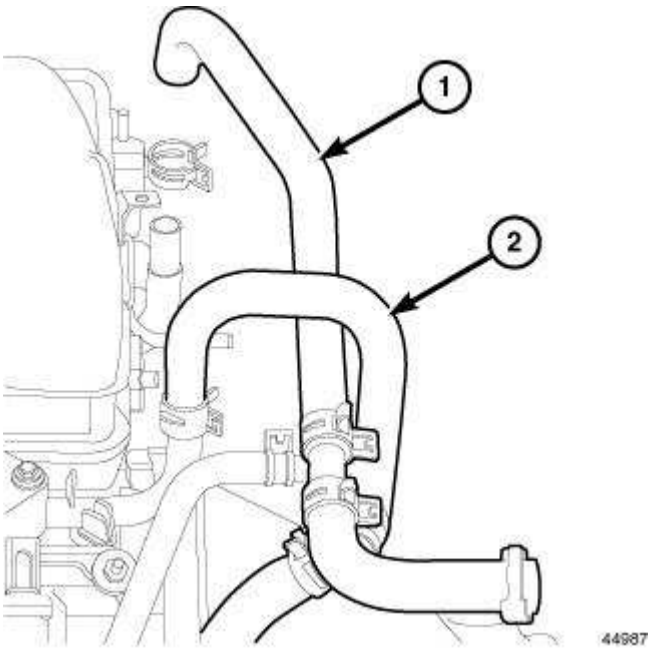


Fig. 89: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the heater hoses (1, 2).

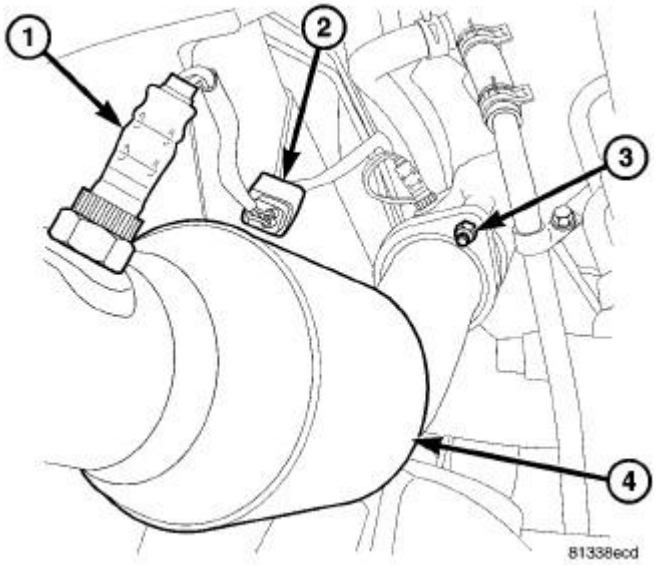


Fig. 90: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

7. Remove the catalytic converters. Refer to **CONVERTER, CATALYTIC, REMOVAL** .
8. Lower the vehicle.

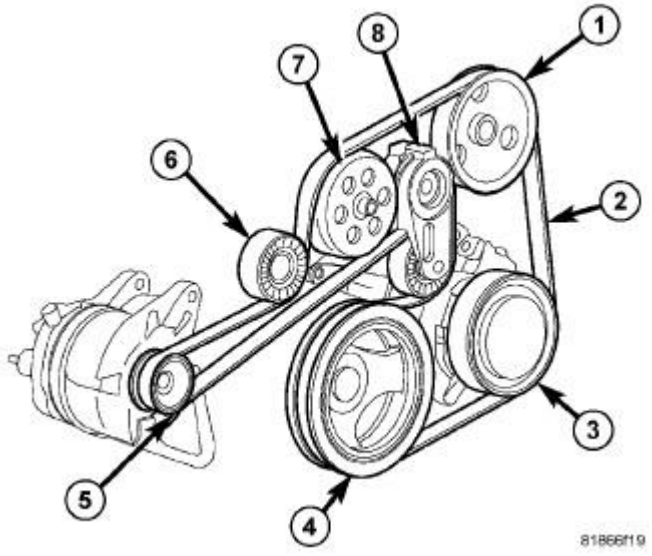


Fig. 91: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever

damage may occur to the tensioner.

9. Rotate the accessory drive belt tensioner (8) clockwise until it contacts it's stop. Remove the accessory drive belt (2), then slowly rotate the tensioner into the freearm position. Refer to **BELT, SERPENTINE, REMOVAL** .

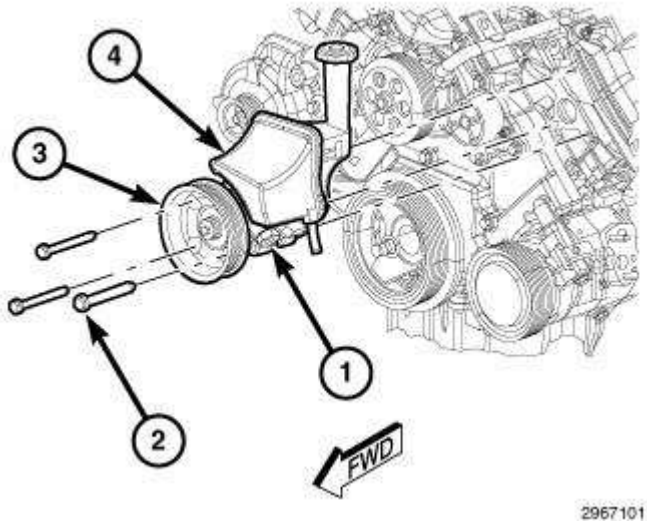


Fig. 92: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to disconnect the power steering pump hoses from the pump, for power steering pump removal.

10. Remove the three power steering pump (1) retaining bolts (2) through the access holes in the pulley (3).
11. Remove the power steering pump (1) and secure out of the way.

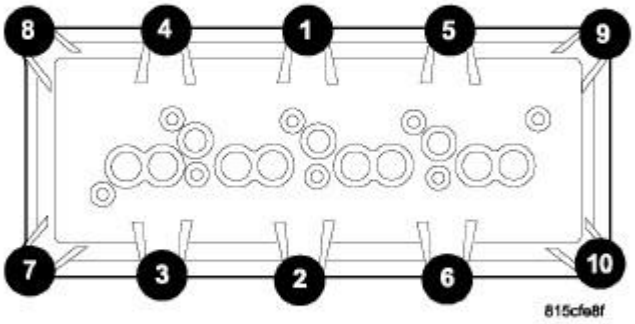


Fig. 93: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

12. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts and remove cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
13. If removing the right cylinder head, remove the engine oil dip stick tube retaining nut at the exhaust manifold and remove the oil dip stick tube.

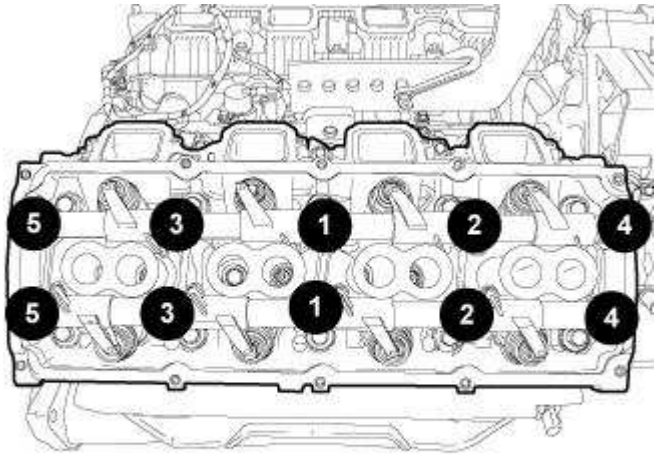


Fig. 94: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Pushrods and rocker arm assemblies must be installed in their

original locations or engine damage could result.

NOTE: **Make sure to identify the original location of the rocker arms and push rods for correct assembly.**

14. Remove the rocker arms and pushrods. Refer to **ROCKER ARM, VALVE, REMOVAL**.

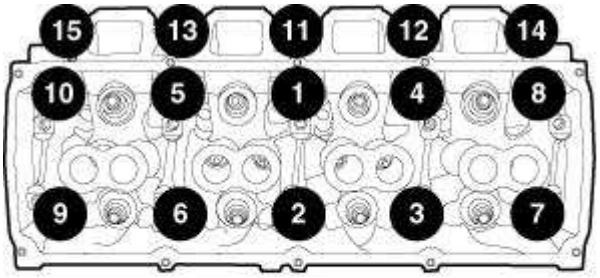


Fig. 95: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

NOTE: **It is not necessary to remove the exhaust manifolds to remove the cylinder heads.**

15. Using the sequence shown in illustration, remove the cylinder head bolts and remove the cylinder head(s).

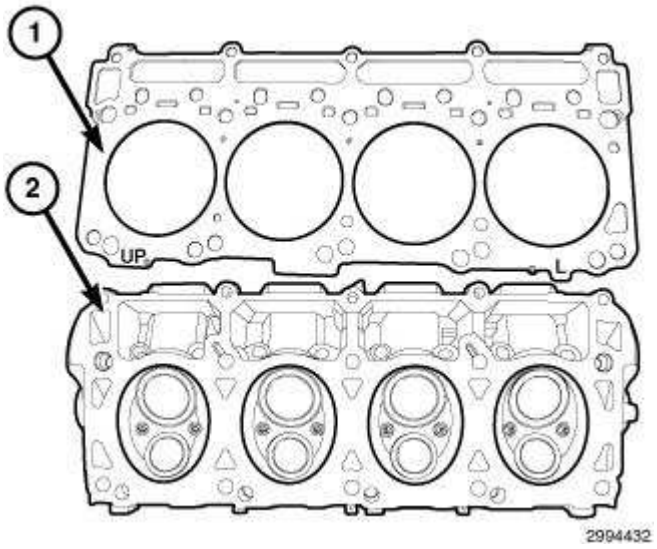


Fig. 96: Cylinder Head Gasket & Cylinder Head

Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

16. Discard the cylinder head gasket (1).
17. Inspect and clean the cylinder head (2) mating surface.

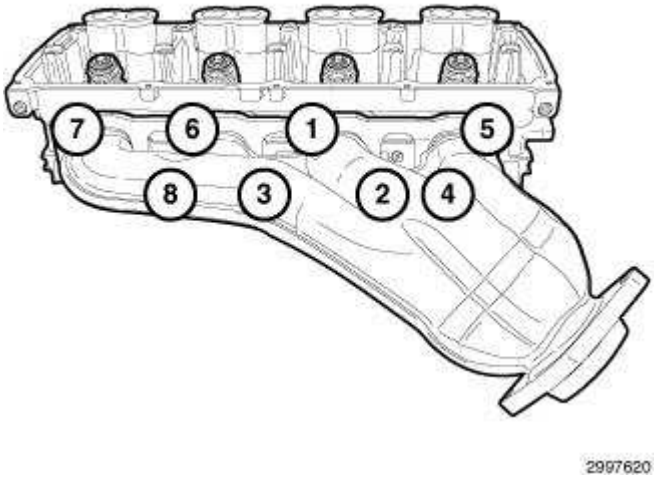


Fig. 97: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

18. If necessary, using the sequence shown in illustration, remove the exhaust manifold bolts and remove the manifold.

CLEANING

CLEANING

Clean all surfaces of the cylinder block and cylinder heads.

Clean the cylinder block front and rear gasket surfaces using a suitable solvent.

INSPECTION

INSPECTION

1. Inspect the cylinder head for flatness using a straightedge and a feeler gauge. If tolerances exceed 0.0508 mm (0.002 in.) replace the cylinder head.
2. Inspect the valve seats for damage. Service the valve seats as necessary.

3. Inspect the valve guides for wear, cracks or looseness. If any of these conditions exist, replace the cylinder head.
4. Inspect push rods. Replace worn or bent push rods.

INSTALLATION

INSTALLATION

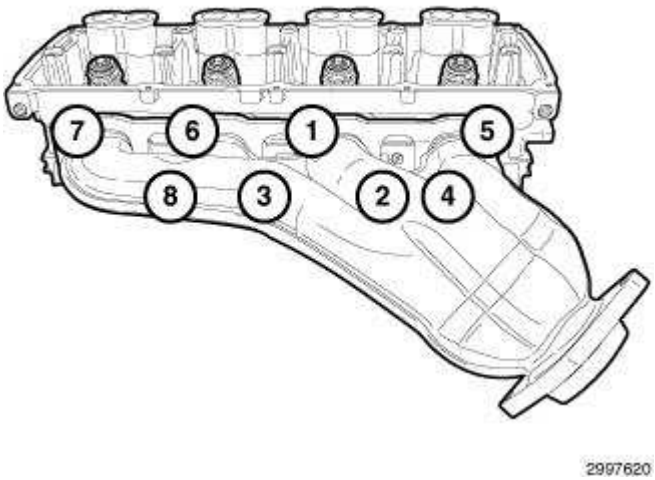


Fig. 98: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

1. If removed, using a new exhaust manifold gasket, position the exhaust manifold and install the retaining bolts finger tight.
2. Using the sequence shown in illustration, tighten the retaining bolts to 31 N.m (23 ft. lbs.).

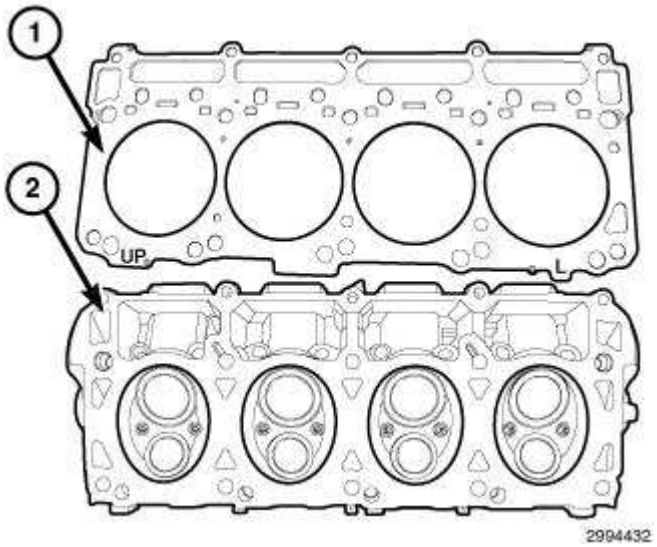


Fig. 99: Cylinder Head Gasket & Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The cylinder head gaskets (1) are not interchangeable between left and right sides. They are marked "UP" to indicate direction to face up and "L" or "R" to indicate left side or right side of engine block.

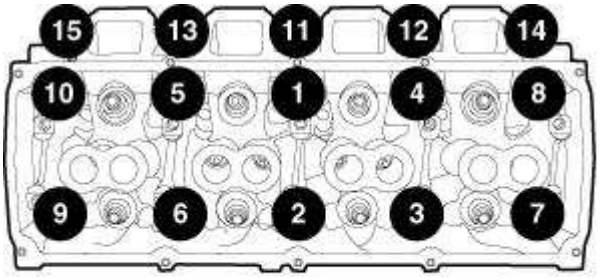
NOTE: Left side shown in illustration, right side similar.

3. Clean all sealing surfaces of the engine block and the cylinder head(s) (2).

NOTE: Rotate crankshaft 45° so that all pistons are 1/2 the way down the cylinder bore to avoid piston to valve contact.

4. Position the new cylinder head gasket(s) (1) onto the engine block.
5. Position the cylinder head(s) (2) onto the engine block.
6. Install the cylinder head bolts finger tight.

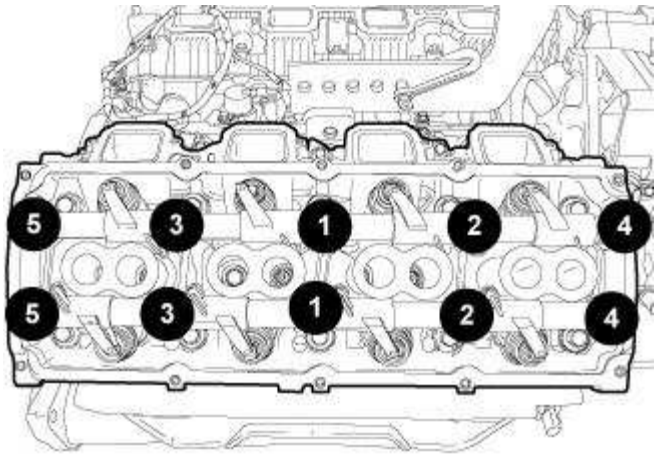
CAUTION: The 6.4L engine uses a unique 4 layer steel head gasket that must be compressed evenly and completely across the deck surface for proper sealing. The tightening sequence must be followed to ensure all layers are compressed before applying the additional 90 degree turn.



88745

Fig. 100: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Using the sequence below, tighten the retaining bolts.
   a. Using the sequence shown in illustration, tighten bolts 1-10 to 34 N.m (25 ft. lbs.).
   b. Using the sequence shown in illustration, tighten bolts 11-15 to 20 N.m (15 ft. lbs.).
   c. Using the sequence shown in illustration, tighten bolts 1-10 to 54 N.m (40 ft. lbs.).
   d. Using the sequence shown in illustration, verify bolts 11-15 are 20 N.m (15 ft. lbs.).
   e. Using the sequence shown in illustration, tighten bolts 1-10 to 61 N.m (45 ft. lbs.).
   f. Using the sequence shown in illustration, rotate bolts 1-10 an additional 90 degrees.
   g. Using the sequence shown in illustration, tighten bolts 11-15 to 34 N.m (25 ft. lbs.).



921225

Fig. 101: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Pushrods and rocker arm assemblies must be installed in their original locations or engine damage could result.

8. Install the pushrods and rocker arms. Refer to **ROCKER ARM, VALVE, INSTALLATION**.
9. If removed, install the oil dip stick tube and tighten the retaining nut at the exhaust manifold.

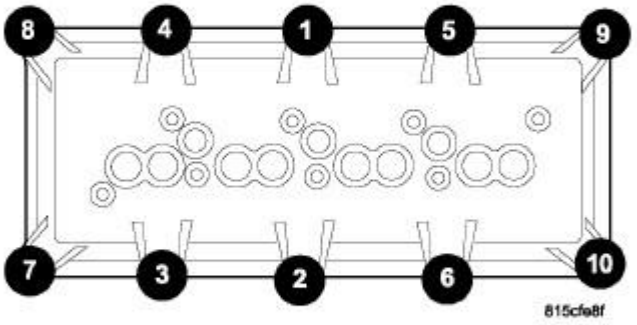


Fig. 102: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

10. Position the cylinder head covers, using the sequence shown in illustration, tighten the cylinder head cover bolts to 8 N.m (70 lbs in.). Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

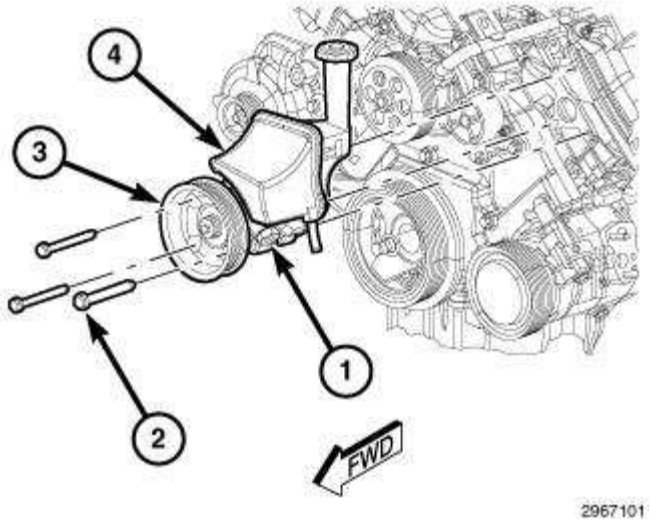


Fig. 103: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the power steering pump. Refer to **PUMP, INSTALLATION** .

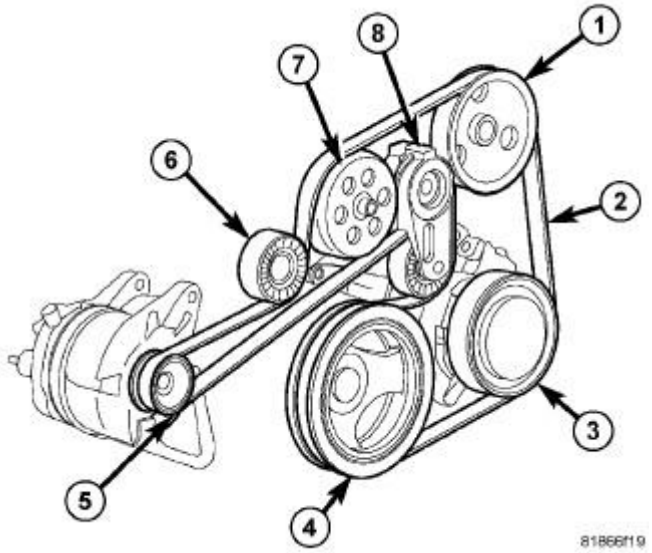


Fig. 104: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

12. Rotate the accessory drive belt tensioner (8) clockwise until it contacts it's stop, install the accessory drive belt (2), then slowly release the tensioner into position. Refer to **BELT, SERPENTINE, INSTALLATION** .

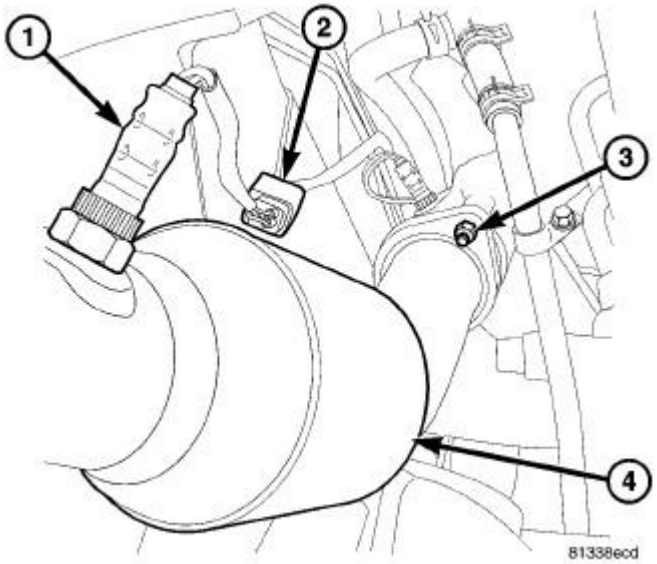


Fig. 105: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic

Converter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

13. Raise and support the vehicle.
14. Install the catalytic converters. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .

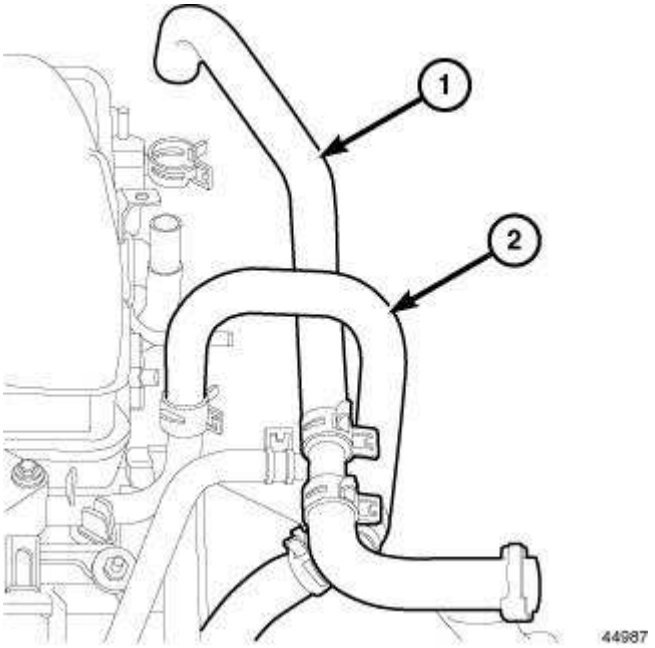


Fig. 106: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

15. Lower the vehicle.
16. Connect the heater hoses (1, 2).
17. Install the intake manifold and throttle body as an assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
18. Connect the fuel supply line.

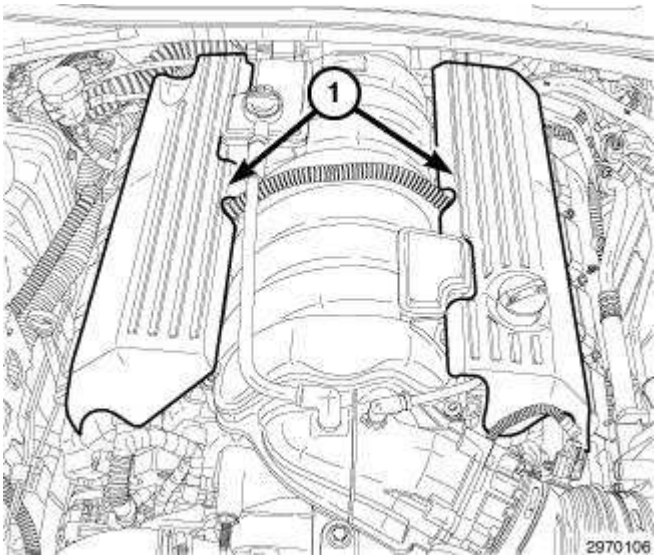


Fig. 107: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

19. Install the engine covers (1).

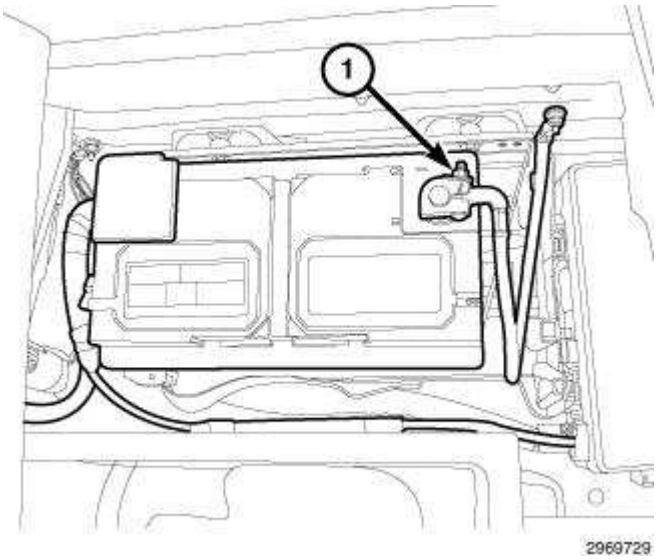


Fig. 108: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

20. Fill cooling system. Refer to **STANDARD PROCEDURE** .
21. Connect the negative battery cable (1).
22. Start engine check for leaks.

COVER(S), CYLINDER HEAD

REMOVAL

REMOVAL

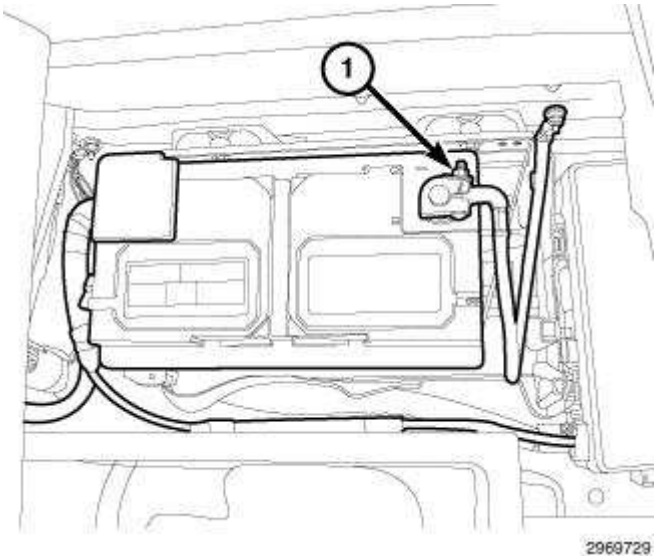


Fig. 109: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).

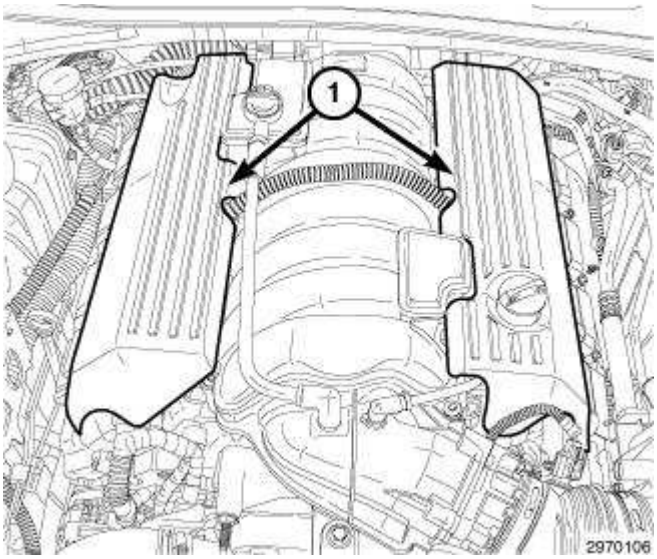


Fig. 110: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine covers (1).

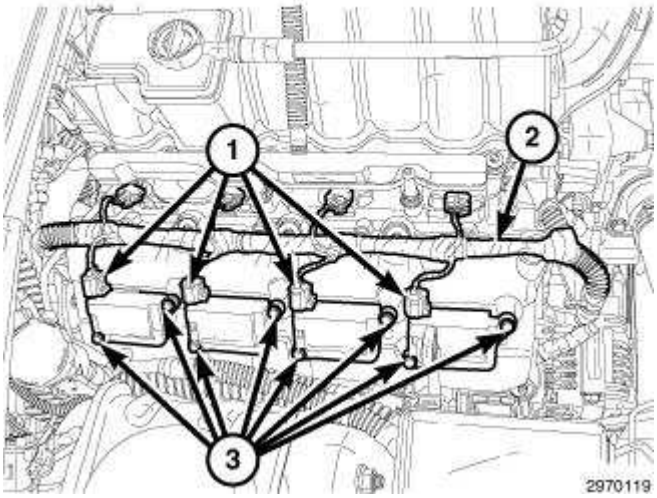


Fig. 111: Ignition Coil Electrical Connectors, Harness & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

3. Disconnect the ignition coil electrical connectors (1).
4. Position the electrical harness (2) aside.
5. Remove the ignition coil retaining bolts (3).

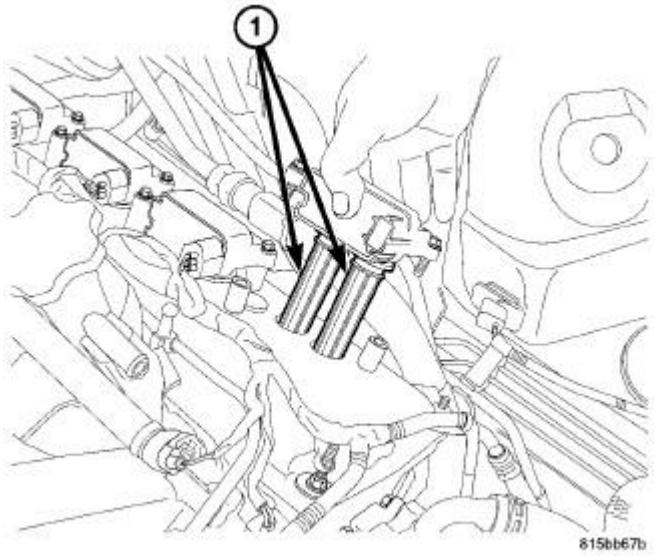


Fig. 112: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

6. Remove the ignition coils (1).

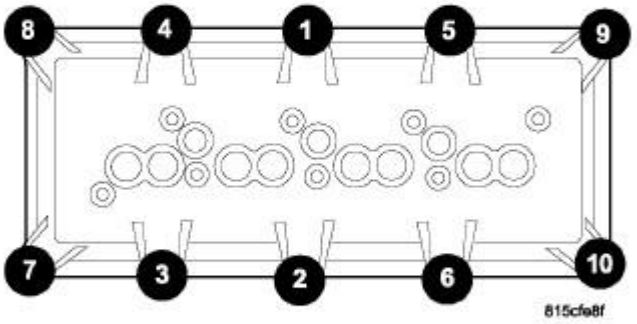


Fig. 113: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts.

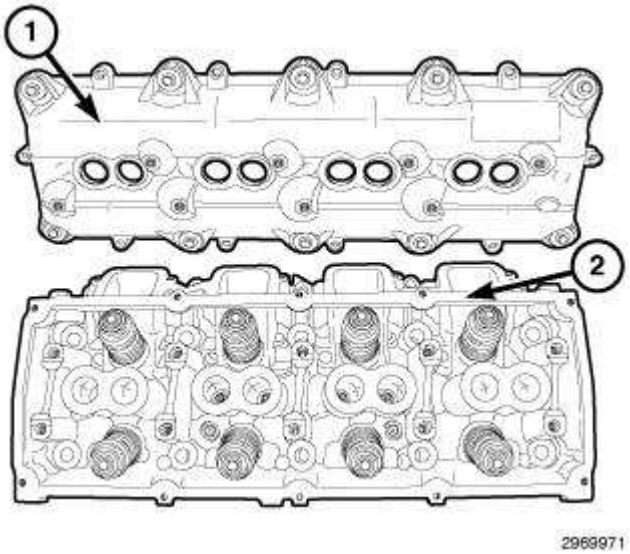


Fig. 114: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

8. Remove the cylinder head cover (1).
9. Clean the sealing surface of the cylinder head (2).

NOTE: The cylinder head cover gasket may be used again, provided no cuts, tears, or

deformation have occurred.

INSTALLATION

INSTALLATION

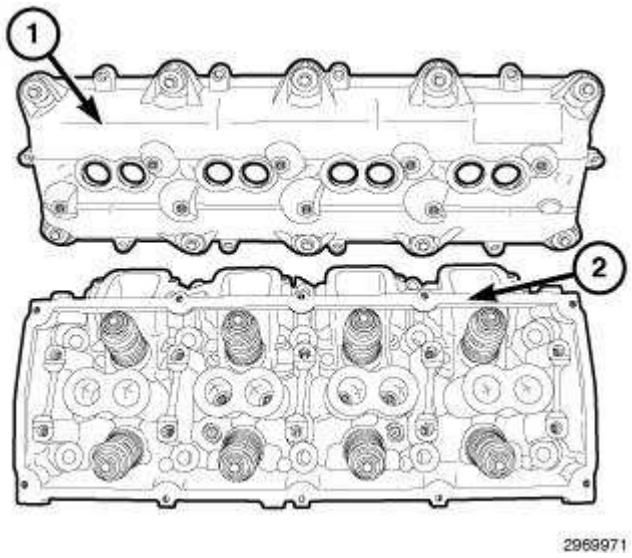


Fig. 115: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.

CAUTION: DO NOT allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.

NOTE: The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.

1. Clean the cylinder head cover (1) and the sealing surface of the cylinder head (2). Inspect and replace gasket if necessary.
2. Install the cylinder head cover and hand start all fasteners.

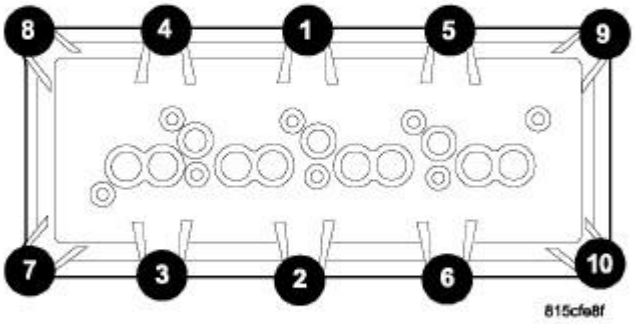


Fig. 116: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, tighten the cylinder head cover bolts to 8 N.m (70 lbs in.).

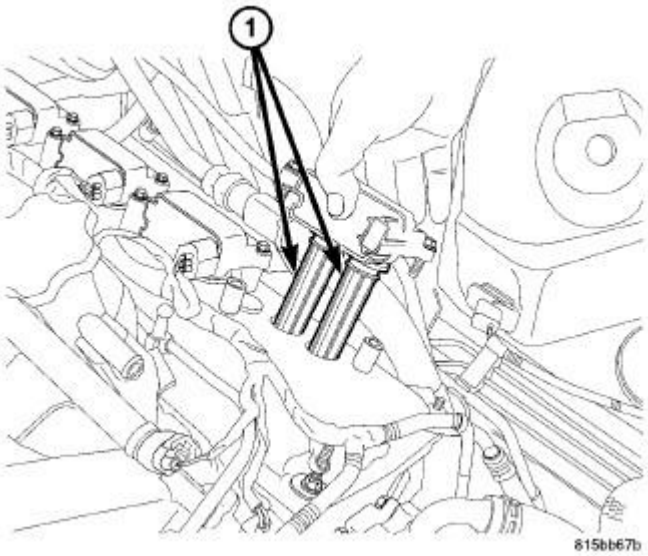


Fig. 117: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

4. Before installing the ignition coils, apply dielectric grease to the inside of the spark plug boots (1).

5. Install the ignition coils.

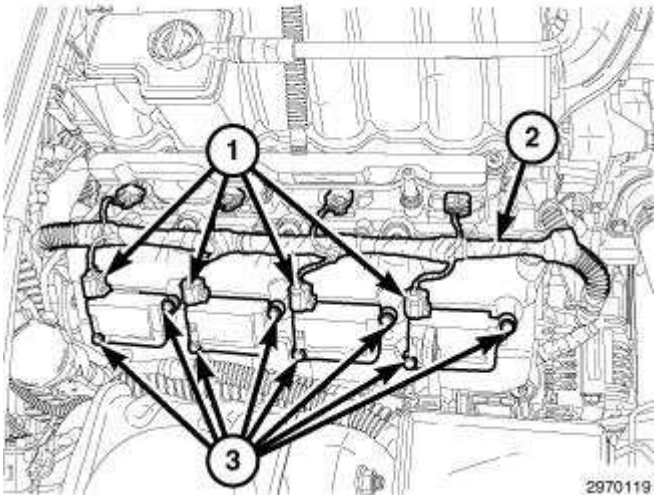


Fig. 118: Ignition Coil Electrical Connectors, Harness & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

6. Tighten the ignition coil retaining bolts (3) to 7 N.m (62 in. lbs.).
7. Position the electrical harness (2).
8. Connect the ignition coil electrical connectors (1).

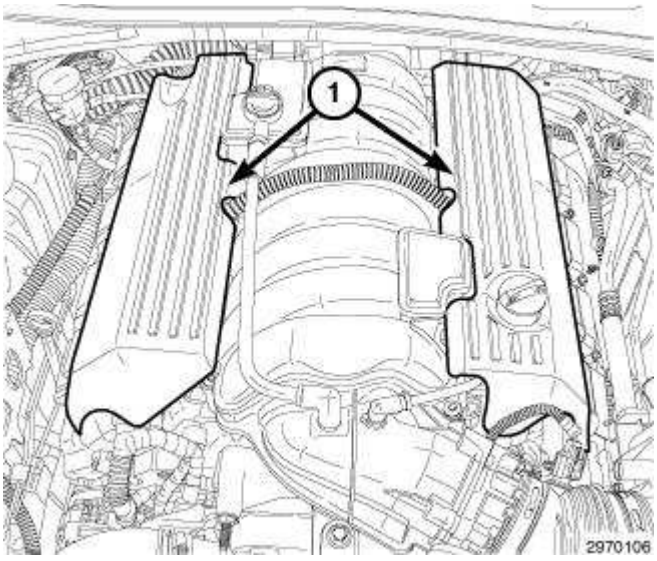


Fig. 119: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine covers (1).

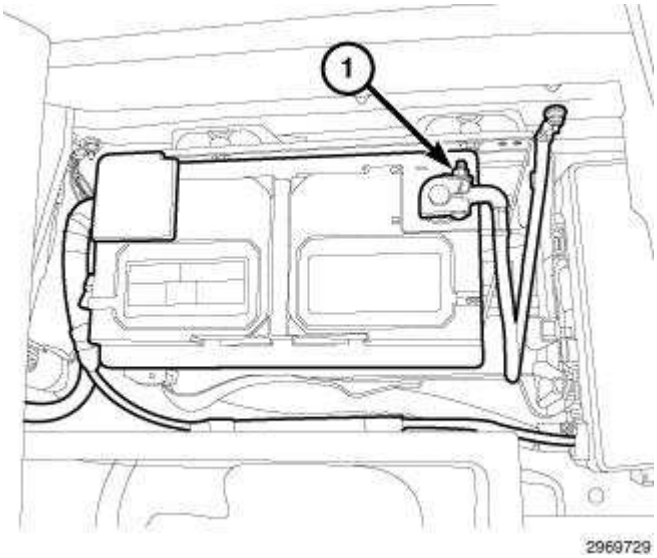


Fig. 120: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

10. Connect the negative battery cable.

ROCKER ARM, VALVE

REMOVAL

REMOVAL

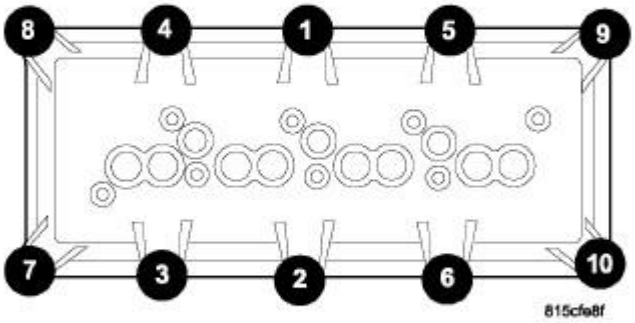


Fig. 121: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

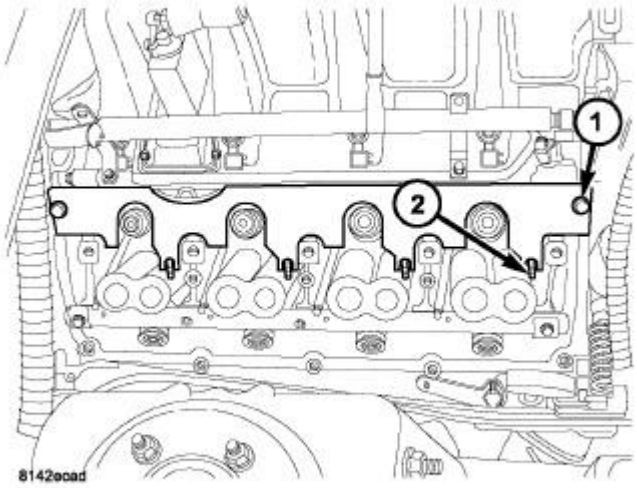


Fig. 122: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

2. Install Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).

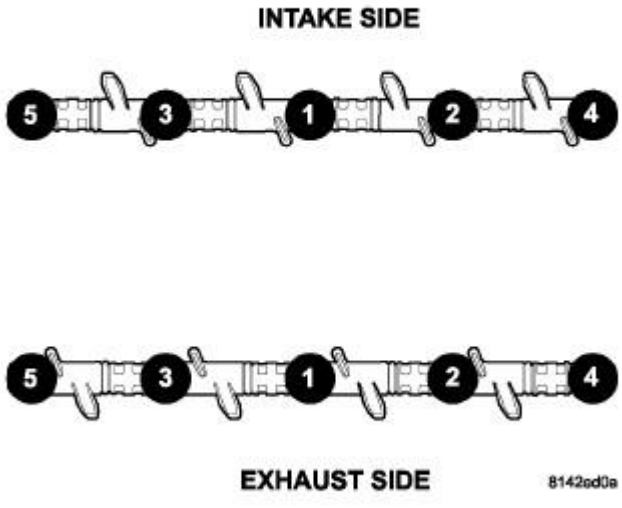


Fig. 123: Rocker Shaft Removal/Tightening Sequence

Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, loosen the rocker shaft assemblies.

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with an "I".

4. Remove the rocker shaft assemblies. Note the location for reassembly.

CAUTION: The longer pushrods are for the exhaust side, and the shorter pushrods are for intake side.

5. Remove the pushrods. Note the pushrod location for reassembly.

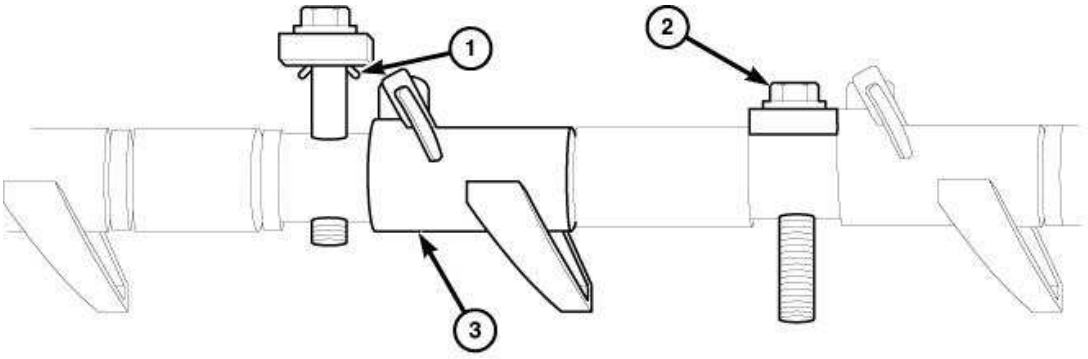


Fig. 124: Rocker Arm Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove the retainers from the rocker shaft assemblies. The assembly tangs (1) at the bottom of the retainers can be damaged, causing the assembly tangs to break off and get into the engine.

INSTALLATION

INSTALLATION

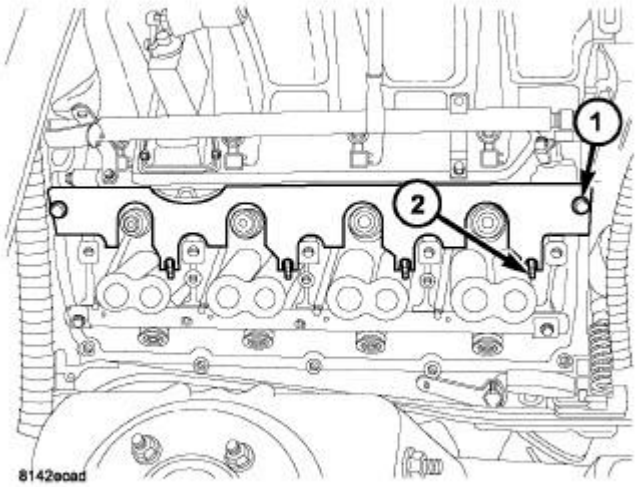


Fig. 125: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The longer pushrods are for the exhaust side, and the shorter pushrods are for intake side.

1. Install the pushrods in the same order as removed.
2. Install the Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).

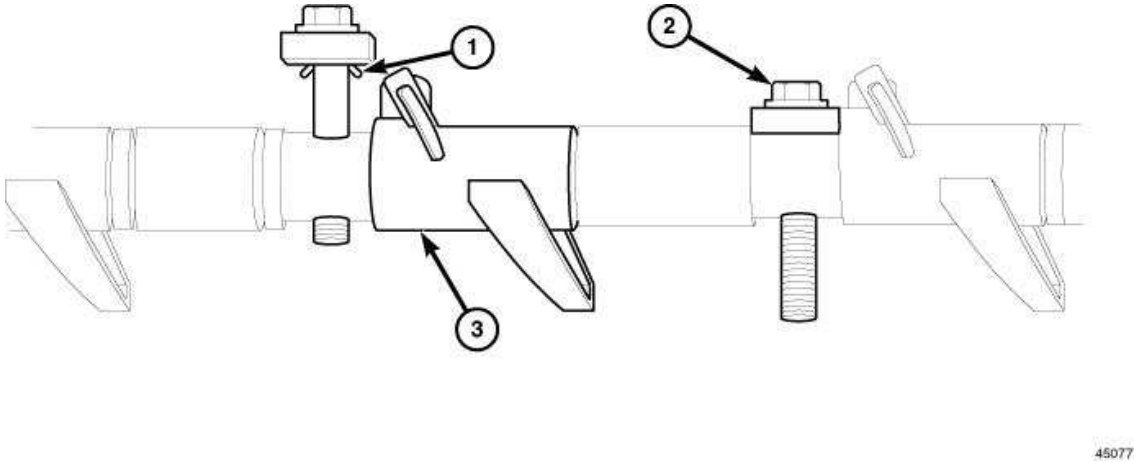


Fig. 126: Rocker Arm Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Ensure the retainers (1) and rocker arms (3) are not overlapped when torquing bolts.

CAUTION: Verify the push rods are installed into the rocker arms (3) and lifters correctly while installing the rocker shaft assembly. Recheck after the rocker shaft assembly has been torqued to specification.

3. Install the rocker shaft assemblies in the same order as removed.

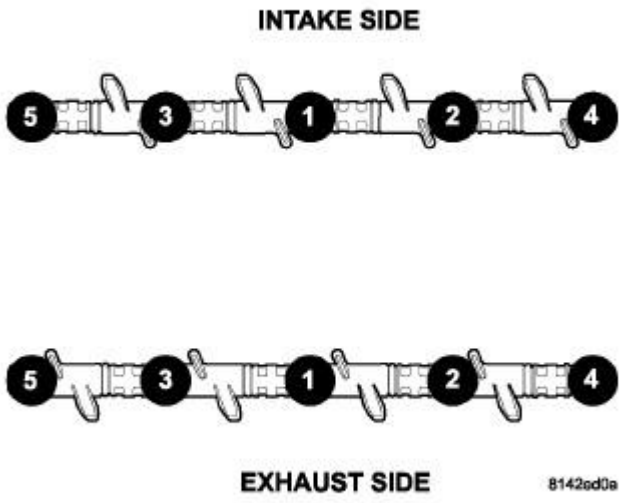


Fig. 127: Rocker Shaft Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with the letter "I".

4. Verify the rocker arms are installed in the correct location.

NOTE: Repeat torque sequence several times to ensure rocker shaft assembly is firmly seated.

5. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

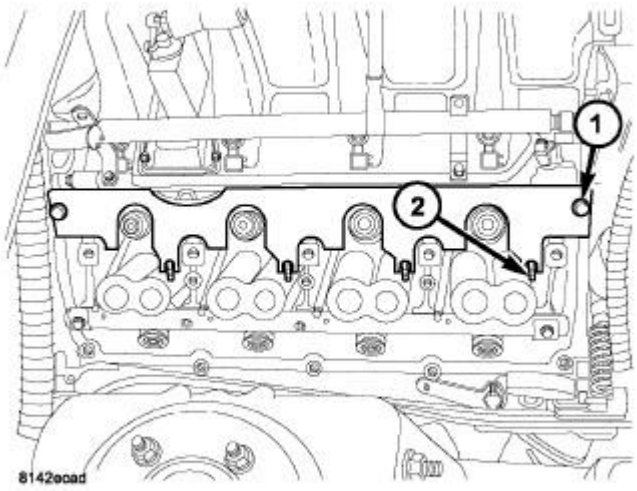


Fig. 128: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate or crank the engine during or immediately after rocker arm installation. Allow the hydraulic roller lifters adequate time to bleed down (about 5 minutes).

6. Remove the Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).

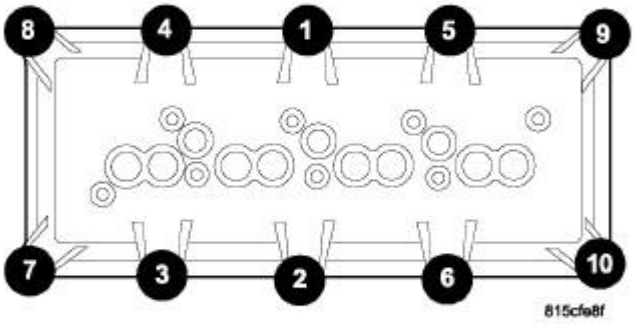


Fig. 129: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

The valve guide seals are made of rubber and incorporate an integral steel valve spring seat. The integral garter spring maintains consistent lubrication control to the valve stems. The intake valve stem seal has a smaller valve spring seat compared to the exhaust valve stem seal. The intake and exhaust valve stem seals are identified by different colors.

SPRING(S), VALVE

REMOVAL

REMOVAL

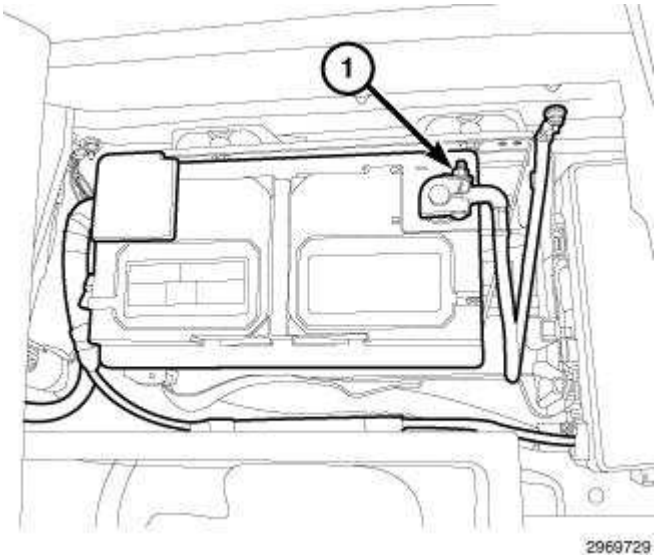


Fig. 130: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

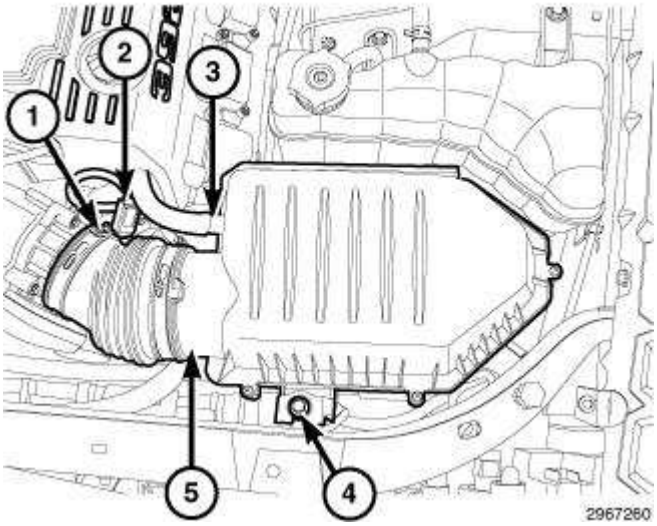


Fig. 131: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

2. Remove the air cleaner housing (5) and clean air tube (1). Refer to **BODY, AIR CLEANER, INSTALLATION**.

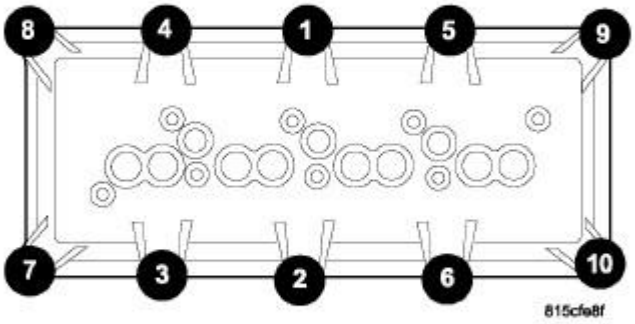


Fig. 132: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Remove the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

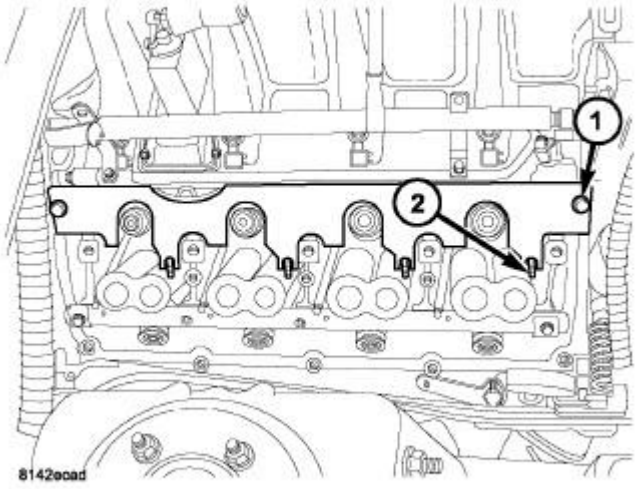


Fig. 133: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The piston must be at TDC, and both valves closed on the cylinder to be serviced.

NOTE: The intake push rods can fall into the engine and become lodged in the oil pan, if removing intake rocker arm shaft, install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1) to retain the intake push rods (2).

4. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1) onto the cylinder head.
5. Clip the pushrods (2) into the pushrod retainer (1).

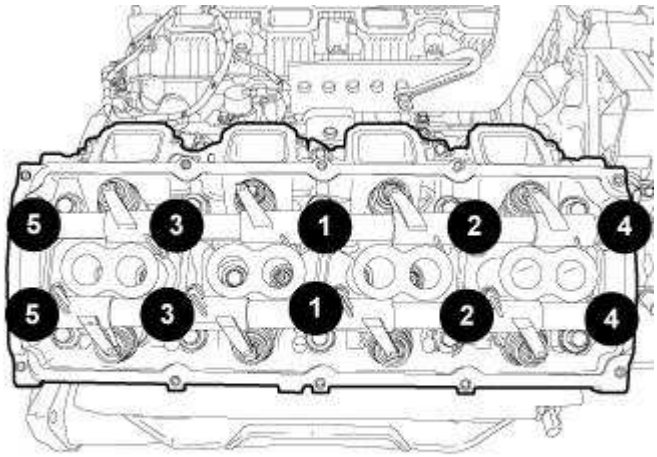


Fig. 134: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with an "I".

6. Using the sequence shown in illustration, remove the rocker arm shaft bolts and remove the rocker arm shaft.

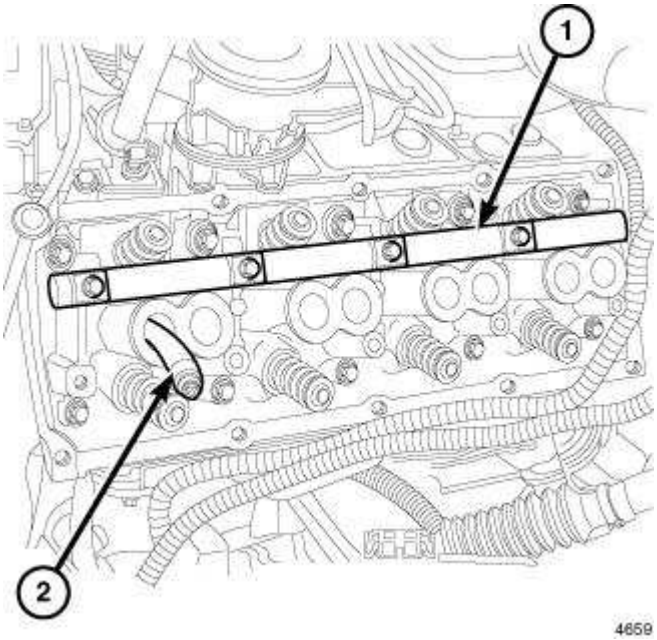


Fig. 135: Rocker Arm Shaft Adapter & Air Hose
Courtesy of CHRYSLER GROUP, LLC

7. Install the rocker arm shaft adapter (special tool #9065B, Compressor, Valve Spring) (1).
8. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

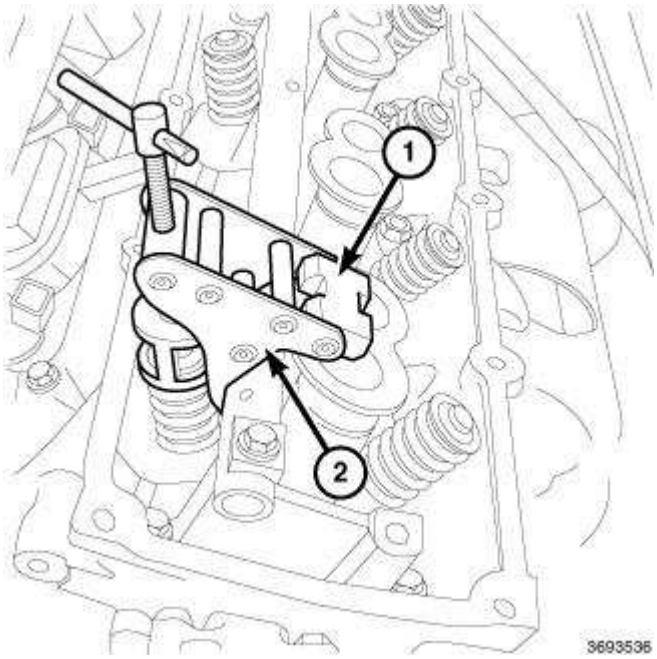


Fig. 136: Intake Valve Spring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: A fulcrum assembly (1) must be rotated to the appropriate setting as marked on the tool for proper valve spring alignment.

NOTE: All valve springs and seals are removed in the same manner.

NOTE: Tap the top of the valve spring retainer to loosen the spring retainer locks.

9. Install the valve spring compressor (special tool #9065B, Compressor, Valve Spring) (1) and remove the intake valve retainer locks.
10. Release the valve spring compressor and remove the valve springs.

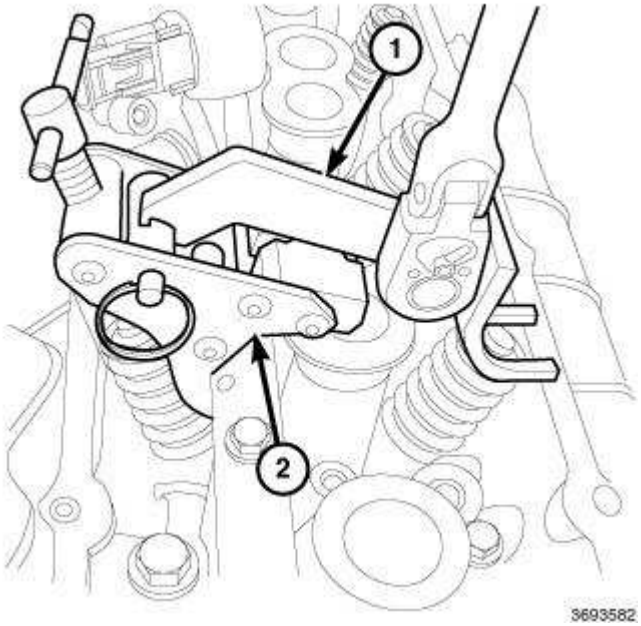


Fig. 137: Valve Spring Compressor & Adapter
Courtesy of CHRYSLER GROUP, LLC

11. Install the valve spring compressor (special tool #9065B, Compressor, Valve Spring) (2) and the rocker arm adapter (special tool #9065-3, Adapter, Valve Spring Compressor) (1) and remove the exhaust valve retainer locks.
12. Release the valve spring compressor and remove the valve spring.

NOTE: The valve springs are interchangeable between intake and exhaust.

13. Remove and discard the valve guide seal.

INSTALLATION

INSTALLATION

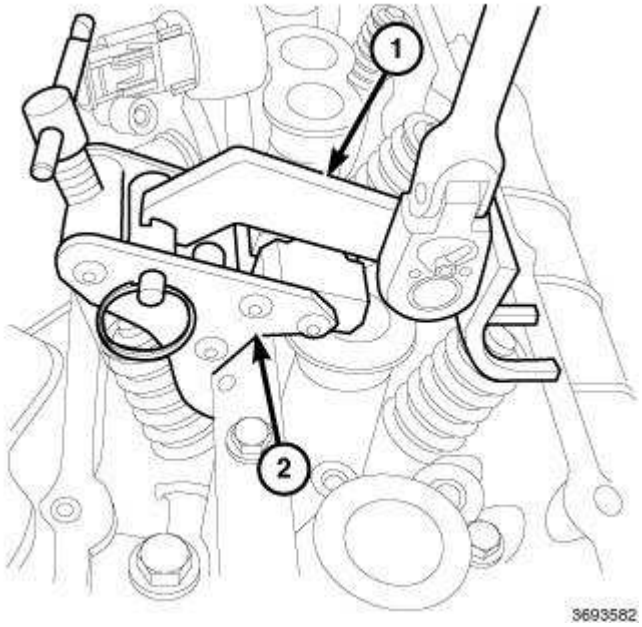


Fig. 138: Valve Spring Compressor & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: All valve springs and seals are installed in the same manner.

NOTE: The intake seal has a smaller spring seat diameter compared to the exhaust seal.

1. Install a new valve guide seal.

   NOTE: The intake spring retainer has a longer free length compared to the exhaust spring retainer.

2. Install the valve spring.
3. Install the valve spring retainer.
4. Using the valve spring compressor (special tool #9065B, Compressor, Valve Spring) (3) and the rocker arm adapter (special tool #9065-3, Adapter, Valve Spring Compressor) (1), compress the valve spring and install the valve spring retainer locks.

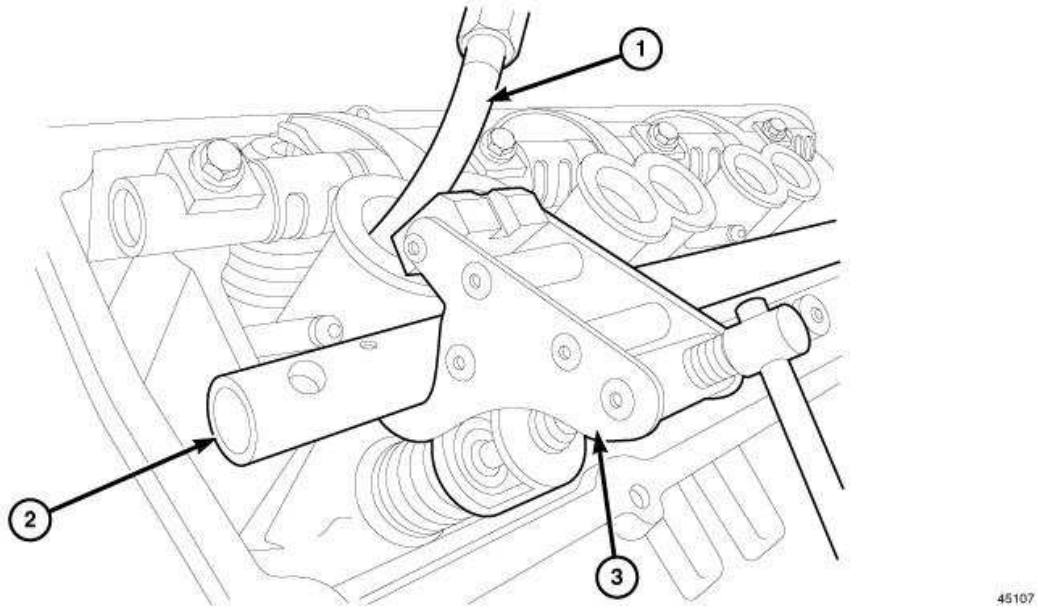


Fig. 139: Air Charge, Valve Spring Compressor & Adapter
Courtesy of CHRYSLER GROUP, LLC

5. Remove the valve spring compressor (special tool #9065B, Compressor, Valve Spring) (3) and the rocker arm adapter (special tool #9065-3, Adapter, Valve Spring Compressor).
6. Release the air charge (1) in the cylinder.

CAUTION: Verify that the pushrods are fully seated into the lifters and the rocker arms. Recheck after rocker arm shaft has been torqued to specification.

7. Install the rocker arm shaft and push rods. Refer to **ROCKER ARM, VALVE, INSTALLATION**.

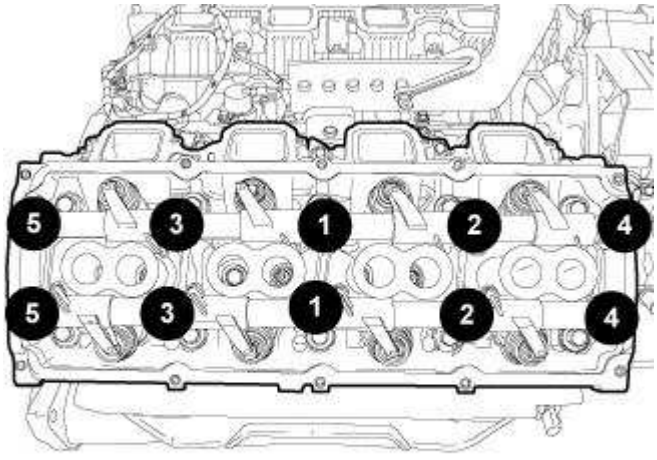


Fig. 140: Rocker Shafts Retaining Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER GROUP, LLC

NOTE: Repeat torque sequence several times to ensure rocker shaft assembly is firmly seated.

8. Using the sequence shown in illustration, tighten the rocker arm shaft bolts to 22 N.m (16 ft. lbs.).

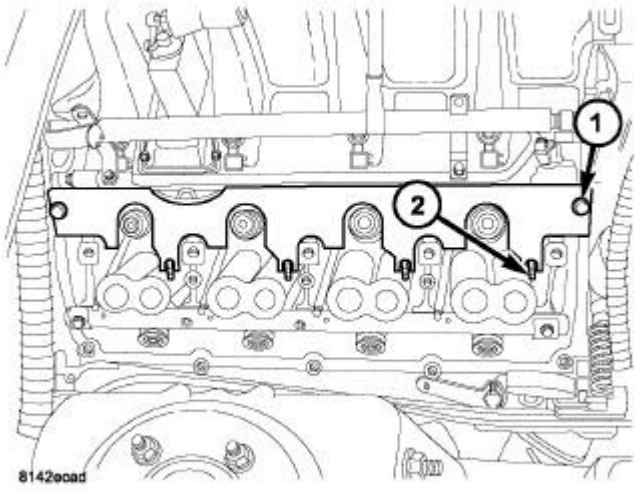


Fig. 141: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

9. Remove the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

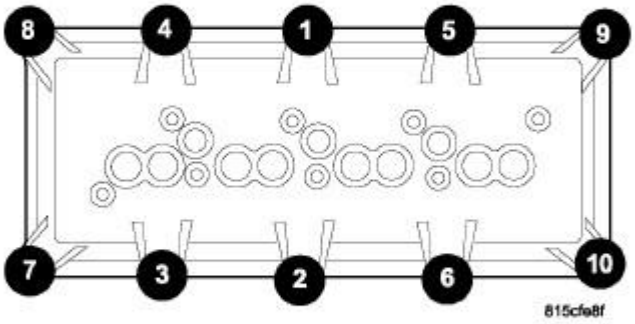


Fig. 142: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

10. Position the cylinder head cover onto the cylinder head.
11. Using the sequence shown in illustration, tighten the cylinder head cover bolts to 8 N.m (6 ft. lbs.). Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

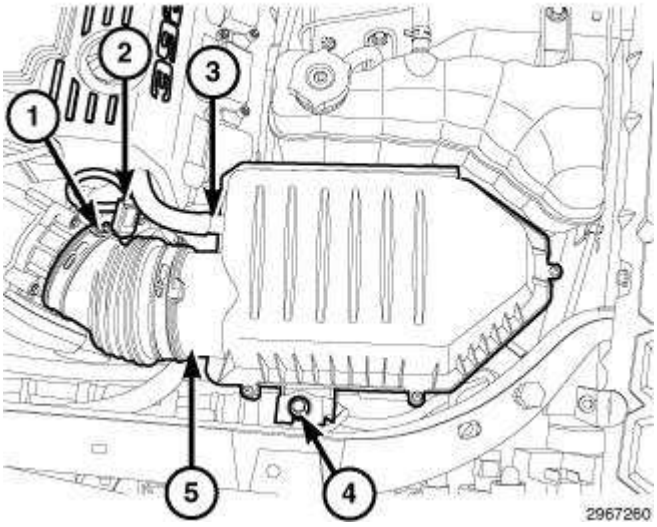


Fig. 143: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

12. Install the air cleaner housing (5) and clean air tube (1). Refer to **BODY, AIR CLEANER,**

INSTALLATION.

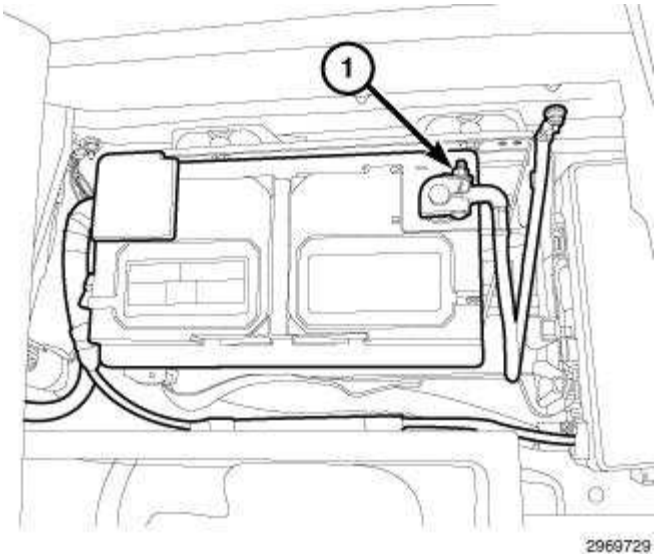


Fig. 144: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

13. Connect the negative battery cable.
14. Road test the vehicle.

VALVES, INTAKE AND EXHAUST

DESCRIPTION

VALVES

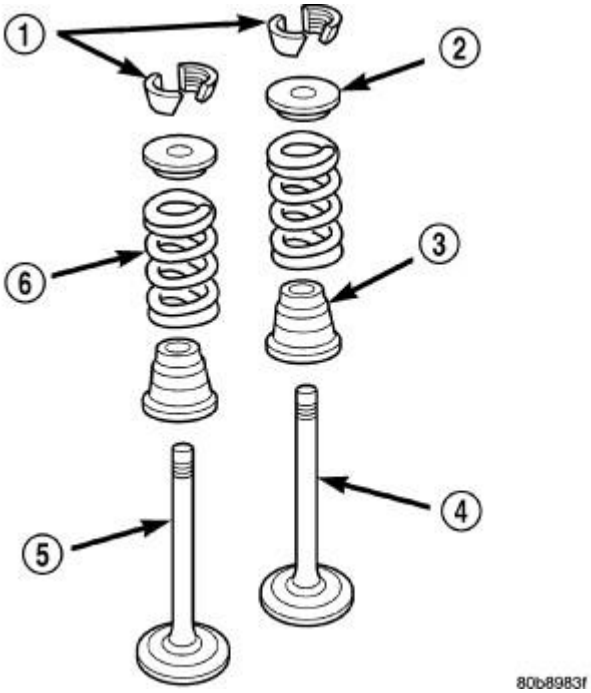


Fig. 145: Valve Assembly Configuration
Courtesy of CHRYSLER GROUP, LLC

Both the intake (4) and exhaust (5) valves are made of steel with full chrome plate on valve stems. The intake valve is 54.3 mm (2.14 in.) diameter and the exhaust valve is 42.0 mm (1.65 in.) diameter. All valves use three bead lock keepers (1) and retainers (2) to retain the springs (6) and promote valve rotation.

VALVE GUIDES

The valve guides are made of powdered metal and are pressed into the cylinder head. The guides are not replaceable or serviceable, and valve guide reaming is not recommended. If the guides are worn beyond acceptable limits, replace the cylinder heads.

STANDARD PROCEDURE

STANDARD PROCEDURE - REFACING

NOTE: Valve seats that are worn or burned can be reworked, provided that the correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.

NOTE: When refacing valves and valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

1. Measure the concentricity of the valve seat using a dial indicator. Total runout should not exceed 0.051 mm (0.002 inch.) total indicator reading.

2. Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat the valve seat with Prussian blue then set the valve in place. Rotate the valve using light pressure. If the blue is transferred to the center of the valve face, contact is satisfactory. If the blue is transferred to the top edge of the valve face, lower the valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, raise the valve seat with a 65 degree stone.
3. Refer to the chart below for the proper valve seat width, valve seat angle, valve face angle and valve spring height.

VALVE SEAT, VALVE FACE AND SPRING HEIGHT CHART

DESCRIPTION	SPECIFICATION	
SEAT WIDTH		
INTAKE	0.94 - 1.04 mm	0.037 - 0.041 in.
EXHAUST	1.16 - 1.26 mm	0.046 - 0.050 in.
SEAT ANGLE		
(INT. AND EXT.)	44.5° - 45°	
FACE ANGLE		
INTAKE	45.5° - 46°	
EXHAUST	45° - 45.5°	
SPRING HEIGHT		
INTAKE	52.1 mm	2.051 in.
EXHAUST	51.2 mm	2.016 in.

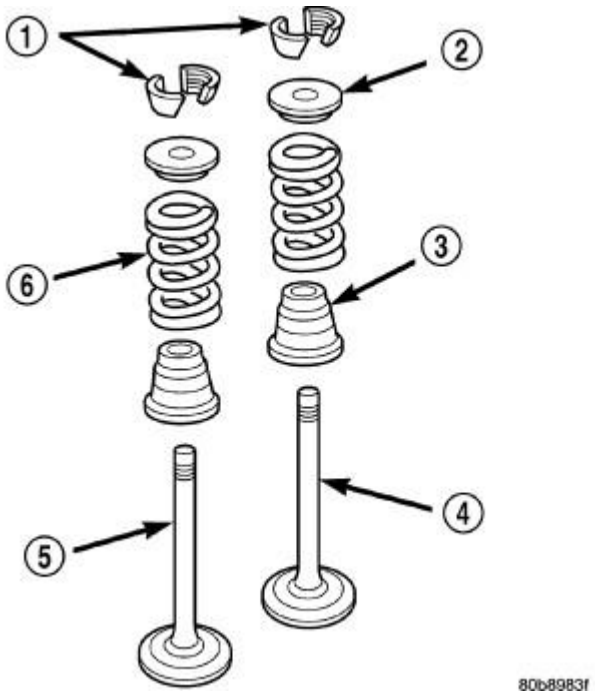


Fig. 146: Valve Assembly Configuration
Courtesy of CHRYSLER GROUP, LLC

4. The valve seat must maintain an angle of 44.5° - 45.0°.
5. The valve face must maintain an angle of 45.5° - 46.0° for the Intake and 45° - 45.5° for the exhaust.

REMOVAL

REMOVAL

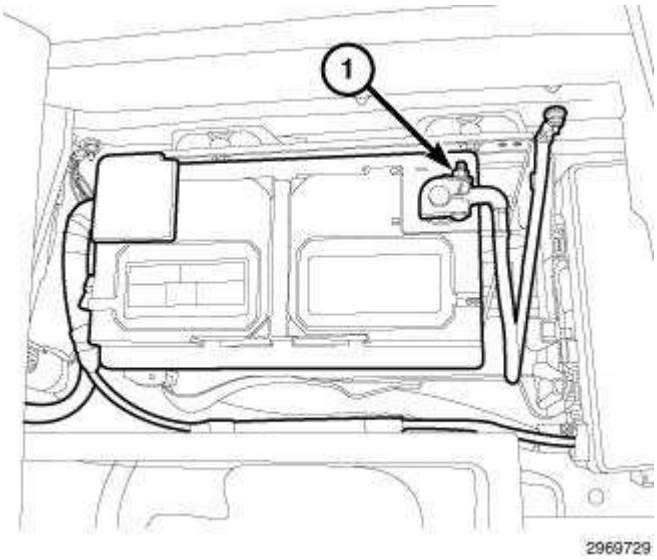


Fig. 147: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

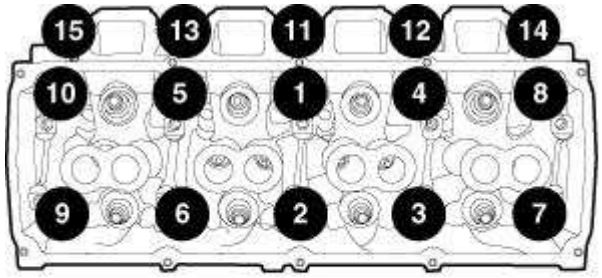


Fig. 148: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

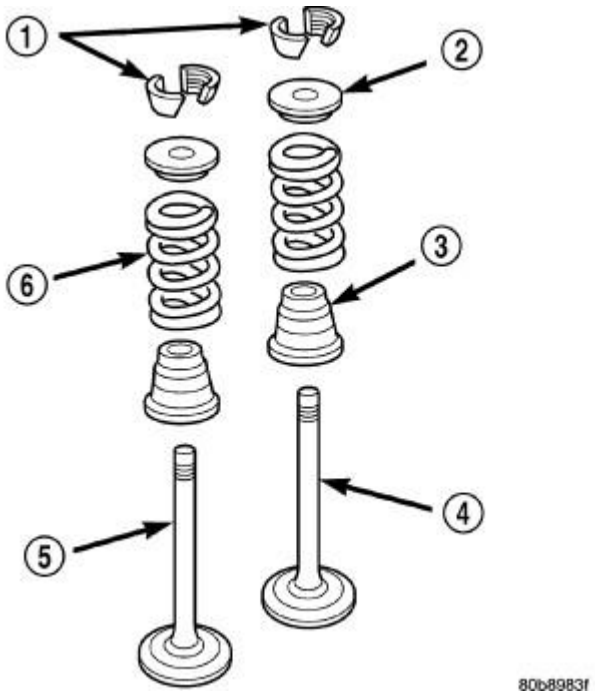


Fig. 149: Valve Assembly Configuration
Courtesy of CHRYSLER GROUP, LLC

3. Compress the valve springs using the valve spring compressor (special tool #C-3422-D, Compressor, Valve Spring) and adapter (special tool #8464, Adapter, Valve Spring).
4. Remove the valve spring retainer locks (1), valve spring retainers (2), valve stem seals (3) and valve springs (6).
5. Before removing the valves, remove any burrs from the valve spring retainer lock grooves in the valve stems (4) to prevent damage to the valve guides. Identify the valves to ensure installation in their original location.
6. Remove the valves (4, 5).

INSTALLATION

INSTALLATION

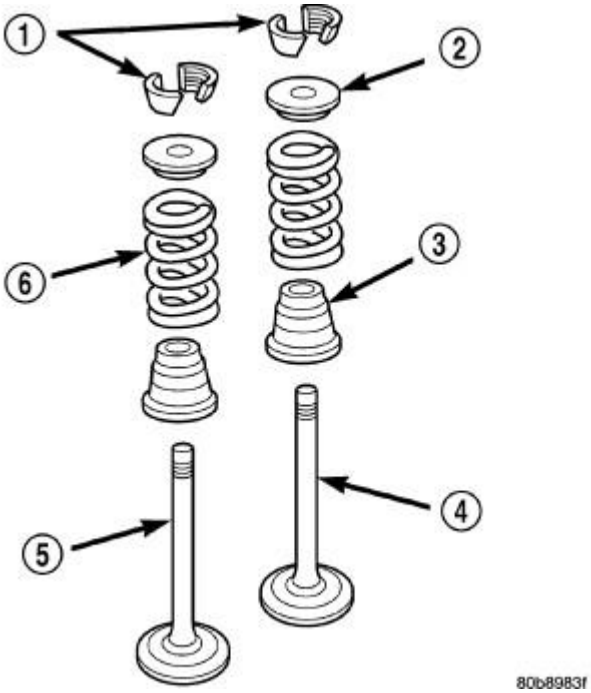


Fig. 150: Valve Assembly Configuration
Courtesy of CHRYSLER GROUP, LLC

1. Clean the valves thoroughly. Discard burned, warped, and cracked valves.
2. Remove carbon and varnish deposits from inside the valve guides with a reliable guide cleaner.
3. Measure the valve stems for wear. If wear exceeds 0.051 mm (0.002 inch), replace the valve.
4. Coat the valve stems (4, 5) with clean engine oil and insert them into the cylinder head.
5. If the valves or seats have been reground, check valve stem height. If the valve is too long, replace the cylinder head.
6. Install new seals (3) on all valve guides. Install the valve springs (6) and valve spring retainers (2).

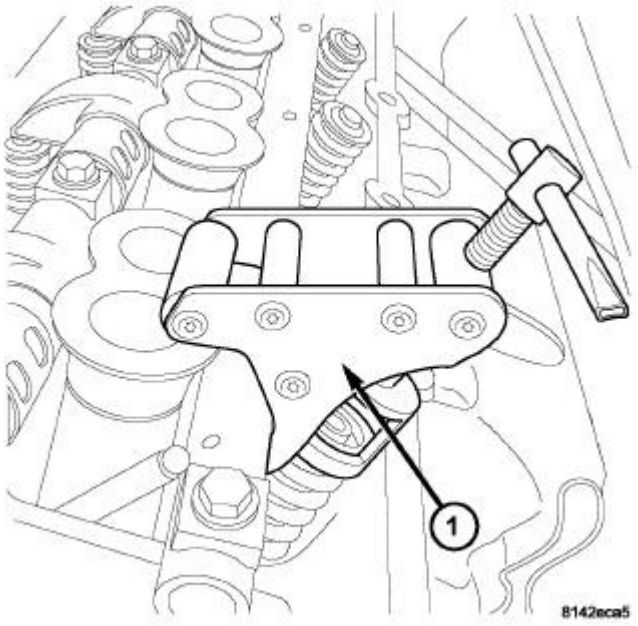


Fig. 151: Valve Spring Compressor
Courtesy of CHRYSLER GROUP, LLC

7. Compress the valve springs with the valve spring compressor (special tool #C-3422-D, Compressor, Valve Spring) (1) and adapter (special tool #8464, Adapter, Valve Spring), install the valve spring retainer locks and release the tool. If the valves and/or seats have been ground, measure the installed height of the springs. Make sure the measurement is taken from the bottom of spring seat in the cylinder head to the bottom surface of valve spring retainer.

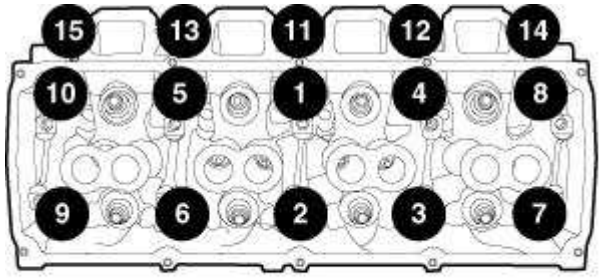


Fig. 152: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Install the cylinder head (2). Refer to **CYLINDER HEAD, INSTALLATION**.

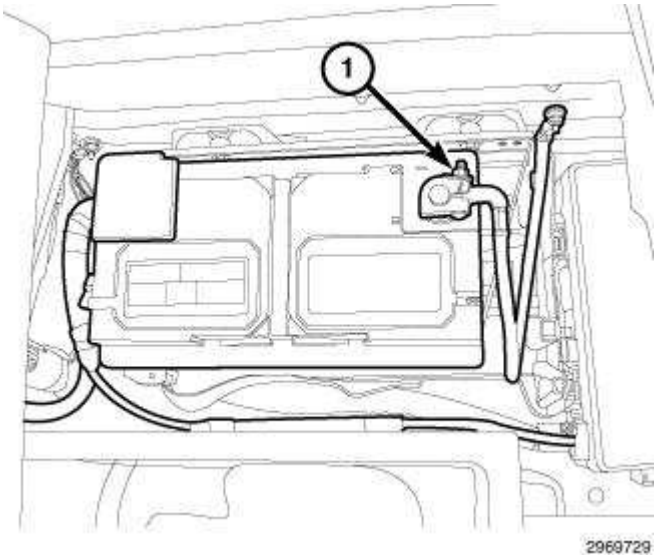


Fig. 153: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

9. Connect the negative battery cable (1).

ENGINE BLOCK

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean the following:

- Gallery at the oil filter adaptor hole.
- Front and rear oil gallery holes.
- Feed holes for the crankshaft main bearings.

Once the block has been completely cleaned, apply Loctite PST pipe sealant with Teflon 592 to the threads of the front and rear oil gallery plugs. Tighten the 1/4 inch NPT plugs to 20 N.m (15 ft. lbs.). Tighten the 3/8 inch NPT plugs to 27 N.m (20 ft. lbs.) and the coolant drain plugs to 34 N.m (25 ft. lbs.).

INSPECTION

INSPECTION

ENGINE BLOCK

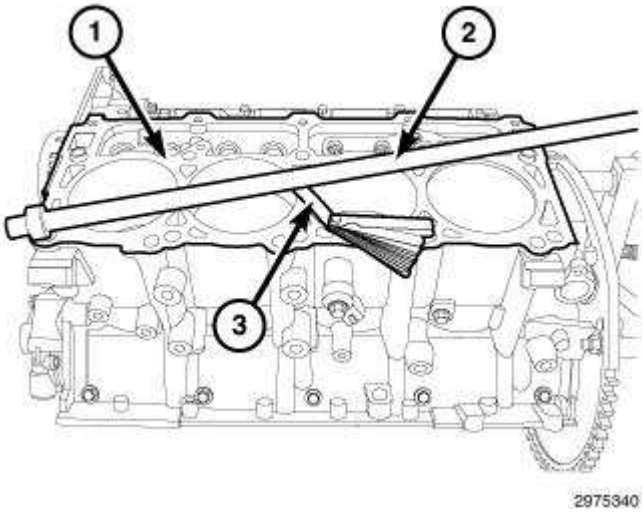


Fig. 154: Checking Engine Block Deck Surface With Precision Straightedge & Feeler Gauge
Courtesy of CHRYSLER GROUP, LLC

1. Clean the engine block thoroughly and check all core hole plugs for evidence of leaking and repair if necessary.
2. Examine the engine block and cylinder bores for cracks or fractures.

NOTE: Check the engine block deck surface with a precision straightedge and feeler gauge. The surface irregularities should not exceed 0.09 mm (0.0035 in.). Check the deck surface from one end to the other with the precision straightedge positioned across corners and parallel to the block centerline up and down the deck.

3. Check the engine block deck (1) surfaces for flatness using a precision straightedge (2) and feeler gauge (3).

CYLINDER BORE

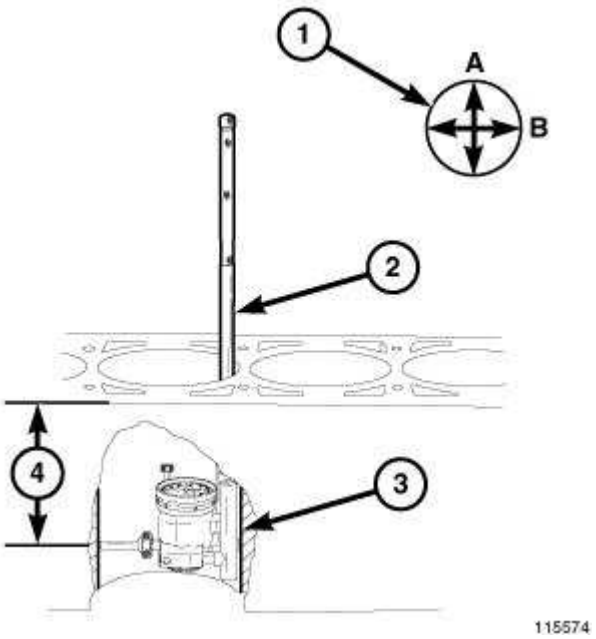


Fig. 155: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

1. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) increments is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90°) to the axis of the crankshaft at point A (1).
3. Repeat the measurement near the middle of the bore then repeat the measurement near the bottom of the bore.
4. Determine the taper by subtracting the smaller diameter from the larger diameter.
5. Rotate the measuring device 90° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specifications.
6. Determine out-of-roundness by comparing the difference between each measurement.
7. If the cylinder bore taper does not exceed 0.0127 mm (0.0005 inch) and out-of-roundness does not exceed 0.008 mm (0.0003 inch) then the cylinder bore can be honed. If the cylinder bore taper or out- of-round condition exceeds the maximum limits, replace the engine block.

NOTE: A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.

MAIN BEARINGS

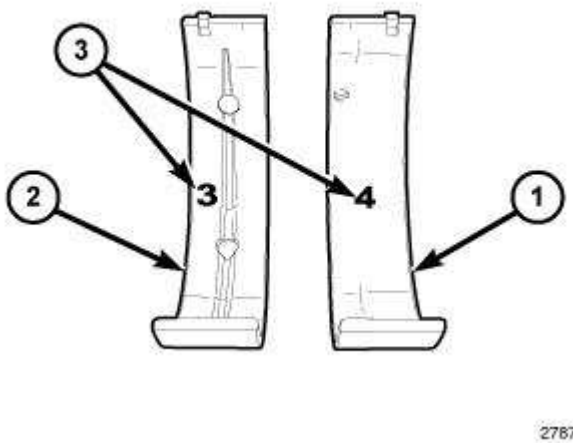


Fig. 156: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the main bearing inserts (1, 2) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, wear or blueing.
6. Replace any bearing that shows abnormal wear.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the engine block main bearing bores show damage, replace the engine block.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

STANDARD PROCEDURE - CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

Crankshaft removed from the cylinder block.

Clean the oil off the main bearing journal.

Determine the maximum diameter of the journal with a micrometer. Measure at two locations 90° apart at each end of the journal.

The maximum allowable taper is 0.008 mm (0.0004 inch). The maximum out-of-round is 0.005 mm (0.0002 inch). Compare the measured diameter with the journal diameter specification (Main Bearing Fitting Chart). Select inserts required to obtain the specified bearing-to-journal clearance.

CRANKSHAFT MAIN BEARING SELECTION

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft counterweight has grade identification marks stamped into it. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4 and 5.

NOTE: Service main bearings are coded. These codes identify what size (color) the bearing is.

MAIN BEARING SELECTION CHART - 6.4L

GRADE	COLOR	mm	In	FOR USE WITH JOURNAL SIZE
	LOWER			64.988-64.995 mm
A	**ORANGE**	0.008 mm U/S	(0.0004 in.) U/S	(2.5585- 2.5588 in.)
	LOWER			64.996-65.004 mm
B	**BLACK**	NOMINAL	NOMINAL	(2.5588-2.5592 in.)
	LOWER			65.005-65.012 mm
C	**GREEN**	0.008 mm O/S	(0.0004 in.) O/S	(2.5592-2.5595 in.)

INSPECTION

INSPECTION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

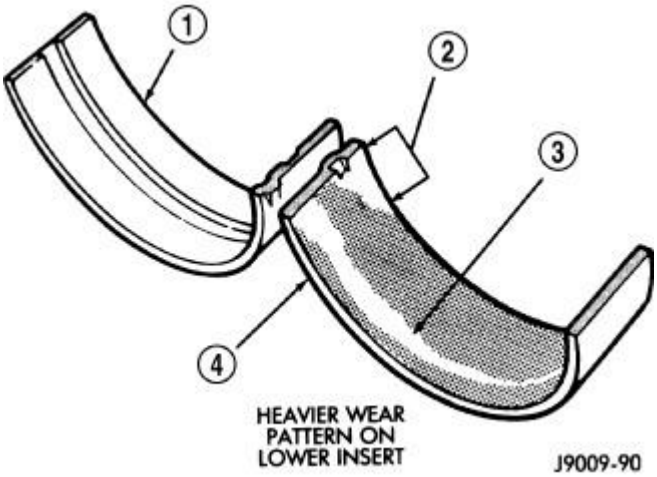


Fig. 157: Main Bearing Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

Wipe the inserts clean and inspect for abnormal wear patterns and for metal or other foreign material imbedded in the lining. Normal main bearing insert wear patterns are illustrated.

NOTE: If any of the crankshaft journals are scored, the crankshaft must be repaired or replaced.

Inspect the back of the inserts for fractures, scoring or irregular wear patterns.

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

REMOVAL

5.7L / 6.4L - CAMSHAFT CORE HOLE PLUG

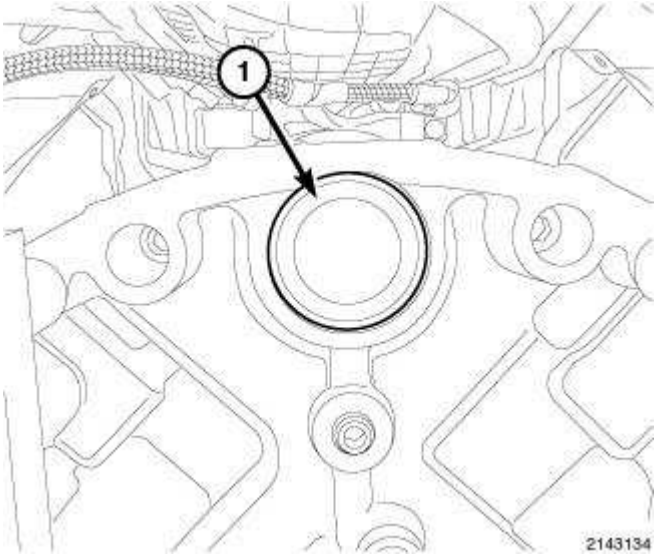


Fig. 158: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove the engine from the vehicle. Refer to **REMOVAL**.
3. Remove the flexplate. Refer to **FLEXPLATE, REMOVAL**.

CAUTION: Do not damage the rear surface of the camshaft or the core plug sealing surface, when removing the core plug.

4. Using a suitable sharp punch, punch a small hole in the camshaft core hole plug (1).

5. Insert a short sheet metal screw into the small hole in the camshaft core hole plug.
6. Using a suitable slide hammer puller, remove the rear camshaft core hole plug.

CAMSHAFT

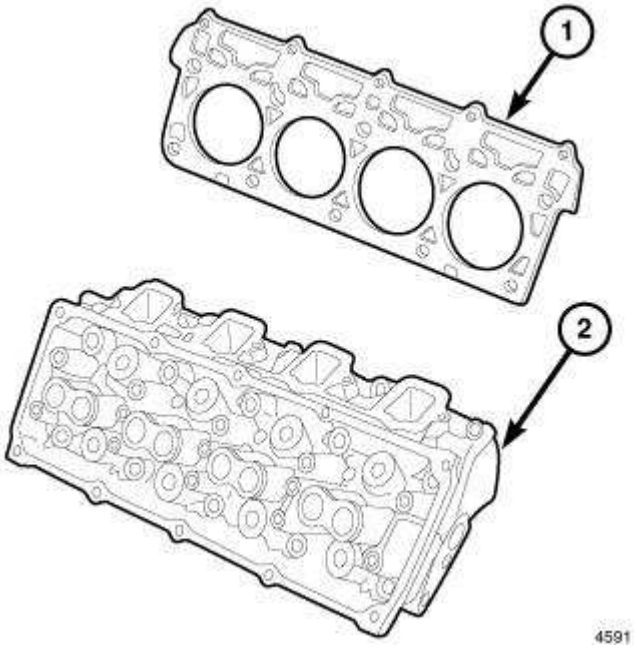


Fig. 159: Cylinder Head & Gasket
Courtesy of CHRYSLER GROUP, LLC

1. Remove both cylinder heads (2). Refer to **CYLINDER HEAD, REMOVAL**.

CAUTION: The 6.4L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

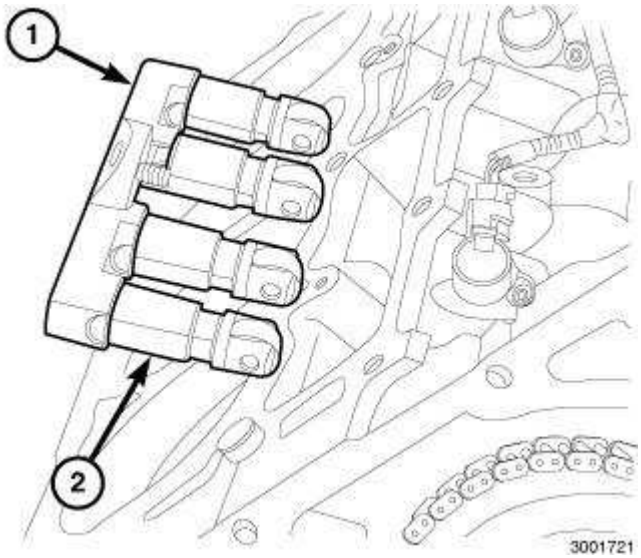


Fig. 160: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

2. Remove the lifters (2) and retainer (1) as an assembly. Refer to **LIFTER(S), HYDRAULIC, ROLLER, REMOVAL**.

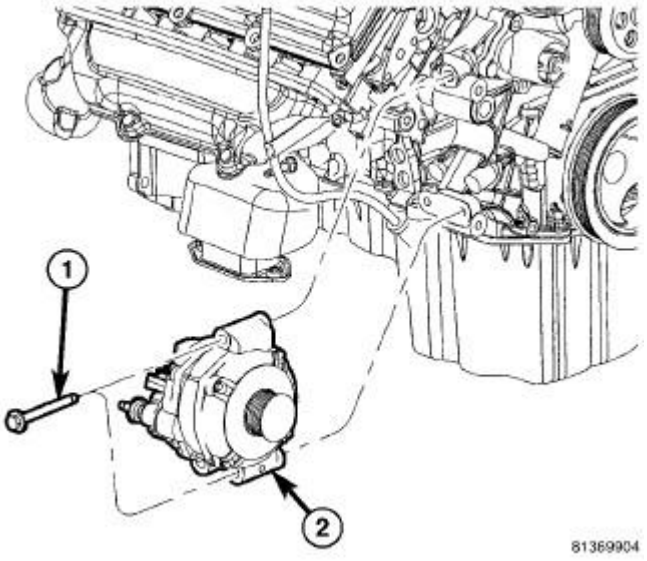


Fig. 161: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Remove the generator. Refer to **GENERATOR, REMOVAL** .

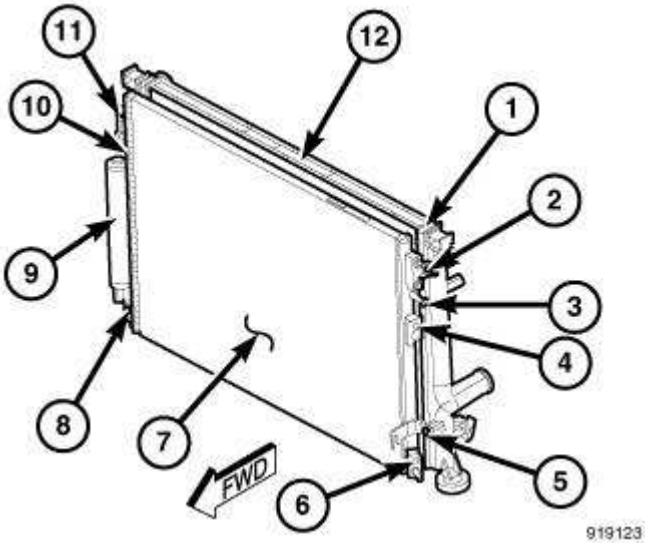


Fig. 162: A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

4. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .
5. Remove the radiator (12). Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .
6. Remove the A/C condenser (7). Refer to **CONDENSER, A/C, REMOVAL** .
7. Raise and support vehicle.

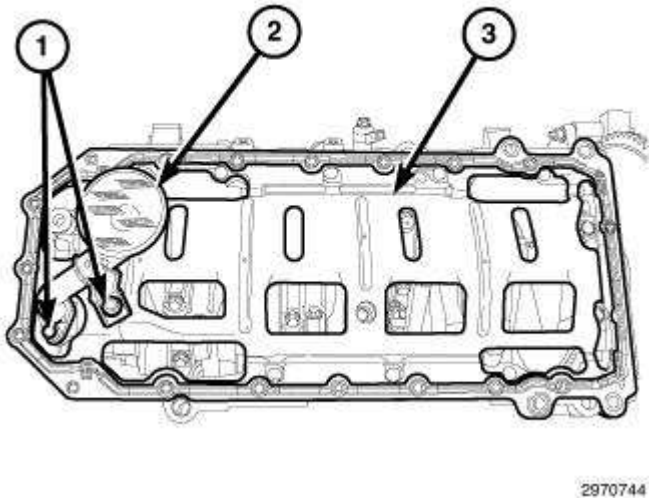


Fig. 163: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove the oil pan and oil pump pickup tube (2). Refer to **PAN, OIL, REMOVAL**.

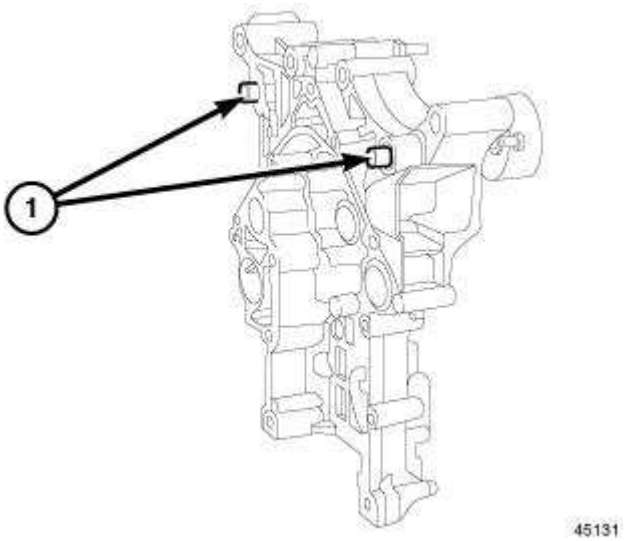


Fig. 164: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove the water pump for timing cover removal.

9. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

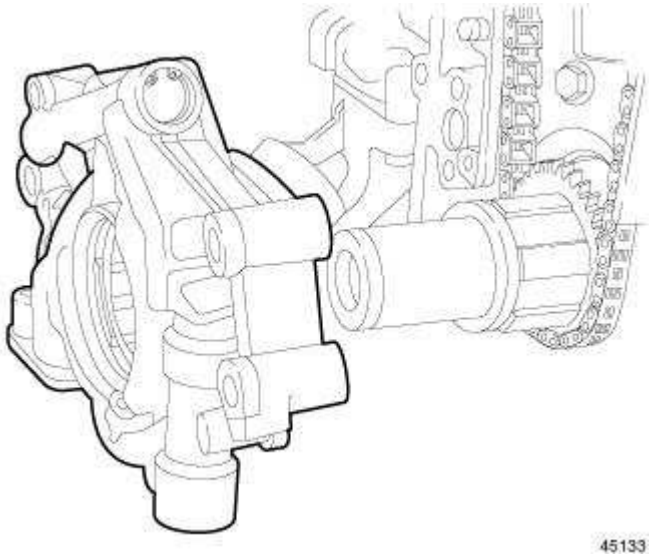


Fig. 165: Remove/Install Oil Pump
Courtesy of CHRYSLER GROUP, LLC

10. Remove the oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.

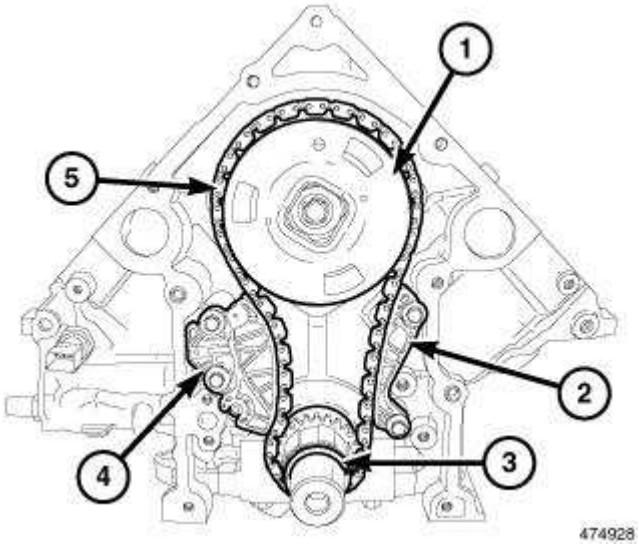


Fig. 166: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER GROUP, LLC

11. Remove the timing chain (5) and camshaft phaser (1). Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

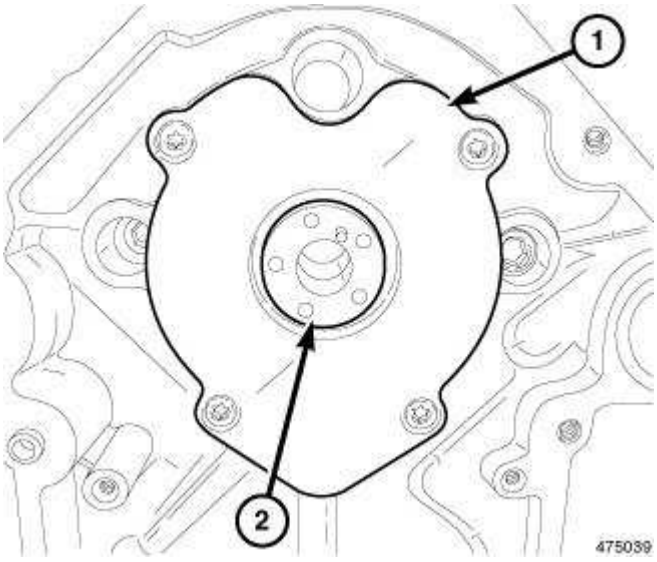


Fig. 167: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

12. Remove the camshaft thrust plate (1).

CAUTION: Use care when removing the camshaft, do not damage the camshaft bearings with the camshaft lobes.

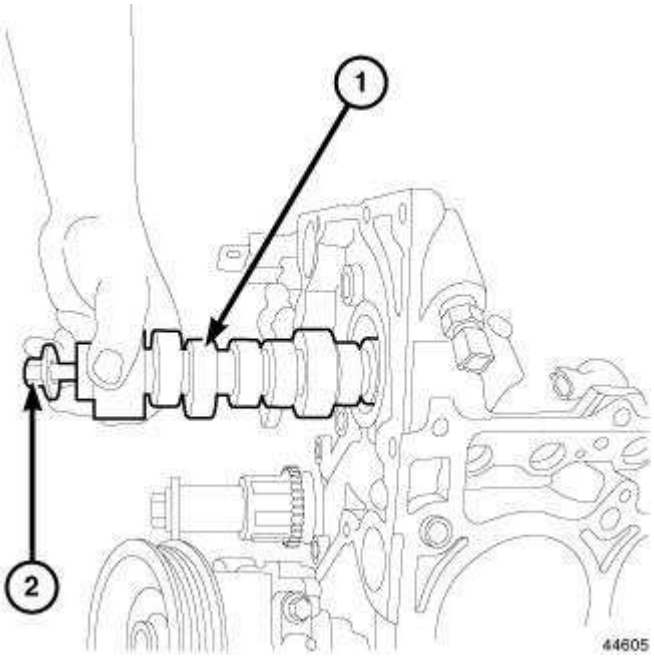


Fig. 168: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

13. Install a long bolt (2) into the front of the camshaft to aid in removal.
14. Remove the camshaft using care not to damage the camshaft bearings with the camshaft lobes (1).

INSPECTION

INSPECTION

1. The cam bearings are not serviceable. Do not attempt to replace cam bearings for any reason.

INSTALLATION

5.7L / 6.4L - CAMSHAFT CORE HOLE PLUG

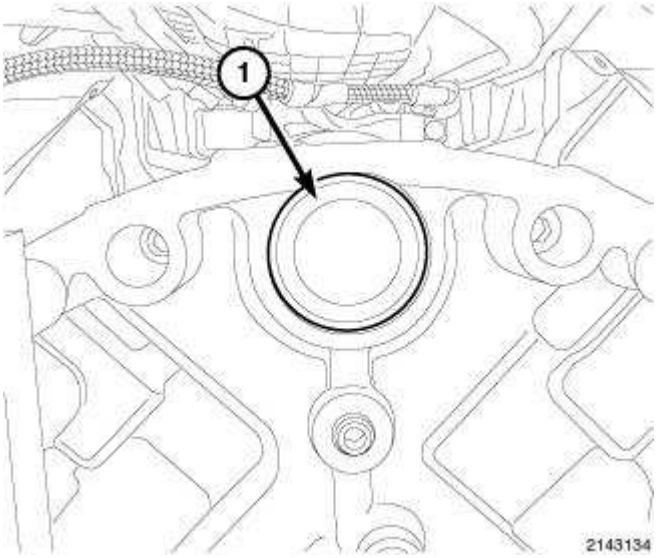


Fig. 169: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Clean the core hole in the cylinder block.

NOTE: Do not apply adhesive to the new camshaft core hole plug. A new plug has adhesive pre-applied.

2. Install a new camshaft core hole plug (1) located at the rear of cylinder block, using a suitable flat faced tool. The plug must be fully seated on the cylinder block shoulder.
3. Install the flexplate. Refer to **FLEXPLATE, INSTALLATION**.
4. Install the engine. Refer to **INSTALLATION**.

CAMSHAFT

CAUTION: The 6.4L engine uses a unique camshaft for use with the Multi Displacement System (MDS). When installing a new camshaft, the replacement camshaft must be compatible with MDS.

CAUTION: Use care when installing the camshaft into the engine block, do not damage the camshaft bearings with the camshaft lobes.

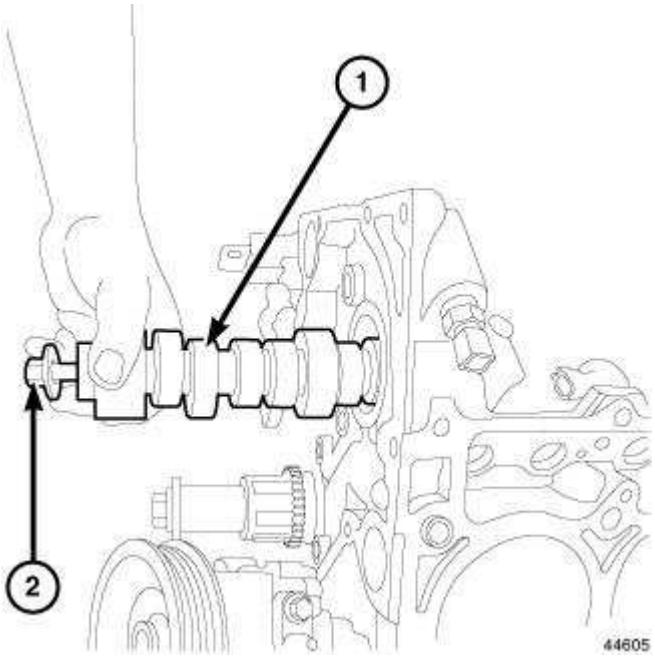


Fig. 170: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the camshaft lobes (1) and the camshaft bearing journals with clean engine oil.
2. Install a long bolt (2) into the front of the camshaft to aid in the installation, carefully install the camshaft into the engine block.

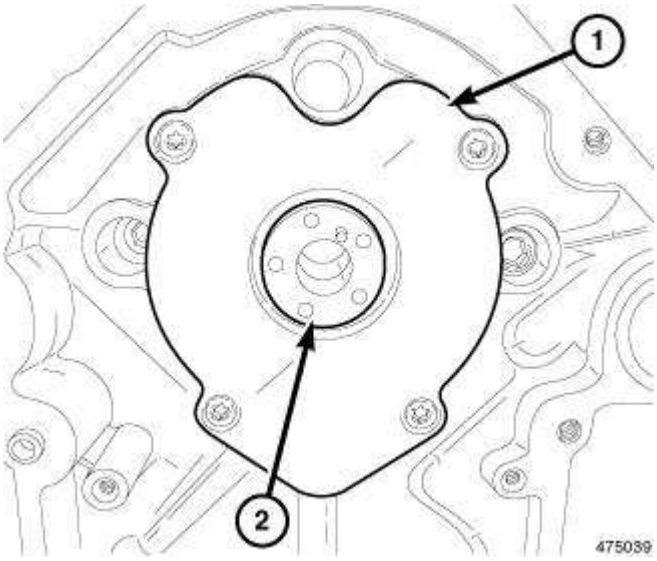


Fig. 171: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the camshaft thrust plate (1) and tighten retaining bolts to 12 N.m (106 in. lbs.).

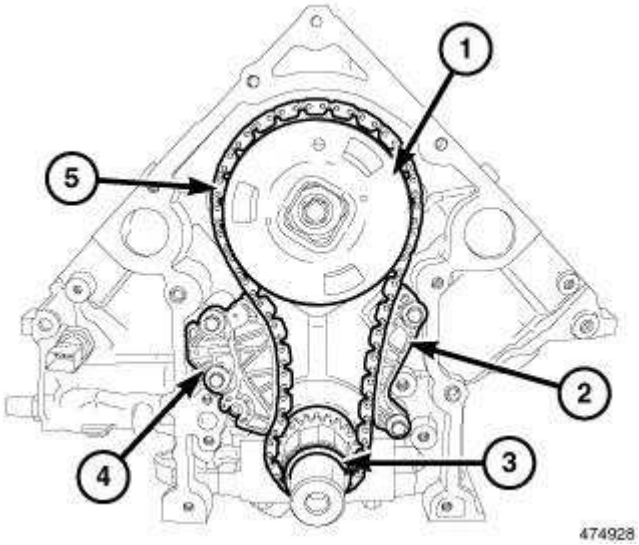


Fig. 172: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER GROUP, LLC

4. Install the timing chain and camshaft phaser. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.
5. Using a suitable dial indicator, measure the camshaft end play. Refer to **Engine - Specifications**. If not within specification, install a new thrust plate.

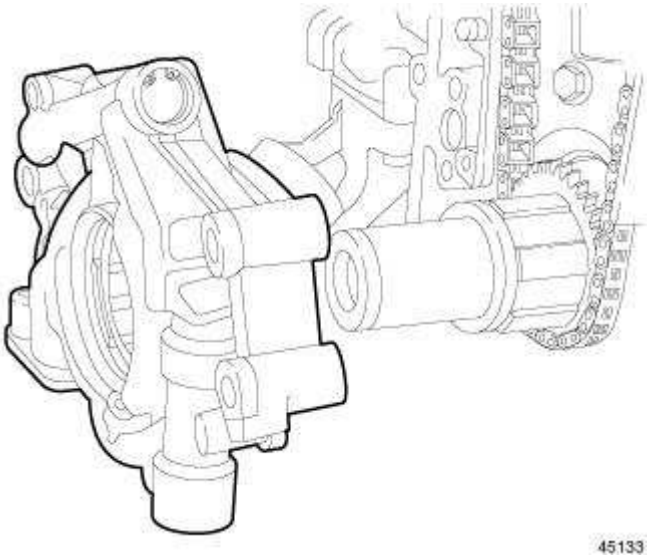


Fig. 173: Remove/Install Oil Pump
Courtesy of CHRYSLER GROUP, LLC

6. Install the oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION**.

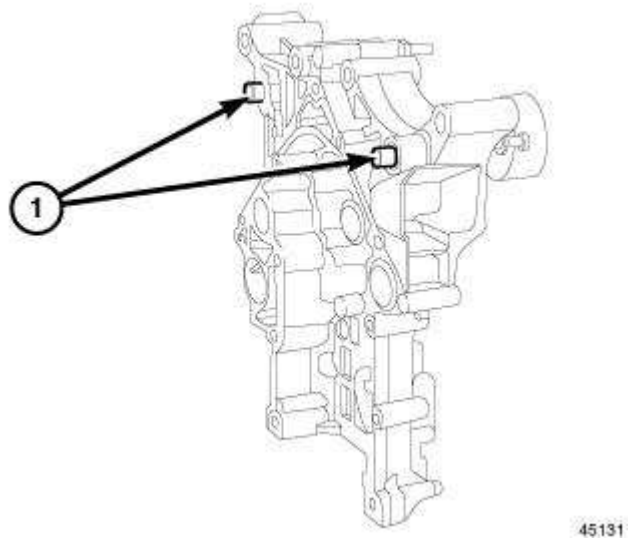


Fig. 174: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

7. Install the engine timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
8. Raise and support vehicle.

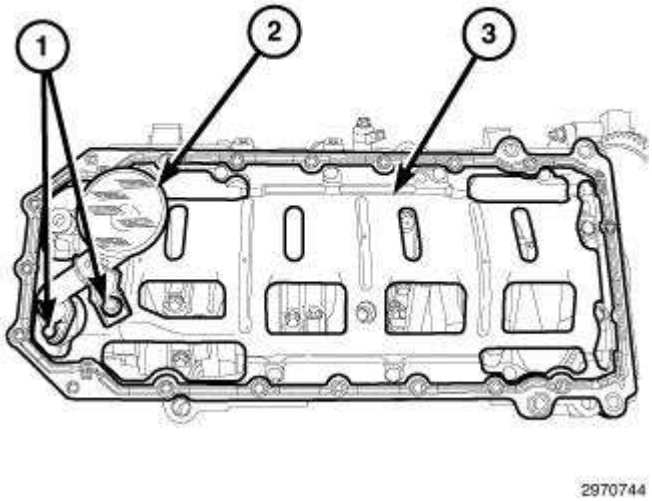


Fig. 175: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the oil pump pickup tube (2) and oil pan. Refer to **PAN, OIL, INSTALLATION**.

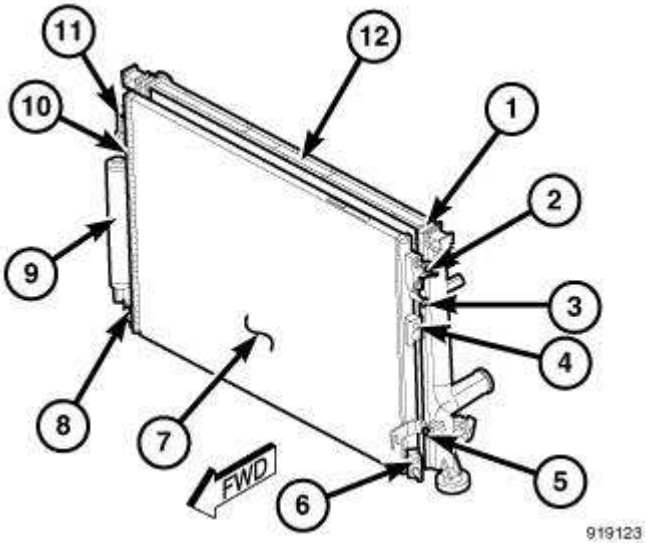


Fig. 176: A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

10. Install the A/C condenser (7). Refer to **CONDENSER, A/C, INSTALLATION** .
11. Install the radiator (12). Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** .
12. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .

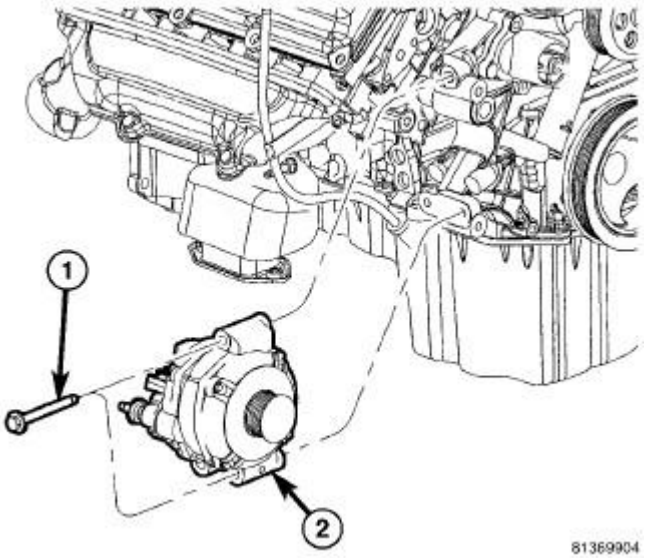


Fig. 177: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Install the generator. Refer to **GENERATOR, INSTALLATION** .

CAUTION: The 6.4L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating

roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

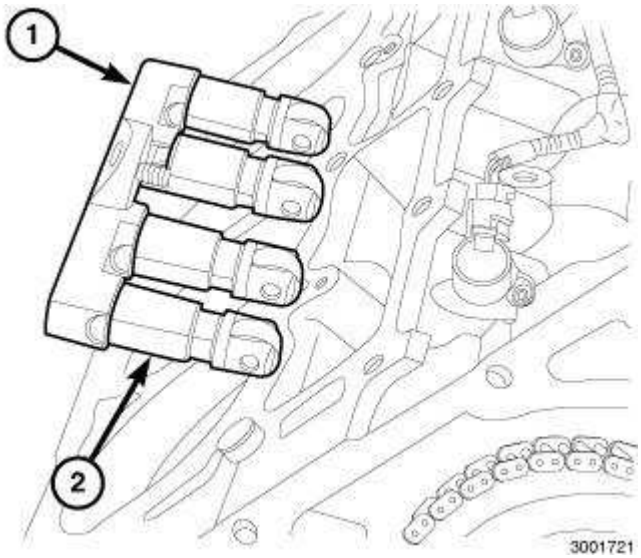


Fig. 178: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

14. Install the lifters (2) and retainer (1) as an assembly into their original location. Refer to **LIFTER (S), HYDRAULIC, ROLLER, INSTALLATION**.

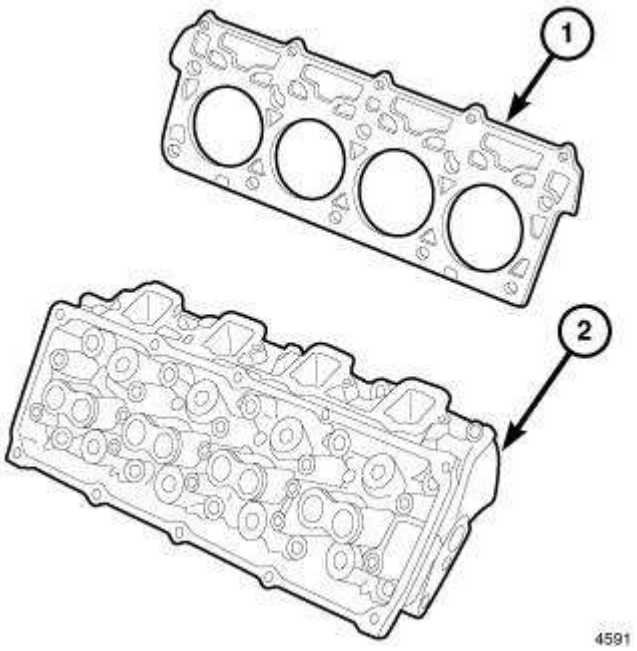


Fig. 179: Cylinder Head & Gasket
Courtesy of CHRYSLER GROUP, LLC

15. Install both cylinder heads (2). Refer to **CYLINDER HEAD, INSTALLATION**.
16. Install the pushrods in the same location as removed.
17. Install the rocker arms. Refer to **ROCKER ARM, VALVE, INSTALLATION**.

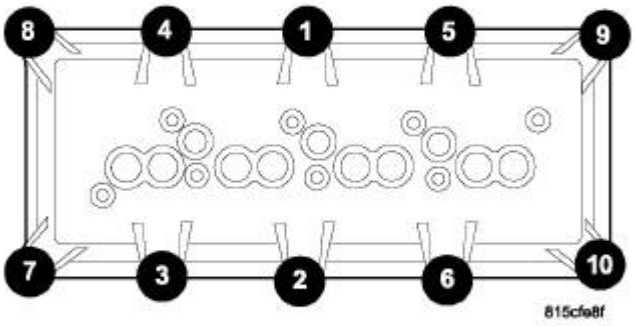


Fig. 180: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

18. Install the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

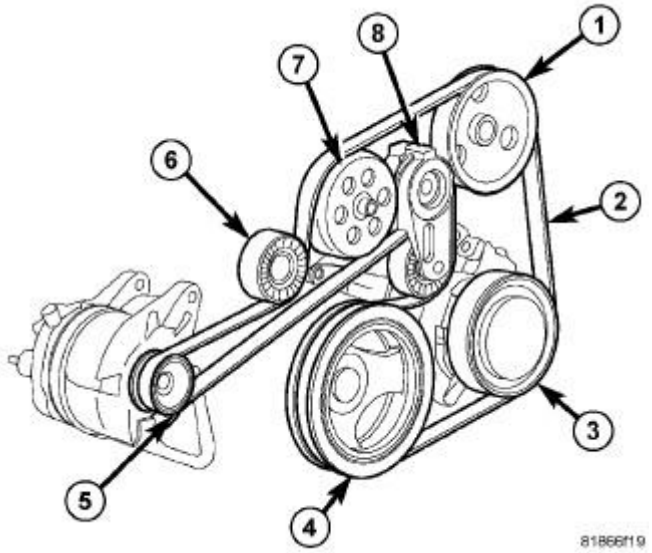


Fig. 181: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

19. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

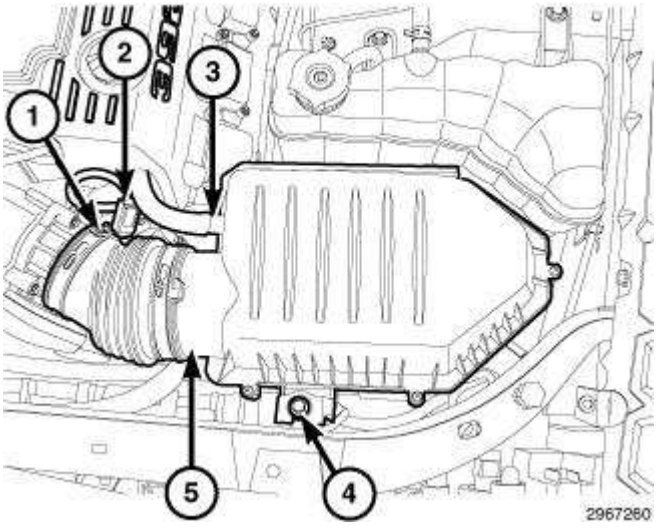


Fig. 182: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

20. Install the air cleaner housing (5) and clean air tube (1).

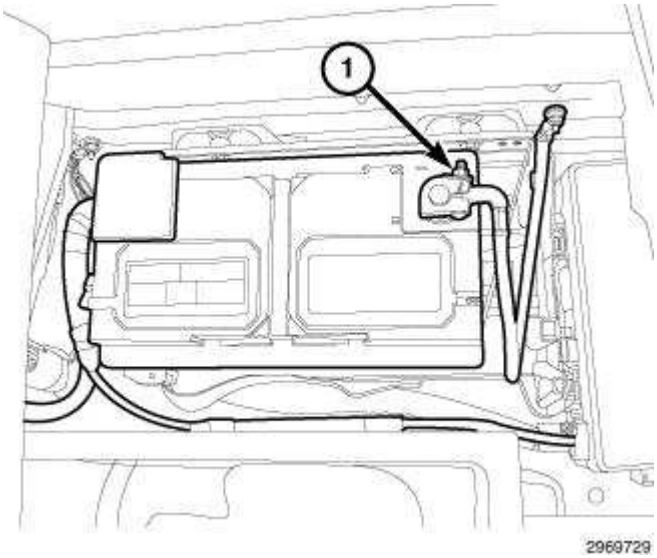


Fig. 183: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

21. Install the negative battery cable.
22. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

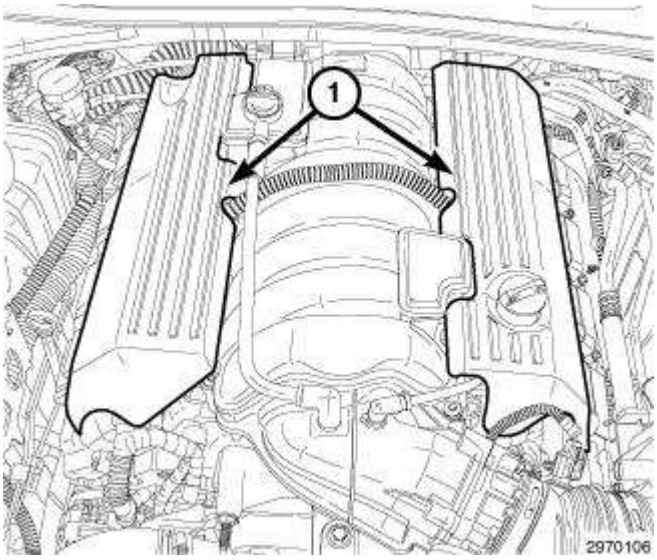


Fig. 184: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

23. Fill the crankcase with the specified type and amount of engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
24. Install engine covers (1).
25. Start the engine and check for leaks.

CRANKSHAFT

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

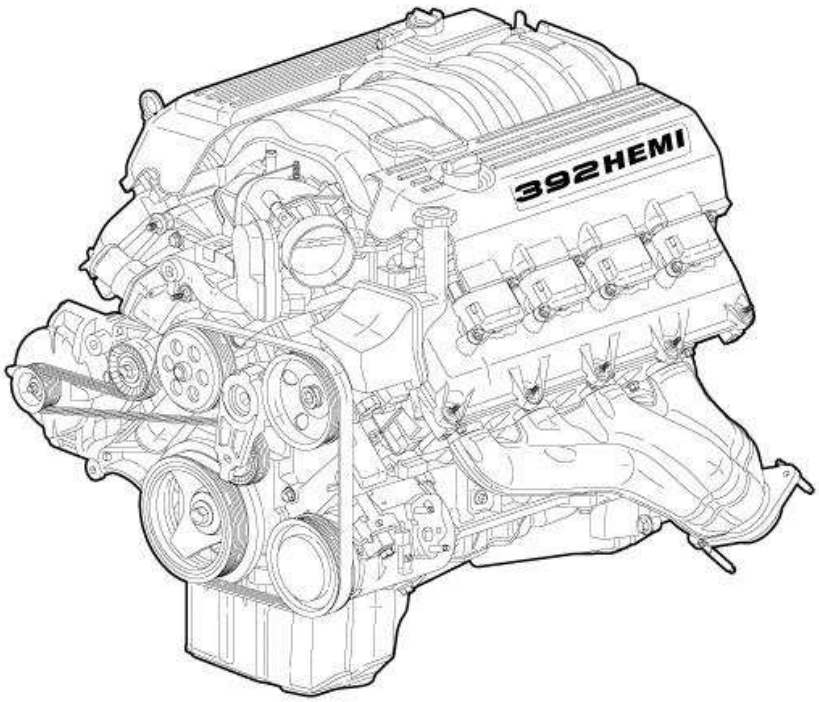


Fig. 185: 6.4L HEMI V-8 Engine
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine. Refer to **REMOVAL**.
2. Secure the engine onto a suitable engine stand.

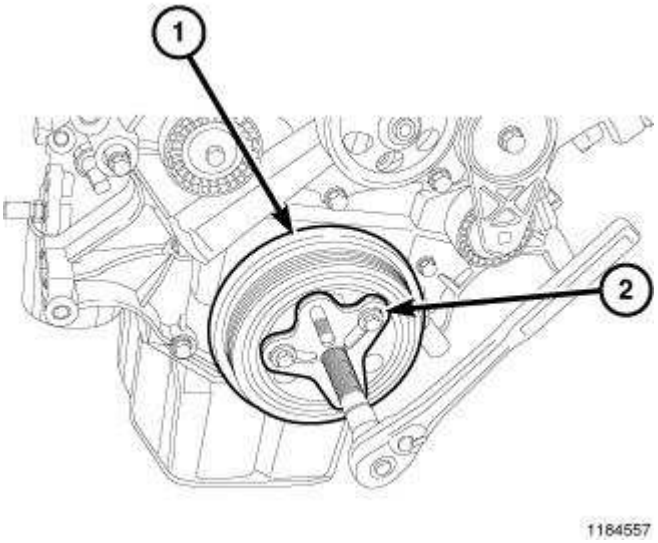


Fig. 186: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.

3. Remove the crankshaft damper retaining bolt.
4. Install the puller tool (2) making sure the bolts are fully threaded through the entire crankshaft damper.
5. Remove the crankshaft damper (1).

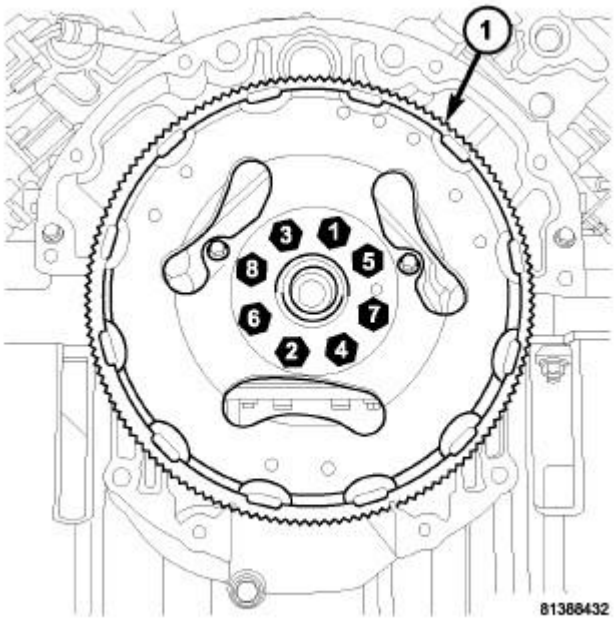


Fig. 187: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Remove the flexplate (1). Refer to **FLEXPLATE, REMOVAL**.

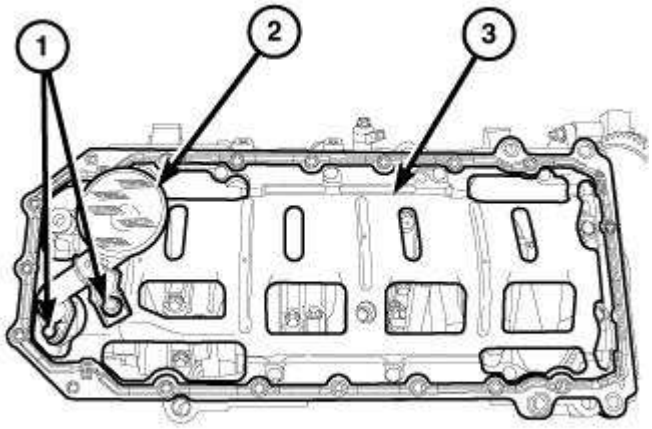


Fig. 188: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.

7. Remove the oil pan and the oil pump pickup tube (2). Refer to **PAN, OIL, REMOVAL**.
8. Remove and discard the oil pan gasket/windage tray (3).

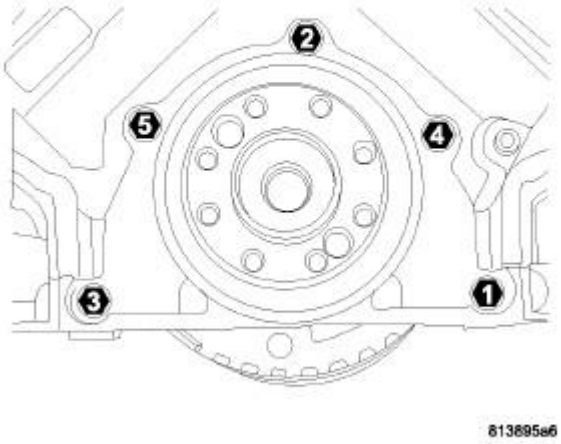


Fig. 189: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

9. Remove the crankshaft rear oil seal retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.

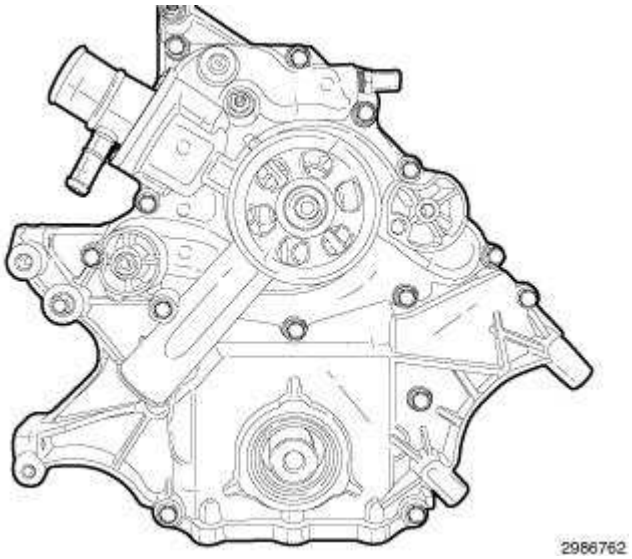


Fig. 190: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

10. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

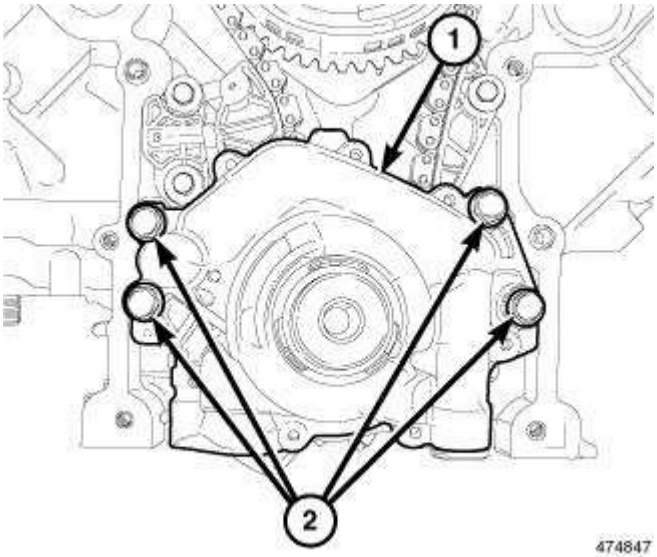


Fig. 191: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

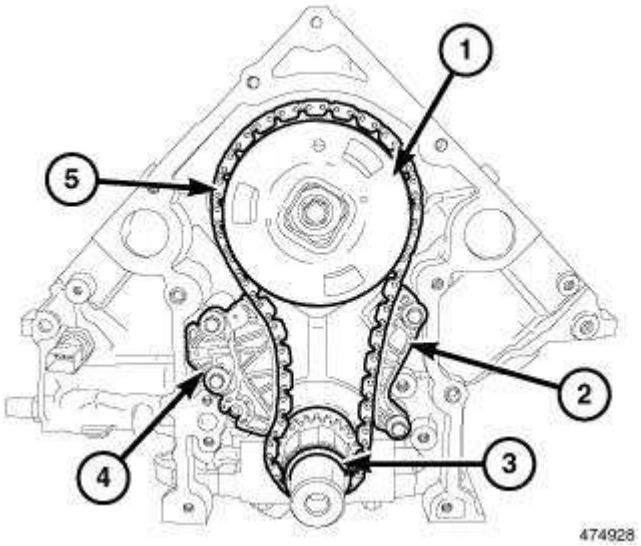


Fig. 192: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER GROUP, LLC

12. Remove the timing chain (5), camshaft phaser (1) and crankshaft sprocket (3). Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

CAUTION: Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.

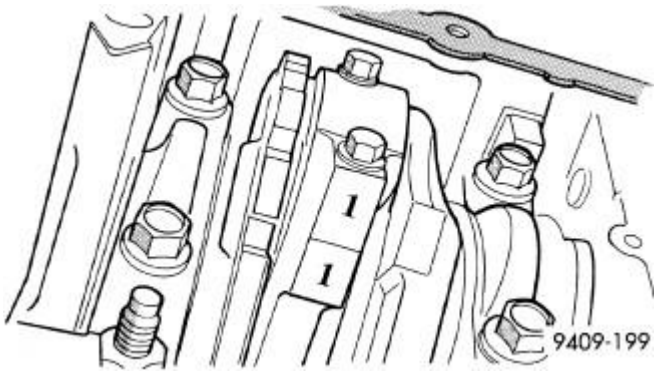


Fig. 193: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.

13. Mark the connecting rod and bearing cap location using a permanent ink marker or scribe tool.
14. Remove the rod bearing caps and bearings.

CAUTION: Do not use a number stamp or a punch to mark main bearing caps as damage to bearing caps and/or bearings could occur.

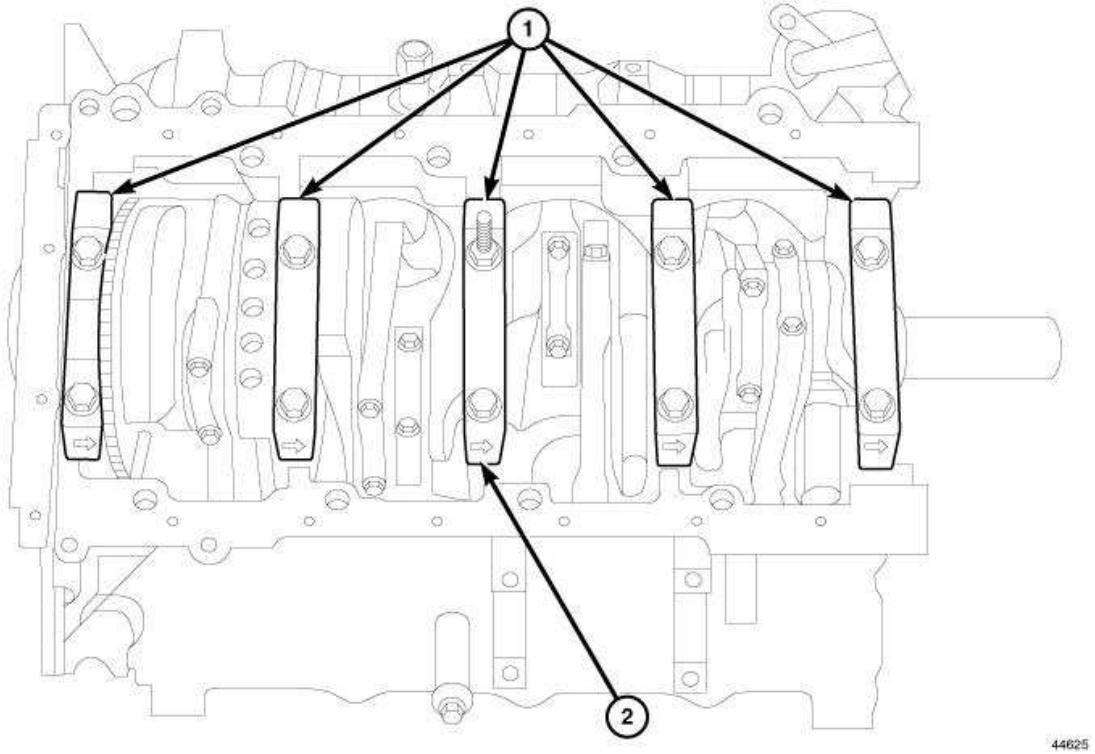


Fig. 194: Main Bearing Caps & Arrows
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Main bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.**

15. Mark the main bearing caps (1) using a permanent ink marker or scribe tool.

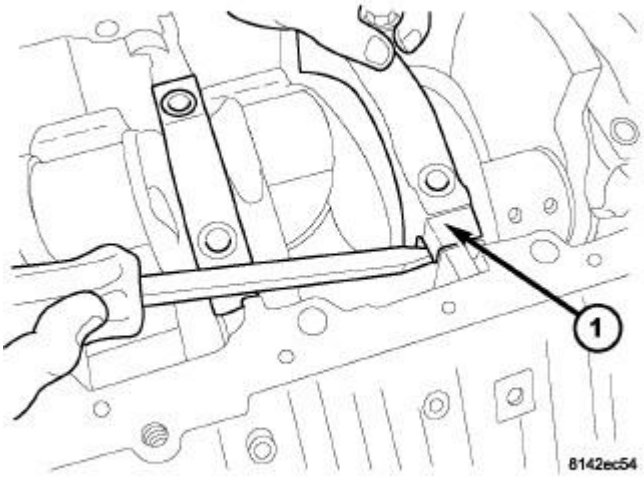


Fig. 195: Main Bearing Cap Removal
Courtesy of CHRYSLER GROUP, LLC

16. Remove the main bearing cap bolts.
17. Remove the main bearing cap crossbolts.
18. Remove main bearing caps (1) and bearings one at a time.

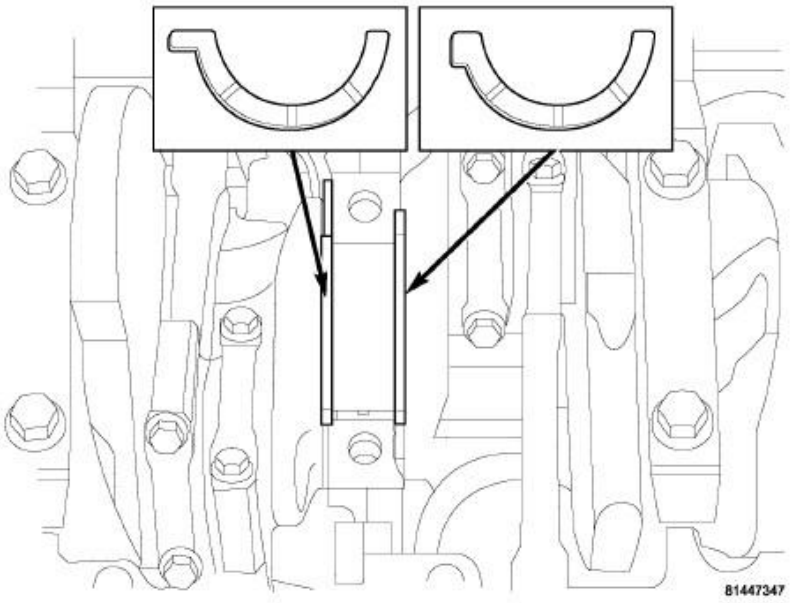


Fig. 196: Thrust Washer Locations
Courtesy of CHRYSLER GROUP, LLC

19. Remove the thrust bearings.

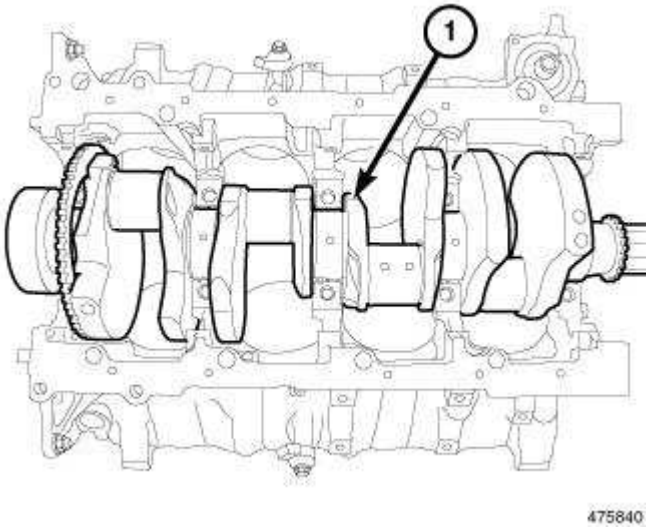


Fig. 197: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

20. Remove the crankshaft (1) out of the engine block.

INSTALLATION

INSTALLATION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

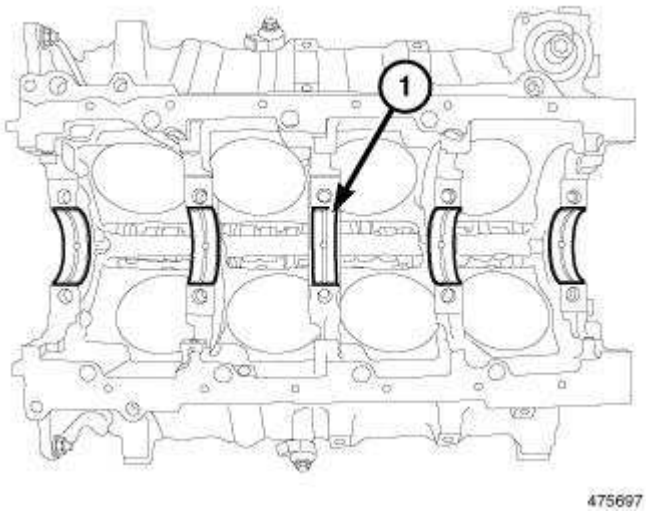


Fig. 198: Main Bearings
Courtesy of CHRYSLER GROUP, LLC

1. Select the proper main bearings (1). Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
2. Lubricate the main bearing shells with clean engine oil.
3. Install the main bearings into the engine block.

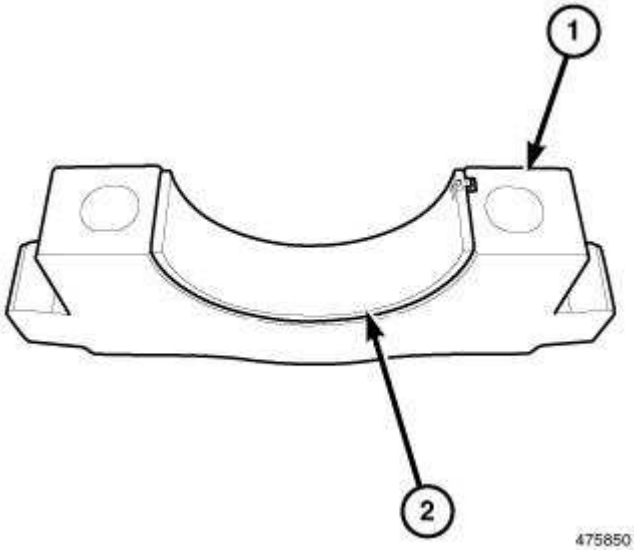


Fig. 199: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

4. Install the main bearing shells (2) into the bearing caps (1).

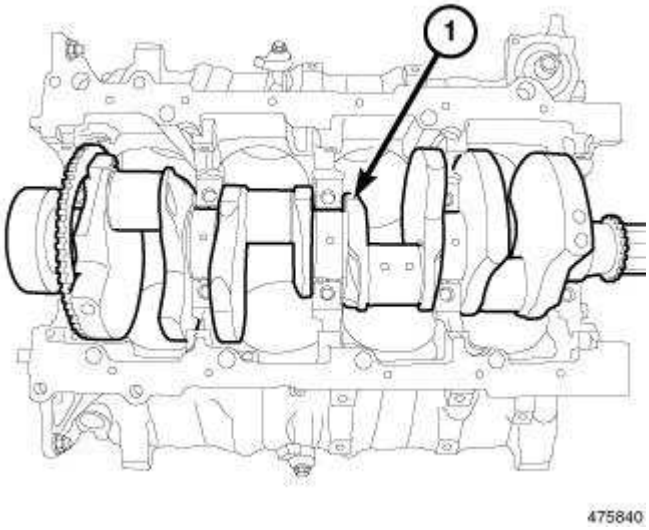


Fig. 200: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

5. Position the crankshaft (1) into the engine block.

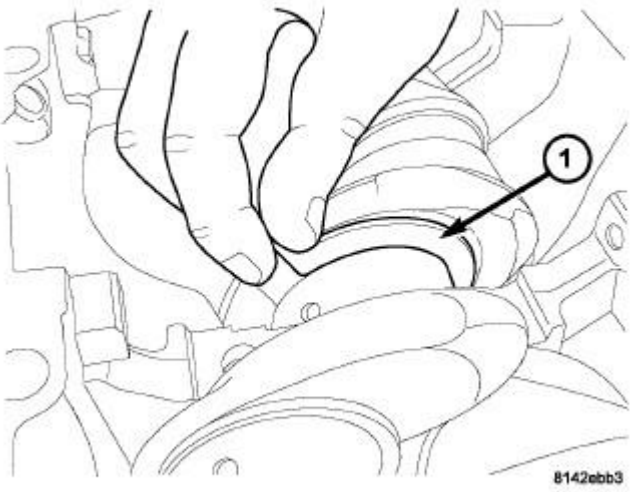


Fig. 201: Thrust Washer Installation
Courtesy of CHRYSLER GROUP, LLC

6. Lubricate and install the thrust bearings (1).

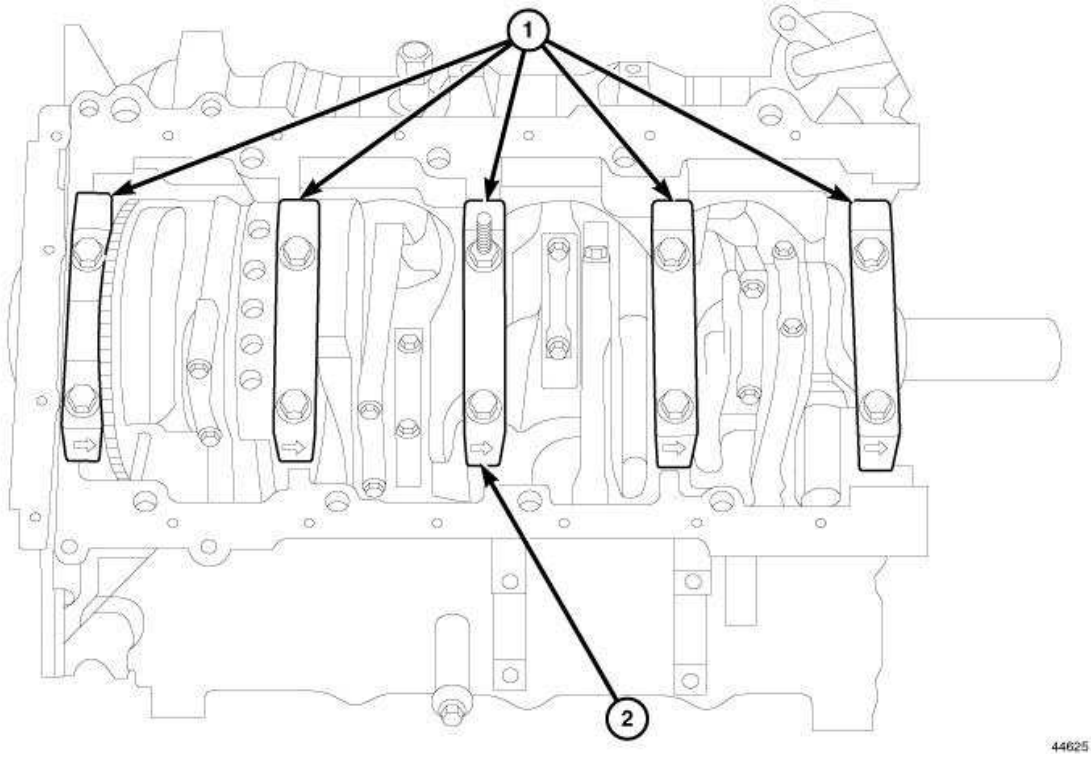


Fig. 202: Main Bearing Caps & Arrows
Courtesy of CHRYSLER GROUP, LLC

7. Install all main bearing caps (1) in the location as noted during removal making sure the arrow (2) faces forward.

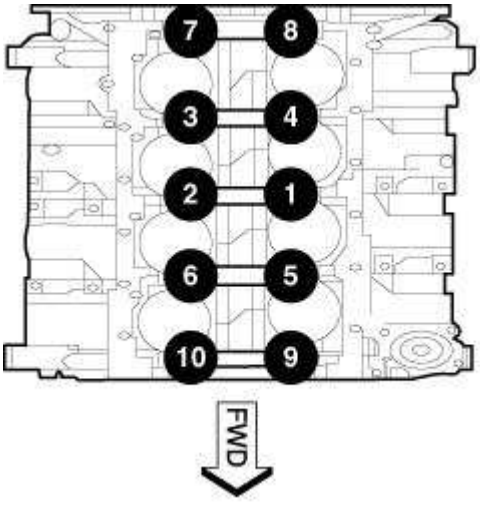


Fig. 203: Main Bearing Cap Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Clean and oil all main cap bolts and install finger tight.
9. Using the sequence shown in illustration, tighten the main bearing cap bolts to 13 N.m (10 ft.

lbs.).

10. Again, using the sequence shown in illustration, tighten the main bearing cap bolts to 28 N.m (21 ft. lbs.).
11. Using the sequence shown in illustration, rotate the main bearing cap bolts an additional 90°.

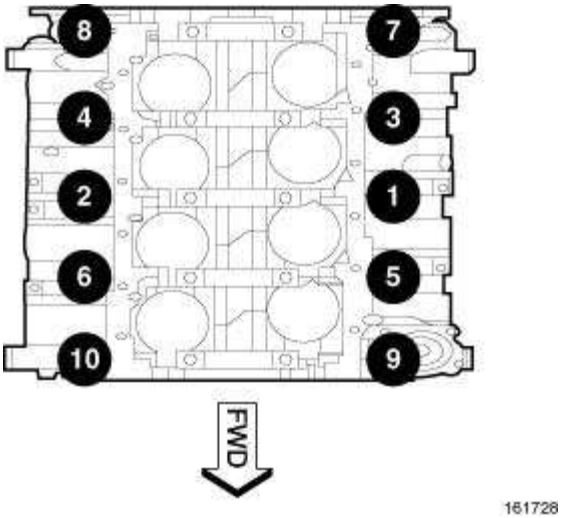


Fig. 204: Crossbolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: The main bearing cap crossbolts are torqued after the final torque of the main cap bolts. Always use a new seal washers on crossbolts.

12. Install the crossbolts with new seal washers finger tight.
13. Using the sequence shown in illustration, tighten the crossbolts to 31 N.m (23 ft. lbs.).
14. Again, using the sequence shown in illustration, repeat the crossbolt tightening procedure.
15. Measure the crankshaft end play. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.

CAUTION: The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.

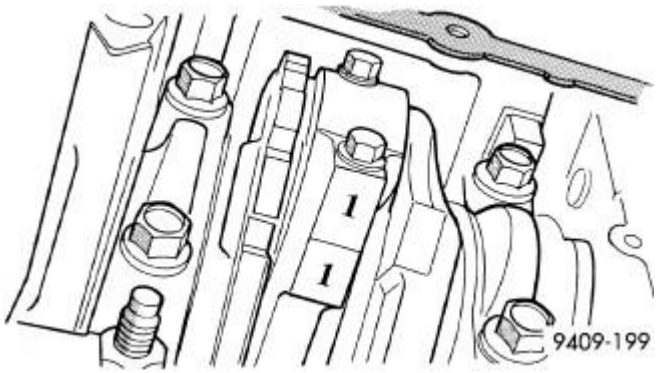


Fig. 205: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

16. Wipe the connecting rod caps clean and install the rod bearings.
17. Lubricate the bearing surfaces with clean engine oil and install the bearings and connecting rod caps onto the connecting rod journals in the same location as noted during removal.
18. Lubricate the new connecting rod bolts with clean engine oil and install the bolts finger tight.
19. Tighten the connecting rod bolts to 21 N.m (15 ft. lbs.) plus an additional 90° turn.

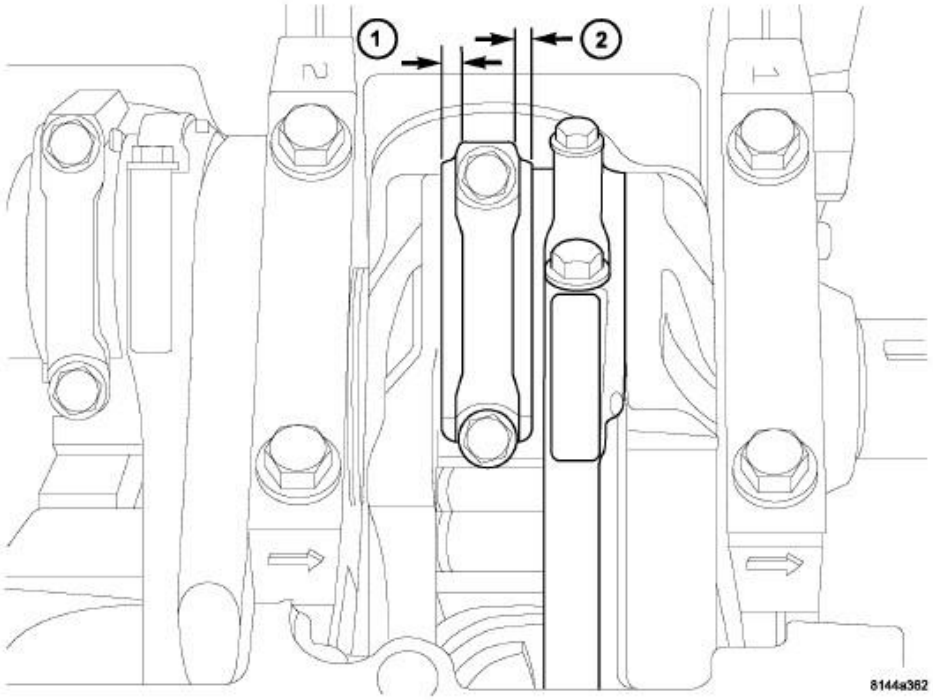


Fig. 206: Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

20. If required, measure the connecting rod side clearance (1, 2). Refer to **Engine - Specifications**.

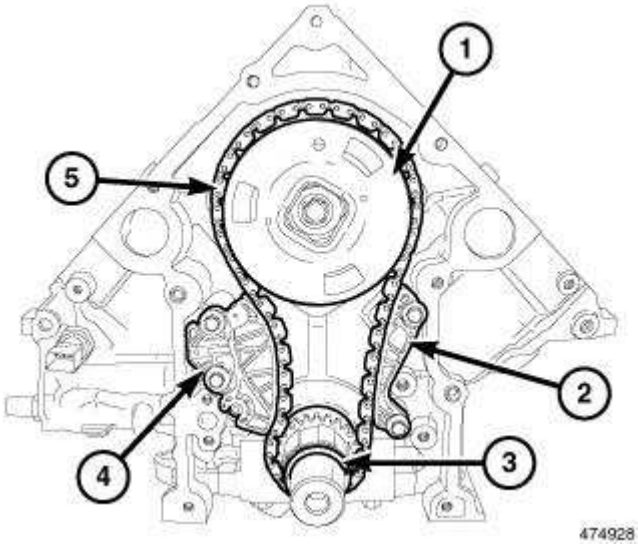


Fig. 207: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER GROUP, LLC

21. Install the timing chain (5), camshaft phaser (1) and crankshaft sprocket (3). Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.

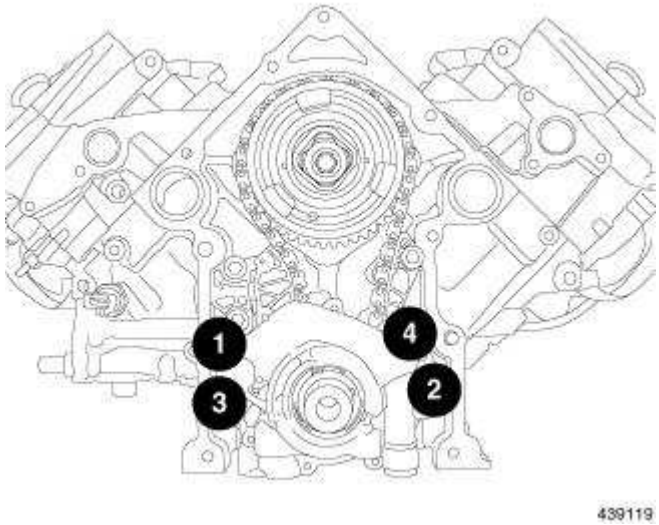


Fig. 208: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

22. Position the oil pump on the crankshaft and install the oil pump retaining bolts finger tight.
23. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).

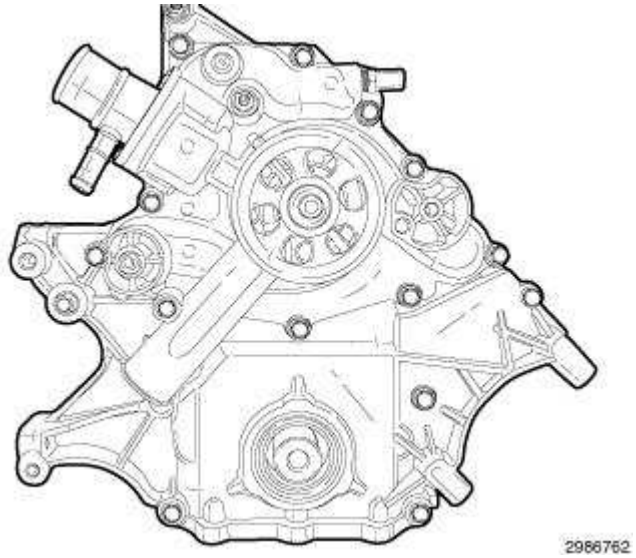


Fig. 209: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

24. Install the engine timing cover (1). Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.

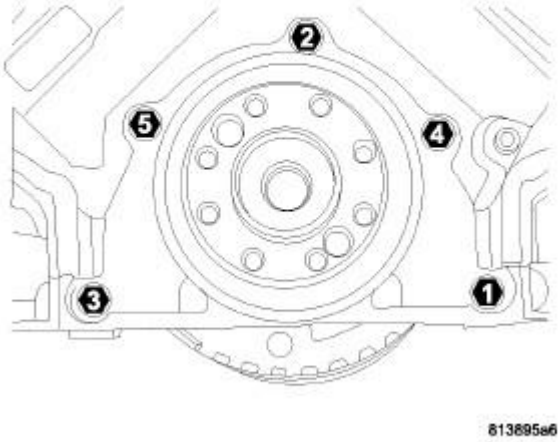


Fig. 210: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

25. Thoroughly clean all gasket residue from the engine block.
26. Position the gasket onto the new crankshaft rear oil seal retainer.
27. Position the crankshaft rear oil seal retainer onto the engine block.
28. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to 15 N.m (11 ft. lbs.).

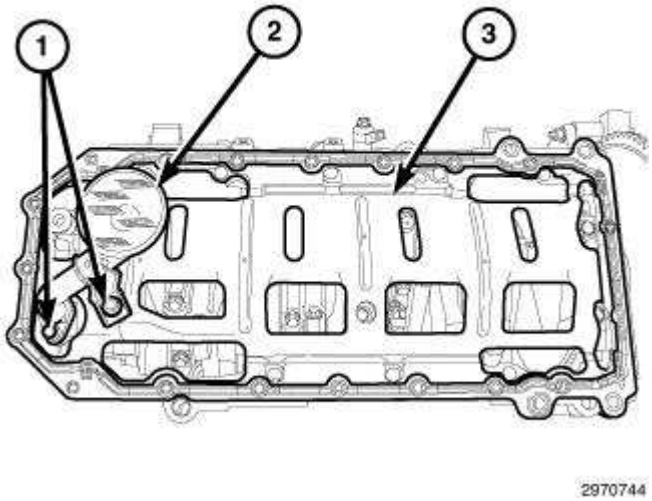


Fig. 211: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

29. Install the oil pump pickup tube (2) and oil pan. Refer to **PAN, OIL, INSTALLATION**.

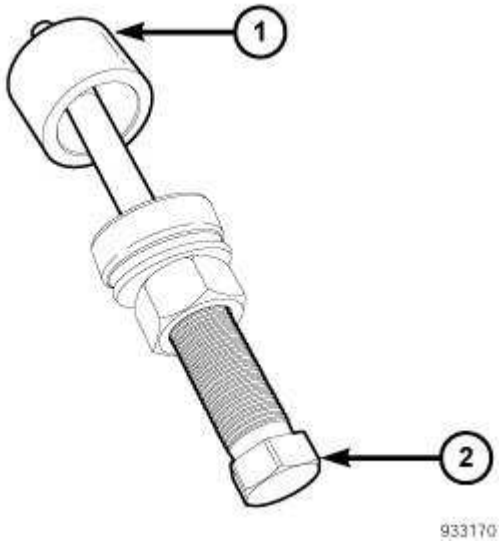


Fig. 212: Pressing Cup & Damper Installer
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To prevent severe damage to the crankshaft Damper Installer (special

tool #8512A, Installer, Damper), thoroughly clean the damper bore and the crankshaft nose before installing damper.

30. Position the damper on the crankshaft.

CAUTION: The Damper Installer (special tool #8512A, Installer, Damper) is assembled in a specific sequence. Failure to assemble this tool in this sequence may result in tool failure and severe damage to either the tool or the crankshaft.

31. Assemble the Damper Installer (special tool #8512A, Installer, Damper) (2) as follows:
    1. Install the nut onto the threaded shaft.
    2. Install the roller bearing onto the threaded shaft making sure the hardened bearing surface is facing the nut.
    3. Install the pressing cup (2) from the A/C Hub Installer (special tool #6871, Installer, A/C Hub) onto the threaded shaft.
    4. Coat the threaded shaft with MOPAR® Nickel Anti-Seize or equivalent.

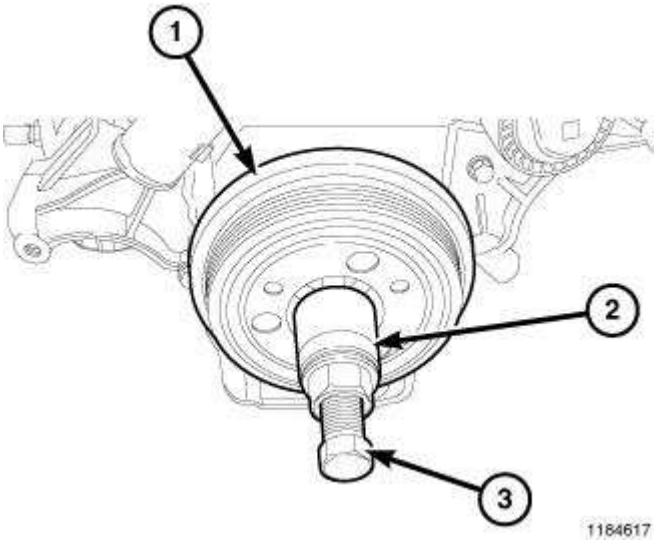


Fig. 213: Pressing Damper Onto Crankshaft
Courtesy of CHRYSLER GROUP, LLC

32. Using the Damper Installer (special tool #8512A, Installer, Damper) (3) and the pressing cup (2) from A/C Hub Installer (special tool #6871, Installer, A/C Hub), press the crankshaft damper (1) onto the crankshaft.
33. Install the crankshaft damper bolt and tighten to 176 N.m (129 ft. lbs.).

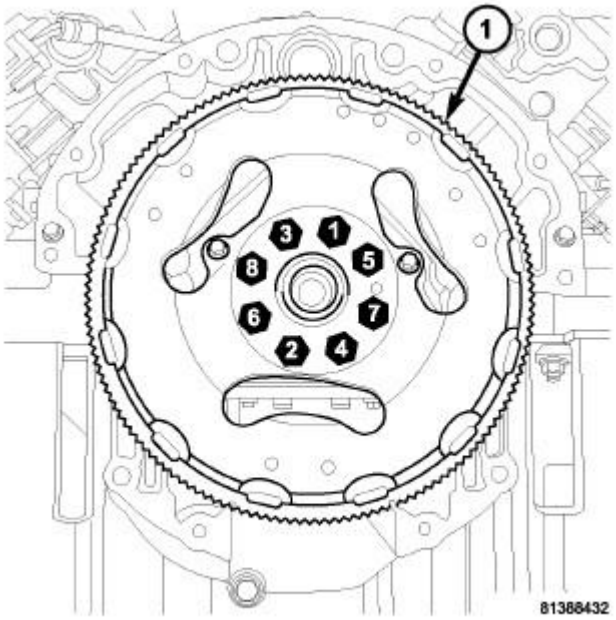


Fig. 214: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

34. Install the flexplate (1). Refer to **FLEXPLATE, INSTALLATION**.

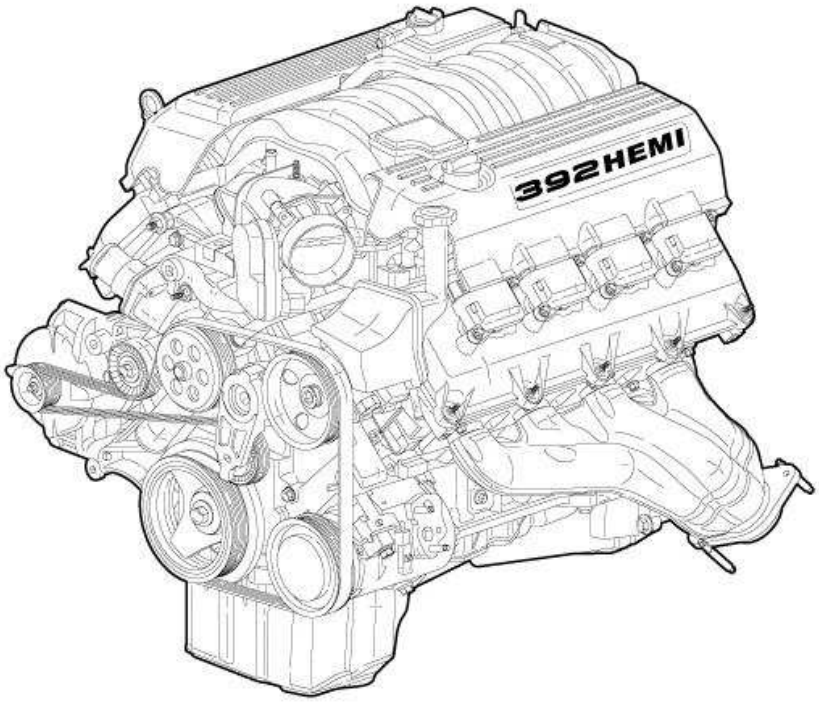


Fig. 215: 6.4L HEMI V-8 Engine

Courtesy of CHRYSLER GROUP, LLC

35. Install the engine. Refer to **INSTALLATION**.
36. Start the engine and check for leaks.

DAMPER, VIBRATION

DESCRIPTION

DESCRIPTION

The crankshaft damper is used to control the resonance that is produced by the engine. The Noise, Vibration, and Harshness (NVH) created from the crankshaft can be controlled by dissipating the torque energy through the damper.

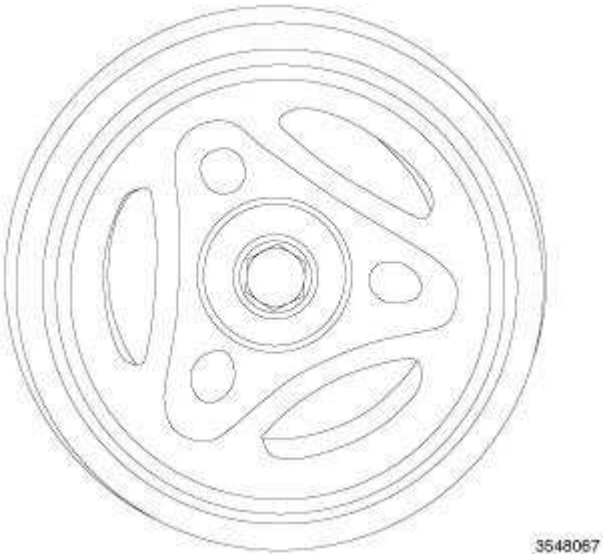


Fig. 216: Crankshaft Damper & Harden Steel Bolt
Courtesy of CHRYSLER GROUP, LLC

The crankshaft damper on the engines is held to the crankshaft by means of a harden steel bolt. The damper is pressed onto a specific machined surface of the crankshaft.

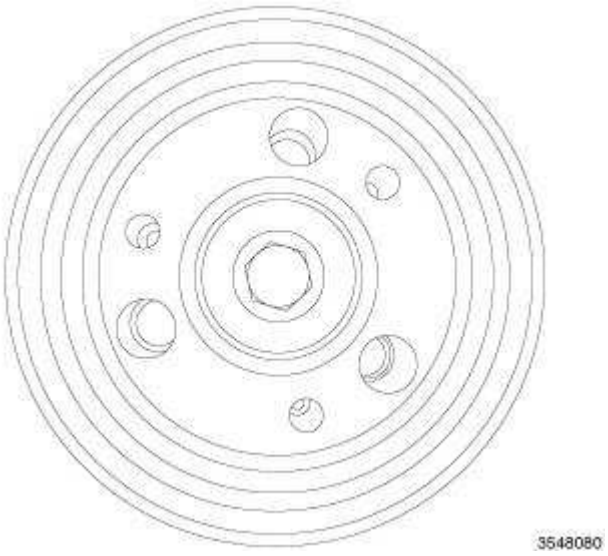


Fig. 217: HEMI® Engine Crankshaft Damper
Courtesy of CHRYSLER GROUP, LLC

The HEMI® Engines incorporate various crankshaft vibration dampers depending on the engine application. And can be removed depending on the application used.

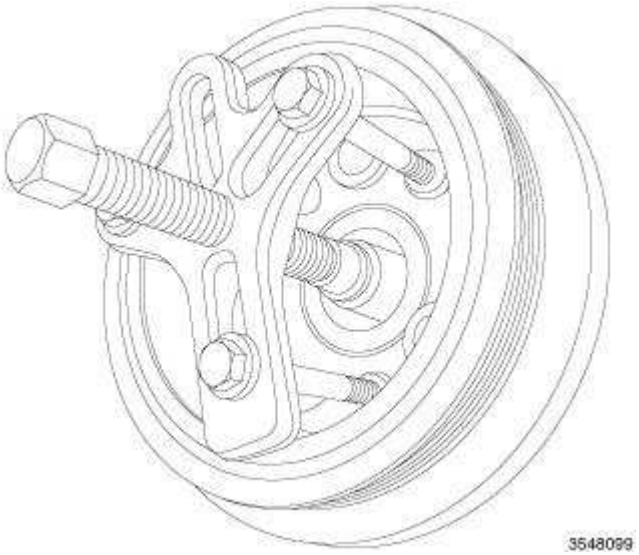


Fig. 218: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

Finding the proper puller for the application will ensure no damage will come to the damper. The flange puller is used by installing 3 bolts into the pre-tapped holes in the damper.

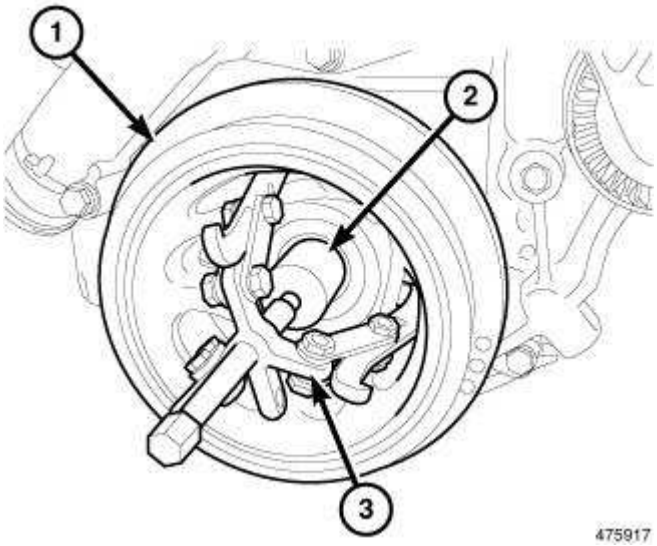


Fig. 219: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

Some pulleys that do not have bolt holes can be removed with a three jaw style (special tool #1023, Puller).

REMOVAL

REMOVAL

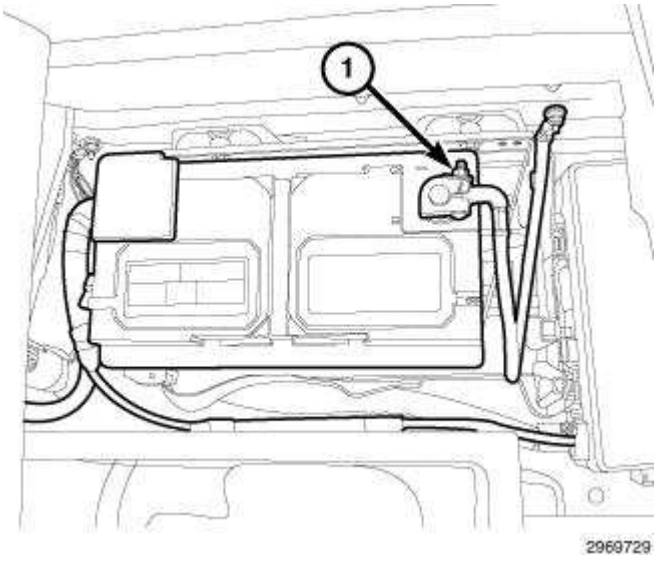


Fig. 220: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

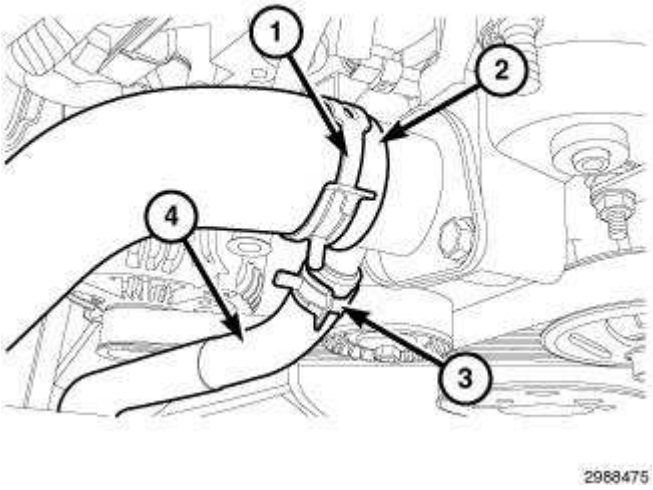


Fig. 221: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

3. Remove the upper radiator hose clamps (1) and remove the upper radiator hose (2).
4. Remove the oil cooler hose clamp (3) and remove oil cooler hose (4) and position aside.

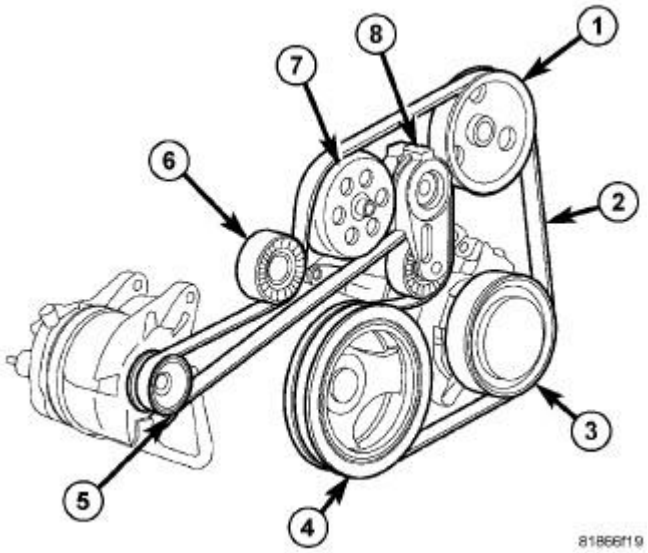


Fig. 222: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

5. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

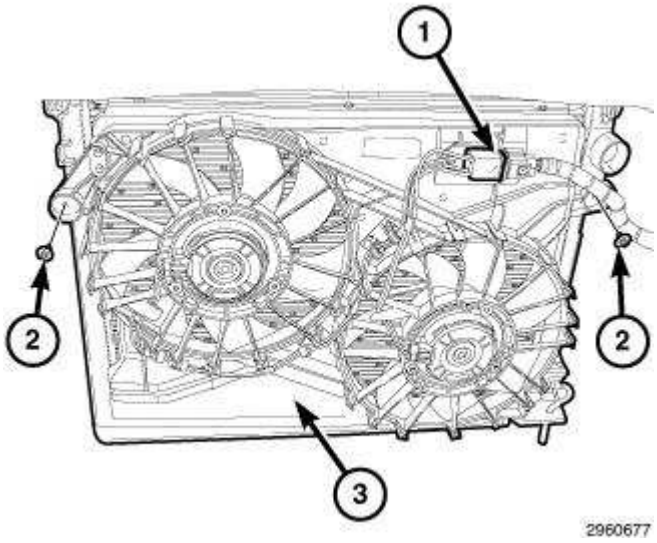


Fig. 223: Cooling Fan Electrical Connector, Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

6. Remove the cooling fan assembly. Refer to **FAN, COOLING, REMOVAL** .

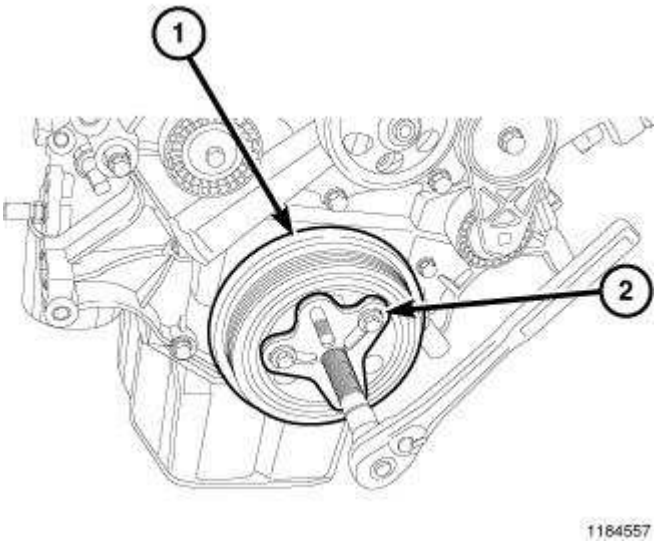


Fig. 224: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.

7. Remove the vibration damper bolt.
8. Install the puller tool (2) making sure the bolts are fully threaded through the entire crankshaft damper.
9. Remove the crankshaft damper (1).

INSTALLATION

INSTALLATION

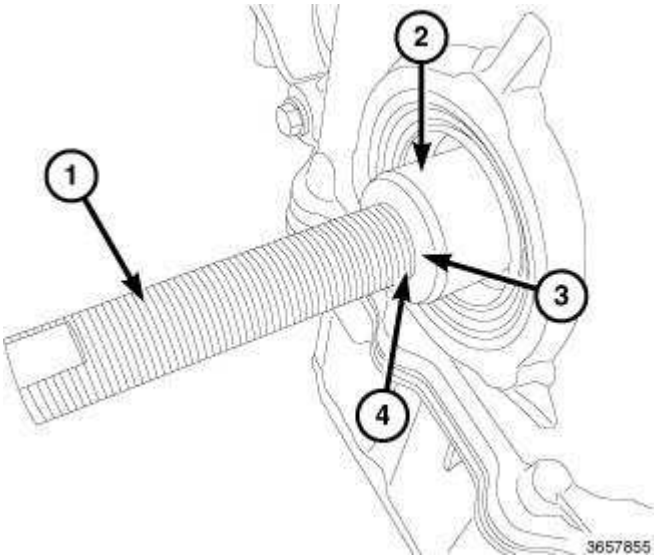


Fig. 225: Installing Vibration Damper Onto Crankshaft Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #10387, Installer, Vibration Damper), install the threaded rod (1) onto the crankshaft (2).
2. Tighten the threaded rod (4) until it is seated to the face (3) of the crankshaft.

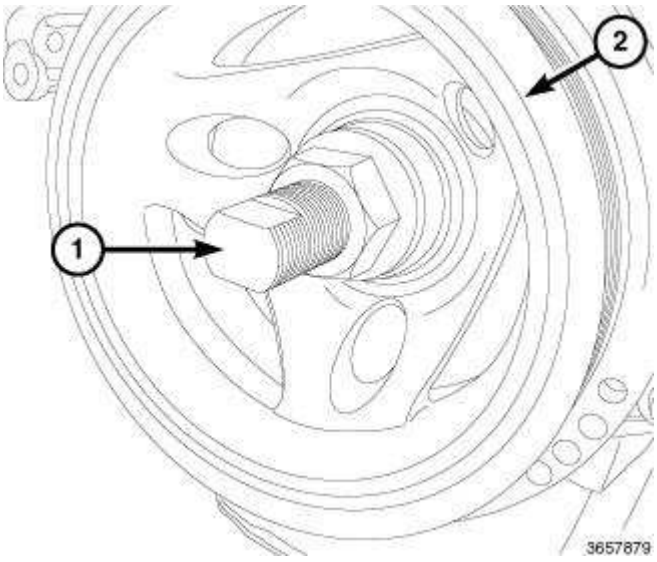


Fig. 226: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

3. Position the damper (2) on the crankshaft.
4. Install the press washer, bearing, washer, and the press nut onto the threaded rod.

5. Using Damper Installer (1) and a deep well socket, press the damper onto the crankshaft till seated.

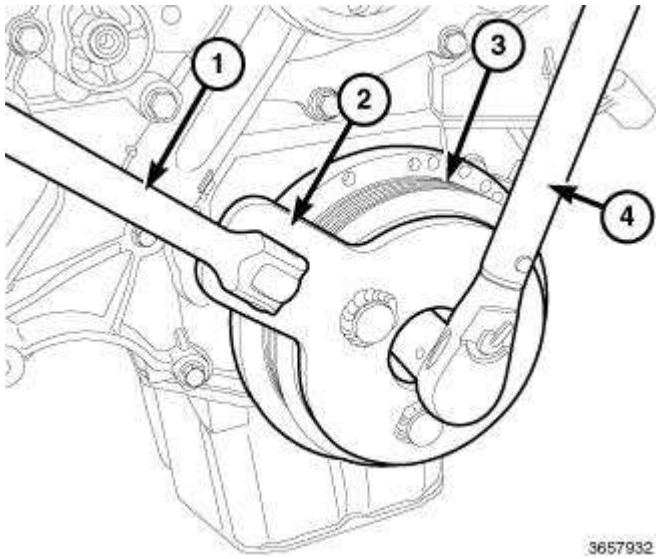


Fig. 227: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

6. Install the vibration damper bolt.
7. Position the (special tool #10386, Holder, Vibration Damper) (2), onto the vibration pulley (3).
8. Tighten the bolt to 250 N.m (184 ft. lbs.).

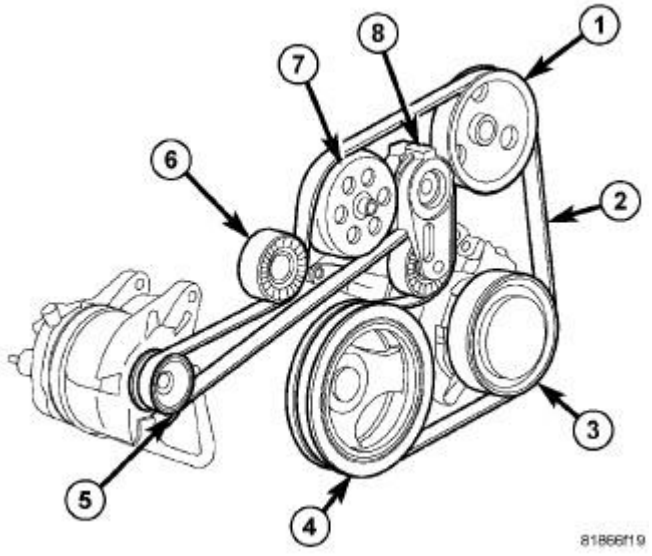


Fig. 228: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

9. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

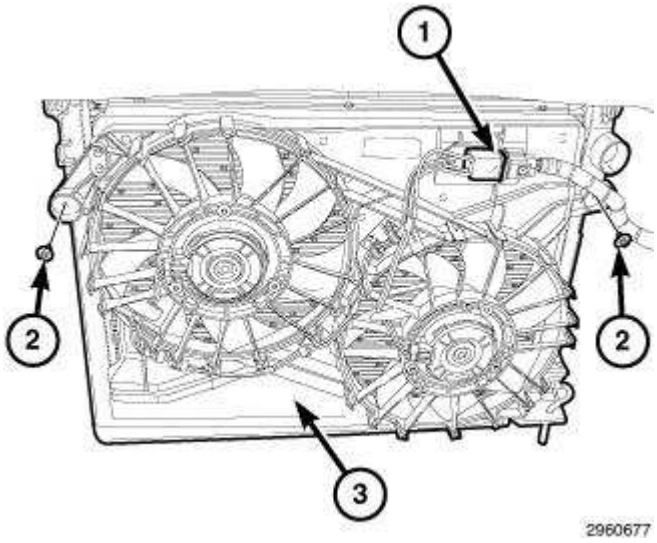


Fig. 229: Cooling Fan Electrical Connector, Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

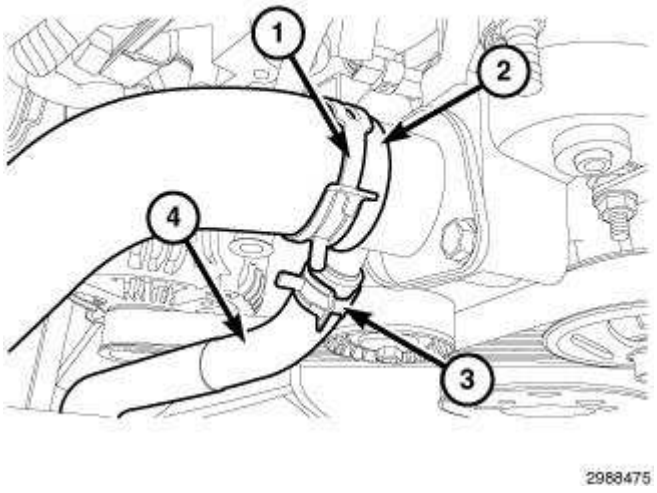


Fig. 230: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

11. Install the oil cooler hose (4) and clamp (3).
12. Install the upper radiator hose (2) and clamp (1).
13. Refill the cooling system. Refer to **STANDARD PROCEDURE** .

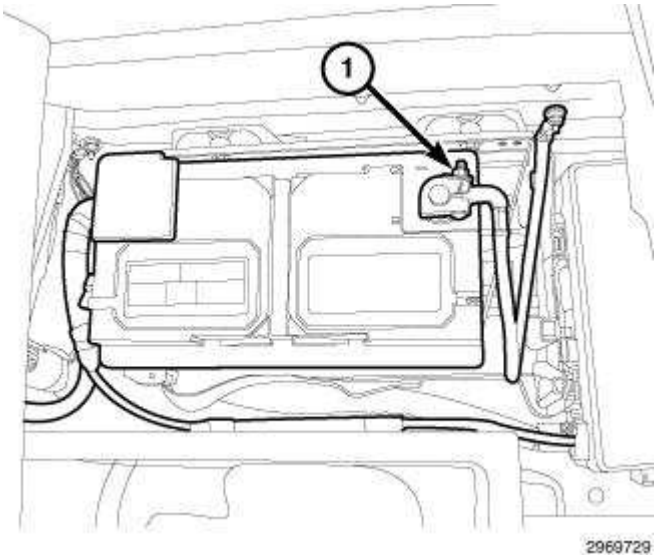


Fig. 231: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

14. Connect the negative battery cable (1).

FLEXPLATE

REMOVAL

REMOVAL

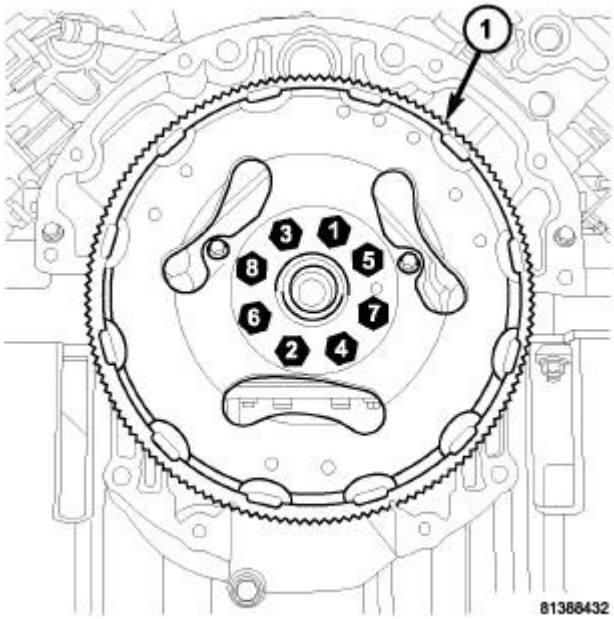


Fig. 232: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Using the sequence shown in illustration, remove the flexplate (1) retaining bolts.
3. Remove the flexplate.

INSTALLATION

INSTALLATION

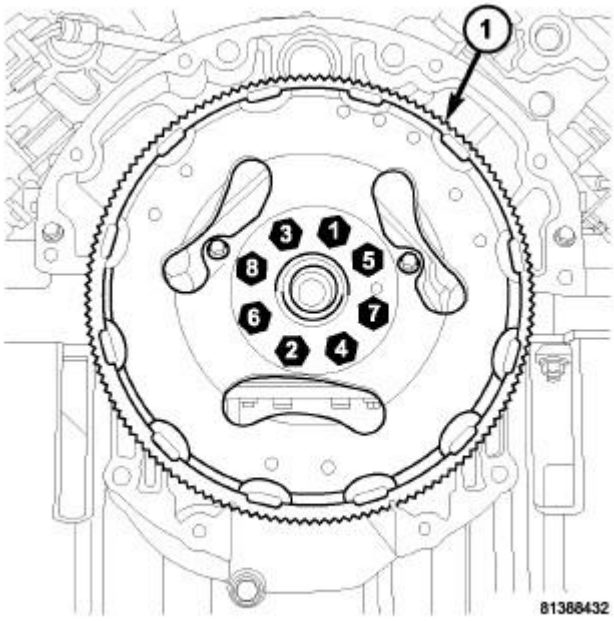


Fig. 233: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Position the flexplate (1) onto the crankshaft and install the bolts finger tight.
2. Using the sequence shown in illustration, tighten the flexplate retaining bolts to 95 N.m (70 ft. lbs.).
3. Install the transmission. Refer to **INSTALLATION** .

LIFTER(S), HYDRAULIC, ROLLER

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HYDRAULIC ROLLER LIFTERS

Before disassembling any part of the engine to correct lifter noise, check the oil pressure. If the vehicle has no oil pressure gauge, install a reliable gauge at the pressure sending-unit. The pressure should be between 207-552 kPa (30-70 psi) at 3, 000 rpm.

Check the oil level after the engine reaches normal operating temperature. Allow 5 minutes to

stabilize oil level, check dipstick. The oil level in the pan should never be above the FULL mark or below the ADD OIL mark on the dipstick. Either of these two conditions could be responsible for noisy lifters.

HIGH

If oil level is above the FULL mark, it is possible for the connecting rods to dip into the oil. With the engine running, this condition could create foam in the oil pan. Foam in oil pan would be fed to the hydraulic lifters by the oil pump causing them to lose length and allow valves to seat noisily.

LOW

Low oil level may allow oil pump to take in air. When air is fed to the lifters, they lose length, which allows valves to seat noisily. Any leaks on intake side of oil pump through which air can be drawn will create the same lifter action. Check the lubrication system from the intake strainer to the pump cover, including the relief valve retainer cap. When lifter noise is due to aeration, it may be intermittent or constant, and usually more than one lifter will be noisy. When oil level and leaks have been corrected, operate the engine at fast idle. Run engine for a sufficient time to allow all of the air inside the lifters to be bled out.

LIFTER NOISE DIAGNOSIS

1. To determine source of lifter noise, crank the engine with cylinder head covers removed.
2. Feel each valve spring or rocker arm to detect noisy lifter. The noisy lifter will cause the affected spring and/or rocker arm to vibrate or feel rough in operation.

   NOTE: Worn valve guides or cocked springs are sometimes mistaken for noisy lifters. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not noticeably reduced, it can be assumed the noise is in the lifter. Inspect the rocker arm push rod sockets and push rod ends for wear.

3. Valve lifter noise ranges from light noise to a heavy click. A light noise is usually caused by excessive leak-down around the unit plunger or by the plunger partially sticking in the lifter body cylinder. The lifter should be replaced. A heavy click is caused by a lifter check valve not seating or by foreign particles wedged between the plunger and the lifter body. This will cause the plunger to stick in the down position. This heavy click will be accompanied by excessive clearance between the valve stem and rocker arm as the valve closes. In either case, lifter assembly should be removed for inspection and cleaning.
4. The valve train generates a noise very much like a light lifter noise during normal operation. Care must be taken to ensure that lifters are making the noise. If more than one lifter seems to be noisy, it's probably not the lifters.

REMOVAL

REMOVAL

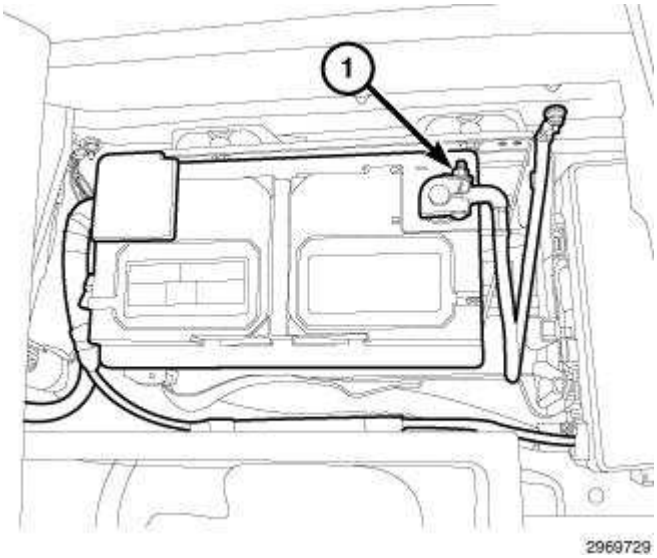


Fig. 234: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

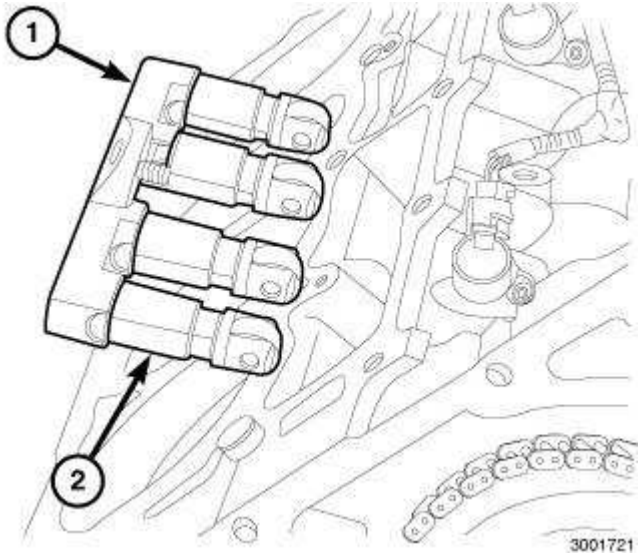


Fig. 235: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

3. Remove the lifters (2) and retainer (1) as an assembly.
4. Check the camshaft lobes for abnormal wear.

INSTALLATION

INSTALLATION

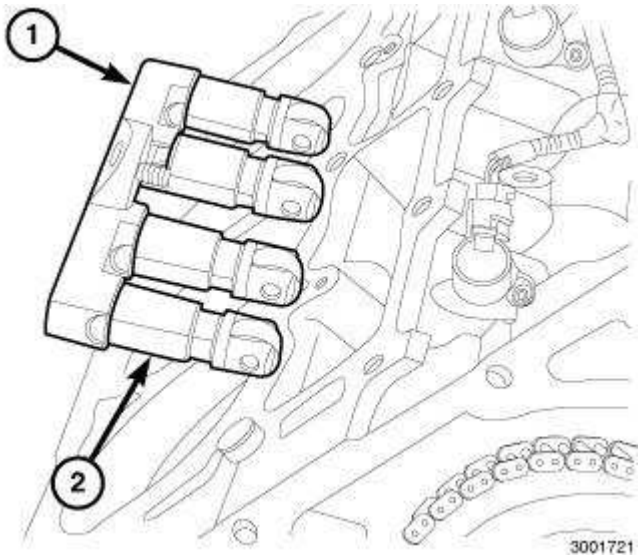


Fig. 236: Hydraulic Lifters/Tappets & Retainer/Guide Holder
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the lifters (2) and retainer (1) assembly with clean engine oil.

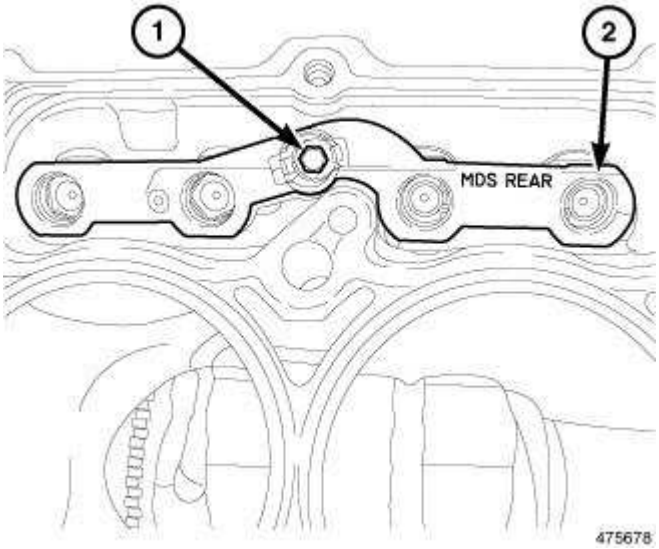


Fig. 237: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The 6.4L Multi Displacement System (MDS) engine uses both

standard roller lifters and deactivating roller lifters. The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer must be installed as an assembly.

2. Install the lifters (2) and retainer (1) as an assembly into their original location.
3. Tighten the lifter retainer bolt (1) to 12 N.m (9 ft. lbs.).
4. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.

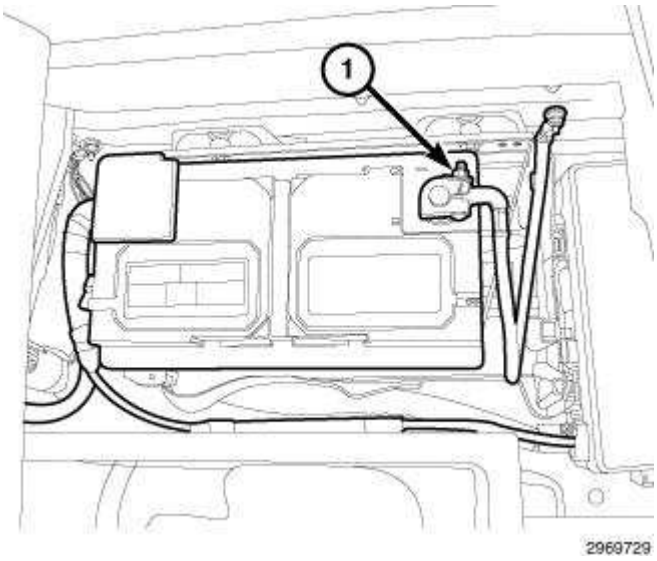


Fig. 238: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

5. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic lifters have filled with oil and have become quiet.

6. Start the engine and check for leaks.
7. Road test the vehicle.

RETAINER, CRANKSHAFT REAR OIL SEAL

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR SEAL AREA LEAKS

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and is serviced as an assembly.

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
3. Inspect the rear of the cylinder block for evidence of oil leakage and note the following:
   - Circular spray pattern generally indicates seal leakage or crankshaft damage.
   - Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil gallery pipe plugs, oil filter runoff and main bearing cap to cylinder block mating surfaces. See appropriate Engine information, for proper repair procedures of these items.
4. If no leaks are detected, pressurize the crankcase **"Engine Oil Leak"** . Refer to **ENGINE OIL LEAK**.

   CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out using an emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.

REMOVAL

REMOVAL

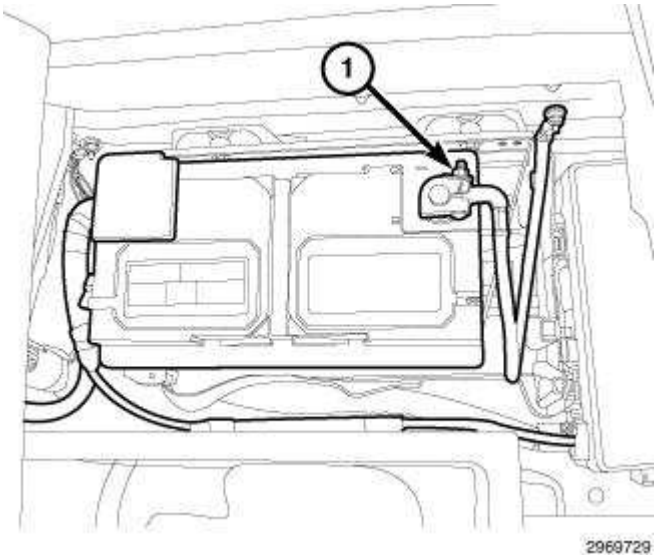


Fig. 239: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

NOTE: This procedure can be performed in vehicle.

1. Disconnect the negative battery cable (1).
2. Remove the transmission. Refer to **REMOVAL** .

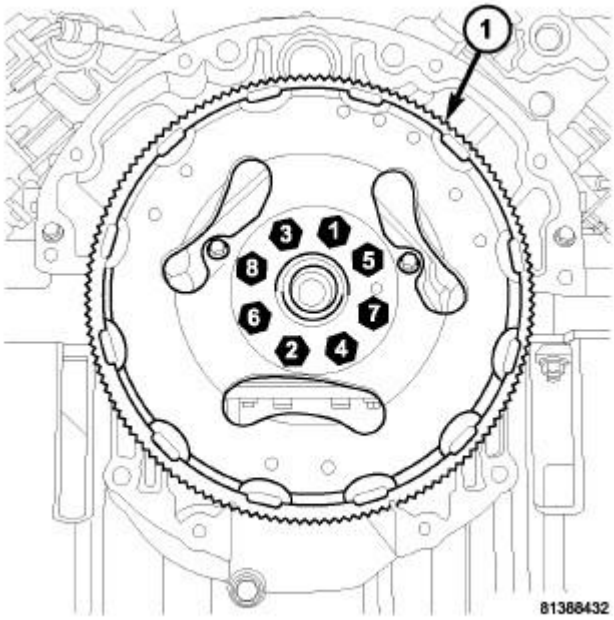


Fig. 240: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Remove the flexplate (1). Refer to **FLEXPLATE, REMOVAL**.
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.

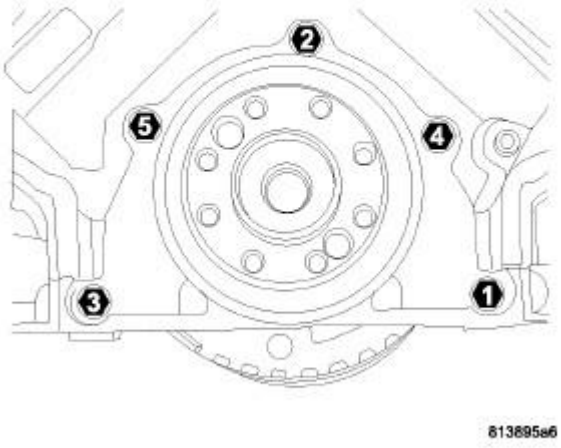


Fig. 241: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.
6. Remove and discard the rear oil seal retainer.

INSTALLATION

INSTALLATION

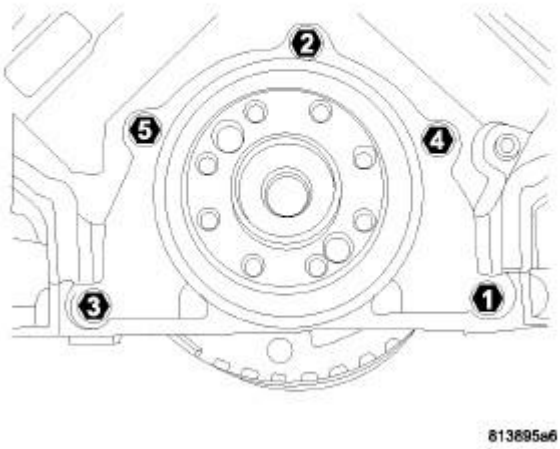


Fig. 242: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

1. Thoroughly clean all gasket residue from the engine block.
2. Position the gasket onto the new crankshaft rear oil seal retainer.
3. Position the crankshaft rear oil seal retainer onto the engine block.
4. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to 15 N.m (11 ft. lbs.).
5. Install the oil pan. Refer to **PAN, OIL, INSTALLATION**.

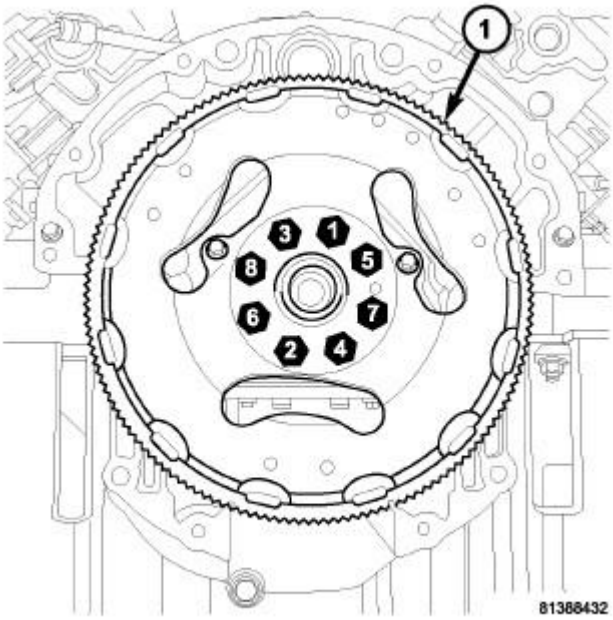


Fig. 243: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Install the flexplate (1). Refer to **FLEXPLATE, INSTALLATION**.
7. Install the transmission. Refer to **INSTALLATION** .
8. Fill the crankcase with the specified type and amount of engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

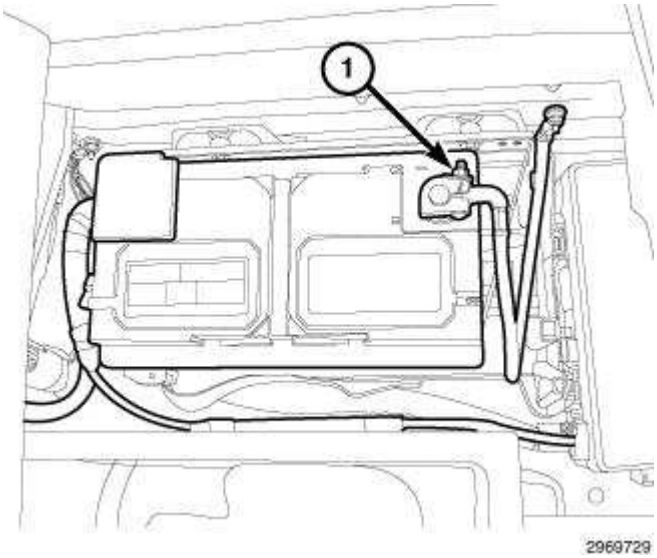


Fig. 244: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

9. Connect the negative battery cable (1).

10. Start the engine and check for leaks.

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON RING FITTING

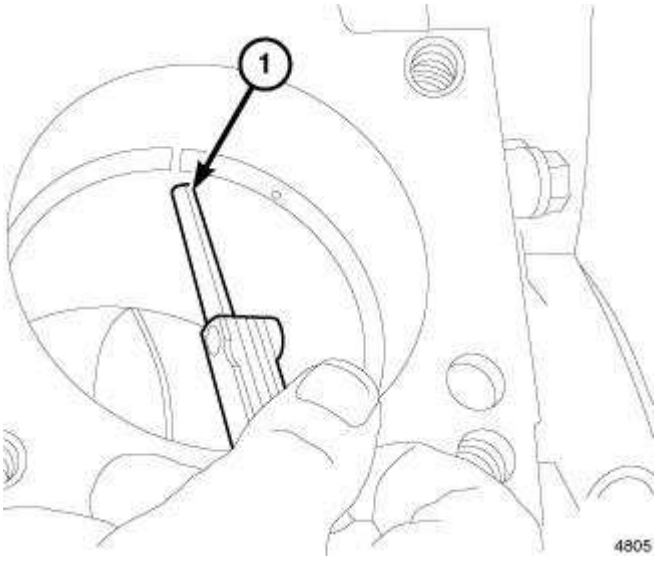


Fig. 245: Using Feeler Gauge To Check Ring End Gap
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before reinstalling used piston rings or installing new piston rings, the piston ring clearances must be checked or engine damage may result.

1. Wipe the cylinder bore clean.
2. Insert the piston ring into the cylinder bore.

NOTE: The piston ring gap measurement must be made with the piston ring positioned at least 12 mm (0.50 inch) from bottom of cylinder bore.

3. Using a piston, make sure that the piston ring is squared in the cylinder bore. Slide the piston ring downward into the cylinder.
4. Using a feeler gauge (1), check the piston ring end gap, replace any rings not within specification.

PISTON RING SIDE CLEARANCE

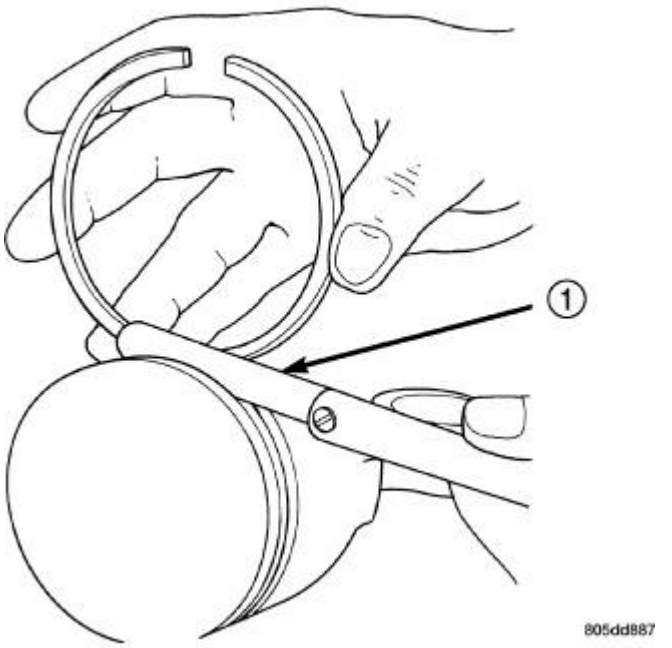


Fig. 246: Measuring Piston Ring Side Clearance
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

1. Measure the piston ring side clearance with a feeler gauge (1) as shown in illustration. Make sure the feeler gauge fits snugly between the piston ring land and the piston ring, replace any ring not within specification.

   NOTE: Make sure the marks on the compression rings face upward.

2. Rotate the ring around the piston. The ring must rotate in the groove with out binding.

PISTON RING INSTALLATION

Fig. 247: Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

1. Install the oil ring expander.
2. Install the lower side rail by placing one end between the piston ring groove and the expander ring (1). Hold the lower side rail end firmly and press down the portion to be installed until the side rail is in position. Repeat this step for the upper side rail.

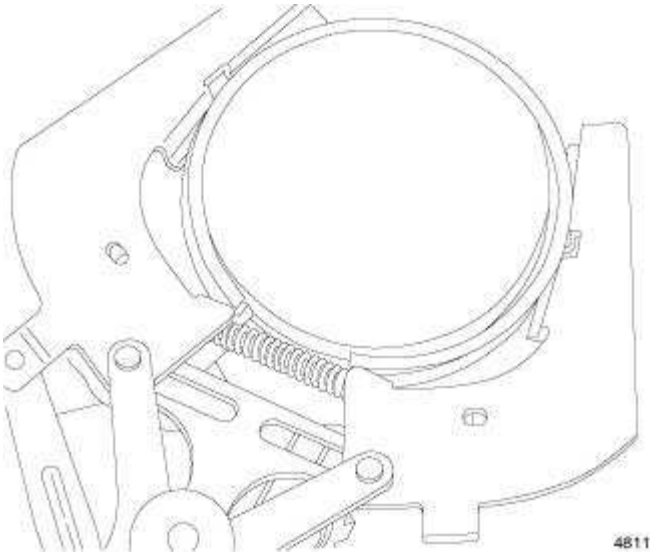


Fig. 248: Installing Upper & Intermediate Rings
Courtesy of CHRYSLER GROUP, LLC

3. Using a piston ring installer, install the No. 2 intermediate piston ring.
4. Using a piston ring installer, install the No. 1 upper piston ring.

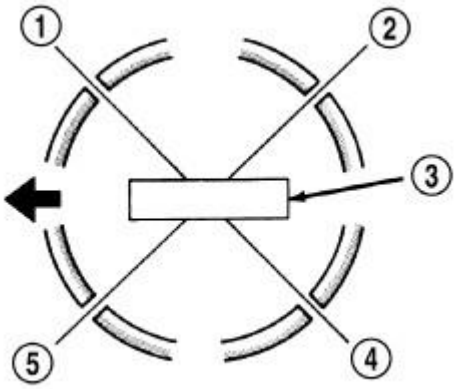


Fig. 249: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

5. Install the oil ring expander gap at the (5) position.
6. Install the oil ring lower side rail gap at the (4) position.
7. Install the oil ring upper side rail gap at the (1) position.
8. Install the second compression ring gap at the (5) position.
9. Install the top compression ring gap at the (2) position.

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are made of a high-strength aluminum alloy. Piston skirts are coated with a solid lubricant (Molykote) to reduce friction and provide scuff resistance. The piston top ring groove and land is anodized. The connecting rods are made of forged powdered metal with a "fractured cap" design. A floating piston pin is used to attach the piston and connecting rod.

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON FITTING

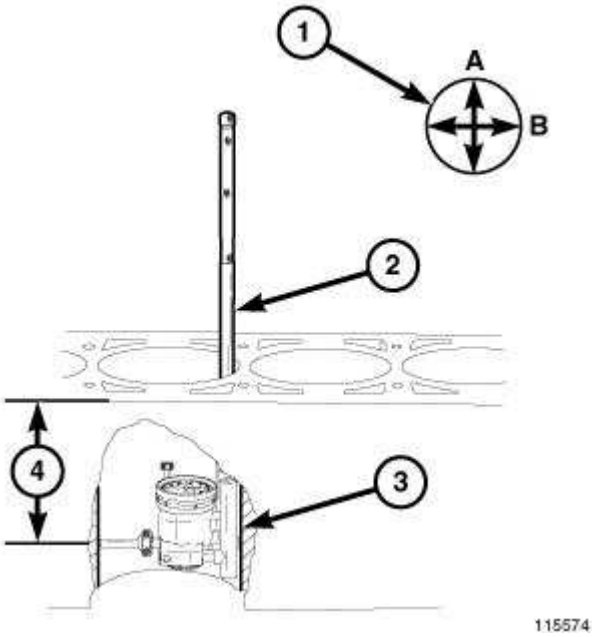


Fig. 250: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

1. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder indicator capable of reading in 0.003 mm (0.0001 in.) increments is required. If a cylinder indicator is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at a point 38.0 mm (1.5 inches) below top of bore (4). Start perpendicular (across or at 90°) to the axis of the crankshaft at point A and then take an additional bore reading 90° to that at point B.

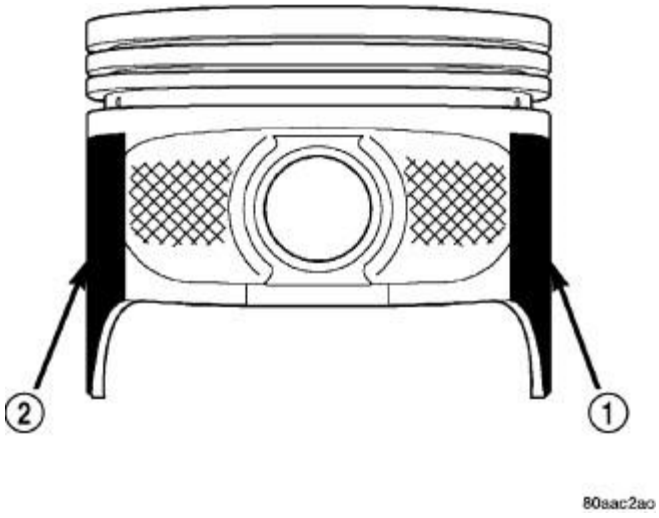


Fig. 251: Moly Coated Piston
Courtesy of CHRYSLER GROUP, LLC

NOTE: The coated pistons, piston pins and connecting rods are pre-assembled

and serviced as an assembly.

3. The piston and rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder bank (even numbered) and must not be interchanged.
4. The coating material (1, 2) is applied to the piston after the final piston machining process. Measuring the outside diameter of a coated piston will not provide accurate results. Therefore measuring the inside diameter of the cylinder bore with a cylinder indicator is **MANDATORY** . To correctly select the proper size piston, a cylinder indicator capable of reading in 0.003 mm (0.0001 in.) increments is required.
5. Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

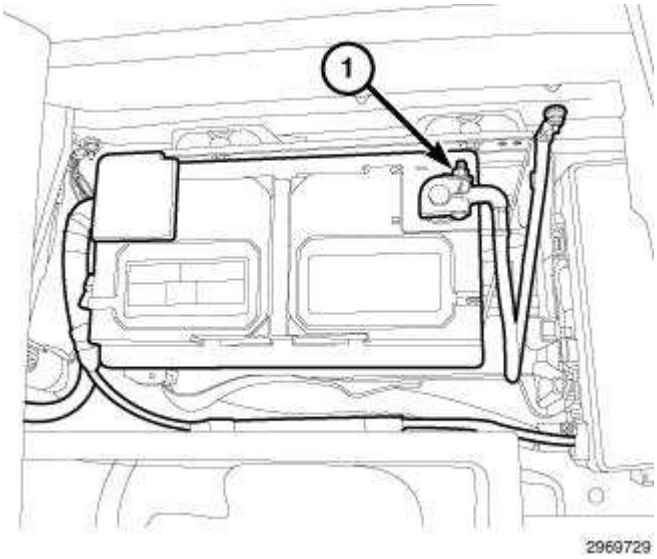


Fig. 252: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable (1).

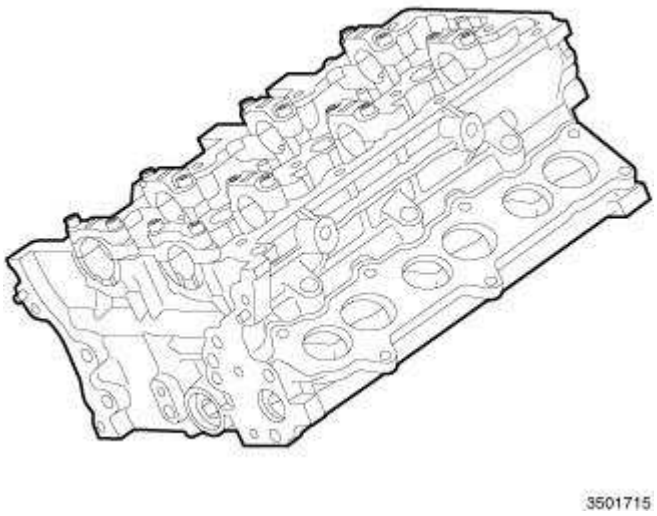


Fig. 253: Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

3. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL**.

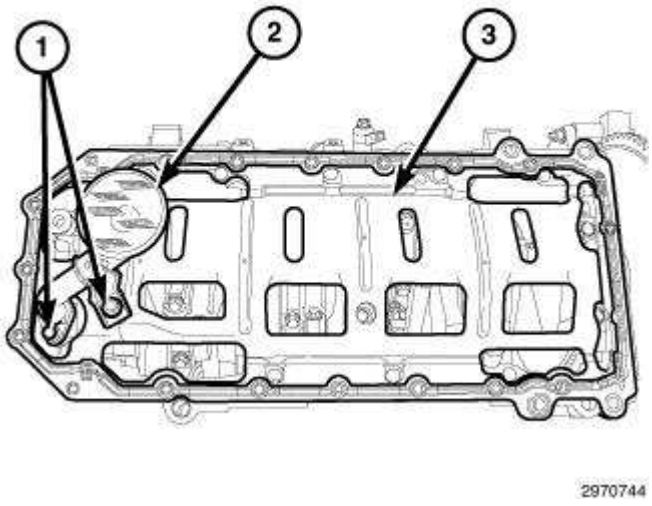


Fig. 254: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.

4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.
5. Remove and discard the oil pan gasket/windage tray (3).
6. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing pistons from engine block. **Be sure to keep the tops of the pistons covered during this operation.**

CAUTION: When removing and installing the pistons and connecting rods, do not damage the piston oil cooler jets. If the jets are bent, engine damage may occur.

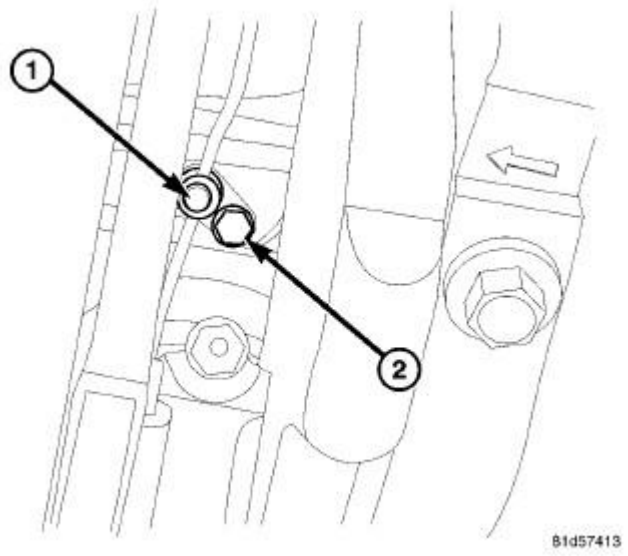


Fig. 255: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Remove the piston oil cooler jet(s) retaining bolt(s) (2) and remove the piston oil cooler jet(s) (1).

CAUTION: Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces as engine damage may occur.

CAUTION: Care must be taken not to nick crankshaft journals as engine damage may occur.

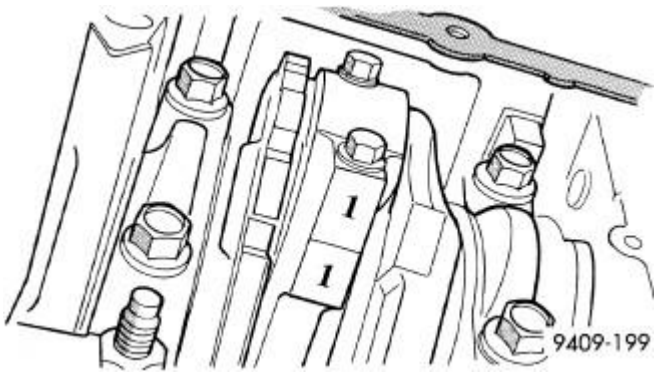


Fig. 256: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

8. Mark the connecting rod and bearing cap position using a permanent ink marker or scribe tool.

NOTE: Pistons and connecting rod assemblies must be removed from the top of the engine block. When removing the piston and connecting rod assemblies from the engine, rotate the crankshaft so each connecting rod is centered in the cylinder bore.

9. Remove the connecting rod cap and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
10. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
11. Carefully remove the piston rings from the piston(s), starting from the top ring down.

CLEANING

CLEANING

CAUTION: DO NOT use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a Moly coating, this coating must not be damaged.

1. Using a suitable cleaning solvent clean the pistons in warm water and towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

INSPECTION

INSPECTION

Check the connecting rod journal for excessive wear, taper and scoring.

Check the connecting rod for signs of twist or bending.

Check the piston for taper and elliptical shape before it is fitted into the cylinder bore. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.

Check the piston for scoring, or scraping marks on the piston skirts. Check the ring lands for cracks and/or deterioration.

INSTALLATION

INSTALLATION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

NOTE: Before reinstalling used rings or installing new rings, the ring clearances must be checked.

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

1. Check piston ring clearance. Refer to **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
2. Before installing piston and connecting rod assemblies into the bore, install the piston rings. Refer to **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
3. Immerse the piston head and rings in clean engine oil and position a ring compressor over the piston and rings and tighten the ring compressor. **Make sure the position of rings do not change during this operation.**

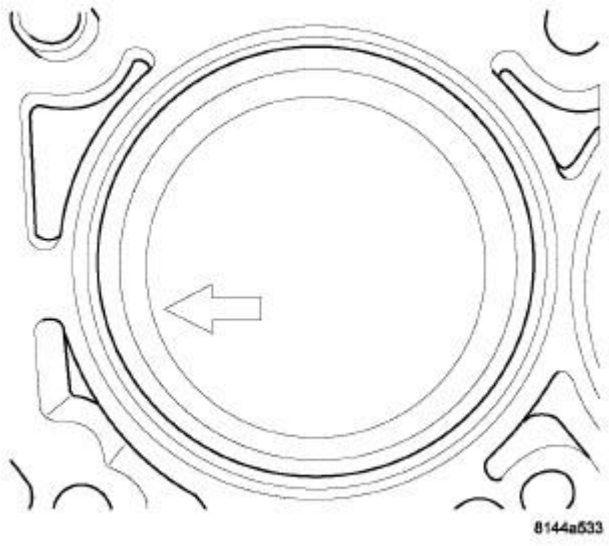


Fig. 257: Piston Direction Arrow
Courtesy of CHRYSLER GROUP, LLC

4. The pistons are marked on the piston pin bore surface with an raised "F" or arrow on top of piston indicating installation position. This mark must be pointing toward the front of the engine on both cylinder banks.
5. Wipe the cylinder bore clean and lubricate with clean engine oil.

6. Rotate the crankshaft until the connecting rod journal is centered with the cylinder bore.
7. Insert the piston and rod assembly into the cylinder bore and carefully position the connecting rod over the crankshaft journal.
8. Tap the piston down in cylinder bore using a hammer handle. While at the same time, guide the connecting rod into position on crankshaft rod journal.
9. Perform the measure bearing clearance procedure. Refer to **ENGINE BLOCK**.

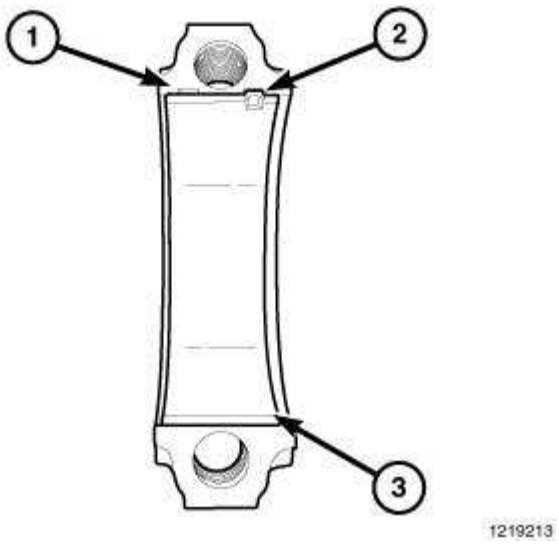


Fig. 258: Connecting Rod Cap & Bearing
Courtesy of CHRYSLER GROUP, LLC

10. Wipe the connecting rod cap (1) clean and lubricate with clean engine oil and install the bearing (3).

NOTE: The connecting rods and bearing caps are not interchangeable, line up the previously marked bearing caps and connecting rods to ensure assembly to their original location.

11. Lubricate the bearing surfaces with clean engine oil and position the rod cap onto the connecting rod.

CAUTION: When installing the connecting rods, make sure the wide side of the connecting rod faces the crankshaft and the narrow sides face each other.

CAUTION: Always replace the connecting rod bolts whenever they are loosened or removed.

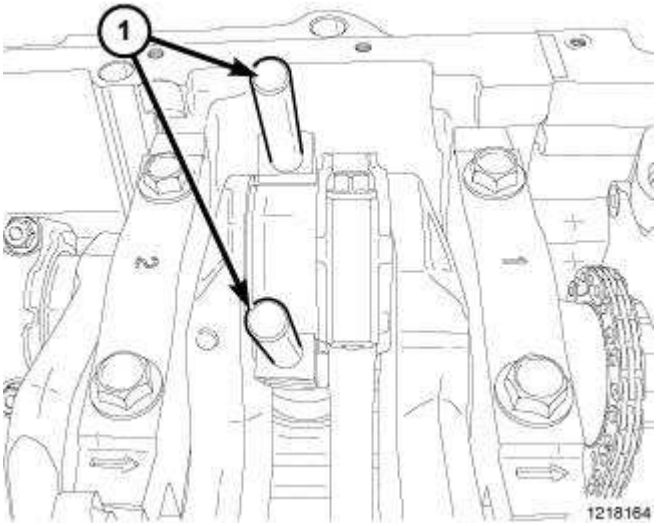


Fig. 259: Connecting Rod Guides
Courtesy of CHRYSLER GROUP, LLC

12. Install the (special tool #8507, Guides, Connecting Rod) (1) into the connecting rod bolt threads.

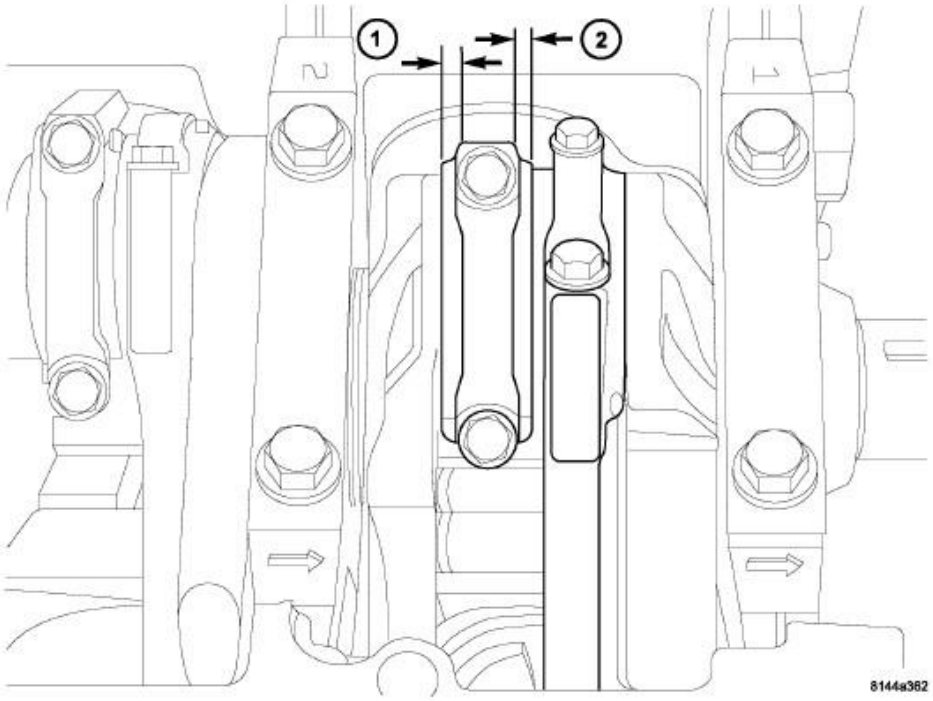


Fig. 260: Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

13. Verify the connecting rods are properly installed, the wide side (1) of the connecting rod is facing towards the crankshaft and the narrow sides (2) of the connecting rods face each other.

14. Lubricate the new rod cap bolts with clean engine oil, install and tighten to 45 N.m (33 ft. lbs.) plus an additional 60° turn.

CAUTION: When removing and installing the pistons and connecting rods, do not damage the piston oil cooler jets. If the jets are bent, engine damage may occur.

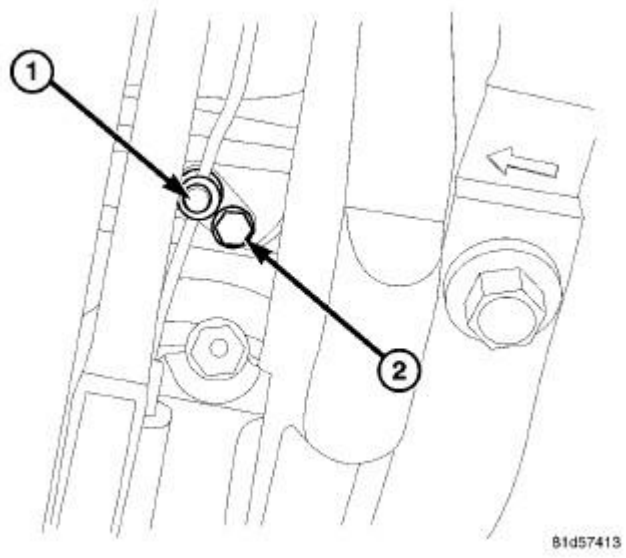


Fig. 261: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

15. Position the piston oil cooler jet(s) (1).
16. Install the piston oil cooler jet retaining bolt(s) (2) and tighten to 13 N.m (10 ft. lbs.).

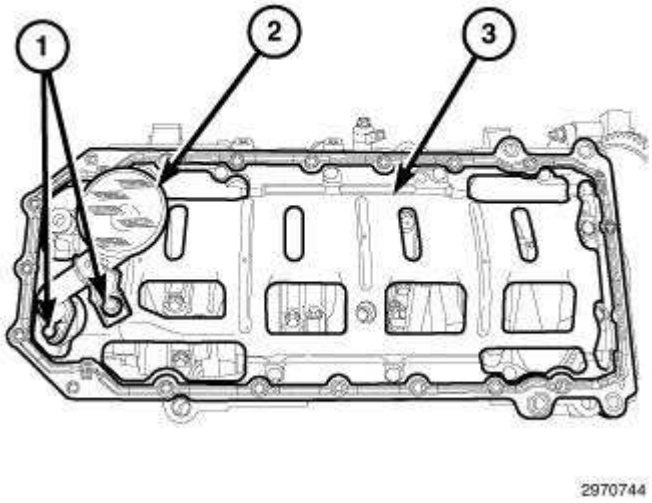


Fig. 262: Integral Windage Tray, Oil Pump Pickup Tube & Bolts

Courtesy of CHRYSLER GROUP, LLC

17. Install the new oil pan gasket/windage tray (3), oil pump pickup tube (2) and oil pan. Refer to **PAN, OIL, INSTALLATION**.
18. Install the engine oil dipstick tube and dipstick.
19. Lower the vehicle.

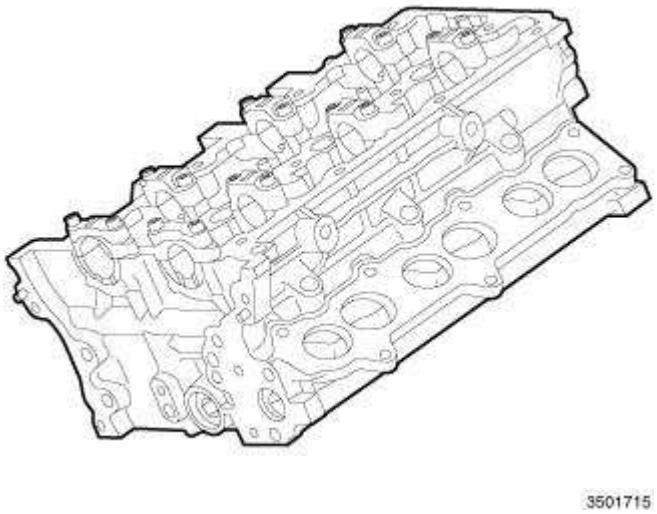


Fig. 263: Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

20. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION**.

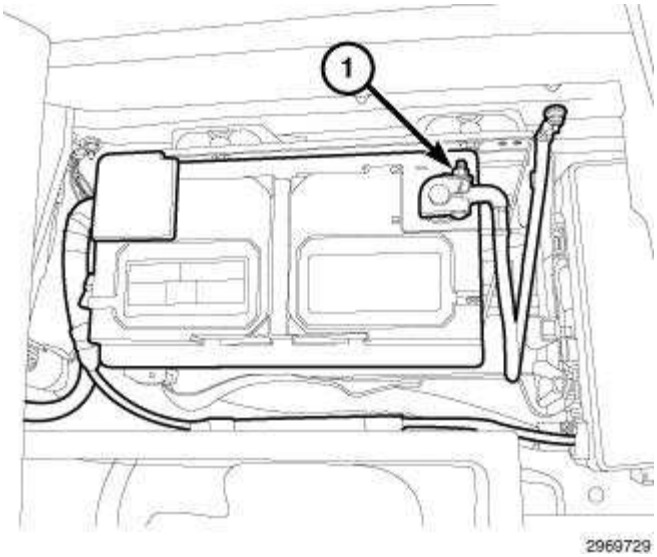


Fig. 264: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

21. Connect the negative battery cable (3).

22. Start the engine and check for leaks.

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

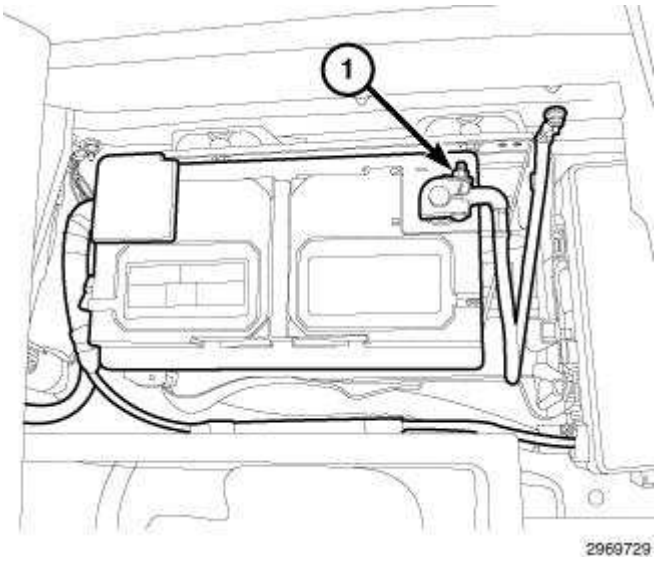


Fig. 265: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

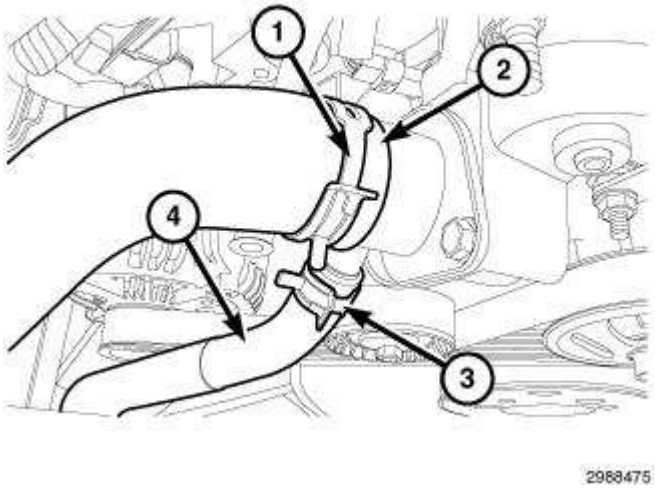


Fig. 266: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

3. Remove the upper radiator hose clamp (1) and remove the upper radiator hose (2).
4. Remove the oil cooler hose clamp (3) and remove oil cooler hose (4).

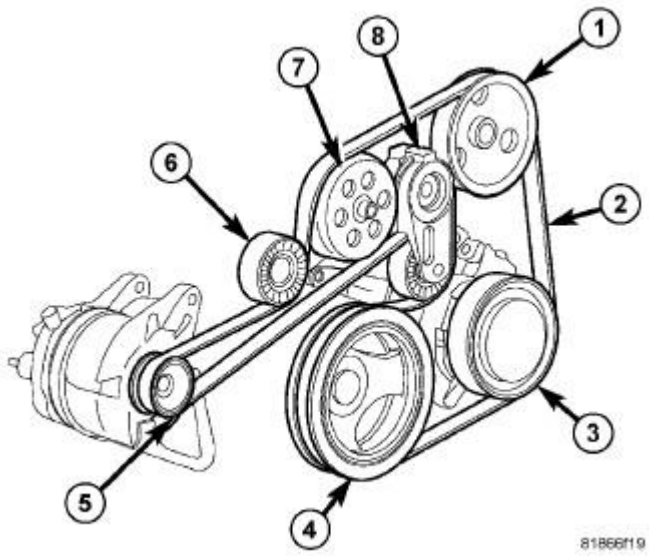


Fig. 267: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

5. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

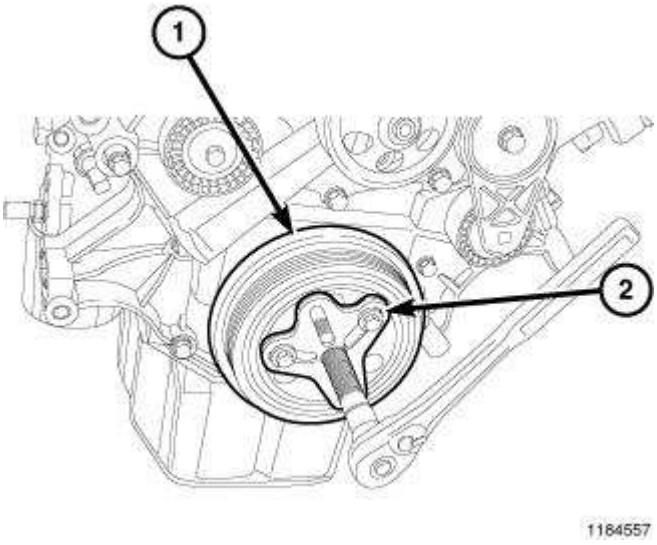


Fig. 268: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.

6. Remove the crankshaft damper retaining bolt.
7. Install the puller tool (2) making sure the bolts are fully threaded through the entire crankshaft damper.
8. Remove the crankshaft damper (1).

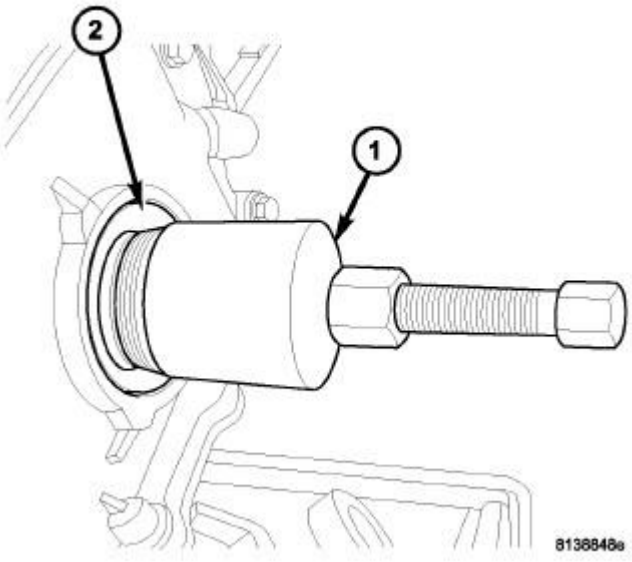


Fig. 269: Front Crankshaft Seal Removal
Courtesy of CHRYSLER GROUP, LLC

9. Using Seal Remover (special tool #9071, Remover, Seal) (1), remove the crankshaft front seal (2).

INSTALLATION

INSTALLATION

CAUTION: The front crankshaft seal must be installed dry. Do not apply lubricant to sealing lip or to outer edge.

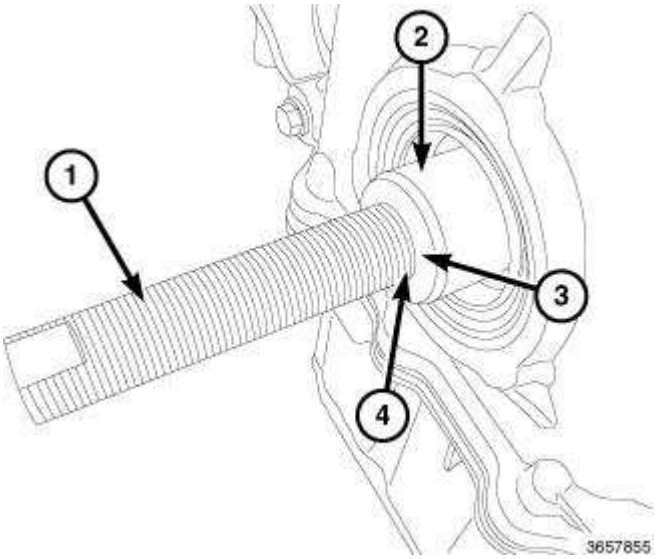


Fig. 270: Installing Vibration Damper Onto Crankshaft Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

1. Install the threaded rod (1) from the (special tool #10387, Installer, Vibration Damper) into the crankshaft (2) till seated.

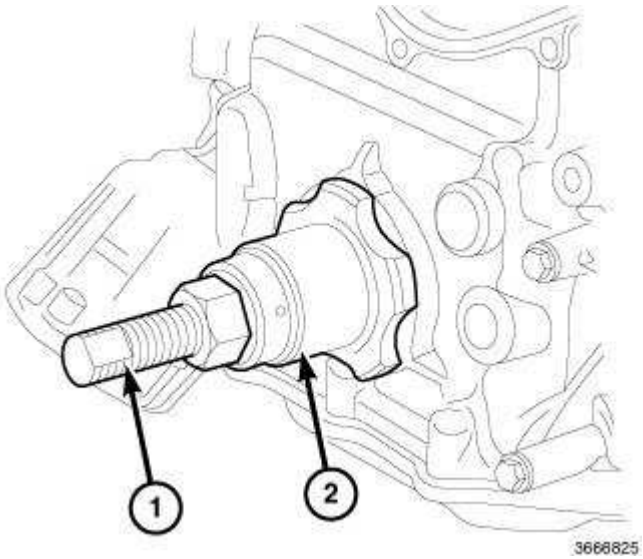


Fig. 271: Front Seal Installation
Courtesy of CHRYSLER GROUP, LLC

2. Using Seal Installer (special tool #9072, Installer, Seal) and (special tool #10387, Installer, Vibration Damper) (2), install the crankshaft front oil seal.

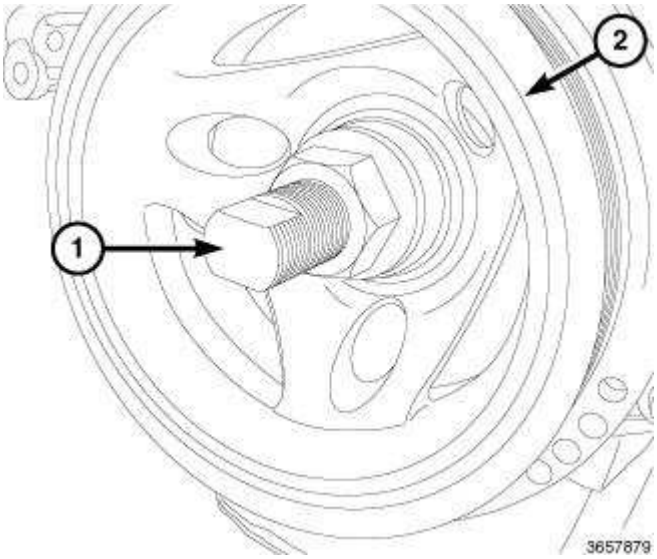


Fig. 272: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

3. Position the damper (2) on the crankshaft.
4. Install the press washer, bearing, washer, and the press nut onto the threaded rod.
5. Using Damper Installer (1) and a deep well socket, press the damper onto the crankshaft till seated.

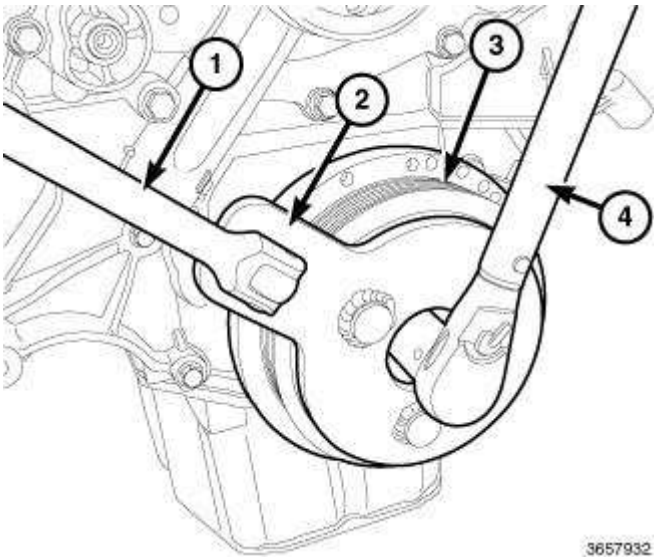


Fig. 273: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

6. Install the vibration damper bolt.
7. Position the (special tool #10386, Holder, Vibration Damper) (2), onto the vibration pulley (3).
8. Tighten the bolt to 250 N.m (184 ft. lbs.).

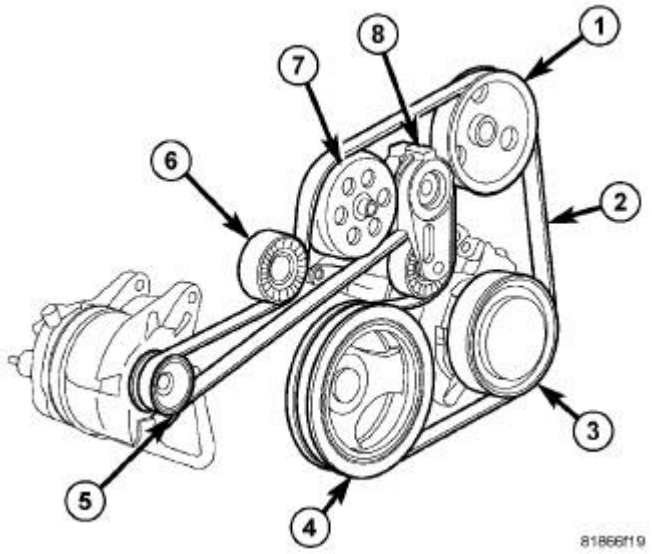


Fig. 274: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

9. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

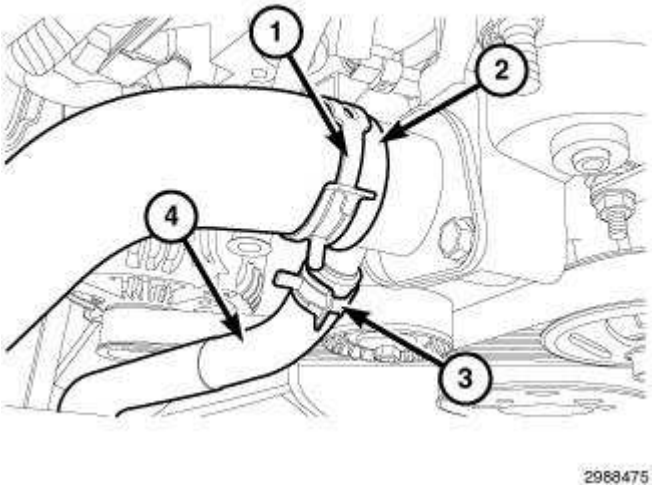


Fig. 275: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

10. Install the upper radiator hose (2) and clamp (1).
11. Install the oil cooler hose (4) and clamp (3).

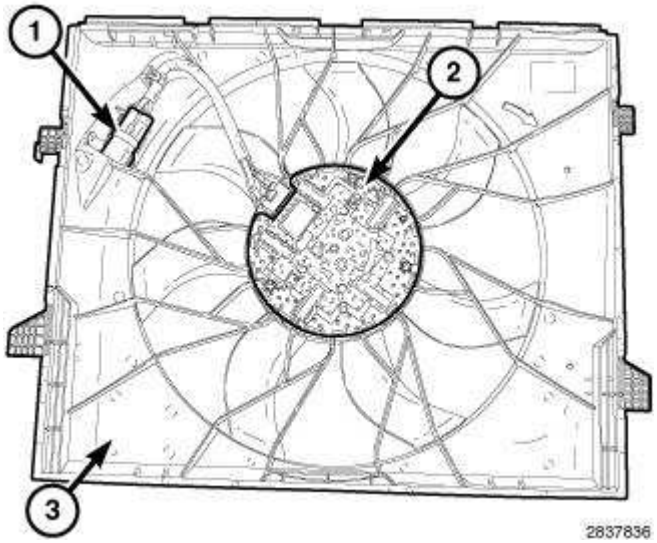


Fig. 276: Cooling Fan Motor Assembly
Courtesy of CHRYSLER GROUP, LLC

12. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .
13. Refill the cooling system. Refer to **STANDARD PROCEDURE** .

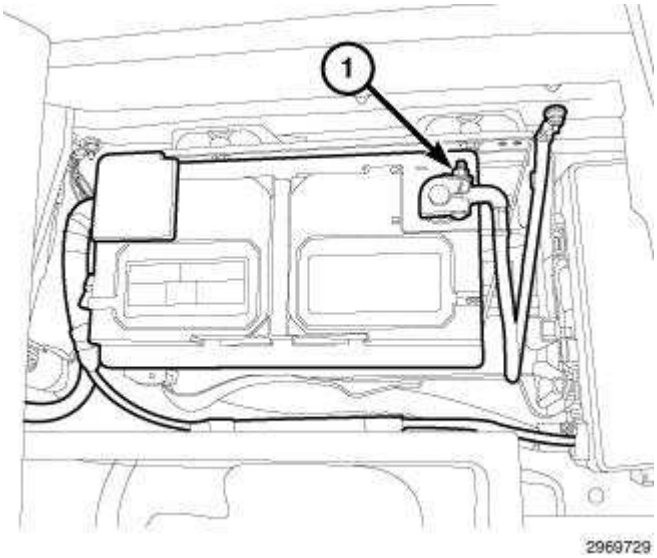


Fig. 277: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

14. Connect the negative battery cable (1).

SEAL, CRANKSHAFT OIL, REAR

DESCRIPTION

DESCRIPTION

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer, for more information, refer to the following;

- **Diagnosis and Testing:** Refer to **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Diagnosis and Testing**.
- **Removal:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.
- **Installation:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION**.

SOLENOID, MULTIPLE DISPLACEMENT

DESCRIPTION

DESCRIPTION

The Multi Displacement System (MDS) selectively deactivates cylinders 1, 4, 6, and 7 to improve fuel economy. It has two modes of operation:

- 8 cylinders for acceleration and heavy loads
- 4 cylinders for cruising and city traffic

The main components of the Multi Displacement System are:

- Unique MDS camshaft
- Deactivating roller lifters
- 4 control valve solenoids
- Control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

Cylinder Deactivation

- Trap an exhaust charge from a normal combustion event
- Normal combustion event
- Deactivate the exhaust valve
- Deactivate the intake valve
- Piston is an air spring
- Cylinders deactivated in firing sequence

Cylinder Reactivation

- Normal combustion event

- Activate the exhaust valve
- Activate the intake valve
- Empty the cylinder
- Cylinders reactivated in firing sequence

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - 6.4L - MDS SOLENOID

The Multi-Displacement System (MDS) has the following detectable issues:

- Solenoid circuit
- Fail to deactivate a cylinder(s)
- Fail to reactivate a cylinder(s)
- Low oil pressure

CONDITION	POSSIBLE CAUSES	CORRECTION
MDS does not activate	1. Low oil pressure	1. Check for proper oil pressure
	2. Bad oil temperature sensor	2. Replace the oil temperature sensor
	3. Malfunctioning MDS solenoid	3. Replace the MDS solenoid
	4. Malfunctioning MDS lifter	4. Replace lifter(s)
MDS does not deactivate	1. Low oil pressure	1. Check or proper oil pressure
	2. Bad oil temperature sensor	2. Replace the oil temp sensor
	3. Malfunctioning MDS solenoid	3. Replace the MDS solenoid
	4. Malfunctioning MDS lifter(s)	4. Replace lifter(s)

REMOVAL

REMOVAL

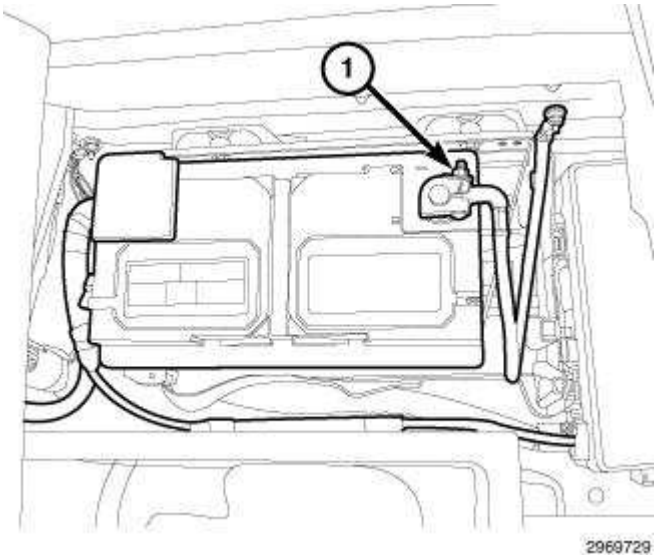


Fig. 278: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

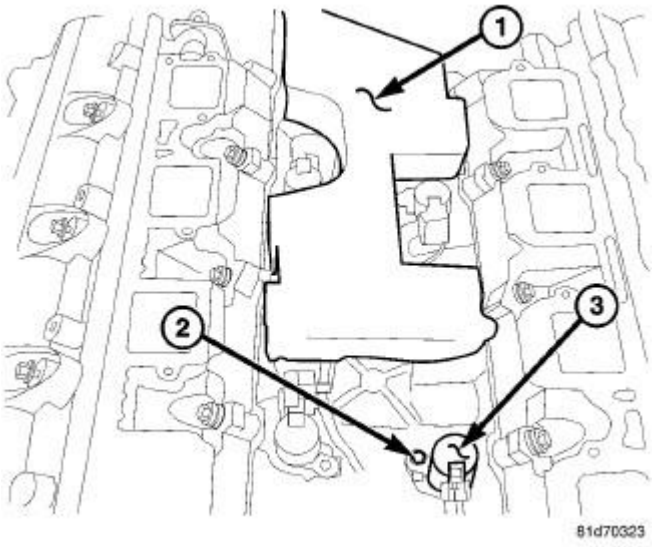


Fig. 279: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Remove foam insulator pad (1).

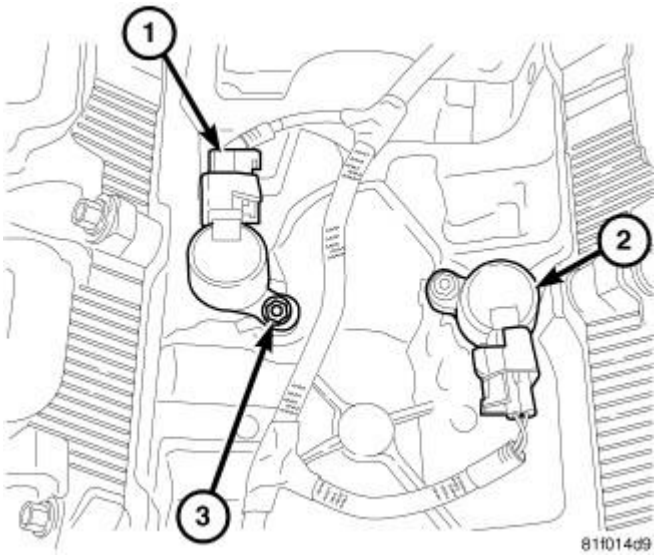


Fig. 280: MDS Solenoids, Electrical Connectors & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the Multiple Displacement Solenoid (MDS) (2) electrical connector(s) (1).
5. Remove the MDS solenoid (2) retaining bolt(s) (3).

CAUTION: Do not try to pry the solenoid out. This could lead to breakage and contamination of the lubrication system.

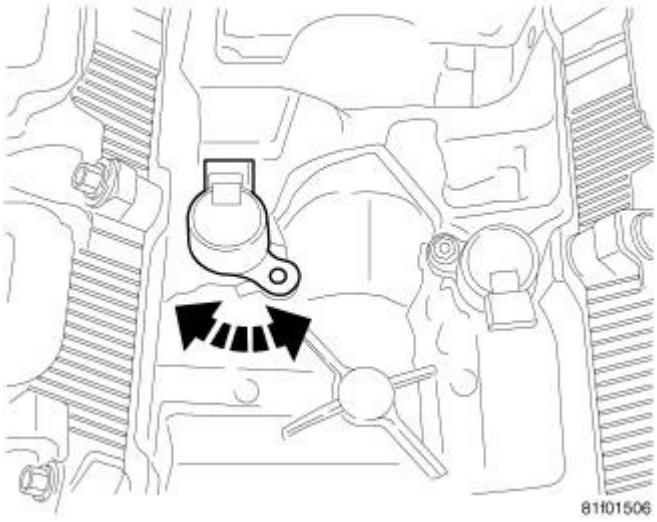


Fig. 281: Removing/Installing MDS Solenoid
Courtesy of CHRYSLER GROUP, LLC

6. Lightly tap on the MDS solenoid(s) with a rubber mallet. Rotate the MDS solenoid(s) from side to side to break the seal.
7. Remove the MDS solenoid(s).

INSTALLATION

INSTALLATION

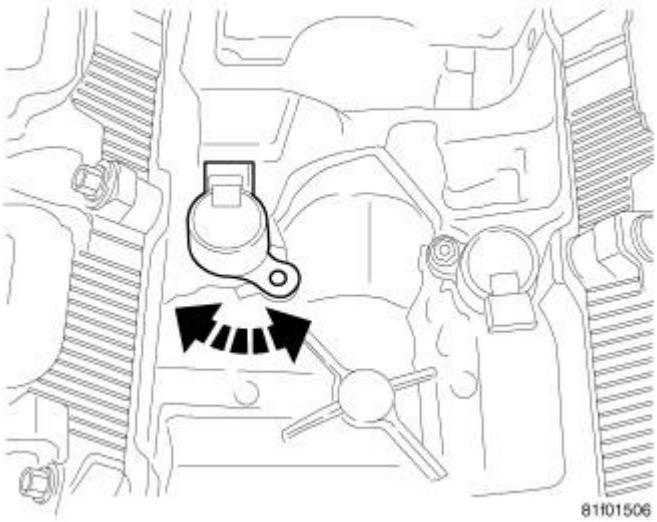


Fig. 282: Removing/Installing MDS Solenoid
Courtesy of CHRYSLER GROUP, LLC

1. Verify the MDS solenoid bores are free of debris before installing the MDS solenoid into the engine block.
2. Install the MDS solenoid(s) (3), ensure the seal is fully seated into the engine block.

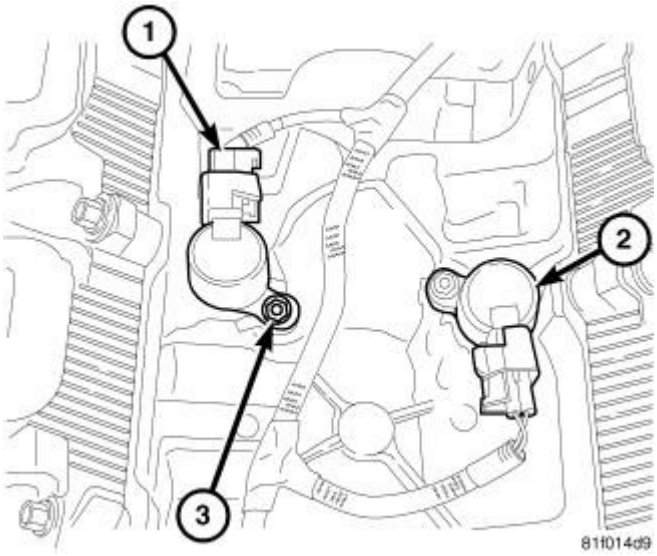


Fig. 283: MDS Solenoids, Electrical Connectors & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the retaining bolt(s) (3) and tighten to 11 N.m (8 ft. lbs.).
4. Connect the MDS electrical connector to the solenoid(s) (1).

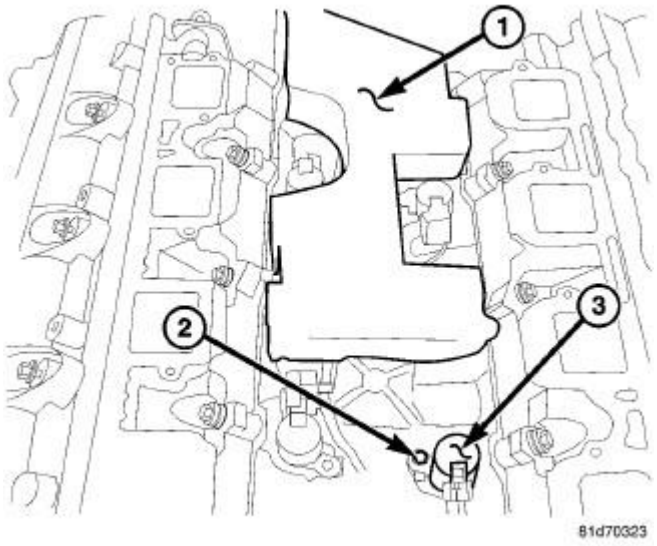


Fig. 284: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the foam insulator pad (1).
6. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

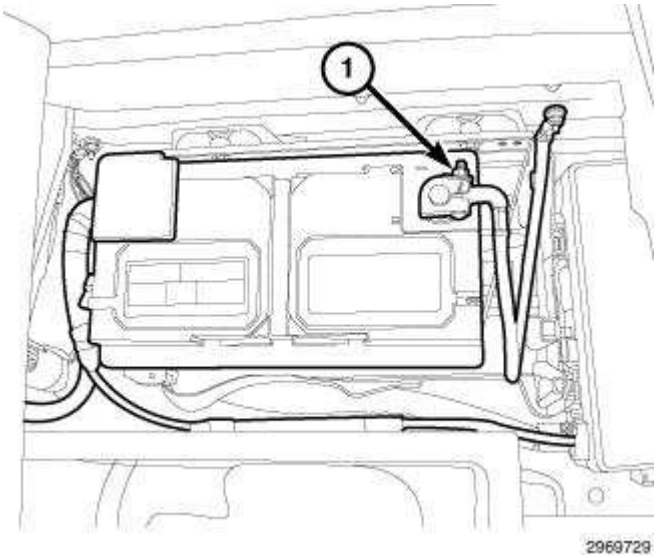


Fig. 285: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

7. Connect the negative battery cable (1).

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

AUTOMATIC TRANSMISSION

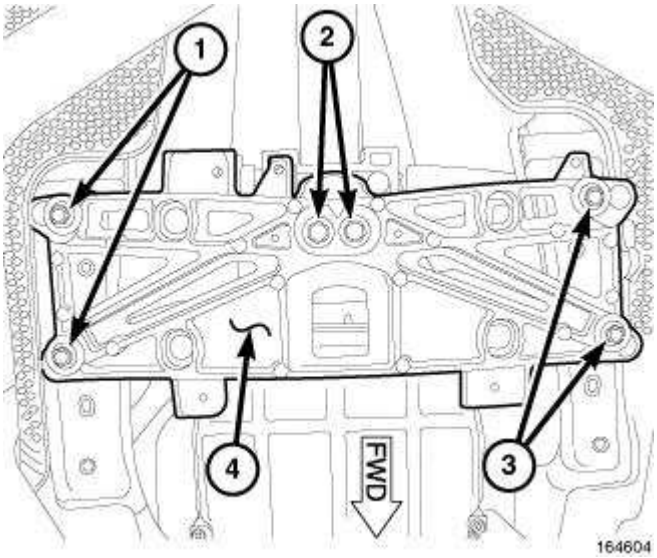


Fig. 286: Rear Cross Member & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator bolts (2).
4. Remove the rear cross member retaining bolts (1, 3) and remove the cross member (4).

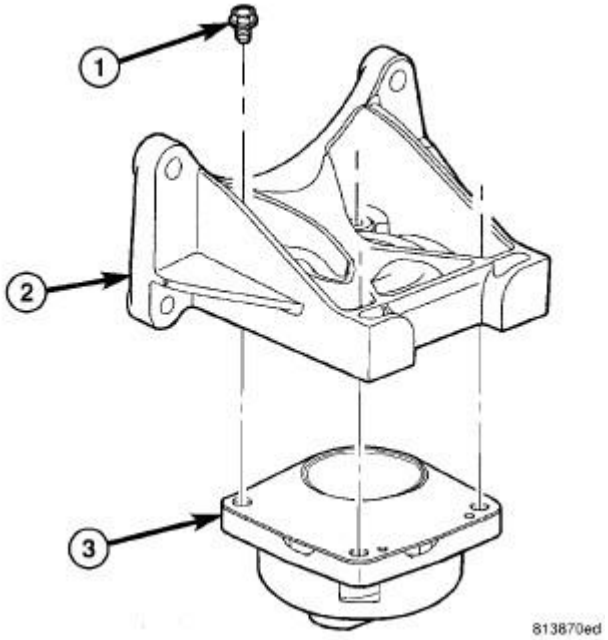


Fig. 287: Rear Transmission Mount Isolator
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear transmission mount isolator (3) retaining bolts (1) and remove the isolator.

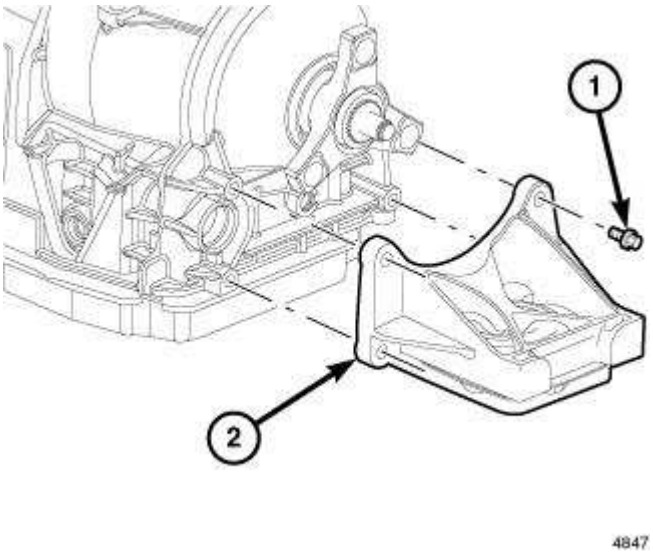
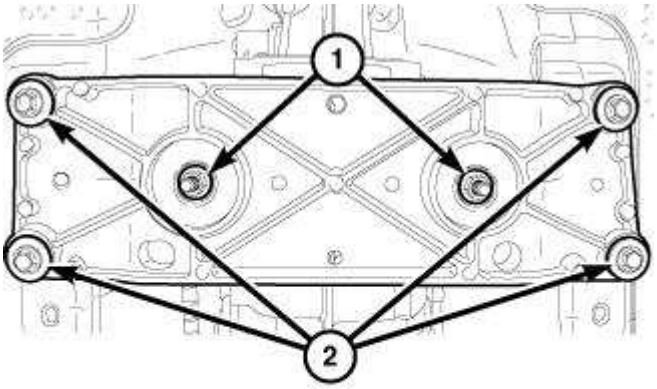


Fig. 288: Rear Transmission Mount Bracket
Courtesy of CHRYSLER GROUP, LLC

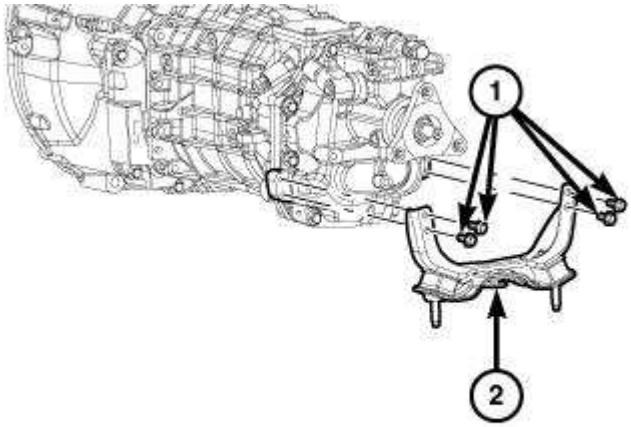
6. If required, remove the rear transmission mount bracket (2) retaining bolts (1) and remove the bracket.



2991684

Fig. 289: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator nuts (1).
4. Remove the rear cross member retaining bolts (2) and remove the cross member.



2992304

Fig. 290: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear transmission mount isolator (2) retaining bolts (1) and remove the isolator.

INSTALLATION

INSTALLATION

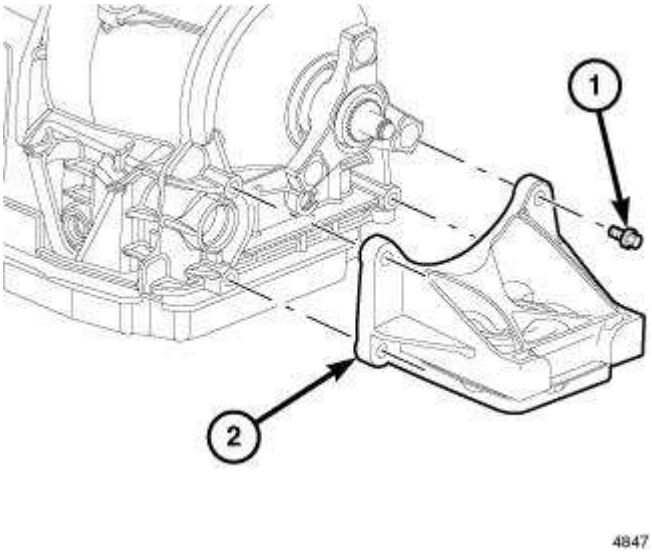


Fig. 291: Rear Transmission Mount Bracket
Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the rear transmission mount bracket (2), install the retaining bolts (1) and tighten to 68 N.m (50 ft. lbs.).

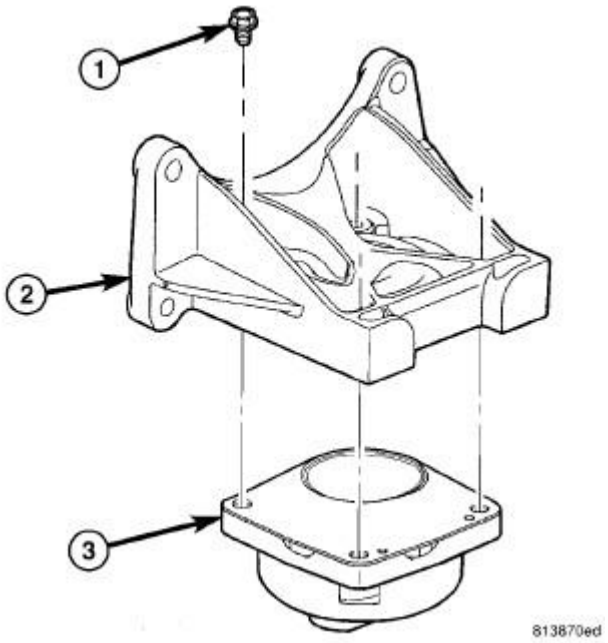


Fig. 292: Rear Transmission Mount Isolator
Courtesy of CHRYSLER GROUP, LLC

2. Position the rear transmission mount isolator (3) to the rear transmission mount bracket (2), install the retaining bolts (1) and tighten to 33 N.m (24 ft. lbs.).

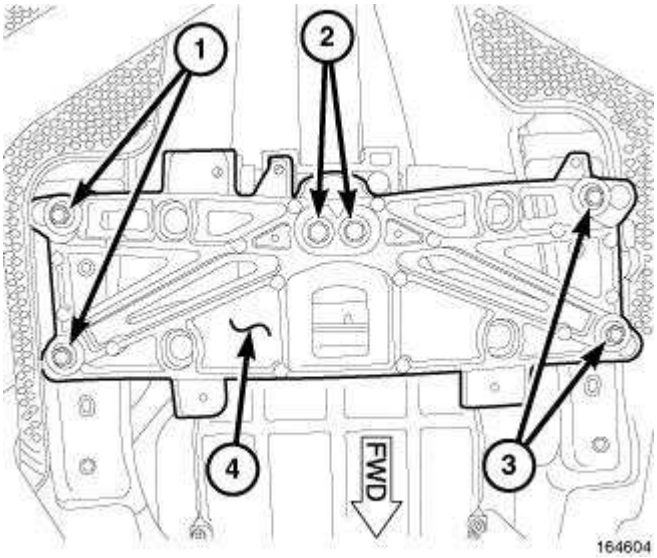


Fig. 293: Rear Cross Member & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Position the transmission crossmember (4), install the retaining bolts (1, 3) finger tight.
4. Install the rear transmission mount isolator retaining bolts (2) finger tight.
5. Tighten the transmission crossmember retaining bolts (1, 3) to 68 N.m (50 ft. lbs.).
6. Lower the transmission and remove the jack.
7. Tighten the rear transmission mount isolator retaining bolts (2) to 47 N.m (35 ft. lbs.).

MANUAL TRANSMISSION

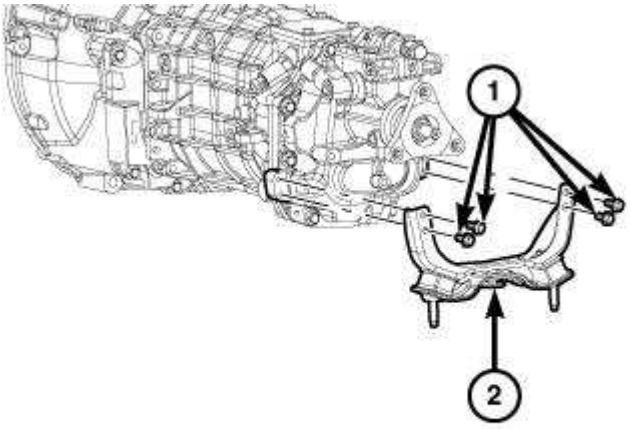


Fig. 294: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear transmission mount isolator (2), install the retaining bolts (1) and tighten to 68

N.m (50 ft. lbs.).

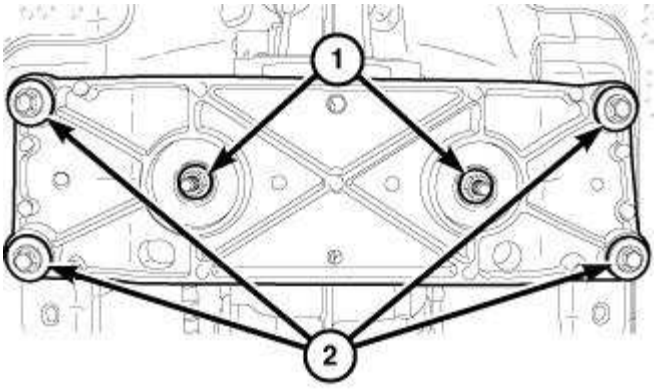


Fig. 295: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the rear cross member, install the retaining bolts (2) finger tight.
3. Install the rear transmission mount isolator nuts (1) finger tight.
4. Tighten the transmission crossmember retaining bolts (2) to 68 N.m (50 ft. lbs.).
5. Lower the transmission and remove the jack.
6. Tighten the rear transmission mount isolator retaining nuts (1) to 47 N.m (35 ft. lbs.).

INSULATOR, ENGINE MOUNT, FRONT

REMOVAL

REMOVAL

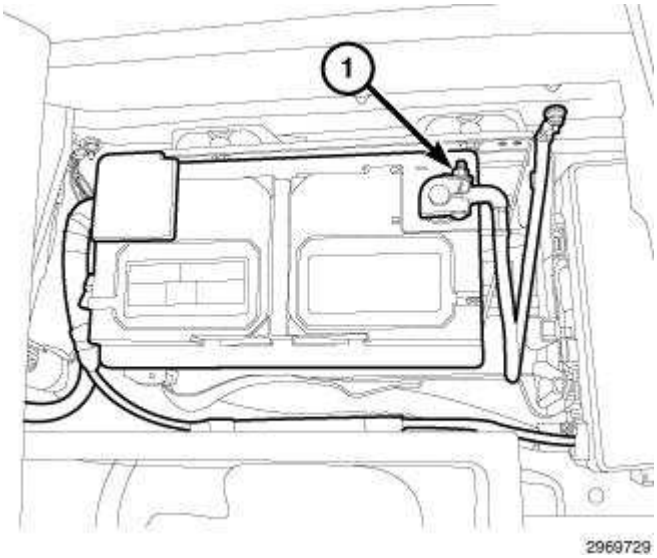


Fig. 296: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).
2. Remove the engine oil dipstick tube retaining nut at the right exhaust manifold.
3. Raise and support the vehicle.

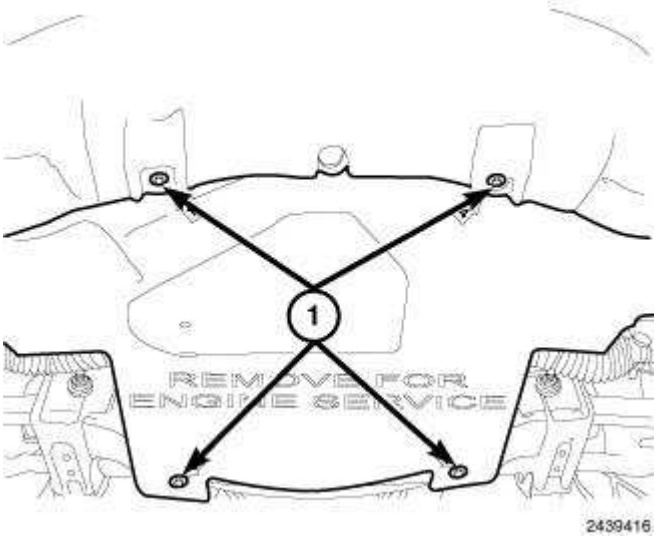


Fig. 297: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove the belly pan retainers (1) and remove the belly pan.

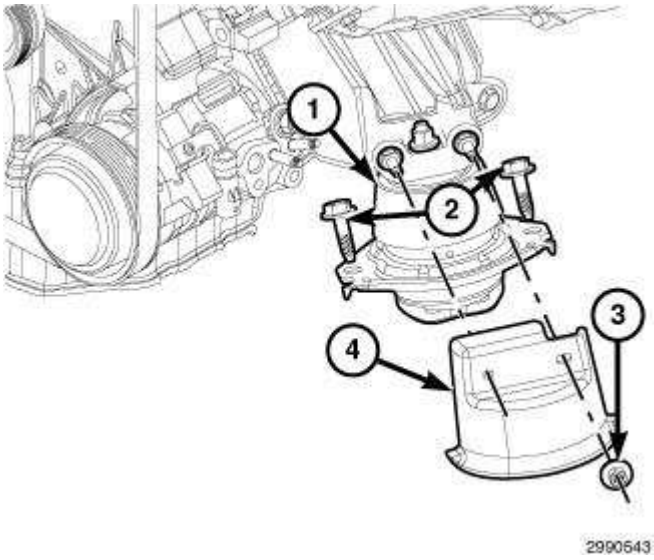


Fig. 298: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

5. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields.
6. Remove both left/right engine mount lower retaining bolts (2).
7. Lower the vehicle.

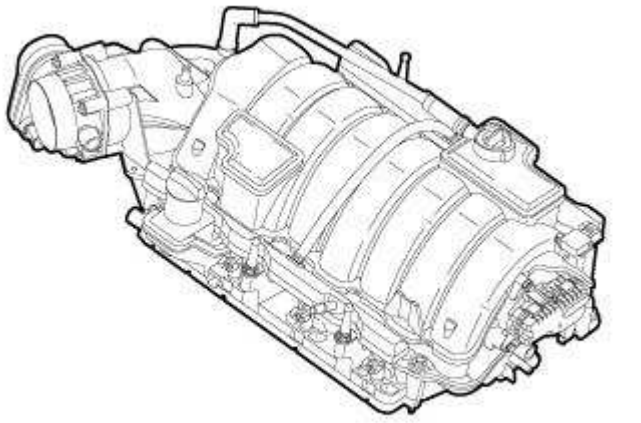


Fig. 299: Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

8. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

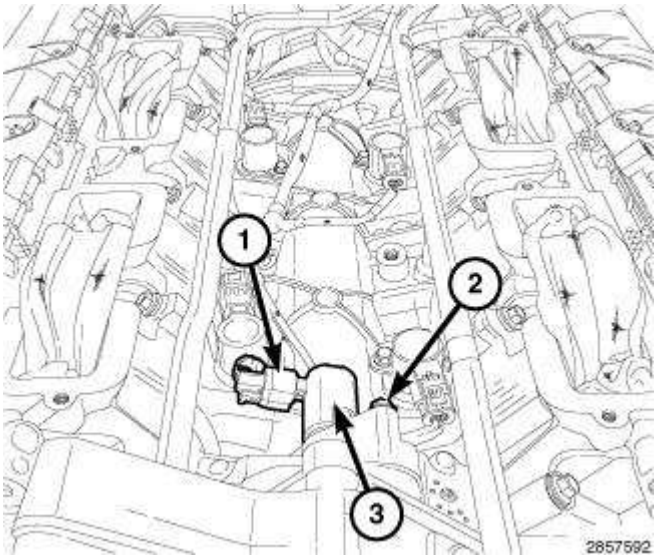


Fig. 300: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove the Oil Control Valve (OCV). Refer to **CONTROL VALVE, OIL INTAKE, REMOVAL**.

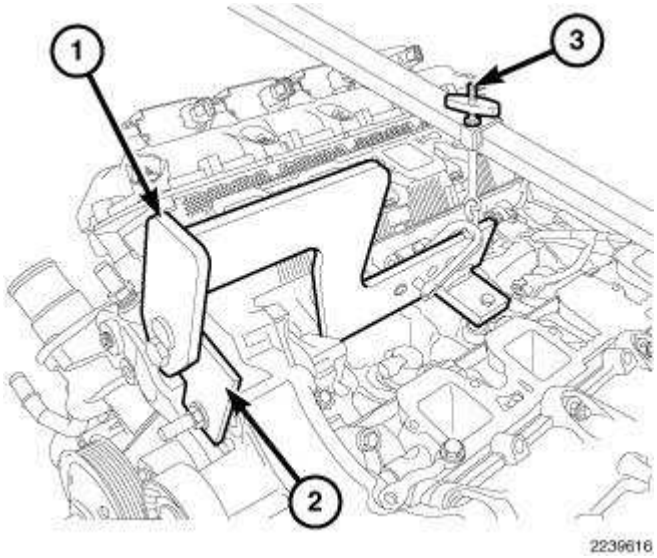


Fig. 301: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install the engine lift fixture.

10. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
11. Raise the engine to provide clearance to remove the engine mounts.
12. Raise and support the vehicle.

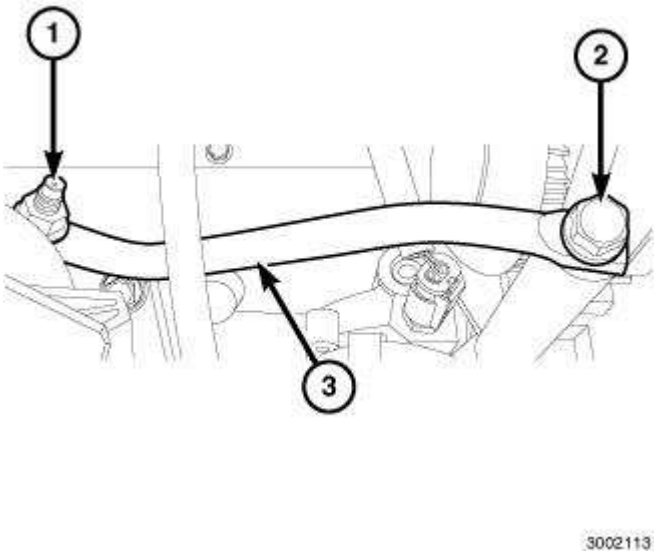


Fig. 302: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

13. Remove the generator support bracket to engine mount retaining nut (1).
14. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).

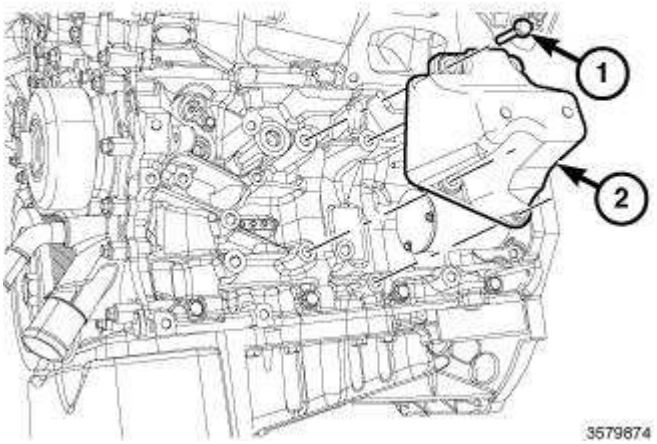


Fig. 303: Engine Mounting Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar. Mounting brackets shown in illustration without the engine mounts.

15. Remove engine mount to engine block mounting bracket retaining bolts (1) and remove the mounting brackets (2).

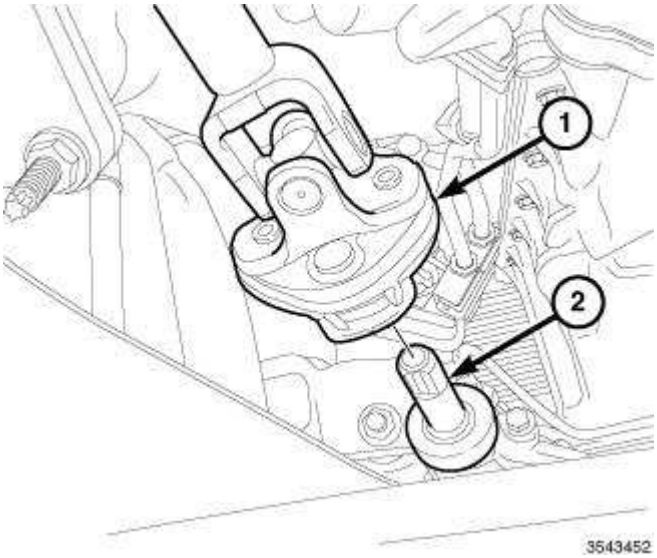


Fig. 304: Intermediate Steering Coupler & Rack And Pinion
Courtesy of CHRYSLER GROUP, LLC

16. For removing the left side engine mount. Disconnect the intermediate steering coupler (1) from the rack and pinion (2).

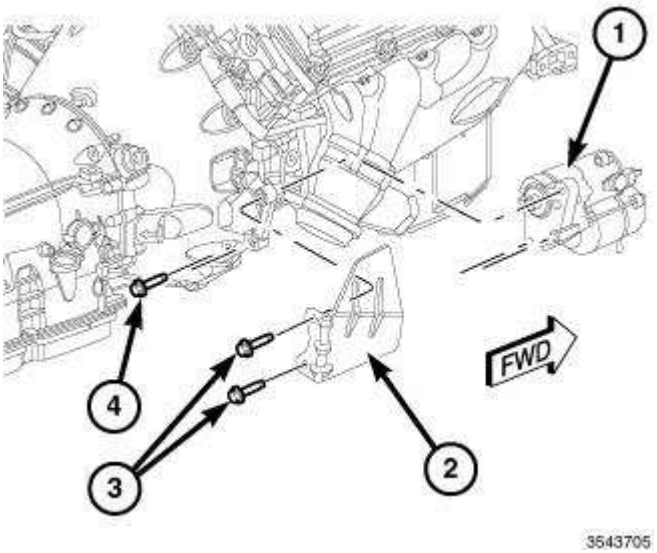


Fig. 305: Starter & Right Side Engine Mount
Courtesy of CHRYSLER GROUP, LLC

17. For removing the right side engine mount. Remove the starter (1).

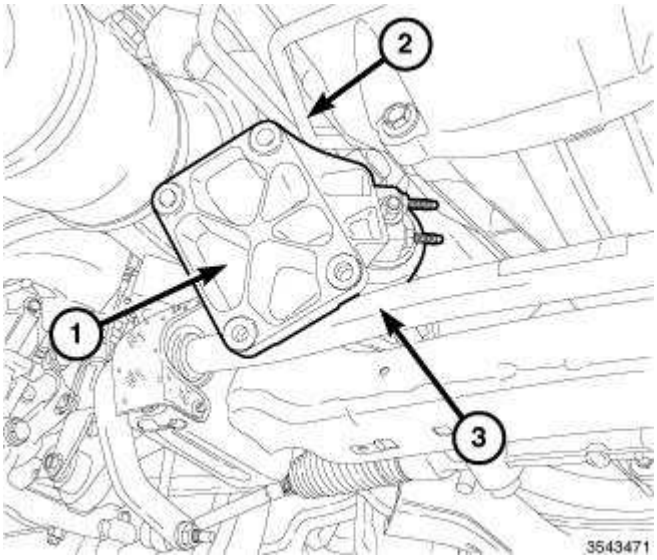


Fig. 306: Engine Mount
Courtesy of CHRYSLER GROUP, LLC

18. Remove the engine mount (1) assembly through the rear side of the engine.

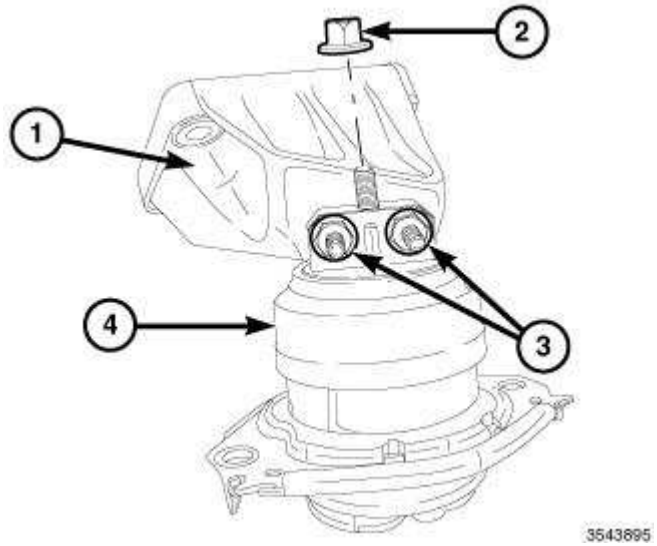


Fig. 307: Engine Mounting Bracket, Engine Mount & Fasteners
Courtesy of CHRYSLER GROUP, LLC

19. Separate the engine mount (4) from the engine mounting bracket (1).

INSTALLATION

INSTALLATION

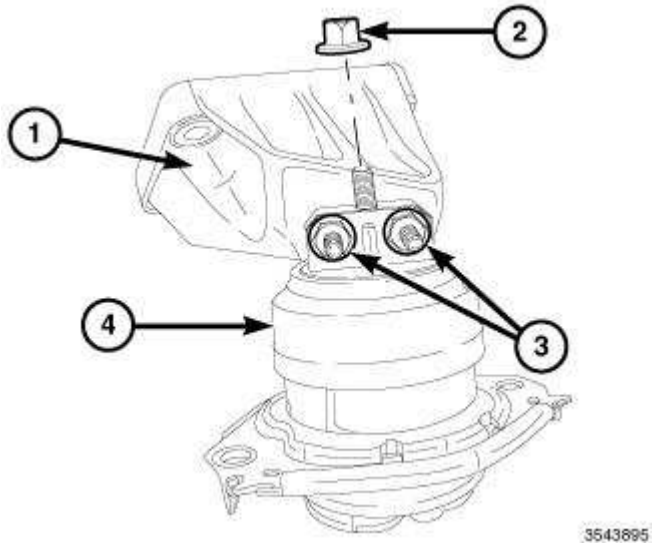


Fig. 308: Engine Mounting Bracket, Engine Mount & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Install the engine mount to the engine bracket. Tighten the nut (2) and studs (3) to 60 N.m (44 ft. lbs.)

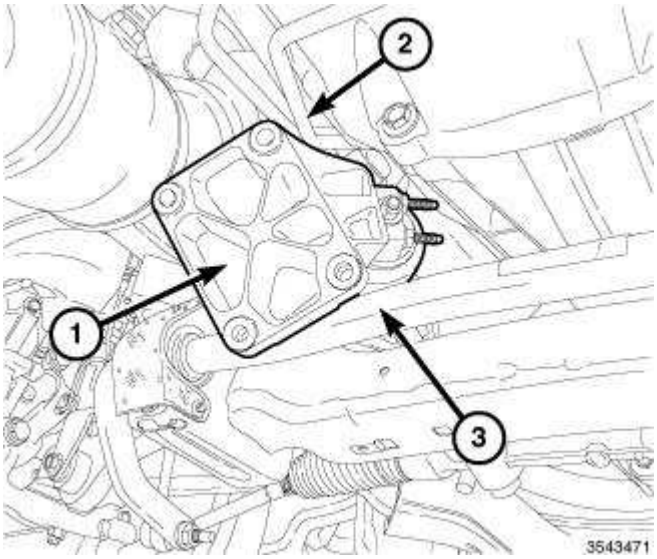


Fig. 309: Engine Mount
Courtesy of CHRYSLER GROUP, LLC

2. Position the engine mount assembly into the vehicle through the rear side of the engine.

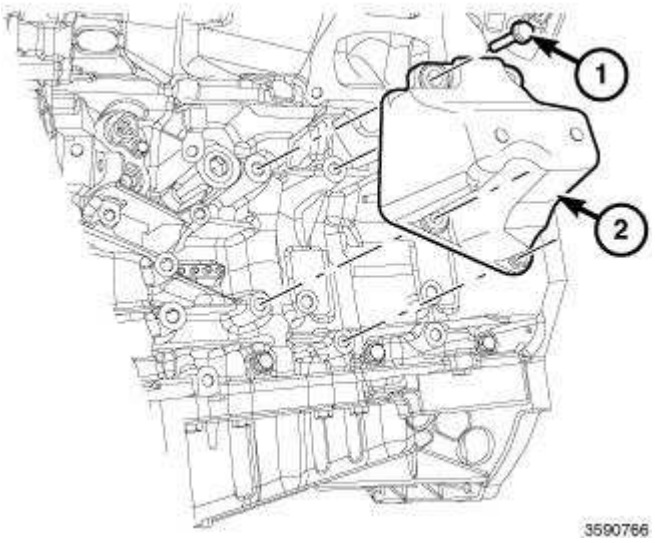


Fig. 310: Left Side Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar. Mounting brackets shown in illustration without the engine mounts.

3. Position the engine mount to engine block. Install the retaining bolts and tighten to 61 N.m (45 ft. lbs.).

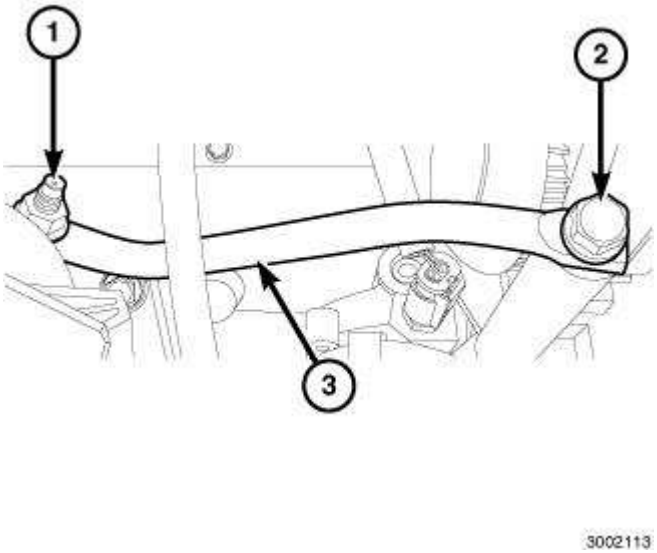


Fig. 311: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

4. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) and tighten finger tight.
5. Position the generator support bracket (3) to the generator, install the retaining bolt (2) and tighten to 65 N.m (48 ft. lbs.).

6. Tighten the generator support bracket (3) to engine mount retaining nut (1) to 28 N.m (21 ft. lbs.).
7. Lower the vehicle.

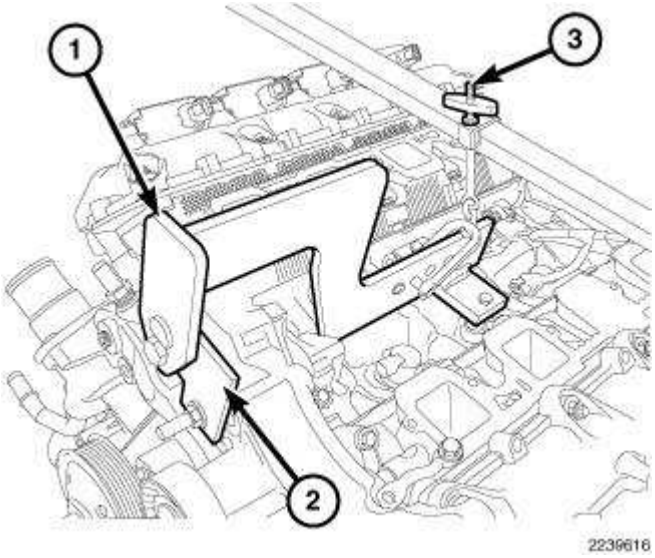


Fig. 312: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

8. Lower the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) until the engine mounts are seated in the engine cradle.
9. Remove the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).

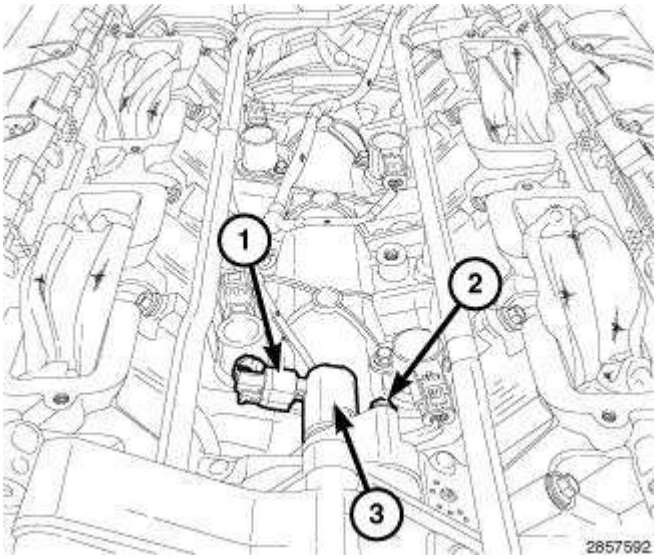


Fig. 313: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Install the Oil Control Valve (OCV). Refer to **CONTROL VALVE, OIL INTAKE, INSTALLATION**.

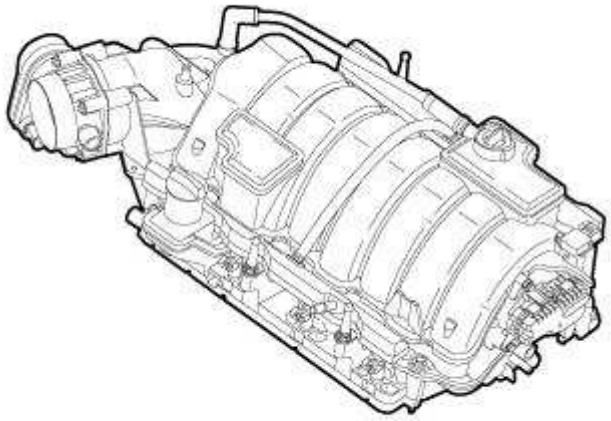


Fig. 314: Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

11. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
12. Raise and support the vehicle.

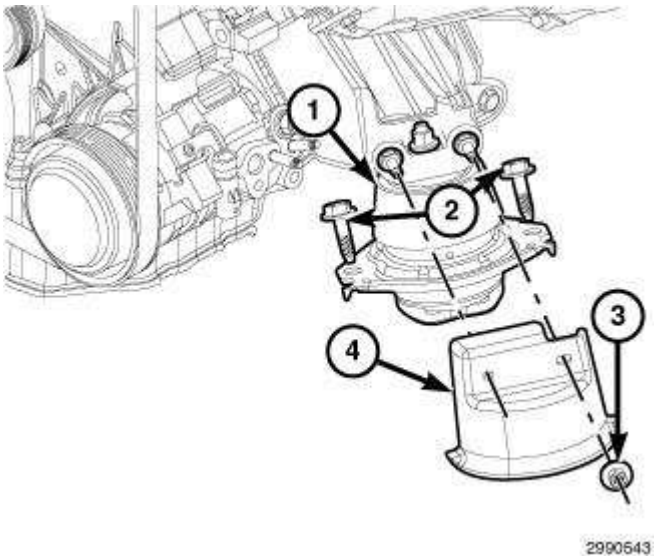


Fig. 315: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

13. Install both left/right engine mount lower retaining bolts (2) and tighten to 61 N.m (45 ft. lbs.).

14. Position both left/right engine mount heat shields (4), install the retaining nuts (3) and tighten to 27 N.m (20 ft. lbs.).

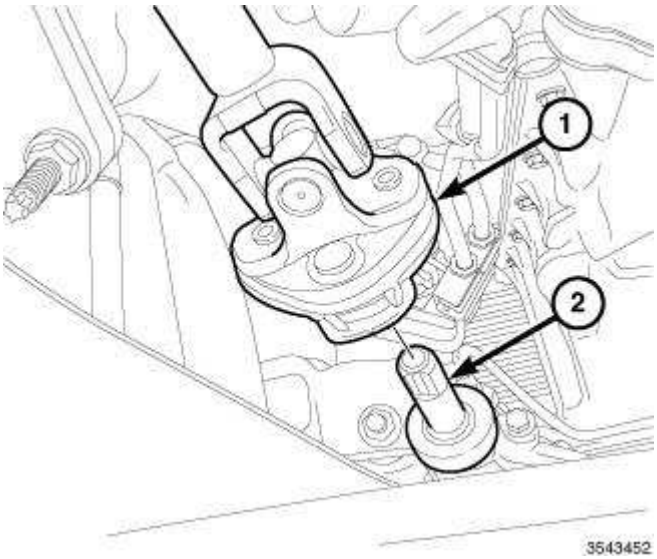


Fig. 316: Intermediate Steering Coupler & Rack And Pinion
Courtesy of CHRYSLER GROUP, LLC

15. If disconnected. Install the intermediate steering coupler to the rack and pinion. Tighten the bolt to 45 N.m (33 ft. lbs.).

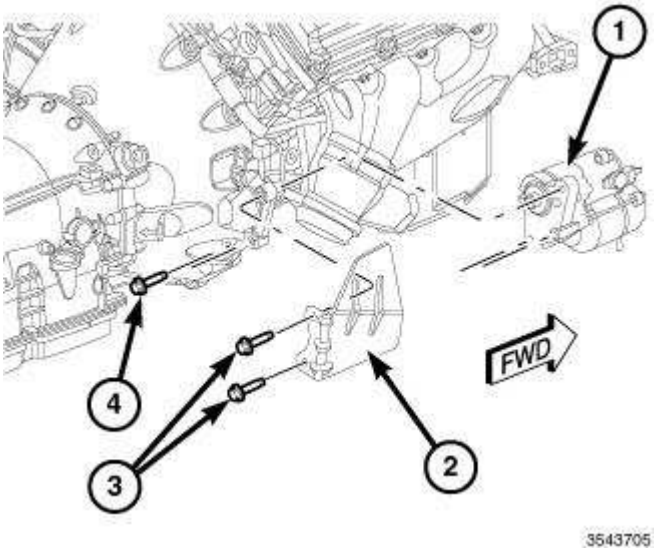


Fig. 317: Starter & Right Side Engine Mount
Courtesy of CHRYSLER GROUP, LLC

16. If removed. Install the starter. Tighten the bolts to 27 N.m (20 ft. lbs.).

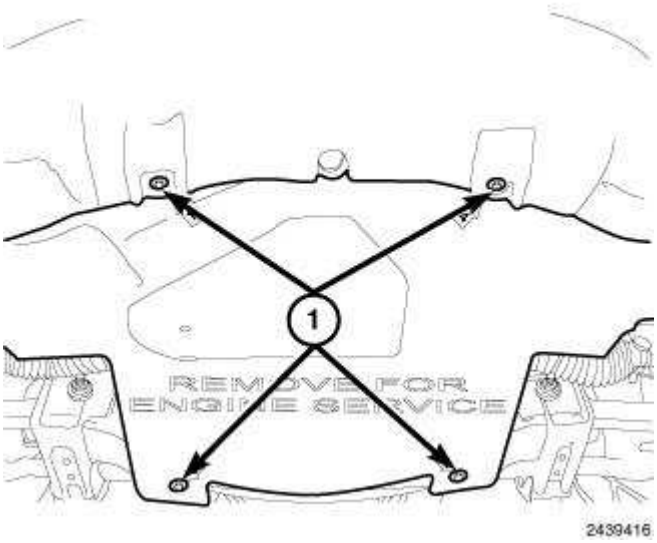


Fig. 318: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

17. Position the belly pan and install the belly pan retainers (1).
18. Lower the vehicle.

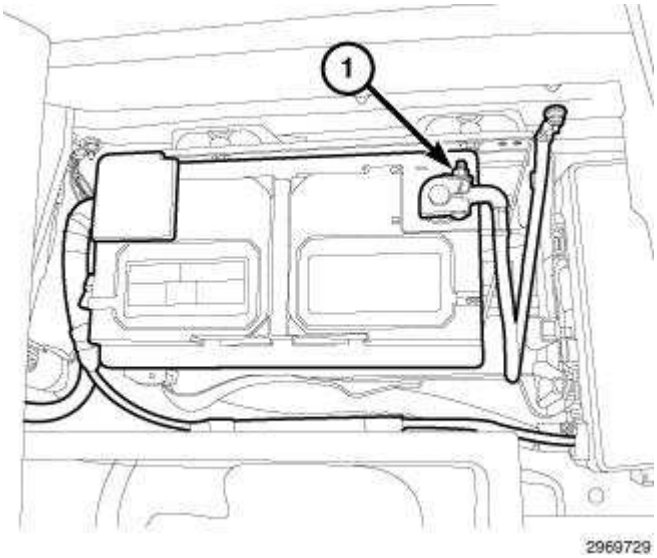


Fig. 319: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

19. Position the engine oil dipstick tube, install the retaining nut at the right exhaust manifold.
20. Connect the negative battery cable (1).

LUBRICATION

DESCRIPTION

DESCRIPTION

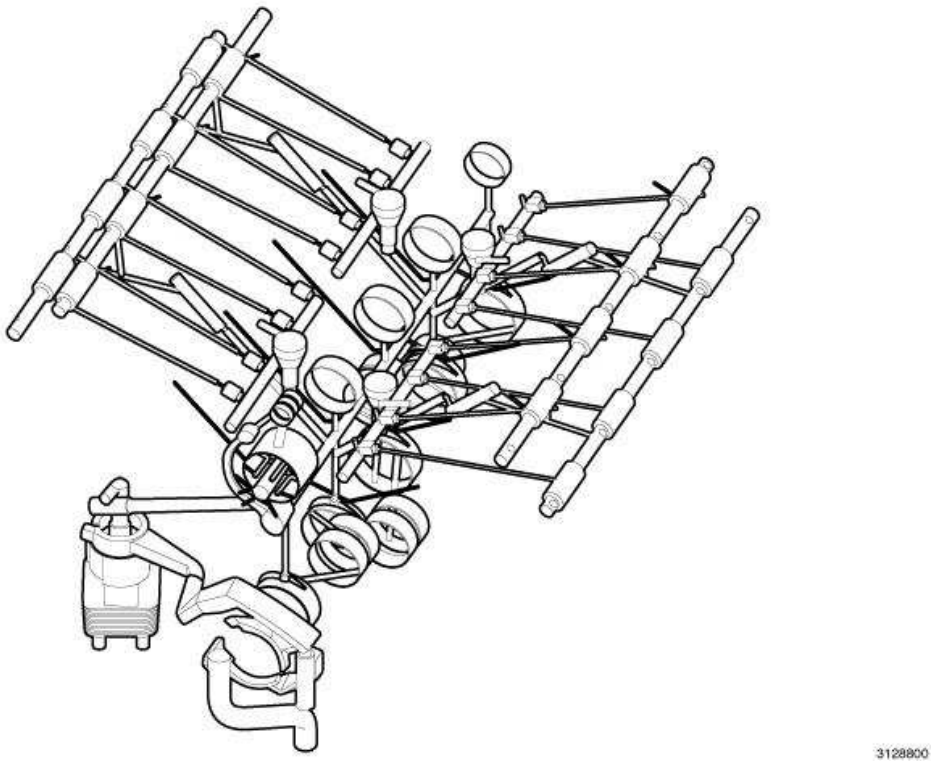


Fig. 320: 6.4L Lubrication System
Courtesy of CHRYSLER GROUP, LLC

The lubrication system is a full flow filtration pressure feed type system.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove oil pressure sending unit and install gauge assembly (special tool #C-3292A, Gauge, Pressure).
2. Run engine until thermostat opens.
3. Check oil pressure gauge:
   - Curb Idle - 25 kPa (4 psi) minimum
   - 3000 rpm - 170 - 758 kPa (25 - 110 psi)
4. If oil pressure is 0 at idle, shut off engine. Check for a clogged oil pick-up screen or a pressure relief valve stuck open.

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell thus temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair per service information procedures.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

   If the oil leak source is not positively identified at this time, proceed with the **AIR LEAK DETECTION TEST METHOD** below.

AIR LEAK DETECTION TEST METHOD

1. Remove the PCV valve, cap or plug the PCV valve port at the intake manifold.
2. Attach an air hose with a pressure gauge and regulator onto the dipstick tube.

   CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
4. If the leakage occurs at the rear oil seal area, proceed with the **INSPECTION FOR REAR SEAL AREA LEAKS** below.
5. If no leaks are detected, turn off the air supply and remove the air hose from the dipstick tube.
6. Remove the PCV port plug or cap at the intake manifold and install the PCV valve.
7. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light. If the oil leak is found and identified, repair per service information procedures.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect the battery.
2. Raise and support the vehicle.
3. Remove torque converter or clutch housing inspection cover.

4. Using a black light and inspect the rear of the engine block for evidence of oil.

   Circular spray pattern on the rear of the engine block generally indicates:

   - Rear crankshaft oil seal
   - Damaged crankshaft

   Oil running straight down the back of the engine block generally indicates:

   - Porous engine block
   - Camshaft core hole plug
   - Oil gallery pipe plug
   - Oil pan gasket
5. If no leaks are detected, pressurize the crankcase as outlined in the **AIR LEAK DETECTION TEST METHOD**.

   CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

6. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and crankshaft oil seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is machined specifically to complement the function of the rear oil seal.

7. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

CONTROL VALVE, OIL INTAKE

DESCRIPTION

DESCRIPTION

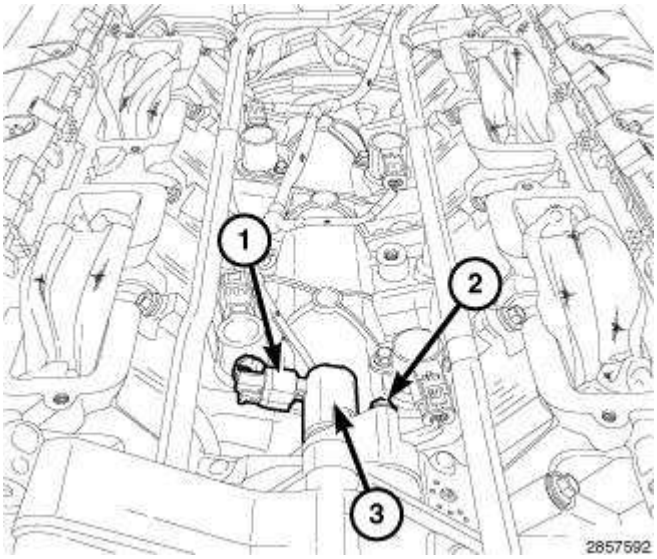


Fig. 321: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

The 6.4L engine is equipped with Variable Valve Timing (VVT). This system uses an Oil Control Valve (OCV) to direct oil pressure to the camshaft phaser assembly. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy and reduce emissions. The OCV (3) is located under the intake manifold.

OPERATION

OPERATION

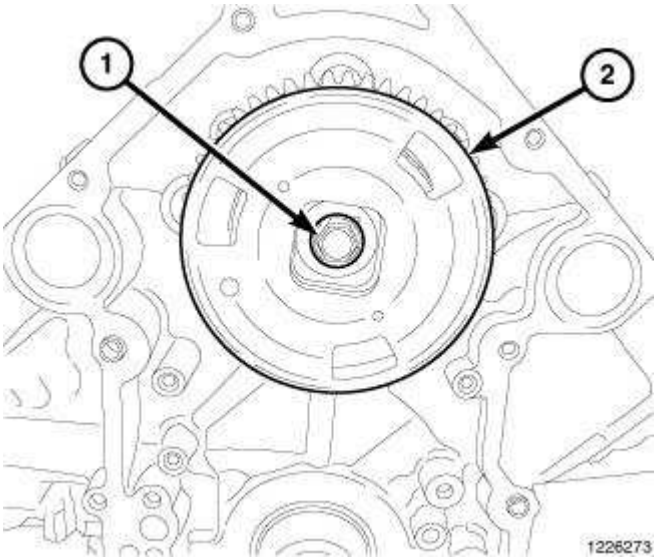


Fig. 322: Camshaft Phaser & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Variable Valve Timing (VVT) assembly is actuated with engine oil pressure. The oil flow to the VVT assemblies are controlled by an Oil Control Valve (OCV). The OCV consist of a Pulse Width

Modulated (PWM) solenoid and a spool valve. The PCM actuates the OCV to control oil flow through the spool valve into the VVT assemblies. The VVT assembly consists of a rotor, stator, and sprocket (Phaser) (2). The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VVT assembly rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable valve timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

REMOVAL

REMOVAL

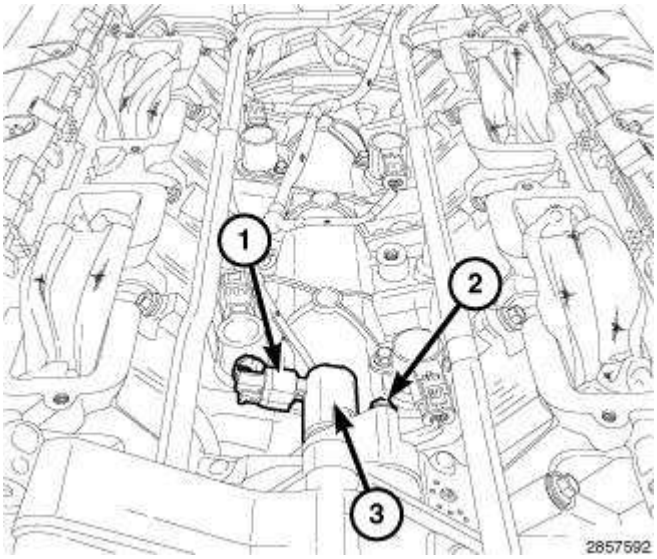


Fig. 323: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Oil Control Valve (OCV) (3) is located under the intake manifold.

1. Remove intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
2. Disconnect OCV electrical connector (1).
3. Remove OCV retaining bolt (2).

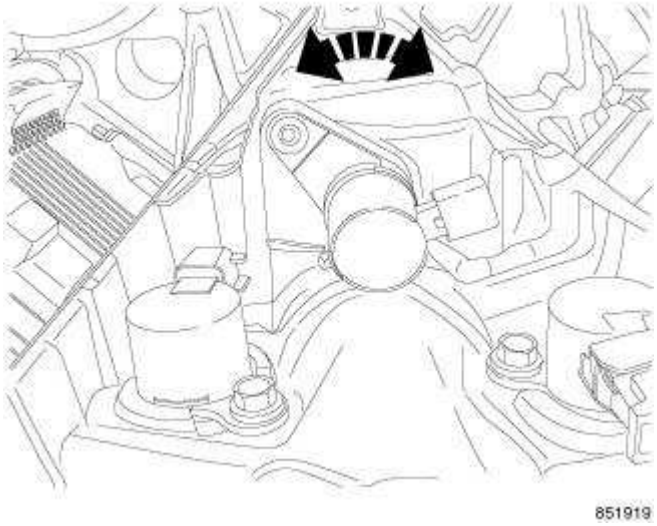


Fig. 324: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove the OCV, the engine must be at room temperature.

4. Rotate the OCV to break the seal and remove.

INSTALLATION

INSTALLATION

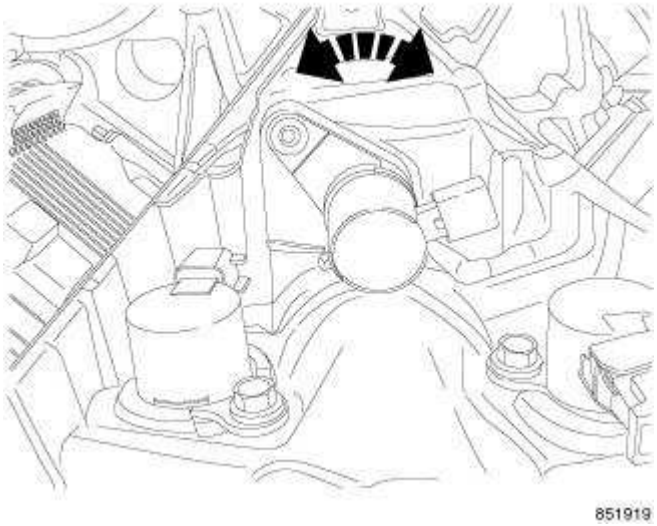


Fig. 325: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the oil control valve (OCV) rubber O-ring seal with clean engine oil.
2. Install the OCV and rotate into position.

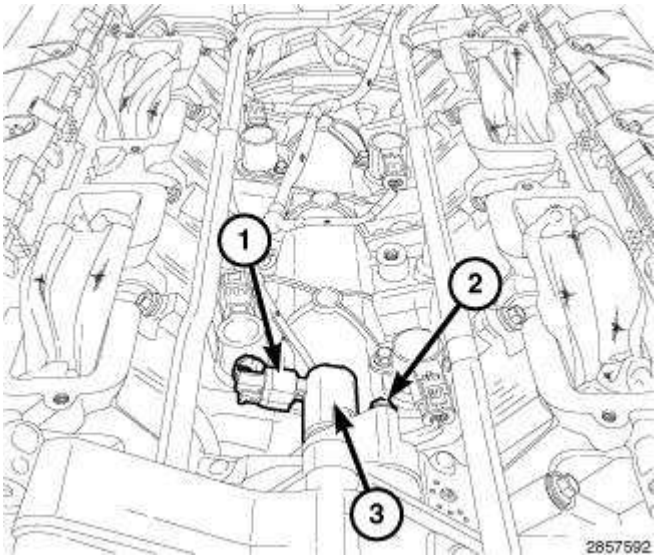


Fig. 326: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the OCV (3) retaining bolt (2) and tighten to 11 N.m (8 ft. lbs.).
4. Connect OCV electrical connector (1).
5. Install intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

COOLER, OIL

DESCRIPTION

DESCRIPTION

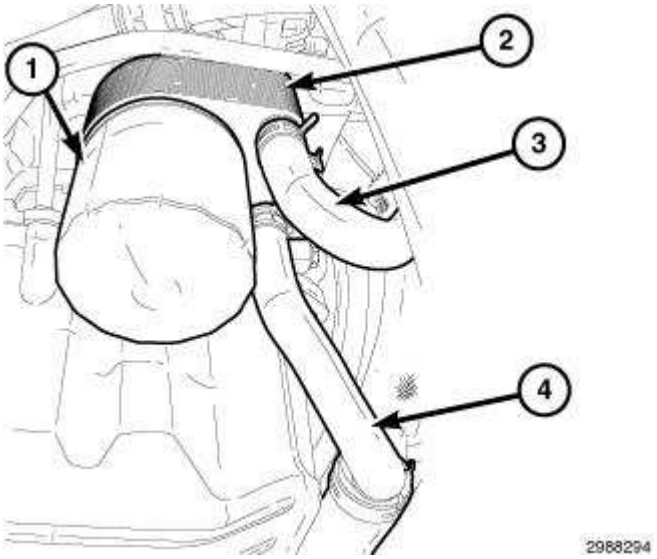


Fig. 327: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

The engine oil cooler (2) is engineered for maximum cooling efficiency with no restriction in oil flow. The oil cooler is a stack plate design coolant-to-oil heat exchanger.

The oil cooler (2) is mounted between the oil filter (1) and the engine block. The oil cooler uses the radiator coolant system; coolant is circulated through two coolant hoses to maintain a consistent engine oil temperature.

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

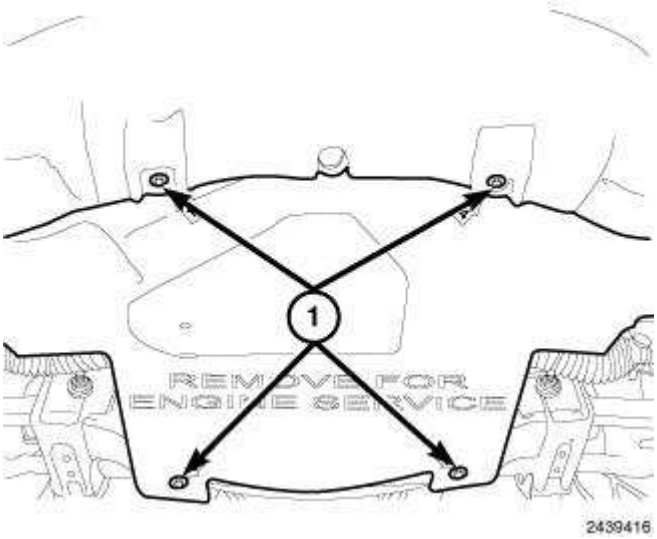


Fig. 328: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the belly pan retainers (1) and remove the belly pan.
3. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

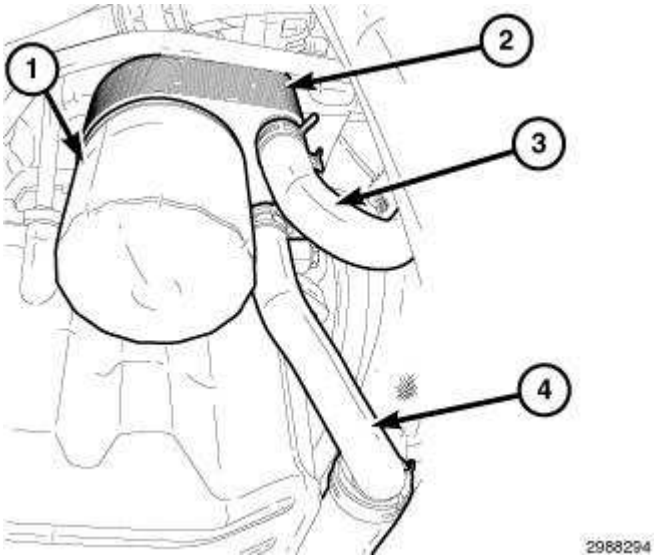


Fig. 329: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil filter (1) from the oil cooler (2).

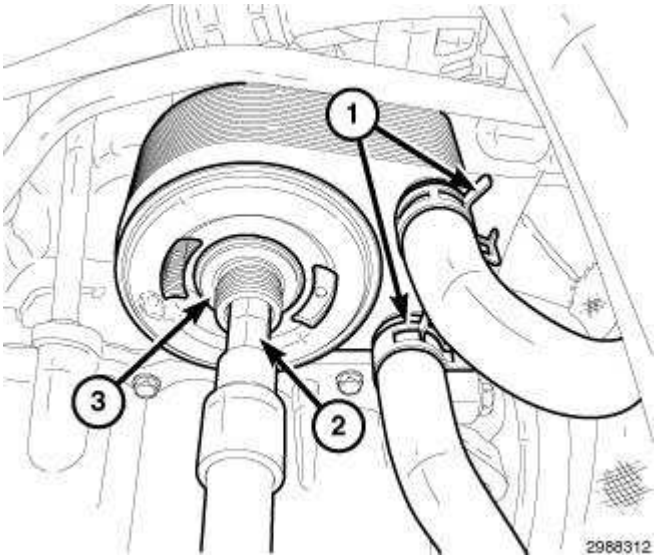


Fig. 330: Clamps, Allen Wrench Socket & Oil Cooler Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the clamps (1) from the cooling hoses at the oil cooler and remove hoses.
6. Using a 12 mm Allen Wrench socket (2), remove the oil cooler retaining bolt (3).

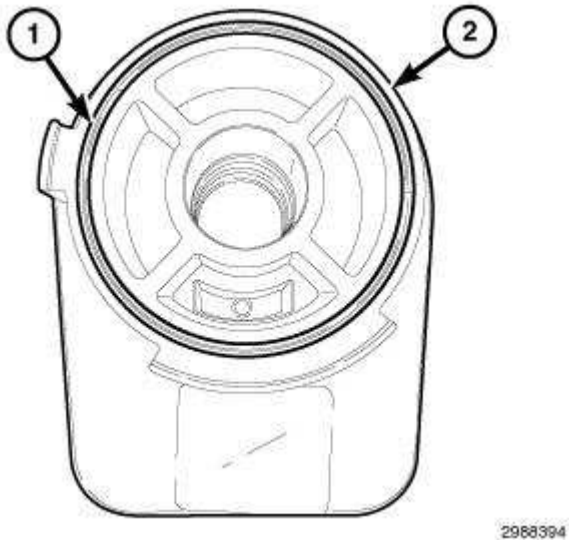


Fig. 331: O-Ring Seal & Oil Cooler
Courtesy of CHRYSLER GROUP, LLC

NOTE: Whenever the oil cooler is serviced, the rubber O-ring seal must be replaced.

7. Remove and discard the oil cooler (2) rubber O-ring seal (1).

INSTALLATION

INSTALLATION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler must be replaced or damage to the new engine and/or components could result.

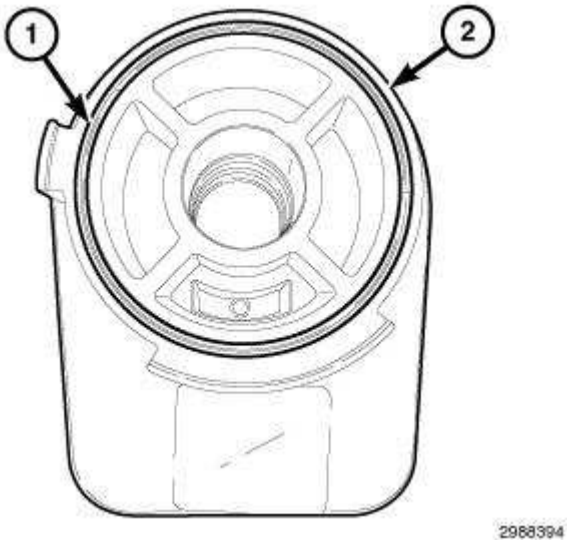


Fig. 332: O-Ring Seal & Oil Cooler

Courtesy of CHRYSLER GROUP, LLC

NOTE: Whenever the oil cooler is serviced, the rubber O-ring seal must be replaced.

1. Clean the sealing surface of the oil cooler (2) and install a new rubber O-ring seal (1).
2. Lightly lubricate the oil cooler rubber O-ring seal (1) with clean engine oil.

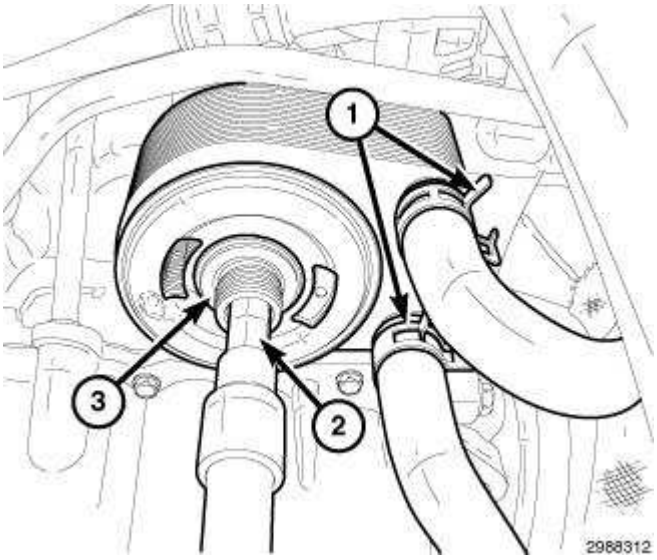


Fig. 333: Clamps, Allen Wrench Socket & Oil Cooler Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Using a 12 mm Allen Wrench socket (2), install the oil cooler retaining bolt (3) and tighten to 28 N.m (21 ft. lbs.).
4. Position the cooling hoses and install the clamps (1).

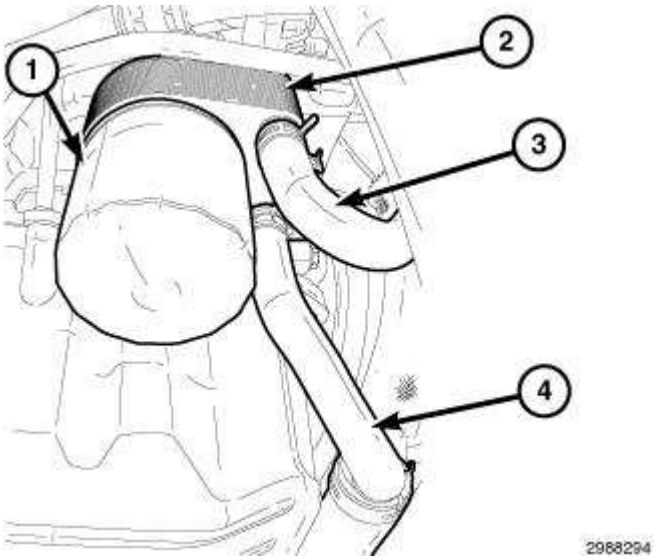


Fig. 334: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

5. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: Do not over tighten the oil filter.

6. Thread the oil filter (1) onto the oil cooler (2) oil filter boss.
7. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180°.

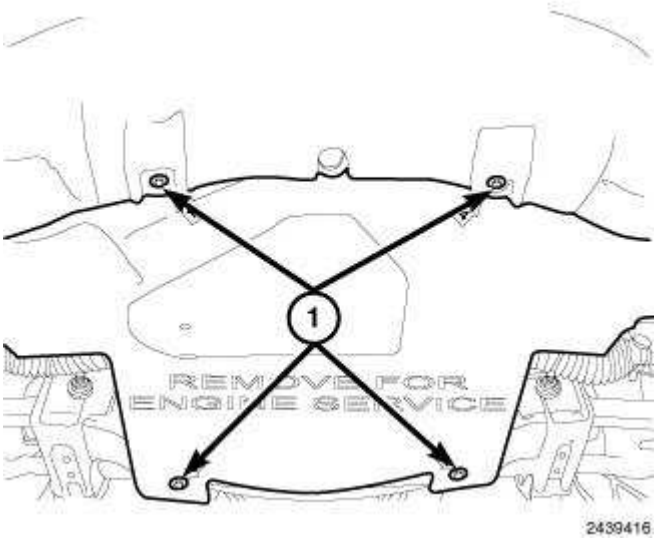


Fig. 335: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Position the belly pan to the under side of the vehicle and install the retainers (1).
9. Lower the vehicle.
10. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
11. Start the engine and check for leaks.
12. Turn the engine off and check the oil level.

FILTER, ENGINE OIL

REMOVAL

REMOVAL

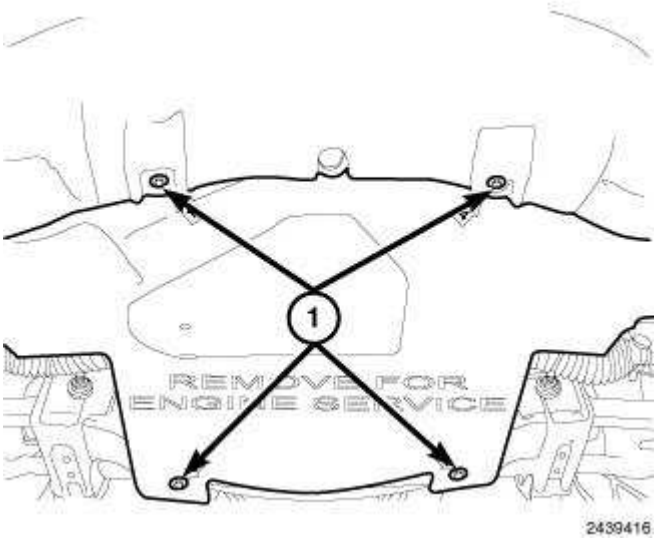


Fig. 336: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

All engines are equipped with a high quality full-flow, disposable type oil filter.

1. Raise and support the vehicle.
2. Remove the belly pan retainers (1) and remove the belly pan.

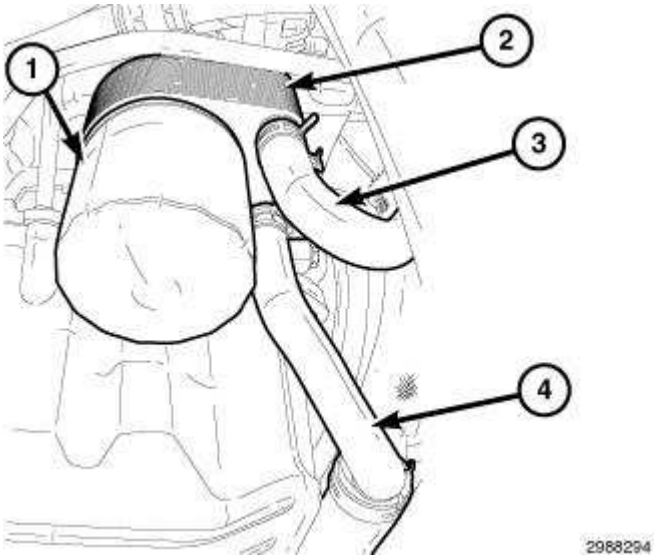


Fig. 337: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

3. Position a drain pan under the oil filter.
4. Using a suitable oil filter wrench, rotate the oil filter (1) counterclockwise to remove it from the oil cooler (2).
5. When the oil filter separates from the oil cooler, keep the gasket end upward to minimize oil spill and remove the oil filter from vehicle.

NOTE: Make sure the oil filter gasket was removed with the oil filter.

6. Using a wiping cloth, clean the oil cooler gasket sealing surface of oil and grime.

INSTALLATION

INSTALLATION

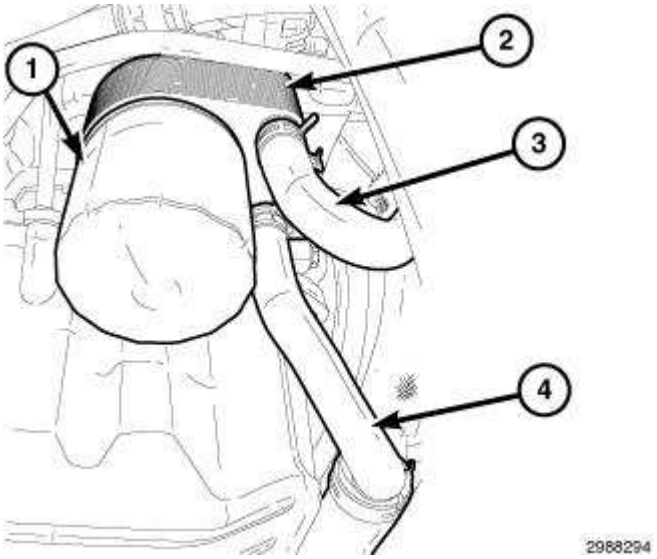


Fig. 338: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

1. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: Do not over tighten the oil filter.

2. Thread the oil filter (1) onto the oil cooler (2) oil filter boss.
3. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180°.

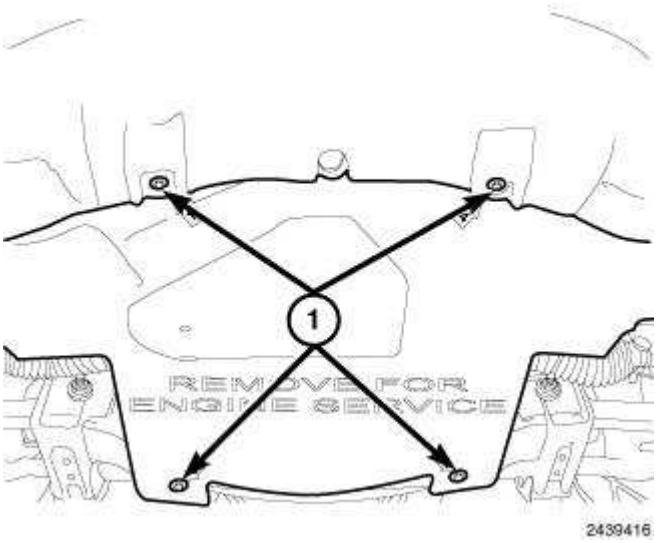


Fig. 339: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Position the belly pan to the under side of the vehicle and install the retainers (1).
5. Lower the vehicle.
6. Fill the crankcase with the specified type and amount of engine oil as described in this information.
7. Install the oil fill cap.
8. Start the engine and check for leaks.
9. Turn the engine off and check the oil level.

JET, PISTON OIL COOLER

DESCRIPTION

DESCRIPTION

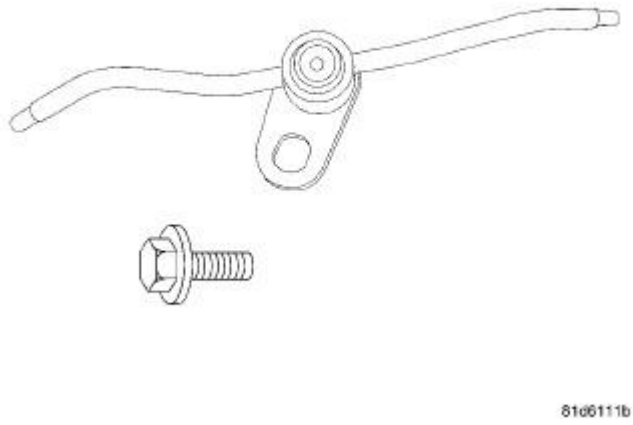


Fig. 340: Engine Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

Four dual-nozzle oil jets are bolted to the cylinder block underneath the main oil gallery. The jets connect with an oil-tight fit to the main gallery through lubrication passages. Each oil jet helps cool the two opposing pistons.

REMOVAL

REMOVAL

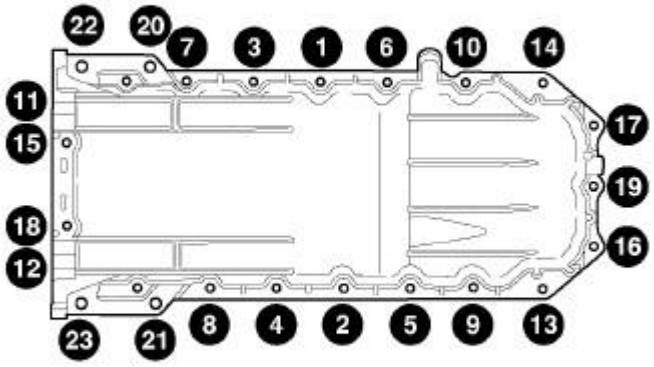


Fig. 341: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Remove the oil pan and oil pump pickup tube. Refer to **PAN, OIL, REMOVAL**.

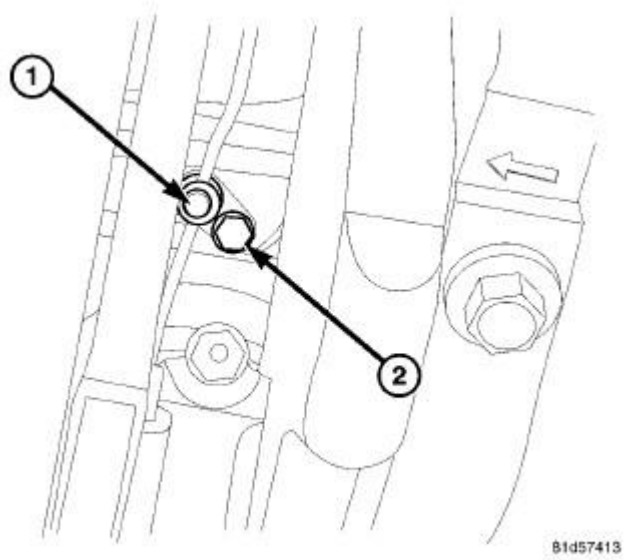


Fig. 342: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rotate the engine crankshaft to access the piston oil cooler jet retaining bolts.

2. Remove the piston oil cooler jet retaining bolt (2).
3. Remove the piston oil cooler jet (1).

INSTALLATION

INSTALLATION

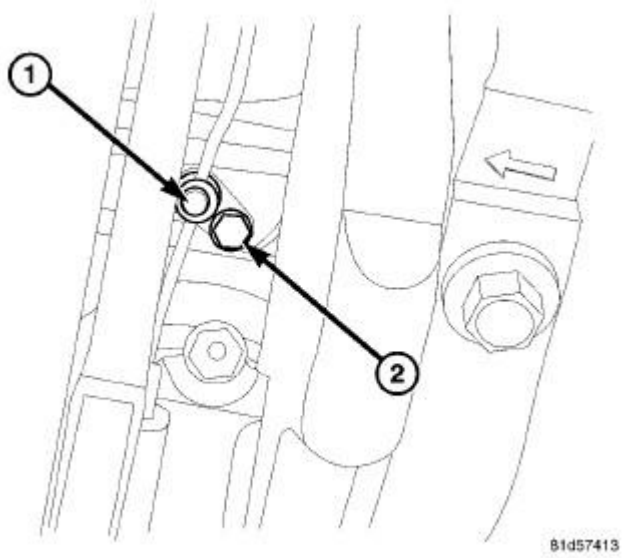


Fig. 343: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the piston oil cooler jet (1).
2. Install the piston oil cooler jet retaining bolt and tighten to 13 N.m (10 ft. lbs.) (2).

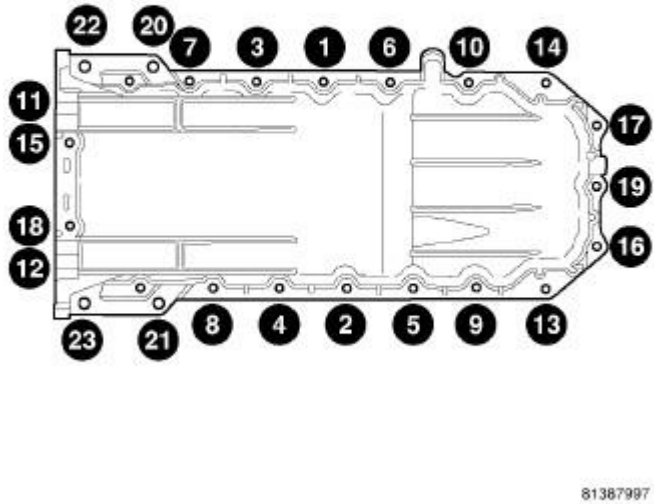


Fig. 344: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL SERVICE

CRANKCASE OIL LEVEL INSPECTION

On the 6.4L engine, the oil level indicator is located on the right side of the engine.

CAUTION: Do not overfill crankcase with engine oil, pressure loss or oil foaming can result.

Inspect the engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about ten minutes before checking the oil level. Checking the engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil level indicator.

1. Position the vehicle on the level surface.
2. With the engine off, allow approximately five minutes for the oil to settle to the bottom of the crankcase and then remove the engine oil level indicator.
3. Wipe the oil level indicator clean.
4. Install the oil level indicator and verify it is seated in the tube.
5. Remove the oil level indicator, with the handle held above the tip, observe the oil level reading.
6. Add oil only if the level is below the ADD mark on the oil level indicator.

ENGINE OIL CHANGE

Change the engine oil at the mileage and time intervals described in the Maintenance Schedules. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

Run the engine until it reaches normal operating temperature.

1. Remove the oil fill cap.
2. Raise and support the vehicle.
3. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** .
4. Place a suitable drain pan under the oil pan drain.
5. Remove the drain plug from the oil pan and allow the oil to drain.
6. Inspect the drain plug threads for stretching or other damage and replace if necessary.
7. Install the drain plug and tighten to 27 N.m (20 ft. lbs.).
8. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .

9. Lower the vehicle and fill the crankcase with the specified type and amount of engine oil described in this information.
10. Install the oil fill cap.
11. Start the engine and check for leaks.
12. Stop the engine and check the oil level.

NOTE: Care should be exercised when disposing of used engine oil.

PAN, OIL

REMOVAL

REMOVAL

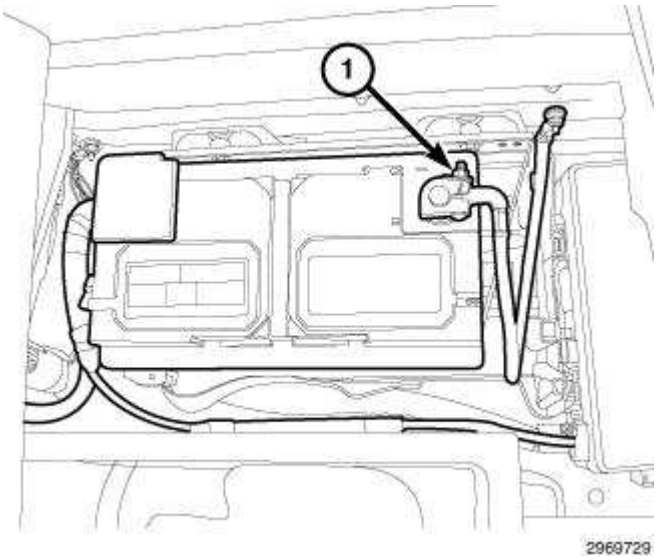


Fig. 345: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Remove the engine oil dipstick and tube from the oil pan.
4. Raise and support the vehicle.

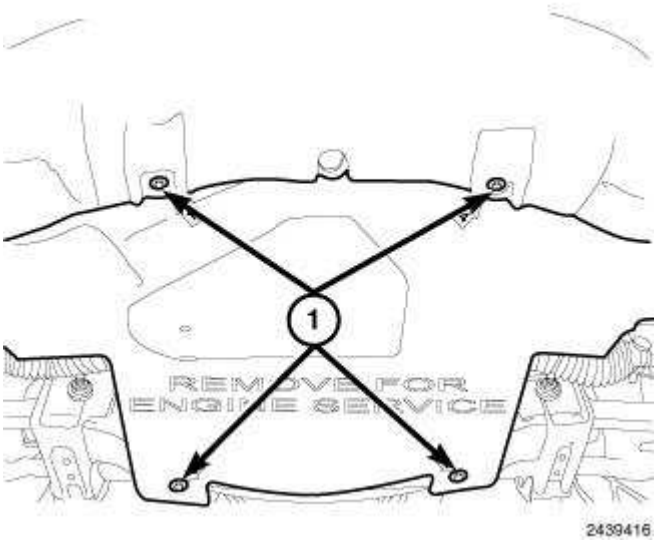


Fig. 346: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan retainers (1) and remove the belly pan.
6. Drain the engine oil and remove the oil filter.

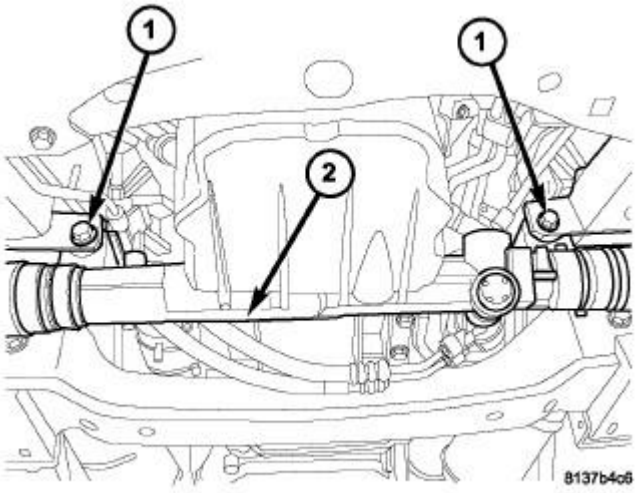


Fig. 347: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not remove P/S hoses, tie rod ends or disconnect the steering column coupler.

7. Remove the steering gear mounting bolts (1) and lower the steering gear (2) to provide clearance to remove the oil pan.

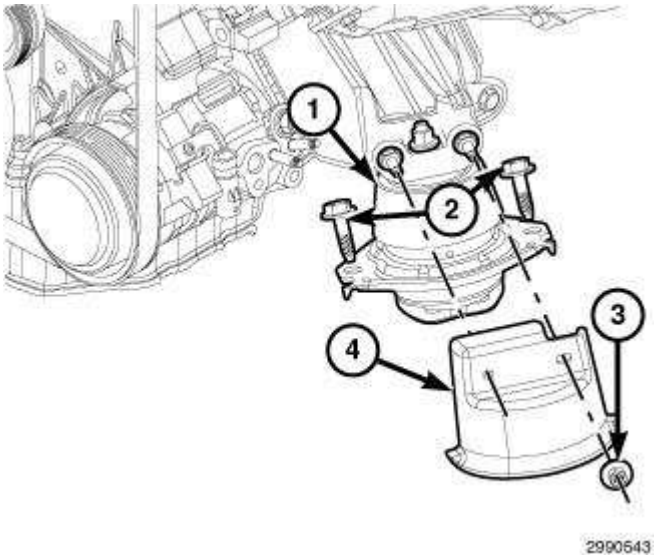


Fig. 348: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

8. Remove both left/right front engine mount heat shield retaining nuts (3) and remove the heat shields (4).
9. Remove both left/right front engine mount lower retaining bolts (2).
10. Lower the vehicle.

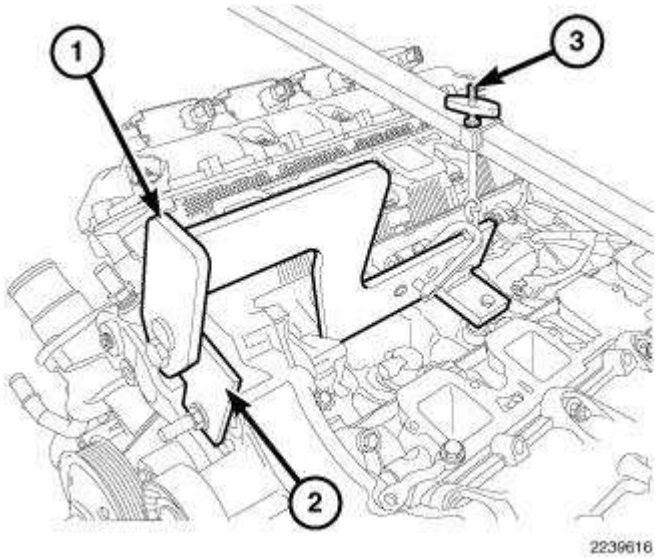


Fig. 349: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install engine lift fixture.

11. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
12. Raise the engine to provide clearance to remove the oil pan.

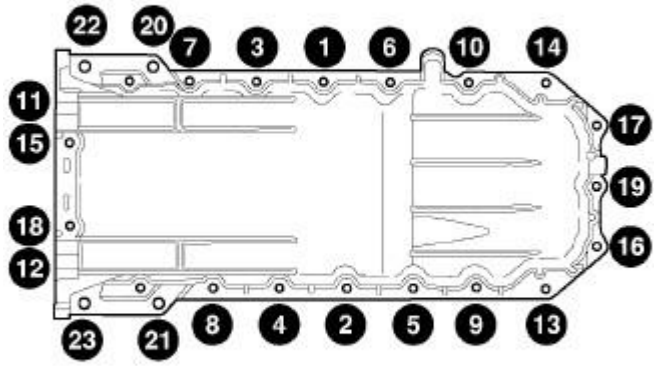


Fig. 350: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not pry on the oil pan or oil pan gasket. The oil pan gasket is integral to the engine windage tray and does not come out with the oil pan.

NOTE: The horizontal M10 retaining bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 retaining bolts (20, 21, 22, 23) and must be reinstalled in their original locations.

13. Raise and support the vehicle.
14. Remove the M10 retaining bolts (horizontal 11, 12, 15, 18 and vertical 20, 21, 22, 23) from the rear of the oil pan to the transmission.
15. Remove the M6 retaining bolts and remove the oil pan.

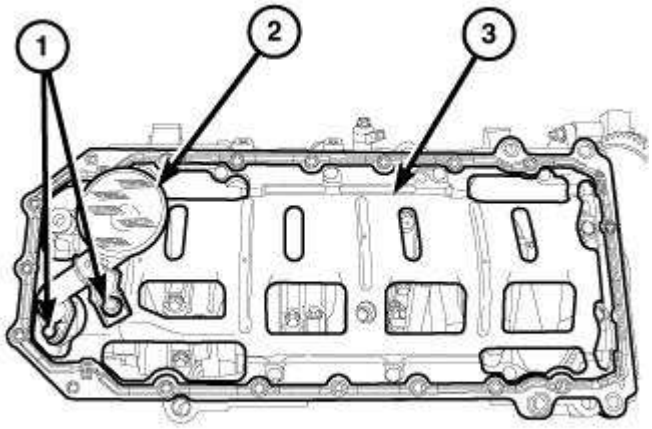


Fig. 351: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.

16. Remove the oil pump pickup tube retaining bolt and nut (1).
17. Remove the oil pump pickup tube (2).
18. Remove and discard the oil pan gasket/windage tray (3).

INSTALLATION

INSTALLATION

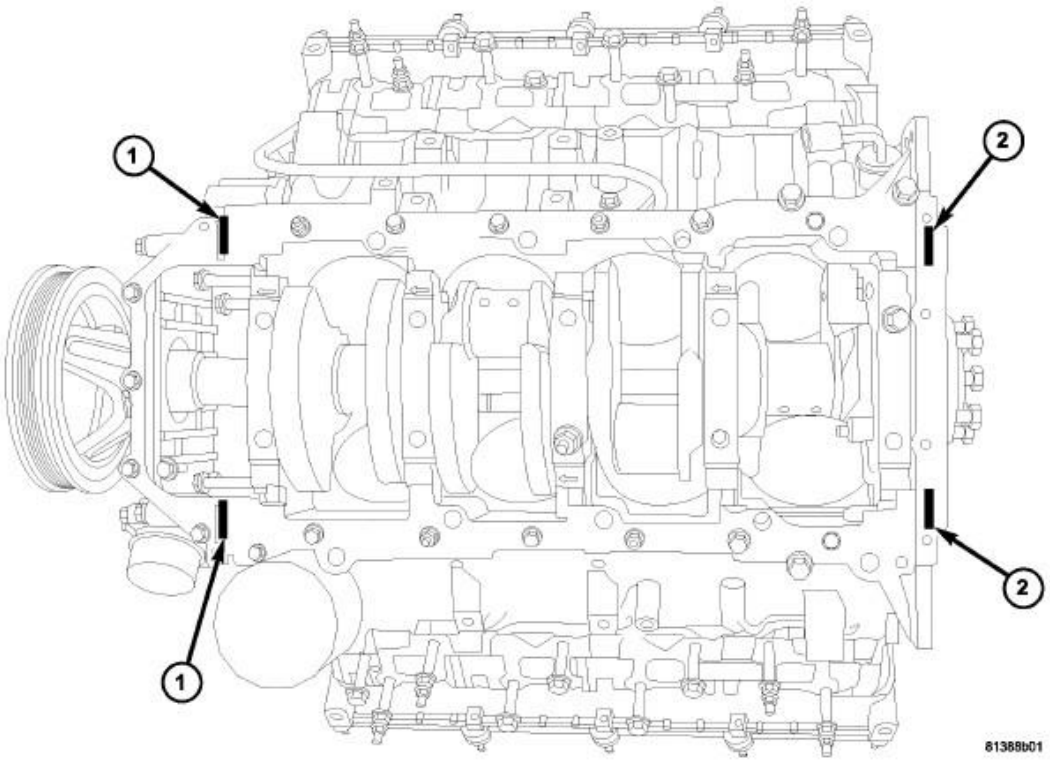


Fig. 352: T-Joint RTV Sealant Application Locations
Courtesy of CHRYSLER GROUP, LLC

1 - Front Cover T-Joints
2 - Rear Oil Retainer T-Joints

NOTE: Mopar® Engine RTV must be applied to the 4 T-joints, the area where the front cover, rear retainer and oil pan gasket meet. The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the 4 T-joint locations.

1. Clean the oil pan gasket mating surface of the engine block and oil pan.
2. Apply Mopar® Engine RTV at the 4 T- joints (1, 2).

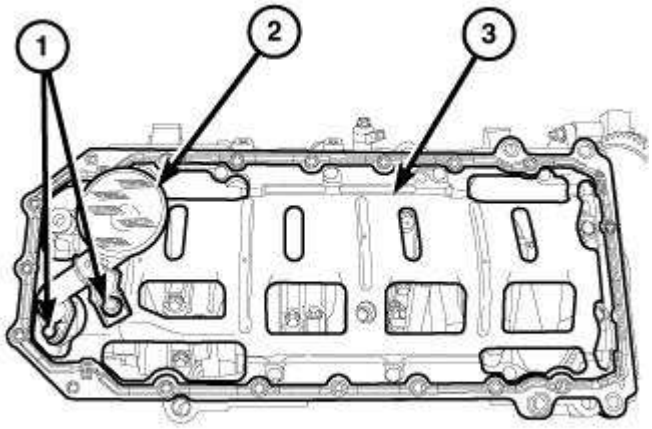


Fig. 353: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.

3. Install a new oil pan gasket/windage tray (3).
4. Using a new O-ring, position the oil pump pickup tube (2) into the oil pump.
5. Install the oil pump pickup tube retaining bolt and nut (1) and tighten to 28 N.m (21 ft. lbs.).

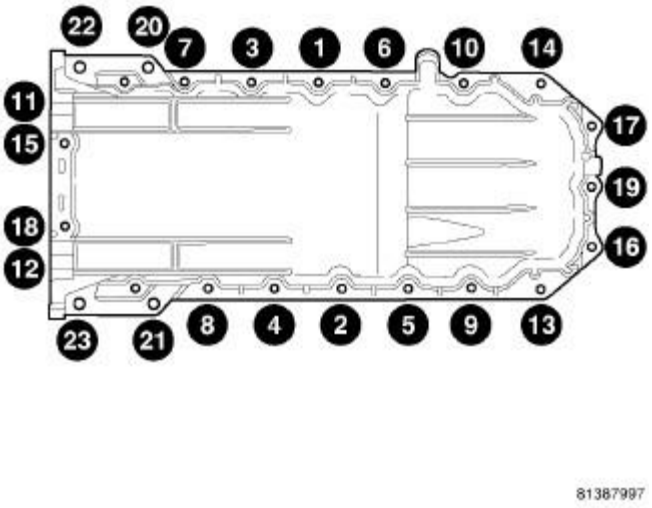


Fig. 354: Oil Pan Bolt Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The horizontal M10 retaining bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 retaining bolts (20, 21, 22, 23) and must be reinstalled in their original locations.**

NOTE: **New M6 retaining bolts must be used when reinstalling the oil pan. Do not reuse the old M6 retaining bolts.**

6. Align the rear of the oil pan with the rear face of the engine block and install the M10 and M6 retaining bolts finger tight.
7. Using the sequence shown in illustration, tighten the M6 retaining bolts to 5 N.m (44 in. lbs.).
8. Using the sequence shown in illustration, tighten the M10 retaining bolts to 54 N.m (40 ft. lbs.).
9. Using the sequence shown in illustration, tighten the M6 retaining bolts to 12 N.m (9 ft. lbs.).
10. Lower the vehicle.

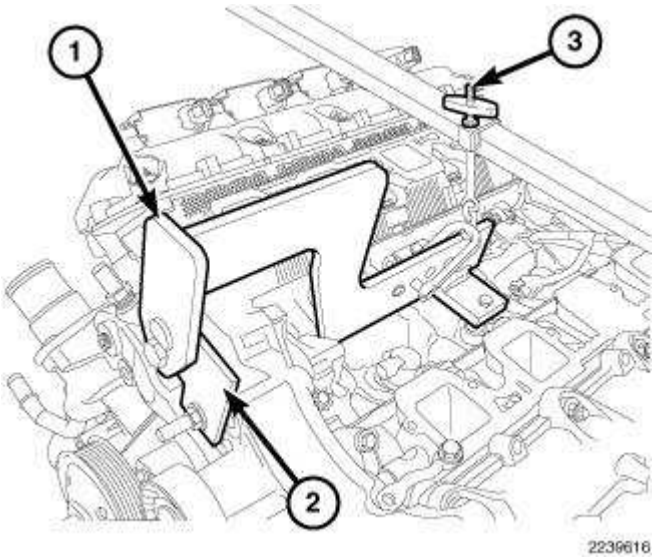


Fig. 355: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

11. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) lower the engine into position and remove.
12. Install the engine oil dipstick tube and dipstick.
13. Raise and support the vehicle.

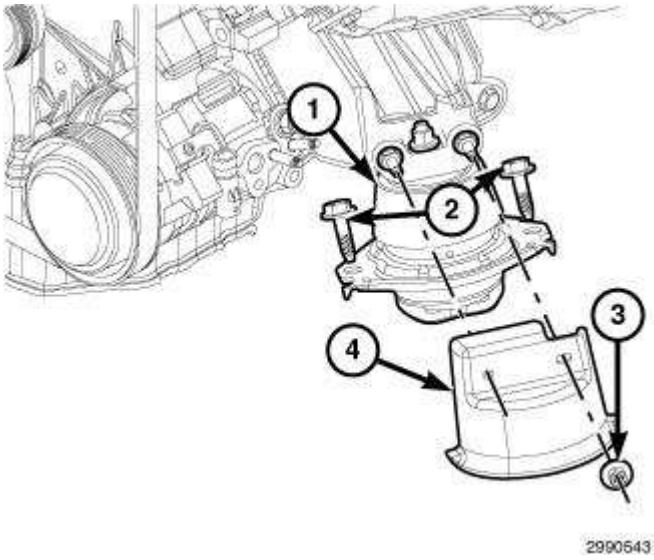


Fig. 356: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

14. Install both engine mount lower retaining bolts (2) and tighten to 61 N.m (45 ft. lbs.).
15. Position both engine mount heat shields (4) and install retaining nuts (3).

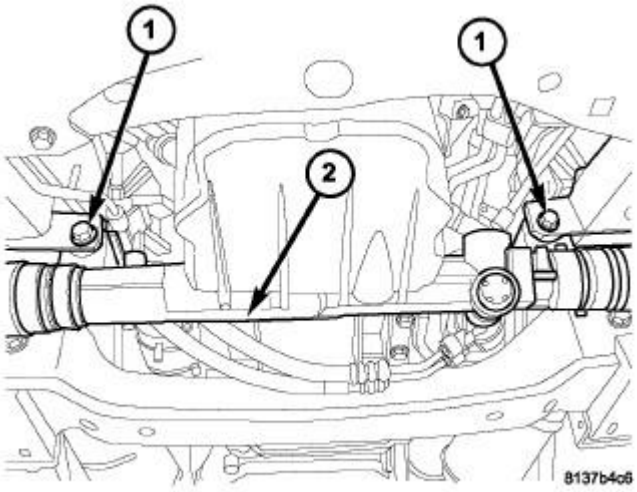


Fig. 357: Gear Mounting Bolts & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

16. Position the steering gear (2), install mounting bolts (1) and tighten to 95 N.m (70 ft. lbs.).

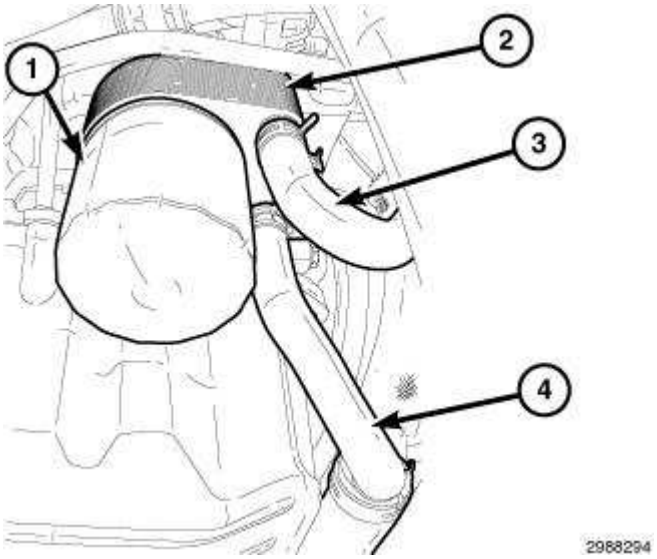


Fig. 358: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

17. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: Do not over tighten the oil filter.

18. Thread the oil filter (1) onto the oil cooler (2) oil filter boss.
19. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180°.

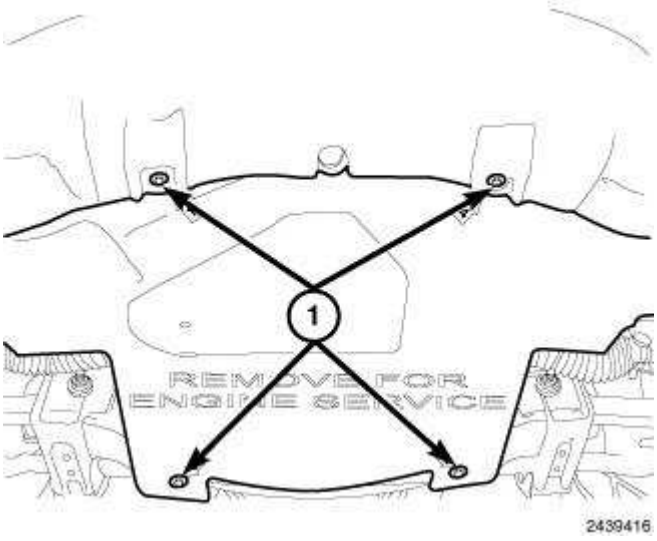


Fig. 359: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

20. Position the belly pan to the under side of vehicle and install belly pan retainers (1).

21. Lower the vehicle.
22. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
23. Fill the engine with oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

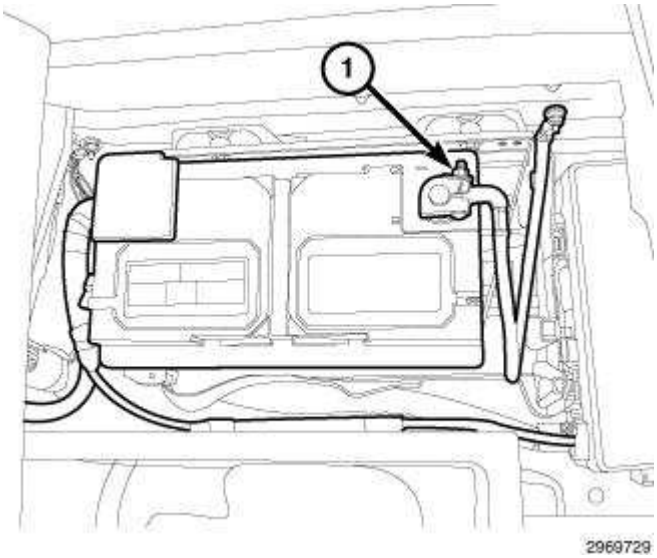


Fig. 360: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

24. Connect the negative battery cable (1).
25. Start the engine and check for leaks.

PUMP, ENGINE OIL

REMOVAL

REMOVAL

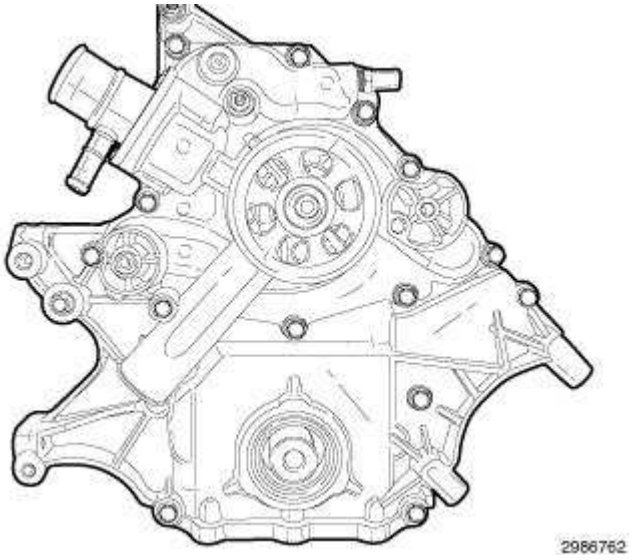


Fig. 361: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove water pump for timing cover removal.

1. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

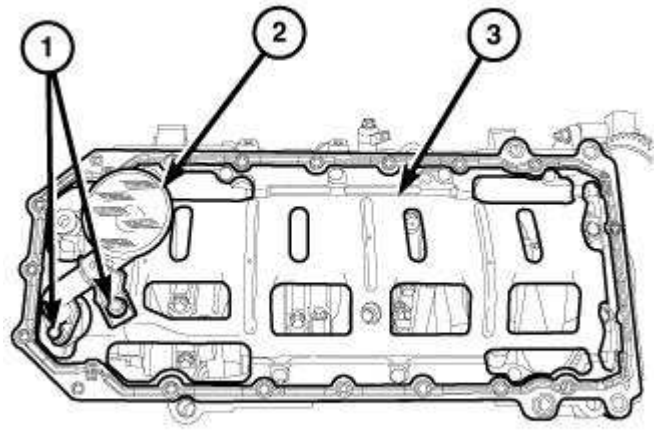


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Fig. 362: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed, a new oil pan gasket and the integral windage tray (3) assembly must be installed, the old gasket cannot be reused.

2. Remove the oil pan and oil pump pickup tube (2). Refer to **PAN, OIL, REMOVAL**.

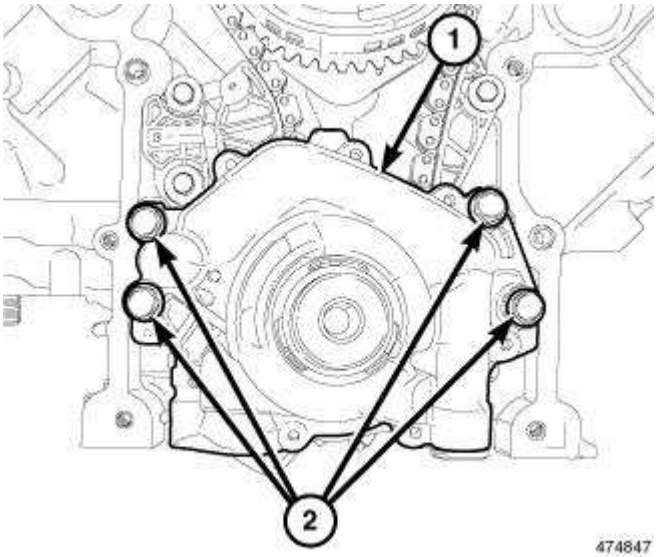

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Fig. 363: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

CLEANING

CLEANING

1. Wash all parts in a suitable solvent.
2. Using compressed air, carefully dry parts.

INSPECTION

INSPECTION

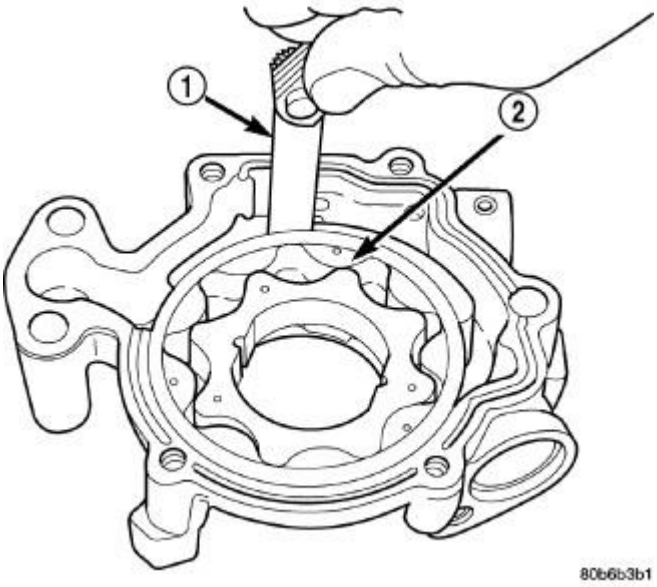

Fig. 364: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER GROUP, LLC

1 - FEELER GAUGE
2 - OUTER ROTOR

CAUTION: Oil pump pressure relief valve and spring should not be removed from the oil pump. If these components are disassembled and or removed from the pump the entire oil pump assembly must be replaced.

1. Remove the pump cover.
2. Clean all parts thoroughly. The mating surface of the oil pump housing should be smooth. If the oil pump cover is scratched or grooved the oil pump assembly should be replaced.
3. Slide the outer rotor into the body of the oil pump. Press the outer rotor to one side of the oil

pump body and measure the clearance between the outer rotor (2) and the body. If the measurement is 0.235 mm (0.009 in.) or greater the oil pump assembly must be replaced.

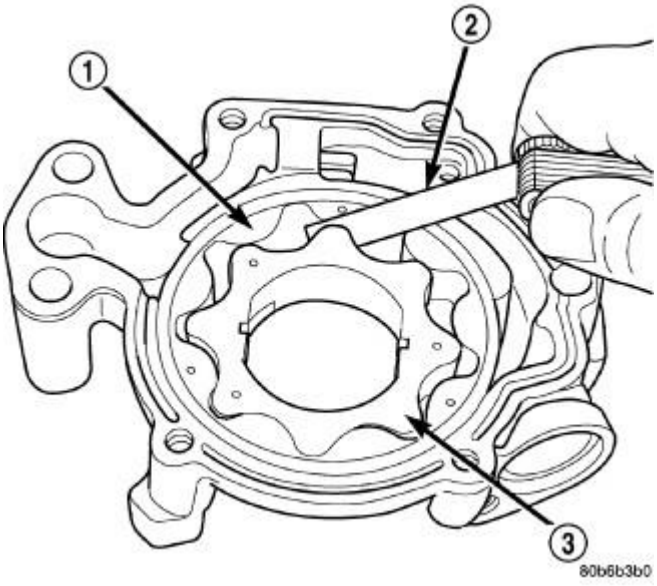

Fig. 365: Measuring Clearance Between Inner & Outer Rotors
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER ROTOR
2 - FEELER GAUGE
3 - INNER ROTOR

4. Install the inner rotor into the oil pump body. Measure the clearance between the inner (3) and outer (1) rotors. If the clearance between the rotors is 0.150 mm (0.006 in.) or greater the oil pump assembly must be replaced.

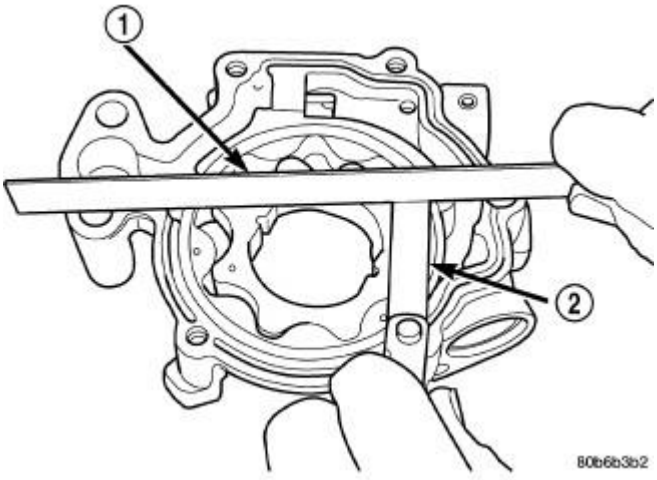

Fig. 366: Measuring Clearance Over Rotors
Courtesy of CHRYSLER GROUP, LLC

1 - STRAIGHT EDGE
2 - FEELER GAUGE

5. Place a straight edge (1) across the body of the oil pump (between the bolt holes), using a feeler gauge (2), measure the clearance between the straightedge and the rotors. If the clearance is 0.095 mm (0.0038 in.) or greater the oil pump must be replaced.
6. Install the pump cover and tighten retainers to 15 N.m (11 ft. lbs.)

NOTE: The 6.4L oil pump is serviced as an assembly. There are no Chrysler part numbers for sub-assembly components. In the event the oil pump is not functioning or out of specification it must be replaced as an assembly.

INSTALLATION

INSTALLATION

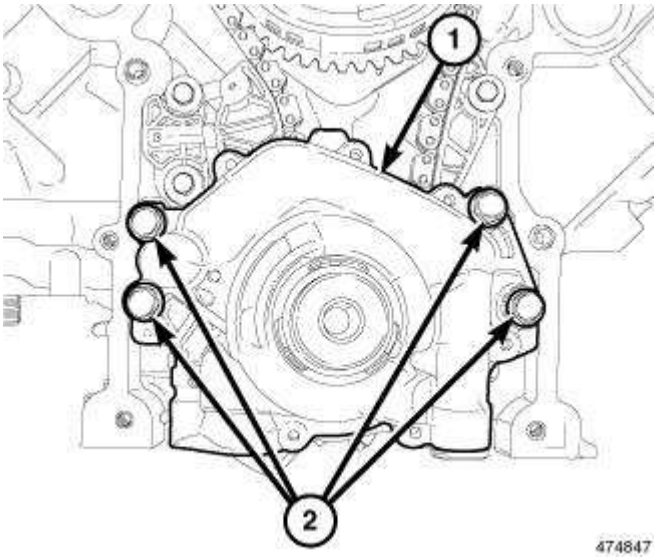

Fig. 367: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the oil pump (1) onto the crankshaft, install the retaining bolts (2) and tighten to 28 N.m (21 ft. lbs.).

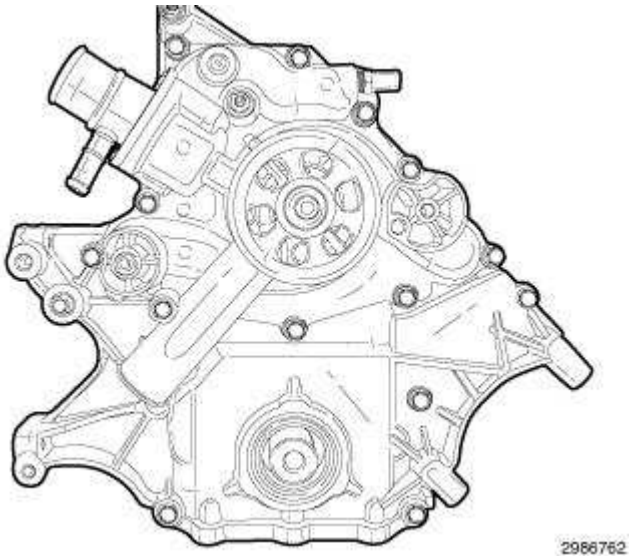

Fig. 368: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

2. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.

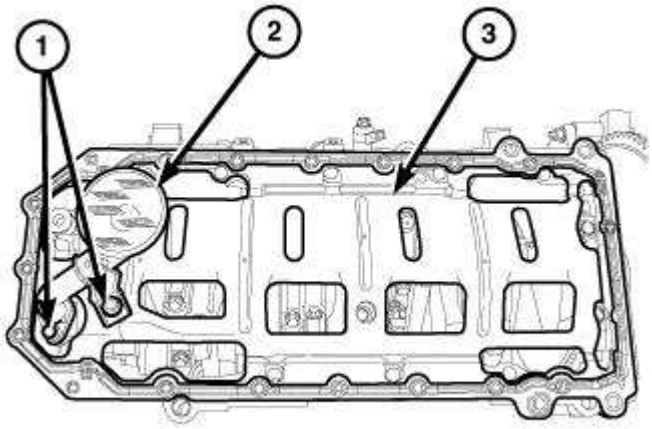

Fig. 369: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the oil pump pickup tube (2) and oil pan. Refer to **PAN, OIL, INSTALLATION**.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit through the PCM
- 5 volt reference circuit from the PCM

The oil pressure sensor returns a voltage signal back to the PCM with reference to oil pressure. Ground for the sensor is supplied by the PCM.

The oil pressure sensor is located on the right side of the engine block. The sensor screws into the engines main oil gallery.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Remove the upper generator mounting bolt.
4. Raise and support the vehicle.

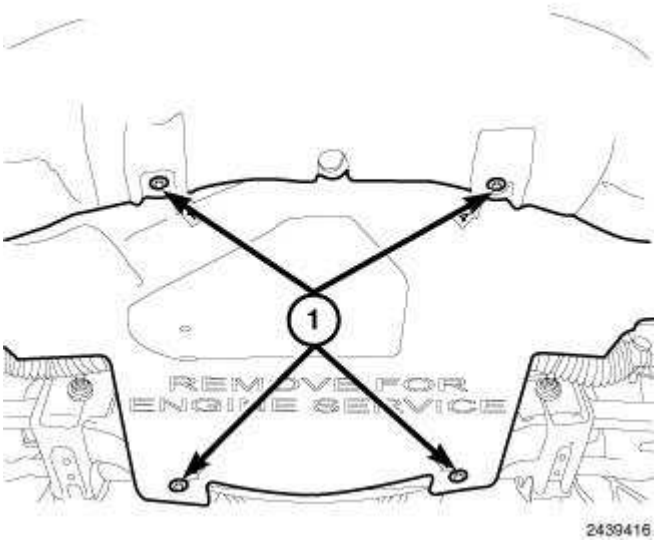

Fig. 370: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan retainers (1) and remove the belly pan.

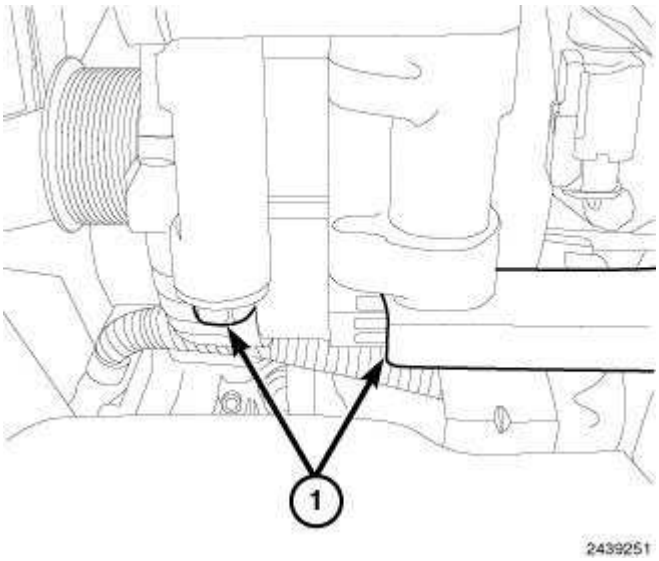

Fig. 371: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the lower generator retaining bolts (1).
7. Lower the vehicle.
8. Position the generator aside to gain access to the oil pressure sensor.

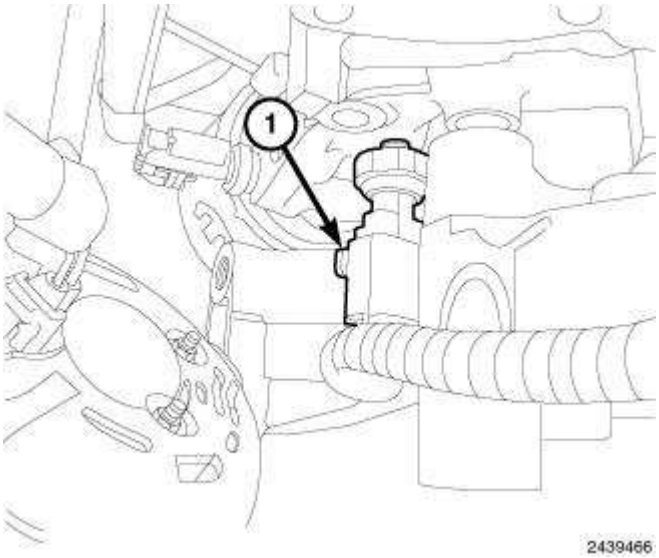

Fig. 372: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the oil pressure sensor electrical connector (1).

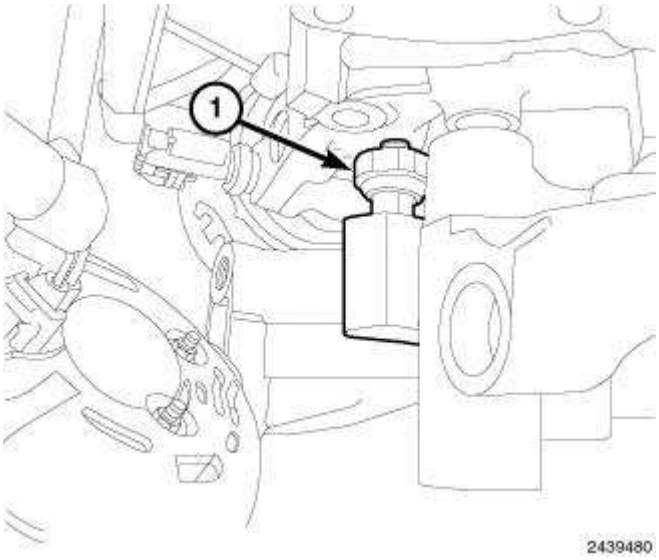

Fig. 373: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

10. Remove the oil pressure sensor (1).

INSTALLATION

INSTALLATION

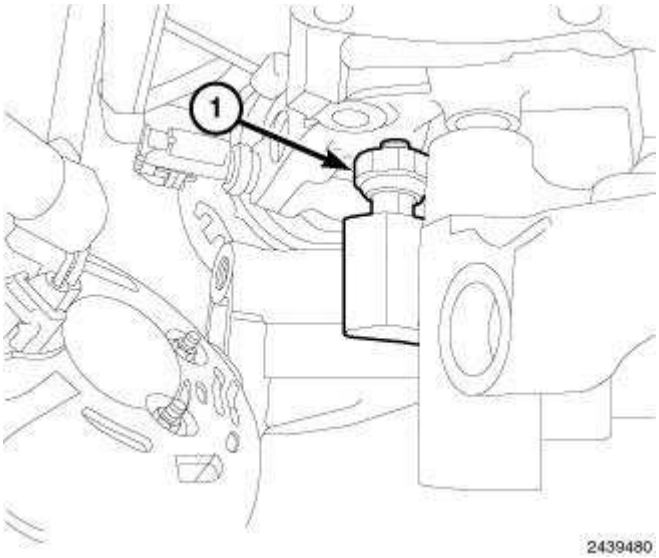

Fig. 374: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply Mopar® Thread Sealant with PTFE to the sensor threads before installing into the engine block.

1. Install the oil pressure sensor (1).

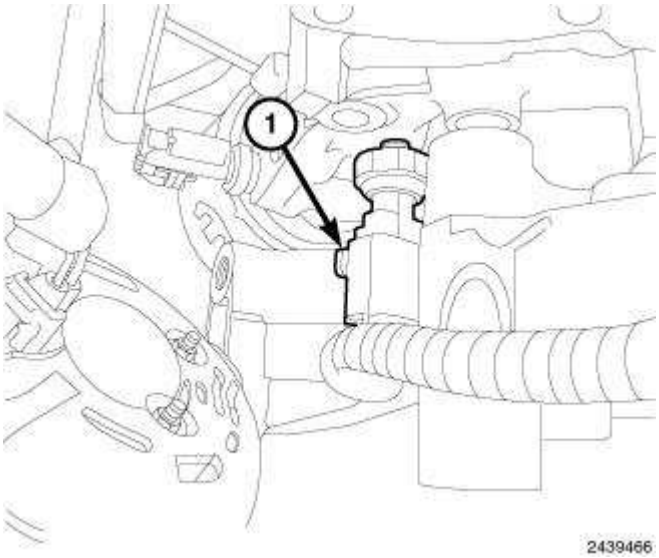

Fig. 375: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil pressure sensor electrical connector (1).
3. Position the generator and install the upper mounting bolt finger tight.
4. Raise and support the vehicle.

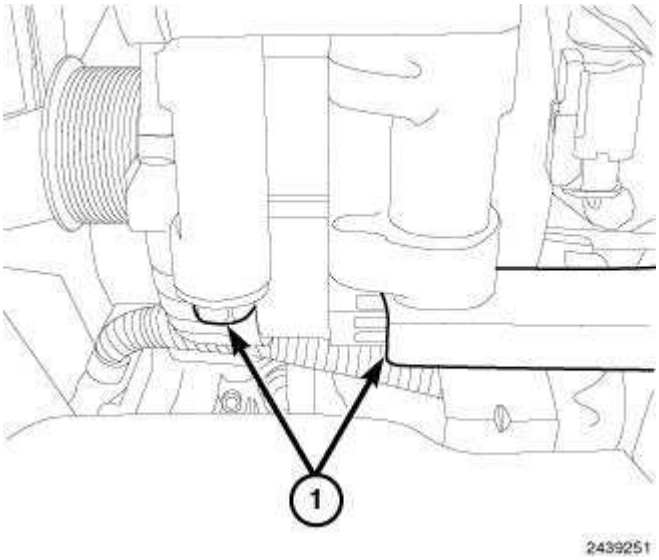

Fig. 376: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the lower mounting bolts (1) and tighten to 55 N.m (41 ft. lbs).

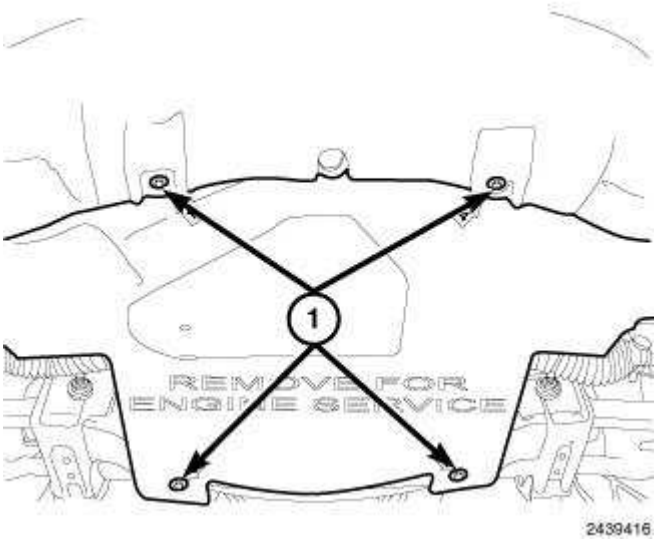

Fig. 377: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Position the lower splash shield and install the retainers (1).
7. Lower the vehicle
8. Tighten the upper generator mounting bolt to 55 N.m (41 ft. lbs).

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to

overheat.

9. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
10. Connect the negative battery cable.

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

The oil temperature sensor uses the following two circuits:

- Signal circuit to the PCM
- Ground circuit from the PCM

The oil temperature sensor is a Negative Thermal Coefficient sensor. The resistance of the sensor changes as oil temperature changes. This results in different output voltages back to the PCM.

The oil temperature sensor is located on the right side of the engine block.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Remove the generator upper mounting bolt.
4. Raise and support the vehicle.

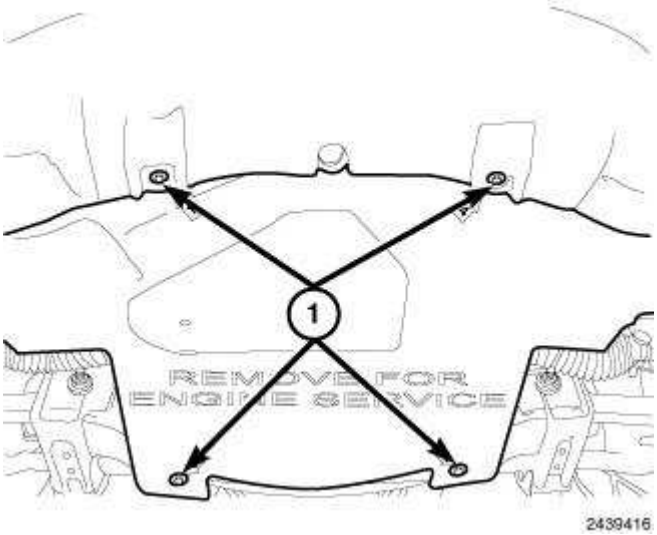

Fig. 378: Lower Splash Shield & Fasteners

Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan retainers (1) and remove the belly pan.

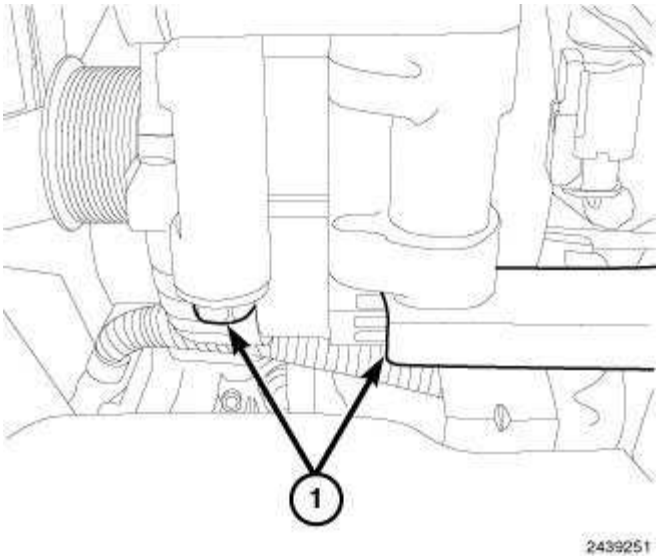

Fig. 379: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the generator lower mounting bolts (1).
7. Lower the vehicle.
8. Position the generator aside to gain access to the oil temperature sensor.

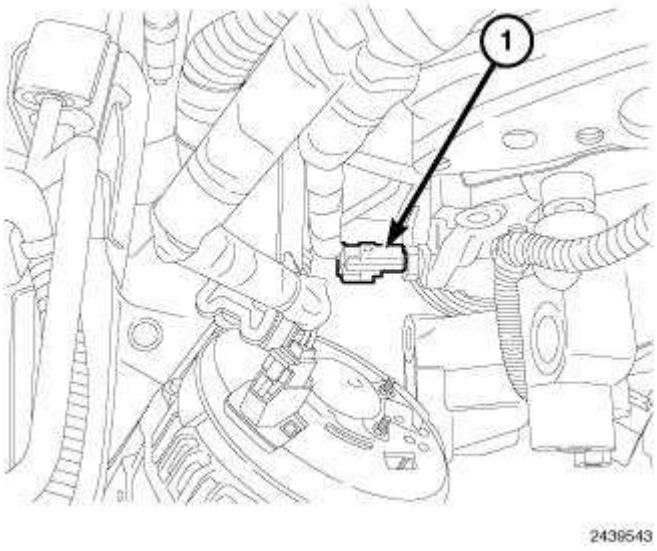

Fig. 380: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the oil temperature sensor electrical connector (1).

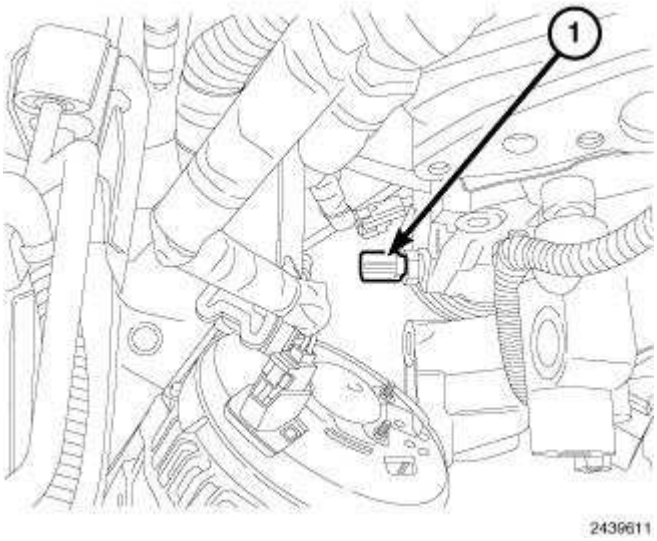

Fig. 381: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

10. Remove the oil temperature sensor (1).

INSTALLATION

INSTALLATION

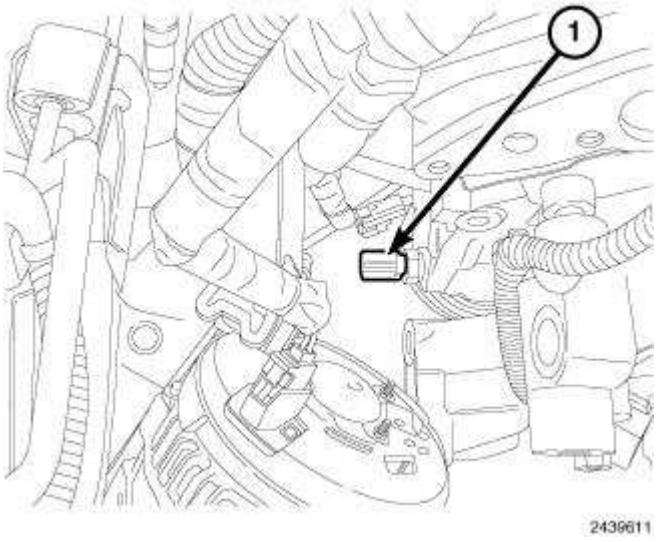

Fig. 382: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply Mopar® Thread Sealant with PTFE to the sensor threads before installing into the engine block.

1. Install the oil temperature sensor (1).

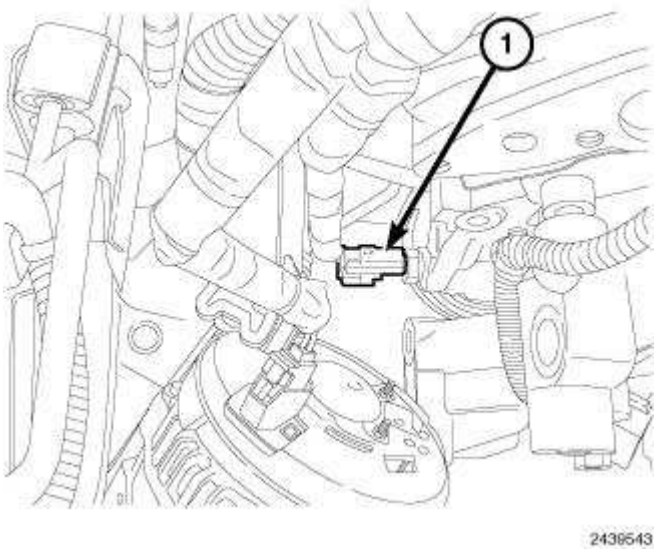

Fig. 383: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil temperature sensor electrical connector (1).
3. Position the generator and install the upper mounting bolt finger tight.
4. Raise and support the vehicle.

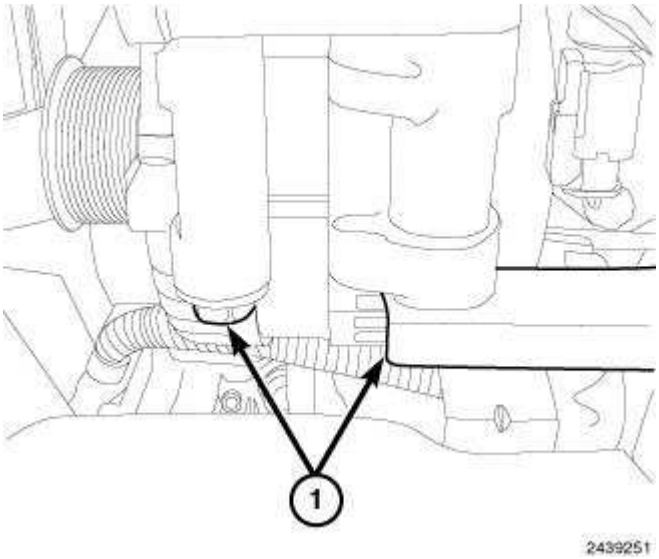

Fig. 384: Lower Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the generator lower mounting bolts (1) and tighten to 55 N.m (41 ft. lbs.).

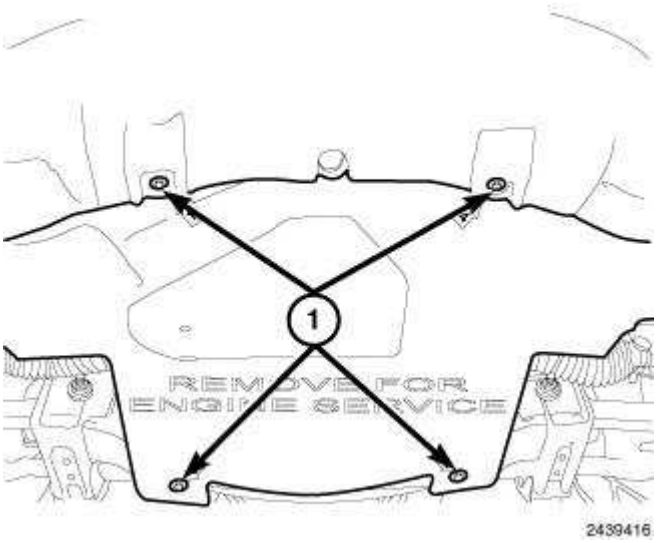

Fig. 385: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Position the belly pan to the under side of the vehicle and install the retainers (1).
7. Lower the vehicle.
8. Tighten the generator upper mounting bolt to 55 N.m (41 ft. lbs.).

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.

9. Install the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
10. Connect the negative battery cable.

MANIFOLDS

MANIFOLD, EXHAUST

DESCRIPTION

DESCRIPTION

The exhaust manifolds are tube in shell air gap design to maximize durability and performance. The exhaust manifolds are made of stainless steel stamped shells and stainless steel tubes with a powdered metal outlet. A layered graphite over perforated steel manifold gasket is used to provide sealing to the cylinder head.

OPERATION

OPERATION

The exhaust manifolds collect the engine exhaust gases exiting the combustion chambers and then channels the exhaust gases to the exhaust pipes/catalytic converters.

REMOVAL

REMOVAL

EXHAUST MANIFOLDS

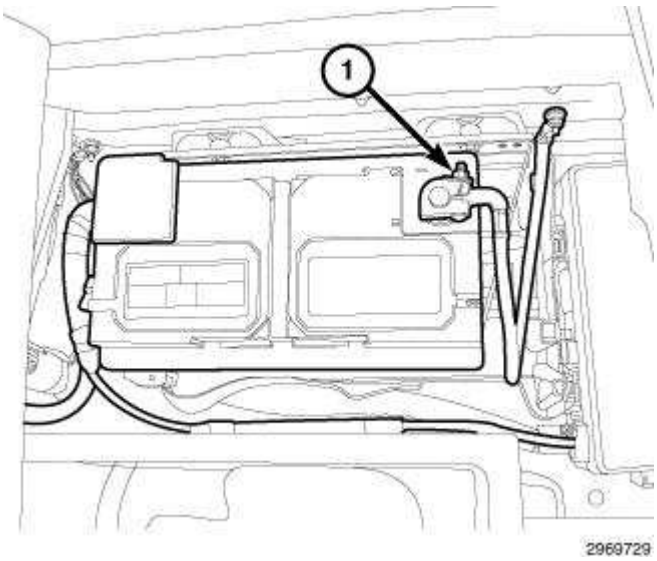

Fig. 386: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left side shown in illustration. Right side similar.

1. Disconnect the negative battery cable (1).

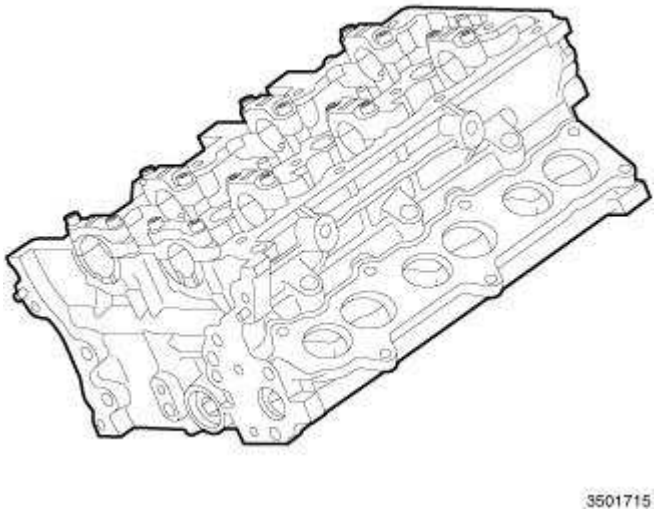

Fig. 387: Cylinder Head

Courtesy of CHRYSLER GROUP, LLC

2. Remove cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

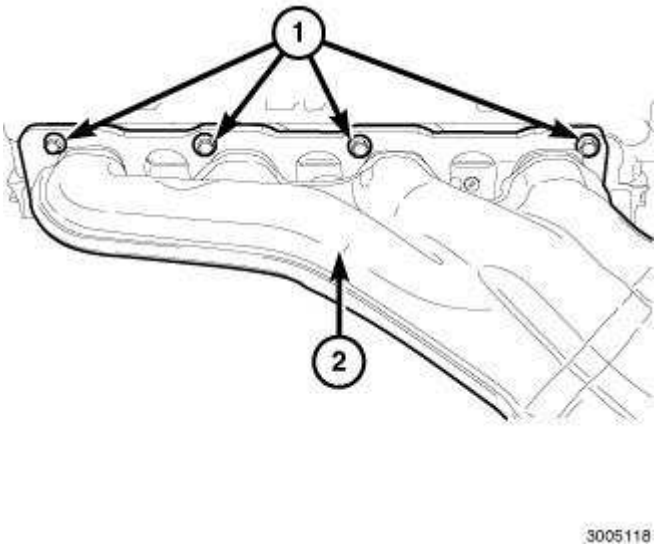

Fig. 388: Exhaust Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the exhaust manifold (2) top row of bolts (1).

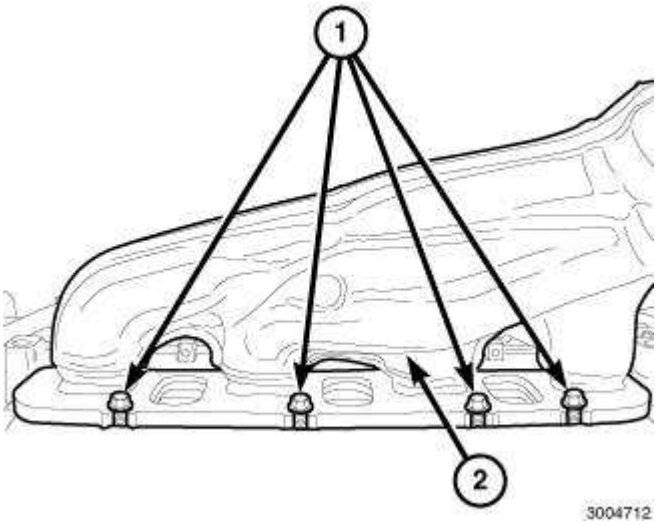

Fig. 389: Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the exhaust manifold heat shield.
5. Remove the exhaust manifold bottom row of bolts (1).

CLEANING

CLEANING

Clean the mating surfaces on cylinder head and manifold. Wash with solvent and blow dry with compressed air.

INSPECTION

INSPECTION

Inspect the exhaust manifold for cracks.

Inspect the mating surface of the exhaust manifold for flatness with a straight edge. The exhaust manifold gasket surface must be flat and within 0.67 mm (0.0264 in.) overall.

INSTALLATION

INSTALLATION

EXHAUST MANIFOLDS

NOTE: Left side shown in illustration. Right side similar.

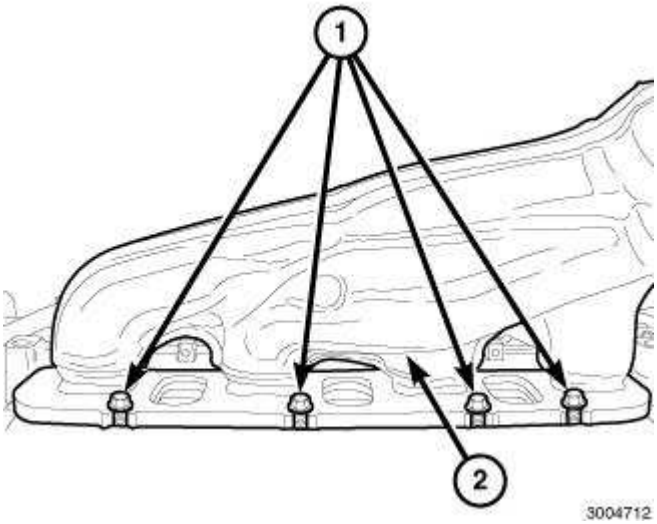

Fig. 390: Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean the sealing surfaces of the exhaust manifold and cylinder head.
2. Using a new exhaust manifold gasket, position the exhaust manifold (2).
3. Install the exhaust manifold bottom row of bolts (1) finger tight.

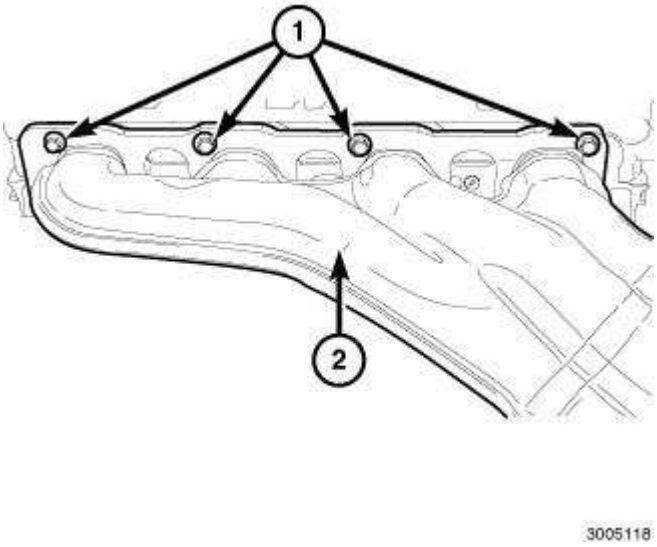

Fig. 391: Exhaust Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the exhaust manifold (2) top row of bolts (1) and tighten to 31 N.m (23 ft. lbs.).
5. Position the coolant bottle (1) and install the retaining bolts (2).
6. Raise and support the vehicle.

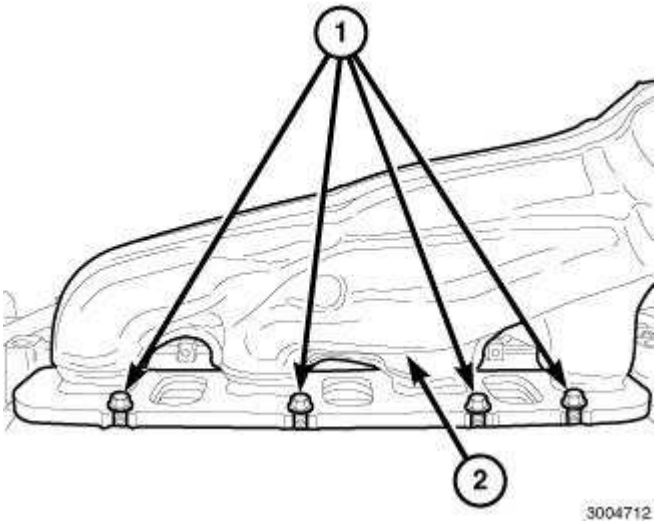

Fig. 392: Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the exhaust manifold bottom row of bolts to 31 N.m (23 ft. lbs.).
8. Install the exhaust manifold heat shield.

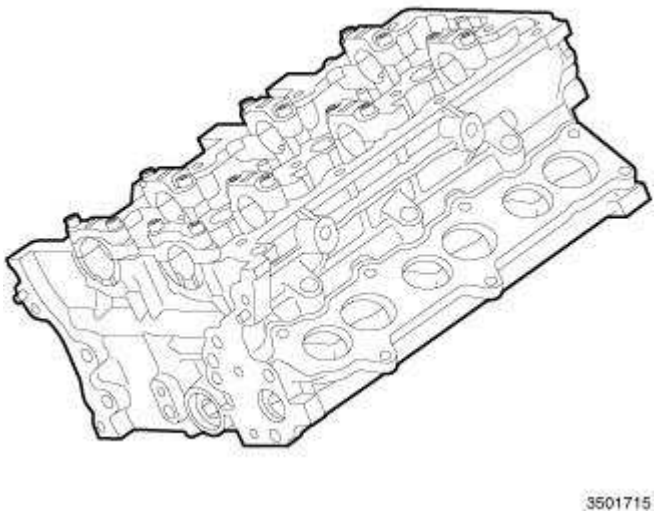

Fig. 393: Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

9. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.

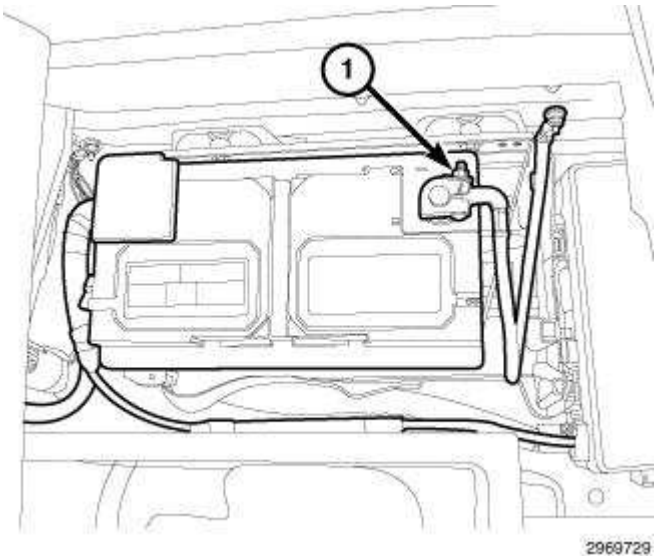

Fig. 394: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

10. Connect the negative battery cable (1).
11. Start the engine and check for leaks.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

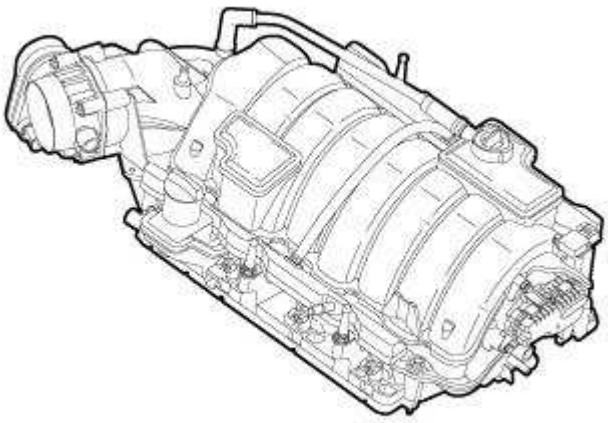

Fig. 395: Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

The intake manifold is made of a composite material and features a dual shaft Short Runner Valve (SRV) system to maximize both low end torque and peak power. The SRV is bolted to the rear of the intake manifold and can be service separately from the manifold. The manifold uses a single plane sealing system with individual port seals and a separate PCV port seal to prevent leaks.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKAGE

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

> **WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing. Failure to follow this warning may result in serious or fatal injury.**

1. Start the engine.
2. Spray a small stream of water at the suspected leak area.
3. If a change in RPM is observed the area of the suspected leak has been found.
4. Repair as required.

REMOVAL

REMOVAL

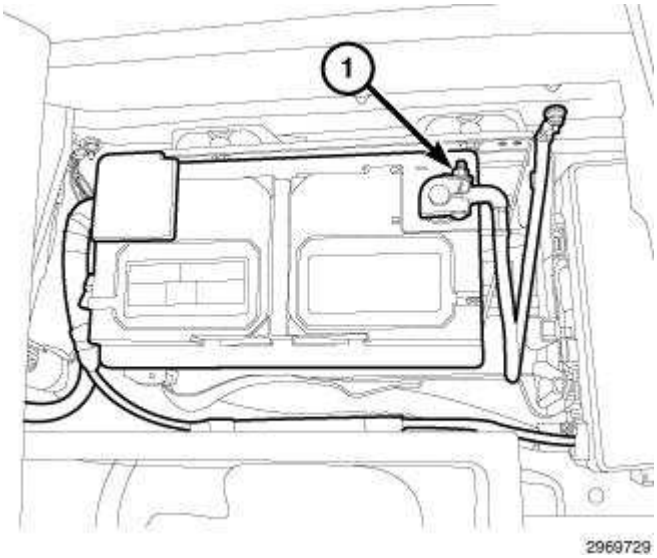

Fig. 396: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the negative battery cable (1).

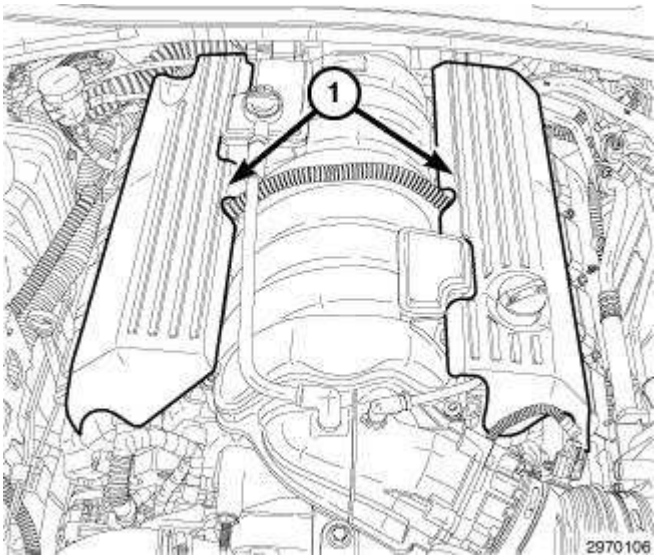

Fig. 397: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine covers (1).
4. Disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .

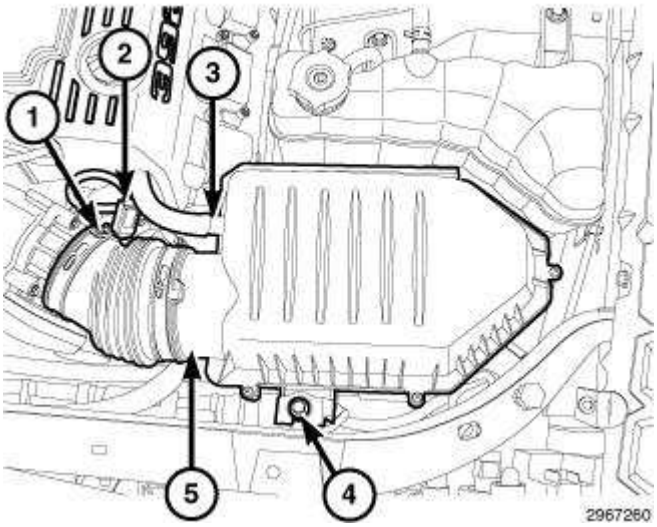

Fig. 398: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

5. Remove the air cleaner housing (5). Refer to **BODY, AIR CLEANER, REMOVAL**.
6. Disconnect the brake booster hose and the EVAP purge hose.

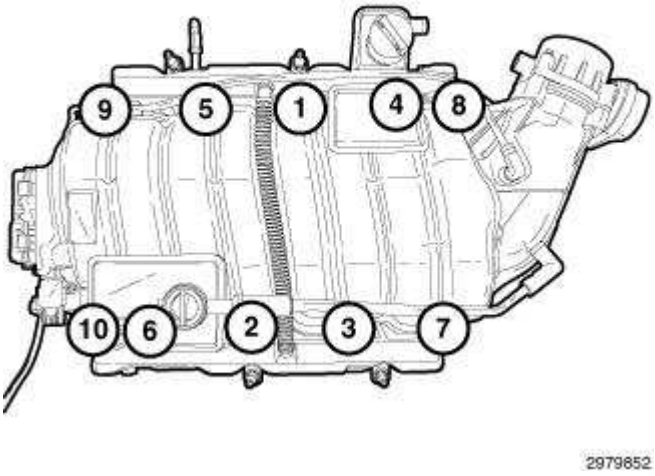

Fig. 399: Intake Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the electrical connectors from the following components:
    - Manifold Absolute Pressure (MAP) Sensor
    - Short Runner Valve (SRV)
    - Fuel Injectors
    - Electronic Throttle Control (ETC)

NOTE: Remove the intake manifold and throttle body as an assembly.

8. Using the sequence shown in illustration, remove the intake manifold retaining bolts.
9. Remove the intake manifold and throttle body as an assembly from the vehicle.

CLEANING

CLEANING

NOTE: There is NO approved repair procedure for the intake manifold. If severe damage is found during inspection, the intake manifold must be replaced.

Before installing the intake manifold thoroughly clean the mating surfaces. Use a suitable cleaning solvent, then air dry.

INSPECTION

INSPECTION

1. Inspect the intake manifold sealing surface for cracks, nicks and distortion.
2. Inspect the intake manifold vacuum hose fittings for looseness or blockage.

INSTALLATION

INSTALLATION

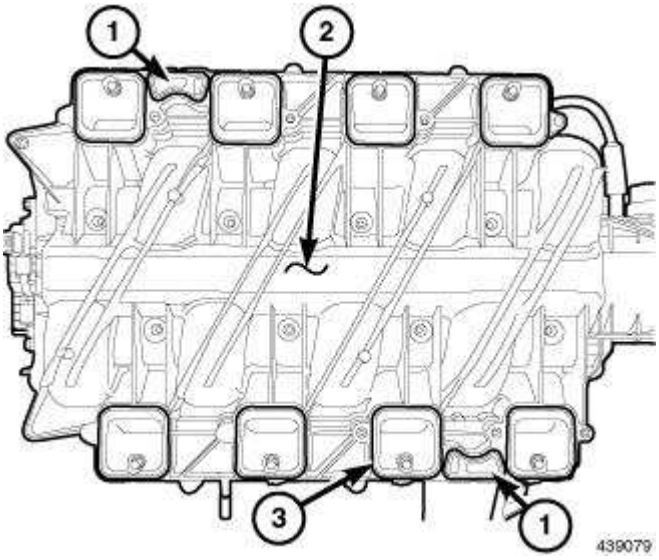

Fig. 400: Intake Manifold & PCV Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: The intake manifold seals (1, 3) may be used again, provided no cuts, tears, or deformation have occurred.

1. Inspect the intake manifold seals and replace if necessary.

NOTE: If reinstalling the original manifold, apply Mopar® Lock & Seal Adhesive to the intake manifold bolts. Not required when installing a new manifold.

2. If required, apply Mopar® Lock & Seal Adhesive to the intake manifold bolts.
3. Position the intake manifold (2).

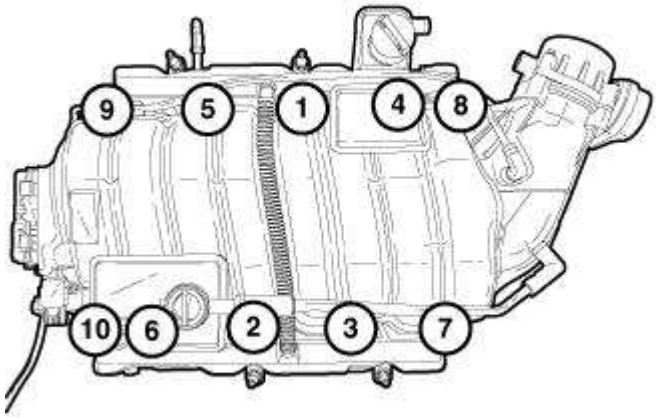

Fig. 401: Intake Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, install the intake manifold retaining bolts and tighten to 12 N.m (9 ft. lbs.).
5. Connect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .
6. Connect the brake booster hose and the EVAP purge hose.
7. Connect the electrical connectors to the following components:
   - Manifold Absolute Pressure (MAP) Sensor
   - Short Runner Valve (SRV)
   - Fuel Injectors
   - Electronic Throttle Control (ETC)

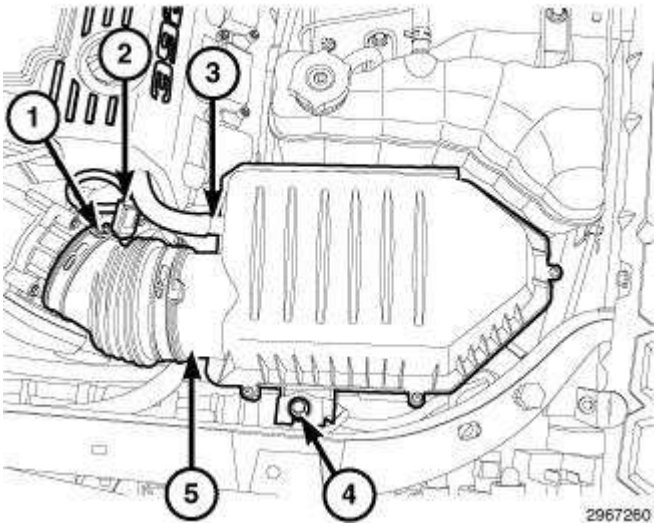

Fig. 402: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

8. While sliding the air duct onto the throttle body, lower the air cleaner housing (5) into position and align the locating pin on the bottom of the housing.
9. Install the air cleaner housing retaining bolt (4) and tighten to 5 N.m (44 in. lbs.).
10. Install the makeup air hose (3) at the air cleaner housing.
11. Connect the intake air temperature sensor electrical connector (2).
12. Position the air duct retaining clamp (1) at the throttle body and tighten to 3 N.m (30 in. lbs.).

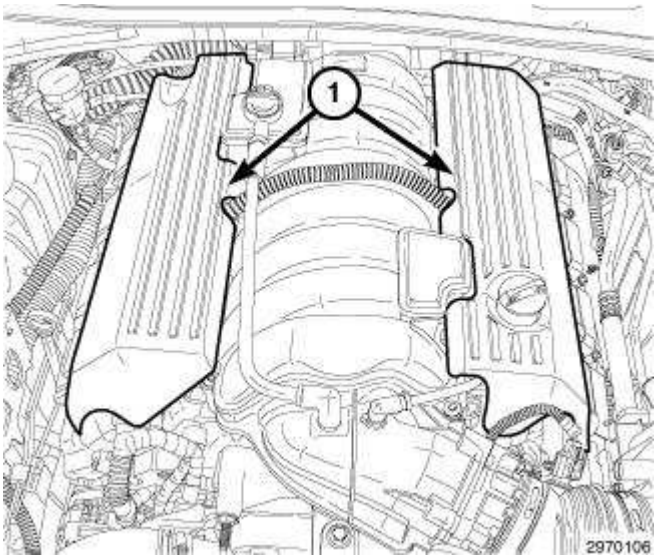

Fig. 403: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

13. Install the engine covers (1) on to the ball studs.

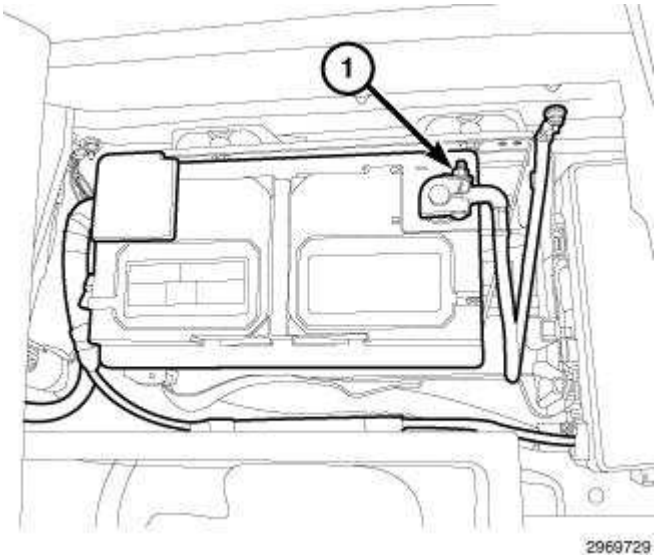

Fig. 404: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

14. Connect the negative battery cable (1).

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

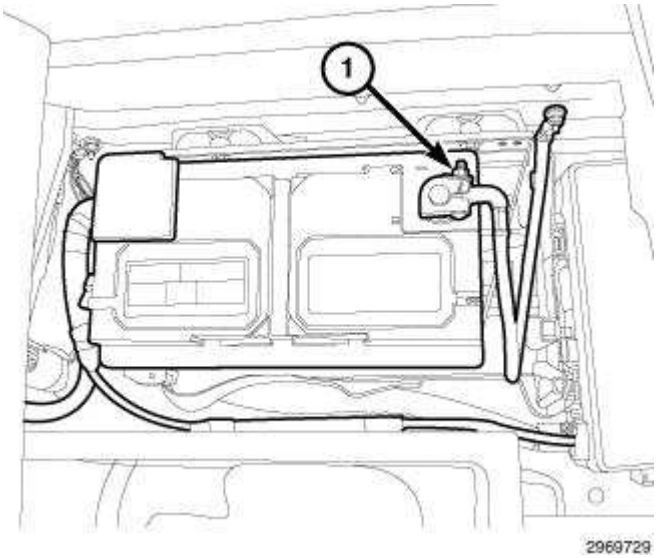

Fig. 405: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Drain the cooling system.

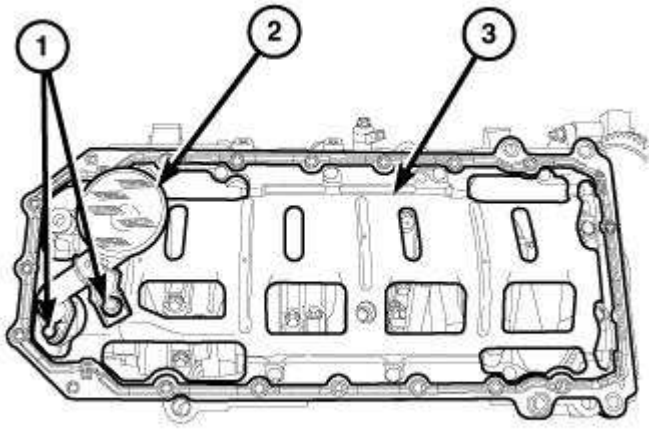

Fig. 406: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil pan and oil pump pick up tube (2). Refer to **PAN, OIL, REMOVAL**.

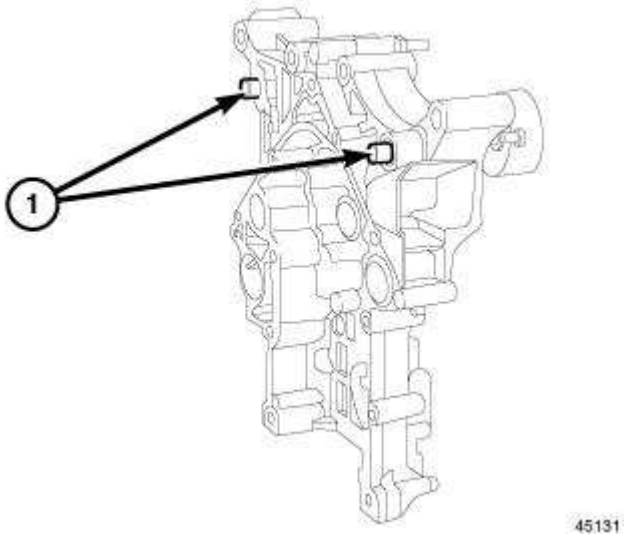

Fig. 407: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

5. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
6. Verify the slide bushings (1) remain located in the engine timing cover during removal.

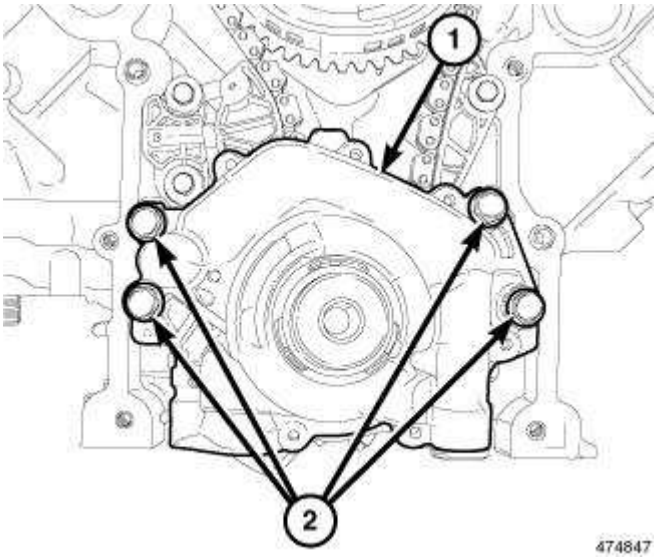

Fig. 408: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

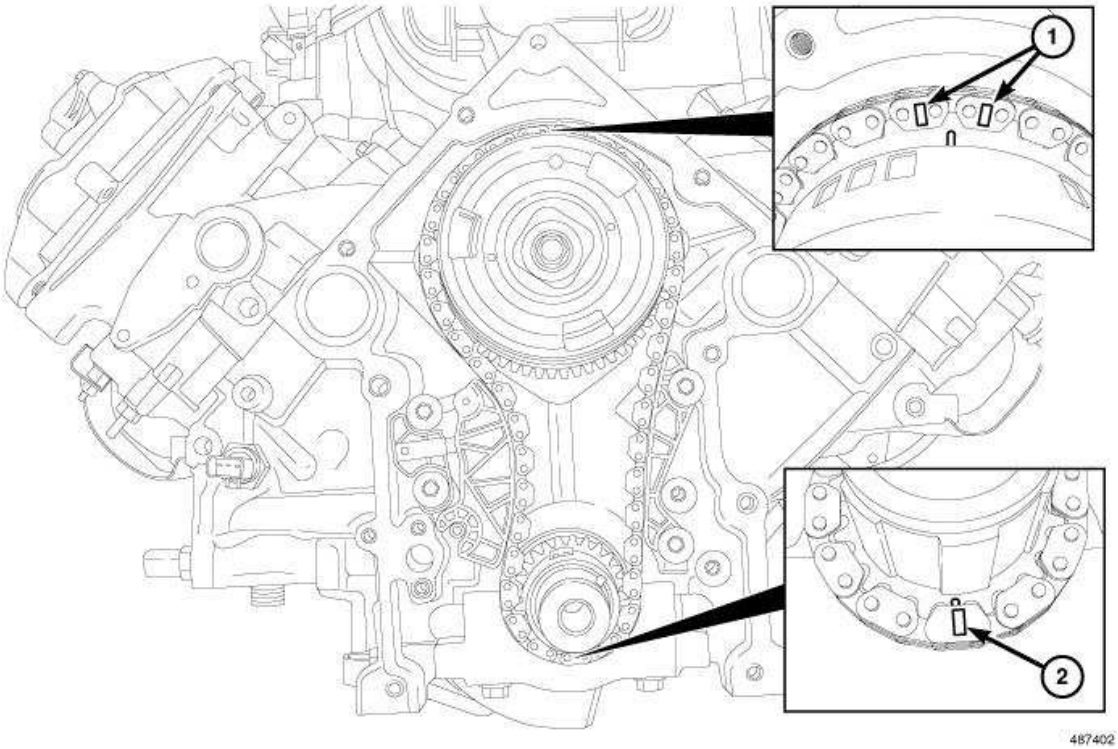

Fig. 409: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

8. Install the vibration damper bolt finger tight. Using a suitable socket and breaker bar, rotate the crankshaft to align the timing marks with the timing chain sprockets (1, 2).

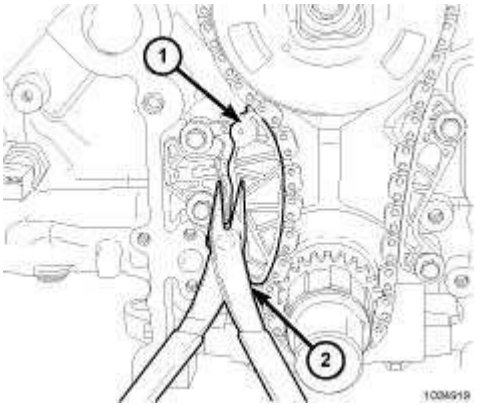

Fig. 410: Retracting Tensioner Shoe Using Pliers
Courtesy of CHRYSLER GROUP, LLC

9. Retract the chain tensioner arm (1) until the hole in the arm lines up with the hole in the bracket.

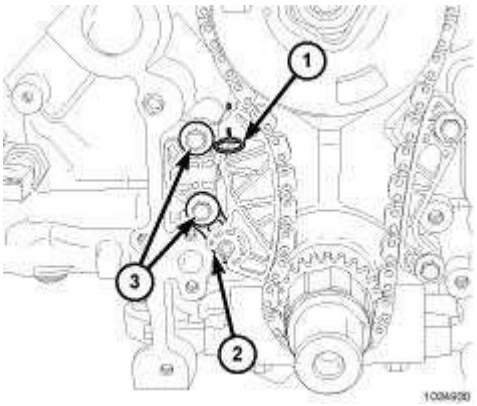

Fig. 411: Timing Chain Tensioner, Pin & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the chain tensioner holes.

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

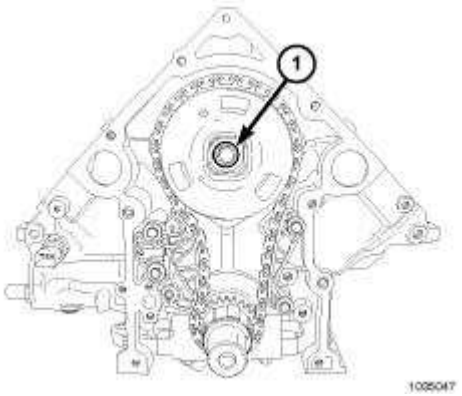

Fig. 412: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Remove the camshaft phaser retaining bolt (1) and remove the timing chain with the camshaft phaser and crankshaft sprocket.

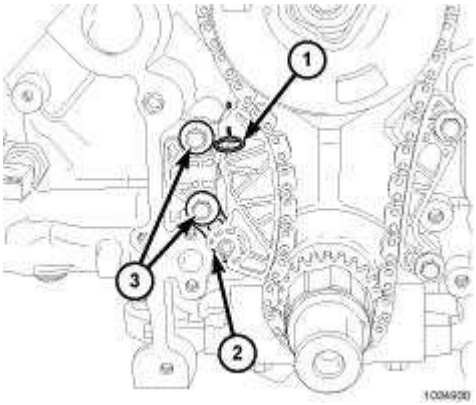

Fig. 413: Timing Chain Tensioner, Pin & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect the timing chain tensioner and timing chain guide shoes for wear and replace as necessary.

12. If the timing chain tensioner is to be replaced, remove the retaining bolts (3) and remove the timing chain tensioner (2).

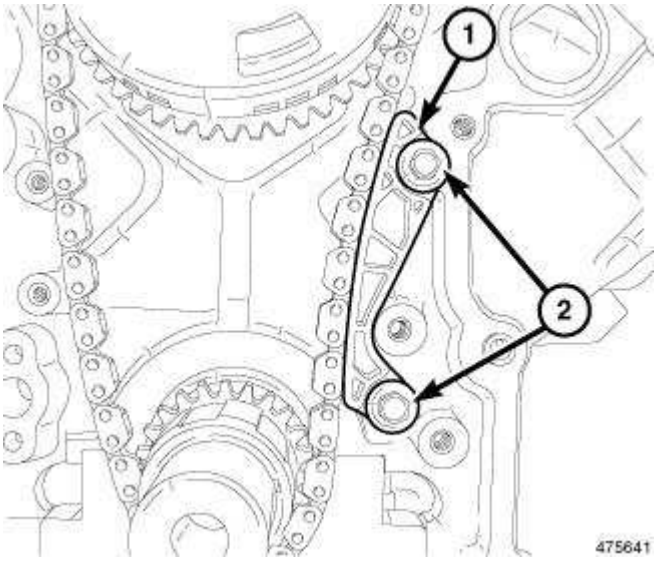

Fig. 414: Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. If the timing chain guide (1) is to be replaced, remove the retaining bolts (2) and remove the timing chain guide (1).

INSTALLATION

INSTALLATION

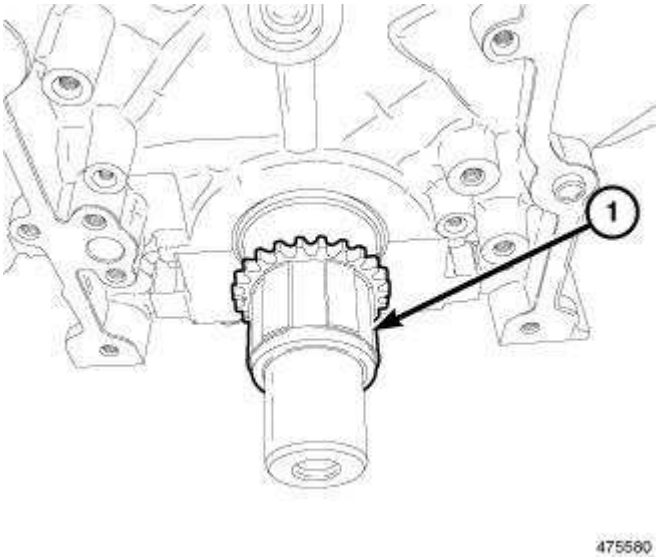

Fig. 415: Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

1. Install the crankshaft sprocket (1) and position halfway onto the crankshaft.

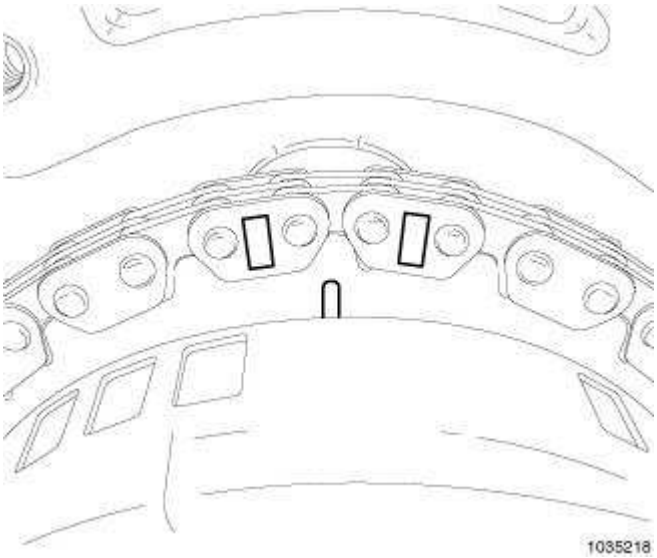

Fig. 416: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER GROUP, LLC

2. While holding the camshaft phaser in hand, position the timing chain on the camshaft phaser and align the timing marks as shown in illustration.

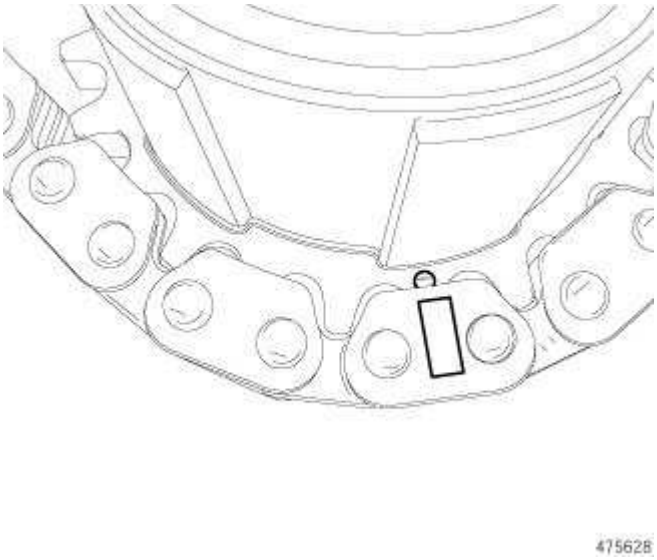

Fig. 417: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER GROUP, LLC

3. While holding the camshaft phaser and timing chain in hand, position the timing chain on the crankshaft sprocket and align the timing mark as shown in illustration.

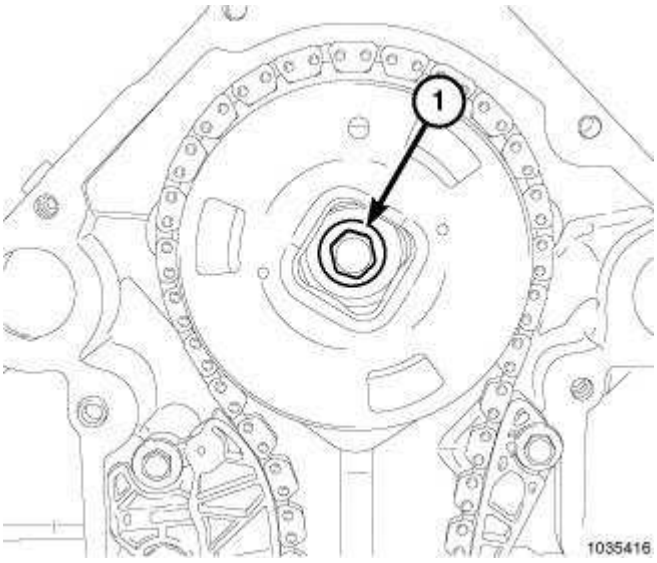

Fig. 418: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Align the slot in the camshaft phaser with the dowel on the camshaft and position the camshaft phaser on the camshaft while sliding the crankshaft sprocket into position.
5. Install the camshaft phaser retaining bolt (1) finger tight.

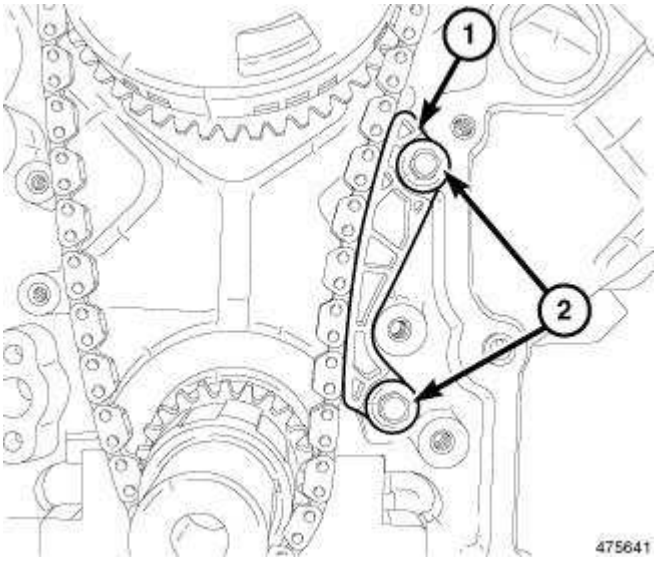

Fig. 419: Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. If removed, install the timing chain guide (1) and tighten the bolts (2) to 11 N.m (8 ft. lbs.).

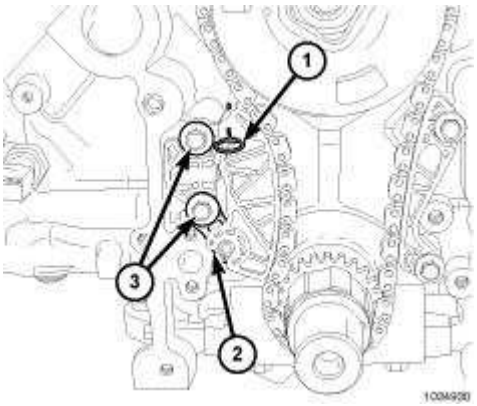

Fig. 420: Timing Chain Tensioner, Pin & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. If removed, install the timing chain tensioner (2) and tighten the bolts (3) to 11 N.m (8 ft. lbs.).
8. If required, retract the chain tensioner arm and install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the holes of the chain tensioner arm.

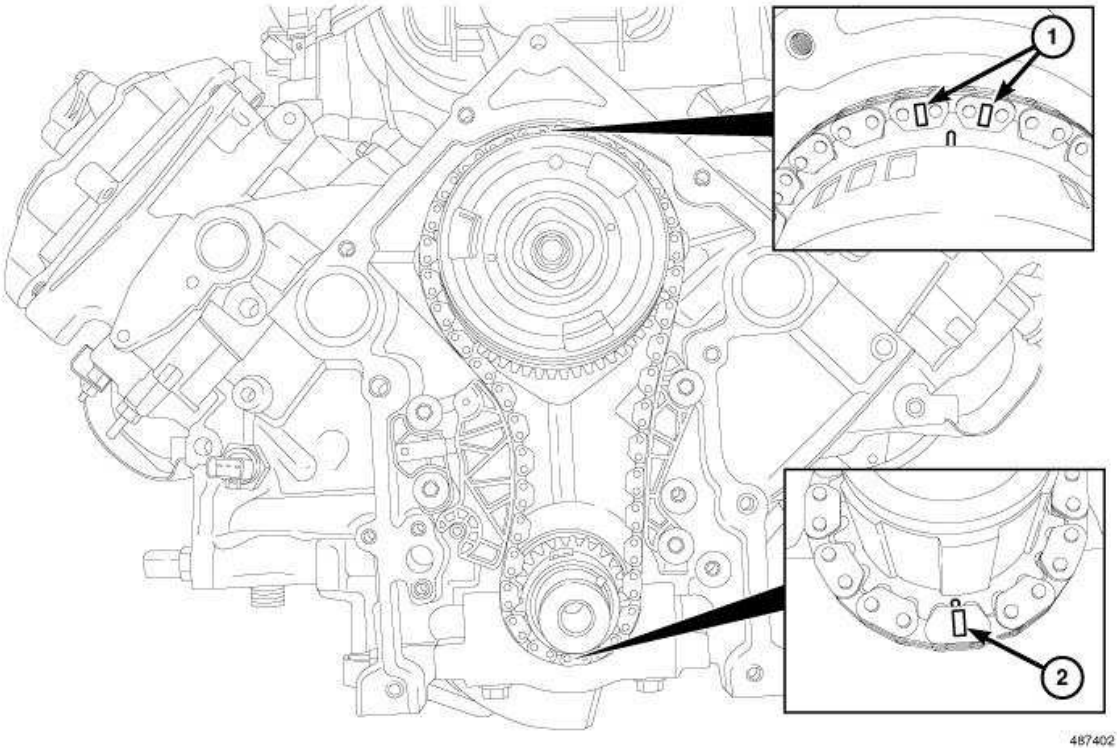

Fig. 421: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the crankshaft two revolutions and verify the alignment of the timing marks (1, 2). If the timing marks do not line up, remove the camshaft sprocket and realign.

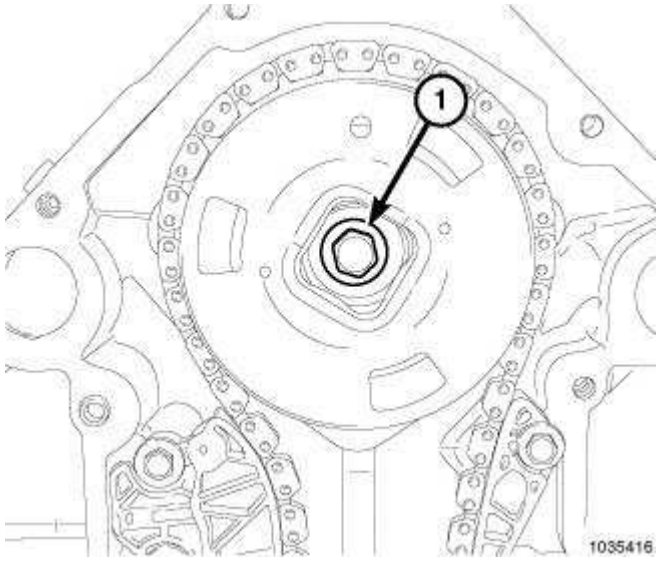

Fig. 422: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the camshaft phaser bolt (1) to 85 N.m (63 ft. lbs.).

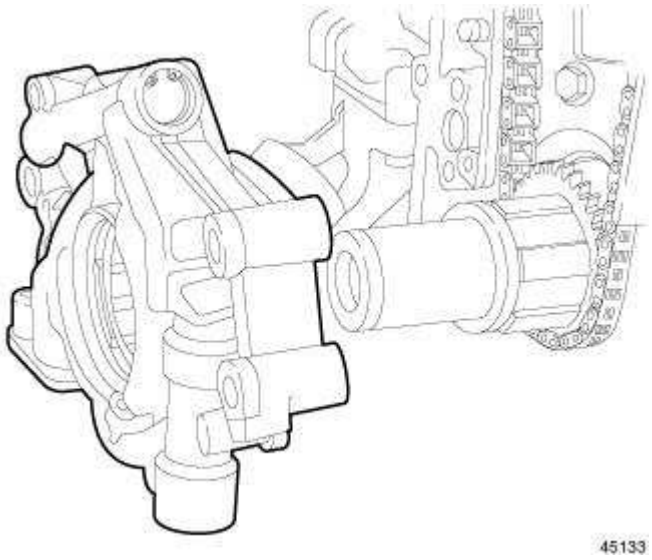

Fig. 423: Remove/Install Oil Pump
Courtesy of CHRYSLER GROUP, LLC

11. Position the oil pump onto the crankshaft and install the oil pump retaining bolts finger tight.

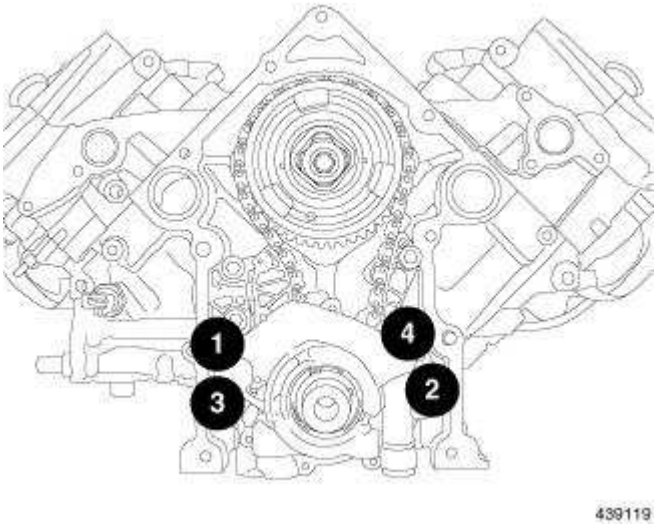

Fig. 424: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

12. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).

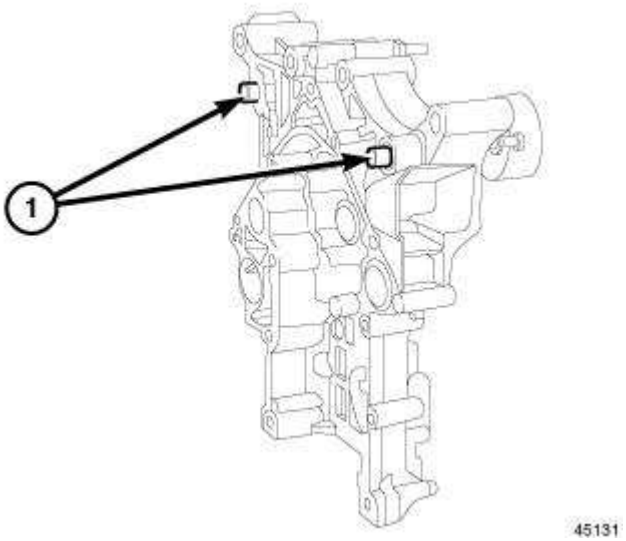

Fig. 425: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

13. Verify the slide bushings (1) remain located in the engine timing cover.

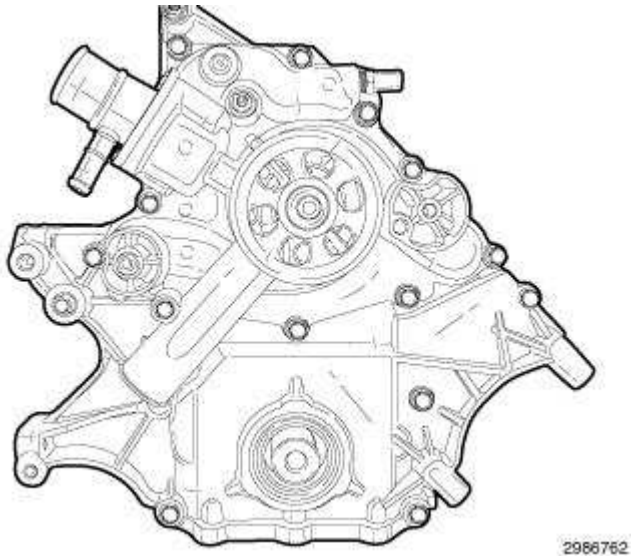

Fig. 426: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

14. Using a new gasket, install the engine timing cover and tighten the retaining bolts to 28 N.m (21 ft. lbs.).

NOTE: The large lifting stud is torqued to 55 N.m (40 ft. lbs.).

15. Tighten the large lifting stud to 55 N.m (40 ft. lbs.).

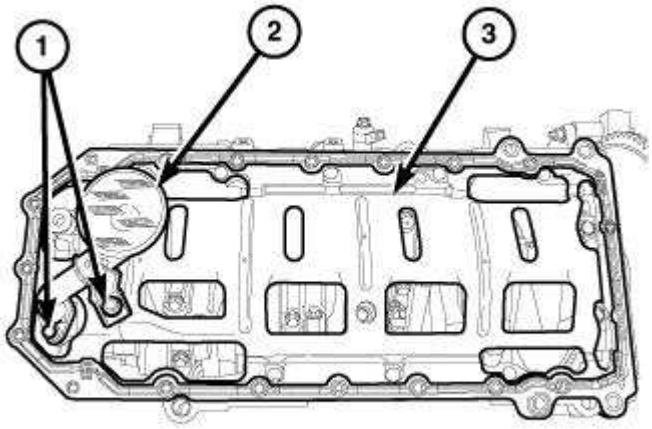

Fig. 427: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Raise and support the vehicle.
17. Install the oil pump pickup tube (2) and the oil pan. Refer to **PAN, OIL, INSTALLATION**.

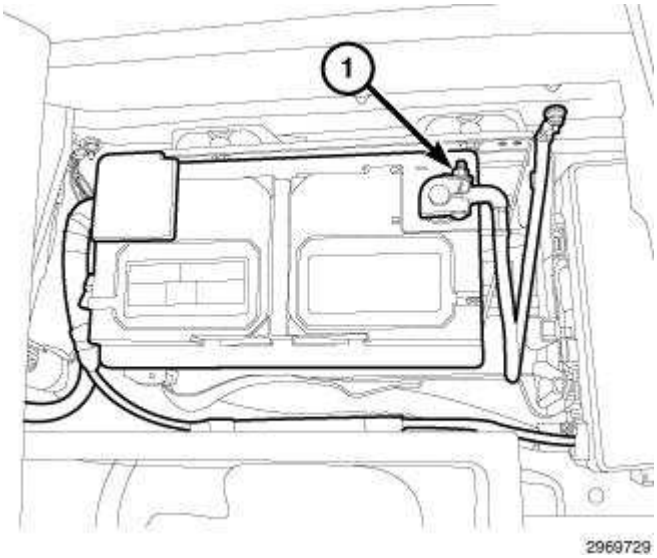

Fig. 428: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

18. Install the negative battery cable.
19. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

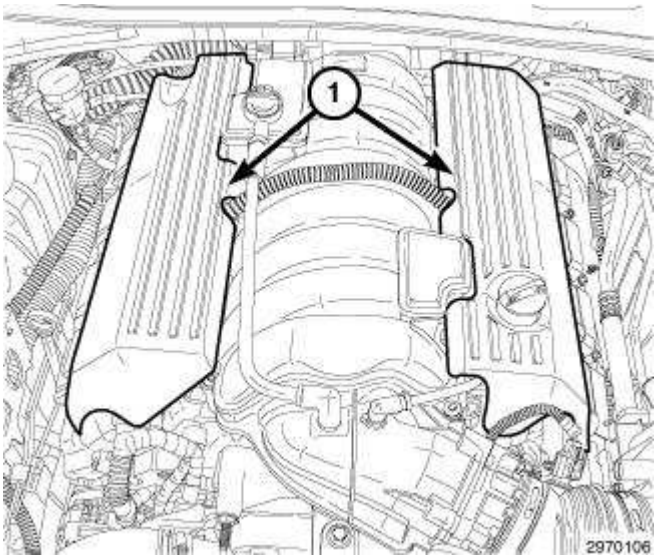

Fig. 429: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

20. Fill the crankcase with the specified type and amount of engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
21. Install the engine covers (1).
22. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

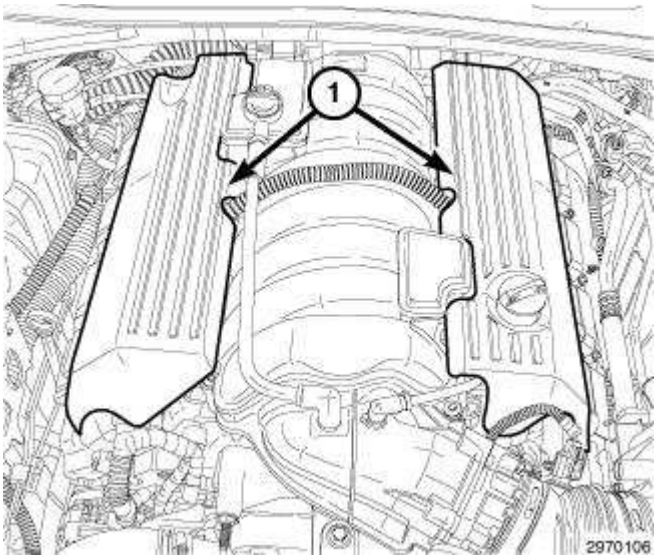

Fig. 430: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine covers (1).
2. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .

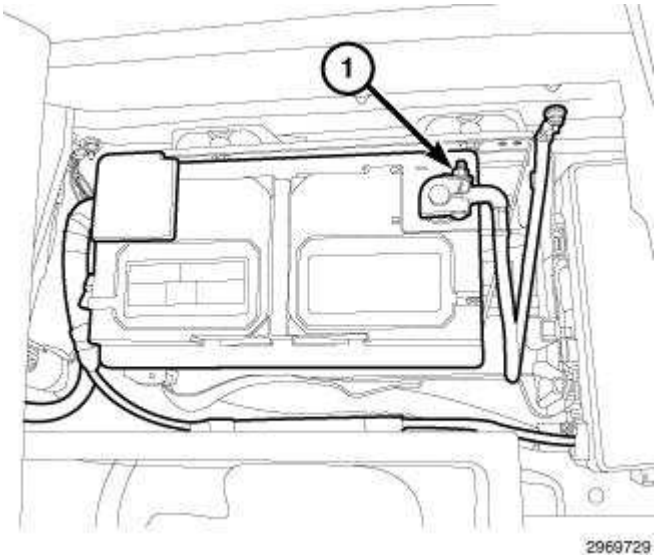

Fig. 431: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the negative battery cable (1).

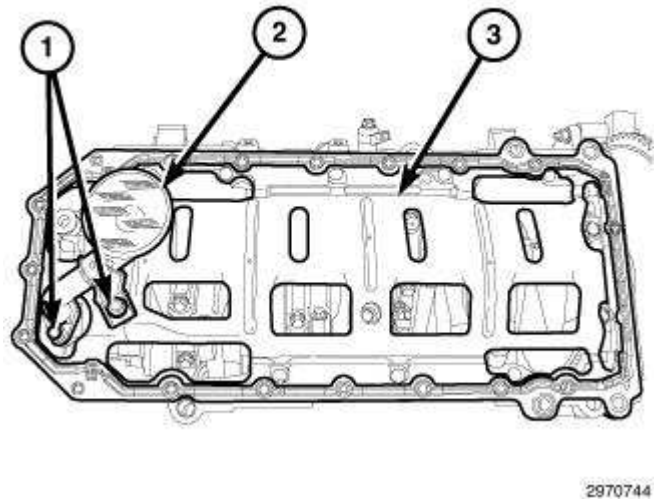

Fig. 432: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.

4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.

5. Remove the oil pump pickup tube retaining bolt and nut (1).
6. Remove the oil pump pickup tube (2).
7. Remove and discard the oil pan gasket/windage tray (3).
8. Lower the vehicle.

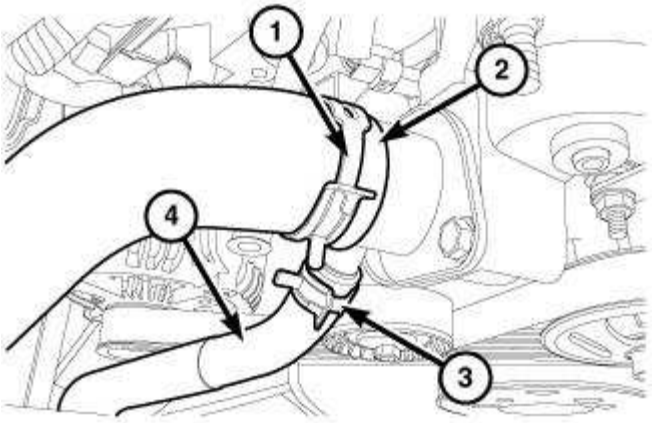

Fig. 433: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

9. Remove the upper radiator hose clamp (1) and remove the upper radiator hose (2).
10. Remove the oil cooler hose clamp (3) and remove oil cooler hose (4).

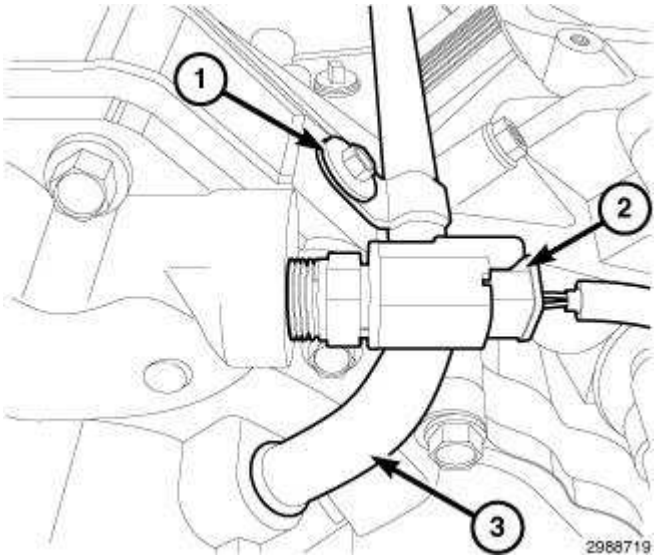

Fig. 434: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Remove the coolant temperature sensor electrical connector (2).
12. Remove the heater tube retaining bolt (1).
13. Lift the heater tube (3) out of the water pump.

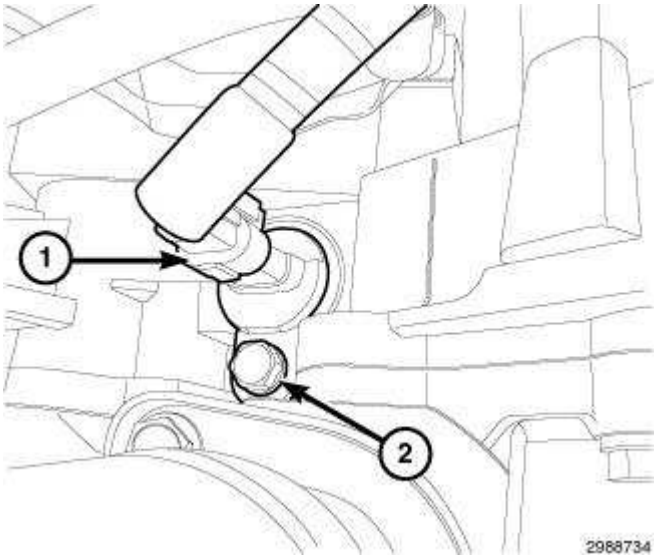

Fig. 435: Camshaft Position Sensor Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the camshaft position sensor electrical connector (1).

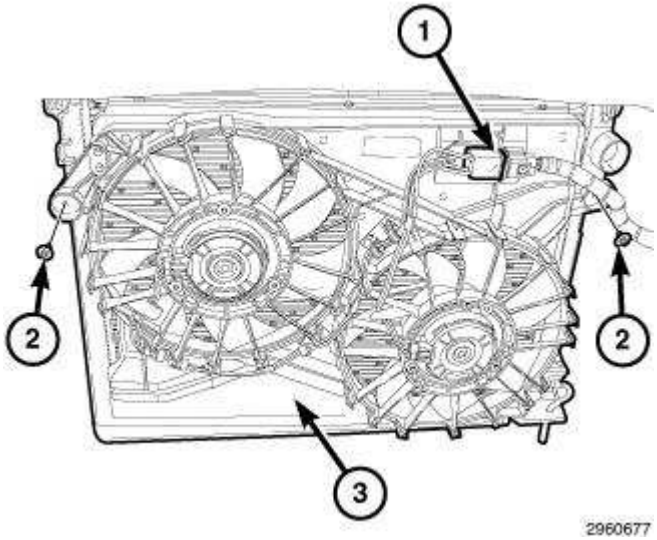

Fig. 436: Cooling Fan Electrical Connector, Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

15. Remove the cooling fan. Refer to **FAN, COOLING, REMOVAL** .

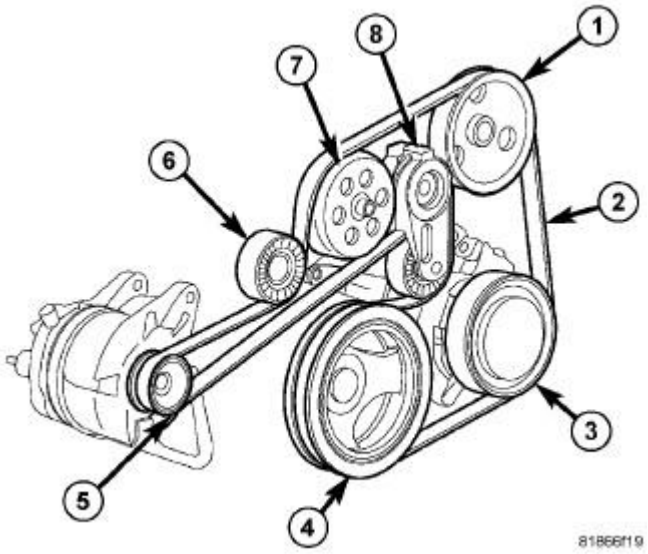

Fig. 437: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

16. Remove the accessory drive belt (2). Refer to **BELT, SERPENTINE, REMOVAL** .
17. Remove the lower radiator hose clamp and remove the lower radiator hose.
18. Remove the idler pulley (6).
19. Remove the belt tensioner (8).

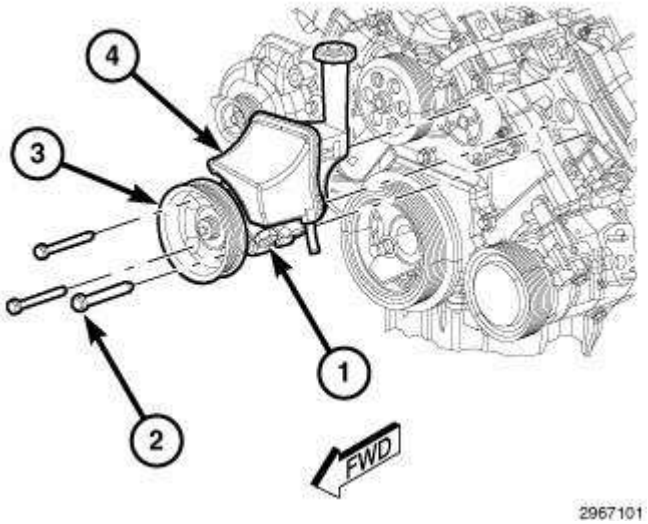

Fig. 438: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to remove the power steering pump hoses for power steering pump removal.**

20. Remove the three power steering pump mounting bolts (2) through the access holes in the pulley (3).
21. Remove the power steering pump (1) from the engine and position aside.

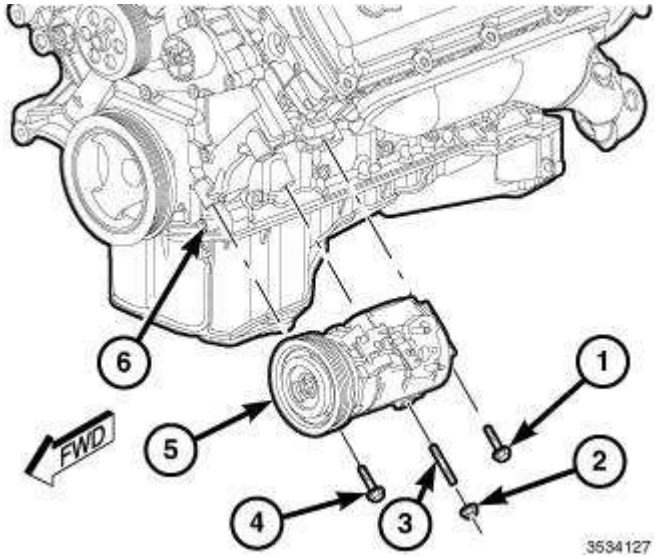

Fig. 439: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

22. Remove A/C compressor from the front timing chain cover and position aside. Refer to **COMPRESSOR, A/C, REMOVAL** .

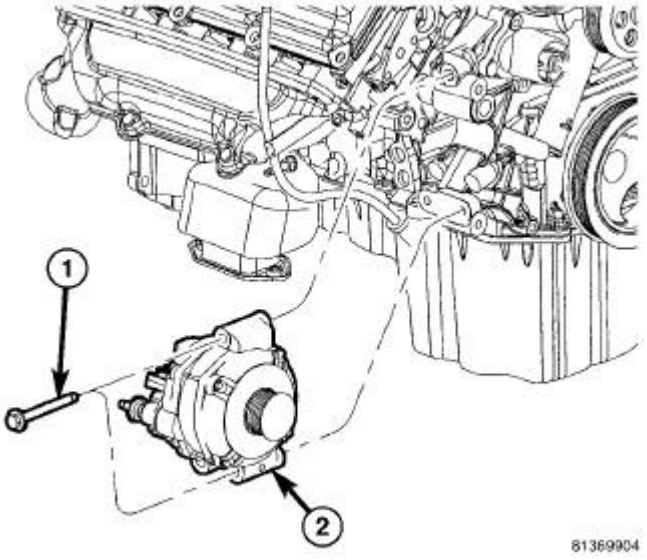

Fig. 440: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

23. Remove the generator from the front timing chain cover and position aside. Refer to **GENERATOR, REMOVAL** .

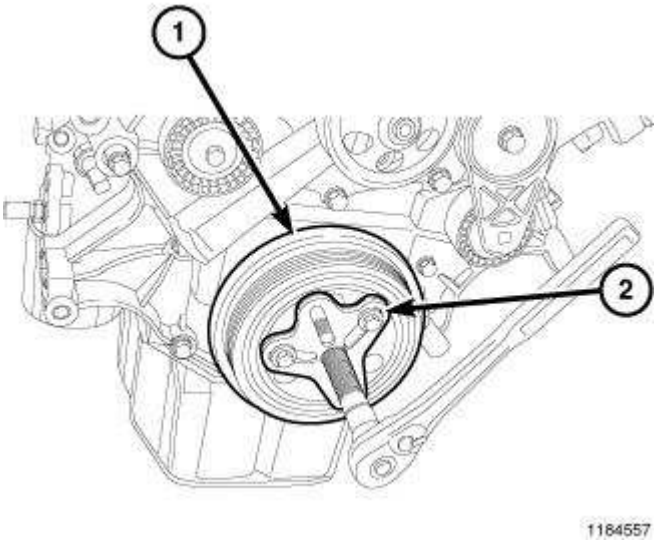

Fig. 441: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.

24. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.
25. Install the puller tool (2) making sure the bolts are fully threaded through the entire crankshaft damper and remove the crankshaft damper (1).

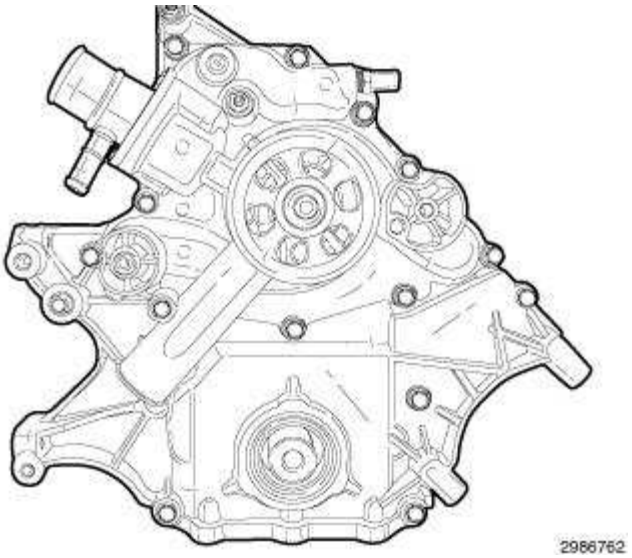

Fig. 442: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove water pump for timing cover removal.

26. Remove the engine timing cover retaining bolts and remove the engine timing cover.

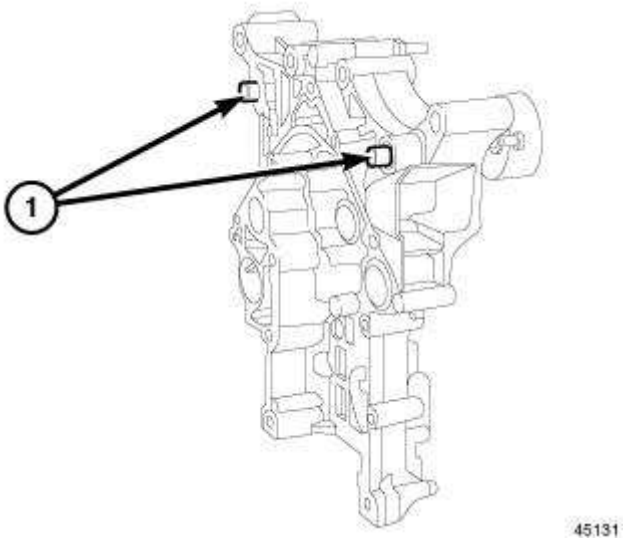

Fig. 443: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

27. Verify that the engine timing cover slide bushings (1) remain located in the engine timing cover.

INSTALLATION

INSTALLATION

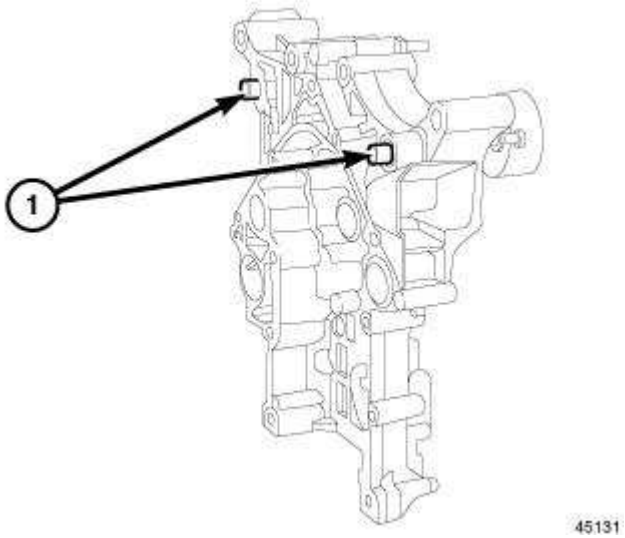

Fig. 444: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

1. Clean the engine timing cover and engine block surface.

NOTE: Always install a new gasket when servicing the engine timing cover.

2. Verify that the engine timing cover slide bushings (1) remain located in the engine timing cover.

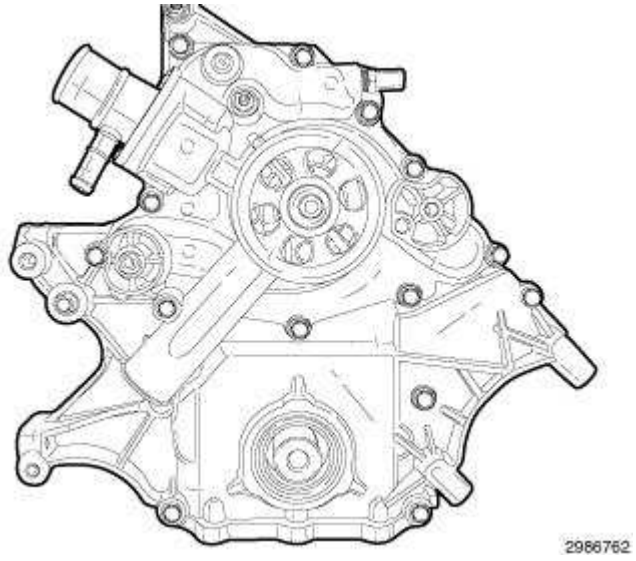

Fig. 445: Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

3. Using a new gasket, install the engine timing cover and tighten the retaining bolts to 28 N.m (21 ft. lbs.).

NOTE: The large lifting stud is torqued to 55 N.m (40 ft. lbs.).

4. Tighten the large lifting stud to 55 N.m (40 ft. lbs.).

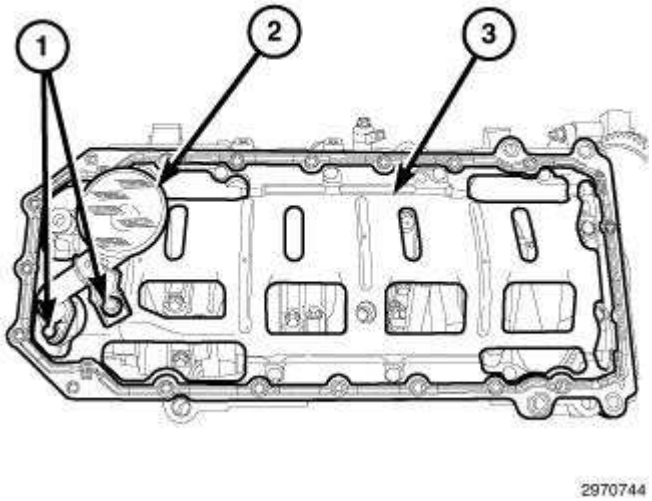

Fig. 446: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Raise and support the vehicle.
6. Install the oil pump pickup tube (2) and the oil pan. Refer to **PAN, OIL, INSTALLATION**.
7. Install the lower radiator hose and clamp.

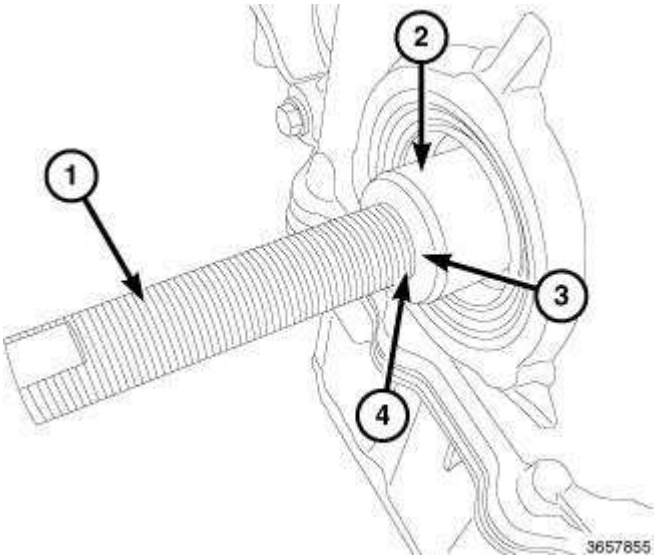

Fig. 447: Installing Vibration Damper Onto Crankshaft Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

8. Assemble the (special tool #10387, Installer, Vibration Damper) as follows:
    1. Install the threaded shaft (1) onto the crankshaft (3) till its seated.
    2. Position the crankshaft damper onto the crankshaft.
    3. Install the thrust washer.
    4. Install the roller bearing onto the threaded shaft making sure the hardened bearing surface is facing away from the crankshaft.
    5. Install the washer.
    6. Install the nut onto the threaded shaft.

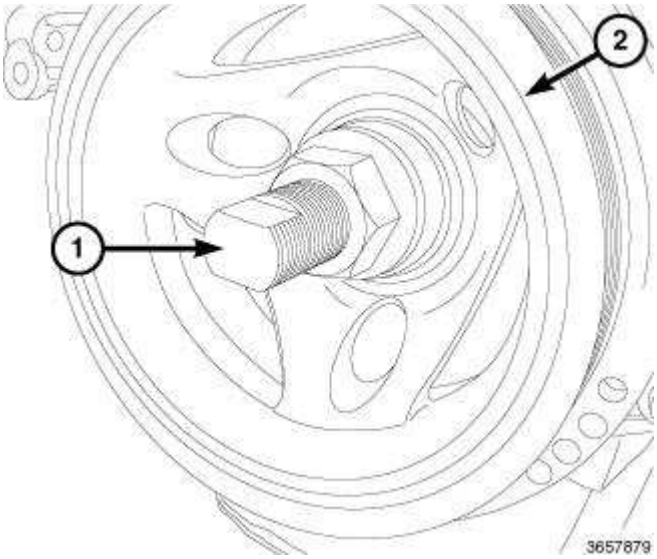

Fig. 448: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

9. Using the crankshaft Damper Installer (1) press the vibration damper (2) onto the crankshaft. Refer to **DAMPER, VIBRATION, INSTALLATION**.
10. Install the crankshaft damper bolt and tighten to 176 N.m (129 ft. lbs.).

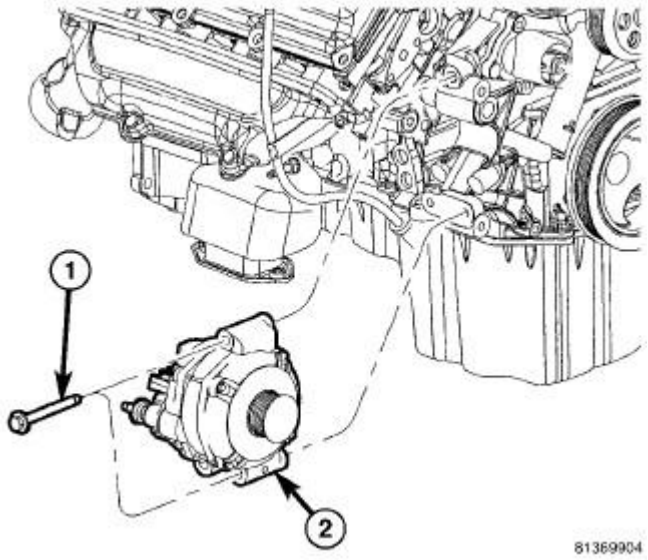

Fig. 449: Generator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Install the generator. Refer to **GENERATOR, INSTALLATION** .

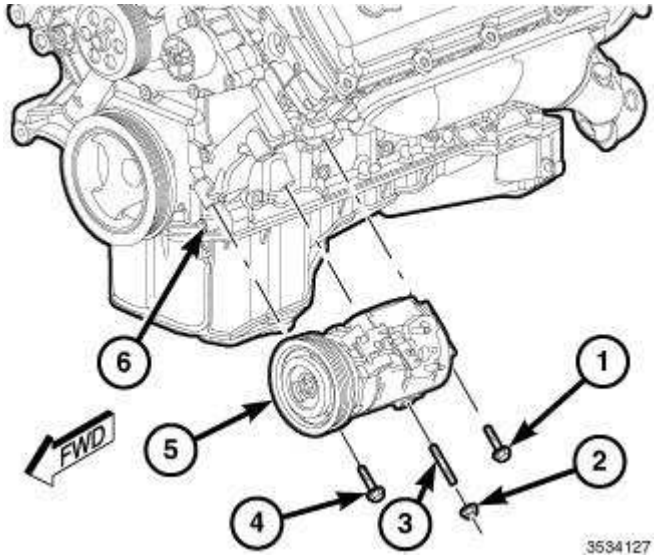

Fig. 450: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

12. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .

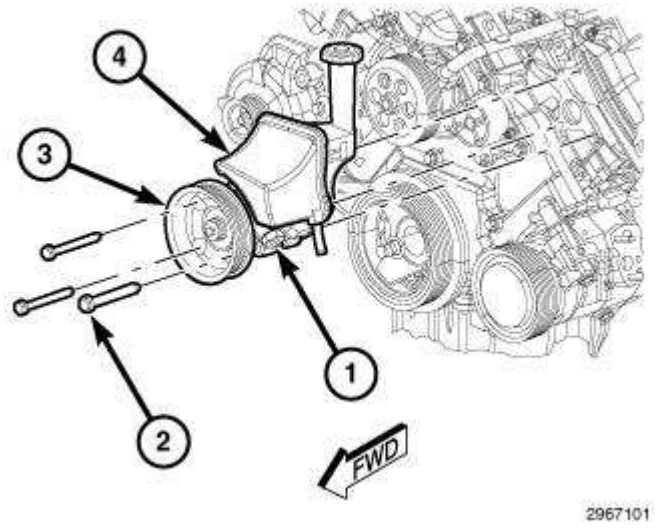

Fig. 451: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Position the power steering pump, align the pump (1) with the mounting holes on the engine.
14. Install the three power steering pump mounting bolts (2) through access holes in the pulley (3) and tighten to 28 N.m (21 ft. lbs.).

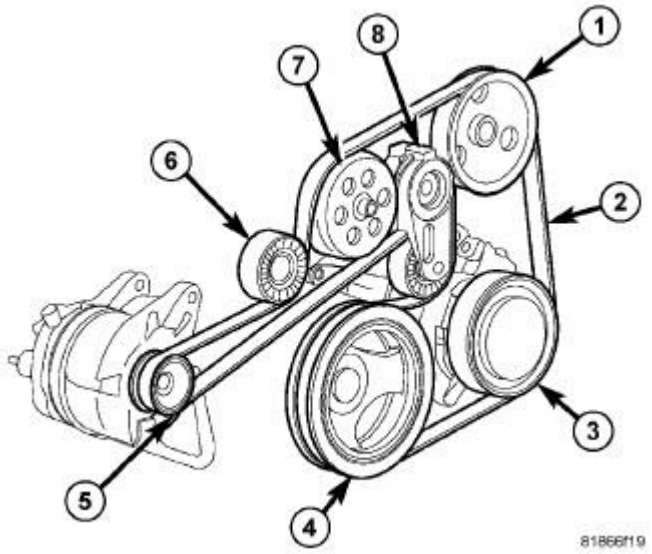

Fig. 452: Accessory Drive Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

15. Install the accessory drive belt tensioner assembly (8) and idler pulley (6).
16. Install the accessory drive belt (2). Refer to **BELT, SERPENTINE, INSTALLATION** .
17. Install the oil dipstick tube and retaining nut.

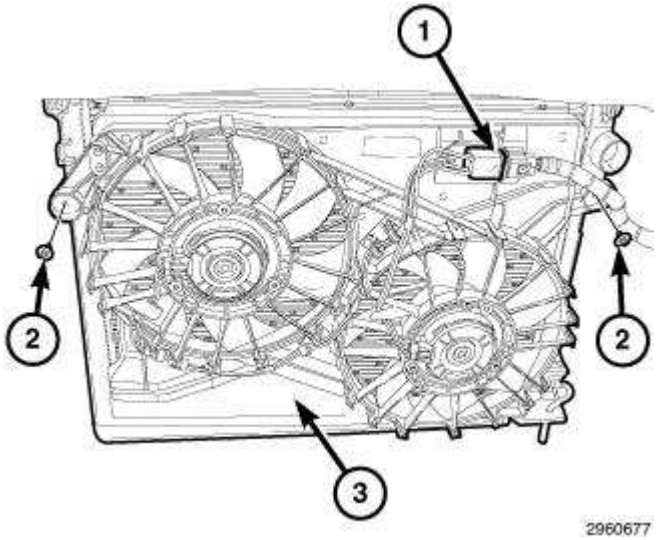

Fig. 453: Cooling Fan Electrical Connector, Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

18. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

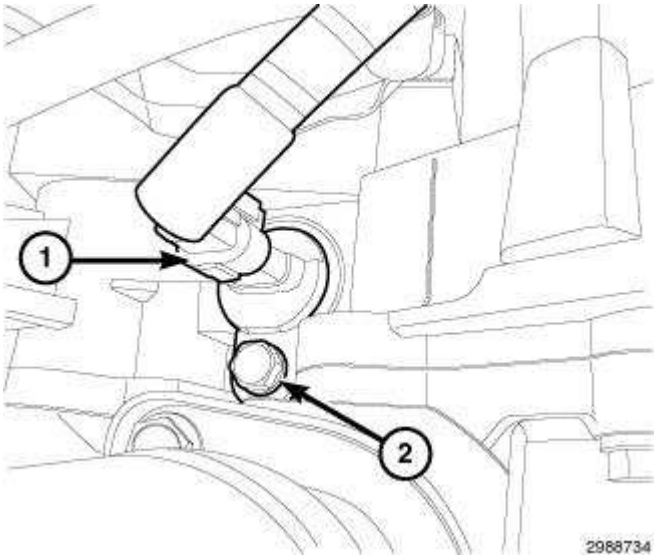

Fig. 454: Camshaft Position Sensor Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

19. Connect the camshaft position sensor electrical connector (1).

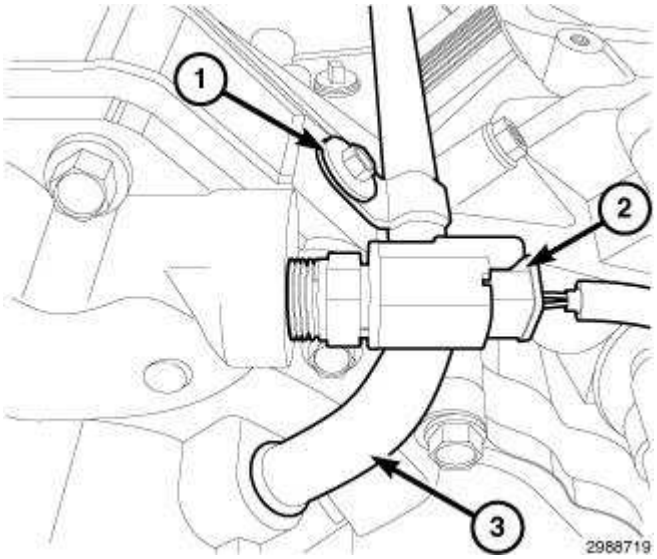

Fig. 455: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

20. Install the heater tube (3) into of the water pump.
21. Install the heater tube retaining bolt (1) and tighten to 12 N.m (9 ft. lbs.).
22. Connect the coolant temperature sensor electrical connector (2).

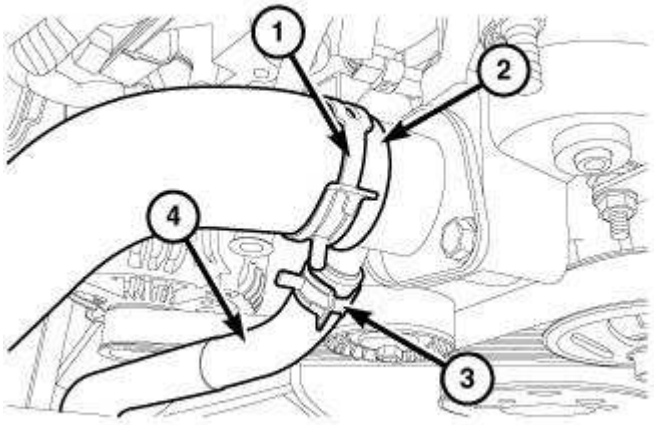

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Fig. 456: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

23. Install the oil cooler hose (4) and clamp (3).
24. Install the upper radiator hose (2) and clamp (1).

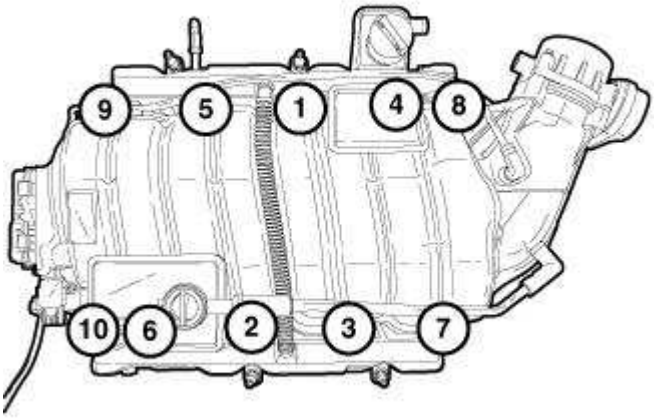

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Fig. 457: Intake Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

25. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
26. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
27. Fill the crankcase with the specified type and amount of engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.

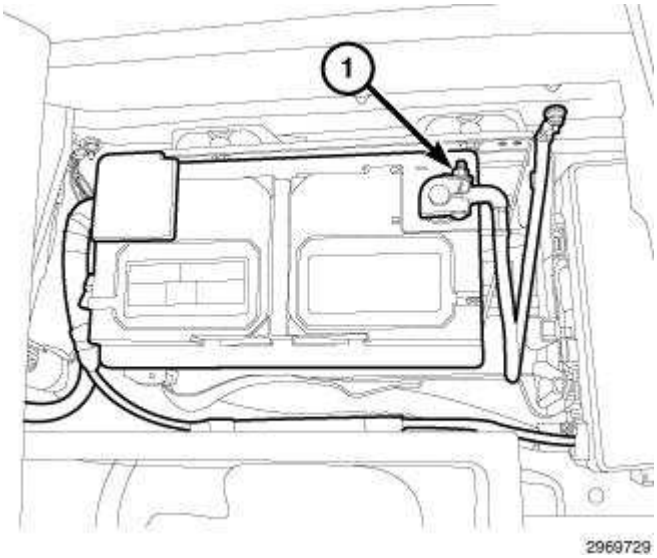

Fig. 458: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

28. Connect the negative battery cable (1).

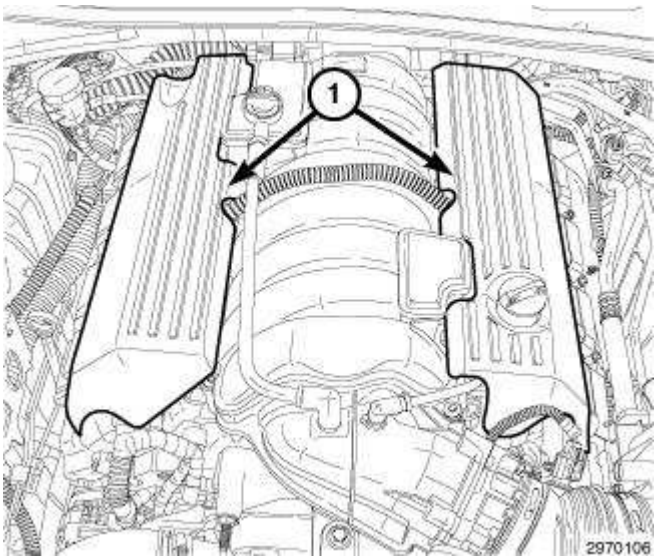

Fig. 459: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

29. Install the engine covers (1).
30. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
31. Start the engine and check for leaks.

TENSIONER, ENGINE TIMING

DESCRIPTION

DESCRIPTION

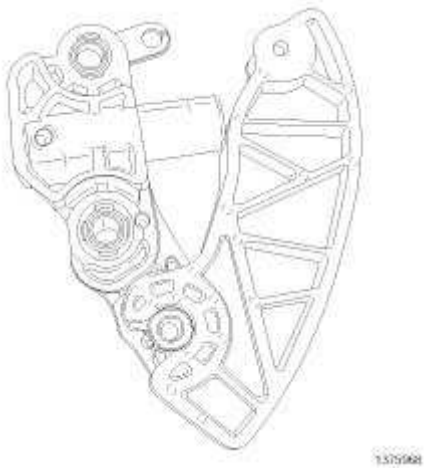

Fig. 460: Timing Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

The timing chain tensioner is a spring loaded design. It consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to keep tension on the chain.

OPERATION

OPERATION

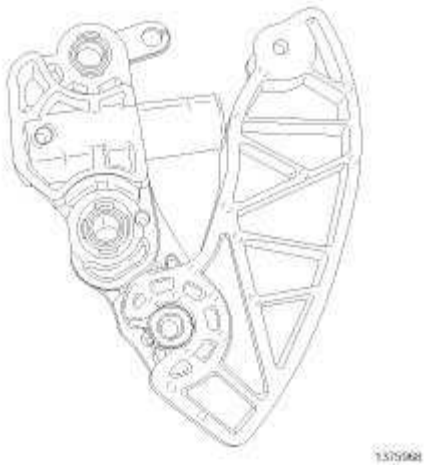

Fig. 461: Timing Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

The timing chain tension is maintained by routing the timing chain through the tensioner assembly. The tensioner assembly consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to maintain the correct timing chain tension.

GENERAL INFORMATION

Commonly Used Abbreviations

* PLEASE READ THIS FIRST *

NOTE: **This article is intended for general information purposes only. This information may not apply to all makes and models. Not all abbreviations are covered as manufacturers add new ones every day.**

"A"

A

Amperes

ABS

Anti-Lock Brakes

ABRS

Air Bag Restraint System

AC

Alternating Current

A/C

Air Conditioning

ACCS

A/C Cycling Switch

ACCUM

Accumulator

ACCY

Accessory

ACT

Air Charge Temperature Sensor

ADJ

Adjust or Adjustable

ADV

Advance

AFS

Airflow Sensor

AI

Air Injection

AIR or A.I.R.

Air Injection Reactor

AIS

Air Injection System

Alt.

Alternator or Altitude

Amp./amp/amps

Ampere

ASCS

Air Suction Control Solenoid

ASD

Auto Shutdown

ASDM

Air Bag System Diagnostic Module

ASV

Air Suction Valve

A/T

Automatic Transmission/Transaxle

ATC

Automatic Temperature Control

ATDC

After Top Dead Center

ATF

Automatic Transmission Fluid

ATS

Air Temperature Sensor

Aux.

Auxiliary

Avg.

Average

AXOD

Automatic Transaxle Overdrive (Ford Models Only)

"B"

BAC

By-Pass Air Control

BAP

Barometric Absolute Pressure Sensor

BARO

Barometric

Batt.

Battery

Bbl.

Barrel (Example: 4-Bbl.)

BCM

Body Control Module

BHP

Brake Horsepower

BMAP

Barometric and Manifold Absolute Pressure Sensor

BOO

Brake On-Off Switch

B/P

Backpressure

BPS

Barometric Pressure Sensor

BPT

Backpressure Transducer

BTDC

Before Top Dead Center

BTSI

Brake Transmission Shift Interlock

BTU

British Thermal Unit

BVSV

Bimetallic Vacuum Switching Valve

"C"

° C

Celsius (Degrees)

Calif.

California

CANP

Canister Purge

CARB

California Air Resources Board

CAT

Catalytic Converter

CB

Circuit Breaker

CBD

Closed Bowl Distributor

cc

cubic centimeter

CCC

Close Coupled Catalyst

CCC

Computer Command Control

CCD

Computer Controlled Dwell

CCOT

Cycling Clutch Orifice Tube

CCW

Counterclockwise

CDI

Capacitor Discharge Ignition

CEC

Computerized Engine Control

CID

Cubic Inch Displacement

cm

Centimeter

CMP

Camshaft Position Sensor

CO

Carbon Monoxide

CO_2

Carbon Dioxide

Cont.

Continued

CONV

Convertible

CP

Canister Purge

CKP

Crankshaft Position Sensor

CTS

Coolant Temperature Sensor

Cu. In.

Cubic Inch

CVC

Constant Vacuum Control

CV

Check Valve or Constant Velocity

CW

Clockwise

CYL or Cyl.

Cylinder

C^3 I

Computer Controlled Coil Ignition

C^4

Computer Controlled Catalytic Converter

"D"

"D"

Drive

DC

Direct Current Or Discharge

DDD

Dual Diaphragm Distributor

Def.

Defrost

Defog.

Defogger

DERM

Diagnostic Energy Reserve Module

DFI

Digital Fuel Injection

Diag.

Diagnostic

DTC

Diagnostic Trouble Code

DIC

Driver Information Center

DIS

Distributorless Ignition System

DIST

Distribution

DLC

Data Link Connector

DOC

Diesel Oxidation Catalyst

DOHC

Double Overhead Cam

DOT

Department of Transportation

DPF

Diesel Particulate Filter

DRB-II

Diagnostic Readout Box

DVOM

Digital Volt-Ohmmeter

"E"

EACV

Electric Air Control Valve

EATX

Electronic Automatic Transaxle

EBCM

Electronic Brake Control Module

EBL

Electronic Back Light

ECM

Engine Control Module

ECT

Engine Coolant Temperature Sensor

EDIS

Electronic Distributorless Ignition System

EEC

Electronic Engine Control

EECS

Evaporative Emission Control System

EEPROM

Electronically Erasable PROM

EFE

Early Fuel Evaporation

EGO

Exhaust Gas Oxygen Sensor

EGR

Exhaust Gas Recirculation

EOT

Engine Oil Temperature

ESA

Electronic Spark Advance

ESC

Electronic Spark Control

EST

Electronic Spark Timing

EVAP

Fuel Evaporative System

EVIC

Electronic Vehicle Information Center

EVP

EGR Valve Position Sensor

EWMA

Exponentially Weighted Moving Average (MODE 6)

Exc.

Except

"F"

° F

Fahrenheit (Degrees)

F/B

Fuse Block

Fed.

Federal

FI

Fuel Injection

FICU

Fuel Injection Control Unit

FIPL

Fuel Injector Pump Lever

FLI

Fuel Level Indicator

FPR-VSV

Fuel Pressure Regulator Vacuum Switching Valve

Ft. Lbs.

Foot Pounds

FWD

Front Wheel Drive

"G"

g

grams

Gals.

gallons

GND or GRND

Ground

"H"

HAC

High Altitude Compensation

HC

Hydrocarbons

H/D

Heavy Duty

HO2S

Heated Exhaust Gas Oxygen Sensor

Hg

Mercury

Hgt.

Height

HLDT

Headlight

HO

High Output

HO2S

Heated Oxygen Sensor

HP

High Performance

HSC

High Swirl Combustion

HSO

High Specific Output

HTR

Heater

Hz

Hertz (Cycles Per Second)

"I"

IAC

Idle Air Control

IACV

Idle Air Control Valve

IAT

Intake Air Temperature

IC

Integrated Circuit

ID

Identification

I.D.

Inside Diameter

IFS

Independant Front Suspension

IFS

Inertia Fuel Shutoff (Ford)

Ign.

Ignition

IMRC

Intake Manifold Runner Control

In.

Inches

INCH Lbs.

Inch Pounds

in. Hg

Inches of Mercury

Inj.

Injector

IP

Instrument Panel

IRS

Independant Rear Suspension

ISC

Idle Speed Control

IVD

Interactive Vehicle Dynamics (Ford)

IVSV

Idle Vacuum Switching Valve

"J"

J/B

Junction Block

"K"

KAPWR

Keep Alive Power

k/ohms

kilo-ohms (1000 ohms)

kg

Kilograms (weight)

kg/cm^2

Kilograms Per Square Centimeter

KM/H

Kilometers Per Hour

KOEO

Key On, Engine Off

KOER

Key On, Engine Running

KS

Knock Sensor

kW

Kilowatt

kV

Kilovolt

"L"

L

Liter

lbs. (Lbs. when used in table)

Pounds

LCD

Liquid Crystal Display

L/D

Light Duty

LDP

Leak Detection Pump (Part of EVAP system.)

LED

Light Emitting Diode

LH

Left Hand

"M"

mA

Milliamps

MA or MAF

Mass Airflow

MAFS

Mass Airflow Sensor

MAP

Manifold Absolute Pressure

MAT

Manifold Air Temperature

Mem.

Memory

MEM-CAL

Memory Calibration Chip

mfd.

Microfarads

MFI

Multiport Fuel Injection

MICU

Multiplex Integrated Control Unit (Acura/Honda)

MIL

Malfunction Indicator Light

MPI

Multi-Point (Fuel) Injection

mm

Millimeters

MPH

Miles Per Hour

mV

Millivolts

"N"

NA

Not Available

NAC

NOx Adsorber Catalyst

NCA

No Color Available (Wiring Diagrams)

NGS

New Generation Star

N.m

Newton Meter

No.

Number

Nos.

Numbers

NOx

Oxides of Nitrogen

"O"

O_2

Oxygen

OBD

On-Board Diagnostics

OC

Oxidation Catalyst

OD

Overdrive

O.D.

Outside Diameter

OHC

Overhead Camshaft

OSS

Output Speed Sensor

O/S

Oversize

oz.

Ounce

ozs.

Ounces

"P"

"P"

Park

P/C

Printed Circuit

PCM

Powertrain Control Module

PCS

Purge Control Solenoid

PC-SOL

Purge Control Solenoid

PCV

Positive Crankcase Ventilation

PFI

Port Fuel Injection

PGM-FI

Programmed Fuel Injection

PID

Parameter Identification

PIP

Profile Ignition Pick-up

PNP

Park Neutral Position Switch

P/N

Park/Neutral

PRNDL

Park Reverse Neutral Drive Low

PROM

Programmable Read-Only Memory

psi

Pounds Per Square Inch

P/S

Power Steering

PSPS

Power Steering Pressure Switch

PTC

Positive Temperature Coefficient

PTO

Power Take-Off

Pts.

Pints

Pwr.

Power

"Q"

Qts.

Quarts

"R"

RABS

Rear Anti-Lock Brake System

RECIRC

Recirculation

RH

Right Hand

RPM

Revolutions Per Minute

RWAL

Rear Wheel Anti-Lock Brake

RWD

Rear Wheel Drive

"S"

SAS

Steering Angle Sensor

SBC

Single Bed Converter

SBEC

Single Board Engine Controller

SDARS

Satellite Digital Audio Radio Service

SES

Service Engine Soon

SFI

Sequential (Port) Fuel Injection

SIL

Shift Indicator Light

SIR

Supplemental Inflatable Restraint

SOHC

Single Overhead Cam

SOL or Sol.

Solenoid

SPFI

Sequential Port Fuel Injection

SPK

Spark Control

SPOUT

Spark Output

SRI

Service Reminder Indicator

SRS

Supplemental Restraint System (Air Bag)

STAR

Self-Test Automatic Readout

STO

Self-Test Output

SUB-O_2

Sub Oxygen Sensor

Sw.

Switch

Sys.

System

"T"

TAB

Thermactor Air By-Pass

TAC

Throttle Actuator Module

TAD

Thermactor Air Diverter

TBC

Body Control Module (General Motors)

TBI

Throttle Body Injection

TCC

Torque Converter Clutch

TDC

Top Dead Center

Temp.

Temperature

TFI

Thick Film Ignition

THERMAC

Thermostatic Air Cleaner

TPM

Tire Pressure Monitor

TPMS

Tire Pressure Monitor System

TPS

Throttle Position Sensor/Switch

TS

Temperature Sensor

TV

Thermovalve

TWC

Three-Way Catalyst

"V"

V

Valve

Vac.

Vacuum

VAF

Vane Airflow

VAPS

Variable Assist Power Steering

VCC

Viscous Converter Clutch

VCRM

Variable Control Relay Module

VIN

Vehicle Identification Number

VM

Vacuum Modulator

Volt.

Voltage

VOM

Volt-Ohmmeter (Analog)

VRV

Vacuum Regulator Valve

VSS

Vehicle Speed Sensor

VSV

Vacuum Switching Valve

"W"

W/

With

W/O

Without

WAC

Wide Open Throttle A/C Switch

WOT

Wide Open Throttle

BRAKES

Antilock Brake System (ABS) - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

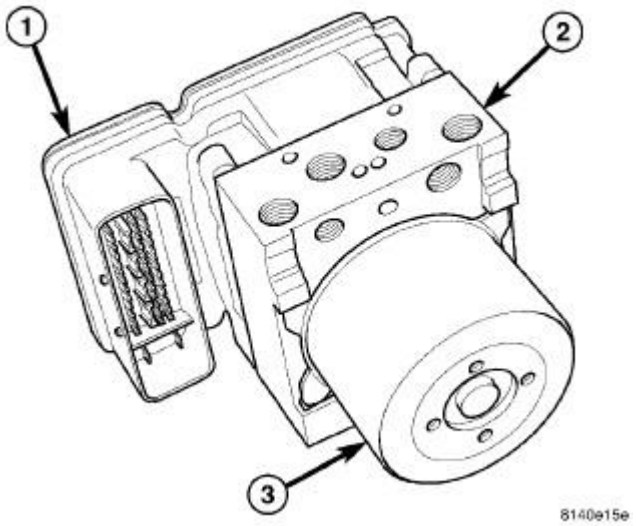

Fig. 1: Integrated Control Unit
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

This vehicle uses an electronic brake control system designated MK25e. This system includes ABS (Antilock Brake System), TCS (Traction Control System), BAS (Brake Assist System), EVBP (Electronic Variable Brake Proportioning) and ESC (Electronic Stability Control). All of these systems work together to enhance vehicle stability and control in various driving conditions and are commonly referred to as ESC.

This system uses components of the base brake system, but also features the following components:

- Integrated Control Unit (ICU) - Includes Hydraulic Control Unit (HCU) (2) and Antilock Brake Module (ABM) (1)
- Wheel Speed Sensors (WSS) - Four sensors (one at each wheel)
- Dynamics Sensor - Includes a yaw rate sensor and a lateral accelerometer.
- Steering Angle Sensor (SAS) - The SAS is part of the Steering Column Control Module

(SCCM).

- Brake Pressure Sensor - The brake pressure sensor is located in the HCU and is not serviceable separate from the HCU.

ABS

The purpose of the Antilock Brake System (ABS) is to prevent wheel lockup under braking conditions on virtually any type of road surface. Antilock braking is desirable because a vehicle that is stopped without locking the wheels retains directional stability and some steering capability. This allows the driver to retain greater control of the vehicle during braking.

ALL-SPEED TRACTION CONTROL

The traction control system (TCS) is an all-speed traction control. All-Speed Traction Control enhances mobility and prevents wheel slip when accelerating on slippery surfaces. It also provides a measure of directional stability control. Using the wheel-speed sensors, it can detect excessive yaw and help keep the car on the intended course, as for instance, when accelerating around a curve.

With rear-wheel drive, All-Speed Traction Control is effective up to 85 mph (137 km/h); with AWD, All-Speed Traction Control is effective up to 45 mph (72 km/h), which is common among competitive AWD vehicles with traction control.

ELECTRONIC STABILITY CONTROL

The Electronic Stability Control (ESC) enhances control and stability of the vehicle under various driving conditions. ESC corrects for over/under steering of the vehicle by applying the brake of the appropriate wheel to assist in counteracting the over/under steer condition. Engine power may also be reduced to help the vehicle maintain the desired path. ESC uses sensors in the vehicle to determine the vehicle path intended by the driver and compares it to the actual path of the vehicle. When the actual path does not match the intended path, ESC applies the brake of the appropriate wheel to assist in counteracting the oversteer or understeer condition.

- Oversteer - When the vehicle is turning more that appropriate for the steering wheel position.
- Understeer - When the vehicle is turning less than appropriate for the steering wheel position.

The "ESC/TCS" indicator light located in the instrument cluster starts to flash as soon as the tires lose traction and the ESC system becomes active. The "ESC/TCS" indicator light also flashes when TCS is active.

The ESC can be turned off by using the ESC Off switch. When the ESC Off switch is depressed, it does not completely turn the system off. The ESC system shuts off engine management but retains brake activations for yaw control.

BRAKE ASSIST SYSTEM

The Brake Assist System (BAS) is designed to optimize the vehicle's braking capability during emergency braking maneuvers. The system detects an emergency braking situation by sensing the

rate and amount of brake application and then applies optimum pressure to the brakes. This can help reduce braking distances. The BAS complements the antilock brake system (ABS). Applying the brakes very quickly results in the best BAS assistance.

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Electronic Variable Brake Proportioning (EVBP) is used to balance front-to-rear braking in place of a traditional rear proportioning valve. The EVBP system uses the ABS system to control the slip of the rear wheels in partial braking range. The braking force of the rear wheels is controlled electronically by using the inlet and outlet valves located in the integrated control unit (ICU).

EVBP activation is invisible to the customer since there is no pump motor noise or brake pedal feedback.

OPERATION

OPERATION

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

ABS

There are a few performance characteristics of the Antilock Brake System (ABS) that may at first seem abnormal, but in fact are normal. These characteristics are described below.

NORMAL BRAKING

Under normal braking conditions, the ABS functions the same as a standard base brake system with a front/rear split master cylinder and conventional vacuum assist.

ABS BRAKING

ABS operation is available at all vehicle speeds above 3-5 mph. If a wheel locking tendency is detected during a brake application, the brake system enters the ABS mode. During ABS braking, hydraulic pressure in the four wheel circuits is modulated to prevent any wheel from locking. Each wheel circuit is designed with a set of electric solenoids to allow modulation. Wheel lockup may be perceived at the very end of an ABS stop and is considered normal.

During an ABS event, the integrated control unit (ICU) regulates hydraulic pressure at all four of the vehicle's wheels.

The hydraulic pressure at each front wheel is controlled independently (relative to the amount of slip at each wheel) in order to maximize the braking force generated by the front brakes. The rear wheels are controlled such that the hydraulic pressure at either rear wheel does not exceed that of the

highest slip rear wheel in order to maintain vehicle stability.

The system can build and release pressure at each wheel, depending on signals generated by the wheel speed sensors (WSS) at each wheel and received at the Antilock Brake Module (ABM).

NOISE AND BRAKE PEDAL FEEL

During ABS braking, some brake pedal movement may be felt. In addition, ABS braking will create ticking, popping, or groaning noises heard by the driver. This is normal and is due to pressurized fluid being transferred between the master cylinder and the brakes. If ABS operation occurs during hard braking, some pulsation may be felt in the vehicle body due to fore and aft movement of the suspension as brake pressures are modulated.

At the end of an ABS stop, ABS is turned off when the vehicle is slowed to a speed of 3-4 mph. There may be a slight brake pedal drop anytime that the ABS is deactivated, such as at the end of the stop when the vehicle speed is less than 3 mph or during an ABS stop where ABS is no longer required. These conditions exist when a vehicle is being stopped on a road surface with patches of ice, loose gravel, or sand on it. Also, stopping a vehicle on a bumpy road surface activates ABS because of the wheel hop caused by the bumps.

TIRE NOISE AND MARKS

Although the ABS system prevents complete wheel lockup, some wheel slip is desired in order to achieve optimum braking performance. Wheel slip is defined as follows: 0 percent slip means the wheel is rolling freely and 100 percent slip means the wheel is fully locked. During brake pressure modulation, wheel slip is allowed to reach up to 25-30 percent. This means that the wheel rolling velocity is 25-30 percent less than that of a free rolling wheel at a given vehicle speed. This slip may result in some tire chirping, depending on the road surface. This sound should not be interpreted as total wheel lockup.

Complete wheel lockup normally leaves black tire marks on dry pavement. The ABS will not leave dark black tire marks since the wheel never reaches a fully locked condition. However, tire marks may be noticeable as light patched marks.

START-UP AND DRIVE-OFF CYCLES

When the ignition is turned on, a popping sound and a slight brake pedal movement may be noticed. The ABS warning lamp will also be on for up to 5 seconds after the ignition is turned on.

When the vehicle is first driven off, a humming may be heard or felt by the driver at approximately 12-25 mph (20-40 km/h). All of these conditions are a normal function of ABS as the system is performing a diagnosis check.

PREMATURE ABS CYCLING

Symptoms of premature ABS cycling include: clicking sounds from the solenoid valves; pump/motor running; and pulsations in the brake pedal. Premature ABS cycling can occur at any braking rate of the vehicle and on any type of road surface. Neither the red BRAKE indicator lamp, nor the amber

ABS indicator lamp, illuminate and no faults are stored in the ABM.

Premature ABS cycling is a condition that needs to be correctly assessed when diagnosing problems with the antilock brake system. It may be necessary to use a scan tool to detect and verify premature ABS cycling.

Check the following common causes when diagnosing premature ABS cycling: damaged wheel bearings (causing tone wheel issues); damaged wheel bearing housings where wheel speed sensors mount; and loose wheel speed sensor mounting bolts.

After diagnosing the defective component, repair or replace it as required. When the component repair or replacement is completed, test drive the vehicle to verify that premature ABS cycling has been corrected.

ALL-SPEED TRACTION CONTROL

Traction control systems sense impending wheel spin based on a model of the rate of change of wheel speed under normal traction conditions. The All-Speed Traction Control uses signals from the same wheel speed sensors as ABS to determine when to apply the brakes to one or more wheels and when to reduce engine torque output using the electronic throttle control (ETC) to prevent wheel slip during acceleration. Throttle control makes the vehicle less reliant on brake application alone to maintain traction, increasing the operating speed range and more closely modulates speed, resulting in smoother operation. With All-Speed Traction Control reducing engine torque as well as applying the brakes, it is possible to achieve almost seamless torque application at the wheels.

If the wheel slip is severe enough to require throttle intervention, All-Speed Traction Control will reduce engine torque and sometimes upshift the transmission to avoid the condition. In milliseconds, All-Speed Traction Control interrogates the engine control system to determine the current torque output, determines how much the torque output the current conditions will allow, and signals this requirement to the engine control system, which reduces the torque by partially closing the throttle. With execution of the torque reduction, the brake system reduces brake pressure to make the transition smooth, while maintaining forward progress. By reducing engine power, braking effectiveness is maintained and the system can operate throughout the normal vehicle speed range. That is why the system is identified as providing "all-speed" traction control.

With AWD, where front-wheel slip can occur, the degree of throttle intervention is relatively less than with rear-wheel drive. The difference in speed capability and the degree of throttle intervention between rear-wheel drive and all-wheel drive is due to the fact that non-driven front wheels on a rear-wheel drive vehicle give the system an accurate vehicle speed reference on which to base responses. With AWD, the possibility that the front wheels may also be slipping makes appropriate corrective action more difficult to determine, thus limiting the effective speed range. Offsetting this is the fact that loss of traction is less likely with AWD because torque is transmitted through all four wheels to begin with. In actual driving situations on snow or ice, the rear-wheel drive and AWD systems respond in essentially the same way up to the 45 mph (72 km/h) limit of the AWD system.

ELECTRONIC STABILITY CONTROL

To determine whether the car is responding properly to cornering commands, ESC uses steering

wheel angle, yaw (turning) rate and lateral acceleration sensors (combined into Dynamics Sensor). Using signals from these sensors, in addition to individual wheel speed sensor signals, the system determines appropriate brake and throttle actions. Once initiated, ESC operates much like All-Speed Traction Control, except that the goal is directional stability. If the vehicle yaw response, or rate of turning, is inconsistent with the steering angle and vehicle speed indications, the ESC system applies the brakes and, if necessary closes the throttle, to restore control. This occurs whether the vehicle is turning too rapidly (oversteering) or not rapidly enough (understeering).

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Upon entry into EVBP the inlet valve for the rear brake circuit is switched ON so that the fluid supply from the master cylinder is shut off. In order to decrease the rear brake pressure, the outlet valve for the rear brake circuit is pulsed. This allows fluid to enter the low pressure accumulator (LPA) in the Hydraulic Control Unit (HCU) resulting in a drop in fluid pressure to the rear brakes. In order to increase the rear brake pressure, the outlet valve is switched off and the inlet valve is pulsed. This increases the pressure to the rear brakes. This back-and-forth process will continue until the required slip difference is obtained. At the end of EVBP braking (brakes released) the fluid in the LPA drains back to the master cylinder by switching on the electronic shuttle valve.

The EVBP will remain functional during many ABS fault modes. If both the red BRAKE and amber ABS warning indicators are illuminated, the EVBP may not be functioning.

STANDARD PROCEDURE

STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING

The base brake's hydraulic system must be bled anytime air enters the hydraulic system. The ABS must always be bled anytime it is suspected that the HCU has ingested air.

Brake systems with ABS must be bled as two independent braking systems. The non-ABS portion of the brake system with ABS is to be bled the same as any non-ABS system.

The ABS portion of the brake system must be bled separately. Use the following procedure to properly bleed the brake hydraulic system including the ABS.

NOTE: During the brake bleeding procedure, be sure the brake fluid level remains close to the FULL level in the master cylinder fluid reservoir. Check the fluid level periodically during the bleeding procedure and add Mopar® DOT 3 brake fluid as required.

BLEEDING

When bleeding the ABS system, the following bleeding sequence must be followed to insure complete and adequate bleeding.

1. Make sure all hydraulic fluid lines are installed and properly torqued.
2. Connect the scan tool to the diagnostics connector. The diagnostic connector is located under

the lower steering column cover to the left of the steering column.

3. Using the scan tool, check to make sure the ABM does not have any fault codes stored. If it does, clear them.

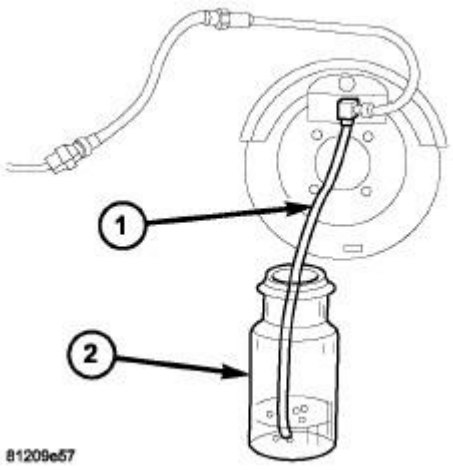

Fig. 2: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

WARNING: When bleeding the brake system wear safety glasses. A clear bleed tube (1) must be attached to the bleeder screws and submerged in a clear container filled part way with clean brake fluid (2). Direct the flow of brake fluid away from yourself and the painted surfaces of the vehicle. Brake fluid at high pressure may come out of the bleeder screws when opened.

NOTE: Pressure bleeding is recommended to bleed the base brake system to ensure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.

4. Bleed the base brake system. Refer to **STANDARD PROCEDURE** .
5. Using the scan tool, select ECU VIEW, followed by ABS MISCELLANEOUS FUNCTIONS to access bleeding. Follow the instructions displayed. When finished, disconnect the scan tool and proceed.
6. Bleed the base brake system a second time. Check brake fluid level in the reservoir periodically to prevent emptying, causing air to enter the hydraulic system.

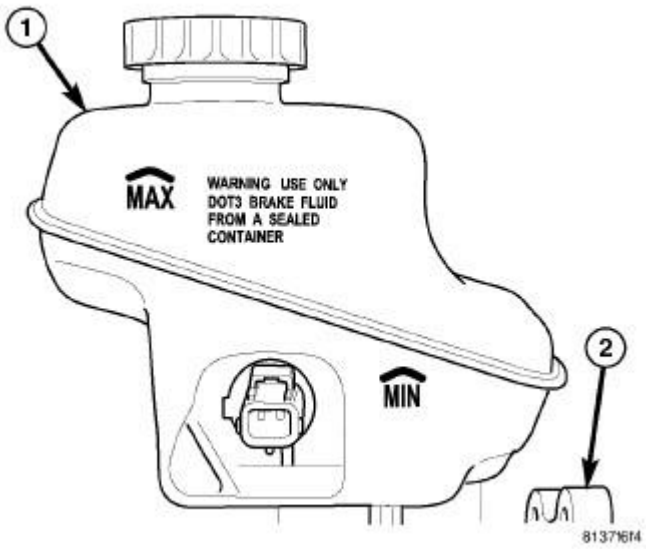

Fig. 3: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

7. Fill the master cylinder fluid reservoir (1) to the MAX level.
8. Test drive the vehicle to be sure the brakes are operating correctly and that the brake pedal does not feel spongy.

SPECIFICATIONS

TORQUE

For ABS fastener torque specifications, see Brake Fastener Torque. Refer to **SPECIFICATIONS** .

ELECTRICAL

SENSOR, DYNAMICS

DESCRIPTION

DESCRIPTION

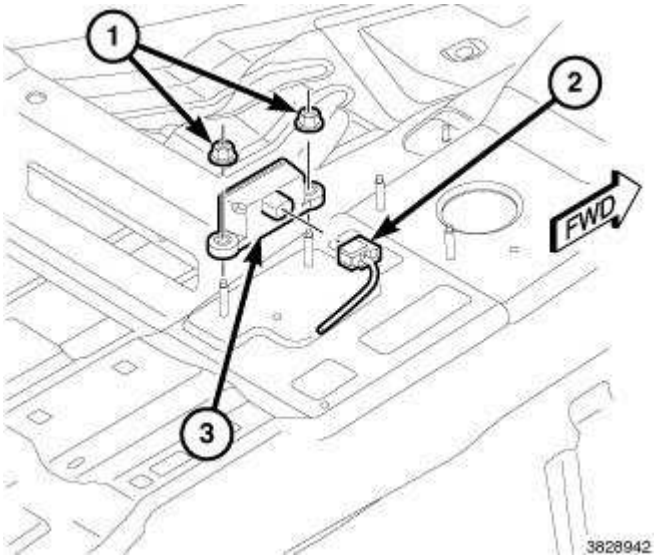

Fig. 4: Dynamics Sensor
Courtesy of CHRYSLER GROUP, LLC

The Yaw Rate and Lateral Acceleration Sensors are housed into one unit known as the Dynamics Sensor (3). The sensor is used to measure side-to-side (Lateral) motion and vehicle rotational sensing (how fast the vehicle is turning - Yaw).

Yaw and Lateral Acceleration Sensors cannot be serviced separately. The entire Dynamics Sensor must be replaced when necessary.

REMOVAL

REMOVAL

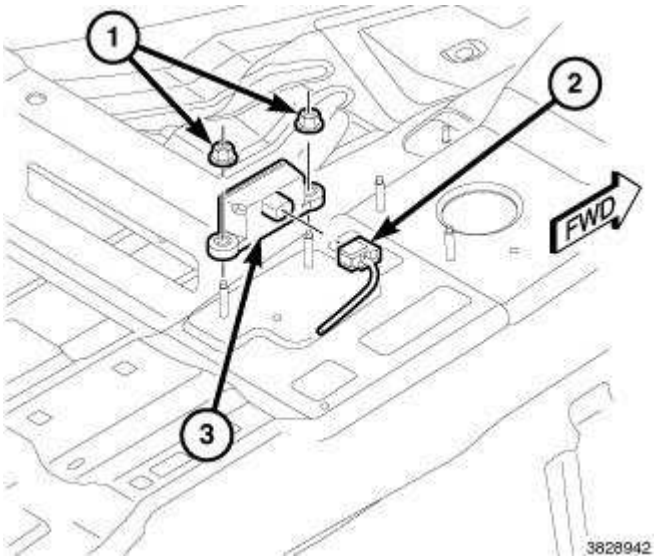

Fig. 5: Dynamics Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable from battery post.
2. Remove floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Disconnect wiring harness (2) connector at sensor (3).
4. Remove nuts (1) mounting sensor (3) to floor pan tunnel.
5. Remove dynamics sensor (3) from vehicle.

INSTALLATION

INSTALLATION

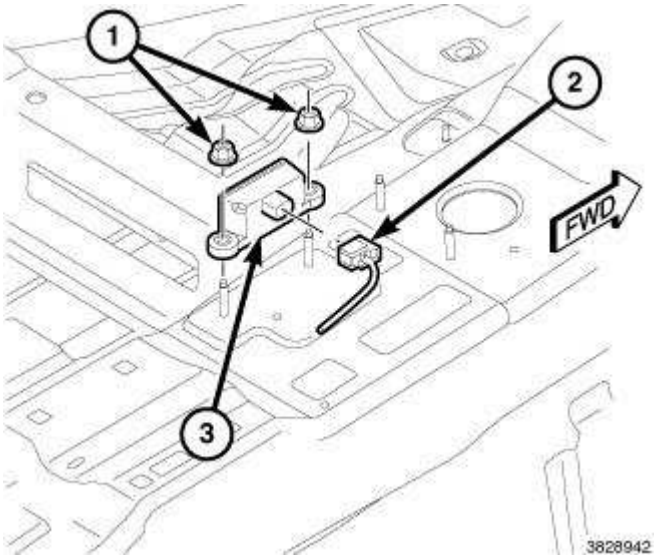

Fig. 6: Dynamics Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install dynamics sensor (3) over studs mounted to floor pan tunnel.
2. Install mounting nuts (1) and tighten to 7 N.m (62 in. lbs.).
3. Connect wiring harness (2) connector to sensor (3).
4. Install floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .
5. Connect battery negative cable to battery post. It is important that this is performed properly.
6. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SENSOR, STEERING WHEEL ANGLE

REMOVAL

REMOVAL

The steering angle sensor is serviced as an assembly with the steering column control module (SCCM). Refer to **MODULE, STEERING COLUMN, REMOVAL** .

INSTALLATION

INSTALLATION

The steering angle sensor is serviced as an assembly with the steering column control module (SCCM). Refer to **MODULE, STEERING COLUMN, INSTALLATION** .

SENSOR, WHEEL SPEED, FRONT

DESCRIPTION

DESCRIPTION

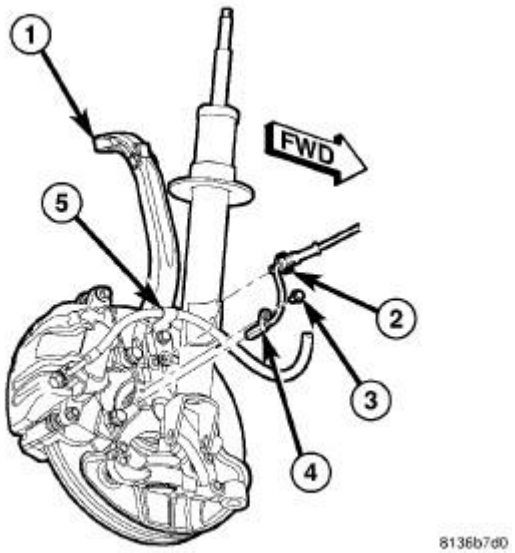

Fig. 7: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

One wheel speed sensor is mounted to each knuckle. The wheel speed sensor, using a tone wheel attached to the hub and bearing (RWD) or front half shaft (AWD) as a trigger mechanism, communicates with the Antilock Brake Module, informing it of that wheel's speed.

The head of the front wheel speed sensor used on Rear-Wheel-Drive (RWD) vehicles mounts to the inside of the knuckle.

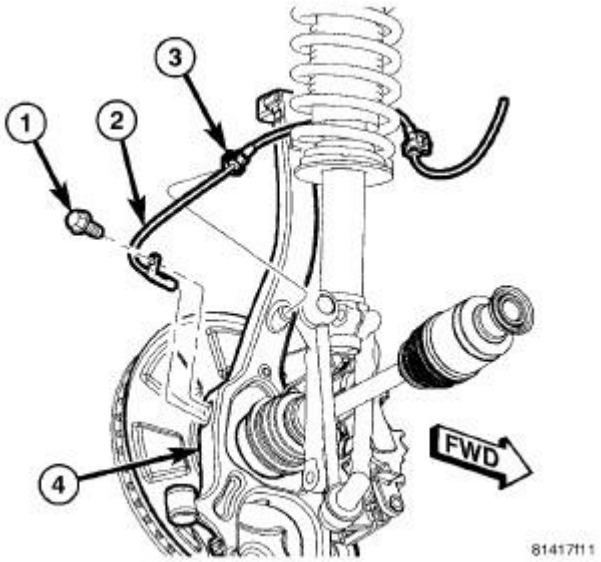

Fig. 8: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

The head of the front wheel speed sensor used on All-Wheel-Drive (AWD) vehicles mounts to the rear of the knuckle.

Vehicles without antilock brakes are equipped with one front wheel speed sensor. It is attached to the right front knuckle and is used to provide wheel speed sense to various vehicle systems.

REMOVAL

ALL-WHEEL-DRIVE

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

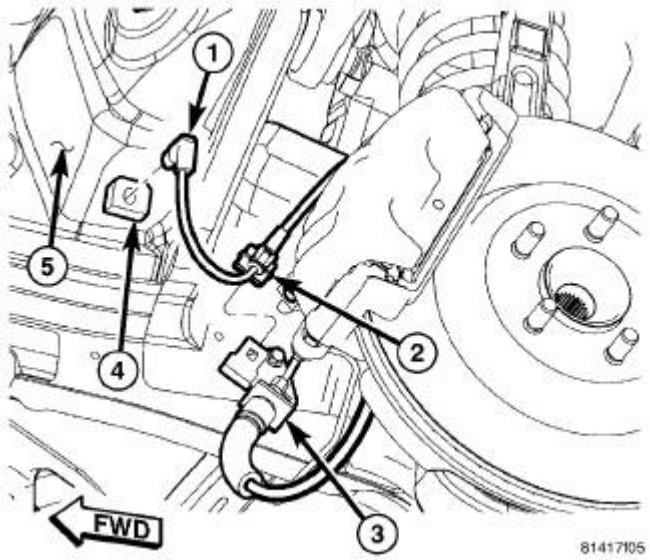

Fig. 9: Wheel Speed Sensor AT Body - AWD
Courtesy of CHRYSLER GROUP, LLC

2. Remove sensor cable routing clip (2) from brake hose bracket (3).

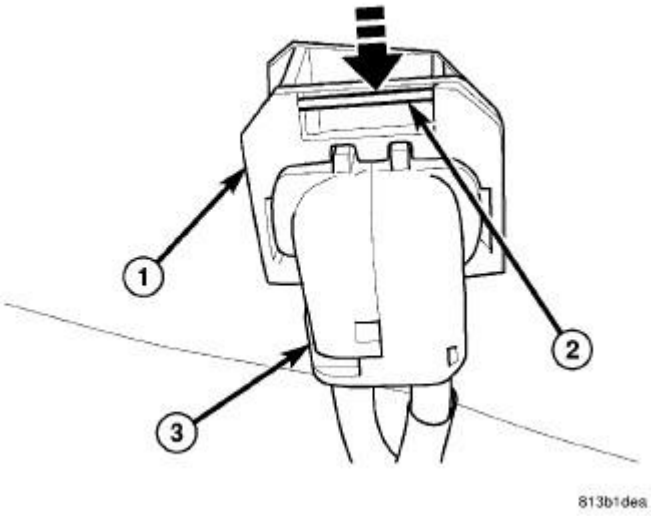

Fig. 10: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To release sensor connector from body wiring harness connector (1) in following step, move retaining clip (2) as indicated here, then pull sensor connector (3) outward.

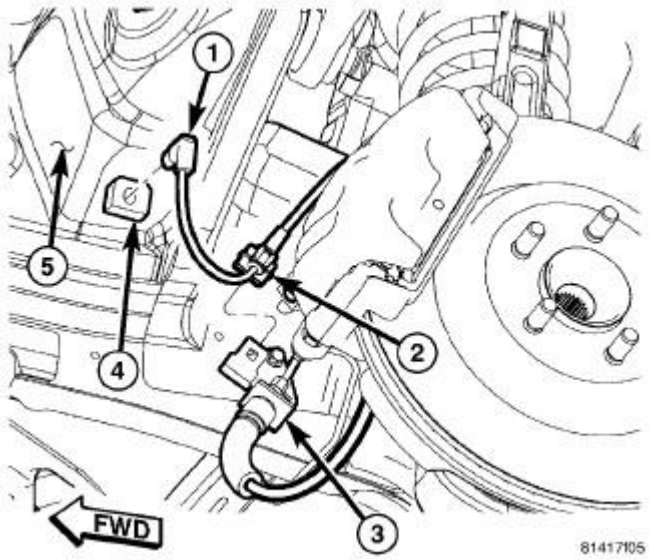

Fig. 11: Wheel Speed Sensor AT Body - AWD
Courtesy of CHRYSLER GROUP, LLC

3. Remove sensor connector (1) from body wiring harness connector (4).

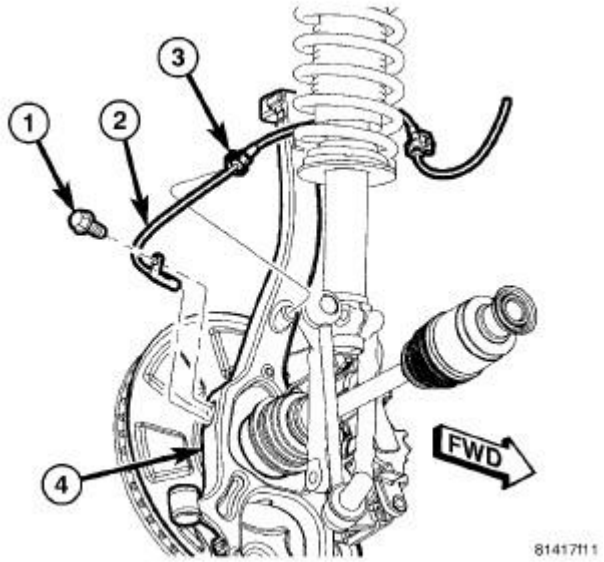

Fig. 12: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

4. Remove screw (1) fastening wheel speed sensor (2) to knuckle (4). Pull sensor head out of knuckle.
5. Remove wheel speed sensor cable routing clip (3) from knuckle (4).
6. Remove wheel speed sensor (2).

REAR-WHEEL-DRIVE

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

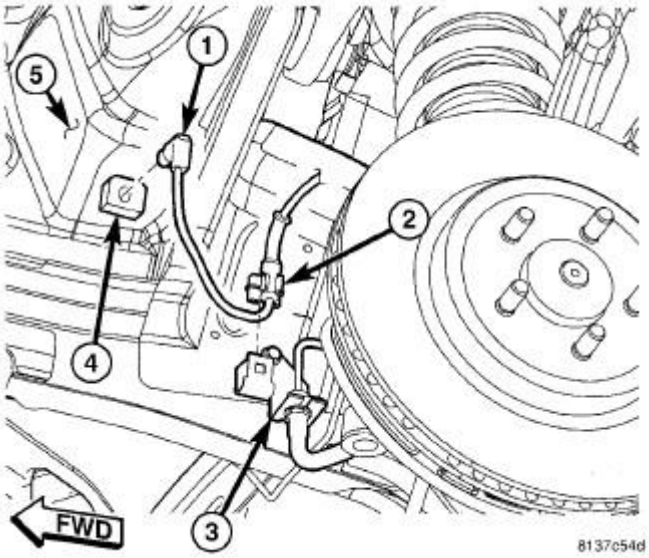

Fig. 13: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

2. Remove sensor cable routing clip (2) from brake hose bracket (3).

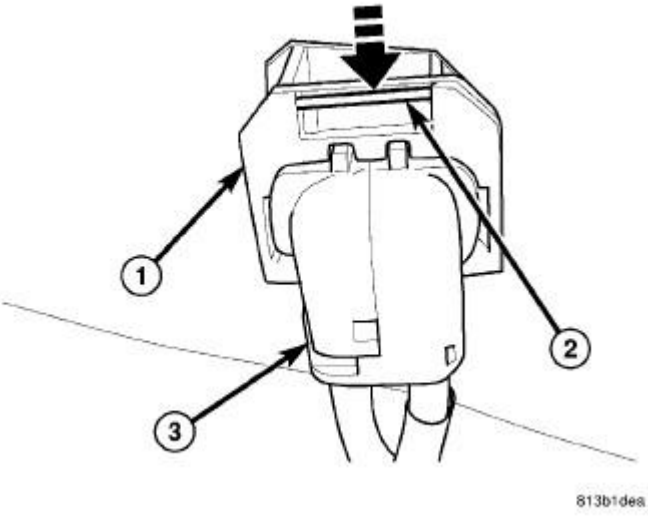

Fig. 14: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To release sensor connector from body wiring harness connector (1) in following step, move retaining clip (2) as indicated here, then pull sensor

connector (3) outward.

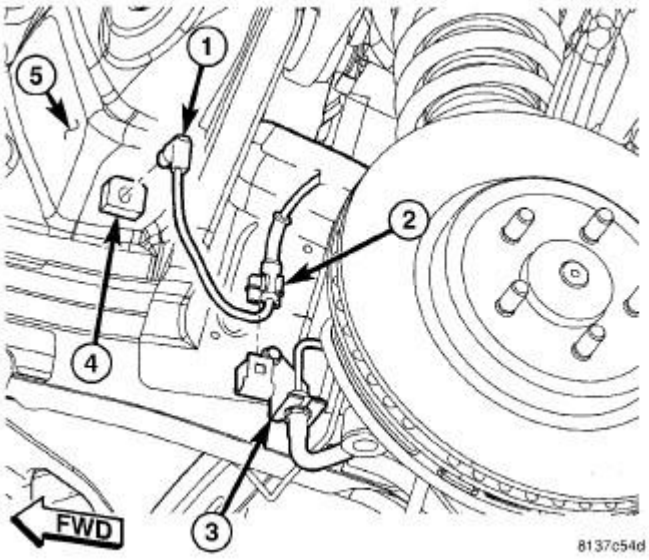

Fig. 15: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

3. Remove sensor connector (1) from body wiring harness connector (4).

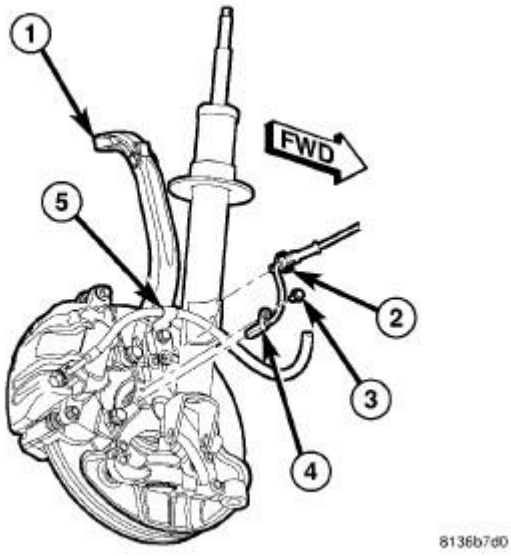

Fig. 16: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

4. Remove screw (3) fastening wheel speed sensor to knuckle (1). Pull sensor head (4) out of knuckle.
5. Remove wheel speed sensor cable routing clip (2) from brake hose routing bracket (5).

INSTALLATION

ALL-WHEEL-DRIVE

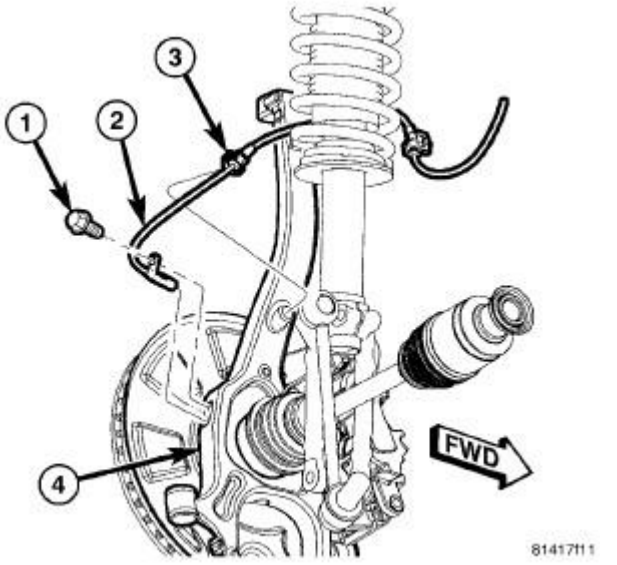

Fig. 17: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

1. Install wheel speed sensor (2) head into knuckle (4) and install mounting screw (1). Tighten screw to 11 N.m (97 in. lbs.).
2. Attach wheel speed sensor cable and routing clip (3) to knuckle (4).

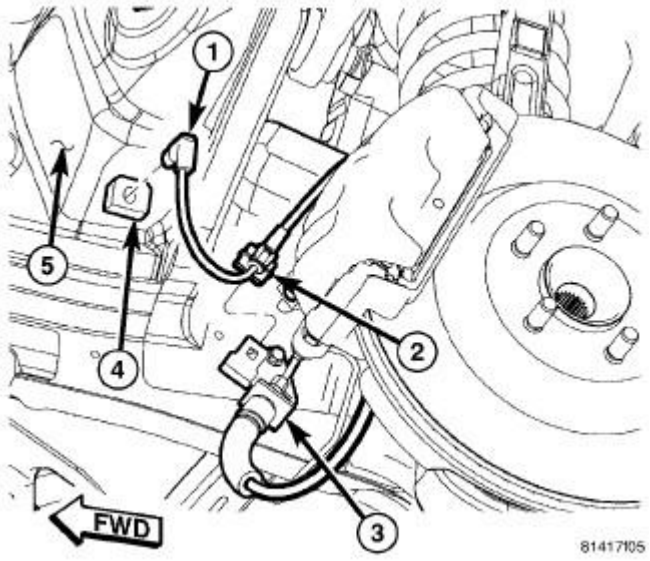

Fig. 18: Wheel Speed Sensor AT Body - AWD
Courtesy of CHRYSLER GROUP, LLC

3. Attach sensor cable routing clip (2) to brake hose bracket (3).
4. Connect sensor connector (1) to body wiring harness connector (4). When installing connector, make sure retaining clip on body connector is properly in place and sensor connect cannot be pulled out.
5. Lower vehicle.
6. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

REAR-WHEEL-DRIVE

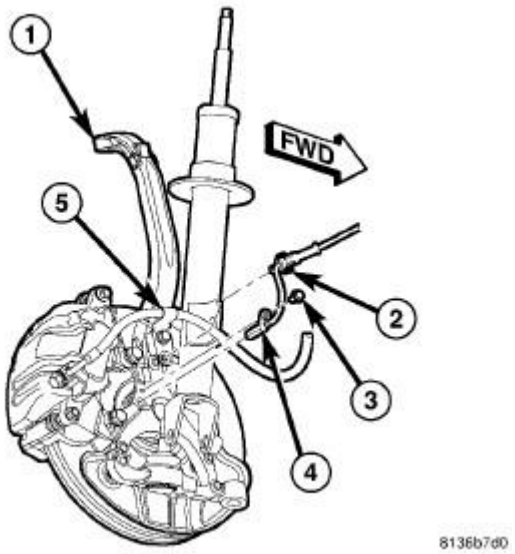

Fig. 19: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Install wheel speed sensor head (4) into knuckle and install mounting screw (3). Tighten screw to 11 N.m (97 in. lbs.).
2. Attach wheel speed sensor cable and routing clip (2) to brake hose routing bracket (5).

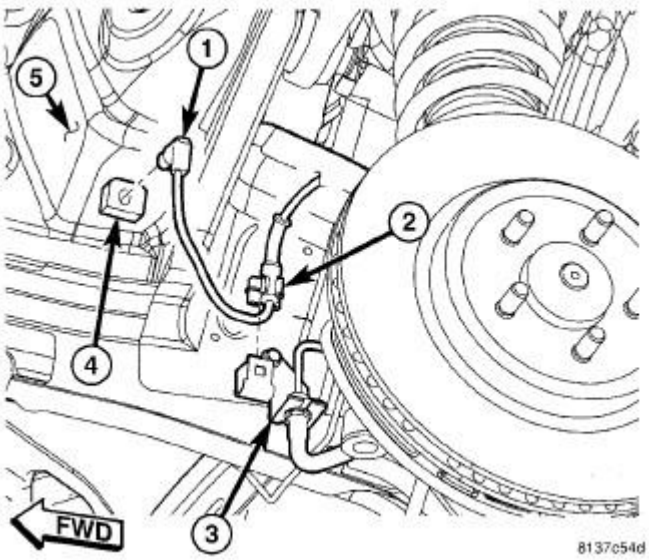

Fig. 20: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

3. Attach sensor cable routing clip (2) to brake hose bracket (3).
4. Connect sensor connector (1) to body wiring harness connector (4). When installing connector, make sure retaining clip on body connector is properly in place and sensor connect cannot be pulled out.
5. Lower vehicle.
6. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SENSOR, WHEEL SPEED, REAR

DESCRIPTION

DESCRIPTION

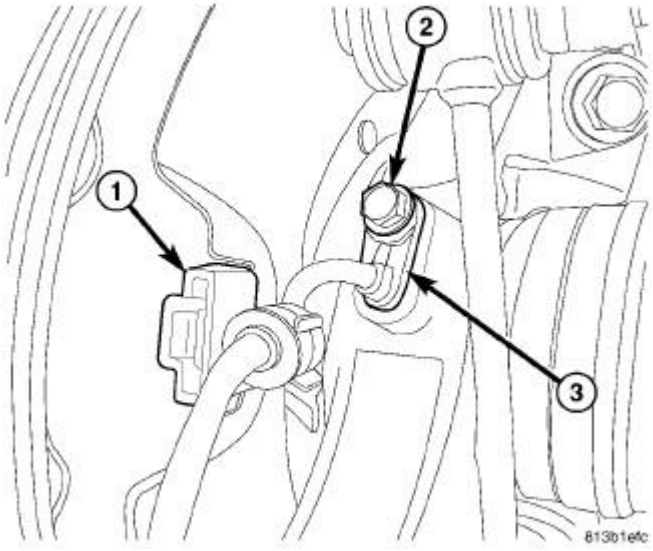

Fig. 21: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

One wheel speed sensor (3) is mounted to the rear of each rear knuckle. The wheel speed sensor, using a tone wheel attached to the rear axle half shaft as a trigger mechanism, communicates with the Antilock Brake Module, informing it of that wheel's speed.

REMOVAL

REMOVAL

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

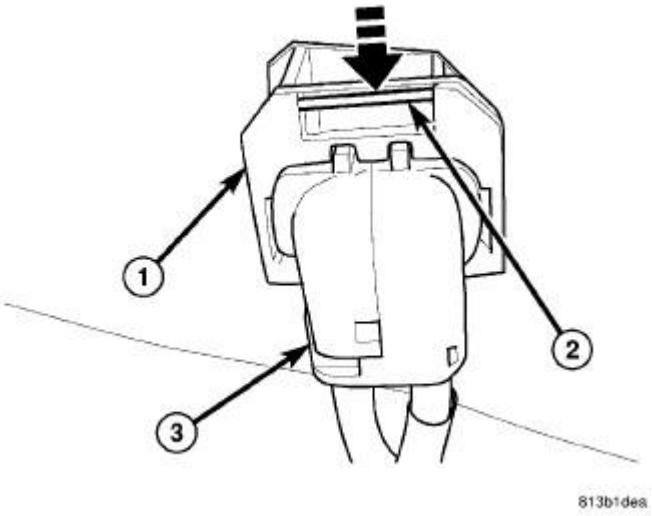

Fig. 22: Releasing Wheel Speed Sensor Connector

Courtesy of CHRYSLER GROUP, LLC

NOTE: To release sensor connector from body wiring harness connector (1) in following step, move retaining clip (2) as indicated here, then pull sensor connector (3) outward.

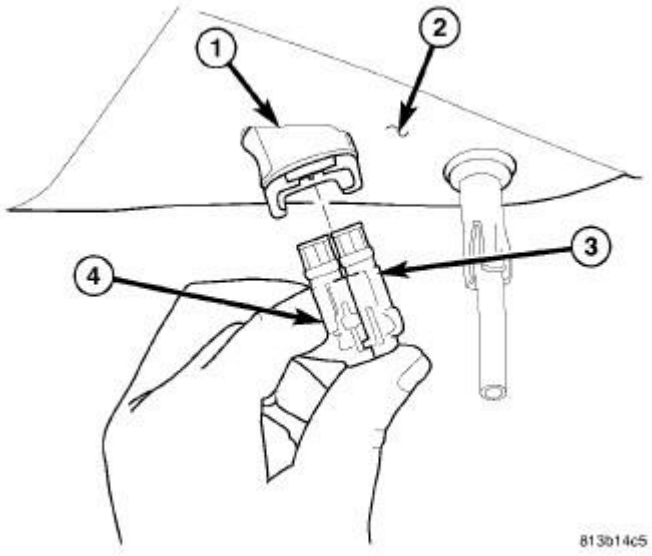

Fig. 23: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

2. Remove sensor connectors (3 and 4) from body wiring harness connector (1) located in luggage compartment floor pan (2).
3. Separate left sensor connector (4) from right sensor connector (3).

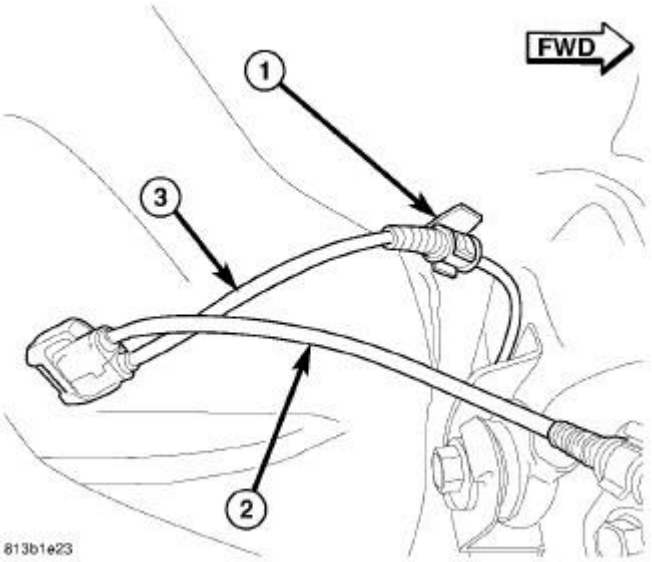

Fig. 24: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

4. If removing left sensor, unclip sensor cable (3) from routing clip near body connector (1).

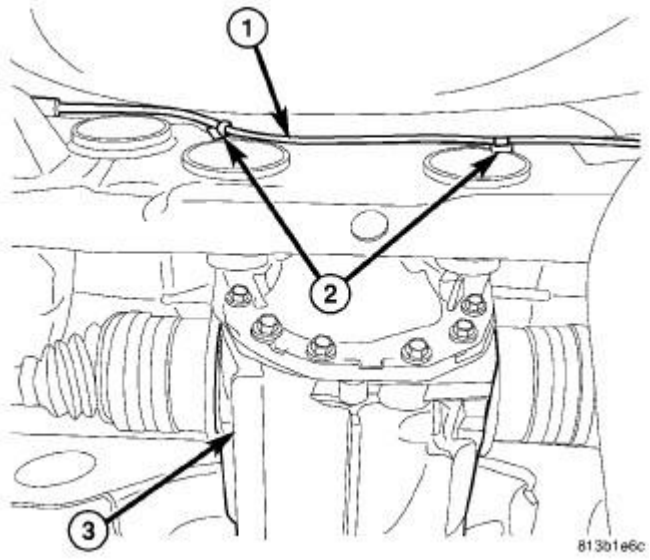

Fig. 25: Left Wheel Speed Sensor Routing Over Rear Differential
Courtesy of CHRYSLER GROUP, LLC

5. If removing left sensor, unclip sensor cable (1) from routing clips (2) along rear of crossmember near rear differential (3).

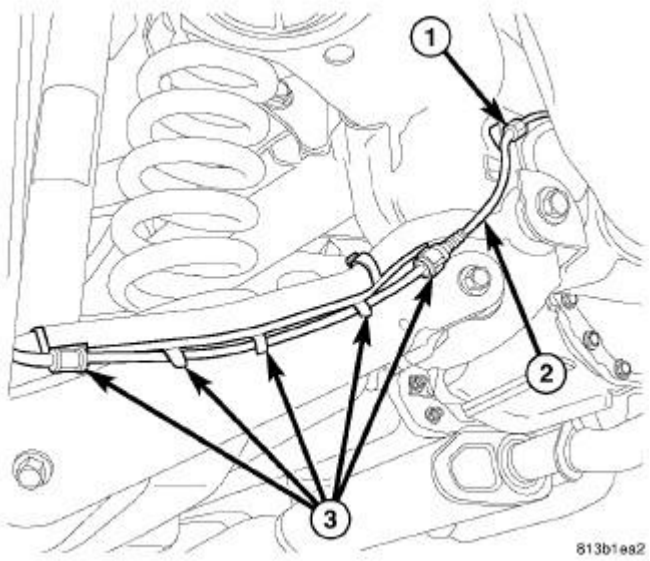

Fig. 26: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

6. If removing left sensor, unclip sensor cable (2) from routing clip (1) above toe link mount on rear crossmember.
7. Unclip sensor cable (2) from routing clips (3) along toe link.

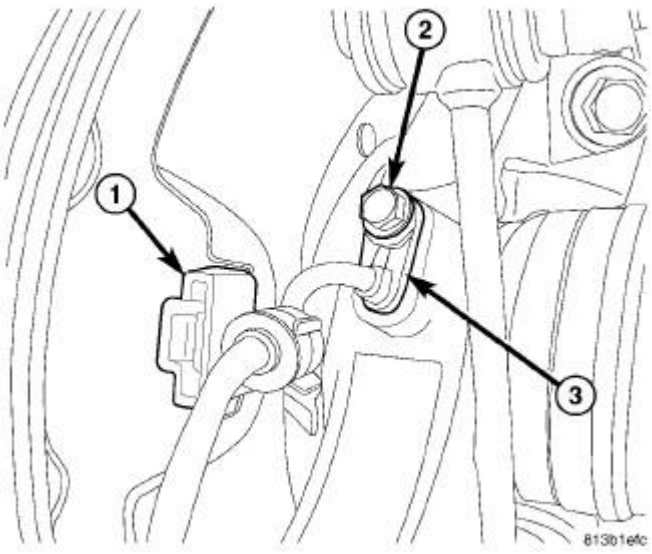

Fig. 27: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

8. Unclip sensor cable at rear brake rotor shield (1).
9. Remove screw (2) fastening sensor head (3) to rear knuckle.
10. Remove wheel speed sensor.

INSTALLATION

INSTALLATION

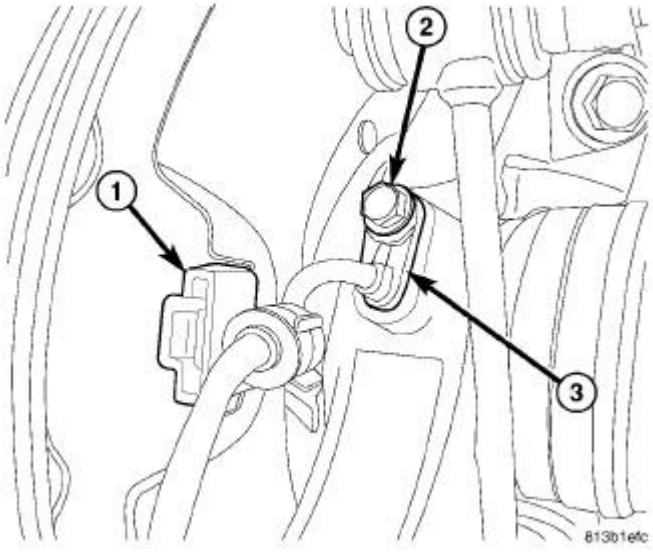

Fig. 28: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Insert wheel speed sensor head (3) into mounting hole in rear of knuckle.
2. Install screw (2) fastening sensor head (3) to rear knuckle. Tighten Screw to 11 N.m (97 in. lbs.).
3. Install sensor cable at rear brake rotor shield (1).

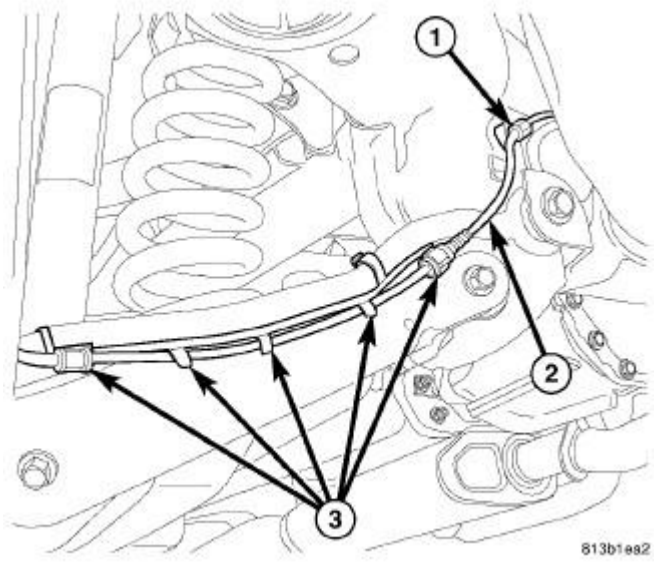

Fig. 29: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

4. Clip sensor cable (2) to routing clips (3) along toe link.
5. If installing left sensor, clip sensor cable (2) to routing clip (1) above toe link mount on rear crossmember.

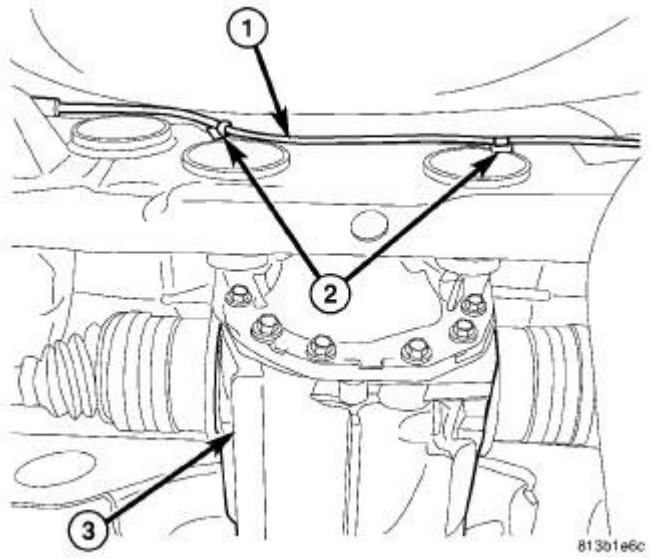

Fig. 30: Left Wheel Speed Sensor Routing Over Rear Differential
Courtesy of CHRYSLER GROUP, LLC

6. If installing left sensor, clip sensor cable (1) to routing clips (2) along rear of crossmember near rear differential (3).

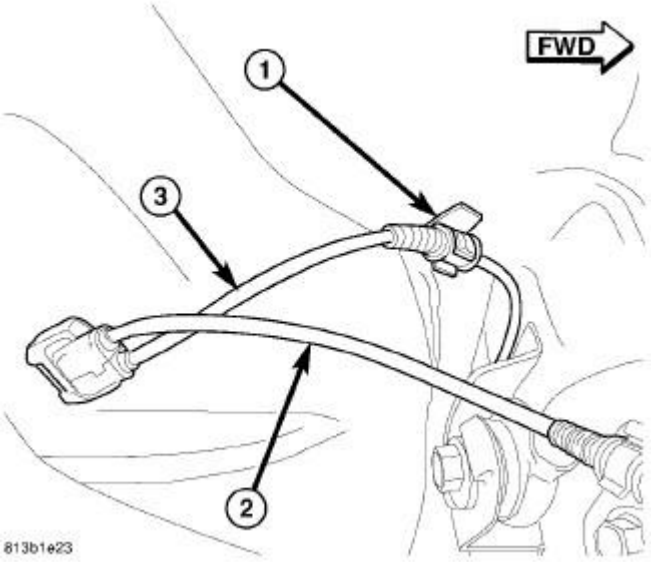

Fig. 31: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

7. If installing left sensor, clip sensor cable (3) to routing clip near body connector (1).

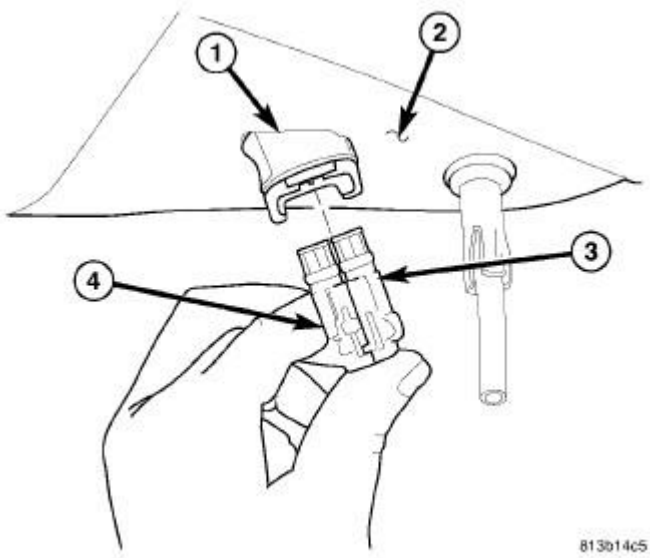

Fig. 32: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

8. Match left sensor connector (4) to right sensor connector (3) to make one connector.
9. Insert sensor connectors (3 and 4) into body wiring harness connector (1) located in luggage compartment floor pan (2). When installing connector, make sure retaining clip on body connector is properly in place and sensor connector cannot be pulled out.
10. Lower vehicle.
11. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SWITCH, ELECTRONIC STABILITY PROGRAM (ESP)

DESCRIPTION

DESCRIPTION

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

The ESC Off Switch is located in the Instrument Panel Switch Pod in the center of the instrument panel. The ESC Off switch turns the Electronic Stability Control off whenever the switch is depressed. Depressing the switch a second time turns the ESC back on. The switch resets itself each time the ignition is cycled.

When the ESC Off switch is depressed and released, turning ESC off, it does not completely turn the system off. The ESC system reduces torque management to a lesser amount, but ESC function can still occur if the system perceives the need.

The ESC Off switch is serviced as part of the Instrument Panel Switch Pod.

REMOVAL

REMOVAL

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

The ESC Off switch is serviced as part of the Instrument Panel Switch Pod. Refer to **POD, SWITCH BANK, REMOVAL** .

INSTALLATION

INSTALLATION

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

The ESC Off switch is serviced as part of the Instrument Panel Switch Pod. Refer to **POD, SWITCH BANK, INSTALLATION** .

HYDRAULIC/MECHANICAL

HYDRAULIC CONTROL UNIT (HCU)

REMOVAL

REMOVAL

To remove the HCU, the ICU must be removed and disassembled. Refer to **INTEGRATED CONTROL UNIT (ICU), REMOVAL**.). Refer to **INTEGRATED CONTROL UNIT (ICU), DISASSEMBLY**.

INSTALLATION

INSTALLATION

To install the HCU, assemble and install the ICU. Refer to **INTEGRATED CONTROL UNIT (ICU), ASSEMBLY** & **INTEGRATED CONTROL UNIT (ICU), INSTALLATION**.

INTEGRATED CONTROL UNIT (ICU)

DESCRIPTION

DESCRIPTION

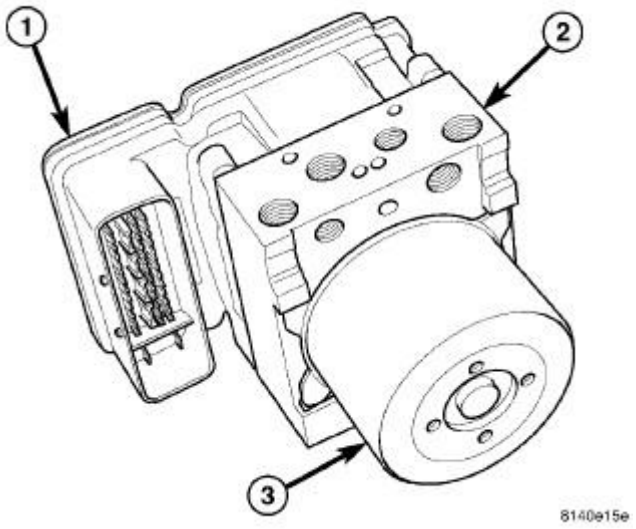

Fig. 33: Integrated Control Unit
Courtesy of CHRYSLER GROUP, LLC

The Hydraulic Control Unit (HCU) (2) and the Antilock Brake Module (ABM) (1) used with this antilock brake system are combined (integrated) into one unit, which is called the Integrated Control Unit (ICU).

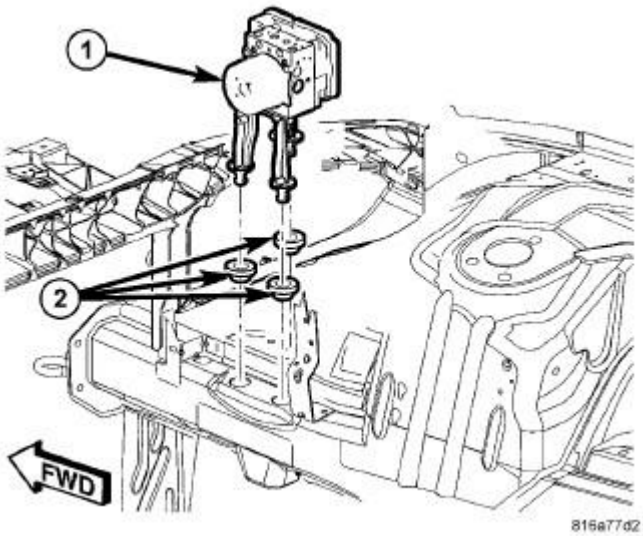

Fig. 34: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

The ICU (1) is located in the engine compartment, mounted to a bracket that is attached to the right side rail through the use of isolation grommets (2).

The ABS with traction control ICU consists of the following components: the ABM, eight (build/decay) solenoid valves (four inlet valves and four outlet valves), two traction control solenoid valves, two hydraulic shuttle valves, valve block, fluid accumulators, a pump, and an electric pump/motor.

The replaceable components of the ICU are the HCU and the ABM. No attempt should be made to service any components of the HCU or ABM. For replacement of the ABM. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

CAUTION: For Adaptive Cruise Control (ACC) equipped vehicles, the ABM and HCU are not separately serviceable. They must be replaced as an assembly.

For additional information on the ABM. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .

REMOVAL

REMOVAL

NOTE: Before proceeding. Refer to CAUTION & WARNING .

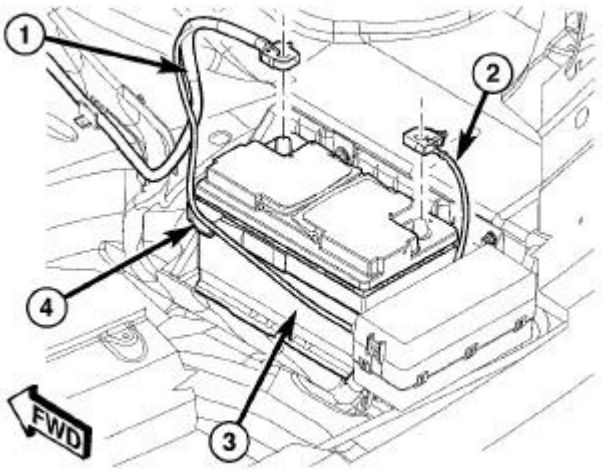

Fig. 35: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.

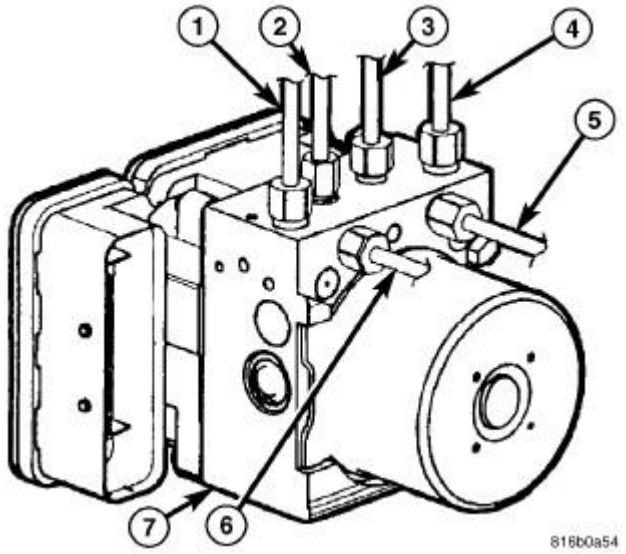

Fig. 36: Brake Tubes AT ICU - Mk25e
Courtesy of CHRYSLER GROUP, LLC

3. Remove primary (4) and secondary (1) brake tubes (from master cylinder) at hydraulic control unit (7).
4. Remove remaining brake tubes (2, 3, 5, 6) at hydraulic control unit (7).

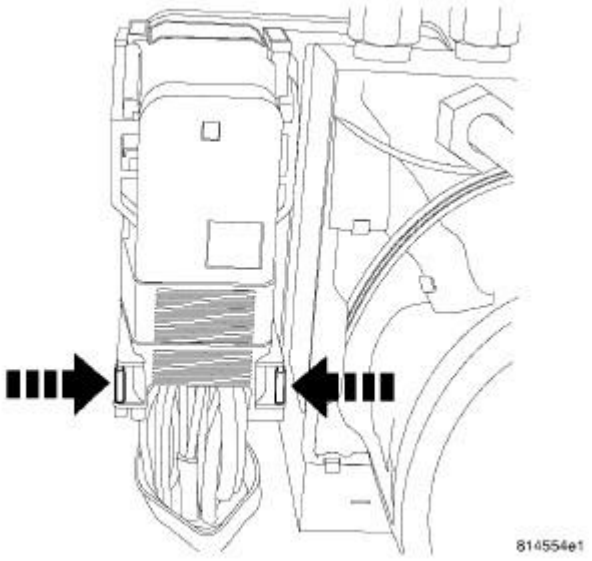

Fig. 37: ABM Connector Release Tabs
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use this figure in the following step to release the ABM harness connector cover. It shows the location of the release tabs.

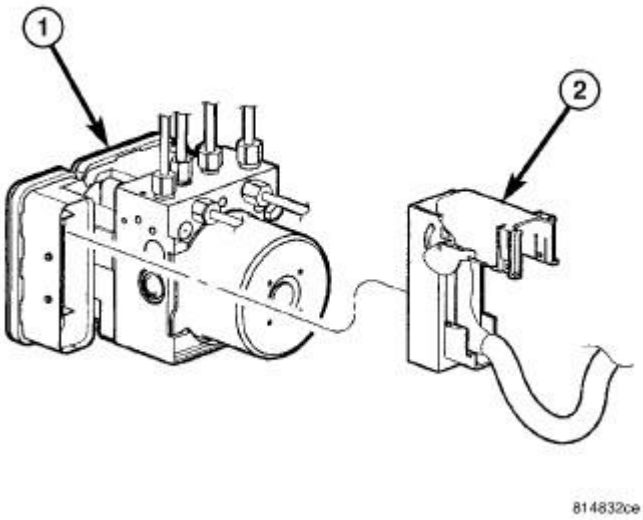

Fig. 38: Anti-Lock Brake Module Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect ABM harness connector from antilock brake module (ABM). To do so:
    1. Depress tabs on each side of connector cover, then
    2. Pull outward and upward on lower half of cover until it locks into position pointing straight outward (2). Connector can then be pulled straight outward off ABM (1).

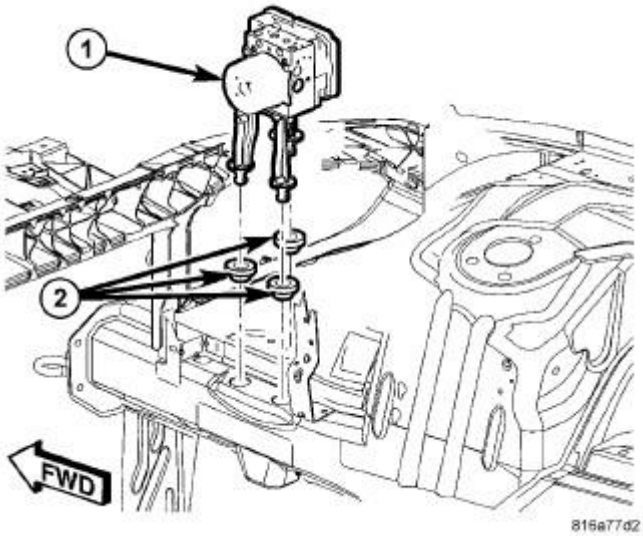

Fig. 39: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Pull up on unit (1) and remove from mounting grommets (2) in body side rail.

DISASSEMBLY

DISASSEMBLY

CAUTION: For Adaptive Cruise Control (ACC) equipped vehicles, the ABM and HCU are not separately serviceable. They must be replaced as an assembly.

1. Remove two screws attaching the mounting bracket to the HCU. Remove the bracket.

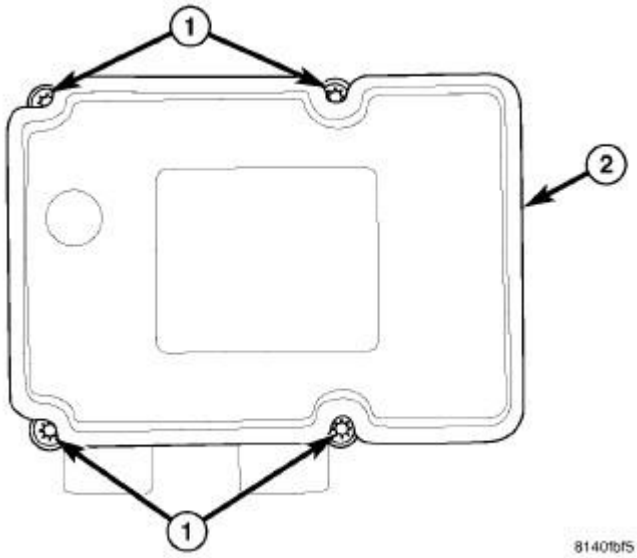

Fig. 40: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER GROUP, LLC

2. Remove four screws (1) attaching ABM (2) to HCU.

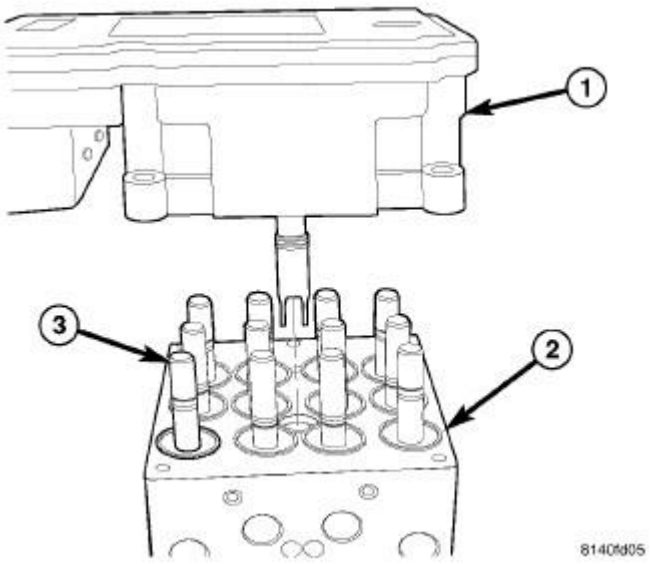

Fig. 41: ABM Assembly To HCU
Courtesy of CHRYSLER GROUP, LLC

3. Separate ABM (1) from HCU (2).

ASSEMBLY

ASSEMBLY

1. Clean any debris off the mating surfaces of the HCU and ABM.

CAUTION: When installing new O-rings or solenoid valve stem seals, do not use any type of lubricant.

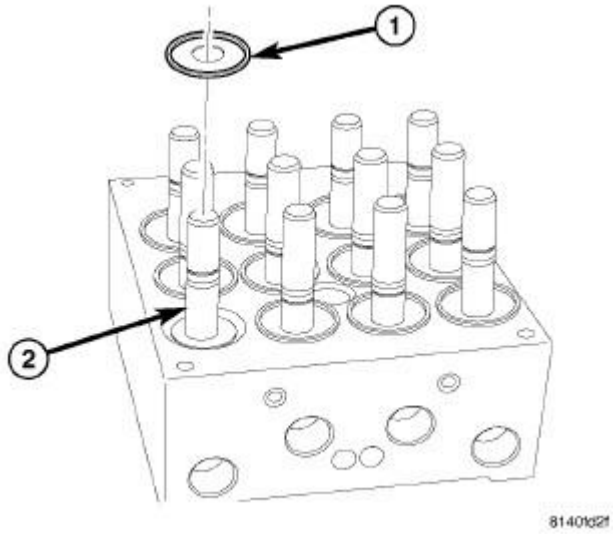

Fig. 42: Solenoid Valve Seal
Courtesy of CHRYSLER GROUP, LLC

2. If the seals (1) on the solenoid valve stems (2) are not new, replace them all. Each of the solenoid valve stem seals must be new to keep out moisture and debris; **do not reuse solenoid valve stem seals** .

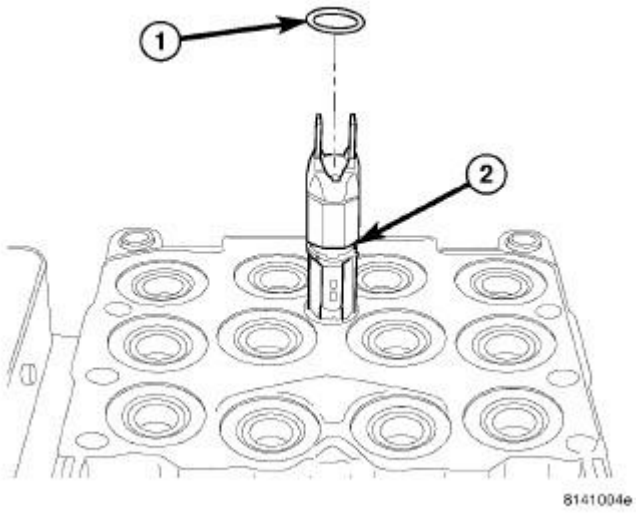

Fig. 43: Internal Pump Connector O-Ring
Courtesy of CHRYSLER GROUP, LLC

3. Replace the pump/motor connector O-ring (1) if it is not new. Be sure the O-ring is properly seated in the mounting groove (2).

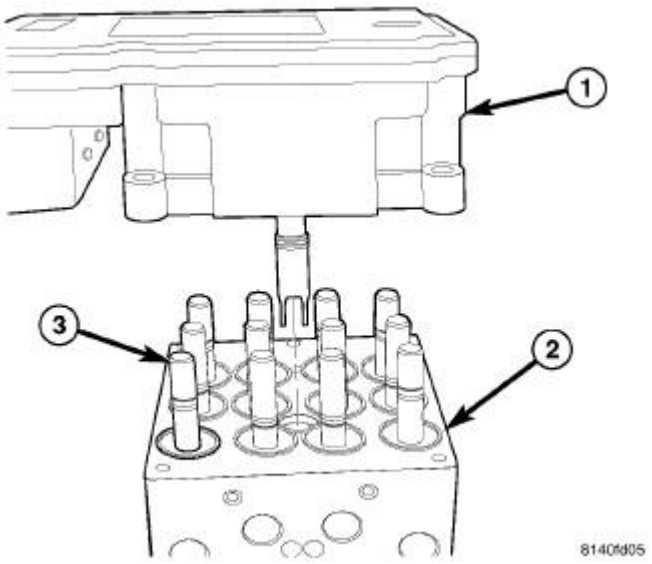

Fig. 44: ABM Assembly To HCU
Courtesy of CHRYSLER GROUP, LLC

4. Align components and install the ABM (1) on the HCU (2).

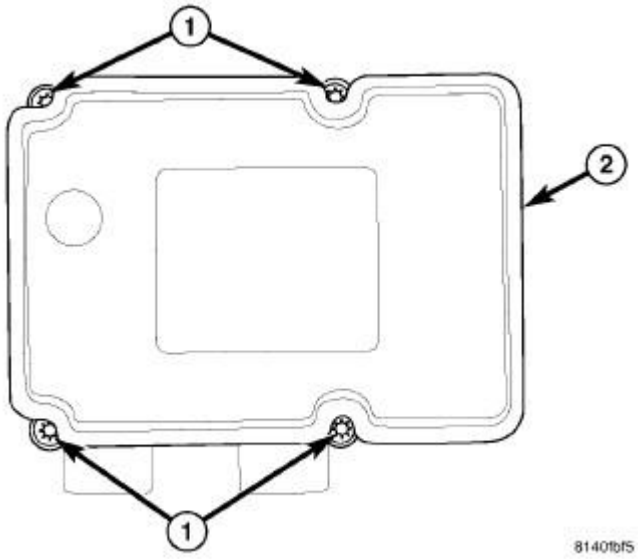

Fig. 45: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER GROUP, LLC

5. Install the four screws (1) attaching the ABM (2) to the HCU. Tighten the mounting screws to 2 N.m (17 in. lbs.).
6. Attach the mounting bracket to the HCU. Install two mounting bracket attaching screws and tighten to 11 N.m (97 in. lbs.).
7. Install the ICU in the vehicle. Refer to **INTEGRATED CONTROL UNIT (ICU), INSTALLATION**.

INSTALLATION

INSTALLATION

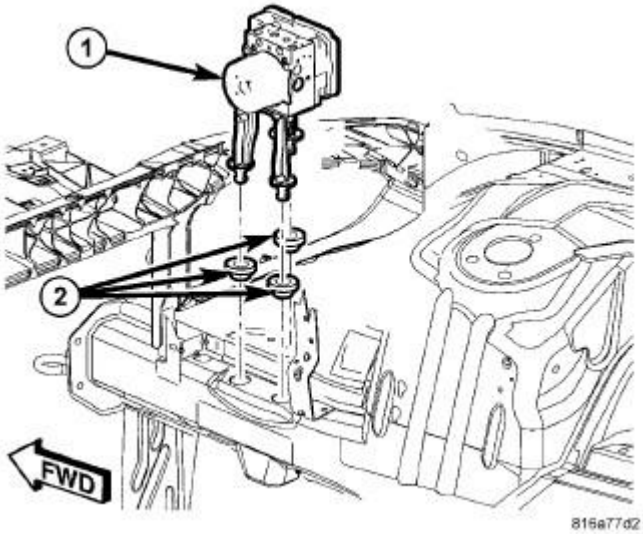

Fig. 46: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Install unit (1), pushing mounting bracket down into mounting grommets (2) located in body side rail.

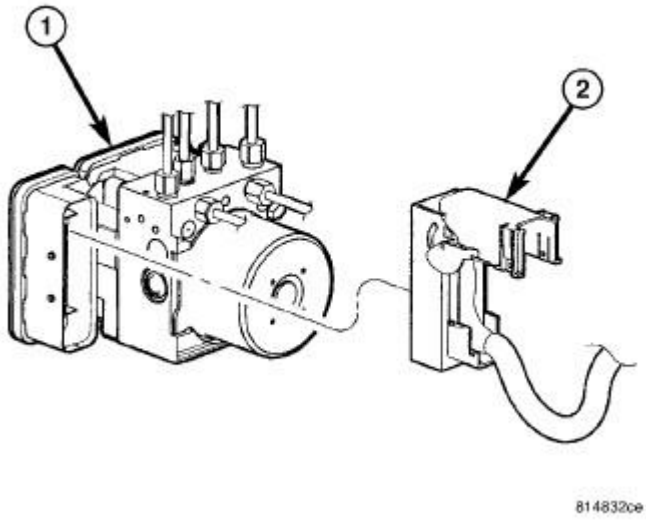

Fig. 47: Anti-Lock Brake Module Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before installing the ABM harness connector (2) on the ABM (1), be

sure the seal is properly installed in the connector.

2. Insert ABM harness connector (2) into socket of ABM (1) and close cover, locking connector in place.

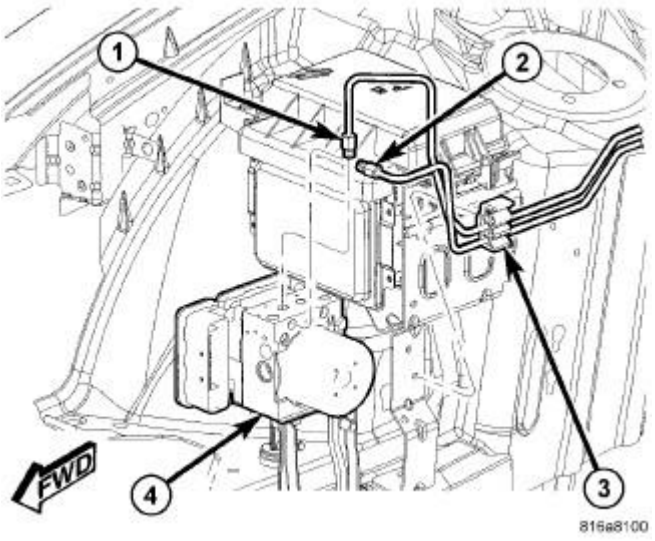

Fig. 48: Left Rear And Right Rear Brake Tubes AT ICU
Courtesy of CHRYSLER GROUP, LLC

3. Install left (2) and right (1) rear brake tubes at hydraulic control unit (4). Tighten tube nuts to 20 N.m (177 in. lbs.) torque.

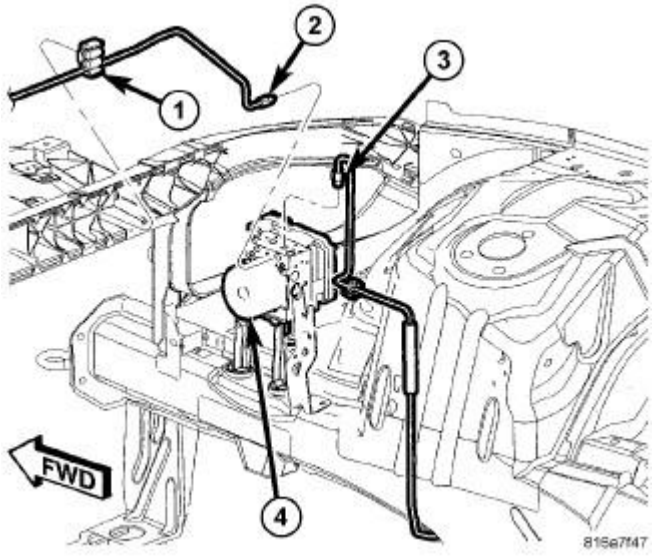

Fig. 49: Left Front And Right Front Brake Tubes AT ICU
Courtesy of CHRYSLER GROUP, LLC

4. Install left (2) and right (3) brake tubes at hydraulic control unit (4). Tighten tube nuts to 20 N.m (177 in. lbs.) torque.

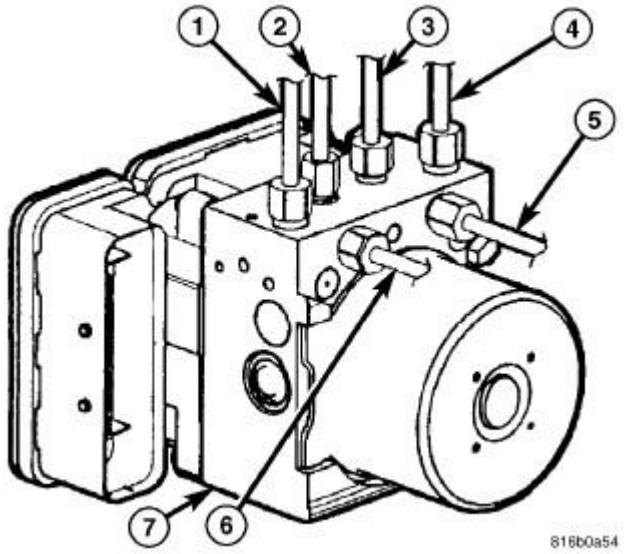

Fig. 50: Brake Tubes AT ICU - Mk25e
Courtesy of CHRYSLER GROUP, LLC

5. Install primary (4) and secondary (1) brake tubes at hydraulic control unit (7). Tighten tube nuts to 20 N.m (177 in. lbs.) torque.
6. Remove brake pedal holding tool.

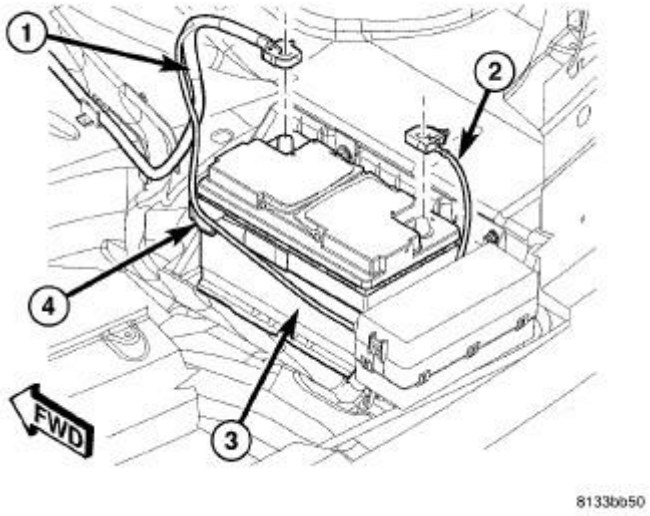

Fig. 51: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

7. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

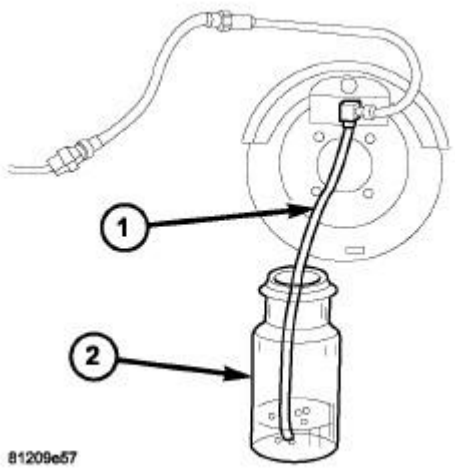

Fig. 52: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

8. Fill and bleed (1) base brake hydraulic system and ABS. Refer to **STANDARD PROCEDURE** .
9. Perform Diagnostic Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
C15AF-1F	LOW SIDE DRIVER - CIRCUIT INTERMITTENT
C15B1-11	REAR ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B1-12	REAR ACCELERATION - CIRCUIT SHORT TO BATTERY
C15B2-11	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B2-12	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B3-11	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B3-12	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B4-04	LEFT FRONT DAMPING VALVE LOW SIDE 1 - SYSTEM INTERNAL FAILURES
C15B4-11	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B4-12	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B4-13	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B5-08	LEFT FRONT DAMPING VALVE LOW SIDE 2 - BUS SIGNAL/MESSAGE FAILURES
C15B5-11	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B5-12	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B5-13	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B6-11	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B6-12	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B6-13	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B7-11	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B7-12	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B7-13	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B8-11	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO

	GROUND
C15B8-12	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B8-13	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B8-14	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND OR OPEN
C15B9-11	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B9-12	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B9-13	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B9-18	LEFT REAR DAMPING VALVE LOW SIDE 2 - UNDER CURRENT
C15BA-11	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15BA-12	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15BA-13	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15BA-1C	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT VOLTAGE OUT OF RANGE
C15BB-11	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO GROUND
C15BB-12	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO BATTERY
C15BB-13	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT OPEN
C15BC-11	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BC-12	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BD-11	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BD-12	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BE-11	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BE-12	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BF-2A	DAMPING MODE BUTTON - STUCK
C15C2-19	LEFT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C3-19	LEFT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C4-19	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C5-19	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C6-19	LEFT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C7-19	LEFT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT

C15C8-19	RIGHT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C9-19	RIGHT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C211B-92	IGNITION RUN/START INPUT CIRCUIT PERFORMANCE - PERFORMANCE OR INCORRECT OPERATION
C211B-92	IGNITION RUN/START INPUT CIRCUIT PERFORMANCE - PERFORMANCE OR INCORRECT OPERATION
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-16	SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
C212A-85	SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
C212C-11	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO GROUND
C212C-12	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO BATTERY
C2202-00	ORIGINAL VIN MISMATCH / MISSING
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220C-00	ACTIVE SUSPENSION MODULE INTERNAL
U0001-00	CAN C BUS
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0102-00	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD
U0114-00	LOST COMMUNICATION WITH FINAL DRIVE CONTROL MODULE (DTCM)
U0121-00	LOST COMMUNICATION WITH ANTILOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0141-00	LOST COMMUNICATION WITH IPM (BCM/TIPM)
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U0168-00	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER MODULE
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0403-00	IMPLAUSIBLE DATA RECEIVED FROM T-CASE
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0427-00	IMPLAUSIBLE DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE (RF HUB)
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0431-00	IMPLAUSIBLE DATA RECEIVED FROM IPM (BCM)
U110A-00	LOSS OF COMMUNICATIONS WITH SCM - CAN-C

DIAGNOSIS AND TESTING

C15AF-1F-LOW SIDE DRIVER - CIRCUIT INTERMITTENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

With the ignition on and no system undervoltage or overvoltage condition present.

SET CONDITION:

The Active Damping Control Module (ADCM) detects excessive voltage fluctuation on the Mode Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.

2. With the scan tool, record and erase DTCs.
3. With the scan tool, read the DTCs in the ADCM.

   Is the DTC active at this time?

   Yes

   - Go To 2.

   No

   - Go To 20.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance between ground and the (S130) Left Front Damper Valve (+) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S130) Left Front Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S130) Left Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S130) Left Front Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 5.

5. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
   1. Measure the resistance between ground and the (S131) Left Front Damper Valve (-) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 6.

6. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S131) Left Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for an open or high resistance.

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 7.

7. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Measure the resistance between ground and the (S132) Right Front Damper Valve (+) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S132) Right Front Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 8.
8. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S132) Right Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S132) Right Front Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 9.
9. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
   1. Measure the resistance between ground and the (S133) Right Front Damper Valve (-) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

- Repair the (S133) Right Front Damper Valve (-) circuit for a short ground.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 10.

10. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S133) Right Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S133) Right Front Damper Valve (-) circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Go To 11.

11. **CHECK THE (S134) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Measure the resistance between ground and the (S134) Left Rear Damper Valve (+) circuit.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S134) Left Rear Damper Valve (+) circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Go To 12.

12. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S134) Left Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

Is the resistance above 5.0 Ohms?

Yes

- Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 13.

13. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
    1. Measure the resistance between ground and the (S135) Left Rear Damper Valve (-) circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S135) Left Rear Damper Valve (-) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 14.

14. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S135) Left Rear Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S135) Left Rear Damper Valve (-) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 15.

15. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Measure the resistance between ground and the (S136) Right Rear Damper Valve (+) circuit.

Is the resistance above 5.0 Ohms?

Yes

- Repair the (S136) Right Rear Damper Valve (+) circuit for a short ground.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 16.

16. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S136) Right Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S136) Right Rear Damper Valve (+) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 17.

17. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
    1. Measure the resistance between ground and the (S137) Right Rear Damper Valve (-) circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S137) Right Rear Damper Valve (-) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 18.

18. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S137) Right Rear Damper Valve (-) circuit between the

ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

Is the resistance above 5.0 Ohms?

Yes

- Repair the (S137) Right Rear Damper Valve (-) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 19.

19. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** and **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

20. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.

5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B1-11-REAR ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Rear Acceleration Sensor Signal circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO GROUND
(S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT OPEN OR HIGH RESISTANCE
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. With the scan tool, read the DTCs in the ADCM.

      Is the DTC active at this time?

Yes

- Go To 2.

No

- Go To 7.

2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

   NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance between ground and the (S168) REAR Acceleration Sensor Signal circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Go To 5.

      No

      - Repair the (S168) Rear Acceleration Sensor Signal circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **CHECK THE (S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT FOR AN OPEN OR**

HIGH RESISTANCE

1. Measure the resistance of the (S168) Rear Acceleration Sensor Signal circuit between the Rear Acceleration Sensor harness connector and the ADCM C2 harness connector.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (S166) Rear Acceleration Sensor Signal circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 5.

5. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S166) Rear Acceleration Sensor Power circuit between the Rear Acceleration Sensor harness connector and the ADCM C2 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S166) Rear Acceleration Sensor Power circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 6.

6. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

7. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B1-12- REAR ACCELERATION - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects when the Rear Acceleration Sensor Signal is shorted to voltage while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes

WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO BATTERY
(S167) REAR ACCELERATION SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.

2. Disconnect the Rear Acceleration Sensor harness connector.
3. Disconnect the ADCM C2 harness connector.
4. Turn the ignition on.
5. Measure the voltage between ground and the (S168) Rear Acceleration Sensor Signal circuit.

   Is the voltage above 5.25 volts?

   Yes

   - Repair the (S168) Rear Acceleration Sensor Power circuit for a short battery.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 4.

4. **CHECK THE (S167) REAR ACCELERATION SENSOR RETURN CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Measure the resistance of the (S167) Rear Acceleration Sensor Return circuit between the Rear Acceleration Sensor harness connector and the ADCM C2 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S167) Rear Acceleration Sensor Return circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 5.

5. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B2-11-LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Signal circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO GROUND
(S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT OPEN OR HIGH RESISTANCE
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 7.
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Go To 3.

3. **CHECK THE (S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Acceleration Sensor harness connector.
    2. Disconnect the ADCM C1 harness connector.
    3. Measure the resistance between ground and the (S162) Left Front Acceleration Sensor Signal circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Go To 5.

    No

    - Repair the (S162) Left Front Acceleration Sensor Signal circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
4. **CHECK THE (S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S162) Left Front Acceleration Sensor Signal circuit between the Left Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S160) Left Front Acceleration Sensor Signal circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 5.
5. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S160) Left Front Acceleration Sensor Power circuit between the Left Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

- Repair the (S160) Left Front Acceleration Sensor Power circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 6.

6. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
7. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B2-12-LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Signal is shorted to voltage while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO BATTERY
(S161) LEFT FRONT ACCELERATION SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

1. Turn the ignition off.
2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Left Front Acceleration Sensor harness connector.
   3. Disconnect the ADCM C1 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S162) Left Front Acceleration Sensor Signal circuit.

      Is the voltage above 5.25 volts?

      Yes

      - Repair the (S162) Left Front Acceleration Sensor Power circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **CHECK THE (S161) LEFT FRONT ACCELERATION SENSOR RETURN CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Measure the resistance of the (S161) Right Front Acceleration Sensor Return circuit between the Left Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

      Is the resistance above 5.0 Ohms?

Yes

- Repair the (S161) Right Front Acceleration Sensor Return circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 5.

5. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B3-11-RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Signal circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO GROUND
(S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT OPEN OR HIGH RESISTANCE
RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

No

- Go To 7.

2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

   NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C1 harness connector.
   3. Measure the resistance between ground and the (S165) Right Front Acceleration Sensor Signal circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Go To 5.

      No

      - Repair the (S165) Right Front Acceleration Sensor Signal circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **CHECK THE (S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S165) Right Front Acceleration Sensor Signal circuit between the Right Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

Is the resistance above 5.0 Ohms?

Yes

- Repair the (S163) Right Front Acceleration Sensor Signal circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 5.

5. **CHECK THE (S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S163) Right Front Acceleration Sensor Power circuit between the Right Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S163) Right Front Acceleration Sensor Power circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 6.

6. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

      - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

7. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B3-12-RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Signal is shorted to voltage while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO BATTERY
(S164) RIGHT FRONT ACCELERATION SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE

RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Right Front Acceleration Sensor harness connector.
    3. Disconnect the ADCM C1 harness connector.

4. Turn the ignition on.
5. Measure the voltage between ground and the (S165) Right Front Acceleration Sensor Signal circuit.

   Is the voltage above 5.25 volts?

   Yes

   - Repair the (S165) Right Front Acceleration Sensor Power circuit for a short battery.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 4.

4. **CHECK THE (S164) RIGHT FRONT ACCELERATION SENSOR RETURN CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Measure the resistance of the (S164) Right Front Acceleration Sensor Return circuit between the Right Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S164) Right Front Acceleration Sensor Return circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 5.

5. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B4-04-LEFT FRONT DAMPING VALVE LOW SIDE 1 - SYSTEM INTERNAL FAILURES

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects the Low Side 1 Damping Valve has an internal failure while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
AIR SUSPENSION CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 3.
2. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Test complete.

3. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B4-11-LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance between ground and the (S130) Left Front Damper Valve (+) circuit.

    Is the resistance above 5.0 Ohms?

    Yes

- Repair the (S130) Left Front Damper Valve (+) circuit for a short ground.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B4-12-LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is

connected correctly.

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S130) Left Front Damper Valve (+) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S130) Left Front Damper Valve (+) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

Does the DTC remain active?

Yes

- Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B4-13-LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve

circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Go To 3.

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance of the (S130) Left Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S130) Left Front Damper Valve (+) circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Go To 4.
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

       Does the DTC remain active?

       Yes

       - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.

2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-08-LEFT FRONT DAMPING VALVE LOW SIDE 2 - BUS SIGNAL/MESSAGE FAILURES

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Left Front Damper Valve (-) circuit is not communicating with the Active Damping Control Module (ADCM).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance of the (S131) Left Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

- Repair the (S131) Left Front Damper Valve (-) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-11-LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is

connected correctly.

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance between ground and the (S131) Left Front Damper Valve (-) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

Yes

- Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-12-LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO**

BATTERY

1. Turn the ignition off.
2. Disconnect the Damping Valve Shock Assembly harness connector.
3. Disconnect the ADCM C2 harness connector.
4. Turn the ignition on.
5. Measure the voltage between ground and the (S131) Left Front Damper Valve (-) circuit.

   Is there any voltage present?

   Yes

   - Repair the (S131) Left Front Damper Valve (-) circuit for a short battery.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-13-LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Front Damping Valve (-) circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. With the scan tool, read the DTCs in the ADCM.

Is the DTC active at this time?

Yes

- Go To 2.

No

- Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S131) Left Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B6-11-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance between ground and the (S132) Right Front Damper Valve (+) circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S132) Right Front Damper Valve (+) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 4.
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B6-12-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY

ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Damping Valve Shock Assembly harness connector.
    3. Disconnect the ADCM C2 harness connector.

4. Turn the ignition on.
5. Measure the voltage between ground and the (S132) Right Front Damper Valve (+) circuit.

   Is there any voltage present?

   Yes

   - Repair the (S132) Right Front Damper Valve (+) circuit for a short battery.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B6-13-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

No

- Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S132) Right Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S132) Right Front Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the vehicle.
6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B7-11-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance between ground and the (S133) Right Front Damper Valve (-) circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S133) Right Front Damper Valve (-) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 4.
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B7-12-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Damping Valve Shock Assembly harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S133) Right Front Damper Valve (-) circuit.

    Is there any voltage present?

Yes

- Repair the (S133) Right Front Damper Valve (-) circuit for a short battery.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B7-13-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S133) Right Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S133) Right Front Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.

4. With the scan tool, erase the DTCs.
5. Start the vehicle.
6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-11-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Adaptive Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

       Is the DTC active at this time?

       Yes

       - Go To 2.

       No

       - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

       Were any problems found?

       Yes

       - Repair as necessary.

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S134) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance between ground and the (S134) Left Rear Damper Valve (+) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S134) Left Rear Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**

1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-12-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

1. Turn the ignition on.
2. With the scan tool, record and erase DTCs.
3. With the scan tool, read the DTCs in the ADCM.

   Is the DTC active at this time?

   Yes

   - Go To 2.

   No

   - Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S134) Left Rear Damper Valve (+) circuit.

      Is there any voltage present?

      Yes

- Repair the (S134) Left Rear Damper Valve (+) circuit for a short battery.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-13-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is

connected correctly.

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S134) Left Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

Does the DTC remain active?

Yes

- Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-14-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit

is shorted to ground or open while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S134) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance between ground and the (S134) Left Rear Damper Valve (+) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S134) Left Rear Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.
4. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S134) Left Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 5.
5. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.

4. With the scan tool, erase the DTCs.
5. Start the vehicle.
6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-11-LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S135) LEFT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance between ground and the (S135) Left Rear Damper Valve (-) circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S135) Left Rear Damper Valve (-) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative

to this circuit.

3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-12-LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. With the scan tool, read the DTCs in the ADCM.

Is the DTC active at this time?

Yes

- Go To 2.

No

- Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO BATTERY**

1. Turn the ignition off.
2. Disconnect the Damping Valve Shock Assembly harness connector.
3. Disconnect the ADCM C2 harness connector.
4. Turn the ignition on.
5. Measure the voltage between ground and the (S135) Left Rear Damper Valve (-) circuit.

Is there any voltage present?

Yes

- Repair the (S135) Left Rear Damper Valve (-) circuit for a short battery.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-13-LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance of the (S135) Left Rear Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S135) Left Rear Damper Valve (-) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 4.
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-18-LEFT REAR DAMPING VALVE LOW SIDE 2 - UNDER CURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Left Rear Damping Valve Solenoid Low Side 2 (rebound stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR

(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

1. Disconnect the Left Rear Damping Valve Shock Assembly harness connector.
2. Disconnect the ADCM C2 harness connector.
3. Connect a jumper wire between Ground and the (S135) Left Rear Damper Valve (-) circuit in the Left Rear Damping Valve Shock Assembly harness connector.
4. Using a 12-volt test light connected to B+, check the (S135) Left Rear Damper Valve (-) circuit in the ADCM C2 harness connector.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Repair the (S135) Left Rear Damper Valve (-) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.

2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BA-11-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

3. With the scan tool, read the DTCs in the ADCM.

   Is the DTC active at this time?

   Yes

   - Go To 2.

   No

   - Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance between ground and the (S136) Right Rear Damper Valve (+) circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S136) Right Rear Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present

at this time.

C15BA-12-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.

2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S136) Right Rear Damper Valve (+) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S136) Right Rear Damper Valve (+) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

- Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BA-13-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes

WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.

3. Measure the resistance of the (S136) Right Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (S136) Right Rear Damper Valve (+) circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.

5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BA-1C-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT VOLTAGE OUT OF RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects when the Right Rear Damper Valve voltage is out of range while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. With the scan tool, read the DTCs in the ADCM.

      Is the DTC active at this time?

      Yes

- Go To 2.

No

- Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S136) Right Rear Damper Valve (+) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S136) Right Rear Damper Valve (+) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**

1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the vehicle.
6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BB-11-RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right rear Damping Valve circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

       Is the DTC active at this time?

       Yes

       - Go To 2.

       No

       - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

       Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance between ground and the (S137) Right Rear Damper Valve (-) circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S137) Right Rear Damper Valve (-) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 4.
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BB-12-RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is shorted to battery voltage while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Damping Valve Shock Assembly harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S137) Right Rear Damper Valve (-) circuit.

    Is there any voltage present?

Yes

- Repair the (S137) Right Rear Damper Valve (-) circuit for a short battery.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BB-13-RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is open while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S137) Right Rear Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S137) Right Rear Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.

6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BC-11-LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Power circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO GROUND
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO (S161) LEFT FRONT ACCELERATION SENSOR RETURN
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Acceleration Sensor harness connector.
    2. Disconnect the ADCM C1 harness connector.
    3. Measure the resistance between ground and the (S160) Left Front Acceleration Sensor Power circuit.

       Is the resistance above 5.0 Ohms?

       Yes

       - Go To 4.

       No

       - Repair the (S160) Left Front Acceleration Sensor Power circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
4. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO THE (S161) LEFT FRONT ACCELERATION SENSOR RETURN**
    1. Measure the resistance between the (S160) Left Front Acceleration Sensor Power circuit and the (S161) Left Front Acceleration Sensor Return circuit.

       Is the resistance above 5.0 Ohms?

       Yes

       - Go To 5.

       No

       - Repair the (S160) Left Front Acceleration Sensor Power circuit for a short to the (160) Acceleration Sensor Return circuit.
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
5. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.

6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BC-12-LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Power circuit is shorted to battery voltage while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO BATTERY
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Go To 3.

3. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Left Front Acceleration Sensor harness connector.
    3. Disconnect the ADCM C1 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S160) Left Front Acceleration Sensor Power circuit.

       Is the voltage above 5.25 volts?

       Yes

       - Repair the (S160) Left Front Acceleration Sensor Power circuit for a short battery.
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Go To 4.
4. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

       Does the DTC remain active?

       Yes

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and

connectors.

2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BD-11-RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Power circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO GROUND
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO (S164) RIGHT FRONT ACCELERATION SENSOR RETURN
RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Acceleration Sensor harness connector.
    2. Disconnect the ADCM C1 harness connector.
    3. Measure the resistance between ground and the (S160) Left Front Acceleration Sensor Power circuit.

    Is the resistance above 5.0 Ohms?

    Yes

- Go To 4.

No

- Repair the (S160) Left Front Acceleration Sensor Power circuit for a short ground.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **CHECK THE (S163) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO (S164) ACCELERATION SENSOR RETURN**
   1. Measure the resistance between the (S163) Right Front Acceleration Sensor Power circuit and the (S164) Right Front Acceleration Sensor Return circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Go To 5.

      No

      - Repair the (S163) Right Front Acceleration Sensor Power circuit for a short to the (164) Right Front Acceleration Sensor Return circuit.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
5. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

      - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete.
6. **INTERMITTENT WIRING AND CONNECTORS**

1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BD-12-RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Power circuit is shorted to battery voltage while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO BATTERY
RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

1. Turn the ignition on.
2. With the scan tool, record and erase DTCs.
3. With the scan tool, read the DTCs in the ADCM.

   Is the DTC active at this time?

   Yes

   - Go To 2.

   No

   - Go To 5.

2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

   NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

   1. Turn the ignition off.
   2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 3.

3. **CHECK THE (S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Acceleration Sensor harness connector.
   3. Disconnect the ADCM C1 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S163) Right Front Acceleration Sensor Power circuit.

      Is the voltage above 5.25 volts?

      Yes

- Repair the (S163) Right Front Acceleration Sensor Power circuit for a short battery.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BE-11-REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Rear Acceleration Sensor Power circuit is shorted to ground while ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT SHORT TO GROUND
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT SHORT TO (S167) REAR ACCELERATION SENSOR RETURN
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

1. Turn the ignition off.
2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C1 harness connector.
   3. Measure the resistance between ground and the (S166) Rear Acceleration Sensor Power circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Go To 4.

      No

      - Repair the (S166) Rear Acceleration Sensor Power circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO THE (S167) REAR ACCELERATION SENSOR RETURN**
   1. Measure the resistance between the (S166) Rear Acceleration Sensor Power circuit and the (S167) Rear Acceleration Sensor Return circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Go To 5.

No

- Repair the (S166) Rear Acceleration Sensor Power circuit for a short to the (160) Acceleration Sensor Return circuit.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

5. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BE-12- REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects when the Rear Acceleration Sensor Power circuit is shorted to battery voltage while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT SHORT TO BATTERY
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

1. Turn the ignition off.
2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Rear Acceleration Sensor harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S166) Rear Acceleration Sensor Power circuit.

      Is the voltage above 5.25 volts?

      Yes

      - Repair the (S166) Rear Acceleration Sensor Power circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BF-2A-DAMPING MODE BUTTON - STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Active Damping Control Module (ADCM) detects the Damping Mode button switch information by receiving messages from the CAN communications bus. Specifically the UP button is wired to the cluster, the cluster sends this information via CAN I to the TIPM, and TIPM sends it onto the ADCM via CAN C.

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

Damping suspension button has been pressed continuously for more than 17 seconds while the ignition is in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING SUSPENSION SWITCH STUCK IN THE PRESSED POSITION
INSTRUMENT CLUSTER
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

       Is the DTC active at this time?

       Yes

       - Go To 2.

       No

       - Go To 5.
2. **DAMPING SUSPENSION SWITCH IN THE PRESSED POSITION**
    1. Turn the ignition off.
    2. Inspect the Damping Mode switch for foreign material which could keep it from returning back to the not pushed state.
    3. Turn the ignition on.
    4. Using the scan tool, monitor the Damping Mode Switch status in the ADCM while pressing and releasing the switch.

       Does the Damping Mode Switch function correctly?

       Yes

       - Test complete, the condition or conditions that originally set this DTC are not present at this time.

       No

- Go To 3.

3. **DAMPING MODE SWITCH**
    1. Turn the ignition off.
    2. Replace the Damping Mode Switch in accordance with the Service Information.

       Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    3. Turn the ignition on.
    4. With the scan tool, record and erase DTCs.
    5. With the scan tool, read the DTCs in the ADCM.

       Does the DTC remain active?

       Yes

       - Go To 4.

       No

       - Test complete, the condition or conditions that originally set this DTC are not present at this time.
4. **INSTRUMENT CLUSTER**
    1. Turn the ignition off.
    2. Replace the Instrument Cluster in accordance with the Service Information. Refer to **REMOVAL** .
    3. Turn the ignition on.
    4. With the scan tool, record and erase DTCs.
    5. With the scan tool, read the DTCs in the ASCM.

       Does the DTC remain active?

       Yes

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Test complete, the condition or conditions that originally set this DTC are not present at this time.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and

connectors.

2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C2-19-LEFT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Left Front Damping Valve Solenoid Low Side 1 (compression stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Left Front Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Connect a jumper wire between Ground and the (S130) Left Front Damper Valve (+) circuit in the Left Front Damping Valve Shock Assembly harness connector.
    4. Using a 12-volt test light connected to B+, check the (S130) Left Front Damper Valve (+) circuit in the ADCM C2 harness connector.

NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Repair the (S130) Left Front Damper Valve (+) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C3-19-LEFT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Left Front Damping Valve Solenoid Low Side 2 (rebound stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

Yes

- Go To 2.

No

- Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

1. Disconnect the Left Front Damping Valve Shock Assembly harness connector.
2. Disconnect the ADCM C2 harness connector.
3. Connect a jumper wire between Ground and the (S131) Left Front Damper Valve (-) circuit in the Left Front Damping Valve Shock Assembly harness connector.
4. Using a 12-volt test light connected to B+, check the (S131) Left Front Damper Valve (-) circuit in the ADCM C2 harness connector.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Repair the (S131) Left Front Damper Valve (-) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present

at this time.

C15C4-19-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Right Front Damping Valve Solenoid Low Side 1 (compression stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Right Front Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Connect a jumper wire between Ground and the (S132) Right Front Damper Valve (+) circuit in the Right Front Damping Valve Shock Assembly harness connector.
   4. Using a 12-volt test light connected to B+, check the (S132) Right Front Damper Valve (+) circuit in the ADCM C2 harness connector.

      NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

      Does the test light illuminate brightly?

      Yes

      - Repair the (S132) Right Front Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **DAMPING VALVE SHOCK ASSEMBLY**
   1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the vehicle.
6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C5-19-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Right Front Damping Valve Solenoid Low Side 2 (rebound stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Right Front Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Connect a jumper wire between Ground and the (S133) Right Front Damper Valve (-) circuit in the Right Front Damping Valve Shock Assembly harness connector.
   4. Using a 12-volt test light connected to B+, check the (S133) Right Front Damper Valve (-) circuit in the ADCM C2 harness connector.

      NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

      Does the test light illuminate brightly?

      Yes

      - Repair the (S133) Right Front Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **DAMPING VALVE SHOCK ASSEMBLY**
   1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C6-19-LEFT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Left Rear Damping Valve Solenoid Low Side 1 (compression stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.

3. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Left Rear Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Connect a jumper wire between Ground and the (S134) Left Rear Damper Valve (+) circuit in the Left Rear Damping Valve Shock Assembly harness connector.
    4. Using a 12-volt test light connected to B+, check the (S134) Left Rear Damper Valve (+) circuit in the ADCM C2 harness connector.

        NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

        Does the test light illuminate brightly?

        Yes

        - Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
        - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

        No

        - Go To 4.
4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

        Does the DTC remain active?

        Yes

        - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
        - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

        No

        - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**

1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C7-19-LEFT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Left Rear Damping Valve Solenoid Low Side 2 (rebound stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Go To 3.
3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Left Rear Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Connect a jumper wire between Ground and the (S135) Left Rear Damper Valve (-) circuit in the Left Rear Damping Valve Shock Assembly harness connector.
    4. Using a 12-volt test light connected to B+, check the (S135) Left Rear Damper Valve (-) circuit in the ADCM C2 harness connector.

NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Repair the (S135) Left Rear Damper Valve (-) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C8-19-RIGHT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Right Rear Damping Valve Solenoid Low Side 1 (compression stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

Yes

- Go To 2.

No

- Go To 5.

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

1. Disconnect the Right Rear Damping Valve Shock Assembly harness connector.
2. Disconnect the ADCM C2 harness connector.
3. Connect a jumper wire between Ground and the (S136) Right Rear Damper Valve (+) circuit in the Right Rear Damping Valve Shock Assembly harness connector.
4. Using a 12-volt test light connected to B+, check the (S136) Right Rear Damper Valve (+) circuit in the ADCM C2 harness connector.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Repair the (S136) Right Rear Damper Valve (+) circuit for an open or high resistance.

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 4.

4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete.
5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C9-19-RIGHT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the Right Rear Damping Valve Solenoid Low Side 2 (rebound stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly with the ignition in the Run position.

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 5.
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

1. Turn the ignition off.
2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Go To 3.

3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Right Rear Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Connect a jumper wire between Ground and the (S137) Right Rear Damper Valve (-) circuit in the Right Rear Damping Valve Shock Assembly harness connector.
   4. Using a 12-volt test light connected to B+, check the (S137) Right Rear Damper Valve (-) circuit in the ADCM C2 harness connector.

      NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

      Does the test light illuminate brightly?

      Yes

      - Repair the (S137) Right Rear Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.

4. **DAMPING VALVE SHOCK ASSEMBLY**
   1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the vehicle.
6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C211B-92-IGNITION RUN/START INPUT CIRCUIT PERFORMANCE - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuous.

SET CONDITION:

The Ignition Status reported on the CAN Bus does not match the state of the Ignition Input.

POSSIBLE CAUSES

Possible Causes
FUSE M15 (20A)
(F943) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT SHORT TO VOLTAGE
(F943) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT OPEN OR HIGH RESISTANCE
(A206) FUSED B(+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM) INTERNAL

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record the DTCs.
   3. With the scan tool, erase the DTCs.
   4. Start the engine.
   5. With the scan tool, read and record the DTCs.

   Is the DTC active at this time?

   Yes

   - Go To 2.

   No

   - Go To 5.
2. **CHECK THE FUSE**
   1. Ignition on, engine not running.
   2. Using a 12-volt test light connected to ground, check the fuse for power.

Is the fuse good?

Yes

- Go To 3.

No

- If the related fuse is open, check the (F943) Fused Ignition Switch Output (RUN/START) circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **(F943) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT SHORT TO VOLTAGE**
    1. Turn ignition off to the lock position.
    2. Disconnect the ADCM harness connector.
    3. With a test light connected to ground check the (F943) Fused Ignition Switch Output (RUN/START) circuit at the ADCM harness connector.

    NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

    Does the test light illuminate brightly?

    Yes

    - Go To 4.

    No

    - Repair the (F943) Fused Ignition Switch Output (RUN/START) circuit for an open or high resistance.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

4. **POWER CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Ignition on, engine not running.
    2. With a test light connected to ground check (A206) Fused B+ and (F943) Fused Ignition Switch Output (RUN/START) circuits at the ADCM harness connector.

    NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

    Does the test light illuminate brightly?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service

Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Repair the Power circuits for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C211B-92-IGNITION RUN/START INPUT CIRCUIT PERFORMANCE - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuous.

SET CONDITION:

The Ignition Status reported on the CAN Bus does not match the state of the Ignition Input.

POSSIBLE CAUSES

Possible Causes

FUSE M15 (20A)
(F943) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT SHORT TO VOLTAGE
(F943) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT OPEN OR HIGH RESISTANCE
(A206) FUSED B(+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM) INTERNAL

NOTE: If any other DTCs are present, repair them first before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record the DTCs.
   3. With the scan tool, erase the DTCs.
   4. Start the engine.
   5. With the scan tool, read and record the DTCs.

   Is the DTC active at this time?

   Yes

   - Go To 2.

   No

   - Go To 5.
2. **CHECK THE FUSE**
   1. Ignition on, engine not running.
   2. Using a 12-volt test light connected to ground, check the fuse for power.

   Is the fuse good?

   Yes

   - Go To 3.

   No

   - If the related fuse is open, check the (F943) Fused Ignition Switch Output

(RUN/START) circuit for a short to ground.

- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **(F943) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT SHORT TO VOLTAGE**
    1. Turn ignition off to the lock position.
    2. Disconnect the ADCM harness connector.
    3. With a test light connected to ground check the (F943) Fused Ignition Switch Output (RUN/START) circuit at the ADCM harness connector.

    NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

    Does the test light illuminate brightly?

    Yes

    - Go To 4.

    No

    - Repair the (F943) Fused Ignition Switch Output (RUN/START) circuit for an open or high resistance.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

4. **POWER CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Ignition on, engine not running.
    2. With a test light connected to ground check (A206) Fused B+ and (F943) Fused Ignition Switch Output (RUN/START) circuits at the ADCM harness connector.

    NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

    Does the test light illuminate brightly?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Repair the Power circuits for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

5. **INTERMITTENT WIRING AND CONNECTORS**

1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C2129-16-BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the battery voltage has dropped below 10 Volts for more than 15 seconds.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
(A206) FUSED B(+) CIRCUIT OPEN OR HIGH RESISTANCE
(Z916) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**

1. Ignition on, engine not running.
2. With the scan tool, read DTCs in the Powertrain Control Module (PCM).

   Are there any Charging System or related voltage DTCs present?

   Yes

   - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **CHARGING SYSTEM - DIAGNOSIS AND TESTING** .

   No

   - Go To 2.

2. **VERIFY THE DTC IS ACTIVE**
   1. With the scan tool, record and erase DTCs.
   2. With the scan tool, read the DTCs in the ADCM.

      Is the DTC active at this time?

      Yes

      - Go To 3.

      No

      - Go To 5.
3. **CHECK THE (A206) FUSED B(+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the ADCM C2 harness connector.
   2. Ignition on, engine not running.
   3. With a 12-volt test light connected to ground, check the (A206) Fused B+ circuit in the ADCM C2 harness connector.

      NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

      Does the test light illuminate brightly?

      Yes

      - Go To 4.

      No

- Repair the (A206) Fused B(+) circuit for an open circuit or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **CHECK THE (Z916) GROUND CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off to the lock position
   2. With a 12-volt test light connected to B+, check the (Z916) Ground circuit in the ADCM C2 harness connector.

      NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

      Does the test light illuminate brightly?

      Yes

      - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Repair the (Z916) Ground circuit for an open circuit or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C2129-17-BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the battery voltage has increased above 16 Volts for more than 15 seconds.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Ignition on, engine not running.
    2. With the scan tool, read DTCs in the Powertrain Control Module (PCM).

       Are there any Charging System or related voltage DTCs present?

       Yes

       - Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

       No

       - Go To 2.
2. **VERIFY THE DTC IS ACTIVE**
    1. With the scan tool, read DTCs in the ADCM.

       Is the status Active for this DTC?

       Yes

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212A-16-SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the battery voltage has dropped below 10 Volts for more than 15 seconds.

POSSIBLE CAUSES

Possible Causes
(A206) FUSED B(+) CIRCUIT OPEN OR HIGH RESISTANCE
(F943) FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE
(Z916) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: Repair all other DTCs first before continuing with this test.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. With the scan tool, record and erase DTCs.
    2. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 4.
2. **CHECK THE (A206) FUSED B(+) AND THE (F943) FUSED IGNITION SWITCH OUTPUT CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn ignition off to the lock position.
    2. Disconnect the ADCM C2 harness connector.
    3. Ignition on, engine not running.
    4. With a test light connected to ground check (A206) Fused B+ circuit and the (F943) Fused Ignition Switch Output circuit at the ADCM C2 harness connector.

    NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

    Does the test light illuminate brightly?

    Yes

    - Go To 3.

    No

    - Repair the Power circuits for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
3. **CHECK THE (Z916) GROUND CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off to the lock position
    2. With a 12-volt test light connected to B+, check the (Z916) Ground circuit in the ADCM C2 harness connector.

NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Repair the (Z916) Ground circuit for an open circuit or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212A-17-SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) detects the system voltage has increased above 16 Volts for more than 15 seconds.

POSSIBLE CAUSES

Possible Causes
(F943) FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE (A206) FUSED B(+) CIRCUIT OPEN OR HIGH RESISTANCE (Z916) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: Repair all other DTCs first before continuing with this test.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. With the scan tool, record and erase DTCs.
    2. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 4.
2. **CHECK THE POWER CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn ignition off to the lock position.
    2. Disconnect the ADCM C2 harness connector.
    3. Ignition on, engine not running.
    4. With a test light connected to ground check the (A206) Fused B(+) circuit and the (F941) Fused Ignition Switch Output circuit at the ADCM C2 harness connector.

    NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

    Does the test light illuminate brightly?

    Yes

- Go To 3.

No

- Repair the Power circuits for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

3. **CHECK THE (Z916) GROUND CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off to the lock position
   2. With a 12-volt test light connected to B+, check the (Z916) Ground circuit in the ADCM C2 harness connector.

      NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

      Does the test light illuminate brightly?

      Yes

      - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Repair the (Z916) Ground circuit for an open circuit or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212A-84-SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously with the ignition on.

SET CONDITION:

The Active Damping Control Module (ADCM) receives a low charging system voltage message over the CAN Bus or detects voltage under 10 volts on the Fused B(+) circuit.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM VOLTAGE LOW
(A206) FUSED B(+) CIRCUIT
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK PCM FOR CHARGING SYSTEM DTC**
    1. With the scan tool, read the PCM DTCs.

       Are there any Charging System DTCs set in the PCM?

       Yes

       - Perform the Charging System diagnostic procedure. Refer to **CHARGING SYSTEM - DIAGNOSIS AND TESTING** .

       No

       - Go To 2.
2. **VERIFY THE DTC IS ACTIVE**
    1. With the scan tool, read the active ADCM DTCs.

       Is the DTC active at this time?

       Yes

- Go To 3.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY CONTROL MODULE (BCM) - BODY VERIFICATION TEST** .

3. **CHECK THE VOLTAGE AT THE (A206) FUSED B(+) CIRCUIT**
    1. Disconnect the ADCM C2 harness connector.
    2. Turn the ignition on.
    3. Measure the voltage between the (A206) Fused B(+) circuit and ground. Compare this value to the voltage measured at the vehicle battery.

       Is the voltage measured at the ADCM C2 harness connector the same as measured at the battery?

       Yes

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Repair the (A206) Fused B(+) circuit as necessary.
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

C212A-85-SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously with the ignition on.

SET CONDITION:

The Active Damping Control Module (ADCM) receives a high charging system voltage message over the CAN Bus or detects voltage over 16 volts on the Fused B(+) circuit.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM VOLTAGE HIGH
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK PCM FOR CHARGING SYSTEM DTC**
    1. With the scan tool, read the PCM DTCs.

       Are there any Charging System DTCs set in the PCM?

       Yes

       - Perform the Charging System diagnostic procedure. Refer to **CHARGING SYSTEM - DIAGNOSIS AND TESTING** .

       No

       - Go To 2.
2. **VERIFY THE DTC IS ACTIVE**
    1. With the scan tool, read the active ADCM DTCs.

       Is the DTC active at this time?

       Yes

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

       No

       - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
       - Perform the BODY VERIFICATION TEST. Refer to **BODY CONTROL MODULE (BCM) - BODY VERIFICATION TEST** .

C212C-11-SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects that too much current is being used when the on-board 12 volt power supply is turned on.

POSSIBLE CAUSES

Possible Causes
(S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

       Is the DTC active at this time?

       Yes

       - Go To 2.

       No

       - Go To 6.
2. **CHECK THE (S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the ADCM C1 harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Disconnect the Left Front Damper Valve harness connector.
    5. Measure the resistance between ground and the (S170) Left Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

       Is the resistance below 5.0 Ohms?

       Yes

- Repair the (S170) Left Front Damper Valve Power Supply circuit for a short to ground.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Right Front Damper Valve harness connector.
   2. Measure the resistance between ground and the (S171) Right Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair the (S171) Right Front Damper Valve Power Supply circuit for a short to ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.
4. **CHECK THE (S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Left Rear Damper Valve harness connector.
   2. Measure the resistance between ground and the (S172) Left Rear Damper Valve Power Supply circuit at the ADCM C1 harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair the (S172) Left Rear Damper Valve Power Supply circuit for a short to ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 5.
5. **CHECK THE (S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Right Rear Damper Valve harness connector.

2. Measure the resistance between ground and the (S173) Right Rear Damper Valve Power Supply circuit at the ADCM C2 harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (S173) Right Rear Damper Valve Power Supply circuit for a short to ground.
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

   No

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212C-12-SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on. Battery voltage between 9 and 16 volts.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects that too much current is being used when the on-board 12 volt power supply is turned on.

POSSIBLE CAUSES

Possible Causes
(S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 6.
2. **CHECK THE (S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the ADCM C1 harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Disconnect the Left Front Damper Valve harness connector.
    5. Turn the ignition on.
    6. Measure the voltage of the (S170) Left Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

    Is there any voltage present?

    Yes

- Repair the (S170) Left Front Damper Valve Power Supply circuit for a short to voltage.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK THE (S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the Right Front Damper Valve harness connector.
   3. Turn the ignition on.
   4. Measure the voltage of the (S171) Right Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

      Is there any voltage present?

      Yes

      - Repair the (S171) Right Front Damper Valve Power Supply circuit for a short to voltage.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Go To 4.
4. **CHECK THE (S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the Left Rear Damper Valve harness connector.
   3. Turn the ignition on.
   4. Measure the voltage of the (S172) Left Rear Damper Valve Power Supply circuit at the ADCM C1 harness connector.

      Is there any voltage present?

      Yes

      - Repair the (S172) Left Rear Damper Valve Power Supply circuit for a short to voltage.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

- Go To 5.

5. **CHECK THE (S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
   1. Turn the ignition off.
   2. Disconnect the Right Rear Damper Valve harness connector.
   3. Turn the ignition on.
   4. Measure the voltage of the (S173) Right Rear Damper Valve Power Supply circuit at the ADCM C2 harness connector.

      Is there any voltage present?

      Yes

      - Repair the (S173) Right Rear Damper Valve Power Supply circuit for a short to voltage.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Replace the Active Damping Control Module (ADCM) at accordance with the Service formation. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.
6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C2202-00-ORIGINAL VIN MISMATCH / MISSING

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Active Damping Control Module (ADCM) continuously monitors the vehicle's VIN (from the CAN bus) and compares it to the VIN which is internally stored within the ADCM when the vehicle was first assembled. When they do not match this fault sets.

WHEN MONITORED:

Continuously.

SET CONDITION:

When the vehicle's VIN (being transmitted on the CAN bus) does not match the current VIN stored within the Active Damping Control Module (ADCM).

POSSIBLE CAUSES

Possible Causes
COMMUNICATIONS DTC(S) PRESENT
POWERTRAIN CONTROL MODULE (PCM)
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, erase DTCs.
    3. Turn ignition off to the lock position.
    4. Ignition on, engine not running.
    5. Wait ten seconds.
    6. With the scan tool, read DTCs.

    Is the DTC active at this time?

    Yes

    - Go To 2.

    No

    - Go To 3.

2. **WRONG VIN PROGRAMMED IN PCM**
    1. Ignition on, engine not running.
    2. With the scan tool, read the VIN in the PCM.
    3. Compare VIN in the PCM to the vehicle VIN.

    Is the correct VIN programmed in the PCM?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Replace the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .
    - Perform the PCM VERIFICATION TEST. Refer to **3.0L DIESEL - PCM VERIFICATION TEST** or **3.6L - POWERTRAIN VERIFICATION TEST** or **5.7L - POWERTRAIN VERIFICATION TEST** or **6.4L - POWERTRAIN VERIFICATION TEST** .
3. **COMMUNICATION DTCS PRESENT**
    1. Turn ignition off to the lock position.
    2. With the scan tool, read DTCs in all other modules. If any communications DTCs are present, perform the appropriate diagnostic procedure. Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** .
    3. Perform any Technical Service Bulletins that may apply.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

C2206-00-VEHICLE CONFIGURATION MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition on.

SET CONDITION:

This DTC will set if any of the learned Vehicle Configuration data from the CAN Bus has changed.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) CAN BUS DTCS
POWERTRAIN CONTROL MODULE (PCM) DTCS
ACTIVE DAMPING CONTROL MODULE (ADCM)

NOTE: If the BCM has been serviced make sure that the Restore Vehicle Configuration is performed before continuing with this diagnostic procedure.

DIAGNOSTIC TEST

1. **BODY CONTROL MODULE (BCM) CAN BUS DTCS ARE PRESENT**
    1. With the scan tool, read TIPM DTCs.

       Are there any BCM CAN BUS DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** .

       No

       - Go To 2.
2. **POWERTRAIN CONTROL MODULE (PCM) DTCS ARE PRESENT**
    1. With the scan tool, read Powertrain Control Module (PCM) DTCs.

       Are there any PCM DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** .

No

- Using the schematics as a guide, check the ADCM pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) Module in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

C220C-00-ACTIVE SUSPENSION MODULE INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Active Damping Control Module (ADCM) continuously monitors internal hardware circuitry for defects. The Service Air Suspension Message will be displayed on the cluster when this fault is first active.

WHEN MONITORED:

Continuously.

SET CONDITION:

Detection of RAM, ROM, EEPROM, Watchdog, no current calibration, or high side switch defect recognized.

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **ACTIVE DAMPING CONTROL MODULE (ADCM) INTERNAL CONDITION**
    1. The ASCM is reporting internal errors.

        NOTE: Before continuing, check the Air Suspension Control Module (ASCM) harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

    2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.
    3. Perform any Technical Service Bulletins that may apply.

Were there any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

U0001-00-CAN C BUS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

Battery voltage between 10 and 16 volts.

Ignition Off Draw (IOD) fuse installed.

SET CONDITION:

The controller detects an open, short to ground or a short to voltage on the CAN C Bus circuit.

POSSIBLE CAUSES

Possible Causes
CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE (BCM) POWER AND GROUND
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 volts before proceeding.

1. Turn the ignition on.

2. With the scan tool, read active DTCs.

   Is the DTC active at this time?

   Yes

   - Perform the U0002-CAN C Bus Off Performance diagnostic procedure. **Refer to U0002-00-CAN C BUS OFF PERFORMANCE** .

   No

   - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0002-00-CAN C BUS OFF PERFORMANCE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition run time is greater than one second. Battery voltage between 9 and 16 volts. Engine run time greater than three seconds.

SET CONDITION:

Bus messages not received from the Totally Integrated Power Module (TIPM) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: For vehicle communication problems, use the scan tool to refer to the Network Review Screen. The screen depicts a high level view of the vehicle network. Fault and problem areas appear in red. Selecting any of the network components allows access to the source of the problem.

1. Turn the ignition on.
2. With a scan tool, read the DTCs.

   Is the DTC active at this time?

   Yes

   - Perform the U0002-00-Can C Bus Off Performance diagnostic procedure in the Body Control Module (BCM).**Refer to U0002-00-CAN C BUS OFF PERFORMANCE** .

   No

   - Perform the Stored Lost Communication DTCs diagnostic procedure.**Refer to COMMUNICATION - DIAGNOSIS AND TESTING** .

U0100-00-LOST COMMUNICATION WITH PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

The battery voltage between 10 and 16 Volts.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Powertrain Control Module (PCM) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
POWERTRAIN CONTROL MODULES POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
POWERTRAIN CONTROL MODULE (PCM)
ANY MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

NOTE: Make sure the battery is fully charged before proceeding.

1. Turn the ignition on.
2. Using the scan tool, read the active DTCs.

   Does the scan tool display: U0100-00-LOST COMMUNICATION WITH PCM?

   Yes

   - **Refer to U0100-00-LOST COMMUNICATION WITH ECM/PCM** and perform the U0100-Lost Communication with PCM diagnostic procedure.

   No

   - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0101-00-LOST COMMUNICATION WITH TCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

With the ignition on.

Battery voltage between 10 and 16 volts.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Transmission Control Module (TCM) for approximately 500ms.

POSSIBLE CAUSES

Possible Causes
CAN BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TRANSMISSION CONTROL MODULE (TCM) POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
TRANSMISSION CONTROL MODULE (TCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

NOTE: Make sure the battery is fully charged before proceeding.

1. Turn the ignition on.
2. With the scan tool, read the active DTCs.

   Does the scan tool display: U0101-00-LOST COMMUNICATION WITH TCM?

   Yes

   - **Refer to U0101-00-LOST COMMUNICATION WITH TCM** and perform the U0101-Lost Communication with TCM diagnostic procedure.

   No

   - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0102-00-LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Ignition run time is greater than one second.

Battery voltage between 9 and 16 volts.

Engine run time greater than three seconds.

SET CONDITION:

Bus messages not received from the Drive Train Control Module (DTCM) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TOTALLY INTEGRATED POWER MODULE POWER AND GROUND
TIPM NOT CONFIGURED CORRECTLY
TOTALLY INTEGRATED POWER MODULE (TIPM)
MODULE THAT SET THIS DTC

NOTE: If present, diagnose and repair DTC U0002-88-CAN C BUS OFF

PERFORMANCE- BUS OFF before diagnosing this DTC.

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read and record the DTCs.
    3. With the scan tool, erase the DTCs.
    4. Cycle the ignition from off to on.
    5. With the scan tool, read the DTCs.

    Is the DTC Active at this time?

    Yes

    - **Refer To U0102-LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD** and perform the U0102-Lost Communication with Transfer Case Control Module / AWD diagnostic procedure.

    No

    - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0114-00-LOST COMMUNICATION WITH FINAL DRIVE CONTROL MODULE (DTCM)

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

Battery Voltage between 10 and 16 Volts.

Ignition Off Draw (IOD) fuse installed.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

The Active Damping Control Module (ADCM) doesn't receive a Final Drive Control Module (FDCM) (DTCM) message over the CAN C BUS circuit for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes

CAN INTERIOR OR CAN C BUS CIRCUITS OPEN OR SHORTED
DIAGNOSTIC TROUBLE CODES (DTC) RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES PRESENT
BODY CONTROL MODULE (BCM) NOT CONFIGURED CORRECTLY
BODY CONTROL MODULE (BCM) POWER AND GROUND
BODY CONTROL MODULE (BCM)
DRIVE TRAIN CONTROL MODULE (DTCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery Voltage is between 10 and 16 Volts before proceeding.

   1. Turn the ignition on.
   2. Using a scan tool, read DTCs.

      Is the DTC active at this time?

      Yes

      - Perform the appropriate diagnostic procedure. **Refer to BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING or BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** .

      No

      - Perform the Stored Lost Communication DTCs diagnostic procedure. **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** .

U0121-00-LOST COMMUNICATION WITH ANTILOCK BRAKE SYSTEM (ABS) CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

The battery voltage between 10 and 16 volts.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Antilock Brake System (ABS) Module for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
ANTI LOCK BRAKE MODULE (ABS) POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
ANTI LOCK BRAKE MODULE (ABS)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: Make sure the battery is fully charged before proceeding.

   1. Turn the ignition on.
   2. With the scan tool, read the active DTCs.

      Does the scan tool display: U0121-00-LOST COMMUNICATION WITH ANTILOCK BRAKE SYSTEM (ABS) CONTROL MODULE?

      Yes

      - **Refer to U0121-00-LOST COMMUNICATION WITH ANTILOCK BRAKE SYSTEM (ABS) CONTROL MODULE** and perform the U0121-00-Lost Communication with Antilock Brake System (ABS) Control Module diagnostic procedure.

      No

      - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0126-00-LOST COMMUNICATION WITH STEERING ANGLE SENSOR

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Angle Sensor (SAS) communicates with other controllers over the CAN C bus. The Active Damping Control Module (ADCM) continuously monitors the bus activity and receives the messages it needs. If the ADCM does not receive messages from the Steering Angle Sensor (SAS), this fault will set.

WHEN MONITORED:

SET CONDITION:

If the Active Damping Control Module (ADCM) Pump fails to receive bus messages from the Steering Angle Sensor (SAS) for approximately 500 ms.

POSSIBLE CAUSES

Possible Causes
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
CAN C BUS CIRCUITS OPEN OR SHORTED
STEERING ANGLE SENSOR POWER AND GROUND
ANTILOCK BRAKE MODULE (ABS) NOT CONFIGURED CORRECTLY
STEERING ANGLE SENSOR (SAS)
ACTIVE DAMPING CONTROL MODULE (ADCM)
ANTILOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With a scan tool, read DTCs.

    Is the DTC active at this time?

    Yes

    - **Refer to U0126-00-LOST COMMUNICATION WITH STEERING ANGLE SENSOR** and perform the U0126-00-LOST COMMUNICATION WITH STEERING ANGLE SENSOR diagnostic procedure.

    No

    - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the STORED LOST COMMUNICATION DTCS diagnostic procedure.

U0141-00-LOST COMMUNICATION WITH IPM (BCM/TIPM)

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

Battery voltage between 10 and 16 volts.

Ignition Off Draw (IOD) fuse installed.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Integrated Power Module (BCM) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
(D65) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D64) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
BODY CONTROL MODULE (BCM) POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and the battery is fully charged before proceeding.

   1. Turn the ignition on.
   2. With the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Perform the U0140-00-Lost Communication with (BCM) diagnostic procedure.**Refer to U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)** .

      No

      - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0155-00-LOST COMMUNICATION WITH CLUSTER/CCN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

Battery voltage between 10 and 16 volts.

Ignition Off Draw (IOD) fuse installed.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Instrument Cluster (CCN) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
INSTRUMENT CLUSTER POWER AND GROUND
BODY CONTROL MODULE (BCM) NOT CONFIGURED CORRECTLY
INSTRUMENT CLUSTER (CCN)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and the battery is fully charged before proceeding.

   1. Turn the ignition on.
   2. With the scan tool, read the DTCs.

      Is the DTC active at this time?

      Yes

      - Perform the U0155-Lost Communication with Cluster/CCN diagnostic procedure. **Refer to U0155-00-LOST COMMUNICATION WITH CLUSTER/CCN** .

      No

      - Perform the Stored Lost Communication DTCs diagnostic procedure. **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** .

U0168-00-LOST COMMUNICATION WITH INTRUSION TRANSCEIVER MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

Battery voltage between 10 and 16 volts.

SET CONDITION:

Bus messages not received from the Intrusion Transceiver Module for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN BUS (+) CIRCUIT SHORTED TO VOLTAGE
CAN BUS (-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE (BCM) NOT CONFIGURED CORRECTLY
INTRUSION TRANSCEIVER MODULE POWER AND GROUND
INTRUSION TRANSCEIVER MODULE
MODULE THAT SET THE DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, read the active DTCs.

       Does the scan tool display; U0168-00-LOST COMMUNICATION WITH INTRUSION TRANSCEIVER MODULE as Active?

       Yes

       - **Refer to U0168-00-LOST COMMUNICATION WITH INTRUSION TRANSCEIVER MODULE** and perform the U0168-00-Lost Communication with Intrusion Transceiver Module.

       No

       - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0401-00-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously with the ignition on, one valid CAN message received at least once, and no U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects an incorrect CAN message from the Powertrain Control Module (PCM).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) CAN BUS DTCS
ENGINE DTCS
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

      Is the DTC active at this time?

      Yes

      - Go To 2.

      No

      - Go To 4.
2. **CHECK IF BODY CONTROL MODULE (BCM) CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the BCM DTCs.

      Are there any BCM CAN BUS DTCs present?

      Yes

      - Perform the appropriate diagnostic procedure. Refer to **BCM, DTC'S B10B3 -**

B1ED2-11 - DIAGNOSIS AND TESTING or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** .

No

- Go To 3.

3. **CHECK IF ENGINE DTCS ARE PRESENT**
   1. With the scan tool, read Engine DTCs.

      Are there any Engine DTCs present?

      Yes

      - Perform the appropriate diagnostic procedure. Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** .

      No

      - Using the schematics as a guide, check the ADCM pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present

at this time.

U0402-00-IMPLAUSIBLE DATA RECEIVED FROM TCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously with the ignition on, one valid CAN message received at least once, and no U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects an incorrect CAN message from the Transmission Control Module (TCM).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) CAN BUS DTCS
TRANSMISSION DTCS
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

   Is the DTC active at this time?

   Yes

   - Go To 2.

   No

   - Go To 4.
2. **CHECK IF BODY CONTROL (BCM) CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the BCM DTCs.

Are there any BCM CAN BUS DTCs present?

Yes

- Perform the appropriate diagnostic procedure. Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Go To 3.

3. **CHECK IF TRANSMISSION DTCS ARE PRESENT**
    1. With the scan tool, read Transmission DTCs.

    Are there any Transmission DTCs present?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **TRANSMISSION CONTROL MODULE (TCM) - DIAGNOSTIC CODE INDEX - 8HP45 AUTOMATIC TRANSMISSION** or **NAG1 - DIAGNOSTIC CODE INDEX** .

    No

    - Using the schematics as a guide, check the ADCM pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

U0403-00-IMPLAUSIBLE DATA RECEIVED FROM T-CASE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously with the ignition on, one valid CAN message received at least once, and no U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects an incorrect CAN message from the Drive Train Control Module (DTCM).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) CAN BUS DTCS
DRIVE TRAIN CONTROL MODULE (DTCM) DTCS
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

   Is the DTC active at this time?

   Yes

   - Go To 2.

No

- Go To 4.

2. **CHECK IF BODY CONTROL MODULE (BCM) CAN BUS DTCS ARE PRESENT**
    1. With the scan tool, read the BCM DTCs.

       Are there any BCM CAN BUS DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** .

       No

       - Go To 3.

3. **CHECK IF TRANSFER CASE DTCS ARE PRESENT**
    1. With the scan tool, read DTCM DTCs.

       Are there any DTCM DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **DTCM - DIAGNOSIS AND TESTING** .

       No

       - Using the schematics as a guide, check the ADCM pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

4. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

U0415-00-IMPLAUSIBLE DATA RECEIVED FROM ABS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

With the ignition on for four seconds, no CAN BUS circuit error condition present, no lost communication with ABS condition present, and no system undervoltage or overvoltage condition present.

SET CONDITION:

The Active Damping Control Module (ADCM) is receiving implausible data for vehicle speed, wheel speeds, brake switch status, longitudinal acceleration, yaw rate, or lateral acceleration from the ABS Module.

POSSIBLE CAUSES

Possible Causes
ANTILOCK BRAKE SYSTEM (ABS) MODULE DTCS PRESENT
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **ABS MODULE DTCS PRESENT**
    1. Ignition on, engine not running.
    2. With the scan tool, read DTCs in the ABS Module.

    Are there any DTCs present?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **ABS - DIAGNOSIS AND TESTING** .

No

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

U0427-00-IMPLAUSIBLE DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE (RF HUB)

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

With the ignition on for four seconds, no CAN BUS circuit error condition present, no lost communication with Radio Frequency (RF Hub) condition present, and no system undervoltage or overvoltage condition present.

SET CONDITION:

The Active Damping Control Module (ADCM) is receiving implausible data for sensor status from the Radio Frequency (RF Hub).

POSSIBLE CAUSES

Possible Causes
RADIO FREQUENCY (RF HUB) DTCS PRESENT ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **RADIO FREQUENCY (RF HUB) DTCS PRESENT**
    1. Ignition on, engine not running.
    2. With the scan tool, read DTCs in the RF Hub.

    Are there any DTCs present?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **RF HUB - DIAGNOSIS AND TESTING** .

    No

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

U0429-00-IMPLAUSIBLE DATA RECEIVED FROM SCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously with the ignition on, one valid CAN message received at least once, and no U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION:

When the Active Damping Control Module (ADCM) detects an incorrect CAN message from the Steering Control Module (SCM).

POSSIBLE CAUSES

Possible Causes
STEERING ANGLE SENSOR (SAS) DTCS PRESENT ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **STEERING ANGLE SENSOR (SAS) DTCS PRESENT**
    1. Ignition on, engine not running.
    2. With the scan tool, read the DTCs in the SAS.

       Are there any DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **SCM - DIAGNOSIS AND TESTING** .

       No

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

U0431-00-IMPLAUSIBLE DATA RECEIVED FROM IPM (BCM)

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

With the ignition on for four seconds, no CAN BUS circuit error condition present, no lost

communication with BCM condition present, and no system undervoltage or overvoltage condition present.

SET CONDITION:

The Active Damping Control Module (ADCM) is receiving no message or implausible data for ambient temperature or the transfer case selector switch.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **BODY CONTROL MODULE (BCM) DTCS PRESENT**
    1. Ignition on, engine not running.
    2. With the scan tool, read the DTCs in the BCM.

       Are there any DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** .

       No

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

U110A-00-LOSS OF COMMUNICATIONS WITH SCM - CAN-C

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Active Damping Control Module (ADCM) communicates with other controllers over the CAN C bus. The ADCM continuously monitors the bus activity and receives the messages it needs. If the ADCM does not receive messages from the SAS, then this fault will set.

WHEN MONITORED:

Ignition on for more than 5 seconds and battery voltage between 10 and 16 volts.

SET CONDITION:

The Active Damping Control Module (ADCM) no longer detects any messaging from the Steering Angle Sensor (SAS) for more than 0.5 of a second after monitoring conditions have been fulfilled.

POSSIBLE CAUSES

Possible Causes
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
CAN C BUS CIRCUITS OPEN OR SHORTED
STEERING ANGLE SENSOR (SAS)
ACTIVE DAMPING CONTROL MODULE (ADCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: If present, diagnose and repair DTC U0001-00-CAN C BUS before diagnosing this DTC.

   1. Ignition on, engine not running.
   2. With the scan tool, read and record ADCM DTCs.
   3. With the scan tool, erase ADCM DTCs.
   4. Cycle the ignition switch.
   5. With the scan tool, read ADCM DTCs.

      Is the DTC active at this time?

      Yes

      - Go To 2.

      No

      - Perform the Stored Lost Communication diagnostic procedure. Refer to **COMMUNICATION - DIAGNOSIS AND TESTING** .

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCS**
   1. With the scan tool, read all active DTCs from all CAN C Bus modules.

      NOTE: Check for CAN C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.

Does the scan tool display any active DTCs related to the conditions listed above?

Yes

- Diagnose and repair the DTCs. Refer to the appropriate Electrical Diagnostic Information.

No

- Go To 3.

3. **VERIFY THAT THE SAS IS ACTIVE ON THE BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the SAS is active on the bus.

    Is the SCM active on the bus?

    Yes

    - Go To 4.

    No

    - Perform the Stored Lost Communication diagnostic procedure. Refer to **COMMUNICATION - DIAGNOSIS AND TESTING** .
4. **CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCs**
    1. With the scan tool, select Network View and select Advanced.

    Is there more than one module with active DTCs "Logged Against" the SAS?

    Yes

    - Replace the Steering Column Control Module (SCCM) in accordance with the service information. Refer to **MODULE, STEERING COLUMN, REMOVAL** .

    No

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **ADCM VERIFICATION TEST**.

STANDARD PROCEDURE

ADCM VERIFICATION TEST

DIAGNOSTIC TEST

1. **ADCM VERIFICATION TEST**

    1. Turn the ignition off.
    2. Connect all previously disconnected components and connectors.
    3. Verify all accessories are turned off and the battery is fully charged.
    4. Verify that the ignition is on, with the scan tool, erase all Diagnostic Trouble Codes (DTCs) from All modules. Start the engine and allow it to run for two minutes and fully operate the system that was indicating the failure.
    5. Turn the ignition off and wait five seconds. Turn the ignition on and using the scan tool, read DTCs from all modules.
    6. If any Diagnostic Trouble Codes are present, Refer to **DIAGNOSIS AND TESTING** and perform the diagnostic procedure.
    7. If there are no DTCs present after turning ignition on, road test the vehicle for at least five minutes.
        - Test drive the vehicle by turning the vehicle left or right in a curving manner at a speed above 25 km/h (15 mph).
    8. Again, with the scan tool read DTCs. If any DTCs are present, Refer to **DIAGNOSIS AND TESTING** for the diagnostic procedure and troubleshoot the new or recurring DTC.
    9. If there are no Diagnostic Trouble Codes (DTCs) present, and the customer's concern can no longer be duplicated, the repair is complete.

        Are any DTCs present or is the original concern still present?

        Yes

        - Repair is not complete, perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING**.

        No

        - Repair is complete.

RESTRAINTS

Service Information - Chrysler 300

WARNING

WARNING

WARNING: To avoid serious or fatal injury on vehicles equipped with the Supplemental Restraint System (SRS), never attempt to repair the electrically conductive circuits or wiring components related to the SRS for which there is no MOPAR wiring repair kit. It is important to use ONLY the recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR® Connector Web Site at the following address on the internet: (http://dto.vftis.com/mopar/disclaimer.asp). Inappropriate repairs can compromise the conductivity and current carrying capacity of those critical electrical circuits, which may cause SRS components not to deploy when required, or to deploy when not required. Only minor cuts or abrasions of wire and terminal insulation where the conductive material has not been damaged, or connector insulators where the integrity of the latching and locking mechanisms have not been compromised may be repaired using appropriate methods.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain or seat (pelvic and thorax) airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side curtains or seat airbags in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side curtain and seat airbags

will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid potential physical injury or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the Occupant Restraint Controller (ORC) capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 12 inches (30 centimeters) of an electronic module or wiring harness, then that module or harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens.

WARNING: To avoid serious or fatal injury, do not attempt to dismantle an airbag unit or tamper with its inflator. Do not puncture, incinerate or bring into contact with electricity. Do not store at temperatures exceeding 93° C (200° F). An airbag inflator unit may contain sodium azide and potassium nitrate. These materials are poisonous and extremely flammable. Contact with acid, water, or heavy metals may produce harmful and irritating gases (sodium hydroxide is formed in the presence of moisture) or combustible compounds. An airbag inflator unit may also contain a gas canister pressurized to over 17.24 kPa (2500 psi). Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury when handling a seat belt tensioner retractor or buckle, proper care should be exercised to keep fingers out from under the retractor or buckle cover and away from the seat belt webbing or cable where it exits from the retractor or buckle cover.

WARNING: To avoid serious or fatal injury, replace all Supplemental Restraint System

(SRS) components only with parts specified in the Chrysler Mopar® Parts Catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection.

WARNING: To avoid serious or fatal injury, the fasteners, screws, and bolts originally used for the Supplemental Restraint System (SRS) components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the SRS. Anytime a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler Mopar® Parts Catalog.

WARNING: To avoid serious or fatal injury when a steering column has an airbag unit attached, never place the column on the floor or any other surface with the steering wheel or airbag unit face down. Failure to follow these instructions may result in possible serious or fatal injury.

DESCRIPTION

OCCUPANT RESTRAINT SYSTEM

An occupant restraint system is standard factory-installed safety equipment on this vehicle. Available occupant restraints for this vehicle include both active and passive types. Active restraints are those which require the vehicle occupants to take some action to employ, such as fastening and adjusting a seat belt; while passive restraints require no action by the vehicle occupants to be employed.

ACTIVE RESTRAINTS

The active restraints for this vehicle include:

- **Child Restraint Anchors** - All vehicles are equipped with three, fixed-position, child seat upper tether anchors for the rear seating. These upper anchors are integral to the rear shelf panel. Two lower anchors are also provided for each outboard rear seating position. The lower anchors are integral to an isofix cross member welded to the center floor panel beneath the rear seat. These lower anchors are accessed from the front of the rear seat where the seat back meets the seat cushion.
- **Front Seat Belts** - Both front seating positions are equipped with three-point seat belt systems employing lower B-pillar mounted inertia latch-type emergency locking retractors, height-adjustable upper B-pillar mounted turning loops, a traveling lower seat belt anchor secured to the outboard side of the seat frame, and a traveling end-release seat belt buckle secured to the inboard side of the seat frame. The passenger side front seat belt retractor is switchable to an automatic locking retractor for compatibility with child seats. The driver and passenger side front seat belt buckles each include an integral seat belt switch that detects whether the front seat belts have been fastened.
- **Rear Seat Belts** - All three rear seating positions are equipped with three-point seat belt systems. The outboard seating position belts employ C-pillar mounted inertia latch-type emergency locking retractors, fixed position upper C-pillar mounted turning loops and fixed

lower seat belt anchors secured to the lower C-pillar. The center position retractor is secured to the rear shelf panel and the fixed lower center seat belt anchor is secured to the floor panel. All three rear seat belts have fixed end-release seat belt buckles secured to the floor panel, a double buckle unit on the right side and a single buckle unit on the left side. Both outboard second row seat belt retractors are switchable to an automatic locking retractor for compatibility with child seats.

PASSIVE RESTRAINTS

Fig. 1: SRS Logo
Courtesy of CHRYSLER GROUP, LLC

The passive restraints available for this vehicle include the following:

- **Active Head Restraints** - Inertia-based Active Head Restraints (AHR) are standard equipment for both front seating positions in this vehicle.
- **Dual Front Airbags** - Multistage driver and front passenger airbags are standard in this model. This airbag system consists of passive, inflatable, Supplemental Restraint System (SRS) components and vehicles with this equipment can be readily identified by the **SRS - AIRBAG** logo molded into the driver airbag trim cover in the center of the steering wheel and also into the passenger airbag door on the top of the instrument panel above the glove box. Vehicles with the airbag system can also be identified by the airbag indicator, which will illuminate in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) from four to six seconds as a bulb test each time the ignition switch is turned to the ON position. Pyrotechnic-type seat belt tensioners are also integral for the driver and passenger front seat belts of all airbag equipped vehicles to work in conjunction with the dual front and side curtain airbags.
- **Knee Blocker Airbag** - The front airbag system also includes a knee blocker airbag (also known as a Knee AirBag/KAB or an Inflatable Knee Blocker/IKB) that is located just below the steering column, behind the instrument panel steering column opening cover. This airbag is also a passive, inflatable, SRS component and vehicles with this equipment can be readily identified by the **SRS - AIRBAG** logo molded into the steering column opening cover on the instrument panel just beneath the steering column.
- **Seat Airbags** - Front seat integrated pelvic and thorax airbags are standard equipment in all

markets. This airbag system consists of passive, inflatable, SRS components and vehicles with this equipment can be readily identified by a sewn tag with the **SRS - AIRBAG** logo located on the outboard side of the front seat back trim cover.

- **Side Curtain Airbags** - Side curtain airbags are standard equipment for this vehicle when it is also equipped with dual front airbags. This airbag system consists of passive, inflatable, SRS components and vehicles with this equipment can be readily identified by a molded identification trim button with the **SRS - AIRBAG** logo located on the top of each B-pillar upper trim panel near the headliner.

The SRS includes the following major components, which are described in further detail elsewhere in this service information:

- **Active Head Restraints** - On vehicles with this equipment, one Active Head Restraint (AHR) is located atop each front seat back unit.
- **Airbag Indicator** - The airbag indicator is integral to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC), which is located on the instrument panel in front of the driver.
- **Clockspring** - The clockspring is located near the top of the steering column, directly beneath the steering wheel.
- **Driver Airbag** - The driver airbag is located in the center of the steering wheel, beneath the driver airbag trim cover.
- **Driver Knee Blocker** - The driver knee blocker is a structural unit secured to the back side of and integral to the instrument panel steering column opening cover.
- **Front Impact Sensor** - Two front impact sensors are used on vehicles equipped with dual front airbags, one left side and one right side. One sensor is located on the back side of each vertical member of the headlamp mounting cross member structural support.
- **Knee Blocker Airbag** - This vehicle is equipped with a knee blocker airbag (also known as the Knee AirBag/KAB or Inflatable Knee Blocker/IKB) feature. The knee blocker airbag is mounted behind the instrument panel steering column opening cover in addition to the static driver knee blocker.
- **Occupant Detection Sensor** - An Occupant Detection Sensor (ODS) is located on the top of the seat cushion of the passenger side front seat in domestic market vehicles.
- **Occupant Restraint Controller** - The Occupant Restraint Controller (ORC) is located on a mount on the floor panel transmission tunnel forward of the transmission gear selector, and is concealed below the instrument panel.
- **Passenger Airbag** - The passenger airbag is located in the instrument panel, beneath the passenger airbag door on the top of the instrument panel above the glove box on the passenger side of the vehicle.
- **Passenger Knee Blocker** - The passenger knee blocker is a structural reinforcement that is integral to and concealed within the glove box door.
- **Seat Airbag** - A seat (also known as pelvic and thorax) airbag unit is secured to each outboard front seat back frame, where it is concealed beneath the seat back trim cover and foam.
- **Seat Belt Tensioner** - A seat belt tensioner is integral to both front seat belt retractor and both front seat buckle units on vehicles equipped with dual front airbags. The seat belt retractor and

tensioner units are secured to each lower inner B-pillar and are concealed behind the lower B-pillar trim. The seat belt buckle tensioner units are located on the inboard rear corner of each front seat cushion frame.

- **Seat Track Position Sensor** - Certain vehicles may include a seat track position sensor that may be located on the inboard side of one of the seat adjuster tracks on both the driver and the passenger front seats.
- **Side Curtain Airbag** - A standard equipment side curtain airbag is secured to each inside roof side rail above the headliner, and extends from the A-pillar to just beyond the C-pillar.
- **Side Impact Sensor** - Six side impact sensors are standard equipment on vehicles equipped with side curtain airbags, three on each side of the vehicle. One pressure-type sensor is located on each right and left side front door hardware module carrier, while one acceleration-type sensor is located on each B-pillar and C-pillar. These sensors are each concealed behind the adjacent interior trim components.

The ORC and the IC each contain a microprocessor and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ORC for control of the airbag indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the SRS components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the SRS components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

PEDESTRIAN PROTECTION SYSTEM

An Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) is factory-installed safety equipment, which is available only in vehicles manufactured for certain export markets. The EPP system includes the following major components, which are described in further detail elsewhere in this service information:

- **Active Hood Hinge Actuators** - The two pyrotechnic EPP active hood hinge actuators are each secured by a screw within a mounting plate located on each of the two active hood hinges, which are located near each rear corner of the hood panel.
- **Active Hood Hinges** - The active hood hinges have several features and components not found on a conventional hood hinge. In addition to a mounting plate for a pyrotechnic actuator and a reset spring, each active hood hinge includes a mid-strap joined to the hood bracket by a pivot pin at the forward end and a shear rivet at the rearward end. An up-stop pin near the center of the hood bracket fits within a slotted hole near the center of the mid-strap. Refer to **HINGE, HOOD** for hood hinge removal and installation procedures.
- **Front Energy Absorber Foam Material** - The front energy absorber foam material is

sandwiched between the front bumper area of the front fascia and the front bumper support beam. Refer to **FASCIA, FRONT** for front fascia removal and installation procedures.

- **Impact Sensors** - The EPP system includes three dedicated acceleration-type impact sensors to support the EPP feature. The impact sensors are each mounted by a screw to a receptacle with a U-nut located on the back of the front fascia. One sensor and bracket is located near each end just above the bumper support beam, and one is located near the center just below the bumper support beam. The impact sensors and the sensor mounting provisions are concealed behind the front fascia.
- **Occupant Restraint Controller** - The Occupant Restraint Controller (ORC) also serves as the Electronic Pedestrian Protection Module (EPPM) in this vehicle. The ORC is located on a mount on the floor panel transmission tunnel near the dash panel just forward of the center instrument panel support.
- **Pedestrian Bar** - A static, tubular metal pedestrian bar (also known as a leg catcher) is concealed just behind the lower end of the front fascia. The pedestrian bar is suspended at each side from the lower end of a stamped metal bracket that is secured at the top near the same brackets that support each end of the front bumper support beam. Refer to **FRAME AND BUMPERS** for the pedestrian bar removal and installation procedures.

The ORC and the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) each contain a microcontroller and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ORC for control of the airbag indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the EPP electronic components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the EPP components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OCCUPANT RESTRAINT SYSTEM

ACTIVE RESTRAINTS

The primary passenger restraints in this or any other vehicle are the standard equipment factory-installed seat belts and child restraint anchors. Seat belts and child restraint anchors are referred to as an active restraint because the vehicle occupants are required to physically fasten and properly adjust these restraints in order to benefit from them.

PASSIVE RESTRAINTS

The passive restraints are referred to as Supplemental Restraint System (SRS) components because

they were designed and are intended to enhance the protection for the occupants of the vehicle **only** when used in conjunction with the seat belts. They are referred to as passive restraints because the vehicle occupants are not required to do anything to make them operate; however, the vehicle occupants must be wearing their seat belts in order to obtain the maximum safety benefit from the factory-installed SRS components. In addition, each front seat occupant must have their Active Head Restraint (AHR) unit properly adjusted in order to obtain its maximum safety benefit.

The SRS electrical circuits are continuously monitored and controlled by a microprocessor and software contained within the Occupant Restraint Controller (ORC). An airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) illuminates from four to six seconds as a bulb test each time the ignition switch is turned to the ON or START positions. Following the bulb test, the airbag indicator is turned ON or OFF by the ORC to indicate the status of the SRS. If the airbag indicator comes ON at any time other than during the bulb test, it indicates that there is a problem in the SRS electrical circuits. Such a problem may cause airbags not to deploy when required, or to deploy when not required.

Deployment of the SRS components depends upon the angle and severity of an impact. Deployment is not based upon vehicle speed; rather, deployment is based upon the rate of deceleration as measured by the forces of gravity (G force) upon the acceleration-type impact sensors, or by a pressure wave within a front door as measured by the pressure-type impact sensor. When an impact is severe enough, the microprocessor in the ORC signals the inflator of the appropriate airbag units to deploy their airbag cushions.

The front seat belt retractor and buckle tensioners, the knee blocker airbag (also known as the Knee AirBag/KAB or Inflatable Knee Blocker/IKB) are provided with a deployment signal by the ORC in conjunction with the front airbags. The side curtain airbags and the seat airbags (also known as pelvic and thorax airbags) are provided with a deployment signal individually by the ORC based upon a side impact sensor input for the same side of the vehicle. The ORC also contains a rollover sensor. Should the vehicle roll over and not cause any acceleration-type or pressure-type impact sensor to signal the need for a deployment, the rollover sensor in the ORC will deploy the side curtain air bags, the seat air bags and, under certain conditions, will also actuate the seat belt buckle and retractor tensioners.

During a frontal vehicle impact, the static knee blockers work in concert with properly fastened and adjusted seat belts to restrain both the driver and the front seat passenger in the proper position for an airbag deployment. The static knee blockers also absorb and distribute the crash energy from the driver and the front seat passenger to the structure of the instrument panel. The seat belt tensioners remove the slack from the front seat belts to provide further assurance that the driver and front seat passenger are properly positioned and restrained for an airbag deployment.

Typically, the vehicle occupants recall more about the events preceding and following a collision than they do of an airbag deployment itself. This is because the airbag deployment and deflation occur very rapidly. In a typical 48 kilometer-per-hour (30 mile-per-hour) barrier impact, from the moment of impact until the airbags are fully inflated takes about 40 milliseconds. Within one to two seconds from the moment of impact, the airbags are almost entirely deflated. The times cited for these events are approximations, which apply only to a barrier impact at the given speed. Actual times will vary somewhat, depending upon the vehicle speed, impact angle, severity of the impact, and the type of collision.

When the ORC monitors a problem in any of the SRS circuits or components, including the seat belt tensioners, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit and sends an electronic message to the IC to turn ON the airbag indicator. The hard wired circuits between components related to the SRS may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SRS or the electronic controls or communication between other modules and devices that provide features of the SRS. The most reliable, efficient, and accurate means to diagnose the SRS or the electronic controls and communication related to SRS operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

PEDESTRIAN PROTECTION SYSTEM

In the event of a frontal vehicle impact, the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) components are designed and intended to enhance the protection for pedestrians from the hard components found just beneath the hood of the vehicle within the engine compartment. The EPP system has three acceleration-type impact sensors located in the front bumper area of the vehicle, a microcontroller-based Occupant Restraint Controller (ORC) located within the passenger compartment of the vehicle that also serves as the EPP system controller and an active hood hinge with a pyrotechnic-type actuator at each rear corner of the hood panel.

The impact sensors continually transmit sensor data to the ORC that give an indication of the forces of gravity (G force) upon the sensors. The ORC also receives electronic message inputs over the Controller Area Network (CAN) data bus indicating the ignition status, vehicle speed and ambient temperature. If the vehicle has a collision, the ORC uses algorithms to analyze all of the input data to determine whether to deploy the hood. If the algorithm makes a deployment decision and that the vehicle speed is between 22 kilometers-per-hour (14 miles-per-hour) and 52 kilometers-per-hour (32 miles-per-hour), then the ORC will send electrical signals to deploy the actuators on the active hood hinges.

When the micro gas generator in each actuator is energized, it produces a large quantity of expanding gas. The expanding gas moves a piston within the actuator that pushes upward against the hood bracket of the active hood hinge. The force of the actuator on the hinge bracket creates a lever action that shears a rivet between the hood bracket and the mid-strap of both hood hinges, allowing the actuators to lift the rear of the hood at the hinges. Lifting the rear of the hood in this manner provides additional clearance between the hood and the hard components found within the engine compartment.

Each active hood hinge functions normally during routine opening and closing of the hood. However, upon active hood hinge deployment the rear of the hood is lifted to a predetermined height, which is controlled by an up-stop pin on the hinge bracket that is engaged within a slotted hole in the mid-strap

of each hinge.

During a frontal pedestrian impact, the purpose of the pedestrian bar (also known as the leg catcher) that supports the lower front fascia is to reduce the severity of leg injuries and to position the pedestrian onto the hood of the vehicle rather than onto the pavement. These goals are both intended to reduce the severity and debilitating nature of potential pedestrian injuries. It should be noted that the pedestrian bar **must** be inspected and replaced if visually damaged following **any** frontal vehicle impact, regardless of whether or how the active hood is deployed.

The EPP system electrical circuits are continuously monitored and controlled by the ORC microcontroller. If the ORC detects a problem it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit and sends an electronic request message to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to illuminate the airbag indicator. The airbag indicator may be turned ON or OFF by the ORC to indicate a problem in either the Supplemental Restraint System (SRS) or the EPP system electrical circuits.

The hard wired circuits between components related to the EPP system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the EPP system or the electronic controls or communication between other modules and devices that provide inputs to the ORC. The most reliable, efficient, and accurate means to diagnose the ORC or the electronic controls and communication related to EPP system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUPPLEMENTAL RESTRAINT SYSTEM

The hard wired circuits between modules and components related to the Supplemental Restraint System (SRS) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SRS or the electronic controls or communication between other modules and devices that provide features of the SRS. The most reliable, efficient, and accurate means to diagnose the SRS or the electronic controls and communication related to SRS operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

In addition to a diagnostic scan tool that contains the latest version of the proper diagnostic software, certain diagnostic procedures for the SRS may require the use of the SRS Load Tool special tool

along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

PEDESTRIAN PROTECTION SYSTEM

The hard wired circuits between modules and components related to the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the EPP system or the electronic controls or communication between other modules and devices that provide features of the EPP system. The most reliable, efficient, and accurate means to diagnose the EPP system or the electronic controls and communication related to EPP system operation, as well as the retrieval or erasure of a Diagnostic Trouble Code (DTC) requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

In addition to a diagnostic scan tool that contains the latest version of the proper diagnostic software, certain diagnostic procedures for the EPP system may require the use of the Supplemental Restraint System (SRS) Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

STANDARD PROCEDURE

HANDLING NON-DEPLOYED SUPPLEMENTAL RESTRAINTS

At no time should any source of electricity be permitted near the inflator on the back of a non-

deployed airbag or seat belt tensioner. When carrying a non-deployed airbag, the trim cover or airbag cushion side of the unit should be pointed away from the body to minimize injury in the event of an accidental deployment. If the airbag unit is placed on a bench or any other surface, the trim cover or airbag cushion side of the unit should be face up to minimize movement in the event of an accidental deployment.

When handling a non-deployed seat belt tensioner, take proper care to keep fingers out from under the retractor or buckle cover and away from the seat belt webbing or cable where it exits from the retractor or buckle cover. In addition, the Supplemental Restraint System (SRS) should be disarmed whenever any steering wheel, steering column, seat belt tensioner, airbag, impact sensor, or instrument panel components require diagnosis or service. Failure to observe this warning could result in accidental airbag deployment and possible personal injury.

All damaged, ineffective or non-deployed airbags and seat belt tensioners which are replaced on vehicles are to be handled and disposed of properly. If an airbag or seat belt tensioner unit is ineffective or damaged and non-deployed, refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

SUPPLEMENTAL RESTRAINT STORAGE

Airbags and seat belt tensioners must be stored in their original, special container until they are used for service. Also, they must be stored in a clean, dry environment; away from sources of extreme heat, sparks and high electrical energy. Always place or store any airbag on a surface with its trim cover or airbag cushion side facing up, to minimize movement in case of an accidental deployment.

SERVICE AFTER A PEDESTRIAN PROTECTION DEPLOYMENT

COMPONENT REPLACEMENT AND INSPECTION REQUIREMENTS

There are two types of Electronic Pedestrian Protection (EPP) system deployments that may occur: pedestrian and non-pedestrian. Following either type of deployment, the Electronic Vehicle Information Center (EVIC) within the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) will display a **SERVICE ACTIVE HOOD** message and the airbag indicator will be illuminated. To make sure continued system integrity, certain components must be replaced or inspected following a deployment based upon the deployment type.

PEDESTRIAN DEPLOYMENT

The following components **must** be replaced following a pedestrian deployment:

- Right and left EPP hood hinge actuators
- Right and left active hood hinges
- Hood panel

The following components **must** be closely inspected, then replaced if any damage is visually evident

following a pedestrian deployment:

- EPP impact sensors
- EPP impact sensor wiring
- Front bumper energy absorber foam material (inspect for compression, cracks and any other signs of deformation or deterioration)
- Front bumper support beam (reinforcement)
- Front fascia
- Front fascia brackets
- Hood latch/secondary catch unit
- Hood latch striker
- Pedestrian bar (see **NOTE**)

NOTE: **The pedestrian bar MUST be inspected and replaced if visually damaged following ANY frontal vehicle impact, regardless of whether the active hood is deployed or how the impact occurred.**

NON-PEDESTRIAN DEPLOYMENT

The following components **must** be replaced following a non-pedestrian deployment:

- Right and left EPP hood hinge actuators
- Right and left active hood hinges

The following components **must** be closely inspected, then replaced if any damage is visually evident following a non-pedestrian deployment:

- EPP impact sensors
- EPP impact sensor wiring
- Front bumper energy absorber foam material (inspect for compression, cracks and any other signs of deformation or deterioration)
- Front bumper support beam (reinforcement)
- Front fascia
- Front fascia brackets
- Hood latch/secondary catch unit
- Hood latch striker
- Hood panel
- Pedestrian bar (see **NOTE 2**)

NOTE:

1. **In order to guarantee continued Electronic Pedestrian Protection (EPP) system integrity, the hood panel MUST be replaced following three EPP deployments, regardless of how the active hood is deployed or the results**

of any visual inspection.

2. **The pedestrian bar MUST be inspected and replaced if visually damaged following ANY frontal vehicle impact, regardless of whether the active hood is deployed or how the impact occurred.**

ACTIVE HOOD HINGE RESET PROCEDURE

If the vehicle remains otherwise safely operable following an EPP deployment, a customer reset position for the active hood hinges is provided to restore adequate forward visibility to drive the vehicle to the nearest dealer for service. Proceed as follows to engage the deployed active hood hinges in the reset position:

1. Push downward on one rear corner of the hood panel.

   NOTE: The initial 15 millimeters (0.60 inch) of travel will require significant effort, up to 300 Newtons (68 pounds) of force. After the initial travel, the deployed EPP actuators will vent and the required force to push the hood downward will be reduced.

2. Continue pushing the hood downward until the active hinge reset mechanism engages. The **C** shaped reset spring on the hinge mid-strap will come into contact with the hood bracket and the resistance will increase. Provide an additional downward force (a soft bump downward) on the hood to cause the reset spring to compress, then snap into the detent notch in the hood bracket. The rear edge of the hood will be raised about 5 millimeters (0.20 inch) higher than the fender when the active hood hinge is in the reset position.
3. Repeat Steps 1 and 2 on the opposite rear corner of the hood panel.

SERVICE AFTER A SUPPLEMENTAL RESTRAINT DEPLOYMENT

Any vehicle which is to be returned to use following a Supplemental Restraint System (SRS) component deployment must have the deployed restraints replaced. In addition, the following guidelines MUST be observed.

- **Following ANY major vehicle impact damage in the vicinity of an impact sensor or the ORC** - It is critical that the mounting surfaces and mounting brackets for the Occupant Restraint Controller (ORC), front impact sensors and side impact sensors located within the proximity of the impact damage be closely inspected and restored to their original conditions. Because the ORC and each impact sensor are used by the SRS to monitor or confirm the direction and severity of a vehicle impact, improper orientation or insecure fastening of these components may cause airbags not to deploy when required, or to deploy when not required.
- **If an active head restraint is deployed** - An inertia-based Active Head Restraint (AHR) unit that is undamaged following a deployment automatically resets itself. These units are designed with the intention of reuse.
- **If the driver airbag is deployed** - If the driver airbag has been deployed, the steering wheel, the clockspring and the complete steering column with lower steering column coupler must also be replaced.

- **If the knee blocker airbag is deployed** - If the knee blocker airbag (also known as the Knee AirBag/KAB or Inflatable Knee Blocker/IKB) has been deployed, the instrument panel steering column opening cover must also be replaced.
- **If the passenger airbag is deployed** - If the passenger airbag has been deployed, the instrument panel top pad must also be replaced.
- **If a seat airbag is deployed** - If a seat (pelvic and thorax) airbag has been deployed, the seat back frame, the seat back foam and the seat back trim cover on the same side of the vehicle as the deployed airbag must also be replaced.
- **If a seat belt tensioner is deployed** - The seat belt tensioners are deployed in conjunction with the front airbags, but can also be deployed with seat (pelvic and thorax) or side curtain airbags. The seat belt tensioners must be replaced if either front airbag has been deployed, and must be inspected if either seat or side curtain airbag has been deployed.
- **If a side curtain airbag is deployed** - If a side curtain airbag has been deployed, the headliner as well as the upper A, B and the C-pillar trim on the same side of the vehicle as the deployed airbag must also be replaced. On vehicles with an optional sunroof, the sunroof drain tubes and hoses must be closely inspected following a side curtain airbag deployment.

The components identified with the deployed SRS components in the preceding list are not intended for reuse and will be damaged or weakened as a result of an airbag deployment, which may or may not be obvious during a visual inspection. All other vehicle components should be closely inspected following any SRS component deployment, but are to be replaced only as required by the extent of the visible damage incurred.

SQUIB CIRCUIT WIRING REPAIRS

In addition to the preceding guidelines, be aware that the heat created by the initiator during an airbag or tensioner deployment will cause collateral damage to the connected wiring (squib circuits) and connector insulators. There are two methods by which an airbag or seat belt tensioner may be connected to the vehicle electrical system. The first method involves a short pigtail harness and connector insulator that are integral to the airbag or tensioner unit and are replaced as a unit with the service replacement airbag or seat belt tensioner. This connection method typically requires no additional wiring repair following a deployment.

However, the second connection method involves a wire harness takeout and connector insulator that are connected directly to the airbag or tensioner initiator or squib. These direct-connect type take outs and connector insulators **MUST** be repaired following an airbag or seat belt tensioner deployment using the approved Supplemental Restraint System Wiring Repairs procedure. Refer to **STANDARD PROCEDURE**.

AIRBAG SQUIB STATUS

Multistage airbags with multiple initiators (squibs) must be checked to determine that all squibs were used during the deployment event. The driver and passenger airbags in this vehicle are deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the driver or passenger squib 1 and squib 2 circuits to the two initiators in the airbag inflators. Typically, both initiators are used and all potentially hazardous chemicals are burned during an airbag deployment

event. However, it is possible for only one initiator to be used; therefore, it is always necessary to confirm that both initiators have been used in order to avoid the improper handling or disposal of potentially live pyrotechnic or hazardous materials. The following procedure should be performed using a diagnostic scan tool to verify the status of both airbag squibs before either deployed airbag is removed from the vehicle for disposal.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

1. Be certain that the diagnostic scan tool contains the latest version of the proper diagnostic software. Connect the scan tool to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, outboard of the steering column.
2. Turn the ignition switch to the ON position.
3. Using the scan tool, read and record the active (current) Diagnostic Trouble Code (DTC) data.

Using the active DTC information, refer to the **Airbag Squib Status** table to determine the status of both driver and passenger airbag squibs.

AIRBAG SQUIB STATUS		
IF THE ACTIVE DTC IS:	**CONDITIONS**	**SQUIB STATUS**
Driver or Passenger Squib 1 open	**AND** the stored DTC minutes for both Driver or Passenger squibs are within 15 minutes of each other	Both Squib 1 and 2 were used.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	**AND** the stored DTC minutes for Driver or Passenger Squib 2 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 1 by 15 minutes or more	Squib 1 was used; Squib 2 is live.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	**AND** the stored DTC minutes for Driver or Passenger Squib 1 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 2 by 15 minutes or more	Squib 1 is live; Squib 2 was used.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	**AND** Driver or Passenger Squib 2 open is NOT an active code	Squib 1 was used; Squib 2 is live.
Driver or Passenger Squib 2 open	**AND** Driver or Passenger Squib 1 open is NOT an active code	Squib 1 is live; Squib 2 was used.

NOTE: **If none of the Driver or Passenger Squib 1 or 2 open are active codes, the status of the airbag squibs is unknown. In this case the airbag should be handled and disposed of as if the squibs were both live.**

CLEANUP PROCEDURE

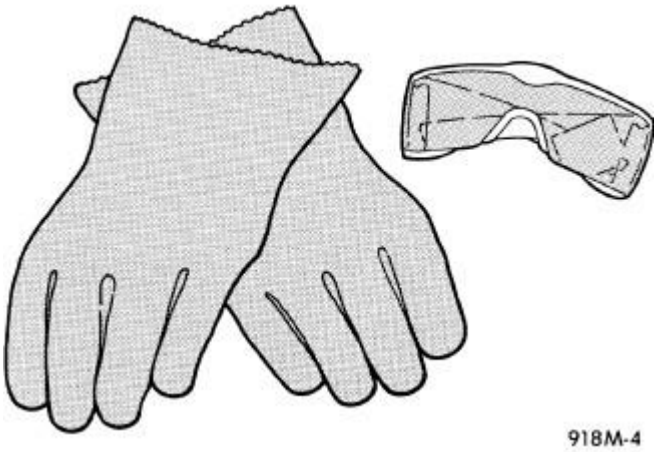

Fig. 2: Safety Glasses & Rubber Gloves
Courtesy of CHRYSLER GROUP, LLC

Following a Supplemental Restraint System (SRS) component deployment, the vehicle interior will contain a powdery residue. This residue consists primarily of harmless particulate by-products of the small pyrotechnic charge that initiates the propellant used to deploy a SRS component. However, this residue may also contain traces of sodium hydroxide powder, a chemical by-product of the propellant material that is used to generate the inert gas that inflates the airbag. Since sodium hydroxide powder can irritate the skin, eyes, nose, or throat, be certain to wear safety glasses, rubber gloves, and a long-sleeved shirt during cleanup.

WARNING: **To avoid serious or fatal injury, if you experience skin irritation during cleanup, run cool water over the affected area. Also, if you experience irritation of the nose or throat, exit the vehicle for fresh air until the irritation ceases. If irritation continues, see a physician.**

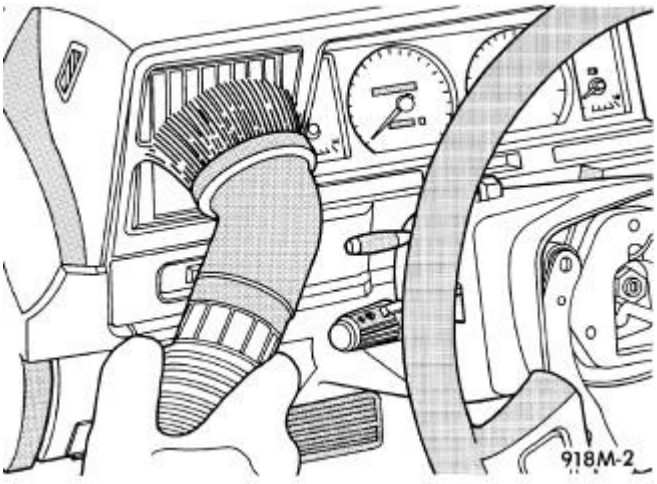

Fig. 3: Vacuum Cleaner
Courtesy of CHRYSLER GROUP, LLC

1. Begin the cleanup by using a vacuum cleaner to remove any residual powder from the vehicle interior. Clean from outside the vehicle and work your way inside, so that you avoid kneeling or sitting on a non-cleaned area.
2. Be certain to vacuum the heater and air conditioning outlets as well. Run the heater and air conditioner blower on the lowest speed setting and vacuum any powder expelled from the outlets.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to AIRBAG SQUIB STATUS heading within this information. All damaged, ineffective, or non-deployed Supplemental Restraint System (SRS) components which are replaced on vehicles are to be handled and disposed of properly. If an airbag or seat belt tensioner unit is ineffective or damaged and non-deployed, refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

3. Next, remove the deployed SRS components from the vehicle. Refer to the appropriate service removal procedures.
4. You may need to vacuum the interior of the vehicle a second time to recover all of the powder.

SUPPLEMENTAL RESTRAINT SYSTEM WIRING REPAIRS

It is important when repairing any Supplemental Restraint System (SRS) electrical circuits to use the

recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR Connector Web Site at the following address on the internet: (http://dto.vftis.com/mopar/disclaimer.asp).

This recommended procedure involves crimping the wires together with a splice band, soldering the crimped connection and, finally, sealing and protecting the repair. The crimp and solder ensure a strong mechanical bond that will always pass a pull test while also maintaining the conductivity and current carrying capacity of the circuit. The adhesive sealant and heat shrink tubing ensures the splice repair will perform as well or better than the original wire and be safe from potential corrosion or short circuits.

There is no limit to the number of splice repairs that can be made in one harness using this procedure. However, as has been past practice, multiple adjacent splices should be offset from each other. This wiring splice repair procedure is approved for harness side repairs only. Repairs and splices to pigtail wires on SRS components such as airbag units, seat belt tensioner units or clocksprings are not approved or recommended.

REPAIR PROCEDURE

CAUTION: If additional wire is needed when making a splice repair to any wire, it is important that the same or next larger size wire gauge be used. Refer to the appropriate wiring diagram for the original wire gauge size.

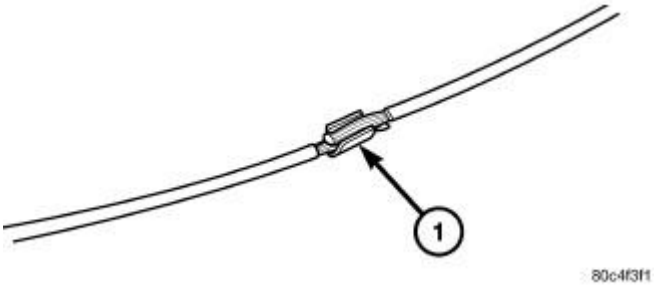

Fig. 4: Splice Band
Courtesy of CHRYSLER GROUP, LLC

1. Remove 13 millimeters (0.50 inch) of insulation from each wire that needs to be spliced.
2. Place a piece of adhesive sealant-lined heat shrink tubing (Part Number 04778570 or equivalent) over the wire on one side of the splice. Be certain the length of tubing will be sufficient to cover and seal the entire repair area.
3. Place the strands of the wires being spliced so that they are overlapping each other within the splice band (1).

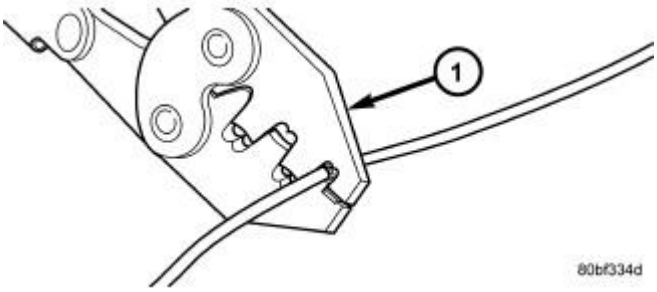

Fig. 5: Crimping Tool
Courtesy of CHRYSLER GROUP, LLC

4. Using a crimping tool (1) (MOPAR Part Number 05019912AA, Miller Special Tool Number (special tool #10042, Crimper, Wire/Terminal) or equivalent) crimp the splice band and wires together securely.

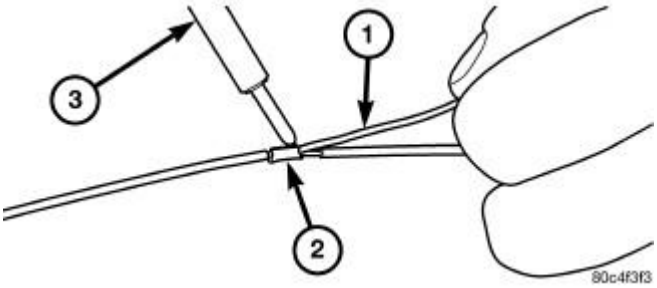

Fig. 6: Solder Splice
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never use acid core solder for electrical wiring repairs.

5. Using rosin core type solder (1) only and a suitable soldering iron (3), solder the wire and splice band connection (2) together.

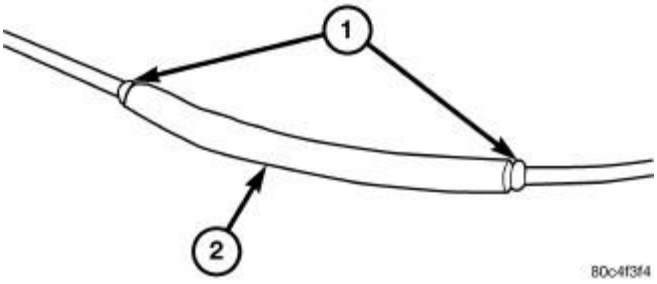

Fig. 7: Heat Shrink Tube
Courtesy of CHRYSLER GROUP, LLC

6. Center the heat shrink tubing (2) over the splice joint repair and heat using a suitable heat gun. Heat the joint until the tubing is tightly sealed and sealant (1) begins to ooze out of both ends of

the tubing.

SUPPLEMENTAL RESTRAINTS VERIFICATION TEST

NOTE: The following procedure should be performed using a diagnostic scan tool to verify proper Supplemental Restraint System (SRS) operation following the service or replacement of any SRS component. Refer to the appropriate diagnostic procedures.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

1. During the following test, the battery negative cable remains disconnected and isolated, as it was during the Supplemental Restraint System (SRS) component removal and installation procedures.
2. Be certain that the diagnostic scan tool contains the latest version of the proper diagnostic software. Connect the scan tool to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, near the steering column opening cover and outboard of the steering column.
3. Turn the ignition switch to the ON position and exit the vehicle with the scan tool.
4. Check to be certain that nobody is in the vehicle, then reconnect the battery negative cable.
5. Using the scan tool, read and record the active (current) Diagnostic Trouble Code (DTC) data.
6. Next, use the scan tool to read and record any stored (historical) DTC data.
7. If any DTC is found in 5 or6, refer to the appropriate diagnostic information.
8. Use the scan tool to erase the stored DTC data. If any problems remain, the stored DTC data will not erase. Refer to the appropriate diagnostic information to diagnose any stored DTC that will not erase. If the stored DTC information is successfully erased, go to9.
9. Turn the ignition switch to the OFF position for about 15 seconds, and then back to the ON position. Observe the airbag indicator in the instrument cluster. It should light from four to six seconds, and then go out. This indicates that the SRS is functioning normally and that the repairs are complete. If the airbag indicator fails to light, or lights and stays ON, there is still an active SRS fault or malfunction. Refer to the appropriate diagnostic information to diagnose the problem.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N-m	Ft. Lbs.	In. Lbs.
Curtain airbag inflator to C/D-pillar bolt	11	8	97
Curtain airbag roof side rail retaining screws	5	4	44
Driver airbag retaining bolts	10	7	89
Electronic Pedestrian Protection Actuator Screw	7.9	-	70
Front seat belt anchor nut	37	27.5	328
Front seat belt buckle retaining nut	43	31.5	381
Front seat belt guide retaining screw	3	2	27
Front seat belt height adjuster retaining bolts	32	23.5	283
Front seat belt retractor retaining bolt	32	23.5	283
Front seat belt turning loop retaining bolt	40	30	354
Impact sensor retaining screws	7	5	62
Left and right side passenger airbag mounting screws	3	2	27
Occupant restraint controller retaining screws	11	8	97
Passenger airbag mounting bolts	12	9	106
Rear center seat belt retractor anchor nut	34	25	301
Rear seat belt anchor bolt	32	23.5	283
Rear seat belt buckle retaining nut	34	25	301
Rear seat belt turning loop retaining bolt	40	29.5	354
Rear center seat belt retractor retaining nut	34	25	301
Rear seat belt retractor retaining bolt	32	23	283

SPECIAL TOOLS

SPECIAL TOOLS

	10042 - Crimper, Wire/Terminal (Originally Shipped In Kit Number(s) 10042.)

ACTUATOR, ELECTRONIC PEDESTRIAN PROTECTION HOOD HINGE

DESCRIPTION

DESCRIPTION

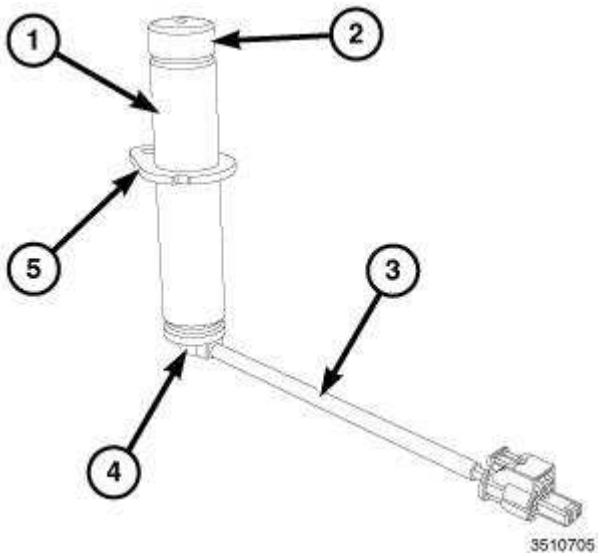

Fig. 8: Integral Bracket, Tubular Metal Housing, Metal Piston, Gas Generator & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

Active hood hinge actuators are found only in vehicles equipped with the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or Active Hood System), which is available only in vehicles manufactured for certain export markets. An EPP active hood hinge actuator is located on each hinge. The actuators are secured by a self-tapping screw through an integral bracket (5) to a mounting plate integral to the lower bracket on each active hood hinge.

The actuator consists primarily of a tubular metal housing (1) containing a metal piston (2) with a molded plastic cap and a small pyrotechnically activated gas generator (4). The actuators are controlled by the Occupant Restraint Controller (ORC). An actuator pigtail wire (3) and connector insulator are routed to a dedicated take out of the headlamp and dash wire harness and connected to the vehicle electrical system by a keyed and latching molded plastic connector insulator to ensure a secure connection.

The EPP active hood hinge actuators cannot be repaired and, if ineffective or damaged, the entire actuator unit must be replaced. The actuators are not intended for reuse and must be replaced following any EPP system deployment.

OPERATION

OPERATION

The Electronic Pedestrian Protection (EPP) active hood hinge actuators are deployed by a signal generated by the Occupant Restraint Controller (ORC) through the right and left hood actuator line 1 and line 2 (or squib) circuits. When the ORC sends the proper electrical signal to the actuators, the electrical energy generates enough heat to initiate a small pyrotechnic gas generator.

The gas generator is installed in one end of a steel cylinder tube where the piston is sealed to the inside circumference of the tube. As the gas expands, it pushes the piston up the tube, where it

actuates the leveraging mechanism of the active hood hinge that cuts the hinge shear rivet and raises the rear edge of the hood panel.

Raising the hood panel following a frontal impact of the vehicle creates additional clearance between the hood and the hard components within the engine compartment. This clearance helps to reduce the severity of injuries that a pedestrian might experience in these situations as a result of harmful contact with those hard parts found just beneath the hood panel within the engine compartment.

The ORC monitors the condition of the active hood hinge actuators through circuit resistance, and will register a Diagnostic Trouble Code (DTC) for any fault that is detected. The ORC will then request illumination of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC). Proper diagnosis of the active hood hinge actuator gas generator and squib circuits requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Electronic Pedestrian Protection (EPP) system active hood hinge actuator. If the actuator is ineffective or damaged, but not deployed, it should be handled in the same manner as is used when handling non-deployed supplemental restraints. Review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the actuator has been deployed, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. .

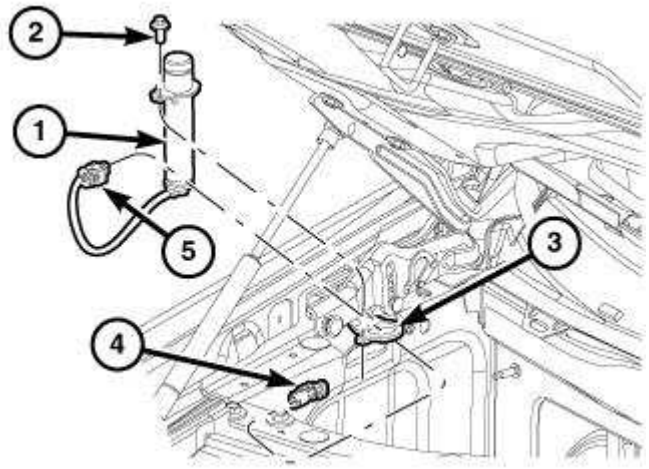

Fig. 9: Pigtail Wire Connector, Electronic Pedestrian Protection (EPP) Active Hood Hinge Actuator & Dash Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. With the ignition switch in the OFF position, disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Disconnect the pigtail wire connector (5) of the Electronic Pedestrian Protection (EPP) active hood hinge actuator (1) from the headlamp and dash wire harness connector (4).
3. Remove the screw (2) that secures the actuator bracket to the mount (3) on the hood hinge lower bracket.
4. Remove the actuator from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Electronic Pedestrian Protection (EPP) system active hood hinge actuator. If the actuator is ineffective or damaged, but not deployed, it should be handled in the same manner as is used when handling non-deployed supplemental restraints. Review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the actuator has been

deployed, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. .

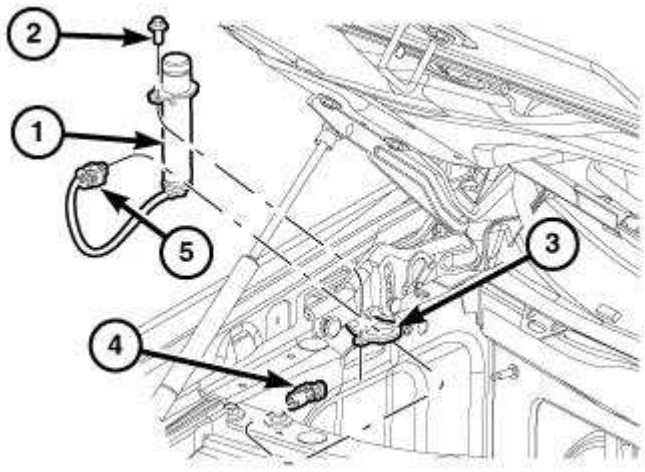

Fig. 10: Pigtail Wire Connector, Electronic Pedestrian Protection (EPP) Active Hood Hinge Actuator & Dash Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Guide the pigtail wire and connector (5) of the Electronic Pedestrian Protection (EPP) active hood hinge actuator (1) through the mount (3) on the hood hinge lower bracket while positioning the actuator to the hinge.
2. Align the hole in the actuator bracket with the hole in the hinge mount.
3. Install and tighten the screw (2) that secures the actuator to the hinge. Tighten the screw to 7.9 N.m (70 in. lbs.).
4. Reconnect the pigtail wire connector of the actuator to the headlamp and dash wire harness connector (4).
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any EPP system component. Refer to **STANDARD PROCEDURE**.

ADJUSTER, SEAT BELT TURNING LOOP, FRONT

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners.

Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

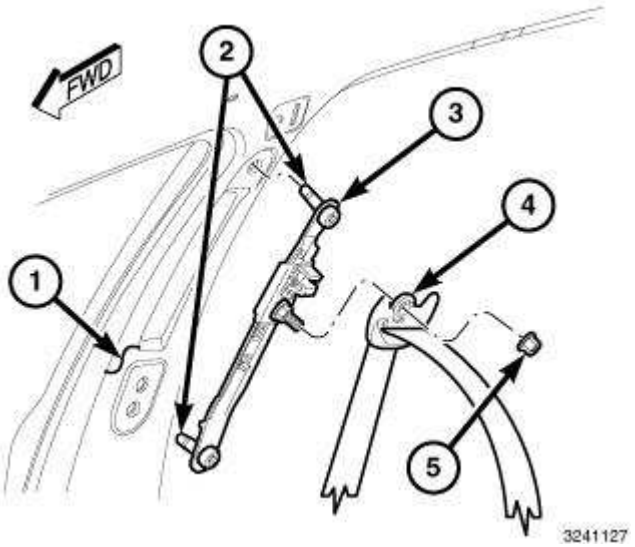

Fig. 11: Nut, Seat Belt Turning Loop, Height Adjuster & Two Screws
Courtesy of CHRYSLER GROUP, LLC

1. Remove the trim from the inside of the B-pillar (1). Refer to **PANEL, B-PILLAR TRIM, REMOVAL** .
2. Remove the nut (5) that secures the seat belt turning loop (4) to the stud on the height adjuster (3).
3. Remove the seat belt turning loop from the height adjuster.
4. Remove the two screws (2) that secure the height adjuster to the upper inner B-pillar.
5. Remove the seat belt turning loop adjuster from the B-pillar.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate.

Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

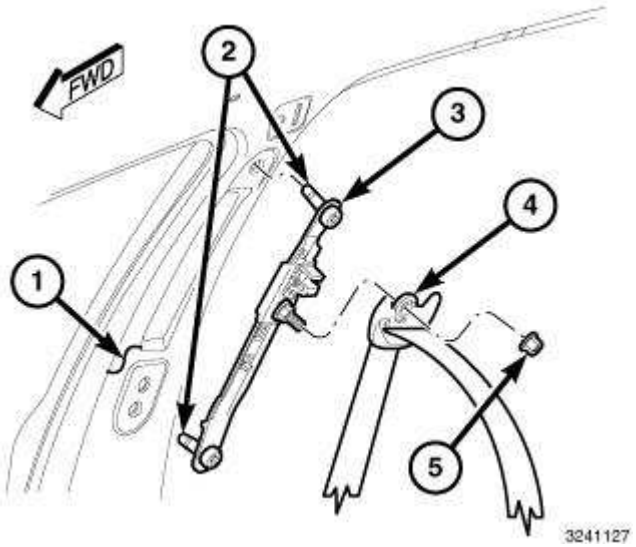

Fig. 12: Nut, Seat Belt Turning Loop, Height Adjuster & Two Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat belt turning loop height adjuster (3) to the inside of the upper inner B-pillar (1).
2. Install and tighten the two screws (2) that secure the adjuster to the B-pillar. Tighten the screws to 45 N.m (33 ft. lbs.).
3. Position the seat belt turning loop (4) onto the stud of the height adjuster on the B-pillar. Be certain that the seat belt webbing between the retractor and the turning loop is not twisted.
4. Install and tighten the nut (5) that secures the turning loop to the height adjuster. Tighten the nut to 45 N.m (33 ft. lbs.).
5. Reinstall the trim onto the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION** .

AIR BAG, DRIVER

DESCRIPTION

DESCRIPTION

Fig. 13: Except SRT
Courtesy of CHRYSLER GROUP, LLC

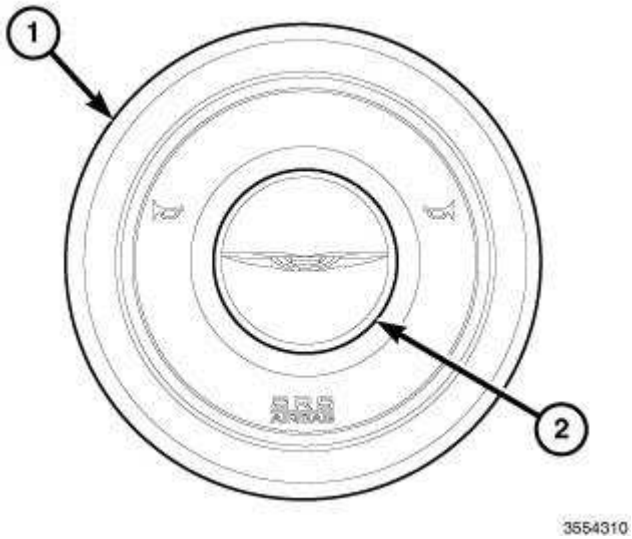

Fig. 14: SRT
Courtesy of CHRYSLER GROUP, LLC

The injection molded, thermoplastic driver airbag protective trim cover (1) is the most visible part of the Driver AirBag (DAB). The DAB is located in the center of the steering wheel, where it is secured with screws to the floating horn switch within the hub cavity of the three-spoke steering wheel. An injection molded, bright emblem with the Chrysler logo (2) is applied to the center of the trim cover.

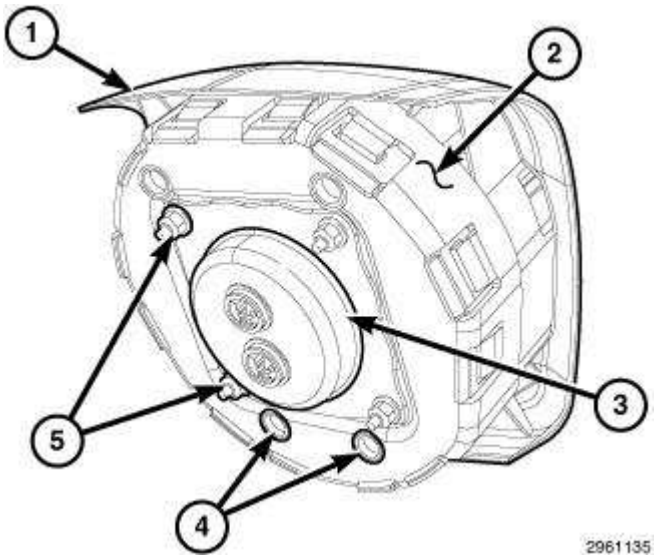

Fig. 15: Except SRT
Courtesy of CHRYSLER GROUP, LLC

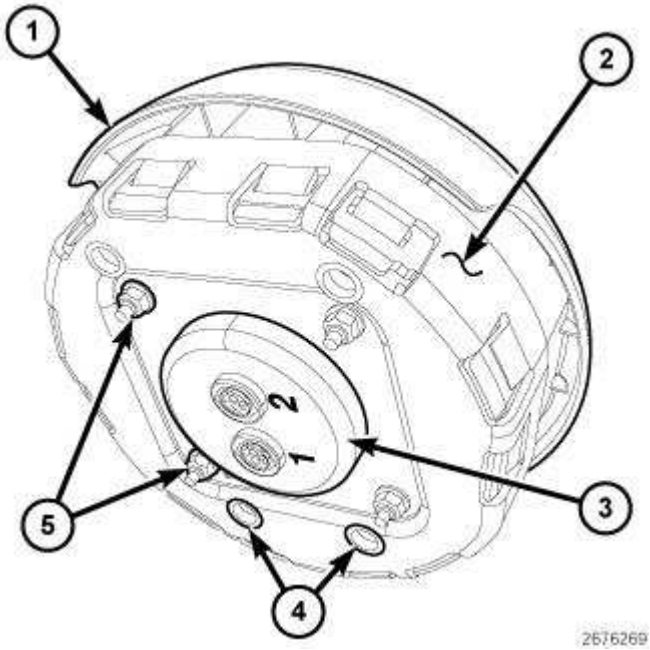

Fig. 16: SRT
Courtesy of CHRYSLER GROUP, LLC

Concealed beneath the DAB trim cover (1) are the folded airbag cushion, the airbag housing (2), the airbag inflator (3) and the retainers (5) that secure the inflator to the housing. The airbag cushion, housing and inflator are secured within an integral receptacle molded into the back of the trim cover. Except for SRT models, the vertical walls of this receptacle have numerous integral window features that are engaged by numerous hook features that are bent outward around the perimeter of the DAB housing. On SRT models, the vertical walls of this receptacle have numerous integral window features that are engaged by numerous tab features that are bent inward around the perimeter of the DAB housing. Once the SRT trim cover is fully seated in the housing, it can only be removed by

cutting it off, and will have to be replaced with a new trim cover. The DAB housing also has four well nuts (4) which are used to secure the floating horn switch to the back of the housing.

The DAB used in this vehicle is a multistage-type that complies with revised federal airbag standards to deploy with less force than those used in some prior vehicles. A radial deploying 67 centimeter (26.5 inch) diameter fabric airbag cushion with internal tethers is used. The airbag inflator is a dual-initiator, non-azide, pyrotechnic-type unit and is secured to the stamped metal airbag housing using four flanged hex nuts. Two keyed and color-coded connector receptacles on the DAB inflator connect the two inflator initiators to the vehicle electrical system through two jacketed, two-wire pigtail harnesses from the clockspring.

The DAB cannot be repaired, and must be replaced if deployed, ineffective or in any way damaged. The DAB trim cover and the floating horn switch are available for individual service replacement.

OPERATION

OPERATION

The multistage Driver AirBag (DAB) is deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the DAB squib 1 and squib 2 circuits to the two initiators in the airbag inflator. By using two initiators, the airbag can be deployed at multiple levels of force. The force level is controlled by the ORC to suit the monitored impact conditions by providing one of several delay intervals between the electrical signals provided to the two initiators. The longer the delay between these signals, the less forcefully the airbag will deploy.

When the ORC sends the proper electrical signals to each initiator, the electrical energy generates enough heat to initiate a small pyrotechnic charge which, in turn ignites chemical pellets within the inflator. Once ignited, these chemical pellets burn rapidly and produce a large quantity of inert gas. The inflator is sealed to the back of the DAB housing and a diffuser in the inflator directs all of the inert gas into the airbag cushion, causing the cushion to inflate. As the cushion inflates, the DAB trim cover will split at predetermined breakout lines, then fold back out of the way. Following a deployment, the airbag cushion quickly deflates by venting the inert gas towards the instrument panel through vent holes within the fabric used to construct the back (steering wheel side) panel of the airbag cushion.

Some of the chemicals used to create the inert gas may be considered hazardous while in their solid state before they are burned, but they are securely sealed within the airbag inflator. Typically, both initiators are used and all potentially hazardous chemicals are burned during an airbag deployment event. However, it is possible for only one initiator to be used during a deployment due to a Supplemental Restraint System (SRS) fault; therefore, it is necessary to always confirm that both initiators have been used in order to avoid the improper disposal of potentially live pyrotechnic or hazardous materials. Refer to **STANDARD PROCEDURE**.

The inert gas that is produced when the chemicals are burned during a deployment is harmless. However, a small amount of residue from the burned chemicals may cause some temporary discomfort if it contacts the skin, eyes or breathing passages. If skin or eye irritation is noted, rinse the affected area with plenty of cool, clean water. If breathing passages are irritated, move to another area where there is plenty of clean, fresh air to breath. If the irritation is not alleviated by these

actions, contact a physician.

Proper diagnosis of the DAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag cushion and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged Driver AirBag (DAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the DAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

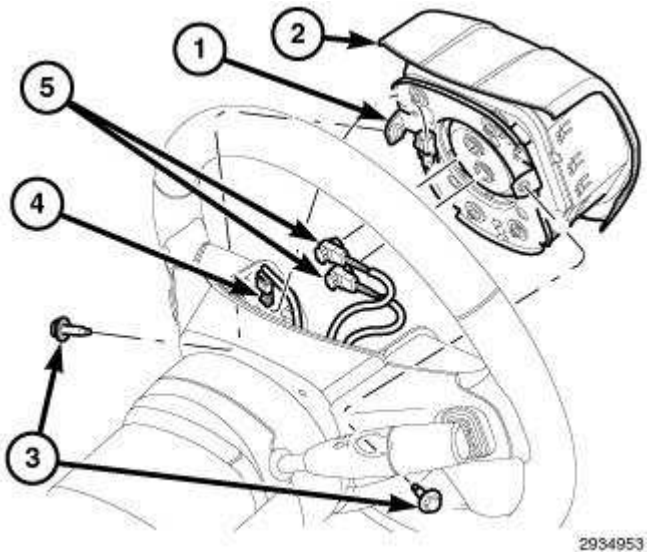

Fig. 17: Two Screws, Floating Horn Switch & Driver Airbag
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Working through the access holes in each side of the steering wheel rear trim cover, remove the two screws (3) that secure the floating horn switch (1) and Driver AirBag (DAB) (2) unit to the steering wheel armature.
3. Pull the DAB and floating horn switch unit away from the steering wheel far enough to access the electrical connections (3 and 4) at the back of the airbag housing and switch unit.
4. Disconnect the steering wheel wire harness connector (4) from the floating horn switch connector on the back of the switch.

CAUTION: Do not pull on the clockspring pigtail wires or pry on the connector insulators to disengage them from the Driver AirBag (DAB) inflator initiator connector receptacles. Improper removal of these pigtail wires and their connector insulators can result in damage to the airbag circuits or the connector insulators.

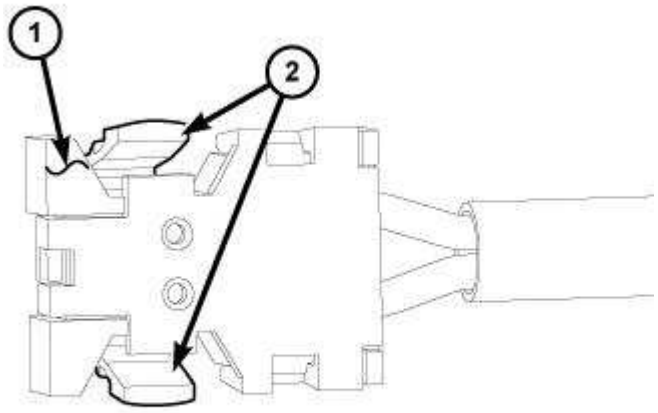

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Fig. 18: Airbag Pigtail Wire Connector Insulators & Integral Latches
Courtesy of CHRYSLER GROUP, LLC

5. The clockspring DAB pigtail wire connector insulators (1) are secured by integral latches (2) to the airbag inflator connector receptacles, which are located on the back of the DAB housing. Pinch both latches firmly, then pull the insulators straight out from the airbag inflator to disconnect them from the connector receptacles.
6. Remove the driver airbag from the steering wheel.
7. If the driver airbag has been deployed, the clockspring and the steering column must be replaced.

DISASSEMBLY

DISASSEMBLY

EXCEPT SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit.

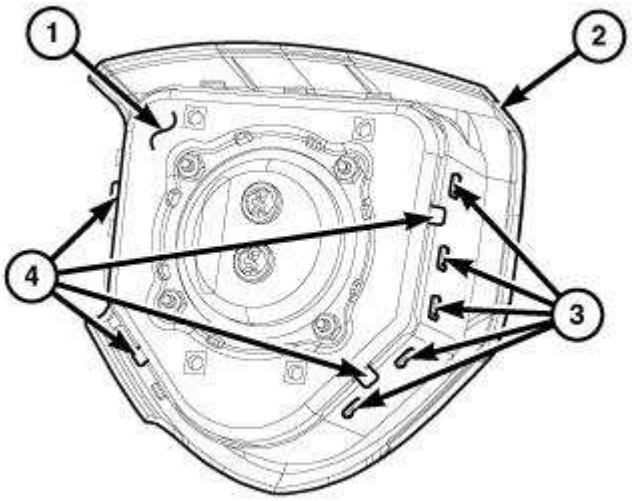

Fig. 19: Trim Cover, Thirteen Hooks, Airbag Housing & Tab
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the Driver AirBag (DAB) from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL**.
3. Place the driver airbag on a suitable clean and dry work surface with the trim cover (2) facing down. If the trim cover will be reused, be certain to take the proper precautions to prevent the trim cover from receiving cosmetic damage during the following procedures.
4. Disengage each of the thirteen hooks (3) of the airbag housing (1) from the thirteen windows in the vertical walls of the trim cover receptacle, one wall at a time. Start by disengaging the upper wall, then do each of the two side walls, and finish with the lower wall. To disengage the hooks, use hand pressure to push outward on the upper edge of the receptacle wall far enough to clear the locating tab (4) on the airbag housing, at the same time push the adjacent edge of the airbag housing firmly and evenly downward into the trim cover receptacle.
5. With all of the hooks disengaged, lift the housing, inflator, and cushion as a unit from the receptacle on the back of the driver airbag trim cover.

SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper

precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit. The trim cover will be irreparably damaged if it is removed from the DAB housing and MUST be replaced with a new trim cover.

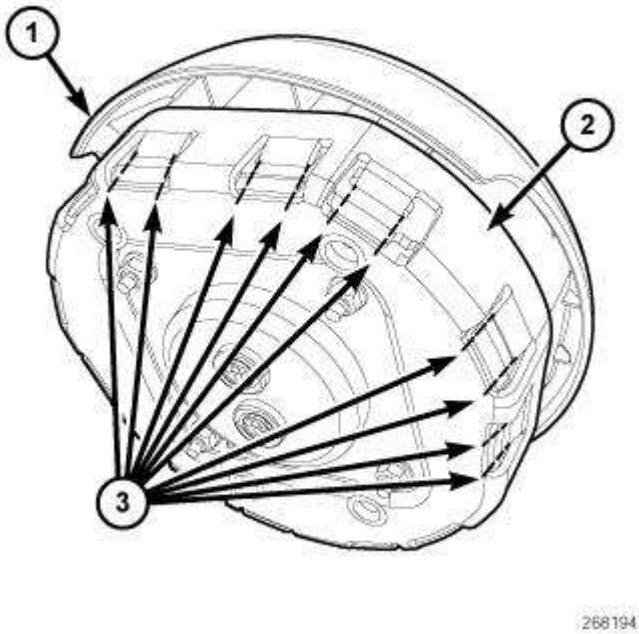

Fig. 20: Twelve Trim Cover, Cut Lines & Airbag Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the Driver AirBag (DAB) from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL**.
3. Place the DAB on a suitable clean and dry work surface.
4. Using a sharp utility knife, carefully cut through the lower edge of each of the twelve trim cover (1) windows at the cut lines (3) on each side of the twelve inward pointing hooks of the airbag housing (2). Use extreme care to prevent any scraps from entering and becoming lost within the airbag housing or cushion.
5. With all of the windows cut open, separate the remainder of the trim cover from the DAB housing by pulling it away from the top of the housing around the perimeter. Discard the removed trim cover.

ASSEMBLY

ASSEMBLY

EXCEPT SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: **The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit.**

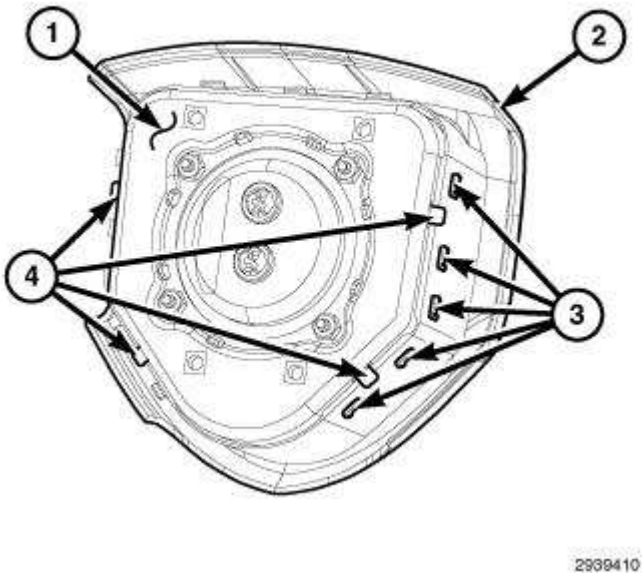

Fig. 21: Trim Cover, Thirteen Hooks, Airbag Housing & Tab
Courtesy of CHRYSLER GROUP, LLC

1. Place the driver airbag trim cover (2) on a suitable clean and dry work surface with the receptacle facing up. Be certain to take the proper precautions to prevent the trim cover from receiving cosmetic damage during the following procedures.
2. Position the driver airbag housing (1), inflator, and cushion as a unit over the trim cover receptacle.
3. Using hand pressure, push the airbag housing firmly and evenly down into the trim cover receptacle far enough that the hooks (3) of the housing are aligned with the windows in the vertical walls of the receptacle.
4. Work around the perimeter of the unit engaging each of the thirteen hooks on the driver airbag housing through the thirteen windows in the walls of the trim cover receptacle.
5. After the driver airbag has been assembled, try pulling the trim cover and the airbag housing away from each other. This action will fully seat the edges of the windows into the cradles of the hooks and the vertical walls of the receptacle beneath the locating tabs (4) of the housing.

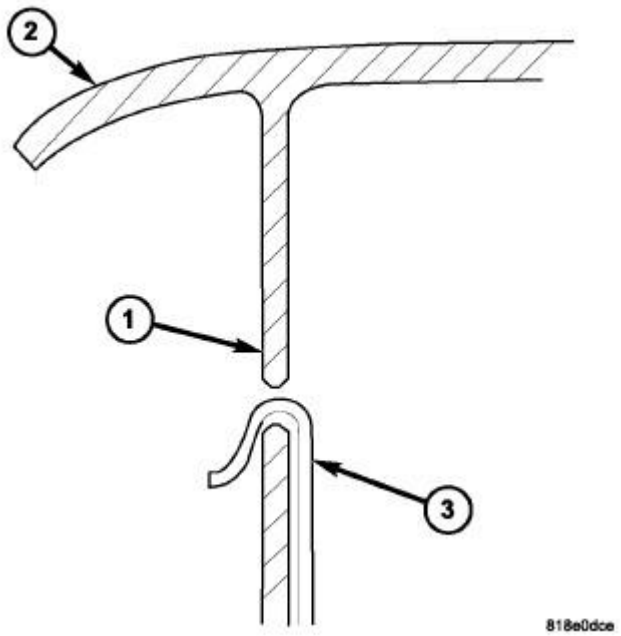

Fig. 22: Airbag Blocking Tab & Housing Hook
Courtesy of CHRYSLER GROUP, LLC

6. Before reinstalling the airbag onto the steering wheel, check that the blocking tab (1) in each of the trim cover (2) windows is oriented over the airbag housing hook (3) as shown in illustration.
7. Reinstall the driver airbag onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION**.

SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped

between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit. The trim cover will be irreparably damaged if it is removed from the DAB housing and MUST be replaced with a new trim cover.

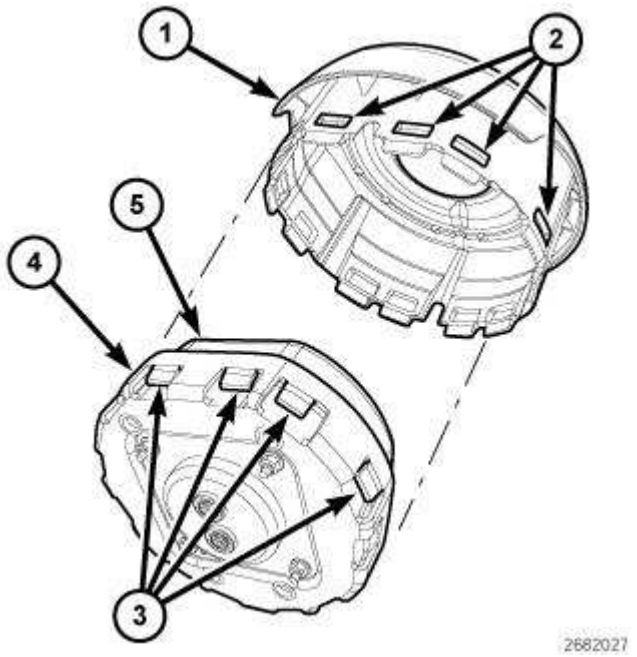

Fig. 23: Driver AirBag Housing, Cushion, DAB Trim Cover, Pointing Hooks & Twelve Windows
Courtesy of CHRYSLER GROUP, LLC

1. Place the Driver AirBag housing (4) on a suitable clean and dry work surface with the cushion (5) facing up.
2. Position the DAB trim cover (1) over the housing. Be certain that the twelve windows (2) of the trim cover are aligned with the twelve inward pointing hooks (3) of the airbag housing. All of the trim cover windows will align with all of the housing hooks correctly only in one position.
3. Insert the edges of the trim cover between the airbag cushion and the airbag housing. Be certain that the trim cover and housing are still properly aligned.
4. Using hand pressure, push the trim cover firmly and evenly down into the housing far enough that each of the inward pointing hooks of the housing is engage through a window in the trim

cover.

5. Inspect around the entire perimeter of the unit being certain each of the twelve hooks on the DAB housing is engaged through the appropriate window in the trim cover.
6. After the DAB has been assembled, try pulling the perimeters of the trim cover and the airbag housing away from each other. This action will fully seat the housing hooks into the trim cover windows.
7. Reinstall the driver airbag onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION**.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the driver airbag trim cover must never be painted. Replacement airbags are serviced with trim covers in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Driver AirBag (DAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the DAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

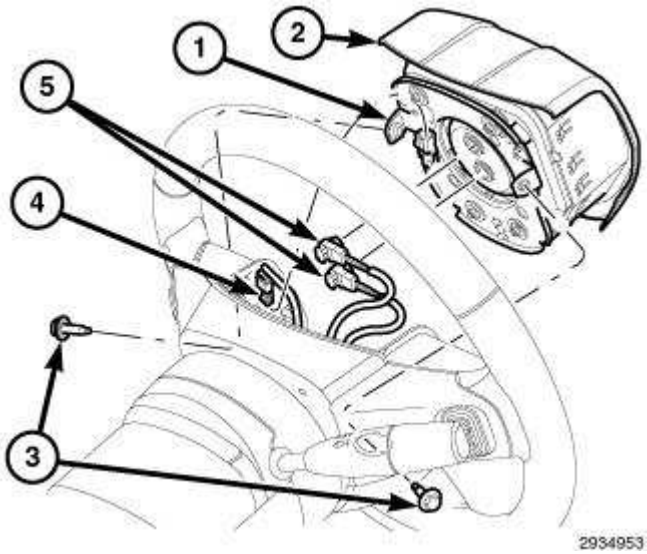

Fig. 24: Two Screws, Floating Horn Switch & Driver Airbag
Courtesy of CHRYSLER GROUP, LLC

1. Position the Driver AirBag (DAB) (2) and floating horn switch (1) unit close enough to the steering wheel to reconnect the electrical connections to the back of the airbag housing.
2. Reconnect the steering wheel wire harness connector (4) to the floating horn switch connector on the back of the switch.
3. Reconnect the wire connectors (5) to the airbag inflator connector receptacles by pressing straight in on the connector insulator. Be certain to engage each keyed and color-coded connector to the matching connector receptacle. You can be certain that each connector is fully engaged in its receptacle by listening carefully for a distinct, audible click as the connector latches snap into place.
4. Carefully position the DAB and floating horn switch unit into the steering wheel hub. Be certain that none of the steering wheel wiring is pinched between the airbag housing or the horn switch and the steering wheel armature.
5. Working through the access holes in each side of the steering wheel rear trim cover, install and tighten the two screws (3) that secure the floating horn switch and DAB unit to the steering wheel armature. Tighten the screws to 13 N.m (10 ft. lbs.).
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, KNEE BLOCKER

DESCRIPTION

DESCRIPTION

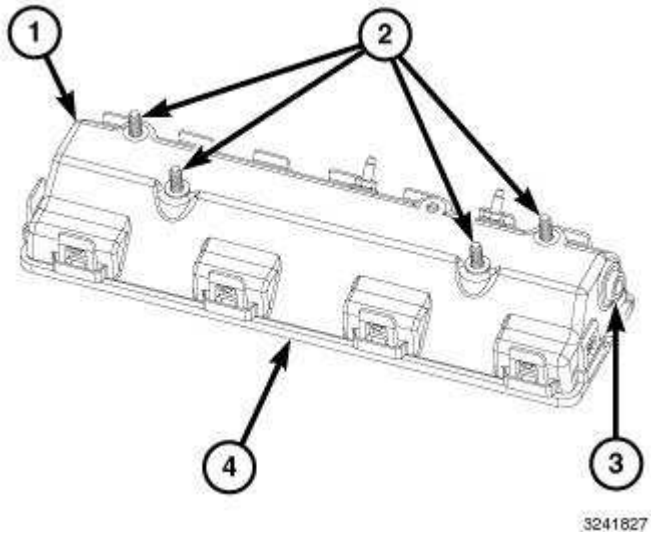

Fig. 25: Airbag Housing, Four Studs, Plastic Protective Cover & Inflator Initiator
Courtesy of CHRYSLER GROUP, LLC

A knee blocker airbag (also known as the Knee AirBag/KAB or the Inflatable Knee Blocker/IKB) is used on vehicles manufactured for domestic markets. These airbags are passive, inflatable, Supplemental Restraint System (SRS) components. Vehicles with this equipment may be readily identified by the **SRS - AIRBAG** logo located on the upper outboard corner of the instrument panel steering column opening cover.

The knee blocker airbag is concealed behind the steering column opening cover below the steering column on the driver side lower instrument panel. Located behind the steering column opening cover, the stamped metal airbag housing (1) is secured by four studs (2) with nuts to the stamped metal lower instrument panel reinforcement of the instrument panel support structure. A molded plastic protective cover (4) is secured over the folded airbag cushion by several hook formations stamped into the airbag housing that are engaged through window openings in tabs integral to the outer perimeter of the cover.

The airbag housing contains the airbag inflator and a heat shield. The airbag inflator is a single-initiator, non-azide hybrid-type unit that is secured to the housing by two studs with nuts and sealed within the airbag housing. The airbag is connected to the vehicle electrical system through a dedicated take out and connector insulator of the instrument panel wire harness that connects directly to the inflator initiator (3).

The knee blocker airbag cannot be repaired, and must be replaced if deployed, ineffective or in any way damaged. If the airbag is deployed, the knee blocker and the steering column opening cover must also be replaced.

OPERATION

OPERATION

The knee blocker airbag (also known as the Knee AirBag/KAB or the Inflatable Knee Blocker/IKB) is

deployed by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through a knee blocker line 1 and line 2 (or squib) circuits to the initiator in the airbag inflator. The hybrid-type inflator assembly for the airbag contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the airbag inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemical pellets burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator is sealed to the airbag cushion and a diffuser in the inflator directs all of the inert gas into the airbag cushion, causing the cushion to inflate. As the cushion inflates, the knee blocker airbag protective cover will split at predetermined tear seam lines concealed on the underside of the cover, then fold open and out of the way.

The cushion protects the lower extremities of the vehicle operator and helps to keep the seat occupant properly positioned for the Driver AirBag (DAB) deployment during a frontal impact collision. Following an airbag deployment, the knee blocker airbag cushion quickly deflates by venting the inert gas through the loose weave of the fabric used to construct the instrument panel side of the airbag cushion, and the deflated cushion hangs down loosely from the lower instrument panel.

Proper diagnosis of the knee blocker airbag inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag cushion and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged Inflatable Knee Blocker (IKB) airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the IKB airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

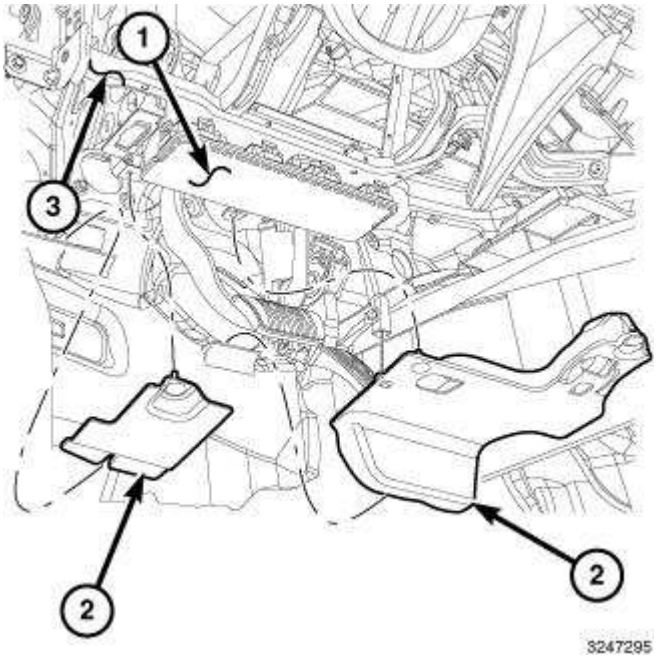

Fig. 26: Panels, Instrument Panel Lower Reinforcement & Knee AirBag (KAB) Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the close out panels (2) from under the driver side of the instrument panel lower reinforcement (3) and surrounding the Knee AirBag (KAB) cover (1) and housing.
3. Remove the steering column opening cover from the instrument panel. Refer to **COVER, INSTRUMENT PANEL, REMOVAL** .

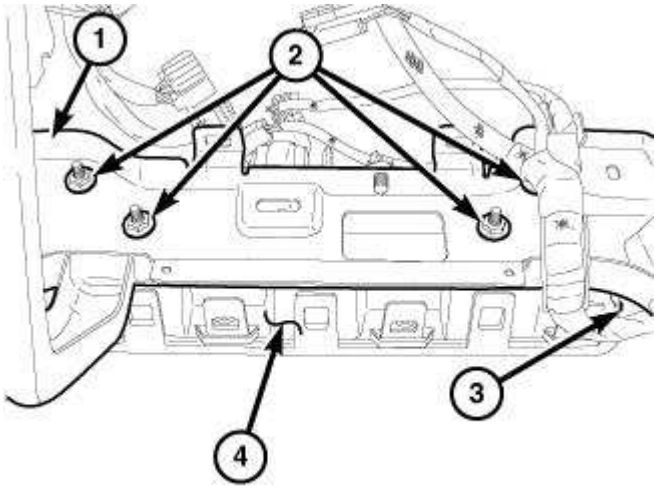

Fig. 27: Four Nuts, Studs, Wire Harness Connection & Instrument Panel Lower Reinforcement
Courtesy of CHRYSLER GROUP, LLC

4. Remove the four nuts (2) that secure the studs of the KAB (4) to the instrument panel lower reinforcement (1).
5. Rotate the outboard end of the KAB downward so that the instrument panel wire harness connection (3) to the KAB inflator faces upward.
6. Disconnect the electrical connection that is secured by integral latches to the KAB inflator initiator connector receptacle on the inboard end of the KAB housing. Depress the latches on each side of the connector insulator and pull the insulator straight out from the inflator initiator to disconnect it from the connector receptacle.
7. Remove the KAB from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Inflatable Knee Blocker (IKB) airbag, or becoming entrapped between the IKB airbag cushion and the IKB cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Inflatable Knee Blocker (IKB) airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the IKB airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

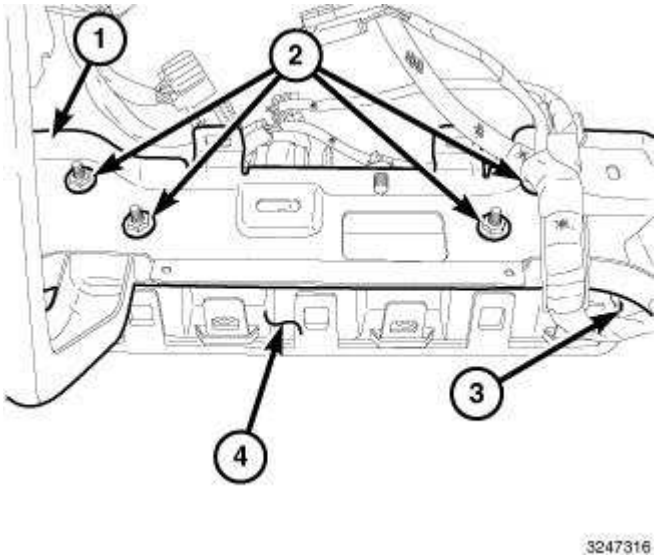

Fig. 28: Four Nuts, Studs, Wire Harness Connection & Instrument Panel Lower Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1. Position the Knee AirBag (KAB) (4) below the steering column opening of the instrument panel in a vertical orientation with the airbag inflator initiator connector receptacle (3) facing upward.
2. Reconnect the connector insulator of the instrument panel wire harness take out for the KAB to the airbag inflator initiator connector receptacle by pressing straight in on the connector. You can be certain that the connector is fully engaged in its receptacle by listening carefully for a distinct, audible click as the connector latches snap into place.
3. Carefully position the KAB to the instrument panel lower reinforcement (1).
4. Install and tighten the four nuts that secure the studs of the KAB to the instrument panel lower reinforcement. Tighten the nuts to 6 N.m (53 in. lbs.).
5. Reinstall the steering column opening cover onto the instrument panel. Refer to **COVER, INSTRUMENT PANEL, INSTALLATION** .

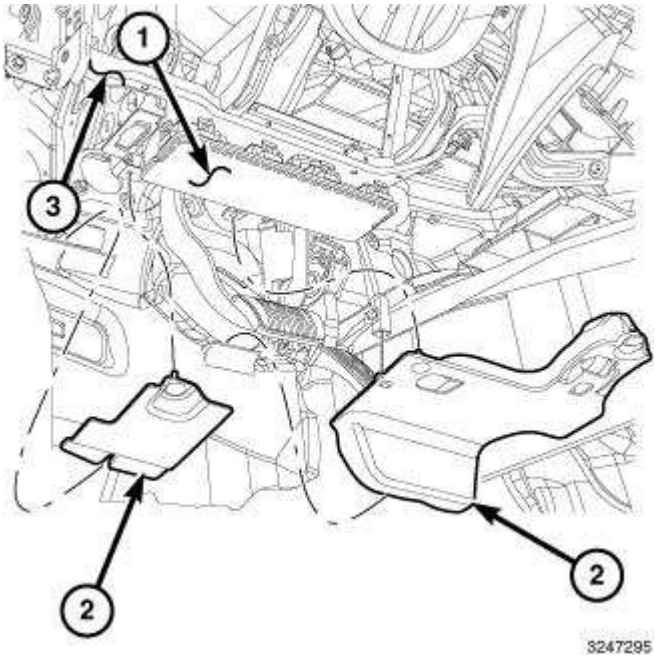

Fig. 29: Panels, Instrument Panel Lower Reinforcement & Knee AirBag (KAB) Cover
Courtesy of CHRYSLER GROUP, LLC

6. Reinstall the close out panels (2) under the driver side of the instrument panel lower reinforcement (3) and surrounding the KAB cover (1) and housing.
7. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, PASSENGER

DESCRIPTION

DESCRIPTION

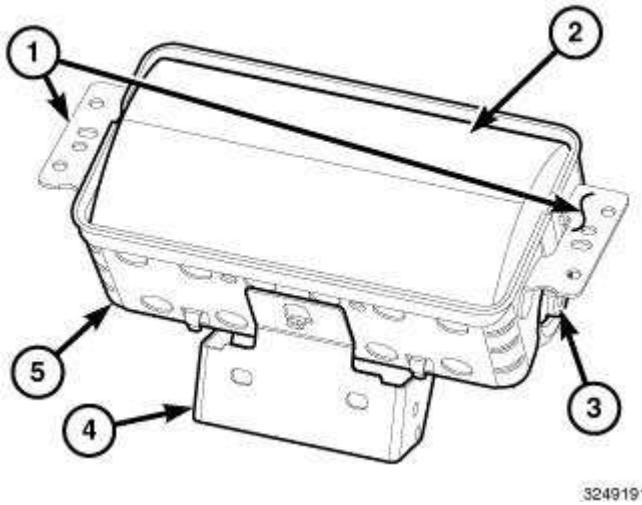

Fig. 30: Upper Bracket, Lower Mounting Bracket, Welded Metal Housing & Airbag Cushion
Courtesy of CHRYSLER GROUP, LLC

The horizontal surface of the instrument panel top pad above the glove box is the most visible part of the Passenger AirBag (PAB). The seamless PAB door is integral to the top of the instrument panel cover above the glove box opening on the instrument panel in front of the front seat passenger seating position. Located below the PAB door area of the instrument panel cover, the PAB retainer or chute is secured to the underside of the instrument panel cover substrate.

The retainer defines the PAB door breakout area of the cover and serves as the receptacle for the PAB cushion and housing. Two U-nuts on each side of the retainer secure the two screws that mount each upper bracket (1) of the PAB housing to the substrate. The PAB is also secured by two screws through a stamped lower mounting bracket (4) to the instrument panel support structure or armature.

The PAB unit used in this vehicle is a multistage type that complies with revised federal airbag standards to deploy with less force than those used in some prior vehicles. The PAB unit consists of a stamped and welded metal housing (5), the airbag cushion (2), and the airbag inflator. The airbag housing contains the airbag inflator and the folded airbag cushion. A rectangular fabric cushion is used.

The passenger airbag used in this vehicle is a multistage type that complies with revised federal airbag standards to deploy with less force than those used in some prior models. The PAB unit consists passenger airbag consists of a stamped and welded metal housing, the airbag cushion, the airbag inflator, and a stamped metal airbag cushion retainer plate that is secured to the airbag housing.

The airbag housing contains the airbag inflator and the folded airbag cushion. The airbag inflator is a non-azide, pyrotechnic-type unit that is secured to and sealed within the airbag housing. A dedicated takeout with keyed and color coded connector insulators directly connects the two inflator initiators (3) to the vehicle electrical system through the instrument panel wire harness. A rectangular fabric cushion is used.

The PAB cannot be repaired and must be replaced if deployed, ineffective or in any way damaged. The PAB door and retainer are serviced only as a unit with the instrument panel cover. If the PAB is deployed, the instrument panel cover must also be replaced.

OPERATION

OPERATION

The multistage Passenger AirBag (PAB) is deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the PAB squib 1 and squib 2 circuits to the two initiators in the airbag inflator. By using two initiators, the PAB can be deployed at multiple levels of force. The force level is controlled by the ORC to suit the monitored impact conditions by providing one of several delay intervals between the electrical signals provided to the two initiators. The longer the delay between these signals, the less forcefully the airbag cushion will deploy.

When the ORC sends the proper electrical signals to each initiator, the electrical energy generates enough heat to initiate a small pyrotechnic charge which, in turn, ignites chemical pellets within the inflator. Once ignited, these chemical pellets burn rapidly and produce a large quantity of inert gas. The inflator is sealed to the airbag cushion and a diffuser in the inflator directs all of the inert gas into the cushion, causing the cushion to inflate. As the cushion inflates, the PAB door area of the instrument panel cover will split at predetermined tear seam lines concealed on the underside of the cover, then the door will pivot up over the top of the instrument panel and out of the way. Following a deployment, the airbag cushion quickly deflates by venting the inert gas through vent holes within the fabric used to construct the back (windshield side) of the cushion.

Typically, both initiators are used during a PAB deployment event. However, it is possible for only one initiator to be used during a deployment due to an airbag system fault; therefore, it is necessary to always confirm that both initiators have been used in order to avoid the improper disposal of potentially live pyrotechnic materials. Refer to **STANDARD PROCEDURE**.

Proper diagnosis of the PAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged passenger airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the passenger airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

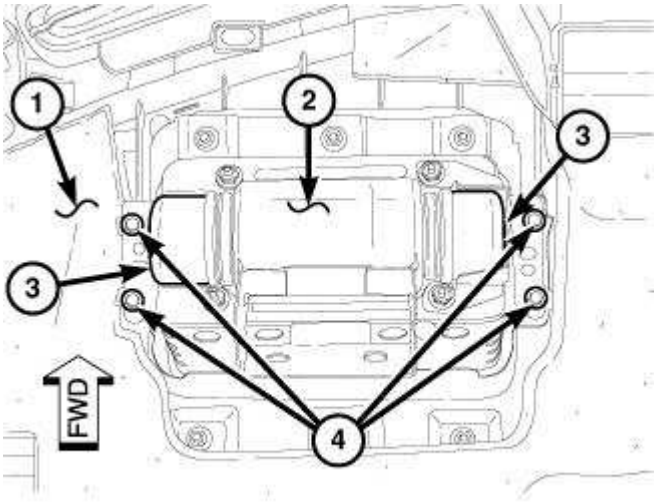

Fig. 31: Two PAB Initiators, Passenger AirBag (PAB), Instrument Panel Cover & Four Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the glove box from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Reach through the instrument panel glove box opening to access and remove the two screws that secure the PAB lower bracket to the instrument panel structural support.
4. Reach through the instrument panel glove box opening to access and disconnect the two instrument panel wire harness connectors from the two PAB initiators (3), one at each side of the PAB inflator canister.
5. Remove the Passenger AirBag (PAB) (2) and instrument panel cover (1) as a unit from the instrument panel support structure or armature. Refer to **COVER, INSTRUMENT PANEL, REMOVAL** .
6. Place the instrument panel cover and passenger airbag unit on a suitable work surface with the top of the cover facing down. If the cover will be reused, be certain to take the proper

precautions to prevent the cover from receiving cosmetic damage during the following procedures.

7. Remove the four screws (4) that secure the two upper airbag mounting brackets to the U-nuts on each side of the PAB retainer or chute (2) on the underside of the instrument panel cover.
8. Remove the PAB from the instrument panel cover.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the passenger airbag, or becoming entrapped between the passenger airbag cushion and the instrument panel top pad. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the instrument panel top pad must never be painted. Replacement top pads are serviced in the original colors. Paint may change the way in which the material of the top pad responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged passenger airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the passenger airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

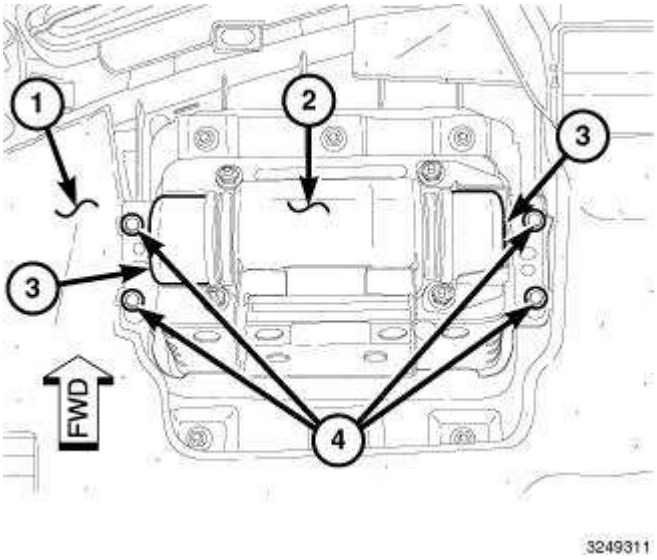

Fig. 32: Two PAB Initiators, Passenger AirBag (PAB), Instrument Panel Cover & Four Screws
Courtesy of CHRYSLER GROUP, LLC

1. Place the instrument panel cover (1) on a suitable work surface with the receptacle of the Passenger AirBag (PAB) retainer or chute facing up. Be certain to take the proper precautions to prevent the cover from receiving cosmetic damage during the following procedures.
2. Carefully position the PAB housing into the airbag retainer receptacle.
3. Install and tighten the four screws that secure the PAB upper mounting brackets to the U-nuts on the retainer. Tighten the screws to 2.8 N.m (25 in. lbs.).
4. Reinstall the PAB and instrument panel cover onto the instrument panel structural support or armature as a unit. Refer to **COVER, INSTRUMENT PANEL, INSTALLATION** .
5. Reach through the instrument panel glove box opening to access and reconnect the two instrument panel wire harness connectors to the two PAB initiators (3), one at each side of the PAB inflator canister. Be certain the connectors are each fully engaged and locked.
6. Reach through the instrument panel glove box opening to install and tighten the two screws that secure the PAB lower bracket to the instrument panel structural support. Tighten the screws to 11.6 N.m (103 in. lbs.).
7. Reinstall the glove box into the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
8. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, SEAT

DESCRIPTION

DESCRIPTION

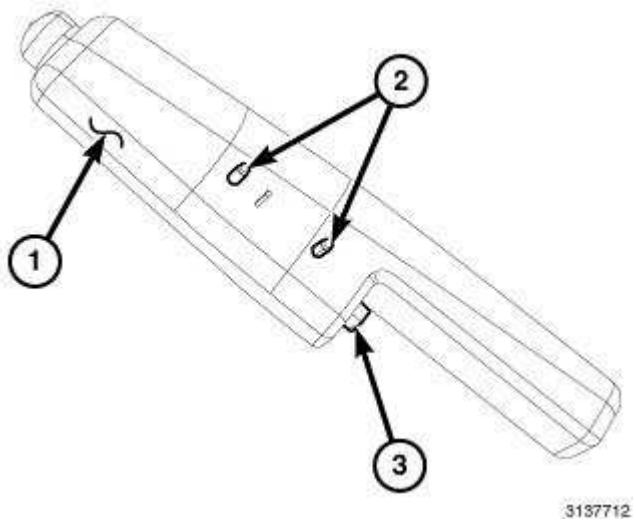

Fig. 33: Seat AirBags (SAB), Two Studs & Inflator Initiator
Courtesy of CHRYSLER GROUP, LLC

Seat AirBags (SAB) (1) (also known as thorax or pelvic airbags) are standard equipment on this model. These airbags are completely concealed beneath the seat back trim cover on the upper outboard sides of both front seat backs. The airbags are inserted into a molded thermoplastic chute on the outside of the seat back frame, then secured to the frame by nuts on two studs (2) on the SAB bracket on the inboard side of the inflator. The SAB is connected to the vehicle electrical system through a dedicated jumper wire harness with a connector insulator that connects directly to the inflator initiator (3). The connector insulators are uniquely keyed and color-coded to ensure they can only be connected to the initiator.

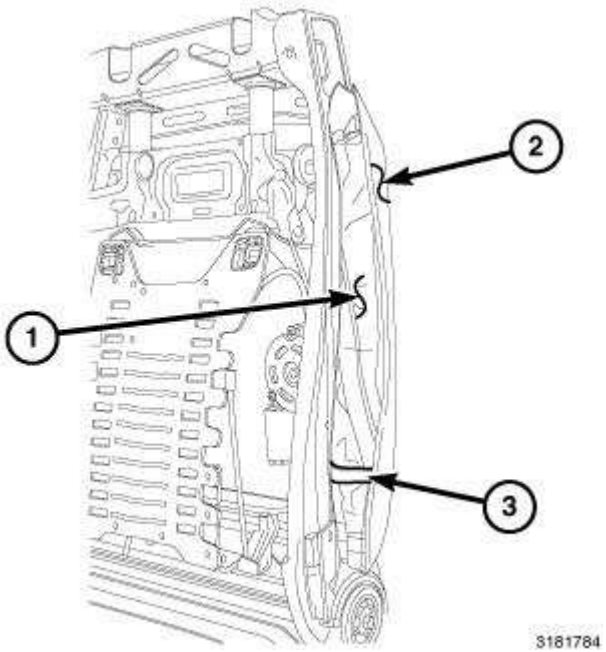

Fig. 34: Folded SAB Cushion, Chute & Fabric Strap
Courtesy of CHRYSLER GROUP, LLC

The folded SAB cushion (1) is contained within and protected by the chute (2). The cushion is constructed of a coated nylon fabric. The folded SAB cushion is tied to the airbag inflator with a fabric strap (3). The inflator consists of the airbag inflator and a high pressure cylinder filled with inert gas. The airbag inflator is a single-initiator, hybrid-type unit that is secured to the SAB bracket.

The SAB cannot be repaired, and must be replaced if deployed, ineffective, or in any way damaged. If the SAB is deployed the thermoplastic chute, the seat back frame, the seat back foam, the seat back trim cover and the seat airbag jumper wire harness must also be replaced.

OPERATION

OPERATION

Each Seat AirBag (SAB) is deployed individually by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through left or right SAB line 1 and line 2 (or squib) circuits. The hybrid-type inflator assembly for each airbag contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemicals burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator and inert gas canister are sealed and connected so that all of the released gas is directed into the folded SAB cushion, causing the cushion to inflate. As the cushion inflates it will split the fabric retainer strap and the thermoplastic chute will direct the expanding cushion through the outboard side of the seat back trim cover and into the area between the outboard side of the front seat and the front door to protect the front seat occupant during a side impact collision or a vehicle rollover incident.

Following the deployment, the SAB cushion slowly deflates by venting the inert gas through the loose weave of the cushion fabric, and the deflated cushion hangs down loosely from the outboard side of the front seat back.

Proper diagnosis of the SAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged Seat AirBag (SAB). If the SAB is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the SAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

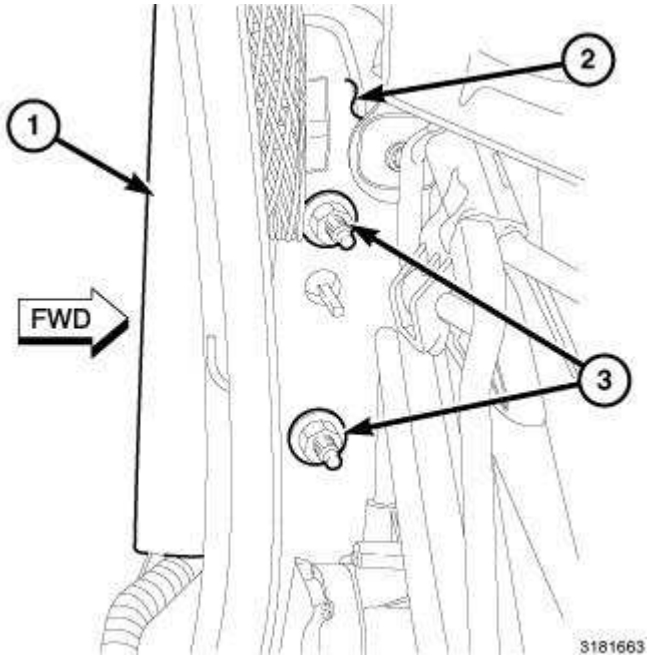

Fig. 35: Front Seat Back Frame, Two Nuts & Seat AirBag (SAB) And Thermoplastic Chute
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat to its most forward position for easiest access to the front seat mounting hardware.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Remove the trim from the front and back of the front seat back frame (2). Refer to **COVER, SEAT BACK, FRONT, REMOVAL** .
5. Remove the two nuts (3) that secure the Seat AirBag (SAB) and thermoplastic chute (1) to the outboard side of the seat back frame.

CAUTION: Do not pull on the Seat AirBag (SAB) jumper wire harness take out or pry on the connector insulator to disengage the connector from the

SAB inflator connector receptacle. Improper removal of this take out and its connector insulator can result in damage to the airbag circuits or the connector insulator.

6. Disengage the two SAB studs from the seat back frame and remove the SAB and chute from the seat back as a unit.

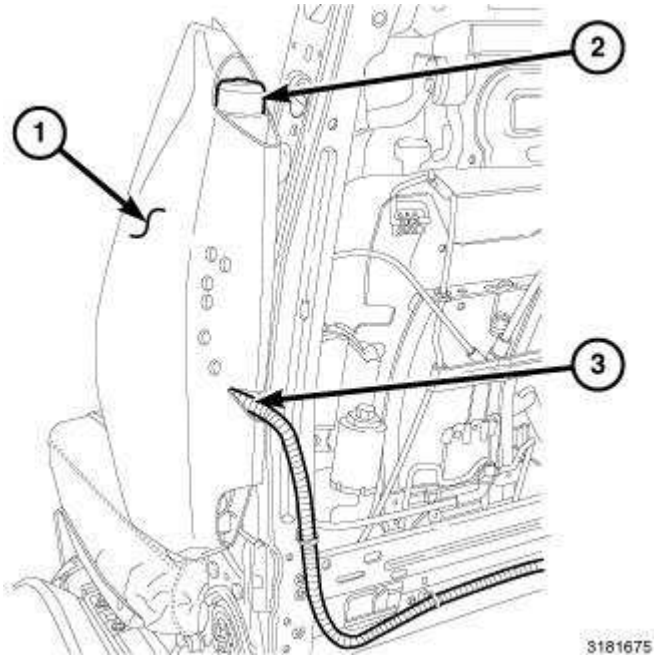

Fig. 36: SAB From The Chute, SAB Jumper Wire Harness & SAB Inflator
Courtesy of CHRYSLER GROUP, LLC

7. Disengage the SAB from the chute (1) to access and disconnect the SAB jumper wire harness (3) connector from the base of the SAB inflator (2). Pull the connector insulator straight out from the inflator to disconnect it from the connector receptacle.
8. Disengage the SAB jumper wire harness from the opening in the back of the chute.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: **The following procedure is for replacement of an ineffective or damaged Seat AirBag (SAB). If the SAB is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the SAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .**

CAUTION: The Seat AirBag (SAB) must be installed into the nylon pouch integral to the front seat back trim cover before the SAB or the trim cover are installed on the front seat back frame. Failure to do so will adversely affect the function of the SAB system.

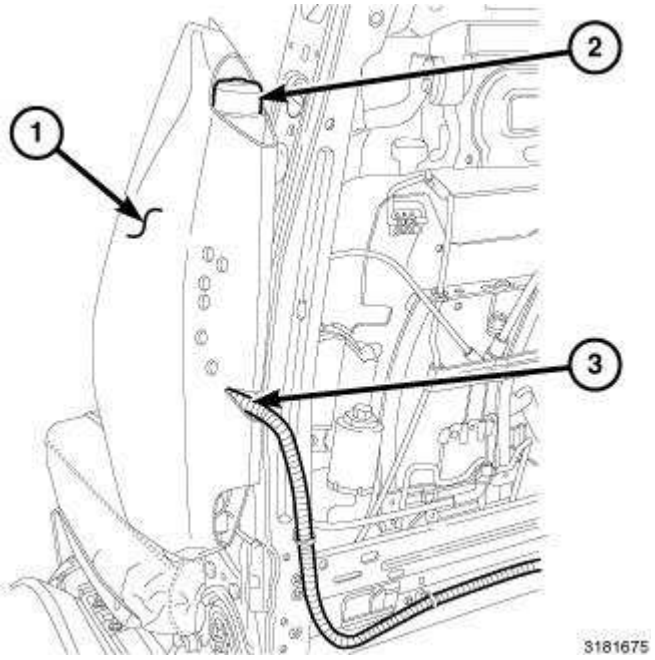

Fig. 37: SAB From The Chute, SAB Jumper Wire Harness & SAB Inflator
Courtesy of CHRYSLER GROUP, LLC

1. Engage the SAB jumper wire harness (3) through the opening in the back of the thermoplastic chute (1).
2. Reconnect the seat jumper wire harness connector to the connector receptacle at the base of the SAB inflator. Be certain that the connector latches and lock are fully engaged.
3. Carefully slide the Seat AirBag (SAB) and inflator (2) into the chute and engage the two SAB studs through the holes provided in the chute. Be certain not to tear or damage the chute.

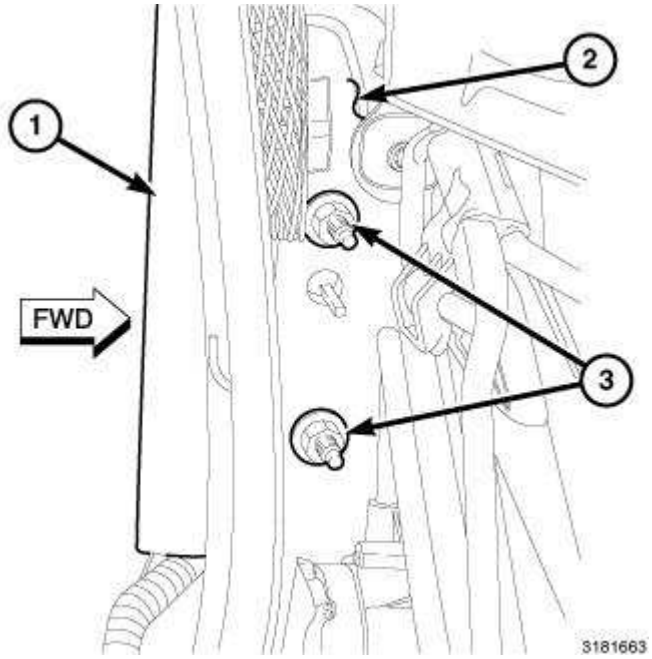

Fig. 38: Front Seat Back Frame, Two Nuts & Seat AirBag (SAB) And Thermoplastic Chute
Courtesy of CHRYSLER GROUP, LLC

4. Position the SAB and chute (1) as a unit to the outboard side of the seat back frame (2) and insert the SAB mounting studs through the mounting holes in the frame.
5. Install and tighten the two nuts (3) that secure the SAB to the outboard side of the seat back frame. Tighten the nuts to 8 N.m (71 in. lbs.).

CAUTION: Be certain that all of the trim is properly reinstalled on the front seat back frame. Failure to do so will adversely affect the function of the Seat AirBag (SAB) system.

6. Reinstall the trim onto the front and back of the front seat back frame. Refer to **COVER, SEAT BACK, FRONT, INSTALLATION** .
7. Reinstall the front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
8. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, SIDE CURTAIN

DESCRIPTION

DESCRIPTION

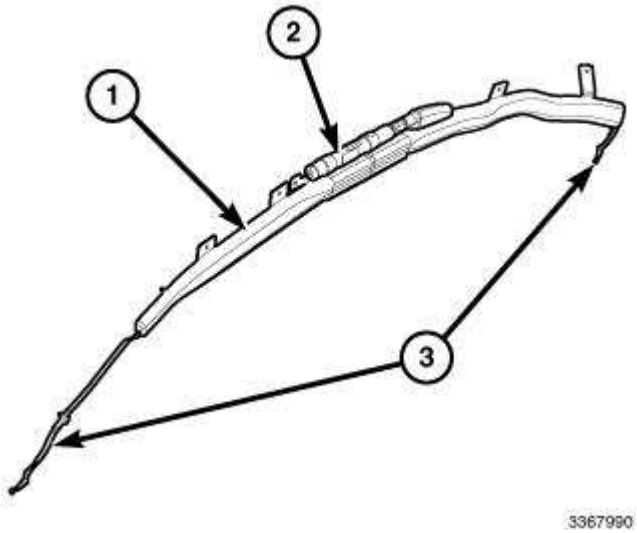

Fig. 39: Side AirBag Inflatable Curtains (SABIC), Tether & Hybrid-Type Inflator
Courtesy of CHRYSLER GROUP, LLC

Side AirBag Inflatable Curtains (SABIC) (1) are standard factory-installed equipment for this vehicle. These airbags are passive, inflatable, Supplemental Restraint System (SRS) components. The SABIC system is designed to reduce injuries to the vehicle occupants in the event of a side impact collision or a vehicle rollover incident. Each SABIC cushion provides full coverage of the side glass on the same side of the vehicle as the monitored impact.

Each vehicle is equipped with two individually controlled SABIC units. These SABIC units are concealed and mounted above the headliner where they are each secured to one of the roof side rails. Each folded airbag cushion is contained within a fabric wrap and extruded plastic channels that extend along the roof rail from the A-pillar at the front of the vehicle to the C-pillar at the rear of the vehicle.

A long tether (3) extends down the A-pillar from the front of the SABIC cushion, while a shorter tether extends back to over the C-pillar. The end of each tether is secured to a slot in the sheet metal with a metal T-hook, while an additional plastic push-in fastener secures the T-hook within the slot in the sheet metal of the pillar. A molded airbag support bracket is snapped into the roof rail above the C-pillar.

The hybrid-type inflator (2) for each SABIC is secured to the roof rail above the B-pillar and the front door opening, and is connected to the airbag cushion by a long tubular manifold. The inflator bracket and the extruded cushion channel are secured with both plastic push-in fasteners and a snap-in fastener to the roof rail. The inflator is initially hung from the roof rail by the snap-in fastener, then the push-in fasteners secure the body of the airbag cushion to the roof rail and the support bracket. Finally, the entire assembly is secured with five screws to the roof rail and the airbag support bracket.

The airbag inflator is connected to the vehicle electrical system through a dedicated take out and connector of the body wire harness near the top of the B-pillar. The body wire harness connects the SABIC unit to the Occupant Restraint Controller (ORC).

The SABIC units cannot be adjusted or repaired and must be replaced if deployed, ineffective, or in any way damaged. Once a SABIC has been deployed, the complete SABIC unit, the headliner, the upper A, B, and C-pillar trim as well as all other visibly damaged components must be replaced.

OPERATION

OPERATION

Each Side AirBag Inflatable Curtain (SABIC) is deployed individually by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through the left or right SABIC line 1 and line 2 (or squib) circuits. The hybrid-type inflator assembly for each airbag contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the airbag inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemicals burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator and inert gas canister are sealed and connected to a tubular manifold so that all of the released gas is directed into the folded airbag cushion, causing the cushion to inflate. As the cushion inflates it will drop down from the roof rail between the edge of the headliner and the side glass/body pillars to form a curtain-like cushion to protect the vehicle occupants during a side impact collision or a vehicle rollover incident. The cushion features large chambers that inflate adjacent to the head of each front and rear seat occupant.

The front and rear tethers keep the SABIC cushion taut to the side of the vehicle. In addition, ramps integral to the side trim of the interior and integral to the SABIC modules themselves guide the cushion into the proper deployment position. Following the deployment, the cushion slowly deflates by venting the inert gas through the loose weave of the cushion fabric and the deflated cushion hangs down loosely from the roof rail.

Proper diagnosis of the SABIC inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There

may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the side curtain airbag, or becoming entrapped between the side curtain airbag cushion and the headliner. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged side curtain airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the side curtain airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

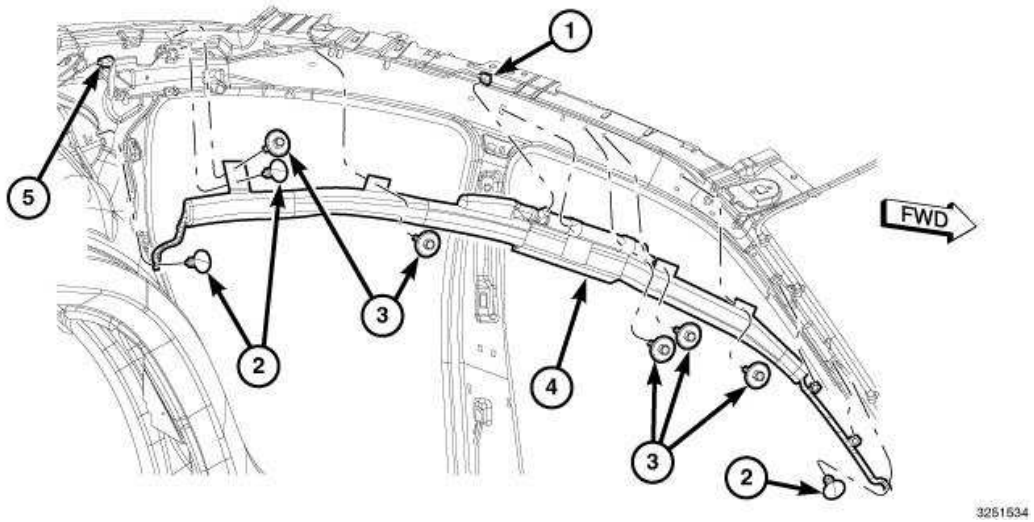

Fig. 40: Wire Harness Connector, Side Air Bag Inflatable Curtain (SABIC), Five Screws & Airbag Support Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the headliner from the vehicle. Refer to **HEADLINER, REMOVAL** .
3. Disconnect the body wire harness connector (1) for the Side Air Bag Inflatable Curtain (SABIC) (4) from the connector receptacle on the inflator on the inner roof rail above the B-pillar.
4. Remove the five screws (3) that secure the SABIC to the inner roof rail and the airbag support bracket (5).
5. Disengage the plastic push-in fasteners (2), then the T-hook that secures the end of each front and rear SABIC tether in the slots in the inner A-pillar and C-pillar sheet metal.

6. Disengage the remaining plastic push-in fasteners that secure the SABIC to the A-pillar, the inner roof rail and the airbag support bracket at the top of the C-pillar.
7. Grasp the SABIC inflator firmly and pull it away sharply to disengage the snap-in fastener from the inner roof rail above the B-pillar.
8. Remove the SABIC from the vehicle as a unit.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the side curtain airbag, or becoming entrapped between the side curtain airbag cushion and the headliner. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged side curtain airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the side curtain airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

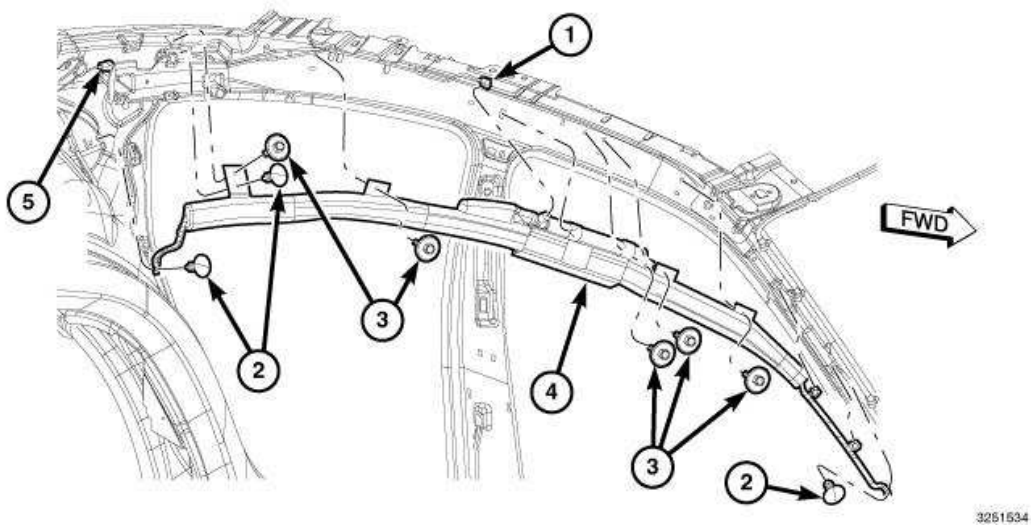

Fig. 41: Wire Harness Connector, Side Air Bag Inflatable Curtain (SABIC), Five Screws & Airbag Support Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain that the box nuts and the airbag support bracket (5) for the Side Air Bag Inflatable Curtain (SABIC) (4) are properly installed in the inner roof rail and that they are in good condition.
2. Position the SABIC into the vehicle as a unit.
3. Align the snap-in fastener on the back of the SABIC inflator with the hole in the inner roof rail above the B-pillar and push on the inflator firmly and evenly to snap it into place.
4. Engage the plastic push-in fasteners (2) that secure the airbag cushion to the inner roof rail and the airbag support bracket behind the inflator and the B-pillar.
5. Engage the T-hook that secures the end of each front and rear SABIC tether into the slots in their respective inner A-pillar or C-pillar sheet metal.
6. Engage the plastic push-in fasteners that secure the SABIC front tether to the holes in the inner A-pillar.
7. Engage the plastic push-in fasteners (2) that secure the front and rear SABIC tether T-hooks in their inner A-pillar or C-pillar slots.
8. Install and tighten the five screws (3) that secure the SABIC to the inner roof rail and the airbag support bracket. Tighten the screws to 9 N.m (80 in. lbs.).
9. Reconnect the body wire harness connector (1) to the SABIC inflator connector receptacle.
10. Reinstall the headliner into the vehicle. Refer to **HEADLINER, INSTALLATION** .
11. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

ANCHOR, CHILD SEAT

DESCRIPTION

DESCRIPTION

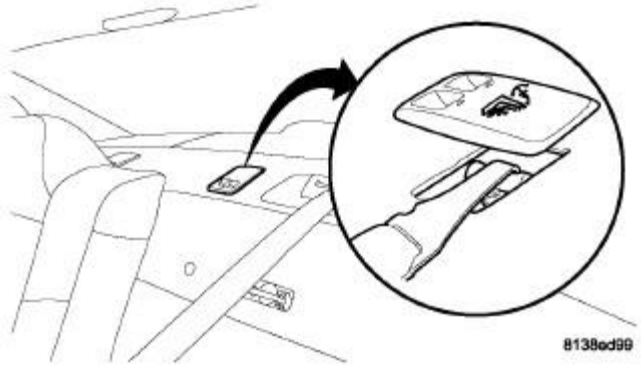

Fig. 42: Lower Anchor & Tether
Courtesy of CHRYSLER GROUP, LLC

This vehicle is equipped with a Lower Anchors and Tether for CHildren, or LATCH child restraint anchorage system for domestic markets. The LATCH system provides for the installation of suitable child restraints in certain seating positions without using the standard equipment seat belt provided for that seating position. The rear seats in these vehicles are equipped with a fixed-position child restraint upper tether anchor for both the center and the two outboard seating positions, and child restraint lower anchors (also known as ISOFIX anchors) for the two outboard seating positions only. Vehicles manufactured for export markets are not equipped with the upper tether anchors, but do have the ISOFIX lower anchors.

The three upper tether anchors are integral to the rear shelf panel. These anchors are each constructed of heavy-gauge steel reinforcement brackets integral to the rear shelf panel and are concealed beneath individual trim cover and bezel units that are integral to the rear shelf trim panel. These upper tether anchors cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced as a unit with the rear shelf panel. The upper tether anchor trim covers and bezels are serviced as a unit with the rear shelf trim panel.

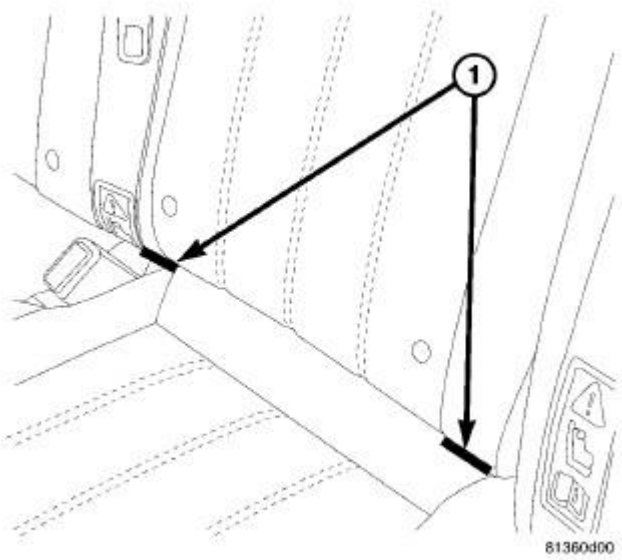

Fig. 43: Lower Anchors
Courtesy of CHRYSLER GROUP, LLC

The lower anchors for all vehicles are integral to an ISOFIX cross member that is permanently mounted to the center floor panel beneath the rear seat cushion. These anchors are constructed from heavy-gauge round steel bar stock that is formed into a U-shape, then securely welded at each end to the cross member.

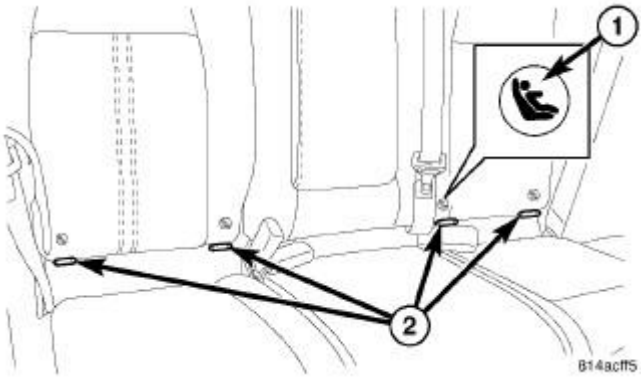

Fig. 44: Identifying Rear Seat Lower Anchors & Markers With An Imprinted Child Seat Icon
Courtesy of CHRYSLER GROUP, LLC

The rear seat lower anchors (2) are each accessed from the front of their respective seats, at each side where the seat back meets the seat cushion. Round markers (1) with an imprinted child seat icon help identify the anchor locations as they may be otherwise difficult to see with the seat back in the upright position. These lower anchors cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced as a unit with the isofix cross member of the center floor panel.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles,

mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

OPERATION

OPERATION

All vehicles manufactured for sale in the United States and Canada are required to be equipped with a Lower Anchors and Tether for CHildren, or LATCH child restraint anchorage system. The rear seats in this vehicle have two pairs of anchor provisions for installing a LATCH-compatible child seat. A single seat may be mounted in the center seating position, or one in each outboard seating position.

With LATCH, child seats are secured by direct attachment to the vehicle structure, rather than by the seat belts. With LATCH-compatible child seats, lower (also known as ISOFIX) anchors attach to the seat structure through heavy-gauge wire loops located at the intersection between the seat cushion and the seat back surfaces.

Three upper tether anchors are integral to the rear shelf panel to secure the top tether strap of child seats equipped with this feature. These upper tether anchors work with both LATCH-compatible and other child seats equipped with a top tether strap. Vehicles manufactured for export markets are equipped with only the ISOFIX lower anchors, and have no upper tether anchor provisions.

The owner's information packet in the vehicle glove box contains details and suggestions on the proper use of all of the factory-installed child restraint anchors.

BUCKLE, SEAT BELT

REMOVAL

FRONT SEAT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in

accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt buckle unit. The front seat belt buckle also includes a seat belt tensioner. If the front seat belt buckle is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

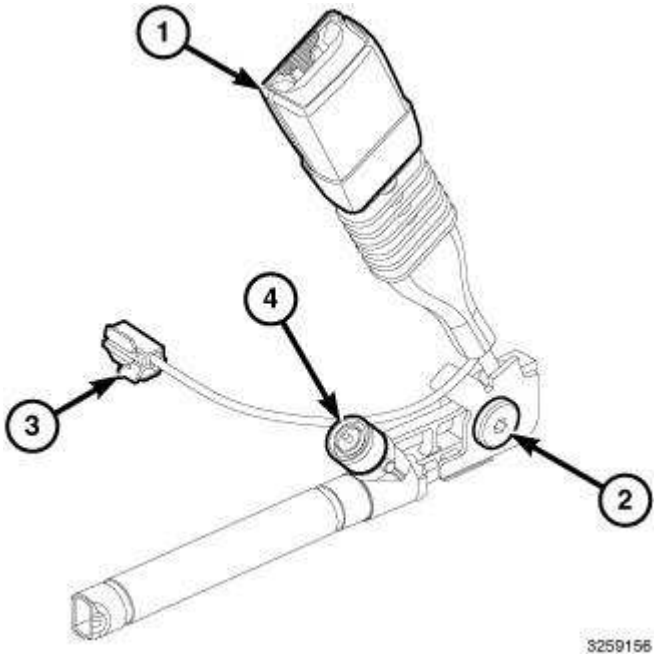

Fig. 45: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat for easiest access to the seat mounting hardware.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Disconnect the seat wire harness connector from the seat belt tensioner initiator (4).
5. Disconnect the seat belt switch pigtail wire connector (3) from the seat wire harness connector.
6. Remove the screw (2) that secures the front seat belt buckle lower anchor to the bracket at the back of the seat cushion frame.
7. Remove the buckle and tensioner (1) from the front seat as a unit.

REAR SEAT

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

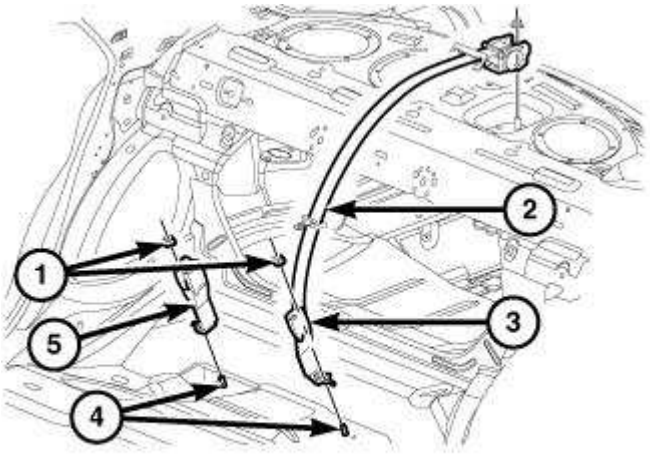

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Fig. 46: Center Rear Seating Position Buckles, Left Outboard Rear Seating Position Buckle & Center Rear Seating Position Seat Belt And Retractor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right outboard and center rear seating position buckles (5) are serviced

only as a unit. The left outboard rear seating position buckle (3) is integral to the center rear seating position seat belt and retractor (2) lower anchor. Refer to RETRACTOR, SEAT BELT, REMOVAL.

1. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, REMOVAL** .
2. Remove the nut (1) that secures the anchor plate of the right outboard and center rear seating position buckles (5) to the stud (4) on the center floor panel.
3. Remove the buckle unit from the vehicle.

INSTALLATION

FRONT SEAT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt buckle unit. The front seat belt buckle also includes a seat belt tensioner. If the front seat belt buckle is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

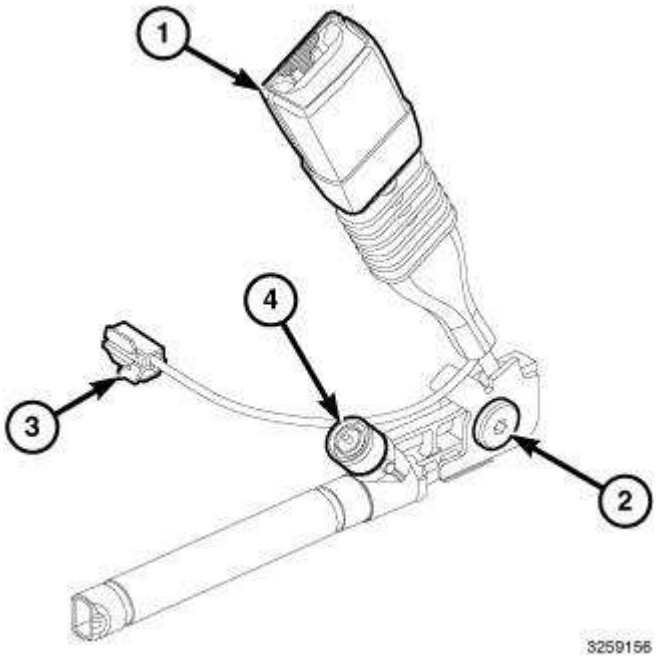

Fig. 47: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat belt buckle and tensioner (1) lower anchor to the bracket at the back of the seat cushion frame.
2. Install and tighten the screw (2) that secures the lower anchor to the seat cushion frame. Tighten the screw to 39 N.m (29 ft. lbs.).
3. Reconnect the seat belt switch pigtail wire connector (3) to the seat wire harness connector.
4. Reconnect the seat wire harness connector to the seat belt tensioner initiator (4).
5. Reinstall the front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

REAR SEAT

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and

unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

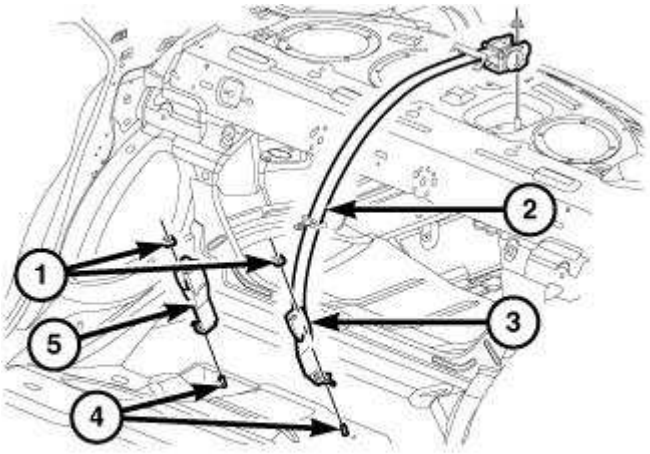

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Fig. 48: Center Rear Seating Position Buckles, Left Outboard Rear Seating Position Buckle & Center Rear Seating Position Seat Belt And Retractor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right outboard and center rear seating position buckles (5) are serviced only as a unit. The left outboard rear seating position buckle (3) is integral to the center rear seating position seat belt and retractor (2) lower anchor. Refer to RETRACTOR, SEAT BELT, INSTALLATION.

1. Position the anchor plate of the right outboard and center rear seating position buckles (5) onto the stud (4) on the center floor panel. Be certain to engage the anti-rotation tab of the anchor plate into the clearance hole in the floor panel.
2. Install and tighten the nut (1) that secures buckle anchor plate to the floor. Tighten the nut to 40 N.m (30 ft. lbs.).
3. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** .

CLOCKSPRING

DESCRIPTION

DESCRIPTION

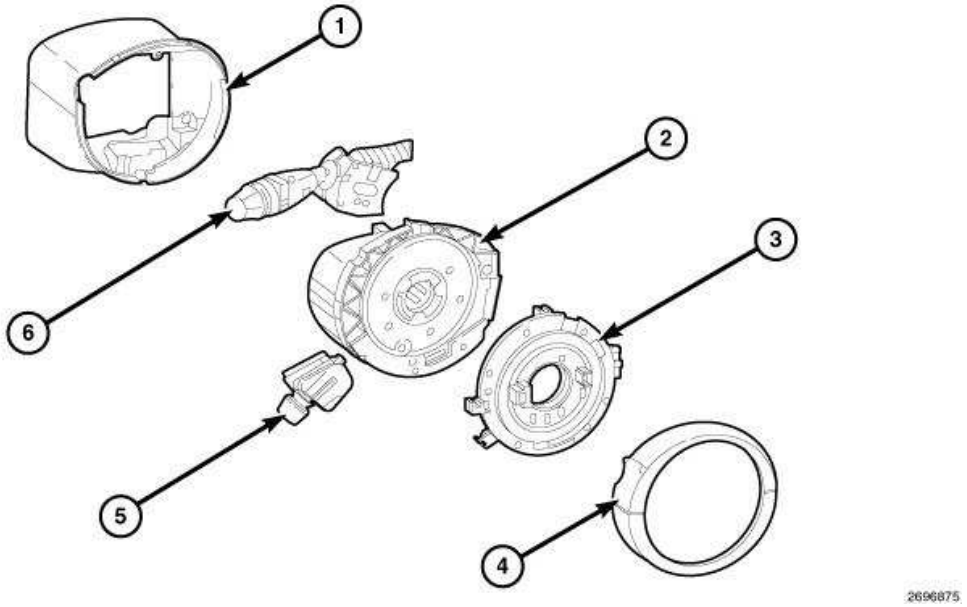


Fig. 49: Steering Column Shroud, Steering Angle Sensor (SAS), Clockspring, Telescope Switch & Trim Cover
Courtesy of CHRYSLER GROUP, LLC

The clockspring (3) for this vehicle is integral to the Steering Column Control Module (SCCM). The clockspring includes an integral, internal turn signal cancel cam. The SCCM is secured near the top of the steering column below the steering wheel. In addition to the clockspring the SCCM includes the steering column shroud (1), the Steering Angle Sensor (SAS) (2), the multi-function switch (6), a power adjustable steering column tilt and telescope switch (5) for vehicles so equipped and a trim cover (4).

Within the plastic clockspring case is a spool-like molded clear plastic rotor with an exposed hub. The upper surface of the rotor hub has a large center hole, two short pigtail wires with connectors, and two connector receptacles that face toward the steering wheel. The inner surface of the clockspring rotor hub has keyway features that are engaged by lug features on the outer circumference of the steering wheel hub. These interlocking features allow the steering wheel to drive the clockspring and SAS and also unlock the clockspring rotor when the steering wheel has been properly installed.

The SCCM includes an integral connector receptacle that faces toward the instrument panel and is connected to the vehicle electrical system through a single takeout and connector of the instrument panel wire harness. The instrument panel wire harness take out has been intentionally provided with additional length to facilitate service removal and installation of the SCCM. However, following SCCM installation, this additional length must be pulled back and secured to the instrument panel structure to prevent undesirable noises while driving.

Wound around the rotor spool within the clockspring case are long ribbon-like tapes that consist of several thin copper wire leads sandwiched between two thin plastic membranes. The outer end of the tapes terminate at the connector receptacle that faces the instrument panel, while the inner end of the tapes terminate at the pigtail wires and connector receptacles on the hub of the clockspring rotor that face the steering wheel. The outer surface of the rotor spool hub within the clockspring case also has the integral lobes of the turn signal cancel cam.

The clear plastic clockspring rotor has an outer band that has a translucent or frosted appearance except for a small, clear inspection window area in the lower right quadrant. The clockspring tape has several black squares that are only visible through the clear inspection window when the clockspring is properly centered. If these squares are not visible through the inspection window, clockspring centering has been compromised and the entire SCCM must be replaced with a new unit.

The service replacement SCCM is shipped with the clockspring pre-centered and with a red molded plastic locking tab installed. The locking tab secures the centered clockspring rotor to the clockspring case during shipment and handling, but must be removed after the SCCM is installed on the steering column and before the steering wheel can be installed. The clockspring cannot be repaired. If the clockspring is ineffective, damaged, if clockspring centering is compromised or if the Driver AirBag (DAB) has been deployed the entire SCCM unit must be replaced. Refer to **MODULE, STEERING COLUMN, REMOVAL** .

OPERATION

OPERATION

The clockspring is a mechanical electrical circuit component that is used to provide continuous electrical continuity between the fixed instrument panel wire harness and certain electrical components mounted on or in the rotating steering wheel. On this vehicle the rotating electrical components include the driver airbag, the horn switch, the speed control switch, the remote radio switches, the hands-free communication switches and the Electronic Vehicle Information Center (EVIC) control switches, if the vehicle is so equipped.

The clockspring is integral to the Steering Column Control Module (SCCM) positioned and secured near the top of the steering column. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** . The turn signal cancel cam is integral to the rim of the clockspring rotor hub spool within the clockspring case so it also moves with the rotation of the steering wheel. Two short, sleeved pigtail wires on the upper surface of the clockspring rotor connect the clockspring to the Driver AirBag (DAB), while a steering wheel wire harness connected to the connector receptacles on the upper surface of the clockspring rotor completes circuits for the various steering wheel-mounted switches and the heated steering wheel, if the vehicle is so equipped.

Like the clockspring in a timepiece, the clockspring tape and conductors have travel limits and can be damaged by being wound too tightly during full stop-to-stop steering wheel rotation. To prevent this from occurring, the clockspring is centered when it is installed on the steering column. Centering the clockspring indexes the clockspring tape to the movable steering components so that the tape can operate within its designed travel limits.

However, if the steering shaft is disconnected from the steering gear the clockspring rotor spool can change position relative to other movable steering components. Clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible in the inspection window, clockspring centering has been compromised and the entire SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN, INSTALLATION** .

Service replacement clocksprings are shipped pre-centered within the SCCM and with a plastic

locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the SCCM is installed on a steering column, clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible in the inspection window, the SCCM must be replaced with a new unit. Proper clockspring installation may also be confirmed by viewing the Steering Angle Sensor (SAS) data using a diagnostic scan tool.

The hard wired clockspring circuits to the SCCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SCCM, the Steering Control Module (SCM) or the electronic controls or communication between other modules and devices that provide some features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to SRS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

STANDARD PROCEDURE

STANDARD PROCEDURE - CLOCKSPRING CENTERING

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

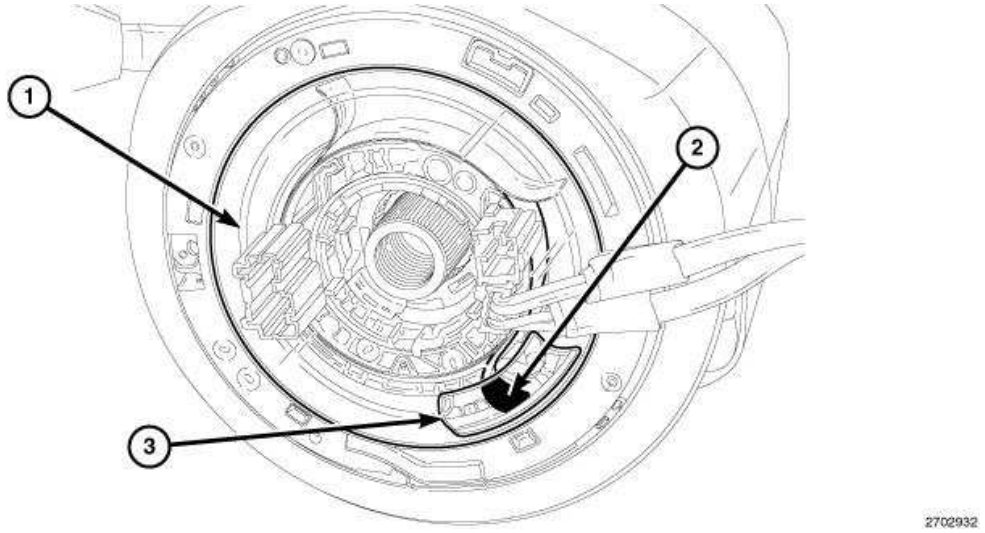


Fig. 50: Inspection Window, Clockspring Rotor & Black Squares
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always turn the steering wheel until the front wheels are in the straight-

ahead position. Then, prior to disconnecting the steering column from the steering gear, lock the steering wheel to the steering column. If clockspring centering has been compromised for ANY reason, the entire Steering Column Control Module (SCCM) and clockspring unit MUST be replaced with a new unit.

Like the clockspring in a timepiece, the clockspring tape has travel limits and can be damaged by being wound too tightly during full stop-to-stop steering wheel rotation. To prevent this from occurring, the clockspring is centered when it is installed on the steering column. Centering the clockspring indexes the clockspring tape to the movable steering components so that the tape can operate within its designed travel limits. However, if the steering shaft is disconnected from the steering gear, the clockspring rotor spool can change position relative to the fixed steering components.

Clockspring centering must always be confirmed by viewing the inspection window (3) on the clockspring rotor (1). If the black squares (2) on the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN, INSTALLATION** .

The service replacement SCCM is shipped with the clockspring pre-centered and with a red plastic locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the SCCM is installed on a steering column, clockspring centering must be confirmed by viewing the black squares on the clockspring tape through the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN, INSTALLATION** . Proper clockspring installation may also be confirmed by viewing the Steering Angle Sensor (SAS) data using a diagnostic scan tool.

MODULE, OCCUPANT RESTRAINT CONTROLLER

DESCRIPTION

DESCRIPTION

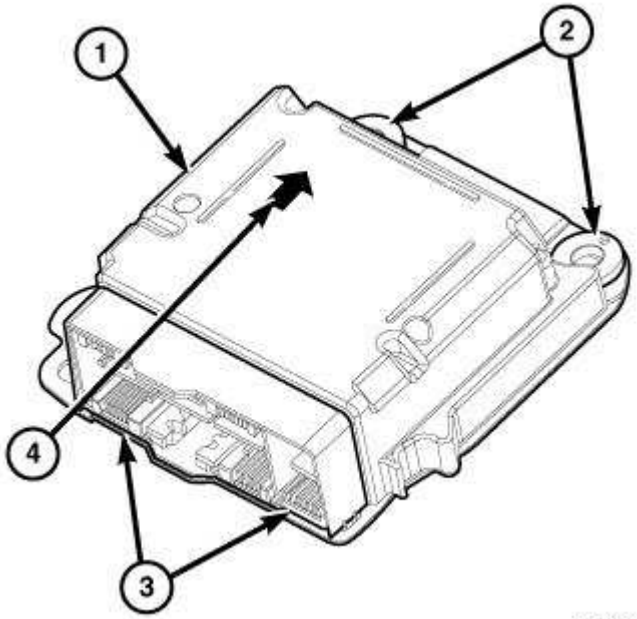


Fig. 51: Occupant Restraint Controller (ORC), Arrow, Integral Mounting Flanges & Electrical Connector Receptacles
Courtesy of CHRYSLER GROUP, LLC

The Occupant Restraint Controller (ORC) (1) is secured by three screws to a stamped steel mounting bracket on the top of the floor panel transmission tunnel near the dash panel and beneath the instrument panel center support in the passenger compartment of the vehicle. Concealed within a hollow in the center of the ORC housing is the electronic circuitry of the ORC which includes a microprocessor, an electronic impact sensor, an electronic safing sensor and an energy storage capacitor. A stamped metal cover plate is secured to the bottom of the ORC housing to enclose and protect the internal electronic circuitry and components.

An arrow (4) printed on the label on the top of the ORC housing provides a visual verification of the proper orientation of the unit, and should always be pointed toward the front of the vehicle. The ORC housing has integral mounting flanges (2) on the right and left front and the left rear corner. The stamped metal cover plate has two integral locating pins on its lower surface. Two molded plastic electrical connector receptacles (3) exit the rearward facing side of the ORC housing. These receptacles connect the ORC to the vehicle electrical system through two dedicated take outs and connectors, one from the instrument panel wire harness and the second from the body wire harness.

The impact sensor and safing sensor internal to the ORC are calibrated for the specific vehicle, and are only serviced as a unit with the ORC. In addition, there are unique versions of the ORC for vehicles with or without certain optional Supplemental Restraint System (SRS) components. The ORC cannot be repaired or adjusted and, if damaged or ineffective, it must be replaced.

PEDESTRIAN PROTECTION SYSTEM

The Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) is available only in vehicles manufactured for certain export markets. In vehicles so

equipped, a unique version of the ORC also serves as the EPP system control module.

OPERATION

OPERATION

The microprocessor in the Occupant Restraint Controller (ORC) contains the Supplemental Restraint System (SRS) logic circuits and controls all of the SRS components. The ORC uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the Controller Area Network (CAN) data bus. This method of communication is used for control of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for SRS diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The ORC microprocessor continuously monitors all of the SRS electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets an active and stored Diagnostic Trouble Code (DTC) and sends electronic messages to the IC over the CAN data bus to turn ON the airbag indicator. An active fault only remains for the duration of the fault, or in some cases for the duration of the current ignition cycle, while a stored fault causes a DTC to be stored in memory by the ORC. For some DTCs, if a fault does not recur for a number of ignition cycles, the ORC will automatically erase the stored DTC. For other internal faults, the stored DTC is latched forever.

The ORC receives battery current through two circuits; a fused ignition switch output (run) circuit through a fuse in the Body Control Module (BCM) (also known as the Common Body Controller/CBC) and a fused ignition switch output (run-start) circuit through a second fuse in the BCM. The ORC receives ground through a ground circuit and take out of the instrument panel wire harness that is secured by a ground screw to the body sheet metal. These connections allow the ORC to be operational whenever the ignition switch is in the START or ON positions.

The ORC also contains an energy-storage capacitor. When the ignition switch is in the START or ON positions, this capacitor is continually being charged with enough electrical energy to deploy the SRS components for up to one second following a battery disconnect or failure. The purpose of the capacitor is to provide backup SRS protection in case there is a loss of battery current supply to the ORC during an impact.

Various sensors within the ORC are continuously monitored by the ORC logic. These internal sensors, along with several external impact sensor inputs allow the ORC to determine both the severity of an impact and to verify the necessity for deployment of any SRS components. Two remote front impact sensors are located on the back of the right and left vertical members of the radiator support near the front of the vehicle. The electronic impact sensors are accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact.

The ORC also monitors inputs from an internal rollover sensor, seat track position sensors, seat belt switches and six additional remote side impact sensors located on the left and right front door module carriers, on the right and left lower B-pillars and on the right and left C-pillars near the belt line to control deployment of the side curtain airbag units and seat (also known as pelvic and thorax) airbags. On vehicles so equipped, the ORC also uses the passenger side seat belt switch input along

with an input from the Occupant Detection Sensor (ODS) in the passenger front seat cushion to support the passenger belt alert feature, and will send electronic messages to the IC to illuminate the seat belt indicator when appropriate.

The impact sensors within the ORC are electronic accelerometer sensors that provide an additional logic input to the ORC microprocessor. These sensors are used to verify the need for a SRS component deployment by detecting impact energy of a lesser magnitude than that of the primary electronic impact sensors, and must exceed a safing threshold in order for the SRS components to deploy. On vehicles equipped with side curtain airbags or seat airbags, a separate impact sensor within the ORC provides confirmation to the ORC microprocessor of side impact forces. This separate sensor is a bi-directional unit that detects impact forces from either side of the vehicle.

Pre-programmed decision algorithms in the ORC microprocessor determine when the deceleration rate as signaled by the impact sensors indicate an impact that is severe enough to require SRS protection and, based upon the severity of the monitored impact, determines the level of front airbag deployment force required for each front seating position. When the programmed conditions are met, the ORC sends the proper electrical signals to deploy the dual multistage front airbags at the programmed force levels, the front seat belt tensioners and, if the vehicle is so equipped, the seat airbags and either side curtain airbag unit.

The hard wired SRS inputs and outputs for the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ORC or the electronic controls or communication between other modules and devices that provide features of the SRS. The most reliable, efficient, and accurate means to diagnose the ORC or the electronic controls and communication related to SRS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PEDESTRIAN PROTECTION SYSTEM

In vehicles so equipped, a microcontroller within the ORC also contains the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) logic circuits. The EPP system logic of the ORC continuously monitors the three dedicated EPP acceleration-type electronic impact sensors located behind the front bumper area of the fascia at the front of the vehicle. The impact sensors are accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact.

The ORC also monitors electronic **ignition status** , **vehicle speed** and **ambient temperature** message inputs received from other electronic modules over the CAN data bus. The EPP system logic of the ORC uses a pre-programmed decision algorithm to analyze all of these inputs, which allows the ORC to determine both the type and severity of an impact.

When the deceleration rate as signaled by the impact sensors indicate an impact that requires the deployment of the pyrotechnic EPP actuator located on each active hood hinge at the rear corners of the hood panel and all other programmed conditions are met, the ORC sends the proper electrical signals to deploy the actuators. As a safing function, the ORC requires confirming sensor inputs from at least two of the three EPP impact sensors before it will issue a deployment signal.

The ORC also contains an energy-storage capacitor. When the ignition switch is in the START or ON positions, this capacitor is continually being charged with enough electrical energy to deploy the active hood hinge actuators for up to one second following a battery disconnect or failure. The purpose of the capacitor is to provide backup EPP system protection in case there is a loss of battery current supply to the ORC during an impact event.

An Event Data Recorder (EDR) within the ORC stores EPP near-deployment event records. The ORC microcontroller continuously monitors all of the EPP system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it logs an active DTC. The ORC also stores a DTC after it has been resolved. When the ORC has logged a DTC, it sends electronic request messages over the CAN data bus to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to turn ON the airbag indicator.

The hard wired EPP inputs and outputs for the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ORC or the electronic controls or communication between other modules and devices that provide features of the EPP system. The most reliable, efficient, and accurate means to diagnose the ORC or the electronic controls and communication related to EPP system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Occupant

Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.

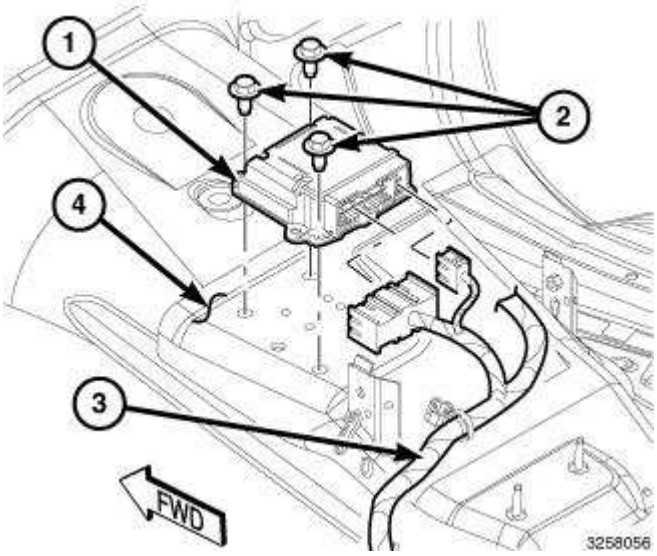


Fig. 52: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the center console from the top of the floor panel transmission tunnel (4). Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Remove the console floor duct from the floor panel transmission tunnel. Refer to **DUCT, FLOOR CONSOLE, REMOVAL** .

   NOTE: If equipped with a cable-type floor shifter, it is not necessary to disconnect the shift cable from the shifter.

4. If equipped with a floor shifter:
   1. Disconnect the wire harness connectors from the shifter.
   2. Remove the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel.
   3. Remove the shifter from the transmission tunnel. If it is a cable-type shifter, carefully position the shifter and cable out of the way over the right side of the transmission tunnel.
5. Remove the switch bank and bezel from the instrument panel center stack. Refer to **POD, SWITCH BANK, REMOVAL** .

6. Remove the Telematics Gateway Module (TGM) from the instrument panel center stack. Refer to **MODULE, TELEMATICS GATEWAY, REMOVAL** .
7. Disconnect the instrument panel and body wire harness (3) connectors from the Occupant Restraint Controller (ORC) (1) connector receptacles located on the rearward facing side of the module.
8. Reach through the instrument panel center stack openings to access and cut the sound deadening material along the right side of the ORC.
9. Reach around and behind the left side of the instrument panel center stack support structure to access and cut the sound deadening material along the forward-facing side of the ORC.
10. Pull the sound deadening material over the left side of the ORC far enough to access the mounting provisions.
11. Remove the three screws (2) that secure the ORC to the top of the floor panel transmission tunnel.
12. Remove the ORC from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be

scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.

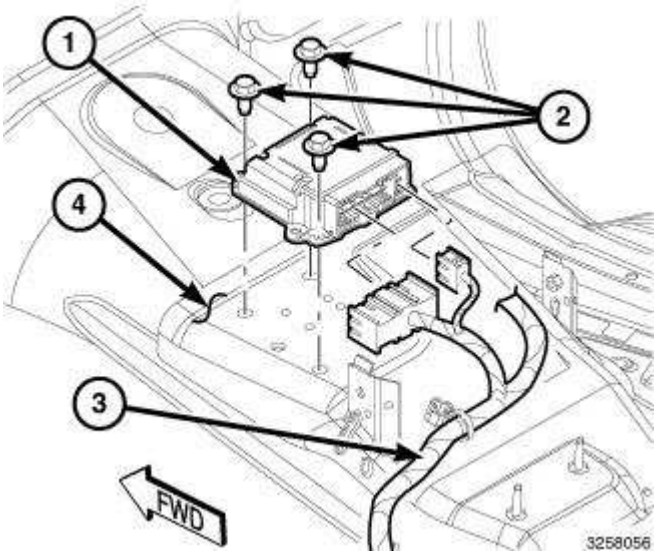


Fig. 53: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Carefully position the Occupant Restraint Controller (ORC) (1) onto the floor panel transmission tunnel (4). When the ORC is correctly positioned, the orientation arrow on the ORC label will be pointed forward in the vehicle.
2. Install and tighten the three screws (2) that secure the ORC to the floor panel transmission tunnel. Tighten the screws to 8 N.m (71 in. lbs.).
3. Restore the flap of sound deadening material that was cut during the removal procedure over and around the ORC.
4. Reconnect the instrument panel and body wire harness (3) connectors to the ORC connector receptacles located on the rearward facing side of the module. Be certain that the latches and the locks on both connectors are each fully engaged.
5. Reinstall the Telematics Gateway Module (TGM) into the instrument panel center stack. Refer to **MODULE, TELEMATICS GATEWAY, INSTALLATION** .
6. Reinstall the switch bank and bezel into the instrument panel center stack. Refer to **POD, SWITCH BANK, INSTALLATION** .
7. If equipped with a floor shifter:
    1. Position the shifter over the four weld studs on the top of the floor panel transmission tunnel.
    2. Install and tighten the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel. Tighten the nuts securely.
    3. Reconnect the wire harness connectors to the shifter.
8. Reinstall the console floor duct onto the floor panel transmission tunnel. Refer to **DUCT,**

FLOOR CONSOLE, INSTALLATION .

9. Reinstall the center console onto the top of the floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, INSTALLATION** .
10. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

RESTRAINT, ACTIVE HEAD

DESCRIPTION

DESCRIPTION

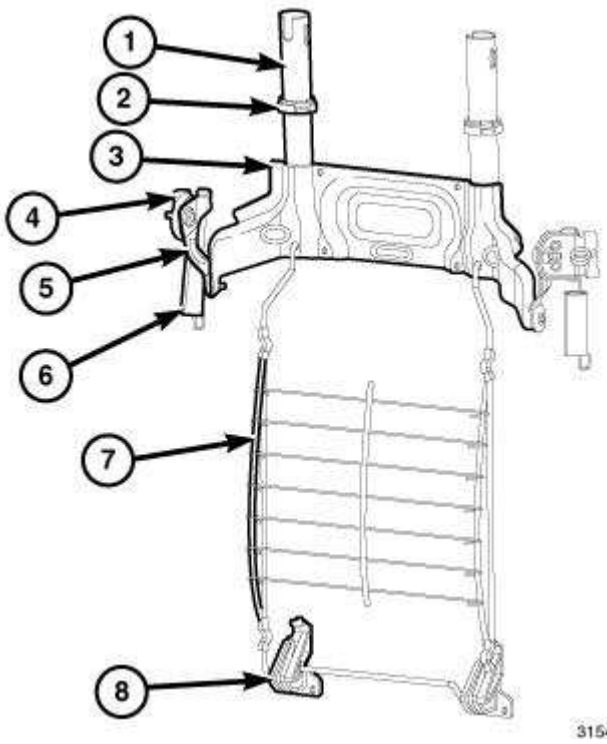


Fig. 54: Steel Headrest Guide Tubes, Fulcrum Bushing, Brackets, Steel Pivot Link, Spring & Static Lumbar Assembly
Courtesy of CHRYSLER GROUP, LLC

Active Head Restraint (AHR) units are standard equipment for both front seating positions in this vehicle. On vehicles so equipped, one inertia-activated AHR unit is located atop each front seat back. Outwardly, an inertia-activated AHR appears the same as a non-active head restraint. The mechanical components that articulate the inertia-activated AHR headrest pad are all concealed within the front seat back frame assembly.

At the top of the seat back frame are two stamped steel headrest guide tubes (1). The guide tubes are each inserted through a molded plastic fulcrum bushing (2) installed in the upper seat back frame member and are permanently fixed to a movable stamped steel armature bracket (3) located just

below the upper frame member near the top of the seat back. The armature bracket is secured to a stamped steel pivot link (5) at each side that pivots on a screw threaded into a mounting bracket (4) welded to each side member of the seat back frame. The pivot links are each have a spring (6) attached to a lever opposite the armature bracket attachment that is anchored to the seat back frame side member below, which provides the spring-loaded return action of the inertia mechanism.

The upper end of the static lumbar assembly (7) is secured at each side to the base of the armature bracket. Each side of the lower end of the lumbar assembly is engaged in a ramp bracket (8) riveted to the lower seat back frame member. The optional power lumbar assembly (not shown) is secured to the armature bracket at the top and the ramp brackets at the bottom in an identical manner as the standard equipment static lumbar assembly.

The inertia-activated AHR linkage cannot be repaired. If damaged or ineffective, it must be replaced as a unit with a new seat back frame unit. However, following an AHR deployment if no physical damage to the unit has occurred, unlike many other Supplemental Restraint System (SRS) components, the spring-loaded inertia-activated AHR linkage will reset itself for reuse.

OPERATION

OPERATION

The inertia-activated Active Head Restraint (AHR) units are deployed and reset automatically by the mechanism contained within each front seat back assembly. During a rear impact, inertia drives the seat occupant rearward into the seat back, loading the seat lumbar assembly. The ramp brackets at the base of the lumbar assembly translate this rearward travel into a vertical motion. The vertical motion of the lumbar assembly is then transmitted to the armature bracket.

Through the rotation of the pivot links at each side of the armature bracket, the vertical motion of the lumbar assembly is converted to a slightly forward and upward arc of the armature bracket, headrest guide tubes and headrest that is designed to reduce the space between the back of the head of the seat occupant and the head restraint pad. Closing this space catches the head of the seat occupant during a low speed rear impact collision event and is important in reducing or eliminating potentially debilitating cervical (also known as whiplash) injuries.

Unless damaged, following the rear impact, the return spring on the pivot link at each side of the armature bracket returns the mechanical components within the seat back and the headrest to their non-loaded positions.

RETRACTOR, SEAT BELT

DESCRIPTION

DESCRIPTION

Both front seating position seat belts are equipped with a Constant Force Retractor (CFR), while the seat belt retractors used in all seating positions include an inertia-type, Emergency Locking Retractor (ELR) mechanism as standard equipment. However, the ELR for all seating positions except the

driver side front are mechanically switchable from an ELR to an Automatic Locking Retractor (ALR).

The CFR, ELR and ALR features are all integral to the seat belt retractor unit mechanism that is concealed beneath a molded plastic cover located on one side of the retractor spool. The CFR, ELR and ALR features cannot be adjusted or repaired and, if ineffective or damaged, the entire seat belt and retractor must be replaced as a unit.

OPERATION

OPERATION

The Constant Force Retractors (CFR) used for both front seating positions provide a constant force load-limiting feature. This load-limiting feature helps to limit the maximum force on the belt webbing to help absorb the energy of the upper torso during an impact event. The CFR feature also helps to offset any extreme torso loading that might occur as the seat belt webbing is automatically retracted by deployment of the belt tensioners in conjunction with a front airbag deployment.

The primary function of the switchable Emergency Locking Retractor (ELR) to Automatic Locking Retractor (ALR) feature is to securely accommodate an infant or child booster seat in any seating position of the vehicle except the driver side front seat without the need for a self-cinching seat belt tip half latch plate unit or another supplemental device that would be required to prevent the seat belt webbing from unwinding freely from the retractor spool of an inertia-type ELR in situations where the minimum inertia locking threshold has not been achieved.

The locked mode of the ALR is engaged and the retractor is switched from operating as a standard inertia-type ELR by first buckling the combination lap and shoulder belt buckle. Then all of the shoulder belt webbing is pulled out from the retractor. Once all of the belt webbing is extracted from the retractor spool, the retractor will automatically become engaged in the pre-locked ALR mode and will make a light, audible clicking or ratcheting sound as the shoulder belt is allowed to retract onto the spool to provide an audible confirmation that the ALR mode is engaged. Once the ALR mode is engaged, the retractor will remain locked and the belt will remain tight around whatever it is restraining.

The retractor is returned to standard ELR (inertia) mode by unbuckling the combination lap and shoulder belt buckle and allowing the belt webbing to be almost fully retracted back onto the retractor spool. The ELR mode is confirmed by the absence of the light, audible clicking or ratcheting sound as the belt webbing retracts. This mode will allow the belt to unwind from and wind onto the retractor spool freely unless and until a predetermined inertia load threshold is sensed, or until the retractor is again switched to the ALR mode.

REMOVAL

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or

instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt and retractor unit. The front outboard retractors also include a seat belt tensioner. If the front seat belt or retractor is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

NOTE: All seat belt retractors except the driver side front retractor include a switchable automatic locking mechanism. Refer to RETRACTOR, SEAT BELT, DESCRIPTION.

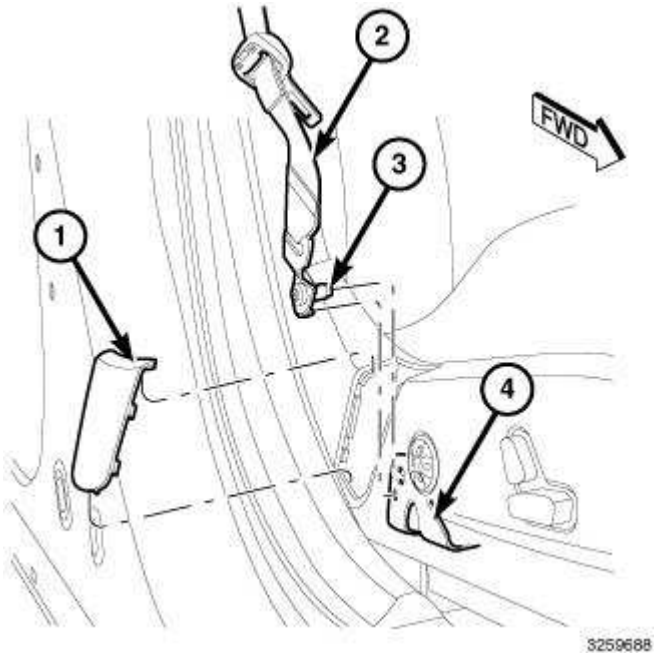


Fig. 55: Front Seat Belt Lower Anchor Cover, Screw, Seat Belt & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Adjust the front seat to its most forward position for easiest access to the front seat belt lower anchor cover (1) and the B-pillar trim.
2. Grasp the upper edge of the lower anchor cover and pull it carefully upward and outward to unsnap it from the front seat cushion outboard side shield.
3. Remove the screw (3) that secures the seat belt (2) lower anchor to the bracket (4) on the outboard side of the front seat cushion frame.
4. Remove the trim from the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, REMOVAL** .

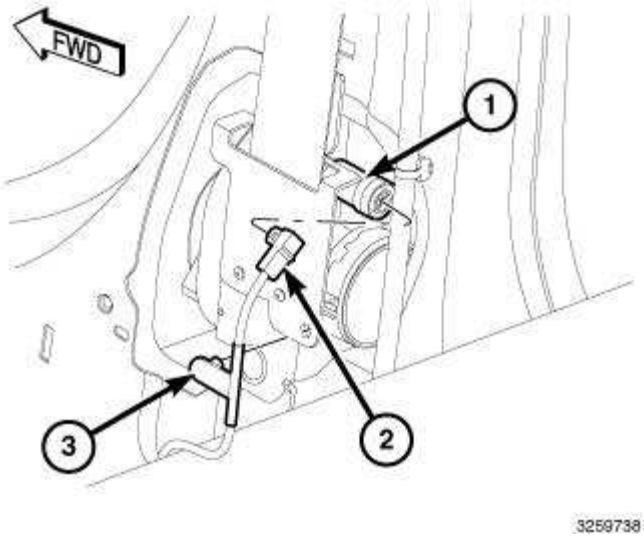


Fig. 56: Body Wire Harness Retainer, Yellow Connector & Seat Belt Tensioner Initiator
Courtesy of CHRYSLER GROUP, LLC

5. Disengage the body wire harness retainer (3) from the retractor bracket.
6. Disconnect the yellow connector (2) of the body wire harness from the seat belt tensioner initiator (1) on the retractor.

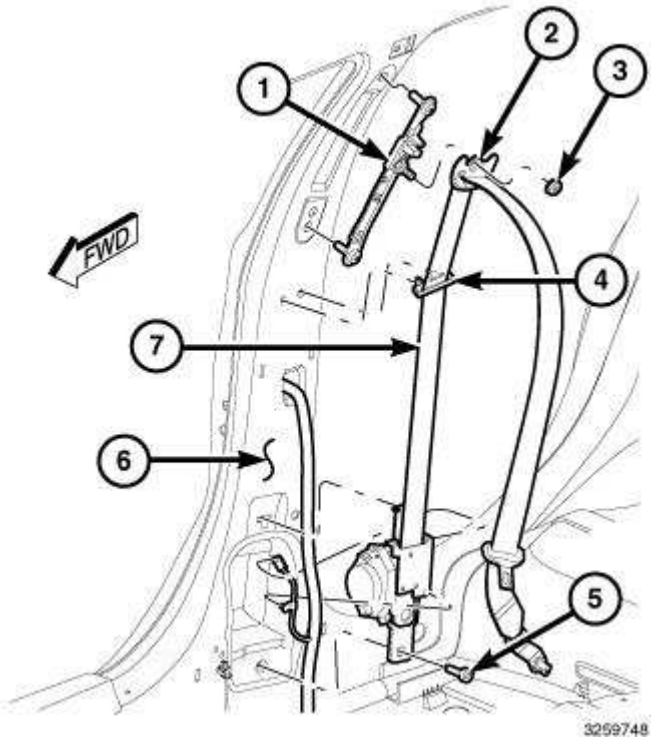


Fig. 57: Nut, Seat Belt Turning Loop, Belt Web Guide, Inner B-Pillar, Front Seat Belt, Screw & Height Adjuster
Courtesy of CHRYSLER GROUP, LLC

7. Remove the nut (3) that secures the seat belt turning loop (2) to the stud of the height adjuster (1) on the upper inner B-pillar.
8. Remove the seat belt turning loop from the height adjuster.
9. Disengage the two clips that secure the belt web guide (4) to the holes in the inner B-pillar (6).
10. Remove the screw (5) that secures the retractor bracket to the base of the inner B-pillar.
11. Disengage the T-tab on the upper retractor bracket from the T-slot in the inner B-pillar.
12. Remove the front seat belt (7) and retractor from the vehicle as a unit.

REAR CENTER

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate.

Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

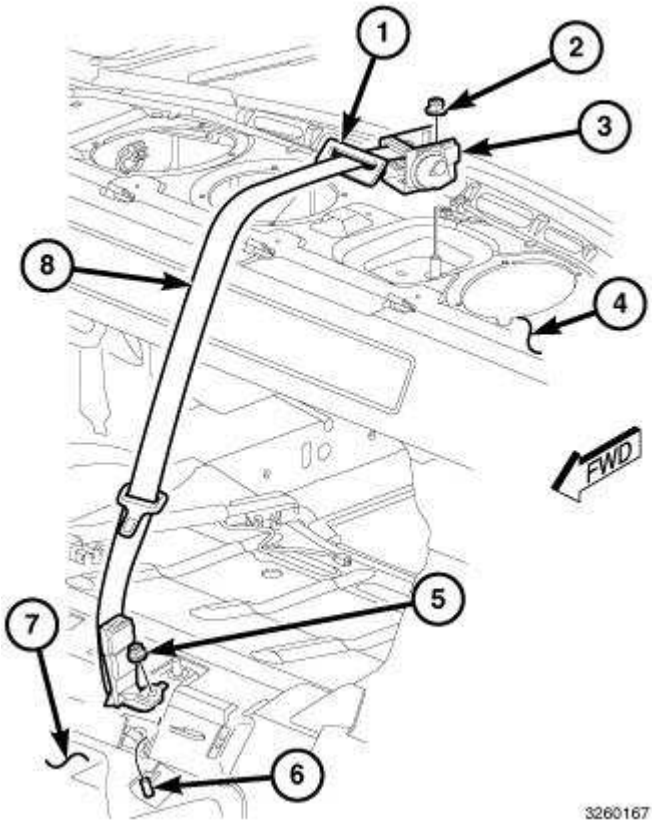


Fig. 58: Nut, Rear Center Seat Belt, Stud, Center Floor Panel, Seat Belt Trim Cover & Rear Shelf Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left outboard rear seating position buckle is integral to the center rear seating position seat belt and retractor lower anchor.

1. Disconnect and isolate the battery negative cable.
2. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, REMOVAL** .
3. Remove the nut (5) that secures the rear center seat belt (8) lower anchor and the left outboard seating position buckle anchor to the stud (6) on the center floor panel (7).
4. Remove the seat belt and buckle anchors from the stud.
5. Disengage the seat belt trim cover (1) from the rear shelf panel trim opening.
6. Remove the trim from the rear shelf panel (4). Refer to **PANEL, REAR SHELF, REMOVAL** .

7. Remove the nut (2) that secures the retractor (3) to the stud on the rear shelf panel.
8. Lift the retractor from the stud and disengage the T-tab on the retractor bracket from the T-slot in the rear shelf panel.
9. Remove the seat belt (8) and retractor from the vehicle as a unit.

REAR OUTBOARD

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

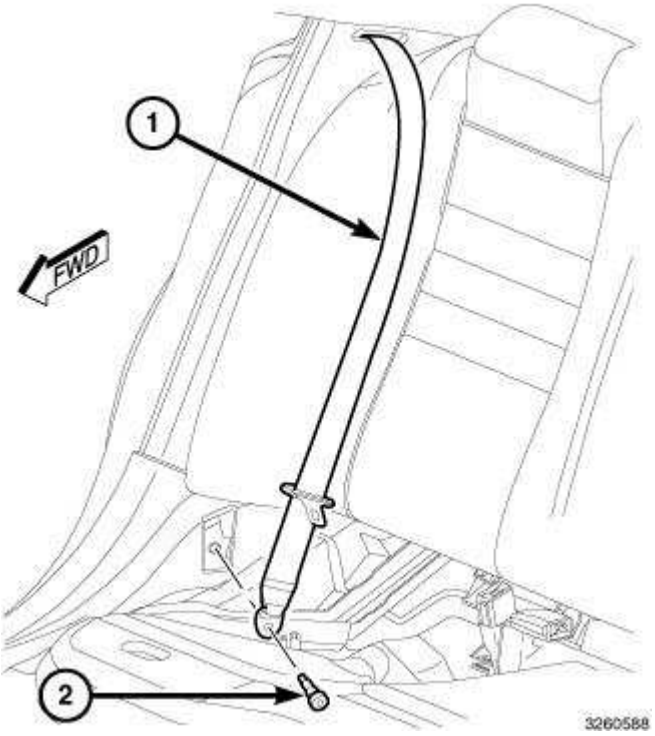


Fig. 59: Screw & Rear Outboard Seat Belt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, SECOND**

ROW, REMOVAL .

3. Remove the screw (2) that secures the rear outboard seat belt (1) to the lower inner C-pillar.

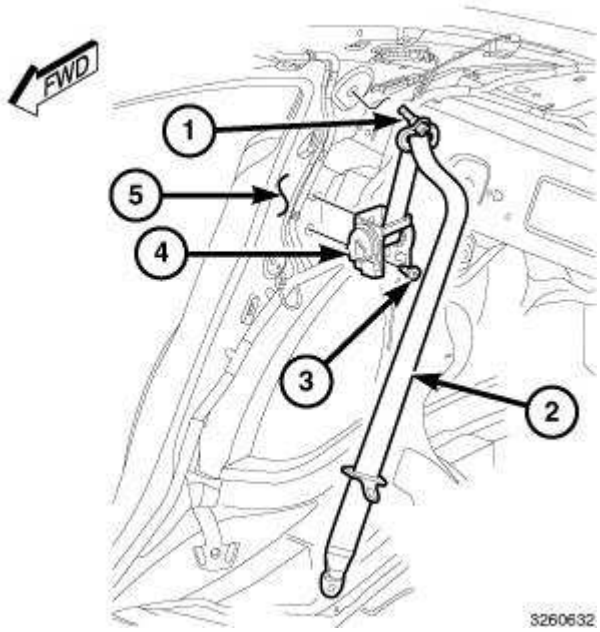


Fig. 60: Seat Belt Webbing, Screw, Seat Belt, Upper C-pillar & Retractor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the trim from the inside of the upper C-pillar (5). Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .
5. Disengage the seat belt webbing (2) and lower anchor from the seat belt opening in the upper C-pillar trim.
6. Remove the screw (1) that secures the seat belt turning loop to the upper inner C-pillar.
7. Remove the seat belt turning loop from the upper inner C-pillar.
8. Remove the screw (3) that secures the retractor (4) to the inner C-pillar.
9. Disengage the retractor T-tab from the T-slot in the inner C-pillar.
10. Remove the rear outboard seat belt and retractor from the inner C-pillar as a unit.

INSTALLATION

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper

precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt and retractor unit. The front outboard retractors also include a seat belt tensioner. If the front seat belt or retractor is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

NOTE: All seat belt retractors except the driver side front retractor include a switchable automatic locking mechanism. Refer to RETRACTOR, SEAT BELT, DESCRIPTION.

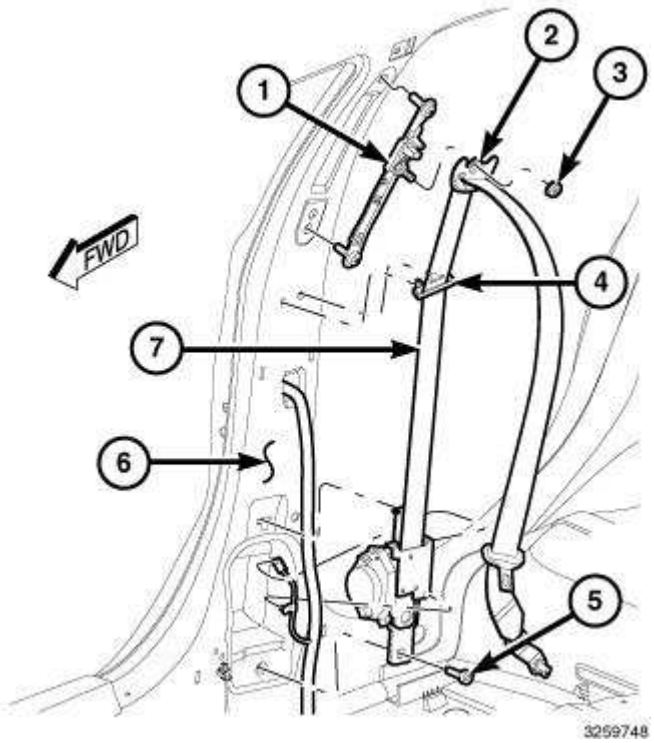


Fig. 61: Nut, Seat Belt Turning Loop, Belt Web Guide, Inner B-Pillar, Front Seat Belt, Screw & Height Adjuster
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat belt (7) and retractor into the vehicle as a unit.
2. Engage the T-tab on the upper retractor bracket into the T-slot in the inner B-pillar (6).
3. Install and tighten the screw (5) that secures the retractor bracket to the base of the inner B-pillar. Tighten the screw to 45 N.m (33 ft. lbs.).
4. Position the belt web guide (4) to the holes in the inner B-pillar and use hand pressure to press it firmly and evenly until the two clips that secure it snap into place. Be certain that the seat belt webbing between the retractor and the web guide is not twisted.
5. Position the seat belt turning loop (2) onto the stud of the height adjuster (1) on the upper inner B-pillar. Be certain that the seat belt webbing between the retractor and the turning loop is not twisted.
6. Install and tighten the nut (3) that secures the turning loop to the height adjuster. Tighten the nut to 45 N.m (33 ft. lbs.).

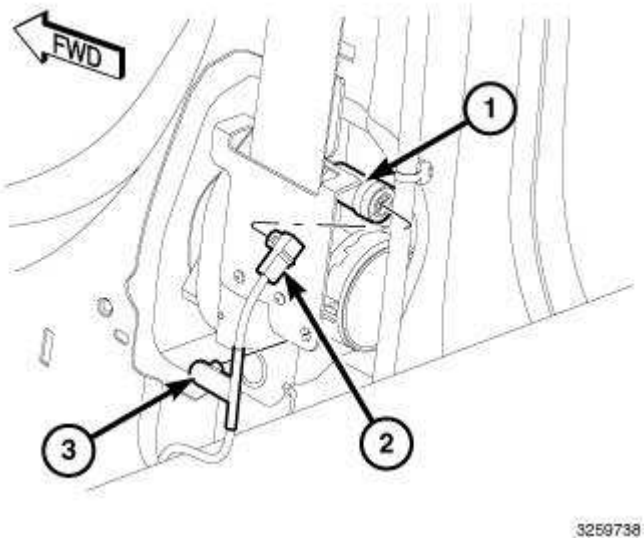


Fig. 62: Body Wire Harness Retainer, Yellow Connector & Seat Belt Tensioner Initiator
Courtesy of CHRYSLER GROUP, LLC

7. Reconnect the yellow connector (2) of the body wire harness to the seat belt tensioner initiator (1) on the retractor.
8. Engage the body wire harness retainer (3) to the retractor bracket.
9. Reinstall the trim onto the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION** .

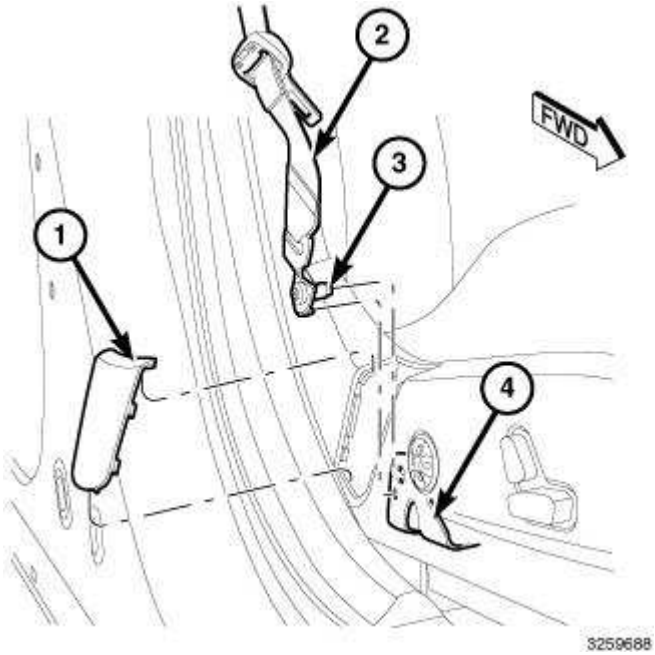


Fig. 63: Front Seat Belt Lower Anchor Cover, Screw, Seat Belt & Bracket
Courtesy of CHRYSLER GROUP, LLC

10. Position the seat belt lower anchor (2) to the mounting bracket (4) on the outboard side of the

front seat cushion frame. Be certain that the seat belt webbing between the turning loop and the lower anchor is not twisted.

11. Install and tighten the screw (3) that secures the lower anchor to the seat. Tighten the screw to 45 N.m (33 ft. lbs.).
12. Reinstall the lower anchor cover (1) onto the front seat cushion outboard side shield by seating the integral lower tab of the cover into position, then pushing inward using care to avoid breaking any of the cover tabs.
13. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

REAR CENTER

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

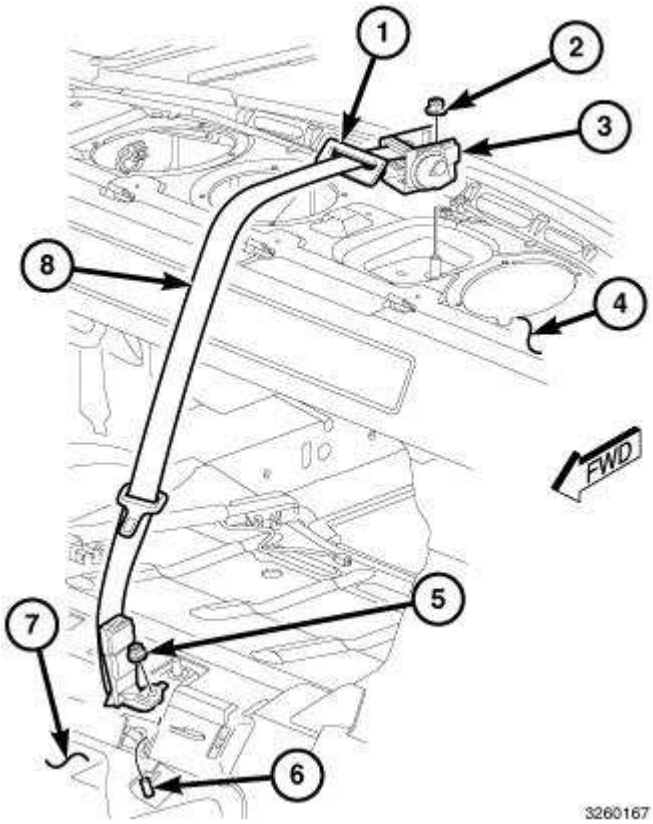


Fig. 64: Nut, Rear Center Seat Belt, Stud, Center Floor Panel, Seat Belt Trim Cover & Rear Shelf Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left outboard rear seating position buckle is integral to the center rear seating position seat belt and retractor lower anchor.

1. Position the center rear seat belt (8) and retractor (3) to the rear shelf panel (4) as a unit.
2. Engage the T-tab on the retractor bracket into the T-slot in the rear shelf panel and lower the retractor over the stud on the rear shelf panel.
3. Install and tighten the nut (2) that secures the retractor to the stud. Tighten the nut to 50 N.m (37 ft. lbs.).
4. Reinstall the trim onto the rear shelf panel. Refer to **PANEL, REAR SHELF, INSTALLATION** .
5. Engage the seat belt trim cover (1) into the rear shelf panel trim opening. Be certain the belt webbing is not twisted between the retractor and the trim cover.
6. Position the rear center seat belt and left outboard seating position buckle anchors over the stud (6) on the center floor panel (7).
7. Install and tighten the nut (5) that secures the seat belt and buckle anchors to the stud. Tighten the nut to 50 N.m (37 ft. lbs.).
8. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION** .

9. Reconnect the battery negative cable.

REAR OUTBOARD

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

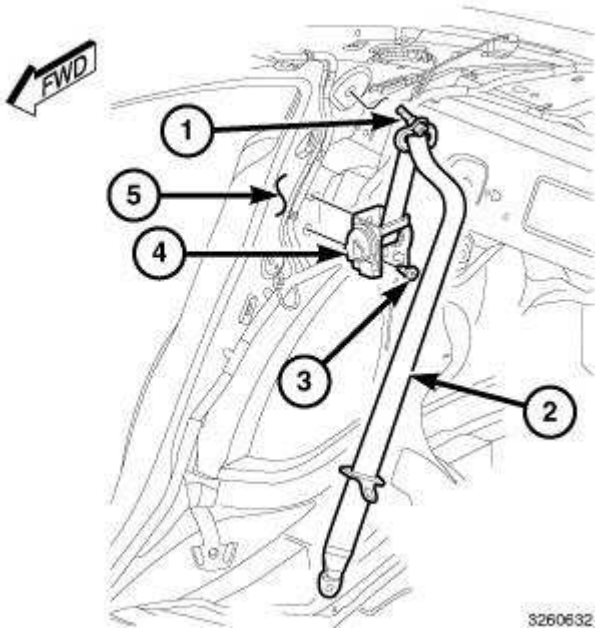


Fig. 65: Seat Belt Webbing, Screw, Seat Belt, Upper C-pillar & Retractor
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear outboard seat belt (2) and retractor (4) to the inner C-pillar (5) as a unit.
2. Engage the T-tab on the retractor bracket into the T-slot in the inner C-pillar.
3. Install and tighten the screw (3) that secures the retractor to the inner C-pillar. Tighten the screw to 32 N.m (24 ft. lbs.).
4. Position the seat belt turning loop to the inner C-pillar. Be certain the seat belt webbing between the retractor and the turning loop is not twisted.
5. Install and tighten the screw (1) that secures the seat belt turning loop to the inner C-pillar. Tighten the screw to 32 N.m (24 ft. lbs.).

6. Insert the seat belt webbing and lower anchor through the seat belt opening in the upper C-pillar trim.
7. Reinstall the trim onto the upper inner C-pillar. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION** .

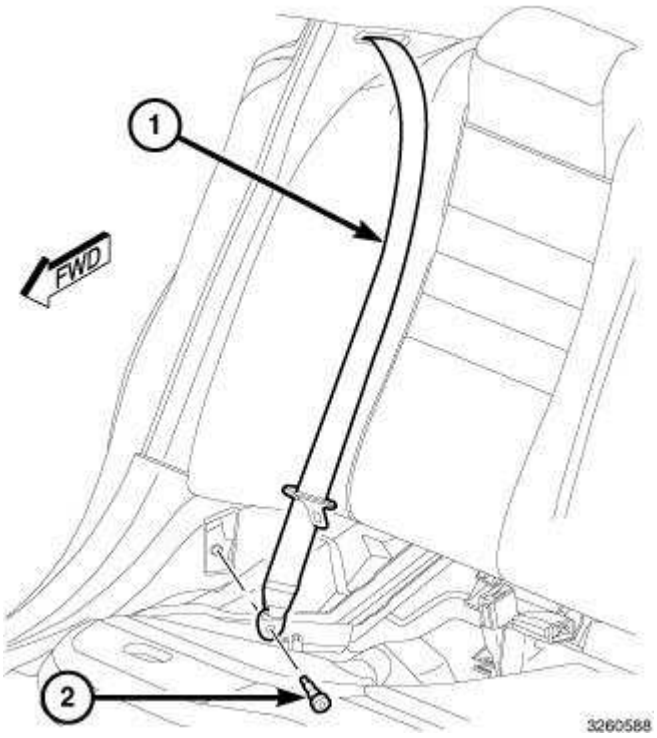


Fig. 66: Screw & Rear Outboard Seat Belt
Courtesy of CHRYSLER GROUP, LLC

8. Position the rear outboard seat belt (1) lower anchor to the lower inner C-pillar. Be certain the seat belt webbing between the turning loop and the lower anchor is not twisted.
9. Install and tighten the screw (2) that secures the seat belt lower anchor to the lower inner C-pillar. Tighten the screw to 45 N.m (33 ft. lbs.).
10. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION** .
11. Reconnect the battery negative cable.

SENSOR, IMPACT

DESCRIPTION

ELECTRONIC PEDESTRIAN PROTECTION

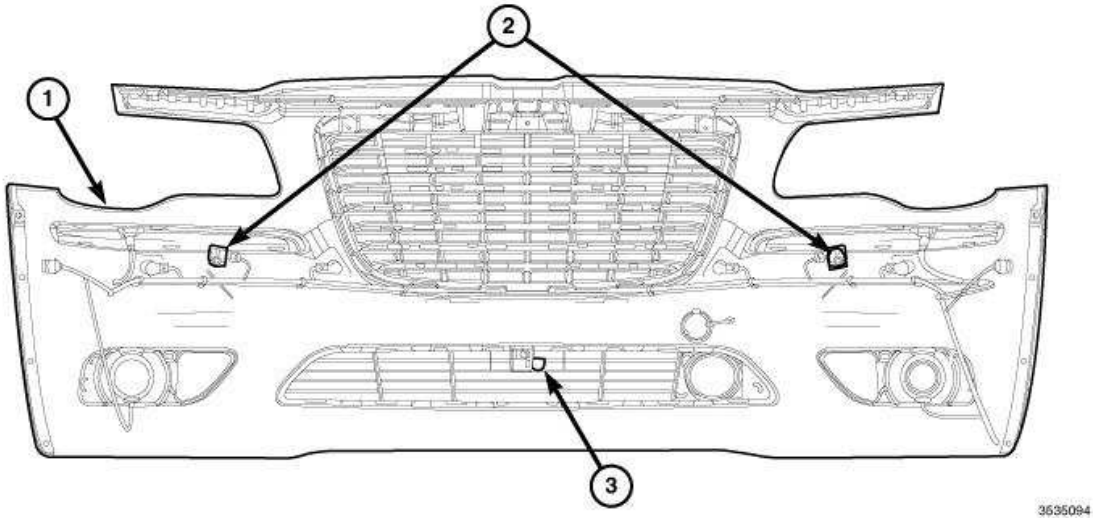


Fig. 67: Electronic Pedestrian Protection (EPP) Impact Sensors & Front Fascia
Courtesy of CHRYSLER GROUP, LLC

Electronic Pedestrian Protection (EPP) impact sensors (2 & 3) are found only in vehicles equipped with the EPP system (also known as the PedPro or Active Hood System), which is available only in vehicles manufactured for certain export markets. These sensors are mounted at the front of the vehicle to provide an additional logic input for use by the Occupant Restraint Controller (ORC) to control the pyrotechnic EPP active hood hinge actuators located on each hinge at the rear corners of the hood panel.

The EPP impact sensors are satellite acceleration-type sensors that are mounted to the back of the front fascia (1) in the front bumper area of the vehicle. The two outboard sensors are each secured by a screw to a U-nut within dedicated molded brackets integral to the back of the front fascia above the front bumper support beam. The center sensor is secured by a screw to a U-nut within a molded dedicated bracket integral to the back of the front fascia below the front bumper support beam. The sensors and the front bumper support beam are concealed behind the front fascia.

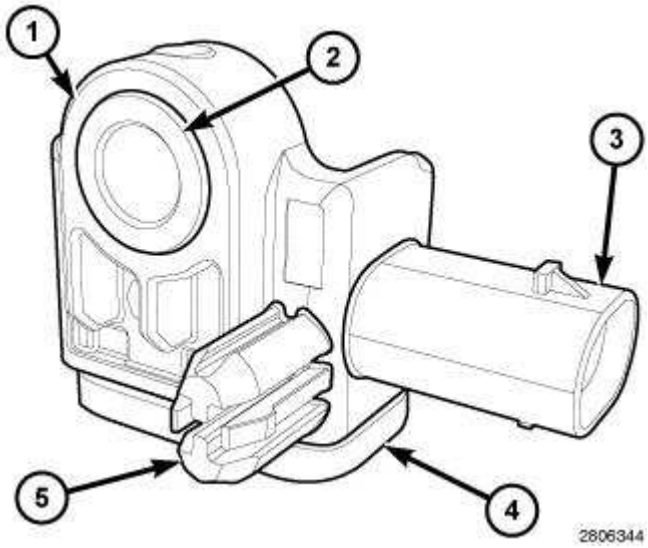


Fig. 68: Satellite Acceleration-Type Impact Sensors, Integral Connector Receptacle, Metal Sleeve & Molded Cover
Courtesy of CHRYSLER GROUP, LLC

Each sensor housing (1) has an integral connector receptacle (3), an integral locator pin with two latch features (5) and an integral mounting hole with a metal sleeve (2) to provide crush protection. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor which includes an electronic communication chip and an electronic acceleration sensor. Potting material fills the cavity and a molded cover (4) is laser welded over the cavity to seal and protect the internal electronic circuitry and components.

The EPP impact sensors are each connected to the vehicle electrical system through dedicated take outs and connectors of the headlamp and dash wire harness. These acceleration-type impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

OCCUPANT RESTRAINT

Remote or satellite impact sensors are mounted in various strategic locations of the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Sensors at the front of the vehicle provide an additional logic input for use by the Occupant Restraint Controller (ORC) to control the front airbags and the seat belt pretensioners. Sensors on each side of the vehicle provide an additional logic input for use by the ORC to control the side curtain airbags, seat airbags and the seat belt pretensioners. Two types of sensors are used in this vehicle. They are the acceleration-type and the pressure-type, which are described in further detail in the following paragraphs.

ACCELERATION TYPE

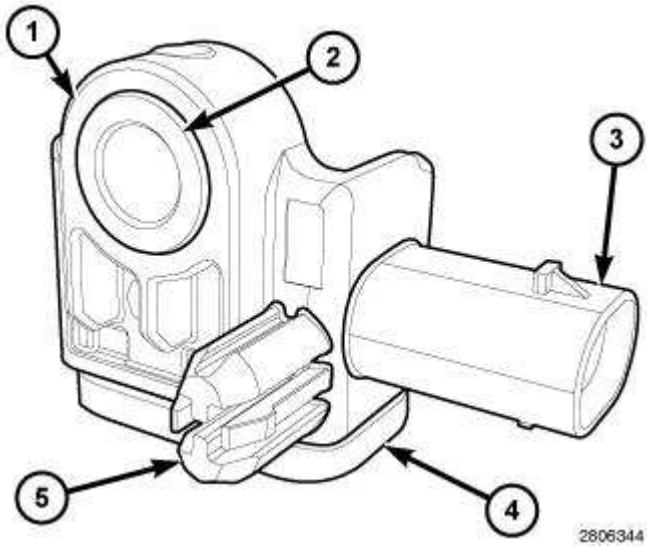


Fig. 69: Satellite Acceleration-Type Impact Sensors, Integral Connector Receptacle, Metal Sleeve & Molded Cover
Courtesy of CHRYSLER GROUP, LLC

Remote or satellite acceleration-type impact sensors (1) are mounted in various locations in the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Sensors at the front of the vehicle provide an additional logic input for use by the ORC to control the front airbags and the seat belt pretensioners. Sensors on each side of the vehicle provide an additional logic input for use by the ORC to control the side curtain airbags, the seat belt pretensioners and the seat (also known as pelvic and thorax) airbags.

Although the front and side acceleration-type impact sensors are similar in appearance and construction, they may not be interchangeable. The front impact sensors may monitor acceleration forces on a different axis than those monitored by the side impact sensors. Each sensor is secured with a single screw to its mounting location. The front sensors are located on the back of each vertical support member of the headlamp mounting cross member between the cooling module and the front lamp unit. A side sensor is located near the base of each inner B-pillar and near the belt line of each C-pillar and concealed behind the interior trim.

Each sensor housing has an integral connector receptacle (3), an integral locator pin with two latch features (5), and an integral mounting hole with a metal sleeve (2) to provide crush protection. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor which includes an electronic communication chip and an electronic acceleration sensor. Potting material fills the cavity and a molded cover (4) is laser welded over the cavity to seal and protect the internal electronic circuitry and components.

The front impact sensors are each connected to the vehicle electrical system through dedicated take outs and connectors of the headlamp and dash wire harness, while the side impact sensors are connected through dedicated take outs and connectors of the body wire harness.

The acceleration-type impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

PRESSURE TYPE

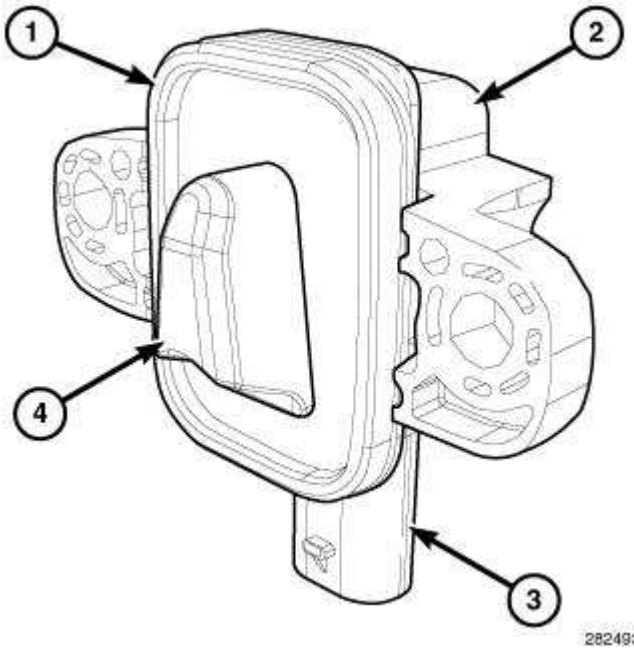


Fig. 70: Sensors, Resilient Gasket, Connector Receptacle & Water Shield
Courtesy of CHRYSLER GROUP, LLC

Two pressure-type front door side impact sensors (2) are used on this vehicle, one each for the left and right sides of the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Each side sensor is secured with two screws and is sealed by a resilient gasket (1) to the front door hardware module carrier on the front door inner panel. The sensors are concealed behind the front door trim panel within the passenger compartment.

The right and left front door side impact sensors are identical in construction and calibration. The impact sensor housing has an integral connector receptacle (3), two integral mounting tabs, and an integral hood-like water shield (4). The water shield extends through a hole in the front door module carrier into the interior of the door cavity and protects the sensor orifice from contamination. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor, which includes an electronic communication chip and the pressure sensor.

The housing cavity is filled with a potting material to seal and protect the internal electronic circuitry and components. A label on the sensor has a directional arrow and the word **down** imprinted upon it to provide verification of the correct sensor orientation in the vehicle. The pressure-type side impact sensors are each connected to the vehicle electrical system through a dedicated take out and connector of the front door wire harness.

These pressure-type front door side impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

OPERATION

ELECTRONIC PEDESTRIAN PROTECTION

The acceleration-type Electronic Pedestrian Protection (EPP) impact sensors are electronic accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microprocessor in the Occupant Restraint Controller (ORC).

The ORC microprocessor continuously monitors all of the EPP system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) then sends electronic messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to control the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through the dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the voltage in the sensor plus circuit.

The hard wired circuits between the acceleration-type EPP impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls or communication between other modules and devices that provide features of the EPP system. The most reliable, efficient, and accurate means to diagnose the impact sensors or the electronic controls and communication related to acceleration-type EPP impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

OCCUPANT RESTRAINT

ACCELERATION-TYPE

The acceleration-type impact sensors are electronic accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microprocessor in the Occupant Restraint Controller (ORC).

The ORC microprocessor continuously monitors all of the passive restraint system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) and controls the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the voltage in the sensor plus circuit.

The hard wired circuits between the impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls or communication between other modules and devices that provide some features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the acceleration-type impact sensors or the electronic controls and communication related to impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PRESSURE-TYPE

The pressure-type front door side impact sensors recognize a side impact in the front door area by monitoring changes in pressure within the front door cavity. A sudden pressure wave is created as the door collapses during an impact event. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microprocessor in the Occupant Restraint Controller (ORC).

The ORC microprocessor continuously monitors all of the passive restraint system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) and controls the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the current in the sensor plus circuit.

The hard wired circuits between the pressure-type front door side impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls or communication between other modules and devices that provide features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the pressure-type impact sensors or the electronic controls and communication related to impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

ELECTRONIC PEDESTRIAN PROTECTION

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Electronic Pedestrian Protection (EPP) system impact sensor, as it can damage the impact sensor or affect its calibration. The EPP impact sensor enables the system to deploy the EPP system active hood hinge actuators. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper EPP active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged

Electronic Pedestrian Protection (EPP) system impact sensor. Whether the EPP system has been deployed or the vehicle has had a front end collision without EPP system deployment, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.

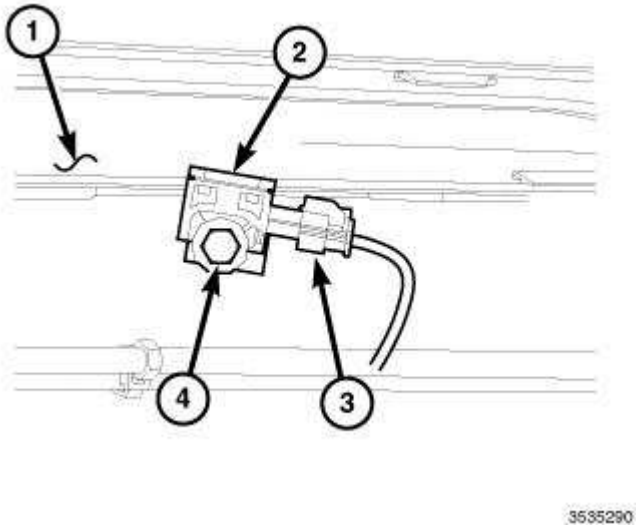


Fig. 71: Outboard Sensors
Courtesy of CHRYSLER GROUP, LLC

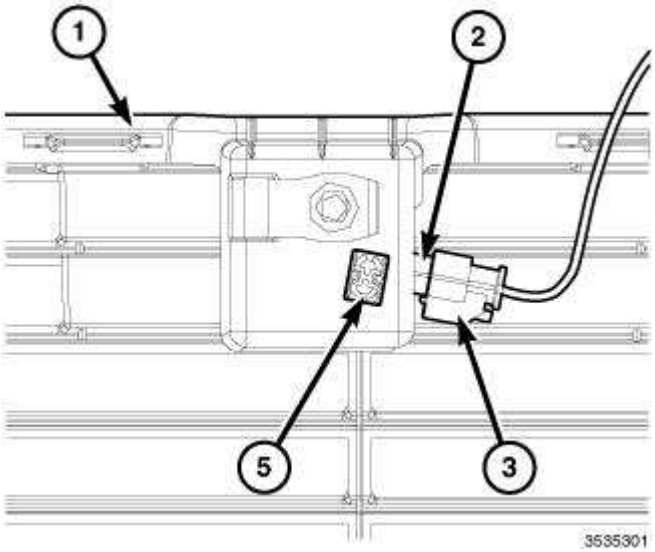


Fig. 72: Center Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the front fascia (1) from the vehicle. Refer to **FASCIA, FRONT, REMOVAL** .
3. Disconnect the front fascia wire harness connector (3) from the Electronic Pedestrian Protection

(EPP) center or outboard impact sensor (2) connector receptacle.

4. Remove the screw (4) that secures the EPP impact sensor to the U-nut within the molded bracket integral to the back of the fascia.
5. Disengage the latch features of the integral locator pin (5) on the EPP impact sensor from the locator hole in the fascia bracket.
6. Remove the EPP impact sensor from the front fascia.

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the front impact sensor, as it can damage the impact sensor or affect its calibration. The front impact sensor enables the system to deploy the front Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper front SRS component deployment.

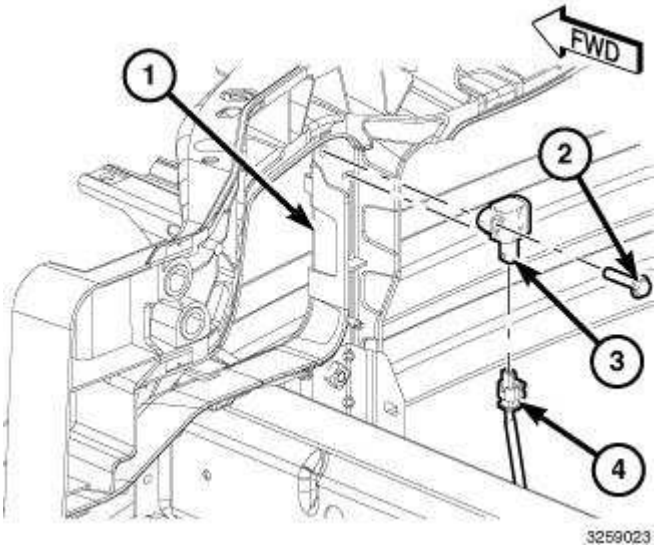


Fig. 73: Front End Module (FEM) Structural Support, Wire Harness Connector, Screw & Left Front Impact Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front and the side impact sensors are NOT interchangeable.

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. For the left hand side only, remove the fastener that secures the engine air cleaner assembly to the Front End Module (FEM) structural support (1) and move the air cleaner assembly far enough to access the impact sensor connector and fastener on the back of the vertical support member between the cooling module and the front lamp unit opening.
3. Disconnect the headlamp and dash wire harness connector (4) from the right or left front impact sensor (3) connector receptacle.
4. Remove the screw (2) that secures the sensor to the back of the FEM vertical support member.
5. Disengage the locating pin integral to the sensor from the locating hole in the FEM vertical support member.
6. Remove the right or left front impact sensor from the vehicle.

SIDE - B-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

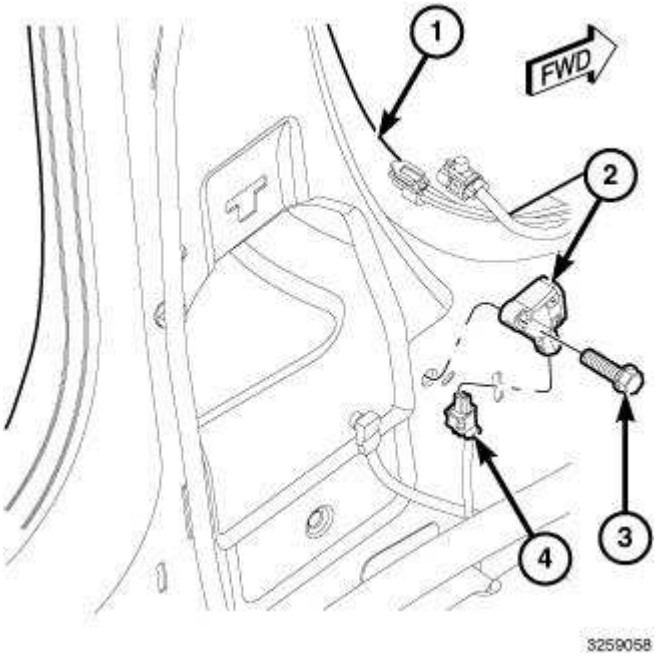


Fig. 74: Lower B-pillar, Body Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Adjust the driver or passenger side front seat to its most forward position for easiest access to the B-pillar trim.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the trim from the inside of the lower B-pillar (1). Refer to **PANEL, B-PILLAR TRIM, REMOVAL** .
4. Disconnect the body wire harness connector (4) from the side impact sensor (2) connector receptacle.
5. Remove the screw (3) that secures the sensor to the lower B-pillar.
6. Gently pry the sensor away from the inner B-pillar far enough to disengage the latch features of the locator pin from the locator hole.
7. Remove the sensor from the inner B-pillar.

SIDE - C-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

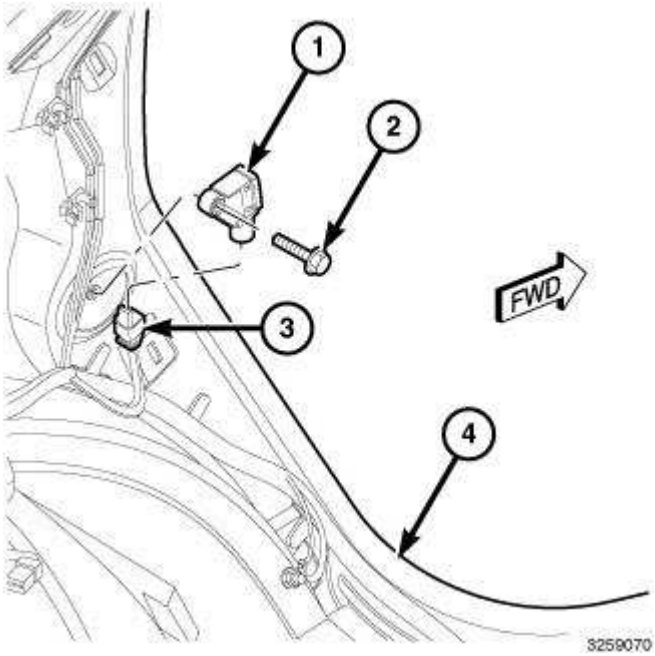


Fig. 75: Lower C-pillar, Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the trim from the inside of the lower C-pillar (4). Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .
3. Disconnect the body wire harness connector (3) from the side impact sensor (1) connector receptacle.
4. Remove the screw (2) that secures the sensor to the inner C-pillar.
5. Gently pry the sensor away from the inner C-pillar far enough to disengage the latch features of the locator pin from the locator hole.
6. Remove the sensor from the inner C-pillar.

SIDE - FRONT DOOR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or

instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

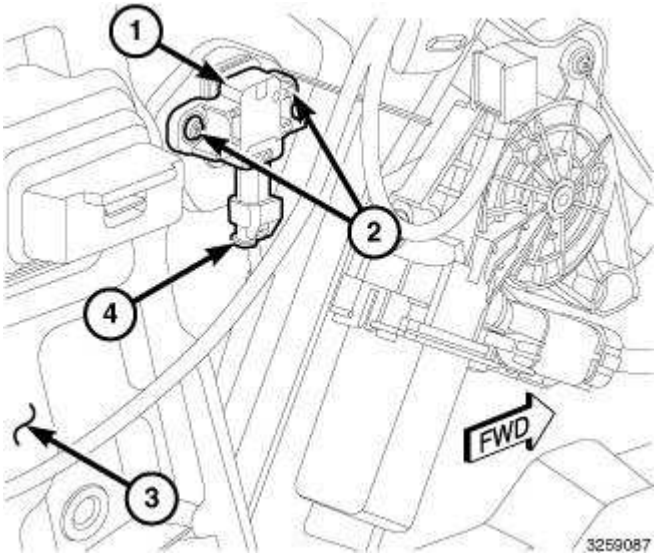


Fig. 76: Front Door Wire Harness Connector, Side Impact Sensor, Two Screws & Front Door Hardware Module Carrier Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the trim panel from the inside of the right or left front door. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Disconnect the front door wire harness connector (4) from the side impact sensor (1) connector receptacle.
4. Remove the two screws (2) that secure the side impact sensor to the front door hardware module carrier panel (3).
5. Remove the side impact sensor from the vehicle.

INSTALLATION

ELECTRONIC PEDESTRIAN PROTECTION

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Electronic Pedestrian Protection (EPP) system impact sensor, as it can damage the impact sensor or affect its calibration. The EPP impact sensor enables the system to deploy the EPP system active hood hinge actuators. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper EPP active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Electronic Pedestrian Protection (EPP) system impact sensor. Whether the EPP system has been deployed or the vehicle has had a front end collision without EPP system deployment, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.

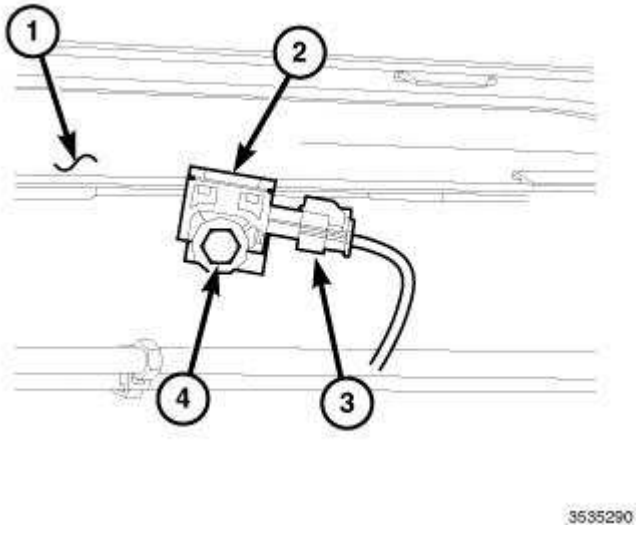


Fig. 77: Outboard Sensors
Courtesy of CHRYSLER GROUP, LLC

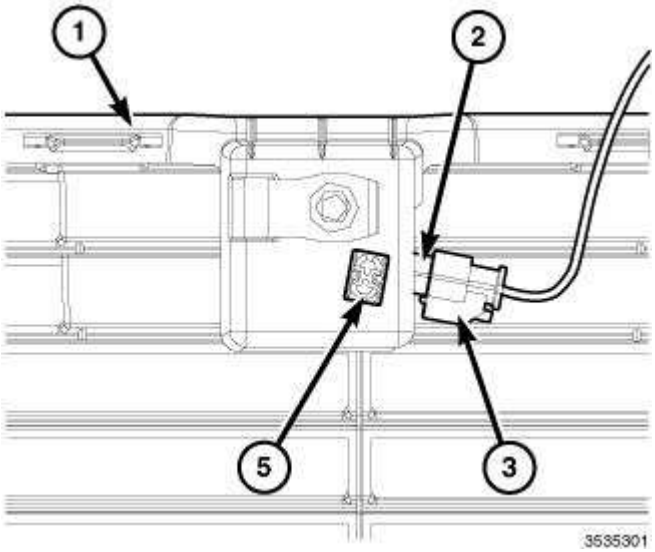


Fig. 78: Center Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Carefully inspect the U-nut for the center or outboard Electronic Pedestrian Protection (EPP) impact sensor to be certain it is good condition and is properly installed in the molded bracket integral to the back of the front fascia (1).
2. Carefully position the EPP impact sensor (2) to the molded bracket. Be certain that the latches of the anti-rotation pin on the back of the sensor are engaged in the clearance hole of the bracket.
3. Install and tighten the screw (4) that secures the sensor to the U-nut in the molded bracket. Tighten the screw to 8 N.m (70 in. lbs.).
4. Reconnect the front fascia wire harness connector (3) to the EPP impact sensor connector receptacle.
5. Reinstall the front fascia onto the vehicle. Refer to **FASCIA, FRONT, INSTALLATION** .
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any EPP system component. Refer to **STANDARD PROCEDURE**.

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the front impact

sensor, as it can damage the impact sensor or affect its calibration. The front impact sensor enables the system to deploy the front Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper front SRS component deployment.

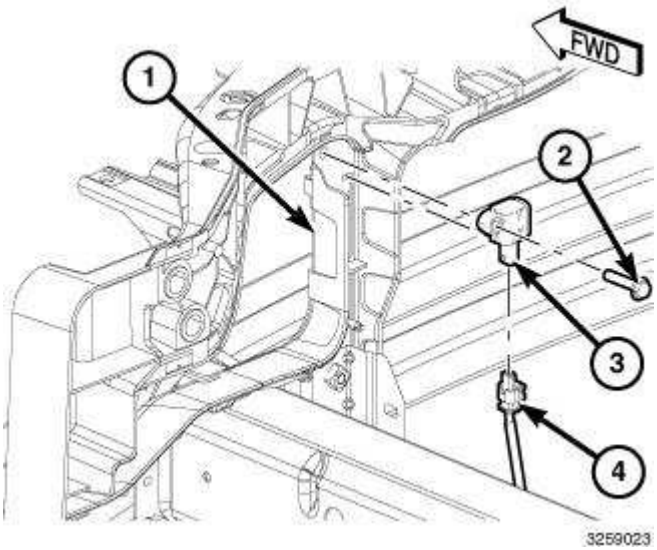


Fig. 79: Front End Module (FEM) Structural Support, Wire Harness Connector, Screw & Left Front Impact Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front and the side impact sensors are NOT interchangeable.

1. Position the right or left front impact sensor (3) to the back of the Front End Module (FEM) vertical support member (1) between the cooling module and the front lamp unit opening.
2. Be certain to engage the locating pin integral to the sensor into the locating hole in the FEM vertical support member.
3. Install and tighten the screw (2) that secures the sensor to the FEM vertical support member. Tighten the screw to 11 N.m (97 in. lbs.).
4. Reconnect the headlamp and dash wire harness connector (4) to the sensor connector receptacle.
5. For the left hand side only, position the engine air cleaner assembly to the FEM structural support and reinstall the fastener that secures the air cleaner assembly.
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SIDE - B-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable

the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

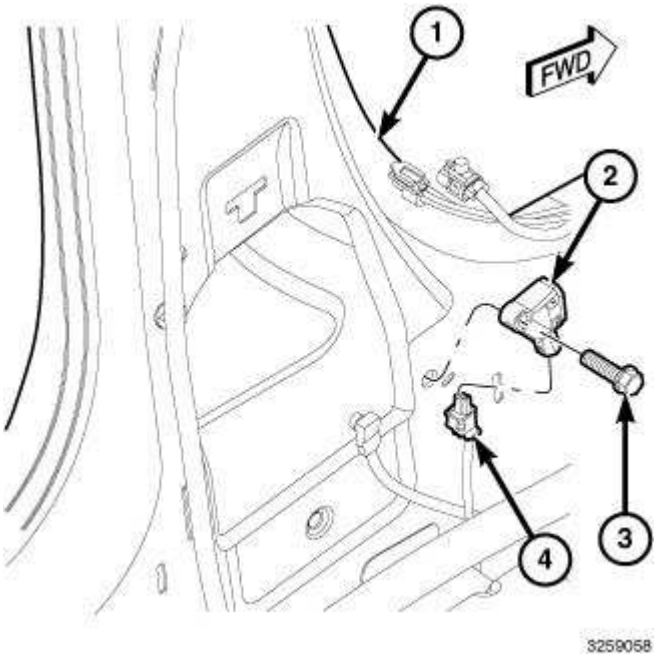


Fig. 80: Lower B-pillar, Body Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the side impact sensor (2) onto the inner B-pillar (1). Be certain that the locator pin on the sensor is fully engaged in the locator hole of the inner B-pillar.
2. Install and tighten the screw (3) that secures the sensor to the inner B-pillar. Tighten the screw to 11 N.m (97 in. lbs.).
3. Reconnect the body wire harness connector (4) to the sensor connector receptacle.
4. Reinstall the lower trim onto the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION** .
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS

component. Refer to **STANDARD PROCEDURE**.

SIDE - C-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

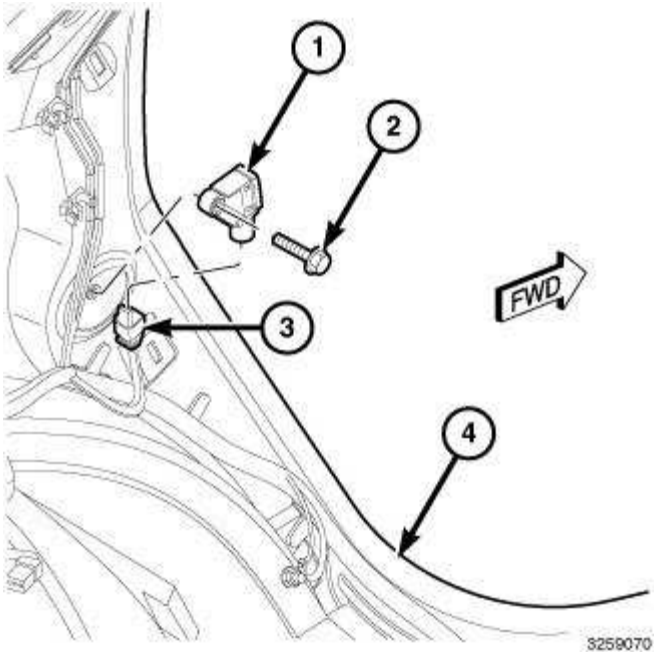


Fig. 81: Lower C-pillar, Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the side impact sensor (1) onto the inner C-pillar (4). Be certain that the locator pin on the sensor is fully engaged in the locator hole of the inner C-pillar.
2. Install and tighten the screw (2) that secures the sensor to the inner C-pillar. Tighten the screw to 11 N.m (97 in. lbs.).

3. Reconnect the body wire harness connector (3) to the sensor connector receptacle.
4. Reinstall the trim onto the inside of the C-pillar. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION** .
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SIDE - FRONT DOOR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

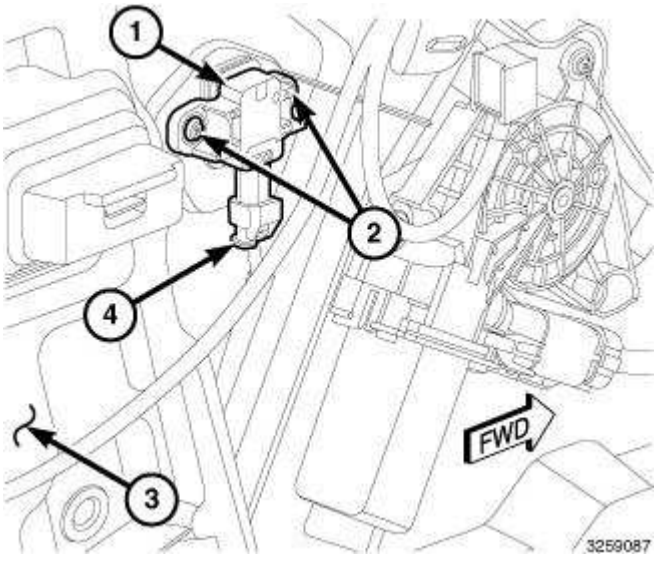


Fig. 82: Front Door Wire Harness Connector, Side Impact Sensor, Two Screws & Front Door Hardware Module Carrier Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Be certain that the gasket between the pressure-type side impact sensor and the front door hardware module carrier panel is in good condition and positioned on the back of the sensor. There MUST be a good seal between the sensor and the hardware module carrier panel for the sensor to operate properly. If the gasket is in poor condition, replace the sensor.**

1. Position the side impact sensor (1) to the right or left front door hardware module carrier panel (3). When the sensor is correctly positioned, the sensor connector receptacle will be pointed toward the bottom of the door.
2. Install and tighten the two screws (2) that secure the side impact sensor to the door hardware module carrier panel. Tighten the screws to 2.4 N.m (21 in. lbs.).
3. Reconnect the front door wire harness connector (4) to the sensor connector receptacle.
4. Reinstall the trim panel onto the inside of the right or left front door. Refer to **PANEL, DOOR TRIM, INSTALLATION** .
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SENSOR, OCCUPANT DETECTION

DESCRIPTION

DESCRIPTION

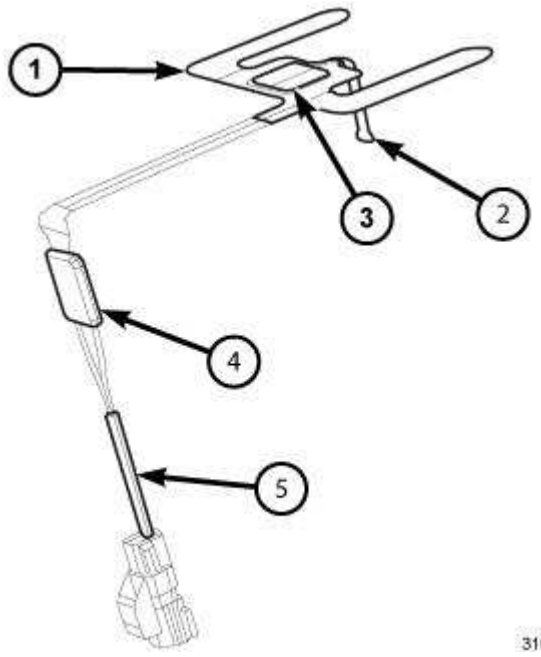


Fig. 83: Plastic Sensor Mat, Locator Tab, Adhesive Patch, Adhesive Block & Connector
Courtesy of CHRYSLER GROUP, LLC

An Occupant Detection Sensor (ODS) is located directly below the passenger side front seat cushion

trim cover. This sensor provides information to the Occupant Restraint Controller (ORC) used for control of the passenger belt alert feature.

The ODS consists of a flexible clear plastic sensor mat (1) containing several resistive membrane, force sensing resistor cells that is secured by either a locator tab (2) and an adhesive patch (3) or by just the adhesive patch to the top surface of the seat cushion foam. The locator tab is still present, but is not used on ventilated seat applications. The adhesive patches on either ODS are a one time only material and cannot be reactivated or reused if removed.

A short, two-conductor pigtail wire and connector (5) connect the sensor to the vehicle electrical system through a dedicated take out and connector of the seat wire harness. A hot melt adhesive block (4) encapsulates and protects the connections between the electrical conductors in the tail of the sensor mat and the pigtail wires as well as a diagnostic resistor.

The ODS cannot be adjusted or repaired, and must be replaced if damaged or ineffective.

OPERATION

OPERATION

The Occupant Detection Sensor (ODS) acts as a simple switch to detect loads placed upon the passenger side front seat cushion. The sensor circuits are connected to and monitored by the Occupant Restraint Controller (ORC) whenever the ignition switch is in the ON position. The ORC uses an algorithm logic in monitoring the changing states of the sensor input to determine whether the seat cushion load is static or dynamic.

The ORC microprocessor continuously monitors all of the Supplemental Restraint System (SRS) electrical circuits to determine the system status and readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC). However, because the ODS input is only used for control of the passenger belt alert feature, which has no effect on SRS component features or functions, the airbag indicator is **NOT** illuminated in response to a detected ODS circuit fault.

The ODS receives source current and a clean ground through dedicated sensor plus and minus circuits from the ORC. The ORC then sends the appropriate sensor status information to the Body Control Module (BCM) (also known as the Common Body Controller/CBC), which uses this information as an additional logic input used for control of the seat belt indicator and the passenger belt alert feature in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC).

The hard wired circuits between the ODS and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ODS or the electronic controls and communication between other modules and devices that provide some features of the passenger belt alert feature. The most reliable, efficient, and accurate means to diagnose the ODS or the electronic controls and communication related to passenger belt alert feature operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

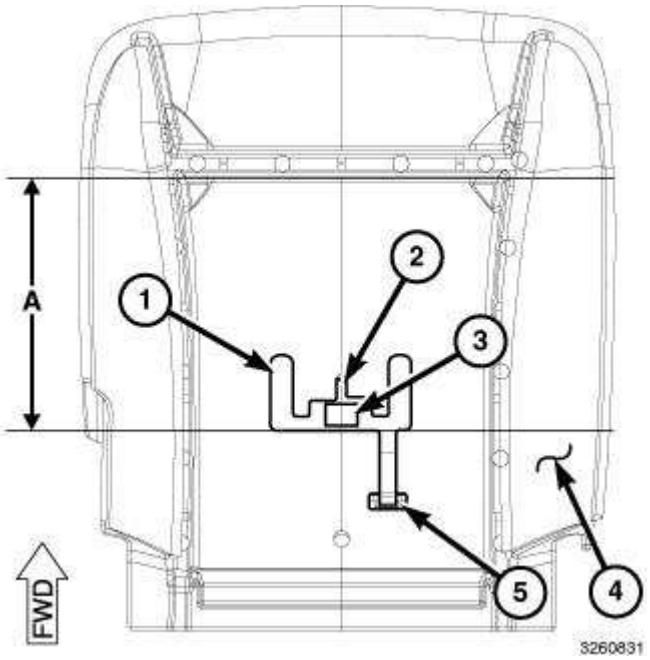


Fig. 84: Occupant Detection Sensor (ODS), Clearance Hole, Seat Cushion Foam, Locator Hole & Adhesive Patch
Courtesy of CHRYSLER GROUP, LLC

1. Position the passenger side front seat to its most forward position for easiest access to the front seat mounting hardware.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the passenger side front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Remove the trim from the front seat cushion foam and frame. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** .
5. If the vehicle is so equipped, remove the heater mat from the seat cushion foam. Refer to **PAD, HEATER, REMOVAL** .
6. Reach under the back of the front seat cushion frame to access and disconnect the Occupant Detection Sensor (ODS) (1) pigtail wire connector from the seat wire harness.
7. Disengage the ODS hot melt block and pigtail wire from the clearance hole (5) near the back of

the seat cushion foam (4).

8. Except on vehicles with the ventilated seat option, disengage the ODS locator tab from the locator hole (2) near the center of the seat cushion foam.
9. Disengage the adhesive patch (3) of the ODS from the top surface of the seat cushion foam.
10. Remove the ODS from the seat cushion.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: When handling a new Occupant Detection Sensor (ODS), it should never be bent, creased, torn, cut or abraded. The ODS should not be handled with or come into contact with hard or sharp-edged tools or objects. Do not allow the ODS to drop more than 2 meters (6.5 feet). Prior to installation, do not sit on, stand on or place boxes, tools or any other foreign object on the ODS. If the ODS adhesive patches become inadvertently adhered to any seat materials or foreign objects prior to proper positioning on the seat cushion, the ODS must be scrapped and replaced with a new unit. Do not modify the seat foam or trim materials of a seat that contains an ODS. Failure to observe these cautions may result in an inoperative ODS, or an ODS that provides inaccurate inputs to the Occupant Restraint Controller (ORC).

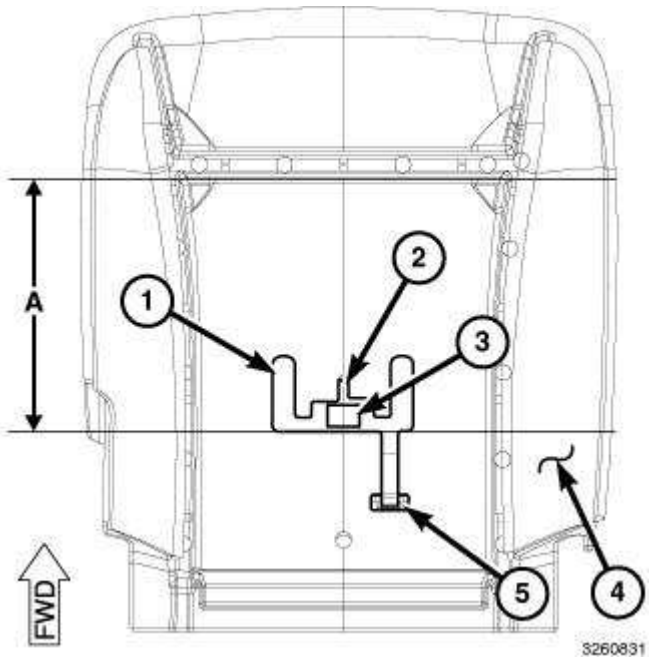


Fig. 85: Occupant Detection Sensor (ODS), Clearance Hole, Seat Cushion Foam, Locator Hole & Adhesive Patch
Courtesy of CHRYSLER GROUP, LLC

1. Except on vehicles equipped with the ventilated seat option, insert the locator tab of the Occupant Detection Sensor (ODS) mat (1) into the locator hole (2) near the center of the seat cushion foam (4) and push the tab all the way through the foam. On vehicles with the ventilated seat option, leave the locator tab flat on the seat cushion and pointed forward in the vehicle.
2. Position the sensor mat on the seat cushion with the two mat sensor cell branches aligned with the sides of the seat and the rear edge of the mat positioned 124 millimeters (4.88 inches) (Distance A) rearward from the back edge of the forward crimp channel in the seat cushion foam.

CAUTION: The adhesive used to secure the ODS to the seat is heat activated and requires that both the adhesive and the material it is applied to be ideally between 21° and 38° C (between 70° and 100° F). Application of the ODS to surfaces below 10° C (50° F) is not recommended as the adhesive becomes too firm to readily adhere. Do not touch or allow the adhesive patches to contact any foreign materials with the release paper removed. Do not attempt to add adhesive materials to the ODS.

3. Peel the release paper off of the adhesive patch (3) on the underside of the ODS mat.
4. Apply hand pressure (0.8 bar or 12 psi) over the adhesive patch of the ODS mat for at least four seconds to activate and adhere the adhesive to the seat cushion foam.
5. Route the ODS pigtail wires through the clearance hole (5) near the back of the seat cushion foam and insert the hot melt block into the recess.
6. Reach under the back of the front seat cushion frame to access, route and reconnect the ODS

pigtail wire and connector to the seat wire harness.

7. If the vehicle is so equipped, reinstall the heater mat onto the seat cushion foam. Refer to **PAD, HEATER, INSTALLATION** .
8. Reinstall the trim onto the front seat cushion foam and frame. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** .
9. Reinstall the passenger side front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
10. Reconnect the battery negative cable.

SENSOR, SEAT TRACK POSITION

DESCRIPTION

DESCRIPTION

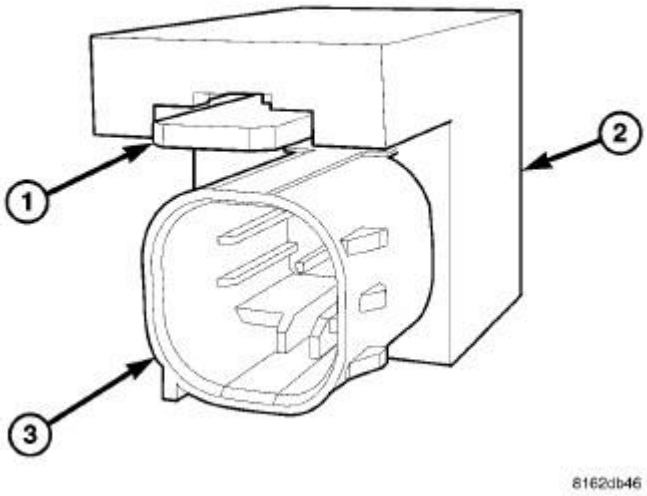


Fig. 86: Identifying Seat Track Position Sensor
Courtesy of CHRYSLER GROUP, LLC

The Seat Track Position Sensor (STPS) (2) is a Hall Effect-type sensor used on some vehicles. This sensor consists of a Hall Effect Integrated Circuit (IC) chip encased in potting material within a cavity of the molded plastic sensor housing.

The sensor housing has a mounting slot containing an integral latch feature (1) and slides and latches onto a stamped metal blade-type bracket located on the inboard side of one of the upper seat adjuster tracks near the rear of the driver side or passenger side front seat. A molded connector receptacle (3) integral to the sensor housing is connected to the vehicle electrical system through a connector and take out of the front seat wire harness beneath the front seat cushion frame.

The STPS cannot be adjusted or repaired and, if ineffective or damaged, the entire sensor must be

replaced.

OPERATION

OPERATION

The seat track position sensor is designed to provide a seat position data input to the Occupant Restraint Controller (ORC) indicating whether the driver or passenger side front seat is in a full forward or a not full forward position. The ORC uses this data as an additional logic input for use in determining the appropriate deployment force to be used when deploying the multistage driver or passenger airbag.

The seat track position sensor receives a nominal five volt supply from the ORC. The sensor communicates the seat position by modulating the voltage returned to the ORC on a sensor data circuit. The ORC also monitors the condition of the sensor circuits and will store a Diagnostic Trouble Code (DTC) for any fault that is detected. The ORC sends messages over the CAN data bus to control the illumination of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC).

The hard wired circuits between the seat track position sensor and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the seat track position sensor or the electronic controls and communication between other modules and devices that provide features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the seat track position sensor or the electronic controls and communication related to seat track position sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

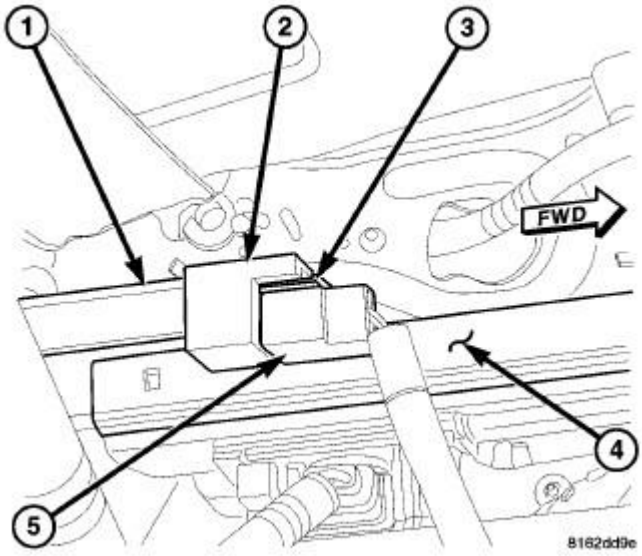


Fig. 87: Seat Track Position Sensor On Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Reach under the rear edge of the front seat cushion to access the seat track position sensor (2) on a bracket (1) located on the inboard side near the rear of one of the upper seat tracks (4).
3. Using a small screwdriver, hold the latch feature (3) depressed while sliding the connector end of the sensor off of the bracket.
4. Disconnect the seat wire harness connector (5) from the sensor connector receptacle.
5. Remove the sensor from under the front seat.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

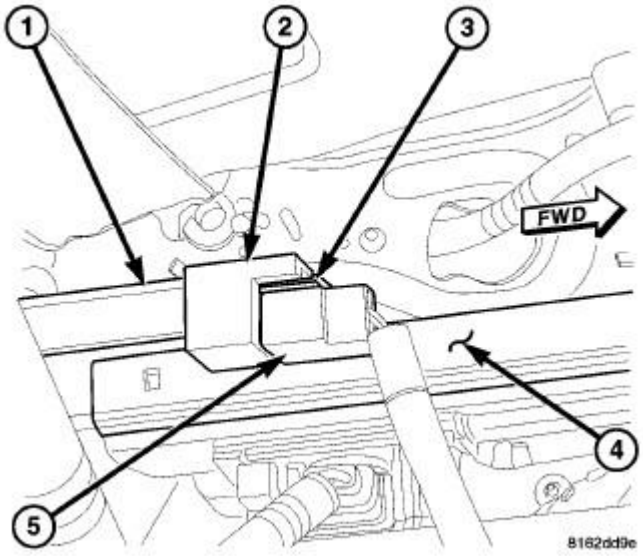


Fig. 88: Seat Track Position Sensor On Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Reach under the rear edge of the front seat cushion to reconnect the seat wire harness connector (5) to the seat track position sensor (2) connector receptacle. Be certain that the latch on the connector is fully engaged.
2. Align the open end of the sensor mounting slot to the blade of the sensor bracket (1) located on the inboard side near the rear of one of the upper seat tracks (4).
3. Push the sensor firmly onto the bracket until the latch feature (3) snaps into place with an audible click.
4. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SWITCH, SEAT BELT

DESCRIPTION

DESCRIPTION

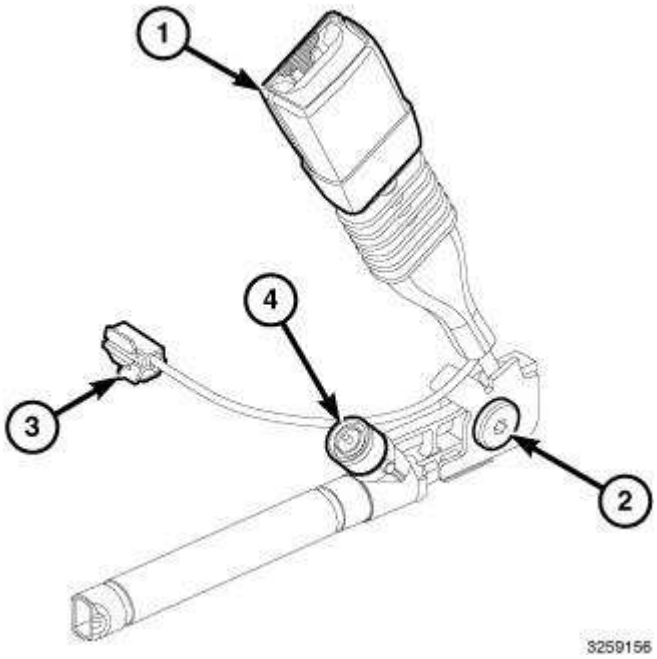


Fig. 89: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

The driver and passenger side front seat belt switches for this vehicle are actually Hall Effect-type sensors. These sensors consist of a fixed-position, Hall Effect Integrated Circuit (IC) chip and a small permanent magnet that is integral to each front seat belt buckle (1). The front seat belt buckles are located on a molded plastic scabbard and secured by a screw (2) to the inboard side of each front seat cushion frame so that the buckles travel with the seat.

The front seat belt switches are connected to the vehicle electrical system through a two-lead pigtail wire and connector (3) on the front seat belt buckle-half, which is connected to a wire harness connector and take out of the seat wire harness. A one kilohm diagnostic resistor is connected in parallel with the IC where the two pigtail wire leads connect to the IC pins.

The seat belt switches cannot be adjusted or repaired and, if ineffective or damaged, the entire front seat belt buckle-half unit must be replaced.

OPERATION

OPERATION

The front seat belt switches are designed to control a hard wired sense input to the Occupant Restraint Controller (ORC). A spring-loaded slide with a small window-like opening is integral to the buckle latch mechanism. When a seat belt tip-half is inserted and latched into the seat belt buckle, the slide is pushed downward and the window of the slide exposes the Hall Effect Integrated Circuit (IC) chip within the buckle. The field of the permanent magnet induces a current within the chip. The chip provides this induced current as an output to the ORC. When the seat belt is unbuckled, the spring-loaded slide moves upward and shields the IC from the field of the permanent magnet, causing

the output current from the seat belt switch to be reduced.

The seat belt switches receive a supply of current from the ORC, and the ORC senses the status of the front seat belt switches through its connection to the seat wire harness. The ORC provides electronic **seat belt switch status** messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) over the Controller Area Network (CAN) data bus. The IC uses these messages as an additional logic input for control of the seat belt indicator. The ORC monitors the condition of the seat belt switch circuits and will store a Diagnostic Trouble Code (DTC) for any fault that is detected.

The hard wired circuits between the seat belt switches and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the switches or the electronic controls or communication between other modules and devices that provide some features of the seat belt reminder system. The most reliable, efficient, and accurate means to diagnose the seat belt switches or the electronic controls and communication related to seat belt switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

TENSIONER, SEAT BELT

DESCRIPTION

DESCRIPTION

In vehicles manufactured for domestic markets, the front seat belt incorporates dual tensioners: one integral to the retractor, and one integral to the buckle.

RETRACTOR TENSIONER

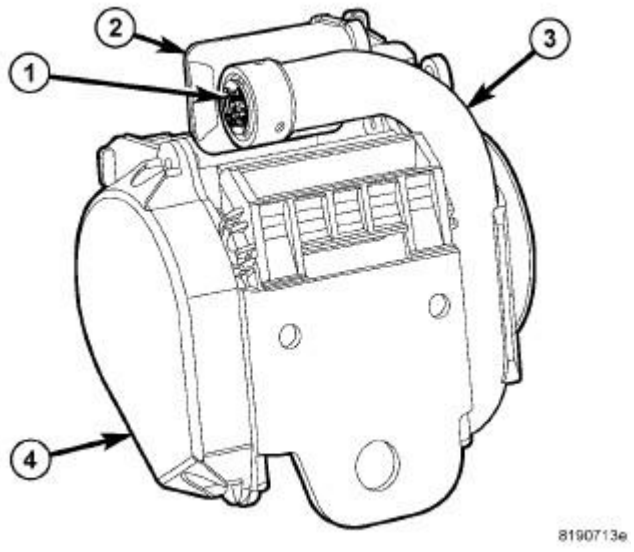


Fig. 90: Seat Belt Tensioner
Courtesy of CHRYSLER GROUP, LLC

Seat belt retractor tensioners supplement the dual front airbag system for all versions of this vehicle. These tensioners are integral to the front seat belt and retractor units (4), which are secured to the inner B-pillar on the right and left sides of the vehicle. The retractor is concealed beneath the molded plastic inner B-pillar trim. The seat belt tensioner consists primarily of a sprocket/pinion, a steel tube (3), a cast metal housing, numerous steel balls, a stamped metal ball trap (2), a torsion bar and a small pyrotechnically activated gas generator with a connector receptacle (1).

All of these components are located on one side of the retractor spool on the outside of the retractor housing except for the torsion bar, which serves as the spindle upon which the retractor spool rides. The seat belt tensioners are controlled by the Occupant Restraint Controller (ORC) and are connected to the vehicle electrical system through a dedicated take outs of the body wire harness by keyed and latching yellow molded plastic connector insulator to ensure a secure connection.

The retractor tensioners cannot be repaired and, if ineffective or damaged, the entire front seat belt and retractor unit must be replaced. If the front airbags have been deployed, the seat belt tensioners have also been deployed. The seat belt tensioners are not intended for reuse and must be replaced following any front airbag deployment. A growling or grinding sound while attempting to operate the seat belt retractor is a sure indication that the seat belt tensioner has been deployed and requires replacement. Refer to **RETRACTOR, SEAT BELT, REMOVAL**.

BUCKLE TENSIONER

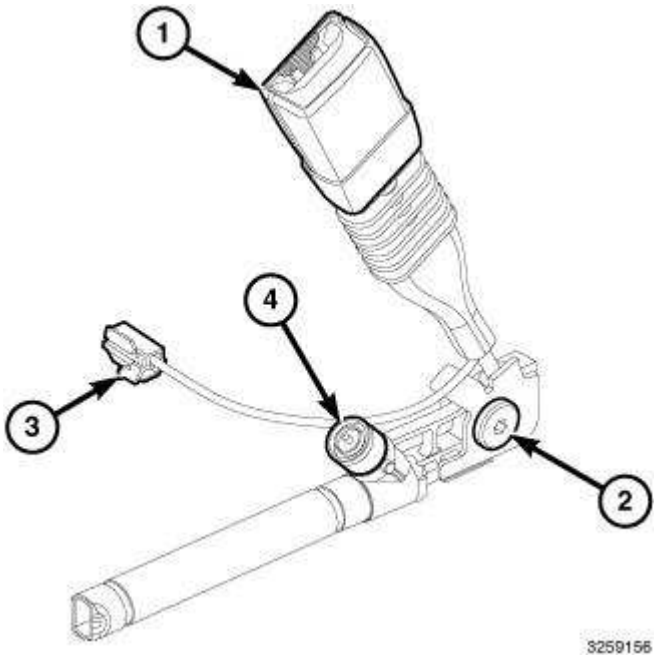


Fig. 91: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

A seat belt buckle tensioner supplements the dual front airbags for domestic market versions of this vehicle. This tensioner is integral to the front seat belt buckle unit, which is secured by a large screw to the outside of the inboard seat cushion frame of the front seat. The buckle tensioner consists

primarily of a buckle (1), a molded plastic scabbard, a cable and piston, a cable guide and bracket, a metal cylinder tube and a small pyrotechnically activated gas generator (4).

The buckle tensioner is controlled by the Occupant Restraint Controller (ORC) and is connected to the vehicle electrical system through a dedicated take out of the seat wire harness by a keyed and latching yellow molded plastic connector insulator to ensure a secure connection. The buckle tensioner has a single pigtail harness (3) for the integral seat belt switch.

The buckle tensioner cannot be repaired and, if ineffective or damaged, the entire front seat belt buckle unit must be replaced. If the front airbags have been deployed, the buckle tensioners have also been deployed. The buckle tensioners are not intended for reuse and must be replaced following any front airbag deployment. Refer to **BUCKLE, SEAT BELT, REMOVAL**.

OPERATION

OPERATION

The seat belt tensioners are deployed in conjunction with the dual front airbags by a signal generated by the Occupant Restraint Controller (ORC) through the driver or passenger seat belt tensioner line 1 and line 2 (or squib) circuits. When the ORC sends the proper electrical signal to the tensioners, the electrical energy generates enough heat to initiate a small pyrotechnic gas generator.

On the retractor tensioner, the gas generator is installed in one end of a steel tube that contains numerous steel balls. As the gas expands, it pushes the steel balls through the tube into a cast metal housing, where a ball guide directs the balls into engagement with the teeth of a sprocket that is geared to one end of the retractor spool. As the balls drive past the sprocket, the sprocket turns and drives the seat belt retractor spool causing the slack to be removed from the front seat belts. The ball trap captures the balls as they leave the sprocket and are expelled from the housing.

On the buckle tensioner, the gas generator is installed in one end of the tubular metal piston housing, which contains a piston secured to one end of a cable. The cable is routed around an integral guide to the buckle, which is secured to the opposite end of the cable. As the gas expands, it pushes the piston and the cable through the tube and pulls the buckle downward, causing the slack to be removed from the front seat belt.

Removing excess slack from the front seat belts not only keeps the occupants properly positioned for an airbag deployment following a frontal impact of the vehicle, but also helps to reduce injuries that the occupants of the front seats might experience in these situations as a result of harmful contact with the steering wheel, steering column, instrument panel or windshield. The seat belt retractor also has a torsion bar mechanism that is designed to deform in order to control the loading being applied to the occupants by the seat belts during a frontal impact, further reducing the potential for occupant injuries.

The ORC monitors the condition of the seat belt tensioners through circuit resistance, and will illuminate the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and store a Diagnostic Trouble Code (DTC) for any fault that is detected. Proper diagnosis of the seat belt tensioner gas generator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate

Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

BRAKES

Antilock Brake System (ABS) - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

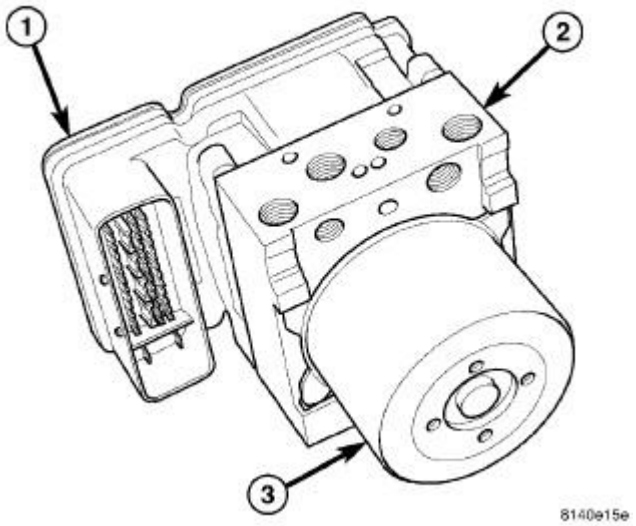


Fig. 1: Integrated Control Unit
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

This vehicle uses an electronic brake control system designated MK25e. This system includes ABS (Antilock Brake System), TCS (Traction Control System), BAS (Brake Assist System), EVBP (Electronic Variable Brake Proportioning) and ESC (Electronic Stability Control). All of these systems work together to enhance vehicle stability and control in various driving conditions and are commonly referred to as ESC.

This system uses components of the base brake system, but also features the following components:

- Integrated Control Unit (ICU) - Includes Hydraulic Control Unit (HCU) (2) and Antilock Brake Module (ABM) (1)
- Wheel Speed Sensors (WSS) - Four sensors (one at each wheel)
- Dynamics Sensor - Includes a yaw rate sensor and a lateral accelerometer.
- Steering Angle Sensor (SAS) - The SAS is part of the Steering Column Control Module

(SCCM).

- Brake Pressure Sensor - The brake pressure sensor is located in the HCU and is not serviceable separate from the HCU.

ABS

The purpose of the Antilock Brake System (ABS) is to prevent wheel lockup under braking conditions on virtually any type of road surface. Antilock braking is desirable because a vehicle that is stopped without locking the wheels retains directional stability and some steering capability. This allows the driver to retain greater control of the vehicle during braking.

ALL-SPEED TRACTION CONTROL

The traction control system (TCS) is an all-speed traction control. All-Speed Traction Control enhances mobility and prevents wheel slip when accelerating on slippery surfaces. It also provides a measure of directional stability control. Using the wheel-speed sensors, it can detect excessive yaw and help keep the car on the intended course, as for instance, when accelerating around a curve.

With rear-wheel drive, All-Speed Traction Control is effective up to 85 mph (137 km/h); with AWD, All-Speed Traction Control is effective up to 45 mph (72 km/h), which is common among competitive AWD vehicles with traction control.

ELECTRONIC STABILITY CONTROL

The Electronic Stability Control (ESC) enhances control and stability of the vehicle under various driving conditions. ESC corrects for over/under steering of the vehicle by applying the brake of the appropriate wheel to assist in counteracting the over/under steer condition. Engine power may also be reduced to help the vehicle maintain the desired path. ESC uses sensors in the vehicle to determine the vehicle path intended by the driver and compares it to the actual path of the vehicle. When the actual path does not match the intended path, ESC applies the brake of the appropriate wheel to assist in counteracting the oversteer or understeer condition.

- Oversteer - When the vehicle is turning more that appropriate for the steering wheel position.
- Understeer - When the vehicle is turning less than appropriate for the steering wheel position.

The "ESC/TCS" indicator light located in the instrument cluster starts to flash as soon as the tires lose traction and the ESC system becomes active. The "ESC/TCS" indicator light also flashes when TCS is active.

The ESC can be turned off by using the ESC Off switch. When the ESC Off switch is depressed, it does not completely turn the system off. The ESC system shuts off engine management but retains brake activations for yaw control.

BRAKE ASSIST SYSTEM

The Brake Assist System (BAS) is designed to optimize the vehicle's braking capability during emergency braking maneuvers. The system detects an emergency braking situation by sensing the

rate and amount of brake application and then applies optimum pressure to the brakes. This can help reduce braking distances. The BAS complements the antilock brake system (ABS). Applying the brakes very quickly results in the best BAS assistance.

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Electronic Variable Brake Proportioning (EVBP) is used to balance front-to-rear braking in place of a traditional rear proportioning valve. The EVBP system uses the ABS system to control the slip of the rear wheels in partial braking range. The braking force of the rear wheels is controlled electronically by using the inlet and outlet valves located in the integrated control unit (ICU).

EVBP activation is invisible to the customer since there is no pump motor noise or brake pedal feedback.

OPERATION

OPERATION

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

ABS

There are a few performance characteristics of the Antilock Brake System (ABS) that may at first seem abnormal, but in fact are normal. These characteristics are described below.

NORMAL BRAKING

Under normal braking conditions, the ABS functions the same as a standard base brake system with a front/rear split master cylinder and conventional vacuum assist.

ABS BRAKING

ABS operation is available at all vehicle speeds above 3-5 mph. If a wheel locking tendency is detected during a brake application, the brake system enters the ABS mode. During ABS braking, hydraulic pressure in the four wheel circuits is modulated to prevent any wheel from locking. Each wheel circuit is designed with a set of electric solenoids to allow modulation. Wheel lockup may be perceived at the very end of an ABS stop and is considered normal.

During an ABS event, the integrated control unit (ICU) regulates hydraulic pressure at all four of the vehicle's wheels.

The hydraulic pressure at each front wheel is controlled independently (relative to the amount of slip at each wheel) in order to maximize the braking force generated by the front brakes. The rear wheels are controlled such that the hydraulic pressure at either rear wheel does not exceed that of the

highest slip rear wheel in order to maintain vehicle stability.

The system can build and release pressure at each wheel, depending on signals generated by the wheel speed sensors (WSS) at each wheel and received at the Antilock Brake Module (ABM).

NOISE AND BRAKE PEDAL FEEL

During ABS braking, some brake pedal movement may be felt. In addition, ABS braking will create ticking, popping, or groaning noises heard by the driver. This is normal and is due to pressurized fluid being transferred between the master cylinder and the brakes. If ABS operation occurs during hard braking, some pulsation may be felt in the vehicle body due to fore and aft movement of the suspension as brake pressures are modulated.

At the end of an ABS stop, ABS is turned off when the vehicle is slowed to a speed of 3-4 mph. There may be a slight brake pedal drop anytime that the ABS is deactivated, such as at the end of the stop when the vehicle speed is less than 3 mph or during an ABS stop where ABS is no longer required. These conditions exist when a vehicle is being stopped on a road surface with patches of ice, loose gravel, or sand on it. Also, stopping a vehicle on a bumpy road surface activates ABS because of the wheel hop caused by the bumps.

TIRE NOISE AND MARKS

Although the ABS system prevents complete wheel lockup, some wheel slip is desired in order to achieve optimum braking performance. Wheel slip is defined as follows: 0 percent slip means the wheel is rolling freely and 100 percent slip means the wheel is fully locked. During brake pressure modulation, wheel slip is allowed to reach up to 25-30 percent. This means that the wheel rolling velocity is 25-30 percent less than that of a free rolling wheel at a given vehicle speed. This slip may result in some tire chirping, depending on the road surface. This sound should not be interpreted as total wheel lockup.

Complete wheel lockup normally leaves black tire marks on dry pavement. The ABS will not leave dark black tire marks since the wheel never reaches a fully locked condition. However, tire marks may be noticeable as light patched marks.

START-UP AND DRIVE-OFF CYCLES

When the ignition is turned on, a popping sound and a slight brake pedal movement may be noticed. The ABS warning lamp will also be on for up to 5 seconds after the ignition is turned on.

When the vehicle is first driven off, a humming may be heard or felt by the driver at approximately 12-25 mph (20-40 km/h). All of these conditions are a normal function of ABS as the system is performing a diagnosis check.

PREMATURE ABS CYCLING

Symptoms of premature ABS cycling include: clicking sounds from the solenoid valves; pump/motor running; and pulsations in the brake pedal. Premature ABS cycling can occur at any braking rate of the vehicle and on any type of road surface. Neither the red BRAKE indicator lamp, nor the amber

ABS indicator lamp, illuminate and no faults are stored in the ABM.

Premature ABS cycling is a condition that needs to be correctly assessed when diagnosing problems with the antilock brake system. It may be necessary to use a scan tool to detect and verify premature ABS cycling.

Check the following common causes when diagnosing premature ABS cycling: damaged wheel bearings (causing tone wheel issues); damaged wheel bearing housings where wheel speed sensors mount; and loose wheel speed sensor mounting bolts.

After diagnosing the defective component, repair or replace it as required. When the component repair or replacement is completed, test drive the vehicle to verify that premature ABS cycling has been corrected.

ALL-SPEED TRACTION CONTROL

Traction control systems sense impending wheel spin based on a model of the rate of change of wheel speed under normal traction conditions. The All-Speed Traction Control uses signals from the same wheel speed sensors as ABS to determine when to apply the brakes to one or more wheels and when to reduce engine torque output using the electronic throttle control (ETC) to prevent wheel slip during acceleration. Throttle control makes the vehicle less reliant on brake application alone to maintain traction, increasing the operating speed range and more closely modulates speed, resulting in smoother operation. With All-Speed Traction Control reducing engine torque as well as applying the brakes, it is possible to achieve almost seamless torque application at the wheels.

If the wheel slip is severe enough to require throttle intervention, All-Speed Traction Control will reduce engine torque and sometimes upshift the transmission to avoid the condition. In milliseconds, All-Speed Traction Control interrogates the engine control system to determine the current torque output, determines how much the torque output the current conditions will allow, and signals this requirement to the engine control system, which reduces the torque by partially closing the throttle. With execution of the torque reduction, the brake system reduces brake pressure to make the transition smooth, while maintaining forward progress. By reducing engine power, braking effectiveness is maintained and the system can operate throughout the normal vehicle speed range. That is why the system is identified as providing "all-speed" traction control.

With AWD, where front-wheel slip can occur, the degree of throttle intervention is relatively less than with rear-wheel drive. The difference in speed capability and the degree of throttle intervention between rear-wheel drive and all-wheel drive is due to the fact that non-driven front wheels on a rear-wheel drive vehicle give the system an accurate vehicle speed reference on which to base responses. With AWD, the possibility that the front wheels may also be slipping makes appropriate corrective action more difficult to determine, thus limiting the effective speed range. Offsetting this is the fact that loss of traction is less likely with AWD because torque is transmitted through all four wheels to begin with. In actual driving situations on snow or ice, the rear-wheel drive and AWD systems respond in essentially the same way up to the 45 mph (72 km/h) limit of the AWD system.

ELECTRONIC STABILITY CONTROL

To determine whether the car is responding properly to cornering commands, ESC uses steering

wheel angle, yaw (turning) rate and lateral acceleration sensors (combined into Dynamics Sensor). Using signals from these sensors, in addition to individual wheel speed sensor signals, the system determines appropriate brake and throttle actions. Once initiated, ESC operates much like All-Speed Traction Control, except that the goal is directional stability. If the vehicle yaw response, or rate of turning, is inconsistent with the steering angle and vehicle speed indications, the ESC system applies the brakes and, if necessary closes the throttle, to restore control. This occurs whether the vehicle is turning too rapidly (oversteering) or not rapidly enough (understeering).

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Upon entry into EVBP the inlet valve for the rear brake circuit is switched ON so that the fluid supply from the master cylinder is shut off. In order to decrease the rear brake pressure, the outlet valve for the rear brake circuit is pulsed. This allows fluid to enter the low pressure accumulator (LPA) in the Hydraulic Control Unit (HCU) resulting in a drop in fluid pressure to the rear brakes. In order to increase the rear brake pressure, the outlet valve is switched off and the inlet valve is pulsed. This increases the pressure to the rear brakes. This back-and-forth process will continue until the required slip difference is obtained. At the end of EVBP braking (brakes released) the fluid in the LPA drains back to the master cylinder by switching on the electronic shuttle valve.

The EVBP will remain functional during many ABS fault modes. If both the red BRAKE and amber ABS warning indicators are illuminated, the EVBP may not be functioning.

STANDARD PROCEDURE

STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING

The base brake's hydraulic system must be bled anytime air enters the hydraulic system. The ABS must always be bled anytime it is suspected that the HCU has ingested air.

Brake systems with ABS must be bled as two independent braking systems. The non-ABS portion of the brake system with ABS is to be bled the same as any non-ABS system.

The ABS portion of the brake system must be bled separately. Use the following procedure to properly bleed the brake hydraulic system including the ABS.

NOTE: During the brake bleeding procedure, be sure the brake fluid level remains close to the FULL level in the master cylinder fluid reservoir. Check the fluid level periodically during the bleeding procedure and add Mopar® DOT 3 brake fluid as required.

BLEEDING

When bleeding the ABS system, the following bleeding sequence must be followed to insure complete and adequate bleeding.

1. Make sure all hydraulic fluid lines are installed and properly torqued.
2. Connect the scan tool to the diagnostics connector. The diagnostic connector is located under

the lower steering column cover to the left of the steering column.

3. Using the scan tool, check to make sure the ABM does not have any fault codes stored. If it does, clear them.

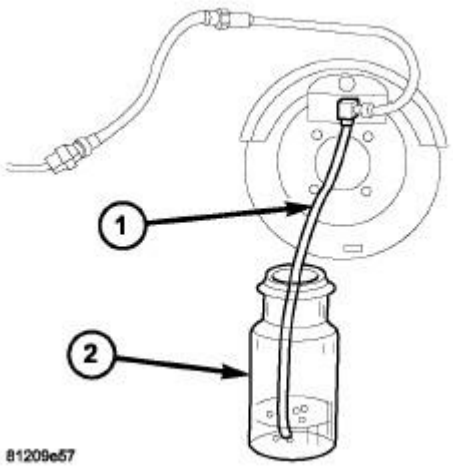


Fig. 2: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

WARNING: When bleeding the brake system wear safety glasses. A clear bleed tube (1) must be attached to the bleeder screws and submerged in a clear container filled part way with clean brake fluid (2). Direct the flow of brake fluid away from yourself and the painted surfaces of the vehicle. Brake fluid at high pressure may come out of the bleeder screws when opened.

NOTE: Pressure bleeding is recommended to bleed the base brake system to ensure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.

4. Bleed the base brake system. Refer to **STANDARD PROCEDURE** .
5. Using the scan tool, select ECU VIEW, followed by ABS MISCELLANEOUS FUNCTIONS to access bleeding. Follow the instructions displayed. When finished, disconnect the scan tool and proceed.
6. Bleed the base brake system a second time. Check brake fluid level in the reservoir periodically to prevent emptying, causing air to enter the hydraulic system.

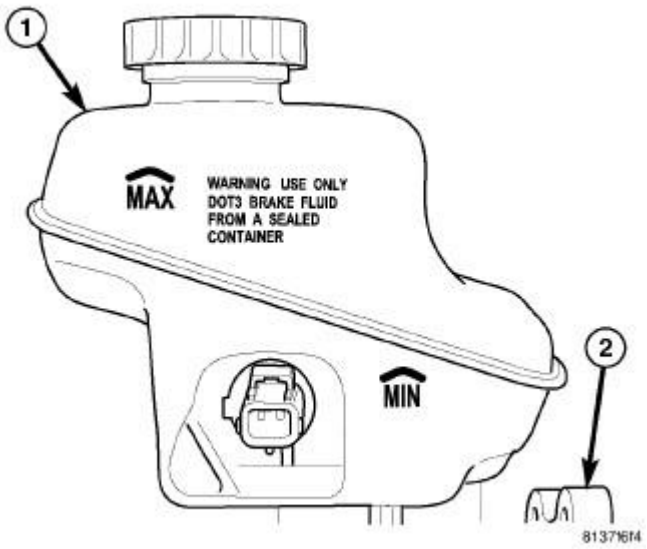


Fig. 3: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

7. Fill the master cylinder fluid reservoir (1) to the MAX level.
8. Test drive the vehicle to be sure the brakes are operating correctly and that the brake pedal does not feel spongy.

SPECIFICATIONS

TORQUE

For ABS fastener torque specifications, see Brake Fastener Torque. Refer to **SPECIFICATIONS** .

ELECTRICAL

SENSOR, DYNAMICS

DESCRIPTION

DESCRIPTION

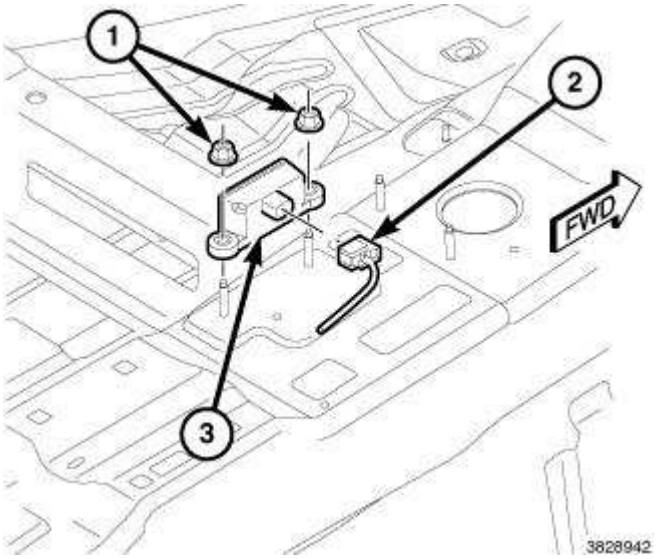


Fig. 4: Dynamics Sensor
Courtesy of CHRYSLER GROUP, LLC

The Yaw Rate and Lateral Acceleration Sensors are housed into one unit known as the Dynamics Sensor (3). The sensor is used to measure side-to-side (Lateral) motion and vehicle rotational sensing (how fast the vehicle is turning - Yaw).

Yaw and Lateral Acceleration Sensors cannot be serviced separately. The entire Dynamics Sensor must be replaced when necessary.

REMOVAL

REMOVAL

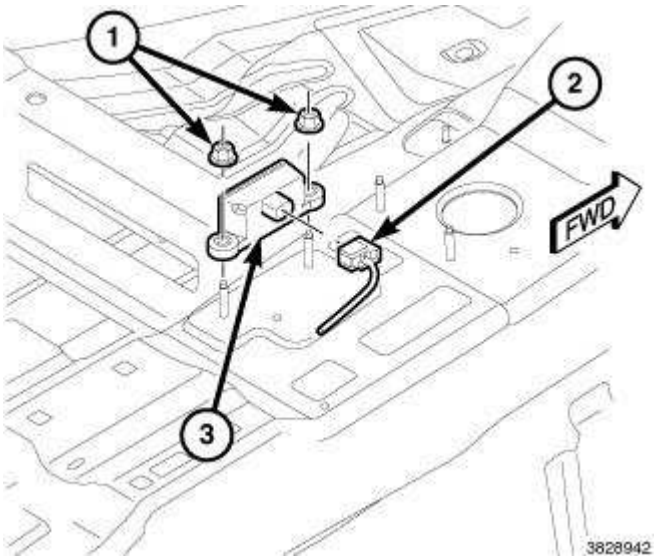


Fig. 5: Dynamics Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable from battery post.
2. Remove floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Disconnect wiring harness (2) connector at sensor (3).
4. Remove nuts (1) mounting sensor (3) to floor pan tunnel.
5. Remove dynamics sensor (3) from vehicle.

INSTALLATION

INSTALLATION

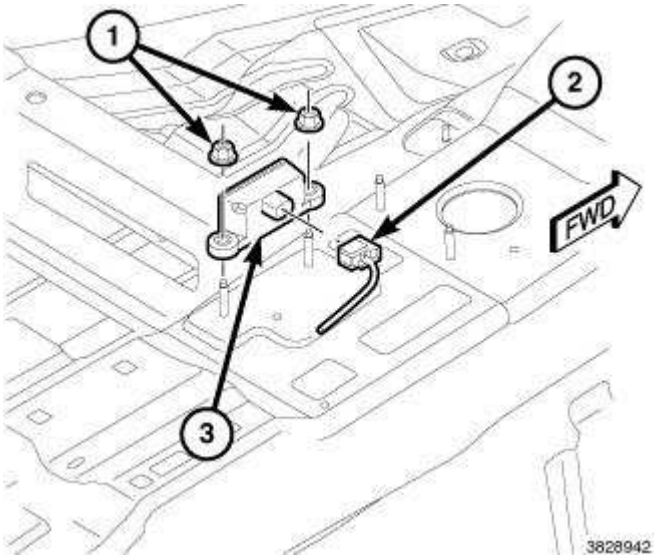


Fig. 6: Dynamics Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install dynamics sensor (3) over studs mounted to floor pan tunnel.
2. Install mounting nuts (1) and tighten to 7 N.m (62 in. lbs.).
3. Connect wiring harness (2) connector to sensor (3).
4. Install floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .
5. Connect battery negative cable to battery post. It is important that this is performed properly.
6. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SENSOR, STEERING WHEEL ANGLE

REMOVAL

REMOVAL

The steering angle sensor is serviced as an assembly with the steering column control module (SCCM). Refer to **MODULE, STEERING COLUMN, REMOVAL** .

INSTALLATION

INSTALLATION

The steering angle sensor is serviced as an assembly with the steering column control module (SCCM). Refer to **MODULE, STEERING COLUMN, INSTALLATION** .

SENSOR, WHEEL SPEED, FRONT

DESCRIPTION

DESCRIPTION

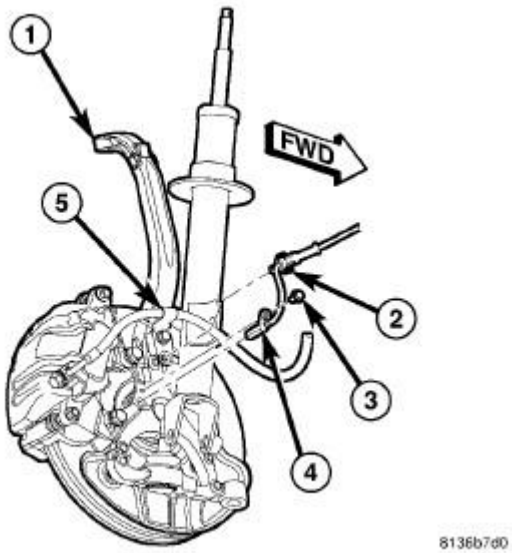


Fig. 7: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

One wheel speed sensor is mounted to each knuckle. The wheel speed sensor, using a tone wheel attached to the hub and bearing (RWD) or front half shaft (AWD) as a trigger mechanism, communicates with the Antilock Brake Module, informing it of that wheel's speed.

The head of the front wheel speed sensor used on Rear-Wheel-Drive (RWD) vehicles mounts to the inside of the knuckle.

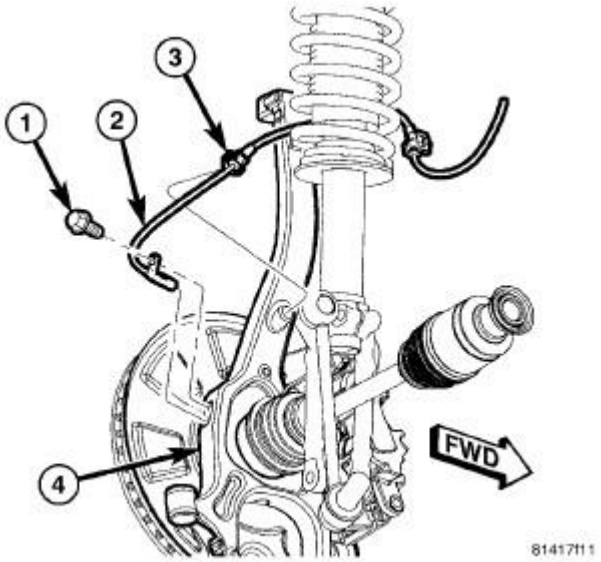


Fig. 8: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

The head of the front wheel speed sensor used on All-Wheel-Drive (AWD) vehicles mounts to the rear of the knuckle.

Vehicles without antilock brakes are equipped with one front wheel speed sensor. It is attached to the right front knuckle and is used to provide wheel speed sense to various vehicle systems.

REMOVAL

ALL-WHEEL-DRIVE

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

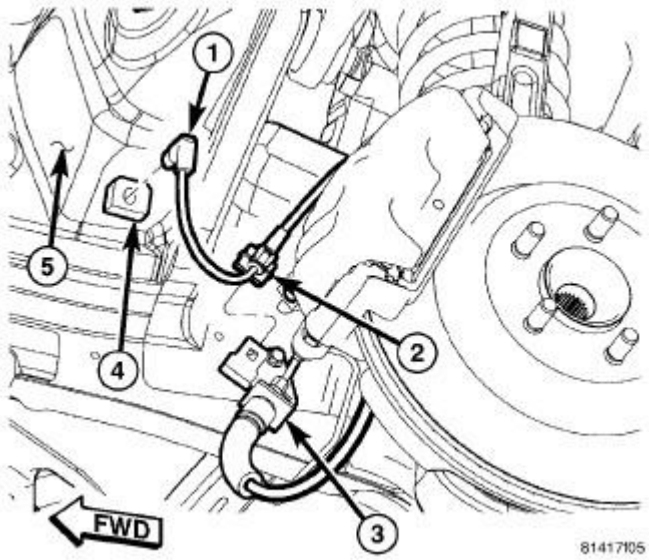


Fig. 9: Wheel Speed Sensor AT Body - AWD
Courtesy of CHRYSLER GROUP, LLC

2. Remove sensor cable routing clip (2) from brake hose bracket (3).

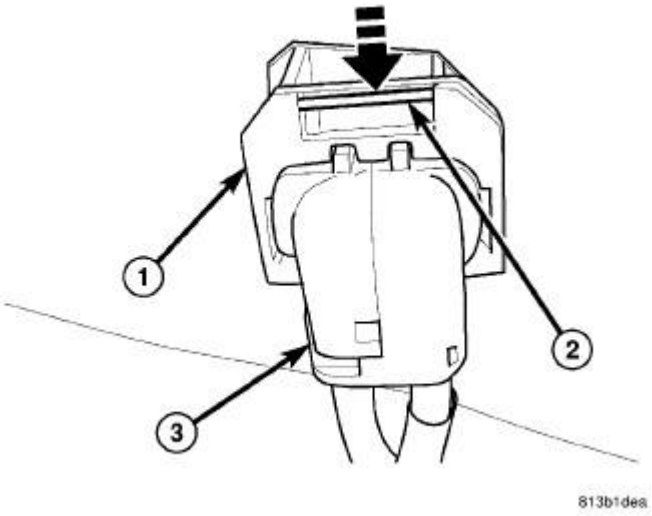


Fig. 10: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To release sensor connector from body wiring harness connector (1) in following step, move retaining clip (2) as indicated here, then pull sensor connector (3) outward.

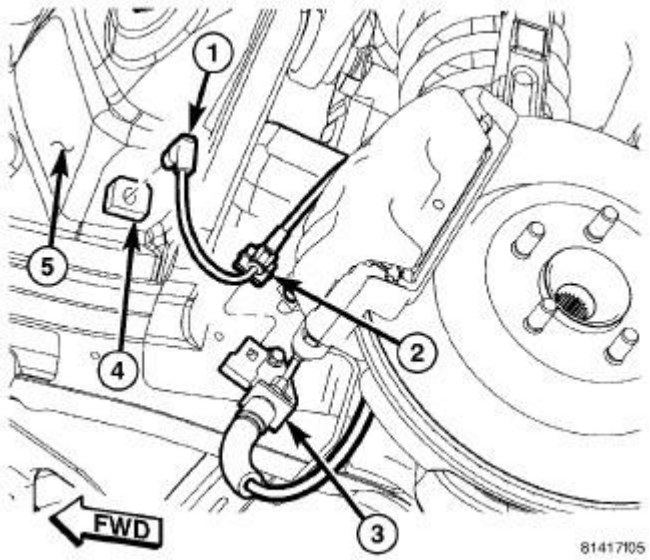


Fig. 11: Wheel Speed Sensor AT Body - AWD
Courtesy of CHRYSLER GROUP, LLC

3. Remove sensor connector (1) from body wiring harness connector (4).

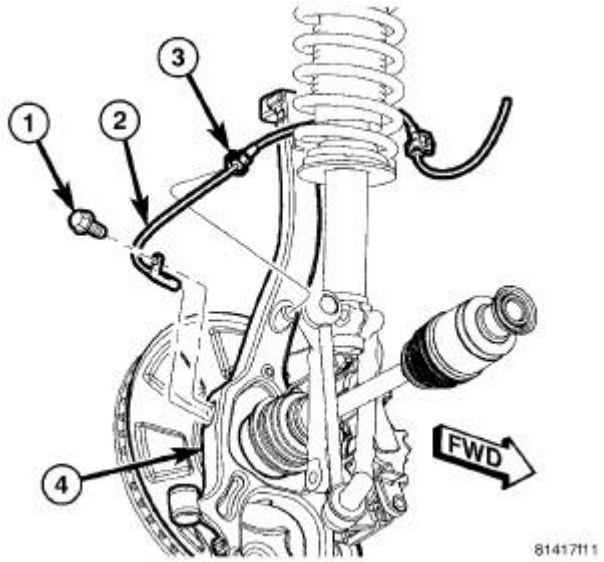


Fig. 12: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

4. Remove screw (1) fastening wheel speed sensor (2) to knuckle (4). Pull sensor head out of knuckle.
5. Remove wheel speed sensor cable routing clip (3) from knuckle (4).
6. Remove wheel speed sensor (2).

REAR-WHEEL-DRIVE

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

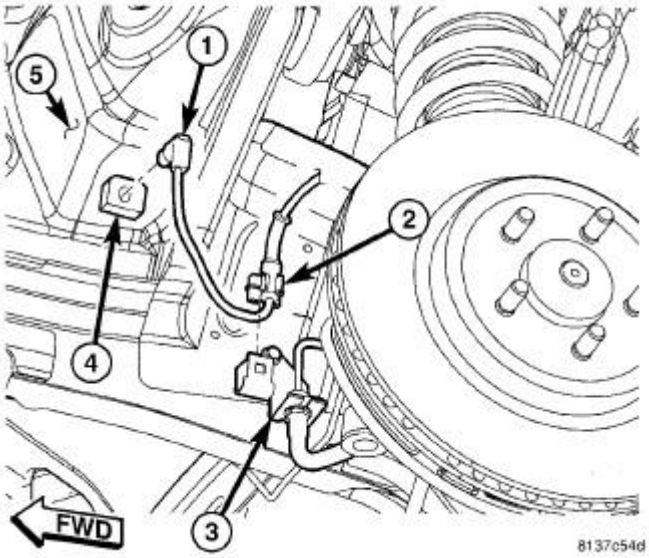


Fig. 13: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

2. Remove sensor cable routing clip (2) from brake hose bracket (3).

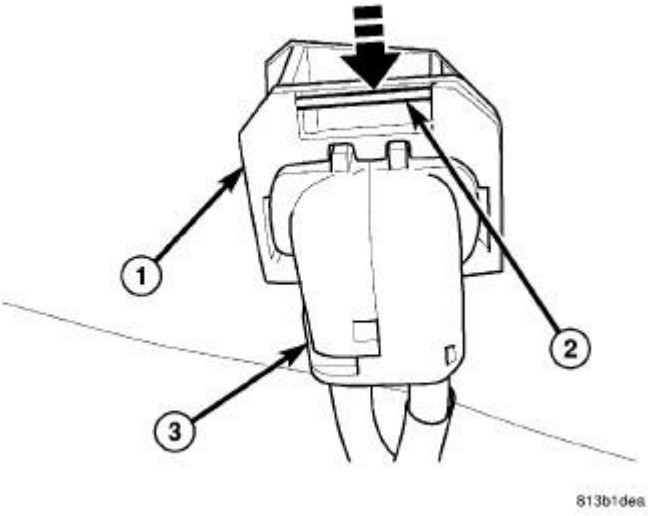


Fig. 14: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To release sensor connector from body wiring harness connector (1) in following step, move retaining clip (2) as indicated here, then pull sensor

connector (3) outward.

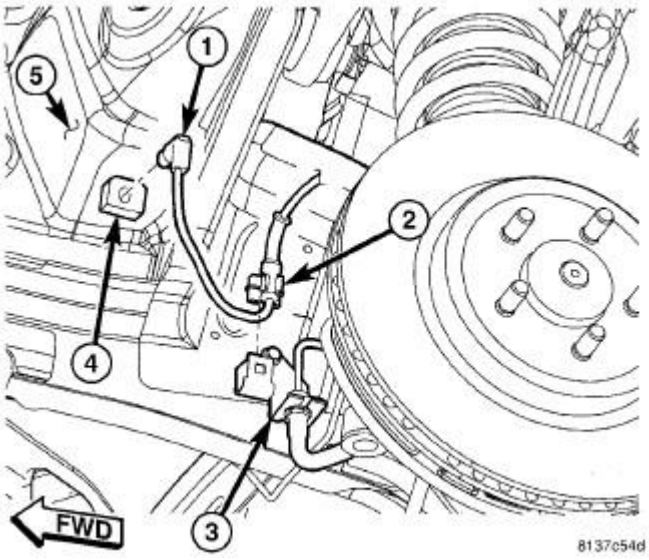


Fig. 15: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

3. Remove sensor connector (1) from body wiring harness connector (4).

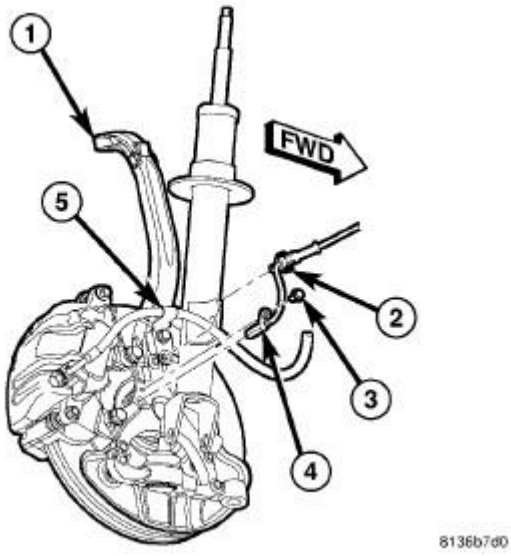


Fig. 16: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

4. Remove screw (3) fastening wheel speed sensor to knuckle (1). Pull sensor head (4) out of knuckle.
5. Remove wheel speed sensor cable routing clip (2) from brake hose routing bracket (5).

INSTALLATION

ALL-WHEEL-DRIVE

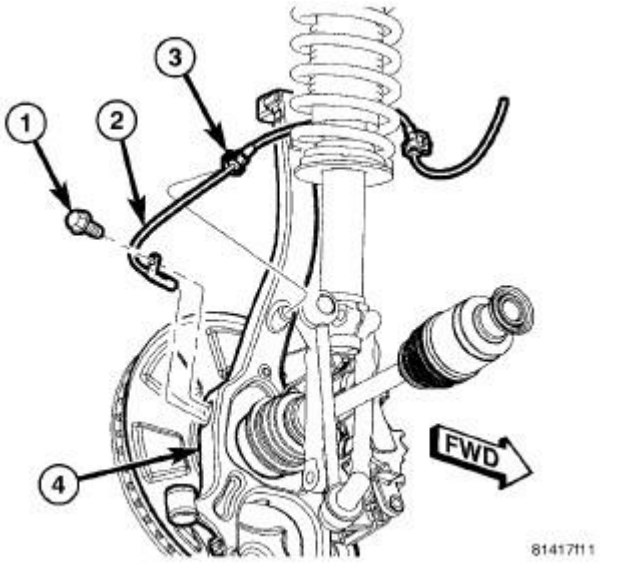


Fig. 17: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

1. Install wheel speed sensor (2) head into knuckle (4) and install mounting screw (1). Tighten screw to 11 N.m (97 in. lbs.).
2. Attach wheel speed sensor cable and routing clip (3) to knuckle (4).

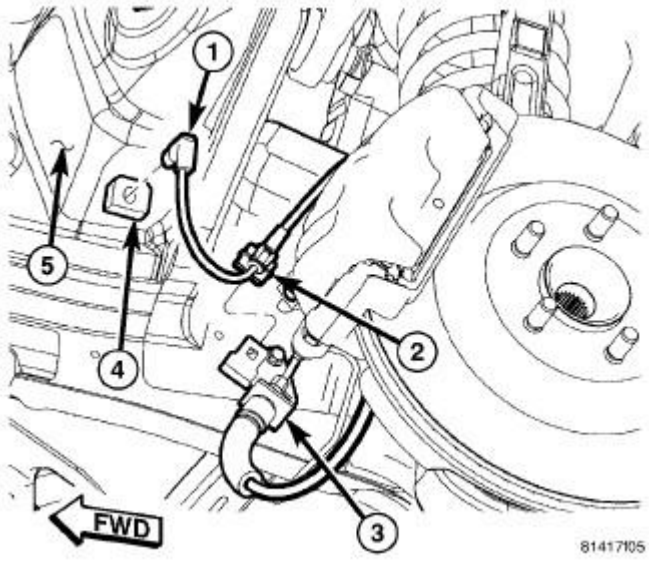


Fig. 18: Wheel Speed Sensor AT Body - AWD
Courtesy of CHRYSLER GROUP, LLC

3. Attach sensor cable routing clip (2) to brake hose bracket (3).
4. Connect sensor connector (1) to body wiring harness connector (4). When installing connector, make sure retaining clip on body connector is properly in place and sensor connect cannot be pulled out.
5. Lower vehicle.
6. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

REAR-WHEEL-DRIVE

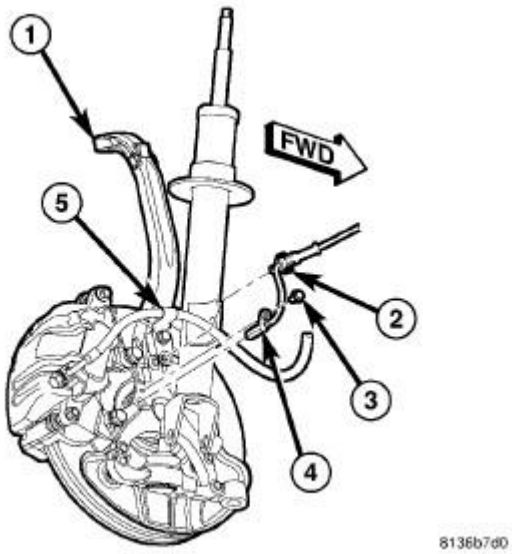


Fig. 19: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Install wheel speed sensor head (4) into knuckle and install mounting screw (3). Tighten screw to 11 N.m (97 in. lbs.).
2. Attach wheel speed sensor cable and routing clip (2) to brake hose routing bracket (5).

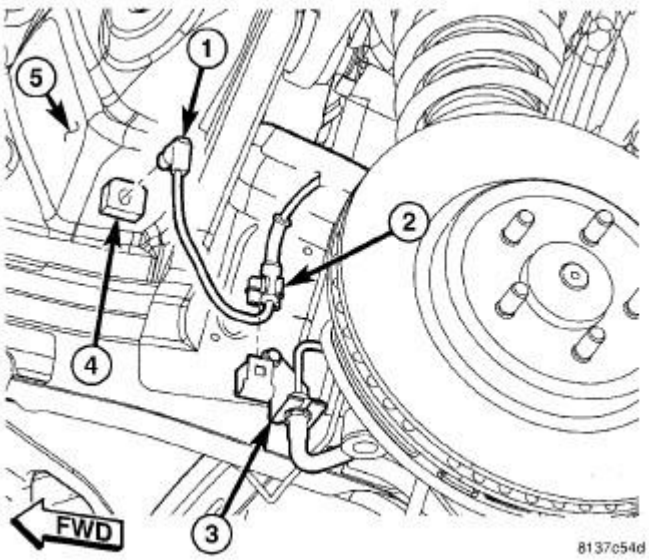


Fig. 20: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

3. Attach sensor cable routing clip (2) to brake hose bracket (3).
4. Connect sensor connector (1) to body wiring harness connector (4). When installing connector, make sure retaining clip on body connector is properly in place and sensor connect cannot be pulled out.
5. Lower vehicle.
6. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SENSOR, WHEEL SPEED, REAR

DESCRIPTION

DESCRIPTION

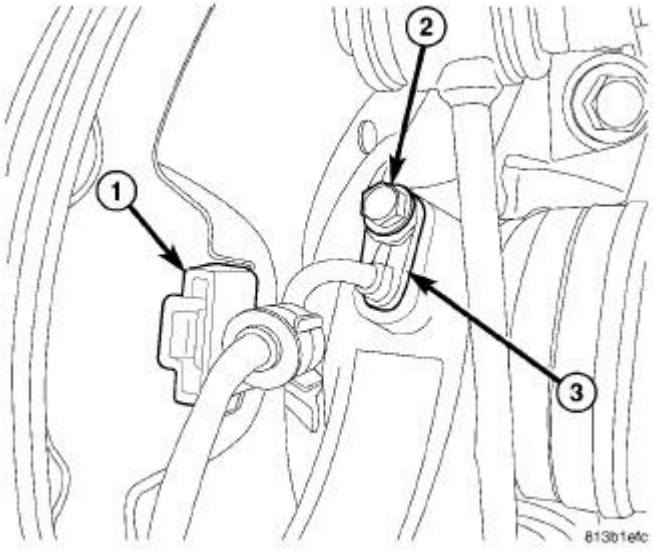


Fig. 21: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

One wheel speed sensor (3) is mounted to the rear of each rear knuckle. The wheel speed sensor, using a tone wheel attached to the rear axle half shaft as a trigger mechanism, communicates with the Antilock Brake Module, informing it of that wheel's speed.

REMOVAL

REMOVAL

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

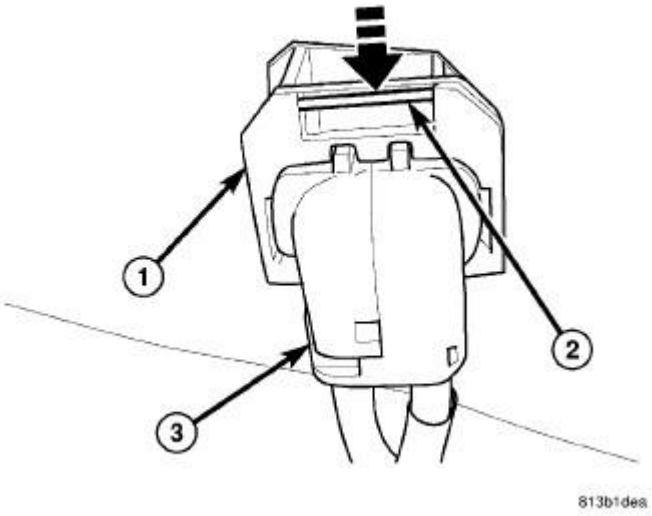


Fig. 22: Releasing Wheel Speed Sensor Connector

Courtesy of CHRYSLER GROUP, LLC

NOTE: To release sensor connector from body wiring harness connector (1) in following step, move retaining clip (2) as indicated here, then pull sensor connector (3) outward.

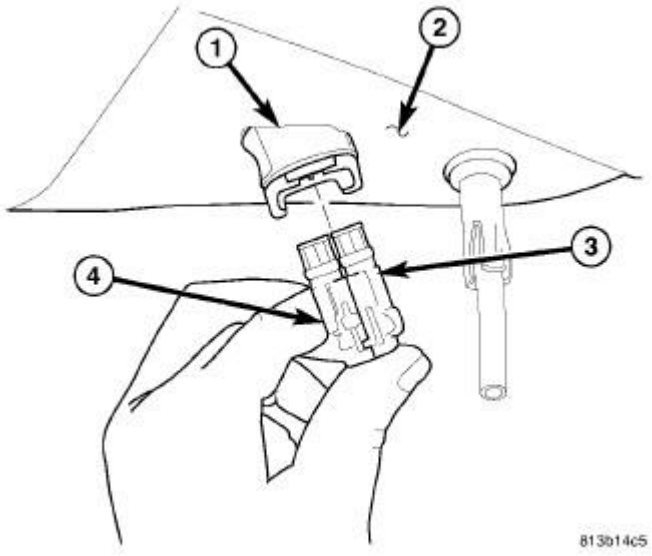


Fig. 23: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

2. Remove sensor connectors (3 and 4) from body wiring harness connector (1) located in luggage compartment floor pan (2).
3. Separate left sensor connector (4) from right sensor connector (3).

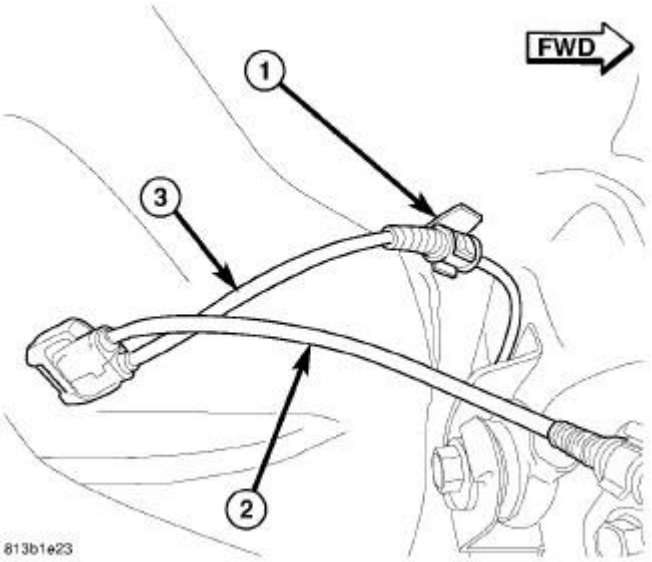


Fig. 24: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

4. If removing left sensor, unclip sensor cable (3) from routing clip near body connector (1).

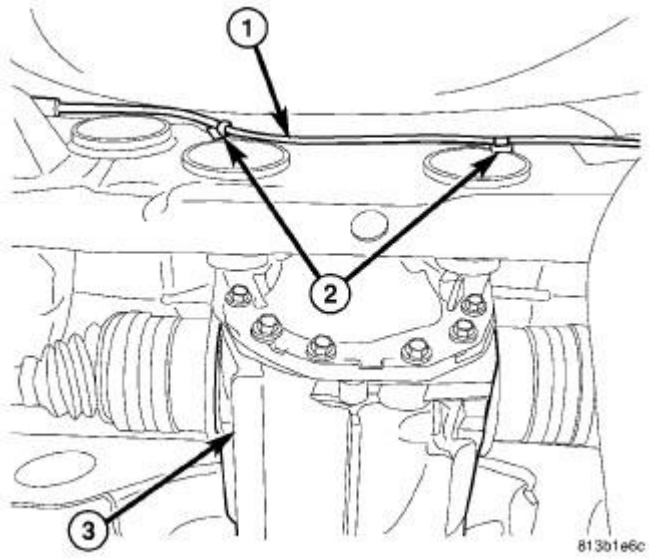


Fig. 25: Left Wheel Speed Sensor Routing Over Rear Differential
Courtesy of CHRYSLER GROUP, LLC

5. If removing left sensor, unclip sensor cable (1) from routing clips (2) along rear of crossmember near rear differential (3).

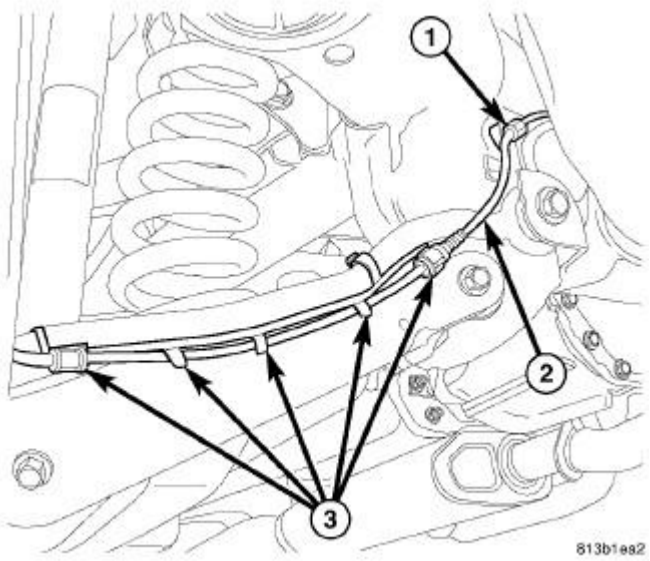


Fig. 26: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

6. If removing left sensor, unclip sensor cable (2) from routing clip (1) above toe link mount on rear crossmember.
7. Unclip sensor cable (2) from routing clips (3) along toe link.

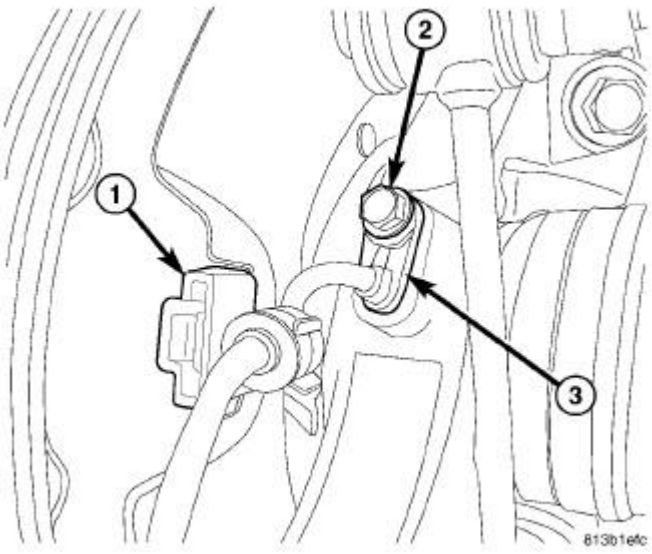


Fig. 27: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

8. Unclip sensor cable at rear brake rotor shield (1).
9. Remove screw (2) fastening sensor head (3) to rear knuckle.
10. Remove wheel speed sensor.

INSTALLATION

INSTALLATION

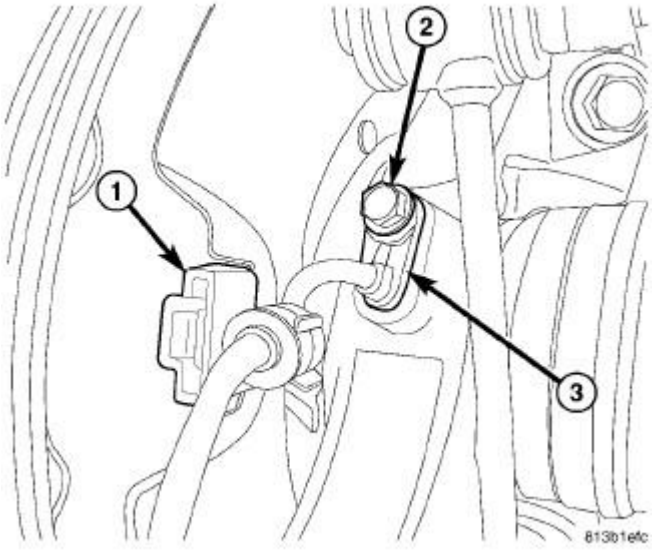


Fig. 28: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Insert wheel speed sensor head (3) into mounting hole in rear of knuckle.
2. Install screw (2) fastening sensor head (3) to rear knuckle. Tighten Screw to 11 N.m (97 in. lbs.).
3. Install sensor cable at rear brake rotor shield (1).

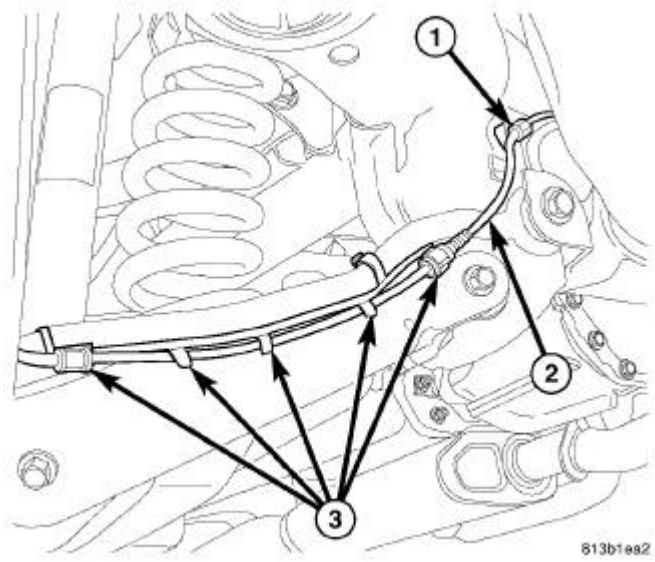


Fig. 29: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

4. Clip sensor cable (2) to routing clips (3) along toe link.
5. If installing left sensor, clip sensor cable (2) to routing clip (1) above toe link mount on rear crossmember.

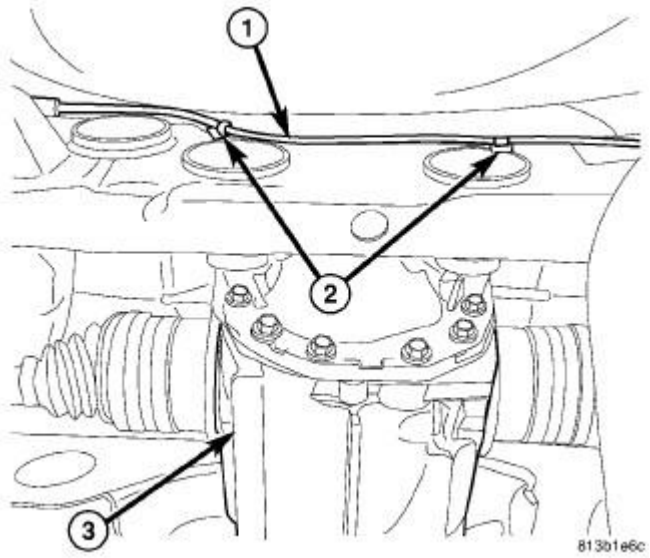


Fig. 30: Left Wheel Speed Sensor Routing Over Rear Differential
Courtesy of CHRYSLER GROUP, LLC

6. If installing left sensor, clip sensor cable (1) to routing clips (2) along rear of crossmember near rear differential (3).

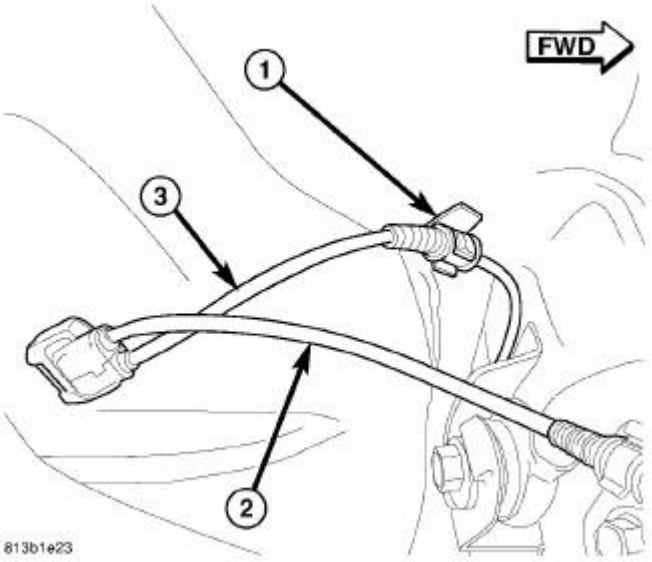


Fig. 31: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

7. If installing left sensor, clip sensor cable (3) to routing clip near body connector (1).

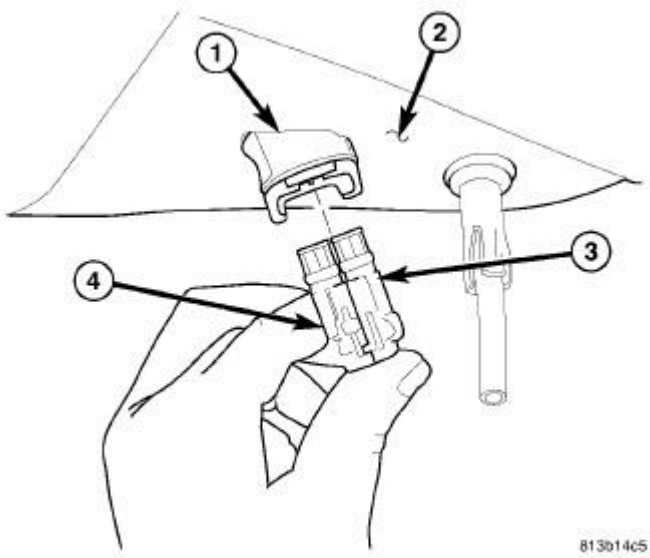


Fig. 32: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

8. Match left sensor connector (4) to right sensor connector (3) to make one connector.
9. Insert sensor connectors (3 and 4) into body wiring harness connector (1) located in luggage compartment floor pan (2). When installing connector, make sure retaining clip on body connector is properly in place and sensor connector cannot be pulled out.
10. Lower vehicle.
11. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SWITCH, ELECTRONIC STABILITY PROGRAM (ESP)

DESCRIPTION

DESCRIPTION

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

The ESC Off Switch is located in the Instrument Panel Switch Pod in the center of the instrument panel. The ESC Off switch turns the Electronic Stability Control off whenever the switch is depressed. Depressing the switch a second time turns the ESC back on. The switch resets itself each time the ignition is cycled.

When the ESC Off switch is depressed and released, turning ESC off, it does not completely turn the system off. The ESC system reduces torque management to a lesser amount, but ESC function can still occur if the system perceives the need.

The ESC Off switch is serviced as part of the Instrument Panel Switch Pod.

REMOVAL

REMOVAL

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

The ESC Off switch is serviced as part of the Instrument Panel Switch Pod. Refer to **POD, SWITCH BANK, REMOVAL** .

INSTALLATION

INSTALLATION

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

The ESC Off switch is serviced as part of the Instrument Panel Switch Pod. Refer to **POD, SWITCH BANK, INSTALLATION** .

HYDRAULIC/MECHANICAL

HYDRAULIC CONTROL UNIT (HCU)

REMOVAL

REMOVAL

To remove the HCU, the ICU must be removed and disassembled. Refer to **INTEGRATED CONTROL UNIT (ICU), REMOVAL**.). Refer to **INTEGRATED CONTROL UNIT (ICU), DISASSEMBLY**.

INSTALLATION

INSTALLATION

To install the HCU, assemble and install the ICU. Refer to **INTEGRATED CONTROL UNIT (ICU), ASSEMBLY** & **INTEGRATED CONTROL UNIT (ICU), INSTALLATION**.

INTEGRATED CONTROL UNIT (ICU)

DESCRIPTION

DESCRIPTION

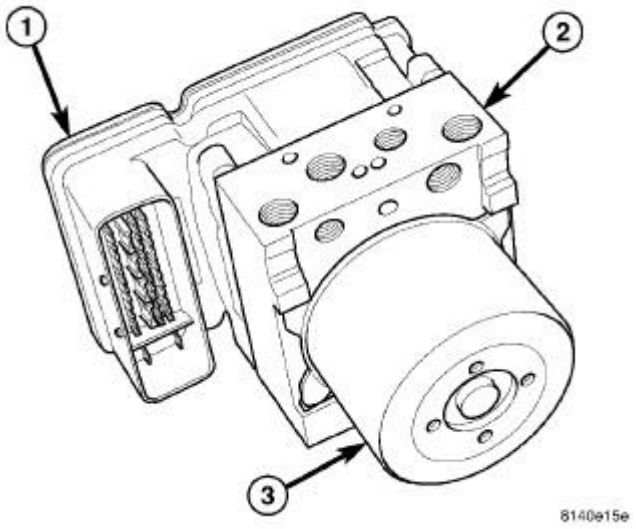


Fig. 33: Integrated Control Unit
Courtesy of CHRYSLER GROUP, LLC

The Hydraulic Control Unit (HCU) (2) and the Antilock Brake Module (ABM) (1) used with this antilock brake system are combined (integrated) into one unit, which is called the Integrated Control Unit (ICU).

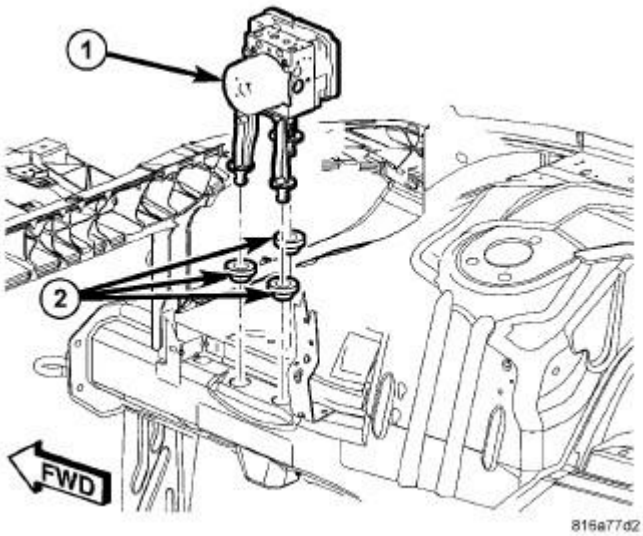


Fig. 34: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

The ICU (1) is located in the engine compartment, mounted to a bracket that is attached to the right side rail through the use of isolation grommets (2).

The ABS with traction control ICU consists of the following components: the ABM, eight (build/decay) solenoid valves (four inlet valves and four outlet valves), two traction control solenoid valves, two hydraulic shuttle valves, valve block, fluid accumulators, a pump, and an electric pump/motor.

The replaceable components of the ICU are the HCU and the ABM. No attempt should be made to service any components of the HCU or ABM. For replacement of the ABM. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

CAUTION: For Adaptive Cruise Control (ACC) equipped vehicles, the ABM and HCU are not separately serviceable. They must be replaced as an assembly.

For additional information on the ABM. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .

REMOVAL

REMOVAL

NOTE: Before proceeding. Refer to CAUTION & WARNING .

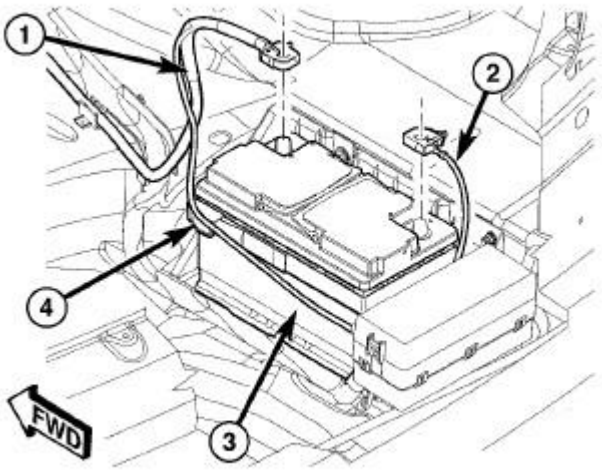


Fig. 35: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.

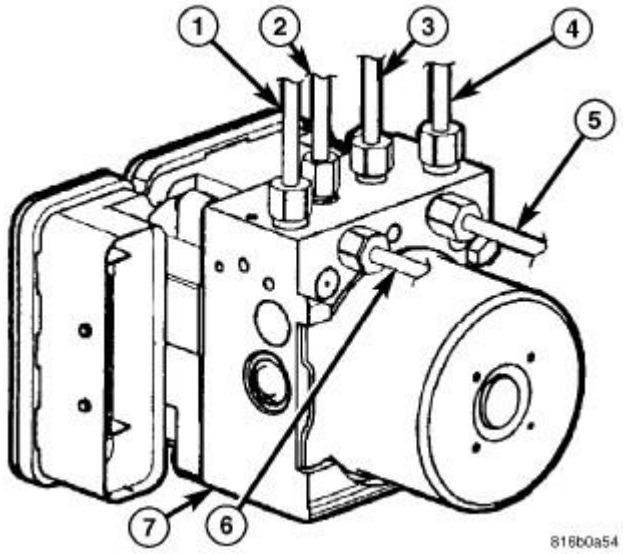


Fig. 36: Brake Tubes AT ICU - Mk25e
Courtesy of CHRYSLER GROUP, LLC

3. Remove primary (4) and secondary (1) brake tubes (from master cylinder) at hydraulic control unit (7).
4. Remove remaining brake tubes (2, 3, 5, 6) at hydraulic control unit (7).

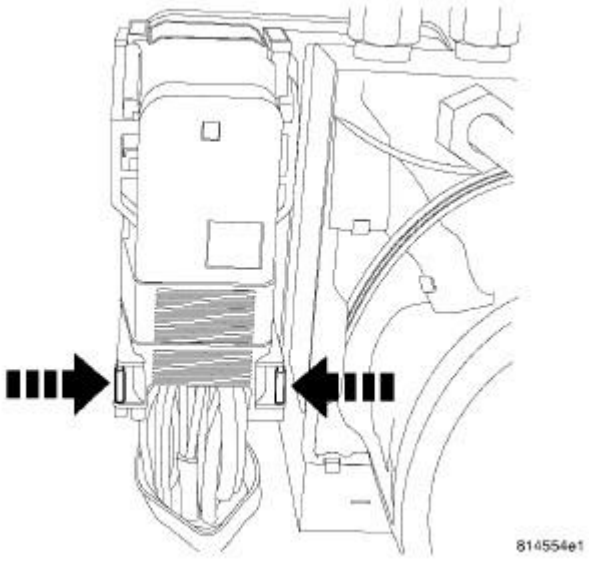


Fig. 37: ABM Connector Release Tabs
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use this figure in the following step to release the ABM harness connector cover. It shows the location of the release tabs.

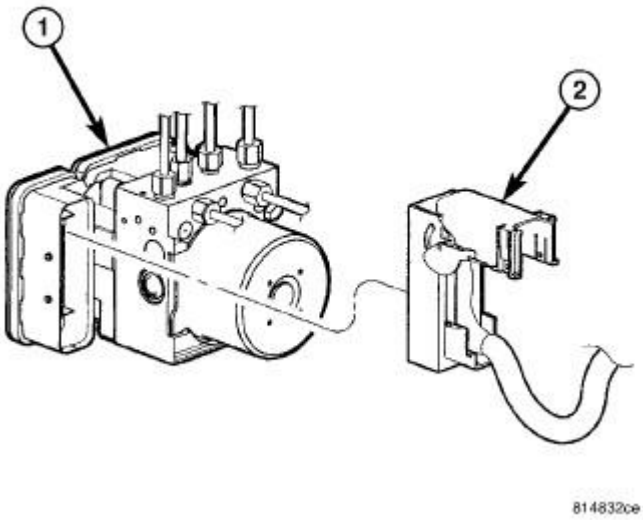


Fig. 38: Anti-Lock Brake Module Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect ABM harness connector from antilock brake module (ABM). To do so:
    1. Depress tabs on each side of connector cover, then
    2. Pull outward and upward on lower half of cover until it locks into position pointing straight outward (2). Connector can then be pulled straight outward off ABM (1).

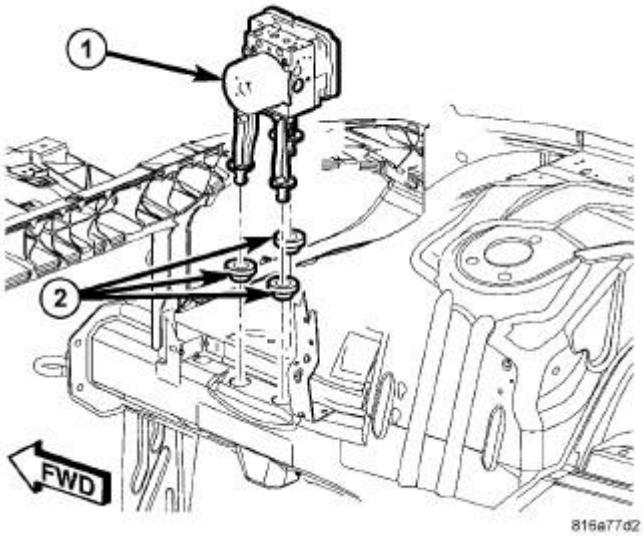


Fig. 39: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Pull up on unit (1) and remove from mounting grommets (2) in body side rail.

DISASSEMBLY

DISASSEMBLY

CAUTION: For Adaptive Cruise Control (ACC) equipped vehicles, the ABM and HCU are not separately serviceable. They must be replaced as an assembly.

1. Remove two screws attaching the mounting bracket to the HCU. Remove the bracket.

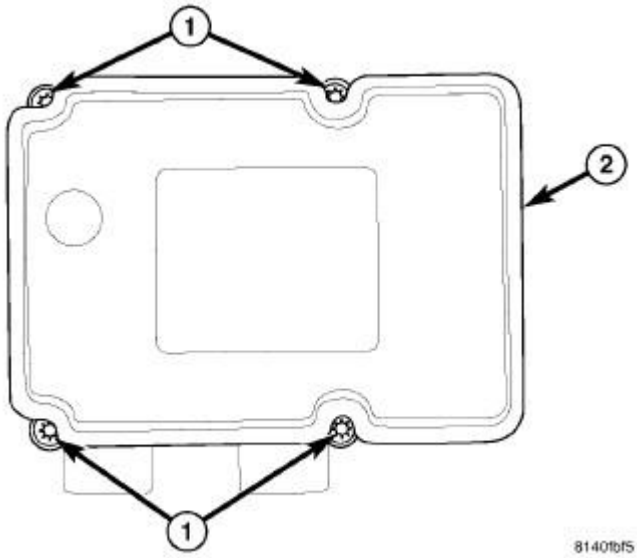


Fig. 40: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER GROUP, LLC

2. Remove four screws (1) attaching ABM (2) to HCU.

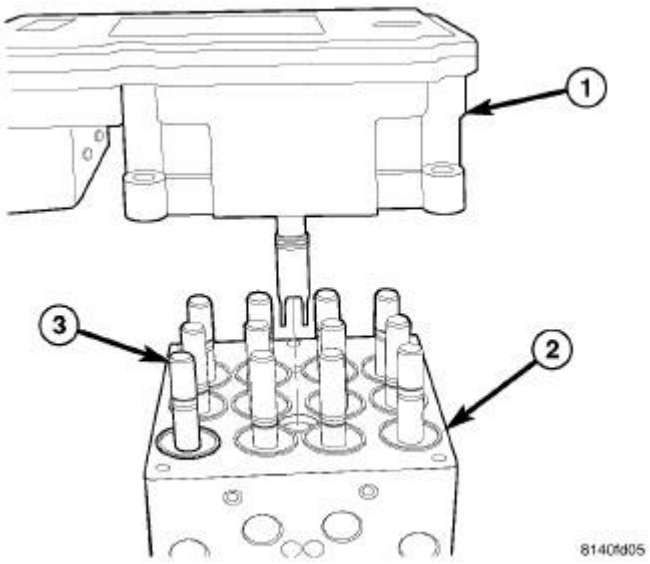


Fig. 41: ABM Assembly To HCU
Courtesy of CHRYSLER GROUP, LLC

3. Separate ABM (1) from HCU (2).

ASSEMBLY

ASSEMBLY

1. Clean any debris off the mating surfaces of the HCU and ABM.

CAUTION: When installing new O-rings or solenoid valve stem seals, do not use any type of lubricant.

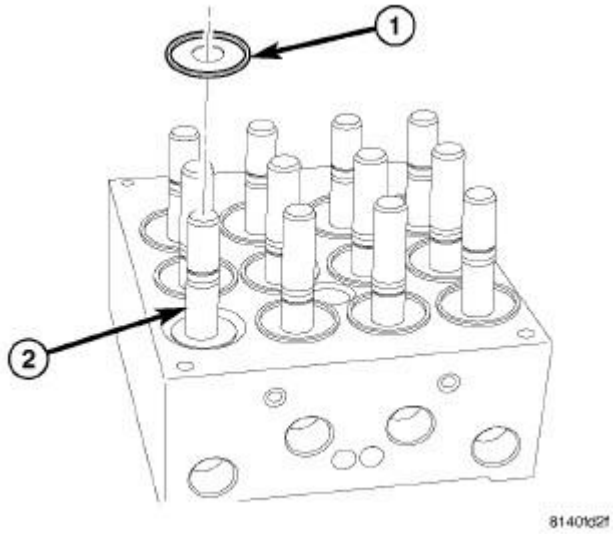


Fig. 42: Solenoid Valve Seal
Courtesy of CHRYSLER GROUP, LLC

2. If the seals (1) on the solenoid valve stems (2) are not new, replace them all. Each of the solenoid valve stem seals must be new to keep out moisture and debris; **do not reuse solenoid valve stem seals** .

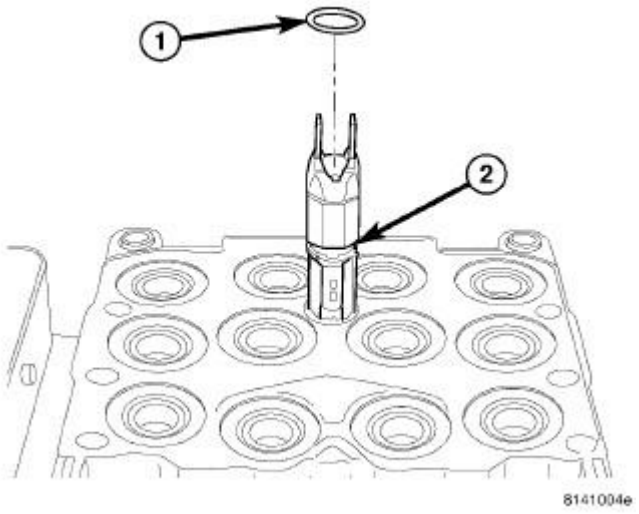


Fig. 43: Internal Pump Connector O-Ring
Courtesy of CHRYSLER GROUP, LLC

3. Replace the pump/motor connector O-ring (1) if it is not new. Be sure the O-ring is properly seated in the mounting groove (2).

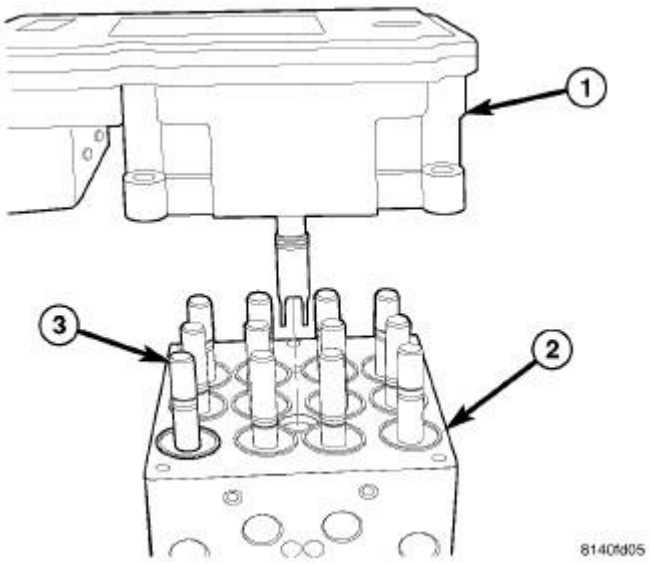


Fig. 44: ABM Assembly To HCU
Courtesy of CHRYSLER GROUP, LLC

4. Align components and install the ABM (1) on the HCU (2).

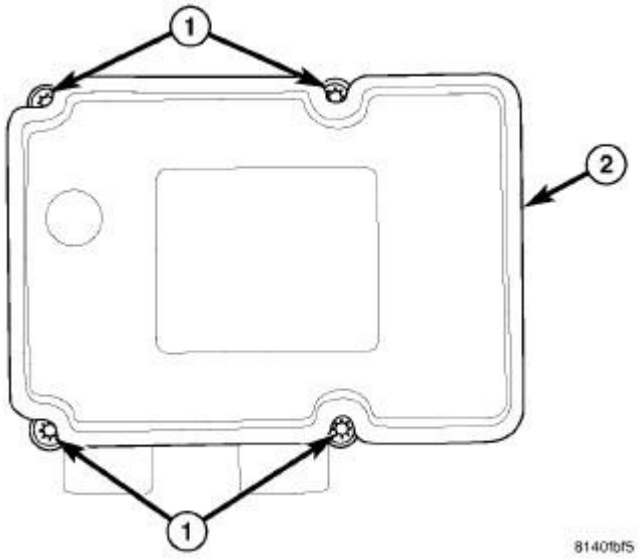


Fig. 45: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER GROUP, LLC

5. Install the four screws (1) attaching the ABM (2) to the HCU. Tighten the mounting screws to 2 N.m (17 in. lbs.).
6. Attach the mounting bracket to the HCU. Install two mounting bracket attaching screws and tighten to 11 N.m (97 in. lbs.).
7. Install the ICU in the vehicle. Refer to **INTEGRATED CONTROL UNIT (ICU), INSTALLATION**.

INSTALLATION

INSTALLATION

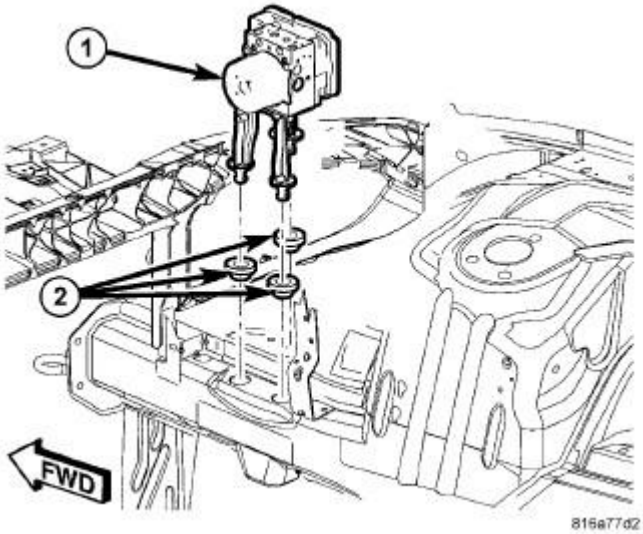


Fig. 46: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Install unit (1), pushing mounting bracket down into mounting grommets (2) located in body side rail.

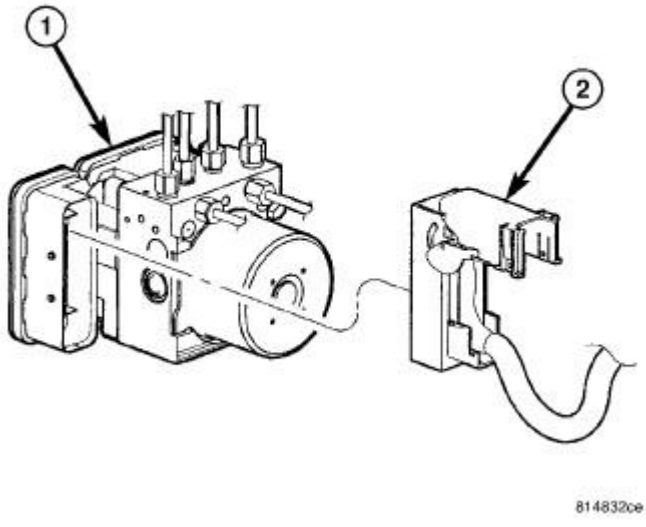


Fig. 47: Anti-Lock Brake Module Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before installing the ABM harness connector (2) on the ABM (1), be

sure the seal is properly installed in the connector.

2. Insert ABM harness connector (2) into socket of ABM (1) and close cover, locking connector in place.

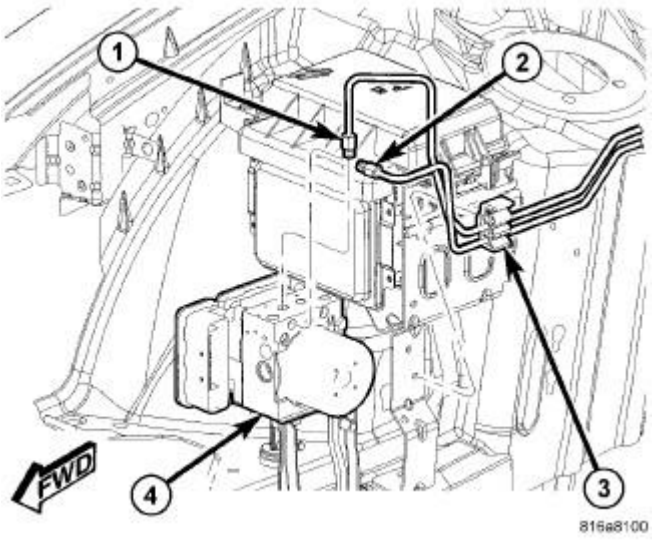


Fig. 48: Left Rear And Right Rear Brake Tubes AT ICU
Courtesy of CHRYSLER GROUP, LLC

3. Install left (2) and right (1) rear brake tubes at hydraulic control unit (4). Tighten tube nuts to 20 N.m (177 in. lbs.) torque.

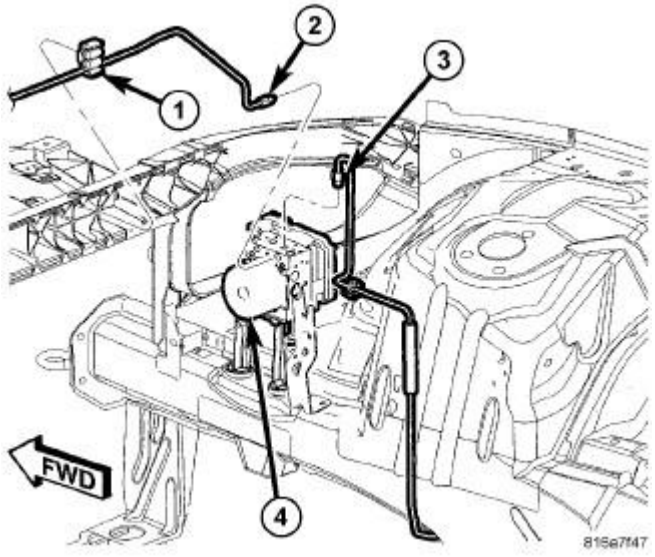


Fig. 49: Left Front And Right Front Brake Tubes AT ICU
Courtesy of CHRYSLER GROUP, LLC

4. Install left (2) and right (3) brake tubes at hydraulic control unit (4). Tighten tube nuts to 20 N.m (177 in. lbs.) torque.

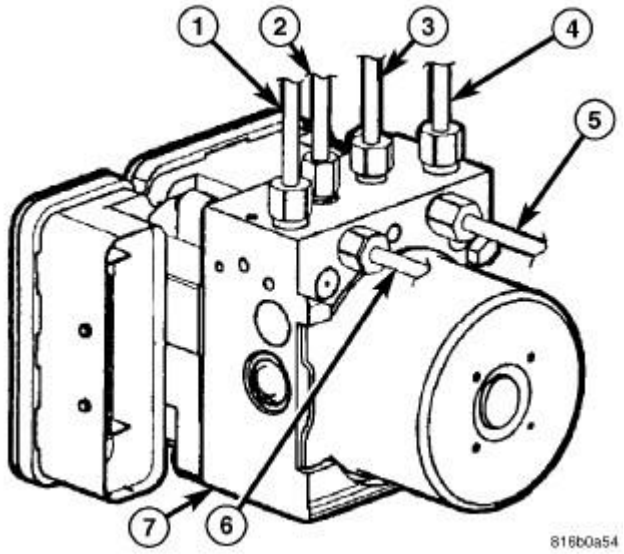


Fig. 50: Brake Tubes AT ICU - Mk25e
Courtesy of CHRYSLER GROUP, LLC

5. Install primary (4) and secondary (1) brake tubes at hydraulic control unit (7). Tighten tube nuts to 20 N.m (177 in. lbs.) torque.
6. Remove brake pedal holding tool.

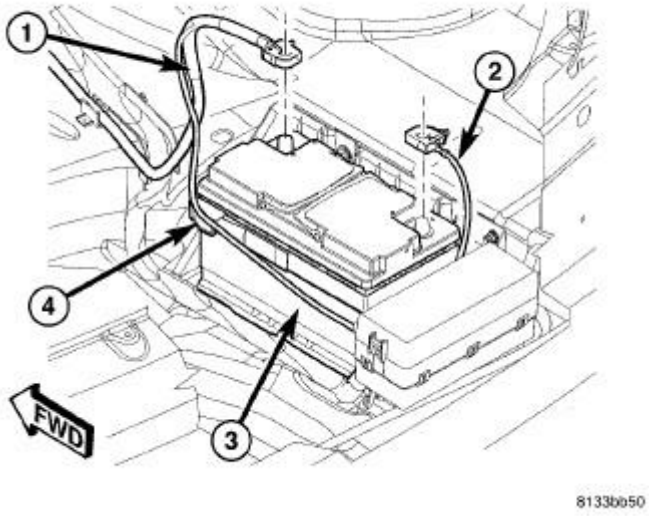


Fig. 51: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

7. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

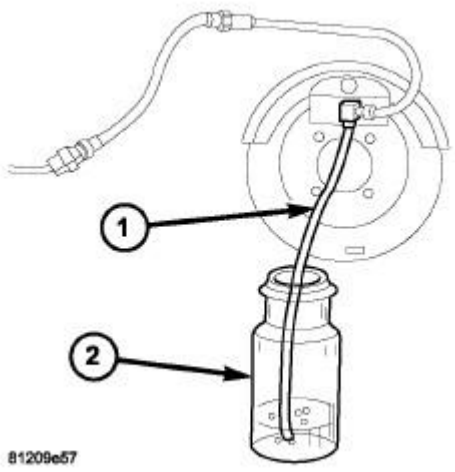


Fig. 52: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

8. Fill and bleed (1) base brake hydraulic system and ABS. Refer to **STANDARD PROCEDURE** .
9. Perform Diagnostic Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

ACCESSORIES AND EQUIPMENT

Audio And Video - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

Several combinations of radio receivers and speaker systems are offered. The audio system uses an ignition switched source of battery current so that the system will only operate when the ignition switch is in the RUN or ACCESSORY positions.

The audio system includes the following components:

- ISC Screen Module
- Telematics Gateway Module (TGM)
- Antenna (AM/FM and Satellite Audio and navigation)
- Power amplifier (with premium speaker system only)
- Radio noise suppression components
- Radio receiver
- Remote radio switches (if equipped)
- Satellite Receiver (integrated within the TGM)
- Speakers

OPERATION

OPERATION

The audio system components are designed to provide audio entertainment and information through the reception, tuning and amplification of locally broadcast radio signals in both the Amplitude Modulating (AM) and Frequency Modulating (FM) commercial frequency ranges.

The audio system components operate on battery current received through a fuse in the Power Distribution Center (PDC) on a fused ignition switch output (run-acc) circuit so that the system will only operate when the ignition switch is in the Run or Accessory positions.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AUDIO

Any diagnosis of the Audio system should begin with the use of scan tool. Check for any Diagnostic Trouble Codes (DTCs) RADIO. If there are any DTCs, perform the appropriate diagnostic procedure(s) before proceeding.

For complete circuit diagrams, refer to the appropriate wiring information.

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

AUDIO SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
TELEMATICS GATEWAY (TGW) INOPERATIVE	1. Fuse inoperative.	Check TGW fuses in the rear PDC. Replace fuses, if required.
	2. Open Wiring.	Perform the "No Response From Radio" test. Refer to **DIAGNOSIS AND TESTING** .
NO AUDIO - BUT TGW LIGHTS UP	1. Antenna problem.	Perform the "Poor or No AM/FM Audio Reception" test. Refer to **DIAGNOSIS AND TESTING** .
	2. TGW or Amplifier (if equipped) connector damaged.	Check for loose or corroded TGW or Amplifier connector. Repair, as required.
	3. Wiring damaged.	Check for shorted or open wires. Repair wiring as required.
	4. TGW or Amplifier (if equipped) ground damaged.	Check for continuity between TGW or Amplifier and a known good ground. There should be continuity. Repair ground as required.
	5. Amplifier (if equipped) inoperative.	Refer to **DIAGNOSIS AND TESTING** or **DIAGNOSIS AND TESTING** .
	6. Speakers inoperative.	or if equipped. Refer to **DIAGNOSIS AND TESTING** or **DIAGNOSIS AND TESTING** or **DIAGNOSIS AND TESTING** .
NO DISPLAY FROM THE INTEGRATED CENTER STACK (ICS) SCREEN	1. Fuse inoperative.	Check the TGW and ICS fuses in the Junction Block. Replace fuses, if required.
	2. TGW and ICS connectors	Check for loose or corroded

	damaged.	TGW and ICS connectors. Check Repair as required.
	3. Wiring damaged.	Check for battery voltage at TGW and ICS connectors. Repair wiring as required.
	4. Low Voltage Differential Signal (LVDS) Video Cable open or connectors damaged.	Check for loose or poor LVDS cable connections between the TGW and ICS connectors. Check and repair as required.
	5. TGW and ICS ground circuit damaged.	Check for continuity between TGW and ICS and a known good ground. There should be continuity. Repair ground as required.
	6. TGW or ICS inoperative.	Check "No Response from TGW". Refer to **DIAGNOSIS AND TESTING** . Check "No Response from ICS" Refer to **DIAGNOSIS AND TESTING** .
POOR AM/FM RADIO RECEPTION	1. Antenna inoperative	Perform the "Poor or No AM/FM Audio Reception" test. Refer to **DIAGNOSIS AND TESTING** .
	2. TGW ground damaged.	Check for continuity between TGW chassis and a known good ground. There should be continuity. Repair ground as required.
	3. TGW inoperative.	Refer to **DIAGNOSIS AND TESTING** . or **DIAGNOSIS AND TESTING** .
	4. Faulty rear window antenna (grid).	Verify that the rear antenna grid is functioning properly. Repair as necessary. Refer to **MAST, ANTENNA, DIAGNOSIS AND TESTING**.
POOR SDAR AUDIO RECEPTION	1. SDAR Antenna Inoperative.	Perform the "Poor or No Satellite Audio Reception" test. Refer to **DIAGNOSIS AND TESTING** .
SOUND DISTORTION (VIBRATION FROM SPEAKER AREA, BUZZING - HUMMING)	1. Door trim panel loose or missing fasteners.	Inspect door trim panel and correct as necessary. Replace any missing fasteners.
	2. Water shield loose or misaligned.	Inspect water shield and adjust as required.

	3. Items placed in door trim panel map pockets vibrating or moving from side to side.	Remove items from door trim panel. Ensure that vibration is no longer present.
	4. Alternator whine.	Check charging system.
	5. Noise when the rear window defogger is on.	Check for an open grid line in the EBL.
NO MEMORY	1. Fuse inoperative.	Check fuse in rear PDC. Replace fuse, if required.
	2. Radio connector damaged.	Check for loose or corroded radio connector. Repair, if required.
	3. Wiring damaged.	Check for battery voltage at radio connector. Repair wiring, if required.
	4. Ground damaged.	Check for continuity between the radio chassis and a known good ground. There should be continuity. Repair ground, if required.
	5. Not communication with the Memory Seat Module (MSMD).	Check for DTCs in the MSMD. Refer to **DIAGNOSIS AND TESTING** .
NO COMPACT DISC OPERATION	1. CD damaged.	Insert known good CD and test operation. Avoid the use of "home made" CD's with adhesive labels. The labels may cause disc to become jammed in the radio.
	2. Foreign material on CD.	Clean CD and test operation.
	3. Condensation on CD or optics.	Allow temperature of vehicle interior to stabilize and test operation.
	4. Radio inoperative.	Exchange or replace radio, if required.

STANDARD PROCEDURE

STANDARD PROCEDURE - USER DATA BACKUP

The mid line ICS with the 8.4 in screen has the option to back up user data. The base model system does not have this option.

Plug in a USB stick into the Universal Customer Interface (UCI) USB port. In "Dealership Menu" then "Copy User Data" this will copy personalization settings to a USB stick. Upon replacing the Telematic Gate Way (TGW) Module return back to the Dealer Menu and select "Restore User Data" to replace

the user's personal settings.

AMPLIFIER

DESCRIPTION

DESCRIPTION

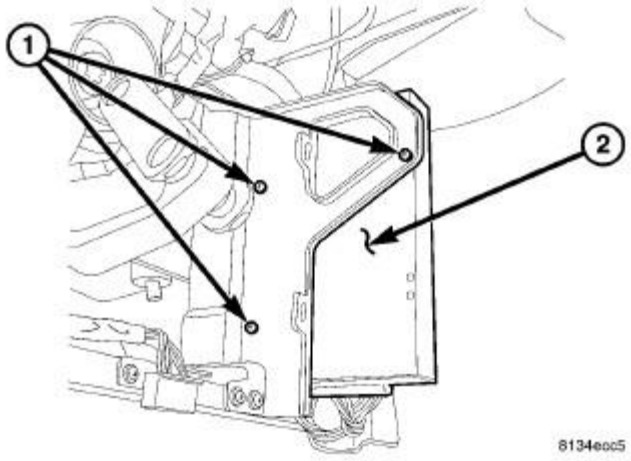


Fig. 1: Amplifier
Courtesy of CHRYSLER GROUP, LLC

NOTE: Hands Free Module removed for clarity.

The amplifier is mounted to the left of the steering column under the instrument panel.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AMPLIFIER

Any diagnosis of the Audio system should begin with the use of a scan tool and the appropriate Diagnostic Service information.

Refer to the appropriate wiring information.

The amplifier unit should be checked if there is no sound output noted from the speakers. For diagnosis of the power amplifier. Refer to **SPEAKER, DIAGNOSIS AND TESTING**.

REMOVAL

REMOVAL

1. Disconnect and isolate battery negative cable.
2. Remove the steering column opening cover. Refer to **COVER, STEERING COLUMN**

OPENING, REMOVAL .

3. Remove the Hands Free Module (HFM). Refer to **MODULE, HANDS FREE, REMOVAL** .
4. Disconnect the amplifier electrical connectors.
5. Loosen the mounting fasteners.
6. Remove the amplifier (2).

INSTALLATION

INSTALLATION

1. Install the amplifier.
2. Tighten the amplifier mounting retainers.
3. Connect the amplifier electrical connectors.
4. Install the Hands Free Module (HFM). Refer to **MODULE, HANDS FREE, INSTALLATION** .
5. Install the steering column cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
6. Connect the negative battery cable.

ANTENNA, SATELLITE, AUDIO

DESCRIPTION

DESCRIPTION

On vehicles equipped with satellite audio, a combined antenna for satellite and navigation is used. For removal and installation. Refer to **ANTENNA, SATELLITE, AUDIO, REMOVAL** and **ANTENNA, SATELLITE, AUDIO, INSTALLATION**.

For information on diagnosing the antenna and cables, using the (special tool #9977-6, Kit, Radio Antenna Diagnostic) perform the "Poor or No Satellite Audio Reception" test. Refer to **DIAGNOSIS AND TESTING** .

REMOVAL

REMOVAL

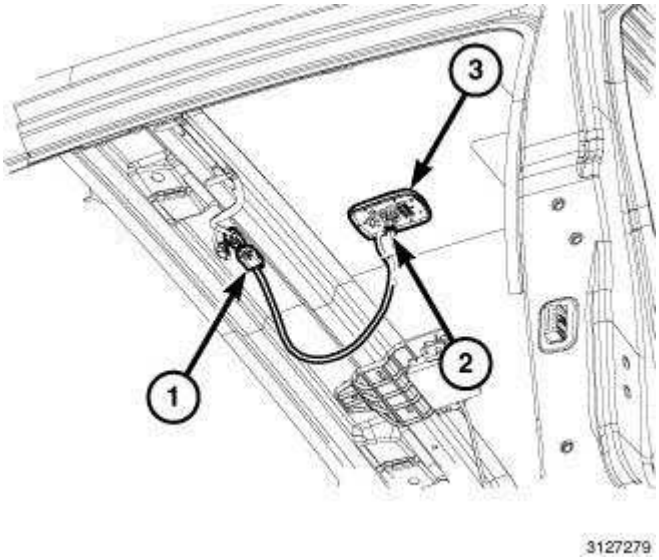


Fig. 2: Antenna Electrical Connectors, Mounting Fastener And Antenna
Courtesy of CHRYSLER GROUP, LLC

NOTE: This operation will require the necessity of two technicians.

1. Disconnect and isolate the negative battery cable.

CAUTION: Be extremely careful not to pull too hard on the headliner which could cause it to buckle. Support it if it starts to drop.

2. Lower the headliner. Refer to **HEADLINER, REMOVAL** .
3. Once the headliner is loose, move the front seats forward and lower the front seat backs and rest the headliner on top of the seats.
4. Disconnect the antenna electrical connectors from the antenna (1).
5. Remove the mounting fastener (2).
6. From inside the vehicle and using a flat bladed tool, depress one of the retaining tabs on the antenna. Push up the one side of the antenna connector through the roof panel. Depress the other side of the connector and remove the antenna (3).

INSTALLATION

INSTALLATION

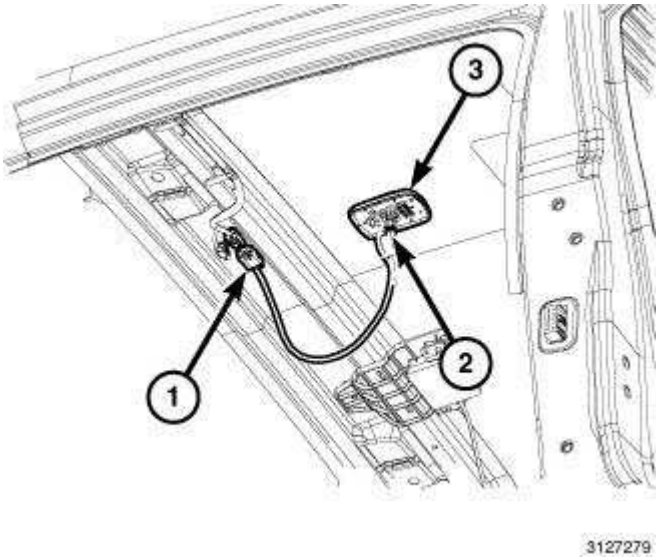


Fig. 3: Antenna Electrical Connectors, Mounting Fastener And Antenna
Courtesy of CHRYSLER GROUP, LLC

1. Insert the antenna harness through the hole in the roof panel. Press the antenna (3) into position until both the retainers engage into position.
2. Install and tighten the mounting fastener (2). Tighten to 9 N.m (80 in. lbs.).
3. Connect the antenna harness to the connectors on the antenna (1).
4. Install the headliner. Refer to **HEADLINER, INSTALLATION** .
5. Connect the negative battery cable.

CABLE, ANTENNA, AUDIO

DESCRIPTION

DESCRIPTION

The AM/FM coaxial antenna cables run from the radio to the Antenna Module which is mounted in the right C-Pillar.

There are two coaxial cables that run in series. The first cable runs from the back of the radio through the instrument panel harness and to the in-line white fakra connector that is behind the glove box and secured to the blower housing. The second coaxial runs from the in-line connector, down the right floor, with the body harness, and up the C-Pillar to the Antenna Module.

For Export Vehicles, the cables run the same but down the LEFT side of the vehicle.

For more information on testing the coaxial cables using the (special tool #9977-6, Kit, Radio Antenna Diagnostic) and perform the "Poor or No AM/FM Audio Reception. Refer to **DIAGNOSIS AND TESTING** .

CABLE, ANTENNA, SATELLITE

DESCRIPTION

DESCRIPTION

The Satellite coaxial antenna cables run from the radio to the Satellite Antenna which is mounted on the roof.

There are two coaxial cables that run in series. The first cable runs from the back of the radio through the instrument panel harness to the in-line white fakra connector that is behind the glove box and secured to the blower housing. The second coaxial runs from the in-line connector, down the right floor with the body harness. The cable then runs up the C-Pillar and across to the center of the rear roof support and connects with the antenna yellow fakra connector.

For Export Vehicles, the cables run the same but down the LEFT side of the vehicle.

For more information on testing the coaxial cables using the (special tool #9977-6, Kit, Radio Antenna Diagnostic) and perform the "Poor or No Satellite Audio Reception. Refer to **DIAGNOSIS AND TESTING** .

CAMERA

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable from the IBS.
2. Remove the Center High Mounted Stop Lamp (CHMSL). Refer to **LAMP, CENTER HIGH MOUNTED STOP, REMOVAL** .
3. Remove the camera retainers and remove the backup camera from the CHMSL.

INSTALLATION

INSTALLATION

1. Install the camera and retainers to the Center High Mounted Stop Lamp (CHMSL).
2. Install the CHMSL. Refer to **LAMP, CENTER HIGH MOUNTED STOP, INSTALLATION** .
3. Connect the negative battery cable to the IBS.

COMPONENTS, RADIO NOISE SUPPRESSION

DESCRIPTION

DESCRIPTION

Radio noise suppression devices are installed on this vehicle. Radio Frequency Interference (RFI) and ElectroMagnetic Interference (EMI) can be produced by any on-board or external source of electromagnetic energy. These electromagnetic energy sources can radiate electromagnetic signals through the air, or conduct them through the vehicle electrical system.

When the audio system converts RFI or EMI to an audible acoustic wave form, it is referred to as radio noise. This undesirable radio noise is generally manifested in the form of "buzzing," "hissing," "popping," "clicking," "crackling," and/or "whirring" sounds. In most cases, RFI and EMI radio noise can be suppressed using a combination of vehicle and component grounding, filtering and shielding techniques. This vehicle is equipped with radio noise suppression devices that were designed to minimize exposure to typical sources of RFI and EMI; thereby, minimizing radio noise complaints.

Radio noise suppression is accomplished primarily through circuitry or devices that are integral to the radios, audio power amplifiers and other on-board electrical components such as generators, wiper motors, blower motors, and fuel pumps that have been found to be potential sources of RFI or EMI. External radio noise suppression devices that are used on this vehicle to control RFI or EMI, and can be serviced, include the following:

- **Engine-to-frame ground strap** - This length of braided ground strap has an eyelet terminal connector crimped to each end. One end is secured to the engine cylinder heads. The other is secured to the frame.

OPERATION

OPERATION

There are two common strategies that can be used to suppress Radio Frequency Interference (RFI) and ElectroMagnetic Interference (EMI) radio noise. The first suppression strategy involves preventing the production of RFI and EMI electromagnetic signals at their sources. The second suppression strategy involves preventing the reception of RFI and EMI electromagnetic signals by the audio system components.

The use of braided ground straps in key locations is part of the RFI and EMI prevention strategy. These ground straps ensure adequate ground paths, particularly for high current components such as many of those found in the starting, charging, ignition, engine control and transmission control systems. An insufficient ground path for any of these high current components may result in radio noise caused by induced voltages created as the high current seeks alternative ground paths through components or circuits intended for use by, or in close proximity to the audio system components or circuits.

Preventing the reception of RFI and EMI is accomplished by ensuring that the audio system components are correctly installed in the vehicle. Loose, corroded or improperly soldered wire harness connections, improperly routed wiring and inadequate audio system component grounding can all contribute to the reception of RFI and EMI. A properly grounded antenna body and radio chassis, as well as a shielded antenna coaxial cable with clean and tight connections will each help reduce the potential for reception of RFI and EMI.

REMOVAL

REMOVAL

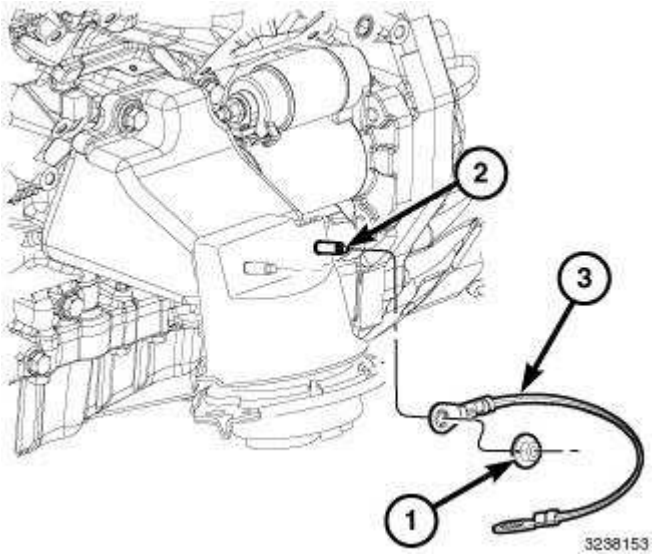


Fig. 4: Suppression Retainer And Driver Side Engine Mount Stud
Courtesy of CHRYSLER GROUP, LLC

1. Open the hood.
2. Remove the radio noise suppression retainer (1) from the driver side engine mount stud (2).
3. Remove the radio noise suppression retainer from the body side of the strap.
4. Remove the radio noise suppression strap from the vehicle.

INSTALLATION

INSTALLATION

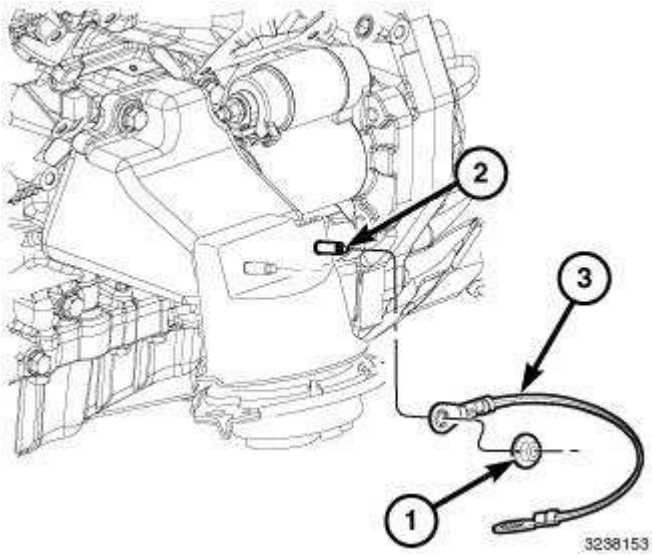


Fig. 5: Suppression Retainer And Driver Side Engine Mount Stud
Courtesy of CHRYSLER GROUP, LLC

1. Position the radio noise suppression strap (3) on the driver side engine mount stud (2).
2. Install the radio noise suppression strap retainer (1) to the engine mount stud (2).
3. Install the radio noise suppression strap to the body.
4. Install the radio noise suppression strap retainer to the body.
5. Close the hood.

MAST, ANTENNA

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR GLASS INTEGRAL ANTENNA

The antenna grid pattern is located above the EBL grid.

For circuit descriptions and diagrams, refer to the appropriate wiring information. To detect breaks in the integral antenna elements, the following procedure is required:

1. Disconnect the antenna module connector from the antenna pigtail on the glass or at the Antenna Module connector. Refer to **MODULE, RADIO ANTENNA, REMOVAL**.
2. Using an ohmmeter, connect one lead to the disconnected module connector and with the other lead check each end of the grid pattern, on the opposite side of the glass, for continuity.

   NOTE: The resistance should be below 2.4 Ohms on each line.

3. Measure the resistance of each line. The resistance should be exactly the same for each line.
4. If the resistance is not exactly the same for each line, check for a crack(s) in the grid. They may be hard to find as all the lines are tied together.
5. Even if the resistance is the same for all lines, do a very close visual inspection of the grid.
6. A break in the antenna grid can be repaired using a Mopar Rear Window Defogger Repair Kit or equivalent.

MODULE, RADIO ANTENNA

DESCRIPTION

DESCRIPTION

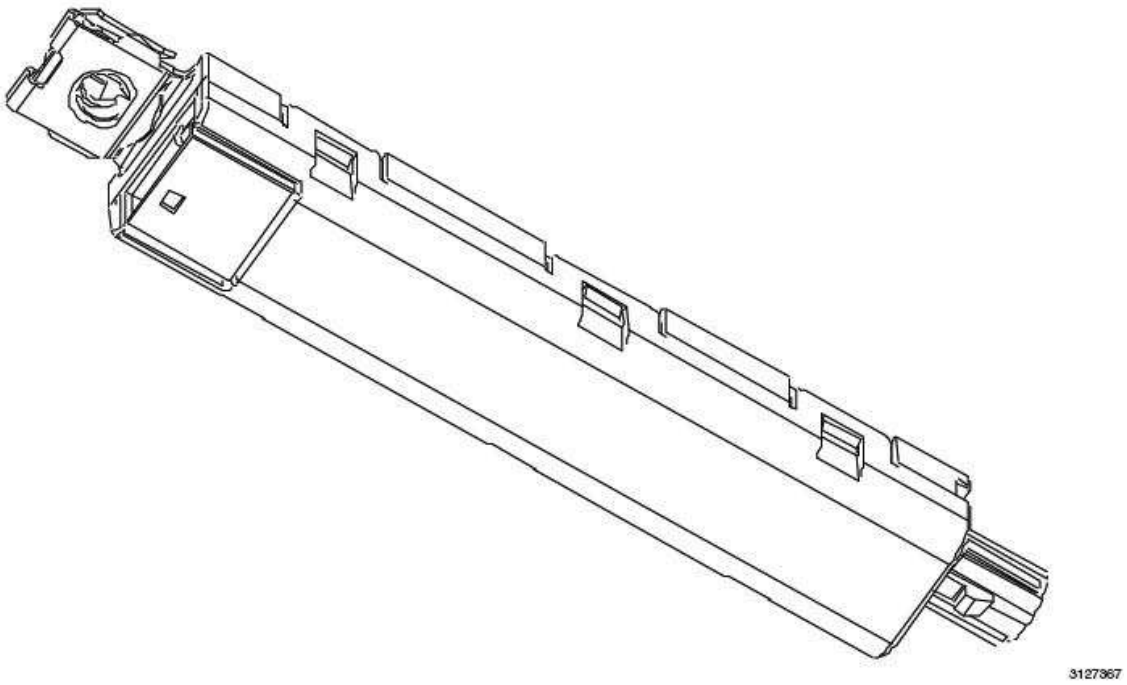


Fig. 6: View Of Antenna Module
Courtesy of CHRYSLER GROUP, LLC

The antenna module is an electronic circuit component designed to capture and enhance RF (Radio Frequency) signals in both the AM and FM broadcast bands. The antenna module is mounted to the right C-pillar. The module is grounded through the mounting bracket and fastener. The module has a one wire electrical connector that connects to the integral radio antenna grid located on the rear window. There is also a coax cable connector coming from the radio. The radio supplies a nine volt supply to the module, through the coax cable.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ANTENNA MODULE

1. Turn the ignition off.
2. Remove the right C-Pillar upper trim. Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .

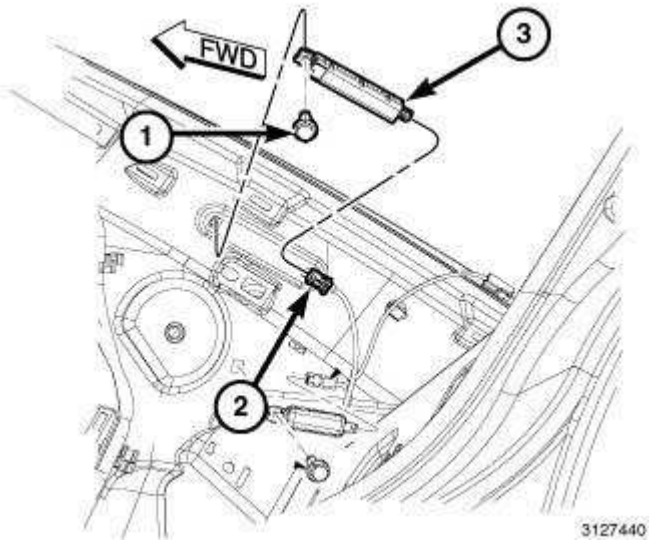


Fig. 7: Antenna Cable, Mounting Fasteners And Antenna Module
Courtesy of CHRYSLER GROUP, LLC

3. Check the antenna connections (2) to the antenna module (3) and to the antenna grid. If they are all right, continue. If they are not all right, clean and tighten the connections and re-test the audio.
4. Disconnect the antenna module white AM/ FM audio fakra connector (2) and connect the (special tool #9977-6-FM, Antenna) to the harness connector.
5. Place the magnetic antenna on the roof of the vehicle.
6. Drive the vehicle outside to a clear un-obstructed overhead view.
7. Turn the radio on and try several AM and FM stations.

- **Audio Improved - Check the antenna grid and repair if necessary. Refer to MAST, ANTENNA, DIAGNOSIS AND TESTING. If the grid checks good, replace the antenna module.**

- **Audio Did Not Improve - Check the radio and cables. or perform the Poor Or No AM/FM Audio Reception test. Refer to MAST, ANTENNA, DIAGNOSIS AND TESTING & DIAGNOSIS AND TESTING .**

REMOVAL

REMOVAL

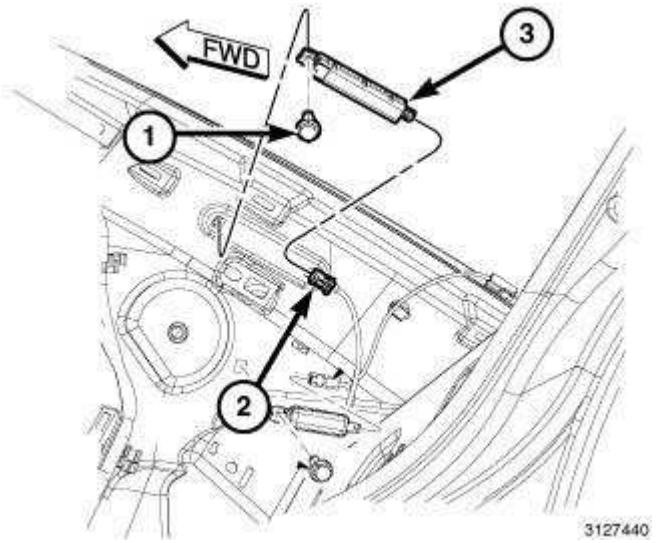


Fig. 8: Antenna Cable, Mounting Fasteners And Antenna Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the C-pillar upper trim.
3. Disconnect the antenna cable (2).
4. Remove the mounting fasteners (1) and antenna module (3).

INSTALLATION

INSTALLATION

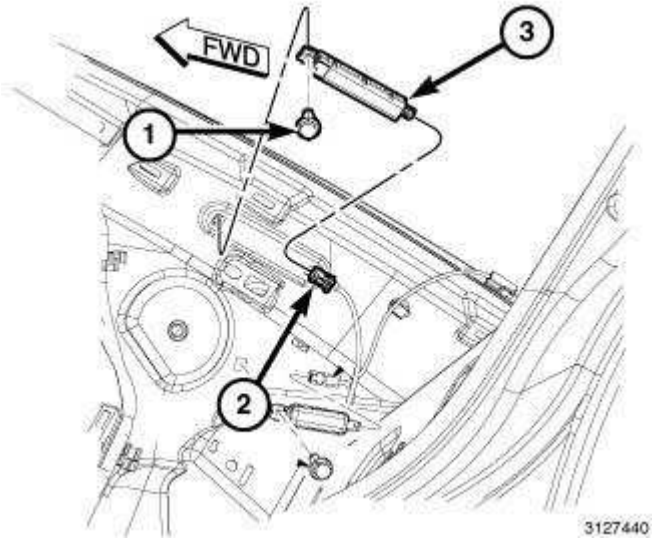


Fig. 9: Antenna Cable, Mounting Fasteners And Antenna Module
Courtesy of CHRYSLER GROUP, LLC

1. Position module into place.

2. Install and tighten mounting fasteners (1).
3. Connect the antenna module (2).
4. Install the C-pillar upper trim.
5. Connect battery negative cable.

RADIO

DESCRIPTION

DESCRIPTION

The radio features have been incorporated into the Telematics Gateway Module. Interaction with the radio features is done through the ISC screen module and switch bank located in the center stack of the instrument panel. For more information, refer to **MODULE, TELEMATICS GATEWAY, DESCRIPTION** and **POD, SWITCH BANK, DESCRIPTION** .

RADIO ANTI-THEFT CODE PROCEDURE

For the vehicles that are equipped with power net or NTG4 radios. If the TGM or the radio have been removed or replaced. A four digit security code is required in order for the radio to function:

1. The key must be in the "RUN" position.
2. Press the "ON/VOL" control button.
3. The word "CODE" or " Please enter Anti-Theft Code" will appear on the display.
4. Enter the 4-digit code by pressing the corresponding preset buttons in sequence.

NOTE: **If three consecutive attempts are made to enter an invalid anti-theft code the radio will enter a 'WAIT' state. While in this state the radio display will read 'WAIT'. To exit the 'WAIT' state the radio must remain powered with the ignition in the run position for a continuous 30 minutes (the vehicle may be driven during this time). After exiting the 'WAIT' state the radio will again display 'CODE' and a valid anti-theft code may be entered.**

SPEAKER

DESCRIPTION

BASE

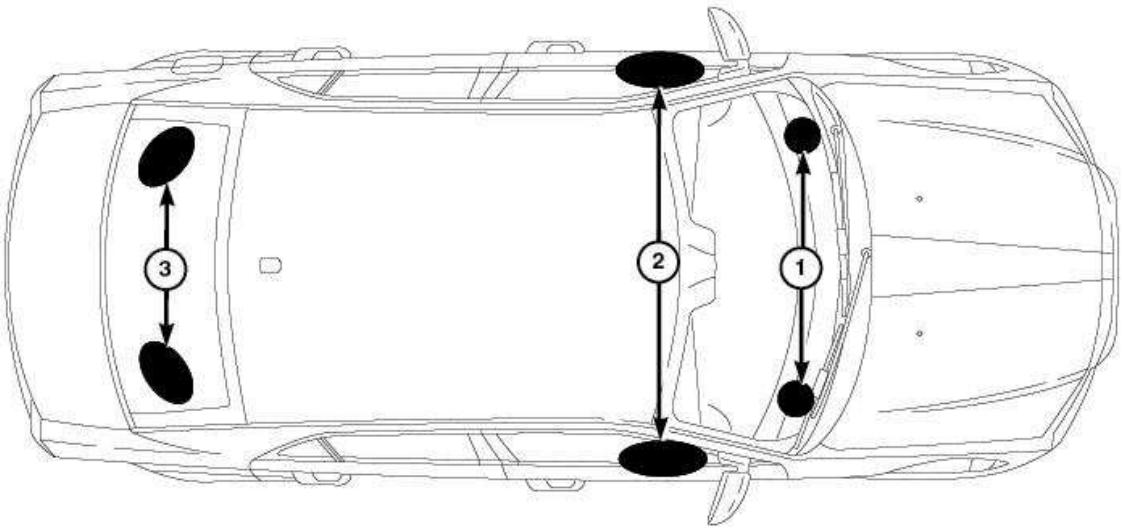


Fig. 10: Six Speakers
Courtesy of CHRYSLER GROUP, LLC

The base speaker system includes six speakers.

- Two 8.89 centimeter (3.5 inch) diameter midrange tweeters located in the instrument panel (1).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker located in each front door (2).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker located on each side of the rear shelf (3).

PREMIUM 1

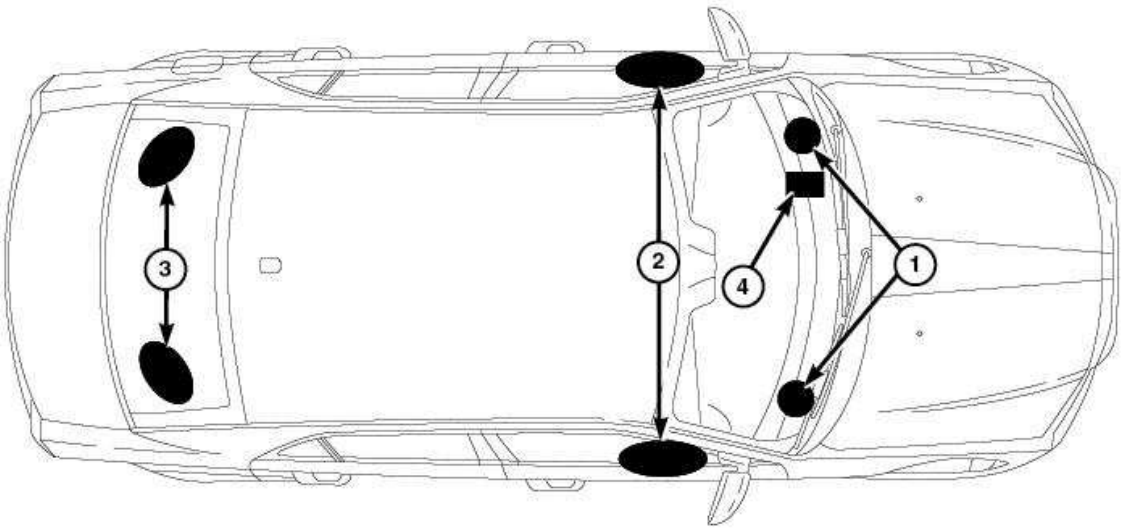


Fig. 11: Six Speakers And Amplifier
Courtesy of CHRYSLER GROUP, LLC

The premium 1 audio system includes six speakers and a amplifier.

- Two 8.89 centimeter (3.5 inch) diameter midrange tweeters located in the instrument panel (1).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker located in each front door (3).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker located on each side of the rear shelf (3).
- 8 channel 276 watts amplifier located under the instrument panel to the left of the steering column (4).

PREMIUM 2

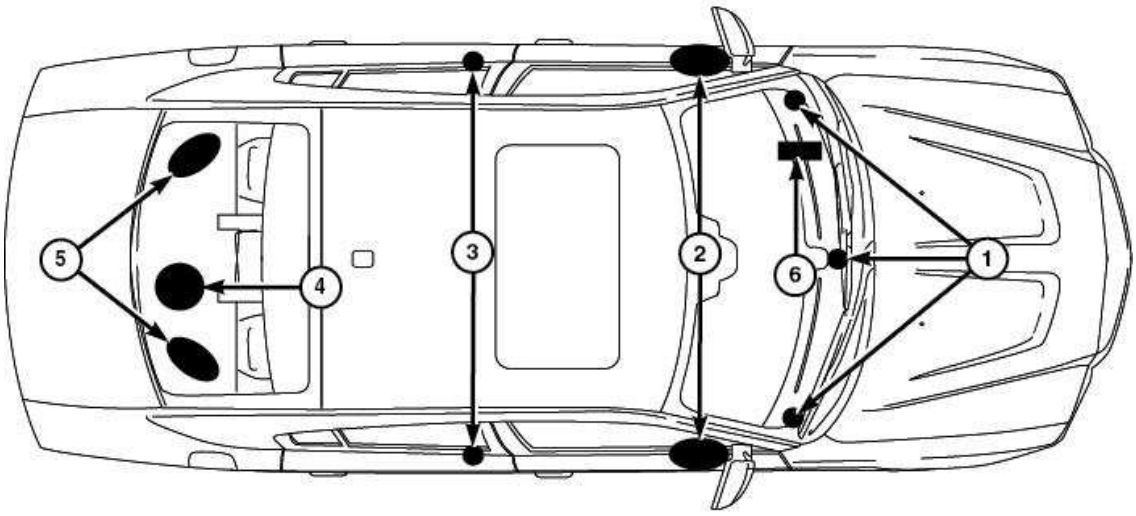


Fig. 12: Nine Speakers And A Amplifier
Courtesy of CHRYSLER GROUP, LLC

The audio system includes nine speakers and a amplifier.

- Three 8.89 centimeter (3.5 inch) diameter midrange tweeters located in the instrument panel (1).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker is located in each front door (2).
- Two 8.89 centimeter (3.5 inch) diameter midrange tweeters located in each rear door (3).
- One 20.32 centimeter (8 inch) DVC subwoofer (4).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker located on each side of the rear shelf (5).
- 12 channel 506 watts amplifier located under the instrument panel to the left of the steering column (6).

SRT

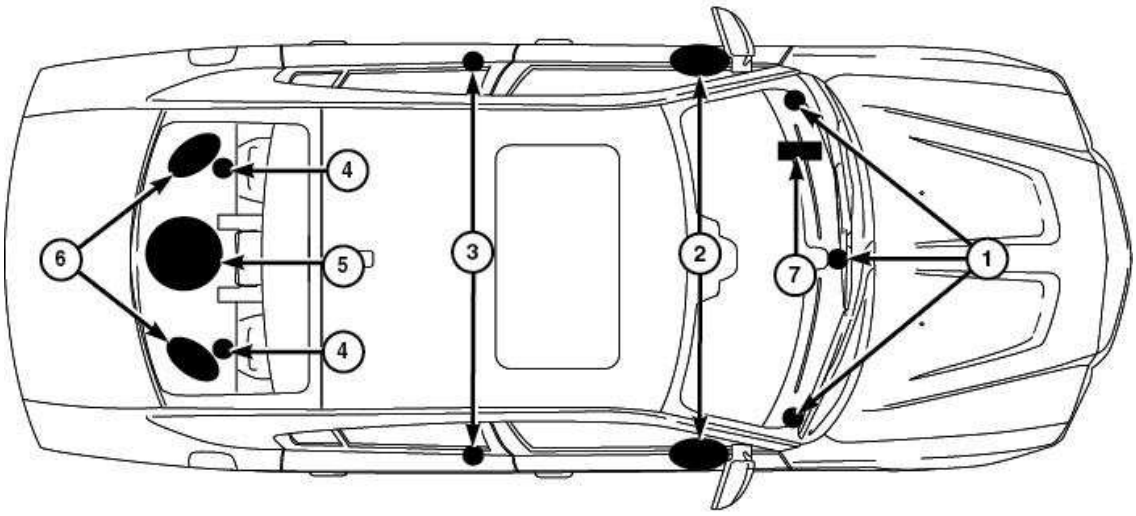


Fig. 13: Eleven Speakers And An Amplifier
Courtesy of CHRYSLER GROUP, LLC

The SRT audio system includes eleven speakers and an amplifier.

- Three - 8.89 centimeter (3.5 inch) diameter midrange tweeters located in the instrument panel (1).
- Two - 15.2 X 23 centimeter (6 X 9 inch) diameter speaker is located in each front door (2).
- Two - 8.89 centimeter (3.5 inch) diameter midrange tweeters located in each rear door (3).
- Two - 8.89 centimeter (3.5 inch) diameter midrange tweeters located on each side of the rear shelf (4).
- One - 25.4 centimeter (10 inch) DVC subwoofer (5).
- Two - 15.2 X 23 centimeter (6 X 9 inch) diameter speaker located on each side of the rear shelf (6).
- One - 12 channel 1000 watts amplifier located under the instrument panel to the left of the steering column (7).

BEATS™ BY DR. DRE™

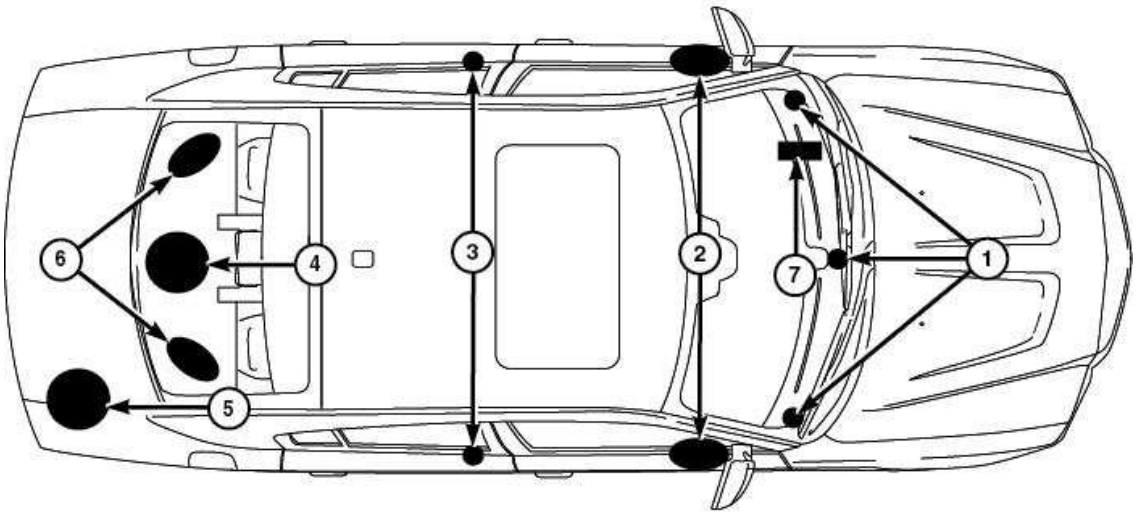


Fig. 14: Eleven Speakers And A Amplifier
Courtesy of CHRYSLER GROUP, LLC

The BEATS™ BY DR. DRE™ audio system includes eleven speakers and a amplifier

- Three 8.89 centimeter (3.5 inch) diameter midrange tweeters located in the instrument panel (1).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker is located in each front door (2).
- Two 8.89 centimeter (3.5 inch) diameter midrange tweeters located in each rear door (3).
- One 20.32 centimeter (8 inch) DVC subwoofer in the rear shelf (4).
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speaker located on each side of the rear shelf (6).
- One 20.32 centimeter (8 inch) DVC subwoofer in the right rear quarter panel in the trunk (5).
- 12 channel 552 watts amplifier located under the instrument panel to the left of the steering column (7).

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SPEAKER

Any diagnosis of the Audio system should begin with the use of a scan tool and the appropriate Diagnostic Service information.

Refer to the appropriate wiring information.

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

CAUTION: The speaker output of the radio is a "floating ground" system. Do not allow any speaker lead to short to ground, as damage to the radio may result.

1. If all speakers are inoperative, check the TGM fuses in the rear power distribution center. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.
2. Check the amplifier fuse (if equipped) in the rear power distribution center. If OK, go to Step 3. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.
3. Turn the ignition switch to the ON position. Turn the radio receiver ON. Adjust the balance and fader control controls to check the performance of each individual speaker. Note the speaker locations that are not performing correctly. Go to Step 4.
4. Check both the speaker feed (+) circuit and return (-) circuit cavities for the inoperative speaker at the wire harness connector for continuity to ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the shorted speaker feed (+) and/or return (-) circuits(s) to the speaker as required.
5. Disconnect wire harness connector at the inoperative speaker. Check for continuity between the speaker feed (+) circuit cavities of the radio receiver wire harness connector or if equipped, the amplifier wire harness connector and the speaker wire harness connector. Repeat the check between the speaker return (-) circuit cavities of the radio receiver wire harness connector and the speaker wire harness connector. In each case, there should be continuity. If OK, replace the faulty speaker. If not OK, repair the open speaker feed (+) and/or return (-) circuits(s) as required.

REMOVAL

INSTRUMENT PANEL

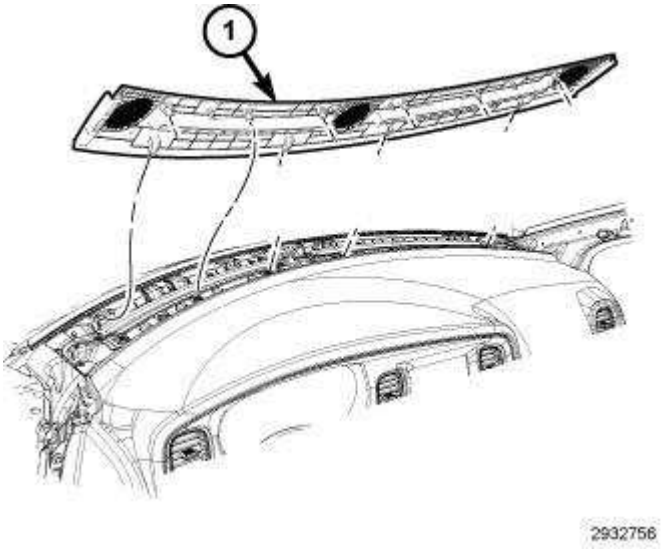


Fig. 15: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the defroster grille (1). Refer to **GRILLE, DEFROSTER, REMOVAL** .
3. Remove the speaker mounting retainers.
4. Disconnect the electrical connector and remove the speaker.

FRONT DOOR

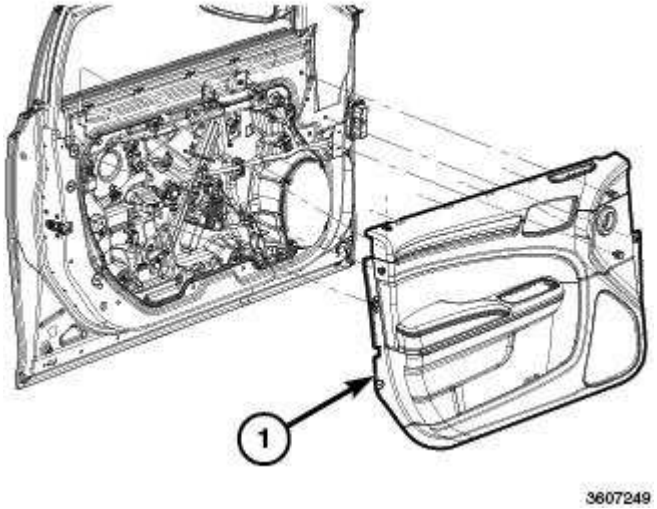


Fig. 16: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the IBS/negative battery cable assembly to the negative battery post.
2. Remove the door trim panel (1). Refer to **PANEL, DOOR TRIM, REMOVAL** .

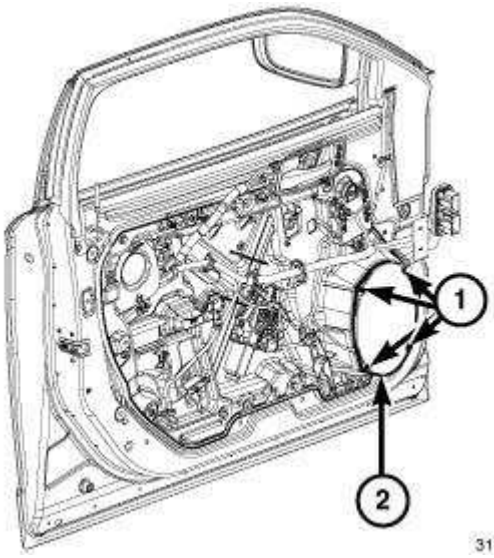


Fig. 17: Speaker Retainers & Speaker (Front Door)
Courtesy of CHRYSLER GROUP, LLC

3. Remove the speaker retainers (1).

NOTE: Hold the speaker while disconnecting the speaker electrical connector.

4. Disconnect the speaker electrical connector from the speaker (2).
5. Remove the speaker from the door.

REAR DOOR

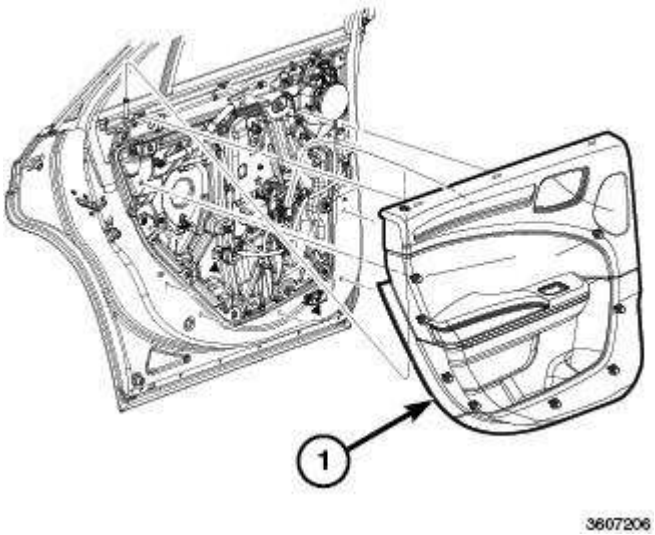


Fig. 18: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the IBS/negative battery cable assembly from the negative battery post.

2. Remove the door trim panel (1). Refer to **PANEL, REAR DOOR TRIM, REMOVAL** .

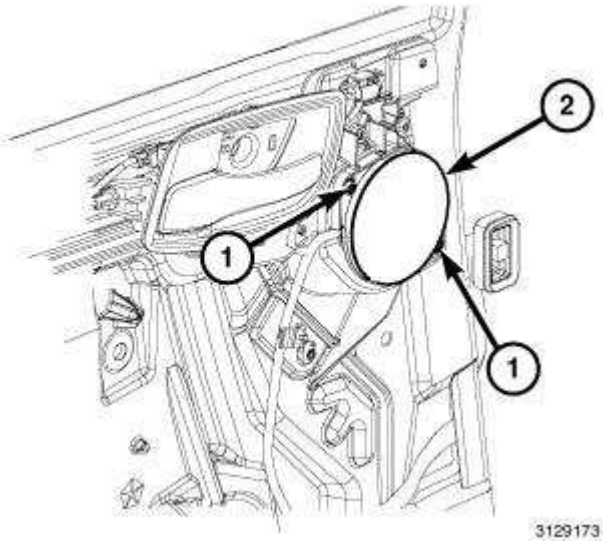


Fig. 19: Speaker Retainers & Speaker (Rear Door)
Courtesy of CHRYSLER GROUP, LLC

3. Remove the speaker retainers (1).
4. Disconnect the speaker electrical connector and remove the speaker (2).

REAR SHELF

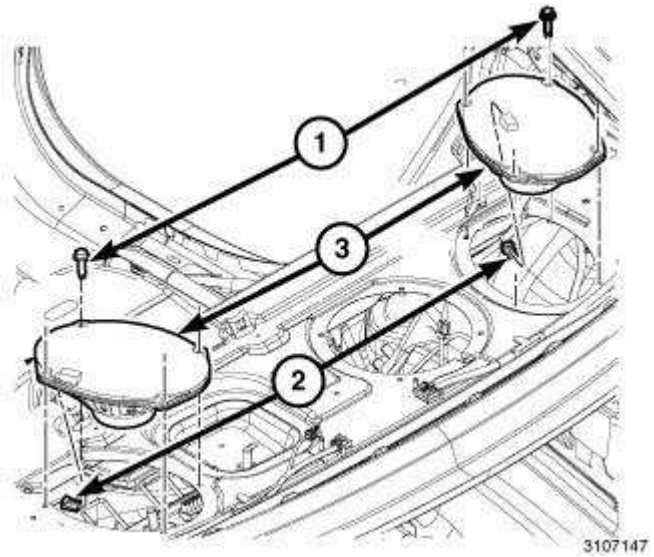


Fig. 20: Speaker Retainers, Speaker Electrical Connector & Rear Shelf Speakers
Courtesy of CHRYSLER GROUP, LLC

NOTE: 6X9" shown in illustration, 6.5" and 3.5" Unity speaker similar.

1. Disconnect the negative battery cable.
2. Remove the rear shelf cover. Refer to **PANEL, REAR SHELF, REMOVAL** .
3. Remove the speaker retainers (1).
4. Disconnect the speaker electrical connector (2).
5. Remove the rear shelf speakers (3).

SUBWOOFER - REAR SHELF

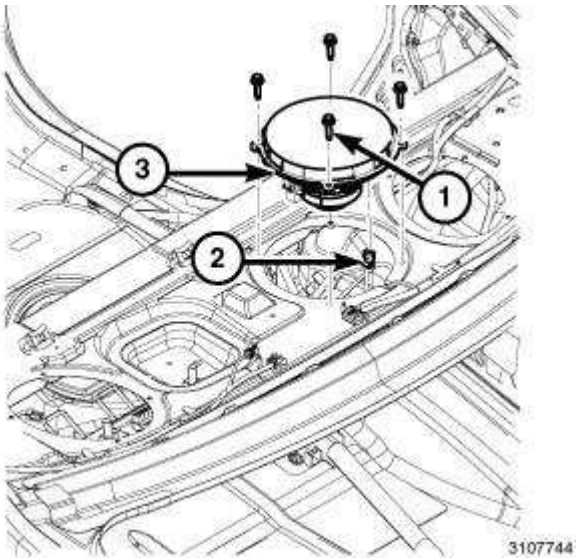


Fig. 21: Subwoofer, Retainers & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the rear shelf cover. Refer to **PANEL, REAR SHELF, REMOVAL** .
3. Remove the subwoofer retainers (1).
4. Disconnect the subwoofer electrical connector (2).
5. Remove the subwoofer (3).

SUBWOOFER - BEATS™ BY DR. DRE™

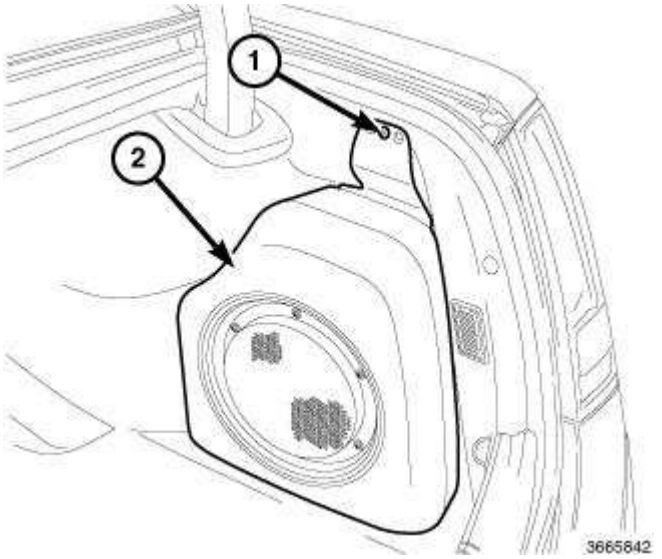


Fig. 22: Subwoofer Mounting Retainer & Vehicle
Courtesy of CHRYSLER GROUP, LLC

1. Open the trunk lid.
2. Disconnect the negative battery cable.
3. Remove the subwoofer mounting retainer (1).
4. Disconnect the subwoofer electrical connector.
5. Remove the subwoofer from the vehicle (2).

INSTALLATION

INSTRUMENT PANEL

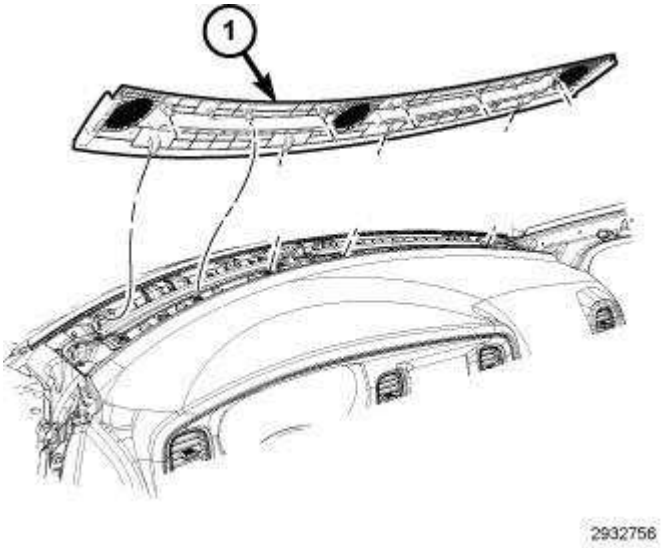


Fig. 23: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

1. Connect the electrical connector to the speaker and position into the instrument panel.
2. Install the speaker mounting retainers.
3. Install the defroster grille (1). Refer to **GRILLE, DEFROSTER, INSTALLATION** .
4. Connect the negative battery cable.

FRONT DOOR

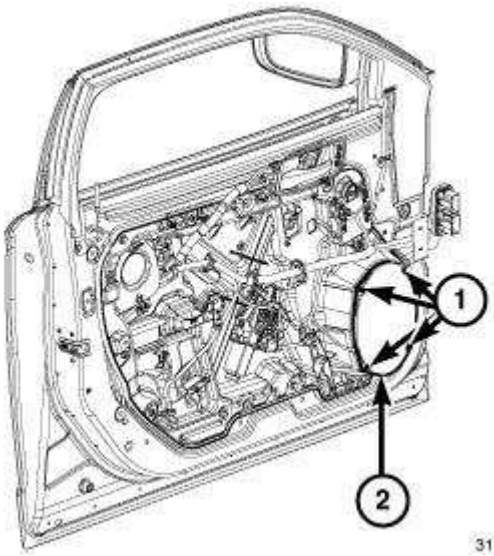


Fig. 24: Speaker Retainers & Speaker (Front Door)
Courtesy of CHRYSLER GROUP, LLC

NOTE: Hold the speaker while connecting the speaker electrical connector.

1. Connect the speaker electrical connector to the speaker.
2. Position the speaker (2) into the door and install the retainers (1).

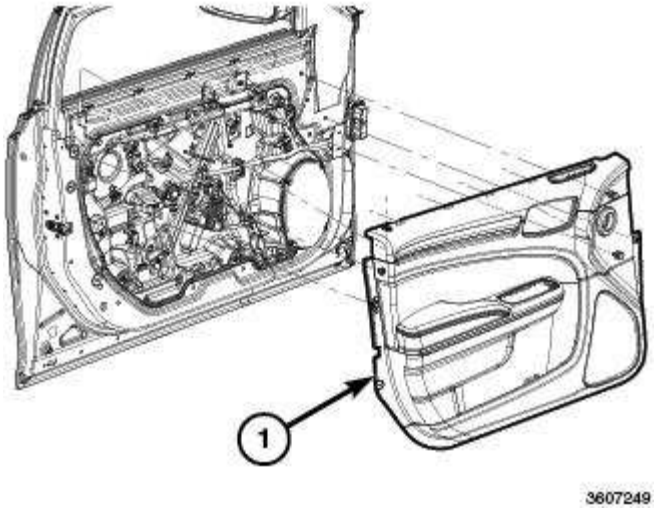


Fig. 25: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

3. Install the door trim panel (1). Refer to **PANEL, DOOR TRIM, INSTALLATION** .
4. Connect the IBS/negative battery cable assembly to the negative battery post.

REAR DOORS

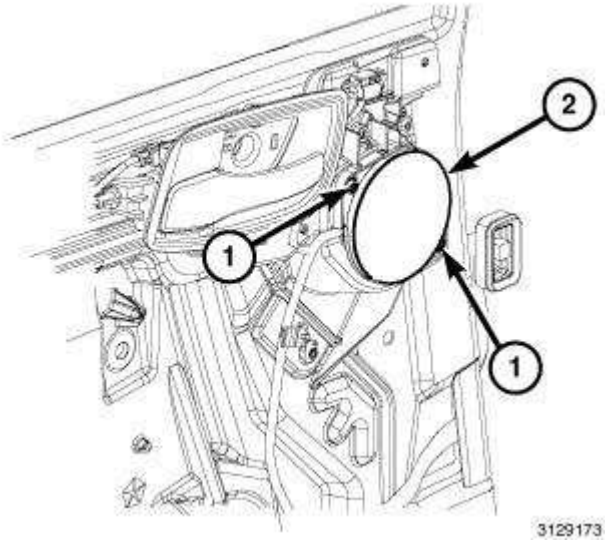


Fig. 26: Speaker Retainers & Speaker (Rear Door)
Courtesy of CHRYSLER GROUP, LLC

1. Connect the speaker electrical connector.
2. Position the speaker (2) into the door and install the speaker retainers (1).

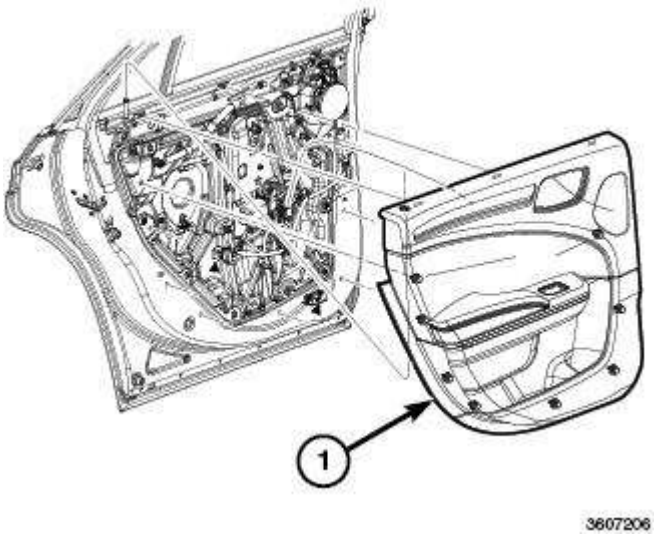


Fig. 27: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

3. Install the door trim panel (1). Refer to **PANEL, REAR DOOR TRIM, INSTALLATION** .
4. Connect the IBS/negative battery cable assembly to the negative battery post.

REAR SHELF

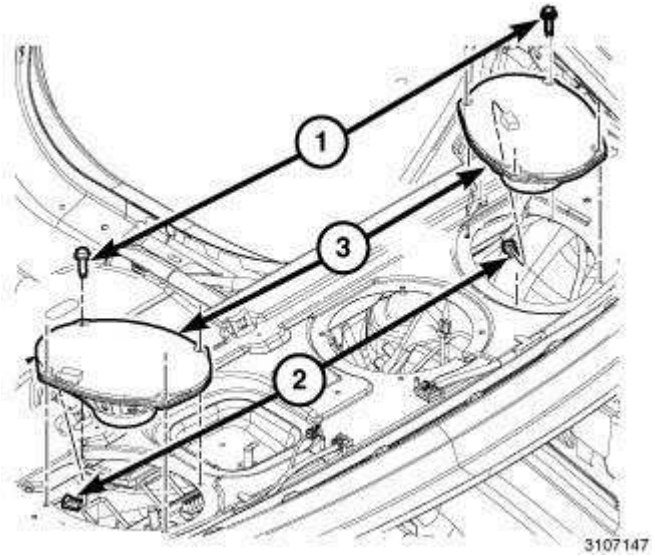


Fig. 28: Speaker Retainers, Speaker Electrical Connector & Rear Shelf Speakers
Courtesy of CHRYSLER GROUP, LLC

NOTE: 6X9" shown in illustration, 6.5" and 3.5" Unity speaker similar.

1. Connect the speaker electrical connector (2).
2. Position speaker (3) into the rear shelf.
3. Install the speaker retainers (1).
4. Install the rear shelf cover. Refer to **PANEL, REAR SHELF, INSTALLATION** .
5. Connect the negative battery cable.

SUBWOOFER - REAR SHELF

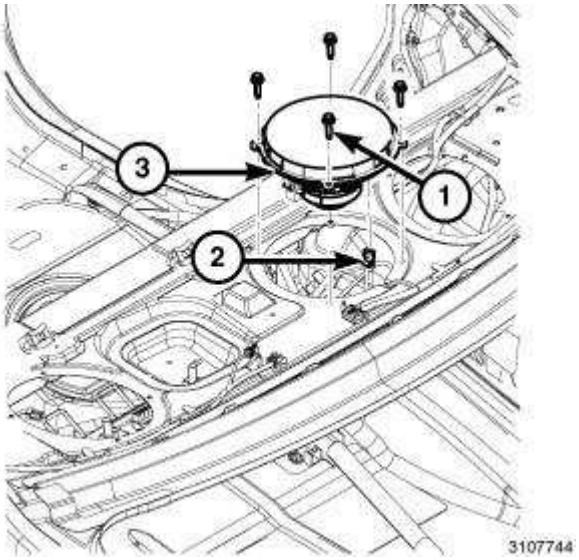


Fig. 29: Subwoofer, Retainers & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

1. Connect the subwoofer electrical connector (2).
2. Position the subwoofer (3) into the rear shelf.
3. Install the subwoofer retainers (1).
4. Install the rear shelf cover. Refer to **PANEL, REAR SHELF, INSTALLATION** .
5. Connect the negative battery cable.

SUBWOOFER - BEATS™ BY DR. DRE™

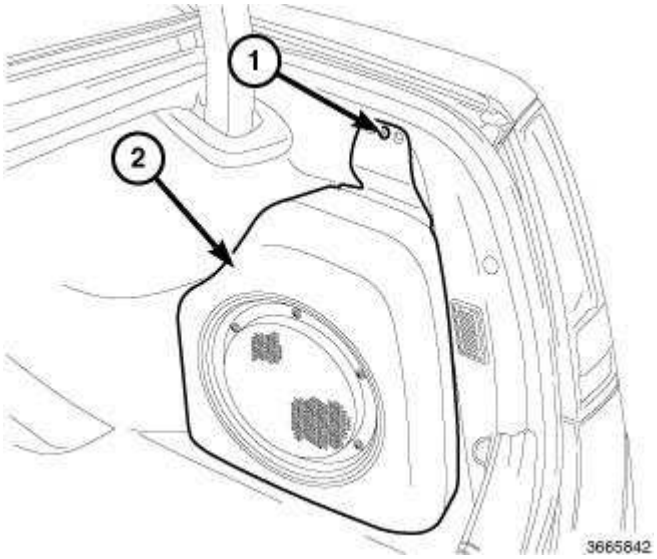


Fig. 30: Subwoofer Mounting Retainer & Vehicle
Courtesy of CHRYSLER GROUP, LLC

1. Position the subwoofer (2) to the right side of the truck area and connect the subwoofer

electrical connector.

2. Install the subwoofer mounting retainer (1).
3. Connect the negative battery cable.
4. Close the trunk lid.

SWITCH, REMOTE RADIO

DESCRIPTION

REMOTE RADIO SWITCH WITHOUT PADDLE SHIFT

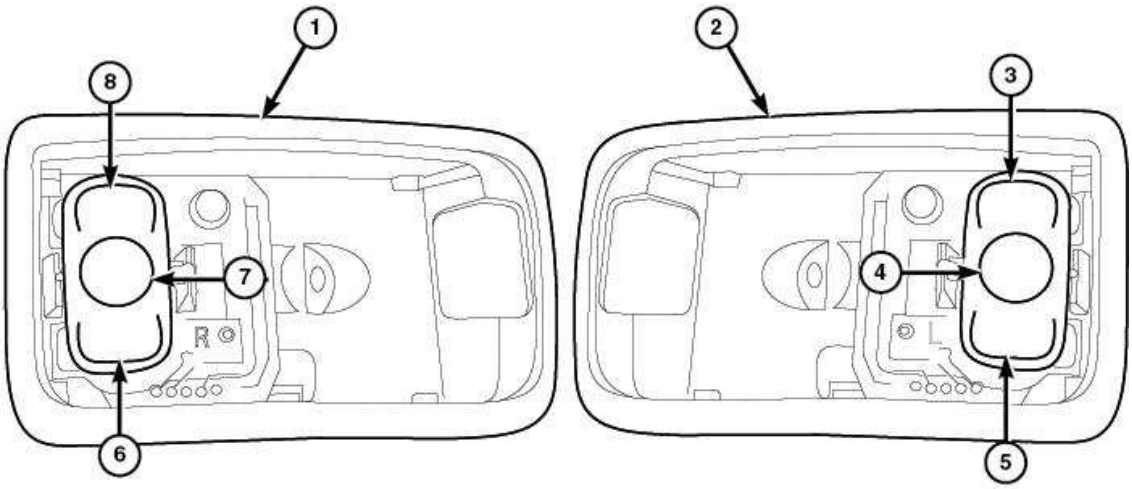


Fig. 31: Remote Radio Switches
Courtesy of CHRYSLER GROUP, LLC

The remote radio switches are mounted to the back of the steering wheel. Each switch consists of a remote radio switch and a paddle shift switch.

The right switch (1) consists of the following functions:

- Volume "UP" (8)
- Mode (7)
- Volume "DOWN" (6)

The left switch (2) consists of the following functions:

- Seek "UP" (3)
- Preset (4)
- Seek "DOWN" (5)

For information on the operation of the remote radio and paddle shift switches. Refer to **SWITCH, REMOTE RADIO, OPERATION**.

REMOTE RADIO SWITCH WITH PADDLE SHIFT

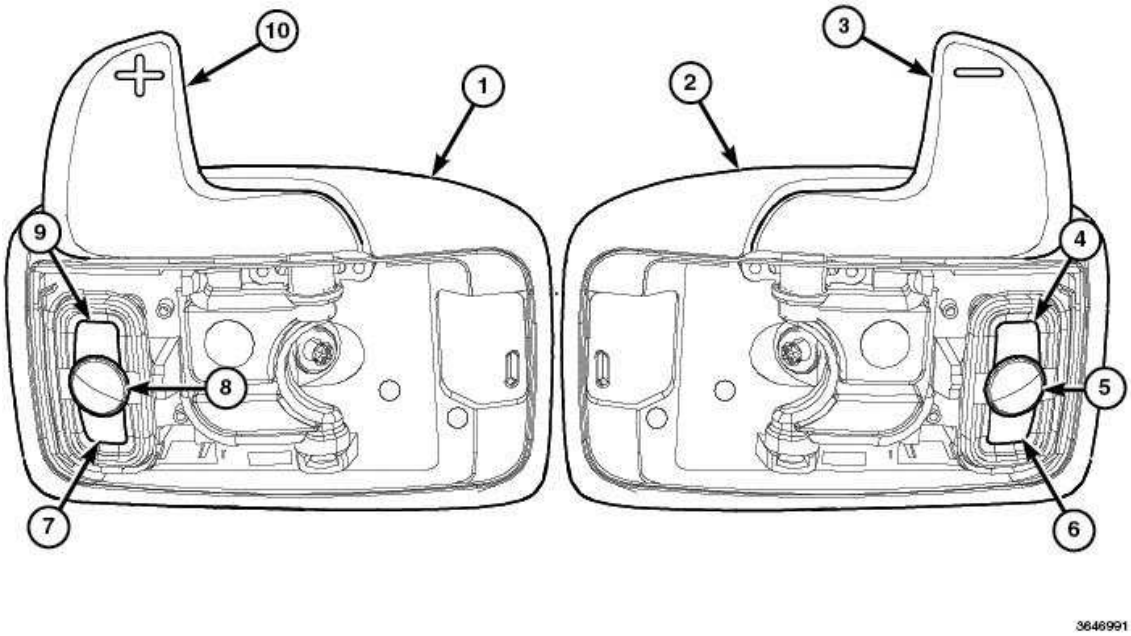


Fig. 32: Remote Radio Switches
Courtesy of CHRYSLER GROUP, LLC

The remote radio switches are mounted to the back of the steering wheel. Each switch consists of a remote radio switch and a paddle shift switch.

The right switch (1) consists of the following functions:

- Upshift switch (paddle shift) (10)
- Volume "UP" (9)
- Mode (8)
- Volume "DOWN" (7)

The left switch (2) consists of the following functions:

- Downshift switch (paddle shift) (3)
- Seek "UP" (4)

- Preset (5)
- Seek "DOWN" (6)

For information on the operation of the remote radio and paddle shift switches. Refer to **SWITCH, REMOTE RADIO, OPERATION**.

OPERATION

REMOTE RADIO SWITCH WITHOUT PADDLE SHIFT

The six switches (back of steering wheel spokes) in the two remote radio switch units are normally open, resistor multiplexed momentary switches that are hard wired to the right steering wheel switch (speed control switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The right steering wheel switch (speed control switch) senses the status of the switches by reading the voltage drop of the signal circuit.

When the right steering wheel switch (speed control switch) senses an input (voltage drop) from any one of the remote radio switches, it communicates the switch status message to the Steering Column Control Module (SCCM) via the LIN Bus (through the clockspring). The SCCM then broadcasts switch status information over the CAN Bus to the audio system. The electronic circuitry within the audio system is programmed to respond to these remote radio switch status messages by adjusting the audio settings as requested.

For the removal procedure. Refer to **SWITCH, REMOTE RADIO, REMOVAL**.

REMOTE RADIO SWITCH WITH PADDLE SHIFT

REMOTE RADIO SWITCHES

The six switches (back of steering wheel spokes) in the two remote radio switch units are normally open, resistor multiplexed momentary switches that are hard wired to the right steering wheel switch (speed control switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The right steering wheel switch (speed control switch) senses the status of the switches by reading the voltage drop of the signal circuit.

When the right steering wheel switch (speed control switch) senses an input (voltage drop) from any one of the remote radio switches, it communicates the switch status message to the Steering Column Control Module (SCCM) via the LIN Bus (through the clockspring). The SCCM then broadcasts switch status information over the CAN Bus to the audio system. The electronic circuitry within the audio system is programmed to respond to these remote radio switch status messages by adjusting the audio settings as requested.

PADDLE SHIFTERS

The paddle shifters in the two remote radio switch units are normally open, resistor multiplexed

momentary switches that are hard wired to the right steering wheel switch (speed control switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The right steering wheel switch (speed control switch) senses the status of the switches by reading the voltage drop of the signal circuit.

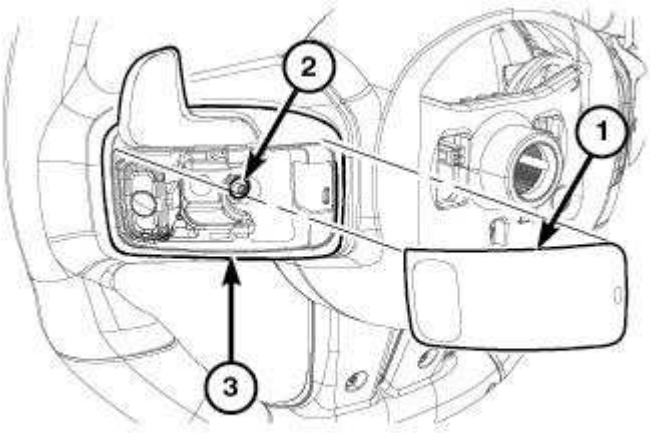
When the right steering wheel switch (speed control switch) senses an input (voltage drop) from any one of the paddle shifters, it communicates the switch status message to the steering column control module (SCCM) via the LIN Bus (through the clockspring). The SCCM then broadcasts switch status information over the CAN Bus to the transmission control module (TCM) communicating driver request for transmission upshift or downshift.

For the removal procedure. Refer to **SWITCH, REMOTE RADIO, REMOVAL**.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.



3648319

Fig. 33: Paddle Shift Unit Cover, Paddle Shift Unit Retainer & Paddle Shift Unit
Courtesy of CHRYSLER GROUP, LLC

NOTE: With paddle shift shown in illustration, without paddle shift similar.

1. Disconnect the IBS/negative battery cable assembly from the negative battery post.
2. From the back of the steering wheel, remove the remote radio switch with paddle shift unit cover (1).
3. Remove the remote radio switch with paddle shift unit retainer (2).
4. Gently remove the remote radio switch with paddle shift unit (3) from the steering wheel.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

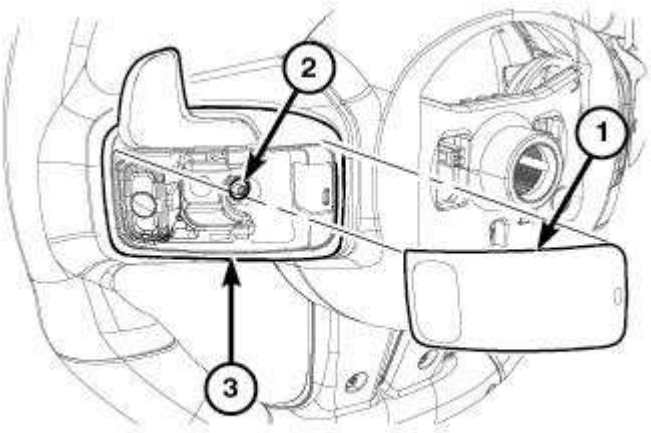


Fig. 34: Paddle Shift Unit Cover, Paddle Shift Unit Retainer & Paddle Shift Unit
Courtesy of CHRYSLER GROUP, LLC

NOTE: With paddle shift shown in illustration, without paddle shift similar.

NOTE: Verify that the remote radio switch with paddle shift unit connector lines up with steering wheel connector before fully seating switch.

1. Install the remote radio switch with paddle shift unit to the back of the steering wheel.
2. Install the remote radio switch with paddle shift unit retainer (2).

Tighten retainer to 1.22 N.m (11 in. lbs.).

3. Install the remote radio switch with paddle shift unit cover (1), be sure that the cover is snapped securely in place.
4. Connect the IBS/negative battery cable assembly to the negative battery post.

AUTOMATIC TRANSMISSION

8HP45 - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

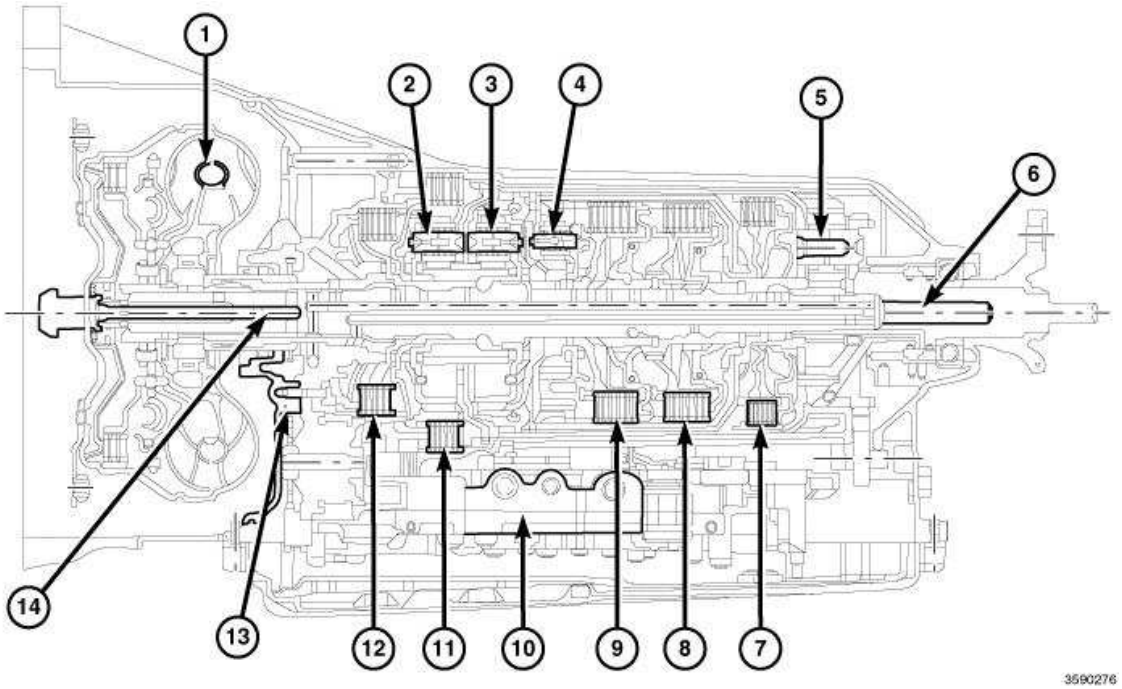


Fig. 1: 8HP45 Automatic Transmission
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER	8 - C CLUTCH
2 -P1 PLANETARY	9 - E CLUTCH
3 - P2 PLANETARY	10 - VALVE BODY
4 - P3 PLANETARY	11 - B CLUTCH
5 - P4 PLANETARY	12 - A CLUTCH
6 - OUTPUT SHAFT	13 - OIL PUMP
7 - D CLUTCH	14 - INPUT SHAFT

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

The transmission case is a single-piece unit. The starter pocket, cooler line fittings, and manual park

release lever are located on the driver's side of the case. The electrical connector and oil fill plug are located on the passenger side of the case. The two-wheel drive model uses a flanged output shaft connection. The all-wheel drive model uses a sealed, externally-splined output shaft to form a dry connection between the adapter plate and the Borg Warner 44-40 transfer case.

TRANSMISSION IDENTIFICATION

Two bar code labels are applied to the transmission case. The label on the driver's side rear of the case contains the Chrysler component tracking number on the top and the Chrysler part number on the bottom.

TRANSMISSION GEAR RATIOS

The gear ratios for the 8HP45 automatic transmission are as follows:

GEAR	RATIO
1ST	4.69:1
2ND	3.13:1
3RD	2.10:1
4TH	1.67:1
5TH	1.28:1
6TH	1.00:1
7TH	0.84:1
8TH	0.67:1
REVERSE	3.30:1

OPERATION

OPERATION

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

The 8HP45 is an electronic eight-speed automatic transmission. The Transmission Control Module Assembly (TCMA), which is integrated into the valve body, provides fully synchronized clutch-to-clutch shifting through four planetary gear sets. The TCMA includes a mounting plate that holds the Transmission Control Module (TCM) and a molded wiring harness for connection to various transmission sensors and solenoids. The valve body assembly contains all the sensors and solenoids required for operation, completely inside the transmission. Eight speeds allow the engine to maintain its optimal RPM range, increasing fuel economy and performance.

Transmission control is performed by the TCM based on hard-wired and CAN bus signals from

sensors and modules. The TCM receives driveability data from the Powertrain Control Module (PCM) and other modules over the CAN-C bus. It also receives shift lever position information from the electronic shifter over a dedicated transmission CAN bus. The TCM processes this input data and controls operation of the torque converter clutch, park lock system, solenoid valves, and pressure regulating valve.

The input and output speed sensors are Hall-effect sensors that measure shaft rotational speed. The input speed sensor is located at the top, near the center, of the of the TCMA and reads input shaft speed from the magnetic ring on the P2 carrier. The output speed sensor is located at the back of the TCMA and reads output shaft speed from the P4 carrier

FILTER SERVICE

The 8HP45 has a conventional fluid sump design, however, the filter is integrated into the oil pan resulting in a lower profile for improved vehicle packaging. The oil pan gasket is reusable providing it is not damaged during removal.

FLUID CHECK AND FILL

A fluid fill tube and indicator are not provided. All work is performed under the vehicle while raised on a hoist. In the event of a transmission shift quality concern, a fluid leak, or in conjunction with a transmission repair, the transmission fluid level must be validated and topped off as necessary. The procedure involves the use of a scan tool to monitor transmission fluid temperature. Specific service procedures are necessary to check and fill the transmission with fluid. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

CLUTCHES

The 8HP45 transmission uses two multi-plate holding clutches (A and B) and three multi-plate driving (rotating) clutches (C, D, and E). Gear shifts from one - eight and eight - one are synchronous shifts, meaning one of the clutches must continue to transmit torque at lower pressure until the other clutch is able to accept the input torque.

Clutches A and B are holding clutches. Clutch A is applied by hydraulic pressure and released by a return spring, similar to the driving clutches. Clutch B operation is unique because it has fluid chambers on both sides of the apply piston, and therefore it is applied and released hydraulically. Regulation of fluid pressure on each side of the piston allows precise positioning of clutch B for apply, release, and controlled slip conditions.

Clutches C, D, and E operate in a similar manner. Regulated pressure is available at the clutch C shift solenoid and the clutch valve. When the shift solenoid is de-energized, fluid flows through the shift solenoid and applies pressure to the clutch valve. During the shift, pressure moves the clutch valve, which begins to apply the clutch. Pressure from the holding valve regulates the opening of the clutch valve, softening the shift. Above a set threshold, the holding valve seats and allows the clutch valve to open completely.

EMERGENCY RUNNING FUNCTION - LIMP IN MODE

In the event of a complete transmission electrical failure (loss of power to the TCM), the transmission enters default limp-in mode. When the TCM loses power, all solenoids are de-energized. Maximum pressure locks the transmission in 6th gear, and a diagnostic trouble code (DTC) is stored in memory. If the vehicle is in a forward gear range when the fault occurs, the transmission defaults to 6th gear.

If the vehicle is in park, reverse, or neutral, or if the engine is turned off when the fault occurs, the transmission will remain in park because the park lock release system cannot release the parking pawl. No hydraulic pressure is supplied to the driving clutches. In this situation, the manual park release lever must be used to disengage the park pawl.

The limp-in function remains active until the DTC is rectified or the stored DTC is erased with the appropriate scan tool.

OIL PUMP OPERATION

The oil pump is located just behind the torque converter, between the pump housing and cover assemblies. The torque converter drives the pump assembly using a chain and sprockets. The oil pump is a double-stroke vane pump. The pump has dual chambers, two inlet and two outlet ports, allowing it to produce the fluid volume necessary for all operating conditions. The pump draws fluid through a filter and pressurizes the fluid as the pump rotates. After the fluid is pressurized, it exits the pump through two exhaust ports that feed the system pressure valve. The system pressure valve maintains fluid pressure and allows excess pressure to be returned to the pump. This reduces cavitation and noise. A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch Application chart provides a basis for analyzing road test results.

CLUTCH APPLICATION

GEAR	A	B	C	D	E	RATIO
1	X	X	X			4.69
2	X	X			X	3.13
3		X	X		X	2.10
4		X		X	X	1.67
5		X	X	X		1.29
6			X	X	X	1.1
7	X		X	X		.84
8	X			X	X	.67
N						N/A
R	X	X		X		3.3

SOLENOID CHART

GEAR	PARK	A	B	C	D	E	TCC	LPS
P	OFF	ON	TP	OFF	OFF	OFF	OFF	OFF
N	ON	ON	TP	OFF	OFF	OFF	OFF	OFF
R	ON	ON	ON	OFF	ON	OFF	OFF	±
1	ON	ON	ON	ON	OFF	OFF	±	±

2	ON	ON	ON	OFF	OFF	ON	±	±
3	ON	OFF	ON	ON	OFF	ON	±	±
4	ON	OFF	ON	OFF	ON	ON	±	±
5	ON	OFF	ON	ON	ON	OFF	±	±
6	ON	OFF	OFF	ON	ON	ON	±	±
7	ON	ON	OFF	ON	ON	OFF	±	±
8	ON	ON	OFF	OFF	ON	ON	±	±

TP= Touch Point Pressure

± = Variable Actuation

POWERFLOW COMPONENTS

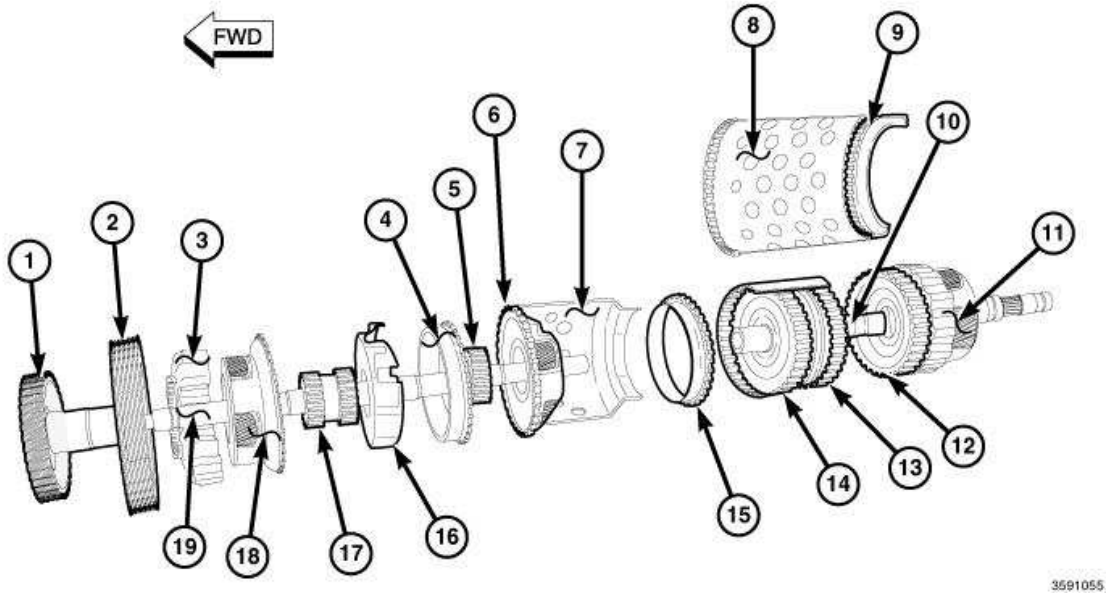


Fig. 2: Powerflow Components
Courtesy of CHRYSLER GROUP, LLC

1- A CLUTCH	11 - P4 CARRIER
2 - B CLUTCH	12 - D CLUTCH
3 - P1 ANNULUS (PARTIAL CUTAWAY)	13 - C CLUTCH
4 - P2 ANNULUS	14 - E CLUTCH
5 - P3 SUN GEAR	15 - P3 ANNULUS
6 - P3 CARRIER	16 - P2 CARRIER
7 - D CLUTCH DRUM (PARTIAL CUTAWAY)	17 - P1/P2 SUN GEAR
8 - P4 ANNULUS DRUM (PARTIAL CUTAWAY)	18 - P1 CARRIER
9 - P4 ANNULUS (PARTIAL CUTAWAY)	19 - INPUT SHAFT

10 - P4 SUN GEAR/D CLUTCH RETAINER (PARTIAL CUTAWAY)	

Use this POWER FLOW COMPONENTS graphic and chart to identify the individual components of the specific gear powerflow explanations below:

FIRST GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) and clutch B (2) holds the P1 annulus (3). Because two members of the same gear set are held, the entire P1 gear set is stationary. The stationary P1 carrier (18) is connected to the P4 annulus (9), locking the annulus. The input shaft (19) drives the C clutch (13), and the C clutch (13) drives the P4 sun gear (10). The P4 sun gear (10) drives the P4 carrier (11), whose pinions walk around the held P4 annulus (9).

SECOND GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) and clutch B (2) holds the P1 annulus (3). As with 1st gear, the entire P1 gear set is stationary. The stationary P1 carrier (18) is connected to the P4 annulus (9), locking the annulus. The input shaft (19) drives the P2 carrier (16). The P2 carrier (16) drives the P2 annulus (4). The P2 annulus (4) drives the E clutch (14) through the P3 sun gear (5) connection. The E clutch (14) then drives the P4 sun gear (10). The P4 sun gear (10) drives the P4 carrier (11), whose pinions walk around the held P4 annulus (9).

THIRD GEAR POWERFLOW

Clutch B (2) holds the P1 (3) annulus. The input shaft (19) drives the C clutch (12), which drives the P4 annulus (9). The C clutch (12) also drives the E clutch (14), which drives the P2 annulus (4). Because the P2 carrier (16) and the P2 annulus (4) are both driven at input shaft speed, the P2 gear set is locked at input shaft speed. The P1/P2 sun gear (17) drives the P1 carrier (18), and the P1 carrier drives the P4 annulus (9).

FOURTH GEAR POWERFLOW

Clutch B (2) holds the P1 annulus (3). With the E (14) and D (12) clutches applied, all components of the P3 and P4 gear sets are locked together to rotate at the same speed. The input shaft (19) drives the P2 carrier (16) which drives the P1/P2 sun gear (17). The P1/P2 sun gear drives the P1 carrier (18). The P1 carrier drives the P4 gear set through the P4 annulus (9).

FIFTH GEAR POWERFLOW

Clutch B (2) holds the P1 annulus (3). The input shaft (19) always drives the P2 carrier (16). Because the C clutch (13) is applied, the P3 annulus (15) and P4 sun gear (10) are also driven at input shaft speed. The D clutch (12) is applied to connect the P3 carrier (6) with the P4 carrier (11). The P2 carrier (16) drives the P1/P2 sun gear (17), which drives the P1 carrier (18). The P1 carrier walks around the held P1 annulus (3) and drives the P4 annulus (9). Gear reduction is achieved between the P4 sun gear (10) rotating at input shaft speed and the P4 annulus (9) rotating at a reduced speed.

SIXTH GEAR POWERFLOW

Clutch C (13) drives the P3 annulus (15) at input shaft speed and E clutch (14) drives the P3 sun gear (5) at input shaft speed. Because two components of the same gear set are driven at the same speed, the entire gear set is locked in rotation. The D clutch (12) connects the P3 carrier (6) to the P4 carrier (11) and the output shaft.

SEVENTH GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) stationary. The input shaft drives the P2 carrier which drives the P2 annulus, increasing the speed of the P3 sun gear (5) and creating overdrive. The C clutch (13) drives the P3 annulus (15) at input shaft speed. The P3 sun gear (5) spins at a faster speed than the P3 annulus (15) and the P3 carrier (6) is the output of the gear set. This results in a reduction that offsets the overdrive of the P2 gear set. The D clutch (12) connects the P3 carrier (6) to the P4 carrier (11) and the output shaft.

EIGHTH GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) stationary. As with 7th gear, the P2 gear set creates an overdrive ratio. However, the E clutch (14) is now applied, which locks together the P3 gear set and eliminates any torque multiplication from the P3 gear set. The overdrive created by P2 is transferred by the D clutch (7) to the output shaft.

REVERSE GEAR POWERFLOW

Clutches A (1) and B (2) hold the P1 gear set to hold the P1/P2 sun gear (17). The input shaft drives the P2 carrier, which produces an overdrive ratio from the P2 gear set, driving the P3 sun gear (5) in engine direction. The P3 carrier (6) is connected to the output shaft by the D clutch (12). This holds the carrier, reversing the direction and multiplying torque. The P3 annulus (15) is connected to the P4 sun gear (10), which drives the P4 gear set opposite of engine direction and multiplies torque again.

DIAGNOSIS AND TESTING

CLUTCH AIR PRESSURE TESTS

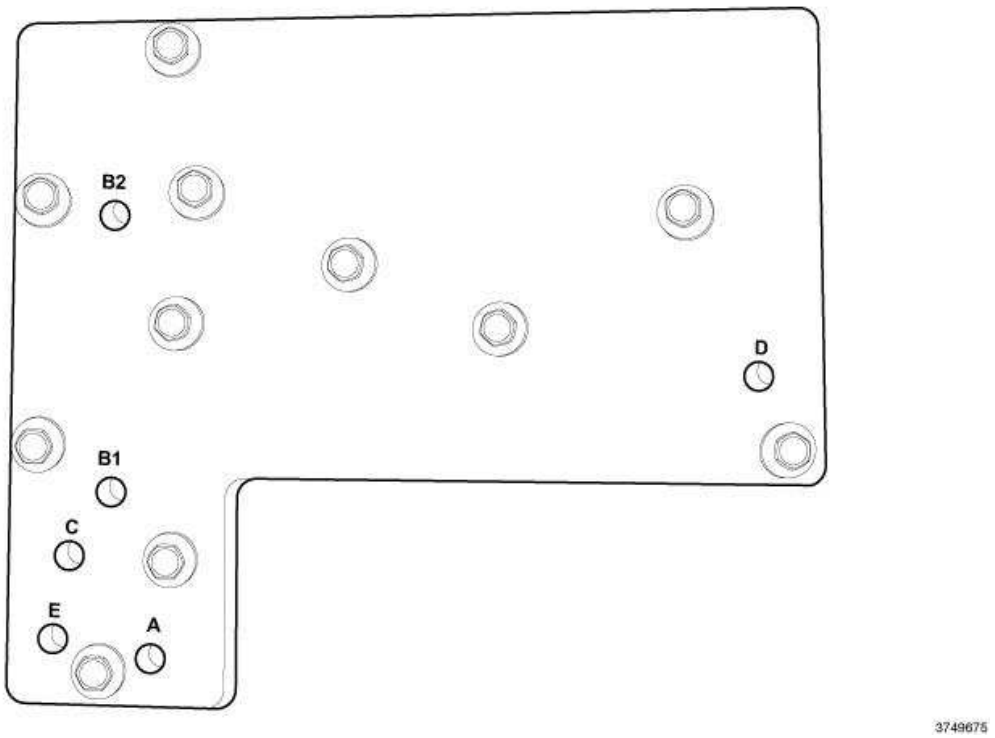


Fig. 3: Clutch Pressure Test
Courtesy of CHRYSLER GROUP, LLC

Inoperative clutches can be located using a series of tests by substituting air pressure for fluid pressure using (special tool #10383, Plate, Clutch Pressure Test).

The clutches may be tested by applying air pressure to their respective passages. The valve body must be removed. To make air pressure tests, proceed as follows:

NOTE: The compressed air supply must be free of all dirt and moisture. Use a pressure of 5-8 bar (73-116 psi).

Remove the oil pan and the valve body. Install (special tool #10383, Plate, Clutch Pressure Test) and tighten bolts to 6 N.m (50 in. lbs.). When testing is finished install valve body and tighten **new** bolts to 8 N.m (71 in. lbs.). Install the oil pan bolts and tighten to 10 N.m (89 in. lbs.). Fill the transmission. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

A CLUTCH

Apply air pressure to the feed hole located on the test plate marked **A** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

B1 CLUTCH FUNCTION

Apply air pressure to the feed hole located on the test plate marked **B1** , listen for an audible thud. The piston should not return to its starting position when the air pressure is removed. An audible hiss

may be heard when testing this clutch as the seal is designed to allow fluid/air to pass.

B2 CLUTCH FUNCTION

Apply air pressure to the feed hole located on the test plate marked **B2** , listen for an audible thud. The piston should return to the beginning B1 starting position and should not return to its starting position when the air pressure is removed. An audible hiss may be heard when testing this clutch as the seal is designed to allow fluid/air to pass.

C CLUTCH

Apply air pressure to the feed hole located on the test plate marked **C** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

D CLUTCH

Apply air pressure to the feed hole located on the test plate marked **D** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

E CLUTCH

Apply air pressure to the feed hole located on the test plate marked **E** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

DIAGNOAIS AND TESTING - AUTOMATIC TRANSMISSION - GENERAL CONDITIONS

CAUTION: Before attempting any repair on an automatic transmission, check for Diagnostic Trouble Codes with the appropriate scan tool.

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

Transmission malfunctions may be caused by these general conditions:

- Poor engine performance.
- Improper adjustments.
- Hydraulic malfunctions.
- Mechanical malfunctions.
- Electronic malfunctions.
- Transfer case performance (if equipped).

Diagnosis of these problems should always begin by checking the easily accessible variables: fluid

level, fluid condition, and transmission fault codes using the appropriate scan tool. Then perform a road test to determine if the problem has been corrected or if more diagnosis is necessary.

DIAGNOSIS AND TESTING - PRELIMINARY

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

VEHICLE IS DRIVABLE

1. Check for transmission fault codes using the appropriate scan tool.
2. Road test and note how transmission upshifts, downshifts, and engages.
3. Check fluid level and condition.

VEHICLE IS DISABLED

1. Check for transmission fault codes using the appropriate scan tool.
2. Check for cracked, leaking cooler lines.
3. Check fluid level and condition.
4. With the transmission in the Park position, attempt to rotate drive shaft(s) to ensure transmission output shaft coupler/flange is secure.
5. Check the transfer case operation (if equipped).
6. Raise and support vehicle on safety stands, start engine with transmission in the Park position and allow to idle for several minutes, shift transmission into gear, and note following:
    1. If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
    2. If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged driveplate, converter, oil pump, or input shaft.
7. Check the TCMA, Wiring, Valve body, and Solenoids (Utilize fault codes to diagnose if available).

DIAGNOSIS AND TESTING - ROAD TESTING

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

Before road testing, be sure the fluid level has been checked and adjusted if necessary. Verify that all diagnostic trouble codes have been resolved.

Observe engine performance during the road test. A poorly tuned engine will not allow accurate analysis of transmission operation.

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

Slippage indicated by engine flare, usually means clutch, overrunning clutch, or line pressure problems.

A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch Application chart provides a basis for analyzing road test results.

CLUTCH APPLICATION

GEAR	A	B	C	D	E	RATIO
1	X	X	X			4.69
2	X	X			X	3.13
3		X	X		X	2.10
4		X		X	X	1.67
5		X	X	X		1.29
6			X	X	X	1.1
7	X		X	X		.84
8	X			X	X	.67
N						N/A
R	X	X		X		3.3

SPECIFICATIONS

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Crossmember to Body Bolt	65	48	-
Crossmember to Transmission Mount Bolt	61	45	-
Engine to Bellhousing Bolt	55	41	-
Extension Housing to Transmission Bolt	27	20	-

Manual Park Release Cable to Case Bolt	20	15	-
Manual Park Release Lever Shaft Nut	10	-	89
Manual Park Release Lever Assembly Nut	10	-	89
Oil Pan Drain Plug	9	-	80
Oil fill Plug	35	26	-
Oil Pan Bolt	10	-	89
Oil Pump Assembly To Case Bolt*	*	*	*
Oil Pump Housing To Cover Bolt	5 + 45°	-	44 + 45°
Output Speed Sensor Bolt	8	-	71
Park Pawl Lock Rod Guide Plate Bolt	10	-	89
Park Pawl Shaft Plug	35	26	-
Propeller Shaft Flange Nut	60	44	-
Shifter Assembly Bolts	7	-	65
Shifter Knob Lower Shroud Bolt	7	-	65
Torque Converter to Flex Plate Bolt	42	31	-
Transfer Case to Transmission Nut	27	20	-
Transmission Mount to Adapter	33	24	-
Valve Body Bolt	8	-	71
***Specific bolts need to be pre-tightened. Refer to PUMP, TRANSMISSION OIL, INSTALLATION.**			

REMOVAL

REMOVAL

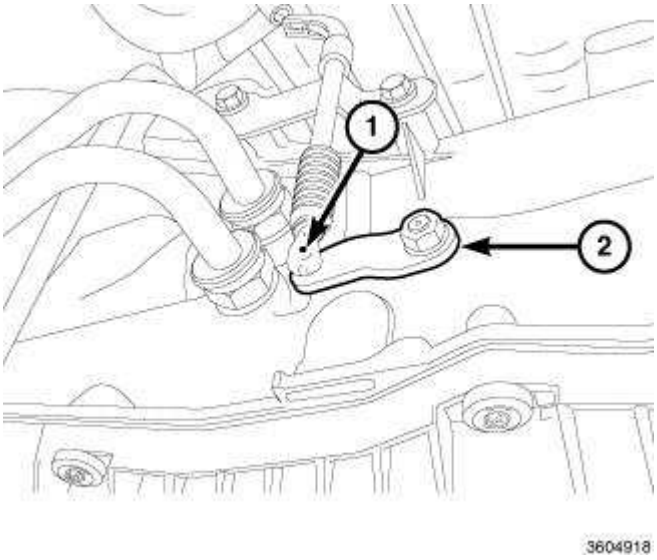


Fig. 4: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Disconnect the right and left bank up stream oxygen sensors.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the complete exhaust system.
5. **For AWD only** , remove the transfer case. Refer to **REMOVAL** .
6. **For RWD only** , remove the rear propeller shaft. Refer to **REMOVAL** .
7. Remove the starter from the transmission and set aside. Refer to **STARTER, REMOVAL** .
8. Disconnect the manual park release cable (1) from the lever (2).

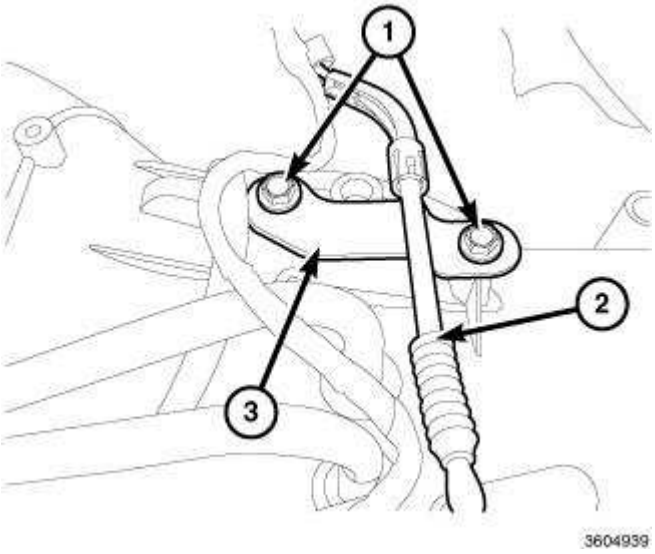


Fig. 5: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolts (1) from the manual park release cable bracket (3) and set the bracket/cable (2, 3) aside.

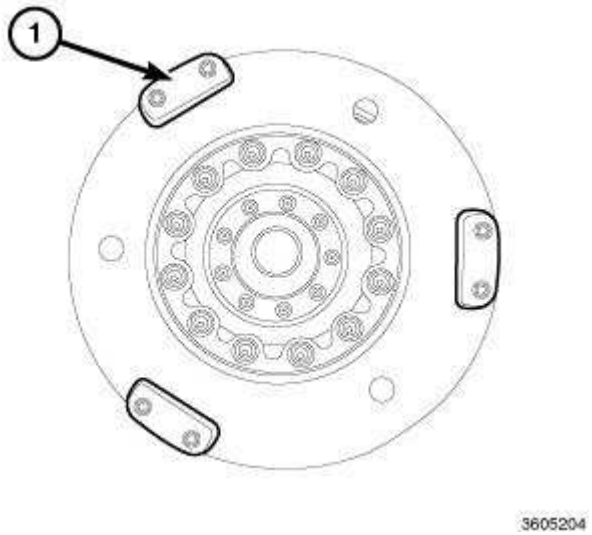


Fig. 6: Two Bolts
Courtesy of CHRYSLER GROUP, LLC

10. The converter is attached with three sets of two bolts (1) 120° apart as shown in illustration.

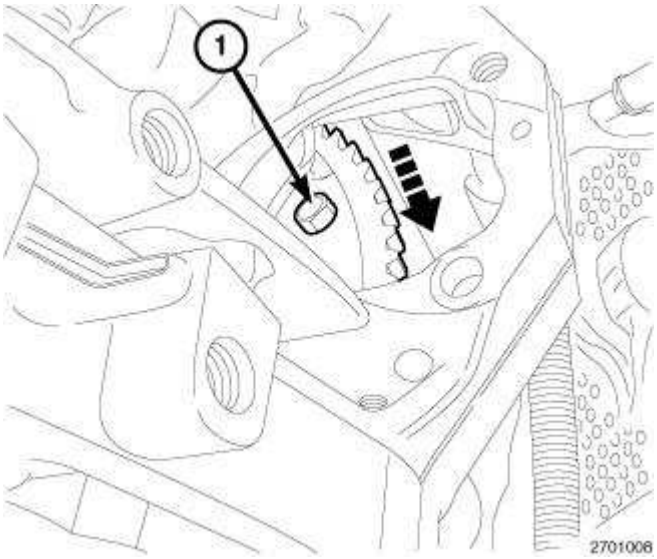


Fig. 7: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Rotate the crankshaft in a clockwise direction for access, and through the starter opening, remove the six converter bolts (1).

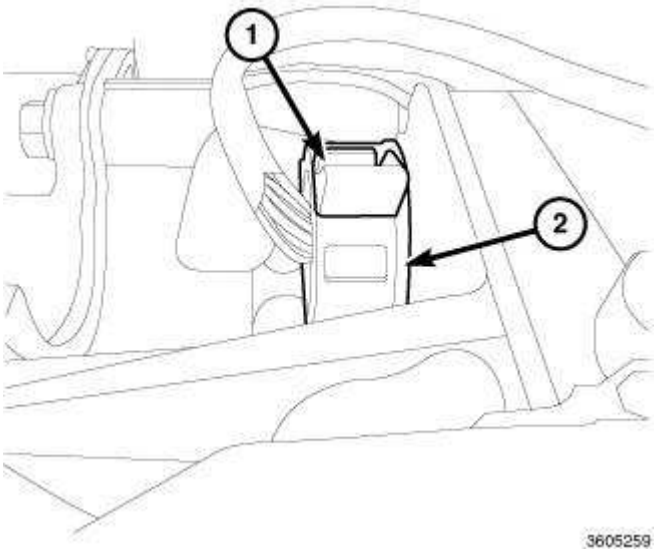


Fig. 8: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

12. Turn the locking mechanism lock (1) of the adapter plug connector (2) counter-clockwise to release the lock.

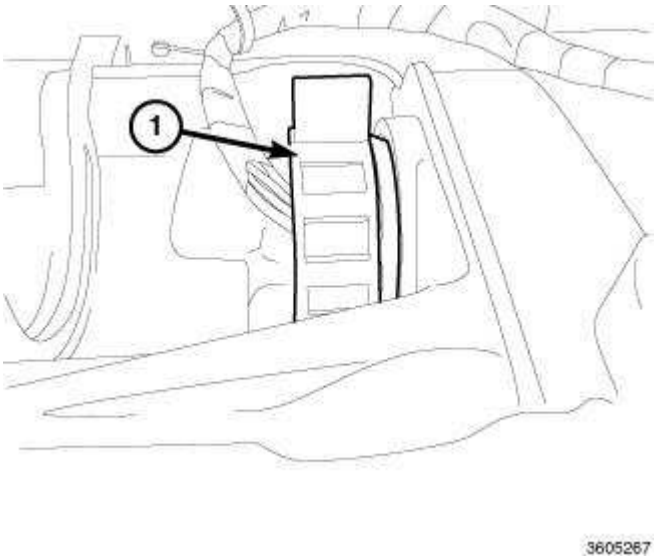


Fig. 9: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

13. Remove the adapter plug connector (1) from the transmission.

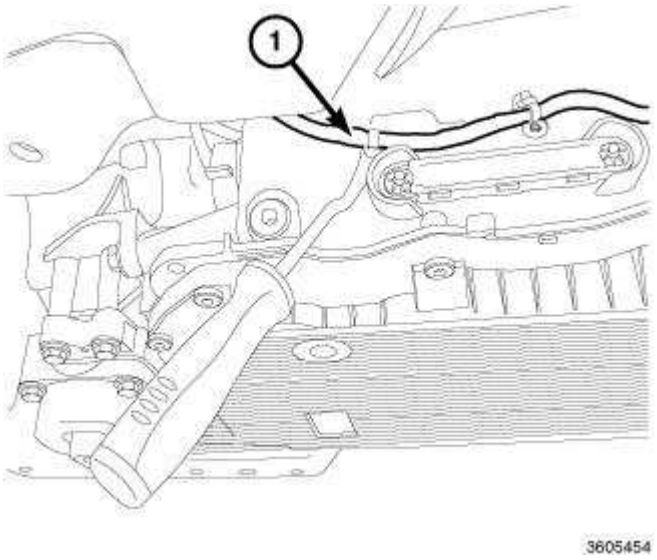


Fig. 10: Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the wiring harness (1) from the transmission case.

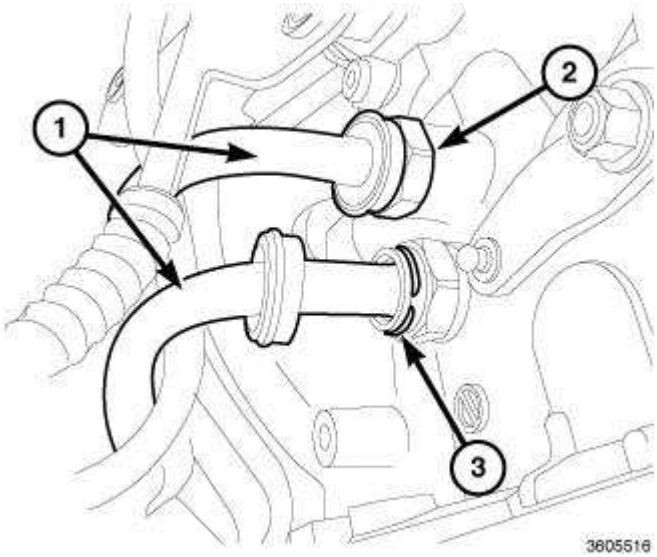


Fig. 11: Transmission Fluid Cooler Lines, Clips & Fittings
Courtesy of CHRYSLER GROUP, LLC

15. Disconnect the transmission fluid cooler lines (1) at the fittings (2) by removing the clips (3).

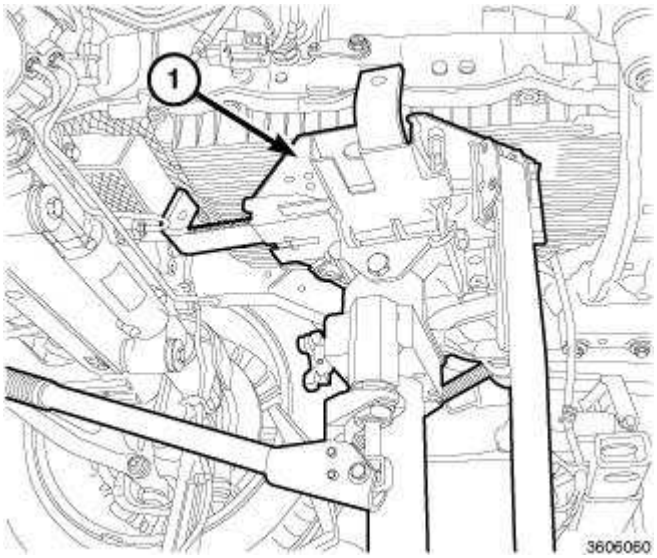


Fig. 12: Service Jack
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.

16. Raise the transmission slightly with a service jack (1) to relieve load on the crossmember.

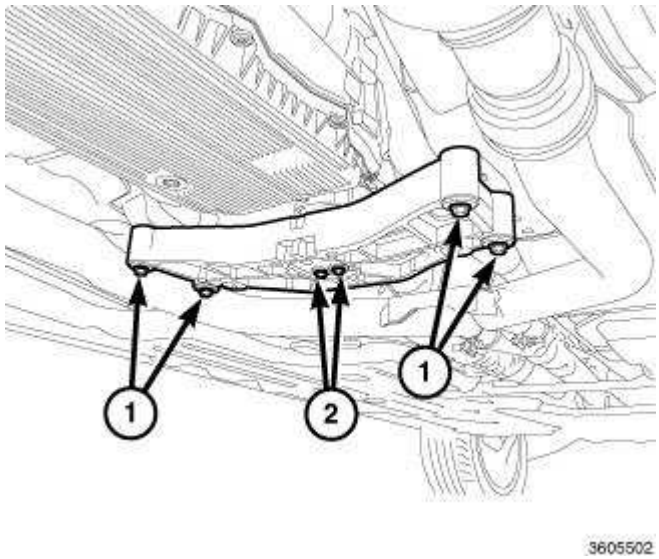


Fig. 13: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove the bolts attaching the crossmember (1) to frame and remove the crossmember.
18. Remove the bolts (2) securing the rear support and cushion to the cross member and remove.

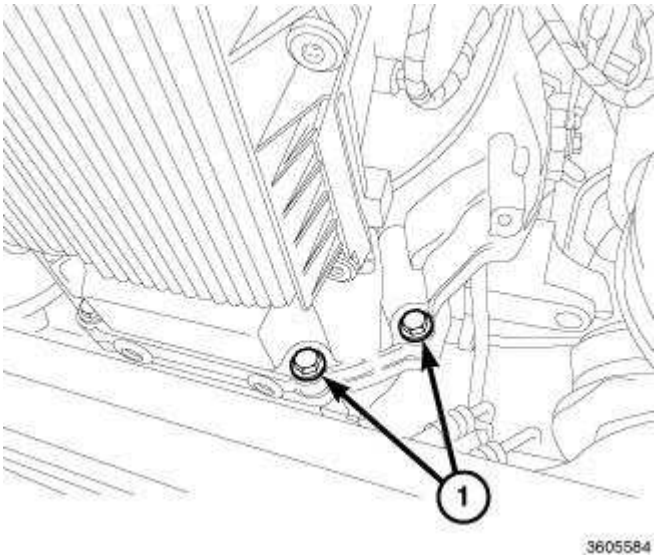


Fig. 14: Bell Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Remove the bell housing bolts (1) on the RH side.

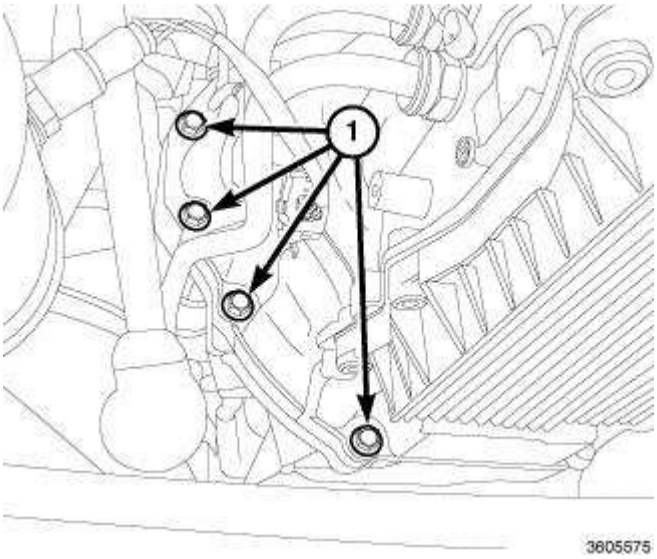


Fig. 15: Bell Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

20. Remove the bell housing bolts (1) on the LH side.

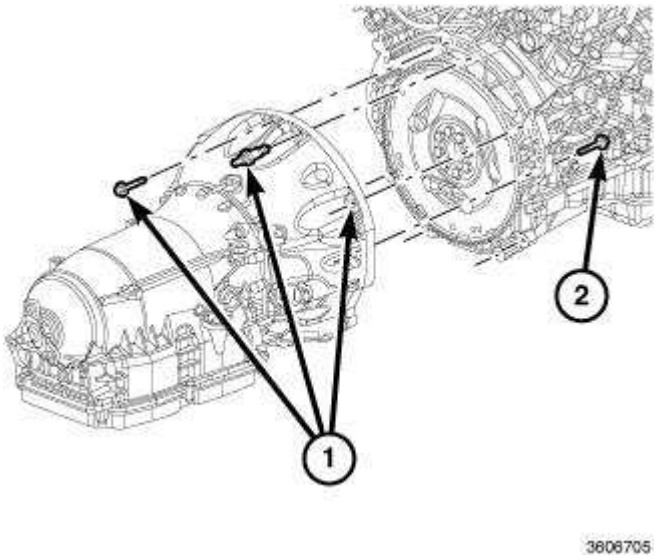


Fig. 16: RWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: RWD shown in illustration, AWD similar.

21. Remove all remaining bell housing bolts (1, 2) securing the transmission to the engine block.
22. Hold the torque converter in place during transmission removal.
23. Lower the transmission and remove the assembly from the vehicle.

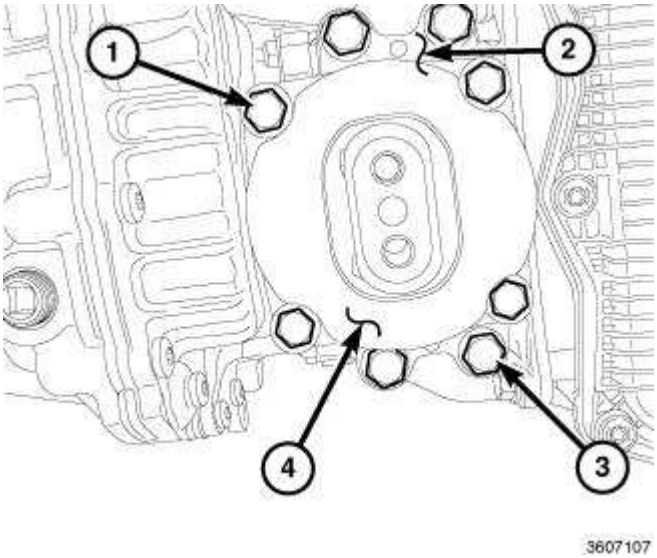


Fig. 17: Four Rear Transmission Mount Bolts, Rear Transmission Mount, Adapter Bracket Bolts & Adapter
Courtesy of CHRYSLER GROUP, LLC

24. **For AWD only** , remove the four rear transmission mount bolts (1) and rear transmission mount (4) from the transmission.

25. **For AWD only** , remove the adapter bracket bolts (3) and the adapter (2) from the transmission.

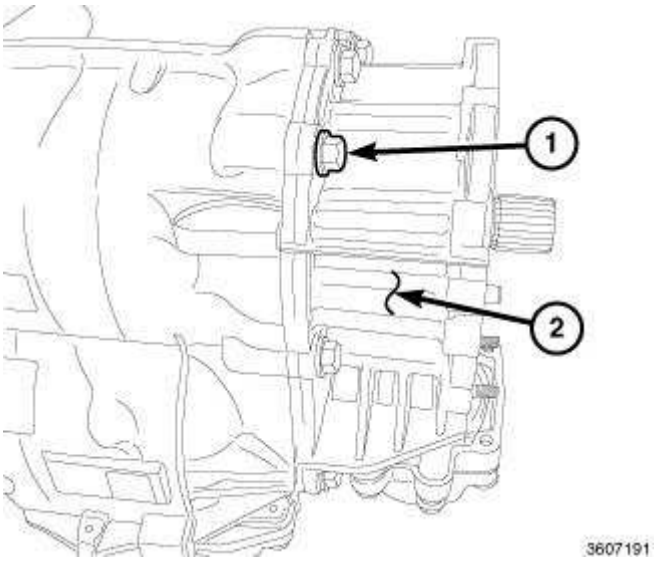


Fig. 18: Seven Extension Housing Bolts & Extension Housing
Courtesy of CHRYSLER GROUP, LLC

26. **For AWD only** , remove the seven extension housing bolts (1) and remove the extension housing (2).

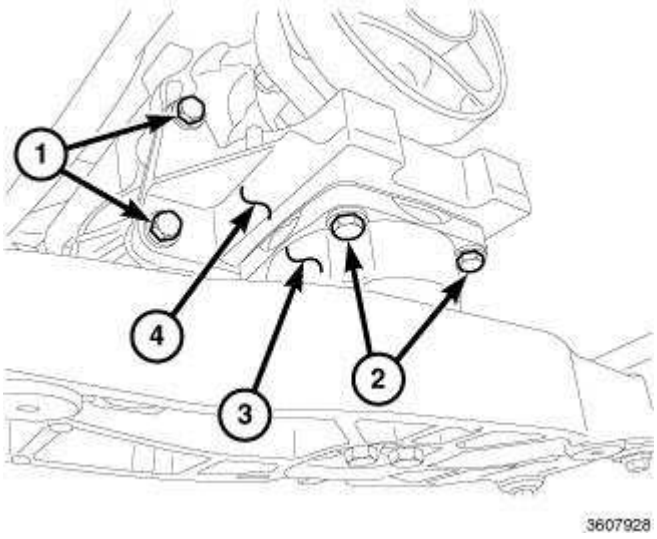


Fig. 19: Four Transmission Mount Bolts & Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

27. **For RWD only** , remove the four transmission mount bolts (2) and the transmission mount (3).
28. **For RWD only** , remove the four adapter bracket bolts (1) and the adapter bracket (4).

DISASSEMBLY

DISASSEMBLY

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

NOTE: If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to appropriate diagnostic information .

NOTE: Tag all clutch pack assemblies, as they are removed, for reassembly identification.

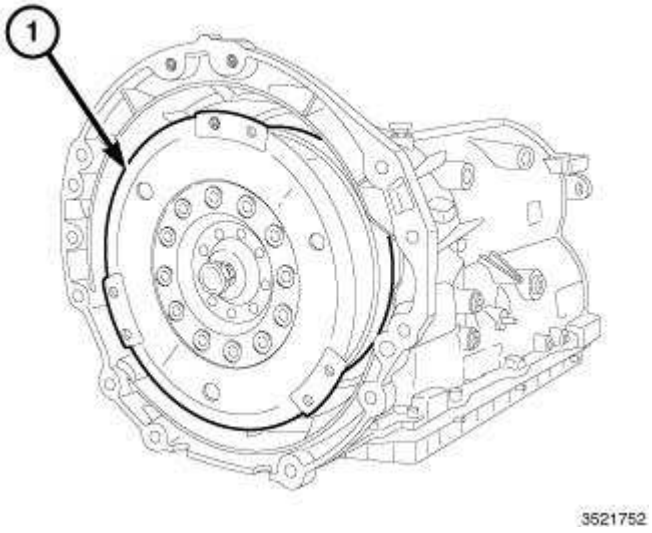


Fig. 20: RWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: RWD Shown in illustration, AWD similar.

1. Remove the torque converter (1).

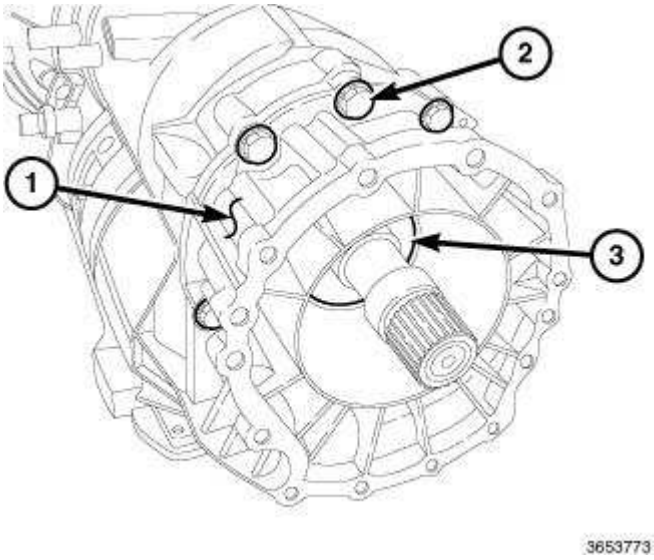


Fig. 21: AWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: AWD only.

2. Remove the seven transmission housing extension bolts (2) and remove the housing (1).
3. Remove the transmission rear oil seal (3) with a suitable slide hammer and screw.

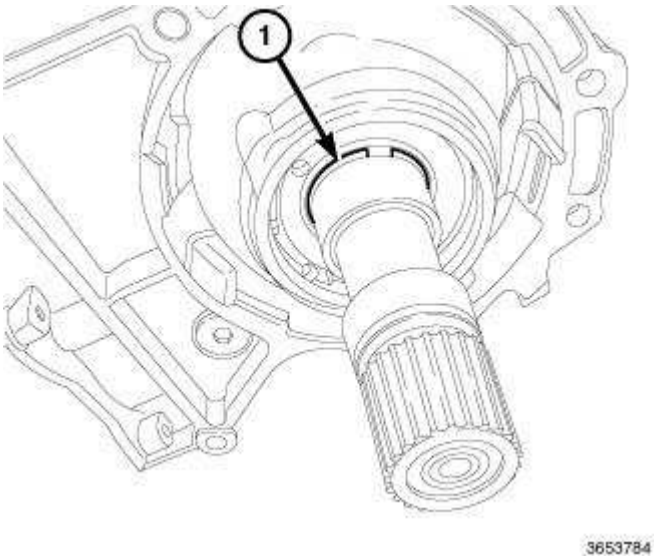


Fig. 22: AWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: AWD only.

4. Remove the input shaft snap ring (1) and washer.

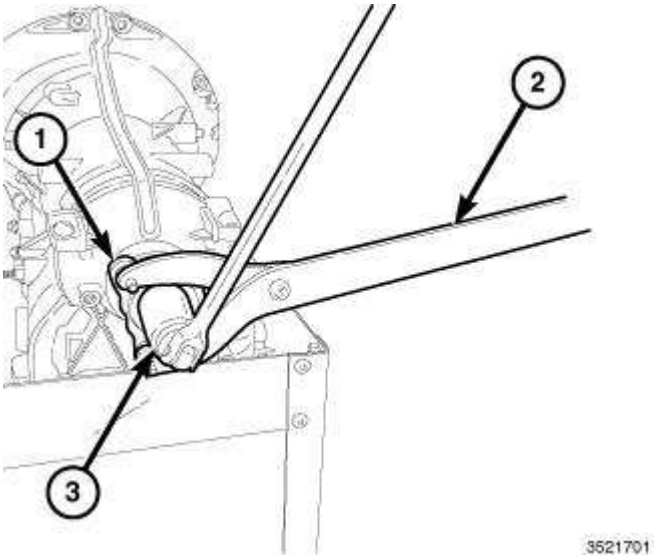


Fig. 23: RWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: RWD only.

5. Using a suitable punch, remove the staking from the propeller shaft flange nut, and loosen the nut about 1 thread using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1).

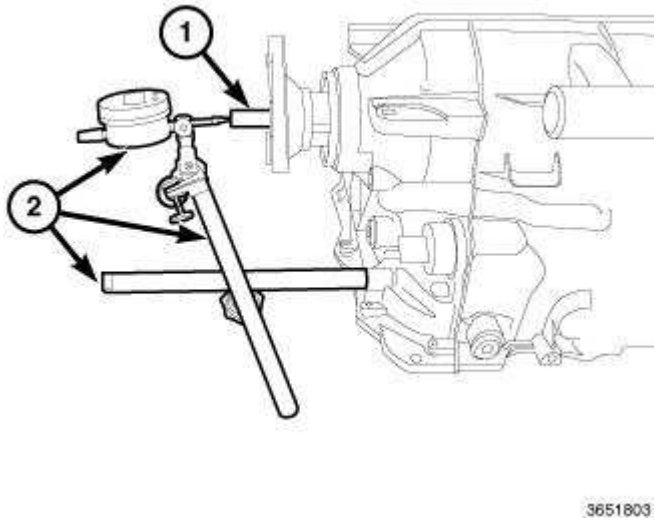


Fig. 24: RWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: RWD shown in illustration, AWD similar.

NOTE: End play specification is between 0.11 - 0.42 mm (0.0043 - 0.0165 in.). If

end play is outside this range, a different selectable end play shim must be used during assembly.

6. Measure the output shaft (1) end play as follows:
    1. Attach a dial indicator (2) and position the plunger against the end of the output shaft (1).
    2. Zero the dial indicator (2).
    3. Move the output shaft (1) in and out, and record the maximum travel for assembly reference.

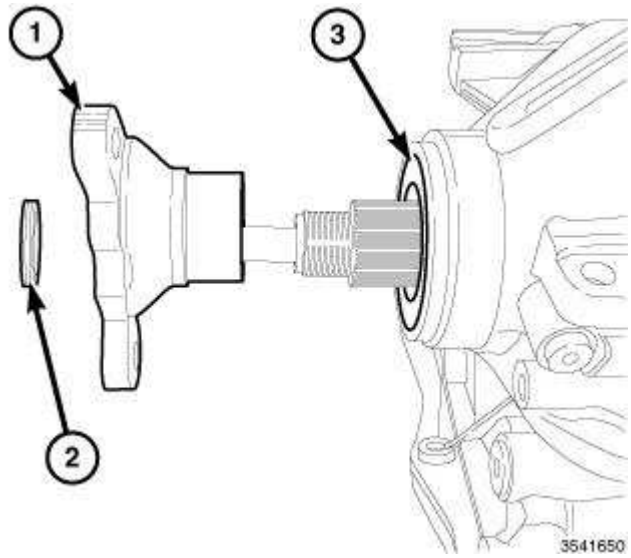


Fig. 25: RWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: RWD only.

7. Finish removing the propeller shaft flange nut.
8. Remove the propeller shaft flange (1).
9. Remove the transmission rear dust seal (2).
10. Remove the transmission rear oil seal (3) with a suitable slide hammer and screw.
11. Remove the transmission output shaft washer.

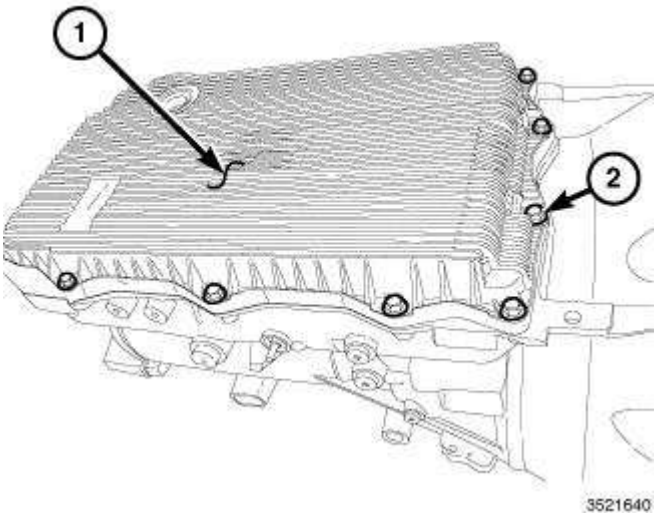


Fig. 26: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the thirteen oil pan retaining bolts (2).

NOTE: Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.

13. Carefully detach the oil pan (1) and gasket.

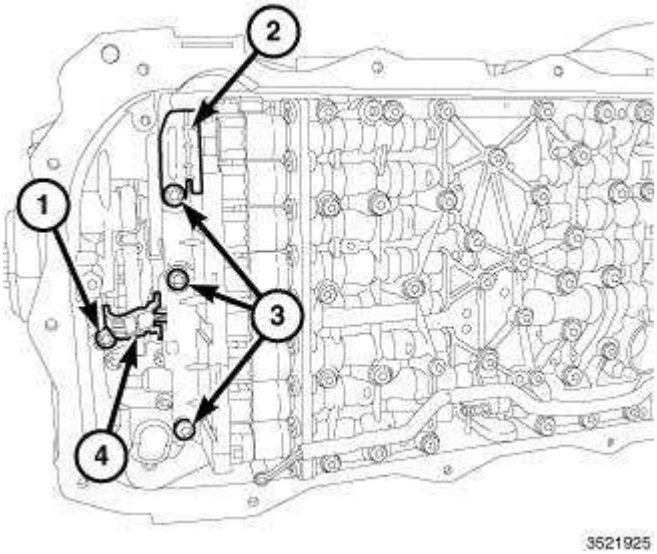


Fig. 27: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Remove the valve body assembly end retainer bolts (3).
15. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
16. Remove the sensor retaining bolt (1) and pull the sensor (4) loose from the case.

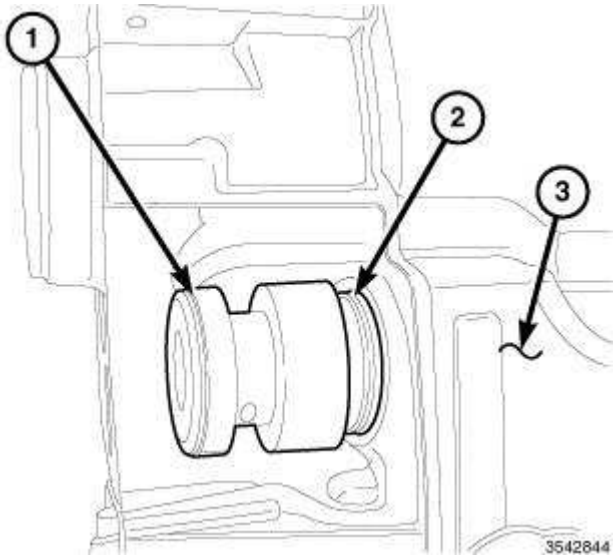


Fig. 28: Remover/Installer, Guide Sleeve
Courtesy of CHRYSLER GROUP, LLC

17. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).

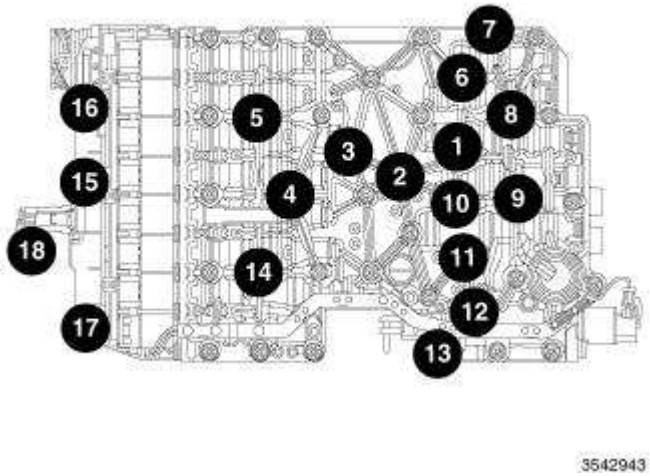


Fig. 29: Valve Body Assembly Retaining Bolts 1-14
Courtesy of CHRYSLER GROUP, LLC

18. Remove valve body assembly retaining bolts 1-14 (15-18 are already removed).
19. Carefully lift the valve body assembly from the transmission.

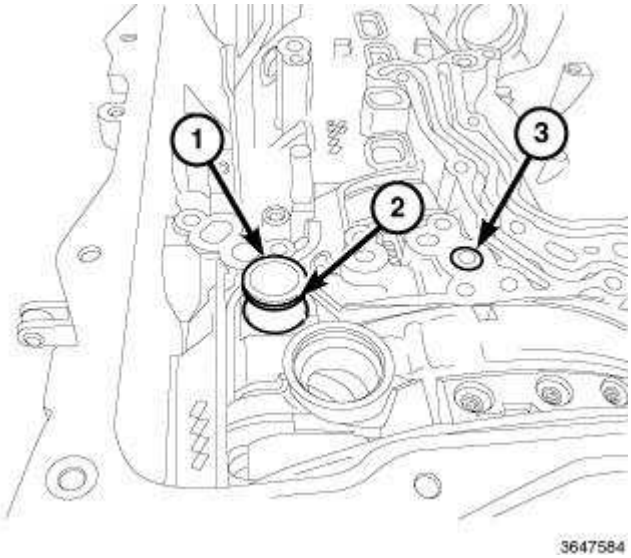


Fig. 30: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fluid port (1) may be in the transmission or the valve body assembly.

20. Pull the fluid port (1) from the transmission or valve body assembly.
21. Remove the two O-rings (2).
22. Remove the compression seal (3) from the transmission.

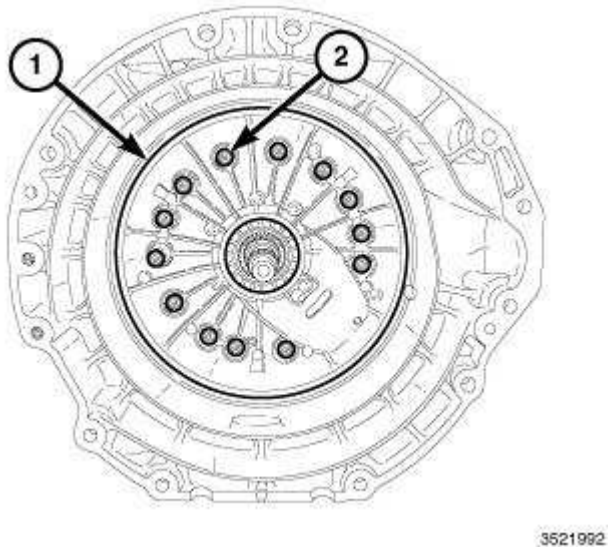


Fig. 31: Thirteen Oil Pump Housing Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

23. Remove the thirteen oil pump housing retaining bolts (2).

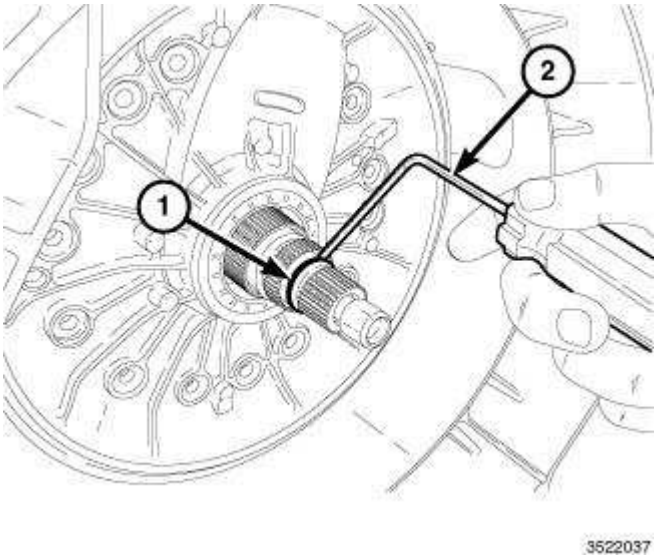


Fig. 32: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

24. Remove the input shaft O-ring (1) using a small pick (2) or equivalent.

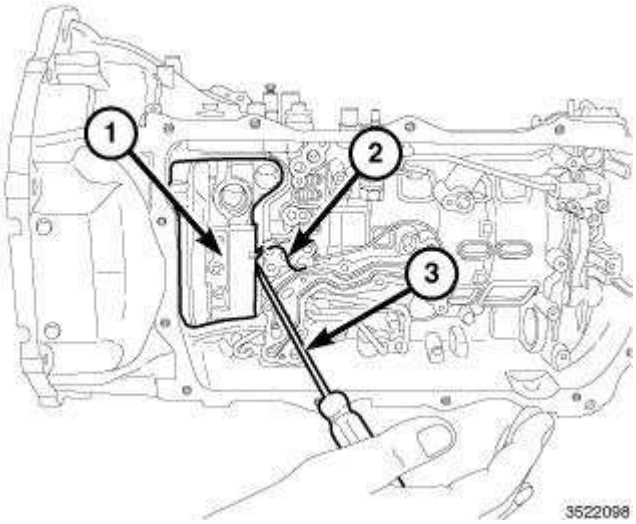


Fig. 33: Oil Pump Housing, Case & Small Flat Blade Screwdriver
Courtesy of CHRYSLER GROUP, LLC

25. Carefully pry the oil pump housing (1) away from the case (2) with a small flat blade screwdriver (3) or equivalent through the case opening.
26. From the front of the transmission, remove the oil pump housing.

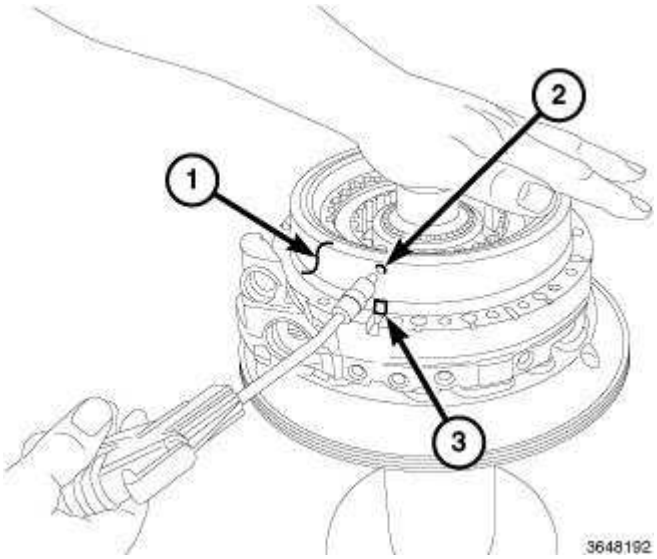


Fig. 34: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply air pressure slowly because oil may spray when B-piston releases from the assembly.

27. With one hand above B-piston (1), carefully apply air pressure into the hole (2) directly above the B-piston alignment tab (3) to remove B-piston (1) from the assembly.

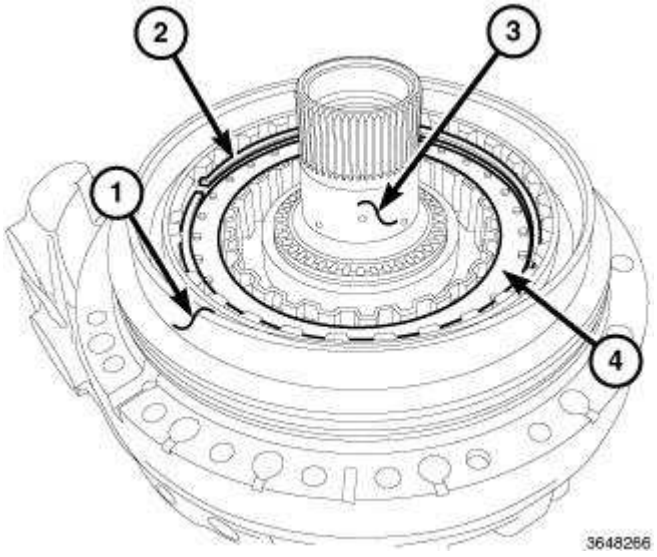


Fig. 35: Outer Ring, Snap Ring & Spacers
Courtesy of CHRYSLER GROUP, LLC

28. Remove the outer ring (1) (under B-piston).
29. Remove the snap ring (2).
30. Remove the clutches and spacers (4).

31. Remove the hub (3).

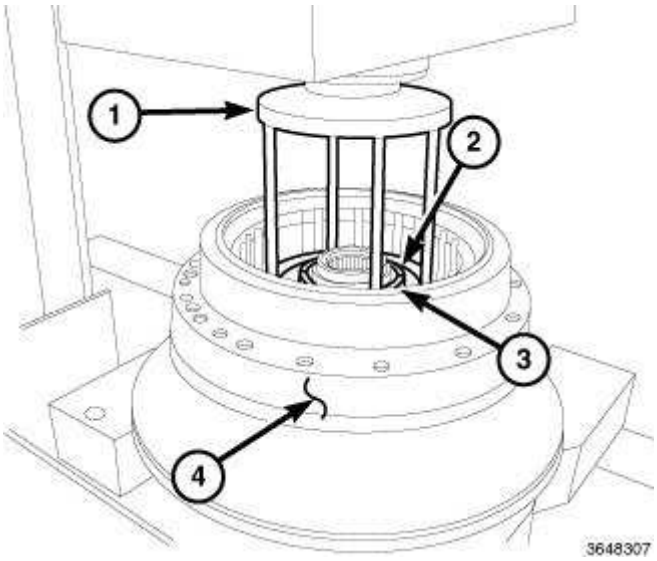


Fig. 36: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

32. Position the oil pump housing assembly (4) in a suitable arbor press.
33. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and remove the two halves of the split retainer ring (2, 3).

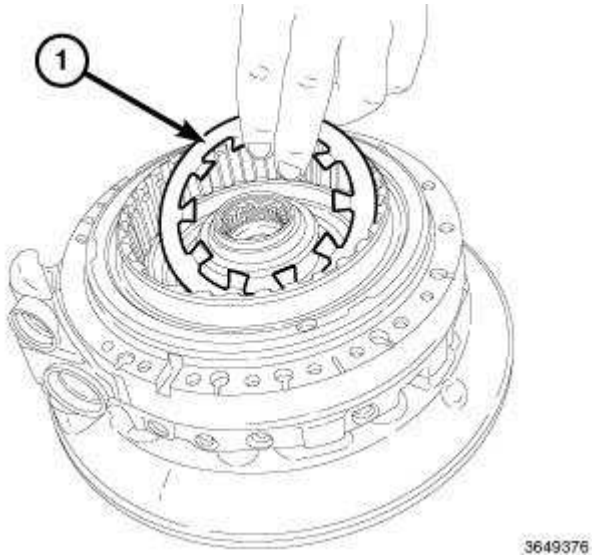


Fig. 37: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

34. Remove the piston retaining ring and piston below it.

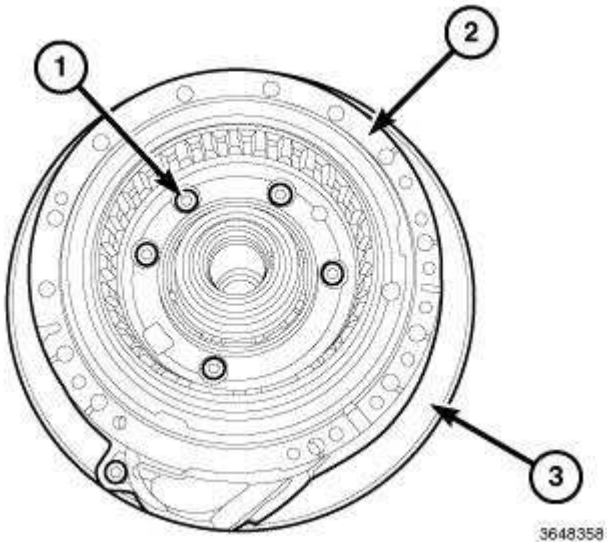


Fig. 38: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

35. Remove the six bolts (1) and separate the oil pump housing (2) from the oil pump cover (3).

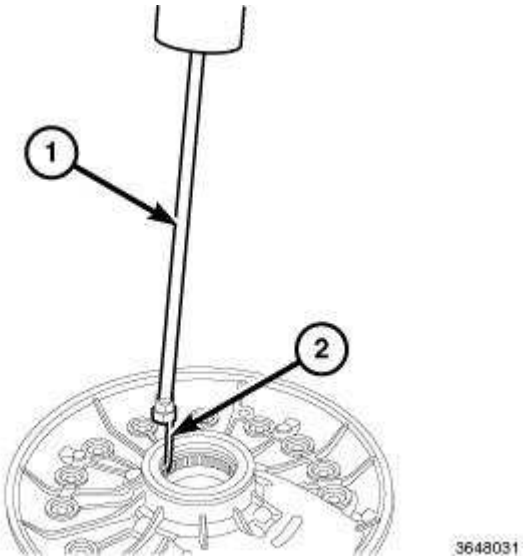


Fig. 39: Remover, Seal & Slide Hammers
Courtesy of CHRYSLER GROUP, LLC

36. Using (special tool #9667, Remover, Seal) (2) and (special tool #C-3752, Slide Hammers) (1), remove the oil seal from the front pump cover.
37. Remove the outer lip seal from the front pump cover.

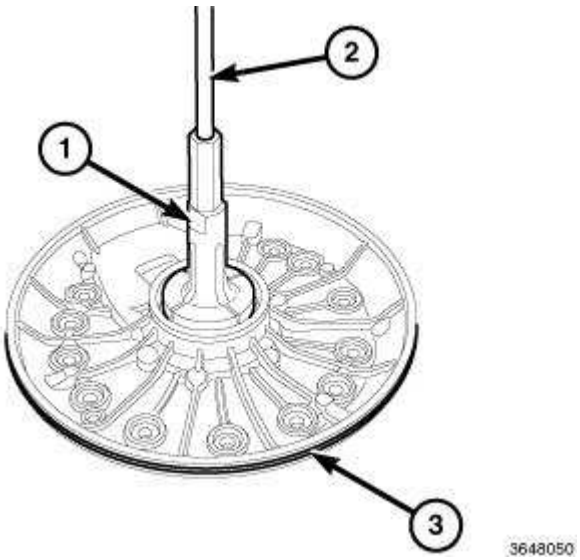


Fig. 40: Remover, Bearing Cup & Slide Hammers
Courtesy of CHRYSLER GROUP, LLC

38. Remove the snap ring.
39. Using (special tool #6787A, Remover, Bearing Cup) (1) and (special tool #C-3752, Slide Hammers) (2) remove the needle bearing from the front cover (3).
40. Remove the snap ring.
41. Using (special tool #9585, Remover, Bearing Cup) and (special tool #C-637, Slide Hammer, Universal) remove the needle bearing.

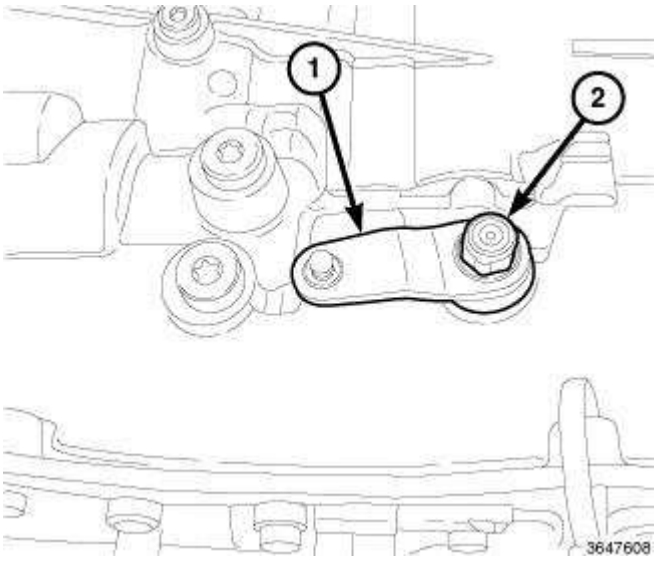


Fig. 41: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

42. Remove the manual park release lever retaining nut (2) and remove the lever (1).

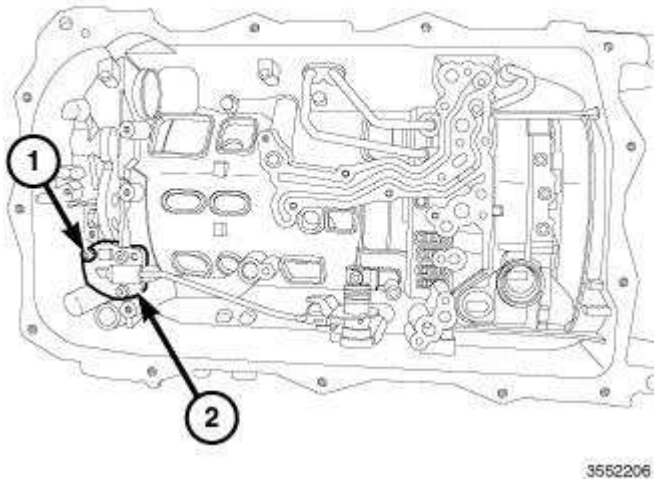


Fig. 42: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate
Courtesy of CHRYSLER GROUP, LLC

43. Remove the three park pawl lock rod guide plate retaining screws (1) and remove the plate (2).

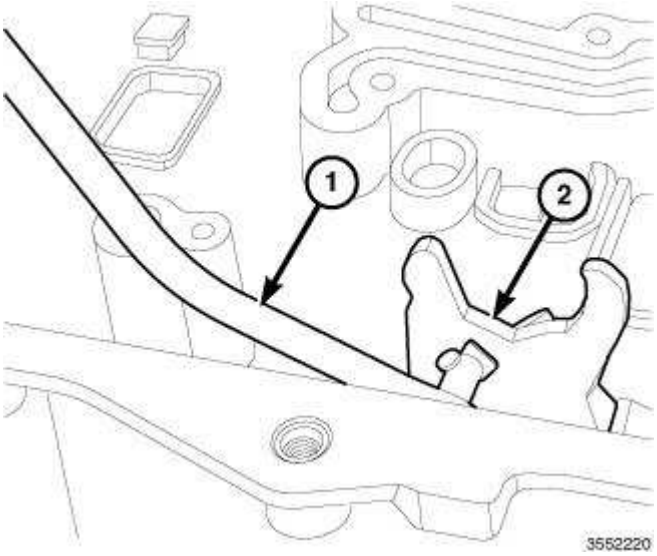


Fig. 43: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

44. Remove the park pawl lock rod (1) from the fork (2).

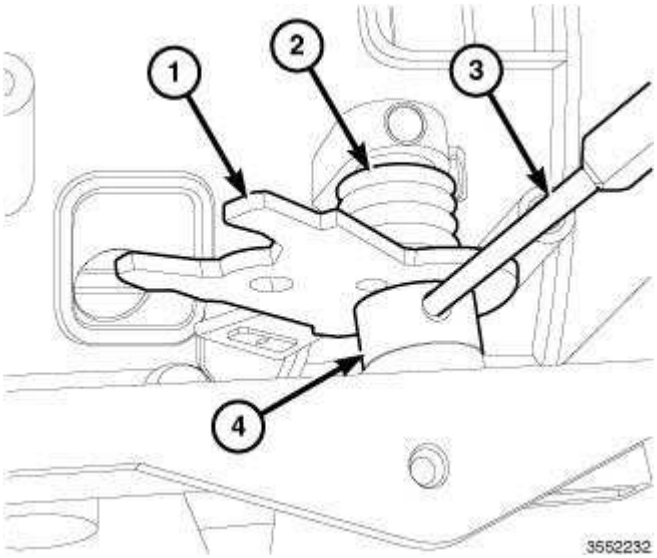


Fig. 44: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

NOTE: Pay attention to the spring position for installation.

45. Remove the roll pin from the selector shaft (4) using a suitable pin punch (3).
46. Remove the shaft (4), spring (2) and fork (1) from the case.
47. Remove the selector shaft seal using a small screwdriver or equivalent.

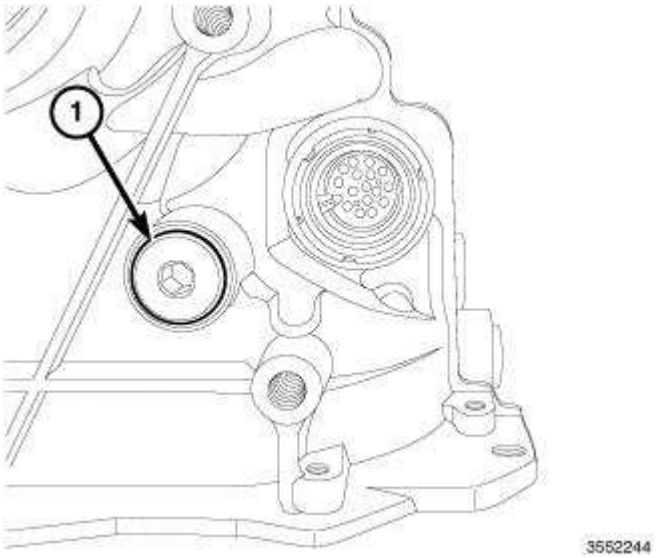


Fig. 45: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

48. Remove the park pawl shaft plug (1) from the rear of the case.

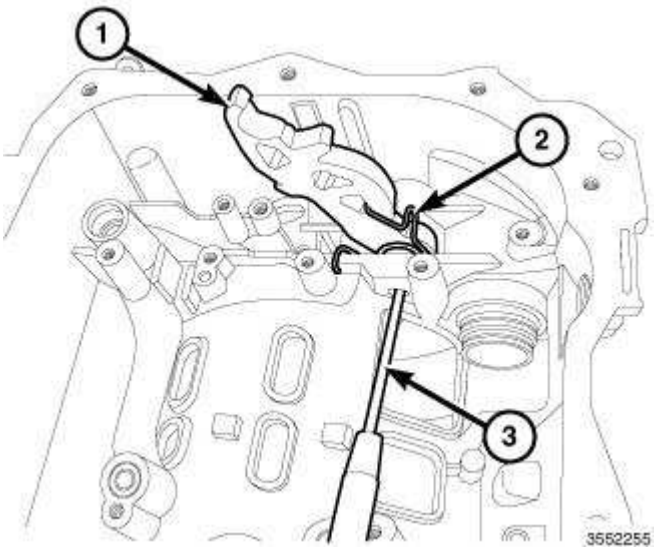


Fig. 46: Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

NOTE: Pay attention to the spring position for installation.

49. Remove the park pawl shaft using a suitable pin punch (3), remove the park pawl (1) and spring (2).

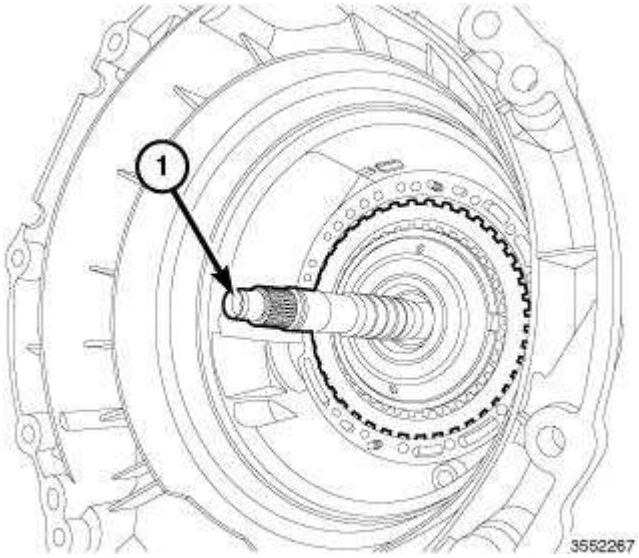


Fig. 47: P4 Annulus Drum Assembly
Courtesy of CHRYSLER GROUP, LLC

50. Remove the input/output shaft and P4 annulus drum assembly (1) from the case.

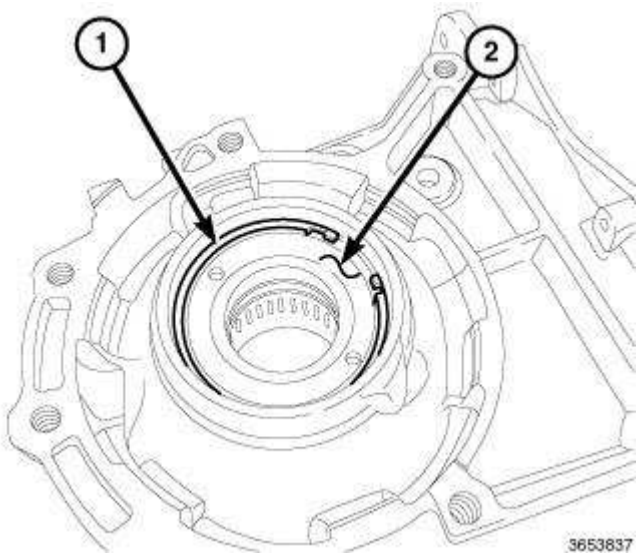


Fig. 48: Outer Bearing Snap Ring & Outer Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: AWD shown in illustration, RWD similar. The AWD bearing is a needle bearing and the RWD is a ball bearing.

51. Remove the outer bearing snap ring (1), and the outer needle bearing (2) (AWD) or outer ball bearing (RWD).

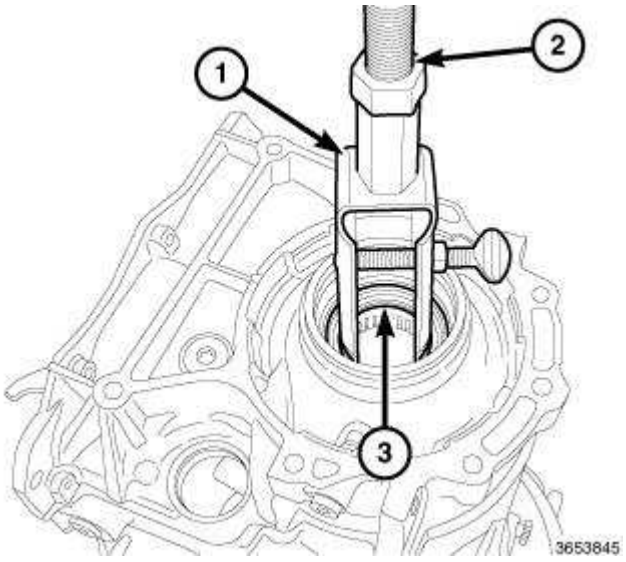


Fig. 49: Bearing Cup, Slide Hammer, Universal & Oil Dam
Courtesy of CHRYSLER GROUP, LLC

NOTE: AWD shown in illustration, RWD similar.

52. Remove the oil dam snap ring.

53. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal) (2), remove the oil dam (3).

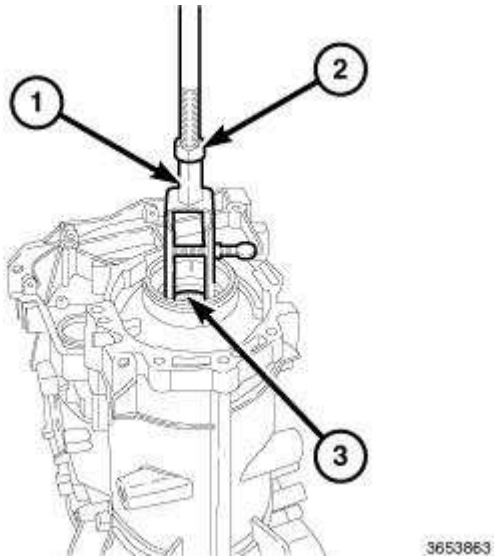


Fig. 50: Bearing Cup & Slide Hammer, Universal
Courtesy of CHRYSLER GROUP, LLC

NOTE: AWD shown in illustration, RWD similar.

54. Remove the output shaft inner needle bearing snap ring.
55. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal) (2), remove the inner needle bearing (3).

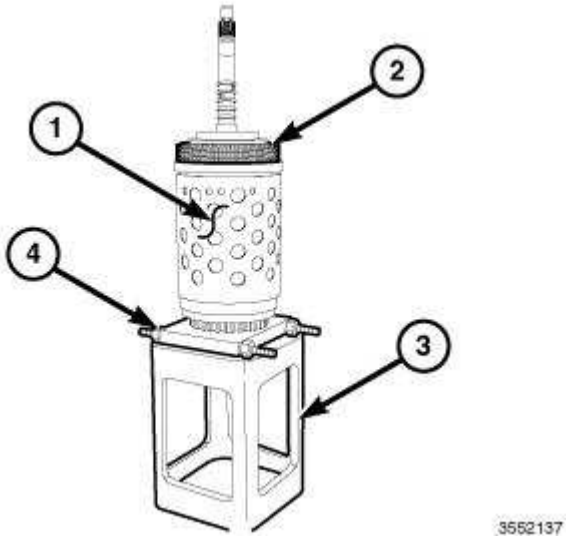


Fig. 51: P4 Annulus Drum Assembly, Assembly, Press Fixture & Splitter, Bearing/Gear
Courtesy of CHRYSLER GROUP, LLC

56. Position the input/output shaft and P4 annulus drum assembly (1) on (special tool #8925-3,

Assembly, Press Fixture) (3) and (special tool #1130, Splitter, Bearing/Gear) (4).

57. Remove the clutch pack (2).

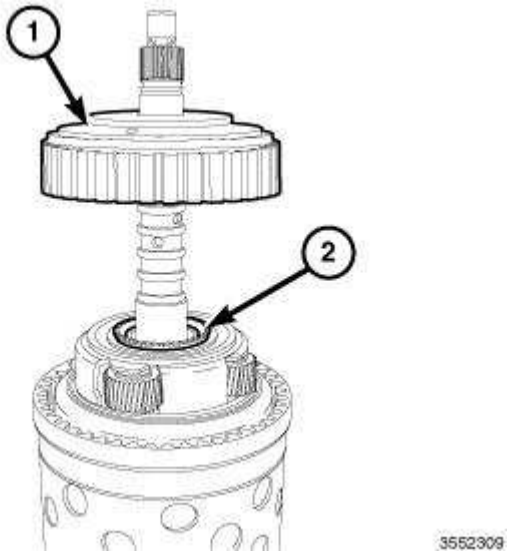


Fig. 52: P1 Annulus/B Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

58. Remove the O-ring and 5 squared O-rings.
59. Remove the P1 annulus/B clutch hub assembly (1) from the P4 annulus drum.

NOTE: The washer may stick to the bottom of the P1 annulus/B clutch hub assembly (1).

60. Remove the selectable shim from the P1 annulus/B clutch hub.
61. Remove the needle bearing and holding plate (2) from the P1 planetary carrier.

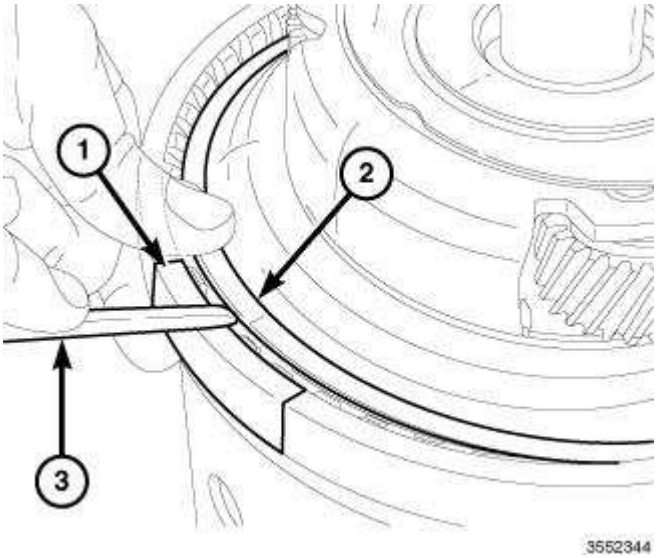


Fig. 53: Suitable Tool & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.

62. Position the (special tool #10378, Rings, Support) (1) on the P4 annulus drum assembly to protect the drum.

NOTE: Pry the snap ring from the opposite side of the snap ring openings to release.

NOTE: When the snap ring is removed the internal clutch drum may drop slightly.

63. Using a suitable tool (3), release the snap ring (2) by prying in and up from the opposite side of the snap ring openings.

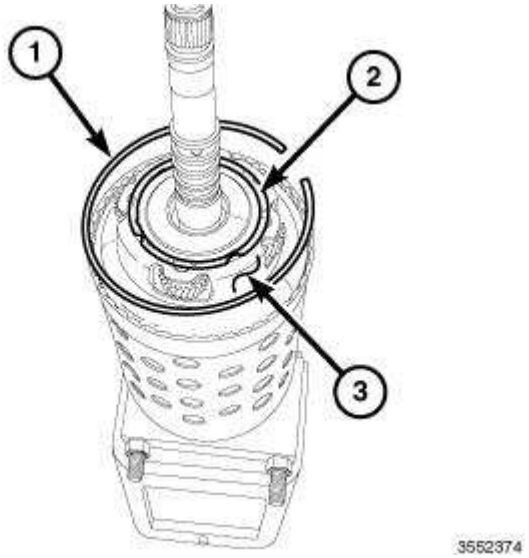


Fig. 54: P1 Planetary Carrier & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

64. Remove the P1 planetary carrier (3).
65. Remove P1/P2 sun gear from the bottom of the P1 planetary carrier (3).

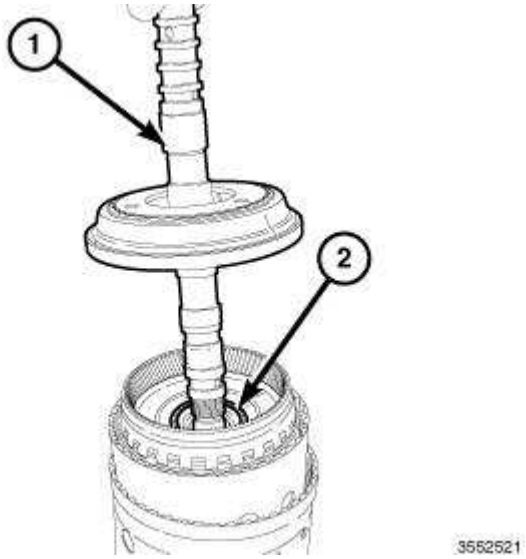


Fig. 55: P2 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

66. Remove the input shaft with P2 planetary carrier (1) from the drum assembly.
67. Remove the needle bearing (2) and washer.

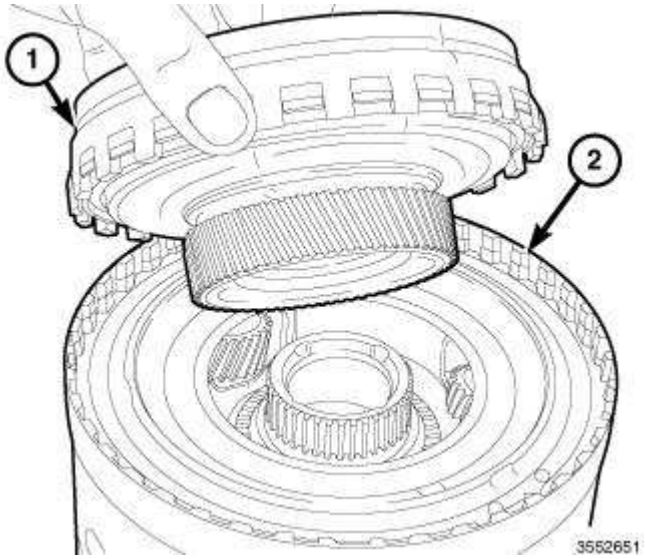


Fig. 56: P2 Annulus/P3 Sun Gear
Courtesy of CHRYSLER GROUP, LLC

68. Remove the P2 annulus/P3 sun gear (1) from the drum assembly (2).

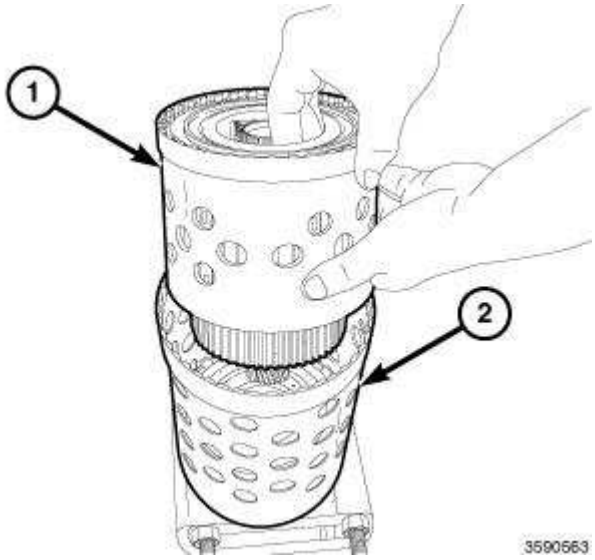


Fig. 57: D Clutch Drum & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

69. Remove the D clutch drum (1) from the P4 annulus drum (2).

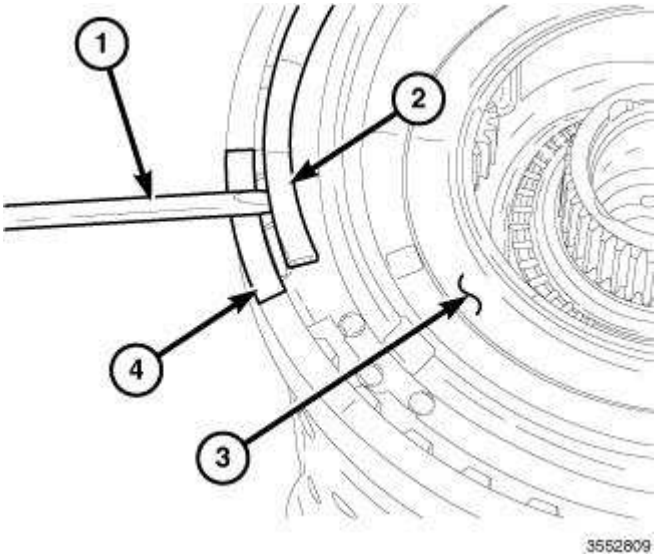


Fig. 58: Rings, Support, Suitable Tool & P3 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

NOTE: The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.

70. Position the (special tool #10378, Rings, Support) (4) on the P4 annulus drum assembly to protect the drum.
71. Using a suitable tool (1), release and remove the snap ring (2).
72. Remove the P3 planetary carrier (3).

73. Remove the needle bearing from the planetary carrier.

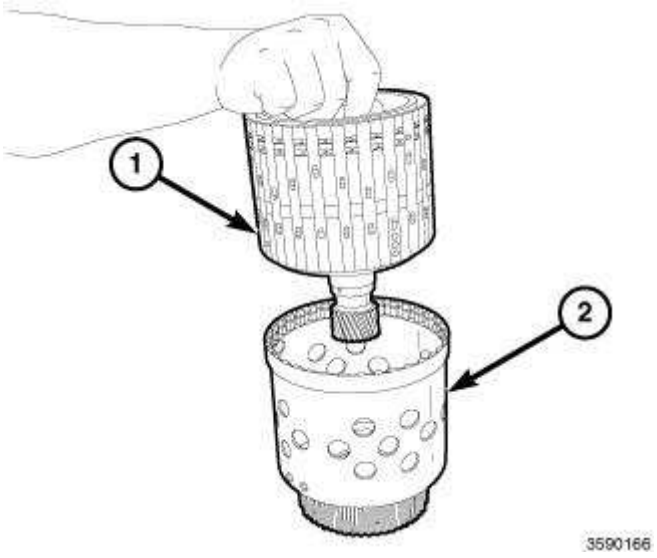


Fig. 59: P4 Sun Gear/C/E Clutch Retainer & D Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

74. Remove the P4 sun gear/C/E clutch retainer (1) from the D clutch drum (2).

Fig. 60: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

75. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).

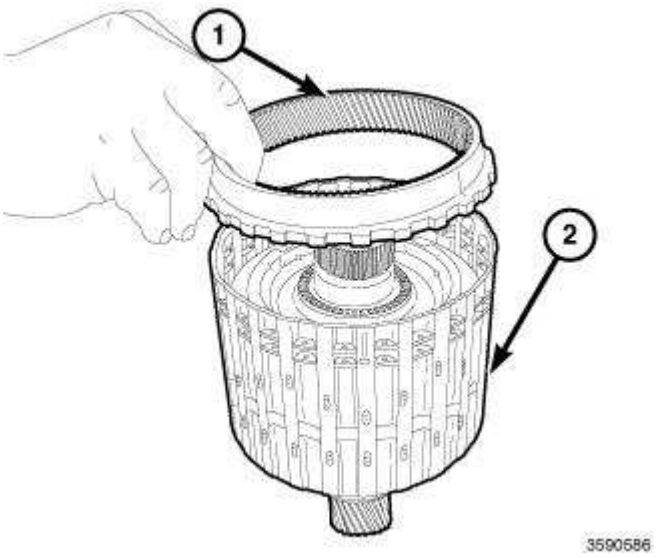


Fig. 61: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

76. Remove the P3 annulus (1) from the P4 sun gear/C/E clutch retainer (2).

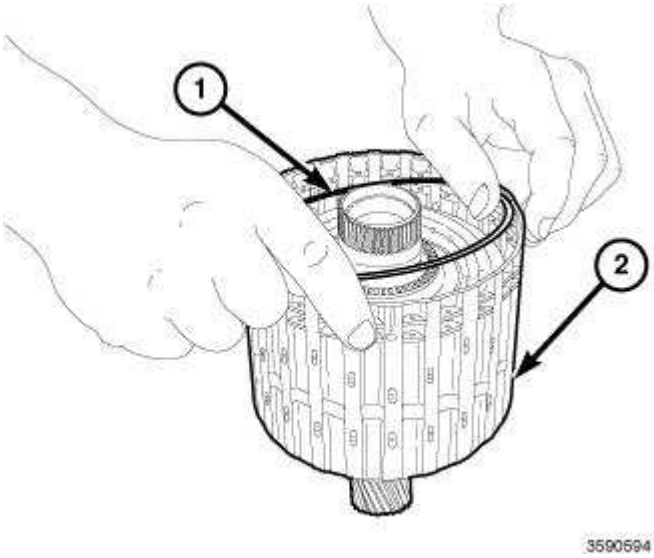


Fig. 62: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

77. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).

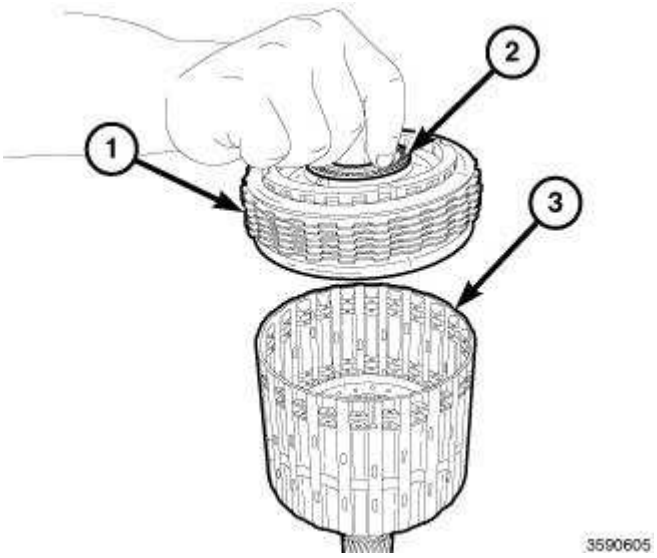


Fig. 63: E Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

78. Remove the E clutch (1) from the P4 sun gear/C/E clutch retainer (3).
79. Remove the needle bearing (2) from the E clutch (1).

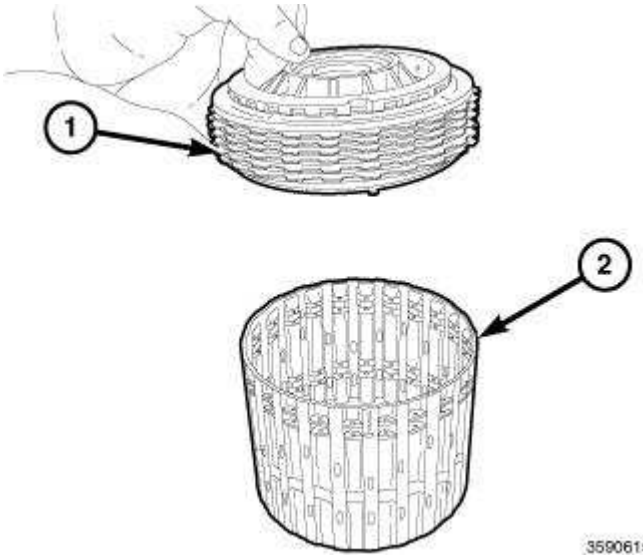


Fig. 64: C Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

80. Remove the C clutch (1) from the P4 sun gear/C/E clutch retainer (2).
81. Remove the bearing from top and bottom of C clutch (1).

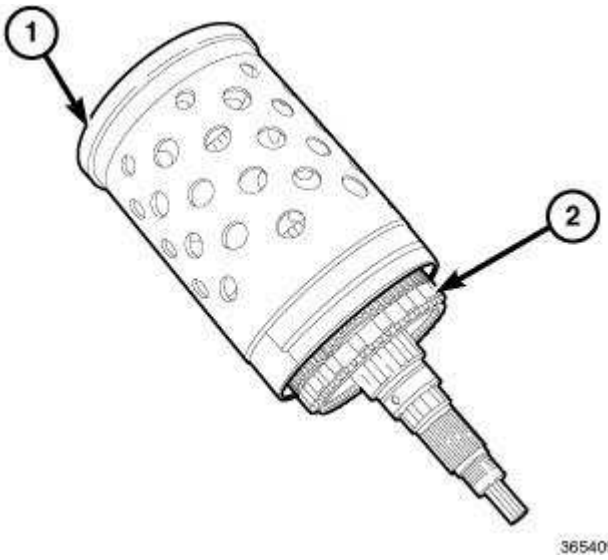


Fig. 65: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

82. Remove the P4 planetary carrier/output shaft (2) from the P4 annulus drum (1).

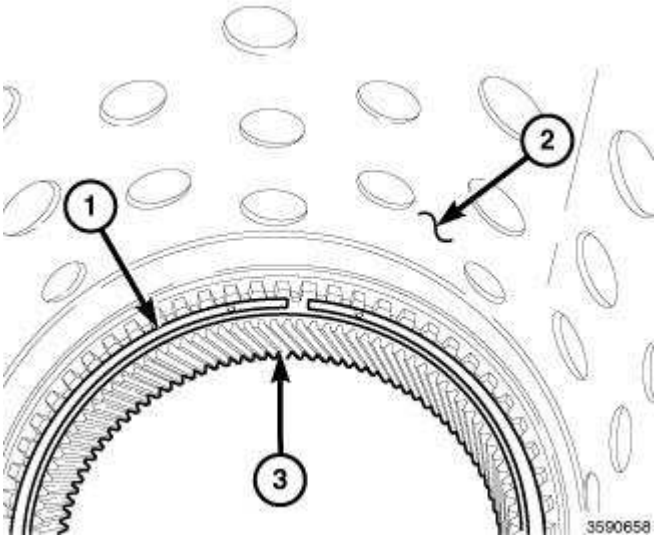


Fig. 66: Snap Ring & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

83. Remove the snap ring (1) from the P4 annulus drum (2).
84. Remove the P4 annulus (3) from the P4 annulus drum (2).

CLEANING

CLEANING

CAUTION: A unique transmission fluid has been developed for the 8HP45

transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with the appropriate automatic transmission fluid only during overhaul and assembly.

NOTE: Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will stick to case surfaces and transmission components and circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.

Flush the case bores and fluid passages thoroughly with approved transmission fluid. Dry the case and all fluid passages with compressed air. Be sure that all fluid passages are clear.

INSPECTION

INSPECTION

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with Helicoil® thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

ASSEMBLY

ASSEMBLY

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in

ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to appropriate diagnostic information .**

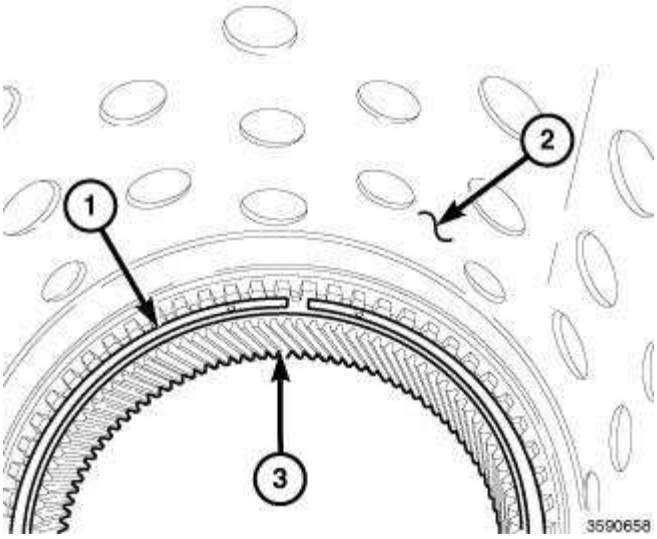


Fig. 67: Snap Ring & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

1. Insert the P4 annulus (3) into the P4 annulus drum (2).
2. Install the snap ring (1) into the P4 annulus drum (2).

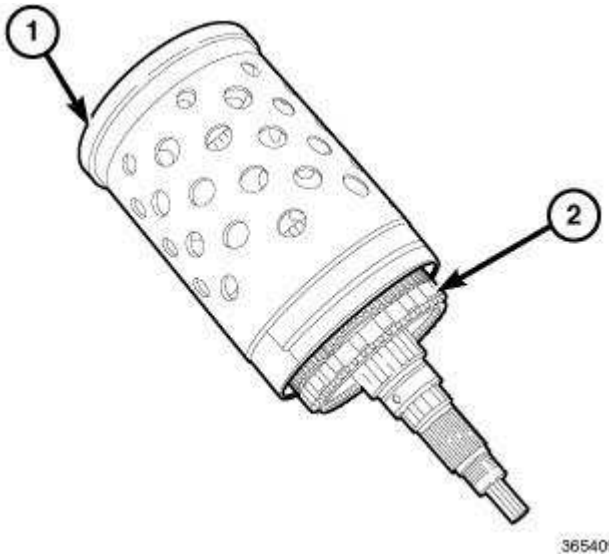


Fig. 68: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum

Courtesy of CHRYSLER GROUP, LLC

3. Install the P4 planetary carrier\output shaft (2) into the P4 annulus drum (1).

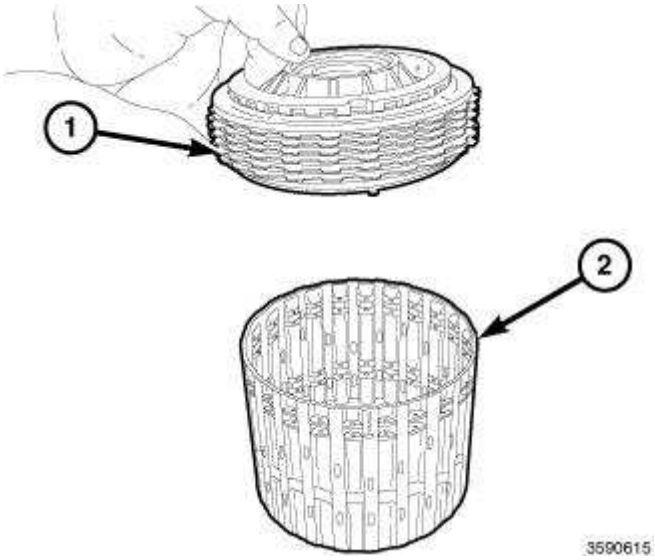


Fig. 69: C Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Position the bearings on the top and the bottom of C clutch (1).
5. Install the C clutch (1) into the P4 sun gear/C/E clutch retainer (2).

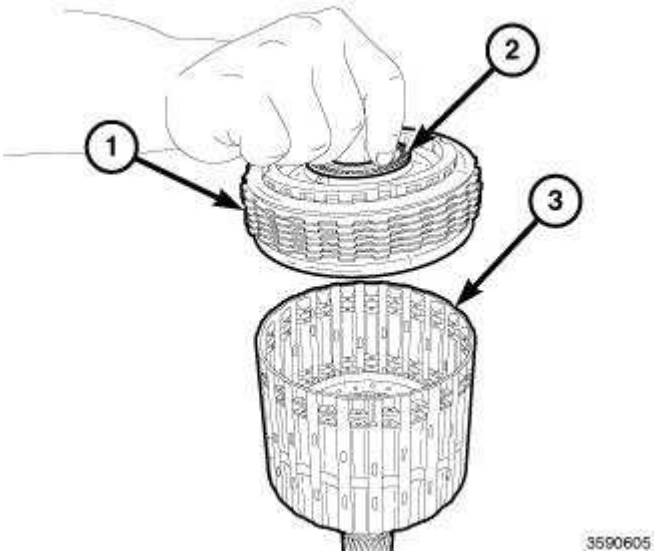


Fig. 70: E Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

6. Install the needle bearing (2) onto the E clutch (1).
7. Install the E clutch (1) into the P4 sun gear/C/E clutch retainer (3).

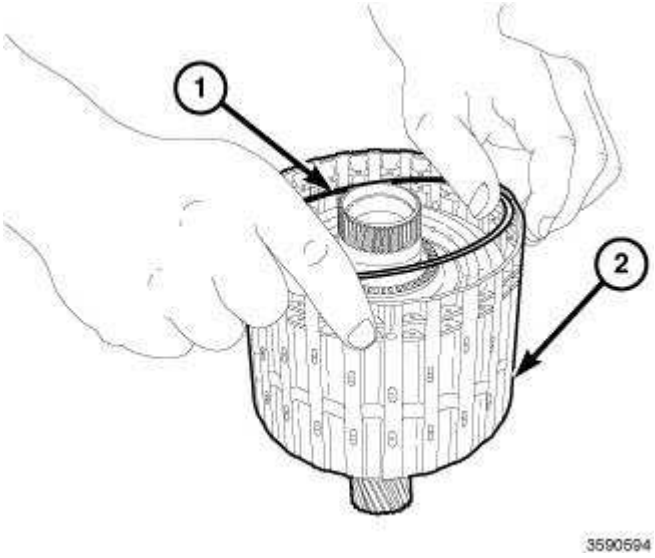


Fig. 71: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

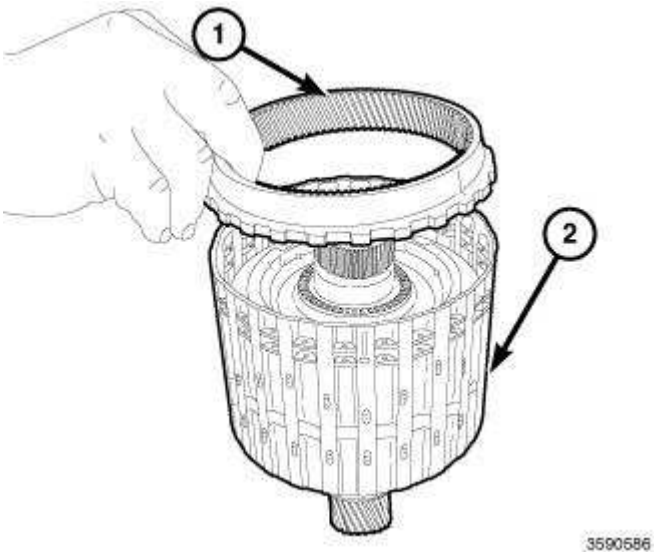


Fig. 72: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

9. Install the P3 annulus (1) into the P4 sun gear/C/E clutch retainer (2).

Fig. 73: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

10. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

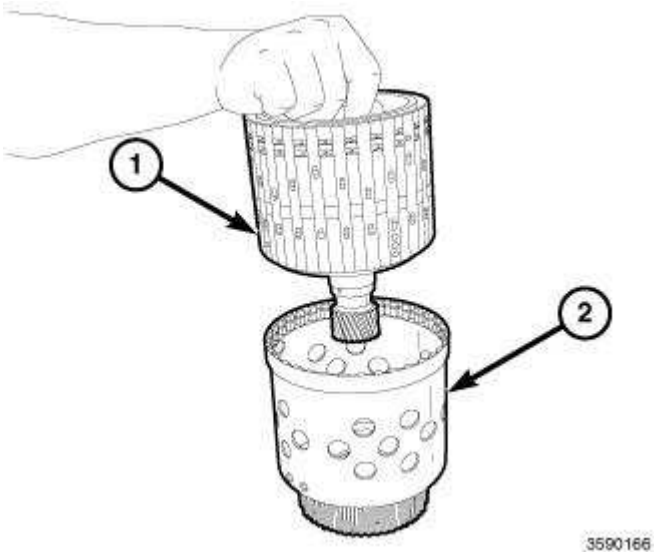


Fig. 74: P4 Sun Gear/C/E Clutch Retainer & D Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

11. Install the P4 sun gear/C/E clutch retainer (1) into the D clutch drum (2).

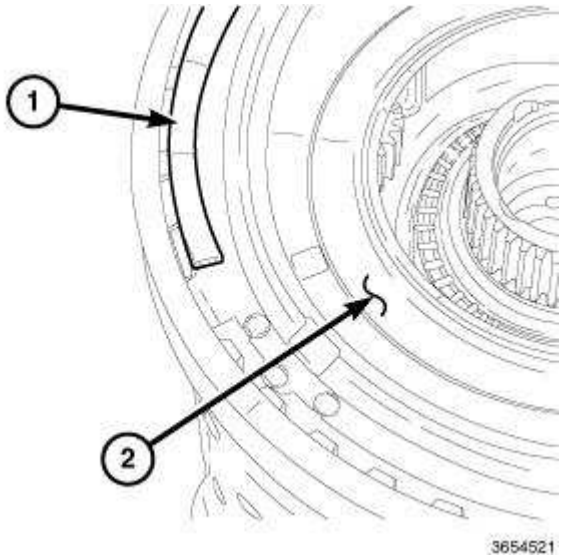


Fig. 75: P3 Planetary Carrier & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

12. Install the needle bearing onto the planetary carrier.
13. Install the P3 planetary carrier (2) in the D clutch drum.
14. Install the snap ring (1).

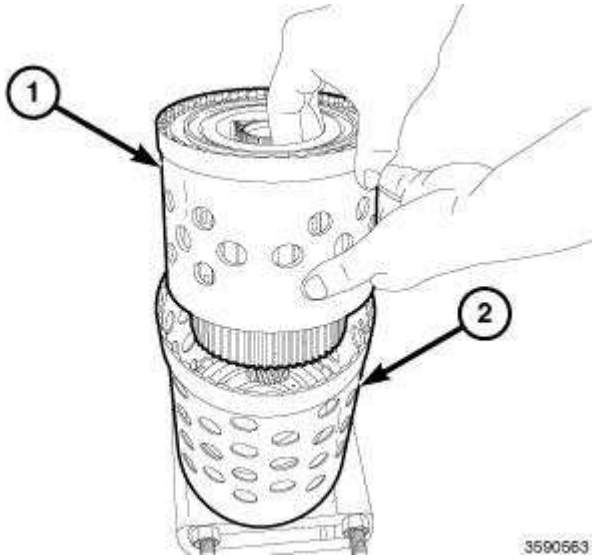


Fig. 76: D Clutch Drum & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

15. Install the D clutch drum (1) into the P4 annulus drum (2).

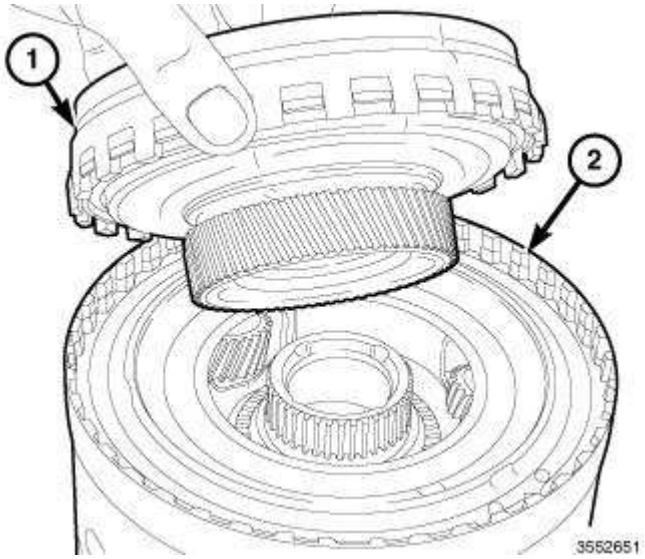


Fig. 77: P2 Annulus/P3 Sun Gear
Courtesy of CHRYSLER GROUP, LLC

16. Install the P2 annulus\P3 sun gear (1) onto the drum assembly (2).

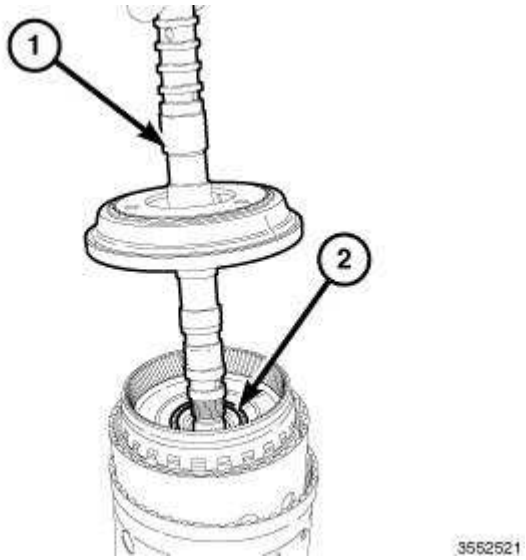


Fig. 78: P2 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

17. Install the needle bearing (2) and washer.
18. Install the input shaft with P2 planetary carrier (1) into the drum assembly.

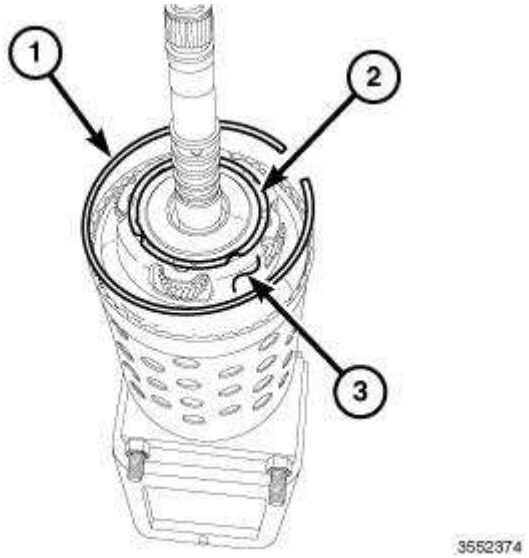


Fig. 79: P1 Planetary Carrier & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

19. Install P1/P2 sun gear into the bottom of the P1 planetary carrier (3).
20. Install the P1 planetary carrier (3).
21. Install the snap ring (1).

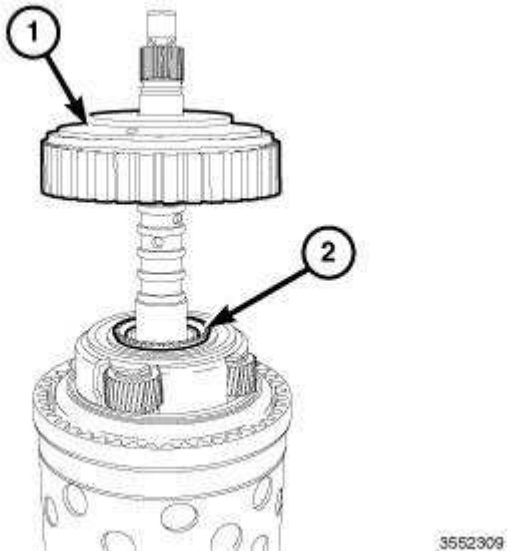


Fig. 80: P1 Annulus/B Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

22. Install the needle bearing and holding plate (2) onto the P1 planetary carrier.
23. Install the selectable shim to the P1 annulus/B clutch hub.
24. Install the P1 annulus\B clutch hub assembly (1) onto the P4 annulus drum.
25. Install the O-ring and five squared O-rings.

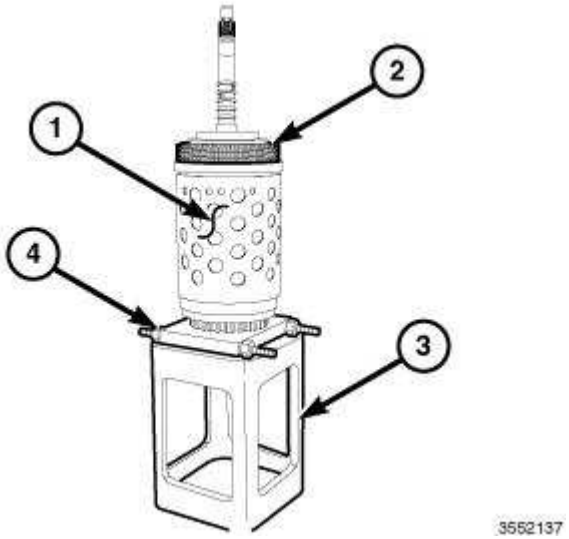


Fig. 81: P4 Annulus Drum Assembly, Assembly, Press Fixture & Splitter, Bearing/Gear
Courtesy of CHRYSLER GROUP, LLC

26. Install the clutch pack (2).

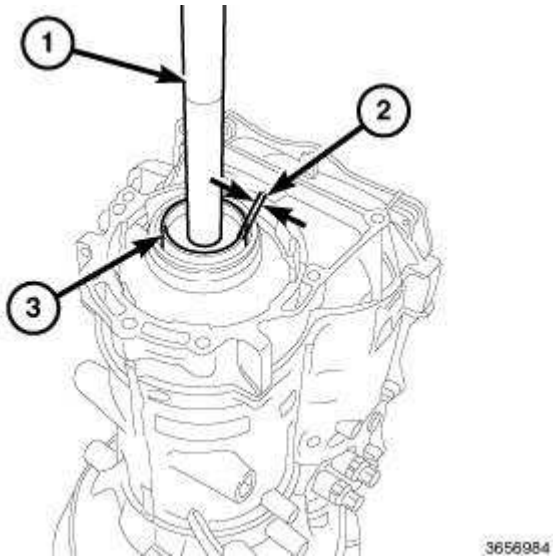


Fig. 82: Output Needle Bearing/Rear Oil Dam, Thick Walled Side & Driver Handle, Universal
Courtesy of CHRYSLER GROUP, LLC

NOTE: The (special tool #10373, Installer, Output Needle Bearing/Rear Oil Dam) (3) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the output shaft inner needle bearing, use the thick walled side (2) of the tool against the bearing.

27. Using (special tool #10373, Installer, Output Needle Bearing/Rear Oil Dam) (3) and (special tool #C-4171, Driver Handle, Universal) (1), install the output shaft inner needle bearing.

28. Install the snap ring.

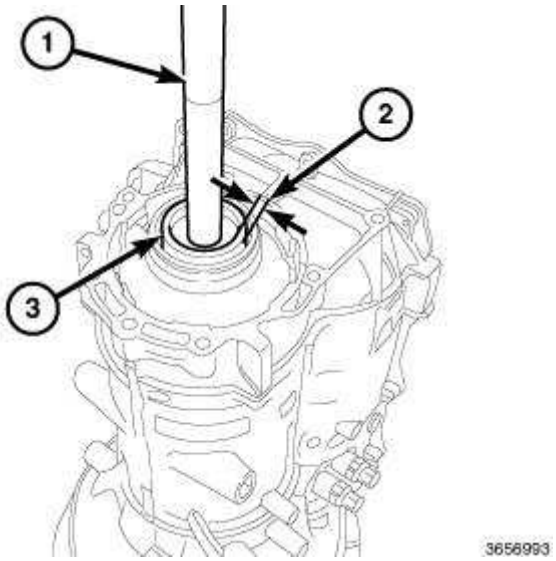


Fig. 83: Output Needle Bearing/Rear Oil Dam, Thin Walled Side & Driver Handle, Universal
Courtesy of CHRYSLER GROUP, LLC

NOTE: The (special tool #10373, Installer, Output Needle Bearing/Rear Oil Dam) (3) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the oil dam, use the thin walled side (2) of the tool against the oil dam.

29. Using (special tool #10373, Installer, Output Needle Bearing/Rear Oil Dam) (3) and (special tool #C-4171, Driver Handle, Universal) (1), install the oil dam.
30. Install the snap ring.

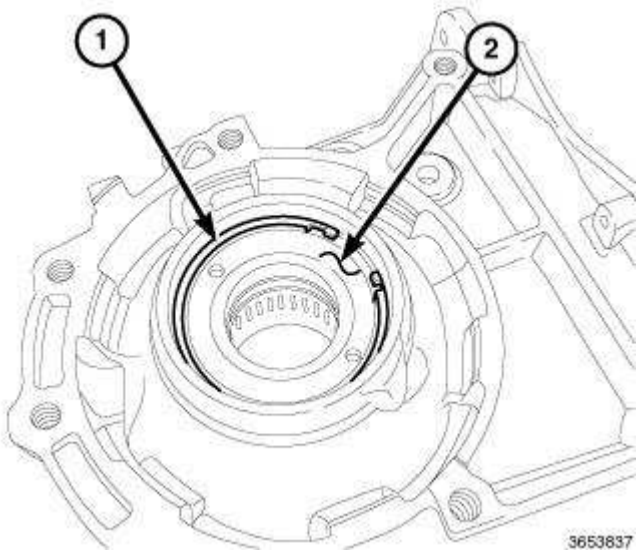


Fig. 84: Outer Bearing Snap Ring & Outer Needle Bearing

Courtesy of CHRYSLER GROUP, LLC

31. Install the needle bearing (AWD) or ball bearing (RWD).
32. Install the snap ring (1).

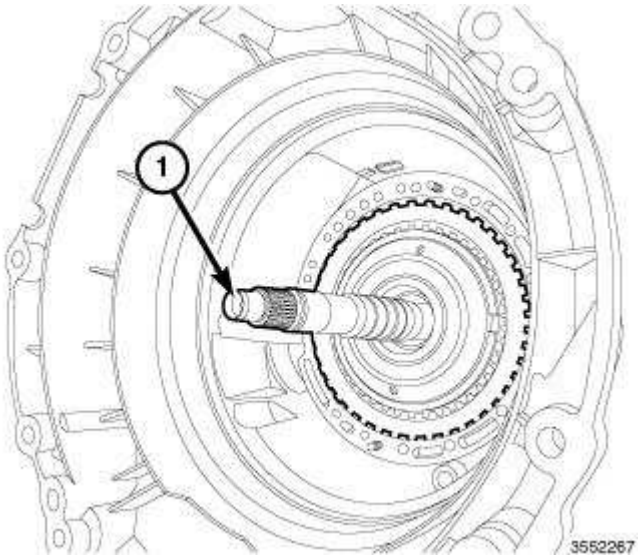


Fig. 85: P4 Annulus Drum Assembly
Courtesy of CHRYSLER GROUP, LLC

33. Install the input/output shaft and P4 annulus drum assembly (1) into the case.

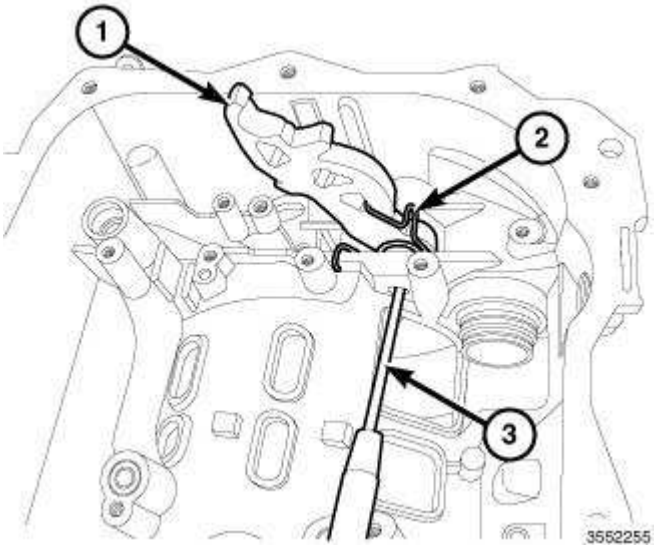


Fig. 86: Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

34. From outside the transmission case, install the park pawl shaft and install the park pawl (1) and spring (2).

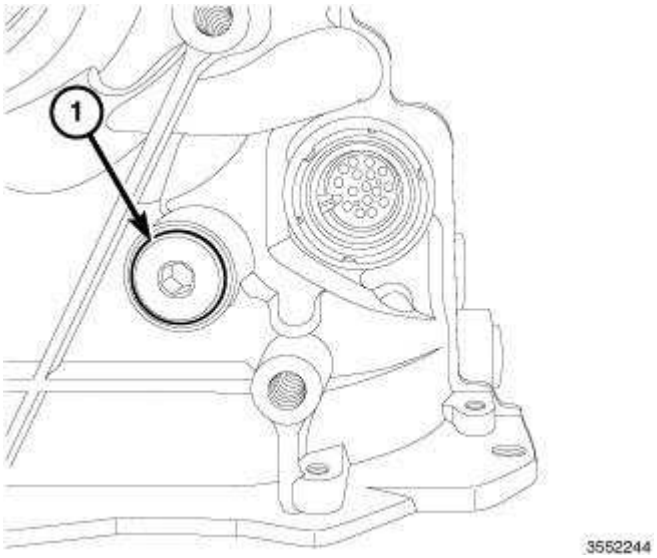


Fig. 87: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

35. Install the park pawl shaft plug (1) into the rear of the case and tighten to 35 N.m (26 ft. lb.).

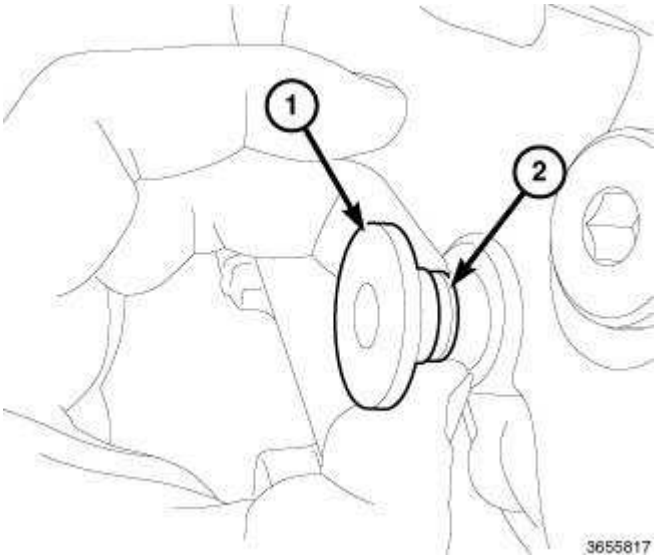


Fig. 88: Spacer & Selector Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

36. Using (special tool #6936, Spacer) (1), install the selector shaft seal (2).

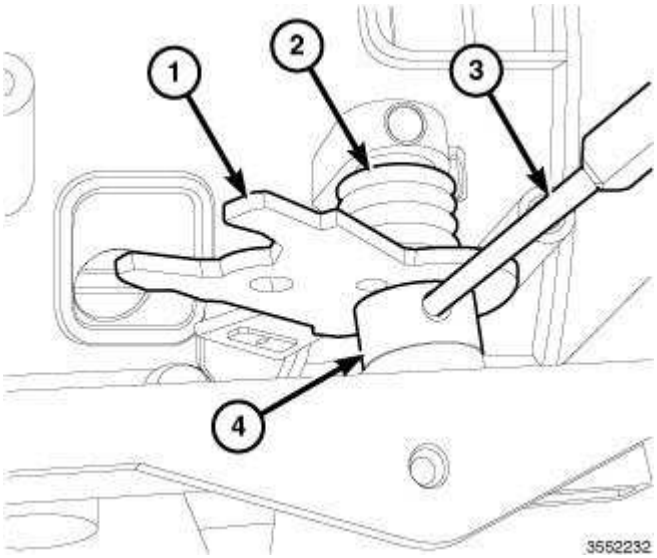


Fig. 89: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

37. Install the shaft (4), spring (2), and fork (1) into the case.
38. Install the roll pin into the selector shaft (4) using a suitable pin punch (3).

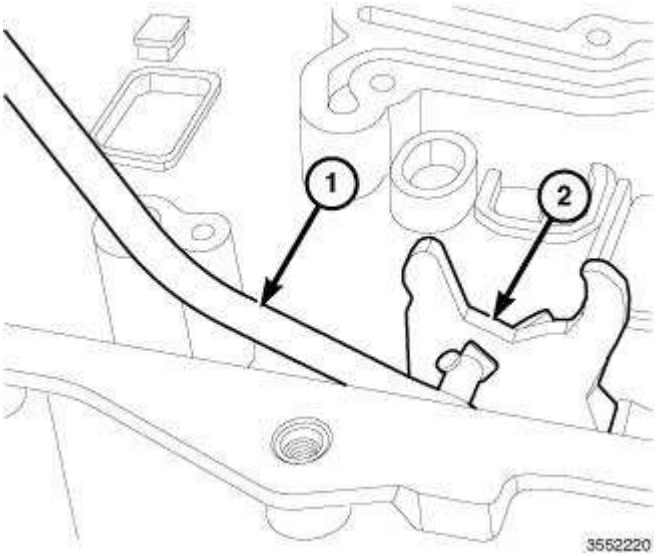


Fig. 90: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

39. Install the park pawl lock rod (1) onto the fork (2).

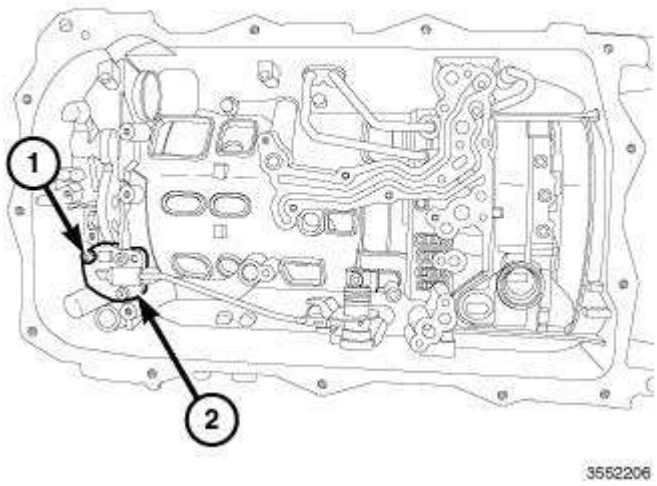


Fig. 91: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate
Courtesy of CHRYSLER GROUP, LLC

40. Position the park pawl lock rod guide plate (2), install the three park pawl lock rod guide plate retaining screws (1) and tighten to 10 N.m (89 in. lb.).

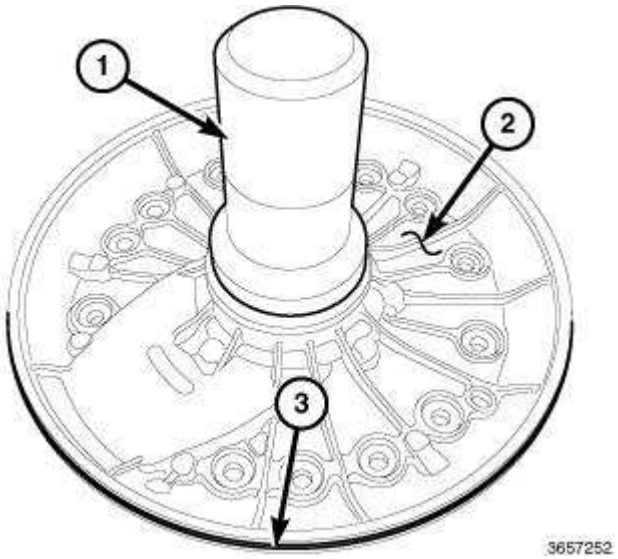


Fig. 92: Oil Pump Cover Lip Seal & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

41. Install the oil pump cover lip seal (3) on the oil pump cover (2).
42. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) (1), install the input shaft seal in the oil pump cover (2).

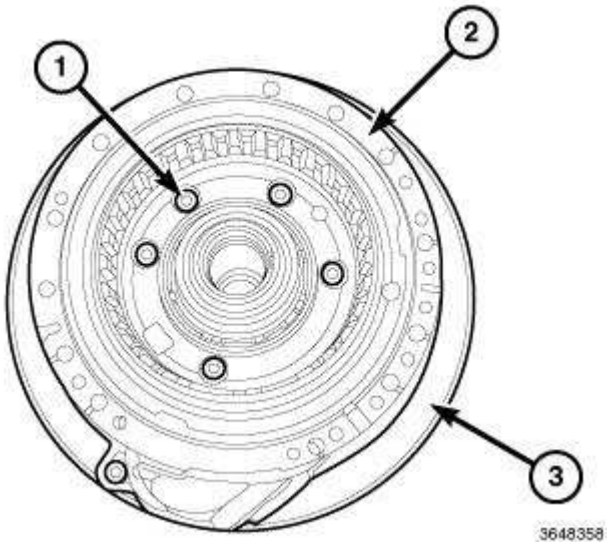


Fig. 93: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

43. Position the oil pump housing (2) and oil pump cover (3) together.
44. Install the five bolts (1) and tighten to 5 N.m (44 in. lb.) plus 45°.

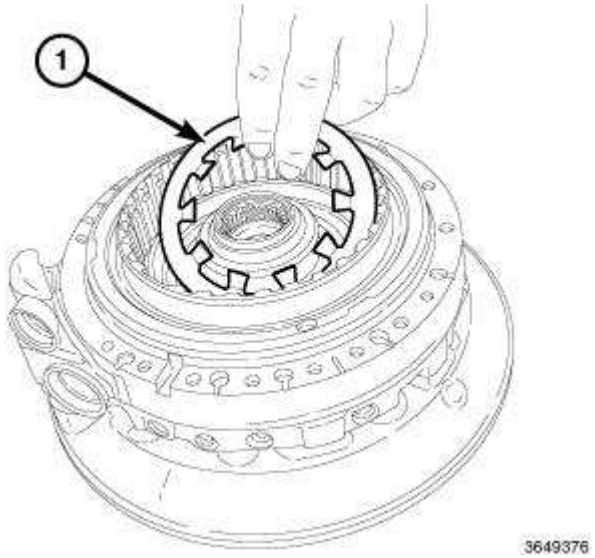


Fig. 94: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

45. Insert the piston and the retaining ring (1) into the housing.

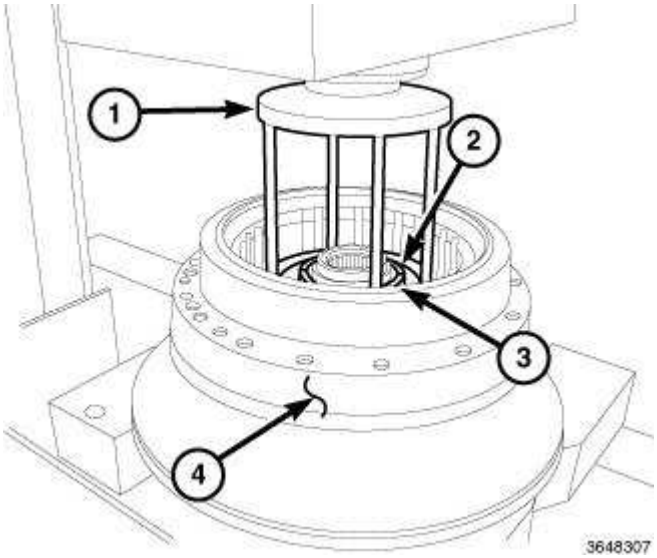


Fig. 95: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

46. Position the oil pump housing assembly (4) in a suitable arbor press.
47. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).

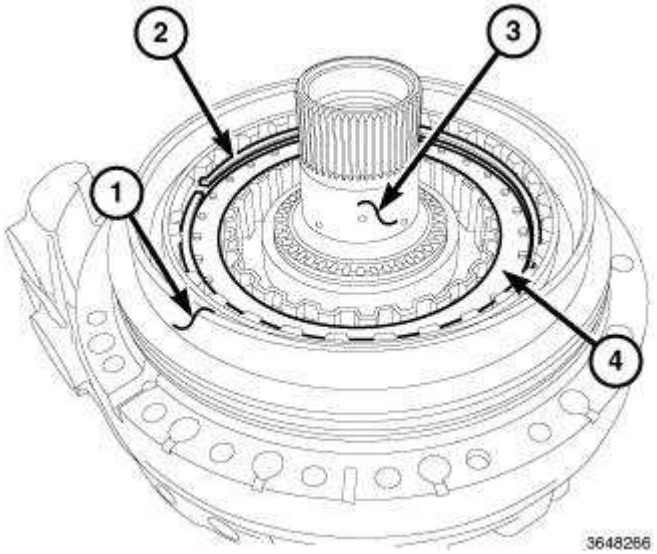


Fig. 96: Outer Ring, Snap Ring & Spacers
Courtesy of CHRYSLER GROUP, LLC

48. Install the hub (3).
49. Install the clutches and spacers (4).
50. Install the snap ring (2).
51. Install the outer ring (1) (below B-piston).

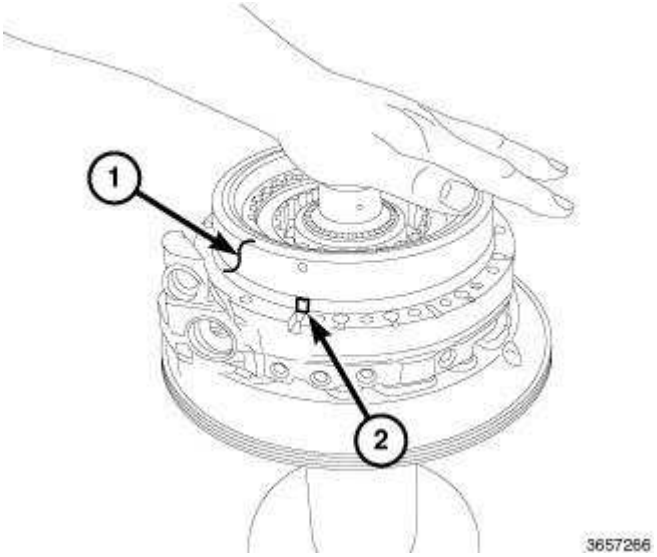


Fig. 97: B-Piston Alignment Tab & B-Piston
Courtesy of CHRYSLER GROUP, LLC

52. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.

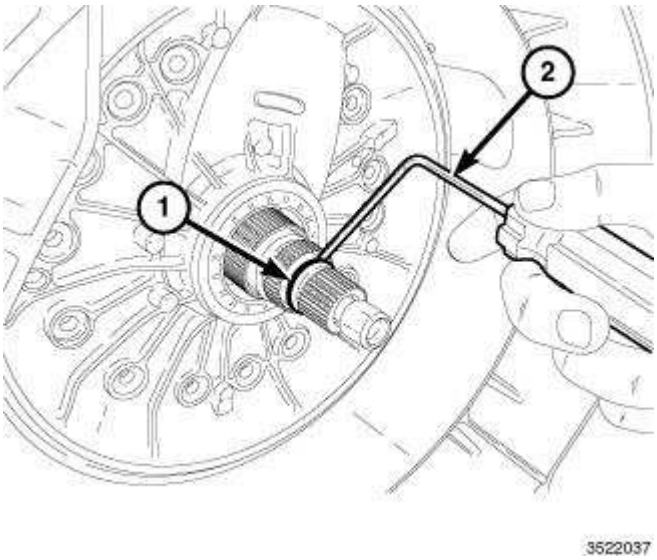


Fig. 98: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

53. Carefully position the oil pump housing assembly into the case.
54. Install the **new** input shaft O-ring.

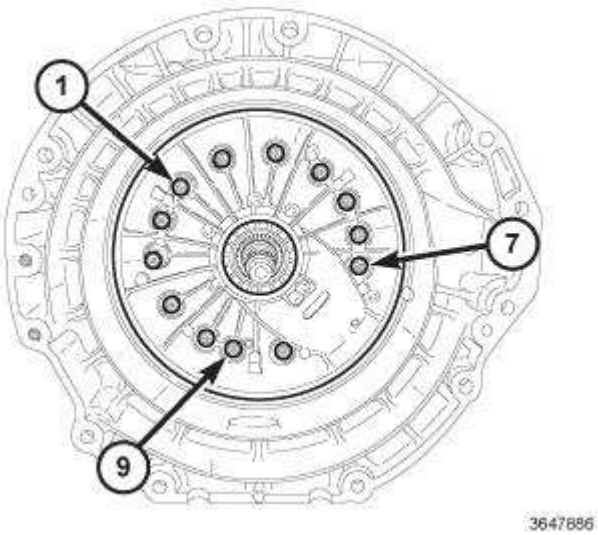


Fig. 99: Pre Tighten Bolts One, Seven And Nine
Courtesy of CHRYSLER GROUP, LLC

55. Install the thirteen oil pump cover retaining bolts and tighten the oil pump cover as follows:
    1. In order to seat the oil pump cover properly, pre tighten bolts one, seven and nine to 6 N.m (53 in. lb.).
    2. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
    3. Working in a clockwise pattern, beginning with number one, tighten an additional 90°.

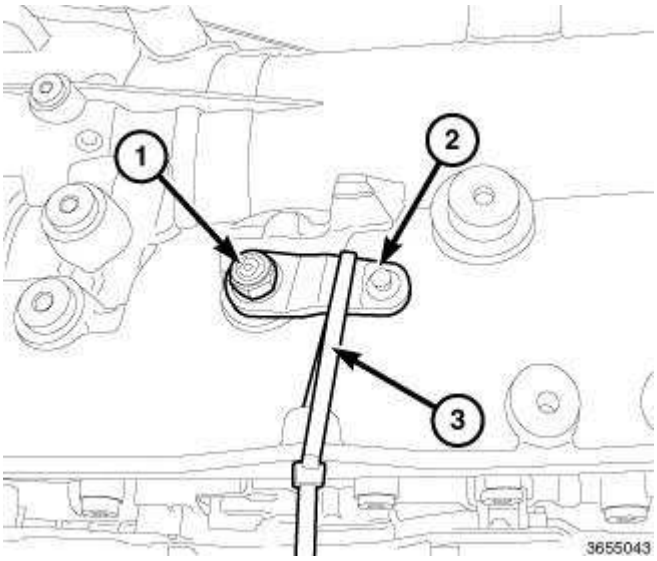


Fig. 100: Manual Park Release Lever & Nut & Tie Strap
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual park release lever (2) can be reversed to release tension and ease the installation of the valve body assembly.

56. Temporarily install the manual park release lever (2) to release tension on the shift fork as follows:
    1. Install the manual shift shaft lever (2) 180 degrees offset from its original position.
    2. Install the nut (1) and hand tighten.
    3. Turn the manual park release lever (2) and using a tie strap (3), secure the lever (2) into position so the park release fork is in the same position as it was before valve body assembly removal.

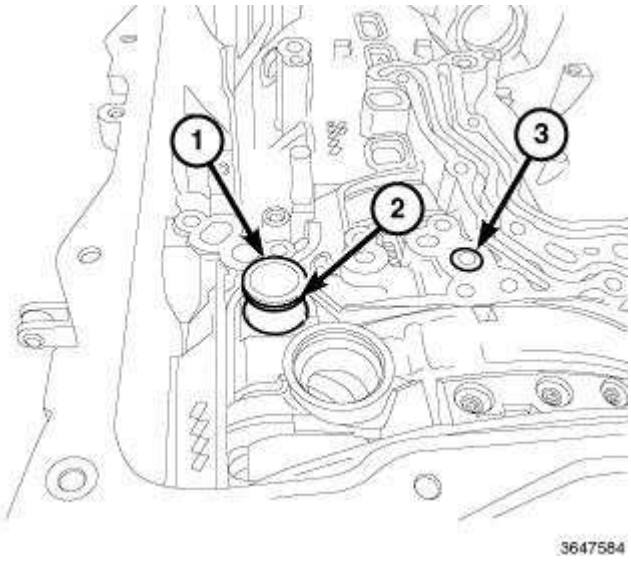


Fig. 101: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

57. Install a new compression seal (3) into the transmission case.
58. Install the fluid port (1) with **new** O-rings to the transmission case.

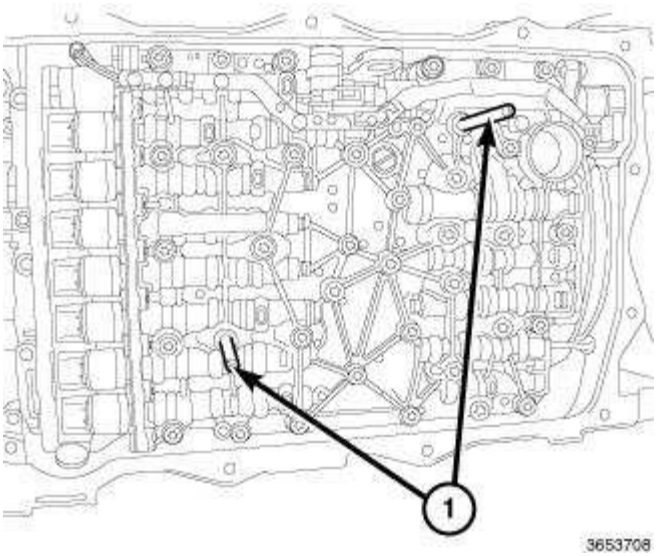


Fig. 102: Pins, Valve Body Alignment & Valve Body Alignment Pins

Courtesy of CHRYSLER GROUP, LLC

59. Install the (special tool #10379, Pins, Valve Body Alignment) (1) in the transmission case as guides for the valve body assembly.

    NOTE: Make sure the shift fork lines up properly.

60. Using the valve body alignment pins (1) to guide, position the valve body assembly to the transmission.

    NOTE: After several bolts have been hand tightened, remove the guide pins (1).

61. Install the fourteen valve body assembly retaining bolts and hand tighten.

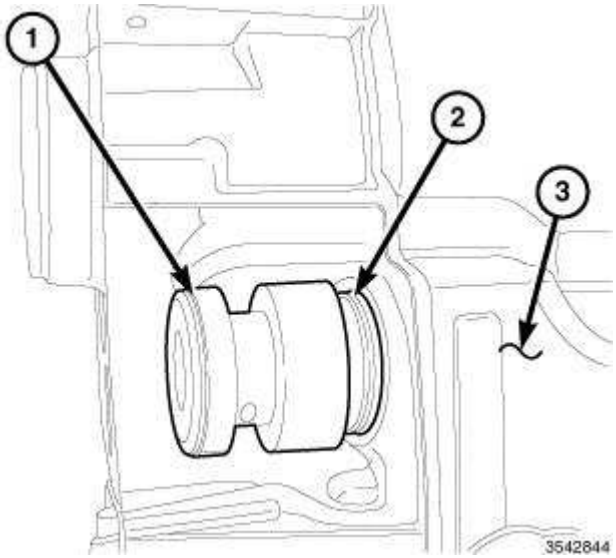


Fig. 103: Remover/Installer, Guide Sleeve
Courtesy of CHRYSLER GROUP, LLC

62. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) into the transmission case (3).

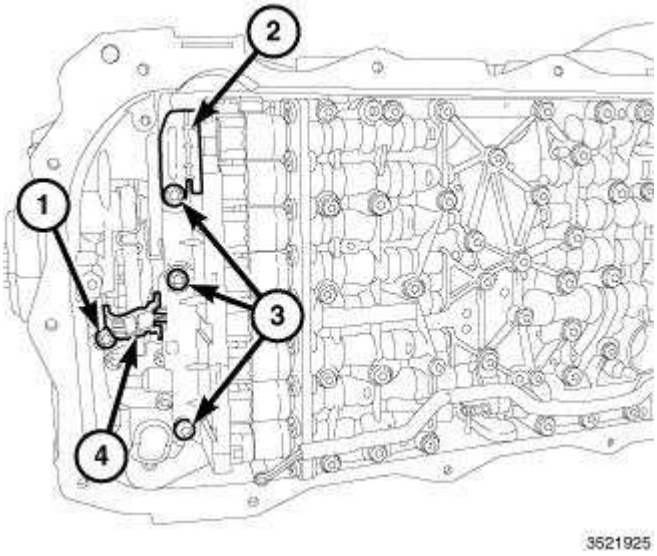


Fig. 104: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

63. Install the sensor (4) and the sensor retaining bolt (1) and hand tighten.
64. Latch the electrical connector insulator lock (2) by pushing in.
65. Install the valve body assembly end retainer bolts (3) and hand tighten.

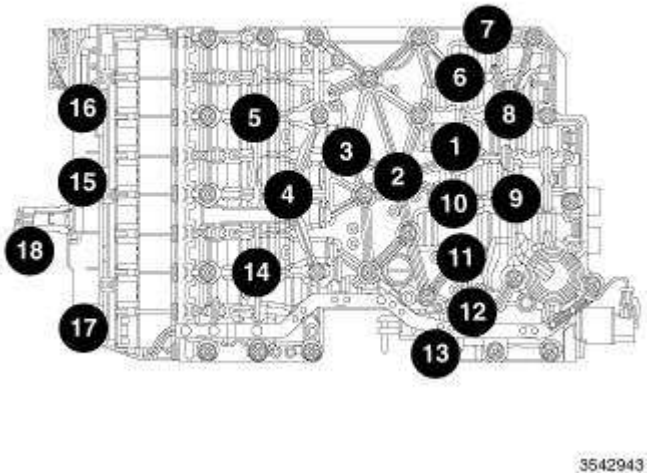


Fig. 105: Valve Body Assembly Retaining Bolts 1-14
Courtesy of CHRYSLER GROUP, LLC

66. Tighten the valve body assembly retaining bolts 1-18 in the sequence shown in illustration to 8 N.m (71 in. lbs.).

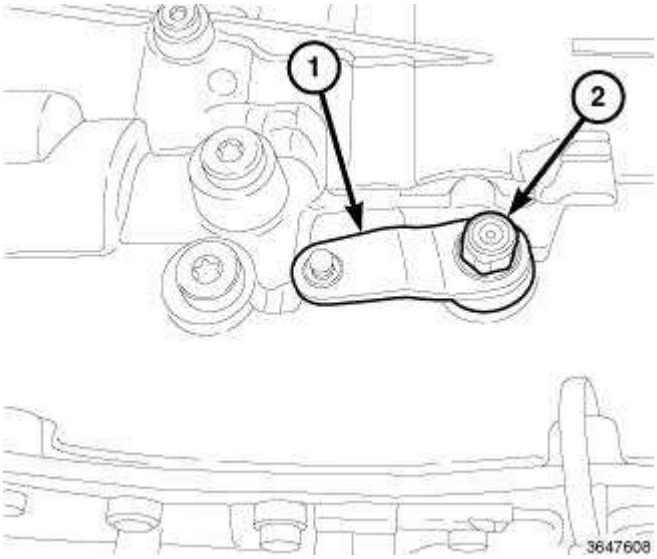


Fig. 106: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

67. Remove the tie strap and return the manual release lever (1) to the original position.
68. Install the nut (2) and tighten to 10 N.m (89 in. lbs.).

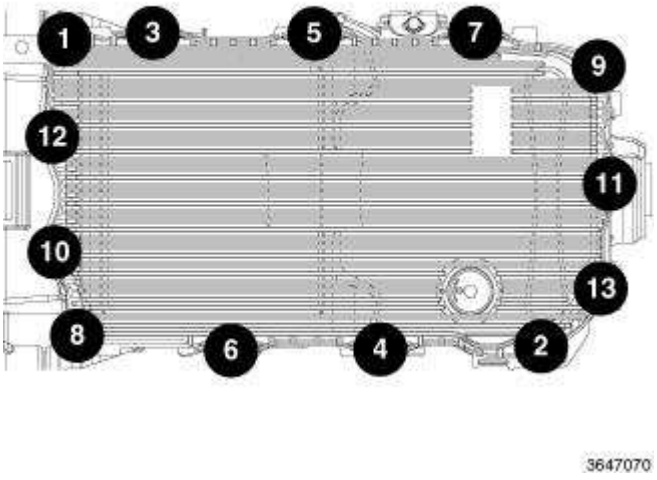


Fig. 107: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

69. Position the oil pan and gasket.
70. Install the thirteen oil pan retaining bolts and using the sequence shown in illustration and tighten to 10 N.m (89 in. lbs.).

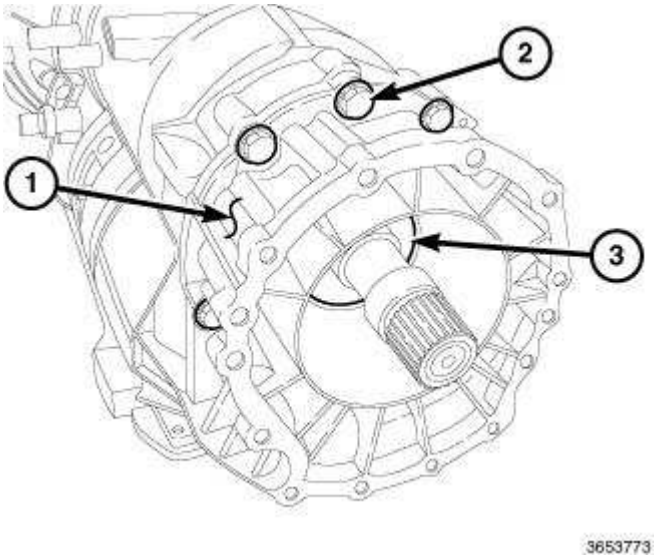


Fig. 108: AWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: AWD only.

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

71. Position the new output shaft seal (3) over the output shaft and against the transmission case.
72. Using (special tool #8481, Installer, Gear) install the output shaft seal.
73. Position the extension housing.
74. Install the seven transmission housing extension bolts (2) and tighten to 27 N.m (20 ft. lbs.).

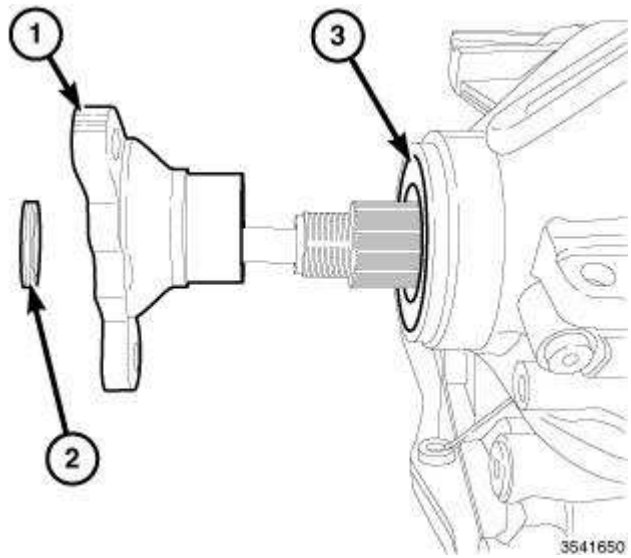


Fig. 109: RWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: RWD only.

75. Install the transmission output shaft washer.

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

76. Position the new output shaft seal (3) over the output shaft and against the transmission case.
77. Using (special tool #8481, Installer, Gear) install the output shaft seal.
78. Install the transmission rear dust seal (2).
79. Install the propeller shaft flange (1).

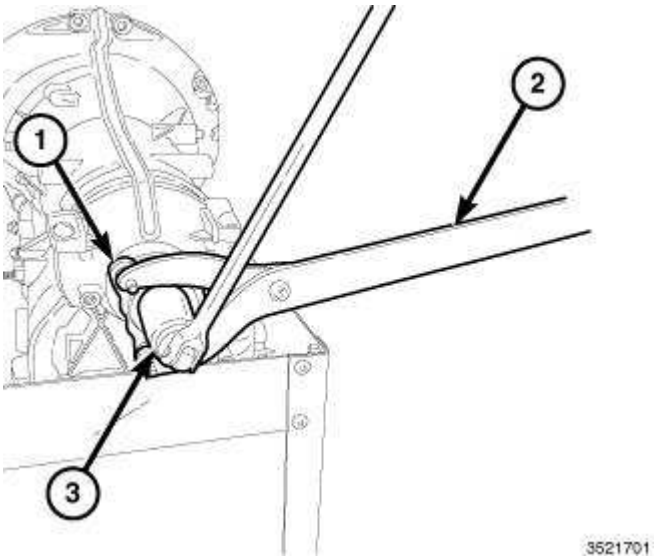


Fig. 110: RWD
Courtesy of CHRYSLER GROUP, LLC

80. Install the **new** propeller shaft flange nut and washer using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1). Tighten to 60 N.m (44 Ft. lbs.).
81. Stake the nut.

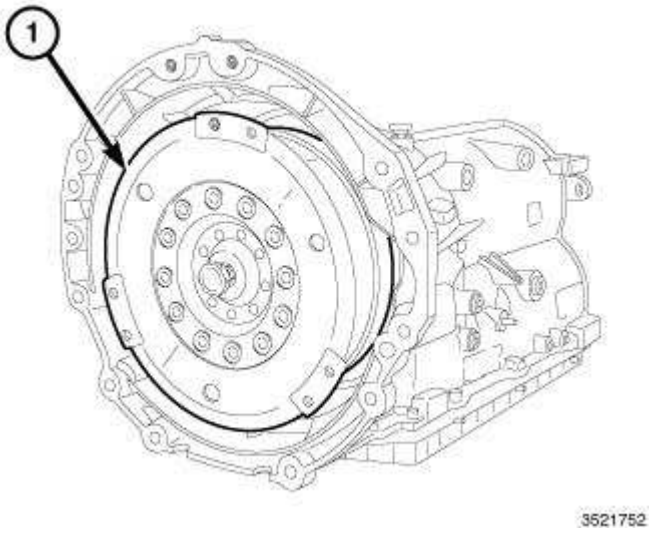


Fig. 111: RWD
Courtesy of CHRYSLER GROUP, LLC

82. Install the torque converter (1). Refer to **TORQUE CONVERTER, INSTALLATION**.
83. Before installing the transmission in the vehicle, pre-fill the transmission as outlined in FILL TRANSMISSION AFTER SERVICE. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

INSTALLATION

INSTALLATION

CAUTION: When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.

NOTE: Make sure that the transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.

1. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.

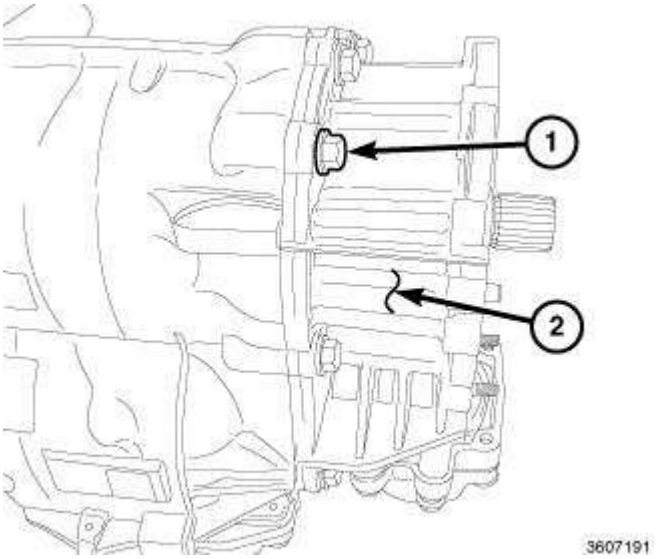


Fig. 112: Seven Extension Housing Bolts & Extension Housing
Courtesy of CHRYSLER GROUP, LLC

2. **For AWD only** , position the extension housing (2), install the seven bolts (1) and tighten to 27 N.m (20 ft. lbs.).

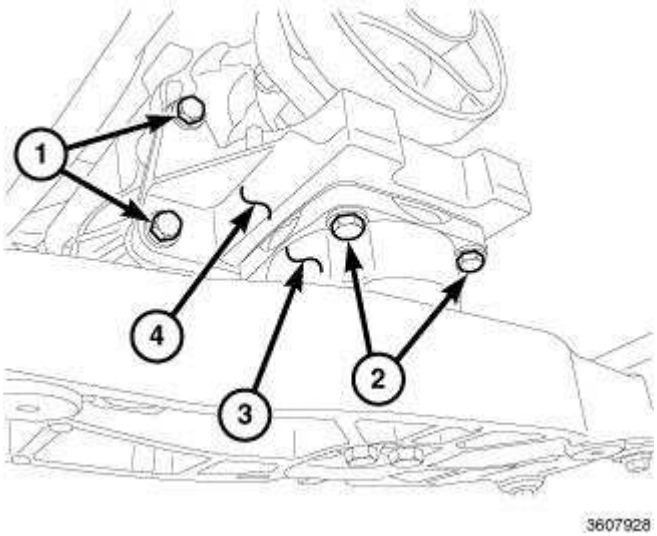


Fig. 113: Four Transmission Mount Bolts & Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

3. **For RWD only** , position the adapter bracket (4), install the adapter bracket bolts (1) and tighten to 33 N.m (24 ft. lbs.).
4. **For RWD only** , position the rear transmission mount (3), install the transmission mount bolts (2) and tighten to 33 N.m (24 ft. lbs.).

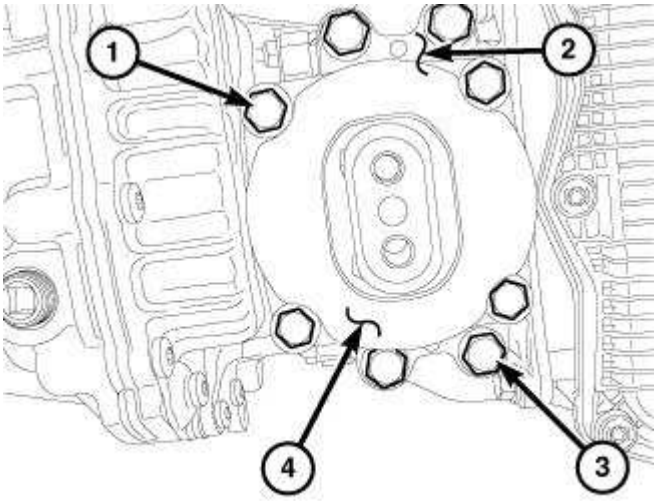


Fig. 114: Four Rear Transmission Mount Bolts, Rear Transmission Mount, Adapter Bracket Bolts & Adapter
Courtesy of CHRYSLER GROUP, LLC

5. **For AWD only** , position the adapter bracket (2), install the adapter bracket bolts (3) and tighten to 33 N.m (24 ft. lbs.).
6. **For AWD only** , position the rear transmission mount (4), install the rear transmission mount bolts (1) and tighten to 33 N.m (24 ft. lbs.).

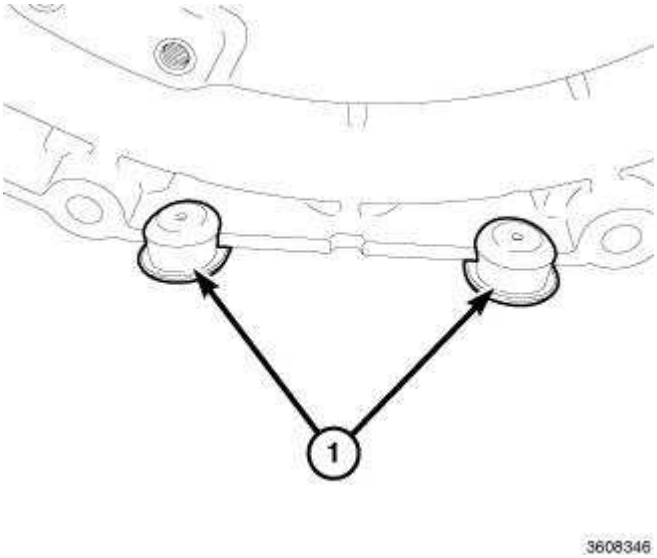


Fig. 115: Rubber Access Plugs
Courtesy of CHRYSLER GROUP, LLC

7. Verify that the rubber access plugs (1) are installed in the front of the transmission.

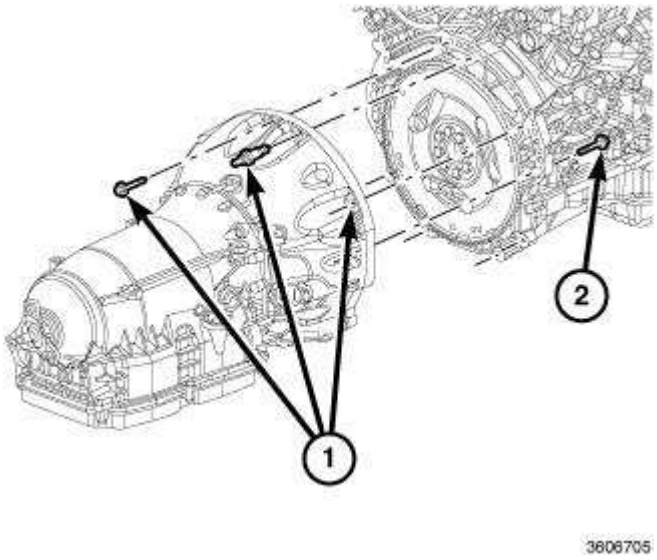


Fig. 116: RWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: Hold torque converter in place during transmission installation.

8. Position the transmission to the vehicle.
9. Install the upper bell housing bolts (1, 2) securing the bell housing to the engine block. Do not tighten at this time.

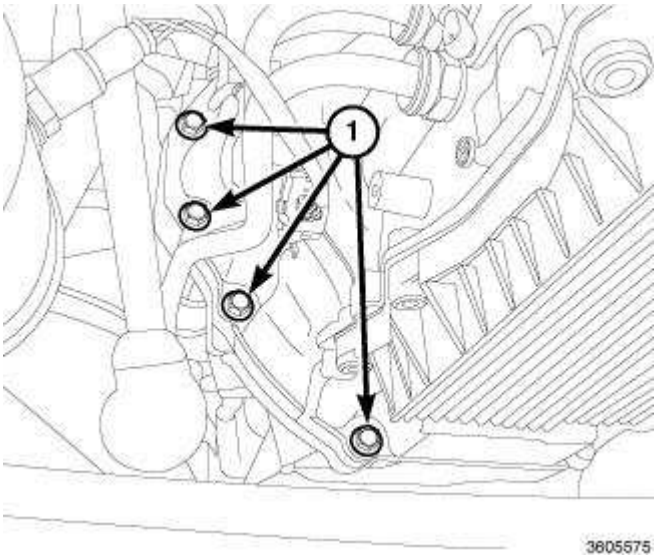


Fig. 117: Bell Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Install the LH bell housing bolts (1). Do not tighten at this time.

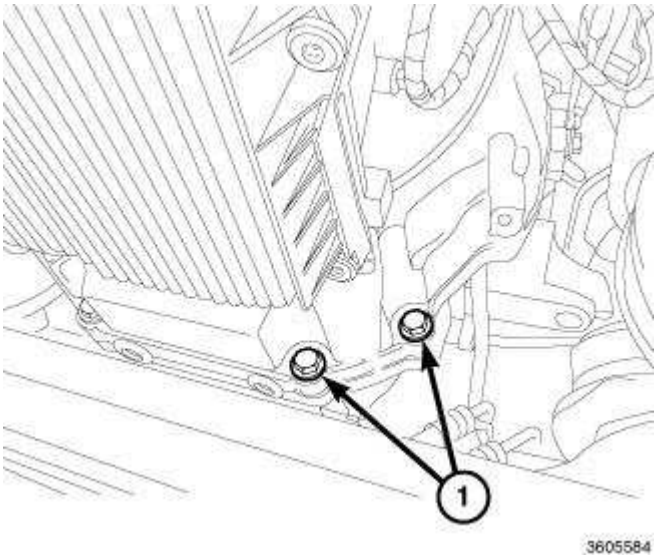


Fig. 118: Bell Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the RH bell housing bolts (1). Tighten **all** the bell housing bolts to 55 N.m (41 ft. lbs.)

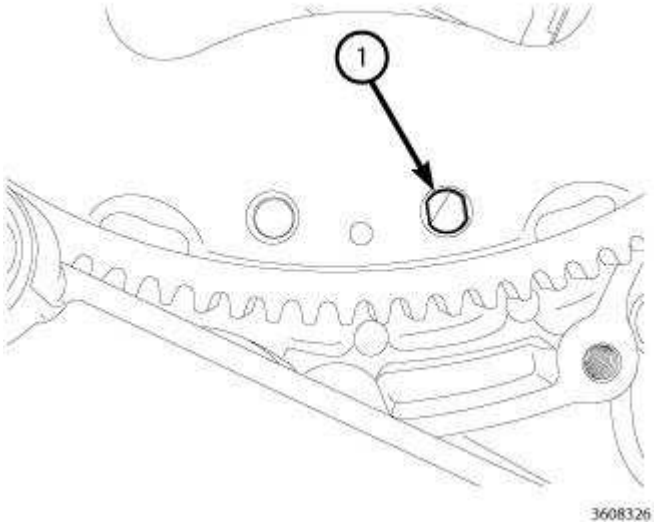


Fig. 119: Alignment Hole
Courtesy of CHRYSLER GROUP, LLC

12. Rotate crankshaft in clockwise direction to line up the alignment hole (1) in the flex plate, then start the first bolt.

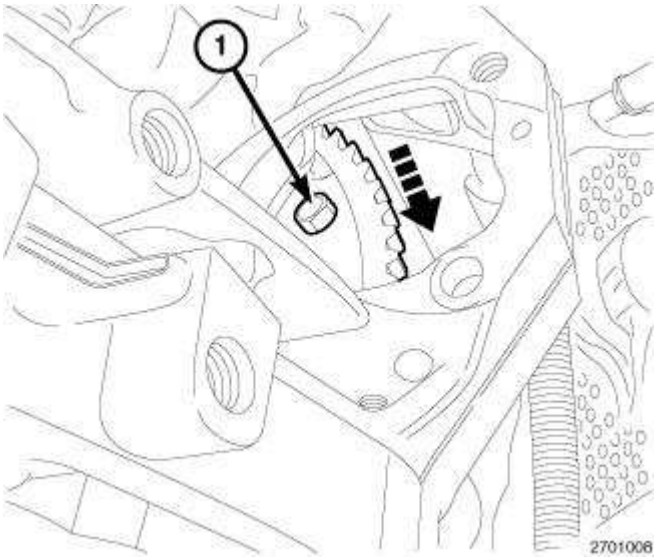


Fig. 120: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Rotate crankshaft in clockwise direction until converter bolts (1) are accessible. There are three sets of two bolts 120° apart. Install the remaining bolts and tighten to 42 N.m (31 ft. lbs.).

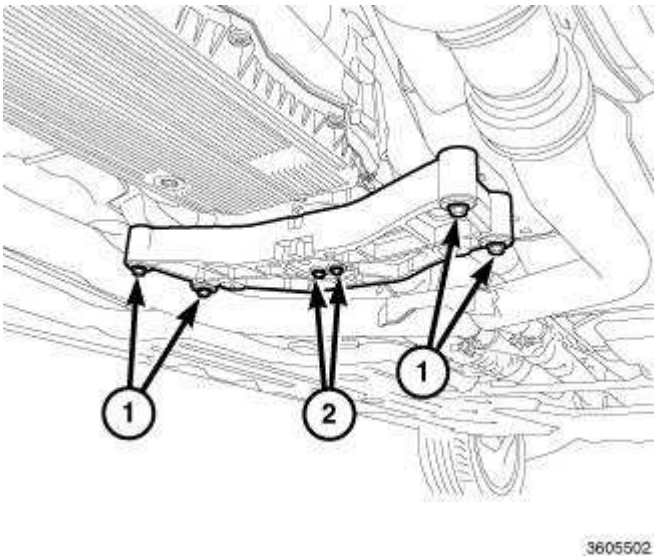


Fig. 121: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Position the crossmember, install the bolts (1) to the frame and tighten to 65 N.m (48 ft. lbs.).
15. Install the bolts (2) securing rear support and cushion to the cross member and tighten to 65 N.m (48 ft. lbs.).

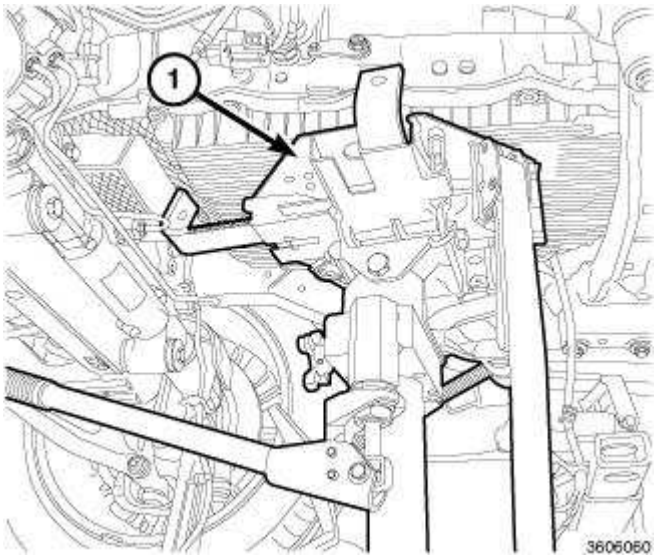


Fig. 122: Service Jack
Courtesy of CHRYSLER GROUP, LLC

16. Remove the transmission jack (1).

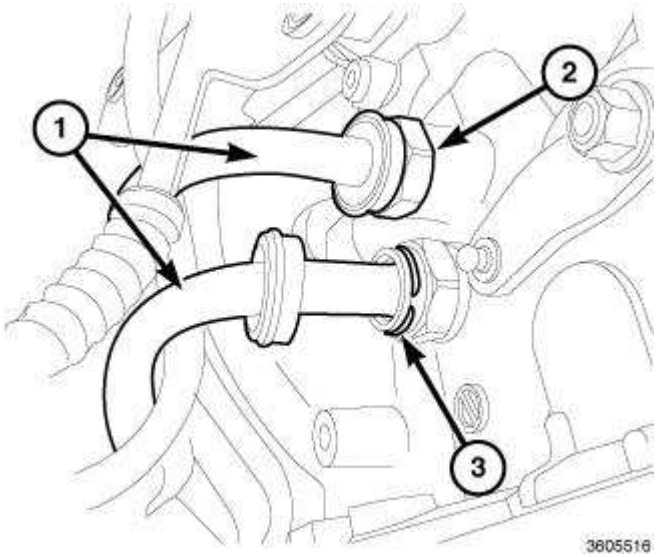


Fig. 123: Transmission Fluid Cooler Lines, Clips & Fittings
Courtesy of CHRYSLER GROUP, LLC

17. Connect transmission fluid cooler lines (1) at transmission fittings (2) and install the clips (3).

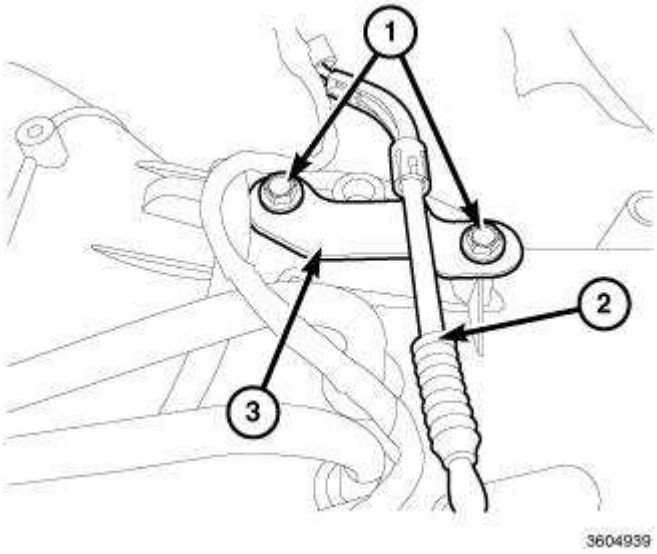


Fig. 124: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

18. Position the manual park release cable bracket/cable (2, 3), install the bolts (1) and tighten to 20 N.m (15 ft. lbs.).

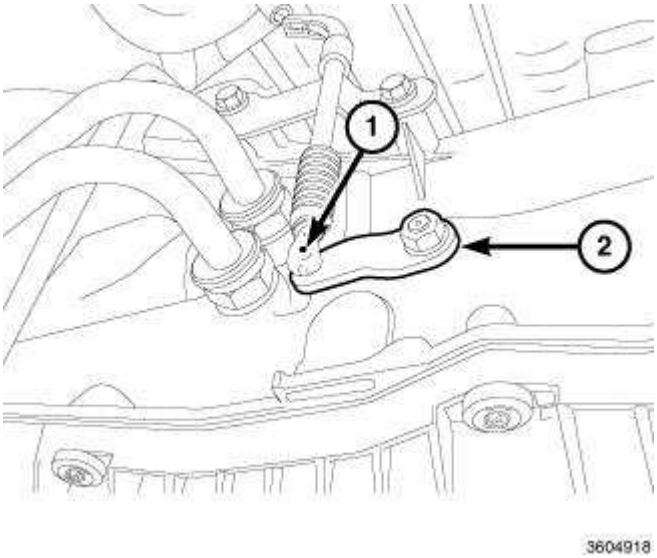


Fig. 125: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

19. Connect the parking pawl release cable (1) to the lever (2).
20. Connect the negative battery cable.
21. Connect the right and left bank up stream oxygen sensors.
22. Install the complete exhaust system.
23. Install the transfer case if equipped. Refer to **INSTALLATION** .
24. Install the rear propeller shaft (RWD). Refer to **INSTALLATION** .

25. Install the starter. Refer to **STARTER, INSTALLATION** .

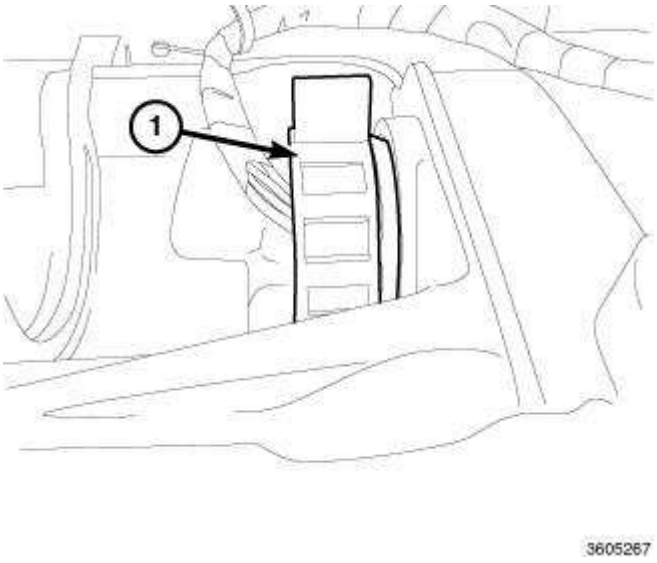


Fig. 126: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

26. Connect the adapter plug connector (1) to the transmission.

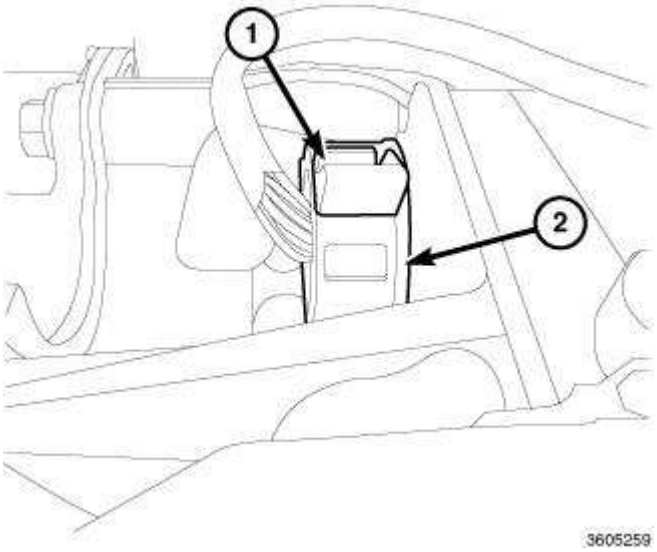


Fig. 127: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

27. Turn the locking mechanism lock (1) of the adapter plug connector (2) clockwise to secure.
28. Perform the STANDARD PROCREDURE - TRANSMISSION FILL AFTER SERVICE. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

SPECIAL TOOLS

SPECIAL TOOLS

	10373 - Installer, Output Needle Bearing/Rear Oil Dam 10375 - Installer, Oil Pump Cover Oil Seal 10377 - Remover/Installer, Guide Sleeve 10378 - Rings, Support 10379 - Pins, Valve Body Alignment 10383 - Plate, Clutch Pressure Test 1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.) 6787A - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 6784, 6809.) 6936 - Spacer (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948.) 8285 - Compressor, Spring (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.) 8481 - Installer, Gear (Originally Shipped In Kit Number(s) 8708, 8708CC.) 8925-3 - Assembly, Press Fixture (Originally Shipped In Kit Number(s) 8998, 8998CC.) 9585 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9691.) 9664 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9675, 9685, 9695.) 9667 - Remover, Seal (Originally Shipped In Kit Number(s) 9691.) C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.) C-3752 - Slide Hammers (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202-CAN, 9202CC.) C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.) C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)

CABLE, MANUAL PARK RELEASE

OPERATION

OPERATION

The 8HP45 utilizes a fully electronic shifter mechanism with no physical connections to the transmission such as shifter linkage or cables. Due to this design the park function of the

transmission is performed using electronic inputs and hydraulic pressure to hold to parking pawl lever in the disengaged position while moving. Once in park this hydraulic pressure is reduced which allows the lever to engage the parking pawl which in turn keeps the vehicle from rolling forward or rearward.

Should the vehicle or any component of the E-Shifter lose power or communication the parking pawl will be engaged and the vehicle cannot be moved. To move the vehicle there is a manual park release mechanism that will allow first responders to disengage the parking pawl and allow the vehicle to be moved further facilitating vehicle recovery such as towing or moving the vehicle to allow jump starting.

REMOVAL

REMOVAL

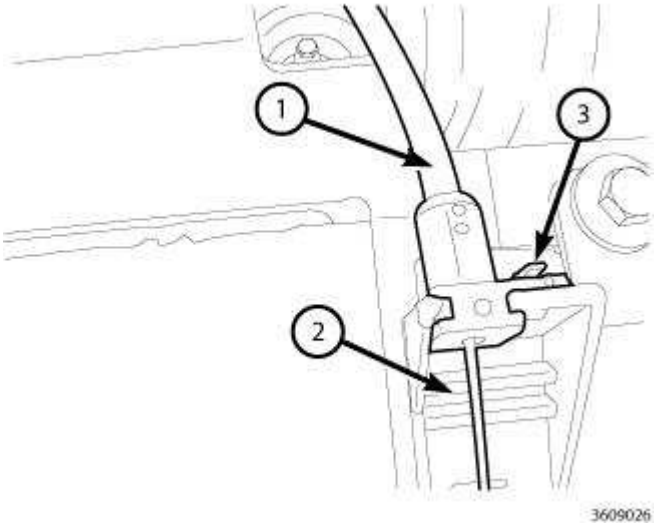


Fig. 128: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the shifter bezel.
3. Disconnect the cable (1) from the housing (2), while holding the release tab (3) open.
4. Disconnect the cable from the lever.
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

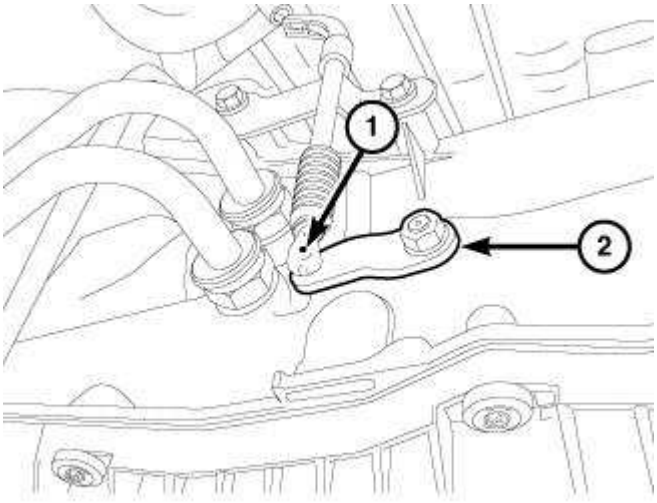


Fig. 129: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

6. Using a flat bladed tool, disconnect the cable (1) from the transmission lever (2).

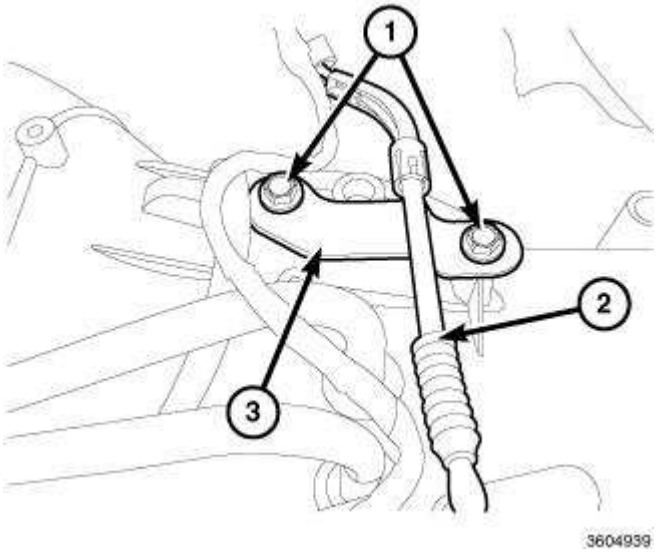


Fig. 130: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

7. Remove the cable retention bracket bolts (1) and remove the cable (2) from the vehicle.

INSTALLATION

INSTALLATION

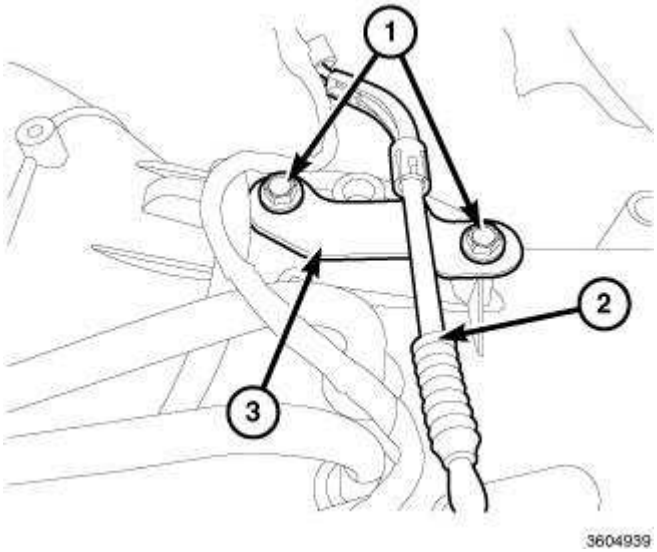


Fig. 131: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

1. Install the cable (2) to the vehicle. Install the cable retention bracket bolts (1) and tighten to 20 N.m (15 ft. lbs.).

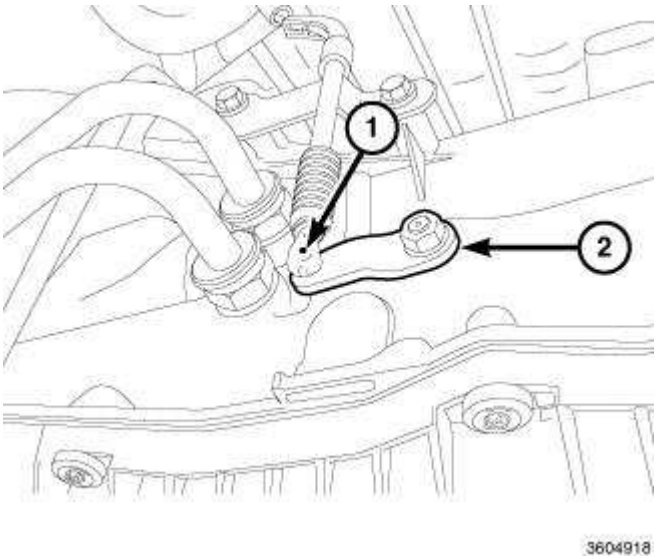


Fig. 132: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

2. Connect the cable (1) to the transmission lever (2).
3. Lower the vehicle.

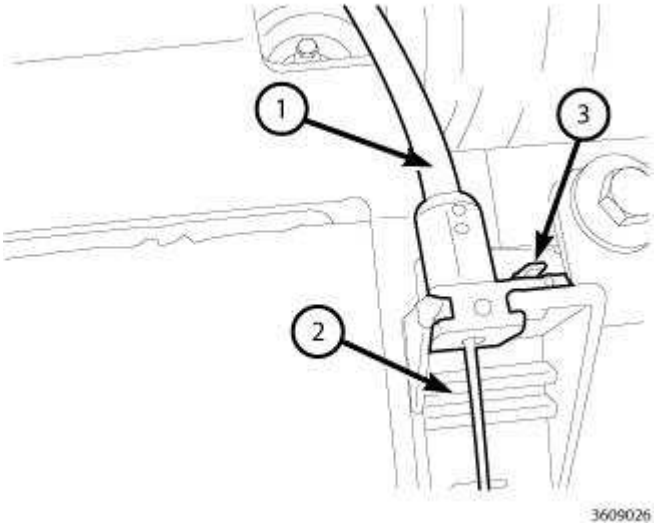


Fig. 133: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

4. Connect the cable end (2) to the lever.
5. Connect the cable (1) to the housing.
6. Install the shifter bezel.
7. Connect the negative battery cable.

FLUID AND FILTER

DESCRIPTION

DESCRIPTION

FILTER SERVICE

The 8HP45 has a conventional fluid sump design, however, the filter is integrated into the oil pan resulting in a lower profile for improved vehicle packaging. The oil pan gasket is reusable providing it is not damaged during removal.

STANDARD PROCEDURE

STANDARD PROCEDURE - CHECK OIL LEVEL

To properly check and fill the transmission, perform the following procedure:

WARNING: There is a risk of accident from vehicle starting off by itself when engine running. There is a risk of injury from contusions and burns if you insert your hands into the engine when it is started or when it is running. Secure vehicle to prevent it from moving off by itself. Wear properly fastened and close-fitting work clothes. Do not touch hot or rotating parts.

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

1. Raise and support the vehicle **on a level hoist** . Refer to **HOISTING, STANDARD PROCEDURE** .
2. Start the engine.
3. Using a scan tool or the vehicle information center, verify that the transmission fluid temperature is below 30°C (86°F).
4. Disable traction control (ESC).
5. Remove the fill plug from the right rear of the transmission case.
6. Add transmission fluid until it trickles from the fill opening.
7. Install the fill plug.
8. Lower the vehicle for access to inside of the vehicle, leaving the tires at least 8 inches off the ground.
9. With the brakes applied, place the transmission in Reverse and hold for 5 seconds.
10. Place the transmission in Drive and hold for 5 seconds.
11. Release the brakes, slowly accelerate to 2nd gear and hold for 5 seconds.
12. Apply the brakes and place the transmission in Neutral.
13. Raise the engine speed to 2000 RPM for 5 seconds.
14. Return the engine to idle and place the transmission in Park.

NOTE: A full transmission will have fluid at the fill hole with the transmission between 30°C (86°F) and 50°C (122°F). Do not over fill.

15. Remove the fill plug and allow excess fluid to drain from fill hole or add fluid as necessary.
16. Install the fill plug.
17. Using a scan tool, clear any DTCs.

STANDARD PROCEDURE - TRANSMISSION FILL AFTER SERVICE

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

To properly fill the transmission after an in vehicle service or overhaul, perform the following procedure:

NOTE: **If the transmission cooler was replaced, add an additional 0.7L (0.72 qts) of transmission fluid.**

1. **If the transmission was overhauled** , prior to installing in the vehicle, tip the transmission on it side, remove the oil fill plug on the right rear side of the case and install 9L (9.5 qts) of transmission fluid. Install the fill plug. After installing the transmission, perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
2. **If an in vehicle service was performed** , raise and support the vehicle **on a level hoist** , remove the oil fill plug on the right rear side of the case and install transmission fluid until it drips from the fill hole. Refer to **HOISTING, STANDARD PROCEDURE** . Install the fill plug and perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

STANDARD PROCEDURE - FLUID/FILTER SERVICE

NOTE: **The oil pan and filter are an integrated assembly that cannot be serviced separately.**

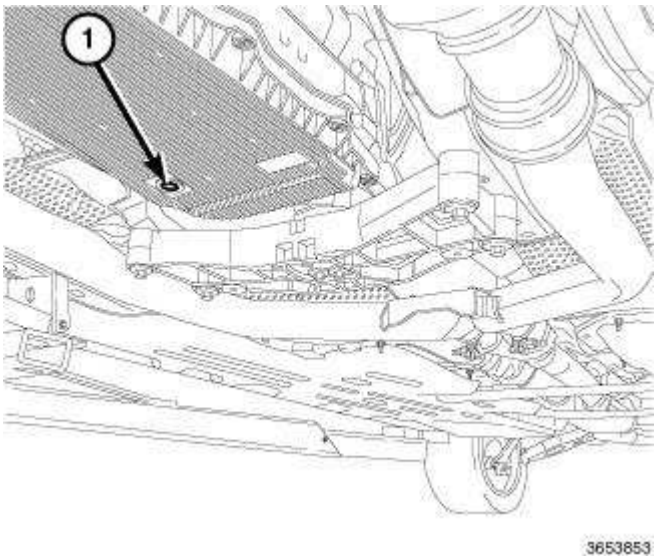


Fig. 134: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

1. Raise the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the transmission oil pan plug and allow the transmission to drain.

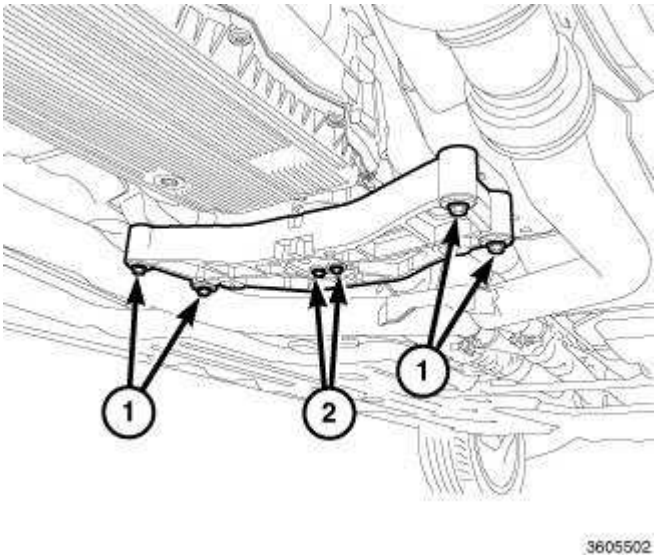


Fig. 135: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Support the transmission with a suitable stand.
4. Remove the bolts (2) securing rear support and cushion to the crossmember.
5. Remove the bolts attaching the crossmember (1) and remove the crossmember.

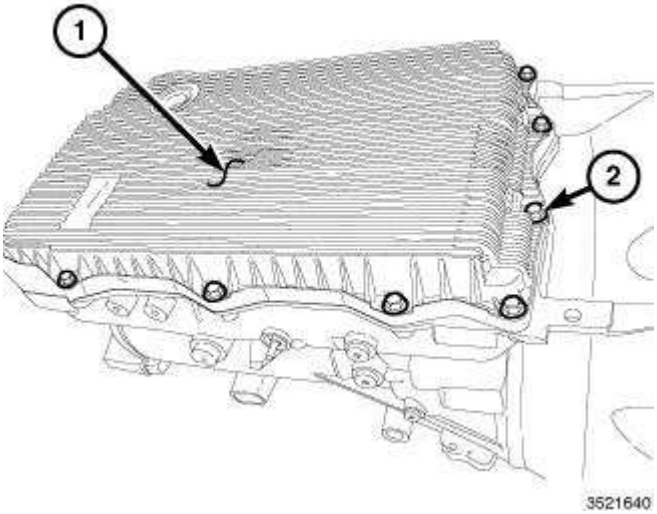


Fig. 136: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.

6. Remove the 13 oil pan retaining bolts (2).
7. Remove the oil pan (1) and gasket. If the pan is being removed for contamination concerns discard the pan.

8. Install the **new** oil pan (1) and gasket.

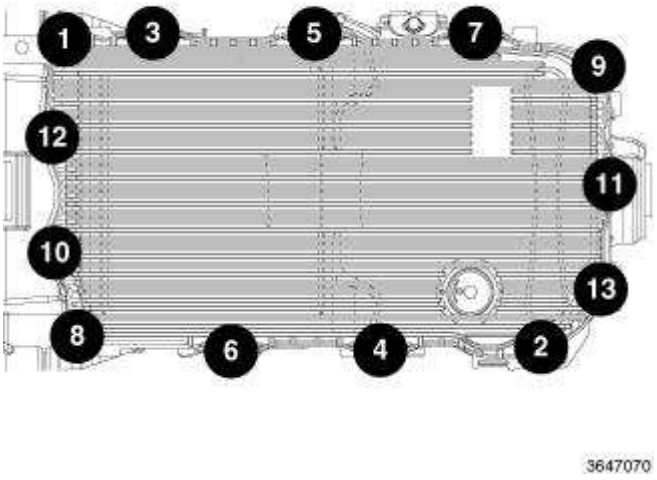


Fig. 137: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

9. Install the 13 oil pan retaining bolts and tighten to 10 N.m (89 in. lbs.) using the sequence given.

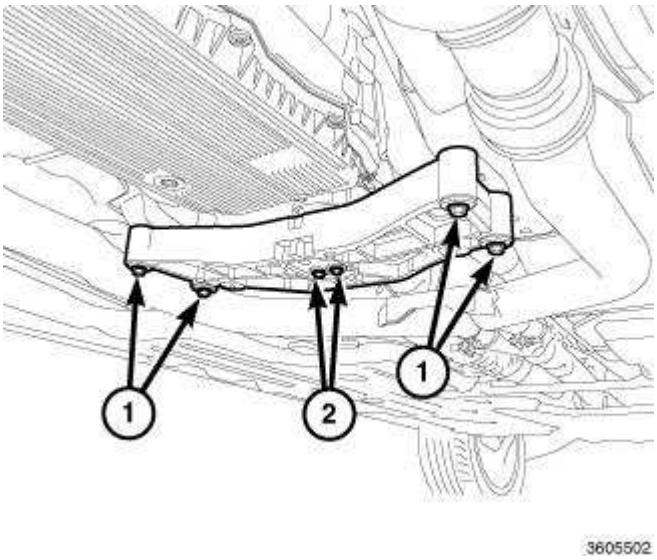


Fig. 138: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Install bolts attaching crossmember (1) to body and Install cross member. Tighten the fasteners to 65 N.m (48 ft. lbs.)
11. Install bolts (2) securing rear support and cushion to the cross member and Install. Tighten the fasteners to 65 N.m (48 ft. lbs.)

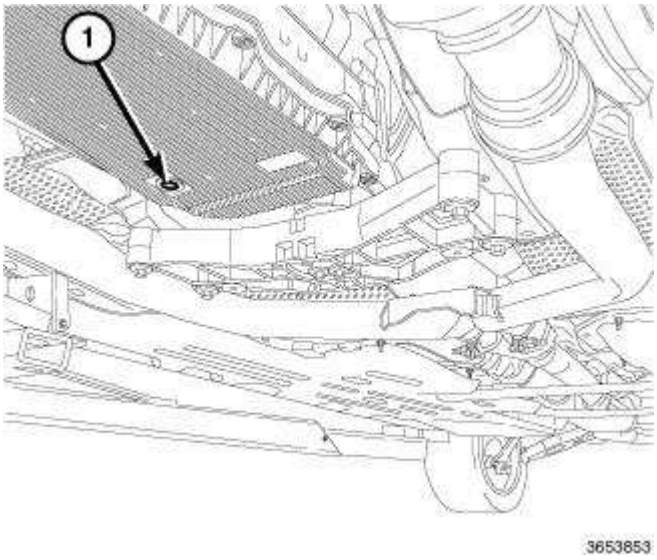


Fig. 139: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

12. Inspect and adjust the fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
13. Lower the vehicle.

LEVER, MANUAL PARK RELEASE

REMOVAL

REMOVAL

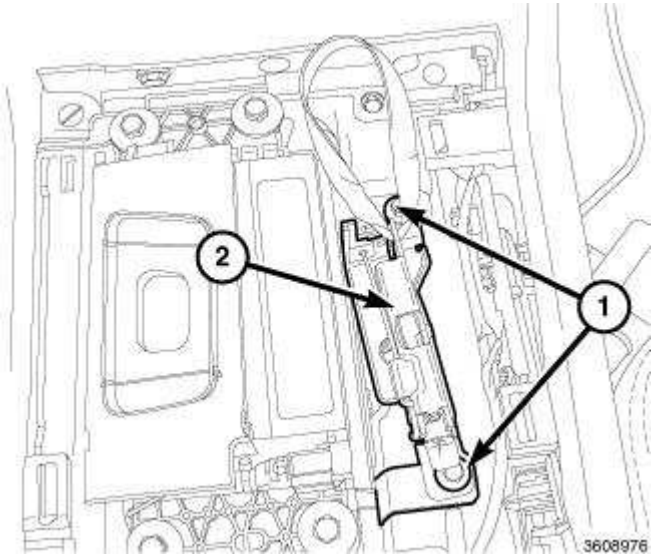


Fig. 140: Bolts & Lever Mechanism
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.

2. Remove the shifter bezel.
3. Remove the bolts (1) securing the lever mechanism (2) to the mounting bracket.

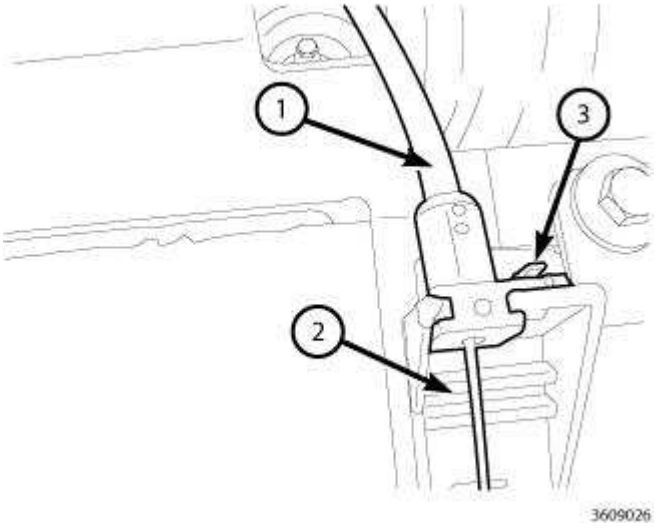


Fig. 141: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the cable (1) from the housing (2), while holding the release tab (3) open.
5. Remove the cable from the lever and remove the lever from the vehicle.

INSTALLATION

INSTALLATION

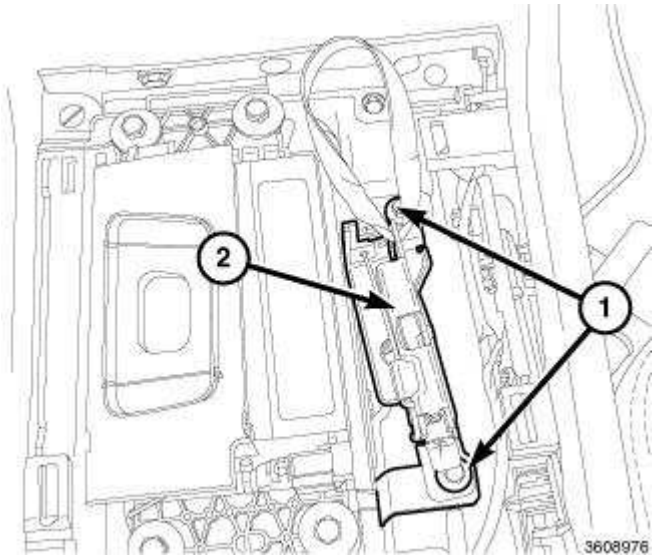


Fig. 142: Bolts & Lever Mechanism
Courtesy of CHRYSLER GROUP, LLC

1. Connect the cable to the lever.
2. Install the bolts (1) securing the lever mechanism (2) to the air ducting and tighten to 10 N.m (89 in. lb.).

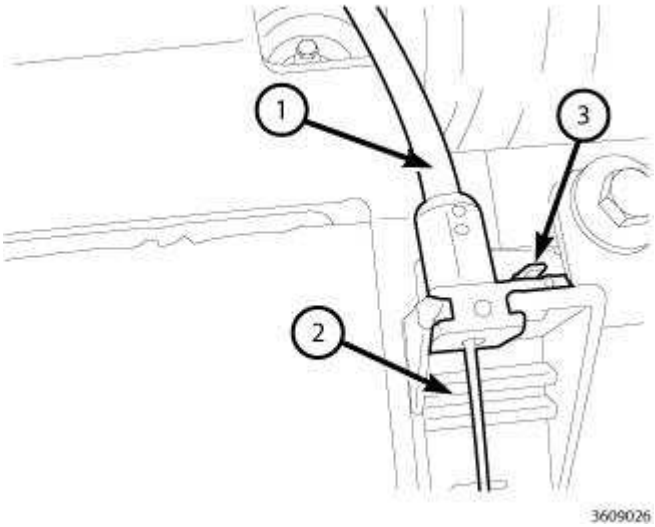


Fig. 143: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

3. Connect the cable to the housing.
4. Install the shifter bezel.
5. Connect the negative battery cable.

PUMP, TRANSMISSION OIL

DESCRIPTION

DESCRIPTION

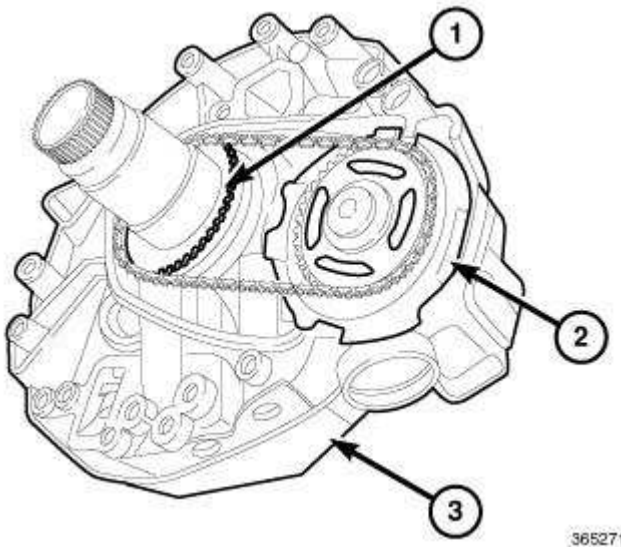


Fig. 144: Transmission Oil Pump & Chain And Sprocket
Courtesy of CHRYSLER GROUP, LLC

The transmission oil pump (2) is driven by a chain and sprocket (1). The oil pump is located just behind the torque converter, inside of the pump housing (3). The pump is a double-stroke vane pump. The pump has dual chambers, two inlet and two outlet ports. The pump provides necessary lubrication and cooling throughout all phases of transmission operation.

OPERATION

OPERATION

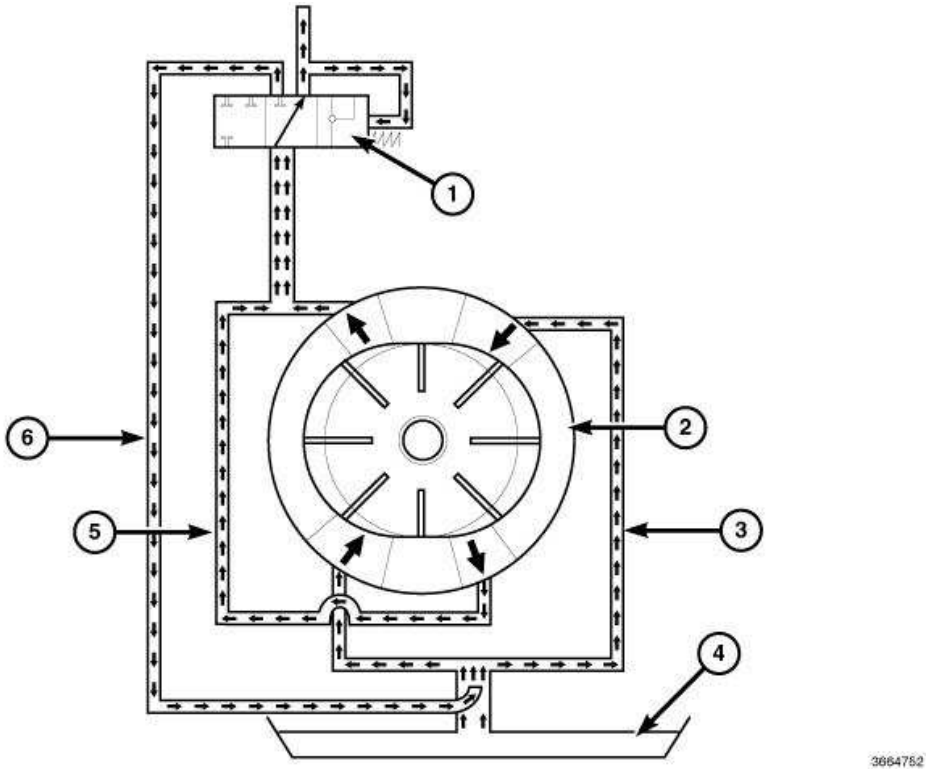


Fig. 145: System Pressure Valve, Sump Pump Pressure, Pipe Intake Pipe Return Of Redundant Oil
Courtesy of CHRYSLER GROUP, LLC

1- SYSTEM PRESSURE VALVE	4 - SUMP
2 - PUMP	5 - PRESSURE PIPE
3 - INTAKE PIPE	6 - RETURN OF REDUNDANT OIL

The transmission oil pump is driven by a chain and sprocket. The oil pump has two intake ports and two exhaust ports. The pump draws fluid through a filter and pressurizes the fluid as the pump rotates. After the fluid is pressurized, it exits the pump through two exhaust ports that feed the system pressure valve. The system pressure valve maintains fluid pressure and allows excess pressure to return to the pump. This reduces cavitation and noise.

REMOVAL

REMOVAL

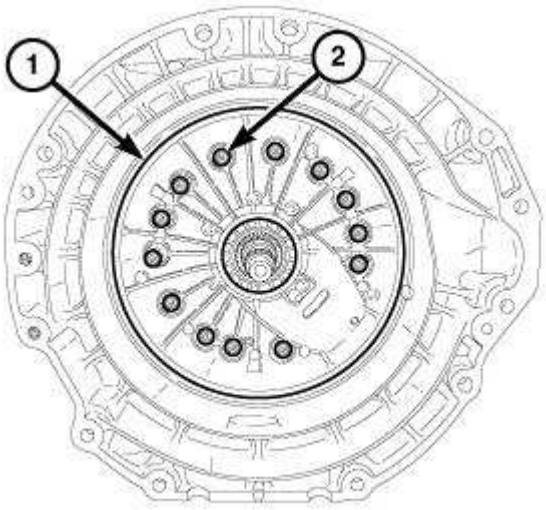


Fig. 146: Thirteen Oil Pump Housing Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL**.
2. Remove the valve body. Refer to **VALVE BODY, REMOVAL**.
3. Remove the thirteen oil pump assembly to case bolts (2).

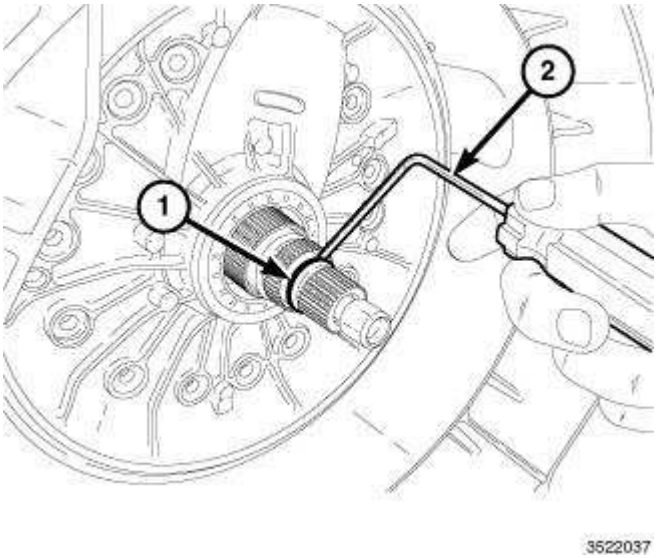


Fig. 147: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

4. Remove the input shaft O-ring (1) using a small pick (2) or equivalent.

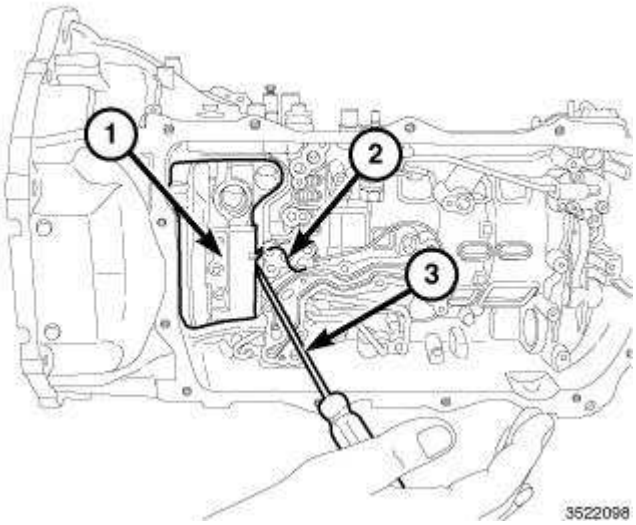


Fig. 148: Oil Pump Housing, Case & Small Flat Blade Screwdriver
Courtesy of CHRYSLER GROUP, LLC

5. Carefully pry the oil pump housing (1) away from the case (2) with a small flat blade screwdriver (3) or equivalent through the case opening.
6. From the front of the transmission, remove the oil pump housing.

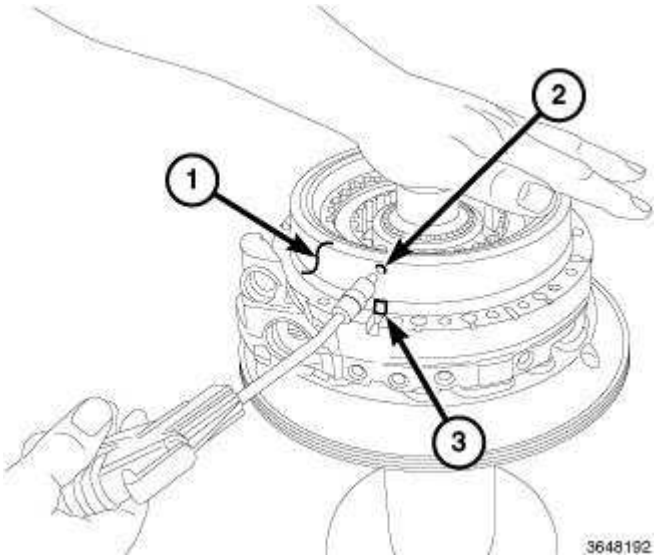


Fig. 149: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply air pressure slowly, oil may spray when B-piston releases from the assembly.

7. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.

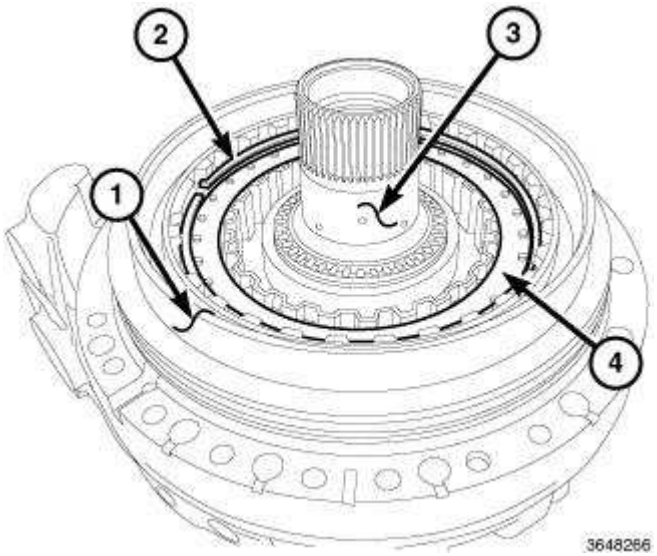


Fig. 150: Outer Ring, Snap Ring & Spacers
Courtesy of CHRYSLER GROUP, LLC

8. Remove the outer ring (1) (inside B-piston).
9. Remove the snap ring (2).
10. Remove the clutches and spacers (4).
11. Remove the hub (3).

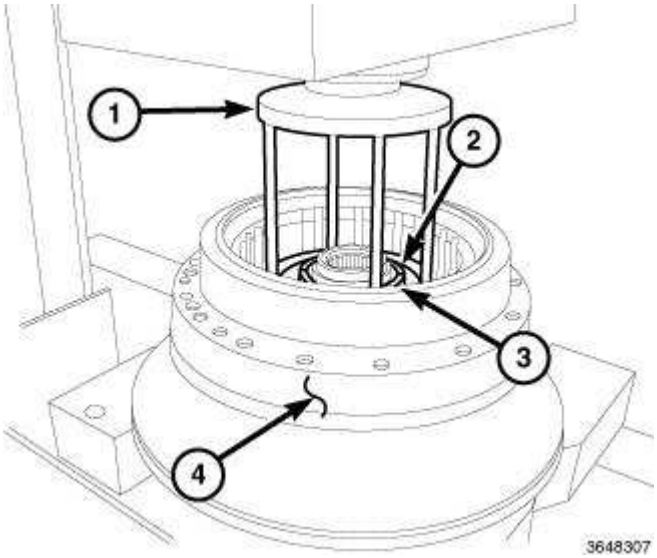


Fig. 151: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

12. Position the oil pump housing assembly (4) in a suitable press.
13. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

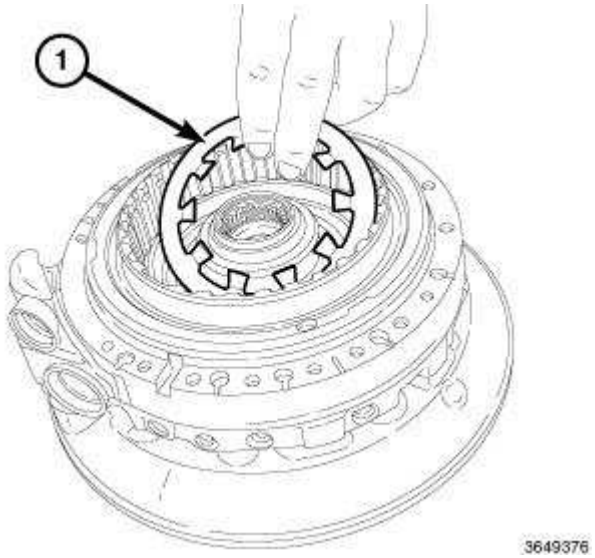


Fig. 152: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

14. Remove the piston retainer and plate.

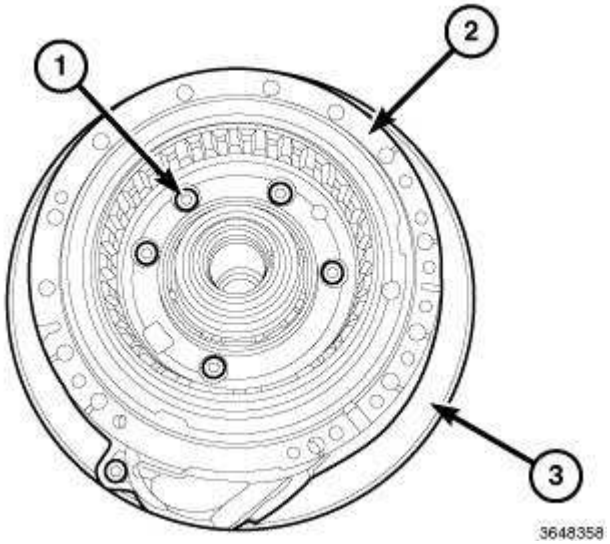


Fig. 153: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

15. Remove the five bolts (1) and separate the oil pump housing (2) from the front oil pump cover (3).

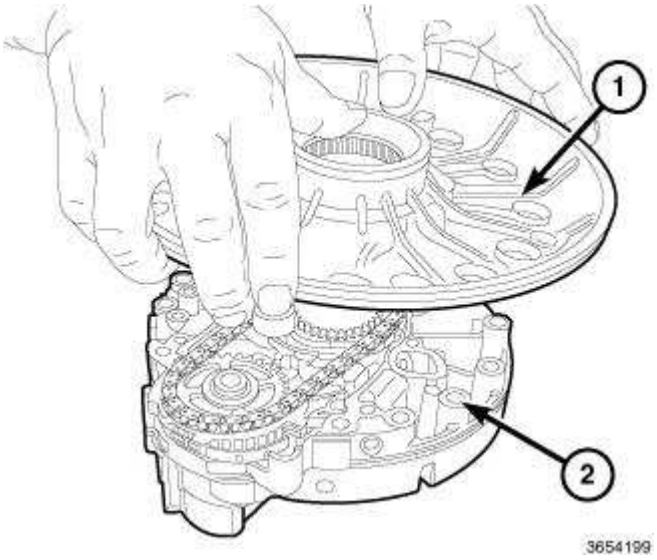


Fig. 154: Front Cover & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

16. Separate the front cover (1) from the oil pump housing (2).

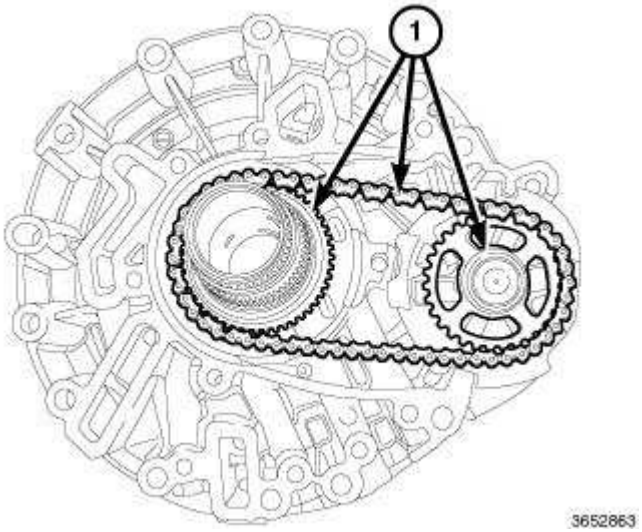


Fig. 155: Drive Sprocket, Chain And Pump Body
Courtesy of CHRYSLER GROUP, LLC

17. Remove the drive sprocket, chain and pump body (1) as an assembly.
18. Remove and discard all O-rings.

INSTALLATION

INSTALLATION

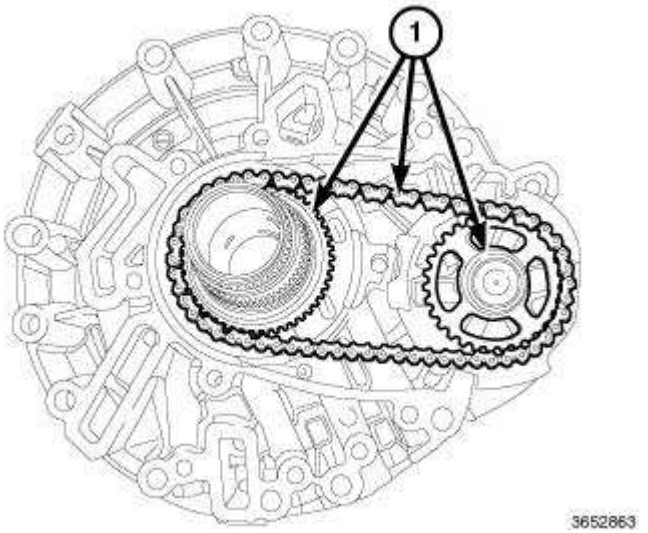


Fig. 156: Drive Sprocket, Chain And Pump Body
Courtesy of CHRYSLER GROUP, LLC

1. Install the drive sprocket, chain and pump body (1) as an assembly into the oil pump housing.

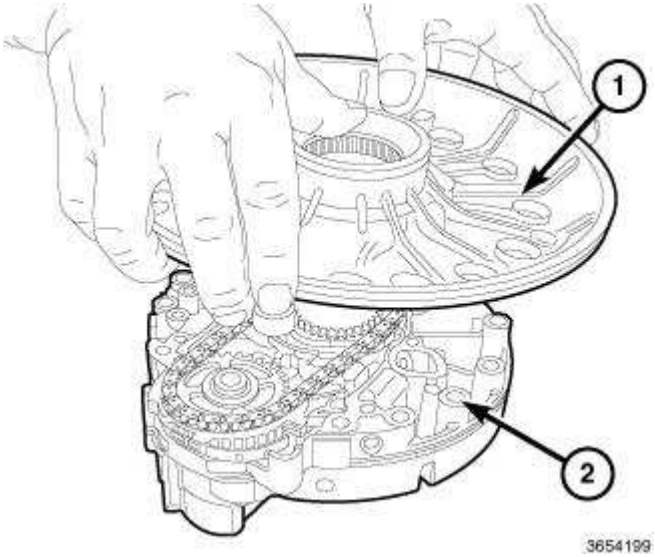


Fig. 157: Front Cover & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

2. Set the pump cover (1) onto the oil pump housing (2), install the five bolts and tighten to 5 N.m (44 in. lbs.) plus 45°.

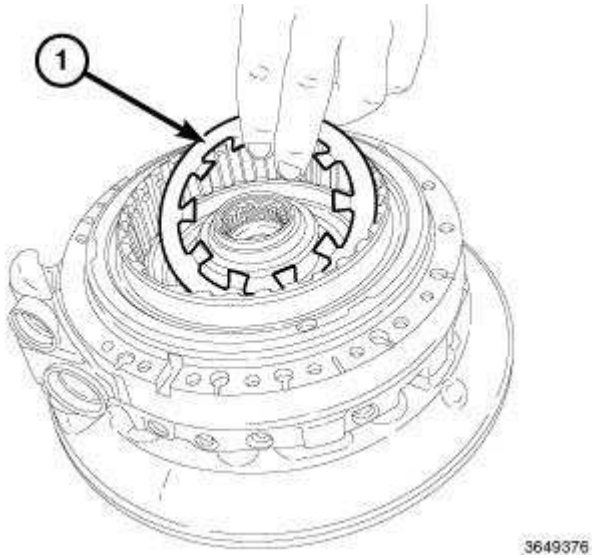


Fig. 158: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

3. Install the piston plate and the piston retainer.

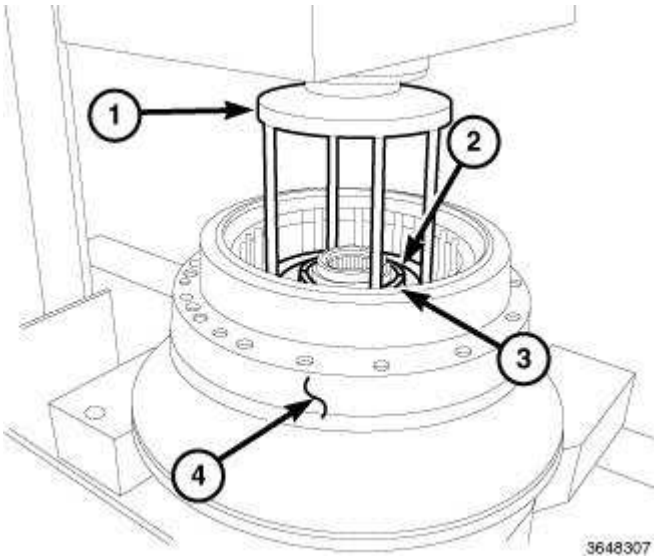


Fig. 159: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

4. Position the oil pump housing assembly (4) in a suitable arbor press.
5. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer and install the two halves of the retaining ring (2).

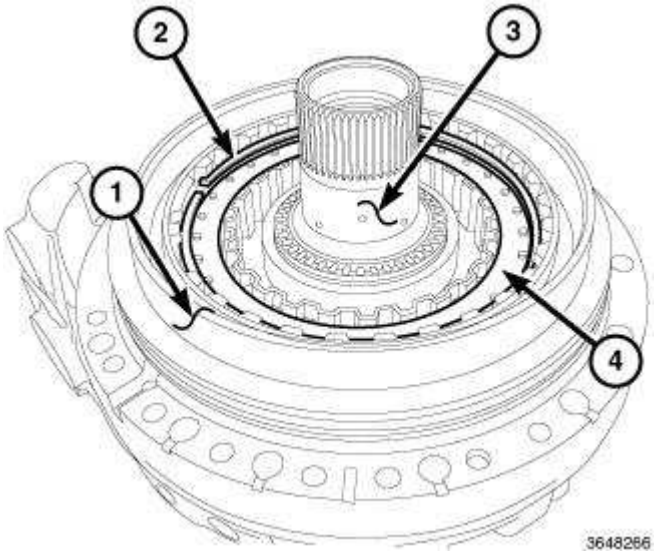


Fig. 160: Outer Ring, Snap Ring & Spacers
Courtesy of CHRYSLER GROUP, LLC

6. Install the hub (3).
7. Install the clutches and spacers (4).
8. Install the snap ring (2).
9. Install the outer ring (1) (inside B-piston).
10. Install the B-piston.

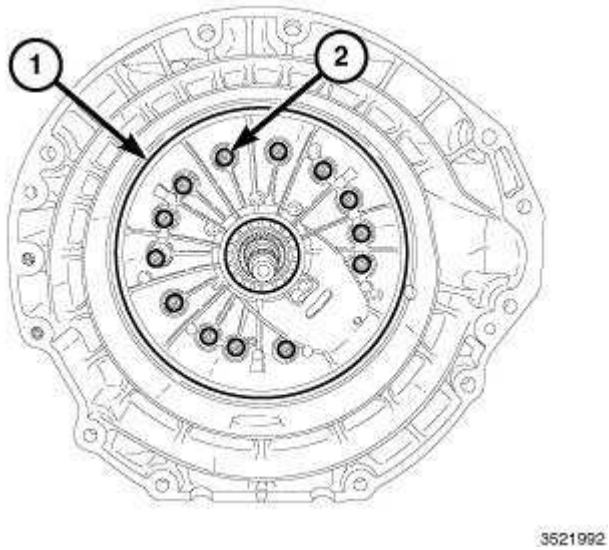


Fig. 161: Thirteen Oil Pump Housing Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the 13 **new** oil pump cover retaining bolts (2) and tighten the oil pump cover as follows:
    1. In order to seat the oil pump cover properly, pre tighten bolts one, seven and nine to 6 N.m (53 in. lb.).

2. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
3. Working in a clockwise pattern, beginning with number one, tighten an additional 90°.

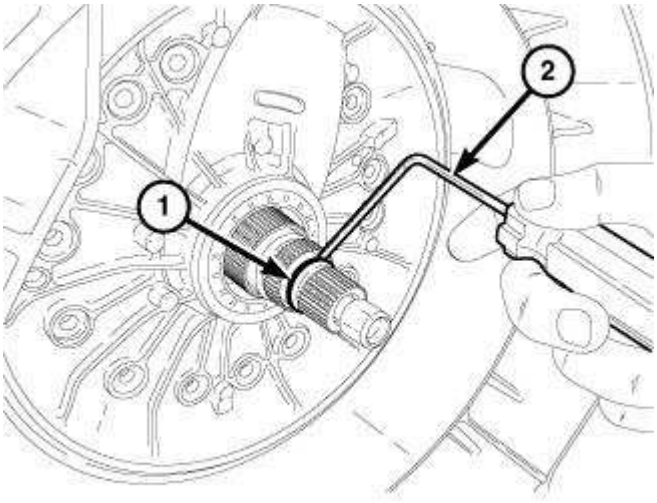


Fig. 162: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

12. Install the **new** input shaft O-ring (1).
13. Install the valve body. Refer to **VALVE BODY, INSTALLATION**.
14. Install the transmission. Refer to **INSTALLATION**.

SEAL, OUTPUT SHAFT

REMOVAL

REAR WHEEL DRIVE

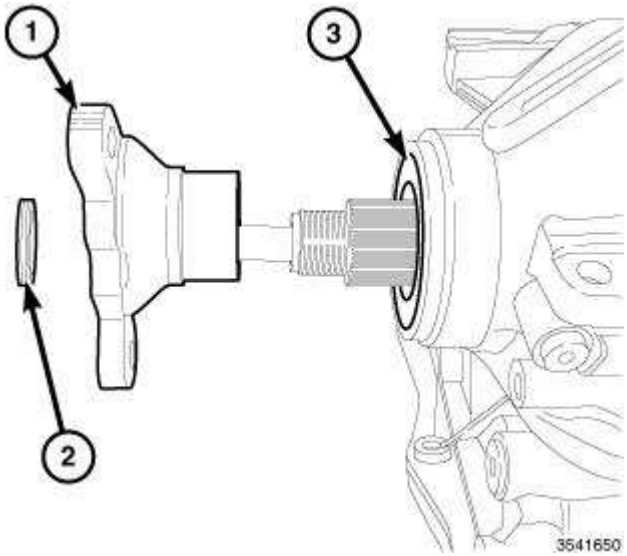


Fig. 163: RWD
Courtesy of CHRYSLER GROUP, LLC

1. Remove the propeller shaft. Refer to **REMOVAL** . Move propeller shaft to the right and tie up.
2. Using a suitable punch, remove the staking from the nut.
3. Remove the propeller shaft flange nut about using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1).
4. Remove the flange (1), and flange dust seal (2).
5. Remove the output shaft seal (3) with suitable screw and slide hammer.

ALL WHEEL DRIVE

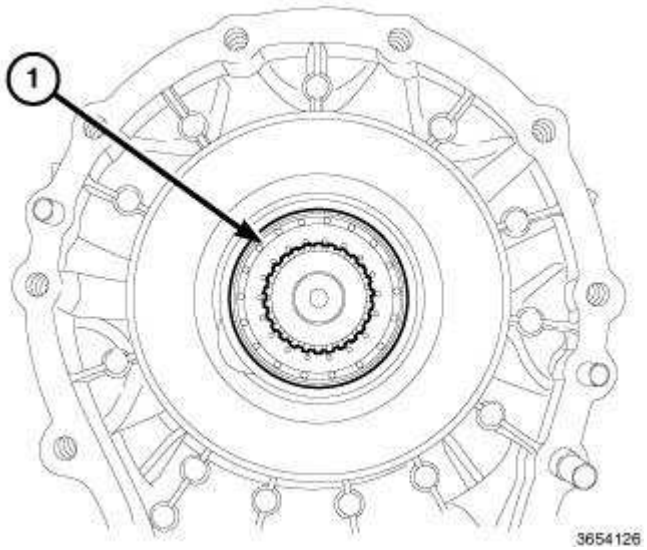


Fig. 164: Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transfer case. Refer to **REMOVAL** .
2. Remove the output shaft seal (1) with suitable screw and slide hammer.

INSTALLATION

REAR WHEEL DRIVE

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

1. Position the new output shaft seal over the output shaft and against the transmission case.
2. Using (special tool #8481, Installer, Gear) install the output shaft seal.
3. Verify that the transmission is in PARK in order to prepare for the installation of the output shaft nut.
4. Install the propeller shaft flange onto the output shaft and install an **new** flange nut. Tighten the nut, with a 34 mm 12 point socket, to 60 N.m (44 ft.lbs.).
5. Stake the nut.
6. Install the propeller shaft. Refer to **INSTALLATION** .
7. Perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

ALL WHEEL DRIVE

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

1. Position the new output shaft seal over the output shaft and against the transmission case.
2. Using (special tool #8481, Installer, Gear) install the output shaft seal.
3. Install the transfer case. Refer to **INSTALLATION** .
4. Perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

SEAL, TORQUE CONVERTER HUB

REMOVAL

REMOVAL

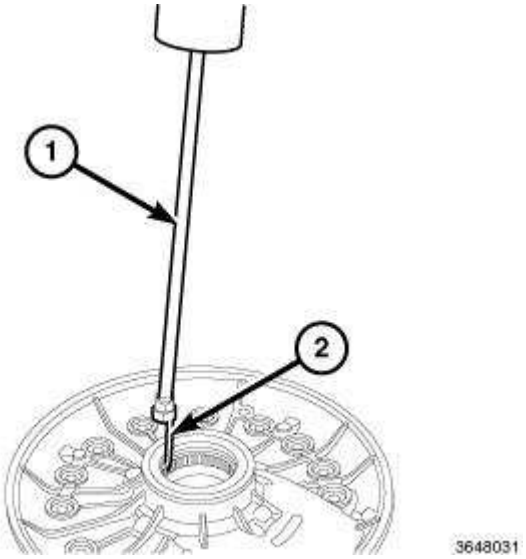


Fig. 165: Remover, Seal & Slide Hammers
Courtesy of CHRYSLER GROUP, LLC

1. Remove the torque converter. Refer to **TORQUE CONVERTER, REMOVAL**.
2. Using (special tool #9667, Remover, Seal) and (special tool #C-3752, Slide Hammers) remove the torque converter hub seal.

INSTALLATION

INSTALLATION

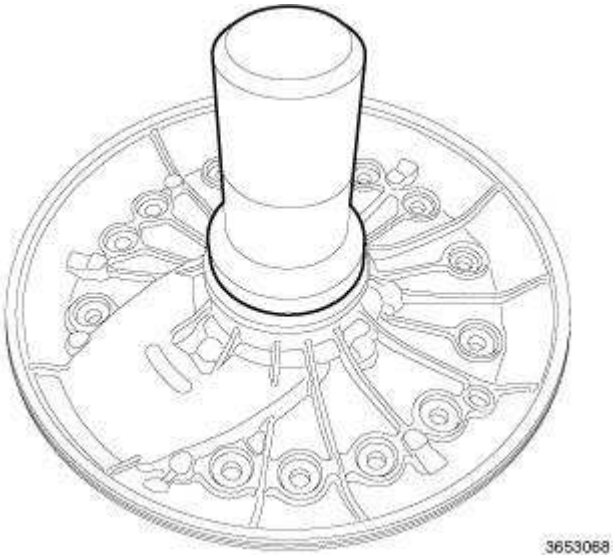


Fig. 166: Oil Pump Cover Oil Seal
Courtesy of CHRYSLER GROUP, LLC

1. Position the torque converter hub seal over the input shaft and against the transmission oil pump cover.

2. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) install a new torque converter hub seal.
3. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.

SENSOR, SPEED

DESCRIPTION

DESCRIPTION

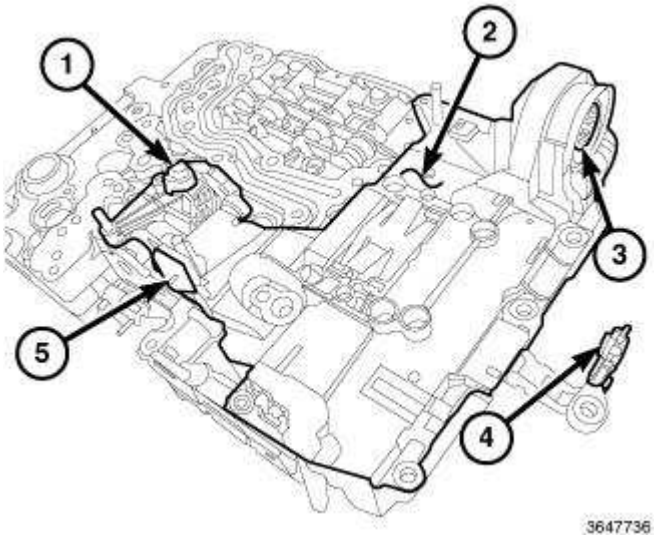


Fig. 167: Input Speed Sensor, Output Speed Sensor, Tcm (Includes Transmission Temperature Sensor) & Park Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor	4 - Output Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)	5 - Park Position Sensor
3 - External Wire Harness Connector	

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

The input speed sensor (1) and the output speed sensor (4) are integrated components of the TCMA and not serviced individually.

OPERATION

OPERATION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

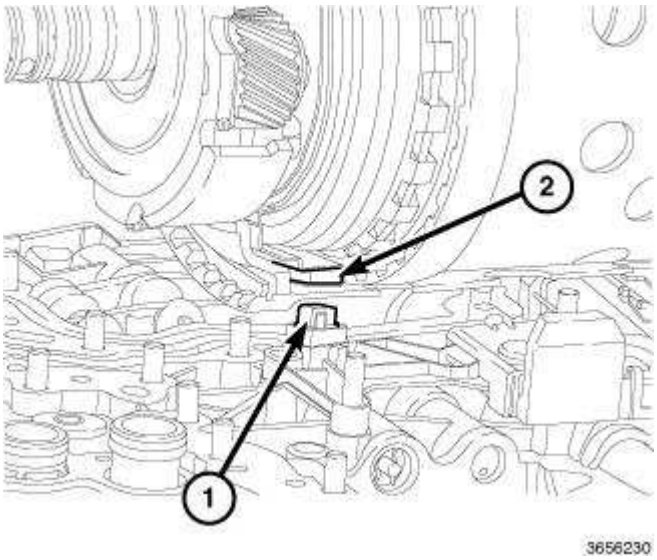


Fig. 168: ISS & Magnetic Ring
Courtesy of CHRYSLER GROUP, LLC

The input speed sensor (ISS) and output speed sensor (OSS) are Hall-effect sensors that measure shaft rotational speed. The ISS (1) is located at the front of the TCMA and reads input shaft speed from the magnetic ring (2) on the P2 carrier.

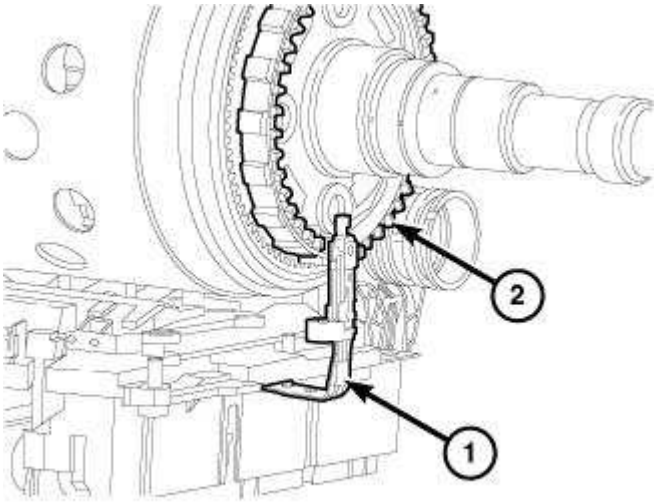


Fig. 169: OSS & P4 Carrier
Courtesy of CHRYSLER GROUP, LLC

The OSS (1) is located at the back of the TCMA and reads output shaft speed from the P4 carrier (2).

SHIFTER, TRANSMISSION

DESCRIPTION

FLOOR SHIFT

COMPONENTS

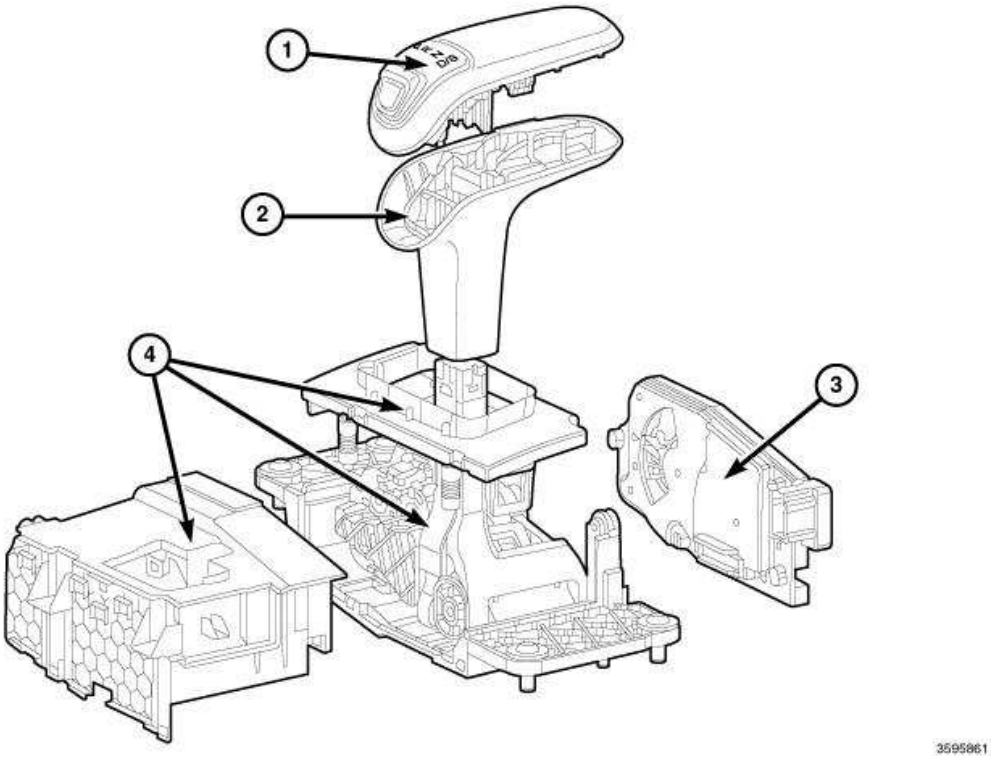


Fig. 170: Upper Shifter Knob Assembly, Lower Shifter Knob / Shroud, Electronic Module & Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1- UPPER SHIFTER KNOB ASSEMBLY
2 - LOWER SHIFTER KNOB / SHROUD
3 - ELECTRONIC MODULE
4 - SHIFTER ASSEMBLY

The E-Shifter is a floor mounted device which controls the transmission without the benefit of a physical connection.

PADDLE SHIFT

Some vehicles may be equipped with optional paddle shift. For more information on paddle shift. Refer to **SWITCH, REMOTE RADIO, DESCRIPTION** .

OPERATION

FLOOR SHIFT

E-SHIFTER

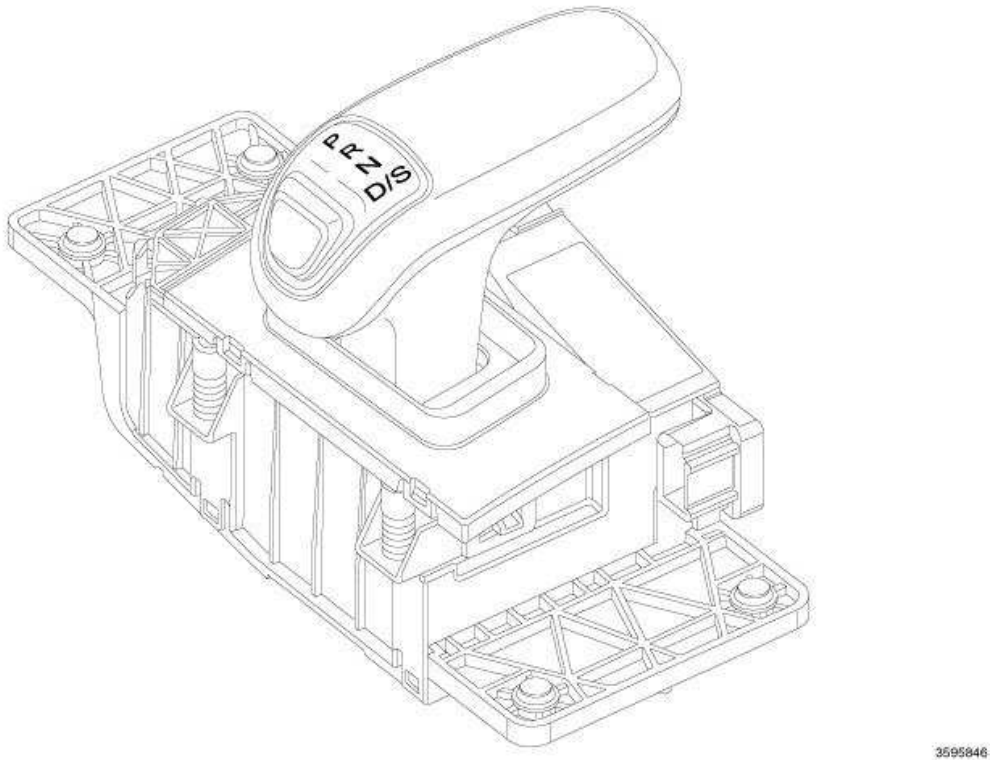


Fig. 171: E-Shifter
Courtesy of CHRYSLER GROUP, LLC

The 8HP45 automatic transmission is operated with the help of an E-Shifter located in the floor console. E-shift or "Shift by Wire" is a vehicle level system that electronically performs the function of current mechanical shifter/linkage/transmission hardware. The E-Shifter is an electronic switch/module using CAN messaging to communicate driver requests for transmission gear changes. The use of an E-Shifter eliminates the system linkage & mechanical connection to transmission park pawl & sprag for normal operation. There are four positions to which the selection lever can be shifted: P, R, N, D/L. With the Sport option package P, R, N, D/S. In addition the Sport option package integrates paddle shifters at the steering wheel with allows the operator to manually chose gears as long as they comply with engine speed parameters.

PADDLE SHIFT

Some vehicles may be equipped with optional paddle shift. Refer to **SWITCH, REMOTE RADIO, OPERATION** .

REMOVAL

REMOVAL

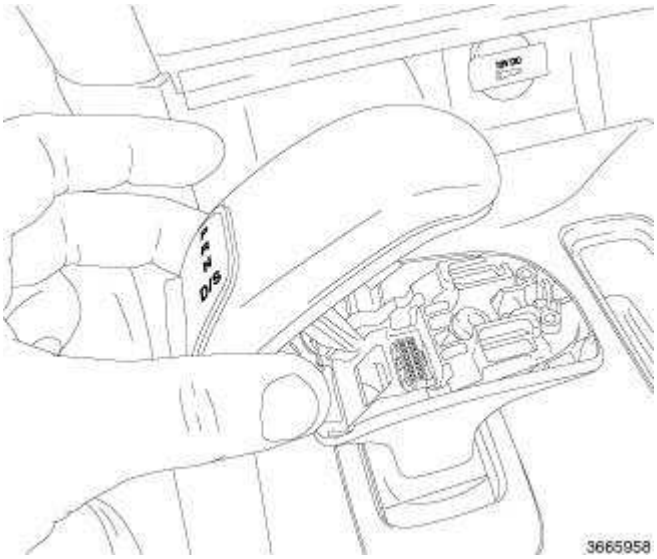


Fig. 172: Upper Gear Shift Knob
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the battery negative cable.
2. Remove the upper gear shift knob.

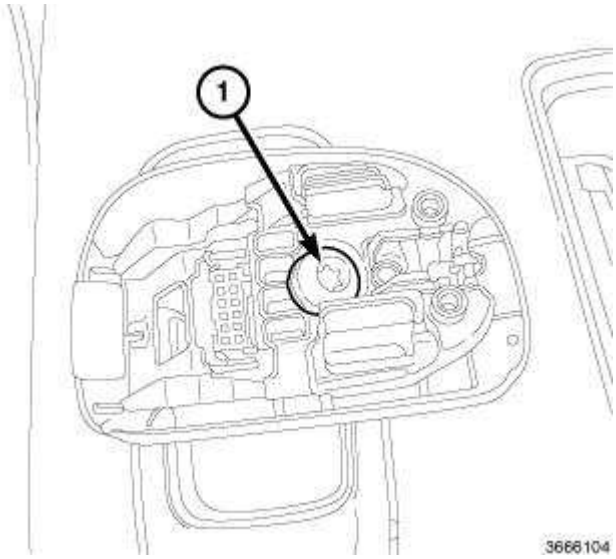


Fig. 173: Screw
Courtesy of CHRYSLER GROUP, LLC

3. Remove the screw (1) then remove the lower knob/shroud.
4. Remove the shifter bezel.

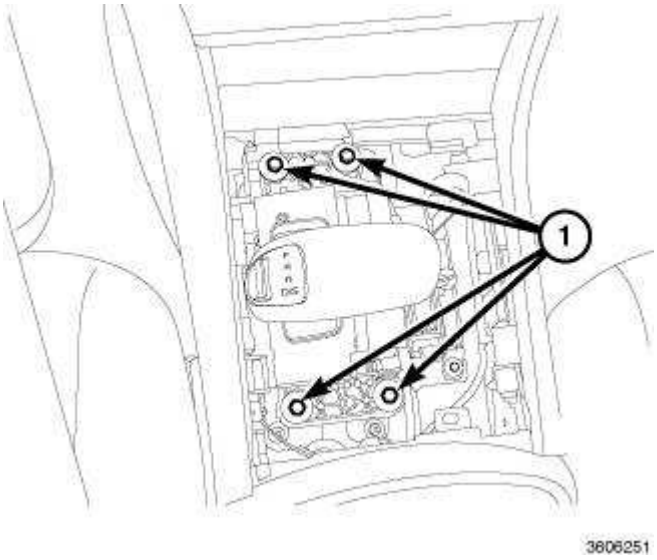


Fig. 174: Shift Mechanism Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the shift mechanism bolts (1).

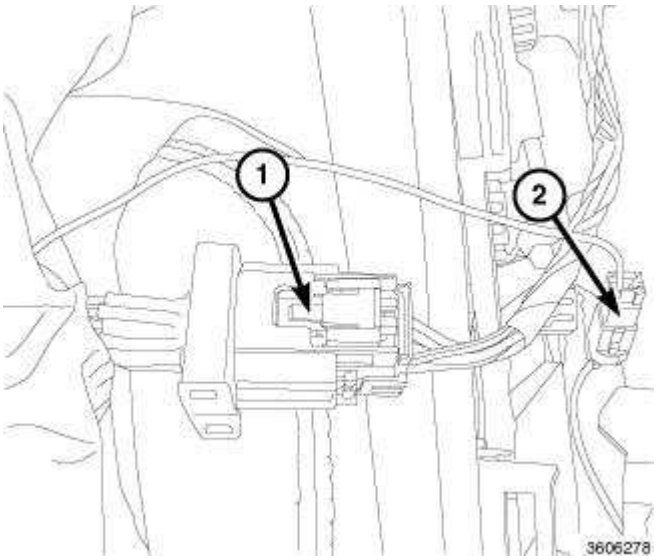


Fig. 175: Two Electrical Connections
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the two electrical connections (1 & 2) prior to removing the shifter mechanism from the vehicle.

INSTALLATION

INSTALLATION

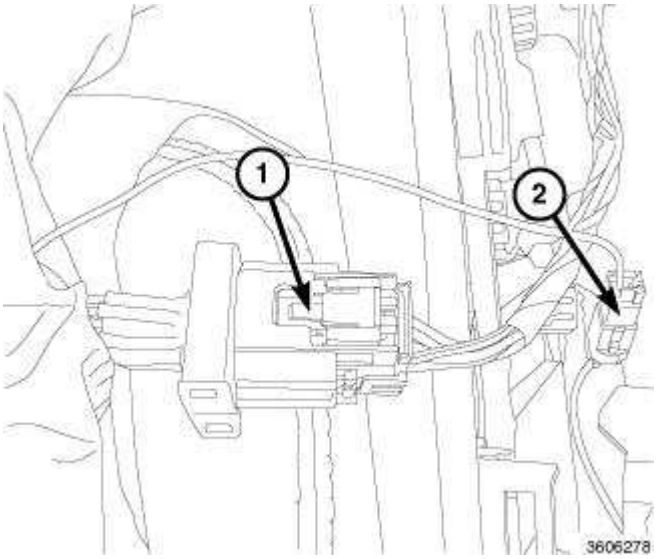


Fig. 176: Two Electrical Connections
Courtesy of CHRYSLER GROUP, LLC

1. Connect the two electrical connections (1, 2) prior to installing the shifter mechanism to the vehicle.

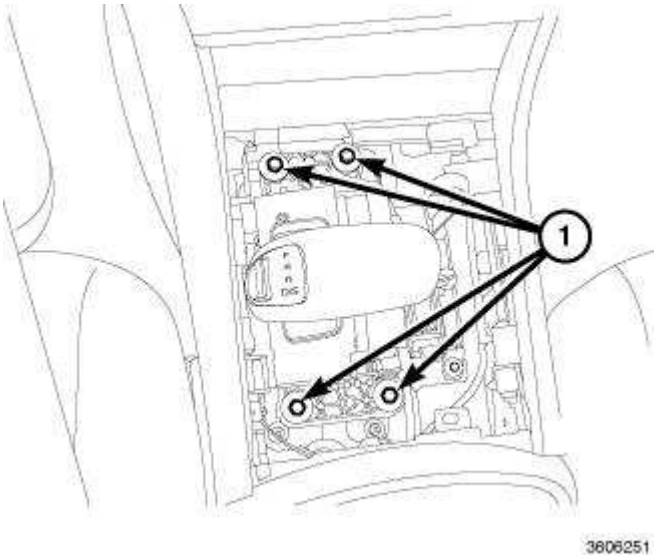


Fig. 177: Shift Mechanism Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the shift mechanism bolts (1), tighten to 7 N.m (65 lb in.).

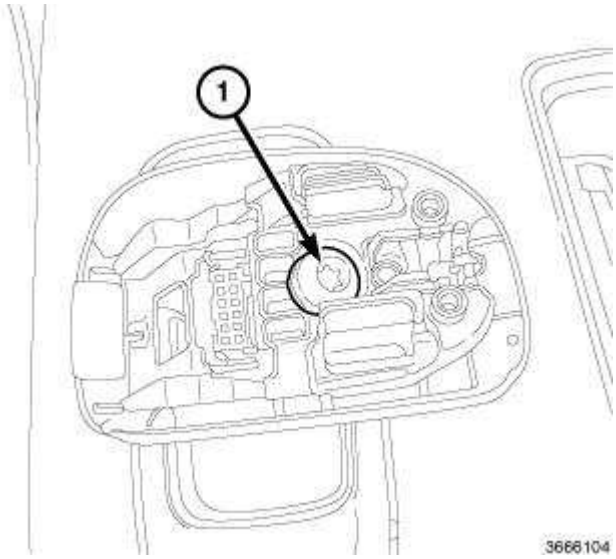


Fig. 178: Screw
Courtesy of CHRYSLER GROUP, LLC

3. Install the shifter bezel.
4. Install the lower knob shroud.
5. Install the bolt (1), tighten to 7 N.m (65 lb in.).

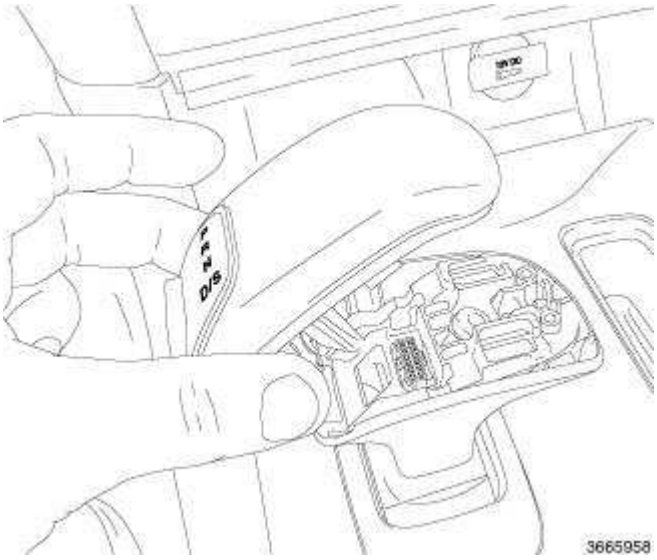


Fig. 179: Upper Gear Shift Knob
Courtesy of CHRYSLER GROUP, LLC

6. Install the upper gear shift knob.
7. Connect the battery negative cable.

SOLENOID, TRANSMISSION

DESCRIPTION

DESCRIPTION

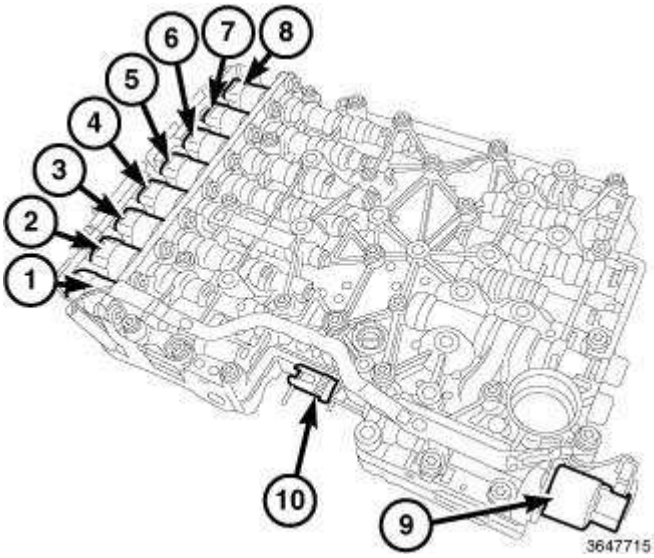


Fig. 180: Solenoid A D E C & Park Release Mechanical Valve
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

The solenoids are integrated into the Transmission Control Module Assembly (TCMA) of the 8HP45 transmission and are not replaceable individually.

OPERATION

OPERATION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions, and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter, and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module.

TORQUE CONVERTER

DESCRIPTION

DESCRIPTION

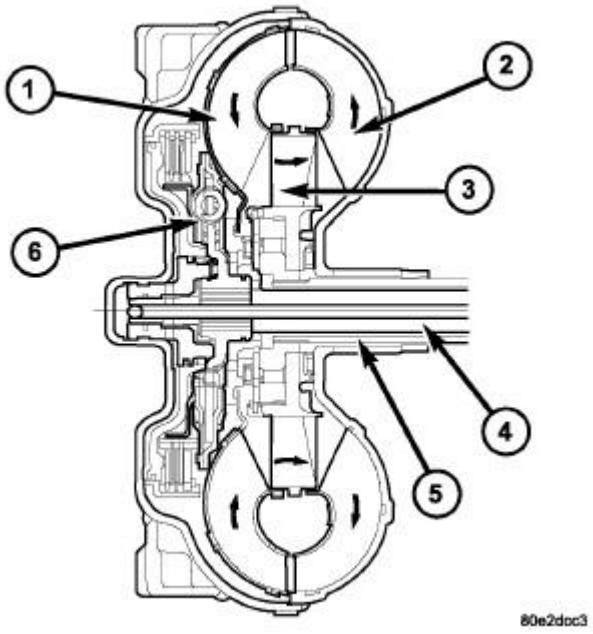


Fig. 181: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT

5 - STATOR SHAFT
6 - TURBINE DAMPER

CAUTION: The torque converter must be replaced if a transmission failure resulted in large amounts of metal or fiber contamination in the fluid.

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. Refer to **Fig. 181**. The torque converter consists of an outer shell with an internal turbine (1), a stator (3), an overrunning clutch, an impeller (2), and an electronically applied converter clutch. The converter clutch provides reduced engine speed and greater fuel economy when engaged. Clutch engagement also provides reduced transmission fluid temperatures. The converter clutch engages in third through fifth gears. The torque converter hub drives the transmission oil (fluid) pump.

A turbine damper (6) has been added for some applications to help improve vehicle noise, vibration, and harshness (NVH) characteristics.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

IMPELLER

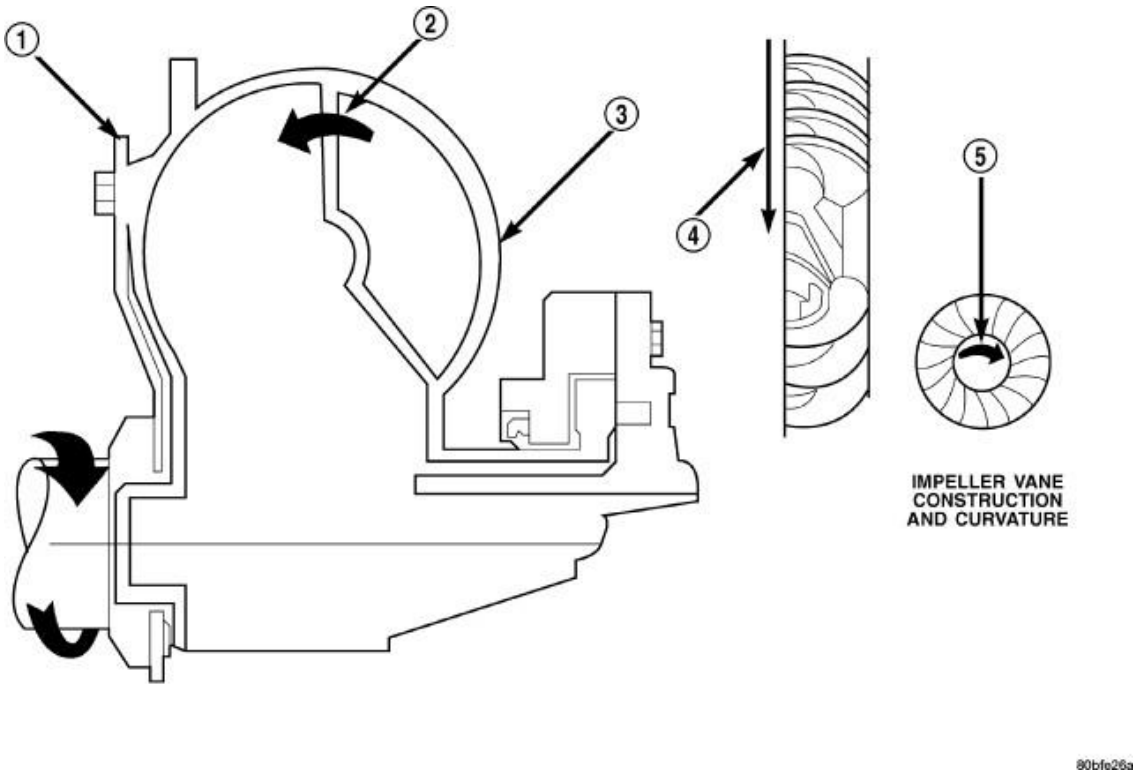


Fig. 182: Identifying Impeller
Courtesy of CHRYSLER GROUP, LLC

1 - ENGINE FLEXPLATE	4 - ENGINE ROTATION

2 - OIL FLOW FROM IMPELLER SECTION INTO TURBINE SECTION	5 - ENGINE ROTATION
3 - IMPELLER VANES AND COVER ARE INTEGRAL	

The impeller (3) is an integral part of the converter housing. Refer to **Fig. 182**. The impeller consists of curved blades placed radially along the inside of the housing on the transmission side of the converter. As the converter housing is rotated by the engine, so is the impeller, because they are one and the same and are the driving members of the system.

TURBINE

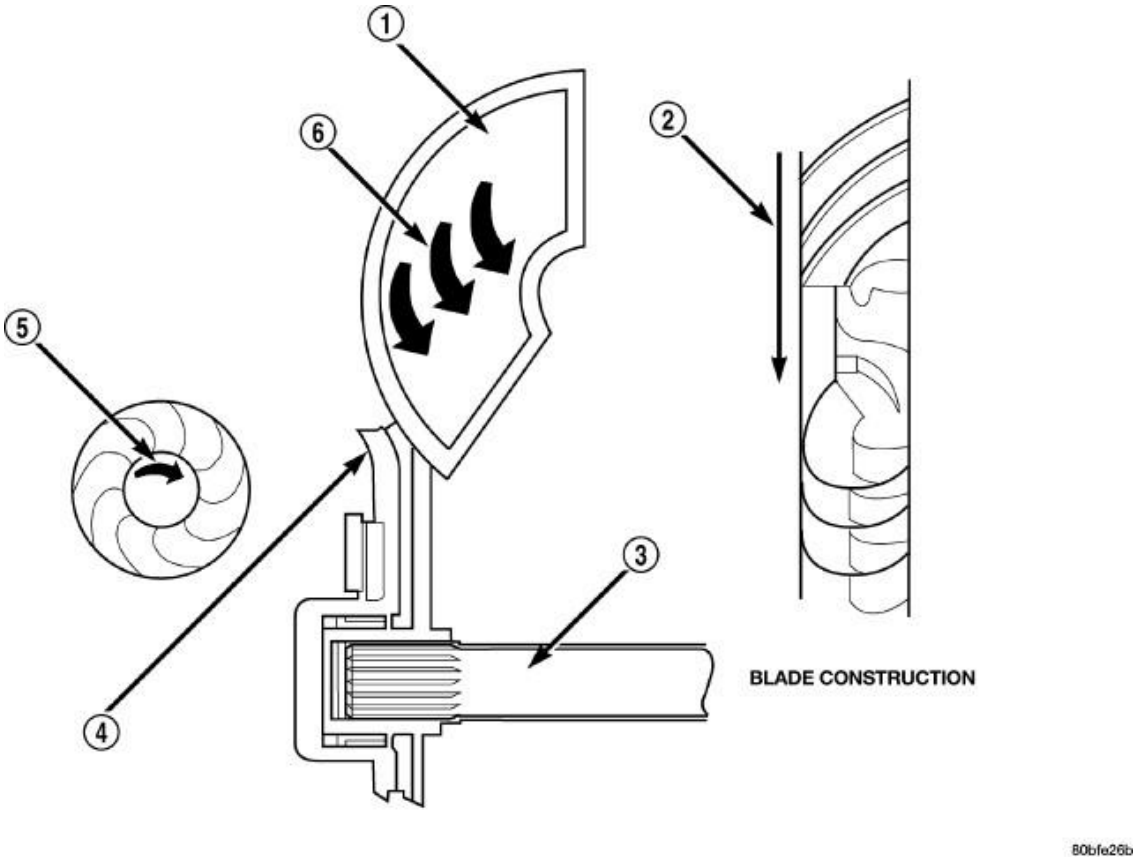


Fig. 183: Identifying Turbine
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE VANE	4 - PORTION OF TORQUE CONVERTER COVER
2 - ENGINE ROTATION	5 - ENGINE ROTATION
3 - INPUT SHAFT	6 - OIL FLOW WITHIN TURBINE SECTION

The turbine (1) is the output, or driven, member of the converter. Refer to **Fig. 183**. The turbine is mounted within the housing opposite the impeller, but is not attached to the housing. The input shaft is inserted through the center of the impeller and splined into the turbine. The design of the turbine is

similar to the impeller, except the blades of the turbine are curved in the opposite direction.

STATOR

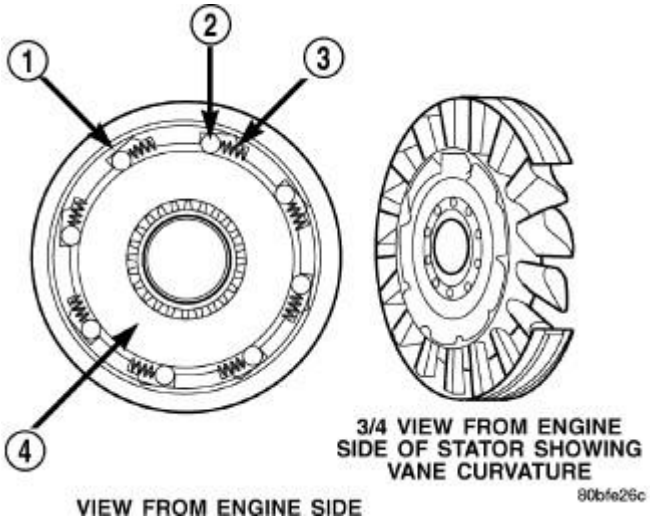
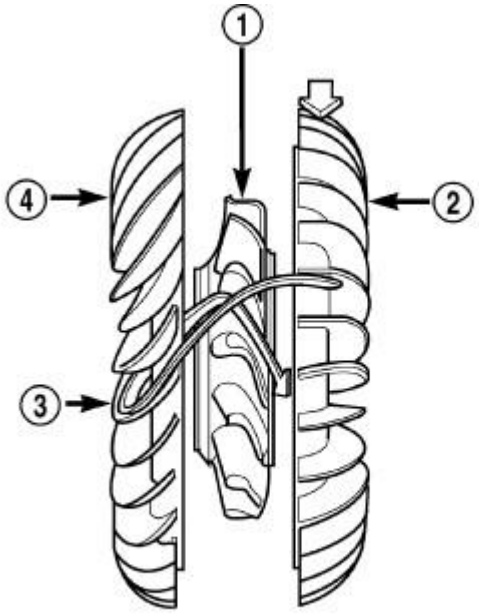


Fig. 184: Identifying Over-Running Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - CAM (OUTER RACE)
2 - ROLLER
3 - SPRING
4 - INNER RACE

The stator assembly (1-4) is mounted on a stationary shaft which is an integral part of the oil pump. Refer to **Fig. 184**.



80bfe26d

Fig. 185: Identifying Stator Components
Courtesy of CHRYSLER GROUP, LLC

1 - STATOR
2 - IMPELLER
3 - FLUID FLOW
4 - TURBINE

The stator (1) is located between the impeller (2) and turbine (4) within the torque converter case. Refer to **Fig. 185**. The stator contains a freewheeling clutch, which allows the stator to rotate only in a clockwise direction. When the stator is locked against the freewheeling clutch, the torque multiplication feature of the torque converter is operational.

TORQUE CONVERTER CLUTCH (TCC)

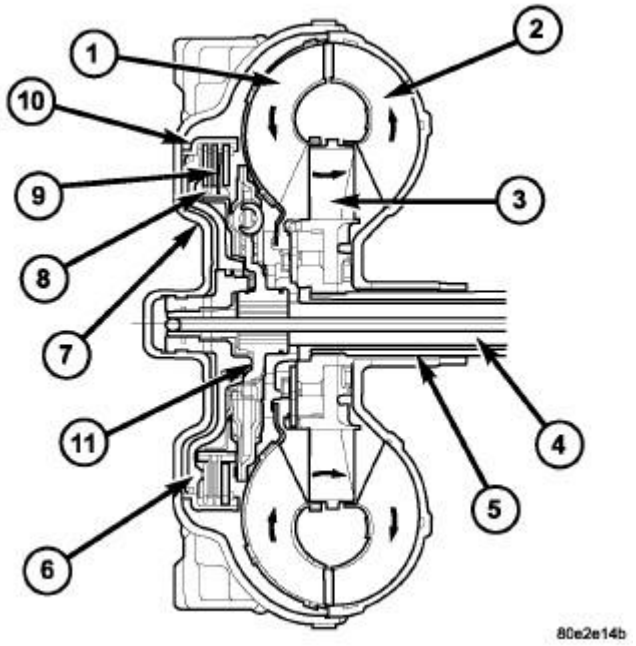


Fig. 186: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER
9 - CLUTCH PLATE SET
10 - EXTERNALLY TOOTHED DISC CARRIER
11 - TURBINE DAMPER

The TCC (9) was installed to improve the efficiency of the torque converter that is lost to the slippage of the fluid coupling. Refer to **Fig. 186**. Although the fluid coupling provides smooth, shock-free power transfer, it is natural for all fluid couplings to slip. If the impeller and turbine were mechanically locked together, a zero slippage condition could be obtained. A hydraulic piston with friction material was added to the turbine assembly to provide this mechanical lock-up.

In order to reduce heat build-up in the transmission and buffer the powertrain against torsional vibrations, the TCM can duty cycle the torque converter lock-up solenoid to achieve a smooth application of the torque converter clutch. This function, referred to as Electronically Modulated Converter Clutch (EMCC) can occur at various times depending on the following variables:

- Shift lever position
- Current gear range
- Transmission fluid temperature
- Engine coolant temperature
- Input speed
- Throttle angle
- Engine speed

OPERATION

OPERATION

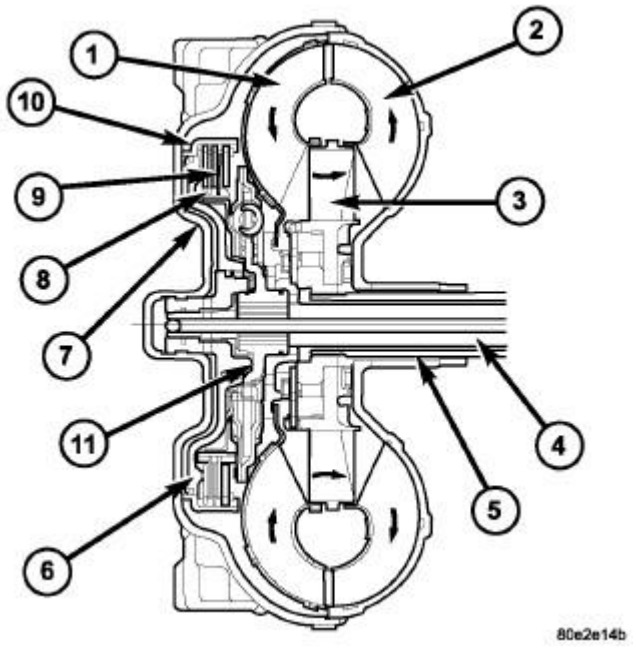


Fig. 187: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER
9 - CLUTCH PLATE SET

10 - EXTERNALLY TOOTHED DISC CARRIER
11 - TURBINE DAMPER

The torque converter housing has a unique shape to incorporate the torque converter clutch and flex plate connection. The torque converter uses the typical turbine, impeller and stator assemblies found in a standard torque converter assembly. The torque converter drives the pump through the splines on the inside of the hub. The torque converter uses a multi-disc torque converter clutch system that improves the durability and the holding pressure in the lock-up circuit. The torque converter incorporates a turbine dampening system. This system suppresses torsional vibrations from the engine to ensure optimal shift quality and reduce noise and vibration concerns.

TURBINE

When the fluid that was put into motion by the impeller blades strikes the blades of the turbine, some of the energy and rotational force is transferred into the turbine and the input shaft. This causes both of them (turbine and input shaft) to rotate in a clockwise direction following the impeller. As the fluid is leaving the trailing edges of the turbine's blades it continues in a "hindering" direction back toward the impeller. If the fluid is not redirected before it strikes the impeller, it will strike the impeller in such a direction that it would tend to slow it down.

STATOR

Torque multiplication is achieved by locking the stator's over-running clutch to its shaft. Under stall conditions (the turbine is stationary), the oil leaving the turbine blades strikes the face of the stator blades and tries to rotate them in a counterclockwise direction. When this happens the over-running clutch of the stator locks and holds the stator from rotating. With the stator locked, the oil strikes the stator blades and is redirected into a "helping" direction before it enters the impeller. This circulation of oil from impeller to turbine, turbine to stator, and stator to impeller, can produce a maximum torque multiplication of about 2.0:1. As the turbine begins to match the speed of the impeller, the fluid that was hitting the stator in such as way as to cause it to lock-up is no longer doing so. In this condition of operation, the stator begins to free wheel and the converter acts as a fluid coupling

TORQUE CONVERTER CLUTCH (TCC)

In a standard torque converter, the impeller (2) and turbine are rotating at about the same speed and the stator (3) is freewheeling, providing no torque multiplication. By applying the turbines piston and friction material (9) a total converter engagement can be obtained. The result of this engagement is a direct 1:1 mechanical link between the engine and the transmission.

HYDRO-MECHANICAL AND ELECTRICAL

The torque converter clutch (TCC) is engaged and released by the transmission control module assembly (TCMA). The TCC can be engaged and controlled in any forward gear from 1 through 8. In addition, the 8HP45 transmission incorporates a neutral idle control (NIC) function. Instead of the engine continuing to drive the converter when the vehicle comes to rest, the converter is partially disconnected from the driveline so only a slight residual load remains. Decoupling of the torque converter during NIC is accomplished by allowing clutch B to slip.

TCC RELEASE

When the TCC is open, the TCC piston is pushed to its default position by torque converter chamber pressure. The torque converter switch valve (SV-TC) provides pressure for torque converter operation which has been regulated by the converter pressure regulating valve (TC-V). After exiting the torque converter, fluid moves into the cooling and lubrication circuits. The converter pressure retention valve (TCH1-V) ensures the torque converter pressure is a minimum of 0.35 bar (5 psi) when the TCC is open.

TCC APPLY

When the TCC solenoid is energized, fluid is directed to the torque converter switch valve (SV-TC) and TCC lockup valve (TCC-V). The TCC lockup valve directs fluid to the TCC and torque converter chamber. The torque converter switch valve directs fluid exiting the converter chamber to a secondary pressure retention valve (TCH2-V) which is calibrated to retain 1.0 bar (14.5 psi) of pressure in the converter. The torque converter switch valve also directs line pressure to the cooler and lubrication circuit.

REMOVAL

REMOVAL

1. Remove transmission from vehicle. Refer to **REMOVAL**.
2. Place a suitable drain pan under the converter housing end of the transmission.

CAUTION: Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition. The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

3. Pull the torque converter forward until the center hub clears the oil pump seal.
4. Separate the torque converter from the transmission.

INSTALLATION

INSTALLATION

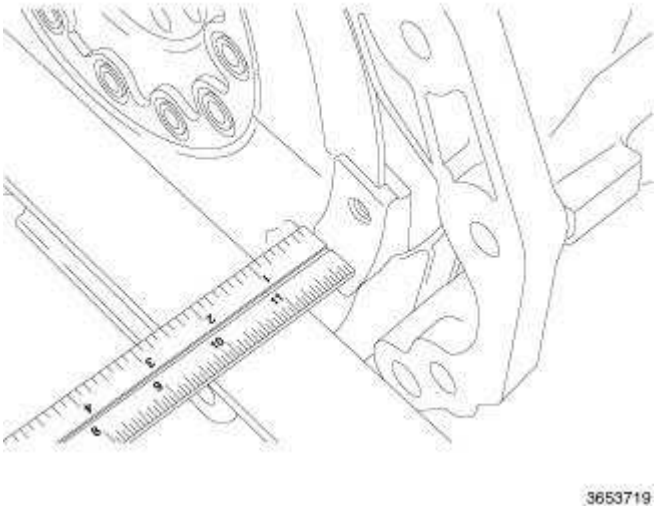


Fig. 188: Scale And Straightedge
Courtesy of CHRYSLER GROUP, LLC

NOTE: Check converter hub for sharp edges, burrs, scratches, or nicks. Polish the hub with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.

1. Lubricate oil pump seal lip with transmission fluid.
2. Place torque converter in position on transmission.

CAUTION: Do not damage oil pump seal or converter hub while inserting torque converter into the front of the transmission.

3. Align torque converter to oil pump seal opening.
4. Insert torque converter hub onto oil pump drive gear.
5. While pushing torque converter inward, rotate the converter until the converter is fully seated onto the oil pump drive gear.
6. Check converter seating with a scale and straightedge. Surface of converter lugs should be at least 13 mm (1/2 in.) to rear of straightedge when converter is fully seated.
7. If necessary, temporarily secure converter with C-clamp attached to the converter housing.
8. Install the transmission in the vehicle. Refer to **INSTALLATION**.
9. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

VALVE BODY

DESCRIPTION

DESCRIPTION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body includes the Transmission Control Module (TCM), all solenoids and sensors, and can be referred to as the Transmission Control Module Assembly (TCMA). The TCM is attached to the valve body between the transmission case and the valve body. If any component of the valve body **including the TCM** sensors or solenoids need replaced, the complete TCMA (valve body) must be replaced. For replacement of the TCMA (valve body). Refer to **VALVE BODY, REMOVAL**. Components of the valve body and TCM are as follows:

VALVE BODY

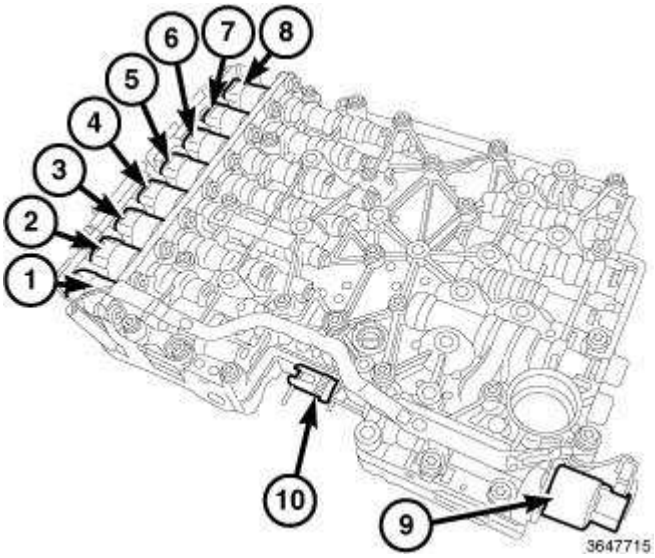


Fig. 189: Solenoid A D E C & Park Release Mechanical Valve
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

This view of the TCMA is the bottom side showing the solenoids as listed. None of these components

can be serviced separately.

TRANSMISSION CONTROL MODULE (TCM)

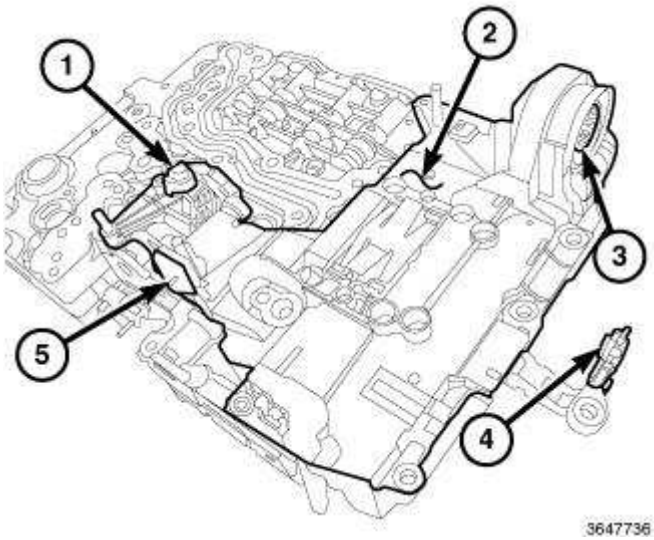


Fig. 190: Input Speed Sensor, Output Speed Sensor, Tcm (Includes Transmission Temperature Sensor) & Park Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

This view of the TCMA is between the between the transmission case and the valve body showing the TCM and sensors as listed. None of these components can be serviced separately.

OPERATION

OPERATION

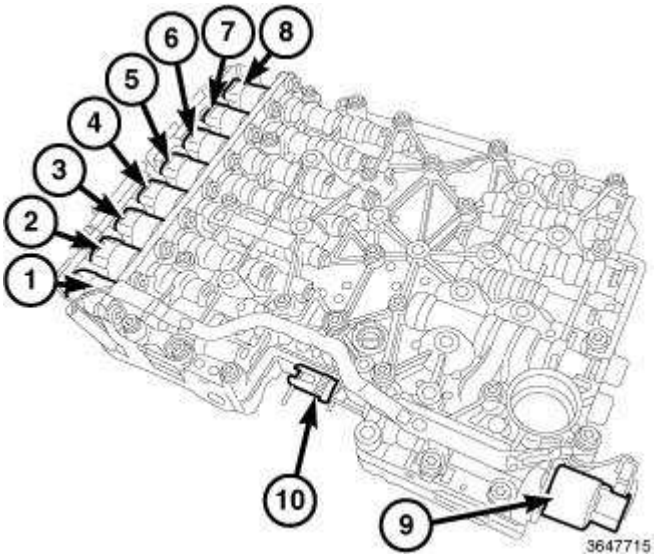


Fig. 191: Solenoid A D E C & Park Release Mechanical Valve
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

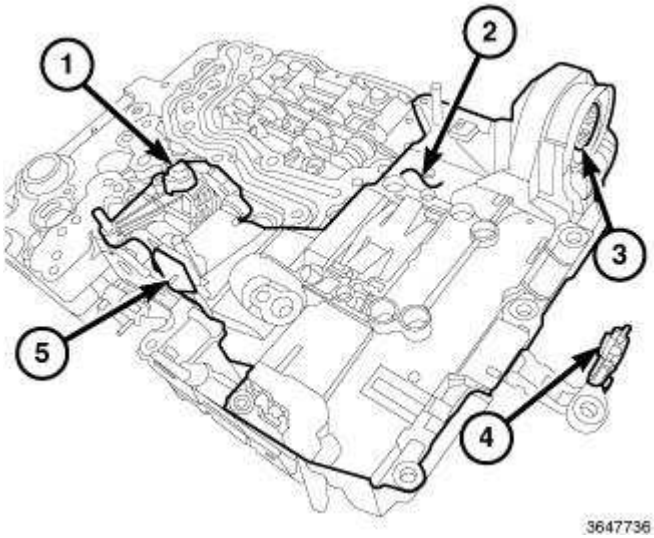


Fig. 192: Input Speed Sensor, Output Speed Sensor, Tcm (Includes Transmission Temperature

Sensor) & Park Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body, which includes the Transmission Control Module (TCM), controls the delivery and pressure of transmission fluid. The TCM is integrated into the valve body. The TCM regulates the amount of hydraulic pressure used to engage the clutches and the Torque Converter Clutch (TCC), in addition to directing hydraulic pressure to engage or release any given clutch for any given required gear. The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module. Due to the complexity of the 8HP45 transmission control system, always refer to the appropriate transmission electrical/electronic diagnostics in this information when attempting to diagnose transmission problems.

If the Transmission Control Module Assembly (TCMA) is replaced, it **must** be programmed and a drive learn needs to be performed before returning the vehicle to the customer. for programming and drive learn procedures. Refer to appropriate diagnostic information .

REMOVAL

REMOVAL

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

1. Raise the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the transmission fluid into a clean container. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

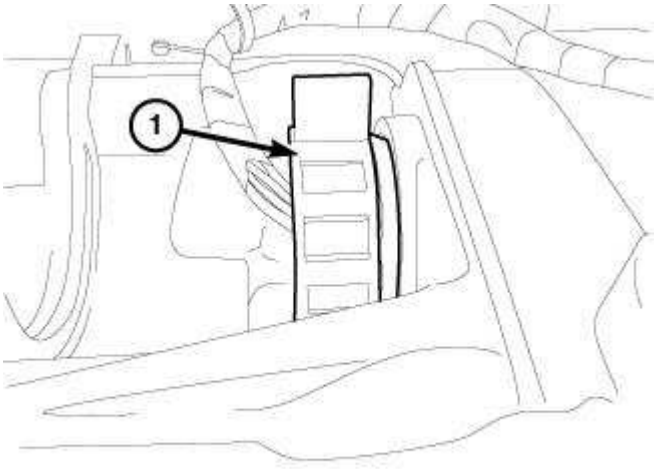


Fig. 193: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

3. Turn the locking mechanism lock (1) of the adapter plug counter-clockwise and disconnect the connector from the transmission.

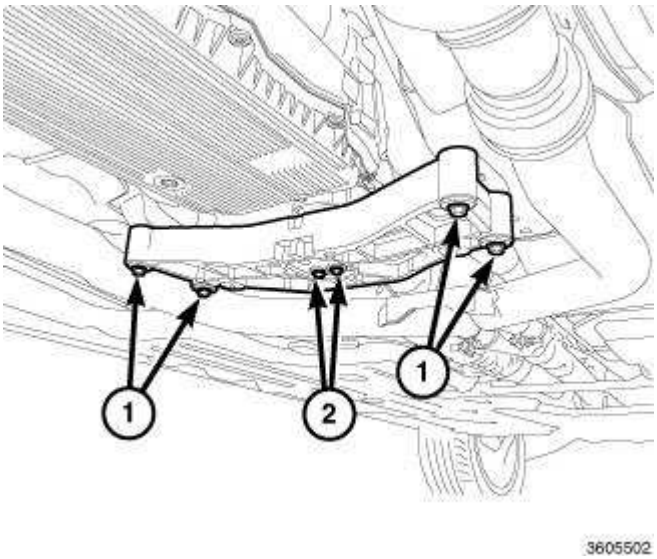


Fig. 194: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Support the transmission with a suitable stand and remove the bolts (1 and 2), remove the transmission crossmember.

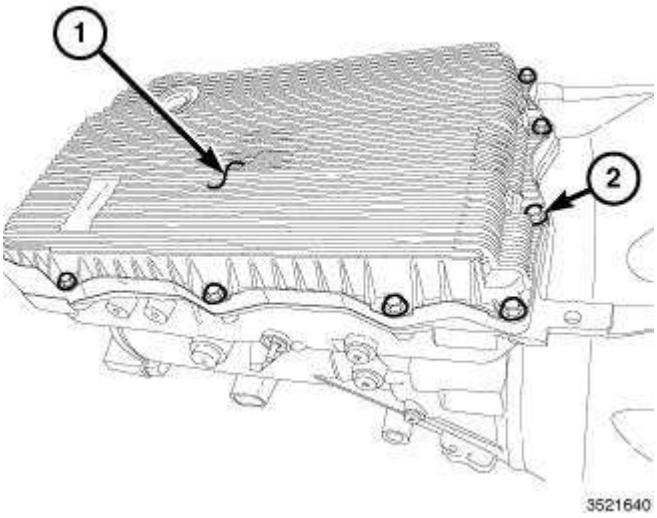


Fig. 195: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.

5. Remove the thirteen oil pan retaining bolts (2).
6. Carefully detach the oil pan (1) and gasket.

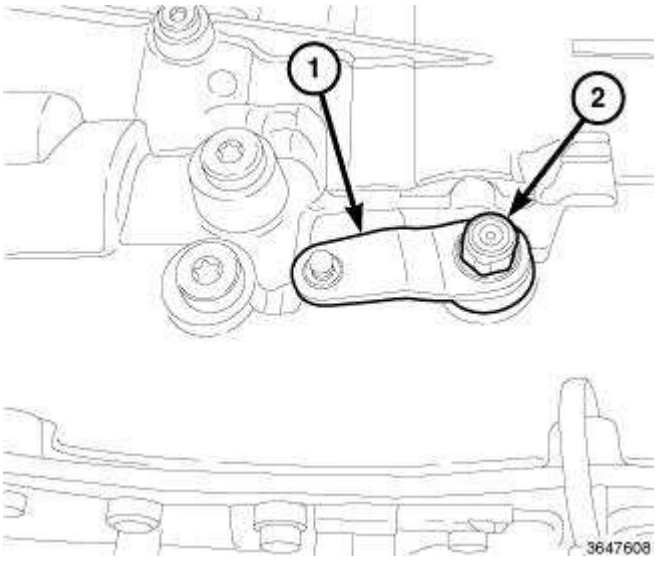


Fig. 196: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

7. Remove the manual release lever retaining nut (2) and remove the lever (1).
8. Reinstall the manual shift shaft lever 180 degrees offset. Using a tie strap, secure the lever into position so the park release fork remains in the same position for installation of the valve body assembly.

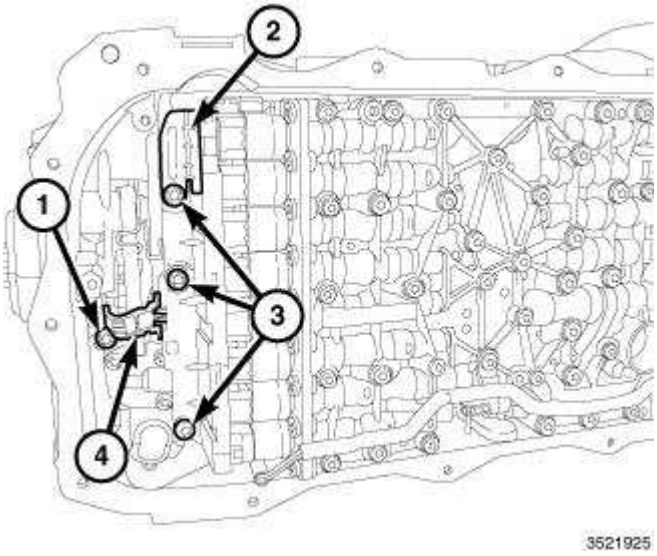


Fig. 197: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the valve body assembly end retainer bolts (3).
10. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
11. Remove the sensor retaining bolt (1) and pull the sensor (4) loose from the case.

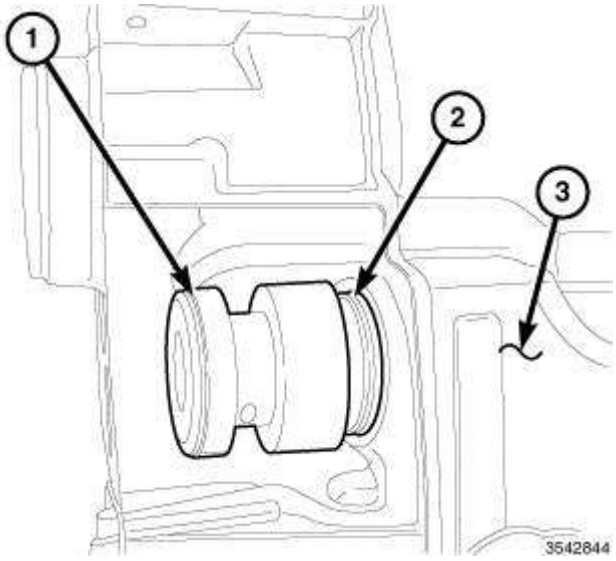


Fig. 198: Remover/Installer, Guide Sleeve
Courtesy of CHRYSLER GROUP, LLC

12. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).

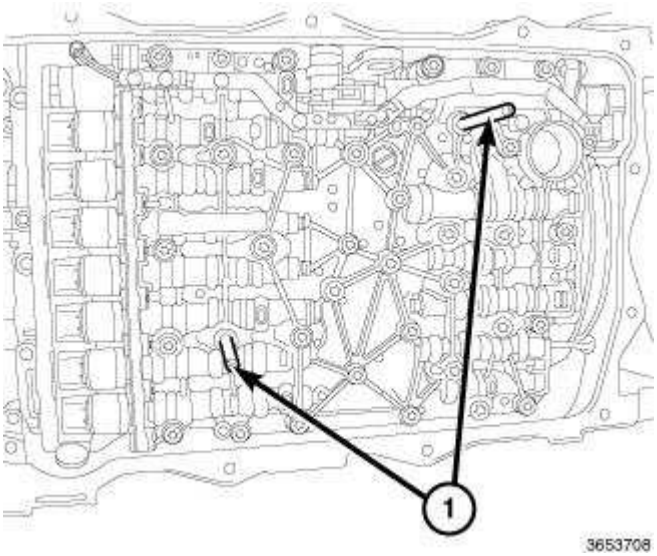


Fig. 199: Pins, Valve Body Alignment & Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

13. Remove two bolts and hand install (special tool #10379, Pins, Valve Body Alignment) (1).
14. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while removing the remaining fasteners.

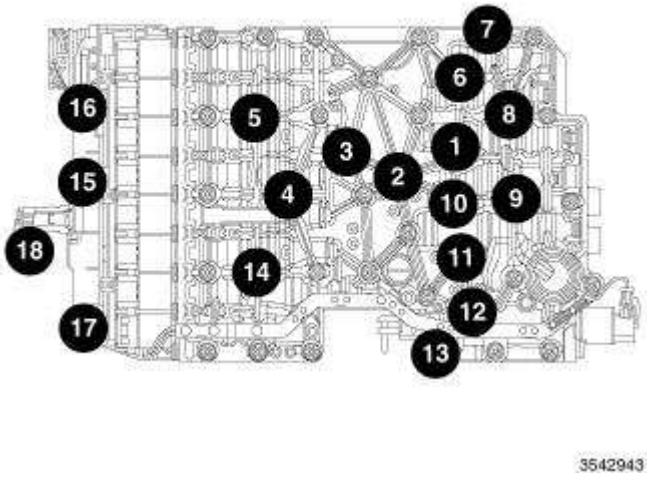


Fig. 200: Valve Body Assembly Retaining Bolts 1-14
Courtesy of CHRYSLER GROUP, LLC

15. Remove remaining valve body assembly retaining bolts.
16. Carefully lower the valve body assembly from the transmission.

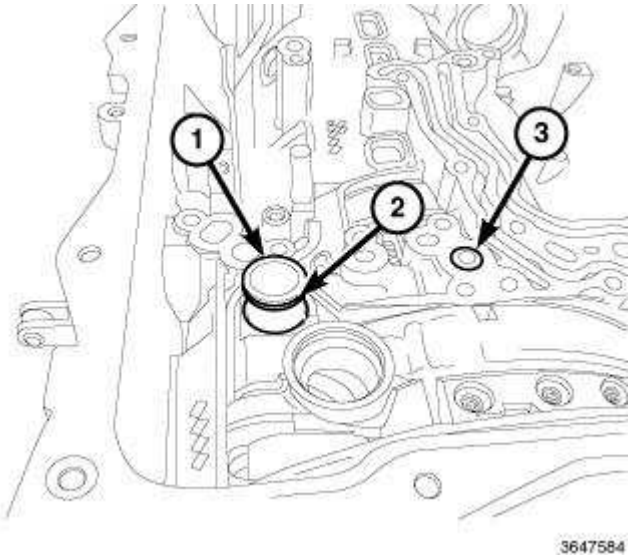


Fig. 201: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fluid port may remain in the valve body upon removal, remove and discard the O-rings.

17. Remove the fluid transfer port (1) from the transmission.
18. Remove and discard the O-ring (2) and seal (3).

INSTALLATION

INSTALLATION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

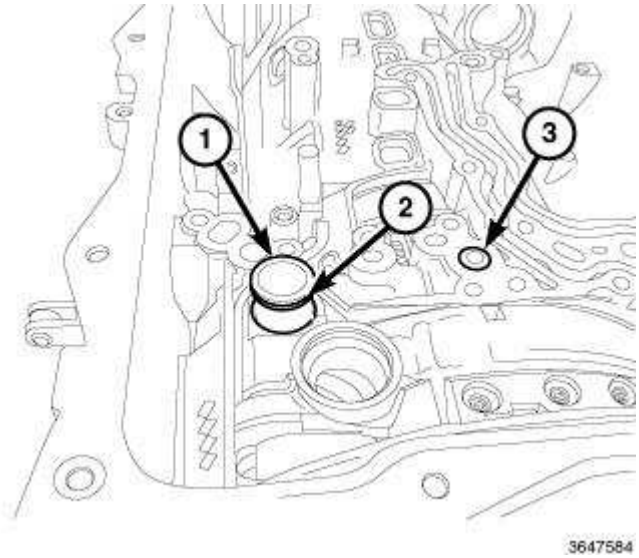


Fig. 202: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the fluid port (1) with **new** O-rings (2) and seal (3) to the valve body.

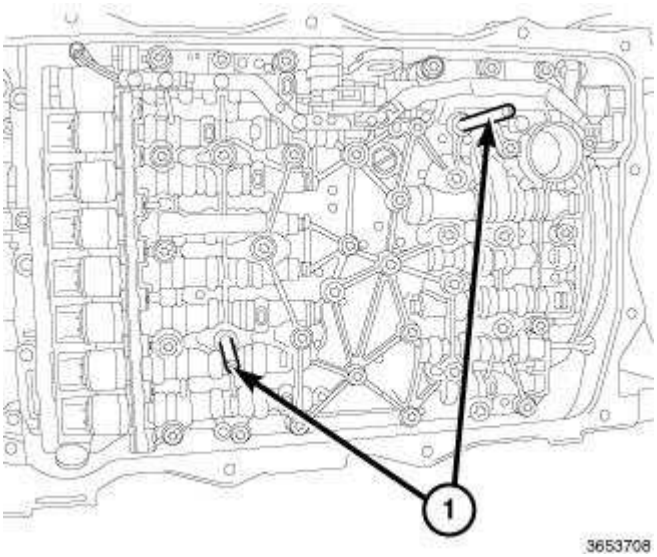


Fig. 203: Pins, Valve Body Alignment & Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the valve body assembly to the transmission using the previously installed (1) (special tool #10379, Pins, Valve Body Alignment) as a guide.
3. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while installing the remaining fasteners.

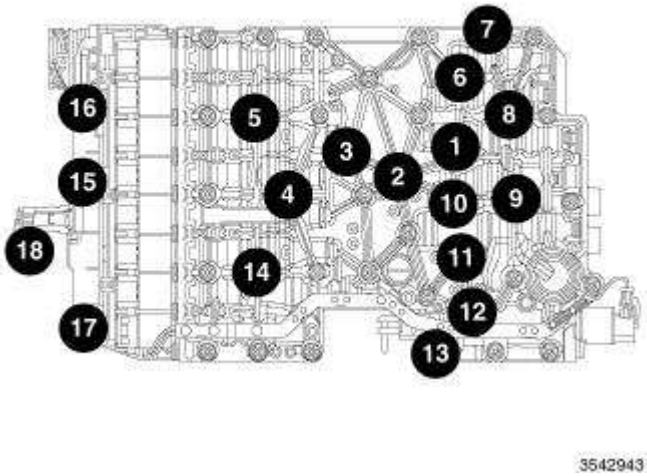


Fig. 204: Valve Body Assembly Retaining Bolts 1-14
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve body assembly retaining bolts not including 16-18 and hand tighten.
5. Remove the pins and install the remaining bolts.

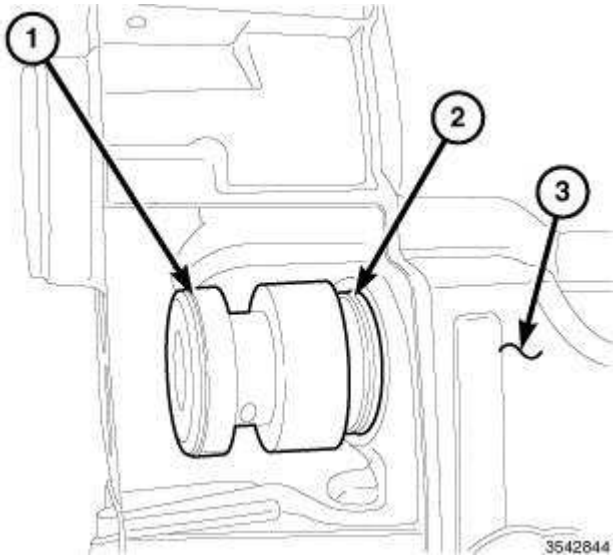


Fig. 205: Remover/Installer, Guide Sleeve
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) to the transmission case (3).

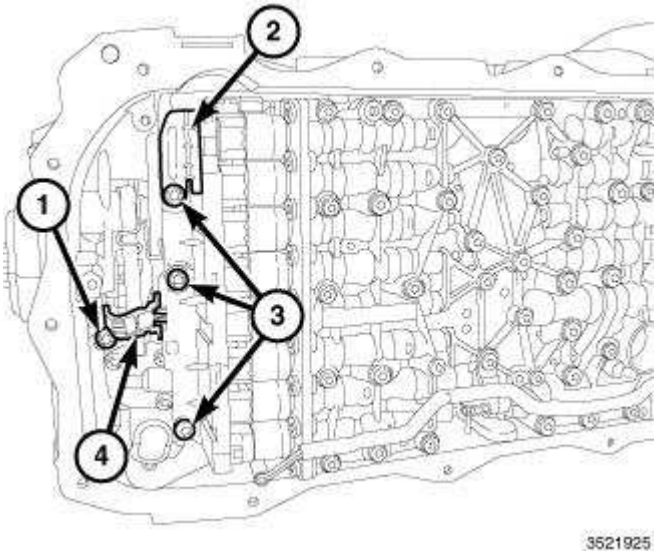


Fig. 206: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Lock the electrical connector lock (2) to the internal harness end.
8. Install the sensor (4) to the case install the retaining bolt (1) and tighten to 8 N.m (71 in. lbs.).
9. Install the valve body assembly end retainer bolts (3) and hand tighten.

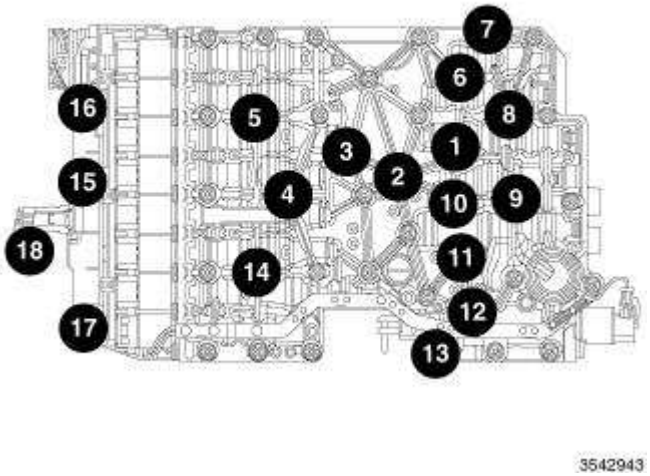


Fig. 207: Valve Body Assembly Retaining Bolts 1-14
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the valve body fasteners to 8 N.m (71 in. lbs.).

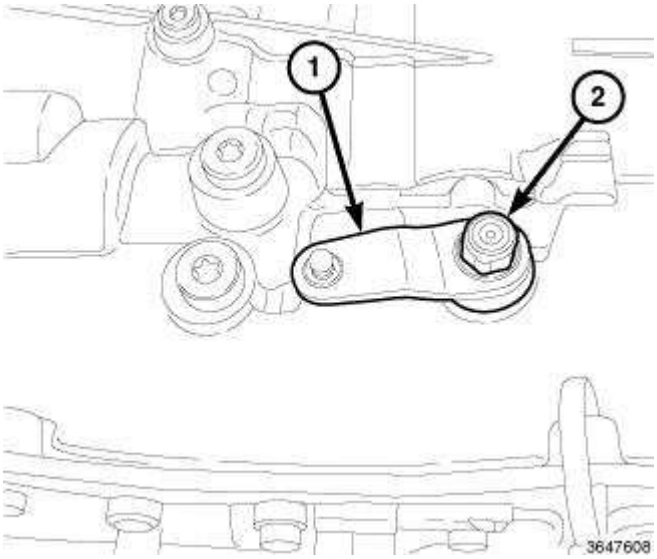


Fig. 208: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

11. Remove the tie strap and return the manual release lever (1) to the original position, tighten the fastener (2) to 35 N.m (26 ft. lbs.).

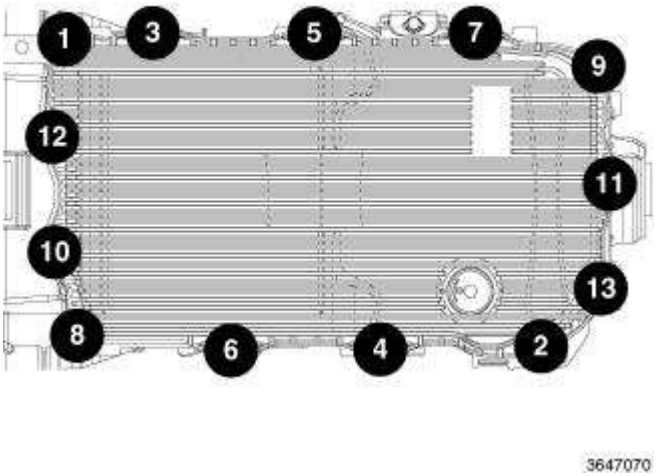


Fig. 209: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

12. Install the oil pan and gasket.
13. Install the thirteen oil pan retaining bolts and tighten the fasteners to 10 N.m (89 in. lbs.) using the sequence given.

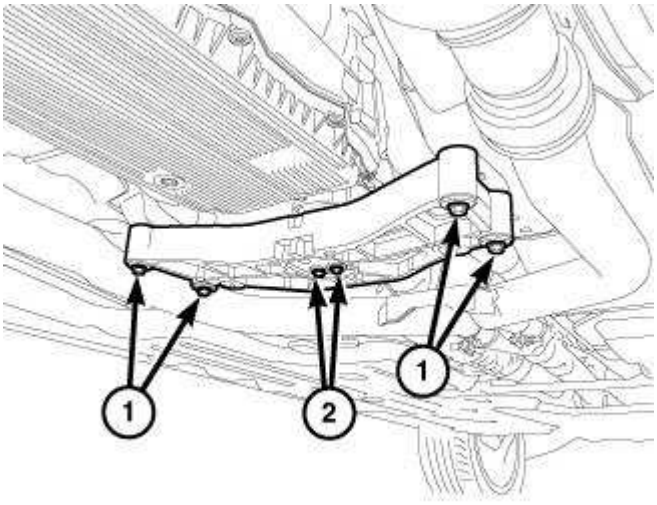


Fig. 210: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install bolts (1) attaching crossmember to frame and Install cross member. Tighten the fasteners to 65 N.m (48 ft. lbs.).
15. Install bolts (2) securing rear support and cushion to the cross member and Install. Tighten the fasteners to 65 N.m (48 ft. lbs.).

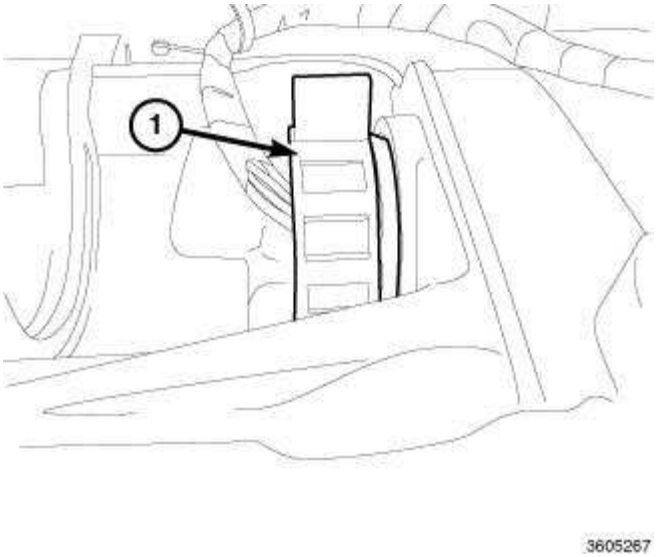


Fig. 211: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

16. Connect plug connector (1).

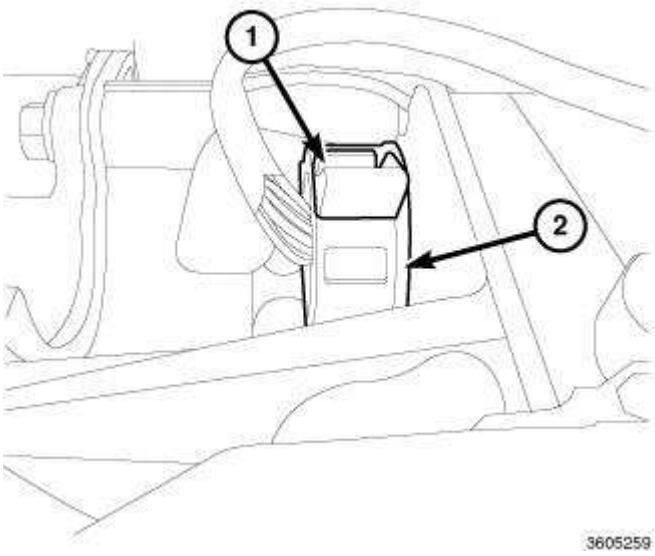


Fig. 212: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

17. Turn the locking mechanism (1) of the harness plug clockwise and lock in place.
18. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
19. Remove the supports and lower the vehicle.
20. Perform the TCM ADAPTATION. Refer to appropriate diagnostic information .

AUTOMATIC TRANSMISSION

NAG1 - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

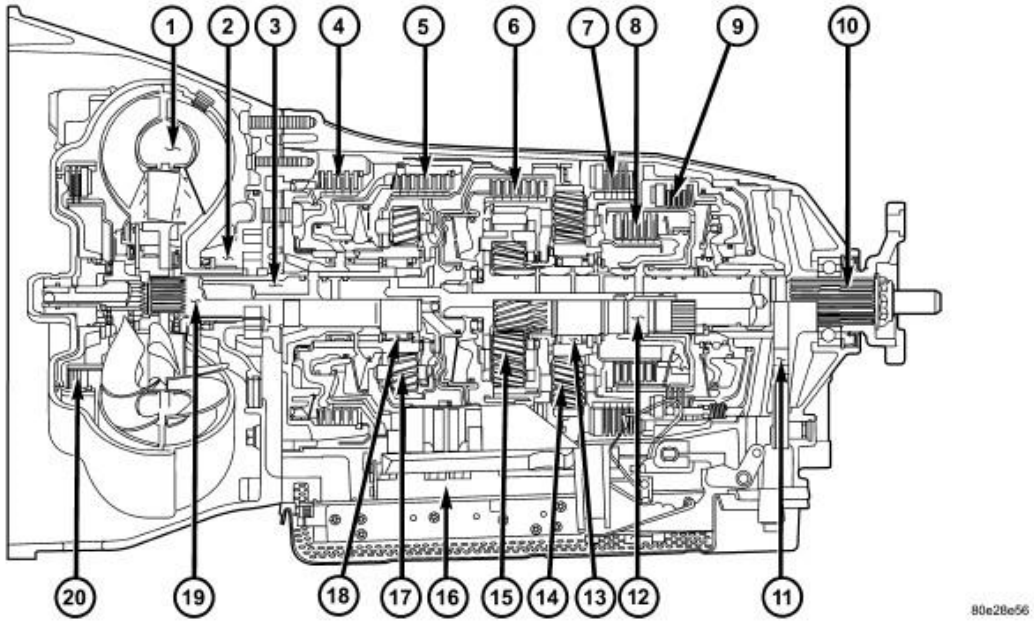


Fig. 1: Nag1 Automatic Transmission
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER	11 - PARKING LOCK GEAR
2 - OIL PUMP	12 - INTERMEDIATE SHAFT
3 - DRIVESHAFT	13 - FREEWHEEL F2
4 - MULTI-DISC HOLDING CLUTCH B1	14 - REAR PLANETARY GEAR SET
5 - DRIVING CLUTCH K1	15 - CENTER PLANETARY GEAR SET
6 - DRIVING CLUTCH K2	16 - ELECTROHYDRAULIC CONTROL UNIT
7 - MULTI-DISC HOLDING CLUTCH B3	17 - FRONT PLANETARY GEAR SET
8 - DRIVING CLUTCH K3	18 - FREEWHEEL F1
9 - MULTI-DISC HOLDING CLUTCH B2	19 - STATOR SHAFT
10 - OUTPUT SHAFT	20 - TORQUE CONVERTER LOCK-UP CLUTCH

The NAG1 automatic transmission is an electronically controlled 5-speed transmission with a lock-up clutch in the torque converter. Refer to **Fig. 1**. The ratios for the gear stages are obtained by 3 planetary gear sets. Fifth gear is designed as an overdrive with a high-speed ratio.

NAG1 identifies a family of transmissions and means "N"ew "A"utomatic "G"earbox, generation 1.

Various marketing names are associated with the NAG1 family of transmissions, depending on the transmission variation being used in a specific vehicle. Some examples of the marketing names are: W5A300, W5A380, and W5A580. The marketing name can be interpreted as follows:

- W = A transmission using a hydraulic torque converter.
- 5 = 5 forward gears.
- A = Automatic Transmission.
- 580 = Maximum input torque capacity in Newton meters.

The gears are actuated electronically/hydraulically. The gears are shifted by means of an appropriate combination of three multi-disc holding clutches, three multi-disc driving clutches, and two freewheeling clutches.

Electronic transmission control enables precise adaptation of pressures to the respective operating conditions and to the engine output during the shift phase which results in a significant improvement in shift quality.

Furthermore, it offers the advantage of a flexible adaptation to various vehicle and engines.

Basically, the automatic transmission with electronic control offers the following advantages:

- Reduces fuel consumption.
- Improved shift comfort.
- More favourable step-up through the five gears.
- Increased service life and reliability.
- Lower maintenance costs.

TRANSMISSION IDENTIFICATION

The transmission can be generically identified visually by the presence of a round 13-way connector located near the front corner of the transmission oil pan, on the right side. Specific transmission information can be found stamped into a pad on the left side of the transmission, above the oil pan rail.

TRANSMISSION GEAR RATIOS

The gear ratios for the NAG1 automatic transmission are as follows:

1st Gear

3.59:1

2nd Gear

2.19:1

3rd Gear

1.41:1

4th Gear

1.00:1

5th Gear

0.83:1

Reverse

3.16:1

TRANSMISSION HOUSING

The converter housing and transmission are made from a light alloy. These are bolted together and centered via the outer multi-disc carrier of multi-disc holding clutch, B1. A coated intermediate plate provides the sealing. The oil pump and the outer multi-disc carrier of the multi-disc holding clutch, B1, are bolted to the converter housing. The stator shaft is pressed into it and prevented from rotating by splines. The electrohydraulic unit is bolted to the transmission housing from underneath. A sheet metal steel oil pan forms the closure.

MECHANICAL SECTION

The mechanical information consists of a input shaft, output shaft, a sun gear shaft, and three planetary gear sets which are coupled to each other. The planetary gear sets each have four planetary pinion gears. The oil pressure for the torque converter lock-up clutch and clutch K2 is supplied through bores in the input shaft. The oil pressure to clutch K3 is transmitted through the output shaft. The lubricating oil is distributed through additional bores in both shafts. All the bearing points of the gear sets, as well as the freewheeling clutches and actuators, are supplied with lubricating oil. The parking lock gear is connected to the output shaft via splines.

Freewheeling clutches F1 and F2 are used to optimize the shifts. The front freewheel, F1, is supported on the extension of the stator shaft on the transmission side and, in the locking direction, connects the sun gear of the front planetary gear set to the transmission housing. In the locking direction, the rear freewheeling clutch, F2, connects the sun gear of the center planetary gear set to the sun gear of the rear planetary gear set.

ELECTROHYDRAULIC CONTROL UNIT

The electrohydraulic control unit comprises the shift plate made from light alloy for the hydraulic control and an electrical control unit. The electrical control unit comprises of a supporting body made of plastic, into which the electrical components are assembled. The supporting body is mounted on the shift plate and screwed to it.

Strip conductors inserted into the supporting body make the connection between the electrical components and a plug connector. The connection to the wiring harness on the vehicle and the transmission control module (TCM) is produced via this 13-pin plug connector with a bayonet lock.

SHIFT GROUPS

The hydraulic control components (including actuators) which are responsible for the pressure distribution before, during, and after a gear change are described as a shift group. Each shift group contains a command valve, a holding pressure shift valve, a shift pressure shift valve, overlap regulating valve, and a solenoid.

The hydraulic system contains three shift groups: 1-2/4-5, 2-3, and 3-4. Each shift group can also be described as being in one of two possible states. The active shift group is described as being in the shift phase when it is actively engaging/disengaging a clutch combination. The 1-2/4-5 shift group control the B1 and K1 clutches. The 2-3 shift group controls the K2 and K3 clutches. The 3-4 shift group controls the K3 and B2 clutches.

OPERATION

OPERATION

The transmission control is divided into the electronic and hydraulic transmission control functions. While the electronic transmission control is responsible for gear selection and for matching the pressures to the torque to be transmitted, the transmission's power supply control occurs via hydraulic elements in the electrohydraulic control module. The oil supply to the hydraulic elements, such as the hydrodynamic torque converter, the shift elements and the hydraulic transmission control, is provided by way of an oil pump connected with the torque converter.

The Transmission Control Module (TCM) allows for the precise adaptation of pressures to the corresponding operating conditions and to the engine output during the gearshift phase, resulting in a noticeable improvement in shift quality. The engine speed limit can be reached in the individual gears at full throttle and kickdown. The shift range can be changed in the forward gears while driving, but the TCM employs a downshift safeguard to prevent over-revving the engine. The system offers the additional advantage of flexible adaptation to different vehicle and engine variants.

EMERGENCY RUNNING FUNCTION

In order to ensure a safe driving state and to prevent damage to the automatic transmission, the TCM control module switches to limp-home mode in the event of critical faults. A diagnostic trouble code (DTC) assigned to the fault is stored in memory. All solenoid and regulating valves are thus de-energized.

The net effect is:

- The last engaged gear remains engaged.
- The modulating pressure and shift pressures rise to the maximum levels.
- The torque converter lockup clutch is deactivated.

In order to preserve the operability of the vehicle to some extent, the hydraulic control can be used to engage 2nd gear or reverse using the following procedure:

- Stop the vehicle.
- Move selector lever to "P".
- Switch off engine.
- Wait at least 10 seconds.
- Start engine.
- Move selector lever to D: 2nd gear.
- Move selector lever to R: Reverse gear.

The limp-home function remains active until the DTC is rectified or the stored DTC is erased with the appropriate scan tool. Sporadic faults can be reset via ignition OFF/ON.

CLUTCH APPLICATION

for which shift elements are applied in each gear position. Refer to **CLUTCH APPLICATION**.

CLUTCH APPLICATION

GEAR	RATIO	B1	B2	B3	K1	K2	K3	F1	F2
1	3.59	X*(1)	X				X* (1)	X	X
2	2.19		X		X		X* (1)		X
3	1.41		X		X	X			
4	1.00				X	X	X		
5	0.83	X				X	X	X* (1)	
N	N/A	X					X		
R	3.16	X* (1)		X			X	X	
R - Limp In	1.93			X	X		X		
(1) * = The shift components required during coast.									

FIRST GEAR POWERFLOW

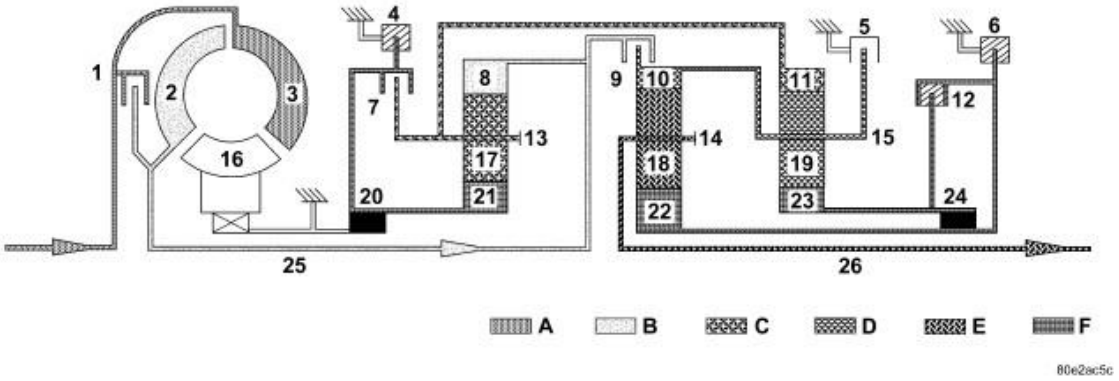


Fig. 2: First Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - THIRD GEAR RATIO
C - FIRST GEAR RATIO	F - FIXED PARTS

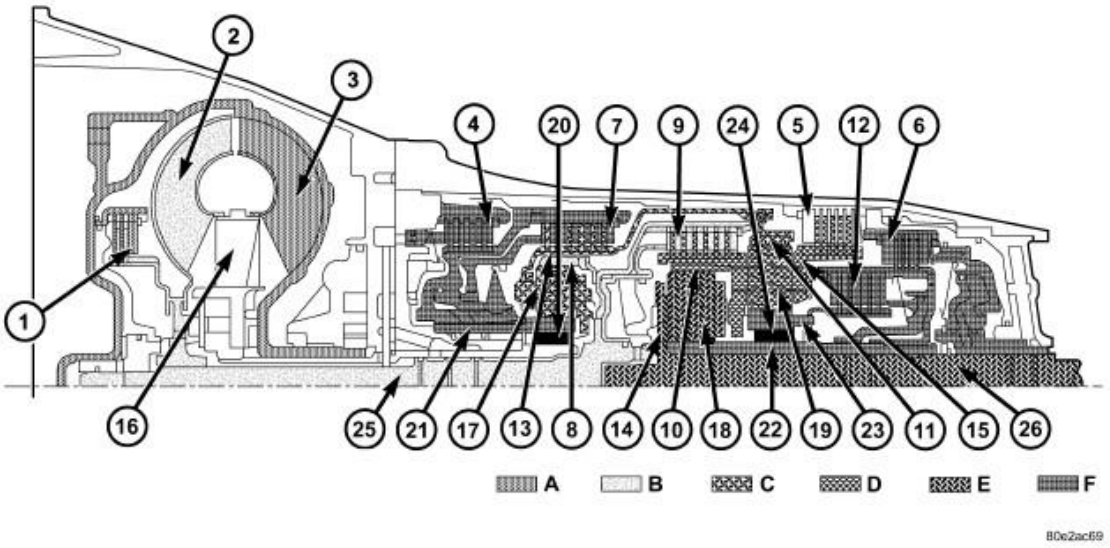


Fig. 3: First Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - THIRD GEAR RATIO
C - FIRST GEAR RATIO	F - FIXED PARTS

Torque from the torque converter is increased via the input shaft (25) and all three planetary gearsets and transferred to the output shaft (26). Refer to **Fig. 3** &**Fig. 2**.

FRONT PLANETARY GEAR SET

The annulus gear (8) is driven by the input shaft (25). The sun gear (21) is held against the housing

by the locked freewheel F1 (20) during acceleration and via the engaged multiple-disc holding clutch B1 (4) during deceleration. The planetary pinion gears (17) turn on the fixed sun gear (21) and increase the torque from the annulus gear (8) to the planetary carrier (13). The planetary carrier (13) moves at a reduced speed in the running direction of the engine.

REAR PLANETARY GEAR SET

The annulus gear (11) turns at a reduced speed due to the mechanical connection to the front planetary carrier (15). The sun gear (23) is held against the housing by the engaged multiple-disc holding clutch B2 (6), by the locked freewheel F2 (24) during acceleration and by the engaged multiple-disc clutch K3 (12) during deceleration. The planetary gears (19) turn on the fixed sun gear (23) and increase the torque from the annulus gear (11) to the planetary carrier (15). The planetary carrier (15) moves at a reduced speed in the running direction of the engine.

CENTER PLANETARY GEAR SET

The annulus gear (10) is driven at the same speed as the rear planetary carrier (15) as a result of a mechanical connection. The sun gear (22) is held against the housing by the multiple-disc holding clutch B2 (6). The planetary pinion gears (18) turn on the fixed sun gear (22) and increase the torque from the annulus gear (10) to the planetary carrier (14). The output shaft (26) connected to the planetary carrier (14) turns at a reduced speed in the running direction of the engine.

SECOND GEAR POWERFLOW

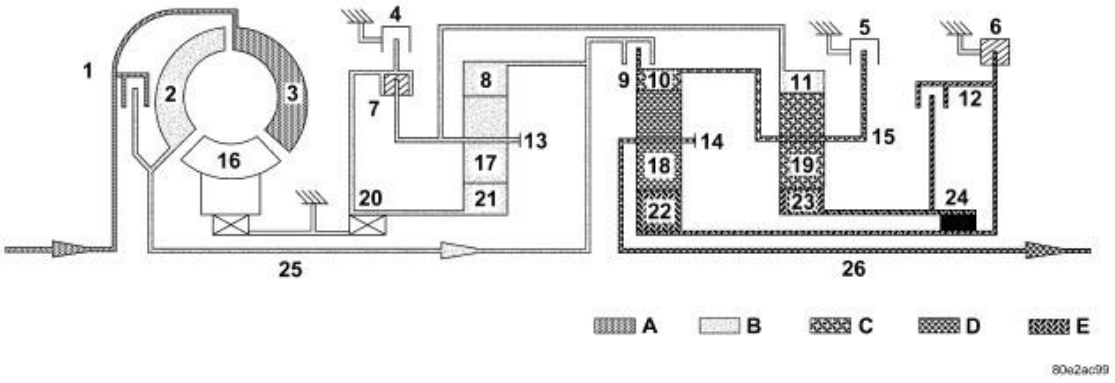


Fig. 4: Second Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS

7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - FIXED PARTS
C - FIRST GEAR RATIO	

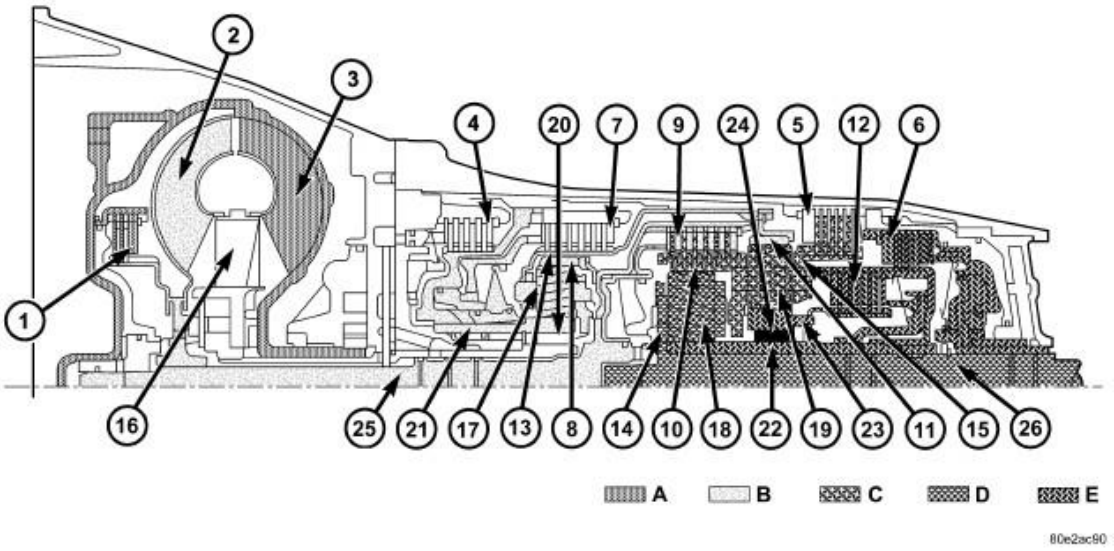


Fig. 5: Second Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2

12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - FIXED PARTS
C - FIRST GEAR RATIO	

Torque from the torque converter is increased via the input shaft (25) and the center and rear planetary gearset and transferred to the output shaft (26). Refer to **Fig. 5** & **Fig. 4**.

FRONT PLANETARY GEAR SET

The planetary carrier (13) and sun gear (21) are connected via the engaged multiple-disc clutch K1 (7). The planetary gearset is therefore blocked and turns as a closed unit at the input speed due to the mechanical connection of the annulus gear (8) and input shaft.

REAR PLANETARY GEAR SET

The annulus gear (11) turns at the input speed as a result of the mechanical connection to the front planetary carrier (13). The sun gear (23) is held against the housing by the engaged multiple-disc holding clutch B2 (6), by the locked freewheel F2 (24) during acceleration and by the engaged multiple-disc clutch K3 (12) during deceleration. The planetary pinion gears (19) turn on the fixed sun gear (23) and increase the torque from the annulus gear (11) to the planetary carrier (15). The planetary carrier (15) moves at a reduced speed in the running direction of the engine.

CENTER PLANETARY GEAR SET

The annulus gear (10) is driven at the same speed as the rear planetary carrier (15) as a result of a mechanical connection. The sun gear (22) is held against the housing by the multiple-disc holding clutch B2 (6). The planetary pinion gears (18) turn on the fixed sun gear (22) and increase the torque from the annulus gear (10) to the planetary carrier (14). The output shaft (5) connected to the planetary carrier (14) turns at a reduced speed in the running direction of the engine.

THIRD GEAR POWERFLOW

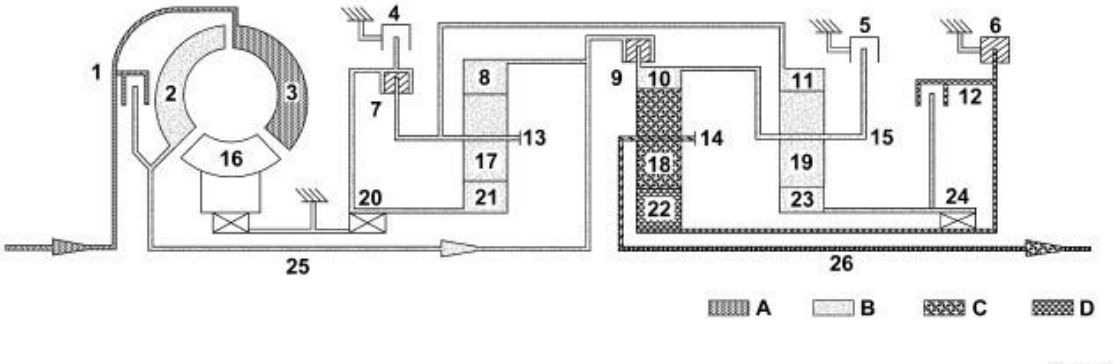


Fig. 6: Third Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	C - FIRST GEAR RATIO
B - TRANSMISSION INPUT SPEED	D - FIXED PARTS

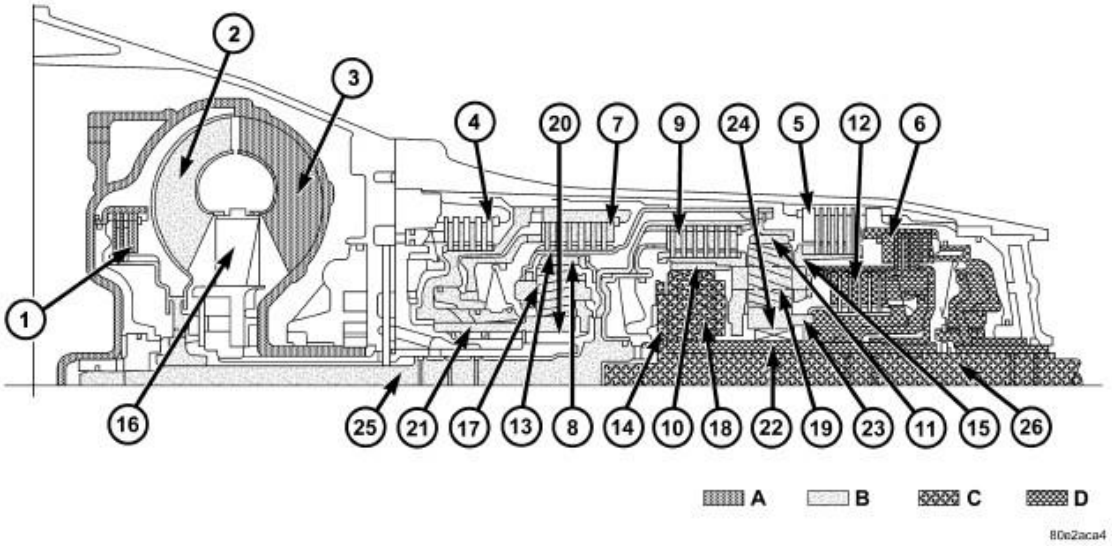


Fig. 7: Third Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR

4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	C - FIRST GEAR RATIO
B - TRANSMISSION INPUT SPEED	D - FIXED PARTS

Torque from the torque converter is increased via the input shaft (25) and the center planetary gearset and transferred to the output shaft (26). Refer to **Fig. 7** & **Fig. 6**.

FRONT PLANETARY GEAR SET

The planetary carrier (13) and sun gear (21) are connected via the engaged multiple-disc clutch K1 (7). The planetary gearset is therefore locked and turns as a closed unit at the input speed due to the mechanical connection of the annulus gear (8) and input shaft (25).

REAR PLANETARY GEAR SET

The multiple-disc clutch K2 (9) is engaged and transfers the input speed of the input shaft (25) to the planetary carrier (15) via the annulus gear (10). The annulus gear (11) turns in the same way as the planetary carrier (15) due to the mechanical connection with the locked front planetary gearset. This planetary gearset is therefore locked and turns as a closed unit.

CENTER PLANETARY GEAR SET

The annulus gear (10) turns at the input speed as a result of the engaged multiple-disc clutch K2 (9). The sun gear (22) is held against the housing by the multiple-disc holding clutch B2 (6). The planetary pinion gears (18) turn on the fixed sun gear (22) and increase the torque from the annulus gear (10) to the planetary carrier (14). The output shaft (26) connected to the planetary carrier (14) turns at a reduced speed in the running direction of the engine.

FOURTH GEAR POWERFLOW

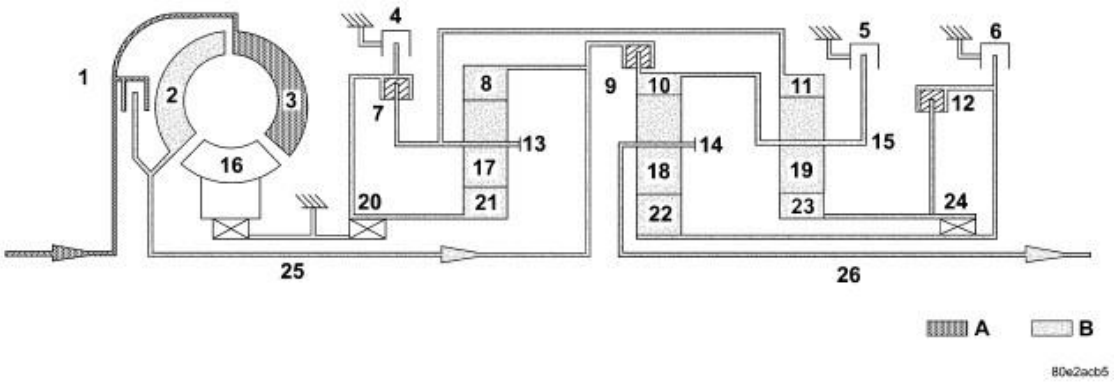


Fig. 8: Fourth Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	B - TRANSMISSION INPUT SPEED

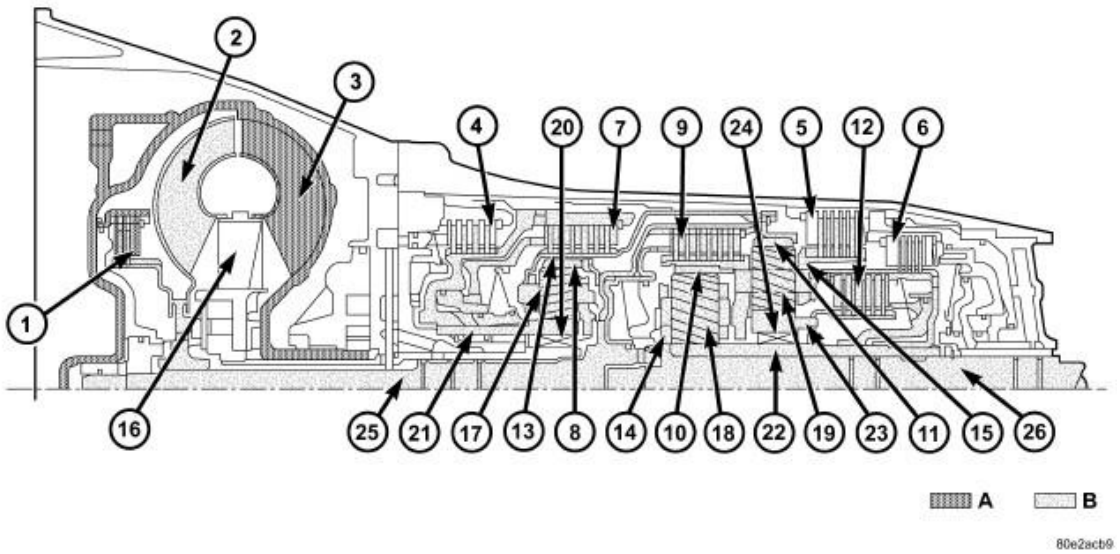


Fig. 9: Fourth Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	B - TRANSMISSION INPUT SPEED

Speed and torque are not converted by the direct gear ratio of the 4th gear. Power is transferred from the input shaft (25) to the output shaft (26) via three locked planetary gearsets. Refer to **Fig. 9** & **Fig. 8**.

FRONT PLANETARY GEAR SET

The planetary carrier (13) and sun gear (21) are connected via the engaged multiple-disc clutch K1 (7). The planetary gearset is therefore locked and turns as a closed unit at the input speed due to the mechanical connection of the annulus gear (8) and the input shaft (25).

REAR PLANETARY GEAR SET

The multiple-disc clutch K2 (9) is engaged and transfers the input speed of the input shaft (25) to the planetary carrier (15) via the annulus gear (10). The annulus gear (11) turns in the same way as the planetary carrier (15) due to the mechanical connection with the locked front planetary gearset. The planetary gearset is therefore locked and turns as a closed unit.

CENTER PLANETARY GEAR SET

The annulus gear (10) turns at the input speed as a result of the engaged multiple-disc clutch K2 (9). The multiple-disc clutch K3 (12) connects the sun gears (22) and (23) of the rear and center planetary gearset. The planetary gearset is locked by the same speeds of the annulus gear (10) and the sun gear (22) and it turns as a closed unit.

FIFTH GEAR POWERFLOW

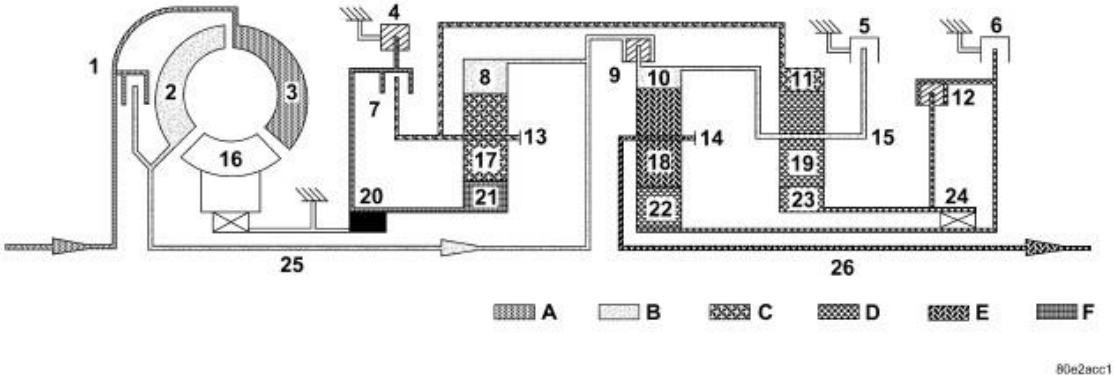


Fig. 10: Fifth Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT

13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - THIRD GEAR RATIO
C - FIRST GEAR RATIO	F - FIXED PARTS

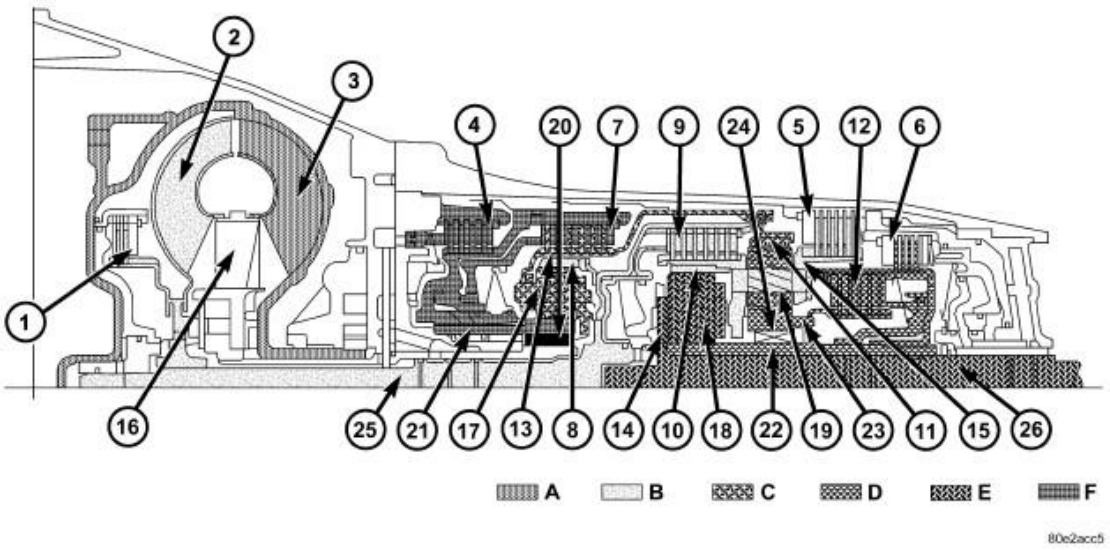


Fig. 11: Fifth Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - THIRD GEAR RATIO
C - FIRST GEAR RATIO	F - FIXED PARTS

Torque from the torque converter is increased via the input shaft (25) and all three planetary gearsets and transferred to the output shaft (26). Refer to **Fig. 11** & **Fig. 10**.

FRONT PLANETARY GEAR SET

The annulus gear (8) is driven by the input shaft (25). The sun gear (21) is held against the housing by the locked freewheel F1 (20) during acceleration and via the engaged multiple-disc holding clutch B1 (4) during deceleration. The planetary pinion gears (17) turn on the fixed sun gear (21) and increase the torque from the annulus gear (8) to the planetary carrier (13). The planetary carrier (13) moves at a reduced speed in the running direction of the engine.

REAR PLANETARY GEAR SET

The multiple-disc clutch K2 (9) is engaged and transfers the input speed of the input shaft (25) to the planetary carrier (15) via the annulus gear (10). The annulus gear (11) turns at a reduced speed due to the mechanical connection with the front planetary carrier (13). The planetary pinion gears (19) turn between the annulus gear (11) and the sun gear (23). The sun gear (23) moves at an increased speed in the running direction of the engine.

CENTER PLANETARY GEAR SET

The annulus gear (10) turns at the input speed as a result of the engaged multiple-disc clutch K2 (9). The multiple-disc clutch K3 (12) transfers an increased speed to the sun gear (22) due to the connection with the sun gear (23). The planetary pinion gears (18) turn between the annulus gear (10) and the sun gear (22). The speed of the planetary carrier (14) and the output shaft connected to the planetary carrier (5) lies between that of the annulus gear (10) and the sun gear (22). This provides a step-up ratio.

REVERSE GEAR POWERFLOW

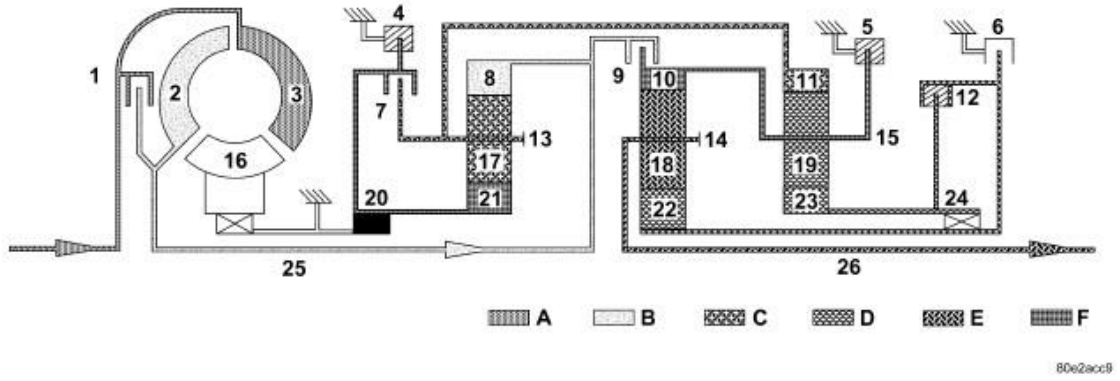


Fig. 12: Reverse Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER

2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - THIRD GEAR RATIO
C - FIRST GEAR RATIO	F - FIXED PARTS

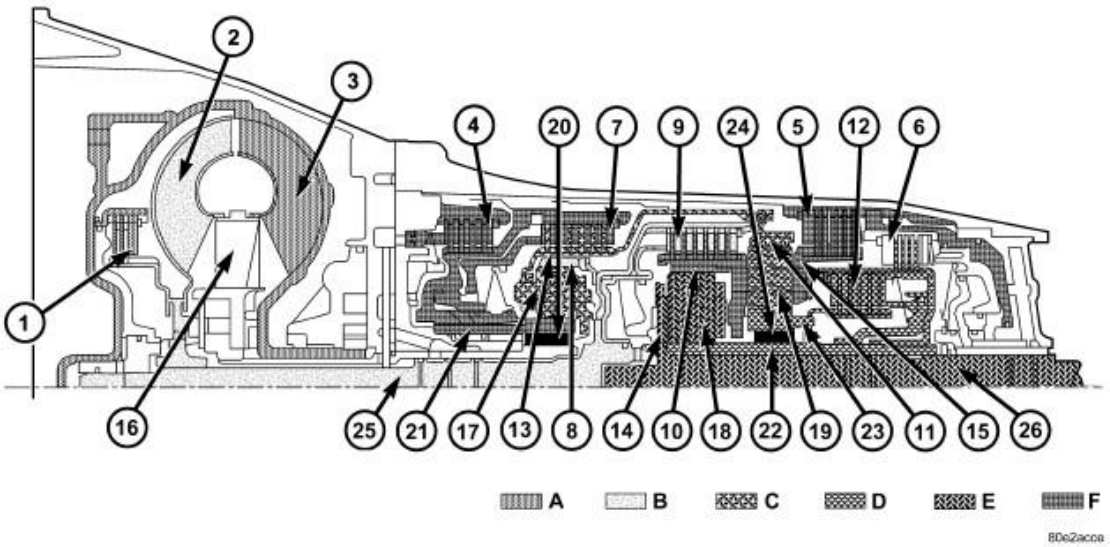


Fig. 13: Reverse Gear Powerflow
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS

7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - THIRD GEAR RATIO
C - FIRST GEAR RATIO	F - FIXED PARTS

Torque from the torque converter is increased via the input shaft (25) and all three planetary gearsets and transferred with reversed direction of rotation to the output shaft (26). Refer to **Fig. 13** & **Fig. 12**.

FRONT PLANETARY GEAR SET

The annulus gear (8) is driven by the input shaft (25). The sun gear (21) is held against the housing by the locked freewheel F1 (20) during acceleration and via the engaged multiple-disc holding clutch B1 (4) during deceleration. The planetary pinion gears (17) turn on the fixed sun gear (21) and increase the torque from the annulus gear (8) to the planetary carrier (13). The planetary carrier (13) moves at a reduced speed in the running direction of the engine.

REAR PLANETARY GEAR SET

The planetary carrier (15) is held against the housing by the engaged multiple-disc holding clutch B3 (5). The annulus gear (11) turns at a reduced speed due to the mechanical connection to the front planetary carrier (13). The planetary gears (19) turn between the annulus gear (11) and the sun gear (23). The direction is reversed by the held planetary carrier (15) so that the sun gear (23) turns in the opposite direction to the running direction of the engine.

CENTER PLANETARY GEAR SET

The annulus gear (10) is held against the housing by the multiple-disc holding clutch B3 (5) via the mechanical connection to the planetary carrier (15). The sun gear (22) turns backwards due to the engaged multiple-disc clutch K3 (12). The planetary gears (18) turn on the fixed annulus gear (10) and increase the torque from the sun gear (22) to the planetary carrier (14). The output shaft (26) connected to the planetary carrier (14) turns at a reduced speed in the opposite direction to the running direction of the engine.

REVERSE GEAR POWERFLOW - LIMP IN

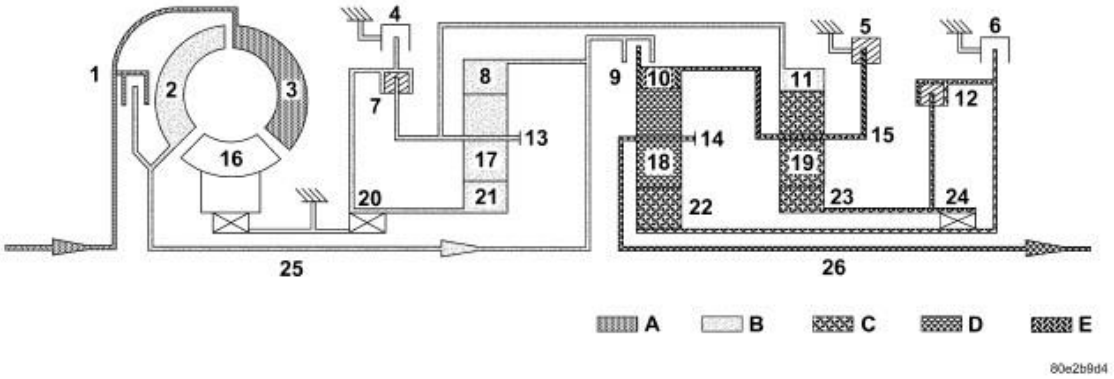


Fig. 14: Reverse Gear Powerflow - Limp In Or 4WD Low Range
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - FIXED PARTS
C - FIRST GEAR RATIO	

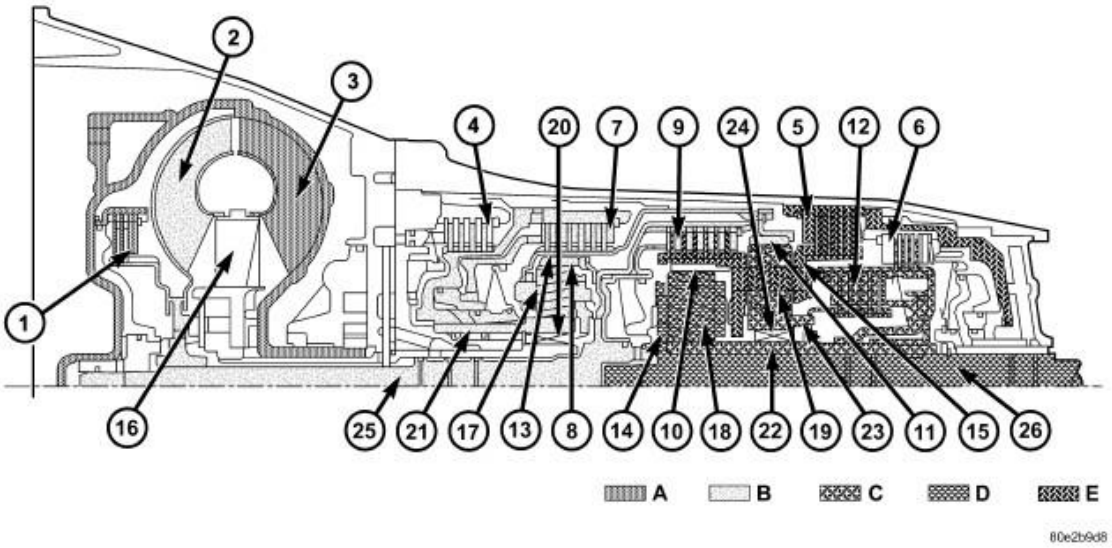


Fig. 15: Reverse Gear Powerflow - Limp In
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH	14 - CENTER PLANETARY CARRIER
2 - TORQUE CONVERTER TURBINE	15 - REAR PLANETARY CARRIER
3 - TORQUE CONVERTER IMPELLER	16 - TORQUE CONVERTER STATOR
4 - HOLDING CLUTCH B1	17 - FRONT PLANETARY PINION GEARS
5 - HOLDING CLUTCH B3	18 - CENTER PLANETARY PINION GEARS
6 - HOLDING CLUTCH B2	19 - REAR PLANETARY PINION GEARS
7 - DRIVING CLUTCH K1	20 - FREEWHEELING CLUTCH F1
8 - FRONT PLANETARY ANNULUS GEAR	21 - FRONT PLANETARY SUN GEAR
9 - DRIVING CLUTCH K2	22 - CENTER PLANETARY SUN GEAR
10 - CENTER PLANETARY ANNULUS GEAR	23 - REAR PLANETARY SUN GEAR
11 - REAR PLANETARY ANNULUS GEAR	24 - FREEWHEELING CLUTCH F2
12 - DRIVING CLUTCH K3	25 - INPUT SHAFT
13 - FRONT PLANETARY CARRIER	26 - OUTPUT SHAFT
A - ENGINE SPEED	D - SECOND GEAR RATIO
B - TRANSMISSION INPUT SPEED	E - FIXED PARTS
C - FIRST GEAR RATIO	

Torque from the torque converter is increased via the input shaft (25) and all three planetary gearsets and transferred with reversed direction of rotation to the output shaft (26). Refer to **Fig. 15** & **Fig. 14**.

FRONT PLANETARY GEAR SET

The clutch K1 (7) is shifted. The planetary carrier (13) and sun gear (21) are connected to each other

as a result. The annulus gear (8) is driven via the input shaft (25). The planetary gear set is locked and turns as a unit.

REAR PLANETARY GEAR SET

The planetary carrier (15) is held against the housing by the engaged multiple-disc holding clutch B3 (5). The annulus gear (11) turns at a reduced speed due to the mechanical connection to the front planetary carrier (13). The planetary pinion gears (19) turn between the annulus gear (11) and the sun gear (23). The direction is reversed by the held planetary carrier (15) so that the sun gear (23) turns in the opposite direction to the running direction of the engine.

CENTER PLANETARY GEAR SET

The annulus gear (10) is held against the housing by the multiple-disc holding clutch B3 (5) via the mechanical connection to the planetary carrier (15). The sun gear (22) turns backwards due to the engaged multiple-disc clutch K3 (12). The planetary gears (18) turn on the fixed annulus gear (10) and increase the torque from the sun gear (22) to the planetary carrier (14). The output shaft (26) connected to the planetary carrier (14) turns at a reduced speed in the opposite direction to the running direction of the engine.

SHIFT GROUPS/ SHIFT SEQUENCE

1-2 SHIFT - FIRST GEAR ENGAGED

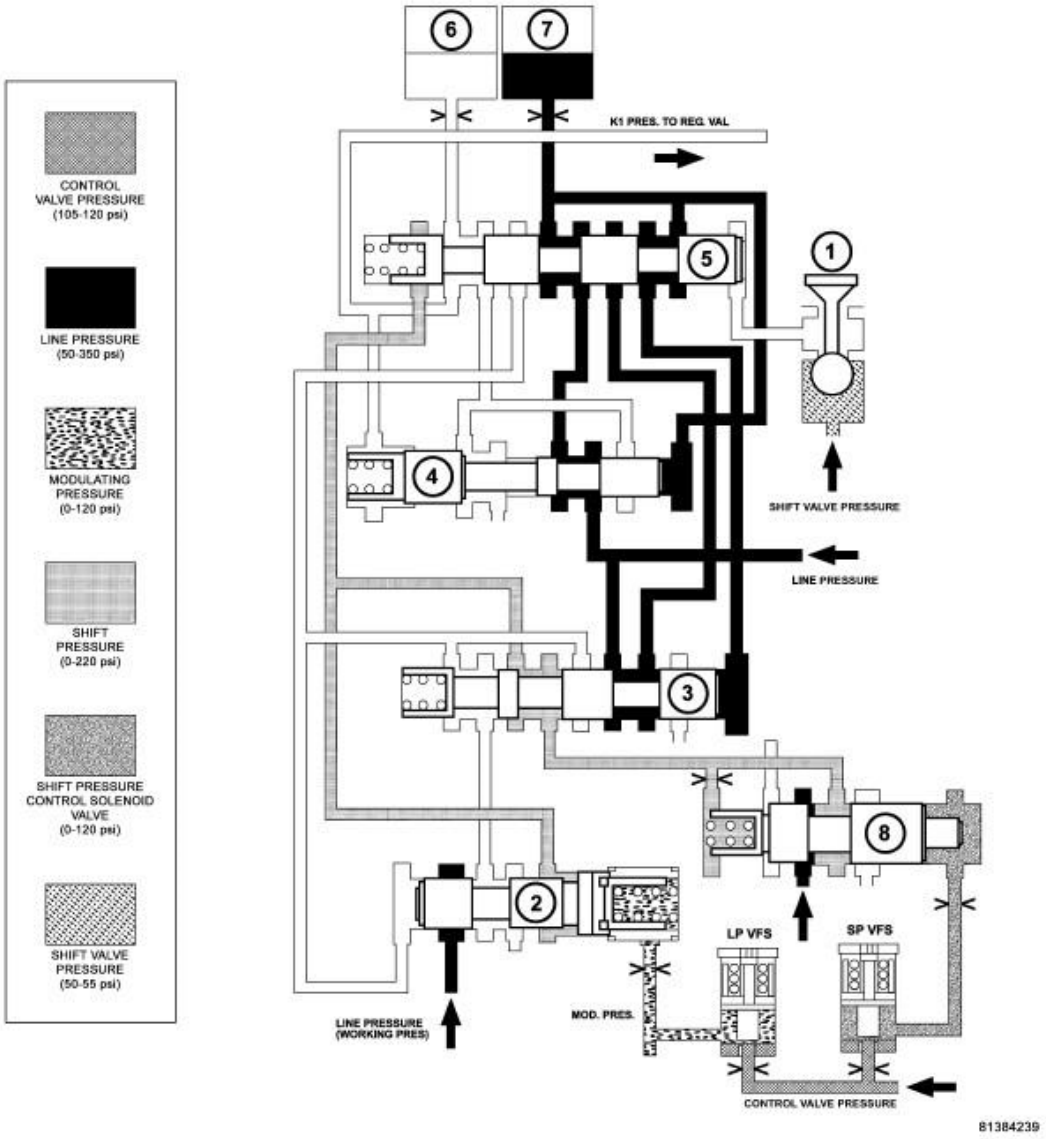


Fig. 16: First Gear Engaged Hydraulic Circuit
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 SHIFT SOLENOID	5 - 1-2/4-5 COMMAND VALVE
2 - 1-2/4-5 OVERLAP VALVE	6 - DRIVING CLUTCH K1
3 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE	7 - HOLDING CLUTCH B1
4 - 1-2/4-5 HOLDING PRESSURE SHIFT VALVE	8 - SHIFT PRESSURE REGULATING VALVE

The end face of the command valve (5) is kept unpressurized via the solenoid valve for 1-2 and 4-5 shift (1). Refer to **Fig. 16**. Because of the holding pressure shift valve (4), the working pressure (p-A) is present at the multiple-disc holding clutch B1 (7). Clutch K1 (6) is unpressurized.

SHIFT PHASE - 1-2 SHIFT PHASE 1

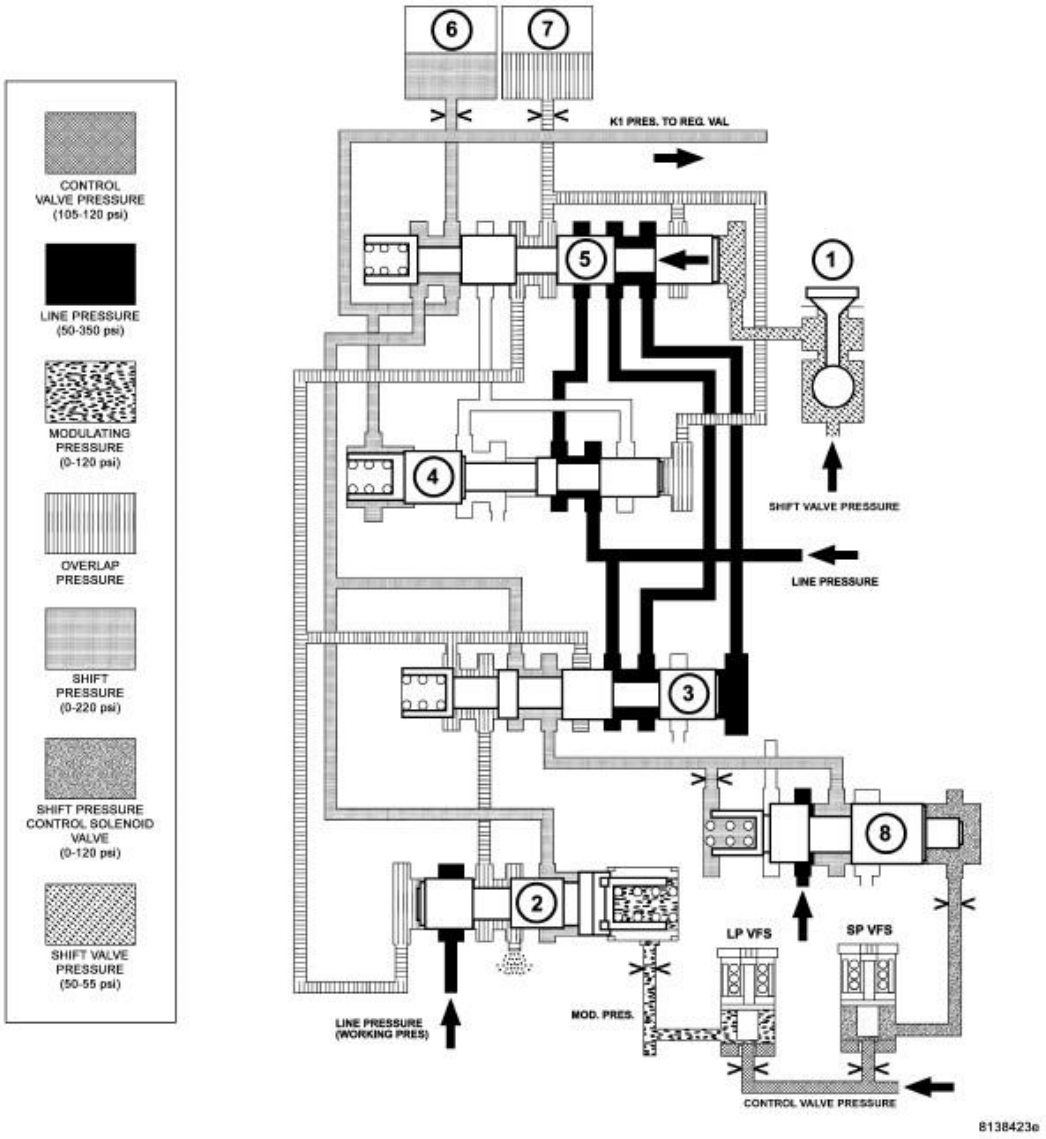


Fig. 17: Shift Phase - 1-2 Shift Phase 1
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 SHIFT SOLENOID	5 - 1-2/4-5 COMMAND VALVE
2 - 1-2/4-5 OVERLAP VALVE	6 - DRIVING CLUTCH K1
3 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE	7 - HOLDING CLUTCH B1
4 - 1-2/4-5 HOLDING PRESSURE SHIFT VALVE	8 - SHIFT PRESSURE REGULATING VALVE

When the 1-2 and 4-5 shift solenoid valve (1) is turned on, the shift valve pressure (p-SV) is directed onto the end face of the command valve (5). Refer to **Fig. 17**. The command valve is moved and the shift pressure (p-S) coming from the shift pressure shift valve (3) is directed via the command valve (5) onto clutch K1 (6).

Simultaneously the clutch B1 (7) is subjected to overlap pressure by the overlap regulating valve (2). The pressure in the clutch B1 (7) as it disengages is controlled during the shift phase depending on engine load by the modulating pressure and the applying clutch pressure (the shift pressure in clutch K1). The controlled pressure in clutch B1 (7) is inversely proportional to the capacity of the clutch being engaged. The rising shift pressure (p-S) at clutch K1 (6) acts on the annular face of the overlap regulating valve (2) and reduces the overlap pressure regulated by the overlap regulating valve (2). When a corresponding pressure level is reached at the holding pressure shift valve (4), this valve switches over.

SHIFT PHASE - 1-2 SHIFT PHASE 2

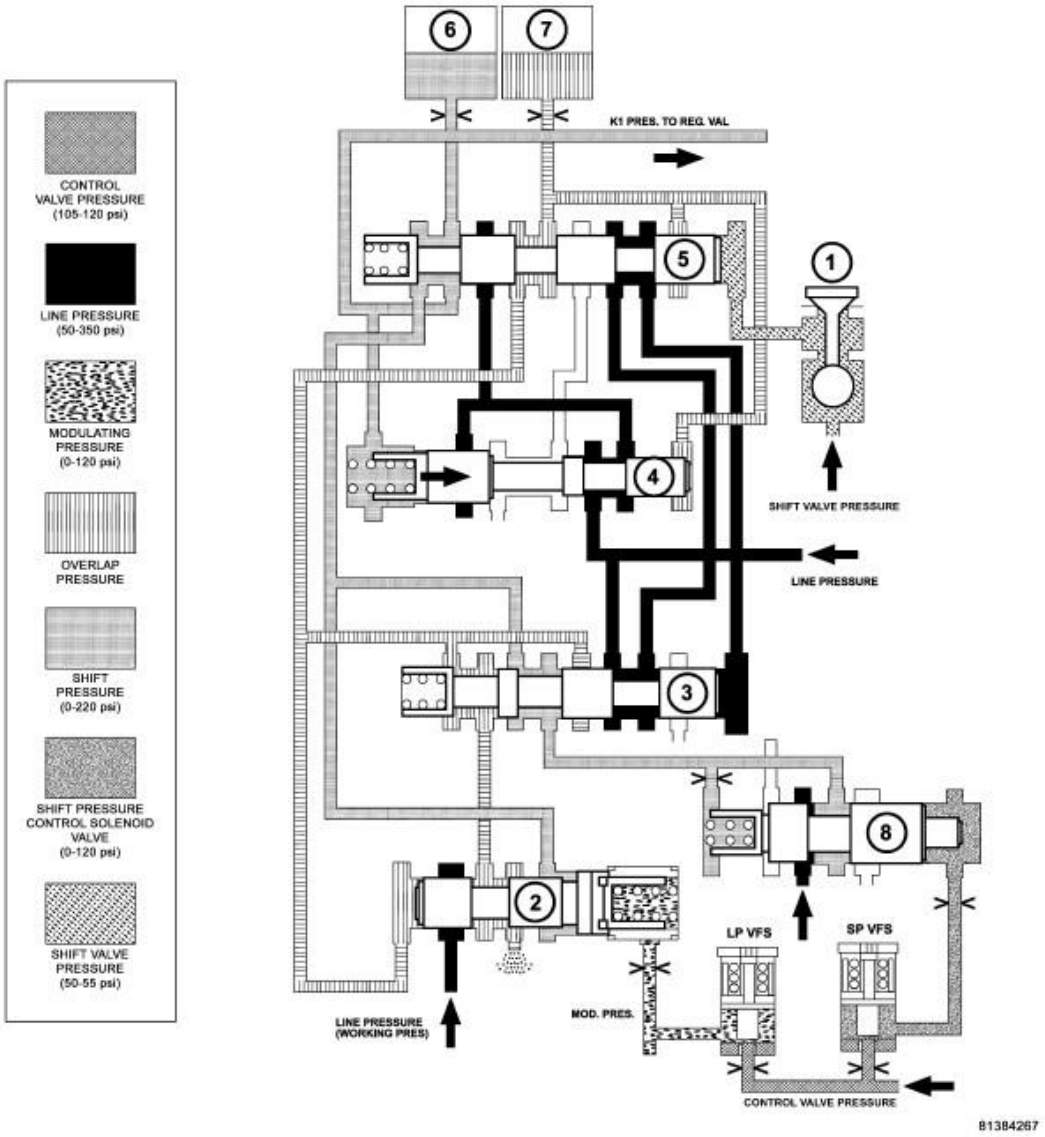


Fig. 18: Shift Phase - 1-2 Shift Phase 2
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 SHIFT SOLENOID	5 - 1-2/4-5 COMMAND VALVE

2 - 1-2/4-5 OVERLAP VALVE	6 - DRIVING CLUTCH K1
3 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE	7 - HOLDING CLUTCH B1
4 - 1-2/4-5 HOLDING PRESSURE SHIFT VALVE	8 - SHIFT PRESSURE REGULATING VALVE

The B1 (7) pressure acting on the end face of the shift pressure shift valve (3) is replaced by the working pressure (p-A). Refer to **Fig. 18**. The shift pressure is also routed to the spring end of the holding valve (4) and the holding valve downshifts. The line pressure is then routed to the command valve (5).

SECOND GEAR ENGAGED

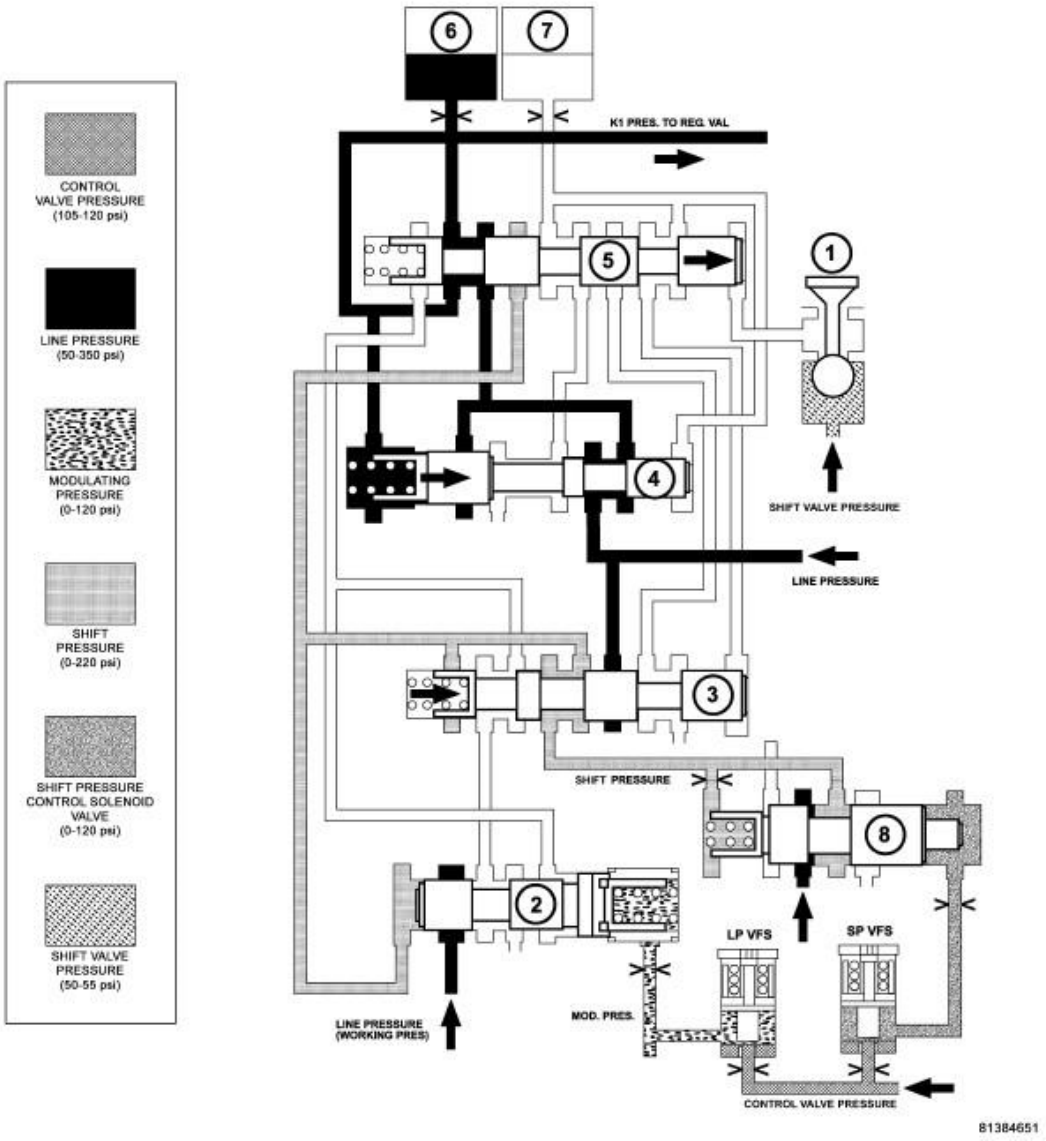


Fig. 19: Second Gear Engaged
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 SHIFT SOLENOID	5 - 1-2/4-5 COMMAND VALVE
2 - 1-2/4-5 OVERLAP VALVE	6 - DRIVING CLUTCH K1
3 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE	7 - HOLDING CLUTCH B1
4 - 1-2/4-5 HOLDING PRESSURE SHIFT VALVE	8 - SHIFT PRESSURE REGULATING VALVE

After the gearchange is complete, the pressure on the end face of the command valve (5) is reduced via the 1-2 and 4-5 shift solenoid valve (1), and the command valve (5) is pushed back to its basic position. Refer to **Fig. 19**. Via the holding pressure shift valve (4) the working pressure (p-A) now passes via the command valve (5) to clutch K1 (6). The multiple-disc holding clutch B1 (7) is deactivated (unpressurized). The spring of the shift pressure shift valve (3) pushes the valve back to its basic position.

SHIFT PHASE - 2-1 SHIFT PHASE 1

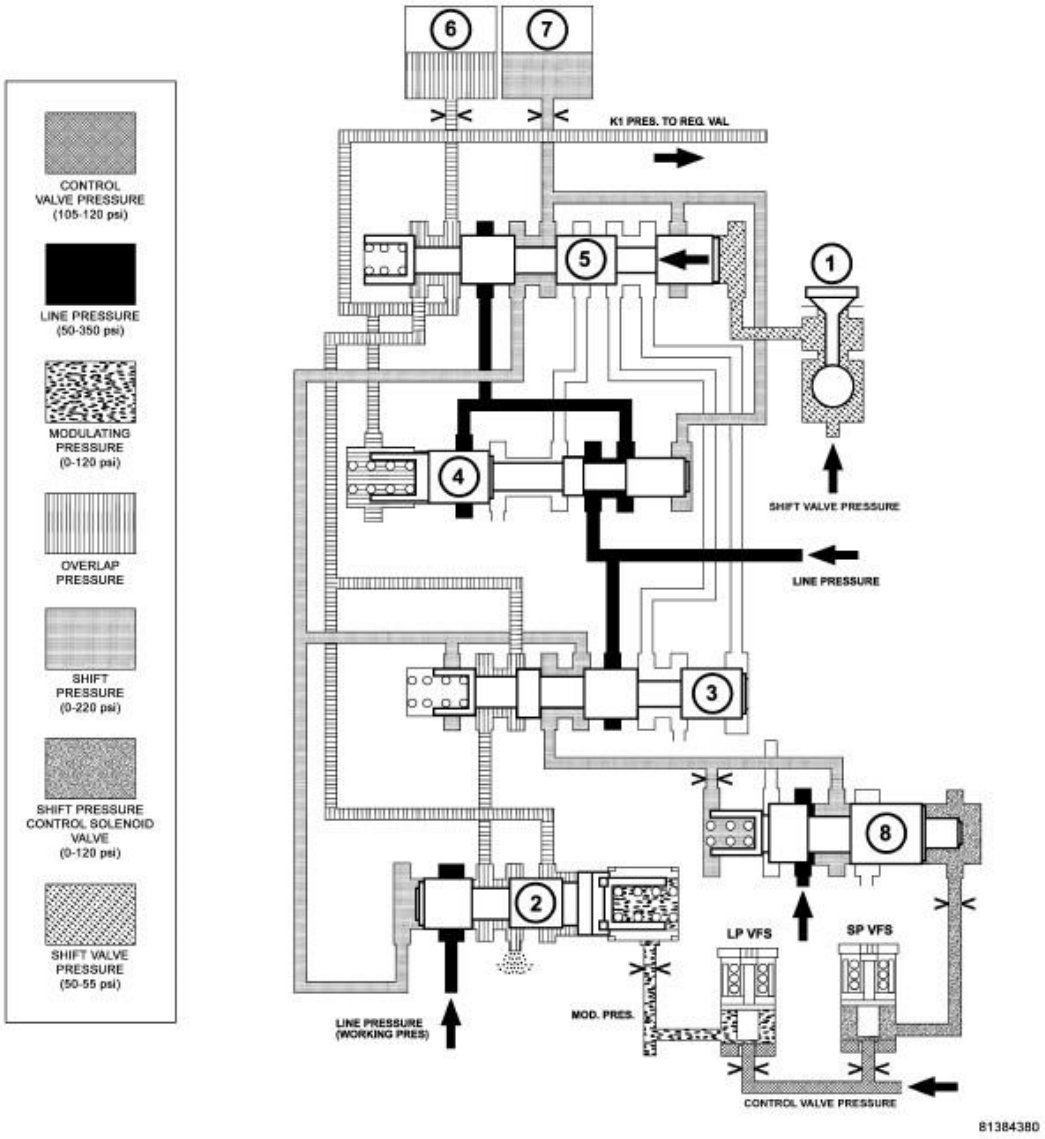


Fig. 20: Shift Phase - 2-1 Shift Phase 1
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 SHIFT SOLENOID	5 - 1-2/4-5 COMMAND VALVE
2 - 1-2/4-5 OVERLAP VALVE	6 - DRIVING CLUTCH K1
3 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE	7 - HOLDING CLUTCH B1
4 - 1-2/4-5 HOLDING PRESSURE SHIFT VALVE	8 - SHIFT PRESSURE REGULATING VALVE

The 1-2/4-5 shift solenoid (1) is turned ON to apply shift pressure (p-S) to the end face of the 1-2/4-5 command valve (5). Refer to **Fig. 20**. This allows the command valve to up-shift and the shift pressure coming from the 1-2/4-5 shift valve (3) is routed to the holding clutch B1 (7) via the command valve.

Simultaneously, the pressure in the releasing clutch, K1 (6), is regulated at the 1-2/4-5 overlap valve (2). The pressure in the K1 clutch as it disengages is controlled during the shift phase depending on engine load, via the modulating pressure (p-MOD), and the shift pressure in clutch B1 (7). The increasing shift pressure in clutch B1, which also acts on the end face of the overlap valve, reduces the overlap pressure.

SHIFT PHASE - 2-1 SHIFT PHASE 2

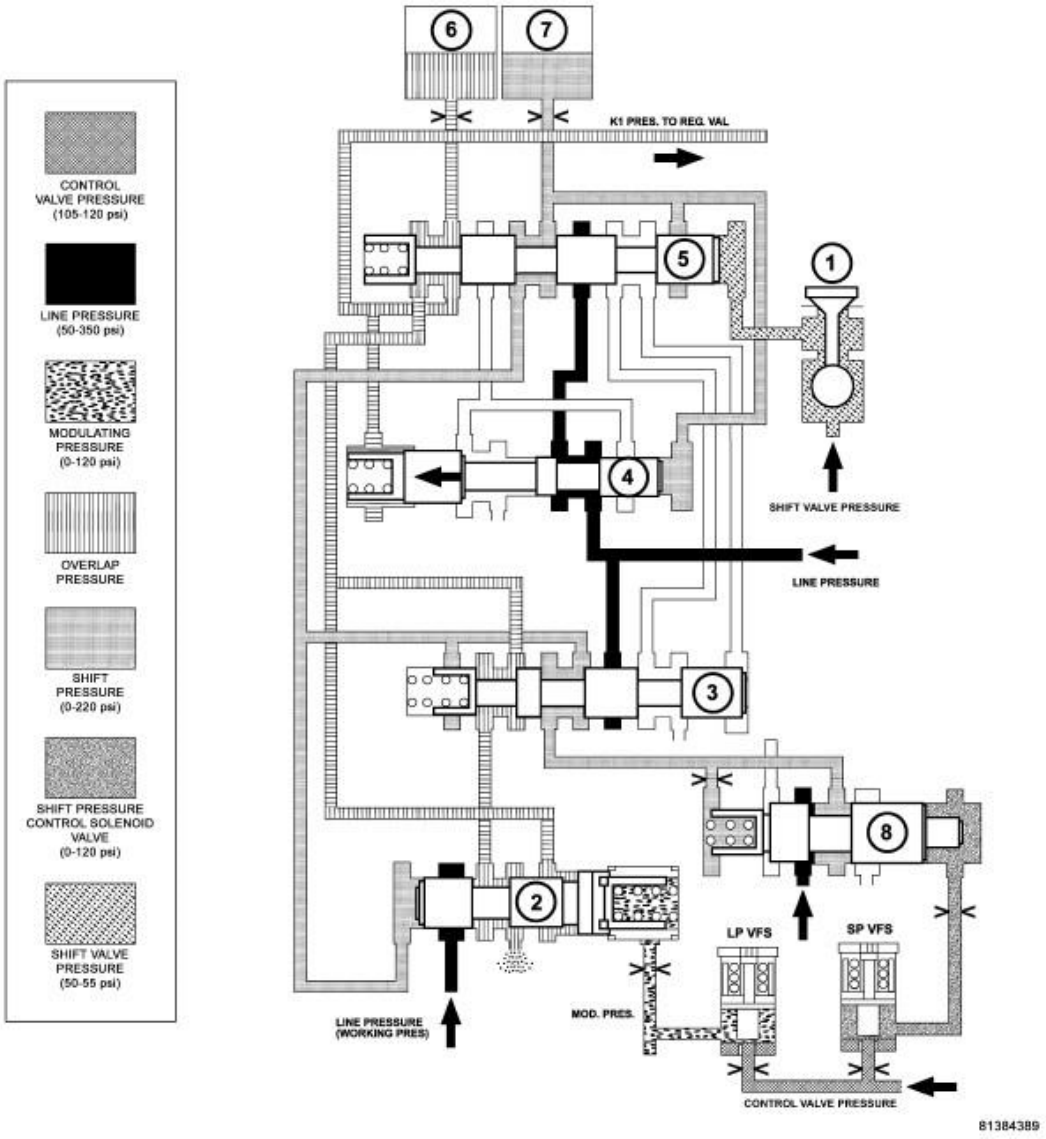


Fig. 21: Shift Phase - 2-1 Shift Phase 2
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 SHIFT SOLENOID	5 - 1-2/4-5 COMMAND VALVE
2 - 1-2/4-5 OVERLAP VALVE	6 - DRIVING CLUTCH K1
3 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE	7 - HOLDING CLUTCH B1

4 - 1-2/4-5 HOLDING PRESSURE SHIFT VALVE	8 - SHIFT PRESSURE REGULATING VALVE

The pressure in clutch B1 (7) acting on the end face of the 1-2/4-5 holding valve (4) forces the valve to up-shift against the spring pressure and allows line pressure (p-A) to pass through the command valve (5). Refer to Fig. 21.

2-1 SHIFT - FIRST GEAR ENGAGED

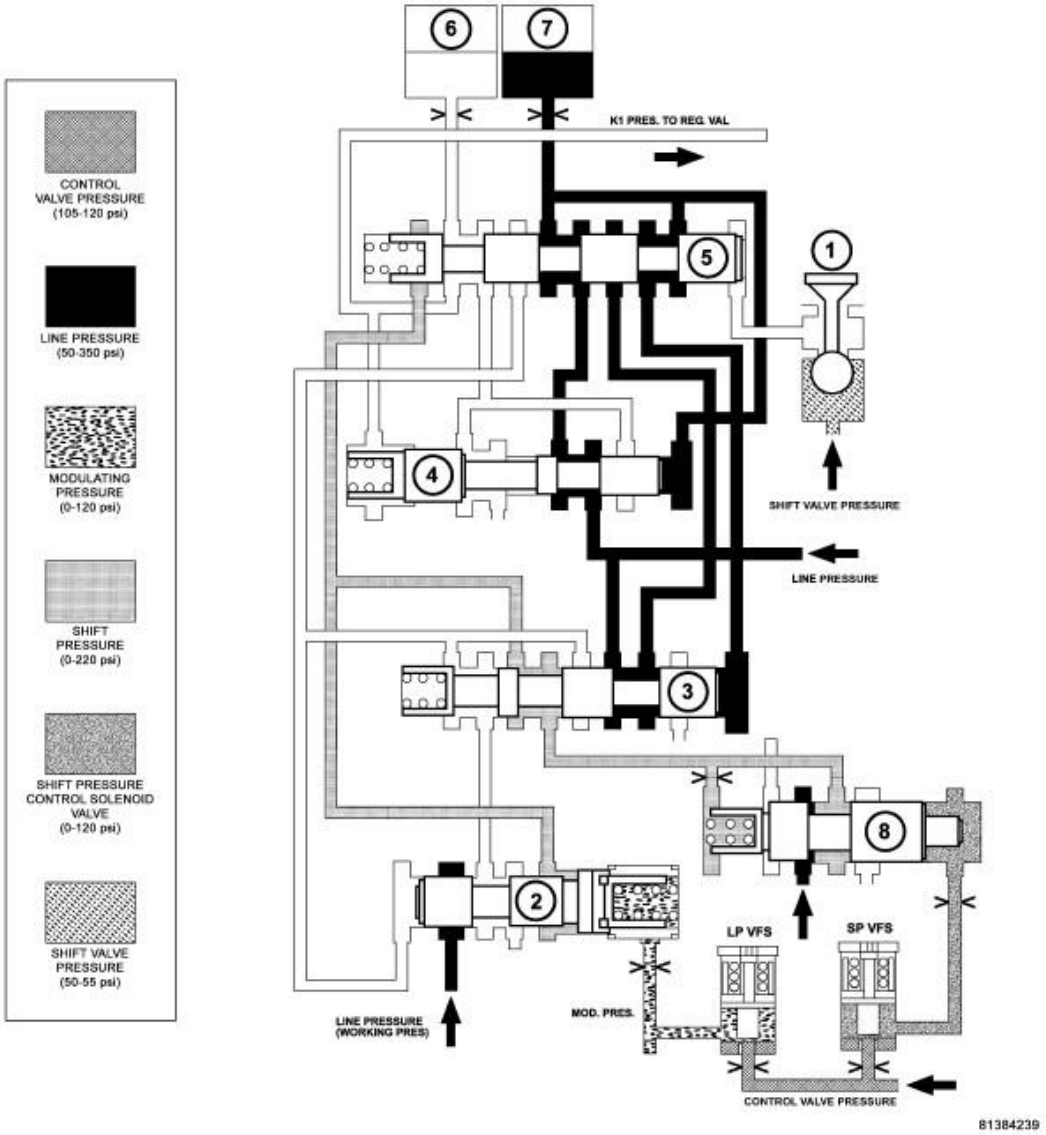


Fig. 22: First Gear Engaged Hydraulic Circuit
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 SHIFT SOLENOID	5 - 1-2/4-5 COMMAND VALVE
2 - 1-2/4-5 OVERLAP VALVE	6 - DRIVING CLUTCH K1

3 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE	7 - HOLDING CLUTCH B1
4 - 1-2/4-5 HOLDING PRESSURE SHIFT VALVE	8 - SHIFT PRESSURE REGULATING VALVE

After the gear change is complete, the 1-2/4-5 shift solenoid (1) is turned off. Refer to **Fig. 22**. This reduces the pressure on the end face of the 1-2/4-5 command valve (5) to 0 psi and the spring pressure downshifts the valve to its initial position. The line pressure (p-A) is switched to the holding clutch B1 (7) and the end face of the holding valve by the downshifted command valve. The upshifted holding valve also allows the remaining pressure in clutch K1 (6) to be vented.

GEAR SHIFT N TO D (1ST GEAR) - ENGINE STARTED

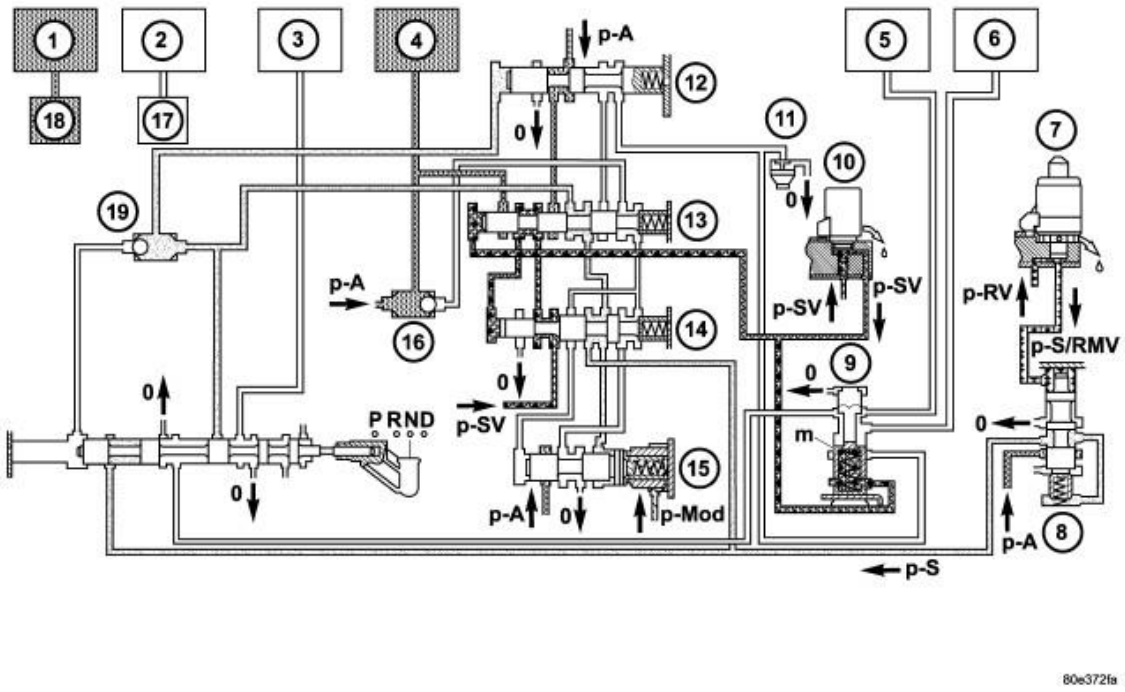


Fig. 23: Engine Started
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING CLUTCH B1	11 - PRESSURE HOLDING VALVE
2 - DRIVING CLUTCH K1	12 - 3-4 HOLDING PRESSURE SHIFT VALVE
3 - HOLDING CLUTCH B3	13 - 3-4 COMMAND VALVE
4 - DRIVING CLUTCH K3	14 - 3-4 SHIFT PRESSURE SHIFT VALVE
5 - HOLDING CLUTCH B2 PISTON	15 - 3-4 OVERLAP REGULATING VALVE
6 - HOLDING CLUTCH B2 PISTON OPPOSING FACE	16 - BALL VALVE

7 - SHIFT PRESSURE REGULATING SOLENOID	17 - 1-2/4-5 COMMAND VALVE
8 - SHIFT PRESSURE REGULATING VALVE	18 - 1-2/4-5 COMMAND VALVE
9 - SHIFT VALVE B2	19 - BALL VALVE
10 - 3-4 SHIFT SOLENOID	

With the engine started and the gearshift lever in the NEUTRAL or PARK positions, holding clutch B1 (1) and driving clutch K3 (4) are applied and the various valves in the 1-2/4-5 shift group are positioned to apply pressure to the holding clutch B2. Refer to **Fig. 23**.

ACTIVATION SEQUENCE

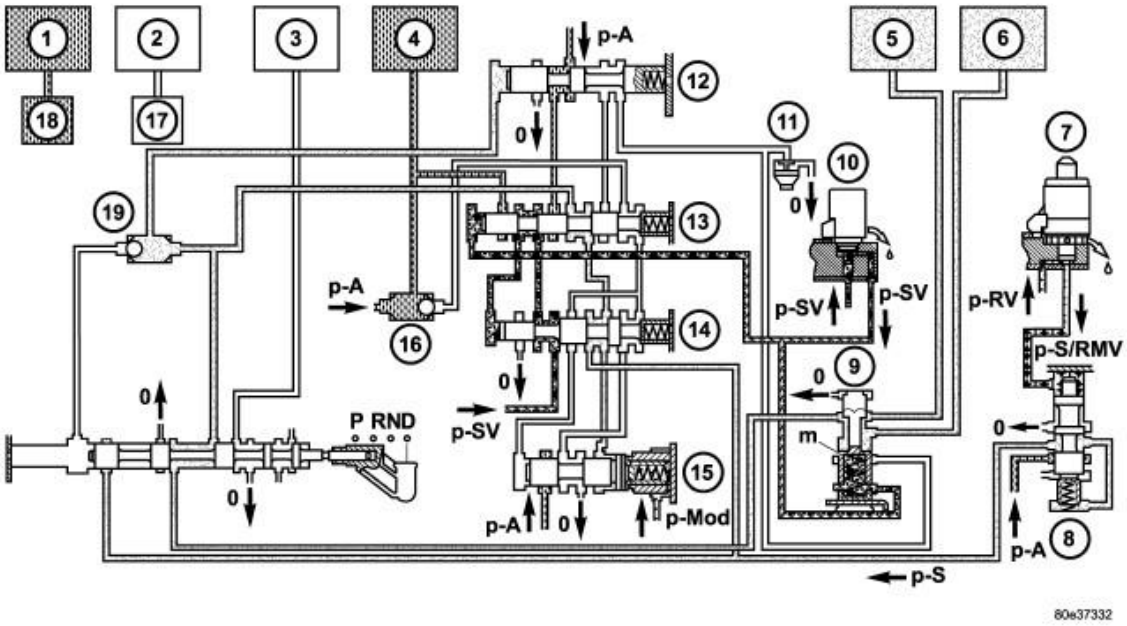


Fig. 24: Activation Sequence
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING CLUTCH B1	11 - PRESSURE HOLDING VALVE
2 - DRIVING CLUTCH K1	12 - 3-4 HOLDING PRESSURE SHIFT VALVE
3 - HOLDING CLUTCH B3	13 - 3-4 COMMAND VALVE
4 - DRIVING CLUTCH K3	14 - 3-4 SHIFT PRESSURE SHIFT VALVE
5 - HOLDING CLUTCH B2 PISTON	15 - 3-4 OVERLAP REGULATING VALVE
6 - HOLDING CLUTCH B2 PISTON OPPOSING FACE	16 - BALL VALVE
7 - SHIFT PRESSURE REGULATING SOLENOID	17 - 1-2/4-5 COMMAND VALVE
8 - SHIFT PRESSURE REGULATING VALVE	18 - 1-2/4-5 COMMAND VALVE
9 - SHIFT VALVE B2	19 - BALL VALVE

10 - 3-4 SHIFT SOLENOID	

The selector valve opens the shift pressure (p-S) feed connection from the ball valve (19) with the shift valve B2 (9). Refer to **Fig. 24**. With the shift valve B2 (9) in the upper position, shift pressure (p-S) travels behind the piston B2 (5) and simultaneously to the opposing face of the piston B2 (6). The multiple-disc holding clutch B2 begins to close.

The pressure on the opposing face of the piston B2 (6) ensures a soft activation of the multiple-disc holding clutch B2.

FIRST GEAR ENGAGED

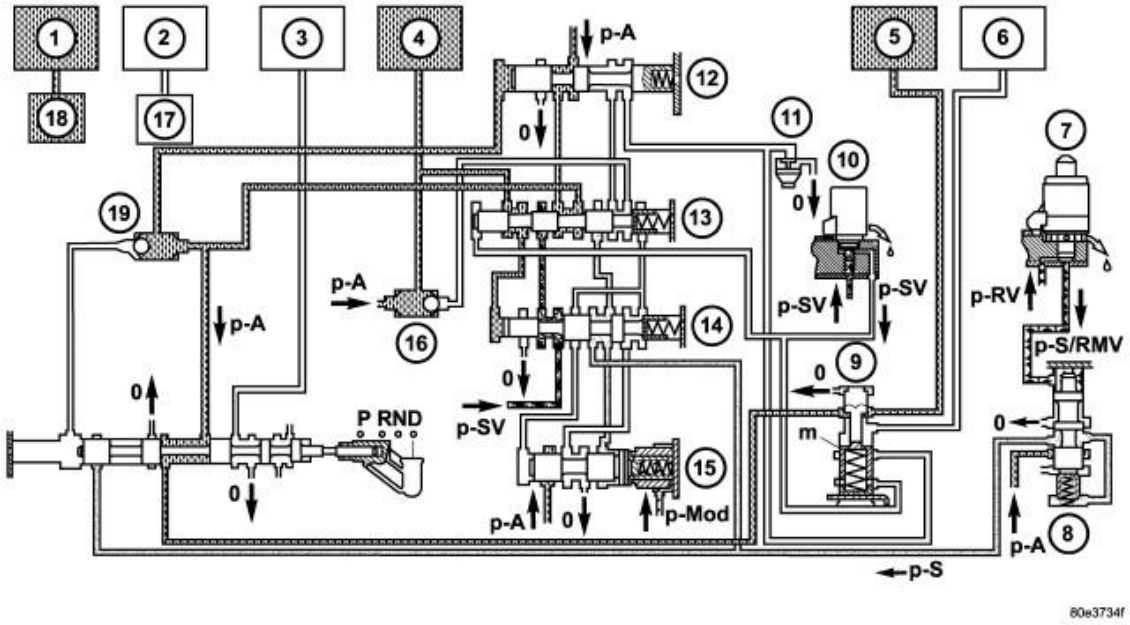


Fig. 25: First Gear Engaged
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING CLUTCH B1	11 - PRESSURE HOLDING VALVE
2 - DRIVING CLUTCH K1	12 - 3-4 HOLDING PRESSURE SHIFT VALVE
3 - HOLDING CLUTCH B3	13 - 3-4 COMMAND VALVE
4 - DRIVING CLUTCH K3	14 - 3-4 SHIFT PRESSURE SHIFT VALVE
5 - HOLDING CLUTCH B2 PISTON	15 - 3-4 OVERLAP REGULATING VALVE
6 - HOLDING CLUTCH B2 PISTON OPPOSING FACE	16 - BALL VALVE
7 - SHIFT PRESSURE REGULATING SOLENOID	17 - 1-2/4-5 COMMAND VALVE
8 - SHIFT PRESSURE REGULATING VALVE	18 - 1-2/4-5 COMMAND VALVE
9 - SHIFT VALVE B2	19 - BALL VALVE

10 - 3-4 SHIFT SOLENOID	

The TCM monitors the activation sequence via the speed of the input shaft, which slows down as the frictional connection in the multiple-disc holding clutch increases. When the speed drops to the specified level, the TCM shuts off the power to the 3-4 shift solenoid valve (10). Refer to **Fig. 25**. The spring chamber of the shift valve B2 (9) is depressurized and switches downwards. This connects the line to the opposing face of the piston B2 (6) with the pressure holding valve (11). The pressure on the opposing face of the piston B2 (6) drops to a residual pressure.

The working pressure (p-A) is formed and travels via the 2-3 holding pressure shift valve, the 2-3 command valve and the ball valve (16) to multi-plate clutch K3 (4) and via the 3-4 command valve (13) to the end face of the 3-4 shift pressure shift valve (14). The 3-4 shift pressure shift valve (14) is moved against the force of the spring towards the right. At the same time the 3-4 solenoid valve (10) is energized. This allows shift valve pressure (p-SV) to enter the spring chamber of the shift valve B2 (9) and to reach the end face of the 3-4 command valve (13). The shift valve B2 (9) is held in the upper position and the 3-4 command valve (13) switches towards the right. At the end face of the 3-4 shift pressure shift valve (14) the working pressure (p-A) is replaced by shift valve pressure (p-SV).

The 3-4 command valve (13) moves to the left. Working pressure (p-A) travels via the holding pressure shift valve (12) and the 3-4 command valve (13) to the piston of multiple-disc holding clutch B2 (5).

DIAGNOSIS AND TESTING

AUTOMATIC TRANSMISSION - GENERAL CONDITIONS

CAUTION: Before attempting any repair on an automatic transmission, check for Diagnostic Trouble Codes with the appropriate scan tool.

Transmission malfunctions may be caused by these general conditions:

- Poor engine performance.
- Improper adjustments.
- Hydraulic malfunctions.
- Mechanical malfunctions.
- Electronic malfunctions.
- Transfer case performance (if equipped).

Diagnosis of these problems should always begin by checking the easily accessible variables: fluid level and condition, gearshift cable adjustment (if equipped) and transmission fault codes using the appropriate scan tool. Then perform a road test to determine if the problem has been corrected or if more diagnosis is necessary.

PRELIMINARY

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

VEHICLE IS DRIVABLE

1. Check for transmission fault codes using the appropriate scan tool.
2. Adjust gearshift cable if complaint was based on delayed, erratic, or harsh shifts.
3. Road test and note how transmission upshifts, downshifts, and engages.
4. Check fluid level and condition.

VEHICLE IS DISABLED

1. Check for broken or disconnected gearshift cable.
2. Check for cracked, leaking cooler lines, or loose or missing pressure-port plugs.
3. Check fluid level and condition.
4. Check shifter linkage: Is cable connected to lever at transmission and does the lever move with gear change on the console shifter ? If no movement, repair shift cable and or shifter.
5. With shifter in Park, attempt to rotate drive shaft(s) to ensure transmission output shaft coupler/flange is secure.
6. Check the transfer case operation (if equipped).
7. Raise and support vehicle on safety stands, start engine with transmission in Park position and allow to idle for several minutes, shift transmission into gear, and note following:
    1. If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
    2. If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged driveplate, converter, oil pump, or input shaft.
    3. If propeller shaft does not turn and transmission is not noisy, perform hydraulic-pressure test to determine if problem is hydraulic or mechanical.
8. Air pressure test the B1, K3, and B2 clutch circuits. Refer to **DIAGNOSIS AND TESTING**.
9. Check the TCM, Wiring, Valve body, and Solenoids (Utilize fault codes to diagnose if available).
10. Remove oil pan and check filter presence and condition (not plugged and seated).
11. If debris is found in the pan, tear down transmission and inspect all hard parts, Front Annulus Gear and Gear to Retainer and Input Shaft (Shaft to Retainer) etc., and clutches. If the hard parts did not show signs of damage replace the torque converter and filter.
12. Remove valve body, disassemble, and inspect Line Pressure Regulating valve for being stuck, clean and remove debris.
13. Check pump rotor for failed inner lugs that are driven by the T/C hub.

ROAD TESTING

Before road testing, be sure the fluid level and control cable adjustments have been checked and adjusted if necessary. Verify that all diagnostic trouble codes have been resolved.

Observe engine performance during the road test. A poorly tuned engine will not allow accurate analysis of transmission operation.

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

Slippage indicated by engine flare, usually means clutch, overrunning clutch, or line pressure problems.

A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch Application chart provides a basis for analyzing road test results. Refer to **CLUTCH APPLICATION**.

CLUTCH APPLICATION

GEAR	RATIO	B1	B2	B3	K1	K2	K3	F1	F2
1	3.59	X* (1)	X				X*(1)	X	X
2	2.19		X		X		X* (1)		X
3	1.41		X		X	X			
4	1.00				X	X	X		
5	0.83	X				X	X	X* (1)	
N	N/A	X					X		
R	3.16	X* (1)		X			X	X	
					R - Limp In	1.93	X	X	X
(1) * = The shift components required during coast.									

AUTOMATIC TRANSMISSION

CONDITION	POSSIBLE CAUSES	CORRECTION
Harsh N-D Engagement or Harsh N-R Engagement	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Transmission in limp-home mode.	2. Check TCM for DTCs. Repair as needed.
	3. Driveline lash/movement.	3. Check engine mounts, transmission mount, driveshaft couplings, rear crossmember mounts, axle mounts and axle lash.

	4. Converter clutch or lock up control valve malfunction.	4. Perform converter clutch diagnostics test. Inspect valve body for stuck or sticky lock up control valve. If valve motion is free, replace lock up solenoid and retest.
	5. Valve Body Malfunction.	5. Inspect valve body for stuck or sticky regulator valve.
	6. Clutch or planetary component damage.	6. Remove, disassemble and repair transmission as necessary.
	7. Water in Trans.	7.Perform TSB, recommend to split and clean VB if heavily contaminated.
DELAYED N-D OR N-R ENGAGEMENT	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Torque converter fluid drain back, delayed soft engagement.	2. If vehicle moves normally after 3 seconds of shifting into gear, no repair is necessary. If longer, inspect pump for worn bushing.
	3. Fluid Level Low.	3. Check and adjust fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
	4. Filter plugged.	4. Check TC out pressure, if < 10psi, check for plugged filter. Replace if needed.
	5. Filter damaged or missing, missing o-ring.	5. Check for damaged/missing filter or cut/missing o-ring.
	6. Valve Body Malfunction.	6. Inspect valve body for stuck/ sticky regulator valve or shift group valves.
	7. Oil pump gears worn/damaged.	7. Inspect pump for damage or excessive clearances. Replace if needed.
NO DRIVE OR REVERSE ENGAGEMENT (vehicle will not move)	1. Misadjusted/damaged shift cable.	1. Inspect shift system. Adjust and/or replace worn/damaged parts.

	2. Fluid level low.	2. Check and adjust fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
	3. Filter plugged.	3. Check TC out pressure, if < 10psi, check for plugged filter. Replace if needed.
	4. Filter damaged or missing, missing filter o-ring.	4. Check for damaged/missing filter or cut/missing o-ring.
	5 Hydraulic system-Low/no line pressure.	5. Remove Electrohydraulic Unit. Inspect or sticky/stuck regulator valve. If valve motion is free, replace line pressure solenoid and retest. If condition still exists check for worn/damaged pump. Replace pump assembly if needed.
	6. TCM in Limp Mode	6. Clear codes and reset.
	7. Stuck Pressure Regulator Valve	7. Split Electrohydraulic Unit t and inspect pressure regulator valve. Remove debris if present. Be certain all shift valves are free, if any valve can't be freed replace Electrohydraulic Unit.
	8. Broken Weld at Front Annulus	8. Replace Hard Parts as Necessary.
	9. Broken Input Shaft Weld	9. Replace Hard Parts as Necessary.
	10. Defective T/C	10. Replace T/C, make sure filter is not clogged.
	11. Broken Output Shaft Weld	11. Replace parts as necessary
	12. Broken/Missing Rear Annulus Weld.	12. Replace parts as necessary.
	13. Unseated Rear Annulus Gear snap ring.	13. Properly install or replace snap ring.
	14. Valves not returned to their home position.	14. Split Electrohydraulic Unit and inspect 3-4 command valve as well as all other valves, being certain they move freely and are free of debris.

SHUDDER GARAGE SHIFT R-D OR D-R	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Customer applying throttle while shift is in progress.	2. Instruct customer to wait until shift is complete prior to applying throttle.
HARSH ROLLING GARAGE SHIFT R-D OR D-R	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Customer shifting into desired range with vehicle motion.	2. Instruct customer to only shift into the desired range with the vehicle stopped and the service brake applied.
	3. Transmission in limp-home mode.	3. Check TCM for DTCs. Repair as needed.
ENGINE STALLS	1. TCC Solenoid Wire in Harness.	1. Inspect for and repair any short, ground, or open.
	2. TCC Solenoid Defective, Bent Terminals or Debris Shorting Terminals.	2. Check for codes. Refer to appropriate diagnostic information .
	3. Debris sticking the TCC Solenoid Open.	3. Remove the TCC Solenoid and try to blow air through it. No air should flow. If air flows freely, replace the TCC Solenoid.
	4. TCC LU Control Valve Stuck.	4. Split the Electrohydraulic Unit and inspect the TCC LU valve for any debris. Remove debris if present. If valve can't be freed replace Electrohydraulic Unit.
ENGINE STALLS WHEN TRANSMISSION IS SHIFTED INTO R OR D.	1. Converter clutch or lock up control valve malfunction.	1. Perform converter clutch diagnostics test. Inspect valve body for stuck or sticky lock up control valve. If valve motion is free, replace lock up solenoid and retest.
	2. Defective torque converter.	2. Replace torque converter.

CLUNK/CLICK NOISE DURING GARAGE SHIFT FROM R-D OR D-R	1. Stick-slip condition between output flange and output shaft nut upon torque reversal from R to D or D to R. Click on first launch.	1. Replace output flange and nut.
HARSH UPSHIFT OR DOWNSHIFT	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Electrohydraulic Unit malfunction.	2. Inspect valve body for sticky/stuck valves. Repair as needed. If valve motion is free, replace shift pressure solenoid and line pressure solenoid and retest.
	3. Damaged or misbuilt clutch.	3. Remove, disassemble and repair transmission as needed.
EMCC SHUDDER AND/OR ROUGH SHIFTs	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Fluid condition, contamination or wrong type.	2. Change fluid per service information procedures. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
	3. Electrohydraulic Unit malfunction.	3. Remove Electrohydraulic Unit. Inspect for sticky/stuck lock up control valve. If valve motion is free, replace the lock up solenoid and retest.
	4. Defective torque converter.	4. Replace torque converter.
GRATING OR SCRAPING NOISE PROPORTIONAL TO ENGINE SPEED	1. Torque converter bolts contacting dust shield.	1. Dust shield bent. Replace if needed. Torque converter bolt backed out. Replace with new bolt and torque to proper level.
	2. Damaged/broken drive plate.	2. Inspect driveplate. Replace if needed.
GRATING OR SCRAPING		1. Check driveshaft, center

NOISE PROPORTIONAL TO TRANSMISSION OUTPUT SPEED	1. Driveshaft or rear axle noise.	bearing and axle for noise or contact with other components.
	2. Transmission output bearing noise.	2. Replace output bearing and retest.
	3. Internal transmission damage.	3. Remove, disassemble and repair transmission as needed.
HIGH PITCHED WHINE/NOISE RELATED TO ENGINE SPEED	1. Fluid level low.	1. Check and adjust fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
	2. Transmission in limp-home mode.	2. Check TCM for DTCs. Repair as needed.
	3. Filter plugged.	3. Check TC out pressure, if < 10psi, check for plugged filter. Replace if needed.
	4. Filter damaged or missing.	4. Check for damaged/missing filter or cut/missing o-ring.
	5. Oil pump bushing worn/ damaged.	5. Visually inspect for worn or damaged pump bushing. Replace pump assembly if needed.
	6. Oil pump gears worn/ damaged.	6. Inspect for worn or damaged pump gears. Replace pump assembly if needed.
NOISE ONLY IN 1ST OR 5TH GEAR	1. Broken Tab on K1/K2 Thrust bearing.	1. Replace K1/K2 Thrust bearing.
FLARES ON THE 1 - 2 SHIFT	1. Failed F1 ORC. Refer to **AIR CHECKING TRANSMISSION CLUTCH OPERATION** .	1. Replace F1 ORC, B1 Retainer and K1 Retainer.
	2. Stuck 1-2 / 4-5 valve.	2. Split Electrohydraulic Unit and inspect 1-2/4-5 valves. Remove debris if present. If valve can't be freed replace Electrohydraulic Unit.
BUMPSHIFT ON 2-1 DOWNSHIFT	1. K1 belleville retainer snap ring.	1. K1 Belleville retainer snap rings may become unseated. Disassemble trans and re-seat snap ring. Verify there are no stuck 1-2/4-5 shift valves in the Electrohydaulic unit prior to removing the trans.

FLARES ON THE 2-3 SHIFT	1.K2 Piston Bottomed Out.	1. Replace Input Shaft Assembly. This issue can be verified by making immediate repeated shifts between 2nd and 3rd. If the flare is eliminated on subsequent shifts to 3rd, It is likely that this is the issue.
	2. Failed F2 ORC. Refer to **AIR CHECKING TRANSMISSION CLUTCH OPERATION** .	2. Replace F2 ORC, Rear Sun Gear and Front Sun Gear
	3. Stuck 2-3 Valves.	3. Split Electrohydraulic Unit and inspect 2-3 valves. Remove debris if present. If valve can't be freed replace Electrohydraulic Unit.
	4. K2 Clutch Slipping.	4. Inspect and if damaged replace K2 Clutch Discs and Seals.
	5. 2-3 Shift Pressure Valve Spring Deformed.	5. It is possible that when the steel cover plate was screwed to the Electrohydraulic Unit, the spring was pinched thus deforming the bore and sticking the valve. Remove the Electrohydraulic Unit and remove the steel plate covering the 2-3 shift pressure valve. If the valve can't be freely removed from the bore, the spring was pinched and the Electrohydraulic Unit requires replacement.
	6. B1 bushing missing.	6. Replace B1 retainer and input shaft.
SLIPS ON 2-3 UPSHIFT	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Fluid level low.	2. Check and adjust fluid level. Refer to **FLUID AND**

		FILTER, STANDARD PROCEDURE.
	3. Filter damaged or missing.	3. Check for damaged/missing filter or cut/missing o-ring.
	4. Valve body malfunction.	4. Check for sticky/stuck 2-3 shift pressure valve or regulator valve.
	5. F2 or B2 clutch damaged.	5. Disassemble transmission, inspect for damaged F2 or B2 clutch. Repair as needed.
FLARE OR NEUTRALS ON THE 3-4 / 4-3 SHIFT	1. Debris sticking the 3-4 Holding Valve	1. Split Electrohydraulic Unit and remove the 3-4 Shift Pressure and 3-4 Holding Valves. Flush the valves and bores with a solvent such as mineral spirits. (Note: Debris can be a very small sliver unnoticable unless flushing onto filter paper.) Only if the valve can not be freed should the Electrohydraulic Unit be replaced.
	2. Debris Sticking the 3-4 Shift Pressure Valve	2. Split Electrohydraulic Unit and remove the 3-4 Shift Pressure and 3-4 Holding Valves. Flush the valves and bores with a solvent such as mineral spirits. (Note: Debris can be a very small sliver unnoticable unless flushing onto filter paper.) Only if the valve can not be freed should the Electrohydraulic Unit be replaced.
	3. Two Plastic Check Balls in one pocket.	3. Split the Electrohydraulic Unit and inspect and verify that there is only one plastic check ball in each of the 4 pockets. If there are two in any pocket, remove one and re-assemble.
		1. Disassemble the transmission, remove the pump and gears from the

SLIPS, BANGS INTO GEAR, DELAYED ENGAGEMENT, VENT TUBE LEAK	1. Casting Void in the Bell Housing.	bell housing. Inspect the pump gear face in the bell housing for a 3/16" diameter void between the pump suction and drainback circuits. If void is present, replace the bell housing.
SLIPS ON 3-4 UPSHIFT	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Fluid level low.	2. Check and adjust fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
	3. Filter damaged or missing.	3. Check for damaged/missing filter or cut/missing o-ring.
	4. Valve body malfunction.	4. Check for sticky/stuck 3 - 4 shift pressure valve or regulator valve.
	5. K3 or B2 clutch damaged.	5. Disassemble transmission, inspect for damaged K3 or B2 clutch. Repair as needed.
SLIPS ON 4-5 UPSHIFT	1. Transmission adaptation/ calibration.	1. Check for latest level TCM software. Perform the TCM adaptation procedure. Refer to **MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE** .
	2. Fluid level low.	2. Check and adjust fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
	3. Filter damaged or missing.	3. Check for damaged/missing filter or cut/missing o-ring.
	4. Electrohydraulic Unit malfunction.	4. Check for sticky/stuck 1 - 2/4- 5 shift pressure valve or regulator valve.
		5. Disassemble

	5. B1 or K1 clutch damaged.	transmission, inspect for damaged B1 or K1 clutch. Repair as needed.
IN-GEAR SHUDDER ON HEAVY ACCELERATION	1. Fluid level low.	1. Check and adjust fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
	2. Filter damaged or missing.	2. Check for damaged/missing filter or cut/missing o-ring.
NO DRIVE ENGAGEMENT FOLLOWING A SHIFT TO N	1. Customer shifting into N at vehicle speeds greater than 25 mph and tipping in on the throttle.	1. Instruct the customer that they should not shift into N at vehicle speeds greater 25 mph.
	2. Shift system malfunction.	2. Inspect shift system for proper adjustment or damage. Check shifter for DTCs. Repair as needed.
REVERSE GEAR POSITION BLOCKED ENGAGEMENT WHEN MOVING SHIFT LEVER FROM D POSITION	1. Customer shifting into R at vehicle speeds greater than 7 mph.	1. Instruct customer that R shifter position is blocked at vehicle speeds greater than 7 mph.
	2. Shift system malfunction.	2. Inspect shift system for proper adjustment or damage. Check shifter for DTCs. Repair as needed.
NO ENGINE CRANKING IN P OR N	1. Gearshift cable adjustment.	1. Adjust shift cable and retest.
	2. Shift system malfunction.	2. Check shifter DTCs. Inspect shift cable and lever assembly. Adjust and/or replace worn/ damaged parts.
	3. Valve body malfunction.	3. Starter lockout contact malfunction. Remove valve body, replace lead frame assembly. Refer to **CONTACT, TEMPERATURE SENSOR\PARK-NEUTRAL, OPERATION**.
INCORRECT TRANSMISSION TEMPERATURE	1. Defective Trans Temp Sensor.	1. Verify proper temperature sensor operation.
	1. Loose/Corroded TCM Connector	1. Disconnect, inspect, and reconnect TCM connector.

SPEED SENSOR ERROR	(Both C1 and C2 Connectors).	Make sure to check for any pushed out pins.
	2. Unlatched Electrohydraulic Unit connector.	2. Remove the Electrohydraulic Unit connector and inspect for any oil or damaged pins. (Note: There is no Electrohydraulic Unit connector pin in position #5) Re-attach the connector and insure that the locking ring tab is fully latched.
	3. Wires Shorted or Open.	3. Ohm the speed sensor wires to make sure there is not a short to another circuit or ground. Visually inspect for any chafing of the wires. Repair as necessary.
	4. TCM Defective.	4. After checking the wiring and connectors replace the TCM.
FLUID LEAK	1. Leak in area of bell housing.	1. Check bolt torque on internal bell housing bolts. If loose, replace fastener and torque to proper level. If bolts are to proper torque level, check pump outer seal and impeller seal. Replace if needed.
	2. Leak in area of control unit (valve body) electrical connector.	2. Check connector for damaged (cut), flattened or missing o-rings. Replace as needed.
	3. Leak in area of pan gasket.	3. Check for proper torque on oil pan clamps. Check for mis-positioned or rolled gasket. Repair as needed.
	4. Leak in area of park guide plug.	4. Remove park guide plug. Check for damaged (cut) or missing o-ring. If o-ring is in good condition, install new plug.
	5. Leak in area of shift lever.	5. Check for damaged shift lever seal or damaged lever. Repair as needed.
		6. Check for worn/damaged

	6. Leak in area of output flange.	slinger seal and output seal. Visually inspect output flange seal surface for damage. Repair as needed.
	7. Leak in area of transmission vent.	7. Check fluid level for overfill condition. Adjust as needed. If fluid level is within specification, ride check vehicle. Monitor transmission temperature. If high operating temperatures are observed, fluid may be contaminated or cooling system malfunctioning. Change fluid per service information procedures. if needed. Refer to **DIAGNOSIS AND TESTING** .
	8. Leak in area of transmission fill tube.	8. Inspect fill tube cap for proper installation. Inspect fill tube grommet between case and fill tube for leakage. Repair as needed.

AIR CHECKING TRANSMISSION CLUTCH OPERATION

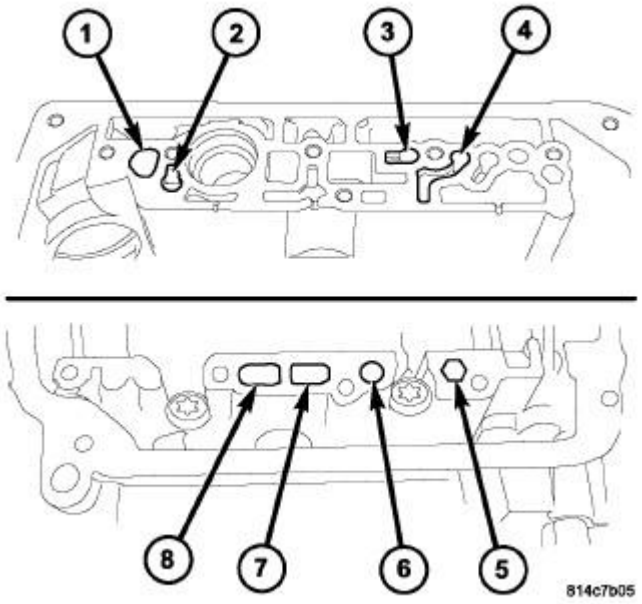


Fig. 26: Nag1 Clutch Application Ports
Courtesy of CHRYSLER GROUP, LLC

1 - K1 CLUTCH APPLY PORT
2 - B1 CLUTCH APPLY PORT
3 - K2 CLUTCH APPLY PORT
4 - TORQUE CONVERTER CLUTCH APPLY PORT
5 - B3 CLUTCH APPLY PORT
6 - B2 CLUTCH COUNTER-PRESSURE PORT
7 - K3 CLUTCH APPLY PORT
8 - B2 CLUTCH APPLY PORT

The ports (1 - 8), are the clutch apply passages.

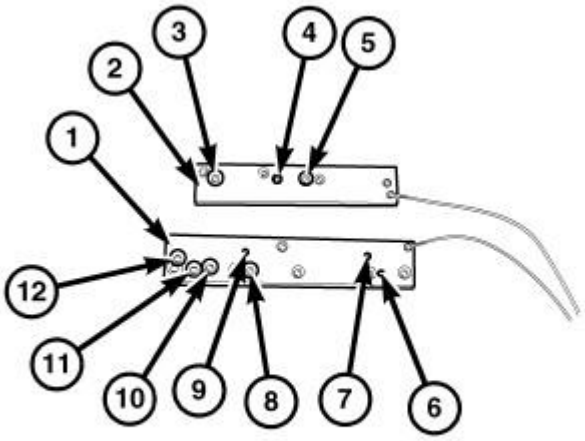


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Fig. 27: Nag1 Air Adapter Plates
Courtesy of CHRYSLER GROUP, LLC

1 - NAG1 AIR CHECK ADAPTER PLATE 10007 - 1 2 - NAG1 AIR CHECK ADAPTER PLATE 10007 - 2
3 - B3 CLUTCH PORT 4 - K3 CLUTCH PORT 5 - B2 CLUTCH PORT 6 - K1 CLUTCH PORT 7 - B1 CLUTCH PORT
8 - K2 CLUTCH PORT
9 - TORQUE CONVERTER CLUTCH LOCK - UP PORT

10 - TORQUE CONVERTER IN PORT
11 - COOLER OUT PORT
12 - TORQUE CONVERTER OUT PORT

When the adapter plates (special tool #10007, Plate, Air Pressure Test) (1&2) are placed over the ports, proper operation of the transmission clutches can be verified. Air-pressure testing can be used to check transmission clutch operation. The test can be conducted with the transmission either in the vehicle (where applicable) or on the work bench, as a final check.

Air-pressure testing requires that the oil pan and valve body be removed from the transmission.

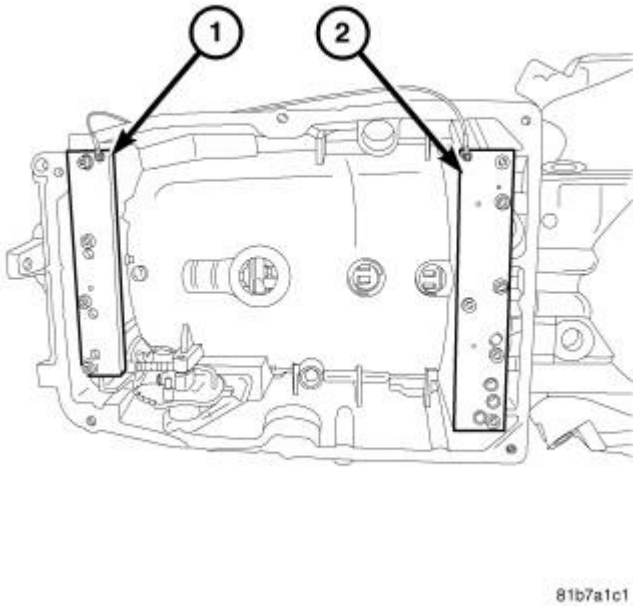

Fig. 28: Nag1 Transmission Adapter Plate
Courtesy of CHRYSLER GROUP, LLC

1 - AIR ADAPTER PLATE 10007 - 2
2 - AIR ADAPTER PLATE 10007 - 1

NOTE: The air supply which is used must be free of moisture and dirt. Use a pressure of 30 psi to test clutch operation.

NOTE: When checking the K1 clutch, air must pass through numerous passages to reach the clutch it's self, therefore only a slight application will be noted.

1. Remove the oil pan.
2. Remove the valve body (electrohydraulic unit). Refer to **UNIT, ELECTROHYDRAULIC CONTROL, REMOVAL**.
3. Using the existing valve body (electrohydraulic unit) mounting bolts attach the Air Adapter

Plates (special tool #10007, Plate, Air Pressure Test) (1&2). Tighten the bolt to 8 N.m (71 in. lbs.).

4. Apply 30 psi of air pressure to each port

If the clutch is functioning, a soft thump will be heard as the clutch is applied. The clutch application can also be felt by touching the appropriate element while applying air pressure. As the air pressure is released, the clutch should also release.

SPECIFICATIONS

SPECIFICATIONS

GEAR RATIOS

GEAR	RATIO
1ST	3.59:1
2ND	2.19:1
3RD	1.41:1
4TH	1.00:1
5TH	0.83:1
REVERSE	3.16:1

SPECIFICATIONS

COMPONENT		METRIC (mm)	INCH (in.)
Geartrain End-play		0.3-0.5	0.012-0.020
Geartrain End-play Shim		0.2, 0.3, 0.4, and 0.5	0.008, 0.012, 0.016, 0.020
Rear Planetary Gear Set End-play		0.15-0.6	0.006-0.024
Rear Planetary Gear Set Snap-rings		3.0, 3.4, and 3.7	0.118, 0.134, 0.146
B1 Clutch Clearance - Double Sided Friction Discs	2 Disc	2.3-2.7	0.091-0.106
	3 Disc	2.7-3.1	0.106-0.122
	4 Disc	3.0-3.4	0.118-0.134
B1 Clutch Clearance - Single Sided Friction Discs	4 Disc	2.2-2.6	0.087-0.102
	6 Disc	2.4-2.8	0.095-0.110
	8 Disc	2.6-3.0	0.102-0.118
B1 Clutch Snap-rings		2.6, 2.9, 3.2, 3.5, 3.8, and 4.1	0.102, 0.114, 0.126, 0.138, 0.150, 0.162
B2 Clutch Clearance	4 Disc	1.9-2.3	0.075-0.091
	5 Disc	2.0-2.4	0.079-0.095
B2 Clutch Snap-rings		2.9, 3.2, 3.5, 3.8, and 4.1	0.114, 0.126, 0.138, 0.150, 0.162
B3 Clutch Clearance		1.0-1.4	0.039-0.055
B3 Clutch Snap-rings		3.2, 3.5, 3.8, 4.1, 4.4, and 4.7	0.126, 0.138, 0.150, 0.162, 0.173, 0.185

K1 Clutch Clearance - Double Sided Friction Discs	3 Disc	2.7-3.1	0.106-0.122
	4 Disc	3.0-3.4	0.118-0.134
	5 Disc	3.3-3.7	0.13-0.146
	6 Disc	3.6-4.0	0.142-0.158
K1 Clutch Clearance - Single Sided Friction Discs	6 Disc	2.4-2.8	0.095-0.110
	8 Disc	2.6-3.0	0.102-0.118
	10 Disc	2.8-3.2	0.110-0.126
	12 Disc	2.9-3.3	0.114-0.130
K1 Clutch Snap-rings		2.6, 2.9, 3.2, 3.5, 3.8, and 4.1	0.102, 0.114, 0.126, 0.138, 0.150, 0.162
K2 Clutch Clearance	3 Disc	2.3-2.7	0.091-0.106
	4 Disc	2.4-2.8	0.095-0.110
	5 Disc	2.5-2.9	0.099-0.114
	6 Disc	2.7-3.1	0.106-0.122
K2 Clutch Snap-rings		2.3, 2.6, 2.9, 3.2, 3.5, and 3.8	0.091, 0.102, 0.114, 0.126, 0.138, 0.150
K3 Clutch Clearance - Double Sided Friction Discs	3 Disc	2.3-2.7	0.091-0.106
	4 Disc	2.4-2.8	0.095-0.110
	5 Disc	2.5-2.9	0.099-0.114
K3 Clutch Clearance - Single Sided Friction Discs	6 Disc	2.3-2.7	0.091-0.106
	8 Disc	2.4-2.8	0.095-0.110
	10 Disc	2.5-2.9	0.099-0.114
K3 Clutch Snap-rings		2.0, 2.3, 2.6, 2.9, 3.2, and 3.5	0.079, 0.091, 0.102, 0.114, 0.126, 0.138

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolt, B2 Clutch Carrier	16	-	141
Bolt, B1 Carrier to Converter Housing	10	-	88.5
Bolt, Oil Pump	20	-	177
Nut, Propeller Flange	200	147.5	-
Nut, 4X4 Adapter Shaft	200	147.5	-
Bolt, Clevis bracket to Crossmember	47	35	
Bolt, Crossmember to Frame	68	50	
Bolt, Electrohydraulic Unit	8	-	71
Bolt, Adapter Plug	2.5	-	22
Bolt, Rear Support to Transmission	47	35	

Bolt, Transmission Housing to Converter Housing	20	-	177
Bolt, Torque Converter Housing to Engine	39	29	
Bolt, Torque Converter Access Cover	11	8	
Bolt, transmission to Engine Oil Pan	39	29	
Bolts, 4X4 Adapter Housing	20	-	177
Bolts, Oil Pan	8	-	71
Screws, Valve Body/Housing Side Cover	4	-	35
Bolt, Shift Plate	8	-	71
Bolt, Solenoid Leaf Spring	8	-	71
Nut, Shifter Mechanism to Floor Pan	7	-	65
Bolt, Torque Converter	42	31	-
Bolt, Lower Fill Tube	12	-	105

SCHEMATICS AND DIAGRAMS

SCHEMATICS AND DIAGRAMS

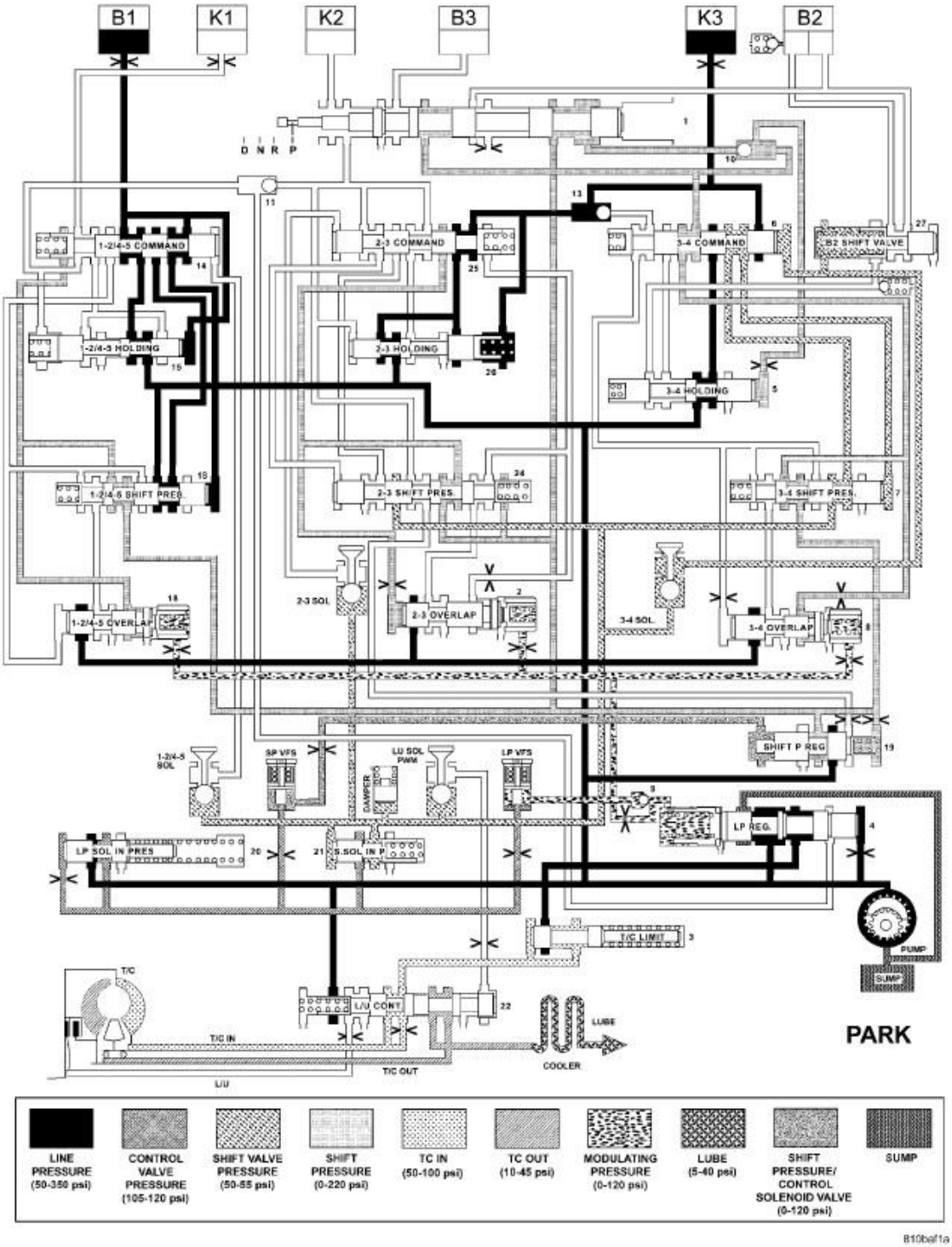

Fig. 29: Hydraulic Flow In Park
Courtesy of CHRYSLER GROUP, LLC

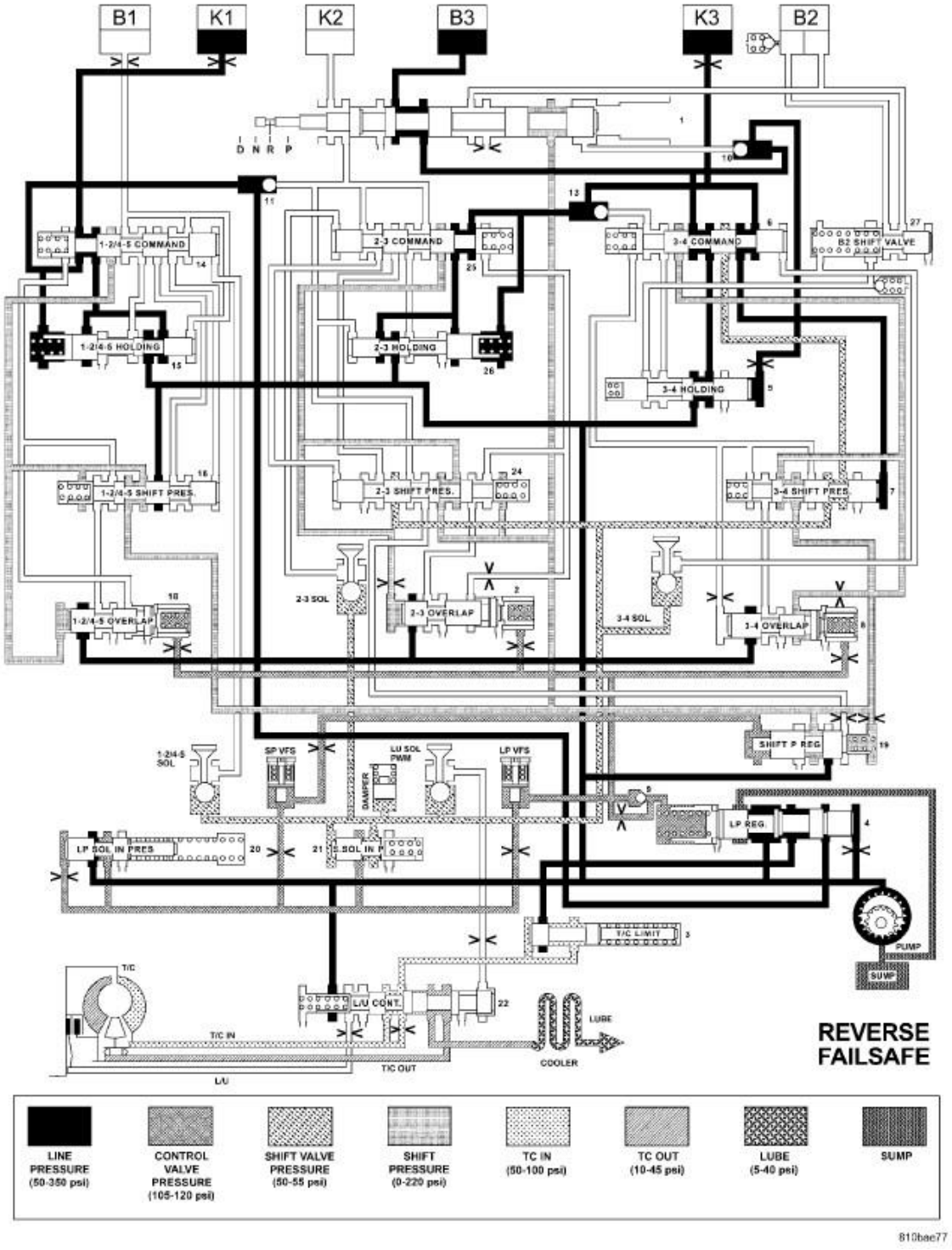

Fig. 30: Hydraulic Flow In Reverse - Failsafe
Courtesy of CHRYSLER GROUP, LLC

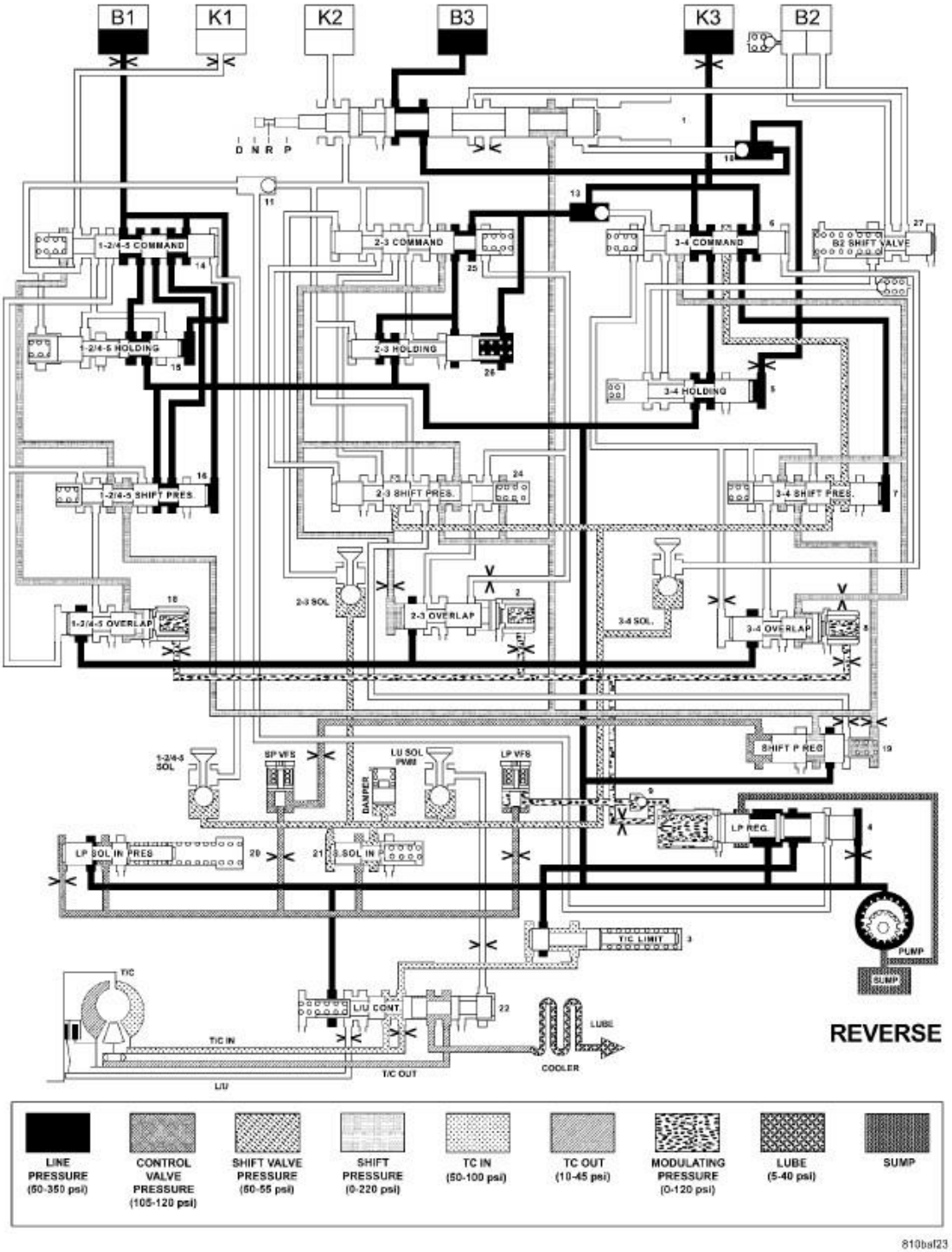

Fig. 31: Hydraulic Flow In Reverse
Courtesy of CHRYSLER GROUP, LLC

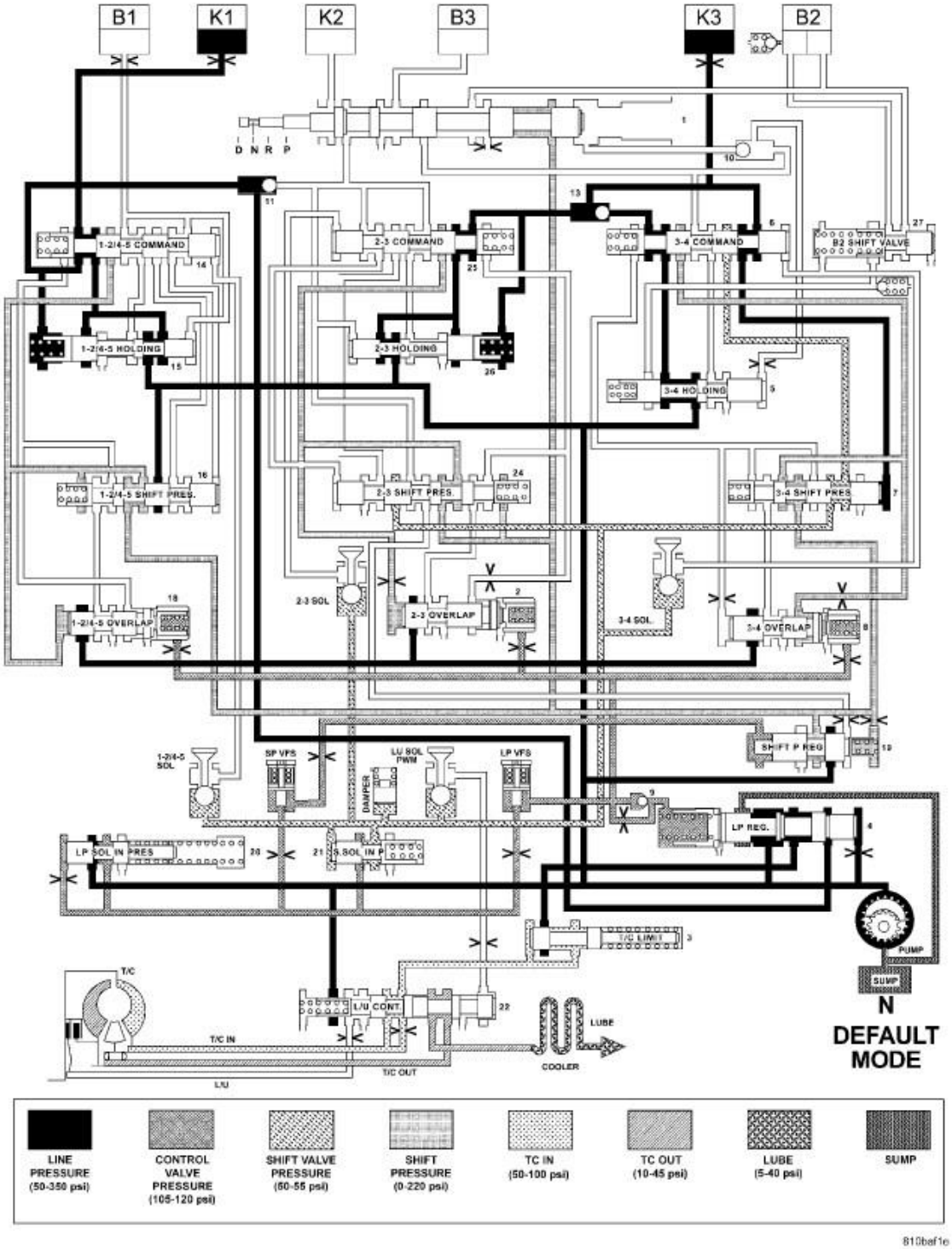

Fig. 32: Hydraulic Flow In Neutral - Default
Courtesy of CHRYSLER GROUP, LLC

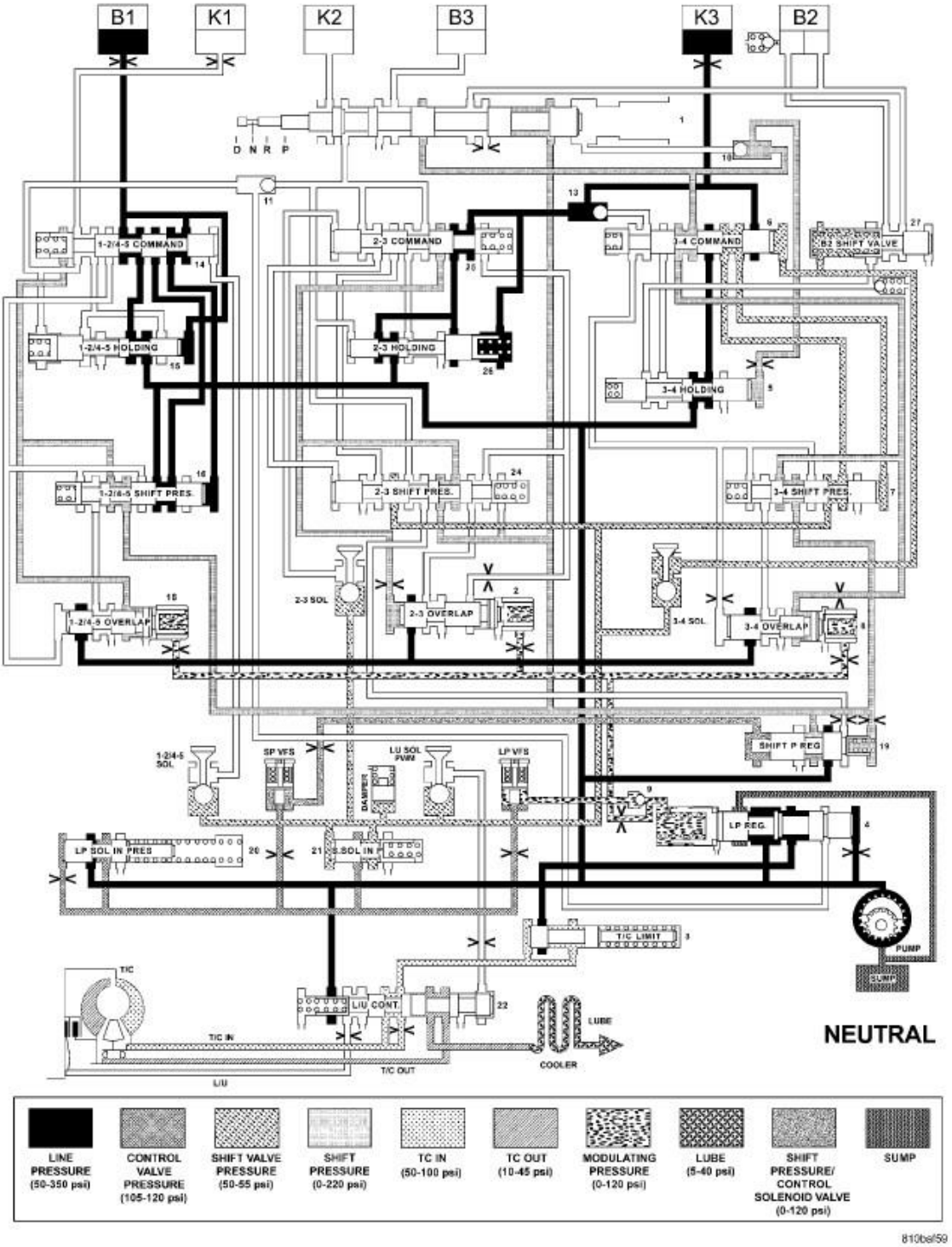

Fig. 33: Hydraulic Flow In Neutral
Courtesy of CHRYSLER GROUP, LLC

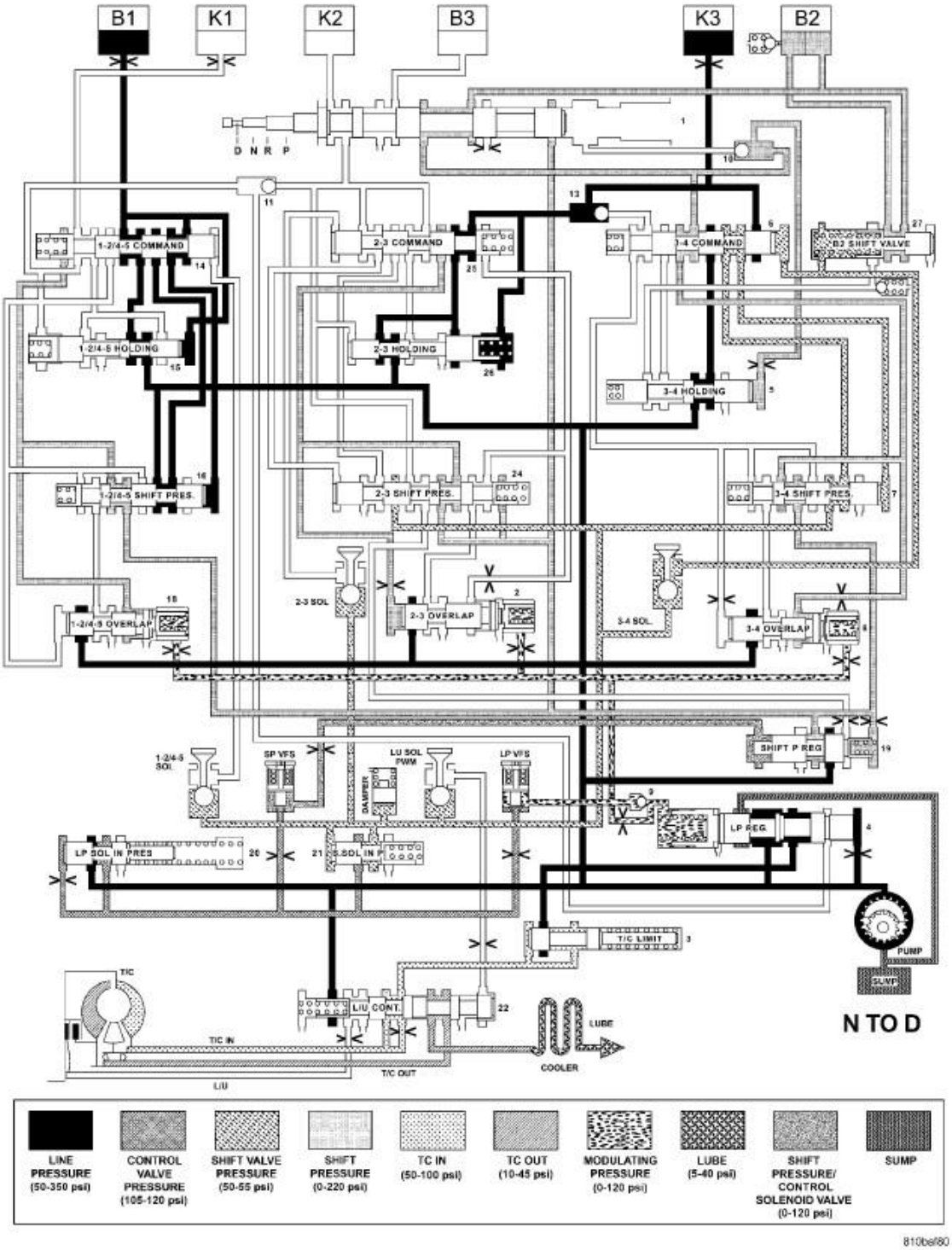

Fig. 34: Hydraulic Flow In Neutral To Drive Transition
Courtesy of CHRYSLER GROUP, LLC

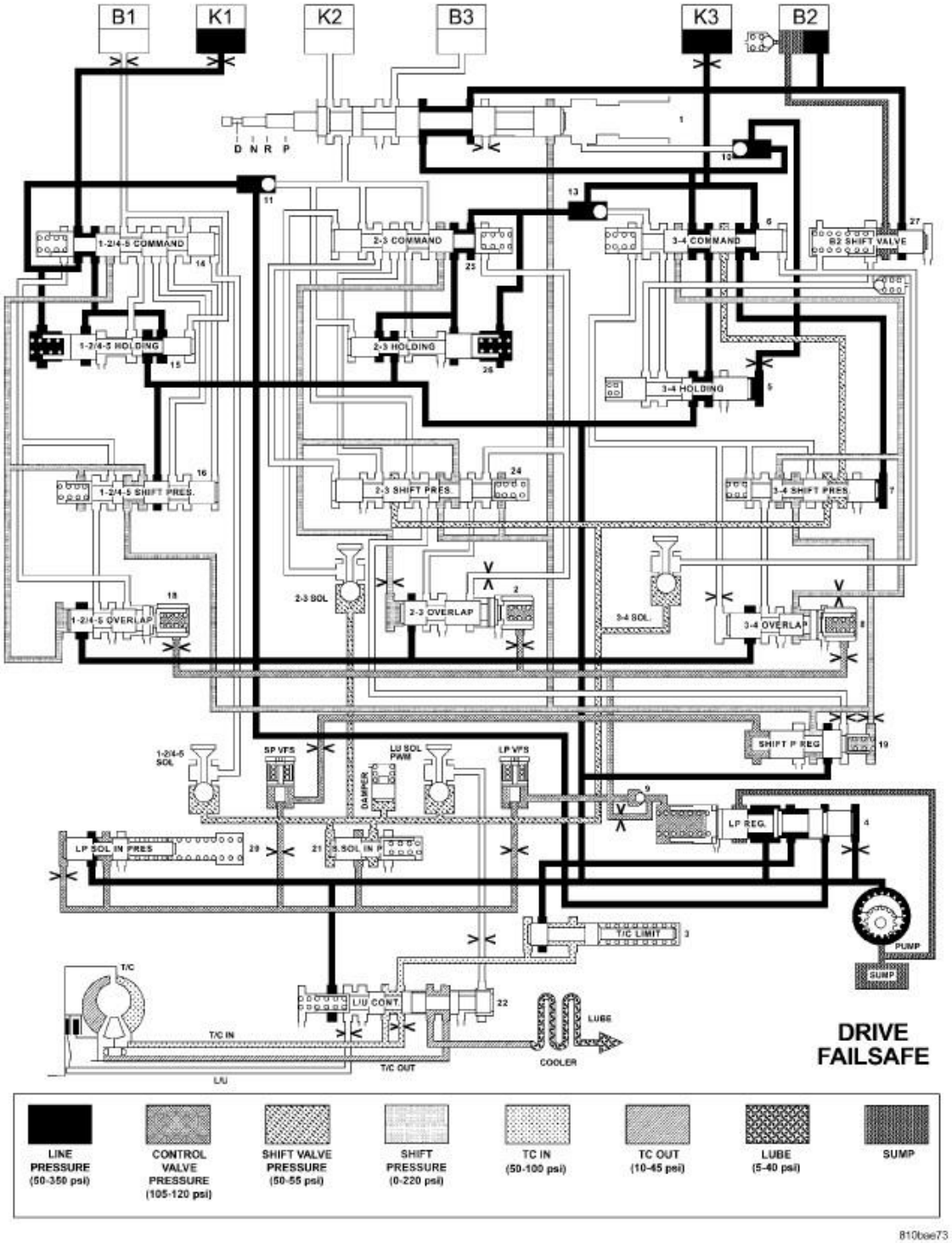

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Fig. 35: Hydraulic Flow In Drive - Failsafe
Courtesy of CHRYSLER GROUP, LLC

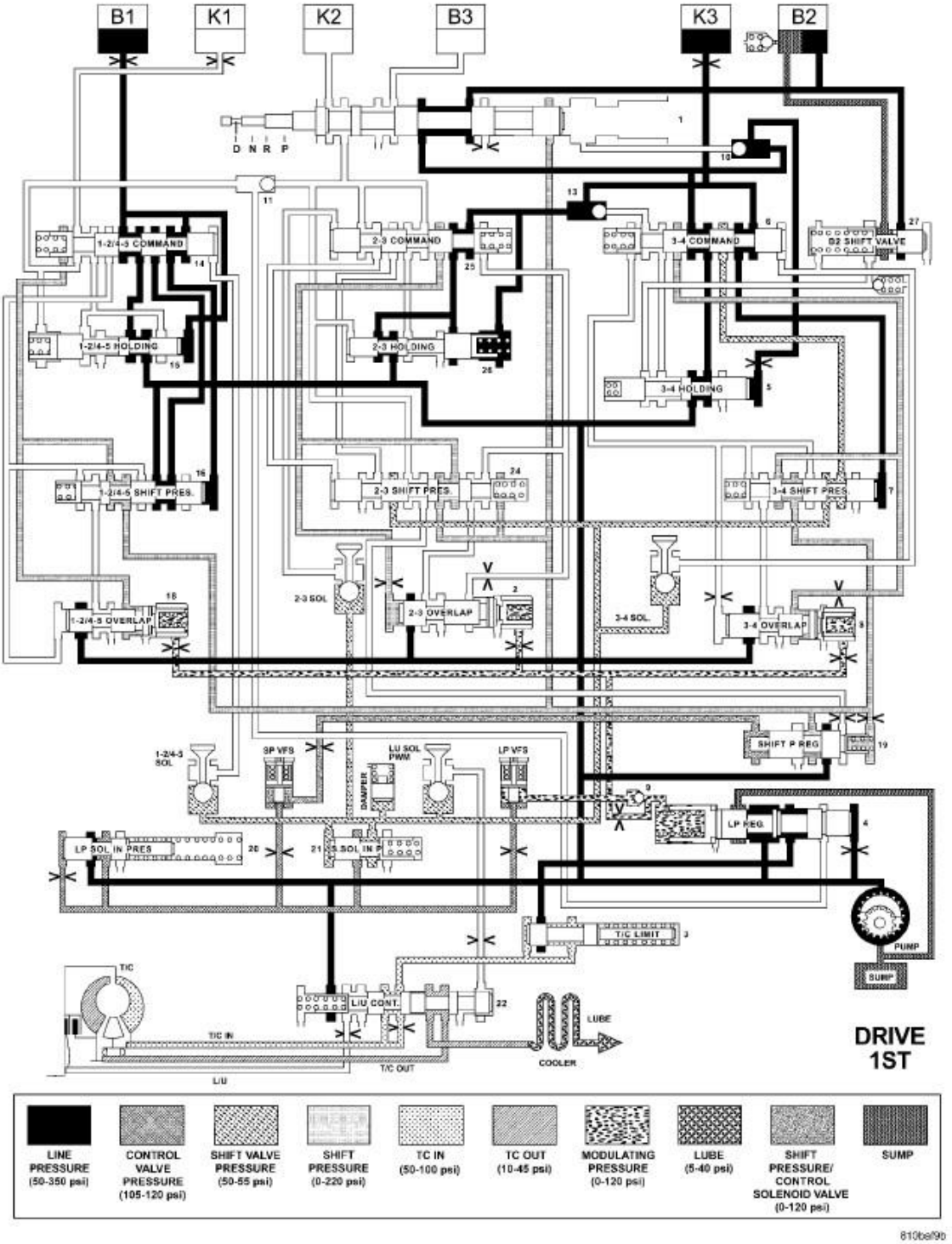

Fig. 36: Hydraulic Flow In Drive - First Gear
Courtesy of CHRYSLER GROUP, LLC

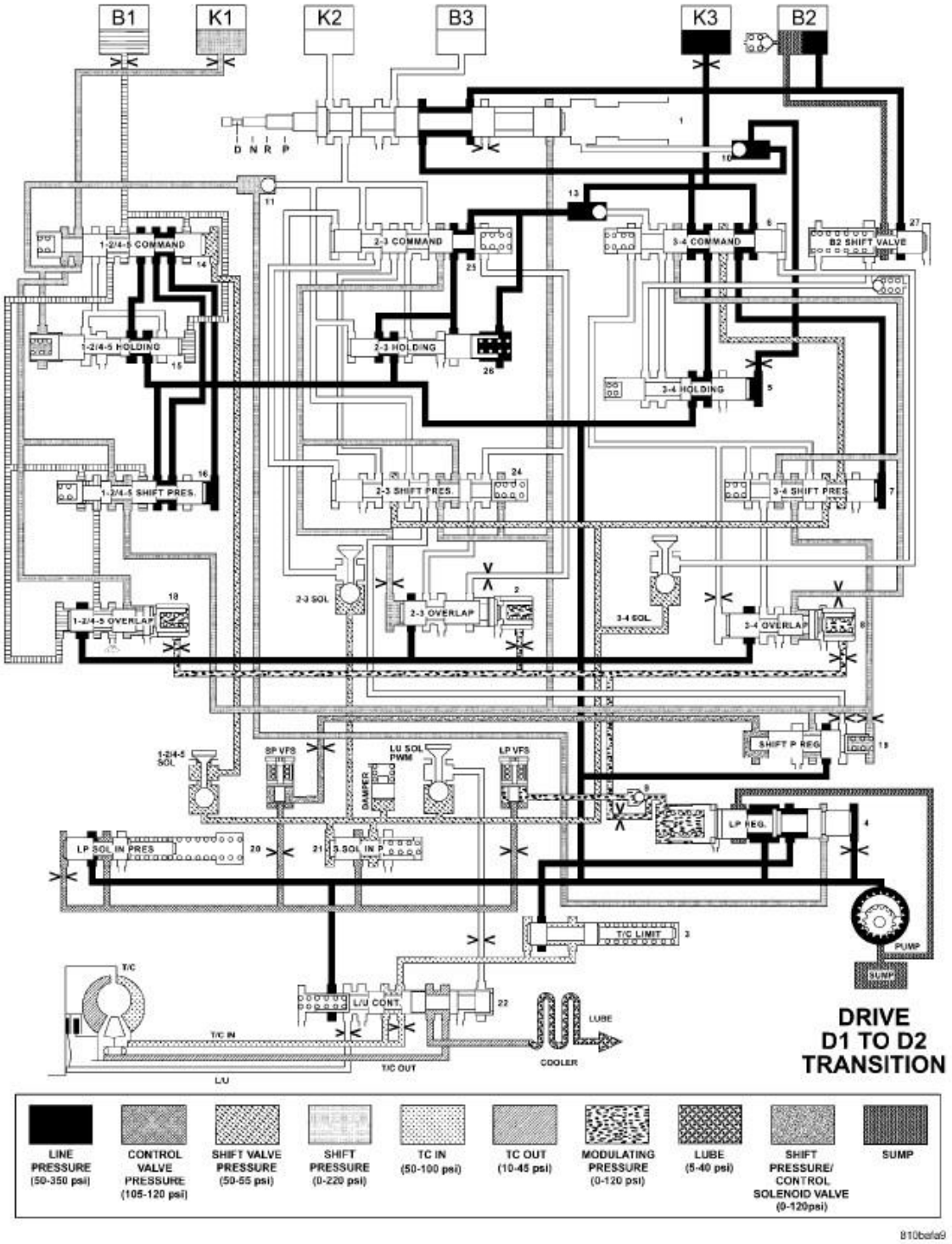

Fig. 37: Hydraulic Flow In Drive - First To Second Gear Transition
Courtesy of CHRYSLER GROUP, LLC

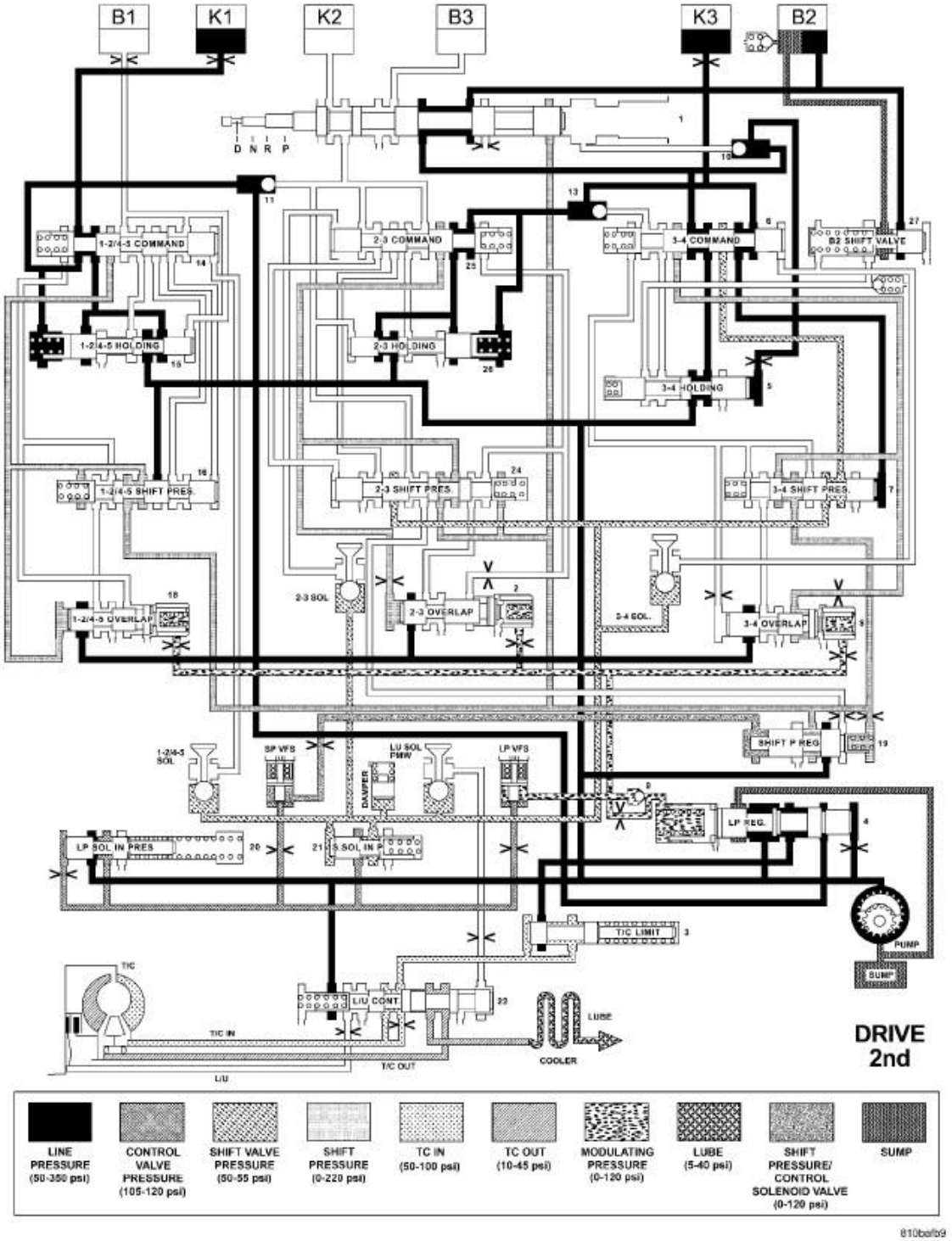

Fig. 38: Hydraulic Flow In Drive - Second Gear
Courtesy of CHRYSLER GROUP, LLC

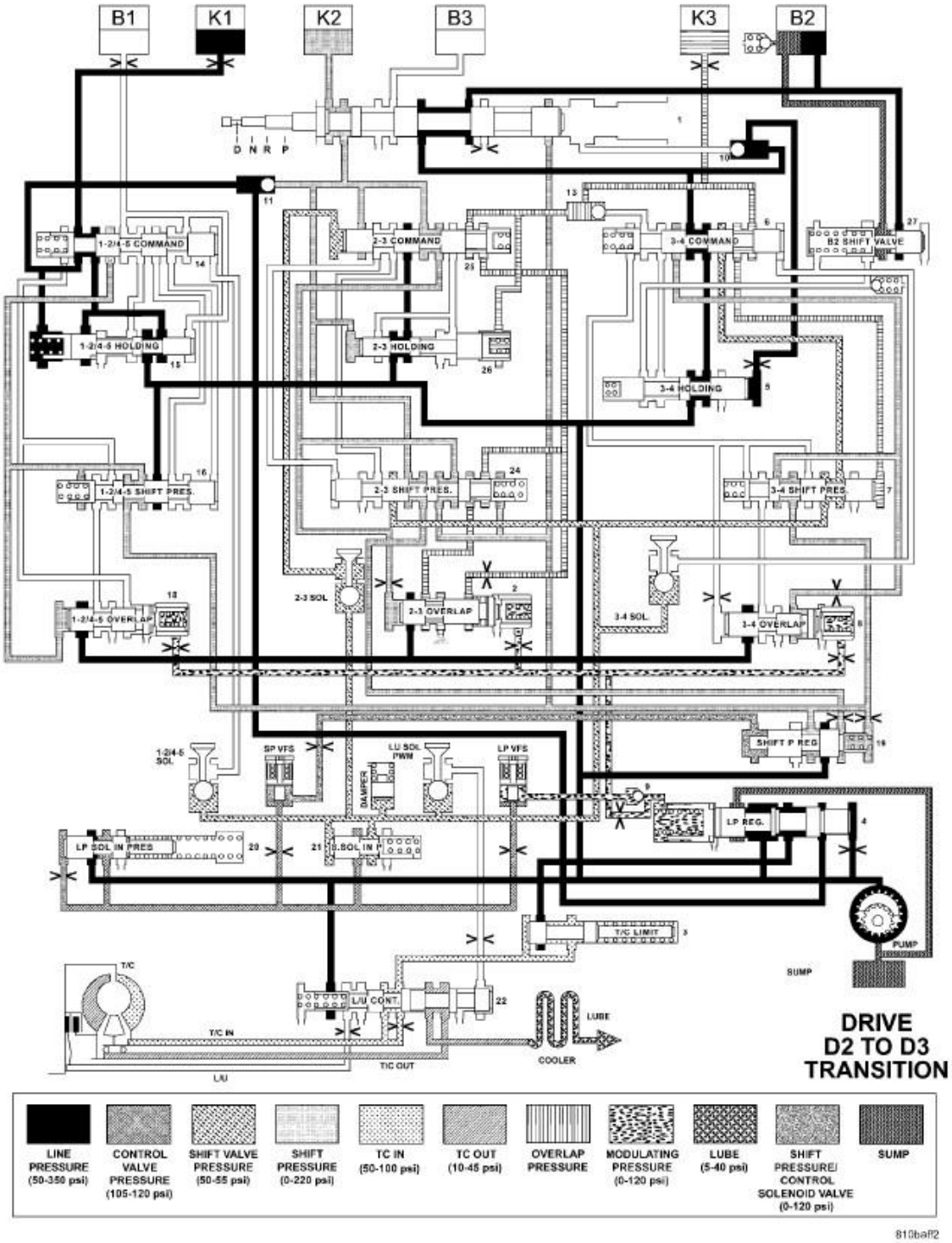

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Fig. 39: Hydraulic Flow In Drive - Second To Third Gear Transition
Courtesy of CHRYSLER GROUP, LLC

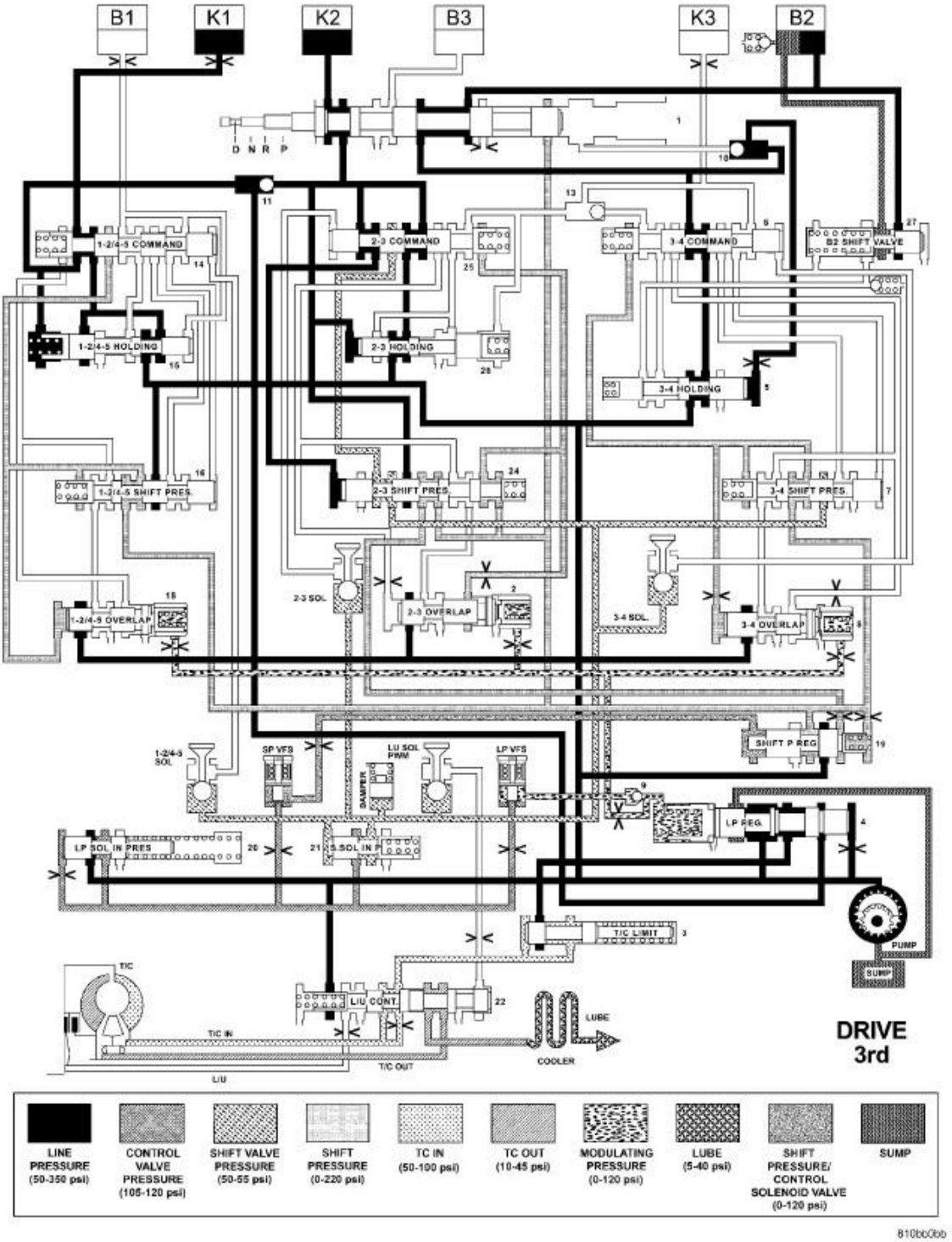

Fig. 40: Hydraulic Flow In Drive - Third Gear
Courtesy of CHRYSLER GROUP, LLC

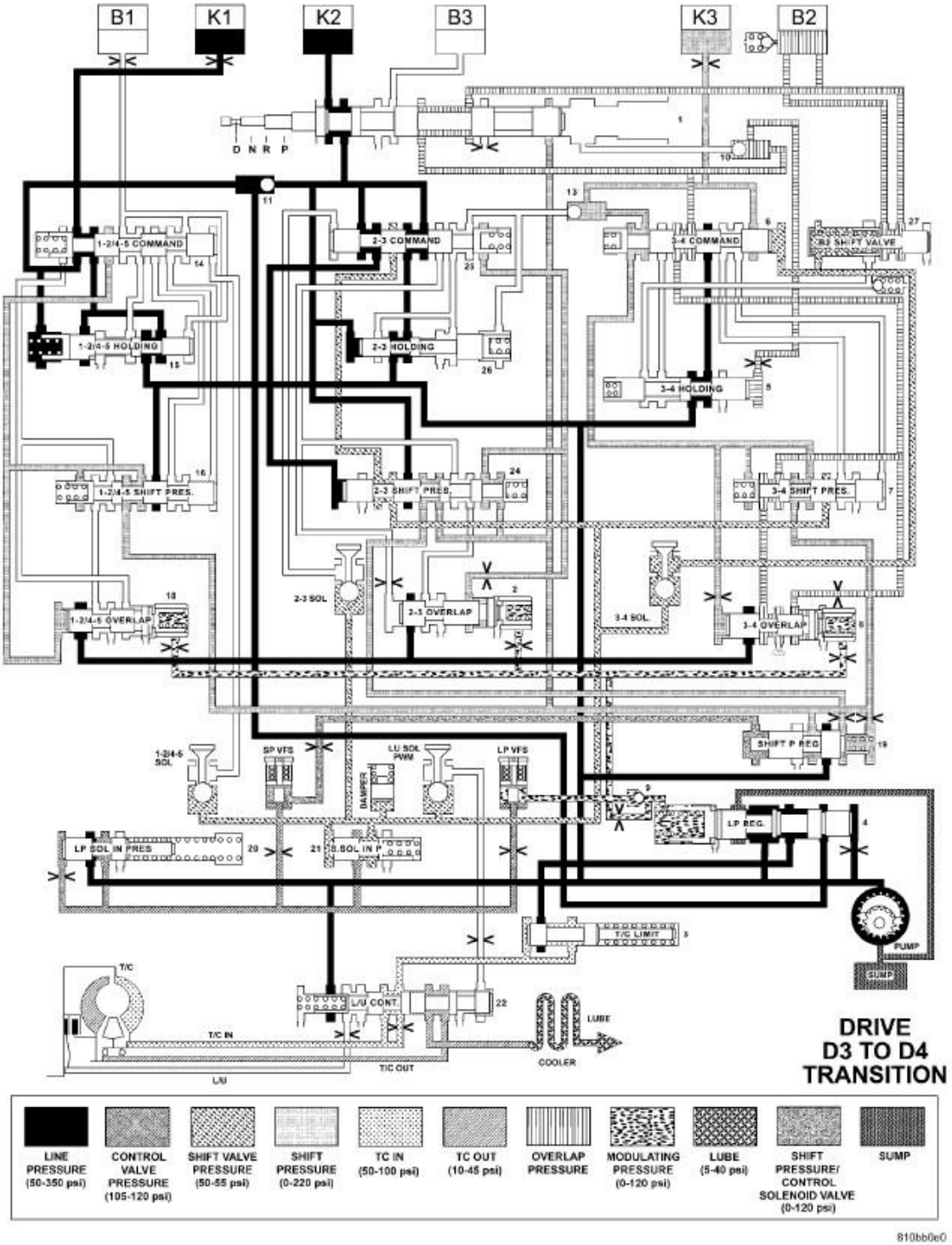

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Fig. 41: Hydraulic Flow In Drive - Third To Fourth Gear Transition
Courtesy of CHRYSLER GROUP, LLC

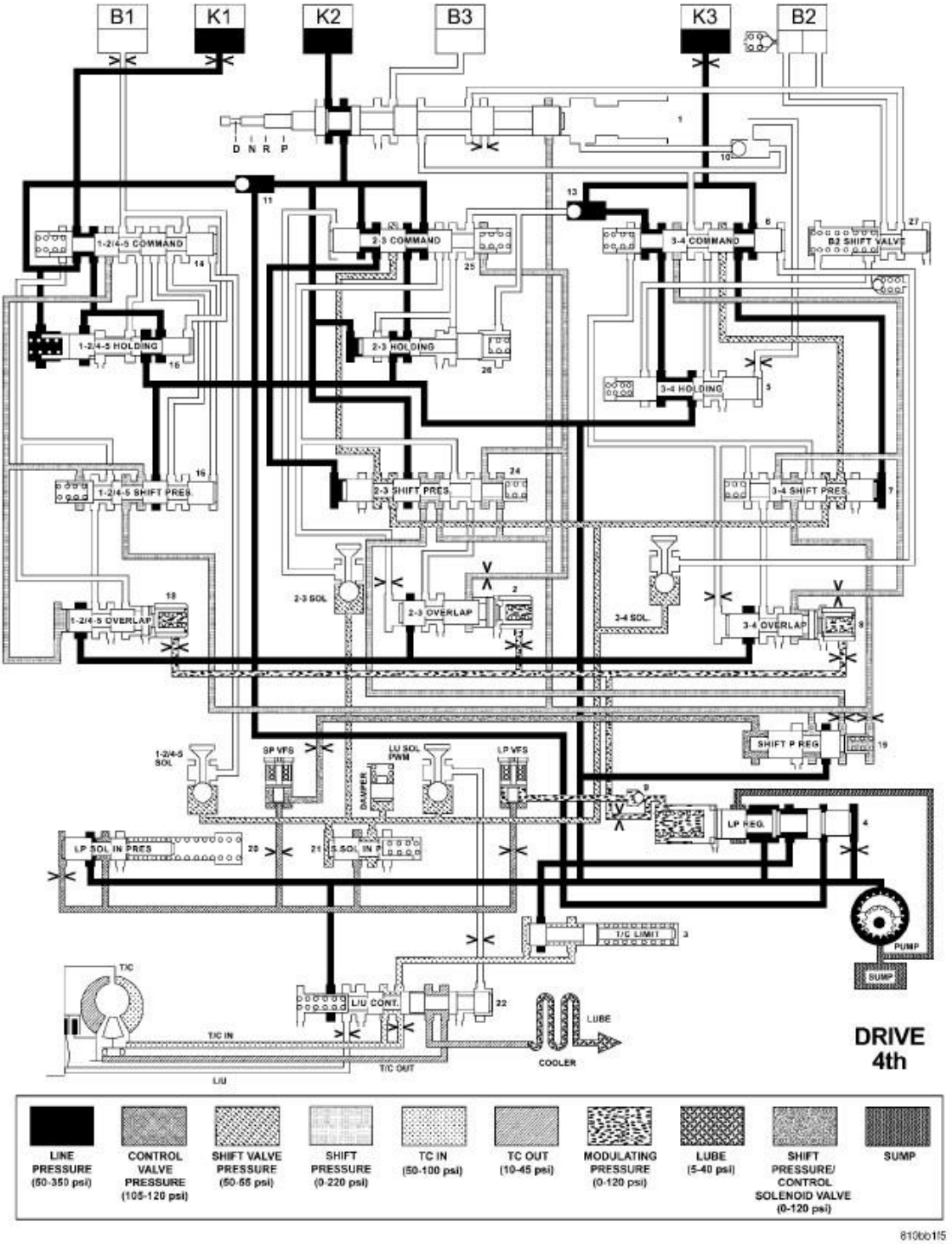

Fig. 42: Hydraulic Flow In Drive - Fourth Gear
Courtesy of CHRYSLER GROUP, LLC

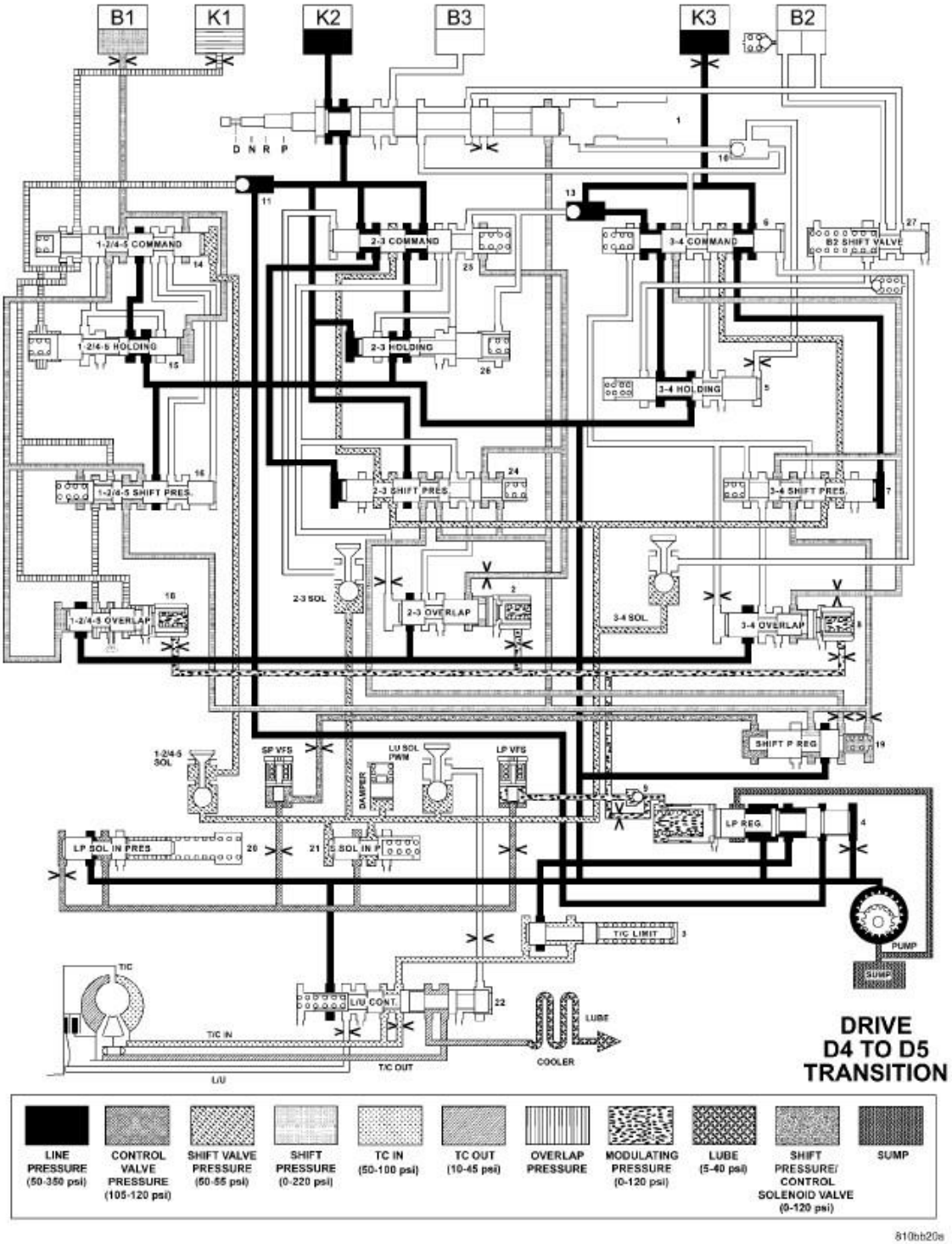

Fig. 43: Hydraulic Flow In Drive - Fourth To Fifth Gear Transition
Courtesy of CHRYSLER GROUP, LLC

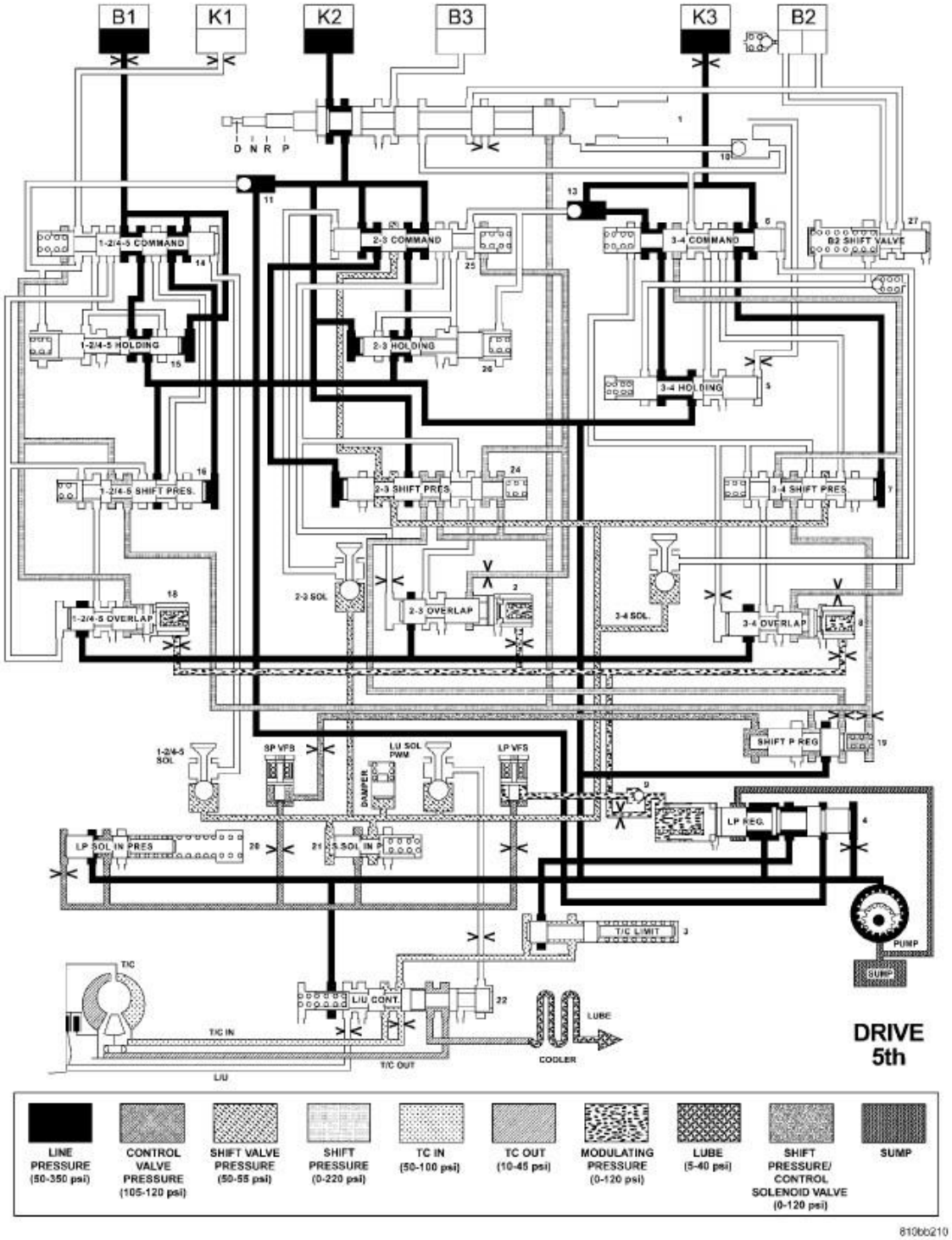

Fig. 44: Hydraulic Flow In Drive - Fifth Gear
Courtesy of CHRYSLER GROUP, LLC

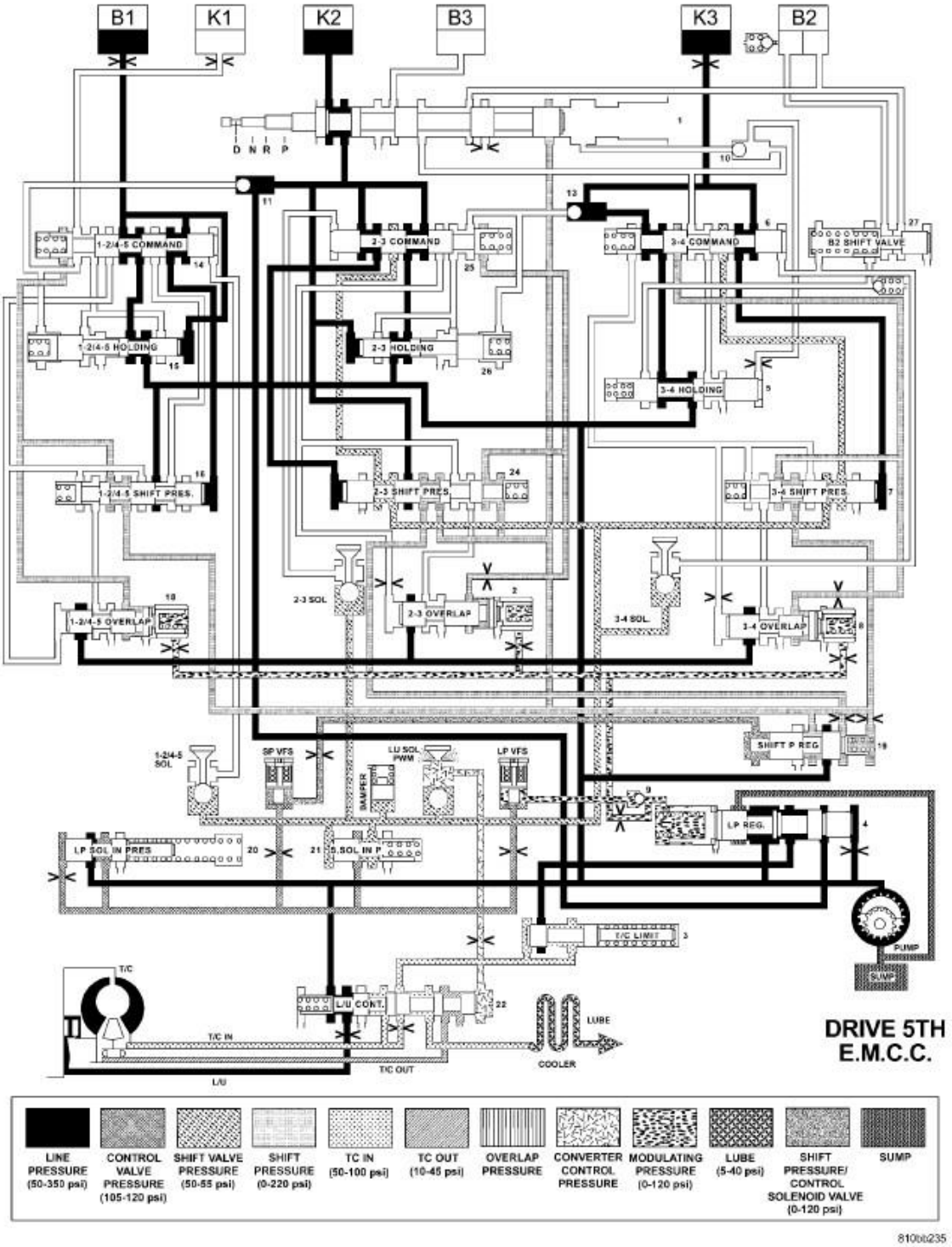

Fig. 45: Hydraulic Flow In Drive - Fifth Gear - EMCC
Courtesy of CHRYSLER GROUP, LLC

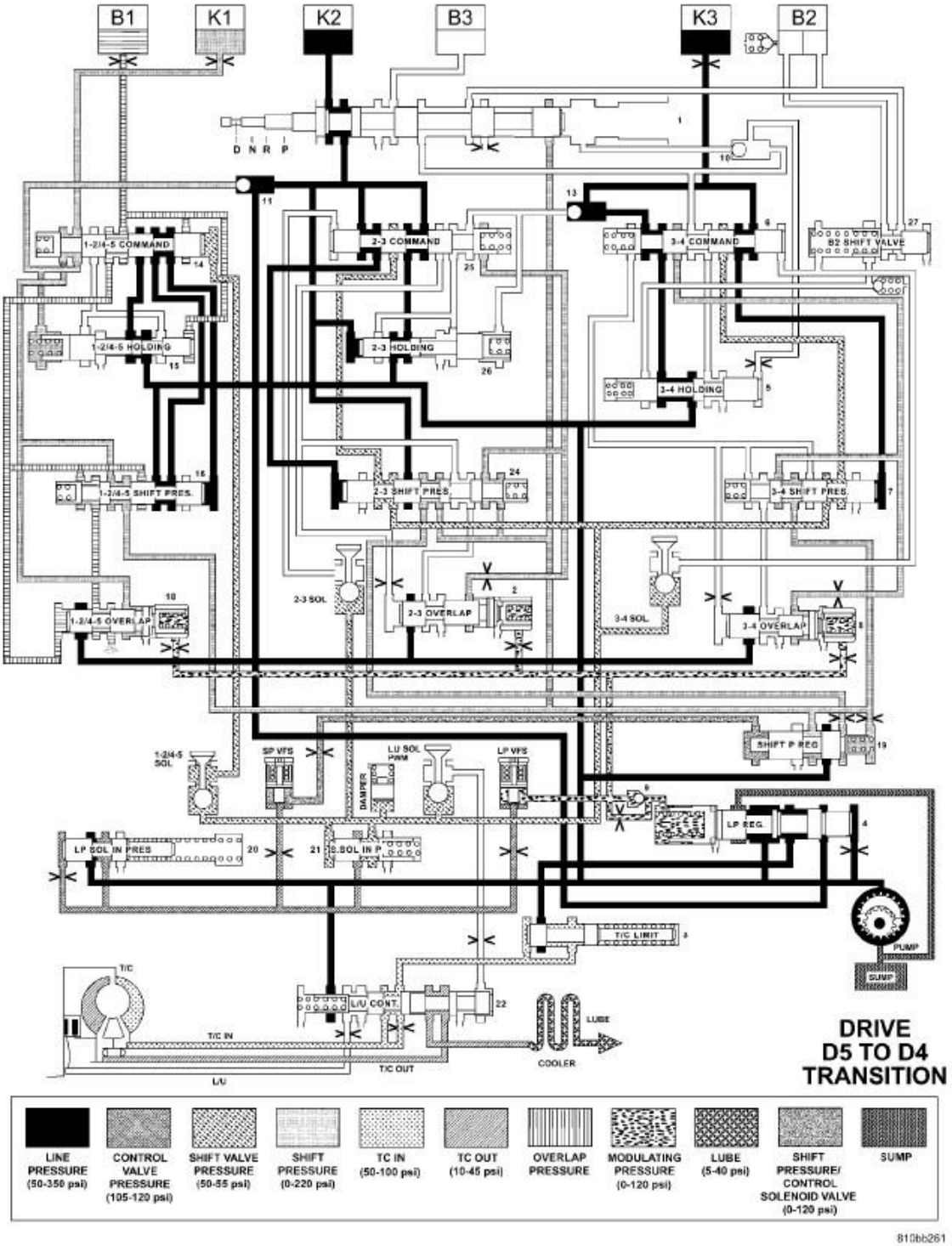

Fig. 46: Hydraulic Flow In Drive - Fifth To Fourth Gear Transition
Courtesy of CHRYSLER GROUP, LLC

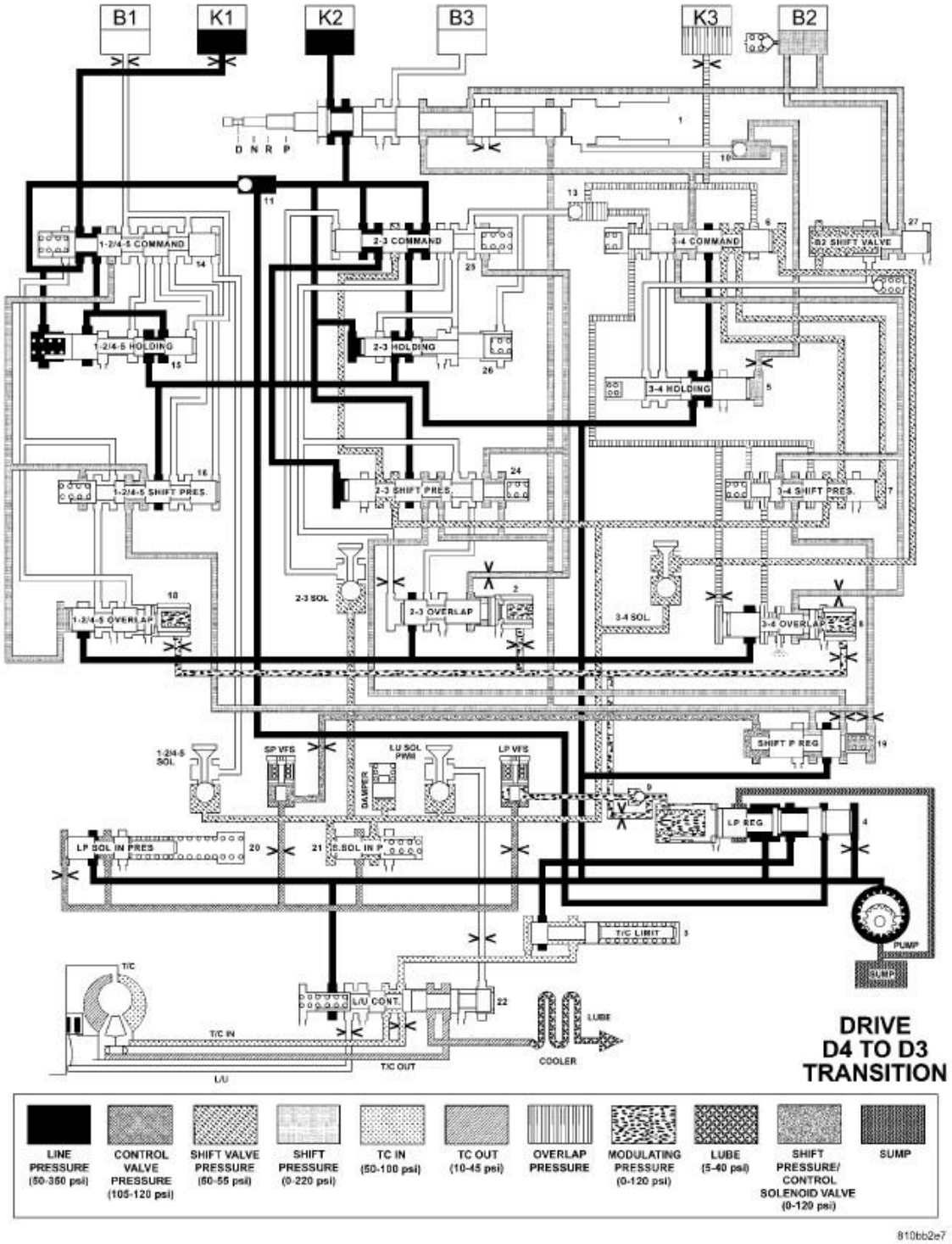

Fig. 47: Hydraulic Flow In Drive - Fourth To Third Gear Transition
Courtesy of CHRYSLER GROUP, LLC

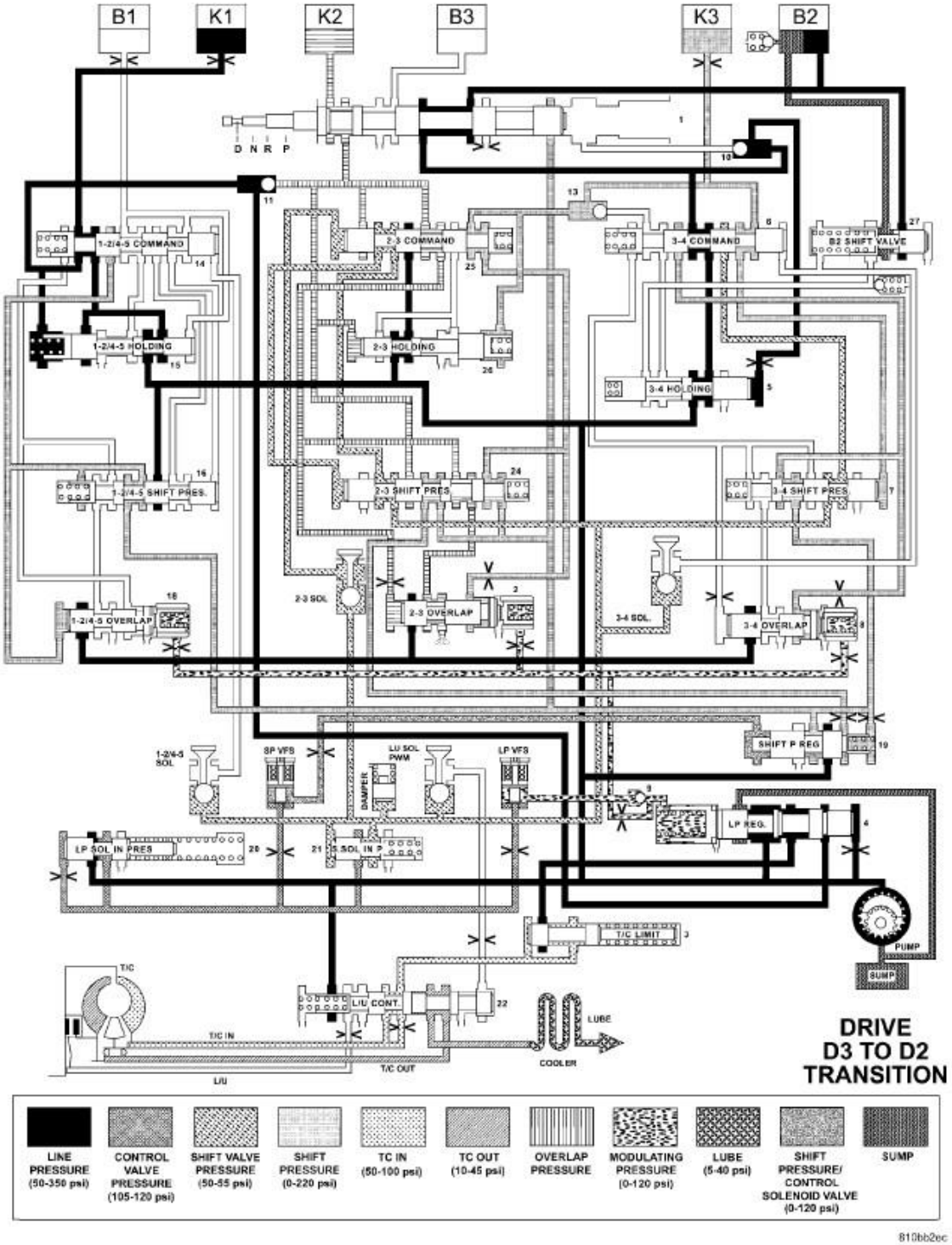

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Fig. 48: Hydraulic Flow In Drive - Third To Second Gear Transition
Courtesy of CHRYSLER GROUP, LLC

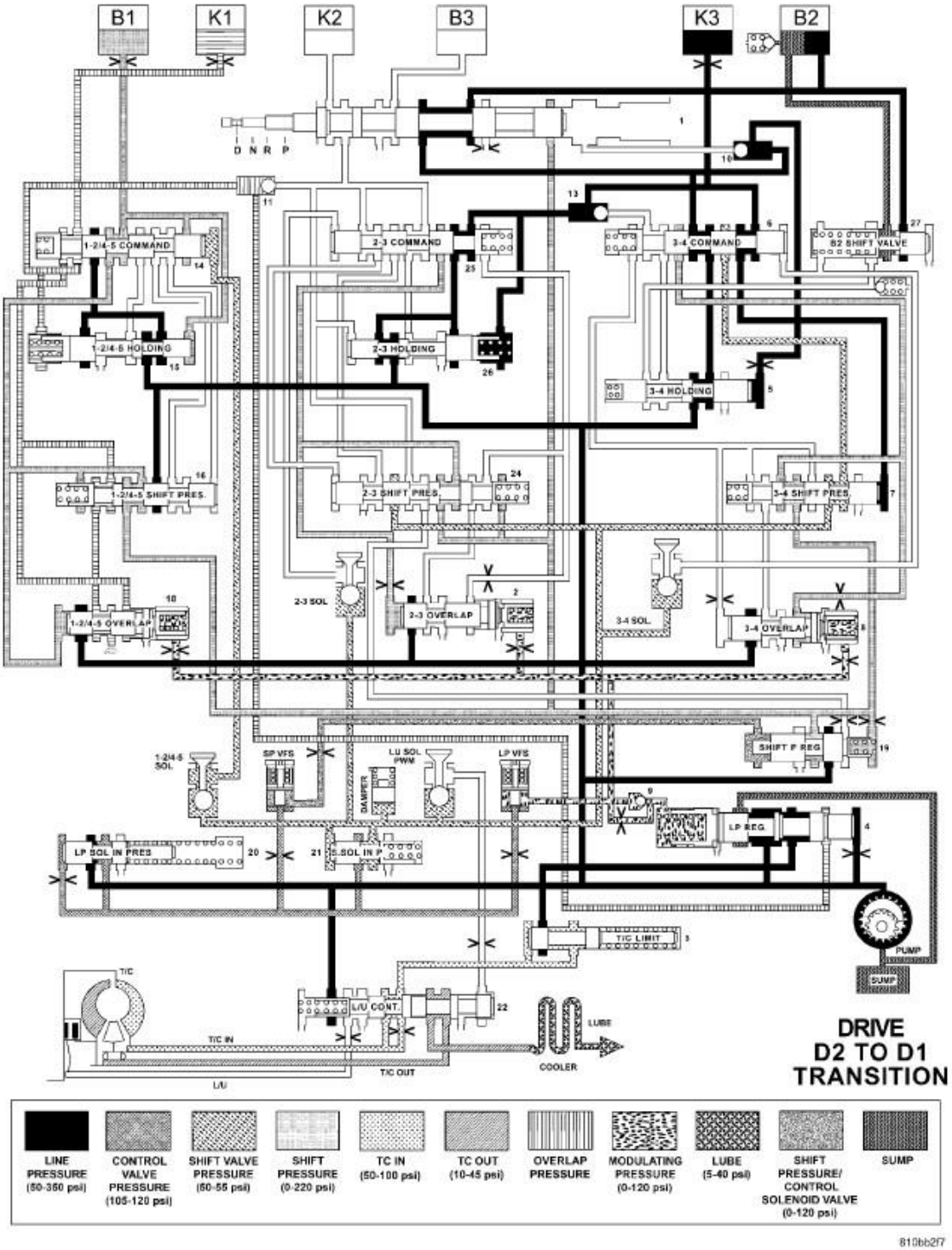

Fig. 49: Hydraulic Flow In Drive - Second To First Gear Transition
Courtesy of CHRYSLER GROUP, LLC

REMOVAL

REMOVAL

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure using the scan tool. Refer to MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE .**

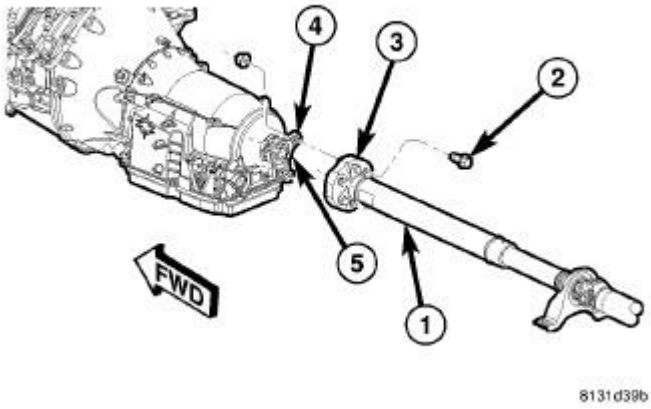

Fig. 50: Disconnect Propeller Shaft
Courtesy of CHRYSLER GROUP, LLC

1 - PROPELLER SHAFT
2 - BOLTS
3 - PROPELLER SHAFT COUPLER
4 - COMPANION FLANGE
5 - PROPELLER SHAFT PILOT

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the exhaust system.
4. For AWD vehicles, remove the transfer case. Refer to **REMOVAL** .
5. Removel the transmission to engine oil pan bolts.

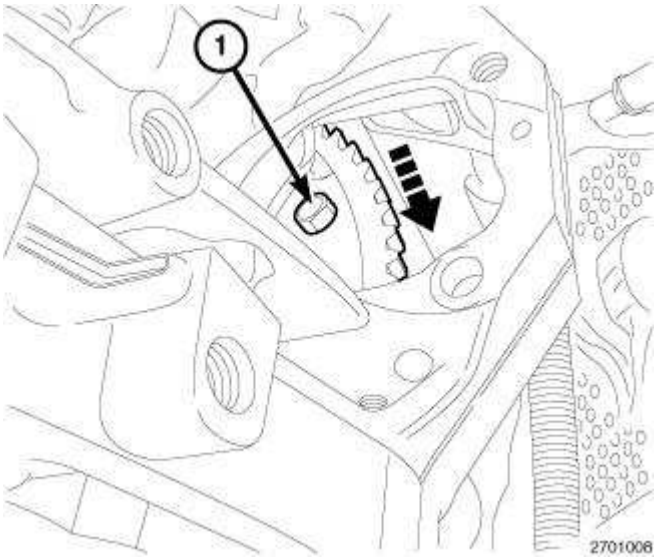

Fig. 51: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The starters are located on the right side of the transmission for RWD vehicles and they are on the left side for AWD vehicles.

6. Remove the bolts (2) holding the starter motor (1) to the transmission. Refer to **STARTER, REMOVAL** .
7. Remove the starter (1) from the transmission starter pocket and safely relocate.
8. Remove any splash shields necessary to gain access to the crankshaft damper bolts.
9. For gas engines, rotate crankshaft in clockwise direction until converter bolts (1) are accessible. Then remove bolts one at a time. Rotate crankshaft with a socket wrench on the dampener bolt.

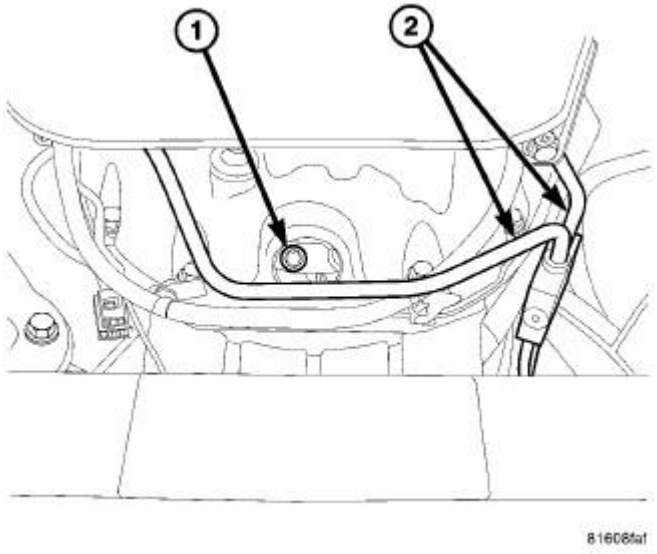

Fig. 52: Torque Converter To Flex Plate Bolts & Fluid Lines

Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER BOLTS
2 - TRANSMISSION COOLER LINES

10. For diesel engines, rotate crankshaft in clockwise direction until converter bolts (1) are accessible. Then remove bolts (1) one at a time. Rotate crankshaft with socket wrench on dampener bolt.

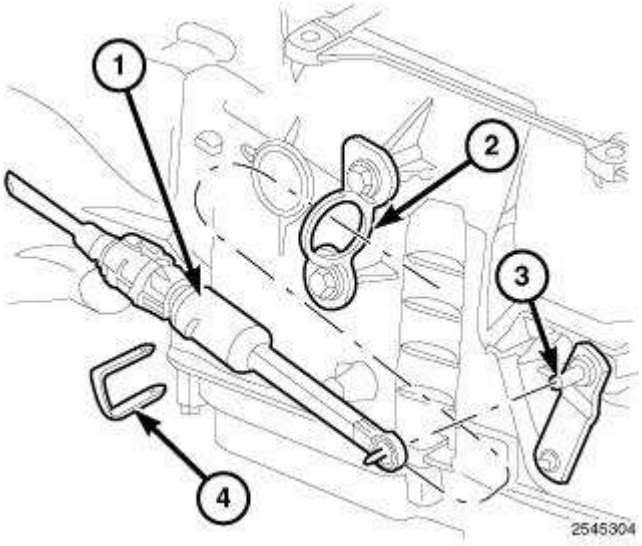

Fig. 53: Identifying Gearshift Cable, Eyelet & Manual Shift Lever
Courtesy of CHRYSLER GROUP, LLC

11. Remove the gearshift cable retaining clip (4) (if equipped).
12. Disconnect the gearshift cable (1) from the shift lever (3), and remove cable from bracket (2).

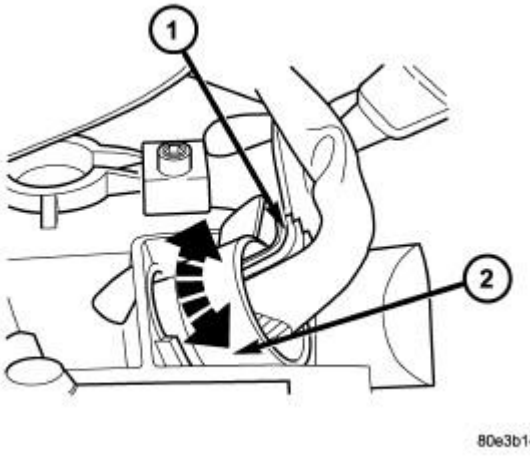

Fig. 54: Removing/Installing Wiring Connector Plug
Courtesy of CHRYSLER GROUP, LLC

1 - PLUG CONNECTOR
2 - ADAPTER PLUG

13. Disconnect 13-pin plug connector (1). Turn bayonet lock of the adapter plug (2) anti-clockwise.
14. Remove the 13-pin connector (1) from the transmission.
15. Remove the fill tube bolt at the transmission case.

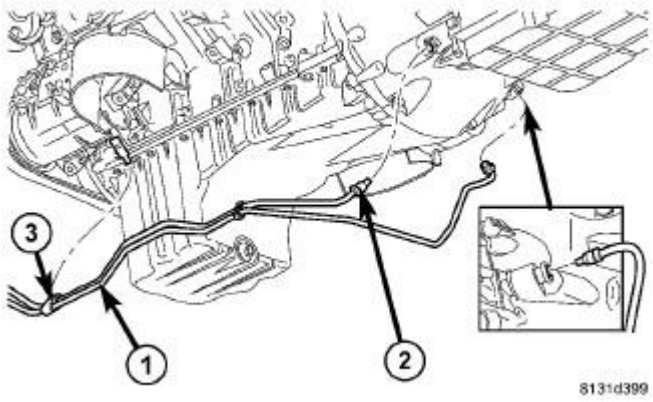

Fig. 55: Transmission Lines
Courtesy of CHRYSLER GROUP, LLC

1 - TRANSMISSION OIL COOLER LINES
2 - COOLER LINE FITTINGS
3 - SUPPORT CLAMPS

16. Disconnect transmission fluid cooler lines (1) at transmission fittings (2) and clips (3).
17. Disconnect the transmission vent hose from the transmission.

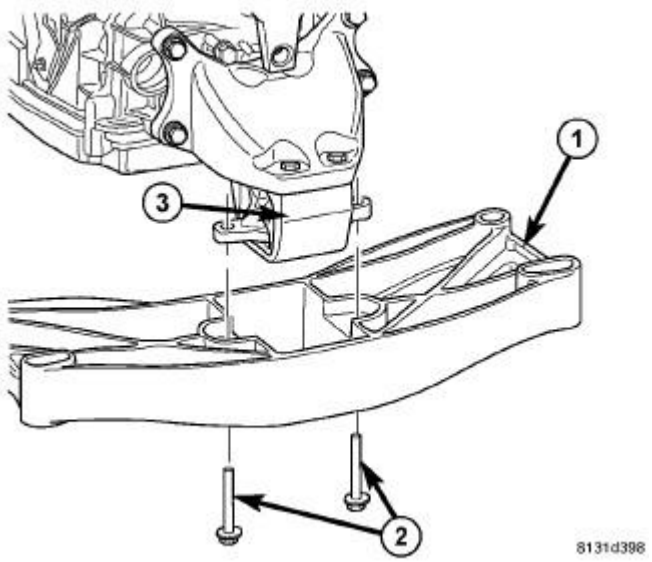

Fig. 56: Locating Transmission Mount, Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

18. Raise transmission slightly with service jack to relieve load on crossmember and supports.
19. Remove bolts (2) securing rear support and cushion (3) to transmission crossmember (1).
20. Remove bolts attaching crossmember (1) to frame and remove crossmember.

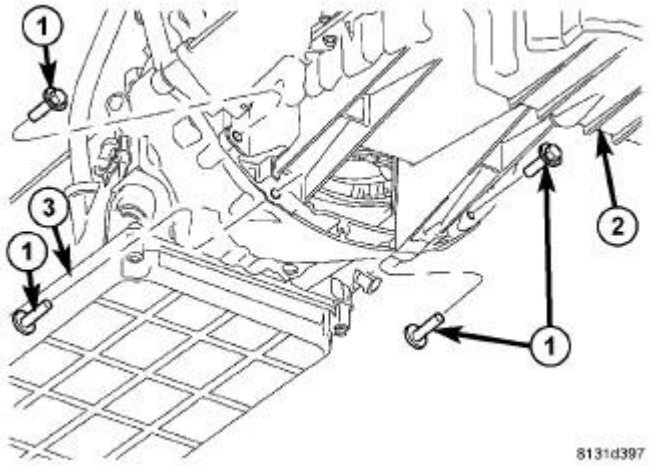

Fig. 57: Removing Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - BOLTS
2 - ENGINE OIL PAN
3 - TRANSMISSION

21. Remove the bolts (1) holding the engine oil pan (2) to the transmission (3), gas engines.

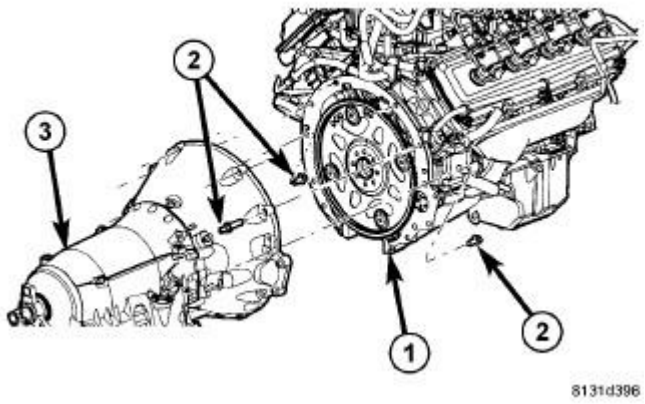

Fig. 58: Removing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - ENGINE
2 - BOLTS
3 - TRANSMISSION

22. Remove all remaining bolts (2) securing the transmission (3) to the engine block (1).
23. While removing the fill tube from the transmission case, carefully work transmission and torque converter assembly rearward off engine block dowels.
24. Hold torque converter in place during transmission removal.
25. Lower transmission and remove assembly from under the vehicle.
26. To remove torque converter, carefully slide torque converter out of the transmission.

DISASSEMBLY

DISASSEMBLY

NOTE: If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure using the scan tool. Refer to MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE .

NOTE: Tag all clutch pack assemblies, as they are removed, for reassembly identification.

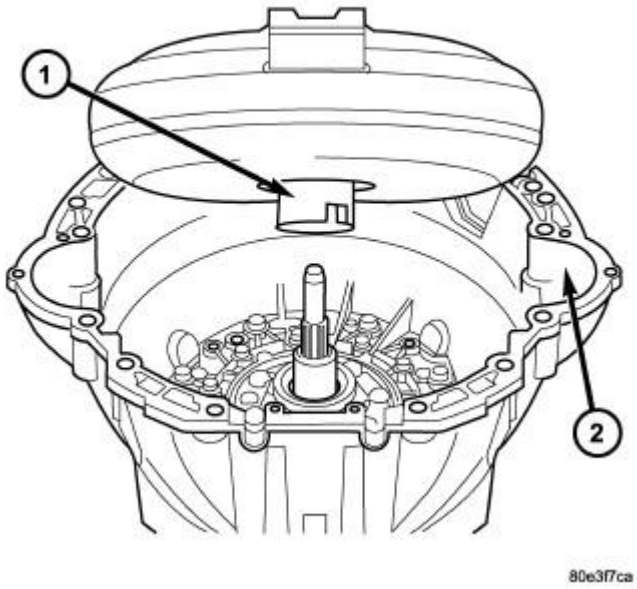

Fig. 59: Removing/Installing Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER
2 - CONVERTER HOUSING

1. Remove the torque converter (1). Refer to **Fig. 59**.

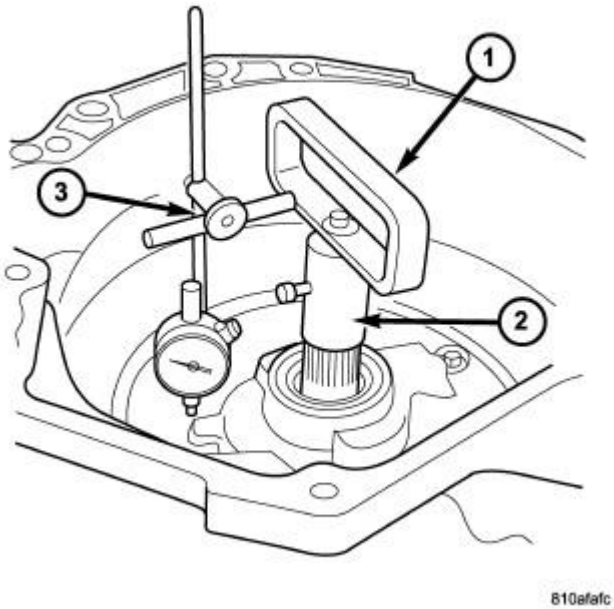

Fig. 60: Checking Input Shaft End Play
Courtesy of CHRYSLER GROUP, LLC

1 - TOOL 8266-8
2 - TOOL 8266-18
3 - TOOL C-3339A

2. Place transmission in a vertical position.
3. Measure input shaft end play as follows: Refer to**Fig. 60**.
    1. Attach Adapter (special tool #8266-18, Spline Tool, NAG1) (2) to Handle (special tool #8266-8, Handle) (1).
    2. Attach dial indicator (special tool #C-3339A, Set, Dial Indicator) (3) to Handle (special tool #8266-8, Handle) (1).
    3. Install the assembled tool onto the input shaft of the transmission and tighten the retaining screw on Adapter (special tool #8266-18, Spline Tool, NAG1) (2) to secure it to the input shaft.
    4. Position the dial indicator plunger against a flat spot on the oil pump and zero the dial indicator.
    5. Move the input shaft in and out. Record the maximum travel for assembly reference.

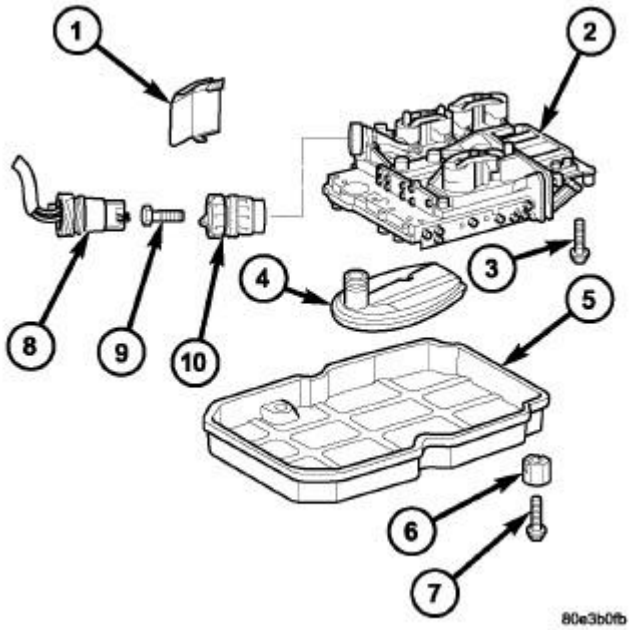

Fig. 61: Removing/Installing Electrohydraulic Unit
Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD
2 - ELECTROHYDRAULIC UNIT

3 - BOLT
4 - OIL FILTER
5 - OIL PAN
6 - CLAMPING ELEMENT
7 - BOLT
8 - 13-PIN PLUG CONNECTOR
9 - BOLT
10 - ADAPTER PLUG

4. Loosen adapter plug bolt (9) and remove from the adapter plug (10) from the transmission housing. Refer to **Fig. 61**.
5. Detach oil pan (5). Refer to **Fig. 61**.
6. Remove oil filter (4). Refer to **Fig. 61**.
7. Unscrew Torx® socket bolts (3) and remove electrohydraulic unit (2).
8. Air check the transmission. Refer to **DIAGNOSIS AND TESTING**.

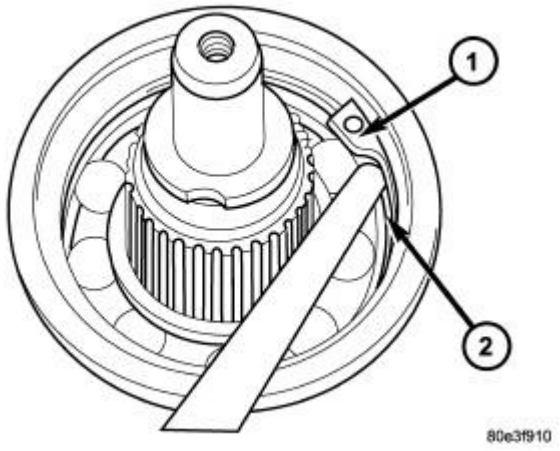

Fig. 62: Removing/Installing Rear Output Shaft Retaining Ring
Courtesy of CHRYSLER GROUP, LLC

1 - RETAINING RING
2 - OUTPUT SHAFT BEARING

9. Place the transmission in PARK to prepare for the removal of the output shaft nut.
10. Remove the nut, with a 30 mm 12 point socket, holding the propeller shaft flange to the output shaft and remove the flange.
11. Remove the transmission rear oil seal with a suitable slide hammer and screw.
12. Remove the transmission output shaft washer. Be sure to tag the washer since it is very similar to the geartrain end-play shim and they must not be interchanged.
13. Remove the transmission rear output shaft bearing retaining ring (1).

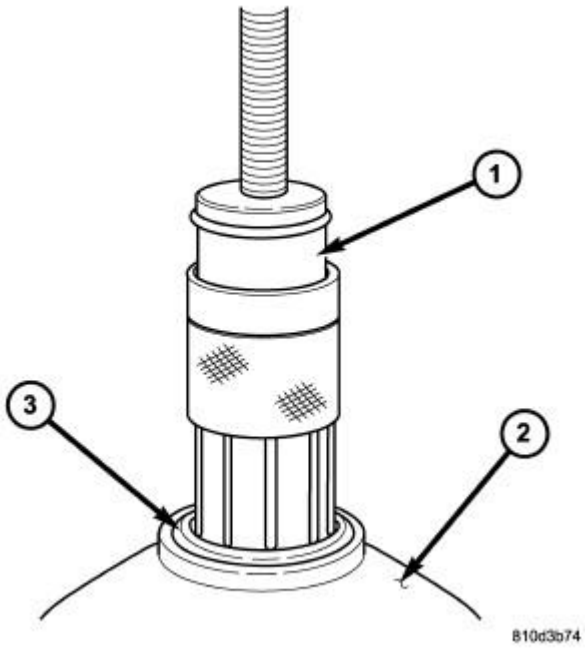

Fig. 63: Removing Bearing
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING REMOVER 9082A
2 - TRANSMISSION CASE
3 - OUTPUT SHAFT BEARING

14. Position Bearing Remover (special tool #9082A, Remover, Bearing) (1) over the inner race of the output shaft bearing (3). Refer to **Fig. 63**.

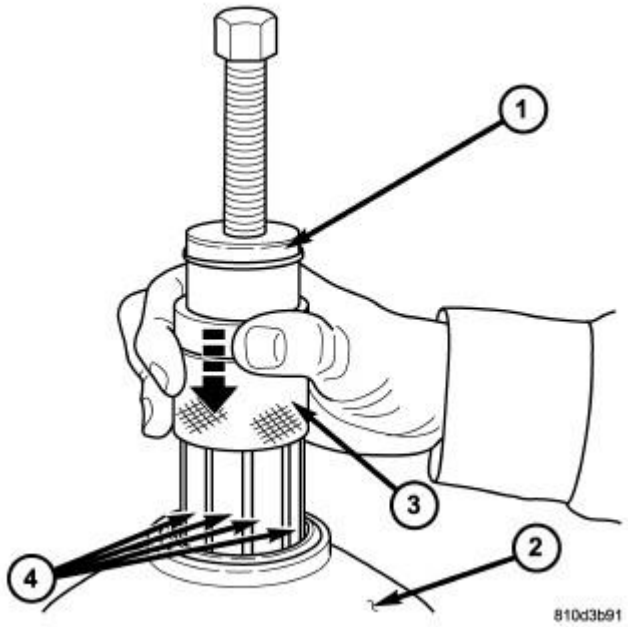

Fig. 64: Slide Remover 9082a Collar Downward
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING REMOVER 9082A
2 - TRANSMISSION CASE
3 - COLLAR
4 - FINGERS

NOTE: Due to production variations in the bearing, it may not be possible to slide the collar fully downward. It is only necessary to slide the collar down far enough that the fingers securely grasp the inner bearing race.

15. Slide the collar (3) on the Bearing Remover (special tool #9082A, Remover, Bearing) (1) downward over the fingers (4) of the tool. Refer to **Fig. 64**.

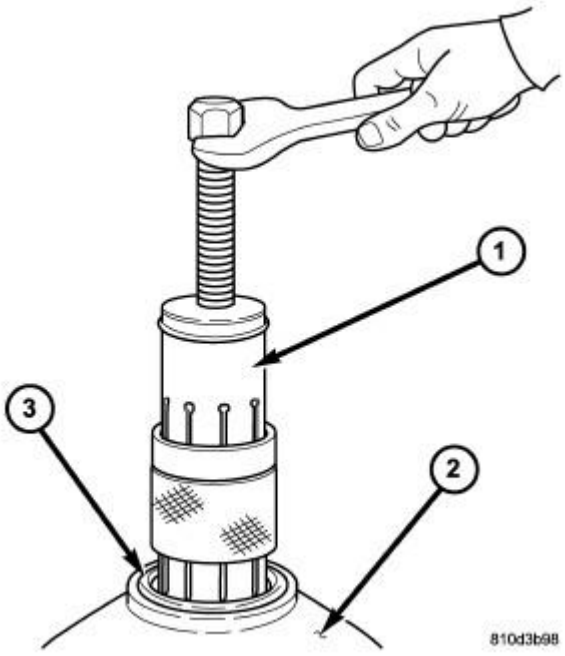

Fig. 65: Removing Output Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING REMOVER 9082A
2 - TRANSMISSION CASE
3 - OUTPUT SHAFT BEARING

16. Remove the output shaft bearing (3). Refer to **Fig. 65**.
17. Remove the geartrain end-play shim from the output shaft. Be sure to tag the shim since it is very similar to the output shaft washer and they must not be interchanged.

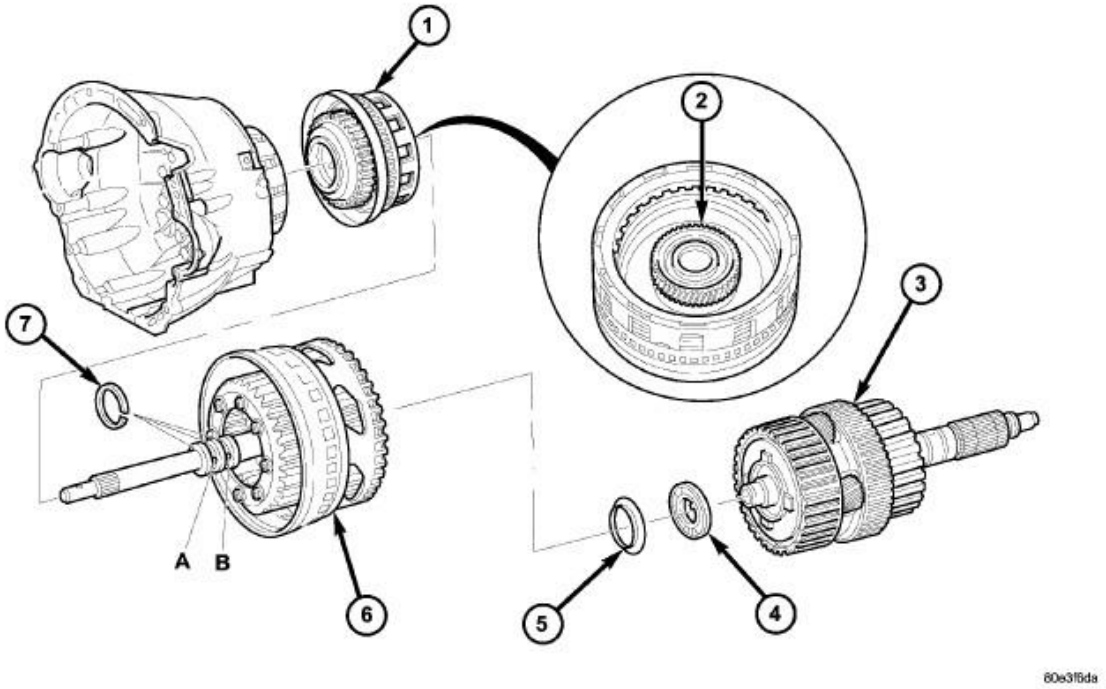

Fig. 66: Remove K1, K2, And K3 Clutches
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVING CLUTCH K1	5 - THRUST WASHER
2 - SUN GEAR OF FRONT PLANETARY GEAR SET	6 - FRONT PLANETARY GEAR SET, DRIVING CLUTCH K2, AND INPUT SHAFT
3 - DRIVING CLUTCH K3, OUTPUT SHAFT, AND CENTER AND REAR PLANETARY GEAR SETS	7 - SEALING RINGS
4 - THRUST NEEDLE BEARING	

18. Remove the bolts holding the transmission housing to the converter housing from inside the converter housing.
19. Stand the transmission upright on the converter housing.
20. Remove the remaining bolts holding the transmission housing to the converter housing.
21. Remove the transmission housing from the converter housing.
22. Remove output shaft with center and rear gear set and clutch K3 (3). Refer to **Fig. 66**.
23. Remove thrust needle bearing (4) and thrust washer (5). Refer to **Fig. 66**.
24. Remove input shaft with clutch K2 and front gear set (6).
25. Remove clutch K1 (1).

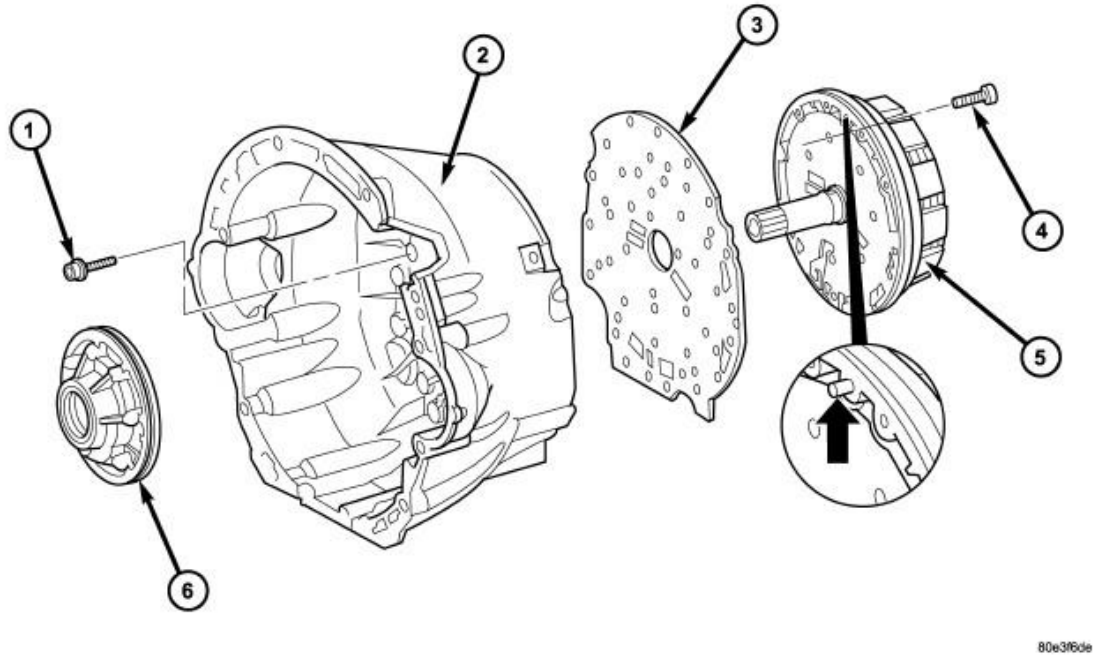

Fig. 67: Removing/Installing Holding Clutch B1 And Oil Pump
Courtesy of CHRYSLER GROUP, LLC

1 - BOLTS - M6X32	4 - BOLTS - M8X35
2 - CONVERTER HOUSING	5 - HOLDING CLUTCH B1
3 - INTERMEDIATE PLATE	6 - OIL PUMP

26. Unscrew Torx® socket bolts (4) and remove oil pump (6). Refer to **Fig. 67**. Screw two opposed bolts into the oil pump housing and press the oil pump out of the converter housing by applying light blows with a plastic hammer.
27. Remove and discard the torque converter hub seal and the oil pump outer o-ring seal from the oil pump.
28. Unscrew Torx® socket bolts (1) and remove multiple-disc holding clutch B1 (5) from converter housing. Refer to **Fig. 67**. Screw two opposed bolts into the multiple-disc holding clutch B1 (5) and separate from the converter housing by applying light blows with a plastic hammer.
29. Detach intermediate plate (3) from converter housing (2). Refer to **Fig. 67**.

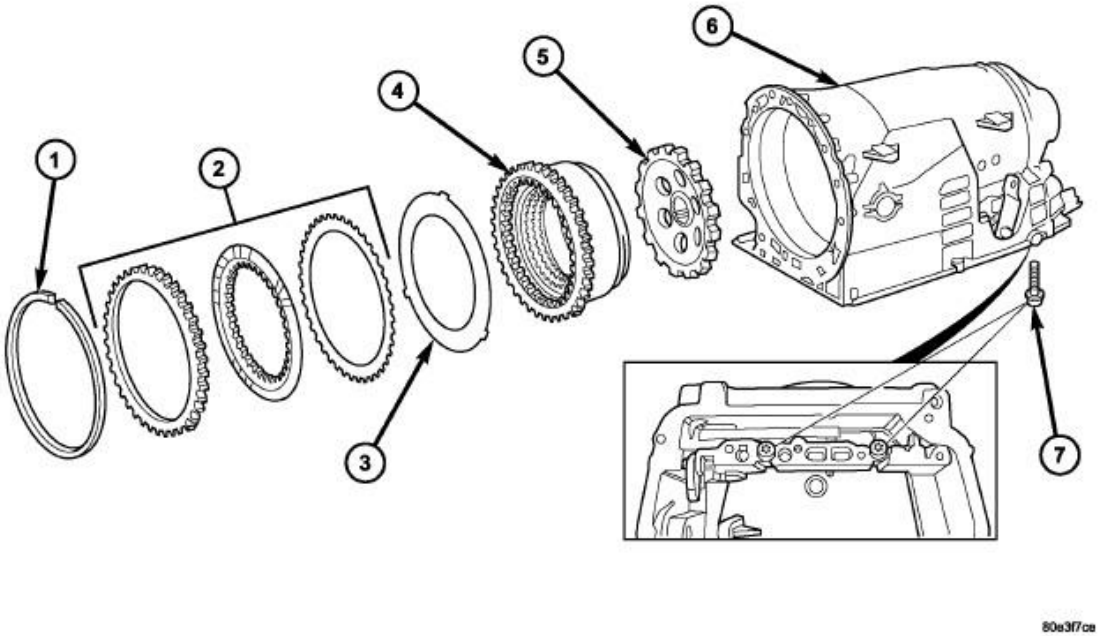

Fig. 68: Identifying B2, B3 And Parking Gear
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING	5 - PARK GEAR
2 - HOLDING CLUTCH B3 DISCS	6 - TRANSMISSION HOUSING
3 - SPRING WASHER	7 - BOLTS - M8X60
4 - HOLDING CLUTCH B2	

30. Remove multiple-disc pack B3 (2) and spring washer (3) by removing snap-ring (1) in transmission housing. Refer to **Fig. 68**. To facilitate removal of the snap-ring (1), compress the multiple-disc pack B3 (2). Note which clutch disc is removed just prior to the spring washer (3) for re-assembly. If the clutch discs are re-used, this disc must be returned to its original position on top of the spring washer.
31. Unscrew Torx® socket bolts (7). Refer to **Fig. 68**.
32. Remove multiple-disc holding clutch B2 (4) from transmission housing. Refer to **Fig. 68**. The externally toothed disc carrier for multiple-disc holding clutch B2 is also the piston for multiple-disc holding clutch B3.
33. Remove parking lock gear (5). Refer to **Fig. 68**.

CLEANING

CLEANING

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they

prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, gaskets, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with Mopar® ATF +4, Automatic Transmission Fluid, during overhaul and assembly. Use petroleum jelly, Mopar® Door Ease, or Ru-Glyde to prelubricate seals, O-rings, and thrust washers. Petroleum jelly can also be used to hold parts in place during reassembly.

Clean the case in a solvent tank. Flush the case bores and fluid passages thoroughly with solvent. Dry the case and all fluid passages with compressed air. Be sure all solvent is removed from the case and that all fluid passages are clear.

NOTE: **Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will stick to case surfaces and transmission components and circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.**

INSPECTION

INSPECTION

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with Helicoil® thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

ASSEMBLY

ASSEMBLY

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure using the scan tool. Refer to MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE .**

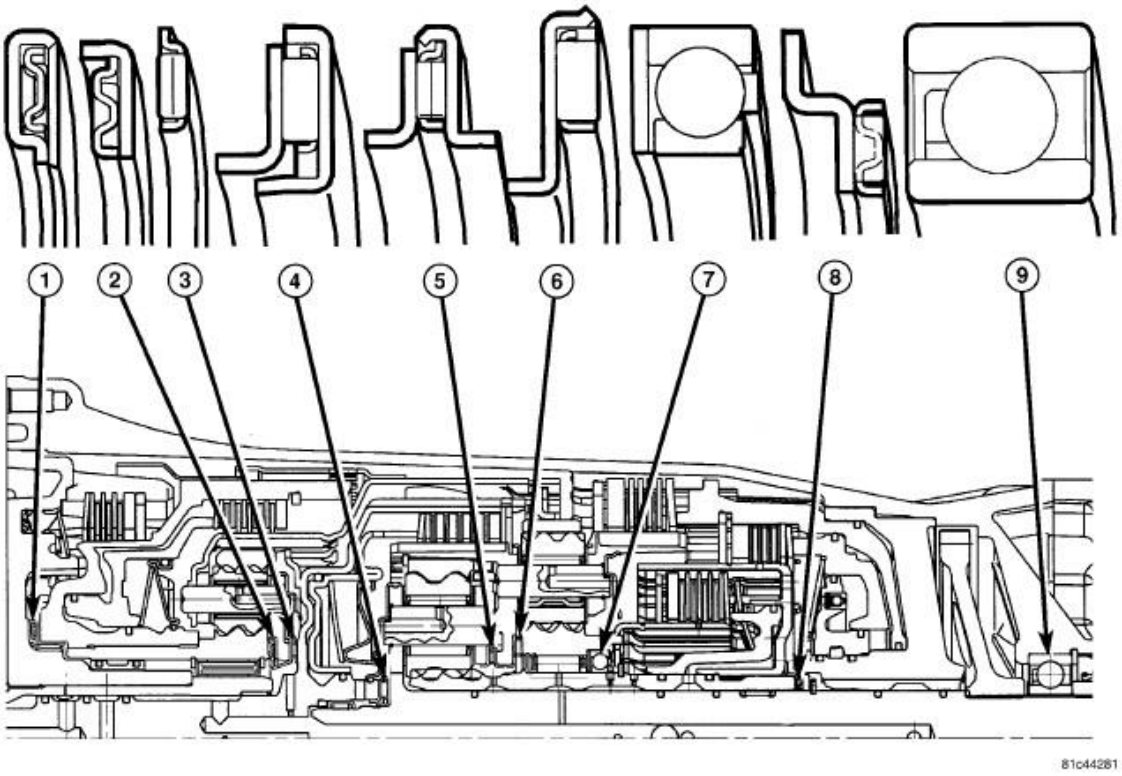

Fig. 69: Nag1 Bearing Orientation
Courtesy of CHRYSLER GROUP, LLC

1 - THRUST BEARING NO. 1	6 - THRUST BEARING NO. 6
2 - THRUST BEARING NO. 2	7 - ROLLER BEARING NO. 7
3 - THRUST BEARING NO. 3	8 - THRUST BEARING NO. 8
4 - THRUST BEARING NO. 4	9 - ROLLER BEARING NO. 9
5 - THRUST BEARING NO. 5	

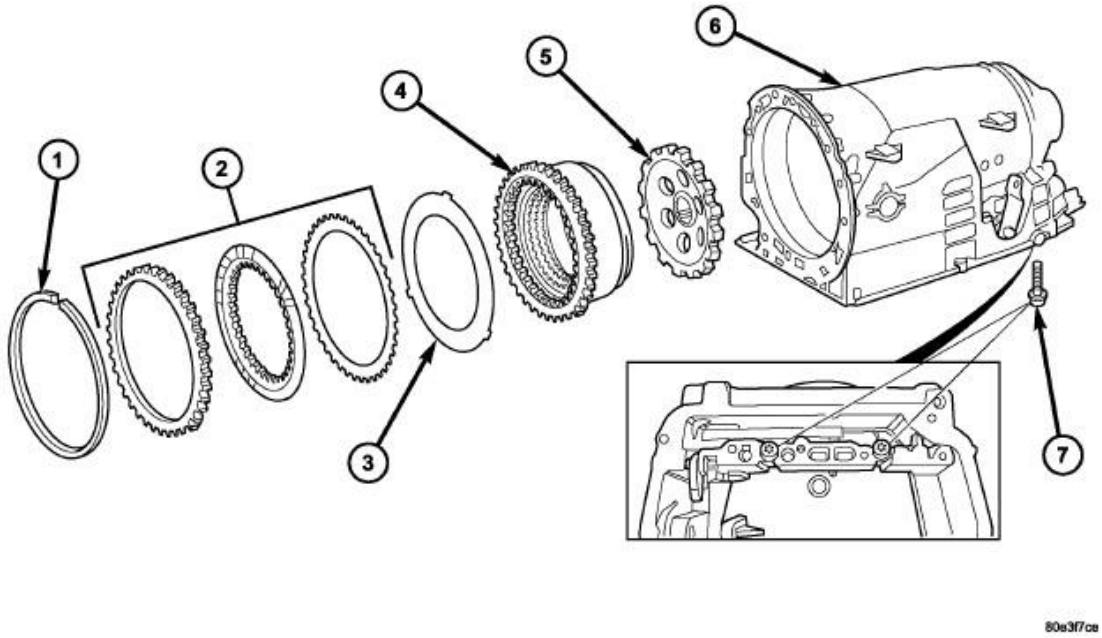

Fig. 70: Identifying B2, B3 And Parking Gear
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING	5 - PARK GEAR
2 - HOLDING CLUTCH B3 DISCS	6 - TRANSMISSION HOUSING
3 - SPRING WASHER	7 - BOLTS - M8X60
4 - HOLDING CLUTCH B2	

1. Insert parking lock gear (5). Refer to **Fig. 70**.
2. Install multiple-disc holding clutch B2 (4) in transmission housing (6). Refer to **Fig. 70**.
3. Screw in both Torx® socket bolts (7). Tighten the bolts to 16 N.m (141 in.lbs.).

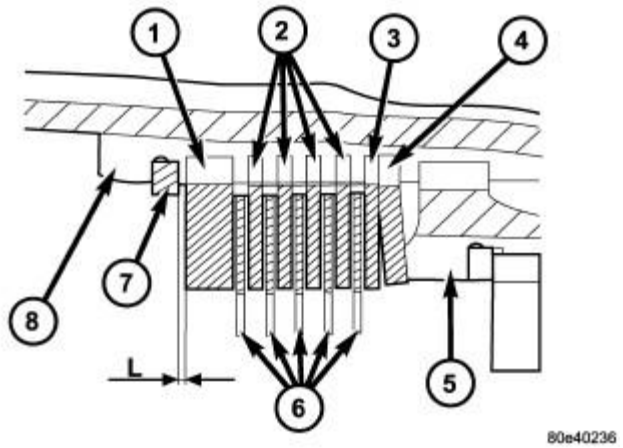

Fig. 71: Measure B3 Clutch Clearance
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER DISC - 6.5 MM (0.256 IN.)	5 - PISTON
2 - OUTER DISCS - 1.8 MM (0.071 IN.)	6 - FRICTION DISCS
3 - OUTER DISCS - 1.8 MM (0.071 IN.)	7 - SNAP-RING
4 - SPRING WASHER	8 - B3 DISC CARRIER

NOTE: During the measurement the snap ring (7) must contact the upper bearing surface of the groove in the outer multiple-disc carrier (8). Refer to Fig. 71.

NOTE: Pay attention to sequence of discs. If the original clutch discs are reused, be sure to return the disc identified on disassembly as belonging on top of the spring washer (4) to its original location. Place new friction multiple-discs in ATF fluid for one hour before installing.

CAUTION: Apply only light pressure (less than 10 N (3 lbs.) of force) to the clutch pack when measuring the clutch clearance with the feeler gauge. Applying excessive force to the clutch will give an incorrect reading and lead to a transmission failure.

4. Insert and measure spring washer (4) and multiple-disc pack B3 (2, 6). Refer to **Fig. 71**.
    1. Put multiple-discs for multiple-disc holding clutch B3 together in the sequence shown in the illustration and insert individually.
    2. Using a feeler gauge, determine the play "L" at three points between the snap ring (7) and outer multiple-disc (1). B3 clutch clearance should be 1.0-1.4 mm (0.039-0.055 in.). Adjust the clearance as necessary.
    3. Adjust with snap-ring (7), if necessary. Snap-rings are available in thicknesses of 3.2 mm (0.126 in.), 3.5 mm (0.138 in.), 3.8 mm (0.150 in.), 4.1 mm (0.162 in.), 4.4 mm (0.173 in.), and 4.7 mm (0.185 in.).

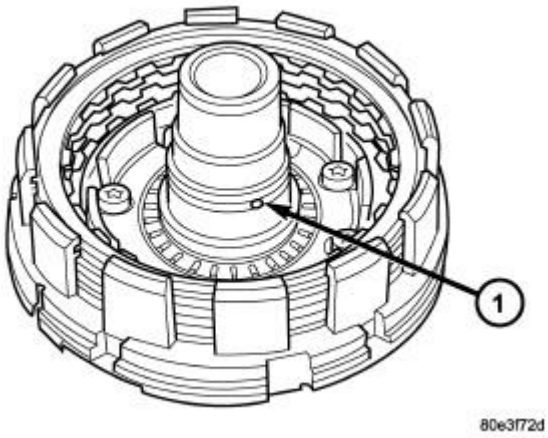

Fig. 72: Check K1 Feed Hole
Courtesy of CHRYSLER GROUP, LLC

1 - K1 CLUTCH FEED HOLE

5. Check that the K1 clutch feed hole (1) in the inner hub of clutch B1 is free before installing clutch B1. Refer to **Fig. 72**.

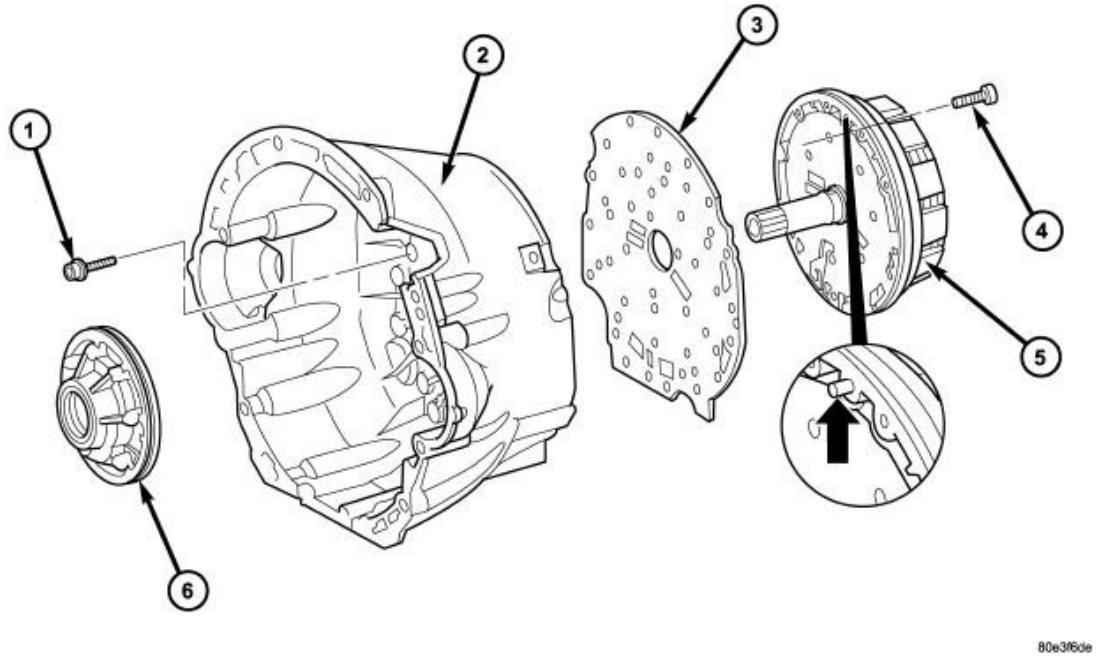

Fig. 73: Removing/Installing Holding Clutch B1 And Oil Pump
Courtesy of CHRYSLER GROUP, LLC

1 - BOLTS - M6X32	4 - BOLTS - M8X35
2 - CONVERTER	5 - HOLDING CLUTCH B1

HOUSING	
3 - INTERMEDIATE PLATE	6 - OIL PUMP

6. Place intermediate plate (3) on converter housing (2) and align.

NOTE: The intermediate plate can generally be used several times. The plate must not be coated with additional sealant

7. Install the holding clutch B1 (5) onto the converter housing and intermediate plate. Refer to **Fig. 73**. Installed position of clutch B1 in relation to converter housing is specified by a plain dowel pin in clutch B1 (arrow).
8. Install the bolts to hold clutch B1 (5) to the converter housing. Refer to **Fig. 73**.
9. Securely tighten multiple-disc holding clutch B1 (5) on converter housing (2) to 10 N.m (89 in.lbs.).

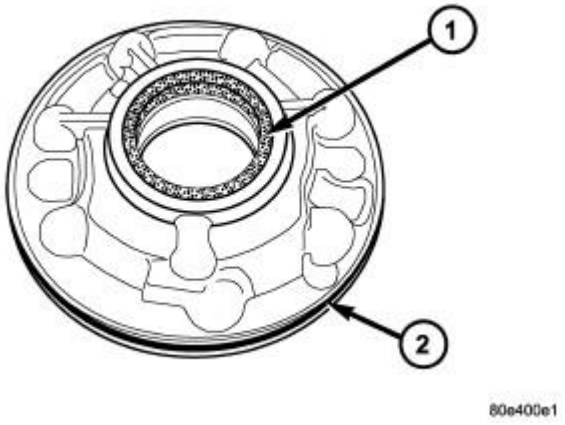

Fig. 74: Identifying Oil Pump Seals
Courtesy of CHRYSLER GROUP, LLC

1 - INNER OIL SEAL
2 - OUTER OIL SEAL

10. Install new torque converter hub seal (1) into the oil pump using Seal Installer (special tool #8902A, Installer, Seal). Refer to **Fig. 74**.
11. Install new oil pump outer o-ring seal onto oil pump. Refer to **Fig. 74**.

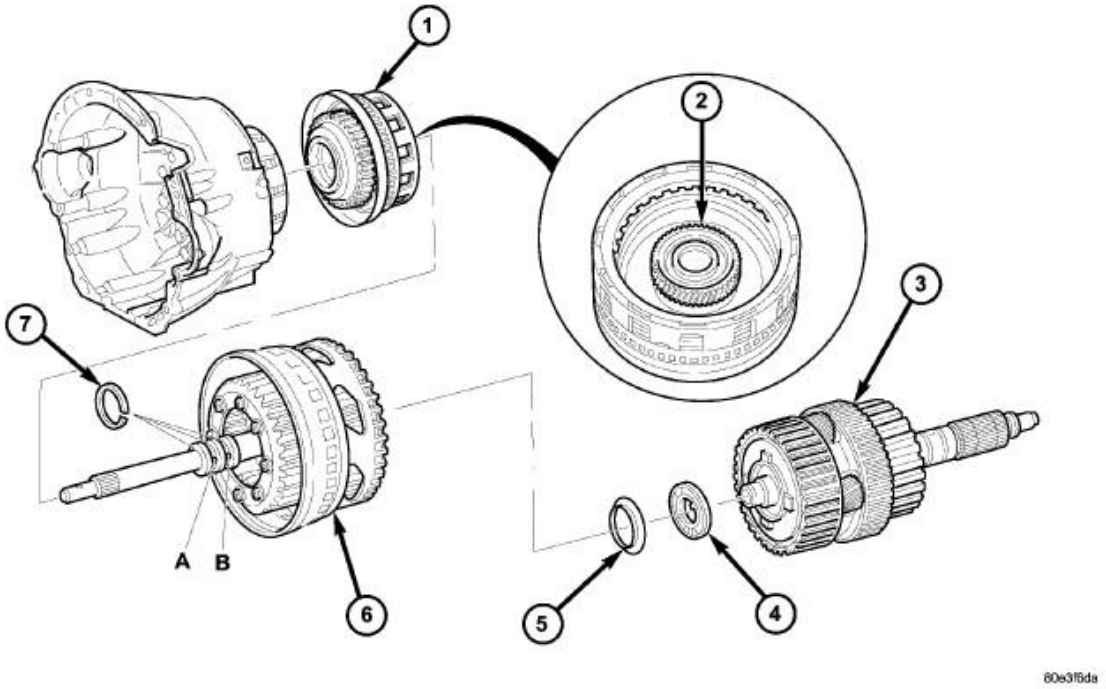

Fig. 75: Remove K1, K2, And K3 Clutches
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVING CLUTCH K1	5 - THRUST WASHER
2 - SUN GEAR OF FRONT PLANETARY GEAR SET	6 - FRONT PLANETARY GEAR SET, DRIVING CLUTCH K2, AND INPUT SHAFT
3 - DRIVING CLUTCH K3, OUTPUT SHAFT, AND CENTER AND REAR PLANETARY GEAR SETS	7 - SEALING RINGS
4 - THRUST NEEDLE BEARING	

12. Install oil pump (6) and securely tighten. Tighten the oil pump bolts to 20 N.m (177 in.lbs.).
13. Using grease, insert sealing rings (7) in the groove so that the joint remains together. Refer to **Fig. 75**.
14. Install the K1 (1) clutch onto the B1 clutch. Refer to **Fig. 75**.
15. Install input shaft with clutch K2 (6) and front gear set (1). Refer to **Fig. 75**.
16. Install front washer (5) and thrust needle bearing (4). Refer to **Fig. 75**.

NOTE: **Insure that the pinion gears are fully seated in the Rear Annulus (Hollow) Gear. If 50% of the pinion gear splines protrude, the Rear Annulus Gear was installed upside down in the K2 Clutch Retainer.**

17. Install output shaft with center and rear gear set and clutch K3 (3). Refer to **Fig. 75**.

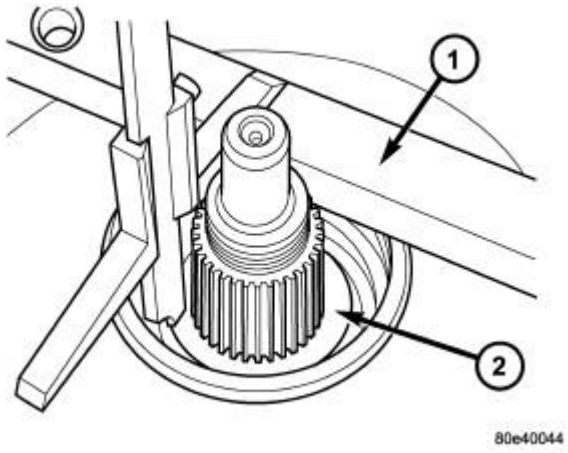

Fig. 76: Measuring From Transmission Housing To Park Gear
Courtesy of CHRYSLER GROUP, LLC

1 - GAUGE BAR 6311
2 - PARK GEAR

18. Using grease, install both Teflon rings in the groove at the rear of the output shaft so that the joint stays together.
19. Mount transmission housing on converter housing.
20. Screw in Torx® socket bolts through the transmission housing into the converter housing. Tighten the bolts to 20 N.m (177 in.lbs.).

NOTE: Verify that there are no nicks or other irregularities in the surface of the transmission case that will cause an inaccurate measurement.

21. Measure end-play between park pawl gear and grooved ball bearing in order to select the proper geartrain end-play shim.
22. Place Gauge Bar (special tool #6311, Gauge Bar) (1) on transmission housing. Using a depth gauge, measure from the gauge bar (1) to the parking lock gear (2). Refer to **Fig. 76**.

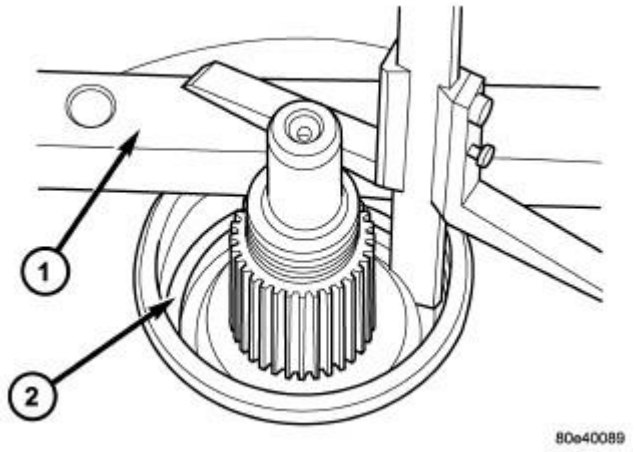

Fig. 77: Measuring From Transmission Housing To Rear Bearing Contact Surface
Courtesy of CHRYSLER GROUP, LLC

1 - GAUGE BAR 6311
2 - OUTPUT SHAFT BEARING CONTACT SURFACE

23. Using a depth gauge, measure from the Gauge Bar (special tool #6311, Gauge Bar) (1) to the contact surface of the output shaft bearing (2) in the transmission housing. Refer to**Fig. 77**.
24. Subtract the first figure from the second figure to determine the current end-play of the transmission. Select a shim or a combination of two shims such that the end-play will be 0.3-0.5 mm (0.012-0.020 in.). Shims are available in thicknesses of 0.2 mm (0.008 in.), 0.3 mm (0.012 in.), 0.4 mm (0.016 in.), and 0.5 mm (0.020 in.).
25. Install the selected end-play shim.

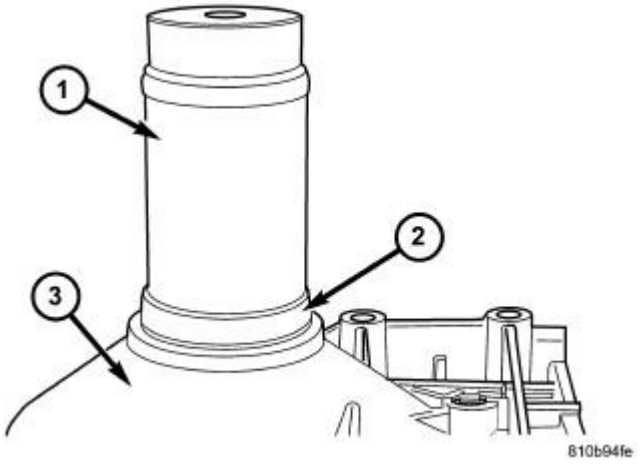

Fig. 78: Installing Output Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING INSTALLER 9287

2 - BEARING
3 - TRANSMISSION CASE

26. Screw in Torx® socket bolts through the converter housing into the transmission housing. Tighten the bolts to 20 N.m (177 in.lbs.).
27. Install output shaft bearing (2) in rear transmission housing. Using Bearing Installer (special tool #9287, Installer, Bearing) (1), install the output shaft bearing (2) into the transmission housing. Refer to **Fig. 78**. **The closed side of the plastic cage must point towards the parking lock gear.**

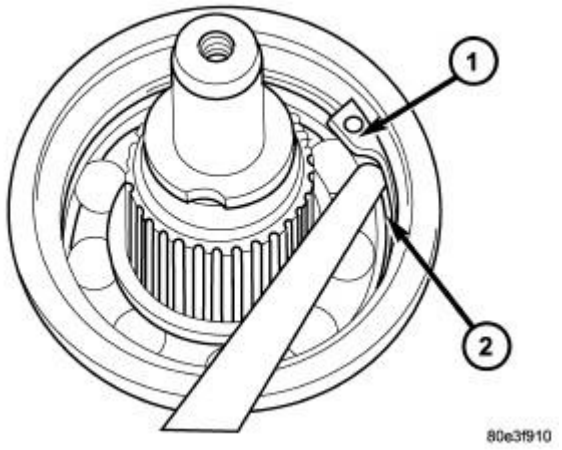

Fig. 79: Removing/Installing Rear Output Shaft Retaining Ring
Courtesy of CHRYSLER GROUP, LLC

1 - RETAINING RING
2 - OUTPUT SHAFT BEARING

28. Install the retaining ring (1). Refer to **Fig. 79**. Ensure that the retaining ring is seated correctly in the groove.
29. Check that there is no play between the bearing and the retaining ring using feeler gauge.
30. There must be no play between the retaining ring and the bearing. If the ring cannot be installed, a thinner ring must be used. If there is play between the ring and the bearing, a thicker ring must be installed. Retaining rings are available in thicknesses of 2.0 mm (0.079 in.), 2.1 mm (0.083 in.), and 2.2 mm (0.087 in.).

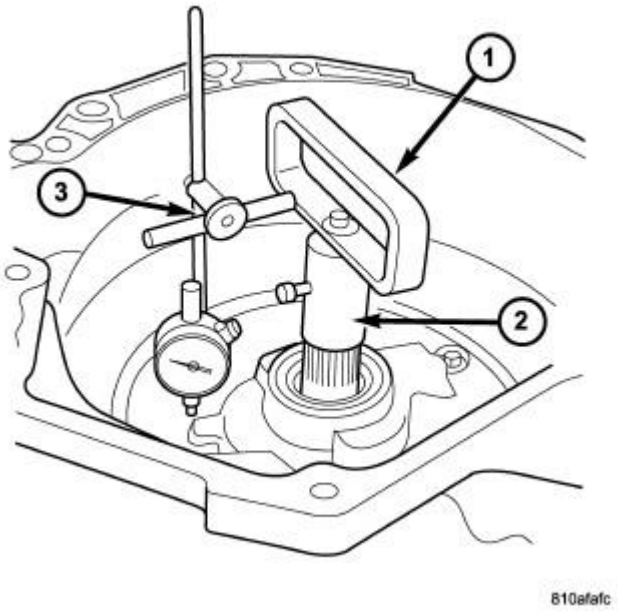

Fig. 80: Checking Input Shaft End Play
Courtesy of CHRYSLER GROUP, LLC

1 - TOOL 8266-8
2 - TOOL 8266-18
3 - TOOL C-3339A

31. Rotate the transmission so that the bellhousing is pointed upward and ensuring that the output shaft is allowed to move freely.
32. Measure input shaft end-play. Refer to **Fig. 80**.

NOTE: If end-play is incorrect, transmission is incorrectly assembled, or the geartrain end-play shim is incorrect. The geartrain end-play shim is selective.

NOTE: If necessary, a combination of shims can be used to achieve the required end-play.

1. Attach Adapter (special tool #8266-18, Spline Tool, NAG1) (2) to Handle (special tool #8266-8, Handle) (1).
2. Attach dial indicator (special tool #C-3339A, Set, Dial Indicator) (3) to Handle (special tool #8266-8, Handle) (1).
3. Install the assembled tool onto the input shaft of the transmission and tighten the retaining screw on Adapter (special tool #8266-18, Spline Tool, NAG1) to secure it to the input shaft.

4. Position the dial indicator plunger against a flat spot on the oil pump and zero the dial indicator.
5. Move input shaft in and out and record reading. End play should be 0.3-0.5 mm (0.012-0.020 in.). Adjust as necessary.

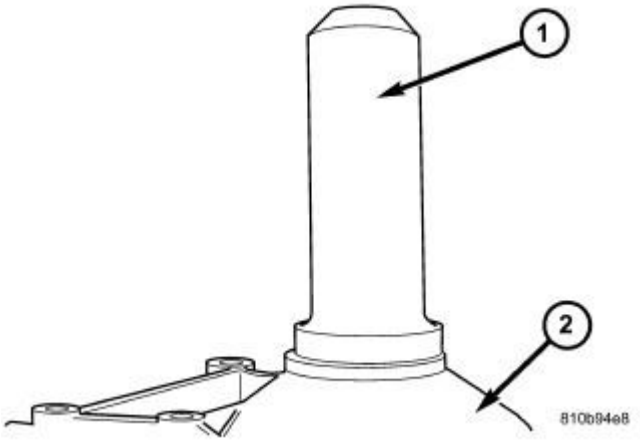

Fig. 81: Installing Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

1 - SEAL INSTALLER 8902A
2 - TRANSMISSION CASE

NOTE: The output shaft shim should be 0.3 mm (0.012 in.). If a 0.3 mm (0.012 in.) shim is not available, use a 0.2 mm (0.008 in.) 0.4 mm (0.016 in.) or 0.5 mm (.020 in.) shim.

33. Install the output shaft shim onto the output shaft.
34. Install a new transmission rear seal into the transmission case with Seal Installer (special tool #8902A, Installer, Seal) (1). Refer to **Fig. 81**.

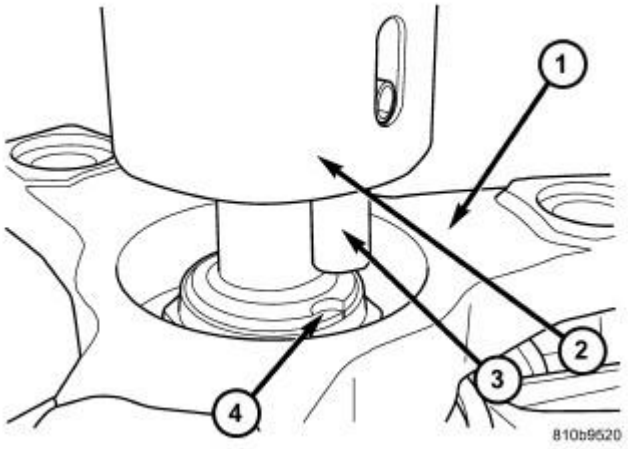

Fig. 82: Align Staking Tool
Courtesy of CHRYSLER GROUP, LLC

1 - PROPELLER SHAFT FLANGE
2 - STAKING TOOL 9078
3 - ALIGNMENT PIN
4 - OUTPUT SHAFT NOTCH

35. Place the transmission in PARK to prepare for the installation of the output shaft nut.
36. Inspect the seal protector on the rear of the output shaft flange. Replace the seal protector if damaged. the seal protector can be removed using a suitable pry tool and installed with a suitable tube style tool.
37. Install the propeller shaft flange onto the output shaft and install an new flange nut. Tighten the flange nut, with a 30 mm 12 point socket, to 200 N.m (147.5 ft.lbs.).
38. Place the Staking Tool (special tool #9078, Staking Tool) (2) and Driver Handle (special tool #C-4171, Driver Handle, Universal) onto the output shaft.
39. Rotate the Staking Tool (special tool #9078, Staking Tool) (2) until the alignment pin (3) engages the output shaft notch (4). Refer to **Fig. 82**.

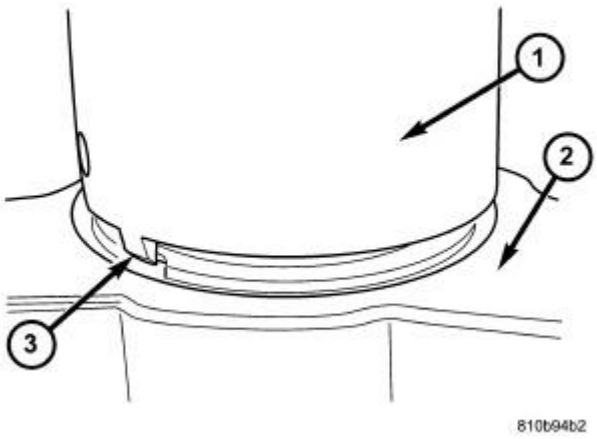

Fig. 83: Stake Output Shaft Nut
Courtesy of CHRYSLER GROUP, LLC

1 - STAKING TOOL 9078
2 - PROPELLER FLANGE
3 - STAKING PIN

40. Press downward on the staking tool (1) until the staking pin (3) contacts the output shaft nut flange (2). Refer to **Fig. 83**.
41. Strike the Driver handle (special tool #C-4171, Driver Handle, Universal) with a suitable hammer until the output shaft nut is securely staked to the output shaft.

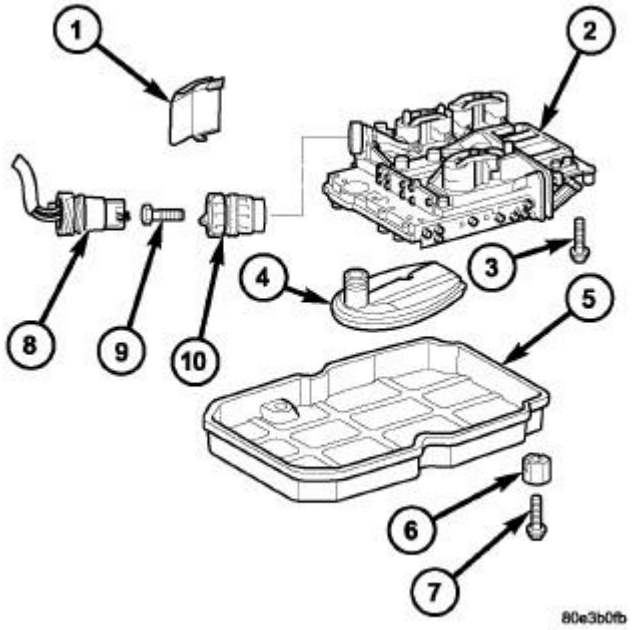

Fig. 84: Removing/Installing Electrohydraulic Unit

Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD
2 - ELECTROHYDRAULIC UNIT
3 - BOLT
4 - OIL FILTER
5 - OIL PAN
6 - CLAMPING ELEMENT
7 - BOLT
8 - 13-PIN PLUG CONNECTOR
9 - BOLT
10 - ADAPTER PLUG

42. Install electrohydraulic unit (2). Tighten the bolts to 8 N.m (71 in.lbs.).
43. Install oil filter (4). Refer to **Fig. 84**.
44. Install oil pan (5). Refer to **Fig. 84**. Tighten the bolts to 8 N.m (71 in.lbs.).
45. Install the adapter plug (10). Refer to **Fig. 84**. Tighten the bolt (9) to 2.5 N.m (22 in. lbs.).

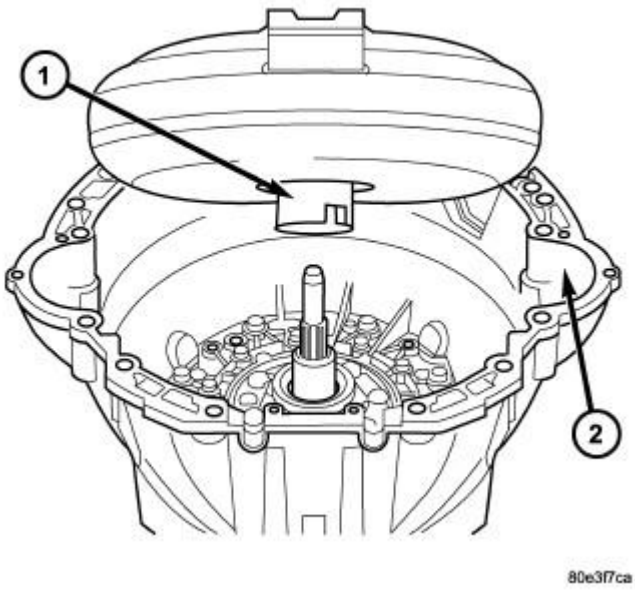

Fig. 85: Removing/Installing Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER
2 - CONVERTER HOUSING

46. Install the torque converter. Refer to **Fig. 85**.

INSTALLATION

INSTALLATION

1. Check torque converter hub and hub drive flats for sharp edges burrs, scratches, or nicks. Polish the hub and flats with 800/1000 grit paper and crocus cloth if necessary. The hub must be smooth to avoid damaging pump seal at installation.
2. If a replacement transmission is being installed, transfer any components necessary, such as the manual shift lever and shift cable bracket, from the original transmission onto the replacement transmission.
3. Lubricate oil pump seal lip with transmission fluid.

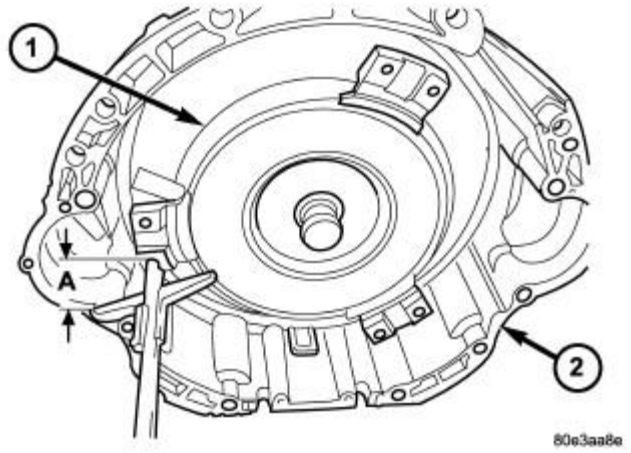

Fig. 86: Measuring Torque Converter Installation Depth
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER
2 - TRANSMISSION HOUSING

4. Place torque converter (1) in position in transmission (2).

CAUTION: Do not damage oil pump seal or converter hub while inserting torque converter into the front of the transmission.

5. Align torque converter to oil pump seal opening.
6. Insert torque converter hub into oil pump.
7. While pushing torque converter inward, rotate converter until converter is fully seated in the oil pump gears.
8. Check converter seating with a scale and straightedge (A). Surface of converter lugs should be at least 19 mm (3/4 in.) to rear of straightedge when converter is fully seated.
9. If necessary, temporarily secure converter with C-clamp attached to the converter housing.

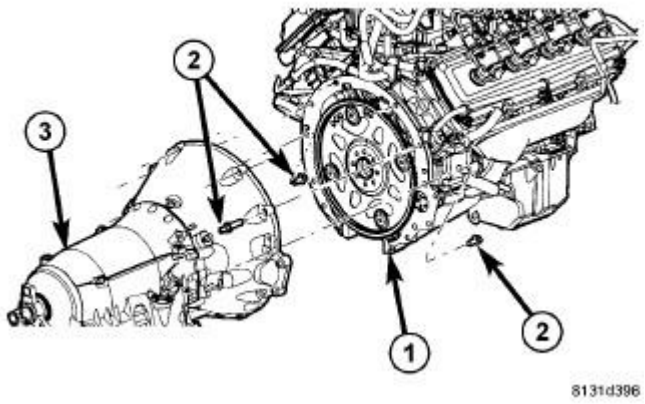

Fig. 87: Removing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - ENGINE
2 - BOLTS
3 - TRANSMISSION

10. Check condition of converter driveplate. Replace the plate if cracked, distorted or damaged. **Also be sure transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.**
11. Apply a light coating of Mopar® High Temp Grease to the torque converter hub pocket in the rear pocket of the engine's crankshaft.
12. Raise transmission (3) and align the torque converter with the drive plate and the transmission converter housing with the engine block (1).
13. Move transmission forward. Then raise, lower, or tilt transmission to align the converter housing with the engine block dowels.
14. While installing the fill tube into the transmission case, carefully work transmission forward and over engine block dowels until converter hub is seated in crankshaft. Verify that no wires, or the transmission vent hose, have become trapped between the engine block and the transmission.
15. Install two torque converter housing bolts (2) to attach the transmission to the engine.
16. Install the remaining torque converter housing to engine bolts (2). Tighten to 39 N.m (29 ft.lbs.).
17. Install the fill tube bolt at the transmission case. Tighten the bolt to 12 N.m (105 lbs in.).

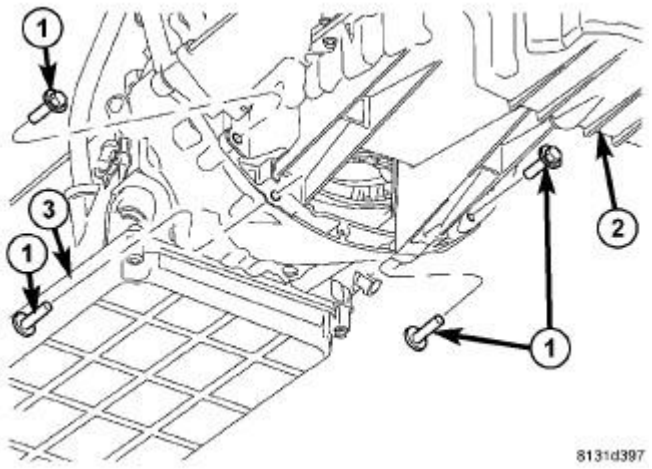

Fig. 88: Removing Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - BOLTS
2 - ENGINE OIL PAN
3 - TRANSMISSION

18. Install the transmission (3) to engine oil pan (2) bolts (1). Tighten to 39 N.m (29 ft.lbs.).

    CAUTION: It is essential that correct length bolts be used to attach the converter to the driveplate. Bolts that are too long will damage the clutch surface inside the converter.

19. For gas engines, install all torque converter-to-driveplate bolts (1) by hand.
20. Verify that the torque converter is pulled flush to the driveplate. Tighten bolts to 42 N.m (31 ft. lbs.).

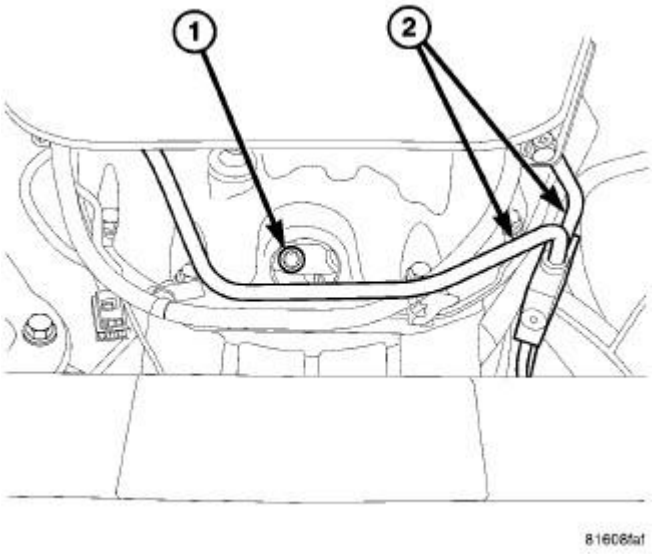

Fig. 89: Torque Converter To Flex Plate Bolts & Fluid Lines
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER BOLTS
2 - TRANSMISSION COOLER LINES

CAUTION: It is essential that correct length bolts be used to attach the converter to the driveplate. Bolts that are too long will damage the clutch surface inside the converter.

21. For diesel engines, install all torque converter-to-driveplate bolts (1) by hand.

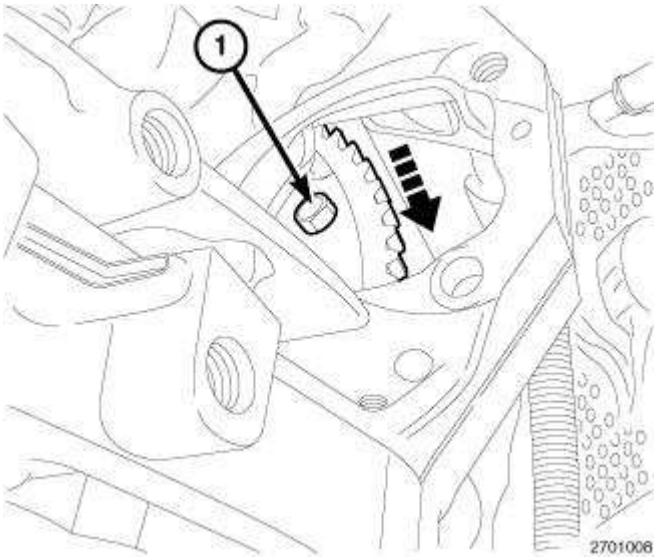

Fig. 90: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

22. Verify that the torque converter is pulled flush to the driveplate. Tighten bolts to 42 N.m (31 ft. lbs.).

NOTE: The starters are located on the right side of the transmission for RWD vehicles and they are on the left side for AWD vehicles.

23. Install starter motor (1). Refer to **STARTER, INSTALLATION** .

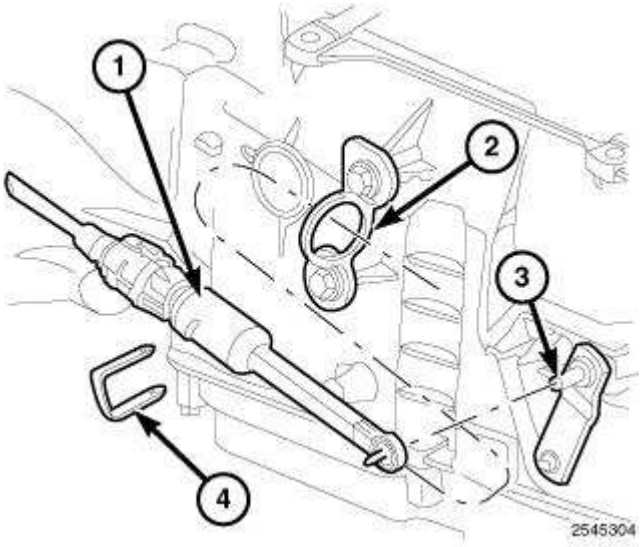

Fig. 91: Identifying Gearshift Cable, Eyelet & Manual Shift Lever
Courtesy of CHRYSLER GROUP, LLC

24. Route the gearshift cable (1) through the mounting bracket (2).
25. Engage the gearshift cable (1) eyelet onto the transmission manual shift lever (3).
26. Install the gearshift cable retaining clip (4) (if equipped).

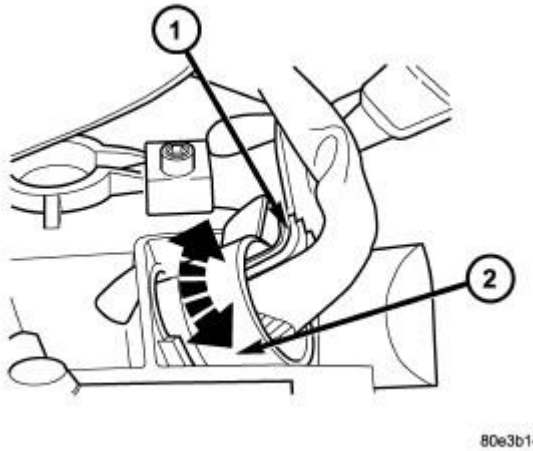

Fig. 92: Removing/Installing Wiring Connector Plug

Courtesy of CHRYSLER GROUP, LLC

1 - PLUG CONNECTOR
2 - ADAPTER PLUG

27. Check O-rings on plug connector (1), and replace if necessary.
28. Install the plug connector (1) into the adapter plug (2). Turn bayonet lock of the adapter plug (2) clockwise to connect plug connector (1).

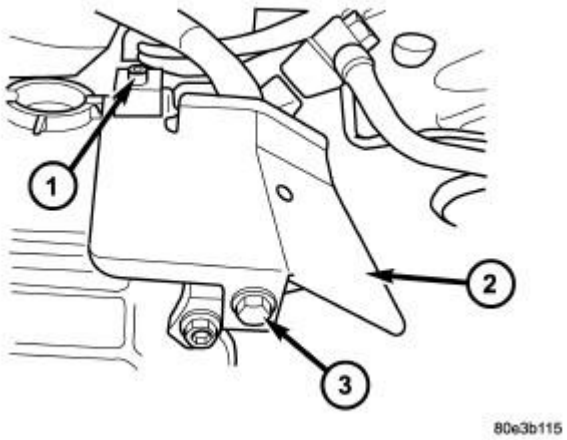

Fig. 93: Removing/Installing Heat Shield
Courtesy of CHRYSLER GROUP, LLC

1 - SCREW
2 - HEAT SHIELD
3 - BOLT

29. Position the heat shield (2), if equipped, onto the transmission housing and install the screw (1) and bolt (3) to hold the shield in place.

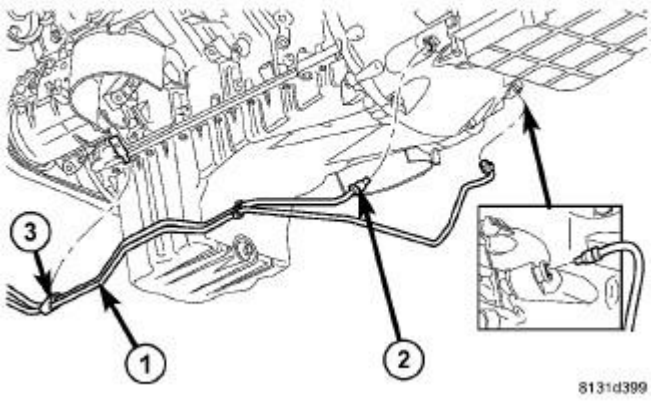

Fig. 94: Transmission Lines
Courtesy of CHRYSLER GROUP, LLC

1 - TRANSMISSION OIL COOLER LINES
2 - COOLER LINE FITTINGS
3 - SUPPORT CLAMPS

30. Connect the cooler line fittings (2) and cooler lines (1) to the transmission.

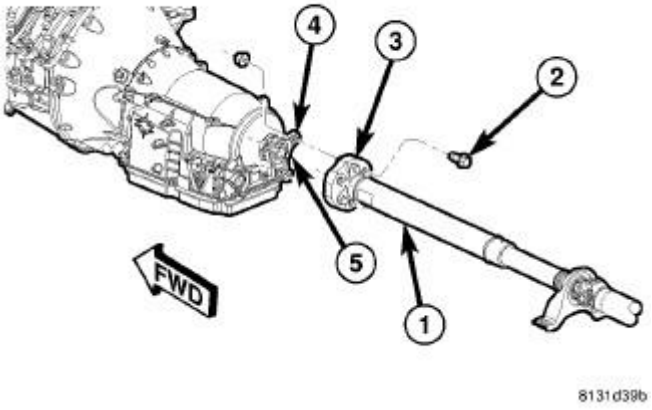

Fig. 95: Disconnect Propeller Shaft
Courtesy of CHRYSLER GROUP, LLC

1 - PROPELLER SHAFT
2 - BOLTS
3 - PROPELLER SHAFT COUPLER
4 - COMPANION FLANGE
5 - PROPELLER SHAFT PILOT

31. For AWD vehicles, install the transfer case, refer to **INSTALLATION** .
32. For RWD vehicles:
    1. Align and connect the propeller shaft (1). Refer to **INSTALLATION** .

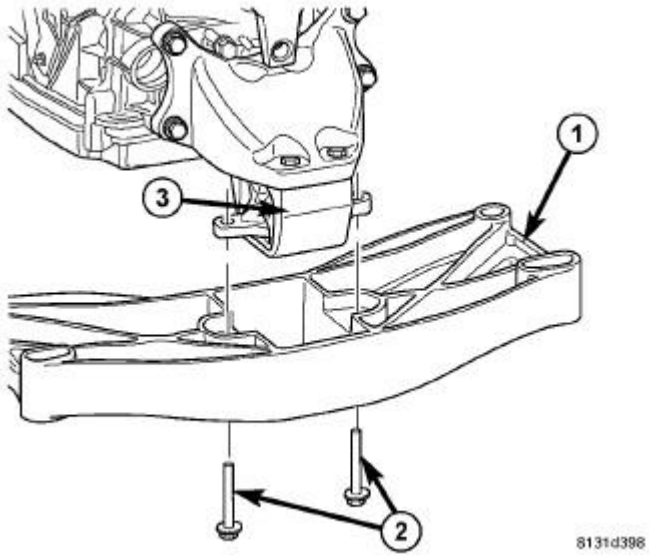

Fig. 96: Locating Transmission Mount, Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

33. Install rear support (3) to transmission. Tighten bolts to 47 N.m (35 ft.lbs.)
34. Install rear transmission crossmember (1). Tighten crossmember to frame bolts to 68 N.m (50 ft.lbs.).
35. Lower transmission onto crossmember and install bolts attaching transmission mount to crossmember. Tighten clevis bracket to crossmember bolts (2) to 47 N.m (35 ft.lbs.).
36. Install exhaust components.
37. Install any necessary splash shields.
38. Adjust gearshift cable if necessary.
39. Lower vehicle.
40. Connect negative battery cable.
41. Fill the transmission with the appropriate transmission fluid according to the standard procedure. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, DESCRIPTION** &**FLUID AND FILTER, STANDARD PROCEDURE**.

    NOTE: If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure using the scan tool. Refer to MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE .

42. Verify proper operation.

SPECIAL TOOLS

SPECIAL TOOLS

	10007 - Plate, Air Pressure Test (Originally Shipped In Kit Number(s) 10007.)
	6311 - Gauge Bar (Originally Shipped In Kit Number(s) 6692, 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	8266-18 - Spline Tool, NAG1 (Originally Shipped In Kit Number(s) 9202, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN, 9329, 9516, 9516-CAN, 9518, 9540, 9785.)
	8266-8 - Handle (Originally Shipped In Kit Number(s) 9202A-CAN, 9202CC, 9299CC, 9299CC, 9300A-CAN.)
	8900A - Multi Use Spring Compressor (Originally Shipped In Kit Number(s) 9202, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN, 9329-SUP, 9516-SUP, 9518-SUP, 9540-SUP, 9785-SUP.)
	8901A - Pressing Tool (Originally Shipped In Kit Number(s) 8901A.)
	8902A - Installer, Seal (Originally Shipped In Kit Number(s) 9202, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN, 9329, 9516, 9516-CAN, 9518, 9540, 9785.)
	9078 - Staking Tool (Originally Shipped In Kit Number(s) 9202, 9202CC, 9299, 9300, 9300A-CAN, 9300-CAN, 9300-CAN, 9329, 9516, 9516-CAN, 9518, 9540, 9785.)
	9082A - Remover, Bearing (Originally Shipped In Kit Number(s) 9202, 9299, 9329, 9516, 9518, 9540, 9785.)
	9287 - Installer, Bearing (Originally Shipped In Kit Number(s) 9202, 9202CC, 9299, 9329, 9516, 9516-CAN, 9518, 9540, 9785.)
	9336A - Dipstick (Originally Shipped In Kit Number(s) 9336A, 9541.)
	9902 - Installer, Seal (Originally Shipped In Kit Number(s) 9901.)
	C-3339A - Set, Dial Indicator (Originally Shipped In Kit Number(s) 9202.)
	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)

BEARING, OUTPUT SHAFT

REMOVAL

REMOVAL

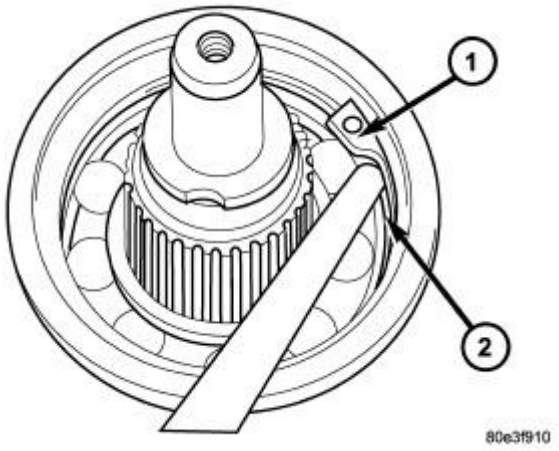

Fig. 97: Removing/Installing Rear Output Shaft Retaining Ring
Courtesy of CHRYSLER GROUP, LLC

1 - RETAINING RING
2 - OUTPUT SHAFT BEARING

1. Raise and support vehicle.
2. Remove the propeller shaft. Refer to **REMOVAL** .
3. Verify that the transmission is in PARK in order to prepare for the removal of the output shaft nut.
4. Remove the nut, with a 30 mm 12 point socket, holding the propeller shaft flange to the output shaft and remove the flange.
5. Remove the transmission rear oil seal with a suitable slide hammer and screw.
6. Remove the transmission output shaft washer. Be sure to tag the washer since it is very similar to the geartrain end-play shim and they must not be interchanged.
7. Remove the transmission rear output shaft bearing retaining ring (1). Refer to **Fig. 97**.

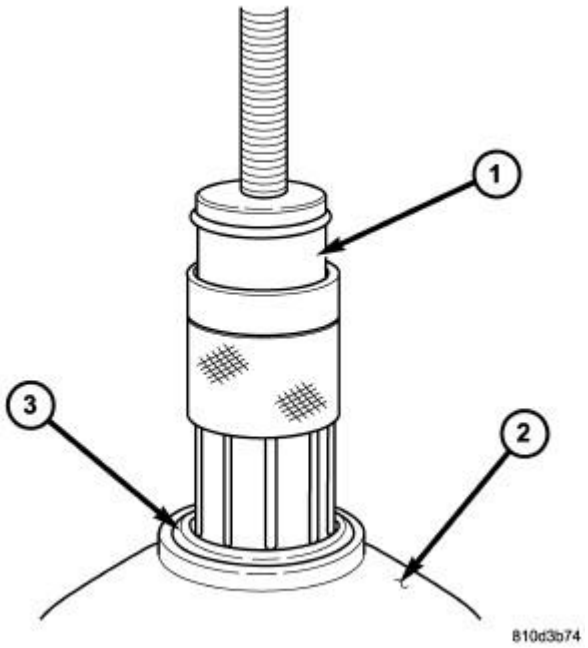

Fig. 98: Removing Bearing
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING REMOVER 9082A
2 - TRANSMISSION CASE
3 - OUTPUT SHAFT BEARING

8. Position Bearing Remover (special tool #9082A, Remover, Bearing) (1) over the inner race of the output shaft bearing. Refer to **Fig. 98**.

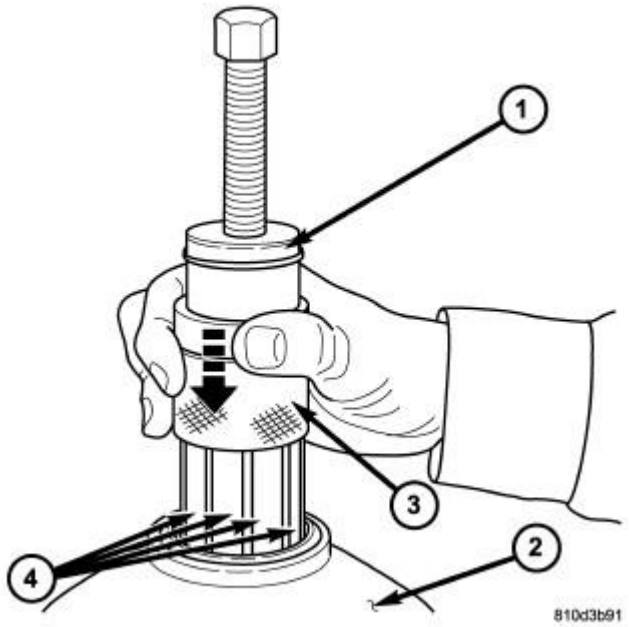

Fig. 99: Slide Remover 9082a Collar Downward
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING REMOVER 9082A
2 - TRANSMISSION CASE
3 - COLLAR
4 - FINGERS

NOTE: Due to production variations in the bearing, it may not be possible to slide the collar fully downward. It is only necessary to slide the collar down far enough that the fingers securely grasp the inner bearing race.

9. Slide the collar (3) on the Bearing Remover (special tool #9082A, Remover, Bearing) (1) downward over the fingers (3) of the tool. Refer to **Fig. 99**.

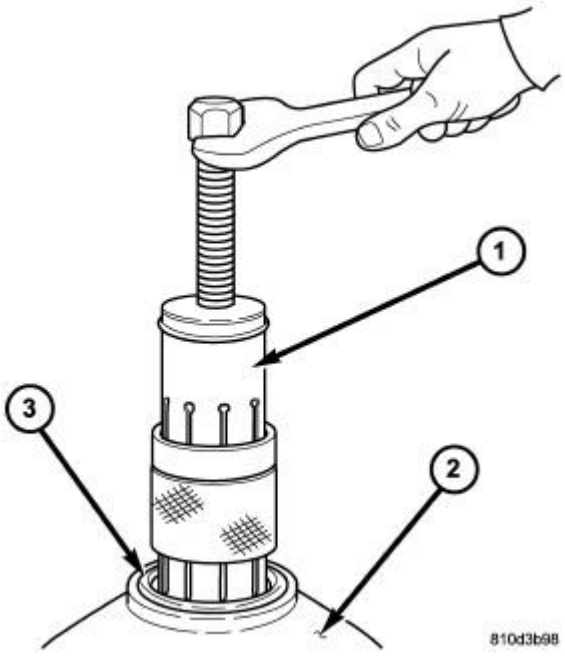

Fig. 100: Removing Output Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING REMOVER 9082A
2 - TRANSMISSION CASE
3 - OUTPUT SHAFT BEARING

CAUTION: Verify that the geartrain end-play shim has remained on the output shaft and against the park gear. The shim may be adhered to the bearing inner race. Retrieve the shim from the bearing and install over the output shaft and against the park gear.

10. Remove the output shaft bearing (3). Refer to **Fig. 100**.

INSTALLATION

INSTALLATION

NOTE: The output shaft shim should be 0.3 mm (0.012 in.). If a 0.3 mm (0.012 in.) shim is not available, use a 0.2 mm (0.008 in.) 0.4 mm (0.016 in.) or 0.5 mm (.020 in.) shim.

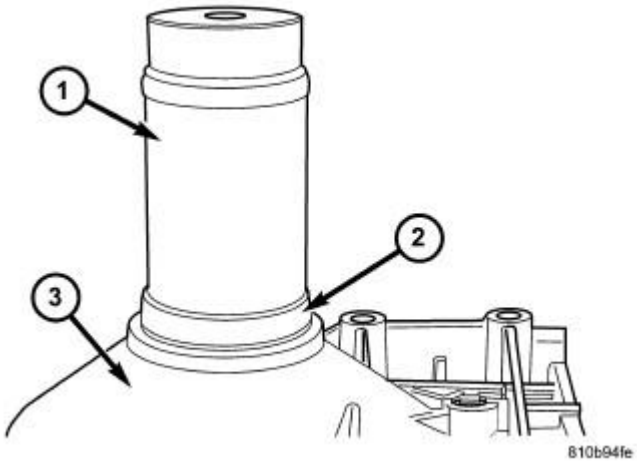

Fig. 101: Installing Output Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING INSTALLER 9287
2 - BEARING
3 - TRANSMISSION CASE

CAUTION: Verify that the geartrain end-play shim is properly installed over the output shaft and against the park gear.

1. Install output shaft bearing in the rear transmission housing. Using Bearing Installer (special tool #9287, Installer, Bearing) (1), install the output shaft bearing (2) into the transmission housing. Refer to **Fig. 101**. **The closed side of the plastic cage must point towards the parking lock gear.**

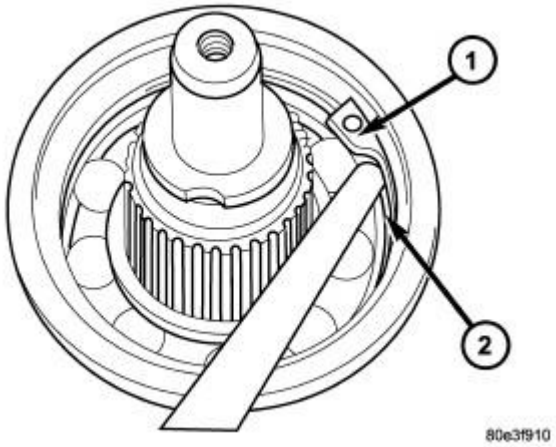

Fig. 102: Removing/Installing Rear Output Shaft Retaining Ring
Courtesy of CHRYSLER GROUP, LLC

1 - RETAINING RING
2 - OUTPUT SHAFT BEARING

2. Install the retaining ring (1). Refer to **Fig. 102**. Ensure that the retaining ring is seated correctly in the groove.
3. Check that there is no play between the bearing and the retaining ring using feeler gauge.
4. There must be no play between the retaining ring and the bearing. If the ring cannot be installed, a thinner ring must be used. If there is play between the ring and the bearing, a thicker ring must be installed. Retaining rings are available in thicknesses of 2.0 mm (0.079 in.), 2.1 mm (0.083 in.), and 2.2 mm (0.087 in.).
5. Install the output shaft washer onto the output shaft.

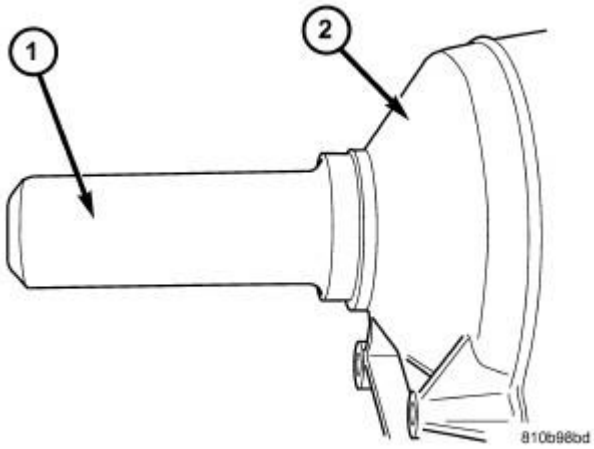

Fig. 103: Installing Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

1 - SEAL INSTALLER 8902A
2 - TRANSMISSION CASE

6. Install a new transmission rear seal into the transmission case with Seal Installer (special tool #8902A, Installer, Seal) (1). Refer to **Fig. 103**.
7. Verify that the transmission is in PARK in order to prepare for the installation of the output shaft nut.
8. Install the propeller shaft flange onto the output shaft and install an new flange nut. Tighten the flange nut, with a 30 mm 12 point socket, to 200 N.m (147.5 ft.lbs.).

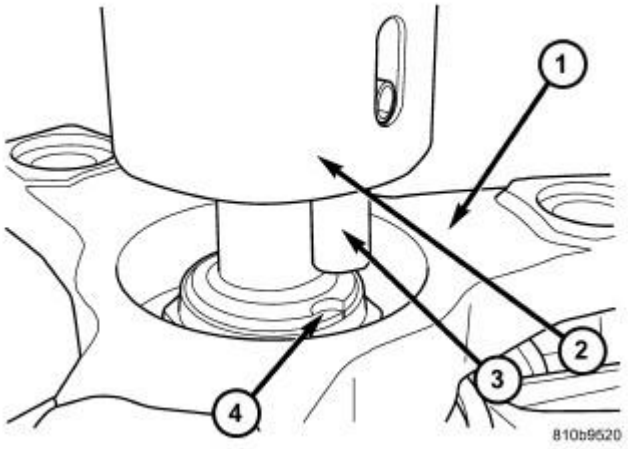

Fig. 104: Align Staking Tool
Courtesy of CHRYSLER GROUP, LLC

1 - PROPELLER SHAFT FLANGE
2 - STAKING TOOL 9078
3 - ALIGNMENT PIN
4 - OUTPUT SHAFT NOTCH

9. Stake the output shaft nut to the output shaft as follows.Place the Staking Tool (special tool #9078, Staking Tool) (2) and Driver Handle (special tool #C-4171, Driver Handle, Universal) onto the output shaft.
10. Rotate the Staking Tool (special tool #9078, Staking Tool) (2) until the alignment pin (3) engages the output shaft notch (4). Refer to **Fig. 104**.

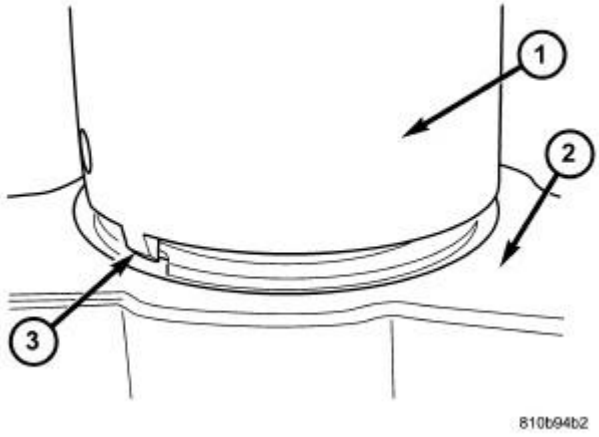

Fig. 105: Stake Output Shaft Nut
Courtesy of CHRYSLER GROUP, LLC

1 - STAKING TOOL 9078

2 - PROPELLER FLANGE
3 - STAKING PIN

11. Press downward on the staking tool (1) until the staking pin (3) contacts the output shaft nut flange (2). Refer to **Fig. 105**.
12. Strike the Driver handle (special tool #C-4171, Driver Handle, Universal) with a suitable hammer until the output shaft nut is securely staked to the output shaft.
13. Install the propeller shaft. Refer to **INSTALLATION** .

CABLE, SHIFT

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - GEARSHIFT CABLE

1. The floor shifter lever and gate positions should be in alignment with all transmission PARK, NEUTRAL, and gear detent positions.
2. Engine starts must be possible with floor shift lever in PARK or NEUTRAL gate positions only. Engine starts must not be possible in any other gear position.
3. With floor shift lever handle push-button not depressed and lever in:
    1. PARK position - Apply forward force on center of handle and remove pressure. Engine starts must be possible.
    2. PARK position - Apply rearward force on center of handle and remove pressure. Engine starts must be possible.
    3. NEUTRAL position - Normal position. Engine starts must be possible.
    4. NEUTRAL position - Engine running and brakes applied, apply forward force on center of shift handle. Transmission shall not be able to shift from NEUTRAL to REVERSE.

ADJUSTMENTS

GEARSHIFT CABLE - FLOOR MOUNT

Check adjustment by starting the engine in PARK and NEUTRAL. Adjustment is CORRECT if the engine starts only in these positions. Adjustment is INCORRECT if the engine starts in one but not both positions. If the engine starts in any position other than PARK or NEUTRAL, or if the engine will not start at all, the park/neutral position contact may be faulty.

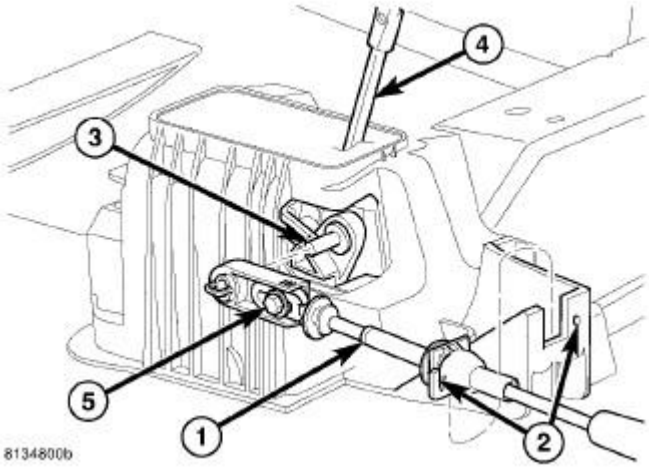

Fig. 106: Gearshift Cable AT Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - CABLE RETAINER AND NOTCH
3 - SHIFTER ASSEMBLY PIN
4 - SHIFT LEVER
5 - ADJUSTMENT BOLT

1. Shift transmission into PARK.
2. Remove floor console as necessary for access to the shift cable adjustment. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Loosen the shift cable adjustment screw (5). Refer to **Fig. 106**.
4. Raise vehicle.
5. Unsnap cable eyelet from transmission shift lever.
6. Verify transmission shift lever is in PARK detent by moving lever fully rearward. Last rearward detent is PARK position.
7. Verify positive engagement of transmission park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.
8. Snap cable eyelet onto transmission shift lever.

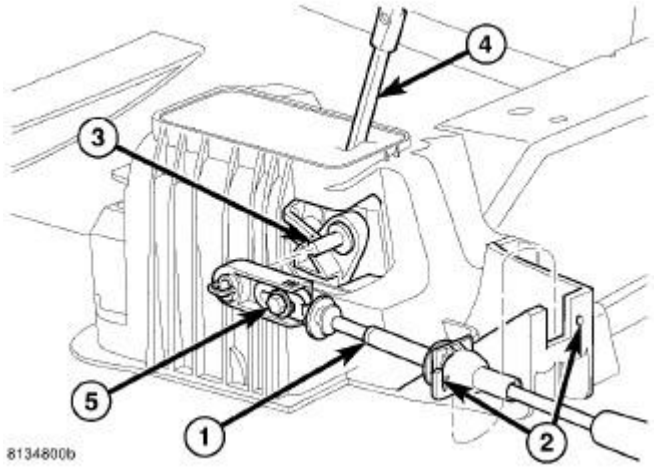

Fig. 107: Gearshift Cable AT Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - CABLE RETAINER AND NOTCH
3 - SHIFTER ASSEMBLY PIN
4 - SHIFT LEVER
5 - ADJUSTMENT BOLT

9. Lower vehicle
10. Tighten the shift cable adjustment screw (5) to 7 N.m (65 in. Refer to **Fig. 107**.lbs.).
11. Verify correct operation.
12. Install any floor console components removed for access. Refer to **CONSOLE, FLOOR, INSTALLATION** .

GEARSHIFT CABLE - COLUMN MOUNT

Check adjustment by starting the engine in PARK and NEUTRAL. Adjustment is CORRECT if the engine starts only in these positions. Adjustment is INCORRECT if the engine starts in one but not both positions. If the engine starts in any position other than PARK or NEUTRAL, or if the engine will not start at all, the park/neutral position contact may be faulty.

1. If necessary, remove the instrument panel side trim at the end of the instrument panel.
2. If necessary, remove the knee bolster fasteners.
3. If necessary, disconnect the trunk release harness connector to the trunk release switch on the knee bolster, and remove the knee bolster.

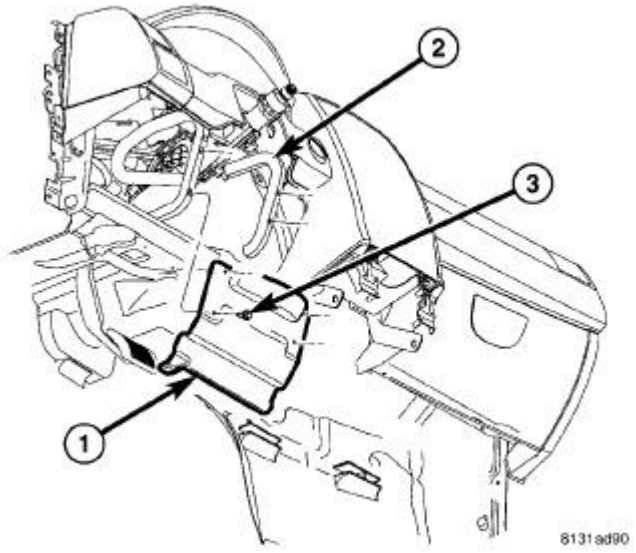

Fig. 108: Reinforcement I/P Steering Column
Courtesy of CHRYSLER GROUP, LLC

4. If necessary, remove the screws (3), and remove the instrument panel steering column cover reinforcement (1).

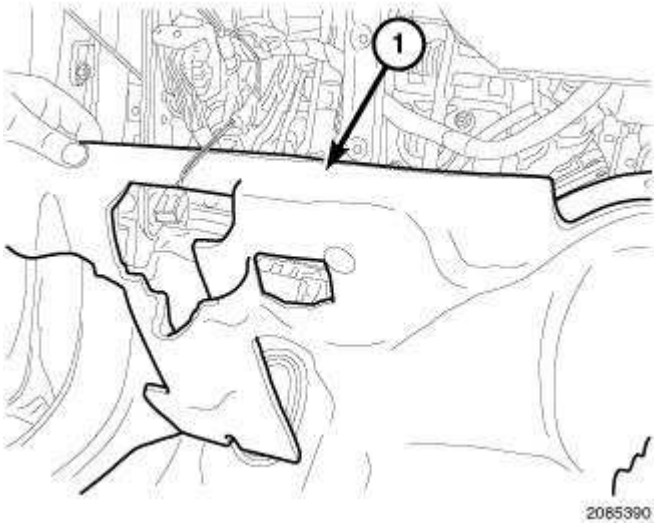

Fig. 109: Identifying Silencer Panel
Courtesy of CHRYSLER GROUP, LLC

5. If necessary, remove the silencer panel fasteners, and remove the silencer panel (1).
6. Shift transmission into PARK.

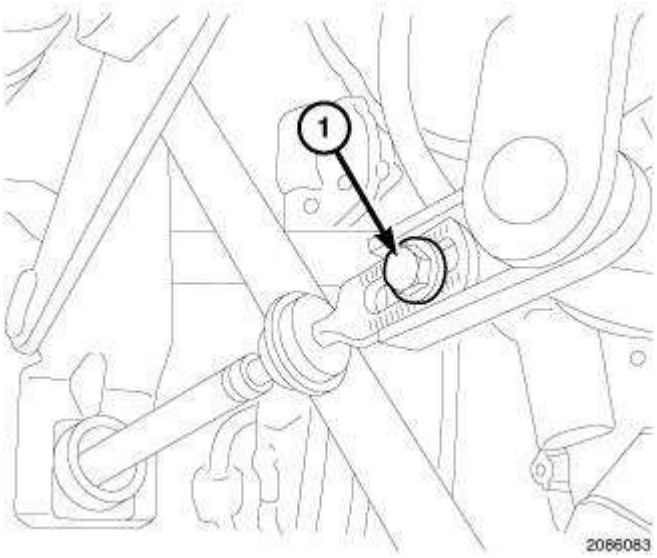

Fig. 110: Shift Cable & Fastener
Courtesy of CHRYSLER GROUP, LLC

7. Loosen the shift cable adjustment screw (1).
8. Raise vehicle.
9. Unsnap cable eyelet from transmission shift lever.
10. Verify transmission shift lever is in PARK detent by moving lever fully rearward. Last rearward detent is PARK position.
11. Verify positive engagement of transmission park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.
12. Snap cable eyelet onto transmission shift lever.
13. Lower vehicle
14. Tighten the shift cable adjustment screw (1) to 7 N.m (65 in.lbs.).
15. Verify correct operation of the shifter.

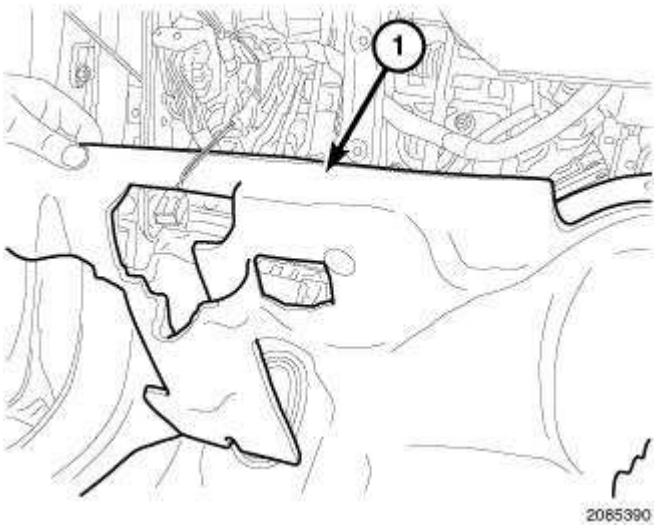

Fig. 111: Identifying Silencer Panel
Courtesy of CHRYSLER GROUP, LLC

16. If removed, install the silencer panel (1), and the silencer panel fasteners.

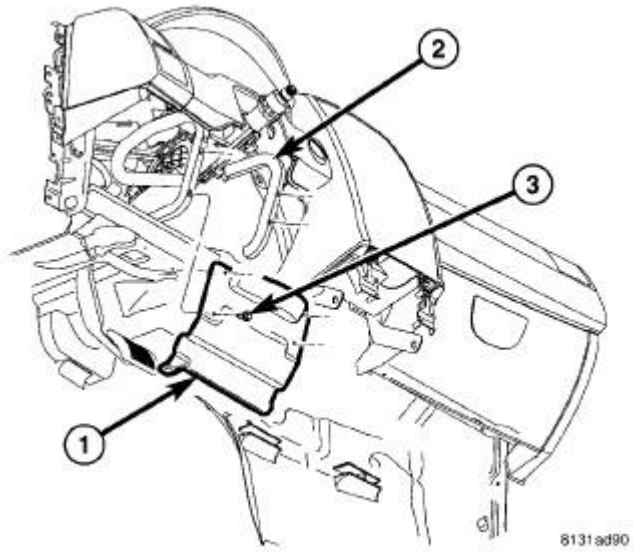

Fig. 112: Reinforcement I/P Steering Column
Courtesy of CHRYSLER GROUP, LLC

17. If removed, install the instrument panel steering column cover reinforcement (1), and the screws (3).
18. If removed, reconnect the trunk release harness connector to the trunk release switch on the knee bolster, and install the knee bolster.
19. If removed, install the knee bolster fasteners.
20. If removed, install the instrument panel side trim at the end of the instrument panel.

REMOVAL

FLOOR MOUNT

1. Shift transmission into PARK.
2. Raise vehicle.

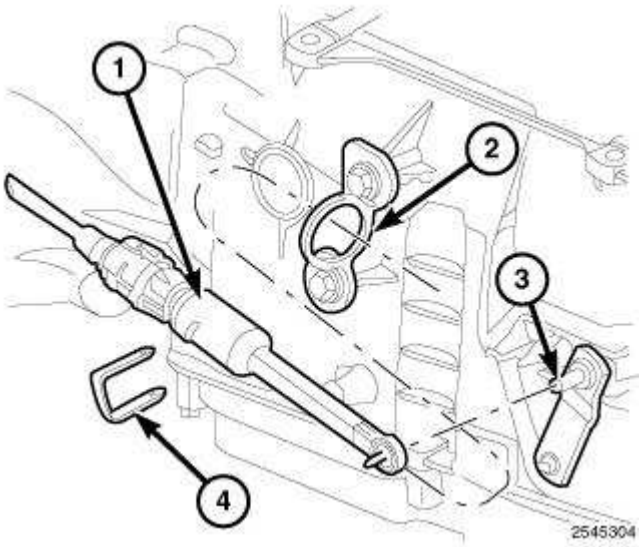

Fig. 113: Identifying Gearshift Cable, Eyelet & Manual Shift Lever
Courtesy of CHRYSLER GROUP, LLC

3. Remove the gearshift cable retaining clip (4) (if equipped).
4. Disengage the gearshift cable (1) eyelet at transmission manual shift lever (3) and pull cable out of the mounting bracket (2).
5. Lower the vehicle.
6. Remove the floor console as necessary to access the shift mechanism and cables. Refer to **CONSOLE, FLOOR, REMOVAL** .
7. If necessary, remove the bolts holding the shield, covering the gearshift and park lock cables, to the floorpan and remove the shield.

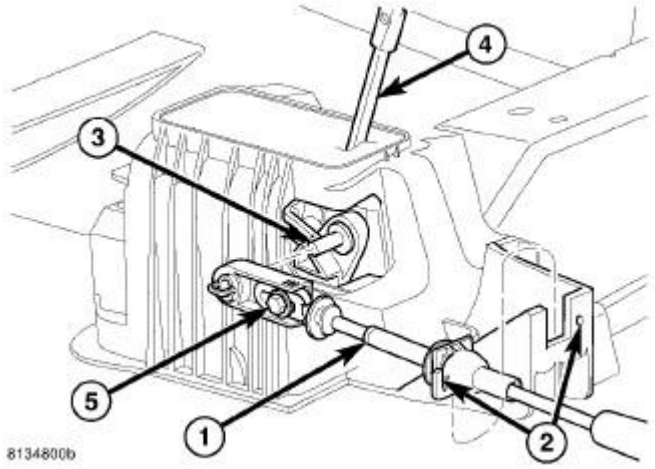

Fig. 114: Gearshift Cable AT Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - CABLE RETAINER AND NOTCH
3 - SHIFTER ASSEMBLY PIN
4 - SHIFT LEVER
5 - ADJUSTMENT BOLT

8. Remove the gearshift cable (1) from the shift lever pin (3).
9. Remove the gearshift cable retainer (2) from the notch (2) in the shifter assembly.

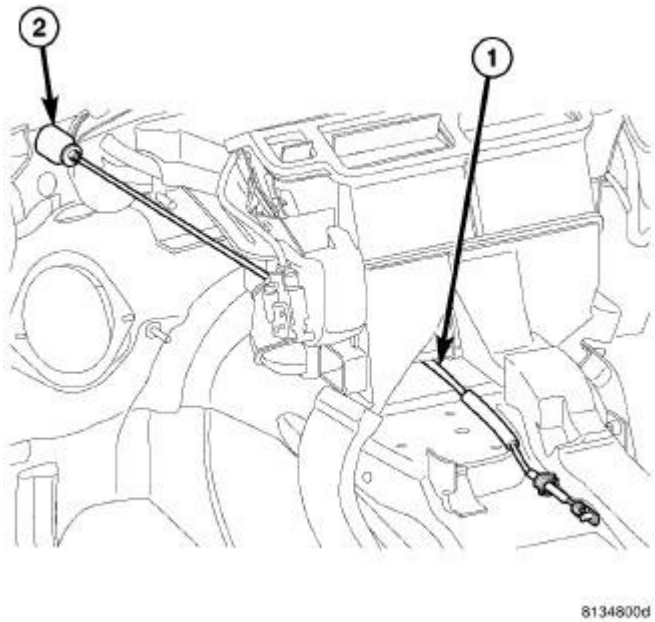

Fig. 115: Gearshift Cable Grommet

Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - GROMMET

10. From under the hood, remove the shift cable grommet (2) from the dash panel.
11. Remove gearshift cable (1) from vehicle.

COLUMN MOUNT

1. Place the shifter in PARK
2. Raise the vehicle.

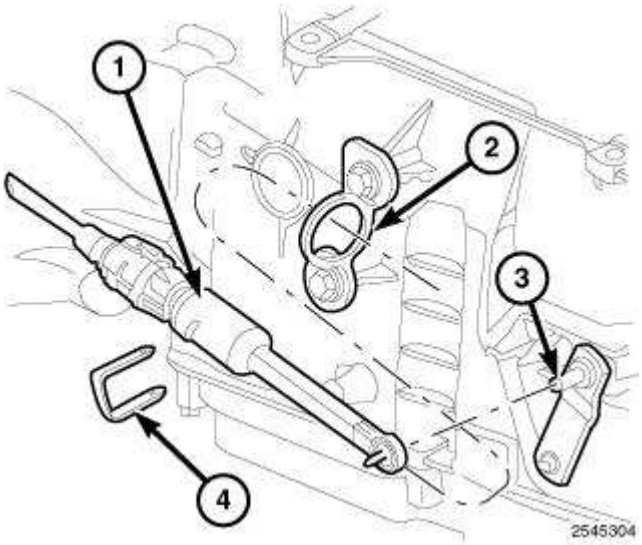

Fig. 116: Identifying Gearshift Cable, Eyelet & Manual Shift Lever
Courtesy of CHRYSLER GROUP, LLC

3. Remove the gearshift cable retaining clip (4) (if equipped).
4. Disconnect the gearshift cable (1) from the shift lever (3), and remove cable from bracket (2).
5. Lower the vehicle.
6. Remove the instrument panel side trim.
7. Remove the knee bolster fasteners, and the knee bolster.
8. If equipped, disconnect the trunk release harness connector from the trunk release switch on the knee bolster.

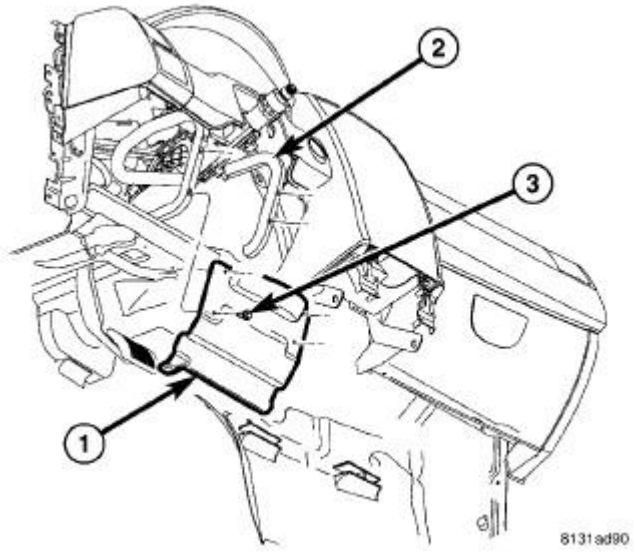

Fig. 117: Reinforcement I/P Steering Column
Courtesy of CHRYSLER GROUP, LLC

9. Remove the screws (3), and the instrument panel steering column cover reinforcement (1).

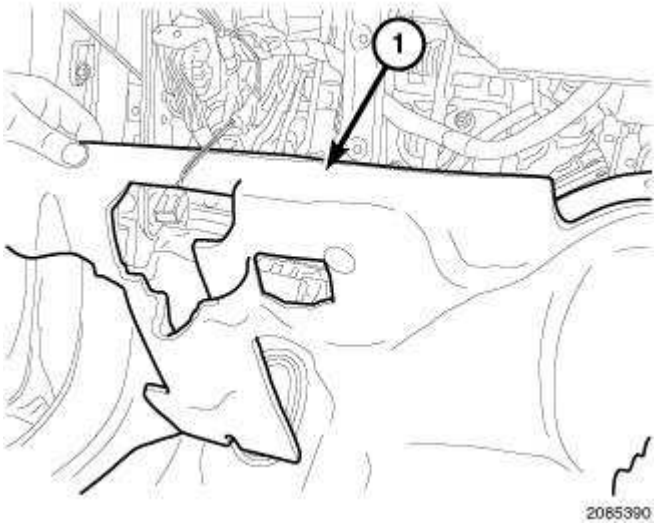

Fig. 118: Identifying Silencer Panel
Courtesy of CHRYSLER GROUP, LLC

10. Remove the silencer panel fasteners and silencer panel (1).

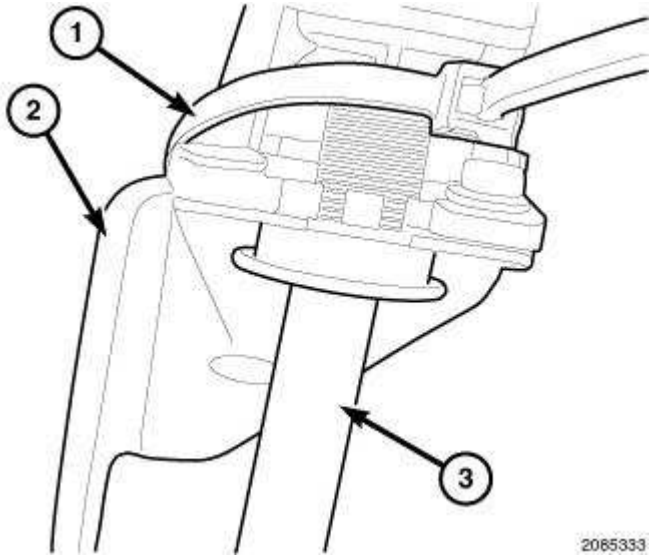

Fig. 119: Tie Strap To Secure Shift Cable To Shift Bracket
Courtesy of CHRYSLER GROUP, LLC

11. If equipped, remove the tie strap (1) that secures the shift cable (3) to the shift bracket (2).

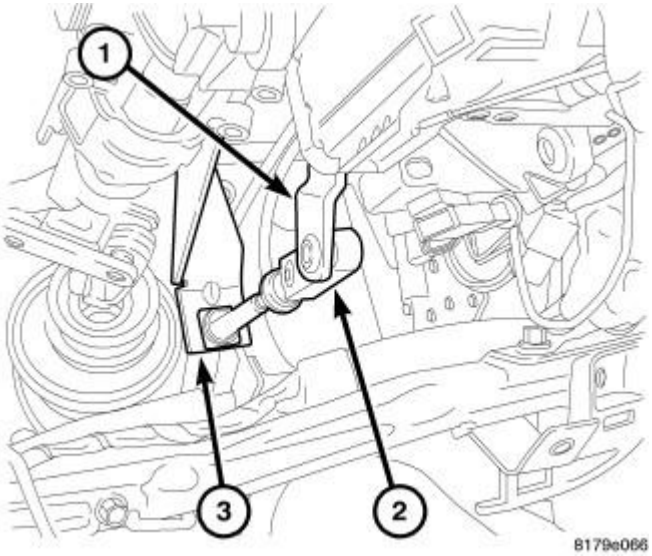

Fig. 120: Shift Cable AT Column
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the shift cable (2) from the shift mechanism (1).
13. Disconnect the shift cable from to cable bracket (3).

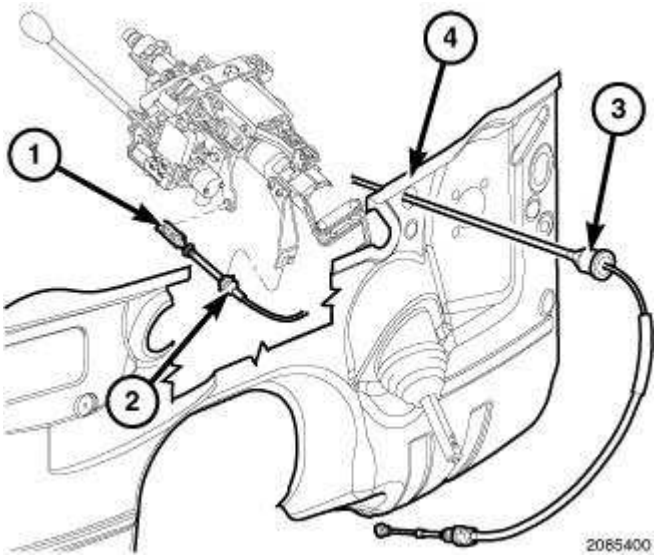

Fig. 121: Identifying Shifter Cable Routing
Courtesy of CHRYSLER GROUP, LLC

14. Remove the shifter cable grommet (3) from the opening in the dash panel (4), and remove the shifter cable.

INSTALLATION

FLOOR MOUNT

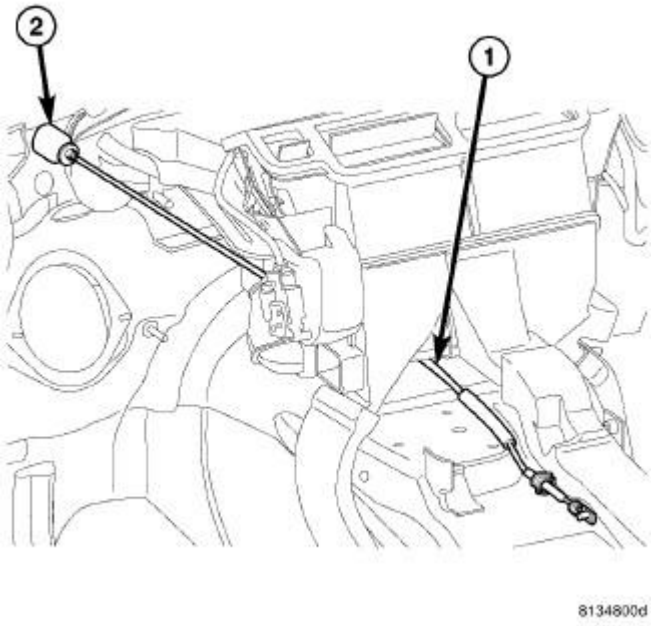

Fig. 122: Gearshift Cable Grommet
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - GROMMET

1. From under the hood, route the gearshift cable (1) through the dash panel and toward the shifter assembly.
2. From under the hood, install the grommet (2) to the dash panel.

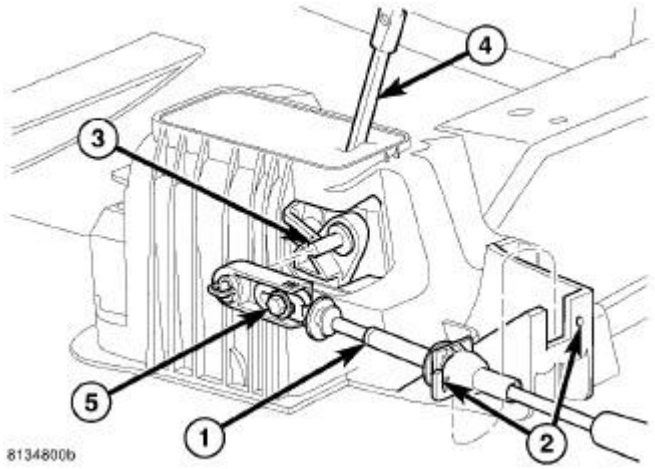

Fig. 123: Gearshift Cable AT Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - CABLE RETAINER AND NOTCH
3 - SHIFTER ASSEMBLY PIN
4 - SHIFT LEVER
5 - ADJUSTMENT BOLT

3. Engage the gearshift cable retainer (2) into the notch (2) in the shifter assembly.
4. Install the gearshift cable (1) onto the shift lever pin (3).
5. Loosen the cable adjustment screw (5), if necessary.

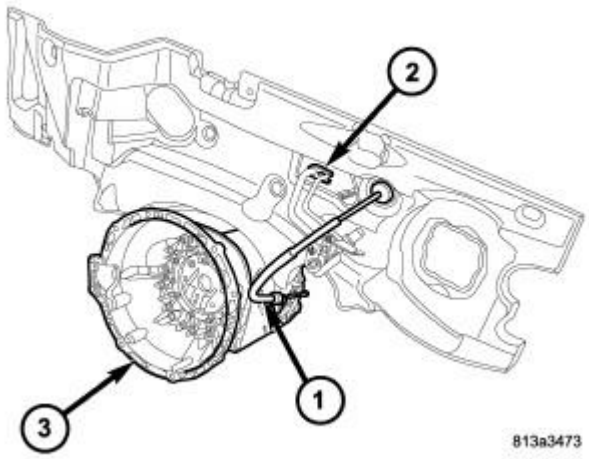

Fig. 124: Gearshift Cable Routing
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - HEATER HOSES
3 - TRANSMISSION

6. From under the hood, route the gearshift cable (1) forward of the air conditioning lines and the heater hoses (2) and toward the transmission (3) manual lever.
7. Place shifter into PARK.
8. Raise vehicle.
9. Verify that the transmission is in the PARK position by trying to rotate the propeller shaft. If the propeller shaft rotates, move the transmission manual shift lever to the full rearward position and turn the propeller shaft until the PARK system is engaged.

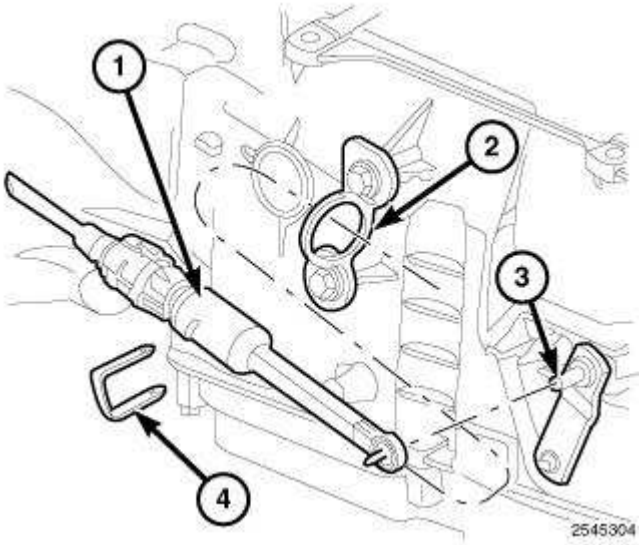

Fig. 125: Identifying Gearshift Cable, Eyelet & Manual Shift Lever
Courtesy of CHRYSLER GROUP, LLC

10. Route the gearshift cable (1) through the mounting bracket (2).
11. Engage the gearshift cable (1) eyelet onto the transmission manual shift lever (3).
12. Install the gearshift cable retaining clip (4) (if equipped).
13. Lower vehicle.
14. Verify that the shifter is in the PARK position.

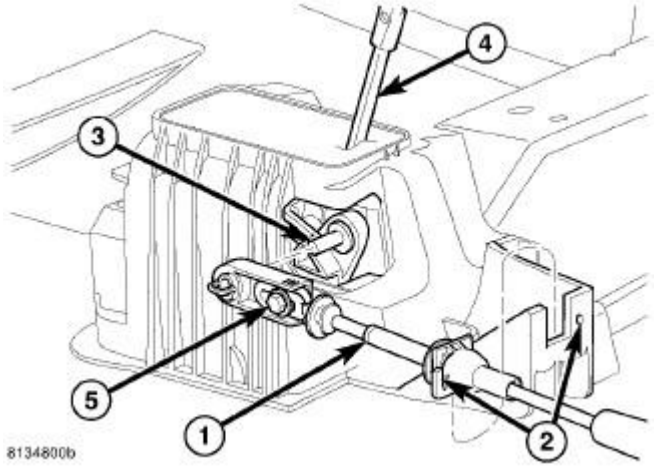

Fig. 126: Gearshift Cable AT Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - CABLE RETAINER AND NOTCH
3 - SHIFTER ASSEMBLY PIN
4 - SHIFT LEVER

5 - ADJUSTMENT BOLT

15. Tighten the adjustment screw (5) to 7 N.m (65 in.lbs.).
16. Verify correct shifter operation.
17. If necessary, install the shield, covering the gearshift and park lock cables, to the floorpan and install the bolts to hold the shield to the floorpan.
18. Install the floor console, lower instrument panel components. Refer to **CONSOLE, FLOOR, INSTALLATION** and dash panel insulation pad as necessary. Refer to **BEZEL, INSTRUMENT PANEL, CENTER, INSTALLATION** .

COLUMN MOUNT

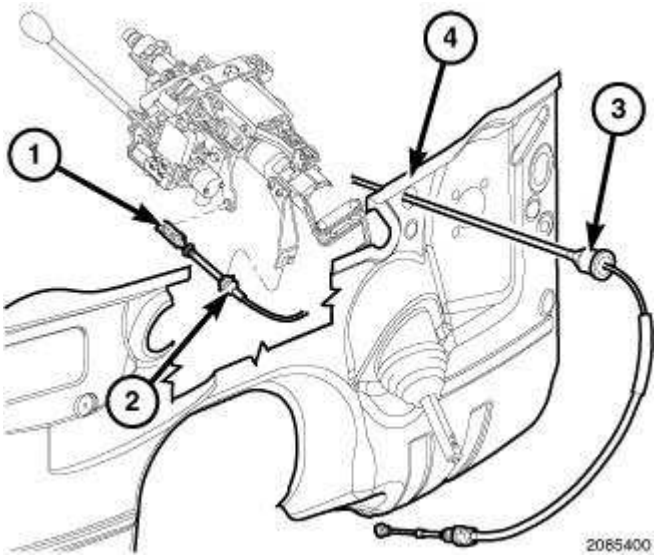

Fig. 127: Identifying Shifter Cable Routing
Courtesy of CHRYSLER GROUP, LLC

1. Route the shifter cable through the dash panel (4), and install the shifter cable grommet (3) into the hole into the dash panel (4).

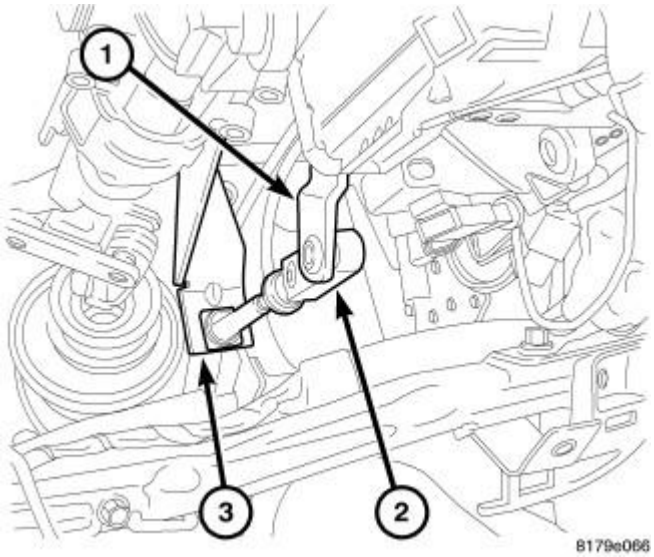

Fig. 128: Shift Cable AT Column
Courtesy of CHRYSLER GROUP, LLC

2. Reconnect the shift cable (2) to the shift mechanism (1).
3. Reconnect the shift cable to the cable bracket (3).

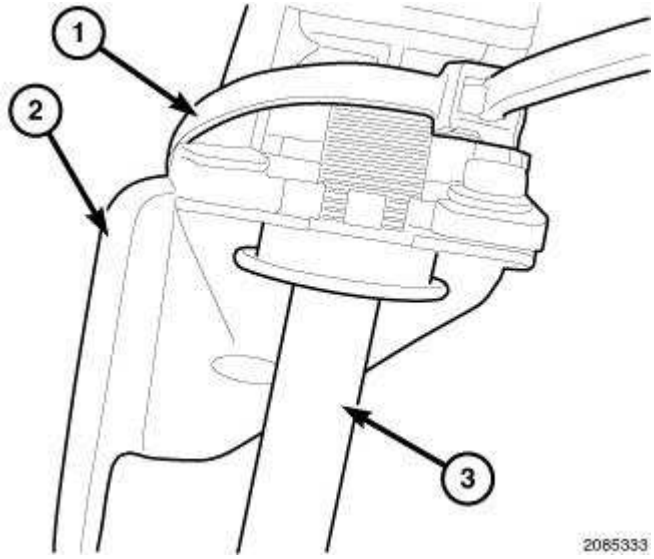

Fig. 129: Tie Strap To Secure Shift Cable To Shift Bracket
Courtesy of CHRYSLER GROUP, LLC

4. Use a tie strap (1) to secure the shift cable (3) to the shift bracket (2).
5. Place shifter into PARK.
6. Raise vehicle.

NOTE: The transmission must be in PARK.

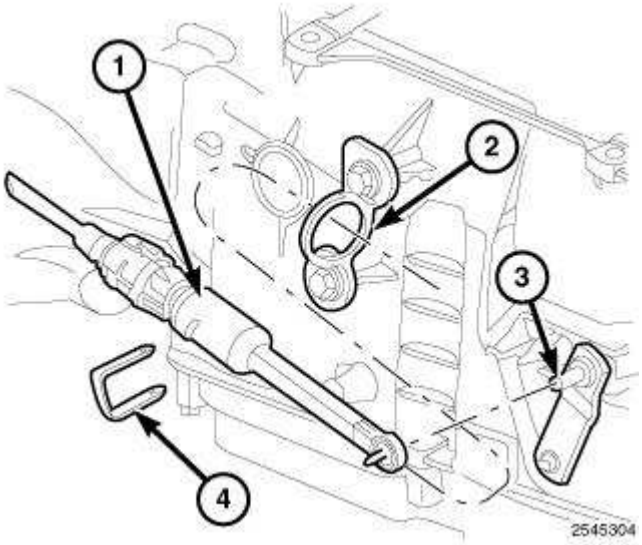

Fig. 130: Identifying Gearshift Cable, Eyelet & Manual Shift Lever
Courtesy of CHRYSLER GROUP, LLC

7. Route shifter cable (1) through the mounting bracket (2).
8. Engage the gearshift cable (1) eyelet onto the transmission manual shift lever (3).
9. Install the gearshift cable retaining clip (4) (if equipped).
10. Lower the vehicle.
11. Verify the transmission shifts in and out of PARK, and through all gear ranges. If necessary, adjust the cable. Refer to **CABLE, SHIFT, ADJUSTMENTS**.

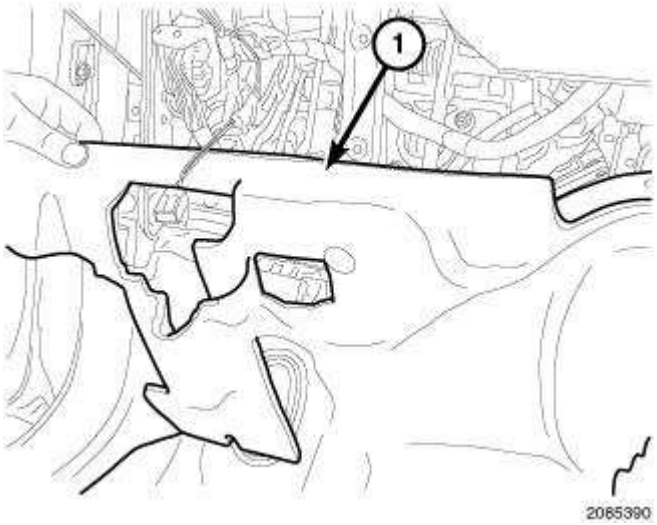

Fig. 131: Identifying Silencer Panel
Courtesy of CHRYSLER GROUP, LLC

12. Install the silencer panel (1), and the silencer panel fasteners.

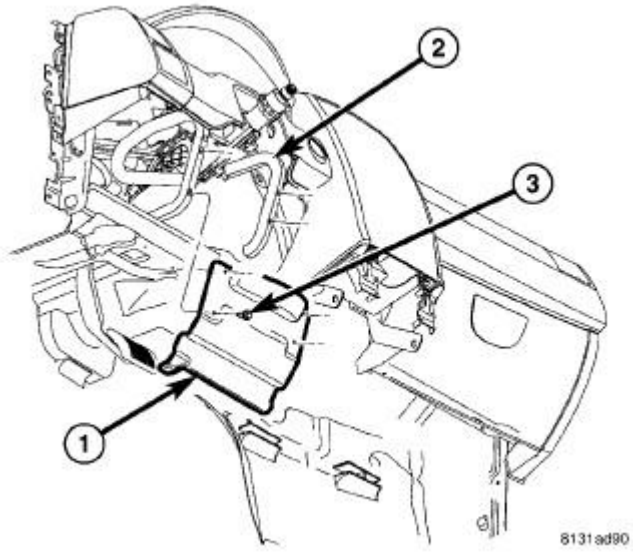

Fig. 132: Reinforcement I/P Steering Column
Courtesy of CHRYSLER GROUP, LLC

13. Install the instrument panel steering column cover reinforcement (1) to the bracket (2), and install the screws (3).
14. Reconnect the trunk release harness connector to the trunk release switch on the knee bolster.
15. Install the knee bolster.
16. Install the knee bolster fasteners.
17. Install the instrument panel side trim at the end of the instrument panel.

CLUTCH, B1

DISASSEMBLY

DISASSEMBLY

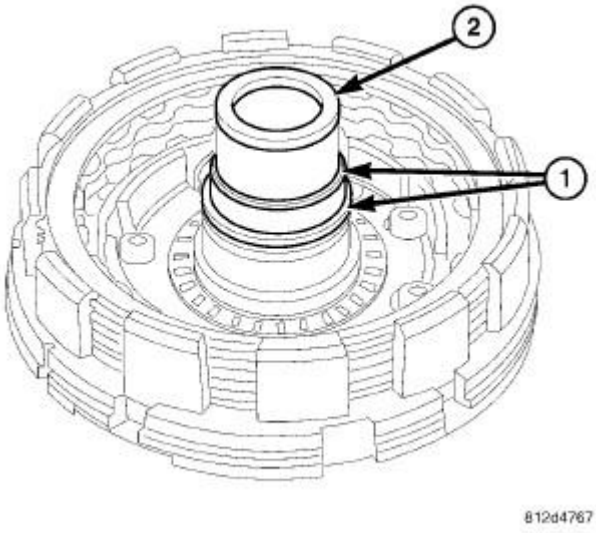

Fig. 133: Identifying Teflon Rings
Courtesy of CHRYSLER GROUP, LLC

1 - TEFLON RINGS
2 - PLATE CARRIER HUB

1. Remove the teflon rings (1) from the B1 plate carrier hub (2). Refer to **Fig. 133**.

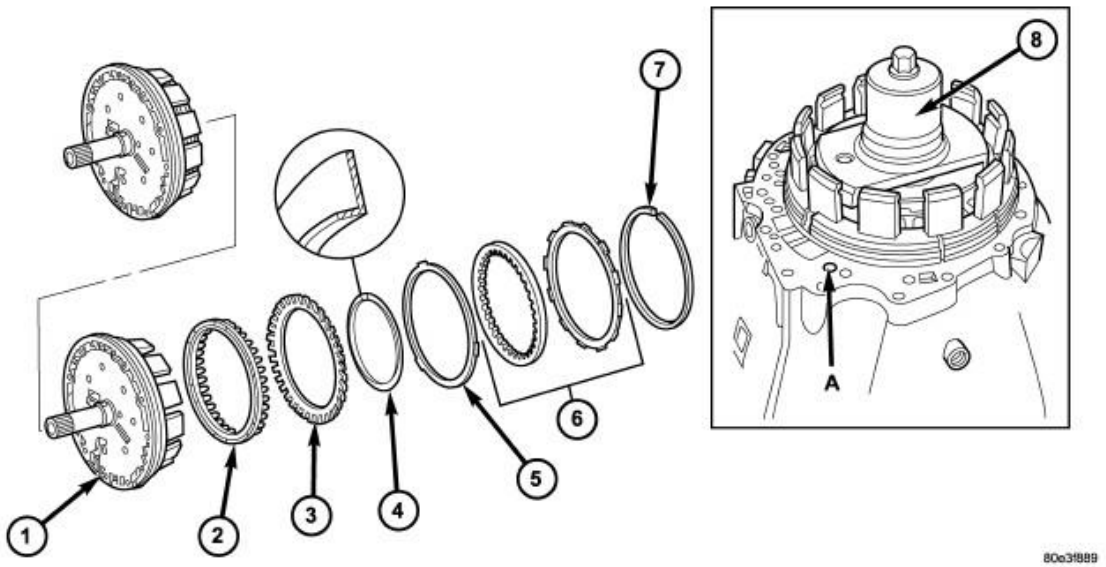

Fig. 134: Identifying Holding Clutch B1
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING CLUTCH B1	5 - DISC SPRING

OUTER CARRIER	
2 - PISTON	6 - MULTIPLE DISC PACK
3 - DISC SPRING	7 - SNAP-RING
4 - SNAP-RING	8 - MULTI-USE SPRING COMPRESSOR 8900

2. Remove snap-ring (7). Refer to **Fig. 134**.
3. Remove multiple-disc pack (6) and disc spring (5) from outer multiple-disc carrier. Note which clutch disc is removed just prior to the disc spring (5) for re-assembly. If the clutch discs are re-used, this disc must be returned to its original position on top of the disc spring.
4. Place the Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) (8) on disc spring (3) and compress the spring until the snap-ring (4) is exposed. Refer to **Fig. 134**.
5. Remove snap-ring (4).
6. Remove piston (2) from the outer multiple-disc carrier by carefully blowing compressed air into the bore (A).

ASSEMBLY

ASSEMBLY

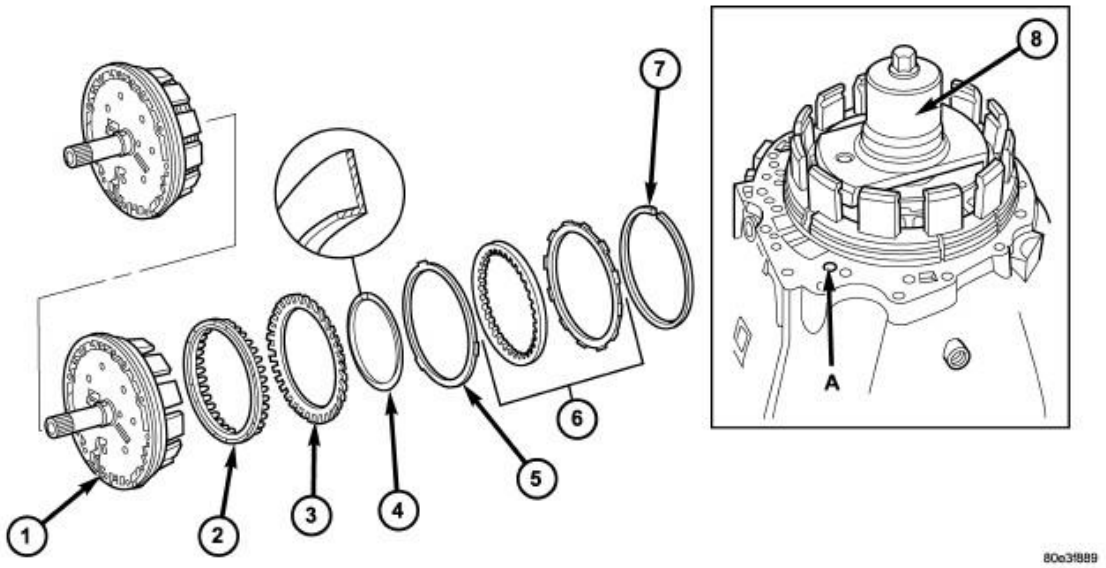

Fig. 135: Identifying Holding Clutch B1
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING CLUTCH B1 OUTER CARRIER	5 - DISC SPRING
2 - PISTON	6 - MULTIPLE DISC PACK
3 - DISC SPRING	7 - SNAP-RING
4 - SNAP-RING	8 - MULTI-USE SPRING COMPRESSOR 8900

NOTE: Check vulcanized gasket, replace if necessary.

1. Install piston (2) in outer multiple-disc carrier (1). Refer to **Fig. 135**.
2. Place compressor (8) on disc spring (3) and compress until the groove of the snap-ring is exposed.

   NOTE: The collar of the snap-ring must point towards the multiple-disc pack. After installing, check snap-ring for correct seat.

3. Insert snap-ring (4). Refer to **Fig. 135**.

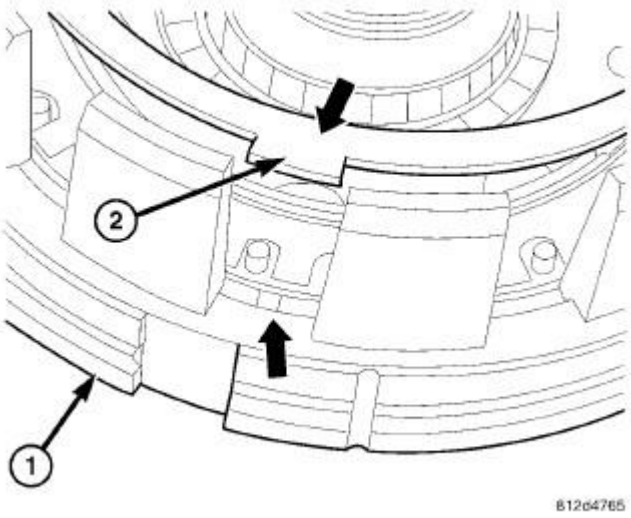

Fig. 136: Installing The Disc Spring
Courtesy of CHRYSLER GROUP, LLC

1 - B1 MULTIPLE-DISC CARRIER
2 - DISC SPRING

4. Insert disc spring (2) in the outer multiple-disc carrier. Refer to **Fig. 136**. Observe the disc spring (2) installation position. The lugs of the disc spring (2) washer must align with the 3 raised pads (arrow) of the B1 multiple-disc carrier (1). The cone of the spring washer must point downwards.

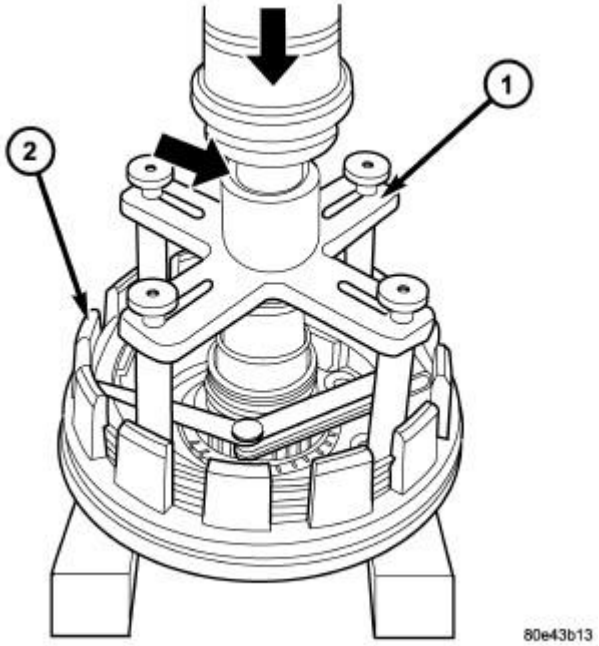

Fig. 137: Measure B1 Clutch Clearance
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSING TOOL 8901A
2 - B1 CLUTCH OUTER CARRIER

5. Insert the multiple-disc pack (6) in the outer multiple-disc carrier and measure the clutch clearance.

NOTE: Pay attention to the sequence of discs. If the original clutch discs are reused, be sure to return the disc identified on disassembly as belonging on top of the disc spring (5) to its original location.

CAUTION: When working with double sided friction discs, an externally lugged steel plate is installed first, followed by a friction disc, and continuing on until all the required discs are installed. When working with single sided friction discs, an externally lugged disc is installed first, followed by an internally lugged disc, and continuing on until all the required discs are installed. All single sided discs are installed with the friction side up.

NOTE: Place new friction multiple-discs in ATF fluid for one hour before installing.

6. Measure B1 clutch clearance by mounting Pressing Tool 8901A (1) on outer multiple disc. Refer to **Fig. 137**.

7. Using a lever press, compress pressing tool to the upper most line marked 1200 N (the marking ring is still visible, see small arrow).

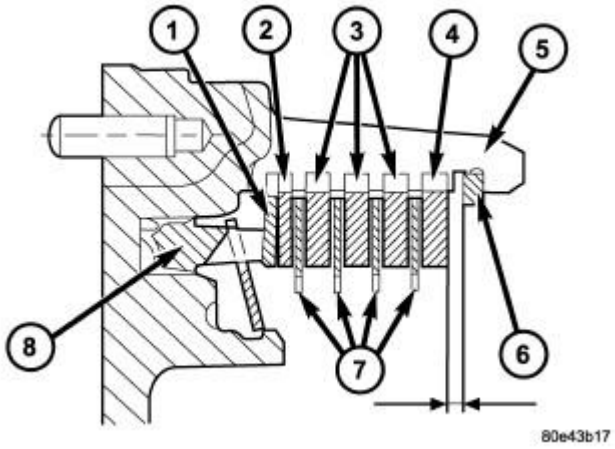

Fig. 138: B1 Clutch Stack-Up - Double Sided Discs
Courtesy of CHRYSLER GROUP, LLC

1 - DISC SPRING
2 - OUTER MULTIPLE DISC - 1.8 mm (0.071 IN.)
3 - OUTER MULTIPLE DISC - 2.8 mm (0.110 IN.)
4 - OUTER MULTIPLE DISC - 4.0 mm (0.158 IN.)
5 - B1 OUTER CARRIER
6 - SNAP-RING
7 - INNER MULTIPLE DISCS
8 - PISTON

8. For transmissions using double sided friction discs, use a feeler gauge to determine the play "L" at three points between the snap-ring (6) and outer multiple-disc (4). Refer to **Fig. 138**. During the measurement, the snap-ring (6) must contact the upper bearing surface of the groove in the outer multiple-disc carrier (5). The correct clearance for transmissions using double sided friction discs is 2.3-2.7 mm (0.091-0.106 in.) for two friction disc versions, 2.7-3.1 mm (0.106-0.122 in.) for three disc versions, and 3.0-3.4 mm (0.118-0.134 in.) for four disc versions.
9. Adjust with snap-ring (6), if necessary. Snap-rings are available in thicknesses of 2.6 mm (0.102 in.), 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), 3.5 mm (0.138 in.), 3.8 mm (0.150 in.), and 4.1 mm (0.162 in.).

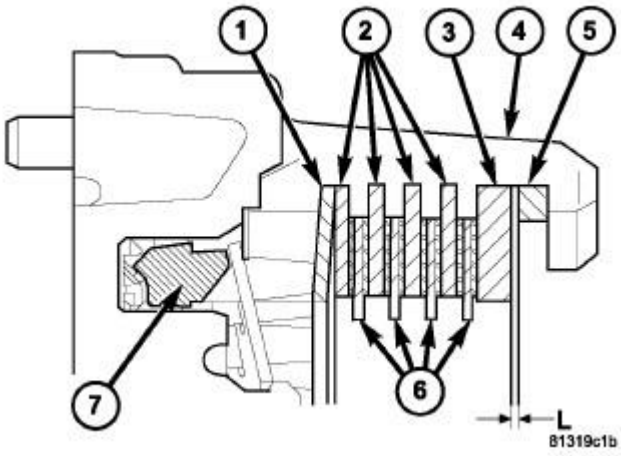

Fig. 139: B1 Clutch Stack-Up - Single Sided Discs
Courtesy of CHRYSLER GROUP, LLC

1 - DISC SPRING
2 - OUTER MULTIPLE DISC
3 - OUTER MULTIPLE DISC - 4.0 mm (0.158 IN.)
4 - B1 OUTER CARRIER
5 - SNAP-RING
6 - INNER MULTIPLE DISCS
7 - PISTON

10. For transmissions using single sided friction discs, use a feeler gauge to determine the play "L" at three points between the snap-ring (5) and outer multiple-disc (3). Refer to **Fig. 139**. During the measurement, the snap-ring (5) must contact the upper bearing surface of the groove in the outer multiple-disc carrier (4). The correct clearance is 2.2-2.6 mm (0.087-0.102 in.) for four friction disc versions, 2.4-2.8 mm (0.095-0.110 in.) for six disc versions, and 2.6-3.0 mm (0.102-0.118 in.) for eight disc versions.
11. Adjust with snap-ring (5), if necessary. Snap-rings are available in thicknesses of 2.6 mm (0.102 in.), 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), 3.5 mm (0.138 in.), 3.8 mm (0.150 in.), and 4.1 mm (0.162 in.).

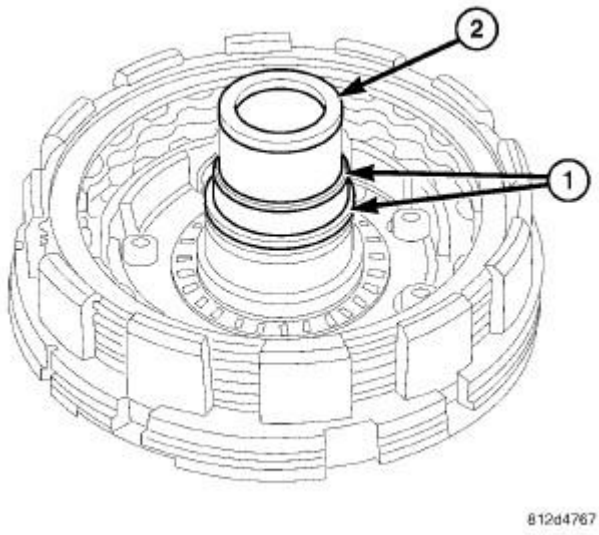

Fig. 140: Identifying Teflon Rings
Courtesy of CHRYSLER GROUP, LLC

1 - TEFLON RINGS
2 - PLATE CARRIER HUB

12. Install the teflon rings (1) onto the B1 plate carrier hub (2). Refer to **Fig. 140**.
13. Coat Teflon rings (1) lightly with grease and insert in the groove so that the joint remains together.

CLUTCH, B2

DISASSEMBLY

DISASSEMBLY

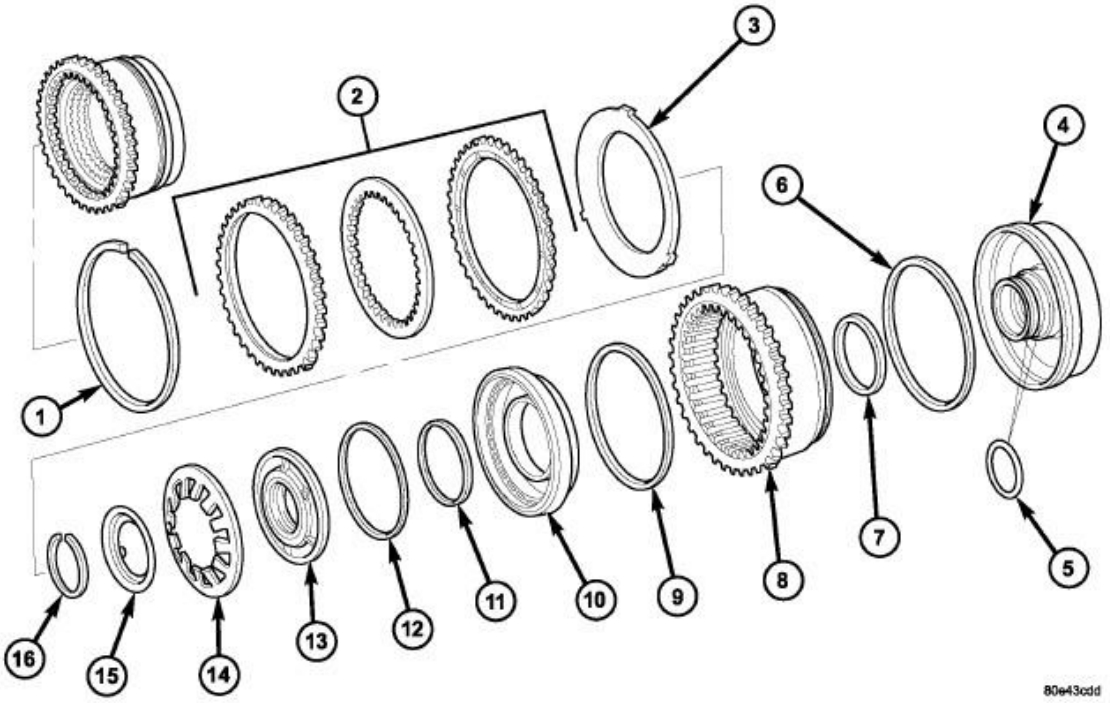

Fig. 141: Exploded View Of Holding Clutch B2
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING	9 - B2 PISTON SEALING RING
2 - MULTIPLE DISC PACK	10 - B2 PISTON
3 - DISC SPRING	11 - PISTON GUIDE SEALING RING
4 - B2 AND B3 PISTON GUIDE	12 - PISTON GUIDE SEALING RING
5 - O-RING	13 - PISTON GUIDE RING
6 - B3 PISTON SEALING RING	14 - PISTON BACK PRESSURE DISC SPRING
7 - B3 PISTON SEALING RING	15 - SPRING PLATE
8 - B3 PISTON/B2 OUTER DISC CARRIER	16 - SNAP-RING

1. Remove snap ring (1). Refer to **Fig. 141**.
2. Take multiple-disc pack B2 (2) and disc spring (3) out of the outer multiple-disc carrier B2 (8). The outer multiple-disc carrier for the multi-disc holding clutch B2 is the piston for the multiple-disc holding clutch B3 at the same time. Note which clutch disc is removed just prior to the disc spring (3) for re-assembly. If the clutch discs are re-used, this disc must be returned to its original position on top of the disc spring.
3. Place the Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) on the spring disc (14) and compress the spring until the groove for the snap-ring is exposed.
4. Remove snap-ring (16). Refer to **Fig. 141**.
5. Remove spring plate (15) and disc spring (14).

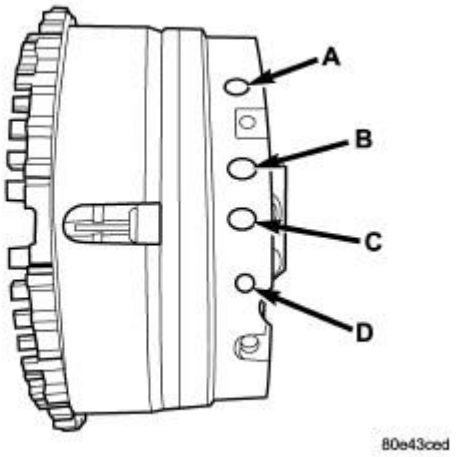

Fig. 142: B2 Clutch Oil Supply Locations
Courtesy of CHRYSLER GROUP, LLC

A - B3 PISTON
B - B2 PISTON GUIDE RING SIDE
C - K3 CLUTCH FEED
D - B2 PISTON SHIFT SIDE

6. Separate piston guide ring (13) and the B2 piston (10) from the B3 piston (8) by blowing compressed air into the bore (**D**). Refer to **Fig. 142**.
7. Press piston guide ring (13) out of the B2 piston (10).
8. Separate piston guide (4) from the B3 piston (8) by blowing compressed air into the bore (**A**). Refer to **Fig. 142**.

ASSEMBLY

ASSEMBLY

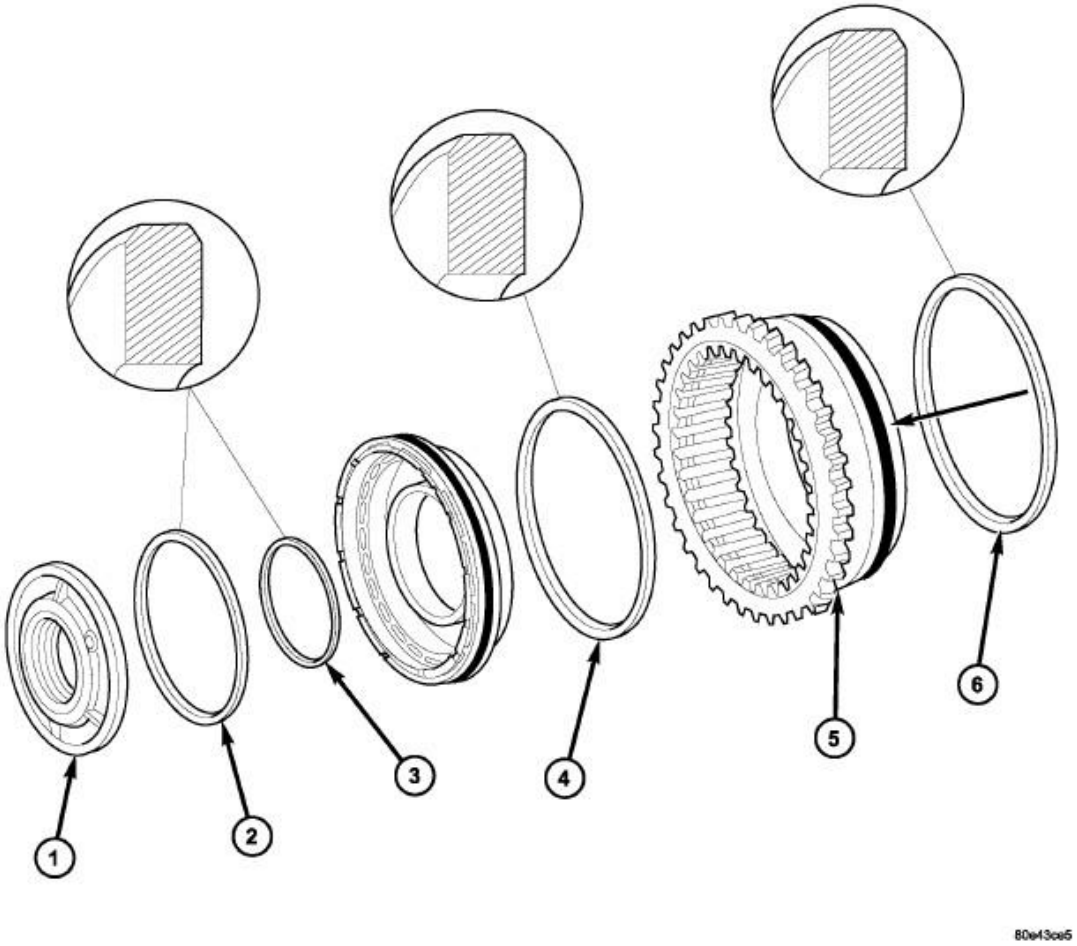

Fig. 143: Holding Clutch B2/B3 Seals
Courtesy of CHRYSLER GROUP, LLC

1 - PISTON GUIDE RING	4 - B2 PISTON SEALING RING
2 - PISTON GUIDE RING SEALING RING	5 - B3 PISTON/B2 OUTER DISC CARRIER
3 - PISTON GUIDE RING SEALING RING	6 - B3 PISTON SEALING RING

1. Check all sealing rings (2-4, 6), replace if necessary. Refer to **Fig. 143**. The rounded off edges on the sealing rings (2, 4, 6) must point outwards.

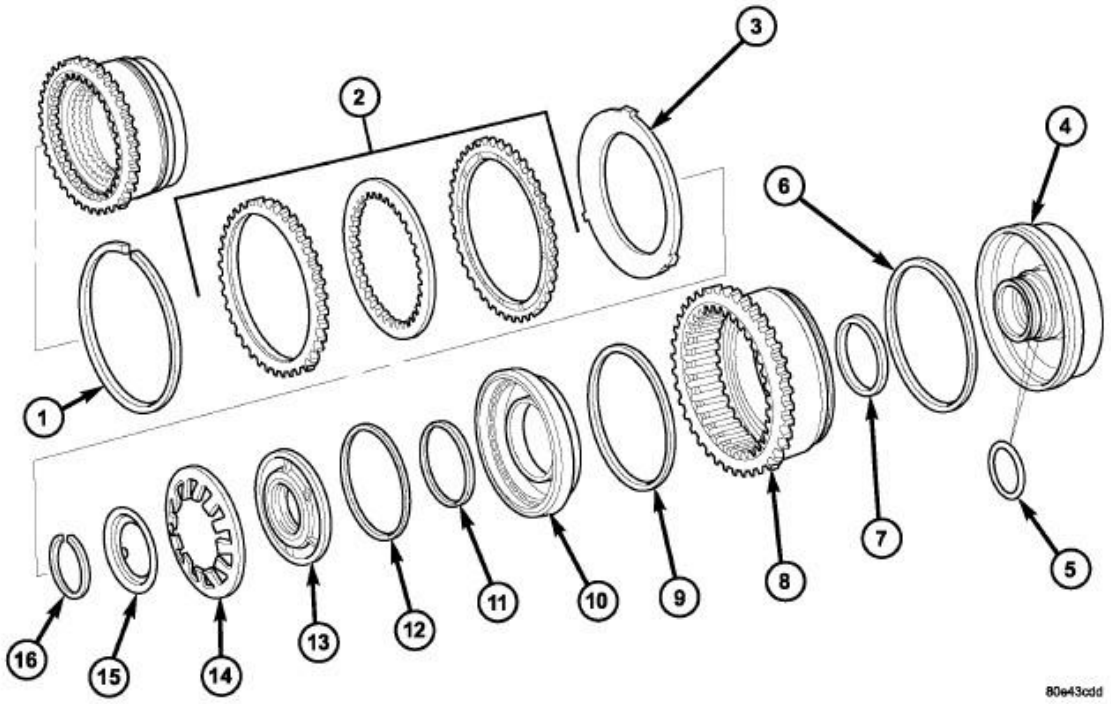

Fig. 144: Exploded View Of Holding Clutch B2
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING	9 - B2 PISTON SEALING RING
2 - MULTIPLE DISC PACK	10 - B2 PISTON
3 - DISC SPRING	11 - PISTON GUIDE SEALING RING
4 - B2 AND B3 PISTON GUIDE	12 - PISTON GUIDE SEALING RING
5 - O-RING	13 - PISTON GUIDE RING
6 - B3 PISTON SEALING RING	14 - PISTON BACK PRESSURE DISC SPRING
7 - B3 PISTON SEALING RING	15 - SPRING PLATE
8 - B3 PISTON/B2 OUTER DISC CARRIER	16 - SNAP-RING

2. Assemble piston guide (4) and B3 piston (8) in the correct position. Refer to **Fig. 144**. Verify that the missing tooth in the B3 piston/B2 outer disc carrier (8) is aligned with the centerline of the two threaded holes in the B2 and B3 piston guide (4).
3. Insert B2 piston (10) in B3 piston (8). Refer to **Fig. 144**.

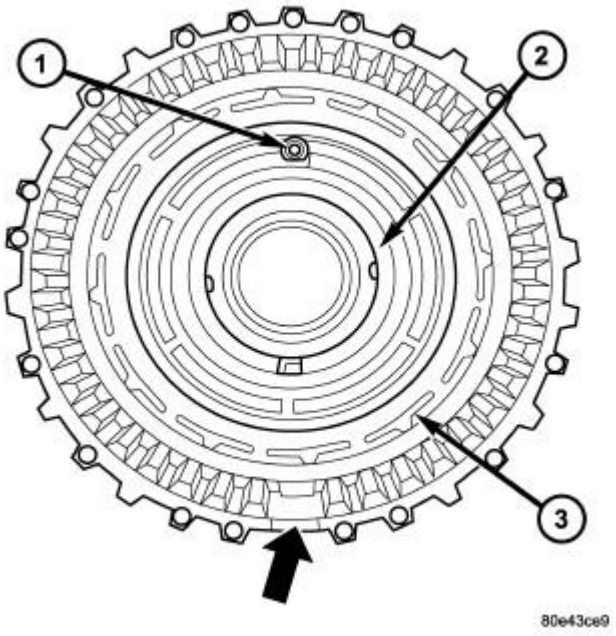

Fig. 145: B2 Piston & Piston Guide Ring
Courtesy of CHRYSLER GROUP, LLC

1 - VALVE
2 - PISTON GUIDE RING
3 - B2 PISTON

4. Insert piston guide ring (2). Refer to **Fig. 145**. The valve (1) in the piston guide ring must be on top.
5. Insert disc spring (14) and spring plate (15). Refer to **Fig. 144**. Insert disc spring with the curvature towards the spring plate
6. Place Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) on the disc spring (14) and compress the spring until the groove for the snap-ring is exposed.
7. Insert snap-ring (16).

NOTE: Pay attention to sequence of discs. If the original clutch discs are reused, be sure to return the disc identified on disassembly as belonging on top of the disc spring (3) to its original location. Place new friction multiple-discs in ATF fluid for one hour before installing.

8. Insert disc spring (3) and multiple-disc pack (2) in the B2 outer multiple-disc carrier.
9. Insert snap-ring (1).

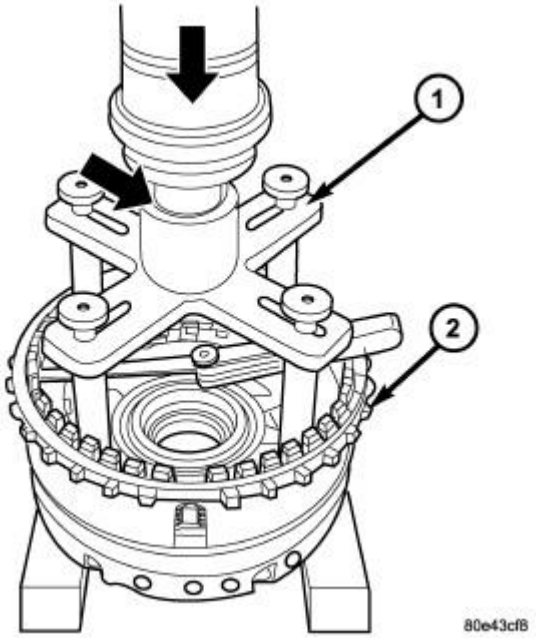

Fig. 146: Measuring B2 Clutch Clearance
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSING TOOL 8901A
2 - B3 PISTON / B2 OUTER DISC CARRIER

NOTE: During the measurement the snap-ring must contact the upper bearing surface of the groove in the outer multiple-disc carrier.

10. Measure the B2 clutch pack clearance by mounting the Pressing Tool 8901A (1) on outer multiple disc. Refer to **Fig. 146**.
11. Using a lever press, compress pressing tool to the upper most line marked 1200 N (the marking ring is still visible, see small arrow).

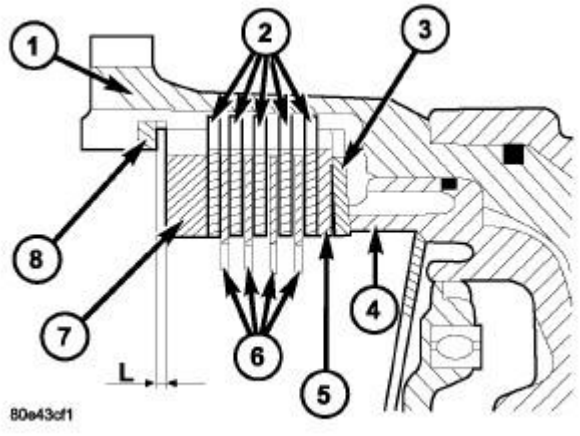

Fig. 147: B2 Clutch Stack-Up
Courtesy of CHRYSLER GROUP, LLC

1 - B2 OUTER DISC CARRIER
2 - FRICTION DISCS
3 - DISC SPRING
4 - B2 PISTON
5 - OUTER MULTIPLE DISC - 1.8 MM (0.071 IN.)
6 - OUTER MULTIPLE DISC - 1.8 MM (0.071 IN.)
7 - OUTER MULTIPLE DISC - 6.5 MM (0.256 IN.)
8 - SNAP-RING

12. Using a feeler gauge, determine the play "L" at three points between the snap-ring (8) and outer multiple-disc (7). Refer to **Fig. 147**.
13. The correct clutch clearance is 1.9-2.3 mm (0.075-0.091 in.) for the four friction disc versions and 2.0-2.4 mm (0.079-0.095 in.) for the five disc versions.
14. Adjust with snap-ring (8), if necessary. Snap-rings are available in thicknesses of 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), 3.5 mm (0.138 in.), 3.8 mm (0.150 in.), and 4.1 mm (0.162 in.).

CLUTCH, FREEWHEELING

OPERATION

OPERATION

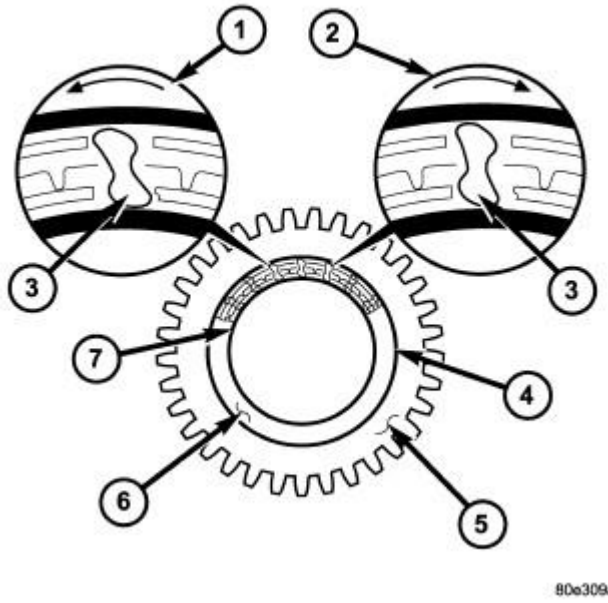

Fig. 148: Identifying Freewheeling Clutch Components
Courtesy of CHRYSLER GROUP, LLC

1 - ROTATION DIRECTION "A"
2 - ROTATION DIRECTION "B"
3 - LOCKING ELEMENTS
4 - OUTER RACE
5 - FRONT OR REAR SUN GEAR
6 - LOCKING ELEMENT CAGE
7 - INNER RACE

The freewheeling clutch optimizes individual gearshifts. Refer to **Fig. 148**. They lock individual elements of a planetary gear set together or against the transmission housing in one direction of rotation to allow the torque to be transmitted.

If the inner race (7) of the freewheeling clutch is locked and the outer race (4) turns counter-clockwise (1), the locking elements (3) adopt a diagonal position on account of their special contours, allowing the freewheel function. The inner race (4) slides under the locking elements (3) with minimal friction. If the rotation of the outer race (4) changes to clockwise (2), the locking elements (3) stand up and lock the outer and inner races (4, 7) together.

DISASSEMBLY

DISASSEMBLY

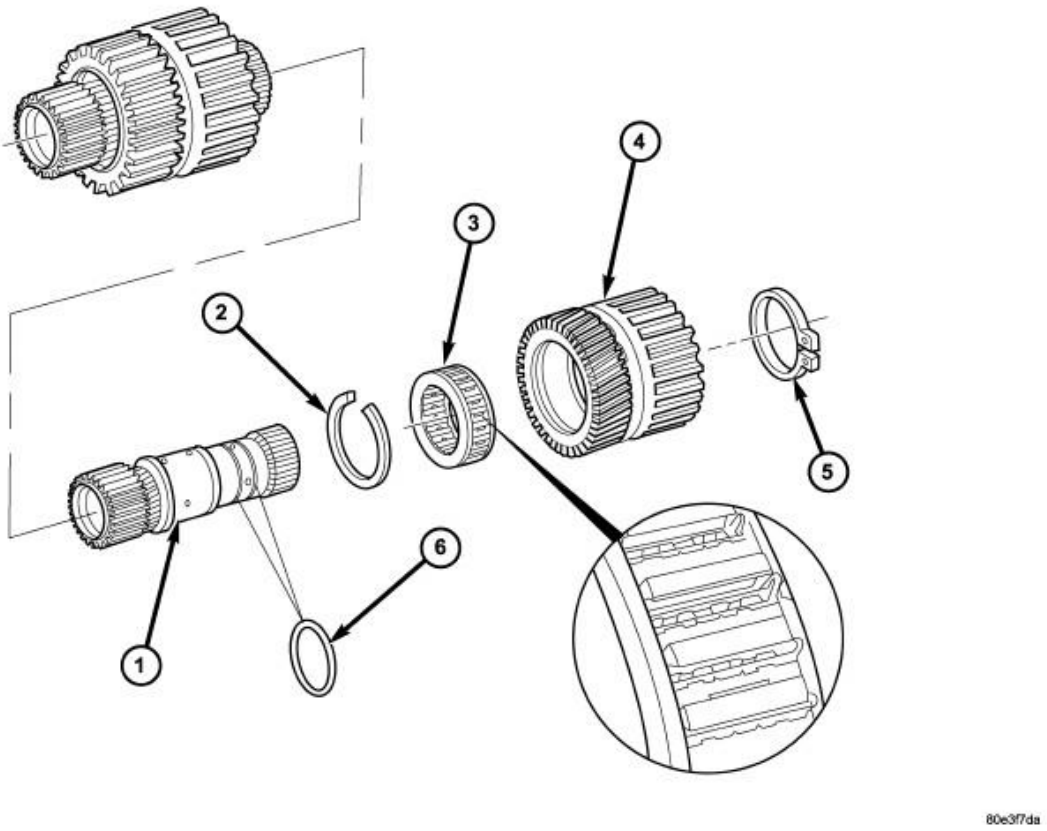

Fig. 149: Identifying Freewheeling Clutch F2
Courtesy of CHRYSLER GROUP, LLC

1 - HOLLOW SHAFT	4 - K3 INNER DISC CARRIER AND REAR PLANETARY SUN GEAR
2 - F2 CLUTCH SNAP-RING	5 - RETAINING RING
3 - FREEWHEELING CLUTCH F2	6 - O-RINGS

1. Remove retaining ring (5) from hollow shaft (1). Refer to **Fig. 149**.
2. Remove rear sun gear (4) with the K3 internally toothed disk carrier and rear freewheeling clutch F2 (3).
3. Remove snap-ring (2) for freewheel. Refer to **Fig. 149**.
4. Press freewheeling clutch (3) out of sun gear.
5. Check O-rings (6), replace if necessary.

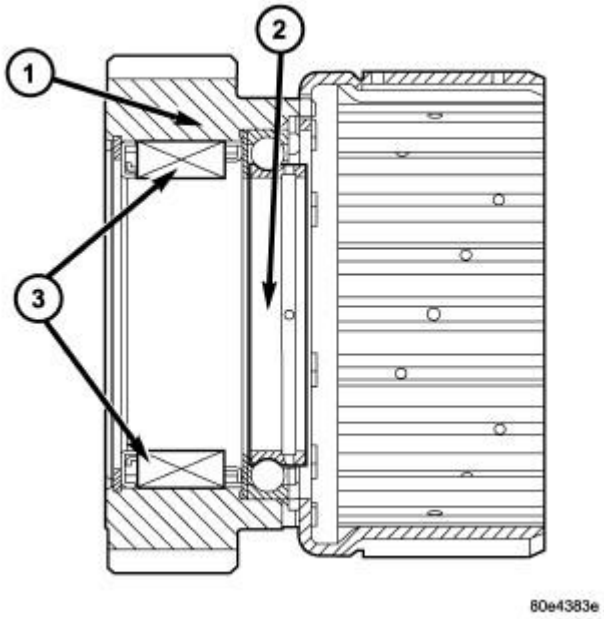

Fig. 150: Freewheeling Clutch F2 Anti-Friction Bearing
Courtesy of CHRYSLER GROUP, LLC

1 - K3 INNER DISC CARRIER AND REAR PLANETARY SUN GEAR
2 - ANTI-FRICTION BEARING
3 - FREEWHEELING CLUTCH F2

6. Check the anti-friction bearing (2) in the rear planetary sun gear for damage. Refer to **Fig. 150**. Replace as necessary.

ASSEMBLY

ASSEMBLY

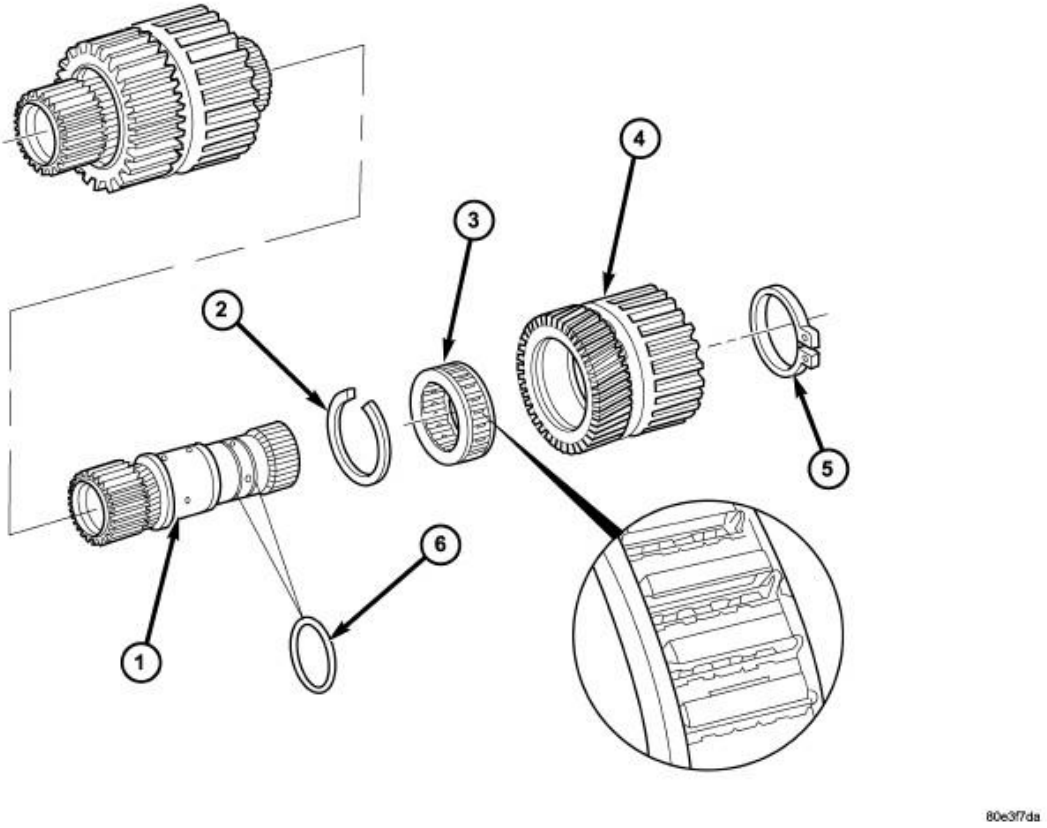

Fig. 151: Identifying Freewheeling Clutch F2
Courtesy of CHRYSLER GROUP, LLC

1 - HOLLOW SHAFT	4 - K3 INNER DISC CARRIER AND REAR PLANETARY SUN GEAR
2 - F2 CLUTCH SNAP-RING	5 - RETAINING RING
3 - FREEWHEELING CLUTCH F2	6 - O-RINGS

NOTE: On freewheeling F2 clutches (3) with metal cages, the side of the freewheeling clutch with the markings (part number, etc.) must be up when the clutch is installed in the sun gear (4). Markings will be visable when the clutch is installed before installing the snap-ring.

NOTE: On freewheeling F2 clutches (3) with plastic cages, the directional arrow on the side of the freewheeling clutch indicates the direction of installation into the sun gear (4). The brass top of the cage will be toward the snap-ring.

1. Press freewheeling clutch F2 (3) into sun gear (4).
2. Install snap-ring (2) for freewheeling clutch.
3. Check O-rings (6) on hollow shaft, replace if necessary.
4. Install rear sun gear (4) with K3 internally toothed disc carrier and rear freewheeling clutch (3)

onto the hollow shaft.

5. Verify proper operation of the freewheeling clutch F2. When the assembly is held with the F2 clutch snap-ring upward, it should be possible to rotate the hollow shaft counter-clockwise.
6. Install retaining ring (5) onto hollow shaft (1).

CLUTCH, INPUT

DESCRIPTION

DESCRIPTION

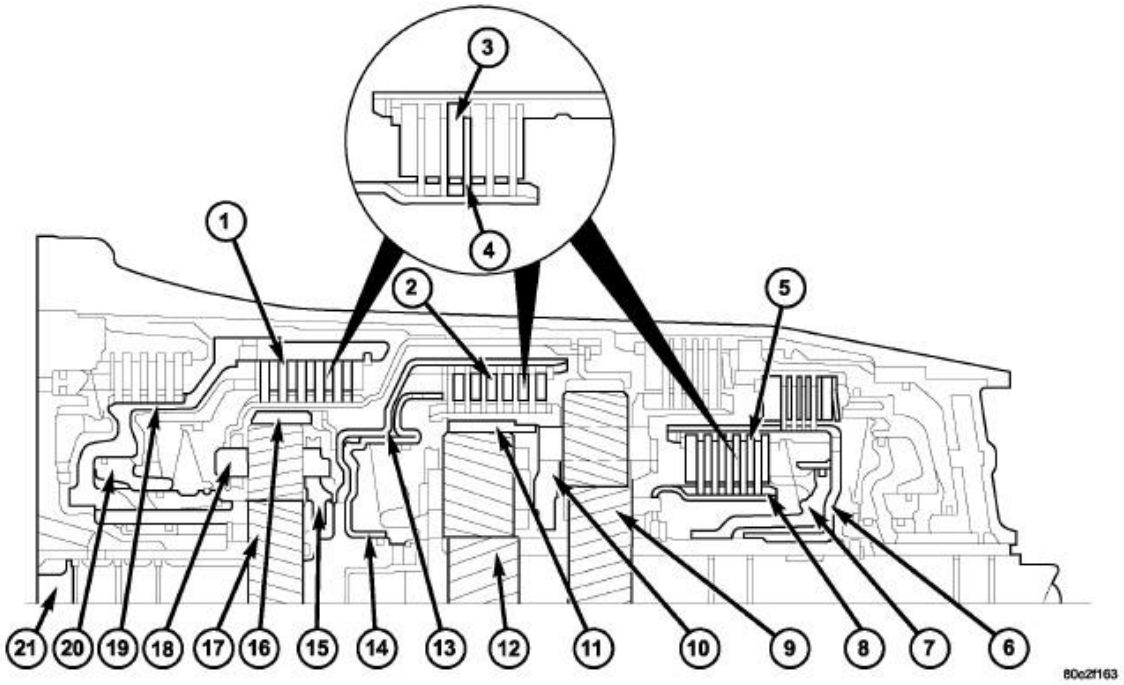

Fig. 152: Identifying Input Clutches
Courtesy of CHRYSLER GROUP, LLC

1 - K1 CLUTCH	12 - CENTER PLANETARY GEARSET SUN GEAR
2 - K2 CLUTCH	13 - K2 CLUTCH EXTERNALLY TOOTHED DISC CARRIER
3 - EXTERNALLY TOOTHED DISC	14 - K2 CLUTCH PISTON
4 - INTERNALLY TOOTHED DISC	15 - FRONT PLANETARY GEARSET PLANETARY CARRIER
5 - K3 CLUTCH	16 - FRONT PLANETARY GEARSET ANNULUS GEAR
6 - K3 CLUTCH EXTERNALLY TOOTHED DISC CARRIER	17 - FRONT PLANETARY GEARSET SUN GEAR
7 - K3 CLUTCH PISTON	18 - K1 CLUTCH INTERNALLY TOOTHED

	DISC CARRIER
8 - K3 CLUTCH INTERNALLY TOOTHED DISC CARRIER	19 - K1 CLUTCH EXTERNALLY TOOTHED DISC CARRIER
9 - REAR PLANETARY GEARSET SUN GEAR	20 - K1 CLUTCH PISTON
10 - CENTER PLANETARY GEARSET PLANETARY CARRIER	21 - INPUT SHAFT
11 - CENTER PLANETARY GEARSET ANNULUS GEAR	

Three multi-plate input clutches (1, 2, 5), the front, middle and rear multi-plate clutches K1 (1), K2 (2), and K3 (5), are located in the planetary gear sets in the transmission housing. Refer to **Fig. 152**.

A multi-plate input clutch consists of a number of internally toothed discs (4) on an internally toothed disc carrier and externally toothed discs (3) on an externally toothed disc carrier.

OPERATION

OPERATION

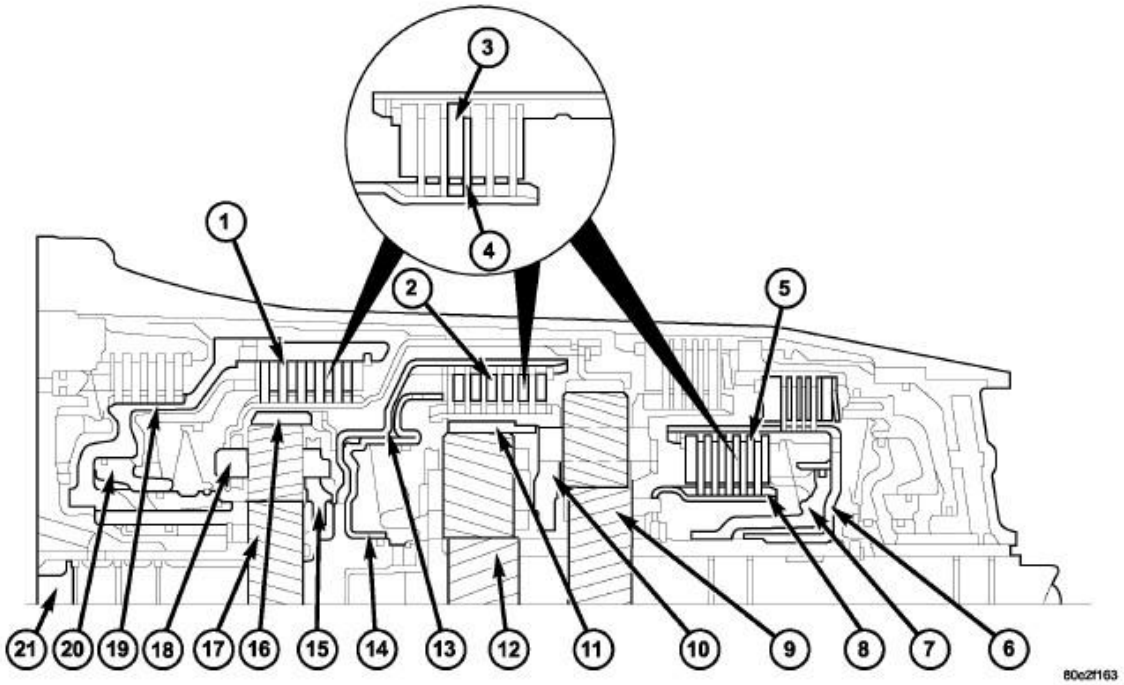

Fig. 153: Identifying Input Clutches
Courtesy of CHRYSLER GROUP, LLC

1 - K1 CLUTCH	12 - CENTER PLANETARY GEARSET SUN GEAR
2 - K2 CLUTCH	13 - K2 CLUTCH EXTERNALLY TOOTHED DISC CARRIER

3 - EXTERNALLY TOOTHED DISC	14 - K2 CLUTCH PISTON
4 - INTERNALLY TOOTHED DISC	15 - FRONT PLANETARY GEARSET PLANETARY CARRIER
5 - K3 CLUTCH	16 - FRONT PLANETARY GEARSET ANNULUS GEAR
6 - K3 CLUTCH EXTERNALLY TOOTHED DISC CARRIER	17 - FRONT PLANETARY GEARSET SUN GEAR
7 - K3 CLUTCH PISTON	18 - K1 CLUTCH INTERNALLY TOOTHED DISC CARRIER
8 - K3 CLUTCH INTERNALLY TOOTHED DISC CARRIER	19 - K1 CLUTCH EXTERNALLY TOOTHED DISC CARRIER
9 - REAR PLANETARY GEARSET SUN GEAR	20 - K1 CLUTCH PISTON
10 - CENTER PLANETARY GEARSET PLANETARY CARRIER	21 - INPUT SHAFT
11 - CENTER PLANETARY GEARSET ANNULUS GEAR	

The input clutches produce a non-positive locking connection between two elements of a planetary gear set or between one element from each of two planetary gear sets in order to transmit the drive torque. Refer to **Fig. 153**.

If the piston (20) on multi-plate clutch K1 (1) is subjected to oil pressure, it presses the internal and external discs of the disc set together. The sun gear (17) is locked with the planetary carrier (15) via the externally toothed disc carrier (19) and the internally toothed disc carrier (18). The front planetary gear set is thus locked and turns as a closed unit.

If the multi-plate clutch K2 (2) is actuated via the piston (14), the piston compresses the disc set. The annulus gear (16) of the front planetary gear set is locked with the annulus gear (11) of the center planetary gear set via the externally toothed disc carrier (13) and the center planetary carrier (10) on which the internally toothed discs are seated. Annulus gear (16) and annulus gear (11) turn at the same speed as the input shaft (21)

If the multi-plate clutch K3 (5) is actuated via the piston (7), the piston compresses the disc set. The sun gear (12) of the center planetary gear set is locked with the sun gear (9) of the rear planetary gear set via the externally toothed disc carrier (6) and the internally toothed disc carrier (8). Sun gear (12) and sun gear (9) turn at the same speed.

CLUTCH, K1

DISASSEMBLY

DISASSEMBLY

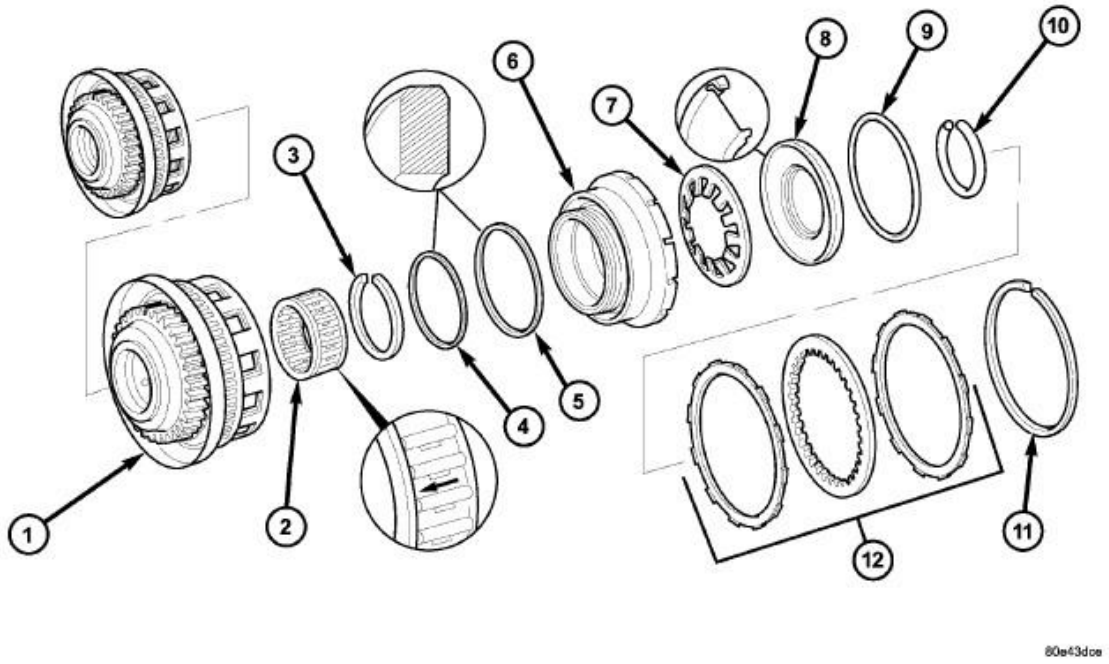

Fig. 154: Input Clutch K1 Components
Courtesy of CHRYSLER GROUP, LLC

1 - K1 OUTER DISC CARRIER	7 - DISC SPRING
2 - FREEWHEELING CLUTCH F1	8 - SPRING PLATE
3 - SNAP-RING	9 - SPRING PLATE SEALING RING
4 - OUTER DISC CARRIER SEALING RING	10 - SNAP-RING
5 - PISTON SEALING RING	11 - SNAP-RING
6 - PISTON	12 - MULTIPLE DISC PACK - REFER TO TEXT FOR CORRECT ASSEMBLY ORDER

1. Remove snap-ring (11) from outer multiple-disc carrier (1). Refer to **Fig. 154**.
2. Take multiple-disc pack (12) out of outer multiple-disc carrier (1). Note which clutch disc is removed just prior to the spring plate (8) for re-assembly. If the clutch discs are re-used, this disc must be returned to its original position on top of the spring plate.

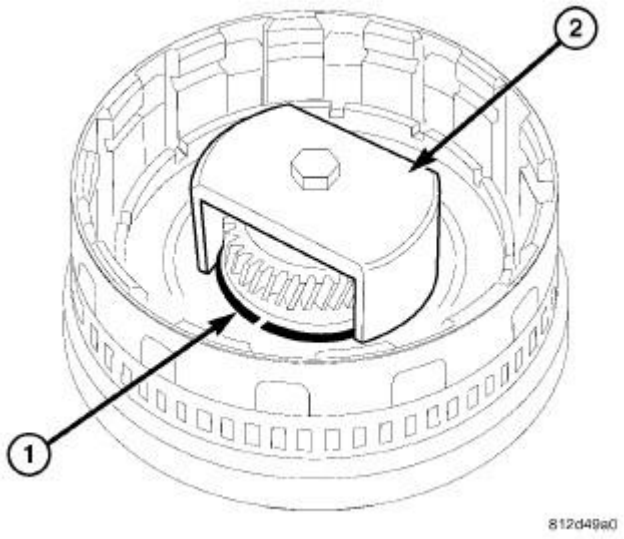

Fig. 155: Compress Disc Spring
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING
2 - MULTI-USE SPRING COMPRESSOR 8900

3. Place Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) (2) on the spring plate and compress the spring until the snap-ring (1) is exposed. Refer to **Fig. 155**.
4. Remove snap-ring (1).
5. Take out disc spring (7) and remove piston (6) by carefully blowing compressed air into the drilled oil feed passage.
6. Remove snap-ring (3) and take out front freewheeling clutch F1 (2). Take care when removing the F1 clutch to prevent the clutch sprags from falling out. If this occurs, the clutch must be replaced.

ASSEMBLY

ASSEMBLY

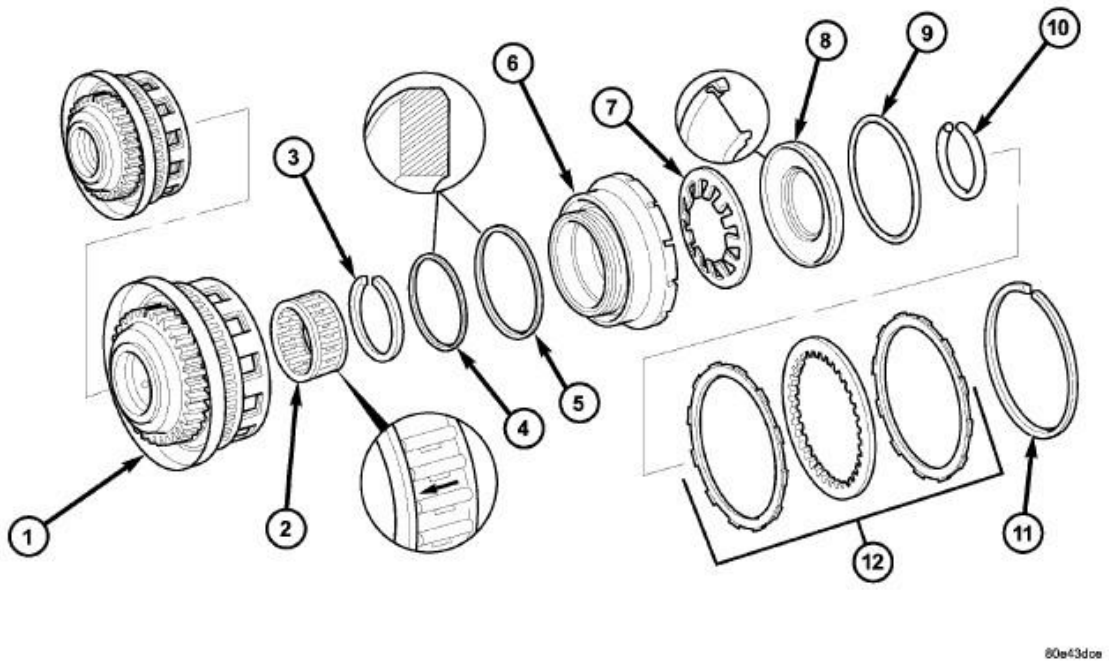

Fig. 156: Input Clutch K1 Components
Courtesy of CHRYSLER GROUP, LLC

1 - K1 OUTER DISC CARRIER	7 - DISC SPRING
2 - FREEWHEELING CLUTCH F1	8 - SPRING PLATE
3 - SNAP-RING	9 - SPRING PLATE SEALING RING
4 - OUTER DISC CARRIER SEALING RING	10 - SNAP-RING
5 - PISTON SEALING RING	11 - SNAP-RING
6 - PISTON	12 - MULTIPLE DISC PACK - REFER TO TEXT FOR CORRECT ASSEMBLY ORDER

1. Install piston (6) in the outer multiple-disc carrier (1). Refer to **Fig. 156**. Check sealing rings (4 and 5), replace if necessary. The rounded off edges of the sealing rings must point outwards.
2. Insert disc spring (7). Refer to **Fig. 156**. Insert disc spring with the curvature towards the piston.
3. Insert spring plate (8). Insert spring plate with the curvature towards the sun gear. Check sealing ring (9), replace if necessary.

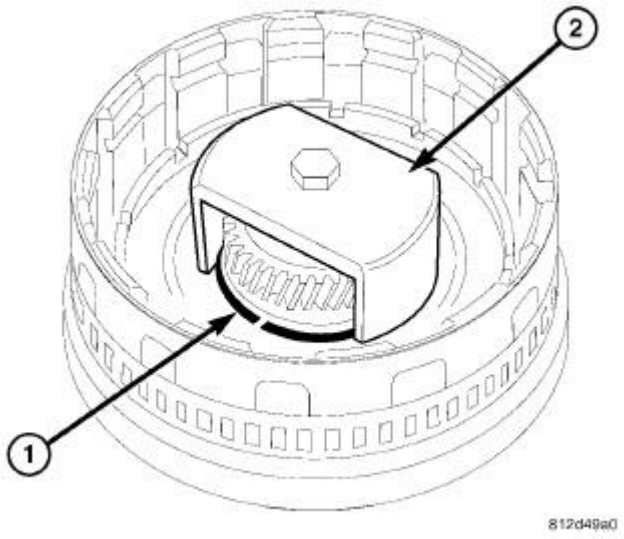

Fig. 157: Compress Disc Spring
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING
2 - SPRING COMPRESSOR 8900

4. Place Spring Compressor (special tool #8900A, Multi Use Spring Compressor) (2) on spring plate and compress the spring until the groove of the snap-ring (1) is exposed. Refer to **Fig. 157**.
5. Insert snap-ring (1). Refer to **Fig. 156**. After installing, check snap-ring for correct seat.

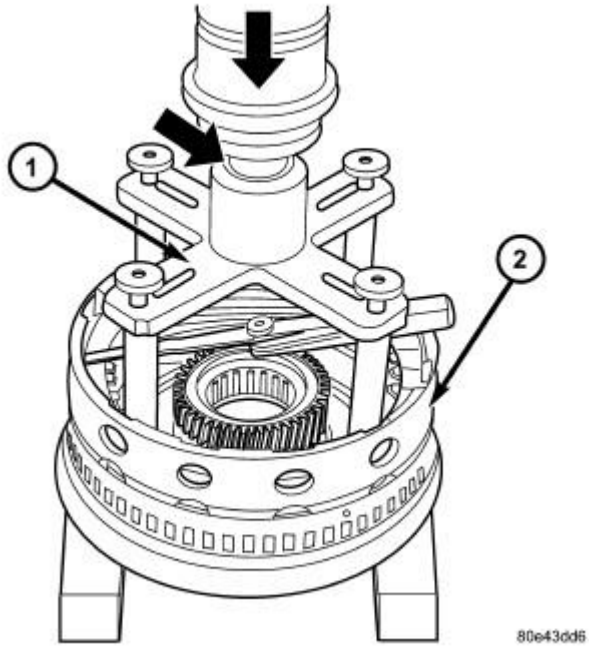

Fig. 158: Measure K1 Clutch Clearance
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSING TOOL 8901A
2 - K1 OUTER DISC CARRIER

CAUTION: When working with double sided friction discs, an externally lugged steel plate is installed first, followed by a friction disc, and continuing on until all the required discs are installed. When working with single sided friction discs, an externally lugged disc is installed first, followed by an internally lugged disc, and continuing on until all the required discs are installed. All single sided discs are installed with the friction side up.

NOTE: Pay attention to the sequence of discs. If the original clutch discs are reused, be sure to return the disc identified on disassembly as belonging on top of the spring plate (8) to its original location.

NOTE: Place new friction multiple-discs in ATF fluid for one hour before installing.

6. Insert multiple-disc pack (12) in the outer multiple-disc carrier.
7. Insert snap-ring (11).
8. Measure the K1 clutch pack clearance by mounting Pressing Tool (special tool #8901A, Pressing Tool) (1) on outer multiple disc. Refer to **Fig. 158**.

9. Using a lever press, compress pressing tool to the upper most line marked 1200 N (the marking ring is still visible, see small arrow).

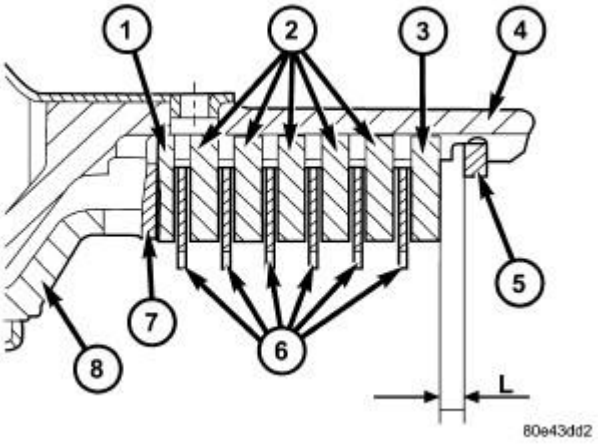

Fig. 159: Input Clutch K1 Stack-Up - Double Sided Discs
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER MULTIPLE DISC - 1.8MM (0.071 IN.)
2 - OUTER MULTIPLE DISC - 2.8MM (0.110 IN.)
3 - OUTER MULTIPLE DISC - 4.0MM (0.158 IN.)
4 - K1 OUTER DISC CARRIER
5 - SNAP-RING
6 - FRICTION DISCS
7 - DISC SPRING
8 - PISTON

10. For transmissions using double sided friction discs, use a feeler gauge to determine the play "L" at three points between the snap-ring (5) and outer multiple-disc (3). Refer to **Fig. 159**.
11. During the measurement the snap-ring (5) must contact the upper bearing surface of the groove in the outer multiple-disc carrier (4).
12. The correct clutch clearance for transmissions with double sided friction discs is 2.7-3.1 mm (0.106-0.122 in.) for three friction disc versions, 3.0-3.4 mm (0.118-0.134 in.) for four disc versions, 3.3-3.7 mm (0.130-0.146 in.) for five disc versions, and 3.6-4.0 mm (0.142-0.158 in.) for six disc versions.
13. Adjust with snap-ring (5), if necessary. Snap-rings are available in thicknesses of 2.6 mm (0.102 in.), 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), 3.5 mm (0.138 in.), 3.8 mm (0.150 in.), and 4.1 mm (0.162 in.).
14. Insert front freewheeling clutch F1 (2) and fit snap-ring (3). The freewheeling clutch F1 (2) must be installed in the direction of the arrow.

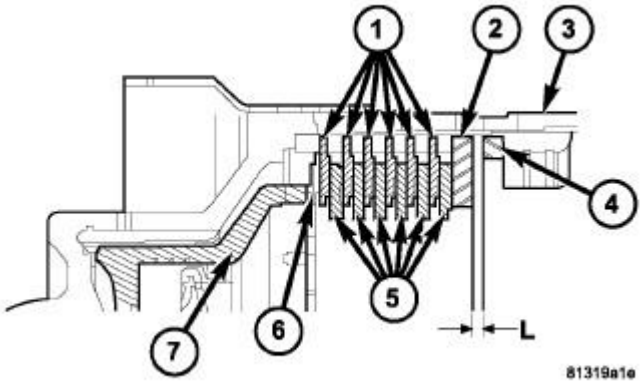

Fig. 160: Input Clutch K1 Stack-Up - Single Sided Discs
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER MULTIPLE DISCS
2 - OUTER MULTIPLE DISC - 4.0MM (0.158 IN.)
3 - K1 OUTER DISC CARRIER
4 - SNAP-RING
5 - INNER MULTIPLE DISCS
6 - DISC SPRING
7 - PISTON

15. For transmissions using single sided friction discs, use a feeler gauge to determine the play "L" at three points between the snap-ring (4) and outer multiple-disc (2). Refer to **Fig. 160**.
16. During the measurement the snap-ring (4) must contact the upper bearing surface of the groove in the outer multiple-disc carrier (3).
17. The correct clutch clearance for transmissions with single sided friction discs is 2.4-2.8 mm (0.095-0.110 in.) for six friction disc versions, 2.6-3.0 mm (0.102-0.118 in.) for eight disc versions, 2.8-3.2 mm (0.110-0.126 in.) for ten disc versions, and 2.9-3.3 mm (0.114-0.130 in.) for twelve disc versions.
18. Adjust with snap-ring (4), if necessary. Snap-rings are available in thicknesses of 2.6 mm (0.102 in.), 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), 3.5 mm (0.138 in.), 3.8 mm (0.150 in.), and 4.1 mm (0.162 in.).
19. Insert front freewheeling clutch F1 (2) and fit snap-ring (3). The freewheeling clutch F1 (2) must be installed in the direction of the arrow.

CLUTCH, K2

DISASSEMBLY

DISASSEMBLY

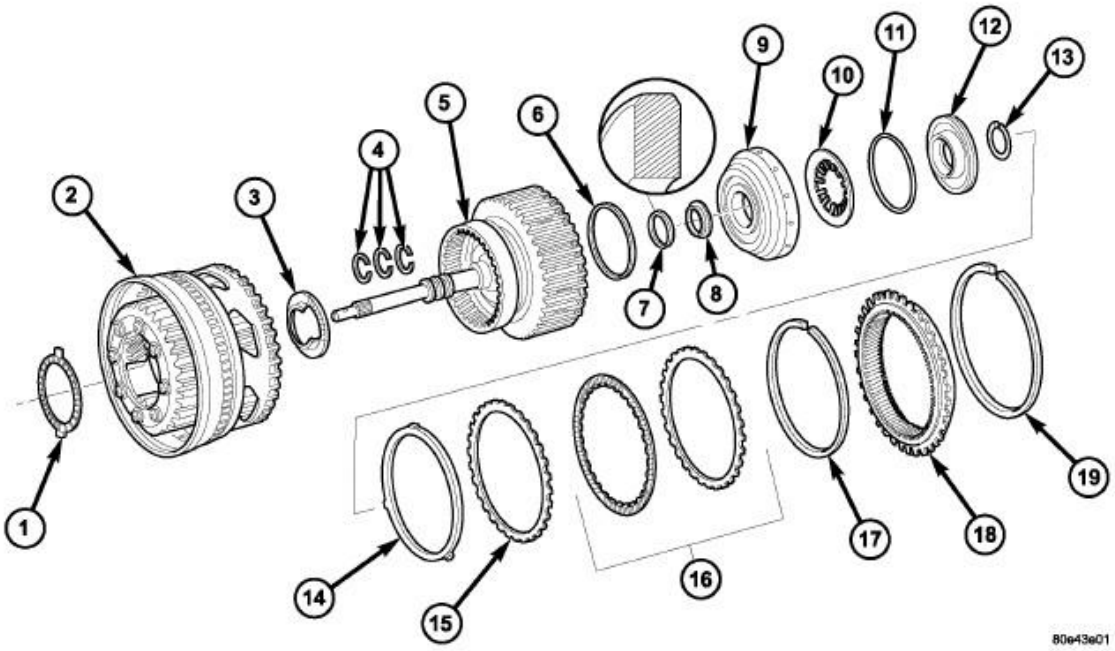

Fig. 161: Exploded View Of Input Clutch K2 Components
Courtesy of CHRYSLER GROUP, LLC

1 - NEEDLE ROLLER BEARING	11 - SPRING RETAINER SEALING - O-RING
2 - K1 INNER DISC CARRIER WITH INTEGRATED FRONT GEAR SET	12 - SPRING RETAINER
3 - THRUST BEARING	13 - SNAP-RING
4 - TORLON SEAL RINGS	14 - DISC SPRING
5 - INPUT SHAFT AND K2 CLUTCH	15 - EXTERNALLY TOOTHED PLATE - 1.8 MM (0.071 IN.)
6 - PISTON OUTER SEAL RING - O-RING	16 - MULTIPLE DISC PACK
7 - PISTON INNER SEAL RING	17 - SNAP-RING
8 - THRUST WASHER	18 - HOLLOW GEAR
9 - PISTON	19 - SNAP-RING
10 - DISC SPRING	

1. Remove snap-ring (19) from the K1 inner multiple-disc carrier with integrated front gear set (2) and take off hollow gear (18).
2. Remove input shaft with clutch K2 (5). Refer to **Fig. 161**.
3. Remove needle thrust bearing (3).
4. Remove snap-ring (17) from K2 outer multiple-disc carrier. Refer to **Fig. 161**.
5. Take out multiple-disc pack (16). Note which clutch disc is removed just prior to the disc spring (14) for re-assembly. If the clutch discs are re-used, this disc must be returned to its original position on top of the disc spring.
6. Take out disc spring (14). Refer to **Fig. 161**.

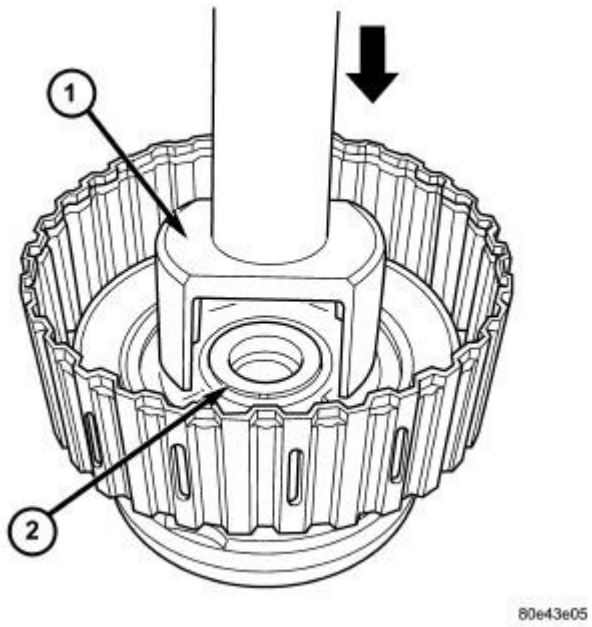

Fig. 162: Compressing K2 Clutch Spring
Courtesy of CHRYSLER GROUP, LLC

1 - MULTI-USE SPRING COMPRESSOR 8900
2 - SNAP-RING

7. Fit Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) (1) onto spring retainer (12) and press until snap-ring (2) is released. Refer to **Fig. 162**.
8. Remove snap-ring (2). Refer to **Fig. 161**.
9. Take out disc spring (10) and pull piston (9) out of outer multiple-disc carrier.

ASSEMBLY

ASSEMBLY

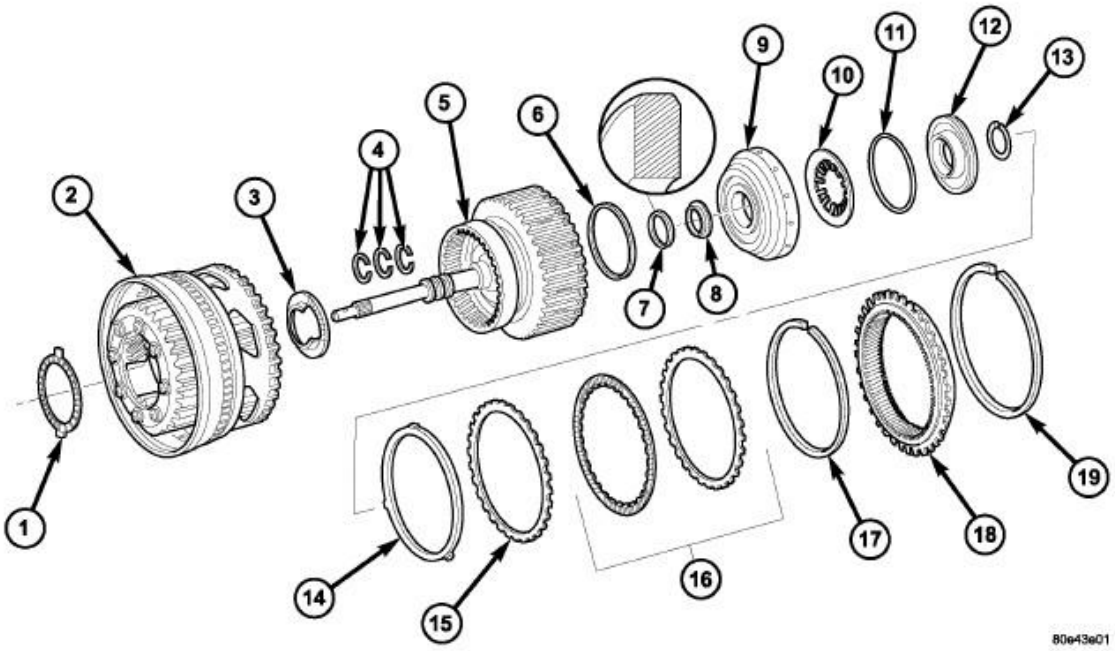

Fig. 163: Exploded View Of Input Clutch K2 Components
Courtesy of CHRYSLER GROUP, LLC

1 - NEEDLE ROLLER BEARING	11 - SPRING RETAINER SEALING - O-RING
2 - K1 INNER DISC CARRIER WITH INTEGRATED FRONT GEAR SET	12 - SPRING RETAINER
3 - THRUST BEARING	13 - SNAP-RING
4 - TORLON SEAL RINGS	14 - DISC SPRING
5 - INPUT SHAFT AND K2 CLUTCH	15 - EXTERNALLY TOOTHED PLATE - 1.8 MM (0.071 IN.)
6 - PISTON OUTER SEAL RING - O-RING	16 - MULTIPLE DISC PACK
7 - PISTON INNER SEAL RING	17 - SNAP-RING
8 - THRUST WASHER	18 - HOLLOW GEAR
9 - PISTON	19 - SNAP-RING
10 - DISC SPRING	

1. Install piston (9) in outer multiple-disc carrier. Refer to **Fig. 163**. Inspect seals (6 and 7), replace if necessary. The rounded edges of the inner piston seal (7) must point to the outside.
2. Insert disk spring (10) and spring retainer (12). Insert disk spring (10) with curved side pointing toward spring retainer (12). Inspect seal (11), replace if necessary. Refer to **Fig. 163**.

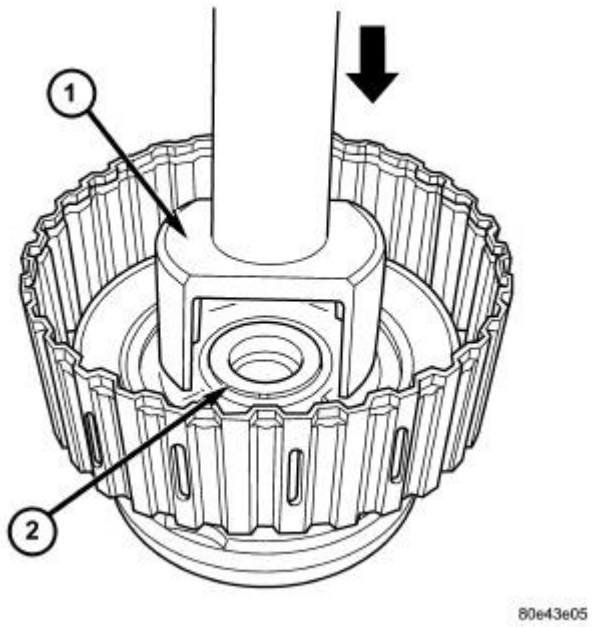

Fig. 164: Compressing K2 Clutch Spring
Courtesy of CHRYSLER GROUP, LLC

1 - MULTI-USE SPRING COMPRESSOR 8900
2 - SNAP-RING

3. Place Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) (1) on spring plate and press until the groove (2) of the snap-ring is exposed. Refer to **Fig. 164**.
4. Insert snap-ring.
5. Insert disk spring (14).

NOTE: Pay attention to the sequence of discs. If the original clutch discs are reused, be sure to return the disc identified on disassembly as belonging on top of the disc spring (14) to its original location.

6. Insert multiple-disk set (16) into outer multiple-disk carrier.
7. Fit snap-ring (17).

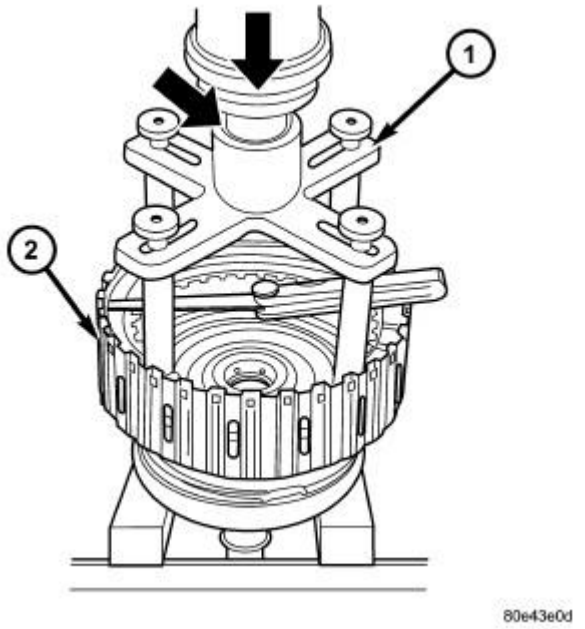

Fig. 165: Measuring K2 Clutch Clearance
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSING TOOL 8901A
2 - K1 INNER DISC CARRIER

8. Measure K2 clutch clearance by mounting Pressing Tool 8901A (1) on outer multiple disc. Refer to **Fig. 165**.
9. Using a lever press, compress pressing tool to the upper most line marked 1200 N (the marking ring is still visible, see small arrow).

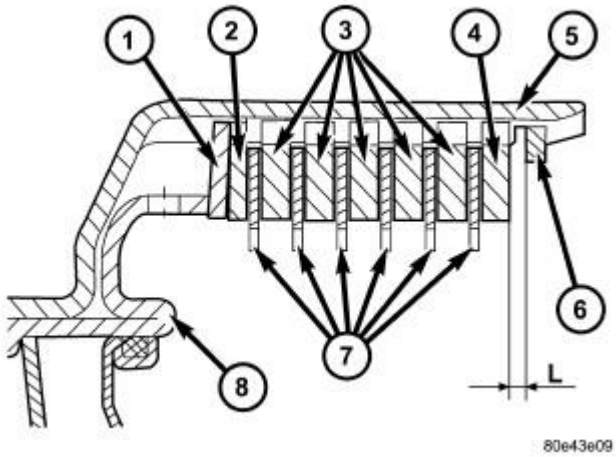

Fig. 166: Input Clutch K2 Stack-Up
Courtesy of CHRYSLER GROUP, LLC

1 - DISC SPRING
2 - OUTER MULTIPLE DISC - 1.8 MM (0.071 IN.)
3 - OUTER MULTIPLE DISC - 3.5 MM (0.138 IN.)
4 - OUTER MULTIPLE DISC - 4.0 MM (0.158 IN.)
5 - K2 OUTER DISC CARRIER
6 - SNAP-RING
7 - FRICTION DISCS
8 - PISTON

10. Using a feeler gauge, determine the play "L" at three points between the snap-ring (6) and outer multiple-disc (4). Refer to **Fig. 166**.
11. During the measurement the snap-ring (6) must contact the upper bearing surface of the groove in the outer multiple-disc carrier.
12. The correct clutch clearance is 2.3-2.7 mm (0.091-0.106 in.) for three friction disc versions, 2.4-2.8 mm (0.095-0.110 in.) for four disc versions, 2.5-2.9 mm (0.099-0.114 in.) for five disc versions, and 2.7-3.1 mm (0.106-0.122 in.) for six disc versions.
13. Adjust with snap-ring (6), if necessary. Snap-rings are available in thicknesses of 2.3 mm (0.091 in.), 2.6 mm (0.102 in.), 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), 3.5 mm (0.138 in.), and 3.8 mm (0.150 in.).

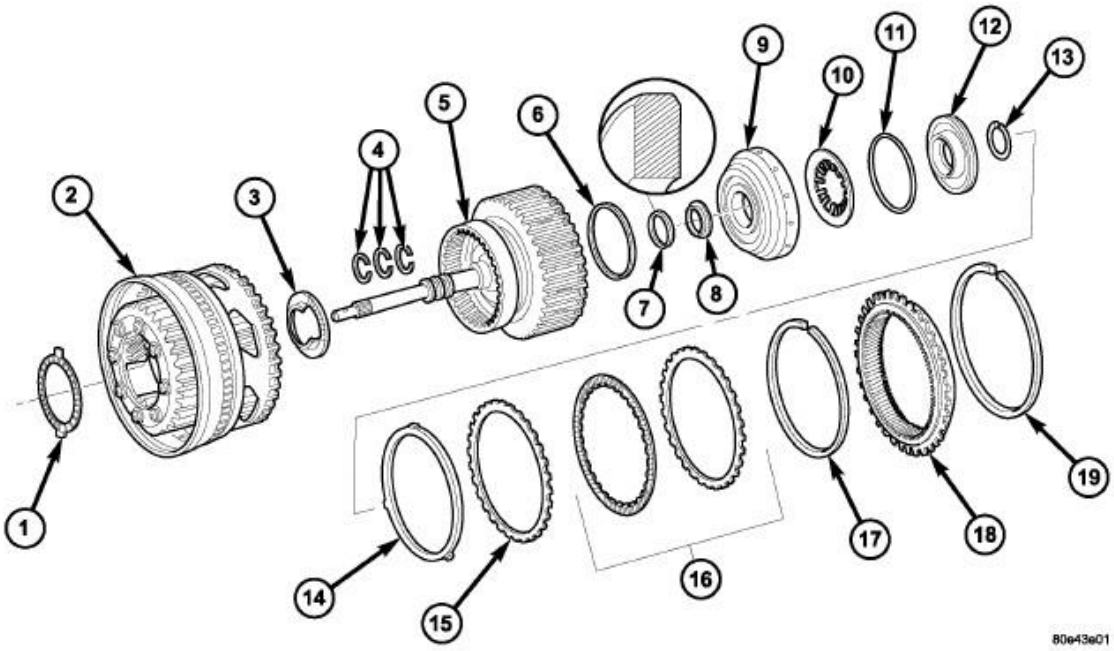

Fig. 167: Exploded View Of Input Clutch K2 Components
Courtesy of CHRYSLER GROUP, LLC

1 - NEEDLE ROLLER BEARING	11 - SPRING RETAINER SEALING - O-RING

2 - K1 INNER DISC CARRIER WITH INTEGRATED FRONT GEAR SET	12 - SPRING RETAINER
3 - THRUST BEARING	13 - SNAP-RING
4 - TORLON SEAL RINGS	14 - DISC SPRING
5 - INPUT SHAFT AND K2 CLUTCH	15 - EXTERNALLY TOOTHED PLATE - 1.8 MM (0.071 IN.)
6 - PISTON OUTER SEAL RING - O-RING	16 - MULTIPLE DISC PACK
7 - PISTON INNER SEAL RING	17 - SNAP-RING
8 - THRUST WASHER	18 - HOLLOW GEAR
9 - PISTON	19 - SNAP-RING
10 - DISC SPRING	

14. Insert axial needle bearing (3) into K1 inner multiple-disk carrier. Refer to **Fig. 167**. Insert axial needle bearing (3) with a little grease to prevent it slipping.
15. Install input shaft in K1 inner multiple-disc carrier with integrated front gear set (2).

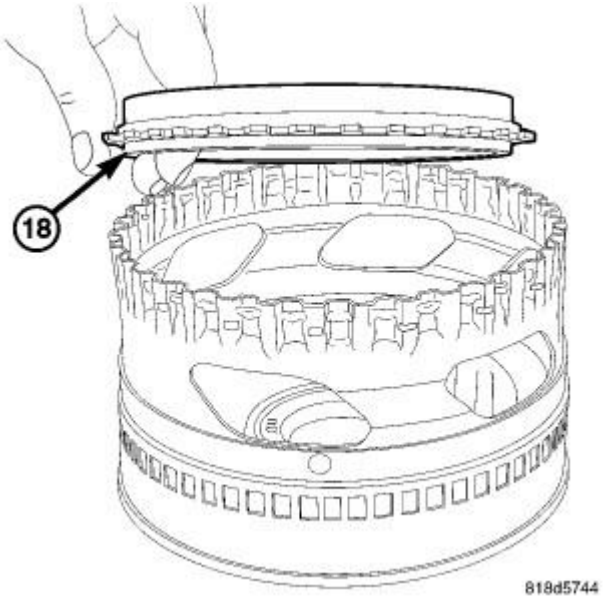

Fig. 168: NAG1 HOLLOW GEAR
Courtesy of CHRYSLER GROUP, LLC

1 - HOLLOW GEAR

NOTE: **Insure that the Hollow Gear (18) is oriented during installation such it protrudes from the K2 Retainer.**

16. Fit internally-geared wheel (18) and install snap-ring.

CLUTCH, K3

DISASSEMBLY

DISASSEMBLY

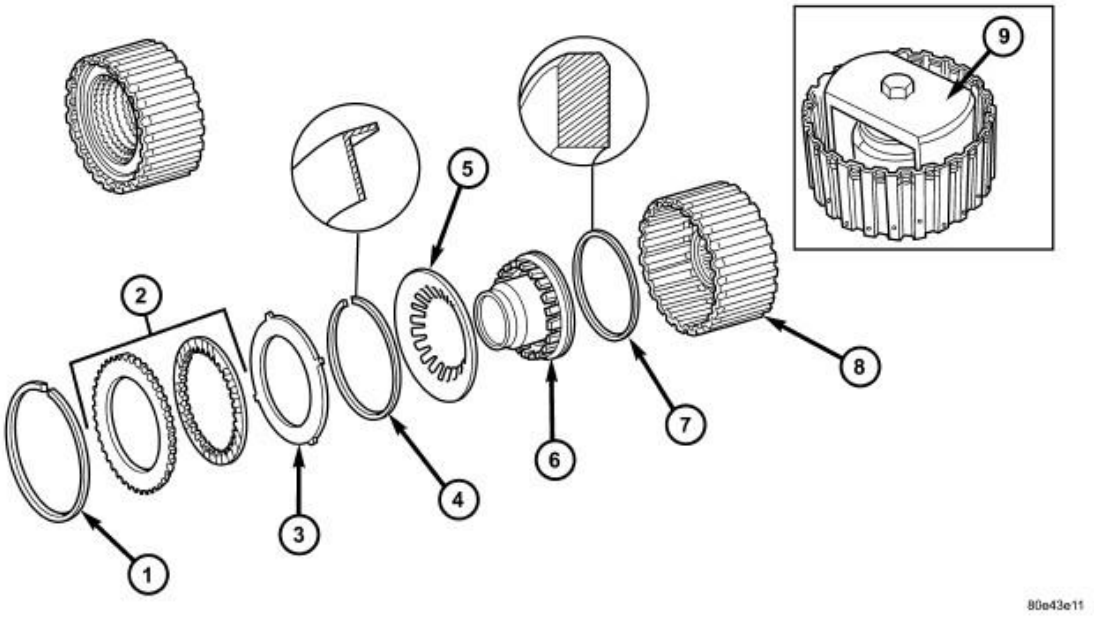

Fig. 169: Input Clutch K3 Components
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING	6 - PISTON
2 - MULTIPLE DISC PACK	7 - SEALING RING
3 - DISK SPRING	8 - OUTER DISC CARRIER
4 - SNAP-RING	9 - MULTI-USE SPRING COMPRESSOR 8900
5 - SPRING PLATE	

1. Remove snap-ring (1) from outer multiple-disc carrier. Refer to **Fig. 169**.
2. Remove multiple-disc pack (2) and disk spring (3) from outer multiple-disc carrier. Note which clutch disc is removed just prior to the disc spring (3) for re-assembly. If the clutch discs are re-used, this disc must be returned to its original position on top of the spring plate.
3. Place Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) (9) on the spring plate (5) and compress the spring until the snap-ring (4) is exposed. Refer to **Fig. 169**.
4. Remove snap-ring (4).
5. Remove spring plate (5) and piston (6) from outer multiple-disc carrier.

ASSEMBLY

ASSEMBLY

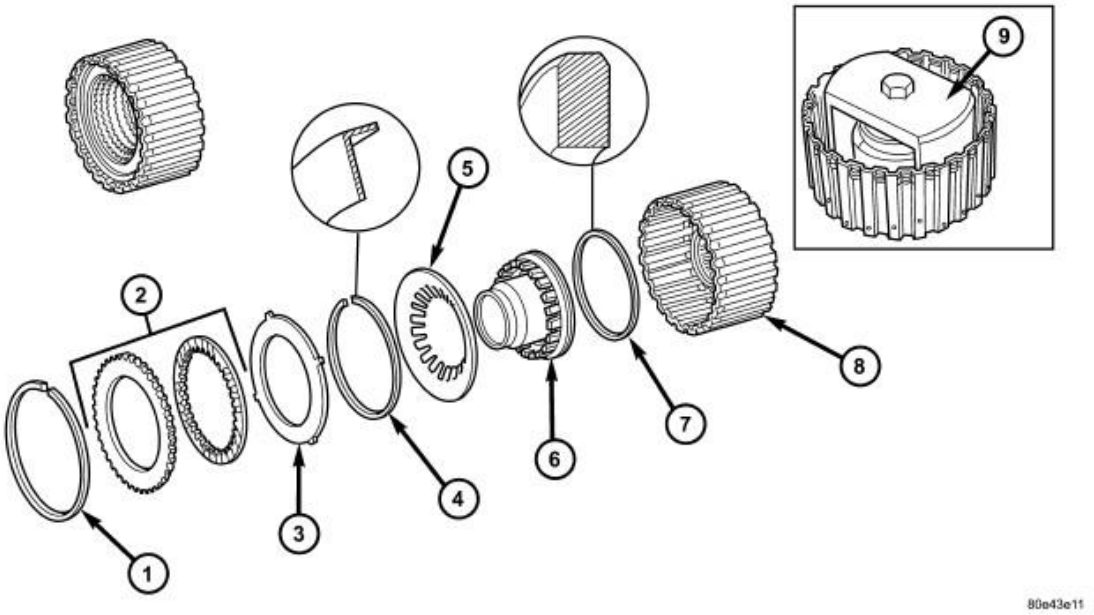

Fig. 170: Input Clutch K3 Components
Courtesy of CHRYSLER GROUP, LLC

1 - SNAP-RING	6 - PISTON
2 - MULTIPLE DISC PACK	7 - SEALING RING
3 - DISK SPRING	8 - OUTER DISC CARRIER
4 - SNAP-RING	9 - MULTI-USE SPRING COMPRESSOR 8900
5 - SPRING PLATE	

1. Install piston (6) in the outer multiple-disc carrier (8). Refer to **Fig. 170**. Check sealing ring (7), replace if necessary. The rounded off edges of the sealing ring must point outwards.
2. Insert the spring plate (5). Insert the spring plate with the curvature towards the piston.
3. Mount the Multi-use Spring Compressor (special tool #8900A, Multi Use Spring Compressor) (9) on the spring plate and clamp until the snap-ring groove is exposed.
4. Insert snap-ring (4). The collar of the snap-ring must point towards the multiple-disc pack.

CAUTION: When working with double sided friction discs, an externally lugged steel plate is installed first, followed by a friction disc, and continuing on until all the required discs are installed. When working with single sided friction discs, an externally lugged disc is installed first, followed by an internally lugged disc, and continuing on until all the required discs are installed. All single sided discs are installed with the friction side up.

NOTE: **Pay attention to the sequence of discs. If the original clutch discs are reused, be sure to return the disc identified on disassembly as belonging on top of the disk spring (3) to its original location.**

NOTE: **Place new friction multiple-discs in ATF fluid for one hour before installing.**

5. Install disk spring (3) and multiple-disc pack (2) in outer multiple-disc carrier (8).
6. Insert snap-ring (1).

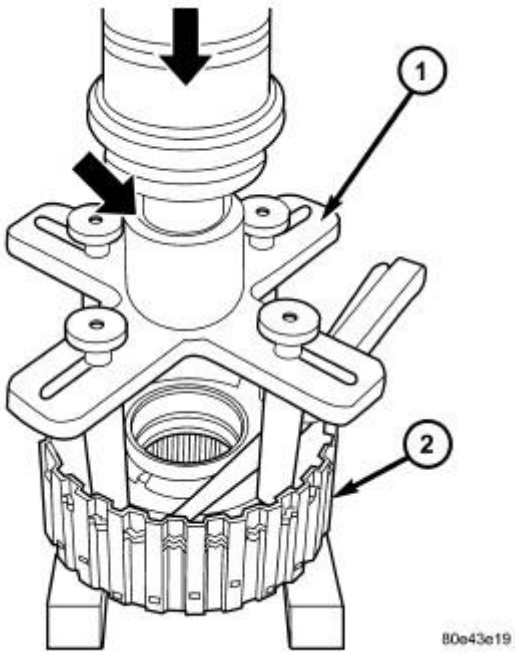

Fig. 171: Measure K3 Clutch Clearance
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSING TOOL 8901A
2 - OUTER DISC CARRIER

7. Measure the K3 clutch clearance by mounting Pressing Tool 8901A (1) on outer multiple disc. Refer to **Fig. 171**.
8. Using a lever press, compress pressing tool to the upper most line marked 1200 N (the marking ring is still visible, see small arrow).

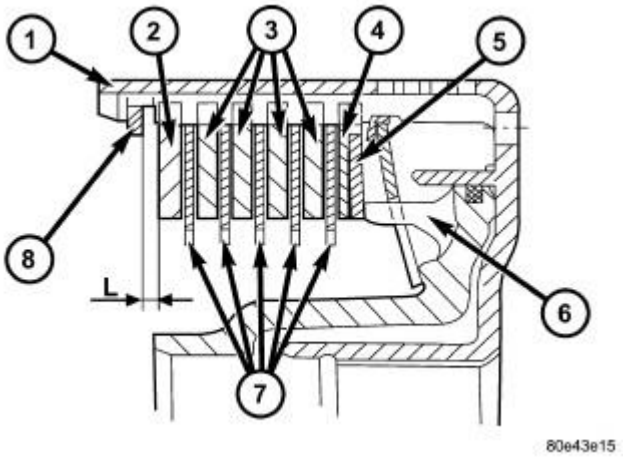

Fig. 172: Input Clutch K3 Stack-Up - Double Sided Discs
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER DISC CARRIER
2 - OUTER MULTIPLE DISC - 4.0 MM (0.158 IN.)
3 - OUTER MULTIPLE DISC - 2.8 MM (0.110 IN.)
4 - OUTER MULTIPLE DISC - 1.8 MM (0.079 IN.)
5 - DISC SPRING
6 - PISTON
7 - FRICTION DISCS - 2.1 MM (0.083 IN.)
8 - SNAP-RING

9. For transmissions using double sided friction discs, use a feeler gauge to determine the play "L" at three points between the snap-ring (8) and outer multiple-disc (2). Refer to **Fig. 172**.
10. During the measurement the snap-ring (8) must contact the upper bearing surface of the groove in the outer multiple-disc carrier.
11. The correct clutch clearance for transmissions with double sided friction discs is 2.3-2.7 mm (0.091-0.106 in.) for three friction disc versions, 2.4-2.8 mm (0.095-0.110 in.) for four disc versions, and 2.5-2.9 mm (0.099-0.114 in.) for five disc versions.
12. Adjust with snap-ring (8), if necessary. Snap-rings are available in thicknesses of 2.0 mm (0.079 in.), 2.3 mm (0.091 in.), 2.6 mm (0.102 in.), 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), and 3.5 mm (0.138 in.).

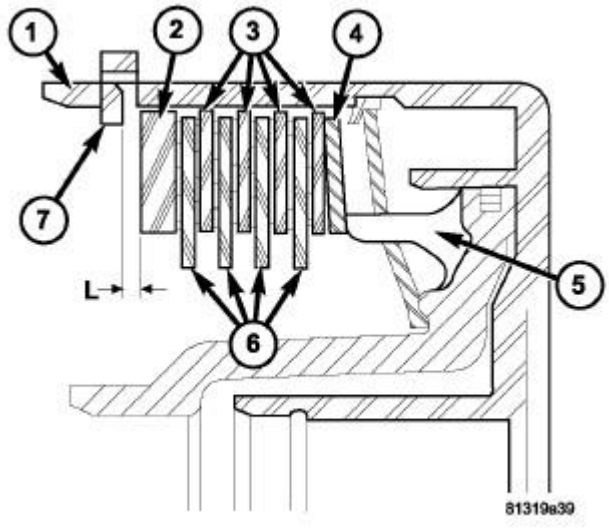

Fig. 173: Input Clutch K3 Stack-Up - Single Sided Discs
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER DISC CARRIER
2 - OUTER MULTIPLE DISC - 4.0 MM (0.158 IN.)
3 - OUTER MULTIPLE DISCS
4 - DISC SPRING
5 - PISTON
6 - INNER MULTIPLE DISCS
7 - SNAP-RING

13. For transmissions using single sided friction discs, use a feeler gauge to determine the play "L" at three points between the snap-ring (7) and outer multiple-disc (2). Refer to **Fig. 173**.
14. During the measurement the snap-ring (7) must contact the upper bearing surface of the groove in the outer multiple-disc carrier.
15. The correct clutch clearance for transmissions with single sided friction discs is 2.3-2.7 mm (0.091-0.106 in.) for six friction disc versions, 2.4-2.8 mm (0.095-0.110 in.) for eight disc versions, and 2.5-2.9 mm (0.099-0.114 in.) for ten disc versions.
16. Adjust with snap-ring (7), if necessary. Snap-rings are available in thicknesses of 2.0 mm (0.079 in.), 2.3 mm (0.091 in.), 2.6 mm (0.102 in.), 2.9 mm (0.114 in.), 3.2 mm (0.126 in.), and 3.5 mm (0.138 in.).

CONTACT, TEMPERATURE SENSOR\PARK-NEUTRAL

DESCRIPTION

PARK/NEUTRAL CONTACT

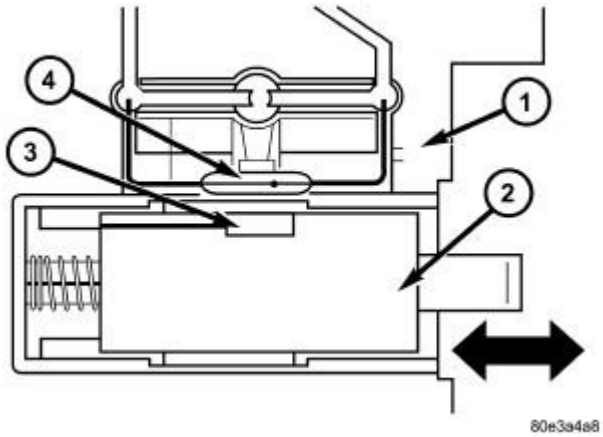

Fig. 174: Cutaway View Of Park/Neutral Contact
Courtesy of CHRYSLER GROUP, LLC

1 - SHELL OF ELECTRIC CONTROL MODULE
2 - PLUNGER
3 - PERMANENT MAGNET
4 - DRY-REED CONTACT

The park/neutral contact (4) is located in the shell of the electric control unit and is fixed to the conductor tracks. Refer to **Fig. 174**.

Its purpose is to recognize selector valve and selector lever positions "P" and "N". The park/neutral contact consists of:

- the plunger (2).
- the permanent magnet (3).
- the dry-reed contact (4).

TRANSMISSION TEMPERATURE SENSOR

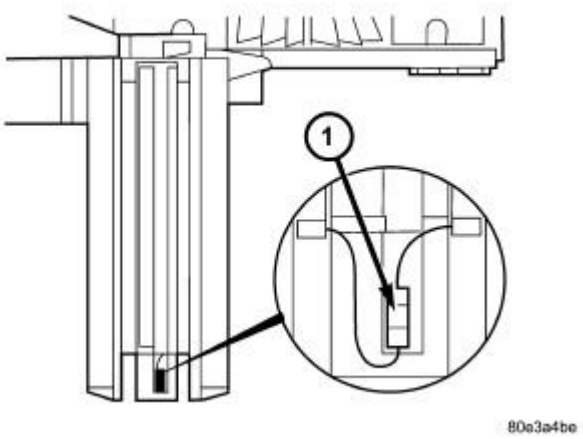

Fig. 175: Cutaway View Of Transmission Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - TRANSMISSION TEMPERATURE SENSOR

The transmission oil temperature sensor (1) is located in the shell of the electric valve control unit and is fixed to the conductor tracks. Refer to **Fig. 175**.

Its purpose is to measure the temperature of the transmission oil and pass the temperature to the TCM as an input signal. It is a temperature-dependent resistor (PTC).

OPERATION

PARK/NEUTRAL CONTACT

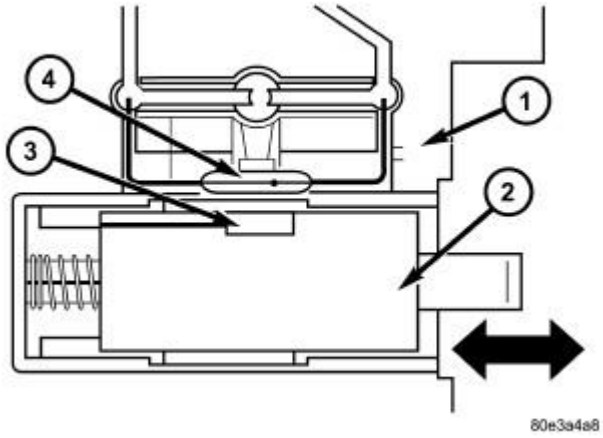

Fig. 176: Cutaway View Of Park/Neutral Contact
Courtesy of CHRYSLER GROUP, LLC

1 - SHELL OF ELECTRIC CONTROL MODULE

2 - PLUNGER
3 - PERMANENT MAGNET
4 - DRY-REED CONTACT

In selector lever positions "P" and "N" the park/neutral contact (4) is actuated by a cam track which is located on the detent plate. Refer to **Fig. 176**. The permanent magnet (3) is moved away from the dry-reed contact (4). The dry-reed contact (4) is opened. The TCM receives an electric signal. The circuit to the starter in the selector lever positions "P" and "N" is closed.

TRANSMISSION TEMPERATURE SENSOR

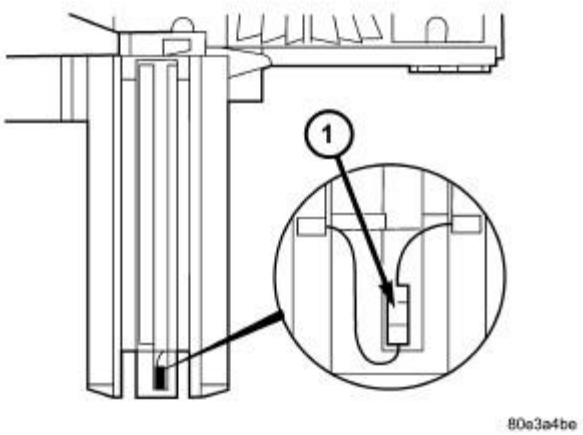

Fig. 177: Cutaway View Of Transmission Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - TRANSMISSION TEMPERATURE SENSOR

The temperature of the transmission oil has a considerable effect on the shifting time and therefore the shift quality. By measuring the oil temperature, shift operations can be optimized in all temperature ranges. The transmission oil temperature sensor (1) is switched in series with the park/neutral contact. Refer to **Fig. 177**. The temperature signal is transferred to the TCM only when the dry-reed contact of the park/neutral contact is closed in REVERSE or a forward gear position.

TRANSMISSION TEMP SENSOR SPECIFICATIONS

TEMPERATURE/VOLTAGE/RESISTANCE CHART

TEMPERATURE (C)	TEMPERATURE (F)	VOLTAGE	RESISTANCE
-50	-58	0.73	506.0
-45	-49	0.77	534.0
-40	-40	0.80	564.0
-35	-31	0.84	593.0
-30	-22	0.88	624.0
-25	-13	0.91	654.0
-20	-4	0.95	686.0
-15	5	0.98	718.0
-10	14	1.02	750.0
-5	23	1.05	783.0
0	32	1.09	817.0
5	41	1.12	851.0
10	50	1.16	886.0
15	59	1.19	921.0
20	68	1.23	957.0
25	77	1.26	994.0
30	86	1.30	1032.0
35	95	1.33	1070.0
40	104	1.37	1109.0
45	113	1.40	1149.0
50	122	1.44	1189.0
55	131	1.48	1231.0
60	140	1.51	1273.0
65	149	1.55	1316.0
70	158	1.58	1360.0
75	167	1.62	1405.0
80	176	1.65	1450.0
85	185	1.69	1497.0
90	194	1.72	1545.0
95	203	1.76	1594.0
100	212	1.79	1644.0
105	221	1.83	1695.0
110	230	1.86	1747.0
115	239	1.90	1800.0
120	248	1.93	1855.0
125	257	1.97	1911.0
130	266	2.00	1968.0
135	275	2.04	2027.0
140	284	2.08	2087.0
145	293	2.11	2148.0
150	302	2.15	2211.0
155	311	2.18	2276.0
160	320	2.22	2342.0
165	329	2.25	2410.0
170	338	2.29	2479.0
175	347	2.32	2551.0

80e3afbe

Fig. 178: Transmission Temperature Sensor Specifications
Courtesy of CHRYSLER GROUP, LLC

Refer to the appropriate Transmission Temperature Sensor Specifications table for the relationship between transmission temperature, sensor voltage, and sensor resistance.

FLUID AND FILTER

OPERATION

OPERATION

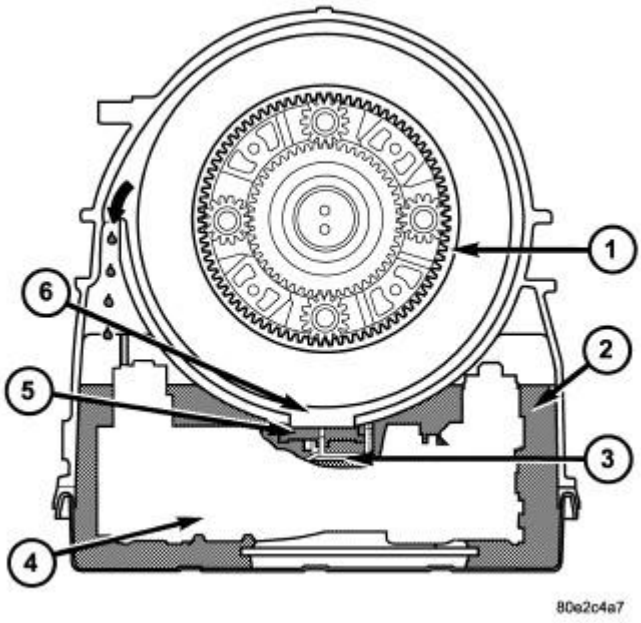

Fig. 179: Fluid Level Control
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSET CHAMBER
2 - OIL GALLERY
3 - SHELL OF ELECTROHYDRAULIC UNIT
4 - ELECTROHYDRAULIC UNIT
5 - FLOAT
6 - OPENING

With low oil levels, the lubricating oil which flows constantly out of the gearset, flows back to oil gallery (2) though the opening (6). If the oil level rises, the oil presses the float (5) against the housing opening (6). Refer to **Fig. 179**. The float (5) therefore separates the oil gallery (2) from the gearset chamber (1). The lubricating oil which continues to flow out of the gearsets is thrown against the housing wall, incorporated by the rotating parts and flows back into the oil gallery (2) through the upper opening (arrow).

DIAGNOSIS AND TESTING

EFFECTS OF INCORRECT FLUID LEVEL

A low fluid level allows the pump to take in air along with the fluid. Air in the fluid will cause fluid pressures to be low and develop slower than normal. If the transmission is overfilled, the gears churn the fluid into foam. This aerates the fluid and causing the same conditions occurring with a low level. In either case, air bubbles cause fluid overheating, oxidation, and varnish buildup which interferes with valve and clutch operation. Foaming also causes fluid expansion which can result in fluid overflow from the transmission vent or fill tube. Fluid overflow can easily be mistaken for a leak if

inspection is not careful.

CAUSES OF BURNT FLUID

Burnt, discolored fluid is a result of overheating which has three primary causes.

1. Internal clutch slippage, usually caused by low line pressure, inadequate clutch apply pressure, or clutch seal failure.
2. A result of restricted fluid flow through the main and/or auxiliary cooler. This condition is usually the result of a faulty or improperly installed drainback valve, a damaged oil cooler, or severe restrictions in the coolers and lines caused by debris or kinked lines.
3. Heavy duty operation with a vehicle not properly equipped for this type of operation. Trailer towing or similar high load operation will overheat the transmission fluid if the vehicle is improperly equipped. Such vehicles should have an auxiliary transmission fluid cooler, a heavy duty cooling system, and the engine/axle ratio combination needed to handle heavy loads.

FLUID CONTAMINATION

Transmission fluid contamination is generally a result of:

- adding incorrect fluid
- failure to clean dipstick and fill tube when checking level
- engine coolant entering the fluid
- internal failure that generates debris
- overheat that generates sludge (fluid breakdown)
- failure to replace contaminated converter after repair

The use of non-recommended fluids can result in transmission failure. The usual results are erratic shifts, slippage, abnormal wear and eventual failure due to fluid breakdown and sludge formation. Avoid this condition by using recommended fluids only.

The dipstick cap and fill tube should be wiped clean before checking fluid level. Dirt, grease and other foreign material on the cap and tube could fall into the tube if not removed beforehand. Take the time to wipe the cap and tube clean before withdrawing the dipstick.

Engine coolant in the transmission fluid is generally caused by a cooler malfunction. The only remedy is to replace the radiator as the cooler in the radiator is not a serviceable part. If coolant has circulated through the transmission, an overhaul is necessary.

The torque converter should be replaced whenever a failure generates sludge and debris. This is necessary because normal converter flushing procedures will not remove all contaminants.

STANDARD PROCEDURE

CHECK OIL LEVEL

1. Verify that the vehicle is parked on a level surface.
2. Remove the dipstick tube cap.

WARNING: There is a risk of accident from vehicle starting off by itself when engine running. There is a risk of injury from contusions and burns if you insert your hands into the engine when it is started or when it is running. Secure vehicle to prevent it from moving off by itself. Wear properly fastened and close-fitting work clothes. Do not touch hot or rotating parts.

3. Actuate the service brake. Start engine and let it run at idle speed in selector lever position "P".
4. Shift through the transmission modes several times with the vehicle stationary and the engine idling
5. Warm up the transmission, wait at least 2 minutes and check the oil level with the engine running. Push the Oil Dipstick (special tool #9336A, Dipstick) into transmission fill tube until the dipstick tip contacts the oil pan and pull out again, read off oil level, repeat if necessary.

NOTE: The dipstick will protrude from the fill tube when installed.

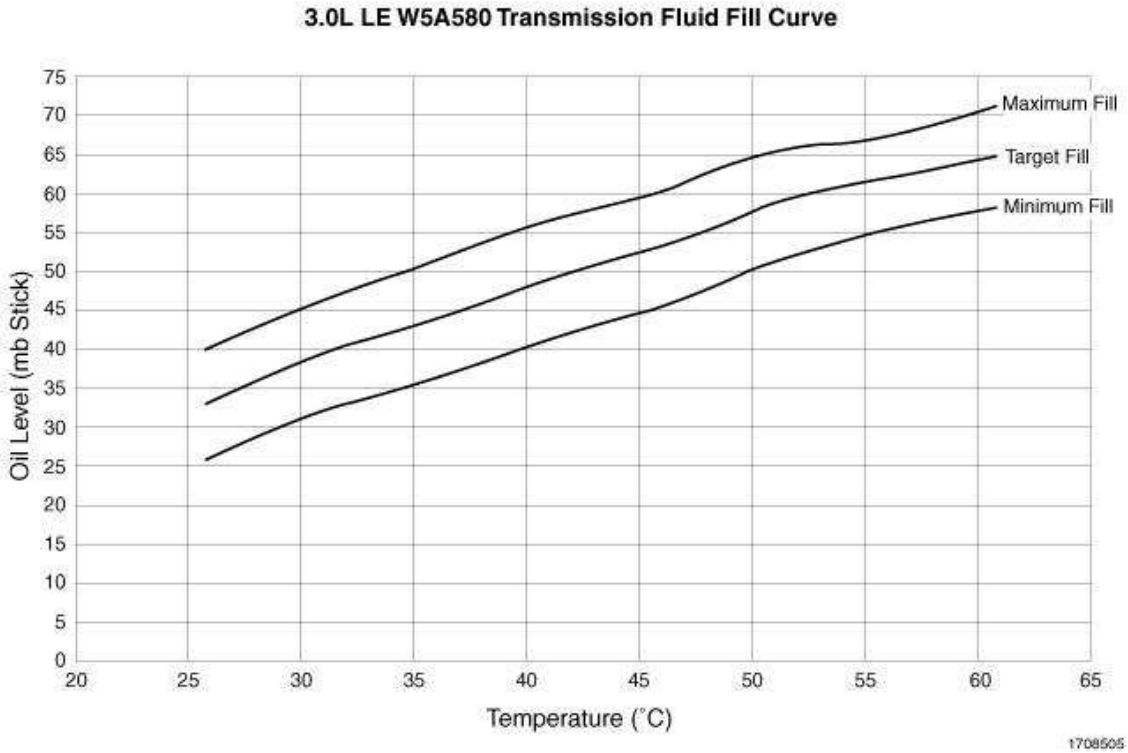

Fig. 180: Nag1 Diesel Fill Graph
Courtesy of CHRYSLER GROUP, LLC

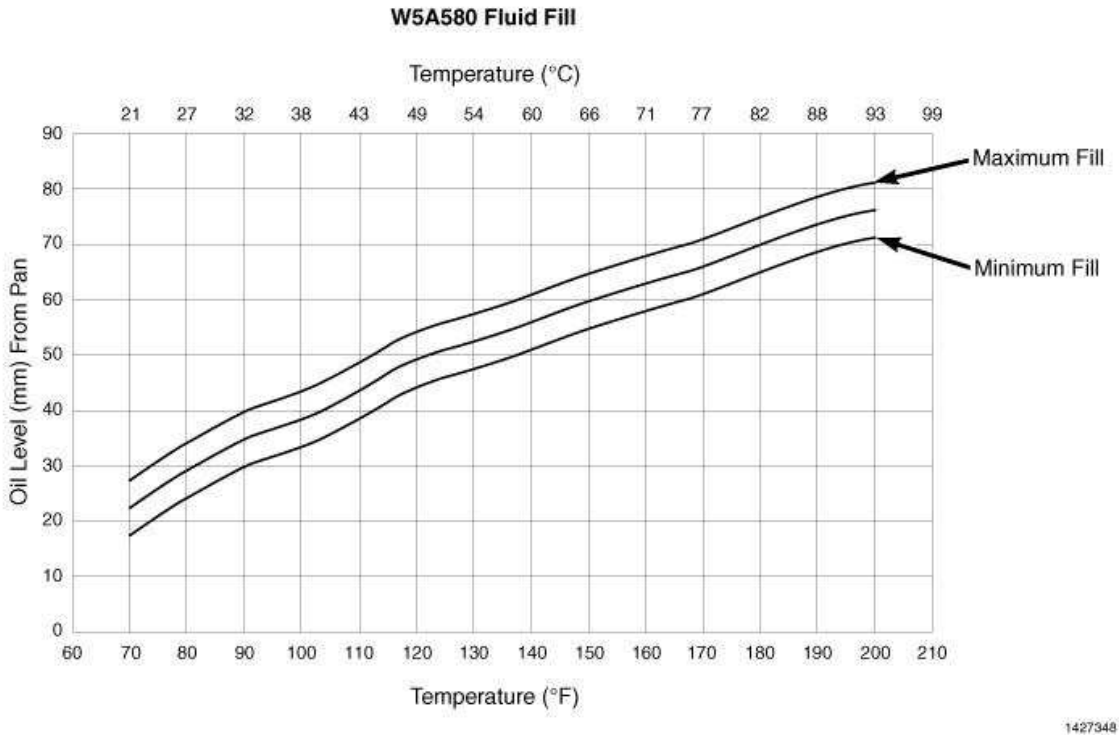

Fig. 181: Nag1 Gasoline Transmission Fill Graph
Courtesy of CHRYSLER GROUP, LLC

6. Check transmission oil temperature using the appropriate scan tool.

NOTE: **The true transmission oil temperature can only be read by a scan tool in REVERSE or any forward gear position. Refer to CONTACT, TEMPERATURE SENSOR\PARK-NEUTRAL, OPERATION.**

7. The transmission Oil Dipstick (special tool #9336A, Dipstick) has indicator marks every 10 mm. With the transmission in Park, determine the height of the oil level on the dipstick and using the height, the transmission temperature, and the Transmission Fluid Graph, determine if the transmission oil level is correct.
8. Add or remove oil as necessary and recheck the oil level.
9. Once the oil level is correct, install the dipstick tube cap.

TRANSMISSION FILL

To avoid overfilling transmission after a fluid change or overhaul, perform the following procedure:

1. Verify that the vehicle is parked on a level surface.
2. Remove the dipstick tube cap.
3. Add following initial quantity of Mopar® ATF +4, Automatic Transmission Fluid, to the transmission:

1. If only fluid and filter were changed, add **5.0 L (10.6pts.)** of transmission fluid to transmission.
2. If the transmission was completely overhauled or the torque converter was replaced or drained, add **7.7 L (16.3 pts.)** of transmission fluid to transmission.

4. Check the transmission fluid and adjust as required. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

FLUID/FILTER SERVICE

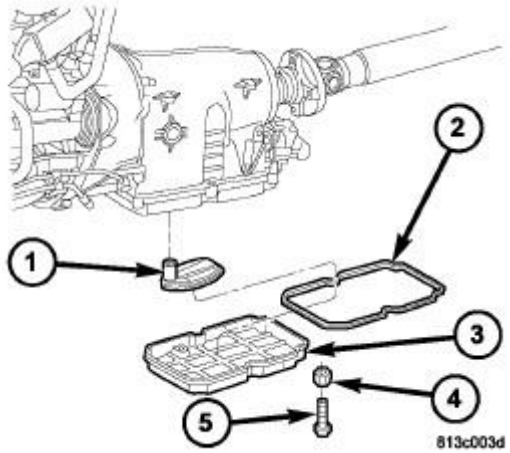

Fig. 182: Fluid/Filter Service Points
Courtesy of CHRYSLER GROUP, LLC

1 - OIL FILTER
2 - OIL PAN GASKET
3 - OIL PAN
4 - RETAINER
5 - BOLT

1. Run the engine until the transmission oil reaches operating temperature.
2. Raise and support vehicle.
3. Remove the bolts (5) and retainers (4) holding the oil pan to the transmission. Refer to **Fig. 182**.
4. Remove the transmission oil pan (3) and gasket (2) from the transmission.
5. Remove the transmission oil filter (1) and o-ring from the electrohydraulic control unit.
6. Clean the inside of the oil pan (3) of any debris. Inspect the oil pan gasket (2) and replace if necessary.
7. Install a new oil filter (1) and o-ring into the electrohydraulic control unit.
8. Install the oil pan (3) and gasket (2) onto the transmission.
9. Install the oil pan bolts (5) and retainers (4). Torque the bolts to 8 N.m (70 in.lbs.).
10. Lower the vehicle and add 5.0 L (10.6 pts.) of transmission fluid to the transmission.

11. Check the oil level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

GEARTRAIN, PLANETARY

DESCRIPTION

DESCRIPTION

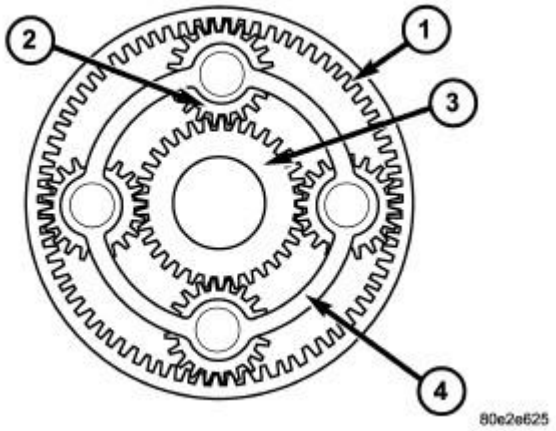

Fig. 183: Planetary Geartrain
Courtesy of CHRYSLER GROUP, LLC

1 - ANNULUS GEAR
2 - PLANETARY PINION GEARS
3 - SUN GEAR
4 - PLANETARY CARRIER

Three planetary gear sets are used to produce the different gear ratios. Refer to **Fig. 183**. These are located in the mechanical part of the transmission as the front, middle and rear planetary gear sets.

OPERATION

OPERATION

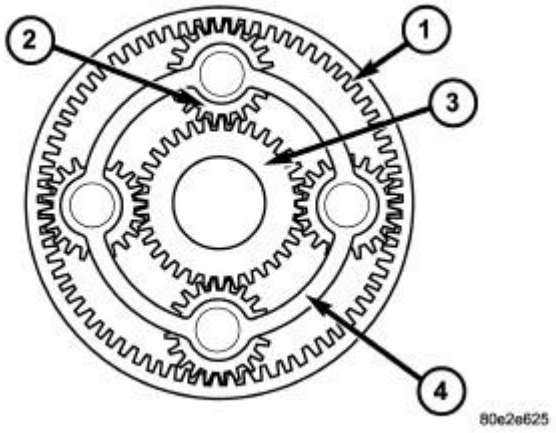

Fig. 184: Planetary Geartrain
Courtesy of CHRYSLER GROUP, LLC

1 - ANNULUS GEAR
2 - PLANETARY PINION GEARS
3 - SUN GEAR
4 - PLANETARY CARRIER

The annulus gear (1) and sun gear (3) elements of a planetary gear system are alternately driven and braked by the actuating elements of the multi-plate clutch and multiple-disc brake. Refer to **Fig. 184**. The planetary pinion gears (2) can turn on the internal gearing of the annulus gear (1) and on the external gearing of the sun gear (3). This allows for a variety of gear ratios and the reversal of the rotation direction without the need for moving gear wheels or shift collars. When two components of the planetary gear set are locked together, the planetary gear set is locked and turns as a closed unit.

The torque and engine speed are converted according to the lever ratios and the ratio of the number of teeth on the driven gears to that on the drive gears, and is referred to as the gear ratio. The overall ratio of a number of planetary gear sets connected in series is obtained by multiplying the partial ratios.

DISASSEMBLY

DISASSEMBLY

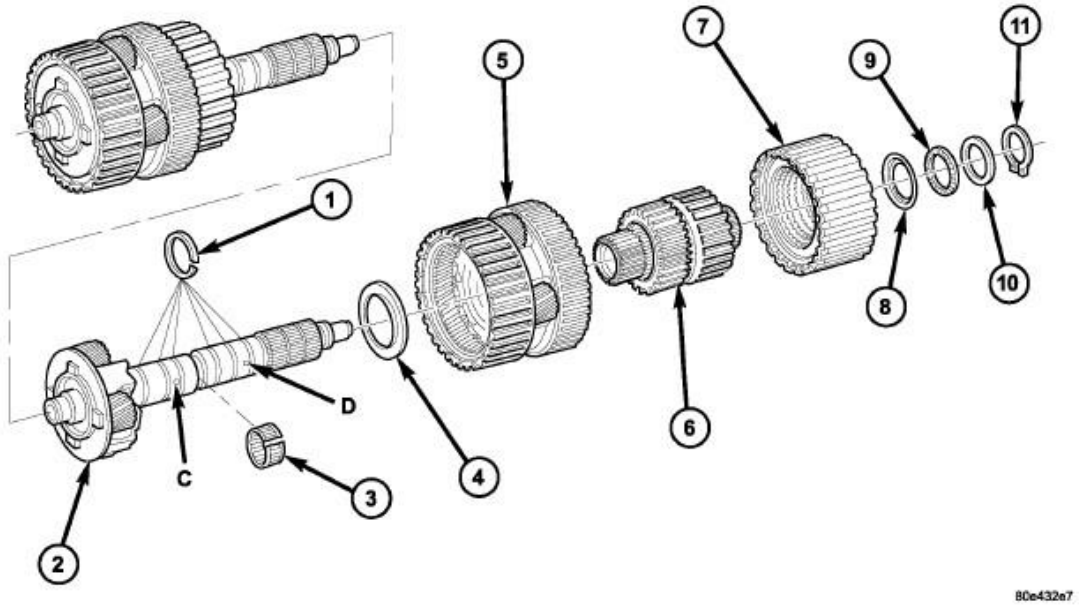

Fig. 185: Output Shaft With Center And Rear Planetary Geartrain
Courtesy of CHRYSLER GROUP, LLC

1 - TEFLON RINGS	7 - DRIVING CLUTCH K3
2 - OUTPUT SHAFT WITH CENTER PLANETARY CARRIER	8 - THRUST WASHER
3 - NEEDLE BEARING	9 - AXIAL NEEDLE BEARING
4 - THRUST WASHER	10 - SHIM
5 - REAR PLANETARY GEAR SET	11 - RETAINING RING
6 - REAR HOLLOW SHAFT/FREEWHEELING CLUTCH F2	

1. Remove upper two visible Teflon rings (1) from output shaft. Refer to **Fig. 185**.
2. Remove retaining ring (11), shim (10), thrust needle bearing (9) and thrust washer (8) from output shaft.
3. Remove clutch K3 (7).
4. Remove rear tubular shaft/freewheeling clutch F2 (6) from output shaft. Refer to **Fig. 185**.
5. Remove rear gear set (5) with integrated tubular shaft of center gear set from output shaft.
6. Remove thrust washer (4).

ASSEMBLY

ASSEMBLY

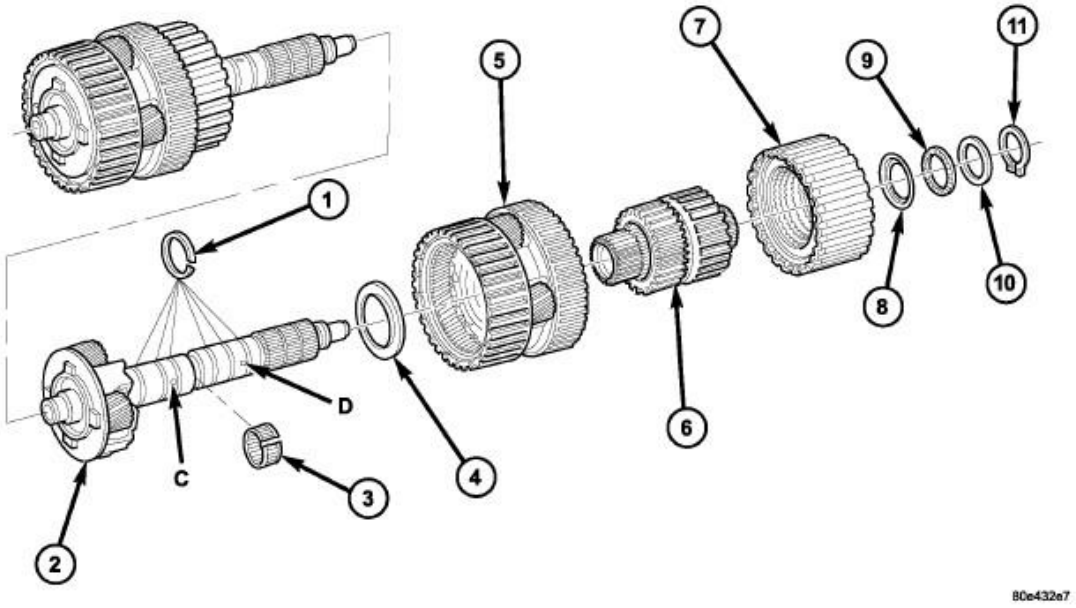

Fig. 186: Output Shaft With Center And Rear Planetary Geartrain
Courtesy of CHRYSLER GROUP, LLC

1 - TEFLON RINGS	7 - DRIVING CLUTCH K3
2 - OUTPUT SHAFT WITH CENTER PLANETARY CARRIER	8 - THRUST WASHER
3 - NEEDLE BEARING	9 - AXIAL NEEDLE BEARING
4 - THRUST WASHER	10 - SHIM
5 - REAR PLANETARY GEAR SET	11 - RETAINING RING
6 - REAR HOLLOW SHAFT/FREEWHEELING CLUTCH F2	

1. Mount thrust washer (4) with the collar pointing towards the planet carrier. Refer to **Fig. 186**.
2. Mount the rear gear set (5) on the rear hollow shaft (6).
3. Using grease, install lower three Teflon rings (1) in the groove so that the joint stays together. Refer to **Fig. 186**.
4. Put rear hollow shaft/freewheeling clutch F2 (6) with rear gear set (5) onto output shaft.
5. Install clutch K3 (7).
6. Mount retaining ring, shim, thrust needle bearing and thrust washer (8 - 11). Refer to **Fig. 186**.
7. Using grease, insert the upper two Teflon rings (1) in the groove so that the joint remains together.

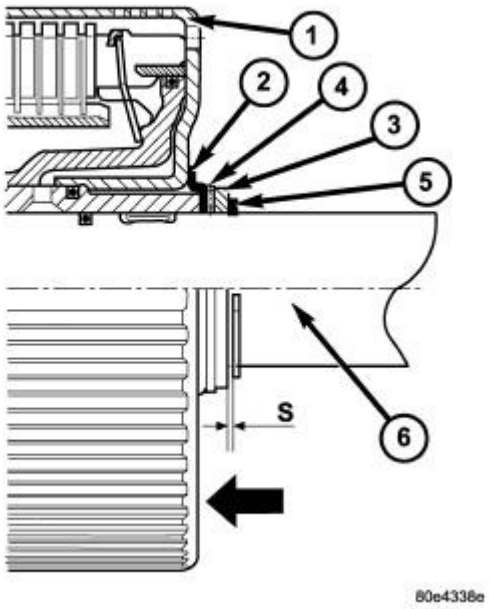

Fig. 187: Check Center & Rear Planetary End-Play
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVING CLUTCH K3
2 - THRUST WASHER
3 - SHIM
4 - AXIAL NEEDLE BEARING
5 - RETAINING RING
6 - OUTPUT SHAFT WITH CENTER PLANETARY CARRIER

NOTE: During the test, apply a contact force by hand to K3 in the direction of the arrow.

8. Inspect axial play between shim (10) and retaining ring (11). Refer to **Fig. 187**. Check axial play "S" between shim (10) and retaining ring (1) using a feeler gauge. Clearance should be 0.15-0.6 mm (0.006-0.024 in.). Shims are available in thicknesses of 3.0 mm (0.118 in.), 3.4 mm (0.134 in.), and 3.7 mm (0.146 in.). Adjust as necessary

HOLDING CLUTCHES

DESCRIPTION

DESCRIPTION

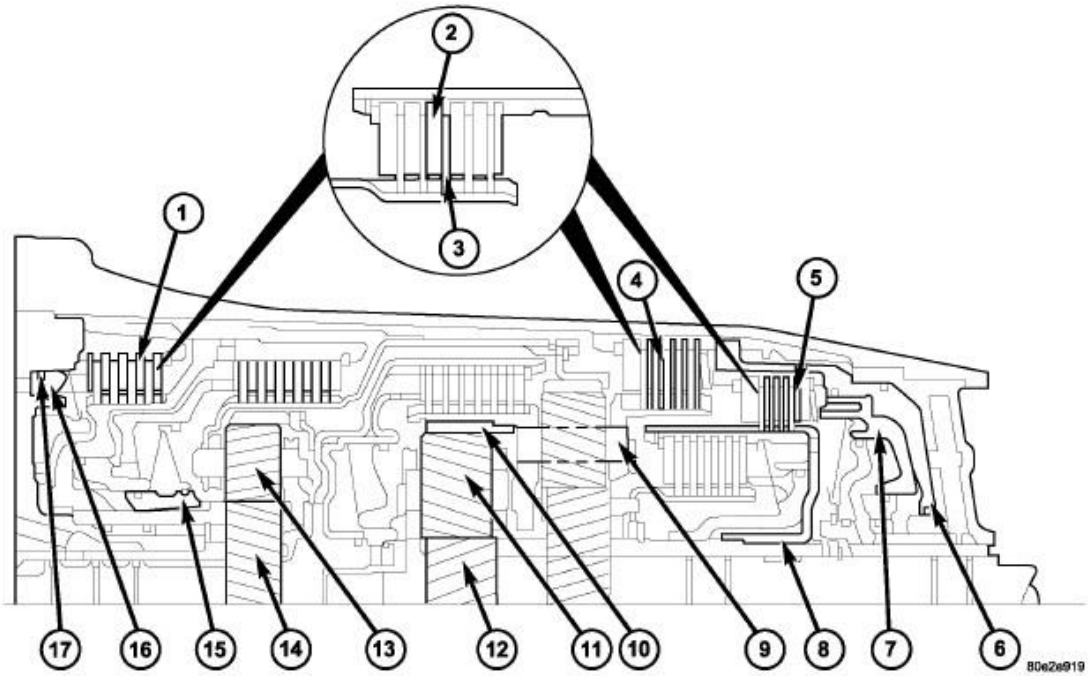

Fig. 188: Identifying Holding Clutches
Courtesy of CHRYSLER GROUP, LLC

1 - B1 CLUTCH	10 - CENTER PLANETARY GEARSET ANNULUS GEAR
2 - EXTERNALLY TOOTHED DISC	11 - CENTER PLANETARY GEARSET PINION GEARS
3 - INTERNALLY TOOTHED DISC	12 - CENTER PLANETARY GEARSET SUN GEAR
4 - B3 CLUTCH	13 - FRONT PLANETARY GEARSET PINION GEARS
5 - B2 CLUTCH	14 - FRONT PLANETARY GEARSET SUN GEAR
6 - B3 CLUTCH PISTON	15 - B1 CLUTCH INTERNALLY TOOTHED DISC CARRIER
7 - B2 CLUTCH PISTON	16 - B1 CLUTCH PISTON
8 - B2 CLUTCH INTERNALLY TOOTHED DISC CARRIER	17 - B1 CLUTCH EXTERNALLY TOOTHED DISC CARRIER
9 - REAR PLANETARY GEARSET PLANETARY CARRIER	

Three multiple-disc holding clutches, the front, B1 (1), middle, B3 (4), and rear multiple disc clutches, B2 (5), are located in the planetary gear sets in the transmission housing. Refer to **Fig. 188**.

A multiple-disc holding clutch consists of a number of internally toothed discs (3) on an internally toothed disc carrier and externally toothed discs (2) on an externally toothed disc carrier, which is

rigidly connected to the transmission housing.

OPERATION

OPERATION

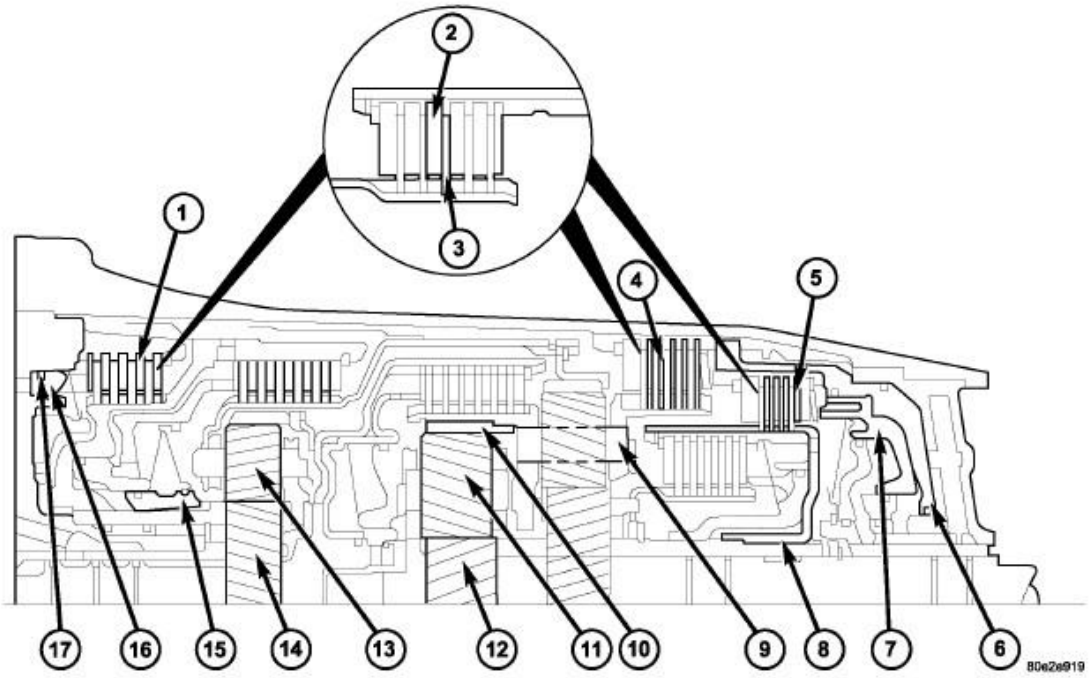

Fig. 189: Identifying Holding Clutches
Courtesy of CHRYSLER GROUP, LLC

1 - B1 CLUTCH	10 - CENTER PLANETARY GEARSET ANNULUS GEAR
2 - EXTERNALLY TOOTHED DISC	11 - CENTER PLANETARY GEARSET PINION GEARS
3 - INTERNALLY TOOTHED DISC	12 - CENTER PLANETARY GEARSET SUN GEAR
4 - B3 CLUTCH	13 - FRONT PLANETARY GEARSET PINION GEARS
5 - B2 CLUTCH	14 - FRONT PLANETARY GEARSET SUN GEAR
6 - B3 CLUTCH PISTON	15 - B1 CLUTCH INTERNALLY TOOTHED DISC CARRIER
7 - B2 CLUTCH PISTON	16 - B1 CLUTCH PISTON
8 - B2 CLUTCH INTERNALLY TOOTHED DISC CARRIER	17 - B1 CLUTCH EXTERNALLY TOOTHED DISC CARRIER
9 - REAR PLANETARY GEARSET PLANETARY CARRIER	

The holding clutches connect the annulus gear, sun gear, or planetary carrier of a planetary gear set against the transmission housing in order to transmit the drive torque. Refer to **Fig. 189**.

If the piston (16) on multiple-disc holding clutch B1 (1) is subjected to oil pressure, it presses the internal (3) and external discs (2) of the disc set together. The internally toothed disc carrier (15) locks the sun gear (14) against the housing. The planetary pinion gears (13) turn on the sun gear (14).

If the multiple-disc holding clutch B2 (5) is actuated via the piston (7), the piston compresses the disc set. The internally toothed disc carrier (8) locks the sun gear (12) against the housing. The planetary pinion gears (11) turn on the sun gear (12).

If the multiple-disc holding clutch B3 (4) is actuated via the piston (6), the planetary carrier (9) and the annulus gear (10) are locked. When the multiple-disc brake B3 (4) is actuated, the direction of rotation is reversed.

KNOB, GEARSHIFT

REMOVAL

REMOVAL

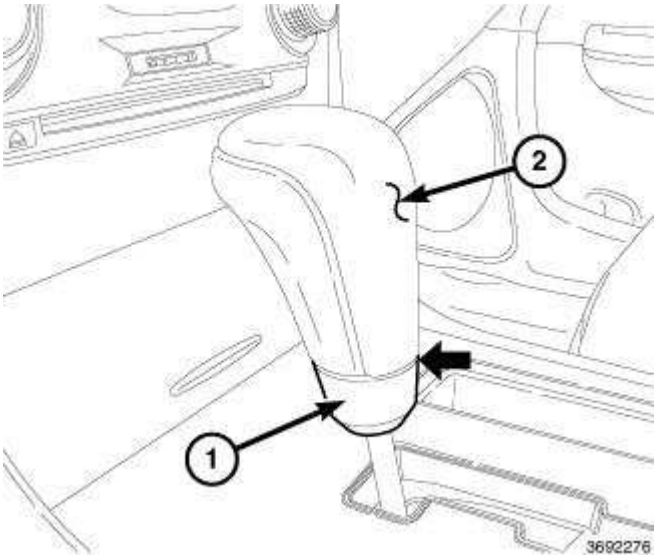

Fig. 190: Collar & Shifter Knob
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #C-4755, Trim Stick) or the equivalent pry the collar (1) away from the shifter knob (2).

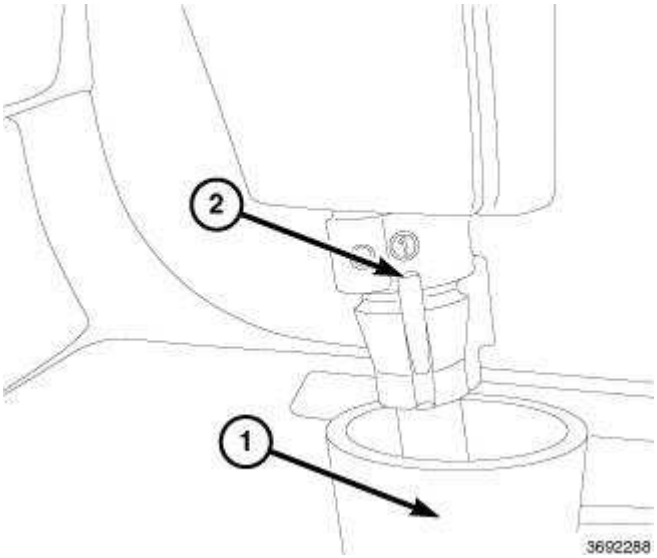

Fig. 191: Disengage The Collar & Disengage The Collar
Courtesy of CHRYSLER GROUP, LLC

2. Completely disengage the collar (1) from the shifter knob (2).

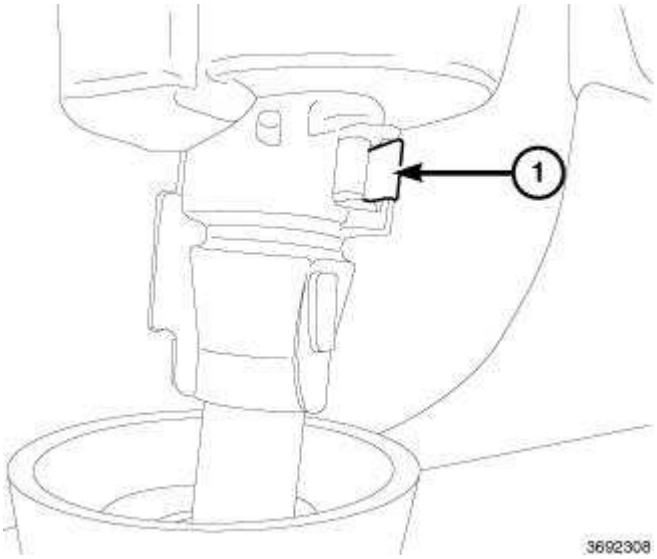

Fig. 192: Retention Clip Tab
Courtesy of CHRYSLER GROUP, LLC

3. Grasp the retention clip tab with pliers or the equivalent and remove the clip from the knob.
4. Grasp the knob and pull firmly upward to remove from the shifter assembly.

INSTALLATION

INSTALLATION

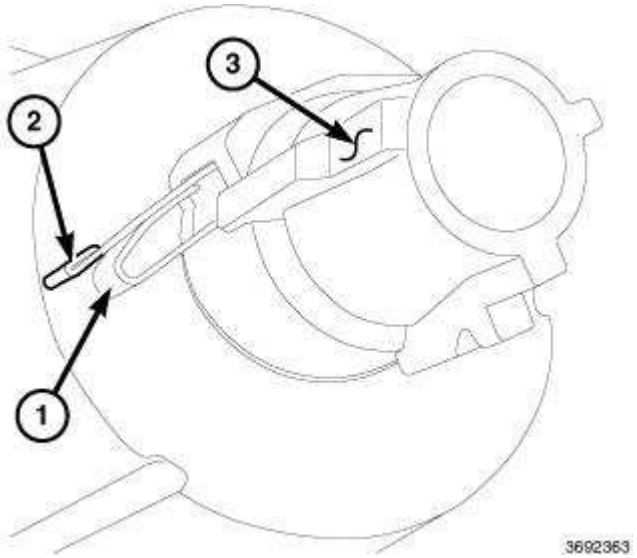

Fig. 193: Retention Spring, Shift Knob & Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: The clip must be installed with the correct orientation or subsequent knob removals will require much more force.

1. Install the retention spring (1) to the shift knob (3) with the tab (2) facing the instrument panel.

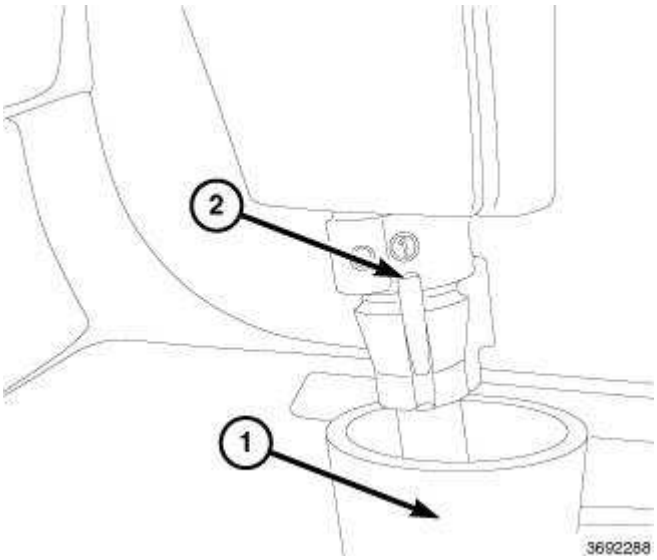

Fig. 194: Disengage The Collar & Disengage The Collar
Courtesy of CHRYSLER GROUP, LLC

2. Install the collar (1) and the knob (2) to the shifter shaft assembly.
3. Firmly push the knob onto the shaft.
4. Orient the collar so that it aligns with the angle of the knob.

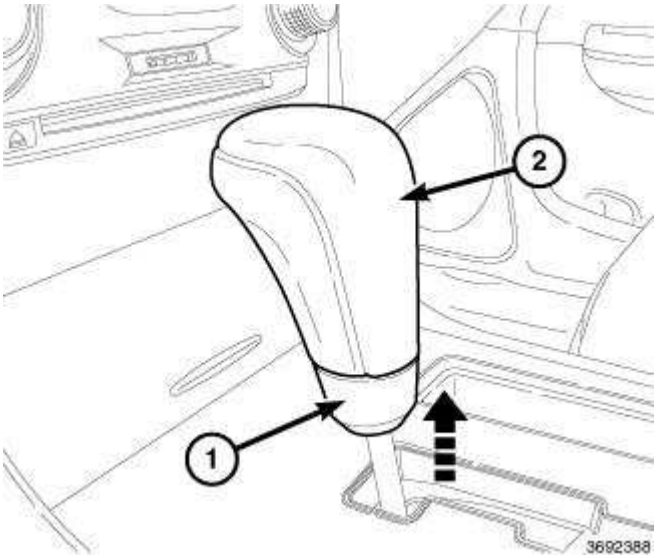

Fig. 195: Collar & Shift Knob
Courtesy of CHRYSLER GROUP, LLC

5. Install the collar (1) to the shift knob (2) and seat fully.

MECHANISM, BRAKE TRANSMISSION SHIFT INTERLOCK

DESCRIPTION

DESCRIPTION

NOTE: Some shifter assemblies may have a small external trim cover to actuate the Brake Transmission Shifter/Ignition Interlock (BTSI).

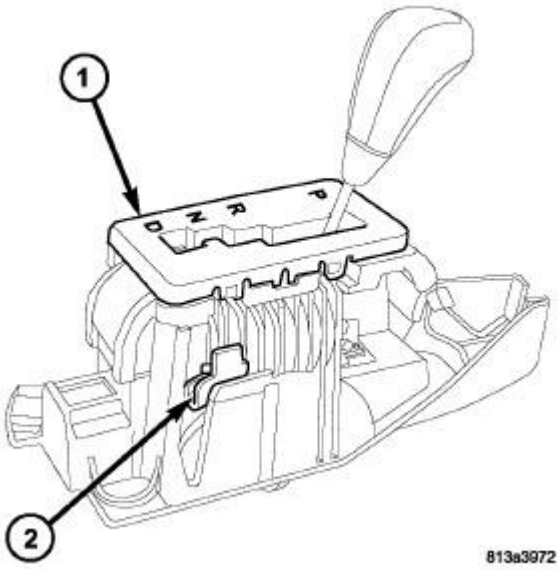

Fig. 196: BTSI Override
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFTER ASSEMBLY
2 - BTSI OVERRIDE

The Brake Transmission Shifter/Ignition Interlock (BTSI) is an electronically operated system that prevents the transmission gear shifter from being moved out of PARK without the proper driver inputs. The system contains a solenoid that is integral to the shifter assembly. The solenoid permits shifter movement out of PARK when the brake is depressed and prevents shifter movement into REVERSE unless a shift into REVERSE is permitted.

A BTSI override (2) is provided on the side of the shifter mechanism (1) to allow the vehicle to be shifted out of PARK in the event of an electrical failure.

OPERATION

OPERATION

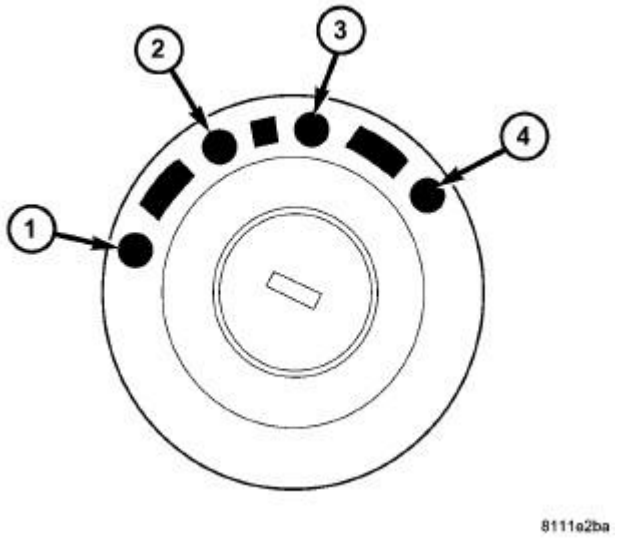

Fig. 197: Ignition Key/Switch Positions
Courtesy of CHRYSLER GROUP, LLC

1 - LOCK
2 - ACC
3 - ON
4 - START

The Brake Transmission Shifter/Ignition Interlock (BTSI) is engaged whenever the ignition switch is in the LOCK (1) position. Refer to **Fig. 197**. An additional electrically activated feature will prevent shifting out of the PARK position unless the brake pedal is depressed at least one-half inch. A solenoid in the shifter assembly is energized when the ignition is in the ON position and the brake pedal is depressed. When the key is in the ON position and the brake pedal is depressed, the shifter is unlocked and will move into any position. The interlock system also prevents the ignition switch from being turned to the LOCK position, unless the shifter is in the gated PARK position.

The following chart describes the normal operation of the Brake Transmission Shift Interlock (BTSI) system. If the "expected response" differs from the vehicle's response, then system repair and/or adjustment is necessary.

ACTION	EXPECTED RESPONSE
1. Turn key to the "ACC" position and depress brake pedal.	1. Shifter CAN be shifted out of park.
2. Turn key to the "ON" position, with foot off of brake pedal.	2. Shifter CANNOT be shifted out of park.
3. Turn key to the "ON" position and depress the brake pedal.	3. Shifter CAN be shifted out of park.
4. Leave shifter in any gear, except "PARK", and try to return key to the "LOCK" position.	4. Key cannot be returned to the "LOCK" position.

5. Return shifter to "PARK" and try to remove the key.	5. Key can be removed (after returning to "LOCK" position).
6. With the key removed, and the brake depressed, try to shift out of "PARK".	6. Shifter cannot be shifted out of "PARK".
NOTE: Any failure to meet these expected responses requires system adjustment or repair.	

BTSI OVERRIDE

NOTE: Some shifter assemblies may have a small external trim cover to actuate the Brake Transmission Shifter/Ignition Interlock (BTSI).

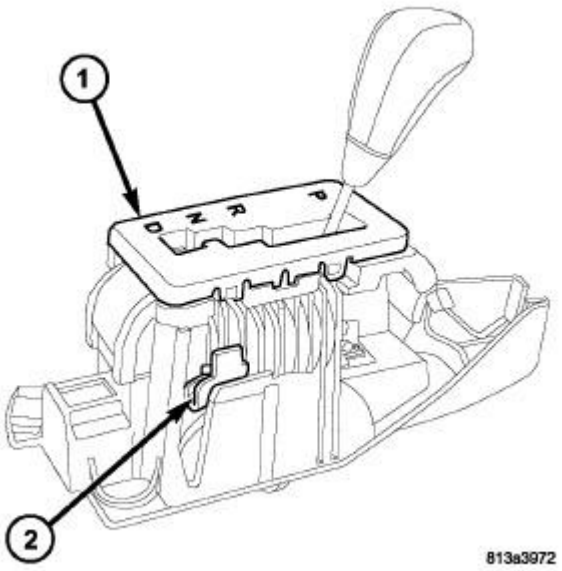

Fig. 198: BTSI Override
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFTER ASSEMBLY
2 - BTSI OVERRIDE

In the event of an electrical failure, the vehicle can be shifted out of PARK by using the following procedure.

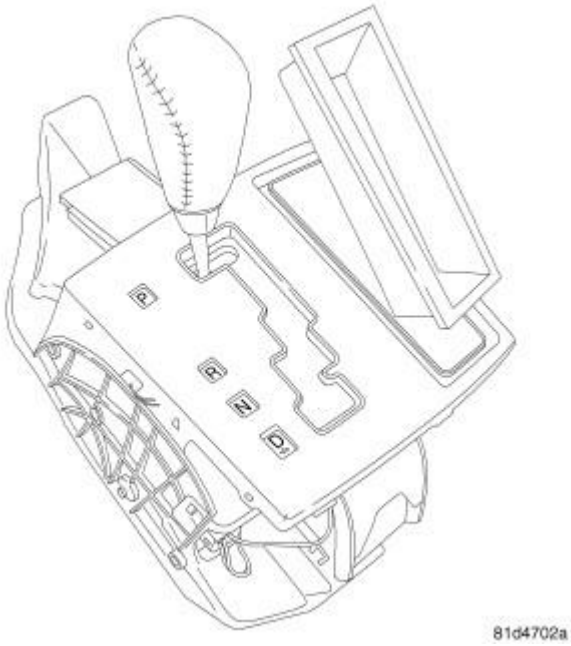

Fig. 199: Cubby Bin Liner
Courtesy of CHRYSLER GROUP, LLC

1. Turn the key to the ACC or ON position.
2. Remove the liner to the cubby bin to the right side of the shifter.

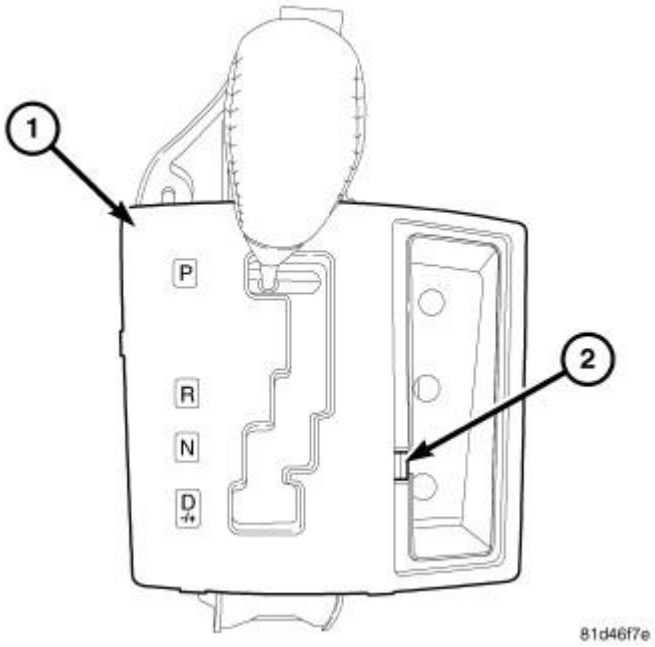

Fig. 200: Nag1 BTSI
Courtesy of CHRYSLER GROUP, LLC

3. Depress the BTSI override (2) on the side of the shifter assembly (1).

4. While the override is depressed, move the shifter out of the PARK position.
5. Return the cubby bin liner to its original location.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BRAKE TRANSMISSION SHIFT INTERLOCK

SYSTEM VERIFICATION

1. Verify that the key can only be removed in the PARK position
2. When the shift lever is in PARK, the ignition key cylinder should rotate freely from ACC to LOCK. When the shifter is in any other gear or neutral position, the ignition key cylinder should not rotate to the LOCK position.
3. Shifting out of PARK should not be possible when the ignition key cylinder is in the ACC position and the brake pedal is not depressed.
4. Shifting out of PARK should not be possible while applying normal force on the shift lever and ignition key cylinder is in the ACC, ON, or START positions unless the foot brake pedal is depressed approximately 1/2 inch (12mm).
5. Shifting out of PARK should not be possible when the ignition key cylinder is in the LOCK position, regardless of the brake pedal position.
6. Shifting between any gears, NEUTRAL or into PARK may be done without depressing foot brake pedal with ignition switch in ACC, ON, or START positions.

PUMP, TRANSMISSION OIL

DESCRIPTION

DESCRIPTION

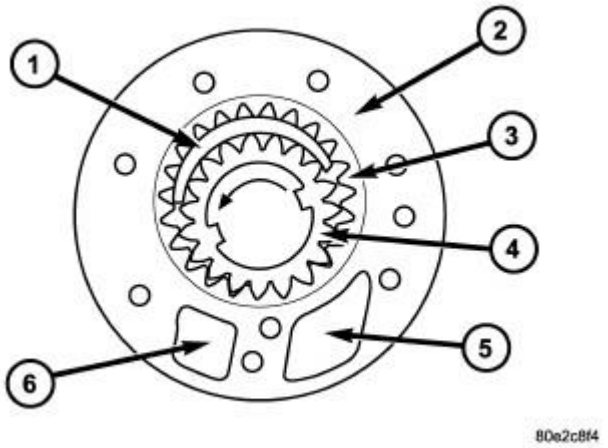

Fig. 201: Identifying Oil Pump Components
Courtesy of CHRYSLER GROUP, LLC

1 - CRESCENT
2 - OIL PUMP
3 - EXTERNAL GEAR
4 - INTERNAL GEAR
5 - INLET CHAMBER
6 - PRESSURE CHAMBER

The oil pump (2) (crescent-type pump) is installed in the bellhousing behind the torque converter and is driven by the drive flange of the torque converter. Refer to **Fig. 201**. The pump creates the oil pressure required for the hydraulic procedures.

OPERATION

OPERATION

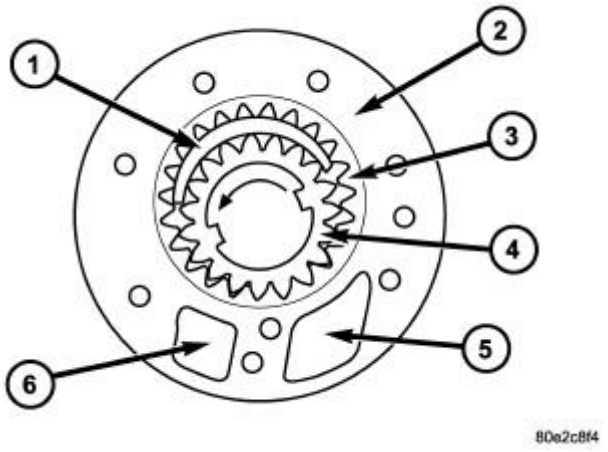

Fig. 202: Identifying Oil Pump Components
Courtesy of CHRYSLER GROUP, LLC

1 - CRESCENT
2 - OIL PUMP
3 - EXTERNAL GEAR
4 - INTERNAL GEAR
5 - INLET CHAMBER
6 - PRESSURE CHAMBER

When the engine is running, the oil is pumped through the inlet chamber (5) along the upper and lower side of the crescent (1) to the pressure chamber (6) of the housing. Refer to **Fig. 202**. The meshing of the teeth prevents oil flowing from the delivery side to the intake side. An external gear (3) is eccentrically mounted in the pump housing. The external gear is driven by the internal gear (4) which is connected to the torque converter hub.

DISASSEMBLY

DISASSEMBLY

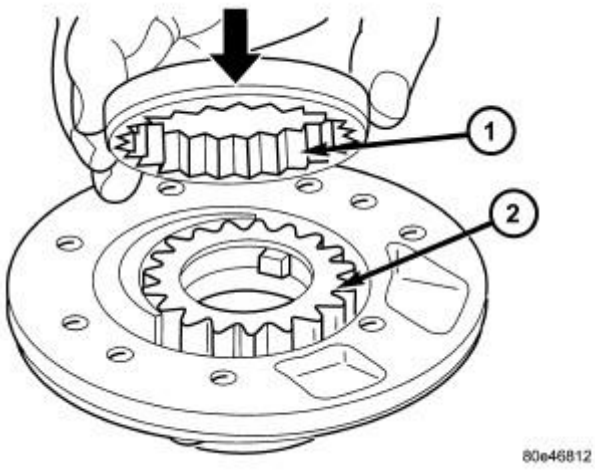

Fig. 203: Oil Pump Gears
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER PUMP ROTOR
2 - INNER PUMP ROTOR

1. Remove pump gears (1 and 2) from pump housing. Refer to **Fig. 203**.

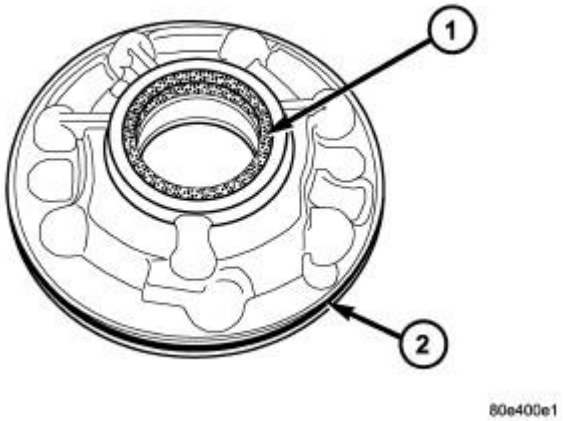

Fig. 204: Identifying Oil Pump Seals
Courtesy of CHRYSLER GROUP, LLC

1 - INNER OIL SEAL
2 - OUTER OIL SEAL

2. Remove the inner oil pump seal (1). Refer to **Fig. 204**.
3. Replace the outer oil pump O-ring (2). Refer to **Fig. 204**.

INSPECTION

INSPECTION

Before measuring any oil pump components, perform a thorough visual inspection of all the components. If any sign of scoring, scratches, or other damage is seen, replace the oil pump as an assembly.

SIDE CLEARANCE

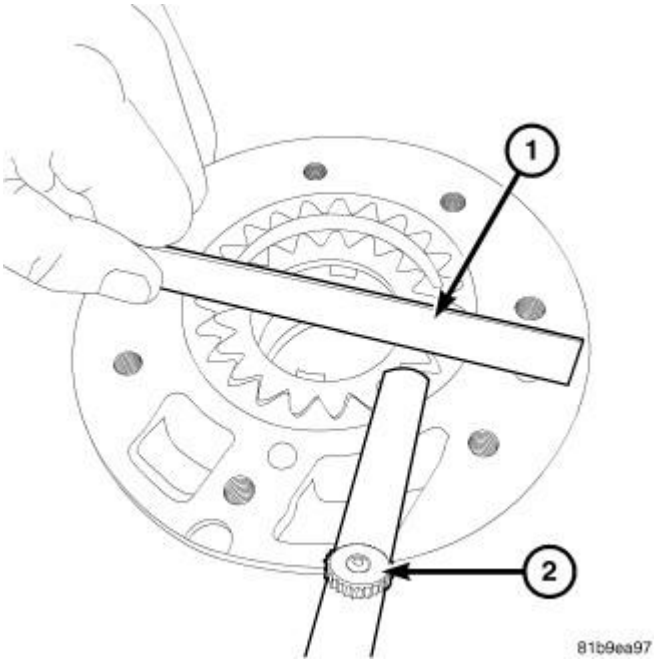

Fig. 205: Oil Pump Side Clearance Check
Courtesy of CHRYSLER GROUP, LLC

1 - FLAT PLATE
2 - FEELER GAUGE

Side clearance is the difference between the thickness of the pump gears and the depth of the pocket in the pump housing. Side clearance can be measured by laying a flat plate (1) across the mounting face of the pump housing, and measuring the distance between the plate and the gears with a feeler gauge (2).

Acceptable side clearance:

- Inner gear: 0.064 mm (0.0025 in) max
- Outer gear: 0.069 mm (0.0027 in) max

TIP CLEARANCE

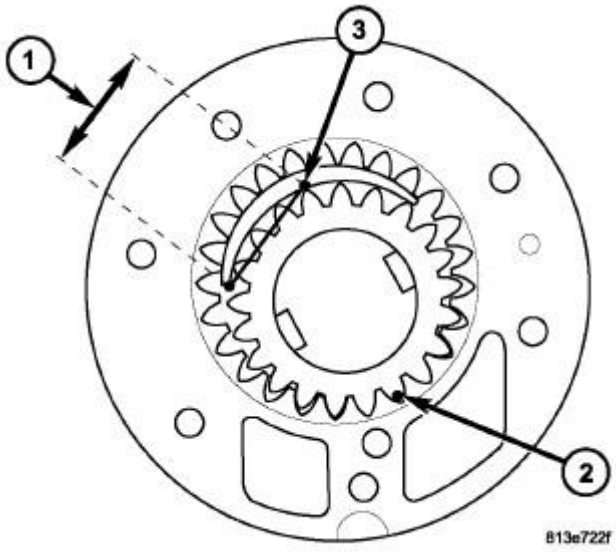

Fig. 206: Oil Pump Measurement
Courtesy of CHRYSLER GROUP, LLC

1 - MEASURE 37MM FROM THE CORNER OF CRESCENT
2 - TIGHT MESH HERE
3 - MEASURE TIP CLEARANCE HERE

Tip clearance is the difference between the tip diameters of the gear teeth and the corresponding diameters of the pocket in the pump housing.

Tip clearance for the inner gear can be checked by moving the inner gear into tight mesh (2) with the outer gear as shown in illustration. Refer to **Fig. 206**. Clearance between the ID of the crescent feature of the housing and the OD of the teeth of the inner gear (3) should then me measured at a point 37 mm (1.45 in.) from the corner of the crescent (1) feature, as shown in illustration below.

Acceptable tip clearance for inner gear:

- 0.85 mm (0.033 in) max

ASSEMBLY

ASSEMBLY

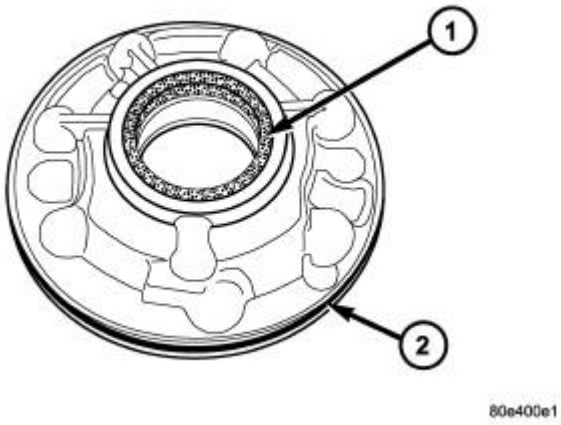

Fig. 207: Identifying Oil Pump Seals
Courtesy of CHRYSLER GROUP, LLC

1 - INNER OIL SEAL
2 - OUTER OIL SEAL

1. Install new inner oil pump seal (1) with Seal Installer 8902A. Refer to **Fig. 207**.
2. Replace O-ring (2). Refer to **Fig. 207**.

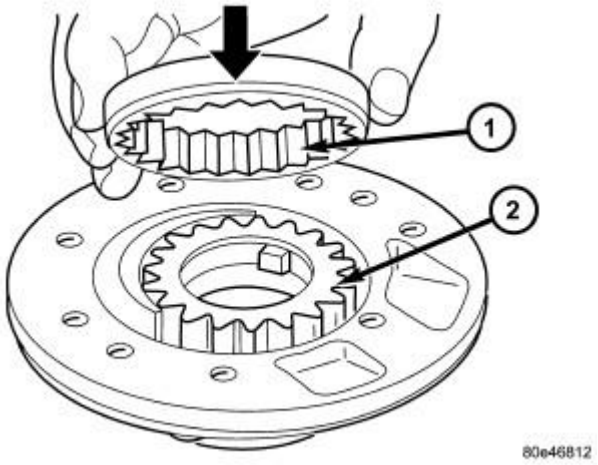

Fig. 208: Oil Pump Gears
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER PUMP ROTOR
2 - INNER PUMP ROTOR

3. Lubricate pump gears and place in the pump housing. Insert pump gear (1) so that the chamfer (arrow) points towards the pump housing. Refer to **Fig. 208**.

SEAL, FILL TUBE

REMOVAL

REMOVAL

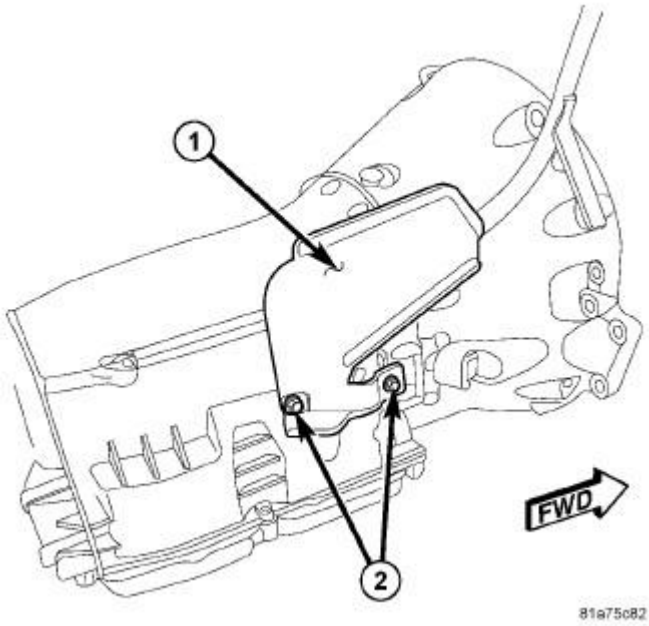

Fig. 209: Water Shield
Courtesy of CHRYSLER GROUP, LLC

1 - WATER SHIELD
2 - WATER SHIELD BOLTS

1. Lift and support the vehicle.
2. Remove water shield bolts and water shield (if equipped).

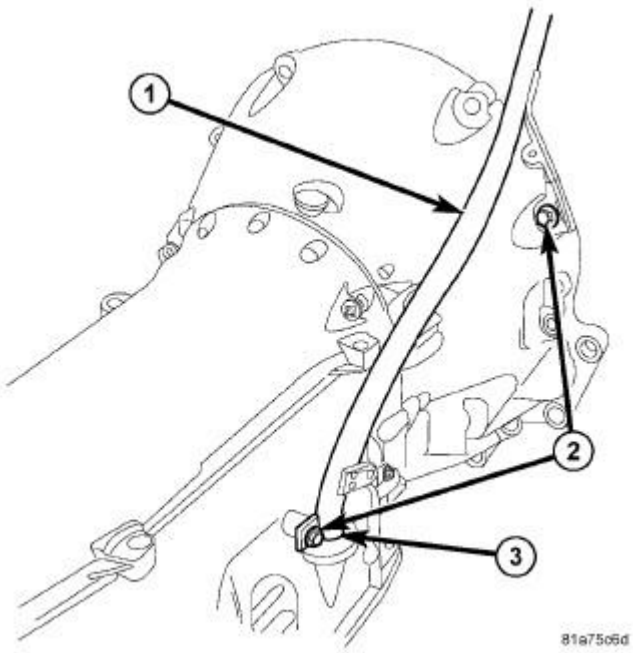

Fig. 210: Typical Fill Tube Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - FILL TUBE
2 - FILL TUBE BOLTS
3 - FILL TUBE SEAL

3. Remove the transmission fill tube bolts (2).
4. Lift the transmission fill tube out of the transmission case.
5. Using a small pry tool remove the transmission fill tube seal.

INSTALLATION

INSTALLATION

Fig. 211: Pierce Fill Tube Seal
Courtesy of CHRYSLER GROUP, LLC

1. Pierce the new transmission fill tube seal along the molded "Y" from the outside.

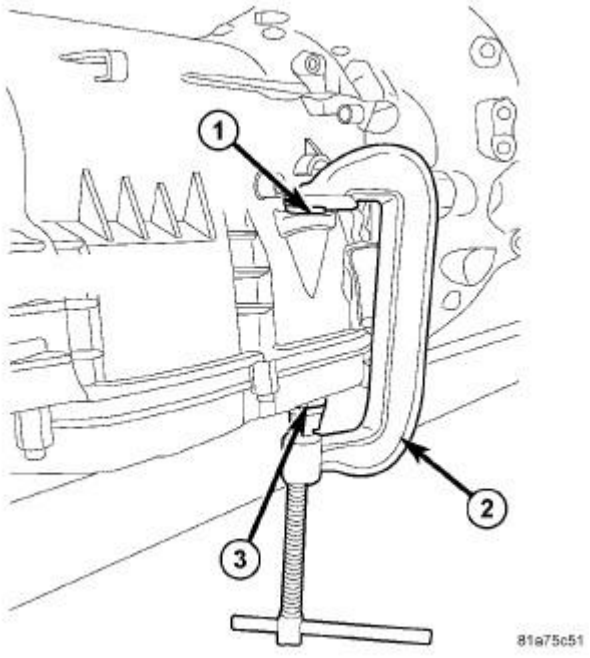

Fig. 212: C-Clamp
Courtesy of CHRYSLER GROUP, LLC

1 - SEAL INSTALLER DISC 9902 2 - "C" CLAMP 3 - SHIM STOCK

NOTE: If the new fill tube seal can not be fully installed into the transmission case fill tube bore by hand, a "C" clamp must be used.

CAUTION: Do not over tighten the "C" clamp during fill tube oil seal installation. Transmission oil pan damage or bending may occur.

2. Lubricate the new transmission fill tube seal with MOPAR® ATF+4 ATF and install the new fill tube seal into the transmission case fill tube bore.
    1. Position seal installer disc (special tool #9902, Installer, Seal) (1) between the "C" clamp (2) and the new transmission fill tube seal
    2. Position a shim stock (3) between the "C" clamp (2) and the **edge** of the transmission oil pan.
    3. Lightly tighten the "C" clamp until the fill tube seal is fully installed into the transmission case fill tube bore.
3. Clean and lubricate the end of the transmission fill tube with MOPAR® ATF+4 ATF and install the fill tube into the transmission case fill tube bore.

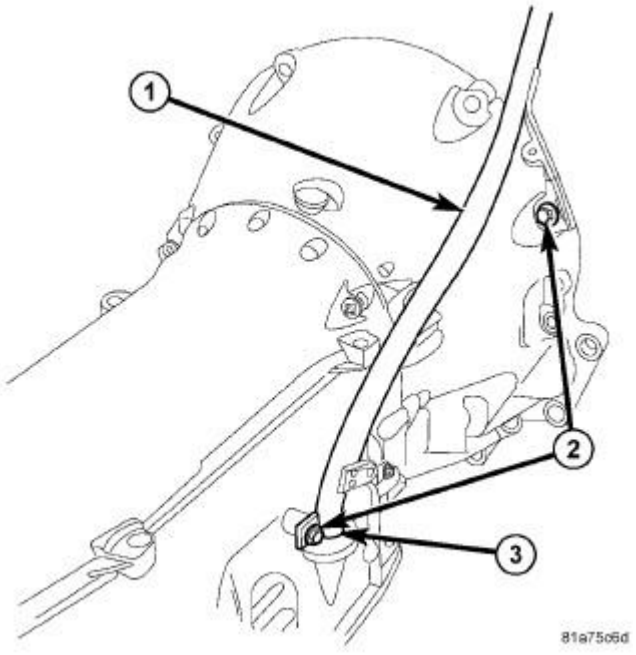

Fig. 213: Typical Fill Tube Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - FILL TUBE

2 - FILL TUBE BOLTS 3 - FILL TUBE SEAL

4. Loosely install the fill tube bolts (2).
5. Tighten the upper fill tube bolt to 39 N.m (29 ft.lbs.).
6. Tighten the lower fill tube bolt to 12 N.m (105 in.lbs.).

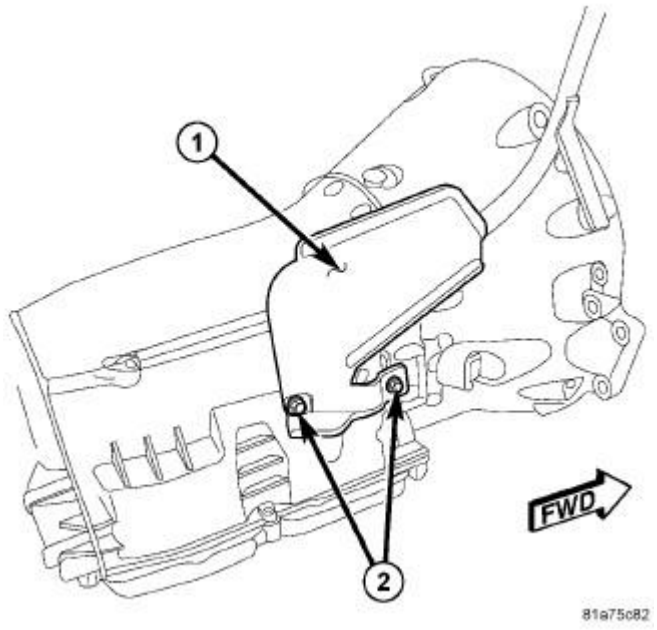

Fig. 214: Water Shield
Courtesy of CHRYSLER GROUP, LLC

1 - WATER SHIELD 2 - WATER SHIELD BOLTS

7. Install the water shield (1) and water shield bolts (2) (if equipped).
8. Tighten the water shield bolts to 12 N.m (9 ft.lbs).
9. Lower vehicle to check and fill transmission as necessary.

SEAL, OUTPUT SHAFT

REMOVAL

REMOVAL

1. Remove the propeller shaft. Refer to **REMOVAL** . Move propeller shaft to the right and tie up.
2. Verify that the transmission is in PARK in order to prepare for the removal of the output shaft

nut.

NOTE: When removing the propeller shaft flange be certain the shim remains on the output shaft.

3. Remove the nut, with a 30 mm 12 point socket, holding the propeller shaft flange to the output shaft and remove the flange.
4. Remove the output shaft seal with suitable screw and slide hammer.

INSTALLATION

INSTALLATION

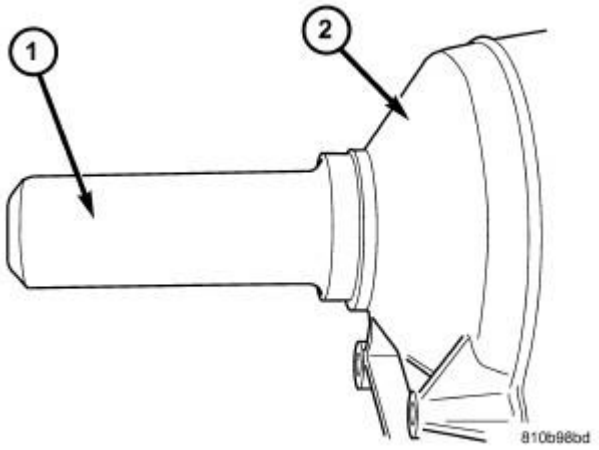

Fig. 215: Installing Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

1 - SEAL INSTALLER 8902A
2 - TRANSMISSION CASE

1. Position the new output shaft seal over the output shaft and against the transmission case.
2. Use Seal Installer (special tool #8902A, Installer, Seal) (1) to install the seal. Refer to **Fig. 215**.
3. Verify that the transmission is in PARK in order to prepare for the installation of the output shaft nut.

NOTE: When installing the propeller shaft flange be certain the shim remained on the output shaft.

4. Install the propeller shaft flange onto the output shaft and install an new flange nut. Tighten the flange nut, with a 30 mm 12 point socket, to 200 N.m (147.5 ft.lbs.).

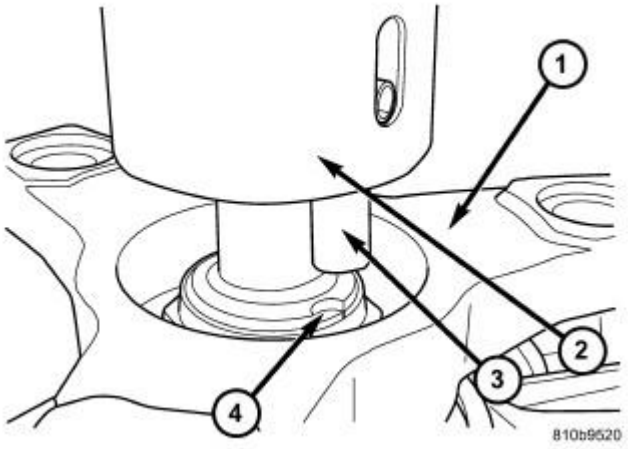

Fig. 216: Align Staking Tool
Courtesy of CHRYSLER GROUP, LLC

1 - PROPELLER SHAFT FLANGE
2 - STAKING TOOL 9078
3 - ALIGNMENT PIN
4 - OUTPUT SHAFT NOTCH

5. Stake the output shaft nut to the output shaft as follows.Place the Staking Tool (special tool #9078, Staking Tool) (2) and Driver Handle (special tool #C-4171, Driver Handle, Universal) onto the output shaft.
6. Rotate the Staking Tool (special tool #9078, Staking Tool) (2) until the alignment pin (3) engages the output shaft notch (4). Refer to **Fig. 216**.

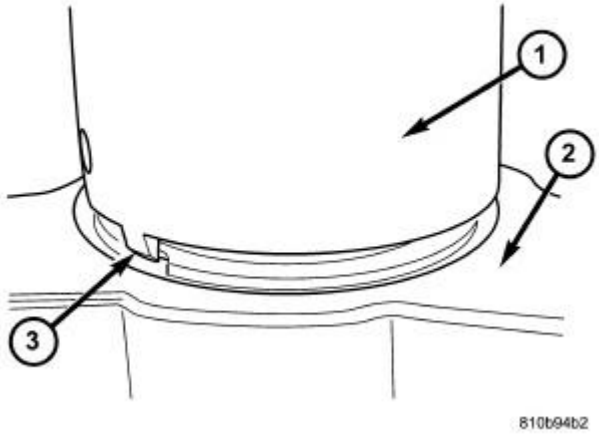

Fig. 217: Stake Output Shaft Nut
Courtesy of CHRYSLER GROUP, LLC

1 - STAKING TOOL 9078

2 - PROPELLER FLANGE
3 - STAKING PIN

7. Press downward on the staking tool until the staking pin (3) contacts the output shaft nut flange (2). Refer to **Fig. 217**.
8. Strike the Driver handle (special tool #C-4171, Driver Handle, Universal) with a suitable hammer until the output shaft nut is securely staked to the output shaft.
9. Install the propeller shaft. Refer to **INSTALLATION** .

SEAL, TORQUE CONVERTER HUB

REMOVAL

REMOVAL

1. Remove the torque converter. Refer to **TORQUE CONVERTER, REMOVAL**.
2. Remove the torque converter hub seal with suitable screw and slide hammer.

INSTALLATION

INSTALLATION

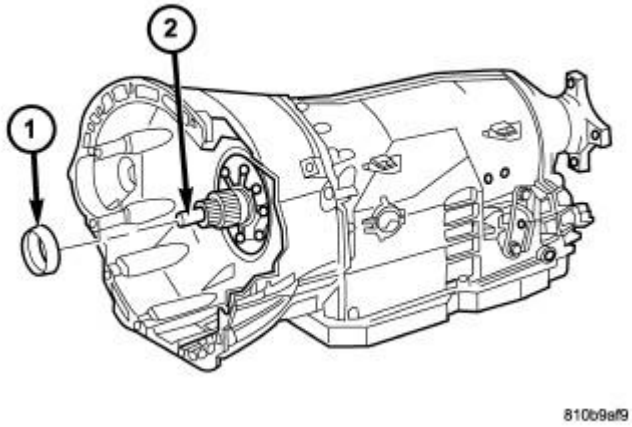

Fig. 218: Position Torque Converter Hub Seal
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER HUB SEAL
2 - INPUT SHAFT

1. Position the torque converter hub seal (1) over the input shaft and against the transmission oil pump. Refer to **Fig. 218**.

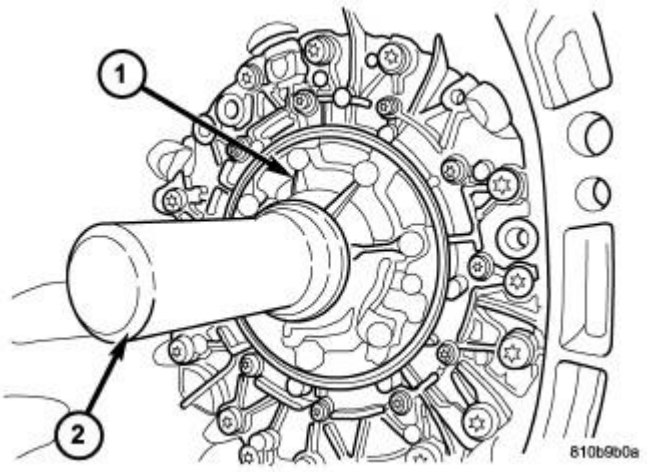

Fig. 219: Install Torque Converter Hub Seal
Courtesy of CHRYSLER GROUP, LLC

1 - OIL PUMP
2 - SEAL INSTALLER 8902A

2. Using Seal Installer (special tool #8902A, Installer, Seal) (2), install a new torque converter hub seal. Refer to **Fig. 219**.
3. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.

SENSOR, SPEED, INPUT

DESCRIPTION

DESCRIPTION

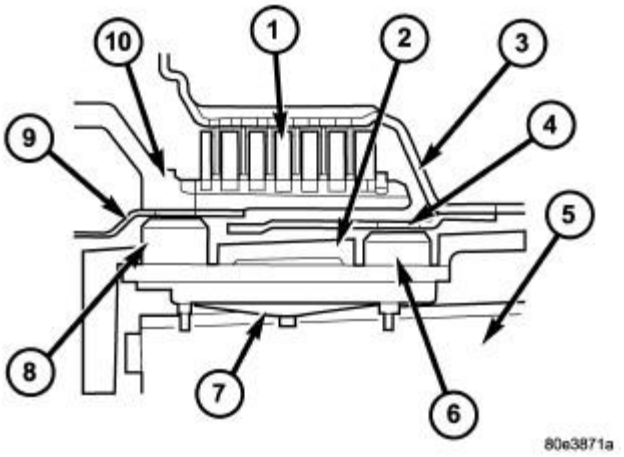

Fig. 220: Locating Input Speed Sensors
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVING CLUTCH K1
2 - TRANSMISSION HOUSING
3 - DRIVING CLUTCH K1 INTERNALLY TOOTHED DISC
4 - EXCITER RING
5 - VALVE HOUSING OF SHIFT PLATE
6 - N2 SPEED SENSOR
7 - SPRING
8 - N3 SPEED SENSOR
9 - EXCITER RING
10 - DRIVING CLUTCH K1 EXTERNALLY TOOTHED DISC

The speed sensors, N2 and N3, (6, 8) are fixed to the shell of the electrohydraulic control unit's leadframe via contact blades. Refer to **Fig. 220**. The speed sensors are pressed against the transmission housing (2) by a spring (7) which is held against the valve housing of the shift plate (5). This ensures a defined distance between the speed sensors and the exciter ring (4).

OPERATION

OPERATION

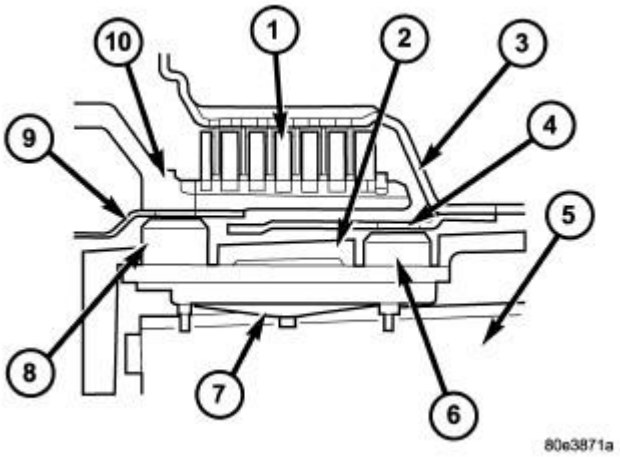

Fig. 221: Locating Input Speed Sensors
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVING CLUTCH K1
2 - TRANSMISSION HOUSING
3 - DRIVING CLUTCH K1 INTERNALLY TOOTHED DISC
4 - EXCITER RING
5 - VALVE HOUSING OF SHIFT PLATE
6 - N2 SPEED SENSOR
7 - SPRING

8 - N3 SPEED SENSOR
9 - EXCITER RING
10 - DRIVING CLUTCH K1 EXTERNALLY TOOTHED DISC

Signals from the speed sensors, N2 and N3, (6, 8) are recorded in the transmission control module (TCM), together with the wheel and engine speeds and other information, and are processed into an input signal for electronic control. Refer to **Fig. 221**.

Speed sensor N2 (6) records the speed of the front planetary rear annulus assembly (10). Speed sensor N3 (8) records the speed of the K1 clutch (3).

RELATIVE SPEED SENSOR READINGS - NAG 1 TRANSMISSION

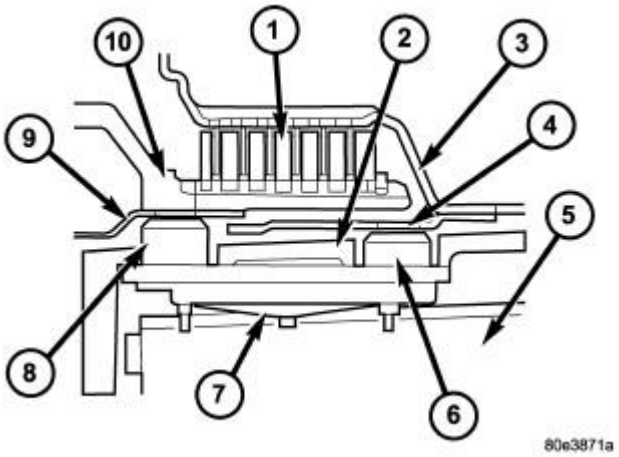

Fig. 222: Locating Input Speed Sensors
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVING CLUTCH K1
2 - TRANSMISSION HOUSING
3 - DRIVING CLUTCH K1 INTERNALLY TOOTHED DISC
4 - EXCITER RING
5 - VALVE HOUSING OF SHIFT PLATE
6 - N2 SPEED SENSOR
7 - SPRING
8 - N3 SPEED SENSOR
9 - EXCITER RING
10 - DRIVING CLUTCH K1 EXTERNALLY TOOTHED DISC

There are several things to note regarding the function of the N2 and N3 speed sensors.

- K1 clutch (N3 speed sensor) will show no rotation whenever the B1 Brake is applied. N3 = Zero in 1st, 5th and Reverse.

- With the vehicle moving forward or reverse, N2 speed sensor reading will be greater than zero in all gears
- Whenever the K1 clutch is applied (2nd, 3rd, and 4th) N2 will be equal to N3.
- There is no speed sensor internal to the transmission that directly measures input shaft speed. However, when K1 is applied N2 equals input shaft/turbine speed.
- The engine speed is fed to the TCM via can bus thus providing impeller speed.
- There is no speed sensor internal to the transmission that directly measures output shaft speed. ABS wheel sensors provide output shaft speed.
- K1 clutch (N3 speed sensor) will show no rotation whenever the B1 Brake is applied. N3 is equal to zero in 1st, 5th and Reverse gears.
- With the vehicle moving forward or reverse, N2 speed sensor reading will be greater than zero in all gears.
- Whenever the K1 clutch is applied (2nd, 3rd, and 4th) N2 will be equal to N3.
- There is no speed sensor internal to the transmission that directly measures input shaft speed. However, when K1 is applied N2 equals input shaft/turbine speed.
- The engine speed is fed to the TCM via the vehicle's communication bus thus providing impeller speed.
- There is no speed sensor internal to the transmission that directly measures output shaft speed. ABS wheel sensors provide output shaft speed.

NOTE: N2 sensor, N3 sensor, output shaft speed sensor are speeds relative to the input shaft turbine speed.

GEAR	INPUT SHAFT/TURBINE SPEED	N2 SENSOR	N3 SENSOR	OUTPUT SHAFT SPEED	OVERALL RATIO
1ST	1.0000	0.6081	0.0000	0.2782	3.59
2ND	1.0000	1.0000	1.0000	0.4574	2.19
3RD	1.0000	1.0000	1.0000	0.7115	1.41
4TH	1.0000	1.0000	1.0000	1.0000	1.00
5TH	1.0000	0.6081	0.0000	1.2035	0.83
REVERSE (S)	1.0000	0.6081	0.0000	-0.3157	-3.17

Based on the preceding chart, it appears that N3 sensor is redundant and provides no additional information. However, the TCM needs to know Input Shaft/Turbine speed. Since the N2 sensor is not directly tied to the Input Shaft, the N3 sensor is required to inform the TCM to divide the N2 value by 0.6081 or 1.0000 to calculate actual Turbine speed.

SHIFTER, TRANSMISSION

DESCRIPTION

DESCRIPTION

FLOOR MOUNT SHIFTER

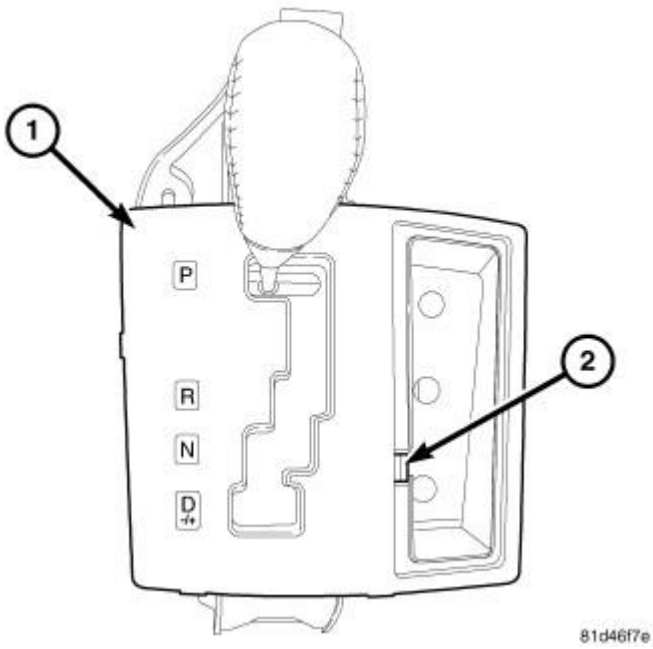

Fig. 223: Nag1 BTSI
Courtesy of CHRYSLER GROUP, LLC

The automatic transmission is operated with the help of a shift lever assembly (SLA) (1) located in the floor console. There are four positions to which the selection lever can be shifted: P, R, N, D. In addition, the selector lever can be moved sideways (+/-) in position "D" to adjust the shift range.

All selector lever positions, as well as selected shift ranges in position "D", are identified by the SLA. The information is then sent to the transmission control module (TCM) via an electrical connection. At the same time, the selector lever positions "P", "R", "N" and "D" are transmitted by a shift cable to the selector shaft in the transmission.

The SLA is comprised of the following functions:

- **Key lock:** Depending on the selector lever position, the ignition cylinder is locked/unlocked, i.e., the ignition key can be removed only if the selector lever is in position "P". An electronic micro switch in the shifter assembly is used to perform this function.
- **Park lock:** The selector lever is not released from position "P" until the brake pedal has been applied and the ignition key is in the ON" position. Shift lock is controlled by the ignition module in conjunction with the brake switch and a locking solenoid in the SLA. As soon as the brake pedal is applied firmly, the locking solenoid is energized and retracted to unlock the selector lever. If the selector lever cannot be moved out of position "P" due to a malfunction, the shift lock function can be overriden (2).
- **Reverse inhibitor:** As soon as the vehicle speed exceeds approximately 4-7 mph, it is no longer possible to move the selector lever from position "N" to position "R". The reverse inhibit functionality is controlled by the same solenoid as the park lock. As the vehicle accelerates past the calibrated speed threshold, the solenoid is energized to block the sideways motion of the

shift lever necessary to move from NEUTRAL to REVERSE. The reverse inhibit is not released until the vehicle speed falls below approximately 4-7 mph and the shifter is moved out of the "D" shifter position.

COLUMN MOUNTED SHIFTER

Some vehicles may be equipped with an optional column mount shifter, which is serviced with the steering column. Refer to **COLUMN, INSTALLATION** or **COLUMN, REMOVAL** .

OPERATION

OPERATION

With the selector lever in position "D", the transmission control module (TCM) automatically shifts the gears that are best-suited to the current operating situation. This means that shifting of gears is continuously adjusted to current driving and operating conditions in line with the selected shift range and the accelerator pedal position. Starting off is always performed in 1st gear.

The selector lever positions are determined by a sensor assembly internal to the shift lever assembly (SLA). The sensor assembly identifies the various positions of the SLA according to the following table.

Shift Lever Position	Bit 0	Bit 1	Bit 2	Bit 3
Default	0	0	0	0
"D"	1	0	1	0
"N"	0	1	1	0
"R"	1	1	1	0
"P"	0	0	0	1
"+"	1	0	0	1
"-"	0	1	0	1
"ND"	1	1	0	1
"RN"	0	0	1	1
"PR"	1	0	1	1
Implausible	1	1	1	1

NOTE: There are currently two different software functions out for "AutoStick" most cars use the upper gear limit functionality as described, but some cars (SRT and RT) use more of a 'gear hold' functionality. These vehicles are able to toggle between 1-2-3-4-5-D when you do the + / - shifts and will not downshift automatically, these systems "hold the gear"

The permissible shifter positions and transmission operating ranges are:

- P = Parking lock and engine starting.

- R = Reverse.
- N = Neutral and engine starting (no power is transmitted to the axles).
- D = The shift range includes all forward gears.

The shift range can be adjusted to the current operating conditions by tipping the selector lever to the left-hand side ("-") or the right-hand side ("+") when in position "D". If the shift range is limited, the display in the instrument cluster indicates the selected shift range and not the currently engaged gear.

- 4= Shift range is limited to gears 1 to 4.
- 3= Shift range is limited to gears 1 to 3.
- 2= Shift range is limited to gears 1 to 2.
- 1= Shift range is limited to the 1st gear.

Tipping the shift lever will have the following results:

- **Tipping the selector lever toward "-" one time after another:** The shift range is reduced in descending sequence by one gear each time, i.e., from D - 4 - 3 - 2 - 1. If the selected limitation of the shift range would result in a downshift causing excessive engine speed, the shifting is not executed and the engaged gear as well as the shift range remain unchanged. This is to prevent the engine from overspeeding. Engine retardation is low with the selector lever in position "D". To make use of the full braking power of the engine, "manual" downshifting by tipping the lever towards the left-hand side is recommended. If this has been done, subsequent upshifting must be carried out manually as well.
- **Tipping the selector lever toward "-" and holding it in this position:** The currently engaged gear in range "D" is indicated in the instrument cluster display and the shift range is limited to this gear.
- **Tipping the selector lever toward "+" one time after another:** The shift range is increased by one gear each time and the increased shift range is displayed in the instrument cluster; possibly, the transmission upshifts to a faster gear.
- **Tipping the selector lever toward "+" several times:** The shift range is increased by one gear each time the lever is tipped until the shift range ends up in "D".
- **Tipping the selector lever toward "+" and holding it in this position:** The shift range is extended immediately to "D", shift ranges are indicated in ascending sequence; possibly, the transmission upshifts to a faster gear due to the extension of the shift range.

REMOVAL

SHIFTER - FLOOR MOUNT

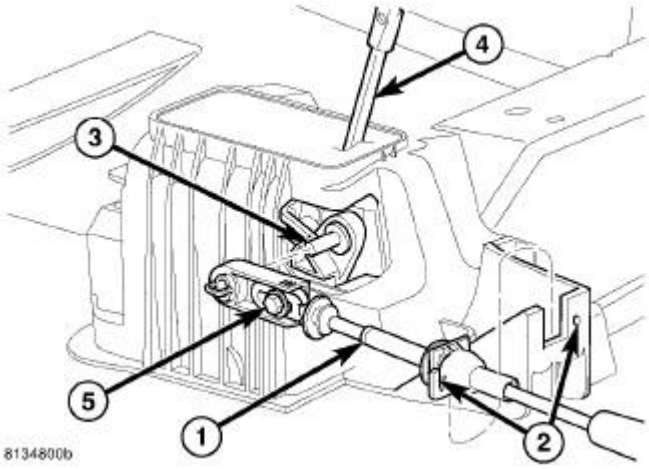

Fig. 224: Gearshift Cable AT Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - CABLE RETAINER AND NOTCH
3 - SHIFTER ASSEMBLY PIN
4 - SHIFT LEVER
5 - ADJUSTMENT BOLT

1. Remove any necessary console parts for access to shift lever assembly and shifter cables. Refer to **CONSOLE, FLOOR, REMOVAL** .
2. Shift transmission into PARK.
3. Disconnect the transmission shift cable (1) at shift lever (3) and shifter assembly bracket (2).
4. Remove the shift cable retainer (2) from the notch in the shifter assembly (2).

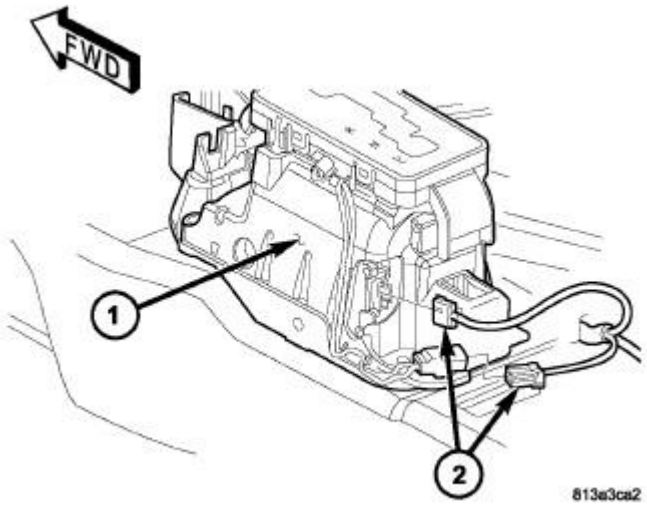

Fig. 225: Shifter Wiring Connectors
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFTER ASSEMBLY
2 - WIRING CONNECTORS

5. Disengage all wiring connectors (2) from the shifter assembly (1).

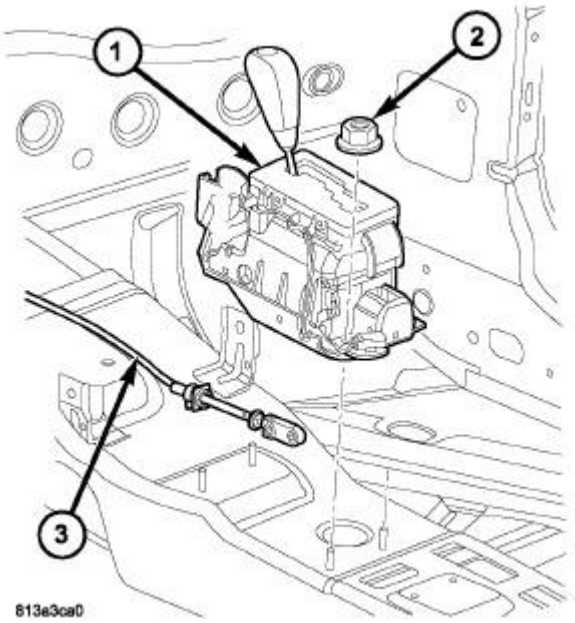

Fig. 226: Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFTER ASSEMBLY
2 - NUTS
3 - GEARSHIFT CABLE

6. Remove all nuts (2) holding the shifter assembly (1) to the floor pan.
7. Remove the shifter assembly (1) from the vehicle.

SHIFTER - COLUMN MOUNT

The column mounted shifter is serviced with the steering column. Refer to **COLUMN, REMOVAL** .

INSTALLATION

SHIFTER - FLOOR MOUNT

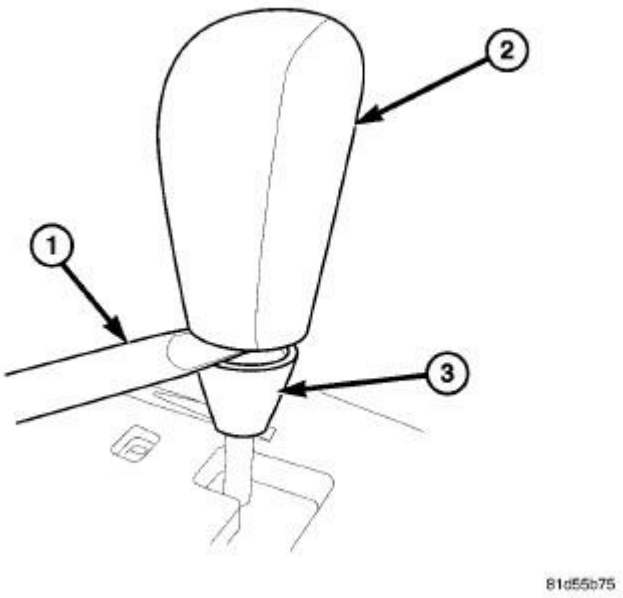

Fig. 227: Shifter Lower Trim
Courtesy of CHRYSLER GROUP, LLC

1. If a new shifter assembly is being installed, use a trim stick (1) to separate the shift knob lower trim (3) from the shift knob (2).

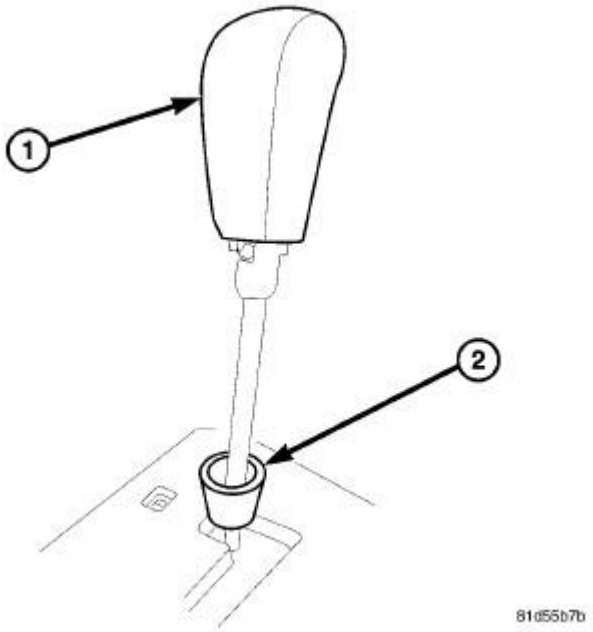

Fig. 228: Shift Knob And Lower Trim
Courtesy of CHRYSLER GROUP, LLC

2. Pull up on the shift knob (1) to remove the knob from the shaft then remove the lower trim (2).
3. Install the lower trim onto the new shifter shaft. Install the shift knob onto the shaft by hand. Install the lower trim onto the shift knob.

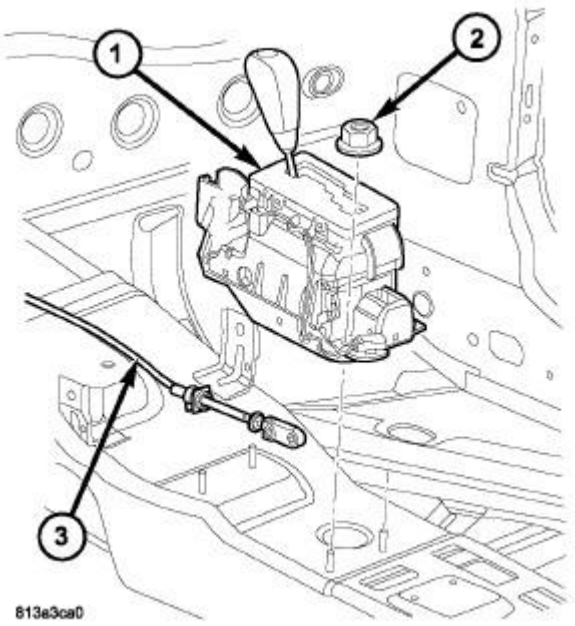

Fig. 229: Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFTER ASSEMBLY
2 - NUTS
3 - GEARSHIFT CABLE

4. Install shifter assembly (1) onto the shifter assembly studs on the floor pan.
5. Install the nuts (2) to hold the shifter assembly (1) onto the floor pan. Tighten nuts to 7 N.m (65 in.lbs.).

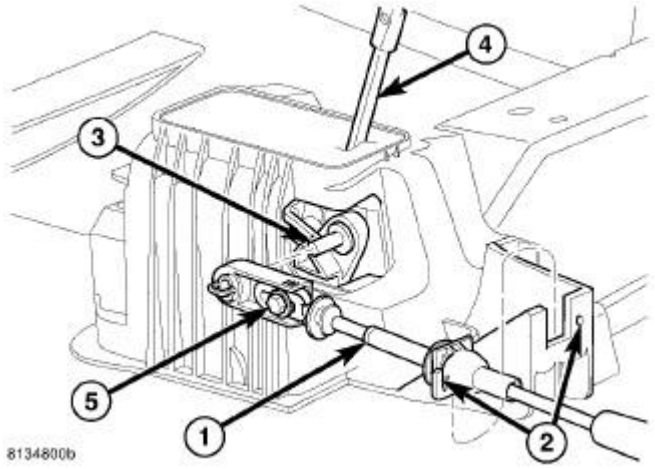

Fig. 230: Gearshift Cable AT Shifter Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - GEARSHIFT CABLE
2 - CABLE RETAINER AND NOTCH
3 - SHIFTER ASSEMBLY PIN
4 - SHIFT LEVER
5 - ADJUSTMENT BOLT

6. Place the floor shifter lever in PARK position.
7. Loosen the adjustment screw (5) on the gearshift cable (1).
8. Install the gearshift cable (1) to the shift lever pin (3).

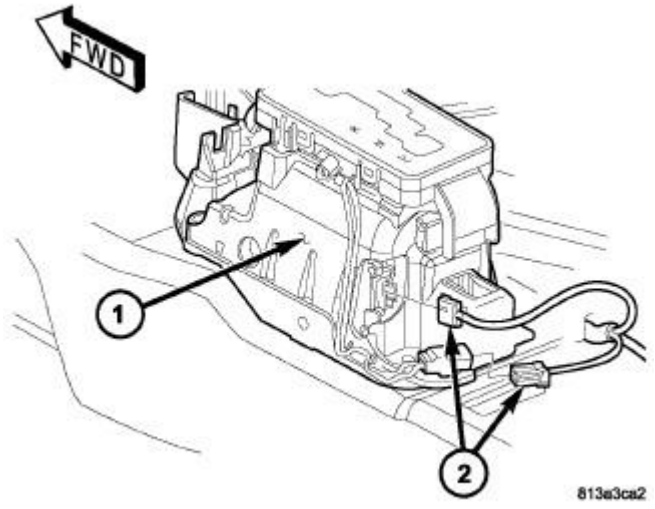

Fig. 231: Shifter Wiring Connectors
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFTER ASSEMBLY
2 - WIRING CONNECTORS

9. Install the wiring harness connectors (2) to the shifter assembly.
10. Verify that the shift lever is in the PARK position and the transmission park sprag is set by rocking the vehicle.
11. Tighten the adjustment screw to 7 N.m (65 in.lbs.).
12. Verify correct shifter, park lock, and BTSI operation.
13. Install any console parts removed for access to shift lever assembly and shift cables. Refer to **CONSOLE, FLOOR, INSTALLATION** .

SHIFTER - COLUMN MOUNT

The column mounted shifter is serviced with the steering column. Refer to **COLUMN, INSTALLATION** .

SOLENOID, TRANSMISSION

DESCRIPTION

DESCRIPTION

The typical electrical solenoid used in automotive applications is a linear actuator. It is a device that produces motion in a straight line. This straight line motion can be either forward or backward in direction, and short or long distance.

A solenoid is an electromechanical device that uses a magnetic force to perform work. It consists of a coil of wire, wrapped around a magnetic core made from steel or iron, and a spring loaded, movable plunger, which performs the work, or straight line motion. The shift valves (solenoids) are On-Off solenoids and are powered up by the TCM with a 12-volt power source and are internally grounded in the transmission. The Torque Converter Clutch (TCC) and Pressure Control (PC) solenoids are also powered up by the TCM and internally grounded in the transmission but are pulse with modulated (PWM). PWM measurable voltage varies depending on percentage of modulation requested by the TCM.

The solenoids used in transmission applications are attached to valves which can be classified as **normally open** or **normally closed** . The **normally open** solenoid valve is defined as a valve which allows hydraulic flow when no current or voltage is applied to the solenoid. The **normally closed** solenoid valve is defined as a valve which does not allow hydraulic flow when no current or voltage is applied to the solenoid. These valves perform hydraulic control functions for the transmission and must therefore be durable and tolerant of dirt particles. For these reasons, the valves have hardened steel poppets and ball valves. The solenoids operate the valves directly, which means that the solenoids must have very high outputs to close the valves against the sizable flow areas and line pressures found in current transmissions. Fast response time is also necessary to ensure accurate control of the transmission.

The strength of the magnetic field is the primary force that determines the speed of operation in a particular solenoid design. A stronger magnetic field will cause the plunger to move at a greater speed than a weaker one. There are basically two ways to increase the force of the magnetic field:

1. Increase the amount of current applied to the coil or
2. Increase the number of turns of wire in the coil.

The most common practice is to increase the number of turns by using thin wire that can completely fill the available space within the solenoid housing. The strength of the spring and the length of the plunger also contribute to the response speed possible by a particular solenoid design.

A solenoid can also be described by the method by which it is controlled. Some of the possibilities include variable force, pulse-width modulated, constant ON, or duty cycle. The variable force and pulse-width modulated versions utilize similar methods to control the current flow through the solenoid to position the solenoid plunger at a desired position somewhere between full ON and full OFF. The constant ON and duty cycled versions control the voltage across the solenoid to allow either full flow or no flow through the solenoid's valve.

UPSHIFT/DOWNSHIFT SOLENOID VALVES

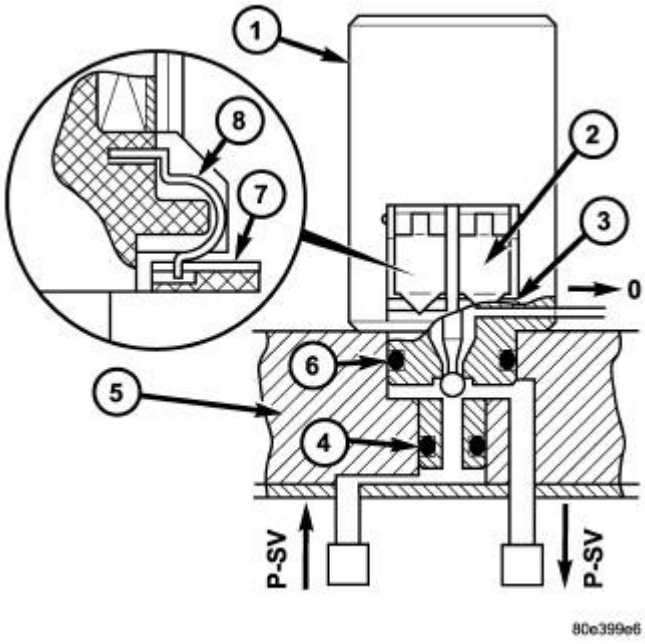

Fig. 232: Cutaway View Of Upshift/Downshift Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - UPSHIFT/DOWNSHIFT SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - O-RING

5 - VALVE HOUSING OF SHIFT PLATE
6 - O-RING
7 - CONDUCTOR TRACK
8 - CONTACT SPRING

The solenoid valves (1) for upshifts and downshifts are located in the shell of the electric control unit and pressed against the shift plate with a spring. Refer to **Fig. 232**.

The solenoid valves (1) initiate the upshift and downshift procedures in the shift plate.

The solenoid valves (1) are sealed off from the valve housing of the shift plate (5) by two O-rings (4, 6). The contact springs (8) at the solenoid valve engage in a slot in the conductor tracks (7). The force of the contact spring (8) ensures safe contacts.

MODULATING PRESSURE CONTROL SOLENOID VALVE

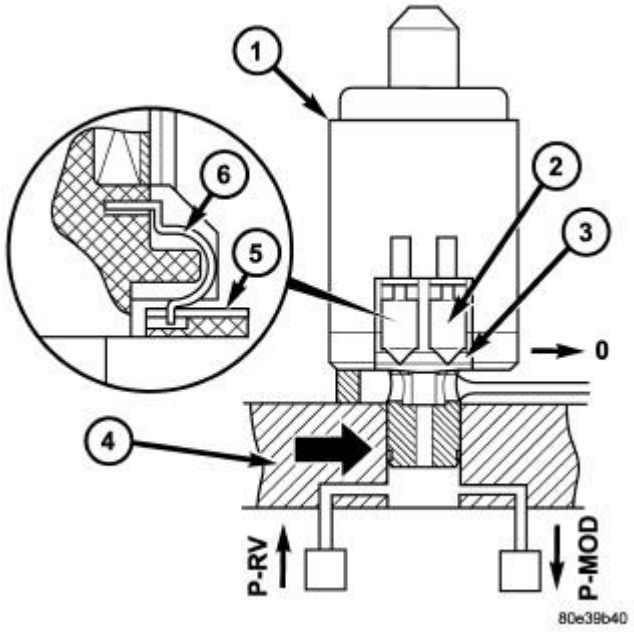

Fig. 233: Cutaway View Of Modulating Pressure Control Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - MODULATING PRESSURE CONTROL SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - VALVE HOUSING SHIFT PLATE
5 - CONDUCTOR TRACK
6 - CONTACT SPRING

The modulating pressure control solenoid valve (1) is located in the shell of the electric valve control unit and pressed against the shift plate by a spring. Refer to **Fig. 233**.

Its purpose is control the modulating pressure depending on the continuously changing operating conditions, such as load and gear change.

The modulating pressure regulating solenoid valve (1) has an interference fit and is sealed off to the valve body of the shift plate (4) by a seal (arrow). The contact springs (2) at the solenoid valve engage in a slot in the conductor tracks (3). The force of the contact springs (2) ensures secure contacts.

TORQUE CONVERTER LOCKUP CLUTCH PWM SOLENOID VALVE

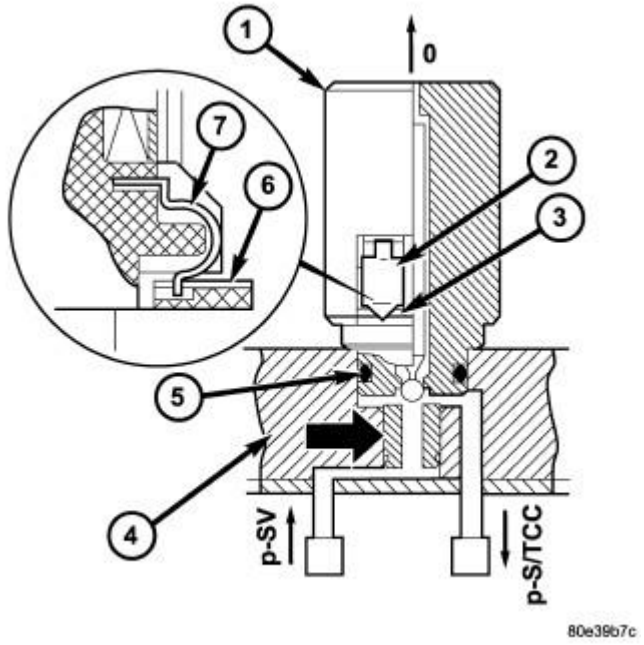

Fig. 234: Cutaway View Of Torque Converter Lockup Clutch PWM Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCKUP CLUTCH PWM SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - VALVE HOUSING OF SHIFT PLATE
5 - O-RING
6 - CONDUCTOR TRACK
7 - CONTACT SPRING

The torque converter lockup clutch PWM solenoid valve (1) is located in the shell of the electric valve control unit and pressed against the shift plate by a spring. Refer to **Fig. 234**.

The PWM solenoid valve (1) for the torque converter lockup controls the pressure for the torque converter lockup clutch.

The torque converter lockup PWM solenoid valve (1) is sealed off to the valve body of the shift plate (4) by an O-ring (5) and a seal (arrow). The contact springs (2) at the solenoid valve engage in a slot in the conductor tracks (3). The force of the contact springs (2) ensures secure contacts.

SHIFT PRESSURE CONTROL SOLENOID VALVE

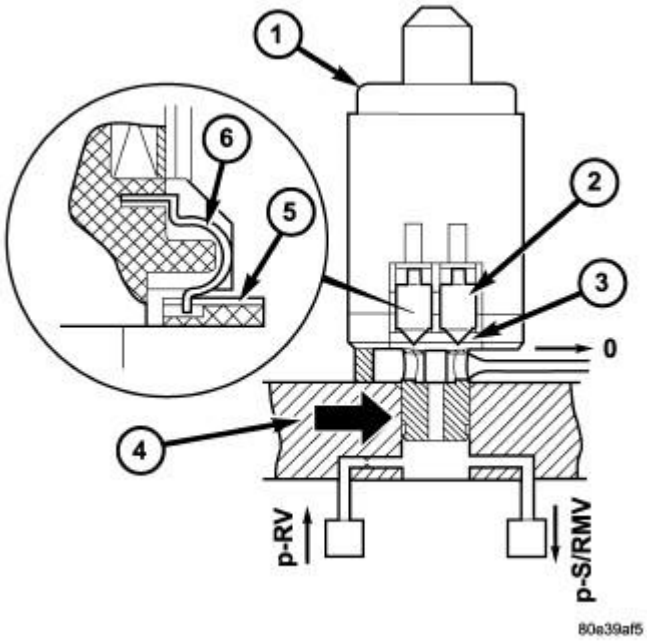

Fig. 235: Cutaway View Of Shift Pressure Control Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFT PRESSURE CONTROL SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - VALVE HOUSING SHIFT PLATE
5 - CONDUCTOR TRACK
6 - CONTACT SPRING

The shift pressure control solenoid valve (1) is located in the shell of the electric valve control unit and pressed against the shift plate by a spring. Refer to **Fig. 235**.

Its purpose is to control the shift pressure depending on the continuously changing operating conditions, such as load and gear change.

The shift pressure regulating solenoid valve (1) has an interference fit and is sealed off to the valve body of the shift plate (4) by a seal (arrow). The contact springs (2) at the solenoid valve engage in a

slot in the conductor tracks (3). The force of the contact springs (2) ensures secure contacts.

OPERATION

OPERATION

NOTE: A scan tool can only display a estimated pressure based on the current fed to the solenoid. Therefore if there's a stuck Line Pressure Regulating valve and the transmission has insufficient pressure, the scan tool will still display estimated MOD and Shift pressures because the solenoids are being fed the correct amount of current.

The solenoids are fed a 12-volt source from the TCM (Transmission Control Module). When an electrical current is applied to the solenoid coil, a magnetic field is created which produces an attraction to the plunger, causing the plunger to move and work against the spring pressure and the load applied by the fluid the valve is controlling. The plunger is normally directly attached to the valve which it is to operate. When the current is removed from the coil, the attraction is removed and the plunger will return to its original position due to spring pressure.

The plunger is made of a conductive material and accomplishes this movement by providing a path for the magnetic field to flow. By keeping the air gap between the plunger and the coil to the minimum necessary to allow free movement of the plunger, the magnetic field is maximized.

UPSHIFT/DOWNSHIFT SOLENOID VALVES

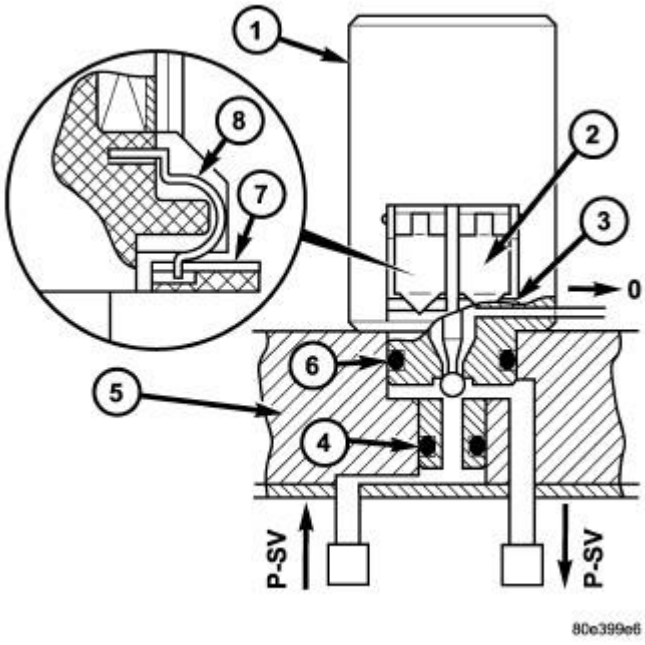

Fig. 236: Cutaway View Of Upshift/Downshift Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - UPSHIFT/DOWNSHIFT SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - O-RING
5 - VALVE HOUSING OF SHIFT PLATE
6 - O-RING
7 - CONDUCTOR TRACK
8 - CONTACT SPRING

If a solenoid valve (1) is actuated by the TCM, it opens and guides the control pressure (p-SV) to the assigned command valve. Refer to **Fig. 236**. The solenoid valve remains actuated and therefore open until the shifting process is complete. The shift pressure (p-SV) to the command valve is reduced to zero as soon as the power supply to the solenoid valve is interrupted.

MODULATING PRESSURE CONTROL SOLENOID VALVE

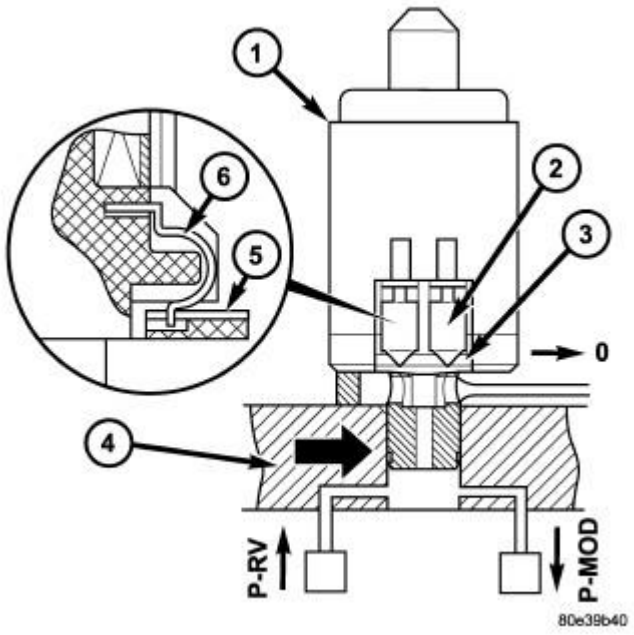

Fig. 237: Cutaway View Of Modulating Pressure Control Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - MODULATING PRESSURE CONTROL SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - VALVE HOUSING SHIFT PLATE
5 - CONDUCTOR TRACK
6 - CONTACT SPRING

The modulating pressure regulating solenoid valve (1) assigns a proportional pressure to the current which is controlled by the TCM according to the load. Refer to **Fig. 237**.

TORQUE CONVERTER LOCKUP CLUTCH PWM SOLENOID VALVE

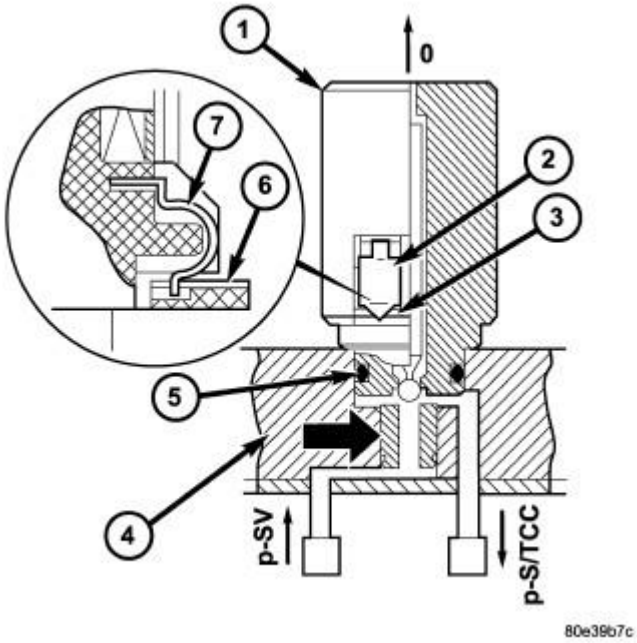

Fig. 238: Cutaway View Of Torque Converter Lockup Clutch PWM Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCKUP CLUTCH PWM SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - VALVE HOUSING OF SHIFT PLATE
5 - O-RING
6 - CONDUCTOR TRACK
7 - CONTACT SPRING

The torque converter lockup PWM solenoid (1) valve converts pulse-wave-modulated current controlled by the TCM into the appropriate hydraulic control pressure (p-S/TCC). Refer to **Fig. 238**.

SHIFT PRESSURE CONTROL SOLENOID VALVE

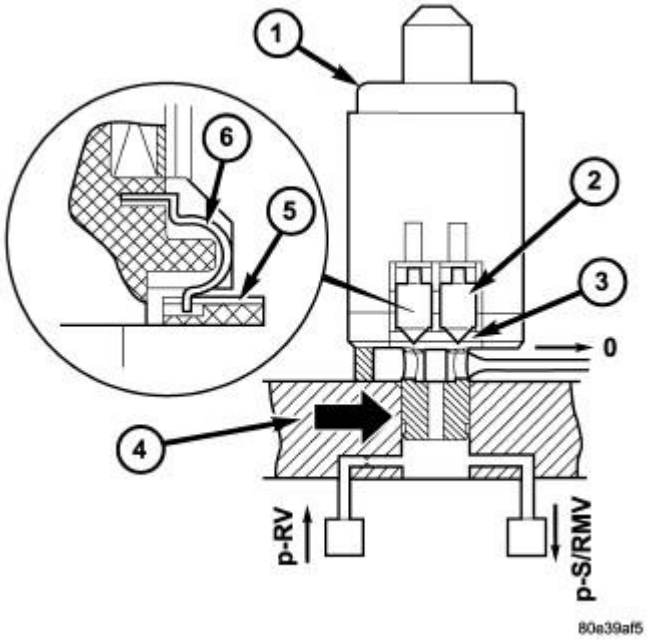

Fig. 239: Cutaway View Of Shift Pressure Control Solenoid Valve
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFT PRESSURE CONTROL SOLENOID VALVE
2 - CONTACT SPRING
3 - CONDUCTOR TRACK
4 - VALVE HOUSING SHIFT PLATE
5 - CONDUCTOR TRACK
6 - CONTACT SPRING

The shift pressure regulating solenoid valve (1) assigns a proportional pressure to the current which is controlled by the TCM according to the load. Refer to **Fig. 239**.

TORQUE CONVERTER

DESCRIPTION

DESCRIPTION

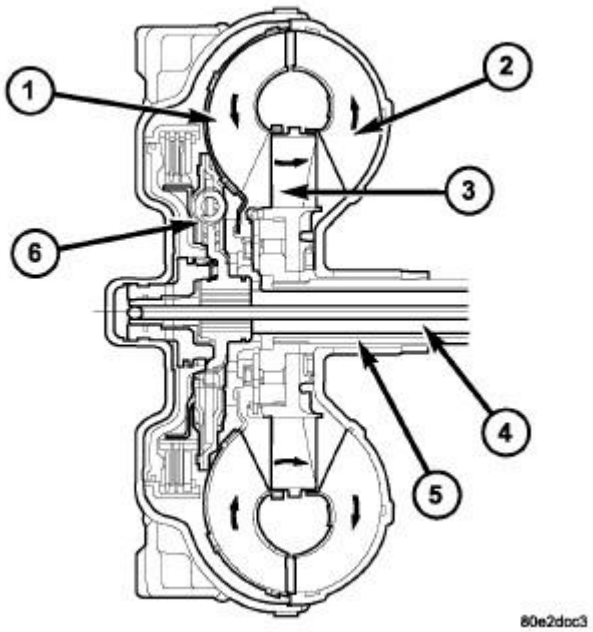

Fig. 240: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - TURBINE DAMPER

CAUTION: The torque converter must be replaced if a transmission failure resulted in large amounts of metal or fiber contamination in the fluid.

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. Refer to **Fig. 240**. The torque converter consists of an outer shell with an internal turbine (1), a stator (3), an overrunning clutch, an impeller (2), and an electronically applied converter clutch. The converter clutch provides reduced engine speed and greater fuel economy when engaged. Clutch engagement also provides reduced transmission fluid temperatures. The converter clutch engages in third through fifth gears. The torque converter hub drives the transmission oil (fluid) pump.

A turbine damper (6) has been added for some applications to help improve vehicle noise, vibration, and harshness (NVH) characteristics.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

IMPELLER

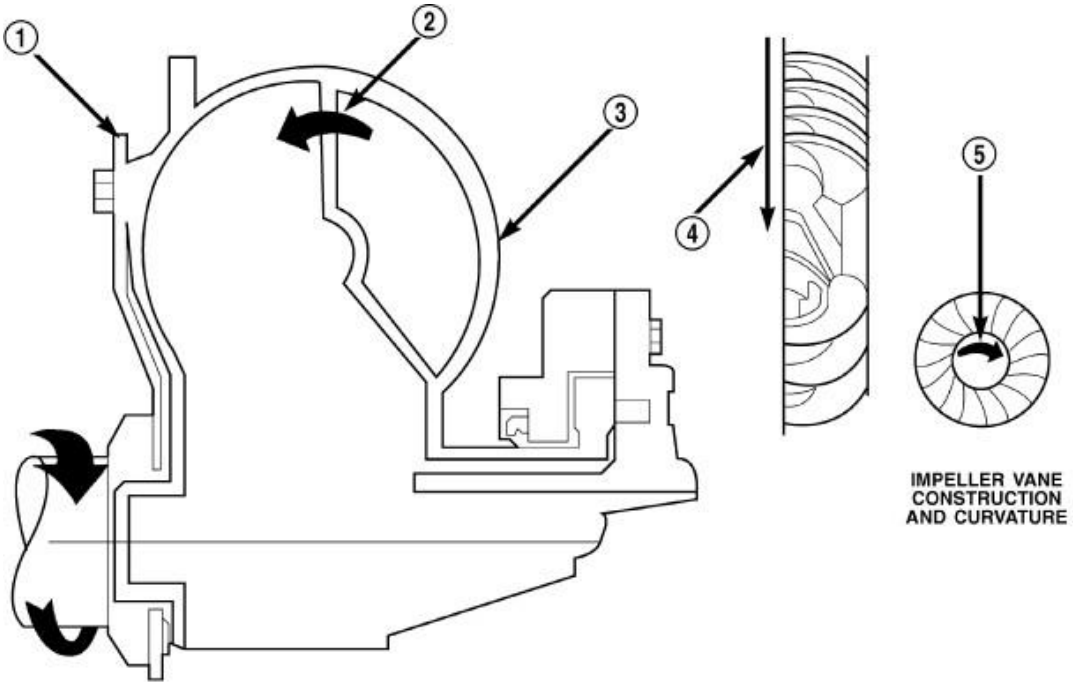

Fig. 241: Identifying Impeller
Courtesy of CHRYSLER GROUP, LLC

1 - ENGINE FLEXPLATE	4 - ENGINE ROTATION
2 - OIL FLOW FROM IMPELLER SECTION INTO TURBINE SECTION	5 - ENGINE ROTATION
3 - IMPELLER VANES AND COVER ARE INTEGRAL	

The impeller (3) is an integral part of the converter housing. Refer to **Fig. 241**. The impeller consists of curved blades placed radially along the inside of the housing on the transmission side of the converter. As the converter housing is rotated by the engine, so is the impeller, because they are one and the same and are the driving members of the system.

TURBINE

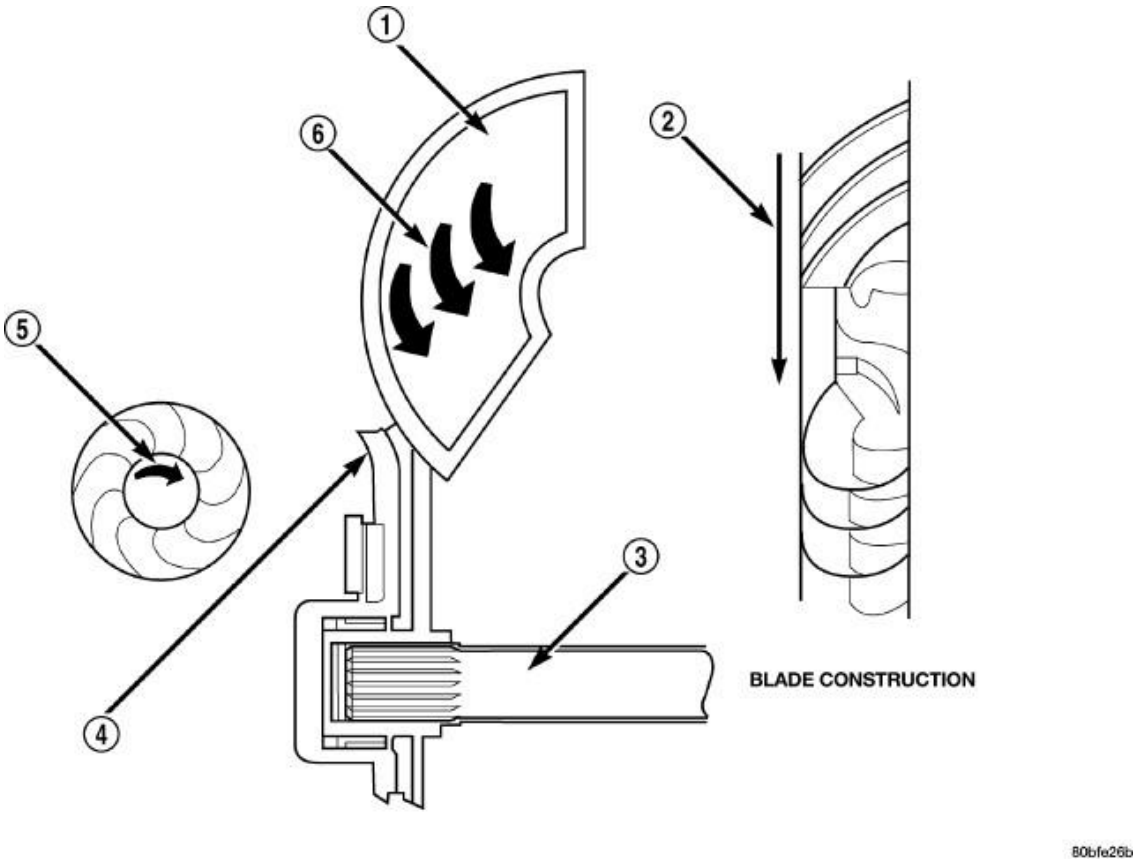

Fig. 242: Identifying Turbine
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE VANE	4 - PORTION OF TORQUE CONVERTER COVER
2 - ENGINE ROTATION	5 - ENGINE ROTATION
3 - INPUT SHAFT	6 - OIL FLOW WITHIN TURBINE SECTION

The turbine (1) is the output, or driven, member of the converter. Refer to **Fig. 242**. The turbine is mounted within the housing opposite the impeller, but is not attached to the housing. The input shaft is inserted through the center of the impeller and splined into the turbine. The design of the turbine is similar to the impeller, except the blades of the turbine are curved in the opposite direction.

STATOR

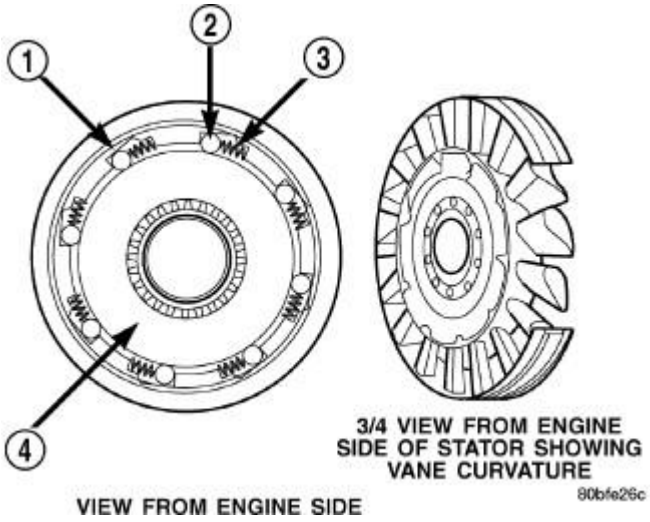

Fig. 243: Identifying Over-Running Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - CAM (OUTER RACE)
2 - ROLLER
3 - SPRING
4 - INNER RACE

The stator assembly (1-4) is mounted on a stationary shaft which is an integral part of the oil pump. Refer to **Fig. 243**.

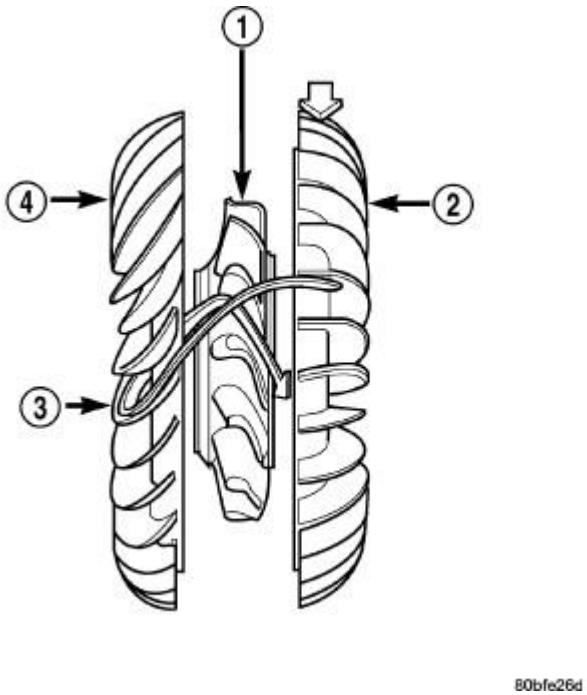

Fig. 244: Identifying Stator Components
Courtesy of CHRYSLER GROUP, LLC

1 - STATOR
2 - IMPELLER
3 - FLUID FLOW
4 - TURBINE

The stator (1) is located between the impeller (2) and turbine (4) within the torque converter case. Refer to **Fig. 244**. The stator contains a freewheeling clutch, which allows the stator to rotate only in a clockwise direction. When the stator is locked against the freewheeling clutch, the torque multiplication feature of the torque converter is operational.

TORQUE CONVERTER CLUTCH (TCC)

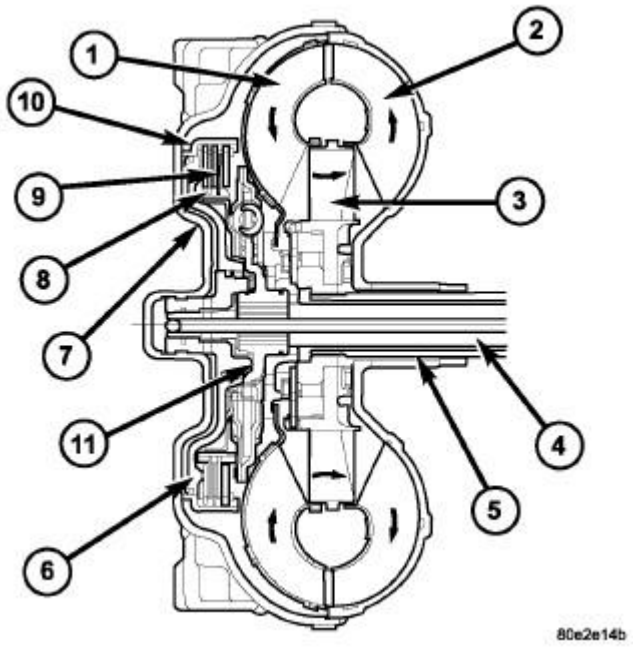

Fig. 245: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER
9 - CLUTCH PLATE SET
10 - EXTERNALLY TOOTHED DISC CARRIER

11 - TURBINE DAMPER

The TCC (9) was installed to improve the efficiency of the torque converter that is lost to the slippage of the fluid coupling. Refer to **Fig. 245**. Although the fluid coupling provides smooth, shock-free power transfer, it is natural for all fluid couplings to slip. If the impeller and turbine were mechanically locked together, a zero slippage condition could be obtained. A hydraulic piston with friction material was added to the turbine assembly to provide this mechanical lock-up.

In order to reduce heat build-up in the transmission and buffer the powertrain against torsional vibrations, the TCM can duty cycle the torque converter lock-up solenoid to achieve a smooth application of the torque converter clutch. This function, referred to as Electronically Modulated Converter Clutch (EMCC) can occur at various times depending on the following variables:

- Shift lever position
- Current gear range
- Transmission fluid temperature
- Engine coolant temperature
- Input speed
- Throttle angle
- Engine speed

OPERATION

OPERATION

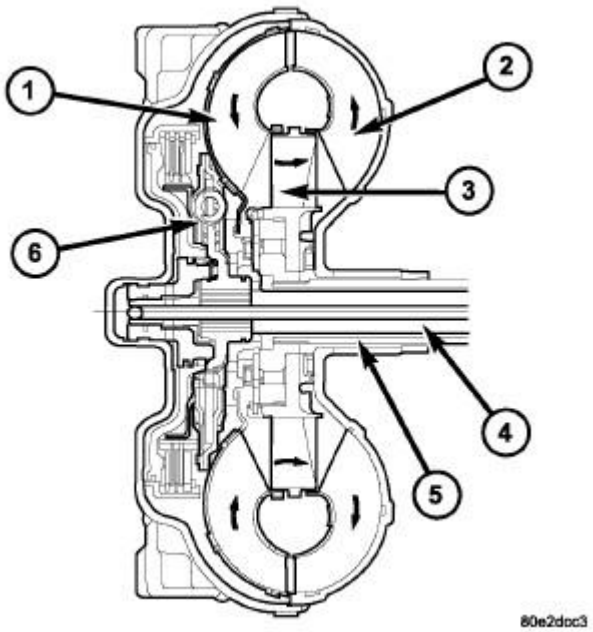

Fig. 246: Torque Converter

Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - TURBINE DAMPER

The converter impeller (driving member) (2), which is integral to the converter housing and bolted to the engine drive plate, rotates at engine speed. Refer to **Fig. 246**. The converter turbine (driven member) (1), which reacts from fluid pressure generated by the impeller, rotates and turns the transmission input shaft (4).

TURBINE

As the fluid that was put into motion by the impeller blades strikes the blades of the turbine, some of the energy and rotational force is transferred into the turbine and the input shaft. This causes both of them (turbine and input shaft) to rotate in a clockwise direction following the impeller. As the fluid is leaving the trailing edges of the turbine's blades it continues in a "hindering" direction back toward the impeller. If the fluid is not redirected before it strikes the impeller, it will strike the impeller in such a direction that it would tend to slow it down.

STATOR

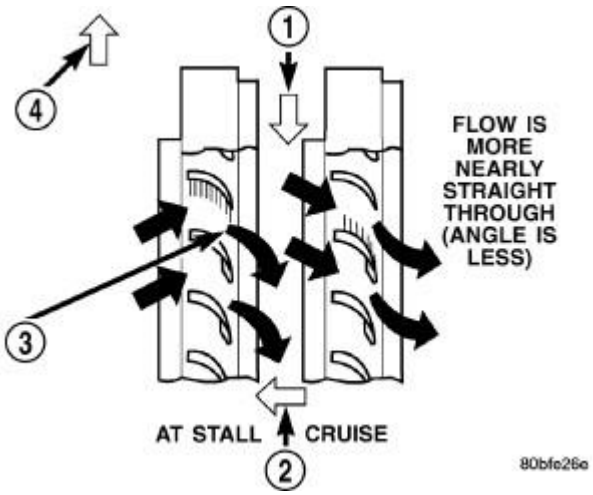

Fig. 247: Identifying Stator Operation
Courtesy of CHRYSLER GROUP, LLC

1 - DIRECTION STATOR WILL FREE WHEEL DUE TO OIL PUSHING ON BACKSIDE OF VANES
2 - FRONT OF ENGINE
3 - INCREASED ANGLE AS OIL STRIKES VANES

4 - DIRECTION STATOR IS LOCKED UP DUE TO OIL PUSHING AGAINST STATOR VANES

Torque multiplication is achieved by locking the stator's over-running clutch to its shaft. Under stall conditions (the turbine is stationary), the oil leaving the turbine blades strikes the face of the stator blades and tries to rotate them in a counterclockwise direction. Refer to **Fig. 247**. When this happens the over-running clutch of the stator locks and holds the stator from rotating. With the stator locked, the oil strikes the stator blades and is redirected into a "helping" direction before it enters the impeller. This circulation of oil from impeller to turbine, turbine to stator, and stator to impeller, can produce a maximum torque multiplication of about 2.0:1. As the turbine begins to match the speed of the impeller, the fluid that was hitting the stator in such as way as to cause it to lock-up is no longer doing so. In this condition of operation, the stator begins to free wheel and the converter acts as a fluid coupling.

TORQUE CONVERTER CLUTCH (TCC)

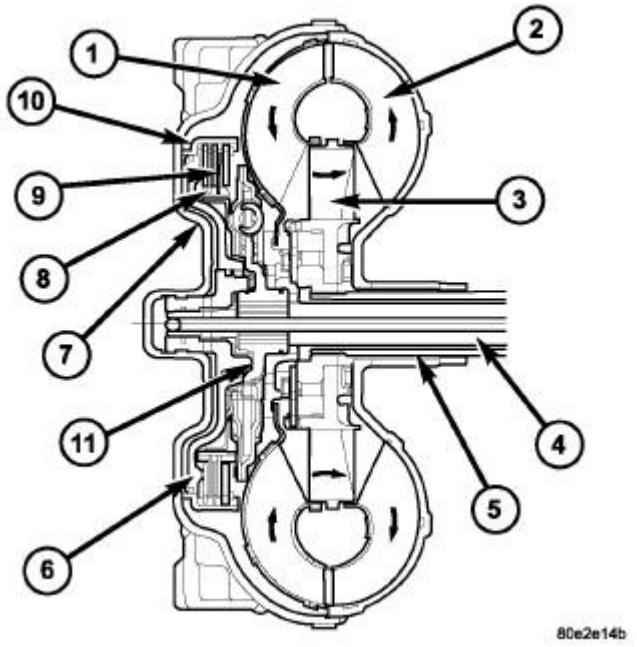

Fig. 248: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER

9 - CLUTCH PLATE SET
10 - EXTERNALLY TOOTHED DISC CARRIER
11 - TURBINE DAMPER

In a standard torque converter, the impeller (2) and turbine (1) are rotating at about the same speed and the stator (3) is freewheeling, providing no torque multiplication. By applying the turbine's piston and friction material (9), a total converter engagement can be obtained. Refer to **Fig. 248**. The result of this engagement is a direct 1:1 mechanical link between the engine and the transmission.

The clutch can be engaged in second, third, fourth, and fifth gear ranges.

The TCM controls the torque converter by way of internal logic software. The programming of the software provides the TCM with control over the torque converter solenoid. There are four output logic states that can be applied as follows:

- No EMCC
- Partial EMCC
- Full EMCC
- Gradual-to-no EMCC

NO EMCC

Under No EMCC conditions, the TCC Solenoid is OFF. There are several conditions that can result in NO EMCC operations. No EMCC can be initiated due to a fault in the transmission or because the TCM does not see the need for EMCC under current driving conditions.

PARTIAL EMCC

Partial EMCC operation modulates the TCC Solenoid (duty cycle) to obtain partial torque converter clutch application. Partial EMCC operation is maintained until Full EMCC is called for and actuated. During Partial EMCC some slip does occur. Partial EMCC will usually occur at low speeds, low load and light throttle situations.

FULL EMCC

During Full EMCC operation, the TCM increases the TCC Solenoid duty cycle to full ON after Partial EMCC control brings the engine speed within the desired slip range of transmission input speed relative to engine RPM.

GRADUAL-TO-NO EMCC

This operation is to soften the change from Full or Partial EMCC to No EMCC. This is done at mid-throttle by decreasing the TCC Solenoid duty cycle.

REMOVAL

REMOVAL

1. Remove transmission and torque converter from vehicle. Refer to **REMOVAL**.
2. Place a suitable drain pan under the converter housing end of the transmission.

CAUTION: Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition. The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

3. Pull the torque converter forward until the center hub clears the oil pump seal.
4. Separate the torque converter from the transmission.

INSTALLATION

INSTALLATION

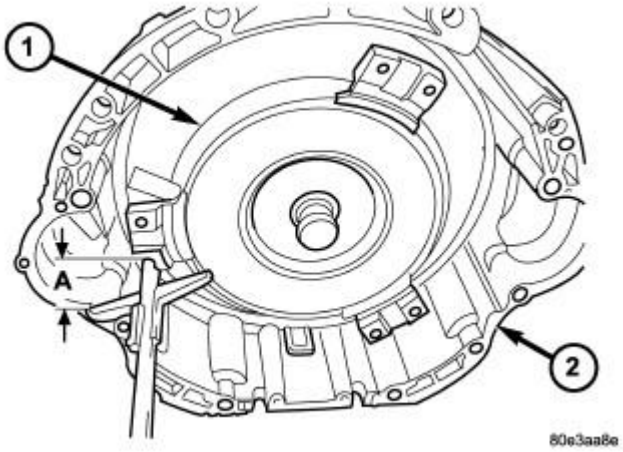

Fig. 249: Measuring Torque Converter Installation Depth
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER
2 - TRANSMISSION HOUSING

Check converter hub and drive flats for sharp edges, burrs, scratches, or nicks. Polish the hub and flats with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.

1. Lubricate oil pump seal lip with transmission fluid.
2. Place torque converter in position on transmission.

CAUTION: Do not damage oil pump seal or converter hub while inserting torque converter into the front of the transmission.

3. Align torque converter to oil pump seal opening.
4. Insert torque converter hub into oil pump.
5. While pushing torque converter inward, rotate converter until converter is fully seated in the oil pump gears.
6. Check converter seating with a scale and straightedge. Refer to **Fig. 249**. Surface of converter lugs should be at least 19 mm (3/4 in.) to rear of straightedge when converter is fully seated.
7. If necessary, temporarily secure converter with C-clamp attached to the converter housing.
8. Install the transmission in the vehicle.
9. Fill the transmission with the recommended fluid.

UNIT, ELECTROHYDRAULIC CONTROL

DESCRIPTION

DESCRIPTION

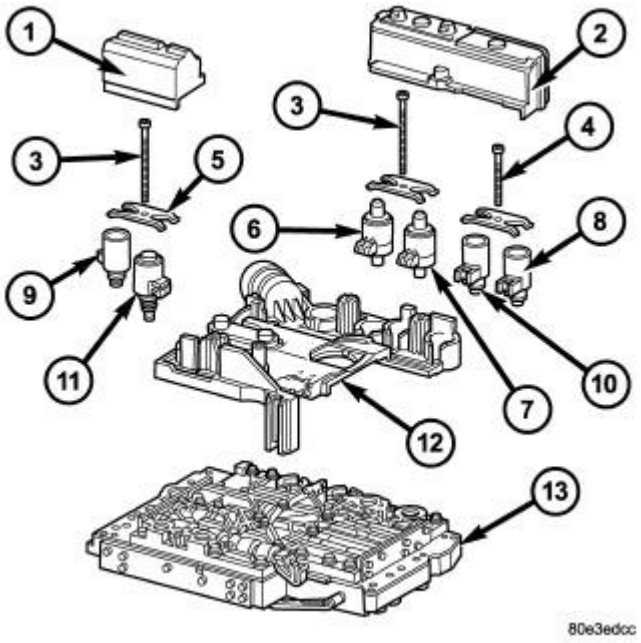

Fig. 250: Electrical Unit Components
Courtesy of CHRYSLER GROUP, LLC

1 - SOLENOID CAP (if equipped)
2 - SOLENOID CAP (if equipped)
3 - BOLT - M6X32
4 - BOLT - M6X30
5 - LEAF SPRING
6 - MODULATING PRESSURE REGULATING SOLENOID VALVE

7 - SHIFT PRESSURE REGULATING SOLENOID
8 - 3-4 SHIFT SOLENOID
9 - TORQUE CONVERTER LOCK-UP SOLENOID
10 - 1-2/4-5 SHIFT SOLENOID
11 - 2-3 SHIFT SOLENOID
12 - ELECTRICAL CONTROL UNIT
13 - SHIFT PLATE

The electrohydraulic control unit comprises the shift plate (13) made from light alloy for the hydraulic control and an electrical control unit (12). Refer to **Fig. 250**. The electrical control unit (12) comprises of a supporting body made of plastic, into which the electrical components (1 - 11) are assembled. The supporting body is mounted on the shift plate (13) and screwed to it.

Strip conductors inserted into the supporting body make the connection between the electrical components and a plug connector. The connection to the wiring harness on the vehicle and the transmission control module (TCM) is produced via this 13-pin plug connector with a bayonet lock.

ELECTRICAL CONTROL UNIT

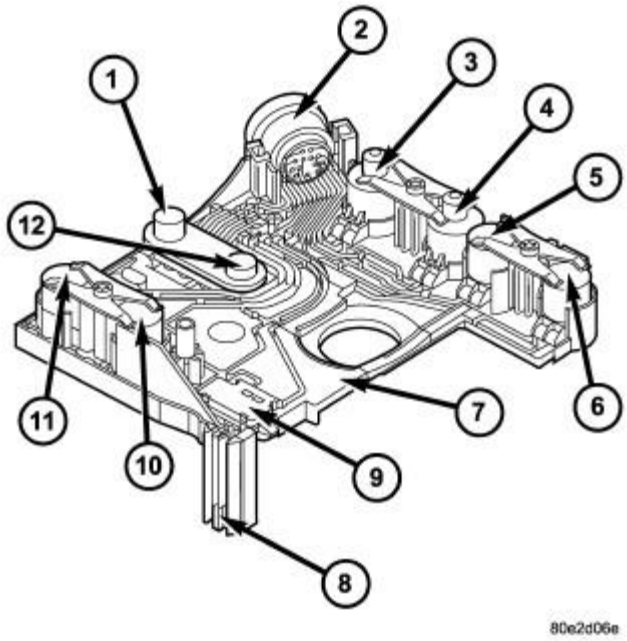

Fig. 251: Identifying Electrical Control Unit Components
Courtesy of CHRYSLER GROUP, LLC

1 - N3 SPEED SENSOR
2 - PLUG CONNECTOR
3 - MODULATING PRESSURE REGULATING SOLENOID
4 - SHIFT PRESSURE REGULATING SOLENOID

5 - 1-2/4-5 SHIFT SOLENOID
6 - 3-4 SHIFT SOLENOID
7 - ELECTRICAL CONTROL UNIT
8 - TRANSMISSION TEMPERATURE SENSOR
9 - STARTER INTERLOCK CONTACT
10 - 2-3 SHIFT SOLENOID
11 - TORQUE CONVERTER LOCK-UP SOLENOID
12 - N2 SPEED SENSOR

The electric valve control unit (7) consists of a plastic shell which houses the RPM sensors (1, 12), regulating solenoid valves (3, 4), solenoid valves (5, 6, 10), the TCC solenoid valve (11), the park/neutral contact (9), and the transmission oil temperature sensor (8). Refer to **Fig. 251**. Conductor tracks integrated into the shell connect the electric components to a plug connection (2). This 13-pin plug connection (2) establishes the connection to the vehicle-side cable harness and to the transmission control module (TCM). With the exception of the solenoid valves, all other electric components are fixed to the conductor tracks.

HYDRAULIC CONTROL UNIT

WORKING PRESSURE (LINE PRESSURE OR OPERATING PRESSURE) (P-A)

The working pressure provides the pressure supply to the hydraulic control and the transmission shift elements. It is the highest hydraulic pressure in the entire hydraulic system. The working pressure is regulated at the working pressure regulating valve in relation to the load and gear. All other pressures required for the transmission control are derived from the working pressure.

LUBRICATION PRESSURE (P-SM)

At the working pressure regulating valve surplus oil is diverted to the lubrication pressure regulating valve, from where it is used in regulated amounts to lubricate and cool the mechanical transmission components and the torque converter. Furthermore, the lubrication pressure (p-Sm) is also used to limit the pressure in the torque converter.

SHIFT PRESSURE (P-S)

The shift pressure is determined by the shift pressure regulating solenoid valve and the shift pressure regulating valve. The shift pressure:

- Regulates the pressure in the activating shift element during the shift phase.
- Determines together with the modulating pressure the pressure reduction at the deactivating shift element as regulated by the overlap regulating valve.
- Initializes 2nd gear in limp-home mode.

MODULATING PRESSURE (P-MOD)

The modulating pressure influences the size of the working pressure and determines together with

the shift pressure the pressure regulated at the overlap regulating valve. The modulating pressure is regulated at the modulating pressure regulating solenoid valve, which is under regulating valve pressure. The modulating pressure is variable and relative to the engine load.

REGULATING VALVE/CONTROL VALVE PRESSURE (P-RV)

The regulating valve pressure is regulated at the regulating valve pressure regulating valve in relation to the working pressure (p-A) up to a maximum pressure of 8 bar (116 psi). It supplies the modulating pressure regulating solenoid valve, the shift pressure regulating solenoid valve and the shift valve pressure regulating valve.

SHIFT VALVE PRESSURE (P-SV)

The shift valve pressure (p-SV) is derived from the regulating valve pressure (p-RV), is regulated at the shift valve pressure regulating valve and is then present at the:

- 1-2 and 4-5 shift solenoid valve.
- 3-4 shift solenoid valve.
- 2-3 shift solenoid valve.
- Torque converter lockup solenoid valve.
- 3-4 and 2-3 shift pressure shift valve.

The shift valve pressure (p-SV) controls the command valves via the upshift/downshift solenoid valves.

OVERLAP PRESSURE (P- U)

The overlap pressure controls the shift component pressure reduction during a shift phase. The pressure in a shift element as it disengages is controlled during the shift phase depending on engine load (modulating pressure) and the pressure in the shift element as it engages. The adjusted pressure is inversely proportional to the transmission capability of the shift element being engaged (controlled overlap).

WORKING PRESSURE REGULATING VALVE (OPERATING PRESSURE)

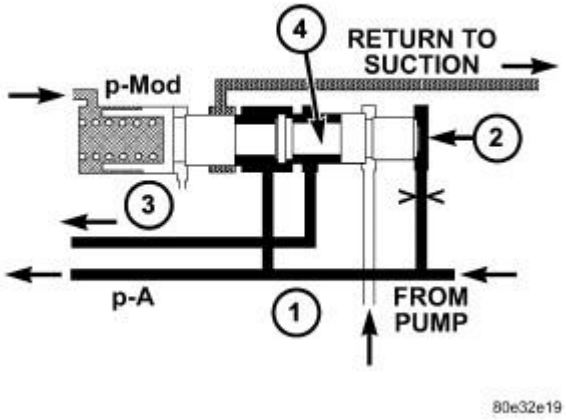

Fig. 252: Working Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSURE FROM K1/K2
2 - END FACE
3 - TO TORQUE CONVERTER REGULATING VALVE
4 - WORKING PRESSURE REGULATING VALVE

The working pressure regulating valve (4) is located in the valve housing of the shift plate. Refer to **Fig. 252**. It regulates the primary pressure of the hydraulic system.

TORQUE CONVERTER LOCKUP CLUTCH REGULATING VALVE

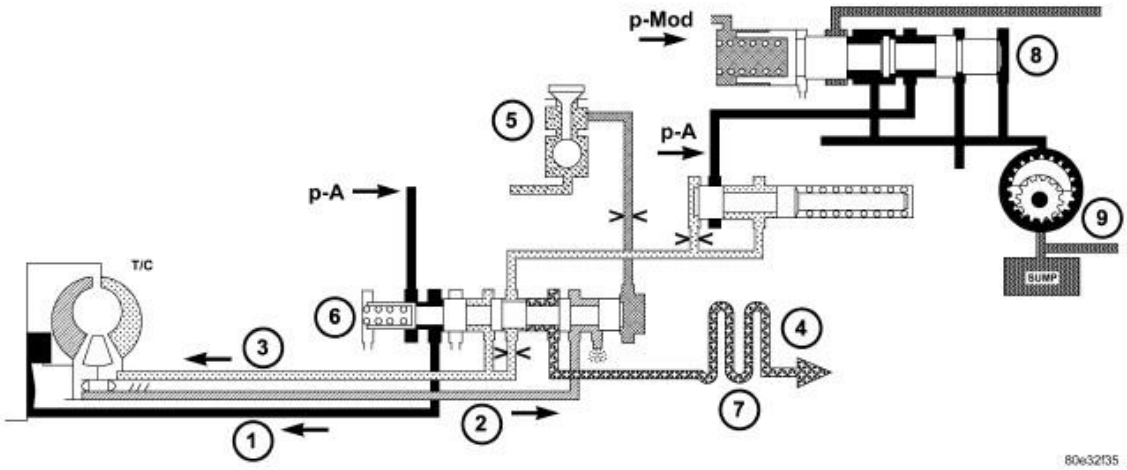

Fig. 253: Torque Converter Lockup Clutch Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH
2 - TORQUE CONVERTER OUTPUT
3 - TORQUE CONVERTER INPUT
4 - LUBRICATION
5 - TORQUE CONVERTER LOCK-UP SOLENOID
6 - TORQUE CONVERTER LOCK-UP CLUTCH REGULATING VALVE
7 - OIL COOLER
8 - LINE PRESSURE REGULATING VALVE
9 - OIL PUMP

The torque converter lock-up clutch regulating valve (6) is located in the valve housing of the electrohydraulic control module. Refer to **Fig. 253**. The valve is responsible for the hydraulic control of the torque converter lockup clutch and distribution of the lubricating oil.

OVERLAP REGULATING VALVE

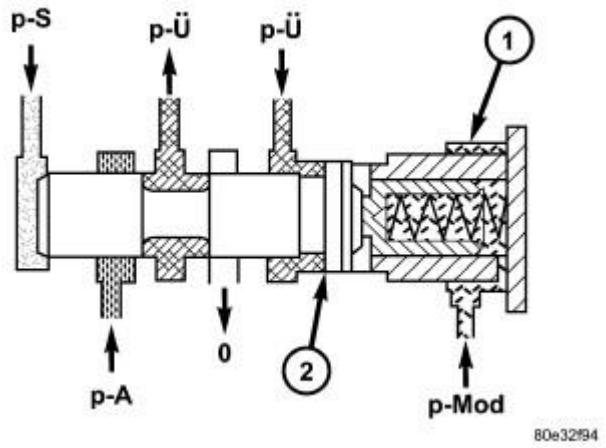

Fig. 254: Cutaway View Of Overlap Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - OVERLAP REGULATING VALVE
2 - ANNULAR SURFACE ON OVERLAP REGULATING VALVE

Each shift group is assigned one overlap regulating valve (1). Refer to **Fig. 254**. The 1-2 / 4-5 overlap regulating valve is installed in the shift valve housing; the 2-3 and 3-4 overlap regulating valves are installed in the valve housing. The overlap regulating valve regulates the pressure reduction during a shift phase.

COMMAND VALVE

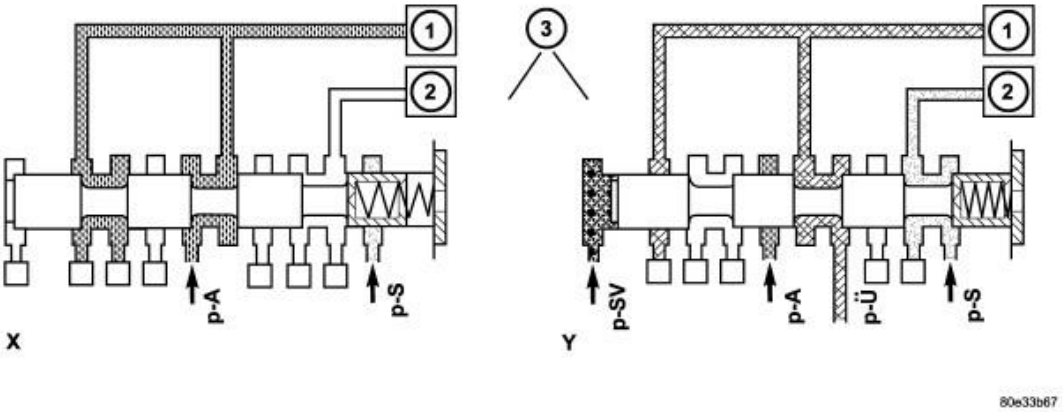

Fig. 255: Cutaway View Of Command Valve
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING CLUTCH B1
2 - DRIVING CLUTCH K1
3 - 1-2/4-5 COMMAND VALVE

Each shift group possesses one command valve (3). Refer to **Fig. 255**. The 1-2 / 4-5 and 2-3 command valves are installed in the shift valve housing, the 3-4 command valve is installed in the valve housing. The command valve switches the shift group from the stationary phase to the shift phase and back again.

HOLDING PRESSURE SHIFT VALVE

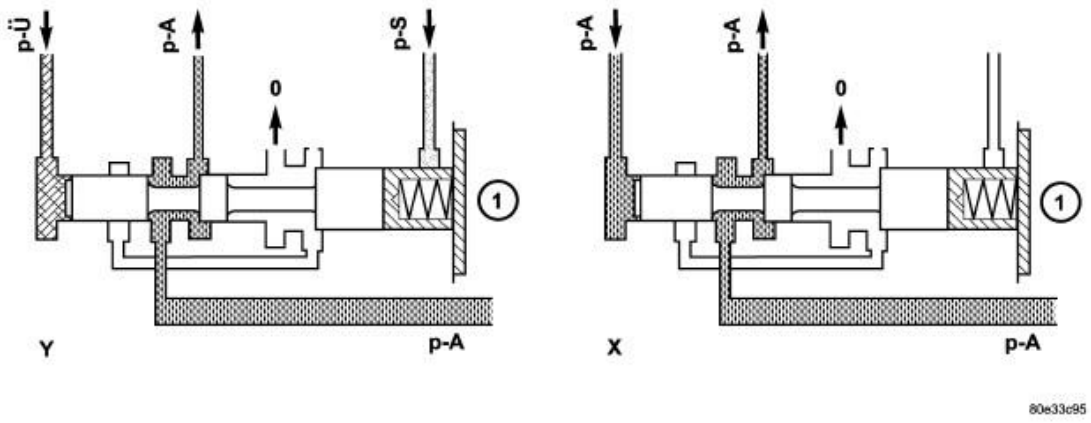

Fig. 256: Identifying Shift Valve Holding Pressure
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING PRESSURE SHIFT VALVE

Each shift group possesses one holding pressure shift valve (1). Refer to **Fig. 256**. The 1-2 / 4-5 and 2-3 holding pressure shift valves are installed in the shift valve housing; the 3-4 holding pressure shift valve is installed in the valve housing. The holding pressure shift valve allocates the working pressure to one actuator of a shift group.

SHIFT PRESSURE SHIFT VALVE

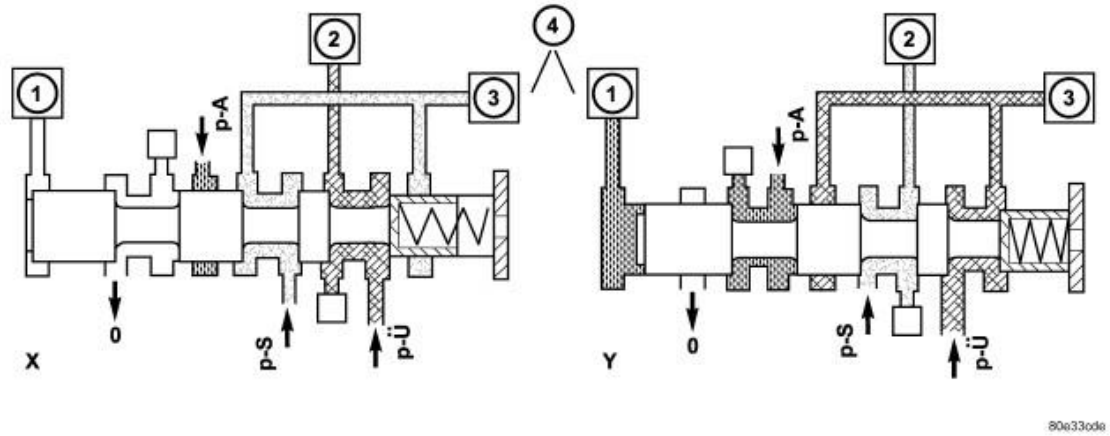

Fig. 257: Identifying Shift Pressure Shift Valve Components
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 COMMAND VALVE
2 - DRIVING CLUTCH K1
3 - HOLDING CLUTCH B1
4 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE

Each shift group possesses one shift pressure shift valve (4). Refer to **Fig. 257**. The 1-2 / 4-5 and 2-3 shift pressure shift valves are installed in the shift valve housing; the 3-4 shift pressure shift valve is installed in the valve housing. It assigns the shift pressure (p-S) to the activating actuator and the overlap pressure (p- U) regulated by the overlap regulating valve to the deactivating actuator.

LUBRICATION PRESSURE REGULATING VALVE

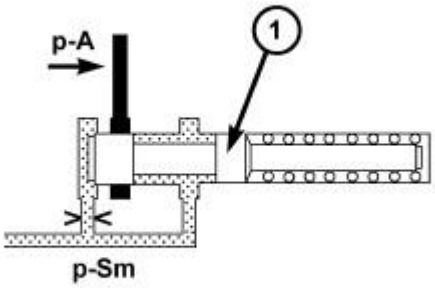

Fig. 258: Lubrication Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - LUBRICATION PRESSURE REGULATING VALVE

The lubrication pressure regulating valve (1) is located in the valve housing of the electrohydraulic control module. Refer to **Fig. 258**. The valve controls the fluid to lubricate and cool the mechanical part of the transmission, and limits the pressure in the torque converter.

SHIFT PRESSURE REGULATING VALVE

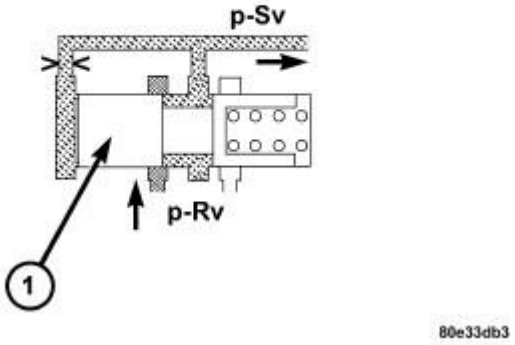

Fig. 259: Shift Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFT PRESSURE REGULATING VALVE

The shift pressure regulating valve (1) is located in the valve housing of the shift plate. Refer to **Fig. 259**. It regulates the shift pressure (p-S).

REGULATING VALVE PRESSURE REGULATING VALVE

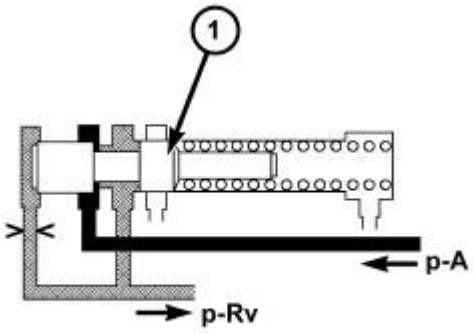

Fig. 260: Regulating Valve Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - REGULATING VALVE PRESSURE REGULATING VALVE

The regulating valve pressure regulating valve (1) is located in the valve housing of the electrohydraulic control module. Refer to **Fig. 260**. It regulates the regulating valve/control valve pressure (p-RV).

SHIFT VALVE PRESSURE REGULATING VALVE

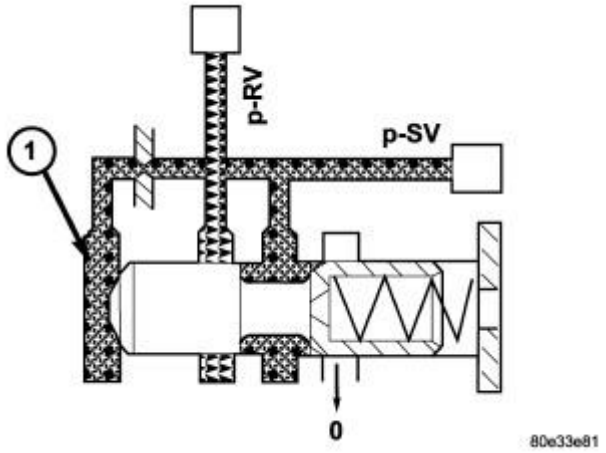

Fig. 261: Shift Valve Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFT VALVE PRESSURE REGULATING VALVE

The shift valve pressure regulating valve (1) is located in the valve housing of the electrohydraulic control module. Refer to **Fig. 261**. It regulates the shift valve pressure (p-SV).

OPERATION

OPERATION

ELECTRICAL CONTROL UNIT

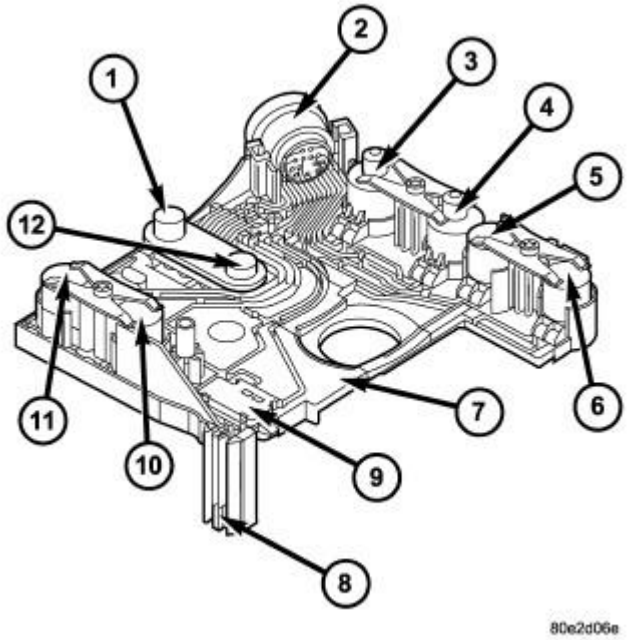

Fig. 262: Identifying Electrical Control Unit Components
Courtesy of CHRYSLER GROUP, LLC

1 - N3 SPEED SENSOR
2 - PLUG CONNECTOR
3 - MODULATING PRESSURE REGULATING SOLENOID
4 - SHIFT PRESSURE REGULATING SOLENOID
5 - 1-2/4-5 SHIFT SOLENOID
6 - 3-4 SHIFT SOLENOID
7 - ELECTRICAL CONTROL UNIT
8 - TRANSMISSION TEMPERATURE SENSOR
9 - STARTER INTERLOCK CONTACT
10 - 2-3 SHIFT SOLENOID
11 - TORQUE CONVERTER LOCK-UP SOLENOID
12 - N2 SPEED SENSOR

Signals from the transmission control module (TCM) are converted into hydraulic functions in the electric valve control unit (7). Refer to **Fig. 262**. The RPM sensors (1, 12), starter interlock contact (9), and transmission oil temperature sensor (8) of the electric valve control unit (7) supply the TCM with input signals. The solenoid valves are controlled by the TCM and trigger the hydraulic functions.

HYDRAULIC CONTROL UNIT

WORKING PRESSURE REGULATING VALVE (LINE PRESSURE OR OPERATING PRESSURE)

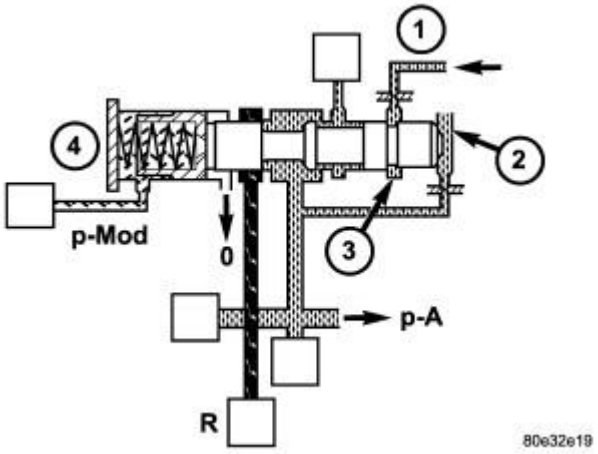

Fig. 263: Working Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSURE FROM K1/K2
2 - END FACE
3 - ANNULAR SURFACE
4 - WORKING PRESSURE REGULATING VALVE

The working pressure (p-A) is regulated at the working pressure regulating valve (4) in relation to load (modulating pressure, p-Mod) and gear (K1 or K2 pressure) (1). Refer to **Fig. 263**. The spring in the working pressure regulating valve sets a minimum pressure level (basic pressure).

TORQUE CONVERTER LOCKUP CLUTCH REGULATING VALVE

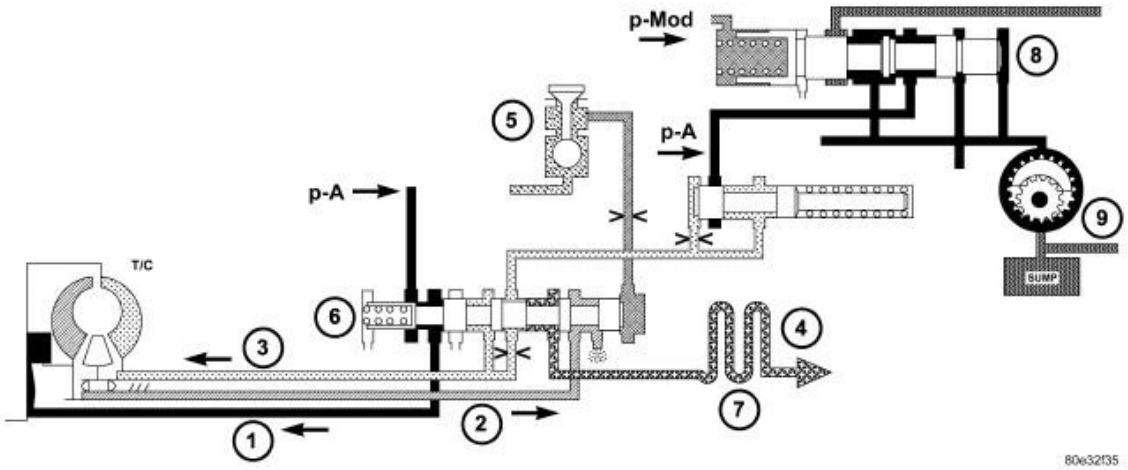

Fig. 264: Torque Converter Lockup Clutch Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER LOCK-UP CLUTCH
2 - TORQUE CONVERTER OUTPUT
3 - TORQUE CONVERTER INPUT
4 - LUBRICATION
5 - TORQUE CONVERTER LOCK-UP SOLENOID
6 - TORQUE CONVERTER LOCK-UP CLUTCH REGULATING VALVE
7 - OIL COOLER
8 - LINE PRESSURE REGULATING VALVE
9 - OIL PUMP

The torque converter lockup clutch regulating valve (6) regulates the torque converter lock-up clutch working pressure (p-TCC) in relation to the torque converter clutch control pressure (p-S/TCC). Refer to **Fig. 264**. According to the size of the working pressure (p-A), the torque converter lockup clutch is either Engaged, Disengaged, or Slipping. When the regulating valve (6) is in the lower position, lubricating oil flows through the torque converter and oil cooler (7) into the transmission (torque converter lockup clutch unpressurized). In its regulating position (slipping, torque converter lockup clutch pressurized), a reduced volume of lubricating oil flows through the annular passage bypassing the torque converter and passing direct through the oil cooler into the transmission. The rest of the lubricating oil is directed via the throttle "a" into the torque converter in order to cool the torque converter lockup clutch.

OVERLAP REGULATING VALVE

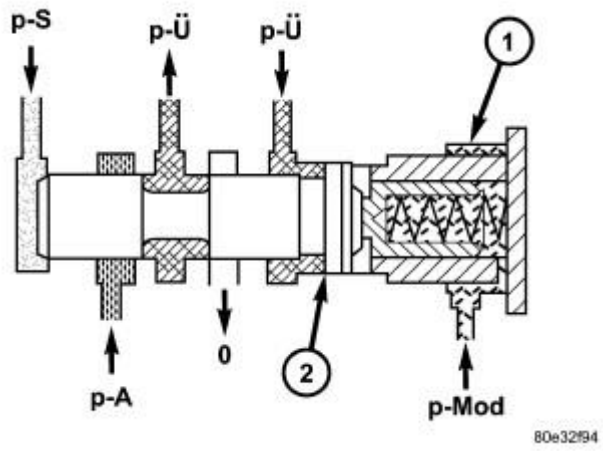

Fig. 265: Cutaway View Of Overlap Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - OVERLAP REGULATING VALVE
2 - ANNULAR SURFACE ON OVERLAP REGULATING VALVE

During the shift phase the pressure in the deactivating shift actuator is regulated in relation to the engine load (modulating pressure, p-Mod) and the pressure in the activating actuator. Refer to **Fig. 265**. The regulated pressure is inversely proportional to the transfer capacity of the activating shift actuator (regulated overlap).

COMMAND VALVE

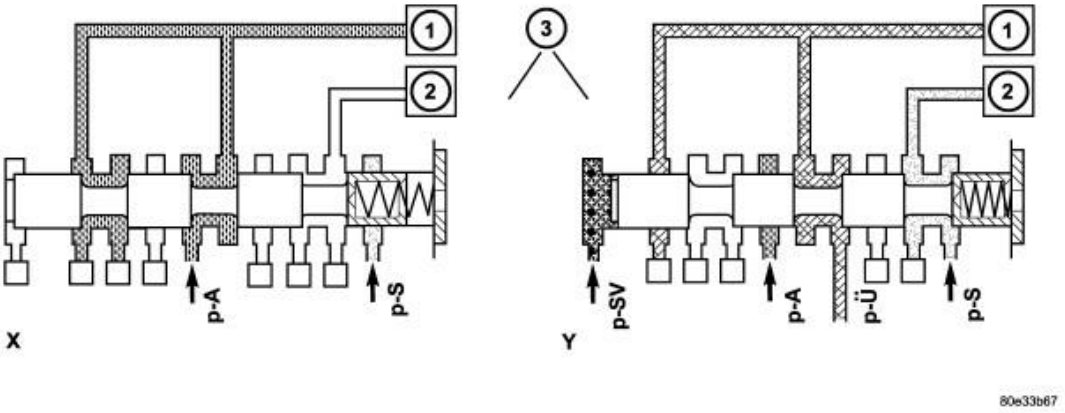

Fig. 266: Cutaway View Of Command Valve
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING CLUTCH B1

2 - DRIVING CLUTCH K1
3 - 1-2/4-5 COMMAND VALVE

When the end face is unpressurized (stationary phase), the working pressure (p-A) is directed to the actuated shift element. If the end face of the command valve is subjected to the shift valve pressure (p-SV) (shift phase), then the shift pressure (p-S) is switched to the activating element and the overlap pressure (p- U) is switched to the deactivating element. Refer to **Fig. 266**.

SHIFT VALVE HOLDING PRESSURE

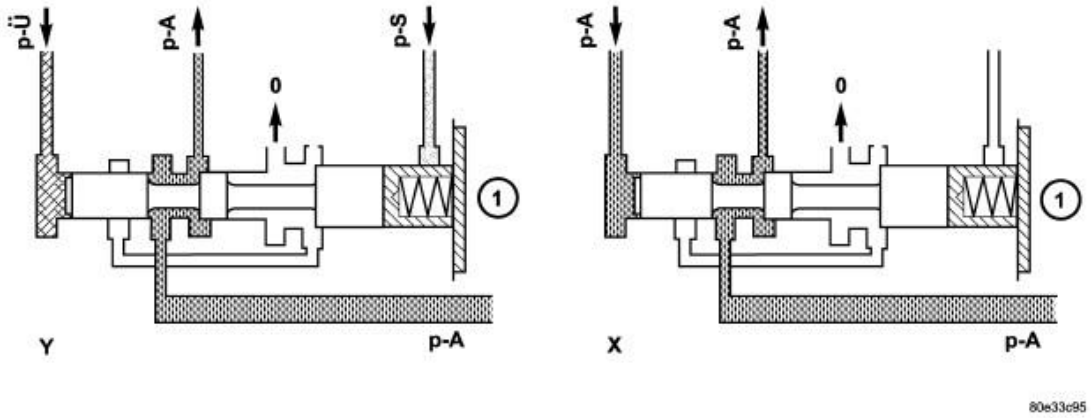

Fig. 267: Identifying Shift Valve Holding Pressure
Courtesy of CHRYSLER GROUP, LLC

1 - HOLDING PRESSURE SHIFT VALVE

The holding pressure shift valve (1) is actuated by the pressures present at the end face in the actuators and a spring. Refer to **Fig. 267**. It assigns the working pressure (p-A) to the actuator with the higher pressure (taking into account the spring force and the effective surface area). The other element of the shift group is then unpressurized. The valve switches over only during the shift phase and only at a certain pressure ratio between the overlap pressure (p- U) and the shift pressure (p-S).

SHIFT PRESSURE SHIFT VALVE

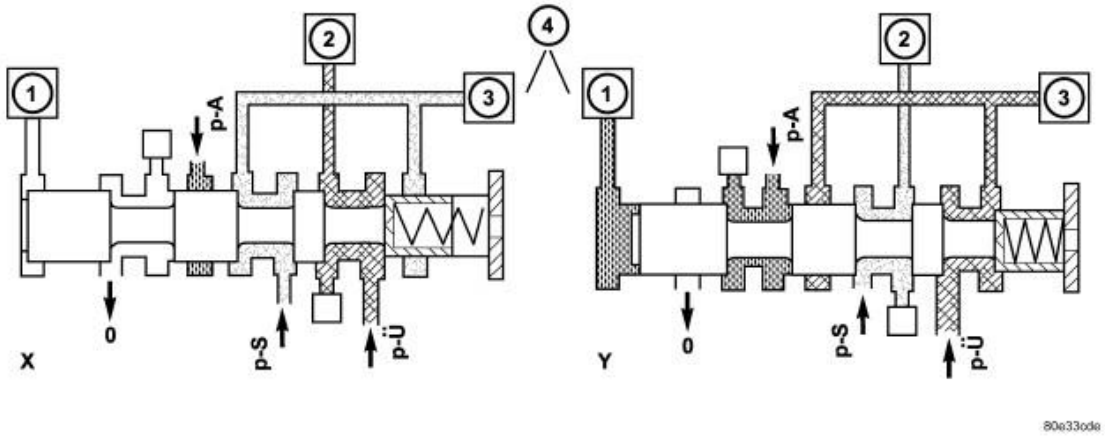

Fig. 268: Identifying Shift Pressure Shift Valve Components
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2/4-5 COMMAND VALVE
2 - DRIVING CLUTCH K1
3 - HOLDING CLUTCH B1
4 - 1-2/4-5 SHIFT PRESSURE SHIFT VALVE

When the multiple-disc brake B1 (3) is activated, the working pressure (p-A) is applied to the end face of the 1-2 / 4-5 shift pressure shift valve (4) via the command valve (1). Refer to **Fig. 268**. Its shift state is maintained during the shift phase by substituting the shift element pressure acting on its end face (and which is variable during the shift phase) with a corresponding constant pressure. When the multi-plate clutch K1 (2) is activated, the end face of the shift valve is unpressurized during the stationary and shift phases, so the shift state is maintained during the shift phase in this case too.

LUBRICATION PRESSURE REGULATING VALVE

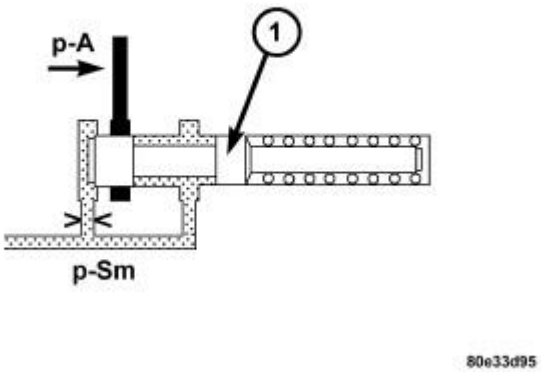

Fig. 269: Lubrication Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - LUBRICATION PRESSURE REGULATING VALVE

At the working pressure regulating valve surplus oil is diverted to the lubrication pressure regulating valve (1), from where the lubrication pressure (p-Sm) is used in regulated amounts to supply the transmission lubrication system including the torque converter. Refer to **Fig. 269**.

SHIFT PRESSURE REGULATING VALVE

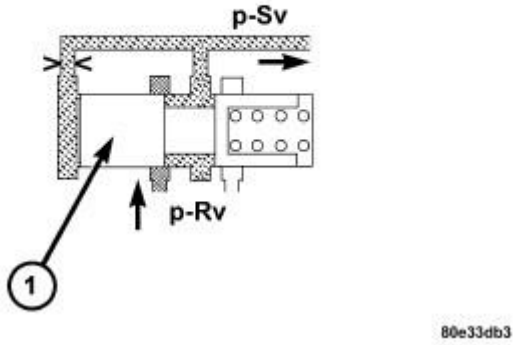

Fig. 270: Shift Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFT PRESSURE REGULATING VALVE

The shift pressure is determined by the shift pressure regulating solenoid valve and the shift pressure regulating valve (1). Refer to **Fig. 270**. In addition, pressure from the clutch K2 is also present at the annular surface of the shift pressure regulating valve. This reduces the shift pressure in 2nd gear.

REGULATING VALVE PRESSURE REGULATING VALVE

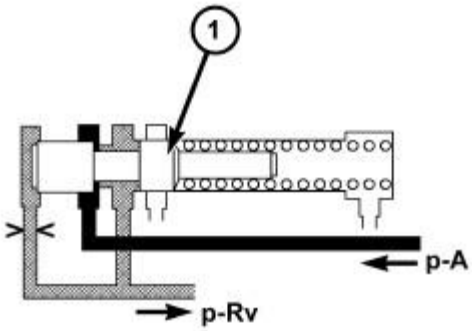

Fig. 271: Regulating Valve Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - REGULATING VALVE PRESSURE REGULATING VALVE

The regulating valve pressure (p-RV) is set at the regulating valve pressure regulating valve (1) in relation to the working pressure (p-A) as far as the maximum pressure. Refer to **Fig. 271**.

SHIFT VALVE PRESSURE REGULATING VALVE

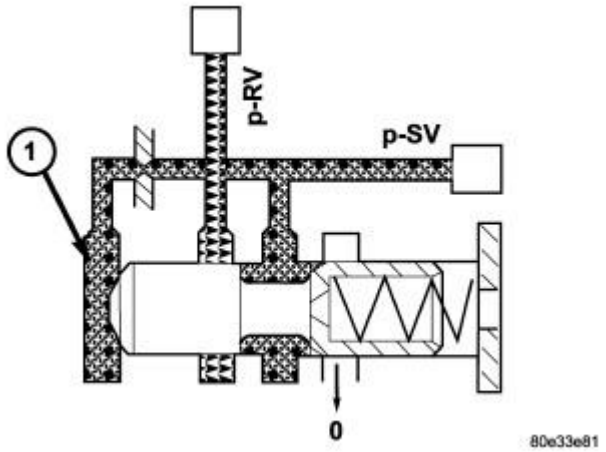

Fig. 272: Shift Valve Pressure Regulating Valve
Courtesy of CHRYSLER GROUP, LLC

1 - SHIFT VALVE PRESSURE REGULATING VALVE

The non-constant regulating valve pressure (p-RV) is regulated to a constant shift valve pressure (p-SV) at the shift valve pressure regulating valve (1) and is used to supply the 1-2 and 4-5 / 3-4 / 2-3 solenoid valves and the torque converter lockup clutch PWM solenoid valve. Refer to **Fig. 272**.

REMOVAL

REMOVAL

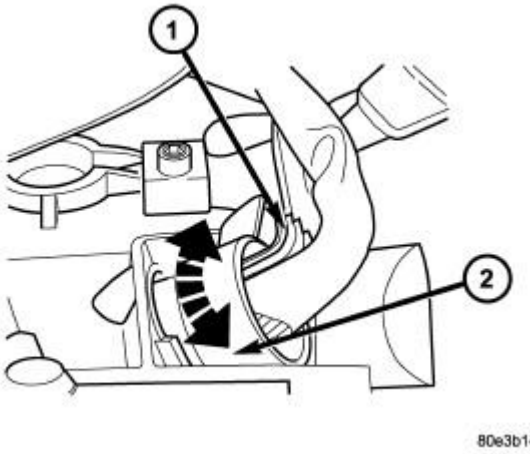

Fig. 273: Removing/Installing Wiring Connector Plug
Courtesy of CHRYSLER GROUP, LLC

1 - PLUG CONNECTOR
2 - ADAPTER PLUG

1. Move selector lever to position "P".
2. Raise vehicle.
3. Disconnect 13-pin plug connector (1). Refer to **Fig. 273**. Turn bayonet lock of the adapter plug (2) anti-clockwise.

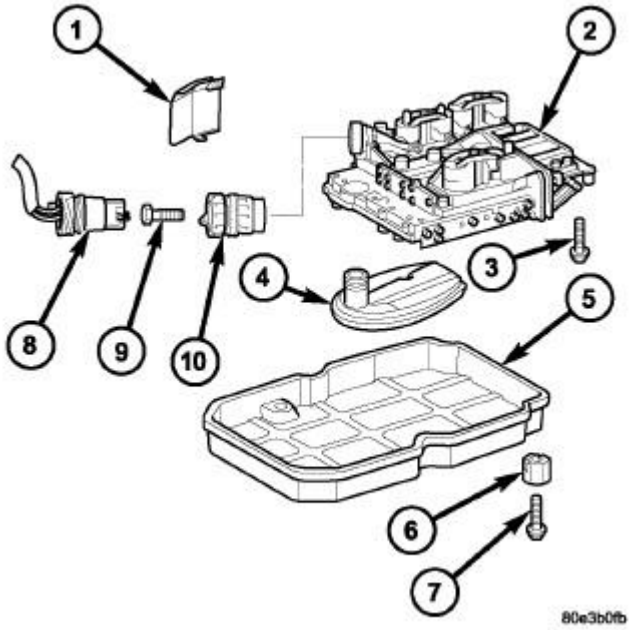

Fig. 274: Removing/Installing Electrohydraulic Unit
Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD
2 - ELECTROHYDRAULIC UNIT
3 - BOLT
4 - OIL FILTER
5 - OIL PAN
6 - CLAMPING ELEMENT
7 - BOLT
8 - 13-PIN PLUG CONNECTOR
9 - BOLT
10 - ADAPTER PLUG

4. Loosen the adapter plug bolt (9) and remove from the adapter plug (10) from the transmission housing. Refer to **Fig. 274**.
5. Detach oil pan (5).
6. Remove oil filter (4).
7. Unscrew Torx® socket bolts (3) and remove electrohydraulic control module (2).

DISASSEMBLY

DISASSEMBLY

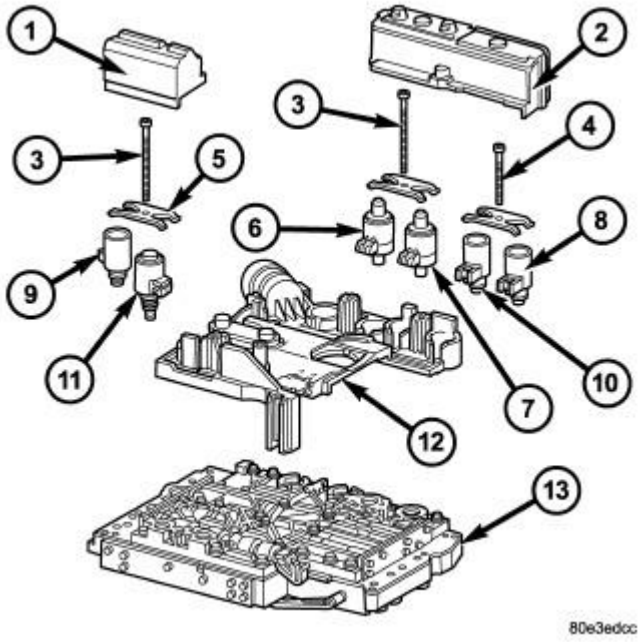

Fig. 275: Electrical Unit Components
Courtesy of CHRYSLER GROUP, LLC

1 - SOLENOID CAP (if equipped)

2 - SOLENOID CAP (if equipped)
3 - BOLT - M6X32
4 - BOLT - M6X30
5 - LEAF SPRING
6 - MODULATING PRESSURE REGULATING SOLENOID VALVE
7 - SHIFT PRESSURE REGULATING SOLENOID
8 - 3-4 SHIFT SOLENOID
9 - TORQUE CONVERTER LOCK-UP SOLENOID
10 - 1-2/4-5 SHIFT SOLENOID
11 - 2-3 SHIFT SOLENOID
12 - ELECTRICAL CONTROL UNIT
13 - SHIFT PLATE

1. Remove electrohydraulic unit from the vehicle. Refer to **UNIT, ELECTROHYDRAULIC CONTROL, REMOVAL**.
2. Remove solenoid caps (1, 2) if equipped.
3. Unscrew Torx® socket bolts (3, 4).

NOTE: Pay attention to the different lengths of the Torx® socket bolts.

4. Remove leaf springs (5).
5. Withdraw solenoid valves (6 - 11) from shift plate (13).

NOTE: Check O-rings on solenoid valves for damage and replace if necessary.

6. Bend away retaining lug on stiffening rib on transmission oil temperature sensor.
7. Remove electrohydraulic control module (12) from the shift plate (13).

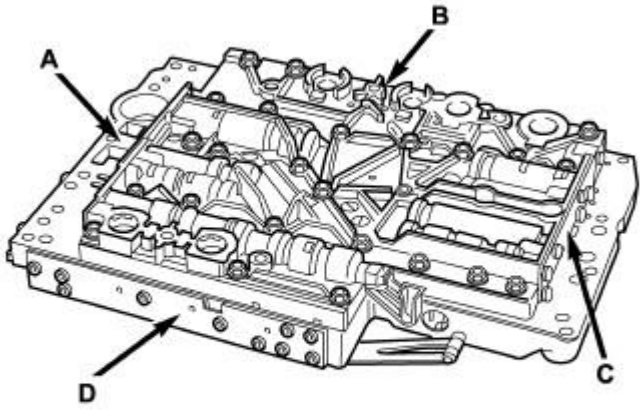

Fig. 276: Shift Valve Group Locations
Courtesy of CHRYSLER GROUP, LLC

A - OPERATING AND LUBRICATING PRESSURE REGULATING VALVES AND 2-3 OVERLAP VALVE
B - 1-2/4-5 SHIFT GROUP AND SHIFT, SHIFT VALVE, AND REGULATING VALVE PRESSURE REGULATING VALVES
C - 3-4 SHIFT GROUP
D - 2-3 SHIFT GROUP, TCC LOCK-UP AND B2 REGULATING VALVES

8. Note the locations of the major shift valve group components for assembly reference.
   A - Operating and Lubricating Pressure Regulating valves and 2-3 Overlap valve
   B - 1-2/4-5 Shift Group and Shift, Shift Valve, and Regulating Valve Pressure Regulating Valves
   C - 3-4 Shift Group
   D - 2-3 Shift Group, TCC Lock-up, and B2 Regulating Valves

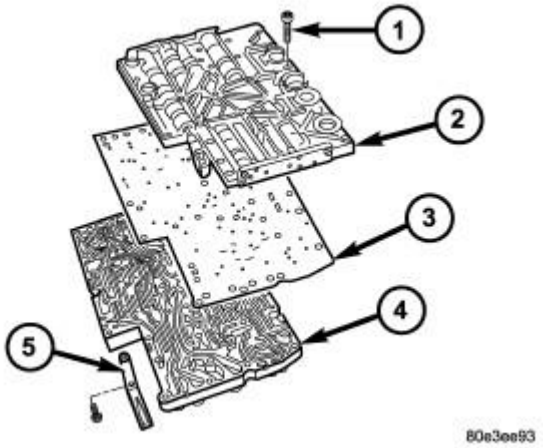

Fig. 277: Shift Plate Components
Courtesy of CHRYSLER GROUP, LLC

1 - BOLTS - 29
2 - VALVE HOUSING
3 - SEALING PLATE
4 - VALVE BODY
5 - LEAF SPRING

NOTE: **Pay great attention to cleanliness for all work on the shift plate. Fluffy cloths must not be used. Leather cloths are particularly good. After dismantling, all parts must be washed and blown out with compressed-air, noting that parts may be blown away.**

9. Unbolt leaf spring (5).
10. Unscrew Torx® bolts (1).
11. Remove valve housing (2) from valve body (4).
12. Remove sealing plate (3).

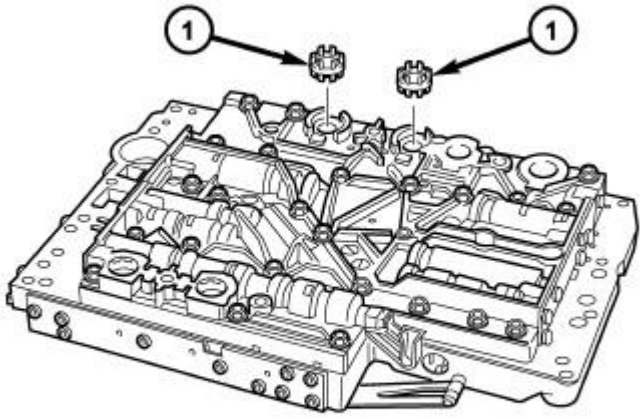

Fig. 278: Solenoid Valve Strainer Locations
Courtesy of CHRYSLER GROUP, LLC

1 - SOLENOID VALVE STRAINERS

13. Remove the strainers (1) for the modulating pressure and shift pressure control solenoid valves from the valve housing. Refer to **Fig. 278**.

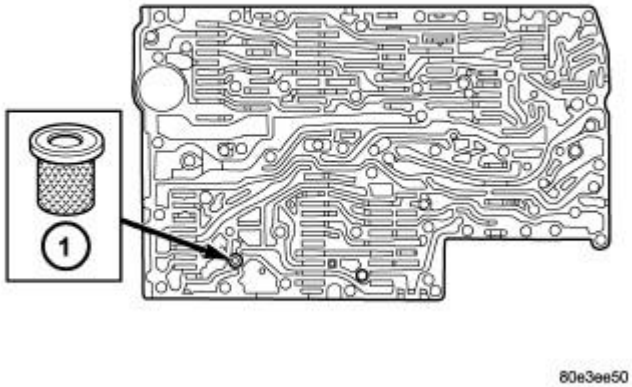

Fig. 279: Converter Lock-Up Solenoid Valve Strainer Location
Courtesy of CHRYSLER GROUP, LLC

1 - CONVERTER LOCK-UP SOLENOID STRAINER

14. Remove the strainer (1) in the inlet to torque converter lock-up control solenoid valve.

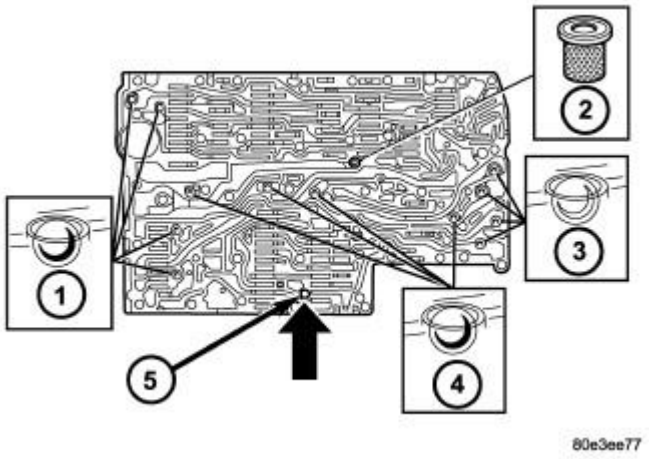

Fig. 280: Check Balls And Strainer Location
Courtesy of CHRYSLER GROUP, LLC

1 - STEEL CHECK BALLS
2 - CENTRAL STRAINER
3 - STEEL CHECK BALLS
4 - PLASTIC CHECK BALLS
5 - PLAIN DOWEL PIN

NOTE: A total of 12 valve balls are located in the valve body, four made from plastic (4) and eight from steel (1, 3).

15. Note the location of all check balls (1, 3, 4) and the central strainer (2) for re-installation. Remove all check balls (1, 3, 4) and the central strainer (2).

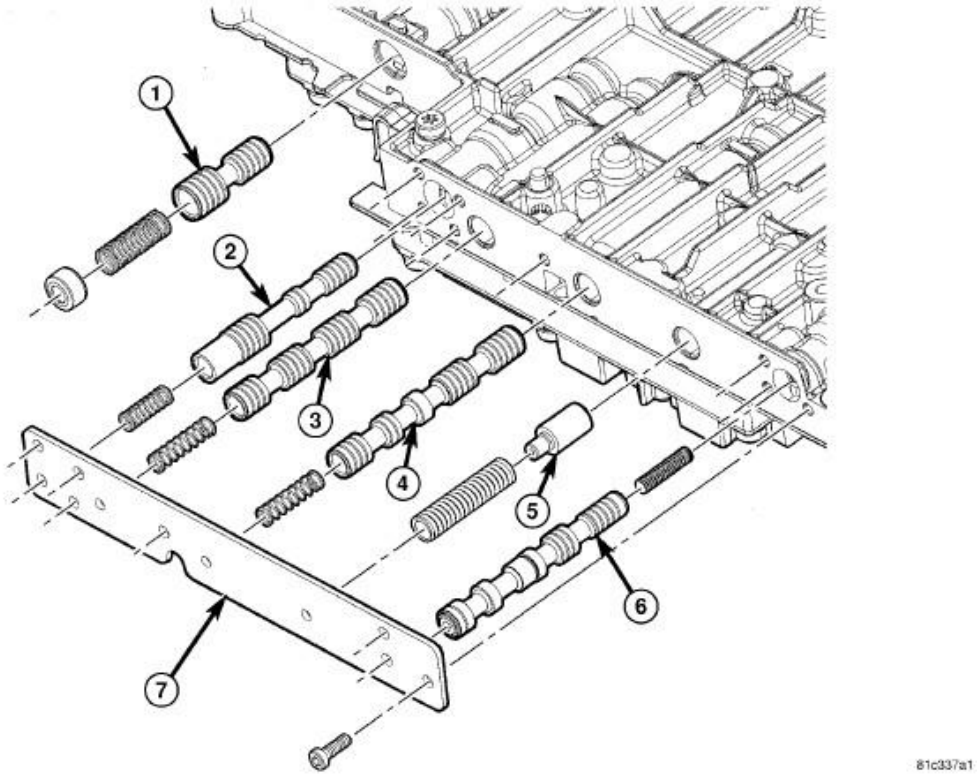

Fig. 281: Lower Valve Body Section 1
Courtesy of CHRYSLER GROUP, LLC

1 - B2 SHIFT VALVE	5 - TCC DAMPER VALVE - if equipped
2 -2-3 HOLDING PRESSURE SHIFT VALVE	6 - TCC LOCK-UP REGULATOR VALVE
3 - 2-3 COMMAND VALVE	7 - SIDE COVER
4 - 2-3 SHIFT PRESSURE	

16. Remove the screws holding the side cover (7) to the valve body and valve housing.
17. Remove the B-2 Shift Valve assembly (1), 2-3 Holding Pressure Valve assembly (2), 2-3 Command Valve assembly (3), 2-3 Shift Pressure assembly (4), TCC Damper Valve (5) if equipped and the TCC Lock-Up Regulator Valve assembly (6) from the valve body.
18. Check all valves for ease of movement and shavings.

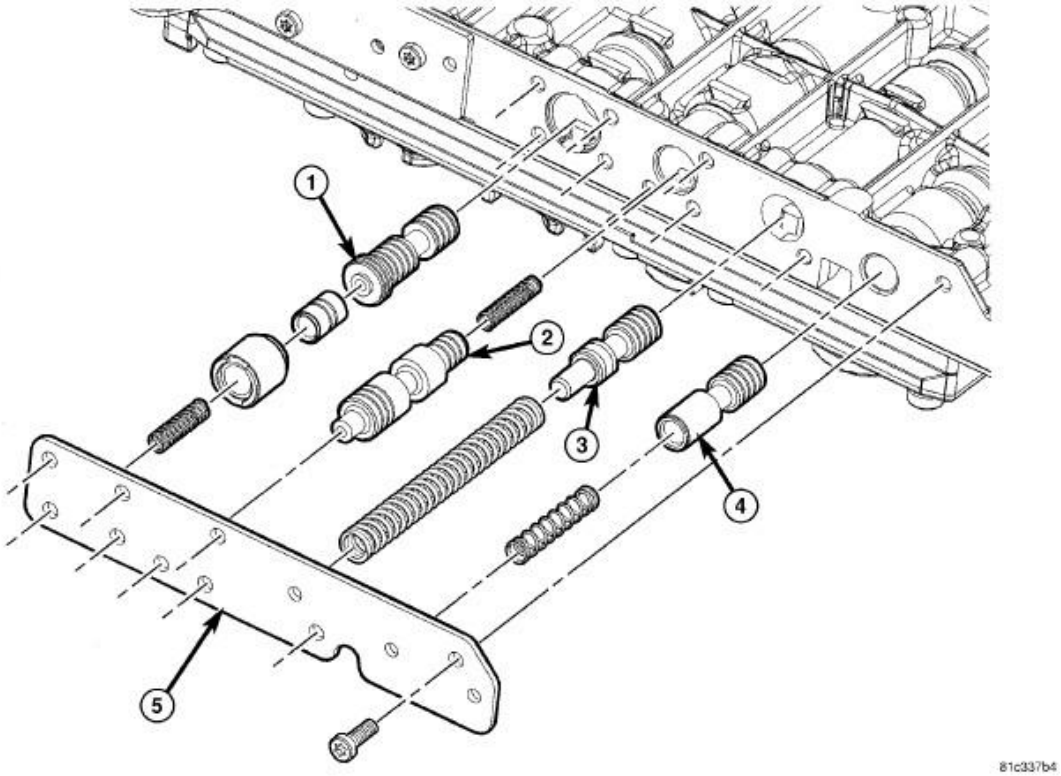

Fig. 282: Lower Valve Body Section 2
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2 / 4-5 OVERLAP REGULATING SLEEVE AND PISTON	4 - SHIFT SOLENOID PRESSURE REGULATING VALVE
2 - SHIFT PRESSURE REGULATING VALVE	5 - SIDE COVER
3 - CONTROL VALVE PRESSURE REGULATOR	

19. Remove the screws holding the side cover (5) to the valve body and valve housing.
20. Remove the 1-2 / 4-5 Overlap Regulating Valve, Sleeve, and Piston assembly (1), Shift Pressure Regulating Valve assembly (2), Control Valve Pressure Regulator assembly (3), and the Shift Solenoid Pressure Regulating Valve (4) from the valve body.
21. Check all valves for ease of movement and shavings.

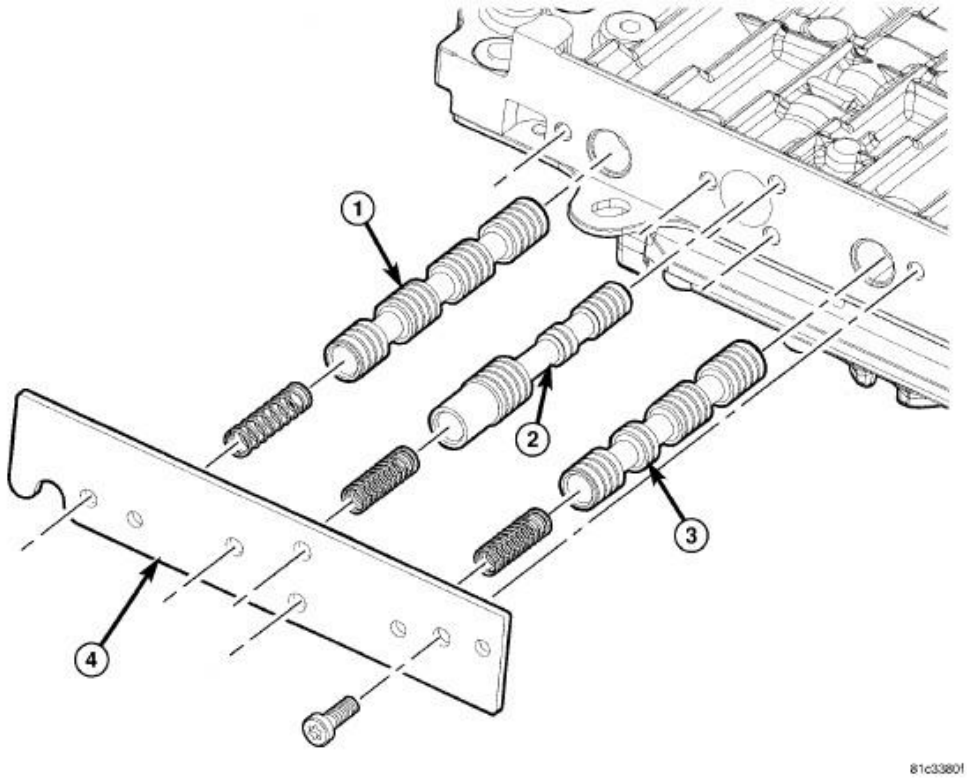

Fig. 283: Lower Valve Body Section 3
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2 / 4-5 COMMAND VALVE	3 - 1-2 / 4-5 SHIFT PRESSURE
2 - 1-2 / 4-5 HOLDING PRESSURE SHIFT VALVE	4 - SIDE COVER

22. Remove the screws holding the side cover (4) to the valve body and valve housing.
23. Remove the 1-2 / 4-5 Command valve assembly (1), 1-2 / 4-5 Holding Pressure Shift Valve (2) and the 1-2 / 4-5 Shift Pressure Shift Valve assembly (3) from the valve body.
24. Check all valves for ease of movement and shavings.

NOTE: The sleeves and pistons of the overlap regulating valves must not be mixed up.

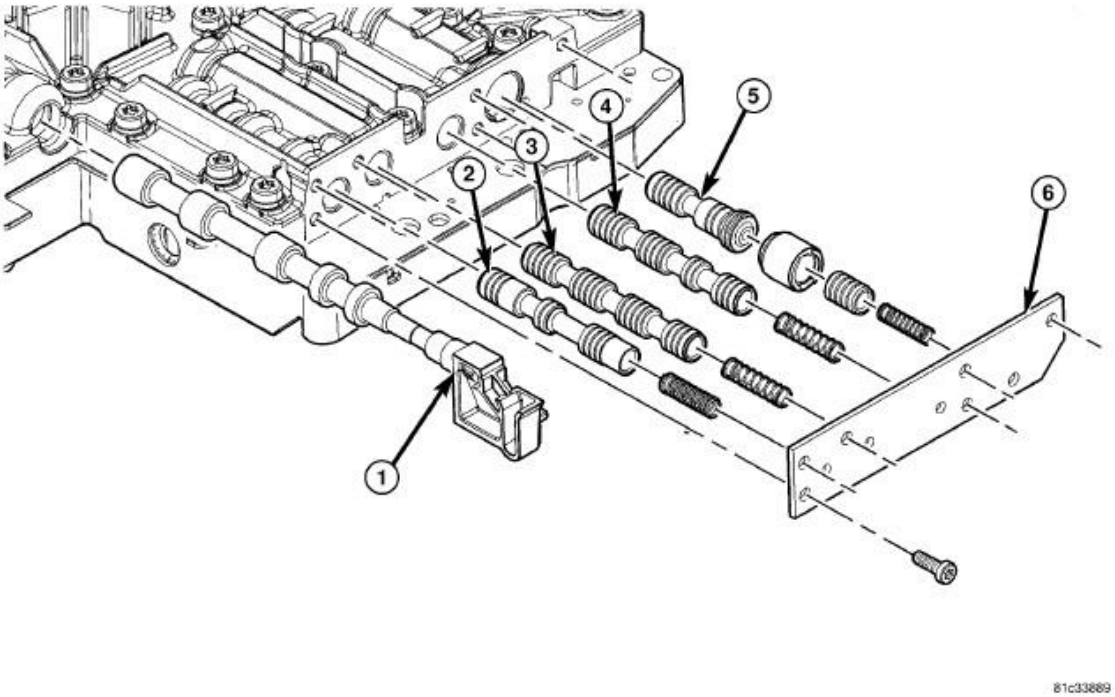

Fig. 284: Upper Valve Body Section 1
Courtesy of CHRYSLER GROUP, LLC

1 - SELECTOR VALVE	4 - 3-4 SHIFT PRESSURE
2 - 3-4 HOLDING PRESSURE SHIFT VALVE	5 - 3-4 OVERLAP REGULATING VALVE, SLEEVE, AND PISTON
3 - 3-4 COMMAND VALVE	6 - SIDE COVER

25. Remove the screws holding the side cover (6) to the valve body and valve housing.
26. Remove the sector valve (1).
27. Remove 3-4 Holding Pressure Shift Valve assembly (2), 3-4 Command Valve assembly (3), 3-4 Shift Pressure Shift Valve assembly (4) and the 3-4 Overlap Regulating Valve Sleeve and Piston assembly (5) from the valve body.
28. Check all valves for ease of movement and shavings.

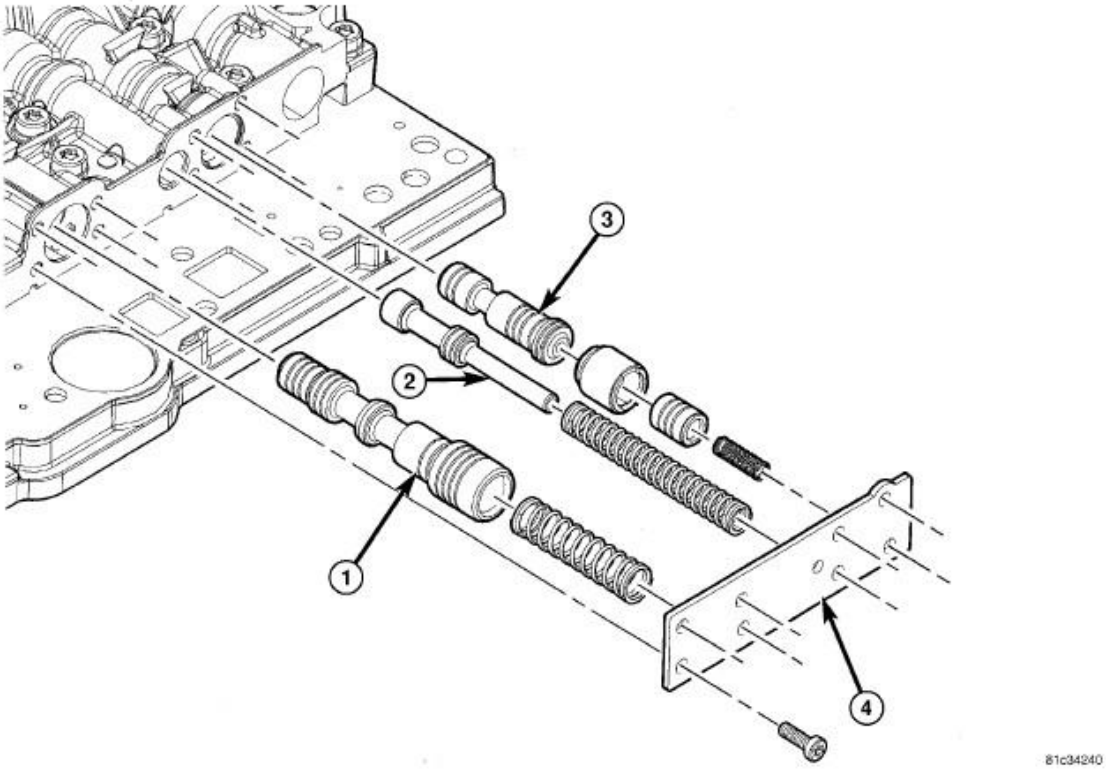

Fig. 285: Upper Valve Body Section 2
Courtesy of CHRYSLER GROUP, LLC

1 - LINE PRESSURE REGULATING VALVE	3 - 2-3 OVERLAP REGULATING VALVE, SLEEVE, AND PISTON
2 - LUBRICATING PRESSURE REGULATING VALVE	4 - SIDE COVER

29. Remove the screws holding the side cover (4) to the valve body and valve housing.
30. Remove the Line Pressure Regulating Valve assembly (1), Lubricating Pressure Regulating Valve assembly (2) and the 2-3 Overlap Regulating Valve, Sleeve and Piston assembly (3) from the valve body.
31. Check all valves for ease of movement and shavings.

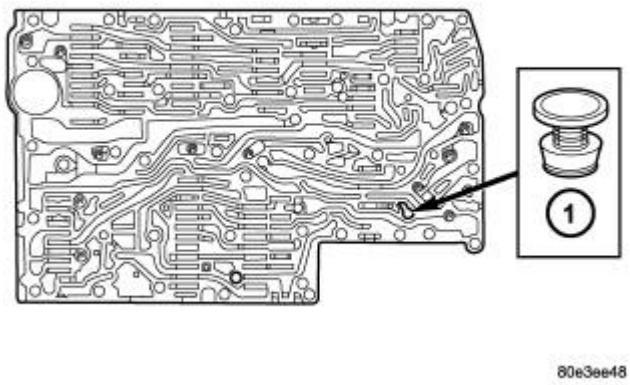

Fig. 286: Pressure Feed Valve Location
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSURE FEED VALVE

32. Remove the pressure supply valve (1) from the valve body.

CLEANING

CLEANING

NOTE: Fine and extremely fine metallic particles have been known affect valve operation in this transmission. While these particles may be to small to see with the naked eye, they can cause flares, or momentary going into neutral, on shifts.

Clean and flush the valve housings, valves, plugs, springs, and separator plates thoroughly with a standard parts cleaning solution only. Do not use gasoline, kerosene, or any type of caustic solution.

Do not immerse any of the electrical components in cleaning solution. Clean the electrical components by wiping them off with dry shop towels only.

Dry all except the electrical parts with compressed air. Make sure all passages are clean and free from obstructions. **Do not use rags or shop towels to dry or wipe off valve body components. Lint from these materials can stick to valve body parts, interfere with valve operation, and clog filters and fluid passages.**

INSPECTION

INSPECTION

Inspect all of the valve body mating surfaces for scratches, nicks, burrs, or distortion. Use a straightedge to check surface flatness. Minor scratches may be removed with crocus cloth using only

very light pressure.

Minor distortion of a valve body mating surface may be corrected by smoothing the surface with a sheet of crocus cloth. Position the crocus cloth on a surface plate, sheet of plate glass or equally flat surface. If distortion is severe or any surfaces are heavily scored, the valve body will have to be replaced. If crocus cloth is used be certain to flush valve body thoroughly.

Inspect the valves and plugs for scratches, burrs, nicks, or scores. Minor surface scratches on steel valves and plugs can be removed with crocus cloth but **do not round off the edges of the valve or plug lands.** Maintaining sharpness of these edges is vitally important. The edges prevent foreign matter from lodging between the valves and plugs and the bore.

Inspect all the valve and plug bores in the valve body. Use a penlight to view the bore interiors. Replace the valve body if any bores are distorted or scored. Inspect all of the valve body springs. The springs must be free of distortion, warpage or broken coils.

Trial fit each valve and plug in its bore to check freedom of operation. When clean and dry, the valves and plugs should drop freely into the bores.

Valve body bores do not change dimensionally with use. If the valve body functioned correctly when new, it will continue to operate properly after cleaning and inspection. It should not be necessary to replace a valve body assembly unless it is damaged in handling.

ASSEMBLY

ASSEMBLY

CAUTION: Make certain all valves and springs are assembled correctly. Failure to follow this caution may result in transmission failure.

NAG1 VALVE BODY SPRING DIMENSION		
VALVE	**SPRING FREE LENGTH**	**TOTAL COILS**
2-3 Holding	18.8 -19.6 mm (0.74 - 0.77 in.)	12
T/C Clutch Damper	37.5 - 38.5 mm (1.48 - 1.51 in.)	19.5
1-2 / 4-5 Overlap	20.95 - 21.65 mm (0.82 - 0.85 In.)	14.5
Shift Pressure Regulator	22.4 - 23.6 mm (0.88 - 0.93 in.)	14.5
Control Valve Pressure Regulator	79.2 - 82.4 mm (3.12 - 3.24 in.)	29
Shift Solenoid Pressure Regulating Valve	32.6 - 34.4 mm (1.28 - 1.35 in.)	15.5

T/C Clutch (LU) Regulator	22.8 - 23.6 mm (0.90 - 0.93 in.)	18.5
B2 Shift Valve	25.8 - 27.0 mm (1.01 - 1.06 in.)	16.5
3/4 Over Lap	21.0 - 20.4 mm (0.83 - 0.80 in.)	13
3-4 Holding, 1-2 / 4-5 Holding, 1-2 / 4-5 Shift Pressure	21.1 - 22.5 mm (0.83 - 0.88 in.)	14
3-4 Command, 3-4 Shift Pressure, 1-2 / 4-5 Command, 2-3 Shift Pressure, 2-3 Command	23.9 - 25.3 mm (0.94 - 1.00 in.)	11.5
Lubricating Pressure Regulating Valve	64.8 - 68.2 mm (2.55 - 2.68 in.)	24
2-3 Overlap	16.9 - 18.7 mm (0.66 - 0.74 in.)	13
Line Pressure Regulator	43.8 - 46.2 mm (1.72 - 1.82 in.)	13.5

NOTE: Pay great attention to cleanliness for all work on the shift plate. Fluffy cloths must not be used. Leather cloths are particularly good. After dismantling, all parts must be washed and blown out with compressed-air, noting that parts may be blown away.

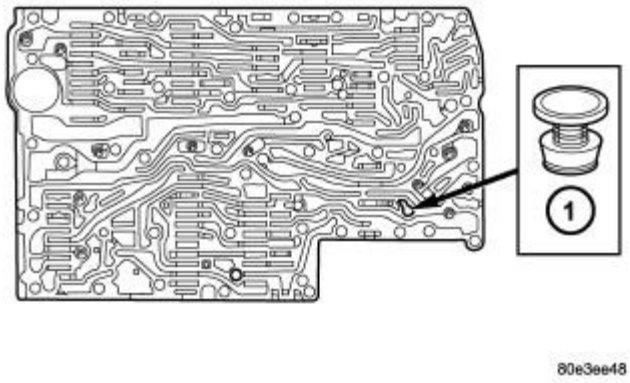

Fig. 287: Pressure Feed Valve Location
Courtesy of CHRYSLER GROUP, LLC

1 - PRESSURE FEED VALVE

1. Install the pressure supply valve (1) into the valve body. Refer to **Fig. 287**.

NAG1 VALVE BODY SPRING DIMENSION		
VALVE	**SPRING FREE LENGTH**	**TOTAL COILS**

2-3 Holding (2)	18.8 -19.6 mm (0.74 - 0.77 in.)	12
T/C Clutch Damper (5)	37.5 - 38.5 mm (1.48 - 1.51 in.)	19.5
T/C Clutch (LU) Regulator (6)	22.8 - 23.6 mm (0.90 - 0.93 in.)	18.5
B2 Shift Valve (1)	25.8 - 27.0 mm (1.01 - 1.06 in.)	16.5
2-3 Shift Pressure (4), 2-3 Command (3)	23.9 - 25.3 mm (0.94 -1.00 in.)	11.5

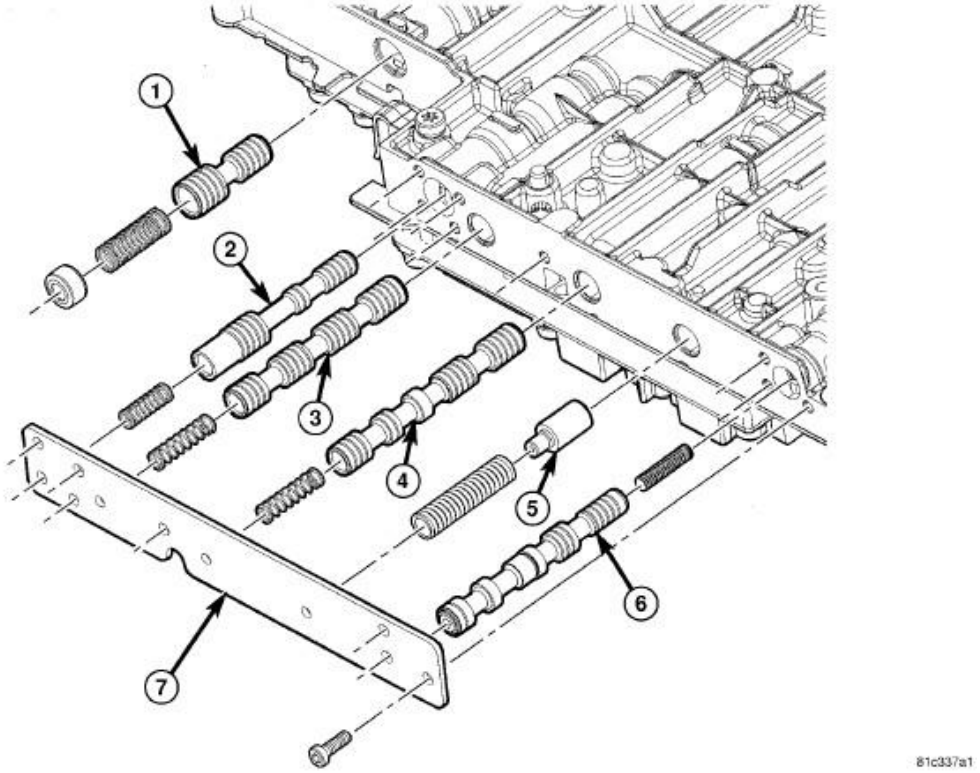

Fig. 288: Lower Valve Body Section 1
Courtesy of CHRYSLER GROUP, LLC

1 - B2 SHIFT VALVE	5 - TCC DAMPER VALVE - if equipped
2 -2-3 HOLDING PRESSURE SHIFT VALVE	6 - TCC LOCK-UP REGULATOR VALVE
3 - 2-3 COMMAND VALVE	7 - SIDE COVER
4 - 2-3 SHIFT PRESSURE	

2. Lubricate and install the B-2 Shift Valve assembly (1), 2-3 Holding Pressure Valve assembly (2), 2-3 Command Valve assembly (3), 2-3 Shift Pressure Shift Valve assembly (4), TCC Damper Valve (5) if equipped and the T/CC Lock-Up Regulator Valve assembly (6) into the valve body.

3. Install the side cover and the screws holding the side cover (7) to the valve body and valve housing. Tighten the screws to 4 N.m (35 in.lbs.).

NAG1 VALVE BODY SPRING DIMENSION		
VALVE	**SPRING FREE LENGTH**	**TOTAL COILS**
1-2 / 4-5 Overlap (1)	20.95 - 21.65 mm (0.82 - 0.85 In.)	14.5
Shift Pressure Regulator (2)	22.4 - 23.6 mm (0.88 - 0.93 in.)	14.5
Control Valve Pressure Regulator (3)	79.2 - 82.4 mm (3.12 - 3.24 in.)	29
Shift Solenoid Pressure Regulating Valve (4)	32.6 - 34.4 mm (1.28 - 1.35 in.)	15.5

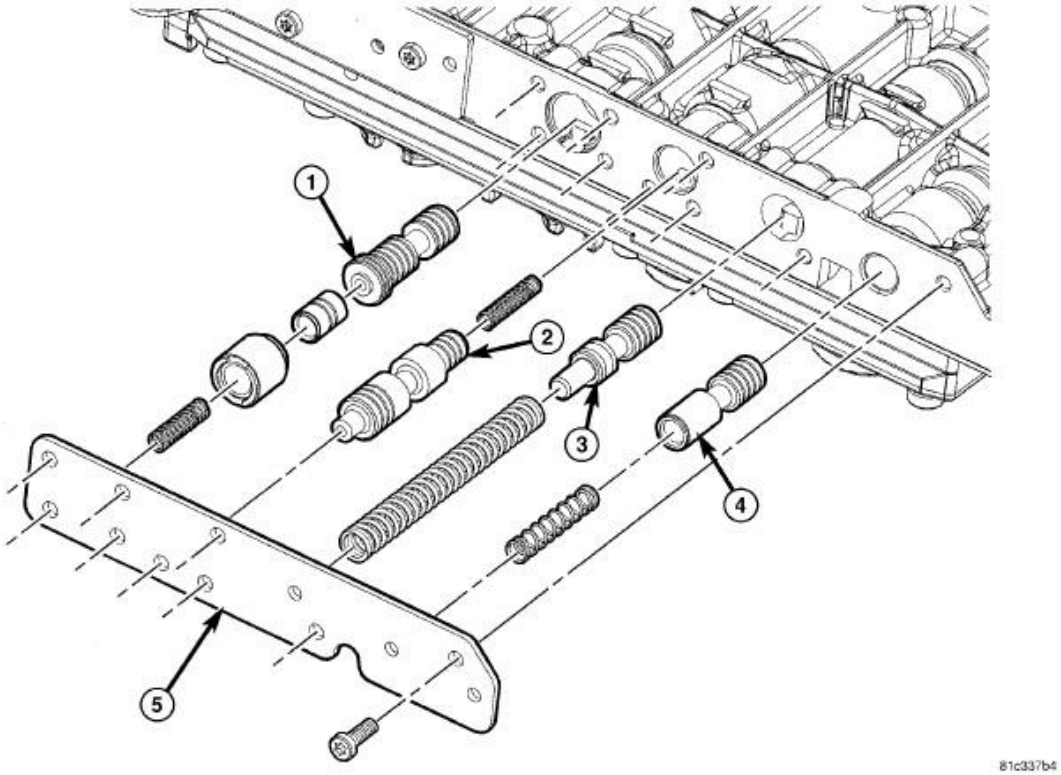

Fig. 289: Lower Valve Body Section 2
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2 / 4-5 OVERLAP REGULATING SLEEVE AND PISTON	4 - SHIFT SOLENOID PRESSURE REGULATING VALVE
2 - SHIFT PRESSURE REGULATING VALVE	5 - SIDE COVER
3 - CONTROL VALVE PRESSURE REGULATOR	

4. Lubricate and install the 1-2 / 4-5 Overlap Regulating Valve, Sleeve, and Piston assembly (1), Shift Pressure Regulating Valve assembly (2), Control Valve Pressure Regulator Valve assembly (3) and Shift Solenoid Pressure Regulating Valve assembly (4) into the valve body.
5. Install the side cover and the screws holding the side cover (5) to the valve body and valve housing. Tighten the screws to 4 N.m (35 in.lbs.).

NAG1 VALVE BODY SPRING DIMENSION		
VALVE	**SPRING FREE LENGTH**	**TOTAL COILS**
1-2 / 4-5 Holding (2), 1-2 / 4-5 Shift Pressure (3)	21.1 - 22.5 mm (0.83 - 0.88 in.)	14
1-2 / 4-5 Command (1)	23.9 - 25.3 mm (0.94 -1.00 in.)	11.5

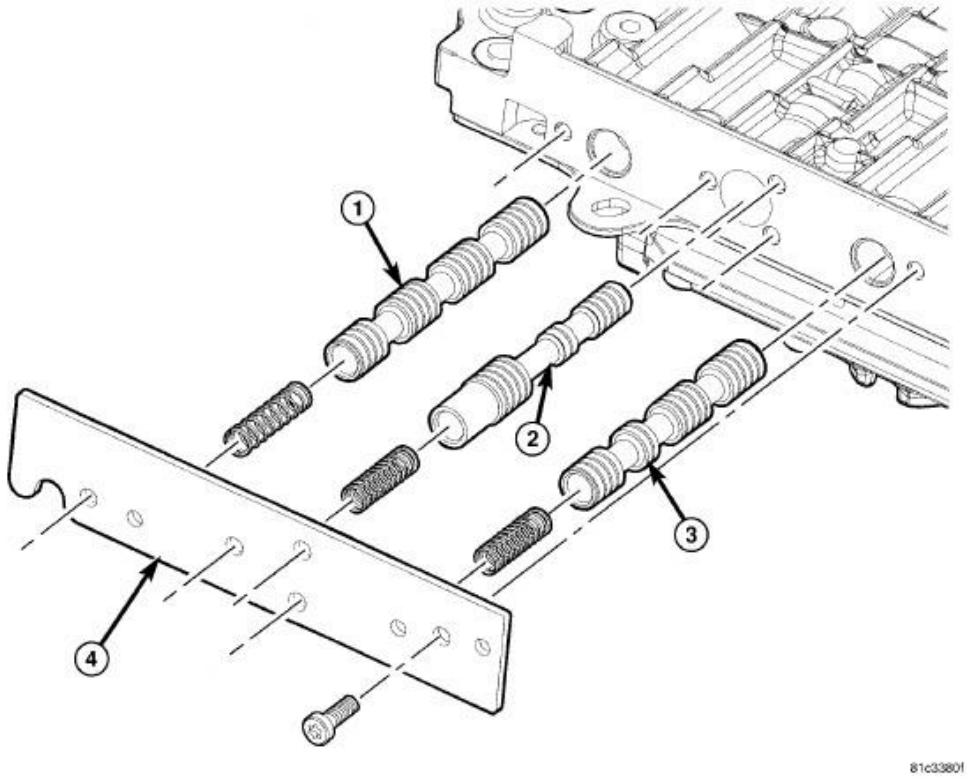

Fig. 290: Lower Valve Body Section 3
Courtesy of CHRYSLER GROUP, LLC

1 - 1-2 / 4-5 COMMAND VALVE	3 - 1-2 / 4-5 SHIFT PRESSURE
2 - 1-2 / 4-5 HOLDING PRESSURE SHIFT VALVE	4 - SIDE COVER

6. Lubricate and install the 1-2 / 4-5 Command valve assembly (1), 1-2 / 4-5 Holding Pressure Shift Valve (2) and the 1-2 / 4-5 Shift Pressure assembly (3) into the valve body.

7. Install the side cover and the screws holding the side cover (4) to the valve body and valve housing. Tighten the screws to 4 N.m (35 in.lbs.).

NAG1 VALVE BODY SPRING DIMENSION		
VALVE	**SPRING FREE LENGTH**	**TOTAL COILS**
3/4 Over Lap (5)	20.4 - 21.0 mm (0.80 - 0.83 in.)	13
3-4 Holding (2)	21.1 - 22.5 mm (0.83 - 0.88 in.)	14
3-4 Command (3), 3-4 Shift Pressure (4)	23.9 - 25.3 mm (0.94 -1.00 in.)	11.5

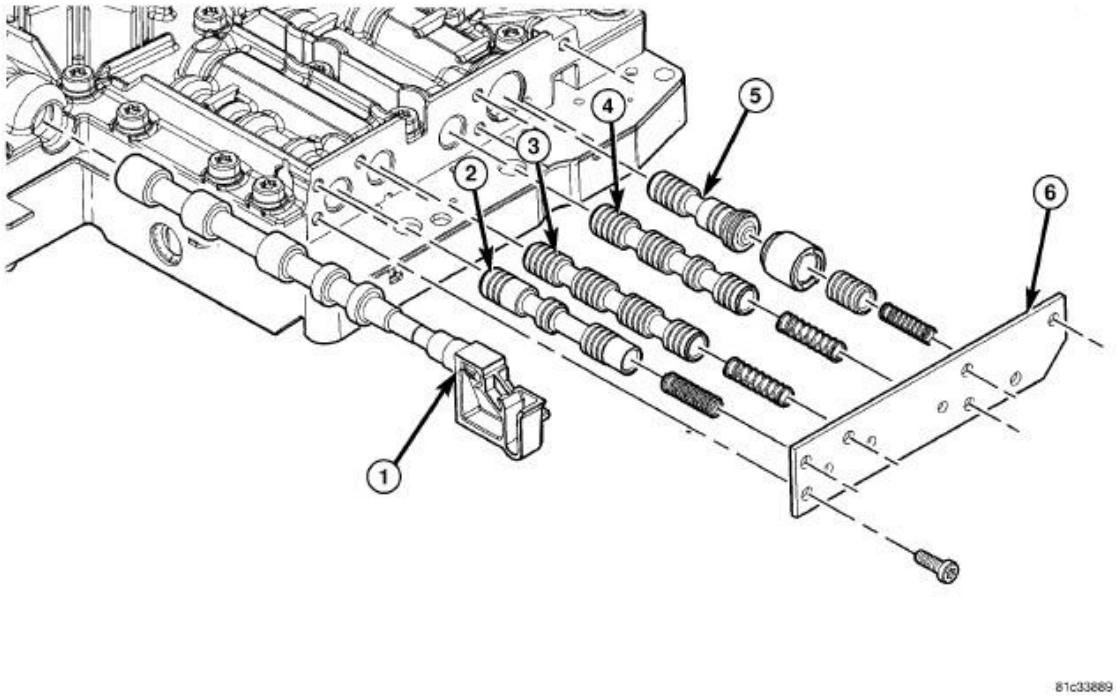

Fig. 291: Upper Valve Body Section 1
Courtesy of CHRYSLER GROUP, LLC

1 - SELECTOR VALVE	4 - 3-4 SHIFT PRESSURE
2 - 3-4 HOLDING PRESSURE SHIFT VALVE	5 - 3-4 OVERLAP REGULATING VALVE, SLEEVE, AND PISTON
3 - 3-4 COMMAND VALVE	6 - SIDE COVER

8. Lubricate and install the sector valve (1).

9. Lubricate and install 3-4 Holding Pressure Shift Valve assembly (2), 3-4 Command Valve assembly (3), 3-4 Shift Pressure assembly (4) and the 3-4 Overlap Regulating Valve Sleeve and Piston assembly (5) into the valve body.
10. Install the side cover and the screws holding the side cover (6) to the valve body and valve housing. Tighten the screws to 4 N.m (35 in.lbs.).

NAG1 VALVE BODY SPRING DIMENSION		
VALVE	**SPRING FREE LENGTH**	**TOTAL COILS**
Lubricating Pressure Regulating Valve (2)	64.8 - 68.2 mm (2.55 - 2.68 in.)	24
2-3 Overlap (3)	16.9 - 18.7 mm (0.66 - 0.74 in.)	13
Line Pressure Regulator (1)	43.8 - 46.2 mm (1.72 - 1.82 in.)	13.5

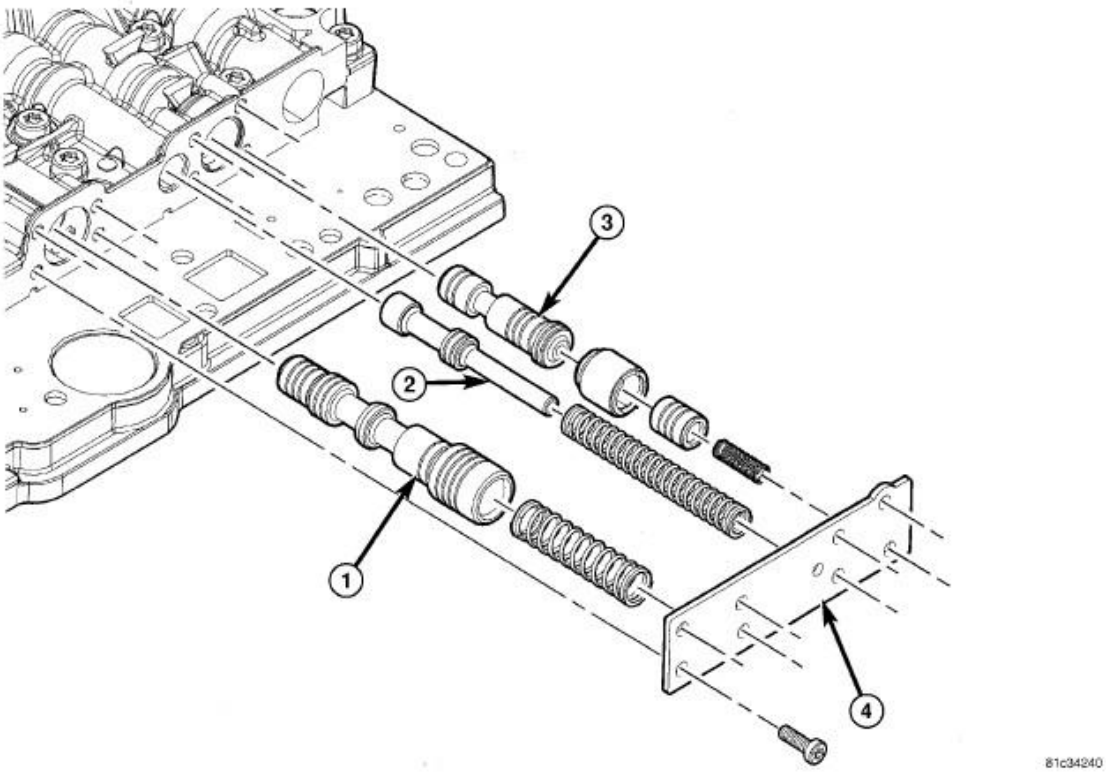

Fig. 292: Upper Valve Body Section 2
Courtesy of CHRYSLER GROUP, LLC

1 - LINE PRESSURE REGULATING VALVE	3 - 2-3 OVERLAP REGULATING VALVE, SLEEVE, AND PISTON
2 - LUBRICATING PRESSURE REGULATING VALVE	4 - SIDE COVER

11. Lubricate and install the Operating Pressure Regulating Valve assembly (1), Lubricating Pressure Regulating Valve assembly (2) and the 2-3 Overlap Regulating Valve, Sleeve and Piston assembly (3) into the valve body.
12. Install the side cover and the screws holding the side cover (6) to the valve body and valve housing. Tighten the screws to 4 N.m (35 in.lbs.).

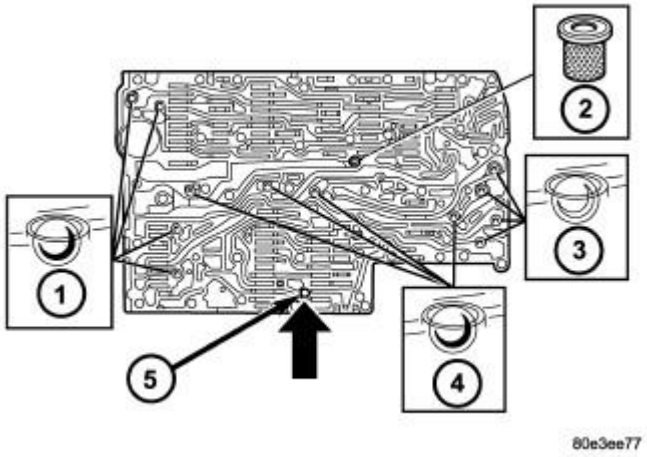

Fig. 293: Check Balls And Strainer Location
Courtesy of CHRYSLER GROUP, LLC

1 - STEEL CHECK BALLS
2 - CENTRAL STRAINER
3 - STEEL CHECK BALLS
4 - PLASTIC CHECK BALLS
5 - PLAIN DOWEL PIN

NOTE: A total of 12 valve balls are located in the valve body, four made from plastic (4) and eight from steel (1, 3).

13. Install all check balls (1, 3, 4) and the central strainer (2). Refer to **Fig. 293**.

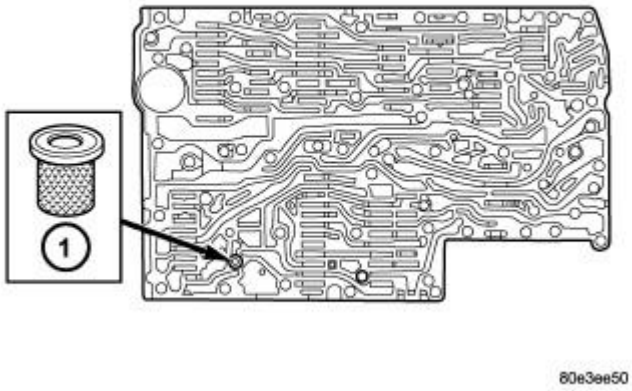

Fig. 294: Converter Lock-Up Solenoid Valve Strainer Location
Courtesy of CHRYSLER GROUP, LLC

1 - CONVERTER LOCK-UP SOLENOID STRAINER

14. Install the strainer (1) in the inlet to torque converter lock-up control solenoid valve. Refer to **Fig. 294**.

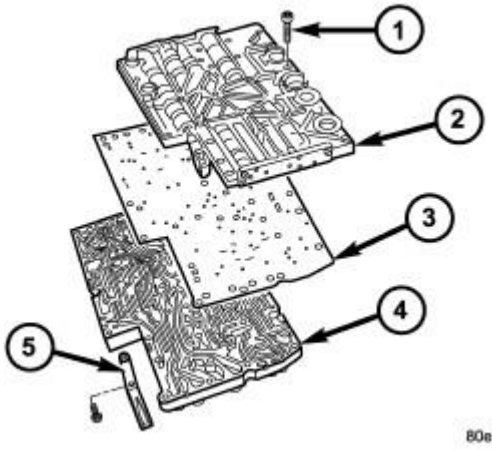

Fig. 295: Shift Plate Components
Courtesy of CHRYSLER GROUP, LLC

1 - BOLTS - 29
2 - VALVE HOUSING
3 - SEALING PLATE
4 - VALVE BODY
5 - LEAF SPRING

15. Position the sealing plate (3) onto the valve body (4). Refer to **Fig. 295**.

16. Install the valve housing (2) onto the valve body (4) and sealing plate (3).
17. Install the shift plate Torx® bolts (1). Refer to **Fig. 295**. Tighten the bolts to 8 N.m (71 in.lbs.).
18. Install leaf spring (5). Refer to **Fig. 295**.

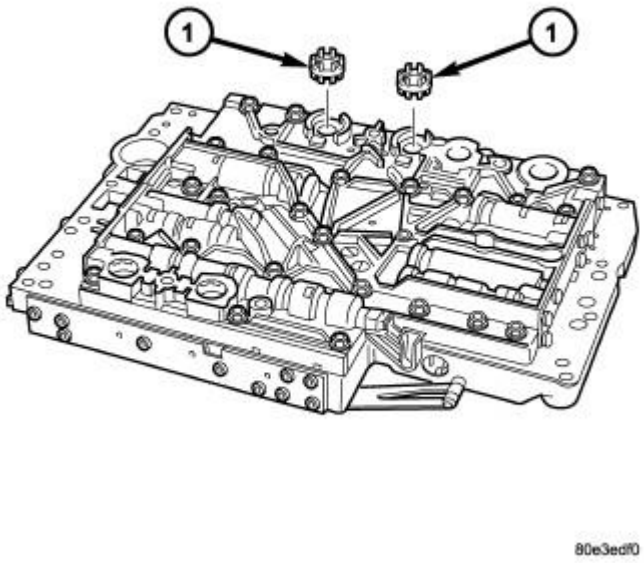

Fig. 296: Solenoid Valve Strainer Locations
Courtesy of CHRYSLER GROUP, LLC

1 - SOLENOID VALVE STRAINERS

19. Install the strainers (1) for the modulating pressure and shift pressure control solenoid valves into the valve housing. Refer to **Fig. 296**.

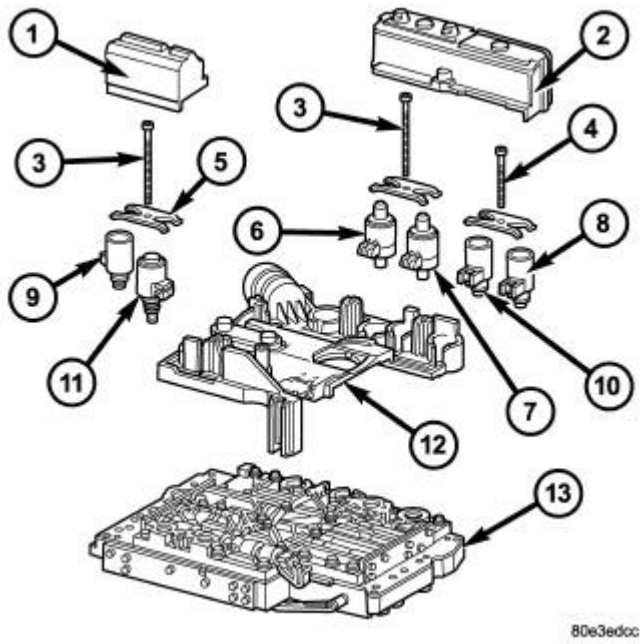

Fig. 297: Electrical Unit Components
Courtesy of CHRYSLER GROUP, LLC

1 - SOLENOID CAP (if equipped)
2 - SOLENOID CAP (if equipped)
3 - BOLT - M6X32
4 - BOLT - M6X30
5 - LEAF SPRING
6 - MODULATING PRESSURE REGULATING SOLENOID VALVE
7 - SHIFT PRESSURE REGULATING SOLENOID
8 - 3-4 SHIFT SOLENOID
9 - TORQUE CONVERTER LOCK-UP SOLENOID
10 - 1-2/4-5 SHIFT SOLENOID
11 - 2-3 SHIFT SOLENOID
12 - ELECTRICAL CONTROL UNIT
13 - SHIFT PLATE

20. Install the electrohydraulic control module (12) onto the shift plate (13). Refer to **Fig. 297**.
21. Bend the retaining lug on stiffening rib on transmission oil temperature sensor to retain the electrohydraulic control module.
22. Install the solenoid valves (6 - 11) into shift plate (13).

NOTE: Check O-rings on solenoid valves for damage and replace if necessary.

23. Install the leaf springs (5).
24. Install the Torx® socket bolts (3, 4). Refer to **Fig. 297**. Tighten the bolts to 8 N.m (71 in.lbs.).

NOTE: Pay attention to the different lengths of the Torx® socket bolts.

25. Install the solenoid caps (1, 2) if equipped.
26. Install the electrohydraulic unit into the vehicle.

INSTALLATION

INSTALLATION

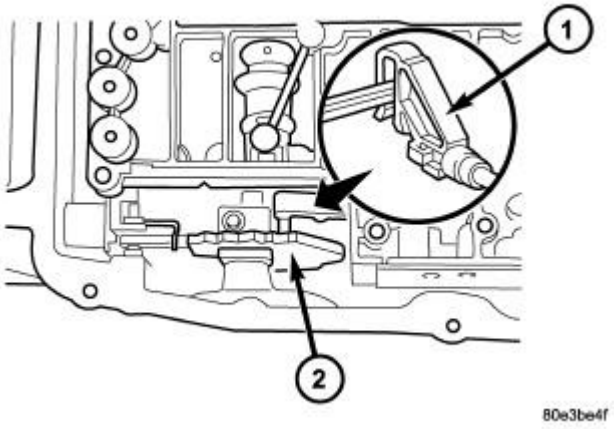

Fig. 298: Connect The Selector Valve To The Detent Plate
Courtesy of CHRYSLER GROUP, LLC

1 - SELECTOR VALVE
2 - DETENT PLATE

1. Position the electrohydraulic unit in the transmission housing.
2. Insert selector valve (1) in driver of detent plate (2). Refer to **Fig. 298**. When installing the electrohydraulic control module in the transmission housing, the plastic part of the selector valve (1) must engage in the driver of the detent plate (2).

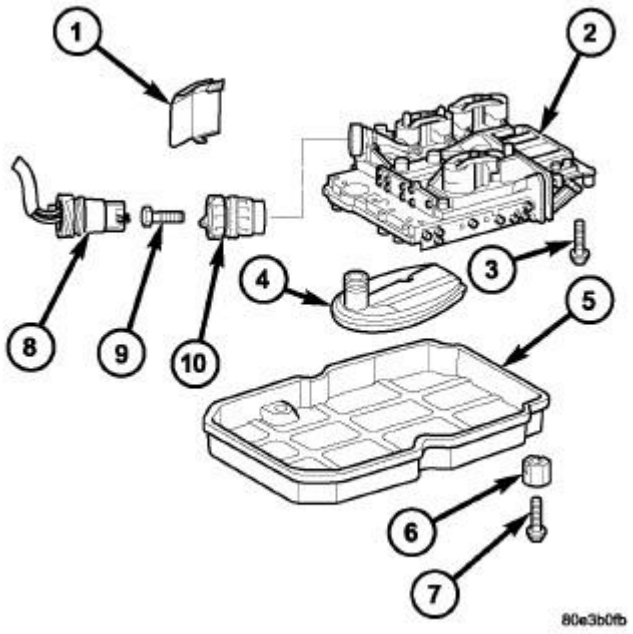

Fig. 299: Removing/Installing Electrohydraulic Unit
Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD
2 - ELECTROHYDRAULIC UNIT
3 - BOLT
4 - OIL FILTER
5 - OIL PAN
6 - CLAMPING ELEMENT
7 - BOLT
8 - 13-PIN PLUG CONNECTOR
9 - BOLT
10 - ADAPTER PLUG

3. Install the Torx® socket bolts (3) and torque to 8 N.m (71 in. Refer to **Fig. 299**.lbs.).
4. Install a new oil filter (4). Refer to **Fig. 299**.
5. Install oil pan (5) and torque the oil pan bolts to 8 N.m (71 in. lbs.). Refer to **Fig. 299**.
6. Install the adapter plug (10) into the transmission housing and tighten the bolt (9) to 2.5 N.m (22 in.lbs.) Refer to **Fig. 299**.

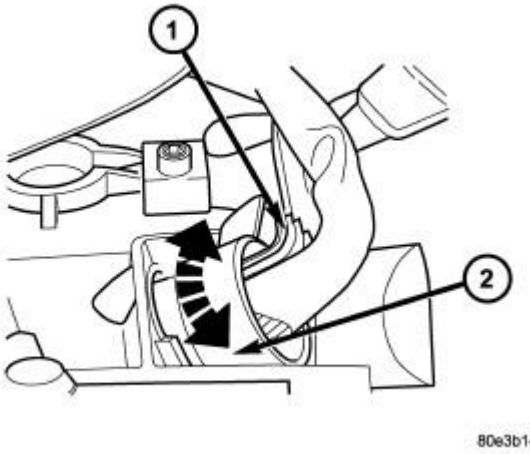

Fig. 300: Removing/Installing Wiring Connector Plug
Courtesy of CHRYSLER GROUP, LLC

1 - PLUG CONNECTOR
2 - ADAPTER PLUG

7. Check O-ring on plug connector (1), and replace if necessary. Refer to **Fig. 300**.
8. Install the plug connector (1) into the adapter plug (2). Turn bayonet lock of adapter plug (2) clockwise to connect plug connector (1).
9. Fill the transmission with the correct oil using the standard procedure. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, DESCRIPTION** and **FLUID AND FILTER, STANDARD PROCEDURE**.

GENERAL INFORMATION

Trouble Shooting - Basic Procedures

* PLEASE READ THIS FIRST *

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

ACCESSORIES & ELECTRICAL

CHARGING SYSTEM TROUBLE SHOOTING

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BASIC CHARGING SYSTEM TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Vehicle Will Not Start	
Dead battery	Check battery cells, alternator belt tension and alternator output
Loose or corroded battery connections	Check all charging system connections
Ignition circuit or switch malfunction	Check and replace as necessary
Alternator Light Stays On With Engine Running	
Loose or worn alternator drive belt	Check alternator drive tension and condition, See Belt Adjustment in TUNE-UP article in the TUNE-UP section

Loose alternator wiring connections	Check all charging system connections
Short in alternator light wiring	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Defective alternator stator or diodes	See Bench Tests in ALTERNATOR article
Defective regulator	See Regulator Check in ALTERNATOR article
Alternator Light Stays Off With Ignition Switch ON	
Blown fuse	See WIRING DIAGRAMS
Defective alternator	See Testing in ALTERNATOR article
Defective indicator light bulb or socket	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Alternator Light Stays OFF With Ignition Switch ON	
Short in alternator wiring	See On-Vehicle Tests in ALTERNATOR article
Defective rectifier bridge	See Bench Tests in ALTERNATOR article
Lights or Fuses Burn Out Frequently	
Defective alternator wiring	See On-Vehicle Tests in ALTERNATOR article
Defective regulator	See Regulator Check in ALTERNATOR article
Defective battery	Check and replace as necessary
Ammeter Gauge Shows Discharge	
Loose or worn drive belt	Check alternator drive belt tension and condition. See Belt Adjustment in TUNE-UP article in the TUNE-UP section
Defective wiring	Check all wires and wire connections
Defective alternator or regulator	See Bench Tests and On-Vehicle Tests in ALTERNATOR article
Defective ammeter, or improper ammeter wiring connection	See Testing in STANDARD

	INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Noisy Alternator	
Loose drive pulley	Tighten drive pulley attaching nut
Loose mounting bolts	Tighten all alternator mounting bolts
Worn or dirty bearings	See Bearing Replacement ALTERNATOR article
Defective diodes or stator	See Bench Test in ALTERNATOR article
Battery Does Stay Charged	
Loose or worn drive belt	Check alternator drive belt tension and condition. See Belt Adjustment in appropriate TUNE-UP article in the TUNE-UP section
Loose or corroded battery connections	Check all charging system connections
Loose alternator connections	Check all charging system connections
Defective alternator or battery	See On-Vehicle Tests and Bench Tests in ALTERNATOR article
Add-on electrical accessories exceeding alternator capacity	Install larger alternator
Battery Overcharged-Uses Too Much Water	
Defective battery	Check alternator output and repair as necessary
Defective alternator	See On-Vehicle Test and Bench Tests in ALTERNATOR article
Excessive alternator voltage	Check alternator output and repair as necessary

IGNITION SYSTEM TROUBLE SHOOTING

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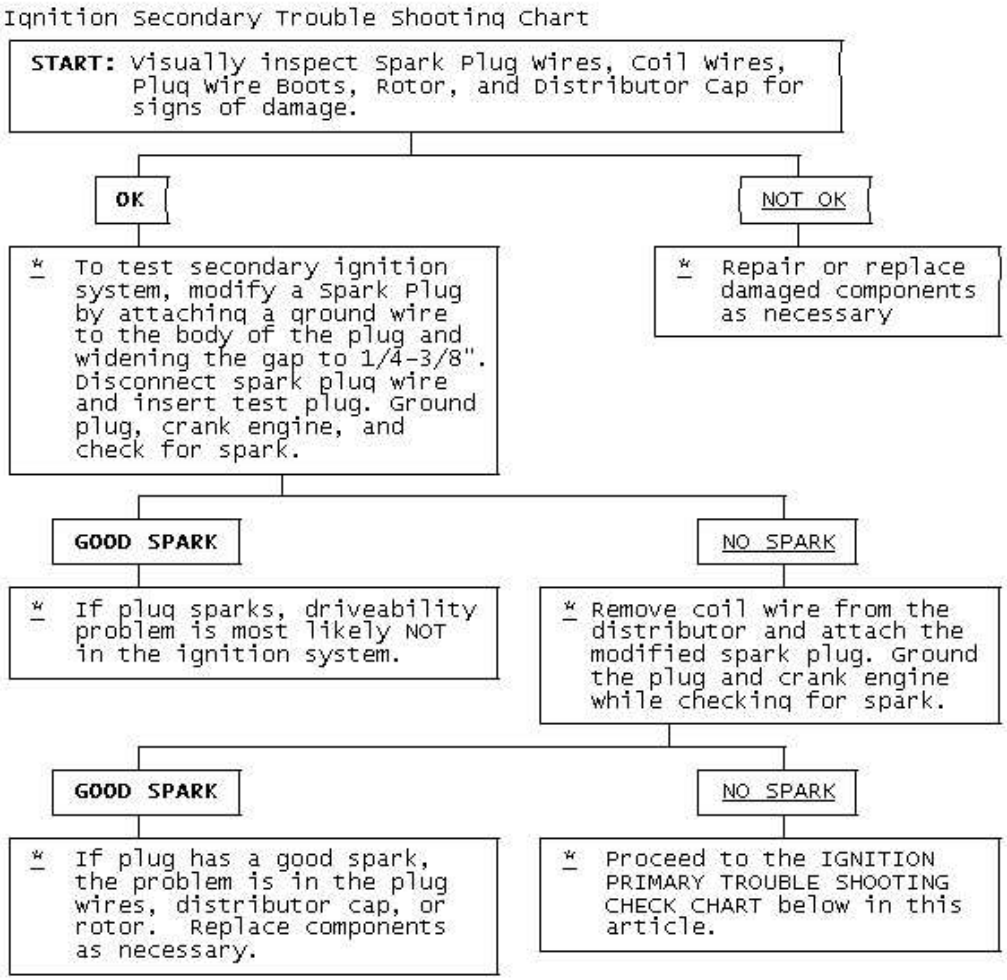

Fig. 1: Ignition Secondary Trouble Shooting Chart

Ignition Primary Trouble Shooting Chart

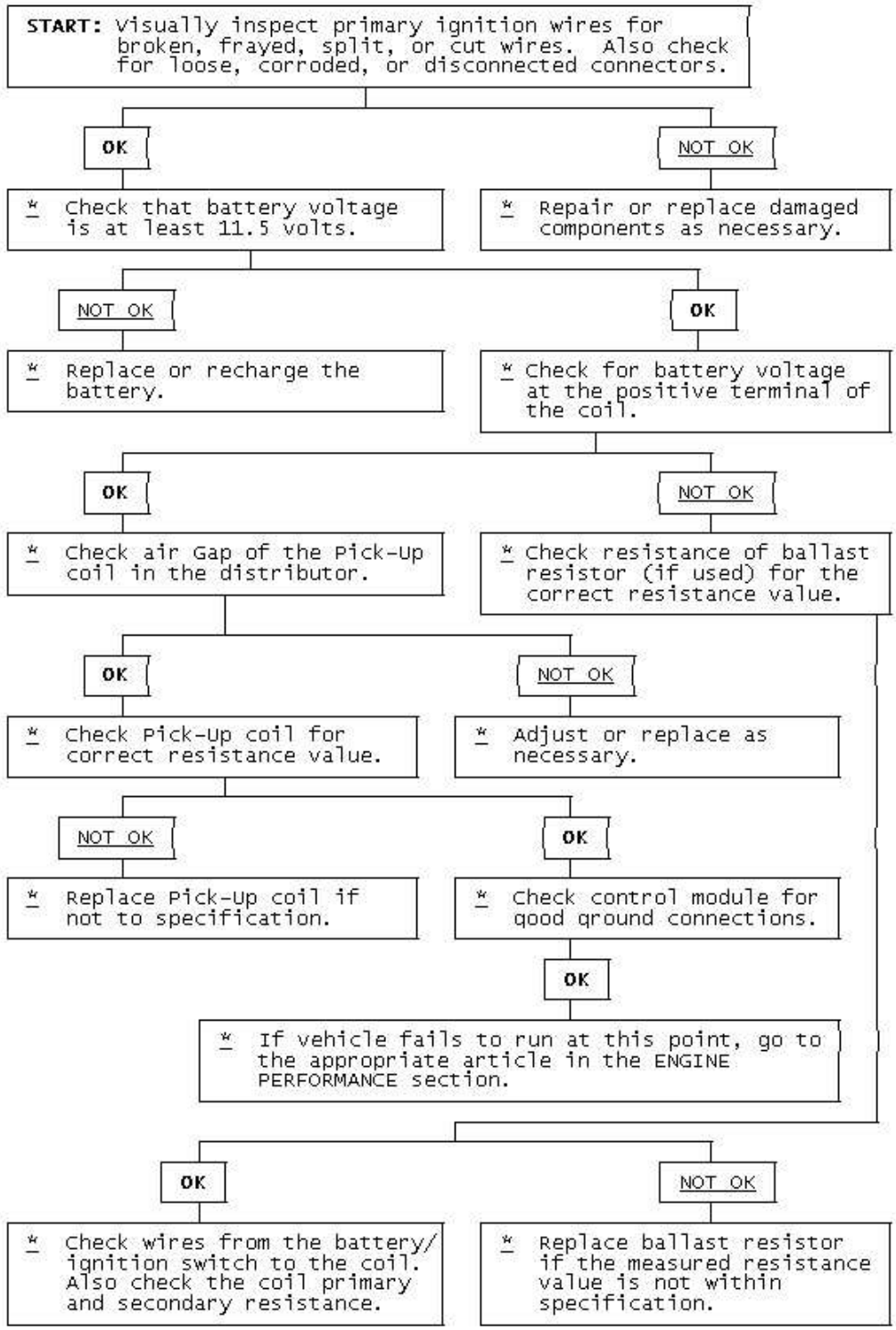

Fig. 2: Ignition Primary Trouble Shooting Chart

STARTER TROUBLE SHOOTING

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BASIC STARTER TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter Fails to Operate	
Dead battery or bad connections between starter and battery	Check battery charge and all wires and connections to starter
Ignition switch faulty or misadjusted	Adjust or replace ignition switch
Open circuit between starter switch ignition terminal on starter relay	Check and repair wires and connections as necessary
Starter relay or starter defective	See Testing in STARTER article
Open solenoid pull-in wire	Testing in STARTER article
Starter Does Not Operate and Headlights Dim	
Weak battery or dead cell	Charge or replace battery as necessary
Loose or corroded battery connections	Check that battery connections are clean and tight
Internal ground in starter windings	See Testing in STARTER article
Grounded starter fields	See Testing in STARTERS
Armature rubbing on pole	See STARTER article shoes
Starter Turns but Engine Does Not Rotate	
Starter clutch slipping	See STARTER article
Broken clutch housing	See STARTER article
Pinion shaft rusted or dry	See STARTER article
Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
Broken teeth on engine flywheel	Replace flywheel and check for starter pinion gear damage
Starter Will Not Crank Engine	
Faulty overrunning clutch	See STARTER article

Broken clutch housing	See STARTER article
Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage
Armature shaft sheared or reduction gear teeth stripped	See STARTER article
Weak battery	Charge or replace battery as necessary
Faulty solenoid	See On-Vehicle Tests in STARTER article
Poor grounds	Check all ground connections for tight and clean connections
Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary
Starter Cranks Engine Slowly	
Battery weak or defective	Charge or replace battery as necessary
Engine overheated	See ENGINE COOLING SYSTEM article
Engine oil too heavy	Check that proper viscosity oil is used
Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
Current draw too low or too high	See Bench Tests in STARTER article
Bent armature, loose pole shoes screws or worn bearing	See STARTER article
Burned solenoid contacts	Replace solenoid
Faulty starter	Replace starter
Starter Engages Engine Only Momentarily	
Engine timing too far advanced	See Ignition Timing in TUNE-UP article
Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
Broken starter clutch	See STARTER article
Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
Weak drive assembly thrust spring	See STARTER article
Weak hold-in coil	See Bench Tests in STARTER article
Starter Drive Will Not Engage	
Defective point assembly	See Testing in STARTER

	article
Poor point assembly ground	See Testing in STARTER article
Defective pull-in coil	Replace starter solenoid
Starter Relay Does Not Close	
Dead battery	Charge or replace battery as necessary
Faulty wiring	Check all wiring and connections leading to relay
Neutral safety switch faulty	Replace neutral safety switch
Starter relay faulty	Replace starter relay
Starter Drive Will Not Disengage	
Starter motor loose on mountings	Tighten starter attach bolts
Worn drive end bushing	See STARTER article
Damaged engine flywheel teeth	Replace flywheel and starter pinion gear for damage
Drive yolk return spring broken or missing	Replace return spring
Faulty ignition switch	Replace ignition switch
Insufficient clearance between winding leads to solenoid terminal and main contact in solenoid	Replace starter solenoid
Starter clutch not disengaging	Replace starter clutch
Ignition starter switch	Replace ignition switch contacts sticking
Starter Relay Operates but Solenoid Does Not	
Faulty solenoid switch, switch connections or relay	Check all wiring between relay and solenoid or replace relay or solenoid as necessary
Broken lead or loose soldered connections	Repair wire or wire connections as necessary
Solenoid Plunger Vibrates When Switch is Engaged	
Weak battery	Charge or replace battery as necessary
Solenoid contacts corroded	Clean contacts or replace solenoid
Faulty wiring	Check all wiring leading to solenoid
Broken connections inside switch cover	Repair connections or replace solenoid
Open hold-in wire	solenoid
Low Current Draw	
Worn brushes or weak brush springs	Replace brushes or brush

	springs as necessary
High Pitched Whine During Cranking Before Engine Fires but Engine Fires and Cranks Normally	
Distance too great between starter pinion and flywheel	Align starter or check that correct starter and flywheel are being used
High Pitched Whine After Engine Fires With Key released. Engine Fires and Cranks Normally	
Distance too small between starter pinion and flywheel	Flywheel runout contributes to the intermittent nature

AIR CONDITIONING & HEAT

AIR CONDITIONING TROUBLE SHOOTING

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BASIC AIR CONDITIONING TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Compressor Not Working	Compressor clutch circuit open.
.....	Compressor clutch coil inoperative.
.....	Poor clutch ground connection.
.....	Fan belts loose.
.....	Thermostatic switch inoperative.
.....	Thermostatic switch not adjusted.
.....	Ambient temperature switch open.
.....	Superheat fuse blown.
Excessive Noise or Vibration	Missing or loose mounting bolts.
.....	Bad idler pulley bearings.
.....	Fan belts not tightened correctly.
.....	Compressor clutch contacting body.
.....	Excessive system pressure.
.....	Compressor oil level low.
.....	Damaged clutch bearings.
.....	Damaged reed valves.
.....	Damaged compressor.
Insufficient or No Cooling; Compressor Working	Expansion valve inoperative.
.....	Heater control valve stuck open.

.....	Low system pressure.
.....	Blocked condenser fins.
.....	Blocked evaporator fins.
.....	Vacuum system leak.
.....	Vacuum motors inoperative.
.....	Control cables improperly adjusted.
.....	Restricted air inlet.
.....	Mode doors binding.
.....	Blower motor inoperative.
.....	Temperature above system capacity.

HEATER SYSTEM TROUBLE SHOOTING

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BASIC HEATER SYSTEM TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Insufficient, Erratic, or No Heat	Low Coolant Level
.....	Incorrect thermostat.
.....	Restricted coolant flow through core.
.....	Heater hoses plugged.
.....	Misadjusted control cable.
.....	Sticking heater control valve.
.....	Vacuum hose leaking.
.....	Vacuum hose blocked.
.....	Vacuum motors inoperative.
.....	Blocked air inlet.
.....	Inoperative heater blower motor.
.....	Oil residue on heater core fins.
.....	Dirt on heater core fins.
Too Much Heat	Improperly adjusted cables.
.....	Sticking heater control valve.
.....	No vacuum to heater control valve.
.....	Temperature door stuck open.
Air Flow Changes During Acceleration	Vacuum system leak.
.....	Bad check valve or reservoir.
Air From Defroster At All Times	Vacuum system leak.

.....	Improperly adjusted control cables.
.....	Inoperative vacuum motor.
Blower Does Not Operate Correctly	Blown fuse.
.....	Blower motor windings open.
.....	Resistors burned out.
.....	Motor ground connection loose.
.....	Wiring harness connections loose.
.....	Blower motor switch inoperative.
.....	Blower relay inoperative.
.....	Fan binding or foreign object in housing.
.....	Fan blades broken or bent.

BRAKES

BRAKE SYSTEM TROUBLE SHOOTING

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BRAKE SYSTEM TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Brakes Pull Left or Right	
Incorrect tire pressure	Inflate tires to proper pressure
Front end out of alignment	See WHEEL ALIGNMENT
Mismatched tires	Check tires sizes
Restricted brake lines or hoses	Check hose routing
Loose or malfunctioning caliper	See DISC BRAKES or BRAKE SYSTEM
Bent shoe or oily linings	See DRUM BRAKES or BRAKE SYSTEM
Malfunctioning rear brakes	See DRUM, DISC BRAKES or BRAKE SYSTEM
Loose suspension parts	See SUSPENSION
Noises Without Brakes Applied	
Front linings worn out	Replace linings
Dust or oil on drums or rotors	See DRUM, DISC BRAKES or BRAKE SYSTEM
Noises With Brakes Applied	

Insulator on outboard shoe damaged	See DISC BRAKES or BRAKE SYSTEM
Incorrect pads or linings	Replace pads or linings
Brake Rough, Chatters or Pulsates	
Excessive lateral runout	Check rotor runout
Parallelism not to specifications	Reface or replace rotor
Wheel bearings not adjusted	See SUSPENSION
Rear drums out-of-round	Reface or replace drums
Disc pad reversed, steel against rotor	Remove and reinstall pad
Excessive Pedal Effort	
Malfunctioning power unit	See POWER BRAKES or BRAKE SYSTEM
Partial system failure	Check fluid and pipes
Worn disc pad or lining	Replace pad or lining
Caliper piston stuck or sluggish	See DISC BRAKES or BRAKE SYSTEM
Master cylinder piston stuck	See MASTER CYLINDERS or BRAKE SYSTEM
Brake fade due to incorrect pads for linings	Replace pads or linings
Linings or pads glazed	Replace pads or linings
Worn drums	Reface or replace drums
Excessive Pedal Travel	
Partial brake system failure	Check fluid and pipes
Insufficient fluid in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
Air trapped in system	See BRAKE BLEEDING or BRAKE SYSTEM
Rear brakes not adjusted	See Adjustments in DRUM BRAKES or BRAKE SYSTEM
Bent shoe or lining	See DRUM BRAKES or BRAKE SYSTEM
Plugged master cylinder cap	See MASTER CYLINDERS or BRAKE SYSTEM
Improper brake fluid	Replace brake fluid
Pedal Travel Decreasing	
Compensating port plugged	See MASTER CYLINDERS or BRAKE SYSTEM
Swollen cup in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
Master cylinder piston not returning	See MASTER CYLINDERS or BRAKE SYSTEM
Weak shoe retracting springs	See DRUM BRAKES

	BRAKE SYSTEM
Wheel cylinder piston sticking	See DRUM BRAKES or BRAKE SYSTEM
Dragging Brakes	
Master cylinder pistons not returning	See MASTER CYLINDERS BRAKE SYSTEM
Restricted brake lines or hoses	Check line routing
Incorrect parking brake adjustment	See DRUM BRAKES BRAKE SYSTEM
Parking Brake cables frozen	See DRUM BRAKES BRAKE SYSTEM
Incorrect installation of inboard disc pad	Remove and replace correctly
Power booster output rod too long	See POWER BRAKE UNITS BRAKE SYSTEM
Brake pedal not returning freely	See DISC, DRUM BRAKES BRAKE SYSTEM
Brakes Grab or Uneven Braking Action	
Malfunction of combination valve	See CONTROL VALVE or BRAKE SYSTEM
Malfunction of power brake unit	See POWER BRAKE UNITS or BRAKE SYSTEM
Binding brake pedal	See DISC, DRUM BRAKES or BRAKE SYSTEM
Pulsation or Roughness	
Uneven pad wear caused by caliper	See DISC BRAKES or BRAKE SYSTEM
Uneven rotor wear	See DISC BRAKES or BRAKE SYSTEM
Drums out-of-round	Reface or replace drums

ENGINE MECHANICAL

COOLING SYSTEM TROUBLE SHOOTING

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COOLING SYSTEM TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION

Overheating	
Coolant Leak	Fill/Pressure Test System
A/C Condenser Fins Clogged	Remove/Clean Condenser
Radiator Fins Clogged	Remove/Clean Radiator
Thermostat Stuck Closed	Replace Thermostat
Clogged Cooling System Passages	Clean/Flush Cooling System
Water Pump Malfunction	Replace Water Pump
Fan Clutch Malfunction	Replace Fan Clutch
Retarded Ignition Timing	Reset Ignition Timing
Cooling Fan Malfunction	Test Cooling Fan/Circuit
Cooling Fan Motor Malfunction	Test Fan Motor
Cooling Fan Relay Malfunction	Test Fan Relay
Faulty Radiator Cap	Replace Radiator Cap
Broken/Slipping Fan Belt	Replace Fan Belt
Restricted Exhaust	Repair Exhaust System
Corrosion	
Impurities In Coolant	Clean/Flush System
Coolant Leakage	
Damaged hose	Replace Hose
Leaky Water Pump	Replace Water Pump
Damaged Radiator Seam	Replace/Repair Radiator
Leaky Thermostat Cover	Replace Thermostat Cover
Cylinder Head Problem	Check Head/Head Gasket
Leaky Freeze Plugs	Replace Freeze Plugs
Recovery System Inoperative	
Loose and/or Defective Radiator Cap	Replace Radiator Cap
Overflow Tube Clogged and/or Leaking	Repair Tube
Recovery Bottle Vent Restricted	Clean Vent
No Heater Core Flow	
Collapsed Heater Hose	Replace Heater Hose
Plugged Heater Core	Clean/Replace Heater Core
Faulty Heater Valve	Replace Heater Valve

GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING

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BASIC GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Lopes At Idle	
Intake manifold-to-head leaks	Replace manifold gasket, See ENGINES
Blown head gasket	Replace head gasket, See ENGINES
Worn timing gears, chain or sprocket	Replace gears, chain or sprocket
Worn camshaft lobes	Replace camshaft, See ENGINES
Overheated engine	Check cooling system, See COOLING
Blocked crankcase vent valve	Remove restriction
Leaking EGR valve	Repair leak and/or replace valve
Faulty fuel pump	Replace fuel pump
Engine Has Low Power	
Leaking fuel pump	Repair leak and/or replace fuel pump
Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
Sticking valves or weak valve springs	Check valve train components, See ENGINES
Incorrect valve timing	Reset valve timing, See ENGINES
Worn camshaft lobes	Replace camshaft, See ENGINES
Blown head gasket	Replace head gasket. See ENGINES.
Clutch slipping	Adjust pedal and/or replace components, See ENGINES
Engine overheating	Check cooling system, See COOLING
Auto. Trans. pressure regulator valve faulty	Replace pressure regulator valve
Auto. Trans. fluid level too low	Add fluid as necessary
Improper vacuum diverter valve operation	Replace vacuum diverter valve
Vacuum leaks	Inspect vacuum system and repair as required
Leaking piston rings	Replace piston rings, See

	ENGINES
Faulty High Speed Operation	
Low fuel pump volume	Replace fuel pump
Leaking valves or worn	Replace valves and/or springs, See ENGINES
Incorrect valve timing	Reset valve timing,See ENGINES
Intake manifold restricted	Remove restriction
Worn distributor shaft	Replace distributor
Faulty Acceleration	
Improper fuel pump stroke	Remove pump and reset pump stroke
Incorrect ignition timing	Reset ignition timing, See TUNE-UP
Leaking valves	Replace valves, See ENGINES
Worn fuel pump diaphragm or piston	Replace diaphragm or piston
Intake Backfire	
Improper ignition timing	Reset ignition timing, See TUNE-UP
Faulty accelerator pump discharge	Replace accelerator pump
Improper choke operation	Check choke and adjust as required
Defective EGR valve	Replace EGR valve
Fuel mixture too lean	Reset air/fuel mixture, See TUNE-UP
Choke valve initial clearance too large	Reset choke valve initial clearance
Exhaust Backfire	
Vacuum leak	Inspect and repair vacuum system
Faulty vacuum diverter valve	Replace vacuum diverter valve
Faulty choke operation	Check choke and adjust as required
Exhaust system leak	repair exhaust system leak
Engine Detonation	
Ignition timing too far advanced	Reset ignition timing, See TUNE-UP
Faulty ignition system	Check ignition timing, See TUNE-UP
Spark plugs loose or faulty	Retighten or replace plugs

Fuel delivery system clogged	Inspect lines, pump and filter for clog
EGR valve inoperative	Replace EGR valve
PCV system inoperative	Inspect and/or replace hoses or valve
Vacuum leaks	Check vacuum system and repair leaks
Excessive combustion chamber deposits	Remove built-up deposits
Leaking, sticking or broken valves	Inspect and/or replace valves
External Oil Leakage	
Fuel pump improperly seated or worn gasket	Remove pump, replace gasket and seat properly
Oil pan gasket broken or pan bent	Straighten pan and replace gasket
Timing chain cover gasket broken	Replace timing chain cover gasket
Rear main oil seal worn	Replace rear main oil seal
Oil pan drain plug not seated properly	Remove and reinstall drain plug
Camshaft bearing drain hole blocked	Remove restriction
Oil pressure sending switch leaking	Remove and reinstall sending switch
Excessive Oil Consumption	
Worn valve stems or guides	Replace stems or guides, See ENGINES
Valve "O" ring seals damaged	Replace "O" ring seals, See ENGINES
Plugged oil drain back holes	Remove restrictions
Improper PCV valve operation	Replace PCV valve
Engine oil level too high	Remove excess oil
Engine oil too thin	Replace thicker oil
Valve stem oil deflectors damaged	Replace oil deflectors
Incorrect piston rings	Replace piston rings, See ENGINES
Piston ring gaps not staggered	Reinstall piston rings, See ENGINES
Insufficient piston ring tension	Replace rings, See ENGINES
Piston ring grooves or oil return	slots clogged Replace piston rings, See ENGINES
Piston rings sticking in grooves	Replace piston rings, See ENGINES

Piston ring grooves excessively worn	Replace piston and rings, See ENGINES
Compression rings installed upside down	Replace compression rings correctly, See ENGINES
Worn or scored cylinder walls	Rebore cylinders or replace block
Mismatched oil ring expander and rail	Replace oil ring expander and rail, See ENGINES
Intake gasket dowels too long	Replace intake gasket dowels
Excessive main or connecting rod bearing clearance	Replace main or connecting rod bearings, See ENGINES
No Oil Pressure	
Low oil level	Add oil to proper level
Oil pressure sender or gauge broken	Replace sender or gauge
Oil pump malfunction	Remove and overhaul oil pump, See ENGINES
Oil pressure relief valve sticking	Remove and reinstall valve
Oil pump passages blocked	Overhaul oil pump, See ENGINES
Oil pickup screen or tube blocked	Remove restriction
Loose oil inlet tube	Tighten oil inlet tube
Loose camshaft bearings	Replace camshaft bearings, See ENGINES
Internal leakage at oil passages	Replace block or cylinder head
Low Oil Pressure	
Low engine oil level	Add oil to proper level
Engine oil too thin	Remove and replace with thicker oil
Excessive oil pump clearance	Reduce oil pump clearance, See ENGINES
Oil pickup tube or screen blocked	Remove restrictions
Main, rod or cam bearing clearance excessive	Replace bearing to reduce clearance, See ENGINES
High Oil Pressure	
Improper grade of oil	Replace with proper oil
Oil pressure relief valve stuck closed	Eliminate binding
Oil pressure sender or gauge faulty	Replace sender or gauge
Noisy Main Bearings	
Inadequate oil supply	Check oil delivery to main bearings

Excessive main bearing clearance	Replace main bearings, See ENGINES
Excessive crankshaft end play	Replace crankshaft, See ENGINES
Loose flywheel or torque converter	Tighten attaching bolts
Loose or damaged vibration damper	Tighten or replace vibration damper
Crankshaft journals out-of-round	Re-grind crankshaft journals
Excessive belt tension	Loosen belt tension
Noisy Connecting Rods	
Excessive bearing clearance or missing bearing	Replace bearing, See ENGINES
Crankshaft rod journal out-of-round	Re-grind crankshaft journal
Misaligned connecting rod or cap	Remove rod or cap and realign
Incorrectly tightened rod bolts	Remove and re-tighten rod bolts
Noisy Pistons and Rings	
Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
Bore tapered or out-of-round	Rebore block
Piston ring broken	Replace piston rings, See ENGINES
Piston pin loose or seized	Replace piston pin, See ENGINES
Connecting rods misaligned	Realign connecting rods
Ring side clearance too loose or tight	Replace with larger or smaller rings
Carbon build-up on piston	Remove carbon
Noisy Valve Train	
Worn or bent push rods	Replace push rods, See ENGINES
Worn rocker arms or bridged pivots	Replace push rods, See ENGINES
Dirt or chips in valve lifters	Remove lifters and remove dirt/chips
Excessive valve lifter leak-down	Replace valve lifters, See ENGINES
Valve lifter face worn	Replace valve lifters, See ENGINES
Broken or cocked valve springs	Replace or reposition springs

Too much valve stem-to-guide clearance	Replace valve guides, See ENGINES
Valve bent	Replace valve, See ENGINES
Loose rocker arms	Retighten rocker arms, See ENGINES
Excessive valve seat run-out	Reface valve seats, See ENGINES
Missing valve lock	Install new valve lock
Excessively worn camshaft lobes	Replace camshaft, See ENGINES
Plugged valve lifter oil holes	Eliminate restriction or replace lifter
Faulty valve lifter check ball	Replace lifter check ball, See ENGINES
Rocker arm nut installed upside down	Remove and reinstall correctly
Valve lifter incorrect for engine	Remove and replace valve lifters
Faulty push rod seat or lifter plunger	Replace plunger or push rod
Noisy Valves	
Improper valve lash	Re-adjust valve lash, See ENGINES
Worn or dirty valve lifters	Clean and/or replace lifters
Worn valve guides	Replace valve guides, See ENGINES
Excessive valve seat or face run-out	Reface seats or valve face
Worn camshaft lobes	Replace camshaft, See ENGINES
Loose rocker arm studs	Re-tighten rocker arm studs, See ENGINES
Bent push rods	Replace push rods, See ENGINES
Broken valve springs	Replace valve springs, See ENGINES
Burned,Sticking or Broken Valves	
Weak valve springs or warped valves	Replace valves and/or springs, See ENGINES
Improper lifter clearance	Re-adjust clearance or replace lifters
Worn guides or improper guide clearance	Replace valve guides, See ENGINES

Out-of-round valve seats or improper seat width	Re-grind valve seats
Gum deposits on valve stems, seats or guide	Remove deposits
Improper spark timing	Re-adjust spark timing
Broken Pistons/Rings	
Undersize pistons	Replace with larger pistons, See ENGINES
Wrong piston rings	Replace with correct rings, See ENGINES
Out-of-round cylinder bore	Re-bore cylinder bore
Improper connecting rod alignment	Remove and realign connecting rods
Excessively worn ring grooves	Replace pistons, See ENGINES
Improperly assembled piston pins	Re-assemble pin-to-piston, See ENGINES
Insufficient ring gap clearance	Install new rings, See ENGINES
Engine overheating	Check cooling system
Incorrect ignition timing	Re-adjust ignition timing, See TUNE-UP
Excessive Exhaust Noise	
Leaks at manifold to head, or to pipe	Replace manifold or pipe gasket
Exhaust manifold cracked or broken	Replace exhaust manifold, See ENGINES

ENGINE PERFORMANCE

CARBURETOR TROUBLE SHOOTING:

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BASIC COLD START SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Choke not closing	Check choke operation, see FUEL SYSTEMS
Choke linkage bent	Check linkage, see FUEL SYSTEM

Engine Starts, Then Dies	
Choke vacuum kick setting too wide	Check setting and adjust see, FUEL SYSTEMS
Fast idle RPM too low	Reset RPM to specification, see TUNE-UP
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
Vacuum leak	Inspect vacuum system for leaks
Low fuel pump outlet	Repair or replace pump, see FUEL SYSTEMS
Low carburetor fuel level	Check float setting see FUEL SYSTEM
Engine Quits Under Load	
Choke vacuum kick setting incorrect	Reset vacuum kick setting,see FUEL SYSTEMS
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEM
Incorrect hot fast idle speed RPM	Reset fast idle RPM, see TUNE-UP
Engine Starts, Runs Up, Then Idles, Slowly With Black Smoke	
Choke vacuum kick set too narrow	Reset vacuum kick, see FUEL SYSTEMS
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
Hot fast idle RPM too low	Reset fast idle RPM, see TUNE-UP

BASIC HOT START SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Engine flooded	Allow fuel to evaporate

BASIC COLD ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Stalls in Gear	
Choke vacuum kick setting incorrect	Reset choke vacuum kick, see FUEL SYSTEMS
Fast idle RPM incorrect	Reset fast idle RPM, see TUNE-UP
Fast idle cam index incorrect	Reset fast idle cam see FUEL SYSTEMS

Acceleration Sag or Stall	
Defective choke control switch	Replace choke control switch
Choke vacuum kick setting incorrect	Reset choke vacuum kick see, FUEL SYSTEMS
Float level incorrect (too low)	Adjust float level, FUEL SYSTEMS
Accelerator pump defective	Repair or replace pump see FUEL SYSTEMS
Secondary throttles not closed	Inspect lockout adjustment, see FUEL SYSTEMS
Sag or Stall After Warmup	
Defective choke control switch	Replace choke control switch, see FUEL SYSTEMS
Defective accelerator pump	Replace pump, see FUEL SYSTEMS
Float level incorrect (too low)	Adjust float level, see FUEL SYSTEMS
Backfiring & Black Smoke	
Plugged heat crossover system	Remove restriction

BASIC WARM ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	**CORRECTION**
Hesitation With Small Amount of Gas Pedal Movement	
Vacuum leak	Inspect vacuum lines
Accelerator pump weak or inoperable	Replace pump, see FUEL SYSTEMS
Float level setting too low	Reset float level, see,FUEL SYSTEMS
Metering rods sticking or binding	Inspect and/or replace rods, see FUEL SYSTEMS
Carburetor idle or transfer system plugged	Inspect system and remove restriction
Frozen or binding heated air inlet	Inspect heated air door for binding
Hesitation With Heavy Gas Pedal Movement	
Defective accelerator pump	Replace pump, see FUEL SYSTEMS
Metering rod carrier sticking or binding	Remove restriction
Large vacuum leak	Inspect vacuum system and repair leak
Float level setting too low	Reset float level, see FUEL

	SYSTEMS
Defective fuel pump, lines or filter	Inspect pump, lines and filter
Air door setting incorrect	Adjust air door setting, see FUEL

DIESEL ENGINE TROUBLE SHOOTING

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NOTE: Diesel engines mechanical diagnosis is the same as gasoline engines for items such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.

BASIC DIESEL ENGINE TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Crank	
Bad battery connections or dead batteries	Check connections and/or replace batteries
Bad starter connections or bad starter	Check connections and/or replace starter
Engine Cranks Slowly, Won't Start	
Bad battery connections or dead batteries	Check connections and/or replace batteries
Engine oil too heavy	Replace engine oil
Engine Cranks Normally, But Will Not Start	
Glow plugs not functioning	Check glow plug system, see FUEL SYSTEMS
Glow plug control not functioning	Check controller, see FUEL SYSTEMS
Fuel not injected into cylinders	Check fuel injectors, see FUEL SYSTEMS
No fuel to injection pump	Check fuel delivery system
Fuel filter blocked	Replace fuel filter
Fuel tank filter blocked	Replace fuel tank filter
Fuel pump not operating	Check pump operation and/or replace pump
Fuel return system blocked	Inspect system and remove restriction

No voltage to fuel solenoid	Check solenoid and connections
Incorrect or contaminated fuel	Replace fuel
Incorrect injection pump timing	Re-adjust pump timing, see FUEL SYSTEMS
Low compression	Check valves, pistons, rings, see ENGINES
Injection pump malfunction	Inspect and/or replace injection pump
Engine Starts, Won't Idle	
Incorrect slow idle adjustment	Reset idle adjustment, see TUNE-UP
Fast idle solenoid malfunctioning	Check solenoid and connections
Fuel return system blocked	Check system and remove restrictions
Glow plugs go off too soon	See glow plug diagnosis in FUEL SYSTEMS
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
No fuel to injection pump	Check fuel delivery system
Incorrect or contaminated fuel	Replace fuel
Low compression	Check valves, piston, rings, see ENGINES
Injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
Fuel solenoid closes in RUN position	Check solenoid and connections
Engines Starts/Idles Rough W/out Smoke or Noise	
Incorrect slow idle adjustment	Reset slow idle, see TUNE-UP
Injection line fuel leaks	Check lines and connections
Fuel return system blocked	Check lines and connections
Air in fuel system	Bleed air from system
Incorrect or contaminated fuel	Replace fuel
Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS
Engines Starts and Idles Rough W/out Smoke or Noise, But Clears After Warm-Up	
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
Engine not fully broken in	Put more miles on engine

Air in system	Bleed air from system
Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS
Engine Idles Correctly, Misfires Above Idle	
Blocked fuel filter	Replace fuel filter
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
Incorrect or contaminated fuel	Replace fuel
Engine Won't Return To Idle	
Fast idle adjustment incorrect	Reset fast idle, see TUNE-UP
Internal injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
External linkage binding	Check linkage and remove binding
Fuel Leaks On Ground	
Loose or broken fuel line	Check lines and connections
Internal injection pump seal leak	Replace injection pump, see FUEL SYSTEMS
Cylinder Knocking Noise	
Injector nozzles sticking open	Test injectors, see FUEL SYSTEMS
Very low nozzle opening pressure	Test injectors and/or replace
Loss of Engine Power	
Restricted air intake	Remove restriction
EGR valve malfunction	Replace EGR valve
Blocked or damaged exhaust system	Remove restriction and/or replace components
Blocked fuel tank filter	Replace filter
Restricted fuel filter	Remove restriction and/or replace filter
Block vent in gas cap	Remove restriction and/or replace cap
Tank-to-injection pump fuel supply blocked	Check fuel lines and connections
Blocked fuel return system	Remove restriction
Incorrect or contaminated fuel	Replace fuel
Blocked injector nozzles	Check nozzle for blockage, see FUEL SYSTEMS
Low compression	Check valves, rings, pistons, see ENGINES

Loud Engine Noise With Black Smoke	
Basic timing incorrect	Reset timing, see FUEL SYSTEMS
EGR valve malfunction	Replace EGR valve
Internal injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
Incorrect injector pump housing pressure	Check pressure, see FUEL SYSTEMS
Engine Overheating	
Cooling system leaks	Check cooling system and repair leaks
Belt slipping or damaged	Check tension and/or replace belt
Thermostat stuck closed	Remove and replace thermostat, see ENGINE COOLING
Head gasket leaking	Replace head gasket
Oil Light on at Idle	
Low oil pump pressure	Check oil pump operation, see ENGINES
Oil cooler or line restricted	Remove restriction and/or replace cooler
Engine Won't Shut Off	
Injector pump fuel solenoid does not return fuel valve to OFF position	Remove and check solenoid and replace if needed

VACUUM PUMP DIAGNOSIS

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive Noise	
Loose pump-to-drive assembly screws	Tighten screws
Loose tube on pump assembly	Tighten tube
Valves not functioning properly	Replace valves
Oil Leakage	
Loose end plug	Tighten end plug
Bad seal crimp	Remove and re-crimp seal

FUEL INJECTION TROUBLE SHOOTING

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BASIC FUEL INJECTION TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start (Cranks Normally)	
Cold start valve inoperative	Test valve and circuit
Poor connection;vacuum or wiring	Check vacuum and electrical connections
Contaminated fuel	Test fuel for water or alcohol
Defective fuel pump relay or circuit	Test relay and wiring
Battery too low	Charge and test battery
Low fuel pressure	Test pressure regulator and fuel pump, check for restricted lines and filters
No distributor reference pulses	Repair ignition system as necessary
Open coolant temperature sensor circuit	Test sensor and wiring
Shorted W.O.T. switch in T.P.S.	Disconnect W.O.T. switch, engine should start
Defective ECM	Replace ECM
Fuel tank residual pressure valve leaks	Test for fuel pressure drop after shut down
Hard Starting	
Disconnected hot air tube to air cleaner	Reconnect tube and test control valve
Defective Idle Air Control (IAC) valve	Test valve operation and circuit
Shorted, open or misadjusted T.P.S.	Test and adjust or replace T.P.S.
EGR valve open	Test EGR valve and control circuit
Poor Oxygen sensor signal	Test for shorted or circuit
Incorrect mixture from PCV system	Test PCV for flow, check sealing of oil filter cap
Poor High Speed Operation	
Low fuel pump volume	Faulty pump or restricted fuel lines or filters
Poor MAP sensor signal	Test MAP sensor, vacuum hose and wiring
Poor Oxygen sensor signal	Test for shorted or open sensor or circuit
Open coolant temperature sensor circuit	Test sensor and wiring
Faulty ignition operation	Check wires for cracks or poor con- nections, test

	secondary voltage with oscilloscope
Contaminated fuel	Test fuel for water or alcohol
Intermittent ECM ground	Test ECM ground connection for resistance
Restricted air cleaner	Replace air cleaner
Restricted exhaust system	Test for exhaust manifold back pressure
Poor MAF sensor signal	Check leakage between sensor and manifold
Poor VSS signal	If tester for ALCL hook-up is available check that VSS reading matches speedometer
Ping or Knock on Acceleration	
Poor Knock sensor signal	Test for shorted or open sensor or circuit
Poor Baro sensor signal	Test for shorted or open sensor or circuit
Improper ignition timing	See VEHICLE EMISSION CONTROL LABEL (where applicable)
Check for engine overheating problems	Low coolant, loose belts or electric cooling fan inoperative

NOTE: For additional electronic fuel injection trouble shooting information, see the appropriate article in the ENGINE PERFORMANCE section (not all vehicles have Computer Engine Control articles). Information is provided there for diagnosing fuel system problems on vehicles with electronic fuel injection.

IGNITION SYSTEM TROUBLE SHOOTING

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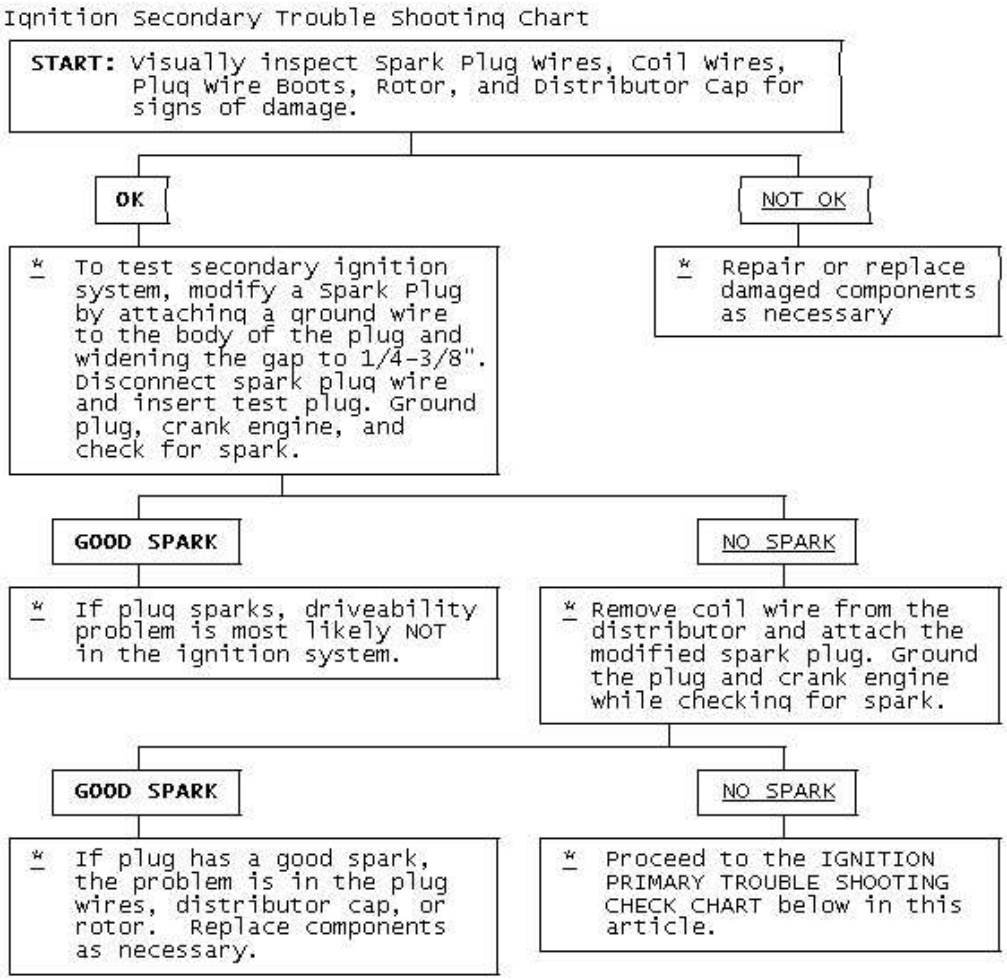

Fig. 3: Ignition Secondary Trouble Shooting Chart

Ignition Primary Trouble Shooting Chart

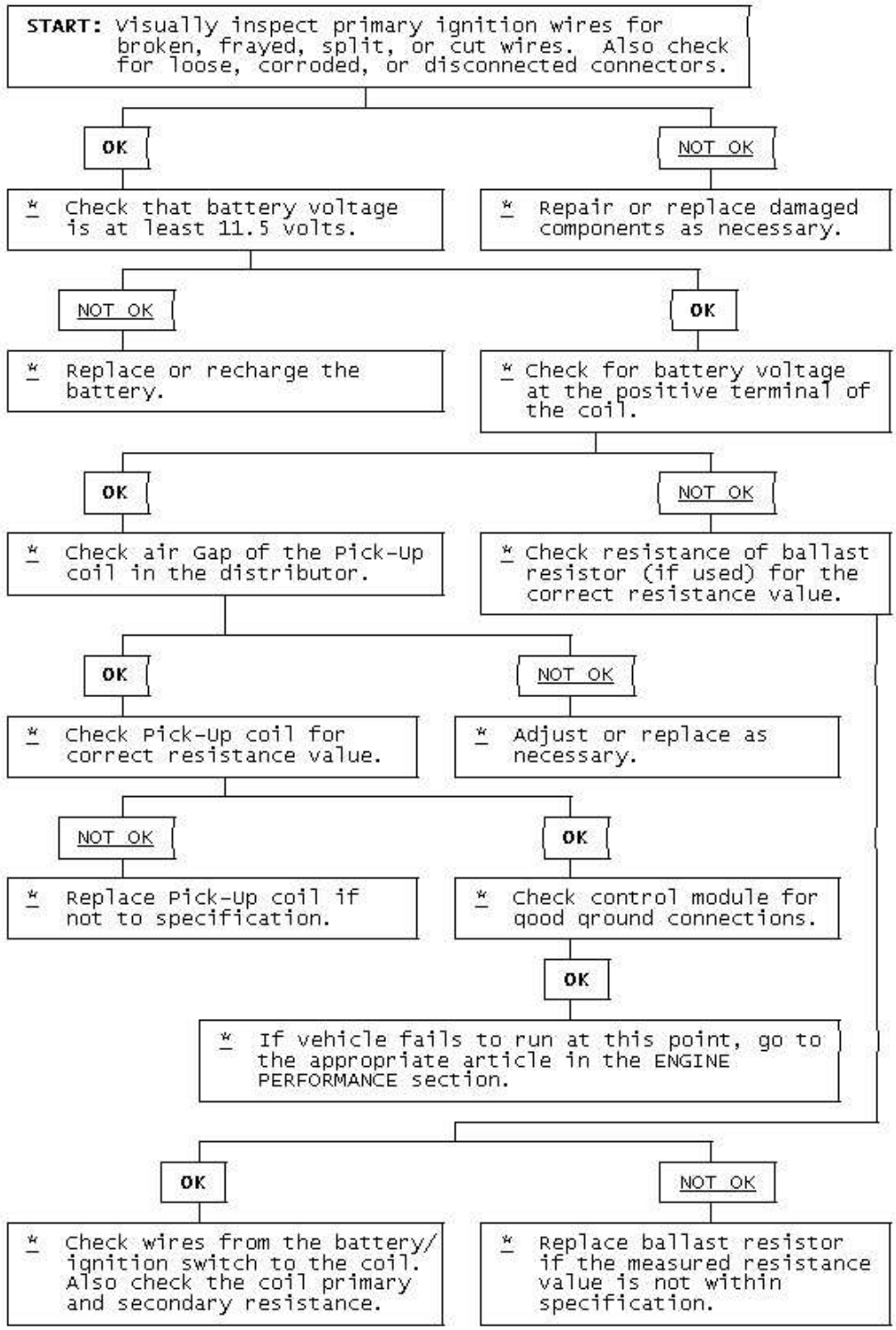

Fig. 4: Ignition Primary Trouble Shooting Chart

STARTER TROUBLE SHOOTING

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BASIC STARTER TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter Fails to Operate	
Dead battery or bad connections between starter and battery	Check battery charge and all wires and connections to starter
Ignition switch faulty or misadjusted	Adjust or replace ignition switch
Open circuit between starter switch ignition terminal on starter relay	Check and repair wires and connections as necessary
Starter relay or starter defective	See Testing in STARTER article
Open solenoid pull-in wire	See Testing in STARTER article
Starter Does Not Operate and Headlights Dim	
Weak battery or dead cell	Charge or replace battery as necessary
Loose or corroded battery connections	Check that battery connections are clean and tight
Internal ground in starter windings	See Testing in STARTER article
Grounded starter fields	See Testing in STARTERS
Armature rubbing on pole shoes	See STARTER article
Starter Turns but Engine Does Not Rotate	
Starter clutch slipping	See STARTER article
Broken clutch housing	See STARTER article
Pinion shaft rusted or dry	See STARTER article
Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
Broken teeth on engine flywheel	Replace flywheel and check for starter pinion

	gear damage
Starter Will Not Crank Engine	
Faulty overrunning clutch	See STARTER article
Broken clutch housing	See STARTER article
Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage
Armature shaft sheared or reduction gear teeth stripped	See STARTER article
Weak battery	Charge or replace battery as necessary
Faulty solenoid	See On-Vehicle Tests in STARTER article
Poor grounds	Check all ground connections for tight and clean connections
Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary
Starter Cranks Engine Slowly	
Battery weak or defective	Charge or replace battery as necessary
Engine overheated	See ENGINE COOLING SYSTEM article
Engine oil too heavy	Check that proper viscosity oil is used
Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
Current draw too low or too high	See Bench Tests in STARTER article
Bent armature, loose pole shoes screws or worn bearings	See STARTER article
Burned solenoid contacts	Replace solenoid
Faulty starter	Replace starter
Starter Engages Engine Only Momentarily	
Engine timing too far advanced	See Ignition Timing in TUNE-UP article
Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
Broken starter clutch	See STARTER article
Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
Weak drive assembly thrust spring	See STARTER article

Weak hold-in coil	See Bench Tests in STARTER article
Starter Drive Will Not Engage	
Defective point assembly	See Testing in STARTER article
Poor point assembly ground	See Testing in STARTER article
Defective pull-in coil	Replace starter solenoid
Starter Relay Does Not Close	
Dead battery	Charge or replace battery as necessary
Faulty wiring	Check all wiring and connections leading to relay
Neutral safety switch faulty	Replace neutral safety switch
Starter relay faulty	Replace starter relay
Starter Drive Will Not Disengage	
Starter motor loose on mountings	Tighten starter attach bolts
Worn drive end bushing	See STARTER article
Damaged engine flywheel teeth	Replace flywheel and starter pinion gear for damage
Drive yolk return spring broken or missing	Replace return spring
Faulty ignition switch	Replace ignition switch
Insufficient clearance between winding leads to solenoid terminal and main contact in solenoid	Replace starter solenoid
Starter clutch not disengaging	Replace starter clutch
Ignition starter switch contacts sticking	Replace ignition switch
Starter Relay Operates but Solenoid Does Not	
Faulty solenoid switch, switch connections or relay	Check all wiring between relay and solenoid or replace relay or solenoid as necessary
Broken lead or loose soldered connections	Repair wire or wire connections as necessary
Solenoid Plunger Vibrates When Switch is Engaged	
Weak battery	Charge or replace battery as necessary
Solenoid contacts corroded	Clean contacts or replace solenoid
Faulty wiring	Check all wiring leading to solenoid

Broken connections inside switch cover	Repair connections or replace solenoid
Open hold-in wire	Replace solenoid
Low Current Draw	
Worn brushes or weak	Replace brushes or brush springs as necessary
High Pitched Whine During Cranking Before Engine Fires but Engine Fires and Cranks Normally	
Distance too great between starter pinion and flywheel	Align starter or check that correct starter and flywheel are being used
High Pitched Whine After Engine Fires With Key released. Engine Fires and Cranks Normally	
Distance too small between starter pinion and flywheel	Flywheel runout contributes to the intermittent nature

TUNE-UP TROUBLE SHOOTING - GAS ENGINE VEHICLES

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BASIC SPARK PLUG TROUBLE SHOOTING CHARTS

CONDITION & POSSIBLE CAUSE	CORRECTION
Normal Spark Plug Condition	
Light Tan or Gray deposits	No Action
Electrode not burned or fouled	No Action
Gap tolerance not changed	No Action
Cold Fouling or Carbon Deposits	
Overrich air/fuel mixture	Adjust air/fuel mixture, see ENGINE PERFORMANCE section
Faulty choke	Replace choke assembly, see ENGINE PERFORMANCE section
Clogged air filter	Clean and/or replace air filter
Incorrect idle speed or dirty carburetor	Reset idle speed and/ or clean carburetor
Faulty ignition wires	Replace ignition wiring
Prolonged operation at idle	Shut engine off during long idle

Sticking valves or worn valve guide seals	Check valve train
Wet Fouling or Oil Deposits	
Worn rings and pistons	Install new rings and pistons
Excessive cylinder wear	Rebore or replace block
Excessive valve guide clearance	Worn or loose bearing
Gap Bridged	
Deposits in combustion chamber becoming fused to electrode	Clean combustion chamber of deposits
Blistered Electrode	
Engine overheating	Check cooling system
Wrong type of fuel	Replace with correct fuel
Loose spark plugs	Retighten spark plugs
Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Pre-Ignition or Melted Electrodes	
Incorrect type of fuel	Replace with correct fuel
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Burned valves	Replace valves
Engine Overheating	Check cooling system
Wrong type of spark plug, too hot	Replace with correct spark plug, see ENGINE PERFORMANCE
Chipped Insulators	
Severe detonation	Check for over-advanced timing or combustion
Improper gapping procedure	Re-gap spark plugs
Rust Colored Deposits	
Additives in unleaded fuel	Try different fuel brand
Water In Combustion Chamber	
Blown head gasket or cracked head	Repair or replace head or head gasket

NOTE: **Before diagnosing an electronic ignition system, ensure that all wiring is connected properly between distributor, wiring connector and spark plugs. Ignition problem will show up either as: Engine Will Not Start or Engine Runs Rough.**

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	

Open circuit between distributor and bulkhead connector	Repair circuit
Open circuit between bulkhead connector and ignition switch	Repair circuit
Open circuit between ignition switch and starter solenoid	Repair circuit
Engine Runs Rough	
Fuel lines leaking or clogged	Tighten fitting, remove restriction
Initial timing incorrect	Reset ignition timing see ENGINE PERFORMANCE
Centrifugal advance malfunction	Repair distributor advance
Defective spark plugs or wiring	Replace plugs or plug wiring
Component Failure	
Spark arc-over on cap, rotor or coil	Replace cap, rotor or or coil
Defective pick-up coil	Replace pick-up coil
Defective ignition coil	Replace ignition coil
Defective vacuum unit	Replace vacuum unit
Defective control module	Replace control module

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS - USING OSCILLOSCOPE PATTERNS

CONDITION & POSSIBLE CAUSE	CORRECTION
Firing Voltage Lines are the Same, but Abnormally High	
Retarded ignition timing	Reset ignition timing, see ENGINE PERFORMANCE section
Fuel mixture too lean	Readjust carburetor, see ENGINE PERFORMANCE
High resistance in coil wire	Replace coil wire
Corrosion in coil tower terminal	Clean and/or replace coil
Corrosion in distributor coil terminal	Clean and/or replace distributor cap
Firing Voltage Lines are the Same but Abnormally Low	
Fuel mixture too rich	Readjust carburetor, see ENGINE PERFORMANCE
Breaks in coil wire causing arcing	Replace coil wire
Cracked coil tower causing arcing	Replace coil
Low coil output	Replace coil
Low engine compression	Determine cause and repair
One or More, But Not All Firing Voltage Lines are Higher Than Others	
Carburetor idle mixture not balanced	Readjust carburetor, see ENGINE PERFORMANCE
EGR valve stuck open	Clean and/or replace valve

High resistance in spark plug wires	Replace spark plug wires
Cracked or broken spark plug insulator	Replace spark plugs
Intake vacuum leak	Repair leak
Defective spark plugs	Replace spark plugs
Corroded spark plug terminals	Replace spark plugs
One or More, But Not All Firing Voltage Lines Are Lower Than Others	
Curb idle mixture not balanced	Readjust carburetor, see ENGINE PERFORMANCE
Breaks in plug wires	Replace plug wires causing arcing
Cracked coil tower causing arcing	Replace coil
Low compression	Determine cause and repair
Defective spark plugs	Replace spark plugs
Corroded spark plugs	Replace spark plugs
Cylinders Not Firing	
Cracked distributor cap terminals	Replace distributor cap
Shorted spark plug wire	Determine cause and repair
Mechanical problem in engine	Determine cause and repair
Defective spark plugs	Replace spark plugs
Spark plugs fouled	Replace spark plugs

BASIC DRIVEABILITY PROBLEMS TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	**CORRECTION**
Hard Starting	
Binding carburetor linkage	Eliminate binding
Binding choke linkage	Eliminate binding
Binding choke piston	Eliminate binding
Restricted choke vacuum	Check vacuum lines for blockage
Worn or dirty needle valve and seat	Clean carburetor, see ENGINE PERFORMANCE
Float sticking	Readjust or replace float see the ENGINE PERFORMANCE section
Incorrect choke adjustment	Reset choke adjustment see ENGINE PERFORMANCE
Defective coil	Replace coil
Improper spark plug gap	Regap spark plugs
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Detonation	

Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Defective spark plugs	Replace spark plugs
Fuel lines clogged	Clean fuel lines
EGR system malfunction	Check and repair EGR system
PCV system malfunction	Repair PCV system
Vacuum leaks	Check and repair vacuum system
Loose fan belts	Tighten or replace fan belts, see ENGINE PERFORMANCE
Restricted airflow	Remove restriction
Vacuum advance malfunction	Check distributor operation
Dieseling	
Binding carburetor linkage	Eliminate binding
Binding throttle linkage	Eliminate blinding
Binding choke linkage or fast idle cam	Eliminate binding
Defective idle solenoid	Replace idle solenoid see ENGINE PERFORMANCE
Improper base idle speed	Reset idle speed, see see ENGINE PERFORMANCE
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Incorrect idle mixture setting	Reset idle mixture, see ENGINE PERFORMANCE
Faulty Acceleration	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Engine cold and choke too lean	Adjust choke and allow engine to warm-up
Defective spark plugs	Replace spark plugs
Defective coil	Replace coil
Faulty Low Speed Operation	
Clogged idle transfer slots	Clean idle transfer slots, see FUEL
Restricted idle air bleeds and passages	Disassemble and clean carburetor, see FUEL
Clogged air cleaner	Replace air filter
Defective spark plugs	Replace spark plugs
Defective ignition wires	Replace ignition wire see ENGINE PERFORMANCE
Defective distributor cap	Replace distributor cap

Faulty High Speed Operation	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Defective distributor centrifugal advance	Replace advance mechanism
Defective distributor vacuum advance	Replace advance unit
Incorrect spark plugs or plug gap	Check gap and/or replace spark plugs
Faulty choke operation	Check choke and repair as required
Clogged vacuum passages	Remove restrictions
Improper size or clogged main jet	Check jet size and clean, see FUEL
Restricted air cleaner	Check filter and replace as necessary
Defective distributor cap, rotor or coil	Replace cap, rotor or coil
Misfire at All Speeds	
Defective spark plugs	Replace spark plugs
Defective spark plug wires	Replace spark plug wires
Defective distributor cap, rotor, or coil	Replace cap, rotor, or coil
Cracked or broken vacuum hoses	Replace vacuum hoses
Vacuum leaks	Repair vacuum leaks
Fuel lines clogged	Remove restriction
Hesitation	
Cracked or broken vacuum	Replace vacuum hoses hoses
Vacuum leaks	Repair Vacuum leaks
Binding carburetor linkage	Eliminate binding
Binding throttle linkage	Eliminate binding
Binding choke linkage or fast idle cam	Eliminate binding
Improper float setting	Readjust float setting, see FUEL
Cracked or broken ignition wires	Replace ignition wires
Rough Idle, Missing or Stalling	
Incorrect curb idle or fast idle speed	Reset idle speed, see see ENGINE PERFORMANCE
Incorrect basic timing	Reset ignition timing see ENGINE PERFORMANCE
Improper idle mixture adjustment	Reset idle mixture, see ENGINE PERFORMANCE
Improper feedback system operation	Check feedback system see ENGINE PERFORMANCE

Incorrect spark plug gap	Reset spark plug gap, see ENGINE PERFORMANCE
Moisture in ignition components	Dry components
Loose or broken ignition wires	Replace ignition wires
Damaged distributor cap or or rotor	Replace distributor cap or rotor
Faulty ignition coil	Replace ignition coil
Fuel filter clogged or worn	Replace fuel filter
Damaged idle mixture screw	Replace idle mixture screw, see FUEL
Improper fast idle cam adjustment	Reset fast idle cam adjustment, see TUNE- see ENGINE PERFORMANCE
Improper EGR valve operation	Replace EGR valve
Faulty PCV valve air flow	Replace PCV valve
Choke binding or improper choke setting	Reset choke or eliminate binding
Vacuum leak	Repair vacuum leak
Improper float bowl fuel level	Reset float adjustment, see FUEL
Clogged air bleed or idle passages	Clean carburetor passages, see FUEL
Clogged or worn air cleaner filter	Replace air filter
Faulty choke vacuum diaphragm	Replace diaphragm, see ENGINE PERFORMANCE
Exhaust manifold heat valve inoperative	Replace heat valve
Improper distributor spark advance	Check distributor operation
Leaking valves or valve components	Check and repair valvetrain
Improper carburetor mounting	Remove and remount carburetor
Excessive play in distributor shaft	Replace distributor
Loose or corroded wiring connections	Repair or replace as required
Engine Surges	
Improper PCV valve airflow	Replace PCV valve
Vacuum leaks	Repair vacuum leaks
Clogged air bleeds	Remove restriction
EGR valve malfunction	Replace EGR valve
Restricted air cleaner filter	Replace air filter
Cracked or broken vacuum hoses	Replace vacuum hoses
Cracked or broken ignition wires	Replace ignition wires
Vacuum advance malfunction	Check unit and replace as

	necessary
Defective or fouled spark plugs	Replace spark plugs
Ping or Spark Knock	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Distributor centrifugal or vacuum advance malfunction	Check operation and replace as necessary
Carburetor setting too lean	Readjust mixture setting, see ENGINE PERFORMANCE
Vacuum leak	Eliminate vacuum leak
EGR valve malfunction	Replace EGR valve
Poor Gasoline Mileage	
Cracked or broken vacuum	Replace vacuum hoses hoses
Vacuum leaks	Repair vacuum leaks
Defective ignition wires	Replace wires
Incorrect choke setting	Readjust setting, see ENGINE PERFORMANCE
Defective vacuum advance	Replace vacuum advance
Defective spark plugs	Replace spark plugs
Binding carburetor power piston	Eliminate binding
Dirt in carburetor jets	Clean and/or replace jets
Incorrect float adjustment	Readjust float setting, see FUEL
Defective power valve	Replace power valve, see ENGINE PERFORMANCE
Incorrect idle speed	Readjust idle speed
Engine Stalls	
Improper float level	Readjust float level
Leaking needle valve and seat	Replace needle valve and seat
Vacuum leaks	Eliminate vacuum leaks

VACUUM PUMP - DIESEL TROUBLE SHOOTING

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NOTE: Diesel engines mechanical diagnosis is the same as gasoline engines for items

such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.

VACUUM PUMP (DIESEL) TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive Noise	
Loose pump-to-drive assembly screws	Tighten screws
Loose tube on pump assembly	Tighten tube
Valves not functioning properly	Replace valves
Oil Leakage	
Loose end plug	Tighten end plug
Bad seal crimp	Remove and re-crimp seal

MANUAL TRANSMISSION

MANUAL TRANSMISSION TROUBLE SHOOTING

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MANUAL TRANSMISSION/TRANSAXLE TROUBLE SHOOTING

Condition	Possible Cause
Noisy In Forward Gears	Low gear oil level, Loose bell housing bolts, Worn bearings or gears
Clunk On Deceleration (FWD Only)	Loose engine mounts, Worn inboard CV joints, Worn differential pinion shaft, Side gear hub counterbore in case worn oversize
Gear Clash When Shifting Forward Gears	Clutch Out Of Adjustment, Shift linkage damaged or out of adjustment, Gears or synchronizers damaged, Low gear oil level
Transmission Noisy When Moving (RWD Only) Quiet In Neutral With Clutch Engaged	Worn rear outputshaft bearing
Gear Rattle	Worn bearings, Wrong gear oil, Low gear oil, Worn gears
Steady Ticking At Idle (Increases With RPM)	Broken tooth on gear
Gear Clash When Shifting Forward Gears	Worn or broken synchronizers
Loud Whine In Reverse	Normal condition (1)
Noise When Stepping On Clutch	Bad release bearing, Worn pilot bearing
Ticking Or Screeching As Clutch Is Engaged	Faulty release bearing, Uneven pressure plate

	fingers
Click Or Snap When Clutch Is Engaged	Worn clutch fork, Worn or broken front bearing retainer
Transmission Shifts Hard	Clutch not releasing, Shift mechanism binding, Clutch installed backwards
Will Not Shift Into One Gear, Shifts Into All Others	Bent shift fork, Worn detent balls
Locked Into Gear, Cannot Shift	Clutch adjustment, Worn detent balls
Transmission Jumps Out Of Gear	Pilot bearing worn, Bent shift fork, Worn gear teeth or face, Excessive gear train end play, Worn synchronizers, Missing detent ball spring, Shift mechanism worn or out of adjustment, Engine or transmission mount bolts loose or out of adjustment, Transmission not aligned
Shift Lever Rattle	Worn shift lever or detents, Worn shift forks, Worn synchronizers sleeve
Shift Lever Hops Under Acceleration	Worn engine or transmission mounts
(1) Most units use spur cut gears in reverse and are noisy	

POWERTRAIN

CLUTCH TROUBLE SHOOTING

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BASIC CLUTCH TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Chattering or Grabbing	
Incorrect clutch adjustment	Adjust clutch
Oil, grease or glaze on facings	Disassemble and clean or replace
Loose "U" joint flange	See DRIVE AXLES article
Worn input shaft spline	Replace input shaft
Binding pressure plate	Replace pressure plate
Binding release lever	See CLUTCH article
Binding clutch disc hub	Replace clutch disc
Unequal pressure plate contact	Replace worn/misaligned components
Loose/bent clutch disc	Replace clutch disc

Incorrect transmission alignment	Realign transmission
Worn pressure plate, disc or flywheel	Replace damaged components
Broken or weak pressure springs	Replace pressure plate
Sticking clutch pedal	Lubricate clutch pedal & linkage
Incorrect clutch disc facing	Replace clutch disc
Engine loose in chassis	Tighten all mounting bolts
Failure to Release	
Oil or grease on clutch facings	Clean or replace clutch clutch disc
Incorrect release lever or pedal adjustment	See CLUTCH article
Worn or broken clutch facings	Replace clutch disc
Bent clutch disc or pressure plate	Replace damaged components
Clutch disc hub binding on input shaft	Clean or replace clutch disc and/or input shaft
Binding pilot bearing	Replace pilot bearing
Sticking release bearing sleeve	Replace release bearing and/or sleeve
Binding clutch cable	See CLUTCH article
Defective clutch master	Replace master cylinder
Defective clutch slave	Replace slave cylinder
Air in hydraulic system	Bleed hydraulic system
Rattling	
Weak or broken release lever spring	Replace spring and check alignment
Damaged pressure plate	Replace pressure plate
Broken clutch return spring	Replace return spring
Worn splines on clutch disc or input shaft	Replace clutch disc and/or input shaft
Worn clutch release bearing	Replace release bearing
Dry or worn pilot bearing	Lubricate or replace pilot bearing
Unequal release lever contact	Align or replace release lever
Incorrect pedal free play	Adjust free play
Warped or damaged clutch disc	Replace damaged components
Slipping	
Pressure springs worn or	Release pressure plate
Oily, greasy or worn facings	Clean or replace clutch disc
Incorrect clutch alignment	Realign clutch assembly

Warped clutch disc or pressure plate	Replace damaged components
Binding release levers or clutch pedal	Lubricate and/or replace release components
Squeaking	
Worn or damaged release	Replace release bearing
Dry or worn pilot or release bearing	Lubricate or replace assembly
Pilot bearing turning in crankshaft	Replace pilot bearing and/or crankshaft
Worn input shaft bearing	Replace bearing and seal
Incorrect transmission alignment	Realign transmission
Dry release fork between pivot	Lubricate release fork and pivot
Heavy and/or Stiff Pedal	
Sticking release bearing sleeve	Replace release bearing and/or sleeve
Dry or binding clutch pedal hub	Lubricate and align components
Floor mat interference with pedal	Lay mat flat in proper area
Dry or binding ball/fork pivots	Lubricate and align components
Faulty clutch cable	Replace clutch cable
Noisy Clutch Pedal	
Faulty interlock switch	Replace interlock switch
Self-adjuster ratchet noise	Lubricate or replace self-adjuster
Speed control interlock switch	Lubricate or replace interlock switch
Clutch Pedal Sticks Down	
Binding clutch cable	See CLUTCH article
Springs weak in pressure plate	Replace pressure plate
Binding in clutch linkage	Lubricate and free linkage
Noisy	
Dry release bearing	Lubricate or replace release bearing
Dry or worn pilot bearing	Lubricate or replace bearing
Worn input shaft bearing	Replace bearing
Transmission Click	
Weak springs in pressure	Replace pressure plate plate
Release fork loose on ball stud	Replace release fork and/or ball stud
Oil on clutch disc damper	Replace clutch disc

Broken spring in slave cylinder	Replace slave cylinder

DRIVE AXLE - NOISE DIAGNOSIS

Unrelated Noises

Some driveline trouble symptoms are also common to the engine, transmission, wheel bearings, tires, and other parts of the vehicle. Ensure cause of trouble actually is in the drive axle before adjusting, repairing, or replacing any of its parts.

Non-Drive Axle Noises

A few conditions can sound just like drive axle noise and have to be considered in pre-diagnosis. The 4 most common noises are exhaust, tires, CV/universal joints and wheel trim rings.

In certain conditions, the pitch of the exhaust gases may e gear whine. At other times, it may be mistaken for a wheel bearing rumble.

Tires, especially radial and snow, can have a high-pitched tread whine or roar, similar to gear noise. Also, some non-standard tires with an unusual tread construction may emit a roar or whine.

Defective CV/universal joints may cause clicking noises or excessive driveline play that can be improperly diagnosed as drive axle problems.

Trim and moldings also can cause a whistling or whining noise. Ensure none of these components are causing the noise before disassembling the drive axle.

Gear Noise

A "howling" or "whining" noise from the ring and pinion gear can be caused by an improper gear pattern, gear damage, or improper bearing preload. It can occur at various speeds and driving conditions, or it can be continuous.

Before disassembling axle to diagnose and correct gear ke sure that tires, exhaust, and vehicle trim have been checked as possible causes.

Chuckle

This is a particular rattling noise that sounds like a stick against the spokes of a spinning bicycle wheel. It occurs while decelerating from 40 MPH and usually can be heard until vehicle comes to a complete stop. The frequency varies with the speed of the vehicle.

A chuckle that occurs on the driving phase is usually caused ive clearance due to differential gear wear, or by a damaged tooth on the coast side of the pinion or ring gear. Even a very small tooth nick or a ridge on the edge of a gear tooth is enough the cause the noise.

This condition can be corrected simply by cleaning the gear tooth nick or ridge with a small grinding

wheel. If either gear is damaged or scored badly, the gear set must be replaced. If metal has broken loose, the carrier and housing must be cleaned to remove particles that could cause damage.

Knock

This is very similar to a chuckle, though it may be louder, and occur on acceleration or deceleration. Knock can be caused by a gear tooth that is damaged on the drive side of the ring and pinion gears. Ring gear bolts that are hitting the carrier casting can cause knock. Knock can also be due to excessive end play in the axle shafts.

Clunk

Clunk is a metallic noise heard when an automatic transmission is engaged in Reverse or Drive, or when throttle is applied or released. It is caused by backlash somewhere in the driveline, but not necessarily in the axle. To determine whether driveline clunk is caused by the axle, check the total axle backlash as follows:

1. Raise vehicle on a frame or twinpost hoist so that drive wheels are free. Clamp a bar between axle companion flange and a part of the frame or body so that flange cannot move.
2. On conventional drive axles, lock the left wheel to keep it from turning. On all models, turn the right wheel slowly until it is felt to be in Drive condition. Hold a chalk marker on side of tire about 12" from center of wheel. Turn wheel in the opposite direction until it is again felt to be in Drive condition.
3. Measure the length of the chalk mark, which is the total axle backlash. If backlash is one inch or less, drive axle is not the source of clunk noise.

Bearing Whine

Bearing whine is a high-pitched sound similar to a whistle. It is usually caused by malfunctioning pinion bearings. Pinion bearings operate at drive shaft speed. Roller wheel bearings may whine in a similar manner if they run completely dry of lubricant. Bearing noise will occur at all driving speeds. This distinguishes it from gear whine, which usually comes and goes as speed changes.

Bearing Rumble

Bearing rumble sounds like marbles being tumbled. It is usually caused by a malfunctioning wheel bearing. The lower pitch is because the wheel bearing turns at only about 1/3 of drive shaft speed.

Chatter On Turns

This is a condition where the entire front or rear of vehicle vibrates when vehicle is moving. The vibration is plainly felt as well as heard. Extra differential thrust washers installed during axle repair can cause a condition of partial lock-up that creates this chatter.

Axle Shaft Noise

Axle shaft noise is similar to gear noise and pinion bearing whine. Axle shaft bearing noise will normally distinguish itself from gear noise by occurring in all driving modes (Drive, cruise, coast and

float), and will persist with transmission in Neutral while vehicle is moving at problem speed.

If vehicle displays this noise condition, remove suspect parts, replace wheel seals and install a new set of bearings. Re-evaluate vehicle for noise before removing any internal components.

Vibration

Vibration is a high-frequency trembling, shaking or grinding condition (felt or heard) that may be constant or variable in level and can occur during the total operating speed range of the vehicle.

The types of vibrations that can be felt in the vehicle can d into 3 main groups:

- Vibrations of various unbalanced rotating parts of the vehicle.
- Resonance vibrations of the body and frame structures caused by rotating of unbalanced parts.
- Tip-in moans of resonance vibrations from stressed engine or exhaust system mounts or driveline flexing modes.

DRIVE AXLE - RWD TROUBLE SHOOTING

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DRIVE AXLE (RWD) TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION
Knocking or Clunking	
Differential Side Gear Clearance	Check Clearance
Worn Pinion Shaft	Replace Pinion Shaft
Axle Shaft End Play	Check End Play
Missing Gear Teeth	Check Differential/Replace Gear
Wrong Axle Backlash	Check Backlash
Misaligned Driveline	Realign Driveline
Clinking During Engagement	
Side Gear Clearance	Check Clearance
Ring and Pinion Backlash	Check Backlash
Worn/Loose Pinion Shaft	Replace Shaft/Bearing
Bad "U" Joint	Replace "U" Joint
Sticking Slip Yoke	Lube Slip Yoke

Broken Rear Axle Mount	Replace Mount
Loose Drive Shaft Flange	Check Flange
Click/Chatter On Turns	
Differential Side Gear Clearance	Check Clearance
Wrong Turn On Plates (1)	Replace Clutch Plates
Wrong Differential Lubricant (1)	Change Lubricant
Knock Or Click	
Flat Spot on Rear Wheel Bearing	Replace Wheel Bearing
Low Vibration At All Speeds	
Faulty Wheel Bearing	Replace Wheel Bearing
Faulty "U" Joint	Replace "U" Joint
Faulty Drive Shaft	Balance Drive Shaft
Faulty Companion Flange	Replace Flange
Faulty Slip Yoke Flange	Replace Flange
(1) Limited slip differential only.	

FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING

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BASIC FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Grease Leaks	CV boot torn or cracked
Clicking Noise on Cornering	Damaged outer CV
Clunk Noise on Acceleration	Damaged inner CV
Vibration or Shudder on Acceleration	Sticking, damaged or worn CV Misalignment or spring height

STEERING & SUSPENSION

MANUAL STEERING GEAR TROUBLE SHOOTING

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BASIC MANUAL STEERING GEAR TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise in Rack and Pinion	
Rack and pinion mounting bracket loose	Tighten all mounting bolts
Lack of/or incorrect lubricant	Correct as necessary
Steering gear mounting bolts loose	Tighten all mounting bolts
Excessive Play	
Front wheel bearing improperly adjusted	See FRONT SUSPENSION article
Loose or worn steering linkage	See STEERING LINKAGE article
Loose or worn steering gear shift	See MANUAL STEERING GEAR article
Steering arm loose on gear shaft	See MANUAL STEERING GEAR article
Steering gear housing bolts loose	Tighten all mounting bolts
Steering gear adjustment too loose	See MANUAL STEERING GEAR article
Steering arms loose on knuckles	Tighten and check steering linkage
Rack and pinion mounting loose	Tighten all mounting bolts
Rack and pinion out of adjustment	See adjustment in STEERING article
Tie rod end loose	Tighten and check steering linkage
Excessive Pitman shaft-to-ball nut lash	Repair as necessary
Poor Returnability	
Lack of lubricant in ball joint or linkage	Lubricate and service systems
Binding in linkage or ball joints	See STEERING LINKAGE and SUSPENSION article
Improper front end alignment	See WHEEL ALIGNMENT article
Improper tire pressure	Inflate to proper pressure
Tie rod binding	Inflate to proper pressure
Shaft seal rubbing shaft	See STEERING COLUMN article
Excessive Vertical Motion	
Improper tire pressure	Inflate to proper pressure
Tires, wheels or rotors out of balance	Balance tires then check wheels and rotors
Worn or faulty shock absorbers	Check and replace if necessary

Loose tie rod ends or steering	Tighten or replace if necessary
Loose or worn wheel bearings	See SUSPENSION article
Steering Pulls to One Side	
Improper tire pressure	Inflate to proper pressure
Front tires are different sizes	Rotate or replace if necessary
Wheel bearings not adjusted properly	See FRONT SUSPENSION article
Bent or broken suspension components	See FRONT SUSPENSION article
Improper wheel alignment	See WHEEL ALIGNMENT article
Brakes dragging	See BRAKES article
Instability	
Low or uneven tire pressure	Inflate to proper pressure
Loose or worn wheel bearings	See FRONT SUSPENSION article
Loose or worn idler arm bushing	See FRONT SUSPENSION article
Loose or worn strut bushings	See FRONT SUSPENSION article
Incorrect front wheel alignment	See WHEEL ALIGNMENT article
Steering gear not centered	See MANUAL STEERING GEARS article
Springs or shock	Check and replace if necessary
Improper cross shaft	See MANUAL STEERING GEARS article

POWER STEERING TROUBLE SHOOTING

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BASIC POWER STEERING TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise	
Pressure hoses touching engine parts	Adjust to proper clearance

Loose Pitman shaft	Adjust or replace if necessary
Tie rods ends or Pitman arm loose	Tighten and check system
Rack and pinion mounts loose	Tighten all mounting bolts
Free play in worm gear	See POWER STEERING GEAR article
Loose sector shaft or thrust bearing adjustment	See POWER STEERING GEAR
Free play in pot coupling	See STEERING COLUMN article
Worn shaft serrations	See STEERING COLUMN article
Growl in Steering Pump	
Excessive pressure in hoses	Restricted hoses, see POWER STEERING GEAR article
Scored pressure plates	See POWER STEERING GEAR article
Scored thrust plates or rotor	See POWER STEERING GEAR article
Extreme wear of cam ring	See POWER STEERING GEAR article
Rattle in Steering Pump	
Vanes not installed	See POWER STEERING PUMP article
Vanes sticking in rotor	See POWER STEERING PUMP article
Swish noise in Pump	
Defective flow control valve	See POWER STEERING PUMP article
Groan in Steering Pump	
Air in fluid	See POWER STEERING PUMP article
Poor pressure hose connection	Tighten and check, replace if necessary
Squawk When Turning	
Damper "O" ring on valve spool cut	See POWER STEERING PUMP article
Moan or Whine in Pump	
Pump shaft bearing scored	Replace bearing and fluid
Air in fluid or fluid level low	See POWER STEERING PUMP article
Hose or column grounded	Check and replace if

	necessary
Cover "O" ring missing or damaged	See POWER STEERING PUMP article
Valve cover baffle missing or damaged	See POWER STEERING PUMP article
Interference of components in pump	See POWER STEERING PUMP article
Loose or poor bracket alignment	Correct or replace if necessary
Hissing When Parking	
Internal leakage in steering gear	Check valved assembly first
Chirp in Steering Pump	
Loose or worn power steering belt	Adjust or replace if necessary
Buzzing When Not Steering	
Noisy pump	See POWER STEERING PUMP article
Free play in steering shaft bearing	See STEERING COLUMN article
Bearing loose on shaft serrations	See STEERING COLUMN article
Clicking Noise in Pump	
Pump slippers too long	See POWER STEERING PUMP article
Broken slipper springs	See POWER STEERING PUMP article
Excessive wear or nicked rotors	See POWER STEERING PUMP article
Damaged cam contour	See POWER STEERING PUMP article
Poor Return of Wheel	
Wheel rubbing against turn signal	See STEERING COLUMN SWITCHES article
Flange rubbing steering gear adjuster	See STEERING COLUMN article
Tight or frozen steering shaft bearing	See STEERING COLUMN article
Steering gear out of adjustment	See POWER STEERING GEAR article
Sticking or plugged spool valve	See POWER STEERING PUMP article
Improper front end alignment	See WHEEL ALIGNMENT

	article
Wheel bearings worn or loose	See FRONT SUSPENSION article
Ties rods or ball joints binding	Check and replace if necessary
Intermediate shaft joints binding	See STEERING COLUMN article
Kinked pressure hoses	Correct or replace if necessary
Loose housing head spanner nut	See POWER STEERING GEAR article
Damaged valve lever	See POWER STEERING GEAR article
Sector shaft adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article
Worm thrust bearing adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article
Reaction ring sticking in cylinder	See POWER STEERING GEAR article
Reaction ring sticking in housing head	See POWER STEERING GEAR article
Steering pump internal leakage	See POWER STEERING PUMP article
Steering gear-to-column misalignment	See STEERING COLUMN article
Lack of lubrication in linkage	Service front suspension
Lack of lubrication in ball joints	Service front suspension
Increased Effort When Turning Wheel Fast Foaming, Milky Power Steering Fluid, Low Fluid Level or Low Pressure	
High internal pump leakage	See POWER STEERING PUMP article
Power steering pump belt slipping	Adjust or replace if necessary
Low fluid level	Check and fill to proper level
Engine idle speed to low	Adjust to correct setting
Air in pump fluid system	See POWER STEERING PUMP article
Pump output low	See POWER STEERING PUMP article
Steering gear malfunctioning	See POWER STEERING GEAR article

Wheel Surges or Jerks	
Low fluid level	Check and fill to proper level
Loose fan belt	Adjust or replace if necessary
Insufficient pump pressure	See POWER STEERING PUMP article
Sticky flow control valve	See POWER STEERING PUMP article
Linkage hitting oil pan at full turn	Replace bent components
Kick Back or Free Play	
Air in pump fluid system	See POWER STEERING PUMP article
Worn poppet valve in steering gear	See POWER STEERING PUMP article
Excessive over center lash	See POWER STEERING GEAR article
Thrust bearing out of adjustment	See POWER STEERING GEAR article
Free play in pot coupling	See POWER STEERING PUMP article
Steering gear coupling loose on shaft	See POWER STEERING PUMP article
Steering disc mounting bolts loose	Tighten or replace if necessary
Coupling loose on worm shaft	Tighten or replace if necessary
Improper sector shaft adjustment	See POWER STEERING GEAR article
Excessive worm piston side play	See POWER STEERING GEAR article
Damaged valve lever	See POWER STEERING GEAR article
Universal joint loose	Tighten or replace if necessary
Defective rotary valve	See POWER STEERING GEAR article
No Power When Parking	
Sticking flow control valve	See POWER STEERING PUMP article
Insufficient pump pressure output	See POWER STEERING PUMP article
Excessive internal pump leakage	See POWER STEERING PUMP article

Excessive internal gear leakage	See POWER STEERING PUMP article
Flange rubs against gear adjust plug	See STEERING COLUMN article
Loose pump belt	Adjust or replace if necessary
Low fluid level	Check and add proper amount of fluid
Engine idle too low	Adjust to correct setting
Steering gear-to-column misaligned	See STEERING COLUMN article
No Power, Left Turn	
Left turn reaction seal "O" ring worn	See POWER STEERING GEAR article
Left turn reaction seal damaged/missing	See POWER STEERING GEAR article
Cylinder head "O" ring damaged	See POWER STEERING PUMP article
No Power, Right Turns	
Column pot coupling bottomed	See STEERING COLUMN article
Right turn reaction seal "O" ring worn	See POWER STEERING GEAR article
Right turn reaction seal damaged	See POWER STEERING GEAR article
Internal leakage through piston end plug	See POWER STEERING GEAR article
Internal leakage through side plugs	See POWER STEERING GEAR article
Lack of Effort in Turning	
Left and/or right reaction seal sticking in cylinder head	Replace, see POWER STEERING GEAR article
Wanders to One Side	
Front end alignment incorrect	See WHEEL ALIGNMENT article
Unbalanced steering gear valve	See POWER STEERING GEAR article
Low Pressure Due to Steering Pump	
Flow control valve stuck or inoperative	See POWER STEERING PUMP article
Pressure plate not flat against cam ring	See POWER STEERING PUMP article
Extreme wear of cam ring	Replace and check

	adjustments
Scored plate, thrust plate or rotor	See POWER STEERING PUMP article
Vanes not installed properly	See POWER STEERING PUMP article
Vanes sticking in rotor slots	See POWER STEERING PUMP article
Cracked/broken thrust or pressure plate	See POWER STEERING PUMP article

STEERING COLUMN TROUBLE SHOOTING

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BASIC STEERING COLUMN TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Noise in Steering	
Coupling pulled apart	See STEERING COLUMNS article
Column not correctly aligned	See STEERING COLUMNS article
Broken lower joint	Replace joint
Horn contact ring not	See STEERING COLUMN article
Bearing not lubricated	See STEERING COLUMN article
Shaft snap ring not properly seated	Reseat or replace snap ring
Plastic spherical joint not lubricated	See STEERING COLUMN article
Shroud or housing loose	Tighten holding screws
Lock plate retaining ring not seated	See STEERING COLUMN article
Loose sight shield	Tighten holding screws
High Steering Shaft Effort	
Column assembly misaligned	See STEERING COLUMN article
Improperly installed dust shield	Adjust or replace
Tight steering universal joint	See STEERING COLUMN article

High Shift Effort	
Column is out of alignment	See STEERING COLUMN article
Improperly installed dust shield	Adjust or replace
Seals or bearings not lubricated	See STEERING COLUMNS article
Mounting bracket screws too long	Replace with new shorter screws
Burrs on shift tube	Remove burrs or replace tube
Lower bowl bearing assembled wrong	See STEERING COLUMN article
Shift tube bent or broken	Replace as necessary
Improper adjustment of shift levers	See STEERING COLUMN article
Improper Trans. Shifting	
Sheared shift tube joint	Replace as necessary
Sheared lower shaft lever	Replace as necessary
Improper shift lever adjustment	See STEERING COLUMN article
Improper gate plate adjustment	See STEERING COLUMN article
Excess Play in Column	
Instrument panel bracket bolts loose	Tighten bolts and check bracket
Broken weld nut on jacket	See STEERING COLUMN article
Instrument bracket capsule sheared	See STEERING COLUMN article
Column bracket/jacket bolts loose	Tighten bolts and check bracket
Steering Locks in Gear	
Release lever mechanism	See STEERING COLUMN article

SUSPENSION TROUBLE SHOOTING

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BASIC SUSPENSION TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Front End Noise	
Loose or worn wheel	See Wheel Bearing Adjustment in SUSPENSION
Worn shocks or shock mountings	Replace struts or strut mountings
Worn struts or strut mountings	Replace struts or strut mountings
Loose or worn lower control arm	See SUSPENSION
Loose steering gear-to-frame bolts	See STEERING
Worn control arm bushings	See SUSPENSION
Ball joints not lubricated	Lubricate ball joints & see Ball Joint Checking in SUSPENSION
Front Wheel Shake, Shimmy, or Vibration	
Tires or wheels out of balance	Check tire balance
Incorrect wheel alignment	See WHEEL ALIGNMENT
Drive shaft unbalanced	Check drive shaft balance
Loose or worn wheel bearings	See WHEEL ALIGNMENT
Loose or worn tie rod ends	See SUSPENSION
Worn upper ball joints	See Ball Joint Checking in SUSPENSION
Worn shock absorbers	Replace shock absorbers
Worn strut bushings	Replace strut bushings
Car Pulls to One Side	
Mismatched or uneven tires	Check tire condition
Broken or sagging springs	See SUSPENSION
Loose or worn strut bushings	See SUSPENSION
Improper wheel alignment	See WHEEL ALIGNMENT
Improper rear axle alignment	Check rear axle alignment
Power steering gear unbalanced	See STEERING
Front brakes dragging	See BRAKES
Abnormal Tire Wear	
Unbalanced tires	Check tire balance & rotation
Sagging or broken springs	See SUSPENSION
Incorrect front end alignment	See WHEEL ALIGNMENT
Faulty shock absorbers	Replace chock absorbers
Scuffed Tires	
Toe-In incorrect	See WHEEL ALIGNMENT
Suspension arm bent or twisted	See appropriate

	SUSPENSION article
Springs Bottom or Sag	
Bent or broken springs	See SUSPENSION
Leaking or worn shock absorbers	Replace shock absorbers
Frame misalignment	Check frame for damage
Spring Noises	
Loose "U" Bolts	See SUSPENSION
Loose or worn bushings	See SUSPENSION
Worn or missing interliners	See SUSPENSION
Shock Absorber Noise	
Loose shock mountings	Check & tighten mountings
Worn bushings	Replace bushings
Air in system	Bleed air from system
Undercoating on shocks	Remove undercoating
Car Leans or Sways on Corners	
Loose stabilizer bar	See SUSPENSION
Faulty shocks or mountings	Replace shocks or mountings
Broken or sagging springs	See SUSPENSION
Shock Absorbers Leaking	
Worn seals or reservoir tube crimped	See SUSPENSION
Broken Springs	
Loose "U" bolts	See SUSPENSION
Inoperative shock absorbers	Replace shock absorbers

WHEEL ALIGNMENT TROUBLE SHOOTING

NOTE: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC WHEEL ALIGNMENT TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Premature Tire Wear	
Improper tire inflation	Check tire pressure
Front alignment out of tolerance	See ALIGNMENT SPECS in WHEEL ALIGNMENT section
Suspension components worn	See SUSPENSION section
Steering system components worn	See STEERING section

Improper standing height	See WHEEL ALIGNMENT
Uneven or sagging springs	See SUSPENSION section
Bent wheel	See WHEEL ALIGNMENT
Improper torsion bar adjustment	See SUSPENSION section
Loose or worn wheel bearings	See WHEEL BEARING ADJ. in SUSPENSION section
Worn or defective shock	Replace shock absorbers
Tires out of balance	Check tire balance
Pulls to One Side	
Improper tire inflation	Check tire pressure
Brake dragging	See BRAKE section
Mismatched tires	See WHEEL ALIGNMENT
Broken or sagging spring	See SUSPENSION section
Broken torsion bar	See SUSPENSION section
Power steering valve not centered	See STEERING section
Front alignment out of tolerance	See WHEEL ALIGNMENT section
Defective wheel bearing	See WHEEL BEARINGS in SUSPENSION section
Uneven sway bar links	See SUSPENSION section
Frame bent	Check for frame damage
Steering system bushing worn	See STEERING section
Hard Steering	
Idler arm bushing too tight	See STEERING LINKAGE in STEERING section
Ball joint tight or seized	See SUSPENSION section
Steering linkage too tight	See STEERING LINKAGE in STEERING section
Power steering fluid low	Add proper amount of fluid
Power steering drive belt loose	See STEERING section
Power steering pump defective	See STEERING section
Steering gear out of adjustment	See STEERING section
Incorrect wheel alignment	See WHEEL ALIGNMENT
Damaged steering gear	See STEERING section
Damaged suspension	See SUSPENSION section
Bent steering knuckle or supports	See SUSPENSION section
Vehicle "Wanders"	
Strut rod or control arm bushing worn	See SUSPENSION section
Loose or worn wheel bearings	See WHEEL BEARINGS in SUSPENSION section
Improper tire inflation	Check tire pressure

Stabilizer bar missing or defective	See SUSPENSION section
Wheel alignment out of tolerance	See Adjustment in WHEEL ALIGNMENT section
Broken spring	See SUSPENSION section
Defective shock absorber	Replace shock absorbers
Worn steering & suspension components	See SUSPENSION section
Front End Shimmy	
Tire out of balance/round	Check tire balance
Excessive wheel runout	See WHEEL ALIGNMENT
Insufficient or improper caster	See WHEEL ALIGNMENT section
Worn suspension or steering components	See SUSPENSION section
Defective shock absorbers	Replace shock absorber
Wheel bearings worn or loose	See WHEEL BEARING ADJ. in SUSPENSION section
Power steering reaction Bracket loose	See STEERING section
Steering gear box (rack) mounting loose	See STEERING section
Steering gear adjustment loose	See STEERING section
Worn spherical joints	See SUSPENSION section
Toe-In Not Adjustable	
Lower control arm bent	See SUSPENSION section
Frame bent	Check frame for damage
Camber Not Adjustable	
Control arm bent	See SUSPENSION section
Frame bent	Check frame for damage
Hub & bearing not seated properly	See SUSPENSION section

ACCESSORIES AND EQUIPMENT

Body - Interior & Exterior - Chrysler 300

WARNING

USE OF HEAT DURING REPAIR

WARNING: Chrysler Group LLC engineering's position on the use of heat during collision repair is as follows:

- **Any body panel or frame component damaged which is to be repaired and reused, must be repaired using the "cold straightening" method. No heat may be used during the straightening process.**
- **During rough straightening prior to panel replacement, damaged panels or frame components may be heated to assist in body/frame realignment. The application of heat must be constrained to the parts which will be replaced and not allowed to affect any other components.**

This "no heat" recommendation is due to the extensive use of high strength and advanced high strength steels in Chrysler Group LLC products. High-strength materials can be substantially and negatively affected from heat input which will not be obviously known to the repairer or consumer.

Ignoring these recommendations may lead to serious compromises in the ability to protect occupants in a future collision event, reduce the engineered qualities and attributes, or decrease the durability and reliability of the vehicle.

This statement supersedes any previously released information by the Chrysler Group LLC.

Failure to follow these instructions may result in serious or fatal injury.

WARNINGS

WARNING: Use an Occupational Safety and Health Administration (OSHA) approved breathing filter, when spraying paint or solvents in a confined area. Failure to follow these instructions may result in possible serious or fatal injury.

- **avoid prolonged skin contact with petroleum or alcohol based cleaning solvents.**
- **do not stand under a hoisted vehicle that is not properly supported**

on safety stands. Failure to follow these instructions may result in possible serious or fatal injury.

CAUTION: When holes are drilled or punched in an inner body panel, verify the depth of space to the outer body panel, electrical wiring or other components. Damage to the vehicle can result.

- **do not weld exterior panels unless combustible material on the interior of vehicle is removed from the repair area. Fire or hazardous conditions, can result.**
- **always have a fire extinguisher ready for use when welding.**
- **disconnect the negative (-) cable clamp from the battery when servicing electrical components that are live when the ignition is off. Damage to electrical system can result.**
- **do not use abrasive chemicals or compounds on painted surfaces. Damage to finish can result.**
- **do not use harsh alkaline based cleaning solvents on painted or upholstered surfaces. Damage to finish or color can result.**
- **do not hammer or pound on plastic trim panel when servicing interior trim. Plastic panels can break.**

RESTRAINT WARNINGS

WARNING: To avoid potential physical injury, or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the ORC capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 30 cm (12 in) of an electronic module/harness, then that module/harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens. Failure to follow these instructions may result in serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with the Supplemental Restraint System (SRS), never attempt to repair the electrically conductive circuits or wiring components related to the SRS for which there is no MOPAR wiring repair kit. It is important to use ONLY the recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR Connector Web Site at the following address on the internet: (http://dto.vftis.com/mopar/disclaimer.asp). Inappropriate repairs can

compromise the conductivity and current carrying capacity of those critical electrical circuits, which may cause SRS components not to deploy when required, or to deploy when not required. Only minor cuts or abrasions of wire and terminal insulation where the conductive material has not been damaged, or connector insulators where the integrity of the latching and locking mechanisms have not been compromised may be repaired using appropriate methods.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side curtain airbags in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side curtain airbags will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

WARNING: To avoid potential physical injury or damage to sensitive electronic

circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the Occupant Restraint Controller (ORC) capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 12 inches (30 centimeters) of an electronic module or wiring harness, then that module or harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens.

WARNING: To avoid serious or fatal injury, do not attempt to dismantle an airbag unit or tamper with its inflator. Do not puncture, incinerate or bring into contact with electricity. Do not store at temperatures exceeding 93° C (200° F). An airbag inflator unit may contain sodium azide and potassium nitrate. These materials are poisonous and extremely flammable. Contact with acid, water, or heavy metals may produce harmful and irritating gases (sodium hydroxide is formed in the presence of moisture) or combustible compounds. An airbag inflator unit may also contain a gas canister pressurized to over 17.24 kPa (2500 psi). Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury when handling a seat belt tensioner retractor. Exercise proper care to keep fingers out from under the retractor cover and away from the seat belt webbing where it exits from the retractor cover. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury, replace all Supplemental Restraint System (SRS) components only with parts specified in the Chrysler Mopar® Parts Catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection.

WARNING: To avoid serious or fatal injury, the fasteners, screws, and bolts originally used for the Supplemental Restraint System (SRS) components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the SRS. Anytime a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler Mopar® Parts Catalog.

WARNING: To avoid serious or fatal injury when a steering column has an airbag unit attached, never place the column on the floor or any other surface with the steering wheel or airbag unit face down. Failure to follow these instructions may result in possible serious or fatal injury.

DESCRIPTION

DESCRIPTION

Throughout this information, references to the Chrysler Corporation vehicle family identification code are used when describing a procedure that is unique to that vehicle. Refer to **VEHICLE INFORMATION** for detailed information on vehicle identification. If a procedure is common to all vehicles covered in this information, no reference will be made to a vehicle family code.

DIAGNOSIS AND TESTING

WATER LEAKS

Water leaks can be caused by poor sealing, improper body component alignment, body seam porosity, missing plugs, or blocked drain holes. Centrifugal and gravitational force can cause water to drip from a location away from the actual leak point, making leak detection difficult. All body sealing points should be water tight in normal wet-driving conditions. Water flowing downward from the front of the vehicle should not enter the passenger or luggage compartment. Moving sealing surfaces will not always seal water tight under all conditions. At times, side glass or door seals will allow water to enter the passenger compartment during high pressure washing or hard driving rain (severe) conditions. Overcompensating on door or glass adjustments to stop a water leak that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After completing a repair, water test vehicle to verify leak has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE WATER LEAK TESTS

Verify that floor and body plugs are in place, body drains are clear, and body components are properly aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate information for proper procedures.

WATER LEAK TESTS

> **WARNING: Do not use electric shop lights or tools in water test area. Personal injury can result.**

When the conditions causing a water leak have been determined, simulate the conditions as closely as possible.

- If a leak occurs with the vehicle parked in a steady light rain, flood the leak area with an open-ended garden hose.
- If a leak occurs while driving at highway speeds in a steady rain, test the leak area with a reasonable velocity stream or fan spray of water. Direct the spray in a direction comparable to actual conditions.
- If a leak occurs when the vehicle is parked on an incline, hoist the end or side of the vehicle to simulate this condition. This method can be used when the leak occurs when the vehicle accelerates, stops or turns. If the leak occurs on acceleration, hoist the front of the vehicle. If the

leak occurs when braking, hoist the back of the vehicle. If the leak occurs on left turns, hoist the left side of the vehicle. If the leak occurs on right turns, hoist the right side of the vehicle. For hoisting recommendations. Refer to **HOISTING, STANDARD PROCEDURE** .

WATER LEAK DETECTION

To detect a water leak point-of-entry, do a water test and watch for water tracks or droplets forming on the inside of the vehicle. If necessary, remove interior trim covers or panels to gain visual access to the leak area. If the hose cannot be positioned without being held, have someone help do the water test.

Some water leaks must be tested for a considerable length of time to become apparent. When a leak appears, find the highest point of the water track or drop. The highest point usually will show the point of entry. After leak point has been found, repair the leak and water test to verify that the leak has stopped.

Locating the entry point of water that is leaking into a cavity between panels can be difficult. The trapped water may splash or run from the cavity, often at a distance from the entry point. Most water leaks of this type become apparent after accelerating, stopping, turning, or when on an incline.

MIRROR INSPECTION METHOD

When a leak point area is visually obstructed, use a suitable mirror to gain visual access. A mirror can also be used to deflect light to a limited-access area to assist in locating a leak point.

BRIGHT LIGHT LEAK TEST METHOD

Some water leaks in the luggage compartment can be detected without water testing. Position the vehicle in a brightly lit area. From inside the darkened luggage compartment inspect around seals and body seams. If necessary, have a helper direct a drop light over the suspected leak areas around the luggage compartment. If light is visible through a normally sealed location, water could enter through the opening.

PRESSURIZED LEAK TEST METHOD

When a water leak into the passenger compartment cannot be detected by water testing, pressurize the passenger compartment and soap test exterior of the vehicle. To pressurize the passenger compartment, close all doors and windows, start engine, and set heater control to high blower in HEAT position. If engine can not be started, connect a charger to the battery to ensure adequate voltage to the blower. With interior pressurized, apply dish detergent solution to suspected leak area on the exterior of the vehicle. Apply detergent solution with spray device or soft bristle brush. If soap bubbles occur at a body seam, joint, seal or gasket, the leak entry point could be at that location.

WIND NOISE

Wind noise is the result of most air leaks. Air leaks can be caused by poor sealing, improper body component alignment, body seam porosity, or missing plugs in the engine compartment or door hinge pillar areas. All body sealing points should be airtight in normal driving conditions. Moving sealing

surfaces will not always seal airtight under all conditions. At times, side glass or door seals will allow wind noise to be noticed in the passenger compartment during high cross winds. Over compensating on door or glass adjustments to stop wind noise that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After a repair procedure has been performed, test vehicle to verify noise has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE TESTS

Verify that floor and body plugs are in place and body components are aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate information for proper procedures.

ROAD TESTING WIND NOISE

1. Drive the vehicle to verify the general location of the wind noise.
2. Apply 50 mm (2 in.) masking tape in 150 mm (6 in.) lengths along weatherstrips, weld seams or moldings. After each length is applied, drive the vehicle. If noise goes away after a piece of tape is applied, remove tape, locate, and repair defect.

POSSIBLE CAUSE OF WIND NOISE

- Moldings standing away from body surface can catch wind and whistle.
- Gaps in sealed areas behind overhanging body flanges can cause wind-rushing sounds.
- Misaligned movable components.
- Missing or improperly installed plugs in pillars.
- Weld burn through holes.

STANDARD PROCEDURE

BUZZ, SQUEAKS AND RATTLES

Buzz, Squeaks and Rattles (BSR's) may be caused by any one or more of the following and may be corrected as indicated:

- Loose fasteners should be tightened to specifications.
- Damaged or missing clips should be replaced.
- Damaged trim panels should be replaced.
- Incorrectly installed trim panels should be reinstalled properly.

Many BSR complaints such as loose trim, can be serviced using various tapes or lubricants. Tapes including foam, flock and anti-squeak, can be used to eliminate noises caused by metal, plastic and vinyl components. Long life lubricants and greases can also be used on a variety of components. Refer to the table for materials and usage. Refer to **BUZZ, SQUEAKS AND RATTLES**.

BUZZ, SQUEAKS AND RATTLES

ITEM	FEATURES	APPLICATIONS	SERVICE TEMP
ITCH AND SQUEAK TAPE	An abrasion resistant material thin enough to conform to most irregular surfaces. Stops most itches and squeaks.	Between metal and metal, metal and plastic, metal and vinyl, vinyl and plastic. Interior. Examples: Trim panels and bezels.	-40° to 107° C (-40° to 225° F)
BLACK NYLON FLOCK	Nylon Flock with an aggressive acrylic adhesive. Provides for cushioning and compression fit, also isolates components. Water-resistant.	Between metal and metal, metal and plastic, vinyl and plastic. Examples: Pull cups, bezels, clips, ducts, top cover to glass, cowl panel.	-40° to 82° C (-40° to 180° F)
HIGH DENSITY URETHANE FOAM	Tear resistant, highly resilient and durable.	Between metal and metal, metal and plastic. Water-resistant. Examples: I/P, heavy metal rattles, isolating brackets.	-40° to 82° C (-40° to 180° F)
OPEN CELL FOAM TAPE	Soft foam conforms to irregular surfaces.	Wire harness and connector wrap. Examples: Seals, gasket, wiring, heat ducts.	-40° to 82° C (-40° to 180° F)
CLOSED CELL LOW DENSITY FOAM TAPE	Soft, conformable. Water-resistant.	Wherever bulk is needed. Prevents closing flutters and rattles when applied to door watershield. Examples: Door, I/P.	-40° to 82° C (-40° to 180° F)
NYE® GREASE 880	Long life.	Suspensions. Examples: Strut bushings, sway bars.	-40° to 200° C (-40° to 390° F)
KRYTOX® OIL	Long life. Will not dry out or harm plastics or rubber.	When access is not possible, oil will migrate to condition. Vinyl, rubber, plastic, metal. Examples: Convertible top bushings, pull cups trim panel inserts.	-34° to 205° C (-30° to 400° F)
KRYTOX® GREASE	Long life. Will not dry out or harm plastics or rubber.	Vinyl, rubber, plastic, metal, glass. Examples: Weather-strips, backlite and windshield moldings.	-34° to 205° C (-30° to 400° F)

HEAT STAKING

1. Remove trim panel.
2. Bend or move the trim panel components at the heat staked joints. Observe the heat staked locations and/or component seams for looseness.
3. Heat stake the components.
    1. If the heat staked or component seam location is loose, hold the two components tightly together and using a soldering gun with a flat tip, melt the material securing the components together. Do not over heat the affected area, damage to the exterior of the trim panel may occur.
    2. If the heat staked material is broken or missing, use a hot glue gun to apply new material to the area to be repaired. The panels that are being heat staked must be held together while the applying the glue. Once the new material is in place, it may be necessary to use a soldering gun to melt the newly applied material. Do not over heat the affected area, damage to the exterior of the trim panel may occur.
4. Allow the repaired area to cool and verify the repair.
5. Install trim panel.

NET, FORM AND PIERCE REPAIR

CAUTION: Failure to follow these recommendations could result in damage or failure to the part and the related parts.

Net, form and pierce is a manufacturing process which takes place during the original build of the vehicle. The original part will have a beveled platform that will decrease toward the fastener location mounting hole. Replacement parts in these areas may not include bevel (form) and / or fastener hole (pierce) and will need to be adapted for proper fit and finish.

The primary locations which may utilize net, form and pierce are:

- Fender Reinforcement (at front end module mount)
- Fender Tower Mounts
- Hood Hinge (lower half)
- Rear Body Header (liftgate hinge mounts)
- Strut Tower (at upper control arm mount)

NOTE: Shock tower is net, pierce only.

NOTE: The thickness of shims is not to exceed the original thickness of the factory bevel. If more shims are needed damage is still present and must be repaired properly.

If the replacement part did not come with a fastener hole, one of equal size and location will have to be drilled. Body shims should be used in the fender reinforcement to front end module. The hood hinge area, fender tower mounts, and rear body header will utilize washers as spacers where a

specific spacer does not exist. The shims and spacers should be sealed between each other and to the stationary surface. Care should be taken when smoothing sealer around washers to ensure undetectable repair. Refinish the repair area per the paint manufacturers recommendations for corrosion resistance and appearance purposes.

PLASTIC BODY PANEL REPAIR

There are many different types of plastics used in today's automotive environment. We group plastics in three different categories: Rigid, Semi-Rigid, and Flexible. Any of these plastics may require the use of an adhesion promoter for repair. These types of plastic are used extensively on Chrysler LLC vehicles. Always follow repair material manufacturer's plastic identification and repair procedures.

RIGID PLASTICS:

Examples of rigid plastic use: Fascias, Hoods, Doors, and other Body Panels, which include SMC, ABS, and Polycarbonates.

SEMI-RIGID PLASTICS:

Examples of semi-rigid plastic use: Interior Panels, Under Hood Panels, and other Body Trim Panels.

FLEXIBLE PLASTICS:

Examples of flexible plastic use: Fascias, Body Moldings, and upper and lower Fascia Covers.

REPAIR PROCEDURE:

The repair procedure for all three categories of plastics is basically the same. The one difference is the material used for the repair. The materials must be specific for each substrate, rigid repair material for rigid plastic repair, semi-rigid repair material for semi-rigid plastic repair and flexible repair material for flexible plastic repair.

ADHESION PROMOTER/SURFACE MODIFIER:

Adhesion Promoters/Surface Modifiers are required for certain plastics. All three categories may have plastics that require the use of adhesion promoter/surface modifiers. Always follow repair material manufacturer's plastic identification and repair procedures.

SAFETY PRECAUTION AND WARNINGS

WARNING:

- **Eye protection should be used when servicing components. Personal injury can result.**
- **Use an OSHA approved breathing mask when mixing epoxy, grinding, and spraying paint or solvents in a confined area. Personal injury can result.**
- **Avoid prolonged skin contact with resin, petroleum, or alcohol based solvents. Personal injury can result.**

- **Do not venture under a hoisted vehicle that is not properly supported on safety stands. Personal injury can result.**

WARNING: Failure to follow these instructions may result in serious or fatal injury.

NOTE:

- **When holes must be drilled or cut in body panels, verify locations of internal body components and electrical wiring. Damage to vehicle can result.**
- **Do not use abrasive chemicals or compounds on undamaged painted surfaces around repair areas. Damage to finish can result.**

RIGID, SEMI-RIGID, AND FLEXIBLE PLASTIC PARTS TYPES

CODE	FAMILY NAME	COMMON TRADE NAME	TYPICAL APPLICATION
ASA	ACRYLONITRILE STYRENE ACRYLITE	LURAN S	CONSOLES, GRILLES
ABS	ACRYLONITRILE BUTADIENE STYRENE	TERLURAN	"A" PILLARS, CONSOLES, GRILLES
ABS/PC	ABS/PC ALLOY	PULSE, PROLOY, BAYBLEND	DOORS, INSTRUMENT PANELS
ABS/PVC	ABS/PV ALLOY	PROLOY, PULSE, LUSTRAN, CYCLOVIN	DOOR PANELS, GRILLES, TRIM
BMC	BULK MOLDING COMPOUND	BMC	FENDER EXTENSIONS
EMA	EHTYLENE METHYL ACRYLATE/IONOMER	SURLYN, EMA, IONOMER	BUMPER GUARDS, PADS
METTON	METTON	METTON	GRILLES, KICK PANELS, RUNNING BOARDS
MPPO	MODIFIED POLYPHENYLENE OXIDE	MPPO	SPOILER ASSEMBLY
PA	POLYAMID	ZYTEL, VYDYNE, PA, MINLON	FENDERS, QUARTER PANELS
PET	THERMOPLASTIC POLYESTER	RYNITE	TRIM
PBT/PPO	PBT/PPO ALLOY	GERMAX	CLADDINGS
PBTP	POLYBUTYLENE THEREPTHALATE	PBT, PBTP, POCAN, VALOX	WHEEL COVERS, FENDERS, GRILLES
PBTP/EEBC	POLYBUTYLENE THEREPTHALATE/EEBC ALLOY	BEXLOY, "M", PBTP/EEBC	FASCIAS, ROCKER PANEL, MOLDINGS
PC	POLYCARBONATE	LEXAN, MERLON,	TAIL LIGHT LENSES, IP

		CALIBRE, MAKROLON PC	TRIM, VALANCE PANELS
PC/ABS	PC/ABS ALLOY	GERMAX, BAY BLENDS, PULSE	DOORS, INSTRUMENT PANELS
PPO	POLYPHENYLENE OXIDE	AZDEL, HOSTALEN, MARLEX, PRFAX, NORYL, GTX, PPO	INTERIOR TRIM, DOOR PANELS, SPLASH SHIELDS, STEERING COLUMN SHROUD
PPO/PA	POLYPHENYLENE/POLYAMID	PPO/PA, GTX 910	FENDERS, QUARTER PANELS
PR/FV	FIBERGLASS REINFORCED PLASTIC	FIBERGLASS, FV, PR/FV	BODY PANELS
PS	POLYSTYRENE	LUSTREX, STYRON, PS	DOOR PANELS, DASH PANELS
RTM	RESIN TRANSFER MOLDING COMPOUND	RTM	BODY PANELS
SMC	SHEET MOLDED COMPOUND	SMC	BODY PANELS
TMC	TRANSFER MOLDING COMPOUND	TMC	GRILLES
UP	UNSATURATED POLYESTER (THERMOSETTING)	SMC, BMC, TMC, ZMC, IMC, XSMC, UP	GRILLE OPENING PANEL, LIFTGATES, FLARESIDE FENDERS, FENDER EXTENSIONS
EEBC	ETHER/ESTER BLOCKED CO-POLYMER	EEBC	BUMPERS
EEBC/PBTP	EEBC/POLYBUTYLENE TEREPTHALATE	EEBC, PBTP, BEXLOY	BUMPER, ROCKER PANELS
EMPP	ETHYLENE MODIFIED POLYPROPYLENE	EMPP	BUMPER COVERS
EPDM	ETHYLENE/PROPROPYLENE DIENE MONOMER	EPDM, NORDEL, VISTALON	BUMPERS
EPM	ETHYLENE/PROPROPYLENE CO-POLYMER	EPM	FENDERS
MPU	FOAM POLYURETHANE	MPU	SPOILERS
PE	POLYETHYLENE	ALATHON, DYLAN, LUPOLEN, MARLEX	"?
PP	POLYPROPYLENE (BLENDS)	NORYL, AZDEL, MARLOX, DYLON, PRAVEX	INNER FENDER, SPOILERS, KICK PANELS
PP/EPDM	PP/EPDM ALLOY	PP/EPDM	SPOILERS, GRILLES
PUR	POLYURETHANE	COLONELS, PUR, PU	FASCIAS, BUMPERS
PUR/PC	PUR/PC ALLOY	TEXIN	BUMPERS
PVC	POLYVINYL CHLORIDE	APEX, GEON, VINYLITE	BODY MOLDINGS, WIRE INSULATION,

			STEERING WHEELS
RIM	REACTION INJECTED MOLDED POLYURETHANE	RIM, BAYFLEX	FRONT FASCIAS, MODULAR WINDOWS
RRIM	REINFORCED REACTION INJECTED MOLDED	PUR, RRIM	FASCIAS, BODY PANELS, BODY TRIMS
TPE	THERMO POLYETHYLENE	TPE, HYTREL, BEXLOY-V	FASCIAS, BUMPERS, CLADDINGS
TPO	THERMOPOLYOLEFIN	POLYTROPE, RENFLEX, SANTOPRENE, VISAFLEX, ETA, APEX, TPO, SHIELDS, CLADDINGS	BUMPERS, END CAPS, TELCAR, RUBBER, STRIPS, SIGHT, INTERIOR B POST
TPP	THERMO-POLYPROPYLENE	TPP	BUMPERS
TPU	THERMOPOLYURETHANE, POLYESTER	TPU, HYTREL, TEXIN, ESTANE	BUMPERS, BODY SIDE, MOLDINGS, FENDERS, FASCIAS

PANEL SECTIONING

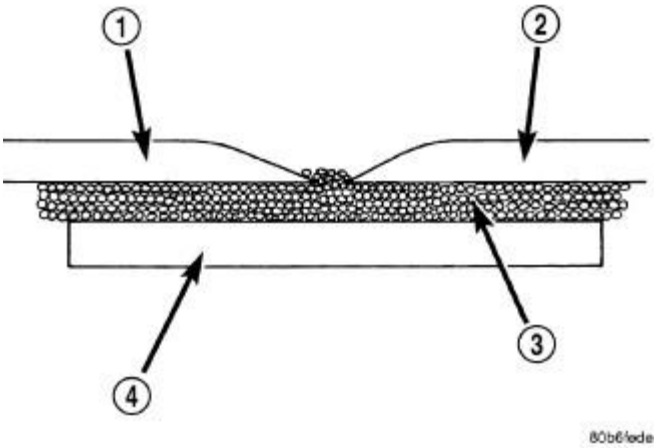


Fig. 1: Identifying Panel Sectioning
Courtesy of CHRYSLER GROUP, LLC

1 - EXISTING PANEL 2 - NEW PANEL 3 - PANEL ADHESIVE 4 - BONDING STRIP

If it is required to section a large panel for a plastic repair, it will be necessary to reinforce the panel. To bond two plastic panels together, a reinforcement must overlap both panels. The panels must be "V'd" at a 20 degree angle. The area to be reinforced should be washed, then sanded. Be sure to wipe off any excess soap and water when finished. Lightly sand or abrade the plastic with an abrasive

pad or sandpaper. Blow off any dust with compressed air or wipe with a clean dry rag.

When bonding plastic panels, follow repair material manufacturers recommendations. Be sure that enough adhesive has been applied to allow squeeze out and to fill the full bond line. Once the pieces have been brought together, do not move them until the adhesive is cured. The assembly can be held together with clamps, rivets, etc. A faster cure can be obtained by heating with a heat lamp or heat gun. After the parts have been bonded and have had time to cure, rough sand the seam and apply the final adhesive filler to the area being repaired. Smooth the filler with a spreader, wooden tongue depressor, or squeegee. For fine texturing, a small amount of water can be applied to the filler surface while smoothing. The cured filler can be sanded as necessary and, as a final step, cleanup can be done with soapy water. Wipe the surface clean with a dry cloth allowing time for the panel to dry before moving on with the repair.

PANEL REINFORCEMENT

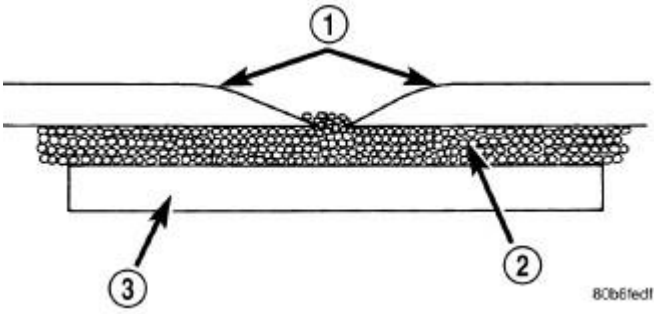


Fig. 2: Identifying Panel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1 - SOFTENED EDGES 2 - PANEL ADHESIVE 3 - BONDING STRIP

Structural repair procedures for rigid panels with large cracks and holes will require a reinforcement backing. Reinforcements can be made with several applications of glass cloth saturated with structural adhesive. Semi-rigid or flexible repair materials should be used for semi-rigid or flexible backing reinforcement and open meshed fiberglass dry wall tape can be used to form a reinforcement. The dry wall tape allows the resin to penetrate through and make a good bond between the panel and the adhesive. Structurally, the more dry wall tape used, the stronger the repair.

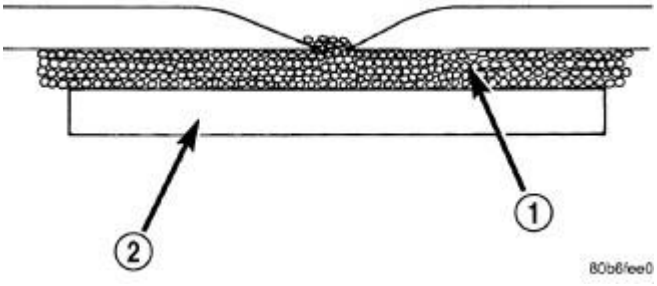


Fig. 3: Identifying Panel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1 - PANEL ADHESIVE 2 - REINFORCEMENT

Another kind of repair that can be done to repair large cracks and holes is to use a scrap piece of similar plastic and bond with structural adhesive. The reinforcement should cover the entire break and should have a generous amount of overlap on either side of the cracked or broken area.

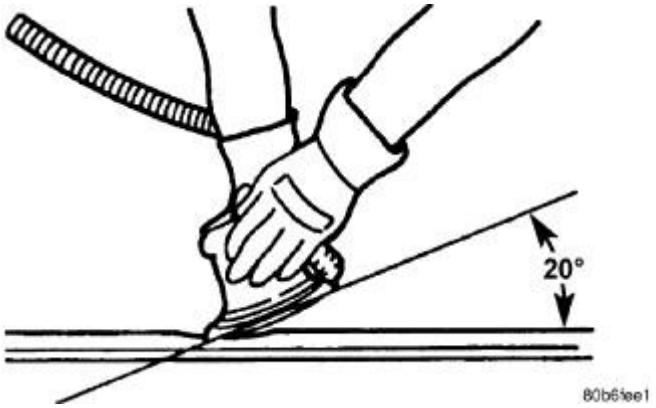


Fig. 4: Beveling Area Around Crack AT 20 Degree Angle
Courtesy of CHRYSLER GROUP, LLC

When repairing plastic, the damaged area is first "V'd" out, or beveled. Large bonding areas are desirable when repairing plastic because small repairs are less likely to hold permanently. Beveling the area around a crack at a 20° angle will increase the bonding surface for a repair. It is recommended that sharp edges be avoided because the joint may show through after the panel is refinished.

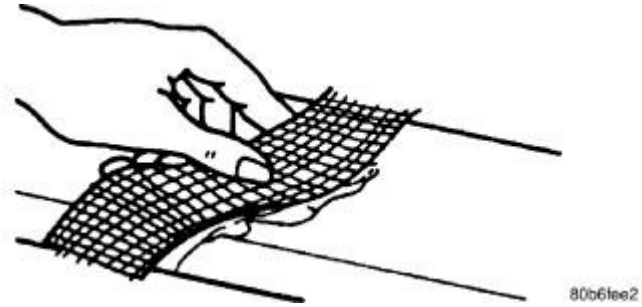


Fig. 5: Identifying Bonding Surface Repair Area
Courtesy of CHRYSLER GROUP, LLC

- Panel repair for both flexible and rigid panels are basically the same. The primary difference between flexible panel repair and rigid panel repair is in the adhesive materials used.
- The technician should first decide what needs to be done when working on any type of body panel. One should determine if it is possible to return the damage part to its original strength

and appearance without exceeding the value of the replacement part.

- When plastic repairs are required, it is recommended that the part be left on the vehicle when ever possible. That will save time, and the panel will remain stationary during the repair. Misalignment can cause stress in the repair areas and can result in future failure.

VISUAL INSPECTION

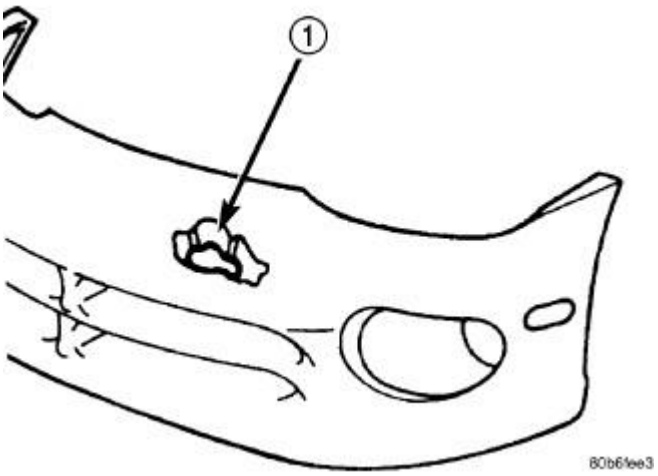


Fig. 6: Identifying Damage Components
Courtesy of CHRYSLER GROUP, LLC

1 - PUNCTURE

Composite materials can mask the severity of an accident. Adhesive bond lines, interior structure of the doors, and steel structures need to be inspected carefully to get a true damage assessment. Close inspection may require partial removal of interior trim or inner panels.

Identify the type of repair: Puncture (1) or Crack - Damage that has penetrated completely through the panel. Damage is confined to one general area; a panel section is not required. However, a backer panel, open fiberglass tape, or matted material must be bonded from behind.

PANEL SURFACE PREPARATION

If a body panel has been punctured, cracked, or crushed, the damaged area must be removed from the panel to achieve a successful repair. All spider web cracks leading away from a damaged area must be stopped or removed. To stop a running crack in a panel, drill a 6 mm (0.250 in.) hole at the end of the crack farthest away from the damage. If spider web cracks can not be stopped, the panel would require replacement. The surfaces around the damaged area should be stripped of paint and freed from wax and oil. Sand surfaces around repair area with 80 -120 grit sandpaper, or equivalent, to assure adhesion of repair materials.

PATCHING PANELS

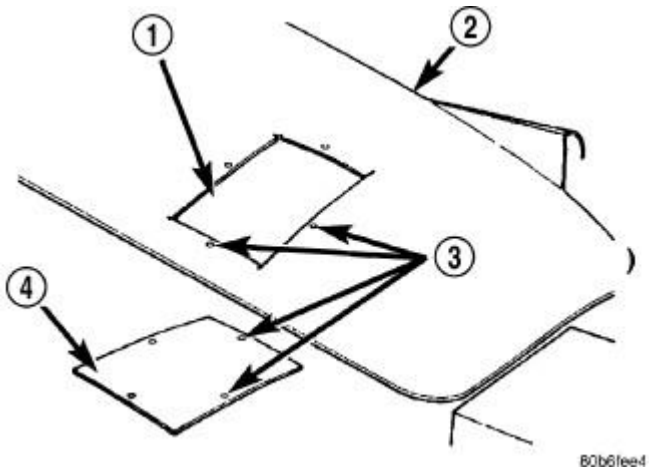


Fig. 7: Identifying Damaged Panel Cutout And Patch
Courtesy of CHRYSLER GROUP, LLC

1 - CUTOUT 2 - DAMAGED BODY PANEL 3 - 4 MM (0.160 IN.) HOLES 4 - PATCH CUT TO SIZE

A panel that has extensive puncture type damage can be repaired by cutting out the damaged material. Use a suitable reciprocating saw or cut off wheel to remove the section of the panel that is damaged. The piece cut out can be used as a template to shape the new patch. It is not necessary to have access to the back of the panel to install a patch. Bevel edges of cutout at 20° to expose a larger bonding area on the outer side. This will allow for an increased reinforcement areas.

PANEL PATCH FABRICATIONS

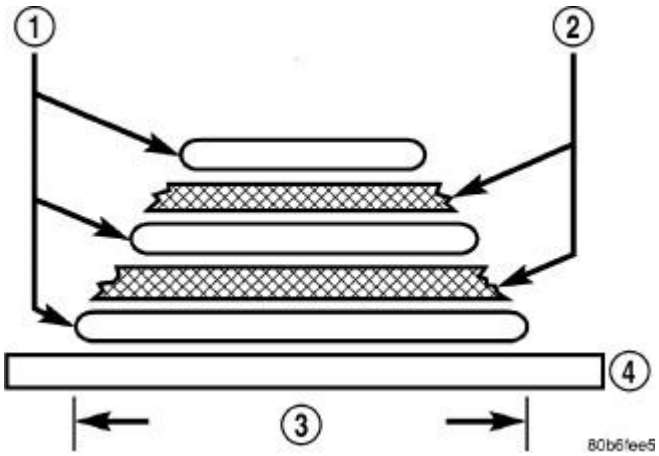


Fig. 8: Identifying Fabricated Panel
Courtesy of CHRYSLER GROUP, LLC

1 - STRUCTURAL ADHESIVE 2 - FIBERGLASS CLOTH OR FIBERGLASS MESH TAPE

3 - WIDTH OF V-GROOVE
4 - WAXED PAPER

A patch can be fabricated from any rigid fiberglass panel that has comparable contour with the repair area. Lift gates and fenders can be used to supply patch material. If existing material is not available or compatible, a patch can be constructed with adhesive and reinforcement mesh (dry wall tape). Perform the following operation if required:

1. Cover waxed paper or plastic with adhesive backed nylon mesh (dry wall tape) larger than the patch required.
2. Tape waxed paper or plastic sheet with mesh to a surface that has a compatible contour to the repair area.
3. Apply a liberal coat of adhesive over the reinforcement mesh. If necessary apply a second or third coat of adhesive and mesh after first coat has cured. The thickness of the patch should be the same as the repair area.
4. After patch has cured, peel waxed paper or plastic from the back of the patch.
5. If desired, a thin film coat of adhesive can be applied to the back of the patch to cover mesh for added strength.

PANEL PATCH INSTALLATION

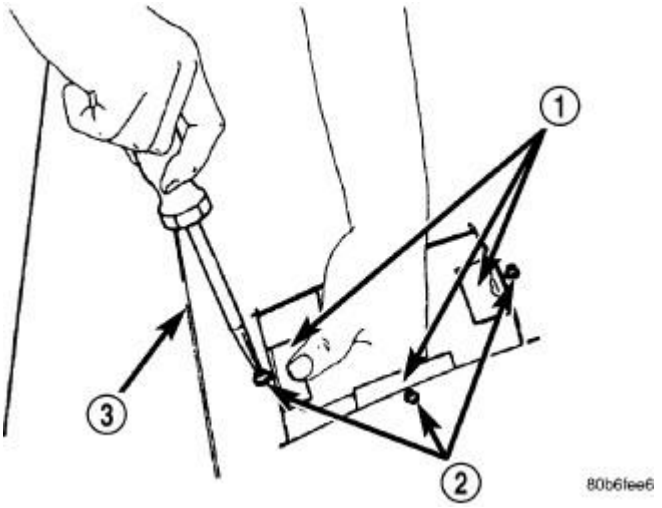


Fig. 9: Securing Support Squares To Body Panel
Courtesy of CHRYSLER GROUP, LLC

1 - SUPPORT SQUARES
2 - SCREWS
3 - DAMAGED BODY PANEL

1. Make a paper or cardboard pattern the size and shape of the cutout hole in the panel.
2. Trim 3 mm (0.125 in.) from edges of pattern so patch will have a gap between connecting surfaces.

3. Using the pattern as a guide, cut the patch to size.
4. Cut scrap pieces of patch material into 50 mm (2 in.) squares to use as patch supports to sustain the patch in the cutout.
5. Drill 4 mm (0.160 in.) holes 13 mm (0.5 in.) in from edge of cutout hole.
6. Drill 4 mm (0.160 in.) holes 13 mm (0.5 in.) away from edge of patch across from holes drilled around cutout.
7. Drill 3 mm (0.125 in.) holes in the support squares 13 mm (0.5 in.) from the edge in the center of one side.
8. Scuff the backside of the body panel around the cutout hole with a scuff pad or sandpaper.
9. Mix enough adhesive to cover one side of all support squares.
10. Apply adhesive to cover one side of all support squares.
11. Using number 8 sheet metal screws, secure support squares to back side of body panel with adhesive sandwiched between the panel and squares.

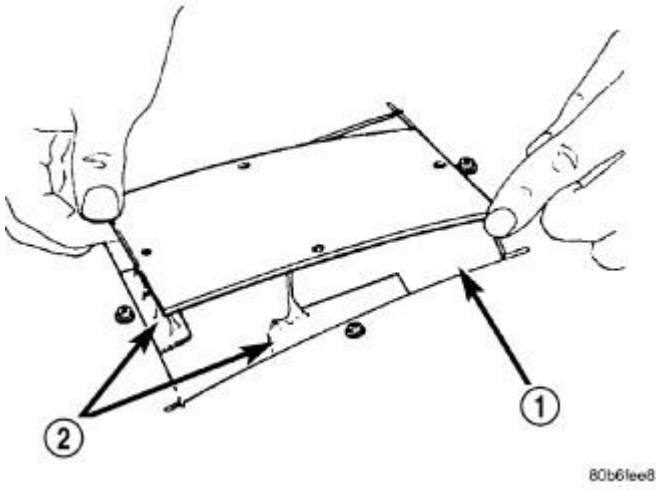


Fig. 10: Identifying Cutout And Support Squares
Courtesy of CHRYSLER GROUP, LLC

1 - CUTOUT 2 - SUPPORT SQUARES

12. Position patch in cutout (1) against support squares (2) and adjust patch until the gap is equal along all sides.
13. Drill 3 mm (0.125 in.) holes in the support squares through the pre-drilled holes in the patch.

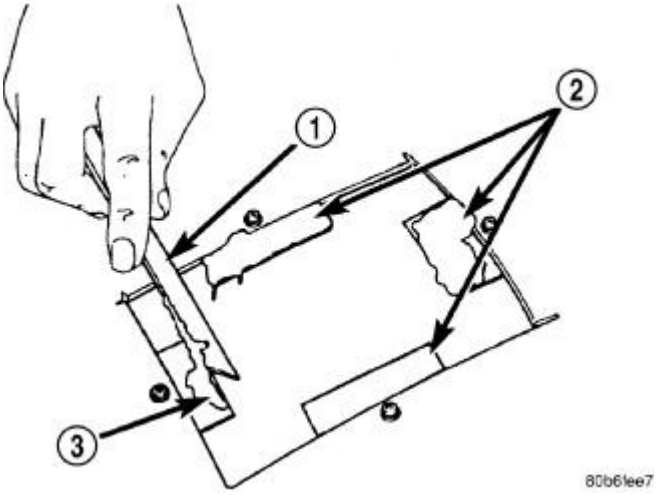


Fig. 11: Applying Adhesive
Courtesy of CHRYSLER GROUP, LLC

1 - APPLICATOR 2 - SUPPORT SQUARES 3 - ADHESIVE

14. Apply a coat of adhesive (3) to the exposed ends of the support squares (2).

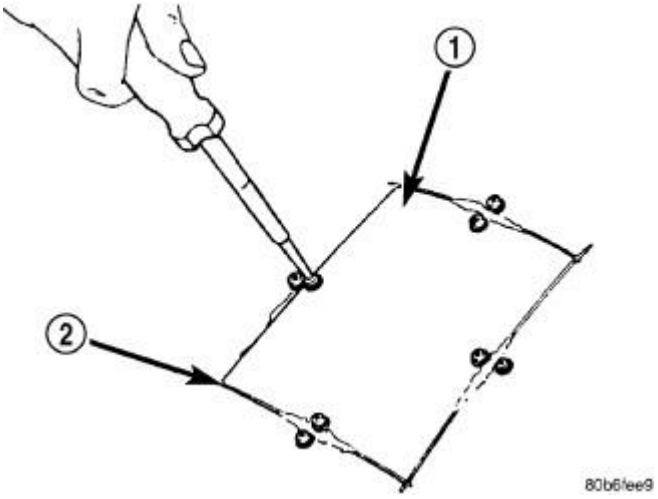


Fig. 12: Applying Coat Of Adhesive To Exposed Ends Of Support Squares
Courtesy of CHRYSLER GROUP, LLC

1 - PATCH 2 - GAP

15. Install screws to hold the patch (1) to support squares. Tighten screws until patch surface is flush with panel surface.
16. Allow adhesive to cure, and remove all screws.

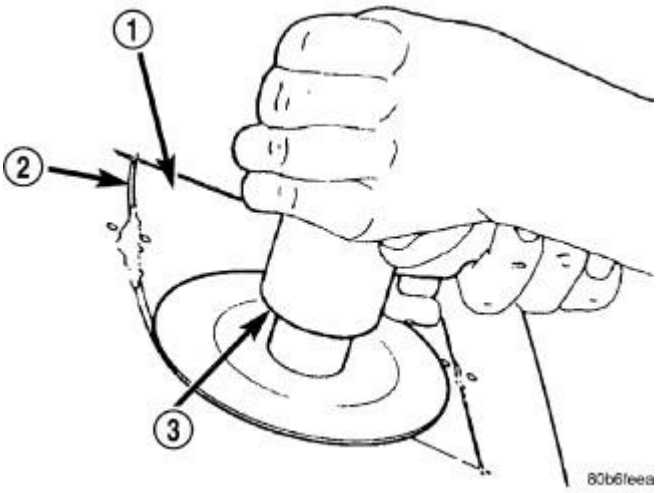


Fig. 13: Grinding Surface
Courtesy of CHRYSLER GROUP, LLC

1 - PATCH 2 - GAP 3 - DISC GRINDER

17. Using a 125 mm (5 in.) 24 grit disc grinder (3), grind a 50 mm (2 in.) to 75 mm (3 in.) wide and 75% -80% deep (original material thickness) path across the gaps (2) around the patch (1). With compressed air, blow dust from around patch.

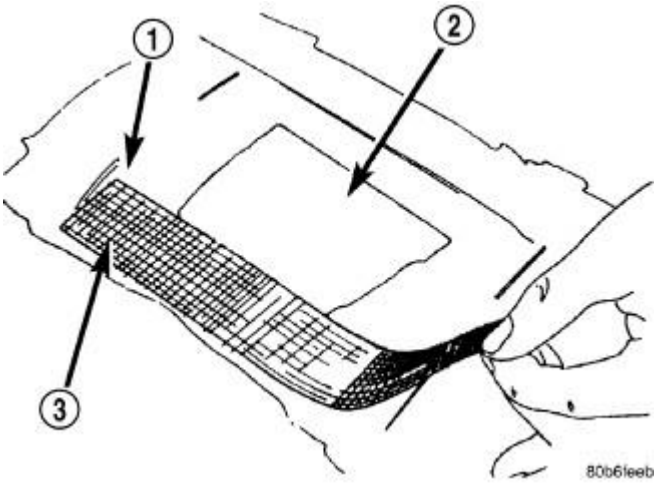


Fig. 14: Covering Gaps With Mesh
Courtesy of CHRYSLER GROUP, LLC

1 - GROUND DOWN AREA 2 - PATCH 3 - MESH

18. Apply adhesive backed nylon mesh (dry wall tape) over gaps around patch.

19. Mix enough adhesive to cover the entire patch area.

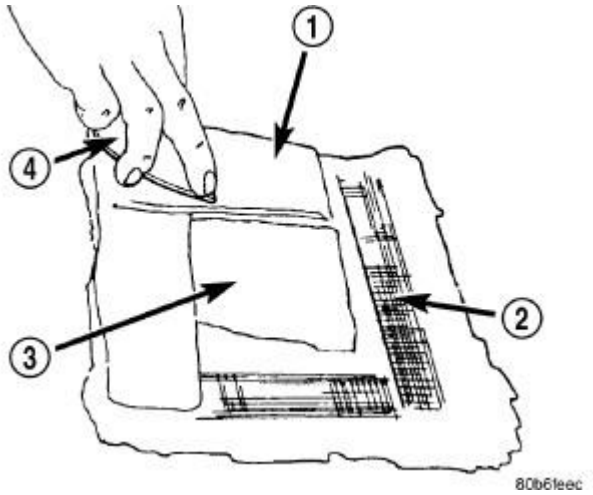


Fig. 15: Applying Adhesive Over Mesh Around Patch
Courtesy of CHRYSLER GROUP, LLC

1 - ADHESIVE
2 - MESH
3 - PATCH
4 - SPREADER

20. Apply adhesive over the mesh around patch, and smooth epoxy with a wide spreader to reduce finish grinding. Use two to three layers of mesh and adhesive to create a stronger repair.

PATCHED PANEL SURFACING

After patch panel is installed, the patch area can be finished using the same methods as finishing other types of body panels. If mesh material is exposed in the patched area, grind surface down, and apply a coat of high quality rigid plastic body filler. Prime, block sand, and paint as required.

SPECIFICATIONS

BODY LUBRICATION

LUBRICATION REQUIREMENTS

Body mechanisms and linkages should be inspected, cleaned, and lubricated, as required, to maintain ease of operation and to provide protection against rust and wear. When performing other under hood services, the hood latch release mechanism and safety catch should be inspected, cleaned, and lubricated. During the winter season, external door lock cylinders should be lubricated to assure proper operation when exposed to water and ice.

Prior to the application of any lubricant, the parts concerned should be wiped clean to remove dust and grit. If necessary, a suitable solvent can be used to clean the item to be lubricated. After

lubricating a component, any excess oil or grease should be removed.

LUBRICANT APPLICATION

DOOR LOCK CYLINDERS

1. Apply a small amount of lubricant directly into the lock cylinder.
2. Apply a small amount of lubricant to the key.
3. Insert key into lock cylinder and cycle the mechanism from the locked to the unlocked position.

NOTE: Do not add more lubricant.

4. Cycle the lock cylinder mechanism several times to allow the lubricant to flow throughout the cylinder.
5. Wipe all lubricant from exterior of lock cylinder and key.

ALL OTHER BODY MECHANISMS

1. Clean component as described above.
2. Apply specified lubricant to all pivoting and sliding contact areas of component.

LUBRICANT USAGE

ENGINE OIL

- Door Hinges - Hinge Pin and Pivot Contact Areas
- Hood Hinges - Pivot Points
- Liftgate Hinges

MOPAR® SPRAY WHITE LUBE OR EQUIVALENT

- Door Check Straps
- Liftgate Latches
- Liftgate Prop Pivots
- Ash Receiver
- Fuel Filler Door Remote Control Latch Mechanism
- Parking Brake Mechanism
- Sliding Seat Tracks
- Liftgate Latch

MOPAR® Multipurpose GREASE OR EQUIVALENT

- All Other Hood Mechanisms

MOPAR® LOCK CYLINDER LUBRICANT OR EQUIVALENT

- Door Lock Cylinders
- Liftgate Lock Cylinder

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Front Console Shifter Bezel	3	-	23
Front Console to Instrument Panel	3	-	23
Front Door Bottom Pull Bracket to Window Regulator Rear Rail	11	-	100
Front Door Latch to Outer Latch Face	12	-	108
Front Door Bottom Pull Cup Bracket to Inside Front Door	11	-	100
Front Door Glass Clamps	10	-	90
Front Door Handle to Door	7	-	62
Front seat track to floor pan bolts	61	45	-
Front seat inboard pivot bolt	40	30	-
Front seat recliner to seat cushion frame	12	9	-
Front seat track to cushion frame bolt	12	9	-
Front seat back	40	30	-
Front seat back to seat cushion	30	22	-
Front seat arm rest - 60/40	12	9	-
Front arm rest - 50/50 split	25	18	-
Front seat back recliner to seat back	12	9	-
Front seat belt buckle anchor nut	40	29	-
Front seat belt retractor bolt	38	28	-
Front seat belt buckle anchor bolt	40	29	-
Front door hinge to hinge pillar bolt	28	21	-
Front Door Hinge to Bracket to Outside the Lower A-Pillar	30	-	22
Front door hinge to door nuts and bolt	28	21	-
Front door latch striker	28	20	-
Front seat rear outboard seat track to floor pan bolts	28	20	-
Front strut tower to tower brace bolts	38	28	-
Decklid latch striker	22	16	-
Decklid Spoiler SRT 8	6	4.4	-
Door hinge bolt and nut	28	21	-
Door hinge double ended stud	14	-	120
Headlamp Mounting Crossmember	28	-	21
Hood latch release cable handle to the cowl side	2.3 to 3.4	-	20 to 30
Hood latch to crossmember	22.6 to 33.9	-	200 to 300
Hood hinges	22.6 to	-	200 to 300

	33.9		
Horn to Crossmember	28	-	21
Instrument Panel Side Support Bolts	27	-	20
Interior Remote Handle to Inside Door	2	-	16
Instrument Panel Fence Bolts	8	-	70
Instrument Panel Bottom Bolts	6	-	55
Rear Child Tether anchor	20	15	-
Radiator Mounting Bracket to Headlamp Mounting Crossmember	28	-	21
Rear door glass to regulator bolt	11	-	105
Front Door Handle to Door	7	-	62
Rear seat arm rest to seat back with ski pass	5	-	46
Rear seat back and belts to floor	44	32	-
Rear seat back 40 section to collar section	60	44	-
Rear seat back 60 section	16	12	-
Rear seat back collar assembly	60	44	-
Rear door hinge to B-pillar bolt	28	20	-
Rear door hinge to door bolt	28	20	-
Rear door latch striker	28	20	-
Sunroof module to roof panel	9	-	80

SPECIAL TOOLS

SPECIAL TOOLS

	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.) C-4829A - Remover, Trim

DECKLID/HATCH/LIFTGATE/TAILGATE

BUMPER

REMOVAL

LOWER

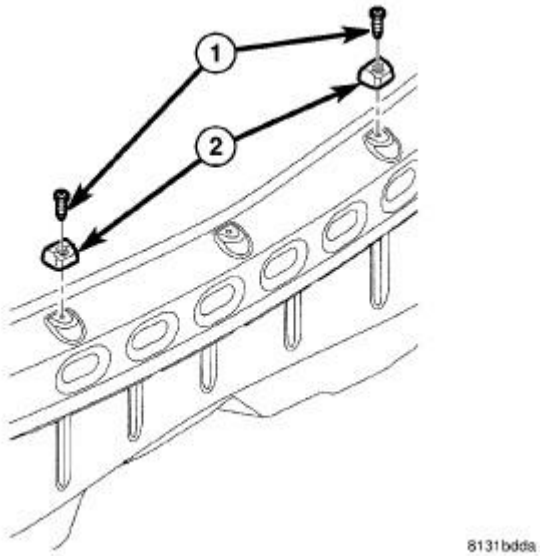


Fig. 16: Lower Decklid Bumpers
Courtesy of CHRYSLER GROUP, LLC

1. Open the deck lid.
2. Remove the push-pin fastener (1) that secures the lower bumper (2) to the rear fascia flange that extends over the deck opening lower panel.
3. Remove the bumper.

UPPER

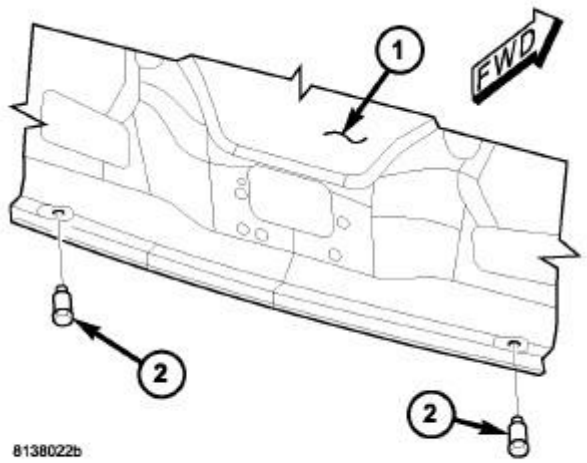


Fig. 17: Upper Decklid Bumpers
Courtesy of CHRYSLER GROUP, LLC

1. Open the deck lid.
2. Unscrew the upper bumper (2) from the lower flange of the deck lid inner panel (1).

INSTALLATION

LOWER

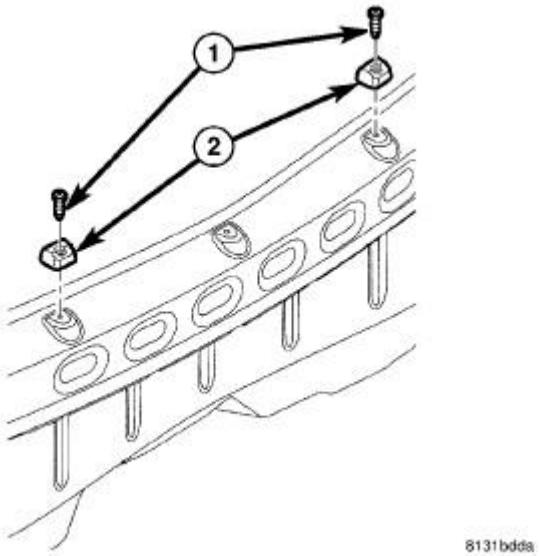


Fig. 18: Lower Decklid Bumpers
Courtesy of CHRYSLER GROUP, LLC

1. Position the lower bumper (2) to the rear fascia flange that extends over the deck opening lower panel.
2. Secure the bumper with a push-pin fastener.
3. Close the deck lid.

UPPER

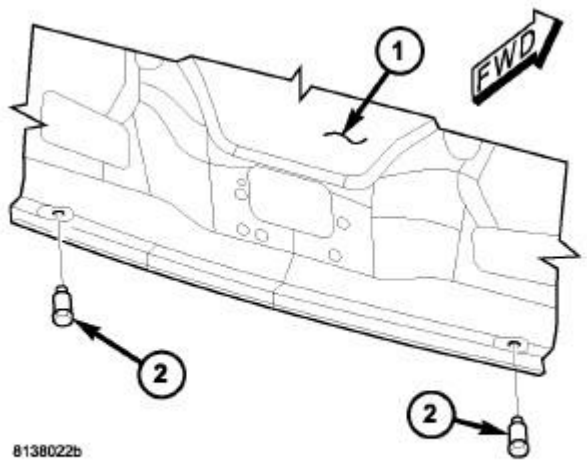


Fig. 19: Upper Decklid Bumpers
Courtesy of CHRYSLER GROUP, LLC

1. Screw the upper bumper (2) into the hole in the lower flange of the deck lid inner panel (1).
2. Thread the bumper in or out of the deck lid as necessary to achieve proper deck lid closing and alignment.
3. Close the deck lid.

DECKLID

REMOVAL

REMOVAL

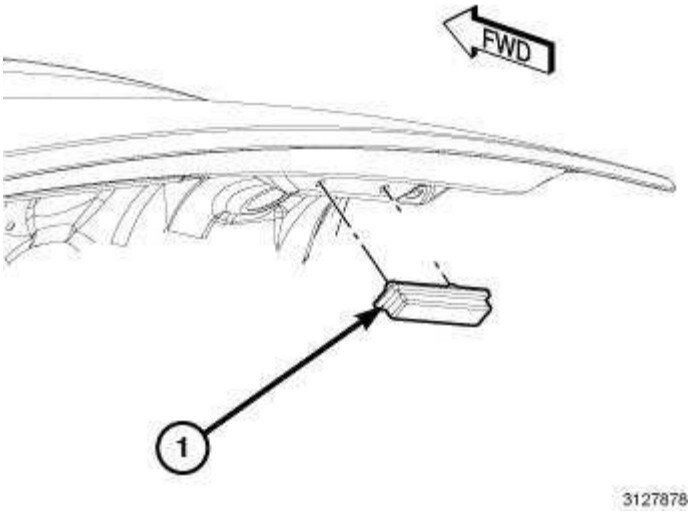


Fig. 20: Trunk Lid Handle

Courtesy of CHRYSLER GROUP, LLC

1. Open the vehicle trunk.
2. Remove the spare tire cover/trunk floor carpet (1) from the spare tire well.
3. Disconnect and isolate the negative cable.
4. Remove the decklid bumper (1). Repeat for the other side.

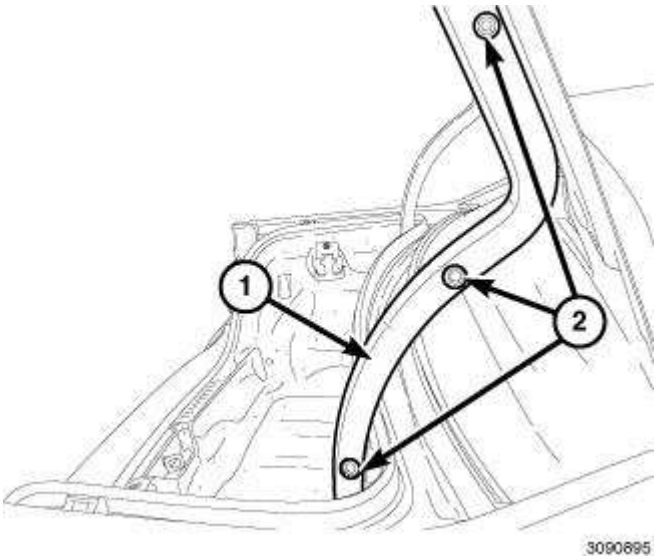


Fig. 21: RH Hinge Trim Push-In Fasteners & Hinge Trim
Courtesy of CHRYSLER GROUP, LLC

5. Remove the hinge trim push-in fasteners (2) and remove the hinge trim (1). If necessary, repeat for the opposite side.

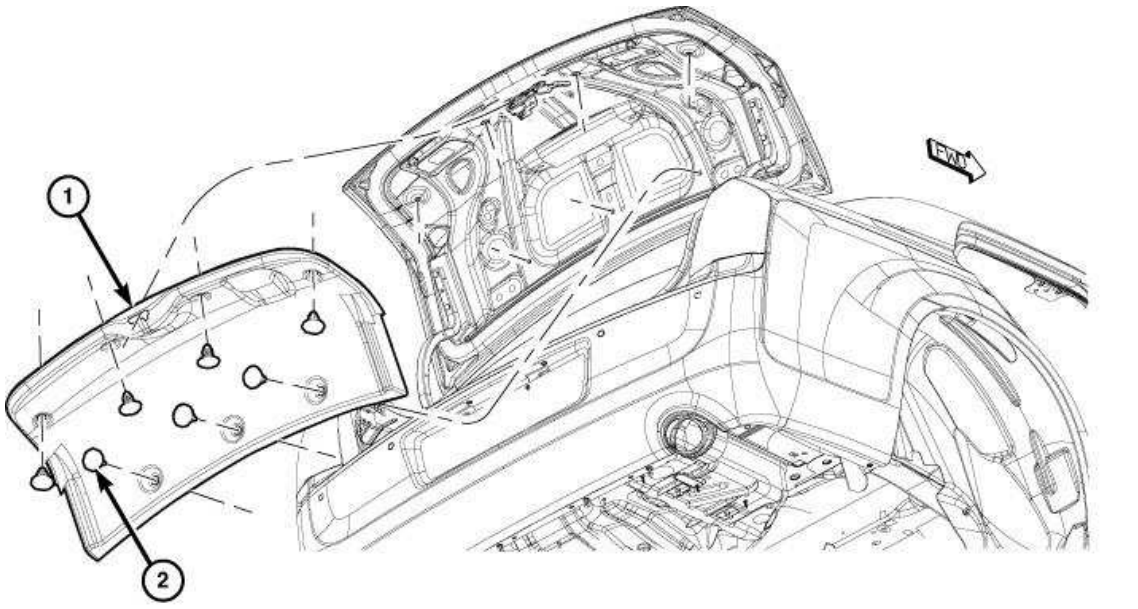


Fig. 22: Push-In Retainers & Decklid Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle must be routed through the deck lid insulator.

6. Remove the push-in retainers (2) securing the deck lid insulator (1) to the decklid.

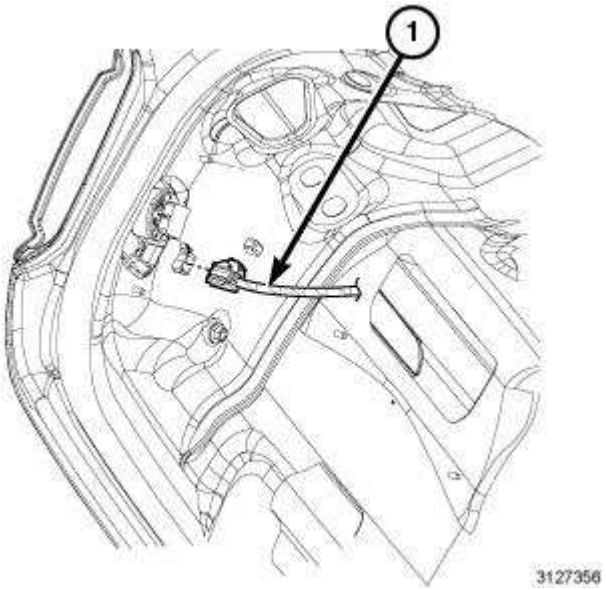


Fig. 23: Lightbar Harness
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect and detach the vehicle to lightbar harness (1) from the decklid.

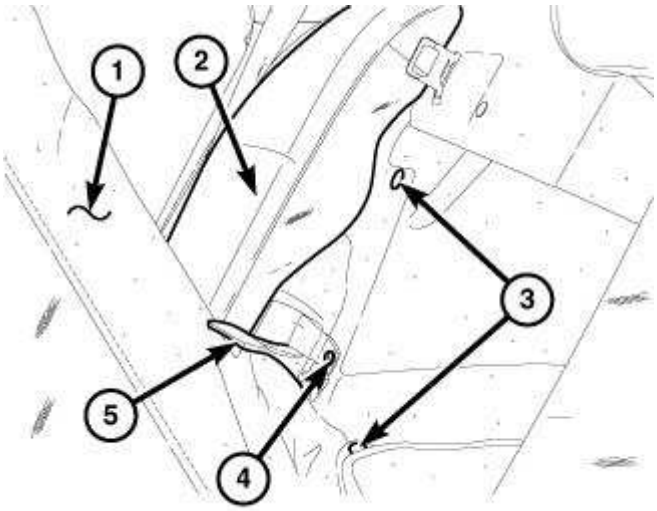


Fig. 24: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Pull the RH rear seat back (1) forward, exposing the luggage compartment. Repeat for the opposite side.
9. Behind the RH rear seat, pull the carpet tab (5) up, exposing the rear seat back side bolster bracket retaining bolt (4). Repeat for the opposite side.
10. Remove the RH rear seat back side bolster bracket bolt (4). Repeat for the opposite side.
11. Remove the push-in fasteners (3) that secure the trunk side trim. Repeat for the opposite side.

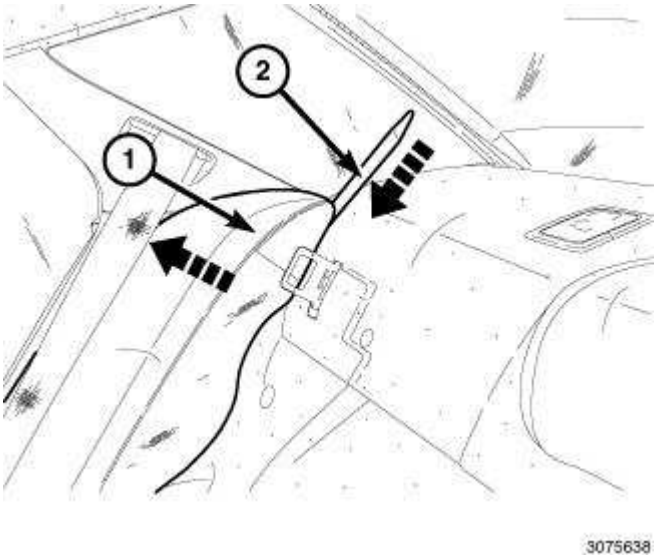


Fig. 25: Trim Stick & Seat Back Bolster
Courtesy of CHRYSLER GROUP, LLC

12. Using a trim stick (special tool #C-4755, Trim Stick) (2) or equivalent, push down between the rear shelf and the RH rear seat back bolster (1) to release the retaining clip, and pull out on the seat back bolster (1) to remove.Repeat for the opposite side.

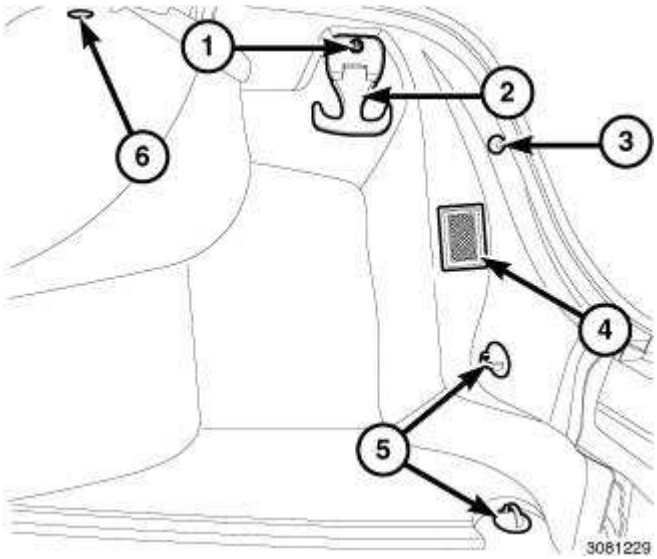


Fig. 26: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH shown in illustration, LH typical.

13. Remove the cargo net hook screw (1) and upper cargo hook (2).
14. Remove the push-in retainer (3) that secures the wheel well cover trim.
15. Remove the cargo net lower hooks (5).
16. Carefully pull back the wheel well cover enough to disconnect the trunk lamp (4) harness connector, and remove the wheel well cover trim.
17. Remove the wheel well cover trim from the trunk/cargo area.

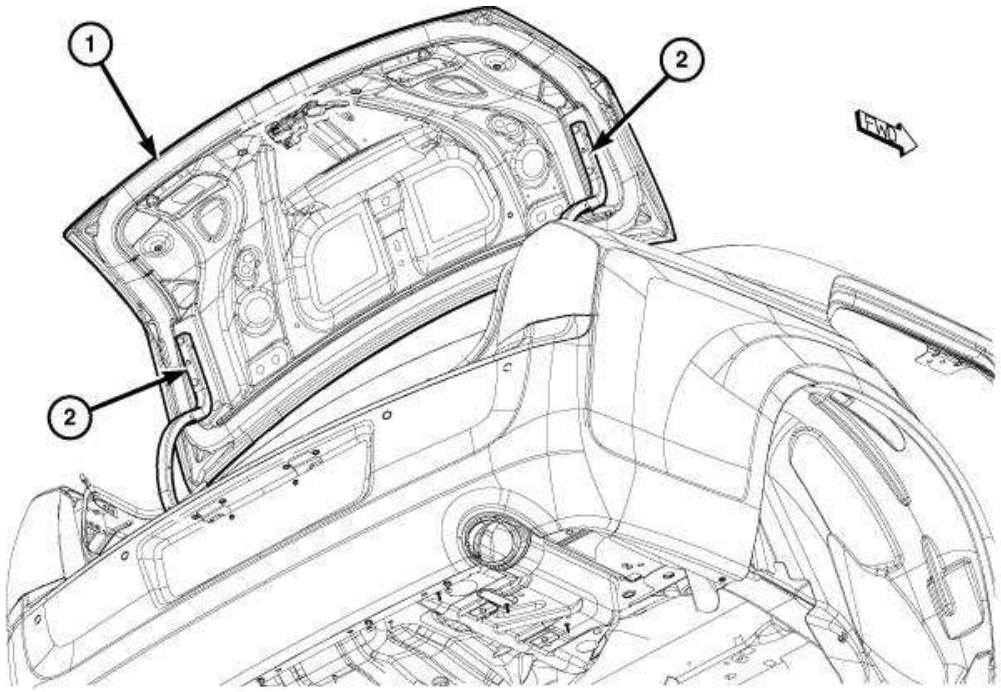


Fig. 27: Hinge Bracket, Deck Lid Inner Panel, Hinge & Decklid
Courtesy of CHRYSLER GROUP, LLC

18. Remove the decklid spring. Refer to **HINGE, REMOVAL** & **HINGE, SPRING, REMOVAL**.
19. Using a china marker/paint pen or equivalent, mark the hinge bracket (2) locations on the deck lid inner panel (1) to aid reinstallation.
20. With the aid of an assistant, remove the bolts attaching the hinge (2) to the decklid (1).
21. Remove the decklid (1).

INSTALLATION

INSTALLATION

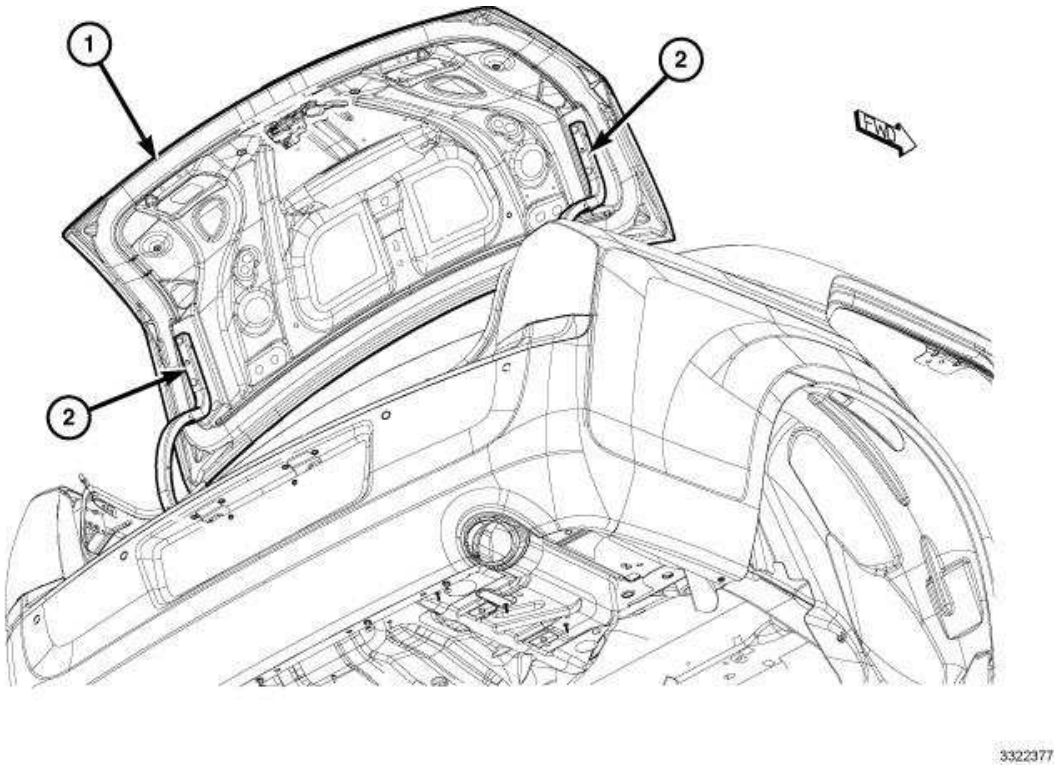


Fig. 28: Hinge Bracket, Deck Lid Inner Panel, Hinge & Decklid
Courtesy of CHRYSLER GROUP, LLC

1. With the aid of an assistant, position the decklid (1) to the springs.
2. Loosely install the bolts attaching the hinge (2) to the decklid (1).
3. Align the decklid to the reference marks where the hinge (2) attaches to the decklid (1).
4. Install and tighten the two bolts that secure the hinge (2) to the deck lid (1). Tighten the screws to 28 N.m (21 ft. lbs.).
5. Install the decklid spring. Refer to **HINGE, INSTALLATION** & **HINGE, SPRING, INSTALLATION**.
6. Adjust the deck lid hinge position as necessary to achieve proper spacing and operation.

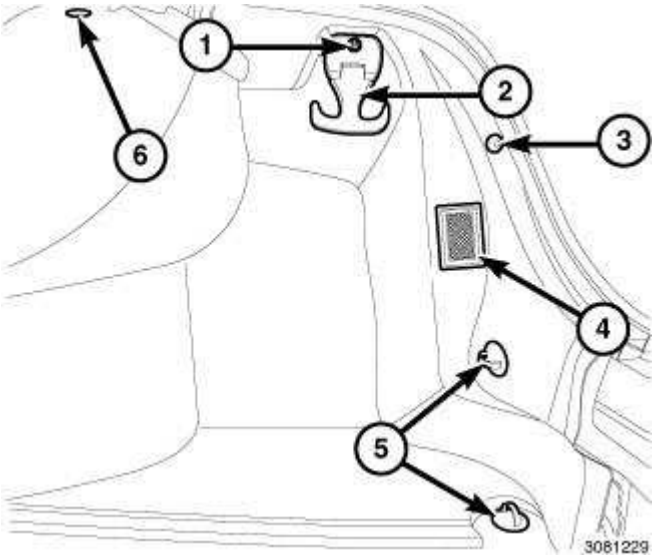


Fig. 29: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH shown in illustration, LH typical.

7. Position the wheel well cover trim into the trunk/cargo area.
8. Connect the trunk lamp (4) harness connector.
9. Install the cargo net lower hooks (5).
10. Install the push-in retainer (3) that secures the wheel well cover trim.
11. Install the cargo net hook screw (1) and upper cargo hook (2).

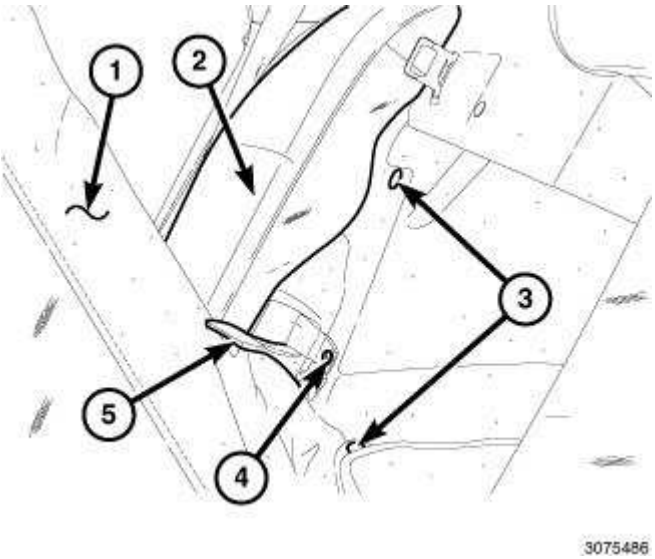


Fig. 30: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

12. Position the rear seat bolster (2), push rearward to engage the retaining clip between the rear

shelf and the bolster.

13. Install the push-in fasteners (3) that secure the trunk side trim. Repeat for the opposite side.
14. Install the RH rear seat back side bolster bracket bolt (4). Repeat for the opposite side.

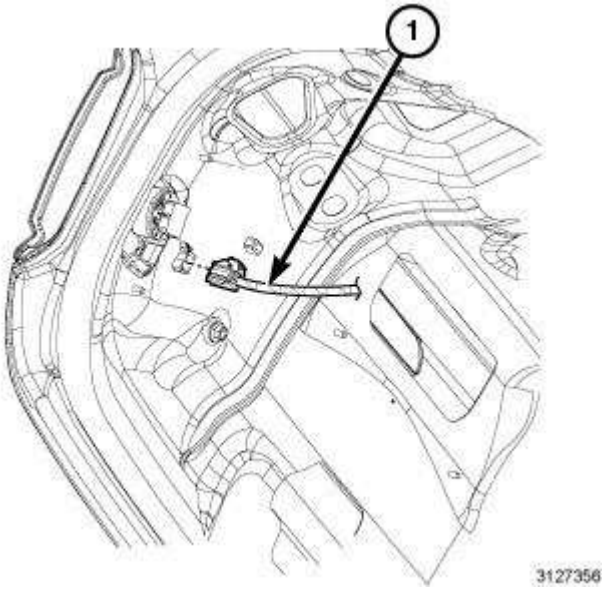


Fig. 31: Lightbar Harness
Courtesy of CHRYSLER GROUP, LLC

15. Connect and attach the vehicle to lightbar harness (1) to the decklid.

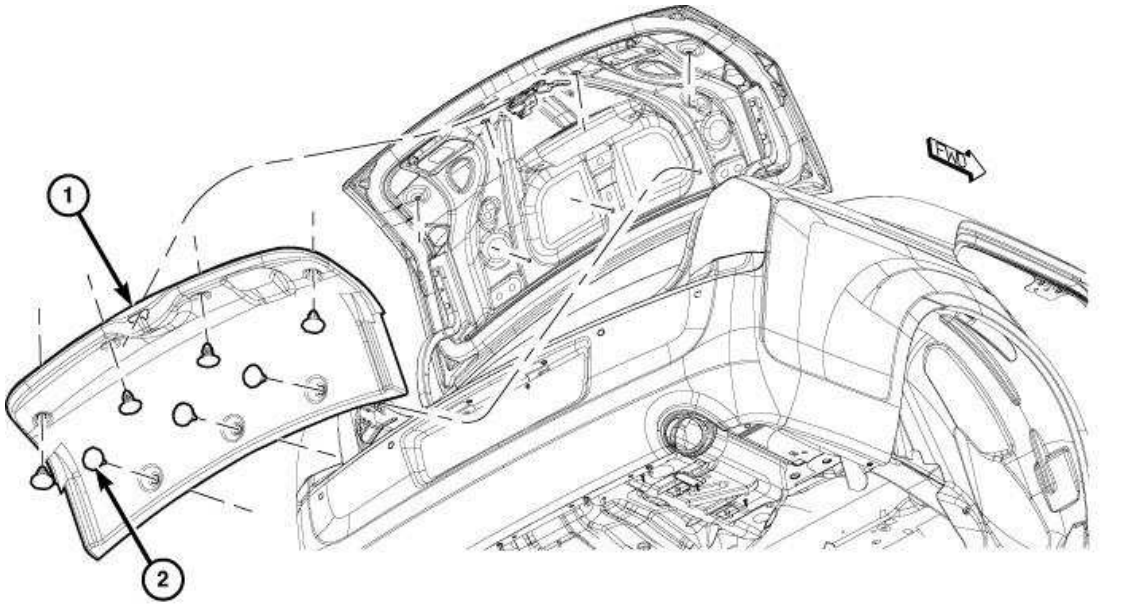


Fig. 32: Push-In Retainers & Decklid Cover

Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle (2) must be routed through the deck lid insulator.

16. Position the decklid insulator.
17. Install the push-in retainers (3) securing the decklid insulator (1) to the decklid.

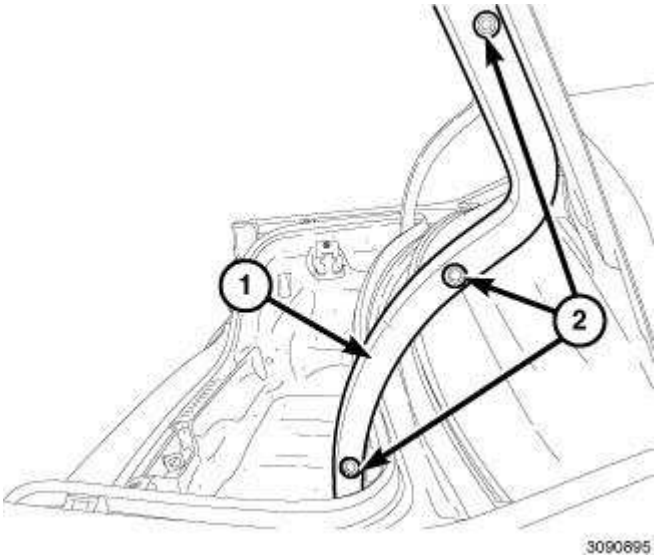


Fig. 33: RH Hinge Trim Push-In Fasteners & Hinge Trim
Courtesy of CHRYSLER GROUP, LLC

18. Position the hinge trim (1) to the hinge.
19. Install the hinge trim push-in fasteners (2). If necessary, repeat for the opposite side.

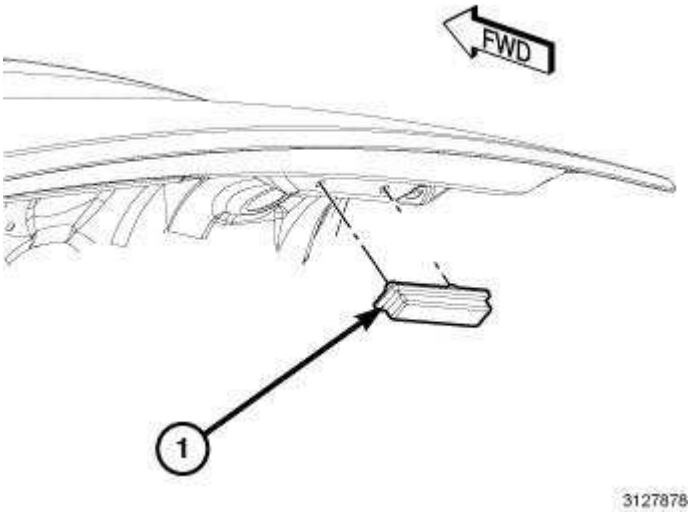


Fig. 34: Trunk Lid Handle
Courtesy of CHRYSLER GROUP, LLC

20. Install the decklid bumper (1). Repeat for the other side.
21. Disconnect and isolate the battery negative cable.
22. Install the spare tire cover/trunk floor carpet over the spare tire well.
23. Close the vehicle trunk.

HINGE

REMOVAL

REMOVAL

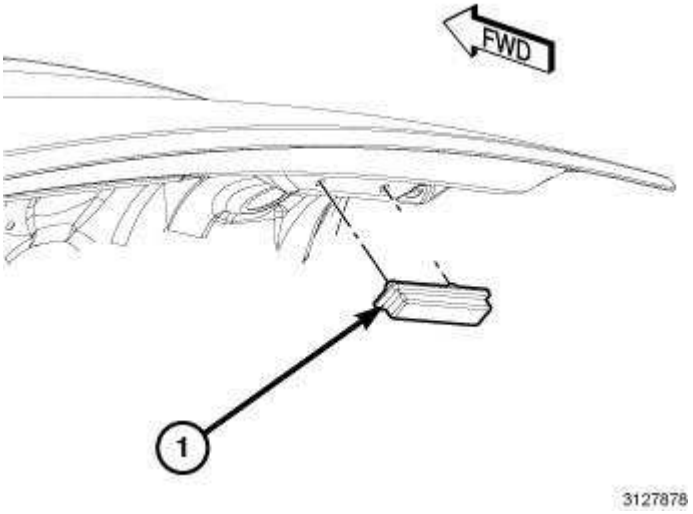


Fig. 35: Trunk Lid Handle
Courtesy of CHRYSLER GROUP, LLC

1. Open the vehicle trunk.
2. Remove the spare tire cover/trunk floor carpet from the spare tire well.
3. Disconnect and isolate the negative cable.
4. Remove the decklid bumper (1). Repeat for the other side.

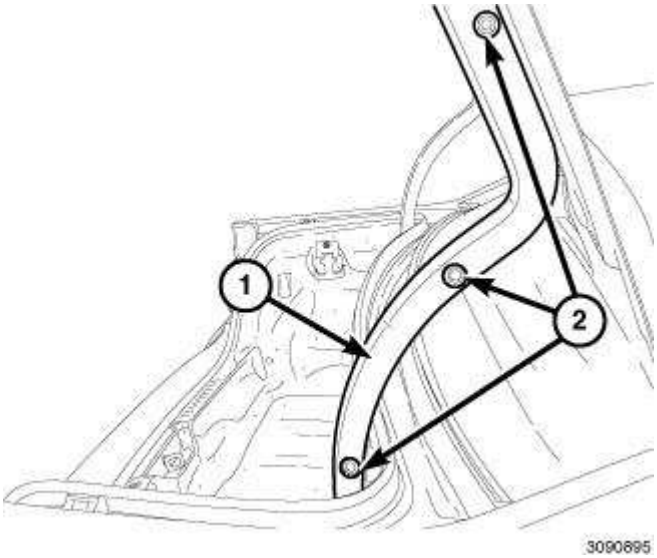


Fig. 36: RH Hinge Trim Push-In Fasteners & Hinge Trim
Courtesy of CHRYSLER GROUP, LLC

5. Remove the hinge trim push-in fasteners (2) and remove the hinge trim (1). If necessary, repeat for the opposite side.

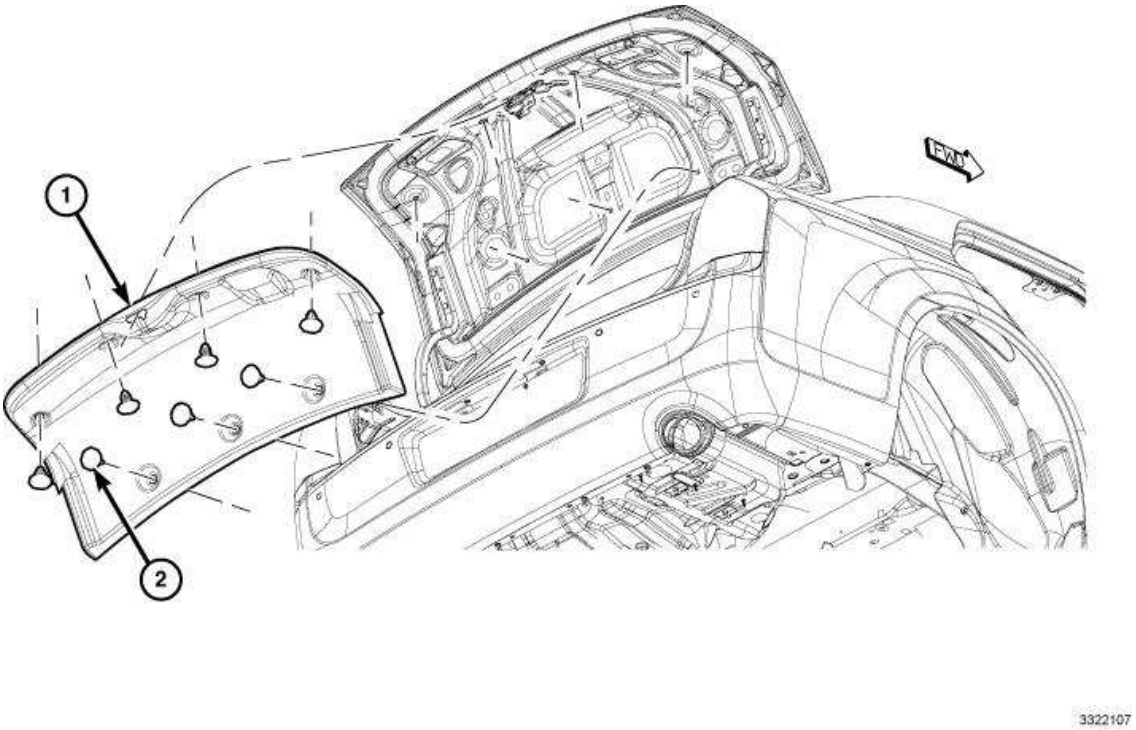


Fig. 37: Push-In Retainers & Decklid Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle (2) must be routed through the deck lid insulator.

6. Remove the push-in retainers (3) securing the deck lid insulator (1) to the decklid.

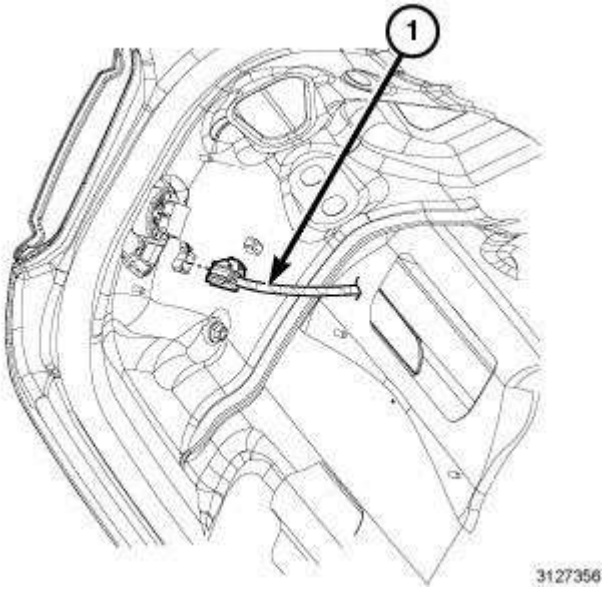


Fig. 38: Lightbar Harness
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect and detach the vehicle to lightbar harness (1) from the decklid.

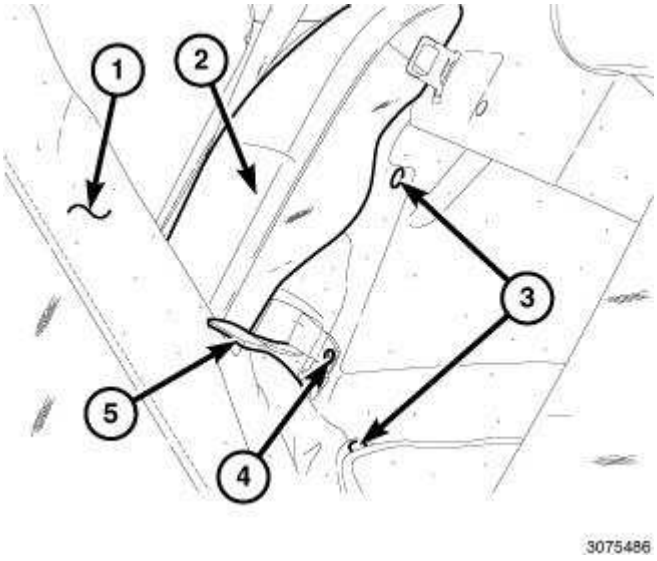


Fig. 39: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Pull the RH rear seat back (1) forward, exposing the luggage compartment. Repeat for the opposite side.
9. Behind the RH rear seat, pull the carpet tab (5) up, exposing the rear seat back side bolster bracket retaining bolt (4). Repeat for the opposite side.
10. Remove the RH rear seat back side bolster bracket bolt (4). Repeat for the opposite side.

11. Remove the push-in fasteners (3) that secure the trunk side trim. Repeat for the opposite side.

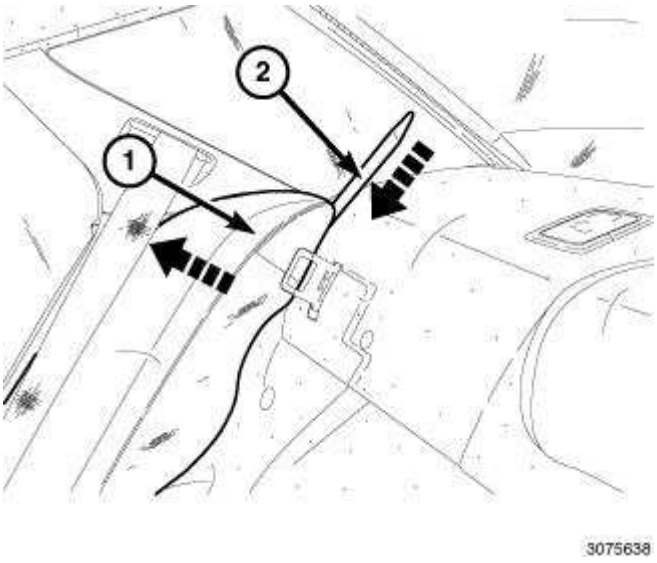


Fig. 40: Trim Stick & Seat Back Bolster
Courtesy of CHRYSLER GROUP, LLC

12. Using a trim stick (special tool #C-4755, Trim Stick) (2) or equivalent, push down between the rear shelf and the RH rear seat back bolster (1) to release the retaining clip, and pull out on the seat back bolster (1) to remove. Repeat for the opposite side.

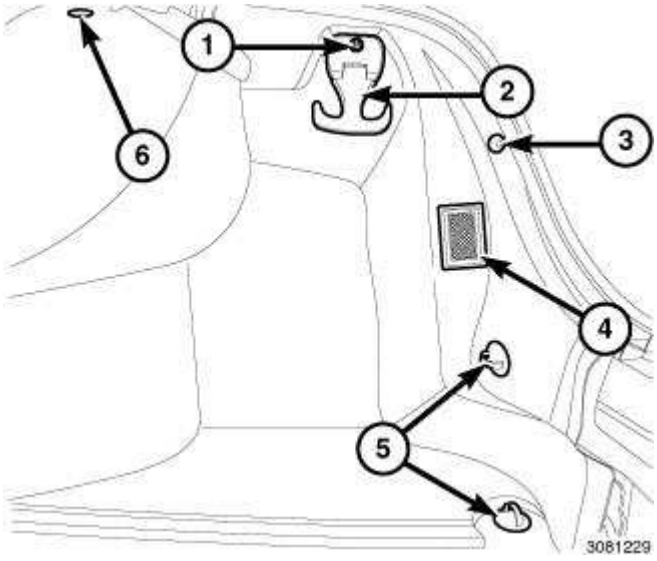


Fig. 41: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH shown in illustration, LH typical.

13. Remove the cargo net hook screw (1) and upper cargo hook (2).
14. Remove the push-in retainer (3) that secures the wheel well cover trim.

15. Remove the cargo net lower hooks (5).
16. Carefully pull back the wheel well cover enough to disconnect the trunk lamp (4) harness connector, and remove the wheel well cover trim.
17. Remove the wheel well cover trim from the trunk/cargo area.

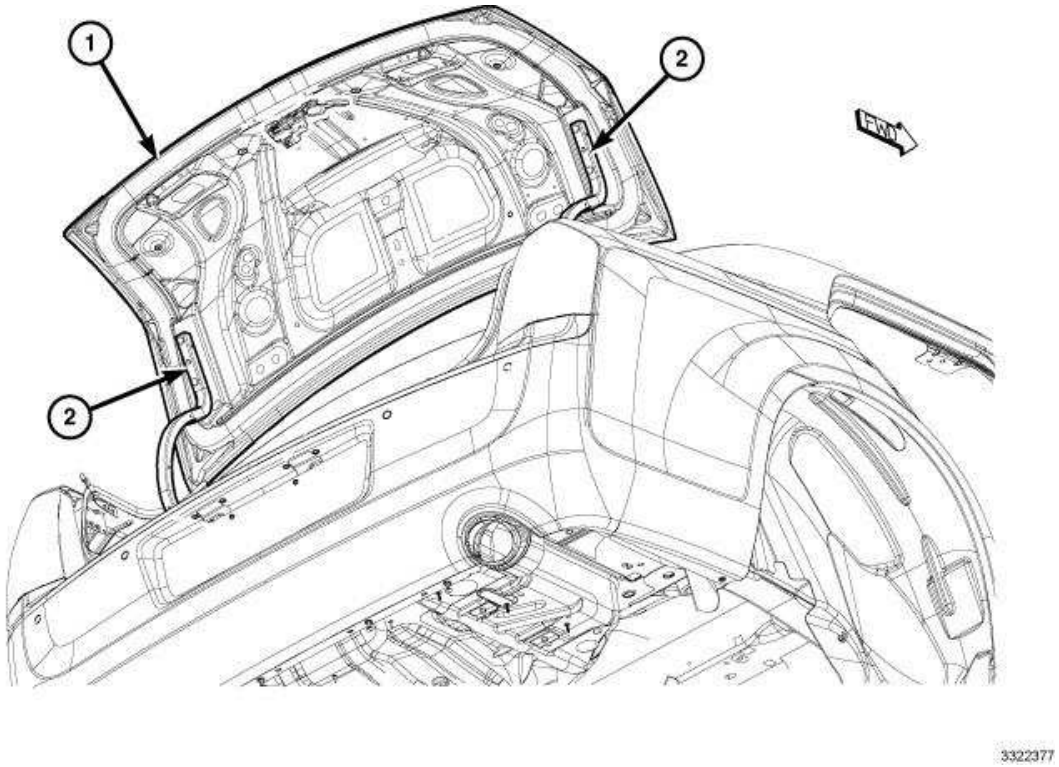


Fig. 42: Hinge Bracket, Deck Lid Inner Panel, Hinge & Decklid
Courtesy of CHRYSLER GROUP, LLC

18. Remove the decklid spring. Refer to **HINGE, REMOVAL** & **HINGE, SPRING, REMOVAL**.
19. Using a china marker/paint pen or equivalent, draw reference marks where the hinge (2) attaches to the decklid (1).
20. With the aid of an assistant, remove the bolts attaching the hinge (2) to the decklid (1).
21. Remove the decklid (1).

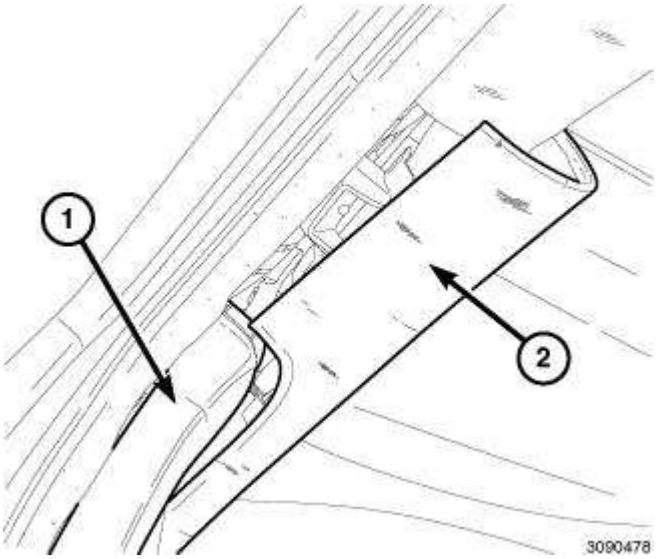


Fig. 43: Quarter Trim Panel
Courtesy of CHRYSLER GROUP, LLC

22. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, remove the quarter trim panel (2). Repeat on the opposite side.

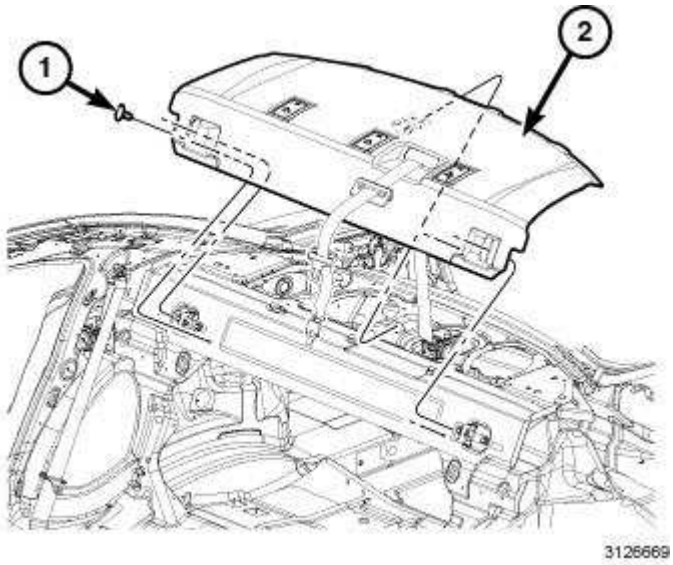


Fig. 44: Push Pin Fastener & Tray Trim Panel
Courtesy of CHRYSLER GROUP, LLC

23. Remove the push pin fastener (1) securing the package tray trim panel (2). Repeat on opposite side.
24. Pull the package tray trim panel (2) forward to disengage the retaining clip.
25. Position the package tray trim panel (2) away from the package tray.

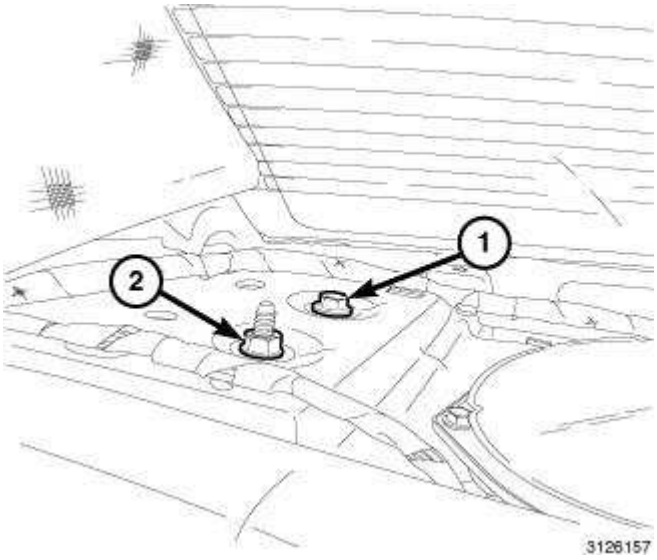


Fig. 45: Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

26. Remove the bolt (1) and the nut (2) securing the hinge to the package tray.
27. Remove the hinge from the vehicle.

INSTALLATION

INSTALLATION

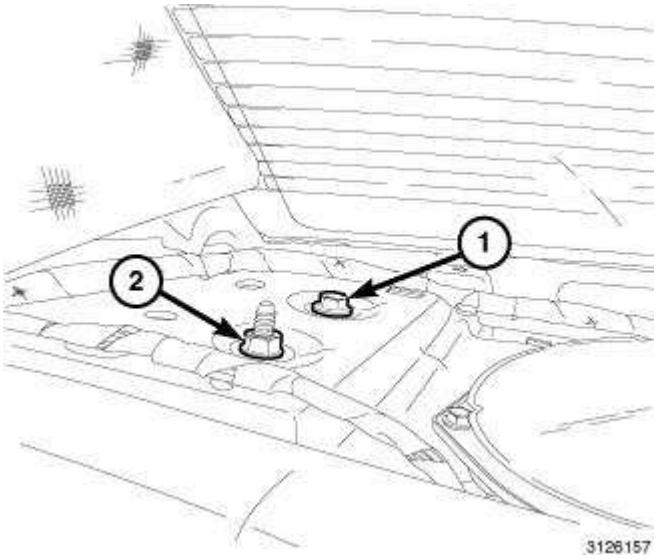


Fig. 46: Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH shown in illustration, LH typical.

1. Position the hinge into the package tray.

2. Remove the bolt (1) and the nut (2) securing the hinge to the package tray. Tighten the bolt and nut to 28 N.m (21 ft. lbs.).

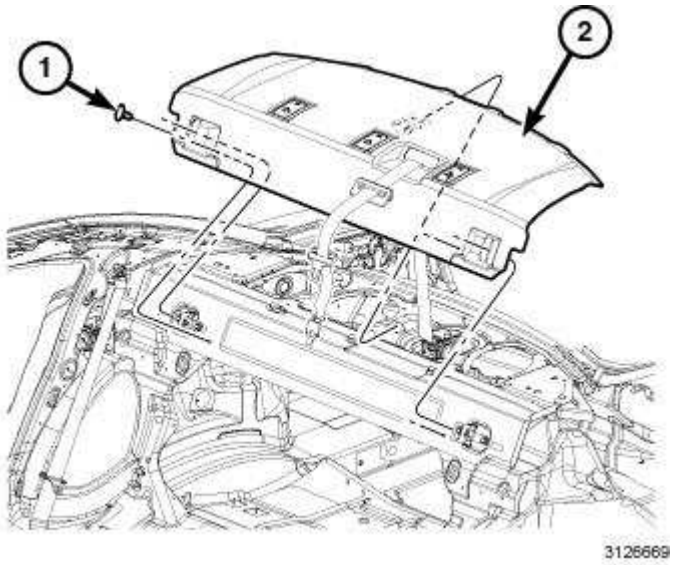


Fig. 47: Push Pin Fastener & Tray Trim Panel
Courtesy of CHRYSLER GROUP, LLC

3. Position the package tray trim panel (2) towards the package tray.
4. Push the package tray trim panel (2) rearward to engage the retaining clip.
5. Install the push pin fastener (1) securing the package tray trim panel (2). Repeat on opposite side.

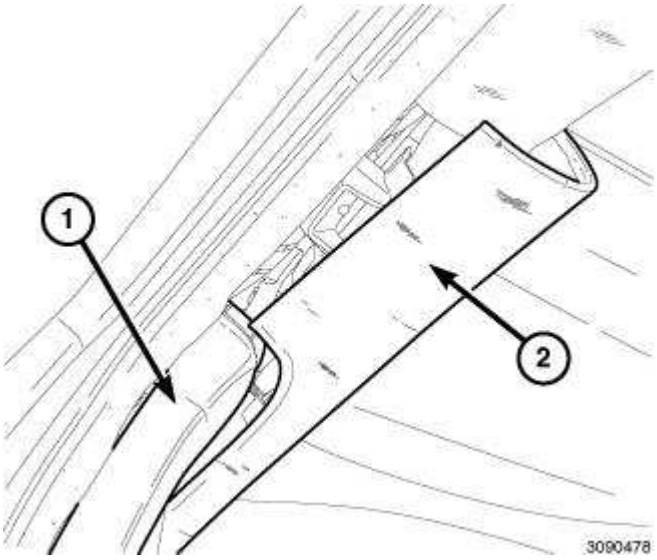


Fig. 48: Quarter Trim Panel
Courtesy of CHRYSLER GROUP, LLC

6. Install the quarter trim panel (2). Repeat on the opposite side.

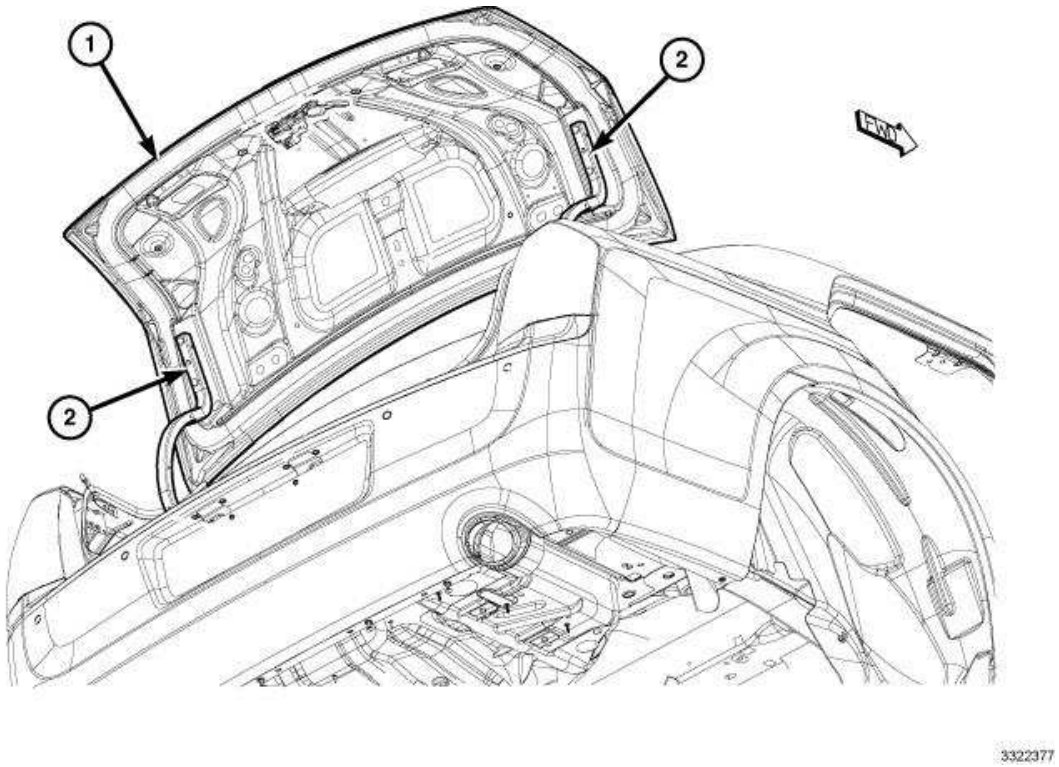


Fig. 49: Hinge Bracket, Deck Lid Inner Panel, Hinge & Decklid
Courtesy of CHRYSLER GROUP, LLC

7. With the aid of an assistant, position the decklid (1) to the springs.
8. Loosely install the bolts attaching the hinge (2) to the decklid (1).
9. Align the decklid to the reference marks where the hinge (2) attaches to the decklid (1).
10. Install and tighten the two bolts that secure the hinge (2) to the deck lid (1). Tighten the screws to 28 N.m (21 ft. lbs.).
11. Install the decklid spring. Refer to **HINGE, INSTALLATION** & **HINGE, SPRING, INSTALLATION**.
12. Adjust the deck lid hinge position as necessary to achieve proper spacing and operation.

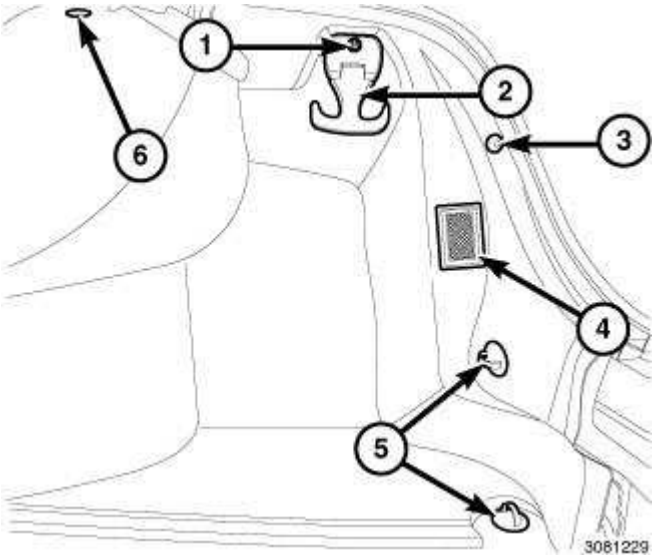


Fig. 50: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH shown in illustration, LH typical.

13. Position the wheel well cover trim into the trunk/cargo area.
14. Connect the trunk lamp (4) harness connector.
15. Install the cargo net lower hooks (5).
16. Install the push-in retainer (3) that secures the wheel well cover trim.
17. Install the cargo net hook screw (1) and upper cargo hook (2).

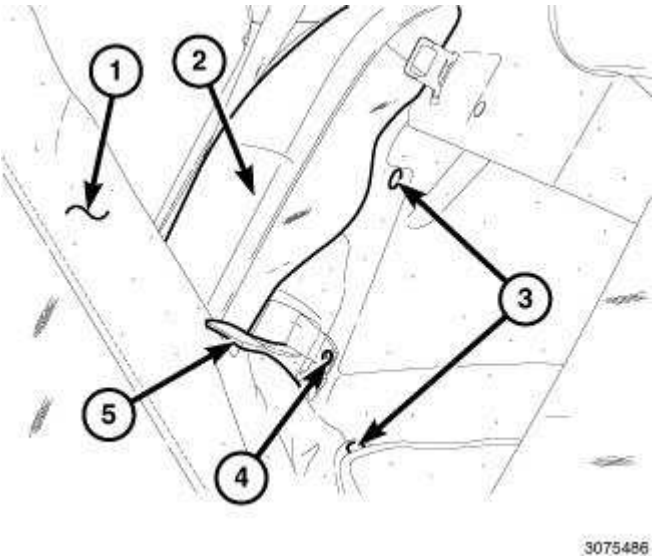


Fig. 51: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

18. Position the rear seat bolster (2), push rearward to engage the retaining clip between the rear

shelf and the bolster.

19. Install the push-in fasteners (3) that secure the trunk side trim. Repeat for the opposite side.
20. Install the RH rear seat back side bolster bracket bolt (4). Repeat for the opposite side.

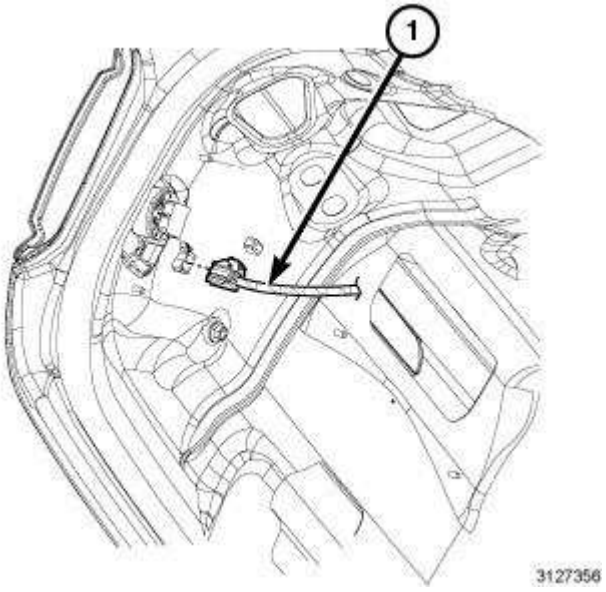


Fig. 52: Lightbar Harness
Courtesy of CHRYSLER GROUP, LLC

21. Connect and attach the vehicle to lightbar harness (1) to the decklid.

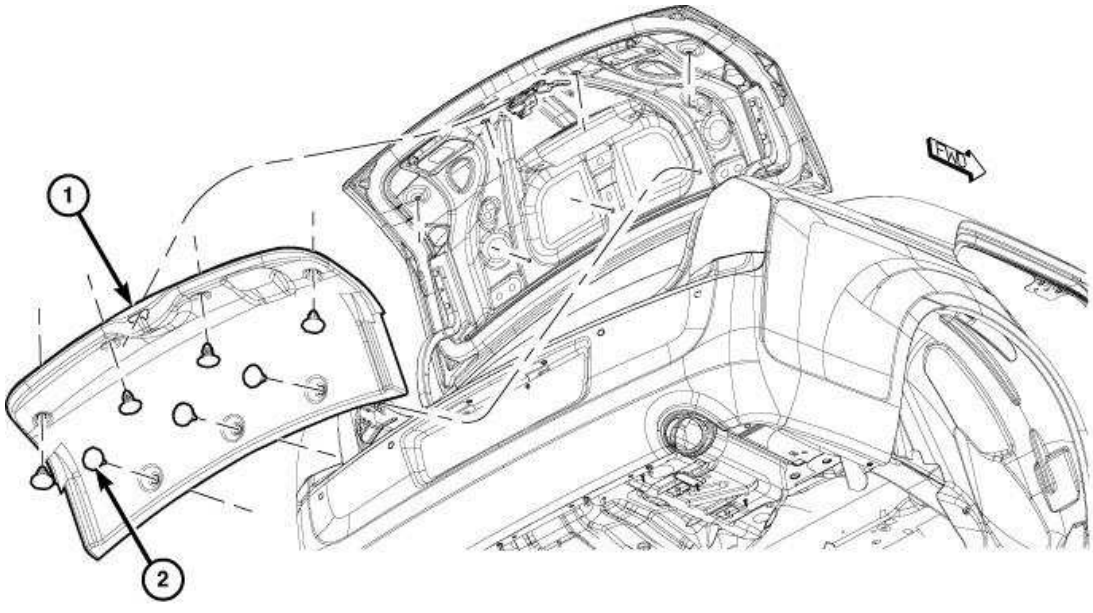


Fig. 53: Push-In Retainers & Decklid Cover

Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle (2) must be routed through the deck lid insulator.

22. Position the decklid insulator.
23. Install the push-in retainers (3) securing the decklid insulator (1) to the decklid.

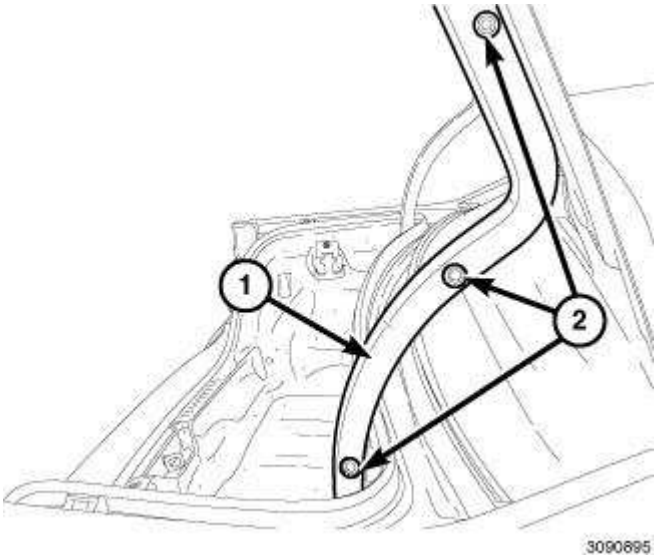


Fig. 54: RH Hinge Trim Push-In Fasteners & Hinge Trim
Courtesy of CHRYSLER GROUP, LLC

24. Position the hinge trim (1) to the hinge.
25. Install the hinge trim push-in fasteners (2). If necessary, repeat for the opposite side.

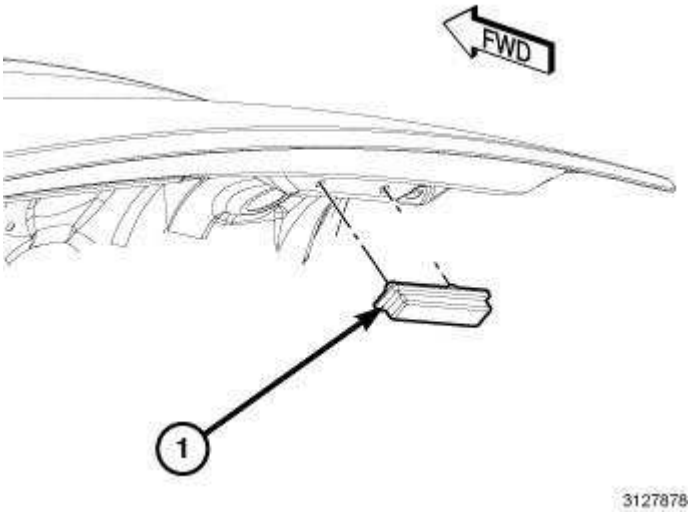


Fig. 55: Trunk Lid Handle
Courtesy of CHRYSLER GROUP, LLC

26. Install the decklid bumper (1). Repeat for the other side.
27. Connect the battery negative cable.
28. Install the spare tire cover/trunk floor carpet over the spare tire well.
29. Close the vehicle trunk.

HINGE, SPRING

REMOVAL

REMOVAL

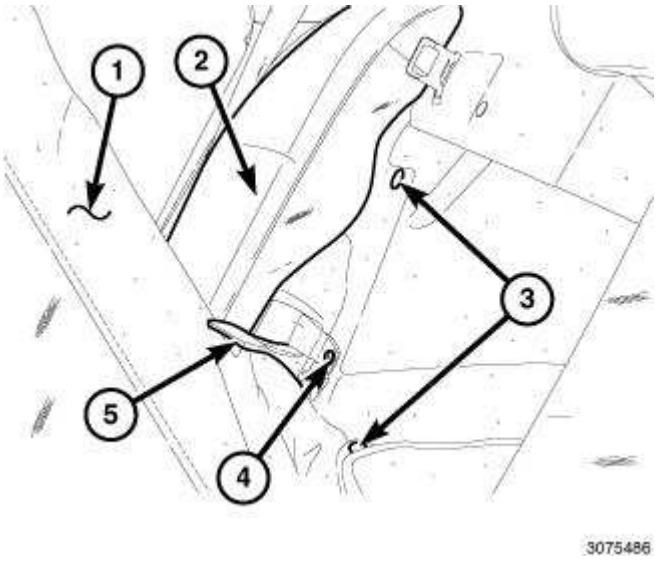


Fig. 56: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Open the decklid.
2. Remove the spare tire cover/trunk floor carpet and disconnect the negative battery cable.
3. Pull the RH rear seat back (1) forward, exposing the luggage compartment. Repeat for the opposite side.
4. Behind the RH rear seat, pull the carpet tab (5) up, exposing the rear seat back side bolster bracket retaining bolt (4). Repeat for the opposite side.
5. Remove the RH rear seat back side bolster bracket bolt (4). Repeat for the opposite side.
6. Remove the push-in fasteners (3) that secure the trunk side trim. Repeat for the opposite side.

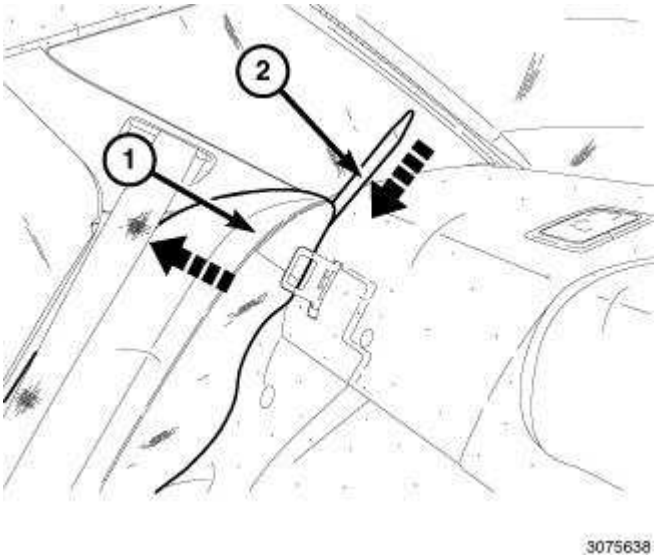


Fig. 57: Trim Stick & Seat Back Bolster
Courtesy of CHRYSLER GROUP, LLC

7. Using a trim stick (special tool #C-4755, Trim Stick) (2) or equivalent, push down between the rear shelf and the RH rear seat back bolster (1) to release the retaining clip, and pull out on the seat back bolster (1) to remove. Repeat for the opposite side.

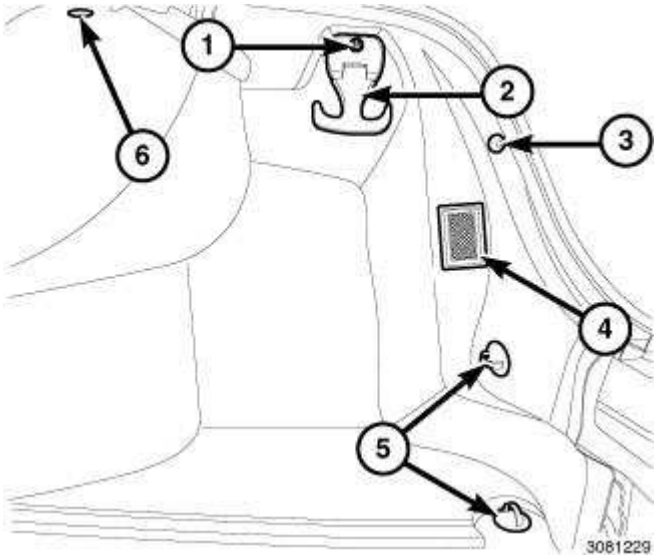


Fig. 58: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH shown in illustration, LH typical.

8. Remove the cargo net hook screw (1) and upper cargo hook (2).
9. Remove the push-in retainer (3) that secures the wheel well cover trim.
10. Remove the cargo net lower hooks (5).

11. Carefully pull back the wheel well cover enough to disconnect the trunk lamp (4) harness connector, and remove the wheel well cover trim.
12. Remove the wheel well cover trim from the trunk/cargo area.

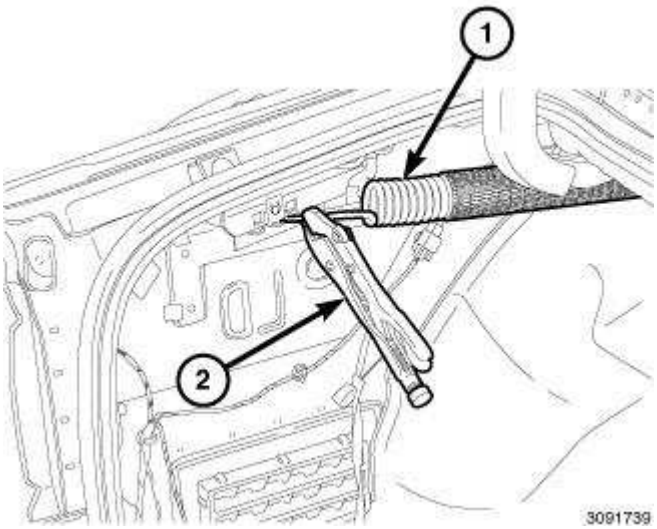


Fig. 59: Spring & Vise Grips
Courtesy of CHRYSLER GROUP, LLC

13. Using a china marker or equivalent, mark the forward and rearward decklid spring attachment locations on the spring (1) and it's respective brackets.
14. Support the decklid with a suitable prop or block to prevent it from closing.
15. Remove the gas prop. Refer to **PROP, GAS, REMOVAL**.
16. Using electrical tape, apply four to six wraps of tape near the rear of the decklid spring (1).

NOTE: Prior to tape application, make sure there is enough clearance to insert tool.

17. Using vise grips, clamp the vise grips (2) on the tape wrapped area of the spring (1).

CAUTION: Apply enough pressure to ensure a firm grip. Do not over-tighten as damage to the spring may occur.

18. Using the vise grips (2), pull rearward and inward towards the center of the vehicle to disengage the spring (1) from the rear bracket.
19. Remove the spring (1) from the front bracket.
20. If necessary, repeat for the opposite side.

INSTALLATION

INSTALLATION

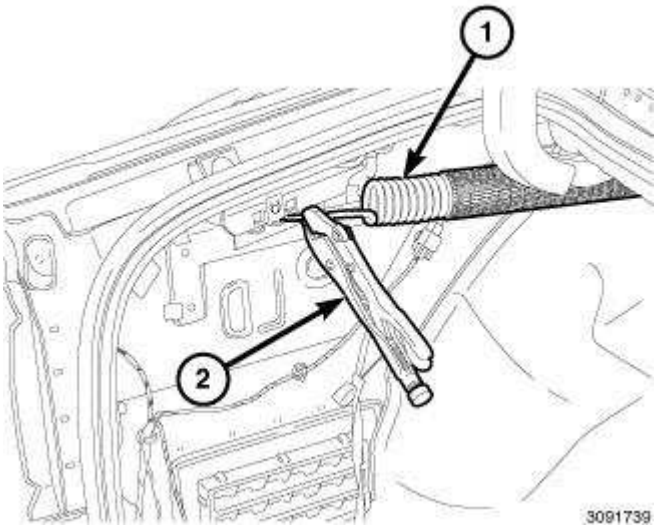


Fig. 60: Spring & Vise Grips
Courtesy of CHRYSLER GROUP, LLC

1. Using the reference marks made in the removal steps, install the spring (1) into the front bracket.
2. Using the vise grips (2) and the reference marks made in the removal steps, pull rearward and outward towards the vehicle side to engage the spring (1) into the rear bracket.
3. Remove the vise grips (2) from the spring.
4. Remove the tape wrap from the spring (1).
5. Install the gas prop, Refer to **PROP, GAS, INSTALLATION**.

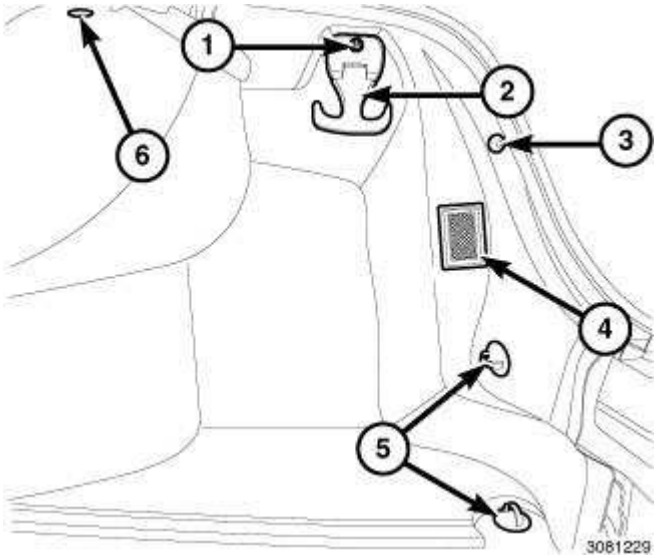


Fig. 61: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH shown in illustration, LH typical.

6. Position the wheel well cover trim into the trunk/cargo area.
7. Connect the trunk lamp (4) harness connector.
8. Install the cargo net lower hooks (5).
9. Install the push-in retainer (3) that secures the wheel well cover trim.
10. Install the cargo net hook screw (1) and upper cargo hook (2).

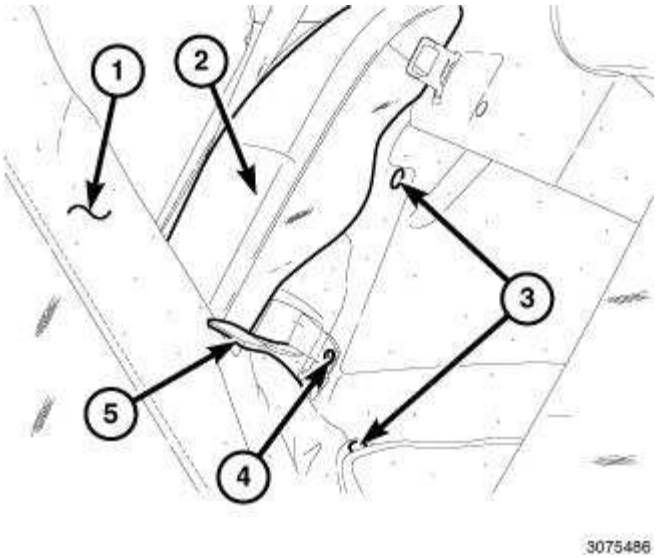


Fig. 62: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Position the rear seat bolster (2), push rearward to engage the retaining clip between the rear shelf and the bolster.
12. Install the push-in fasteners (3) that secure the trunk side trim. Repeat for the opposite side.
13. Install the RH rear seat back side bolster bracket bolt (4). Repeat for the opposite side.
14. If necessary, repeat for the opposite side.
15. Remove the decklid support prop/block.
16. Connect the negative battery cable.
17. Install the spare tire cover/trunk floor carpet over the spare tire well and close the decklid.

LATCH

REMOVAL

REMOVAL

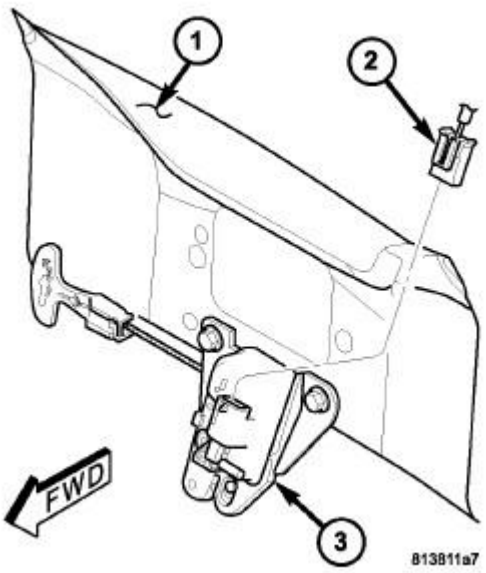


Fig. 63: Deck Lid
Courtesy of CHRYSLER GROUP, LLC

1. Open the deck lid.
2. Disconnect and isolate the battery negative cable.
3. Remove the cover from over the latch on the inside of the deck lid.
4. Disconnect the connector (2) of the body wire harness take out for the deck lid (1) from the latch connector receptacle (3).

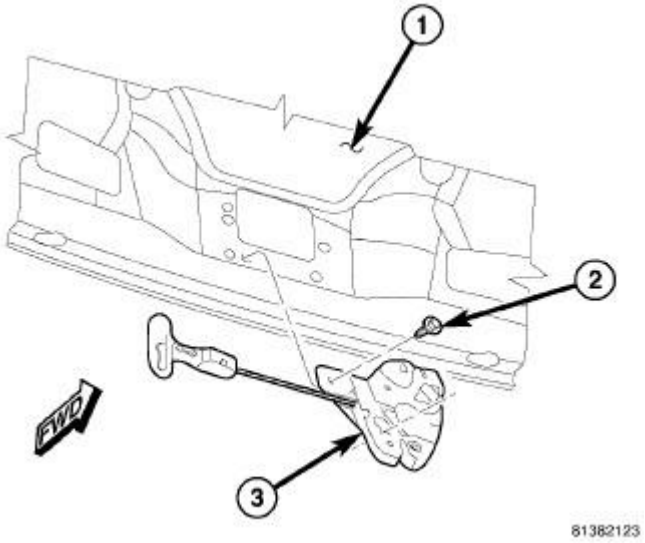


Fig. 64: Latch

Courtesy of CHRYSLER GROUP, LLC

5. Remove the two screws (2) that secure the latch (3) to the inside of the deck lid (1).
6. Remove the latch from the inside of the deck lid.

INSTALLATION

INSTALLATION

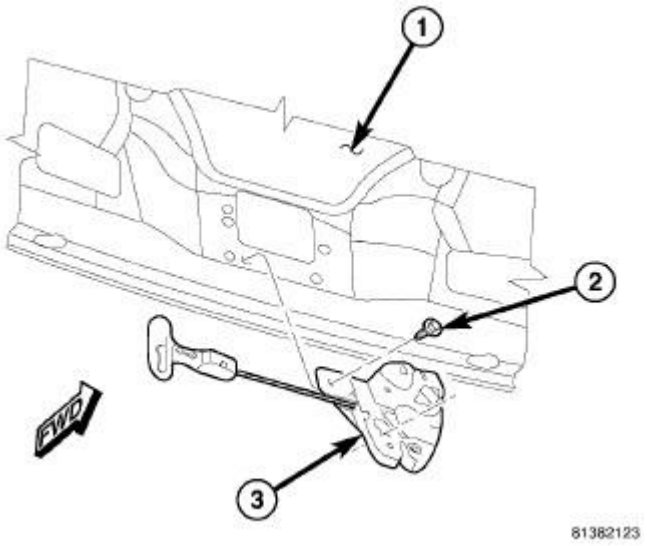


Fig. 65: Latch
Courtesy of CHRYSLER GROUP, LLC

1. Position the latch (3) to the inside of the deck lid (1).
2. Install and tighten the two screws (2) that secure the latch to the inside of the deck lid. Tighten the screws to 8 N.m (71 in. lbs.).

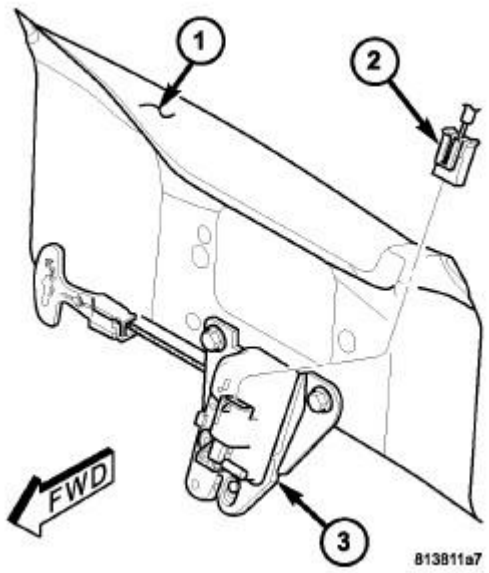


Fig. 66: Deck Lid
Courtesy of CHRYSLER GROUP, LLC

3. Reconnect the connector (2) of the body wire harness take out for the deck lid (1) to the latch connector receptacle (3).
4. Reinstall the cover over the latch on the inside of the deck lid.
5. Reconnect the battery negative cable.
6. Close the deck lid.

PROP, GAS

REMOVAL

REMOVAL

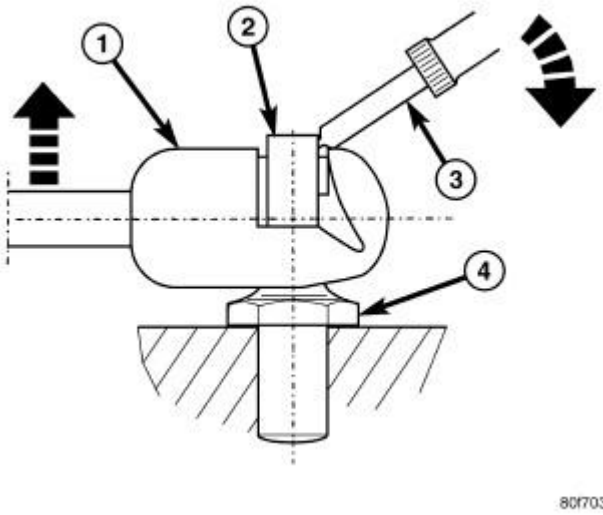


Fig. 67: Removing PDU Ball Socket From Ball Stud
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH shown in illustration, RH typical.

1. Open and support the deck lid with a suitable prop or block.

WARNING: To avoid personal injury or death, during service lift the ball socket end retaining clip only far enough to release the socket from the ball stud. Excessive prying or removal of the clip may result in improper clip spring tension. Improper clip tension may result in the support cylinder separating from the ball stud causing sudden, unexpected loss of deck lid support.

2. Insert a small flat-bladed tool (3) into the notch on the outer face of one ball socket end (1) of the support cylinder and carefully pry the retaining clip (2) outward while pulling the ball socket away from the ball stud (4) on the deck lid hinge.
3. Release the retaining clip to its installed position.

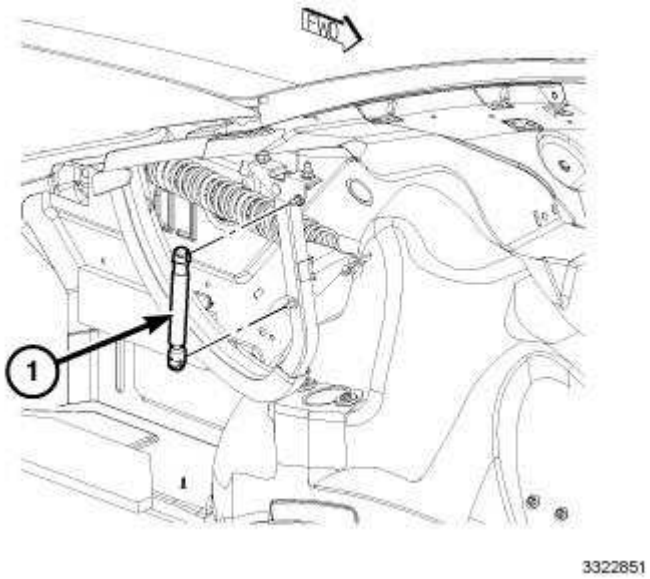


Fig. 68: Support Cylinder
Courtesy of CHRYSLER GROUP, LLC

4. Remove the support cylinder (1) from the deck lid hinge.

INSTALLATION

INSTALLATION

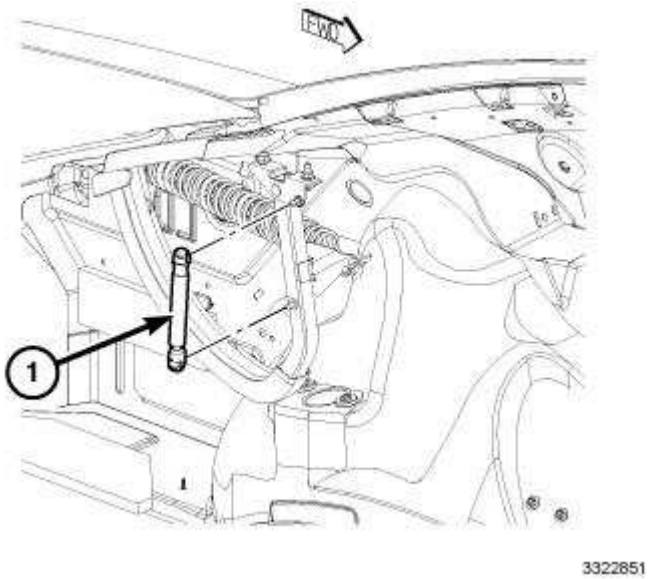


Fig. 69: Support Cylinder
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH shown in illustration, RH typical.

1. Position the ball socket on the cylinder end of the support cylinder (1) to the ball stud on the

upper bracket of the deck lid hinge.

2. Using hand pressure, press the ball socket onto the ball stud until the retainer clip snaps into place.
3. Position the ball socket on the rod end of the support cylinder to the ball stud on the lower bracket of the deck lid hinge.
4. Using hand pressure, press the ball socket onto the ball stud until the retainer clip snaps into place.
5. Inspect to be certain that the retaining clip on each of the support cylinder ball socket ends is fully seated.
6. Remove the service prop or block and close the deck lid.

SPOILER, DECKLID

REMOVAL

REMOVAL

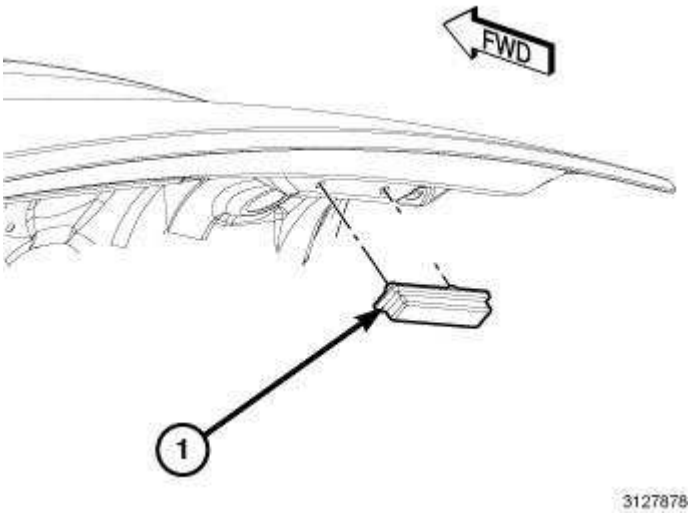


Fig. 70: Trunk Lid Handle
Courtesy of CHRYSLER GROUP, LLC

1. Open the vehicle trunk.
2. Remove the decklid bumper (1). Repeat for the other side.

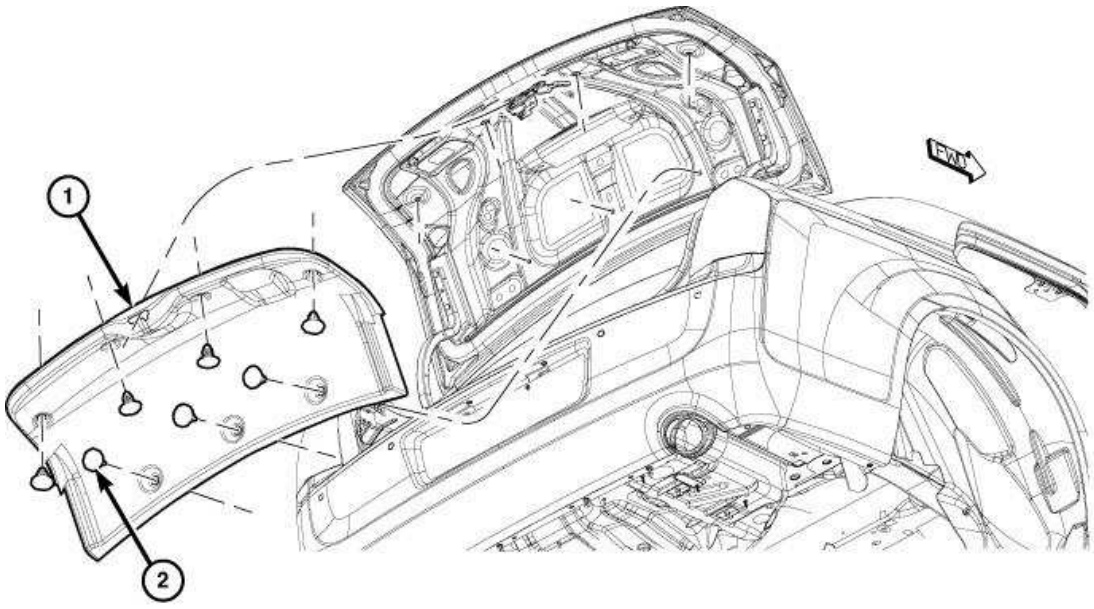


Fig. 71: Push-In Retainers & Decklid Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle must be routed through the deck lid insulator.

3. Remove the push-in retainers (2) securing the deck lid insulator (1) to the decklid.

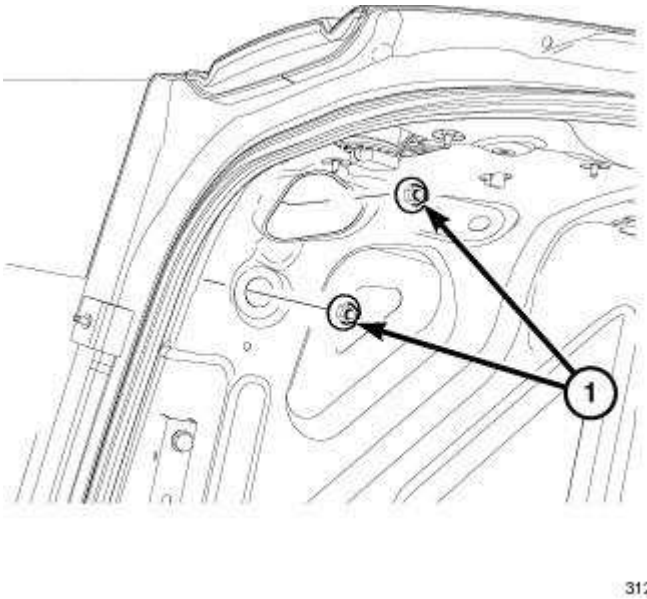


Fig. 72: Spoiler Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the spoiler nuts from spoiler studs through the access hole in the decklid. Repeat for the opposite side.

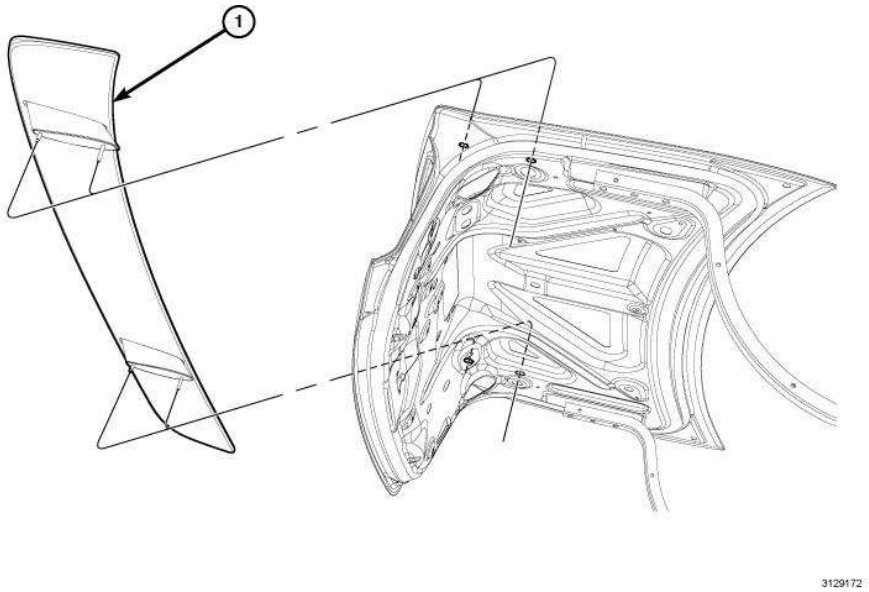


Fig. 73: Spoiler
Courtesy of CHRYSLER GROUP, LLC

5. Lower the decklid.
6. Remove spoiler (1) from decklid by lifting straight up and rearward.

INSTALLATION

INSTALLATION

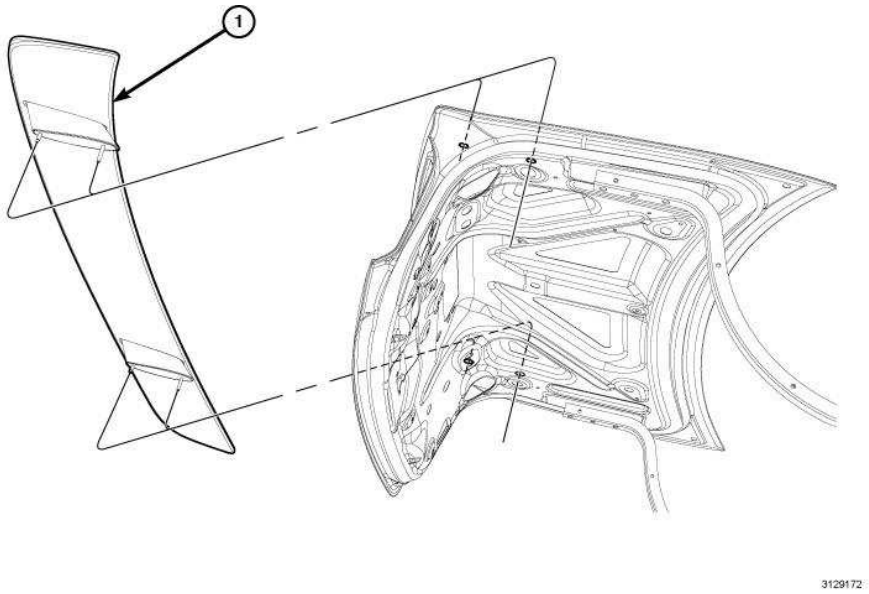


Fig. 74: Spoiler

Courtesy of CHRYSLER GROUP, LLC

1. Position the spoiler (1) by aligning the studs through decklid holes.

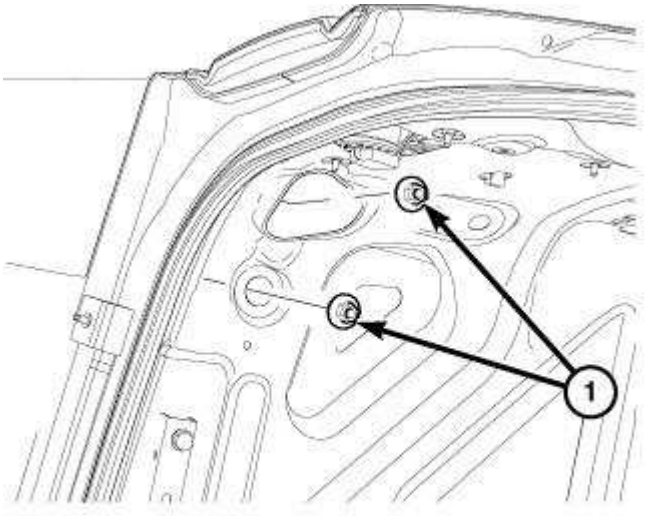


Fig. 75: Spoiler Nuts
Courtesy of CHRYSLER GROUP, LLC

2. Lift the decklid.
3. Loosely install the nuts (1) to the spoiler studs through the access holes in the decklid. Repeat for the opposite side.
4. Torque the nuts to 6 N.m (4.4 ft. lbs.). Repeat for the opposite side.

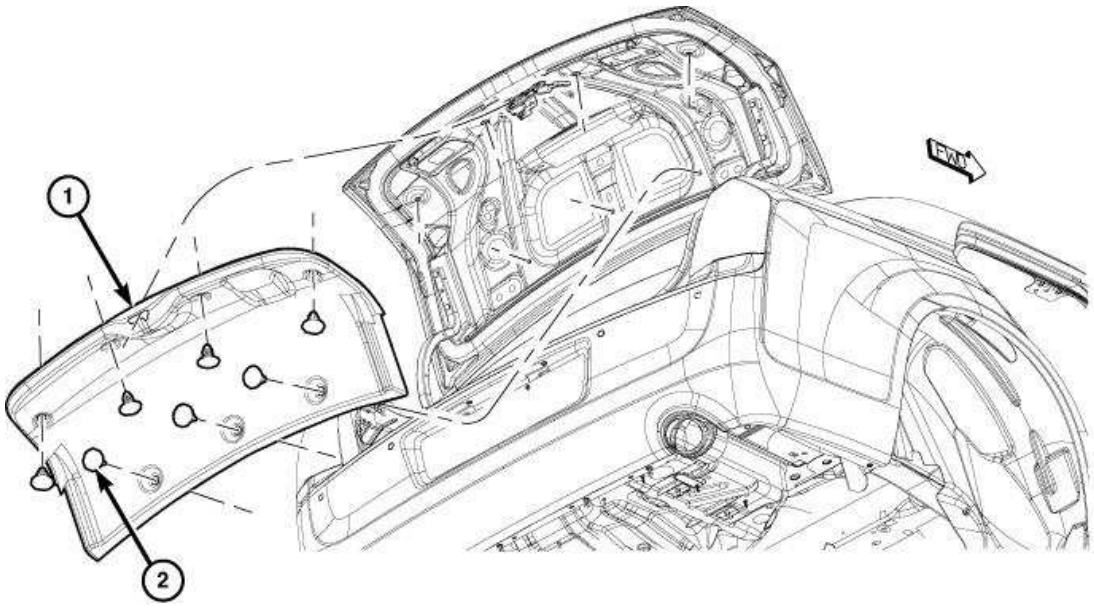


Fig. 76: Push-In Retainers & Decklid Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle must be routed through the deck lid insulator.

5. Position the decklid insulator.
6. Install the push-in retainers (2) securing the decklid insulator (1) to the decklid.

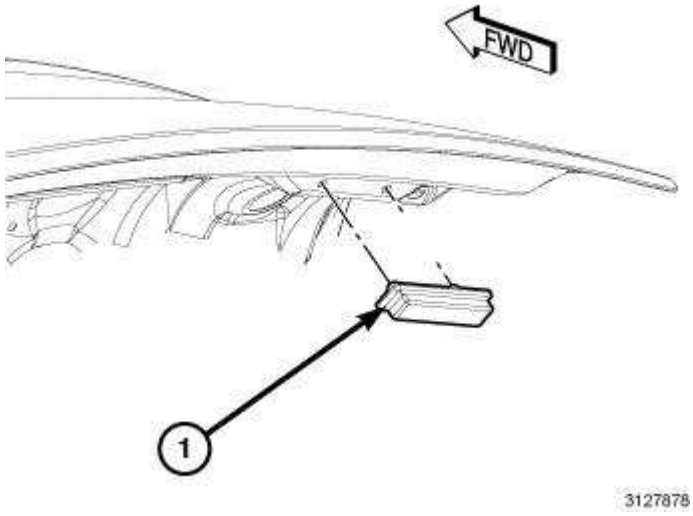


Fig. 77: Trunk Lid Handle
Courtesy of CHRYSLER GROUP, LLC

7. Install the decklid bumper (1). Repeat for the other side.

STRIKER, LATCH

REMOVAL

REMOVAL

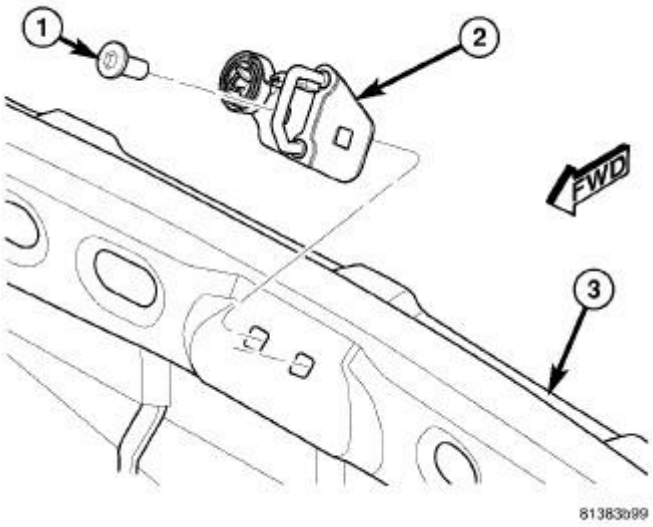


Fig. 78: Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Open the deck lid.
2. Remove the trunk rear trim panel from the inside of the deck opening lower panel (3). Refer to **PANEL, TRUNK TRIM, REAR, REMOVAL**.
3. Mark the deck lid latch striker (2) location on the inside of the deck opening lower panel to aid reinstallation.
4. Remove the two screws (1) that secure the latch striker to the inside of the deck opening lower panel.
5. Remove the latch striker from the vehicle.

INSTALLATION

INSTALLATION

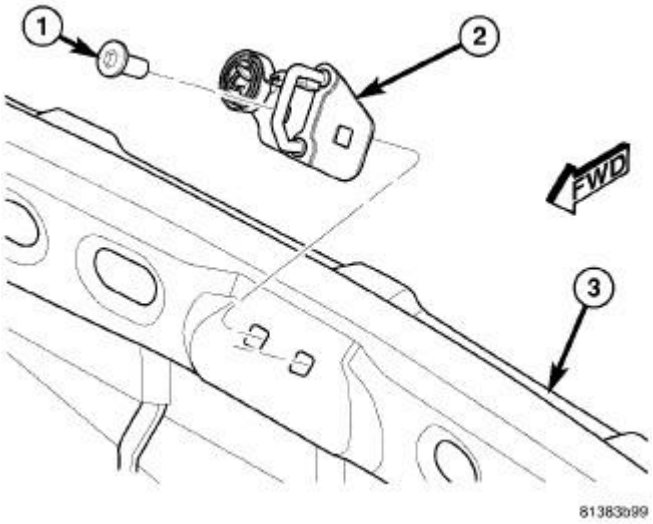


Fig. 79: Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Position the deck lid latch striker (2) to the inside of the deck opening lower panel (3).
2. Install and tighten the two screws (1) that secure the latch striker to the deck opening lower panel. Tighten the screws to 28 N.m (21 ft. lbs.).
3. Adjust the latch striker position as necessary to achieve proper deck lid latch operation.
4. Reinstall the trunk rear trim panel to the deck opening lower panel. Refer to **PANEL, TRUNK TRIM, REAR, INSTALLATION**.
5. Close the deck lid.

DOOR - FRONT

DESCRIPTION

DESCRIPTION

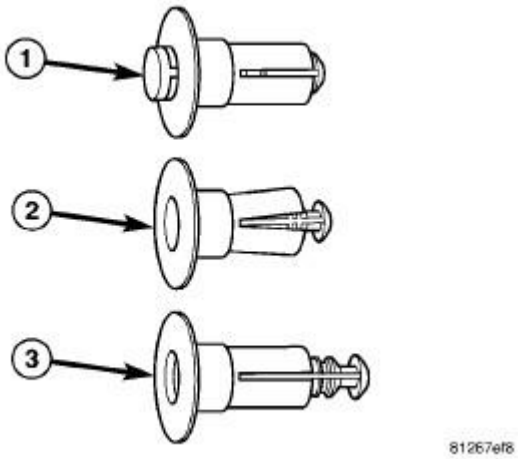


Fig. 80: Push Pin Fastener
Courtesy of CHRYSLER GROUP, LLC

1 - OPEN POSITION
2 - LOCK POSITION
3 - RELEASE POSITION

1. The push pin fastener is in the open position (1) when the center pin is pull outward approximately 2 mm. Then the push pin fastener is ready to be used.
2. To install push pin place it into position, and push the center pin in flush with the head of the push pin to lock it into position (2).
3. To remove the push pin fastener, push the center pin inward approximately 2 mm to release push pin fastener (3).

CYLINDER, DOOR LOCK

REMOVAL

REMOVAL

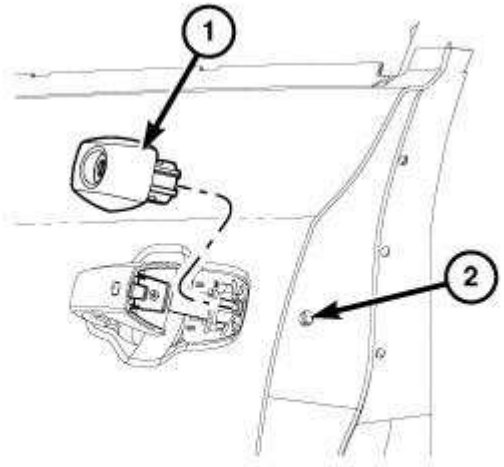


Fig. 81: PIA Fastener & Door Lock Cylinder/Delete Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Lock cylinder is only present on the front driver door. The remaining doors are equipped with a delete cap. The delete caps are removed/installed similar to the lock cylinder.

1. Disconnect the negative battery cable.
2. Open the front door.
3. Remove the protective plug used to cover the PIA fastener (2) located rearward of the door lock cylinder/delete cap (1).
4. Remove the door lock cylinder/delete cap (1) from the front door by loosening the PIA fastener (2) accessed rearward of the handle and gently prying door lock cylinder/delete cap (1) away.**Do not attempt to remove the PIA fastener.**

INSTALLATION

INSTALLATION

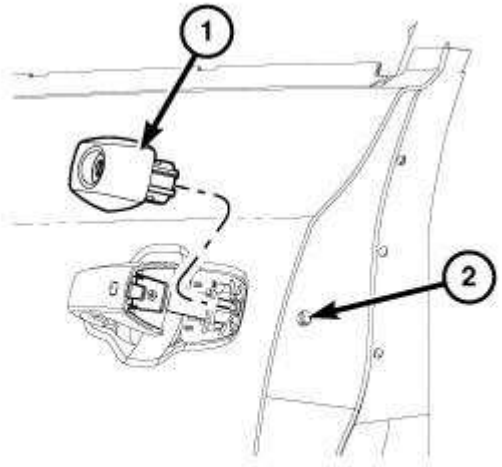


Fig. 82: PIA Fastener & Door Lock Cylinder/Delete Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Lock cylinder is only present on the front driver door. The remaining doors are equipped with a delete cap. The delete caps are removed/installed similar to the lock cylinder.

1. Position the door lock cylinder (1) to the front door, once properly positioned, tighten the PIA fastener (2) accessible rearward of the handle. Tighten the fastener securely and install the protective plug over the fastener opening.
2. Connect the negative battery cable.

DOOR

REMOVAL

REMOVAL

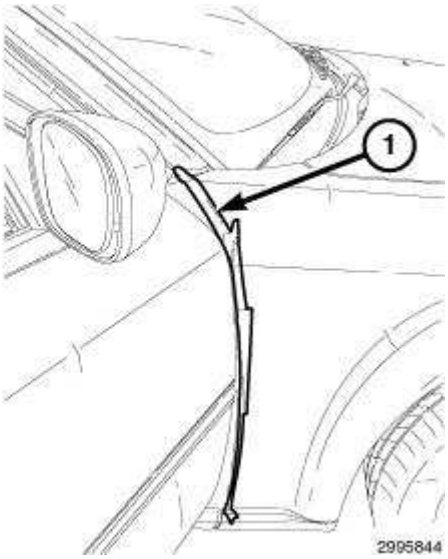


Fig. 83: Applying Tape To Rear Fender Edge For Protection
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Open the front door.
3. Using masking tape or equivalent, apply a strip of tape (1) to the rear fender edge near the door for protection.
4. Support the door with a suitable lifting device.

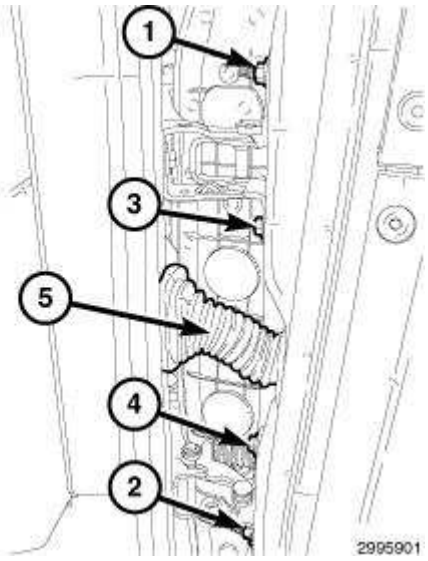


Fig. 84: Removing/Installing Front Door Wire Harness Boot & Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disengage the front door wire harness boot (5) and connector from the outside of the lower A-pillar.
6. Disconnect the door wire harness connectors.

7. Remove the hinge to door nuts (1, 2) from the door.
8. Remove the hinge to door bolts (3, 4) from the door.

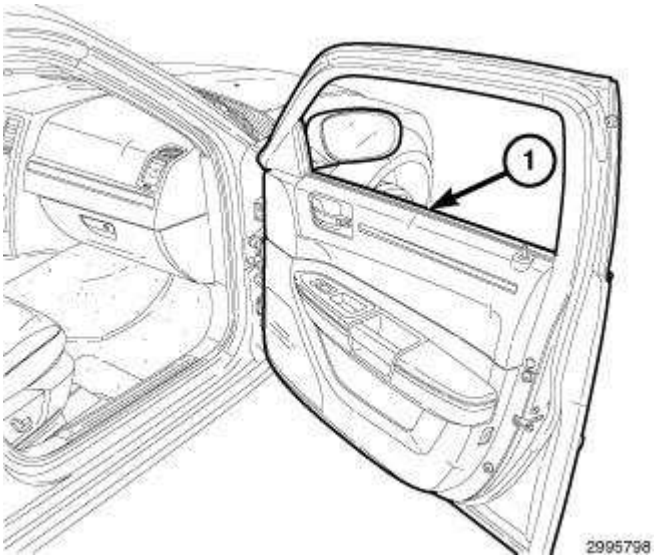


Fig. 85: Removing/Installing Door From The Hinges
Courtesy of CHRYSLER GROUP, LLC

NOTE: Have an assistant to aid in removal/installation.

9. Remove the door from the hinges by pulling straight out.

INSTALLATION

INSTALLATION

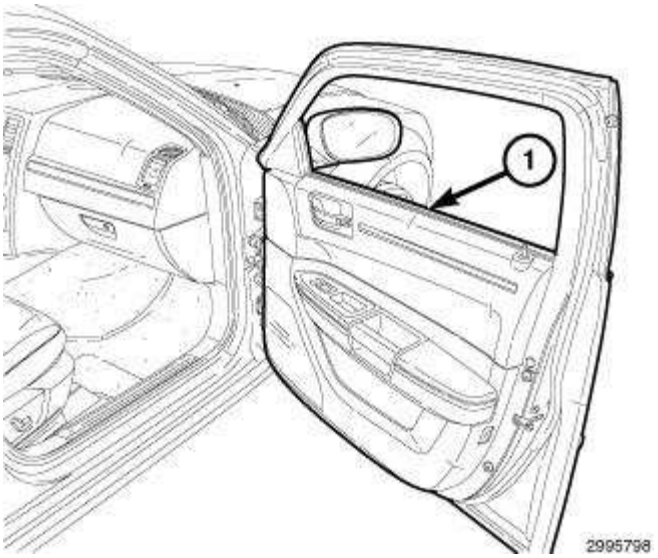


Fig. 86: Removing/Installing Door From The Hinges
Courtesy of CHRYSLER GROUP, LLC

NOTE: Have an assistant to aid in removal/installation.

1. Support the front door (1) with a suitable lifting device.
2. Position and align the door hinge studs with the upper and lower hinge brackets.
3. Push the door in towards (1) the vehicle to seat the studs into the hinge brackets.

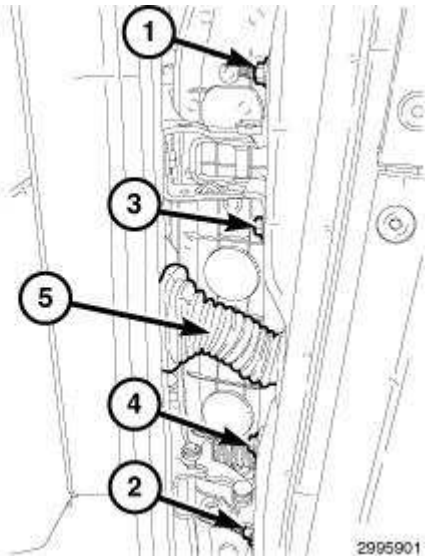


Fig. 87: Removing/Installing Front Door Wire Harness Boot & Connector
Courtesy of CHRYSLER GROUP, LLC

4. Install and tighten the nuts (1, 2) into both the upper and lower front door hinge studs to secure the door hinge brackets to the door. Tighten the fasteners to 24 N.m (18 ft. lbs.).
5. Install and tighten the bolts (3, 4) into both the upper and lower front door hinge studs to secure the door hinge brackets to the door. Tighten the fasteners to 24 N.m (18 ft. lbs.).
6. Remove the lifting device supporting the door.
7. Carefully pull the body wire harness connector(s) (5) out from the A-pillar far enough to reconnect them to the door wire harness boot and connector.
8. Engage the front door wire harness boot and connector (5 into the wiring clearance hole on the outside of the lower A-pillar.
9. Reconnect the battery negative cable.

NOTE: For vehicles equipped with the optional Automatic Express Up power window feature, recalibration of this feature is required whenever power to the door module is disrupted.

10. Adjust the door hinge positions as necessary to achieve proper door spacing and operation.

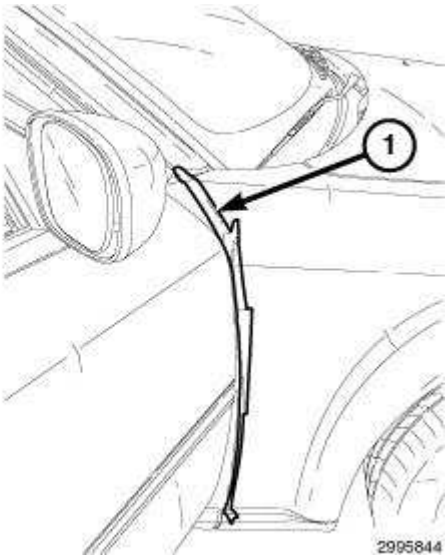


Fig. 88: Applying Tape To Rear Fender Edge For Protection
Courtesy of CHRYSLER GROUP, LLC

11. Remove the tape strip (1) from the rear edge of front fender.

GLASS, DOOR

REMOVAL

REMOVAL

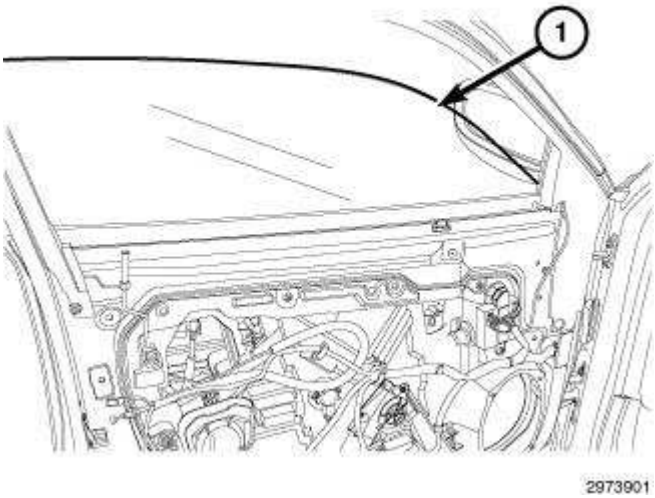


Fig. 89: Window
Courtesy of CHRYSLER GROUP, LLC

1. Remove the trim panel from the inside of the front door. Refer to **PANEL, DOOR TRIM, REMOVAL**.

2. Remove the inner belt weatherstrip from the front door.
3. Open the latch access panel located on the carrier plate near the lock rod assembly.
4. Remove the clear adhesive patch covering the front window regulator access hole located just behind the electronic door module. If the clear adhesive patch is not present, there will be an indented area in the same location that will need to be cut out.
5. Temporarily install the window switch pod, reconnect the negative battery cable and lower the window (1) until the white regulator tabs are visible in both access holes.
6. With the help of an assistant holding the glass, release the window regulator tab and lift the window up and tape the glass (1) to the door header.
7. Remove the door carrier plate. Refer to **PLATE, CARRIER, REMOVAL**.
8. With the help of an assistant holding the glass, remove the tape and lower the glass (1) into the carrier plate cavity.
9. Remove the glass (1) through the carrier plate cavity.

INSTALLATION

INSTALLATION

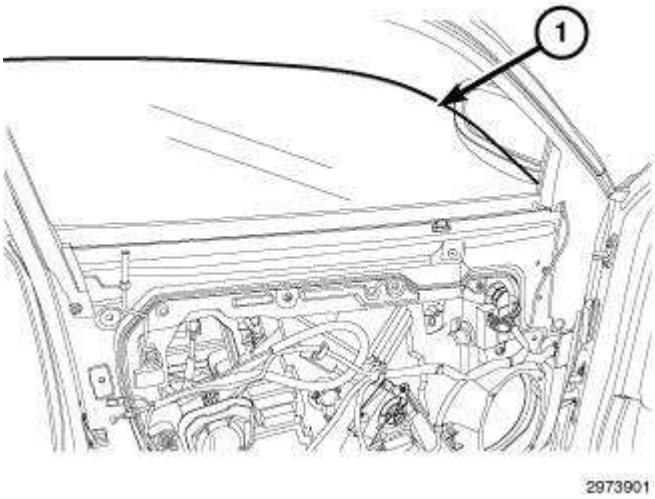


Fig. 90: Window
Courtesy of CHRYSLER GROUP, LLC

1. Install the glass (1) through the carrier plate cavity.
2. With the help of an assistant holding the glass, lift the glass into place and secure with tape.
3. Install the carrier plate. Refer to **PLATE, CARRIER, INSTALLATION**.
4. Remove the tape or wedge from the window, lower the glass and engage the window regulator tabs into the glass.
5. Add or re-apply a clear adhesive patch covering the front window regulator access hole.
6. Close the latch access panel.

7. Reinstall the inner belt weatherstrip onto the front door.
8. Reinstall the trim panel onto the inside of the front door. Refer to **PANEL, DOOR TRIM, INSTALLATION**.

HANDLE, EXTERIOR

REMOVAL

REMOVAL

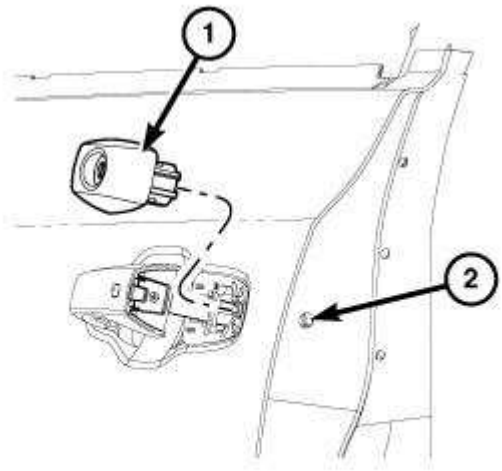


Fig. 91: PIA Fastener & Door Lock Cylinder/Delete Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH Shown in illustration, RH typical.

1. Disconnect the negative battery cable.
2. Remove the door lock cylinder (1) from the front door. Refer to **CYLINDER, DOOR LOCK, REMOVAL**.

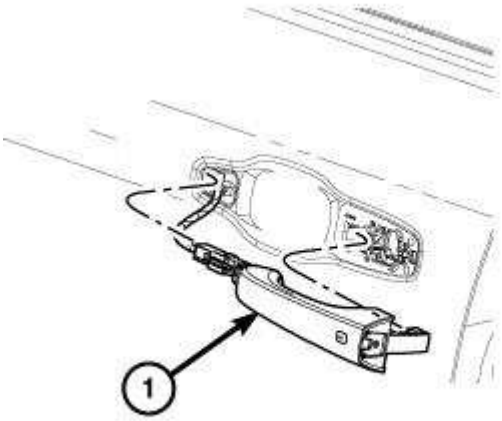


Fig. 92: Slide Handle
Courtesy of CHRYSLER GROUP, LLC

3. Slide handle (1) rearward and out.
4. Disconnect the harness connector and remove the handle (1).

INSTALLATION

INSTALLATION

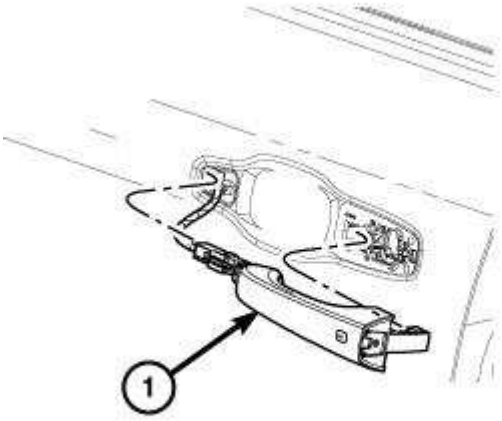


Fig. 93: Slide Handle
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH Shown in illustration, RH typical.

1. Connect the harness connector and position the handle (1) to the door.

2. Slide handle (1) in and forward.

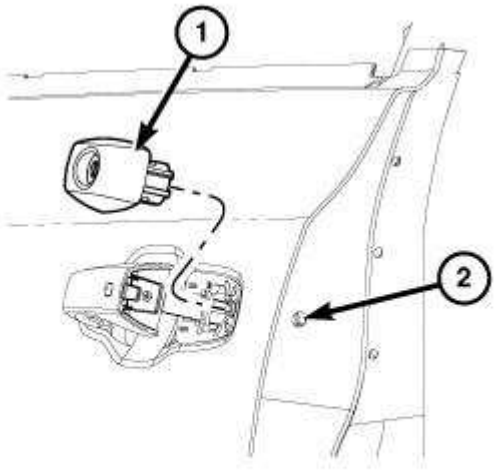


Fig. 94: PIA Fastener & Door Lock Cylinder/Delete Cap
Courtesy of CHRYSLER GROUP, LLC

3. Install the door lock cylinder (1) to the front door. Refer to **HANDLE, EXTERIOR, INSTALLATION**.
4. Connect the negative battery cable.

HINGE, DOOR

REMOVAL

REMOVAL

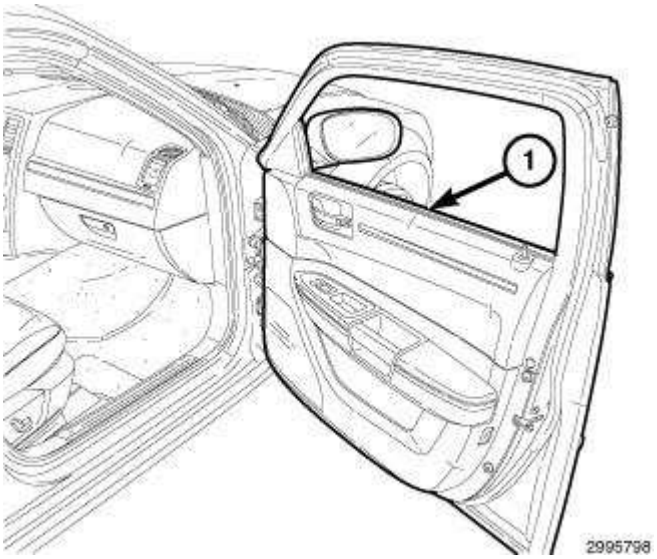


Fig. 95: Removing/Installing Door From The Hinges
Courtesy of CHRYSLER GROUP, LLC

1. Remove the door from the vehicle. Refer to **DOOR, REMOVAL**.

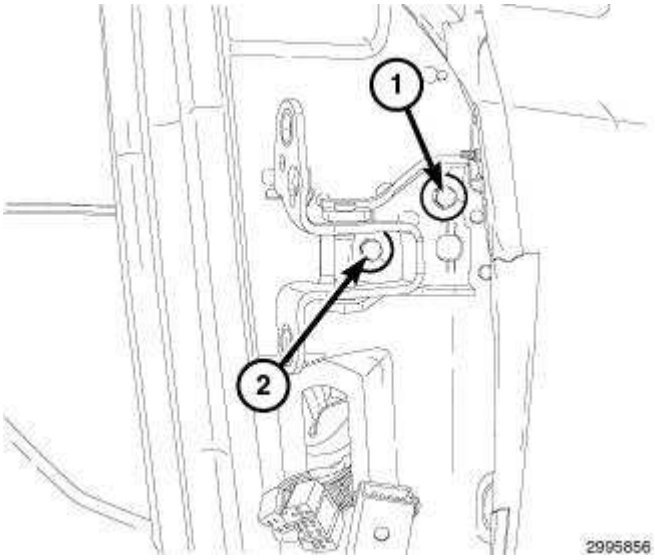


Fig. 96: Locating Fasteners of Upper And Lower Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Upper hinge shown in illustration, lower hinge similar.

2. Mark the upper or lower hinge bracket location on the outside of the lower A-pillar to aid installation.
3. Remove the fasteners (1, 2) that secure the hinge bracket to the outside of the lower A-pillar.
4. Remove the hinge bracket from the A-pillar.

INSTALLATION

INSTALLATION

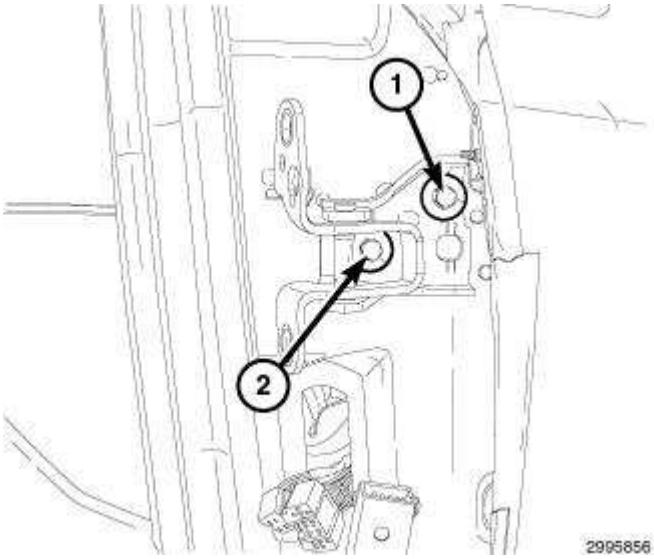


Fig. 97: Locating Fasteners of Upper And Lower Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Upper hinge shown in illustration, lower hinge similar.

1. Position and align the upper or lower hinge to the outside face of the lower A-pillar using the reference marks made when removing.
2. Install and tighten the fasteners (1, 2) that secure the hinge to the lower A-pillar. Tighten the fasteners to 30 N.m (22 ft. lbs.).

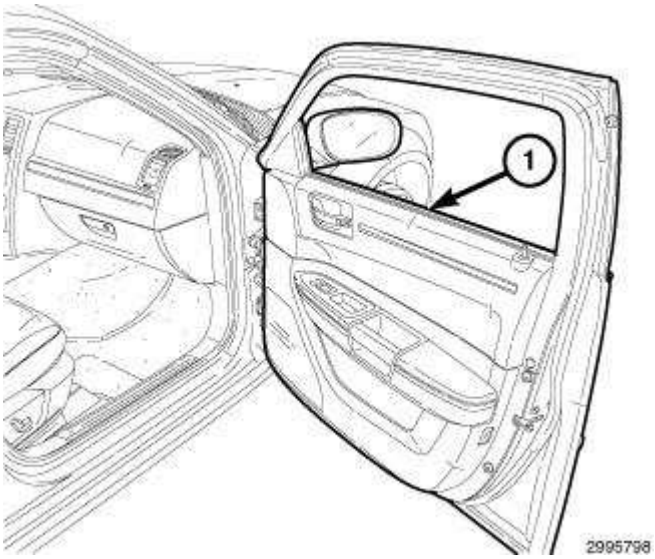


Fig. 98: Removing/Installing Door From The Hinges
Courtesy of CHRYSLER GROUP, LLC

3. Install the front door onto the vehicle, Refer to **DOOR, INSTALLATION**.

LATCH, DOOR

DESCRIPTION

DESCRIPTION

The door latch is integrated to the door's module/carrier plate. To remove or install the latch, the carrier plate will need to be removed for access. Refer to **PLATE, CARRIER, REMOVAL** &**PLATE, CARRIER, INSTALLATION**.

MOLDING, INTERIOR WINDOW TRIM

REMOVAL

REMOVAL

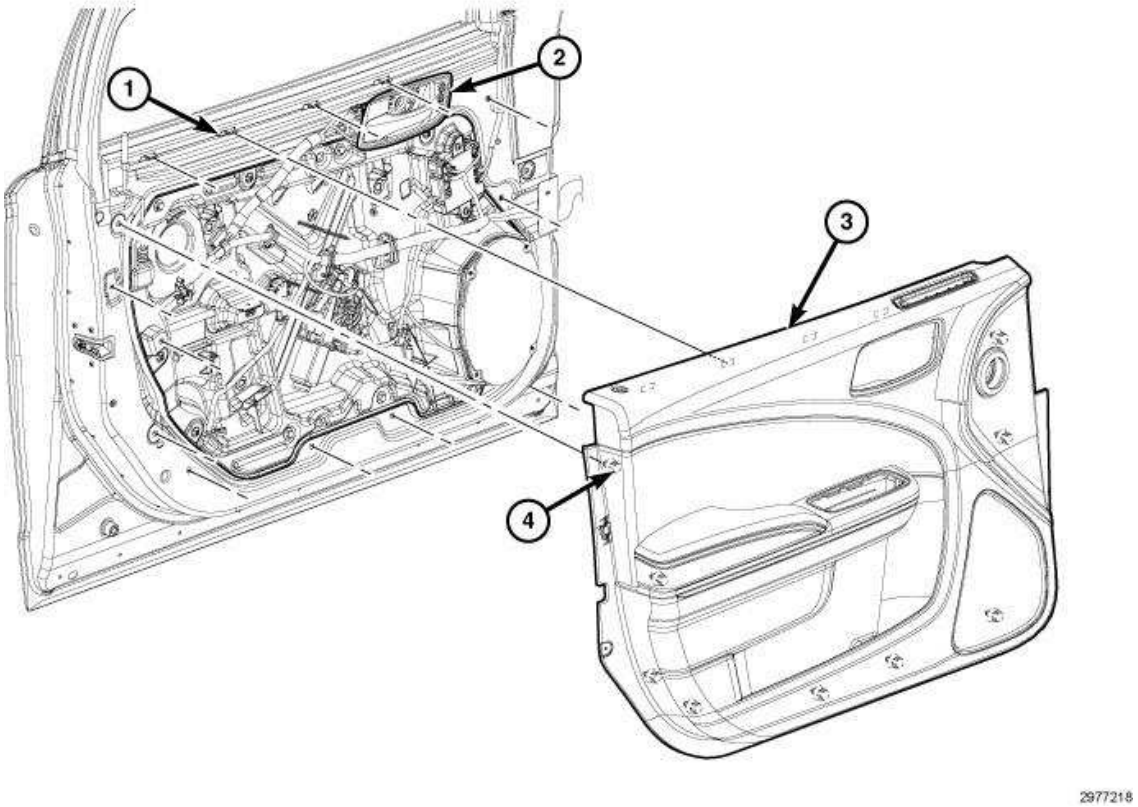


Fig. 99: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the door trim panel (3). Refer to **PANEL, DOOR TRIM, REMOVAL**.

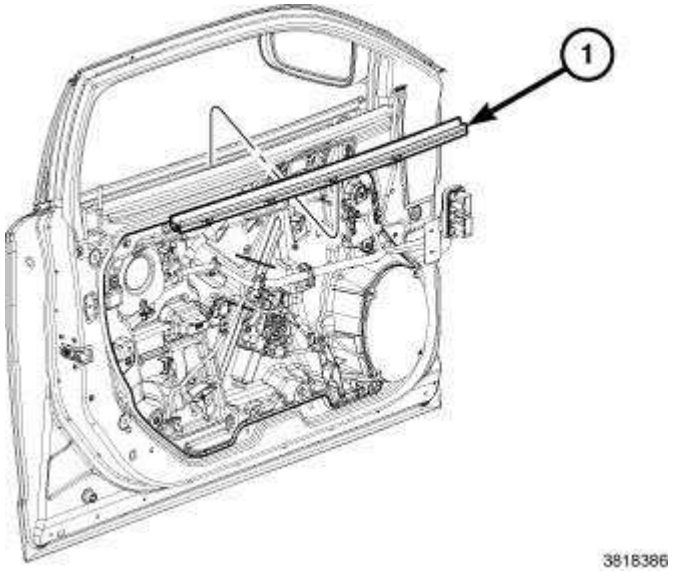


Fig. 100: Inner Molding Weatherstrip
Courtesy of CHRYSLER GROUP, LLC

3. Remove the inner molding weatherstrip (1).

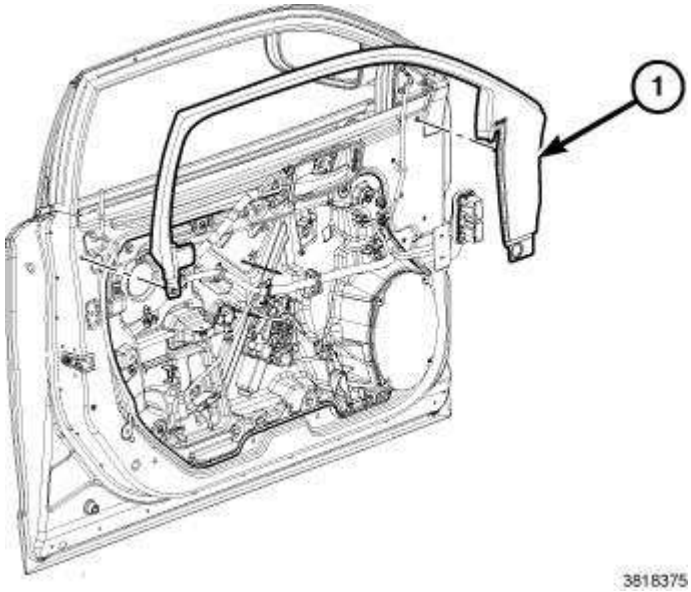


Fig. 101: Interior Window Trim Molding
Courtesy of CHRYSLER GROUP, LLC

4. Using (special tool #C-4755, Trim Stick), detach the fasteners and retaining tabs securing the interior window trim molding (1) and position slightly away from the door.
5. If equipped, disconnect the speaker from the molding (1).
6. Remove the interior window trim molding (1).

INSTALLATION

INSTALLATION

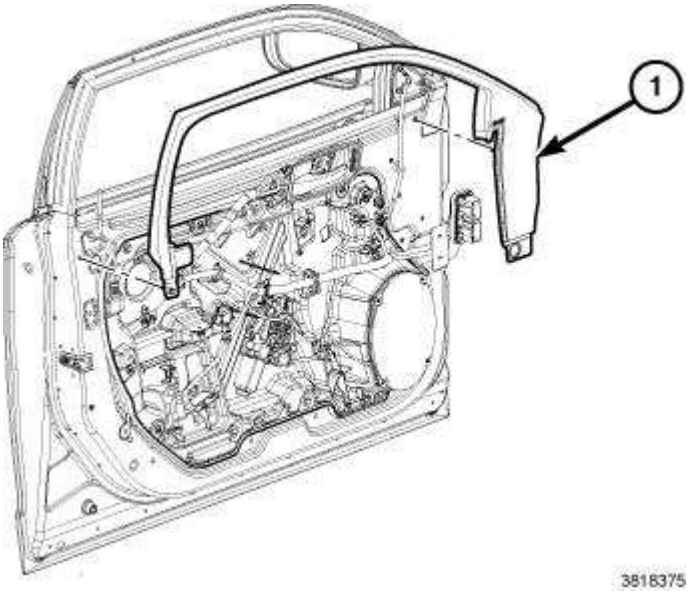


Fig. 102: Interior Window Trim Molding
Courtesy of CHRYSLER GROUP, LLC

1. Position the interior window trim molding (1) near the door.
2. If equipped, connect the speaker wire harness to the molding (1).
3. Align the interior window trim molding (1) to the door. Install the fasteners securing the trim molding, engage all retaining tabs.

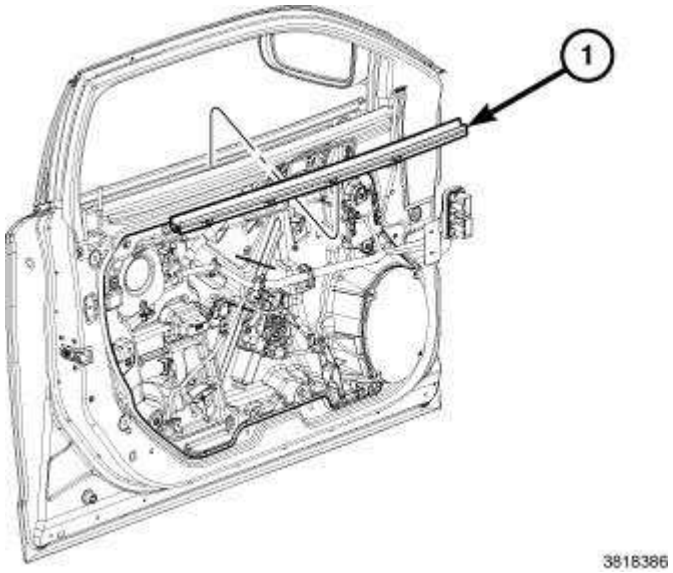


Fig. 103: Inner Molding Weatherstrip
Courtesy of CHRYSLER GROUP, LLC

4. Install the inner molding weatherstrip (1).

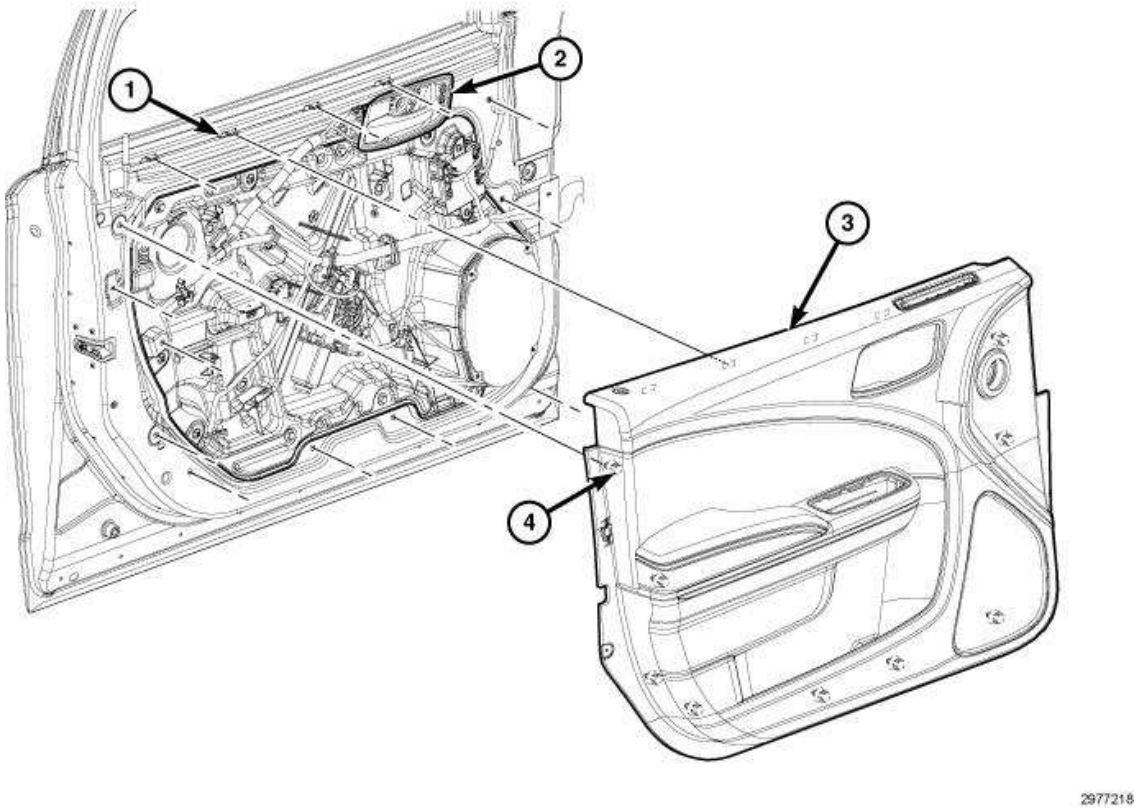


Fig. 104: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

5. Install the door trim panel (3). Refer to **PANEL, DOOR TRIM, INSTALLATION**.
6. Connect the battery negative cable.

PANEL, DOOR TRIM

REMOVAL

REMOVAL

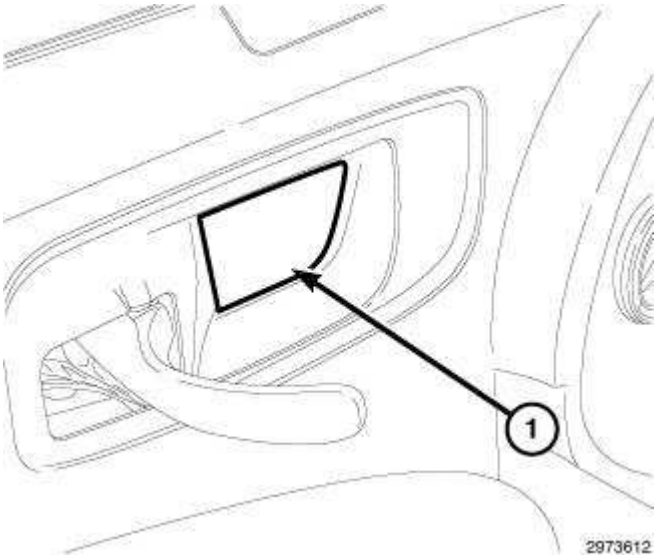


Fig. 105: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a small pick tool, pull out on interior latch handle and remove the trim plate (1).

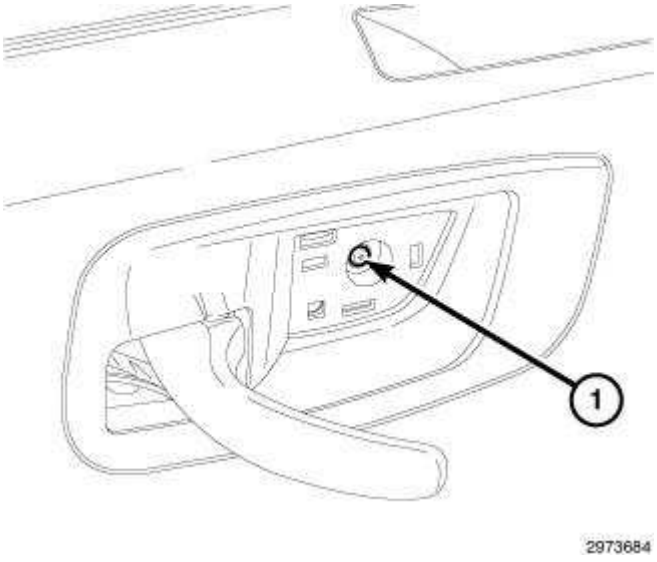


Fig. 106: Screw
Courtesy of CHRYSLER GROUP, LLC

3. Pull out on interior latch handle and remove the screw (1).

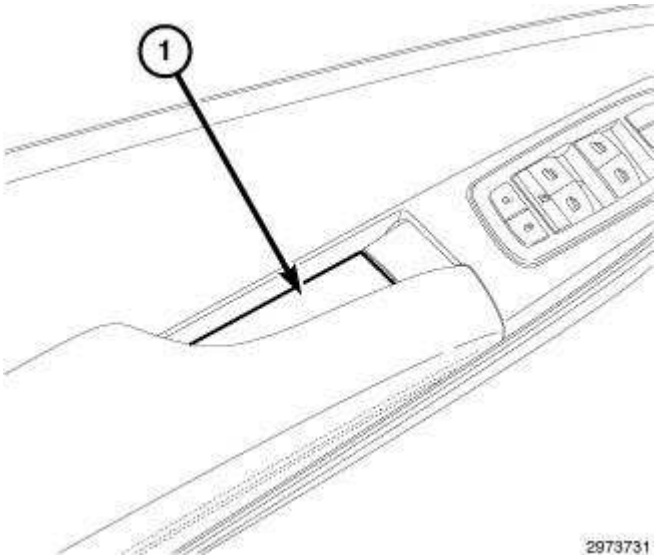


Fig. 107: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

4. Using a small pick tool, remove the trim plate (1) just behind the armrest.

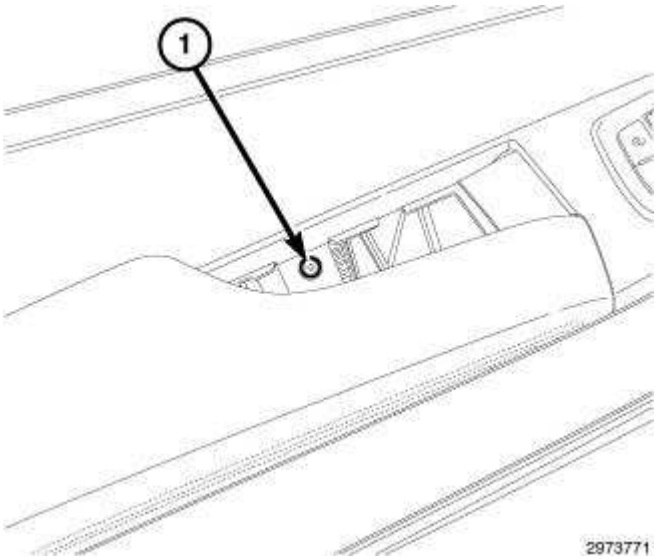


Fig. 108: Screw
Courtesy of CHRYSLER GROUP, LLC

5. Remove the screw (1) just behind the armrest.
6. Remove and disconnect the power window switch. Refer to **SWITCH, POWER WINDOW, REMOVAL** .

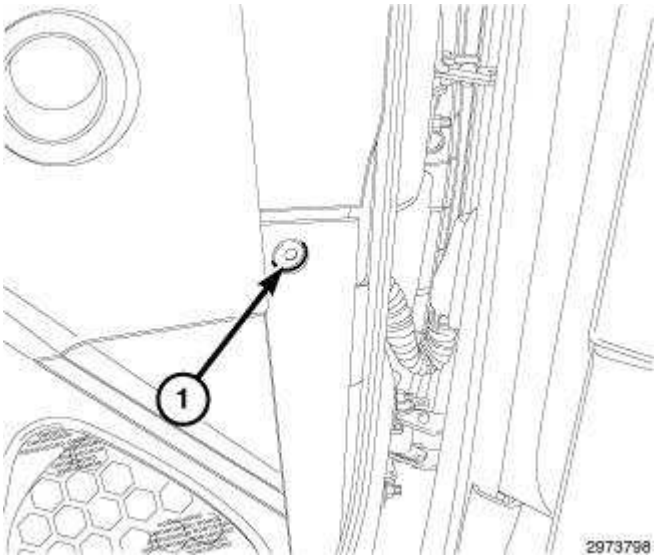


Fig. 109: Push Pin Fastener
Courtesy of CHRYSLER GROUP, LLC

7. Remove the push pin fastener (1) near the front of the door.

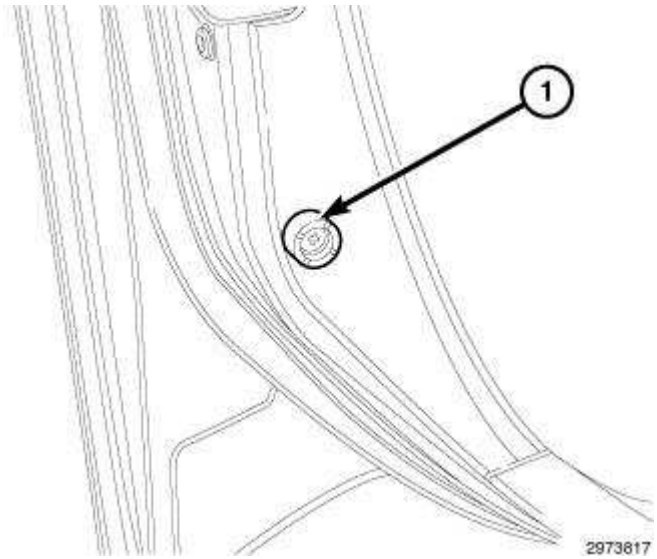


Fig. 110: Screw/Bumper
Courtesy of CHRYSLER GROUP, LLC

8. Remove the screw/bumper (1) from the rear of the door trim.

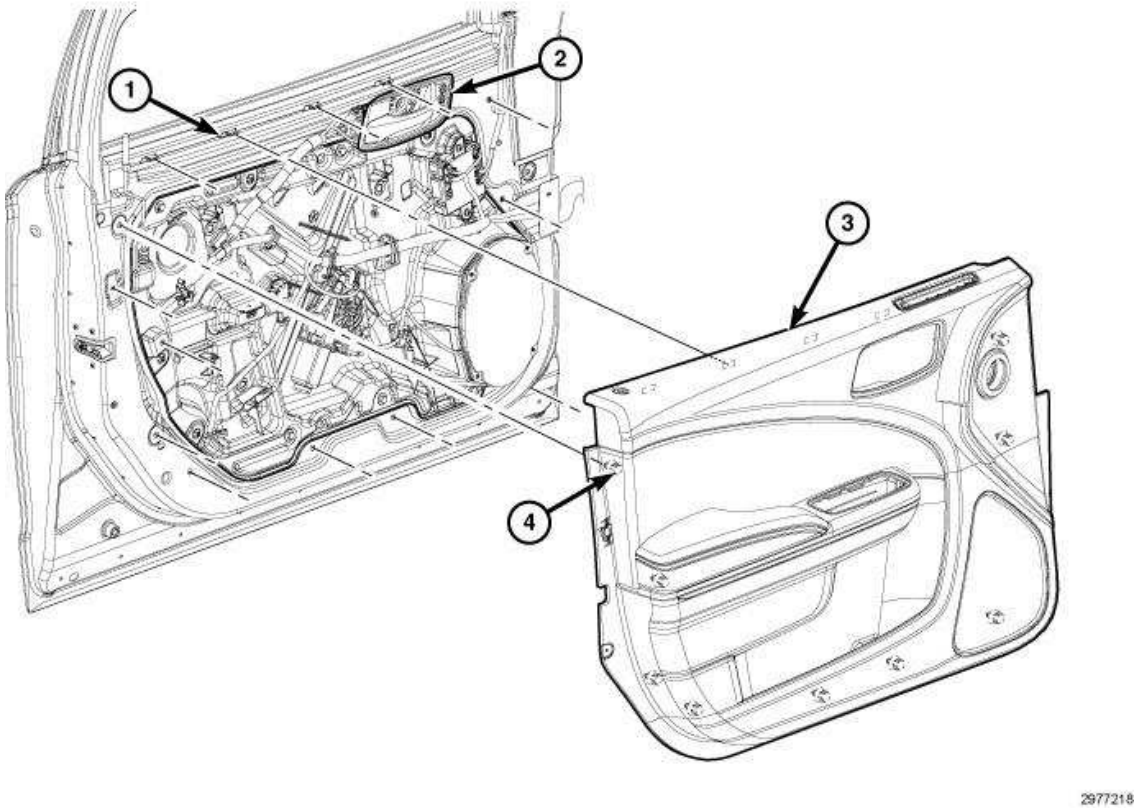


Fig. 111: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

9. Remove the latch handle assembly (2) from the door.

NOTE: **If desired, the latch handle assembly can be left installed to the door trim panel. If left installed, the technician will need to detach the latch cable at the handle before the door trim panel is fully removed.**

10. Using (special tool #C-4755, Trim Stick) or equivalent, disengage the door trim snap retainers (4) and slightly reposition the trim panel (3).
11. Raise the trim panel (3) up and peel the belt molding off from the flange.**Do not fully remove at this time.** .

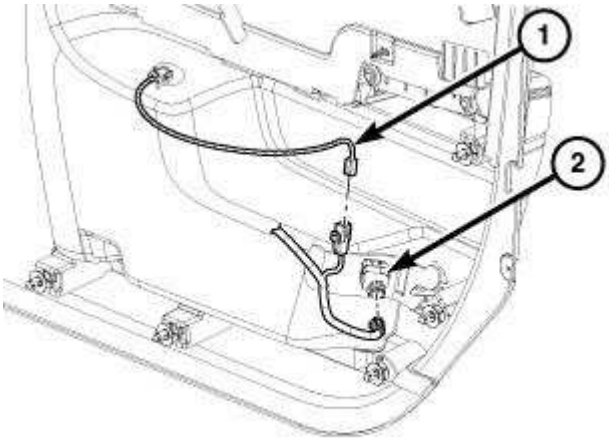


Fig. 112: Harness & Fuel Door Release Switch
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the harness (1) from the fuel door release switch (2).
13. Remove the door trim panel.
14. If necessary, use a flat bladed screwdriver to disengage the belt molding clips from the trim panel.

INSTALLATION

INSTALLATION

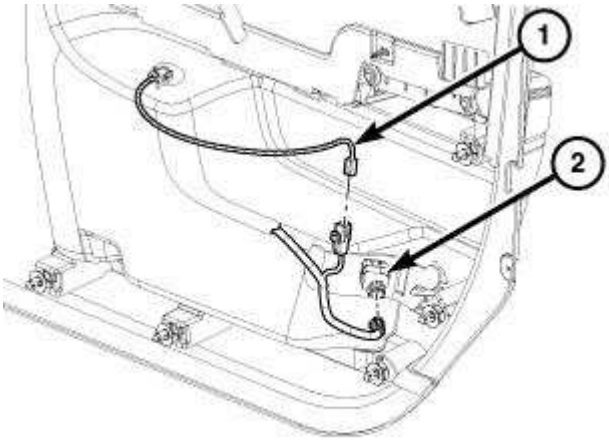


Fig. 113: Harness & Fuel Door Release Switch
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, engage the belt molding clips (1) to the trim panel.
2. Prior to installation, check to be certain that all snap retainers are in good condition on the door trim panel and the door's carrier plate. Replace if necessary.
3. Position the door trim panel near the door. **Do not install at this time.**

4. Connect the harness (1) to the fuel door release switch (2).

NOTE: **If the latch handle assembly is installed to the door trim panel, the technician will need to attach the latch cable at the handle before the door trim panel is installed.**

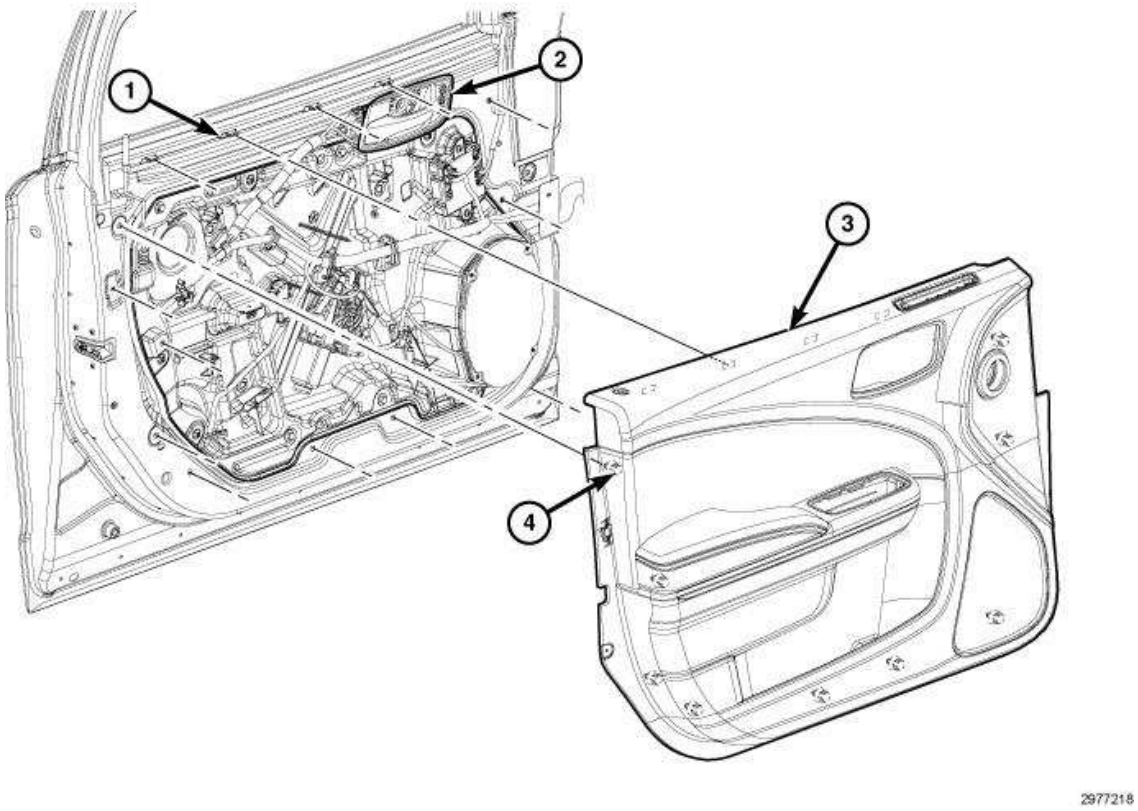


Fig. 114: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

5. Feed the latch handle assembly (2) on an angle through the opening in the door trim panel (3). Once the latch handle is fed through the opening, snap it into place.
6. Using firm pressure, engage the door trim snap retainers (1, 4) into the door's carrier plate.

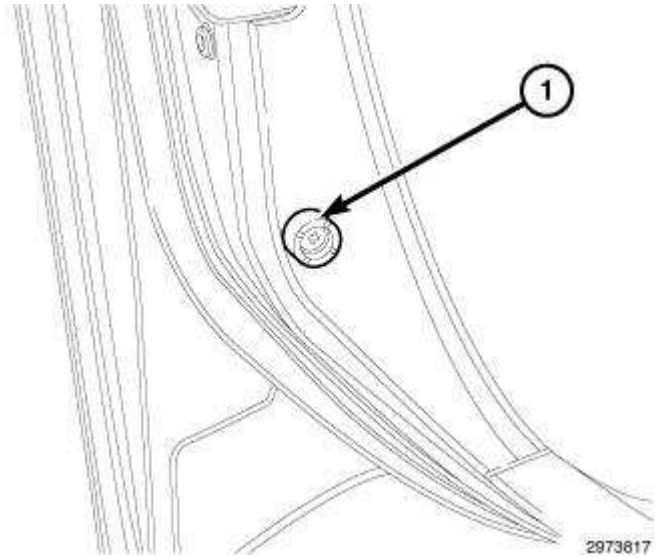


Fig. 115: Screw/Bumper
Courtesy of CHRYSLER GROUP, LLC

7. Install the screw/bumper (1) to the rear of the door trim.

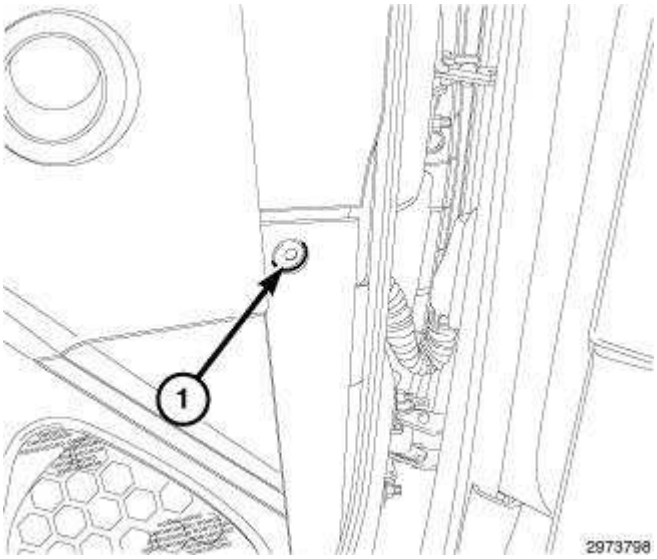


Fig. 116: Push Pin Fastener
Courtesy of CHRYSLER GROUP, LLC

8. Install the push pin fastener (1) near the front of the door.

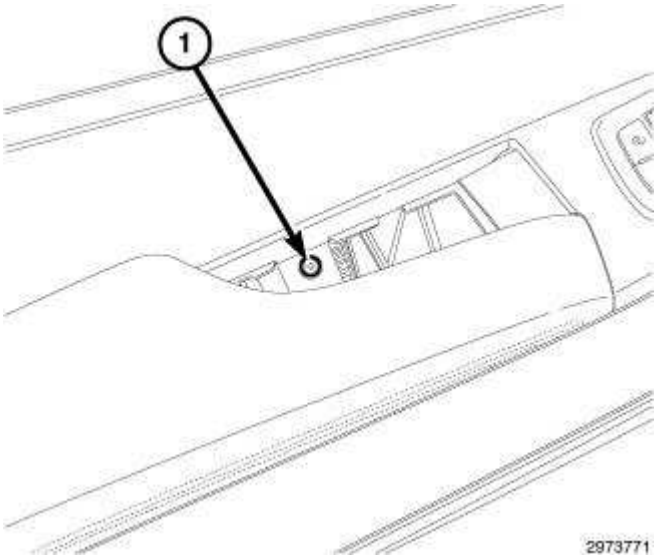


Fig. 117: Screw
Courtesy of CHRYSLER GROUP, LLC

9. Install the screw (1) just behind the armrest. Tighten the screw to 2 N.m (16 in. lbs.).
10. Connect and install the power window switch. Refer to **SWITCH, POWER WINDOW, INSTALLATION** .

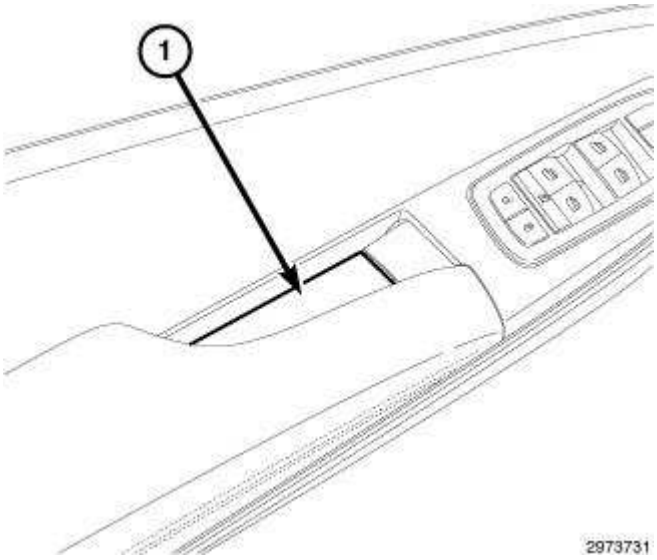


Fig. 118: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

11. Install the trim plate (1) just behind the armrest.

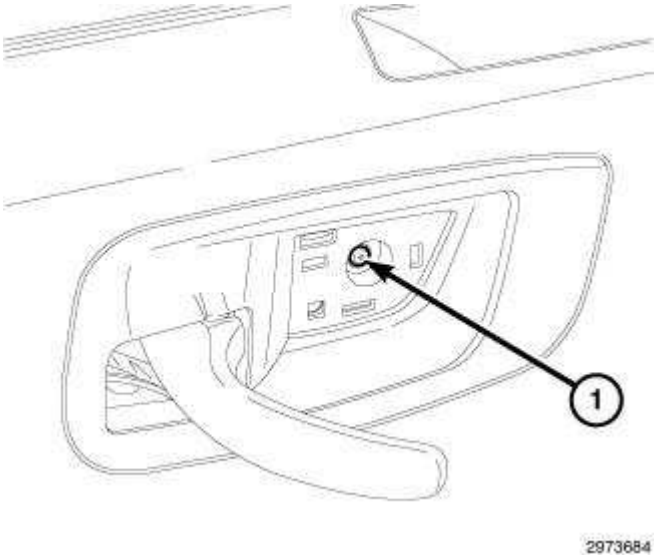


Fig. 119: Screw
Courtesy of CHRYSLER GROUP, LLC

12. Pull out on interior latch handle and install the screw (1) securing the latch handle to the carrier plate. Tighten the screw to 2 N.m (16 in. lbs.).

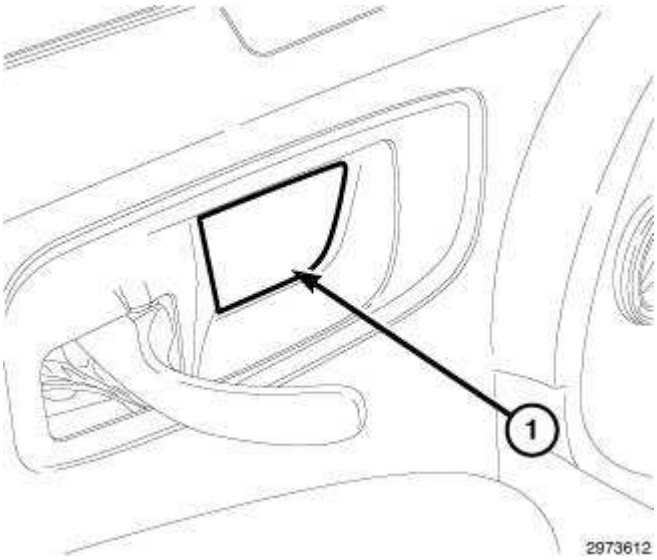


Fig. 120: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

13. Pull out on interior latch handle and install the trim plate (1).

NOTE: **For vehicles equipped with the optional Automatic Express Up power window feature, calibration of this feature is required whenever power to the door module is disrupted.**

A battery reconnect procedure must be performed anytime the battery has

been disconnected.

14. Connect the battery negative cable.

PLATE, CARRIER

REMOVAL

REMOVAL

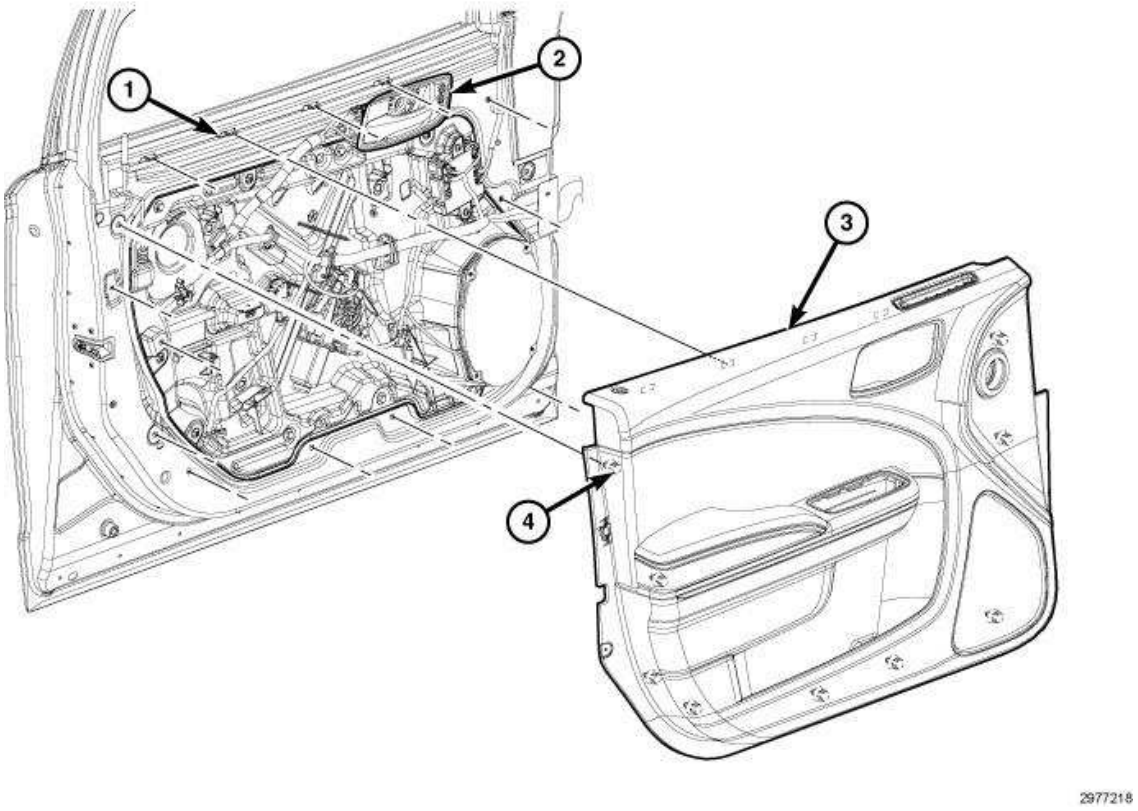


Fig. 121: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the front door trim (3). Refer to **PANEL, DOOR TRIM, REMOVAL**.

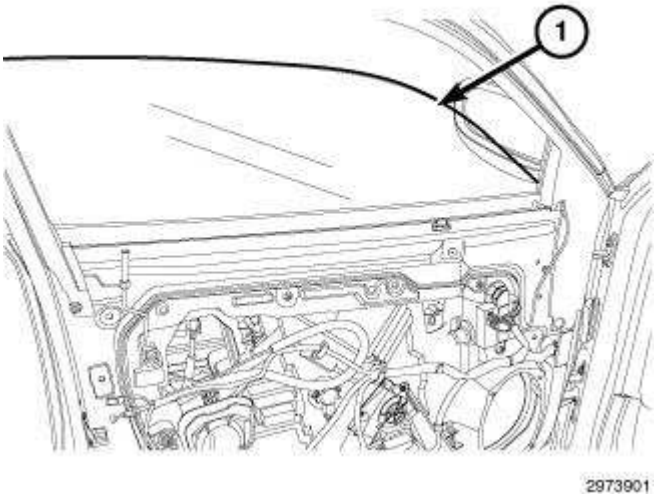


Fig. 122: Window
Courtesy of CHRYSLER GROUP, LLC

3. Open the latch access panel located on the carrier plate near the lock rod assembly.
4. Remove the clear adhesive patch covering the front window regulator access hole located just behind the electronic door module. If the clear adhesive patch is not present, there will be an indented area in the same location that will need to be cut out.
5. Temporarily install the window switch pod, reconnect the negative battery cable and lower the window until the white regulator tabs are visible in both access holes.
6. With the help of an assistant holding the glass, release the front and rear window regulator tabs and lift the window up.
7. Secure the window glass into place with a wedge or tape.
8. Disconnect the negative battery cable and remove the window switch pod.

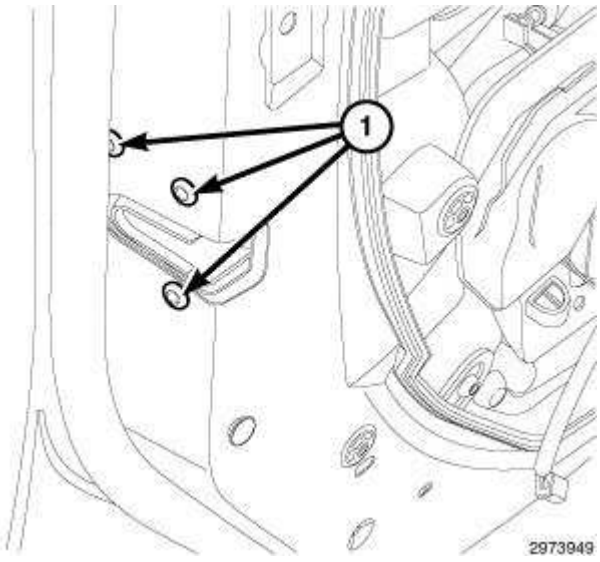


Fig. 123: Front Door Latch Mounting Screws

Courtesy of CHRYSLER GROUP, LLC

9. Remove the front door latch mounting screws (1).

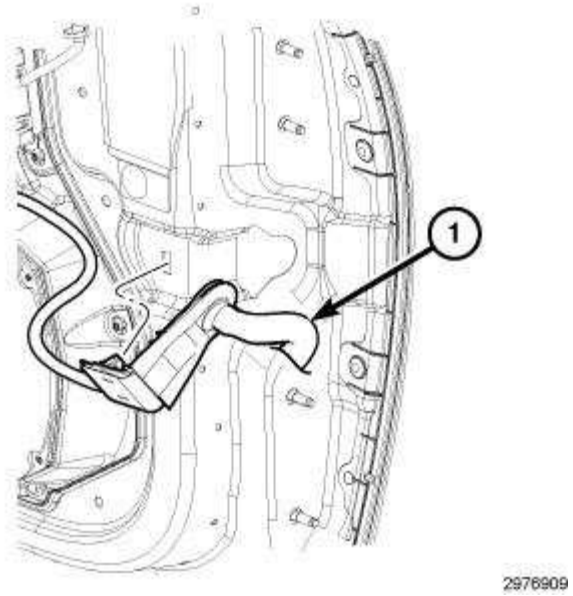


Fig. 124: front door harness wiring
Courtesy of CHRYSLER GROUP, LLC

10. Remove the front door harness wiring (1) bracket from the front of the door.

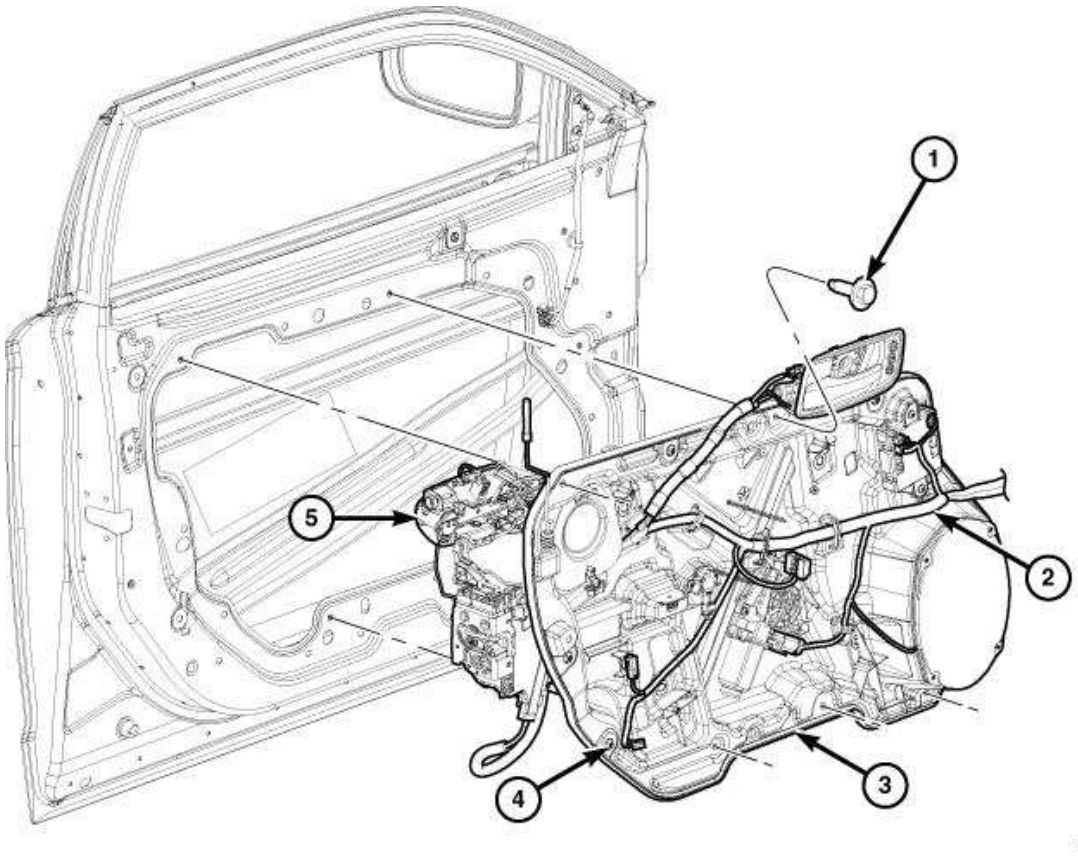


Fig. 125: Front Door Wiring Harness, Front Door Carrier Plate, Exterior Handle Assembly, Bolts & Carrier Plate Torx Head Retainers
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the front door wiring harness (2) from all door carrier motors, modules, sensors and the latch.
12. Remove the front door wiring harness (2) from the front door carrier plate (3).
13. If necessary, disconnect the link rods from the rear of the exterior handle assembly (5) through the access plate in the carrier plate.
14. Remove the five carrier plate bolts (1).
15. Disengage the six carrier plate torx head retainers (4).
16. Remove the carrier plate (3) from the front door.
17. If servicing the latch, separate the presenter and the latch from the carrier plate.

INSTALLATION

INSTALLATION

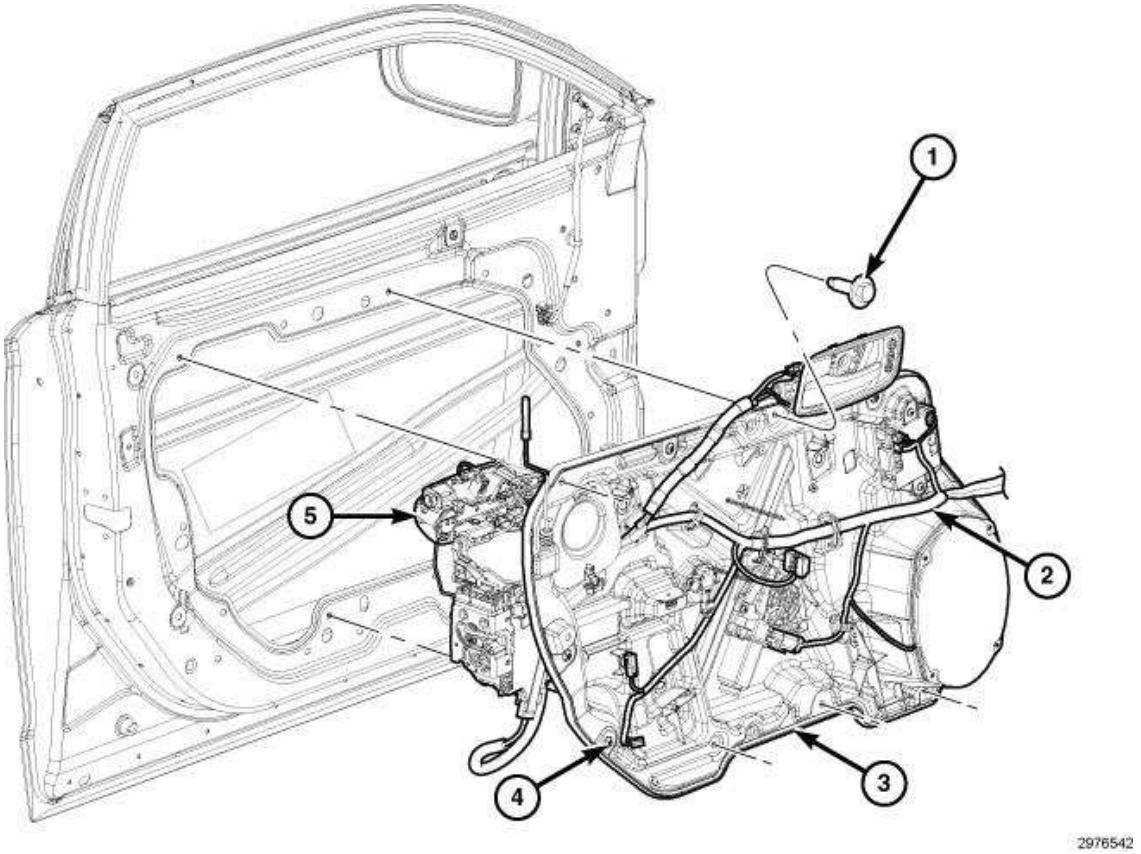


Fig. 126: Front Door Wiring Harness, Front Door Carrier Plate, Exterior Handle Assembly, Bolts & Carrier Plate Torx Head Retainers
Courtesy of CHRYSLER GROUP, LLC

1. If servicing the latch, attach the presenter and the latch to the carrier plate.
2. Position the carrier plate (3) to the front door.
3. Engage the six carrier plate torx head retainers (4).
4. Install the five carrier plate bolts (1). Tighten the bolts to 6 N-m (53 in. lbs.).
5. If necessary, connect the link rods to the rear of the exterior handle assembly (5).
6. Install the front door wiring harness (2) to the front door carrier plate (3).
7. Connect the front door wiring harness (2) to all door carrier motors, modules, sensors and the latch.

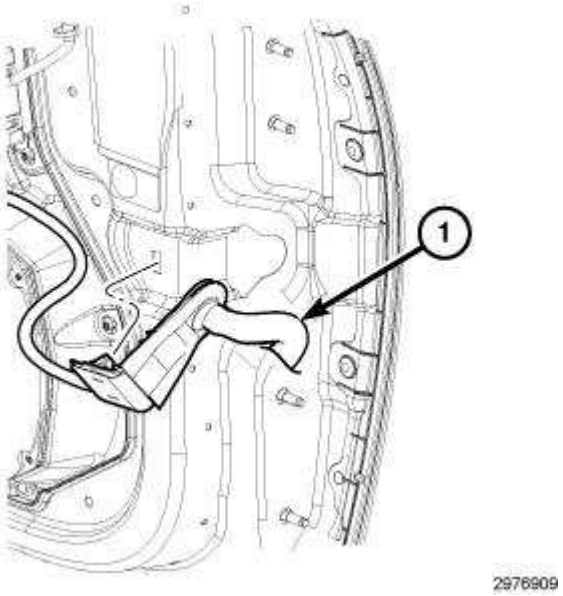


Fig. 127: front door harness wiring
Courtesy of CHRYSLER GROUP, LLC

8. Install the front door harness wiring (1) bracket to the front of the door.

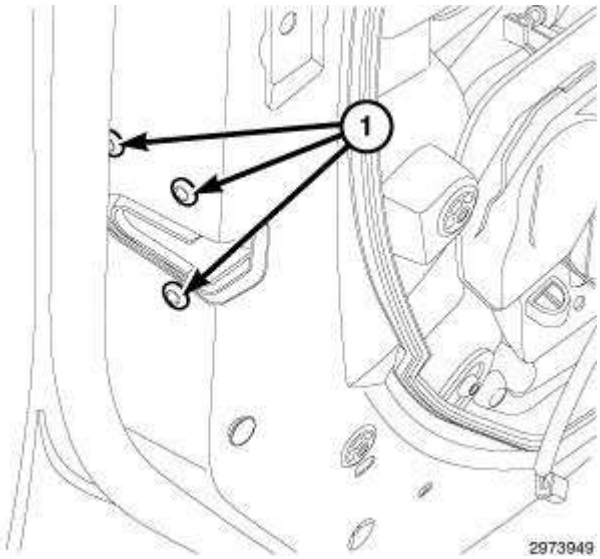


Fig. 128: Front Door Latch Mounting Screws
Courtesy of CHRYSLER GROUP, LLC

9. Install the front door latch mounting screws (1). Tighten the screws to 7 N-m (62 in. lbs.).

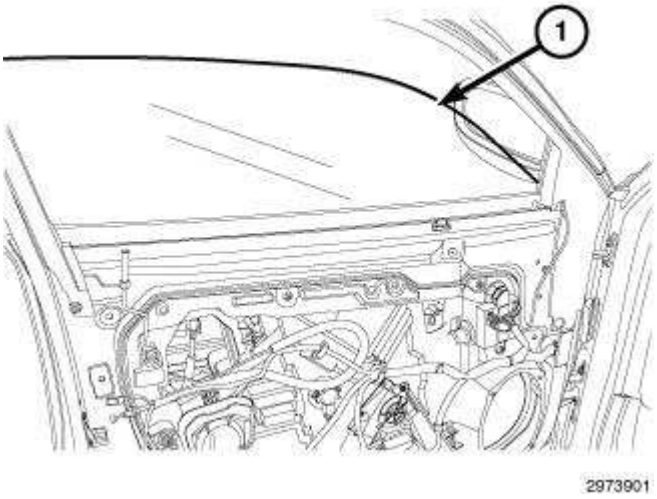


Fig. 129: Window
Courtesy of CHRYSLER GROUP, LLC

10. With the help of an assistant holding the glass, remove the wedge or tape securing the window glass into place.
11. With the help of an assistant holding the glass, slowly lower the glass into place and align with the white regulator tabs.
12. Engage the window regulator tabs into the glass.
13. Add or re-apply a clear adhesive patch covering the front window regulator access hole.
14. Close the latch access panel.

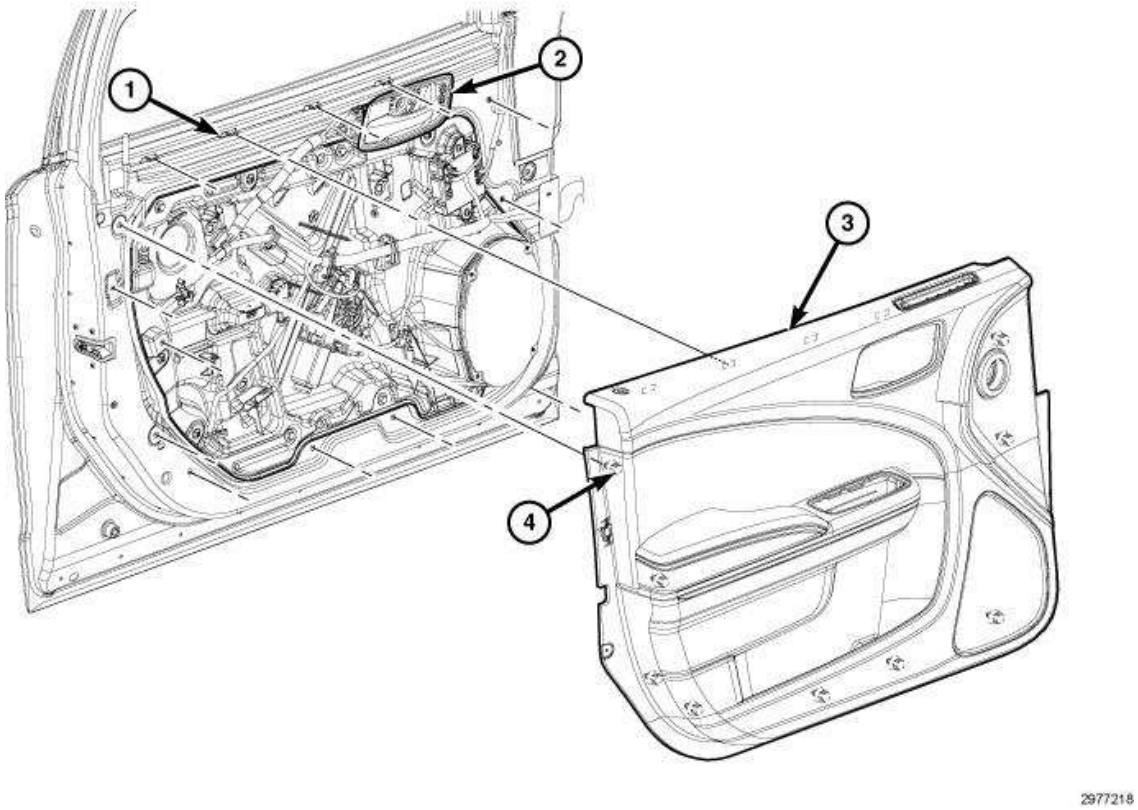


Fig. 130: Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

15. Install the front door trim (3). Refer to **PANEL, DOOR TRIM, INSTALLATION**.
16. Connect the battery negative cable.

NOTE: **For vehicles equipped with the optional Automatic Express Up power window feature, calibration of this feature is required whenever power to the door module is disrupted.**

A battery reconnect procedure must be performed anytime the battery has been disconnected.

REGULATOR, WINDOW

DESCRIPTION

DESCRIPTION

The window regulator is incorporated into the door module carrier plate. The motor for the regulator is a serviceable part that can be replaced by only removing the door trim panel and its 3 attaching screws. The regulator itself is not serviceable. To remove/install the door module carrier plate. Refer to **PLATE, CARRIER, REMOVAL** & **PLATE, CARRIER, INSTALLATION**.

STRIKER, DOOR LATCH

REMOVAL

REMOVAL

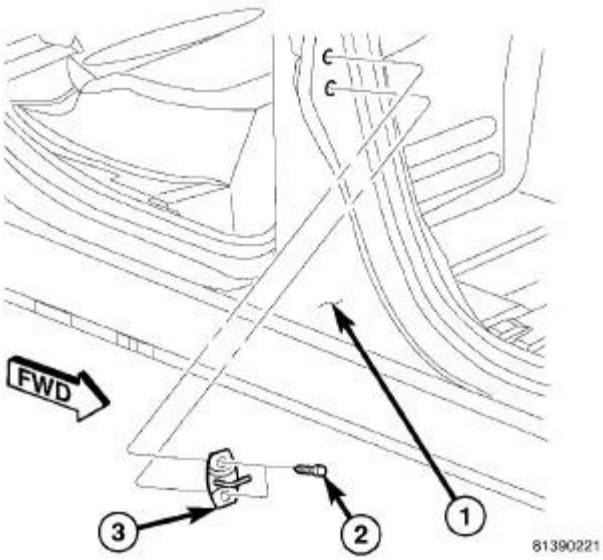


Fig. 131: Front Door Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Open the front door.
2. Mark the front door latch striker (3) location on the face of the outer B-pillar (1) to aid reinstallation.
3. Remove the two screws (2) that secure the striker to the B-pillar.
4. Remove the striker from the B-pillar.

INSTALLATION

INSTALLATION

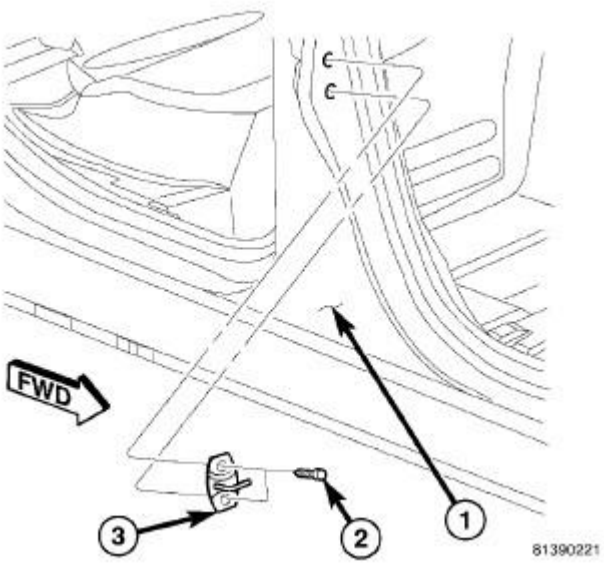


Fig. 132: Front Door Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Position the front door latch striker (3) on the face of the outer B-pillar (1).
2. Install and tighten the two screws (2) that secure the striker to the B-pillar. Tighten the screws to 33 N.m (24 ft. lbs.).
3. Adjust the latch striker position as necessary to achieve proper door spacing and latch operation.

DOORS - REAR

DOOR, REAR

REMOVAL

REMOVAL

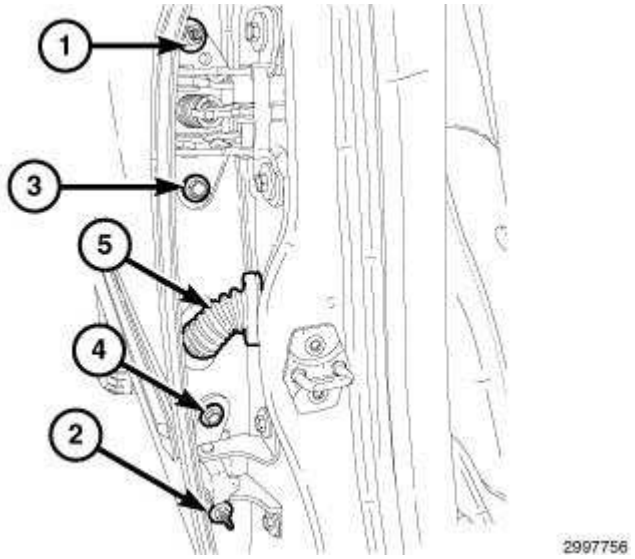


Fig. 133: Removal/Installation Of Nuts And Bolts of Rear Door
Courtesy of CHRYSLER GROUP, LLC

NOTE: Have an assistant to aid in removal/installation.

1. Disconnect and isolate the battery negative cable.
2. Open the front door.
3. Mark the upper and/or lower hinge bracket location on the door.
4. Carefully pull the door wire harness boot and connector (5) out from the B-pillar far enough to access and disconnect the body wire harness connector.
5. Remove the bolts (3, 4) securing the hinge bracket to the door.
6. Open the door to the full open position.
7. Support the door with a suitable lifting device.
8. Remove the nuts (1, 2) securing the hinge bracket to the door.
9. Remove the rear door from the vehicle.

INSTALLATION

INSTALLATION

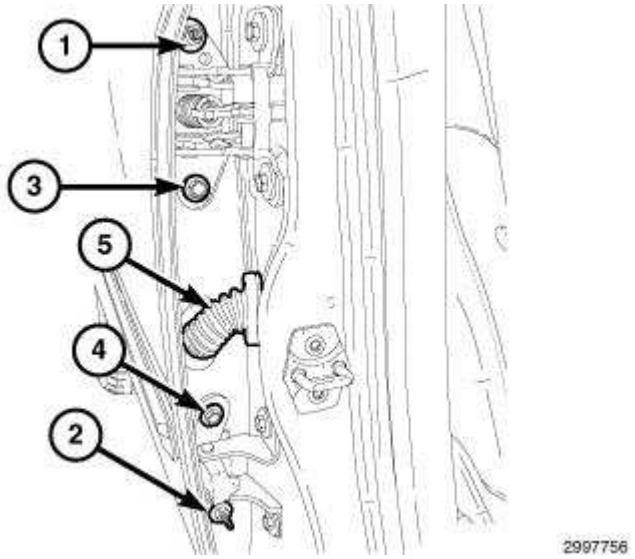


Fig. 134: Removal/Installation Of Nuts And Bolts of Rear Door
Courtesy of CHRYSLER GROUP, LLC

NOTE: Have an assistant to aid in removal/installation.

1. Support the front door (1) with a suitable lifting device.
2. Position and align the door hinge studs with the upper and lower hinge brackets using the reference marks made in removal.
3. Push the door in towards the vehicle to seat the studs into the hinge brackets.
4. Install and tighten the nuts (1, 2) into both the upper and lower front door hinge studs to secure the door hinge brackets to the door. Tighten the fasteners to 24 N.m (18 ft. lbs.).
5. Install and tighten the bolts (3, 4) into both the upper and lower front door hinge studs to secure the door hinge brackets to the door. Tighten the fasteners to 24 N.m (18 ft. lbs.).
6. Remove the lifting device supporting the door.
7. Carefully pull the body wire harness connector(s) (5) out from the A-pillar far enough to reconnect them to the door wire harness boot and connector.
8. Engage the front door wire harness boot and connector (5) into the wiring clearance hole on the outside of the lower A-pillar.
9. Reconnect the battery negative cable.

NOTE: For vehicles equipped with the optional Automatic Express Up power window feature, recalibration of this feature is required whenever power to the door module is disrupted.

10. Adjust the door hinge positions as necessary to achieve proper door spacing and operation.

GLASS, DOOR

REMOVAL

REMOVAL

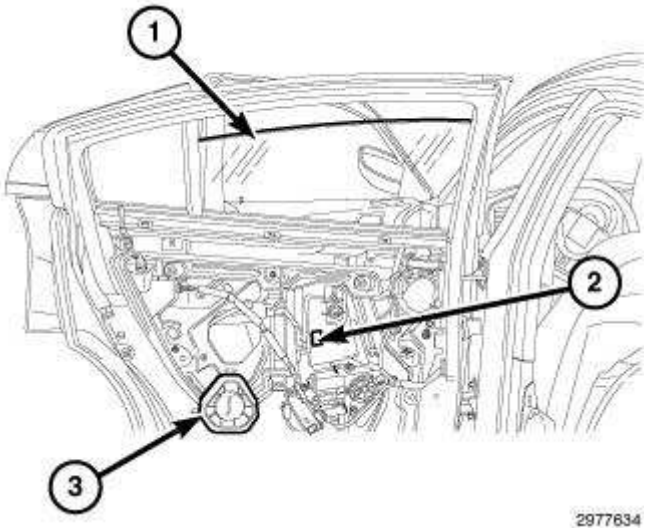


Fig. 135: Rear Door Glass, Latch Access Cover & Access Hole
Courtesy of CHRYSLER GROUP, LLC

1. Raise the rear door glass (1) up to it's full position.
2. Remove the trim panel from the inside of the rear door. Refer to **PANEL, REAR DOOR TRIM, REMOVAL**.
3. Remove the inner belt weatherstrip from the rear door.
4. Open the latch access cover (3).
5. Remove the cover for the regulator tab access hole. If a clear adhesive patch is not present, there will be an indented area in the same location that will need to be cut out.
6. Temporarily install the window switch pod, reconnect the negative battery cable and lower the window until the white regulator tab is visible in the access hole (2).
7. With the help of an assistant holding the glass, release the window regulator tab and lift the window up and tape the glass (1) to the door header.
8. Remove the door carrier plate. Refer to **PLATE, CARRIER, REMOVAL**.
9. Remove the tape securing the glass, lower the sliding glass into the carrier plate cavity.

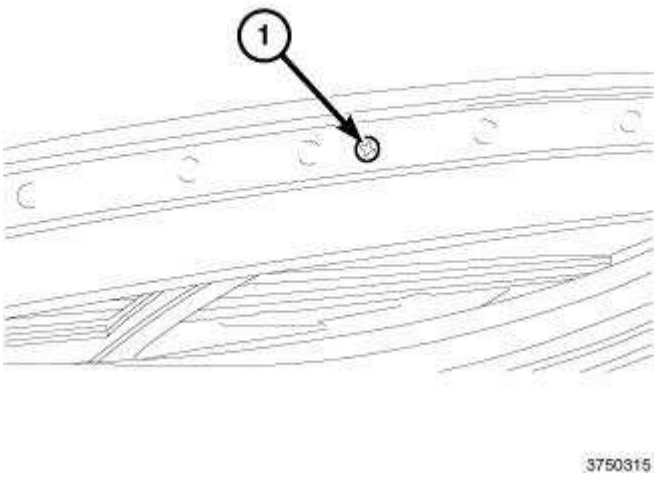


Fig. 136: Fastener
Courtesy of CHRYSLER GROUP, LLC

10. Peel back the door weatherstrip, remove the fastener securing the fixed glass run to the door.

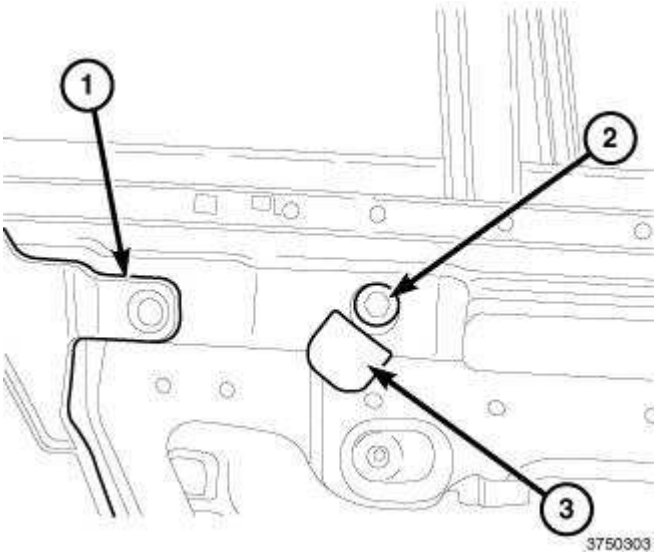


Fig. 137: Upper Trim, Cover & Fastener
Courtesy of CHRYSLER GROUP, LLC

11. Detach and remove the upper trim (1) from the door.
12. Remove the cover (3) for the lower fixed glass fastener access hole.
13. Remove the fastener (2) securing the fixed glass to the door.
14. Lift the fixed glass and glass run on an angle to remove.
15. Remove the sliding glass through the carrier plate cavity.

INSTALLATION

INSTALLATION

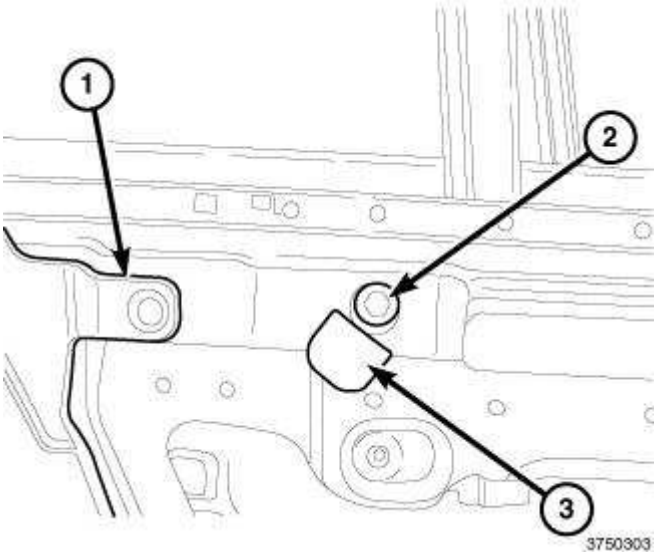


Fig. 138: Upper Trim, Cover & Fastener
Courtesy of CHRYSLER GROUP, LLC

1. Insert the rear door glass (1) into the carrier plate cavity.
2. Lower the fixed glass and glass run on an angle to position into the door.
3. Install the fastener (2) securing the fixed glass to the door. Tighten the fastener securely.
4. Install the cover (3) for the lower fixed glass fastener access hole.
5. Align, position and attach the upper trim (1) to the door.

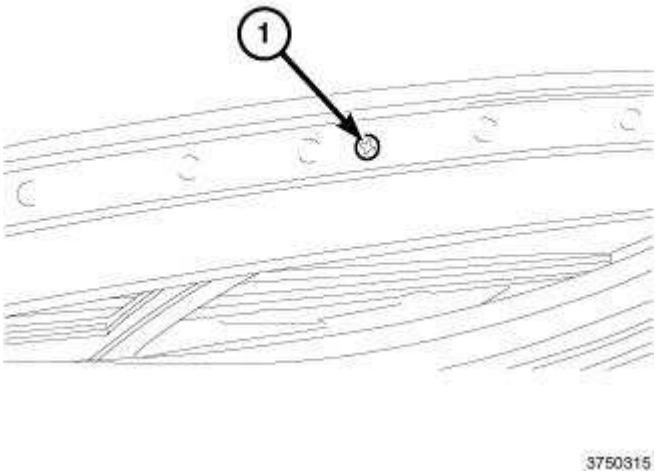


Fig. 139: Fastener
Courtesy of CHRYSLER GROUP, LLC

6. Install the fastener (1) securing the fixed glass to the door. Tighten the fastener securely.

7. Install the door weatherstrip.

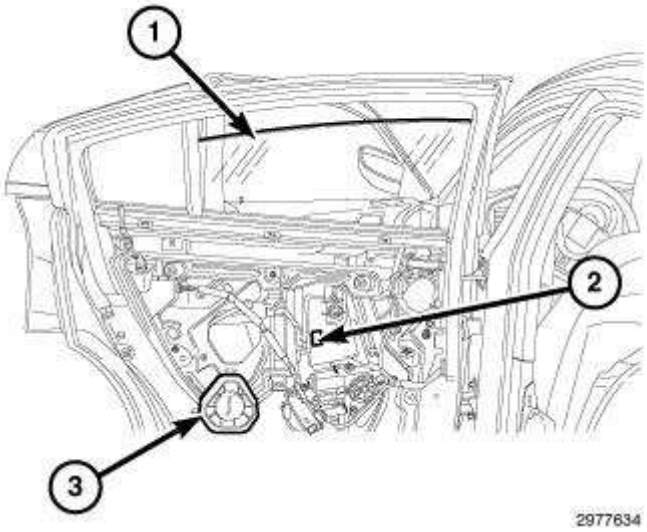


Fig. 140: Rear Door Glass, Latch Access Cover & Access Hole
Courtesy of CHRYSLER GROUP, LLC

8. Lift the sliding glass (1) and tape the glass to the door header.
9. Install the rear door carrier plate. Refer to **PLATE, CARRIER, INSTALLATION**.
10. Install the outside door handle.
11. With the help of an assistant holding the glass, remove the tape securing the glass, lower and align the glass with the regulator tab.
12. Engage the window regulator tab into the glass.
13. Apply a clear adhesive patch or equivalent to the front window regulator access hole.
14. Close the latch access cover (3).
15. Reinstall the inner belt weatherstrip onto the rear door.
16. Reinstall the trim panel onto the inside of the rear door. Refer to **PANEL, REAR DOOR TRIM, INSTALLATION**.

HANDLE, EXTERIOR

REMOVAL

REMOVAL

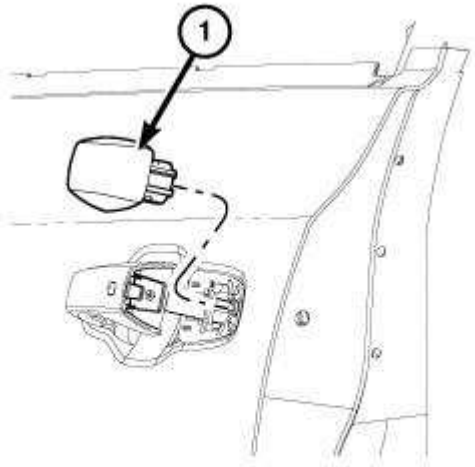


Fig. 141: Blank Cylinder Bezel
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH Shown in illustration, RH typical.

1. Disconnect the negative battery cable.
2. Remove the blank cylinder bezel (1) from the door by removing the PIA fastener accessed rearward of the handle and prying away.

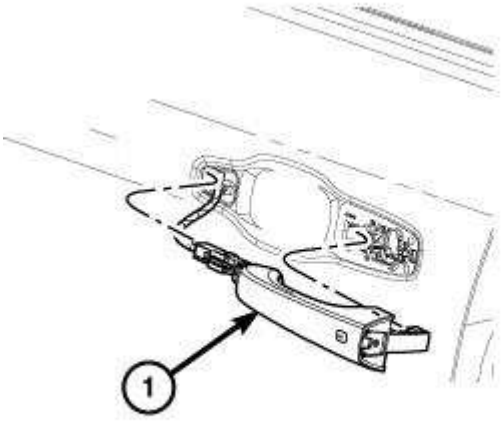
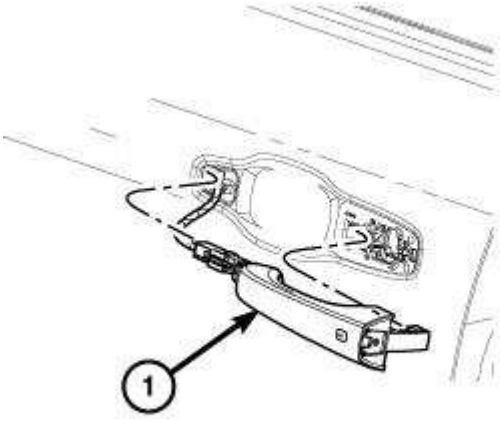


Fig. 142: Slide Handle
Courtesy of CHRYSLER GROUP, LLC

3. Slide handle (1) rearward and out.
4. Disconnect the harness connector and remove the handle (1).

INSTALLATION

INSTALLATION

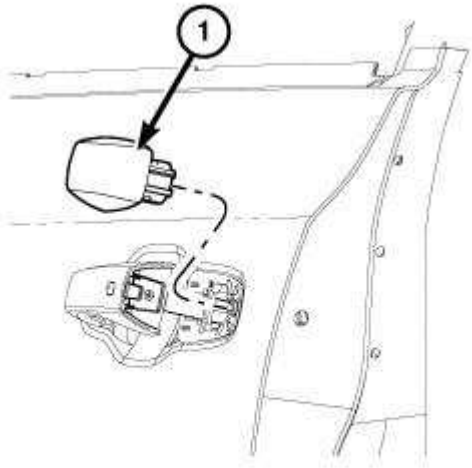


3329122

Fig. 143: Slide Handle
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH Shown in illustration, RH typical.

1. Connect the harness connector and position the handle (1) to the door.
2. Slide handle (1) in and forward.



3329280

Fig. 144: Blank Cylinder Bezel
Courtesy of CHRYSLER GROUP, LLC

3. Install the blank cylinder bezel (1) to the front door by positioning and installing the PIA fastener accessed rearward of the handle. Tighten the fastener securely.
4. Connect the negative battery cable.

HINGE, DOOR

REMOVAL

REMOVAL

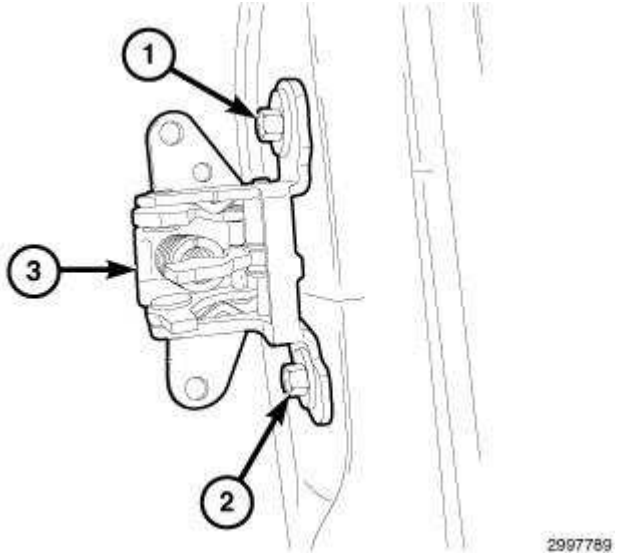


Fig. 145: Identifying Screws And Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Upper hinge shown in illustration, lower hinge similar.

1. Remove the rear door from the vehicle. Refer to **DOOR, REAR, REMOVAL**.
2. Mark the upper (3) and/or lower hinge bracket location on the outside of the lower B-pillar to aid reinstallation.
3. Remove the two screws (1, 2) that secure the hinge bracket to the outside of the lower B-pillar.
4. Remove the hinge bracket (3) from the B-pillar.

INSTALLATION

INSTALLATION

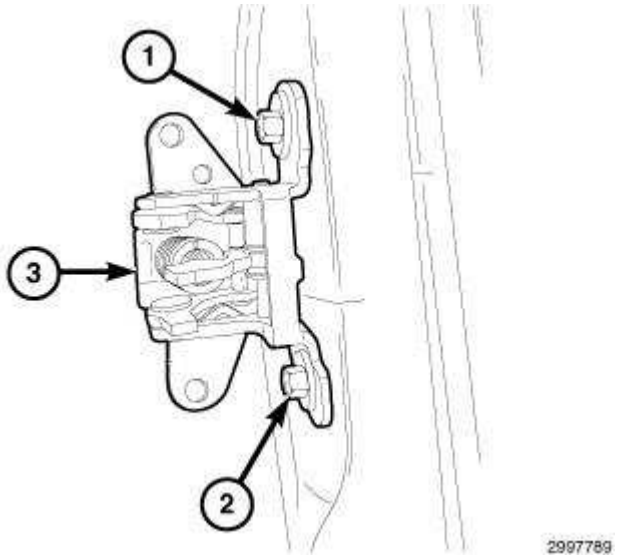


Fig. 146: Identifying Screws And Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

NOTE: Upper hinge shown in illustration, lower hinge similar.

1. Position and align the upper (3) and/or lower hinge to the outside face of the lower A-pillar using the reference marks made when removing.
2. Install and tighten the fasteners (1, 2) that secure the hinge to the lower A-pillar. Tighten the fasteners to 30 N.m (22 ft. lbs.).
3. Reinstall the rear door onto the vehicle. Refer to **DOOR, REAR, INSTALLATION**.

LATCH, DOOR

DESCRIPTION

DESCRIPTION

The door latch is integrated to the door's module/carrier plate. To remove or install the latch, the carrier plate will need to be removed for access. Refer to **PLATE, CARRIER, REMOVAL** & **PLATE, CARRIER, INSTALLATION**.

PANEL, REAR DOOR TRIM

REMOVAL

REMOVAL

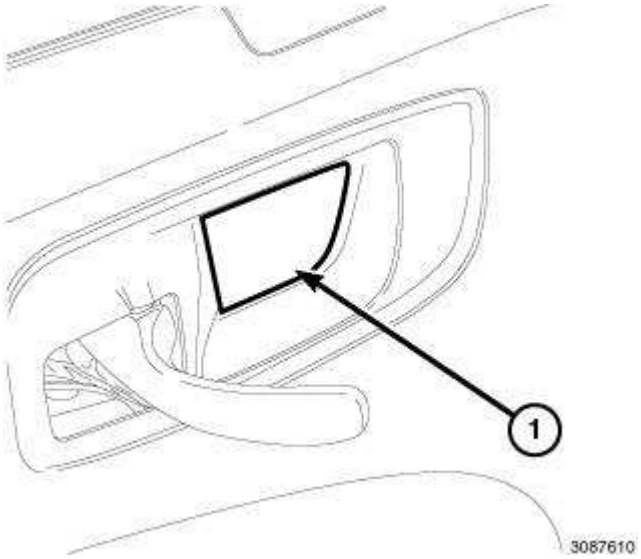


Fig. 147: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a small pick tool, pull out on interior latch handle and remove the trim plate (1).

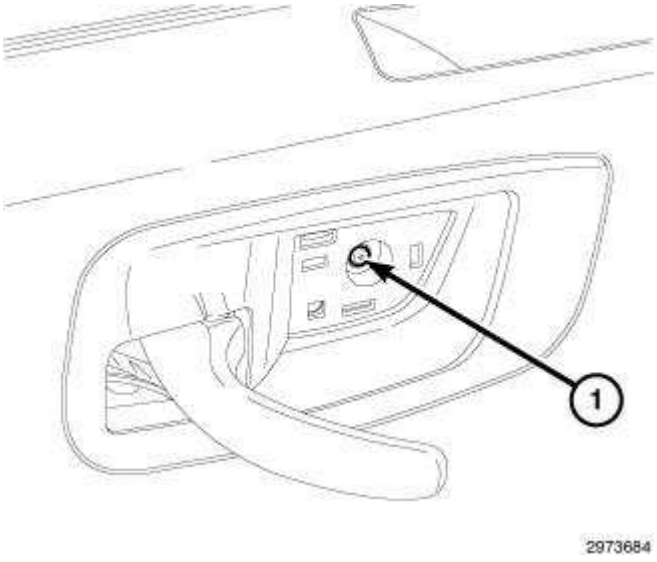


Fig. 148: Screw
Courtesy of CHRYSLER GROUP, LLC

3. Pull out on interior latch handle and remove the screw (1).

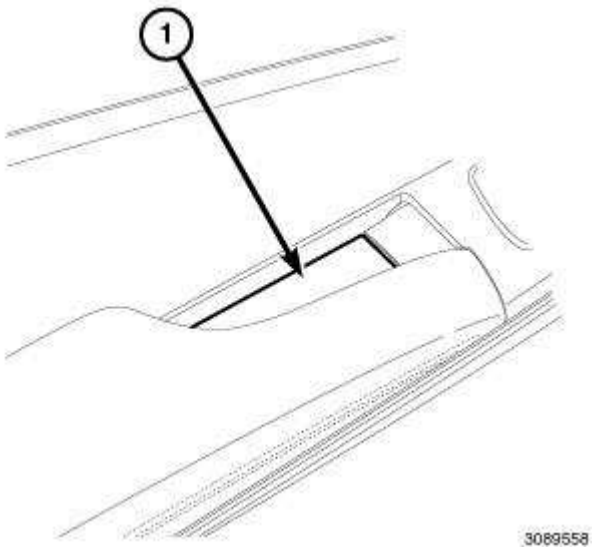


Fig. 149: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

4. Using a small pick tool, remove the trim plate (1) just behind the armrest.

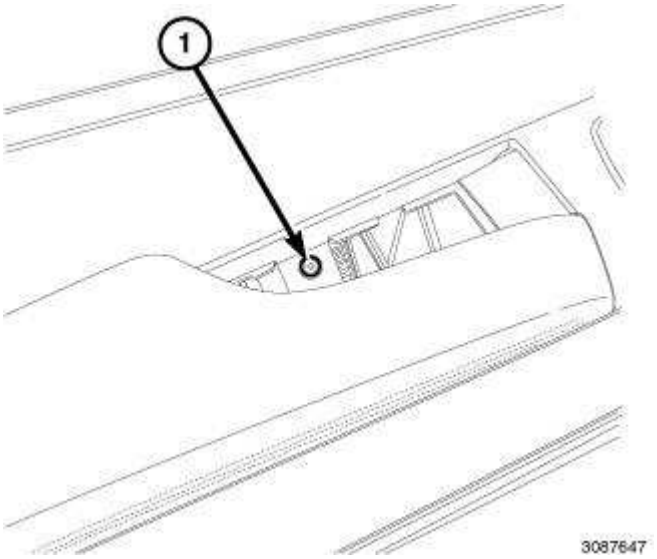


Fig. 150: Screw
Courtesy of CHRYSLER GROUP, LLC

5. Remove and disconnect the power window switch. Refer to **SWITCH, POWER WINDOW, REMOVAL** .
6. Remove the screw (1) just behind the armrest.

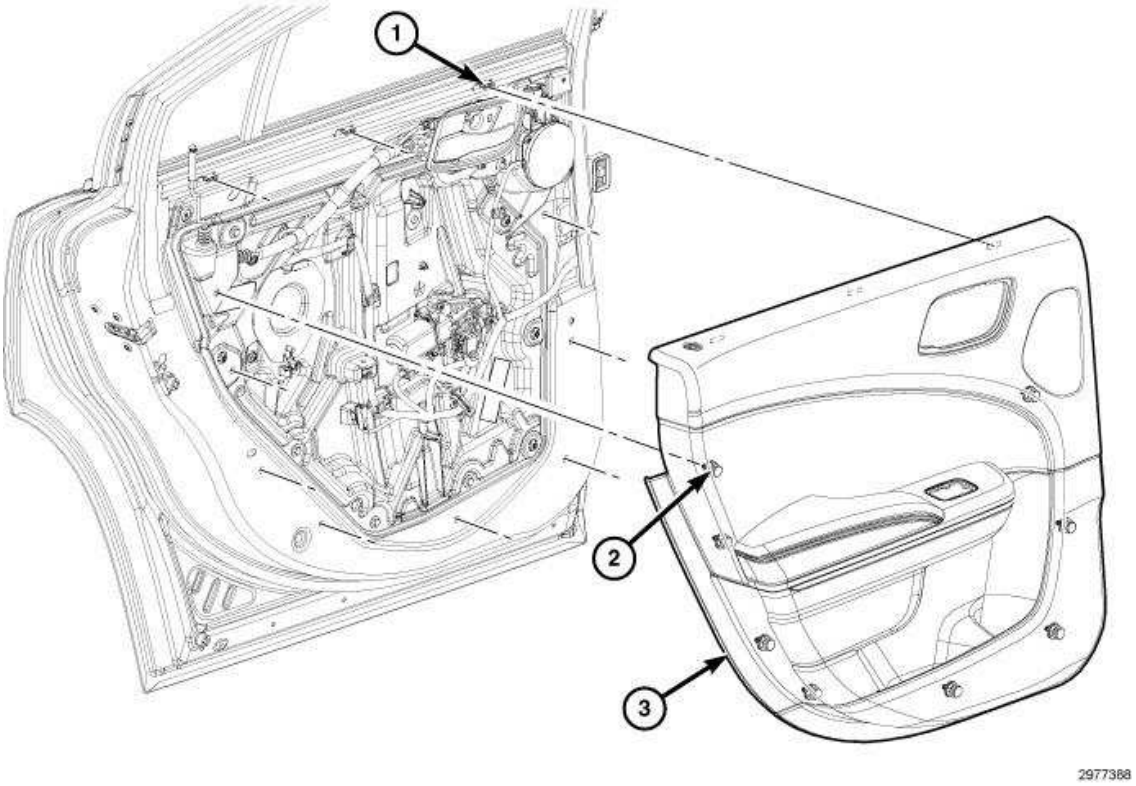


Fig. 151: Door Trim Snap Retainers & Trim Panel
Courtesy of CHRYSLER GROUP, LLC

7. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, disengage the door trim snap retainers (2).
8. Raise the trim panel (3) up and peel the belt molding off from the flange.**Do not fully remove at this time.**

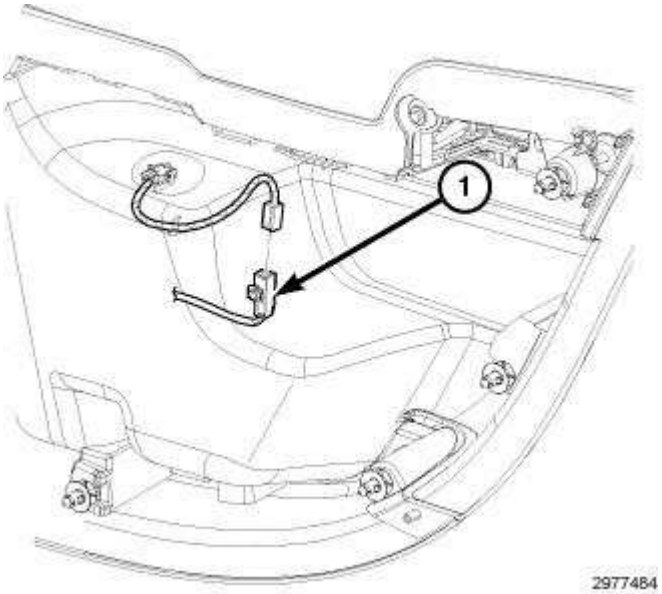


Fig. 152: Map Light Harness
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the map light harness (1).
10. Remove the door trim panel.
11. If necessary, use a flat bladed screwdriver to disengage the belt molding clips (1) from the trim panel.

INSTALLATION

INSTALLATION

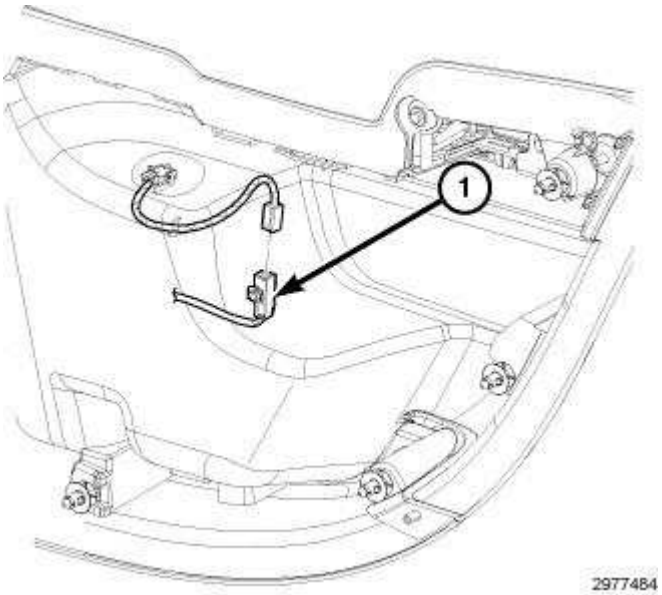


Fig. 153: Map Light Harness
Courtesy of CHRYSLER GROUP, LLC

1. Prior to installation, check to be certain that all snap retainers are in good condition on the door trim panel and the door's carrier plate. Replace if necessary.
2. Position the door trim panel near the door. **Do not install at this time.**
3. Connect the map light harness (1).

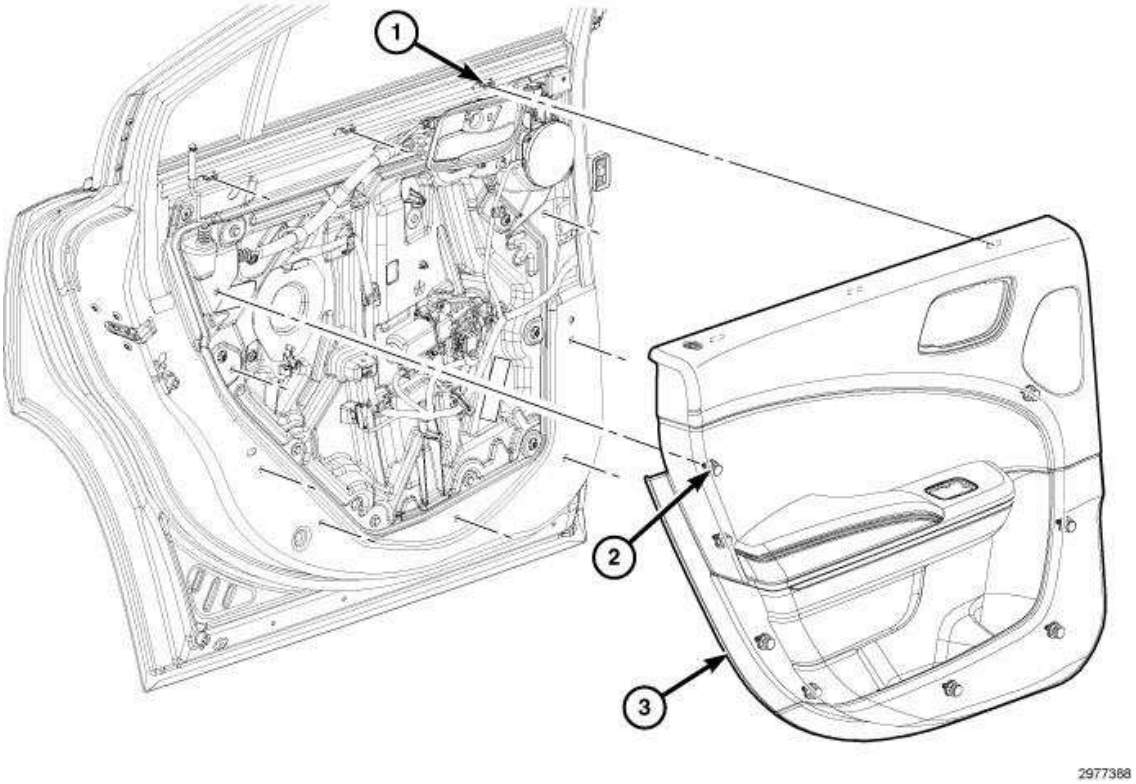


Fig. 154: Door Trim Snap Retainers & Trim Panel
Courtesy of CHRYSLER GROUP, LLC

4. Feed the latch handle assembly on an angle through the opening in the door trim panel (3). Once the latch handle is fed through the opening, snap it into place.
5. Using firm pressure, engage the door trim snap retainers (1, 2) into the door's carrier plate.

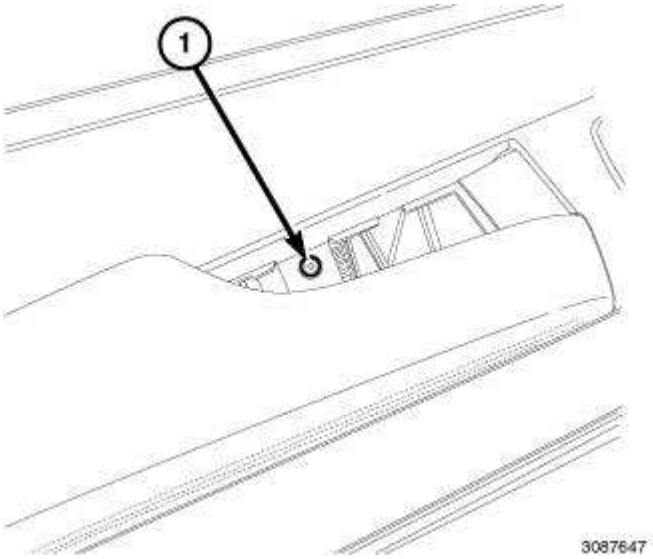


Fig. 155: Screw
Courtesy of CHRYSLER GROUP, LLC

6. Install the screw (1) just behind the armrest. Tighten the screw to 2 N.m (16 in. lbs.).
7. Connect and install the power window switch. Refer to **SWITCH, POWER WINDOW, INSTALLATION** .

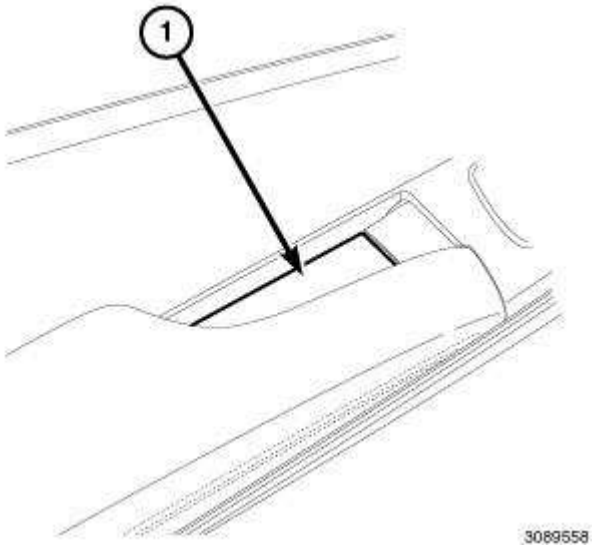


Fig. 156: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

8. Install the trim plate (1) just behind the armrest.

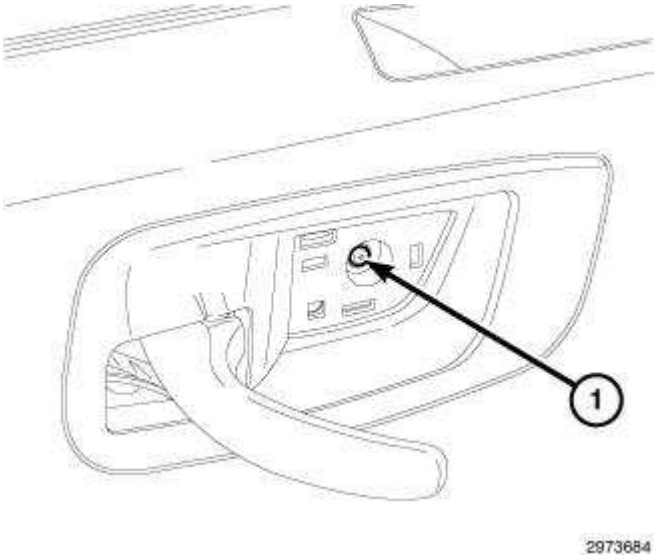


Fig. 157: Screw
Courtesy of CHRYSLER GROUP, LLC

9. Pull out on interior latch handle and install the screw (1) securing the latch handle to the carrier plate. Tighten the screw to 2 N.m (16 in. lbs.).

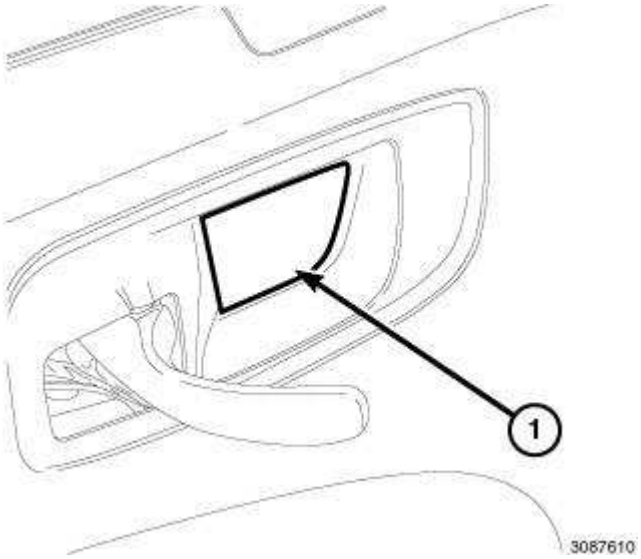


Fig. 158: Trim Plate
Courtesy of CHRYSLER GROUP, LLC

10. Pull out on interior latch handle and install the trim plate (1).

NOTE: **For vehicles equipped with the optional Automatic Express Up power window feature, calibration of this feature is required whenever power to the door module is disrupted.**

A battery reconnect procedure must be performed anytime the battery has

been disconnected.

11. Connect the battery negative cable.

PLATE, CARRIER

REMOVAL

REMOVAL

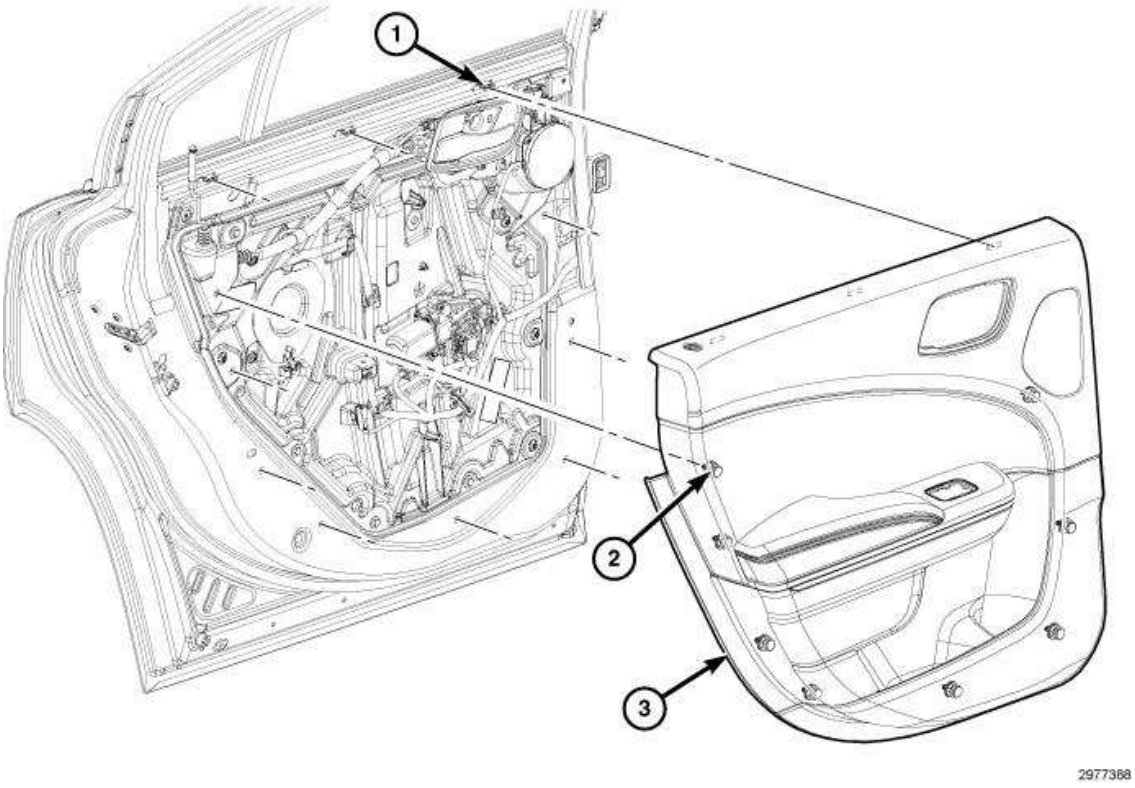


Fig. 159: Door Trim Snap Retainers & Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Raise the window to it's fully up position.
2. Disconnect and isolate the battery negative cable.
3. Remove the rear door trim. Refer to **PANEL, REAR DOOR TRIM, REMOVAL**.

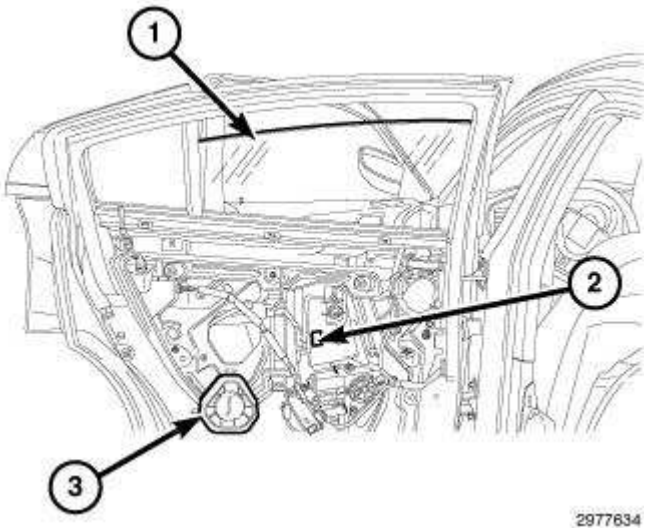


Fig. 160: Rear Door Glass, Latch Access Cover & Access Hole
Courtesy of CHRYSLER GROUP, LLC

4. Remove the cover from the access hole (2).
5. Temporarily install the window switch pod, reconnect the negative battery cable and lower the window until the white regulator tab is visible in the access hole (2).
6. With the help of an assistant holding the glass, release the window regulator tab and lift the window up.
7. Secure the window glass into place with a wedge or tape.
8. Disconnect the negative battery cable and remove the window switch pod.
9. Disconnect the door harness from the vehicle body harness.

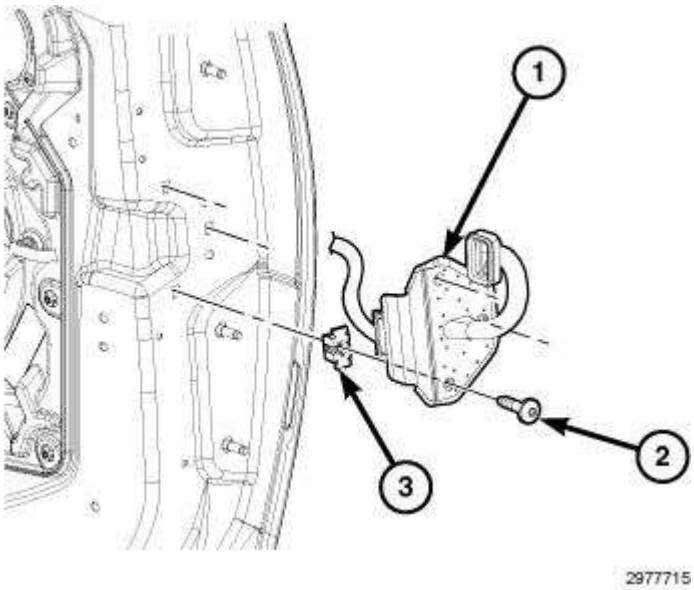


Fig. 161: Latch Access Panel, Screws & Harness Grommet/Bracket
Courtesy of CHRYSLER GROUP, LLC

10. Open the latch access panel (3).
11. Remove the screws (2) from the harness grommet/bracket (1).
12. Remove the harness grommet/bracket (1) from the door.

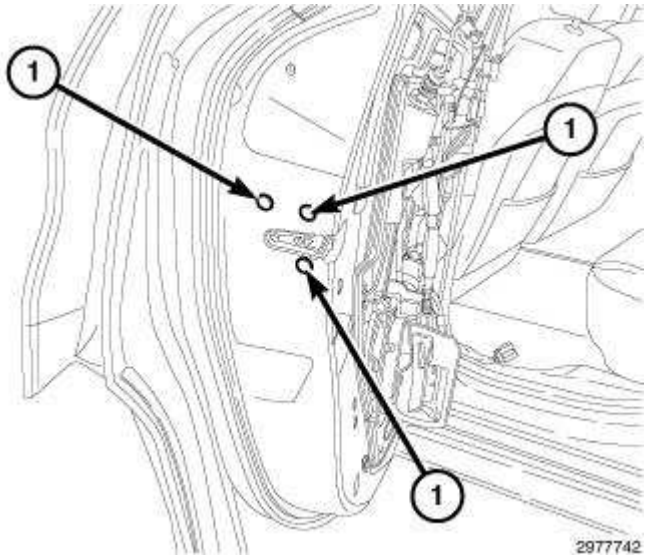


Fig. 162: Rear Door Latch Screws
Courtesy of CHRYSLER GROUP, LLC

13. Remove the exterior door handle. Refer to **HANDLE, EXTERIOR, REMOVAL**.
14. Remove the rear door latch screws (1).

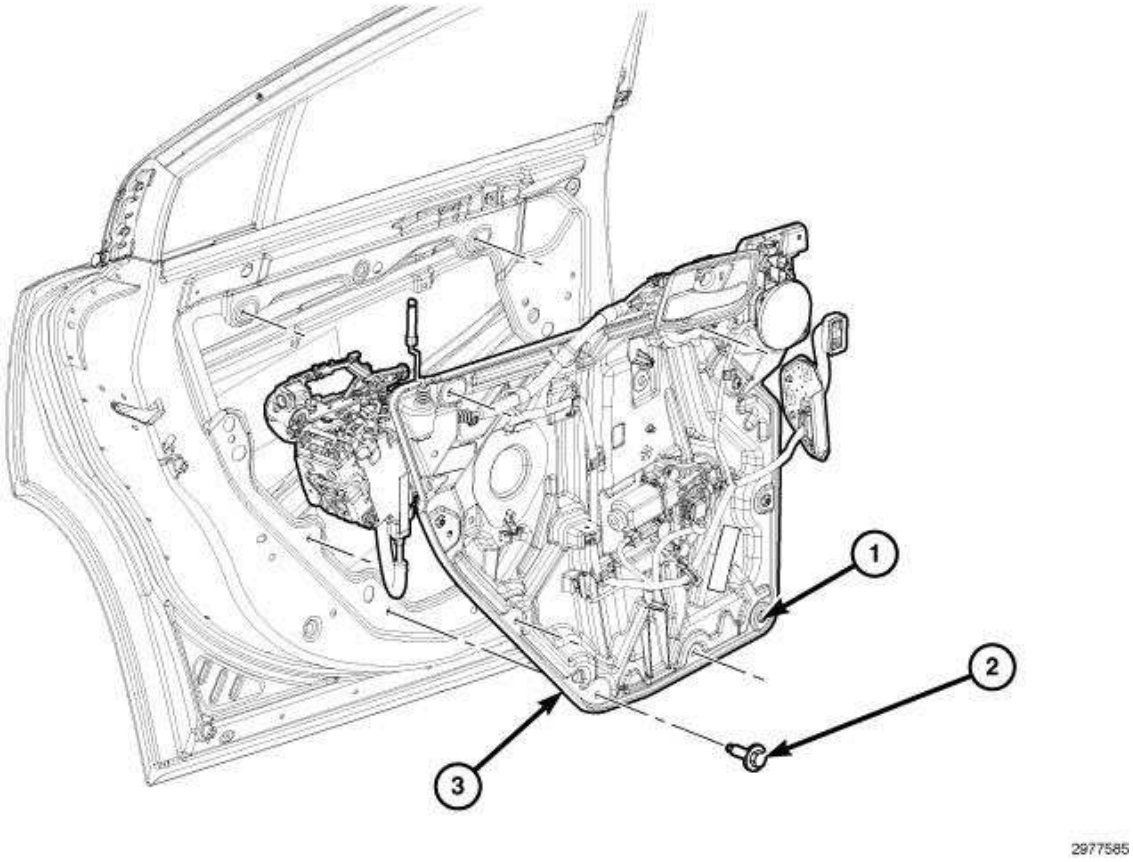


Fig. 163: Seven Carrier Plate Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove the seven carrier plate bolts (2).
16. Disengage the four carrier plate torx head retainers (1).
17. Remove the carrier plate (3) from the rear door.
18. If servicing the latch, separate the presenter and the latch from the carrier plate.

INSTALLATION

INSTALLATION

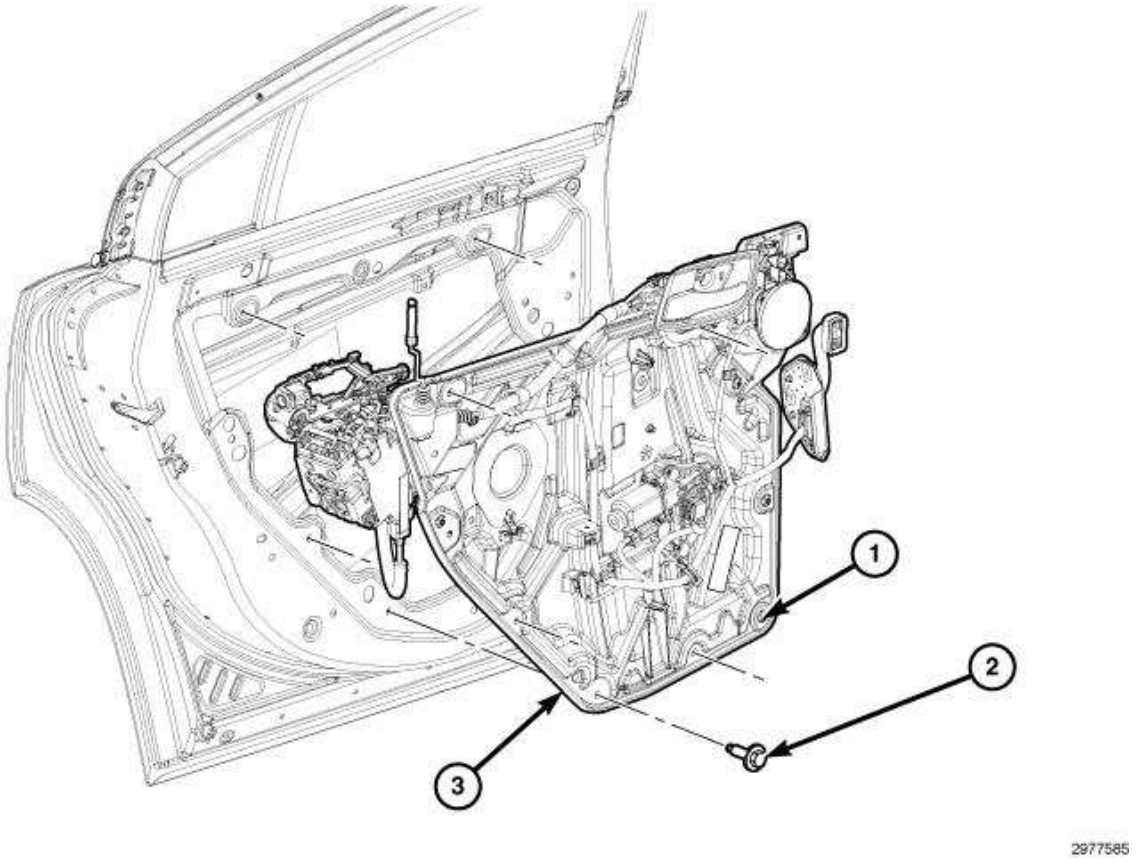


Fig. 164: Seven Carrier Plate Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If servicing the latch, attach the presenter and the latch to the carrier plate.
2. Position the carrier plate (3) to the rear door.
3. Engage the four carrier plate torx head retainers (1).
4. Install the seven carrier plate bolts (2). Tighten the bolts to 6 N-m (53 in. lbs.).

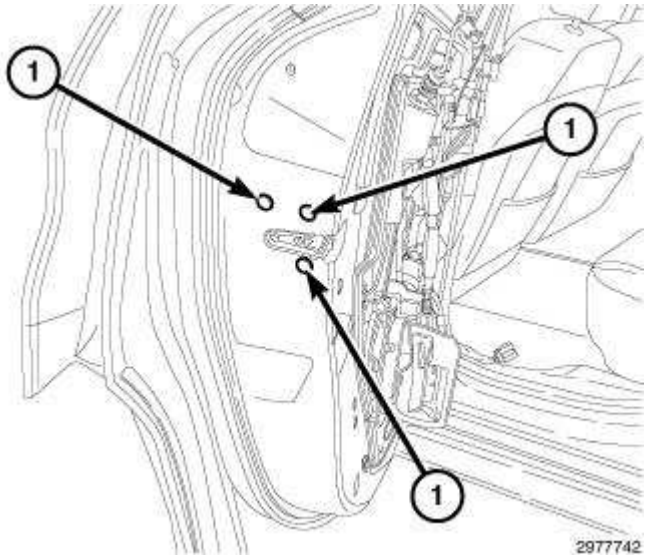


Fig. 165: Rear Door Latch Screws
Courtesy of CHRYSLER GROUP, LLC

5. Install the rear door latch mounting screws (1). Tighten the screws to 7 N-m (62 in. lbs.).

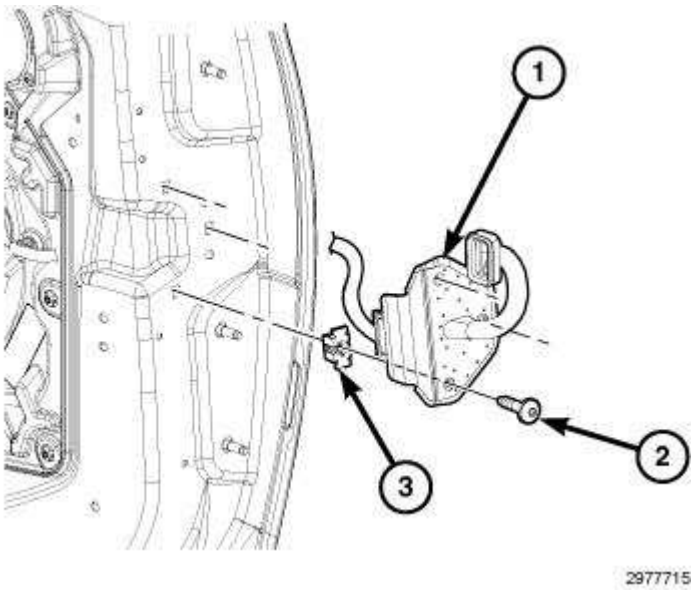


Fig. 166: Latch Access Panel, Screws & Harness Grommet/Bracket
Courtesy of CHRYSLER GROUP, LLC

6. Position the harness grommet/bracket (1) to the door.
7. Install the screws (2) securing the harness grommet/bracket (1) to the door. Tighten the screws securely.

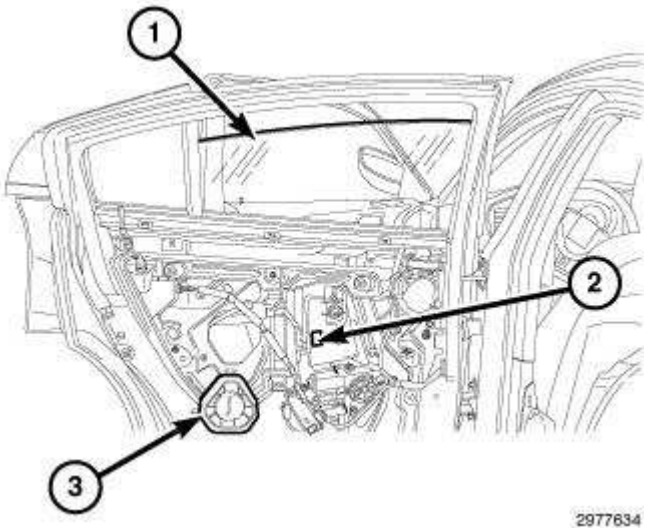


Fig. 167: Rear Door Glass, Latch Access Cover & Access Hole
Courtesy of CHRYSLER GROUP, LLC

8. Connect the door harness to the vehicle body harness.
9. Remove the wedge or tape securing the window glass into place.
10. With the help of an assistant holding the glass, lower the glass and align with the regulator tab.
11. Engage the window regulator tabs into the glass.
12. Apply tape to cover the front window regulator access hole.
13. Install the exterior door handle. Refer to **HANDLE, EXTERIOR, INSTALLATION**.
14. Close the latch access panel.

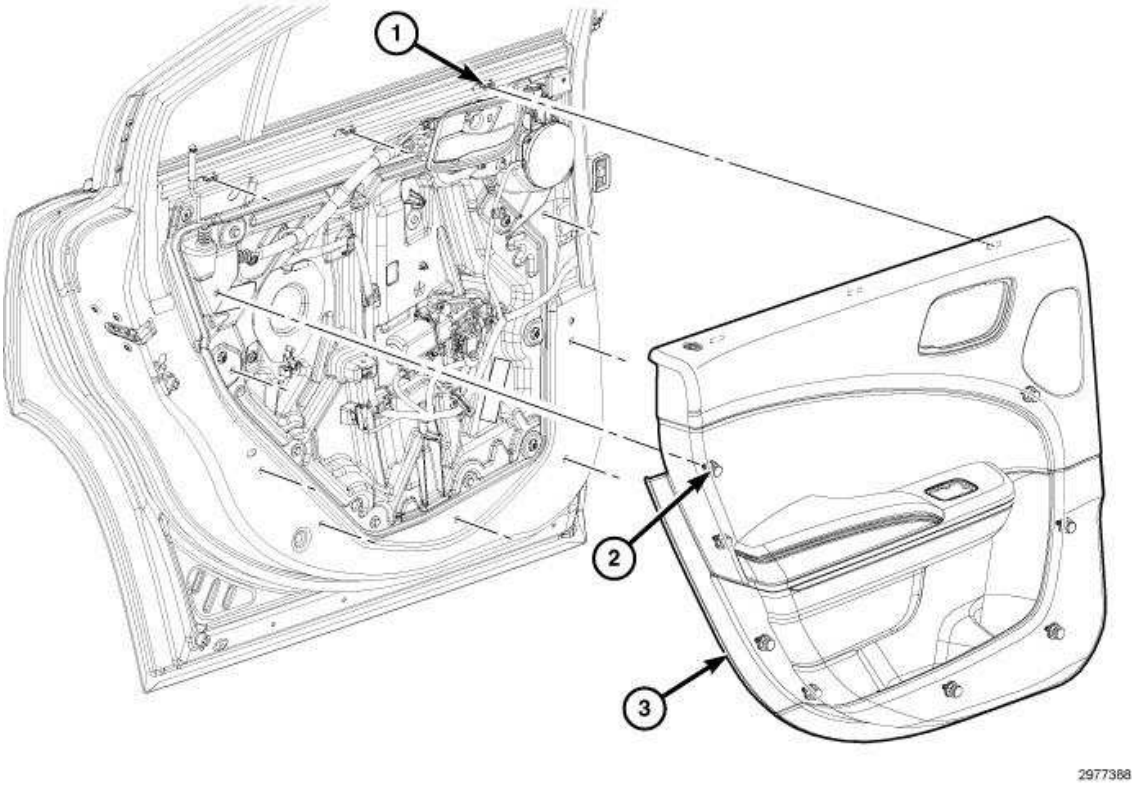


Fig. 168: Door Trim Snap Retainers & Trim Panel
Courtesy of CHRYSLER GROUP, LLC

15. Install the rear door trim (3). Refer to **PANEL, REAR DOOR TRIM, INSTALLATION**.

NOTE: A battery reconnect procedure must be performed anytime the battery has been disconnected.

16. Connect the battery negative cable.

REGULATOR, WINDOW

DESCRIPTION

DESCRIPTION

The window regulator is incorporated into the door module carrier plate. The motor for the regulator is a serviceable part that can be replaced by only removing the door trim panel and its 3 attaching screws. The regulator itself is not serviceable. To remove/install the door module carrier plate. Refer to **PLATE, CARRIER, REMOVAL** &**PLATE, CARRIER, INSTALLATION**.

STRIKER, DOOR LATCH

REMOVAL

REMOVAL

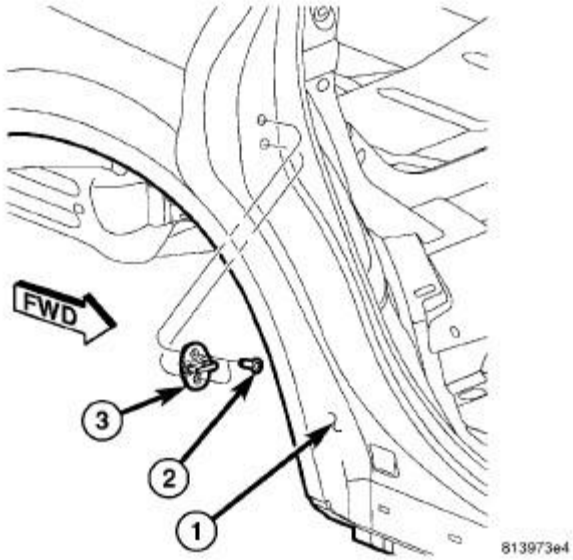


Fig. 169: Striker
Courtesy of CHRYSLER GROUP, LLC

1. Open the rear door.
2. Mark the rear door latch striker (3) location on the face of the outer C-pillar (1) to aid reinstallation.
3. Remove the two screws (2) that secure the striker to the C-pillar.
4. Remove the striker from the C-pillar.

INSTALLATION

INSTALLATION

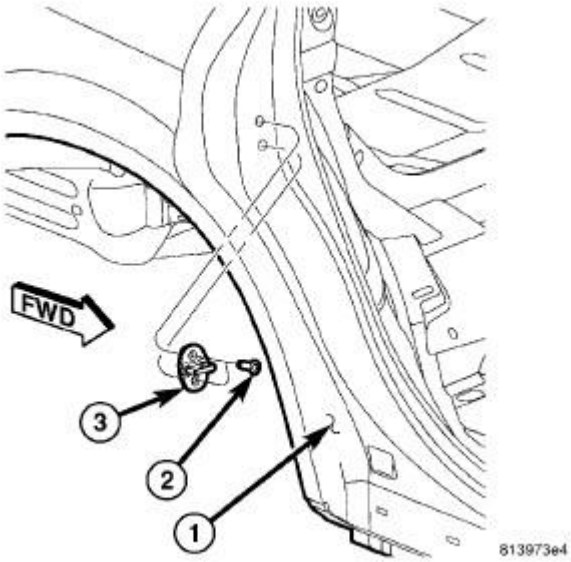


Fig. 170: Striker
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear door latch striker (3) on the face of the outer C-pillar (1).
2. Install and tighten the two screws (2) that secure the striker to the C-pillar. Tighten the screws to 33 N.m (24 ft. lbs.).
3. Adjust the latch striker position as necessary to achieve proper door spacing and latch operation.

EXTERIOR

CLADDING, BODY

REMOVAL

REMOVAL

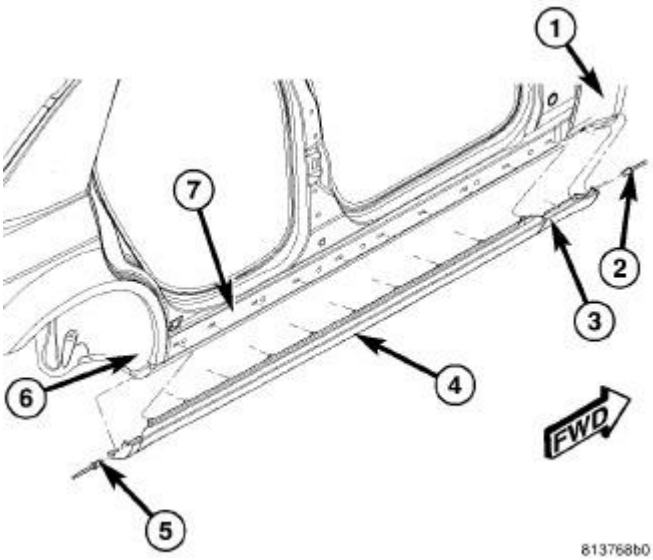


Fig. 171: Body Side Cladding
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the wheels from the side of the vehicle being serviced. Refer to **REMOVAL** .
3. Remove the pop rivets (2 and 5) from the front fender (1) and rear quarter panel (6).
4. Remove the rear body side cladding (4) by disengaging the cladding retaining clips from the rocker panel (7).
5. Remove the front body side cladding (3) by disengaging the retaining clip from the front fender.

INSTALLATION

INSTALLATION

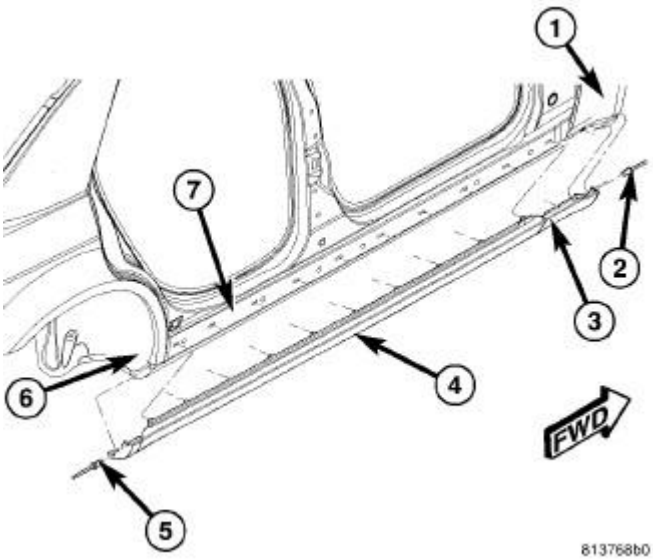


Fig. 172: Body Side Cladding
Courtesy of CHRYSLER GROUP, LLC

1. Position the front body side cladding (3) to the front fender (1).
2. Engaging the front cladding retaining clip to the front fender.
3. Position the rear body side cladding (4) to the rocker panel (6).
4. Engaging the rear cladding retaining clips to the rocker panel.
5. Install the pop rivets (2 and 5).
6. Install the wheels. Refer to **INSTALLATION** .
7. Lower the vehicle.

COVER, COWL PANEL

REMOVAL

REMOVAL

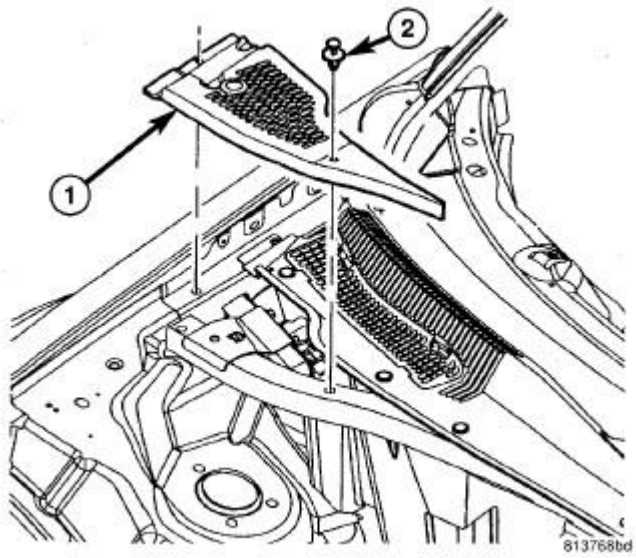


Fig. 173: Cowl Panel 1
Courtesy of CHRYSLER GROUP, LLC

1. Remove the two push pins (2) that secure the front cowl top panel (1) to the right rear corner of the engine compartment
2. Remove the front cowl top panel.

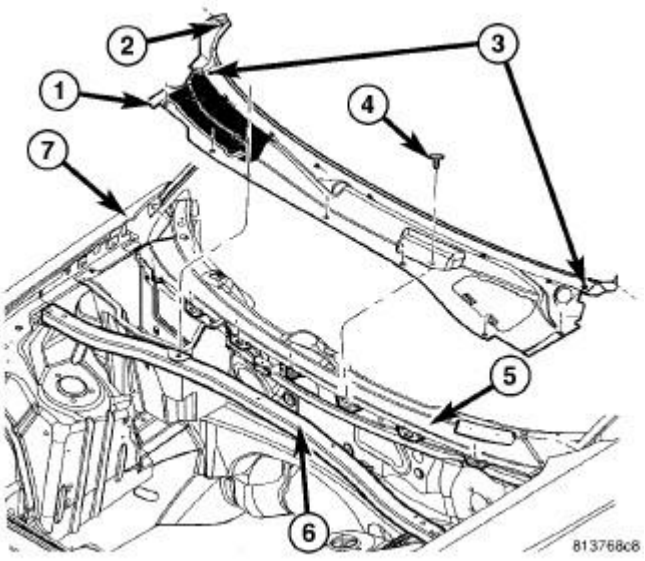


Fig. 174: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

3. Remove the windshield wiper arms. Refer to **ARM, WIPER, REMOVAL** .
4. Remove the push-pin (2) that secures each end of the cowl top panel (1) to each front fender (7).

5. Disengage the two 1/4-turn fasteners (3) that secure the cowl top panel to the dash panel (5).
6. Remove the six push-pins (4) that secure the cowl top panel to the strut tower support (6).
7. Disengage the integral retaining clips that secure the cowl top panel to the dash panel and remove the cowl panel from the engine compartment.

INSTALLATION

INSTALLATION

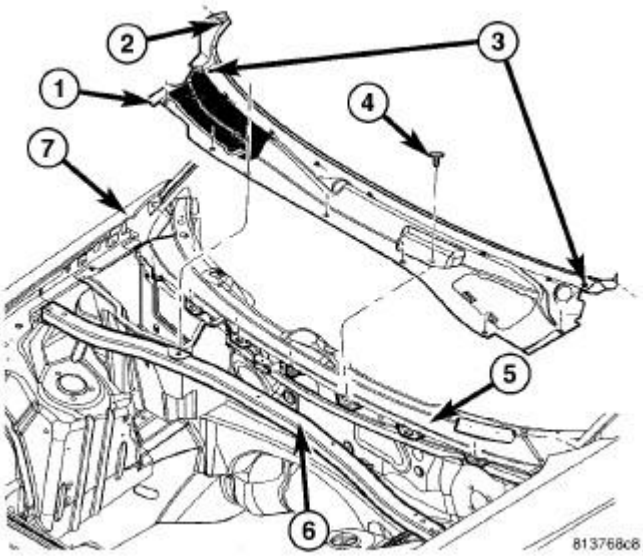


Fig. 175: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

1. Position the cowl top panel (1) into the engine compartment.
2. Engage the integral retaining clips that secure the cowl top panel to the dash panel (5).
3. Install the six push-pins (4) that secure the cowl top panel to the strut tower support (6).
4. Engage the 1/4-turn fasteners (3) that secure cowl top panel to the dash panel.
5. Install the push-pin (2) that secures each end of the cowl top panel to each front fender (7).
6. Install the windshield wiper arms. Refer to **ARM, WIPER, INSTALLATION** .

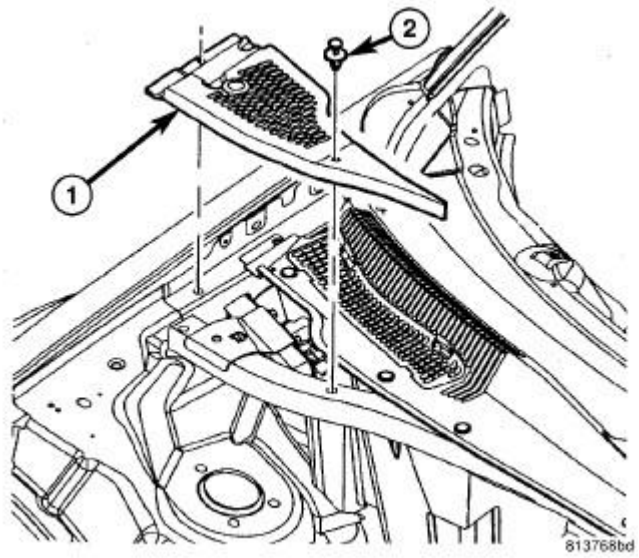


Fig. 176: Cowl Panel 1
Courtesy of CHRYSLER GROUP, LLC

7. Position the front cowl top panel (1) to the right rear corner of the engine compartment.
8. Install the two push-pins (2) that secure the front cowl top panel.

CROSSMEMBER, HEADLAMP MOUNTING

REMOVAL

REMOVAL

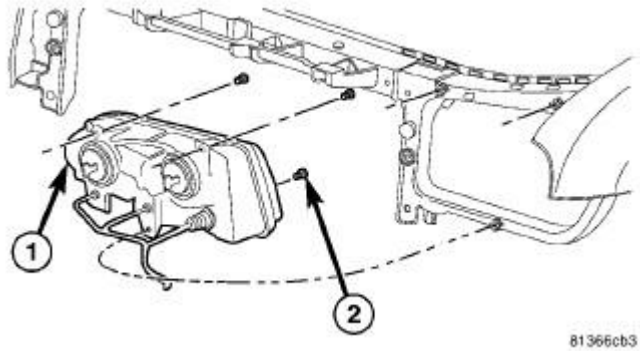


Fig. 177: Headlamp Attaching Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
3. Remove the headlamp units (1).

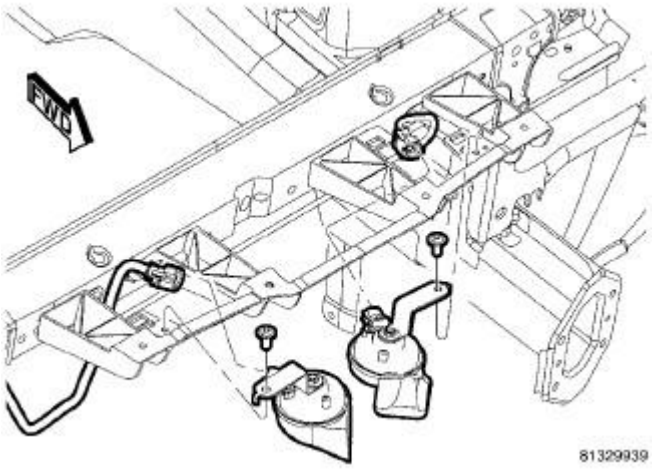


Fig. 178: Horn Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the headlamp wire harness from the horns.
5. Remove the bolts that secure the horns to the headlamp mounting crossmember and remove the horns.

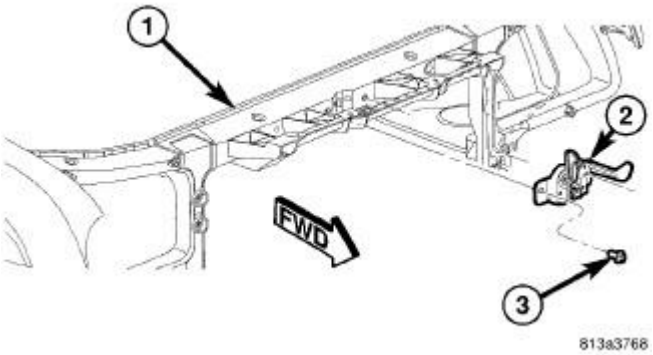


Fig. 179: Removing Hood Latch
Courtesy of CHRYSLER GROUP, LLC

6. Mark the location of the hood latch (2) on the front of the headlamp mounting crossmember (1) to aid in reinstallation.
7. Remove the two bolts (3) that secure the hood latch to the headlamp mounting crossmember and position the hood latch and cable out of the way.

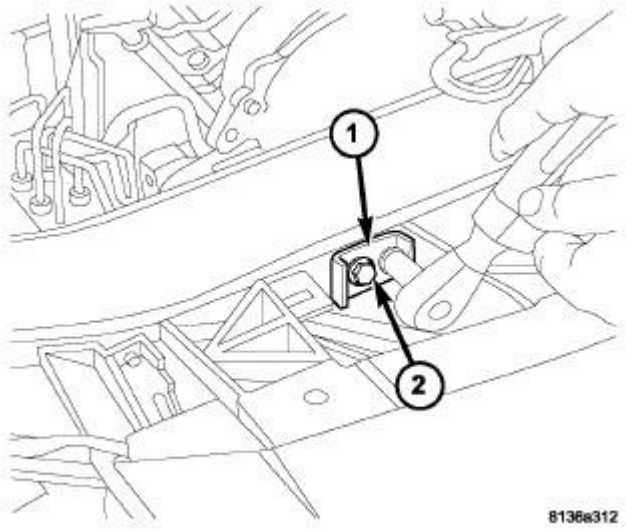


Fig. 180: Radiator Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

8. Remove the bolts (2) the secure the radiator mounting brackets (1) to the headlamp mounting crossmember.

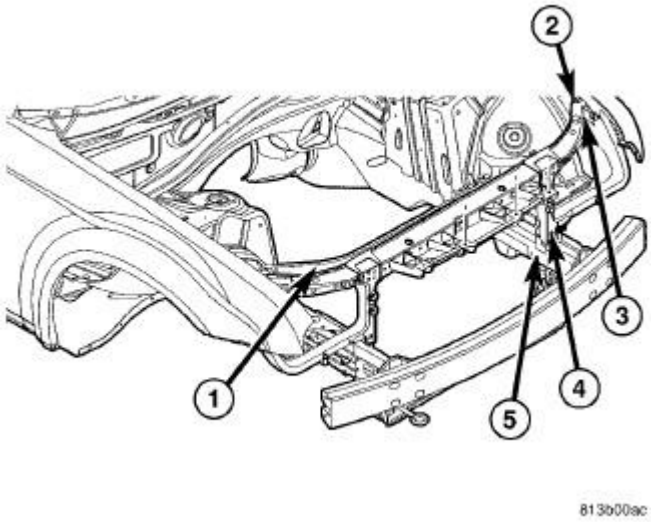


Fig. 181: Headlamp Mounting Crossmember
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mark the location of the headlamp mounting crossmember to the other body components prior to removal of the crossmember to aid in reinstallation.

9. Mark the location of the headlamp mounting crossmember (1) to the front fenders.
10. Remove the bolts (2 and 3) that secure the headlamp mounting crossmember to the front fenders.
11. Remove the bolts (4) that secure the headlamp mounting crossmember to the front frame rails (5).
12. Remove the headlamp mounting crossmember from the engine compartment.

INSTALLATION

INSTALLATION

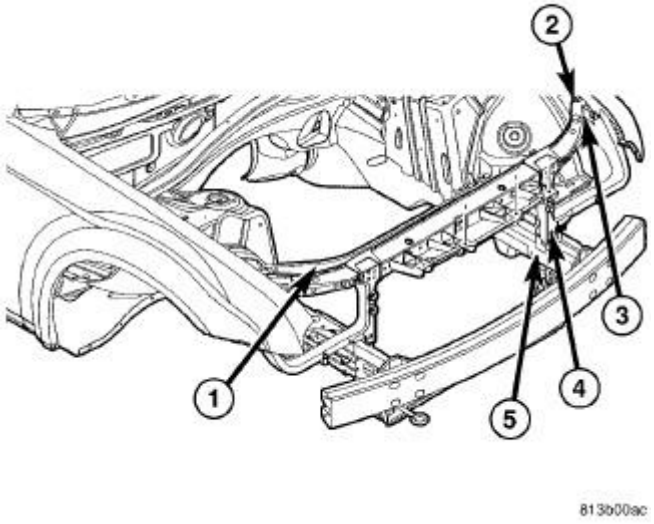


Fig. 182: Headlamp Mounting Crossmember
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Vehicle Emission Control Information (VECI) label(s) must be in place for the life of the vehicle. When replacing the component in which the VECI label is adhered, a new VECI label must also be adhered to the new component.

1. Position the headlamp mounting crossmember (1) into the engine compartment.
2. Loosely install the bolts (2 and 3) that secure the headlamp mounting crossmember to the front fenders.
3. Loosely install the bolts (4) that secure the headlamp mounting crossmember to the front frame rails (5).
4. Align the headlamp mounting crossmember using the alignment marks previously indicated and tighten all of the retaining bolts to 28 N.m (21 ft. lbs.).

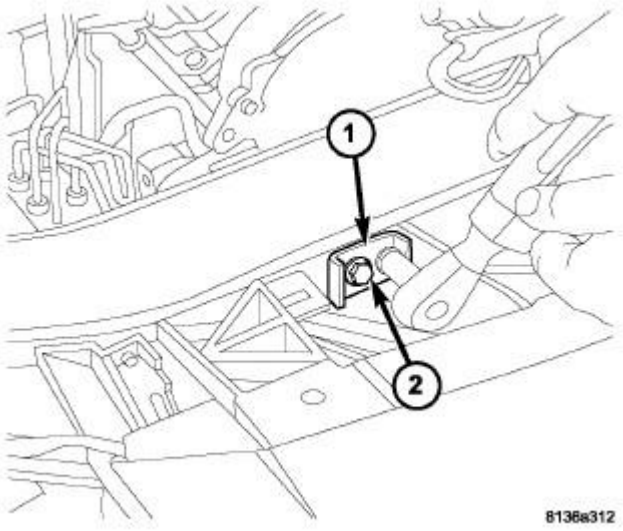


Fig. 183: Radiator Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

5. Install the bolts (2) that secure the radiator mounting bracket (1) to the headlamp mounting crossmember. Tighten the bolts to 5 N.m (45 in. lbs.).

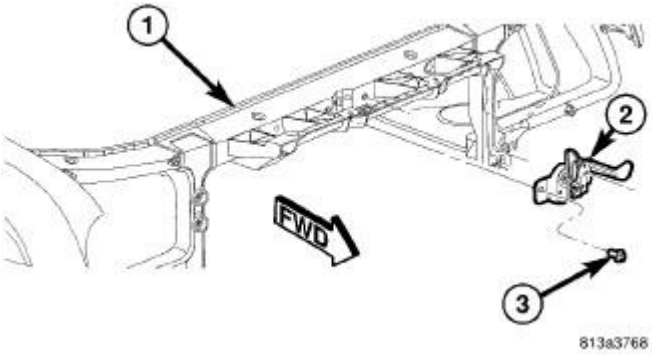


Fig. 184: Removing Hood Latch
Courtesy of CHRYSLER GROUP, LLC

6. Position the latch (2) to the front of the crossmember (1).
7. Loosely install the two bolts (3) that secure the hood latch to the headlamp mounting crossmember.
8. Align the hood latch using the alignment marks previously indicated and tighten the hood latch bolts to 28 N.m (21 ft. lbs.).

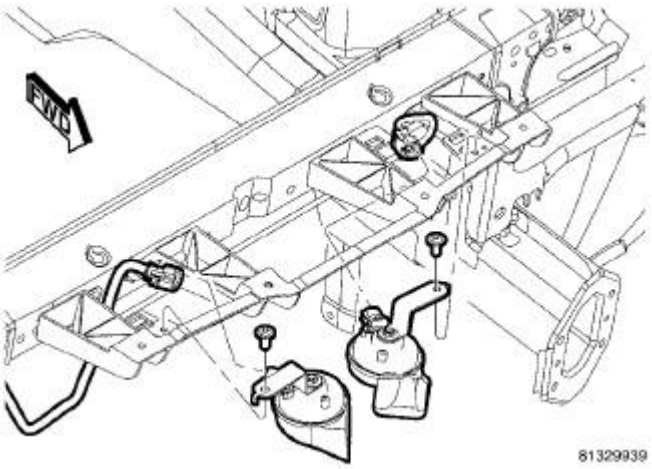


Fig. 185: Horn Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Install the horns onto the headlamp mounting crossmember. Tighten the bolts to 28 N.m (21 ft. lbs.).
10. Connect the headlamp wire harness to the horns.

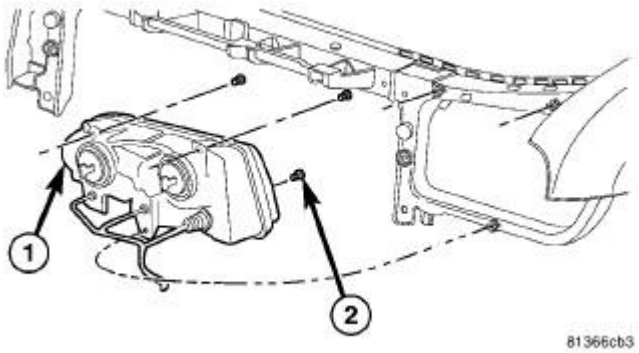


Fig. 186: Headlamp Attaching Screws
Courtesy of CHRYSLER GROUP, LLC

11. Install the headlamp units (1).
12. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
13. Reconnect the negative battery cable.
14. Carefully close the hood and verify hood latch and panel alignment. Adjust as necessary.
15. If equipped with ACC (Adaptive Cruise Control), module must be realigned.

FENDER, FRONT

REMOVAL

REMOVAL

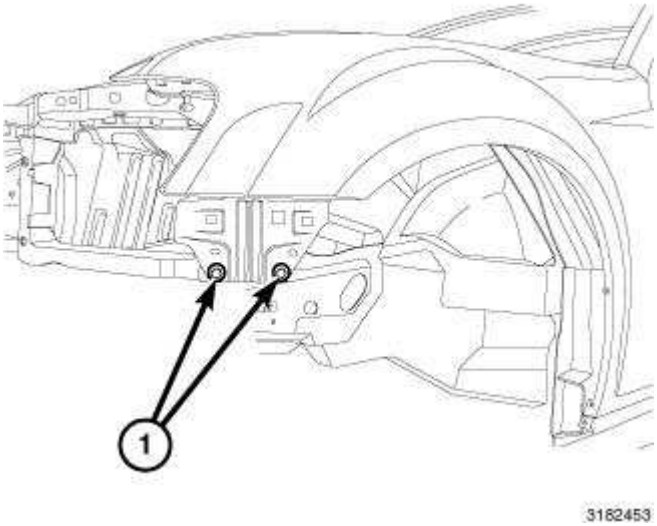


Fig. 187: Two Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the front wheel.
4. Remove the front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** & **SHIELD, SPLASH, REAR WHEELHOUSE, REMOVAL**.
5. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
6. Remove the headlamp. Refer to **UNIT, FRONT LAMP, REMOVAL** .
7. Remove the two fasteners (1) securing the fender's front dogleg to the front end module.

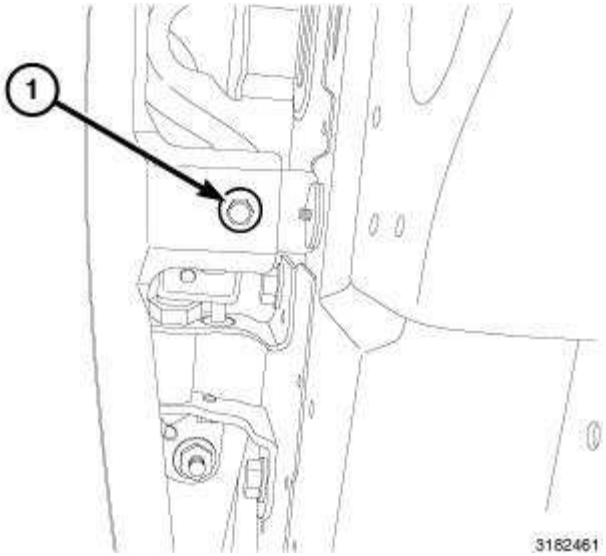


Fig. 188: Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Accessing through the wheelhouse, remove the bolt (1) securing the fender's rear dogleg to the bodyside bracket.

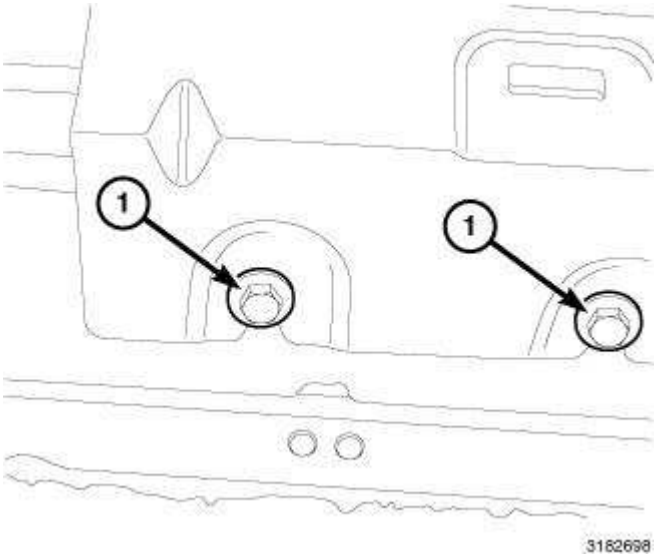


Fig. 189: Two Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the rocker panel/cladding.
10. Remove the two bolts (1) securing the lower fender dogleg to the sill.

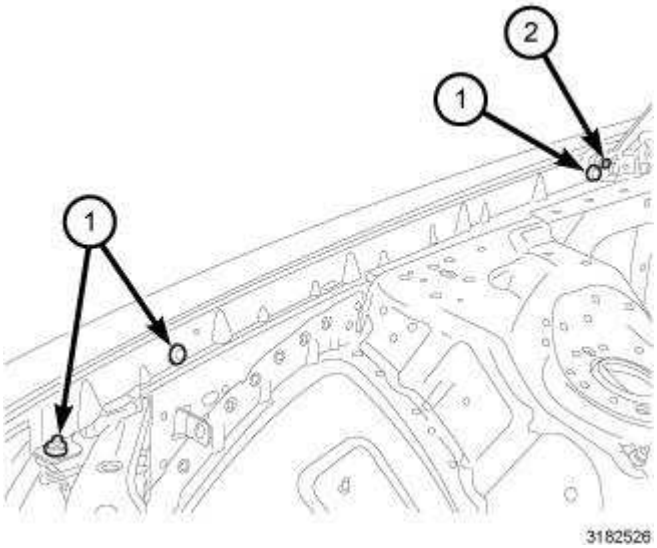


Fig. 190: Hood Hinge & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Lower the vehicle.
12. Open the hood and support with a suitable prop or block.
13. Remove the hood hinge (2). Refer to **HINGE, HOOD, REMOVAL**.

14. Remove the fasteners (1) securing the inner fender ledge.
15. Remove the fender from the vehicle.

INSTALLATION

INSTALLATION

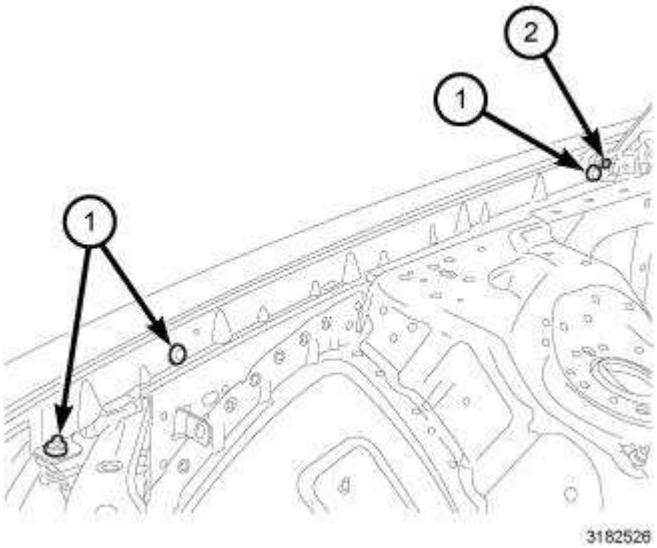


Fig. 191: Hood Hinge & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position the fender to the vehicle.
2. Install the fasteners (1) securing the inner fender ledge. Tighten the fasteners to 8 N-m (71 in. lbs.).
3. Install the hood hinge (2). Refer to **HINGE, HOOD, INSTALLATION**.
4. Raise and support the vehicle.

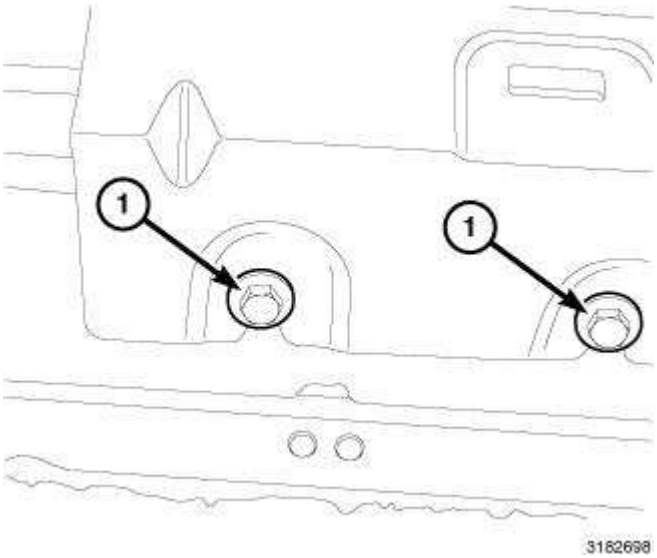


Fig. 192: Two Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the two bolts (1) securing the lower fender dogleg to the sill. Tighten the fasteners to 9 N-m (80 in. lbs.).
6. Install the rocker panel/cladding.

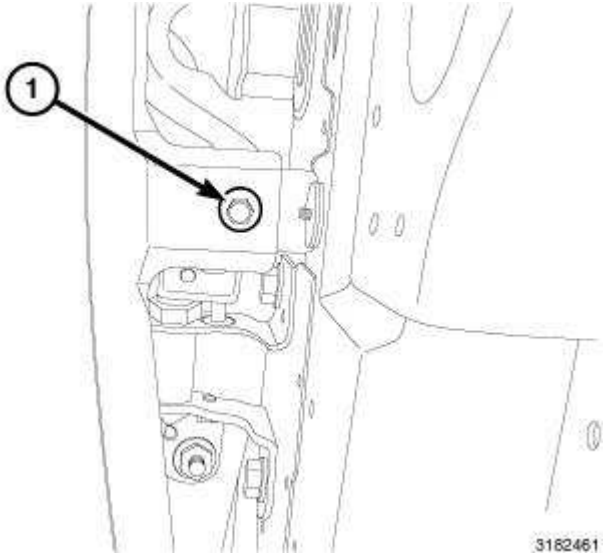


Fig. 193: Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Accessing through the wheelhouse, install the bolt (1) securing the fender's rear dogleg to the bodyside bracket. Tighten the fastener to 8 N-m (71 in. lbs.).

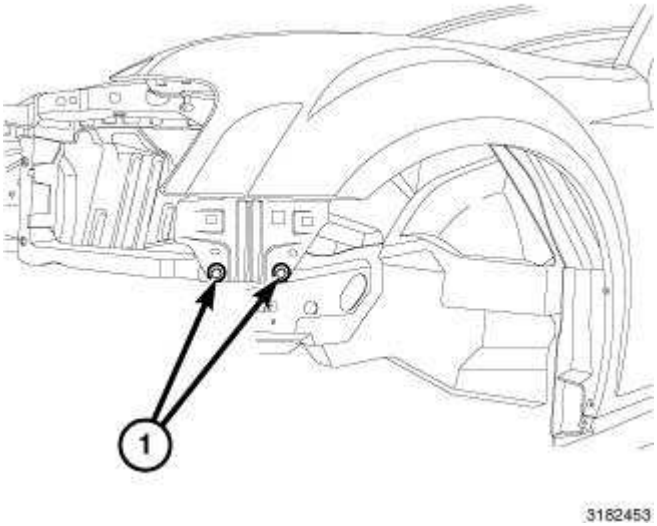


Fig. 194: Two Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Install the two fasteners (1) securing the fender's front dogleg to the front end module. Tighten the fasteners to 8 N-m (71 in. lbs.).
9. Install the headlamp. Refer to **UNIT, FRONT LAMP, INSTALLATION** .
10. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
11. Check the fender for proper gap and flushness. Refer to **GAP AND FLUSH, SPECIFICATIONS**.
12. Install the front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** & **SHIELD, SPLASH, REAR WHEELHOUSE, INSTALLATION**.
13. Install the front wheel.
14. Lower the vehicle.
15. Connect the negative battery cable.
16. Close the hood.

GRILLE

REMOVAL

REMOVAL

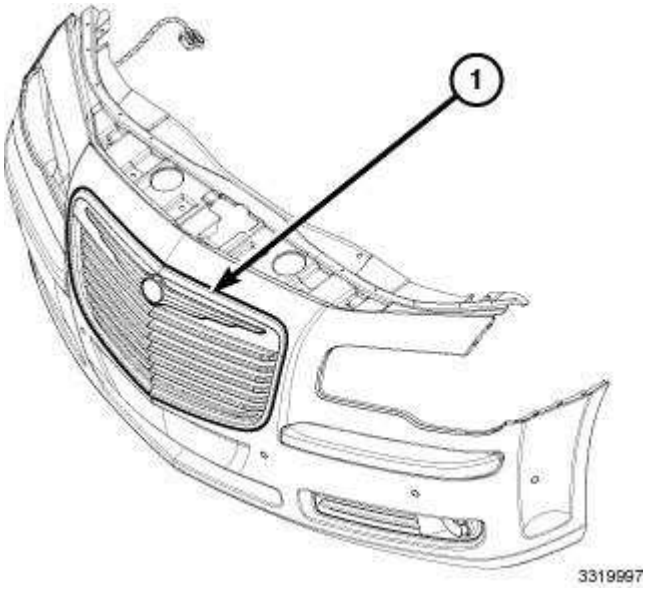


Fig. 195: Front Fascia
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Take the proper precautions to protect the face of the front fascia from cosmetic damage.

1. Remove the front fascia (1) and place it on a workbench. Refer to **FASCIA, FRONT, REMOVAL** .
2. Remove the screws that secure the grille (1) to the inside of the front fascia.

3. Remove the grille (1) from the front fascia.

INSTALLATION

INSTALLATION

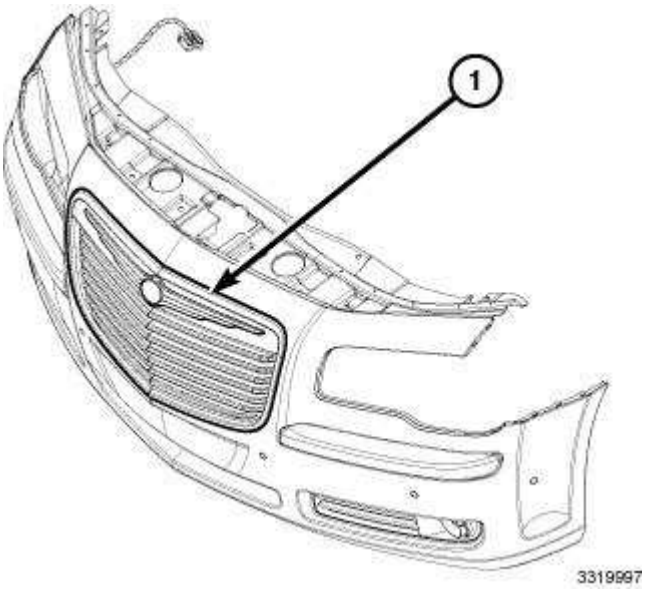


Fig. 196: Front Fascia
Courtesy of CHRYSLER GROUP, LLC

1. Position the grille (1) into the front fascia.
2. Install the screws that secure the grille to the front fascia. Tighten the screws securely.
3. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .

INLET, FRESH AIR

REMOVAL

REMOVAL

NOTE: On SRT 8 models only.

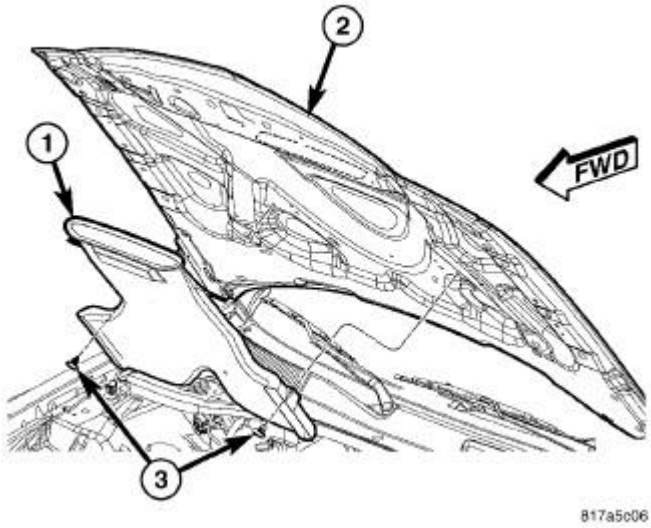


Fig. 197: Air Inlet
Courtesy of CHRYSLER GROUP, LLC

1. Remove hood liner.
2. Remove push pins (2) and remove air inlet (1) from hood (2).

INSTALLATION

INSTALLATION

NOTE: On SRT 8 models only.

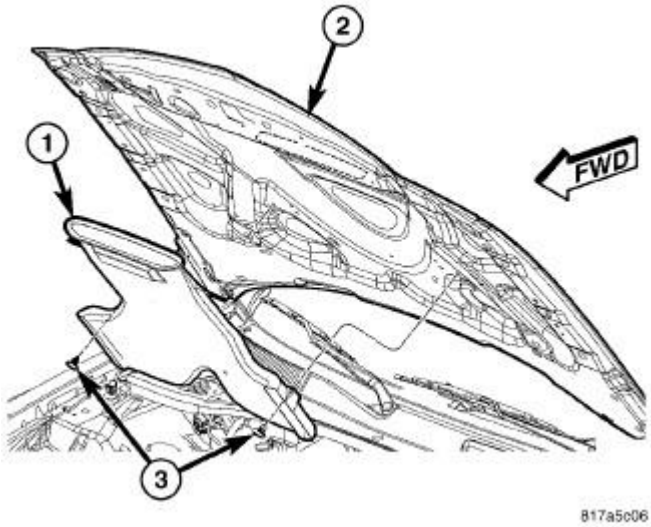


Fig. 198: Air Inlet

Courtesy of CHRYSLER GROUP, LLC

1. Place air inlet (1) to hood (2).
2. Insert push pins (3) fastening air inlet to hood.
3. Install hood liner and push pins.

MIRROR, OUTSIDE REARVIEW

REMOVAL

REMOVAL

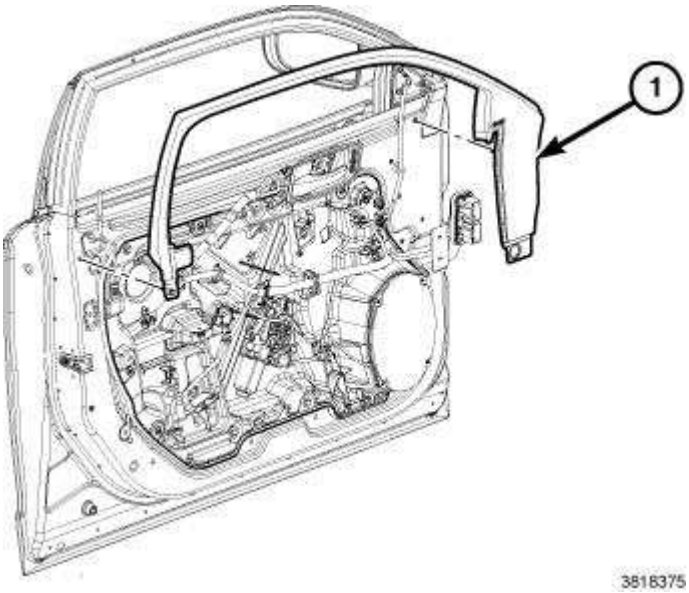


Fig. 199: Interior Window Trim Molding
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the window trim molding (1) to gain access to the mirror fasteners. Refer to **MOLDING, INTERIOR WINDOW TRIM, REMOVAL**.

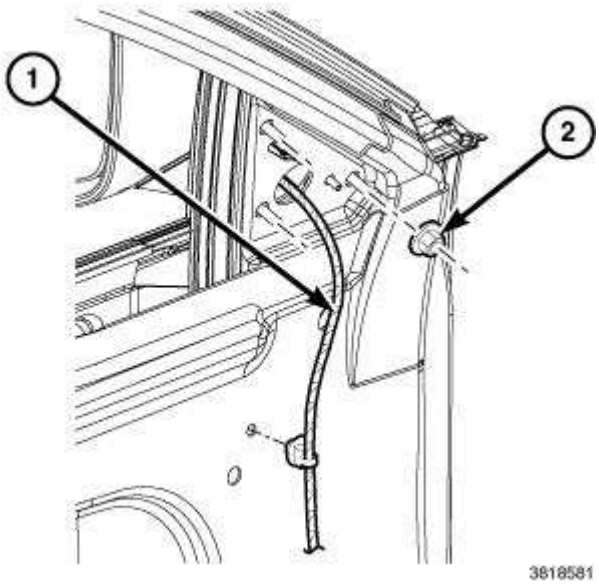


Fig. 200: Mirror Electrical Harness & Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Detatch and disconnect the mirror wire harness (1) from the door wire harness.
4. Remove the three nuts (2) that secure the outside rearview mirror to the front door.

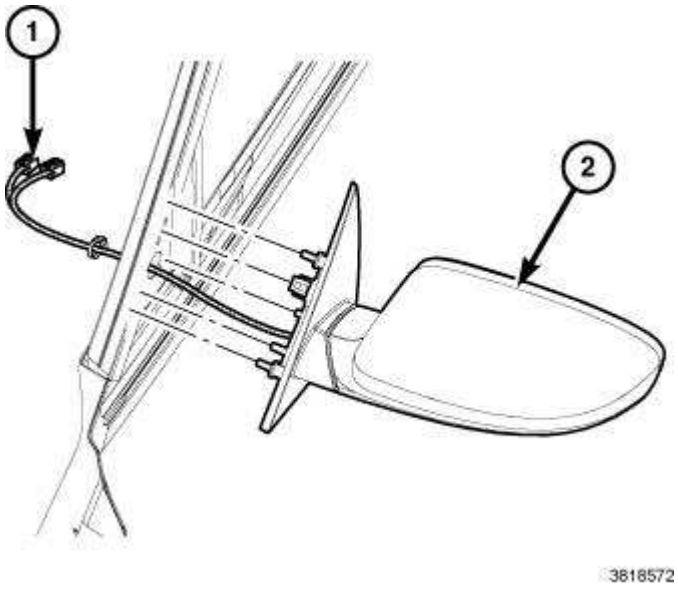


Fig. 201: Outside Rearview Mirror & Harness
Courtesy of CHRYSLER GROUP, LLC

5. Remove the outside rearview mirror (2) from the front door. Feed the harness (1) through the access hole in the mirror flag.

INSTALLATION

INSTALLATION

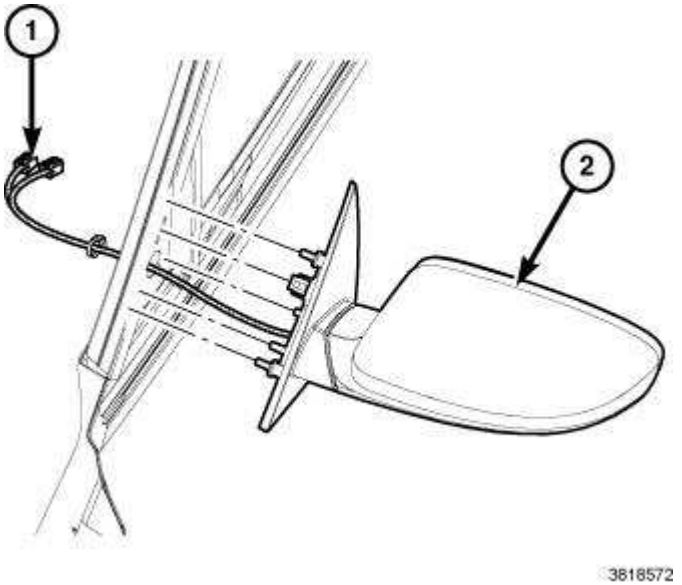


Fig. 202: Outside Rearview Mirror & Harness
Courtesy of CHRYSLER GROUP, LLC

1. Feed the mirror wire harness (1) through the access hole in the mirror flag.
2. Position the outside rearview mirror (2) to the front door.

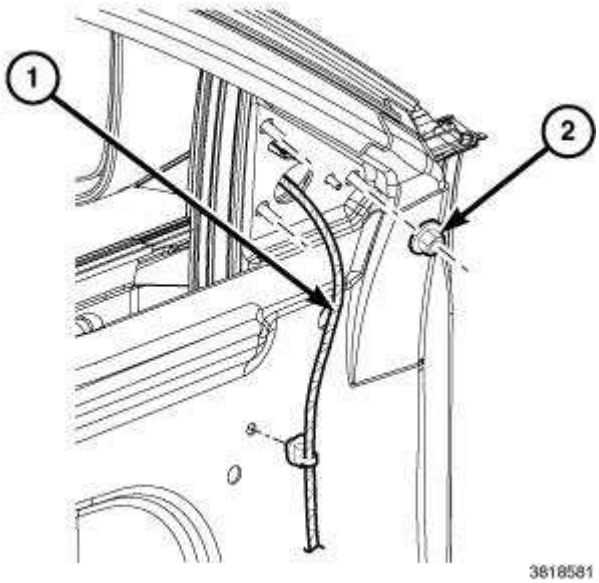


Fig. 203: Mirror Electrical Harness & Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Install the three nuts (1) that secure the mirror to the front door. Tighten the nuts to 7 N.m (60 in. lbs.).

4. Connect and attach the mirror electrical harness (1).

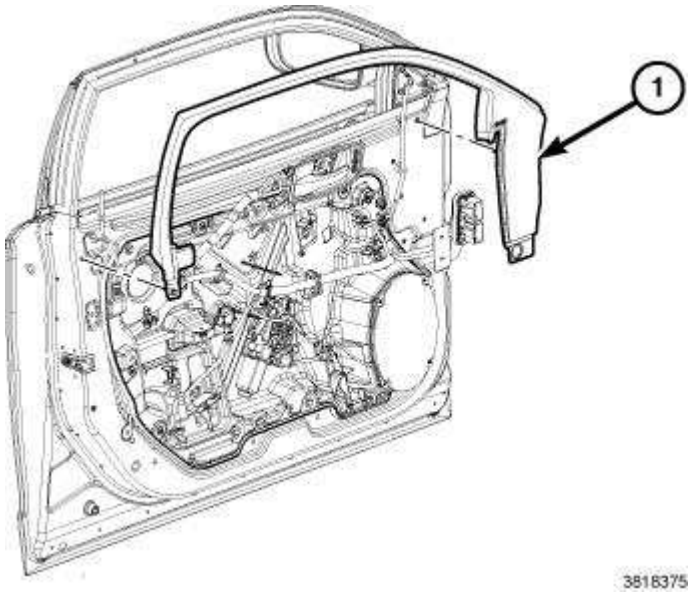


Fig. 204: Interior Window Trim Molding
Courtesy of CHRYSLER GROUP, LLC

5. Install the window trim molding (1). Refer to **MOLDING, INTERIOR WINDOW TRIM, INSTALLATION**.
6. Reconnect the negative battery cable.

MIRROR, OUTSIDE REARVIEW, GLASS

REMOVAL

REMOVAL

GLASS

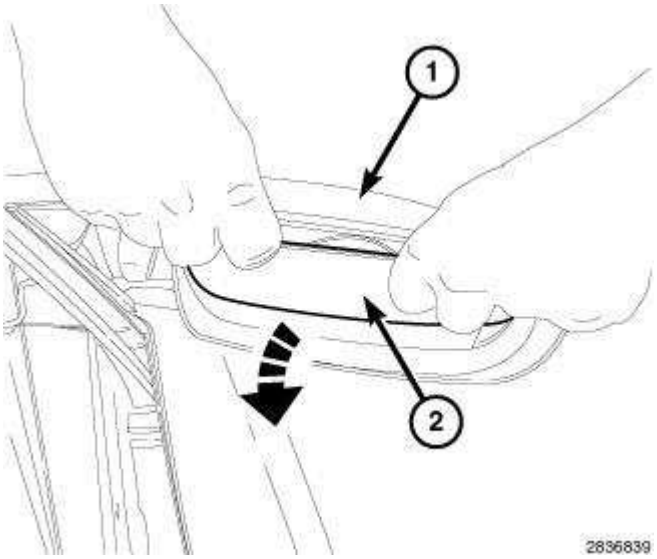


Fig. 205: Mirror Glass Case & Mirror Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Always wear eye and hand protection when servicing the mirror glass. Failure to observe these warnings may result in personal injury from broken glass.

1. Push mirror glass case (2) into full down position
2. Disconnect and isolate the negative battery cable.
3. Place thumbs behind mirror glass case (2) and push out from the mirror assembly (1). This will disengage the mirror glass case's snap attachment feature.

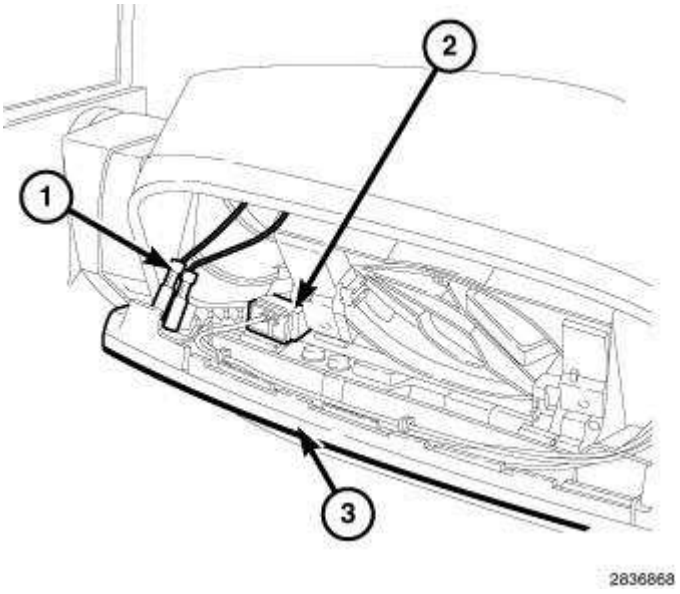


Fig. 206: Heater Wires & Mirror Motor Glass Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

4. If equipped, disconnect the blind spot indicator and heater wires (1) by pulling on thumb tabs.
5. Disconnect the mirror motor glass electrical connector (2).

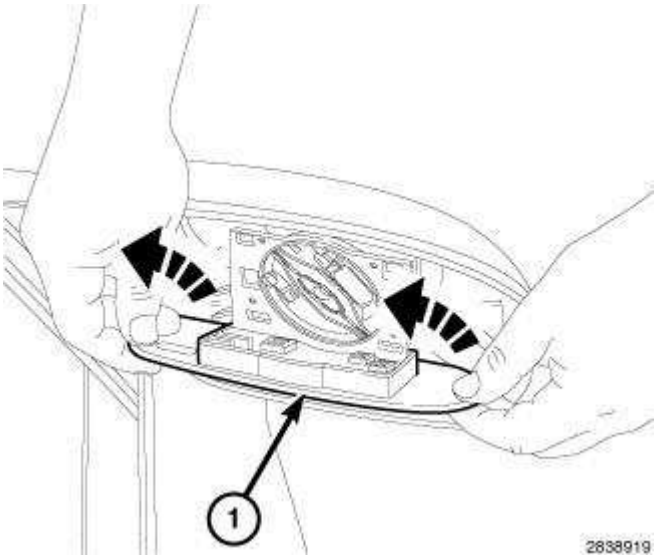


Fig. 207: Mirror Glass Case
Courtesy of CHRYSLER GROUP, LLC

6. Remove the mirror glass case (1) from the glass motor by pulling up and out. This will disengage the "hook" feature at the bottom of the mirror glass case assembly (1).

MIRROR CAP

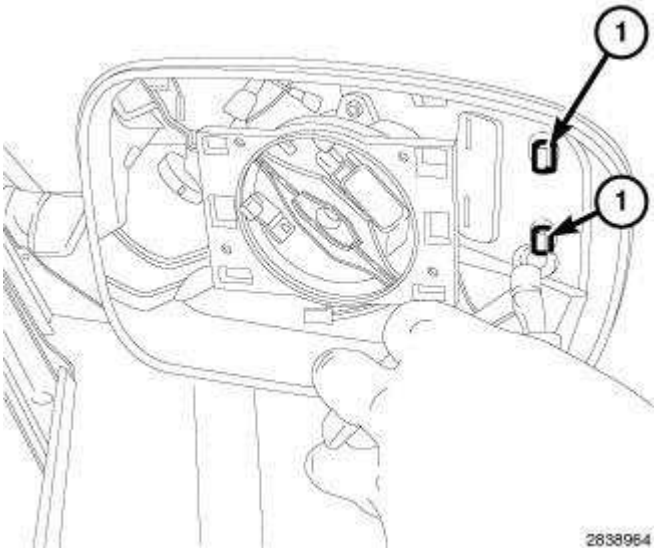


Fig. 208: Mirror Cap Outboard Snaps
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use caution when removing the mirror cap, retainer tabs may break during cap removal.

NOTE: **In the event that the mirror cap retainer tabs were broken during a previous disassembly, a piece of double sided adhesive tape would have been added between the mirror cap and shell to improve retention. If the tape is present it will make the amount of force needed to remove the cap higher.**

1. Remove the mirror glass.
2. Using a flat head screw driver, pliers or equivalent, disengage the mirror cap outboard snaps (1).

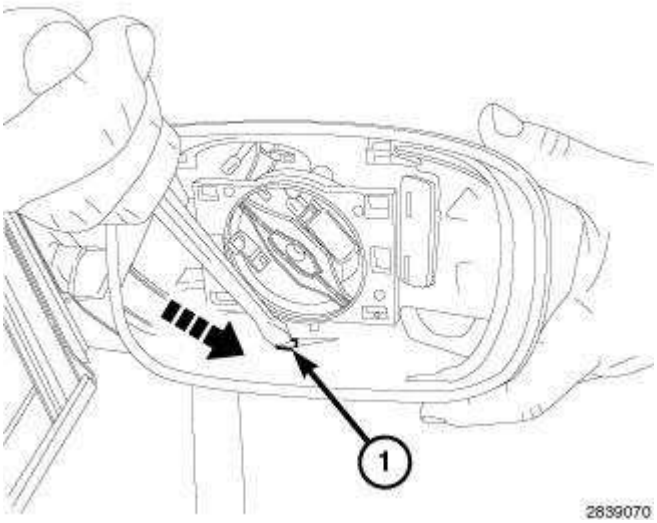


Fig. 209: Bottom Snap
Courtesy of CHRYSLER GROUP, LLC

3. Using a flat head screw driver, apply downward pressure to the bottom snap (1).
4. Push with the screw driver and pull on the cap with your opposite hand creating a gap between the shell and the shell cap.
5. Continue to pull on the cap using both hands as necessary until the cap breaks away from the shell.

INSTALLATION

INSTALLATION

GLASS

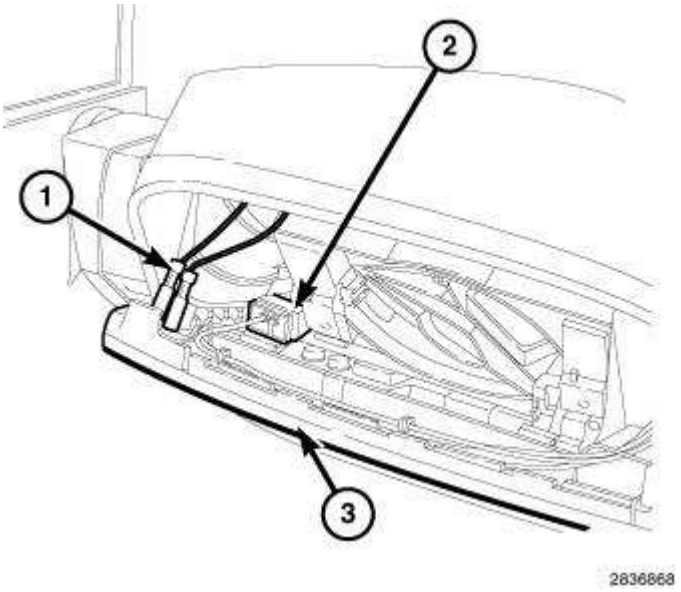


Fig. 210: Heater Wires & Mirror Motor Glass Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

1. Install the glass case (3) to motor by pushing the glass case "hooks" into place.
2. If equipped, connect the blind spot indicator and heater wires (1).
3. Connect the mirror motor glass electrical connector (2).

CAUTION: Make sure wires are not caught between the glass case and the motor.

4. Push the glass case (3) on until the glass case snaps are fully seated on motor.

NOTE: An audible snap is normal.

5. Repeat steps for the opposite side.
6. Connect the negative battery cable.

MIRROR CAP

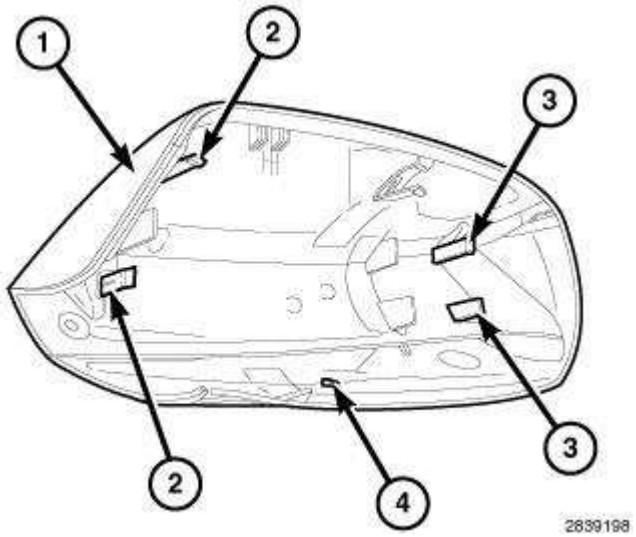


Fig. 211: Snap Locations & Kit Supplied Chrome Mirror Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the mirror cap retaining tabs are broken, install a piece of double sided adhesive tape to the affected area.

NOTE: In the event that the mirror cap retainer tabs were broken during a previous disassembly, a piece of double sided adhesive tape would have been added between the mirror cap and shell to improve retention. If the tape is present it will need to be removed and replaced with a new piece before reassembly.

1. Review the snap locations (2, 3 & 4) on the kit supplied chrome mirror cap (1).

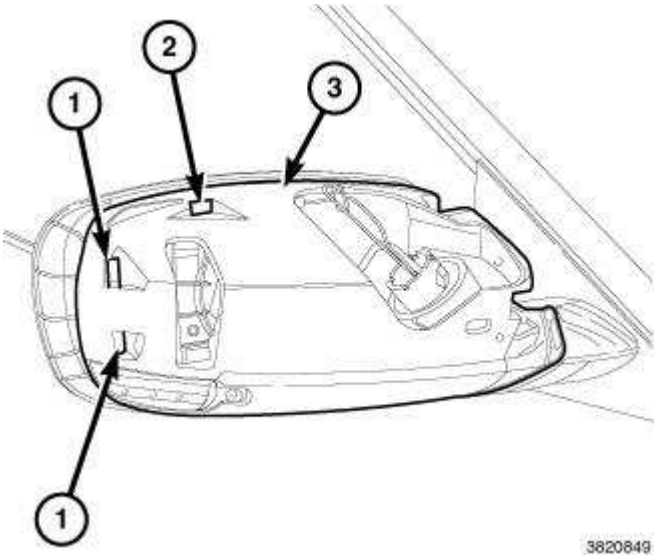


Fig. 212: Snap Locations & Mirror Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Review the snap locations (1 & 2) on the mirror assembly (3).

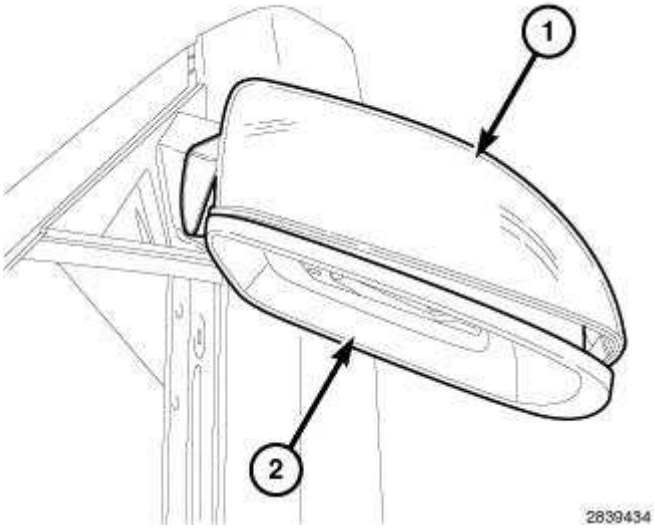


Fig. 213: Mirror Cap & Mirror Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Begin installation by aligning the snaps on the mirror cap (1) with the snap locations on the mirror assembly (2).
4. Verify that all snaps are in the correct position.
5. Apply gentle pressure on the mirror cap (1) until all snaps are fully seated into the mirror assembly (2).

SHIELD, SPLASH, FRONT WHEELHOUSE

REMOVAL

REMOVAL

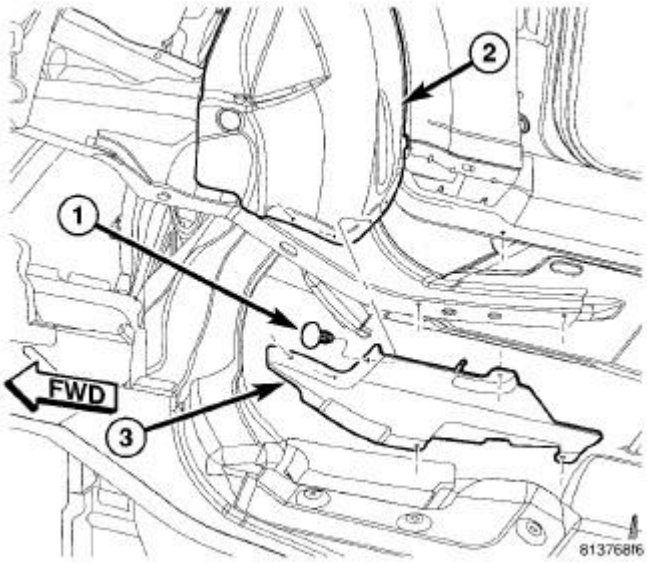


Fig. 214: Removing/Installing Shield
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the wheels from the side of the vehicle being serviced. Refer to **REMOVAL** .
3. Remove the body side cladding from the side of the vehicle being serviced.
4. Remove the push-pins (1) that secure the lower front wheelhouse shield (3) to the front wheelhouse shield (3) and the body.
5. Remove lower front wheelhouse shield from the vehicle.

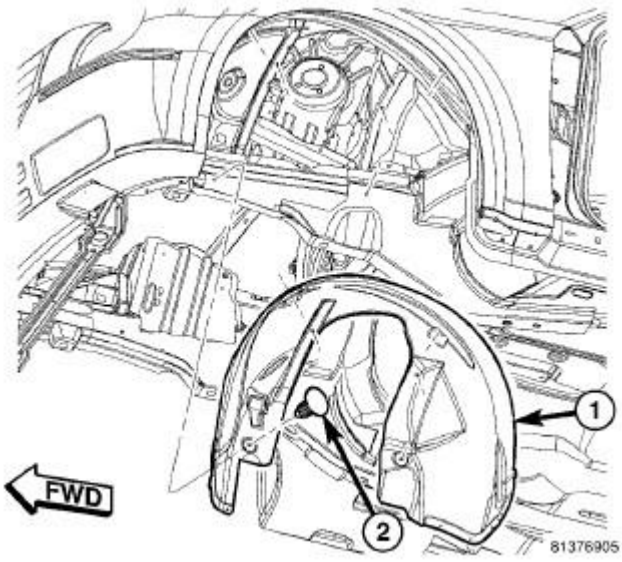


Fig. 215: Removing/Installing Front Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

6. Remove the front belly pan. Refer to **BELLY PAN, REMOVAL** .
7. Remove the push-pins (2) that secure the front wheelhouse shield (1) to the body.
8. Remove the front wheelhouse shield from the vehicle.

INSTALLATION

INSTALLATION

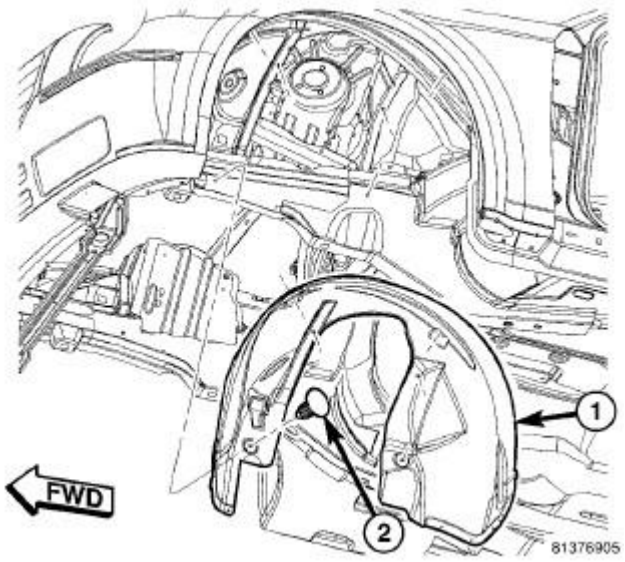


Fig. 216: Removing/Installing Front Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

1. Position the front wheelhouse shield (1) into the front fenderwell.
2. Install the push-pin (2) that secure the front wheelhouse shield to the body.
3. Install the front belly pan. Refer to **BELLY PAN, INSTALLATION** .

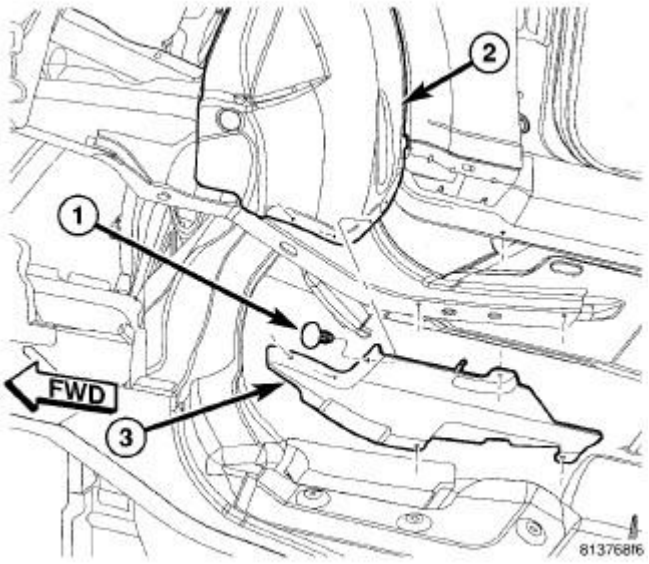


Fig. 217: Removing/Installing Shield
Courtesy of CHRYSLER GROUP, LLC

4. Position the lower front wheelhouse shield (3) onto the body.
5. Install the push-pins (1) that secure the lower front wheelhouse shield to the front wheelhouse shield (2) and the body.
6. Install the body side cladding.
7. Install the front wheels. Refer to **INSTALLATION** .
8. Lower the vehicle.

SHIELD, SPLASH, REAR WHEELHOUSE

REMOVAL

REMOVAL

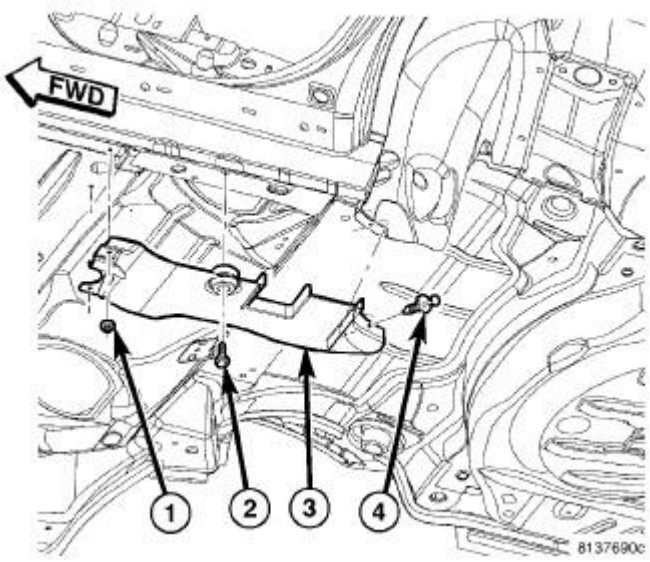


Fig. 218: Shield 1
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the wheels from the side of the vehicle being serviced. Refer to **REMOVAL** .
3. Remove the rear portion of the body side cladding from the side of the vehicle being serviced.
4. Remove the nuts (1), bolt (2) and the push-pins (4), that secure the lower rear wheelhouse shield (3) to the body.
5. Remove lower rear wheelhouse shield from the vehicle.

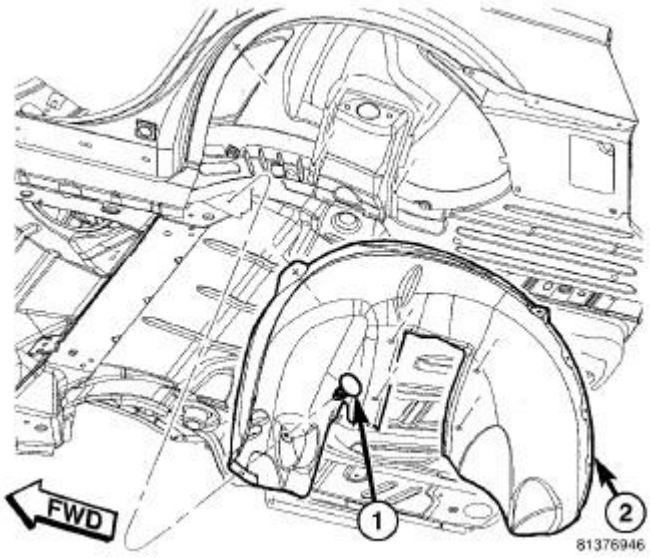


Fig. 219: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

6. Remove the push-pins (1) that secure the rear wheelhouse shield (2) to the body.
7. Remove the rear wheelhouse shield from the vehicle.

INSTALLATION

INSTALLATION

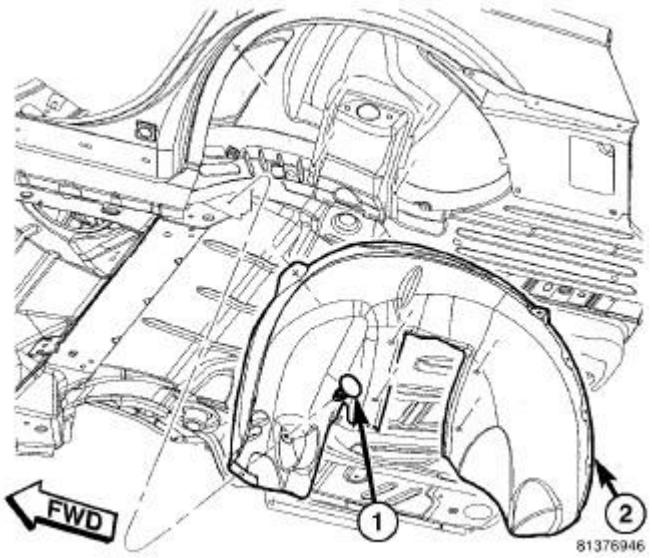


Fig. 220: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear wheelhouse shield (2) into the rear wheelwell.
2. Install the push-pins (1) that secure the rear wheelhouse shield to the body.

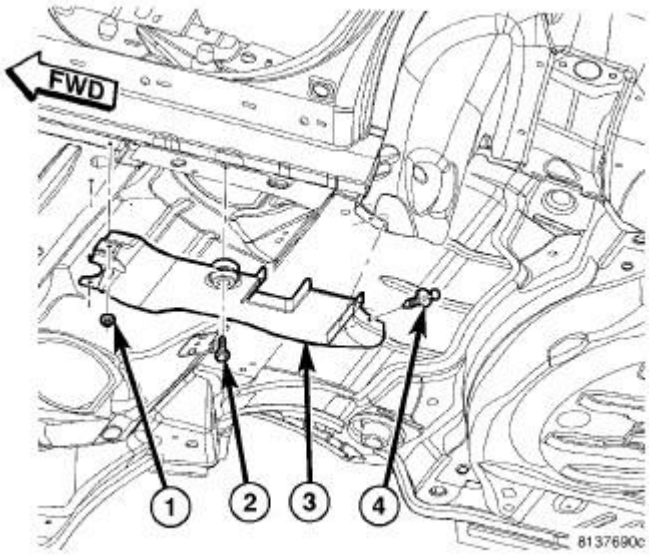


Fig. 221: Shield 1
Courtesy of CHRYSLER GROUP, LLC

3. Position the lower rear wheelhouse shield (3) onto the body.
4. Install the nuts (1), bolt (2) and the push-pins (4) that secure the lower rear wheelhouse shield to the body. Tighten the nuts and the bolt securely.
5. Install the rear portion of the body side cladding.
6. Install the wheels. Refer to **INSTALLATION** .
7. Lower the vehicle.

TRIM, COWL EXTENSION

REMOVAL

REMOVAL

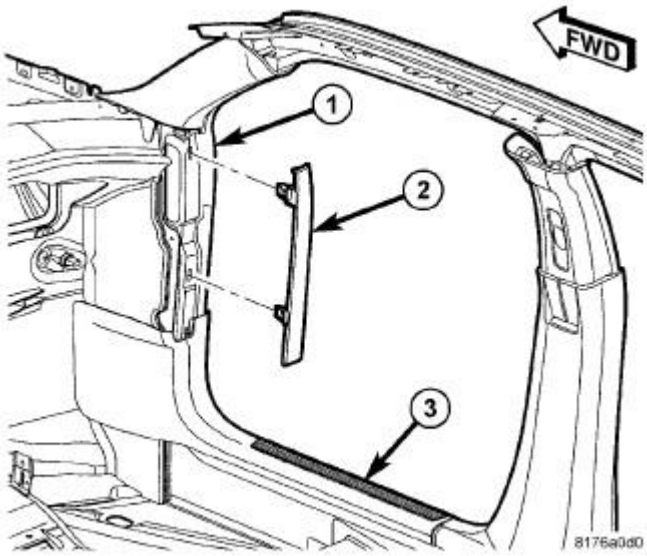


Fig. 222: Cowl Trim Extension
Courtesy of CHRYSLER GROUP, LLC

1. Insert special tool (special tool #C-4755, Trim Stick) (from the outside in the direction of arrow 2) under the middle of the trim extension (2).
2. Slide trim stick up to the upper spring clip retainer, and pry to disengage clip.
3. Slide the trim stick down to the lower spring clip retainer, and pry to disengage clip.

INSTALLATION

INSTALLATION

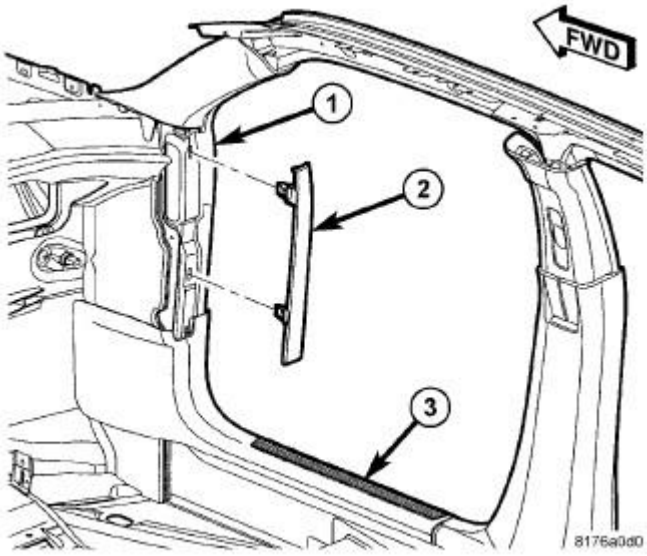


Fig. 223: Cowl Trim Extension
Courtesy of CHRYSLER GROUP, LLC

1. Place trim extension (2) against cowl (1) and align spring clips with holes on cowl.
2. Tap trim extension on to cowl (1) ensuring trim extension (2) is properly seated.

HOOD

BUMPER, HOOD

REMOVAL

REMOVAL

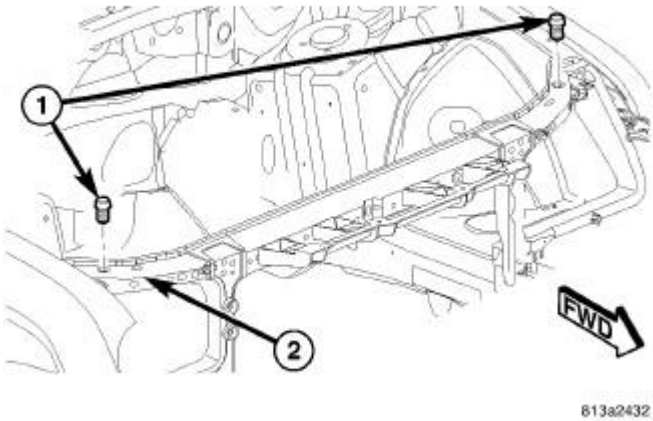


Fig. 224: Hood Adjuster Bumpers
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the hood.
2. Unscrew the hood adjustment bumper(s) (1) from the mounting hole(s) in the top of the headlamp mounting crossmember (2).
3. Remove the adjustment bumper(s) from the vehicle.

INSTALLATION

INSTALLATION

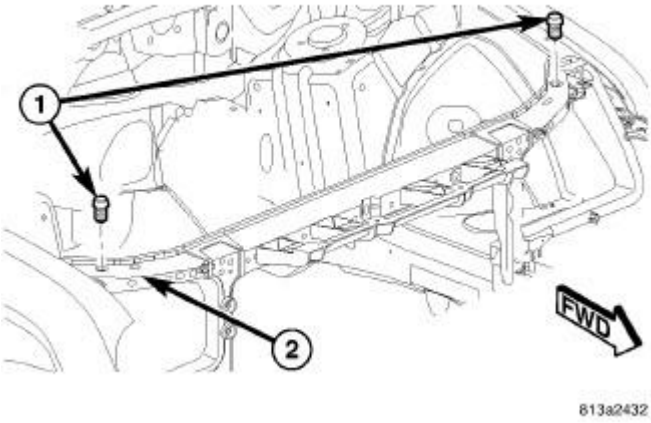


Fig. 225: Hood Adjuster Bumpers
Courtesy of CHRYSLER GROUP, LLC

1. Install the hood adjustment bumper(s) (1) into the mounting hole(s) located in the top of the headlamp mounting crossmember (2).
2. Adjust the adjustment bumper(s) in or out of the crossmember as necessary to achieve proper hood alignment.

CABLE, HOOD RELEASE

REMOVAL

REMOVAL

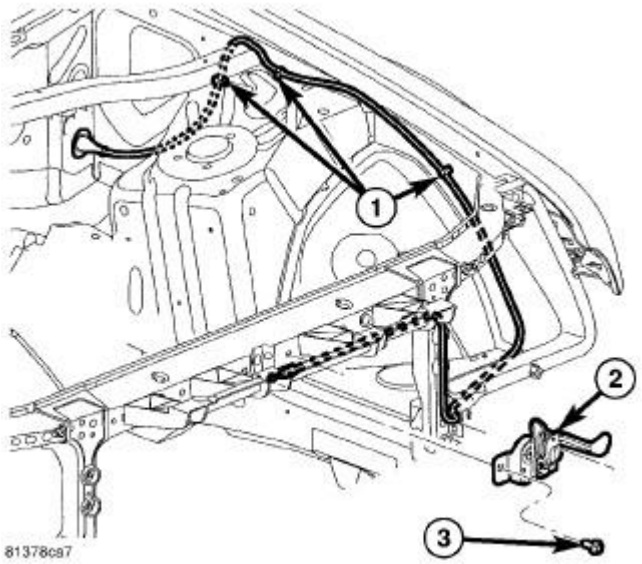


Fig. 226: Latch Release Cable
Courtesy of CHRYSLER GROUP, LLC

1. Remove the hood latch (2) from the vehicle. Refer to **LATCH, HOOD, REMOVAL**.
2. Remove the left headlamp unit from the vehicle.
3. Disengage the hood latch release cable from the integral routing clips on the headlamp mounting crossmember and the routing clips (1) along the left side of the engine compartment.

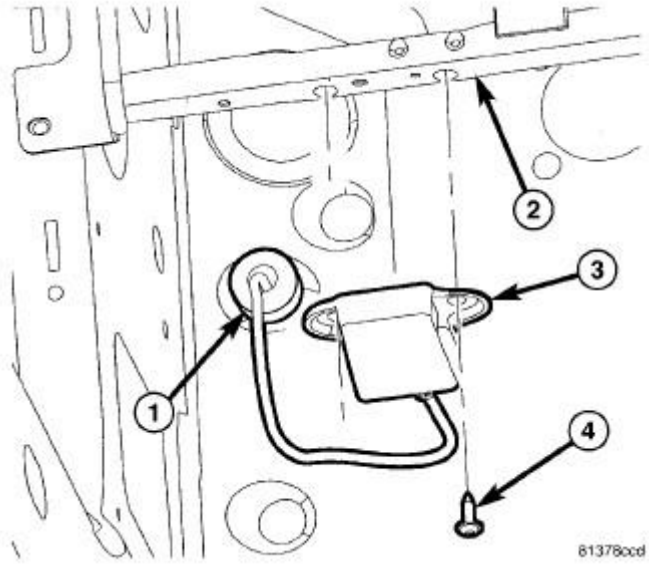


Fig. 227: Hood Latch Release Handle
Courtesy of CHRYSLER GROUP, LLC

4. From the passenger compartment, remove the closeout panel from beneath the left side of the instrument panel. Refer to **PANEL, SILENCER, REMOVAL**.

5. Unseat the hood latch release cable grommet (1) from the dash panel.
6. Remove the two screws (4) that secure the hood latch release handle (3) to the lower instrument panel reinforcement (2).
7. Remove the hood latch release handle and cable through the passenger compartment of the vehicle.

INSTALLATION

INSTALLATION

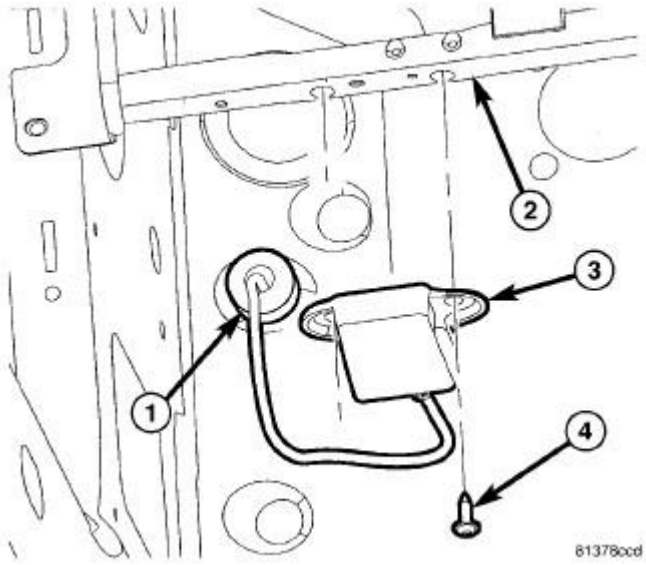


Fig. 228: Hood Latch Release Handle
Courtesy of CHRYSLER GROUP, LLC

1. Position the hood latch release handle and cable (3) under the left side of the instrument panel in the passenger compartment of the vehicle.
2. Thread the cable through the appropriate hole in the dash panel far enough to seat the cable grommet (1) into the hole.
3. Position the hood latch release handle to the lower instrument panel reinforcement (2).
4. Install and tighten the two screws (4) that secure the handle to the reinforcement. Tighten the screws to 5 N.m (45 in. lbs.).
5. Reinstall the closeout panel beneath the left side of the instrument panel. Refer to **PANEL, SILENCER, INSTALLATION**.

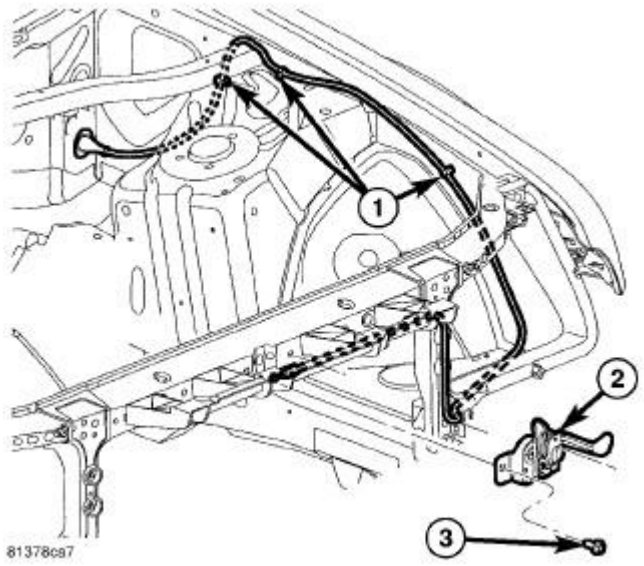


Fig. 229: Latch Release Cable
Courtesy of CHRYSLER GROUP, LLC

6. Route the hood latch release cable from the dash panel along the left side of the engine compartment to the center of the headlamp mounting crossmember as shown in illustration.
7. Fully engage the cable into the integral routing clips on the headlamp mounting crossmember and the routing clips (1) along the left side of the engine compartment.
8. Reinstall the left headlamp unit to the vehicle.
9. Reinstall the hood latch (2) to the vehicle. Refer to **LATCH, HOOD, INSTALLATION**.

HINGE, HOOD

REMOVAL

REMOVAL

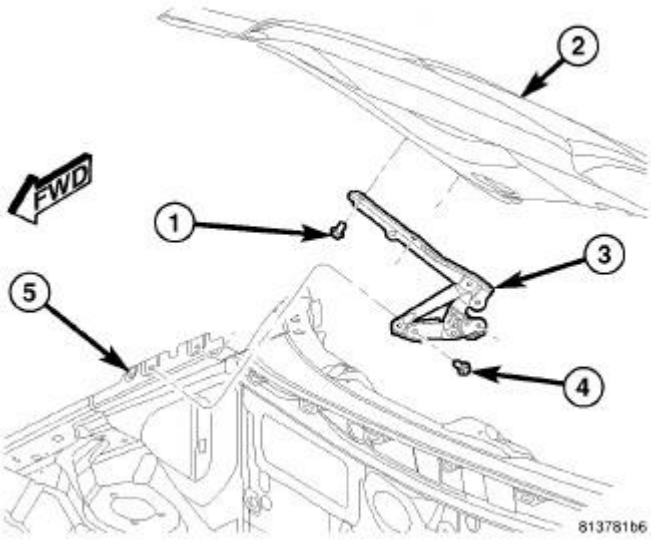


Fig. 230: Hinge
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the hood (2) with a suitable prop or block.
2. For BUX models, disconnect the negative battery cable and wait at least two minutes.
3. For BUX models, remove the electronic pedestrian protection hood hing actuator, refer to **ACTUATOR, ELECTRONIC PEDESTRIAN PROTECTION HOOD HINGE, REMOVAL** .
4. If the vehicle is so equipped, disconnect the upper end of the gas support cylinder from the upper bracket of the hood hinge (3). Refer to **PROP, GAS, REMOVAL**.
5. Mark the location of the hood hinge upper bracket on the hood (2) inner panel to aid reinstallation.
6. Remove the two screws (1) that secure the hinge to the hood.
7. Mark the hinge lower bracket location on the inside of the front fender ledge (5) to aid reinstallation.
8. Remove the two screws (4) that secure the hinge to the fender.
9. Remove the hood hinge from the vehicle.

INSTALLATION

INSTALLATION

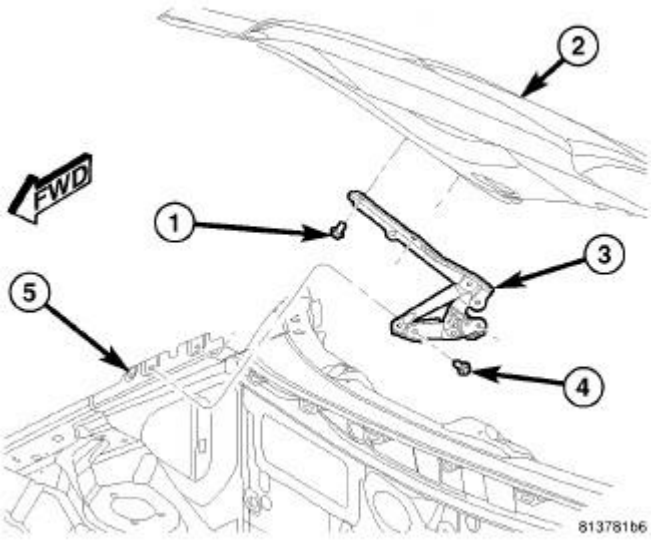


Fig. 231: Hinge
Courtesy of CHRYSLER GROUP, LLC

1. For BUX models, in the case of active hood deployment. Refer to **STANDARD PROCEDURE** .
2. Using the reference marks, position the lower bracket of the hood hinge (3) to the inside of the front fender ledge (5) on the vehicle.
3. Install and tighten the two screws (4) that secure the hinge to the fender. Tighten the screws to 28 N.m (21 ft. lbs.).
4. Position the hood panel (2) to the upper hinge bracket on the vehicle.
5. Install and tighten the two screws (2) that secure the hinge to the hood. Tighten the screws to 28 N.m (21 ft. lbs.).
6. For BUX models, install the electronic pedestrian protection hood hinge actuator. Refer to **ACTUATOR, ELECTRONIC PEDESTRIAN PROTECTION HOOD HINGE, INSTALLATION** .
7. For BUX models, connect the negative battery cable and wait at least two minutes.
8. If the vehicle is so equipped, reinstall the upper end of the gas support cylinder to the upper hinge bracket. Refer to **PROP, GAS, INSTALLATION**.
9. Remove the fixture being used to support the hood for service and close the hood.
10. Adjust the hood hinge position as necessary to achieve proper spacing and operation.

HOOD

REMOVAL

REMOVAL

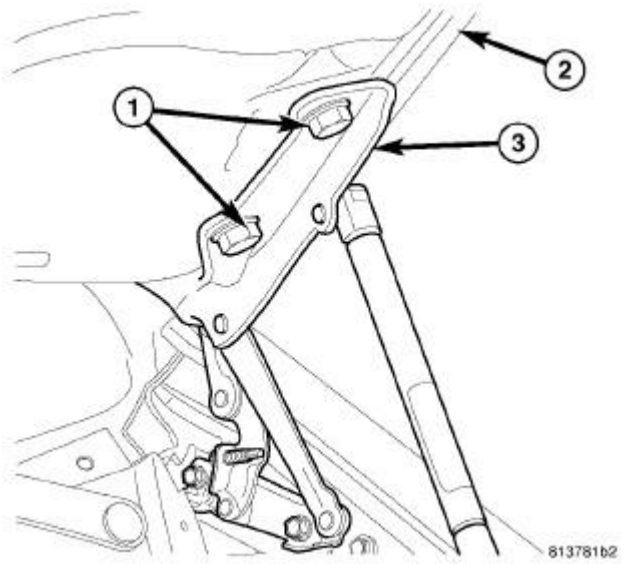


Fig. 232: Upper Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the hood (2).
2. Disconnect the washer supply hose between the body and the two washer nozzles on the underside of the hood.
3. Mark both upper hinge bracket (3) locations on the hood inner panel to aid reinstallation.
4. With the aid of an assistant, support the hood while removing the two screws (1) that secure each upper hinge bracket to the hood.
5. Remove the hood from the vehicle.

INSTALLATION

INSTALLATION

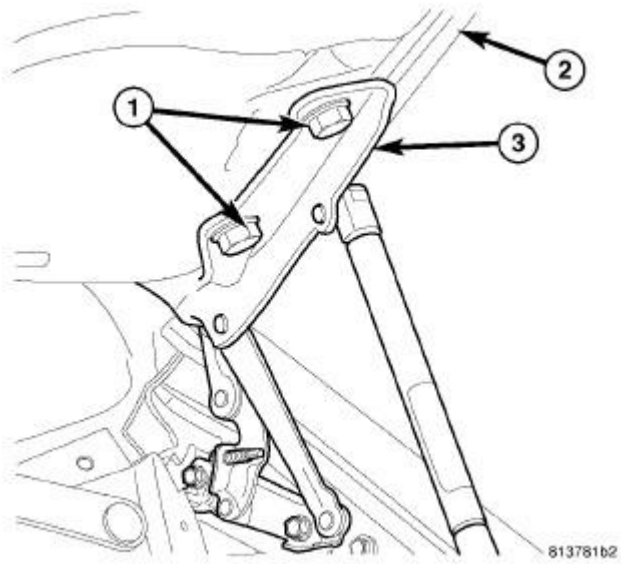


Fig. 233: Upper Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

1. With the aid of an assistant, support and position the hood panel (2) to the two upper hinge brackets (3) on the vehicle.
2. Install and tighten the two screws (1) that secure each upper hinge bracket to the hood. Tighten the screws to 28 N.m (21 ft. lbs.).
3. Reconnect the washer supply hose between the body and the two washer nozzles on the underside of the hood.
4. Close the hood.
5. Adjust the hood hinge positions and the hood adjuster bumpers as necessary to achieve proper spacing and operation.

LATCH, HOOD

REMOVAL

REMOVAL

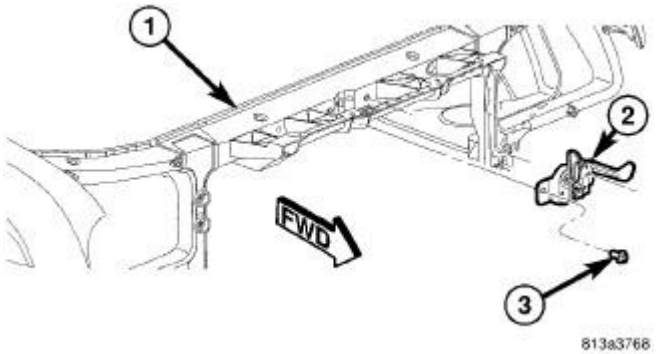


Fig. 234: Removing Hood Latch
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Unsnap the left underhood appearance cover (4) from the headlamp mounting crossmember (1).
3. Disengage the interlocking feature on the inboard end of the left underhood appearance cover from the inboard end of the right cover (2) and remove it from the vehicle.
4. Unsnap the right underhood appearance cover from the headlamp mounting crossmember and remove it from the vehicle.
5. Mark the location of the hood latch (2) on the front of the headlamp mounting crossmember (1) to aid reinstallation.
6. Remove the two screws (3) that secure the latch to the front of the crossmember.

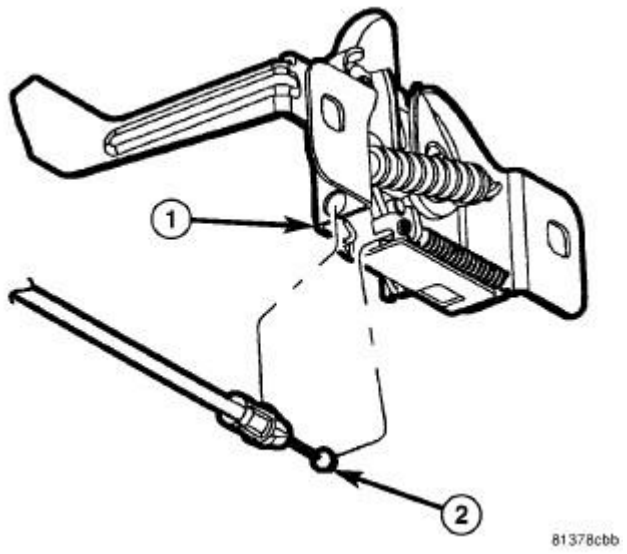


Fig. 235: Hood Latch Release Cable
Courtesy of CHRYSLER GROUP, LLC

7. If equipped with remote start, disconnect the harness connector from the hood latch.
8. Pull the latch (1) away from the front of the crossmember far enough to access and disengage the hood latch release cable housing from the latch and the cable ball end (2) from the latch lever.
9. Remove the hood latch from the vehicle.

INSTALLATION

INSTALLATION

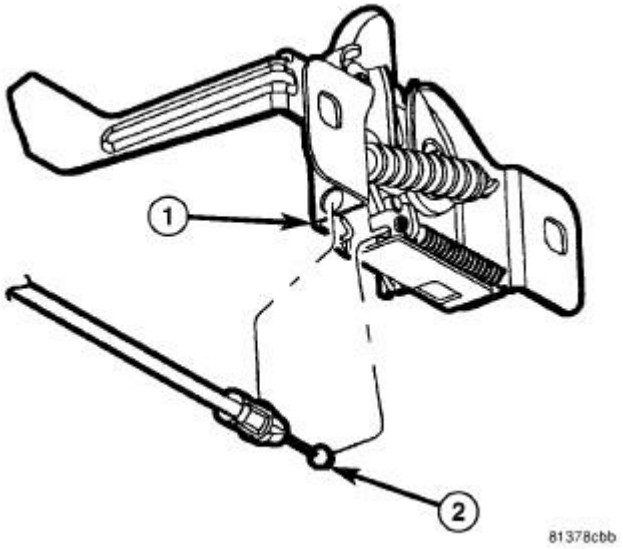


Fig. 236: Hood Latch Release Cable
Courtesy of CHRYSLER GROUP, LLC

1. Position the hood latch (1) close enough to the front of the headlamp mounting crossmember to access and engage the hood latch release cable ball end (2) to the latch lever and the cable housing to the latch.
2. If equipped with remote start, connect the wiring connector to the hood latch.

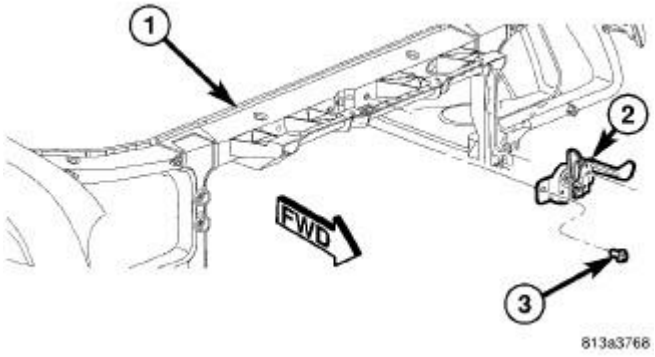


Fig. 237: Removing Hood Latch
Courtesy of CHRYSLER GROUP, LLC

3. Position the latch (2) to the front of the crossmember (1).
4. Install and tighten the two screws (3) that secure the latch to the crossmember. Tighten the screws to 28 N.m (21 ft. lbs.).
5. Adjust the latch position as necessary to achieve proper hood latch operation.

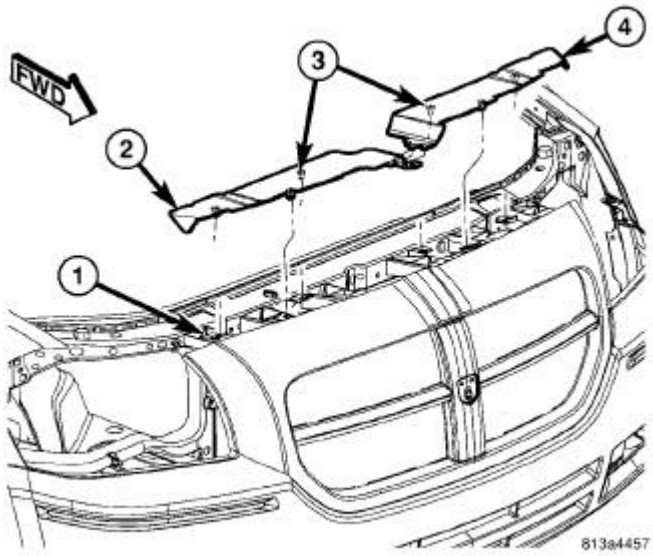


Fig. 238: Upper Radiator Closeout Panel
Courtesy of CHRYSLER GROUP, LLC

6. Position the right underhood appearance cover (2) to the headlamp mounting crossmember (1).
7. Using hand pressure, press the right appearance cover downward until each of the integral clips (3) snaps into the receptacles in the headlamp mounting crossmember.
8. Engage the interlocking feature on the inboard end of the left appearance cover (4) with the inboard end of the right cover and position it to the headlamp mounting crossmember.
9. Using hand pressure, press the left appearance cover downward until each of the integral clips snaps into the receptacles in the headlamp mounting crossmember.
10. Reconnect the battery negative cable.

PROP, GAS

REMOVAL

REMOVAL

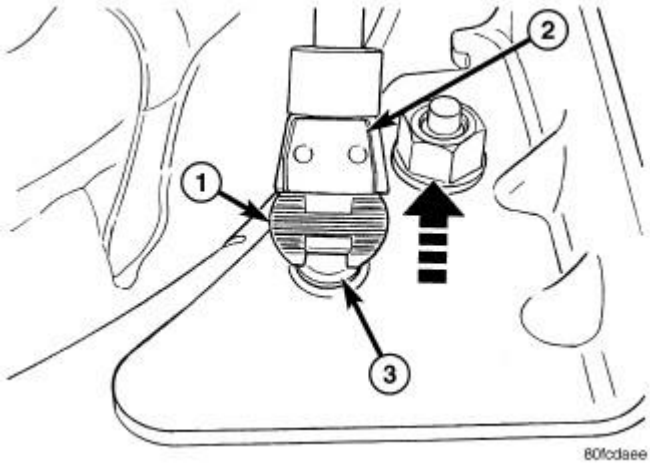


Fig. 239: Lower Notch Of Retainer Of Lower Ball Socket End
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the hood with a suitable prop or block.
2. Insert a small flat-bladed tool into the lower notch of the retainer (1) of the lower ball socket end (2) of the support cylinder on the top of the fender load beam and carefully pry the retaining clip upward to the installation position.

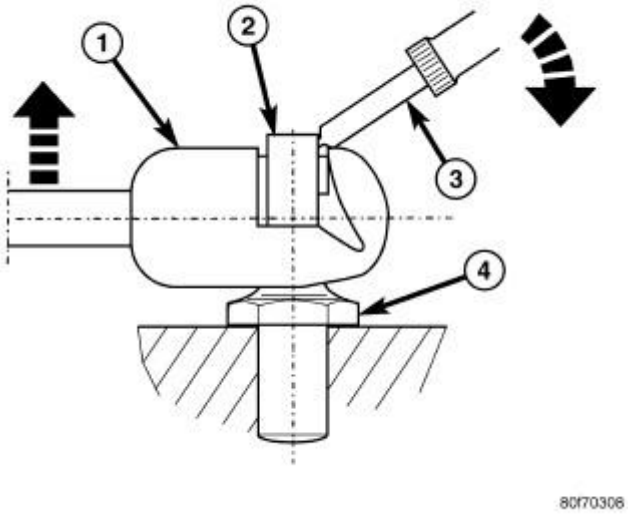


Fig. 240: Prying Retaining Clip Outward
Courtesy of CHRYSLER GROUP, LLC

WARNING: To avoid personal injury or death, during service lift the ball socket end retaining clip only far enough to release the socket from the ball stud. Excessive prying or removal of the clip may result in improper clip spring tension. Improper clip tension may result in the support cylinder separating from the ball stud causing sudden, unexpected

loss of hood support.

3. Insert a small flat-bladed tool (3) into the notch on the outer face of the upper ball socket end (1) of the support cylinder and carefully pry the retaining clip (2) outward while pulling the ball socket away from the ball stud (4) on the upper hood hinge bracket.
4. Release the retaining clip to its installed position.
5. Disengage the lower ball socket from the ball stud.
6. Remove the support cylinder from the vehicle.

INSTALLATION

INSTALLATION

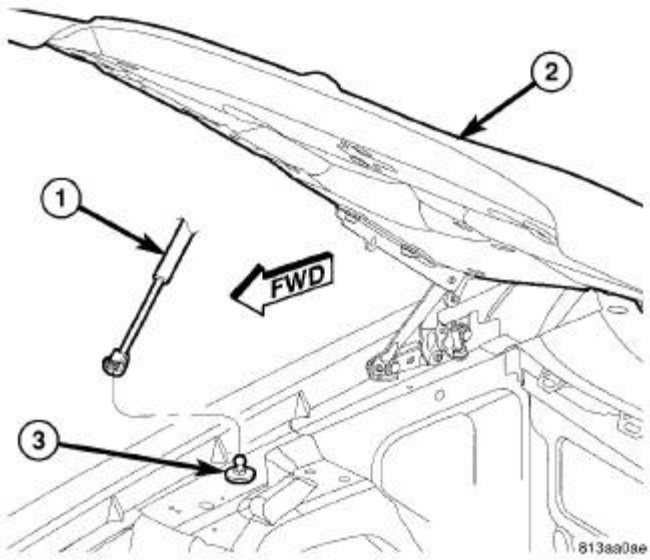


Fig. 241: Ball Stud & Support Cylinder
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain that the ball stud (3) on the top of the fender load beam is in good condition and properly installed. Tighten the ball stud to 28 N.m (21 ft. lbs.).
2. Position the ball socket on the rod end of the support cylinder (1) to the ball stud on the top of the fender load beam.

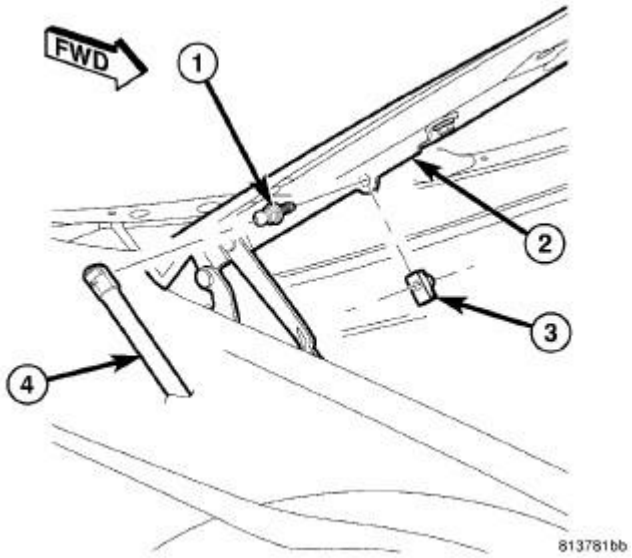


Fig. 242: Ball Stud & U-Nut
Courtesy of CHRYSLER GROUP, LLC

3. Check to be certain that the ball stud (1) secured by a U-nut (3) to the upper bracket (2) of the hood hinge is in good condition and properly installed. Tighten the ball stud to 28 N.m (21 ft. lbs.).
4. Position the ball socket on the cylinder end of the support cylinder (4) to the ball stud on the upper bracket of the hood hinge.
5. Using hand pressure, press the ball socket onto the ball stud until the retainer clip snaps into place.
6. Inspect to be certain that the retaining clip on each of the support cylinder ball socket ends is fully seated.
7. Remove the service prop or block and close the hood.

ROD, HOOD PROP

REMOVAL

REMOVAL

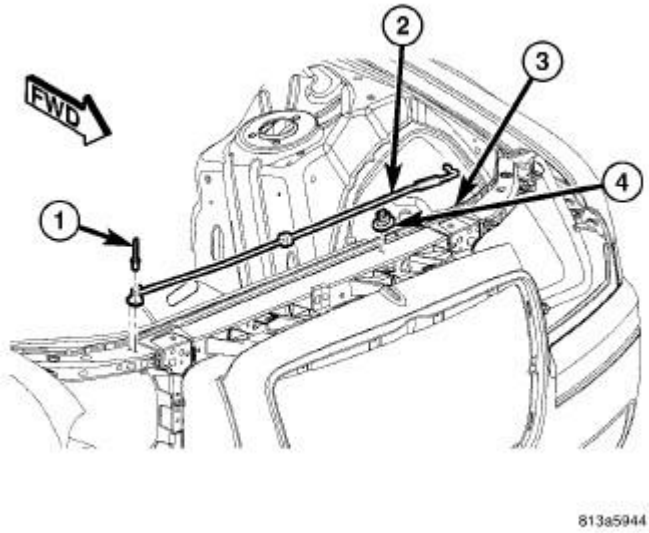


Fig. 243: Prop Rod
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the hood.
2. Remove the blind rivet (1) that secures the hood prop rod (2) pivot bracket to the right side of the headlamp mounting crossmember (3).
3. Disengage the prop rod from the rod clip (4) on the left side of the headlamp mounting crossmember.
4. Remove the hood prop rod from the vehicle.

INSTALLATION

INSTALLATION

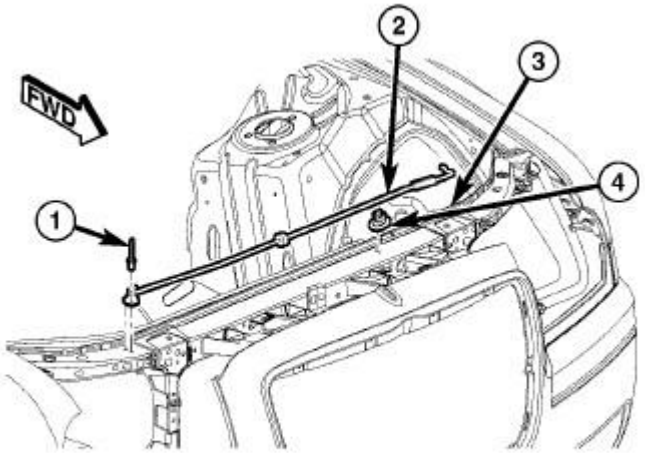


Fig. 244: Prop Rod
Courtesy of CHRYSLER GROUP, LLC

1. Position the hood prop rod (2) pivot bracket to the right side of the headlamp mounting crossmember (3).
2. Secure the pivot bracket to the headlamp mounting crossmember with a new blind rivet (1).
3. Engage the prop rod into the rod clip (4) on the left side of the headlamp mounting crossmember.
4. Close the hood.

STRIKER, HOOD

REMOVAL

REMOVAL

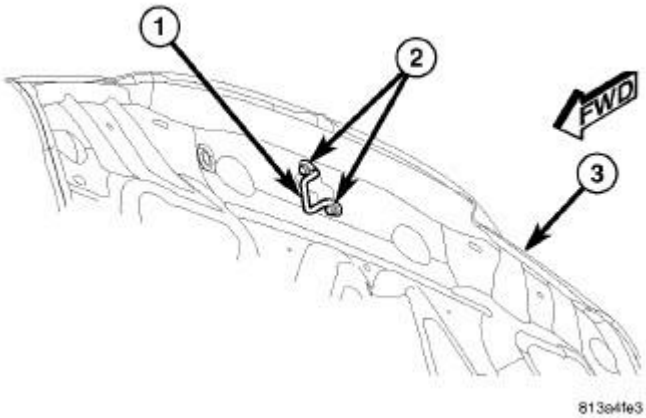


Fig. 245: Removing/Installing Hood Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the hood (3).
2. Remove the two screws (2) that secure the latch striker (1) to the hood inner reinforcement.
3. Remove the striker from the vehicle.

INSTALLATION

INSTALLATION

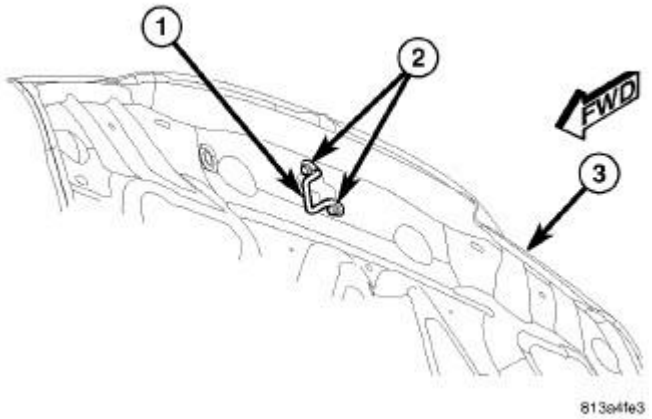


Fig. 246: Removing/Installing Hood Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Position the latch striker (1) to the underside of the hood (3).
2. Install and tighten the two screws (2) that secure the striker to the hood inner reinforcement. Tighten the screws to 28 N.m (21 ft. lbs.).
3. Close the hood.

INSTRUMENT PANEL

BEZEL, INSTRUMENT CLUSTER

DESCRIPTION

DESCRIPTION

The instrument cluster bezel is integrated with the cluster. An instrument cluster hood is present and must be removed to access the fasteners securing the cluster to the instrument panel.

REMOVAL

REMOVAL

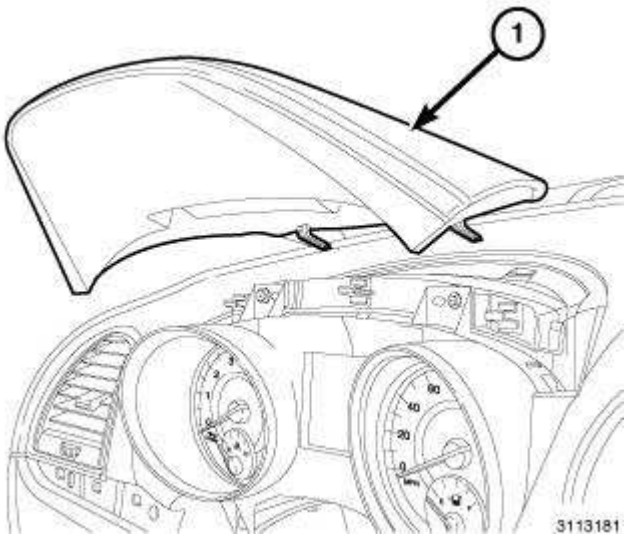


Fig. 247: Instrument Cluster Bezel Hood
Courtesy of CHRYSLER GROUP, LLC

1. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent (1), gently pry between the instrument cluster bezel hood (1) and the instrument panel to release the snap retainers that secure the bezel hood.

INSTALLATION

INSTALLATION

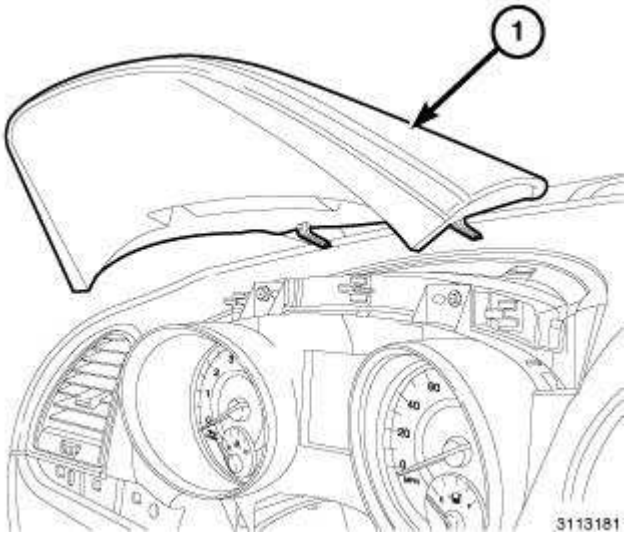


Fig. 248: Instrument Cluster Bezel Hood
Courtesy of CHRYSLER GROUP, LLC

1. Align the instrument cluster bezel hood (1) to the instrument panel and hand tap to engage the snap retainers that secure the bezel hood.

BEZEL, INSTRUMENT PANEL, CENTER

REMOVAL

REMOVAL

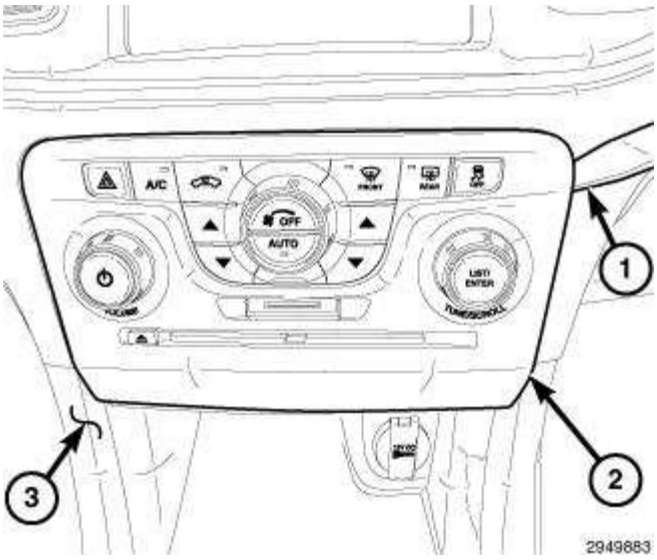


Fig. 249: Switch Bank
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions.
2. Disconnect the negative battery cable.
3. Remove the AC/heater control faceplate (2) from the I/P. Refer to **POD, SWITCH BANK, REMOVAL** .

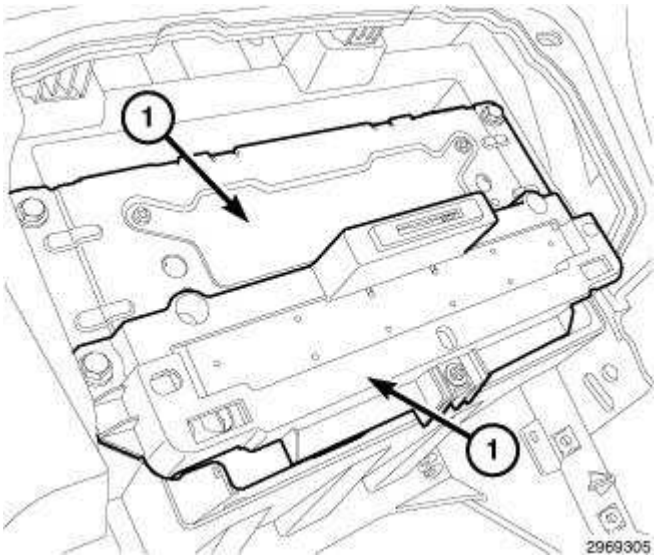


Fig. 250: Telematics Gateway Assembly
Courtesy of CHRYSLER GROUP, LLC

4. Remove and disconnect the telematics gateway assembly (1). Refer to **MODULE, TELEMATICS GATEWAY, REMOVAL** .

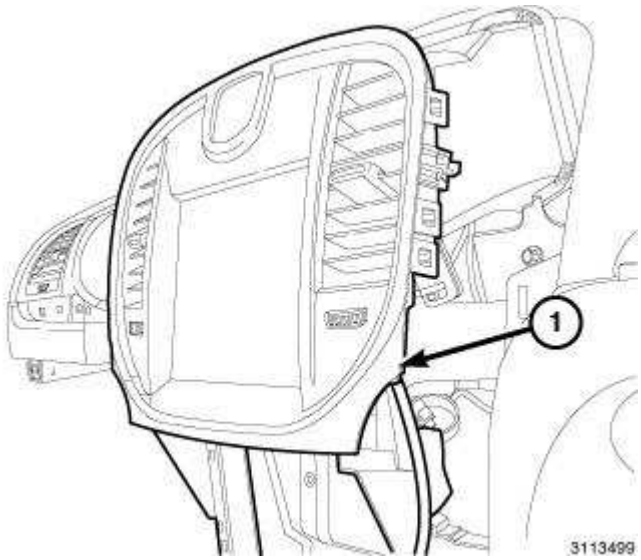


Fig. 251: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Using (special tool #C-4755, Trim Stick) or equivalent, remove the center bezel (1) from the instrument panel by releasing the snap retainers from the instrument panel.

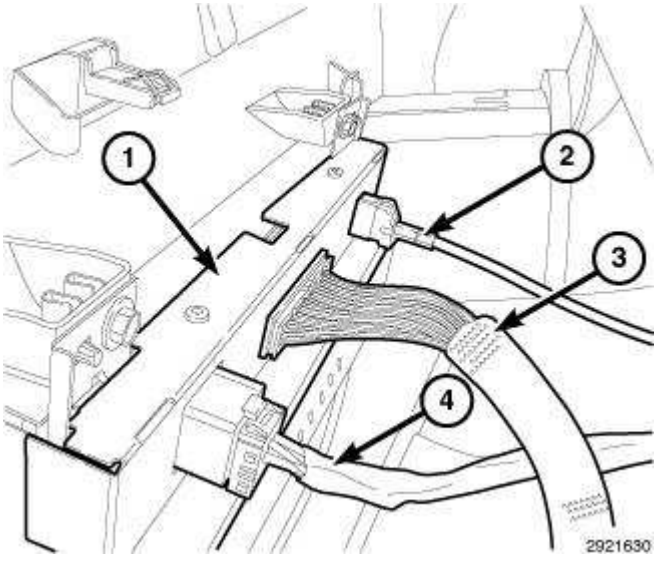


Fig. 252: Harness Connectors & Display Screen
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the harness connectors (2, 3 & 4) from the rear of the display screen (1).
7. Disconnect the clock harness and remove the center trim bezel.

INSTALLATION

INSTALLATION

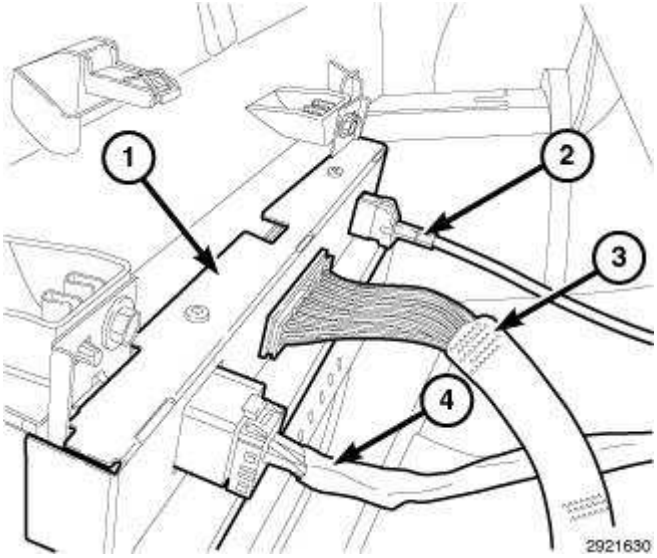


Fig. 253: Harness Connectors & Display Screen
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions
2. Position the center bezel near the instrument panel.
3. Connect the harness connectors (2, 3 & 4) from the rear of the display screen (1).
4. Connect the clock harness and align the center trim bezel to the instrument panel.

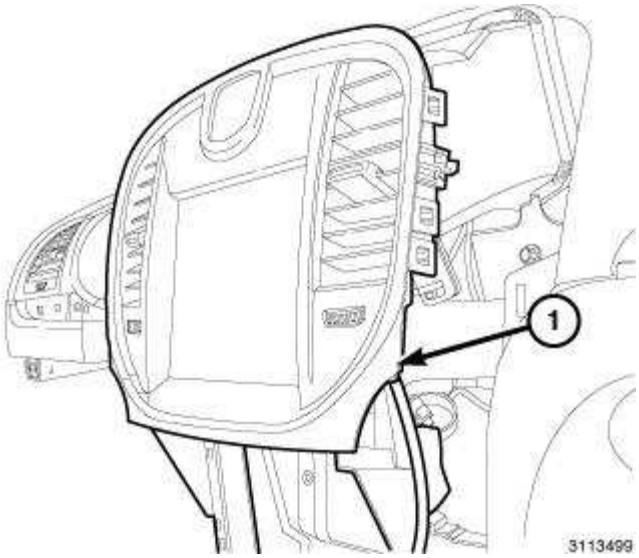


Fig. 254: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Install the center bezel (1) onto the instrument panel (2) and carefully push on the outside edges of the center bezel to fully seat the snap clip retainers into the instrument panel.

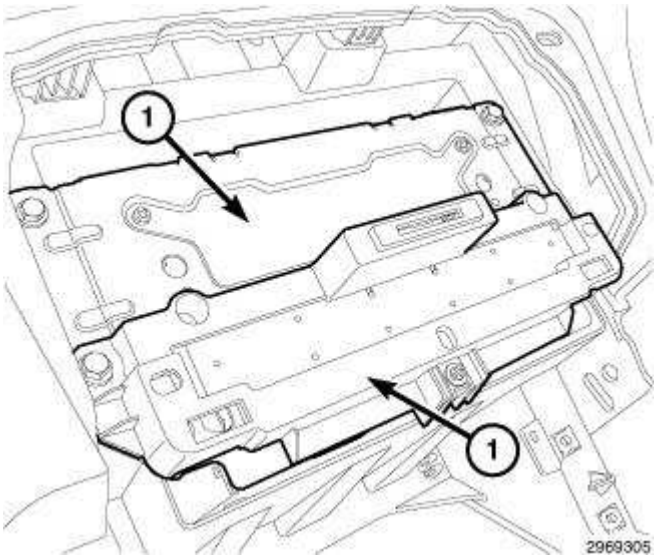


Fig. 255: Telematics Gateway Assembly
Courtesy of CHRYSLER GROUP, LLC

6. Connect and install the telematics gateway assembly (1). Refer to **MODULE, TELEMATICS GATEWAY, INSTALLATION** .

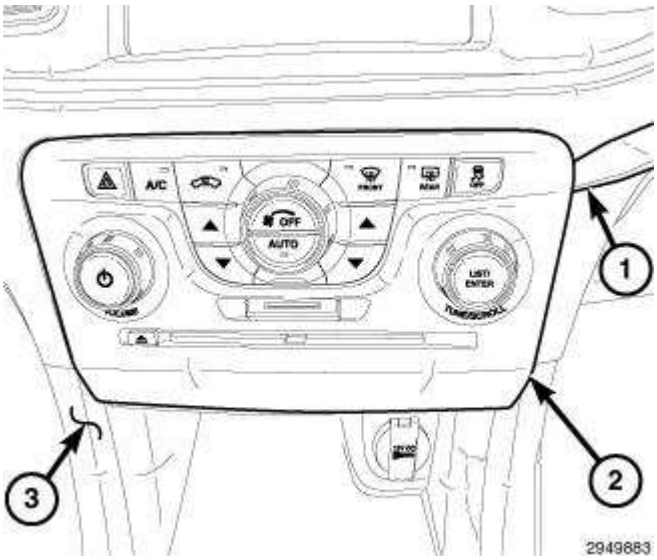


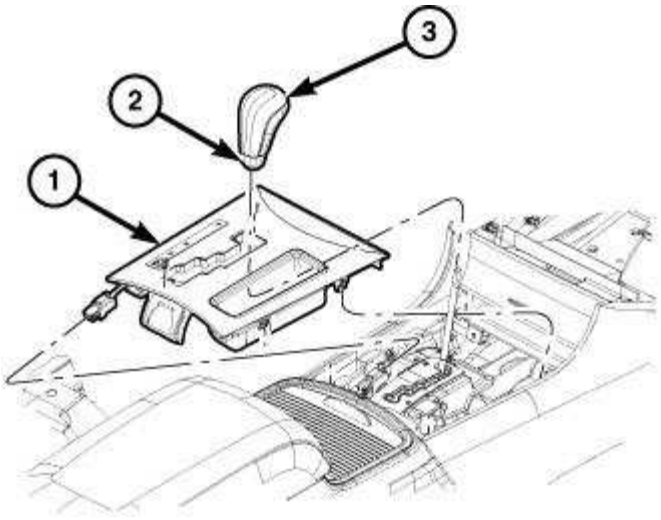
Fig. 256: Switch Bank
Courtesy of CHRYSLER GROUP, LLC

7. Connect and install the AC/heater control faceplate (2) to the I/P. Refer to **POD, SWITCH BANK, INSTALLATION** .
8. Connect the negative battery cable.

BIN, INSTRUMENT PANEL

REMOVAL

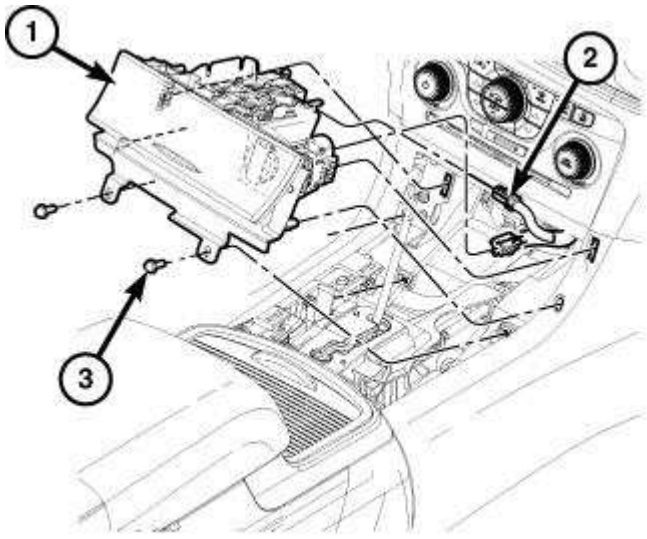
REMOVAL



2964689

Fig. 257: Shifter Knob, Retaining Ring & Shifter Bezel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Using a thin wire type tool, locate and press the release while pulling up on the shifter knob (3).
3. Remove the shifter knob (3) and retaining ring (2).
4. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, gently pry between the shifter bezel (1) and the floor console to release the snap retainers that secure the bezel.**Do not pull with excessive force or fully remove at this time.**
5. Disconnect the shifter bezel wiring harness and remove the shifter bezel (1).



3305304

Fig. 258: Two Screws, Storage Bin & LED/Lamp Wiring Harness

Courtesy of CHRYSLER GROUP, LLC

6. Remove the two screws (3) securing the storage bin (1) to the front console.
7. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, gently pry between the storage bin (1) and the floor console side close out panel to release the two snap retainers that secure the storage bin (1) to the front console and close out panel.
8. Disconnect the 12V power outlet wiring harness from the rear of the storage bin (1).
9. Disconnect the LED/Lamp wiring harness (2) from the rear of the storage bin (1) and remove the storage bin from the I/P.

INSTALLATION

INSTALLATION

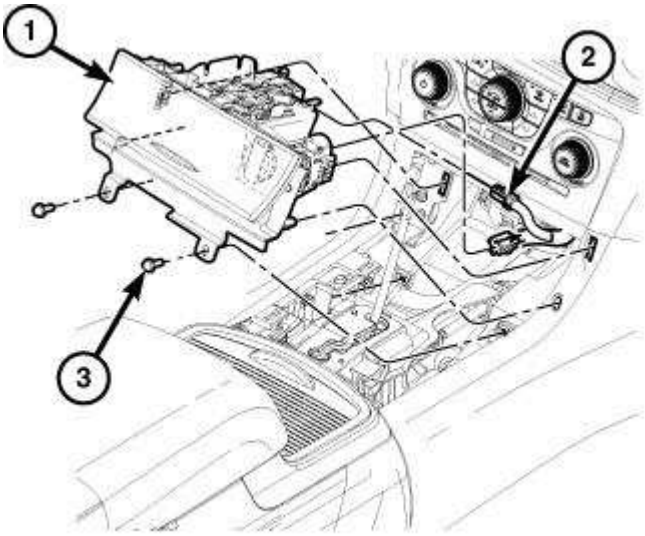


Fig. 259: Two Screws, Storage Bin & LED/Lamp Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

1. Connect the LED/Lamp wiring harness (2) to the rear of the storage bin (1).
2. Connect the 12V power outlet wiring harness to the rear of the storage bin (1).
3. Align the storage bin (1) to the front floor console and the side close out panel to engage the two snap retainers and alignment pins that secure the storage bin (1) to the floor console.
4. Install the two screws (3) securing the storage bin (1) to the front console. Tighten the screws to 2 N.m (18 in. lbs.).

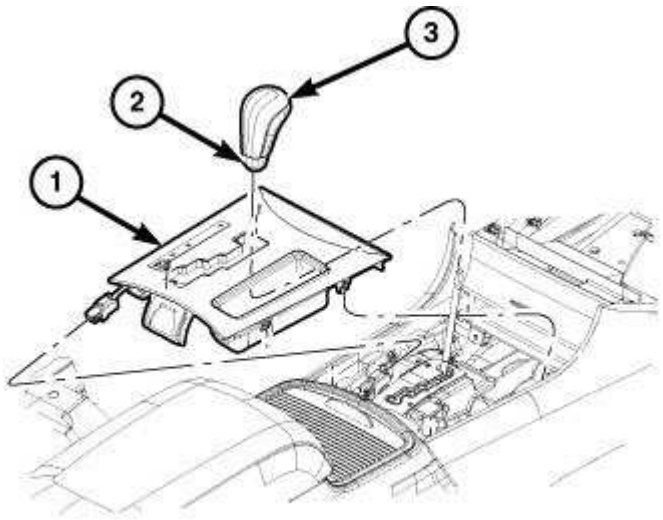


Fig. 260: Shifter Knob, Retaining Ring & Shifter Bezel
Courtesy of CHRYSLER GROUP, LLC

5. Connect the shifter bezel wiring harness and position the console shifter bezel (1) over the gear selector lever.
6. Position the tabs on the underside of the console shifter bezel (1) into the holes in the floor console. Use hand pressure to engage the retaining tabs.
7. Install and tighten the two screws (1) that secure the front of the console shifter bezel to the console. Tighten the screws to 3 N.m (23 in. lbs.).
8. Position the mat (5) into the console rear bin with the curved edge oriented forward in the vehicle.
9. Slide the retaining ring over the shifter shaft (2) and slide the shifter knob (3) onto the shaft and push down into place until fully locked.
10. Reconnect the negative battery cable.

COVER, INSTRUMENT PANEL

REMOVAL

REMOVAL

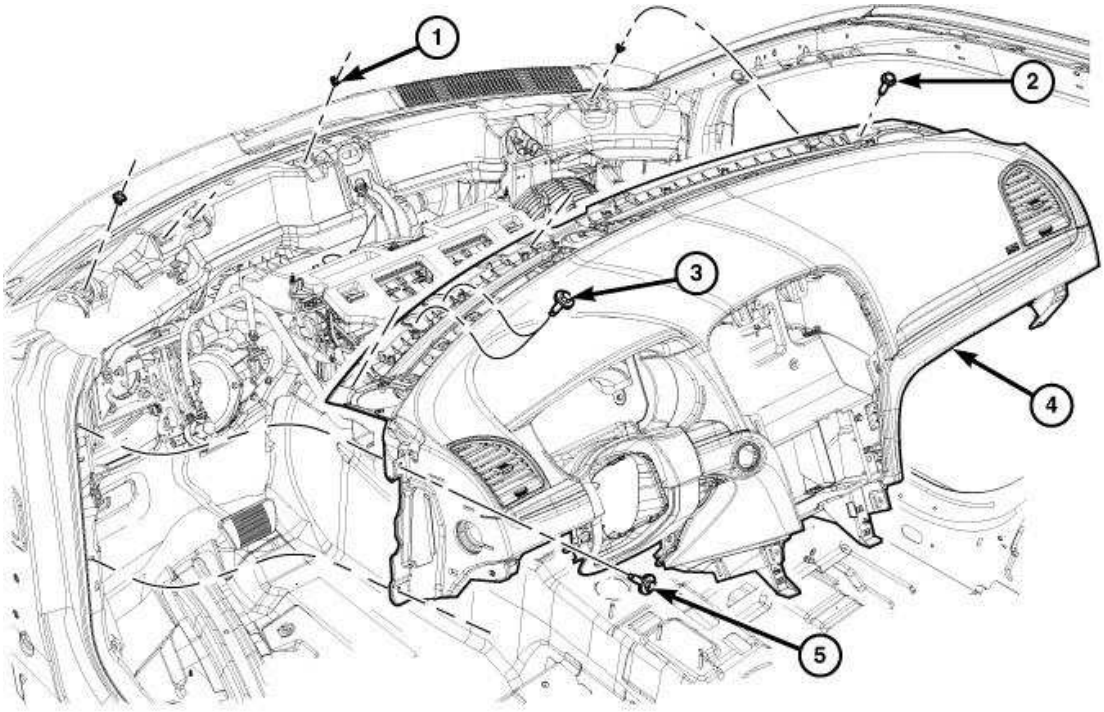


Fig. 261: Instrument Panel
Courtesy of CHRYSLER GROUP, LLC

1. With the help of an assistant, remove the instrument panel and place on bench. Refer to **PANEL, INSTRUMENT, REMOVAL**.

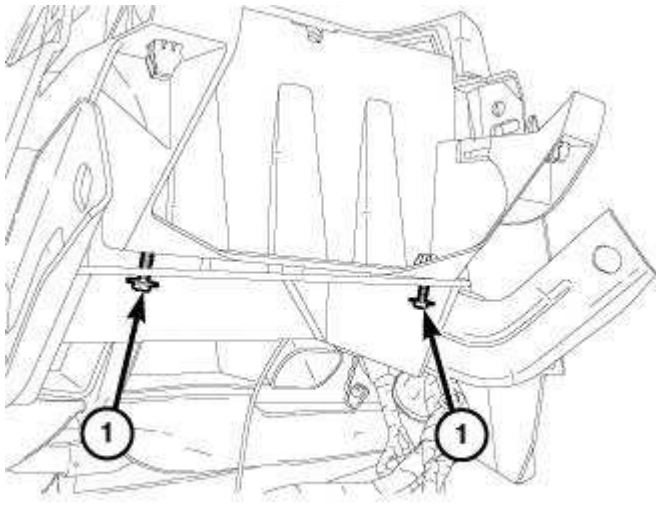


Fig. 262: Two Screws
Courtesy of CHRYSLER GROUP, LLC

2. With the help of an assistant, turn the I/P upright.

3. Remove the two screws (1) that secure the telematics gateway assembly reinforcement to the I/P cover.

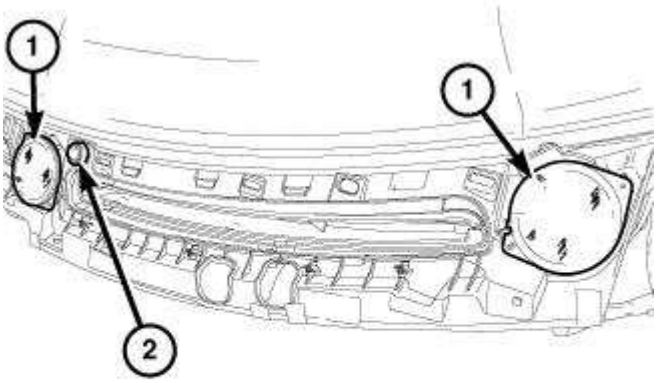


Fig. 263: Speakers & Sun Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the passenger side airbag. Refer to **AIR BAG, PASSENGER, REMOVAL** .
5. Remove the defroster duct. Refer to **DUCT, DEFROSTER, REMOVAL** .
6. Remove the speakers (1) from the I/P. Refer to **SPEAKER, REMOVAL** .
7. Remove the sun sensor (2) from the I/P. Refer to **SENSOR, SUN, REMOVAL** .

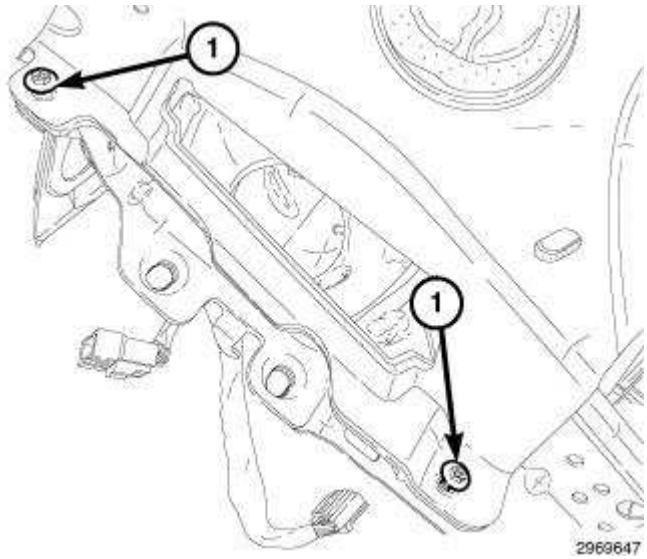


Fig. 264: Screws
Courtesy of CHRYSLER GROUP, LLC

8. Remove the two I/P cover to structure side screws (1). Repeat for the opposite side.

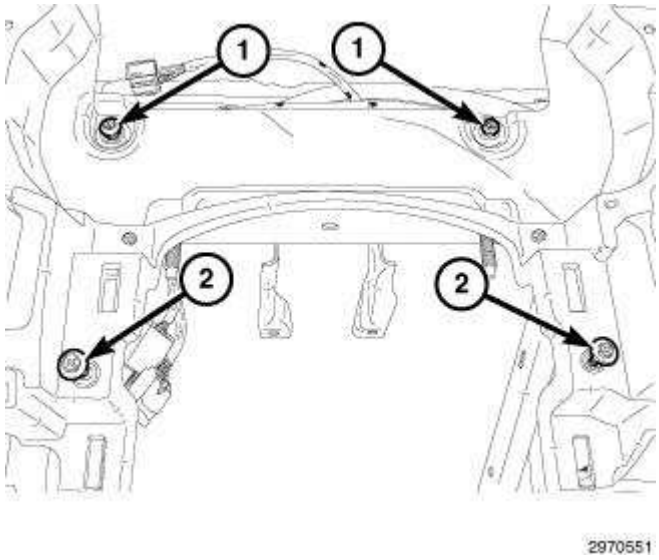


Fig. 265: Screws
Courtesy of CHRYSLER GROUP, LLC

9. Remove the screws (1) that attach the I/P cover to structure in the instrument cluster area.
10. Remove the screws (2) that attach the I/P cover to structure in the steering column area.

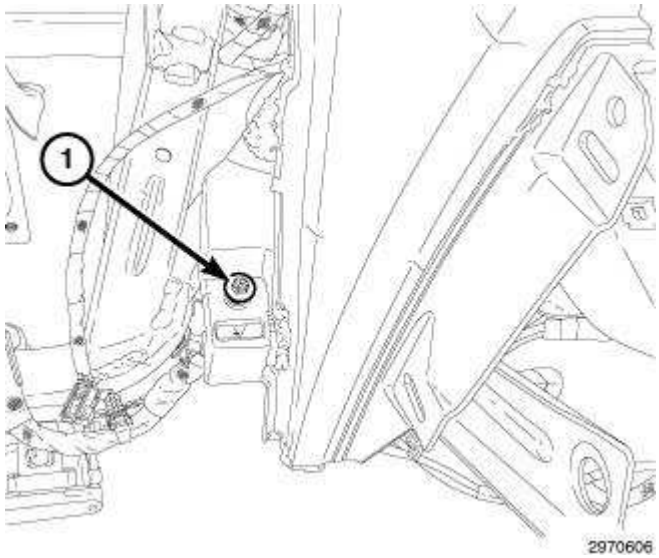


Fig. 266: Screw
Courtesy of CHRYSLER GROUP, LLC

11. Remove the screw (1) that attaches the I/P cover to the structure in the lower center stack area, on the driver side.

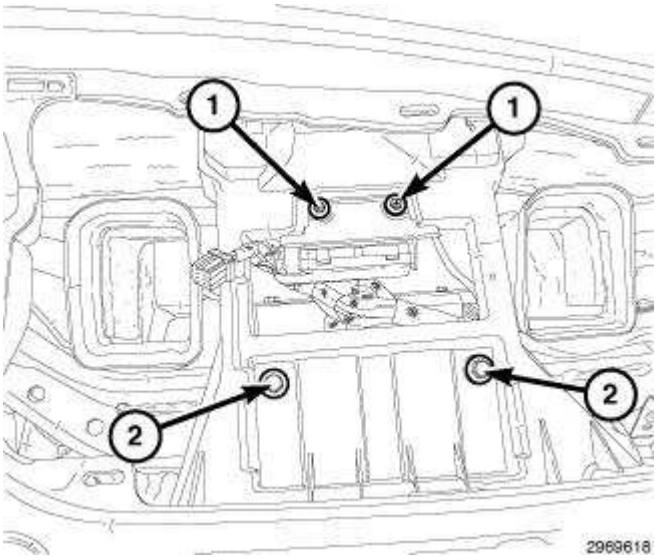


Fig. 267: Two Screws & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the two screws (1) from the module.
13. Remove the two I/P to structure bolts (2).

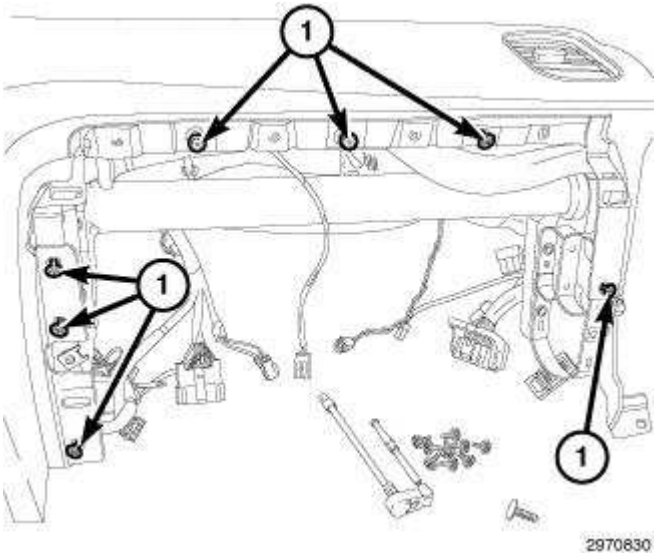


Fig. 268: Seven Screws
Courtesy of CHRYSLER GROUP, LLC

14. Remove the seven screws (1) attaching the I/P cover to the structure in the glove box area.

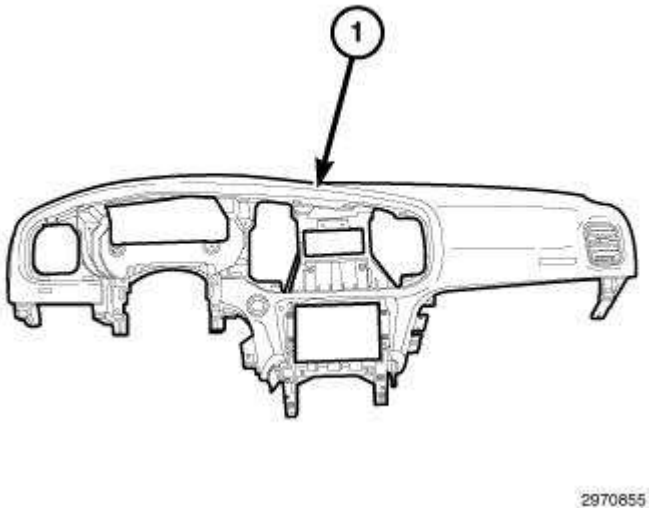


Fig. 269: Cover
Courtesy of CHRYSLER GROUP, LLC

15. Disconnect and remove the WIN module.
16. Remove the I/P cover (1) from the structure.

INSTALLATION

INSTALLATION

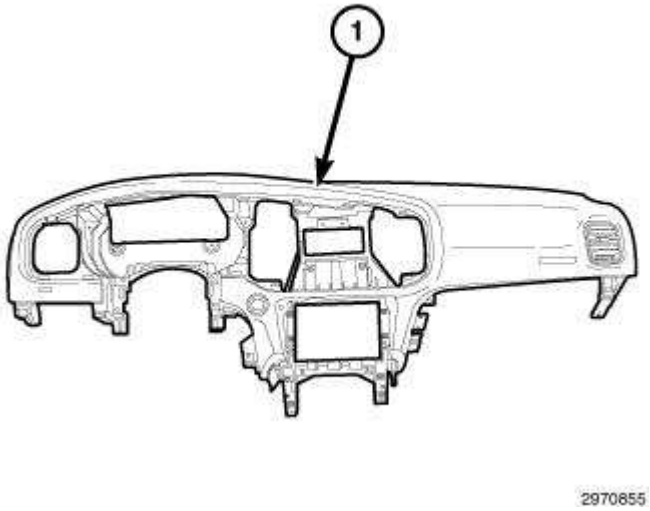


Fig. 270: Cover
Courtesy of CHRYSLER GROUP, LLC

1. With the help of an assistant, position the I/P cover (1) to the structure.
2. Connect and install the WIN module.

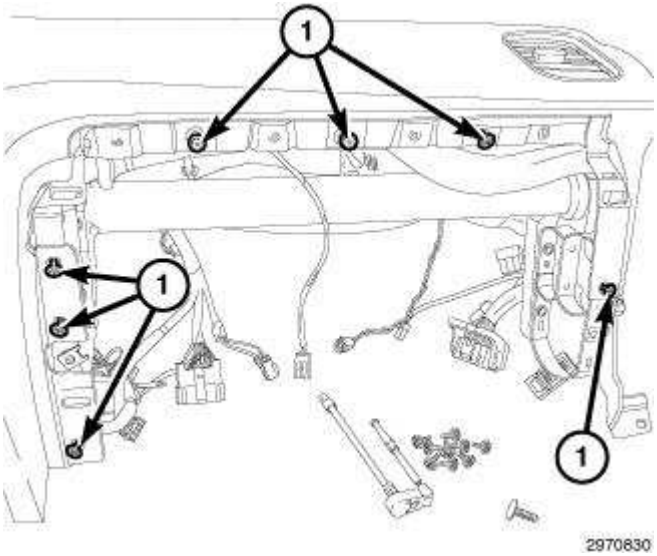


Fig. 271: Seven Screws
Courtesy of CHRYSLER GROUP, LLC

3. Install the seven screws (1) attaching the I/P cover to the structure in the glove box area. Tighten the screws securely.

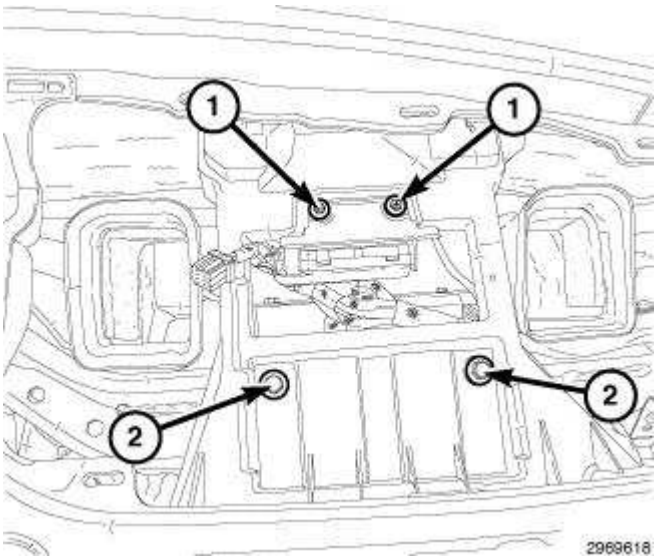


Fig. 272: Two Screws & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Position the module and install the two screws (1) to the module. Tighten the screws securely.
5. Install the two I/P to structure bolts (2). Tighten the bolts securely.

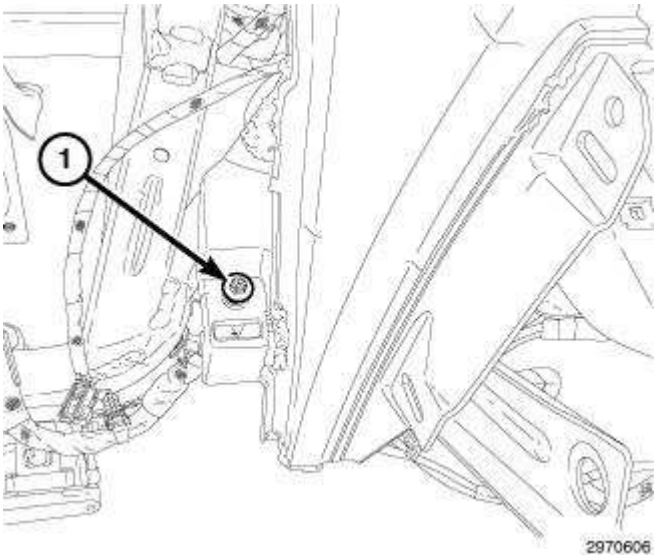


Fig. 273: Screw
Courtesy of CHRYSLER GROUP, LLC

6. Install the screw (1) that attaches the I/P cover to the structure in the lower center stack area, on the driver side. Tighten the screw securely.

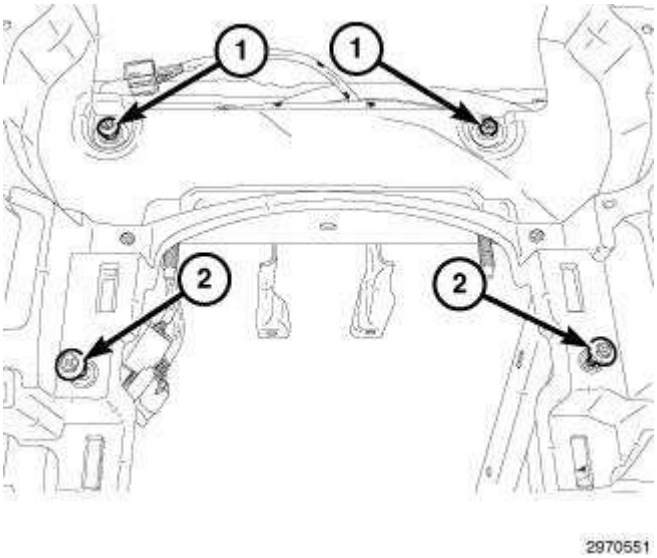


Fig. 274: Screws
Courtesy of CHRYSLER GROUP, LLC

7. Install the screws (1) that attach the I/P cover to structure in the instrument cluster area. Tighten the screws securely.
8. Remove the screws (2) that attach the I/P cover to structure in the steering column area. Tighten the screws securely.

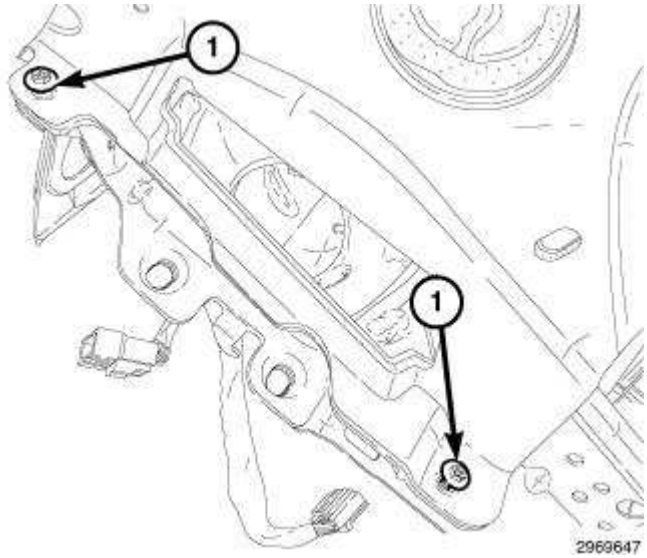


Fig. 275: Screws
Courtesy of CHRYSLER GROUP, LLC

9. Install the two I/P cover to structure side screws (1). Repeat for the opposite side. Tighten the screws securely.

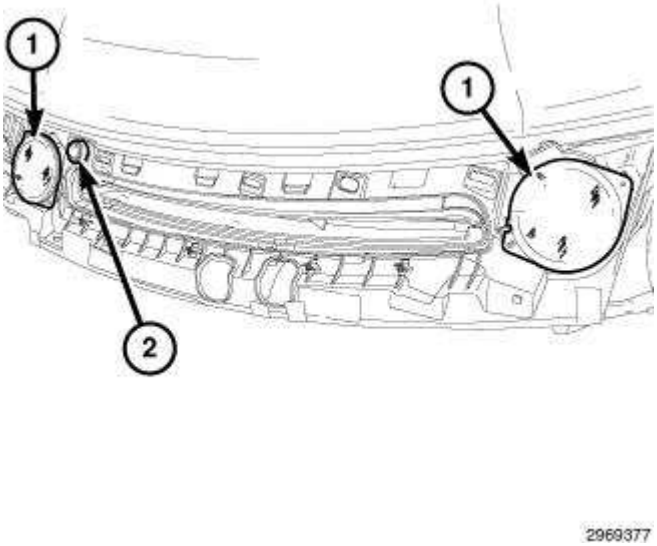


Fig. 276: Speakers & Sun Sensor
Courtesy of CHRYSLER GROUP, LLC

10. Install the sun sensor (2) to the I/P. Refer to **SENSOR, SUN, INSTALLATION** .
11. Install the speakers (1) to the I/P. Refer to **SPEAKER, INSTALLATION** .
12. Install the defroster duct. Refer to **DUCT, DEFROSTER, INSTALLATION** .
13. Install the passenger side airbag. Refer to **AIR BAG, PASSENGER, INSTALLATION** .

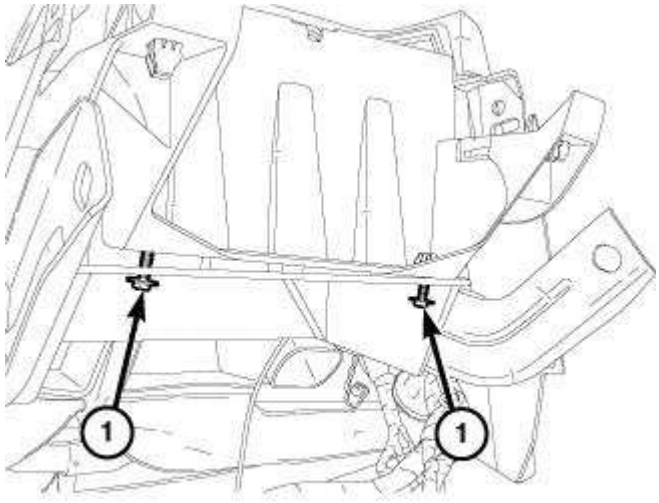


Fig. 277: Two Screws
Courtesy of CHRYSLER GROUP, LLC

14. With the help of an assistant, turn the I/P upright.
15. Install the two screws (1) that secure the telematics gateway reinforcement to the I/P cover. Tighten the screws securely.

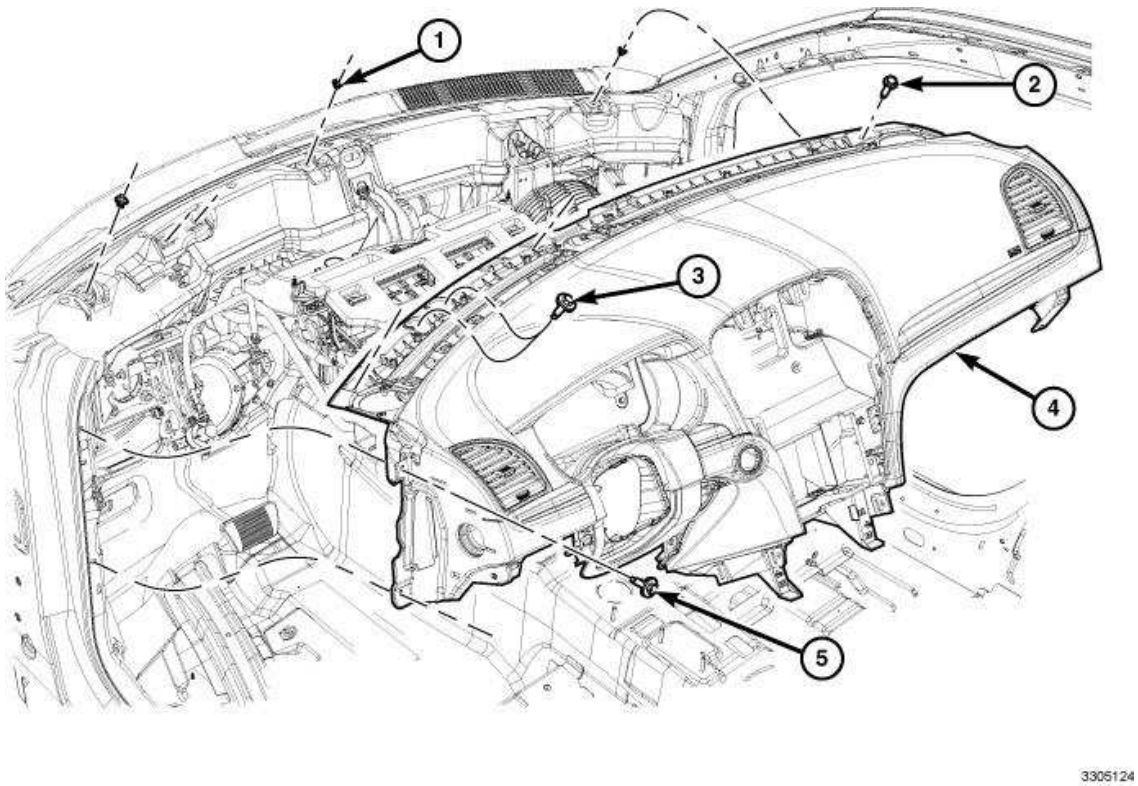


Fig. 278: Instrument Panel
Courtesy of CHRYSLER GROUP, LLC

16. With the help of an assistant, install the instrument panel into the vehicle. Refer to **PANEL, INSTRUMENT, INSTALLATION**.

COVER, STEERING COLUMN OPENING

REMOVAL

REMOVAL

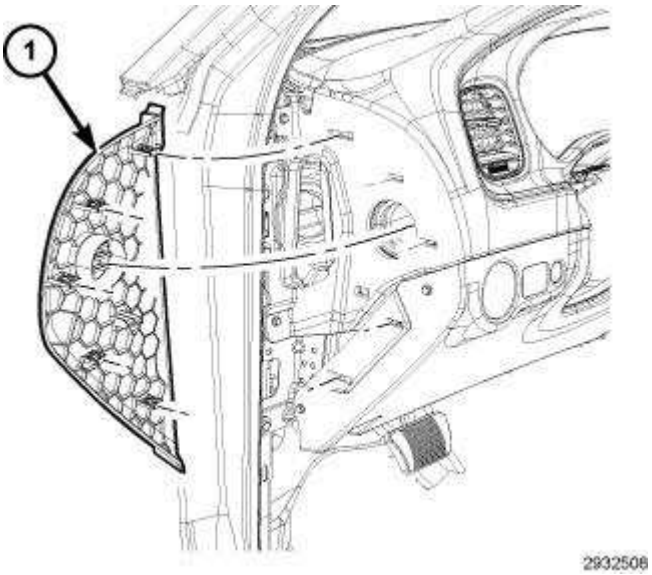


Fig. 279: End Cap
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate negative battery cable.
2. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent (1), gently pry between the end cap (1) and the instrument panel to release the snap retainers that secure the end cap. Repeat on opposite side.

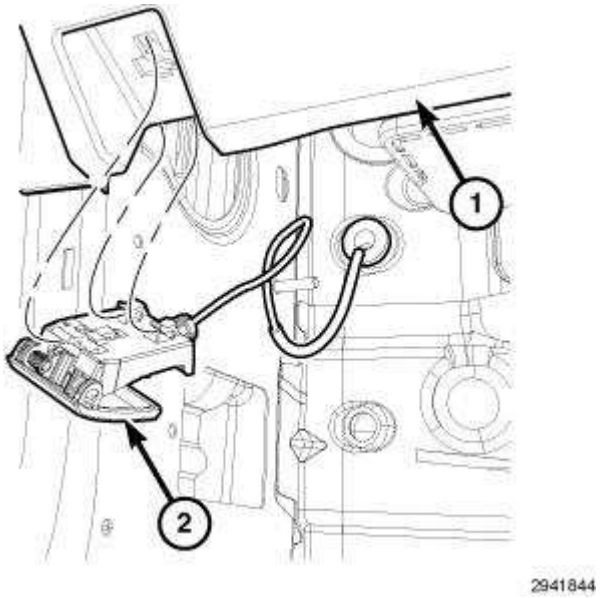


Fig. 280: Hood Release Handle
Courtesy of CHRYSLER GROUP, LLC

3. Remove the hood release handle (2) from the knee blocker trim (1) by pushing down to disengage and then pulling rearward on the handle.

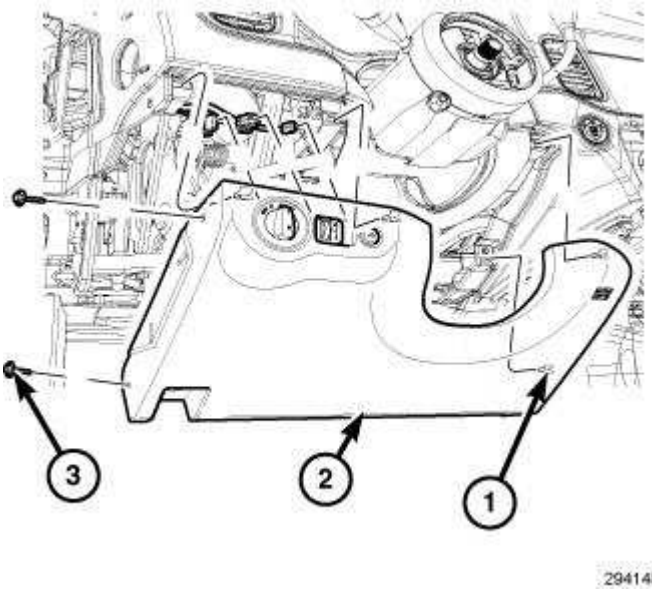


Fig. 281: Two Side Screws, Lower Screw & Knee Blocker Trim
Courtesy of CHRYSLER GROUP, LLC

NOTE: Steering wheel removed for clarity.

4. Remove the two side screws (3) and the lower screw (1) securing the knee blocker trim (2) to the instrument panel.
5. Using (special tool #C-4755, Trim Stick) or equivalent (1), partially remove the upper portion of

the knee blocker trim (2) by gently prying between the knee blocker trim (2) and the instrument panel to release the upper snap retainers.**Do not remove the knee blocker trim or pull with excessive force.**

6. Disconnect the in-car temperature sensor.

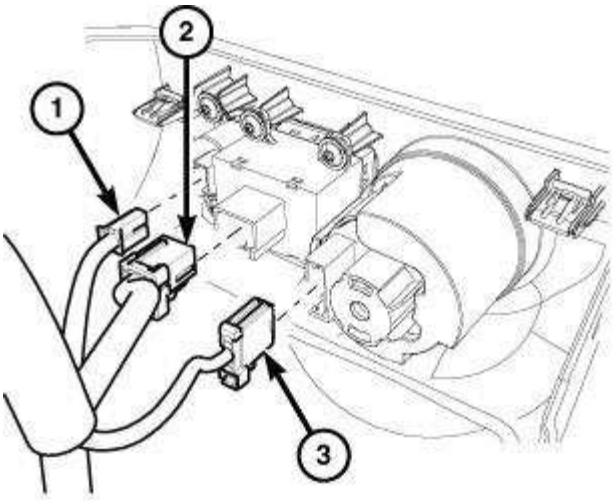


Fig. 282: Light Switch Harnesses
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the light switch harnesses (1, 2 & 3) from the switch and finish removing the knee blocker trim.

INSTALLATION

INSTALLATION

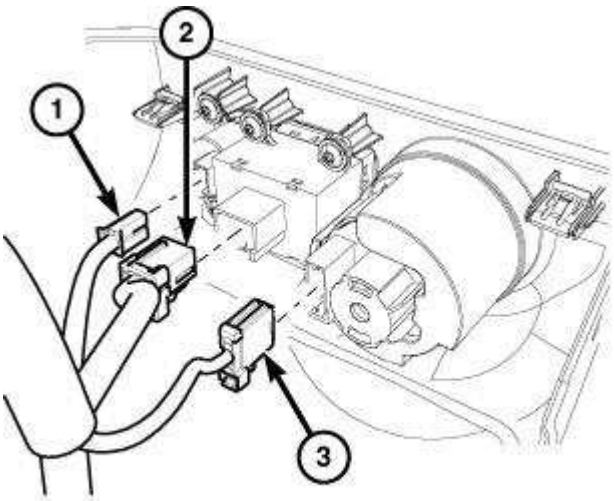


Fig. 283: Light Switch Harnesses

Courtesy of CHRYSLER GROUP, LLC

1. Connect the light switch harnesses (1, 2 & 3) to the switch located on the knee blocker trim.

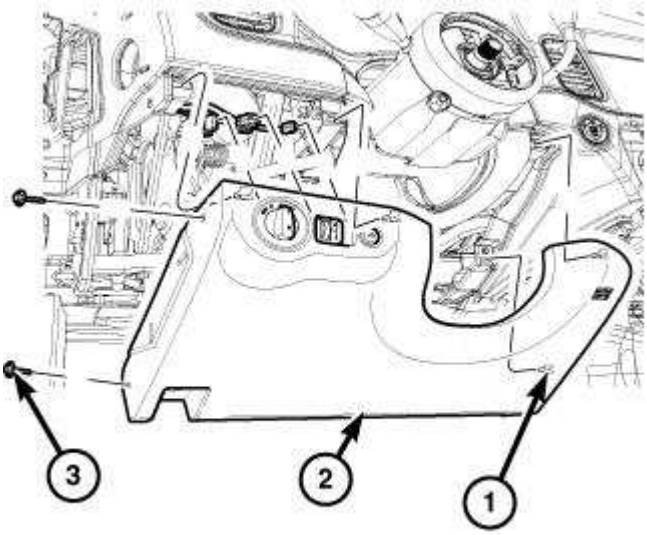


Fig. 284: Two Side Screws, Lower Screw & Knee Blocker Trim
Courtesy of CHRYSLER GROUP, LLC

NOTE: Steering wheel removed for clarity.

2. Connect the in-car temperature sensor.
3. Install the upper portion of the knee blocker trim (2) by pushing on the knee blocker trim (2) to engage the upper snap retainers.
4. Install the two side screws (3) and the lower screw (1) securing the knee blocker trim (2) to the instrument panel. Tighten the screws to 30 in-lbs.

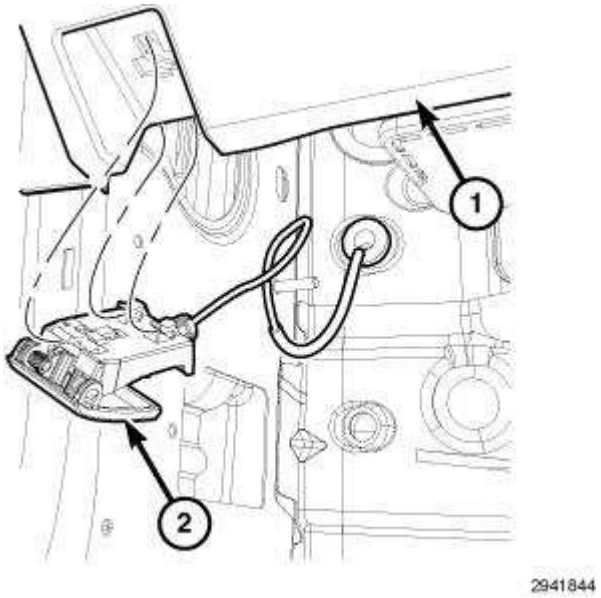


Fig. 285: Hood Release Handle
Courtesy of CHRYSLER GROUP, LLC

5. Install the hood release handle (2) to the knee blocker trim by aligning and pushing up.

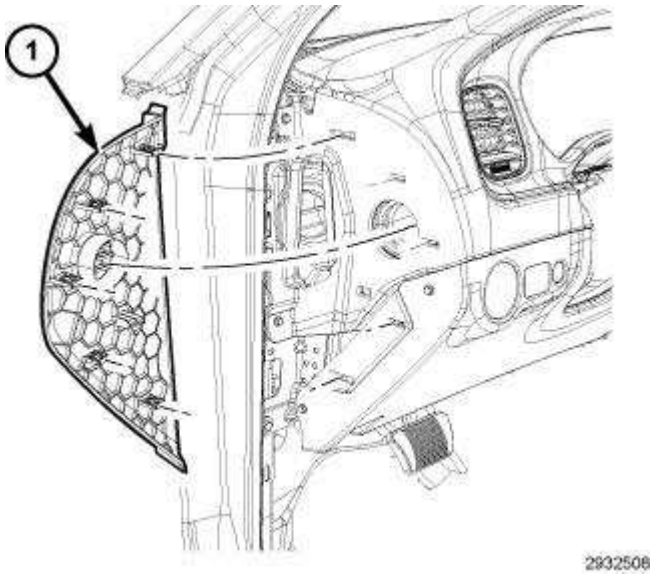


Fig. 286: End Cap
Courtesy of CHRYSLER GROUP, LLC

6. Install the end cap (1) to the instrument panel and engage the snap retainers that secure the end cap. Repeat on opposite side.
7. Connect the negative battery cable.

NOTE: For vehicles equipped with the optional Automatic Express Up power window feature, recalibration of this feature is required whenever power to the door

module is disrupted.

CYLINDER, GLOVE BOX LOCK

DESCRIPTION

DESCRIPTION

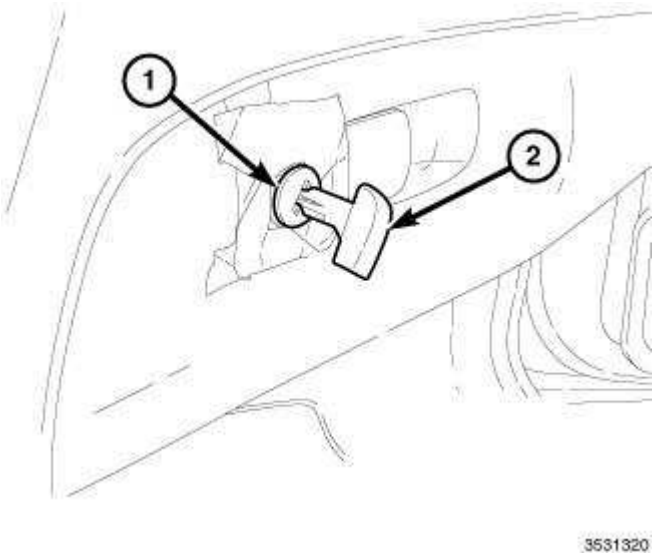


Fig. 287: Glove Box Lock Cylinder
Courtesy of CHRYSLER GROUP, LLC

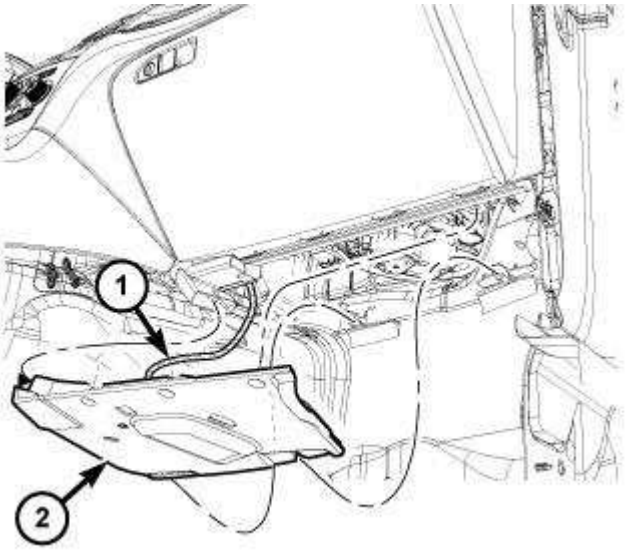
The glove box lock cylinder (1) is not serviceable part. If the glove box module or door are replaced, the lock cylinder will need to be transferred. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** & **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION**.

GLOVE BOX, INSTRUMENT PANEL

REMOVAL

REMOVAL

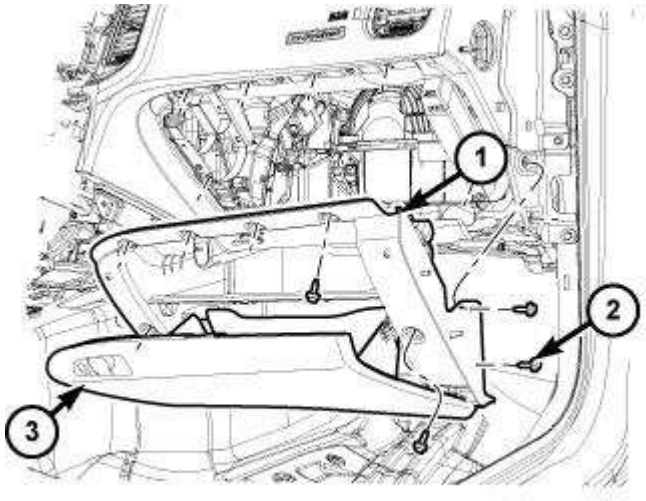
GLOVE BOX MODULE



2932866

Fig. 288: Right Side Instrument Panel Silencer & LED Harness
Courtesy of CHRYSLER GROUP, LLC

1. Remove the right side instrument panel end cap.
2. Remove the right side instrument panel silencer (2) and disconnect the LED harness (1). Refer to **PANEL, SILENCER, REMOVAL**.



2933122

Fig. 289: Ground Eyelet, Two Side Screws & Glove Box Compartment
Courtesy of CHRYSLER GROUP, LLC

3. Open the glove box door (3).
4. Remove the two side screws (2) from the glove box compartment (1).
5. Remove the six screws from the glove box compartment (1).
6. Disconnect the wiring harness and remove the glove box compartment (1).

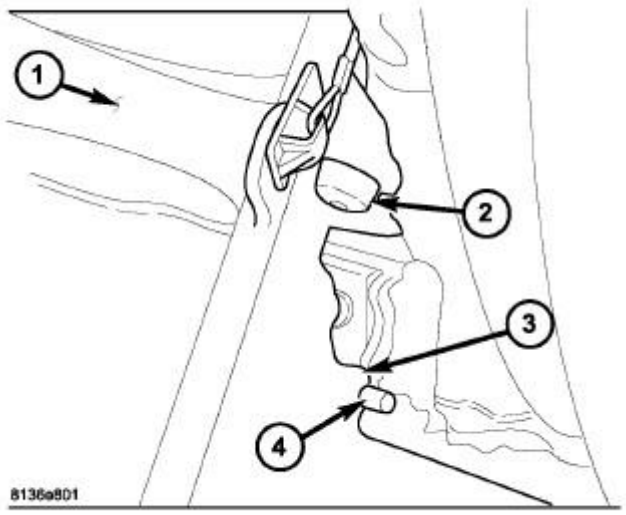


Fig. 290: Removing/Installing Glove Box Bin
Courtesy of CHRYSLER GROUP, LLC

1. Open the glove box bin (1).
2. Push in on both sides of glove box bin to disengage the glove box stops (2) and lower the bin.
3. Pivot the glove box bin downward and disengage the glove box hinge hooks (3) from the instrument panel hinge brackets (4) located at each end of the bin.

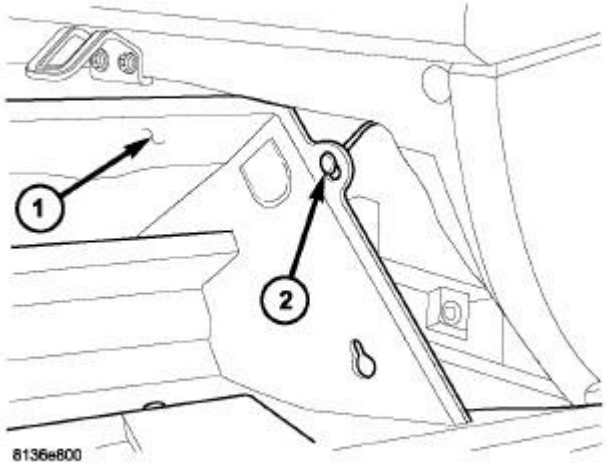


Fig. 291: Glove Box Bin Support Strap
Courtesy of CHRYSLER GROUP, LLC

4. Turn the glove box bin (1) sideways and remove the support strap and retainer assembly (2) from the outboard end of the bin.
5. Remove the glove box bin from the vehicle.

LOCK CYLINDER

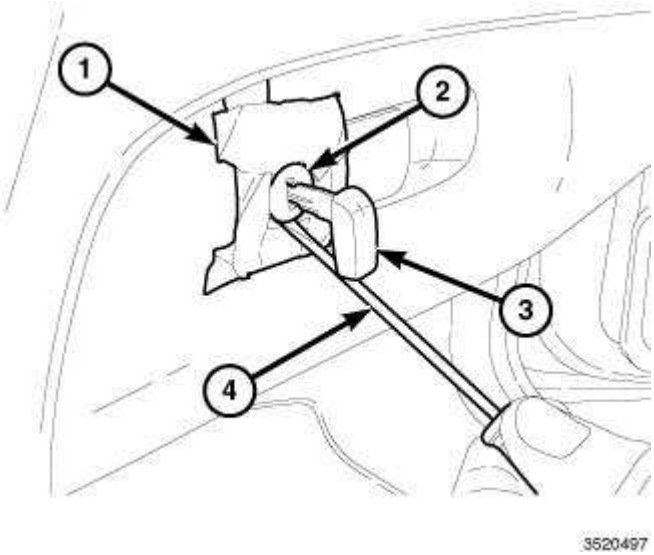


Fig. 292: Masking Tape, Lock Cylinder, Key & Screwdriver
Courtesy of CHRYSLER GROUP, LLC

1. Prior to removal, place masking tape (1) or equivalent around the perimeter of the lock cylinder (2).
2. Insert the key (3) into the lock cylinder (2) and turn the key into the locked position.
3. Insert a small flat bladed screwdriver (4) into the opening between the lock cylinder (2) and bezel at the "6 o'clock position".
4. Apply downward pressure on the screwdriver (4) while turning the key clockwise approximately 45°.

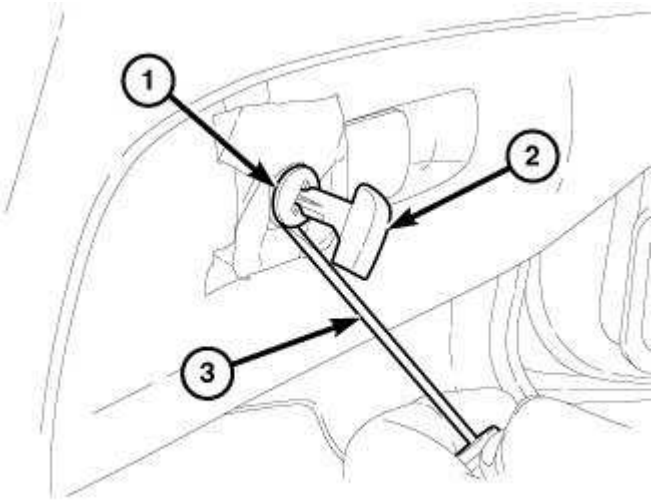


Fig. 293: Lock Cylinder, Key & Screwdriver
Courtesy of CHRYSLER GROUP, LLC

5. Remove the lock cylinder (1), key (2) and screwdriver (3) together.

INSTALLATION

INSTALLATION

GLOVE BOX MODULE

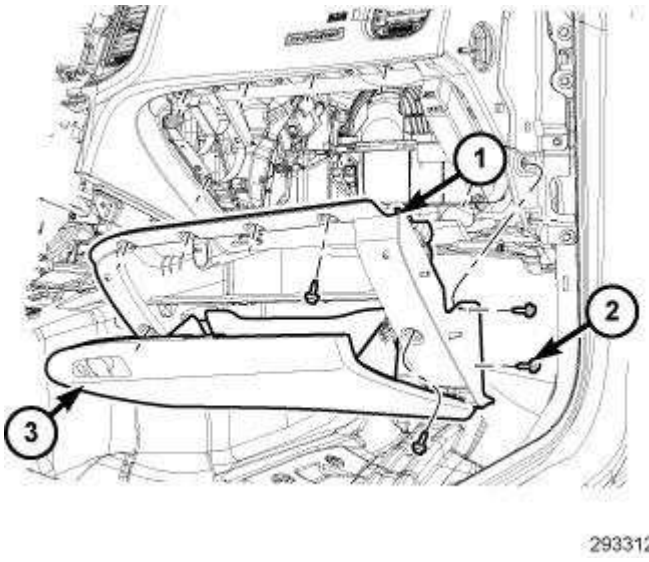


Fig. 294: Ground Eyelet, Two Side Screws & Glove Box Compartment
Courtesy of CHRYSLER GROUP, LLC

1. Connect the wiring harness and position the glove box compartment (1) into the I/P.
2. Install the six screws to the glove box compartment (1). Tighten the screws to 30 in-lbs.

3. Install the two side screws (2) securing the glove box compartment (1) to the I/P. Tighten the screws to 30 in-lbs.
4. Close the glove box door (3).

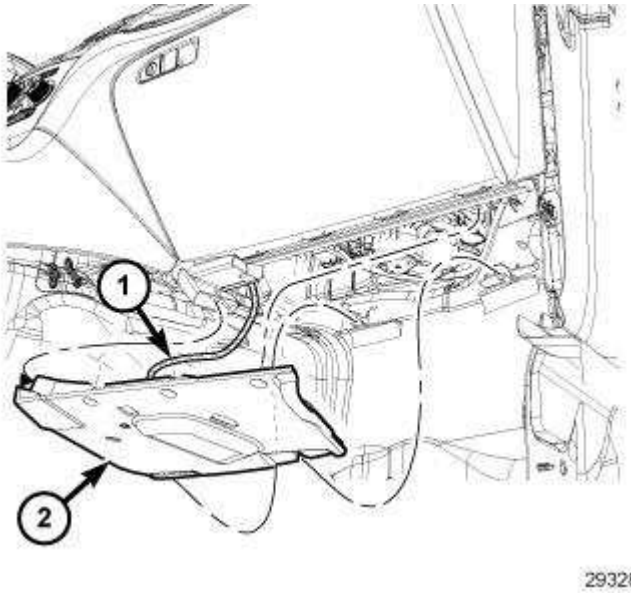


Fig. 295: Right Side Instrument Panel Silencer & LED Harness
Courtesy of CHRYSLER GROUP, LLC

5. Connect the LED harness (1) and install the right side instrument panel silencer (2).

DOOR

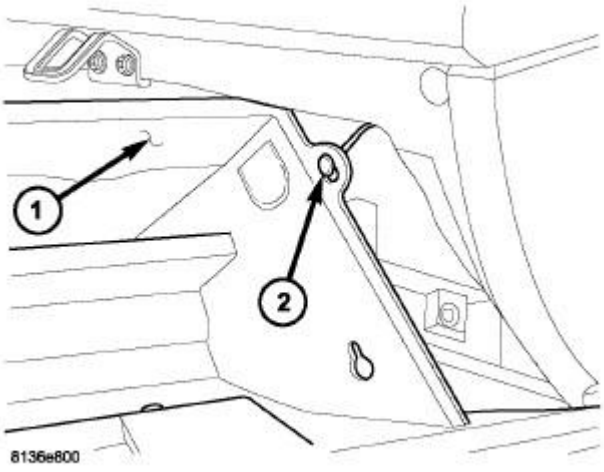


Fig. 296: Glove Box Bin Support Strap
Courtesy of CHRYSLER GROUP, LLC

1. Position the glove box bin (1) into the vehicle.
2. Turn the glove box bin sideways and install the support strap and retainer assembly (2) onto the outboard end of the bin.

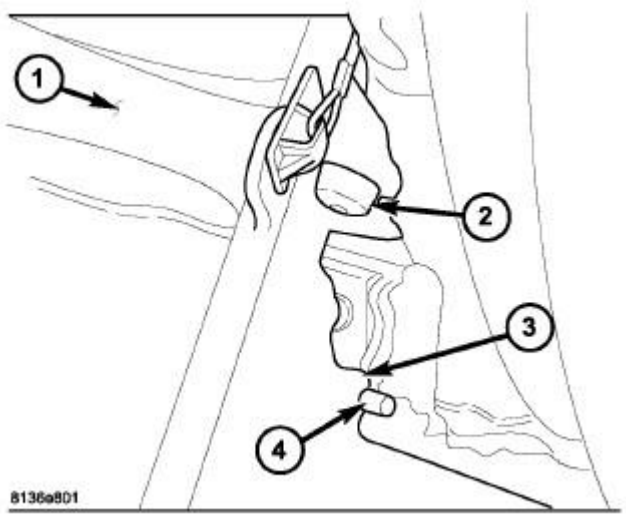


Fig. 297: Removing/Installing Glove Box Bin
Courtesy of CHRYSLER GROUP, LLC

3. Engage the glove box bin hinge hooks (3) onto the instrument panel hinge brackets (4) located at each end of the glove box bin (1) and pivot the bin upward.
4. To engage the glove box stops (2), push inward on both sides of the glove box bin and pivot the glove box into the instrument panel.
5. Close the glove box bin.

LOCK CYLINDER

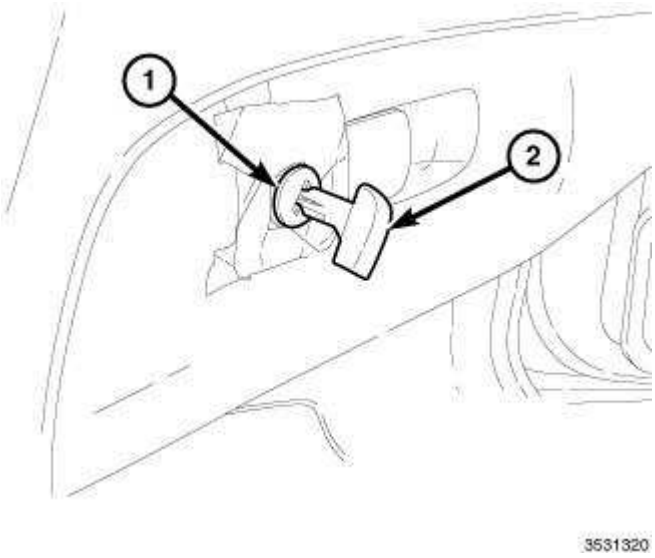


Fig. 298: Glove Box Lock Cylinder
Courtesy of CHRYSLER GROUP, LLC

1. Install the lock cylinder (1) and key (2) into the glove box door together in a position approximately 45° clockwise from the locked position.

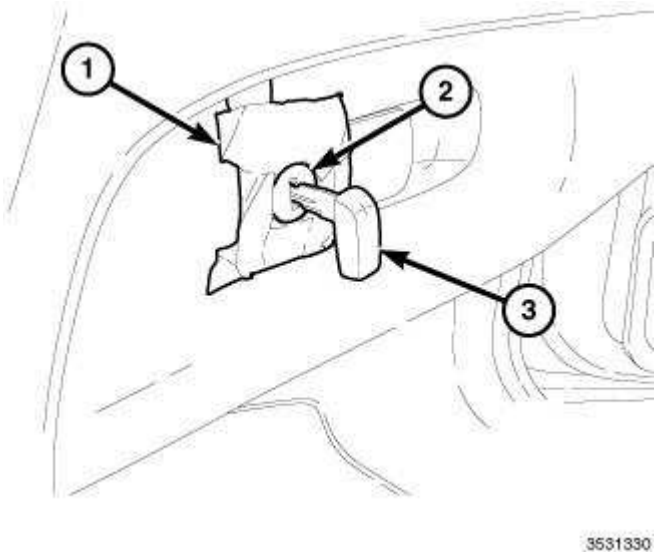


Fig. 299: Key, Lock Cylinder & Masking Tape
Courtesy of CHRYSLER GROUP, LLC

2. Turn the key (3) counter clockwise to the locked position.
3. Remove the key (3) from the lock cylinder (2).
4. Reinsert the key and verify the lock cylinder is functioning properly.
5. Remove the masking tape (1) from the lock cylinder perimeter.

GRILLE, DEFROSTER

REMOVAL

REMOVAL

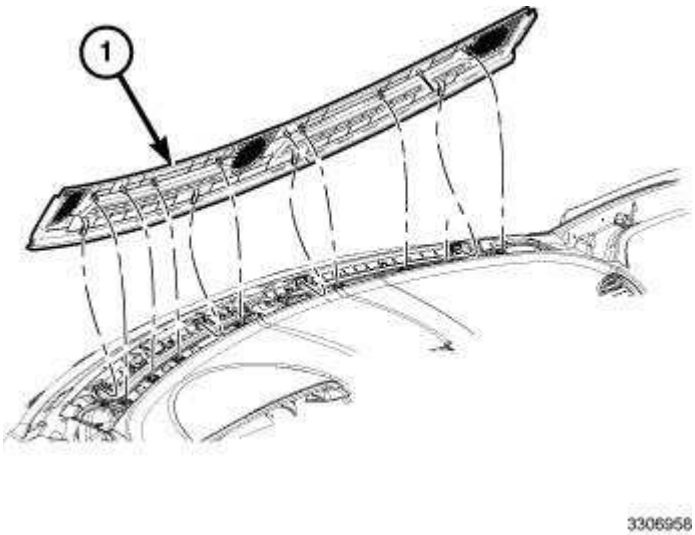


Fig. 300: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions.
2. Remove the A-pillar trim panels.
3. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, gently pry between the instrument panel top cover and the rearward edge of the defroster grille (1) to release the snap clip retainers that secure the defroster grille.
4. Pull the defroster grille (1) rearward and remove the defroster grille.

INSTALLATION

INSTALLATION

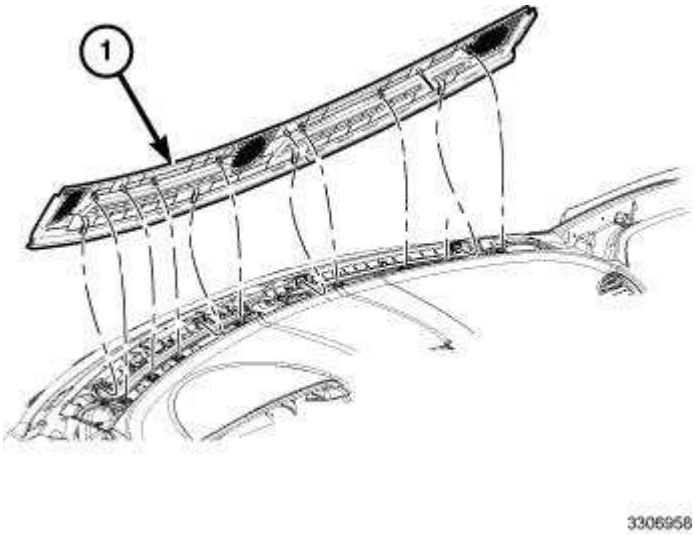


Fig. 301: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions.
2. Align and position the front hooks of the defroster grille (1) onto the top of the instrument panel.
3. Carefully push the defroster grille (1) forward to fully seat the hooks into the instrument panel top cover.
4. Carefully push down on the defroster grille (1) to fully seat the snap clip retainers into the instrument panel top cover.
5. Install the A-pillar trim panels.

LATCH, GLOVE BOX DOOR

DESCRIPTION

DESCRIPTION

The glove box door latch is integrated into the glove box door. The glove box door latch is not a serviceable part. The glove box door key cylinder can be replaced. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL**& **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION**.

PANEL, INSTRUMENT

REMOVAL

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with air bags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid personal injury or death, never strike or drop the occupant restraint controller, as it can damage the impact sensor or affect its calibration. The occupant restraint controller contains the impact sensor, which enables the system to deploy the supplemental restraints. If an airbag control module is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper supplemental restraint deployment.

CAUTION: On vehicles equipped with the Occupant Classification System (OCS), never replace both the Occupant Restraint Controller (ORC) and the Occupant Classification Module (OCM) at the same time. If both require replacement, replace one. Then perform the supplemental restraint verification test before replacing the other. Both the ORC and the OCM store OCS calibration data, which they transfer to one another when one of them is replaced. If both are replaced at the same time, an irreversible fault will be set in both modules.

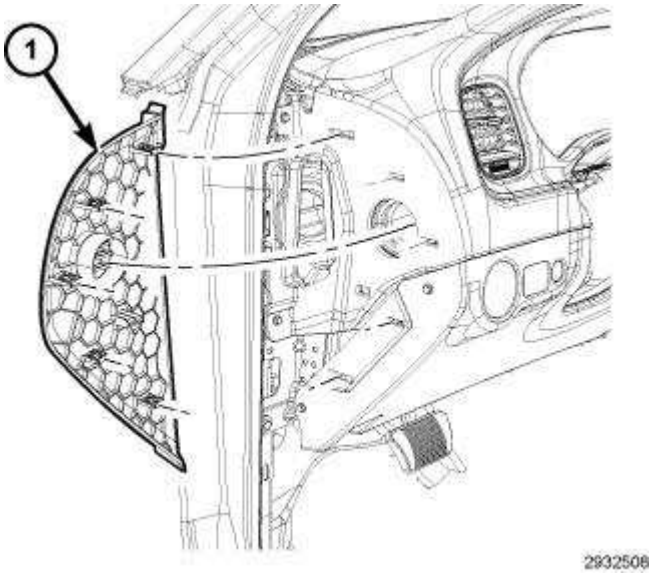


Fig. 302: End Cap
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions.
2. Disconnect and isolate negative battery cable.
3. Using (special tool #C-4755, Trim Stick) or equivalent (1), gently pry between the end cap (1) and the instrument panel to release the snap retainers that secure the end cap. Repeat on opposite side.

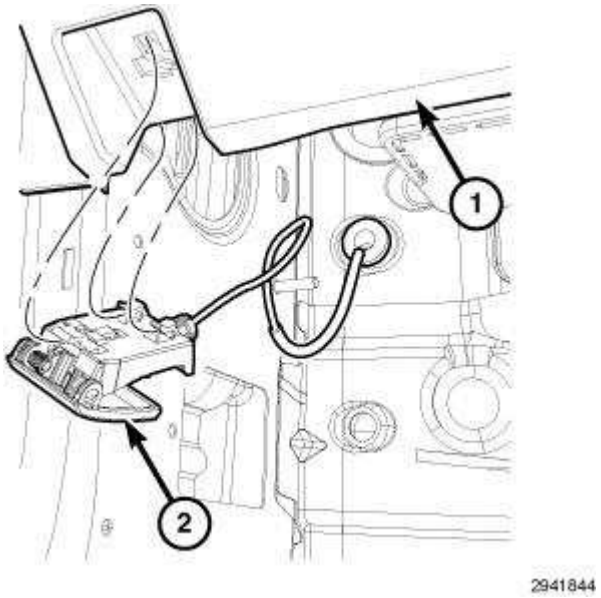


Fig. 303: Hood Release Handle
Courtesy of CHRYSLER GROUP, LLC

4. Remove the hood release handle (2) from the knee blocker trim (1) by pushing down to disengage and then pulling rearward on the handle.

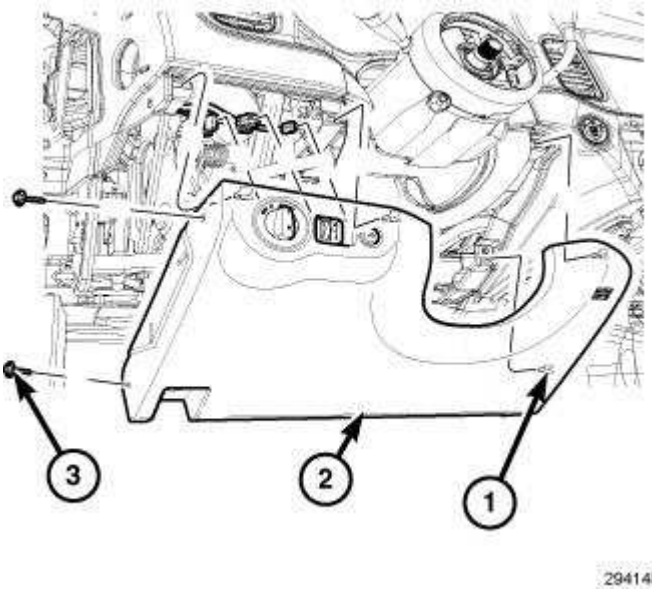


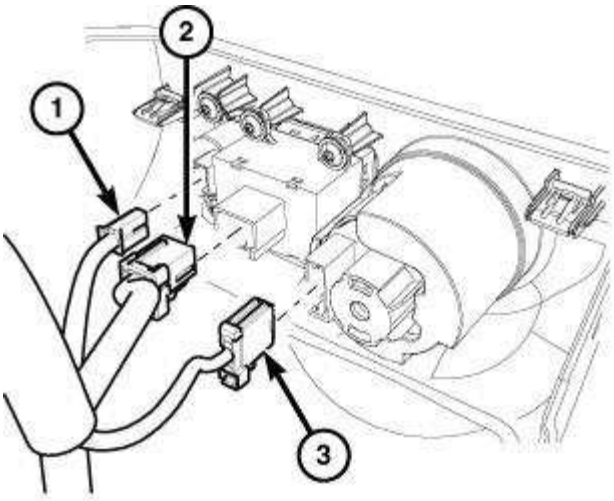
Fig. 304: Two Side Screws, Lower Screw & Knee Blocker Trim
Courtesy of CHRYSLER GROUP, LLC

NOTE: Steering wheel removed for clarity.

5. Remove the two side screws (3) and the lower screw (1) securing the knee blocker trim (2) to the instrument panel.
6. Using (special tool #C-4755, Trim Stick) or equivalent (1), partially remove the upper portion of

the knee blocker trim (2) by gently prying between the knee blocker trim (2) and the instrument panel to release the upper snap retainers.**Do not remove the knee blocker trim or pull with excessive force.**

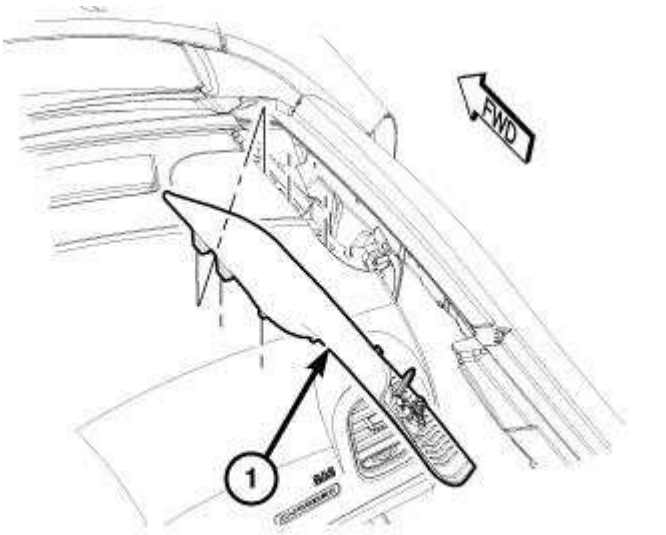
7. Disconnect the in-car temperature sensor.



2941496

Fig. 305: Light Switch Harnesses
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the light switch harnesses (1, 2 & 3) from the switch and finish removing the knee blocker trim.
9. Remove the steering column assembly. Refer to **COLUMN, REMOVAL** .



2960368

Fig. 306: A-Pillar Trim Panels
Courtesy of CHRYSLER GROUP, LLC

10. Remove the A-pillar trim panels. Refer to **PANEL, A-PILLAR TRIM, REMOVAL**.

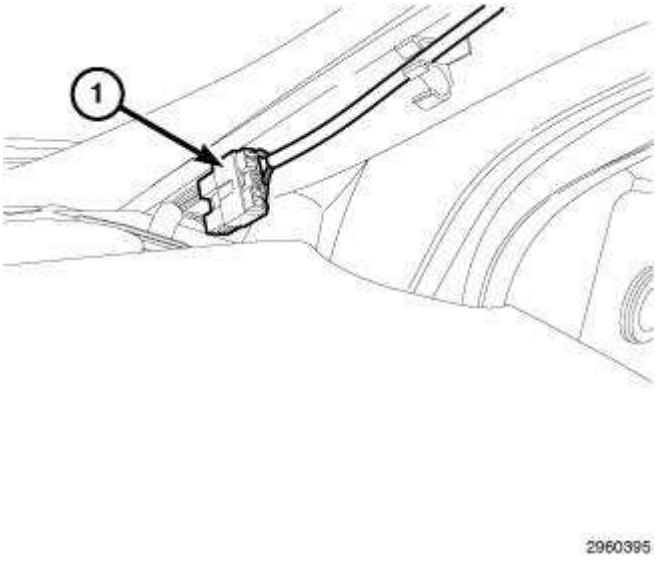


Fig. 307: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the wire harness connectors (1) located on the A-pillar, repeat on opposite side.

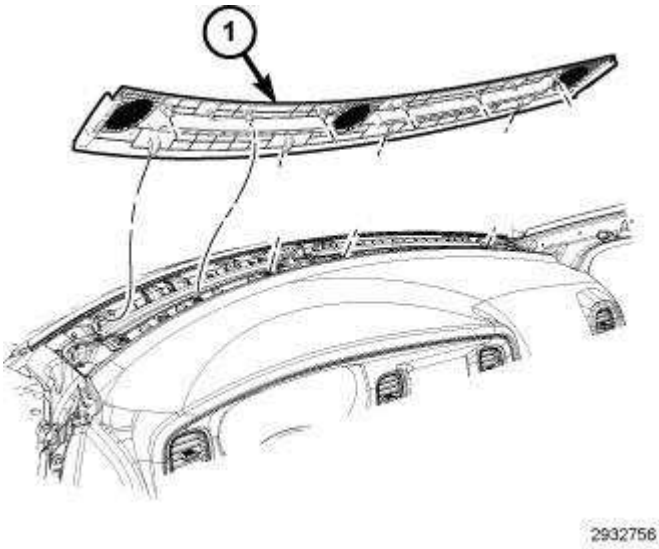


Fig. 308: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

12. Using (special tool #C-4755, Trim Stick) or equivalent (1), gently pry between the defroster grille (1) and the instrument panel to release the snap retainers that secure the defroster grille.

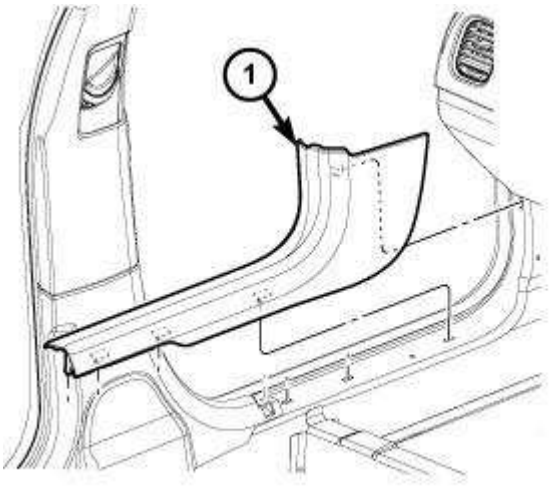


Fig. 309: Door Scuff Plate
Courtesy of CHRYSLER GROUP, LLC

13. Remove the lower portion of the door weatherstrip.
14. Using (special tool #C-4755, Trim Stick) or equivalent (1), remove the door scuff plate (1). Repeat on opposite side.

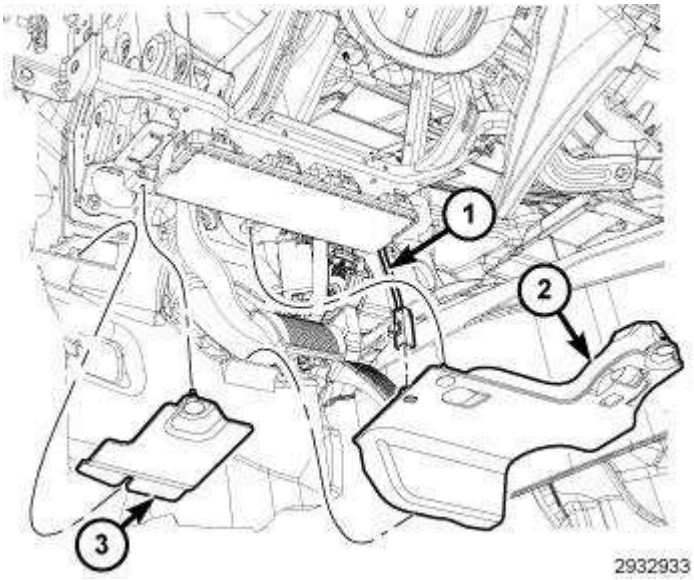
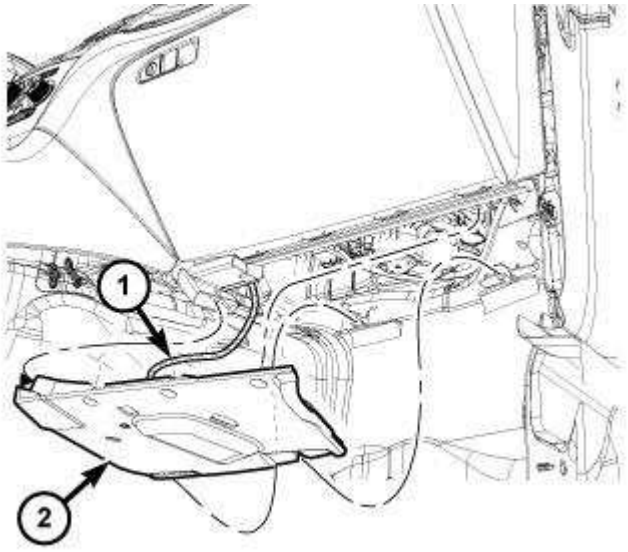


Fig. 310: LED Harness & Left Side Instrument Panel Silencers
Courtesy of CHRYSLER GROUP, LLC

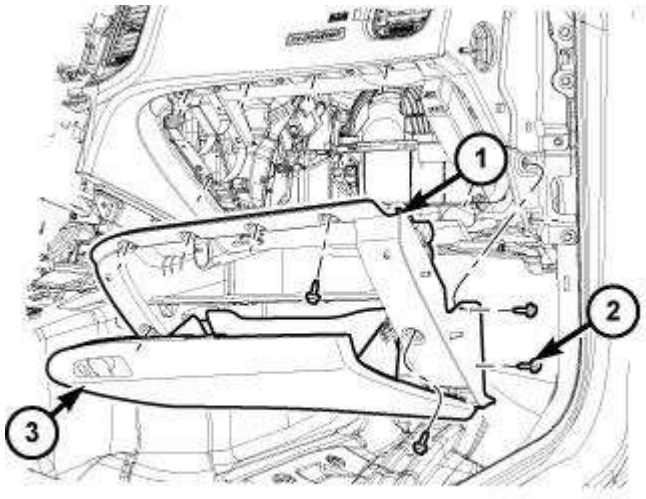
15. Disconnect the LED harness (1) and remove the left side instrument panel silencers (2, 3). Refer to **PANEL, SILENCER, REMOVAL**.



2932866

Fig. 311: Right Side Instrument Panel Silencer & LED Harness
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the LED harness (1) and remove the right side instrument panel silencer (2). Refer to **PANEL, SILENCER, REMOVAL**.



2933122

Fig. 312: Ground Eyelet, Two Side Screws & Glove Box Compartment
Courtesy of CHRYSLER GROUP, LLC

17. Remove the glove box door (3).
18. Remove the two side screws (2) from the glove box compartment (1).
19. Remove the six screws from the glove box compartment (1).
20. Disconnect the wiring harness and remove the glove box compartment (1).

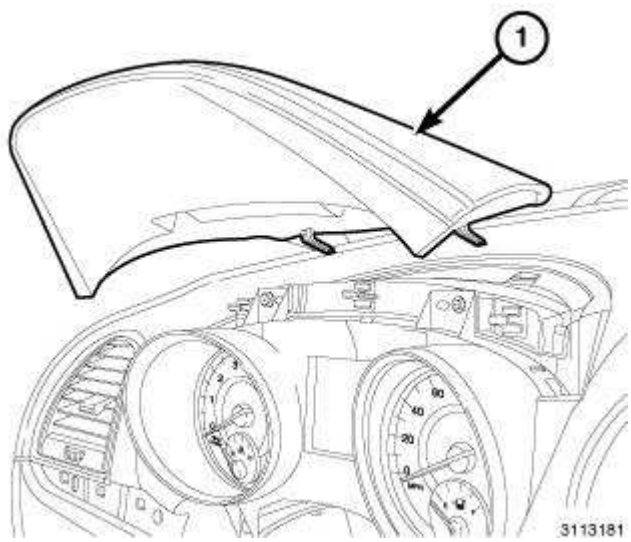


Fig. 313: Instrument Cluster Bezel Hood
Courtesy of CHRYSLER GROUP, LLC

21. Using (special tool #C-4755, Trim Stick) or equivalent (1), gently pry between the instrument cluster bezel hood (1) and the instrument panel to release the snap retainers that secure the bezel hood.

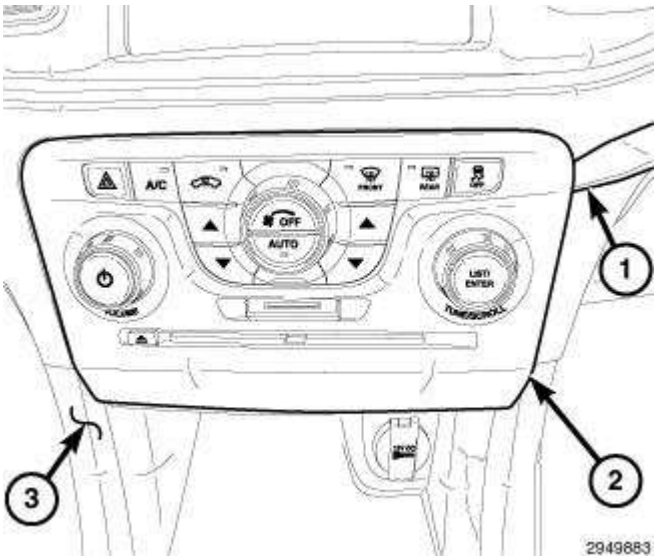


Fig. 314: Switch Bank
Courtesy of CHRYSLER GROUP, LLC

22. Remove the AC/heater control faceplate (2) from the I/P. Refer to **POD, SWITCH BANK, REMOVAL** .

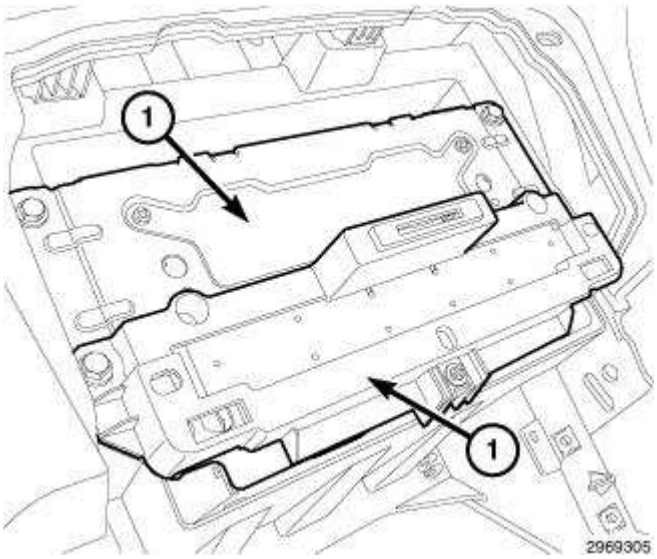


Fig. 315: Telematics Gateway Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: The telematics gateway mounting fasteners also secure the bottom portion of the center trim bezel.

23. Remove and disconnect the telematics gateway assembly (1). Refer to **MODULE, TELEMATICS GATEWAY, REMOVAL** .

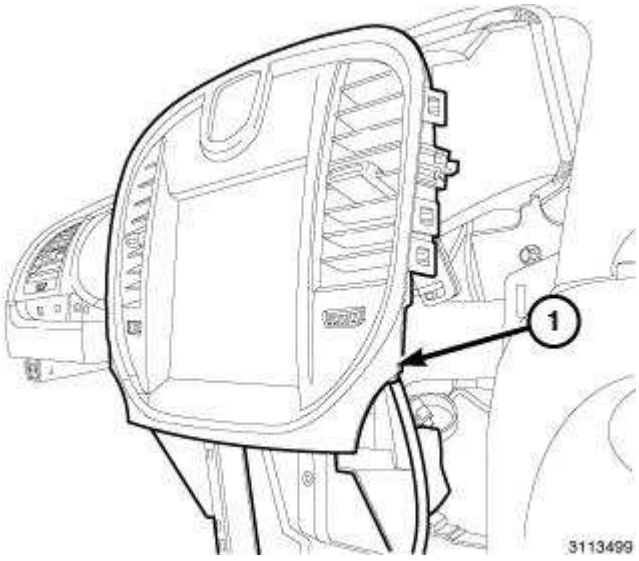


Fig. 316: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

24. Using (special tool #C-4755, Trim Stick) or equivalent, remove the center bezel (1) from the instrument panel by releasing the snap retainers from the instrument panel.

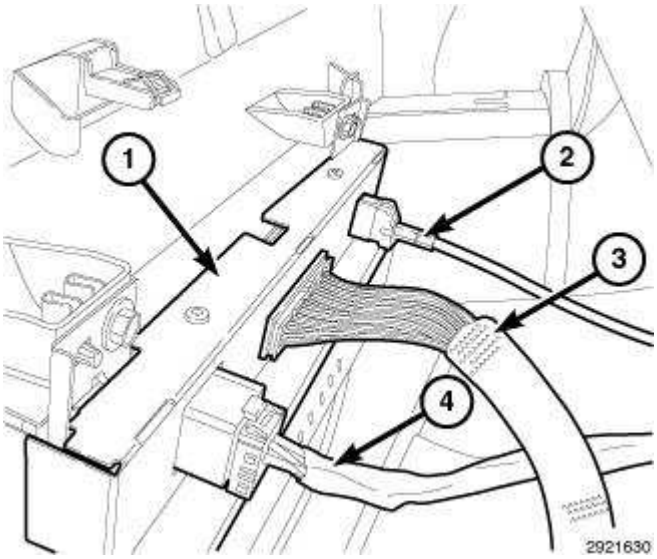


Fig. 317: Harness Connectors & Display Screen
Courtesy of CHRYSLER GROUP, LLC

25. Disconnect the harness connectors (2, 3 & 4) from the rear of the display screen (1).
26. Remove the instrument cluster from the vehicle. Refer to **REMOVAL** .

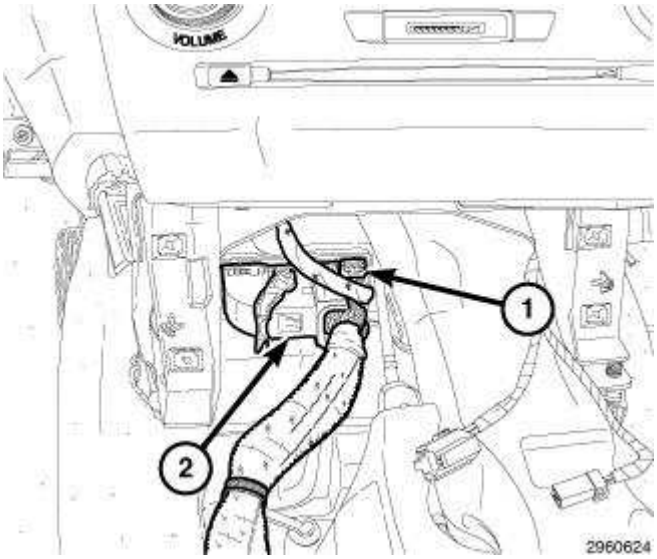


Fig. 318: Occupant Restraint Module Harnesses
Courtesy of CHRYSLER GROUP, LLC

27. Remove the floor console. Refer to **CONSOLE, FLOOR, REMOVAL**.
28. Disconnect the occupant restraint module harnesses (1 & 2).

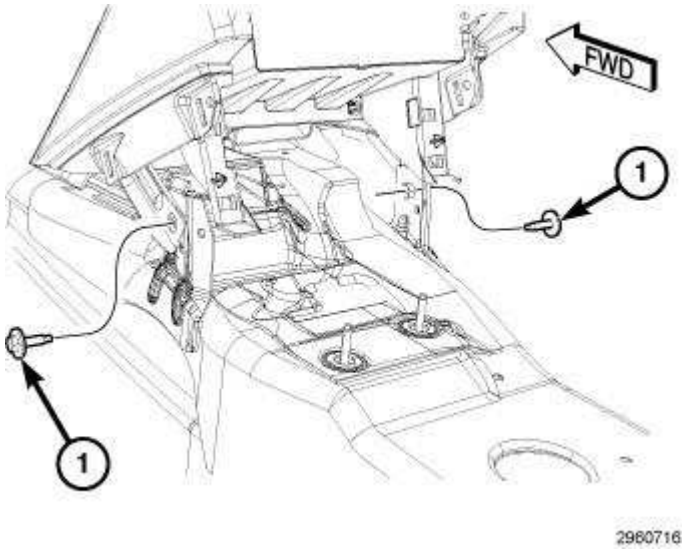


Fig. 319: Floor Pan Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

29. Remove the lower I/P to floor pan bracket bolts (1).

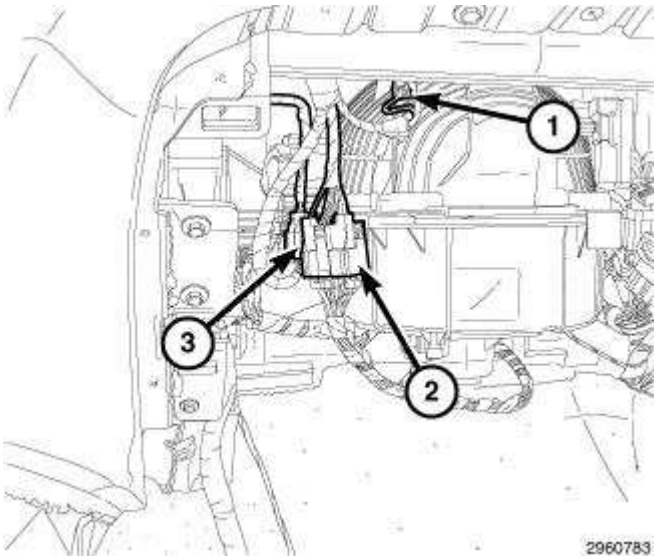


Fig. 320: HVAC And Antenna Harnesses
Courtesy of CHRYSLER GROUP, LLC

30. Disconnect the HVAC and antenna harnesses (1, 2, 3).

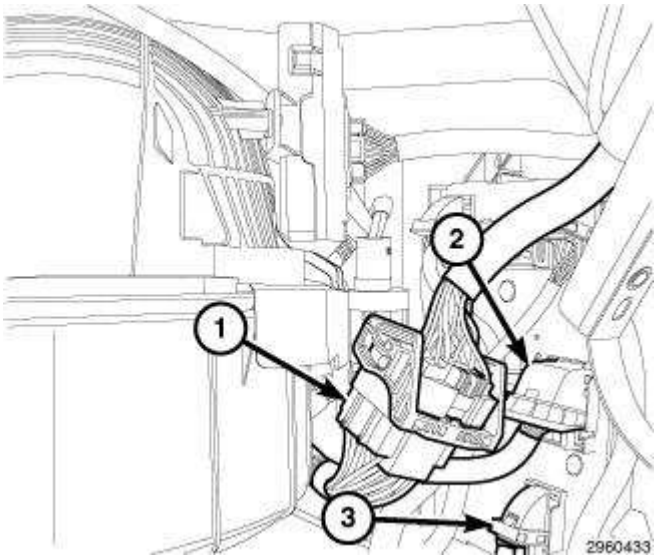


Fig. 321: Bulkhead Harness
Courtesy of CHRYSLER GROUP, LLC

31. Disconnect the bulkhead harness (1) on the right hand side of the vehicle.
32. Disconnect the harnesses (2 & 3) from the vehicle control module.

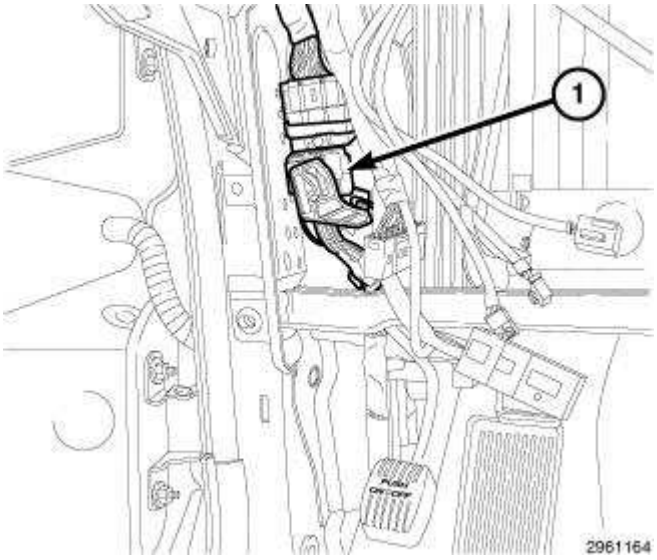


Fig. 322: Bulkhead Harness
Courtesy of CHRYSLER GROUP, LLC

33. Disconnect the bulkhead harness (1) on the left hand side of the vehicle.

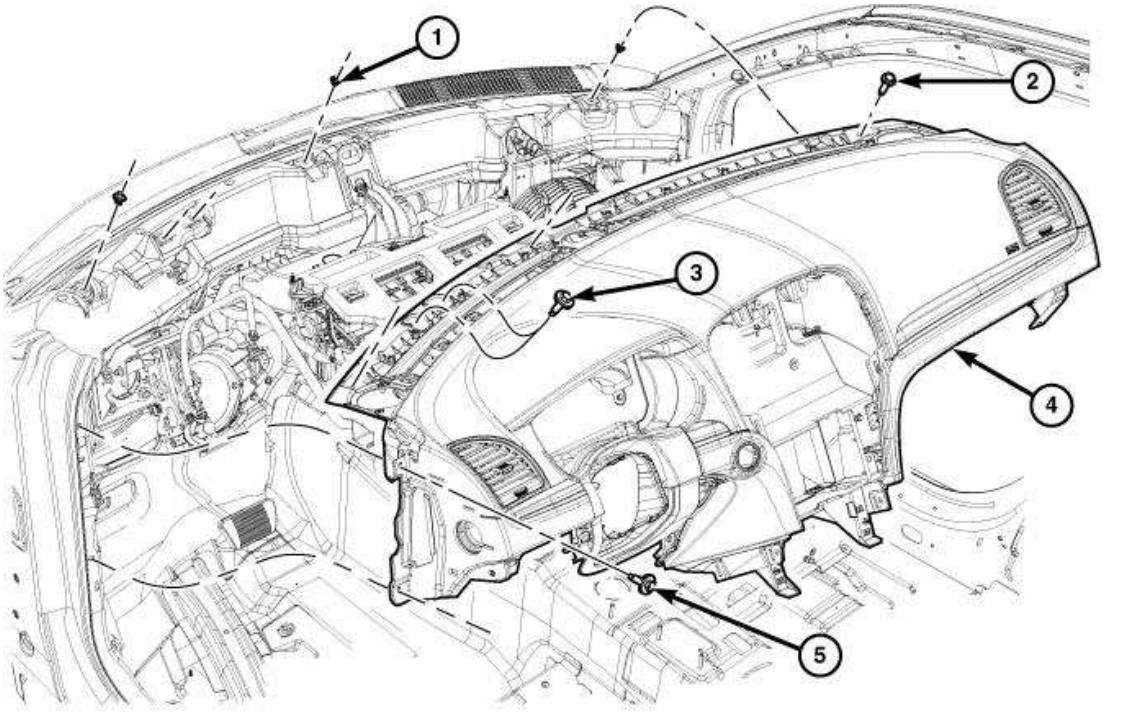


Fig. 323: Instrument Panel
Courtesy of CHRYSLER GROUP, LLC

34. Remove the five upper bolts (2, 3).
35. Remove the three side bolts (5), repeat for the opposite side.
36. With the help of an assistant, remove the instrument panel by lifting up and out.
37. If required, remove the spring nuts (1) from the dash panel.

INSTALLATION

INSTALLATION

WARNING: To avoid personal injury or death, on vehicles equipped with air bags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid personal injury or death, never strike or drop the occupant restraint controller, as it can damage the impact sensor or affect its

calibration. The occupant restraint controller contains the impact sensor, which enables the system to deploy the supplemental restraints. If an airbag control module is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper supplemental restraint deployment.

CAUTION: On vehicles equipped with the Occupant Classification System (OCS), never replace both the Occupant Restraint Controller (ORC) and the Occupant Classification Module (OCM) at the same time. If both require replacement, replace one. Then perform the supplemental restraint verification test before replacing the other. Both the ORC and the OCM store OCS calibration data, which they transfer to one another when one of them is replaced. If both are replaced at the same time, an irreversible fault will be set in both modules.

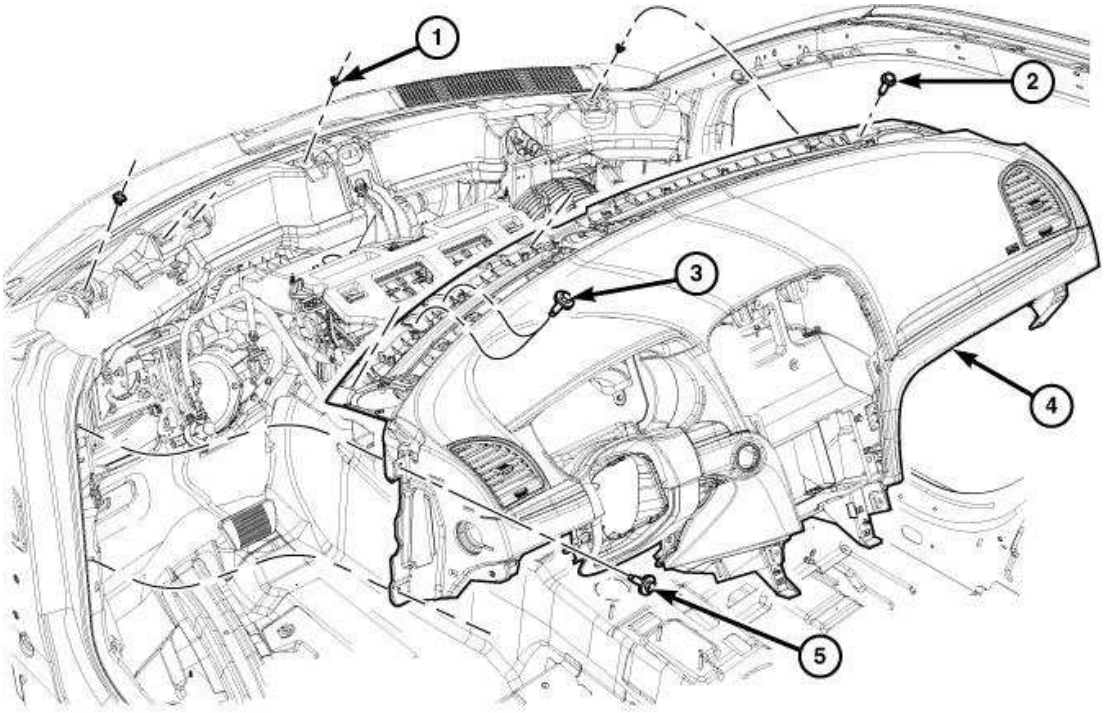


Fig. 324: Instrument Panel
Courtesy of CHRYSLER GROUP, LLC

1. If required, install new spring nuts (1) into the dash panel.
2. With the help of an assistant, install the instrument panel (4). **Make sure the instrument panel (4) hooks are properly seated into their openings.** .
3. Install the three side bolts (5), tighten the bolts to 16 N-m (12 ft. lbs.), repeat for the opposite side.

4. Install the five upper bolts (2, 3), tighten the bolts to 21 N-m (15 ft. lbs.)

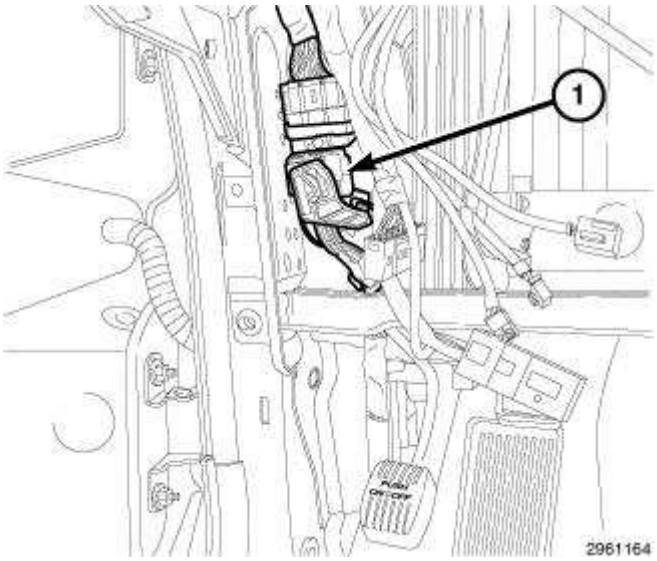


Fig. 325: Bulkhead Harness
Courtesy of CHRYSLER GROUP, LLC

5. Connect the bulkhead harness (1) to the vehicle harness on the left hand side of the vehicle.

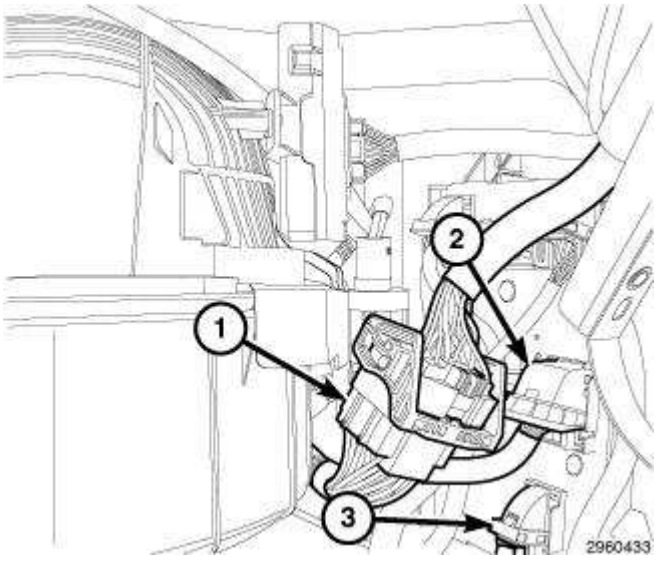


Fig. 326: Bulkhead Harness
Courtesy of CHRYSLER GROUP, LLC

6. Connect the harnesses (2 & 3) to the vehicle control module.
7. Connect the bulkhead harness (1) to the vehicle harness on the right hand side of the vehicle.

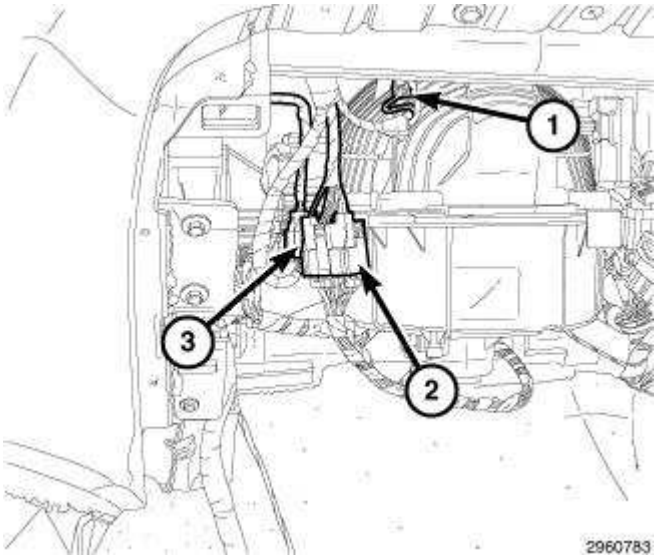


Fig. 327: HVAC And Antenna Harnesses
Courtesy of CHRYSLER GROUP, LLC

8. Connect the antenna and HVAC harnesses (1, 2, 3).

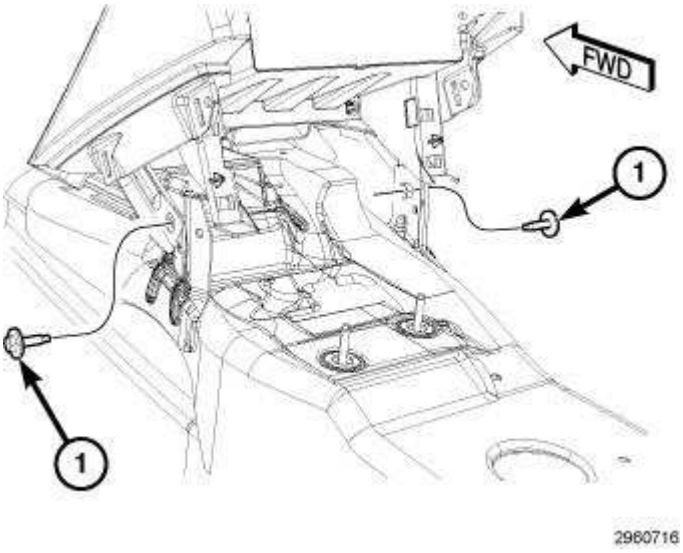


Fig. 328: Floor Pan Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the lower I/P to floor pan bracket bolts (1), tighten the bolts to 16 N-m (12 ft. lbs.).

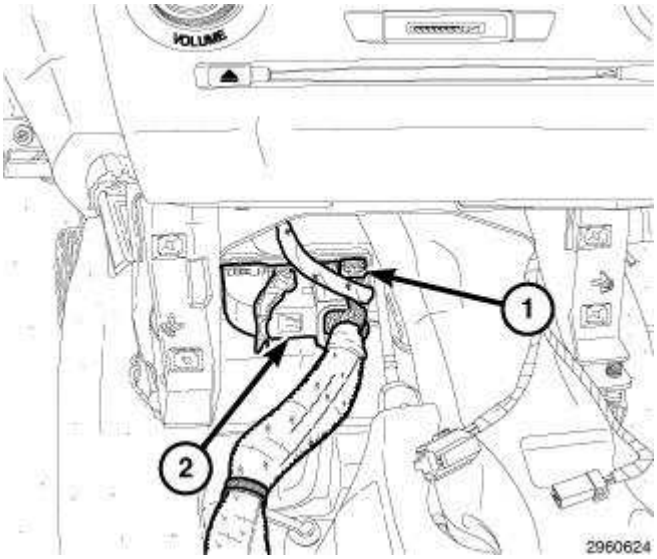


Fig. 329: Occupant Restraint Module Harnesses
Courtesy of CHRYSLER GROUP, LLC

10. Connect the occupant restraint module harnesses (1 & 2).
11. Install the floor console. Refer to **CONSOLE, FLOOR, INSTALLATION**.

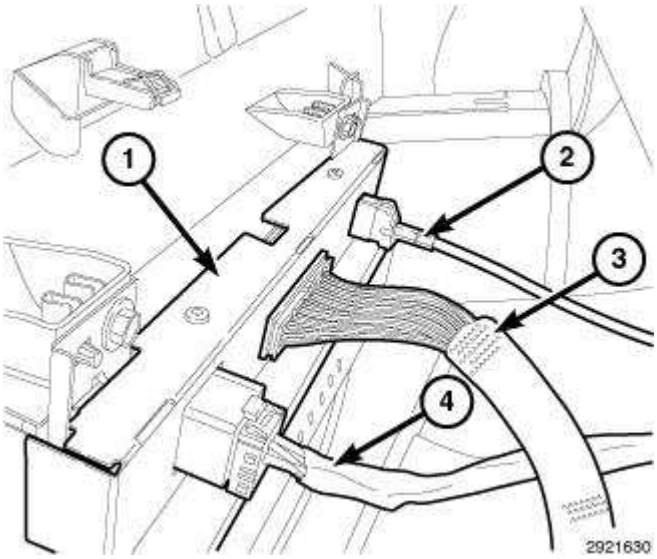


Fig. 330: Harness Connectors & Display Screen
Courtesy of CHRYSLER GROUP, LLC

12. Install the instrument cluster from the vehicle. Refer to **INSTALLATION** .
13. Position the instrument cluster bezel near it's opening in the I/P and connect the harness connectors (2, 3 & 4) to the rear of the display screen (1).

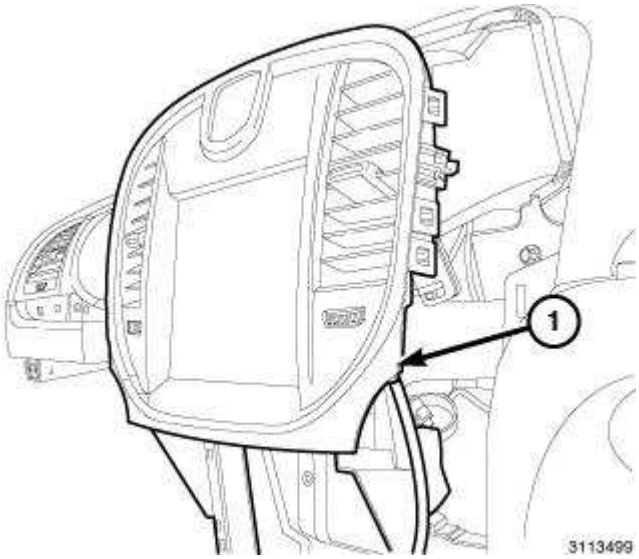


Fig. 331: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

14. Install the center bezel (1) onto the instrument panel (2) and carefully push on the outside edges of the center bezel to fully seat the snap clip retainers into the instrument panel.
15. Install the instrument cluster bezel to the vehicle.

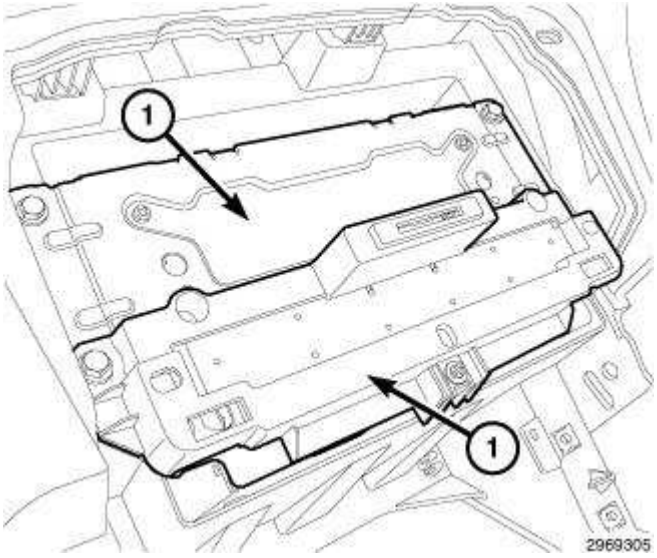


Fig. 332: Telematics Gateway Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: The telematics gateway mounting fasteners also secure the bottom portion of the center trim bezel.

16. Connect and install the telematics gateway assembly (1). Refer to **MODULE, TELEMATICS GATEWAY, INSTALLATION** .

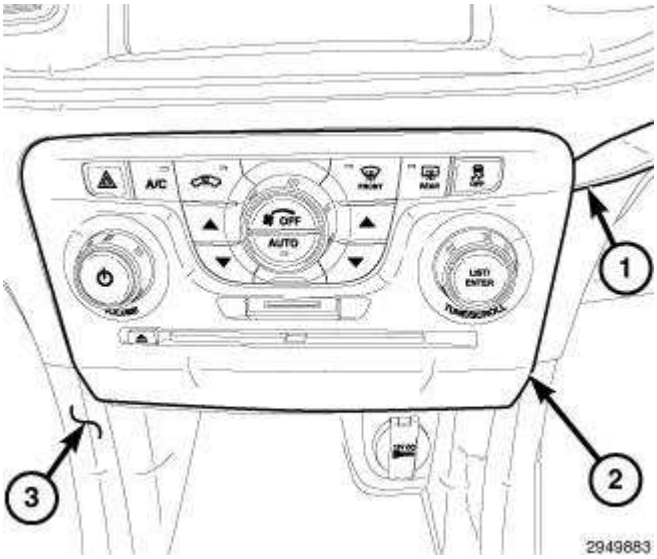


Fig. 333: Switch Bank
Courtesy of CHRYSLER GROUP, LLC

17. Connect and install the AC/heater control faceplate (2) to the I/P. Refer to **POD, SWITCH BANK, INSTALLATION** .

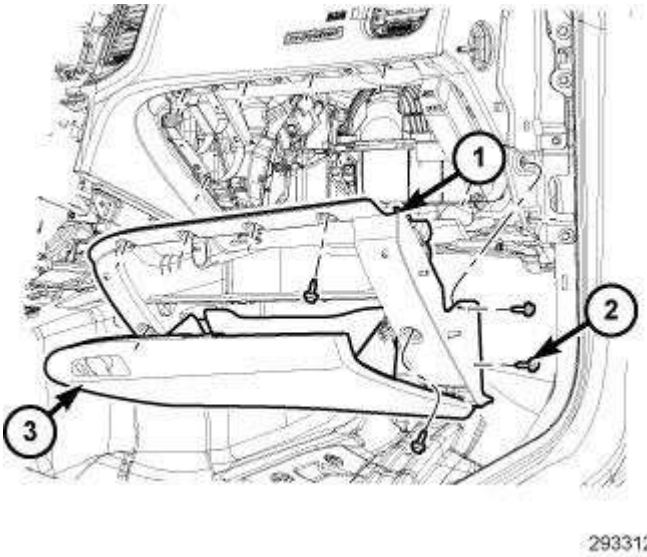


Fig. 334: Ground Eyelet, Two Side Screws & Glove Box Compartment
Courtesy of CHRYSLER GROUP, LLC

18. Connect the wiring harness and position the glove box compartment (1) into the I/P.
19. Install the six screws to the glove box compartment (1). Tighten the screws to 30 in-lbs.
20. Install the two side screws (2) securing the glove box compartment (1) to the I/P. Tighten the screws to 30 in-lbs.
21. Install the glove box door (3).

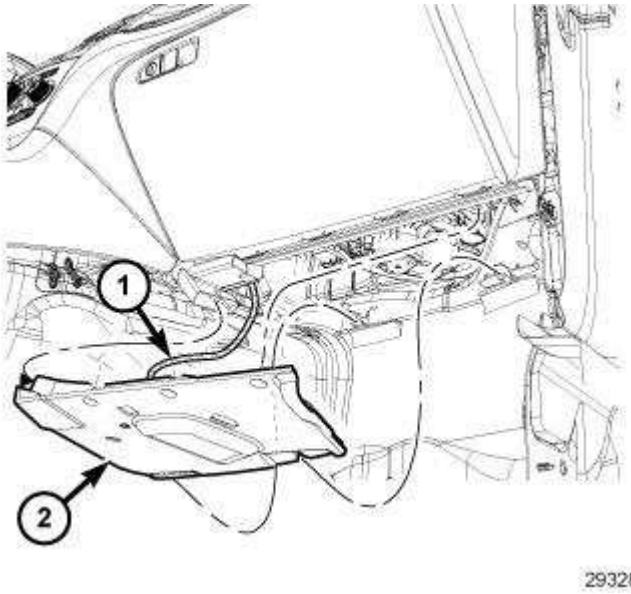


Fig. 335: Right Side Instrument Panel Silencer & LED Harness
Courtesy of CHRYSLER GROUP, LLC

22. Connect the LED harness (1) and install the right side instrument panel silencer (2).

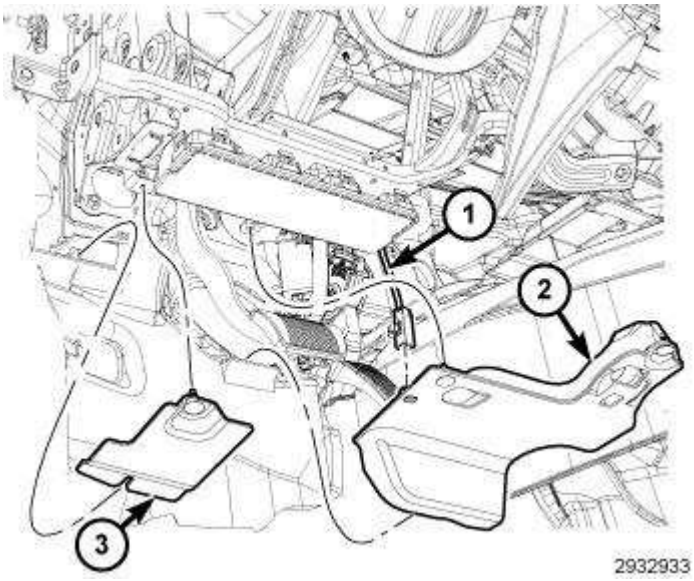


Fig. 336: LED Harness & Left Side Instrument Panel Silencers
Courtesy of CHRYSLER GROUP, LLC

23. Connect the LED harness (1) and install the left side instrument panel silencers (2, 3).

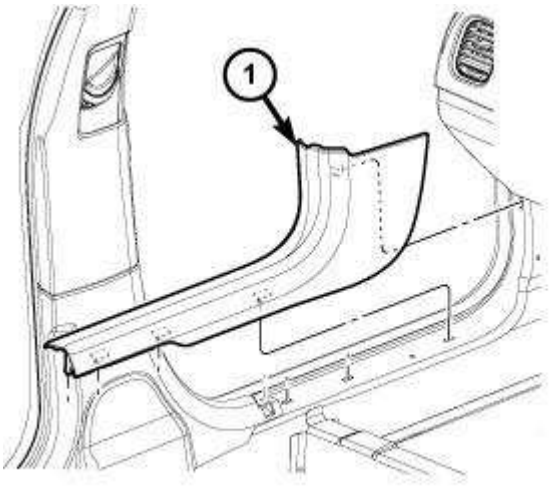


Fig. 337: Door Scuff Plate
Courtesy of CHRYSLER GROUP, LLC

24. Install the door scuff plate (1).
25. Install the lower portion of the door weatherstrip.

NOTE: Repeat steps 22-23 on the opposite side.

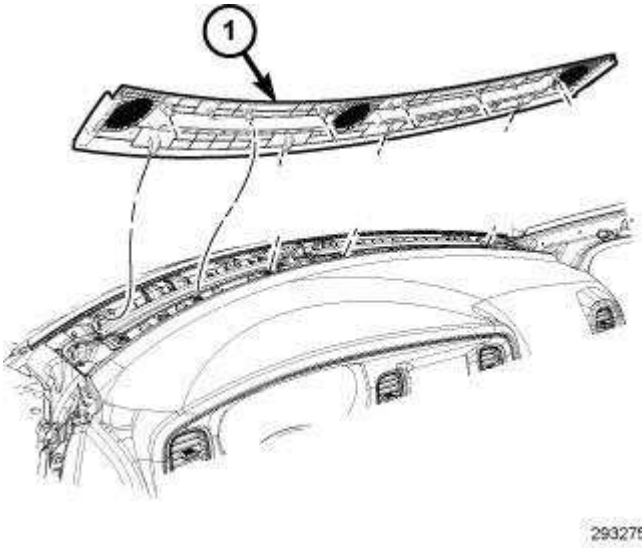


Fig. 338: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

26. Position the defroster grille (1) to the instrument panel and press firmly to engage the snap retainers that secure the defroster grille.

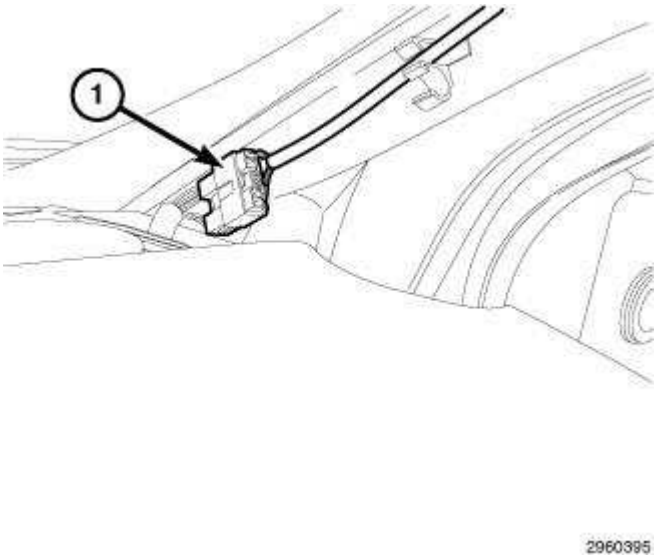


Fig. 339: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

27. Connect the wire harness connector (1) located on the A-pillar, repeat on opposite side.

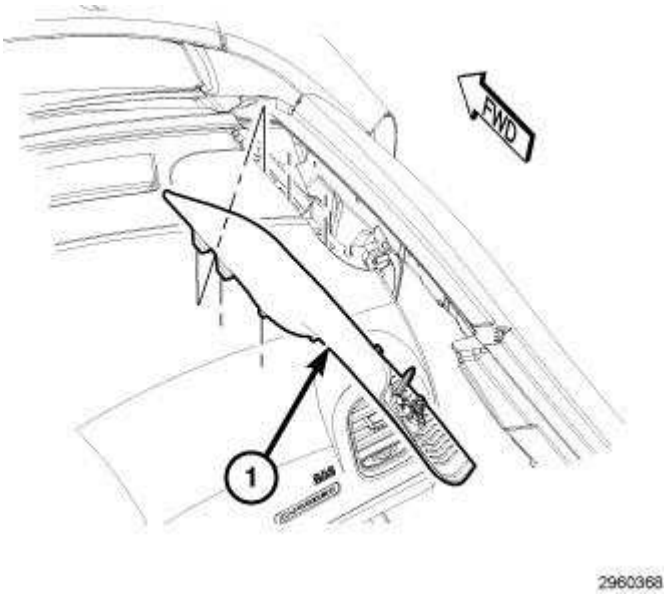


Fig. 340: A-Pillar Trim Panels
Courtesy of CHRYSLER GROUP, LLC

28. Install the A-pillar trim panels. Refer to **PANEL, A-PILLAR TRIM, REMOVAL**.

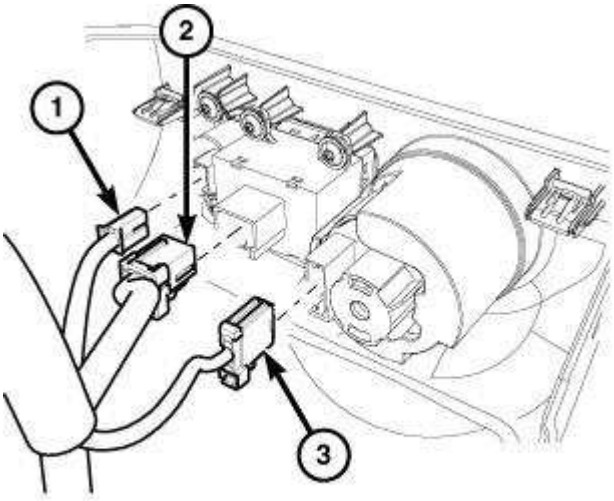


Fig. 341: Light Switch Harnesses
Courtesy of CHRYSLER GROUP, LLC

29. Install the steering column assembly. Refer to **COLUMN, INSTALLATION** .
30. Connect the light switch harnesses (1, 2 & 3) to the switch located on the knee blocker trim.

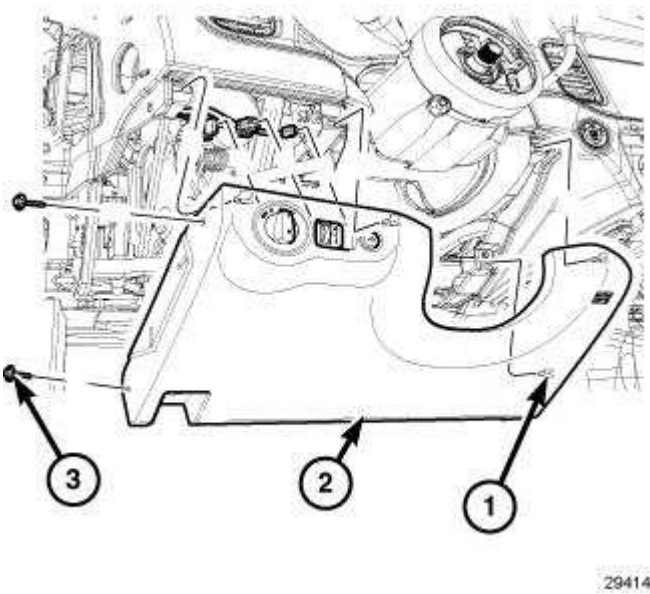


Fig. 342: Two Side Screws, Lower Screw & Knee Blocker Trim
Courtesy of CHRYSLER GROUP, LLC

NOTE: Steering wheel removed for clarity.

31. Connect the in-car temperature sensor.
32. Install the upper portion of the knee blocker trim (2) by pushing on the knee blocker trim (2) to engage the upper snap retainers.

33. Install the two side screws (3) and the lower screw (1) securing the knee blocker trim (2) to the instrument panel. Tighten the screws to 30 in-lbs.

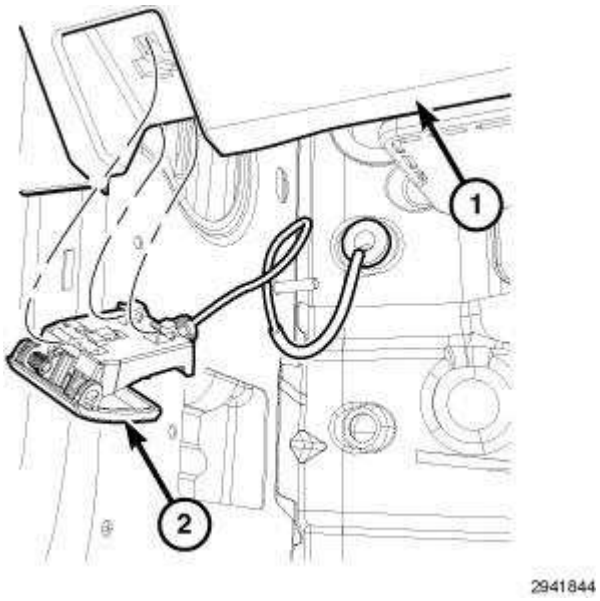


Fig. 343: Hood Release Handle
Courtesy of CHRYSLER GROUP, LLC

34. Install the hood release handle (2) to the knee blocker trim by aligning and pushing up.

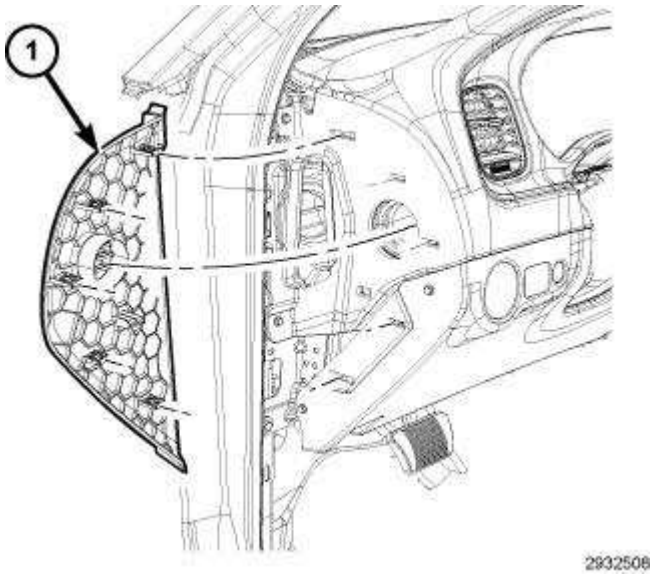


Fig. 344: End Cap
Courtesy of CHRYSLER GROUP, LLC

35. Install the end cap (1) to the instrument panel and engage the snap retainers that secure the end cap. Repeat on opposite side.
36. Connect the negative battery cable.

37. Perform the supplemental restraint system verification test. Refer to **STANDARD PROCEDURE** .

PANEL, SILENCER

REMOVAL

REMOVAL

DRIVER SIDE

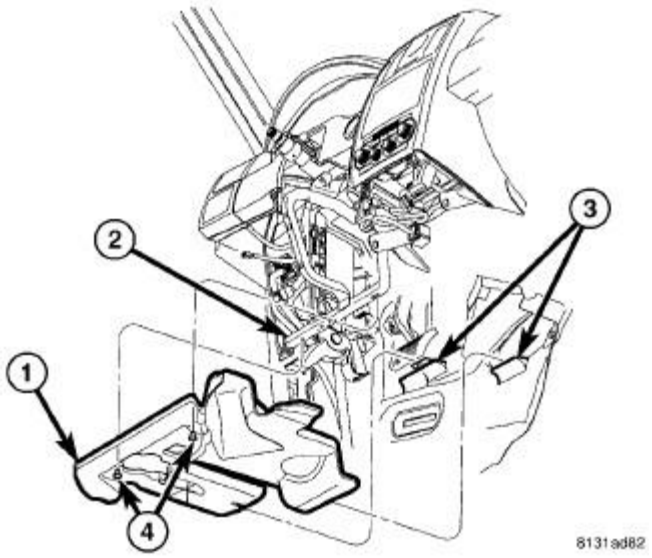


Fig. 345: Left Instrument Panel Closeout Panel
Courtesy of CHRYSLER GROUP, LLC

1. Remove the push-pins (4) that secure the instrument panel silencer (1) to the instrument panel bracket (2).
2. Pull the instrument panel silencer rearward to disengage it from the brackets (3) located near the dash panel.
3. Remove the instrument panel silencer from the vehicle.

PASSENGER SIDE

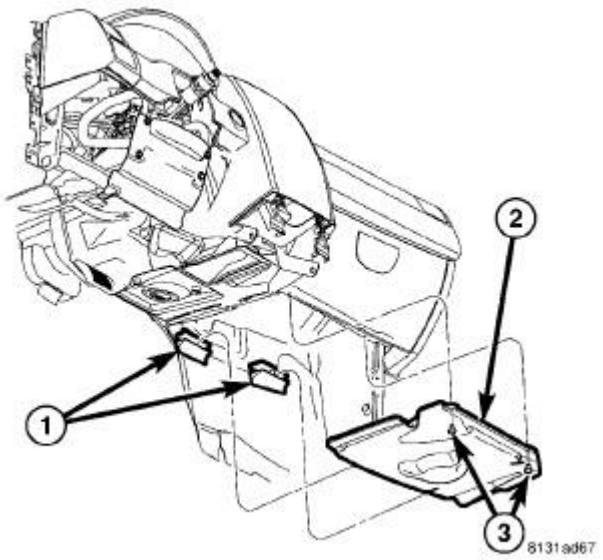


Fig. 346: Right Instrument Panel Closeout Panel
Courtesy of CHRYSLER GROUP, LLC

1. Remove the push-pins (3) that secure the instrument panel silencer (2) to the instrument panel.
2. Pull the instrument panel silencer rearward to disengage it from the brackets (1) located near the dash panel.
3. Remove the instrument panel silencer from the vehicle.

INSTALLATION

INSTALLATION

DRIVER SIDE

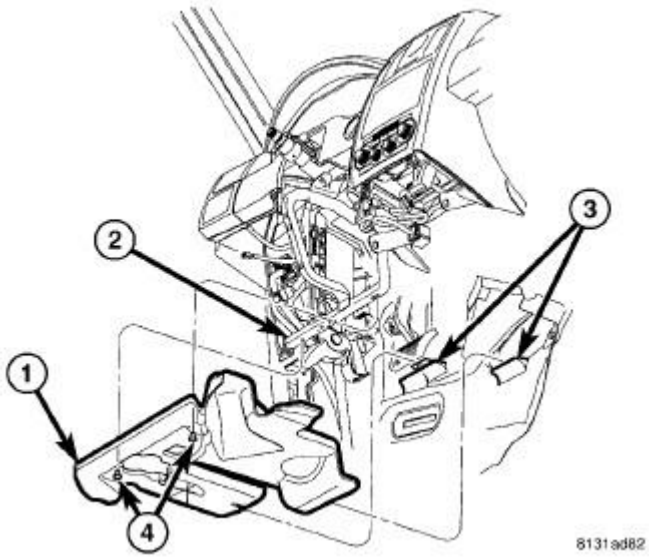


Fig. 347: Left Instrument Panel Closeout Panel
Courtesy of CHRYSLER GROUP, LLC

1. Position the instrument panel silencer (1) into the vehicle.
2. Install the instrument panel silencer above the brackets (3) located near the dash panel.
3. Install the push-pins (4) that secure the instrument panel silencer to the instrument panel bracket (2).

PASSENGER SIDE

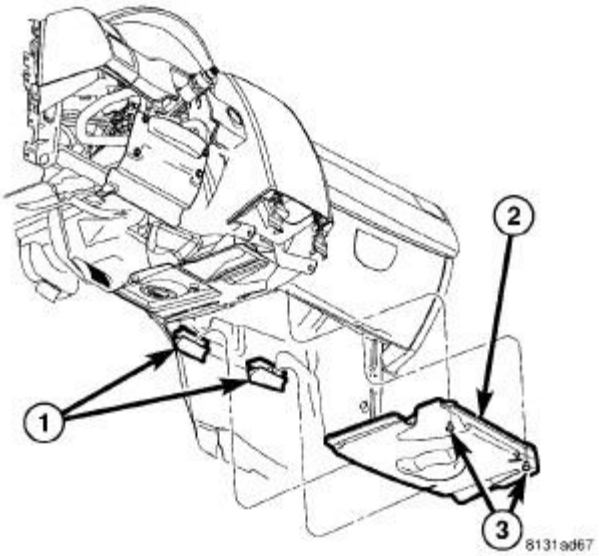


Fig. 348: Right Instrument Panel Closeout Panel
Courtesy of CHRYSLER GROUP, LLC

1. Position the instrument panel silencer (2) into the vehicle.
2. Install the instrument panel silencer above the brackets (1) located near the dash panel.
3. Install the push-pins (3) that secure the instrument panel silencer to the instrument panel.

STRIKER, GLOVE BOX DOOR LATCH

REMOVAL

REMOVAL

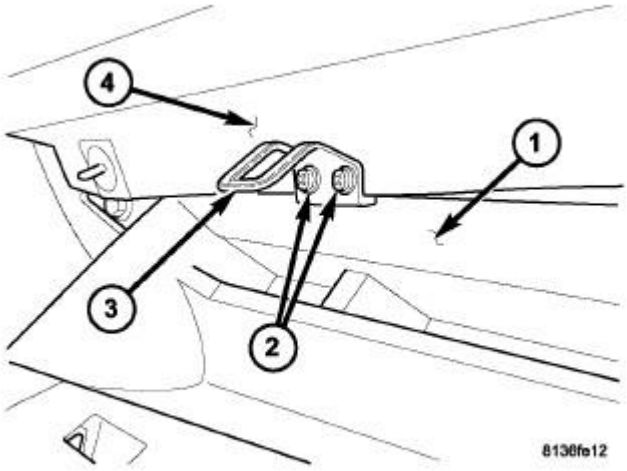


Fig. 349: Striker-Latch-Glove Box R And I
Courtesy of CHRYSLER GROUP, LLC

1. Open the glove box door (1).
2. Remove the two screws (2) that secure the glove box latch striker (3) to the instrument panel (4).
3. Remove the glove box latch striker from the instrument panel.

INSTALLATION

INSTALLATION

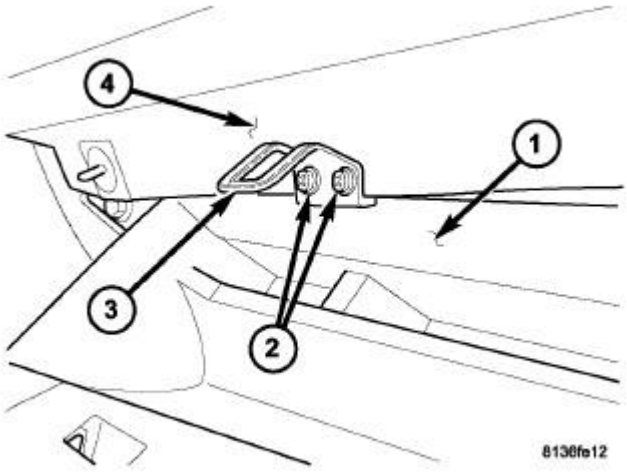


Fig. 350: Striker-Latch-Glove Box R And I
Courtesy of CHRYSLER GROUP, LLC

1. Position the glove box latch striker (3) onto the instrument panel (4).
2. Install the two screws (2) that secure the glove box latch striker onto the instrument panel. Tighten the screws securely.
3. Close glove box door (1).

INTERIOR

CARPET

REMOVAL

FRONT

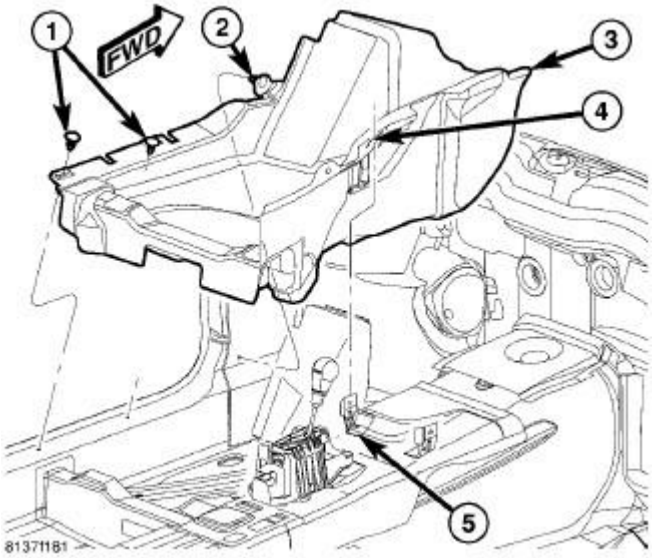


Fig. 351: Close And Lock Tonneau Cover (Close Top) Operation Chart
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front carpet consists of two individual carpets, one for the driver side and one for the passenger side. These carpets can be removed from and installed into the vehicle individually.

1. Remove the driver and/or passenger front seat from the vehicle as appropriate. Refer to **SEAT, FRONT, REMOVAL**.
2. Remove the center console from the front floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, REMOVAL**.
3. Remove the trim from the driver or passenger side lower cowl side inner panel as appropriate. Refer to **PANEL, COWL TRIM, REMOVAL**.
4. Remove the two push-pin fasteners (1) that secure the outboard edge of the front carpet (3) to the front door opening sill.

5. On the driver side only, remove the push-pin fastener (2) that secures the front carpet to the cowl side inner panel above the foot rest.

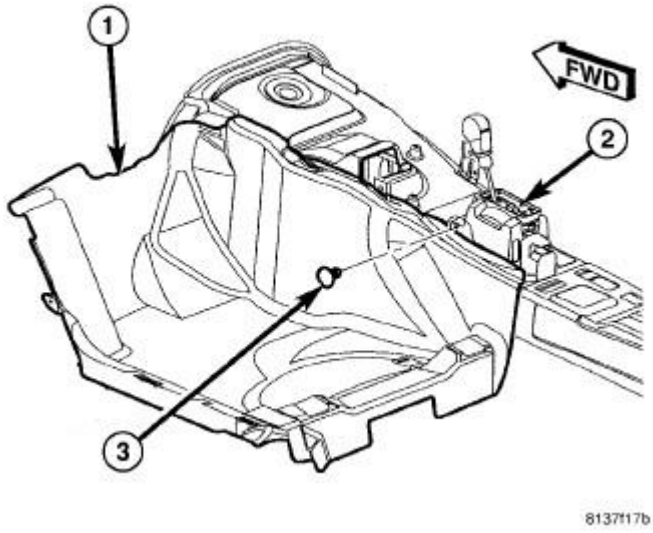


Fig. 352: Inboard Edge Of Front Carpet To Transmission Shifter Bracket
Courtesy of CHRYSLER GROUP, LLC

6. On the driver side only, remove the push-pin fastener (3) that secures the inboard edge of the front carpet (1) to the transmission shifter bracket (2).
7. Remove the front carpet from the floor panel.

REAR

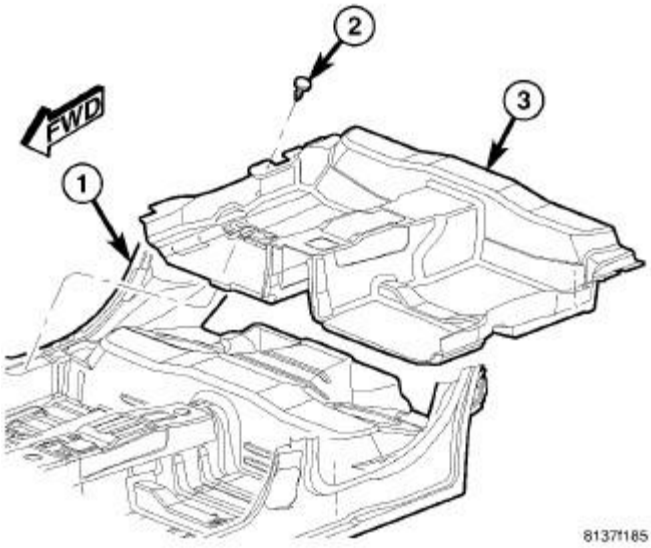


Fig. 353: Rear Carpet

Courtesy of CHRYSLER GROUP, LLC

1. Remove the driver and passenger front seats from the vehicle. Refer to **SEAT, FRONT, REMOVAL**.
2. Remove the center console from the front floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, REMOVAL**.
3. Remove the trim from the inside of both lower B-pillars. Refer to **PANEL, B-PILLAR TRIM, REMOVAL**.
4. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** & **COVER, SEAT CUSHION, SECOND ROW, REMOVAL**.
5. Remove the scuff plate from both rear door sills. Refer to **PLATE, SCUFF, REAR DOOR SILL, REMOVAL**.
6. Remove the push-pin fasteners (2) that secure the outboard edges of the rear carpet (3) near the front of each rear door opening (1) sill.
7. Lift the rear carpet from the floor panel far enough to extract the body wire harness take outs and connectors through the appropriate slits in the carpeting.
8. Remove the rear carpet from the vehicle through one of the rear door openings.

TRUNK - SEDAN

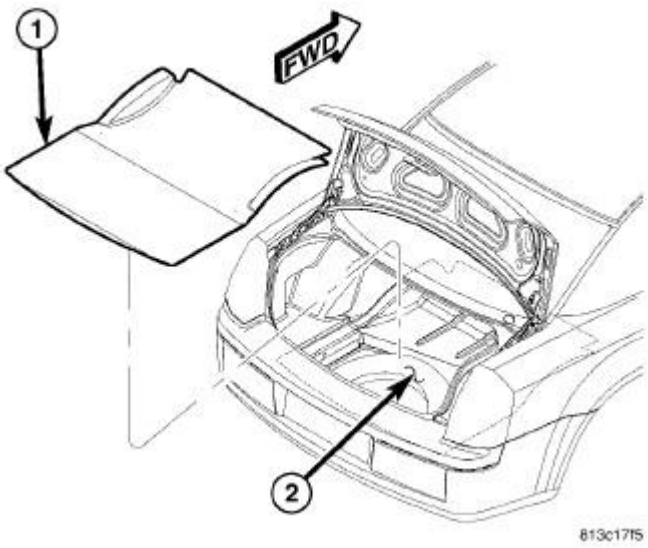


Fig. 354: Spare Tire Cover/Trunk Floor Carpet
Courtesy of CHRYSLER GROUP, LLC

1. If equipped, remove the cargo liner and/or cargo net from the luggage compartment.
2. Fold and remove the spare tire cover/trunk floor carpet (1) from over the spare tire well (2).

INSTALLATION

FRONT

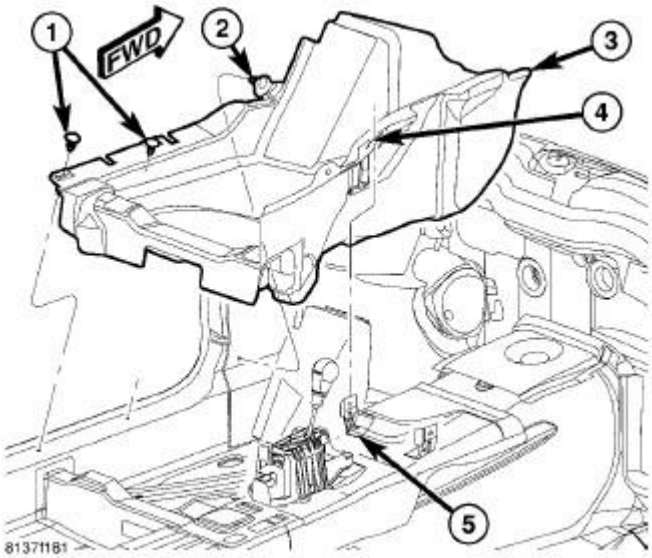


Fig. 355: Close And Lock Tonneau Cover (Close Top) Operation Chart
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front carpet consists of two individual carpets, one for the driver side and one for the passenger side. These carpets can be removed from and installed into the vehicle individually.

1. Position and fit the front carpet (3) onto the floor panel. Be certain that the rear of the front carpet is fitted over the floor panel front crossmember and butts up against the front of the rear carpet without interference with the rear floor air duct opening. Be certain that the front of the front carpet is fitted to the dash panel without interference with the steering column, the accelerator or the heater and air conditioner unit. On the driver side only, be certain the slit (4) on the inboard edge of the carpet is engaged around the left instrument panel support bracket (5) on the top of the floor panel transmission tunnel.
2. Install the two push-pin fasteners (1) that secure the outboard edge of the front carpet to the front door opening sill.
3. On the driver side only, install the push-pin fastener (2) that secures the front carpet to the cowl side inner panel above the foot rest.

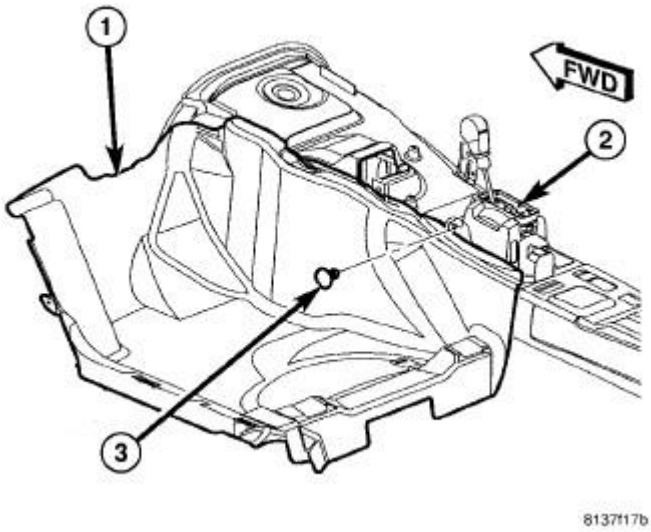


Fig. 356: Inboard Edge Of Front Carpet To Transmission Shifter Bracket
Courtesy of CHRYSLER GROUP, LLC

4. On the driver side only, install the push-pin fastener (3) that secures the inboard edge of the front carpet (1) to the transmission shifter bracket (2).
5. Reinstall the trim onto the driver or passenger side lower cowl side inner panel as appropriate. Refer to **PANEL, COWL TRIM, INSTALLATION**.
6. Reinstall the center console onto the front floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, INSTALLATION**.
7. Reinstall the driver and/or passenger front seat into the vehicle as appropriate. Refer to **SEAT, FRONT, INSTALLATION**.

REAR

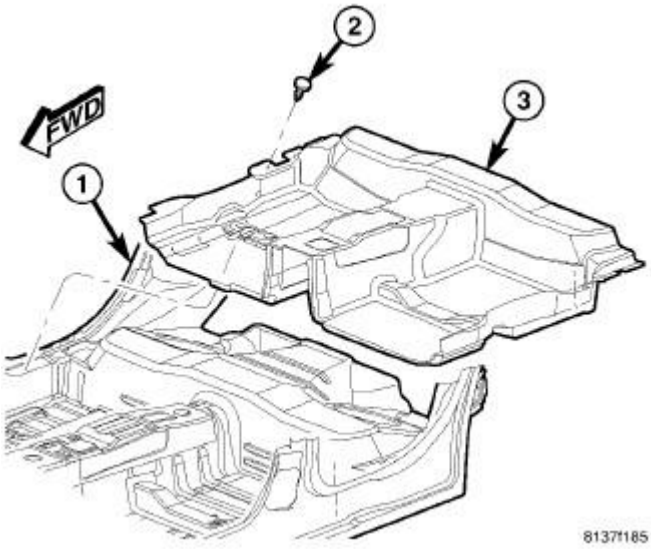


Fig. 357: Rear Carpet
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear carpet (3) into the vehicle through one of the rear door openings.
2. Pull the body wire harness take outs and connectors through the appropriate slits in the rear carpet.
3. Fit the rear carpet to the floor panel. Be certain to align the holes in the carpet with the corresponding holes in the floor panel. Be certain that the rear edge of the carpet is fitted over the rear seat kick-up area and over the rear seat cushion cups on the top of the kick-up area. Be certain that the front edge of the carpet is fitted over the front seat rear crossmember and butts up against the rear of the front seat front crossmember.
4. Install the push-pin fasteners (2) that secure the outboard edges of the rear carpet near the front of each rear door opening (1) sill.
5. Reinstall the scuff plate onto both rear door sills. Refer to **PLATE, SCUFF, REAR DOOR SILL, INSTALLATION**.
6. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** & **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION**.
7. Reinstall the trim onto the inside of both lower B-pillars. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION**.
8. Reinstall the center console onto the front floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, INSTALLATION**.
9. Reinstall the driver and passenger front seats into the vehicle. Refer to **SEAT, FRONT, INSTALLATION**.

TRUNK - SEDAN

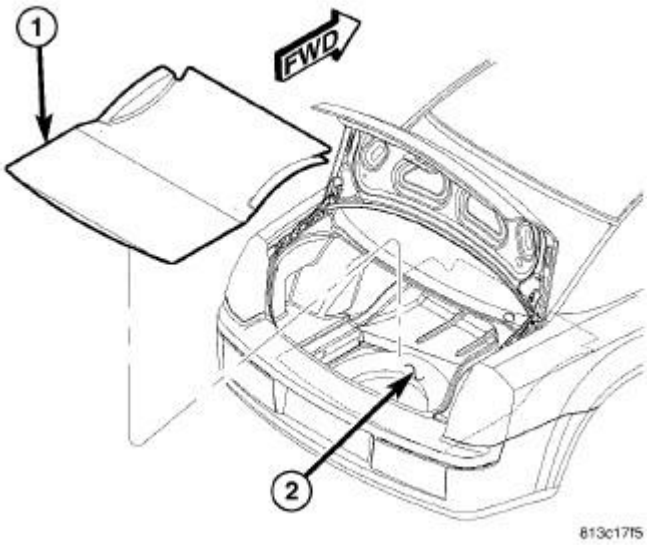


Fig. 358: Spare Tire Cover/Trunk Floor Carpet
Courtesy of CHRYSLER GROUP, LLC

1. Fold the spare tire cover/trunk floor carpet (1) and place it within the luggage compartment.
2. Unfold, position and fit the spare tire cover/trunk floor carpet over the spare tire well (2) in the luggage compartment.
3. If equipped, reinstall the cargo liner and/or cargo net into the luggage compartment.

CONSOLE, FLOOR

REMOVAL

REMOVAL

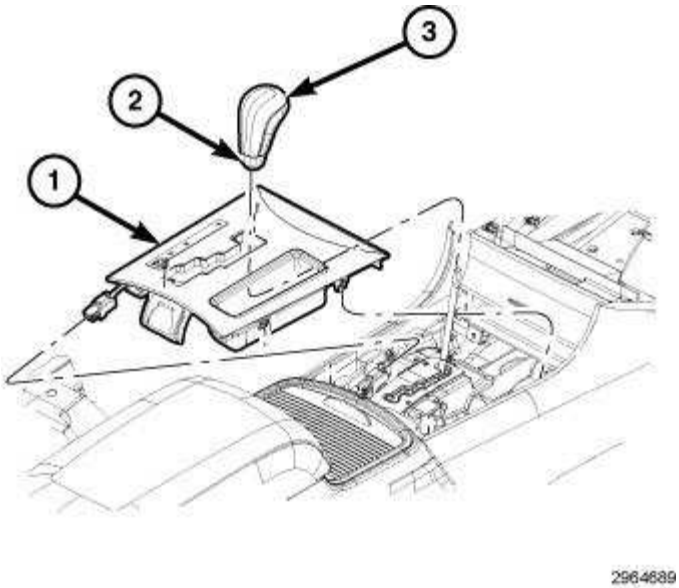


Fig. 359: Shifter Knob, Retaining Ring & Shifter Bezel
Courtesy of CHRYSLER GROUP, LLC

1. Apply the parking brake.
2. Turn the ignition switch to the On position, apply the service brakes and place the gear selector lever into the Neutral position.
3. Turn the ignition switch to the Off position and release the service brakes.

NOTE: **For vehicles equipped with the optional Automatic Express Up power window feature, calibration of this feature is required whenever power to the door module is disrupted.**

A battery reconnect procedure must be performed anytime the battery has been disconnected.

4. Disconnect and isolate the battery negative cable.
5. Using a thin wire type tool, locate and press the release while pulling up on the shifter knob (3).
6. Remove the shifter knob (3). Refer to **KNOB, GEARSHIFT, REMOVAL** & **SHIFTER, TRANSMISSION, REMOVAL** .
7. Using (special tool #C-4755, Trim Stick) or equivalent, gently pry between the shifter bezel (1) and the floor console to release the snap retainers that secure the bezel.**Do not pull with excessive force or fully remove at this time.**
8. Disconnect the shifter bezel wiring harness and remove the shifter bezel (1).

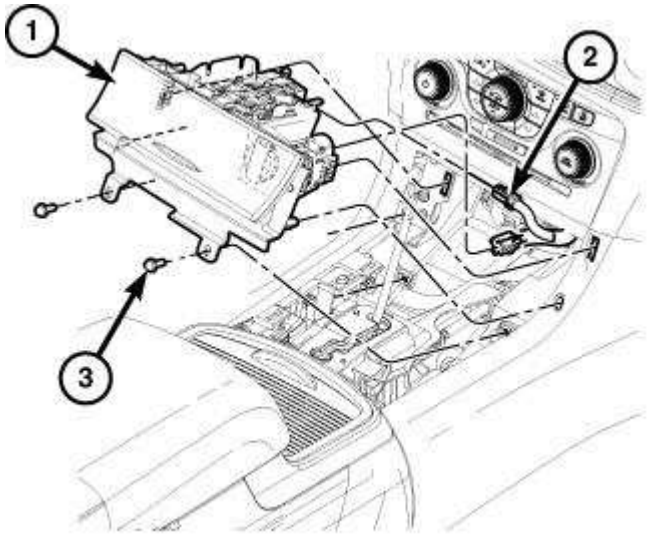


Fig. 360: Two Screws, Storage Bin & LED/Lamp Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

9. Remove the two screws (3) securing the storage bin (1) to the front console.
10. Using (special tool #C-4755, Trim Stick) or equivalent, gently pry between the storage bin (1)

and the floor console side close out panel to release the two snap retainers that secure the storage bin (1) to the front console and close out panel.

11. Disconnect the 12V power outlet wiring harness from the rear of the storage bin (1).
12. Disconnect the LED/Lamp wiring harness (2) from the rear of the storage bin (1) and remove the storage bin from the I/P.

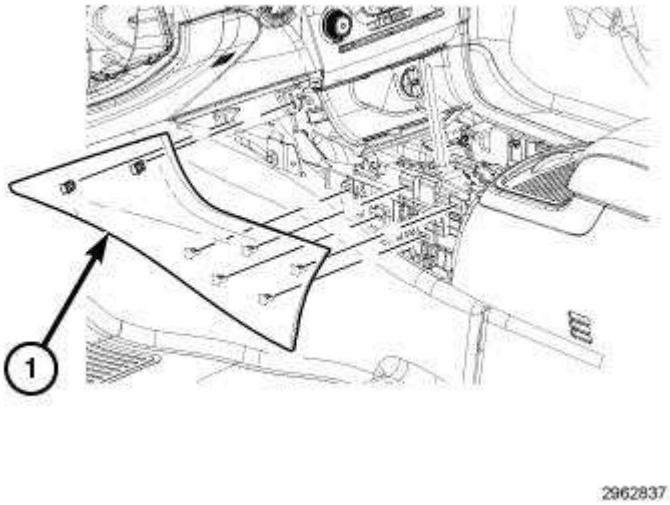


Fig. 361: Side Close Out Panel
Courtesy of CHRYSLER GROUP, LLC

13. Using (special tool #C-4755, Trim Stick) or equivalent, gently pry between the instrument panel and the floor console side close out panel (1) to release the two snap retainers that secure the close out panel to the instrument panel.
14. Using (special tool #C-4755, Trim Stick) or equivalent, gently pry between the floor console side close out panel (1) and the floor console to release the five snap retainers that secure the close out panel to the floor console.

NOTE: Repeat steps 14-15 for the opposite side.

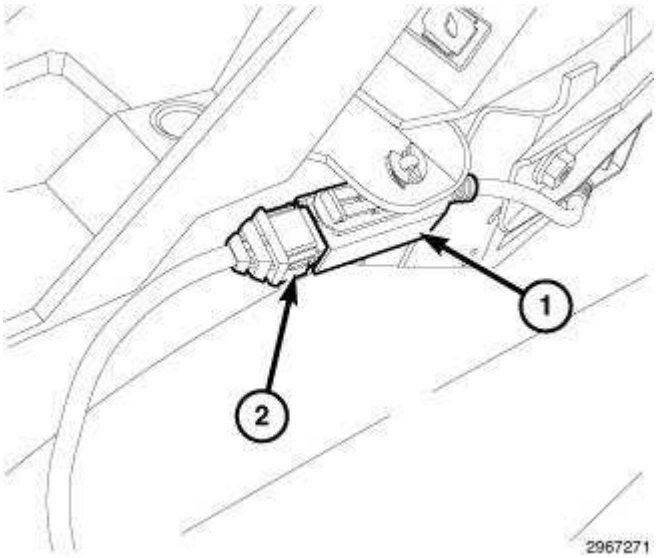


Fig. 362: USB Jumper Harness
Courtesy of CHRYSLER GROUP, LLC

15. If equipped, disconnect USB jumper harness (2).
16. Remove the connector (1) from the floor console tab by disengaging the retaining tab on the connector and sliding forward.

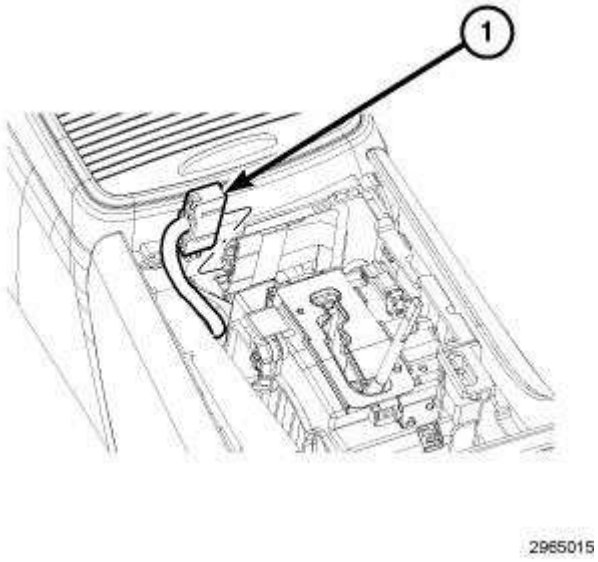


Fig. 363: Power Outlet Harness
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the console storage bin's power outlet harness (1).

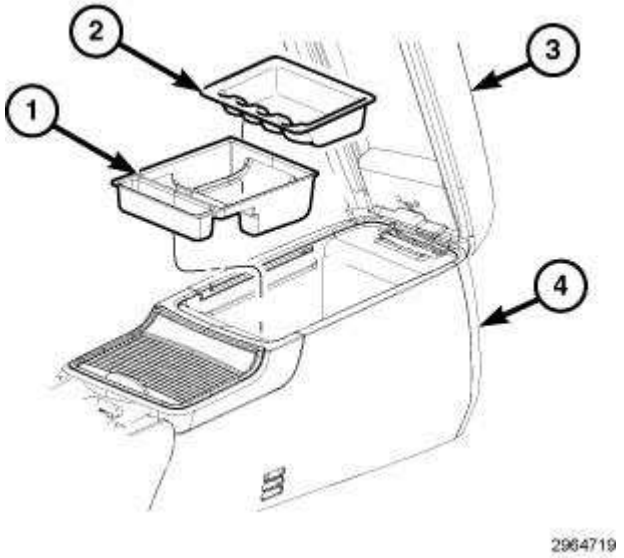


Fig. 364: Lid & Bins
Courtesy of CHRYSLER GROUP, LLC

18. Open the lid (3) of the console rear bin (4) and remove the coin holder bin (2).
19. Remove the mat bin (1) from the console rear bin (4).

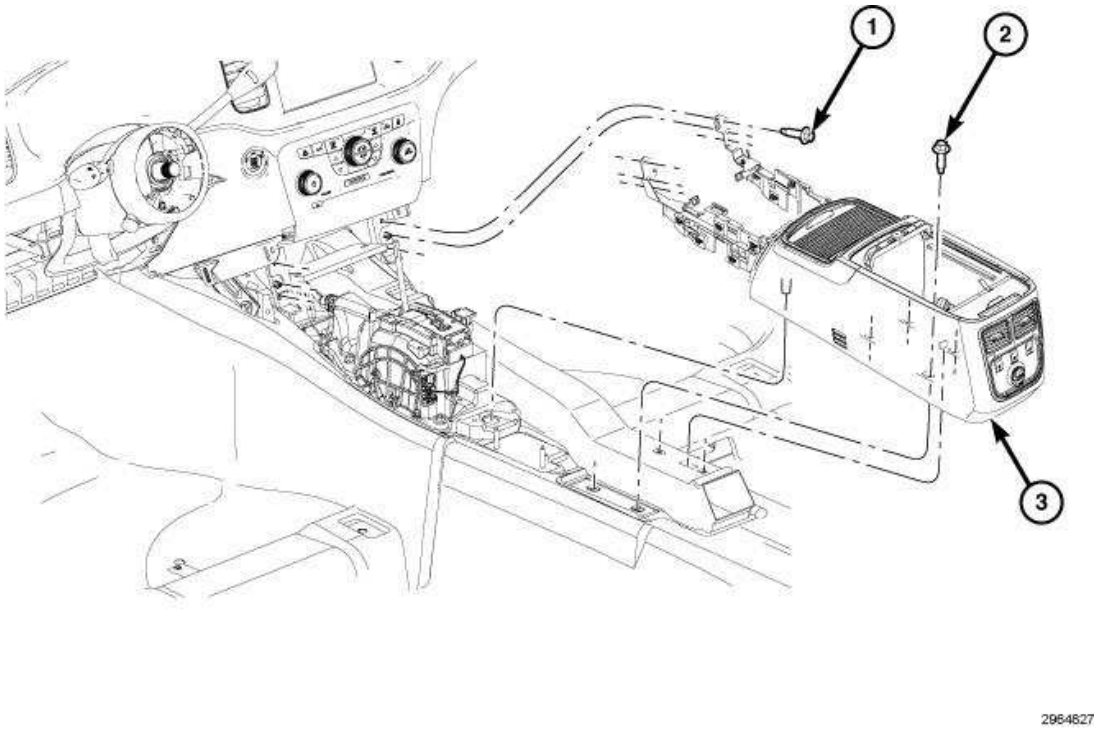


Fig. 365: Four Screws & Floor Console
Courtesy of CHRYSLER GROUP, LLC

20. Remove the four screws (2) from the rear bin that secure the floor console (3) to the floor panel

transmission tunnel.

21. Remove the four screws (1) that secure the front of the console (3) to the instrument panel.
22. Slide the floor console (3) rearward and tilt up. If equipped, disconnect the rear heated seat connector.
23. Remove the floor console from the vehicle.

INSTALLATION

INSTALLATION

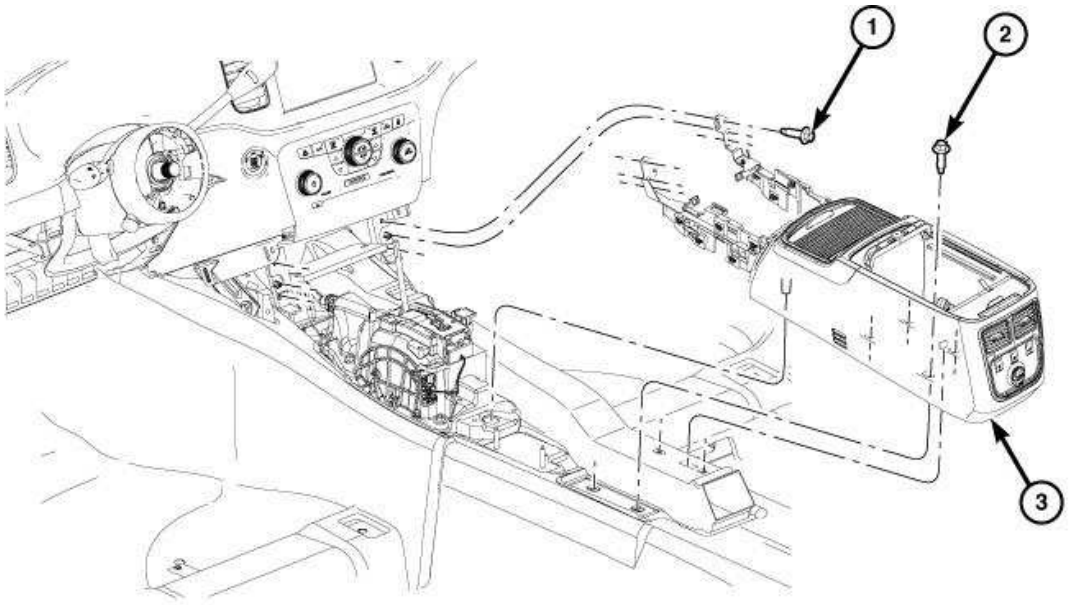


Fig. 366: Four Screws & Floor Console
Courtesy of CHRYSLER GROUP, LLC

1. Position the floor console (3) into the vehicle rearward far enough to access and if equipped, reconnect the rear heated seat connector.
2. While holding both sides of the console (3) at the front carefully engage the ears at the front of the console to the slots at the lower instrument panel.
3. Locate the two alignment holes at the front of the console (3) over the two alignment pins on the instrument panel.
4. Engage the locating pin on the underside of the console rear bin into the slot in the top of the floor panel transmission tunnel.
5. Install and tighten the four screws (1) that secure the front of the console (3) to the instrument panel. Tighten the screws to 2 N.m (18 in. lbs.).
6. Install and tighten the four screws (2) into the rear bin that secure the console (3) to the floor panel transmission tunnel. Tighten the screws to 4 N.m (35 in. lbs.).

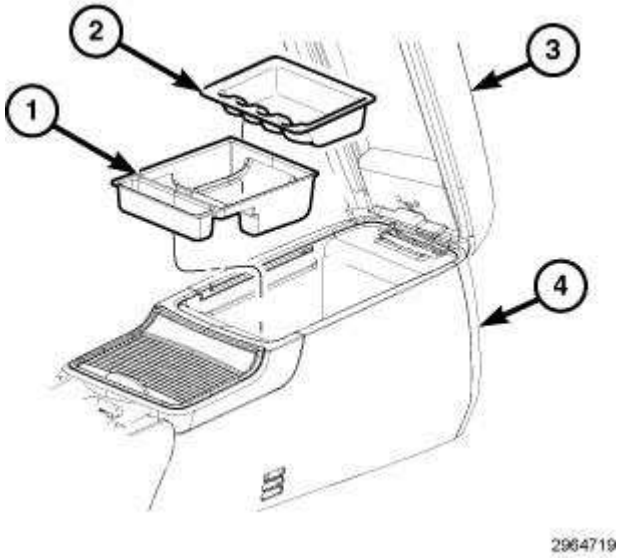


Fig. 367: Lid & Bins
Courtesy of CHRYSLER GROUP, LLC

7. Open the lid (3) of the console rear bin (4) and install the mat bin (1) into the console rear bin (4).
8. Install the coin holder bin (2).

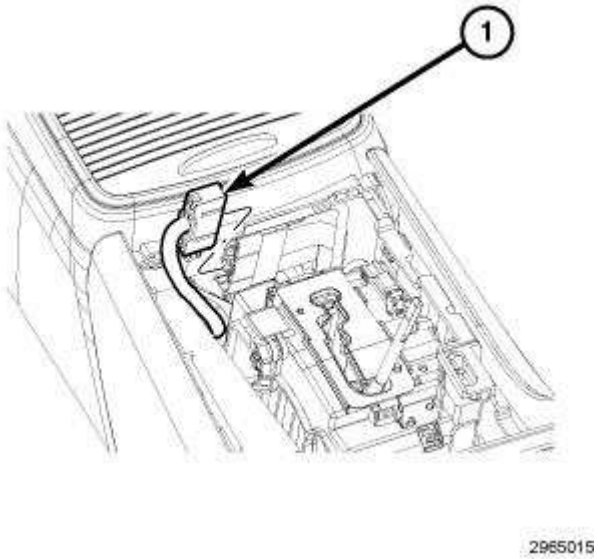


Fig. 368: Power Outlet Harness
Courtesy of CHRYSLER GROUP, LLC

9. Connect the console storage bin's power outlet harness (1).

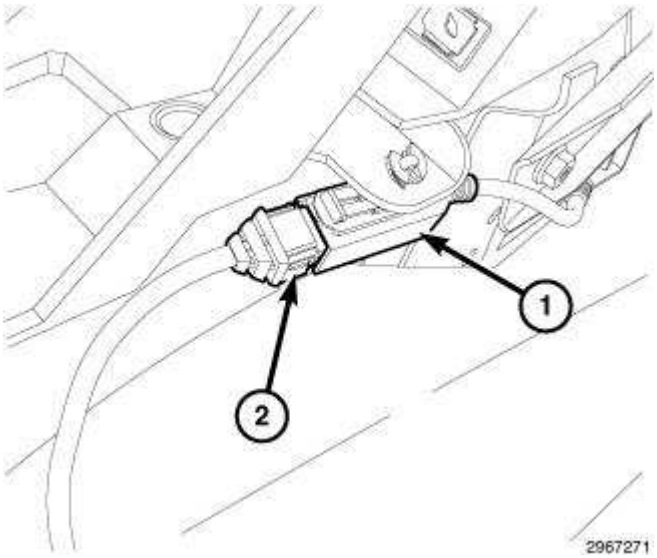


Fig. 369: USB Jumper Harness
Courtesy of CHRYSLER GROUP, LLC

10. If equipped, install the connector (1) to the floor console tab by engaging the retaining tab on the connector to the fastener and sliding rearward.
11. If equipped, connect the USB jumper harness (2).

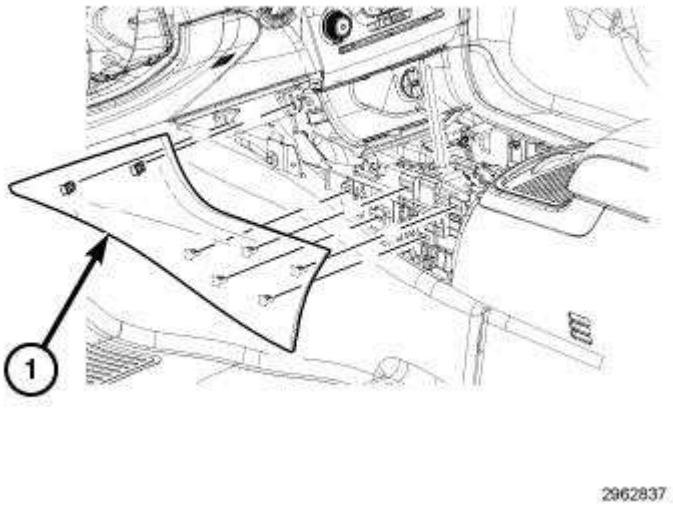


Fig. 370: Side Close Out Panel
Courtesy of CHRYSLER GROUP, LLC

12. Align the floor console side close out panel (1) to the floor console and use hand pressure to engage the five snap retainers that secure the close out panel to the floor console.
13. Align the floor console side close out panel (1) to the floor console and use hand pressure to engage the two snap retainers that secure the close out panel to the instrument panel.

NOTE: Repeat steps 12-13 for the opposite side.

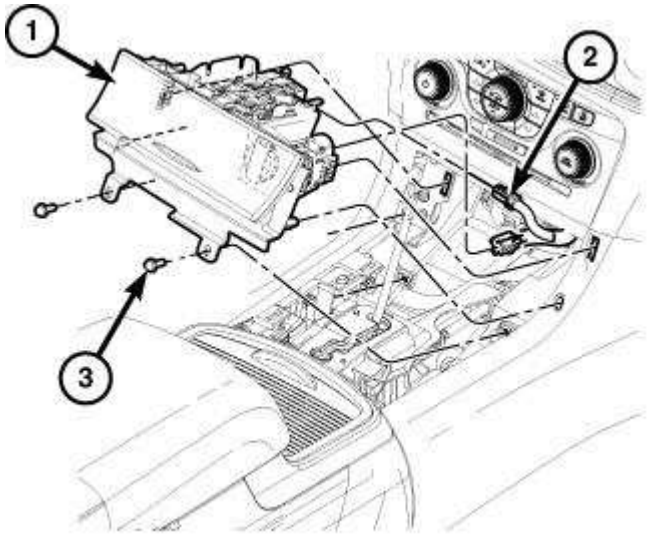


Fig. 371: Two Screws, Storage Bin & LED/Lamp Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

14. Connect the LED/Lamp wiring harness (2) to the rear of the storage bin (1).
15. Connect the 12V power outlet wiring harness to the rear of the storage bin (1).
16. Align the storage bin (1) to the front floor console and the side close out panel to engage the two snap retainers and alignment pins that secure the storage bin (1) to the floor console.
17. Install the two screws (3) securing the storage bin (1) to the front console. Tighten the screws to 2 N.m (18 in. lbs.).

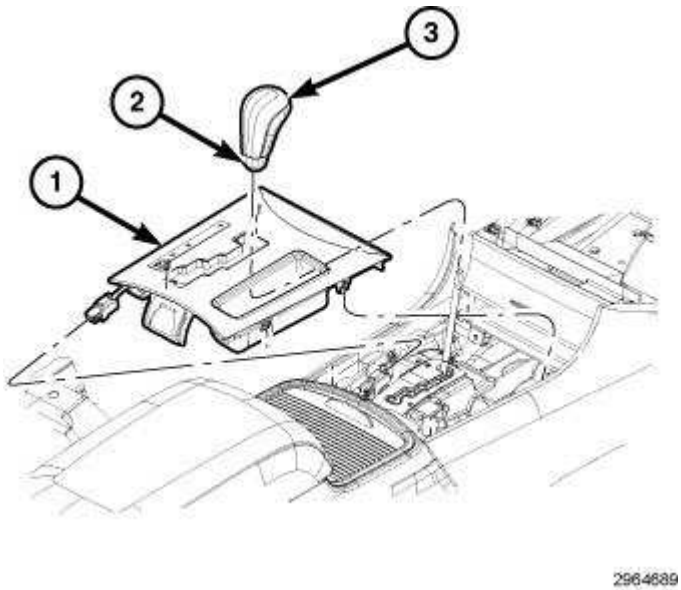


Fig. 372: Shifter Knob, Retaining Ring & Shifter Bezel
Courtesy of CHRYSLER GROUP, LLC

18. Connect the shifter bezel wiring harness and position the console shifter bezel (1) over the gear

selector lever.

19. Position the tabs on the underside of the console shifter bezel (1) into the holes in the floor console. Use hand pressure to engage the retaining tabs.
20. Install and tighten the two screws (1) that secure the front of the console shifter bezel to the console. Tighten the screws to 3 N.m (23 in. lbs.).
21. Position the mat (5) into the console rear bin with the curved edge oriented forward in the vehicle.
22. Install the shifter knob (3). Refer to **SHIFTER, TRANSMISSION, INSTALLATION** or **KNOB, GEARSHIFT, INSTALLATION** .

NOTE: **For vehicles equipped with the optional Automatic Express Up power window feature, calibration of this feature is required whenever power to the door module is disrupted.**

A battery reconnect procedure must be performed anytime the battery has been disconnected.

23. Reconnect the battery negative cable.

CONSOLE, OVERHEAD

DESCRIPTION

DESCRIPTION

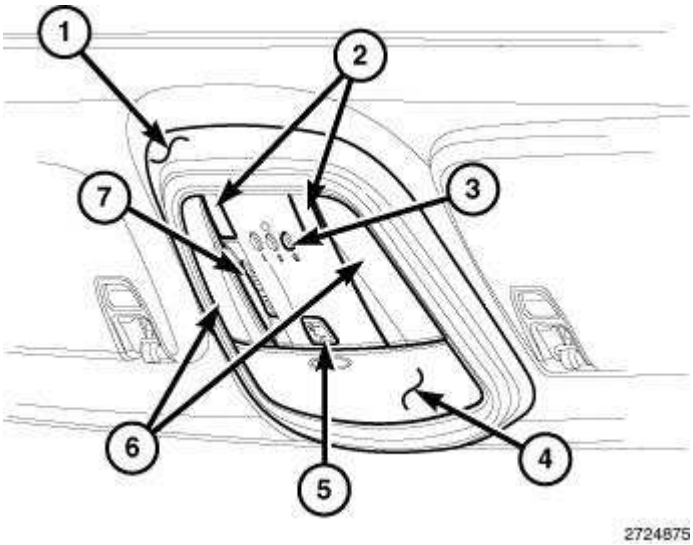


Fig. 373: View Of Overhead Console Transmitter Push Buttons
Courtesy of CHRYSLER GROUP, LLC

An overhead console is standard on this vehicle and includes the following components:

- Overhead storage compartment (4)

- Front map/reading lamps switches (2)
- Power sunroof switch (7) - if equipped
- Universal transmitter (3) - if equipped
- Power rear liftgate (5) - if equipped

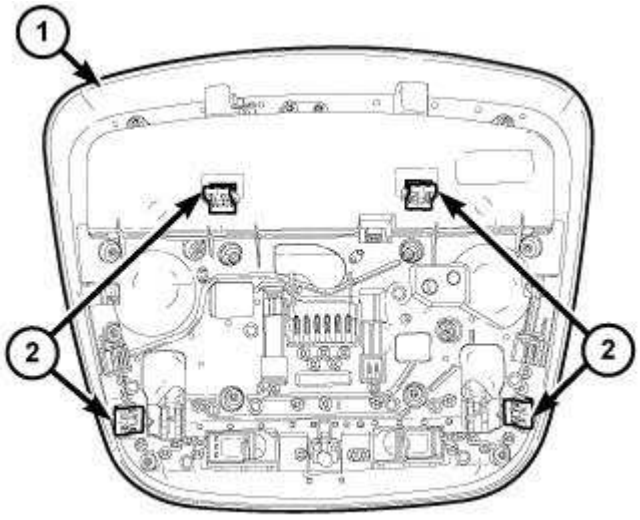


Fig. 374: Overhead Console Assembly & Four Snap Clips
Courtesy of CHRYSLER GROUP, LLC

The overhead console assembly (1) is mounted by four snap clips (2) securing it to a molded plastic retainer bracket located above the headliner. The Electronic Overhead Module is secured to the overhead console with screws and is only serviced as an assembly with the overhead console.

REMOVAL

REMOVAL

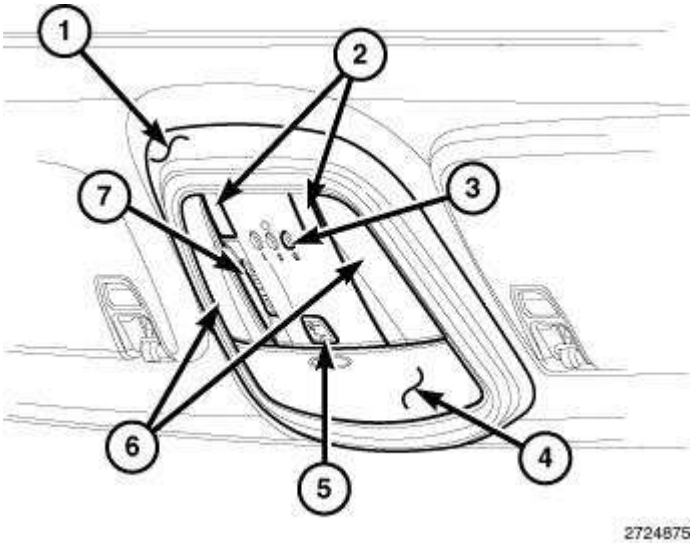


Fig. 375: View Of Overhead Console Transmitter Push Buttons
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Pull downward on the sides of the overhead console housing firmly and evenly to disengage the snap clips from the overhead console bracket.

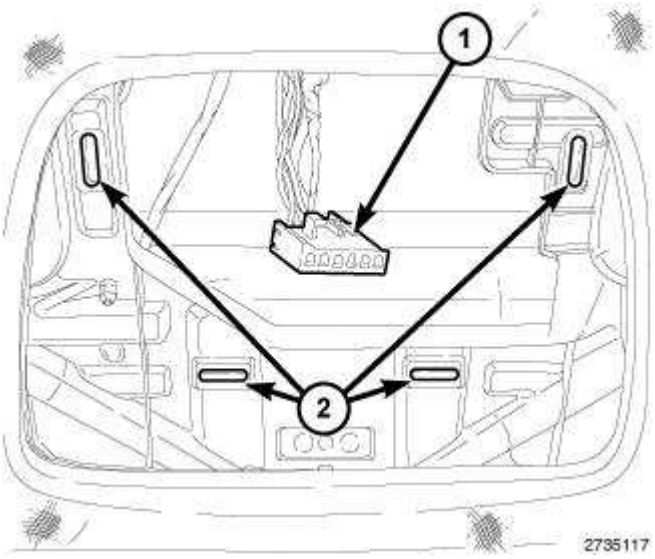


Fig. 376: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

3. Lower the overhead console far enough to access the wire harness connectors (1).
4. Disconnect the roof wire harness connectors from the connector receptacles.
5. Remove the overhead console.

INSTALLATION

INSTALLATION

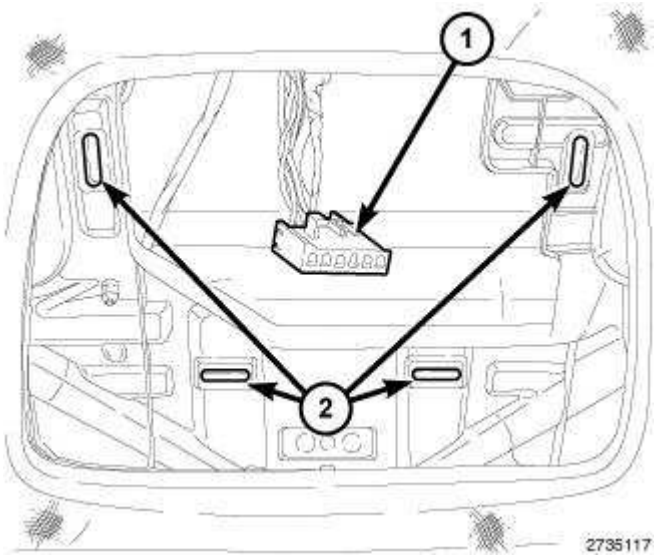


Fig. 377: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Position the overhead console near the mounting location on the headliner.
2. Connect the roof wire harness connectors (1) to the overhead console connector receptacles.
3. Align the snap clips on the overhead console housing with their receptacles (2) in the overhead console bracket.

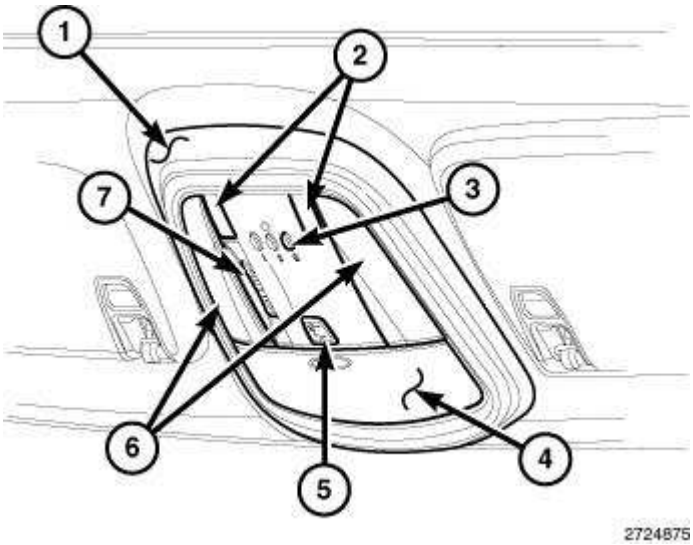


Fig. 378: View Of Overhead Console Transmitter Push Buttons
Courtesy of CHRYSLER GROUP, LLC

4. Push upward firmly and evenly on the sides of the overhead console housing (1) over the snap clip locations until the snap clips are fully engaged with their receptacles in the overhead console bracket.
5. Connect the negative battery cable.

FOOT REST, FLOOR, FRONT

REMOVAL

REMOVAL

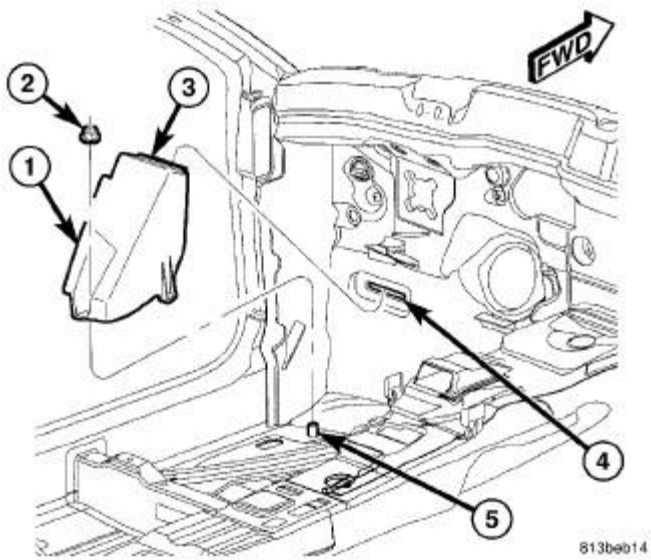


Fig. 379: Front Floor Foot Rest
Courtesy of CHRYSLER GROUP, LLC

1. Remove the trim from the driver side lower cowl side inner panel. Refer to **PANEL, COWL TRIM, REMOVAL**.
2. Remove the push-pin fastener that secure the driver side front carpet to the cowl side inner panel and the front door opening sill.
3. Pull the front floor carpet up and away from the foot rest (1) far enough to access and remove the nut (2) that secures the foot rest to the weld stud (5) on the front floor panel.
4. Lift the base of the foot rest upward far enough to disengage the tab (3) at the top of the foot rest from the slot (4) in the dash panel.

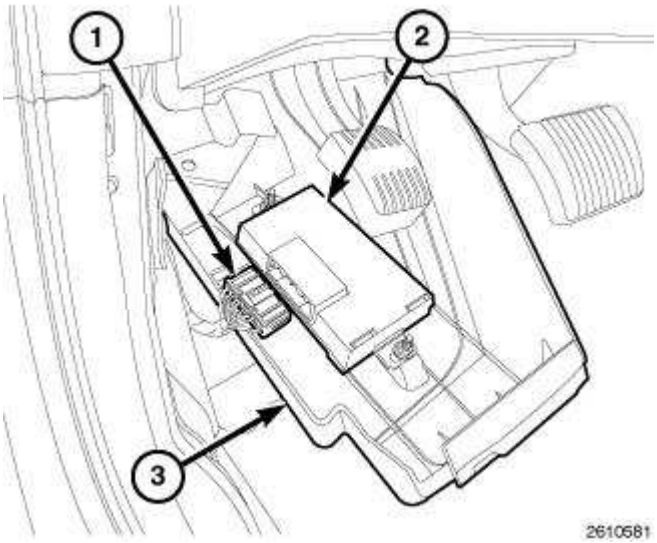


Fig. 380: DTCM Connector
Courtesy of CHRYSLER GROUP, LLC

5. (if equipped) Turn foot rest over and disconnect the DTCM connector (1) from the DTCM (2).
6. Remove the foot rest (3) from the vehicle.

INSTALLATION

INSTALLATION

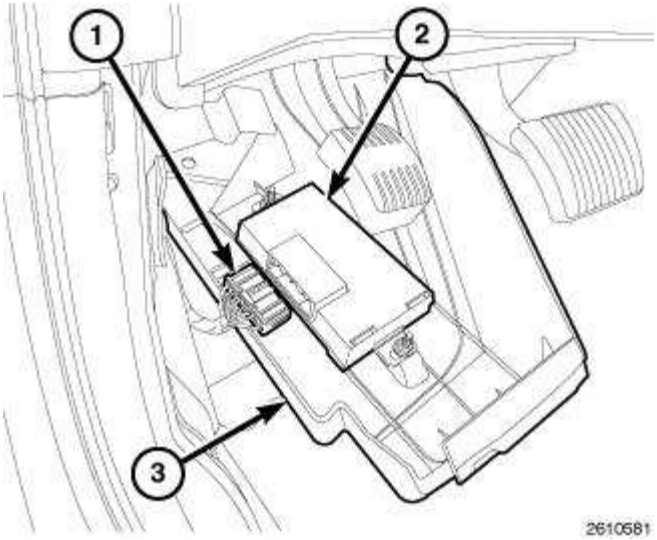


Fig. 381: DTCM Connector
Courtesy of CHRYSLER GROUP, LLC

1. (if equipped) Connect the electrical connector (1) to the DTCM (2).

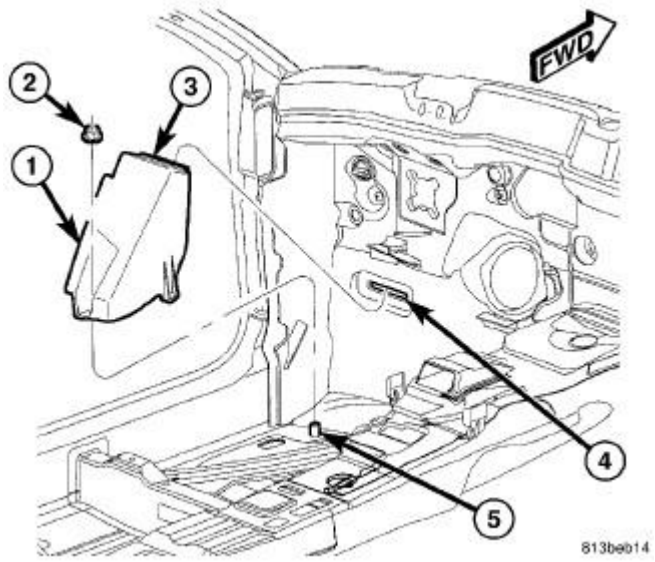


Fig. 382: Front Floor Foot Rest
Courtesy of CHRYSLER GROUP, LLC

2. Pull the outboard edge of the driver side front floor carpet up and away from the floor far enough to position the foot rest (1) between the front floor panel and the carpet.
3. Engage the tab (3) at the top of the foot rest into the slot (4) in the dash panel.
4. Position the hole at the base of the foot rest over the weld stud (5) on the front floor panel.
5. Install and tighten the nut (2) that secures the foot rest to the weld stud. Tighten the nut to 16 N.m (12 ft. lbs.).
6. Reposition the driver side front carpet to the cowl side inner panel and the front door opening sill and secure with the push-pin fastener.
7. Reinstall the trim onto the driver side lower cowl side inner panel. Refer to **PANEL, COWL TRIM, INSTALLATION**.

HEADLINER

REMOVAL

REMOVAL

WITH SUNROOF

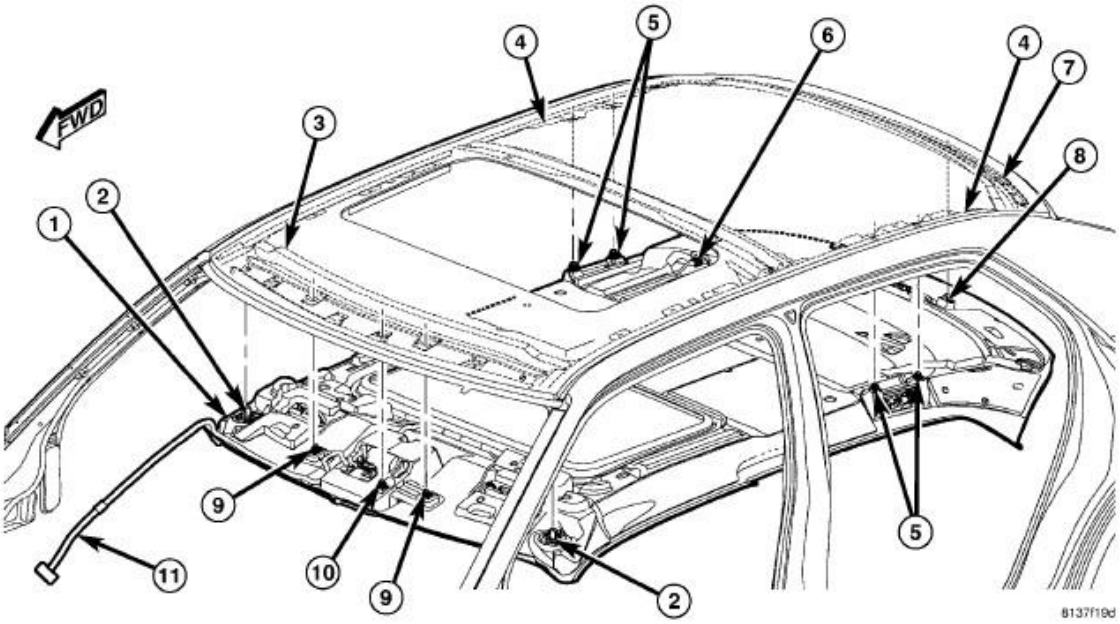


Fig. 383: Removing/Installing Headliner
Courtesy of CHRYSLER GROUP, LLC

NOTE: In the event the headliner is damaged or creased during removal, it will need to be replaced with a new headliner.

1. Disconnect and isolate the battery negative cable.
2. Remove the windshield. Refer to **WINDSHIELD, REMOVAL**.
3. Remove the trim from both upper A-pillars. Refer to **PANEL, A-PILLAR TRIM, REMOVAL**.
4. Disengage the headliner wire harnesses from the retainers on each inner A-pillar and disconnect the connectors (11) from the body wire harness connectors near the base of each A-pillar.
5. Remove the trim from both upper B-pillars. Refer to **PANEL, B-PILLAR TRIM, REMOVAL**.
6. Remove the trim from both upper C-pillars. Refer to **PANEL, C-PILLAR TRIM, REMOVAL**.
7. If the vehicle is so equipped, remove the overhead console from the center of the headliner (1) near the windshield header (3).
8. If the vehicle is so equipped, disconnect the electrochromic (automatic dimming) and/or the telematic (hands-free phone) mirror takeout(s) and connector(s) as well as the headliner wire harness from the connector receptacle(s) on the back (windshield side) of the inside rear view mirror housing.
9. Remove both sun visors and both visor receptacles from the headliner near the windshield header.
10. Remove both grab handle/coat hook/rear dome/reading lamp units from the headliner at the inner rear roof side rails (4).
11. Remove the trim welt from the headliner sunroof opening.
12. Recline both front seat backs.

13. Carefully pull the headliner downward at the windshield header far enough to disengage the spring clip retainers at each sun visor mounting location (2), at each visor receptacle location (9), and at the overhead console location (10).
14. Carefully pull the headliner downward at the inner rear roof side rails far enough to disengage the spring clip retainers at each grab handle location (5).
15. Carefully pull the headliner downward near the center of the rear roof header (7) far enough to disengage the rear spring clip retainer (8).
16. Reach between the headliner and the roof panel from the right rear door opening to access and disconnect the sunroof jumper wire connector from the headliner wire harness sunroof take out and connector (6).
17. Carefully remove the headliner through the windshield opening.

WITHOUT SUNROOF

NOTE: In the event the headliner is damaged or creased during removal, it will need to be replaced with a new headliner.

NOTE: Do not remove the headliner from the vehicle unless replacing with a new headliner. Repeated removals of the headliner can cause damage due to fatigue of the headliner material.

1. Disconnect and isolate the battery negative cable.
2. Remove the windshield. Refer to **WINDSHIELD, REMOVAL**.
3. Remove the trim from both upper A-pillars. Refer to **PANEL, A-PILLAR TRIM, REMOVAL**.
4. Disengage the headliner wire harnesses from the retainers on each inner A-pillar and disconnect the connectors (11) from the body wire harness connectors near the base of each A-pillar.
5. Remove the trim from both upper B-pillars. Refer to **PANEL, B-PILLAR TRIM, REMOVAL**.
6. Remove the trim from both upper C-pillars. Refer to **PANEL, C-PILLAR TRIM, REMOVAL**.
7. If the vehicle is so equipped, remove the overhead console from the center of the headliner near the windshield header.
8. If the vehicle is so equipped, disconnect the electrochromic (automatic dimming) and/or the telematic (hands-free phone) mirror takeout(s) and connector(s) of the headliner wire harness from the connector receptacle(s) on the back (windshield side) of the inside rear view mirror housing.
9. Remove both sun visors and both visor receptacles from the headliner near the windshield header.
10. Remove both grab handle/coat hook/rear dome/reading lamp units from the headliner at the inner rear roof side rails.
11. Recline both front seat backs.
12. Carefully pull the headliner downward at the windshield header far enough to disengage the spring clip retainers at each sun visor mounting location (2), at each visor receptacle location, and at the overhead console location.

13. Carefully pull the headliner downward at the inner rear roof side rails far enough to disengage the spring clip retainers at each grab handle location.
14. Carefully pull the headliner downward near the center of the rear roof header far enough to disengage the rear spring clip retainer.
15. Carefully bow the headliner longitudinally as necessary to remove the unit through the right rear door opening.

INSTALLATION

INSTALLATION

WITH SUNROOF

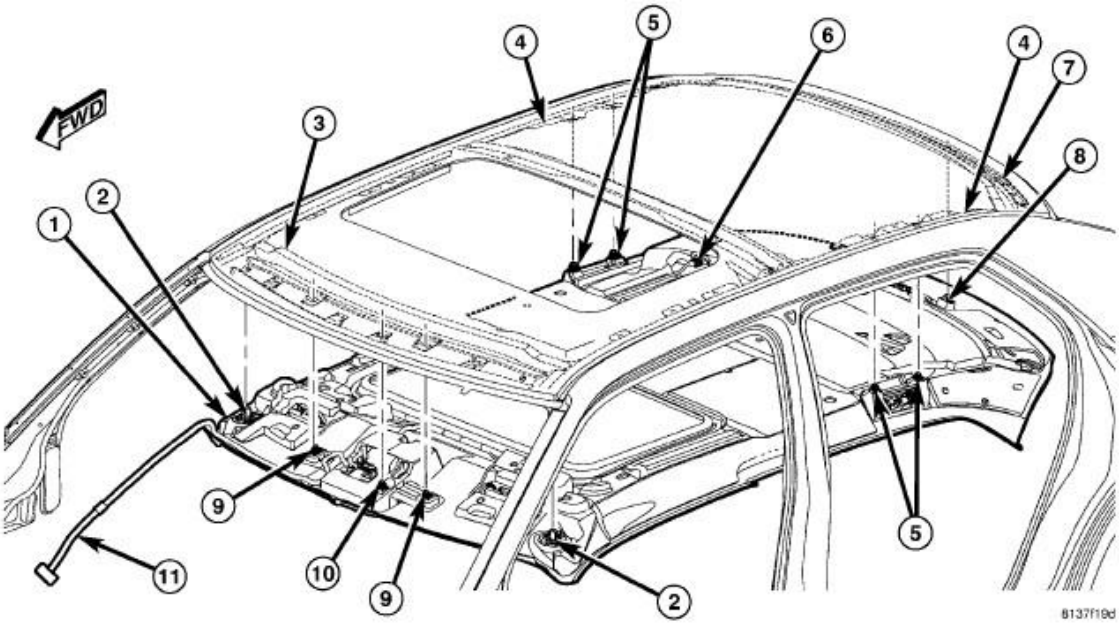


Fig. 384: Removing/Installing Headliner
Courtesy of CHRYSLER GROUP, LLC

NOTE: In the event the headliner is damaged or creased during removal, it will need to be replaced with a new headliner.

1. Carefully insert the headliner through the windshield opening.
2. Reach between the headliner and the roof panel from the right rear door opening to access and reconnect the sunroof jumper wire connector to the headliner wire harness sunroof take out and connector (6).

NOTE: In order to ease installation and ensure proper headliner positioning it is important to install the headliner spring clip retainers in the correct sequence as follows.

3. Position the spring clip at the right visor receptacle location (9) to the appropriate hole in the

windshield header (3) and press firmly and evenly upward on the headliner over the retainer location until it snaps into place.

4. Position the rear spring clip retainer (8) to the appropriate hole near the center of the rear roof header (7) and press firmly and evenly upward on the headliner over the retainer location until it snaps into place.
5. Position the two spring clip retainers at each grab handle location (5) to the appropriate holes in the inner rear roof side rails (4) and press firmly and evenly upward on the headliner over each retainer location until it snaps into place.
6. Position the spring clip retainers at each sun visor mounting location (2), at the left visor receptacle location (9), and at the overhead console location (10) to the appropriate holes in the windshield header and press firmly and evenly upward on the headliner over each retainer location until it snaps into place.
7. Reinstall the trim welt onto the headliner sunroof opening.
8. Reinstall both grab handle/coat hook/rear dome/reading lamp units into the headliner at the inner rear roof side rails.
9. Reinstall both sun visors and both visor receptacles onto the headliner near the windshield header.
10. If the vehicle is so equipped, reconnect the electrochromic (automatic dimming) and/or the telematic (hands-free phone) mirror takeout and connector of the headliner wire harness to the connector receptacle(s) on the back (windshield side) of the inside rear view mirror housing.
11. If the vehicle is so equipped, reinstall the overhead console to the center of the headliner near the windshield header.
12. Reinstall the trim onto both upper C-pillars. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.
13. Reinstall the trim onto both upper B-pillars. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION**.
14. Engage the headliner wire harnesses into the retainers on each inner A-pillar and reconnect the connectors (11) to the body wire harness connectors near the base of each A-pillar. Be certain the harnesses are not twisted and that the connectors are both fully engaged.
15. Reinstall the trim onto both upper A-pillars. Refer to **PANEL, A-PILLAR TRIM, INSTALLATION**.
16. Install the windshield. Refer to **WINDSHIELD, INSTALLATION**.
17. Reconnect the battery negative cable.

WITHOUT SUNROOF

NOTE: In the event the headliner is damaged or creased during removal, it will need to be replaced with a new headliner.

1. Carefully bow the headliner longitudinally as necessary to position the unit into the vehicle through the right rear door opening.

NOTE: In order to ease installation and ensure proper headliner positioning it is important to install the headliner spring clip retainers in the correct sequence as follows.

2. Position the spring clip at the right visor receptacle location to the appropriate hole in the windshield header and press firmly and evenly upward on the headliner over the retainer location until it snaps into place.
3. Position the rear spring clip retainer to the appropriate hole near the center of the rear roof header and press firmly and evenly upward on the headliner over the retainer location until it snaps into place.
4. Position the two spring clip retainers at each grab handle location to the appropriate holes in the inner rear roof side rails and press firmly and evenly upward on the headliner over each retainer location until it snaps into place.
5. Position the spring clip retainers at each sun visor mounting location, at the left visor receptacle location, and at the overhead console location to the appropriate holes in the windshield header and press firmly and evenly upward on the headliner over each retainer location until it snaps into place.
6. Reinstall both grab handle/coat hook/rear dome/reading lamp units into the headliner at the inner rear roof side rails.
7. Reinstall both sun visors and both visor receptacles onto the headliner near the windshield header.
8. If the vehicle is so equipped, reconnect the electrochromic (automatic dimming) and/or the telematic (hands-free phone) mirror takeout and connector of the headliner wire harness to the connector receptacle(s) on the back (windshield side) of the inside rear view mirror housing.
9. If the vehicle is so equipped, reinstall the overhead console to the center of the headliner near the windshield header.
10. Reinstall the trim onto both upper C-pillars. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.
11. Reinstall the trim onto both upper B-pillars. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION**.
12. Engage the headliner wire harnesses into the retainers on each inner A-pillar and reconnect the connectors (11) to the body wire harness connectors near the base of each A-pillar. Be certain the harnesses are not twisted and that the connectors are both fully engaged.
13. Reinstall the trim onto both upper A-pillars. Refer to **PANEL, A-PILLAR TRIM, INSTALLATION**.
14. Install the windshield. Refer to **WINDSHIELD, INSTALLATION**.
15. Reconnect the battery negative cable.

MIRROR, REARVIEW

REMOVAL

REMOVAL

PRISMATIC MIRROR

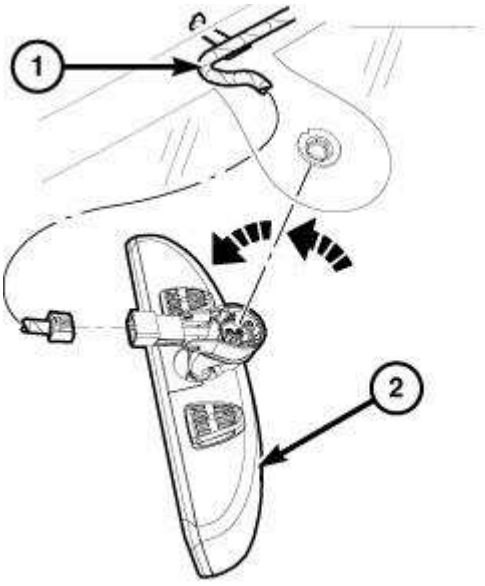


Fig. 385: Mirror Harness Connector & Mirror Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: View shown in illustration from exterior of the vehicle.

1. Disconnect the negative battery cable.
2. Remove the harness trim cover.
3. Disconnect the mirror harness connector (1).
4. Accessing through the vehicle interior, twist the mirror assembly (2) clockwise and release the mirror from the aluminum button attached to the windshield.

TELEMATICS MIRROR

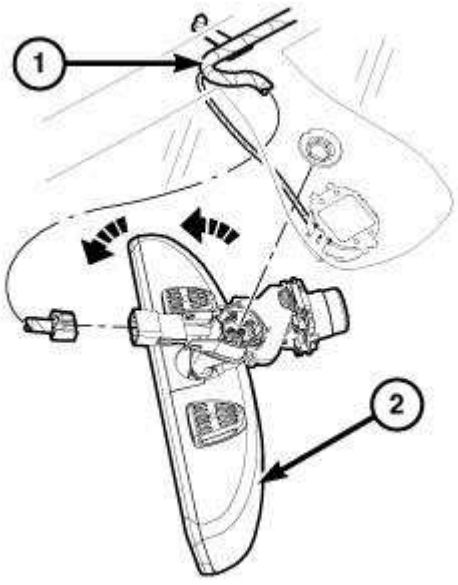


Fig. 386: Mirror Harness Connector & Mirror Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: View shown in illustration from exterior of the vehicle.

1. Disconnect the negative battery cable.
2. Using (special tool #C-4755, Trim Stick), separate the mirror trim, harness trim covers and remove.
3. Disconnect the mirror harness connector (1).
4. Accessing through the vehicle interior, twist the mirror assembly (2) clockwise and release the mirror from the aluminum button attached to the windshield.

INSTALLATION

INSTALLATION

PRISMATIC MIRROR

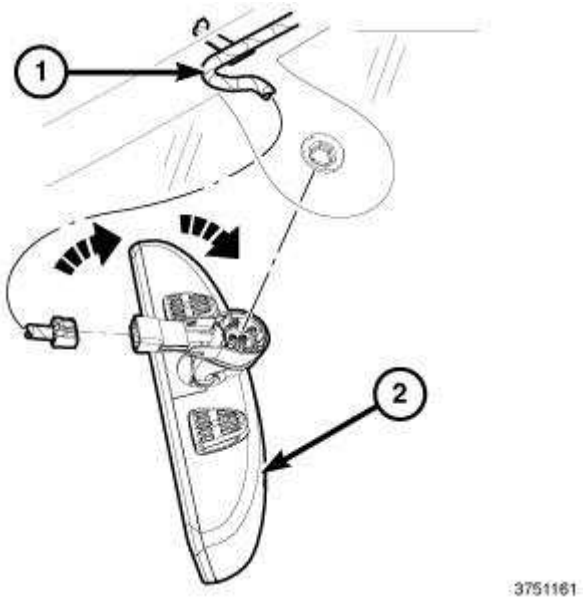


Fig. 387: Mirror Assembly & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: View shown in illustration from exterior of the vehicle.

1. Place the rearview mirror over the aluminum button in the upper center of the windshield.
2. Accessing through the vehicle interior, twist the mirror assembly (2) counter clockwise to install the mirror on the aluminum button attached to the windshield.

NOTE: Mirror must be fully seated or wedged onto the button before rotating.

3. Connect the mirror harness connector (1) to the mirror (2).
4. Position the harness back and install the harness cover.
5. Connect the negative battery cable.

TELEMATICS MIRROR

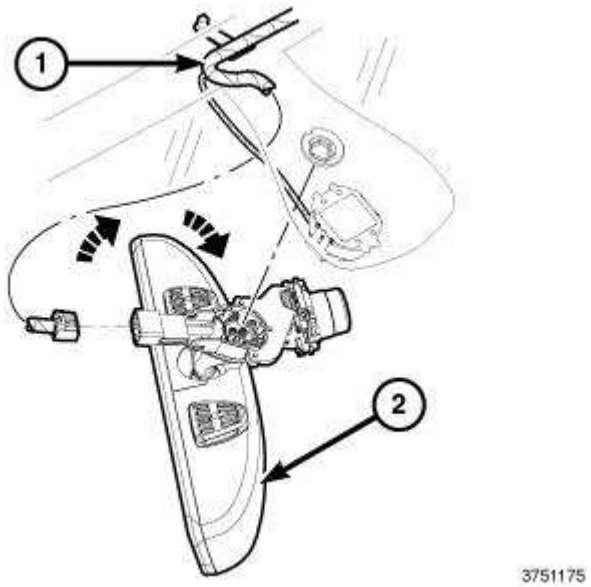


Fig. 388: Mirror Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

1. Place the rearview mirror over the aluminum button in the upper center of the windshield.
2. Twist the mirror base onto the button in a counter clockwise direction to attach the mirror.

NOTE: Mirror must be fully seated or wedged onto the button before rotating.

NOTE: Mirror must be rotated in a counter clockwise direction to prevent the mirror from touching the rain sensor.

3. Position the rain sensor wire harness back into place and secure accordingly.
4. Connect the electrical connector (1) and install the trim cover.

NOTE: Rain sensor connection should be verified prior to install the mirror trim covers.

5. Install the mirror trim and harness trim covers

NOTE: Failure to calibrate the Smartbeam camera may diminish system performance and cause Diagnostic Trouble Codes (DTCs) to set.

6. Perform the Smartbeam System Calibration Procedure. Refer to **SMART BEAM, STANDARD PROCEDURE** .
7. Connect the negative battery cable.

REAR VIEW MIRROR SUPPORT BRACKET

1. Mark the position for the mirror bracket on the outside of the windshield glass with a wax pencil.
2. Clean the bracket contact area on the glass. Use a mild powdered cleanser on a cloth saturated with isopropyl (rubbing) alcohol. Finally, clean the glass with a paper towel dampened with alcohol.
3. Sand the surface on the support bracket with fine grit-sandpaper. Wipe the bracket surface clean with a paper towel.
4. Apply accelerator to the surface on the bracket according to the following instructions:
    1. Crush the vial to saturate the felt applicator.
    2. Remove the paper sleeve.
    3. Apply accelerator to the contact surface on the bracket.
    4. Allow the accelerator to dry for five minutes.
    5. Do not touch the bracket contact surface after the accelerator has been applied.
5. Apply adhesive accelerator to the bracket contact surface on the windshield glass. Allow the accelerator to dry for one minute. Do not touch the glass contact surface after the accelerator has been applied.
6. Install the bracket according to the following instructions:
    1. Apply one drop of adhesive at the center of the bracket contact-surface on the windshield glass.
    2. Apply an even coat of adhesive to the contact surface on the bracket.
    3. Align the bracket with the marked position on the windshield glass.
    4. Press and hold the bracket in place for at least one minute.

    NOTE: Verify that the mirror support bracket is correctly aligned, because the adhesive will cure rapidly.

7. Allow the adhesive to cure for 8-10 minutes. Remove any excess adhesive with an alcohol-dampened cloth.
8. Allow the adhesive to cure for an additional 8-10 minutes before installing the mirror.

    NOTE: Failure to calibrate the Smartbeam camera may diminish system performance and cause Diagnostic Trouble Codes (DTCs) to set.

9. If equipped, perform the Smartbeam System Calibration Procedure after installing the mirror. Refer to **SMART BEAM, STANDARD PROCEDURE** .

PANEL, A-PILLAR TRIM

REMOVAL

REMOVAL

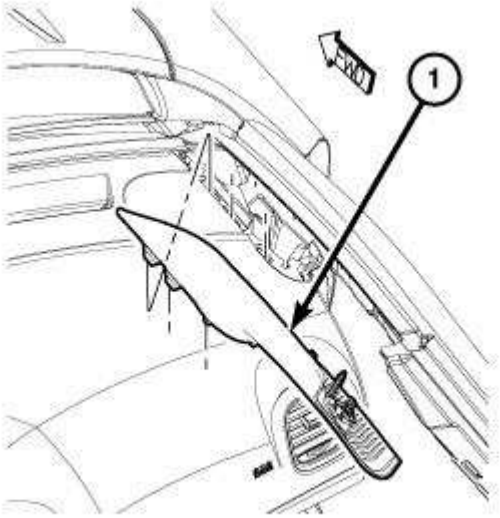


Fig. 389: A-Pillar Trim
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #C-4755, Trim Stick) trim stick or another suitable wide flat-bladed tool, carefully pry the upper end of the A-pillar trim (1) rearward from the inside of the A-pillar far enough to disengage the two spring clip retainers that secure the trim to the slots in the pillar.
2. Disengage the base of the A-pillar trim from the end of the instrument panel top cover.
3. Remove the A-pillar trim from the vehicle.

INSTALLATION

INSTALLATION

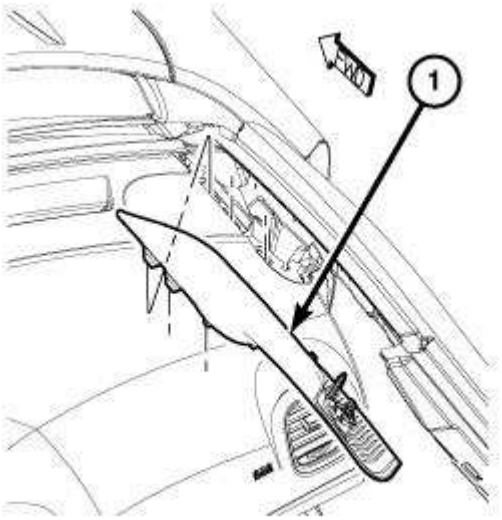


Fig. 390: A-Pillar Trim
Courtesy of CHRYSLER GROUP, LLC

1. Engage the base of the A-pillar trim (1) to the end of the instrument panel top cover.
2. Align the spring clip retainers on the trim with the slots in the inner A-pillar.
3. Using hand pressure, press firmly and evenly forward on the trim over each of the spring clip locations until the retainers snap into place.

PANEL, B-PILLAR TRIM

REMOVAL

REMOVAL

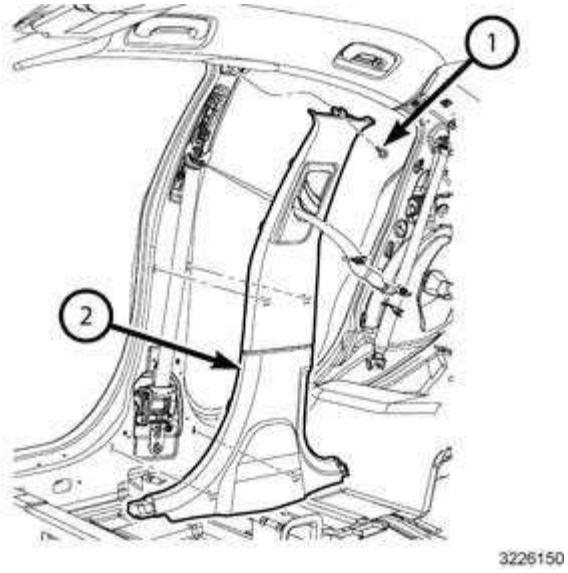


Fig. 391: B-Pillar

Courtesy of CHRYSLER GROUP, LLC

1. Detach the seat belt at the seat. Refer to **RETRACTOR, SEAT BELT, REMOVAL** .
2. Detach the front and rear door scuff trim panels at the B-pillar (1).
3. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, starting at the bottom of the B-pillar (1) and working upward, disengage the retaining clips.
4. Remove the B-Pillar (1).

INSTALLATION

INSTALLATION

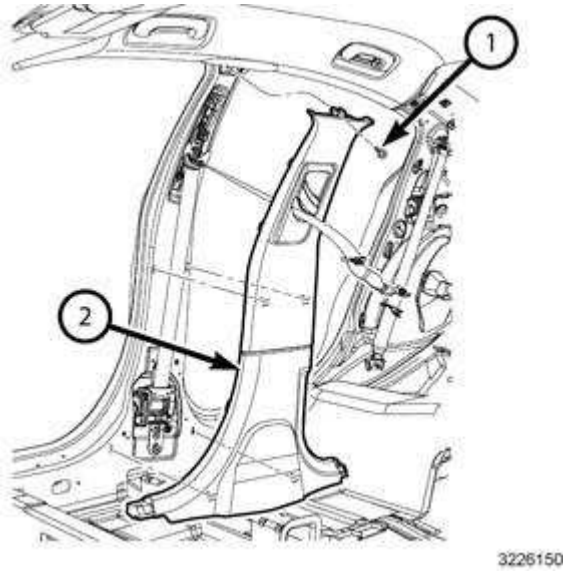


Fig. 392: B-Pillar
Courtesy of CHRYSLER GROUP, LLC

1. Align and position the B-Pillar (1).
2. Starting at the top of the B-pillar (1) and working downward, hand tap to engage the retaining clips.
3. Re-attach the front and rear door scuff trim panels at the B-pillar (1).
4. Re-install the seat belt at the seat. Refer to **RETRACTOR, SEAT BELT, INSTALLATION** .

PANEL, C-PILLAR TRIM

REMOVAL

UPPER

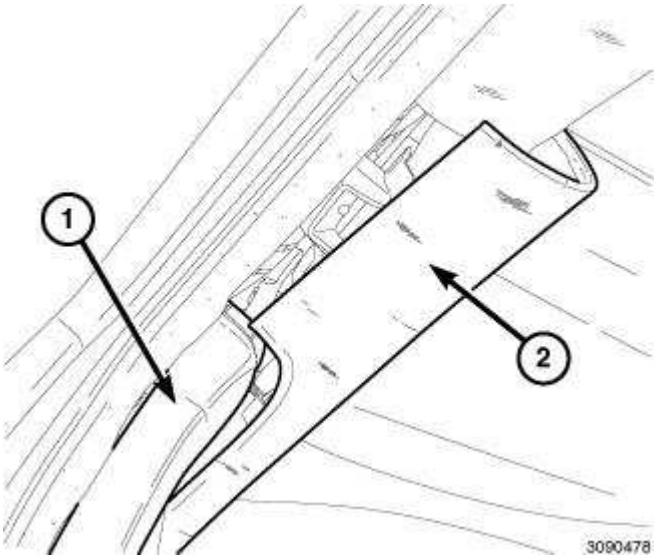


Fig. 393: Quarter Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, carefully pry the upper C-pillar trim (1) away from the lower C-Pillar trim (2).
3. Remove the upper C-Pillar trim (2).

LOWER

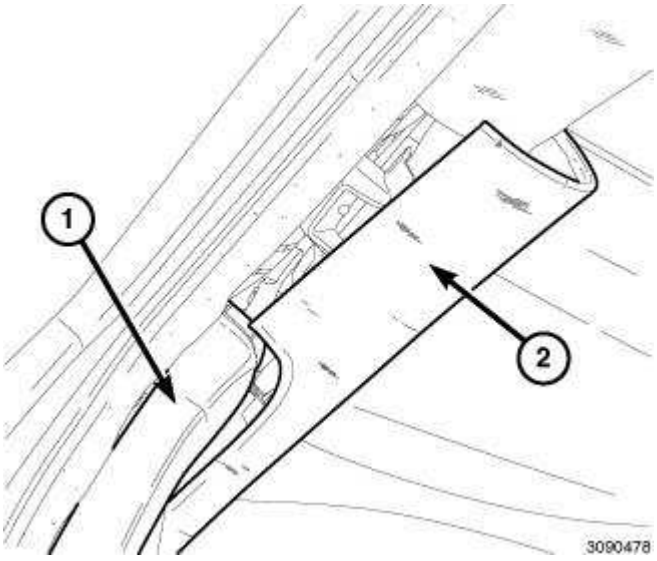


Fig. 394: Quarter Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Using (special tool #C-4755, Trim Stick) or equivalent, carefully pry the upper C-pillar trim (1) away from the lower C-Pillar trim (2).

3. Remove the upper C-Pillar trim (2).
4. Remove the seat belt(s) at the rear seat. Refer to **RETRACTOR, SEAT BELT, REMOVAL** .
5. Remove the rear seat back and cushion from the vehicle. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** or **COVER, SEAT CUSHION, SECOND ROW, REMOVAL** or **SEAT BACK, SECOND ROW, REMOVAL**.

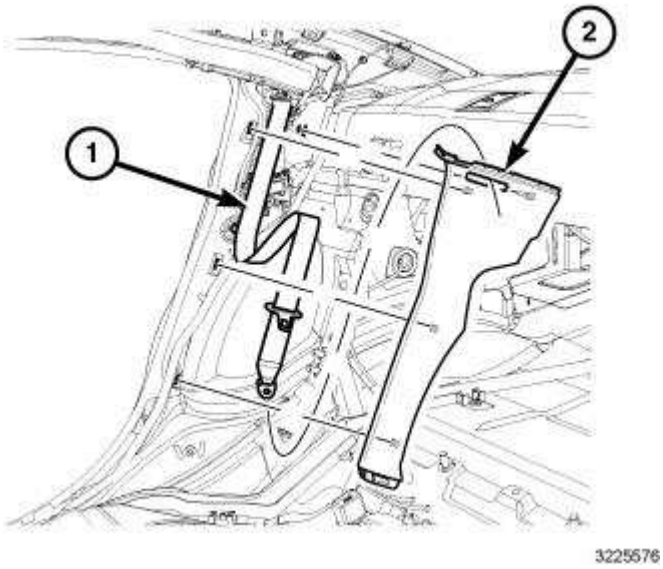


Fig. 395: Seat Belt & C-Pillar Trim
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rear seat back side bolster from the quarter inner panel. Refer to **BOLSTER, SEAT, REMOVAL**.
7. Using (special tool #C-4755, Trim Stick) or equivalent, carefully pry the lower C-pillar trim (1) away to disengage it's retaining clips/tabs.
8. Feed the seat belt (1) through the panel opening and remove the lower C-pillar trim (2) from the quarter inner panel.

INSTALLATION

UPPER

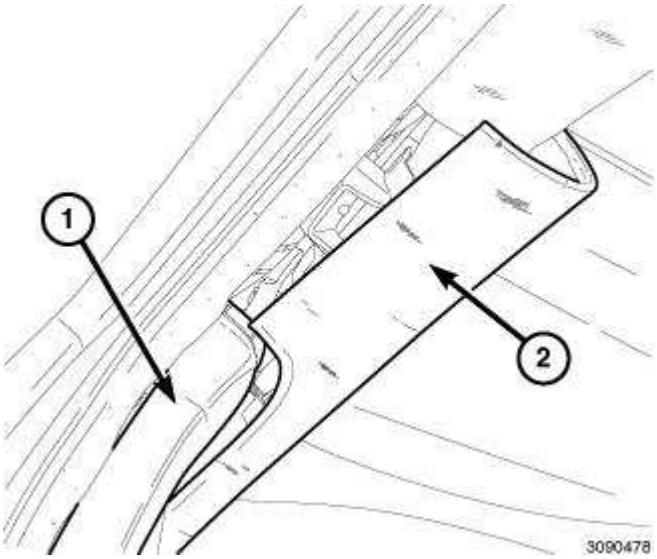


Fig. 396: Quarter Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Align and position the upper C-Pillar trim panel (2) to the sheet metal and to the lower C-pillar trim panel (1).
2. Hand tap to install the upper C-Pillar trim panel (2).
3. Connect the negative battery cable.

LOWER

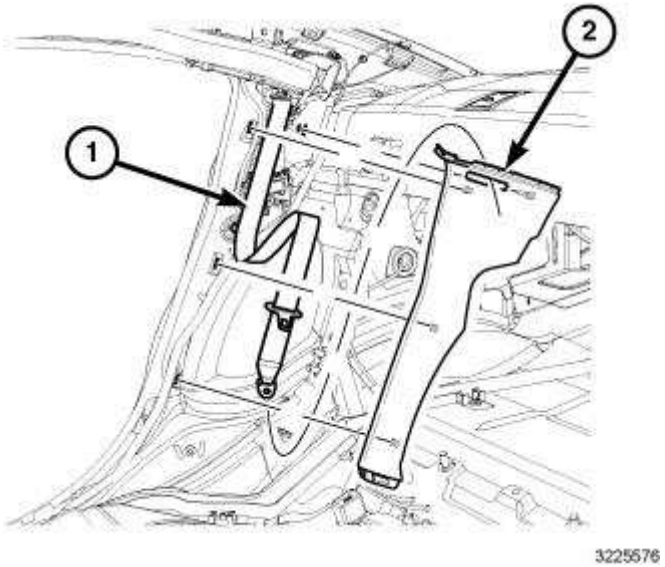


Fig. 397: Seat Belt & C-Pillar Trim
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain that the spring nuts (2) are properly installed and in good condition on the quarter inner panel (1). Replace the spring nut if any damage is evident.

2. Feed the seat belt (1) through the lower C-Pillar trim panel (2).
3. Position the lower C-pillar trim (2) onto the quarter inner panel with the lower edge sequenced over the rear extension of the rear door sill scuff plate.
4. Hand tap to secure the lower C-pillar trim (1) to the rear shelf panel.

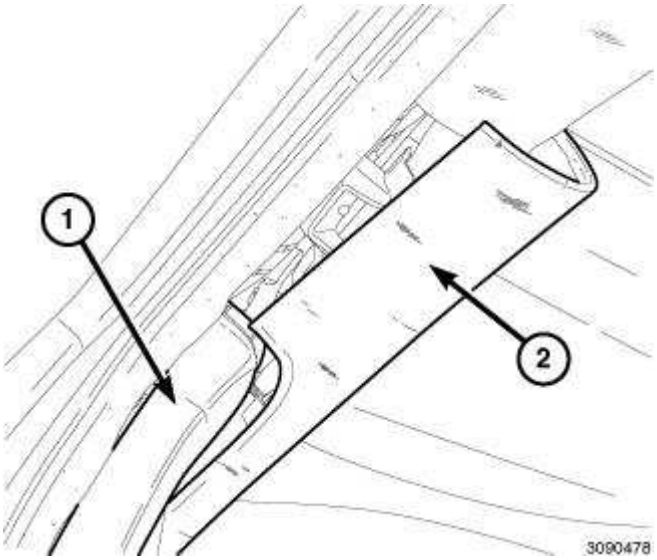


Fig. 398: Quarter Trim Panel
Courtesy of CHRYSLER GROUP, LLC

5. Align and position the upper C-Pillar trim panel (2).
6. Hand tap to install the upper C-Pillar trim panel (2).
7. Install the seat belt at the seat. Refer to **RETRACTOR, SEAT BELT, INSTALLATION** .
8. Install the rear seat back side bolster to the quarter inner panel. Refer to **BOLSTER, SEAT, INSTALLATION**.
9. Reinstall the rear seat back and cushion into the vehicle. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** or **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION** or **SEAT BACK, SECOND ROW, INSTALLATION**.
10. Connect the negative battery cable.

PANEL, COWL TRIM

REMOVAL

UPPER

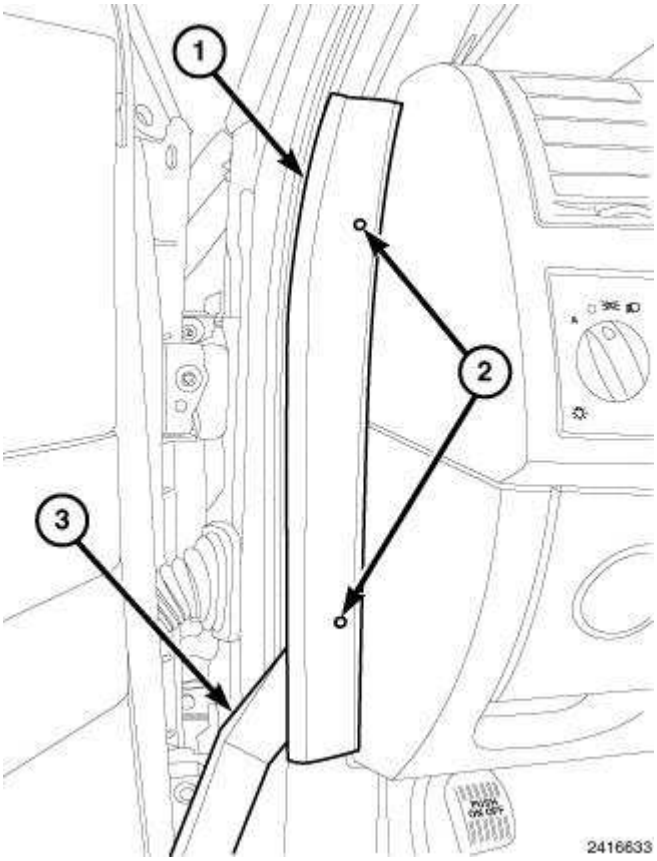


Fig. 399: Removing Upper Cowl Trim Panel - Lower Retaining Clip
Courtesy of CHRYSLER GROUP, LLC

1. Using trim tool (special tool #C-4829A, Remover, Trim) or equivalent (3), directly below the lower retaining clip (2), release the clip.

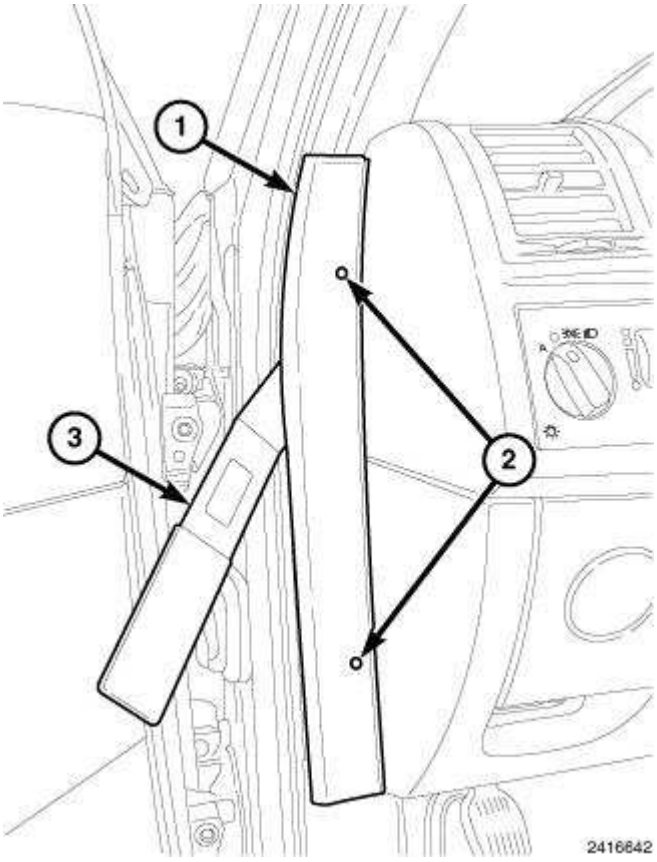


Fig. 400: Upper Cowl Trim Panel
Courtesy of CHRYSLER GROUP, LLC

2. Using trim tool (special tool #C-4829A, Remover, Trim) or equivalent (3), directly below the upper retaining clip (2), release the clip and remove the upper cowl trim panel (1).

LOWER

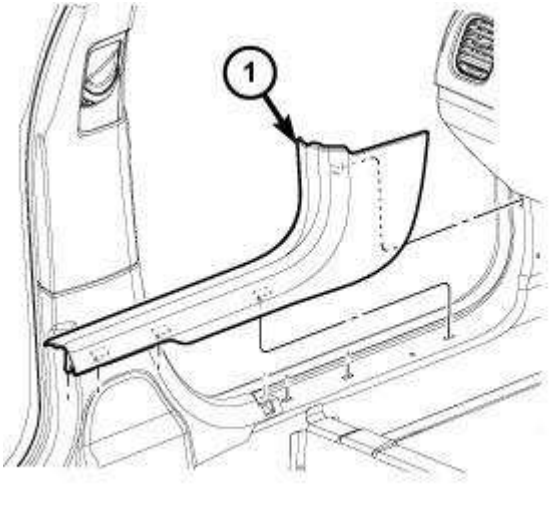


Fig. 401: Door Scuff Plate

Courtesy of CHRYSLER GROUP, LLC

1. Remove the upper cowl trim from the front of the front door opening. Refer to **PANEL, COWL TRIM, REMOVAL**.
2. Using a trim stick or another suitable wide flat-bladed tool and starting nearest the B-pillar trim, carefully pry the lower cowl trim (1) upward from the front door opening sill far enough to disengage the three spring clip retainers that secure the trim to the slots in the sill.
3. Using a trim stick or another suitable wide flat-bladed tool, carefully pry the lower cowl trim rearward from the front of the front door opening far enough to disengage the spring clip retainer that secures the trim to the slot in the cowl (1).
4. Remove the lower cowl trim from the vehicle.

INSTALLATION

UPPER

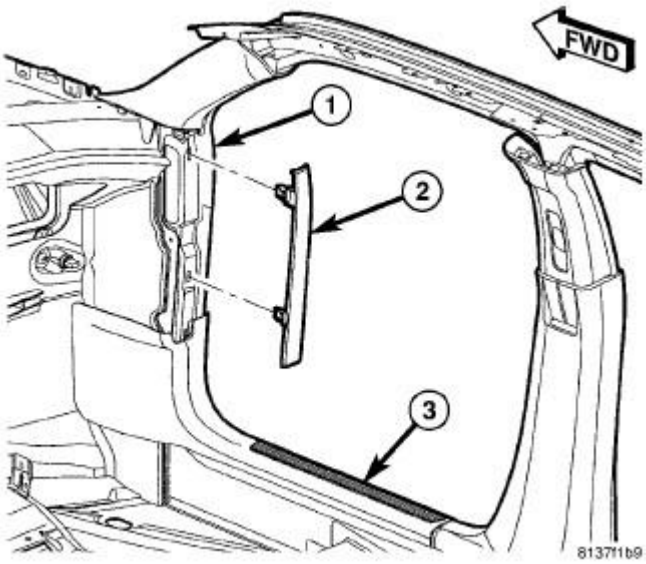


Fig. 402: Upper Cowl Trim
Courtesy of CHRYSLER GROUP, LLC

1. Position the upper cowl trim (2) to the cowl (1) at the front of the front door opening and the lower cowl trim (3).
2. Align the two spring clip retainers on the trim with the slots in the cowl.
3. Using hand pressure, press firmly and evenly downward on the trim over each of the spring clip locations until the retainers snap into place.

LOWER

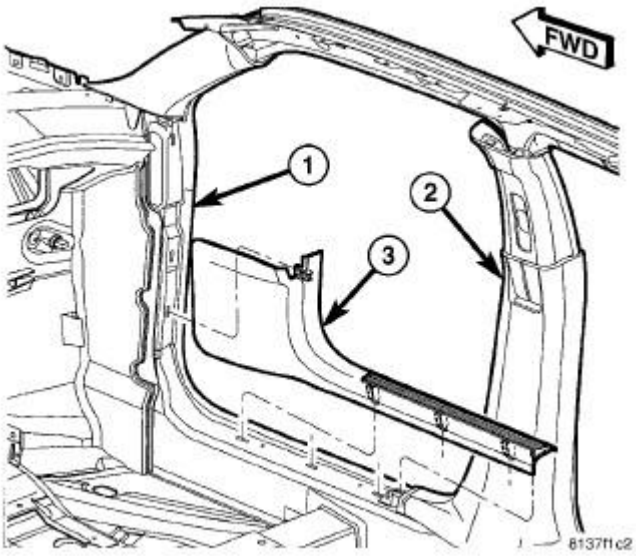


Fig. 403: Lower Cowl Trim
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain that the three plastic nuts are properly installed and in good condition in the slots of the front door opening sill. Replace a plastic nut if any damage is evident.
2. Position the vertical portion of the lower cowl trim (3) to the cowl (1) at the front of the front door opening.
3. Align the spring clip retainer on the trim with the slot in the cowl (1).
4. Using hand pressure, press firmly and evenly forward on the trim over the spring clip location until the retainer snaps into place.
5. Position the horizontal portion of the lower cowl trim to the front door sill and the B-pillar trim (2).
6. Align the three spring clip retainers on the trim with the slots in the sill.
7. Using hand pressure, press firmly and evenly downward on the trim over each of the spring clip locations until the retainers snap into place.
8. Reinstall the upper cowl trim to the front of the front door opening. Refer to **PANEL, COWL TRIM, INSTALLATION**.

PANEL, REAR SHELF

REMOVAL

REMOVAL

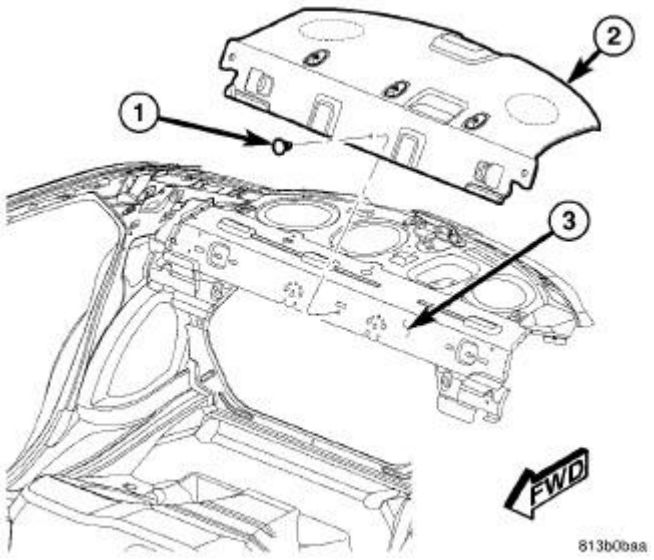


Fig. 404: Rear Shelf Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the right and left lower and upper C-pillar trim from the vehicle. Refer to **PANEL, C-PILLAR TRIM, REMOVAL**.
3. Remove the nut that secures the center rear seat belt lower anchor to the stud on the floor panel and feed the seat belt webbing back through the opening in the top of the rear shelf panel trim (2) to the retractor.
4. Remove the push-pin fastener (1) that secures the trim to the rear shelf panel (3).
5. Slide the trim forward to disengage the S-clip that secures the underside of the trim to the center of the shelf panel.
6. Remove the trim from the rear shelf panel.

INSTALLATION

INSTALLATION

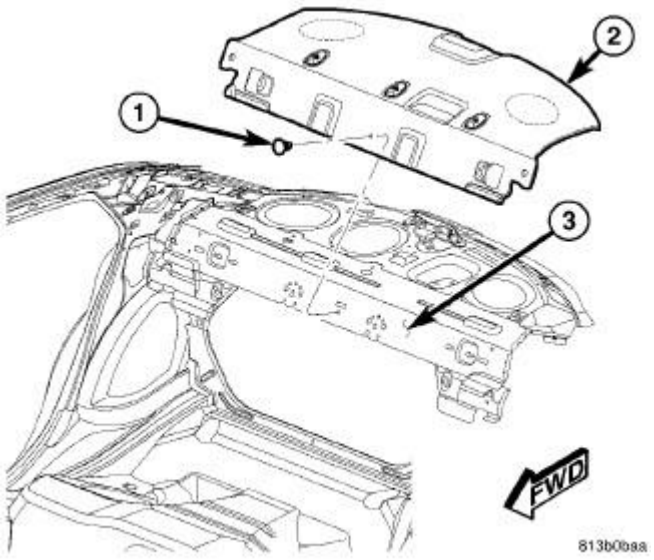


Fig. 405: Rear Shelf Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Position the trim (2) onto the rear shelf panel (3).
2. Slide the rear edge of the trim rearward to engage the lens bezel of the center high-mounted stop lamp and far enough to engage the S-clip that secures the underside of the trim to the center of the shelf panel.
3. Install the push-pin fastener (1) that secures the trim to the rear shelf panel.
4. Pull the center rear seat belt lower anchor and belt webbing from the retractor through the opening in the top of the rear shelf panel trim and back down to the stud on the floor panel.
5. Install and tighten the nut that secures the seat belt lower anchor to the stud on the floor panel. Tighten the nut to 34 N.m (25 ft. lbs.).
6. Reinstall the right and left upper and lower C-pillar trim to the vehicle. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.
7. Reconnect the battery negative cable.

PANEL, TRUNK TRIM, REAR

REMOVAL

REMOVAL

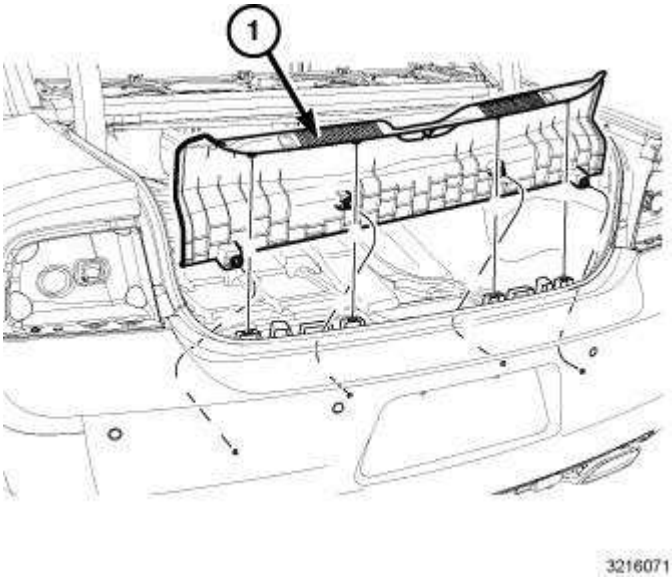


Fig. 406: Trunk Scuff Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Open the decklid.
2. Fold-up load floor to vertical position.
3. If necessary, partially remove the decklid weatherstrip.
4. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, disengage the lower retaining clips.
5. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, disengage the upper retaining clips.
6. Remove the trunk scuff trim panel (1) from the vehicle.

INSTALLATION

INSTALLATION

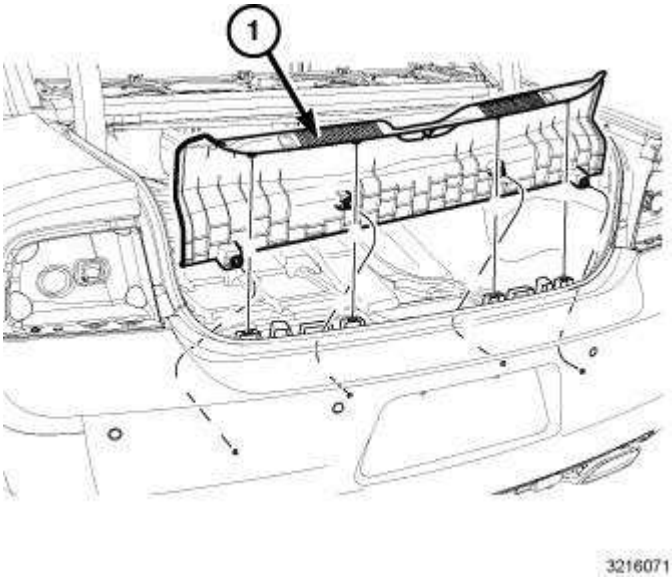


Fig. 407: Trunk Scuff Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Align and position the trunk scuff trim panel (1) to the vehicle.
2. Hand tap to engage the retaining clips.
3. Return the load floor to the horizontal position.
4. If necessary, re-install the decklid weatherstrip.
5. Close the decklid.

PLATE, SCUFF, REAR DOOR SILL

REMOVAL

REMOVAL

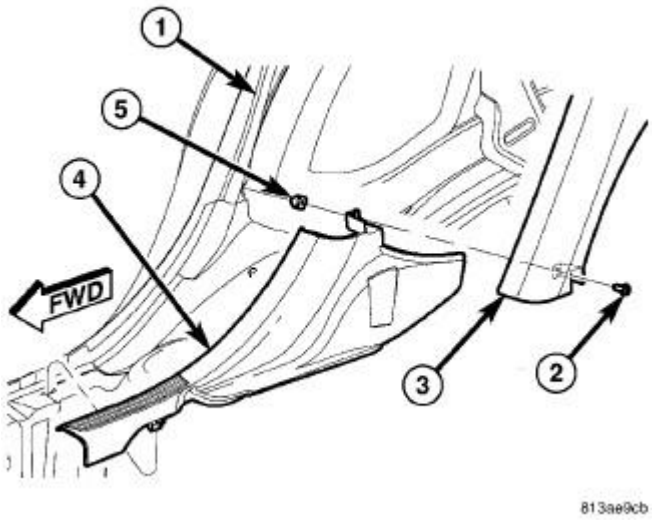


Fig. 408: Rear Door Sill Scuff Plate
Courtesy of CHRYSLER GROUP, LLC

1. Remove the screw (2) that secures the rear door scuff plate (4) to the quarter inner panel.
2. Remove the screw that secures the outboard rear seat belt lower anchor to the quarter inner panel.
3. Using a trim stick or another suitable wide flat-bladed tool, carefully pry the scuff plate upwards from the sill far enough to disengage the two spring clip retainers that secure the scuff plate to the slots in the sill.
4. Disengage the rear extension of the scuff plate from under the lower C-pillar trim (Sedan) or quarter trim panel (Wagon) (3).
5. Remove the rear door scuff plate from the vehicle.

INSTALLATION

INSTALLATION

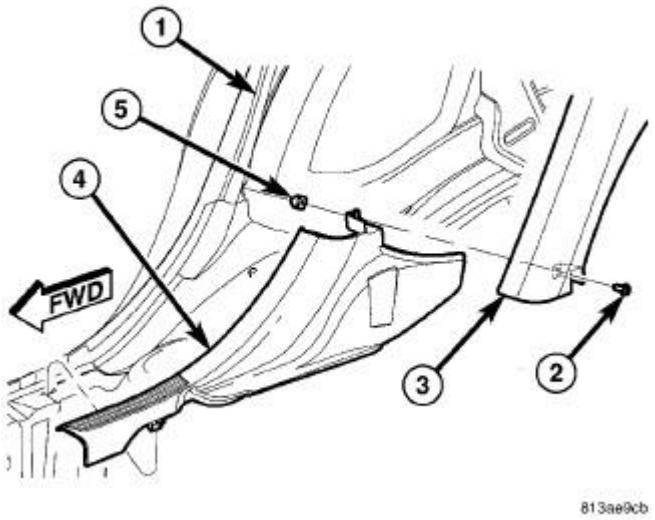


Fig. 409: Rear Door Sill Scuff Plate
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain that spring nut (5) is properly installed and in good condition in the quarter inner panel (1).
2. Check to be certain that a plastic nut is properly installed and in good condition in the slot of the rear door opening sill. Replace the plastic nut if any damage is evident.
3. Engage the rear extension of the rear door scuff plate (4) under the lower C-pillar trim (Sedan) or quarter trim panel (Wagon) (3) on the quarter inner panel.
4. Align the two spring clip retainers on the scuff plate with the slots in the rear door sill.
5. Using hand pressure, press firmly and evenly downward on the scuff plate over each of the spring clip locations until the retainers snap into place.
6. Position the outboard rear seat belt lower anchor to the quarter inner panel.
7. Install and tighten the screw that secures the outboard rear seat belt lower anchor to the quarter inner panel. Tighten the screw to 32 N.m (24 ft. lbs.).
8. Install and tighten the screw (2) that secures the scuff plate trim panel and the lower C-pillar trim (Sedan) or quarter trim panel (Wagon) to the quarter inner panel. Tighten the screw to 11 N.m (8 ft. lbs.).

SUNSHADE, REAR WINDOW

REMOVAL

REMOVAL

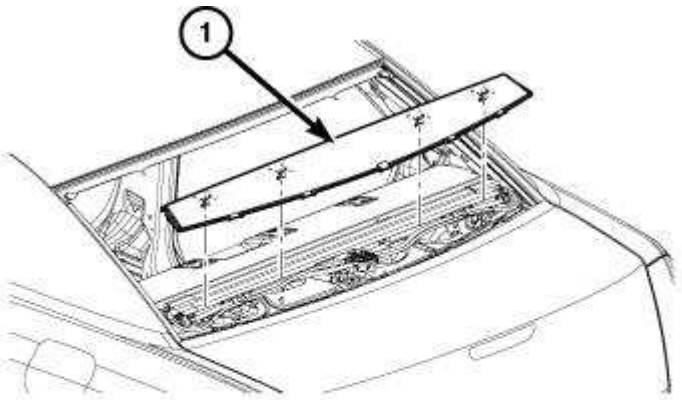


Fig. 410: Sunshade Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, disengage the retaining tabs from the sunshade trim panel (1) and remove.

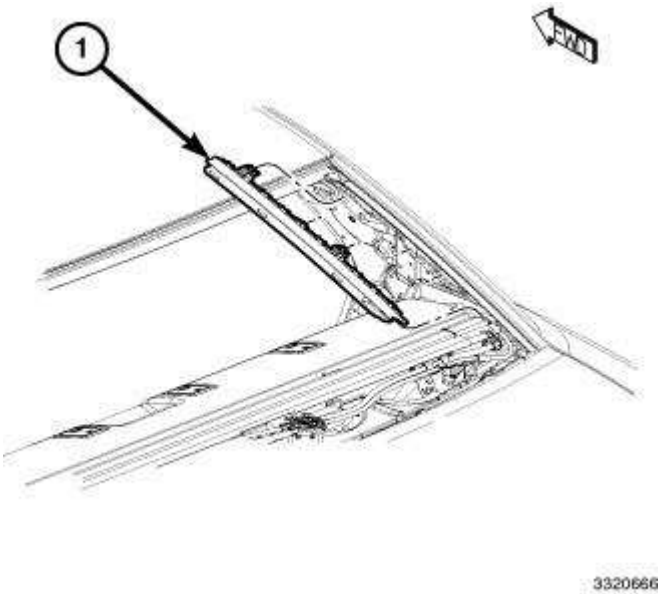


Fig. 411: Sunshade Guide Track
Courtesy of CHRYSLER GROUP, LLC

3. Remove the C-pillar trim. Refer to **PANEL, C-PILLAR TRIM, REMOVAL**.
4. Disengage the sunshade from the track.
5. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, disengage the retaining tabs

from the sunshade guide track (1) and remove the track.

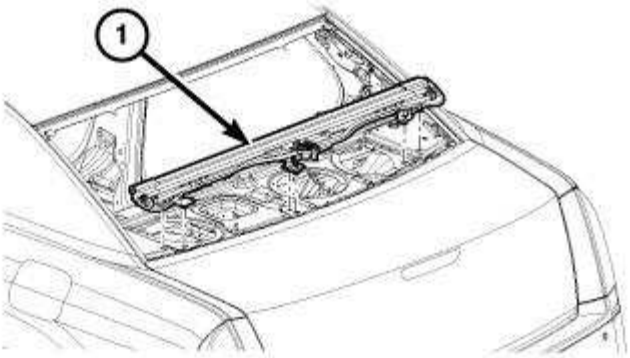


Fig. 412: Rear Window Sunshade
Courtesy of CHRYSLER GROUP, LLC

6. Remove the package tray trim panel. Refer to **PANEL, REAR SHELF, REMOVAL**.
7. Remove the fasteners securing the rear window sunshade (1) to the package tray.
8. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, disengage the retaining tabs securing the sunshade (1).
9. Disconnect the sunshade electrical connector and remove the rear window sunshade (1) from the vehicle.

INSTALLATION

INSTALLATION

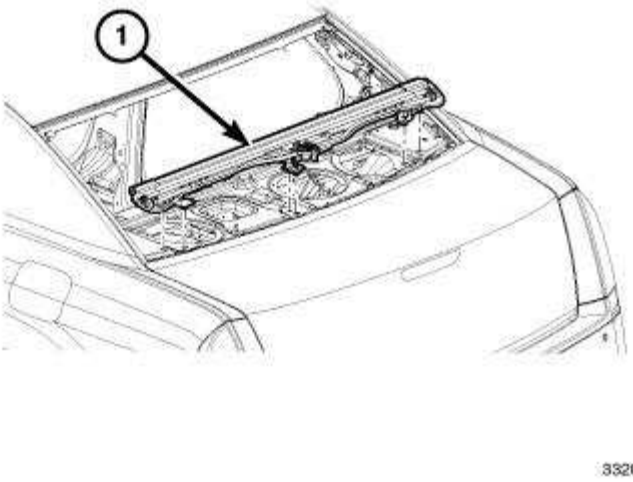


Fig. 413: Rear Window Sunshade
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear window sunshade into the vehicle and connect the sunshade electrical connector.
2. Align the retaining tabs to the openings in the package tray and hand tap to engage the retaining tabs securing the sunshade (1).
3. Install the fasteners securing the rear window sunshade (1) to the package tray. Tighten the fasteners securely.
4. Install the package tray trim panel. Refer to **PANEL, REAR SHELF, INSTALLATION**.

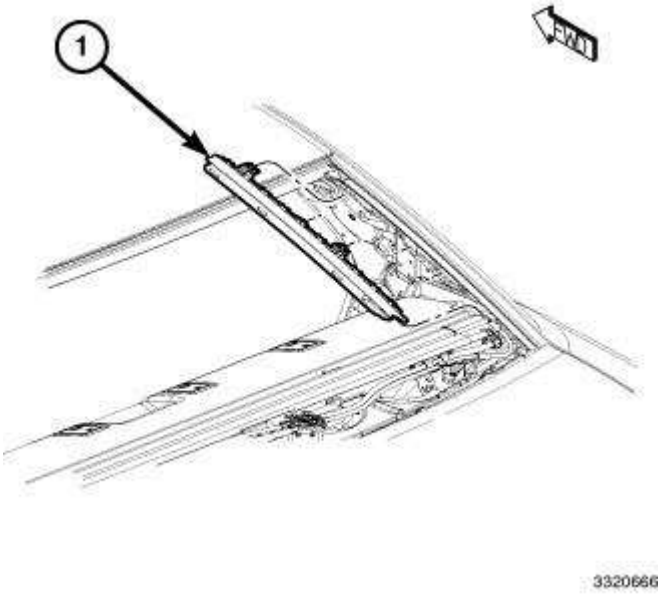


Fig. 414: Sunshade Guide Track
Courtesy of CHRYSLER GROUP, LLC

5. Position and align the sunshade guide track (1) to the C-pillar, hand tap to engage the retaining tabs securing the sunshade guide track to the C-pillar.
6. Engage the sunshade to the track.
7. Install the C-pillar trim. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.

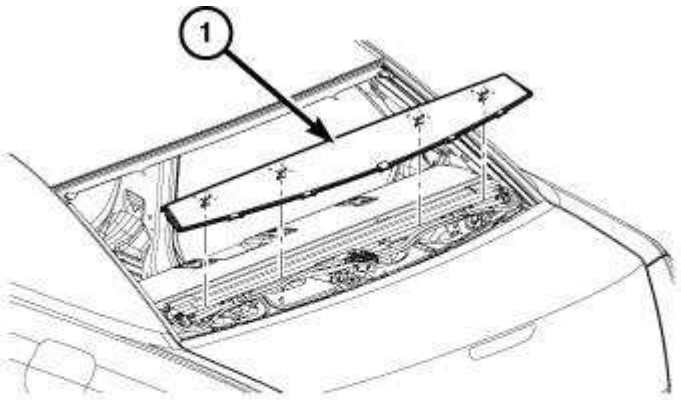


Fig. 415: Sunshade Trim Panel
Courtesy of CHRYSLER GROUP, LLC

8. Align the sunshade trim panel (1), hand tap to engage the retaining tabs.
9. Connect the negative battery cable.

WELT, TRUNK

REMOVAL

REMOVAL

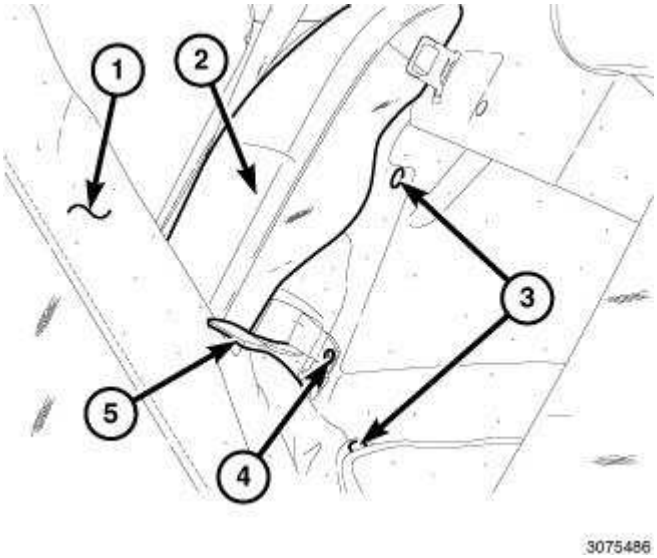


Fig. 416: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Remove the trunk rear trim panel from the luggage compartment. Refer to **PANEL, TRUNK TRIM, REAR, REMOVAL**.
2. Pull the RH rear seat back (1) forward, exposing the luggage compartment.
3. Behind the RH rear seat, pull the carpet tab (5) up, exposing the rear seat back side bolster bracket retaining bolt (4).
4. Remove the push-in fasteners (3) that secure the trunk side trim.

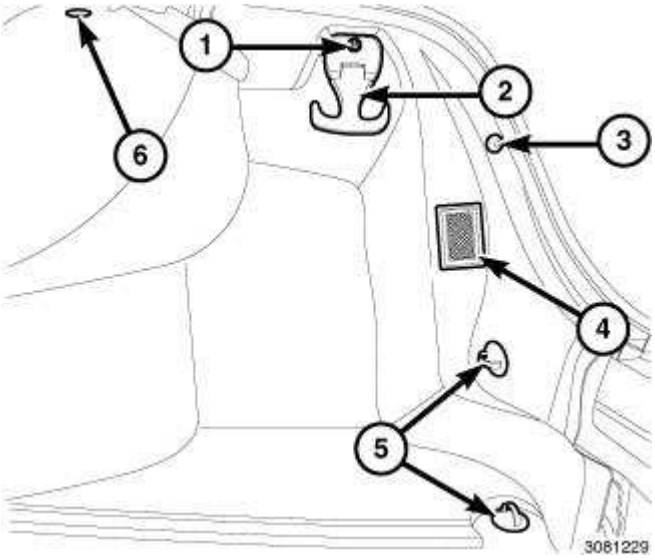


Fig. 417: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

5. Remove the wheel well cover trim as follows:
    1. On the RH side, remove the cargo net hook screw (1) and upper cargo hook (2).
    2. On the RH side, remove the push-in retainer (3) that secures the wheel well cover trim.
    3. On the RH side, remove the cargo net lower hooks (5).
    4. Carefully pull back the wheel well cover enough to disconnect the trunk lamp (4) harness connector, and remove the wheel well cover trim.

INSTALLATION

INSTALLATION

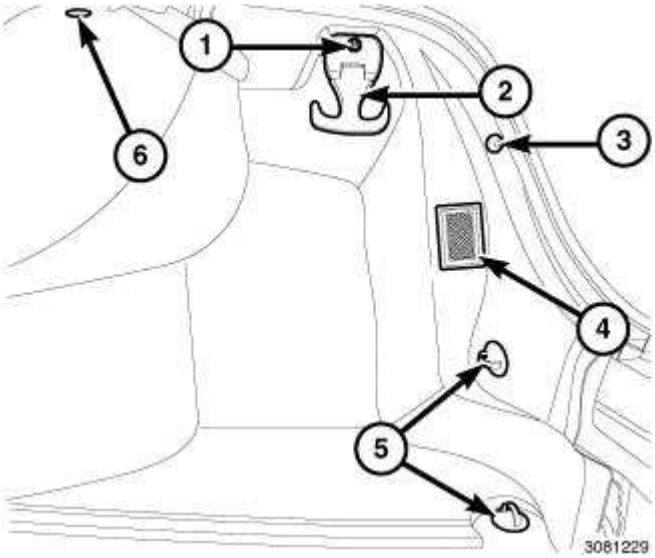


Fig. 418: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

1. Install the wheel well cover trim as follows:
    1. Position the wheel well cover and connect the trunk lamp (4) harness connector.
    2. Install the cargo net lower hooks (5).
    3. Install the push-in retainer (3) that secures the wheel well cover trim.
    4. Install the cargo net hook screw (1) and upper cargo hook (2).
2. Reinstall the trunk rear trim panel into the luggage compartment. Refer to **PANEL, TRUNK TRIM, REAR, INSTALLATION**.

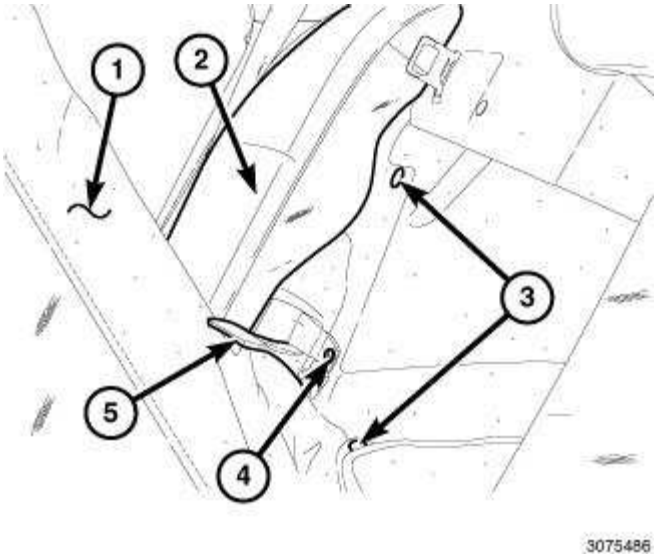


Fig. 419: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Position the forward portion of the trunk side trim and install the push pin fasteners (3) to secure

the trunk side trim.

4. Reposition the carpet tab (5), covering the rear seat back side bolster bracket retaining bolt (4).

PAINT

SPECIFICATIONS

SPECIFICATIONS

Exterior vehicle body color(s) are identified on the Vehicle Certification Label or the Body Code Plate.

The first digit of the paint code listed on the vehicle indicates the sequence of application, i.e.: P = primary coat, Q = secondary coat. The color names provided in the Paint and Trim Code Description chart are the same color names used on most repair product containers.

EXTERIOR COLORS

EXTERIOR COLOR	CHRYSLER CODE
Midnight Blue Pearlcoat	BB8
Deep Molten Red Pearlcoat	BR8
Tungsten Met. Clearcoat	CDM
Gloss Black Clearcoat	DX8
Bright White Clearcoat	GW7
Luxury Brown Pearlcoat	GTW
Sapphire Crystal Met. Clearcoat	JBF
Deep Cherry Red Crystal Pearlcoat	JRP
Ivory 3 Coat	JWD
Crystal Blue Pearlcoat	KDB
Cashmere Pearlcoat	KFS
Bright Silver Met. Clearcoat	WS2

INTERIOR COLORS

INTERIOR COLOR	CHRYSLER CODE
Dark Frost Beige/Light Frost Beige	L9
Black/Light Frost Beige	XL
Black/Radar Red	XR
Black	X9

SEATS

WARNING

WARNING

WARNING: **During and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or inoperative buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or faulty seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® parts catalog. Failure to follow these instructions may result in personal injury or death.**

WARNING: **On vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment. Failure to follow these instructions may result in personal injury or death.**

WARNING: **On vehicles equipped with airbags, before performing any welding operations disconnect and isolate the battery negative (ground) cable and disconnect all wire harness connectors from the Airbag Control Module (ACM). Failure to take the proper precautions could result in accidental airbag deployment and other possible damage to the supplemental restraint system circuits and components. Failure to follow these instructions may result in personal injury or death.**

WARNING: **Replace all restraint system components only with parts specified in the Chrysler Mopar® parts catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection. Failure to follow these instructions may result in personal injury or death.**

WARNING: **The fasteners, screws, and bolts originally used for the restraint system components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the restraint system. Any time a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler Mopar® parts catalog. Failure to follow these instructions may result in personal injury or death.**

WARNING: On vehicles equipped with the Occupant Classification System (OCS) do not hang any after market devices from the front passengers seat back. Do not install a front drivers seat back cover with map pocket onto the passenger seat. Failure to follow these instructions may result in personal injury or death.

WARNING: The Seat Weight Sensor is a sensitive, calibrated unit and must be handled carefully. Do not drop or handle roughly. If dropped or damaged, replace with another sensor. Failure to follow these instructions may result in personal injury or death.

WARNING: The front passenger seat must be handled carefully as well. When removing the seat, be careful when setting on floor not to drop. If dropped, the sensor may be inoperative. Failure to follow these instructions may result in personal injury or death.

WARNING: When the seat is on the floor, no one should sit in the front passenger seat. This uneven force may damage the sensing ability of the seat weight sensors. If sat on and damaged, the sensor may be inoperative. Failure to follow these instructions may result in personal injury or death.

ADJUSTER, SEAT, FRONT

REMOVAL

REMOVAL

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. Remove the seat cushion as necessary. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** or **COVER, SEAT CUSHION, SECOND ROW, REMOVAL**.

POWER

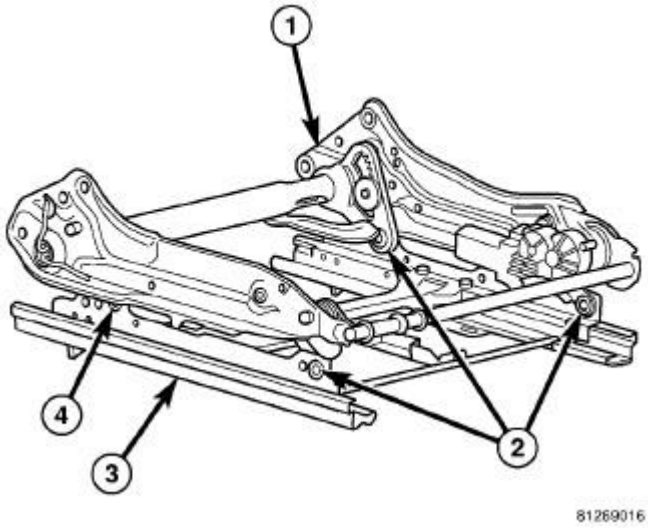


Fig. 420: Identifying Power Adjusters & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Remove the seat risers. Refer to **RISER, SEAT, FRONT, REMOVAL**.
2. Remove the bolts and nuts (2 AND 4) and separate the height adjuster assembly from the length adjuster assembly (3).

NOTE: Bolt (4) is a different size from the other three bolts (2). Note the location for proper installation.

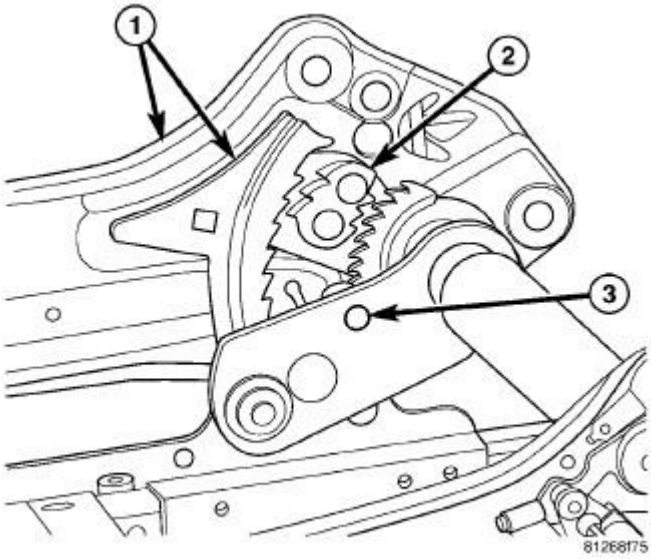


Fig. 421: Locking Pawl
Courtesy of CHRYSLER GROUP, LLC

WARNING: A seat structure that has seen significant load may have the locking mechanism activated and may exhibit the following symptoms:

- **Locking pawl (2) loose**
- **Locking pawl (2) engaged into the seat frame side member (1)**
- **Height adjuster only works on outboard side**
- **Broken or missing shear pin (3)**

If any one or more of these symptoms exist replace the height adjuster assembly. Do not attempt any repairs. Failure to follow these instructions may result in personal injury or death.

MANUAL

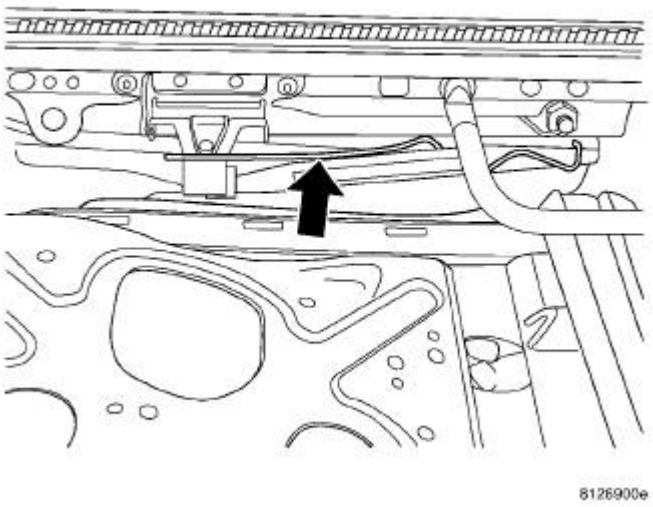


Fig. 422: Towel Bar Spring
Courtesy of CHRYSLER GROUP, LLC

1. Remove the spring clip.

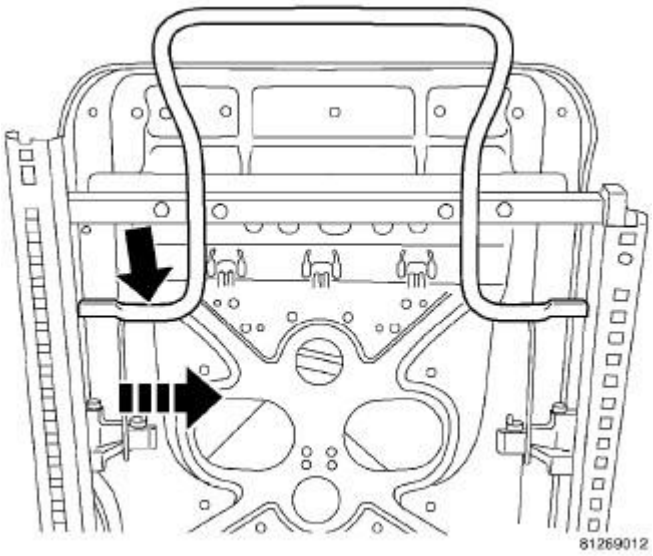


Fig. 423: Towel Bar
Courtesy of CHRYSLER GROUP, LLC

2. Squeeze the towel bar together and pull the towel bar out of the left and right seat tracks.

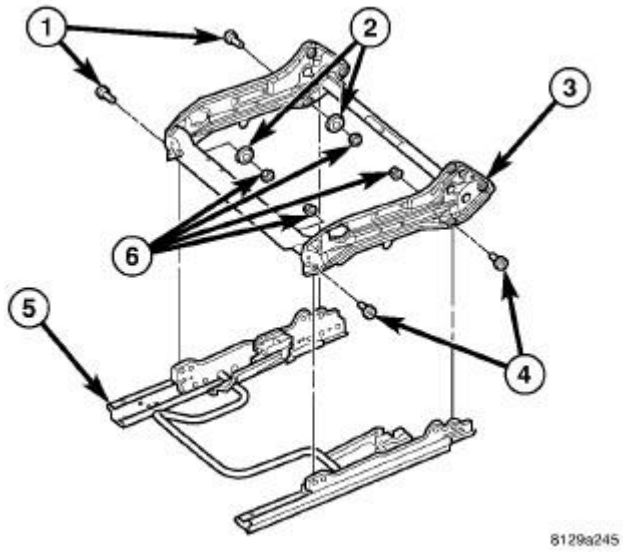


Fig. 424: Manual Adjusters
Courtesy of CHRYSLER GROUP, LLC

3. Remove the bolts (1 AND 4), nuts (6) and spacers (2) and separate the side member assembly (3) from the length adjuster assembly (5).

INSTALLATION

INSTALLATION

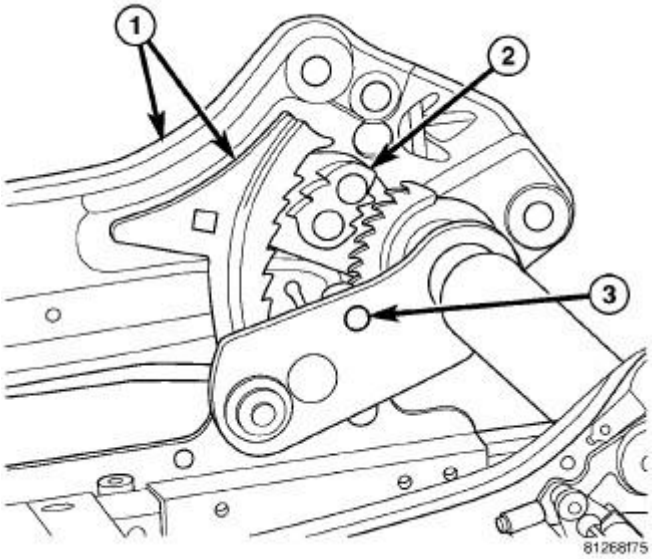


Fig. 425: Locking Pawl
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.

WARNING: A seat structure that has seen significant load may have the locking mechanism activated and may exhibit the following symptoms:

- **Locking pawl (2) loose**
- **Locking pawl (2) engaged into the seat frame side member (1)**
- **Height adjuster only works on outboard side**
- **Broken or missing shear pin (3)**

If any one or more of these symptoms exist replace the height adjuster assembly. Do not attempt any repairs. Failure to follow these instructions may result in personal injury or death.

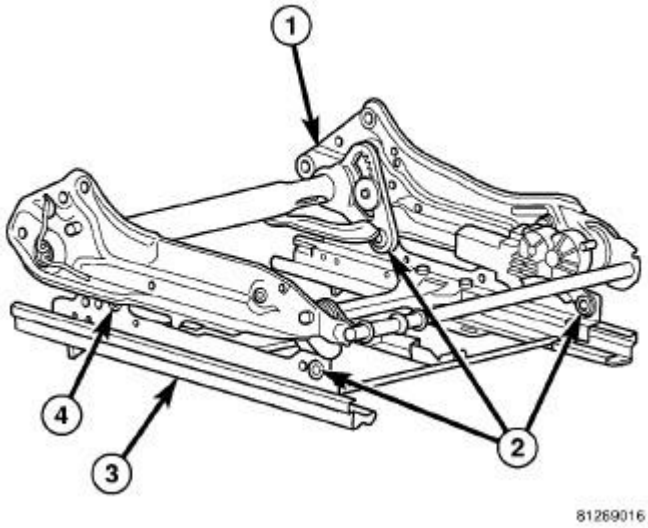


Fig. 426: Identifying Power Adjusters & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Install the seat risers. Refer to **RISER, SEAT, FRONT, INSTALLATION**.
3. Position the height adjuster assembly (1) onto the length adjuster assembly (3) and install the nuts, bolts and spacers on the inboard side.

NOTE: Bolts (2) and (4) are different and need to be installed into the correct positions.

4. Tighten the bolts to 21 N.m (15 ft. lbs.).
5. Install the seat cushion and install the seat. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** or **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION**.

MANUAL

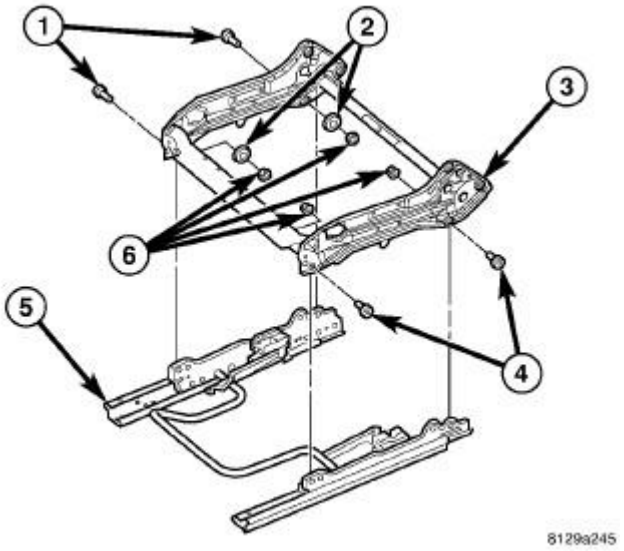


Fig. 427: Manual Adjusters
Courtesy of CHRYSLER GROUP, LLC

1. Install the seat risers. Refer to **RISER, SEAT, FRONT, INSTALLATION**.
2. Position the side member assembly (3) onto the length adjuster assembly (5) and install the nuts (6), bolts (1 AND 4) and spacers (2) on the inboard side.
3. Tighten the bolts to 42 N.m (31 ft. lbs.).

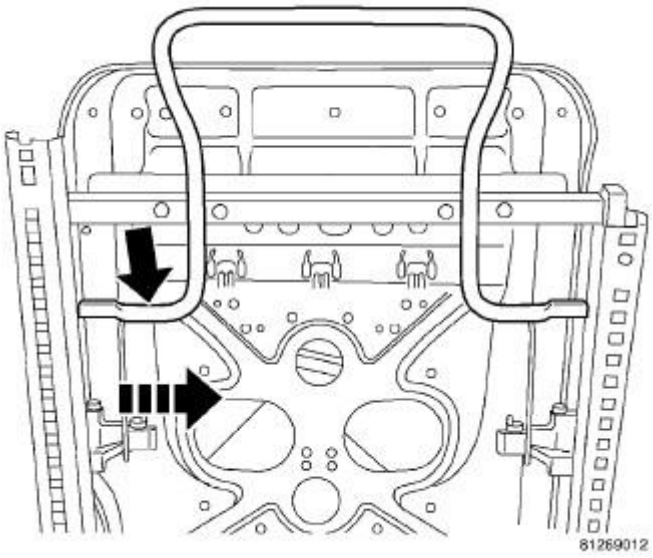


Fig. 428: Towel Bar
Courtesy of CHRYSLER GROUP, LLC

4. Squeeze the towel bar together and insert the ends into the bushings on both tracks.

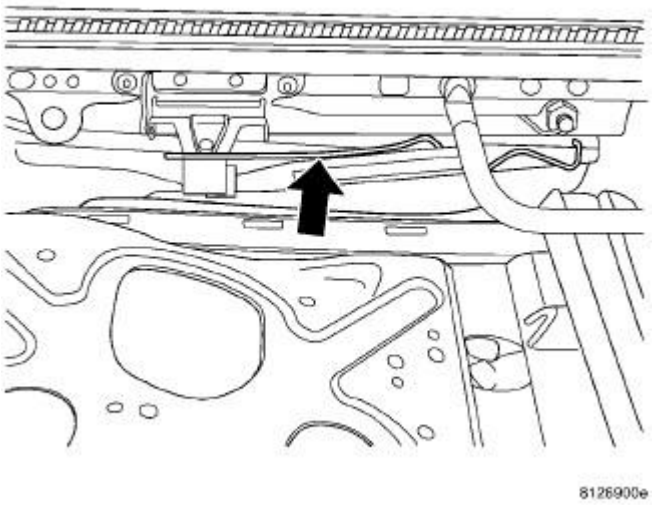


Fig. 429: Towel Bar Spring
Courtesy of CHRYSLER GROUP, LLC

5. Install the spring clip.
6. Install the seat cushion and install the seat. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** or **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION**.

ARMREST, REAR

REMOVAL

REMOVAL

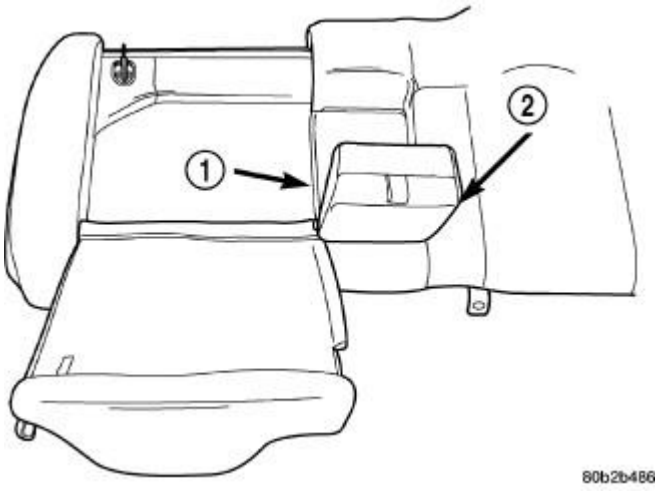


Fig. 430: Rear Seat Arm Rest - 60/40
Courtesy of CHRYSLER GROUP, LLC

1 - BOLT
2 - RETAINING C-CLIP

1. Fold down 40 side rear seat back.
2. Remove arm rest bolt (1).
3. Remove retaining C-clip (2).
4. Remove arm rest.

INSTALLATION

INSTALLATION

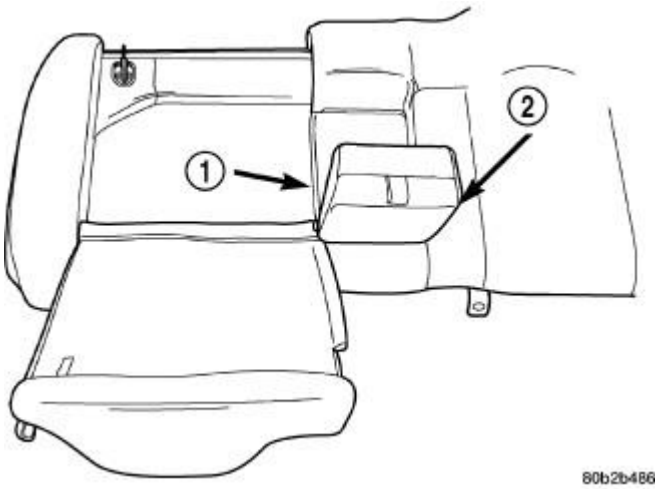


Fig. 431: Rear Seat Arm Rest - 60/40
Courtesy of CHRYSLER GROUP, LLC

1 - BOLT
2 - RETAINING C-CLIP

1. Place arm rest in bracket.
2. Install arm rest bolt (1). Tighten to 12 N.m (9 ft. lbs.).
3. Install retaining C-clip (2).
4. Reposition the seats.

BOLSTER, SEAT

REMOVAL

REMOVAL

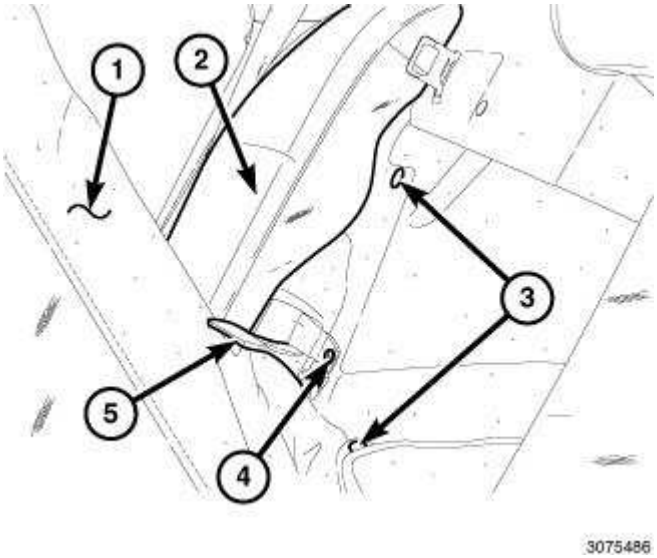


Fig. 432: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Pull the RH rear seat back (1) forward, exposing the luggage compartment.
2. Behind the RH rear seat, pull the carpet tab (5) up, exposing the rear seat back side bolster bracket retaining bolt (4).
3. Remove the RH rear seat back side bolster bracket bolt (4).

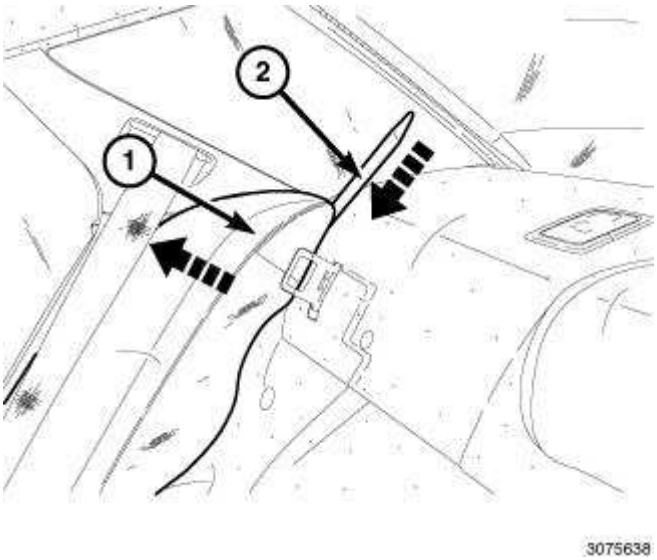


Fig. 433: Trim Stick & Seat Back Bolster
Courtesy of CHRYSLER GROUP, LLC

4. Using a trim stick (special tool #C-4755, Trim Stick) (2) or equivalent, push down between the rear shelf and the RH rear seat back bolster (1) to release the retaining clip, and pull out on the seat back bolster (1) to remove.

INSTALLATION

INSTALLATION

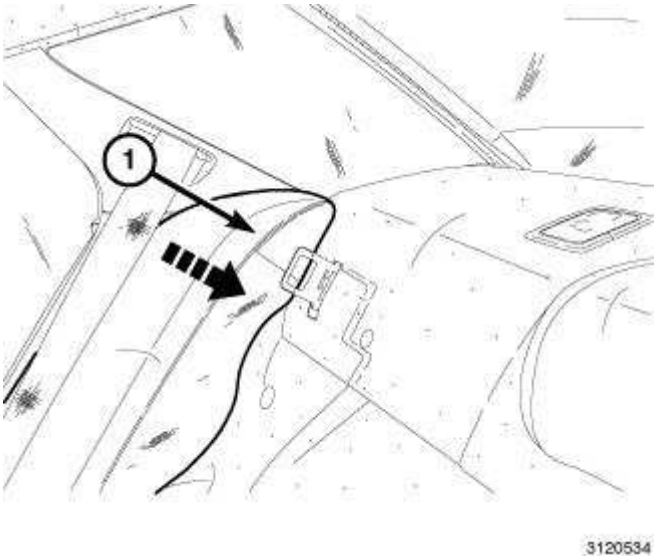


Fig. 434: Rear Seat Back Bolster
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear seat back bolster (1) and push in to engage the upper clip into the body.

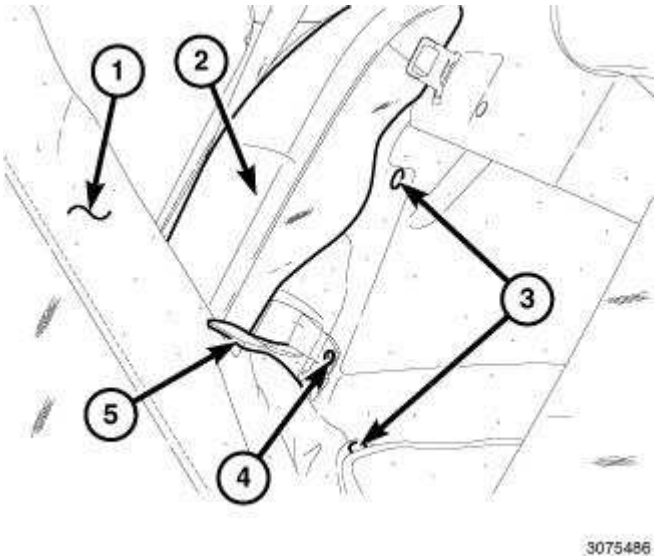


Fig. 435: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Install the RH rear seat back side bolster bracket bolt (4). Tighten the bolt securely.
3. Reposition the carpet tab (5), covering the rear seat back side bolster bracket retaining bolt (4).

COVER, SEAT BACK, FRONT

REMOVAL

REMOVAL

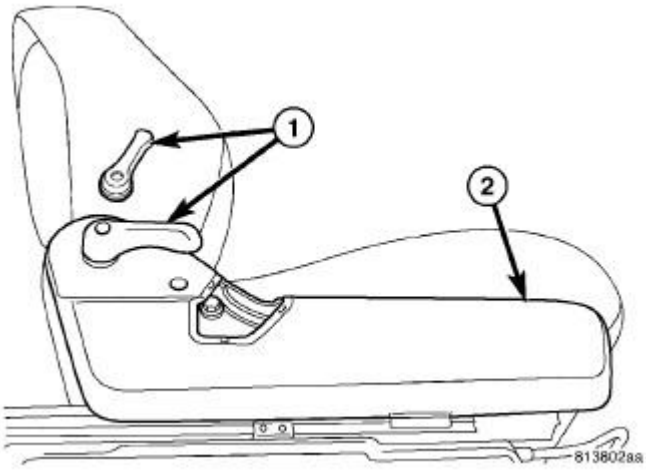


Fig. 436: Handles & Shields
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. Remove the front seat. Refer to **SEAT, FRONT, REMOVAL**.
3. Remove the lumbar and recliner handles (1).
4. Remove the screws and remove the side shields (2).

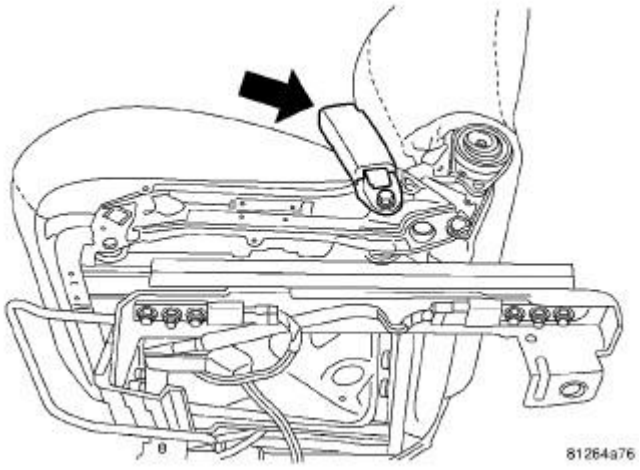


Fig. 437: Buckle
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belt buckle.

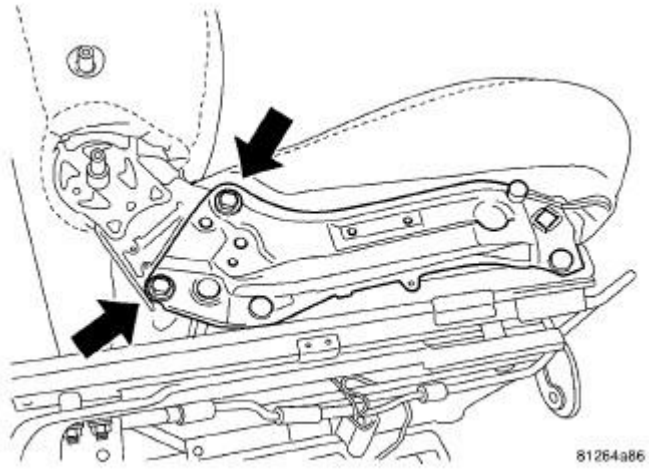


Fig. 438: Back Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the seat back bolts from both sides.

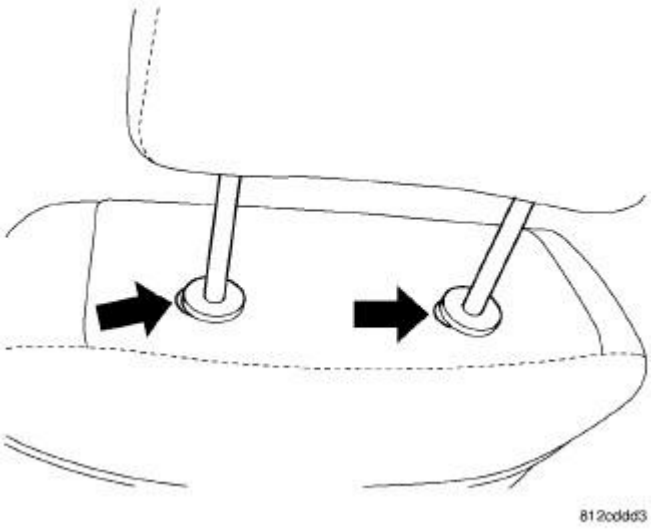


Fig. 439: Removing/Installing Head Rest
Courtesy of CHRYSLER GROUP, LLC

7. Push in the buttons on both headrest sleeves, pull the headrest up and remove.

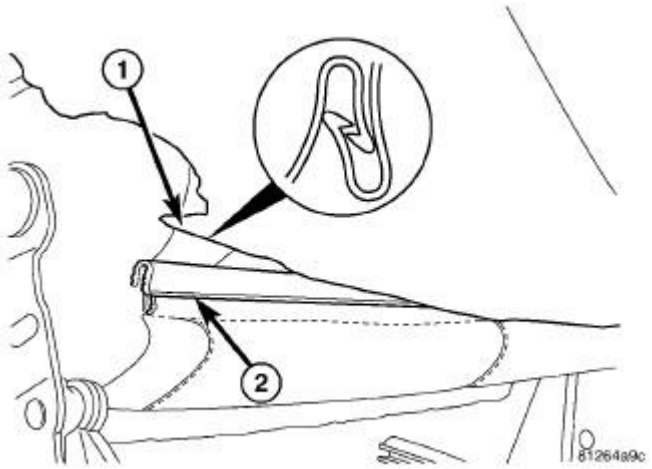


Fig. 440: J-Straps
Courtesy of CHRYSLER GROUP, LLC

8. Separate the j-straps (1 AND 2) and pull cover up over frame and remove cushion.
9. Pinch both headrest sleeve ribs from inside the seat back frame with pliers or equivalent.
10. Strike the bottom of the sleeve with a rubber mallet or equivalent, and remove the headrest sleeves.

INSTALLATION

INSTALLATION

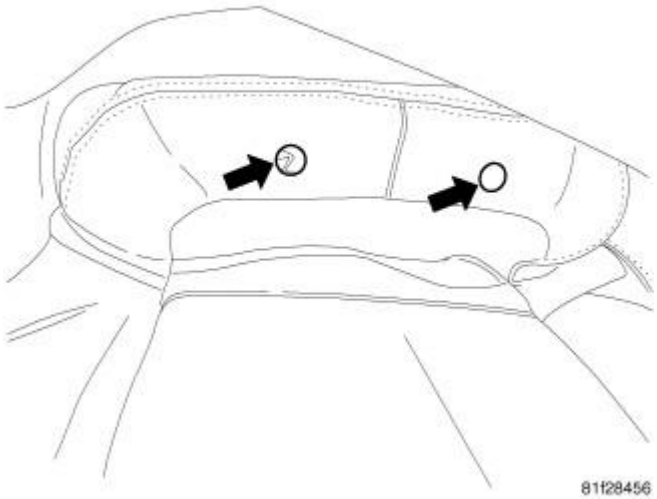


Fig. 441: Align Head Rest
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.

2. With the cover turned inside out, align the head rest guide sleeve holes with the trim cover on the foam pad.
3. Roll the cover down over the seat back.

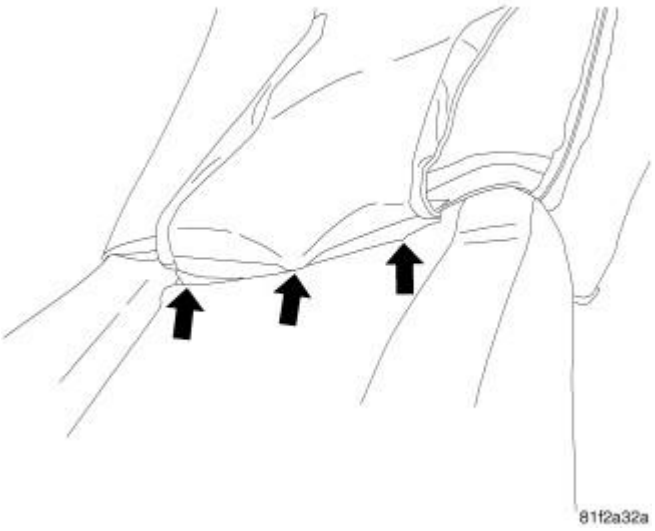


Fig. 442: Horizontal Wire
Courtesy of CHRYSLER GROUP, LLC

4. Hog ring the horizontal wire in the trim cover to the wire in the foam pad.
5. Continue rolling the cover completely down the back.

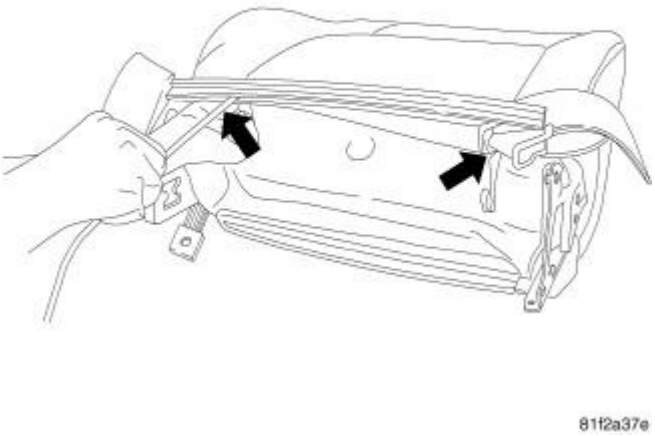


Fig. 443: Vertical Support Wire
Courtesy of CHRYSLER GROUP, LLC

6. Insert the two vertical support wires into the vertical pockets on the trim cover.

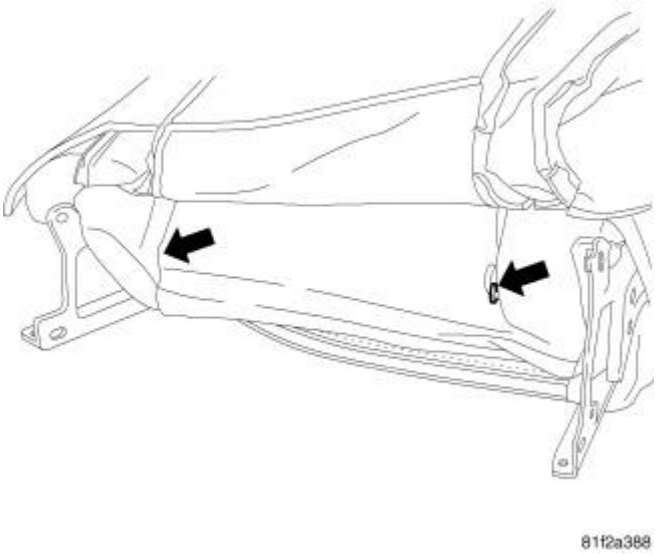


Fig. 444: Vertical Hog Ring
Courtesy of CHRYSLER GROUP, LLC

7. Hog ring the support wires to the support wires in the foam pad.
8. Pull the trim tab up and hook it onto the back frame.

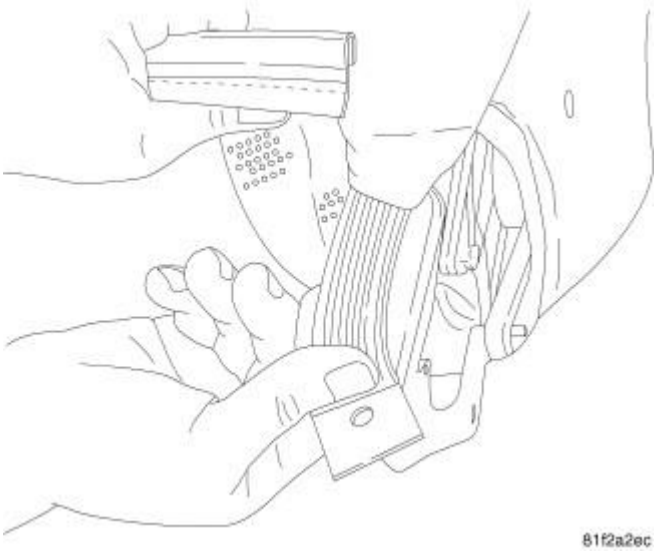


Fig. 445: Elastic Band
Courtesy of CHRYSLER GROUP, LLC

9. Attach the elastic band.
10. Connect the j-strap.

COVER, SEAT CUSHION, FRONT

REMOVAL

REMOVAL

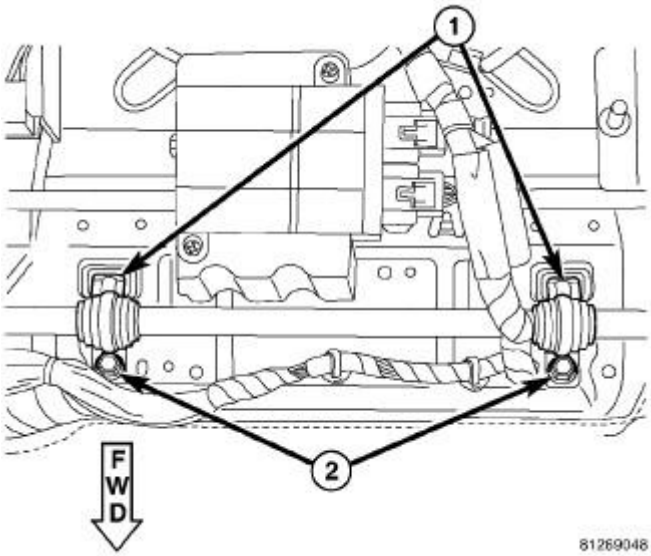


Fig. 446: Cushion Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. Move the seat to the forward position and disconnect and isolate the batter negative cable.
3. Remove the bolts (2) and the clamps (1) and remove the seat cushion.
4. Disconnect the electrical connector, if equipped.

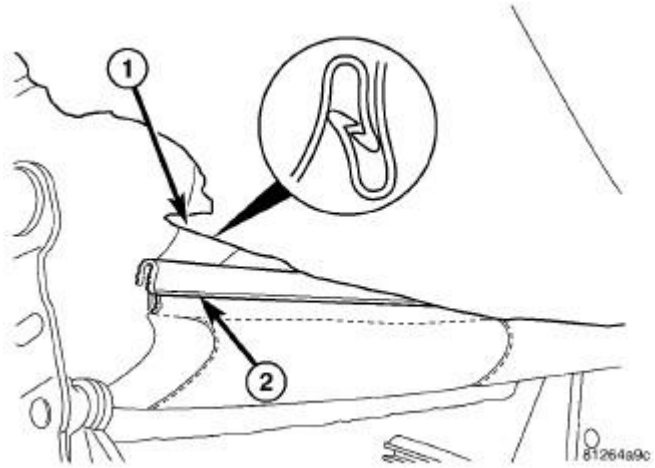


Fig. 447: J-Straps
Courtesy of CHRYSLER GROUP, LLC

5. Separate the j-straps (1 AND 2) and seat cushion cover and foam.

INSTALLATION

INSTALLATION

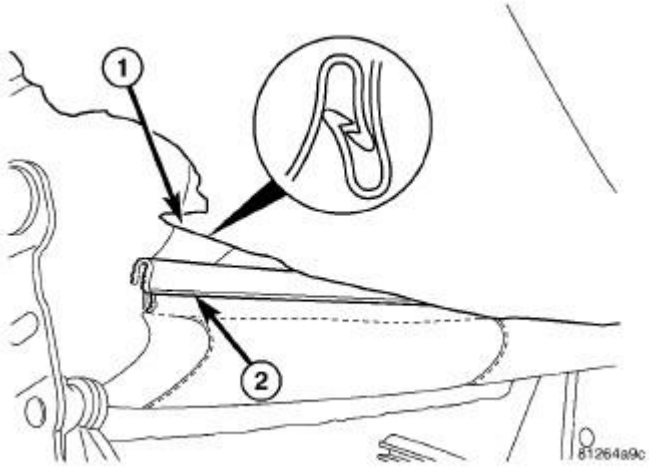


Fig. 448: J-Straps
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. Position the cushion cover and foam over the seat pan and connect the j-straps (1 AND 2).

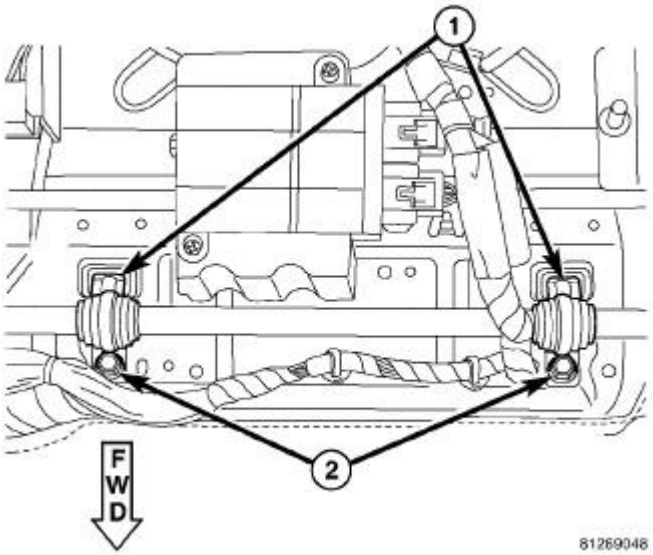


Fig. 449: Cushion Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Position the seat cushion assembly onto the seat frame and install the clamps (1).
4. Connect the wire harness to the seat cushion pan, if equipped.

5. Install the bolts (2) and tighten to 10 N.m (90 in. lbs.).
6. Connect battery negative cable.

COVER, SEAT CUSHION, SECOND ROW

REMOVAL

REMOVAL

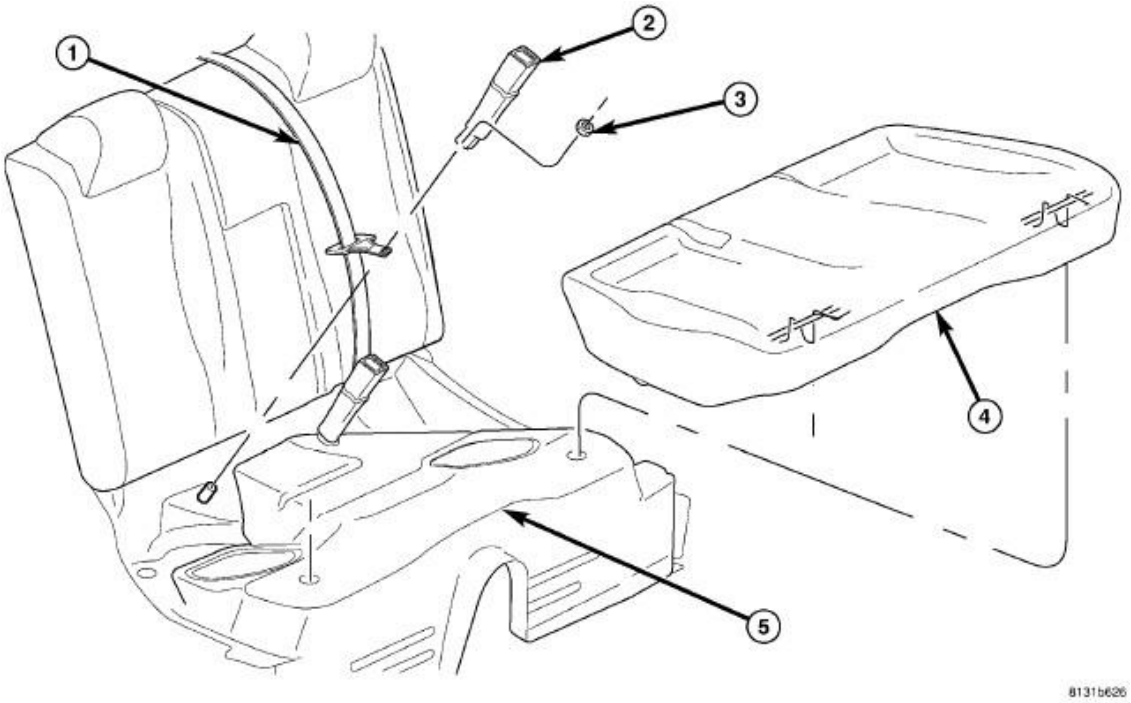


Fig. 450: Rear Seat Cushion & Rear Seat Belt Rib Buckle
Courtesy of CHRYSLER GROUP, LLC

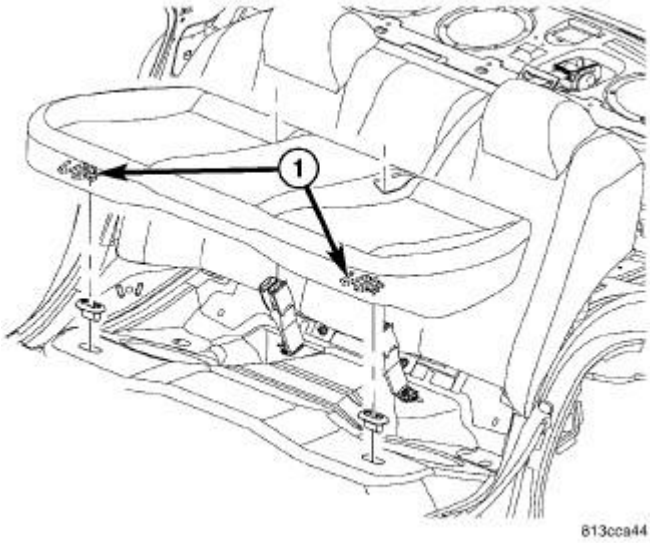


Fig. 451: Rear Seat Cushion
Courtesy of CHRYSLER GROUP, LLC

1. Pull upward at forward edge of cushion each retainer loop of the rear seat cushion to disengage retainer loops from cups in floor.
2. Remove rear seat cushion (4) from vehicle.

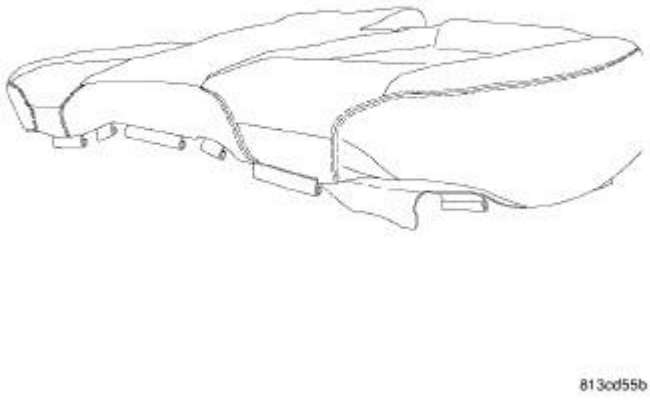


Fig. 452: Connect J-Straps
Courtesy of CHRYSLER GROUP, LLC

3. Disengage the J-straps attaching seat cover to the cushion.

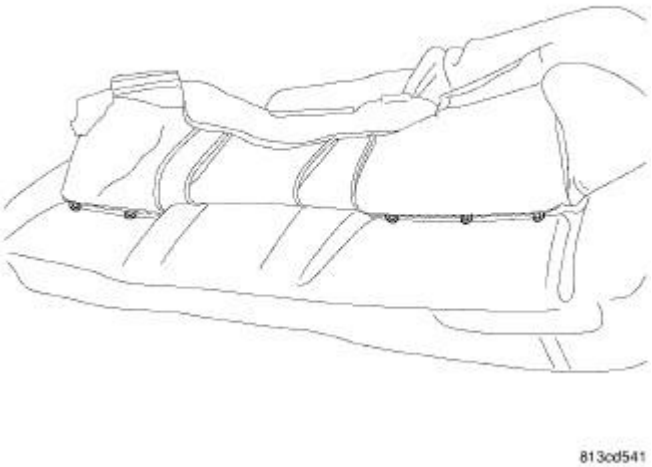


Fig. 453: Move Seat Cover To Access Hog Rings
Courtesy of CHRYSLER GROUP, LLC

4. Fold rear of the seat cover forward to uncover hog rings.

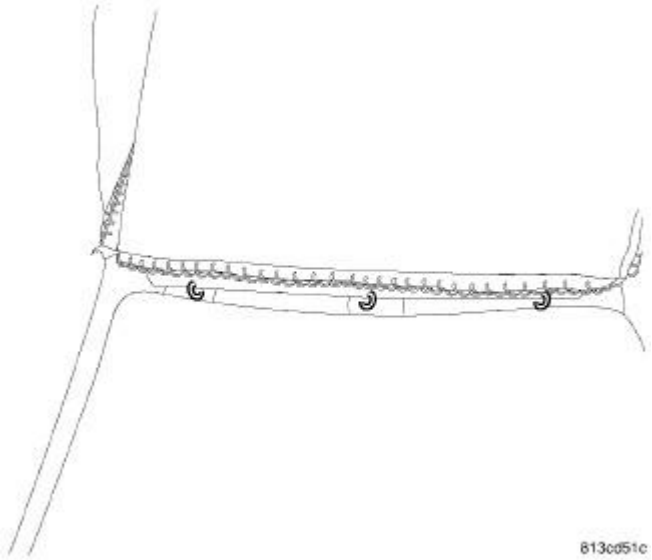


Fig. 454: Rear Seat Cushion Hog Rings (4)
Courtesy of CHRYSLER GROUP, LLC

5. Start on the rear side of the cushion and cut hog rings.

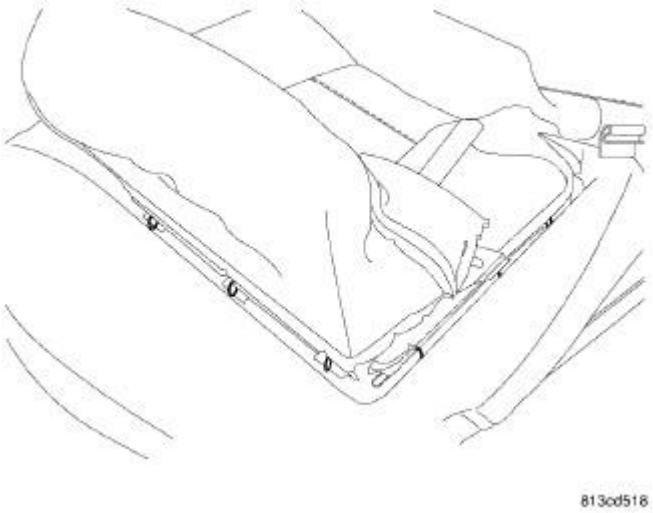


Fig. 455: Rear Seat Cushion Hog Rings (3)
Courtesy of CHRYSLER GROUP, LLC

6. Cut the hog rings on the outer side of the cushion.

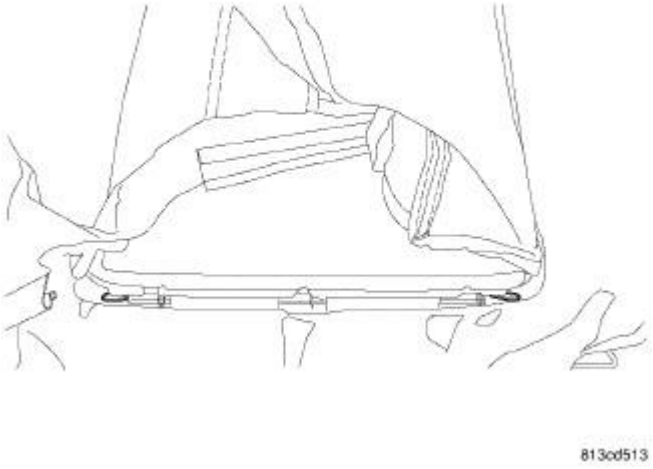


Fig. 456: Rear Seat Cushion Hog Rings (2)
Courtesy of CHRYSLER GROUP, LLC

7. Work around the outer edges and cut the hog rings.

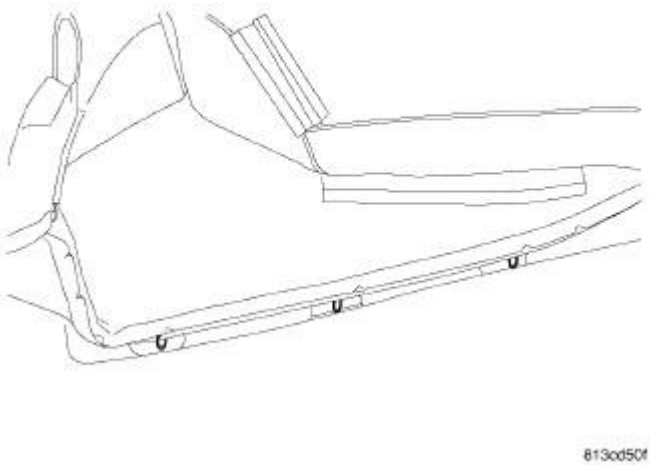


Fig. 457: Rear Seat Cushion Hog Rings (1)
Courtesy of CHRYSLER GROUP, LLC

8. Fold cover up to access the inner hog rings and cut them.
9. Repeat operation on the other side of cushion.
10. Remove seat cushion cover from seat cushion.

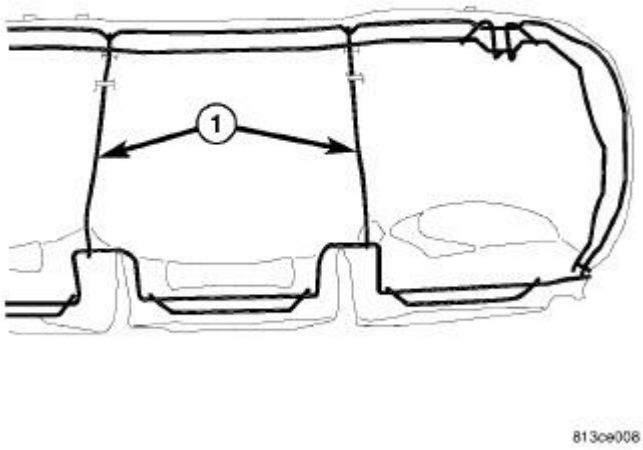


Fig. 458: Cushion Support
Courtesy of CHRYSLER GROUP, LLC

11. If replacing cushion, remove the cushion support by cutting the hog rings attaching it to the foam and remove.

INSTALLATION

INSTALLATION

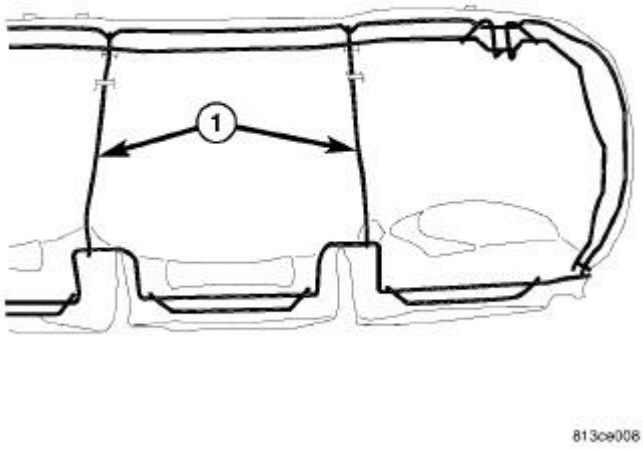


Fig. 459: Cushion Support
Courtesy of CHRYSLER GROUP, LLC

1. Install hog rings attaching cushion support, if remove.

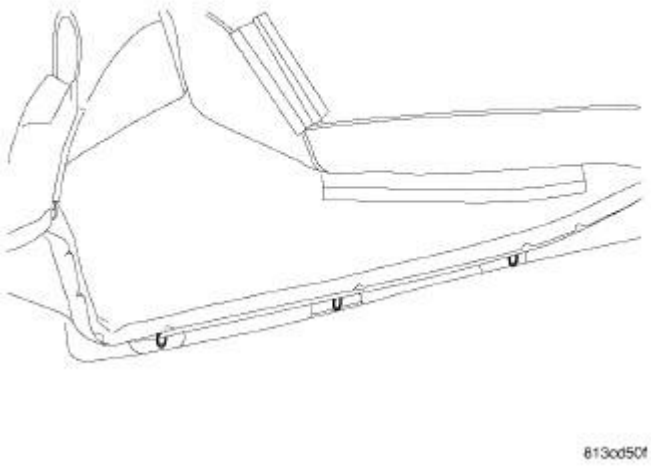


Fig. 460: Rear Seat Cushion Hog Rings (1)
Courtesy of CHRYSLER GROUP, LLC

2. Place seat cover into position on the foam.
3. Install the attaching hog rings on the inner side of the seat cover and cushion.

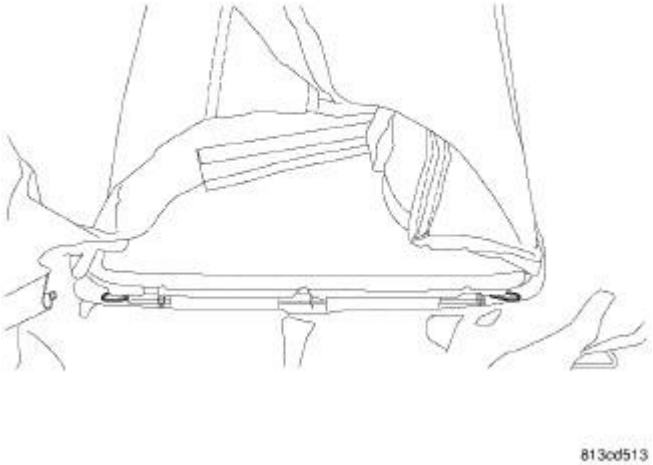


Fig. 461: Rear Seat Cushion Hog Rings (2)
Courtesy of CHRYSLER GROUP, LLC

4. Install hog rings on the on the front side the seat cover.

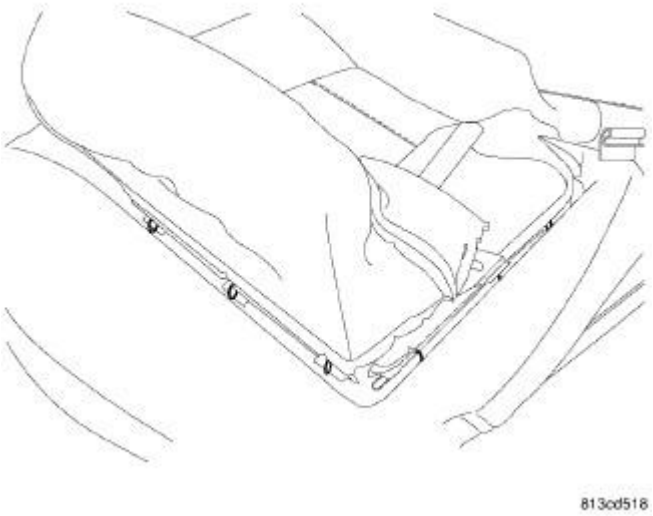


Fig. 462: Rear Seat Cushion Hog Rings (3)
Courtesy of CHRYSLER GROUP, LLC

5. Install hog rings on the outer side of the seat cover. Check for seat cover wrinkles.

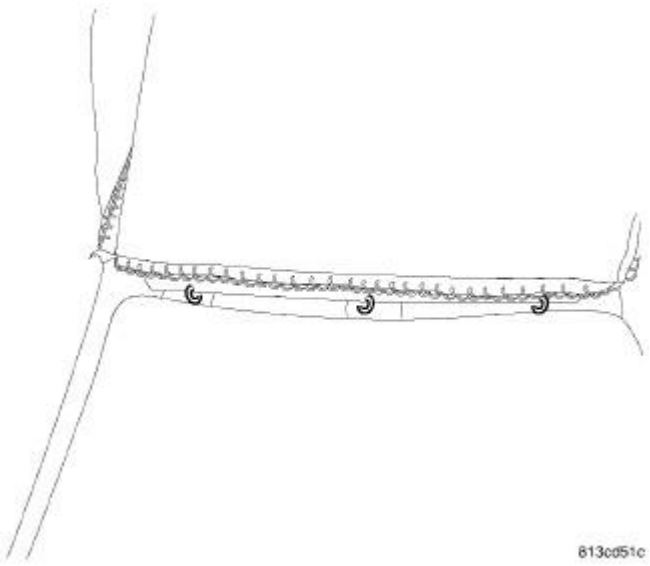


Fig. 463: Rear Seat Cushion Hog Rings (4)
Courtesy of CHRYSLER GROUP, LLC

6. Install the hog rings on the rear side of seat cover.
7. Repeat the operation for the other side of cushion.

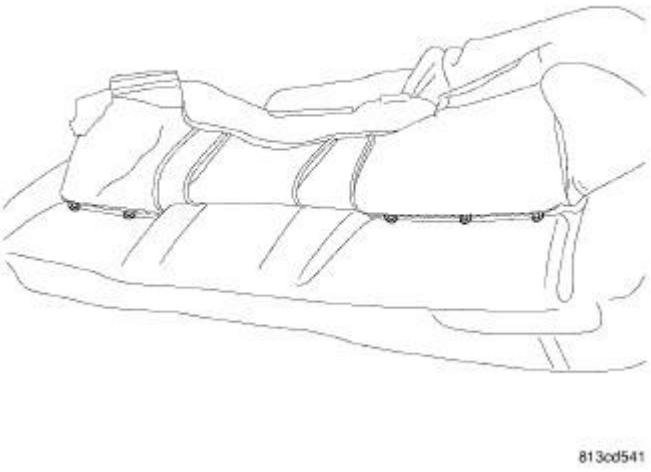


Fig. 464: Move Seat Cover To Access Hog Rings
Courtesy of CHRYSLER GROUP, LLC

8. Position seat cover in to position on the foam and check for seat cover wrinkles.

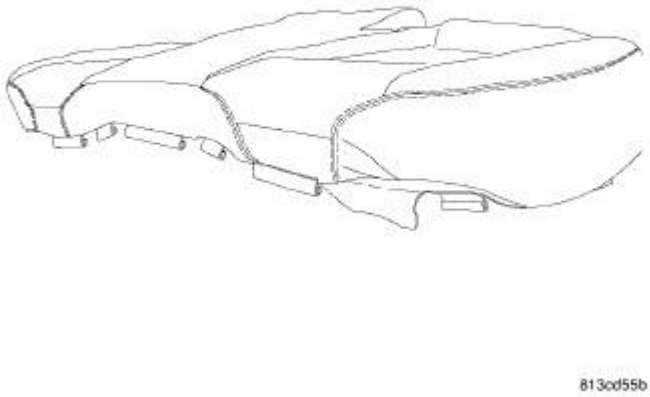


Fig. 465: Connect J-Straps
Courtesy of CHRYSLER GROUP, LLC

9. Connect the J-straps, and smooth out seat cover.
10. Steam wrinkles from seat cushion, if necessary.

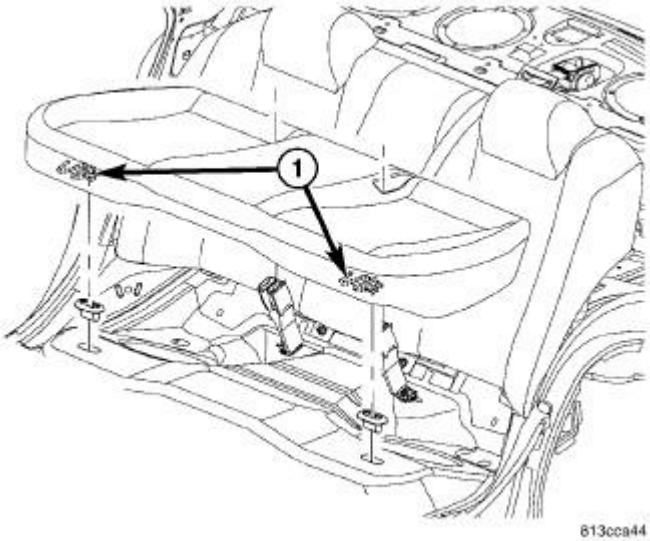


Fig. 466: Rear Seat Cushion
Courtesy of CHRYSLER GROUP, LLC

11. Place seat cushion (4) into position.
12. Engage retainer loops into cup on floor kick up.
13. Push downward at forward edge at each retainer loop of the rear seat cushion to engage retainers.

RISER, SEAT, FRONT

REMOVAL

REMOVAL

MANUAL LENGTH ADJUSTER

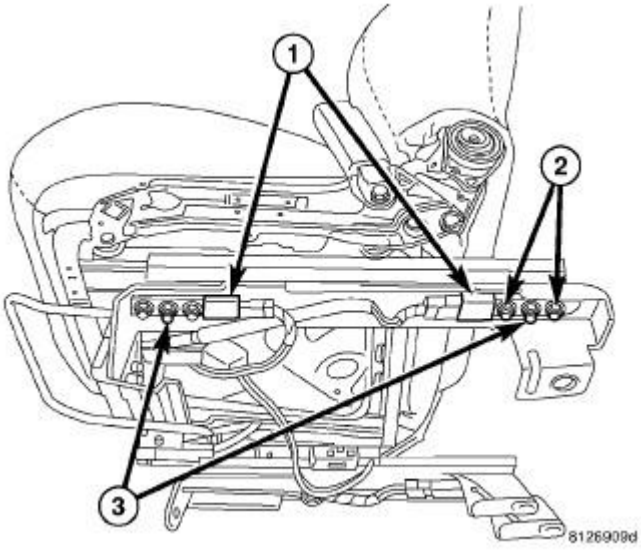


Fig. 467: PASS Seat Manual Track
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. Remove the seat. Refer to **SEAT, FRONT, REMOVAL**.
3. Move the seat to the forward position on the tracks and remove the seat adjuster bolts/nuts (3).
4. Move the seat to the reward position on the tracks and remove the front seat adjuster bolts/nuts (3).

NOTE: Passenger seat with strain gauges shown in illustration, drivers side seat similar.

5. Disconnect strain gauge electrical connectors (1), if equipped.
6. If equipped, remove the strain gauge bolts (2) and remove the strain gauges as necessary.

POWER LENGTH ADJUSTER

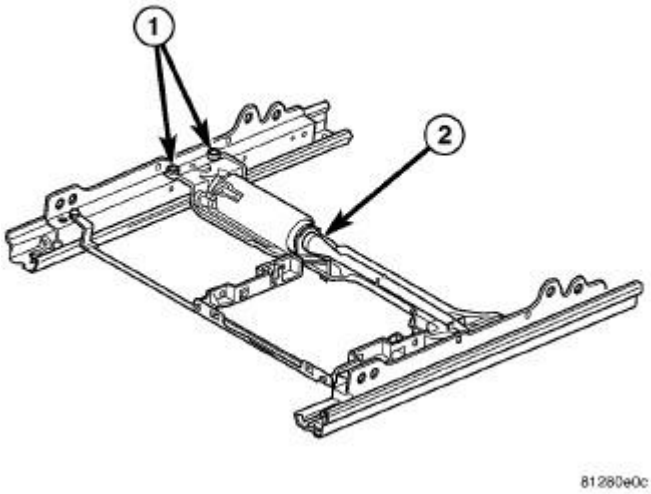


Fig. 468: Power Length Adjuster
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. Unbolt the seat from the floor as necessary to gain access to the riser bolts. Refer to **SEAT, FRONT, REMOVAL**.
3. Move the seat to the forward position on the tracks, tip the seat backwards in vehicle and remove the seat adjuster bolts/nuts (1).
4. Move the seat to the reward position on the tracks and remove the front seat adjuster bolts/nuts (1).

NOTE: Manual seat length adjuster shown in illustration, power similar.

5. If the seat cannot be moved forward or backward, remove the seat cushion. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** or **COVER, SEAT CUSHION, SECOND ROW, REMOVAL**.
6. Remove the four bolts (1) and remove the motor and cable assembly (2) from the length adjuster assembly.

CAUTION: When the motor and cable assembly are removed from the tracks discard the length adjuster assembly and replace with a new one.

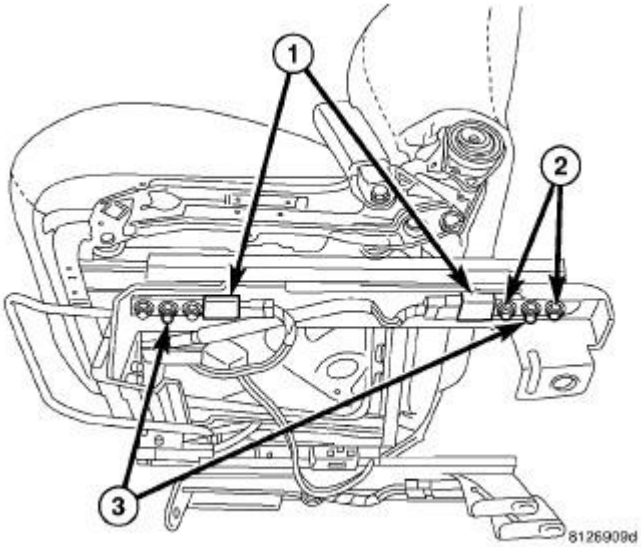


Fig. 469: PASS Seat Manual Track
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect and isolate battery negative cable.
8. Remove the seat off of the risers and disconnect the electrical connectors.
9. Disconnect strain gauge electrical connectors (1), if equipped.
10. If equipped, remove the strain gauge bolts (2) and remove the strain gauges as necessary.

INSTALLATION

INSTALLATION

MANUAL LENGTH ADJUSTER

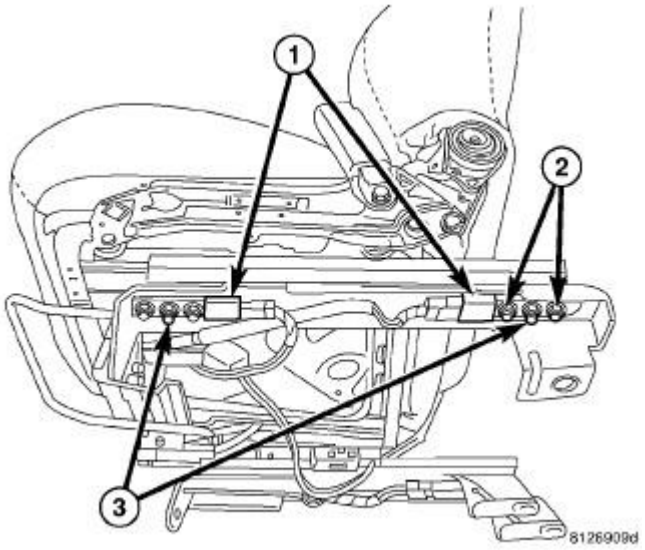


Fig. 470: PASS Seat Manual Track
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.

   NOTE: Passenger seat with strain gauges shown in illustration, drivers side seat similar.

2. If equipped, install the strain gauges and install the bolts (2).
3. Tighten the bolts to 40 N.m (30 ft. lbs.).
4. If necessary, connect the electrical connections (1).
5. Move the seat to the forward position on the tracks and install the rear seat adjuster bolts/nuts (3).
6. Tighten the bolts to 45 N.m (33 ft. lbs.).
7. Move the seat to the reward position on the tracks and install the front seat adjuster bolts/nuts (3).
8. Tighten the bolts to 45 N.m (33 ft. lbs.).
9. Install the seat. Refer to **SEAT, FRONT, INSTALLATION**.

POWER LENGTH ADJUSTER

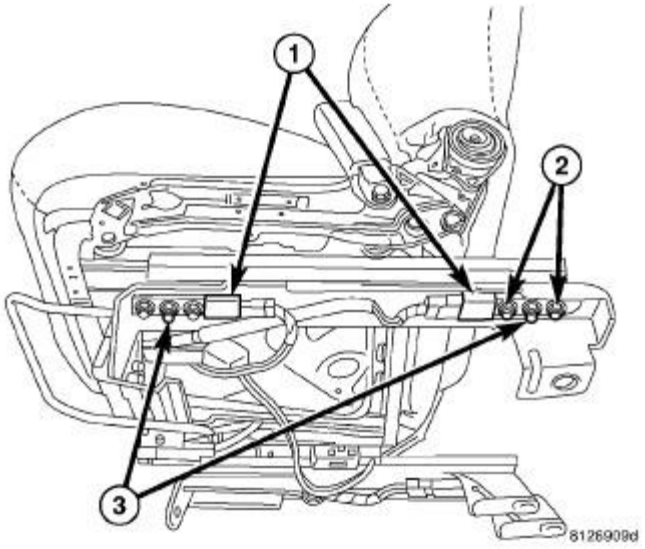


Fig. 471: PASS Seat Manual Track
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. If equipped, install the strain gauges and install the bolts (2).

3. Tighten the bolts to 40 N.m (30 ft. lbs.).
4. Position the seat into the vehicle onto the risers and connect the electrical connectors.
5. Move the seat to the forward position on the tracks and install the seat adjuster bolts/nuts (3).
6. Tighten the bolts attaching the adjuster to the risers/strain gauges to 45 N.m (33 ft. lbs.).
7. Move the seat to the reward position on the tracks and install the front seat adjuster bolts/nuts (3).
8. Tighten the bolts attaching the adjuster to the risers/strain gauges to 45 N.m (33 ft. lbs.).
9. If necessary, connect the strain gauge electrical connections (1).

CAUTION: When the motor and cable assembly are removed from the tracks discard the length adjuster assembly and replace with a new one.

10. Bolt the seat to the floor. Refer to **SEAT, FRONT, INSTALLATION**.

SEAT BACK, SECOND ROW

REMOVAL

REMOVAL

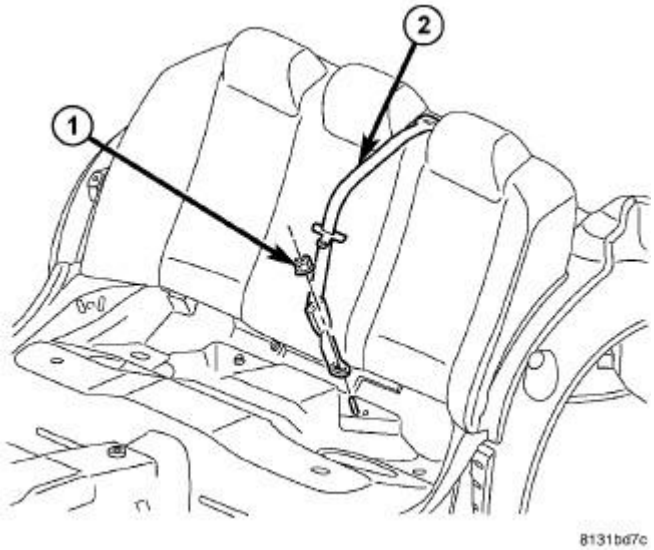


Fig. 472: Rear Center Seat Belt Anchor 49
Courtesy of CHRYSLER GROUP, LLC

1. Remove the seat cushion. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** or **COVER, SEAT CUSHION, SECOND ROW, REMOVAL**.
2. Remove the nut and disconnect the seat belt anchor.

40% SEAT BACK SIDE

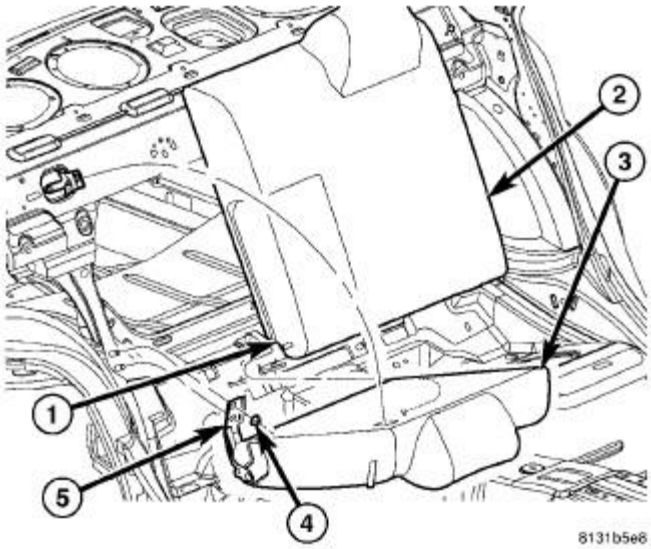


Fig. 473: Rear Seat Back 40%
Courtesy of CHRYSLER GROUP, LLC

1. Fold the 40% section of the seat (3) down.
2. Remove the two nuts (4) attaching seat back.
3. Pivot the seat back off the pivot pin (1) located on the 60% seat back (2).
4. Remove the seat back from vehicle.

60/40 SEAT BACK - DOMESTIC SEDAN

60% SEAT BACK SIDE

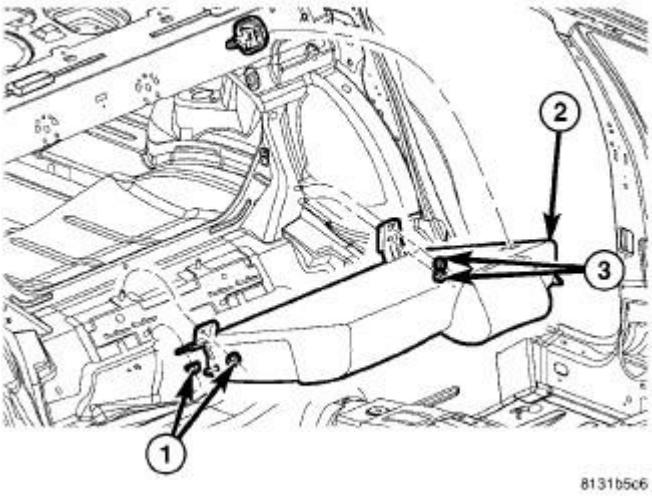


Fig. 474: Rear Seat Back 60%
Courtesy of CHRYSLER GROUP, LLC

1. With the 40% seat back removed.
2. Fold the 60% section of the seat down.
3. Remove the four nuts attaching seat back (4).
4. Remove the seat back for vehicle.

60/40 SEAT BACK - EXPORT SEDAN

40% SEAT BACK SIDE

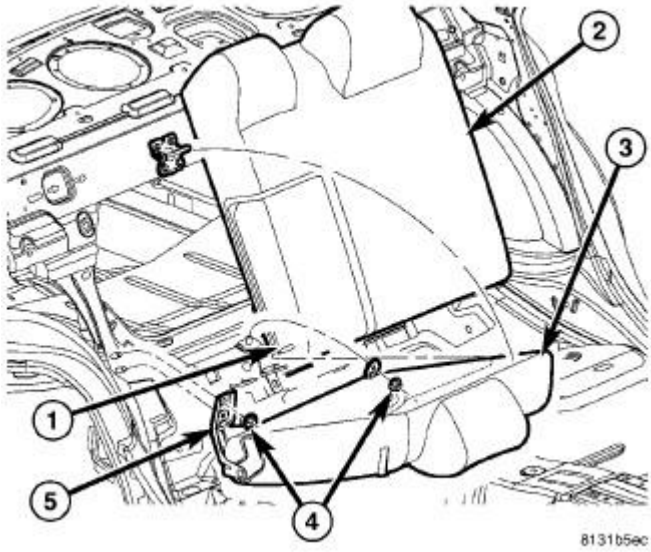


Fig. 475: Rear Seat Back 40% - Export

Courtesy of CHRYSLER GROUP, LLC

1. Fold the 40% section of the seat (3) down.
2. Remove the three nuts (4) attaching seat back.
3. Remove the seat back from vehicle.

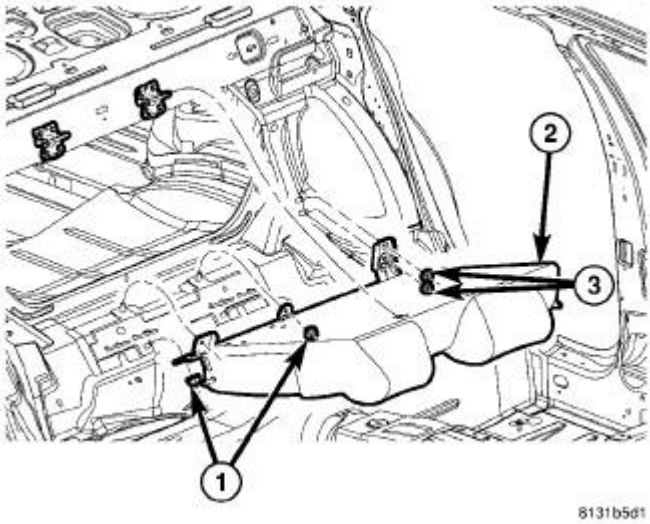


Fig. 476: Rear Seat Back 60% - Export
Courtesy of CHRYSLER GROUP, LLC

60/40 SEAT BACK - EXPORT SEDAN

60% SEAT BACK SIDE

1. With the 40% seat back removed.
2. Remove the four nuts (1) and (3) attaching seat back.
3. Remove the seat back from vehicle.

NON-FOLDING SEAT BACK

1. Remove the lower seat back mounting fasteners.
2. Disengage the upper seat back snap fasteners by using a flat blade tool inserted at the top of the seat and pushing down on spring fasteners to disengage.
3. Remove the seat back from the vehicle.

INSTALLATION

INSTALLATION

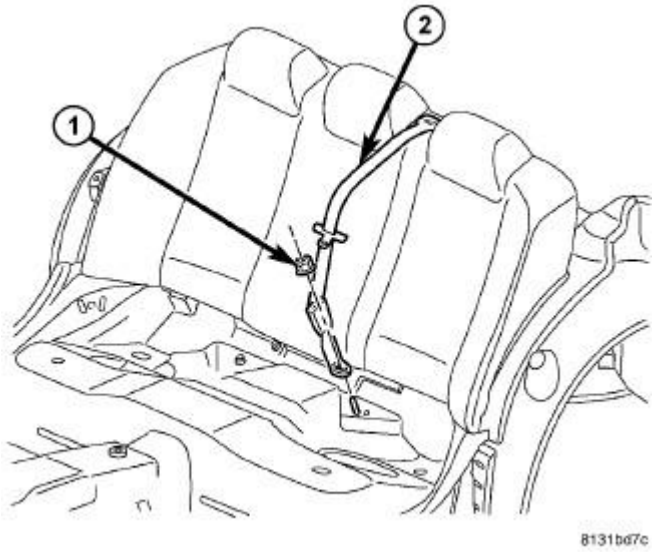


Fig. 477: Rear Center Seat Belt Anchor 49
Courtesy of CHRYSLER GROUP, LLC

1. Place seat belt into position and install the seat belt anchor nut. Tighten nut to 32 N.m (24 ft. lbs.).
2. Place the seat cushion into position and push downward on the forward edge of the seat cushion to lock into position. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** or **COVER, SEAT CUSHION, SECOND ROW, REMOVAL**.

60/40 SEAT BACK DOMESTIC SEDAN

60% SEAT BACK SIDE

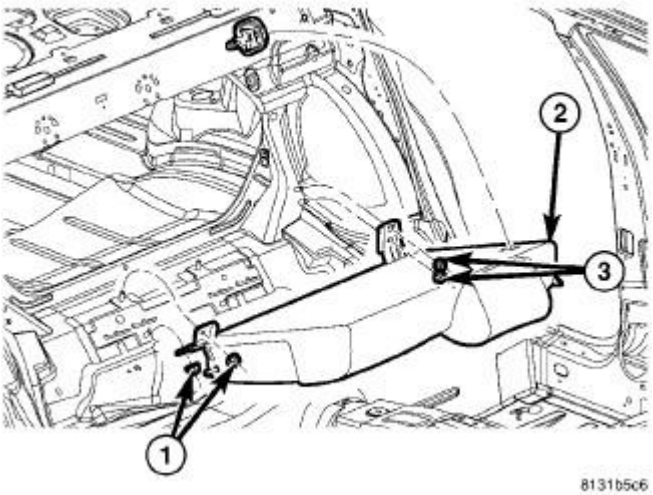


Fig. 478: Rear Seat Back 60%

Courtesy of CHRYSLER GROUP, LLC

1. With the 40% seat back removed.
2. Place 60% seat back (2) into position on the studs.
3. Fold the 60% section of the seat down.
4. Install the four nuts (1) and (3) attaching seat back (2). Tighten nuts to 57 N.m (42 ft. lbs.).

60/40 SEAT BACK DOMESTIC SEDAN

40% SEAT BACK SIDE

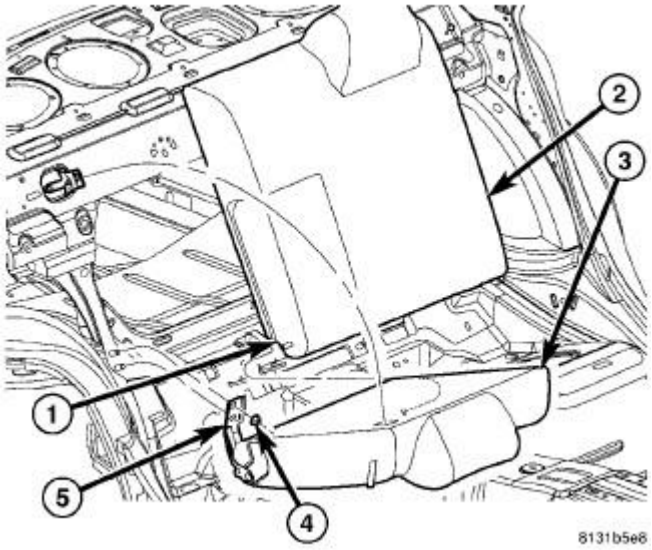


Fig. 479: Rear Seat Back 40%
Courtesy of CHRYSLER GROUP, LLC

1. Place the 40% section (3) into position.
2. Slide 40% seat back onto the pivot pin (1) located on the 60% seat back (2).
3. Install the two nuts (5) attaching seat back. Tighten nuts to 57 N.m (42 ft. lbs.).

60/40 SEAT BACK EXPORT SEDAN

60% SEAT BACK SIDE

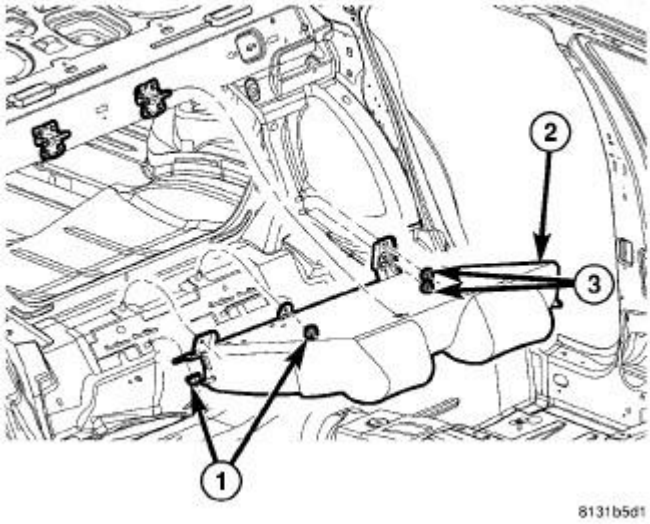


Fig. 480: Rear Seat Back 60% - Export
Courtesy of CHRYSLER GROUP, LLC

1. With the 40% seat back removed.
2. Place 60% seat back (2) into position on the studs.
3. Fold the 60% section of the seat down.
4. Install the four nuts (1) and (3) attaching seat back (2). Tighten nuts to 57 N.m (42 ft. lbs.).

60/40 SEAT BACK EXPORT SEDAN

40% SEAT BACK SIDE

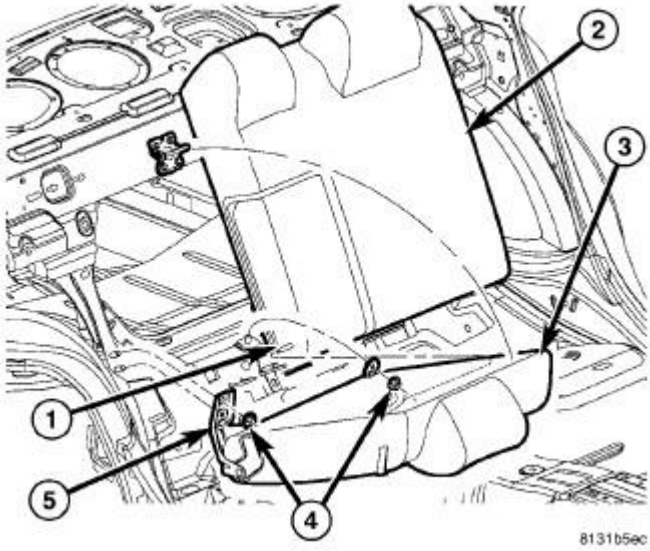


Fig. 481: Rear Seat Back 40% - Export

Courtesy of CHRYSLER GROUP, LLC

1. Place the 40% section (3) into position onto the studs.
2. Fold the 40% section of the seat down.
3. Install the four nuts (4) attaching seat back (3). Tighten nuts to 57 N.m (42 ft. lbs.).

NON-FOLDING SEAT BACK

1. Install the seat back to the vehicle.
2. Align the snap fasteners at the top of the rear seat back and engage the snap fasteners to secure the seat back.
3. Install the lower seat back mounting fasteners. Tighten to 57 N.m (42 ft. lbs.).

SEAT, FRONT

REMOVAL

REMOVAL

WARNING: Review all warnings and cautions prior to servicing the seats. Refer to SEATS, WARNING. Failure to follow these instructions may result in serious or fatal injury.

WARNING: Handled seats carefully when servicing. Be careful not to drop seats on the workbench or floor. If dropped, the seat position sensor may become damaged and inoperative. Failure to follow these instructions may result in serious or fatal injury.

NOTE: Typical left side seat shown in illustrations. Right side seat similar.

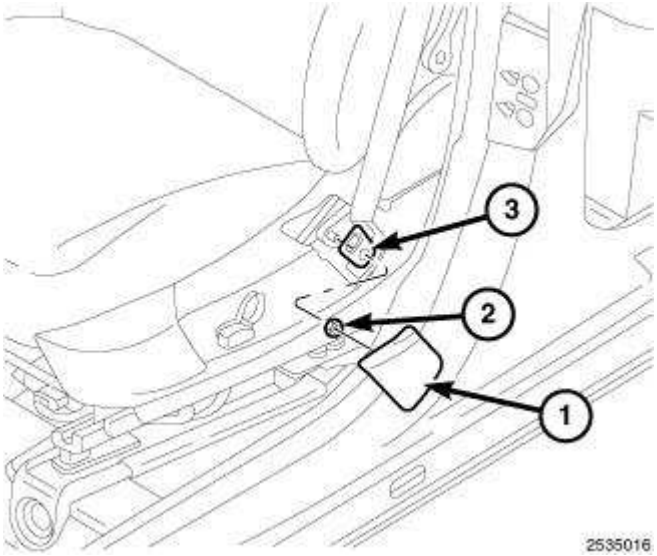


Fig. 482: Front Seat Belt To Outboard
Courtesy of CHRYSLER GROUP, LLC

1. Move the seat full forward.
2. Remove the trim cover (1).
3. Remove the nut (2) from the stud located on the outboard seat cushion frame.
4. Remove the lower seat belt anchor (3) from the stud.

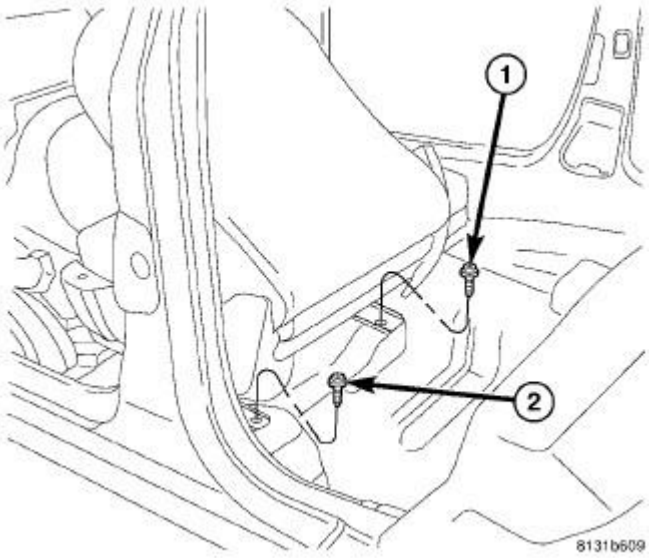


Fig. 483: Front Seat Left Side Rear Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the two bolts (1 and 2) that secure the rear of the seat to the body.

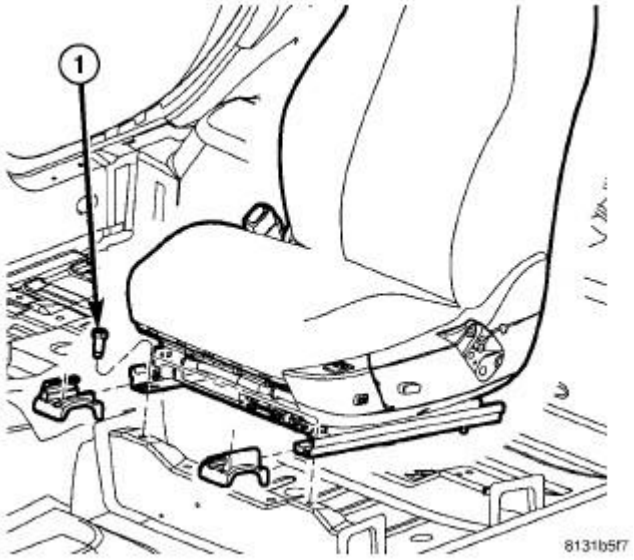


Fig. 484: Front Seat Left Side Front Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Move the seat full rearward.
7. Disconnect and isolate the negative battery cable.
8. Remove the two bolts (1) that secure the front of the seat to the body.
9. Tip the seat rearward and disconnect the electrical connectors, as required.
10. Remove the seat from the vehicle and carefully place it on a work bench or the floor.

INSTALLATION

INSTALLATION

WARNING: Handled seats carefully when servicing. Be careful not to drop seats on the workbench or floor. If dropped, the seat position sensor may become damaged and inoperative. Failure to follow these instructions may result in serious or fatal injury.

NOTE: Typical left side seat shown in illustrations. Right side seat similar.

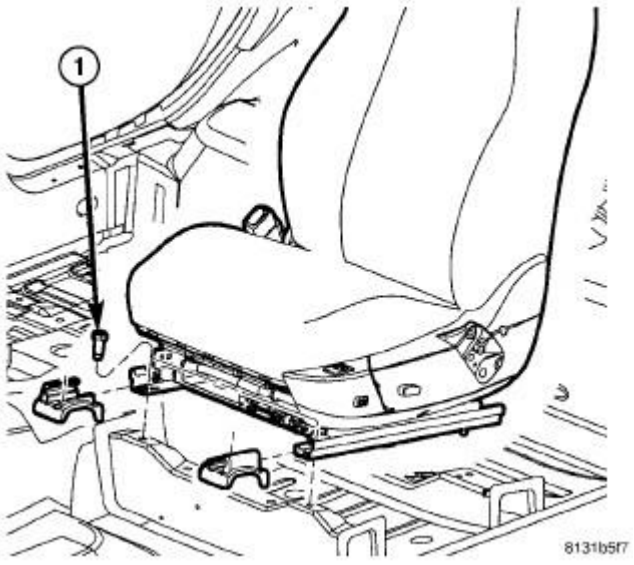


Fig. 485: Front Seat Left Side Front Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Place the seat into the vehicle and connect the electrical connectors.
2. Install the two bolts (1) that secure the front of the seat to the body. Tighten the bolts to 70 N.m (52 ft. lbs.).

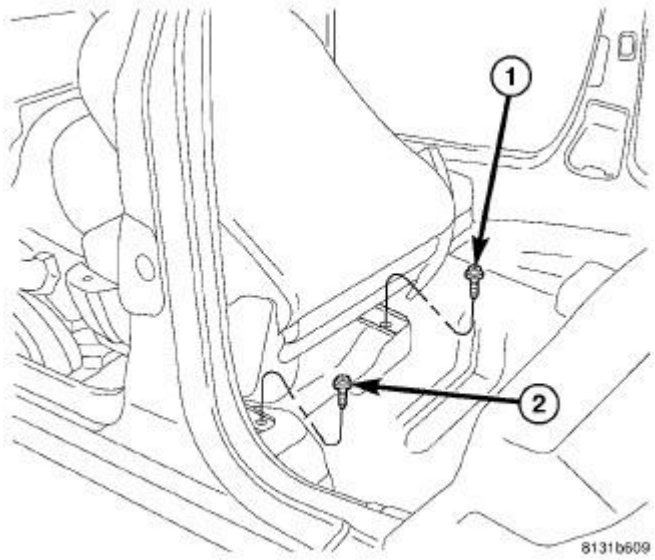


Fig. 486: Front Seat Left Side Rear Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Reconnect the negative battery cable.
4. Move the seat full forward.
5. Install the two bolts (1) that secure the rear of the seat to the body. Tighten the bolts to 70 N.m (52 ft. lbs.).

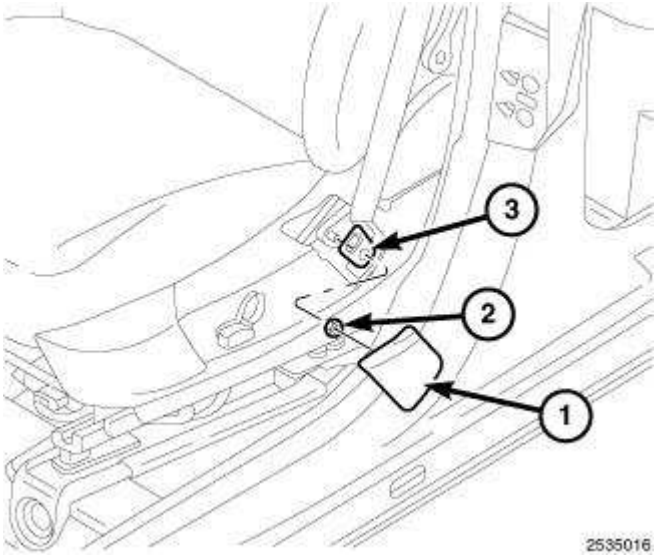


Fig. 487: Front Seat Belt To Outboard
Courtesy of CHRYSLER GROUP, LLC

6. Install the lower seat belt anchor (3) onto the stud located on the seat cushion frame.
7. Install the nut (2) that secures the lower seat belt anchor to the stud. Tighten the nut to 37 N.m (27 ft. lbs.).

8. Install the trim cover (1).
9. Perform the supplemental restraint system verification test. Refer to **STANDARD PROCEDURE** .

STRIKER, SEAT BACK, SECOND ROW

REMOVAL

REMOVAL

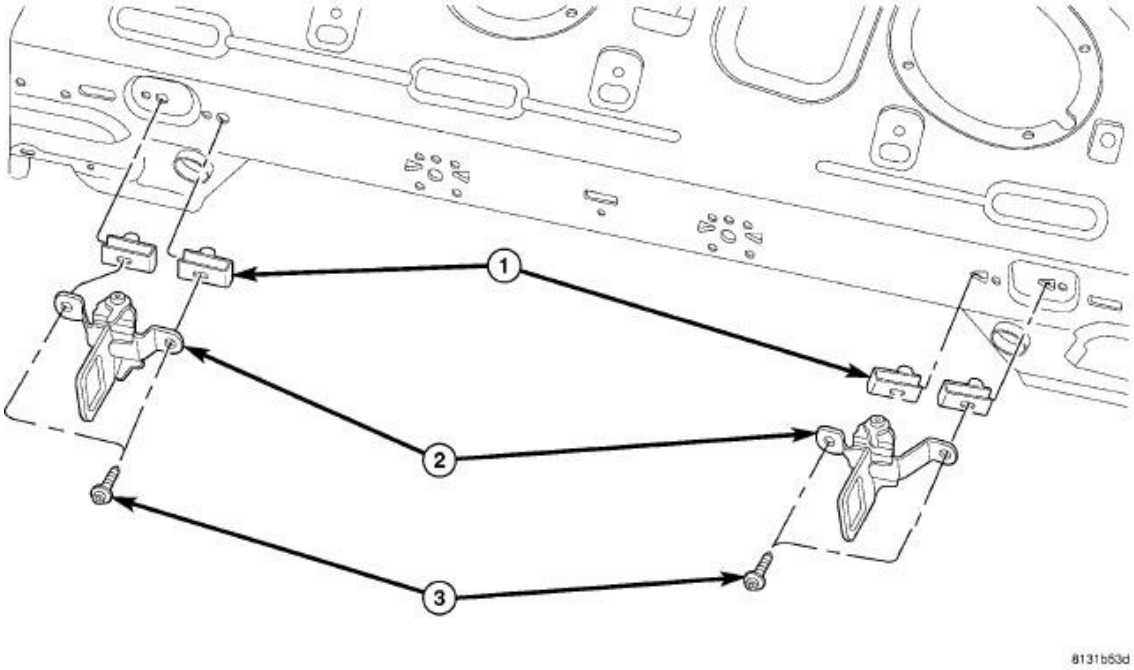


Fig. 488: Rear Seat Back Striker 60/40 Seats
Courtesy of CHRYSLER GROUP, LLC

1. Remove the sedan seat back striker (2), remove the attaching screws (3) and remove seat back striker from the vehicle.

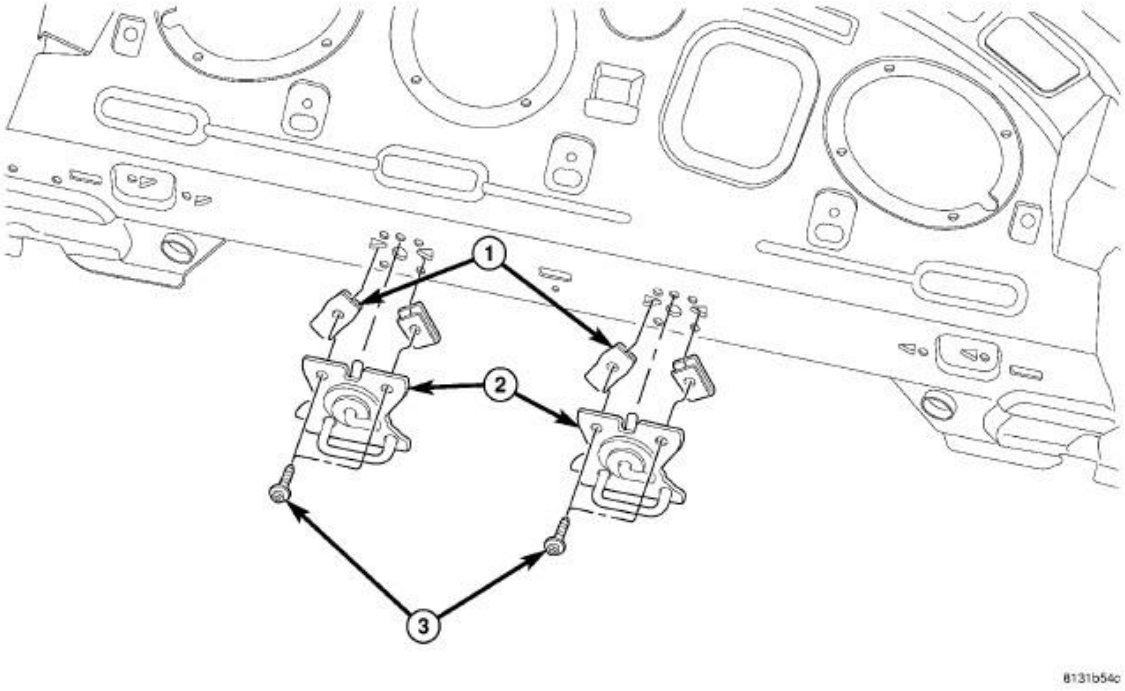


Fig. 489: Rear Seat Back Striker 60/40 Seats - Export
Courtesy of CHRYSLER GROUP, LLC

2. Remove the export sedan seat back striker (2), remove the attaching screws (3) and remove seat back striker from the vehicle.

INSTALLATION

INSTALLATION

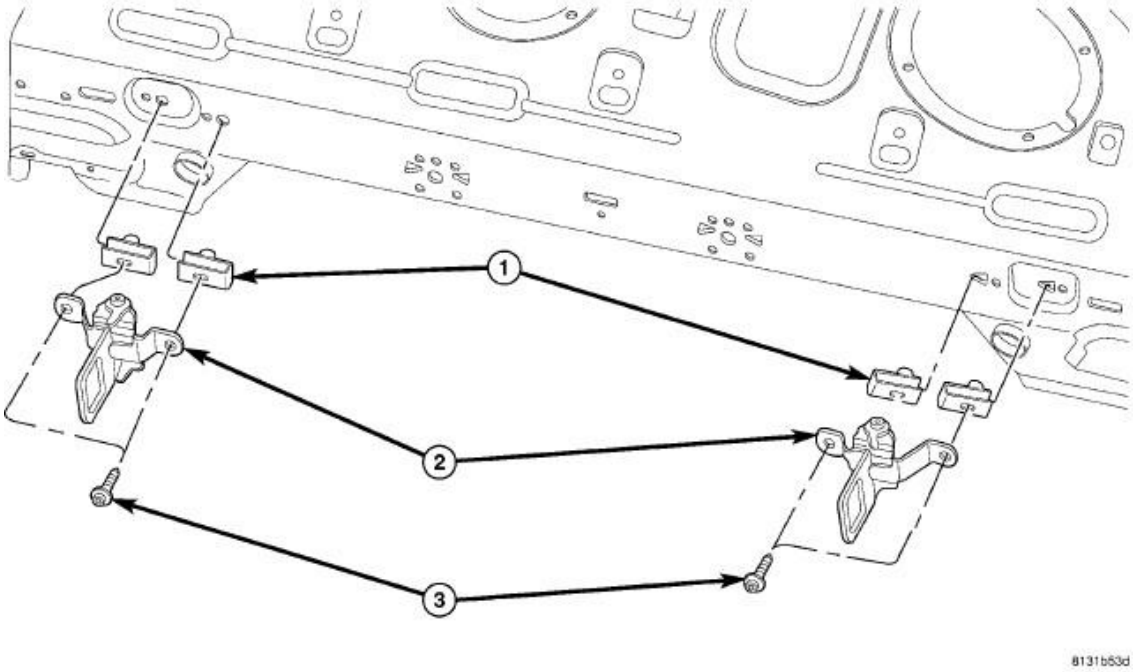


Fig. 490: Rear Seat Back Striker 60/40 Seats
Courtesy of CHRYSLER GROUP, LLC

1. Spring nut(s) (1) replace, if necessary.
2. Place the sedan back seat striker (2) into position and Install attaching screws (3).

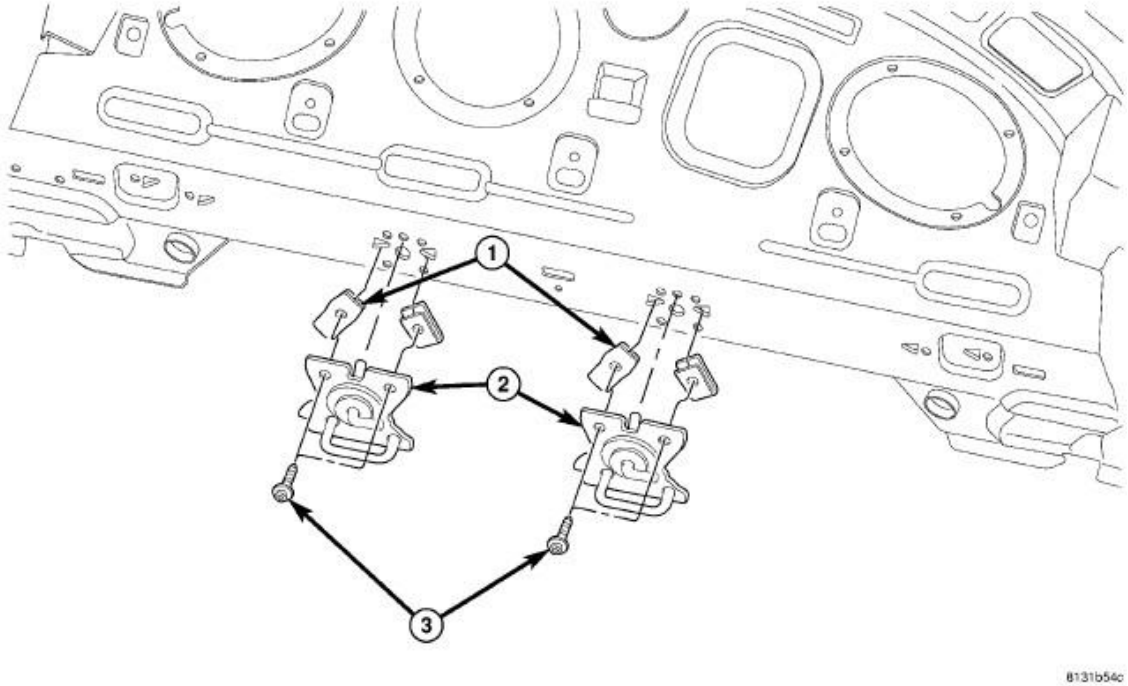


Fig. 491: Rear Seat Back Striker 60/40 Seats - Export
Courtesy of CHRYSLER GROUP, LLC

3. Spring nut(s) (1) replace, if necessary.
4. Place the (Export) sedan back seat striker (2) into position and Install attaching screws (3).

SUPPORT, LUMBAR

REMOVAL

REMOVAL

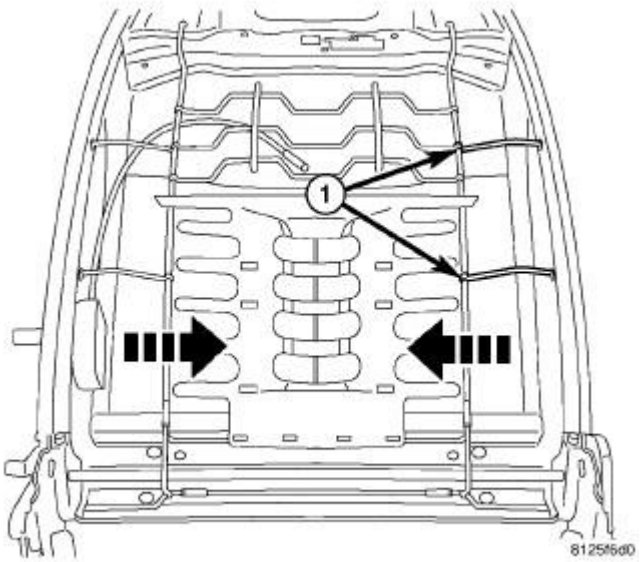


Fig. 492: Identifying Lumbar Mat Side Wires
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.
2. Remove the seat back cushion/cover.
3. Release the lumbar mat side wires (1) by pulling out on the wire supports and then pulling them in.

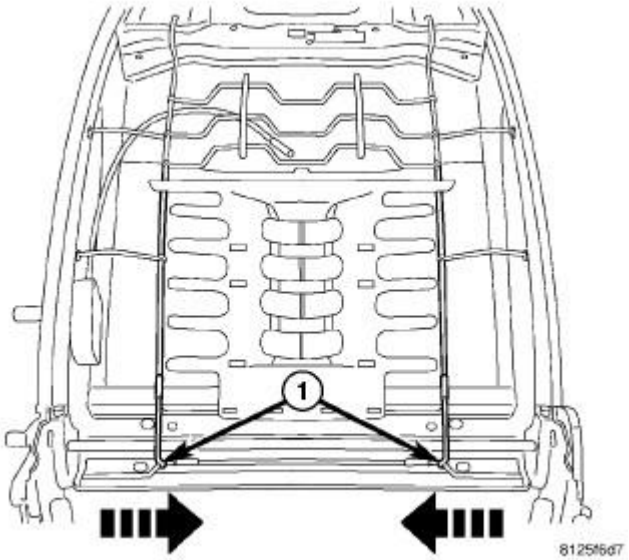


Fig. 493: Lumbar Screen 2
Courtesy of CHRYSLER GROUP, LLC

4. Squeeze the lower support wires (1) in and release the lower wires.

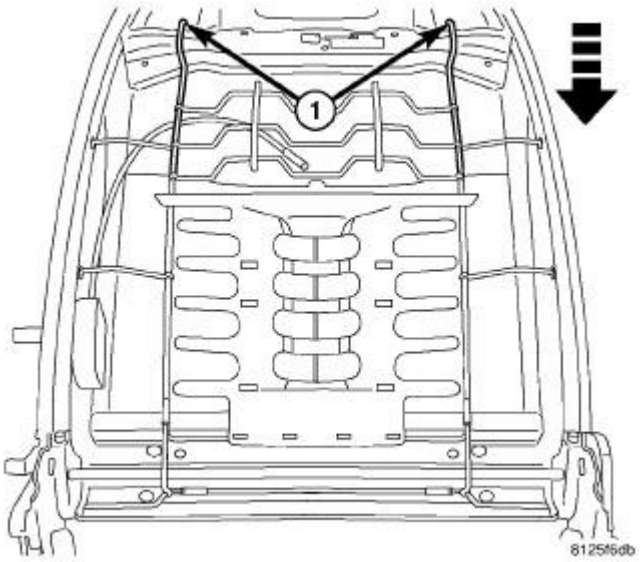


Fig. 494: Lumbar Screen 3
Courtesy of CHRYSLER GROUP, LLC

5. Pull the upper support wires (1) down and release the lumbar mat from the seat back frame.

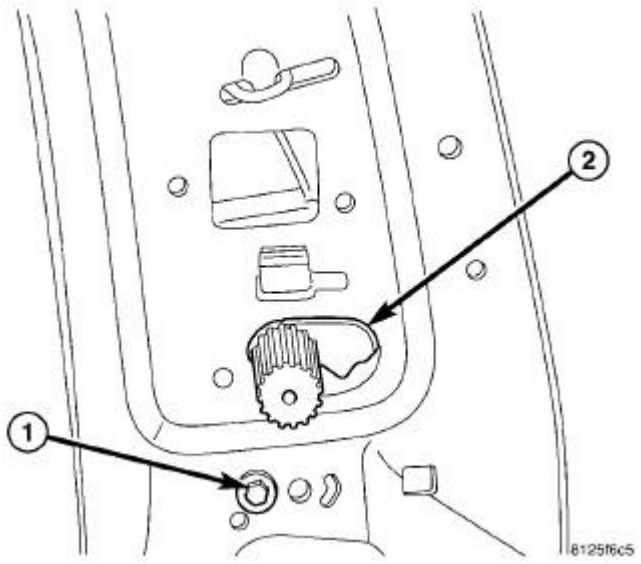


Fig. 495: Lumbar Actuator
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rivet (1) and remove the lumbar mechanism (2).

INSTALLATION

INSTALLATION

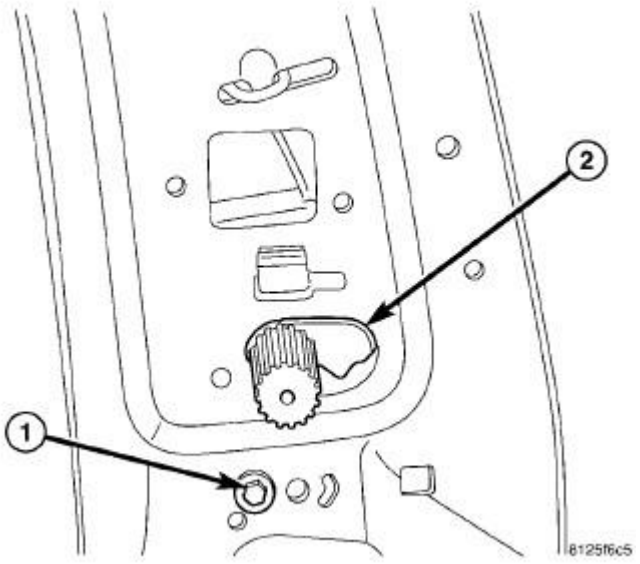


Fig. 496: Lumbar Actuator
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, WARNING**.

2. Install the lumbar mechanism (2) and install a new rivet (1).

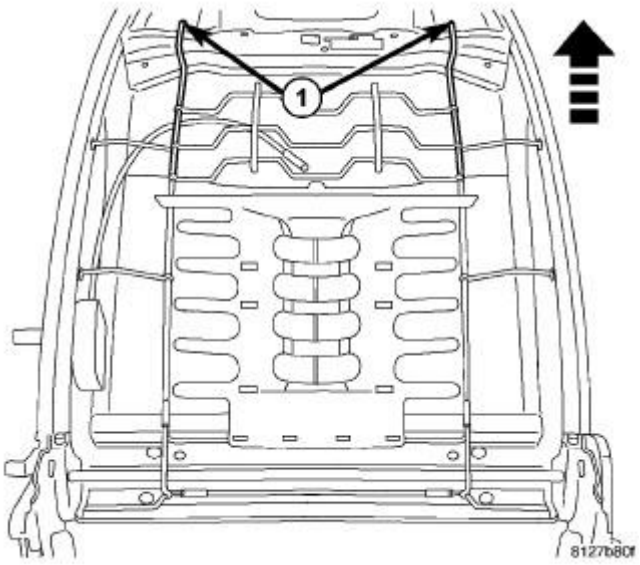


Fig. 497: Lumbar Screen 3
Courtesy of CHRYSLER GROUP, LLC

3. Place lumbar mat onto seat back frame and insert the upper support wires (1) into the frame.

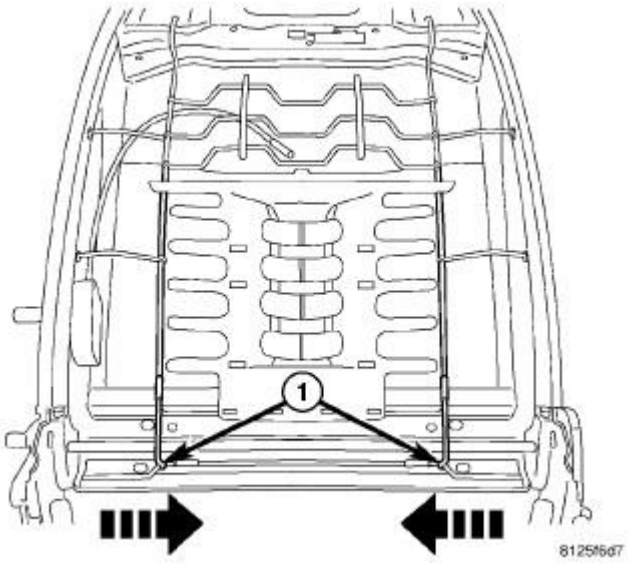


Fig. 498: Lumbar Screen 2
Courtesy of CHRYSLER GROUP, LLC

4. Squeeze the lower support wires (1) together and insert into the lower frame.

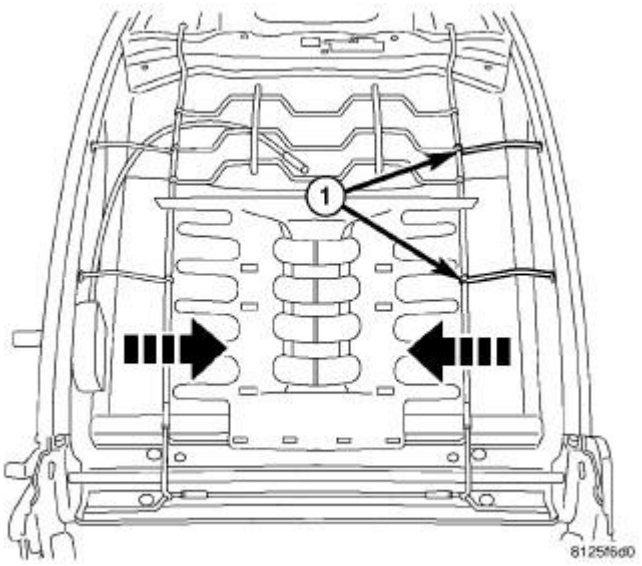


Fig. 499: Identifying Lumbar Mat Side Wires
Courtesy of CHRYSLER GROUP, LLC

5. Squeeze the side support wires together and insert them into the sides of the seat back frame.
6. Install the seat back cushion/cover. Refer to **COVER, SEAT BACK, FRONT, INSTALLATION**.

STATIONARY GLASS

WARNING

WARNING

WARNING: Do not operate the vehicle within 24 hours of windshield installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the windshield may not perform properly in an accident.

- **urethane adhesives are applied as a system. Use glass cleaner, glass prep solvent, glass primer, PVC (vinyl) primer and pinch weld (fence) primer provided by the adhesive manufacturer. If not, structural integrity could be compromised.**
- **Chrysler does not recommend glass adhesive by brand. Technicians should review product labels and technical data sheets, and use only adhesives that their manufactures warrant will restore a vehicle to the requirements of FMVSS 212. Technicians should also insure that primers and cleaners are compatible with the particular adhesive used.**
- **be sure to refer to the urethane manufacturer's directions for curing time specifications, and do not use adhesive after its expiration date.**
- **vapors that are emitted from the urethane adhesive or primer could**

cause personal injury. Use them in a well-ventilated area.

- **skin contact with urethane adhesive should be avoided. Personal injury may result.**
- **always wear eye and hand protection when working with glass.**

CAUTION: Protect all painted and trimmed surfaces from coming in contact with urethane or primers.

Be careful not to damage painted surfaces when removing moldings or cutting urethane around windshield.

BACKLITE

REMOVAL

REMOVAL

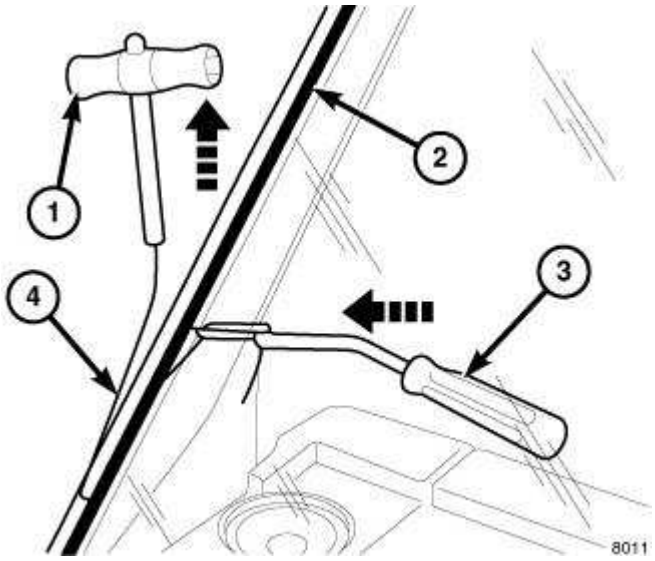


Fig. 500: Adhesive Separation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Windshield removal shown in illustration, backlite similar.

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **STATIONARY GLASS, WARNING**.
2. Remove the trim panel from the rear shelf. Refer to **PANEL, REAR SHELF, REMOVAL**.
3. Disconnect the wire connectors from rear window defogger terminals and, rear window mounted radio antenna, if equipped.

CAUTION: Be careful not to damage painted surfaces when cutting urethane around the backlight.

4. Using an assistant and a wire-type windshield cut-out tool (1, 3 and 4), cut and separate the urethane adhesive (2) securing the backlite to the backlite fence.
5. Carefully remove the backlite from the vehicle.

INSTALLATION

INSTALLATION

CAUTION: To help prevent water leaks, partially roll down the left and right door glass before installing the backlite. This avoids pressurizing the passenger compartment if a door is slammed before the urethane is cured.

CAUTION: Protect all painted and trimmed surfaces from coming in contact with urethane or primers.

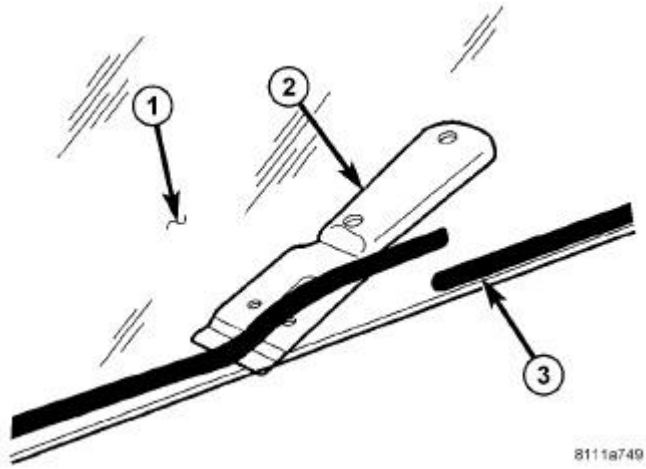


Fig. 501: Glass Adhesive Preparation
Courtesy of CHRYSLER GROUP, LLC

1. If the backlite (1) is being reused, remove the as much original urethane (3) as possible from the glass surface using a razor knife (2).

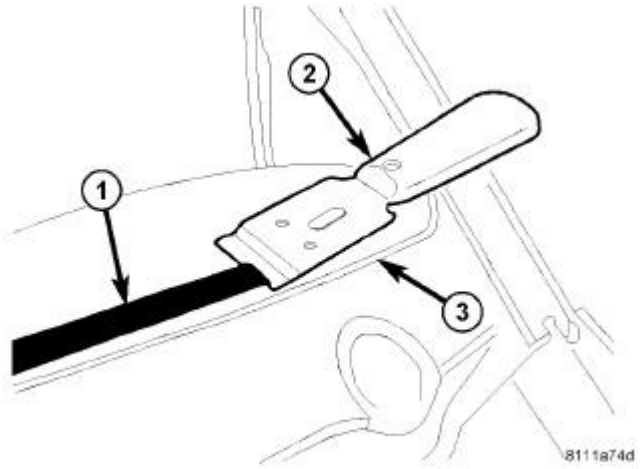


Fig. 502: Smoothing Windshield Adhesive
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To prevent corrosion, do not damage paint on the backlite fence when removing original urethane.**

NOTE: **The backlite fence should be cleaned of most of its old urethane adhesive. A small amount of old urethane, approximately 1 mm in height should remain on the fence. Do not completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely affected. Replace any missing or damaged spacers around the perimeter of the backlite fence.**

2. Using a razor knife (2), level the original bead of urethane (1) on the backlite fence (3) to a thickness of approximately 1 mm (0.04 in.) and remove the loose adhesive.

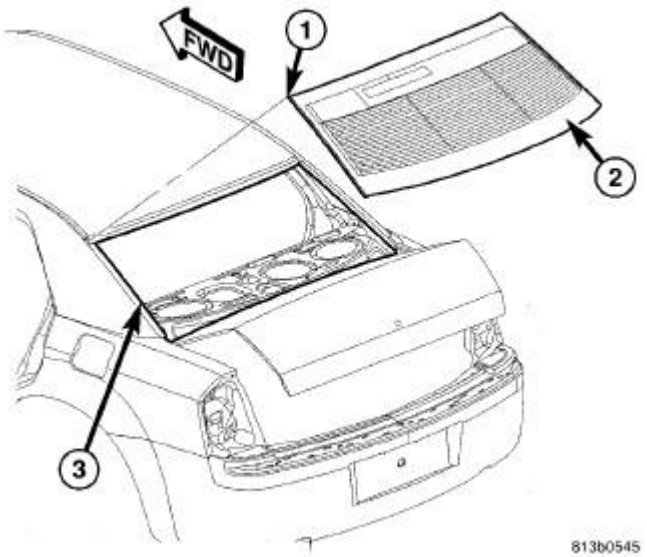


Fig. 503: Backlight
Courtesy of CHRYSLER GROUP, LLC

3. Install a new rubber seal (1) around the top and side edges of backlite (2).
4. Using an assistant, position the backlite into the backlite opening and against the backlite fence (3).
5. Verify the backlite lays evenly against the fence at the top, bottom and sides of the opening. If not, the fence must be formed to the shape of the backlite.
6. Mark the backlite and fence with a grease pencil or pieces of masking tape to use as a reference for installation.
7. Using an assistant, remove the backlite from the backlite opening and place it on a suitable padded work surface.

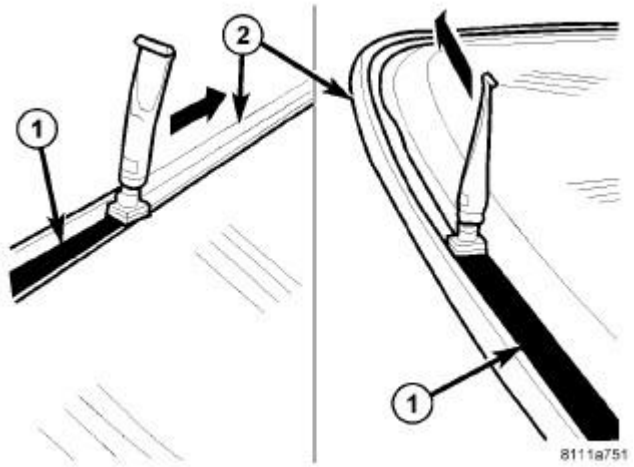


Fig. 504: Windshield Primer
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not use solvent based glass cleaners to clean the backlite before applying glass prep and primer or poor glass adhesion may result.

8. Clean the inside of the backlite with an ammonia based glass cleaner and a lint-free cloth.
9. Apply glass prep adhesion promoter 25 mm (1 in.) wide (1) around the perimeter of the backlight (2) and 5 mm (0.2 in.) from the edge of the glass and wipe dry with a clean lint-free cloth until no streaks are visible.
10. Apply glass primer 25 mm (1 in.) wide around the perimeter of the backlight and 5 mm (0.2 in.) from the edge of the glass. Allow at least three minutes drying time.
11. Using a flashlight, verify that the primer is completely and evenly installed along the perimeter of the backlite.
12. Re-prime any area that is not fully and evenly primed.

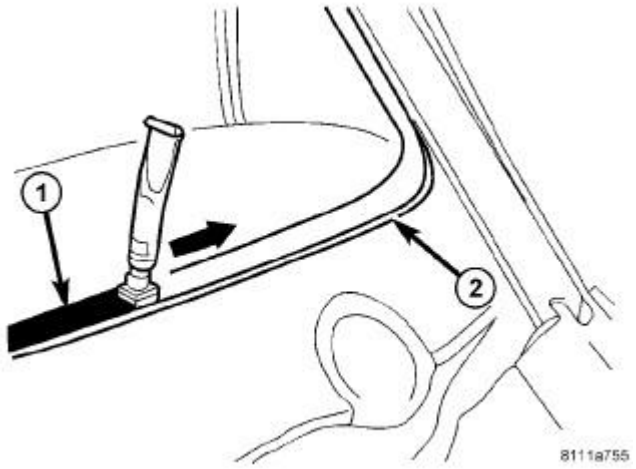


Fig. 505: Applying Windshield Primer
Courtesy of CHRYSLER GROUP, LLC

13. Clean the backlite fence with an ammonia based glass cleaner and a lint-free cloth.
14. Apply pinch weld primer 15 mm (0.75 in.) wide (1) around the backlite fence (2). Allow at least three minutes drying time.
15. Using a flashlight, verify that the primer is completely and evenly installed along the backlite fence.
16. Re-prime any area that is not fully and evenly primed.

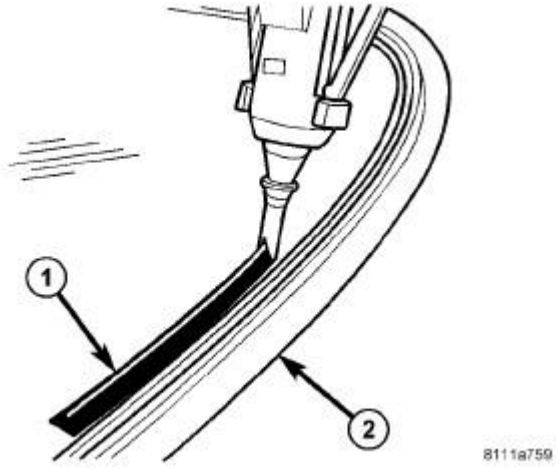


Fig. 506: Applying Windshield Adhesive
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always apply the bead of adhesive to the backlite. Always install the backlite within 5 minutes after applying the adhesive.

NOTE: If the original urethane adhesive has been exposed for more than 12

hours, the entire adhesive area will need to be re-primed prior to installing new adhesive.

17. Apply approximately a 10 mm (0.4 in.) wide bead of adhesive (1) with a triangular nozzle approximately 6 mm (0.230 in.) from the edge of the glass (2) starting at the bottom center of the backlite.

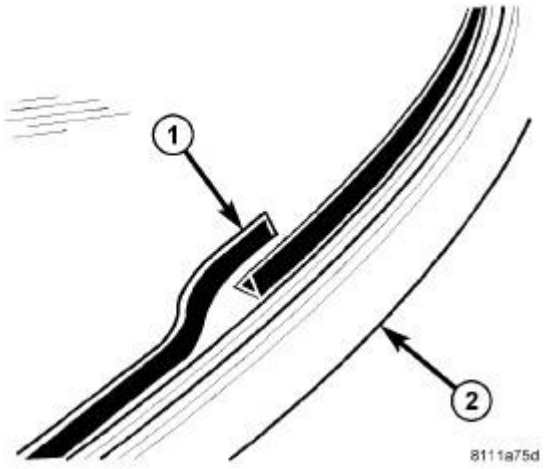


Fig. 507: Identifying Windshield Adhesive Overlap
Courtesy of CHRYSLER GROUP, LLC

18. Run the end of the adhesive bead (1) on the backlite (2) parallel to the start of the bead and smooth the ends flush.

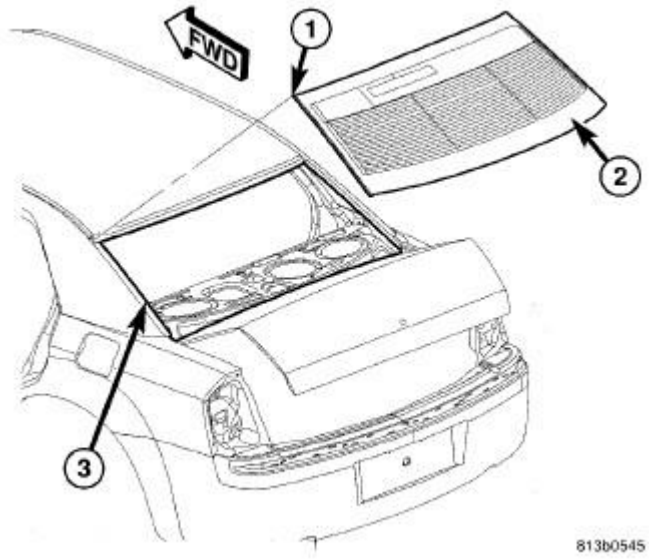


Fig. 508: Backlight
Courtesy of CHRYSLER GROUP, LLC

19. Using an assistant, position the backlite (2) over the backlite opening.
20. Using the grease pencil marks or tape as reference points, align the backlite to the opening.
21. Carefully lower the backlite onto the backlite fence (3). Guide the backlite and the rubber seal (1) around the backlite into its proper location.

CAUTION: It is not possible to move the backlite after installation. The backlite should never be pressed into place by more than one person, because the backlite can break if pressed simultaneously on both sides.

22. Push the backlite inward until the backlite comes into contact with the spacers located on each side of the backlite fence.
23. Connect the wire connectors to the rear window defogger terminals and, rear window mounted radio antenna, if equipped.
24. Install the trim panel to the rear shelf. Refer to **PANEL, REAR SHELF, INSTALLATION**.

WINDSHIELD

DESCRIPTION

DESCRIPTION

The windshield is attached to the window frame (fence) with urethane adhesive. The urethane adhesive is applied cold and seals the surface area between the window opening and the glass. The primer adheres the urethane adhesive to the windshield.

It is difficult to salvage a windshield during the removal operation. The windshield is part of the structural support for the roof. The urethane bonding used to secure the windshield to the fence is difficult to cut or clean from any surface. If the rubber seals are set in urethane, it would also be unlikely they could be salvaged. Before removing the windshield, check the availability of the windshield and seals from the parts supplier.

REMOVAL

REMOVAL

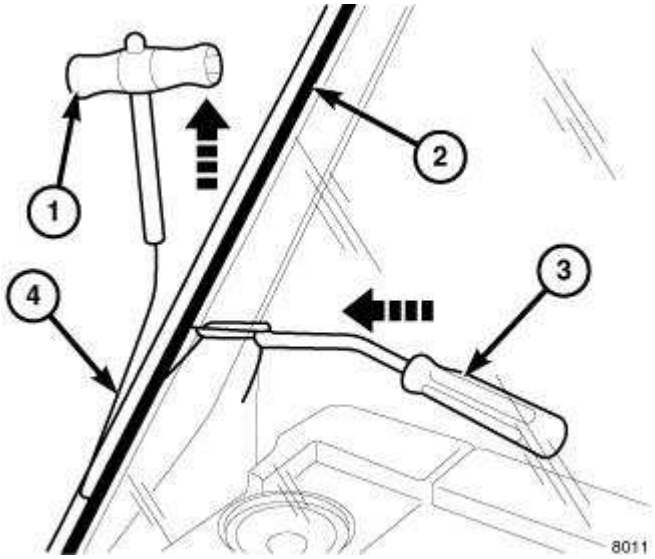


Fig. 509: Adhesive Separation
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **STATIONARY GLASS, WARNING**.
2. Remove the rear view mirror. Refer to **MIRROR, REARVIEW, REMOVAL**.
3. Remove the cowl grille. Refer to **COVER, COWL PANEL, REMOVAL**.

CAUTION: Be careful not to damage painted surfaces when removing moldings or cutting urethane around the windshield.

4. Remove the windshield side moldings.
5. Using an assistant and a wire-type windshield cut-out tool (1, 3 and 4), cut and separate the urethane adhesive (2) securing the windshield to the windshield fence.
6. Carefully remove the windshield from the vehicle.

INSTALLATION

INSTALLATION

WARNING: Do not operate the vehicle within 24 hours of windshield installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the windshield may not perform properly if the vehicle is in an accident.

CAUTION: To help prevent water leaks, partially roll down the left and right door glass before installing the windshield. This avoids pressurizing the passenger compartment if a door is slammed before the urethane is cured.

CAUTION: Protect all painted and trimmed surfaces from coming in contact with

urethane or primers.

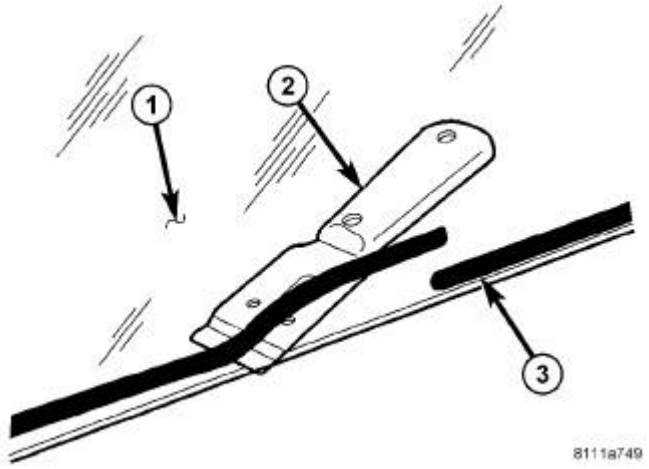


Fig. 510: Glass Adhesive Preparation
Courtesy of CHRYSLER GROUP, LLC

1. If the windshield (1) is being reused, remove the as much original urethane (3) as possible from the glass surface using a razor knife (2).

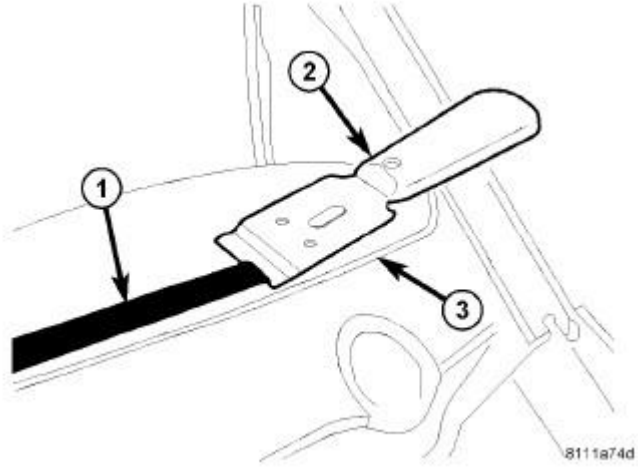


Fig. 511: Smoothing Windshield Adhesive
Courtesy of CHRYSLER GROUP, LLC

NOTE: To prevent corrosion, do not damage paint on windshield fence when removing original urethane.

NOTE: The windshield fence should be cleaned of most of its old urethane adhesive. A small amount of old urethane, approximately 1 mm in height should remain on the fence. Do not completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely

affected. Support spacers located near the cowl at the bottom of the windshield fence should be replaced with new spacers. Replace any missing or damaged spacers around the perimeter of the windshield fence.

2. Using a razor knife (2), level the original bead of urethane (1) on the windshield fence (3) to a thickness of approximately 1 mm (0.04 in.) and remove the loose adhesive.

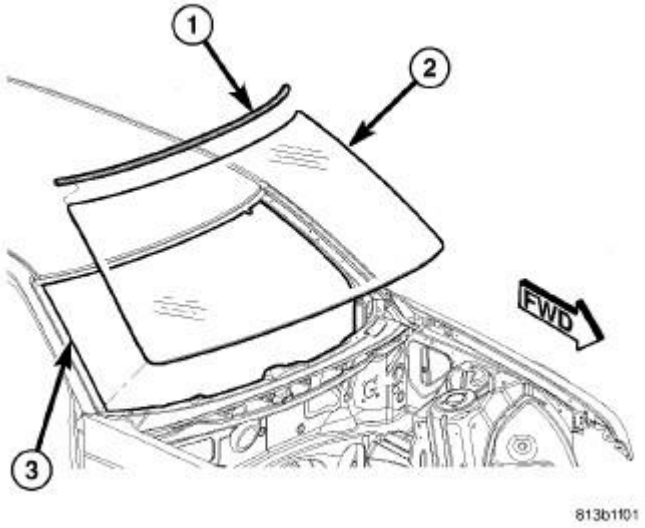


Fig. 512: Windshield
Courtesy of CHRYSLER GROUP, LLC

3. Install a new rubber seal (1) along the top of the windshield (2).
4. Using an assistant, position the windshield into the windshield opening and against the windshield fence (3).
5. Verify the windshield lays evenly against the fence at the top, bottom and sides of the opening. If not, the fence must be formed to the shape of the windshield.
6. Mark the windshield and the windshield fence with a grease pencil or pieces of masking tape to use as a reference for installation.
7. Using an assistant, remove the windshield from the windshield opening and place it on a suitable padded work surface.

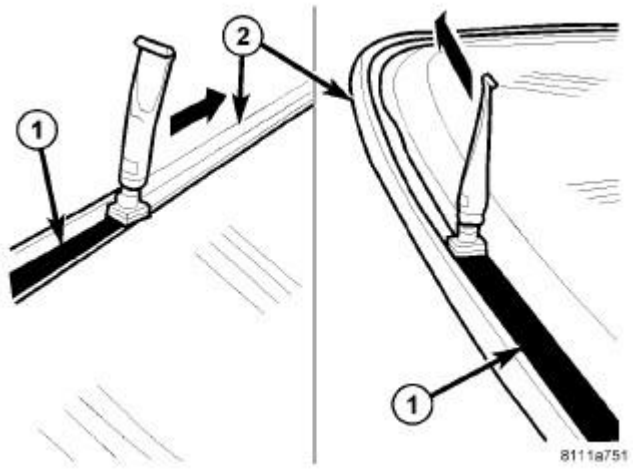


Fig. 513: Windshield Primer
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not use solvent based glass cleaners to clean the windshield before applying glass prep and primer or poor glass adhesion may result.

8. Clean the inside of the windshield with an ammonia based glass cleaner and a lint-free cloth.
9. Apply glass prep adhesion promoter 25 mm (1 in.) wide (1) around the perimeter of the windshield (2) and 5 mm (0.2 in.) from the edge of the glass and wipe dry with a clean lint-free cloth until no streaks are visible.
10. Apply glass primer 25 mm (1 in.) wide (1) around the perimeter of the windshield (2) and 5 mm (0.2 in.) from the edge of the glass. Allow at least three minutes drying time.
11. Using a flashlight, verify that the primer is completely and evenly installed along the perimeter of the windshield.
12. Re-prime any area that is not fully and evenly primed.

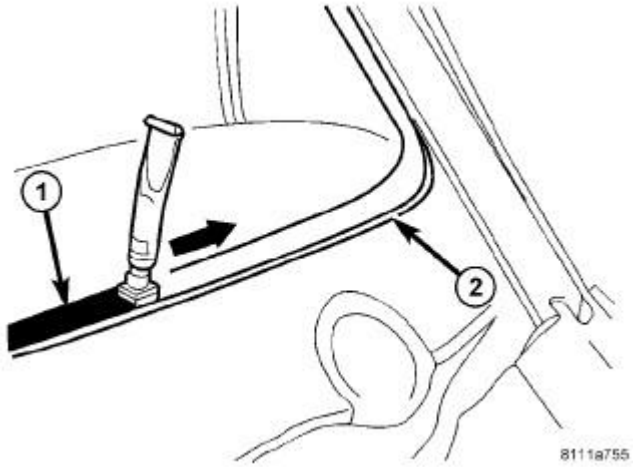


Fig. 514: Applying Windshield Primer

Courtesy of CHRYSLER GROUP, LLC

13. Clean the windshield fence with an ammonia based glass cleaner and a lint-free cloth.
14. Apply pinch weld primer 15 mm (0.75 in.) wide (1) around the windshield fence (2). Allow at least three minutes drying time.
15. Using a flashlight, verify that the primer is completely and evenly installed along the windshield fence.
16. Re-prime any area that is not fully and evenly primed.

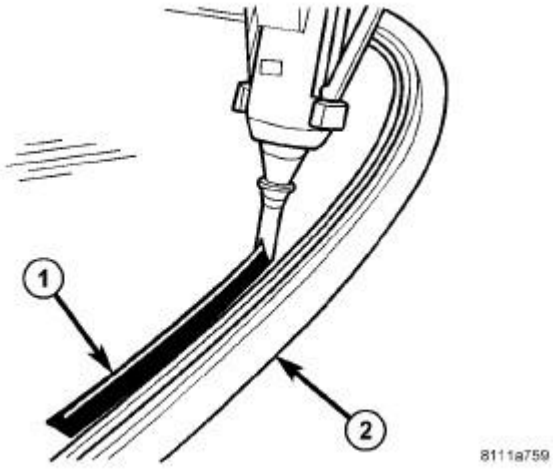


Fig. 515: Applying Windshield Adhesive
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always apply the bead of adhesive to the windshield. Always install the windshield within 5 minutes after applying the adhesive.

NOTE: If the original urethane adhesive has been exposed for more than 12 hours, the entire adhesive area will need to be re-primed prior to installing new adhesive.

17. Apply approximately a 10 mm (0.4 in.) wide bead of adhesive (1) with a triangular nozzle approximately 6 mm (0.230 in.) from the edge of the glass (2) starting at the bottom center of the windshield.

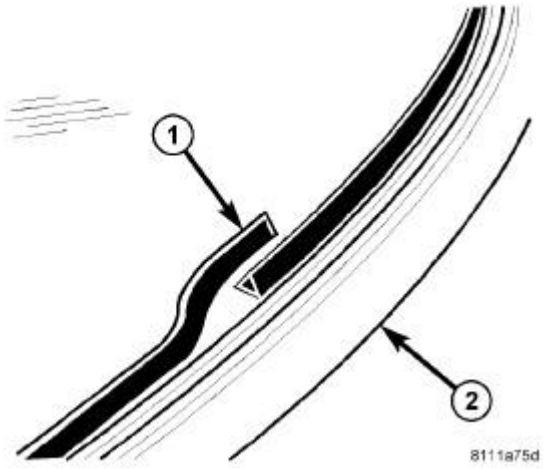


Fig. 516: Identifying Windshield Adhesive Overlap
Courtesy of CHRYSLER GROUP, LLC

18. Run the end of the adhesive bead (1) on the windshield (2) parallel to the start of the bead and smooth the ends flush.

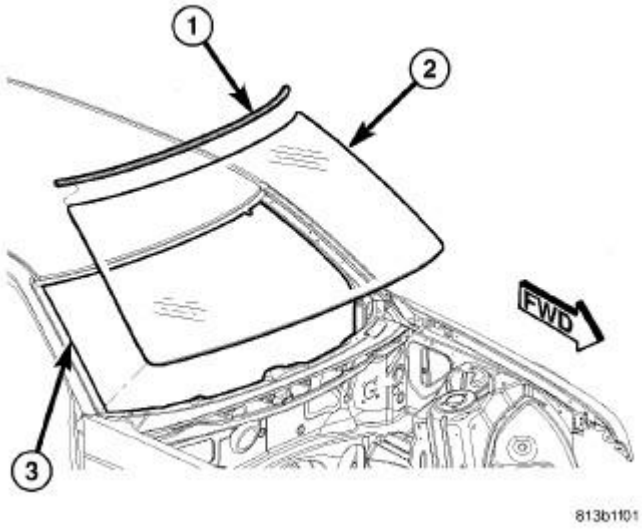


Fig. 517: Windshield
Courtesy of CHRYSLER GROUP, LLC

19. Using an assistant, position the windshield (2) over the windshield opening.
20. Using the grease pencil marks or tape as reference points, align the windshield to the opening.
21. Carefully lower the windshield onto the windshield fence. Guide the windshield and the rubber seal at the top the windshield into its proper location.

CAUTION: It is not possible to move the windshield after installation. The windshield should never be pressed into place by more than one

person, because the windshield can break if pressed simultaneously on both sides.

22. Push the windshield inward until the windshield comes into contact with the spacers located on each side of the windshield fence (2).
23. Install the windshield side moldings.
24. Install the cowl grille. Refer to **COVER, COWL PANEL, REMOVAL**.
25. Install the rear view mirror. Refer to **MIRROR, REARVIEW, INSTALLATION**.

SUNROOF, DUAL PANE

DESCRIPTION

DESCRIPTION

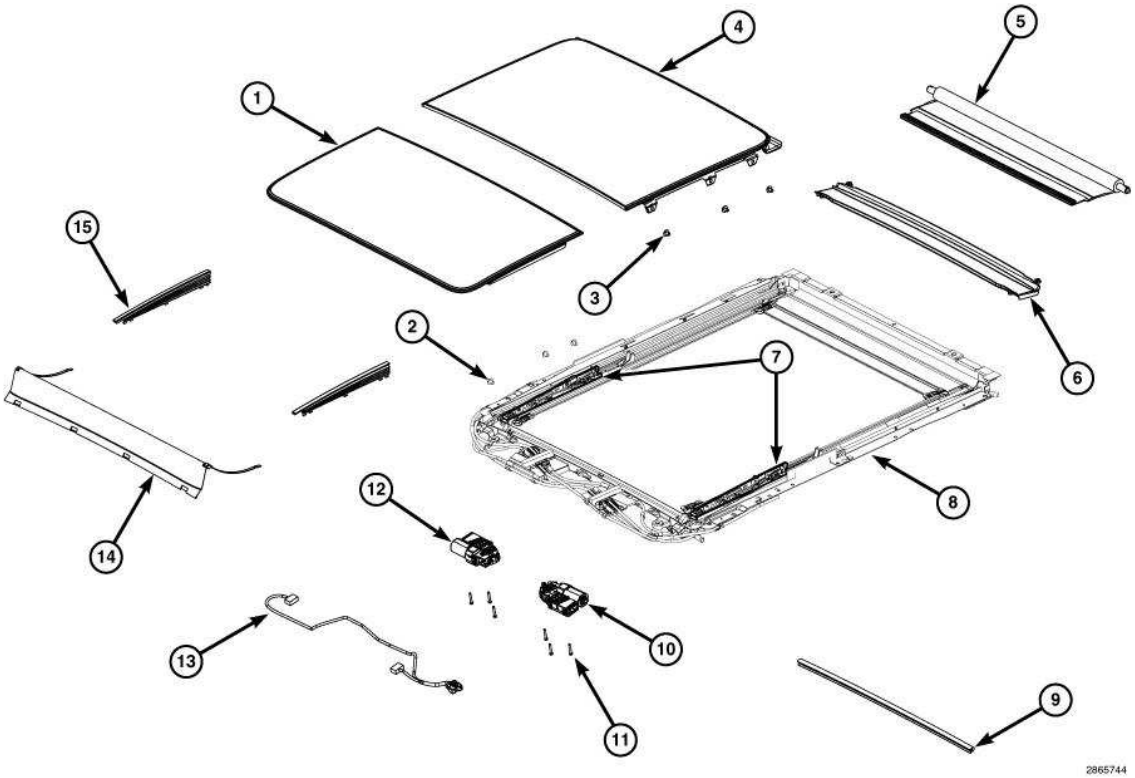


Fig. 518: Exploded View Of Dual Pane Sunroof
Courtesy of CHRYSLER GROUP, LLC

PARTS LIST

1 - FRONT GLASS PANEL	9 - SEAL
2 - FRONT GLASS FASTENERS (6) 4.5 N.m (40 in. lbs.)	10 - FRONT GLASS MOTOR

3 - REAR GLASS FASTENERS (6) 4.5 N.m (40 in. lbs.)	11 - MOTOR SCREWS 4 N.m (35 in. lbs.)
4 - REAR GLASS PANEL	12 - SUNSHADE MOTOR
5 - ROLLO SUNSHADE	13 - WIRE HARNESS
6 - DRAIN CHANNEL	14 - WIND DEFLECTOR
7 - GLASS GUIDES	15 - MECHANISM COVERS
8 - SUNROOF ASSEMBLY	

The power sunroof system allows the sunroof to be opened, closed or placed in the vent position electrically by actuating a switch in the overhead console. The sunroof system receives battery feed through a fuse in the Power Distribution Center (PDC). The sunroof will operate normally with the key in any position while the Accessory Delay system is active.

The front sunroof glass panel tilts upward at the rear for ventilation and slides rearward under the fixed rear glass panel when open. The panel seals flush with the roof in the closed position to eliminate wind noise. The sunroof includes an electric rolling sunshade to cover the deep-tinted glass panel.

In addition to the standard power sunroof operation, this vehicle offers several additional features. There is an express (one-touch) opening and closing feature as well as Excessive Force Limitation (EFL). The EFL function detects obstacles trapped between the glass and the vehicle roof during a closing motion.Upon sensing an obstacle the EFL function will reverse direction of the glass to allow removal of the obstacle.

The main components of the power sunroof system are:

- The motor/module assembly
- The power sunroof glass and frame assembly
- The power sunroof switch
- The electric rolling sunshade

REMOVAL

REMOVAL

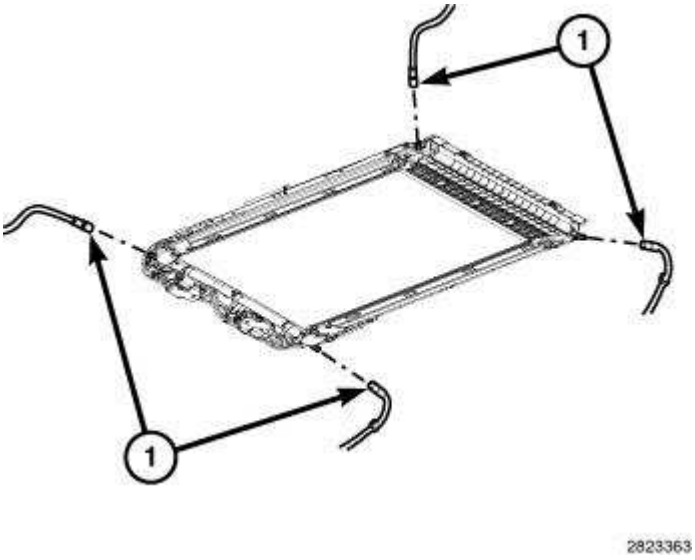


Fig. 519: Four Drain Tubes
Courtesy of CHRYSLER GROUP, LLC

NOTE: For exploded view and call outs. Refer to SUNROOF, DUAL PANE, DESCRIPTION.

1. Move glass panel to the fully closed position.
2. Disconnect and isolate the battery negative cable.
3. Lower the headliner in the vehicle enough to gain access to the sunroof assembly. Refer to **HEADLINER, REMOVAL**.
4. Disconnect the four drain tubes (1) from sunroof housing.
5. Disconnect the sunroof wire harness electrical connector.

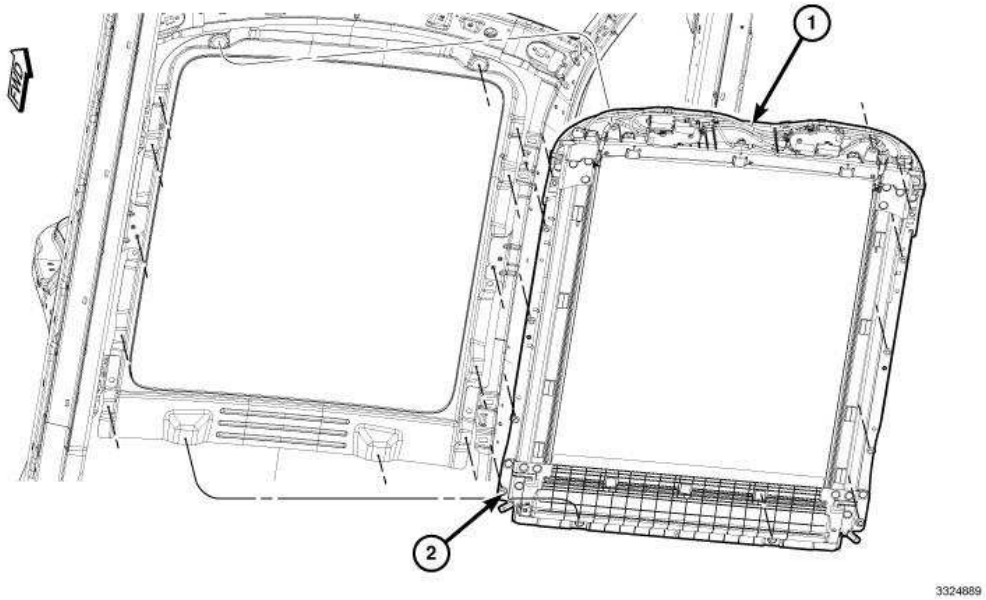


Fig. 520: Fourteen Bolts & Sunroof Assembly
Courtesy of CHRYSLER GROUP, LLC

6. Loosen the fourteen bolts (2) attaching sunroof assembly.
7. With the help of an assistant, support the sunroof and remove the fourteen bolts (2) attaching the sunroof assembly (1) to the roof panel.
8. Remove the sunroof assembly (1) from vehicle.

INSTALLATION

INSTALLATION

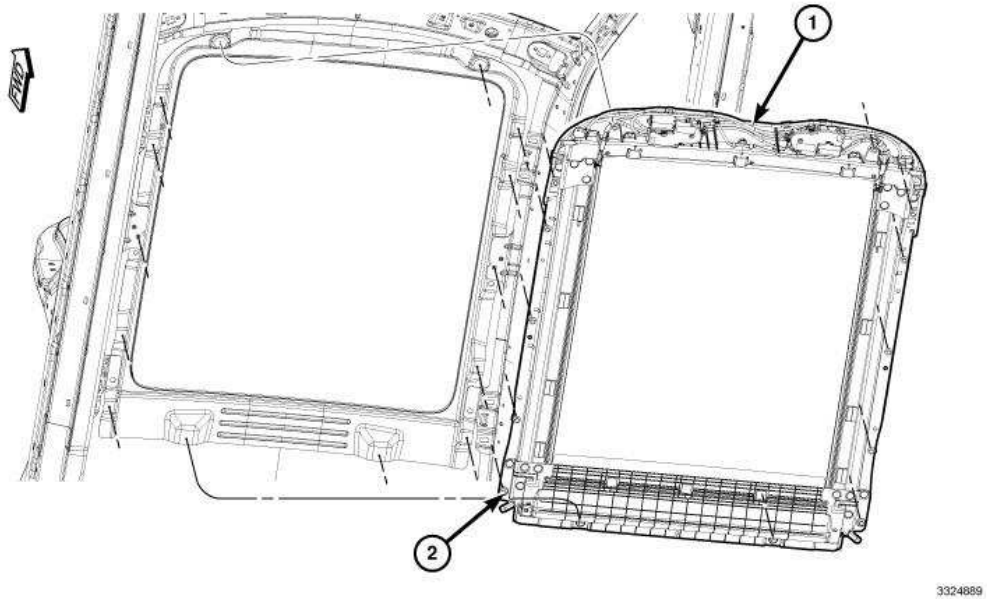


Fig. 521: Fourteen Bolts & Sunroof Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: After installation the sunroof motor will need to be initialized.

1. Verify that glass panel is fully closed.
2. Locate the alignment holes along the sides of the module assembly and position the holes so that they line up with the holes located in sunroof frame.
3. Raise sunroof module assembly (1) and guide it carefully into position.
4. While supporting the sunroof assembly (1), install the 14 bolts (2). Tighten the bolts to 9 N.m (80 in. lbs.).

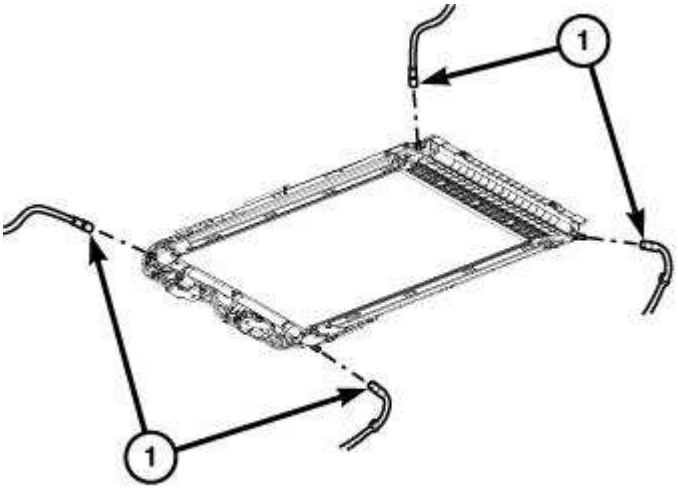


Fig. 522: Four Drain Tubes
Courtesy of CHRYSLER GROUP, LLC

5. Connect the electrical connector.
6. Connect the drain tubes (1) to the sunroof.
7. Connect the battery negative cable.
8. Test sunroof operation, adjust if necessary. Refer to **ADJUSTMENTS** .
9. Install the headliner. Refer to **HEADLINER, INSTALLATION**.
10. Initialize sunroof motor. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE** .

CHANNEL, SUNROOF DRAIN

REMOVAL

REMOVAL

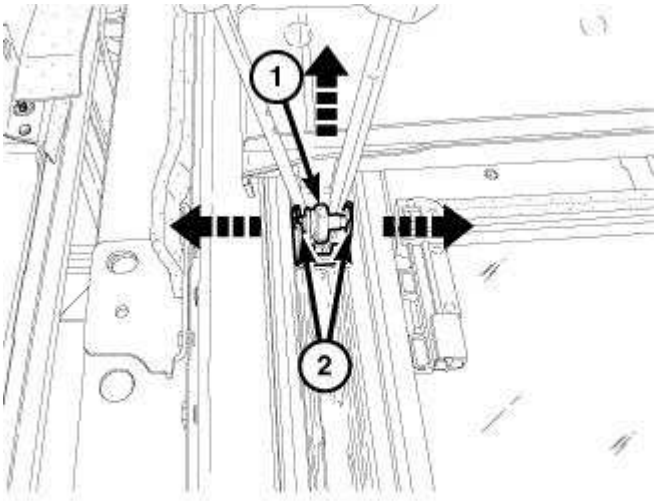


Fig. 523: Vertical Uprights
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Vertical uprights (2) located on the channel support should be pried apart using care. If an upright is damaged during service the entire sunroof assembly will need to be replaced.

1. Remove the front glass panel. Refer to **GLASS, SUNROOF, FRONT, REMOVAL** or **GLASS, SUNROOF, REAR, REMOVAL**.
2. Remove each side of the drain channel (1) by prying apart the two vertical uprights (2) on the channel support.

INSTALLATION

INSTALLATION

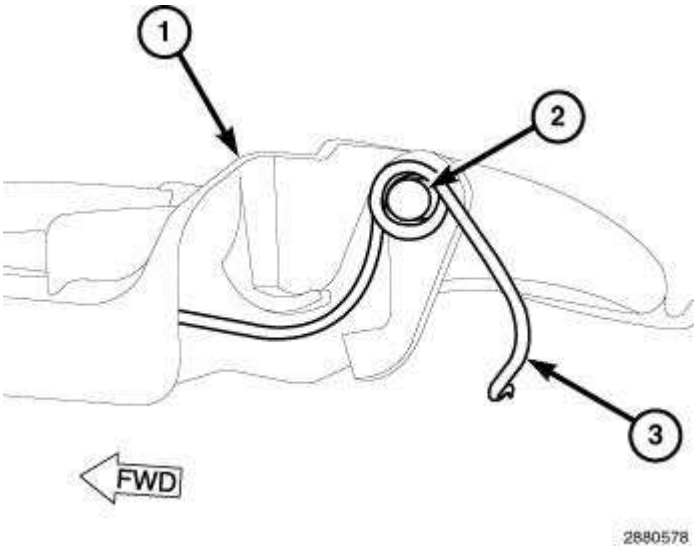


Fig. 524: Channel Spring, Axle & Channel
Courtesy of CHRYSLER GROUP, LLC

1. Place channel spring (3) over channel axle (2).

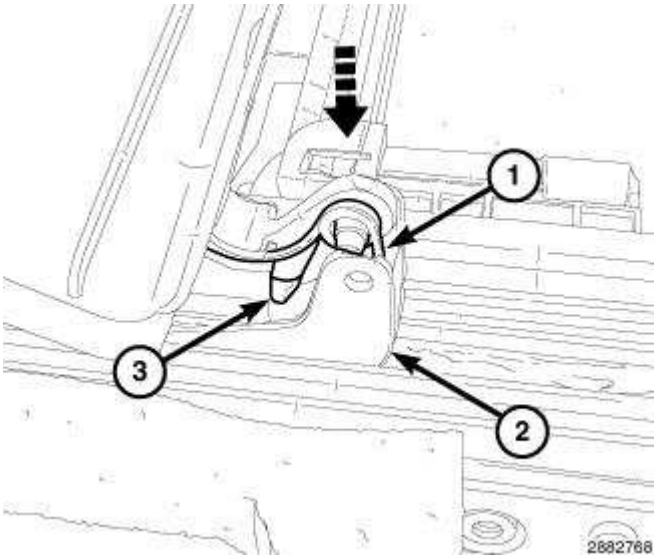


Fig. 525: Channel, Support & Stop Tab
Courtesy of CHRYSLER GROUP, LLC

2. Carefully snap the channel (1) into the support (2) by pushing down on the channel while holding the spring in place.

NOTE: Make sure the stop tab (3) is free to move within the support (2).

3. Install the front glass panel. Refer to **GLASS, SUNROOF, FRONT, INSTALLATION** or **GLASS, SUNROOF, REAR, INSTALLATION**.

COVER, SUNROOF MECHANISM

REMOVAL

REMOVAL

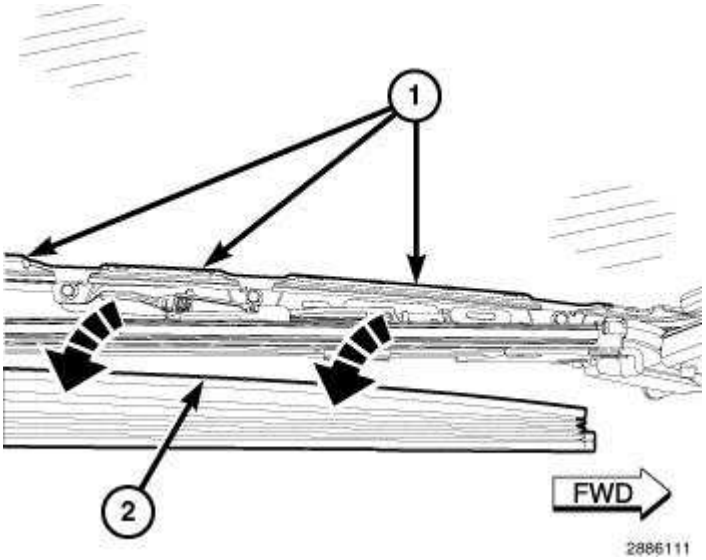


Fig. 526: Mechanism Cover & Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Move the front glass into the full closed position.
2. Open the sunshade into the full open position.
3. Separate the mechanism cover (2) from the tabs (1) on the glass panel.

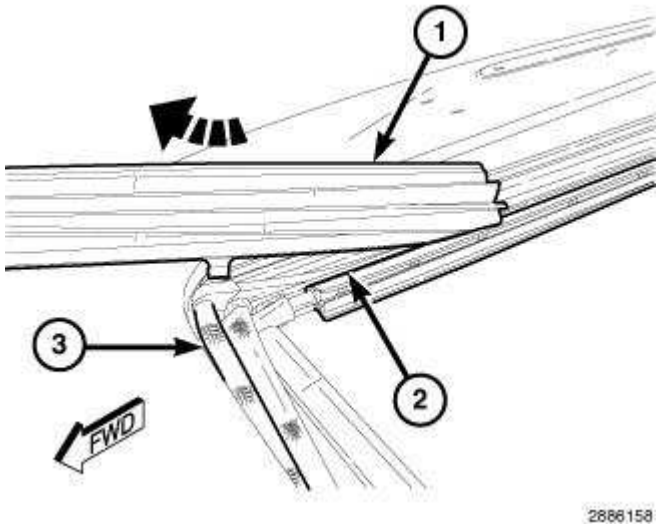


Fig. 527: Wind Deflector, Mechanism Covers & Frame
Courtesy of CHRYSLER GROUP, LLC

4. Hold the mechanism covers down and open the front glass into the full open position.
5. Hold the wind deflector (3) down and slide the mechanism covers (1) out the front of the guide in the frame (2).

INSTALLATION

INSTALLATION

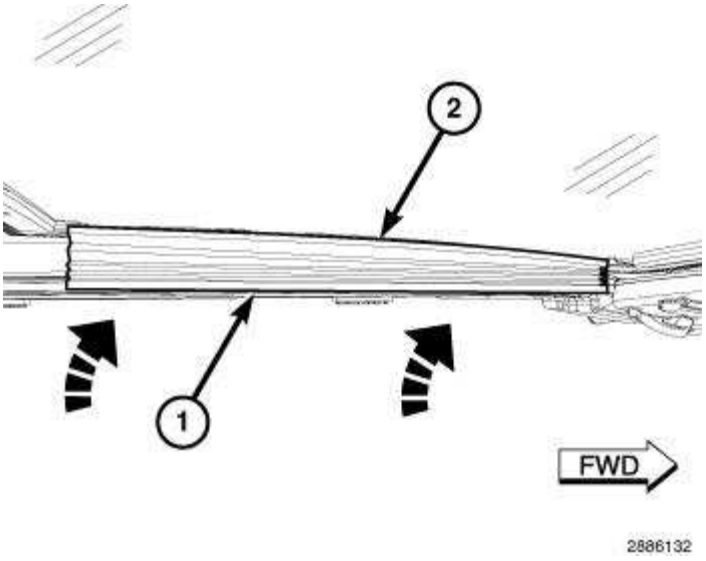


Fig. 528: Mechanism Cover & Cover
Courtesy of CHRYSLER GROUP, LLC

1. With the sunroof in the open position, snap the mechanism cover (1) into the lower guide channel.
2. Hold down each cover and close the sunroof.
3. Snap the upper portion of the cover (3) into the retaining clips on the glass panel between the locating features.

DEFLECTOR, WIND

REMOVAL

REMOVAL

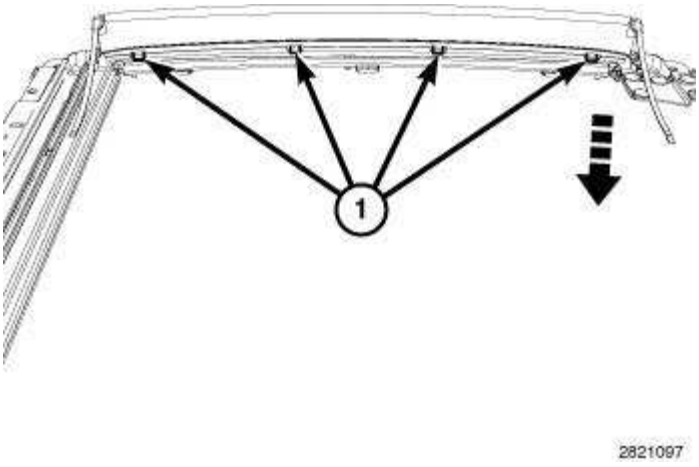


Fig. 529: Plastic Clips
Courtesy of CHRYSLER GROUP, LLC

1. Move the front glass into the full open position.
2. Push down the lower rod to remove from the under plastic clips (1).

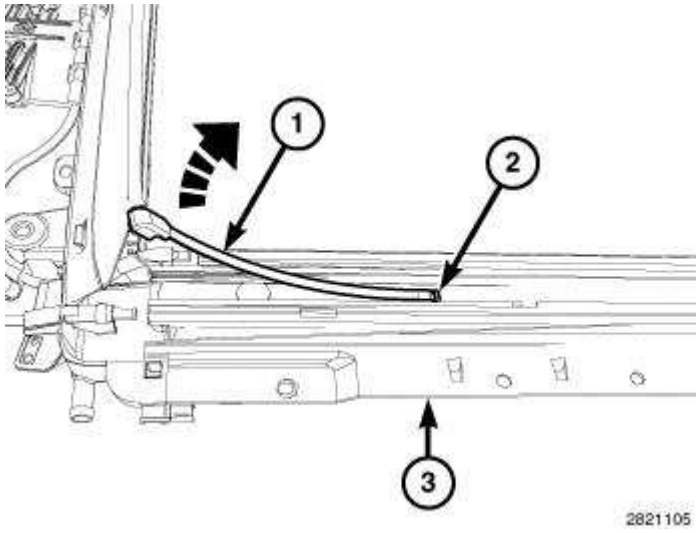


Fig. 530: Spring Arms, Slots & Frame
Courtesy of CHRYSLER GROUP, LLC

3. Rotate the deflector up and remove the spring arms (1) from the slots (2) in the frame (3).

INSTALLATION

INSTALLATION

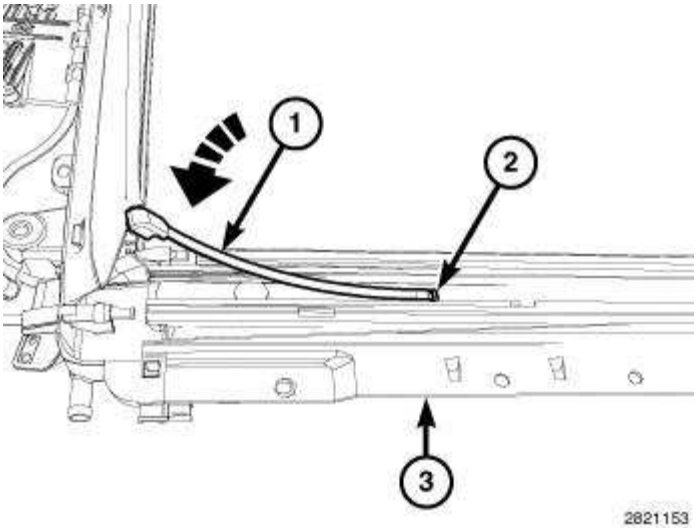


Fig. 531: Spring Arms, Slots & Frame
Courtesy of CHRYSLER GROUP, LLC

1. Position the deflector spring arms (1) into the slots (2) of the frame (3).

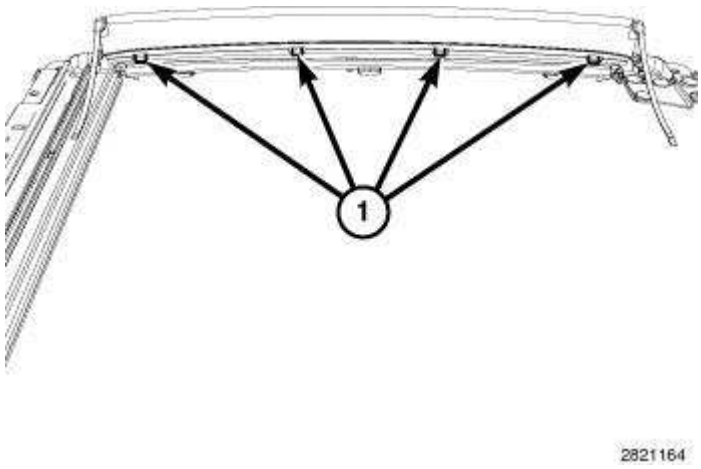


Fig. 532: Plastic Clips
Courtesy of CHRYSLER GROUP, LLC

2. Place the lower rod under the plastic clips (1) and slide up into the clips. Be careful not to snap off the plastic clips.
3. Verify the sunroof operation and alignment.

GLASS, SUNROOF, FRONT

ADJUSTMENTS

ADJUSTMENTS

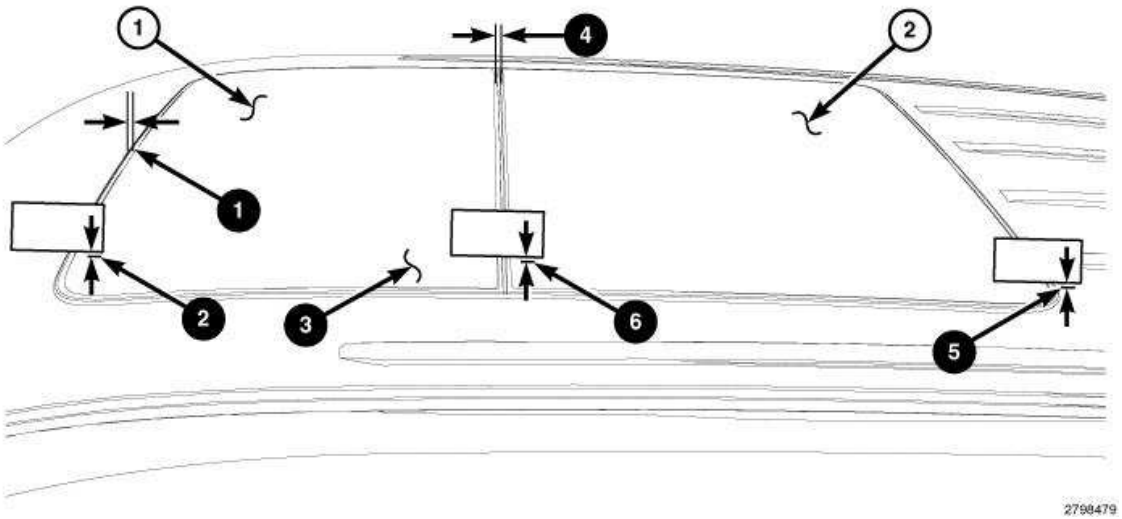


Fig. 533: DUAL PANE SUNROOF GLASS ADJUSTMENT
Courtesy of CHRYSLER GROUP, LLC

1 - FRONT GLASS PANEL
2 - REAR GLASS PANEL
GLASS ADJUSTMENT SEQUENCE

1 - SET THE FRONT GLASS PANEL FRONT GAP TO 3 mm (0.12 in.)
2 - SET THE FRONT OF THE FRONT GLASS PANEL FLUSH TO UNDER FLUSH 2.5 mm (0.10 in.)
3 - SET THE REAR OF THE FRONT GLASS PANEL FLUSH WITH THE ROOF
4 - SET THE FRONT OF THE REAR GLASS PANEL GAP TO 3.5 mm TO 4 mm (0.14 in. to 0.16 in)
5 - SET THE REAR OF THE REAR GLASS PANEL OVER FLUSH 0 mm TO 2.5 mm (0.0 in. to 0.10 in)
6 - SET THE FRONT OF THE REAR GLASS PANEL FLUSH TO UNDER FLUSH 2.5 mm (0.10 in.)

1. Open the sunshade fully.
2. Verify the sunroof glass panel is in the fully closed position.
3. Separate the mechanism covers from the tabs on the glass panel.
4. Loosen the attaching screws on each side of the rear glass panel enough to permit adjustment of the glass gap and flush.
5. Loosen the attaching screws on each side of the front glass panel enough to permit adjustment of the glass gap and flush.

NOTE: Use shims to maintain gap during the flush adjustments.

6. Adjust the front edge of the front glass gap to 3 mm (0.12 in.).
7. Adjust the front surface of the front sunroof glass panel 0.00 mm to 2.5 mm (0.00 in. to 0.10 in.) below the top surface of the roof.
8. Tighten the front glass panel attaching screws to 4.5 N.m (40 in. lbs.).
9. Adjust the rear surface of the front sunroof glass panel flush with the top surface of the roof.
10. Tighten the remaining front glass panel attaching screws to 4.5 N.m (40 in. lbs.).

NOTE: Use shims to maintain gap during the flush adjustments.

11. Adjust the front edge of the rear glass gap 3.5 mm (0.12 in.) minimum to 4.0 mm (35.5 in.) maximum.
12. Adjust the rear surface of the rear sunroof glass panel 0.00 mm to 2.5 mm (0.00 in. to 0.10 in.) above the top surface of the roof.
13. Tighten the rear screws of the rear glass panel to 4.5 N.m (40 in. lbs.).
14. Adjust the front surface of the rear sunroof glass panel 0.00 mm to 2.5 mm (0.00 in. to 0.10 in.) below the top surface of the front glass panel.
15. Tighten the remaining rear glass panel attaching screws to 4.5 N.m (40 in. lbs.).
16. Check for proper fit. If not OK, repeat glass panel adjustment.
17. Position the mechanism covers over the glass tabs between the locating features and seat fully.
18. Verify sunroof operation and alignment.

REMOVAL

REMOVAL

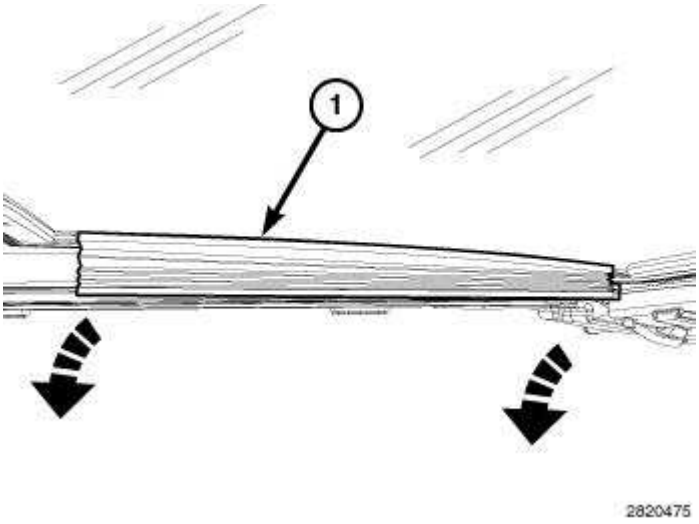


Fig. 534: Mechanism Covers
Courtesy of CHRYSLER GROUP, LLC

1. Move the glass panel into the full closed position.
2. Open the sunshade fully.
3. Separate the mechanism covers (1) from the tabs on the glass panel.

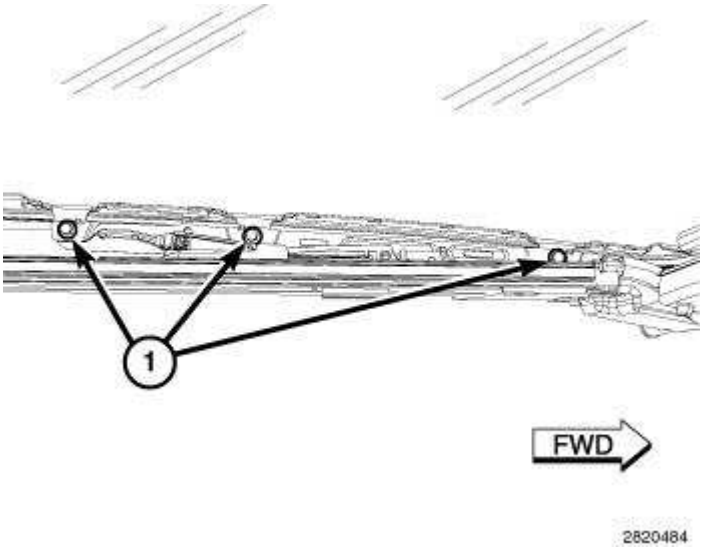


Fig. 535: Six Glass Panel Screws
Courtesy of CHRYSLER GROUP, LLC

4. Remove the six glass panel screws (1).

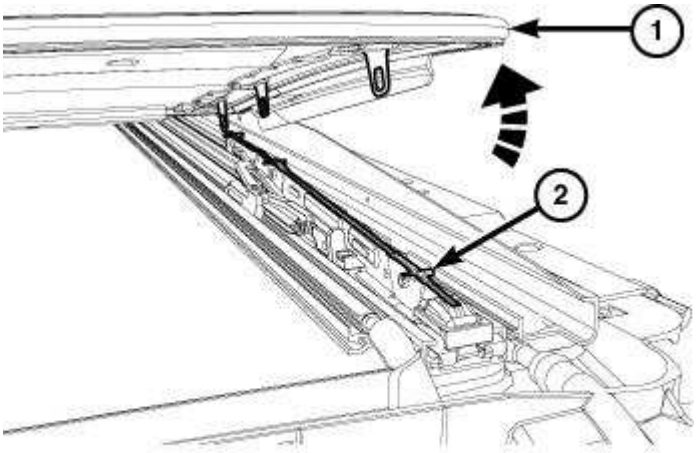


Fig. 536: Glass Panel & Guide Mechanisms
Courtesy of CHRYSLER GROUP, LLC

5. Lift off the glass panel (1) from the guide mechanisms (2) and remove from vehicle.

INSTALLATION

INSTALLATION

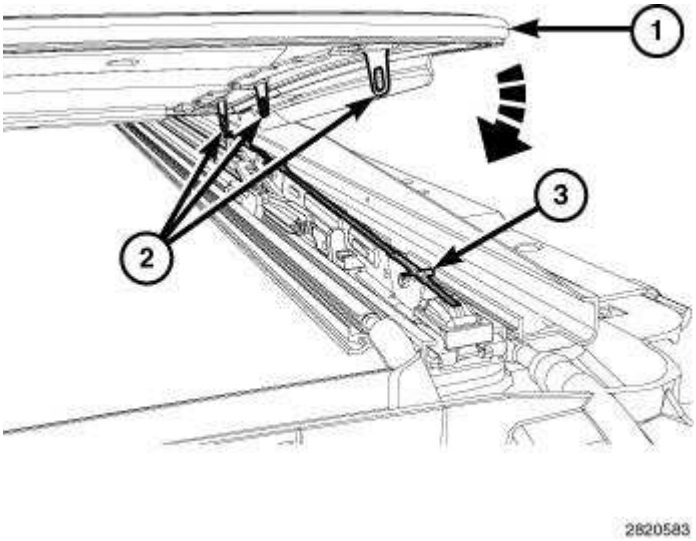


Fig. 537: Glass Panel, Six Glass Tabs & Guide Mechanism/Lift Arms
Courtesy of CHRYSLER GROUP, LLC

1. Position the glass panel (1) onto the guide mechanism/lift arms (3).

CAUTION: Make sure that all six glass tabs (2) go into the slots on the guide mechanism/lift arms (3).

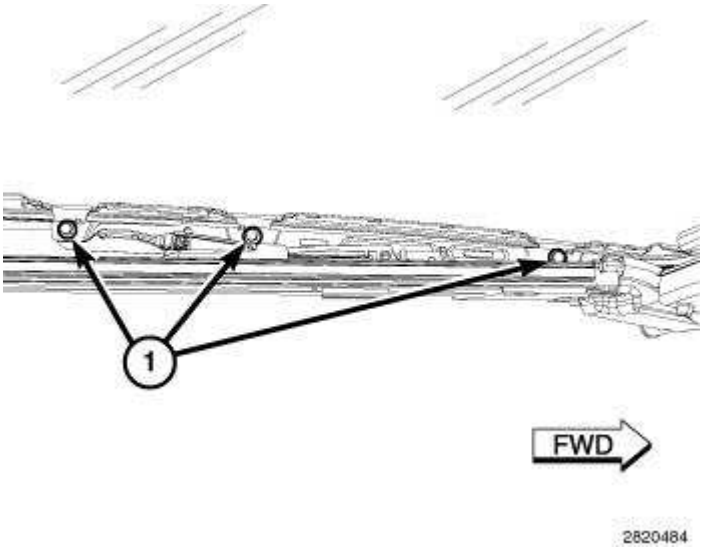


Fig. 538: Six Glass Panel Screws
Courtesy of CHRYSLER GROUP, LLC

2. Start the six attaching screws (1).
3. Connect a 12v power supply and verify that the sunroof is in the closed position.
4. Adjust the sunroof glass. Refer to **ADJUSTMENTS** .
5. Tighten the six screws (1) to 4.5 N.m (40 in. lbs.).

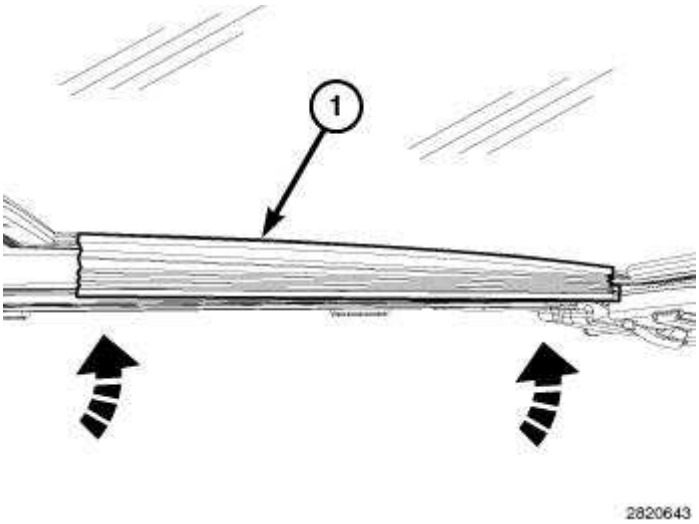


Fig. 539: Mechanism Covers
Courtesy of CHRYSLER GROUP, LLC

6. Position the mechanism covers (1) over the glass tabs between the locating features and seat fully.
7. Verify sunroof operation and alignment.

GLASS, SUNROOF, REAR

ADJUSTMENTS

ADJUSTMENTS

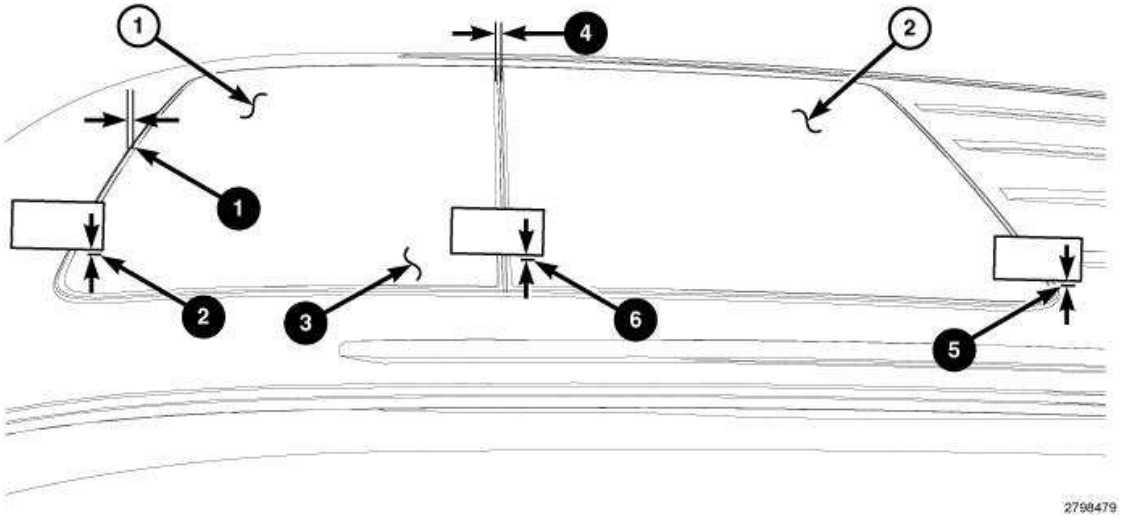


Fig. 540: DUAL PANE SUNROOF GLASS ADJUSTMENT
Courtesy of CHRYSLER GROUP, LLC

1 - FRONT GLASS PANEL
2 - REAR GLASS PANEL
GLASS ADJUSTMENT SEQUENCE
1 - SET THE FRONT GLASS PANEL FRONT GAP TO 3 mm (0.12 in.)
2 - SET THE FRONT OF THE FRONT GLASS PANEL FLUSH TO UNDER FLUSH 2.5 mm (0.10 in.)
3 - SET THE REAR OF THE FRONT GLASS PANEL FLUSH WITH THE ROOF
4 - SET THE FRONT OF THE REAR GLASS PANEL GAP TO 3.5 mm TO 4 mm (0.14 in. to 0.16 in)
5 - SET THE REAR OF THE REAR GLASS PANEL OVER FLUSH 0 mm TO 2.5 mm (0.0 in. to 0.10 in)
6 - SET THE FRONT OF THE REAR GLASS PANEL FLUSH TO UNDER FLUSH 2.5 mm (0.10 in.)

1. Open the sunshade fully.
2. Verify the sunroof glass panel is in the fully closed position.
3. Separate the mechanism covers from the tabs on the glass panel.
4. Loosen the attaching screws on each side of the rear glass panel enough to permit adjustment of the glass gap and flush.
5. Loosen the attaching screws on each side of the front glass panel enough to permit adjustment of the glass gap and flush.

NOTE: Use shims to maintain gap during the flush adjustments.

6. Adjust the front edge of the front glass gap to 3 mm (0.12 in.).
7. Adjust the front surface of the front sunroof glass panel 0.00 mm to 2.5 mm (0.00 in. to 0.10 in.) below the top surface of the roof.
8. Tighten the front glass panel attaching screws to 4.5 N.m (40 in. lbs.).
9. Adjust the rear surface of the front sunroof glass panel flush with the top surface of the roof.
10. Tighten the remaining front glass panel attaching screws to 4.5 N.m (40 in. lbs.).

NOTE: Use shims to maintain gap during the flush adjustments.

11. Adjust the front edge of the rear glass gap 3.5 mm (0.12 in.) minimum to 4.0 mm (35.5 in.) maximum.
12. Adjust the rear surface of the rear sunroof glass panel 0.00 mm to 2.5 mm (0.00 in. to 0.10 in.) above the top surface of the roof.
13. Tighten the rear screws of the rear glass panel to 4.5 N.m (40 in. lbs.).
14. Adjust the front surface of the rear sunroof glass panel 0.00 mm to 2.5 mm (0.00 in. to 0.10 in.) below the top surface of the front glass panel.
15. Tighten the remaining rear glass panel attaching screws to 4.5 N.m (40 in. lbs.).
16. Check for proper fit. If not OK, repeat glass panel adjustment.
17. Position the mechanism covers over the glass tabs between the locating features and seat fully.
18. Verify sunroof operation and alignment.

REMOVAL

REMOVAL

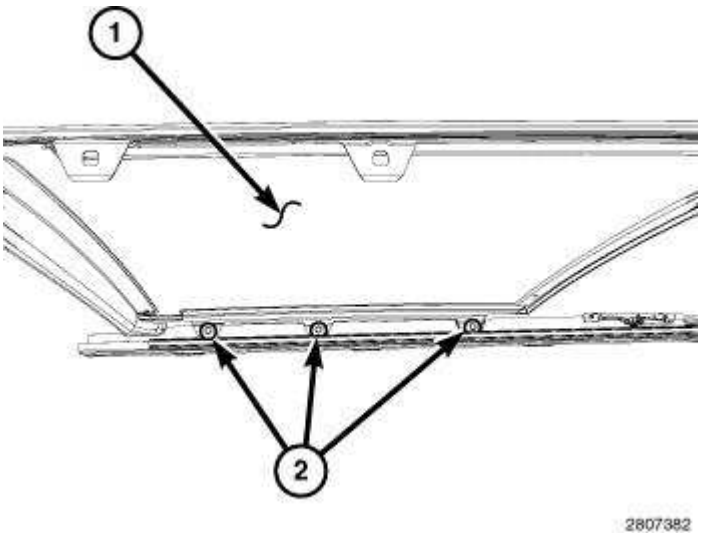


Fig. 541: Six Bolts & Glass Panel
Courtesy of CHRYSLER GROUP, LLC

1. Close the front glass panel and open the sunshade fully.

2. Remove the sunroof assembly. Refer to **SUNROOF, DUAL PANE, REMOVAL**.
3. Remove the six bolts (2) and remove the glass panel (1).

INSTALLATION

INSTALLATION

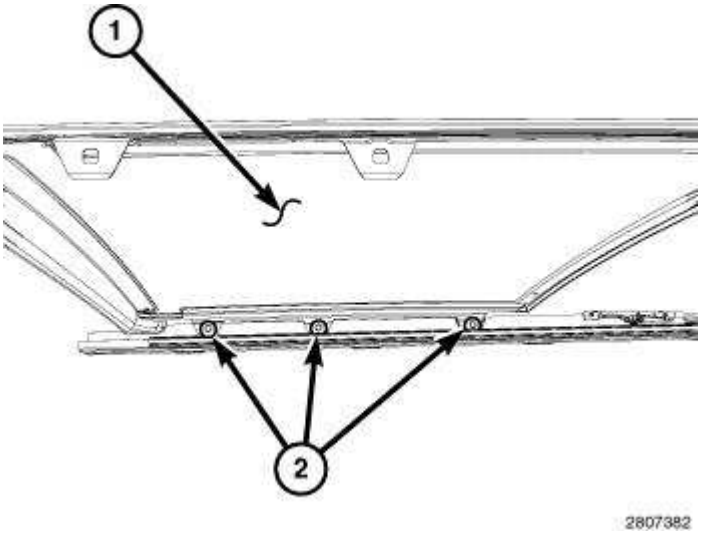


Fig. 542: Six Bolts & Glass Panel
Courtesy of CHRYSLER GROUP, LLC

1. Install the glass (1) and install the six bolts (2).
2. Install the sunroof assembly. Refer to **SUNROOF, DUAL PANE, INSTALLATION**.
3. Check and adjust the sunroof glass panels. Refer to **ADJUSTMENTS** .
4. Verify sunroof operation and alignment.

GUIDE, SUNROOF, GLASS

REMOVAL

REMOVAL

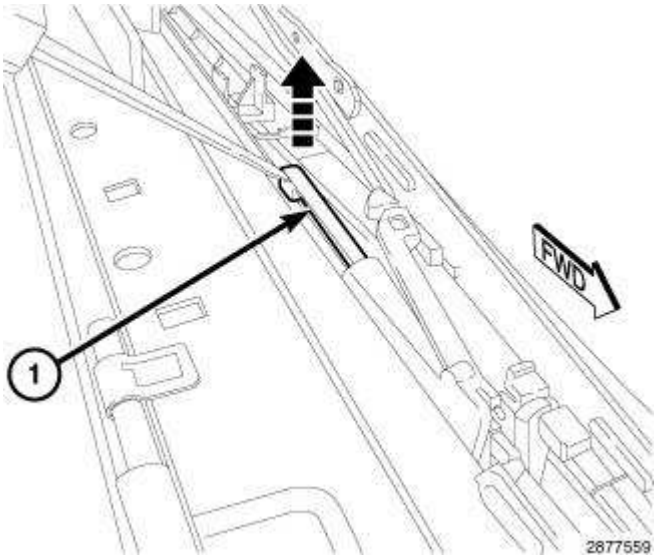


Fig. 543: Locking Lever & Channel Guide
Courtesy of CHRYSLER GROUP, LLC

1. Place the sunroof in the vent position.
2. Remove the sunroof assembly. Refer to **SUNROOF, DUAL PANE, REMOVAL**.
3. Remove the motor. Refer to **MOTOR, SUNROOF, REMOVAL** .
4. Remove the glass. Refer to **GLASS, SUNROOF, FRONT, REMOVAL** or **GLASS, SUNROOF, REAR, REMOVAL**.
5. Remove the wind deflector. Refer to **DEFLECTOR, WIND, REMOVAL**.
6. Lift the locking lever out of the notch in the channel guide.

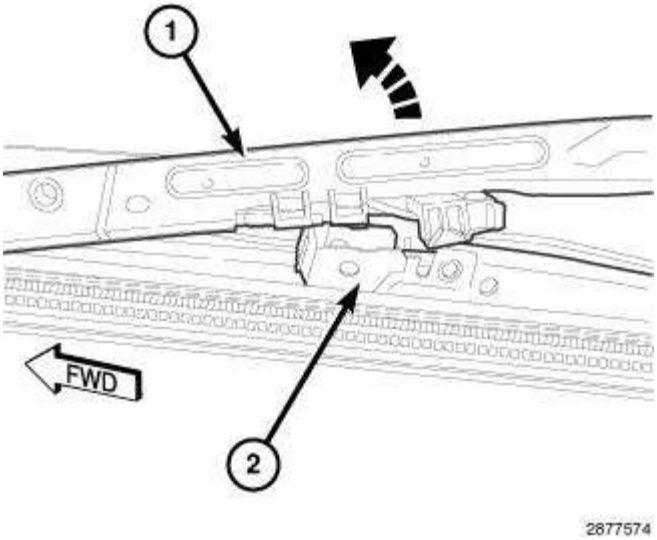


Fig. 544: Mechanism Forward
Courtesy of CHRYSLER GROUP, LLC

7. Slide the mechanism forward until the wedge shaped mechanism piece releases.

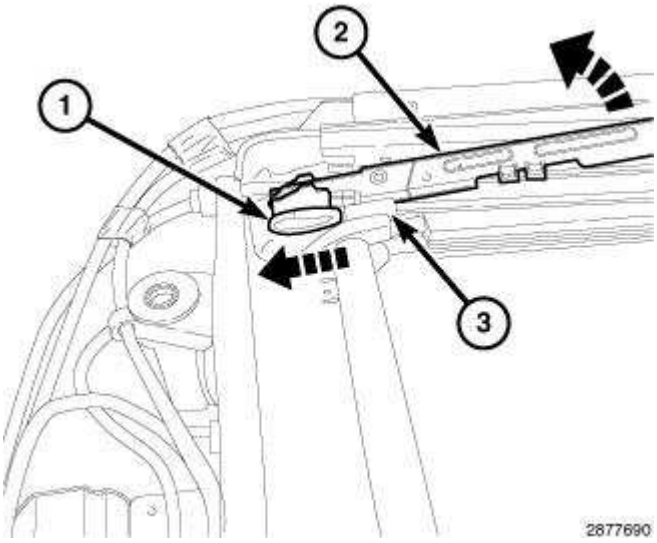


Fig. 545: Glass Guide
Courtesy of CHRYSLER GROUP, LLC

8. Lift the glass guide and push forward out of the channel guide.

INSTALLATION

INSTALLATION

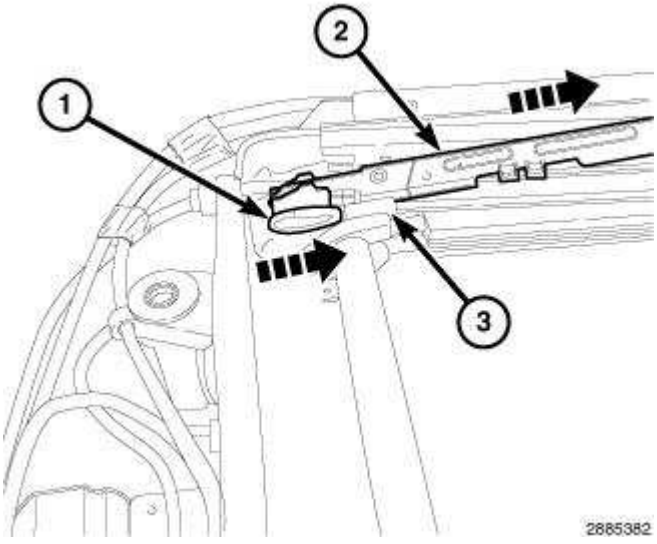


Fig. 546: Front Foot & Guide Channel
Courtesy of CHRYSLER GROUP, LLC

1. Insert the front foot into the guide channel and push the guide assembly rearward.

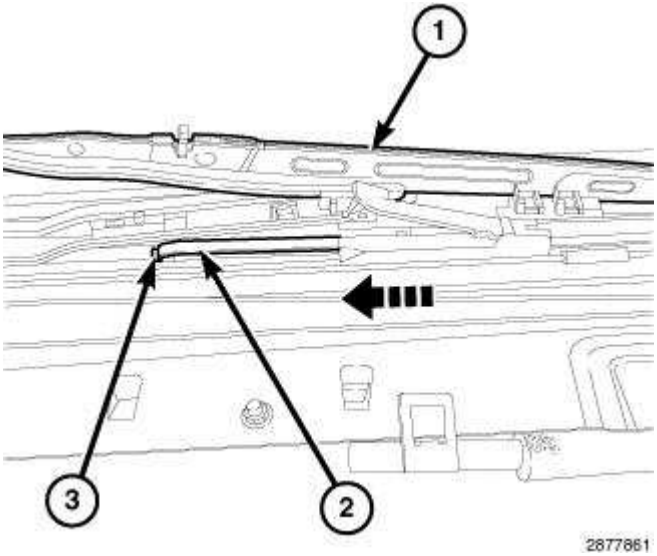


Fig. 547: Guide Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Slide the guide assembly rearward until the locking lever engages into the notch in the channel guide.

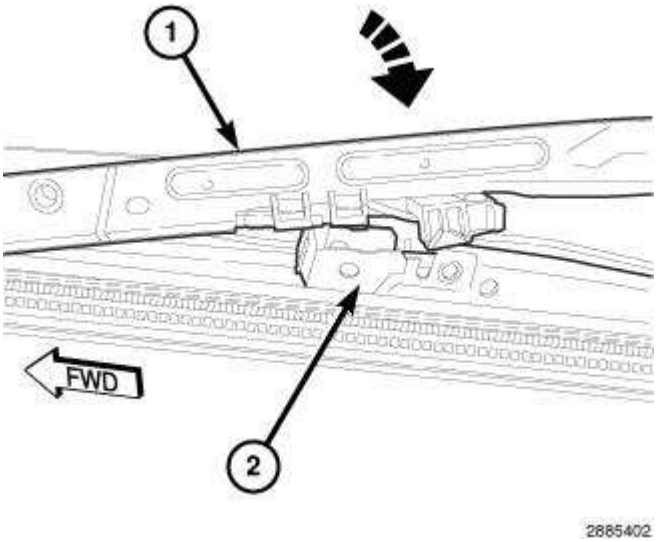


Fig. 548: Guide Assembly & Drive Unit
Courtesy of CHRYSLER GROUP, LLC

3. Slide the guide assembly (1) rearward until the wedge shaped mechanism piece connects to the drive unit (2).
4. Install the wind deflector. Refer to **DEFLECTOR, WIND, INSTALLATION**.
5. Install the glass. Refer to **GLASS, SUNROOF, FRONT, INSTALLATION** or **GLASS, SUNROOF, REAR, INSTALLATION**.
6. Install the glass motor. Refer to **MOTOR, SUNROOF, INSTALLATION** .

7. Install the sunroof assembly. Refer to **SUNROOF, DUAL PANE, INSTALLATION**.

SUNSHADE, SUNROOF

REMOVAL

REMOVAL

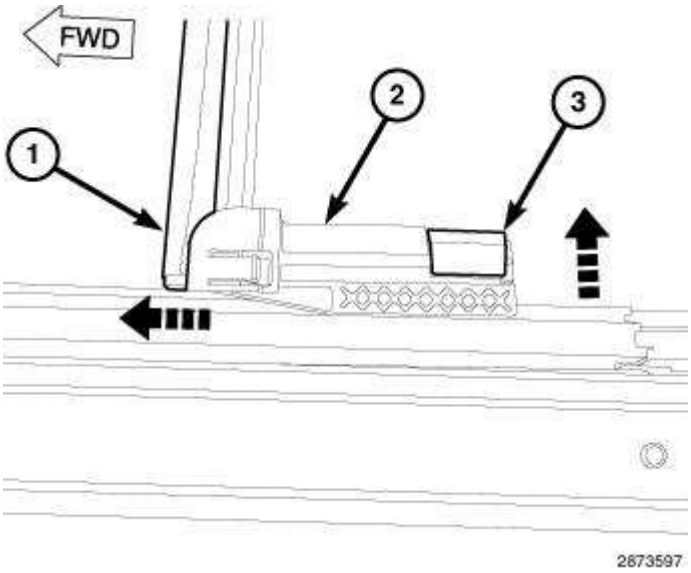


Fig. 549: Front Shade Aluminum Beam & Cable Overmolds
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear glass panel. Refer to **GLASS, SUNROOF, FRONT, REMOVAL** or **GLASS, SUNROOF, REAR, REMOVAL**.
2. Release the front shade aluminum beam (1) from the cable overmolds (2).

NOTE: The sunshade retraction spring force is significant. Firmly hold onto the sunshade while releasing the shade from the overmolds in the following steps.

3. Release the white clips (3) from the cable overmold (2).
4. Allow the spring to retract remaining fabric into the roll.

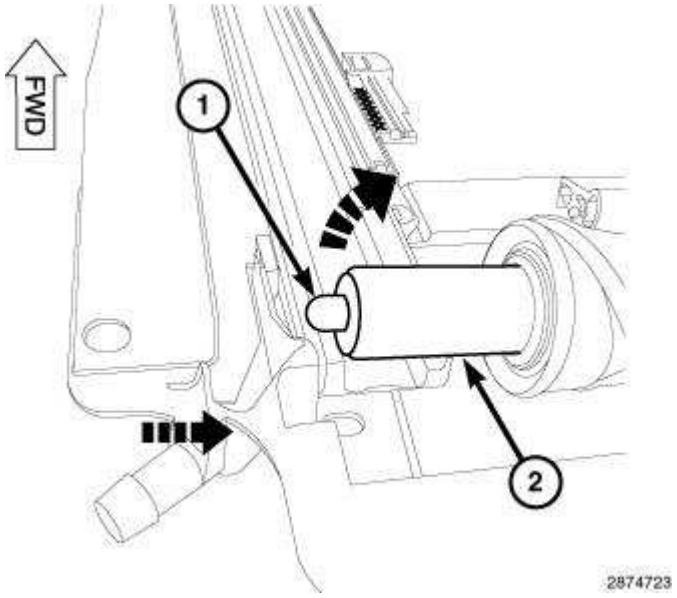


Fig. 550: Fabric Roll & White Plastic Pin
Courtesy of CHRYSLER GROUP, LLC

5. While holding the spring loaded tube and fabric roll (2), push in the white plastic pin (1) on the left hand side of the shade tube and lift.

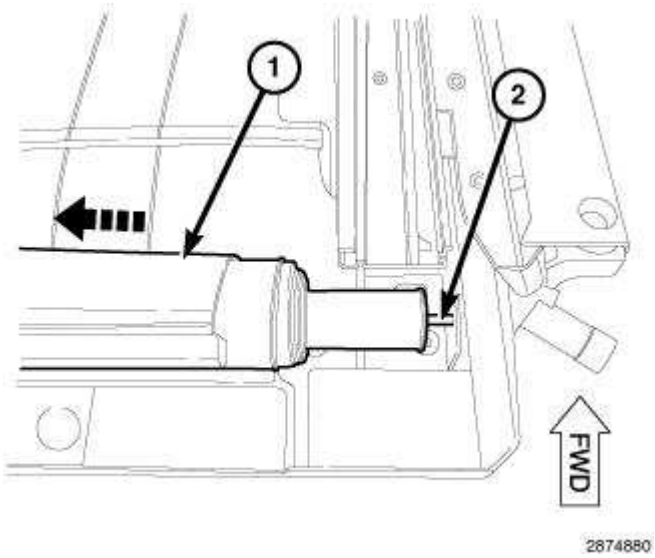


Fig. 551: Shade Assembly & Steel Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the sunshade spring lock is released before it engages in the internal slot, the sunshade has to be replaced with a new one. Once released, the sunshade spring lock can not be reset.

6. Carefully pull the shade assembly (1) to the left twisting slightly until the steel rod (2) on the right hand side of the shade tube engages internal slot.

7. When at least one inch of the inner steel rod is exposed it can be removed from the rear beam without the spring unwinding.

INSTALLATION

INSTALLATION

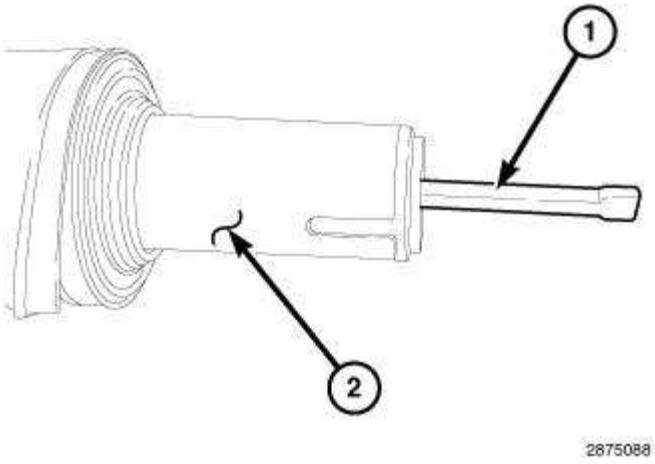


Fig. 552: Flattened Steel Rod & Shade Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Locate the flattened steel rod on the right hand side of the shade assembly

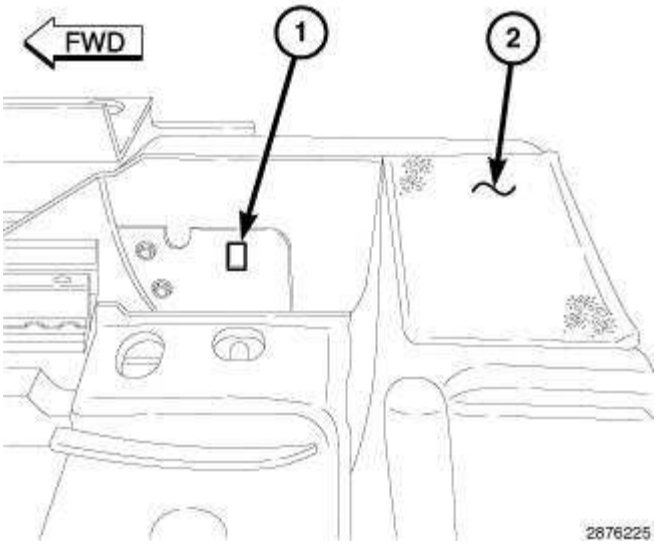


Fig. 553: Flattened Steel Rod & Rear Beam
Courtesy of CHRYSLER GROUP, LLC

2. Insert the flattened steel rod into the slot (1) in the steel plate in the rear beam (2).

CAUTION: If the sunshade spring lock is released before the sunshade is installed, the sunshade has to be replaced with a new one. Once released, the sunshade spring lock can not be reset.

3. With the sunroof held firmly, push the sunshade assembly to the right to release the shade spring lock.
4. Push the left side of the sunshade down until the white plastic pin snaps into the hole on the right hand side of the rear beam.

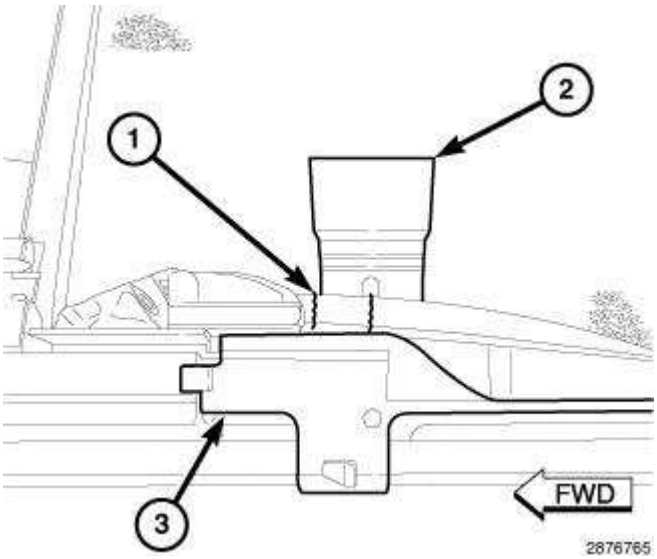


Fig. 554: Front Shade Beam & Fabric
Courtesy of CHRYSLER GROUP, LLC

NOTE: The sunshade retraction spring force is significant. Firmly hold onto the sunshade while securing the shade to the overmolds in the following steps.

5. Extend the front shade beam forward of the cable overmolds and work the fabric under the cable overmolds.
6. Insert the white clips into the stitched pockets on the sunshade cloth and install the clip onto the rear edge of the cable overmold.

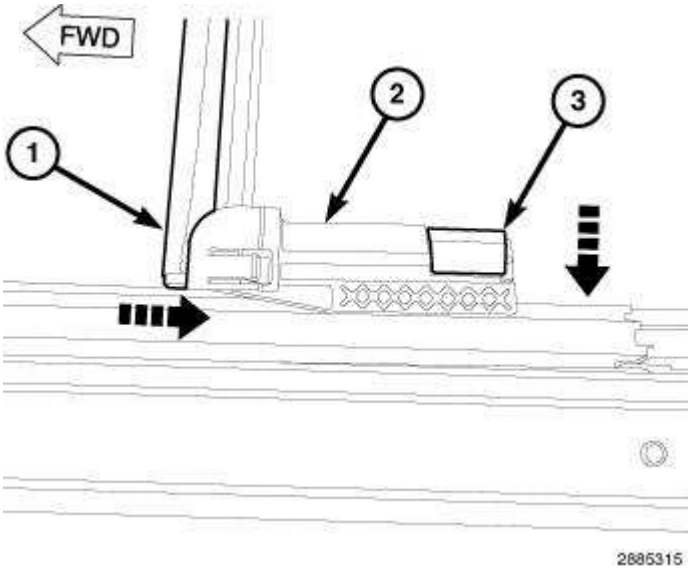


Fig. 555: Sunshade Front Beam & Cable Overmolds
Courtesy of CHRYSLER GROUP, LLC

7. Rotate the sunshade front beam (1) into the front of the cable overmolds (2) and seat until they click into place fully.
8. Install the rear sunroof glass assembly. Refer to **GLASS, SUNROOF, FRONT, INSTALLATION** or **GLASS, SUNROOF, REAR, INSTALLATION**.

TUBE, SUNROOF DRAIN

REMOVAL

REMOVAL

FRONT

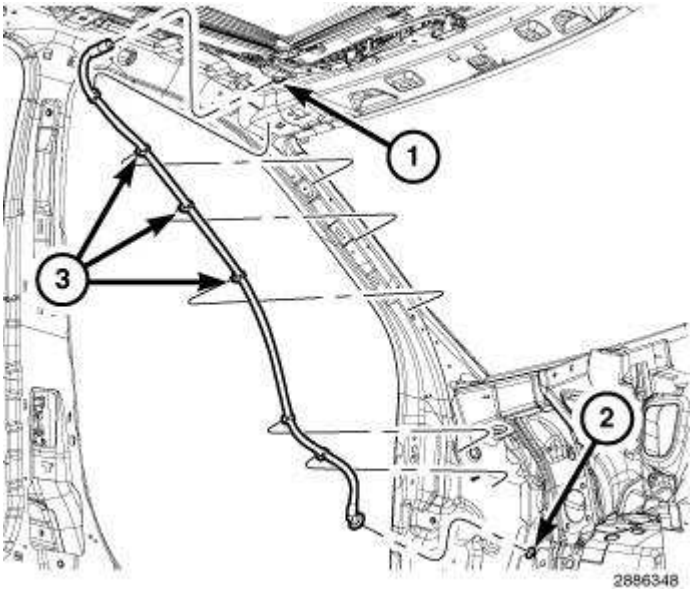


Fig. 556: Sunroof, Front Drain Tube Support Clips & Floor Grommet
Courtesy of CHRYSLER GROUP, LLC

NOTE: Driver side shown in illustration, passenger side typical unless noted.

1. Remove the A-pillar trim. Refer to **PANEL, A-PILLAR TRIM, REMOVAL**.
2. Remove the lower cowl panel. Refer to **PANEL, COWL TRIM, REMOVAL**.
3. If servicing the driver side, remove the steering column opening trim panel. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL**.
4. If servicing the passenger side, remove the glove box module. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL**.
5. Lower the headliner as necessary to gain access to the drain tube. Refer to **HEADLINER, REMOVAL**.
6. Separate the drain tube support clips (3).
7. Disconnect the drain tube from the floor grommet (2).
8. Disconnect the tube from the sunroof (1) and pull the tube up through the instrument panel.

REAR

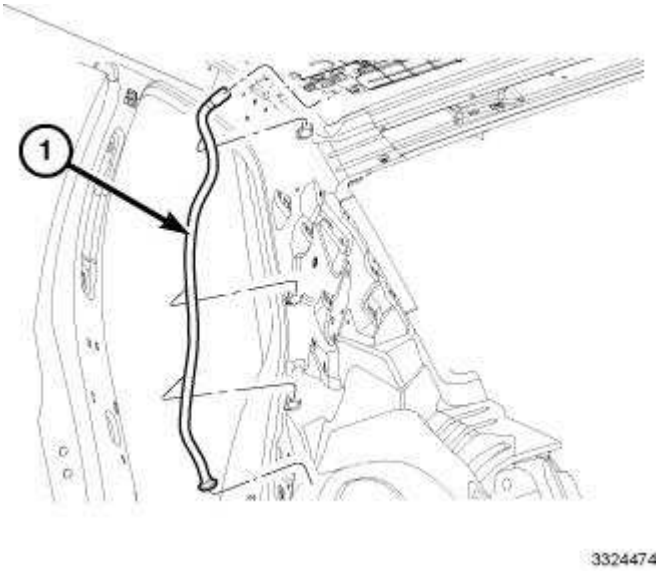


Fig. 557: Drain Tube
Courtesy of CHRYSLER GROUP, LLC

1. Remove the lower C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, REMOVAL**.
2. Lower the headliner as necessary to gain access to the drain tube. Refer to **HEADLINER, REMOVAL**.
3. Separate the drain tube support clips.
4. Disconnect the drain tube (1) from the floor grommet.
5. Disconnect the tube from the sunroof and remove the tube (1).

INSTALLATION

INSTALLATION

FRONT

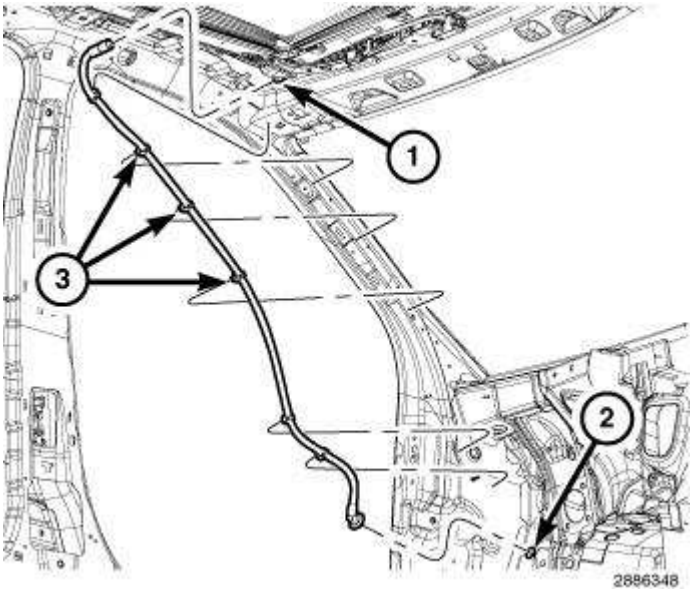


Fig. 558: Sunroof, Front Drain Tube Support Clips & Floor Grommet
Courtesy of CHRYSLER GROUP, LLC

1. Install the front tube and seat the push pin fasteners (3) fully.
2. Position the lower portion through the grommet (2) in the body.
3. Connect the new drain tube to the sunroof housing (1) and test drainage.
4. If servicing the passenger side, install the glove box module. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION**.
5. If servicing the driver side, install the steering column opening trim panel. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION**.
6. Install the lower cowl panel. Refer to **PANEL, COWL TRIM, INSTALLATION**.
7. Install the headliner. Refer to **HEADLINER, INSTALLATION**.
8. Install the A-pillar trim. Refer to **PANEL, A-PILLAR TRIM, INSTALLATION**.

REAR

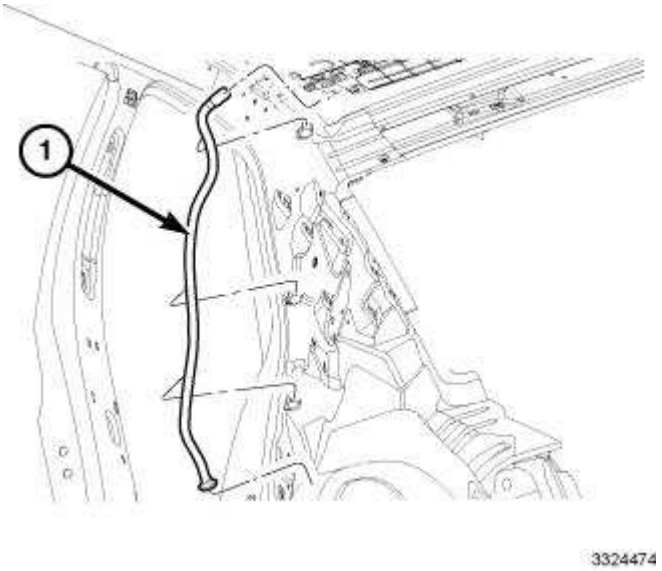


Fig. 559: Drain Tube
Courtesy of CHRYSLER GROUP, LLC

1. Install the rear tube and seat the push pin fasteners fully.
2. Position the lower portion through the grommet in the body.
3. Connect the new drain tube (1) to the sunroof housing and test drainage.
4. Install the headliner. Refer to **HEADLINER, INSTALLATION**.
5. Install the lower C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.

BODY STRUCTURE

GAP AND FLUSH

SPECIFICATIONS

SPECIFICATIONS

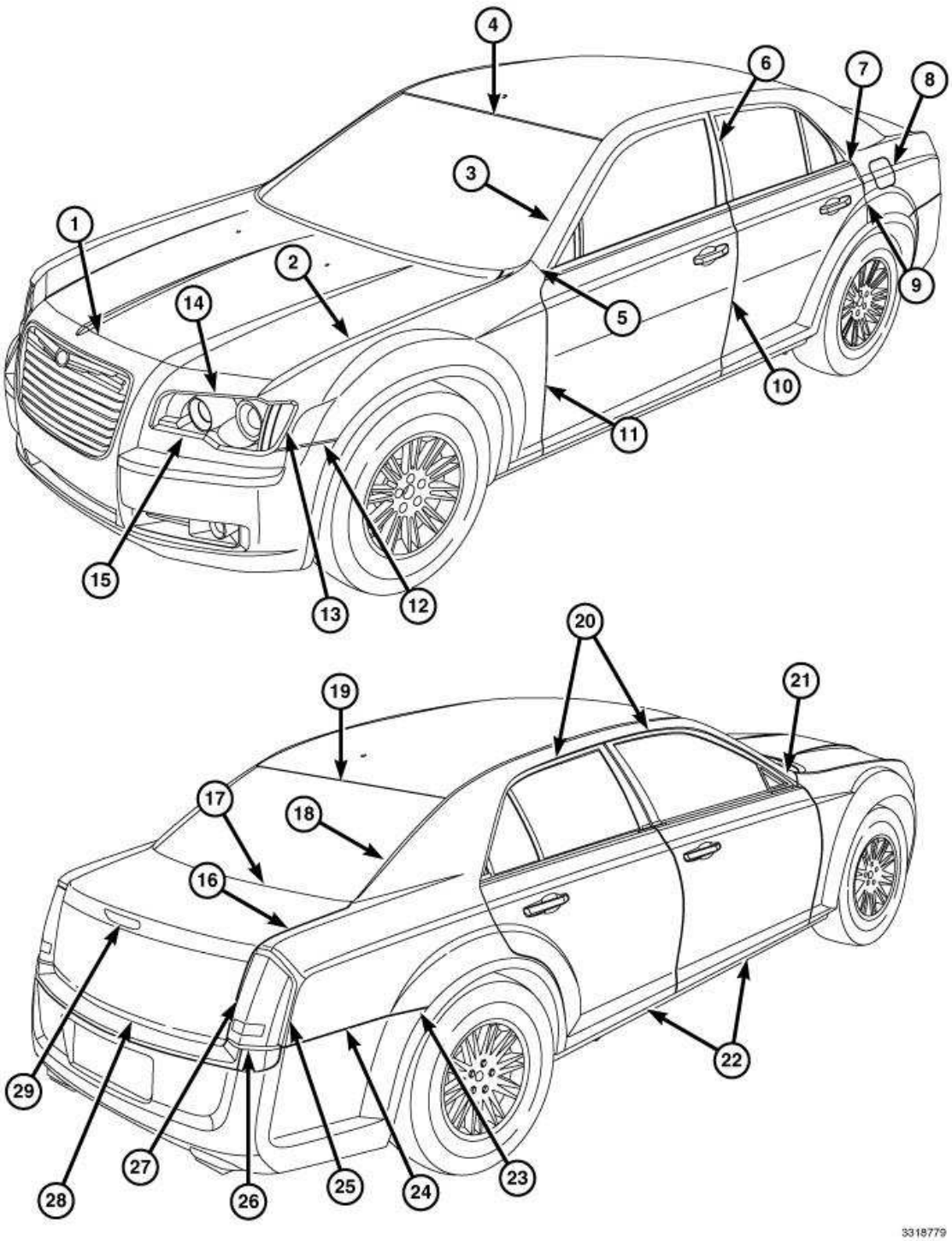


Fig. 560: Body Structure, Gap and Flush
Courtesy of CHRYSLER GROUP, LLC

NOTE:
All measurements are in millimeters.

O/F = Over Flush **U/F = Under Flush**
U/D = Up/Down **F/A = Fore/Aft**

DIMENSION	DESCRIPTION	GAP	FLUSH
1	Hood to Facia	3.5+/- 1.5 Parallel within 1.5	Facia O/F 1.0+/- 1.5 Consistent within 1.5
2	Hood to Fender	3.5+/- 1.0 Parallel within 1.5 Side to side within 1.5	Hood 0.0+/- 1.5 Consistent within 1.5 Side to side within 1.5
3	Windshield to Body Side	Isolator: No Gap 0.0 Glass: 6.0 +/- 2.0 Parallel within 2.0	
		Side to side within 2.0	
4	Windshield to Roof	Isolator: No Gap 0.0 Glass: 6.0 +/- 2.0 Parallel within 2.0	Glass: U/F 2.7 +/- 1.5 Consistent within 1.0
5	Front Door Belt Molding to Fender	4.0 +/- 1.5	Belt Molding: U/F 1.0 +/- 1.5
6	Front Door Applique to Rear Door Applique	4.0 +/- 1.5 Parallel within 1.5	0.0 +/- 1.5 Consistent within 1.5
7	Rear Belt Molding to Body Side	5.0 +/- 1.5	Belt Molding: O/F 3.0 +/- 1.5
8	Fuel Filler Door to Body Side	Belt Molding: 3.0 +/- 1.0 Parallel within 1.0	Door: U/F 0.5 +/- 1.0 Consistent within 1.0
9	Rear Door to Body Side Feature Line 0.0 +/- 1.5 U/D	4.0 +/- 1.0 Parallel within 1.5	0.0 +/- 1.0 Consistent within 1.5
10	Front Door to Rear Door Feature Line 0.0 +/- 1.5 U/D	4.0 +/- 1.0 Parallel within 1.5	Front Door O/F 0.8 +/- 1.0 Consistent within 1.5

11	Fender to Front Door Feature Line 0.0 +/- 1.5 U/D	4.0 +/- 1.0 Parallel within 1.0	Fender O/F 0.8 +/- 1.0 Consistent within 1.5
12	Facia to Fender	Net to 0.5	0.0 +/- 1.0 Consistent within 1.0
13	Headlamp to Fender	2.0 +/- 1.5 Parallel within 1.0 Side to side within 2.0	Headlamp (top) U/F 2.0 inboard to 1.0 outboard Headlamp (bottom) 0.0 +/- 1.5 Side to side within 2.0
14	Headlamp to Facia	2.5 +/- 1.5 Parallel within 2.0 Side to side within 2.0	@ top 1.2 +/- 1.5 Consistent within 2.0
15	Headlamp to Facia (bottom inboard middle)	2.0+/- 1.5 Parallel within 2.0	
		Side to side within 2.0	
16	Decklid to Body Side	3.5 +/- 1.0 Parallel within 1.0 Side to side within 1.5	
17	Backlight to Decklid	12.5+/- 2.0 Parallel within 2.0	
		No Gap to Molding	
18	Backlight to Body Side	5.0 +/- 2.0 Parallel within 1.5 Side to side within 1.5	
19	Backlight to Roof	6.0 +/- 2.0 Parallel within 2.0	Roof O/F 2.0 +/- 2.0 Consistent within 1.0
20	Door Lip Opening to Body Side	5.4 +/- 1.5	Bodyside 0/F 3.0 +/- 1.5

		Parallel within 1.5	Consistent within 1.5
21	Mirror Flag to Door Lip Opening Molding	2.0+/- 1.3	0.0 +/- 1.3
22	Front and Rear Doors to Sill	6.0 +/- 2.0 Parallel within 2.0	Sill O/F 6.0 +/- 2.0 Consistent within 2.0
23	Facia to Body Side Alignment at Wheelhouse: Facia O/F 2.0 +/- 1.0		
24	Facia to Body Side	Net to 0.5	0.0 +/- 1.0 Consistent within 1.0
25	Taillamp to Body Side	1.5 +/- 1.0 Parallel within 1.5 Side to side within 2.0	
26	Taillamp to Facia (Bright)	2.0 +/- 2.0 Parallel within 1.0 Side to side within 2.0	Taillamp O/F 1.0 +/- 2.0 Consistent within 1.0
27	Taillamp to Decklid	3.5 +/- 2.0 Parallel within 2.0	
		Side to side within 2.0	
28	Decklid to Facia	U/D 6.5 +/- 2.0 Parallel within 2.0	
	Cross Car transition	From 4.0 to 6.5 (below taillight) Side to side within 2.0	
29	Decklid Centerlamp Applique to Decklid	1.0+/- 1.0 Parallel within 2.0	

BRAKES

Base - Service Information - Chrysler 300

WARNING

WARNING

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

CAUTION

CAUTION

CAUTION: Use only Mopar® brake fluid or an equivalent from a tightly sealed container. Brake fluid must conform to DOT 3 specifications. Do not use petroleum-based fluid because seal damage in the brake system will result.

CAUTION: Brake fluid will damage painted surfaces. If brake fluid is spilled on any painted surfaces, wash it off immediately with water.

CAUTION: Never use gasoline, kerosene, alcohol, motor oil, transmission fluid, or any fluid containing mineral oil to clean system components. These fluids damage rubber cups and seals.

CAUTION: During service procedures, grease or any other foreign material must be kept off the caliper assembly, brake linings, brake rotor and external surfaces of the hub.

CAUTION: Disc brake calipers are made of aluminum. They are anodized and appear black in color. When handling the calipers or brake rotors, be careful to avoid damaging them, and avoid scratching or nicking the brake pad lining.

CAUTION: Anytime the battery has been disconnected and is reconnected it is important that this be performed properly. The vehicle may be equipped

with systems that require special calibration processes.

STANDARD PROCEDURE

BASE BRAKE BLEEDING

CAUTION: Before removing the master cylinder cover, wipe it clean to prevent dirt and other foreign matter from dropping into the master cylinder.

CAUTION: Use only Mopar® brake fluid or an equivalent from a fresh, tightly sealed container. Brake fluid must conform to DOT 3 specifications.

NOTE: For bleeding the antilock brake hydraulic system, Refer to STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING .

NOTE: Do not pump the brake pedal at any time while having a bleeder screw open during the bleeding process. This will only increase the amount of air in the system and make additional bleeding necessary.

NOTE: Do not allow the master cylinder reservoir to run out of brake fluid while bleeding the system. An empty reservoir will allow additional air into the brake system. Check the fluid level frequently and add fluid as needed.

The following wheel circuit sequence for bleeding the brake hydraulic system should be used to ensure adequate removal of all trapped air from the brake hydraulic system.

- Right rear wheel
- Left rear wheel
- Right front wheel
- Left front wheel

NOTE: Pressure bleeding is highly recommended to bleed this brake system to ensure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.

The base brake system can be bled using the pressure method or the manual method. Both methods are presented in this text.

PRESSURE BLEEDING METHOD

NOTE: Follow pressure bleeder manufacturer's instructions for use of pressure bleeding equipment.

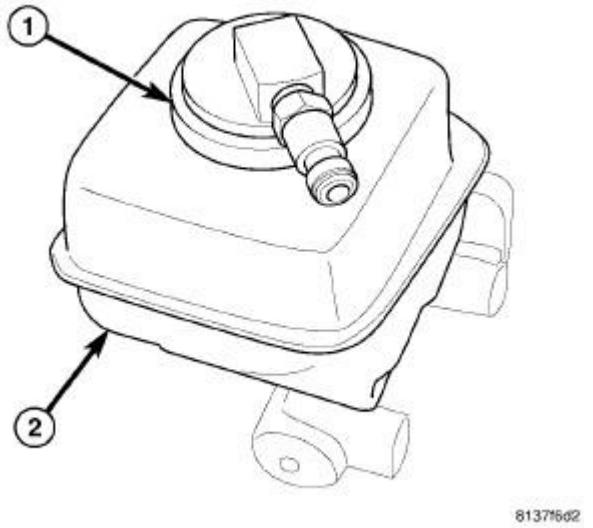


Fig. 1: Fluid Reservoir & Adapter
Courtesy of CHRYSLER GROUP, LLC

1. Remove filler cap from the top of fluid reservoir (2) on master cylinder.
2. Install Adapter (1), Special Tool (special tool #6921, Cap, Master Cylinder), in the caps place on the reservoir (2).
3. Attach Bleeder Tank, Special Tool C-3496-B, or equivalent, to Adapter (special tool #6921, Cap, Master Cylinder) (1). Pressurize the system following the pressure bleeder manufacturer's instructions.

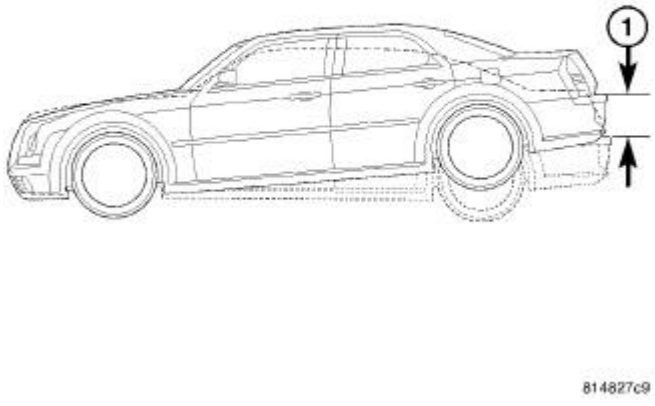


Fig. 2: Vehicle Rear Raised For Bleeding
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To ensure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5° higher than the front or approximately 10-12 inches as measured at the rear bumper (1).**

4. Raise and support vehicle placing rear of vehicle approximately 5° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.

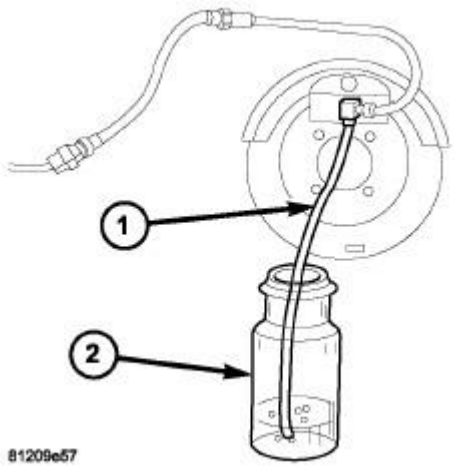


Fig. 3: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

5. If installed, remove rubber dust caps from all four bleeder screws on calipers.
6. Starting at the first wheel circuit as listed earlier, attach a clear hose (1) to the bleeder screw at that wheels brake caliper and feed the other end of hose into a clear jar (2) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: **Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.**

7. Open bleeder screw at least one full turn or more to obtain an adequate flow of brake fluid.
8. After 4 to 8 ounces of brake fluid has been bled through the brake hydraulic circuit, and an air-free flow (no bubbles) is maintained in the clear plastic hose (1) and jar (2), close the bleeder screw.
9. Bleed the remaining wheel circuits in the same manner until all air is removed from the brake hydraulic system.
10. Check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be

trapped in the hydraulic system. Rebleed the brake system as necessary.

11. If equipped with antilock brakes, the hydraulic control unit may need to be bled, then rebleed base brakes. Refer to **STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING** .
12. Reinstall all 4 bleeder screw dust caps.
13. Test drive vehicle to ensure brakes are operating properly and pedal feel is correct.

MANUAL BLEEDING METHOD

NOTE: To bleed the base brake system manually, an assistants help is required.

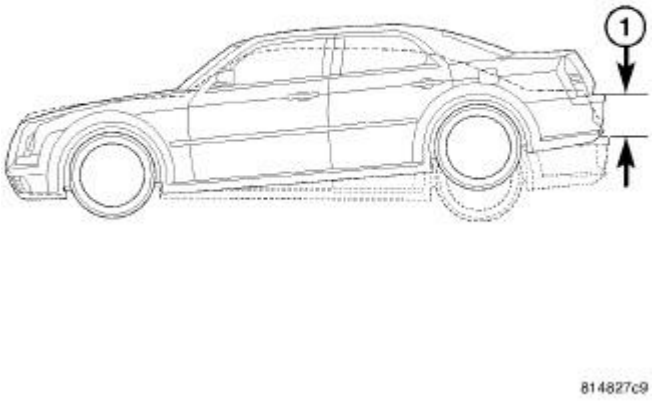


Fig. 4: Vehicle Rear Raised For Bleeding
Courtesy of CHRYSLER GROUP, LLC

NOTE: To ensure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5° higher than the front or approximately 10-12 inches as measured at the rear bumper (1).

1. Raise and support vehicle placing rear of vehicle approximately 5° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.

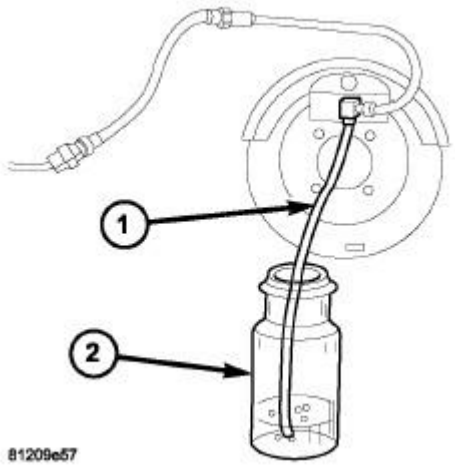


Fig. 5: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

2. Remove rubber duct caps from all 4 bleeder screws.
3. Attach a clear hose (1) to the bleeder screw at one wheel and feed the other end of the hose into a clear jar (2) containing fresh brake fluid.
4. Have an assistant pump the brake pedal three or four times and hold it down before the bleeder screw is opened.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

5. While the pedal is being held down, open the bleeder screw at least 1 full turn. When the bleeder screw opens the brake pedal will drop all the way to the floor. Continue to hold the pedal all the way down.
6. Once the brake pedal has dropped, close the bleeder screw. The pedal can then be released.
7. Repeat steps One through Five until all trapped air is removed from that wheel circuit (usually four or five times). This should pass a sufficient amount of fluid to expel all the trapped air from the brakes hydraulic system. Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level. This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This will ensure that air does not reenter the brake hydraulic system.

8. Bleed the remaining wheel circuits in the same manner until all air is removed from the brake

hydraulic system.

9. Check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be trapped in the hydraulic system. Rebleed the brake system as necessary.
10. If equipped with antilock brakes, the hydraulic control unit may need to be bled, then rebleed base brakes. Refer to **STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING** .
11. Reinstall all 4 bleeder screw dust caps.
12. Test drive vehicle to ensure brakes are operating properly and pedal feel is correct.

BASE BRAKE BLEEDING - SRT8

Use the following procedure to bleed the rear brake calipers of this vehicle. The front brake calipers may be bled using the same procedure as the standard model.

CAUTION: Before removing the master cylinder cover, wipe it clean to prevent dirt and other foreign matter from dropping into the master cylinder.

CAUTION: Use only Mopar® brake fluid or an equivalent from a fresh, tightly sealed container. Brake fluid must conform to DOT 3 specifications.

NOTE: For bleeding the antilock brake hydraulic system, refer to STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING .

NOTE: Do not pump the brake pedal at any time while having a bleeder screw open during the bleeding process. This will only increase the amount of air in the system and make additional bleeding necessary.

NOTE: Do not allow the master cylinder reservoir to run out of brake fluid while bleeding the system. An empty reservoir will allow additional air into the brake system. Check the fluid level frequently and add fluid as needed.

NOTE: Pressure bleeding is highly recommended to bleed this brake system to ensure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.

Although it is recommended that the base brake system be bled using the pressure method, the manual method can also be performed. Both methods are presented in this text.

PRESSURE BLEEDING METHOD

NOTE: Follow pressure bleeder manufacturer's instructions for use of pressure bleeding equipment.

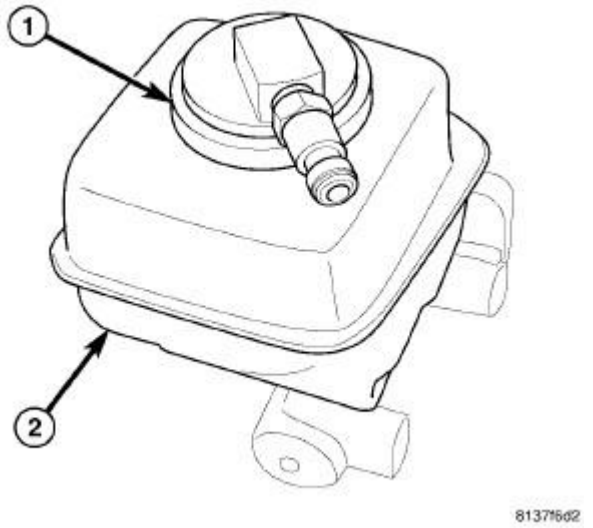


Fig. 6: Fluid Reservoir & Adapter
Courtesy of CHRYSLER GROUP, LLC

1. Remove filler cap from the top of fluid reservoir (2) on master cylinder.
2. Install Adapter (1), Special Tool (special tool #6921, Cap, Master Cylinder), in the caps place on the reservoir (2).
3. Attach Bleeder Tank, Special Tool C-3496-B, or equivalent, to Adapter (special tool #6921, Cap, Master Cylinder) (1). Pressurize the system following the pressure bleeder manufacturer's instructions.

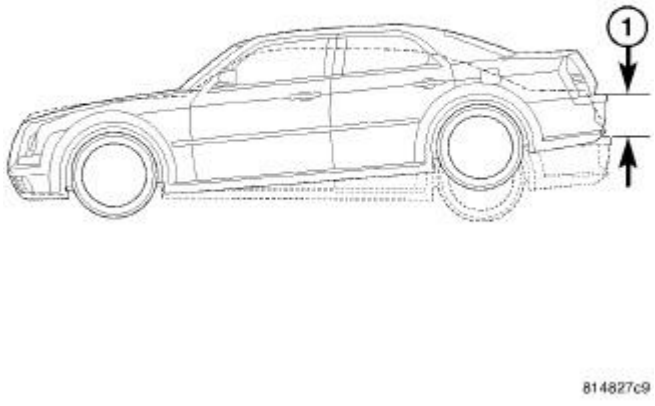


Fig. 7: Vehicle Rear Raised For Bleeding
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To ensure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5° higher than the front or approximately 10-12 inches as measured at the rear bumper (1).**

4. Raise and support vehicle placing rear of vehicle approximately 5° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.

NOTE: **The following wheel circuit sequence for bleeding the brake hydraulic system should be used to ensure adequate removal of all trapped air from the brake hydraulic system.**

- **Right rear wheel**
- **Left rear wheel**
- **Right front wheel**
- **Left front wheel**

REAR BRAKES

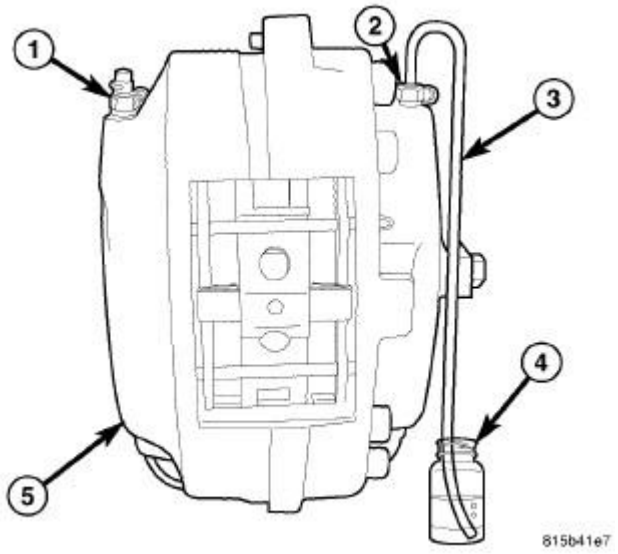


Fig. 8: Bleeding Caliper Inboard Half
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove rubber dust caps from both bleeder screws on each caliper.
2. Starting at the first wheel circuit that needs to be bled (See list in above note), attach a clear hose (3) to the inboard bleeder screw (2) at that wheels brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some

air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

3. Open inboard bleeder screw (2) at least one full turn or more to obtain an adequate flow of brake fluid.
4. After 4 to 8 ounces of brake fluid has been bled through the brake hydraulic circuit, and an air-free flow (no bubbles) is maintained in the clear plastic hose (3) and jar (4), close the bleeder screw (2).
5. Remove clear hose and install bleeder screw dust cap.

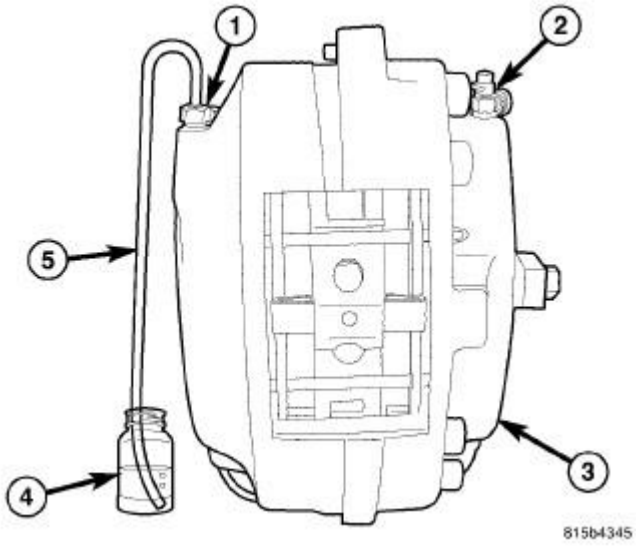


Fig. 9: Bleeding Caliper Outboard Half
Courtesy of CHRYSLER GROUP, LLC

6. Attach a clear hose (5) to the outboard bleeder screw (1) at that same wheels brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

7. Open outboard bleeder screw (1) at least one full turn or more to obtain an adequate flow of brake fluid.
8. After 4 to 8 ounces of brake fluid has been bled through the brake hydraulic circuit, and an air-free flow (no bubbles) is maintained in the clear plastic hose (5) and jar (4), close the bleeder screw (1).
9. Remove clear hose and install bleeder screw dust cap.
10. Bleed opposite rear brake wheel circuits as necessary in the same manner until all air is removed from the brake hydraulic system, then proceed to the front brakes.

FRONT BRAKES

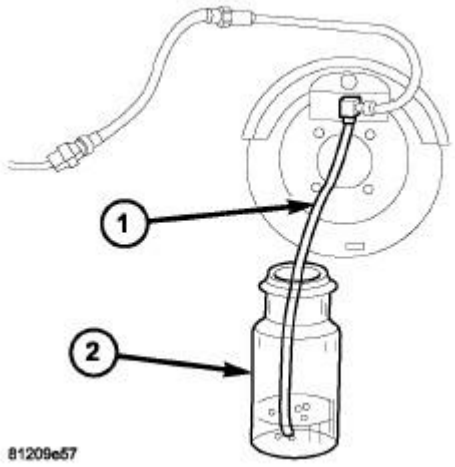


Fig. 10: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove rubber dust cap from bleeder screw on each front brake caliper.
2. Starting at the first wheel circuit that needs to be bled (See list in above note), attach a clear hose (1) to the bleeder screw at that wheels brake caliper and feed the other end of hose into a clear jar (2) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

3. Open bleeder screw at least one full turn or more to obtain an adequate flow of brake fluid.
4. After 4 to 8 ounces of brake fluid has been bled through the brake hydraulic circuit, and an air-free flow (no bubbles) is maintained in the clear plastic hose (1) and jar (2), close the bleeder screw.

5. Install bleeder screw dust cap.
6. Bleed opposite front brake wheel circuit as necessary in the same manner until all air is removed from the brake hydraulic system.
7. If equipped with antilock brakes, the hydraulic control unit may need to be bled, then rebleed base brakes. Refer to **STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING** .
8. Once all brakes are bled, check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be trapped in the hydraulic system. Rebleed the brake system as necessary.
9. Test drive vehicle to ensure brakes are operating properly and pedal feel is correct.

MANUAL BLEEDING METHOD

NOTE: To bleed the base brake system manually, an assistants help is required.

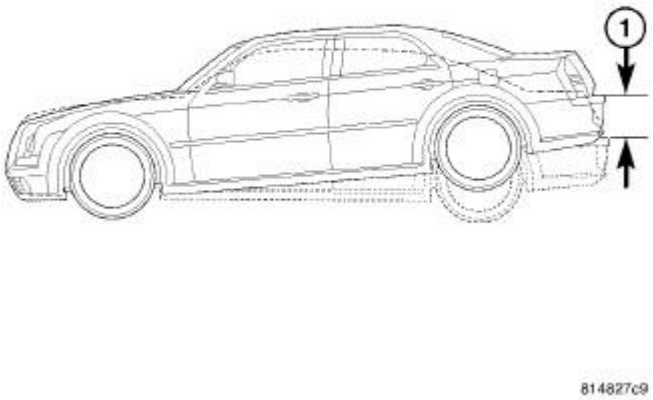


Fig. 11: Vehicle Rear Raised For Bleeding
Courtesy of CHRYSLER GROUP, LLC

NOTE: To ensure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5° higher than the front or approximately 10-12 inches as measured at the rear bumper (1).

1. Raise and support vehicle placing rear of vehicle approximately 5° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.

NOTE: The following wheel circuit sequence for bleeding the brake hydraulic system should be used to ensure adequate removal of all trapped air from the brake hydraulic system.

- **Right rear wheel**
- **Left rear wheel**
- **Right front wheel**
- **Left front wheel**

REAR BRAKES

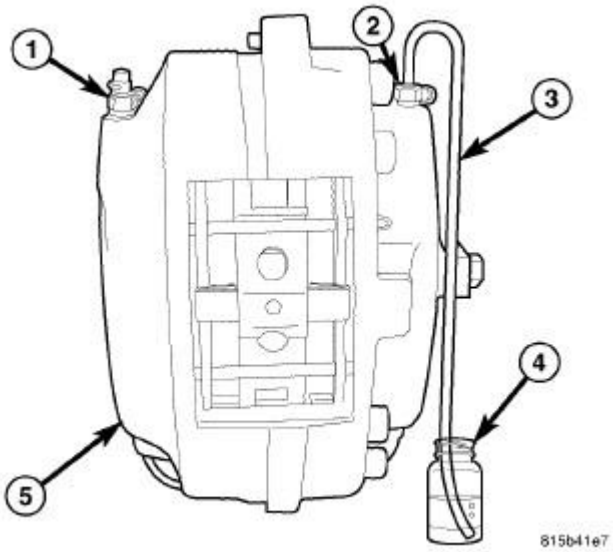


Fig. 12: Bleeding Caliper Inboard Half
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove rubber dust caps from both bleeder screws on each caliper.
2. Starting at the first wheel circuit that needs to be bled (See list in above note), attach a clear hose (3) to the inboard bleeder screw (2) at that wheels brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.
3. Have an assistant pump the brake pedal three or four times, then hold it down before the bleeder screw is opened.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

4. While the pedal is being held down, open the inboard bleeder screw (2) at least one full turn. When the bleeder screw opens the brake pedal will drop all the way to the floor. Continue to hold the pedal all the way down.

5. Once the brake pedal has dropped, close the bleeder screw. The pedal can then be released.
6. Repeat the above three steps until all trapped air is removed from that wheel circuit (usually four or five times). This should pass a sufficient amount of fluid to expel all the trapped air from the brakes hydraulic system. **Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level.** This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This will ensure that air does not reenter the brake hydraulic system.

7. Remove clear hose and install bleeder screw dust cap.

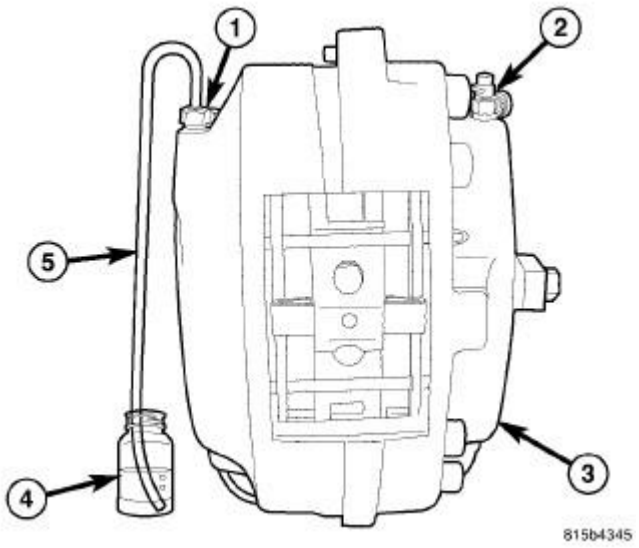


Fig. 13: Bleeding Caliper Outboard Half
Courtesy of CHRYSLER GROUP, LLC

8. Attach a clear hose (5) to the outboard bleeder screw (1) at that same wheels brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.
9. Have an assistant pump the brake pedal three or four times, then hold it down before the bleeder screw is opened.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

10. While the pedal is being held down, open the outboard bleeder screw (2) at least one full turn. When the bleeder screw opens the brake pedal will drop all the way to the floor. Continue to hold the pedal all the way down.
11. Once the brake pedal has dropped, close the bleeder screw. The pedal can then be released.
12. Repeat the above three steps until all trapped air is removed from that wheel circuit (usually four or five times). This should pass a sufficient amount of fluid to expel all the trapped air from the brakes hydraulic system. **Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level.** This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: **Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This will ensure that air does not reenter the brake hydraulic system.**

13. Remove clear hose and install bleeder screw dust cap.
14. Bleed opposite rear brake wheel circuits as necessary in the same manner until all air is removed from the brake hydraulic system, then proceed to the front brakes.

FRONT BRAKES

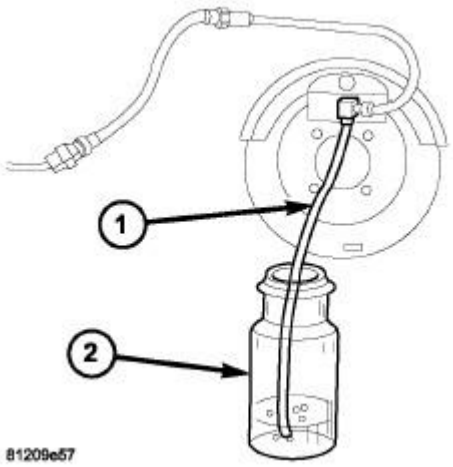


Fig. 14: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove rubber dust cap from bleeder screw on each front brake caliper.
2. Starting at the first wheel circuit that needs to be bled (See list in above note), attach a clear hose (1) to the bleeder screw at one wheel and feed the other end of the hose into a clear jar (2) containing fresh brake fluid.
3. Have an assistant pump the brake pedal three or four times and hold it down before the bleeder screw is opened.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some

air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

4. While the pedal is being held down, open the bleeder screw at least one full turn. When the bleeder screw opens the brake pedal will drop all the way to the floor. Continue to hold the pedal all the way down.
5. Once the brake pedal has dropped, close the bleeder screw. The pedal can then be released.
6. Repeat steps One through Five until all trapped air is removed from that wheel circuit (usually four or five times). This should pass a sufficient amount of fluid to expel all the trapped air from the brakes hydraulic system. Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level. This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This will ensure that air does not reenter the brake hydraulic system.

7. Install bleeder screw dust cap.
8. Bleed opposite front brake wheel circuit as necessary in the same manner until all air is removed from the brake hydraulic system.
9. If equipped with antilock brakes, the hydraulic control unit may need to be bled, then rebleed base brakes. Refer to **STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING** .
10. Once all brakes are bled, check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be trapped in the hydraulic system. Rebleed the brake system as necessary.
11. Test drive vehicle to ensure brakes are operating properly and pedal feel is correct.

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
ABS ICU Mounting Bolts To Bracket	11	8	97
ABS ABM-To-HCU Mounting Screws	2	-	17
ABS Wheel Speed Sensor Head Mounting Screw - Front	11	8	97
ABS Wheel Speed Sensor Head Mounting Screw - Rear	11	8	97
Adjustable Pedal Position Sensor Mounting Screws	7.5	5.5	66
Brake Pedal Mounting Nuts	25	18	221

Brake Tube Nuts	20	15	177
Brake Hose-to-Front knuckle Bracket Screw	11	8	97
Brake Hose Caliper Banjo Bolt	50	37	-
Brake Hose Caliper Banjo Bolt - SRT8	33	24	__
Disc Brake Caliper Adapter Mounting Bolts - Front	95	70	-
Disc Brake Caliper Adapter Mounting Bolts - Rear	115	85	-
Disc Brake Caliper Guide Pin Bolts - Front	60	44	-
Disc Brake Caliper Guide Pin Bolts - Rear	31	23	275
Disc Brake Caliper Mounting Bolts - Front - SRT8	190	140	-
Disc Brake Caliper Mounting Bolts - Rear - SRT8	130	96	-
Disc Brake Caliper Bleeder Screw	11	8	97
Master Cylinder Mounting Nuts - MK25	25	18	221
Master Cylinder Mounting Nuts - MK25E	15	11	133
Power Brake Booster Mounting Nuts	25	18	221
Parking Brake Cable Knuckle Mounting Screw	8	6	71
Parking Brake Lever (Pedal) Mounting Bolt And Nuts	26	19	230
Wheel Mounting (Lug) Nuts	150	110	-

SPECIAL TOOLS

SPECIAL TOOLS

	25-W - Roller Contact Point 6921 - Cap, Master Cylinder (Originally Shipped In Kit Number(s) 6907.) 8358-1 - Bleed Tube (Originally Shipped In Kit Number(s) 8646, 8647, 8648.) 9314 - Installer, Dust Boot (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.) 9315 - Installer, Dust Boot (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.) 9748-1 - Adapter, Bleeder (Originally Shipped In Kit Number(s) 9796.) 9748-2 - Adapter, Bleeder (Originally Shipped In Kit Number(s) 9796.) C-3339A - Set, Dial Indicator (Originally Shipped In Kit Number(s) 9202.) C-3919 - Gauge, Brake Shoes C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC,

9299CC, 9300A-CAN.)

ELECTRICAL

PUMP, ELECTRIC VACUUM

DESCRIPTION

DESCRIPTION

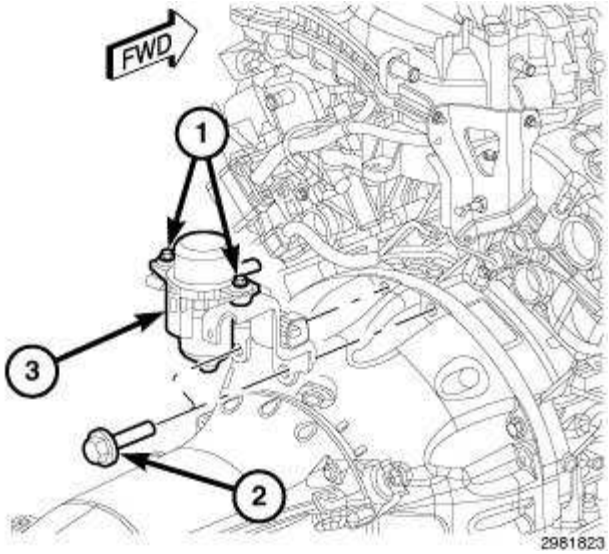


Fig. 15: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

NOTE: Only vehicles with a 3.6L engine have an electric vacuum pump.

There is an electric vacuum pump (3) located on the back of the engine mounted to the top of the transmission. The vacuum pump (3) has one electrical connector on a pigtail connected to the mounting bracket. The vacuum pump (3) mounts to the bracket with two rubber insulated studs (1) to reduce vibration, and the bracket mounts to the transmission with two bolts (2). The vacuum hose has a quick-connect type end with a locking tab at the vacuum pump.

OPERATION

OPERATION

The Electric Vacuum Pump (EVP) system is installed to provide supplemental vacuum to the brake booster when the engine vacuum supply is low. The vacuum pump is connected to the engine and the brake booster through a series of hoses and one-way flow check valves. A pressure senor, mounted in the brake booster, provides information to the Antilock Brake System (ABS) module, then the vacuum level is sent over CAN to the Powertrain Control Module (PCM). The PCM modulates the EVP operation to maintain the brake booster vacuum within a given range. This system ensures that the customer experiences a consistent brake pedal feel under all driving conditions.

A two wire electrical connector is used to supply power and ground for the vacuum pump. Operating voltage is between 9V - 16V. Control of the vacuum pump is provided by the Powertrain Control Module (PCM) using a low side driver to a normally open relay (coil side). The relay coil side power is from a fuse in the under hood PDC. The switched power to the vacuum pump relay comes directly from the battery through an inline fuse holder located in the engine compartment.

The PCM monitors the Manifold Absolute Pressure (MAP) sensor and when the signal indicates low engine vacuum the PCM will cycle the vacuum pump as necessary to add vacuum to the power brake booster. The vacuum hoses are connected between the vacuum pump, the engine manifold (for MAP sensor signal), and the power brake booster vacuum sensor (on the brake booster). When the PCM cycles the vacuum pump on, the PCM monitors the MAP sensor and if the vacuum signal does not indicate a rising vacuum then DTCs will be set. Additionally the Antilock Brake System (ABS) module monitors the vacuum at the brake booster vacuum sensor and DTCs will also set in the ABS module.

REMOVAL

REMOVAL

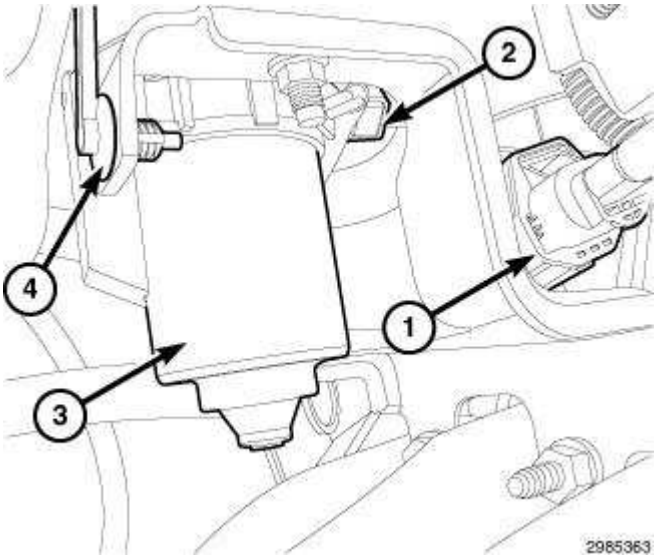


Fig. 16: Electrical Connector, Harness Connector, Hose & Vacuum Pump
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine appearance cover.
2. Disconnect the electrical connector (1) and remove the harness connector (4) from the mounting bracket.
3. Release the locking tab and disconnect the quick connect vacuum hose (2) from the vacuum pump (3).

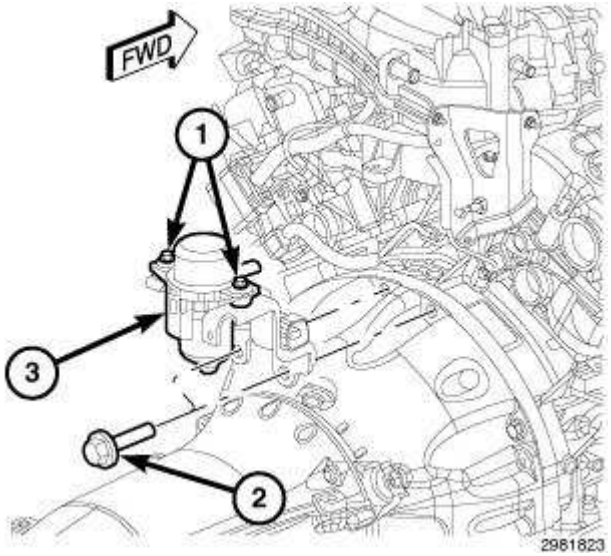


Fig. 17: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

4. Remove the vacuum pump bracket bolts (2) and remove the vacuum pump assembly (3) from the vehicle.

INSTALLATION

INSTALLATION

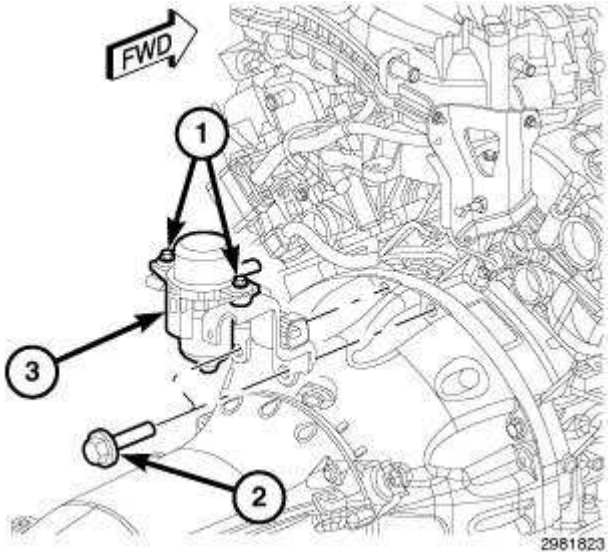


Fig. 18: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

1. Position the vacuum pump assembly (3), install the bracket mounting bolts (2) and tighten to 55 N.m (41 ft. lbs.).

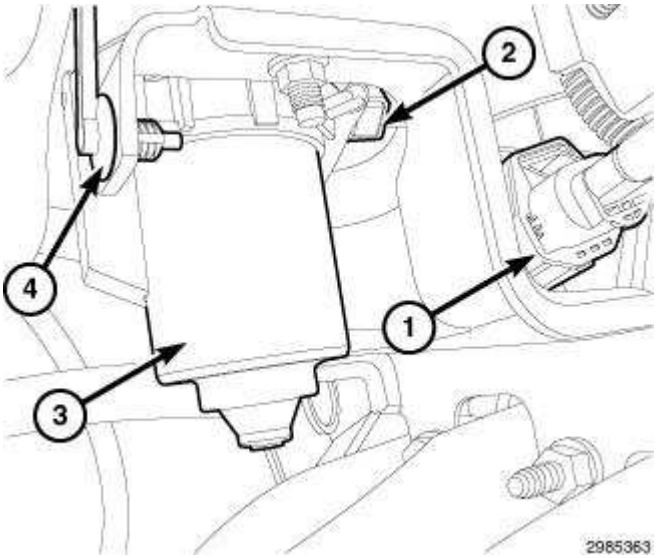


Fig. 19: Electrical Connector, Harness Connector, Hose & Vacuum Pump
Courtesy of CHRYSLER GROUP, LLC

2. Attach the harness connector to the bracket (4), and connect the electrical connector (1).
3. Connect the quick-connect vacuum hose (2) to the vacuum pump (3) and seat the locking tab.
4. Install the engine appearance cover.

SWITCH, BRAKE FLUID LEVEL

REMOVAL

REMOVAL

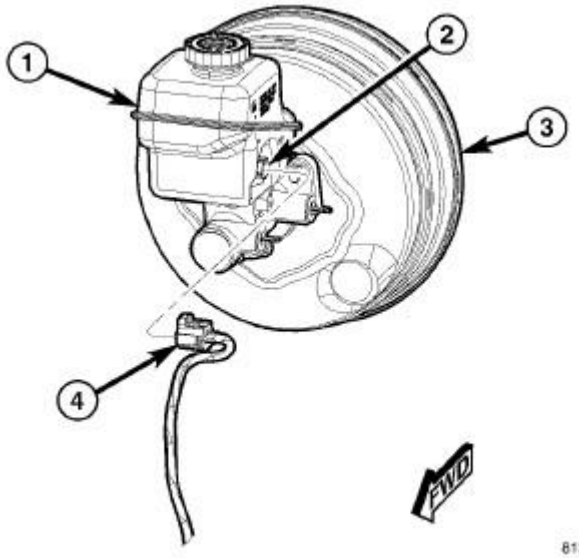


Fig. 20: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

The brake fluid level sensor (2) is an integral part of the master cylinder fluid reservoir (1). Refer to **RESERVOIR, BRAKE MASTER CYLINDER, REMOVAL**.

INSTALLATION

INSTALLATION

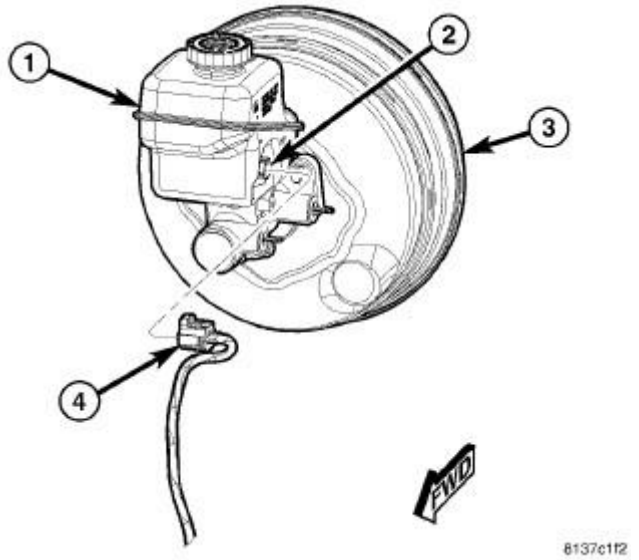


Fig. 21: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

The brake fluid level sensor (2) is an integral part of the master cylinder fluid reservoir (1). Refer to **RESERVOIR, BRAKE MASTER CYLINDER, INSTALLATION**.

HYDRAULIC/MECHANICAL

DESCRIPTION

NON SRT

Four-wheel disc brakes are standard on this vehicle. There are two four-wheel disc brake systems available, a standard and a premium. The standard disc brake system is referred to as "Seventeen-Inch." The premium disc brake system is referred to as "Eighteen-Inch."

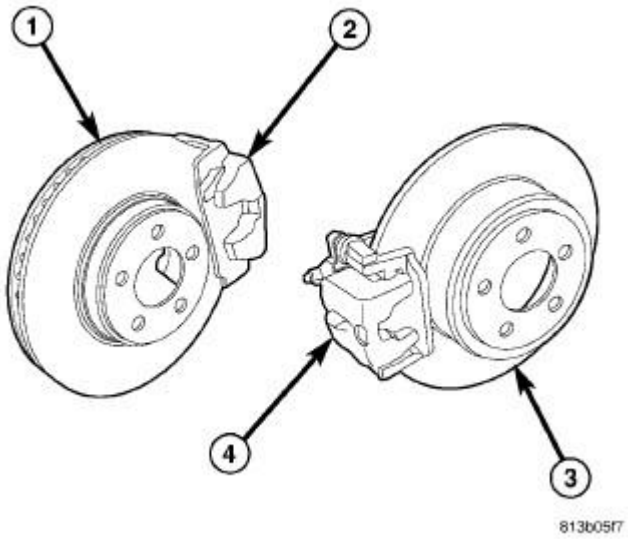


Fig. 22: 17 Inch Brakes
Courtesy of CHRYSLER GROUP, LLC

"Seventeen-inch" four-wheel disc brakes (so called because they are designed to fit inside 17-inch wheels) are standard on rear-wheel drive models with V6 engines. They feature single-piston aluminum calipers (2) and vented rotors (1) in the front and single-piston aluminum calipers (4) with solid rotors (3) in the rear.

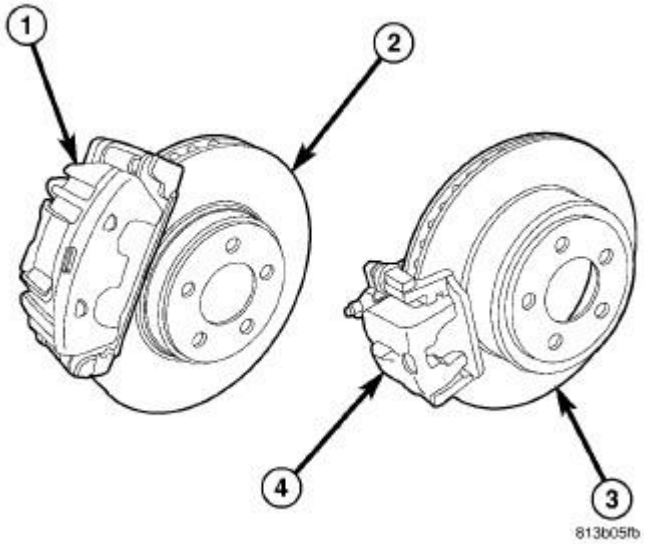


Fig. 23: 18 Inch Brakes
Courtesy of CHRYSLER GROUP, LLC

"Eighteen-inch" four-wheel disc brakes (so called because they are designed to fit inside 18-inch wheels) are standard on all international models and optional on other models. They feature twin-piston aluminum calipers (1) and vented rotors (2) in the front and single-piston aluminum calipers (4)

with vented rotors (3) in the rear. Although the rear calipers appear the same as the 17-inch system, the rear calipers used with this system feature a wider jaw to compensate for the wider, vented brake rotors used.

Although the twin-piston caliper used is the same, Rear-Wheel-Drive (RWD) models mount the caliper to the rear (trailing end) of the knuckle while All-Wheel-Drive (AWD) models mount the caliper to the front (leading end) of the knuckle.

All calipers are aluminum construction and are the low-drag type. New-technology caliper construction allows minimal drag of the pads on the discs with low clearance to the rotors to maintain maximum pedal feel and responsiveness.

All calipers are anodized, giving them an off-black appearance. This coating offers corrosion protection and a long-term neat appearance.

Phenolic pistons are used in all calipers. The premium twin caliper pistons have stainless steel caps for protection against damage due to contact with the brake pads.

All brake rotors are fully coated with Geomet™, a water-soluble, environmental friendly corrosion preventive. Both the friction surfaces and the vents are coated. During initial brake applications of a new rotor, the brake pads scrub the coating off the friction surfaces, ensuring that the remainder will be rust free. Coating the vents also ensures that there will not be a loss of heat capacity over time.

SRT

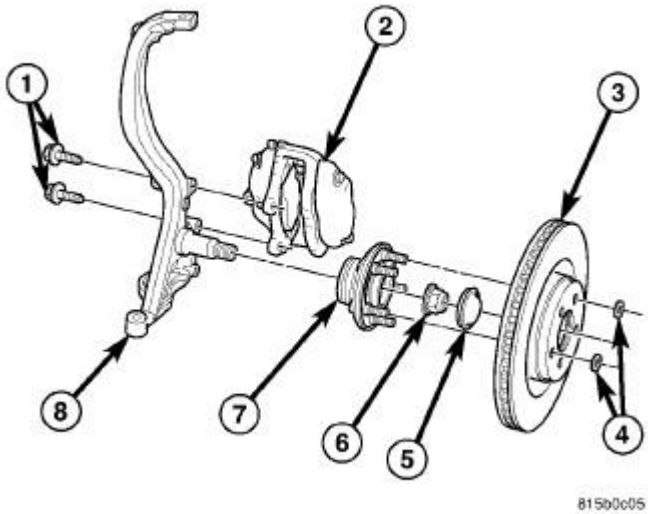


Fig. 24: Exploded View Of Front Disc Brakes - Srt-8
Courtesy of CHRYSLER GROUP, LLC

SRT8 models utilize four-wheel disc brakes. All brake calipers (2) are four-piston opposed fixed design manufactured by Brembo.

All brake rotors (3) are the internal vented type. There are no dust shields behind the front brake rotors.

All SRT8 calipers mount directly to the knuckle. They do not use brake caliper adapters.

The SRT8 rear brake rotors have integrated parking brake drums like the standard rear disc brake system.

Each front brake caliper features four 42 mm pistons, two in each outer half of the caliper. The two outer halves of this caliper connect hydraulically using internal passageways. These calipers are not serviceable. Do not attempt disassembly.

Each rear brake caliper features four pistons also, two in each half of the caliper. Each half has one 28 mm and one 32 mm piston. When mounted, the smaller size (28 mm) piston is located at the top while the larger size (32 mm) piston is located at the bottom. The two halves of the caliper are connected hydraulically by means of an external brake tube located on the bottom of the caliper assembly. Each caliper half has its own bleeder screw at the top and must be bled individually when bleeding is required. These calipers are not serviceable. Do not attempt disassembly.

BLOCK, BRAKE LINE UNION

DESCRIPTION

DESCRIPTION

A junction block is used on vehicles that are not equipped with antilock brakes (ABS) allowing use of the same brake tubes on all applications. The junction block is located in the engine compartment, in front of the right wheel well. The junction block mounts in the same location as the ABS integrated control unit (ICU) does on vehicles with ABS.

It has six threaded ports to which the brake tubes connect. Two are for the brake tubes coming from the master cylinder. The remaining four ports are for the brake tubes going to each wheel brake assembly.

The junction block contains a proportioning valve. The proportioning valve is not serviced separately from the junction block.

OPERATION

OPERATION

The junction block distributes the brake fluid coming from the master cylinder primary and secondary ports to the four brake tubes leading to the wheel brakes. Since the junction block mounts in the same location as the ABS integrated control unit (ICU), it allows for the common use of brake tubes on the vehicle whether it is equipped with or without ABS.

The junction block includes a rear brake proportioning valve. Placed in the fluid flow passages leading to the rear brake tube ports, it balances front-to-rear braking.

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION & WARNING.

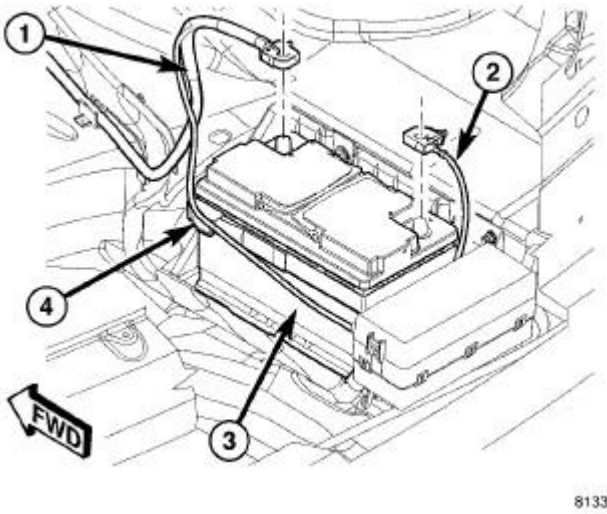


Fig. 25: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.

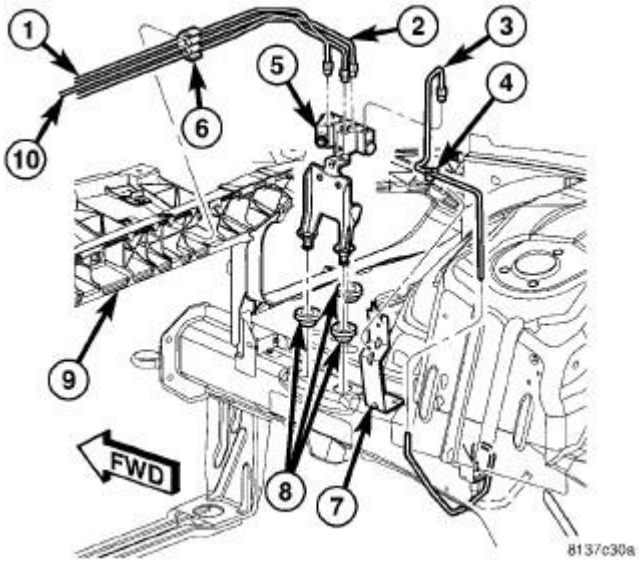


Fig. 26: Junction Block & Brake Tubes
Courtesy of CHRYSLER GROUP, LLC

3. Remove brake tubes (1, 2, 3 and 10) at junction block (5).

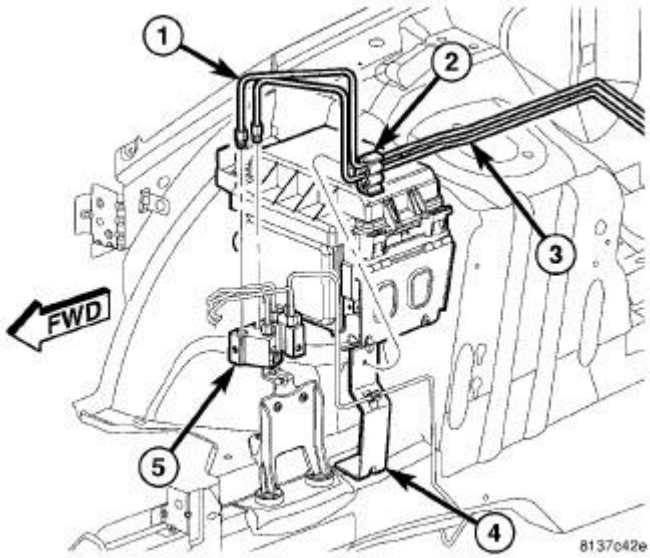


Fig. 27: Rear Tubes AT Junction Block
Courtesy of CHRYSLER GROUP, LLC

4. Remove remaining brake tubes (1 and 3) at junction block (5).

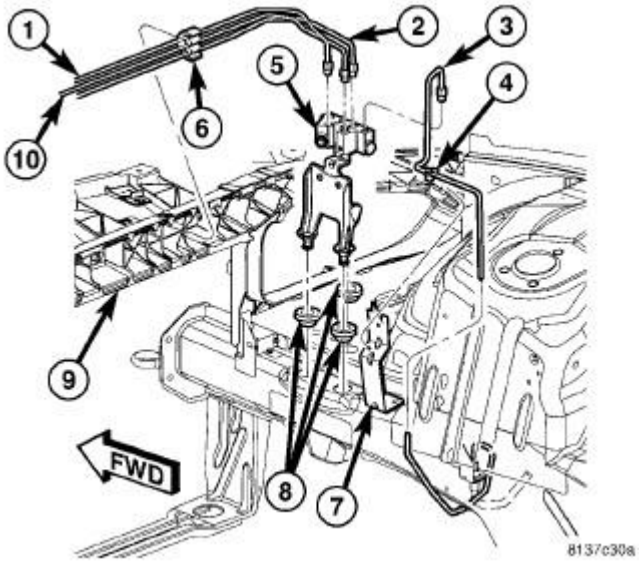


Fig. 28: Junction Block & Brake Tubes
Courtesy of CHRYSLER GROUP, LLC

5. Pull up on junction block (5) and remove from mounting grommets (8).

INSTALLATION

INSTALLATION

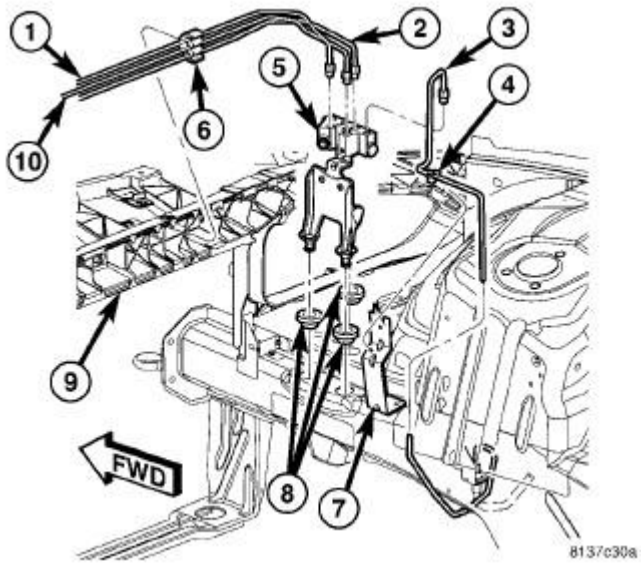


Fig. 29: Junction Block & Brake Tubes
Courtesy of CHRYSLER GROUP, LLC

1. Install junction block (5), pushing mounting bracket down into mounting grommets (8) located in body of vehicle.

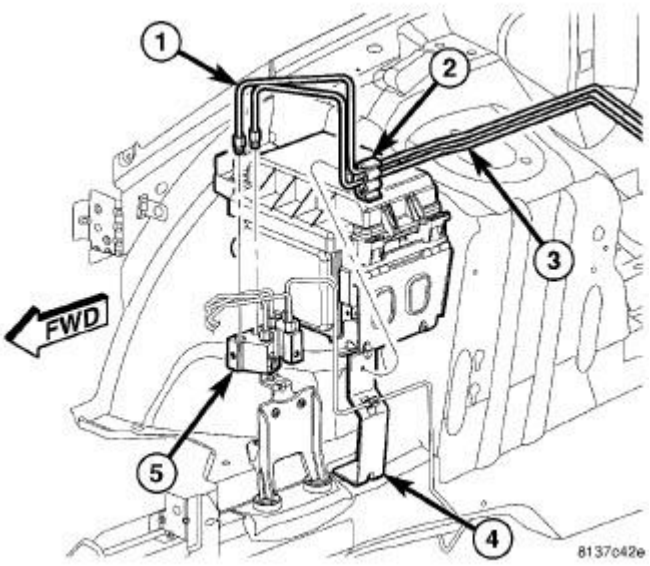


Fig. 30: Rear Tubes AT Junction Block
Courtesy of CHRYSLER GROUP, LLC

2. Install brake tubes to rear (1 and 3) at hydraulic control unit. Tighten tube nuts to 20 N.m (177 in. lbs.) torque.

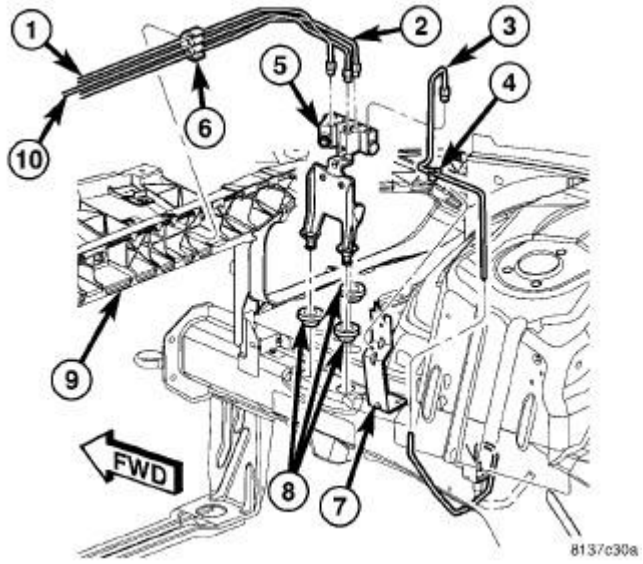


Fig. 31: Junction Block & Brake Tubes
Courtesy of CHRYSLER GROUP, LLC

3. Install brake tubes (1, 2, 3 and 10) at junction block (5). Tighten tube nuts to 20 N.m (177 in. lbs.) torque.
4. Remove brake pedal holding tool.

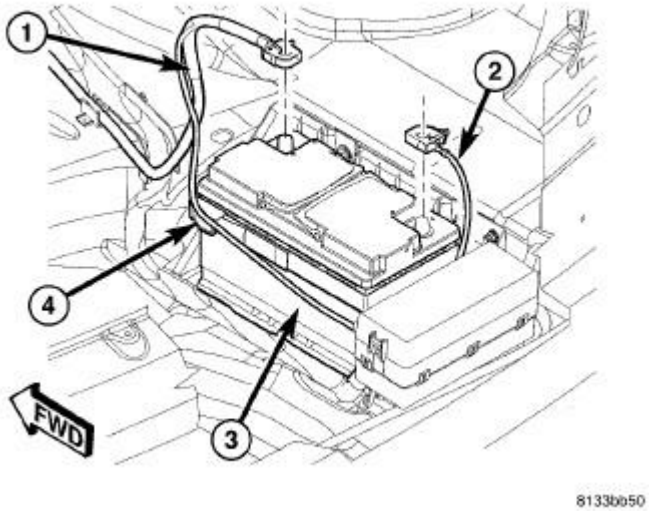


Fig. 32: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

5. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

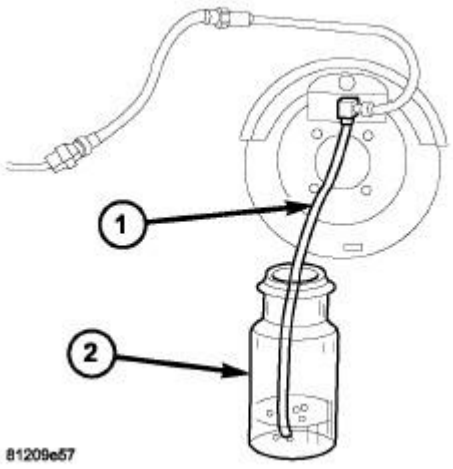


Fig. 33: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

6. Fill and bleed (1) base brake hydraulic system. Refer to **BASE BRAKE BLEEDING** .
7. Road test vehicle to verify proper operation of brakes.

BOOSTER, POWER BRAKE

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MASTER CYLINDER/POWER BOOSTER

1. Start the engine and check the booster vacuum hose connections. A hissing noise indicates a vacuum leak. Correct any vacuum leaks before proceeding.
2. Stop the engine and pump the brake pedal until all vacuum reserve in the booster is depleted.
3. Press and hold the brake pedal under light foot pressure. The pedal should hold firm. If the pedal falls away, there may be an external leak or the master cylinder is faulty (internal leakage).
4. Start the engine and note pedal action. It should fall away slightly under light foot pressure, then hold firm. If no pedal action is discernible, the power booster, vacuum supply or vacuum check valve is faulty, proceed to the POWER BOOSTER VACUUM TEST.
5. If the POWER BOOSTER VACUUM TEST passes, rebuild the booster vacuum reserve as follows: Release the brake pedal. Increase engine speed to 1500 RPM, close the throttle and immediately turn off the ignition to stop the engine.
6. Wait a minimum of 90 seconds and try brake action again. The booster should provide two or more vacuum assisted pedal applications. If the vacuum assist is not provided, the booster is faulty.

POWER BOOSTER VACUUM TEST

1. Connect a vacuum gauge to the booster check valve with a short length of hose and T-fitting.
2. Start and run the engine at curb idle for one minute.
3. Observe the vacuum supply. If the vacuum supply is less that 12 inches HG (406 millibars), repair the vacuum supply.
4. Clamp the hose shut between the intake vacuum source and the check valve.
5. Stop the engine and observe the vacuum gauge.
6. If the vacuum drops more than one inch HG (33 millibars) within 15 seconds, the booster diaphragm or check valve is faulty.

POWER BOOSTER CHECK VALVE TEST

1. Remove the power booster check valve from the power booster.
2. Using a hand operated vacuum pump, apply 15-20 inches HG (508-677 millibars) vacuum at the booster side of the check valve.
3. The vacuum should hold steady. If the gauge on the pump indicates vacuum loss, the check valve is faulty and should be replaced.

REMOVAL

REMOVAL

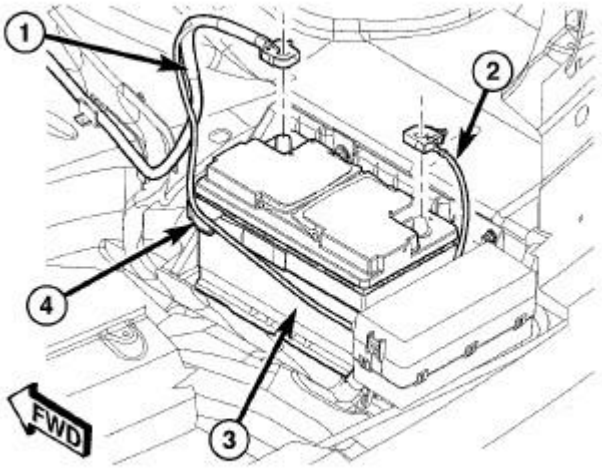


Fig. 34: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

1. Move driver's seat to full rearward position.
2. Disconnect and isolate battery negative cable (2) from battery post.
3. Remove windshield wiper module Refer to **LINKAGE, WIPER ARM, REMOVAL** .
4. Remove master cylinder. Refer to **MASTER CYLINDER, BRAKE, REMOVAL**.

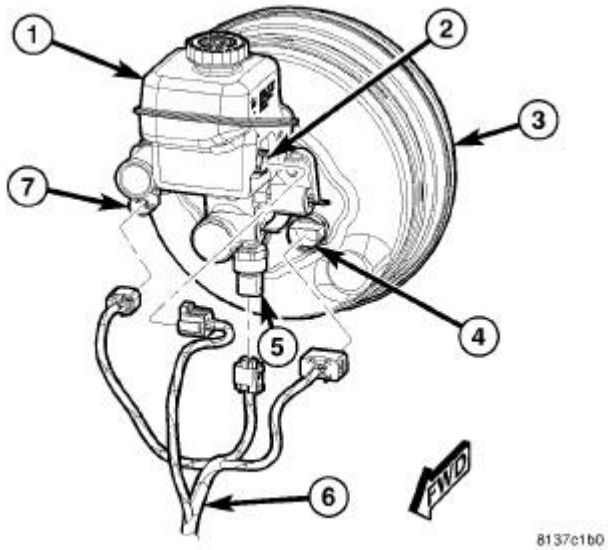


Fig. 35: Identifying Master Cylinder Wiring Harness & Connectors
Courtesy of CHRYSLER GROUP, LLC

5. If equipped with MK25 and Electronic Stability Control (ESC), disconnect wiring harness (6) connector at pedal travel sensor (7) on power brake booster (3).
6. If equipped with MK25 and ESC, disconnect wiring harness (6) connector at active brake booster solenoid (4).

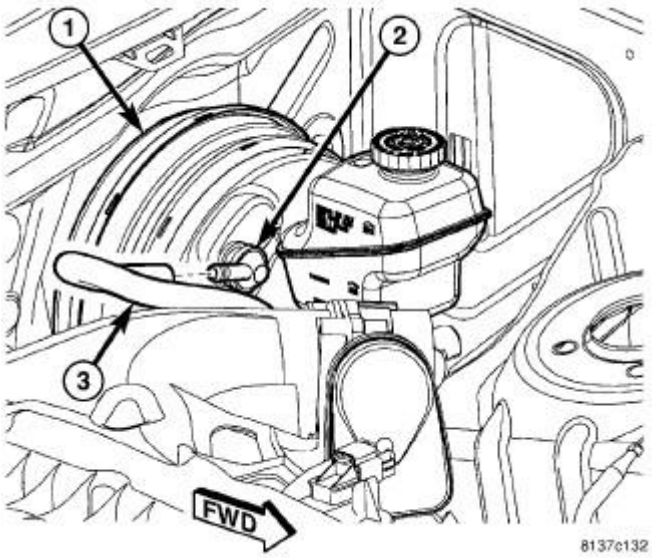


Fig. 36: Vacuum Hose Connection
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect vacuum hose (3) from check valve (2) on face of booster (1). **Do not remove check valve from booster.**

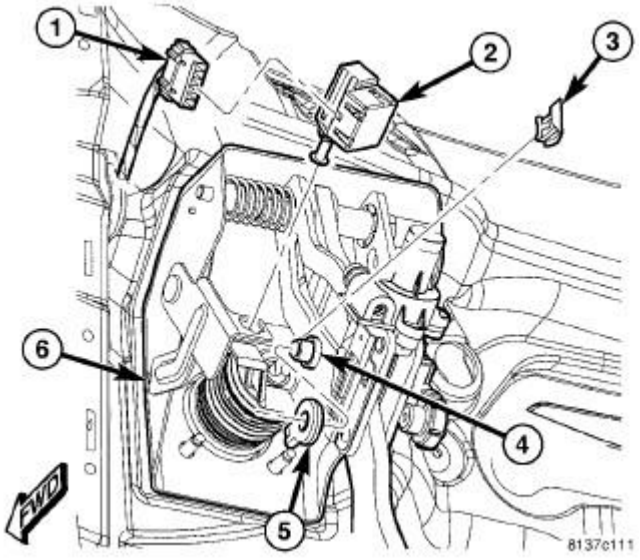


Fig. 37: Locating Stop Lamp Switch And Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

8. Remove brake lamp switch. Refer to **SWITCH, STOP LAMP, REMOVAL** .
9. Remove booster push rod from pin on brake pedal. To do so:
    1. Position small screwdriver between center tang on power brake booster brake pedal pin retaining clip (3).
    2. Rotate screwdriver enough to allow retaining clip center tang to pass over end of brake pedal pin, then slide retaining clip off brake pedal pin.
    3. **Discard retaining clip (3). It is not to be reused. Install NEW retaining clip when assembling.**
10. Slide booster push rod (5) off brake pedal pin (4).

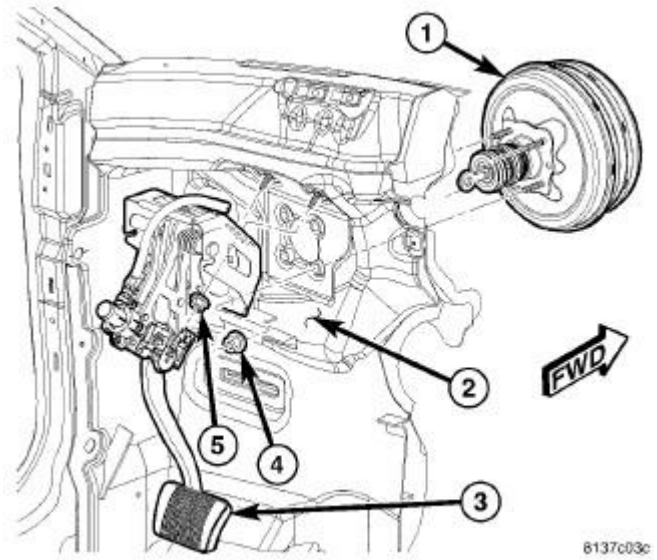


Fig. 38: Booster & Pedal Mounting
Courtesy of CHRYSLER GROUP, LLC

11. Remove four power brake booster mounting nuts (4).
12. Slide power brake booster forward out of dash panel and remove through opening between cross-brace and windshield.

BOOSTER - RHD

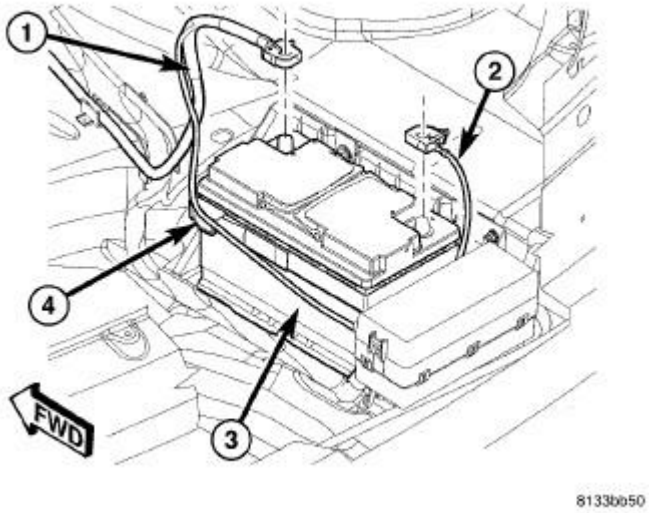


Fig. 39: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Move driver's seat to full rearward position.
2. Disconnect and isolate negative battery cable (1).
3. Remove windshield wiper module. Refer to **LINKAGE, WIPER ARM, REMOVAL** .

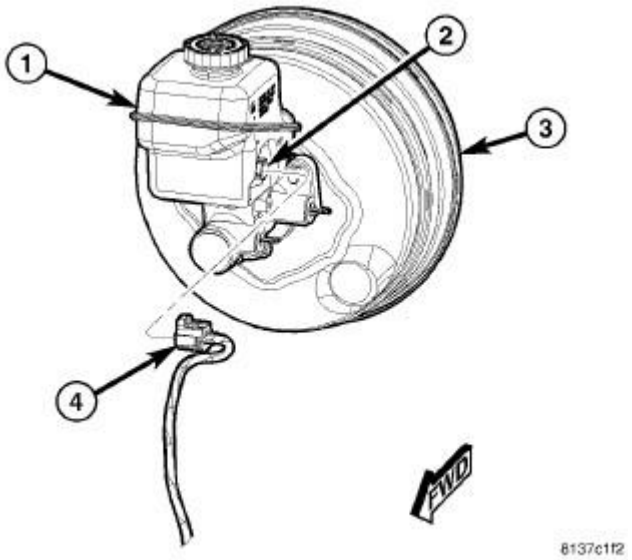


Fig. 40: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect wiring harness connector (4) from brake fluid level sensor (2) in master cylinder brake fluid reservoir (1).

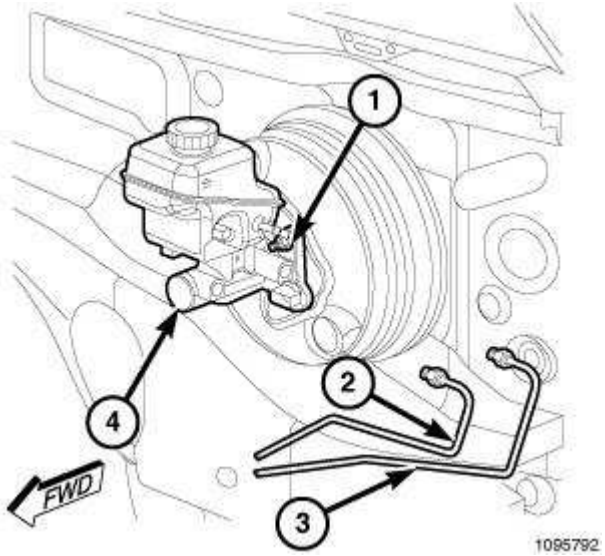


Fig. 41: Brake Tubes AT Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

5. Remove primary (3) and secondary (2) brake tubes from master cylinder (4). Install sealing plugs in open brake tube outlet ports.

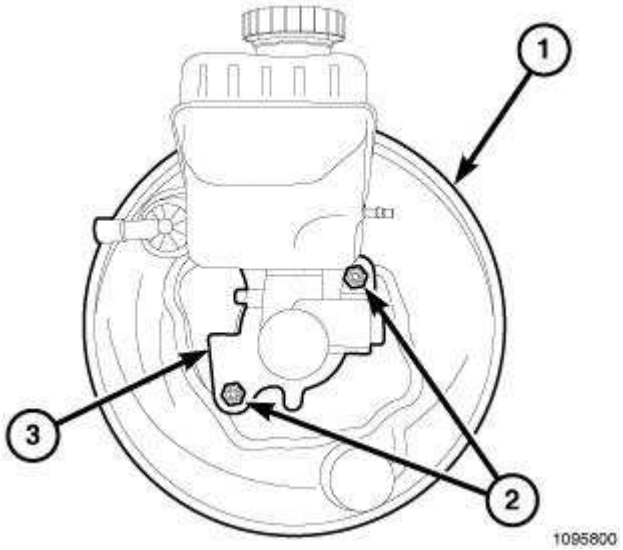


Fig. 42: Master Cylinder Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before removing master cylinder from power brake vacuum booster, master cylinder and vacuum booster must be thoroughly cleaned. This must be done to prevent dirt particles from falling into power brake vacuum booster. Use only Mopar® Brake Parts Cleaner or equivalent.

6. Remove two nuts (2) attaching master cylinder (3) to power brake booster (1).

7. Slide master cylinder (3) straight out of power brake booster (1).

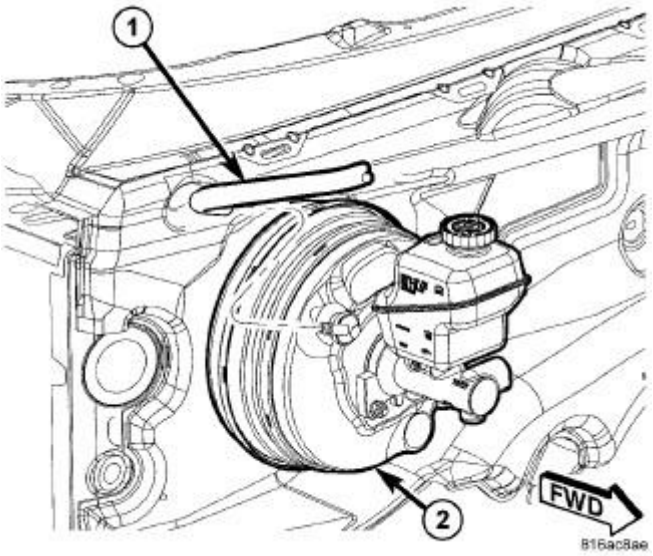


Fig. 43: Vacuum Hose Connection - RHD
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect vacuum hose (1) from check valve on face of booster (2). **Do not remove check valve from booster.**
9. Remove driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .
10. Remove steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .

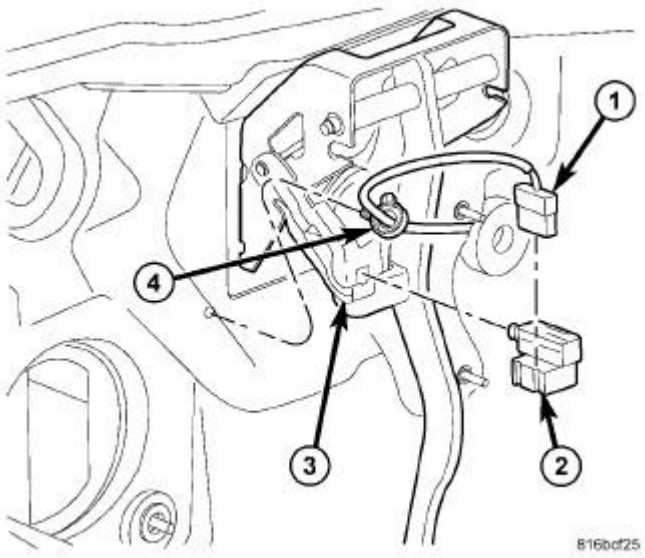


Fig. 44: Stop Lamp Switch Mounting - RHD

Courtesy of CHRYSLER GROUP, LLC

11. Remove stop lamp switch (2). Refer to **SWITCH, STOP LAMP, REMOVAL** .

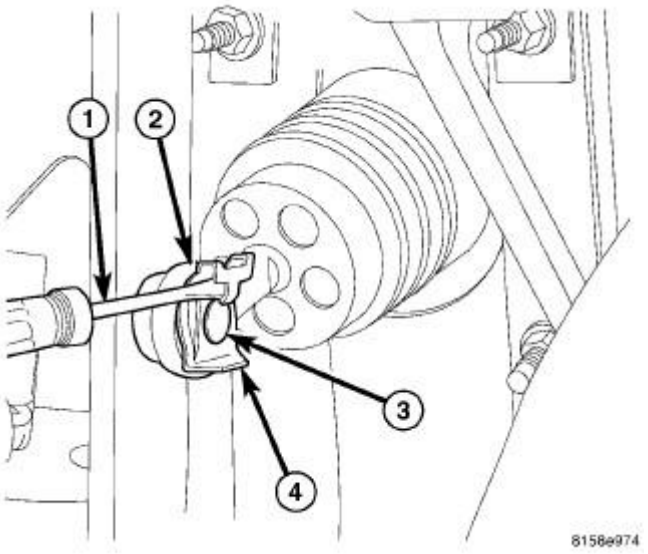


Fig. 45: View Of Pedal Retaining Clip
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing booster push rod from brake pedal pin, be careful not to damage rubber O-ring on pin.

12. Remove booster push rod from pin on brake pedal. To do so:
    1. Position small screwdriver (1) between center tang on power brake booster brake pedal pin retaining clip (4).
    2. Rotate screwdriver enough to allow retaining clip center tang to pass over end of brake pedal pin (3), then slide retaining clip off brake pedal pin.
    3. **Discard retaining clip. It is not to be reused. Install NEW retaining clip when assembling.**
13. Slide booster push rod (2) off brake pedal pin (3).

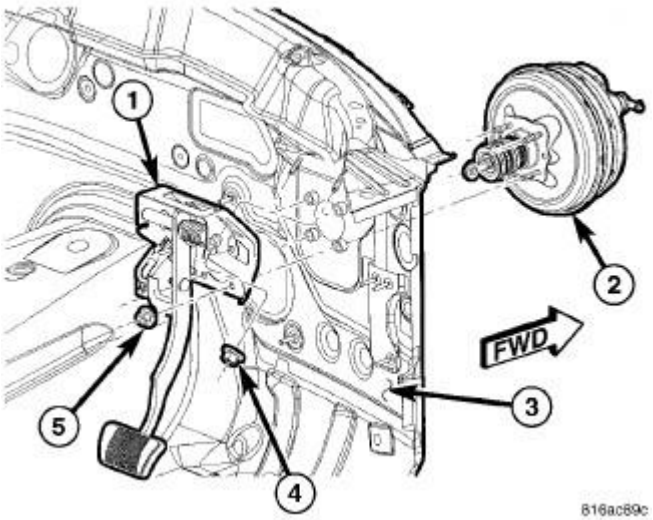


Fig. 46: Booster And Pedal Mounting - RHD
Courtesy of CHRYSLER GROUP, LLC

14. Remove four power brake booster mounting nuts (5).
15. Slide power brake booster forward out of dash panel and remove through opening between cross-brace and windshield.

INSTALLATION

INSTALLATION

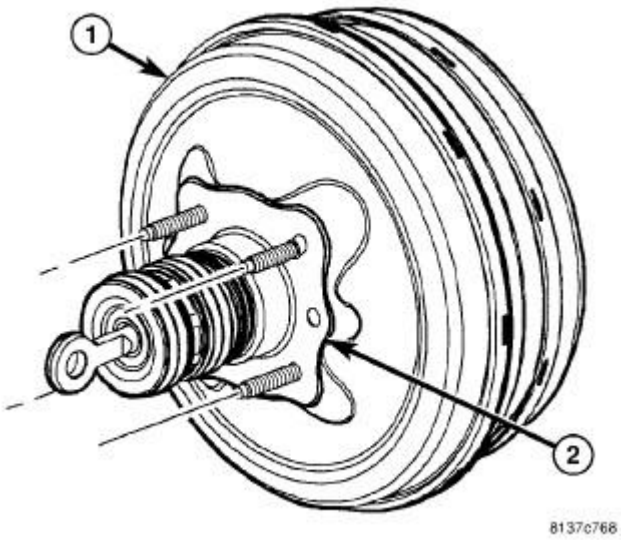


Fig. 47: Booster Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before installing booster, make sure there is a NEW booster seal (2) placed over push rod and mounting studs on rear of booster (1).**

NOTE: **The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.**

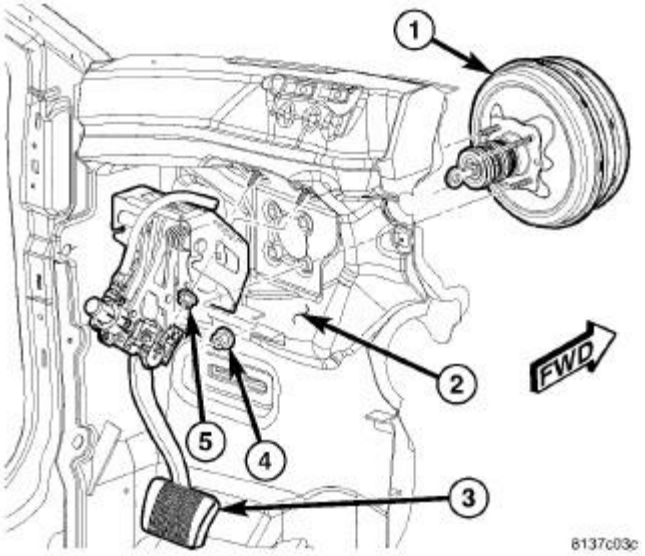


Fig. 48: Booster & Pedal Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Install power brake booster through opening between cross-brace and windshield. Guide booster (1) push rod and mounting studs through dash panel (2).

   NOTE: **Be sure to tighten all four booster mounting nuts to specifications or a vacuum leak can result.**

2. Install four power brake booster mounting nuts (4). Tighten nuts to 25 N.m (18 ft. lbs.) torque.

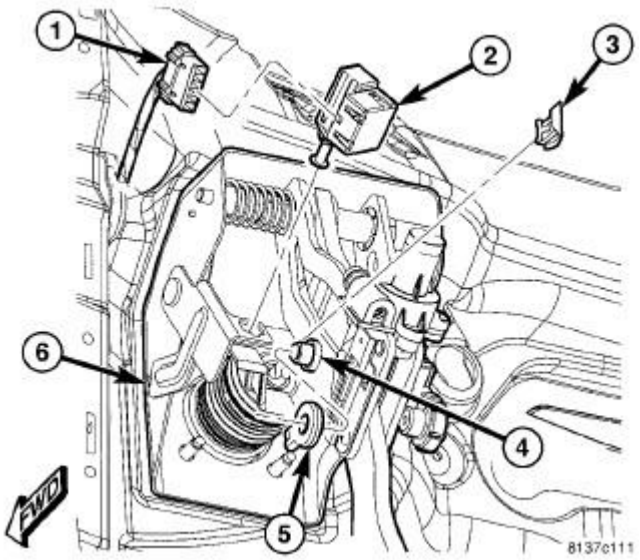


Fig. 49: Locating Stop Lamp Switch And Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

3. Slide booster push rod (5) onto brake pedal pin (4). Install NEW retaining clip (3) securing push rod to brake pedal.
4. Install and adjust brake lamp switch (2). Refer to **SWITCH, STOP LAMP, INSTALLATION** .

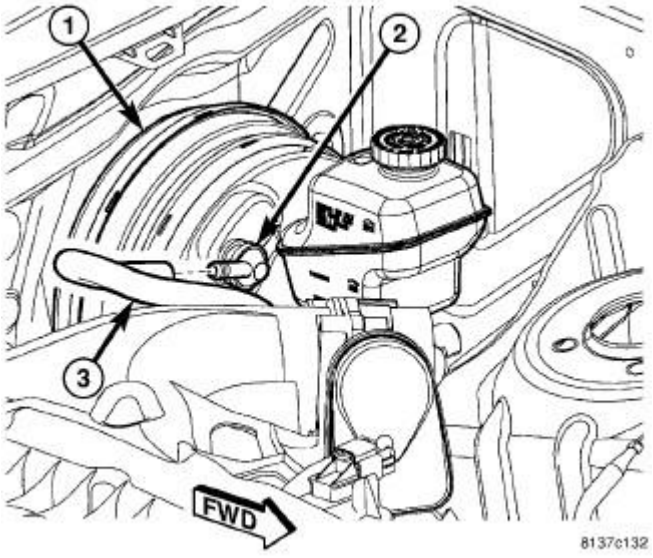


Fig. 50: Vacuum Hose Connection
Courtesy of CHRYSLER GROUP, LLC

5. Connect vacuum hose (3) to check valve (2) on face of booster (1). **Do not remove check valve from booster.**

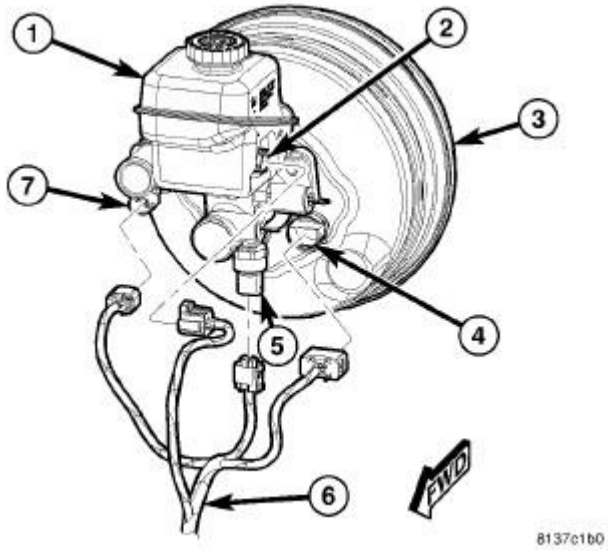


Fig. 51: Identifying Master Cylinder Wiring Harness & Connectors
Courtesy of CHRYSLER GROUP, LLC

6. If equipped with MK25 and Electronic Stability Control (ESC), connect wiring harness (6) connector at pedal travel sensor (7) on power brake booster (3).
7. If equipped with MK25 and ESC, connect wiring harness (6) connector at active brake booster solenoid (4).
8. Install master cylinder (1). Refer to **MASTER CYLINDER, BRAKE, INSTALLATION**.
9. Install windshield wiper module and components removed to access. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .

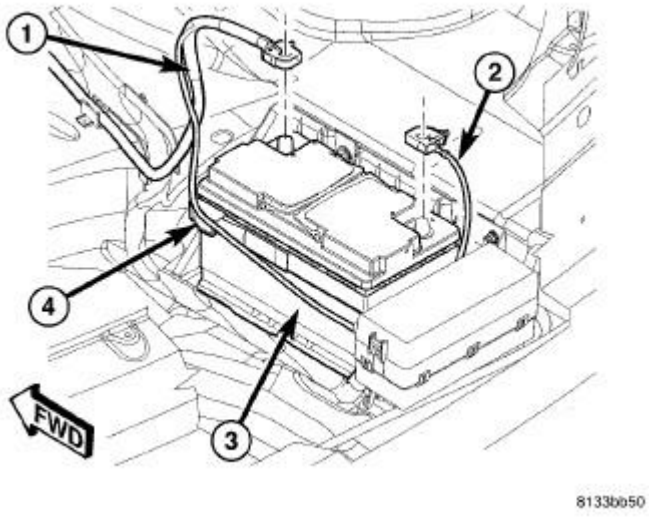


Fig. 52: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

10. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
11. Fill and bleed brakes as necessary.
12. Road test vehicle to ensure proper operation of brakes.

BOOSTER - RHD

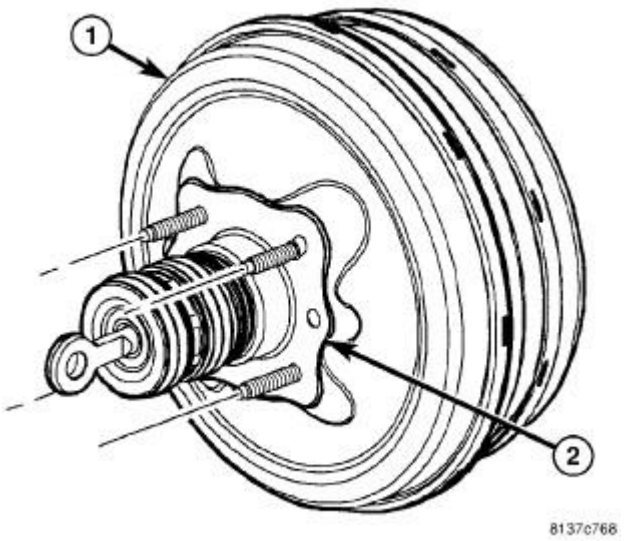


Fig. 53: Booster Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install a NEW booster seal (2) over push rod and mounting studs on rear of booster (1).

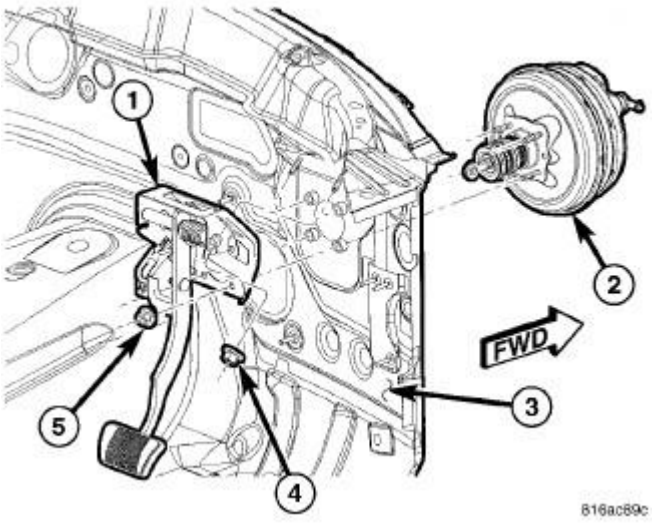


Fig. 54: Booster And Pedal Mounting - RHD
Courtesy of CHRYSLER GROUP, LLC

2. Install power brake booster through opening between cross-brace and windshield. Guide booster (2) push rod and mounting studs through dash panel (3).

NOTE: Be sure to evenly tighten all four booster mounting nuts to specifications or a vacuum leak can result.

3. Install four power brake booster mounting nuts (5). Tighten nuts to 25 N.m (18 ft. lbs.).

CAUTION: When installing booster push rod on brake pedal pin, be careful not to damage rubber O-ring on pin.

4. Slide booster push rod onto brake pedal pin. Install NEW retaining clip securing push rod to brake pedal.

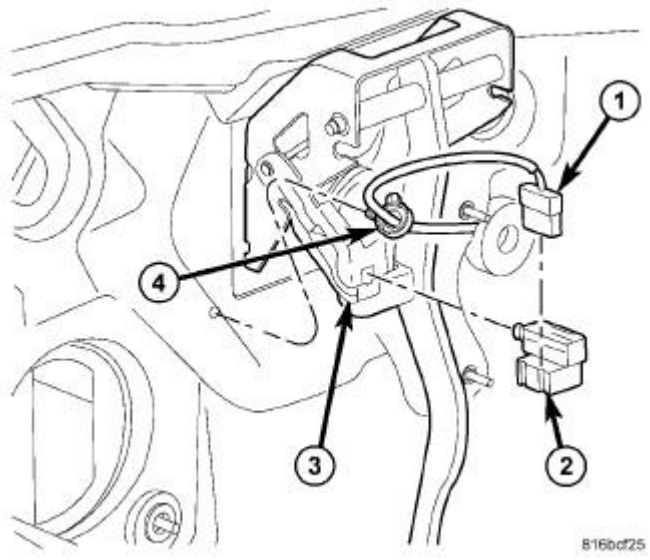


Fig. 55: Stop Lamp Switch Mounting - RHD
Courtesy of CHRYSLER GROUP, LLC

5. Install and adjust brake lamp switch (2). Refer to **SWITCH, STOP LAMP, INSTALLATION** .
6. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
7. Install driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .

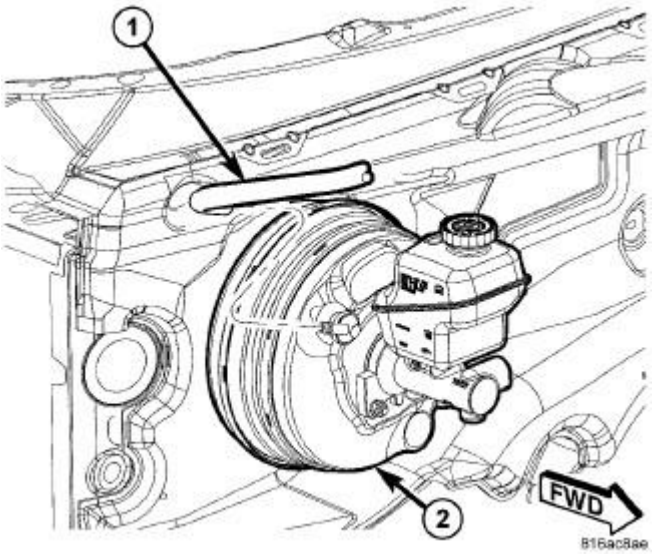


Fig. 56: Vacuum Hose Connection - RHD
Courtesy of CHRYSLER GROUP, LLC

8. Connect vacuum hose (1) to check valve on face of booster (2). **Do not remove check valve from booster.**

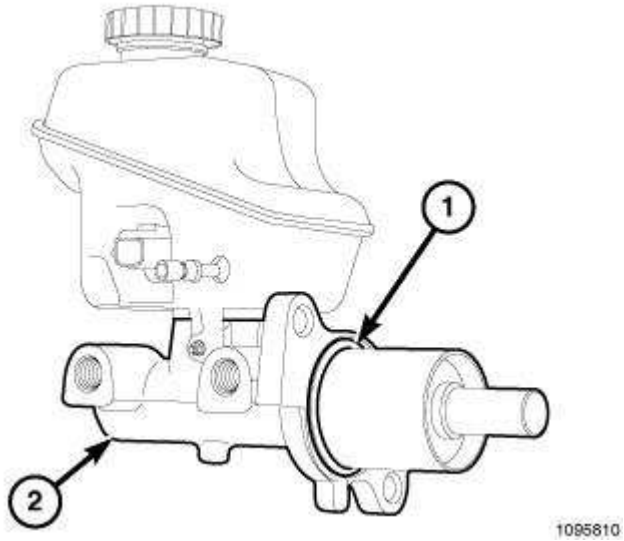


Fig. 57: Vacuum Seal On Rear Of Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When replacing master cylinder on vehicle, a NEW vacuum seal (2) MUST be installed on master cylinder.

9. Install NEW vacuum seal (1) on rear of master cylinder (2) making sure seal fits squarely in mounting groove.

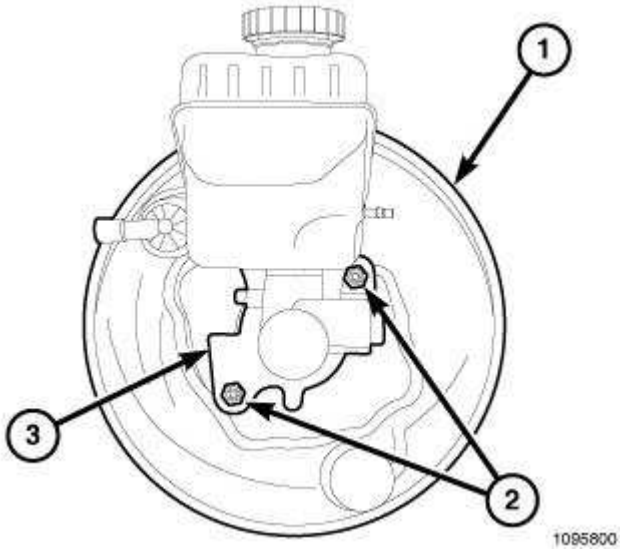


Fig. 58: Master Cylinder Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

10. Position master cylinder (3) on studs of power brake booster, aligning booster push rod with master cylinder piston.
11. Install two master cylinder mounting nuts (1). Tighten mounting nuts to 15 N.m (133 in. lbs.).

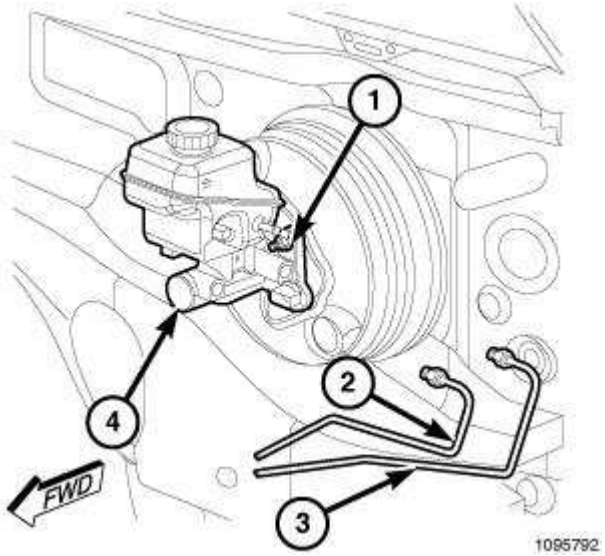


Fig. 59: Brake Tubes AT Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

12. Thread primary (3) and secondary (2) brake tubes into master cylinder primary and secondary ports. Tighten tube nuts to 20 N.m (177 in. lbs.).

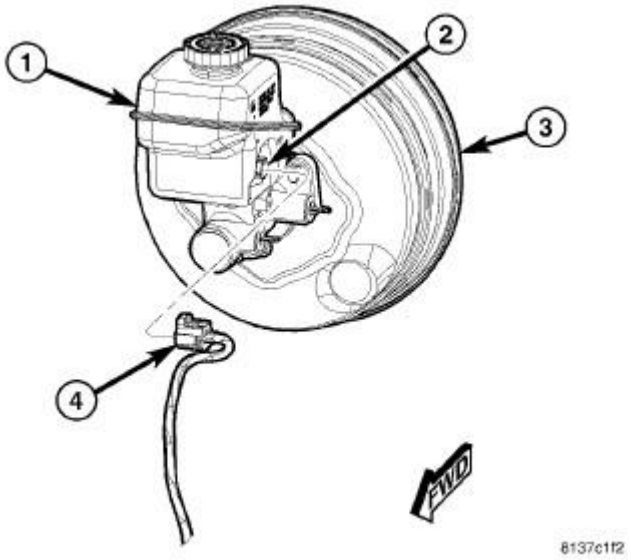


Fig. 60: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

13. Connect wiring harness connector (4) to brake fluid level sensor (2) mounted in brake fluid reservoir (1).
14. Install windshield wiper module and components. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .

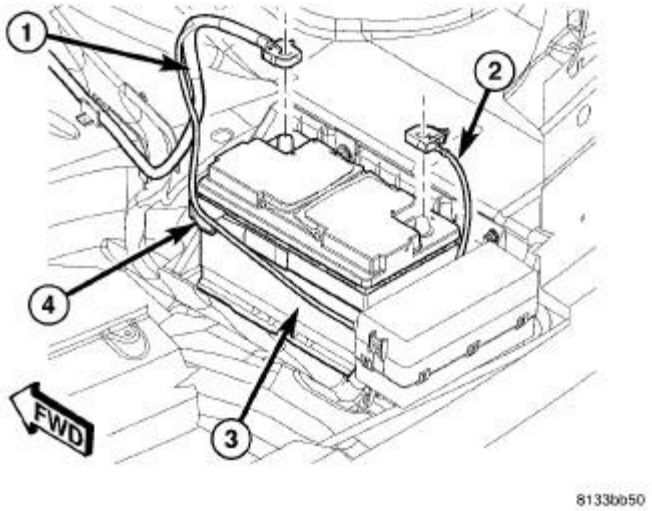


Fig. 61: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

15. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
16. Fill and bleed brakes as necessary.

17. Road test vehicle to ensure proper operation of brakes.

CALIPER, DISC BRAKE, FRONT SRT8

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

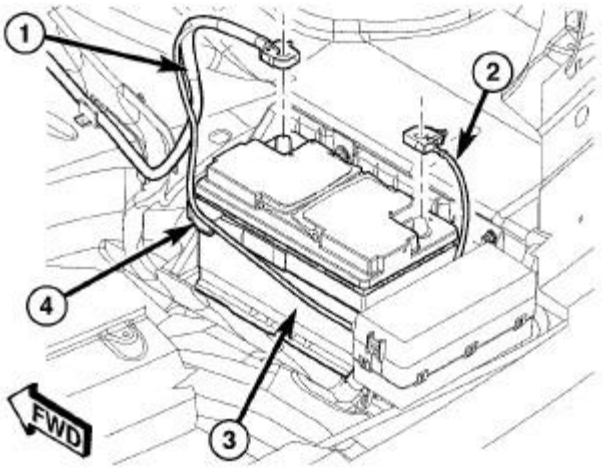


Fig. 62: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

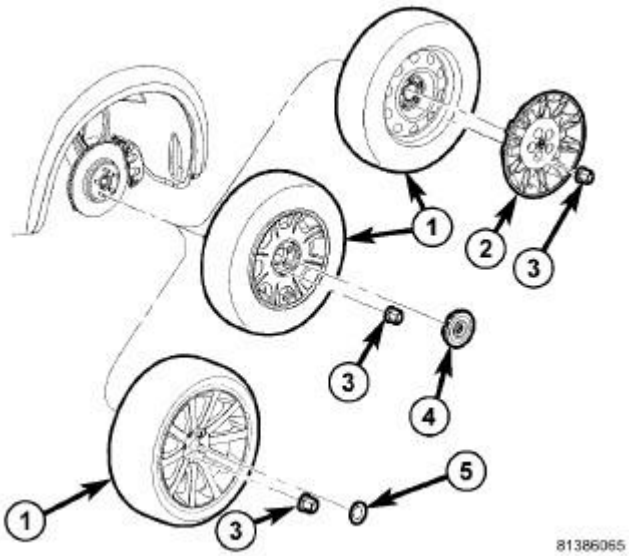


Fig. 63: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

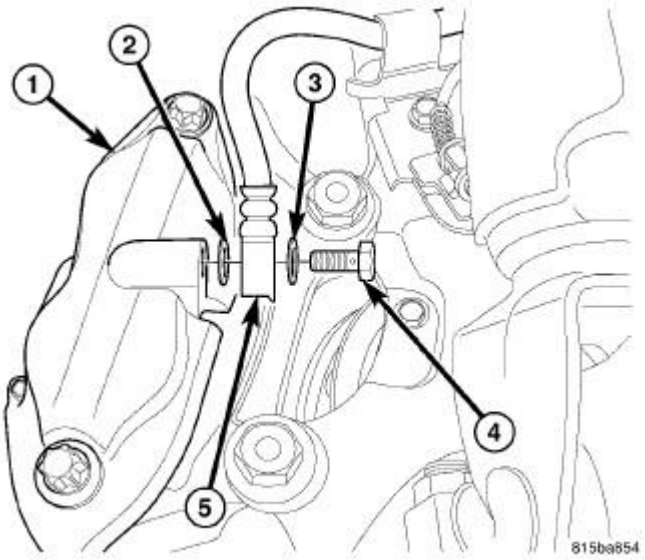


Fig. 64: Flex Hose Connection AT Caliper - Srt8
Courtesy of CHRYSLER GROUP, LLC

5. Remove banjo bolt (4) connecting flexible brake hose (5) to caliper (1). There are two sealing washers (2, 3) (one one each side of hose fitting) that will come off when bolt is removed. Discard these washers; use NEW washers upon installation.

CAUTION: When pushing pistons back into caliper bores, use only a trim stick

as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

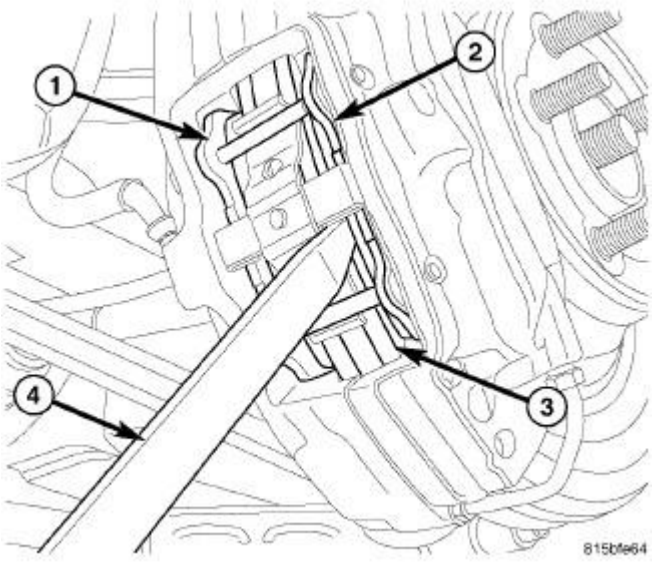


Fig. 65: Pushing Back Pistons In Bore
Courtesy of CHRYSLER GROUP, LLC

6. Place trim stick (4) between brake pad (2) and outer edge of rotor (3).
7. Using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

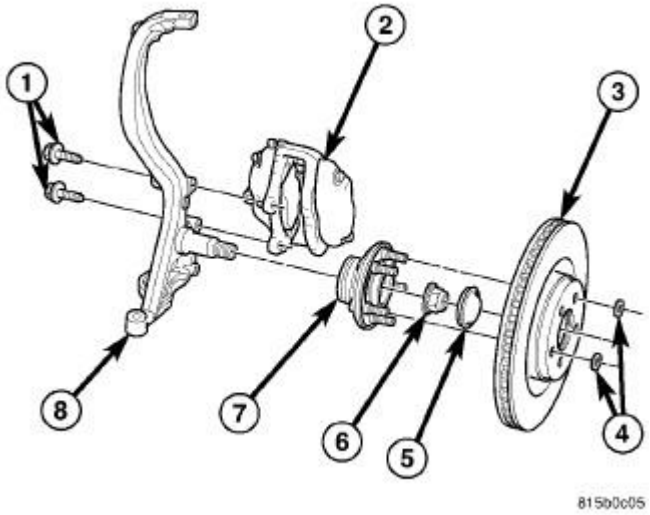


Fig. 66: Exploded View Of Front Disc Brakes - Srt-8
Courtesy of CHRYSLER GROUP, LLC

8. Remove caliper mounting bolts (1).
9. Remove brake caliper (2) with pads from knuckle (3) and brake rotor (3).
10. If brake pads need to be removed from caliper.

NOTE: These calipers are not serviceable. Do not attempt disassembly.

INSTALLATION

INSTALLATION

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary. Refer to INSPECTION .

1. Completely retract caliper pistons back into bores of caliper. Use hand pressure or a C-clamp may also be used to retract pistons, first placing a wood block or used brake pad (not to be reused) over pistons before installing C-clamp to avoid damaging piston.
2. If brake pads need to be installed in caliper before installation. Refer to **PADS, BRAKE, SRT8, INSTALLATION** or **PADS, BRAKE, FRONT, INSTALLATION** or **PADS, BRAKE, REAR, INSTALLATION**.

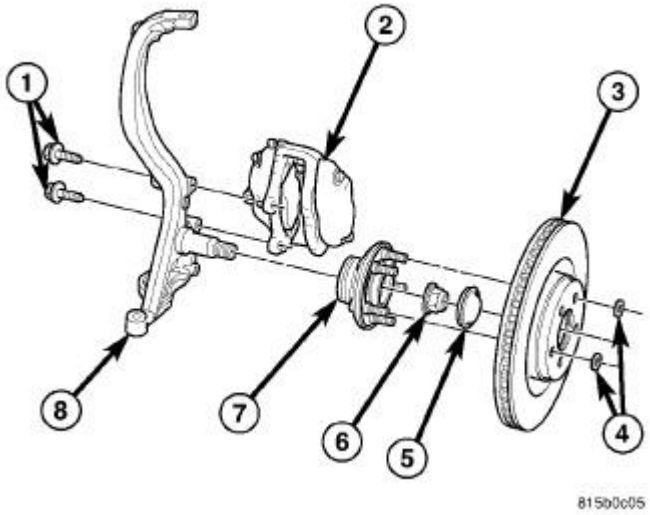


Fig. 67: Exploded View Of Front Disc Brakes - Srt-8
Courtesy of CHRYSLER GROUP, LLC

3. Slide caliper with pads (2) over brake rotor (3) and align with knuckle (8).
4. Install caliper mounting bolts (1). Tighten bolts to 190 N.m (140 ft. lbs.) torque.

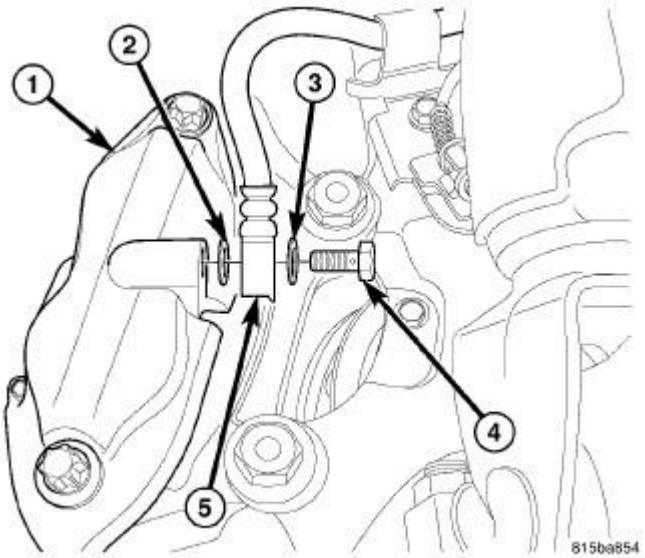


Fig. 68: Flex Hose Connection AT Caliper - Srt8
Courtesy of CHRYSLER GROUP, LLC

5. Install banjo bolt (4) attaching brake hose (5) to caliper (1). Install NEW washers (2, 3) on each side of hose fitting as banjo bolt is placed through banjo fitting. Thread banjo bolt into caliper and tighten to 33 N.m (24 ft. lbs.) torque.

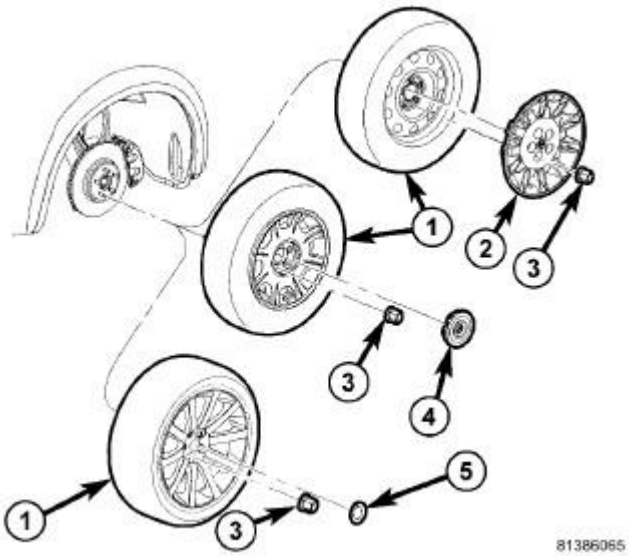


Fig. 69: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) torque. Refer to **INSTALLATION** .
7. Lower vehicle.
8. Remove brake pedal holding tool.

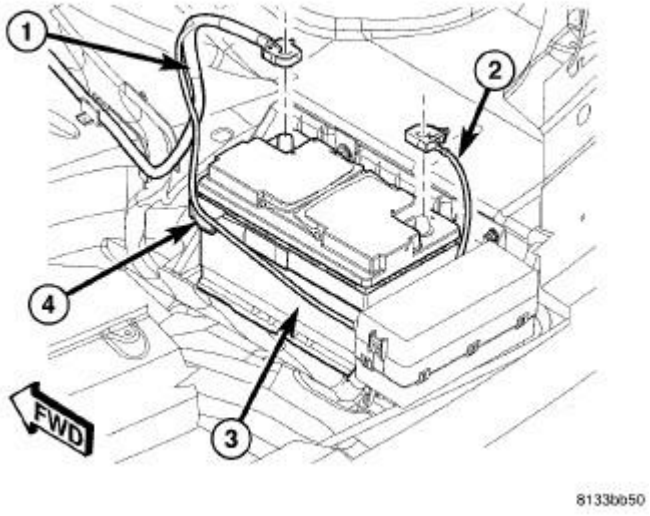


Fig. 70: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

9. Connect battery negative cable (2) to battery post. It is important that this is performed properly. Refer to **STANDARD PROCEDURE** .

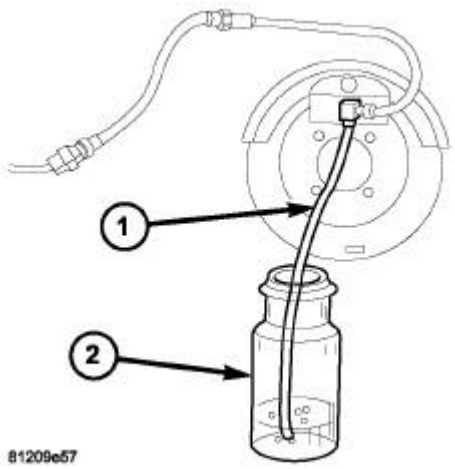


Fig. 71: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

10. Bleed (1) the area of repair for the brake system. **If a proper pedal is not felt during bleeding an area of repair then a base bleed system must be performed.** Refer to **BASE BRAKE BLEEDING** .

    CAUTION: If NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications.

11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pads. If NEW brake pads are installed, they need to be properly burnished. Refer to **PADS, BRAKE, SRT8, STANDARD PROCEDURE**.

CALIPER, DISC BRAKE, REAR SRT8

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

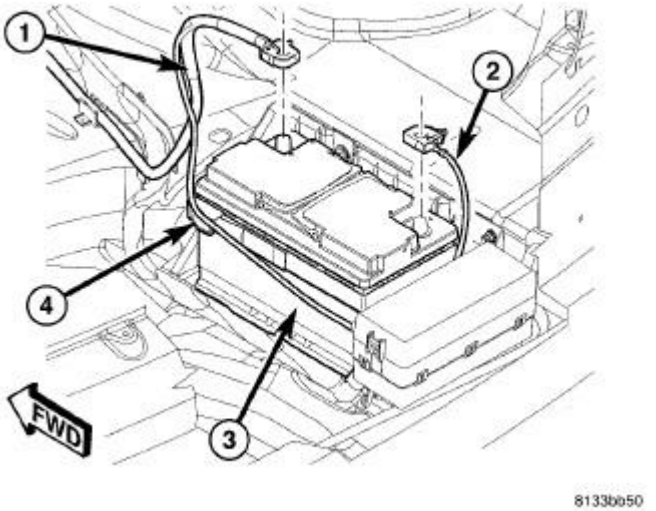


Fig. 72: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

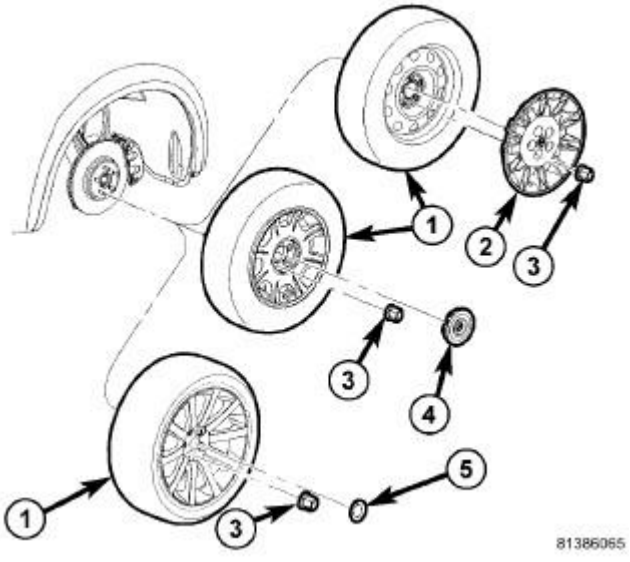


Fig. 73: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

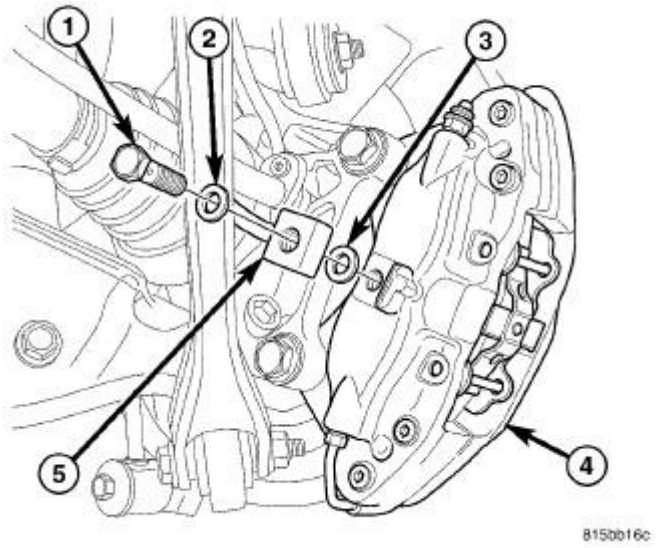


Fig. 74: Rear Flex Hose Connection - Srt8
Courtesy of CHRYSLER GROUP, LLC

5. Remove banjo bolt (1) connecting flexible brake hose (5) to caliper (4). There are two sealing washers (2, 3) (one one each side of hose fitting) that will come off when bolt is removed. Discard these washers; install NEW washers on installation.

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

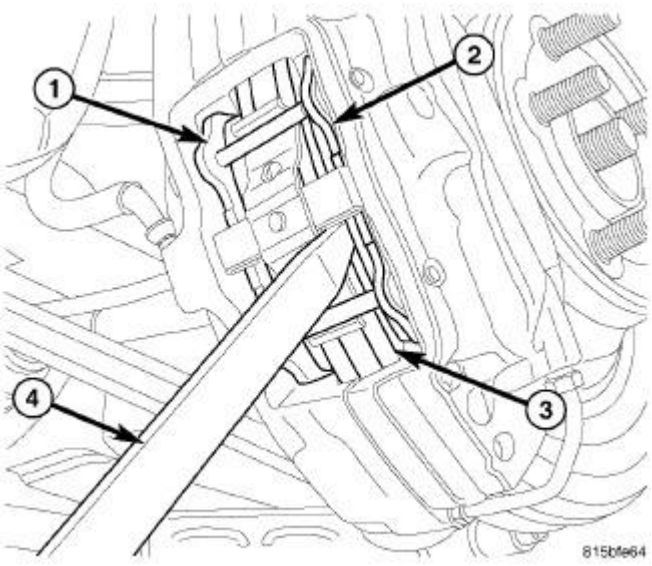


Fig. 75: Pushing Back Pistons In Bore
Courtesy of CHRYSLER GROUP, LLC

6. Place trim stick (4) between brake pad (2) and outer edge of rotor (3).
7. Using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

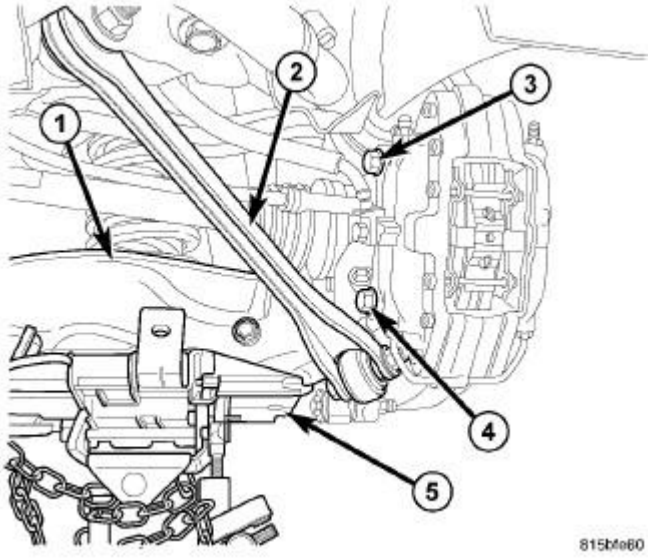


Fig. 76: Accessing Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Support spring link (1) using a transmission jack (5) or other appropriate jack. Raise spring link just enough to access brake caliper lower mounting bolt (4) from above compression link (2).

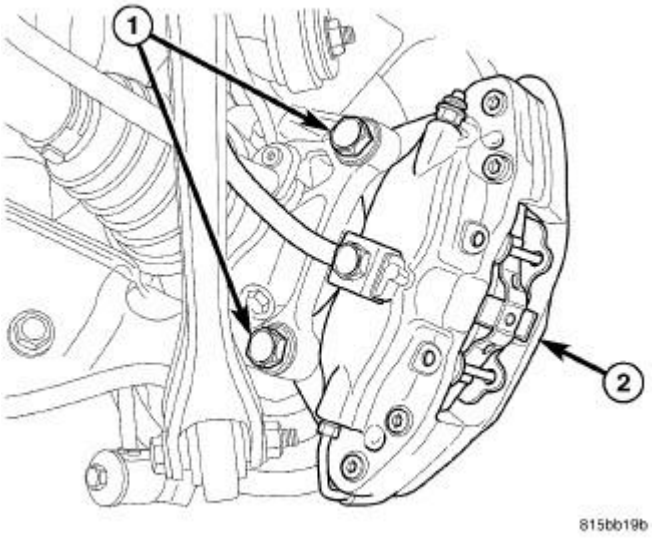


Fig. 77: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the lower and upper caliper mounting bolts (1).
10. Remove brake caliper (2) with pads from knuckle and brake rotor.
11. If brake pads need to be removed from caliper.

NOTE: These calipers are not serviceable. Do not attempt disassembly.

INSTALLATION

INSTALLATION

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary. Refer to INSPECTION .

1. Completely retract caliper pistons back into bores of caliper. Use hand pressure or a C-clamp may also be used to retract pistons, first placing a wood block or used brake pad (not to be reused) over piston before installing C-clamp to avoid damaging piston.
2. If brake pads need to be installed in caliper before installation. Refer to **PADS, BRAKE, SRT8, INSTALLATION** or **PADS, BRAKE, FRONT, INSTALLATION** or **PADS, BRAKE, REAR, INSTALLATION**.

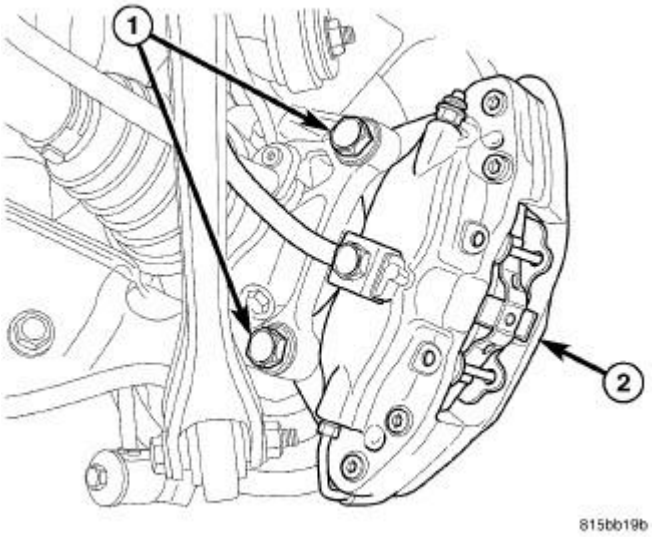


Fig. 78: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Slide caliper with pads (2) over brake rotor and align with knuckle.
4. Install caliper mounting bolts (1). Tighten bolts to 130 N.m (96 ft. lbs.) torque.
5. Remove jack from under spring link.

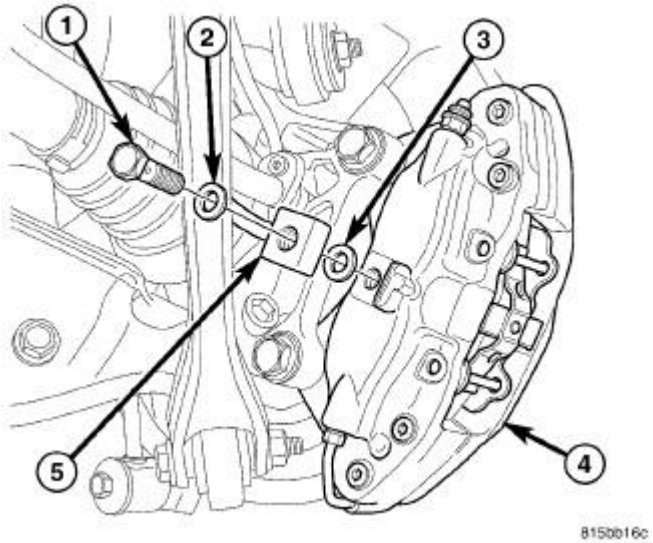


Fig. 79: Rear Flex Hose Connection - Srt8
Courtesy of CHRYSLER GROUP, LLC

6. Install banjo bolt (1) attaching brake hose (5) to caliper (4). Install NEW washers (2, 3) on each side of hose fitting as banjo bolt is placed through banjo fitting. Thread banjo bolt into caliper and tighten to 33 N.m (24 ft. lbs.) torque.

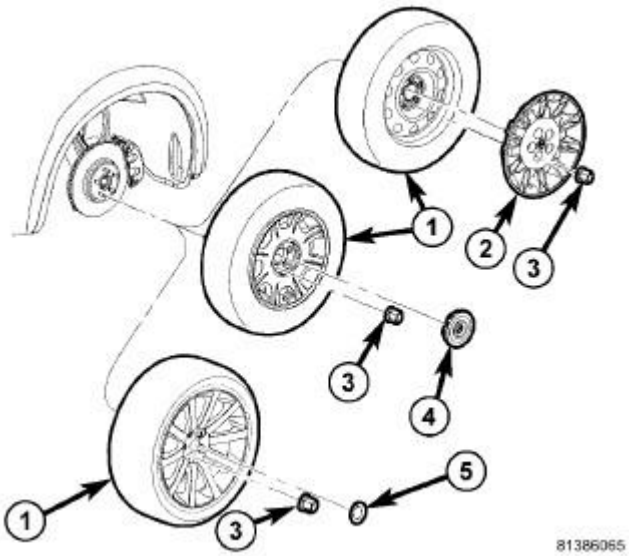


Fig. 80: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) torque. Refer to **INSTALLATION** .
8. Lower vehicle.
9. Remove brake pedal holding tool.

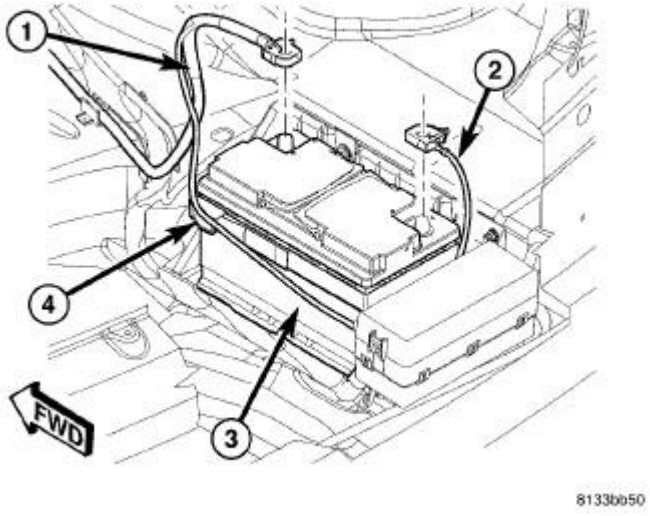


Fig. 81: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

10. Connect battery negative cable (2) to battery post. It is important that this is performed properly. Refer to **STANDARD PROCEDURE** .

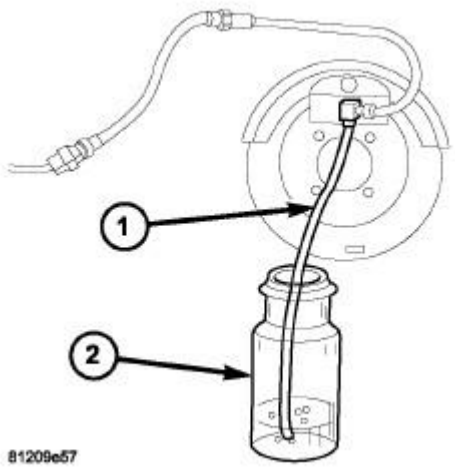


Fig. 82: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

11. Bleed (1) the area of repair for the brake system. **If a proper pedal is not felt during bleeding an area of repair then a base bleed system must be performed.** Refer to **BASE BRAKE BLEEDING** .

    CAUTION: If NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications.

12. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pads. If NEW brake pads are installed, they need to be properly burnished. Refer to **PADS, BRAKE, SRT8, STANDARD PROCEDURE**.

CALIPER, DISC BRAKE, REAR

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

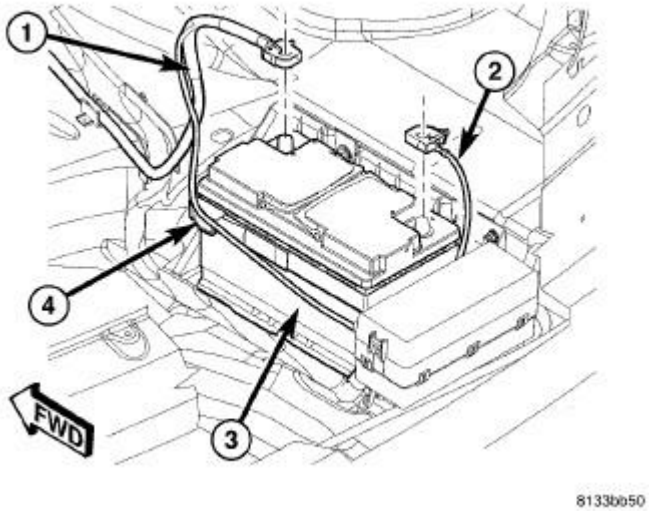


Fig. 83: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

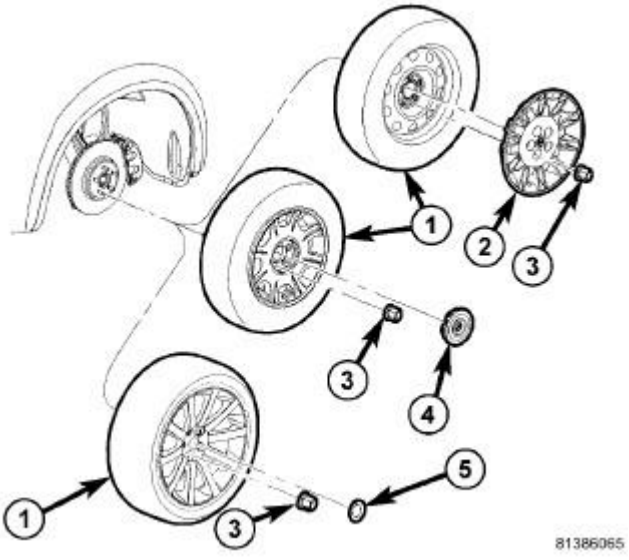


Fig. 84: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

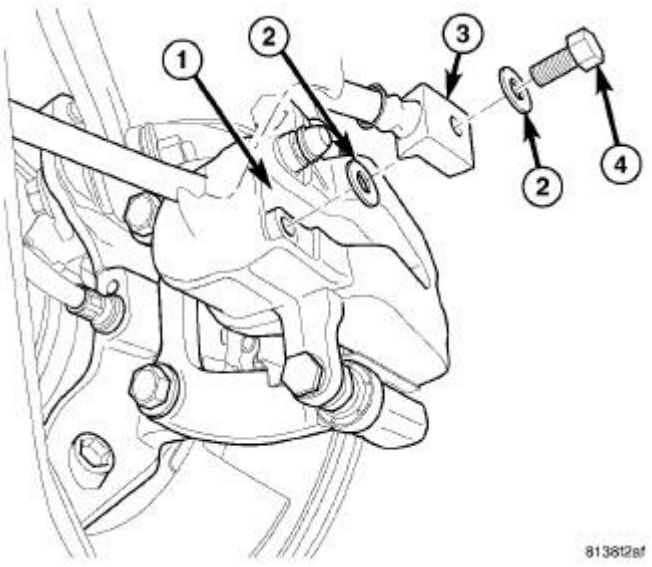


Fig. 85: Flex Hose Connection AT Rear Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Remove banjo bolt (4) connecting flexible brake hose (3) to caliper (1). There are two sealing washers (2) (one one each side of hose fitting) that will come off when bolt is removed. Discard these washers; install NEW washers on installation.

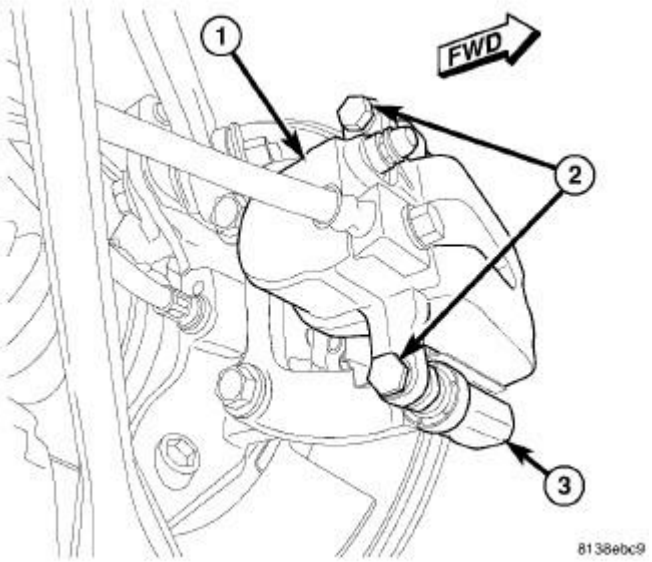


Fig. 86: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

6. While holding guide pins from turning, remove caliper guide pin bolts (2).

7. Remove brake caliper (1) from brake adapter (3) and pads.

DISASSEMBLY

DISASSEMBLY

NOTE: Before disassembling brake caliper, clean and inspect it. Refer to INSPECTION and CLEANING . .

WARNING: Under no condition should high pressure air ever be used to remove a piston from a caliper bore. Personal injury could result from such a practice.

CAUTION: Do not use excessive force when clamping caliper in vise. Excessive vise pressure will cause bore distortion.

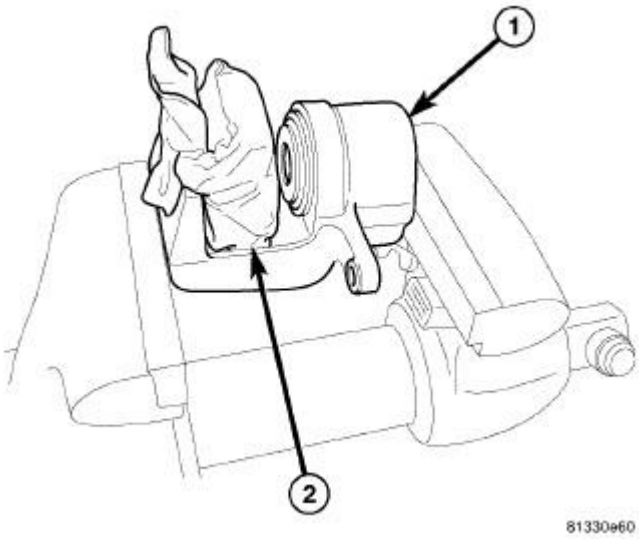


Fig. 87: Rear Caliper In Vise
Courtesy of CHRYSLER GROUP, LLC

1. Drain brake fluid from caliper.
2. Mount caliper in a vise equipped with protective jaws.
3. Place a wooden block (2) (padded with approximately one-inch thickness of shop towels) in front of caliper (1) piston as shown in illustration. Padded block should be sized to allow piston to push out of bore far enough to be removed by hand after being loosened by air pressure, yet large enough to keep piston from coming completely out. This will cushion and protect caliper piston during removal.

WARNING: Do not place face or hands near caliper and piston if using

compressed air pressure to remove piston. Do not use high pressure.

4. Apply low pressure compressed air to caliper fluid inlet in **short spurts** to ease piston out of bore.
5. Remove piston from caliper (1).

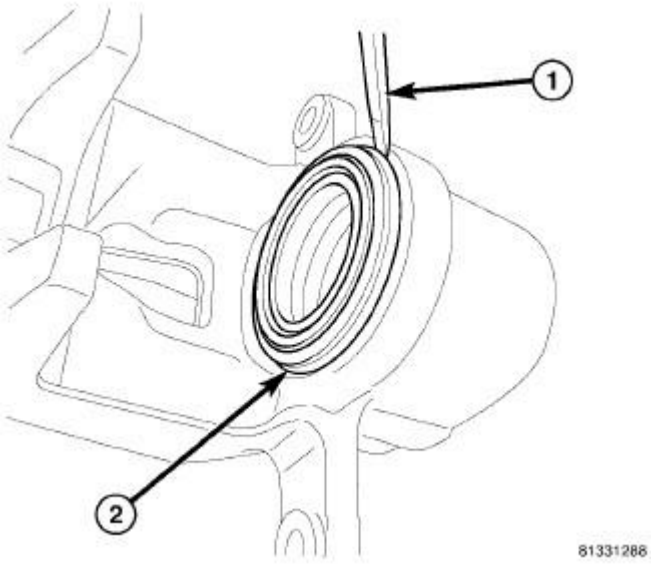


Fig. 88: Removing Rear Caliper Dust Boot
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When working on disc brake caliper, always use care and suitable tools to avoid damaging the aluminum housing.

6. Using a suitable tool (1), carefully remove dust boot (2) and discard it.

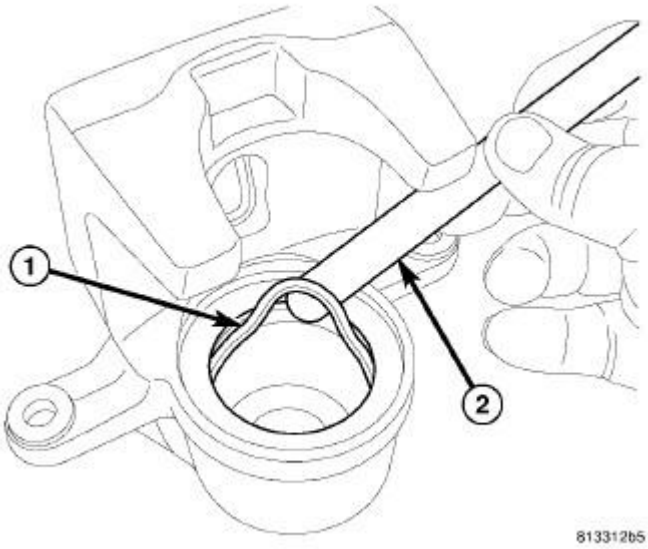


Fig. 89: Removing Rear Caliper Piston Seal
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use a screw driver or other metal tool for seal removal. Using such tools can scratch bore or leave burrs on seal groove edges.

7. Using a soft tool such as a plastic trim stick (2), work piston seal (1) out of its groove in caliper piston bore. Discard used seal.

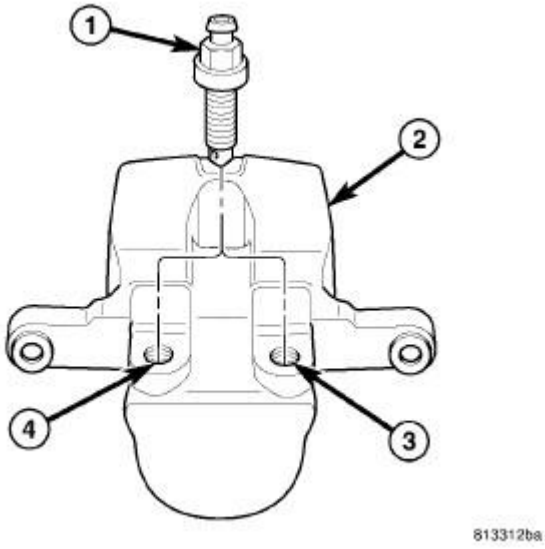


Fig. 90: Rear Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

8. Remove caliper bleeder screw (1) from caliper housing (2).

9. Clean piston bore and drilled passage ways with alcohol or a suitable solvent. Wipe it dry using only a lint-free cloth.
10. Inspect both piston and bore for scoring or pitting.

NOTE: It is not recommended to hone caliper bore. The anodized coating would be compromised.

CLEANING

CLEANING

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

To clean or flush the internal passages of the brake caliper, use fresh brake fluid or Mopar® Non-Chlorinated Brake Parts Cleaner. Never use gasoline, kerosene, alcohol, oil, transmission fluid or any fluid containing mineral oil to clean the caliper. These fluids will damage rubber cups and seals.

INSPECTION

INSPECTION

Inspect the disc brake caliper for the following:

- Cracked or damaged housing
- Brake fluid leaks in and around boot area
- Ruptures, brittleness or damage to the piston dust boot

If caliper fails inspection, disassemble and recondition caliper, replacing the seals and dust boots or replace caliper.

ASSEMBLY

ASSEMBLY

CAUTION: Dirt, oil, and solvents can damage caliper seals. Ensure assembly area is clean and dry.

NOTE: Always use new, clean Mopar® DOT 3 Motor Vehicle Brake Fluid or equivalent

when assembling brake caliper.

NOTE: Never use used or old piston seals or boots for reassembly.

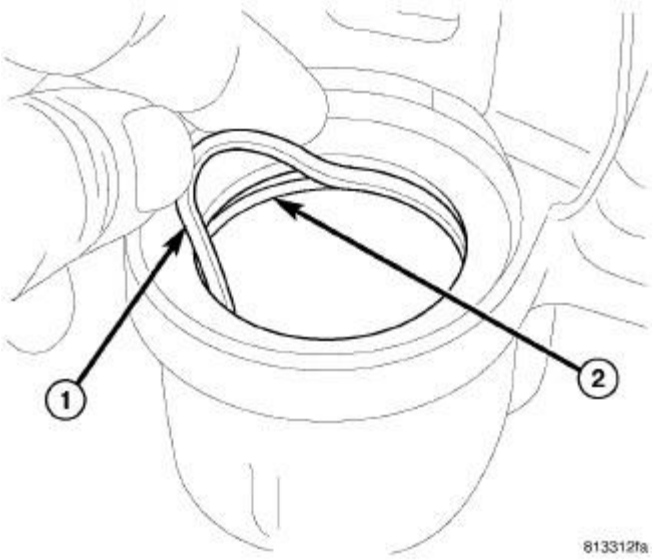


Fig. 91: Installing Rear Caliper Piston Seal
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate caliper piston, piston seal (1) and piston bore (2) with clean, fresh brake fluid.
2. Install NEW piston seal (1) in groove of caliper bore (2). Seal should be started at one area of groove and gently worked around and into the groove using only your clean fingers to seat it.

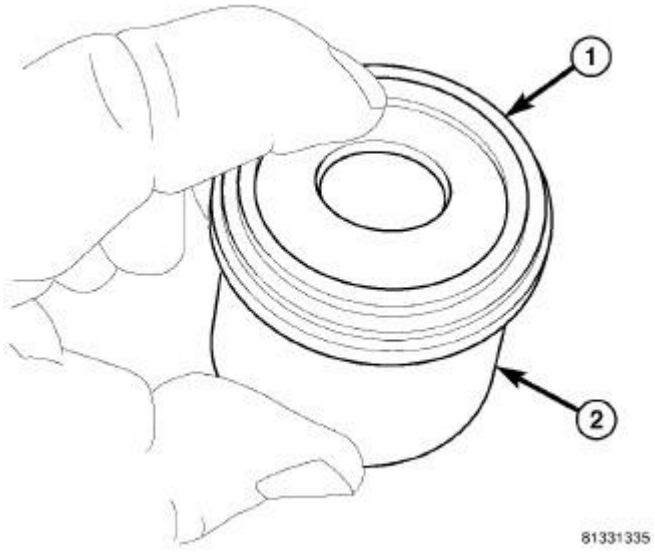


Fig. 92: Installing Boot On Caliper Piston
Courtesy of CHRYSLER GROUP, LLC

3. Install NEW dust boot (1) on piston (2) and work boot lip into groove at top of piston. Stretch boot downward, straightening boot folds, then move boot back upward as necessary until folds snap uniformly into place.

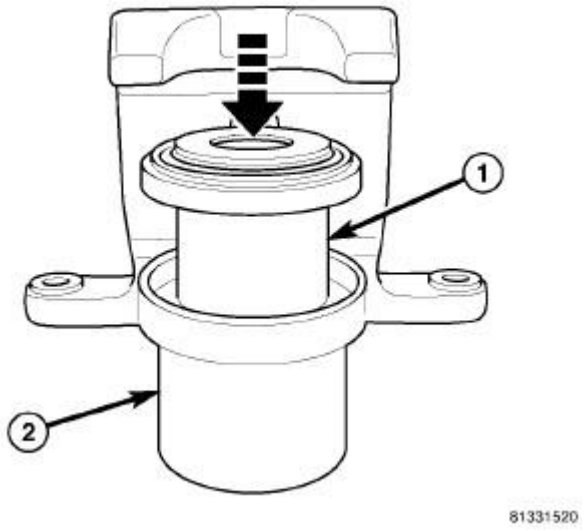


Fig. 93: Installing Piston In Rear Caliper
Courtesy of CHRYSLER GROUP, LLC

4. Install piston (1) into caliper piston (2) bore, pressing piston down to bottom of bore using hand-pressure. Using a piece of wood or wooden hammer handle may also suffice as long as piston and boot damage can be avoided.

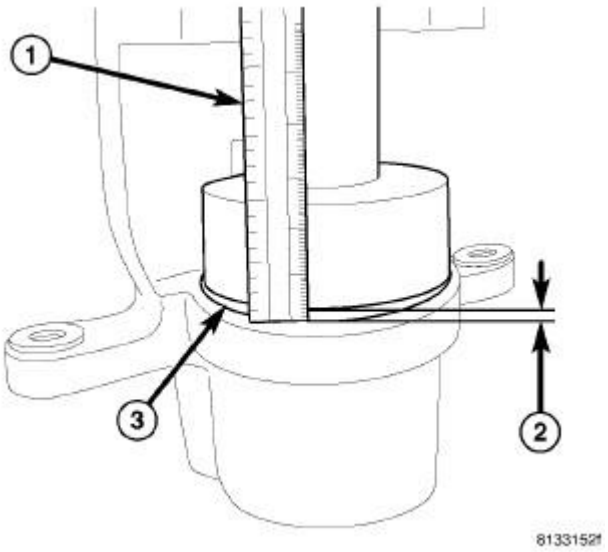


Fig. 94: Measuring Dust Boot Height
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing dust boot in following step, use care not to over-install boot or damage will occur. The boot (3) will bottom in the counterbore before the top of the boot reaches the surface of the caliper. The boot will bottom with approximately 2 mm (1/16 inch) (2) of boot still showing above caliper housing.

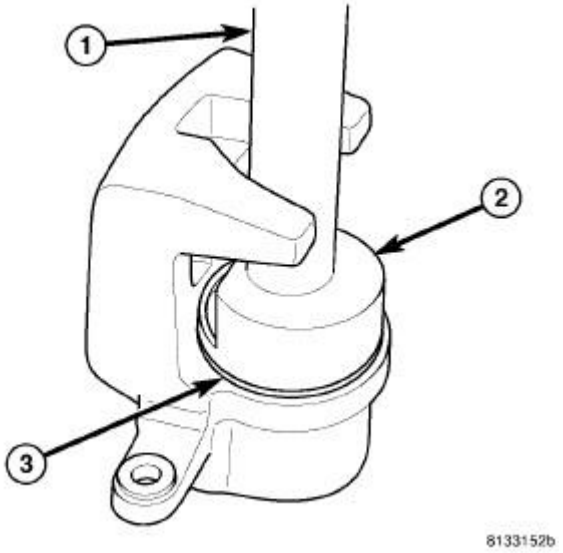


Fig. 95: Installing Dust Boot Using Tool
Courtesy of CHRYSLER GROUP, LLC

5. Seat dust boot (3) in caliper counterbore using Installer, Special Tool (special tool #9314, Installer, Dust Boot), with Handle, Special Tool (special tool #C-4171, Driver Handle, Universal). Install dust boot until it bottoms. Do not over-seat dust boot or damage will occur.

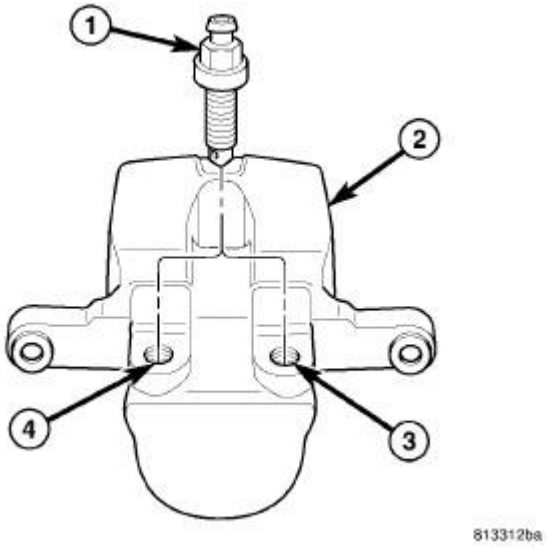


Fig. 96: Rear Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

6. Install bleeder screw in correct threaded hole. Caliper housing is not side-specific, so it is important to install bleeder screw in threaded hole that will be uppermost once caliper is installed on vehicle. Tighten bleeder screw to 15 N.m (125 in. lbs.) torque.
7. Install caliper on vehicle. Refer to **CALIPER, DISC BRAKE, FRONT SRT8, INSTALLATION** or **CALIPER, DISC BRAKE, REAR SRT8, INSTALLATION** or **CALIPER, DISC BRAKE, REAR, INSTALLATION** or **CALIPER, DISC BRAKE, SINGLE PISTON, INSTALLATION** or **CALIPER, DISC BRAKE, TWIN PISTON, INSTALLATION**.

INSTALLATION

INSTALLATION

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary. Refer to INSPECTION .

CAUTION: Use care when installing caliper onto disc brake adapter to avoid damaging boots on caliper guide pins.

1. Completely retract caliper piston back into bore of caliper. Use hand pressure or a C-clamp may be used to retract piston, first placing a wood block over piston before installing C-clamp to avoid damaging piston.
2. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.

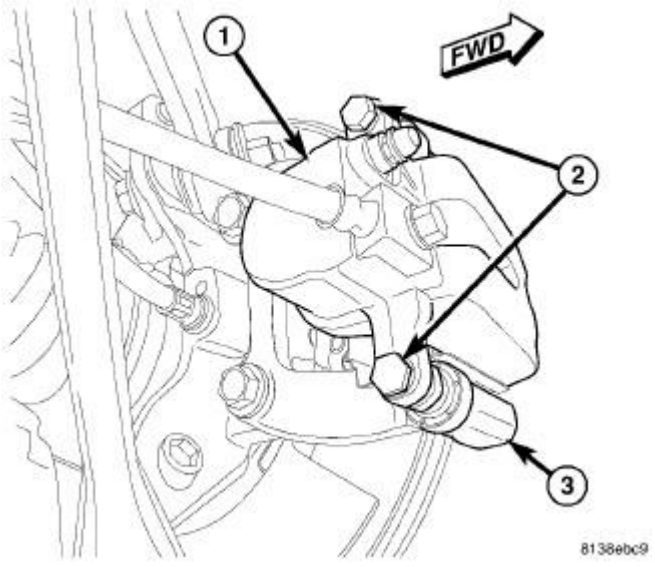


Fig. 97: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

3. Slide caliper over brake pads and onto caliper adapter (3).

CAUTION: Extreme caution should be taken not to crossthread caliper guide pin bolts (2) when they are installed.

NOTE: Before installing caliper guide pin bolts, clean guide pin bolt threads and apply Mopar® Lock AND Seal Adhesive or equivalent.

4. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 31 N.m (23 ft. lbs.).

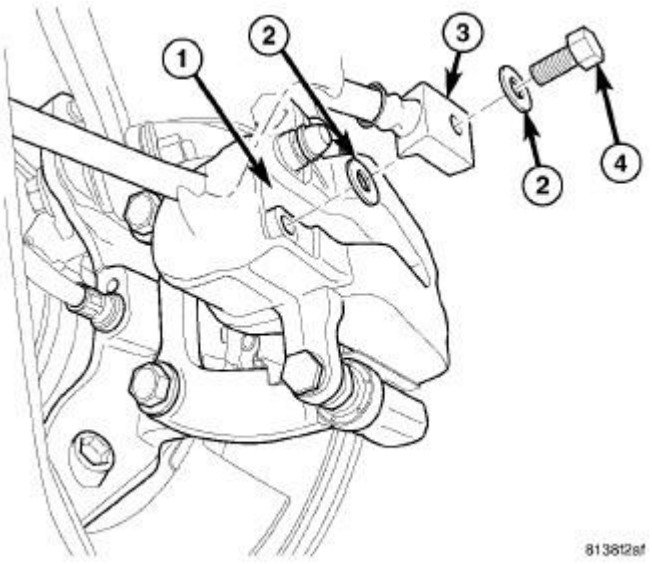


Fig. 98: Flex Hose Connection AT Rear Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Install banjo bolt (4) attaching brake hose (3) to caliper (1). Install NEW washers (2) on each side of hose fitting as banjo bolt is placed through fitting. Thread banjo bolt into caliper and tighten to 50 N.m (37 ft. lbs.).

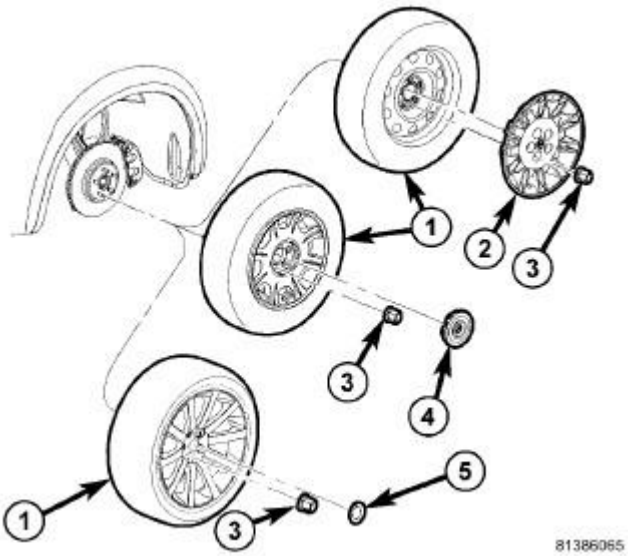


Fig. 99: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
7. Lower vehicle.
8. Remove brake pedal holding tool.

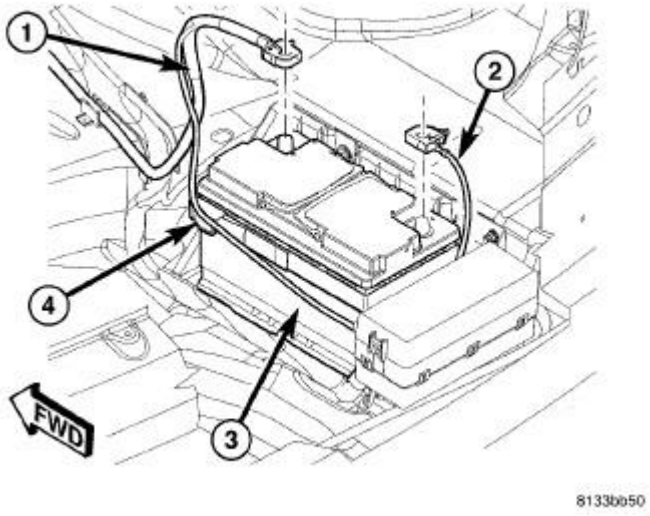


Fig. 100: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

9. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

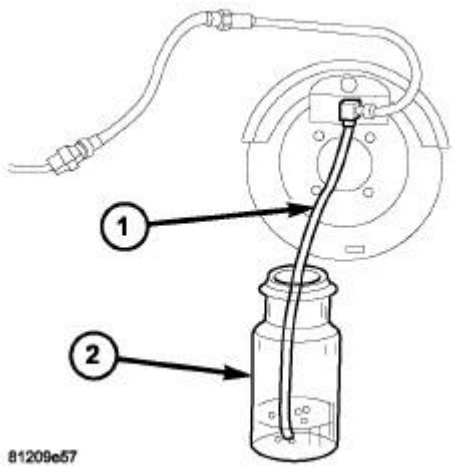


Fig. 101: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

10. Bleed (1) the area of repair for the brake system. **If a proper pedal is not felt during bleeding an area of repair then a base bleed system must be performed.** Refer to **BASE BRAKE BLEEDING** .
11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

CALIPER, DISC BRAKE, SINGLE PISTON

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

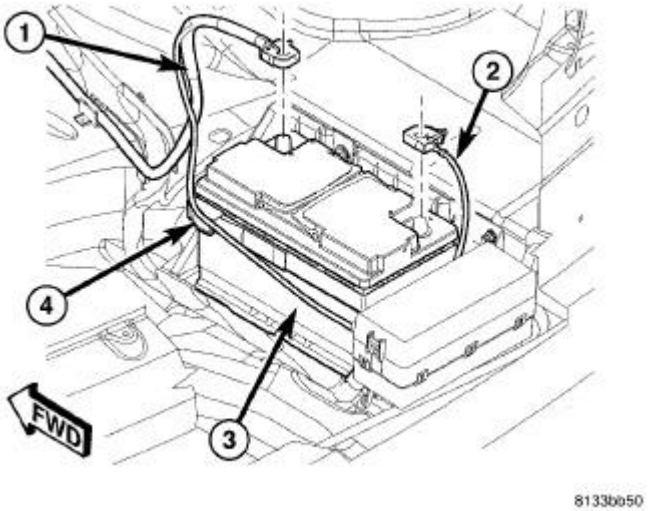


Fig. 102: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

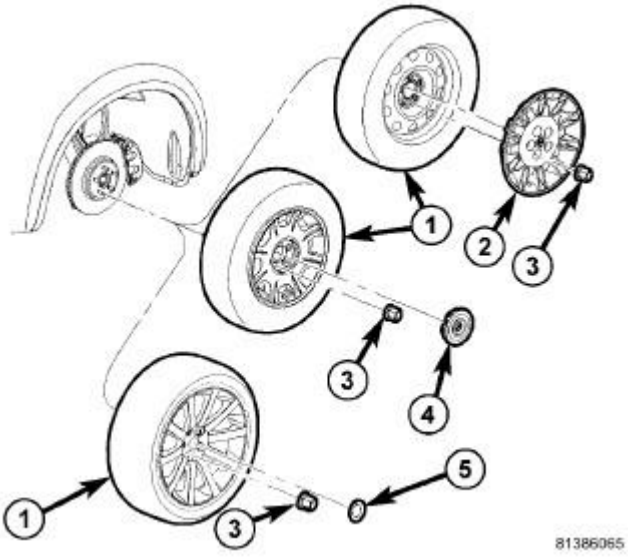


Fig. 103: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

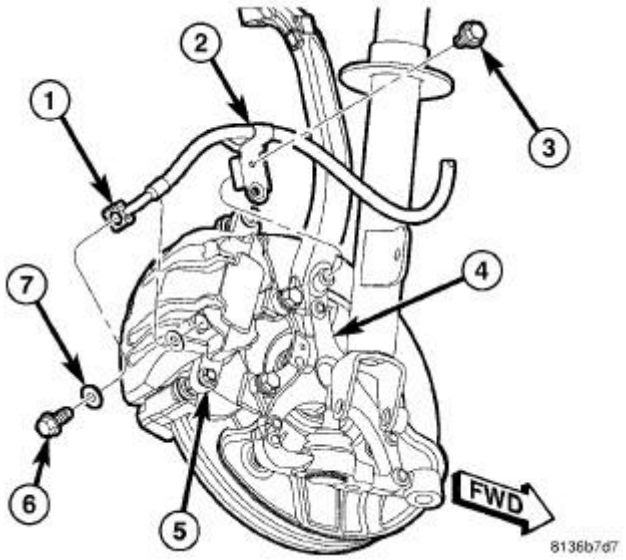


Fig. 104: Front Brake Flex Hose AT Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Remove banjo bolt (6) connecting flexible brake hose (1) to caliper (5). There are two sealing washers (7) (one one each side of hose fitting) that will come off when bolt is removed. Discard these washers; install NEW washers on installation.

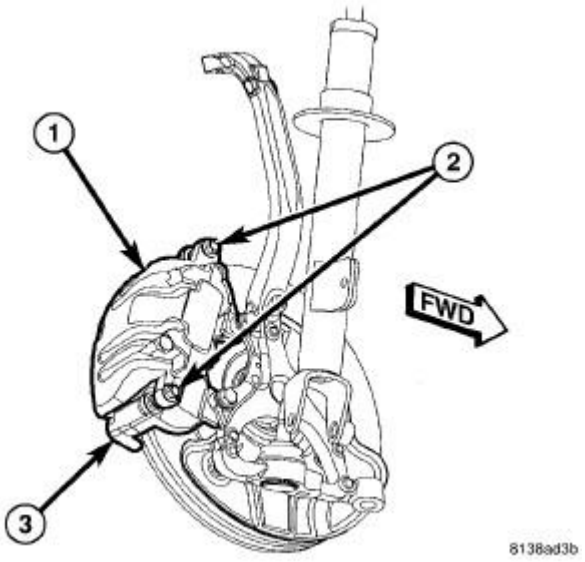


Fig. 105: Front Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

6. While holding guide pins from turning, remove caliper guide pin bolts (2).

7. Remove brake caliper (1) from brake adapter (3) and pads.

DISASSEMBLY

DISASSEMBLY

NOTE: Before disassembling brake caliper, clean and inspect it. Refer to INSPECTION and CLEANING . .

WARNING: Under no condition should high pressure air ever be used to remove a piston from a caliper bore. Personal injury could result from such a practice.

CAUTION: Do not use excessive force when clamping caliper in vise. Excessive vise pressure will cause bore distortion.

1. Drain brake fluid from caliper.

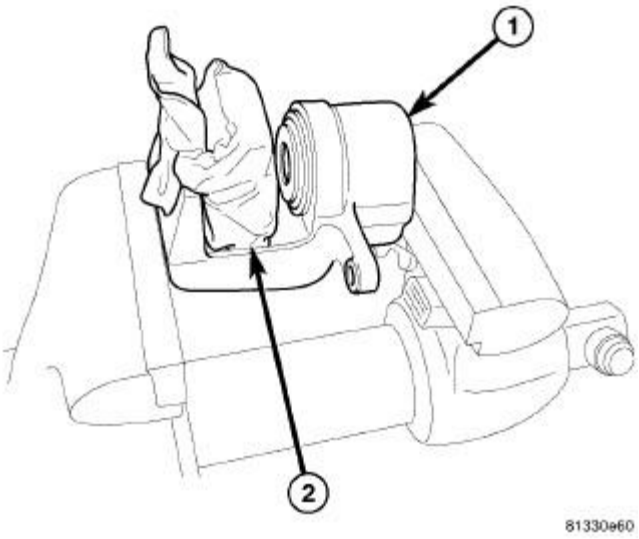


Fig. 106: Rear Caliper In Vise
Courtesy of CHRYSLER GROUP, LLC

2. Mount caliper in a vise equipped with protective jaws.
3. Place a wooden block (2) (padded with approximately one-inch thickness of shop towels) in front of caliper (1) piston as shown in illustration. Padded block should be sized to allow piston to push out of bore far enough to be removed by hand after being loosened by air pressure, yet large enough to keep piston from coming completely out. This will cushion and protect caliper piston during removal.

WARNING: Do not place face or hands near caliper and piston if using

compressed air pressure to remove piston. Do not use high pressure.

4. Apply low pressure compressed air to caliper fluid inlet in **short spurts** to ease piston out of bore.
5. Remove piston from caliper (1).

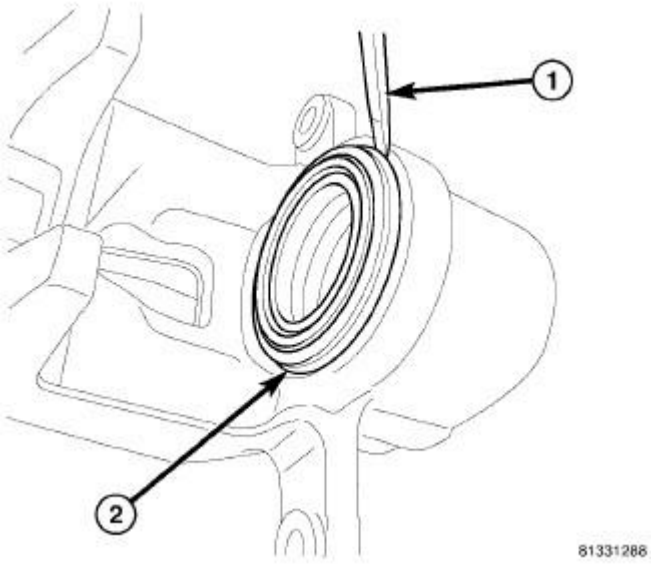


Fig. 107: Removing Rear Caliper Dust Boot
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When working on disc brake caliper, always use care and suitable tools to avoid damaging the aluminum housing.

6. Using a suitable tool (1), carefully remove dust boot (2) and discard it.

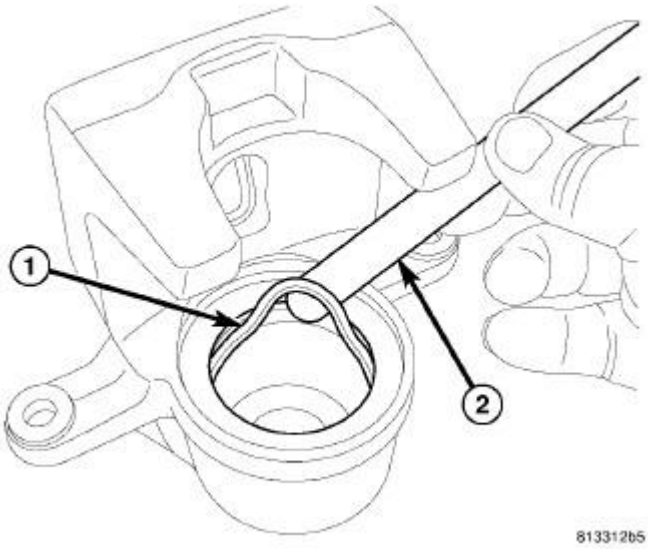


Fig. 108: Removing Rear Caliper Piston Seal
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use a screw driver or other metal tool for seal removal. Using such tools can scratch bore or leave burrs on seal groove edges.

7. Using a soft tool such as a plastic trim stick (2), work piston seal (1) out of its groove in caliper piston bore. Discard used seal.

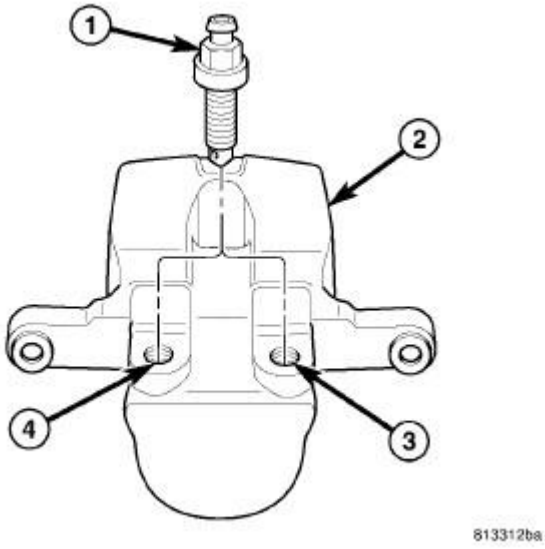


Fig. 109: Rear Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

8. Remove caliper bleeder screw (1) from caliper housing (2).

9. Clean piston bore and drilled passage ways with alcohol or a suitable solvent. Wipe it dry using only a lint-free cloth.
10. Inspect both piston and bore for scoring or pitting.

NOTE: It is not recommended to hone caliper bore. The anodized coating would be compromised.

CLEANING

CLEANING

WARNING: Chrysler does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

To clean or flush the internal passages of the brake caliper, use fresh brake fluid or Mopar® Non-Chlorinated Brake Parts Cleaner. Never use gasoline, kerosene, alcohol, oil, transmission fluid or any fluid containing mineral oil to clean the caliper. These fluids will damage rubber cups and seals.

INSPECTION

INSPECTION

Inspect the disc brake caliper for the following:

- Cracked or damaged housing
- Brake fluid leaks in and around boot area
- Ruptures, brittleness or damage to the piston dust boot

If caliper fails inspection, disassemble and recondition caliper, replacing the seals and dust boots or replace caliper.

ASSEMBLY

ASSEMBLY

CAUTION: Dirt, oil, and solvents can damage caliper seals. Ensure assembly area is clean and dry.

NOTE: Always use new, clean Mopar® DOT 3 Motor Vehicle Brake Fluid or equivalent

when assembling brake caliper.

NOTE: Never use used or old piston seals or boots for reassembly.

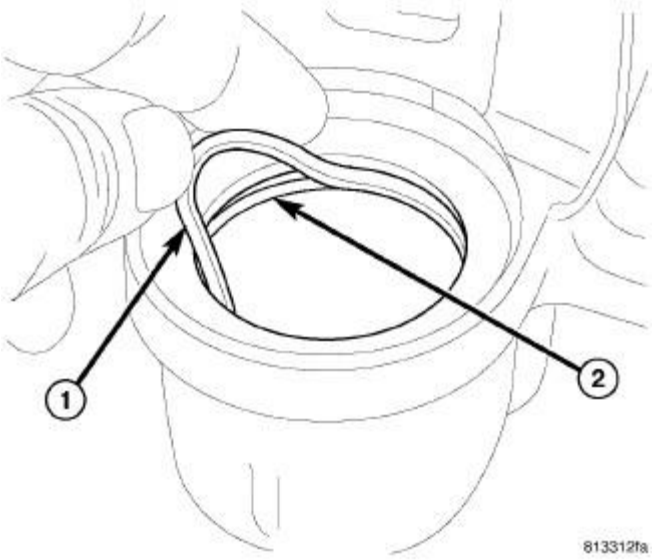


Fig. 110: Installing Rear Caliper Piston Seal
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate caliper piston, piston seal (1) and piston bore (2) with clean, fresh brake fluid.
2. Install NEW piston seal (1) in groove of caliper bore (2). Seal should be started at one area of groove and gently worked around and into the groove using only your clean fingers to seat it.

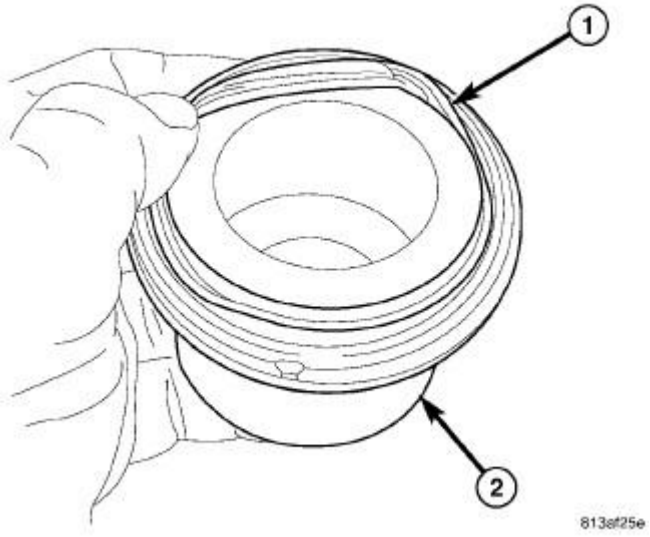


Fig. 111: Installing Boot On Piston
Courtesy of CHRYSLER GROUP, LLC

3. Install NEW dust boot (1) on piston (2) and work boot lip into groove at top of piston. Stretch boot downward, straightening boot folds, then move boot back upward as necessary until folds snap uniformly into place.

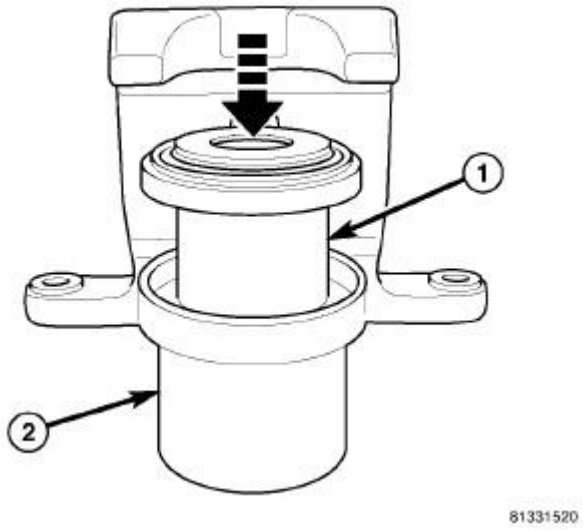


Fig. 112: Installing Piston In Rear Caliper
Courtesy of CHRYSLER GROUP, LLC

4. Install piston (1) into caliper piston (2) bore, pressing piston down to bottom of bore using hand-pressure. Using a piece of wood or wooden hammer handle may also suffice as long as piston and boot damage can be avoided. **The dust boot will not seat at this time. Refer to following step.**

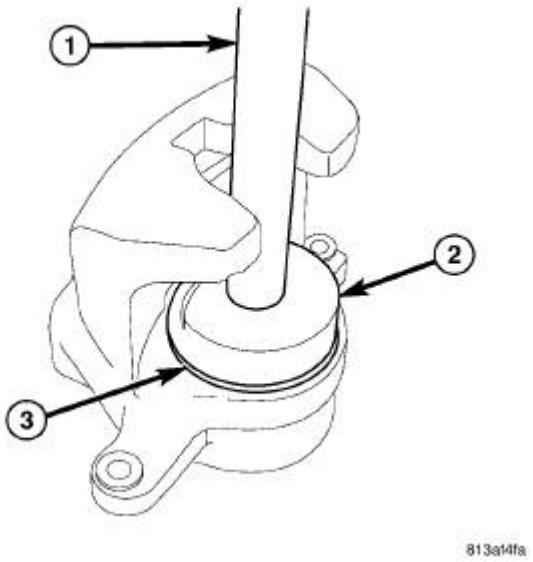


Fig. 113: Seat dust boot, Installer & Handle
Courtesy of CHRYSLER GROUP, LLC

5. Seat dust boot (3) in caliper counterbore using Installer (2), Special Tool (special tool #9315, Installer, Dust Boot), with Handle (1), Special Tool (special tool #C-4171, Driver Handle, Universal). Install dust boot until it bottoms. Do not over-seat dust boot or damage will occur.

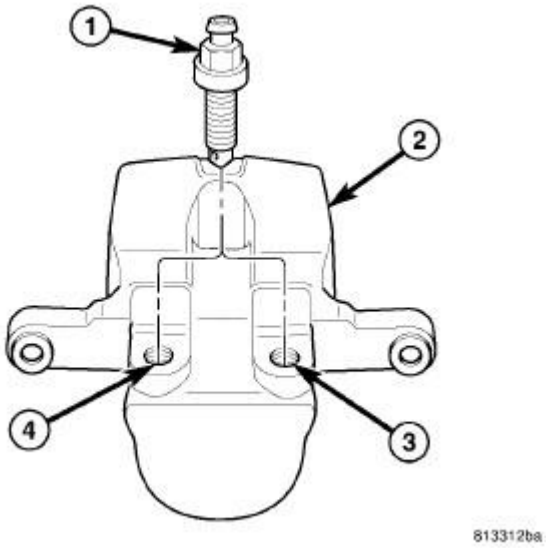


Fig. 114: Rear Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

6. Install bleeder screw in correct threaded hole. Caliper housing is not side-specific, so it is important to install bleeder screw in threaded hole that will be uppermost once caliper is installed on vehicle. Tighten bleeder screw to 15 N.m (125 in. lbs.) torque.
7. Install caliper on vehicle. Refer to **CALIPER, DISC BRAKE, FRONT SRT8, INSTALLATION** or **CALIPER, DISC BRAKE, REAR SRT8, INSTALLATION** or **CALIPER, DISC BRAKE, REAR, INSTALLATION** or **CALIPER, DISC BRAKE, SINGLE PISTON, INSTALLATION** or **CALIPER, DISC BRAKE, TWIN PISTON, INSTALLATION**.

INSTALLATION

INSTALLATION

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary. Refer to INSPECTION .

CAUTION: Use care when installing caliper onto disc brake adapter to avoid damaging boots on caliper guide pins.

1. Completely retract caliper piston back into bore of caliper. Use hand pressure or a C-clamp may be used to retract piston, first placing a wood block over piston before installing C-clamp to avoid damaging piston.
2. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.

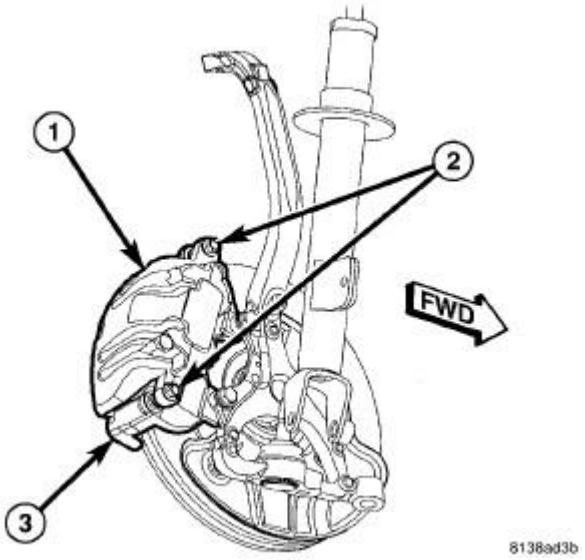


Fig. 115: Front Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

3. Slide caliper over brake pads and onto caliper adapter (3).

CAUTION: Extreme caution should be taken not to crossthread caliper guide pin bolts (2) when they are installed.

4. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 60 N.m (44 ft. lbs.).

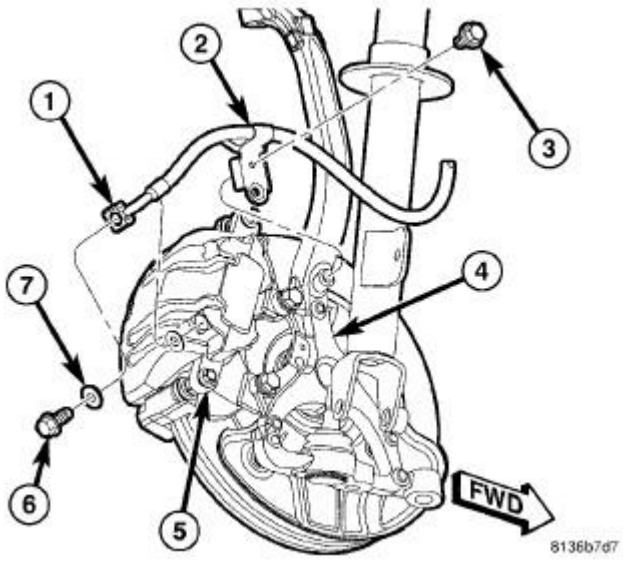


Fig. 116: Front Brake Flex Hose AT Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Install banjo bolt (6) attaching brake hose (1) to caliper (5). Install NEW washers (7) on each side of hose fitting as banjo bolt is placed through fitting. Thread banjo bolt into caliper and tighten to 50 N.m (37 ft. lbs.).

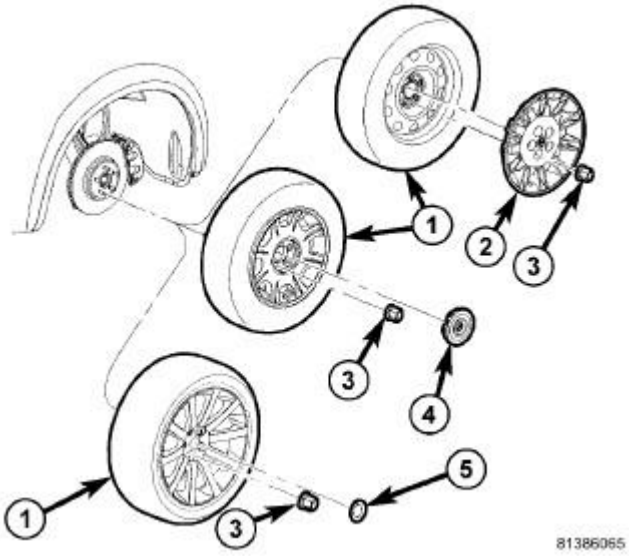


Fig. 117: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.). Refer to **INSTALLATION** .
7. Lower vehicle.
8. Remove brake pedal holding tool.

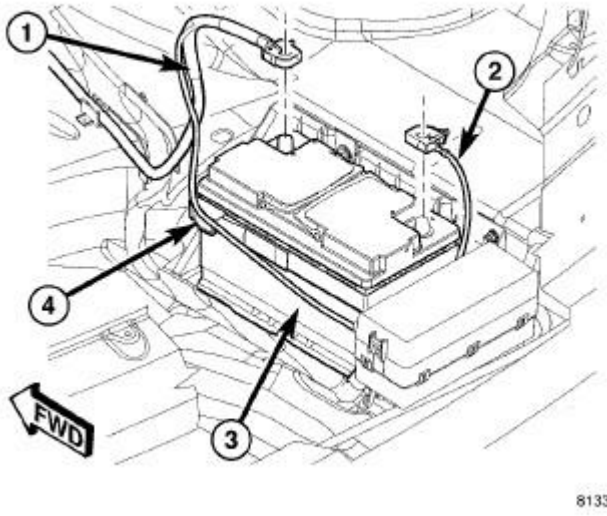


Fig. 118: Disconnecting/Connecting Battery Cables

Courtesy of CHRYSLER GROUP, LLC

9. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

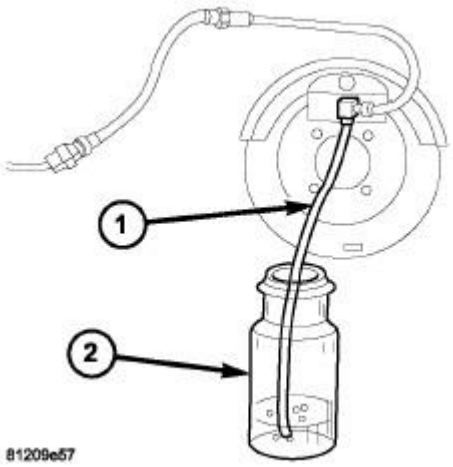


Fig. 119: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

10. Bleed (1) the area of repair for the brake system. **If a proper pedal is not felt during bleeding an area of repair then a base bleed system must be performed.** Refer to **BASE BRAKE BLEEDING** .
11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

CALIPER, DISC BRAKE, TWIN PISTON

REMOVAL

ALL-WHEEL-DRIVE

NOTE: Before proceeding. Refer to CAUTION or WARNING.

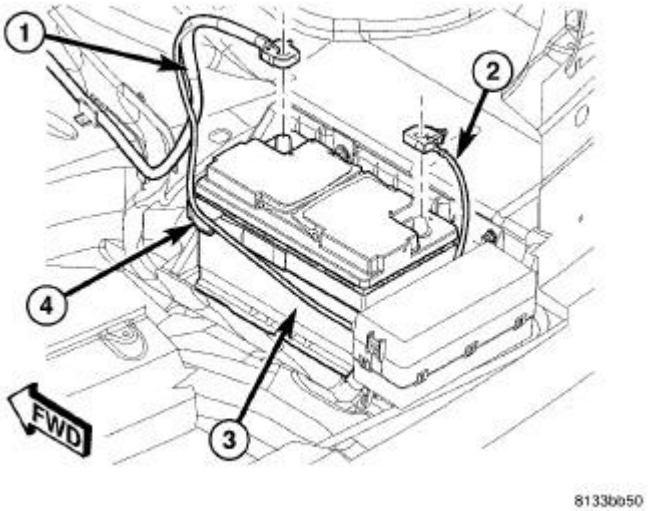


Fig. 120: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

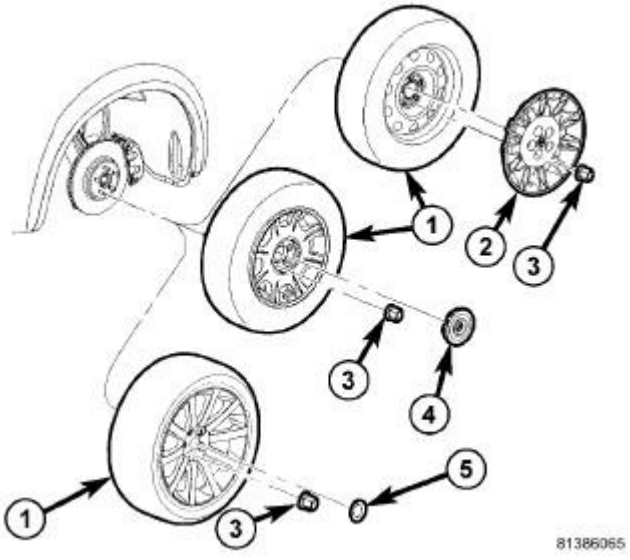


Fig. 121: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

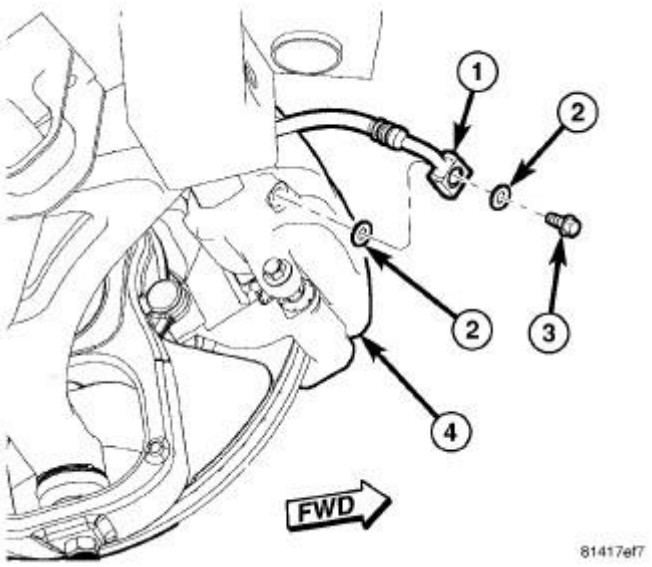


Fig. 122: Front Brake Flex Hose AT Caliper - AWD
Courtesy of CHRYSLER GROUP, LLC

5. Remove banjo bolt (3) connecting flexible brake hose (1) to caliper (4). There are two sealing washers (2) (one one each side of hose fitting) that will come off when bolt is removed. Discard these washers; install NEW washers on installation.

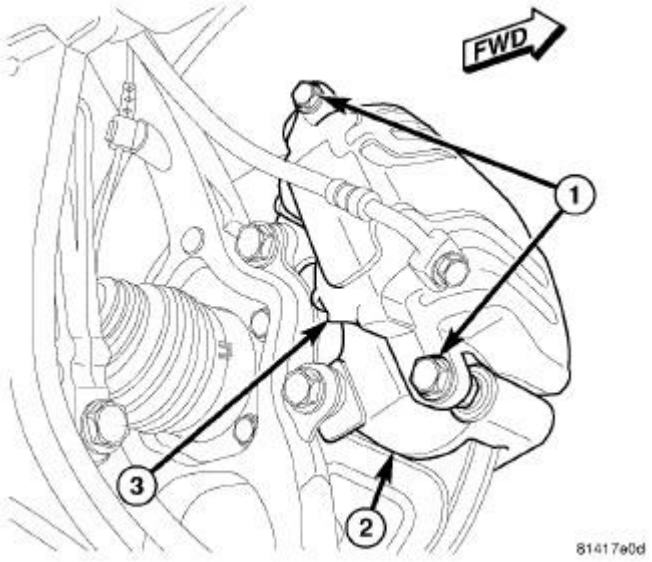


Fig. 123: Front Caliper Mounting - AWD
Courtesy of CHRYSLER GROUP, LLC

6. While holding guide pins from turning, remove caliper guide pin bolts (1).

7. Remove brake caliper (3) from brake adapter (2) and pads.

REAR-WHEEL-DRIVE

NOTE: Before proceeding. Refer to CAUTION or WARNING.

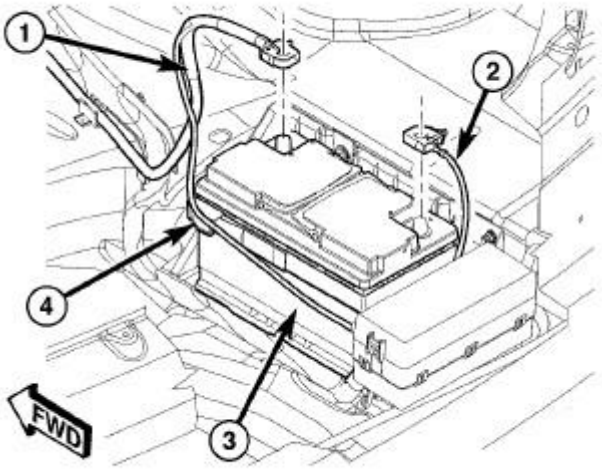


Fig. 124: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

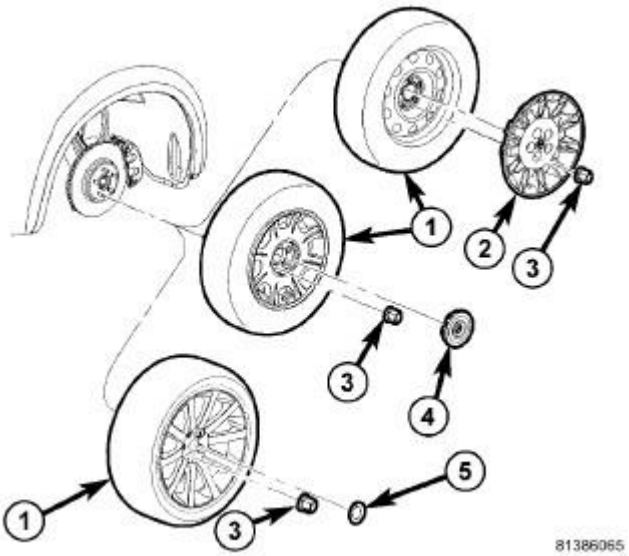


Fig. 125: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

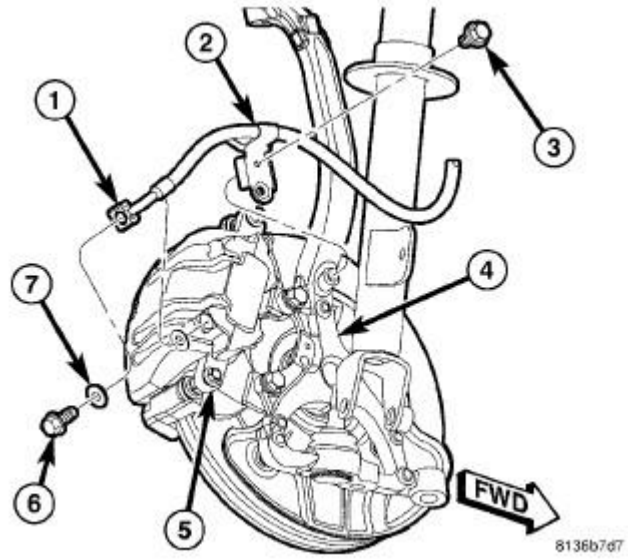


Fig. 126: Front Brake Flex Hose AT Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Remove banjo bolt (6) connecting flexible brake hose (1) to caliper (5). There are two sealing washers (7) (one one each side of hose fitting) that will come off when bolt is removed. Discard these washers; install NEW washers on installation.

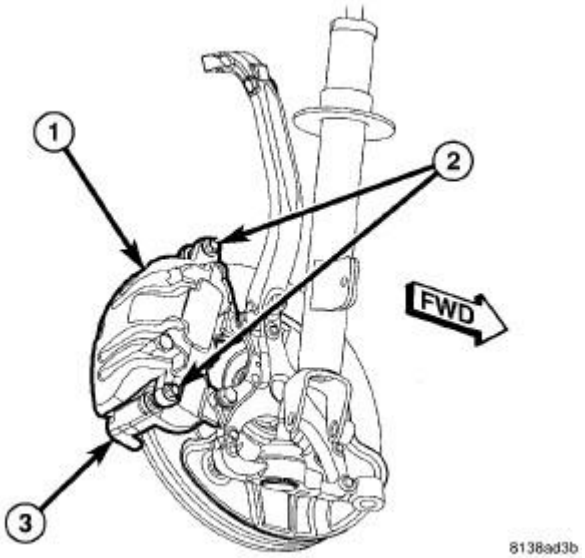


Fig. 127: Front Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

6. While holding guide pins from turning, remove caliper guide pin bolts (2).
7. Remove brake caliper (1) from brake adapter (3) and pads.

DISASSEMBLY

DISASSEMBLY

NOTE: Before disassembling the brake caliper, clean and inspect it. Refer to INSPECTION and CLEANING . .

WARNING: Under no condition should high pressure air ever be used to remove a piston from a caliper bore. Personal injury could result from such practice.

1. Drain brake fluid from caliper.

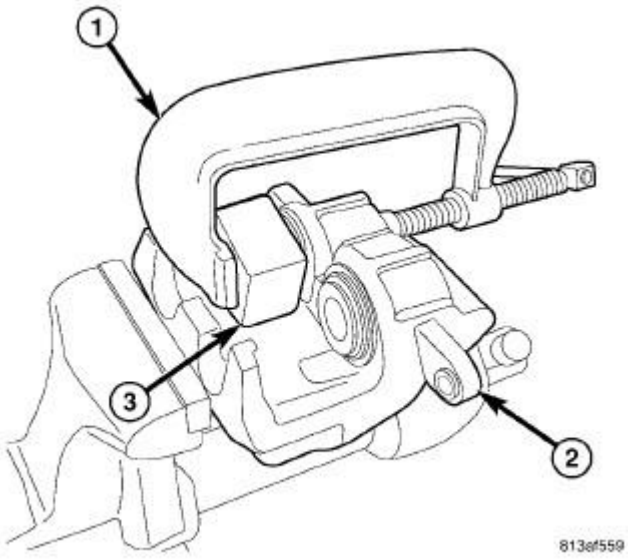


Fig. 128: C-Clamp Over Piston Number 1
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use excessive force when clamping caliper (2) in vise. Caliper housing is made of aluminum. Excessive vise pressure will cause bore distortion.

2. Mount caliper (2) in vise equipped with protective jaws.
3. C-clamp (1) a block of wood (3) over one piston.

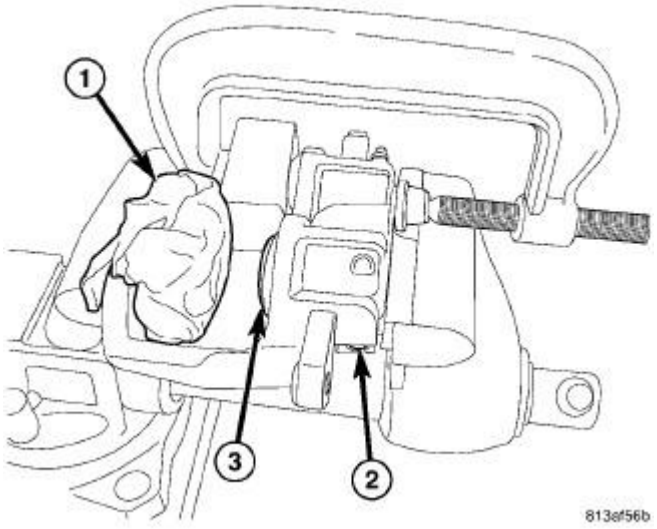


Fig. 129: Padded Block In Front Of Piston Number 2
Courtesy of CHRYSLER GROUP, LLC

4. Take another block of wood and pad it with one-inch thickness of shop towels. Padded block should be sized to allow piston to push out of bore far enough to be removed by hand after being loosened by air pressure, yet large enough to keep piston from coming completely out.
5. Place the padded block of wood (1) in outboard shoe side of caliper (2) in front of exposed piston (3). This will cushion and protect caliper piston during removal.

WARNING: Do not place face or hands near caliper and piston if using compressed air to remove piston. Do not use high pressure.

WARNING: Never attempt to catch piston as it leaves bore. This could result in personal injury.

CAUTION: Do not blow piston out of bore with sustained air pressure. This could result in a cracked piston. Use only short spurts of air.

6. Apply **short spurts of low pressure air** with a rubber tipped blow gun through caliper brake hose port. Use only enough air pressure to ease piston out of bore.
7. Remove piston from caliper (2).
8. Remove C-clamp and block of wood.

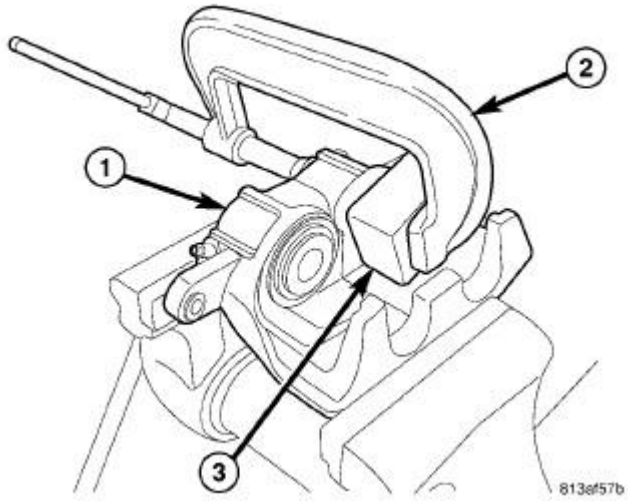


Fig. 130: C-Clamp Over Piston Number 2 Boot
Courtesy of CHRYSLER GROUP, LLC

9. C-clamp (1) the block of wood (3) over dust boot of first piston removed. This will seal empty piston bore.

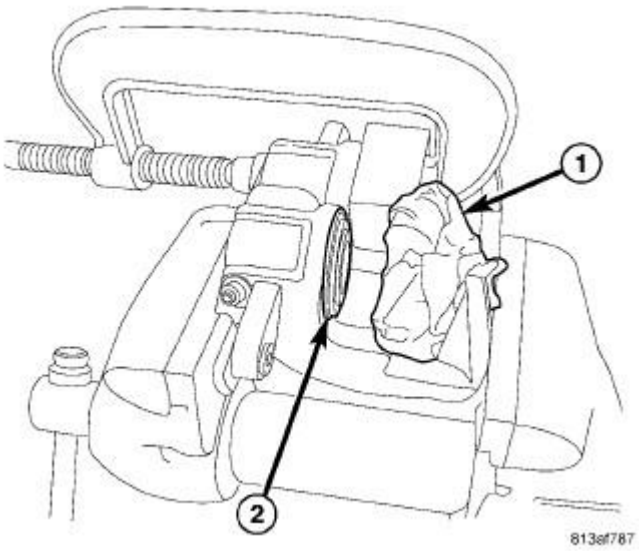


Fig. 131: Padded Block In Front Of Piston 1
Courtesy of CHRYSLER GROUP, LLC

10. Move padded piece of wood (1) in front of piston (2) yet to be removed.
11. Remove second piston using same procedure with **short spurts of low pressure air** .
12. Remove C-clamp and block of wood from caliper.

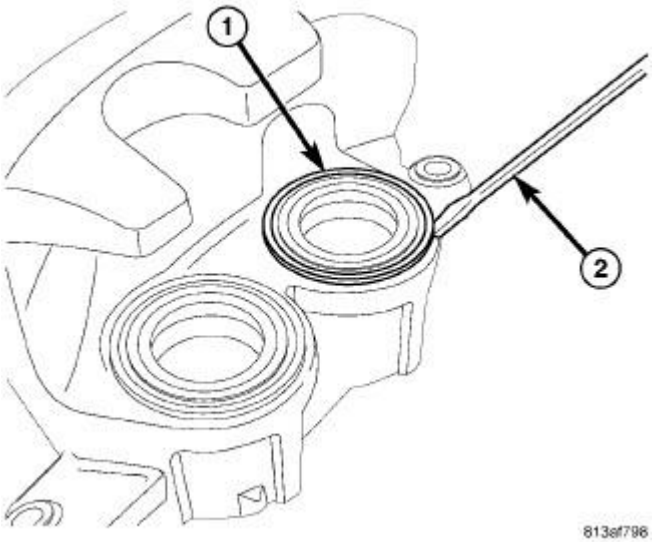


Fig. 132: Removing Dust Boots
Courtesy of CHRYSLER GROUP, LLC

13. Remove piston dust boots (1) (over each bore) with an appropriate pry tool (2). **Use care not to damage aluminum housing.**

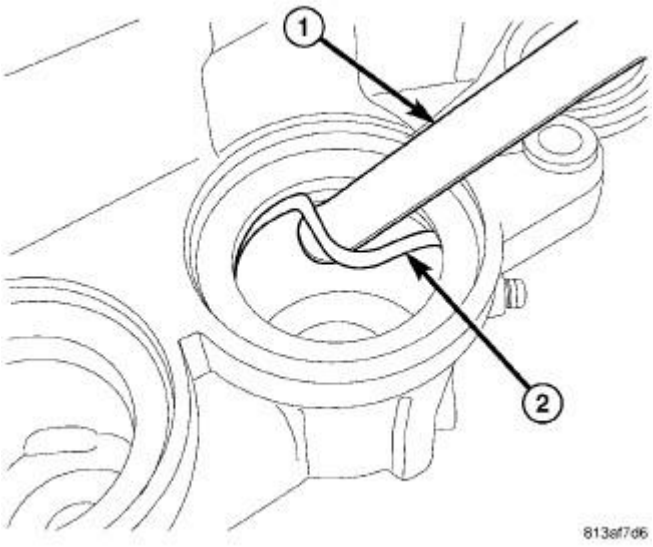


Fig. 133: Removing Piston Seals
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use an appropriate tool (1) to remove piston seals (2) to avoid scratching piston bore. Do not use a screwdriver or other metal tool to remove seals.

14. Using a soft tool such as a plastic trim stick (1), remove piston seals (2) from caliper bores.

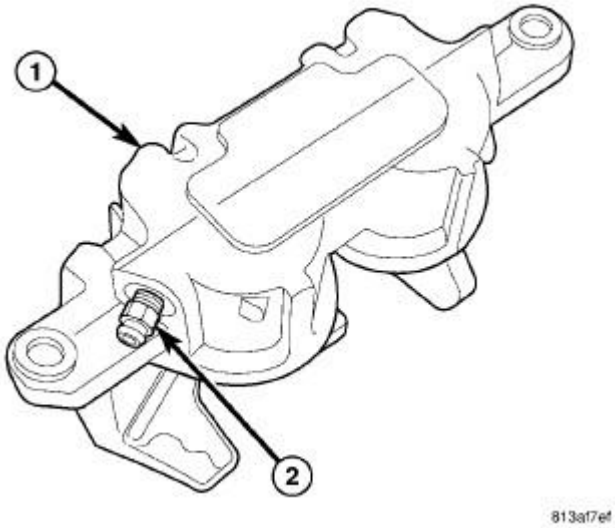


Fig. 134: Twin Piston Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

15. Remove caliper bleeder screw (2) from caliper housing (1).

16. Clean piston bore and drilled passage ways with alcohol or a suitable solvent. Wipe it dry using only a lint-free cloth.
17. Inspect both piston and bore for scoring or pitting.

NOTE: It is not recommended to hone caliper bore. The anodized coating would be compromised.

CLEANING

CLEANING

WARNING: Chrysler does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

To clean or flush the internal passages of the brake caliper, use fresh brake fluid or Mopar® Non-Chlorinated Brake Parts Cleaner. Never use gasoline, kerosene, alcohol, oil, transmission fluid or any fluid containing mineral oil to clean the caliper. These fluids will damage rubber cups and seals.

INSPECTION

INSPECTION

Inspect the disc brake caliper for the following:

- Cracked or damaged housing
- Brake fluid leaks in and around boot area
- Ruptures, brittleness or damage to the piston dust boot

If caliper fails inspection, disassemble and recondition caliper, replacing the seals and dust boots or replace caliper.

ASSEMBLY

ASSEMBLY

CAUTION: Dirt, oil, and solvents can damage caliper seals. Ensure assembly area is clean and dry.

NOTE: Always use new, clean Mopar® DOT 3 Motor Vehicle Brake Fluid when

assembling brake caliper.

NOTE: Never use old or used piston seals or boots for assembly.

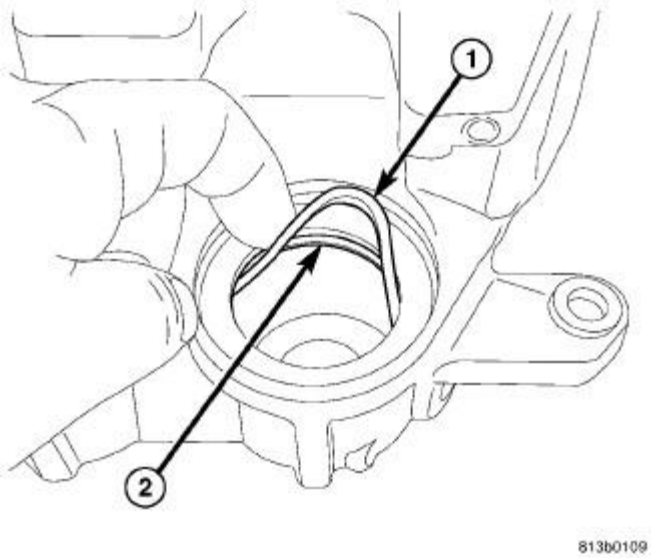


Fig. 135: Installing Piston Seals
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate caliper pistons, piston seals (1) and piston bores (2) with clean, fresh brake fluid.
2. Install NEW piston seal (1) into groove of each caliper piston bore (2).

NOTE: Make sure seal is fully seated and not twisted in groove.

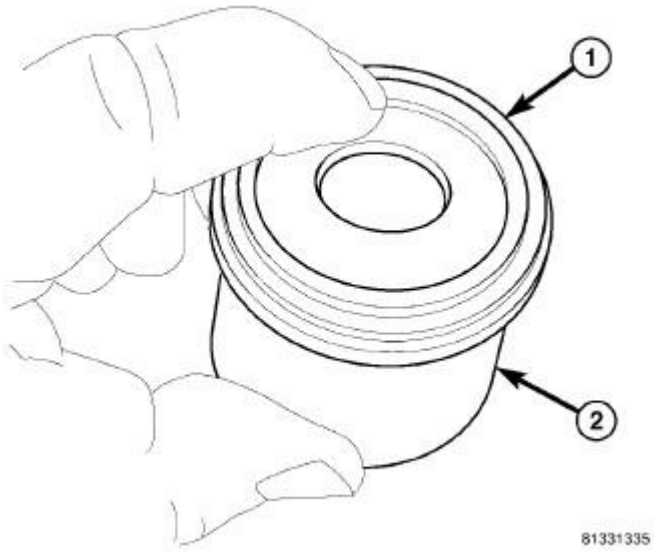


Fig. 136: Installing Boot On Caliper Piston
Courtesy of CHRYSLER GROUP, LLC

3. Install NEW boot (1) on each piston (2) and work boot lip into groove at top of piston. Stretch boot rearward straightening boot folds, then move boot forward as necessary until folds snap uniformly into place.

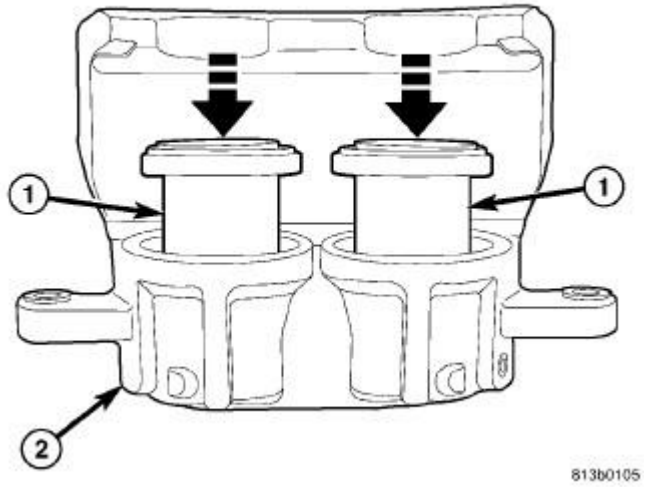


Fig. 137: Installing Pistons In Caliper
Courtesy of CHRYSLER GROUP, LLC

4. Install each piston (1), one at a time, into its caliper piston (2) bore, pressing piston down to bottom of bore using hand-pressure. Using a piece of wood or wooden hammer handle may also suffice as long as piston and boot damage is avoided.

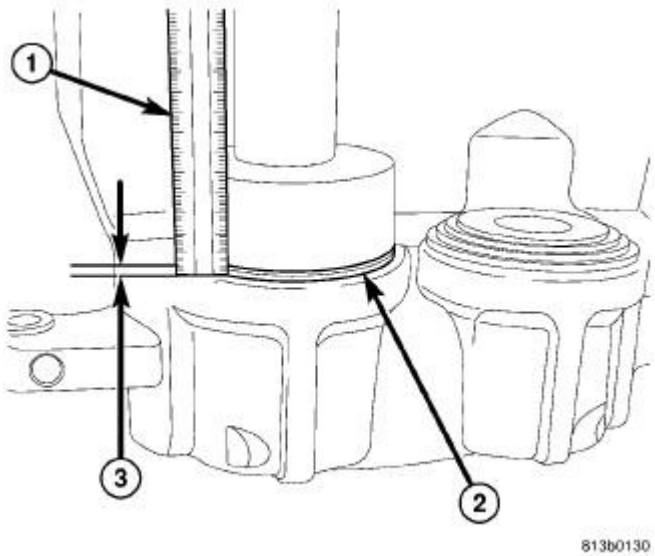


Fig. 138: Measuring Dust Boot Heights
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When seating dust boots in following step, use care not to over-install boots or damage will occur. Each boot (2) will bottom in the counterbore before the top of the boot reaches the surface of the caliper. The boot will bottom with approximately 2 mm (1/16 inch) (3) of boot still showing above caliper housing.

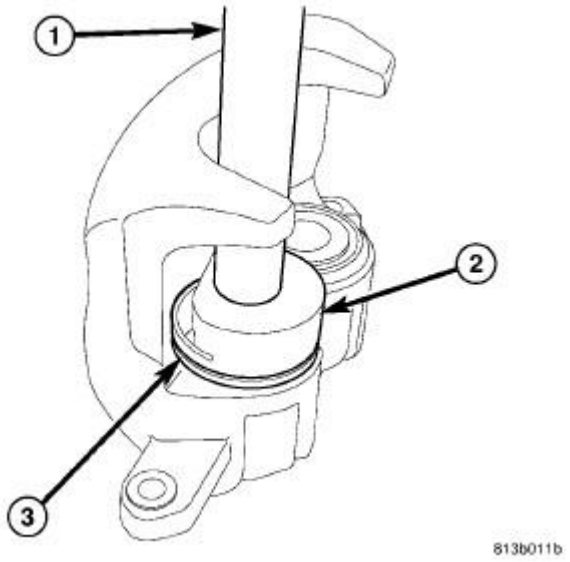


Fig. 139: Seat dust boots, Installer & Handle
Courtesy of CHRYSLER GROUP, LLC

5. Seat dust boots (3) in caliper counterbores using Installer (special tool #9315, Installer, Dust Boot) (2) with Handle (special tool #C-4171, Driver Handle, Universal) (1). Install each dust boot until it bottoms. Do not over-seat dust boot or damage will occur.

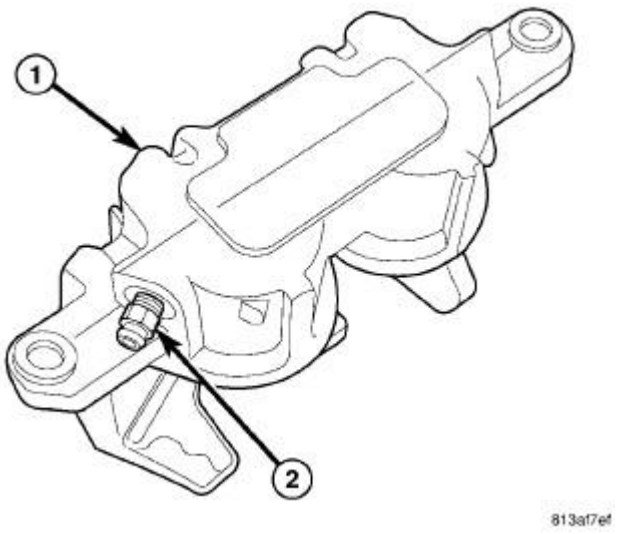


Fig. 140: Twin Piston Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

6. Install caliper bleeder screw (2) in caliper housing (1). Tighten bleeder screw to 15 N.m (125 in. lbs.) torque.
7. Install caliper on vehicle. Refer to **CALIPER, DISC BRAKE, FRONT SRT8, INSTALLATION** or **CALIPER, DISC BRAKE, REAR SRT8, INSTALLATION** or **CALIPER, DISC BRAKE, REAR, INSTALLATION** or **CALIPER, DISC BRAKE, SINGLE PISTON, INSTALLATION** or **CALIPER, DISC BRAKE, TWIN PISTON, INSTALLATION**.

INSTALLATION

ALL-WHEEL-DRIVE

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary. Refer to INSPECTION .

CAUTION: Use care when installing caliper onto disc brake adapter to avoid damaging boots on caliper guide pins.

1. Completely retract caliper pistons back into bores of caliper. Use hand pressure or a C-clamp may also be used to retract pistons, first placing a wood block over piston before installing C-clamp to avoid damaging piston.
2. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.

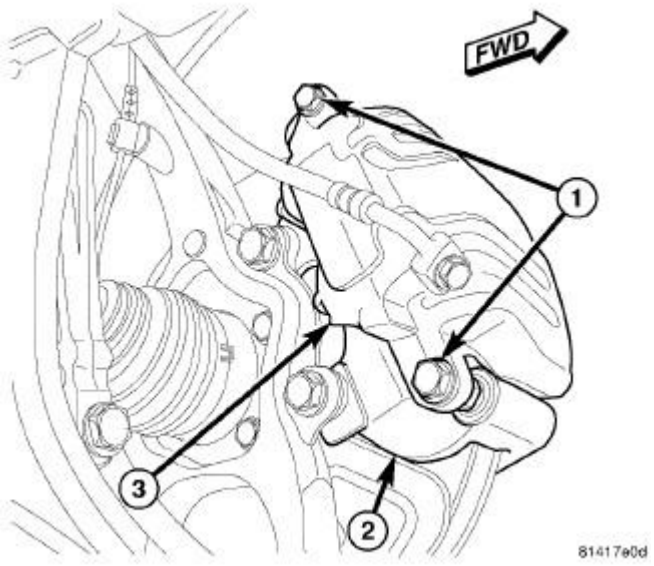


Fig. 141: Front Caliper Mounting - AWD
Courtesy of CHRYSLER GROUP, LLC

3. Slide caliper (3) over brake pads and onto caliper adapter (2).

CAUTION: Extreme caution should be taken not to crossthread caliper guide pin bolts (1) when they are installed.

4. Align caliper mounting holes with guide pins, then install guide pin bolts (1). While holding guide pins from turning, tighten bolts to 60 N.m (44 ft. lbs.).

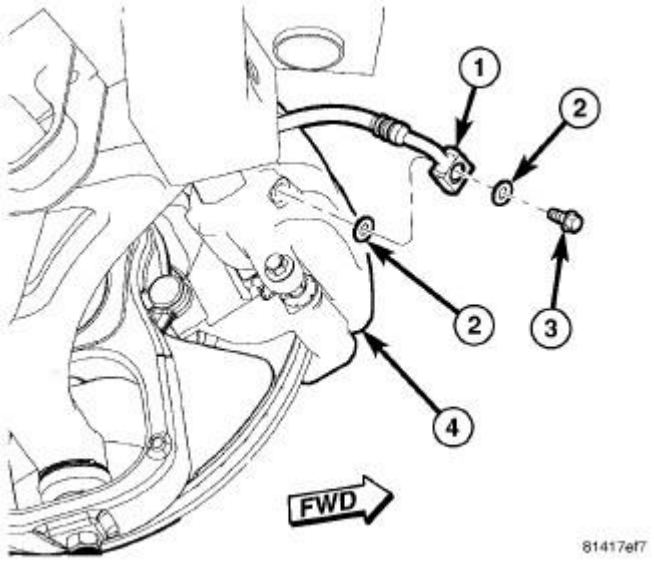


Fig. 142: Front Brake Flex Hose AT Caliper - AWD
Courtesy of CHRYSLER GROUP, LLC

5. Install banjo bolt (3) attaching brake hose (1) to caliper (4). Install NEW washers (2) on each side of hose fitting as banjo bolt is placed through fitting. Thread banjo bolt into caliper and tighten to 50 N.m (37 ft. lbs.).

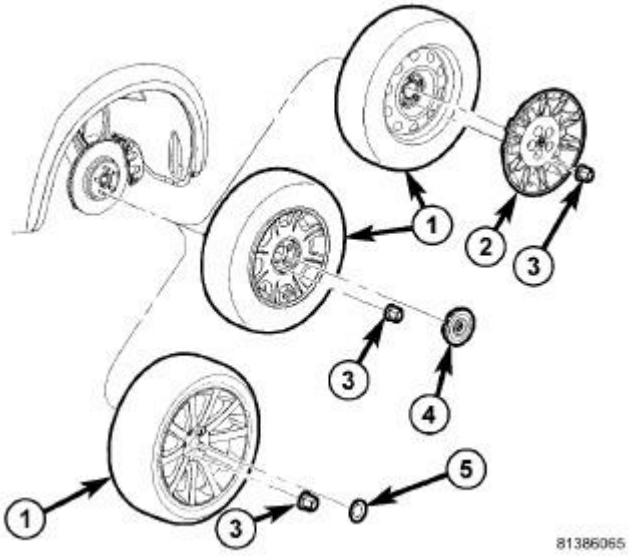


Fig. 143: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
7. Lower vehicle.
8. Remove brake pedal holding tool.

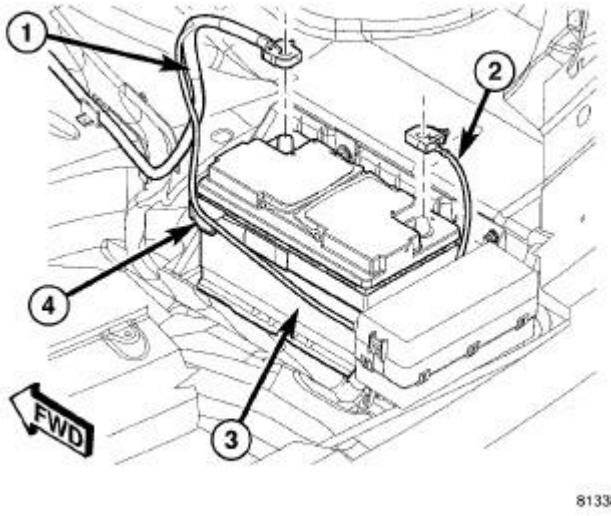


Fig. 144: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

9. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

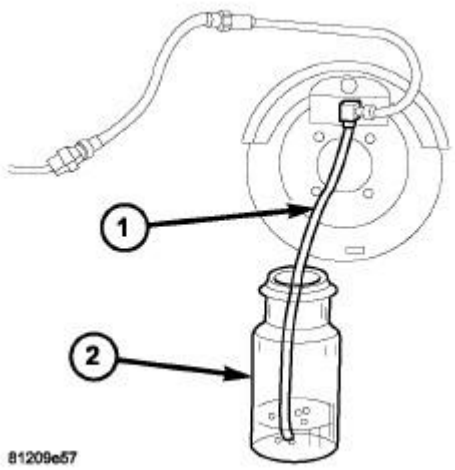


Fig. 145: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

10. Bleed (1) the area of repair for the brake system. **If a proper pedal is not felt during bleeding an area of repair then a base bleed system must be performed.** Refer to **BASE BRAKE BLEEDING** .
11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

REAR-WHEEL-DRIVE

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary. Refer to INSPECTION .

CAUTION: Use care when installing caliper onto disc brake adapter to avoid damaging boots on caliper guide pins.

1. Completely retract caliper pistons back into bores of caliper. Use hand pressure or a C-clamp may also be used to retract pistons, first placing a wood block over piston before installing C-clamp to avoid damaging piston.
2. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.

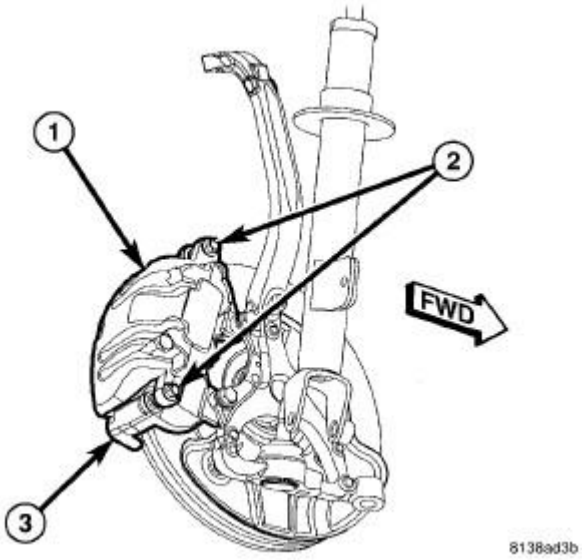


Fig. 146: Front Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

3. Slide caliper over brake pads and onto caliper adapter (3).

CAUTION: Extreme caution should be taken not to crossthread caliper guide pin bolts (2) when they are installed.

4. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 60 N.m (44 ft. lbs.).

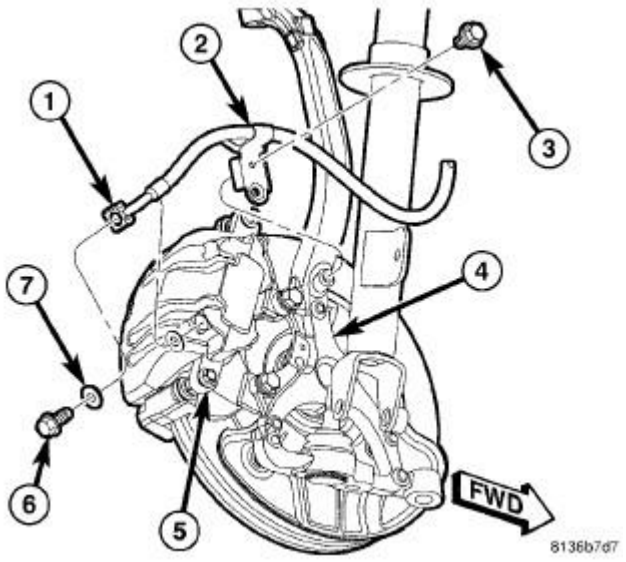


Fig. 147: Front Brake Flex Hose AT Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Install banjo bolt (6) attaching brake hose (1) to caliper (5). Install NEW washers (7) on each side of hose fitting as banjo bolt is placed through fitting. Thread banjo bolt into caliper and tighten to 50 N.m (37 ft. lbs.).

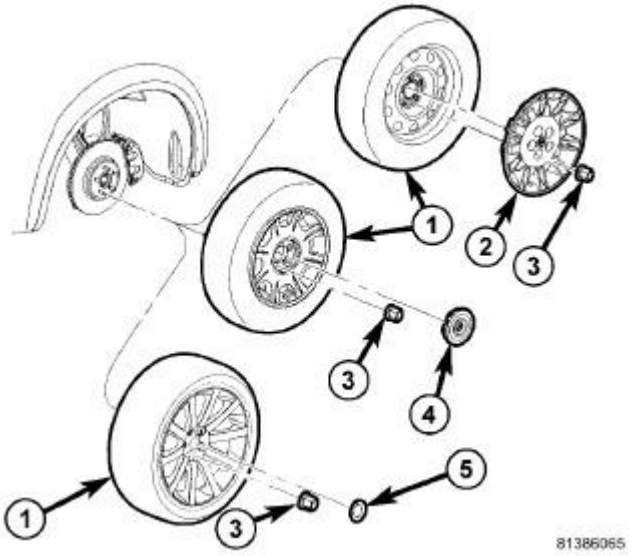


Fig. 148: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
7. Lower vehicle.
8. Remove brake pedal holding tool.

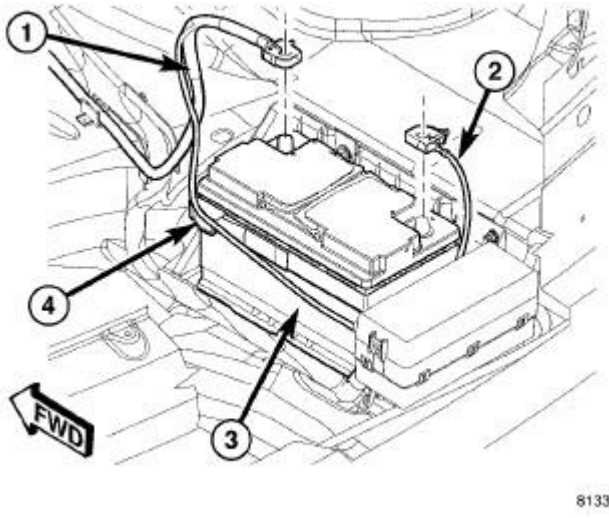


Fig. 149: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

9. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

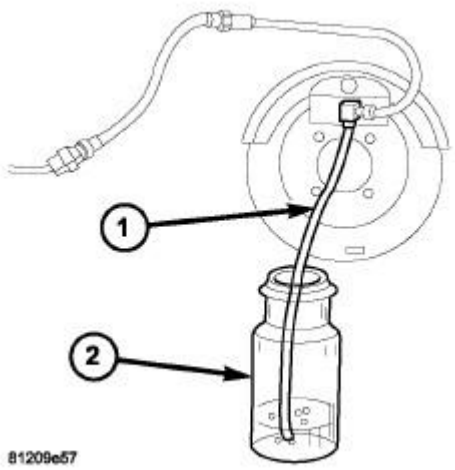


Fig. 150: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

10. Bleed (1) the area of repair for the brake system. **If a proper pedal is not felt during bleeding an area of repair then a base bleed system must be performed** . Refer to **BASE BRAKE BLEEDING** .
11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

FLUID

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BRAKE FLUID CONTAMINATION

Indications of fluid contamination are swollen or deteriorated rubber parts.

Swollen rubber parts indicate the presence of petroleum in the brake fluid.

To test for contamination, put a small amount of drained brake fluid in clear glass jar. If fluid separates into layers, there is mineral oil or other fluid contamination of the brake fluid.

If brake fluid is contaminated, drain and thoroughly flush system. Replace master cylinder, proportioning valve, caliper seals, wheel cylinder seals, Antilock Brake hydraulic unit and all hydraulic fluid hoses.

SPECIFICATIONS

BRAKE FLUID

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards.

No other type of brake fluid is recommended or approved for usage in the vehicle brake system. Use only Mopar® Brake Fluid DOT 3 Motor Vehicle or equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from an container which has been left open. An open container of brake fluid will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

BRAKE FLUID - EXPORT

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards. If DOT 3 brake fluid is not available, brake fluid conforming to DOT 4 specifications may be used in its place. The fluids are compatible, but DOT 4 usage may require additional fluid maintenance. No other type of brake fluid is recommended or approved for usage in the vehicle brake system. Use only Mopar® Brake Fluid DOT 3 Motor Vehicle or equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from an container which has been left open. An open container of brake fluid will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

MASTER CYLINDER, BRAKE

DESCRIPTION

DESCRIPTION

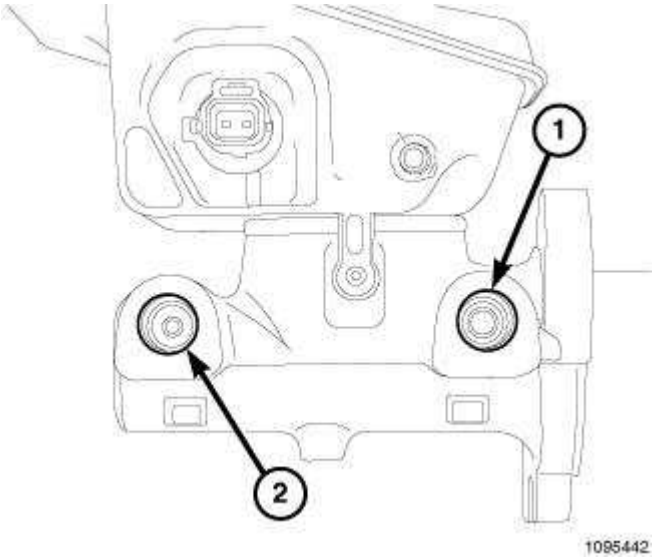


Fig. 151: Primary And Secondary Ports
Courtesy of CHRYSLER GROUP, LLC

The master cylinder has a cast aluminum housing with a top mounted reservoir. The dual outlet port design housing features a primary port (1) machined for 8 mm (5/16 inch) tubing and a secondary port (2) machined for 6.25 mm (1/4 inch) tubing.

The master cylinder has a 25.4 mm bore.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MASTER CYLINDER/POWER BOOSTER

1. Start the engine and check the booster vacuum hose connections. A hissing noise indicates a vacuum leak. Correct any vacuum leaks before proceeding.
2. Stop the engine and pump the brake pedal until all vacuum reserve in the booster is depleted.
3. Press and hold the brake pedal under light foot pressure. The pedal should hold firm. If the pedal falls away, there may be an external leak or the master cylinder is faulty (internal leakage).
4. Start the engine and note pedal action. It should fall away slightly under light foot pressure, then hold firm. If no pedal action is discernible, the power booster, vacuum supply or vacuum check valve is faulty, proceed to the POWER BOOSTER VACUUM TEST.
5. If the POWER BOOSTER VACUUM TEST passes, rebuild the booster vacuum reserve as follows: Release the brake pedal. Increase engine speed to 1500 RPM, close the throttle and immediately turn off the ignition to stop the engine.
6. Wait a minimum of 90 seconds and try brake action again. The booster should provide two or more vacuum assisted pedal applications. If the vacuum assist is not provided, the booster is faulty.

POWER BOOSTER VACUUM TEST

1. Connect a vacuum gauge to the booster check valve with a short length of hose and T-fitting.
2. Start and run the engine at curb idle for one minute.
3. Observe the vacuum supply. If the vacuum supply is less that 12 inches HG (406 millibars), repair the vacuum supply.
4. Clamp the hose shut between the intake vacuum source and the check valve.
5. Stop the engine and observe the vacuum gauge.
6. If the vacuum drops more than one inch HG (33 millibars) within 15 seconds, the booster diaphragm or check valve is faulty.

POWER BOOSTER CHECK VALVE TEST

1. Remove the power booster check valve from the power booster.
2. Using a hand operated vacuum pump, apply 15-20 inches HG (508-677 millibars) vacuum at the booster side of the check valve.
3. The vacuum should hold steady. If the gauge on the pump indicates vacuum loss, the check valve is faulty and should be replaced.

STANDARD PROCEDURE

STANDARD PROCEDURE - MASTER CYLINDER BLEEDING

CAUTION: When clamping master cylinder in vise, only clamp master cylinder by its mounting flange. Do not clamp master cylinder piston rod, reservoir, seal or body.

1. Clamp master cylinder in a vise.

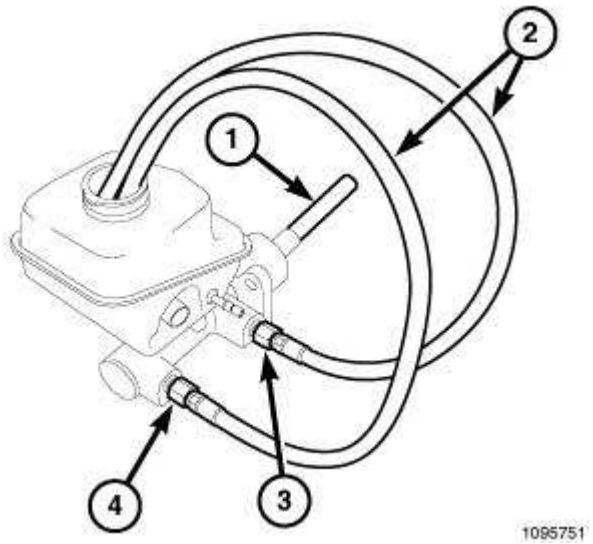


Fig. 152: Bleeding Tools On Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing Adapters in master cylinder, do not overtighten. Damage to master cylinder could occur.

NOTE: Bleeder Adapters (special tool #9748-1, Adapter, Bleeder) and (special tool #9748-2, Adapter, Bleeder) are not interchangeable. To avoid mix-up, Bleeder Adapter (special tool #9748-1, Adapter, Bleeder) is silver while Bleeder Adapter (special tool #9748-2, Adapter, Bleeder) is black.

2. Attach special tools for bleeding master cylinder in following fashion:
    1. Thread Adapter (3), Special Tool (special tool #9748-2, Adapter, Bleeder), into primary outlet port. Tighten Adapter to 14 N.m (124 in. lbs.).
    2. Thread Adapter (4), Special Tool (special tool #9748-1, Adapter, Bleeder), into secondary outlet port. Tighten Adapter to 14 N.m (124 in. lbs.).
    3. Thread a Bleeder Tube (2), Special Tool (special tool #8358-1, Bleed Tube), into each Adapter. Tighten each tube to 14 N.m (124 in. lbs.). Flex each bleeder tube and place open end into mouth of fluid reservoir as far down as possible.

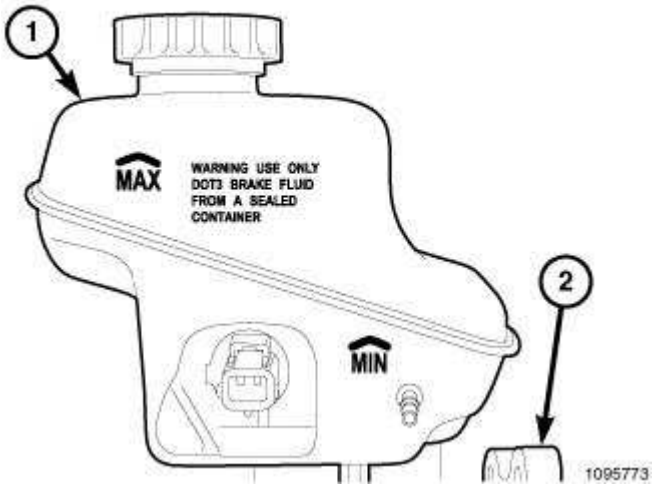


Fig. 153: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make sure open ends of bleeder tubes stay below surface of brake fluid once reservoir is filled to proper level.

3. Fill brake fluid reservoir (1) to the MAX level with Mopar® brake fluid or equivalent conforming to DOT 3 specifications. Make sure fluid level is above tips of bleeder tubes in reservoir to ensure no air is ingested during bleeding.

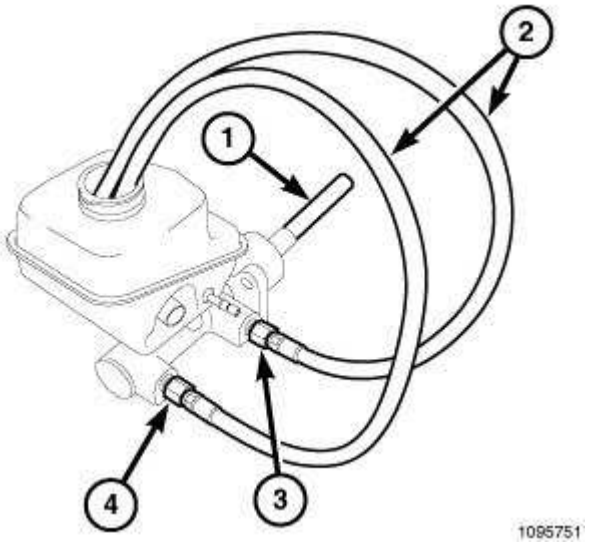


Fig. 154: Bleeding Tools On Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

4. Using a wooden dowel as a pushrod (1), slowly depress master cylinder pistons, then release pressure, allowing pistons to return to released position. Repeat several times until all air bubbles are expelled. Make sure fluid level stays above tips of bleeder tubes in reservoir while bleeding.
5. Remove bleeder tubes (2) and adapters (3, 4) from master cylinder outlet ports, then plug outlet ports and install fill cap on reservoir.
6. Remove master cylinder from vise.
7. Install master cylinder on vehicle. Refer to **MASTER CYLINDER, BRAKE, INSTALLATION**.

REMOVAL

MASTER CYLINDER

CAUTION: Vacuum in power brake booster must be pumped down (removed) before removing master cylinder from power brake booster. This is necessary to prevent power brake booster from sucking in any contamination as master cylinder is removed. This can be done simply by pumping brake pedal, with vehicle's engine not running, until a firm feeling brake pedal is achieved.

1. With engine not running, pump brake pedal until a firm pedal is achieved (4-5 strokes).

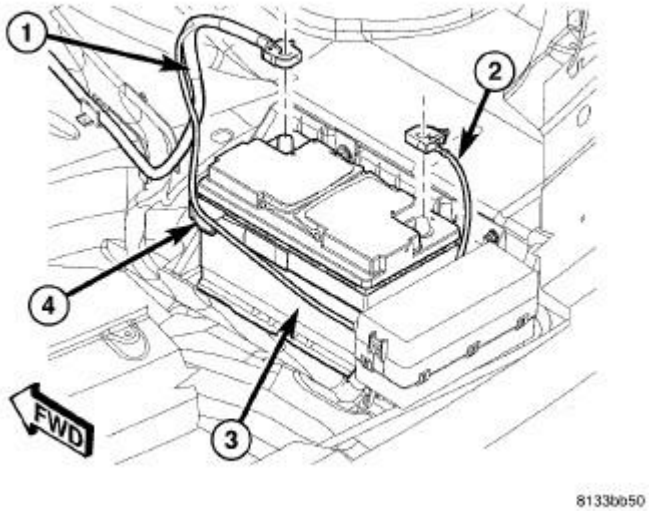


Fig. 155: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect and isolate battery negative cable (2) from battery post.

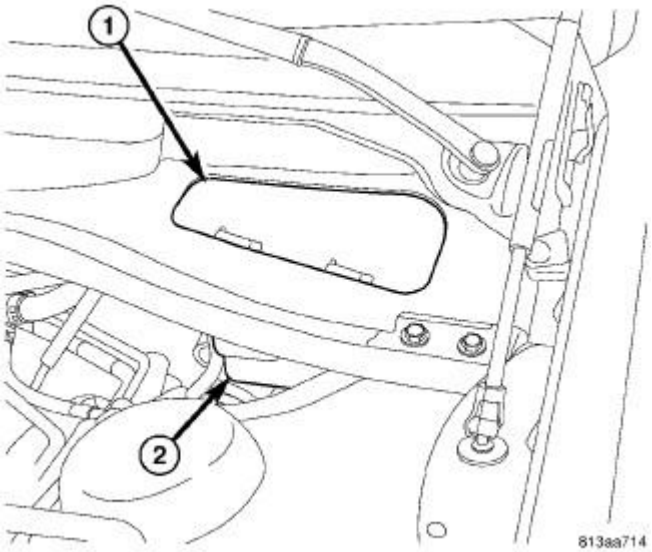


Fig. 156: Cowl Access Panel
Courtesy of CHRYSLER GROUP, LLC

3. Remove access panel (1) in cowl area to expose master cylinder (2).
4. Thoroughly clean all surfaces of brake fluid reservoir and master cylinder. Use only Mopar® Brake Parts Cleaner or equivalent.

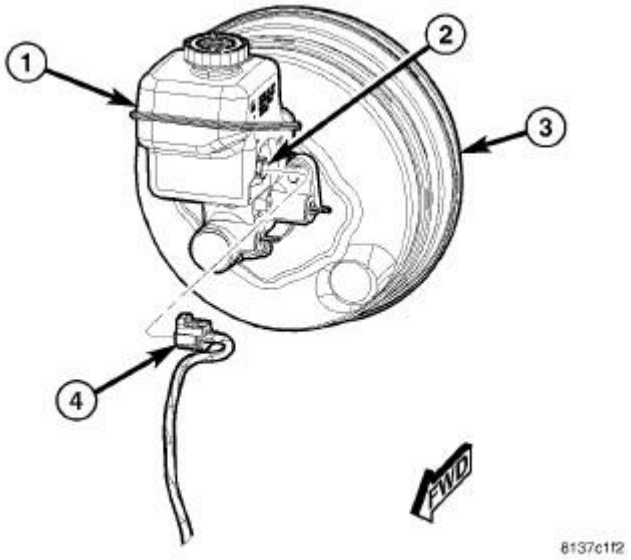


Fig. 157: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect wiring harness connector (4) from brake fluid level sensor (2) in master cylinder brake fluid reservoir (1).

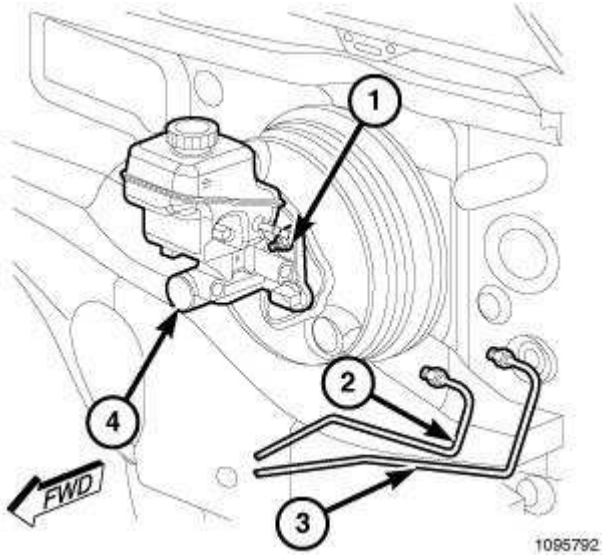


Fig. 158: Brake Tubes AT Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect primary (3) and secondary (2) brake tubes from master cylinder (4). Install sealing plugs in open brake tube outlet ports.

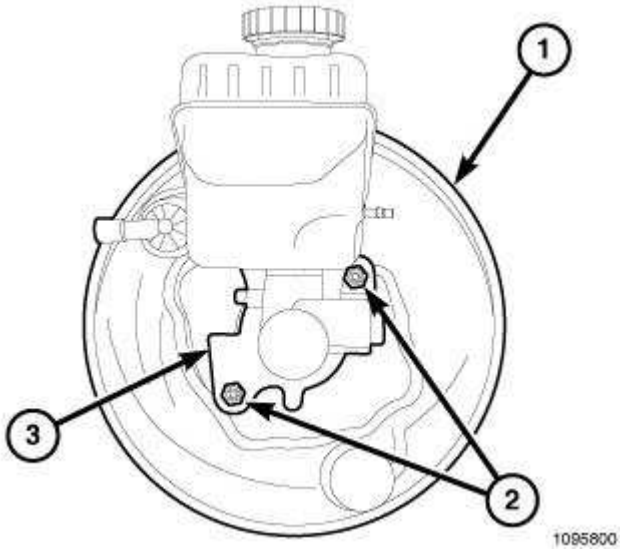


Fig. 159: Master Cylinder Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before removing master cylinder from power brake vacuum booster, master cylinder and vacuum booster must be thoroughly cleaned. This must be done to prevent dirt particles from falling into power brake vacuum booster. Use only Mopar® Brake Parts Cleaner or equivalent.

7. Remove two nuts (2) attaching master cylinder (3) to power brake booster (1).
8. Slide master cylinder (3) straight out of power brake booster (1).

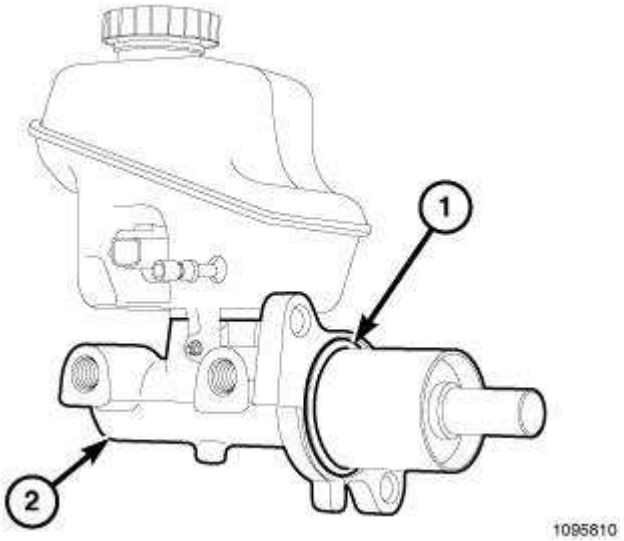


Fig. 160: Vacuum Seal On Rear Of Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Vacuum seal (1) on rear of master cylinder (2) is used to allow vacuum ability in power brake vacuum booster. Vacuum seal MUST be replaced whenever master cylinder is removed from power brake vacuum booster.

9. Remove vacuum seal (1) located on mounting flange of master cylinder (2). Vacuum seal is removed by **carefully** pulling it off rear of master cylinder. **Do not attempt to pry seal off master cylinder by inserting a sharp tool between seal and master cylinder casting. Damage can occur.**

MASTER CYLINDER - RHD

CAUTION: Vacuum in power brake booster must be pumped down (removed) before removing master cylinder from power brake booster. This is necessary to prevent power brake booster from sucking in any contamination as master cylinder is removed. This can be done simply by pumping brake pedal, with vehicle's engine not running, until a firm feeling brake pedal is achieved.

1. With engine not running, pump brake pedal until a firm pedal is achieved (4-5 strokes).

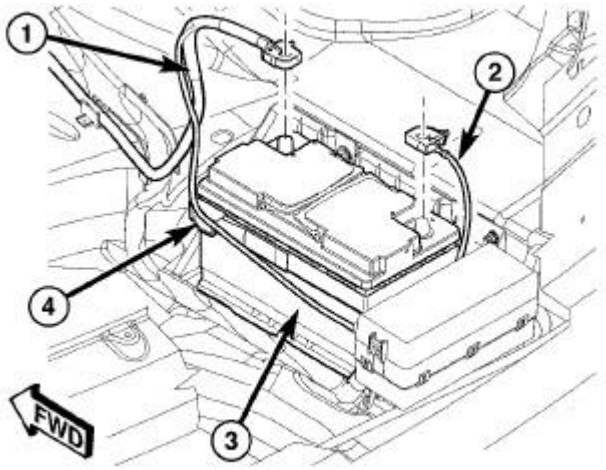


Fig. 161: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect and isolate battery negative cable (2) from battery post.

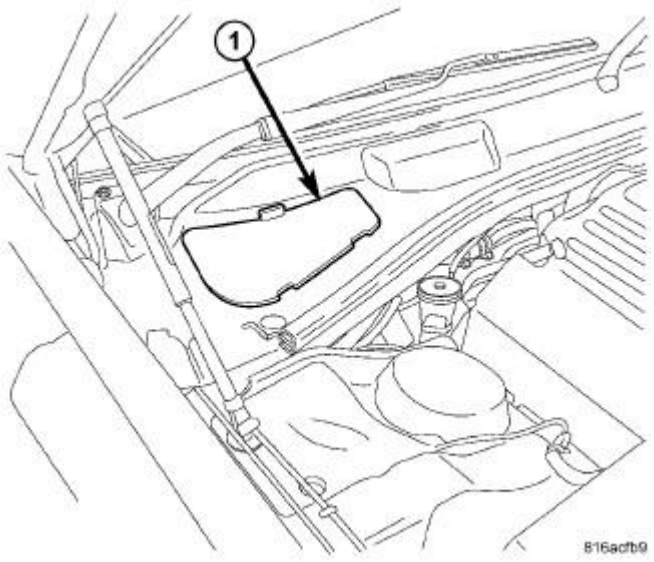


Fig. 162: Cowl Access Panel - RHD
Courtesy of CHRYSLER GROUP, LLC

3. Remove access panel (1) in cowl area to expose master cylinder.
4. Thoroughly clean all surfaces of brake fluid reservoir and master cylinder. Use only Mopar® Brake Parts Cleaner or equivalent.

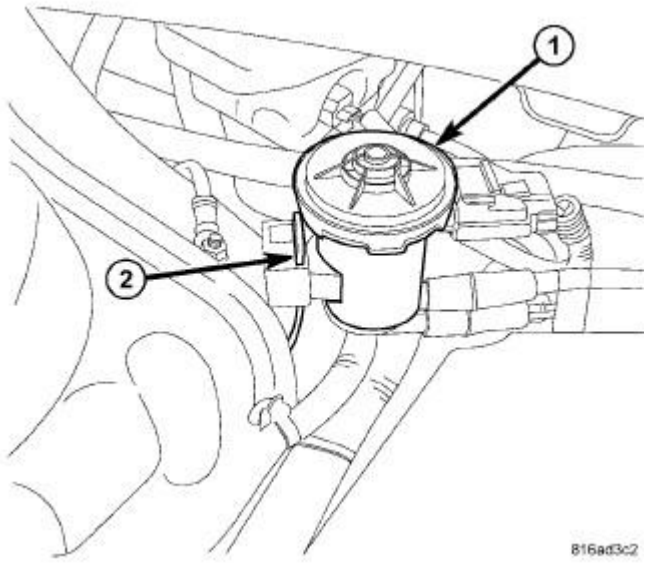


Fig. 163: EVAP/Purge Solenoid
Courtesy of CHRYSLER GROUP, LLC

5. Remove purge solenoid (1) from mount (2) and move it to side leaving hoses and wiring connected.

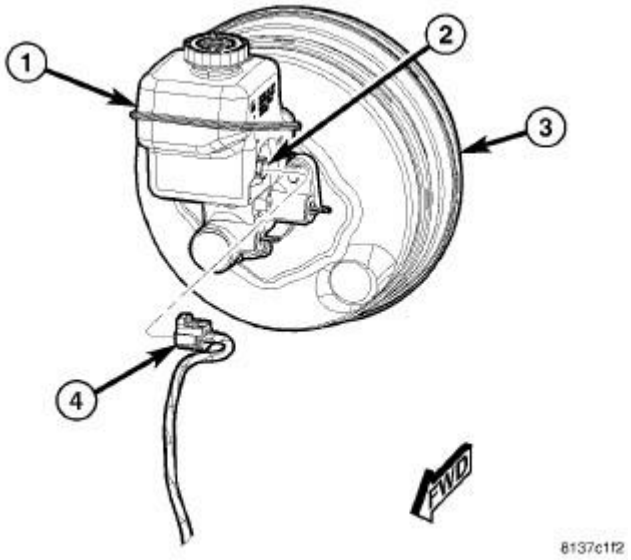


Fig. 164: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect wiring harness connector (4) from brake fluid level sensor (2) in master cylinder brake fluid reservoir (1).

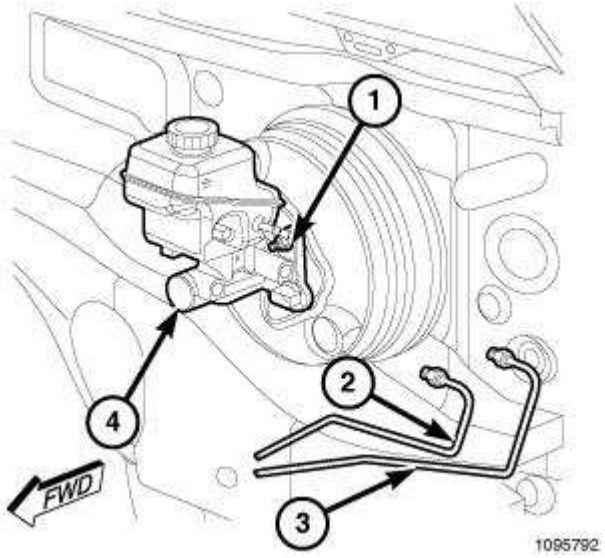


Fig. 165: Brake Tubes AT Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

7. Remove primary (3) and secondary (2) brake tubes from master cylinder (4). Install sealing plugs in open brake tube outlet ports.

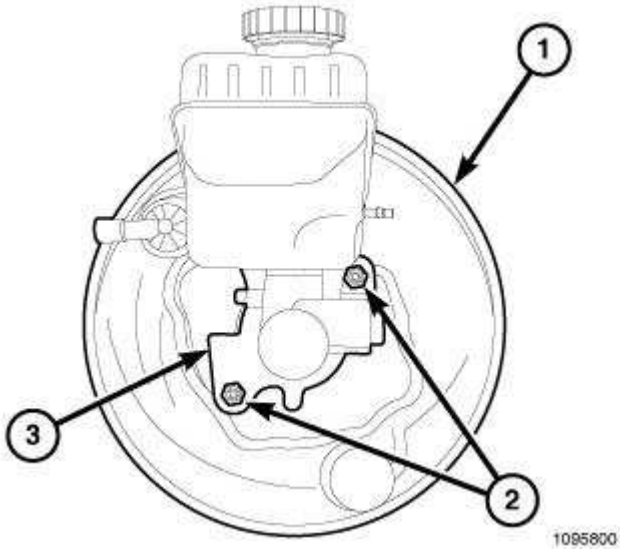


Fig. 166: Master Cylinder Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before removing master cylinder from power brake vacuum booster, master cylinder and vacuum booster must be thoroughly cleaned. This must be done to prevent dirt particles from falling into power brake vacuum booster. Use only Mopar® Brake Parts Cleaner or equivalent.

8. Remove two nuts (2) attaching master cylinder (3) to power brake booster (1).
9. Slide master cylinder (3) straight out of power brake booster (1).

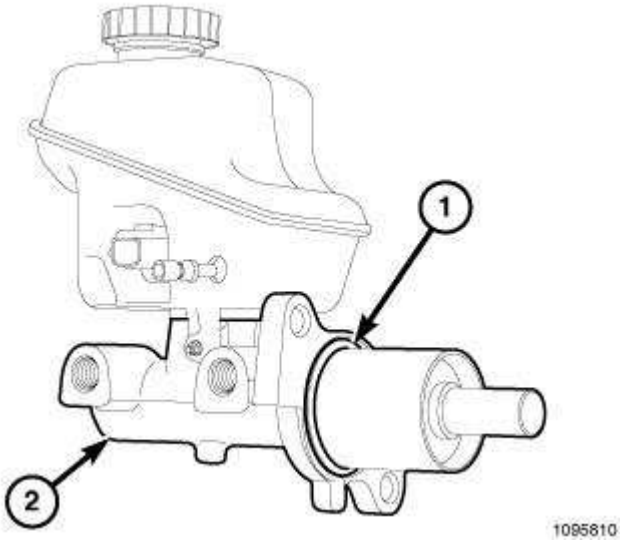


Fig. 167: Vacuum Seal On Rear Of Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Vacuum seal (1) on rear of master cylinder (2) is used to allow vacuum ability in power brake vacuum booster. Vacuum seal MUST be replaced whenever master cylinder is removed from power brake vacuum booster.

10. Remove vacuum seal (1) located on mounting flange of master cylinder (2). Vacuum seal is removed by **carefully** pulling it off rear of master cylinder. **Do not attempt to pry seal off master cylinder by inserting a sharp tool between seal and master cylinder casting. Damage can occur.**

DISASSEMBLY

DISASSEMBLY

1. Clean master cylinder housing and brake fluid reservoir. Use only Mopar® Brake Parts Cleaner or equivalent.

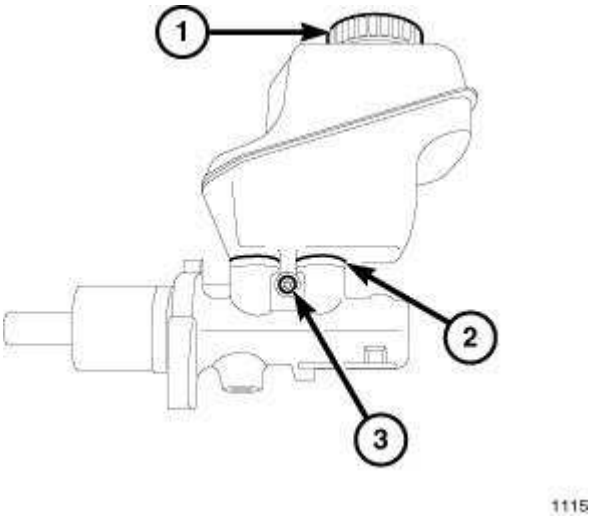


Fig. 168: Fluid Reservoir Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove brake fluid reservoir cap (1). Using a syringe or equivalent type tool, empty as much brake fluid as possible from the reservoir.

CAUTION: When removing fluid reservoir from the master cylinder, do not pry off using any type of tool. This can damage the fluid reservoir or master cylinder housing.

3. Remove screw (3) fastening fluid reservoir to master cylinder housing.
4. Rock the brake fluid reservoir side-to-side while pulling up to remove it from seal grommets in master cylinder housing.

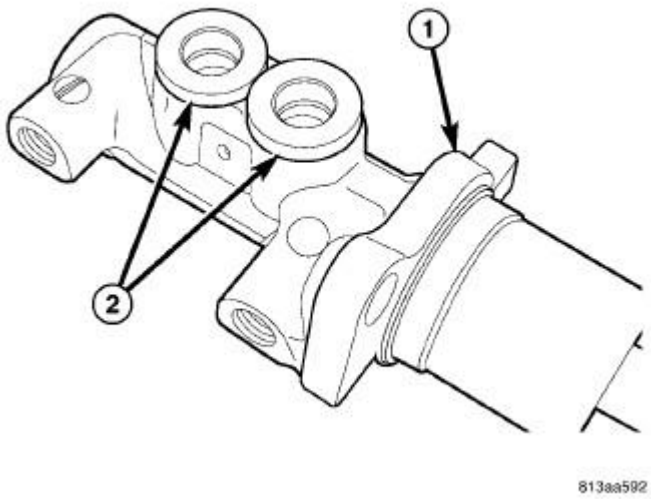


Fig. 169: Reservoir Seal Grommets
Courtesy of CHRYSLER GROUP, LLC

5. Remove two brake fluid reservoir seal grommets (2) from master cylinder housing (1).

ASSEMBLY

ASSEMBLY

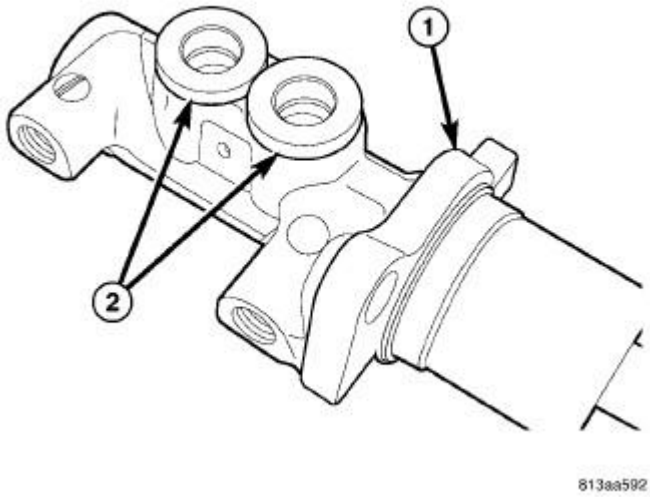


Fig. 170: Reservoir Seal Grommets
Courtesy of CHRYSLER GROUP, LLC

1. Install NEW brake fluid reservoir sealing grommets (2) in master cylinder housing (1).

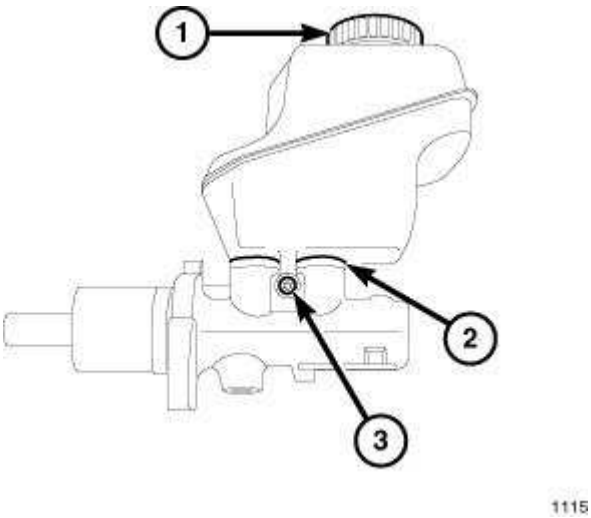


Fig. 171: Fluid Reservoir Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Lubricate reservoir mounting area with fresh clean brake fluid. Place reservoir in position over sealing grommets. Seat reservoir into sealing grommets using a rocking motion while firmly pressing down on fluid reservoir. Once installed, make sure fluid reservoir is touching the top of both sealing grommets (2) or reservoir is not properly installed.
3. Install fluid reservoir mounting screw (3). Tighten screw to 28 N.m (250 in. lbs.).
4. Thoroughly bleed master cylinder before installing it on vehicle. Refer to **MASTER CYLINDER, BRAKE, STANDARD PROCEDURE**.

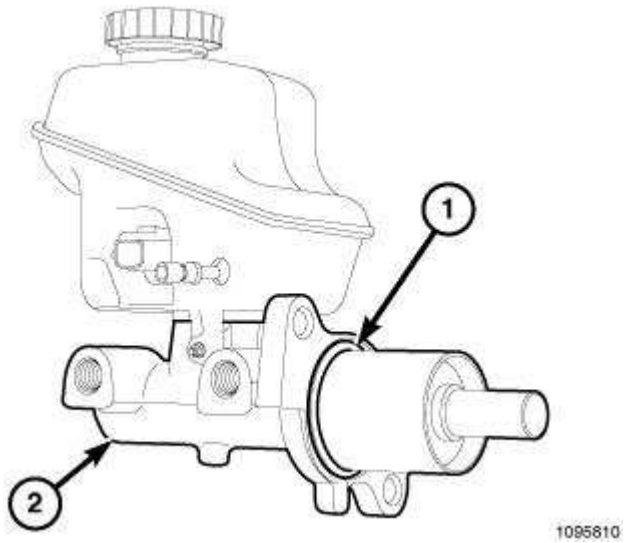


Fig. 172: Vacuum Seal On Rear Of Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

5. Install master cylinder on power brake booster. Upon installation, vacuum seal (1) on rear of master cylinder must be replaced. Refer to **MASTER CYLINDER, BRAKE, INSTALLATION**.

INSTALLATION

MASTER CYLINDER

1. Thoroughly bleed master cylinder before installing it on vehicle. Refer to **MASTER CYLINDER, BRAKE, STANDARD PROCEDURE**.

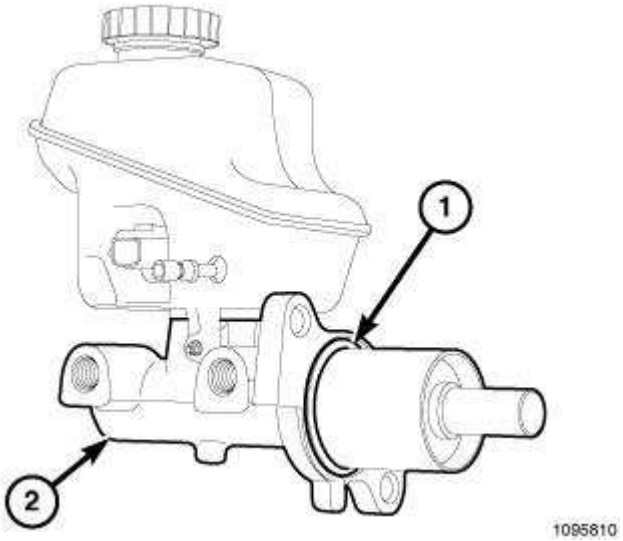


Fig. 173: Vacuum Seal On Rear Of Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When replacing master cylinder on vehicle, a NEW vacuum seal (1) MUST be installed on master cylinder.

2. Install NEW vacuum seal (1) on rear of master cylinder (2) making sure seal fits squarely in mounting groove.

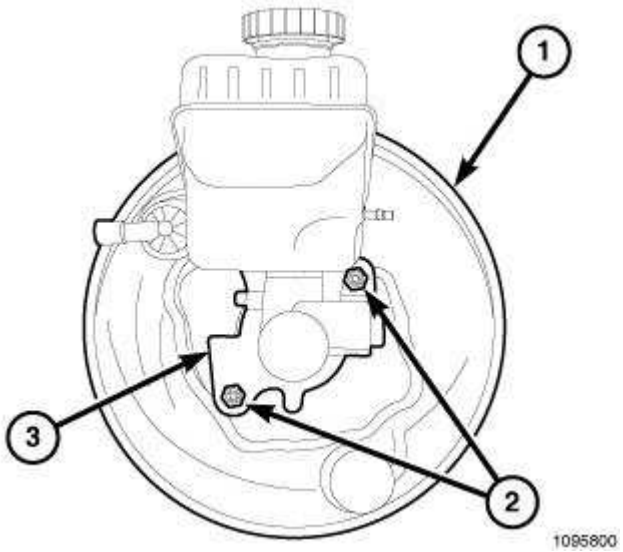


Fig. 174: Master Cylinder Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Position master cylinder (3) on studs of power brake booster, aligning booster push rod with master cylinder piston.
4. Install two master cylinder mounting nuts (2). Tighten mounting nuts to 15 N.m (133 in. lbs.).

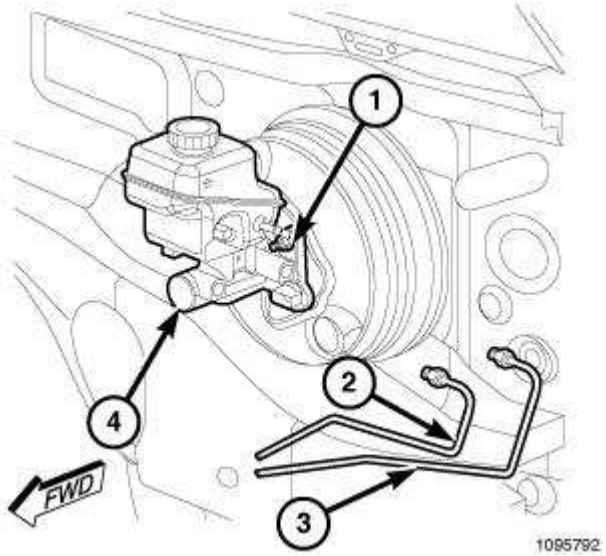


Fig. 175: Brake Tubes AT Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

5. Thread primary (3) and secondary (2) brake tubes into master cylinder primary and secondary ports. Tighten tube nuts to 20 N.m (177 in. lbs.).

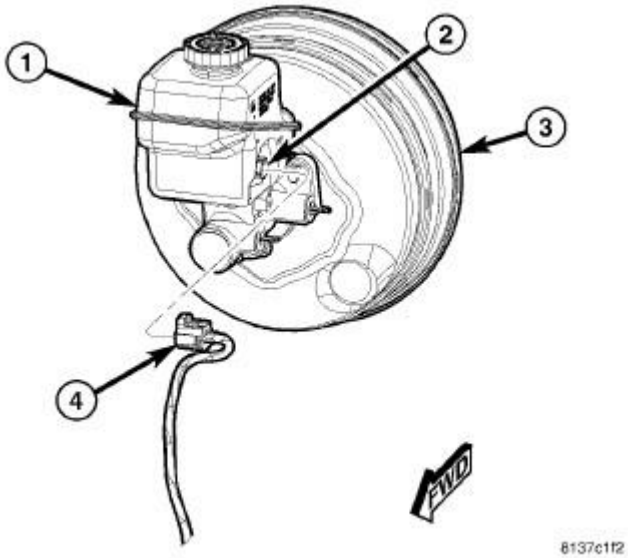


Fig. 176: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

6. Connect wiring harness connector (4) to brake fluid level sensor (2) mounted in brake fluid reservoir (1).

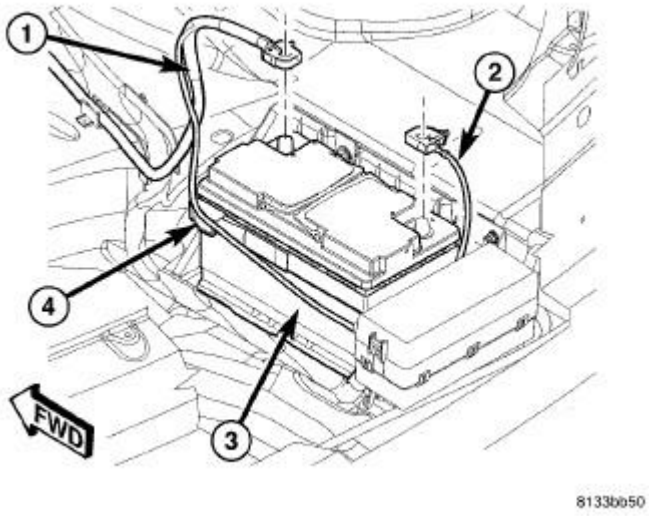


Fig. 177: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

7. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

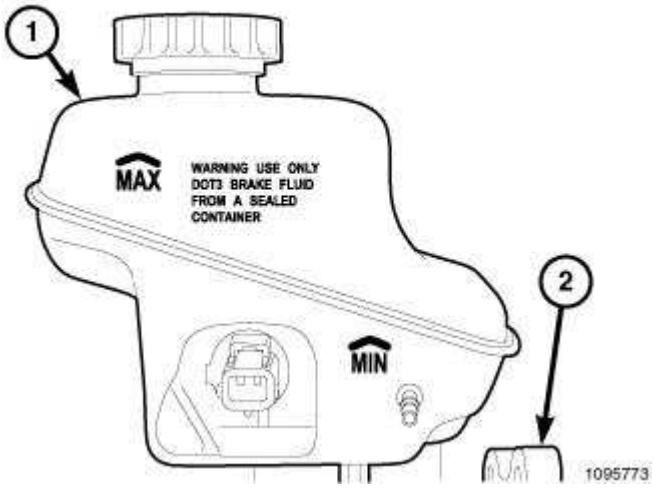


Fig. 178: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

WARNING: Be certain a firm brake pedal is achieved prior to attempting vehicle operation. If a firm brake pedal cannot be achieved, bleed entire brake hydraulic system and check for leaks. Refer to BASE BRAKE

BLEEDING .

8. Fill master cylinder fluid reservoir (1) with clean, fresh Mopar® Brake Fluid or equivalent.
9. Install access panel in cowl area.
10. Road test vehicle to ensure proper operation of brakes.

MASTER CYLINDER - RHD

1. Thoroughly bleed master cylinder before installing it on vehicle. Refer to **MASTER CYLINDER, BRAKE, STANDARD PROCEDURE**.

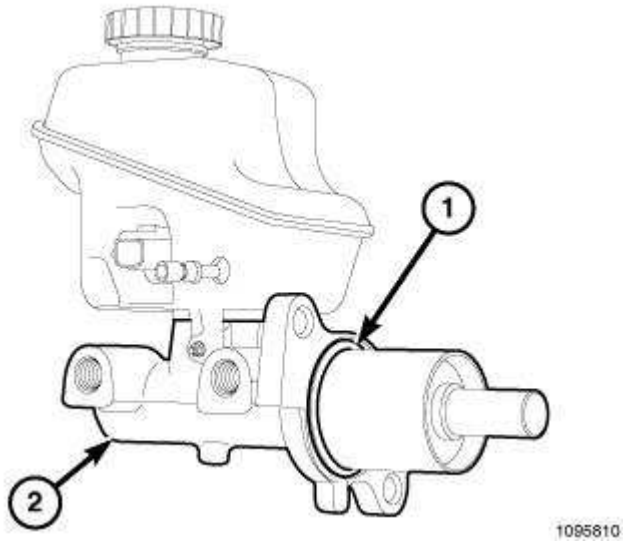


Fig. 179: Vacuum Seal On Rear Of Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When replacing master cylinder on vehicle, a NEW vacuum seal (2) MUST be installed on master cylinder.

2. Install NEW vacuum seal (1) on rear of master cylinder (2) making sure seal fits squarely in mounting groove.

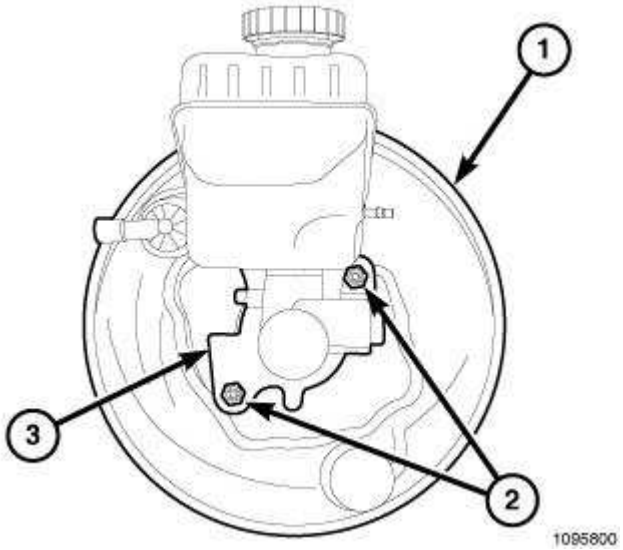


Fig. 180: Master Cylinder Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Position master cylinder (3) on studs of power brake booster, aligning booster push rod with master cylinder piston.
4. Install two master cylinder mounting nuts (1). Tighten mounting nuts to 15 N.m (133 in. lbs.).

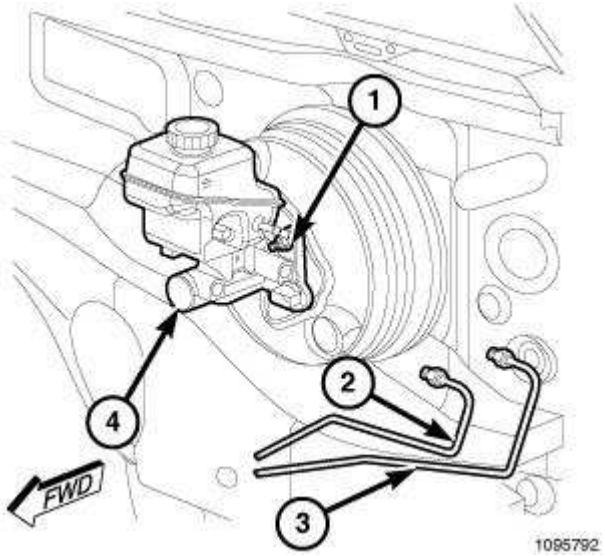


Fig. 181: Brake Tubes AT Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

5. Thread primary (3) and secondary (2) brake tubes into master cylinder primary and secondary ports. Tighten tube nuts to 20 N.m (177 in. lbs.).

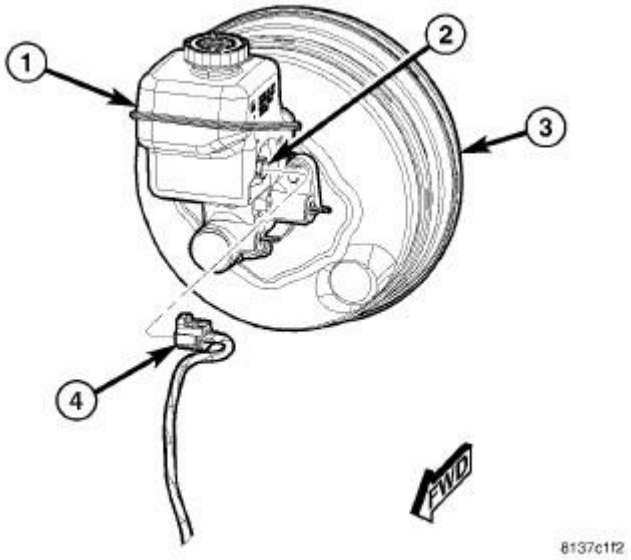


Fig. 182: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

6. Connect wiring harness connector (4) to brake fluid level sensor (2) mounted in brake fluid reservoir (1).

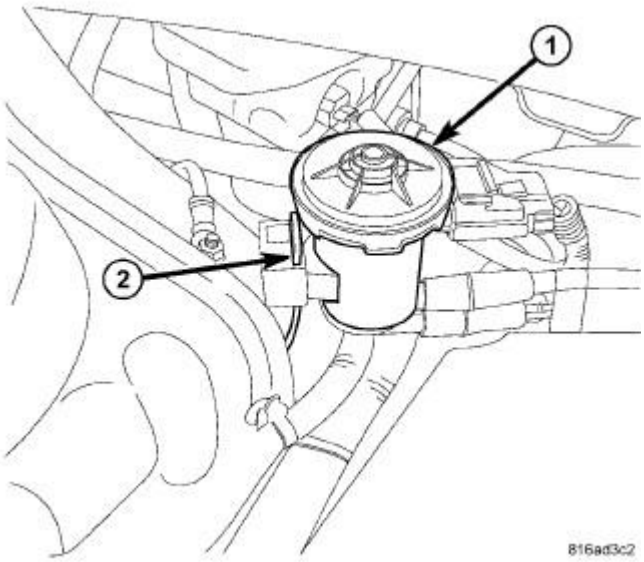


Fig. 183: EVAP/Purge Solenoid
Courtesy of CHRYSLER GROUP, LLC

7. Install purge solenoid (1) on mount (2).

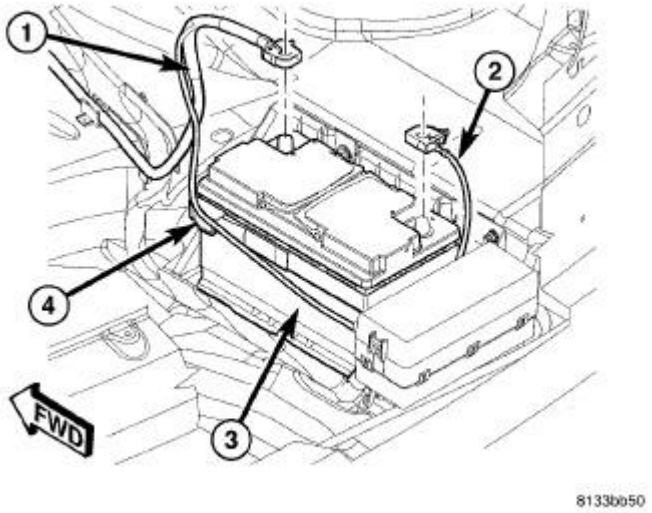


Fig. 184: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

8. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

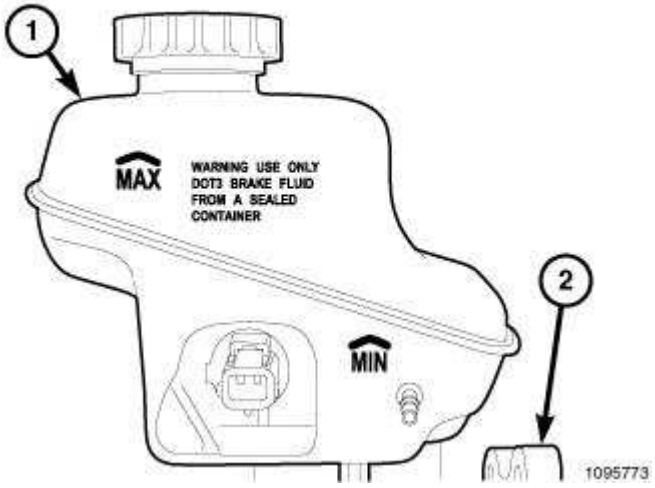


Fig. 185: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

WARNING: Be certain a firm brake pedal is achieved prior to attempting vehicle operation. If a firm brake pedal cannot be achieved, bleed entire brake hydraulic system and check for leaks. Refer to BASE BRAKE BLEEDING .

9. Fill master cylinder fluid reservoir (1) with clean, fresh Mopar® Brake Fluid or equivalent.

10. Install access panel in cowl area.
11. Road test vehicle to ensure proper operation of brakes.

PADS, BRAKE, SRT8

STANDARD PROCEDURE

STANDARD PROCEDURE - BRAKE PAD BURNISHING

CAUTION: After installing NEW brake pads, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications.

When NEW brake pads are installed on a vehicle, this procedure must be used to correctly burnish (seat) the brake linings to the brake rotor discs.

1. Accelerate the vehicle to a steady speed of about 40 mph (65 km/h).
2. Using light brake pedal pressure, slow the vehicle from 40 mph to 0 mph in approximately 6 seconds.
3. Accelerate back up to 40 mph for approximately one minute to allow the brakes to cool down.
4. Repeat this procedure 15 to 20 times to correctly seat the brake lining material.

REMOVAL

REMOVAL

NOTE: Review all Warnings and Cautions. Refer to WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

NOTE: Perform 2 through8 on each side of vehicle to complete pad set removal.

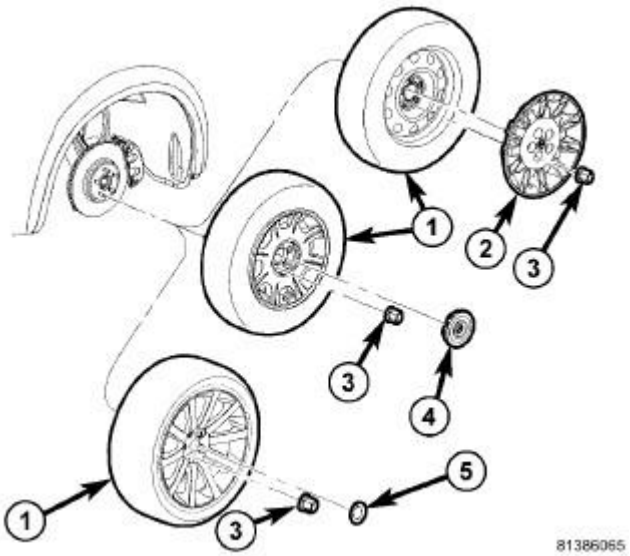


Fig. 186: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

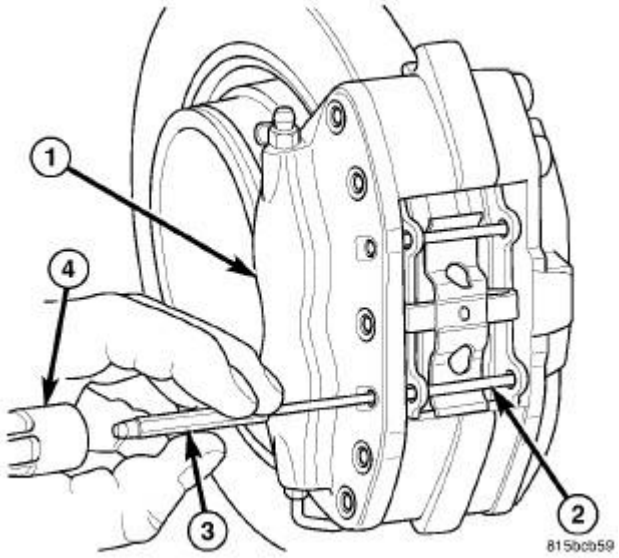


Fig. 187: Removing Lower Support Pin
Courtesy of CHRYSLER GROUP, LLC

3. Using hammer (4) and pin punch (3) on outboard end, tap lower brake pad support pin (2) out of caliper (1).

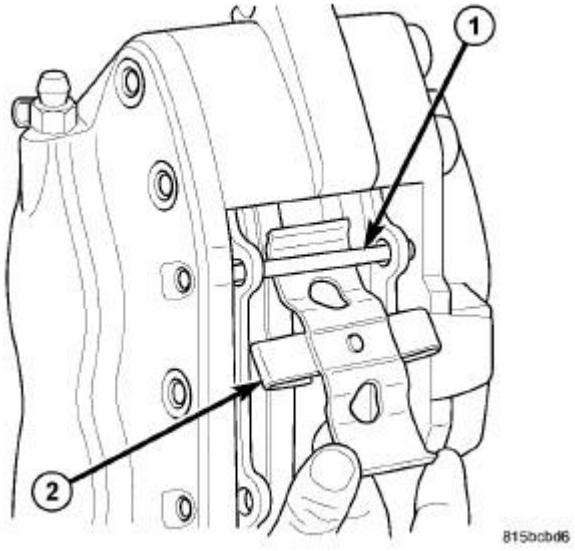


Fig. 188: Removing/Installing Spring Clip
Courtesy of CHRYSLER GROUP, LLC

4. Remove brake pad spring clip (2) out from under the upper support pin (1) still in caliper.

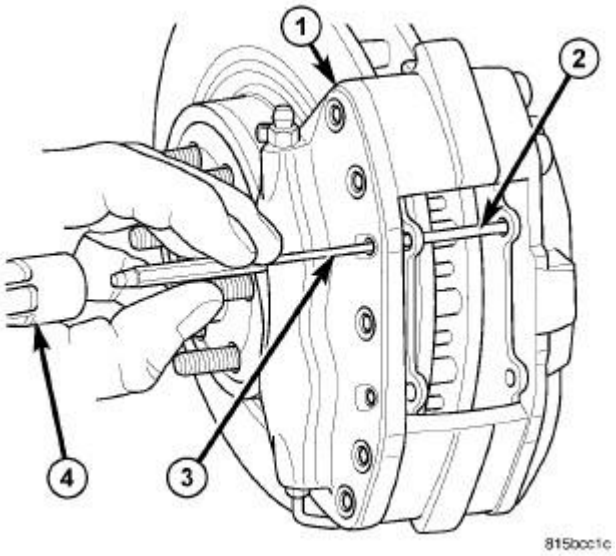


Fig. 189: Removing Upper Support Pin
Courtesy of CHRYSLER GROUP, LLC

5. Using pin punch (3) and hammer (4), remove upper brake pad support pin (2) in same manner used on lower support pin.

CAUTION: When pushing pistons back into caliper bores, if hand pressure is not sufficient, use only a trim stick as shown in illustration or other

suitable soft tool to do so. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor or pads.

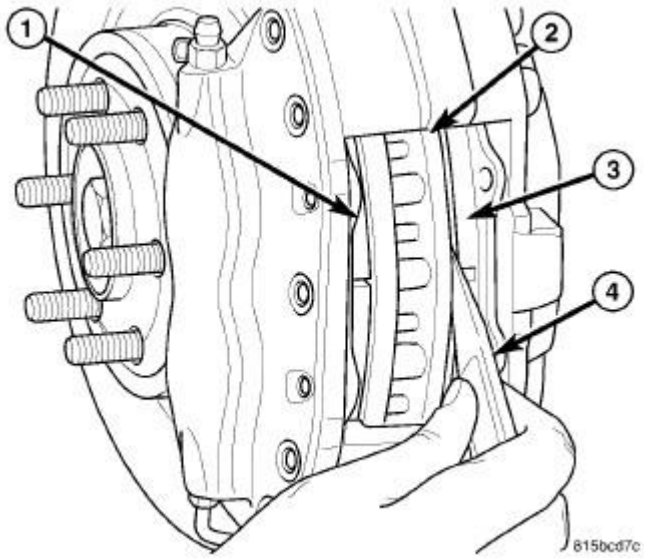


Fig. 190: Pushing Back Pistons Into Bores
Courtesy of CHRYSLER GROUP, LLC

6. Using hand pressure, pull pads back to seat caliper pistons into bores if possible. If not possible, perform the following to do this correctly without damaging the caliper, pistons, dust boots or brake rotor disc.
    1. Place trim stick (3) between inboard brake pad and outer edge of rotor (1).
    2. Using trim stick (3), apply pressure against the inboard brake pad until both pistons are completely bottomed in bores of inboard caliper half. Leave trim stick in place to hold pistons in place.
    3. Place second trim stick between outboard brake pad and rotor, then repeat above step on outboard pad and pistons.

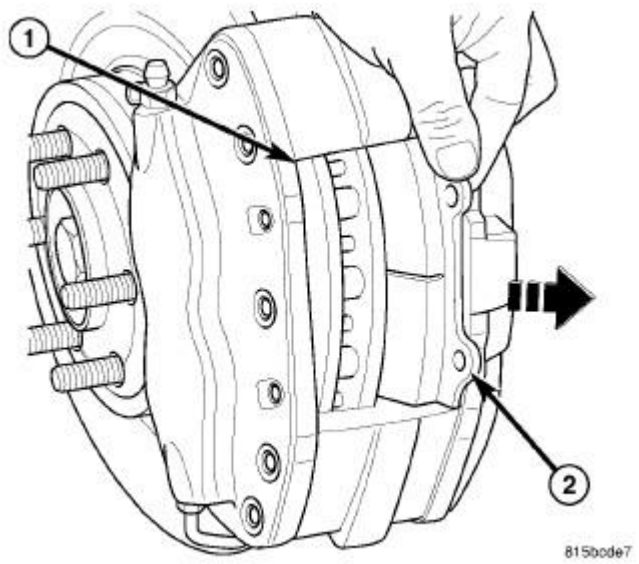


Fig. 191: Brake Pad Removal
Courtesy of CHRYSLER GROUP, LLC

7. Remove inboard brake pad (2) through opening in caliper (1). Remove outboard brake pad in same manner.

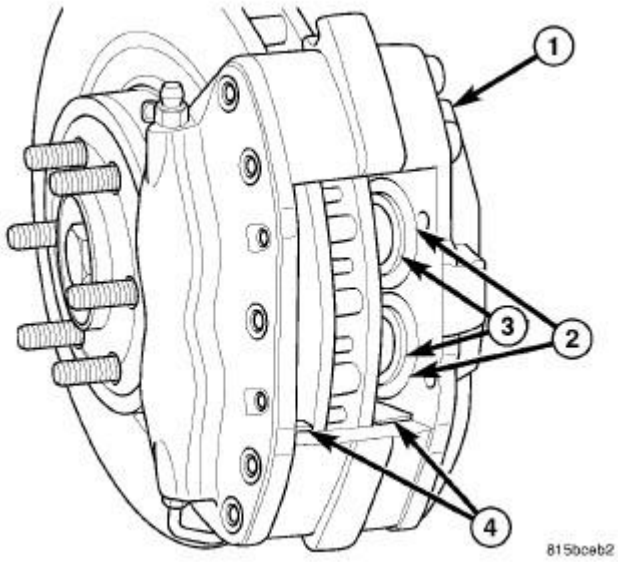


Fig. 192: Piston And Seal Inspection
Courtesy of CHRYSLER GROUP, LLC

8. Once brake pads are removed from caliper (1), inspect all four caliper pistons (3) and dust boots (2) for evidence of brake fluid leakage. Also inspect dust boots on all caliper pistons for any cuts, tears or heat cracks and brake pad supports (4) (if equipped) for excess wear or damage. If caliper fails inspection, it should be replaced.

CLEANING

CLEANING

WARNING: Chrysler does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

INSPECTION

INSPECTION

Visually inspect brake pads for uneven lining wear. Also inspect for excessive lining deterioration. Check the clearance between the tips of the wear indicators (if equipped) on the pads and the brake rotors.

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear, remove the disc brake pads from the vehicle.

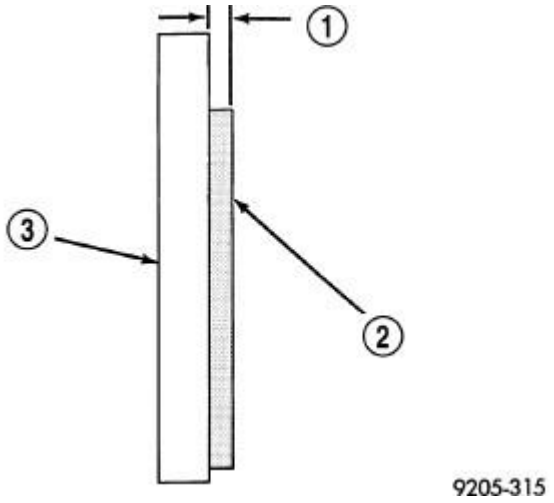


Fig. 193: Brake Pad Friction Material Thickness Measurement
Courtesy of CHRYSLER GROUP, LLC

1 - BRAKE SHOE ASSEMBLY FRICTION MATERIAL THICKNESS IS TO BE MEASURED AT THE THINNEST POINT.
2 - BRAKE SHOEd ASSEMBLY FRICTION MATERIAL
3 - BRAKE SHOE ASSEMBLY BACKING PLATE

Measure brake pad minimum thickness (1). Brake pads must be replaced when usable material on a

brake pad lining (2) measured at its **thinnest point** measures one millimeter (0.04 inches) or less.

If a brake pad fails inspection, replace **both** disc brake pads (inboard and outboard) at each caliper. It is also necessary to replace the pads on the opposite side of the vehicle as well as the pads failing inspection to maintain proper braking characteristics.

If the brake pad assemblies do not require replacement, be sure to reinstall the brake pads in the original position they were removed from.

NOTE: It is important to inspect both front and rear brake pads during the same inspection.

INSTALLATION

INSTALLATION

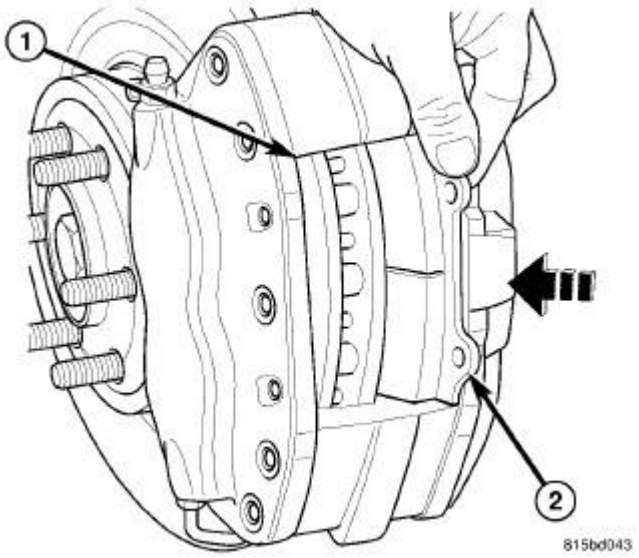


Fig. 194: Brake Pad Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform 1 through11 on each side of vehicle to complete pad set installation before proceeding with12.

1. Make sure all caliper pistons are fully seated (bottomed) in bores.
2. If equipped, remove the film from the brake pad double sticky isolator.
3. Slide NEW inboard (2) and outboard brake pads into opening (1) in disc brake caliper. **If installing rear brake pads, make sure beveled end of each pad lining is directed against the direction the rotor is rotating in when vehicle is moving forward, in other words, the rear pads need to have beveled end facing upward.**

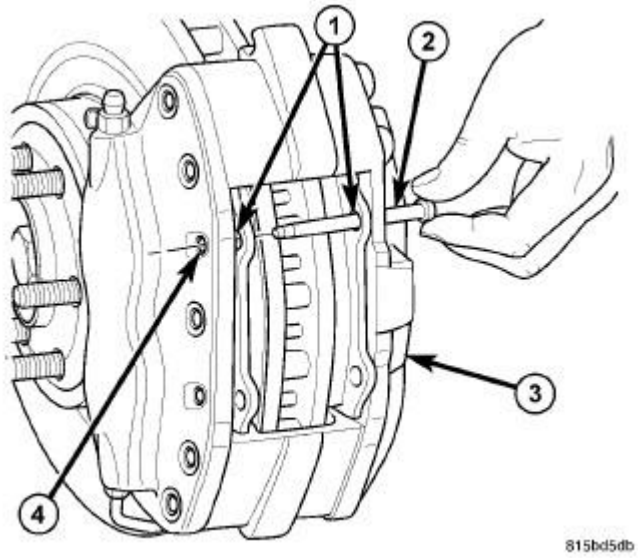


Fig. 195: Installing Upper Support Pin
Courtesy of CHRYSLER GROUP, LLC

4. From inboard side, slide upper brake pad support pin (2) through caliper (3) and upper holes in both brake pads (1). Ensure that small end of support pin is in hole (4) in outboard half of caliper.

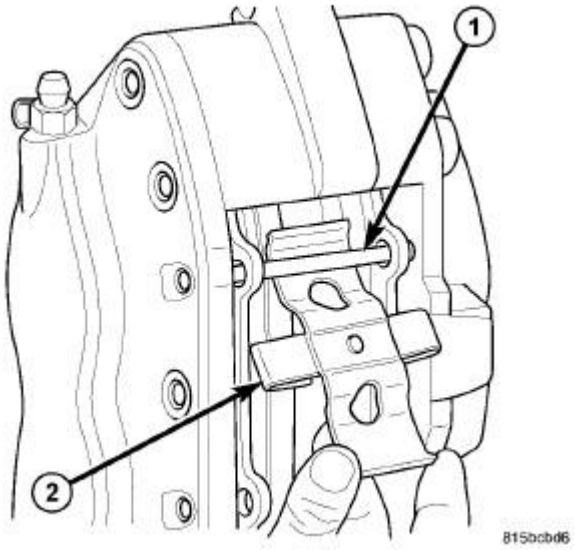


Fig. 196: Removing/Installing Spring Clip
Courtesy of CHRYSLER GROUP, LLC

5. Install upper end of brake pad spring clip (2) under upper brake pad support pin (1).

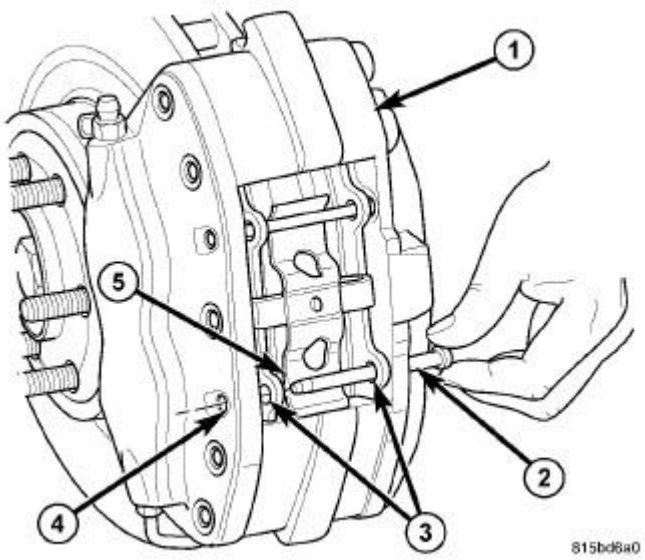


Fig. 197: Installing Lower Support Pin
Courtesy of CHRYSLER GROUP, LLC

6. Press on lower end of spring clip (5) until it touches brake rotor.
7. Slide lower brake pad support pin (2) through caliper (1) and lower holes in both brake pads (3) in the same manner the upper pin was installed. Ensure small end of support pin is in hole (4) in outboard half of caliper.
8. Release the spring clip allowing it to engage lower support pin.

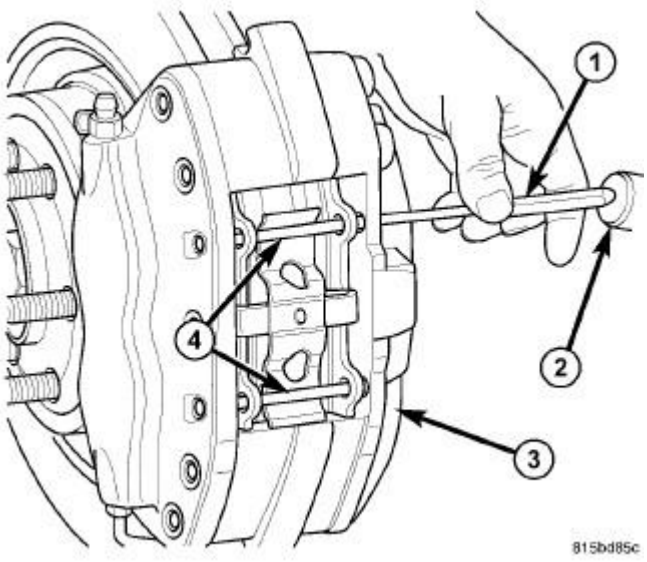


Fig. 198: Seating Support Pins
Courtesy of CHRYSLER GROUP, LLC

9. From inboard side, seat upper and lower support pins (4) into caliper (3) using pin punch (1)

and hammer (2). Support pins must be driven into caliper until support pin retaining rings are locked into place.

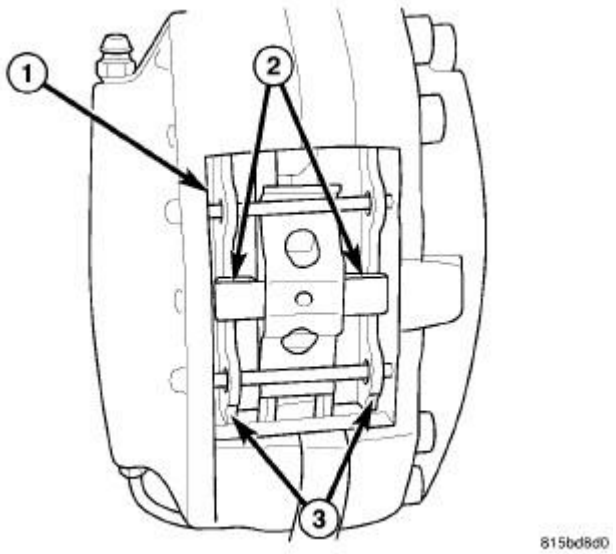


Fig. 199: Correctly Assembled Pads In Caliper
Courtesy of CHRYSLER GROUP, LLC

10. Once support pins are fully installed into caliper, inspect assembled caliper to make sure spring clip (2) is centered in opening (1) of caliper, correctly engaging upper and lower support pins, and is resting against both brake pads (3).

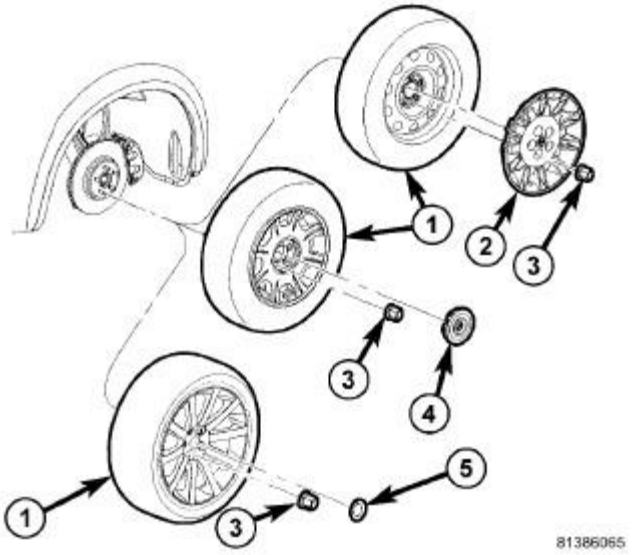


Fig. 200: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

11. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.)

torque. Refer to **INSTALLATION** .

12. Lower vehicle.
13. Pump brake pedal several times to set pads to caliper and brake rotor.

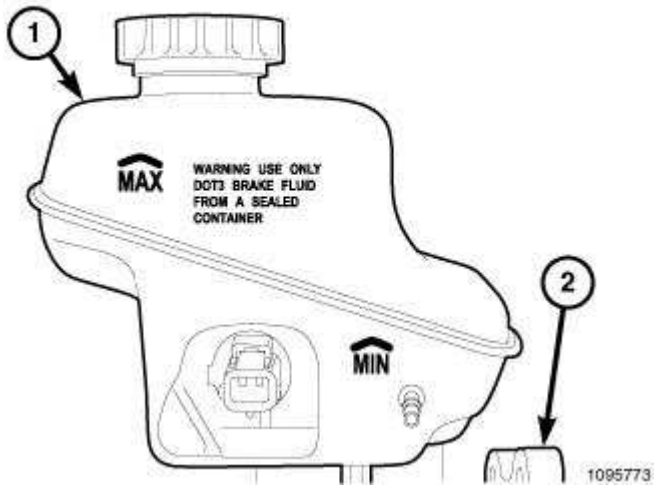


Fig. 201: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

14. Check and adjust brake fluid level in reservoir (1).

CAUTION: When NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

NOTE: When NEW brake pads are installed, they must be burnished (seated) to the rotor. This must be done to ensure the proper performance of the replacement brake pads.

15. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pad linings. NEW brake pads need to be burnished properly. Refer to **PADS, BRAKE, SRT8, STANDARD PROCEDURE**.

PADS, BRAKE, FRONT

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

NOTE: **Perform steps 2 through 6 on each side of the vehicle.**

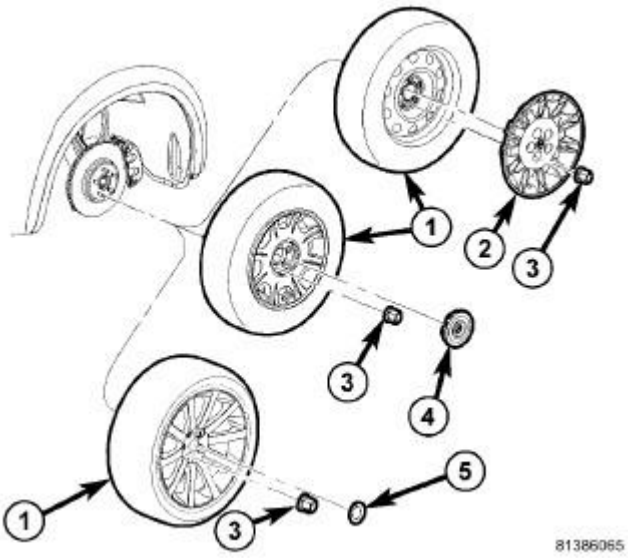


Fig. 202: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

NOTE: **In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be accomplished before guide pin bolts are removed by grasping rear of caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.**

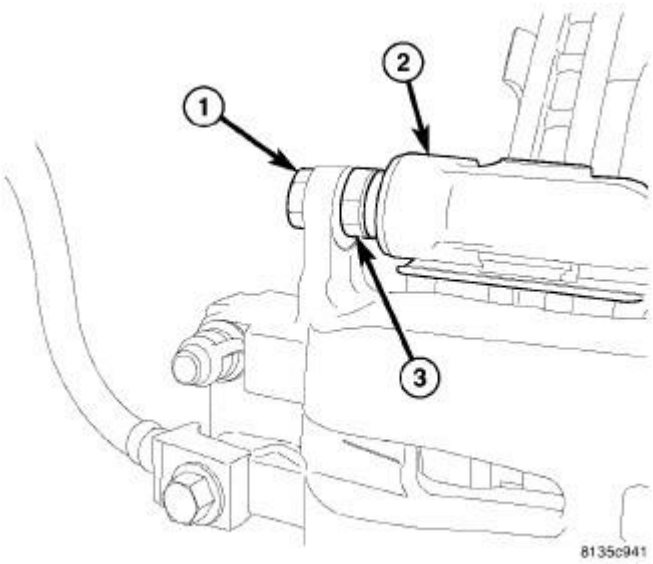


Fig. 203: Caliper Guide Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Remove lower caliper guide pin bolt. To do so, hold the guide pin (3) stationary while turning bolt (1).

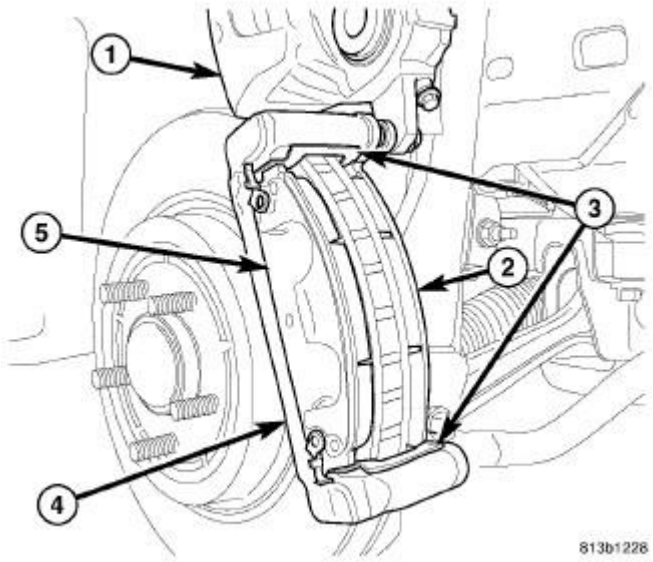


Fig. 204: Access To Front Pads
Courtesy of CHRYSLER GROUP, LLC

4. Rotate caliper upward (1), exposing brake pads (2 and 5). **Use care not to overextend brake hose when doing this or damage may occur.**
5. Remove inboard (2) and outboard (5) brake pads from caliper adapter (4).
6. If necessary, remove anti-rattle clips (3) from upper and lower abutments of adapter (4).

CLEANING

CLEANING

WARNING: Chrysler does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

INSPECTION

INSPECTION

Visually inspect brake pads for uneven lining wear. Also inspect for excessive lining deterioration. Check the clearance between the tips of the wear indicators (if equipped) on the pads and the brake rotors.

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear, remove the disc brake pads from the vehicle.

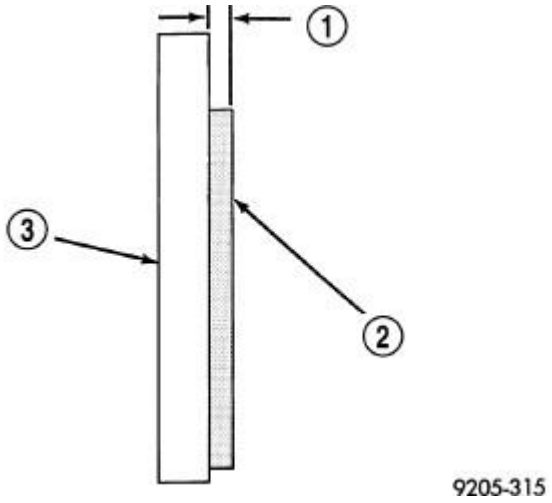


Fig. 205: Brake Pad Friction Material Thickness Measurement
Courtesy of CHRYSLER GROUP, LLC

1 - BRAKE SHOE ASSEMBLY FRICTION MATERIAL THICKNESS IS TO BE MEASURED AT THE THINNEST POINT.
2 - BRAKE SHOEd ASSEMBLY FRICTION MATERIAL
3 - BRAKE SHOE ASSEMBLY BACKING PLATE

Measure brake pad minimum thickness (1). Brake pads must be replaced when usable material on a

brake pad lining (2) measured at its **thinnest point** measures one millimeter (0.04 inches) or less.

If a brake pad fails inspection, replace **both** disc brake pads (inboard and outboard) at each caliper. It is also necessary to replace the pads on the opposite side of the vehicle as well as the pads failing inspection to maintain proper braking characteristics.

If the brake pad assemblies do not require replacement, be sure to reinstall the brake pads in the original position they were removed from.

NOTE: It is important to inspect both front and rear brake pads during the same inspection.

INSTALLATION

INSTALLATION

NOTE: Perform steps 1 through 7 on each side of the vehicle.

1. Completely retract caliper piston(s) back into bore(s) of caliper. To do so:
    1. Remove fluid reservoir cap.
    2. Use hand pressure or a C-clamp may be used to retract piston, first placing a wood block over piston(s) before installing C-clamp to avoid damaging piston(s).
    3. Install fluid reservoir cap.

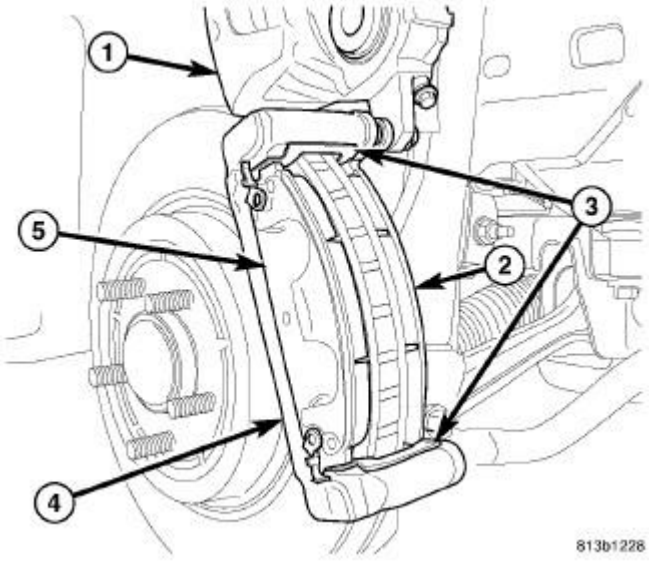


Fig. 206: Access To Front Pads
Courtesy of CHRYSLER GROUP, LLC

2. If removed, attach anti-rattle clips (3) to upper and lower abutments of adapter (4).
3. If equipped, remove the film from the brake pad double sticky isolator.

4. Install NEW inboard (2) and outboard (5) brake pads on caliper adapter (4). NEW Inboard and outboard pads are interchangeable.
5. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.
6. Rotate caliper downward, aligning upper mounting boss with lower guide pin.

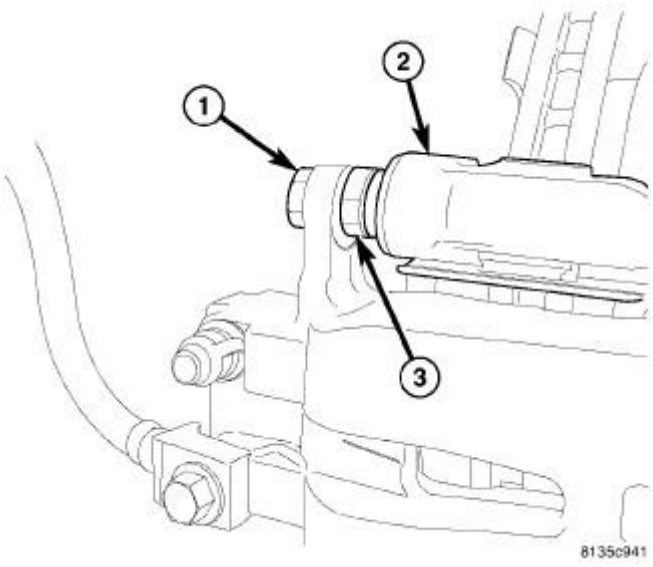


Fig. 207: Caliper Guide Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Install Upper caliper guide pin bolt (1). While holding guide pin (3) stationary tighten bolt to 60 N.m (44 ft. lbs.).

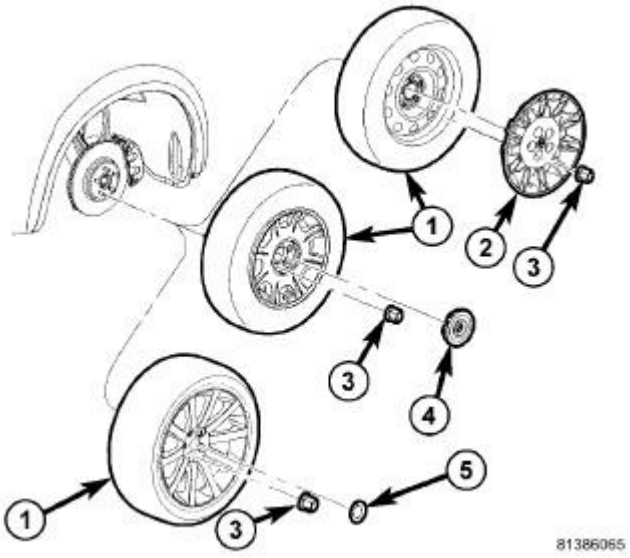


Fig. 208: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

8. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
9. Lower vehicle.
10. Pump brake pedal several times to set pads to caliper and brake rotor.

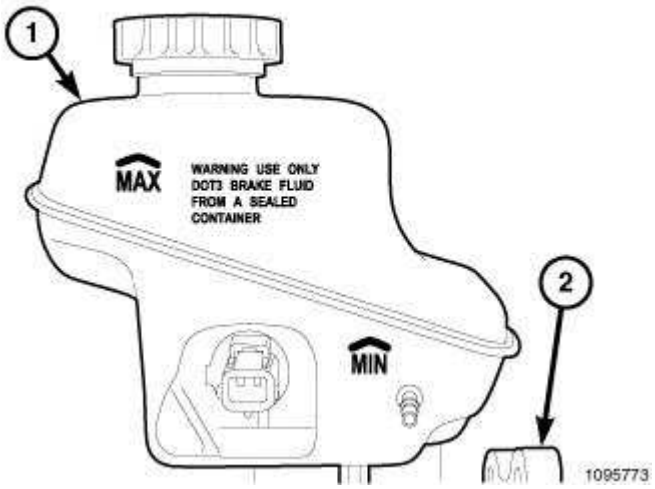


Fig. 209: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

11. Check and adjust brake fluid level in reservoir (1).

CAUTION: When NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

CAUTION: A burnish procedure must be performed anytime NEW brake pads or rotors are installed on a vehicle equipped with the Police Package. This procedure is particularly important in situations where high speed pursuit is a possibility. It is recommended that the procedure be performed by the Police agency operating the vehicle so it can be performed in a safe controlled environment. This information is covered in the Police Package Owners Manual Supplement which was supplied when the vehicle was originally delivered.

12. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes. If the vehicle is equipped with the Police Package, a burnish procedure must be followed (Refer to preceding Caution).

PADS, BRAKE, REAR

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

   NOTE: Perform steps 2 through 6 on each side of the vehicle.

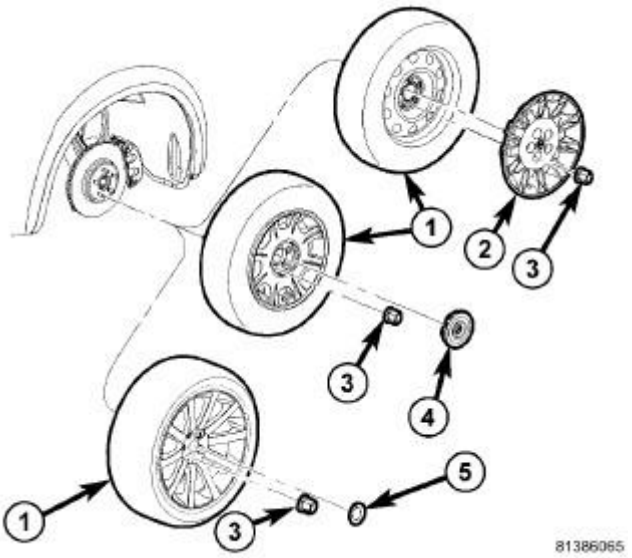


Fig. 210: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

   NOTE: In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be accomplished before guide pin bolts are removed by grasping rear of caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.

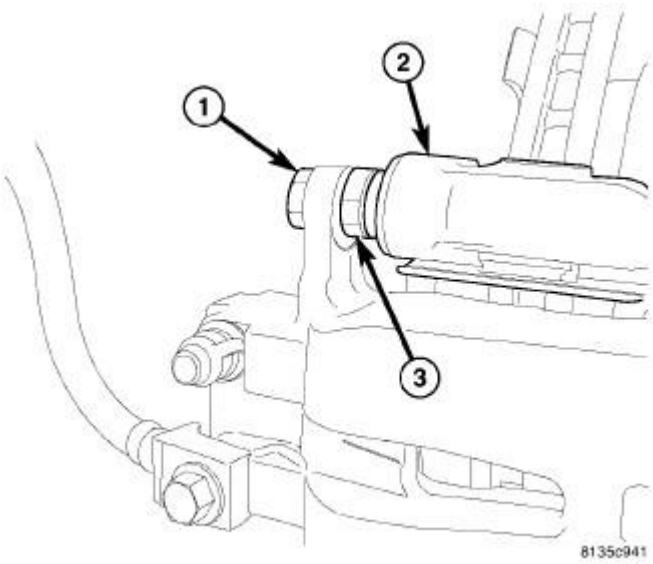


Fig. 211: Caliper Guide Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Remove Upper caliper guide pin bolt (1). To do so, hold the guide pin (3) stationary while turning bolt.

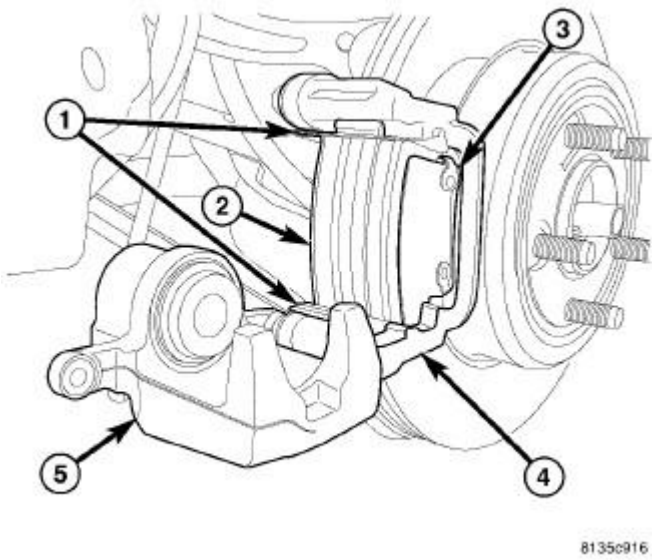


Fig. 212: Access To Rear Brake Pads
Courtesy of CHRYSLER GROUP, LLC

4. Rotate caliper downward (5), exposing brake pads (2 and 3). **Use care not to overextend brake hose when doing this or damage may occur.**
5. Remove inboard (2) and outboard (3) brake pads from caliper adapter (4).
6. If necessary, remove anti-rattle clips (1) from upper and lower abutments of adapter (4).

CLEANING

CLEANING

WARNING: Chrysler does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

INSPECTION

INSPECTION

Visually inspect brake pads for uneven lining wear. Also inspect for excessive lining deterioration. Check the clearance between the tips of the wear indicators (if equipped) on the pads and the brake rotors.

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear, remove the disc brake pads from the vehicle.

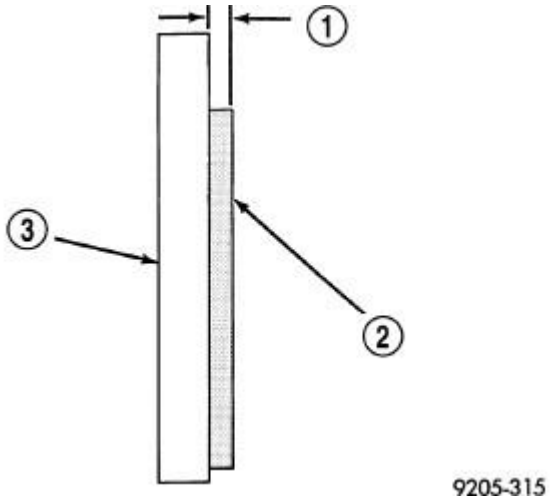


Fig. 213: Brake Pad Friction Material Thickness Measurement
Courtesy of CHRYSLER GROUP, LLC

1 - BRAKE SHOE ASSEMBLY FRICTION MATERIAL THICKNESS IS TO BE MEASURED AT THE THINNEST POINT.
2 - BRAKE SHOEd ASSEMBLY FRICTION MATERIAL
3 - BRAKE SHOE ASSEMBLY BACKING PLATE

Measure brake pad minimum thickness (1). Brake pads must be replaced when usable material on a

brake pad lining (2) measured at its **thinnest point** measures one millimeter (0.04 inches) or less.

If a brake pad fails inspection, replace **both** disc brake pads (inboard and outboard) at each caliper. It is also necessary to replace the pads on the opposite side of the vehicle as well as the pads failing inspection to maintain proper braking characteristics.

If the brake pad assemblies do not require replacement, be sure to reinstall the brake pads in the original position they were removed from.

NOTE: It is important to inspect both front and rear brake pads during the same inspection.

INSTALLATION

INSTALLATION

NOTE: Perform steps 1 through 7 on each side of the vehicle.

1. Completely retract caliper piston back into bore of caliper. To do so:
    1. Remove fluid reservoir cap.
    2. Use hand pressure or a C-clamp may be used to retract piston, first placing a wood block over piston before installing C-clamp to avoid damaging piston.
    3. Install fluid reservoir cap.

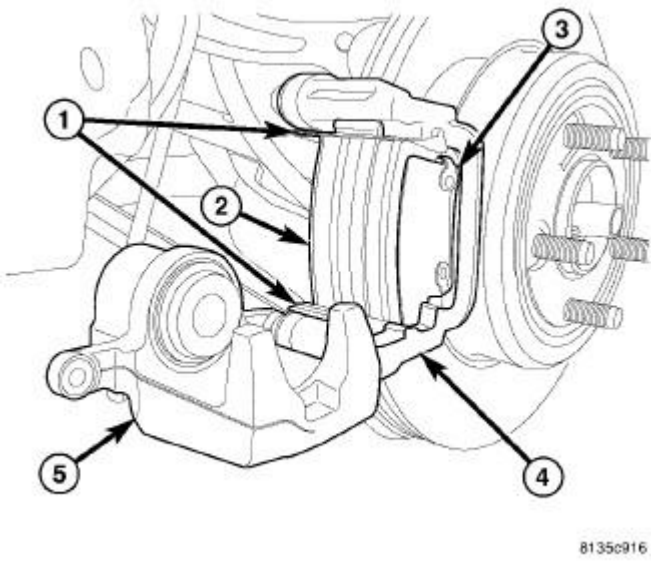


Fig. 214: Access To Rear Brake Pads
Courtesy of CHRYSLER GROUP, LLC

2. If removed, attach anti-rattle clips (1) to upper and lower abutments of adapter (4).
3. If equipped, remove the film from the brake pad double sticky isolator.

4. Install NEW inboard (2) and outboard (3) brake pads on caliper adapter (4). NEW Inboard and outboard pads are interchangeable.
5. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.
6. Rotate caliper upward, aligning upper mounting boss with upper guide pin.

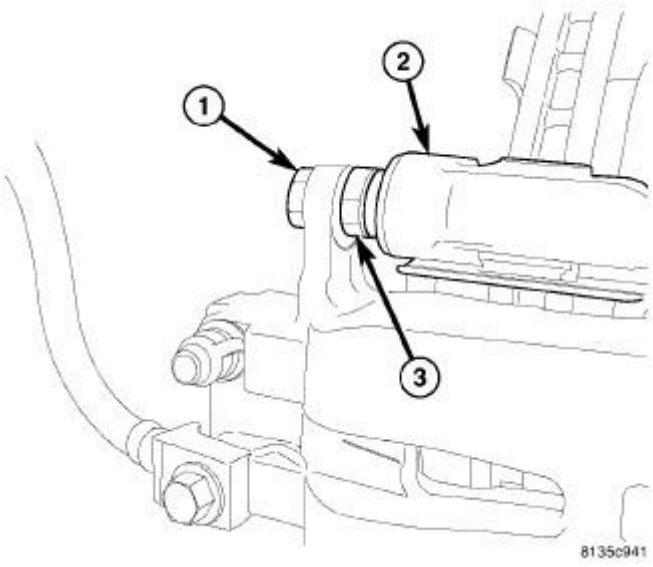


Fig. 215: Caliper Guide Pin & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before installing caliper guide pin bolts, clean guide pin bolt threads and apply Mopar® Lock AND Seal Adhesive or equivalent.

7. Install upper caliper guide pin bolt (1). While holding guide pin (3) stationary tighten bolt to 31 N.m (23 ft. lbs.).

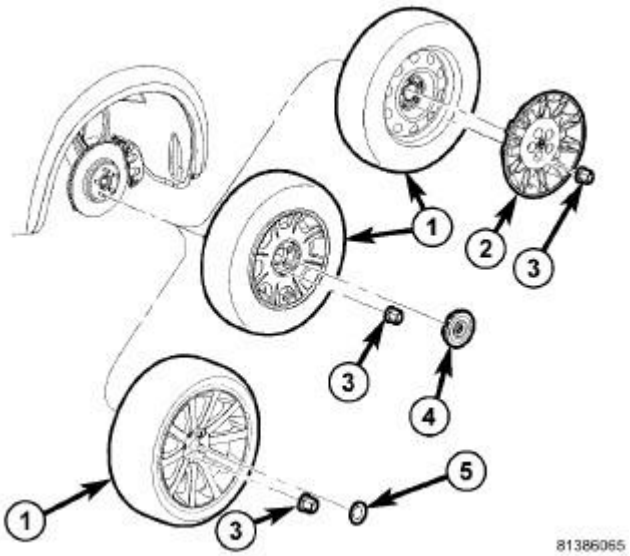


Fig. 216: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

8. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
9. Lower vehicle.
10. Pump brake pedal several times to set pads to caliper and brake rotor.

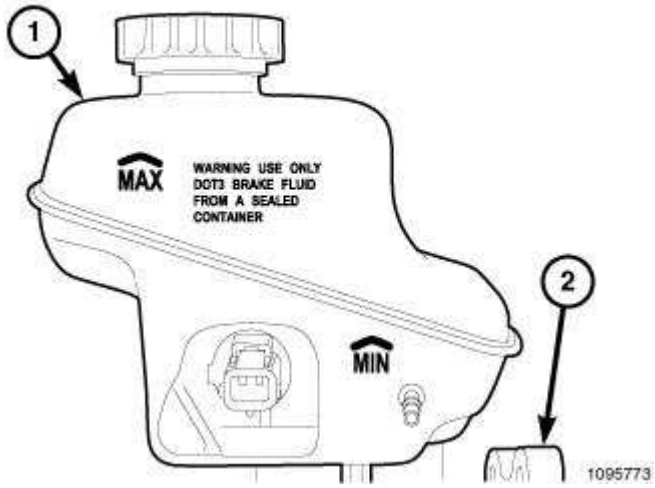


Fig. 217: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

11. Check and adjust brake fluid level in reservoir (1).

CAUTION: When NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake

applications following installation.

CAUTION: A burnish procedure must be performed anytime NEW brake pads or rotors are installed on a vehicle equipped with the Police Package. This procedure is particularly important in situations where high speed pursuit is a possibility. It is recommended that the procedure be performed by the Police agency operating the vehicle so it can be performed in a safe controlled environment. This information is covered in the Police Package Owners Manual Supplement which was supplied when the vehicle was originally delivered.

12. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes. If the vehicle is equipped with the Police Package, a burnish procedure must be followed (Refer to preceding Caution).

PEDAL(S), BRAKE AND/OR ACCELERATOR

REMOVAL

PEDAL

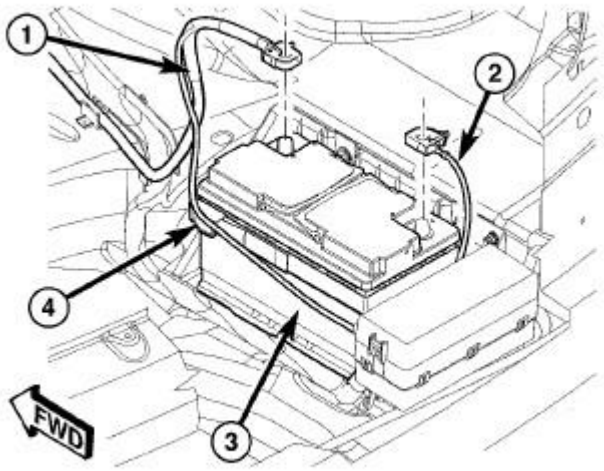


Fig. 218: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Remove driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .
3. Remove steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .

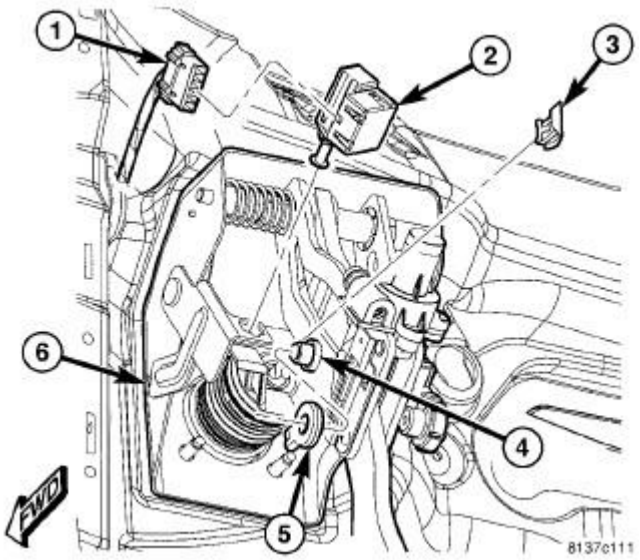


Fig. 219: Locating Stop Lamp Switch And Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

4. Remove brake lamp switch. Refer to **SWITCH, STOP LAMP, REMOVAL** .
5. Remove booster push rod from pin on brake pedal. To do so:
    1. Position small screwdriver between center tang on power brake booster brake pedal pin retaining clip (3).
    2. Rotate screwdriver enough to allow retaining clip center tang to pass over end of brake pedal pin, then slide retaining clip off brake pedal pin.
    3. **Discard retaining clip (3). It is not to be reused. Install NEW retaining clip when assembling.**
6. Slide booster push rod (5) off brake pedal pin (4).

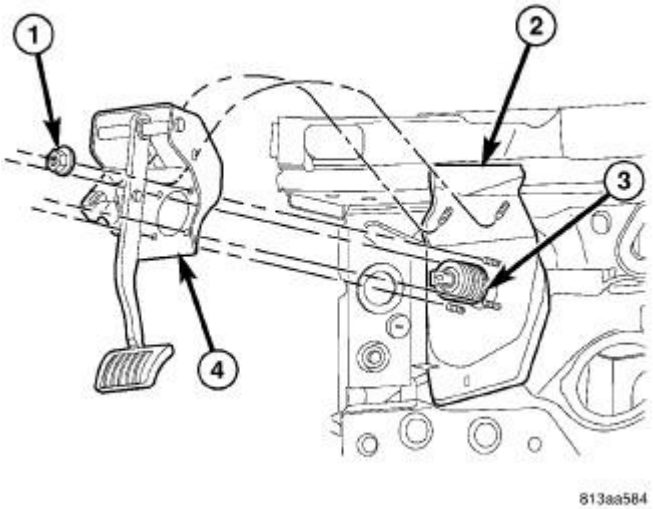


Fig. 220: Brake Pedal Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Remove four power brake booster (3) mounting nuts (1).
8. Remove two nuts (1) fastening pedal bracket to upper dash panel (2).
9. Push power brake booster (3) forward into engine compartment as far as possible by hand. Do not force it.
10. Remove brake pedal (4).

PEDAL - RHD

1. Move driver's seat to full rearward position.

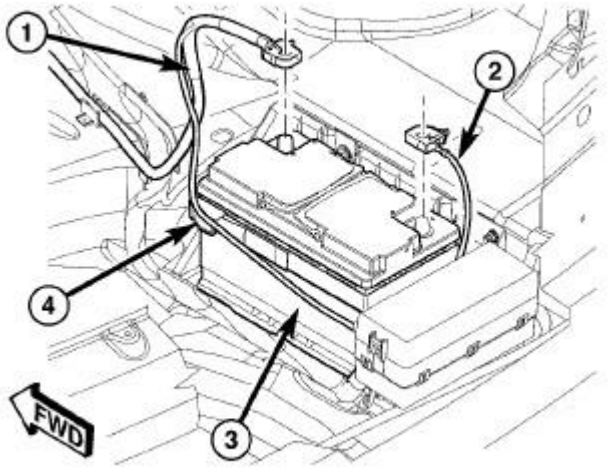


Fig. 221: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect and isolate battery negative cable (2) from battery post.
3. Remove driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .
4. Remove steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .

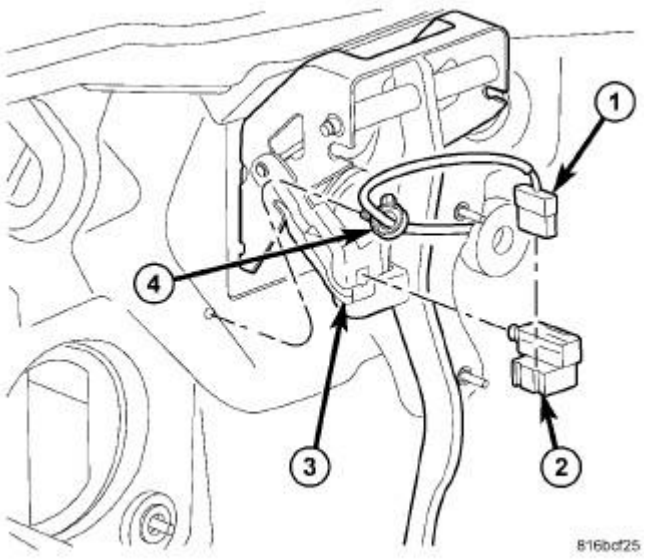


Fig. 222: Stop Lamp Switch Mounting - RHD
Courtesy of CHRYSLER GROUP, LLC

5. Remove stop lamp switch (2). Refer to **SWITCH, STOP LAMP, REMOVAL** .

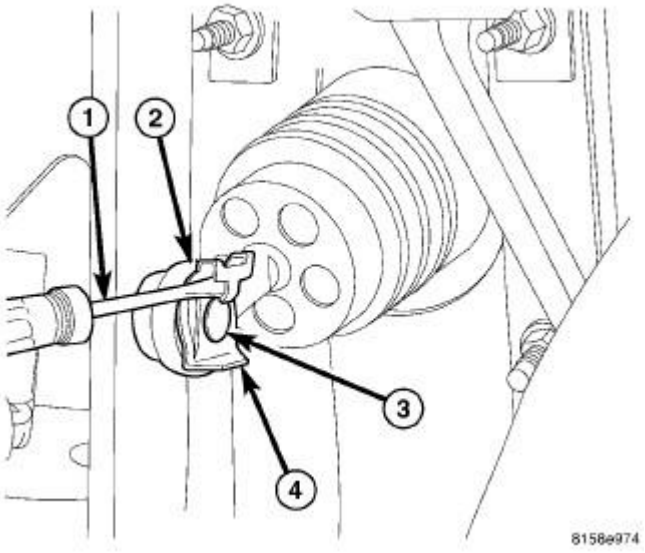


Fig. 223: View Of Pedal Retaining Clip
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing booster push rod from brake pedal pin, be careful not to damage rubber O-ring on pin.

6. Remove booster push rod from pin on brake pedal. To do so:
    1. Position small screwdriver (1) between center tang on power brake booster brake pedal

pin retaining clip (4).

2. Rotate screwdriver enough to allow retaining clip center tang to pass over end of brake pedal pin (3), then slide retaining clip off brake pedal pin.
3. **Discard retaining clip. It is not to be reused. Install NEW retaining clip when assembling.**

7. Slide booster push rod (2) off brake pedal pin (3).

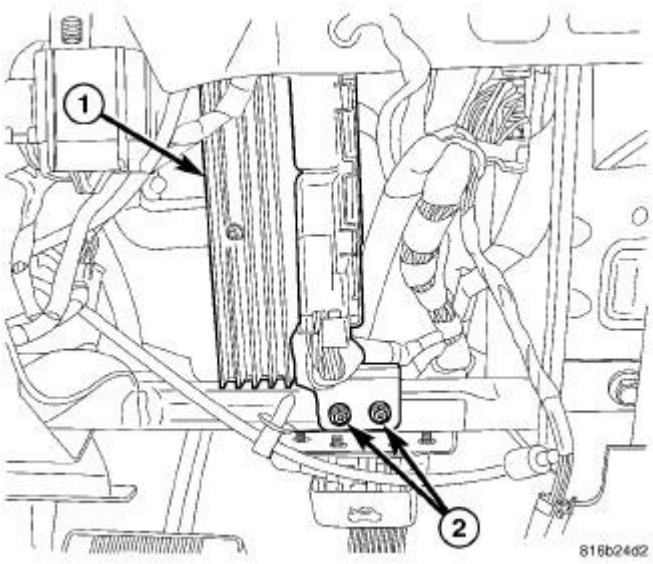


Fig. 224: Radio Amplifier /Transmission Control Module
Courtesy of CHRYSLER GROUP, LLC

8. Remove two lower (2) and one upper mounting screw fastening the radio amplifier/transmission control module assembly (1) in place.
9. Disconnect four wiring connectors and remove radio amplifier/transmission control module assembly (1).

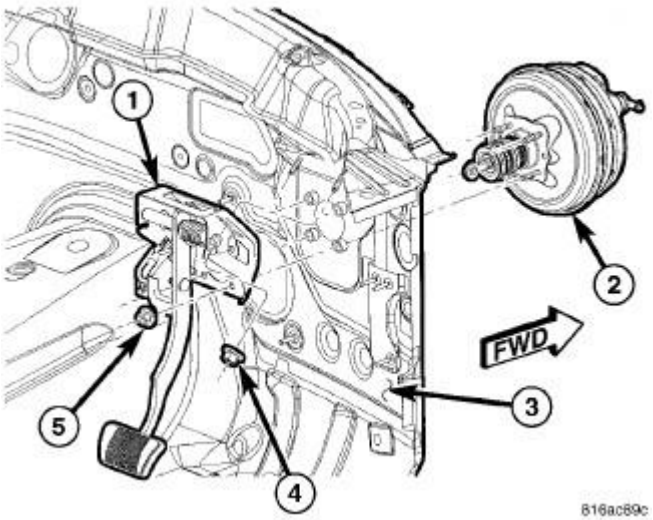


Fig. 225: Booster And Pedal Mounting - RHD
Courtesy of CHRYSLER GROUP, LLC

10. Remove four power brake booster (2) mounting nuts (5).
11. Remove two nuts (4) fastening pedal bracket to upper dash panel (3).
12. Push power brake booster (3) forward into engine compartment as far as possible by hand. Do not force it.
13. Remove brake pedal (1).

INSTALLATION

PEDAL

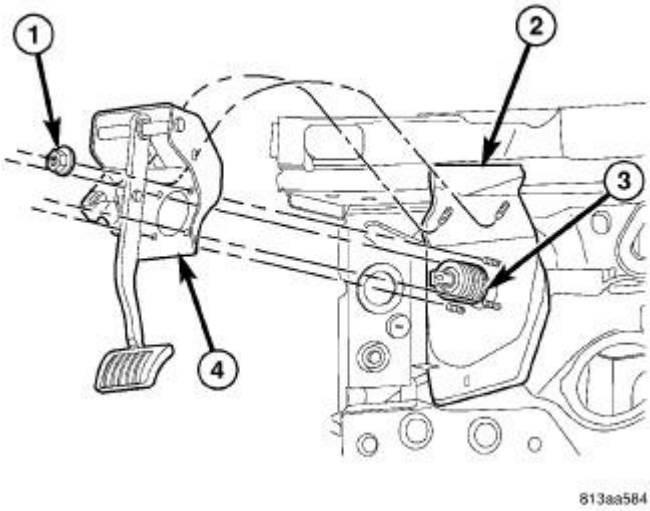


Fig. 226: Brake Pedal Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Install adjustable brake pedal assembly (4) under instrument panel and slide over booster push rod.
2. From engine compartment side, push power brake booster (3) mounting studs back through dash panel (2) and brake pedal bracket.
3. Install two upper mounting nuts (1) fastening pedal bracket to upper dash panel (2). **Do not tighten at this time.**
4. Install four power brake booster mounting nuts (1). Tighten nuts to 25 N.m (18 ft. lbs.) torque.
5. Tighten two upper mounting nuts (1) to 25 N.m (18 ft. lbs.) torque.

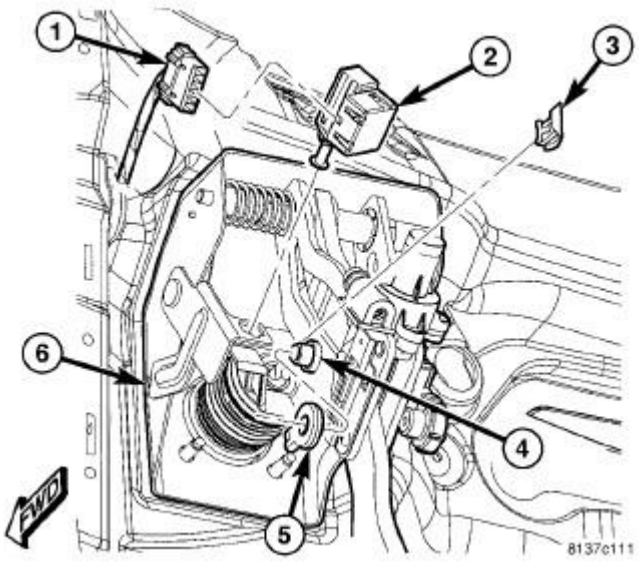


Fig. 227: Locating Stop Lamp Switch And Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

6. Slide booster push rod (5) onto brake pedal pin (4). Install NEW retaining clip (3) securing push rod to brake pedal.
7. Install and adjust brake lamp switch (2). Refer to **SWITCH, STOP LAMP, INSTALLATION** .
8. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
9. Install driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .

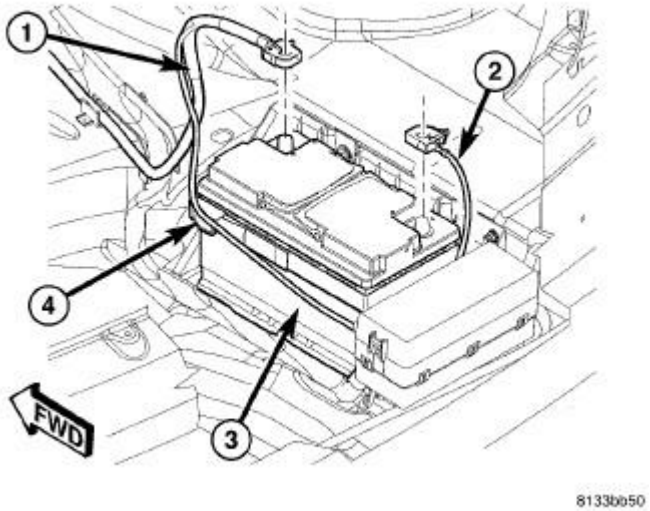


Fig. 228: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

10. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
11. Road test vehicle testing operation of brakes.

PEDAL - RHD

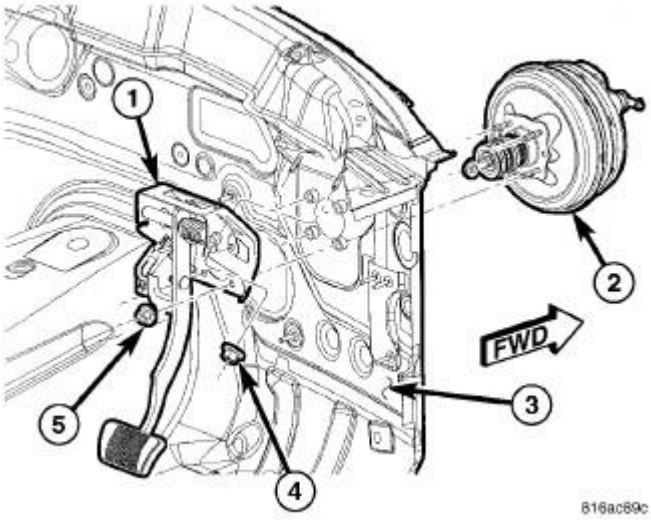


Fig. 229: Booster And Pedal Mounting - RHD
Courtesy of CHRYSLER GROUP, LLC

1. Install brake pedal assembly (4) under instrument panel and slide over booster push rod.
2. From engine compartment side, push power brake booster (3) mounting studs back through

dash panel (2) and brake pedal bracket.

3. Install two upper mounting nuts (4) fastening pedal bracket to dash panel (3). **Do not tighten at this time.**
4. Install four power brake booster mounting nuts (5). Tighten nuts to 25 N.m (18 ft. lbs.).
5. Tighten two upper mounting nuts (4) to 25 N.m (18 ft. lbs.).

CAUTION: When installing booster push rod on brake pedal pin, be careful not to damage rubber O-ring on pin.

6. Slide booster push rod onto brake pedal pin. Install NEW retaining clip securing push rod to brake pedal.

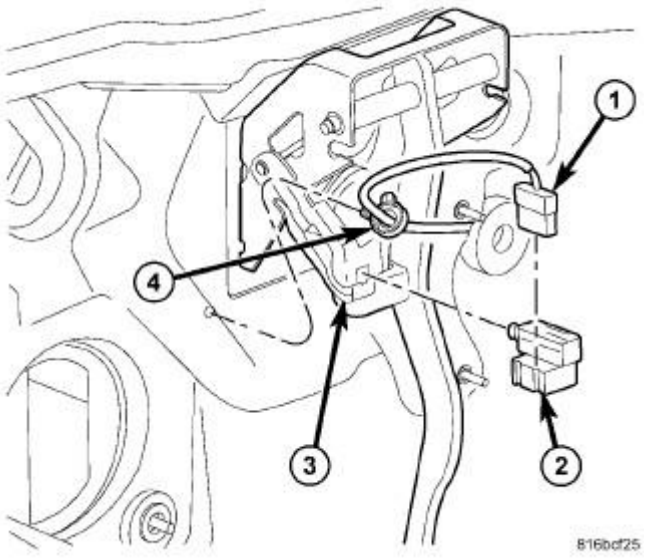


Fig. 230: Stop Lamp Switch Mounting - RHD
Courtesy of CHRYSLER GROUP, LLC

7. Install and adjust brake lamp switch (2). Refer to **SWITCH, STOP LAMP, INSTALLATION** .

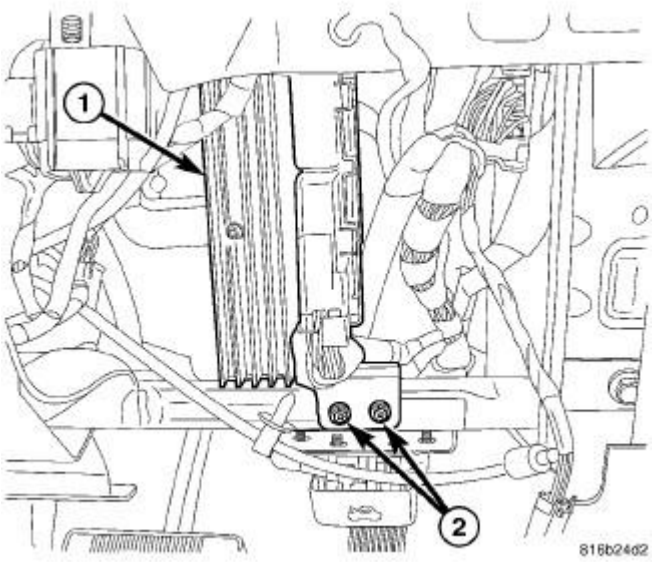


Fig. 231: Radio Amplifier /Transmission Control Module
Courtesy of CHRYSLER GROUP, LLC

8. Connect four wiring connectors to radio amplifier/transmission control module assembly (1).
9. Place radio amplifier/transmission control module assembly (1) in mounted position. Install one upper and two lower (2) mounting screws.
10. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
11. Install driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .

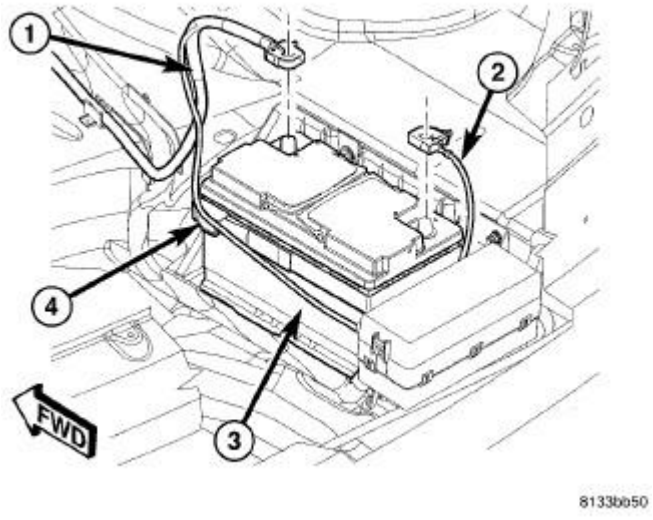


Fig. 232: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

12. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
13. Road test vehicle testing operation of brakes.

PEDAL(S), BRAKE AND/OR ACCELERATOR, ADJUSTABLE

STANDARD PROCEDURE

STANDARD PROCEDURE - ADJUSTABLE PEDALS SYCHRONIZATION

NOTE: Although the pedals can be synchronized at either the full-forward or full-rearward positions (both pedals must be in the same position), it is recommended to do so with the pedals positioned in the full-forward position due to service part positioning from the factory.

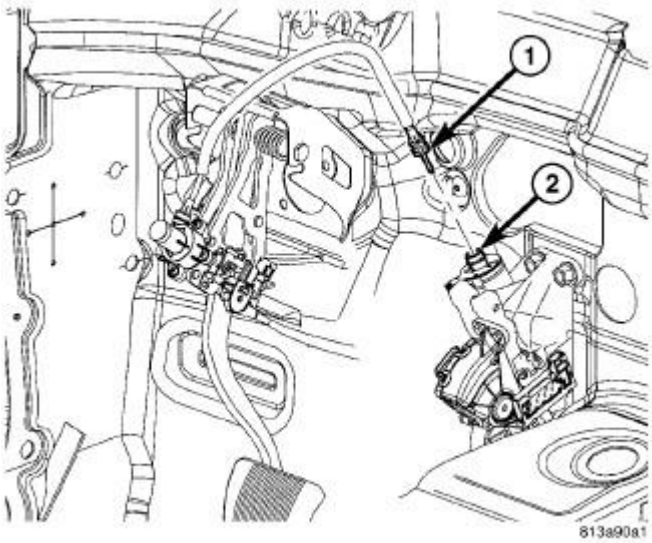


Fig. 233: Cable Attachment To Accelerator Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the adjuster cable (1) running between the accelerator pedal module and the brake pedal assembly at the adjuster motor (2).

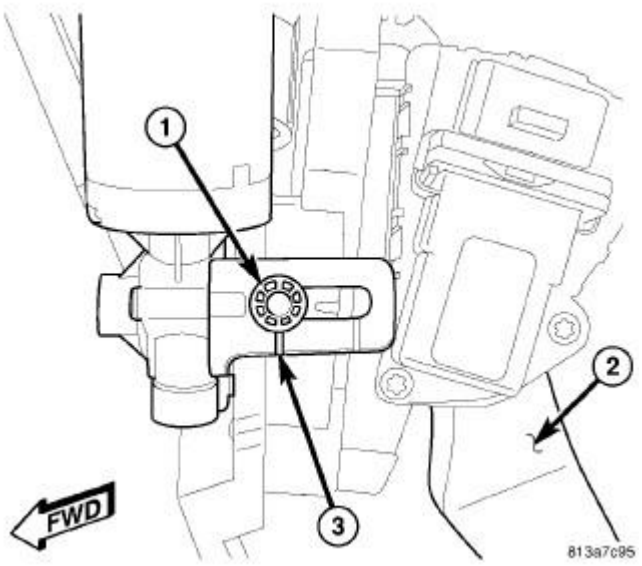


Fig. 234: Accelerator Pedal Adjusted Full-Forward
Courtesy of CHRYSLER GROUP, LLC

2. Using the switch, position the accelerator pedal (2) in the full-forward position. The pin on the pedal (1) will line up with the adjustment line (2) at this point.

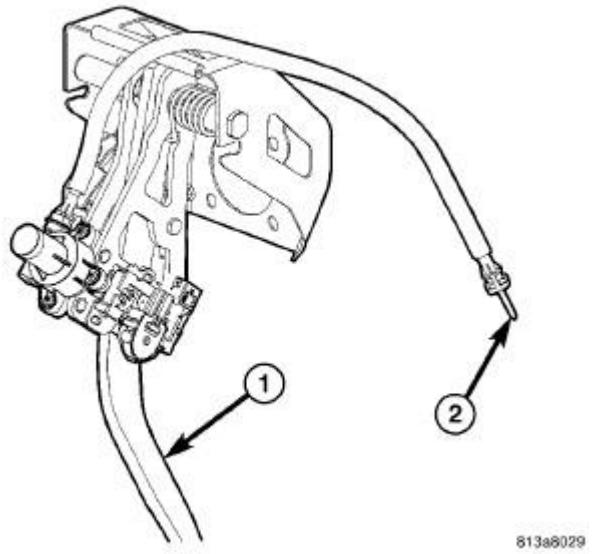


Fig. 235: Cable End To Be Rotated
Courtesy of CHRYSLER GROUP, LLC

3. Using a drill motor, or other suitable device, rotate the adjuster cable strand (2) from the accelerator pedal end to position the brake pedal (1) toward the full-forward position.

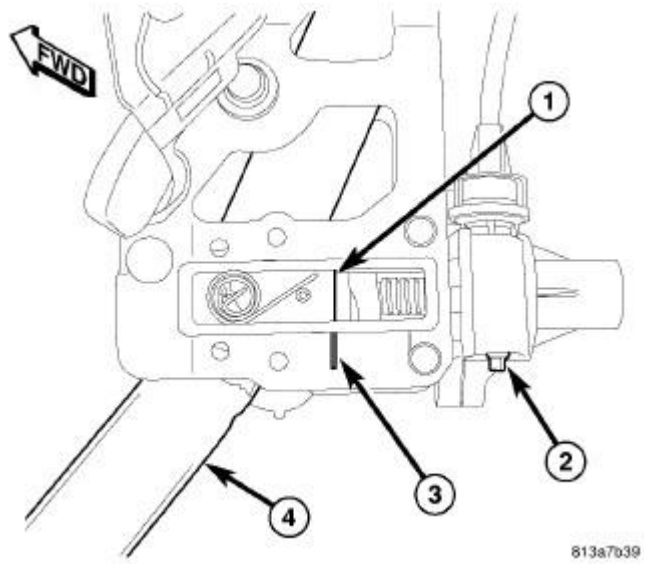


Fig. 236: Brake Pedal Adjusted Full-Forward
Courtesy of CHRYSLER GROUP, LLC

4. Rotate the adjuster cable strand until the brake pedal (4) gear drive block (1) lines up with the full-forward adjustment line (3) as shown in illustration. If equipped, fine adjustments can be made by turning the adjustment knob (2) by hand to line up the components.
5. Reconnect the adjuster cable to the adjuster motor. If the cable resists connection, if equipped, turn the adjustment knob (2) by hand until the cable drops into place. If not equipped with the adjustment knob, wiggle the cable around until the cable drops into place.
6. Verify proper operation of the adjustable pedals.

REMOVAL

REMOVAL

1. Move driver's seat to full rearward position.

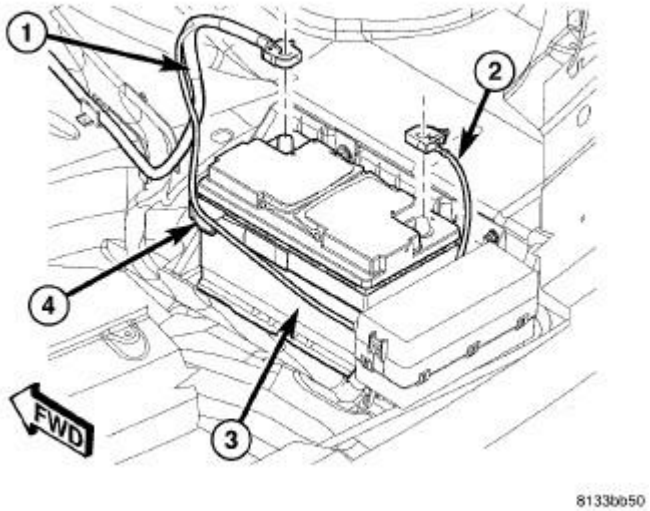


Fig. 237: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect and isolate battery negative cable (2) from battery post.

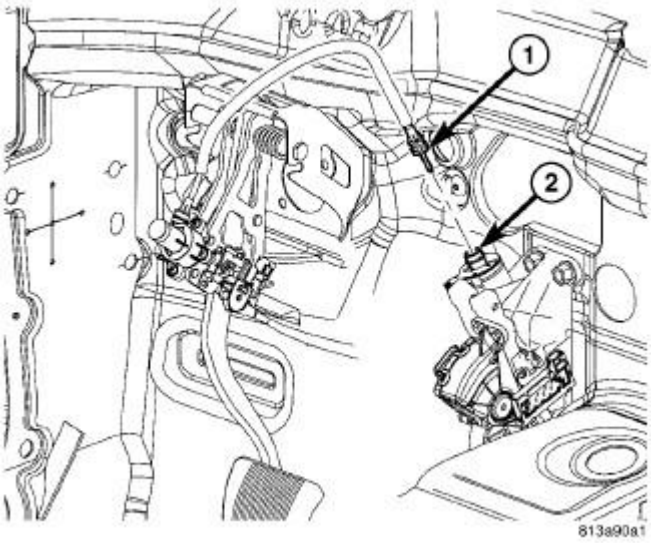


Fig. 238: Cable Attachment To Accelerator Module
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect adjuster cable (1) at accelerator adjuster motor (2).

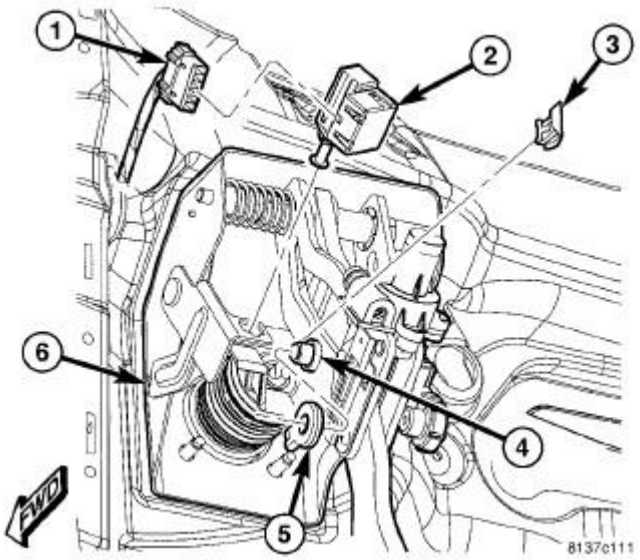


Fig. 239: Locating Stop Lamp Switch And Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

4. Remove brake lamp switch. Refer to **SWITCH, STOP LAMP, REMOVAL** .
5. Remove booster push rod from pin on brake pedal. To do so:
    1. Position small screwdriver between center tang on power brake booster brake pedal pin retaining clip (3).
    2. Rotate screwdriver enough to allow retaining clip center tang to pass over end of brake pedal pin, then slide retaining clip off brake pedal pin.
    3. **Discard retaining clip (3). It is not to be reused. Install NEW retaining clip when assembling.**
6. Slide booster push rod (5) off brake pedal pin (4).

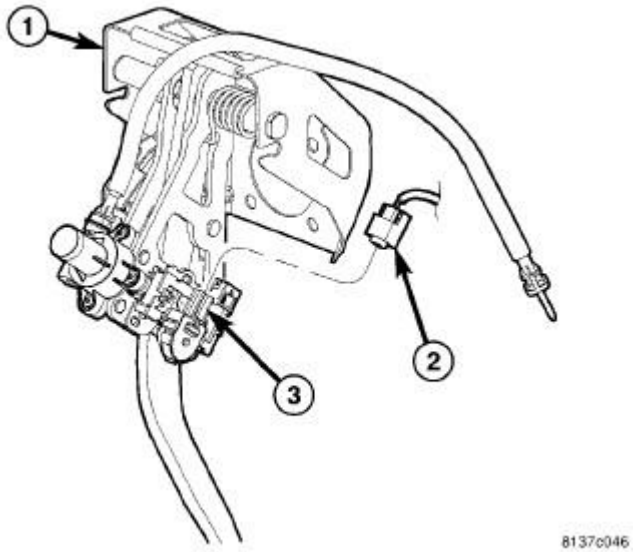


Fig. 240: Pedal Position Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect wiring connector (2) at brake pedal position sensor (3).

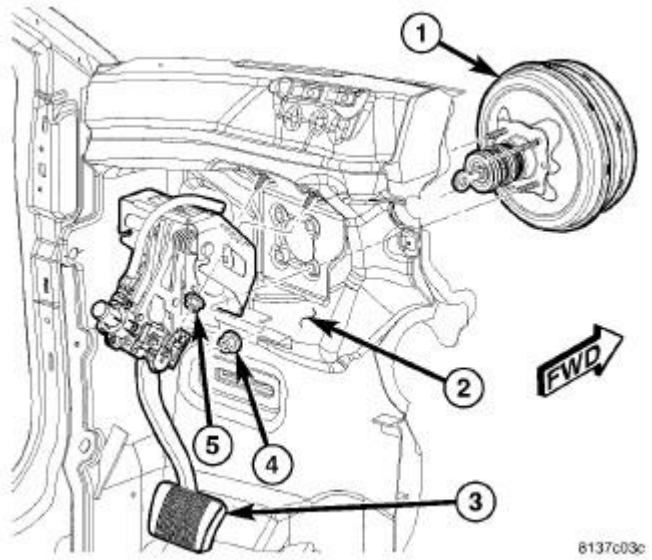


Fig. 241: Booster & Pedal Mounting
Courtesy of CHRYSLER GROUP, LLC

8. Remove four power brake booster mounting nuts (4).
9. Remove two nuts (5) fastening pedal bracket to upper dash panel (2).
10. Push power brake booster (1) forward into engine compartment as far as possible by hand. Do not force it.
11. Remove adjustable brake pedal assembly (3).
12. Remove adjuster cable at brake pedal gear drive.

INSTALLATION

INSTALLATION

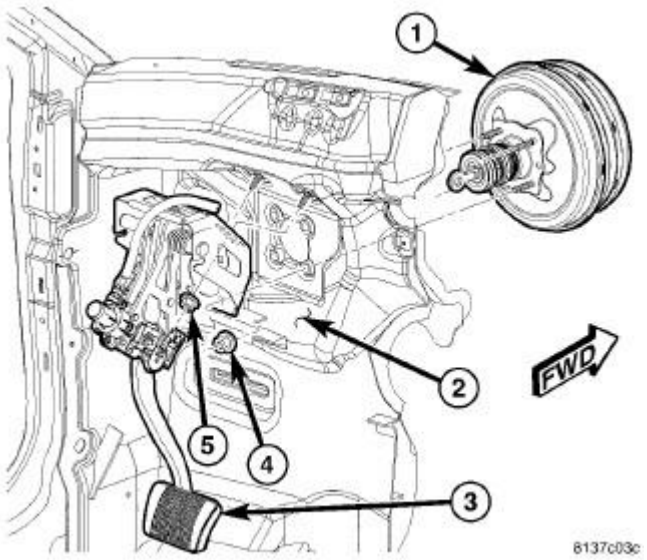


Fig. 242: Booster & Pedal Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Attach cable to brake pedal gear drive.
2. Install adjustable brake pedal assembly (3) under instrument panel and slide over booster push rod.
3. From engine compartment side, push power brake booster (1) mounting studs back through dash panel (2) and brake pedal bracket.
4. Install two nuts (5) fastening pedal bracket to upper dash panel (2). **Do not tighten at this time.**
5. Install four power brake booster mounting nuts (4). Tighten nuts to 25 N.m (18 ft. lbs.) torque.
6. Tighten two upper mounting nuts (5) to 25 N.m (18 ft. lbs.) torque.

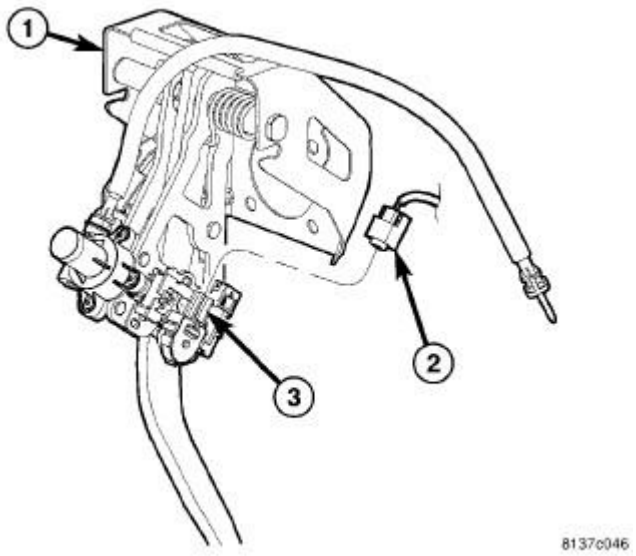


Fig. 243: Pedal Position Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

7. Connect wiring connector (2) at brake pedal position sensor (3).

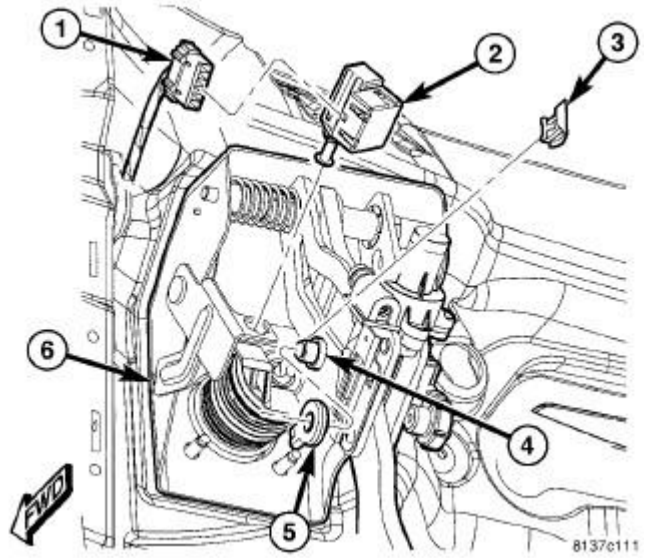


Fig. 244: Locating Stop Lamp Switch And Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

8. Slide booster push rod (5) onto brake pedal pin (4). Install NEW retaining clip (3) securing push rod to brake pedal.
9. Install and adjust brake lamp switch (2). Refer to **SWITCH, STOP LAMP, INSTALLATION** .

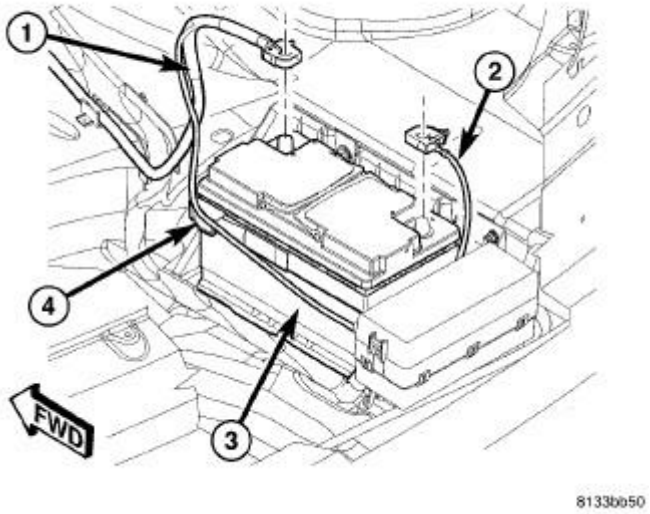


Fig. 245: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

10. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

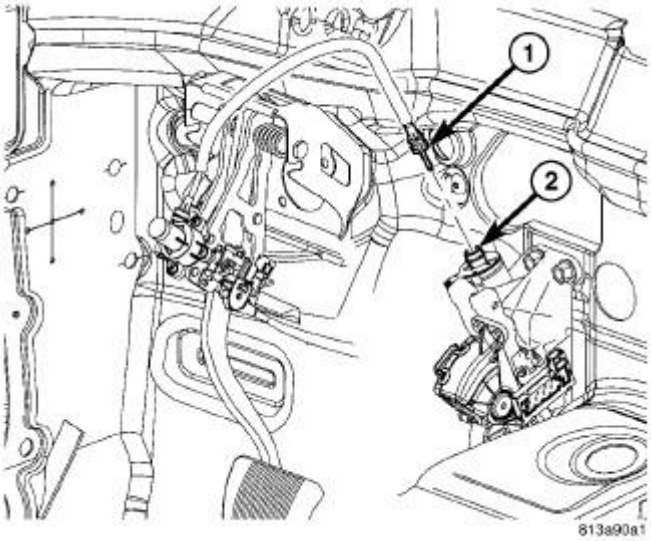


Fig. 246: Cable Attachment To Accelerator Module
Courtesy of CHRYSLER GROUP, LLC

11. Synchronize brake pedal to accelerator pedal, then connect adjuster cable (1) to adjuster motor (2). Refer to **PEDAL(S), BRAKE AND/OR ACCELERATOR, ADJUSTABLE, STANDARD PROCEDURE**.
12. If vehicle is equipped with memory seats, the system will need to be initialized. Refer to appropriate diagnostic information.
13. Test operation of adjustable pedals.
14. Road test vehicle testing operation of brakes and accelerator.

RESERVOIR, BRAKE MASTER CYLINDER

REMOVAL

REMOVAL

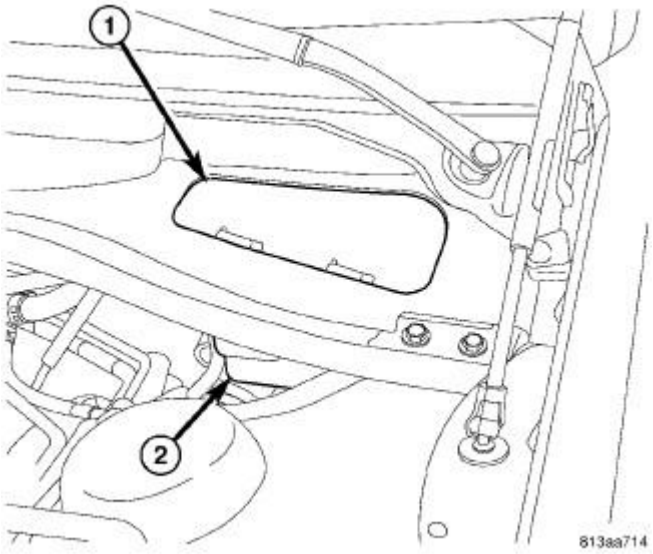


Fig. 247: Cowl Access Panel
Courtesy of CHRYSLER GROUP, LLC

1. Remove access panel (1) in cowl area to expose master cylinder (2).
2. Thoroughly clean all surfaces of brake fluid reservoir and master cylinder. Use only Mopar® Brake Parts Cleaner or equivalent.

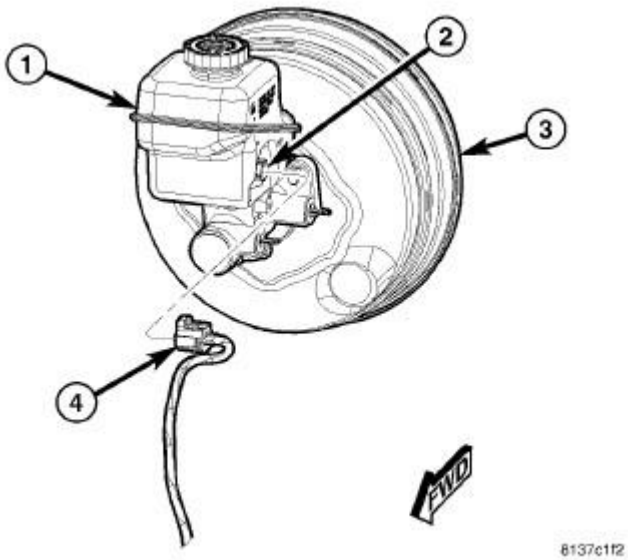


Fig. 248: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect wiring harness connector (4) from brake fluid level sensor (2) in master cylinder brake fluid reservoir (1).

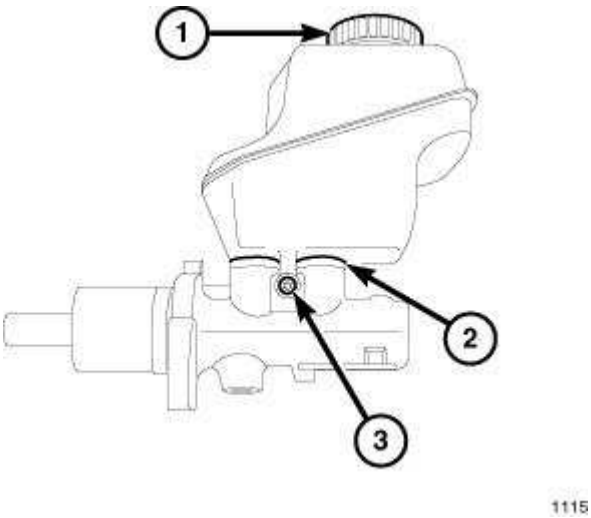


Fig. 249: Fluid Reservoir Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove brake fluid reservoir cap (1). Using a clean syringe or equivalent type tool, empty as much brake fluid as possible from the reservoir.

CAUTION: When removing fluid reservoir from the master cylinder, do not pry off using any type of tool. This can damage the fluid reservoir or master cylinder housing.

5. Remove screw (3) fastening fluid reservoir to master cylinder housing.
6. Rock the brake fluid reservoir side-to-side while pulling up to remove it from seal grommets in master cylinder housing.

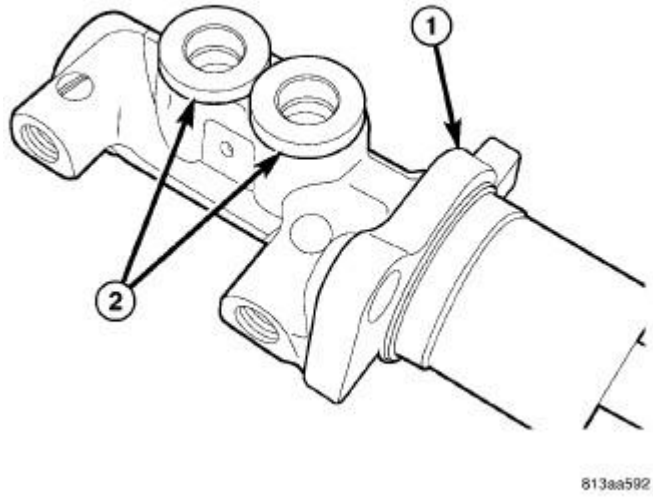


Fig. 250: Reservoir Seal Grommets
Courtesy of CHRYSLER GROUP, LLC

7. Remove two brake fluid reservoir seal grommets (2) from master cylinder housing (1).

INSTALLATION

INSTALLATION

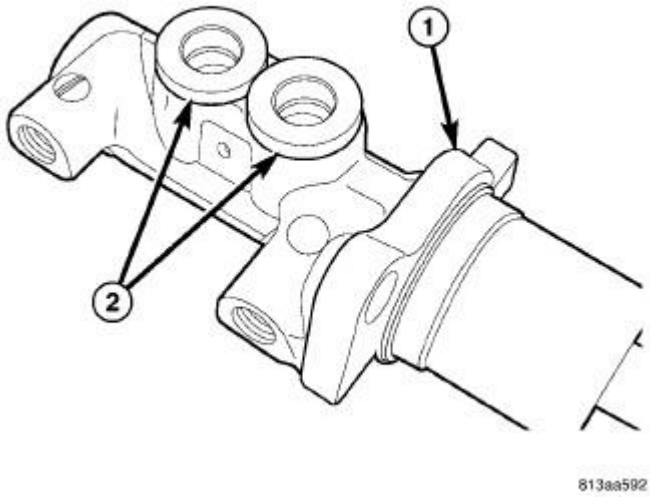


Fig. 251: Reservoir Seal Grommets
Courtesy of CHRYSLER GROUP, LLC

1. Install NEW brake fluid reservoir sealing grommets (2) in master cylinder housing (1).

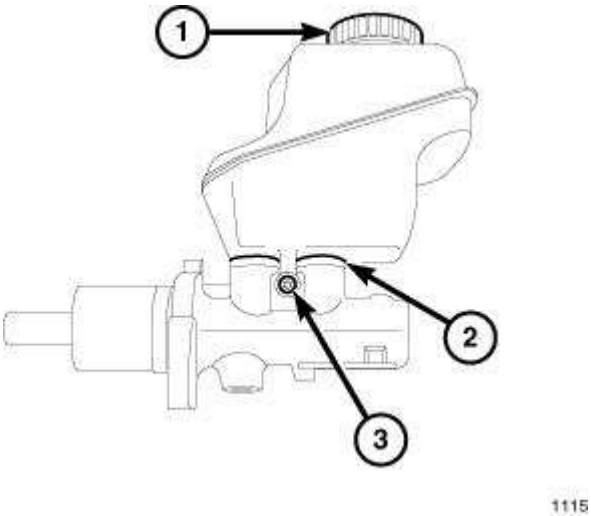


Fig. 252: Fluid Reservoir Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Lubricate reservoir mounting area with fresh clean brake fluid. Place reservoir in position over sealing grommets. Seat reservoir into sealing grommets using a rocking motion while firmly

pressing down on fluid reservoir. Once installed, make sure fluid reservoir is touching the top of both sealing grommets (2) or reservoir is not properly installed.

3. Install fluid reservoir mounting screw (3). Tighten screw to 28 N.m (250 in. lbs.) torque.

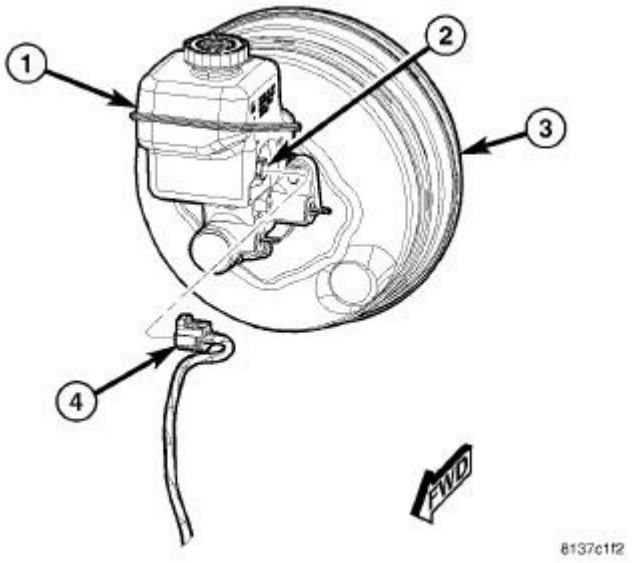


Fig. 253: Brake Fluid Level Sensor Connection
Courtesy of CHRYSLER GROUP, LLC

4. Connect wiring harness connector (4) to brake fluid level sensor (2) mounted in brake fluid reservoir (1).

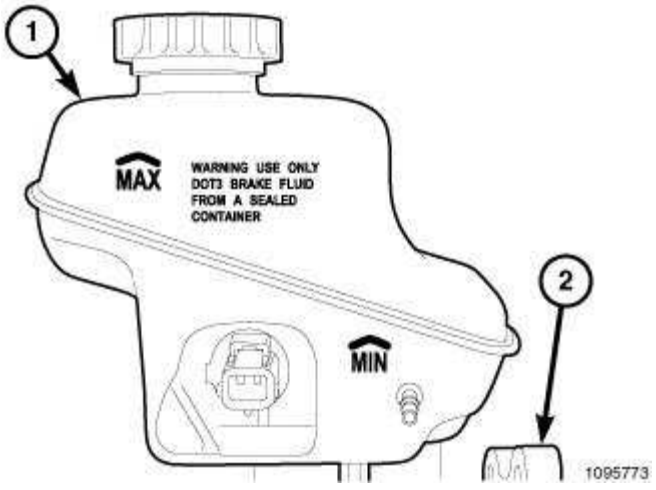


Fig. 254: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

5. Fill master cylinder fluid reservoir (1) with clean, fresh Mopar® Brake Fluid or equivalent.

6. Install access panel in cowl area.

WARNING: Be certain a firm brake pedal is achieved prior to attempting vehicle operation. If a firm brake pedal cannot be achieved, bleed entire brake hydraulic system and check for leaks. Refer to BASE BRAKE BLEEDING .

7. Road test vehicle to ensure proper operation of brakes.

ROTOR, BRAKE

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BRAKE ROTOR

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.

Excessive runout or wobble in a rotor can increase pedal travel due to piston knock-back. This increases guide pin sleeve wear due to the tendency of the caliper to follow the rotor wobble.

When diagnosing a brake noise or pulsation, the machined disc braking surface should be inspected.

BRAKING SURFACE INSPECTION

Light braking surface scoring and wear is acceptable. If heavy scoring or warping is evident, the rotor must be refaced or replaced. Refer to **ROTOR, BRAKE, STANDARD PROCEDURE**.

Excessive wear and scoring of the rotor can cause improper lining contact on the rotor's braking surface. If the ridges on the rotor are not removed before new brake shoes are installed, improper wear of the shoes will result.

If a vehicle has not been driven for a period of time, the rotor's braking surface will rust in the areas not covered by the brake shoes at that time. Once the vehicle is driven, noise and chatter from the disc brakes can result when the brakes are applied.

Some discoloration or wear of the rotor surface is normal and does not require resurfacing when linings are replaced. If cracks or burned spots are evident, the rotor must be replaced.

ROTOR MINIMUM THICKNESS

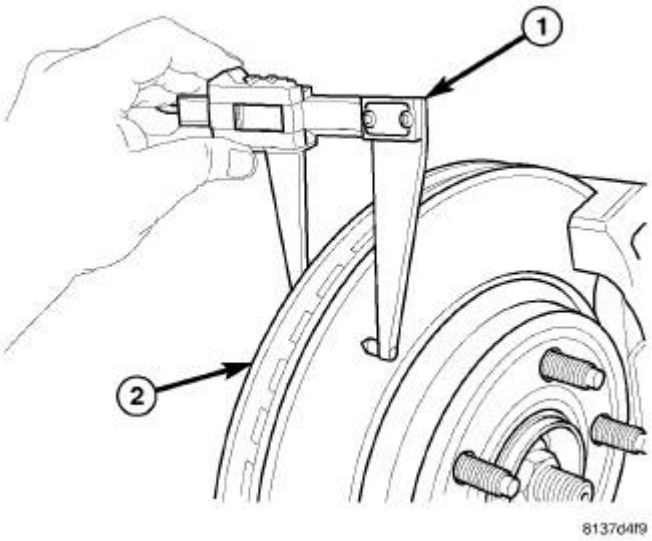


Fig. 255: Measuring Rotor Thickness
Courtesy of CHRYSLER GROUP, LLC

Measure rotor thickness (1) at the center of the brake shoe contact surface. Replace the rotor if it is worn below minimum thickness or if machining the rotor will cause its thickness to fall below specifications.

CAUTION: Do not machine the rotor if it will cause the rotor to fall below minimum thickness.

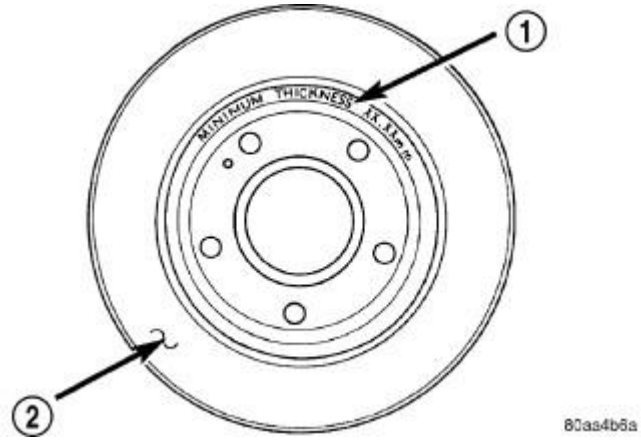


Fig. 256: Minimum Brake Rotor Thickness Markings (Typical)
Courtesy of CHRYSLER GROUP, LLC

1 - ROTOR MINIMUM THICKNESS MARKING
2 - ROTOR

Most minimum thickness specifications (1) are cast into the rotor's unmachined surface (2). Some

brake rotors have the minimum thickness specification located elsewhere. Limits can also be found in this component's specification table. Refer to **ROTOR, BRAKE, SPECIFICATIONS**.

ROTOR THICKNESS VARIATION

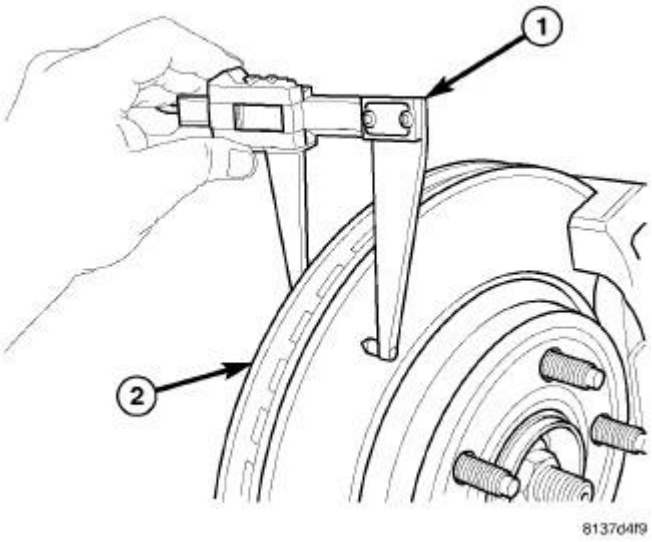


Fig. 257: Measuring Rotor Thickness
Courtesy of CHRYSLER GROUP, LLC

Thickness variation in a rotor's braking surface can result in pedal pulsation, chatter and surge. This can also be caused by excessive runout in the rotor or the hub.

Rotor thickness variation measurements should be made in conjunction with measuring runout. Measure thickness of the brake rotor (2) at 12 equal points around the rotor braking surface with a micrometer (1) at a radius approximately 25 mm (1 inch) from edge of rotor. If thickness measurements vary beyond the specification listed in the specification table, the rotor should be refaced or replaced. Refer to **ROTOR, BRAKE, SPECIFICATIONS** and **ROTOR, BRAKE, STANDARD PROCEDURE**.

ROTOR RUNOUT

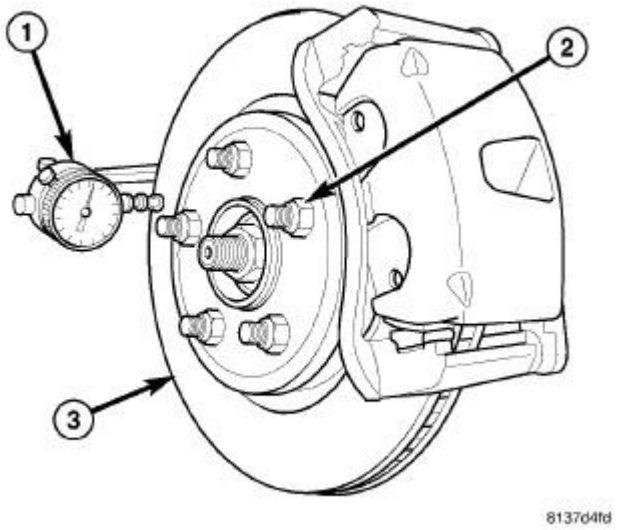


Fig. 258: Measuring Rotor Runout
Courtesy of CHRYSLER GROUP, LLC

On-vehicle rotor runout is the combination of the individual runout of the hub face and the runout of the brake rotor (hub runout can be measured separately). To measure rotor runout on the vehicle:

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove tire and wheel assembly. Refer to **REMOVAL** .
3. Install standard wheel mounting nuts, flat side to rotor, on all studs (2). Progressively tighten nuts to 150 N.m (110 ft. lbs.) torque.
4. Mount Dial Indicator (1), Special Tool (special tool #C-3339A, Set, Dial Indicator), with Wheel, Special Tool (special tool #25-W, Roller Contact Point), or equivalent, to knuckle. Position Dial Indicator Wheel to contact rotor braking surface approximately ten millimeters from outer edge of rotor (3).
5. Slowly rotate brake rotor checking lateral runout, marking the low and high spots. Record these measurements.
6. Check and record runout of opposite side of rotor in same fashion, marking the low and high spots.
7. Compare runout measurement to specifications. Refer to **ROTOR, BRAKE, SPECIFICATIONS**.

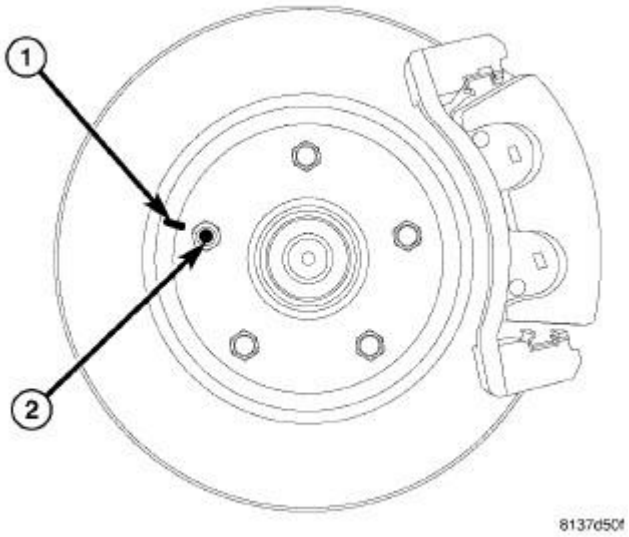


Fig. 259: Wheel Stud & Rotor Index Marked
Courtesy of CHRYSLER GROUP, LLC

If runout is in excess of specifications, check the lateral runout of the hub face. Before removing the rotor from the hub, place a chalk mark across both the rotor (1) and the one wheel stud (2) closest to where the high runout measurement was taken. This way, the original mounting spot of the rotor on the hub is indexed.

8. Remove the rotor from the hub. Refer to **ROTOR, BRAKE, REMOVAL**.

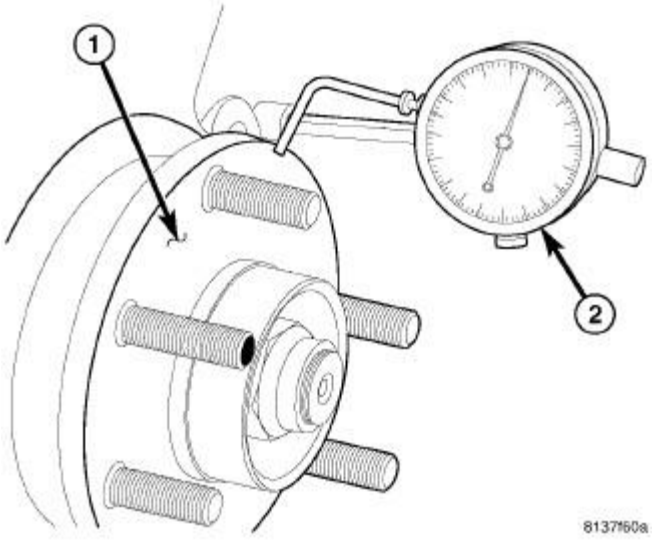


Fig. 260: Measuring Hub Runout
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before measuring hub runout, clean the hub face surface with an appropriate cleaner. This provides a clean surface to get an accurate indicator reading.**

9. Mount Dial Indicator (2), Special Tool (special tool #C-3339A, Set, Dial Indicator), to the knuckle. Position Dial Indicator stem so it contacts hub face (1) near outer diameter. Care must be taken to position stem outside of stud circle, but inside of chamfer on the hub rim.
10. Slowly rotate hub measuring runout. Hub runout should not exceed 0.01 mm (0.0004 inch). If runout exceeds this specification, the hub must be replaced. Refer to **HUB AND BEARING, REMOVAL** or **HUB AND BEARING, REMOVAL** .

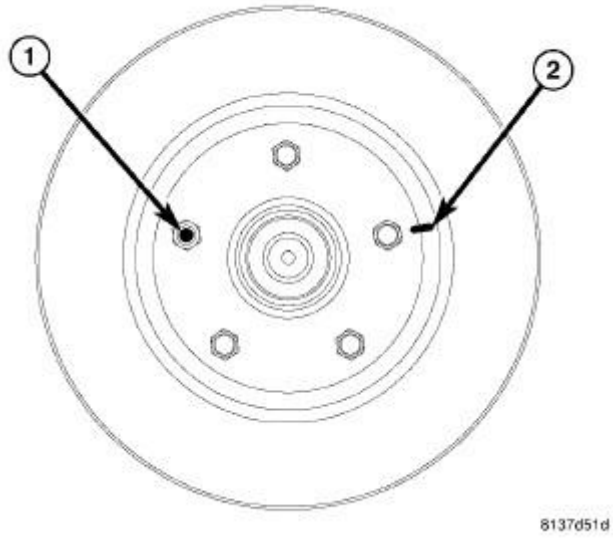


Fig. 261: Rotor Reindexed On Wheel Studs
Courtesy of CHRYSLER GROUP, LLC

11. If hub runout does not exceed this specification, install original rotor back on hub, aligning chalk mark on rotor (2) with a wheel mounting stud, two studs apart from original stud (1).

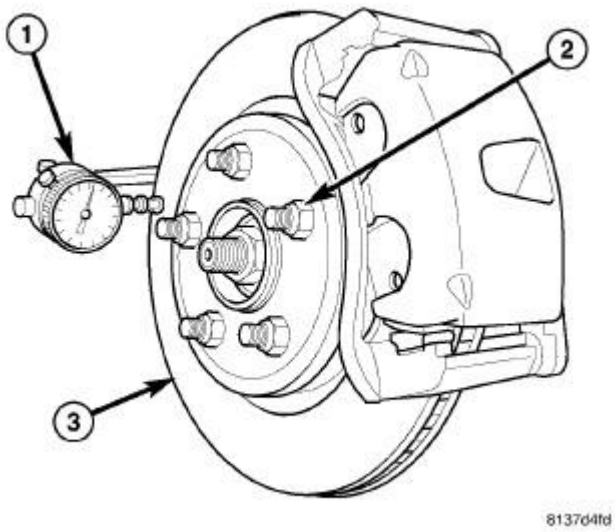


Fig. 262: Measuring Rotor Runout
Courtesy of CHRYSLER GROUP, LLC

12. Install standard wheel mounting nuts, flat side to rotor, on all studs (2). Progressively tighten nuts to 150 N.m (110 ft. lbs.) torque.
13. Mount Dial Indicator (1) and remeasure runout on both sides of the brake rotor as explained in earlier steps to see if runout is now within specifications. Refer to **ROTOR, BRAKE, SPECIFICATIONS**.
14. If runout is still not within specifications, reface or replace brake rotor. Refer to **ROTOR, BRAKE, STANDARD PROCEDURE**.

STANDARD PROCEDURE

STANDARD PROCEDURE - BRAKE ROTOR MACHINING

NOTE: Refacing the rotor is not required each time the brake pads are replaced, only when the need is foreseen.

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.

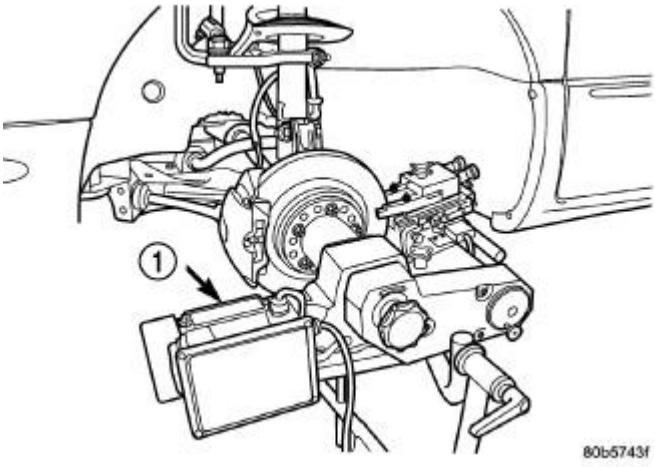


Fig. 263: On-Car Brake Lathe
Courtesy of CHRYSLER GROUP, LLC

1 - ON-CAR BRAKE LATHE

If the rotor surface is deeply scored or warped, or there is a complaint of brake roughness or brake pedal pulsation, the rotor should be refaced using a hub-mounted on-car brake lathe (1), or replaced.

The use of a hub-mounted on-car brake lathe (1) is highly recommended to eliminate the possibility of excessive runout. It trues the brake rotor to the vehicle's hub and bearing.

Minimum allowable thickness is the minimum thickness which the brake rotor machined surface may be cut to.

CAUTION: Do not machine the rotor if it will cause the rotor to fall below minimum thickness.

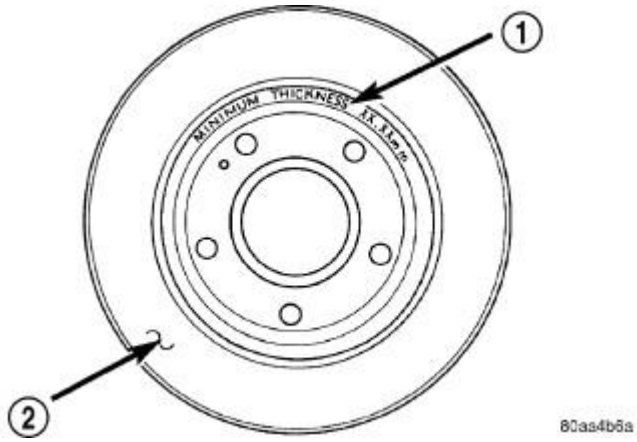


Fig. 264: Minimum Brake Rotor Thickness Markings (Typical)
Courtesy of CHRYSLER GROUP, LLC

1 - ROTOR MINIMUM THICKNESS MARKING
2 - ROTOR

NOTE: **Most brake rotors (2) have markings for minimum allowable thickness specification cast into an unmachined surface of the rotor or stamped into the hat section (1). Some brake rotors have the minimum thickness specification located elsewhere. Minimum thickness specifications can also be found in this component's specification table. Refer to ROTOR, BRAKE, SPECIFICATIONS.**

Before lathe installation, verify the brake rotor face and the hub adapters are free of any chips, rust, or contamination.

When mounting and using the brake lathe, strict attention to the brake lathe manufacturer's operating instructions is required.

Machine both sides of the brake rotor at the same time. Cutting both sides at the same time minimizes the possibility of a tapered or uneven cut.

When refacing a rotor, the required TIR (Total Indicator Reading) and thickness variation limits MUST BE MAINTAINED. Extreme care in the operation of rotor turning equipment is required. Specifications for brake rotor machining can be found in this informations specification table. Refer to **ROTOR, BRAKE, SPECIFICATIONS**.

SPECIFICATIONS

SPECIFICATIONS

NOTE: **When refacing a rotor, the required TIR (Total Indicator Reading) and thickness variation limits MUST BE MAINTAINED. Extreme care in the operation of rotor turning (machining) equipment is required.**

LIMITS/SPECIFICATIONS - 17 INCH BRAKES (BASE)

Brake Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Runout *
Front	27.87-28.13 mm 1.097-1.107 in.	26.5 mm 1.040 in.	0.010 mm 0.0004 in.	0.035 mm 0.0014 in.
Rear	9.87-10.13 mm 0.389-0.399 in.	8.5 mm 0.335 in.	0.010 mm 0.0004 in.	0.035 mm 0.0014 in.
* TIR Total Indicator Reading (Measured On Vehicle)				

LIMITS/SPECIFICATIONS - 18 INCH BRAKES (PREMIUM)

Brake Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Runout *
Front	27.87-28.13 mm 1.097-1.107 in.	26.5 mm 1.040 in.	0.010 mm 0.0004 in.	0.035 mm 0.0014 in.
Rear	21.87-22.13 mm 0.861-0.871 in.	20.5 mm 0.807 in.	0.010 mm 0.0004 in.	0.035 mm 0.0014 in.
* TIR Total Indicator Reading (Measured On Vehicle)				

REMOVAL

FRONT

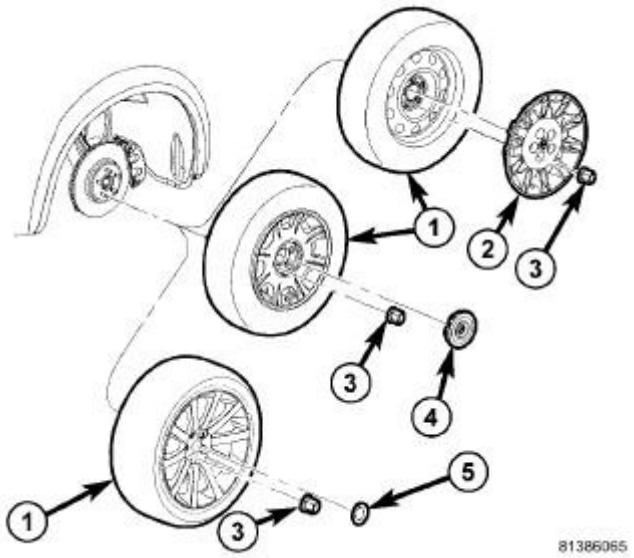


Fig. 265: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

NOTE: In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be

accomplished before mounting bolts are removed, by grasping rear of caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.

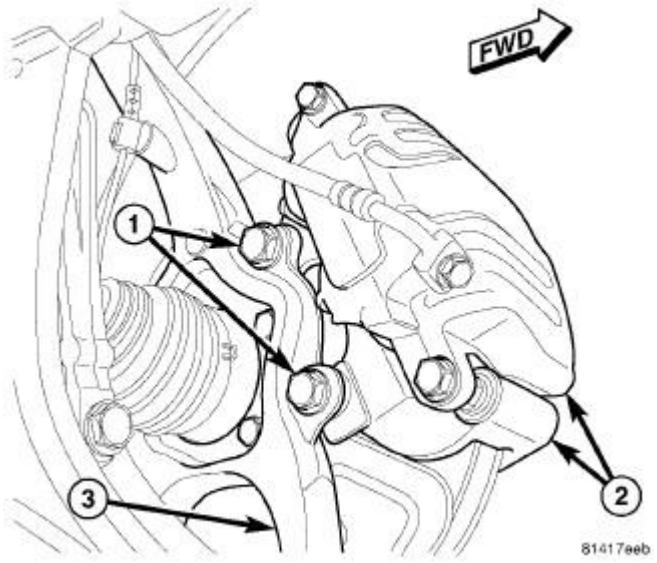


Fig. 266: Locating Front Caliper Bolts AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

3. AWD - Remove two bolts (1) securing disc brake caliper and adapter (2) to knuckle (3).
4. AWD - Remove disc brake caliper and adapter (2) from knuckle (3) as an assembly. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

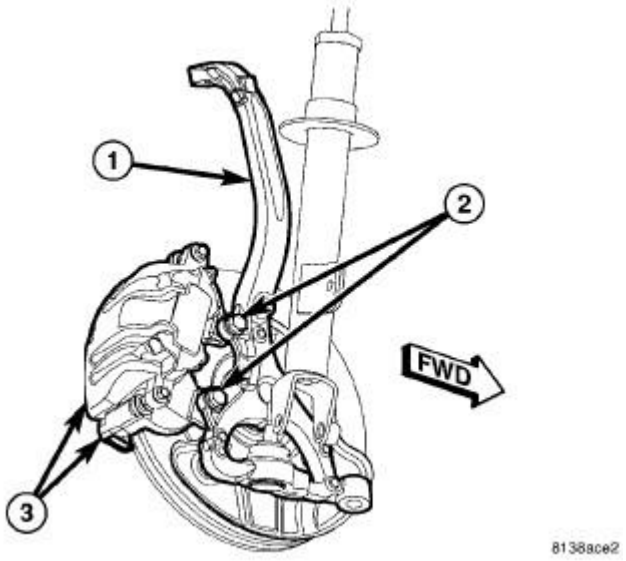


Fig. 267: Front Caliper & Adapter Mounting

Courtesy of CHRYSLER GROUP, LLC

5. RWD - Remove two bolts (2) securing disc brake caliper and adapter (3) to knuckle (1).
6. RWD - Remove disc brake caliper and adapter (3) from knuckle (1) as an assembly. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

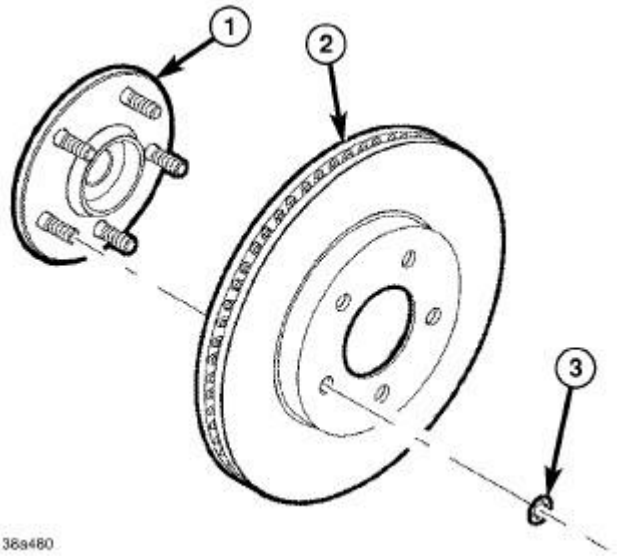


Fig. 268: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

7. Remove any clips (3) retaining brake rotor (2) to wheel studs.
8. Slide brake rotor (2) off hub and bearing (1).

FRONT - SRT8

NOTE: Before proceeding. Refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

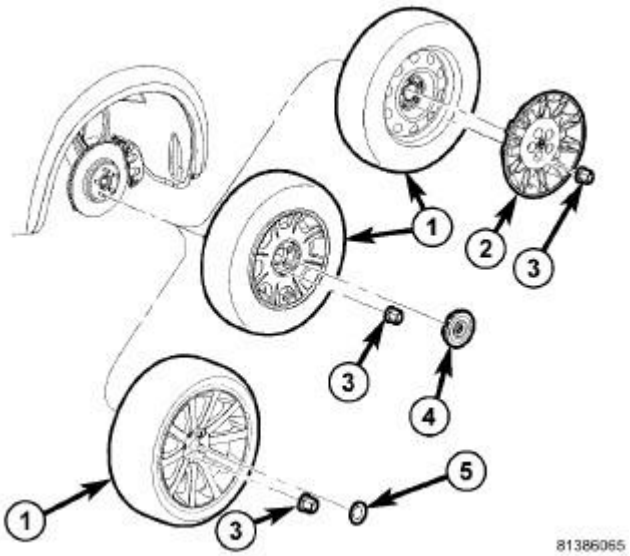


Fig. 269: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

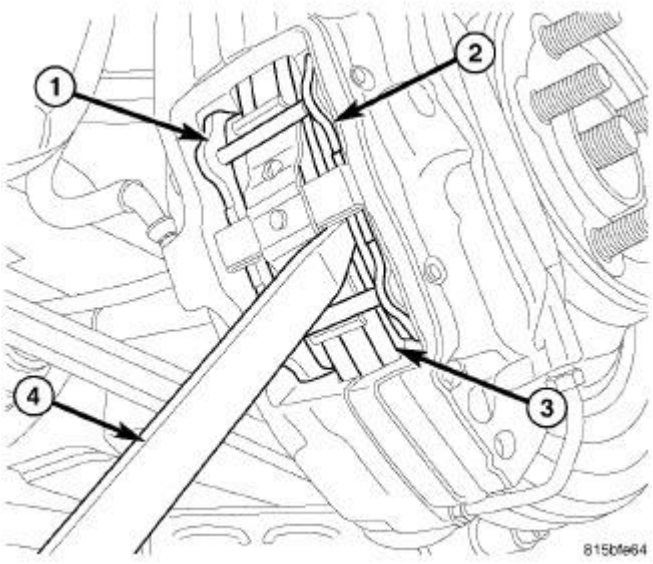


Fig. 270: Pushing Back Pistons In Bore
Courtesy of CHRYSLER GROUP, LLC

3. Place trim stick (4) between brake pad (2) and outer edge of rotor (3).
4. Using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

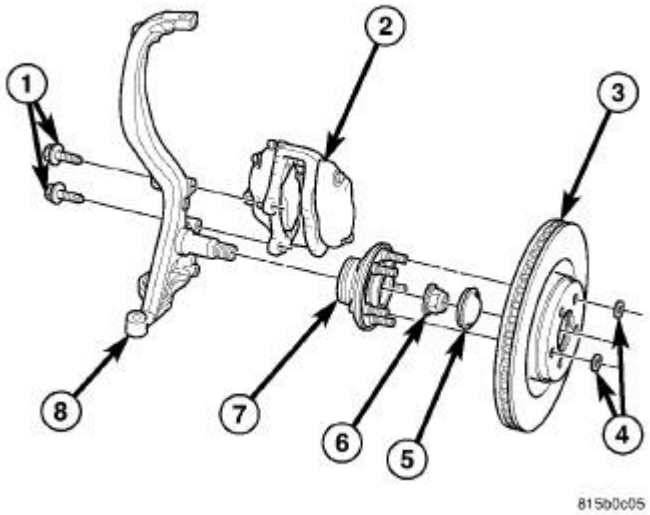


Fig. 271: Exploded View Of Front Disc Brakes - Srt-8
Courtesy of CHRYSLER GROUP, LLC

5. Remove caliper mounting bolts (1).
6. Remove brake caliper (2) with pads from knuckle (8) and brake rotor (3). Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.
7. Remove any clips (4) retaining brake rotor (3) to wheel studs.
8. Slide brake rotor (3) off hub and bearing (7).

REAR

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

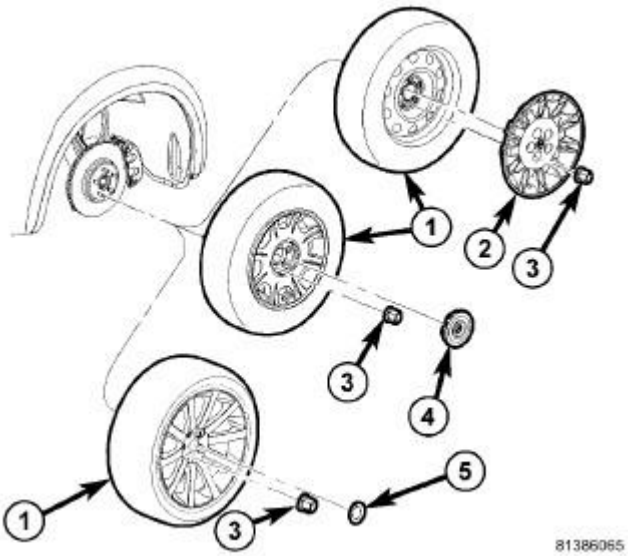


Fig. 272: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

NOTE: In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be accomplished before guide pin bolts are removed, by grasping rear of caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.

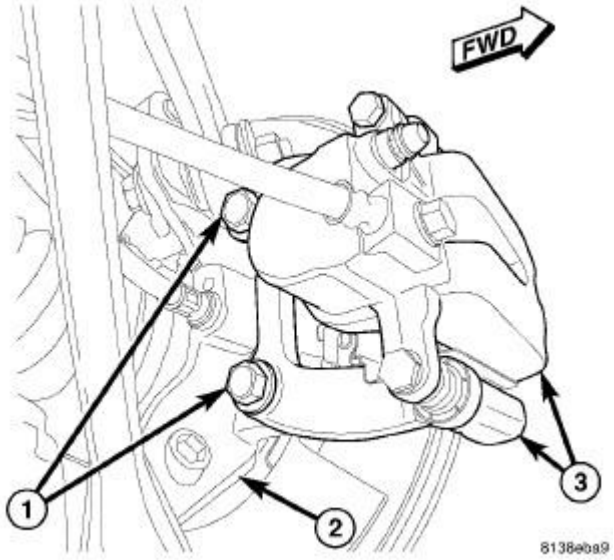


Fig. 273: Rear Caliper & Adapter Mounting

Courtesy of CHRYSLER GROUP, LLC

3. Remove two bolts (1) securing disc brake caliper adapter (3) to knuckle (2).
4. Remove disc brake caliper and adapter (3) from knuckle as an assembly. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

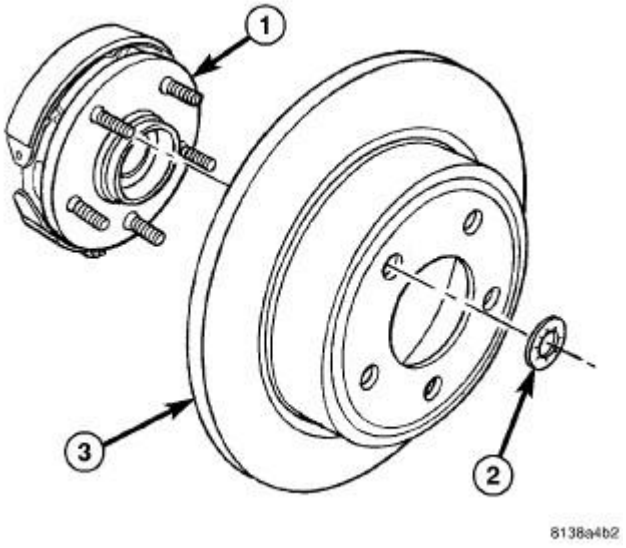


Fig. 274: Solid Brake Rotor Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Remove any clips (2) retaining brake rotor (3) to wheel mounting studs.
6. Slide brake rotor (3) off hub and bearing (1).

REAR - SRT8

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

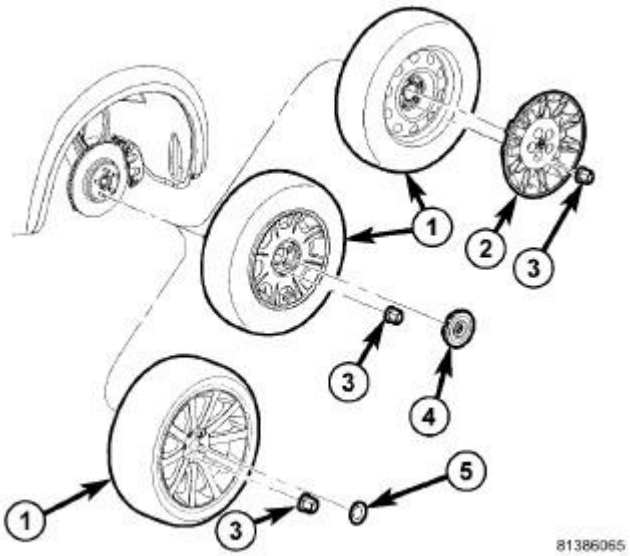


Fig. 275: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

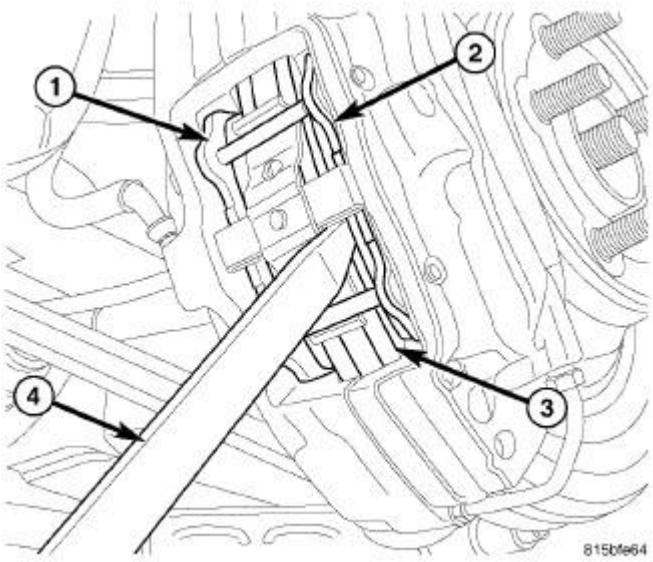


Fig. 276: Pushing Back Pistons In Bore
Courtesy of CHRYSLER GROUP, LLC

3. Place trim stick (4) between brake pad (2) and outer edge of rotor (3).
4. Using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

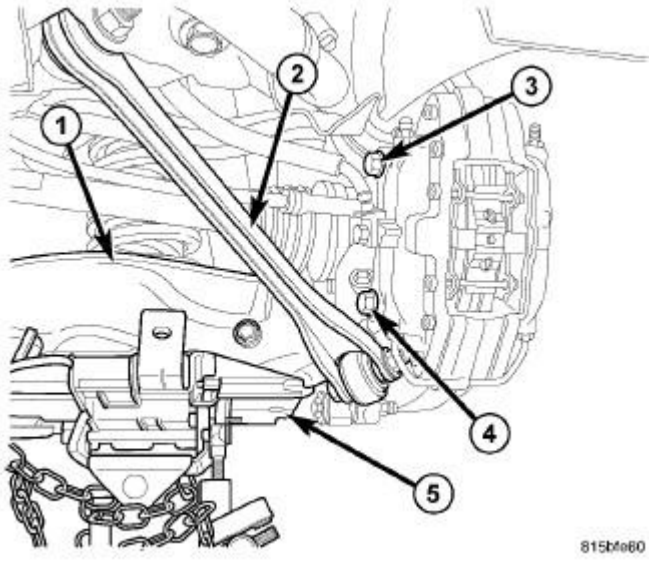


Fig. 277: Accessing Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Support spring link (1) using a transmission jack (5) or other appropriate jack. Raise spring link just enough to access brake caliper lower mounting bolt (4) from above compression link (2).

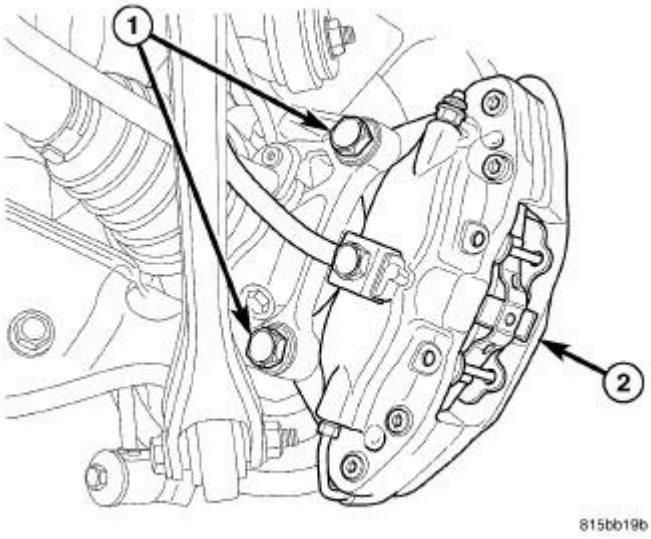


Fig. 278: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the lower and upper caliper mounting bolts (1).
7. Remove brake caliper (2) with pads from knuckle and brake rotor. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

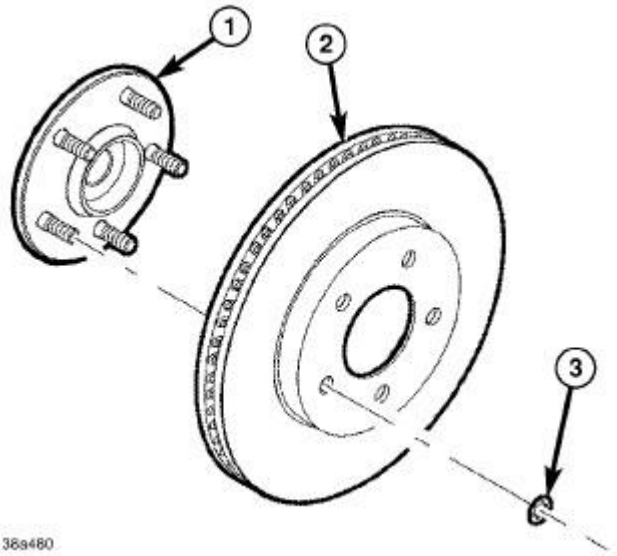


Fig. 279: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

8. Remove any clips (3) retaining brake rotor (2) to wheel mounting studs.
9. Slide brake rotor (2) off hub and bearing (1).

INSTALLATION

FRONT

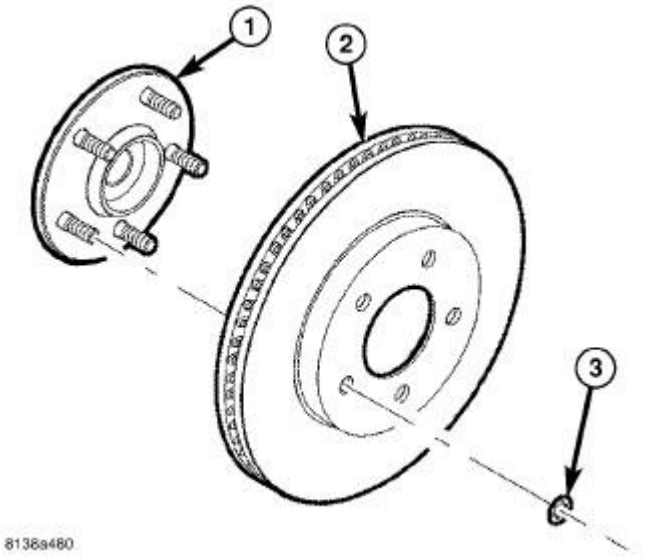


Fig. 280: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect brake pads before installation. Refer to INSPECTION .

1. Clean hub face (1) to remove any dirt or corrosion where rotor mounts.
2. Install brake rotor (2) over studs on hub and bearing.

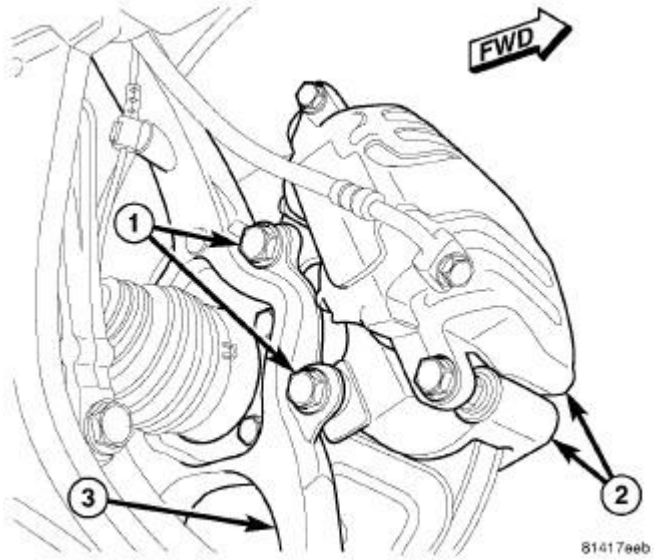


Fig. 281: Locating Front Caliper Bolts AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

NOTE: New caliper mounting bolts should be used because they come with a lock patch of thread locker on them. If reusing caliper mounting bolts, ensure

the bolts and threads are clean of any leftover adhesive and apply Mopar® Stud N' Bearing Mount Adhesive or equivalent.

3. AWD - Install disc brake caliper and adapter assembly (2) over brake rotor.
4. AWD - Install **NEW** mounting bolts (1) securing caliper adapter (2) to knuckle (3). Tighten bolts to 95 N.m (70 ft. lbs.).

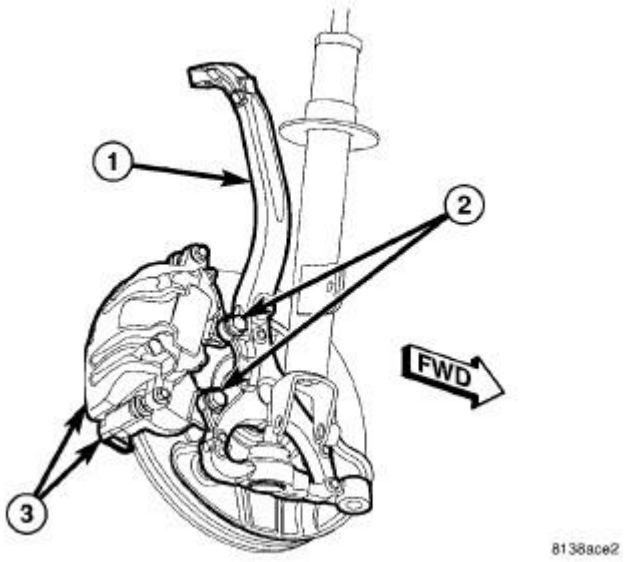


Fig. 282: Front Caliper & Adapter Mounting
Courtesy of CHRYSLER GROUP, LLC

5. RWD - Install disc brake caliper and adapter assembly (3) over brake rotor.
6. RWD - Install mounting bolts (2) securing caliper adapter (3) to knuckle (1). Tighten bolts to 95 N.m (70 ft. lbs.).

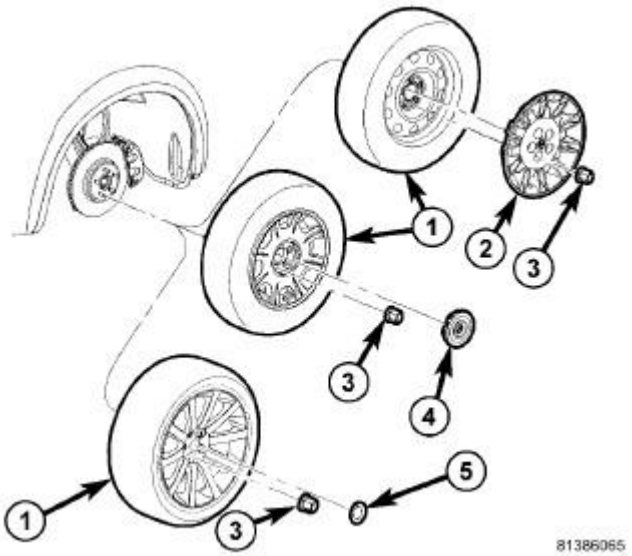


Fig. 283: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
8. Lower vehicle.
9. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.

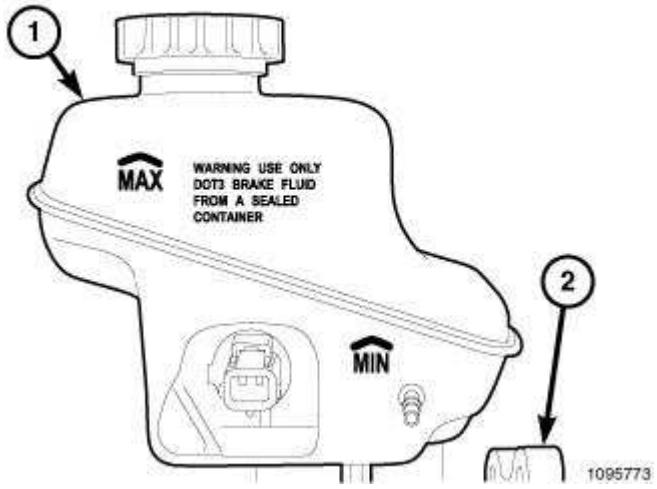


Fig. 284: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

10. Check and adjust brake fluid level in reservoir (1) as necessary.

CAUTION: If NEW brake rotors or pads have been installed, keep in mind that

braking effectiveness might be somewhat reduced during the first brake applications following installation.

CAUTION: A burnish procedure must be performed anytime NEW brake pads or rotors are installed on a vehicle equipped with the Police Package. This procedure is particularly important in situations where high speed pursuit is a possibility. It is recommended that the procedure be performed by the Police agency operating the vehicle so it can be performed in a safe controlled environment. This information is covered in the Police Package Owners Manual Supplement which was supplied when the vehicle was originally delivered.

11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes. If the vehicle is equipped with the Police Package, a burnish procedure must be followed (Refer to preceding Caution).

FRONT - SRT8

NOTE: Inspect brake pads before installation. Refer to INSPECTION .

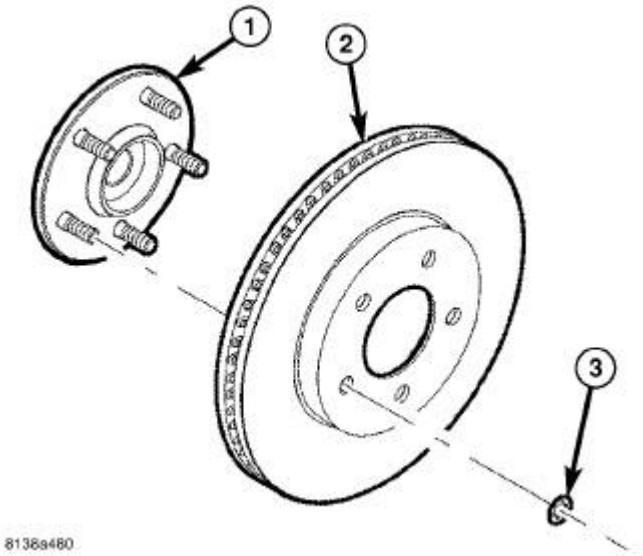


Fig. 285: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

1. Clean hub face (1) to remove any dirt or corrosion where rotor mounts.

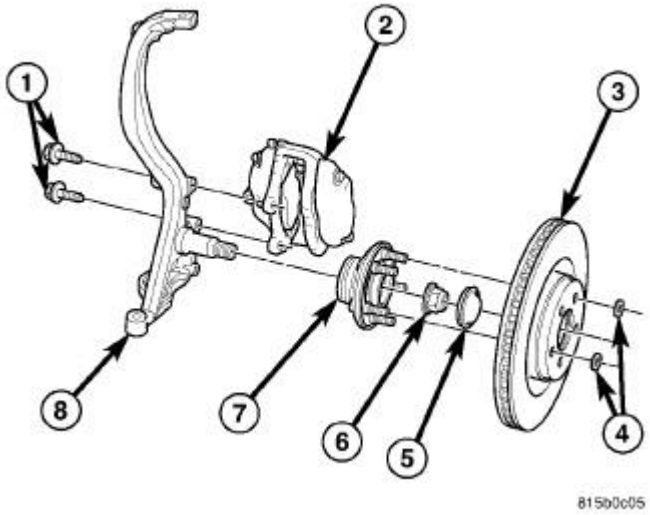


Fig. 286: Exploded View Of Front Disc Brakes - Srt-8
Courtesy of CHRYSLER GROUP, LLC

2. Install brake rotor (3) over studs on hub and bearing (7).
3. Slide caliper with pads (2) over brake rotor (3) and align with knuckle (8).
4. Install caliper mounting bolts (1). Tighten bolts to 190 N.m (140 ft. lbs.) torque.

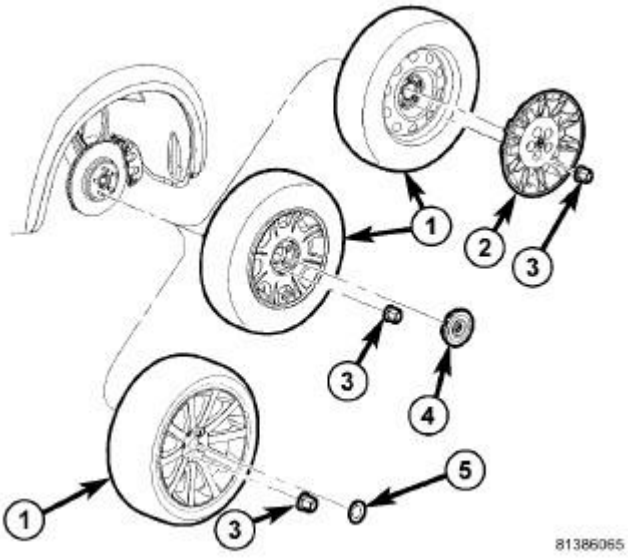


Fig. 287: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) torque. Refer to **INSTALLATION** .
6. Lower vehicle.

7. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.

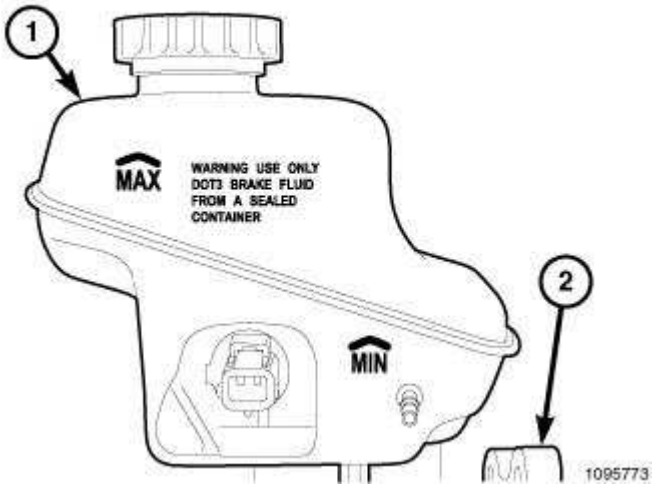


Fig. 288: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

8. Check and adjust brake fluid level in reservoir (1) as necessary.

CAUTION: If NEW brake rotors or pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

9. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pads. If NEW brake pads are installed, they need to be properly burnished. Refer to **PADS, BRAKE, SRT8, STANDARD PROCEDURE**.

REAR

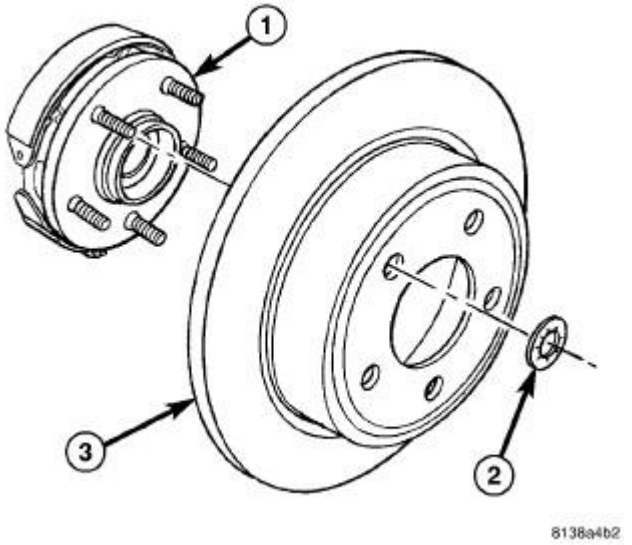


Fig. 289: Solid Brake Rotor Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect disc brake pads and parking brake shoes before installation. Refer to INSPECTION .

1. Clean hub (1) face to remove any dirt or corrosion where brake rotor mounts.
2. Install brake rotor (3) over wheel mounting studs and onto hub (1).

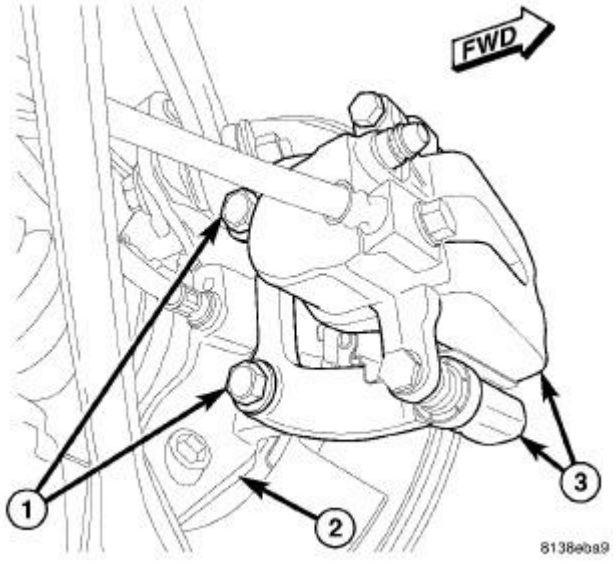


Fig. 290: Rear Caliper & Adapter Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: New caliper mounting bolts should be used because they come with a lock

patch of thread locker on them. If reusing caliper mounting bolts, ensure the bolts and threads are clean of any leftover adhesive and apply Mopar® Stud N' Bearing Mount Adhesive or equivalent.

3. Install disc brake caliper and adapter assembly (3) over brake rotor.
4. Install mounting bolts (1) securing caliper adapter (3) to knuckle (2). Tighten bolts to 115 N.m (85 ft. lbs.).

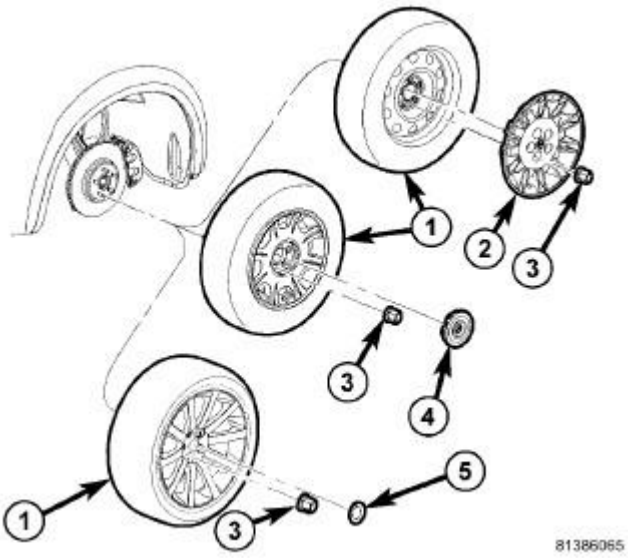


Fig. 291: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
6. Lower vehicle.
7. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.

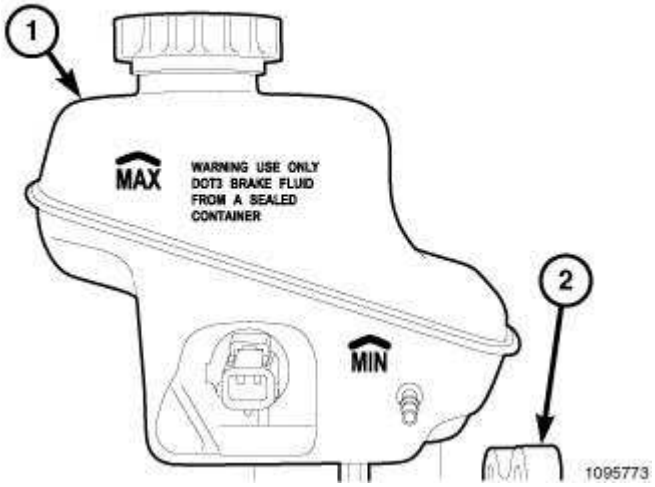


Fig. 292: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

8. Check and adjust brake fluid level in reservoir (1) as necessary.

CAUTION: If NEW brake rotors or pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

CAUTION: A burnish procedure must be performed anytime NEW brake pads or rotors are installed on a vehicle equipped with the Police Package. This procedure is particularly important in situations where high speed pursuit is a possibility. It is recommended that the procedure be performed by the Police agency operating the vehicle so it can be performed in a safe controlled environment. This information is covered in the Police Package Owners Manual Supplement which was supplied when the vehicle was originally delivered.

9. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes. If the vehicle is equipped with the Police Package, a burnish procedure must be followed (Refer to preceding Caution).

REAR - SRT8

NOTE: Inspect brake pads and parking brake shoes before installation. Refer to INSPECTION .

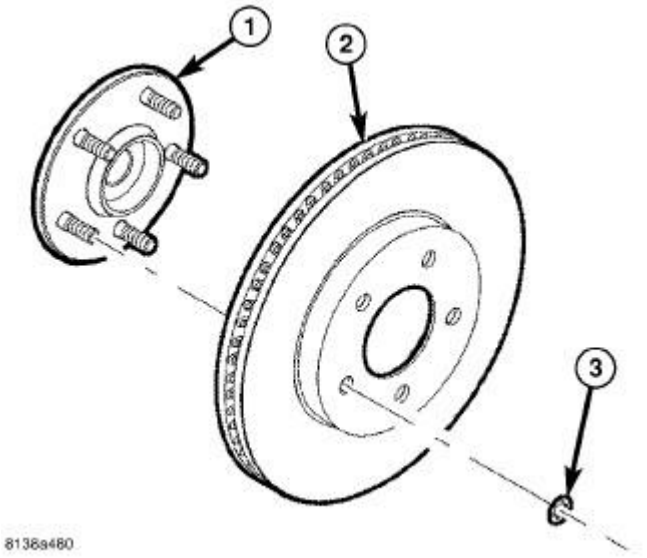


Fig. 293: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

1. Clean hub face (1) to remove any dirt or corrosion where rotor mounts.
2. Install brake rotor (2) over studs on hub and bearing (1).

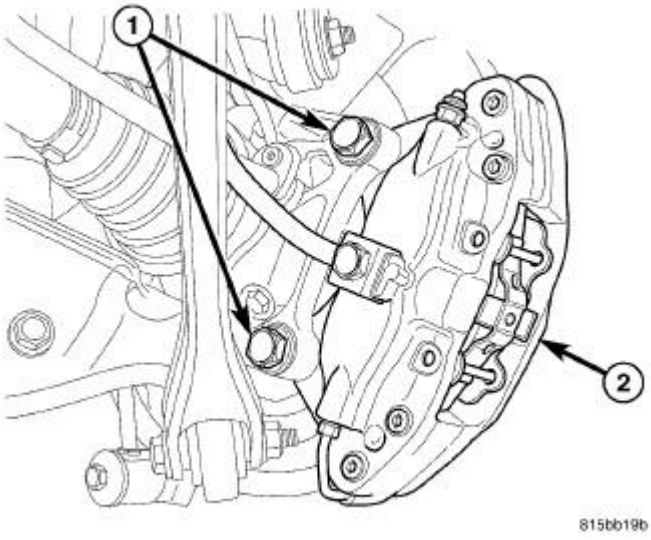


Fig. 294: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Slide caliper with pads (2) over brake rotor and align with knuckle.
4. Install caliper mounting bolts (1). Tighten bolts to 130 N.m (96 ft. lbs.) torque.
5. Remove jack from under spring link.

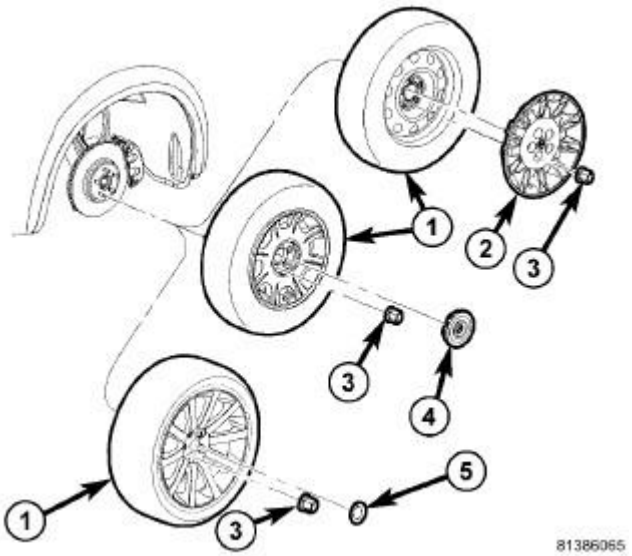


Fig. 295: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) torque. Refer to **INSTALLATION** .
7. Lower vehicle.
8. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.

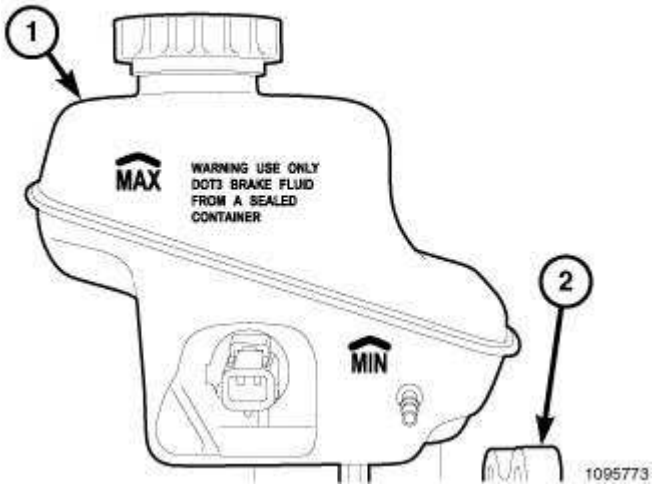


Fig. 296: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

9. Check and adjust brake fluid level in reservoir (1) as necessary.

CAUTION: If NEW brake rotors or pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

10. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pads. If NEW brake pads are installed, they need to be properly burnished. Refer to **PADS, BRAKE, SRT8, STANDARD PROCEDURE**.

TUBES AND HOSES, BRAKE

INSPECTION

INSPECTION

Brake tubing should be inspected periodically for evidence of physical damage or contact with moving or hot components.

Flexible rubber hose is used at both the front and rear wheel brakes. Inspection of the flexible brake hoses should be performed whenever the brake system is serviced and every 12, 000 km (7, 500 miles) or 12 months, whichever comes first. Inspect hydraulic brake hoses for surface cracking, scuffing, or worn spots. If the fabric casing of the hose becomes exposed due to cracks or abrasions in the hose cover, the hose should be replaced immediately. Eventual deterioration of the hose can take place with possible burst failure. Faulty installation can cause twisting, resulting in wheel, tire, or chassis interference.

NOTE: This vehicle is equipped with more than one size (diameter) brake tube depending on location on the vehicle. If a brake tube must be replaced, always use the same size brake tubing as that being replaced. Never use under-size brake tubing.

VALVE, PROPORTIONING

DESCRIPTION

DESCRIPTION

A proportioning valve is used on each vehicle without antilock brakes. One valve is used for both rear brake hydraulic circuits. The proportioning valve is located in the junction block. Refer to **BLOCK, BRAKE LINE UNION, DESCRIPTION**. The valve is not serviceable and must be replaced as part of the junction block.

PARKING BRAKE

DESCRIPTION

DESCRIPTION

This vehicle uses drum-in-hat style parking brakes at each rear wheel. The system is actuated using a foot-operated mechanism and three parking brake cables.

CABLE, PARKING BRAKE, FRONT

REMOVAL

REMOVAL

NOTE: Before proceeding. Refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

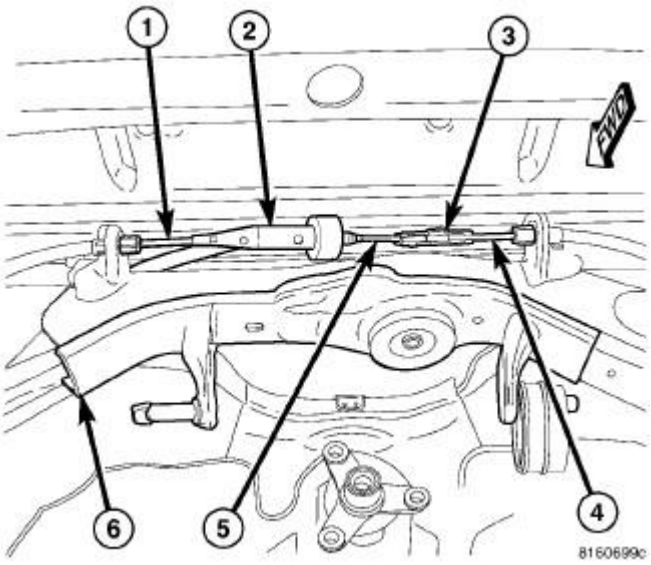


Fig. 297: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

2. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable (4) above axle differential (not shown).

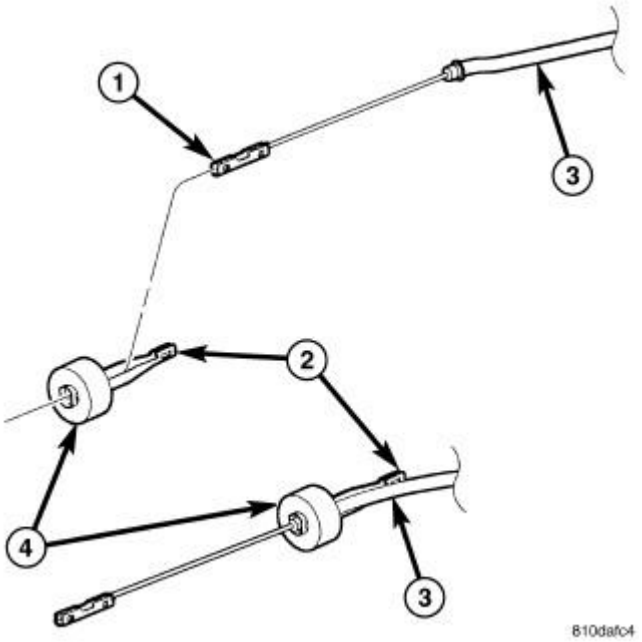


Fig. 298: Front Cable Installation Into Equalizer
Courtesy of CHRYSLER GROUP, LLC

3. Remove front cable (3) from equalizer (2).

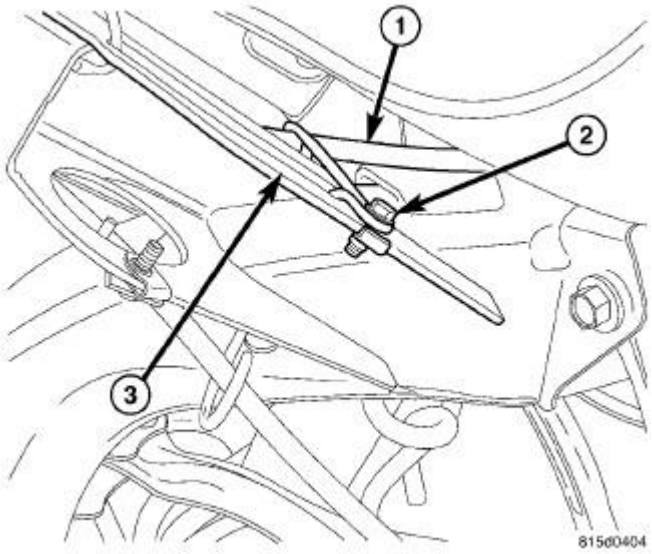


Fig. 299: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

4. Remove screw (2) fastening cable (1) routing bracket to rear crossmember front flange (3).

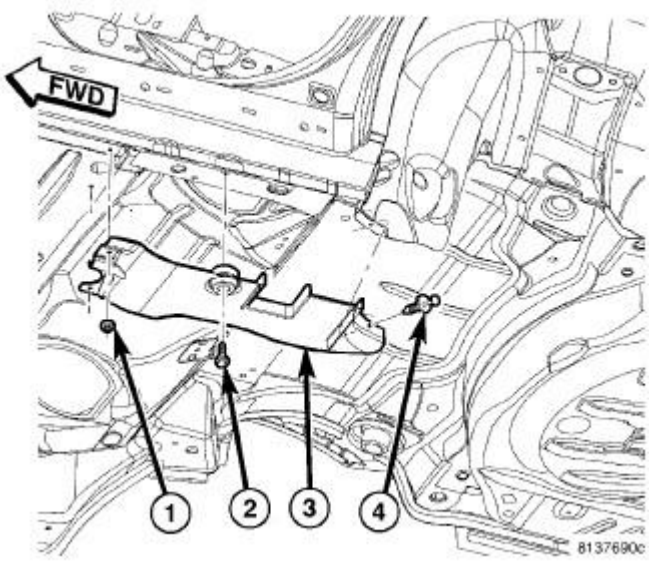


Fig. 300: Shield 1
Courtesy of CHRYSLER GROUP, LLC

5. Remove nuts (1), bolt (2) and push-pins (4), securing lower rear wheelhouse shield (3) to body of vehicle. Remove lower rear wheelhouse shield.

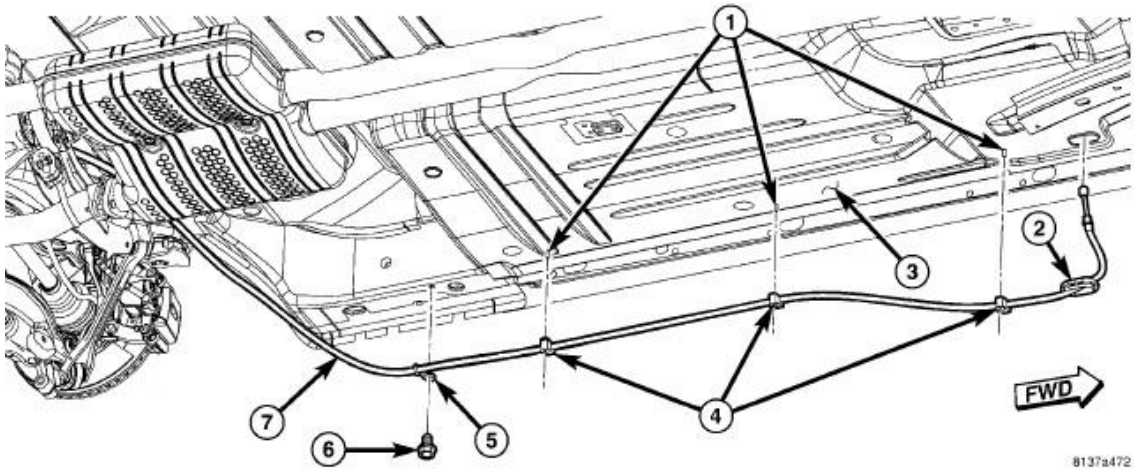


Fig. 301: Front Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

6. Remove screw (6) and routing clip (4) nuts fastening cable (7) to underside of body (3).
7. Lower vehicle.
8. Remove driver door opening sill scuff plate and cowl side trim.
9. Remove clip and roll back carpet away from front cable.

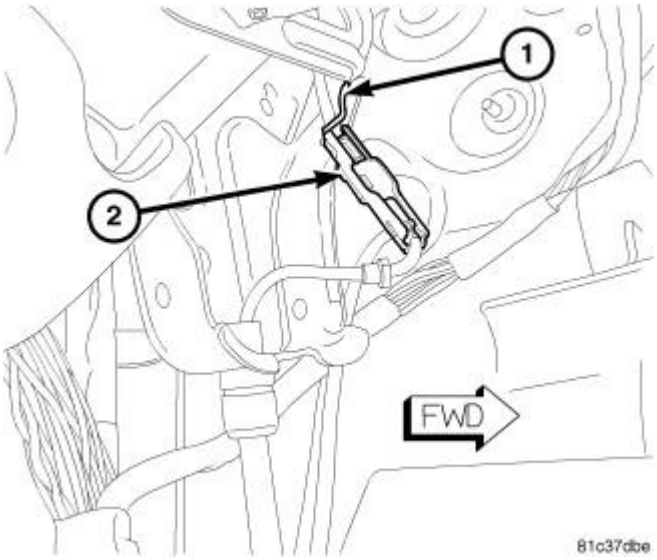


Fig. 302: Cable Connector Secured In Fork
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove front parking brake cable from cable connector at lever without securing connector first. If not secured, cable connector will wind up inside lever assembly making it most difficult to retrieve and reconnect to front cable upon installation.

10. Using pliers, reach up inside parking brake lever assembly and pull downward on parking brake cable connector. Secure cable connector (2) in retaining fork (1) formed into parking brake lever bracket as shown in illustration.

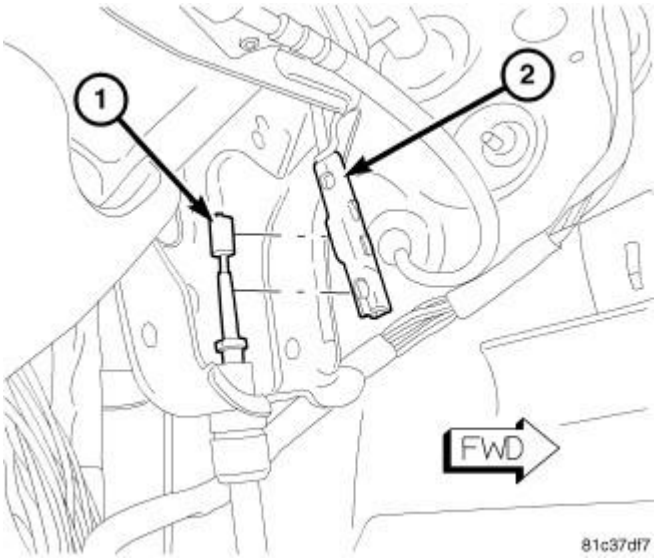


Fig. 303: Front Cable AT Lever Connector
Courtesy of CHRYSLER GROUP, LLC

11. Disengage and remove front parking brake cable strand (1) from cable connector (2), leaving

cable connector secured in retaining fork.

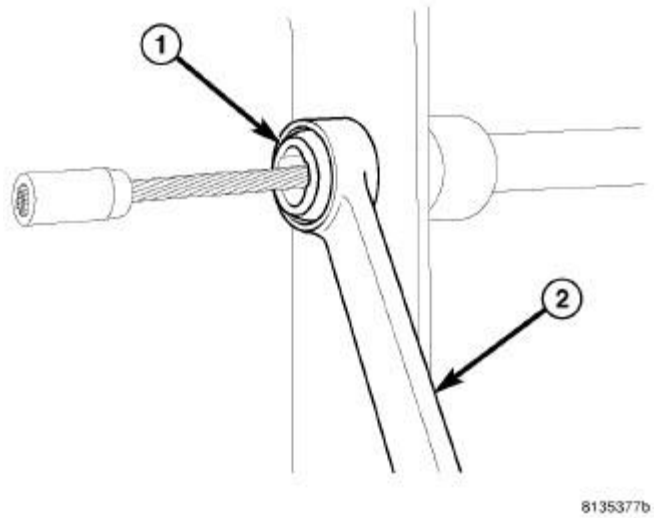


Fig. 304: Removing Cable Using Wrench
Courtesy of CHRYSLER GROUP, LLC

1 - CABLE RETAINER
2 - 12-POINT BOX WRENCH

12. Place 13 mm 12-point box wrench (2) over cable retainer (1) at lever bracket as shown in illustration to collapse retainer fingers. Pull cable from bracket.

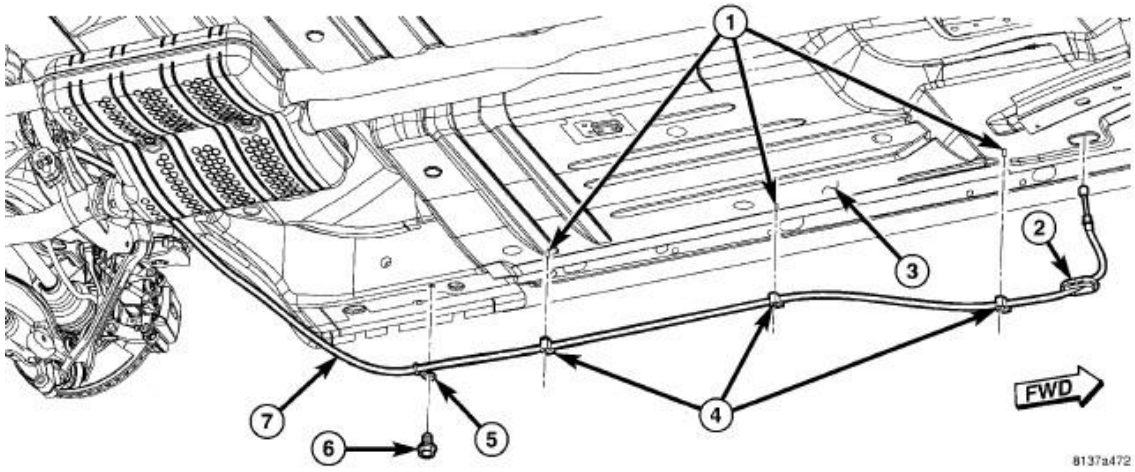


Fig. 305: Front Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

13. Remove parking brake cable grommet (2) from floor pan (3).
14. Remove parking brake cable (7) through hole in floor pan.

INSTALLATION

INSTALLATION

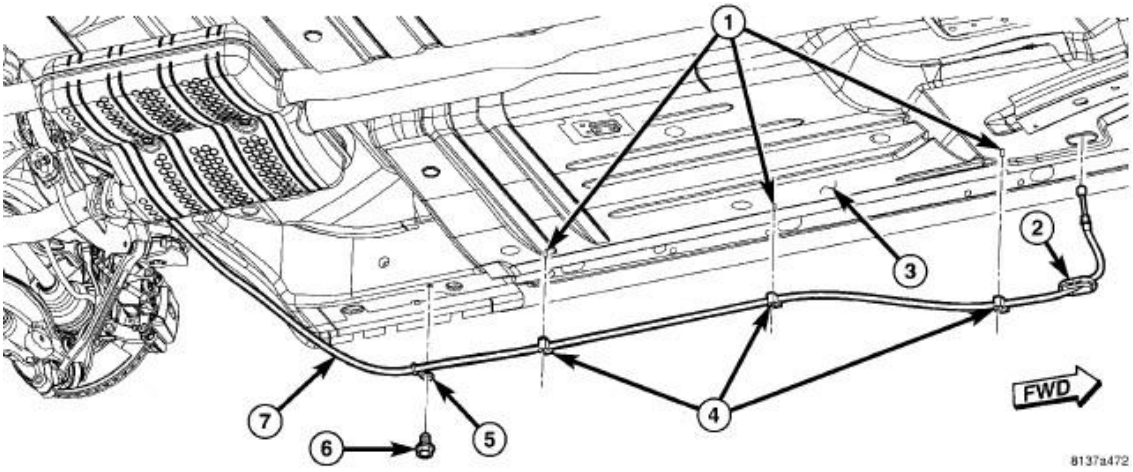


Fig. 306: Front Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

1. Guide parking brake cable (7) down through hole in floor pan.
2. Install parking brake cable grommet (2) in hole of floor pan (3).

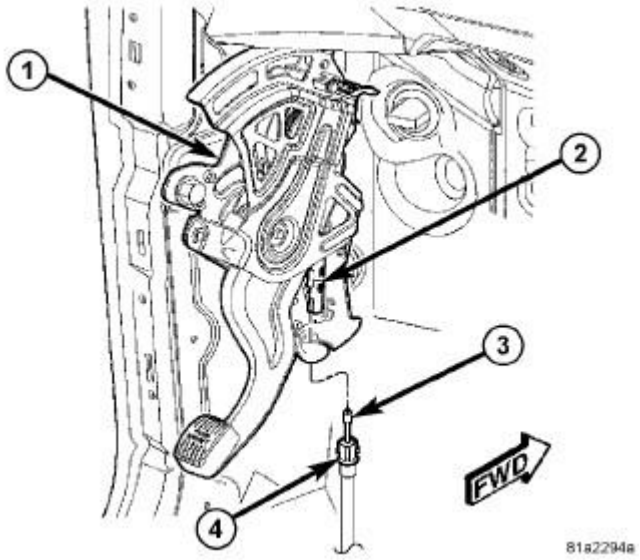


Fig. 307: Front Cable AT Lever
Courtesy of CHRYSLER GROUP, LLC

3. Guide cable strand (3) up through lever bracket and press cable housing retainer (4) into bracket allowing retainer fingers to lock cable in place.

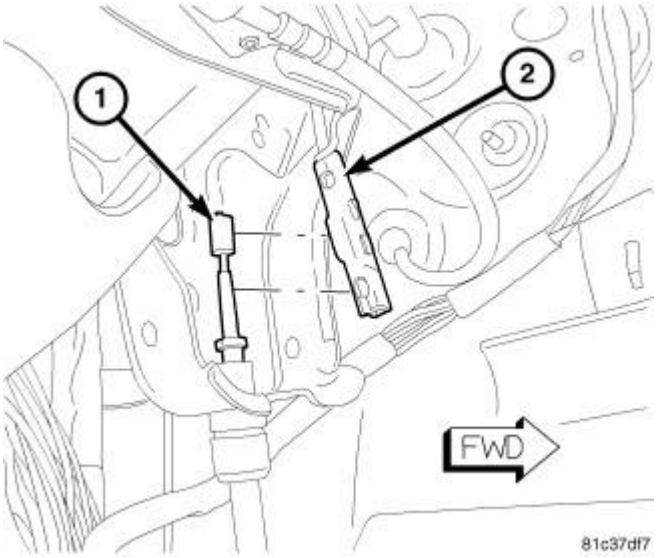


Fig. 308: Front Cable AT Lever Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect front parking brake cable strand (1) to cable connector (2) secured in retaining fork.
5. Once front parking brake cable strand is completely seated in cable connector (2), lift cable connector out of retaining fork using pliers and slowly allow lever mechanism to take up slack in cable.
6. Lay carpet back into place and install retaining clip.
7. Install driver door opening sill scuff plate and cowl side trim.
8. Raise and support vehicle.

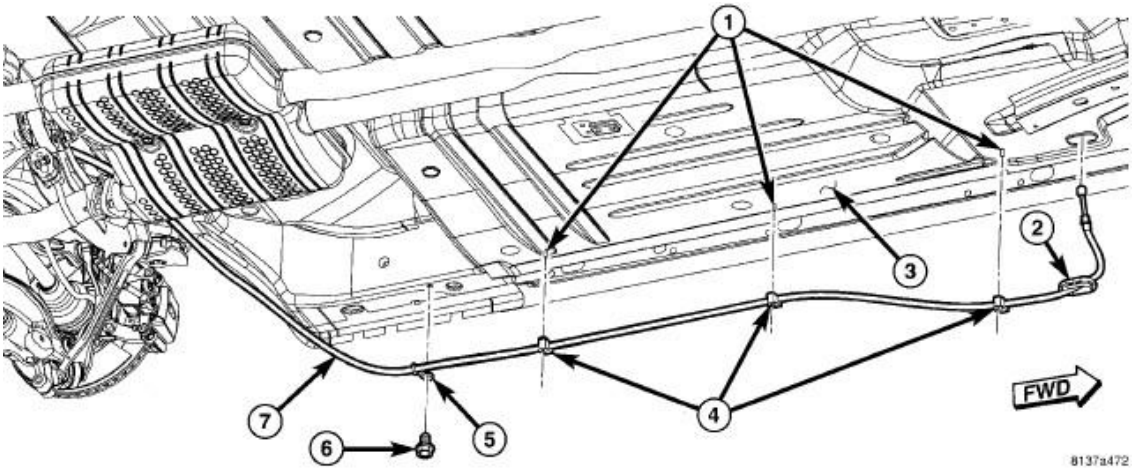


Fig. 309: Front Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

9. Install screw (6) and routing clip (4) nuts fastening cable (7) to underside of body (3).

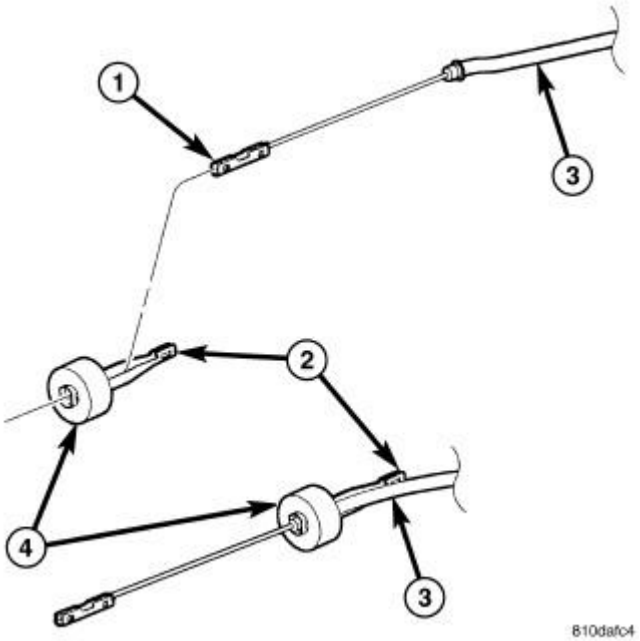


Fig. 310: Front Cable Installation Into Equalizer
Courtesy of CHRYSLER GROUP, LLC

10. Route cable above rear crossmember, then slide cable end (1) (shown in illustration with connector) and housing (3) through equalizer (2) above rear axle differential.

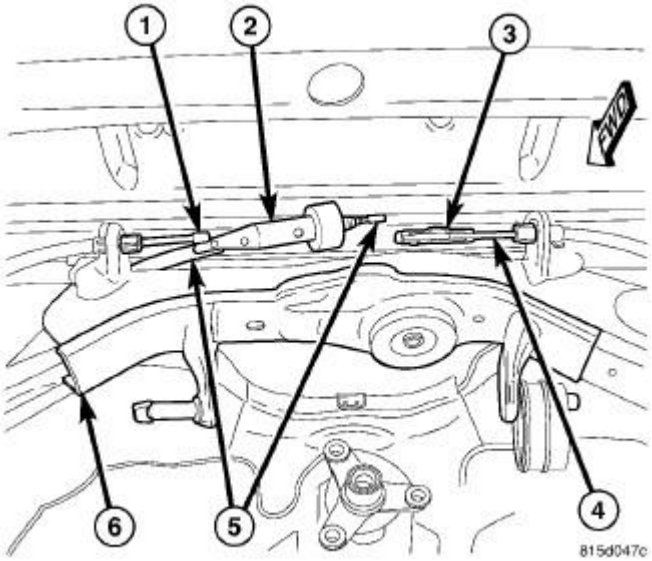


Fig. 311: Parking Brake Cables AT Rear Crossmember
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out

parking brake lever to service parking brake components.

11. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4) (axle differential not shown).

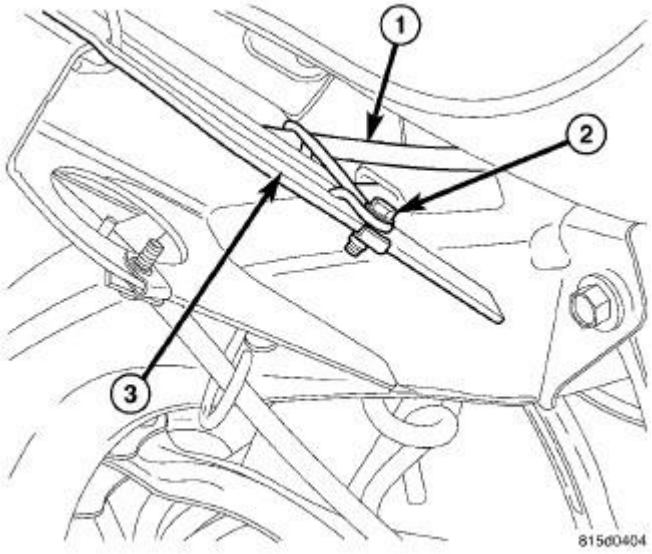


Fig. 312: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

12. Install screw (2) fastening cable (1) routing bracket to rear crossmember front flange (3).

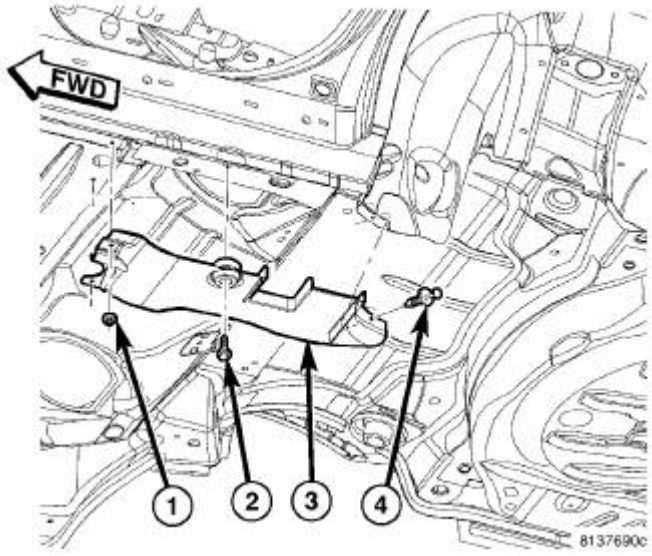


Fig. 313: Shield 1
Courtesy of CHRYSLER GROUP, LLC

13. Position lower rear wheelhouse shield (3) onto body of vehicle. Install nuts (1), bolt (2) and push-pins (4) securing lower rear wheelhouse shield to body. Tighten nuts and bolt securely.
14. Lower vehicle until rear wheels are just above floor level.
15. Apply parking brake lever. Release lever, then reapply.
16. Check to make sure rear wheels will not rotate with lever applied.
17. Release parking brake lever, then check to make sure rear wheels rotate without excessive drag.
18. Apply parking brake lever.
19. Lower vehicle.

CABLE, PARKING BRAKE, REAR

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

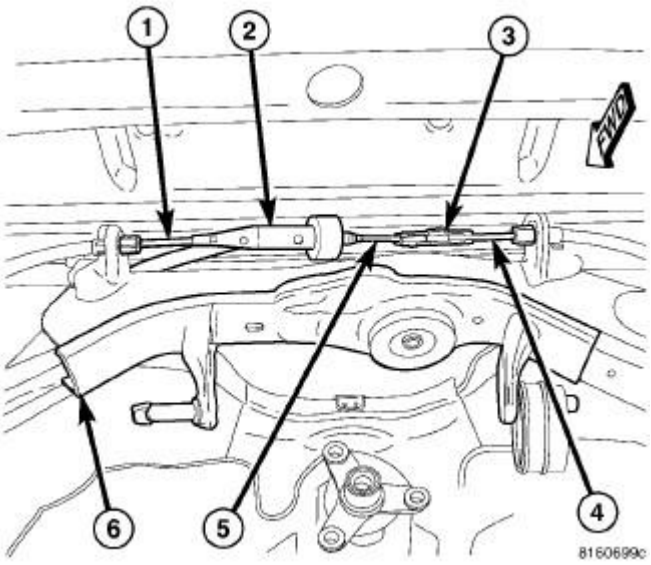


Fig. 314: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

2. Disconnect rear parking brake cable near front cable as follows:
   - If removing left rear cable, disconnect cable (1) at equalizer (2) above rear axle differential

(not shown) and rear crossmember (6).

- If removing right rear cable, disconnect cable (4) at connector (3) above rear axle differential (not shown) and rear crossmember (6).

3. Remove parking brake shoes on side of cable service. Refer to **SHOES, PARKING BRAKE, REMOVAL**.

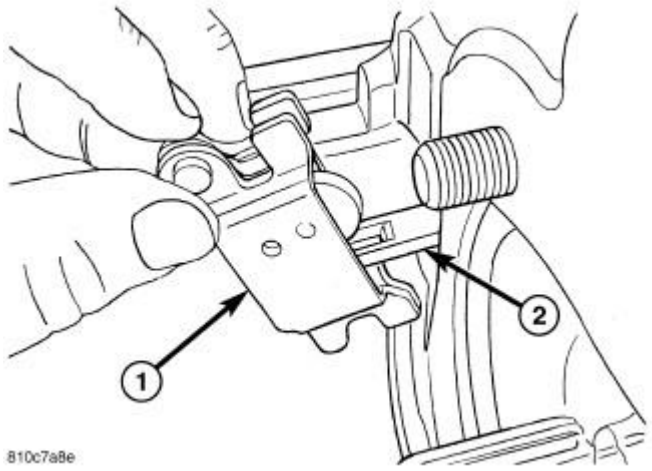


Fig. 315: Removing/Installing Actuator
Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR
2 - CABLE END

4. Remove shoe actuator lever (1) from end of cable (2) and support.

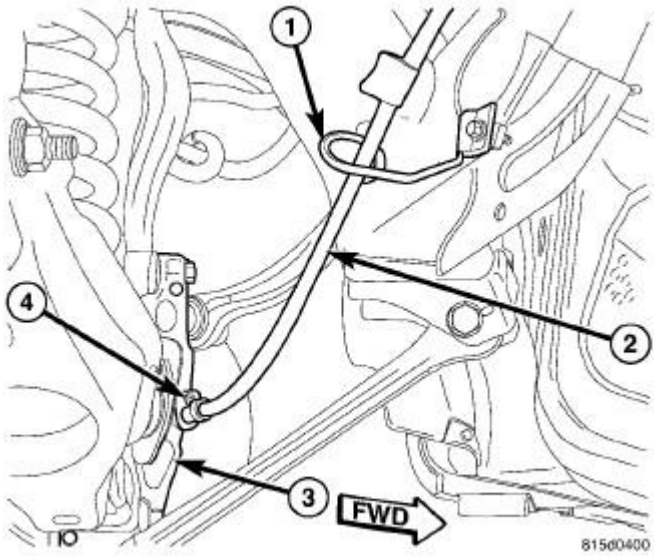


Fig. 316: Rear Cable Routing To Knuckle

Courtesy of CHRYSLER GROUP, LLC

5. Remove screw (4) fastening cable (2) to knuckle (3). Remove cable from knuckle.
6. Remove cable (2) from routing guide (1).

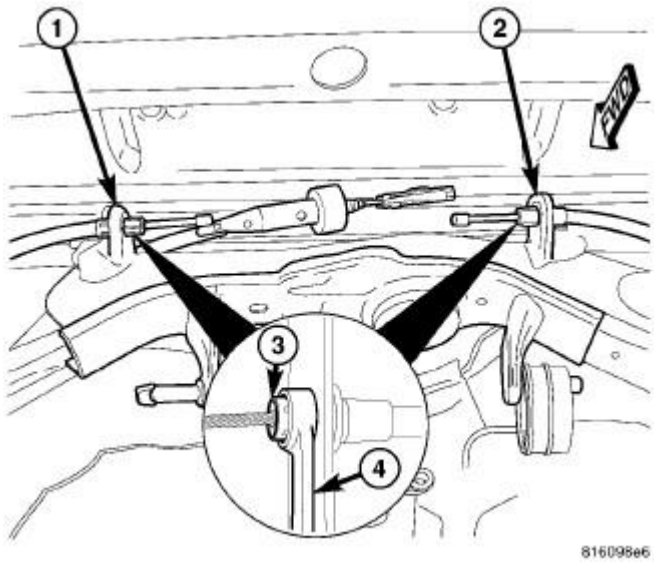


Fig. 317: Cables AT Crossmember Bracket
Courtesy of CHRYSLER GROUP, LLC

7. Place 13 mm 12-point box wrench (4) over cable strand and completely onto cable retainer (3) as shown in illustration at crossmember bracket (1 - left) (2 - right). It may be necessary to wiggle wrench around somewhat to collapse retainer fingers. With wrench in place, pull cable from bracket.
8. Remove parking brake cable from vehicle.

INSTALLATION

INSTALLATION

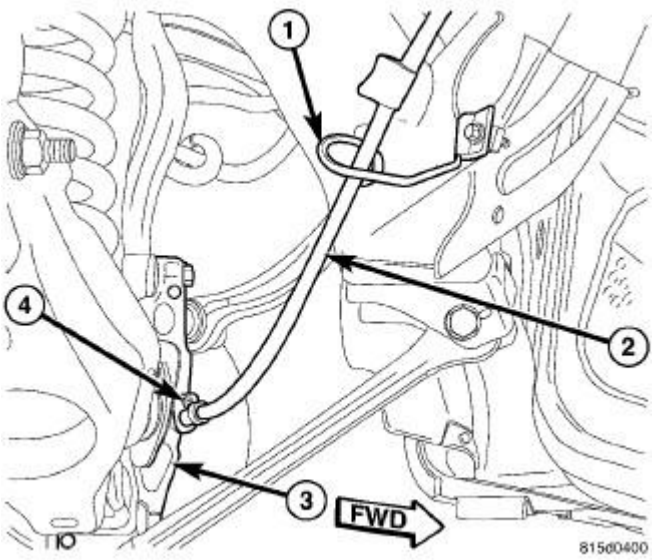


Fig. 318: Rear Cable Routing To Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Route leading end of rear parking brake cable (2) up through cable guide (1) on crossmember.

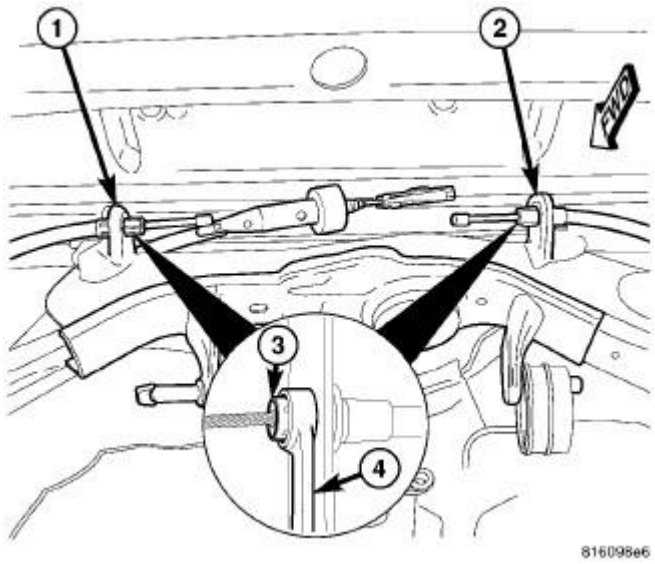


Fig. 319: Cables AT Crossmember Bracket
Courtesy of CHRYSLER GROUP, LLC

2. Guide cable leading end through crossmember bracket (1 - left) (2 - right) near equalizer and press cable housing retainer into bracket allowing retainer fingers to lock cable in place.

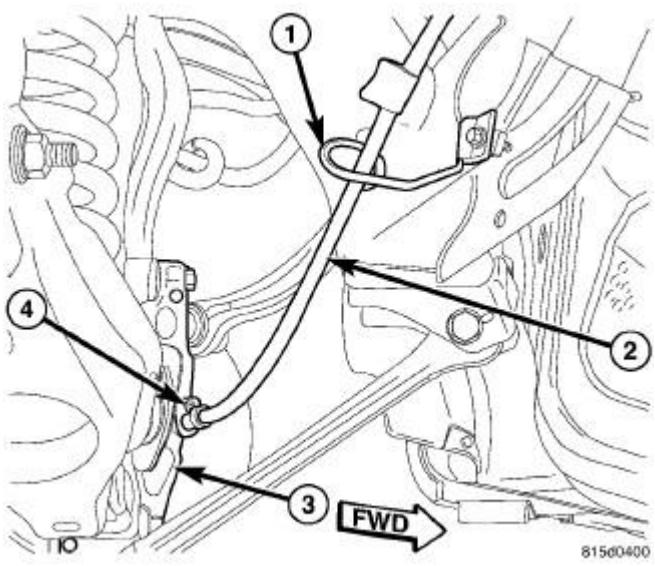


Fig. 320: Rear Cable Routing To Knuckle
Courtesy of CHRYSLER GROUP, LLC

3. Insert opposite end of cable (2) through rear knuckle (3) and install mounting screw (4). Tighten screw to 8 N.m (71 in. lbs.) torque.

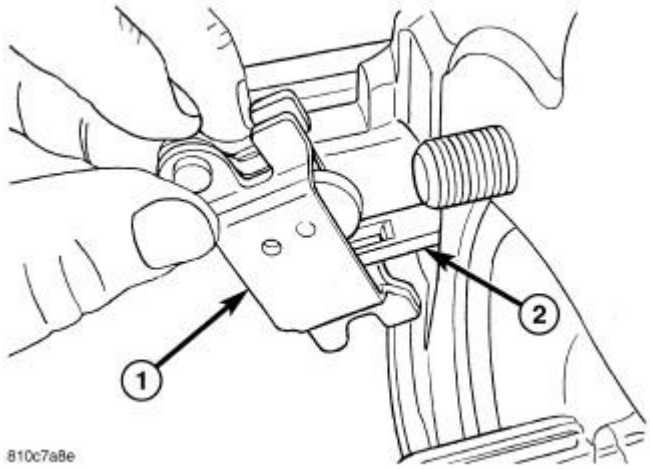


Fig. 321: Removing/Installing Actuator
Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR
2 - CABLE END

4. Install shoe actuator lever (1) on end of parking brake cable (2). Make sure actuator lever is positioned with word "UP" facing outward.
5. Install parking brake shoes as well as all components necessary to access them. Refer to **SHOES, PARKING BRAKE, INSTALLATION**.

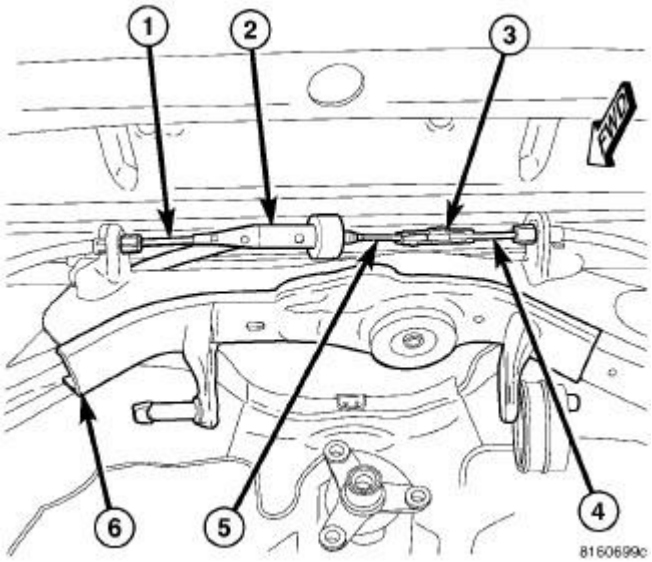


Fig. 322: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock out parking brake lever to service parking brake components.

6. Connect rear parking brake cable at equalizer/front cable as follows:
   - If installing left rear cable, connect cable (1) at equalizer (2) above rear axle differential (not shown) and rear crossmember (6).
   - If installing right rear cable, connect cable (4) at connector (3) above rear axle differential (not shown) and rear crossmember (6).
7. Lower vehicle until rear wheels are just above floor level.
8. Apply parking brake lever. Release lever, then reapply.
9. Check to make sure rear wheels will not rotate with lever applied.
10. Release parking brake lever, then check to make sure rear wheels rotate without excessive drag.
11. Adjust parking brake shoes as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS**.
12. Lower vehicle.

LEVER, PARKING BRAKE

REMOVAL

LEVER

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

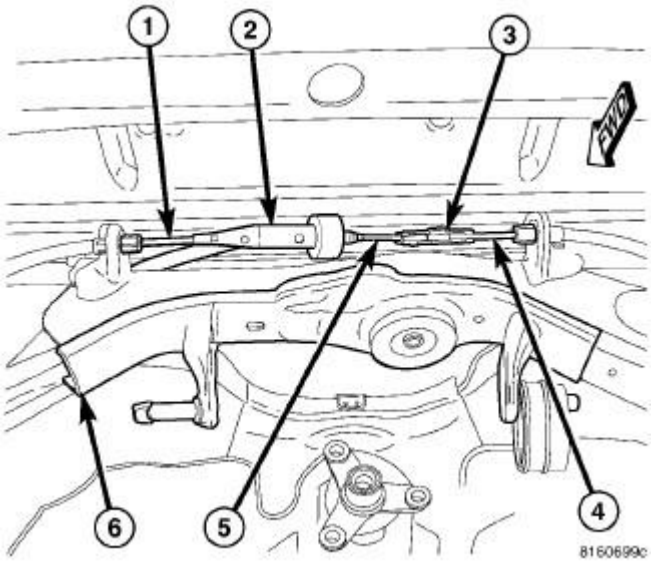


Fig. 323: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

2. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable.
3. Lower vehicle.
4. Remove steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .

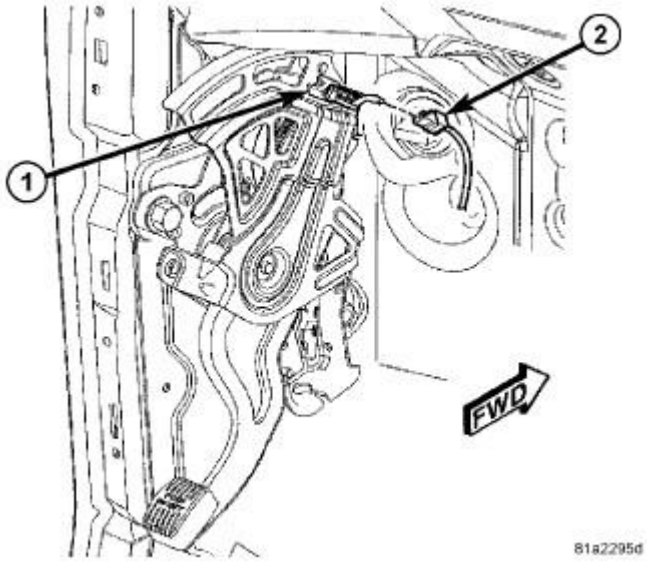


Fig. 324: Parking Brake Switch Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect wiring connector (2) at parking brake switch (1).

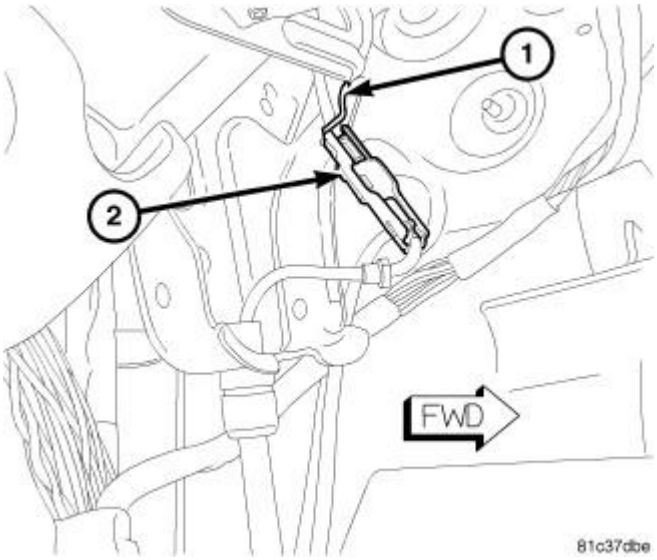


Fig. 325: Cable Connector Secured In Fork
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove front parking brake cable from cable connector at lever without securing connector first. If not secured, cable connector will wind up inside lever assembly making it most difficult to retrieve and reconnect to front cable upon installation.

6. Using pliers, reach up inside parking brake lever assembly and pull downward on parking brake cable connector. Secure cable connector (2) in retaining fork (1) formed into parking brake lever bracket as shown in illustration.

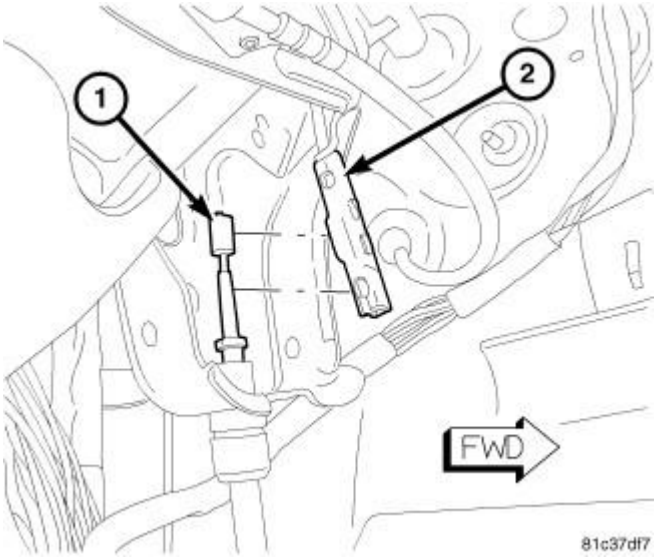


Fig. 326: Front Cable AT Lever Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disengage and remove front parking brake cable strand (1) from cable connector (2), leaving cable connector secured in retaining fork.

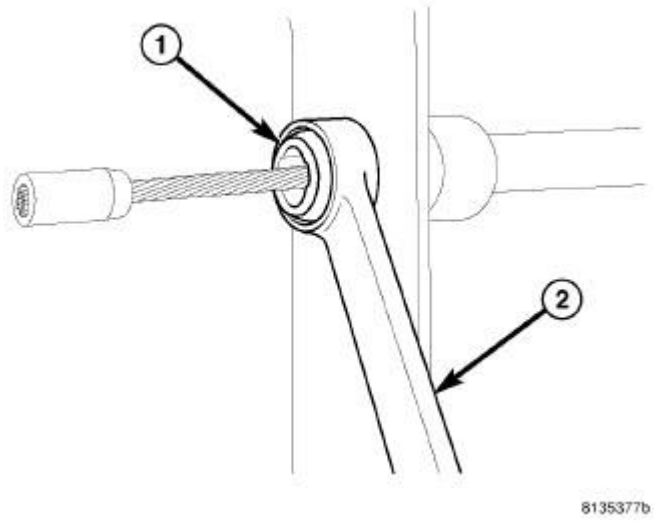


Fig. 327: Removing Cable Using Wrench
Courtesy of CHRYSLER GROUP, LLC

1 - CABLE RETAINER
2 - 12-POINT BOX WRENCH

8. Place 13 mm 12-point box wrench (2) over cable retainer (1) at lever bracket as shown in illustration to collapse retainer fingers. Pull cable from bracket.

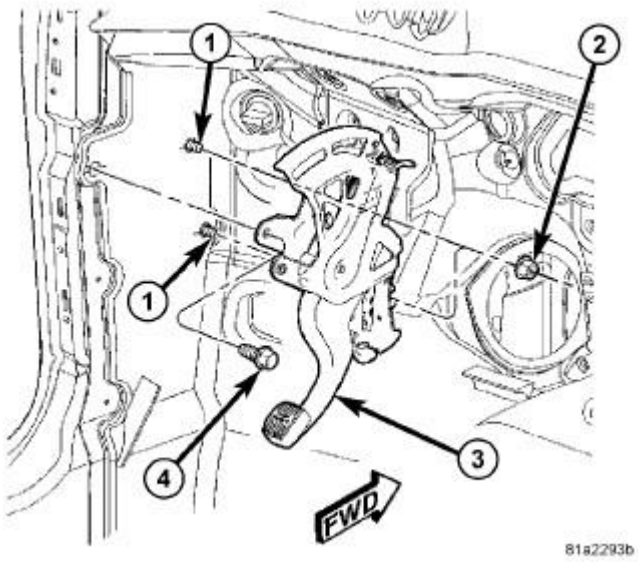


Fig. 328: Lever Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolt (4) and two nuts (2) mounting parking brake lever (3) to body.
10. Remove parking brake lever (3).

LEVER - RHD

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

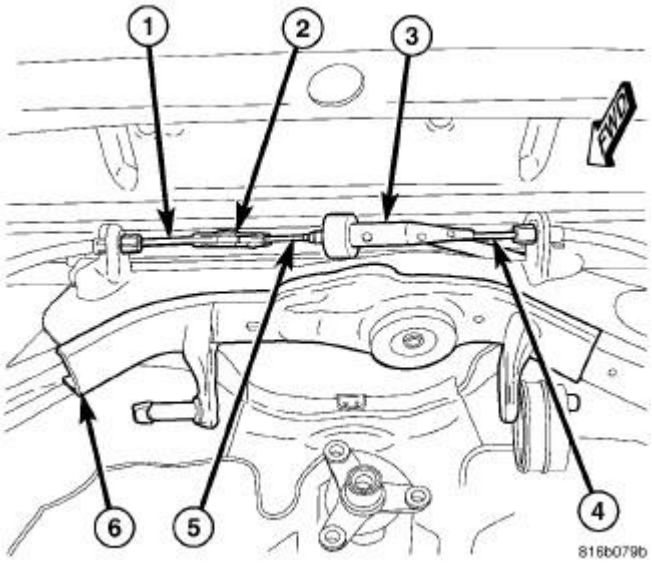


Fig. 329: Cables AT Equalizer - RHD

Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

2. Disconnect front parking brake cable (5) at connector (2) to right rear parking brake cable.
3. Lower vehicle.
4. Remove driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .
5. Remove steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
6. Remove foot rest. Refer to **FOOT REST, FLOOR, FRONT, REMOVAL** .
7. Roll back carpet at center console to access lever mounting nuts.

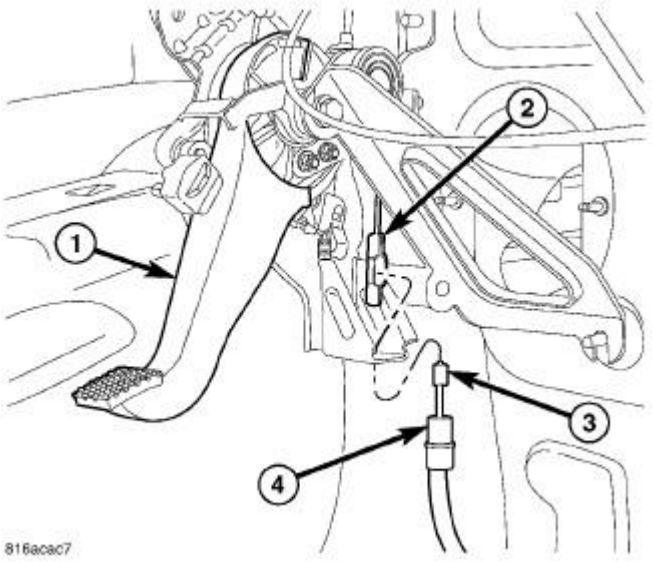


Fig. 330: Cable Connection AT Lever - RHD
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect wiring connector at parking brake switch on lever.
9. Disconnect front parking brake cable strand (3) at lever connector (2).

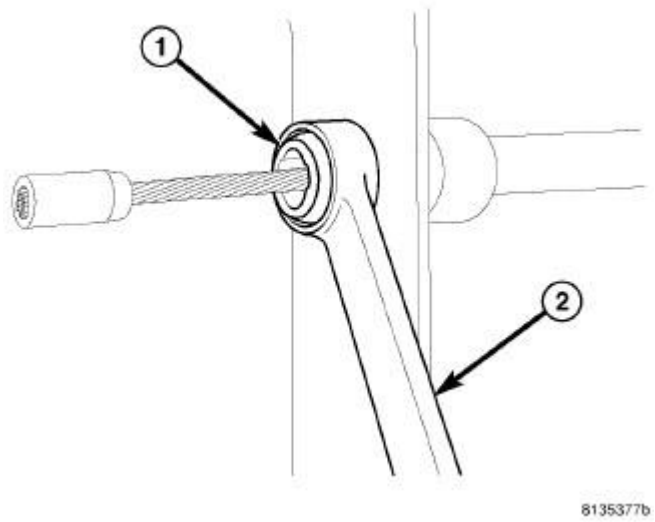


Fig. 331: Removing Cable Using Wrench
Courtesy of CHRYSLER GROUP, LLC

1 - CABLE RETAINER
2 - 12-POINT BOX WRENCH

10. Place 13 mm 12-point box wrench (2) over cable retainer (1) at lever bracket as shown in illustration to collapse retainer fingers. Pull cable from bracket.

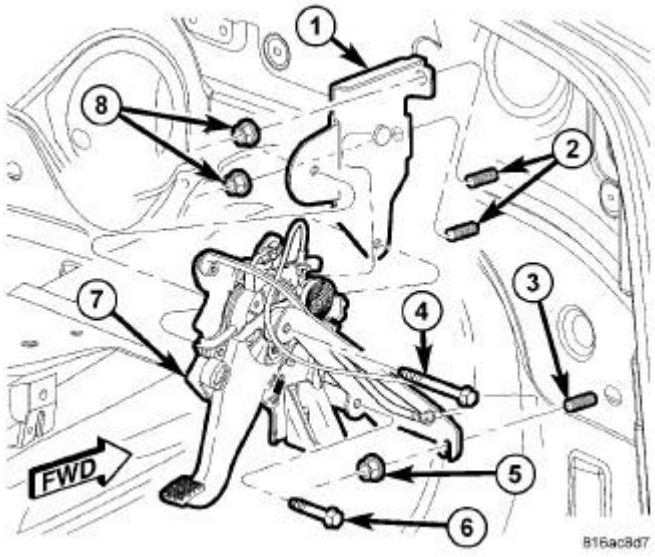


Fig. 332: Parking Brake Lever - RHD
Courtesy of CHRYSLER GROUP, LLC

11. Loosen nut (5) mounting parking brake lever (7) to body.

12. Remove nuts (8) mounting parking brake lever (7) to body.
13. Remove parking brake lever (7).

INSTALLATION

LEVER

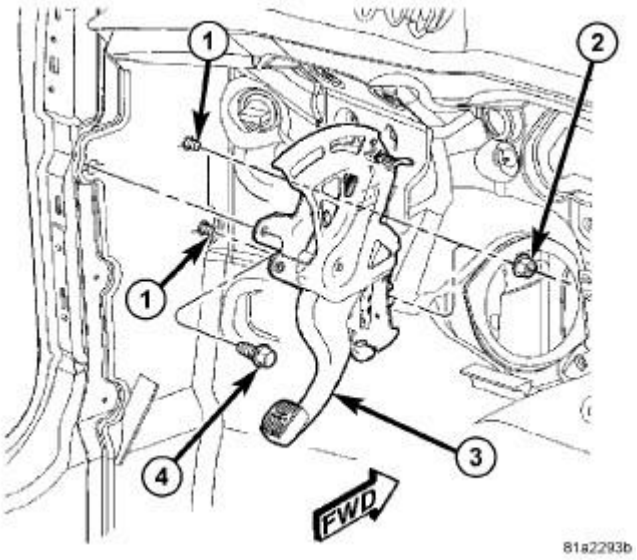


Fig. 333: Lever Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Install parking brake lever (3) over mounting studs (1).
2. Install bolt (4) and two nuts (2) mounting parking brake lever to body. Tighten bolt and nuts to 26 N.m (19 ft. lbs.).

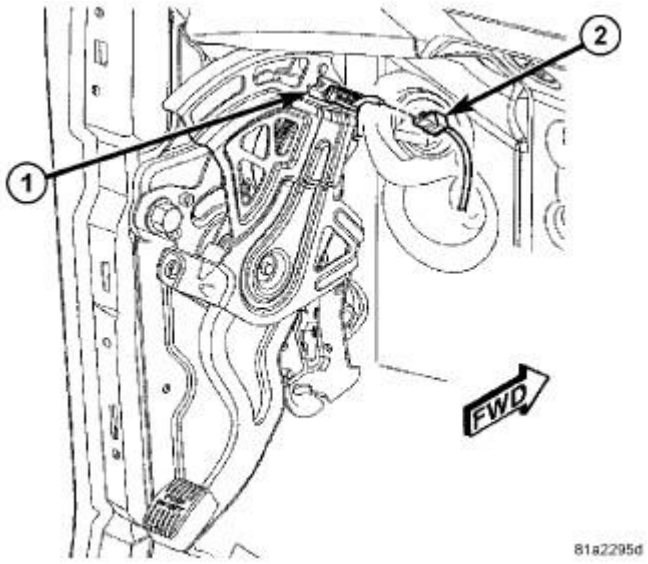


Fig. 334: Parking Brake Switch Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect wiring connector (2) at parking brake switch (1).

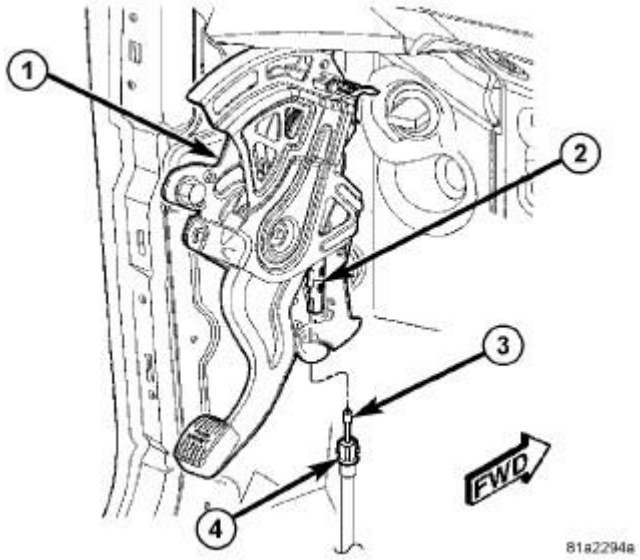


Fig. 335: Front Cable AT Lever
Courtesy of CHRYSLER GROUP, LLC

4. Guide cable strand (3) up through lever bracket and press cable housing retainer (4) into bracket allowing retainer fingers to lock cable in place.

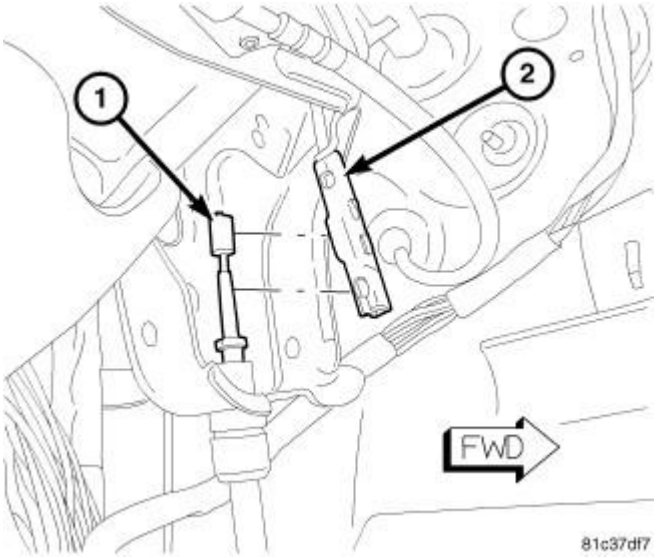


Fig. 336: Front Cable AT Lever Connector
Courtesy of CHRYSLER GROUP, LLC

5. If original parking brake lever is being installed:
    1. Connect front parking brake cable strand (1) to cable connector (2) secured in retaining fork.
    2. Once front parking brake cable strand is completely seated in cable connector (2), lift cable connector out of retaining fork using pliers and slowly allow lever mechanism to take up slack in cable.

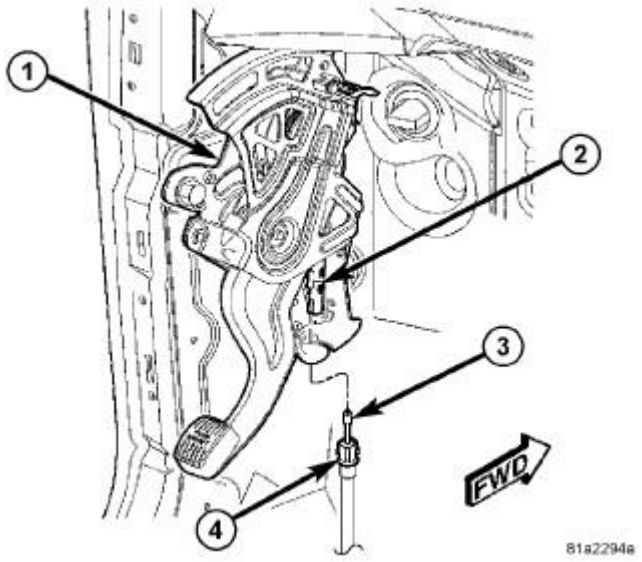


Fig. 337: Front Cable AT Lever
Courtesy of CHRYSLER GROUP, LLC

6. If NEW parking brake lever is being installed:

1. Connect front parking brake cable strand (3) at lever connector (2).
2. Once front parking brake cable strand is completely seated in cable connector (2), remove pin locking out automatic tensioning spring.

7. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
8. Raise and support vehicle.

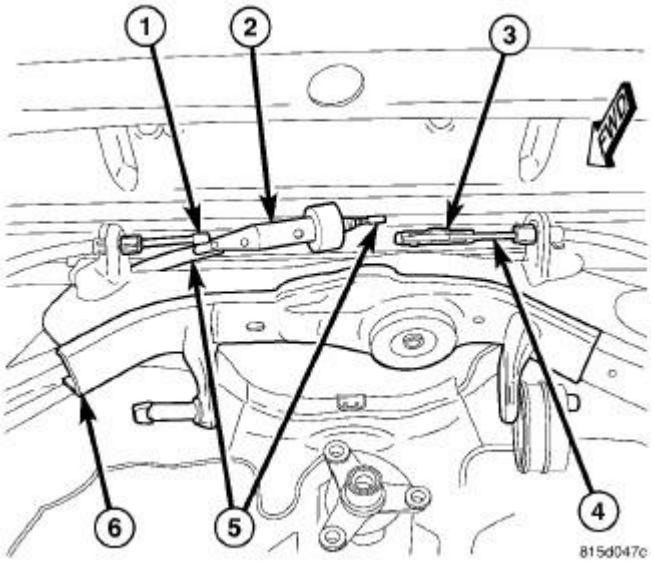


Fig. 338: Parking Brake Cables AT Rear Crossmember
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

9. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4).
10. Lower vehicle until rear wheels are just above floor level.
11. Apply parking brake lever. Release lever to test release cable and handle. Reapply lever. While doing this, check to make sure the red indicator lamp in the cluster turns on and off properly.
12. Check to make sure rear wheels will not rotate with lever applied.
13. Release parking brake lever, then check to make sure rear wheels rotate without excessive drag.
14. Apply parking brake lever.
15. Lower vehicle.

LEVER - RHD

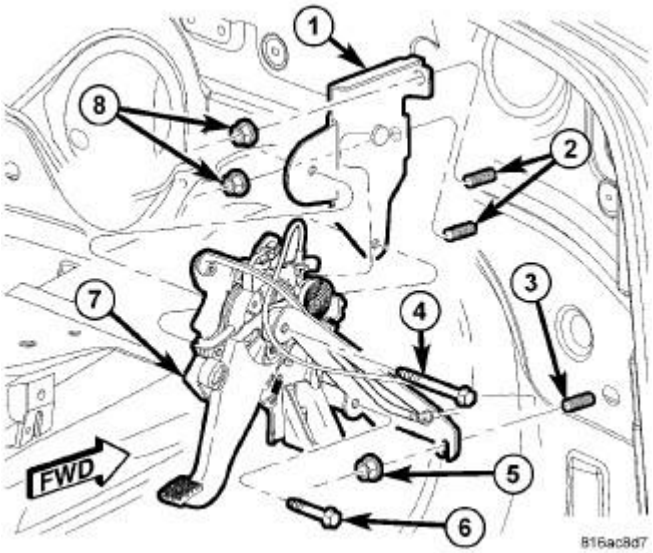


Fig. 339: Parking Brake Lever - RHD
Courtesy of CHRYSLER GROUP, LLC

1. Install parking brake lever (7) over mounting studs (2, 3).
2. Install two nuts (8) mounting left side of parking brake lever to body. Tighten nuts to 26 N.m (19 ft. lbs.).
3. Tighten nut (5) left on stud (3) to 26 N.m (19 ft. lbs.).

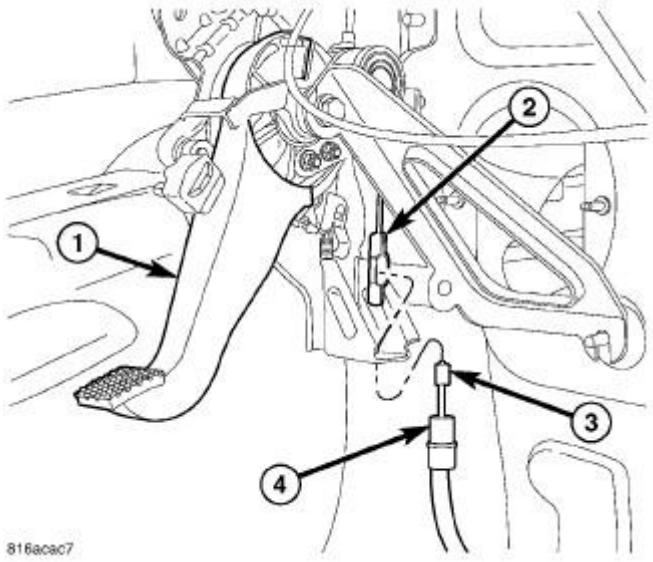


Fig. 340: Cable Connection AT Lever - RHD
Courtesy of CHRYSLER GROUP, LLC

4. Connect wiring connector at parking brake switch.
5. Guide front parking brake cable strand (3) up through lever bracket and press cable housing

retainer (4) into bracket allowing retainer fingers to lock cable in place.

6. Connect parking brake cable strand (3) at lever connector (2).
7. If installing new lever, remove pin locking out automatic tensioning spring.
8. Reposition carpet back to original position at center console.
9. Install foot rest. Refer to **FOOT REST, FLOOR, FRONT, INSTALLATION** .
10. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
11. Install driver side silencer under instrument panel. Refer to **PANEL, SILENCER, INSTALLATION** .
12. Raise and support vehicle.

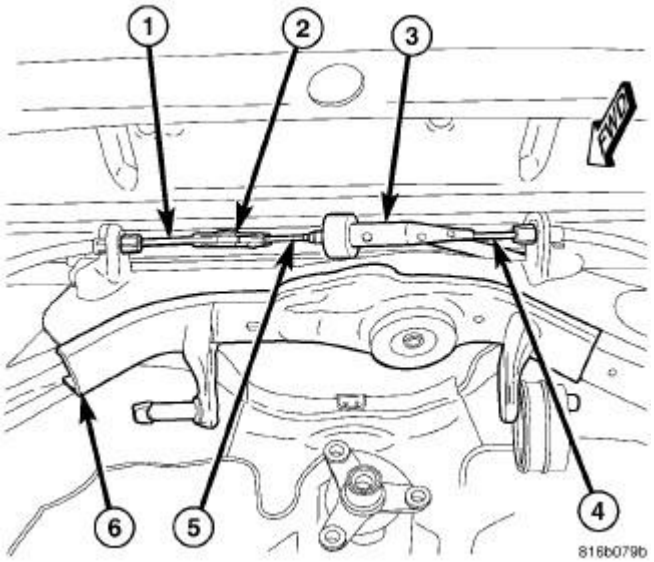


Fig. 341: Cables AT Equalizer - RHD
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

13. Connect front parking brake cable (5) at connector (2) to left rear parking brake cable (1).
14. Lower vehicle until rear wheels are just above floor level.
15. Apply parking brake lever. Release lever to test release cable and handle. Reapply lever. While doing this, check to make sure the red indicator lamp in the cluster turns on and off properly.
16. Check to make sure rear wheels will not rotate with lever applied.
17. Release parking brake lever, then check to make sure rear wheels rotate without excessive drag.
18. Apply parking brake lever.
19. Lower vehicle.

SHOES, PARKING BRAKE

ADJUSTMENTS

ADJUSTMENTS

While most vehicles require only a fine adjustment of the parking brake shoes, some vehicles may require a preliminary adjustment before a fine adjustment can be made. If a preliminary adjustment must be made, refer to PRELIMINARY ADJUSTMENT following the fine adjustment procedure listed below.

1. Place parking brake lever in "full released" position.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

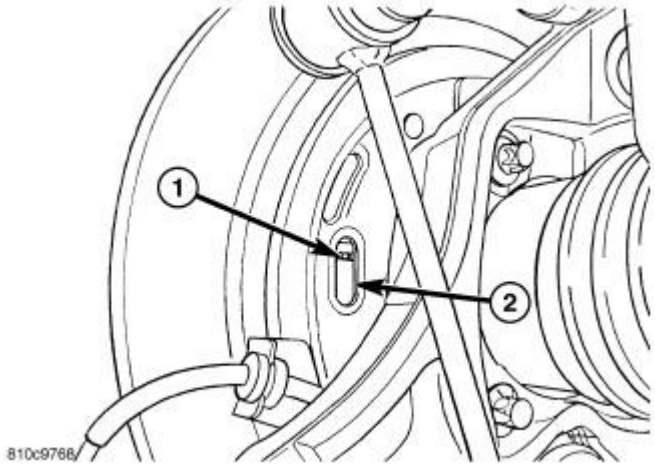


Fig. 342: Access To Shoe Adjuster Star-Wheel
Courtesy of CHRYSLER GROUP, LLC

1 - ADJUSTER STAR WHEEL
2 - ACCESS HOLE

3. Remove plug in parking brake shoe support to access adjuster star-wheel (1).

NOTE: Through the access hole (2), rotate the adjuster star wheel (1) in the following direction to expand the shoes outward against the drum.

- **Left brake - Rotate star-wheel toward rear of vehicle.**
- **Right brake - Rotate star-wheel toward front of vehicle.**

4. Using an appropriate tool, turn adjuster star wheel (1) until wheel will not rotate (dead lock).
5. Back off adjuster six detents (teeth).
6. Rotate wheel, checking for light drag. If drag is too heavy, continue to back off adjuster one

detent at a time until light drag is present. **Do not back off star-wheel more than 17 detents from wheel lock.**

7. Install access plug.
8. Adjust opposite wheel parking brake shoes using same method.
9. Lower vehicle.
10. Apply and release parking brake lever once to ensure proper operation of parking brakes.

PRELIMINARY ADJUSTMENT

1. Remove rear brake rotor. Refer to **ROTOR, BRAKE, REMOVAL**.

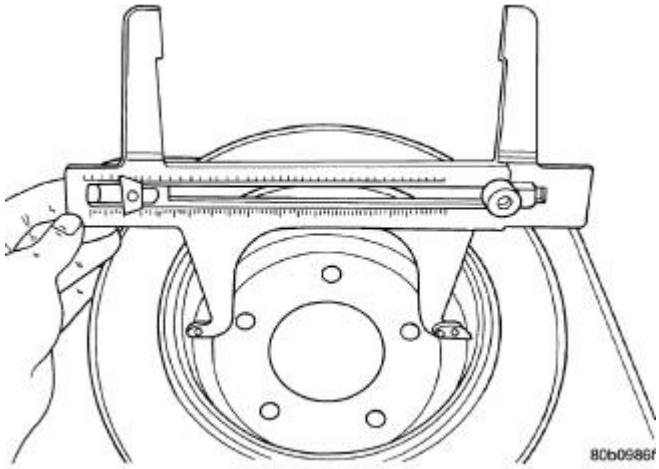


Fig. 343: Measuring Parking Brake Drum Diameter
Courtesy of CHRYSLER GROUP, LLC

2. Using Brake Shoe Gauge, Special Tool (special tool #C-3919, Gauge, Brake Shoes), or equivalent, measure inside diameter of parking brake drum portion of rotor. Set Gauge.

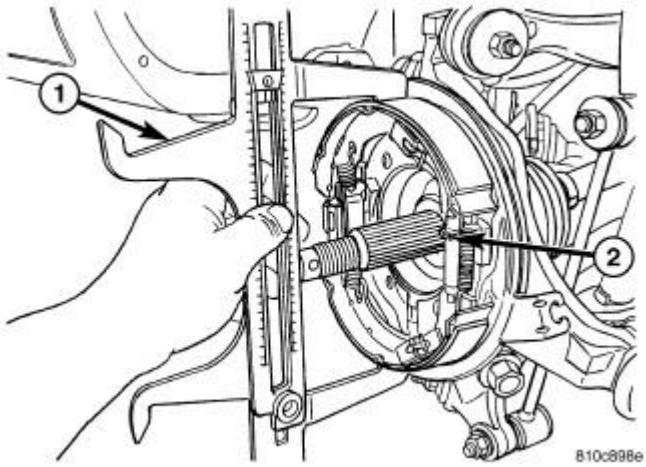


Fig. 344: Measuring Parking Brake Shoes

Courtesy of CHRYSLER GROUP, LLC

1 - BRAKE SHOE GAUGE
2 - ADJUSTER STAR WHEEL

3. Place Gauge (1) over parking brake shoes at widest point.
4. Using adjuster star wheel (2), adjust parking brake shoes until linings on both park brake shoes just touch jaws on gauge.
5. Install rear brake rotor. Refer to **ROTOR, BRAKE, INSTALLATION**.
6. Perform fine adjustment of parking brake shoes.

REMOVAL

REMOVAL

NOTE: The following procedure may be used to remove shoes on either side of the vehicle.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Access and remove rear hub and bearing. Refer to **HUB AND BEARING, REMOVAL** .

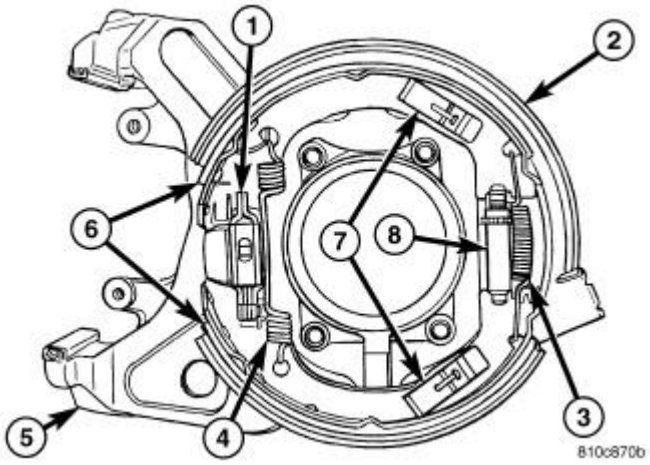


Fig. 345: Identifying Parking Brake Components
Courtesy of CHRYSLER GROUP, LLC

1 - ACTUATOR
2 - SUPPORT
3 - ADJUSTER SPRING
4 - RETURN SPRING
5 - CALIPER ADAPTER
6 - SHOES

7 - HOLD-DOWN CLIPS AND PINS
8 - ADJUSTER

3. Completely back off parking brake shoe adjustment (8).
4. Remove parking brake shoe adjuster spring (3).
5. Remove shoe adjuster (8).
6. Remove upper brake shoe hold-down clip and pin (7).
7. Remove upper shoe (6) from return spring (4) and shoe actuator lever (1).
8. Remove return spring (4) from lower shoe (6).

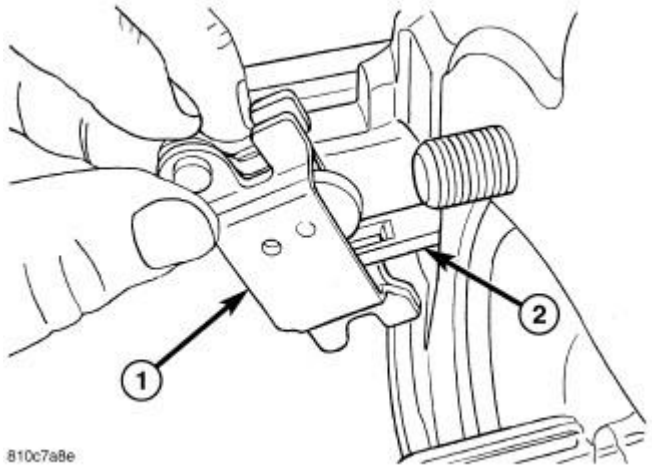


Fig. 346: Removing/Installing Actuator
Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR
2 - CABLE END

9. Remove shoe actuator lever (1) from end of cable (2).

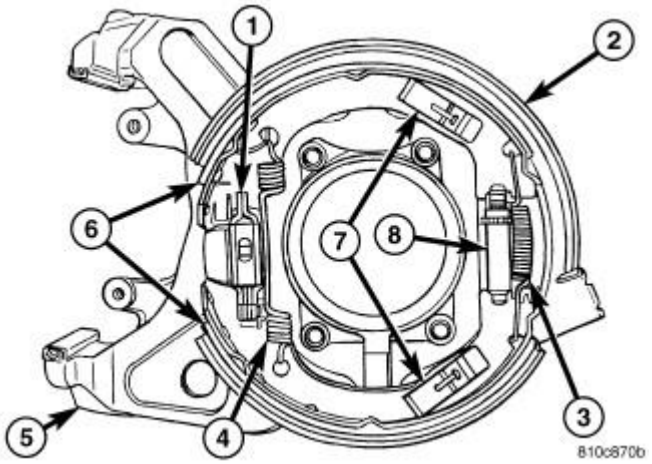


Fig. 347: Identifying Parking Brake Components
Courtesy of CHRYSLER GROUP, LLC

1 - ACTUATOR
2 - SUPPORT
3 - ADJUSTER SPRING
4 - RETURN SPRING
5 - CALIPER ADAPTER
6 - SHOES
7 - HOLD-DOWN CLIPS AND PINS
8 - ADJUSTER

10. Remove lower brake shoe hold-down clip and pin (7).
11. Remove lower shoe (6).
12. Inspect springs, adjuster, lever and aluminum shoe anchor pin for wear or damage. Replace as necessary.

INSTALLATION

INSTALLATION

NOTE: The following procedure may be used to install shoes on either side of the vehicle.

NOTE: Inspect springs, adjuster, lever and aluminum shoe anchor pin for wear or damage prior to installation. Replace as necessary.

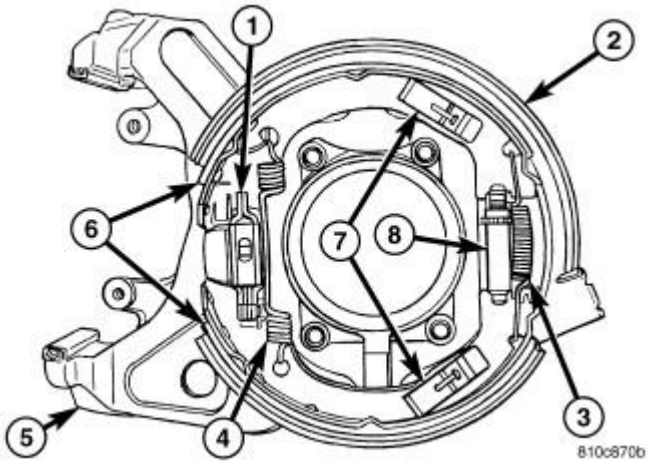


Fig. 348: Identifying Parking Brake Components
Courtesy of CHRYSLER GROUP, LLC

1 - ACTUATOR
2 - SUPPORT
3 - ADJUSTER SPRING
4 - RETURN SPRING
5 - CALIPER ADAPTER
6 - SHOES
7 - HOLD-DOWN CLIPS AND PINS
8 - ADJUSTER

1. Install lower brake shoe hold-down pin (7) through rear of support (2).
2. Install lower shoe (6) against support plate (2).
3. Install lower brake shoe hold-down clip (7).

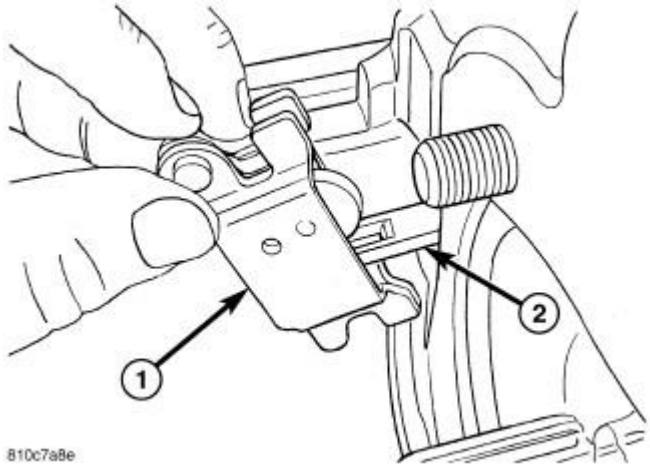


Fig. 349: Removing/Installing Actuator

Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR
2 - CABLE END

4. Install shoe actuator lever (1) on end of parking brake cable (2). Make sure actuator lever is positioned with word "UP" facing outward.

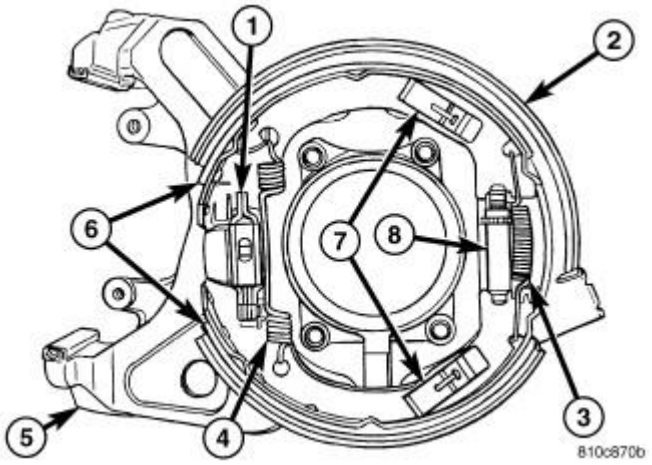


Fig. 350: Identifying Parking Brake Components
Courtesy of CHRYSLER GROUP, LLC

1 - ACTUATOR
2 - SUPPORT
3 - ADJUSTER SPRING
4 - RETURN SPRING
5 - CALIPER ADAPTER
6 - SHOES
7 - HOLD-DOWN CLIPS AND PINS
8 - ADJUSTER

5. Install return spring (4) to lower shoe (6).
6. Install upper shoe (6) against support plate and onto shoe actuator lever.
7. Install upper brake shoe hold-down pin (7) through rear of support and upper shoe.
8. Install upper brake shoe hold-down clip (7).
9. Attach return spring (4) to upper shoe (6).
10. Install shoe adjuster (8). Place end of adjuster with star wheel upward.
11. Install parking brake shoe adjuster spring (3).

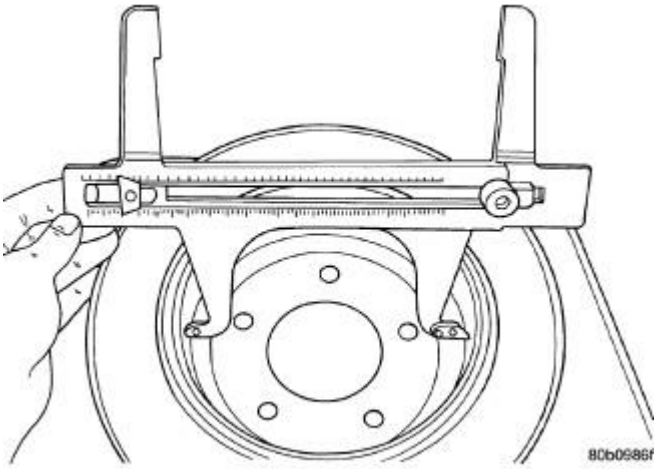


Fig. 351: Measuring Parking Brake Drum Diameter
Courtesy of CHRYSLER GROUP, LLC

12. Using Brake Shoe Gauge, Special Tool (special tool #C-3919, Gauge, Brake Shoes), or equivalent, measure inside diameter of parking brake drum portion of rotor. Set gauge.

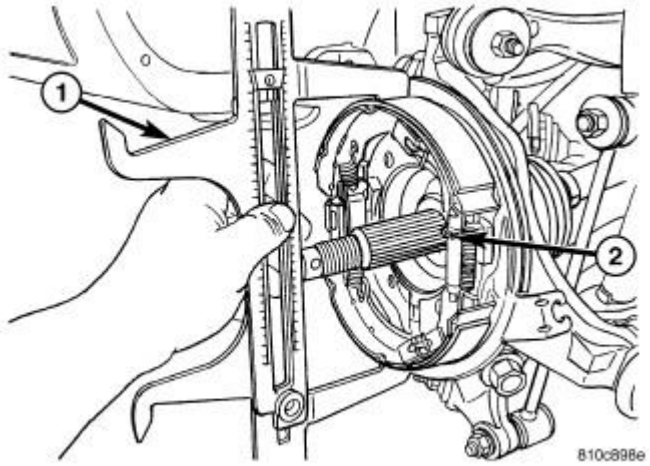


Fig. 352: Measuring Parking Brake Shoes
Courtesy of CHRYSLER GROUP, LLC

1 - BRAKE SHOE GAUGE
2 - ADJUSTER STAR WHEEL

13. Place Gauge (1) over parking brake shoes at widest point.
14. Using adjuster star wheel (2), adjust parking brake shoes until linings on both park brake shoes just touch jaws on gauge. This will give a good preliminary adjustment of parking brake shoes, before a final adjustment is made at end of this procedure.
15. Install hub and bearing with wheel speed sensor as well as all components necessary to access it. Refer to **HUB AND BEARING, INSTALLATION** .

16. Lower vehicle.
17. Perform final adjustment of parking brake shoes. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS**.

CABIN AIR FILTER

Chrysler - 300, Charger & Magnum

REMOVAL & INSTALLATION

CABIN AIR FILTER

NOTE: Manufacturer's terminology for this filter is Particulate Air Filter.

Removal

1. Remove front air inlet grille (1) from the wiper module screen (2) located under the dash panel in the engine compartment. Refer to **Fig. 1**.
2. Open the filter door (3) on the top of the particulate air filter housing (4) located inside of the dash panel plenum (5). Refer to **Fig. 1**.

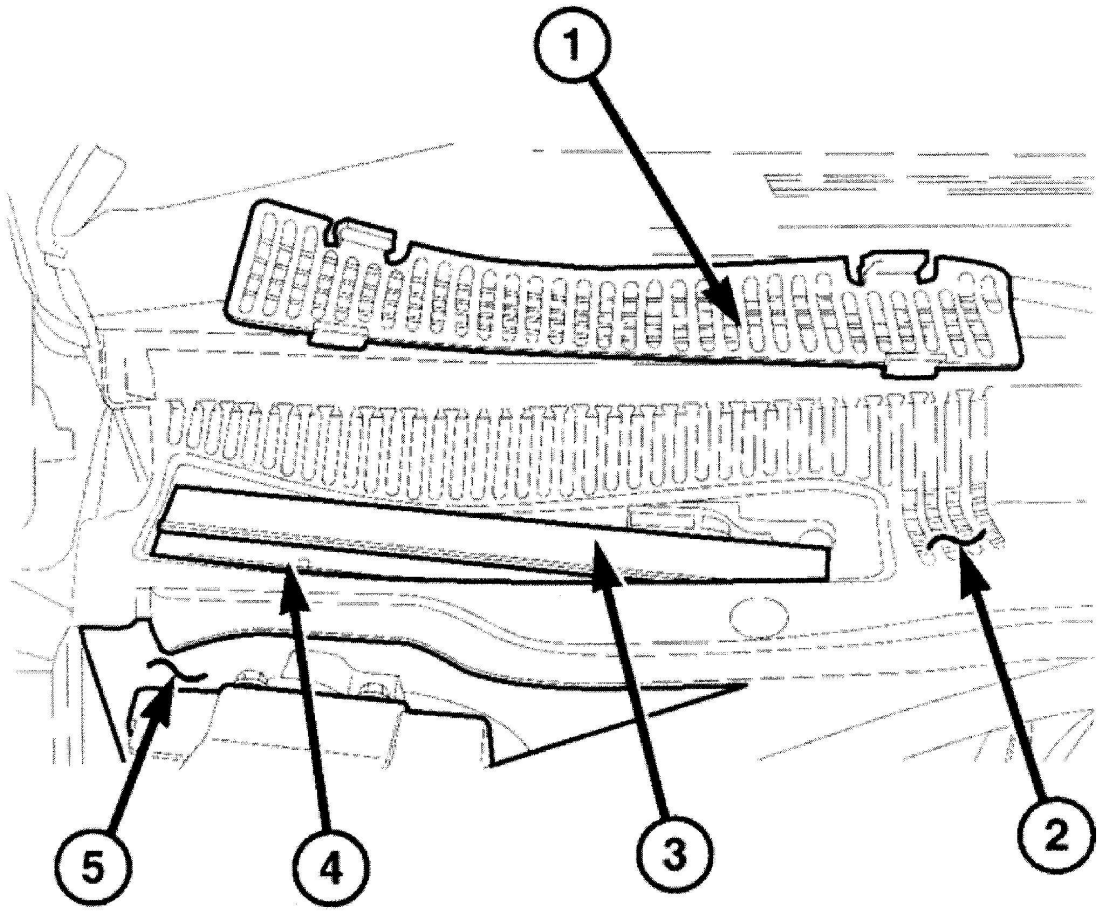


Fig. 1: Underhood Dash Panel Components

Courtesy of DAIMLERCHRYSLER CORPORATION

NOTE: To aid in reinstallation, note the installed position of the particulate air filter prior to removal of the filter.

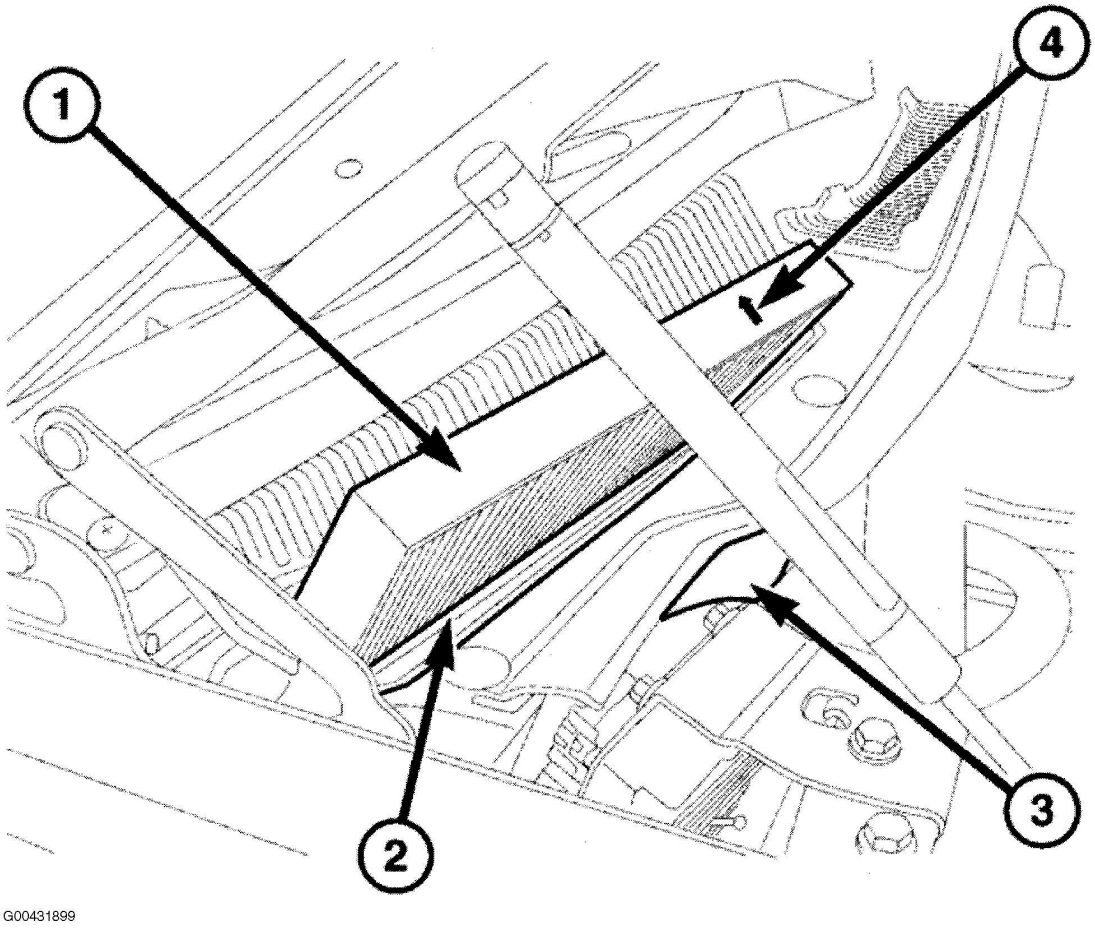


Fig. 2: Particulate Air Filter Position & Location
Courtesy of DAIMLERCHRYSLER CORPORATION

3. Remove the particulate air filter (1) from the particulate air filter housing (2) located inside of the dash panel plenum (3). Note the direction of air flow indicated by an arrow (4) on the filter. Refer to **Fig. 2**.

Installation

NOTE: The particulate air filter is labeled with "REAR OF VEHICLE" and an arrow to indicate air flow direction through the filter. Make sure to properly install the particulate air filter. Failure to properly install the filter will result in the need to replace the filter sooner than required by design.

1. Install the particulate air filter (1) into the particulate air filter housing (2) located inside of the dash panel plenum (3). Insert the particulate air filter down directly into the filter housing with the arrow (4) on the filter pointing to the rear of the vehicle. The particulate air filter is held in place by friction between the filter element and the filter housing, so no fasteners are required. Refer to **Fig. 2**.
2. Close the filter door (3) on the top of the particulate air filter housing (4) located inside of the dash panel plenum (5). Refer to **Fig. 1**.
3. Install the air inlet grille (1) onto the wiper module screen (2). Refer to **Fig. 1**.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the OBD system. Some circuits are checked continuously and some are checked only under certain conditions.

If the OBD system senses that a monitored circuit is bad, it will put a DTC into electronic memory. The DTC will stay in electronic memory as long as the circuit continues to be bad. The PCM is programmed to clear the memory after 40 good trip if the problem does not occur again.

ON-BOARD DIAGNOSTIC SYSTEM

DIAGNOSTIC TROUBLE CODES

A DTC description can be read using the scan tool. Refer to the appropriate Powertrain Diagnostic Procedures manual for information.

A DTC does not identify which component in a circuit is bad. Thus, a DTC should be treated as a symptom, not as the cause for the problem. In some cases, because of the design of the diagnostic test procedure, a DTC can be the reason for another DTC to be set. Therefore, it is important that the test procedures be followed in sequence, to understand what caused a DTC to be set.

ERASING DIAGNOSTIC TROUBLE CODES

The Scan Tool must be used to erase a DTC.

The following procedures may be used to diagnose the charging system if:

- the check gauges lamp or battery lamp is illuminated with the engine running
- the voltmeter (if equipped) does not register properly
- an undercharged or overcharged battery condition occurs.

Remember that an undercharged battery is often caused by:

- accessories being left on with the engine not running
- a faulty or improperly adjusted switch that allows a lamp to stay on. Refer to Ignition-Off Draw Test. Refer to **BATTERY, STANDARD PROCEDURE** .
- loose generator belt.

INSPECTION

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the On-Board Diagnostic (OBD) system. Some charging system circuits are checked continuously, and some are checked only under certain conditions.

Refer to Diagnostic Trouble Codes in; Powertrain Diagnostic manual for more DTC information. This will include a complete list of DTC's including DTC's for the charging system.

To perform a complete test of the charging system, refer to the appropriate Powertrain Diagnostic Procedures service manual and the scan tool. Perform the following inspections before attaching the scan tool.

1. Inspect the battery condition. Refer to the Battery information for procedures. Refer to **DIAGNOSIS AND TESTING** .
2. Inspect condition of battery cable terminals, battery posts, connections at engine block, starter solenoid and relay. They should be clean and tight. Repair as required.
3. Inspect all fuses in both the fuseblock and Power Distribution Center (PDC) or IPM (if equipped) for tightness in receptacles. They should be properly installed and tight. Repair or replace as required.
4. Inspect generator mounting bolts for tightness. Replace or tighten bolts if required. Refer to the Generator Removal/Installation for torque specifications. Refer to **SPECIFICATIONS**.
5. Inspect generator drive belt condition and tension.
6. Inspect decoupler pulley (if equipped). Ensure decoupler pulley is driving the alternator rotor.
7. Inspect automatic belt tensioner (if equipped). Refer to **ENGINE COOLING SYSTEM** for more information.
8. Inspect generator electrical connections at generator field, battery output, and ground terminal (if equipped). Also check generator ground wire connection at engine (if equipped). They should all be clean and tight. Repair as required.

SPECIFICATIONS

GENERATOR

MANUFACTURER	ENGINE	NOMINAL RATING	MINIMUM OUTPUT (AMPS) (@ SPECIFIED TEST CONDITIONS)
Denso SC2	3.6L, 5.7L	160A	110A
Denso SC4	3.6L, 5.7L	180A	120A
Denso SC6	Police	220A	140A
TEST CONDITIONS			

1. Engine RPM : 2500 RPM (ENGINE HOT)
2. Voltage Output : 13.0 - 16.0 V

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Battery Terminal Nut	5	-	45
Generator Mounting Bolts - 3.6L	25	18	-
Generator Mounting Bolts - 5.7L	65	48	-
Generator Support Bracket Bolt - 5.7L	65	48	-
Generator Support Bracket Nut - 5.7L	28	20.5	-
Generator B+ Output Cable Terminal Nut	13	-	115

GENERATOR

REMOVAL

3.0L

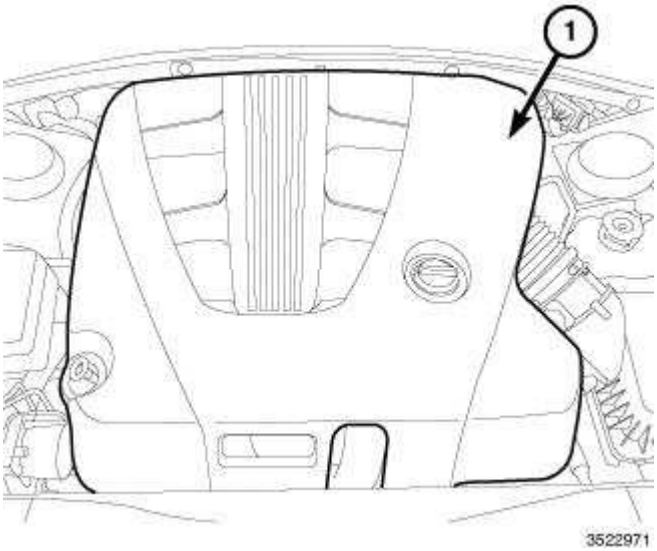


Fig. 1: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

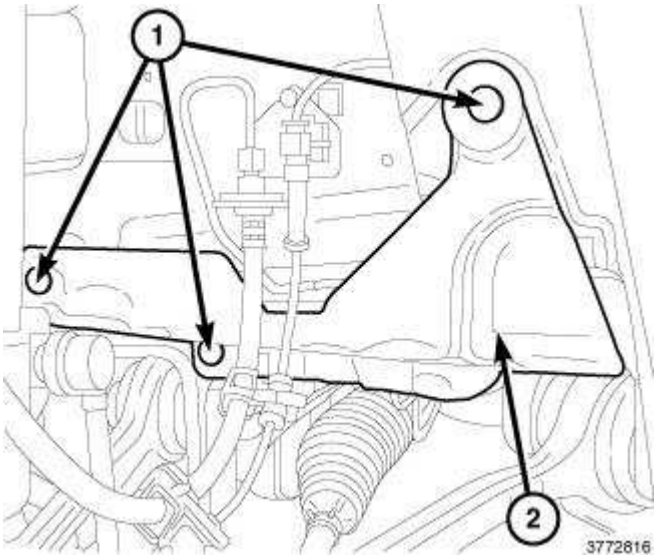


Fig. 2: Three Push Pins & Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

3. Remove the right front wheel and tire assembly. Refer to **REMOVAL** .
4. Remove the three push pins (1) and the lower splash shield (2).

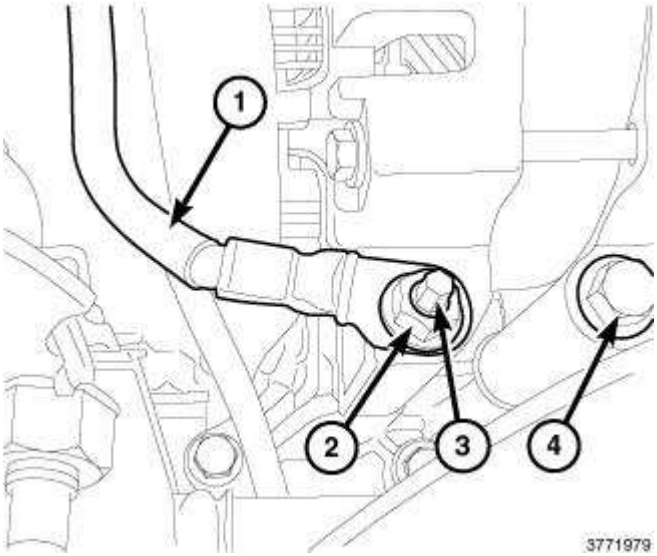


Fig. 3: Lower Generator Bolt, Nut, Ground Cable & Stud
Courtesy of CHRYSLER GROUP, LLC

5. Lower the vehicle.
6. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
7. Remove the lower generator bolt (4).
8. Remove the nut (2) the ground cable (1), and stud (3) from the bottom of generator.

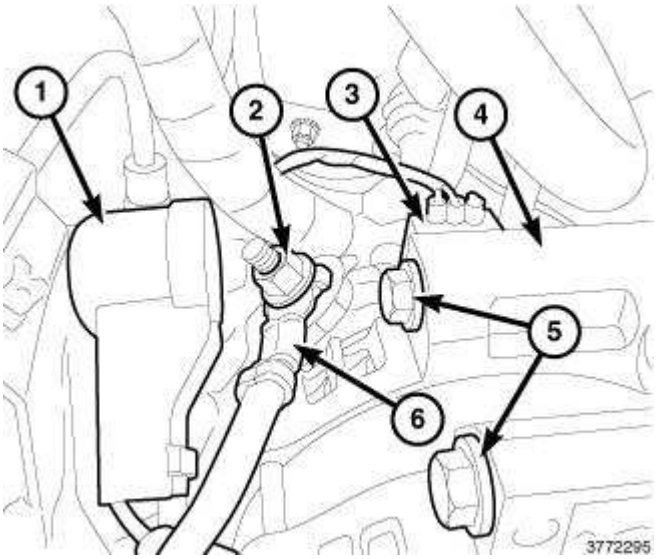


Fig. 4: Field Generator Wire Harness Connector, Protective Cover, Two Upper Bolts, Generator & B+ Cable
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the field generator wire harness connector (3).
10. Remove the protective cover (1) from the B+ cable (6).
11. Remove the two upper bolts (5) and the generator (4).

3.6L

WARNING: Disconnect the negative battery cable before removing the battery output wire (B+ wire) from the generator. Failure to do so can result in injury or damage the electrical system.

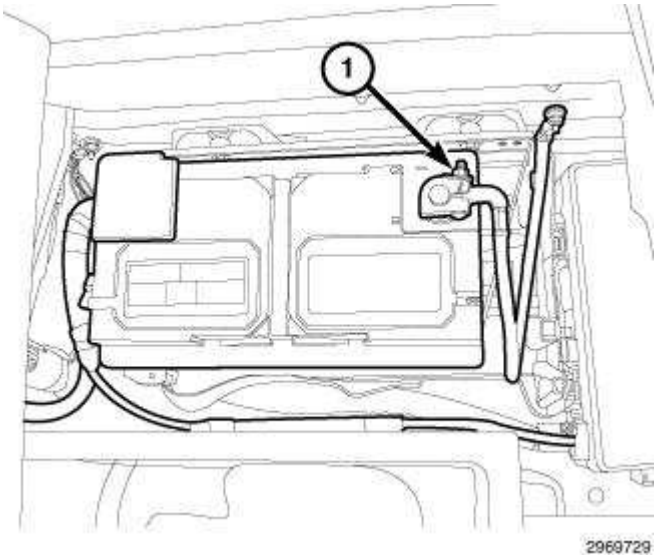


Fig. 5: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

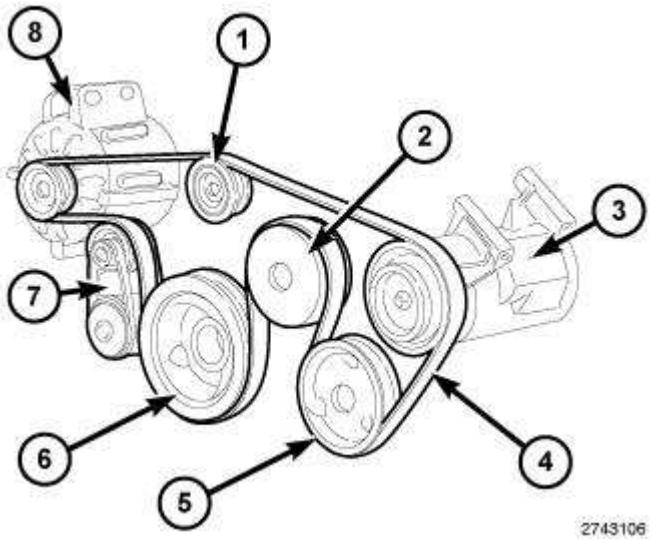


Fig. 6: Drive Belt Tensioners & Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

2. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts it's stop and remove the accessory drive belt (4), then slowly rotate the tensioner into the freearm position.

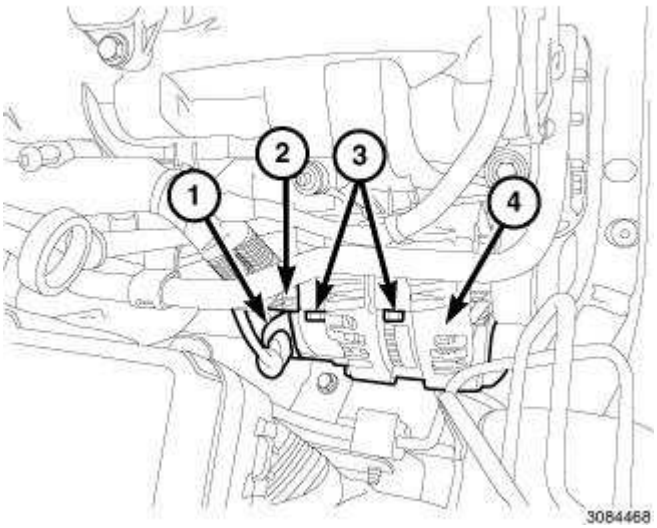


Fig. 7: Retaining Bolts, Insulator Cover, Generator And Field Wire Connector
Courtesy of CHRYSLER GROUP, LLC

3. Remove the upper generator retaining bolts (3).

4. Remove the insulator cover (1) from the B+ output terminal at the rear of the generator (4).
5. Remove the B+ terminal retaining nut at the rear of the generator and remove the B+ terminal.
6. Depress the field wire connector tab at the rear of the generator and disconnect the field wire connector (2).

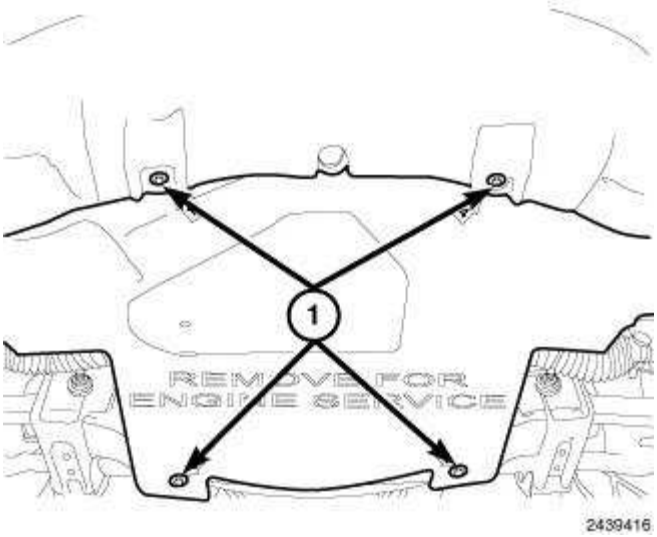


Fig. 8: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Raise and support the vehicle.
8. Remove the belly pan retainers (1) and remove the belly pan.

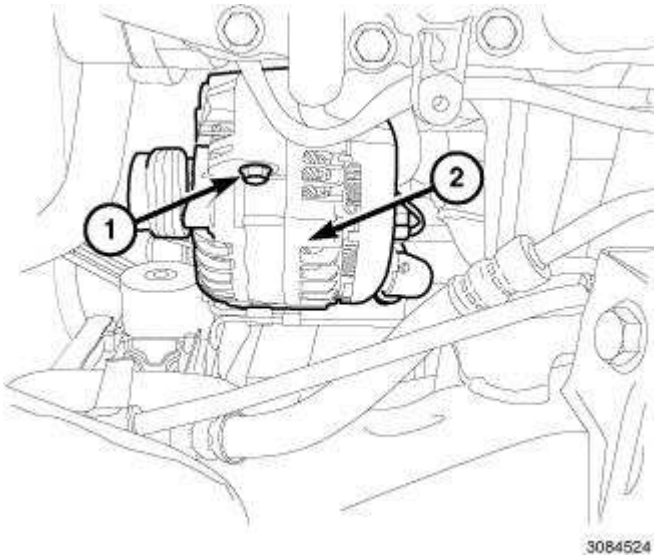


Fig. 9: Generator Retaining Bolt And Generator
Courtesy of CHRYSLER GROUP, LLC

9. Remove the lower generator retaining bolt (1).

10. Remove the generator (2) from below the engine compartment.

5.7L

WARNING: Disconnect the negative battery cable before removing the battery output wire (B+ wire) from the generator. Failure to do so can result in injury or damage the electrical system.

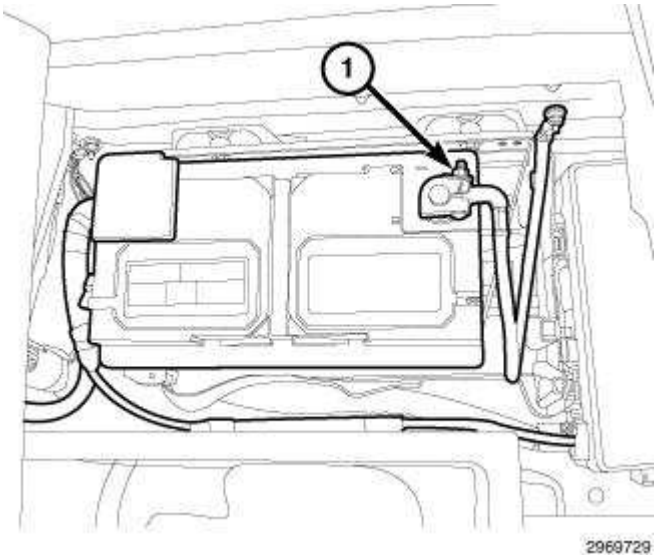


Fig. 10: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

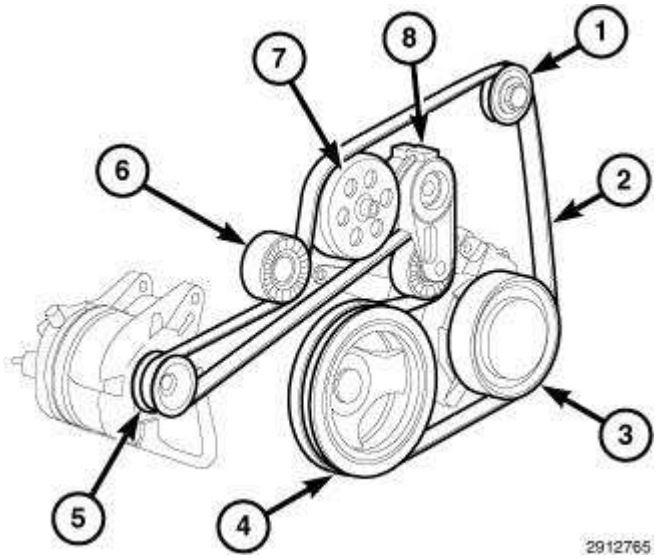


Fig. 11: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

2. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop and remove the accessory drive belt (2), then slowly rotate the tensioner into the freearm position.

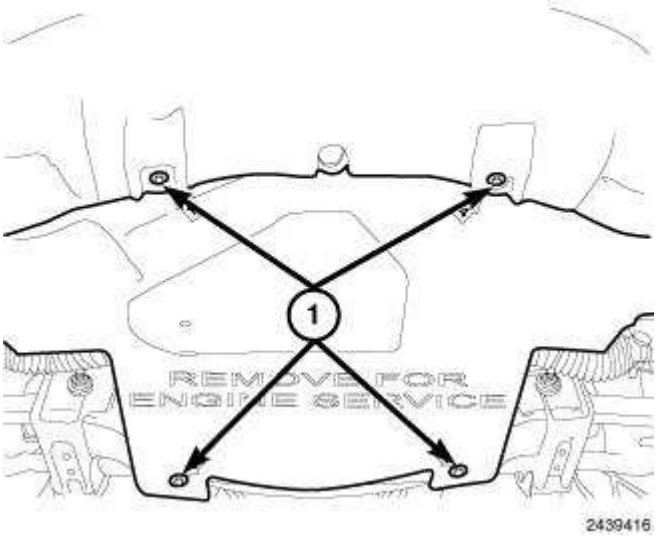


Fig. 12: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Raise and support the vehicle.
4. Remove the belly pan retainers (1) and remove the belly pan.

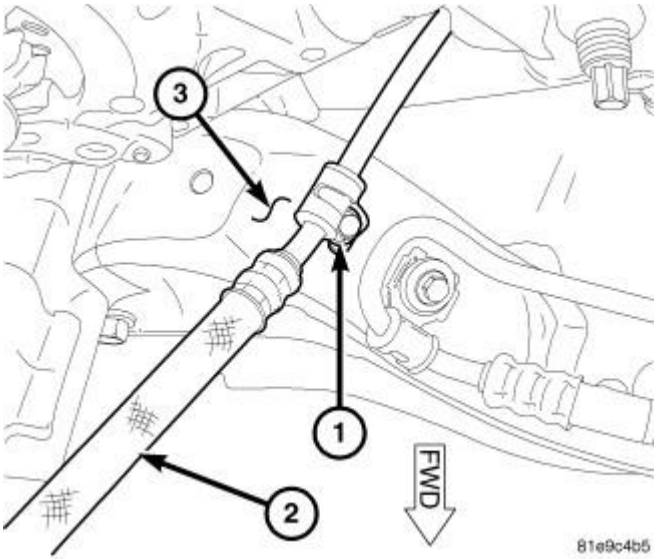


Fig. 13: Trans Cooler Line Clamp
Courtesy of CHRYSLER GROUP, LLC

5. Remove the transmission cooler line retaining clamp (1) at the right crossmember (3) and position the transmission cooler line (2) aside.

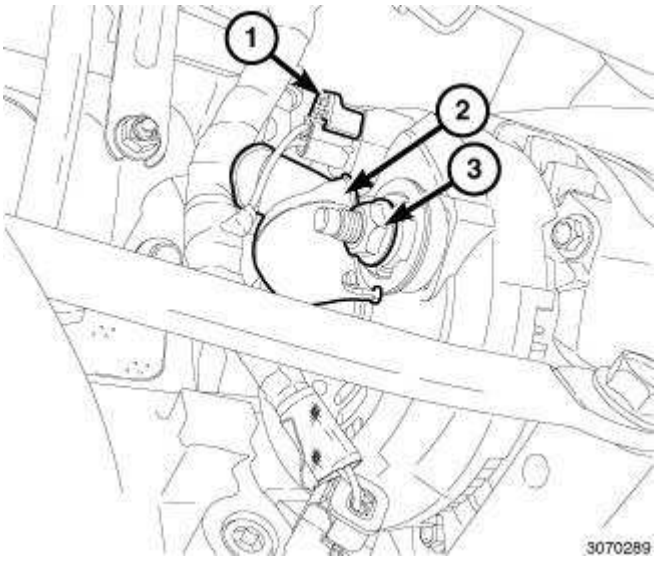


Fig. 14: Connector Tab, Insulator Cover And Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

6. Depress the field wire connector tab (1) at the rear of the generator and disconnect the field wire connector.
7. Remove the insulator cover (2) from B+ output terminal at the rear of the generator.
8. Remove the B+ terminal retaining nut (3) at the rear of the generator and remove the B+ terminal.

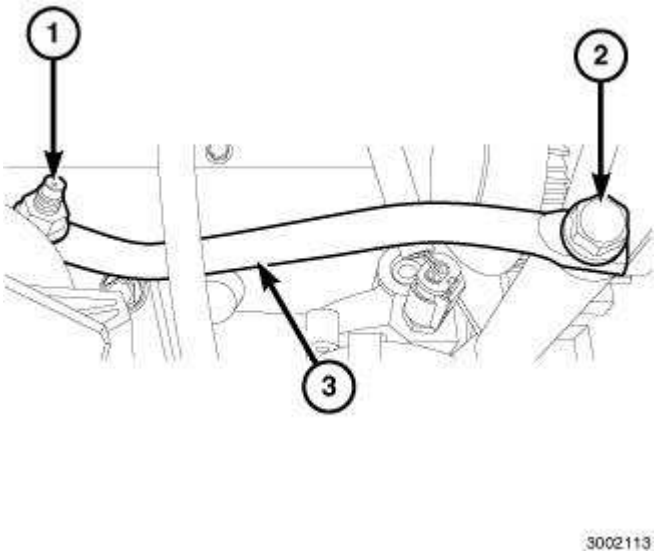


Fig. 15: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

9. Remove the generator support bracket to engine mount retaining nut (1).
10. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).

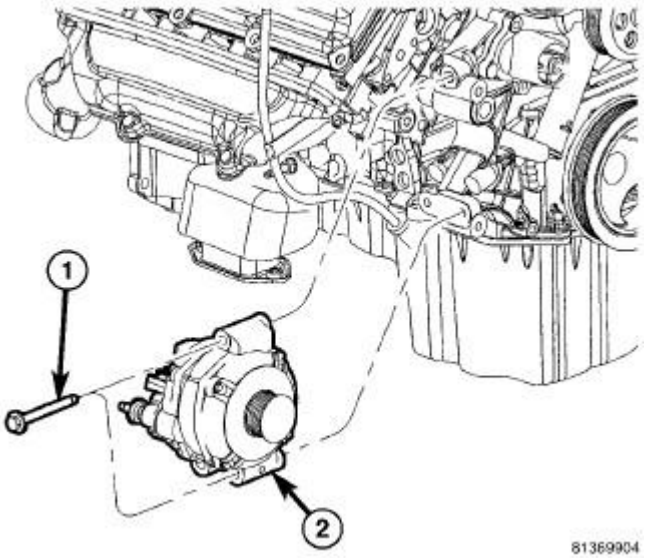


Fig. 16: Generator - 5.7L
Courtesy of CHRYSLER GROUP, LLC

11. Remove the remaining lower generator retaining bolt (1).
12. Lower the vehicle.
13. Remove the upper generator retaining bolt (1) and remove the generator (2) from the vehicle.

WARNING: Disconnect the negative cable from the battery before removing the battery output wire (B+ wire) from the generator. Failure to do so can result in injury or damage to the electrical system.

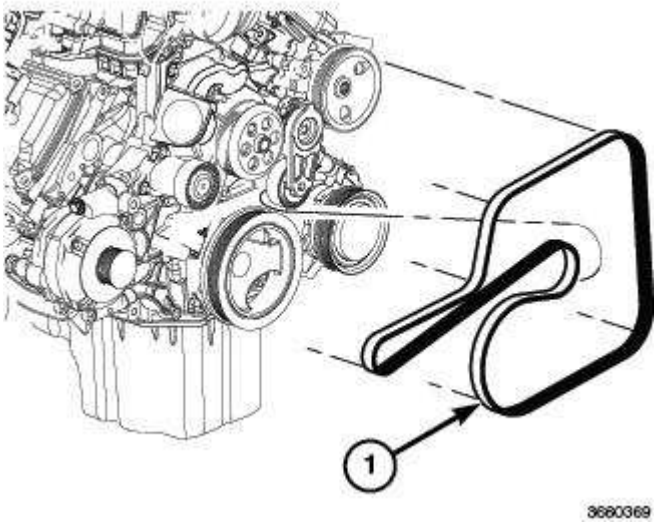


Fig. 17: Serpentine Belt Routing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .

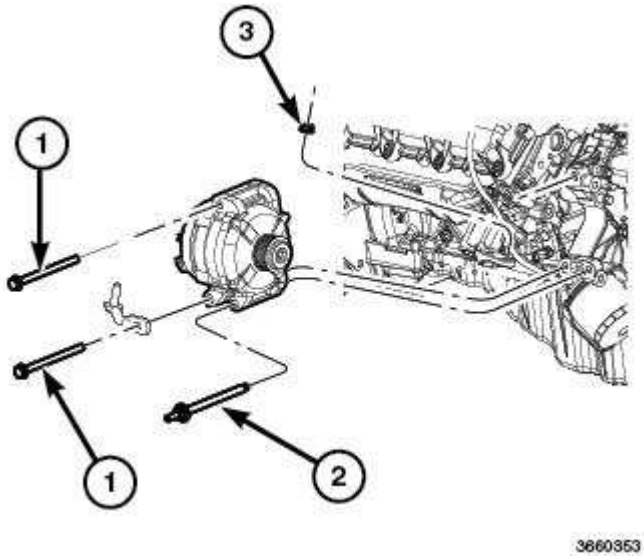


Fig. 18: Field Wire Connector, Upper And Lower Rear Generator Mounting Bolts & Lower Front Stud Nut Bolt

Courtesy of CHRYSLER GROUP, LLC

4. Unsnap the plastic insulator cap from the B+ output terminal.
5. Remove the B+ terminal mounting nut at the rear of the generator. Disconnect the terminal from the generator.
6. Disconnect the field wire connector (3) at the rear of the generator by pushing on the connector tab.
7. Remove the one upper and lower rear generator mounting bolts (1).

NOTE: Not required to loosen the bracket bolt, the generator will slide out.

8. Remove the lower front stud nut bolt (2).
9. Remove the generator from vehicle.

INSTALLATION

3.0L

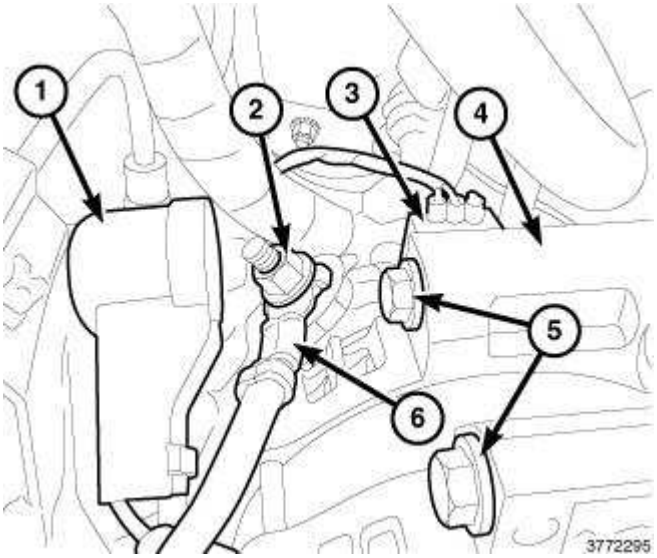


Fig. 19: Field Generator Wire Harness Connector, Protective Cover, Two Upper Bolts, Generator & B+ Cable
Courtesy of CHRYSLER GROUP, LLC

1. Position the generator (4) to the engine and install the upper generator bolts (5). Tighten bolts (5) to 28 N.m (21 ft. lbs).
2. Install the B+ cable (6) to the generator. Tighten nut (2) to 11 N.m (97 in. lbs.).
3. Install the protective cover (1) from the B+ cable (6).
4. Connect the field generator wire harness connector (3).

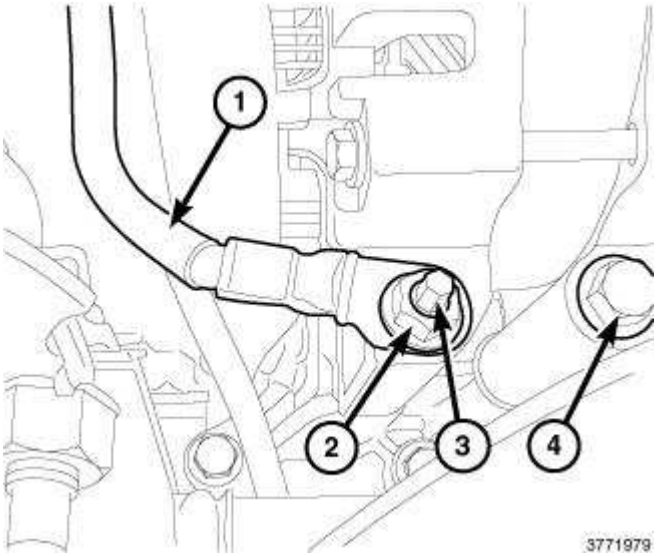


Fig. 20: Lower Generator Bolt, Nut, Ground Cable & Stud
Courtesy of CHRYSLER GROUP, LLC

5. Install the lower generator stud (3) and tighten to 12 N.m (106 in. lbs.).
6. Install the ground cable (1) to the generator. Tighten nut (2) to 28 N.m (21 ft. lbs).
7. Install the lower generator bolt (4) and tighten to 28 N.m (21 ft. lbs).
8. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

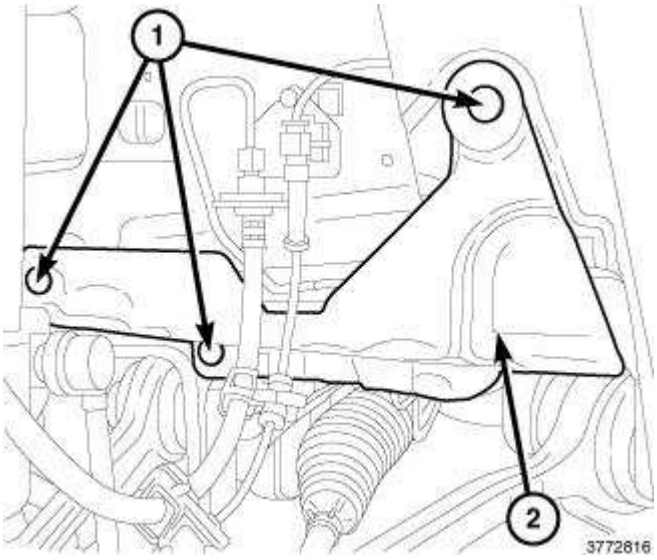


Fig. 21: Three Push Pins & Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

9. Position the lower splash shield (2) and install the three push pins (1).
10. Install the right front wheel and tire assembly. Refer to **INSTALLATION** .

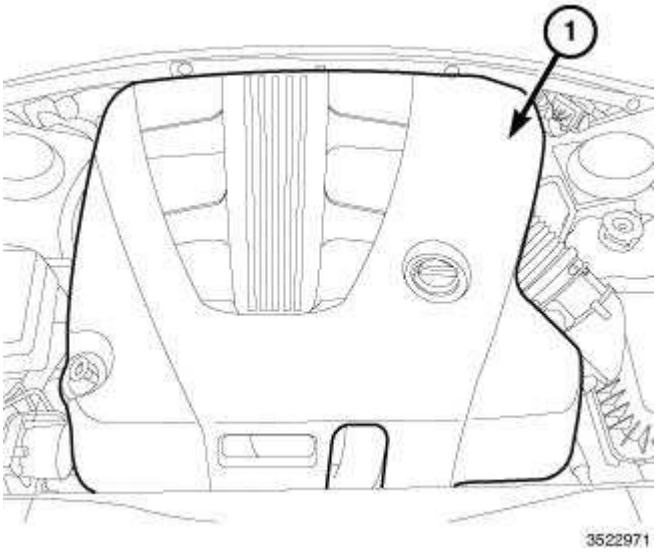


Fig. 22: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

11. Install the engine cover (1).
12. Connect the negative battery cable.

3.6L

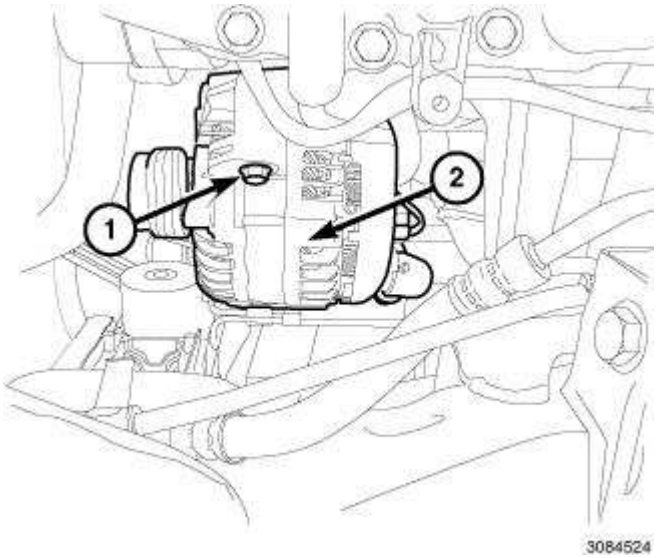


Fig. 23: Generator Retaining Bolt And Generator
Courtesy of CHRYSLER GROUP, LLC

NOTE: Position the generator, install all bolts to engine finger tight, then tighten fasteners to specification.

1. Position the generator (2) to the engine and install the lower retaining bolt (1) finger tight.
2. Lower the vehicle.

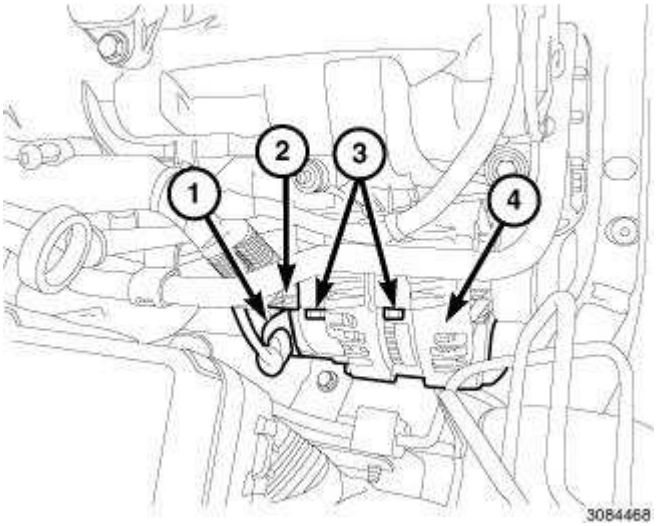


Fig. 24: Retaining Bolts, Insulator Cover, Generator And Field Wire Connector
Courtesy of CHRYSLER GROUP, LLC

3. Install the upper generator retaining bolts (3) and tighten to 25 N.m (18 ft. lbs.).
4. Snap the field wire connector (2) into the rear of the generator.
5. Position the generator B+ terminal eyelet to the generator output stud, install the retaining nut (1) and tighten to 13 N.m (10 ft. lbs.).
6. Install the insulator cover onto the B+ output terminal.
7. Raise and support the vehicle.

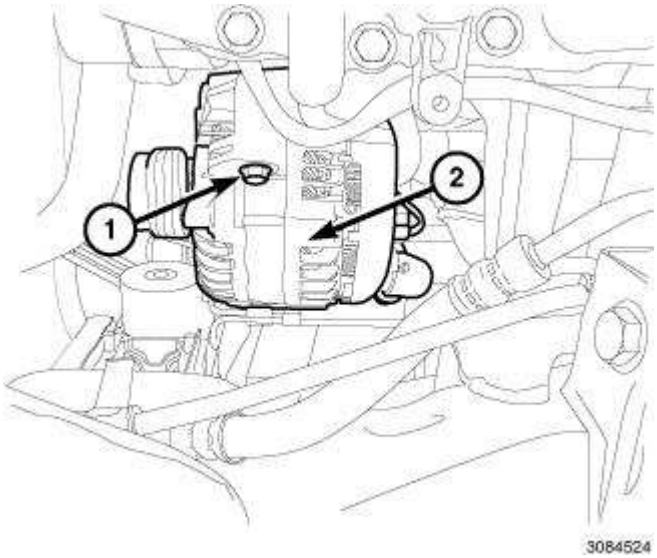


Fig. 25: Generator Retaining Bolt And Generator
Courtesy of CHRYSLER GROUP, LLC

8. Tighten the lower generator retaining bolt (1) to 25 N.m (18 ft. lbs.).

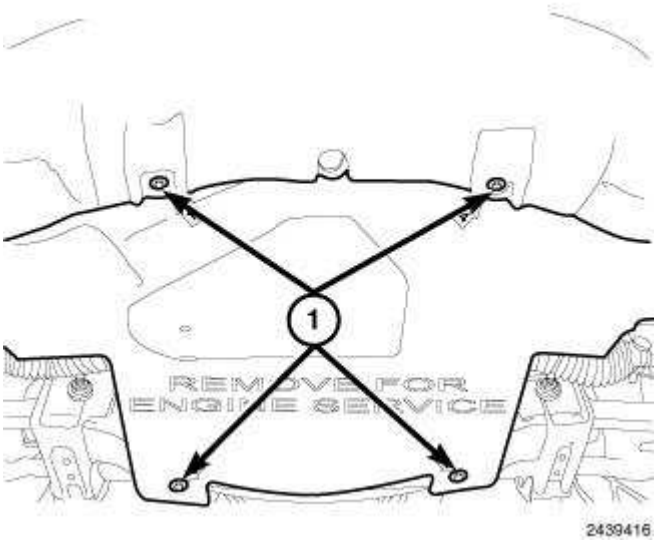


Fig. 26: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Position the belly pan and install the belly pan retainers (1).
10. Lower the vehicle.

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump will be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

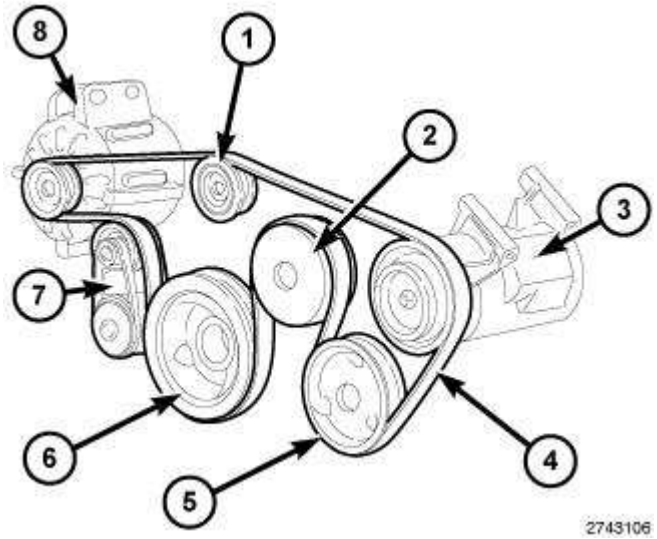


Fig. 27: Drive Belt Tensioners & Accessory Drive Belt Routing

Courtesy of CHRYSLER GROUP, LLC

11. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and install the accessory drive belt (4) onto the pulleys and slowly release the tensioner.

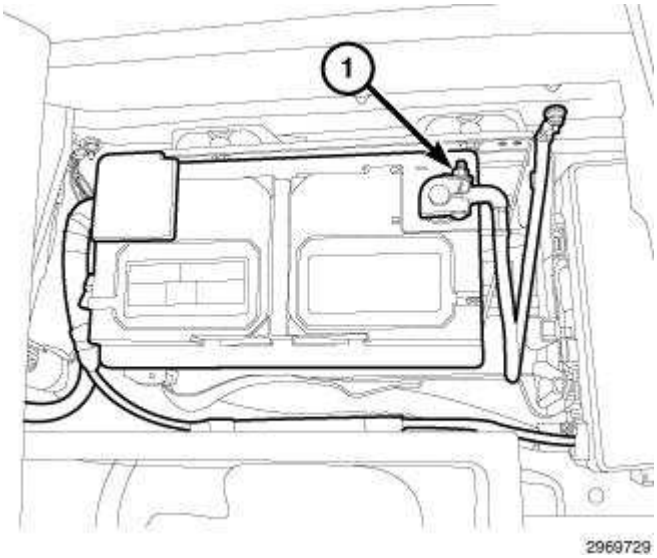


Fig. 28: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

12. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

5.7L

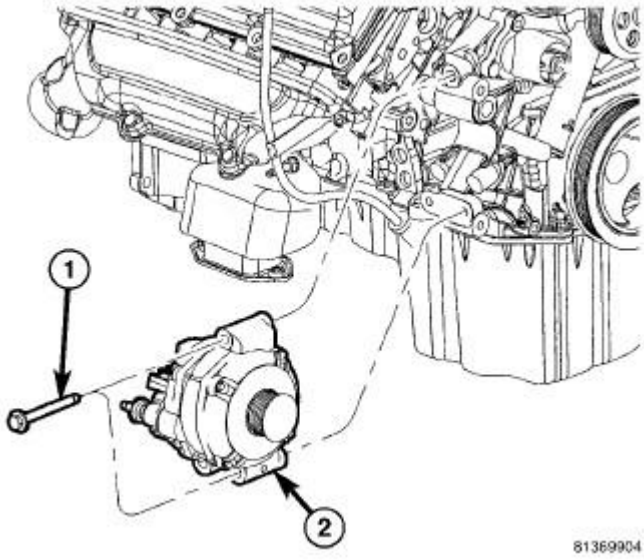


Fig. 29: Generator - 5.7L
Courtesy of CHRYSLER GROUP, LLC

1. Position the generator (2) and install the upper generator retaining bolt (1) finger tight.
2. Raise and support the vehicle.

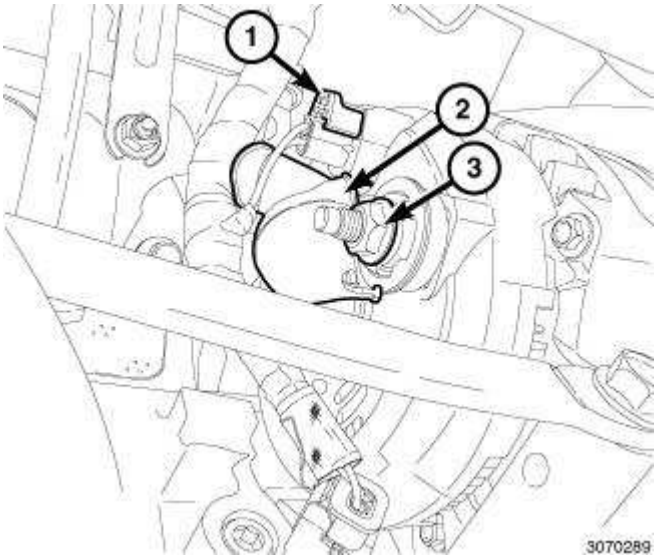


Fig. 30: Connector Tab, Insulator Cover And Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

3. Position the generator B+ terminal eyelet to the generator output stud, install the retaining nut (3) and tighten to 13 N.m (10 ft. lbs.).
4. Install the insulator cover (2) onto the B+ output terminal.
5. Snap the field wire connector (1) into the rear of the generator.

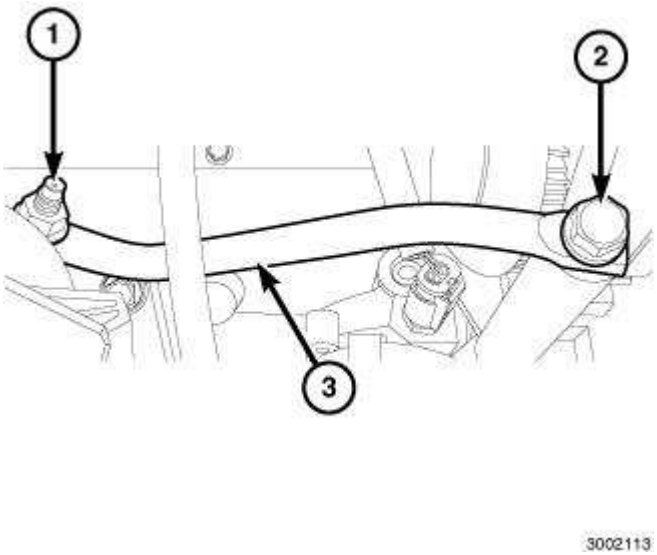


Fig. 31: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

6. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) finger

tight.

7. Position the generator support bracket (3) to the generator and install the retaining bolt (2) finger tight.
8. Install the remaining generator retaining bolt and tighten both lower retaining bolts to 65 N.m (48 ft. lbs.).
9. Tighten the generator support bracket (3) to engine mount retaining nut (1) to 28 N.m (21 ft. lbs.).

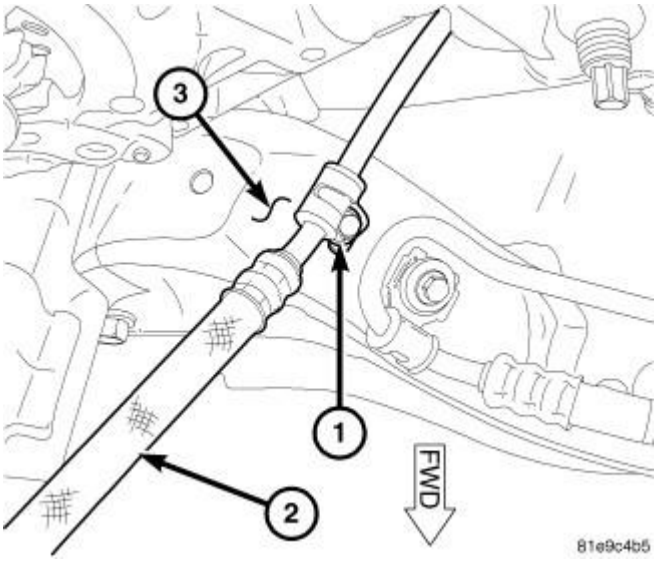


Fig. 32: Trans Cooler Line Clamp
Courtesy of CHRYSLER GROUP, LLC

10. Position transmission cooler line (2) and install the transmission cooler line retainer clamp (1) to the right crossmember (3).

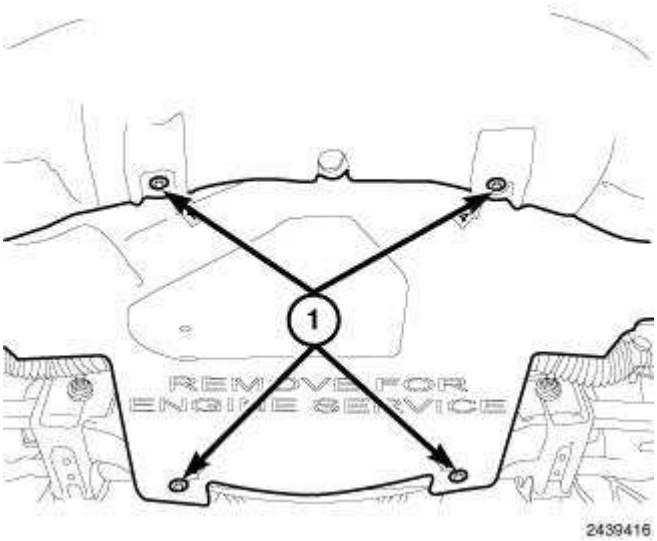


Fig. 33: Lower Splash Shield & Fasteners

Courtesy of CHRYSLER GROUP, LLC

11. Position the belly pan and install the belly pan retainers (1).
12. Lower the vehicle.
13. Tighten the generator upper retaining bolt to 65 N.m (48 ft. lbs.).

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

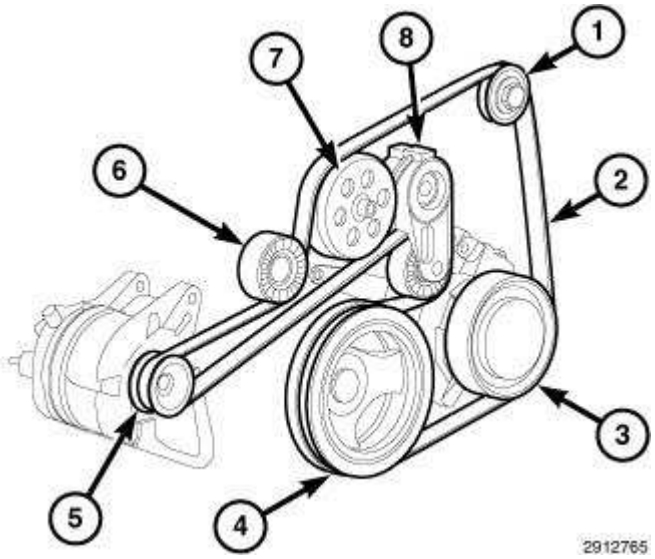


Fig. 34: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

14. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop, install the accessory drive belt (2) onto the pulleys and slowly release the tensioner.

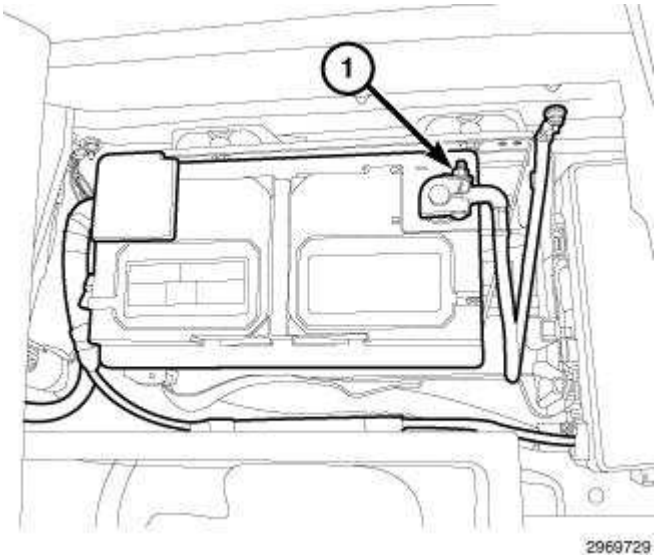


Fig. 35: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

15. Connect the negative battery cable and tighten the nut (1) to 5 N.m (45 in. lbs.).

6.4L

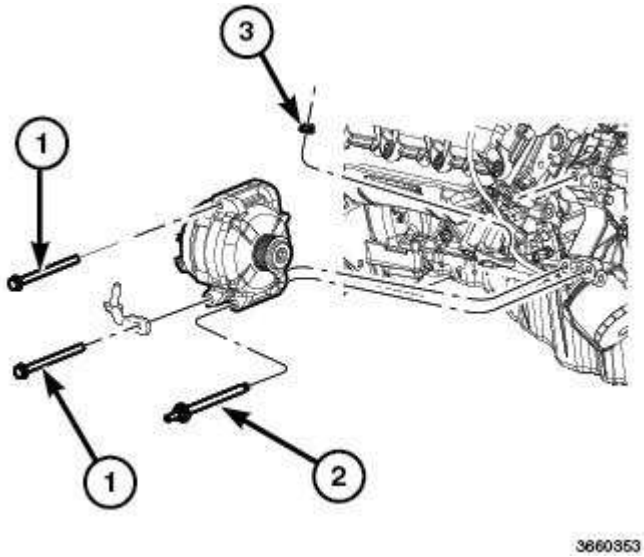


Fig. 36: Field Wire Connector, Upper And Lower Rear Generator Mounting Bolts & Lower Front Stud Nut Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the generator to the engine.
2. Install the lower rear then upper mounting bolt (1).
3. Install the front lower stud nut bolt (2).

   Torque the bolts to 41 N.m (30 ft. lbs.).

4. Snap the field wire connector (3) into the rear of the generator.
5. Install the B+ terminal eyelet to the generator output stud.

   Tighten the mounting nut to 12 N.m (108 in. lbs.).

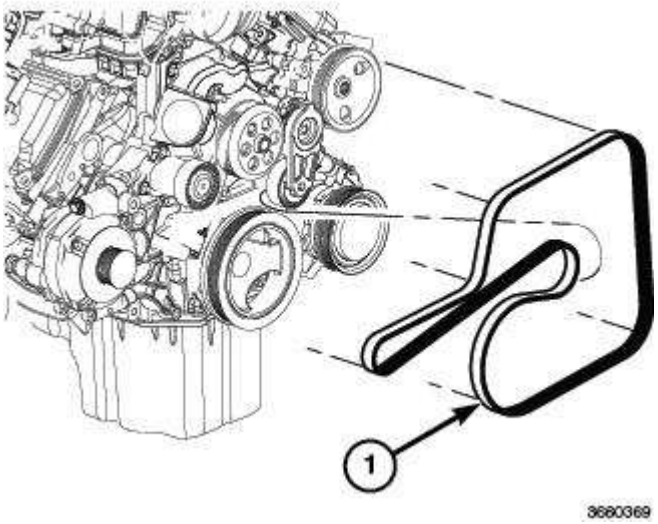


Fig. 37: Serpentine Belt Routing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

CAUTION: When installing a serpentine accessory drive belt, the belt must be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat. Refer to belt routing label in engine compartment, or refer to ACCESSORY DRIVE the Belt Schematics .

6. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
7. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
8. Install the negative battery cable.

ACCESSORIES AND EQUIPMENT

Chime/Buzzer - Service Information - Chrysler 300

DESCRIPTION

CHIME WARNING SYSTEM

A chime warning system is standard factory-installed equipment. The chime warning system uses an electromechanical transducer and an electromechanical relay that are soldered onto the electronic circuit board inside of the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to provide audible indications of various vehicle conditions that may require the attention of the vehicle operator or occupants.

The electromechanical transducer generates beep tones and chime tones, while the electromechanical relay generates click tones to emulate the sounds associated with conventional turn signal and hazard warning flasher operation. The microprocessor-based IC utilizes electronic **chime request** messages received from other modules in the vehicle over the Controller Area Network (CAN) data bus to monitor many sensors and switches throughout the vehicle. In response to those inputs, the circuitry and programming of the IC allow it to control the audible outputs that are produced through its on-board transducer and relay.

The IC is capable of producing the following audible outputs:

- **Slow Rate Repetitive Click** - Repeated **click** tones that are issued at a slow rate of about 90 clicks per minute.
- **Fast Rate Repetitive Click** - Repeated **click** tones that are issued at a fast rate of more than about 180 clicks per minute.
- **Single Chime Tone** - A single **chime** tone.
- **Slow Rate Repetitive Chime** - Repeated **chime** tones that are issued at a slow rate of about 50 chimes per minute.
- **Fast Rate Repetitive Chime** - Repeated **chime** tones that are issued at a fast rate of about 180 chimes per minute.

Hard-wired circuitry connects the IC and the various chime warning system switch and sensor inputs to their modules and to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the IC through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The IC chime warning system circuits and components cannot be adjusted or repaired. If the IC circuitry, the on-board transducer or the relay are damaged or ineffective, the IC unit must be

replaced.

BLIND SPOT MONITOR SYSTEM

The Blind Spot Monitor (BSM) system is an optional factory-installed electronic driving aid. During driving maneuvers the system alerts the vehicle operator to vehicles located in the alert zones immediately behind and to the left or right of the vehicle which, due to the surrounding rear vehicle structure, might be otherwise difficult to perceive. When an object is detected, the system uses an electromechanical transducer within the cluster and Light Emitting Diode (LED) indicators within the side view mirrors to provide the vehicle operator with visual and audible indications of the presence of other vehicles.

The BSM system includes the following major components, which are described in further detail elsewhere in this service information:

- **Electronic Vehicle Information Center** - In vehicles equipped with the optional blind spot monitor system, the optional Electronic Vehicle Information Center (EVIC) in the instrument cluster displays textual warnings and error messages and emits audible warnings related to the current operating status of the BSM system and provides an interface that allows the vehicle operator to manually disable or enable the system using the customer programmable features option.
- **Blind Spot Display** - Vehicles equipped with the blind spot monitor system have an LED display unit mounted in the side view mirrors. The body of the displays are concealed to the back side of the side view mirrors. Only the amber colored triangle is visible on the outer surface of the mirror glass.
- **Blind Spot Module** - Vehicles equipped with the blind spot monitor system include a module which is secured to the right quarter inner panel by two retainers and concealed behind the interior trim panel.
- **Blind Spot Sensors** - Vehicles equipped with the blind spot system have two radar blind spot sensors that are concealed behind the rear bumper fascia. Each sensor is snapped into an individual molded plastic mounting bracket secured at horizontal intervals located on the back side of the rear bumper fascia near the left and right wheel openings.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The blind spot monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced.

PARK ASSIST SYSTEM

A park assist system is an optional factory-installed electronic parking aid. In some markets only a rear park assist system is offered, while other markets may have both front and rear park assist systems available. During parking and other similar vehicle maneuvers, this system alerts the vehicle operator to obstacles located in the path immediately in front of or behind the vehicle which, due to the surrounding vehicle structures, might be otherwise difficult to perceive. When an object is detected, the system uses the cluster display, and the vehicles audio system to provide the vehicle operator with visual, and audible indications of the presence, and proximity of such objects.

The park assist system includes the following major components, which are described in further detail elsewhere in this service information:

- **Electronic Vehicle Information Center** - In vehicles equipped with the optional park assist system, the optional EVIC in the instrument cluster displays textual warnings and error messages, and emits audible warnings related to the current operating status of the park assist system.
- **Park Assist Switch** - The optional park assist system can be manually disabled or enabled using the U-Connect Touch ™ screen module; located in the instrument panel center stack. The operator can select from one of three options under the settings tab to enable or disable the system, the tone alerts, or the visual alerts.
- **Park Assist Module** - Vehicles equipped with the park assist system include a park assist module which is concealed within the molded plastic park assist module housing. There are three mounting tabs integral to the module housing that secure the module to the vehicle body. Two connector receptacles containing terminal pins that connect the module to the vehicle electrical system are integral to the one side of the housing.
- **Park Assist Sensors** - Vehicles equipped with the rear park assist system have four ultrasonic park assist sensors that are concealed behind the rear bumper fascia. In addition to the rear sensors, vehicles equipped with the front park assist system have six ultrasonic park assist sensors that are concealed behind the front bumper fascia. Each sensor is snapped into an individual molded plastic mounting bracket located at horizontal intervals along the back side of the front or rear bumper fascias.

Hard-wired circuitry connects the various park assist system components to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The park assist system components cannot be adjusted or repaired. If any of the park assist system components are damaged or ineffective, that component must be replaced.

OPERATION

CHIME WARNING SYSTEM

The chime warning system operates on battery voltage received on a non-switched fused B(+) circuit so that the system may operate regardless of the ignition switch position. The chime warning system also monitors the ignition switch position so that some chime features are functional only with the ignition switch in the ON position, while others are functional regardless of the ignition switch position.

The chime warning system provides an audible indication to the vehicle operator or occupants under the following conditions:

- **ABS Indicator Warning** - On vehicles equipped with an optional Antilock Brake System (ABS), the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) will generate one short chime each time the ABS indicator is illuminated. This warning indicates a failure condition has been monitored affecting the operation of the ABS related components or circuits. This warning will only occur following completion of the ABS indicator bulb test, and will only occur once during any ignition cycle.
- **Adjustable Pedal System Warning** - On vehicles equipped with the optional adjustable pedal system, the IC will generate one short chime each time a pedal adjustment request is received and a **PEDAL ADJUST. DISABLED - CRUISE CONTROL SET** or a **PEDAL ADJUST. DISABLED - SHIFTER IN REVERSE** textual message is displayed in the EVIC display of the IC. A single short chime will also be sounded each time a pedal adjustment request is received while a failure condition has been monitored affecting the operation of the adjustable pedal system related components or circuits.
- **Airbag Indicator Warning** - The IC will generate one short chime when the ignition switch is in the ON position, and the airbag indicator is illuminated. This warning indicates a failure condition has been monitored affecting the operation of the Supplemental Restraint System (SRS) related components or circuits. This warning will only occur following completion of the airbag indicator bulb test.
- **Automatic Oil Change Indicator** - On vehicles with a gasoline engine, the IC will generate one short chime each time an **OIL CHANGE REQUIRED** or **OIL CHANGE RESET** textual message is displayed in the EVIC display of the IC. This warning indicates that a duty-cycle algorithm contained within the software of the Powertrain Control Module (PCM) has determined that a recommended oil change interval has been attained, or that a reset of the interval has been requested following performance of the recommended service. will only occur once during any ignition cycle.
- **Charging System Indicator Warning** - The IC will generate one short chime each time the ignition switch is in the ON position and the charging system indicator is illuminated. This warning indicates that a failure condition has been monitored affecting the operation of the charging system related components or circuits.
- **Check Gas Cap Warning** - On domestic market vehicles with a gasoline engine, the IC will generate one short chime each time the **CHECK GASCAP** textual message is displayed in the EVIC display of the IC. This warning will only occur once during any ignition cycle.
- **Check Gauges Warning** - The IC will generate one short chime each time the **CHECK GAUGES** textual message is displayed in the EVIC display of the IC. This warning indicates that a gross leak has been detected in the on-board vapor recovery system.
- **Check Engine Indicator Warning** - The IC will generate one short chime when the ignition switch is in the ON position and the check engine (Malfunction Indicator Lamp/MIL) indicator is illuminated. This warning indicates that a failure condition has been monitored affecting the

operation of a critical fuel or emissions related component or circuit.

- **Door Ajar Warning** - The IC will generate one short chime when a **DOOR(S) OPEN** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that a door is, or multiple doors are not closed or completely latched while the vehicle is moving.
- **Electronic Stability Control (ESC) System Warning** - On vehicles equipped with the optional ESC, the IC will generate one short chime when the **ESC OFF** textual message is displayed in the EVIC display of the IC. This warning indicates that the ESC system has been manually disabled using the ESC switch.
- **Electronic Stability System Fault Warning** - On vehicles equipped with the optional ESC, the IC will generate one short chime each time the ESC indicator is illuminated in the instrument cluster. This warning indicates a failure condition has been monitored affecting the operation of the ESC related components or circuits. This warning will only occur following completion of the ESC indicator bulb test, and will only occur once during any ignition cycle.
- **Fasten Seat Belt Indicator Warning** - The IC will generate repetitive chimes at a slow rate to announce that a hard-wired input from the seat belt switch and the ignition switch indicate that the driver side front seat belt is not fastened with the ignition switch in the ON position. The chime warning system also supports the enhanced seat belt reminder (beltminder) when this feature is enabled. Refer to **INDICATORS, INSTRUMENT CLUSTER, OPERATION** .
- **Head/Park Lamps-ON Warning** - The IC will generate repetitive chimes at a fast rate to indicate that hard-wired inputs from the headlamp switch and the ignition switch indicate that the exterior lamps are turned ON with the ignition switch in the OFF position, and either a hard-wired input or an electronic message is received over the Controller Area Network (CAN) data bus indicating that the driver side front door is open. The chimes will continue to sound until the exterior lamps are turned OFF, the driver side front door is closed, or the ignition switch is turned to the ON position, whichever occurs first.
- **Hood Ajar Warning** - On vehicles sold in a market where a hood ajar switch is required equipment, the IC will generate one short chime each time a **HOOD OPEN** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the hood is not closed or completely latched while the vehicle is moving.
- **Key-In-Ignition Warning** - The IC will generate repetitive chimes at a fast rate to indicate that hard-wired inputs from the key-in ignition switch and the ignition switch indicate that the key is in the ignition lock cylinder with the ignition switch in the OFF position, and either a hard-wired input or an electronic message is received over the CAN data bus indicating that the driver side front door is open. The chimes will continue to sound until the key is removed from the ignition lock cylinder, the driver side front door is closed, or the ignition switch is turned to the ON position, whichever occurs first.
- **Low Brake Fluid Warning** - The IC will generate one short chime when a **LOW BRAKE FLUID LEVEL** textual message is displayed in the EVIC display of the IC. This warning indicates that the monitored fluid level in the brake master cylinder is low.
- **Low Coolant Warning** - The IC will generate one short chime when the **COOLANT LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the monitored engine coolant level in the coolant reserve bottle is low. This chime will only occur once during any ignition cycle.
- **Low Fuel Warning** - The IC will generate one short chime when the **FUEL LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the

monitored fuel level in the fuel tank is low. This chime will only occur once during any ignition cycle.

- **Low Oil Pressure Indicator Warning** - The IC will generate one short chime when the low oil pressure indicator is illuminated and the engine speed is greater than 300 revolutions per minute. This warning indicates that the monitored engine oil pressure is low.
- **Low Wash Warning** - The IC will generate one short chime when the **WASHER FLUID LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the monitored washer fluid level in the washer reservoir is low.
- **Memory System Warning** - On vehicles equipped with the optional memory system, the IC will generate one short chime each time a memory recall request is received and a **MEMORY SYSTEM DISABLED - SEATBELT FASTENED** textual message and icon, or a **MEMORY SYSTEM DISABLED - VEHICLE NOT IN PARK** textual message is displayed in the EVIC display of the IC. A single short chime will also be sounded each time a memory recall request is received while the memory system is inhibited due to a vehicle speed input that is greater than zero.
- **Overspeed Warning** - The IC will generate repetitive chimes at a slow rate when the **WARNING! LIMIT SPEED** textual message is displayed in the EVIC display of the IC. This warning indicates that the vehicle speed is over a pre-programmed speed value. This feature is only enabled on vehicles that have been configured for sale in a Middle East Gulf Coast Country (GCC).
- **Park Assist System Warning** - On vehicles equipped with the optional park assist system, the IC will generate one short chime when the **PARK ASSIST DISABLED** textual message is displayed in the EVIC display of the IC. This warning indicates that the park assist system has been manually disabled using the park assist switch. On vehicles with park assist system this chime warning will only occur as the gear selector lever is being moved from any position except REVERSE or NEUTRAL into REVERSE or NEUTRAL.
- **Park Brake Reminder** - The IC will generate one short chime when the brake/park brake indicator is illuminated to announce that the park brake is applied or not fully released and the vehicle is moving. This chime will only occur once during any ignition cycle.
- **Perform Service Reminder** - On vehicles equipped with a diesel engine, the IC will generate one short chime when the **PERFORM SERVICE** textual message is displayed in the EVIC display of the IC. This reminder occurs when the service distance is at or below zero (miles or kilometers), and will repeat at each subsequent ignition cycle until the service distance is reset, increased or until the service reminder function is disabled. This chime will only occur once during any ignition cycle.
- **Remote Keyless Entry System Warning** - The IC will generate one short chime when a **SERVICE KEYLESS SYS., KEY FOB NOT DETECTED, VEHICLE NOT IN PARK,** or **VEHICLE NOT IN REVERSE** textual error message is displayed in the reconfigurable display of the IC. This message indicates that a Passive Entry and Keyless Go (PEKG) system feature is inoperable due to the displayed error condition.
- **FOBIK PROGRAMMING. Refer to STANDARD PROCEDURE .**
- **Service Column Lock Warning** - On right-hand drive vehicles manufactured with the electronic steering column lock, the IC will generate one short chime each time the **SERVICE COLUMN LOCK** textual message is displayed in the reconfigurable display of the IC. This warning indicates that a failure condition has been monitored affecting the operation of the electronic

steering column lock components or circuits.

- **Service Exhaust Warning** - On vehicles equipped with a diesel engine, the IC will generate one short chime each time the **SERVICE EXHAUST** textual message is displayed in the EVIC display of the IC. This warning indicates that a clogged or damaged diesel engine exhaust particulate filter has been monitored, which may affect diesel engine performance and emissions. This chime will only occur once during any ignition cycle.
- **Service Park Assist System Warning** - On vehicles equipped with the optional park assist system, the IC will generate one short chime each time the **SERVICE PARK ASSIST SYSTEM** textual message is displayed in the EVIC display of the IC. This warning indicates a failure condition has been monitored affecting the operation of the park assist system related components or circuits.
- **Service Tire Pressure Monitor System Warning** - On vehicles equipped with an optional base or premium Tire Pressure Monitor (TPM) system, the IC will generate one short chime each time a **SERVICE TIRE PRESS. SYSTEM** textual message is displayed in the EVIC display of the IC. This warning indicates a failure condition has been monitored affecting the operation of the tire pressure monitor system related components or circuits.
- **Tire Pressure Monitor Warning** - On vehicles equipped with an optional base or premium Tire Pressure Monitor (TPM) system, the IC will generate one short chime each time a **LOW PRESSURE** textual message is displayed in the EVIC display of the IC. This warning indicates that a low pressure condition has been monitored in one of the tires on or in the vehicle.
- **Trans Overtemp Warning** - The IC will generate one short chime each time the **TRANSMISSION OVER TEMP** textual message is displayed in the EVIC display of the IC. This warning indicates that the fluid temperature in the automatic transmission is excessive. This chime will repeat each time the trans overtemp message is cycled from OFF to ON.
- **Turn Signal/Hazard Warning Flasher Emulation** - The IC will generate repetitive clicks at a slow rate to emulate an electromechanical flasher when the turn signal or hazard warning system are operating. The IC will generate repetitive clicks at a fast rate to indicate that the right or left turn signal are operating with one or more bulbs ineffective. In either case, the clicks will continue until the turn signal and hazard warning systems are turned OFF.
- **Turn Signal On Warning** - The IC will generate one short chime and a **TURN SIGNAL ON** textual message with a blinking right or left turn signal icon are displayed in the EVIC display of the IC. This warning indicates that a turn signal has been active continuously for 1.6 kilometers (1 mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per hour). The hazard warning flashers will not activate this chime feature.

The IC provides chime service for all available features in the chime warning system, except for the audible warning function provided by each of the optional park assist system display modules. The IC relies on its internal programming, numerous hard-wired inputs, and electronic message inputs received from other modules over the CAN and the Local Interface Network (LIN) data buses to provide the chime warning system features. The internal programming of the IC determines the priority of each chime request input that is received, as well as the rate and duration of each chime that is to be generated.

The hard-wired circuits between components related to the chime warning system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of

wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the chime warning system or the electronic controls or communication between modules and other devices that provide some features of the chime warning system. The most reliable, efficient, and accurate means to diagnose the chime warning system or the electronic controls and communication related to chime warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

BLIND SPOT MONITOR SYSTEM

The Blind Spot Monitor (BSM) system is active only when the ignition switch is in the ON or START positions, the transmission gear selector lever is in the DRIVE or NEUTRAL position and the vehicle speed is greater than 10 kilometers-per-hour (6 miles-per-hour). In vehicles equipped with this option, the system is enabled from the factory as a default. The system can be manually disabled and enabled by the vehicle operator using the customer programmable features option of the optional Electronic Vehicle Information Center (EVIC) in the instrument cluster.

The BSM system provides another feature called Rear Cross Path (RCP). The RCP feature is active only when the gear selector is in the reverse position. The RCP feature is intended to aid the driver when backing out of parking spaces where vision of oncoming vehicles may be blocked. The host vehicle must proceed slowly and cautiously out of the parking space until the rear end of the vehicle is exposed. The RCP system will then have a clear view of the cross traffic and if an on coming vehicle is detected, alert the driver. The RCP monitors the rear detection zones on both sides of the vehicle, for objects that are moving toward the side of the vehicle with a minimum speed of 1 to 2 mph (1 km/h to 3 km/h), to objects moving a maximum of 10 mph (16 km/h), such as in parking lot situations.

The microprocessor based blind spot monitor module is the central component of the BSM system. It receives and analyzes data from the sensors, calculates and communicates the proper information to the Driver/Passenger door module to illuminate the display, performs system diagnostics, and communicates with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) data bus. The module operates on battery voltage received through a fuse in the Totally Integrated Power Module (TIPM), and is grounded through a take out and eyelet terminal of the body wire harness that is secured by a screw to the body sheet metal.

Two BSM radar sensors in the rear bumper fascia allow the blind spot monitor system to locate and identify nearby obstacles. The width of the BSM detection zone covers one lane over on both side of the vehicle, approximately 13ft (4.0m). The length of the BSM zone starts at the outside rear view mirror and extends approximately 15ft (4.5m) from the edge of the rear bumper.

The BSM display units, located within the side view mirrors, provide the vehicle operator with a visual warning indicating that an object has been detected within one of the vehicles detection zones. The BSM display **ICON** is illuminated immediately if an object of interest is in the detection zone and meets the warning criteria. However, the BSM system will not illuminate the **ICON** if the object of interest from the rear of the zone and passes the host vehicle at a speed greater that 31mph (50kph), or enters the detection zone from the front of the zone and remains in the zone for less than 1.5

seconds or passes through the zone with a relative speed greater than 12mph (20kph), or if the target vehicle passes the host vehicle in the opposite direction.

The BSM audible alert, is a single chime tone that can also be enabled. The chime tone is only sounded when the turn signal is activated and an object of interest is in the detection zone on the same side and meets the warning criteria. The chime tone is not active during normal driving conditions unless the turn signal is activated. The BSM system also sends a radio mute signal over the CAN data bus to the radio when the chime tone is activated. This request signal activates the radio mute function while the chime tone is sounded, approximately 2 to 3 seconds, then resumes normal radio function. The audible alert my also be deactivated if the operator prefers using the driver preferences within the EVIC. The BSM system can be configured for lights and chime, lights only, and system off.

The RCP function uses the same BSM icon and audible chime. However, the RCP function always combines the BSM display with the audible chime if an object is detected within the RCP detection zone. The BSM icon is illuminated on the side where the object is detected and a rapid repeating short chime tone is sounded. The audible chime can not be deactivated in the RCP function.

When the BSM module monitors a problem in any of the system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit, sends an electronic message to the instrument cluster, and a **SERVICE BLIND SPOT SYSTEM** or **BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE** textual message is displayed in the EVIC display.

The hardwired circuits between components related to the blind spot monitor system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the blind spot monitor system or the electronic controls or communication between modules and other devices that provide some features of the system. The most reliable, efficient, and accurate means to diagnose the blind spot monitor system or the electronic controls and communication related to BSM system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PARK ASSIST SYSTEM

The park assist system is active only when the ignition switch is in the RUN position, the transmission gear selector lever is in either the REVERSE position and the vehicle speed is less than 18 kph (12 mph). The park assist system is enabled from the factory as a default but can be manually disabled or enabled using the U-Connect Touch ™ screen module, under the settings tab, by adding or removing a check mark in the OFF selection box, for more information. Refer to **MODULE, INTEGRATED CENTER STACK SCREEN, OPERATION** .

The disable feature is provided for trailer towing purposes. With a trailer attached to the vehicle the audible and visible park assist alerts would be incessant whenever the gear selector lever was in the REVERSE position due to the proximity of the trailer to the rear of the vehicle. When the system is disabled, a park assist icon will appear within the display. On vehicles equipped with an optional

EVIC, a **PARK ASSIST OFF** textual message will appear within the EVIC display of the instrument cluster whenever the gear selector lever is in the REVERSE position.

The microprocessor based park assist module is the central component of the park assist system. It supplies voltage to the park assist sensors, receives and analyzes data from the sensors, calculates and communicates the proper display information Instrument Cluster (IC), performs system diagnostics, and communicates with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) data bus. The module operates on battery voltage received through a fuse in the Power Distribution Center (PDC), and is grounded through a take out of the body wire harness.

Four ultrasonic park assist sensors in the rear bumper fascia allow the park assist system to locate and identify the proximity of nearby obstacles. These sensors each generate ultrasonic sound pulses when triggered by the park assist module, then signal the module when an echo of the reflected sound pulses is received. The detection distance range from the rear of the vehicle is about 0.3 meters (11.8 inches) to about 2.0 meters (80 inches), and the detection height range from the ground is about 0.2 meters (7.8 inches) to about 0.8 meters (31 inches). The detection area extends somewhat around both rear sides (corners) of the vehicle.

The park assist display, located within the EVIC unit, provides the vehicle operator with a visible warning if the vehicle comes to within about 100 centimeters (39 inches) to 200 centimeters (79 inches) of the detected object. The display is visible to the vehicle operator only when looking forward and an object is detected within the detection zone. The system will also emit a series of short, intermittent, audible beeps and automatically lower the volume of the audio system 20 dB below a set tone alert volume, if the vehicles audio system is turned ON. The audible warning changes from intermittent beeps to a continuous tone as the vehicle comes to within 30 centimeters (12 inches) of a detected object.

When the park assist module monitors a problem in any of the park assist system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit. The park assist module then sends an electronic message over the CAN data bus, and one of several **SERVICE PARK ASSIST SYSTEM** textual and graphical message is displayed within the EVIC display, when the message is received by the IC.

The hard-wired circuits between components related to the park assist system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist system or the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist system or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

CHIME WARNING SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the chime warning system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the chime warning system or the electronic controls or communication between modules and other devices that provide some features of the chime warning system. The most reliable, efficient, and accurate means to diagnose the chime warning system or the electronic controls and communication related to chime warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

BLIND SPOT MONITOR SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The following textual message May appear within the Electronic Vehicle Information Center (EVIC):

1. **BLIND SPOT SYSTEM OFF** - Message to the vehicle operator at "Key ON" to indicate the system has been turned off.
2. **SERVICE BLIND SPOT SYSTEM** - Message indicates that the BSM system is permanently unavailable. An EVIC message will be displayed and the BSM warning display in both mirrors will be permanently illuminated. This may be due to a hardware failure.
3. **BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE** - Message indicates that the BSM system is temporarily unavailable as a result of one of the following reasons:

- Sensor blockage - BSM display in both mirrors will illuminate as long as blockage exists.
- Radar interference - BSM display **ICON** will illuminate ONLY on the side of the interference during the first 15 seconds of interference. If the interference remains present, the system will illuminate the opposite side **ICON** and send a "temporarily Unavailable" message.
- Sensor over temperature - BSM display in both mirrors will illuminate as long as condition exists.

NOTE: If the "BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE" message is received for a minimum of 5 minutes, please verify that the area of the rear fascia where the sensors are located is not blocked by snow, ice or road debris. If the area is blocked, remove the blockage and verify the message is no longer present in the EVIC display.

NOTE: If the vehicle has experienced any trauma in the area where the sensors are located, even if the fascia is not damaged, the sensor may have become misaligned. A misaligned sensor will result in the BSM system to not operate properly.

The hard-wired circuits between components related to the blind spot monitor system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the blind spot monitor system or the electronic controls or communication between modules and other devices that provide some features of the system. The most reliable, efficient, and accurate means to diagnose the blind spot monitor system or the electronic controls and communication related to BSM system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PARK ASSIST SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: The presence of jackhammers, large trucks, and other vibrations in the vicinity of the vehicle could impact the performance of the system.

The following textual messages May appear in the Electronic Vehicle Information Center (EVIC):

1. **SERVICE PARK ASSIST** - If a service park assist textual message appears in the EVIC display, the system may or have a hard fault, and further investigation may be needed.
2. **CLEAN PARK ASSIST SENSORS** - If a clean park assist sensors textual message appears in the EVIC display, be certain to confirm the following:
   - The rear bumper is free of ice, snow, mud or other obstructions that will prevent the system from operating properly.

     The park assist system is self correcting, please verify that the area of the rear bumper where the sensors are located is not blocked by ice, snow, mud or other obstructions. If the area is blocked, remove the blockage, shift the transmission selector lever into reverse and verify the message is no longer present in the EVIC display. The system may also be corrected when the vehicle is driven at a speed greater than 14 kph (8 mph).
3. **SERVICE PARK ASSIST SENSORS** - If a service park assist sensors textual message appears in the EVIC display, a sensor, or the sensor wiring may be damaged, and further investigation may be needed.
4. **PARK ASSIST OFF** - If a park assist OFF textual message appears in the EVIC display, the system may be manually cut-off

The hard wired circuits between components related to the park assist system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist system or the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist system or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DISPLAY, BLIND SPOT

DESCRIPTION

DESCRIPTION

Vehicles equipped with the Blind Spot Monitor (BSM) system have an Light Emitting Diode (LED) display unit mounted in the side view mirrors. The body of the displays are concealed to the back side of the side view mirror glass. Only the amber colored triangle is visible on the outer surface of the mirror glass. The BSM display units are an integral part to the mirror glass and are only serviced with the glass. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** or **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, INSTALLATION** or **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** for service information.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The blind spot monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced. For more information on the blind spot monitor system and its components. Refer to **DESCRIPTION**.

OPERATION

OPERATION

The Blind Spot Monitor (BSM) display units, located within the side view mirrors, provide the vehicle operator with a visual warning indicating that an object has been detected within one of the vehicles detection zones. The BSM display **ICON** is illuminated immediately if an object of interest is in the detection zone and meets the warning criteria. However, the BSM system will not illuminate the **ICON** if the object of interest from the rear of the zone and passes the host vehicle at a speed greater that 31mph (50kph), or enters the detection zone from the front of the zone and remains in the zone for less than 1.5 seconds or passes through the zone with a relative speed greater than 12mph (20kph), or if the target vehicle passes the host vehicle in the opposite direction. For more information on the BSM display and other components in the system. Refer to **OPERATION**.

DISPLAY, PARK ASSIST

DESCRIPTION

DESCRIPTION

The Park Assist display is an integral part of the Electronic Vehicle Information Center (EVIC). The park assist **ICON** , for image information, is only displayed when an object is detected. Refer to **INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS, DESCRIPTION** . An electronic message is sent to the Cab Compartment Node (CCN) from the park assist module, over the Controller Area Network (CAN) Data Bus when an object is within the detection area. The CCN then displays the object detection icon with the corresponding alert bar for the distance and location of the object within the EVIC display.

Depending on market and system capabilities, the display icon has as many as 24 different variations with the corresponding alert bars, depending on size, location and distance of the object being detected. The image will display three solid bars followed by a single tone for maximum distance then will flash and reduce the amount of bars as the proximity to the object is reduced followed by a repetitive tone, down to a single bar with a continuos tone.

The EVIC display is only serviced as a complete unit with the instrument cluster. It cannot be adjusted or repaired. If ineffective or damaged, the entire display unit must be replaced, for more information. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .

OPERATION

OPERATION

The Park Assist system for this vehicle is only available on vehicles equipped with an Electronic Vehicle Information Center (EVIC). The park assist display is an integrated part of the EVIC and receives battery current and ground from, and is completely controlled by, the Cab Compartment Node (CCN). The CCN will display the park assist **ICON** whenever an object is detected and a signal is received from the park assist module, over the Controller Area Network (CAN) data bus. The icon image displayed has as many as 24 different variations depending on size, distance and location of the object being detected. The microprocessor in the park assist module continually monitors the display status, and will store a Diagnostic Trouble Code (DTC) in memory for any monitored fault it detects in the park assist display.

The hard-wired circuits between components related to the park assist display may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist display or the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist display or the electronic controls and communication related to park assist display operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

MODULE, BLIND SPOT

DESCRIPTION

DESCRIPTION

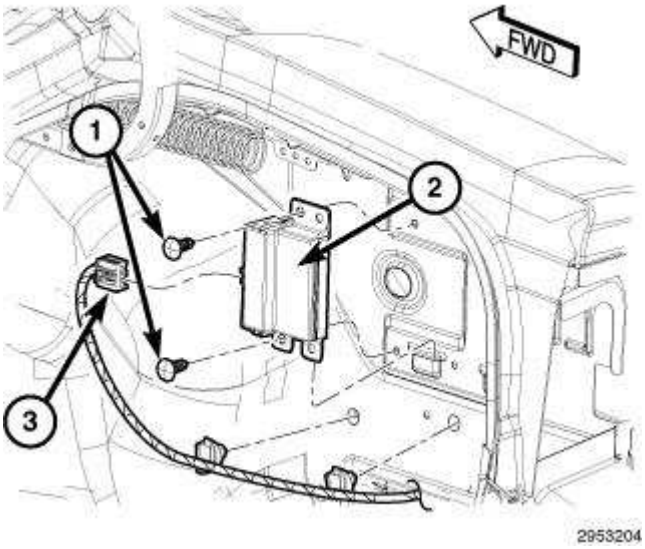


Fig. 1: Blind Spot Monitor (BSM) System Module
Courtesy of CHRYSLER GROUP, LLC

Blind Spot Module: Vehicles equipped with the Blind Spot Monitor (BSM) system, includes a module that is secured to a mounting bracket within the right inner quarter panel. Concealed beneath the inner quarter trim panel, the module is secured to the mounting bracket by two push-pin type retainers.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the vehicle electrical system. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle, and retained by many different methods. These circuits may be connected to each other, and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out, and location views for the various wire harness connectors, splices and grounds.

The Blind Spot Monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced. For more information on the blind spot monitor system and its components. Refer to **DESCRIPTION**.

OPERATION

OPERATION

The microprocessor based Blind Spot Monitor (BSM) module is the central component of the BSM system. It receives and analyzes data from the sensors, calculates and communicates the proper information to the Driver/Passenger door module to illuminate the display, performs system diagnostics, and communicates with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) data bus. The module operates on battery voltage received through a fuse in the Totally Integrated Power Module (TIPM), and is grounded through a

take out and eyelet terminal of the body wire harness that is secured by a screw to the body sheet metal. For more information on the operation of the BSM module and other components in the BSM system Refer to **OPERATION**.

REMOVAL

REMOVAL

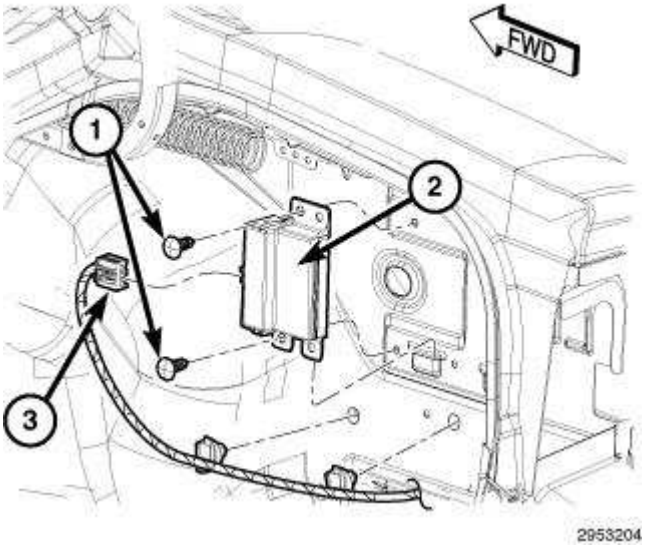


Fig. 2: Blind Spot Monitor (BSM) System Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the inner trim panel from the right quarter panel to access the blind spot module (1), which is located just behind the right rear wheel well. Refer to **WELT, TRUNK, REMOVAL** .
3. Disconnect the body wire harness connector (3) from the module connector receptacle.
4. Remove the push-pin type retainers (1) that secure the Blind Spot Monitor (BSM) module to the inner panel.
5. Remove the module from the vehicle.

INSTALLATION

INSTALLATION

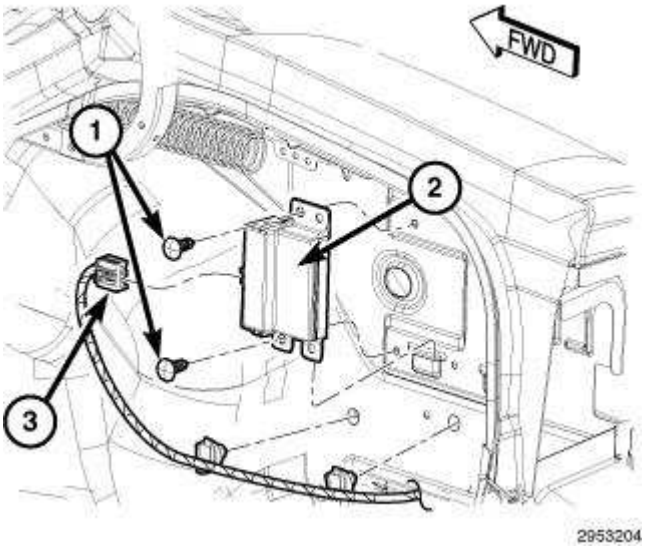


Fig. 3: Blind Spot Monitor (BSM) System Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the Blind Spot Monitor (BSM) module (2) to the right inner panel, at the rear of the vehicle.
2. Install the push-pin type retainers (2).
3. Connect the body wire harness connector (3) to the module connector receptacle.
4. Install the trim onto the right quarter inner panel. Refer to **WELT, TRUNK, INSTALLATION** .
5. Connect the negative battery cable.

MODULE, PARK ASSIST

REMOVAL

REMOVAL

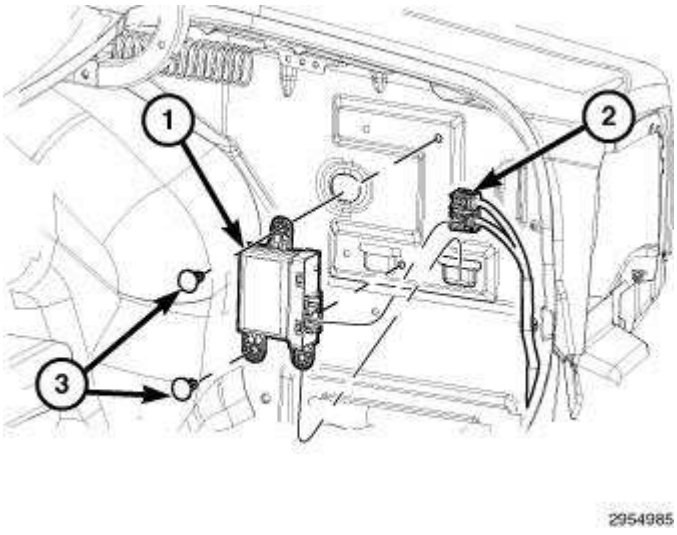


Fig. 4: Park Assist Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the inner trim panel from the right quarter panel to access the park assist module (1), which is located just behind the right rear wheel well. Refer to **WELT, TRUNK, REMOVAL** .
3. Remove the push-pin type retainers (1) that secure the park assist module to the inner panel.
4. Remove the module from the vehicle.

INSTALLATION

INSTALLATION

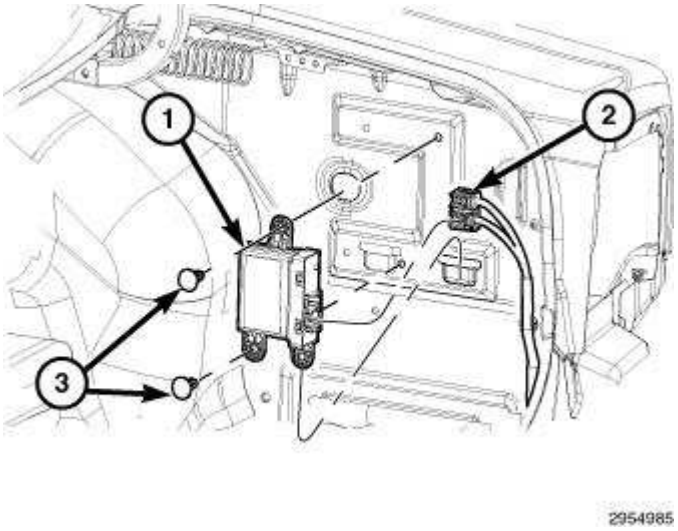


Fig. 5: Park Assist Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the park assist module (1) to the right inner panel, at the rear of the vehicle.
2. Install the push-pin type retainers (3).
3. Connect the body wire harness connectors (2) to the module connector receptacles.
4. Install the trim onto the right quarter inner panel. Refer to **WELT, TRUNK, INSTALLATION** .
5. Connect the negative battery cable.

SENSOR, BLIND SPOT

DESCRIPTION

DESCRIPTION

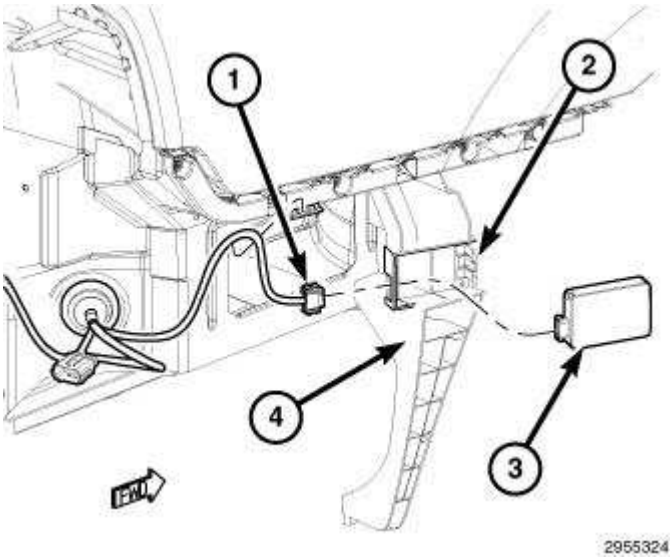


Fig. 6: Blind Spot Monitor (BSM) System Sensor
Courtesy of CHRYSLER GROUP, LLC

Blind Spot Sensors: Vehicles equipped with the Blind Spot Monitor (BSM) system, have two radar blind spot sensors that are concealed behind the rear bumper fascia. Each sensor is snapped into an individual molded plastic bracket and secured at horizontal intervals located near the left and right wheel openings.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the vehicle electrical system. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and, to the vehicle's electrical system through the use of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The Blind Spot Monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced. For more information on the blind spot monitor system and its components. Refer to **DESCRIPTION**.

OPERATION

OPERATION

Two Blind Spot Monitor (BSM) radar sensors in the rear bumper fascia allow the blind spot monitor system to locate and identify nearby obstacles. The width of the BSM detection zone covers one lane over on both side of the vehicle, approximately 13ft (4.0m). The length of the BSM zone starts at the outside rear view mirror and extends approximately 15ft (4.5m) from the edge of the rear bumper. For more information on the BSM sensors and other components in the system. Refer to **OPERATION**.

REMOVAL

REMOVAL

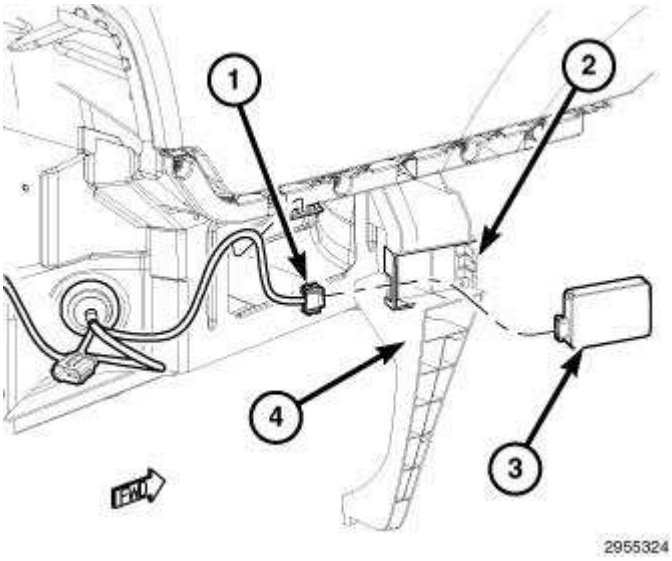


Fig. 7: Blind Spot Monitor (BSM) System Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the bumper fascia from the rear of the vehicle. Refer to **FASCIA, REAR, REMOVAL** .
3. Disconnect the wire harness connector (1) from the blind spot monitor sensor (3) connector receptacle.
4. Carefully pry the sensor bracket latch features (2) away from the top and bottom latch tabs of the sensor far enough to disengage the sensor from the bracket (4).

INSTALLATION

INSTALLATION

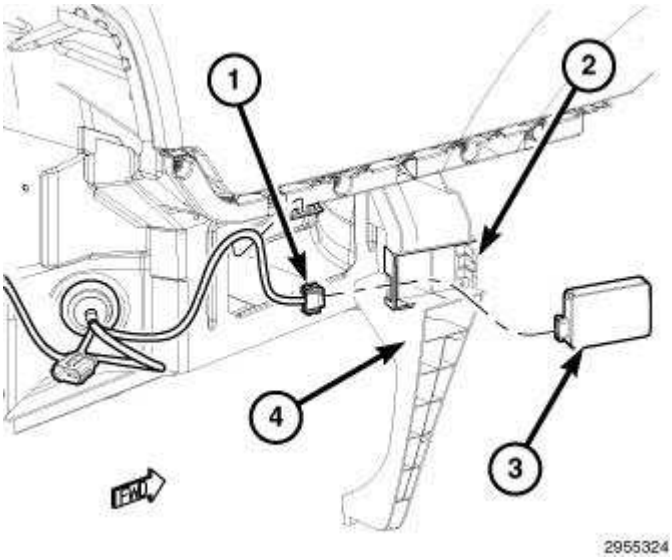


Fig. 8: Blind Spot Monitor (BSM) System Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Align and insert the sensor into the sensor bracket (4) until the bracket latch features (2) are fully engaged over the top and bottom latch tabs of the sensor (3).
2. Connect the wire harness connector (1) to the sensor connector receptacle.
3. Install the bumper fascia onto the rear of the vehicle. Refer to **FASCIA, REAR, INSTALLATION** .
4. Connect the negative battery cable.

SENSOR, PARK ASSIST

REMOVAL

REMOVAL

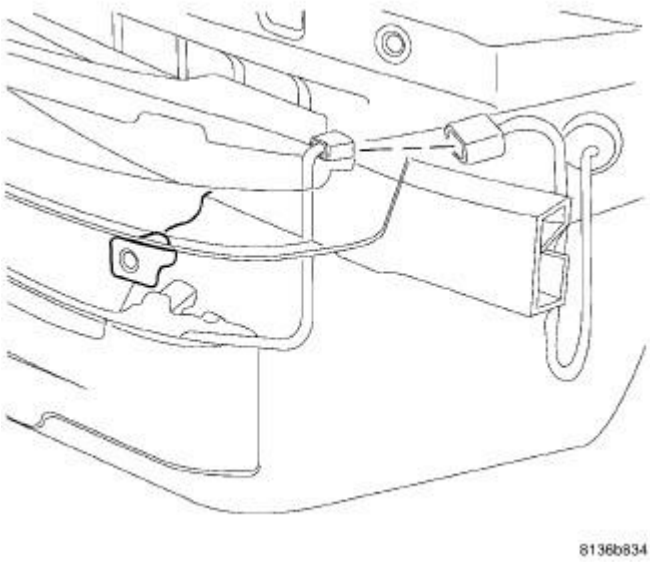


Fig. 9: Removing/Installing Park Assist Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove rear fascia. Refer to **FASCIA, REAR, REMOVAL** .
3. Unsnap Park Assist Sensor from the retaining housing and remove from fascia.

INSTALLATION

INSTALLATION

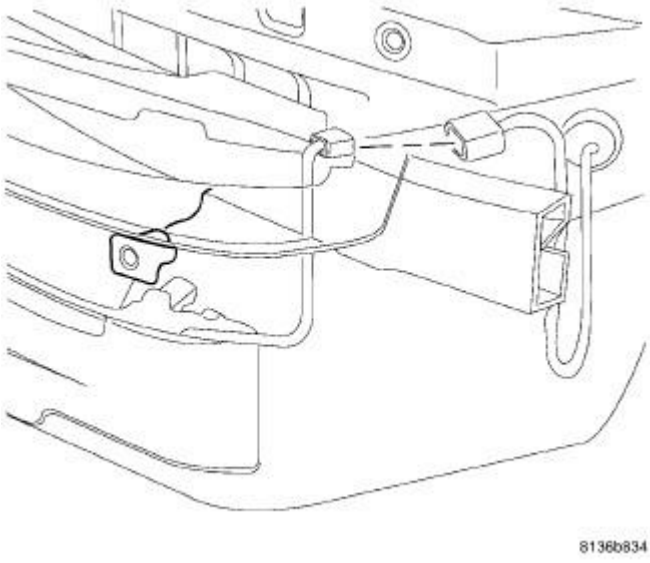


Fig. 10: Removing/Installing Park Assist Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Position the Park Assist Sensor over the retaining housing and firmly snap into housing in rear fascia.
2. Install the rear fascia. Refer to **FASCIA, REAR, INSTALLATION** .
3. Connect the battery negative cable.

SWITCH, PARK ASSIST

DESCRIPTION

DESCRIPTION

Fig. 11: Integrated Center Stack (ICS) Screen
Courtesy of CHRYSLER GROUP, LLC

The Park Assist switch is integral to the instrument panel Integrated Center Stack (ICS) Screen (1), also known as the U-Connect Touch ™ screen module. The park assist system can be manually disabled or enabled using the U-Connect Touch ™ screen module controls under the settings tab, for more information. Refer to **MODULE, INTEGRATED CENTER STACK SCREEN, OPERATION** .

The U-Connect Touch ™ screen module cannot be adjusted or repaired and, if the park assist switch is ineffective or damaged, the entire ICS must be replaced, for more information. Refer to **MODULE, INTEGRATED CENTER STACK SCREEN, REMOVAL** .

OPERATION

OPERATION

The status of the park assist controls are continually monitored by the Integrated Center Stack (ICS) Screen (1), also known as the U-Connect Touch ™ screen module. The ICS receives battery voltage at all times on a fused battery feed circuit, and a path to ground at all times through the instrument panel wire harness. The inputs to, and outputs from the ICS consist of electronic communication with

the Body Control Module (BCM) over the Controller Area Network (CAN) data bus.

Each time the park assist controls are used the ICS circuitry sends an electronic **park assist switch status** message input to the BCM over the CAN data bus. The BCM then sends an electronic **park assist switch request** message to the park assist module over the CAN data bus. The park assist module responds to each **park assist switch request** message by toggling the status of the park assist system from enabled to disabled, or from disabled to enabled, then sends an electronic **park assist system status** message back to the BCM over the CAN data bus as confirmation.

The BCM responds to the system status message received from the ICS, by sending a message to the IC over the CAN-C data bus to display **Park assist system off** in the Electronic Vehicle Information Center (EVIC) display; when the system has been disabled by the vehicle operator. The **Park assist system off** message will display each time the ignition switch is in the ON or START positions, and remain that way until a bus message is received that the system has been enabled.

The hard-wired circuits between components related to the park assist switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist switch or the electronic controls and communication related to park assist switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ACCESSORIES AND EQUIPMENT

Chime/Buzzer - Service Information - Chrysler 300

DESCRIPTION

CHIME WARNING SYSTEM

A chime warning system is standard factory-installed equipment. The chime warning system uses an electromechanical transducer and an electromechanical relay that are soldered onto the electronic circuit board inside of the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to provide audible indications of various vehicle conditions that may require the attention of the vehicle operator or occupants.

The electromechanical transducer generates beep tones and chime tones, while the electromechanical relay generates click tones to emulate the sounds associated with conventional turn signal and hazard warning flasher operation. The microprocessor-based IC utilizes electronic **chime request** messages received from other modules in the vehicle over the Controller Area Network (CAN) data bus to monitor many sensors and switches throughout the vehicle. In response to those inputs, the circuitry and programming of the IC allow it to control the audible outputs that are produced through its on-board transducer and relay.

The IC is capable of producing the following audible outputs:

- **Slow Rate Repetitive Click** - Repeated **click** tones that are issued at a slow rate of about 90 clicks per minute.
- **Fast Rate Repetitive Click** - Repeated **click** tones that are issued at a fast rate of more than about 180 clicks per minute.
- **Single Chime Tone** - A single **chime** tone.
- **Slow Rate Repetitive Chime** - Repeated **chime** tones that are issued at a slow rate of about 50 chimes per minute.
- **Fast Rate Repetitive Chime** - Repeated **chime** tones that are issued at a fast rate of about 180 chimes per minute.

Hard-wired circuitry connects the IC and the various chime warning system switch and sensor inputs to their modules and to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the IC through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The IC chime warning system circuits and components cannot be adjusted or repaired. If the IC circuitry, the on-board transducer or the relay are damaged or ineffective, the IC unit must be

replaced.

BLIND SPOT MONITOR SYSTEM

The Blind Spot Monitor (BSM) system is an optional factory-installed electronic driving aid. During driving maneuvers the system alerts the vehicle operator to vehicles located in the alert zones immediately behind and to the left or right of the vehicle which, due to the surrounding rear vehicle structure, might be otherwise difficult to perceive. When an object is detected, the system uses an electromechanical transducer within the cluster and Light Emitting Diode (LED) indicators within the side view mirrors to provide the vehicle operator with visual and audible indications of the presence of other vehicles.

The BSM system includes the following major components, which are described in further detail elsewhere in this service information:

- **Electronic Vehicle Information Center** - In vehicles equipped with the optional blind spot monitor system, the optional Electronic Vehicle Information Center (EVIC) in the instrument cluster displays textual warnings and error messages and emits audible warnings related to the current operating status of the BSM system and provides an interface that allows the vehicle operator to manually disable or enable the system using the customer programmable features option.
- **Blind Spot Display** - Vehicles equipped with the blind spot monitor system have an LED display unit mounted in the side view mirrors. The body of the displays are concealed to the back side of the side view mirrors. Only the amber colored triangle is visible on the outer surface of the mirror glass.
- **Blind Spot Module** - Vehicles equipped with the blind spot monitor system include a module which is secured to the right quarter inner panel by two retainers and concealed behind the interior trim panel.
- **Blind Spot Sensors** - Vehicles equipped with the blind spot system have two radar blind spot sensors that are concealed behind the rear bumper fascia. Each sensor is snapped into an individual molded plastic mounting bracket secured at horizontal intervals located on the back side of the rear bumper fascia near the left and right wheel openings.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The blind spot monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced.

PARK ASSIST SYSTEM

A park assist system is an optional factory-installed electronic parking aid. In some markets only a rear park assist system is offered, while other markets may have both front and rear park assist systems available. During parking and other similar vehicle maneuvers, this system alerts the vehicle operator to obstacles located in the path immediately in front of or behind the vehicle which, due to the surrounding vehicle structures, might be otherwise difficult to perceive. When an object is detected, the system uses the cluster display, and the vehicles audio system to provide the vehicle operator with visual, and audible indications of the presence, and proximity of such objects.

The park assist system includes the following major components, which are described in further detail elsewhere in this service information:

- **Electronic Vehicle Information Center** - In vehicles equipped with the optional park assist system, the optional EVIC in the instrument cluster displays textual warnings and error messages, and emits audible warnings related to the current operating status of the park assist system.
- **Park Assist Switch** - The optional park assist system can be manually disabled or enabled using the U-Connect Touch ™ screen module; located in the instrument panel center stack. The operator can select from one of three options under the settings tab to enable or disable the system, the tone alerts, or the visual alerts.
- **Park Assist Module** - Vehicles equipped with the park assist system include a park assist module which is concealed within the molded plastic park assist module housing. There are three mounting tabs integral to the module housing that secure the module to the vehicle body. Two connector receptacles containing terminal pins that connect the module to the vehicle electrical system are integral to the one side of the housing.
- **Park Assist Sensors** - Vehicles equipped with the rear park assist system have four ultrasonic park assist sensors that are concealed behind the rear bumper fascia. In addition to the rear sensors, vehicles equipped with the front park assist system have six ultrasonic park assist sensors that are concealed behind the front bumper fascia. Each sensor is snapped into an individual molded plastic mounting bracket located at horizontal intervals along the back side of the front or rear bumper fascias.

Hard-wired circuitry connects the various park assist system components to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The park assist system components cannot be adjusted or repaired. If any of the park assist system components are damaged or ineffective, that component must be replaced.

OPERATION

CHIME WARNING SYSTEM

The chime warning system operates on battery voltage received on a non-switched fused B(+) circuit so that the system may operate regardless of the ignition switch position. The chime warning system also monitors the ignition switch position so that some chime features are functional only with the ignition switch in the ON position, while others are functional regardless of the ignition switch position.

The chime warning system provides an audible indication to the vehicle operator or occupants under the following conditions:

- **ABS Indicator Warning** - On vehicles equipped with an optional Antilock Brake System (ABS), the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) will generate one short chime each time the ABS indicator is illuminated. This warning indicates a failure condition has been monitored affecting the operation of the ABS related components or circuits. This warning will only occur following completion of the ABS indicator bulb test, and will only occur once during any ignition cycle.
- **Adjustable Pedal System Warning** - On vehicles equipped with the optional adjustable pedal system, the IC will generate one short chime each time a pedal adjustment request is received and a **PEDAL ADJUST. DISABLED - CRUISE CONTROL SET** or a **PEDAL ADJUST. DISABLED - SHIFTER IN REVERSE** textual message is displayed in the EVIC display of the IC. A single short chime will also be sounded each time a pedal adjustment request is received while a failure condition has been monitored affecting the operation of the adjustable pedal system related components or circuits.
- **Airbag Indicator Warning** - The IC will generate one short chime when the ignition switch is in the ON position, and the airbag indicator is illuminated. This warning indicates a failure condition has been monitored affecting the operation of the Supplemental Restraint System (SRS) related components or circuits. This warning will only occur following completion of the airbag indicator bulb test.
- **Automatic Oil Change Indicator** - On vehicles with a gasoline engine, the IC will generate one short chime each time an **OIL CHANGE REQUIRED** or **OIL CHANGE RESET** textual message is displayed in the EVIC display of the IC. This warning indicates that a duty-cycle algorithm contained within the software of the Powertrain Control Module (PCM) has determined that a recommended oil change interval has been attained, or that a reset of the interval has been requested following performance of the recommended service. will only occur once during any ignition cycle.
- **Charging System Indicator Warning** - The IC will generate one short chime each time the ignition switch is in the ON position and the charging system indicator is illuminated. This warning indicates that a failure condition has been monitored affecting the operation of the charging system related components or circuits.
- **Check Gas Cap Warning** - On domestic market vehicles with a gasoline engine, the IC will generate one short chime each time the **CHECK GASCAP** textual message is displayed in the EVIC display of the IC. This warning will only occur once during any ignition cycle.
- **Check Gauges Warning** - The IC will generate one short chime each time the **CHECK GAUGES** textual message is displayed in the EVIC display of the IC. This warning indicates that a gross leak has been detected in the on-board vapor recovery system.
- **Check Engine Indicator Warning** - The IC will generate one short chime when the ignition switch is in the ON position and the check engine (Malfunction Indicator Lamp/MIL) indicator is illuminated. This warning indicates that a failure condition has been monitored affecting the

operation of a critical fuel or emissions related component or circuit.

- **Door Ajar Warning** - The IC will generate one short chime when a **DOOR(S) OPEN** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that a door is, or multiple doors are not closed or completely latched while the vehicle is moving.
- **Electronic Stability Control (ESC) System Warning** - On vehicles equipped with the optional ESC, the IC will generate one short chime when the **ESC OFF** textual message is displayed in the EVIC display of the IC. This warning indicates that the ESC system has been manually disabled using the ESC switch.
- **Electronic Stability System Fault Warning** - On vehicles equipped with the optional ESC, the IC will generate one short chime each time the ESC indicator is illuminated in the instrument cluster. This warning indicates a failure condition has been monitored affecting the operation of the ESC related components or circuits. This warning will only occur following completion of the ESC indicator bulb test, and will only occur once during any ignition cycle.
- **Fasten Seat Belt Indicator Warning** - The IC will generate repetitive chimes at a slow rate to announce that a hard-wired input from the seat belt switch and the ignition switch indicate that the driver side front seat belt is not fastened with the ignition switch in the ON position. The chime warning system also supports the enhanced seat belt reminder (beltminder) when this feature is enabled. Refer to **INDICATORS, INSTRUMENT CLUSTER, OPERATION** .
- **Head/Park Lamps-ON Warning** - The IC will generate repetitive chimes at a fast rate to indicate that hard-wired inputs from the headlamp switch and the ignition switch indicate that the exterior lamps are turned ON with the ignition switch in the OFF position, and either a hard-wired input or an electronic message is received over the Controller Area Network (CAN) data bus indicating that the driver side front door is open. The chimes will continue to sound until the exterior lamps are turned OFF, the driver side front door is closed, or the ignition switch is turned to the ON position, whichever occurs first.
- **Hood Ajar Warning** - On vehicles sold in a market where a hood ajar switch is required equipment, the IC will generate one short chime each time a **HOOD OPEN** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the hood is not closed or completely latched while the vehicle is moving.
- **Key-In-Ignition Warning** - The IC will generate repetitive chimes at a fast rate to indicate that hard-wired inputs from the key-in ignition switch and the ignition switch indicate that the key is in the ignition lock cylinder with the ignition switch in the OFF position, and either a hard-wired input or an electronic message is received over the CAN data bus indicating that the driver side front door is open. The chimes will continue to sound until the key is removed from the ignition lock cylinder, the driver side front door is closed, or the ignition switch is turned to the ON position, whichever occurs first.
- **Low Brake Fluid Warning** - The IC will generate one short chime when a **LOW BRAKE FLUID LEVEL** textual message is displayed in the EVIC display of the IC. This warning indicates that the monitored fluid level in the brake master cylinder is low.
- **Low Coolant Warning** - The IC will generate one short chime when the **COOLANT LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the monitored engine coolant level in the coolant reserve bottle is low. This chime will only occur once during any ignition cycle.
- **Low Fuel Warning** - The IC will generate one short chime when the **FUEL LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the

monitored fuel level in the fuel tank is low. This chime will only occur once during any ignition cycle.

- **Low Oil Pressure Indicator Warning** - The IC will generate one short chime when the low oil pressure indicator is illuminated and the engine speed is greater than 300 revolutions per minute. This warning indicates that the monitored engine oil pressure is low.
- **Low Wash Warning** - The IC will generate one short chime when the **WASHER FLUID LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the monitored washer fluid level in the washer reservoir is low.
- **Memory System Warning** - On vehicles equipped with the optional memory system, the IC will generate one short chime each time a memory recall request is received and a **MEMORY SYSTEM DISABLED - SEATBELT FASTENED** textual message and icon, or a **MEMORY SYSTEM DISABLED - VEHICLE NOT IN PARK** textual message is displayed in the EVIC display of the IC. A single short chime will also be sounded each time a memory recall request is received while the memory system is inhibited due to a vehicle speed input that is greater than zero.
- **Overspeed Warning** - The IC will generate repetitive chimes at a slow rate when the **WARNING! LIMIT SPEED** textual message is displayed in the EVIC display of the IC. This warning indicates that the vehicle speed is over a pre-programmed speed value. This feature is only enabled on vehicles that have been configured for sale in a Middle East Gulf Coast Country (GCC).
- **Park Assist System Warning** - On vehicles equipped with the optional park assist system, the IC will generate one short chime when the **PARK ASSIST DISABLED** textual message is displayed in the EVIC display of the IC. This warning indicates that the park assist system has been manually disabled using the park assist switch. On vehicles with park assist system this chime warning will only occur as the gear selector lever is being moved from any position except REVERSE or NEUTRAL into REVERSE or NEUTRAL.
- **Park Brake Reminder** - The IC will generate one short chime when the brake/park brake indicator is illuminated to announce that the park brake is applied or not fully released and the vehicle is moving. This chime will only occur once during any ignition cycle.
- **Perform Service Reminder** - On vehicles equipped with a diesel engine, the IC will generate one short chime when the **PERFORM SERVICE** textual message is displayed in the EVIC display of the IC. This reminder occurs when the service distance is at or below zero (miles or kilometers), and will repeat at each subsequent ignition cycle until the service distance is reset, increased or until the service reminder function is disabled. This chime will only occur once during any ignition cycle.
- **Remote Keyless Entry System Warning** - The IC will generate one short chime when a **SERVICE KEYLESS SYS., KEY FOB NOT DETECTED, VEHICLE NOT IN PARK,** or **VEHICLE NOT IN REVERSE** textual error message is displayed in the reconfigurable display of the IC. This message indicates that a Passive Entry and Keyless Go (PEKG) system feature is inoperable due to the displayed error condition.
- **FOBIK PROGRAMMING. Refer to STANDARD PROCEDURE .**
- **Service Column Lock Warning** - On right-hand drive vehicles manufactured with the electronic steering column lock, the IC will generate one short chime each time the **SERVICE COLUMN LOCK** textual message is displayed in the reconfigurable display of the IC. This warning indicates that a failure condition has been monitored affecting the operation of the electronic

steering column lock components or circuits.

- **Service Exhaust Warning** - On vehicles equipped with a diesel engine, the IC will generate one short chime each time the **SERVICE EXHAUST** textual message is displayed in the EVIC display of the IC. This warning indicates that a clogged or damaged diesel engine exhaust particulate filter has been monitored, which may affect diesel engine performance and emissions. This chime will only occur once during any ignition cycle.
- **Service Park Assist System Warning** - On vehicles equipped with the optional park assist system, the IC will generate one short chime each time the **SERVICE PARK ASSIST SYSTEM** textual message is displayed in the EVIC display of the IC. This warning indicates a failure condition has been monitored affecting the operation of the park assist system related components or circuits.
- **Service Tire Pressure Monitor System Warning** - On vehicles equipped with an optional base or premium Tire Pressure Monitor (TPM) system, the IC will generate one short chime each time a **SERVICE TIRE PRESS. SYSTEM** textual message is displayed in the EVIC display of the IC. This warning indicates a failure condition has been monitored affecting the operation of the tire pressure monitor system related components or circuits.
- **Tire Pressure Monitor Warning** - On vehicles equipped with an optional base or premium Tire Pressure Monitor (TPM) system, the IC will generate one short chime each time a **LOW PRESSURE** textual message is displayed in the EVIC display of the IC. This warning indicates that a low pressure condition has been monitored in one of the tires on or in the vehicle.
- **Trans Overtemp Warning** - The IC will generate one short chime each time the **TRANSMISSION OVER TEMP** textual message is displayed in the EVIC display of the IC. This warning indicates that the fluid temperature in the automatic transmission is excessive. This chime will repeat each time the trans overtemp message is cycled from OFF to ON.
- **Turn Signal/Hazard Warning Flasher Emulation** - The IC will generate repetitive clicks at a slow rate to emulate an electromechanical flasher when the turn signal or hazard warning system are operating. The IC will generate repetitive clicks at a fast rate to indicate that the right or left turn signal are operating with one or more bulbs ineffective. In either case, the clicks will continue until the turn signal and hazard warning systems are turned OFF.
- **Turn Signal On Warning** - The IC will generate one short chime and a **TURN SIGNAL ON** textual message with a blinking right or left turn signal icon are displayed in the EVIC display of the IC. This warning indicates that a turn signal has been active continuously for 1.6 kilometers (1 mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per hour). The hazard warning flashers will not activate this chime feature.

The IC provides chime service for all available features in the chime warning system, except for the audible warning function provided by each of the optional park assist system display modules. The IC relies on its internal programming, numerous hard-wired inputs, and electronic message inputs received from other modules over the CAN and the Local Interface Network (LIN) data buses to provide the chime warning system features. The internal programming of the IC determines the priority of each chime request input that is received, as well as the rate and duration of each chime that is to be generated.

The hard-wired circuits between components related to the chime warning system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of

wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the chime warning system or the electronic controls or communication between modules and other devices that provide some features of the chime warning system. The most reliable, efficient, and accurate means to diagnose the chime warning system or the electronic controls and communication related to chime warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

BLIND SPOT MONITOR SYSTEM

The Blind Spot Monitor (BSM) system is active only when the ignition switch is in the ON or START positions, the transmission gear selector lever is in the DRIVE or NEUTRAL position and the vehicle speed is greater than 10 kilometers-per-hour (6 miles-per-hour). In vehicles equipped with this option, the system is enabled from the factory as a default. The system can be manually disabled and enabled by the vehicle operator using the customer programmable features option of the optional Electronic Vehicle Information Center (EVIC) in the instrument cluster.

The BSM system provides another feature called Rear Cross Path (RCP). The RCP feature is active only when the gear selector is in the reverse position. The RCP feature is intended to aid the driver when backing out of parking spaces where vision of oncoming vehicles may be blocked. The host vehicle must proceed slowly and cautiously out of the parking space until the rear end of the vehicle is exposed. The RCP system will then have a clear view of the cross traffic and if an on coming vehicle is detected, alert the driver. The RCP monitors the rear detection zones on both sides of the vehicle, for objects that are moving toward the side of the vehicle with a minimum speed of 1 to 2 mph (1 km/h to 3 km/h), to objects moving a maximum of 10 mph (16 km/h), such as in parking lot situations.

The microprocessor based blind spot monitor module is the central component of the BSM system. It receives and analyzes data from the sensors, calculates and communicates the proper information to the Driver/Passenger door module to illuminate the display, performs system diagnostics, and communicates with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) data bus. The module operates on battery voltage received through a fuse in the Totally Integrated Power Module (TIPM), and is grounded through a take out and eyelet terminal of the body wire harness that is secured by a screw to the body sheet metal.

Two BSM radar sensors in the rear bumper fascia allow the blind spot monitor system to locate and identify nearby obstacles. The width of the BSM detection zone covers one lane over on both side of the vehicle, approximately 13ft (4.0m). The length of the BSM zone starts at the outside rear view mirror and extends approximately 15ft (4.5m) from the edge of the rear bumper.

The BSM display units, located within the side view mirrors, provide the vehicle operator with a visual warning indicating that an object has been detected within one of the vehicles detection zones. The BSM display **ICON** is illuminated immediately if an object of interest is in the detection zone and meets the warning criteria. However, the BSM system will not illuminate the **ICON** if the object of interest from the rear of the zone and passes the host vehicle at a speed greater that 31mph (50kph), or enters the detection zone from the front of the zone and remains in the zone for less than 1.5

seconds or passes through the zone with a relative speed greater than 12mph (20kph), or if the target vehicle passes the host vehicle in the opposite direction.

The BSM audible alert, is a single chime tone that can also be enabled. The chime tone is only sounded when the turn signal is activated and an object of interest is in the detection zone on the same side and meets the warning criteria. The chime tone is not active during normal driving conditions unless the turn signal is activated. The BSM system also sends a radio mute signal over the CAN data bus to the radio when the chime tone is activated. This request signal activates the radio mute function while the chime tone is sounded, approximately 2 to 3 seconds, then resumes normal radio function. The audible alert my also be deactivated if the operator prefers using the driver preferences within the EVIC. The BSM system can be configured for lights and chime, lights only, and system off.

The RCP function uses the same BSM icon and audible chime. However, the RCP function always combines the BSM display with the audible chime if an object is detected within the RCP detection zone. The BSM icon is illuminated on the side where the object is detected and a rapid repeating short chime tone is sounded. The audible chime can not be deactivated in the RCP function.

When the BSM module monitors a problem in any of the system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit, sends an electronic message to the instrument cluster, and a **SERVICE BLIND SPOT SYSTEM** or **BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE** textual message is displayed in the EVIC display.

The hardwired circuits between components related to the blind spot monitor system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the blind spot monitor system or the electronic controls or communication between modules and other devices that provide some features of the system. The most reliable, efficient, and accurate means to diagnose the blind spot monitor system or the electronic controls and communication related to BSM system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PARK ASSIST SYSTEM

The park assist system is active only when the ignition switch is in the RUN position, the transmission gear selector lever is in either the REVERSE position and the vehicle speed is less than 18 kph (12 mph). The park assist system is enabled from the factory as a default but can be manually disabled or enabled using the U-Connect Touch ™ screen module, under the settings tab, by adding or removing a check mark in the OFF selection box, for more information. Refer to **MODULE, INTEGRATED CENTER STACK SCREEN, OPERATION** .

The disable feature is provided for trailer towing purposes. With a trailer attached to the vehicle the audible and visible park assist alerts would be incessant whenever the gear selector lever was in the REVERSE position due to the proximity of the trailer to the rear of the vehicle. When the system is disabled, a park assist icon will appear within the display. On vehicles equipped with an optional

EVIC, a **PARK ASSIST OFF** textual message will appear within the EVIC display of the instrument cluster whenever the gear selector lever is in the REVERSE position.

The microprocessor based park assist module is the central component of the park assist system. It supplies voltage to the park assist sensors, receives and analyzes data from the sensors, calculates and communicates the proper display information Instrument Cluster (IC), performs system diagnostics, and communicates with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) data bus. The module operates on battery voltage received through a fuse in the Power Distribution Center (PDC), and is grounded through a take out of the body wire harness.

Four ultrasonic park assist sensors in the rear bumper fascia allow the park assist system to locate and identify the proximity of nearby obstacles. These sensors each generate ultrasonic sound pulses when triggered by the park assist module, then signal the module when an echo of the reflected sound pulses is received. The detection distance range from the rear of the vehicle is about 0.3 meters (11.8 inches) to about 2.0 meters (80 inches), and the detection height range from the ground is about 0.2 meters (7.8 inches) to about 0.8 meters (31 inches). The detection area extends somewhat around both rear sides (corners) of the vehicle.

The park assist display, located within the EVIC unit, provides the vehicle operator with a visible warning if the vehicle comes to within about 100 centimeters (39 inches) to 200 centimeters (79 inches) of the detected object. The display is visible to the vehicle operator only when looking forward and an object is detected within the detection zone. The system will also emit a series of short, intermittent, audible beeps and automatically lower the volume of the audio system 20 dB below a set tone alert volume, if the vehicles audio system is turned ON. The audible warning changes from intermittent beeps to a continuous tone as the vehicle comes to within 30 centimeters (12 inches) of a detected object.

When the park assist module monitors a problem in any of the park assist system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit. The park assist module then sends an electronic message over the CAN data bus, and one of several **SERVICE PARK ASSIST SYSTEM** textual and graphical message is displayed within the EVIC display, when the message is received by the IC.

The hard-wired circuits between components related to the park assist system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist system or the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist system or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

CHIME WARNING SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the chime warning system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the chime warning system or the electronic controls or communication between modules and other devices that provide some features of the chime warning system. The most reliable, efficient, and accurate means to diagnose the chime warning system or the electronic controls and communication related to chime warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

BLIND SPOT MONITOR SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The following textual message May appear within the Electronic Vehicle Information Center (EVIC):

1. **BLIND SPOT SYSTEM OFF** - Message to the vehicle operator at "Key ON" to indicate the system has been turned off.
2. **SERVICE BLIND SPOT SYSTEM** - Message indicates that the BSM system is permanently unavailable. An EVIC message will be displayed and the BSM warning display in both mirrors will be permanently illuminated. This may be due to a hardware failure.
3. **BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE** - Message indicates that the BSM system is temporarily unavailable as a result of one of the following reasons:

- Sensor blockage - BSM display in both mirrors will illuminate as long as blockage exists.
- Radar interference - BSM display **ICON** will illuminate ONLY on the side of the interference during the first 15 seconds of interference. If the interference remains present, the system will illuminate the opposite side **ICON** and send a "temporarily Unavailable" message.
- Sensor over temperature - BSM display in both mirrors will illuminate as long as condition exists.

NOTE: If the "BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE" message is received for a minimum of 5 minutes, please verify that the area of the rear fascia where the sensors are located is not blocked by snow, ice or road debris. If the area is blocked, remove the blockage and verify the message is no longer present in the EVIC display.

NOTE: If the vehicle has experienced any trauma in the area where the sensors are located, even if the fascia is not damaged, the sensor may have become misaligned. A misaligned sensor will result in the BSM system to not operate properly.

The hard-wired circuits between components related to the blind spot monitor system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the blind spot monitor system or the electronic controls or communication between modules and other devices that provide some features of the system. The most reliable, efficient, and accurate means to diagnose the blind spot monitor system or the electronic controls and communication related to BSM system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PARK ASSIST SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: The presence of jackhammers, large trucks, and other vibrations in the vicinity of the vehicle could impact the performance of the system.

The following textual messages May appear in the Electronic Vehicle Information Center (EVIC):

1. **SERVICE PARK ASSIST** - If a service park assist textual message appears in the EVIC display, the system may or have a hard fault, and further investigation may be needed.
2. **CLEAN PARK ASSIST SENSORS** - If a clean park assist sensors textual message appears in the EVIC display, be certain to confirm the following:
   - The rear bumper is free of ice, snow, mud or other obstructions that will prevent the system from operating properly.

     The park assist system is self correcting, please verify that the area of the rear bumper where the sensors are located is not blocked by ice, snow, mud or other obstructions. If the area is blocked, remove the blockage, shift the transmission selector lever into reverse and verify the message is no longer present in the EVIC display. The system may also be corrected when the vehicle is driven at a speed greater than 14 kph (8 mph).
3. **SERVICE PARK ASSIST SENSORS** - If a service park assist sensors textual message appears in the EVIC display, a sensor, or the sensor wiring may be damaged, and further investigation may be needed.
4. **PARK ASSIST OFF** - If a park assist OFF textual message appears in the EVIC display, the system may be manually cut-off

The hard wired circuits between components related to the park assist system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist system or the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist system or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DISPLAY, BLIND SPOT

DESCRIPTION

DESCRIPTION

Vehicles equipped with the Blind Spot Monitor (BSM) system have an Light Emitting Diode (LED) display unit mounted in the side view mirrors. The body of the displays are concealed to the back side of the side view mirror glass. Only the amber colored triangle is visible on the outer surface of the mirror glass. The BSM display units are an integral part to the mirror glass and are only serviced with the glass. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** or **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, INSTALLATION** or **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** for service information.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The blind spot monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced. For more information on the blind spot monitor system and its components. Refer to **DESCRIPTION**.

OPERATION

OPERATION

The Blind Spot Monitor (BSM) display units, located within the side view mirrors, provide the vehicle operator with a visual warning indicating that an object has been detected within one of the vehicles detection zones. The BSM display **ICON** is illuminated immediately if an object of interest is in the detection zone and meets the warning criteria. However, the BSM system will not illuminate the **ICON** if the object of interest from the rear of the zone and passes the host vehicle at a speed greater that 31mph (50kph), or enters the detection zone from the front of the zone and remains in the zone for less than 1.5 seconds or passes through the zone with a relative speed greater than 12mph (20kph), or if the target vehicle passes the host vehicle in the opposite direction. For more information on the BSM display and other components in the system. Refer to **OPERATION**.

DISPLAY, PARK ASSIST

DESCRIPTION

DESCRIPTION

The Park Assist display is an integral part of the Electronic Vehicle Information Center (EVIC). The park assist **ICON** , for image information, is only displayed when an object is detected. Refer to **INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS, DESCRIPTION** . An electronic message is sent to the Cab Compartment Node (CCN) from the park assist module, over the Controller Area Network (CAN) Data Bus when an object is within the detection area. The CCN then displays the object detection icon with the corresponding alert bar for the distance and location of the object within the EVIC display.

Depending on market and system capabilities, the display icon has as many as 24 different variations with the corresponding alert bars, depending on size, location and distance of the object being detected. The image will display three solid bars followed by a single tone for maximum distance then will flash and reduce the amount of bars as the proximity to the object is reduced followed by a repetitive tone, down to a single bar with a continuos tone.

The EVIC display is only serviced as a complete unit with the instrument cluster. It cannot be adjusted or repaired. If ineffective or damaged, the entire display unit must be replaced, for more information. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .

OPERATION

OPERATION

The Park Assist system for this vehicle is only available on vehicles equipped with an Electronic Vehicle Information Center (EVIC). The park assist display is an integrated part of the EVIC and receives battery current and ground from, and is completely controlled by, the Cab Compartment Node (CCN). The CCN will display the park assist **ICON** whenever an object is detected and a signal is received from the park assist module, over the Controller Area Network (CAN) data bus. The icon image displayed has as many as 24 different variations depending on size, distance and location of the object being detected. The microprocessor in the park assist module continually monitors the display status, and will store a Diagnostic Trouble Code (DTC) in memory for any monitored fault it detects in the park assist display.

The hard-wired circuits between components related to the park assist display may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist display or the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist display or the electronic controls and communication related to park assist display operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

MODULE, BLIND SPOT

DESCRIPTION

DESCRIPTION

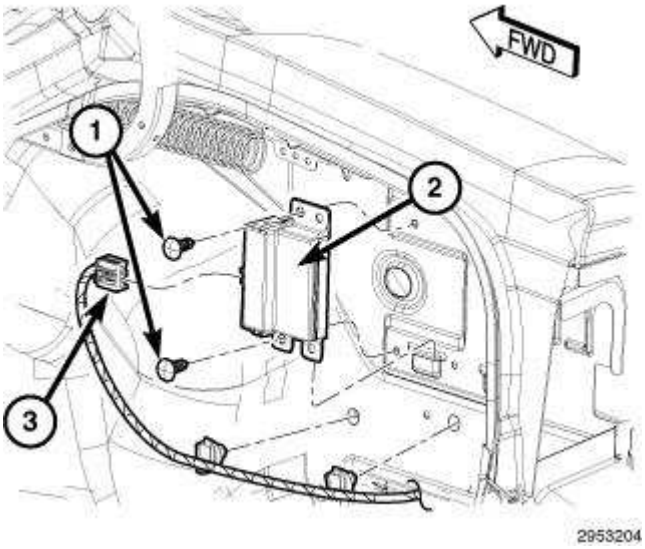


Fig. 1: Blind Spot Monitor (BSM) System Module
Courtesy of CHRYSLER GROUP, LLC

Blind Spot Module: Vehicles equipped with the Blind Spot Monitor (BSM) system, includes a module that is secured to a mounting bracket within the right inner quarter panel. Concealed beneath the inner quarter trim panel, the module is secured to the mounting bracket by two push-pin type retainers.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the vehicle electrical system. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle, and retained by many different methods. These circuits may be connected to each other, and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out, and location views for the various wire harness connectors, splices and grounds.

The Blind Spot Monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced. For more information on the blind spot monitor system and its components. Refer to **DESCRIPTION**.

OPERATION

OPERATION

The microprocessor based Blind Spot Monitor (BSM) module is the central component of the BSM system. It receives and analyzes data from the sensors, calculates and communicates the proper information to the Driver/Passenger door module to illuminate the display, performs system diagnostics, and communicates with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) data bus. The module operates on battery voltage received through a fuse in the Totally Integrated Power Module (TIPM), and is grounded through a

take out and eyelet terminal of the body wire harness that is secured by a screw to the body sheet metal. For more information on the operation of the BSM module and other components in the BSM system Refer to **OPERATION**.

REMOVAL

REMOVAL

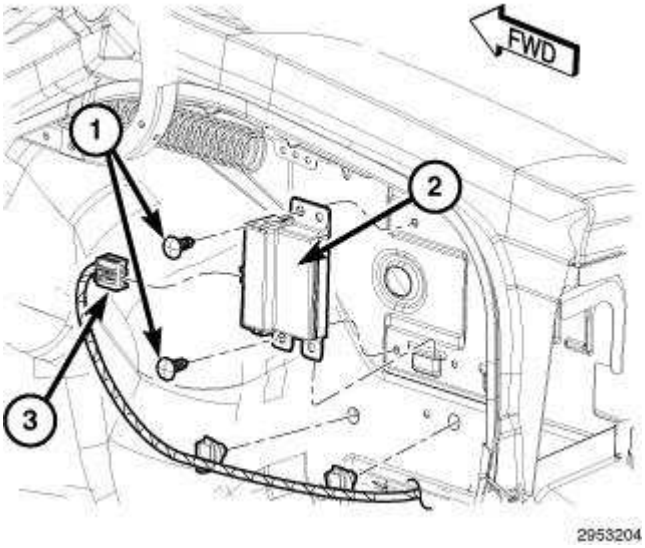


Fig. 2: Blind Spot Monitor (BSM) System Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the inner trim panel from the right quarter panel to access the blind spot module (1), which is located just behind the right rear wheel well. Refer to **WELT, TRUNK, REMOVAL** .
3. Disconnect the body wire harness connector (3) from the module connector receptacle.
4. Remove the push-pin type retainers (1) that secure the Blind Spot Monitor (BSM) module to the inner panel.
5. Remove the module from the vehicle.

INSTALLATION

INSTALLATION

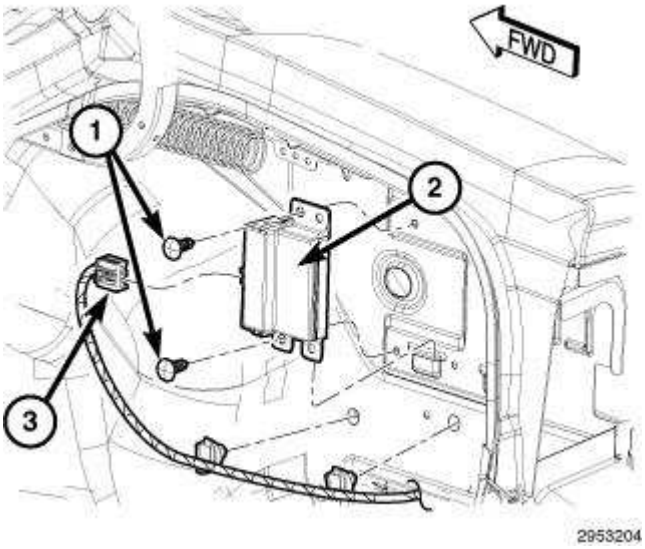


Fig. 3: Blind Spot Monitor (BSM) System Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the Blind Spot Monitor (BSM) module (2) to the right inner panel, at the rear of the vehicle.
2. Install the push-pin type retainers (2).
3. Connect the body wire harness connector (3) to the module connector receptacle.
4. Install the trim onto the right quarter inner panel. Refer to **WELT, TRUNK, INSTALLATION** .
5. Connect the negative battery cable.

MODULE, PARK ASSIST

REMOVAL

REMOVAL

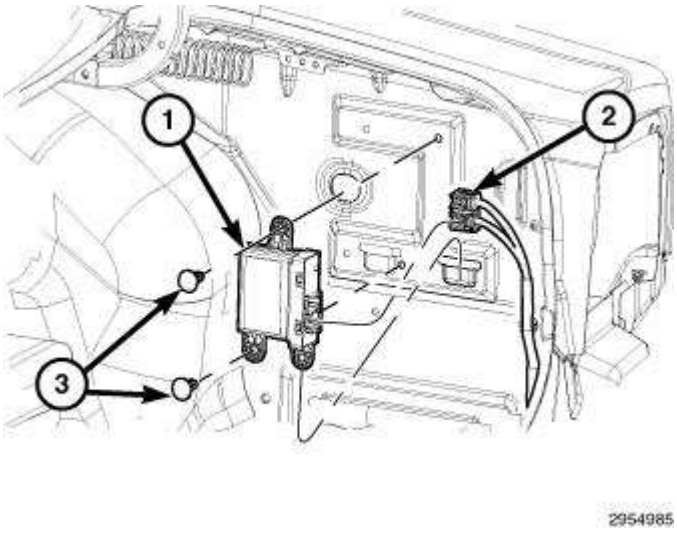


Fig. 4: Park Assist Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the inner trim panel from the right quarter panel to access the park assist module (1), which is located just behind the right rear wheel well. Refer to **WELT, TRUNK, REMOVAL** .
3. Remove the push-pin type retainers (1) that secure the park assist module to the inner panel.
4. Remove the module from the vehicle.

INSTALLATION

INSTALLATION

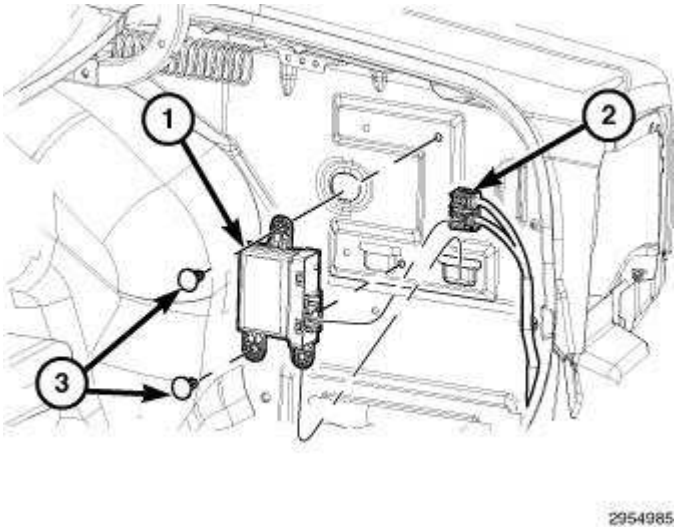


Fig. 5: Park Assist Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the park assist module (1) to the right inner panel, at the rear of the vehicle.
2. Install the push-pin type retainers (3).
3. Connect the body wire harness connectors (2) to the module connector receptacles.
4. Install the trim onto the right quarter inner panel. Refer to **WELT, TRUNK, INSTALLATION** .
5. Connect the negative battery cable.

SENSOR, BLIND SPOT

DESCRIPTION

DESCRIPTION

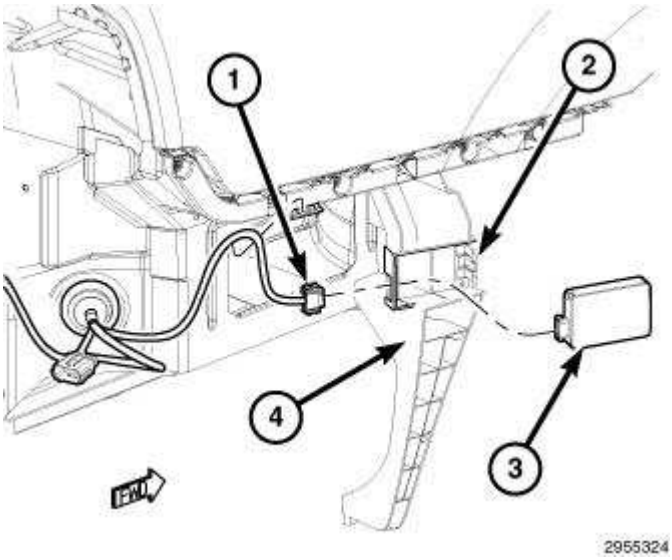


Fig. 6: Blind Spot Monitor (BSM) System Sensor
Courtesy of CHRYSLER GROUP, LLC

Blind Spot Sensors: Vehicles equipped with the Blind Spot Monitor (BSM) system, have two radar blind spot sensors that are concealed behind the rear bumper fascia. Each sensor is snapped into an individual molded plastic bracket and secured at horizontal intervals located near the left and right wheel openings.

Hard-wired circuitry connects the various blind spot monitor system components to each other through the vehicle electrical system. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and, to the vehicle's electrical system through the use of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The Blind Spot Monitor system components cannot be adjusted or repaired. If any of the BSM system components are damaged or inoperative, that component must be replaced. For more information on the blind spot monitor system and its components. Refer to **DESCRIPTION**.

OPERATION

OPERATION

Two Blind Spot Monitor (BSM) radar sensors in the rear bumper fascia allow the blind spot monitor system to locate and identify nearby obstacles. The width of the BSM detection zone covers one lane over on both side of the vehicle, approximately 13ft (4.0m). The length of the BSM zone starts at the outside rear view mirror and extends approximately 15ft (4.5m) from the edge of the rear bumper. For more information on the BSM sensors and other components in the system. Refer to **OPERATION**.

REMOVAL

REMOVAL

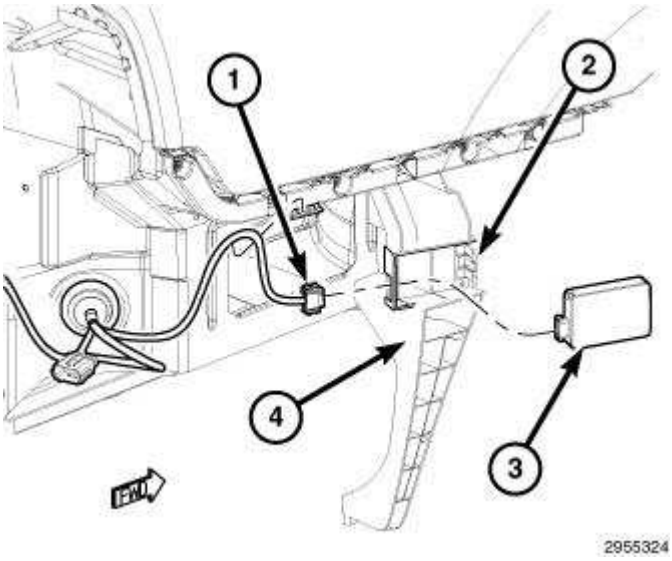


Fig. 7: Blind Spot Monitor (BSM) System Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the bumper fascia from the rear of the vehicle. Refer to **FASCIA, REAR, REMOVAL** .
3. Disconnect the wire harness connector (1) from the blind spot monitor sensor (3) connector receptacle.
4. Carefully pry the sensor bracket latch features (2) away from the top and bottom latch tabs of the sensor far enough to disengage the sensor from the bracket (4).

INSTALLATION

INSTALLATION

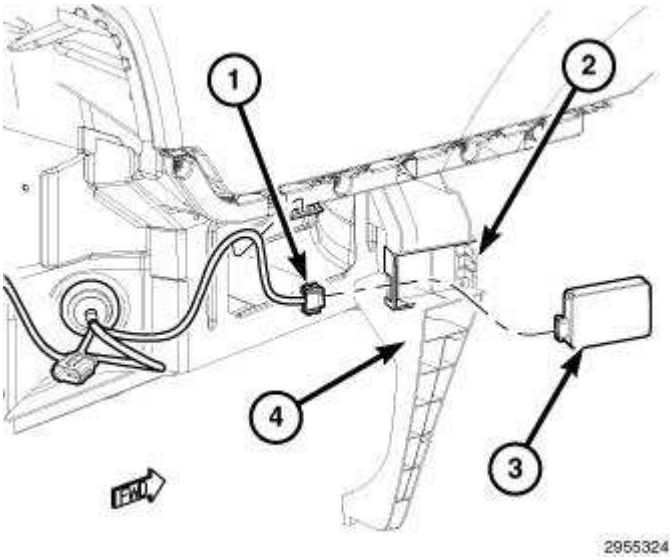


Fig. 8: Blind Spot Monitor (BSM) System Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Align and insert the sensor into the sensor bracket (4) until the bracket latch features (2) are fully engaged over the top and bottom latch tabs of the sensor (3).
2. Connect the wire harness connector (1) to the sensor connector receptacle.
3. Install the bumper fascia onto the rear of the vehicle. Refer to **FASCIA, REAR, INSTALLATION** .
4. Connect the negative battery cable.

SENSOR, PARK ASSIST

REMOVAL

REMOVAL

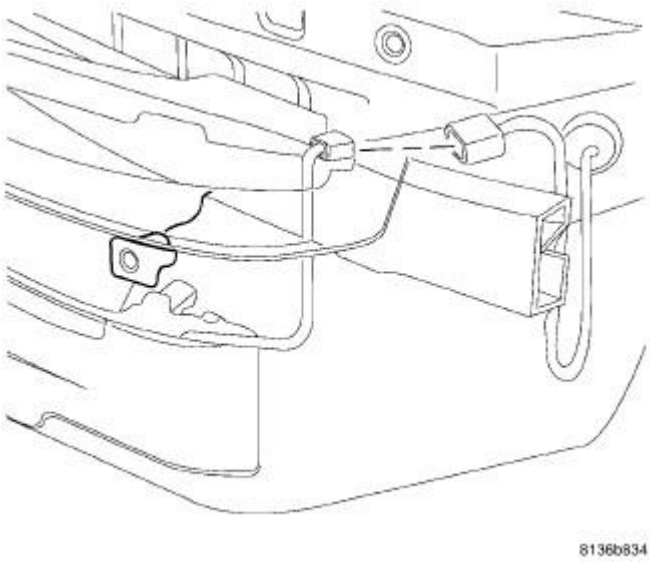


Fig. 9: Removing/Installing Park Assist Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove rear fascia. Refer to **FASCIA, REAR, REMOVAL** .
3. Unsnap Park Assist Sensor from the retaining housing and remove from fascia.

INSTALLATION

INSTALLATION

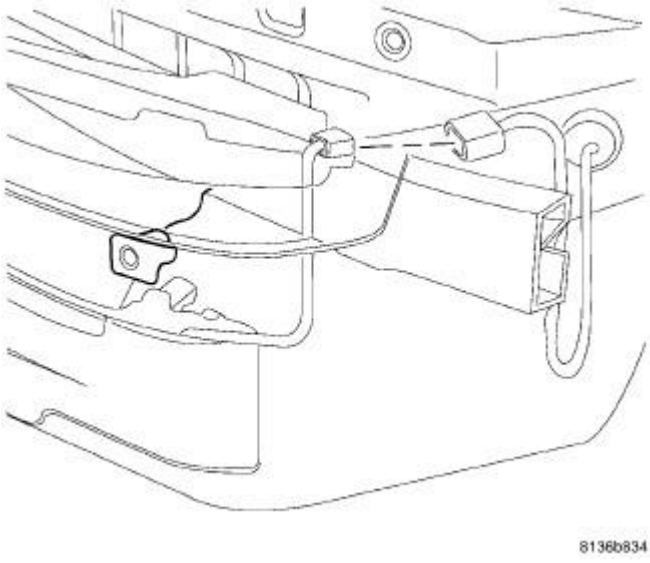


Fig. 10: Removing/Installing Park Assist Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Position the Park Assist Sensor over the retaining housing and firmly snap into housing in rear fascia.
2. Install the rear fascia. Refer to **FASCIA, REAR, INSTALLATION** .
3. Connect the battery negative cable.

SWITCH, PARK ASSIST

DESCRIPTION

DESCRIPTION

Fig. 11: Integrated Center Stack (ICS) Screen
Courtesy of CHRYSLER GROUP, LLC

The Park Assist switch is integral to the instrument panel Integrated Center Stack (ICS) Screen (1), also known as the U-Connect Touch ™ screen module. The park assist system can be manually disabled or enabled using the U-Connect Touch ™ screen module controls under the settings tab, for more information. Refer to **MODULE, INTEGRATED CENTER STACK SCREEN, OPERATION** .

The U-Connect Touch ™ screen module cannot be adjusted or repaired and, if the park assist switch is ineffective or damaged, the entire ICS must be replaced, for more information. Refer to **MODULE, INTEGRATED CENTER STACK SCREEN, REMOVAL** .

OPERATION

OPERATION

The status of the park assist controls are continually monitored by the Integrated Center Stack (ICS) Screen (1), also known as the U-Connect Touch ™ screen module. The ICS receives battery voltage at all times on a fused battery feed circuit, and a path to ground at all times through the instrument panel wire harness. The inputs to, and outputs from the ICS consist of electronic communication with

the Body Control Module (BCM) over the Controller Area Network (CAN) data bus.

Each time the park assist controls are used the ICS circuitry sends an electronic **park assist switch status** message input to the BCM over the CAN data bus. The BCM then sends an electronic **park assist switch request** message to the park assist module over the CAN data bus. The park assist module responds to each **park assist switch request** message by toggling the status of the park assist system from enabled to disabled, or from disabled to enabled, then sends an electronic **park assist system status** message back to the BCM over the CAN data bus as confirmation.

The BCM responds to the system status message received from the ICS, by sending a message to the IC over the CAN-C data bus to display **Park assist system off** in the Electronic Vehicle Information Center (EVIC) display; when the system has been disabled by the vehicle operator. The **Park assist system off** message will display each time the ignition switch is in the ON or START positions, and remain that way until a bus message is received that the system has been enabled.

The hard-wired circuits between components related to the park assist switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient, and accurate means to diagnose the park assist switch or the electronic controls and communication related to park assist switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ACCESSORIES AND EQUIPMENT

Clock - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

Chrysler vehicles include an electrically operated analog clock as standard equipment. The clock includes hands for both hours and minutes, but no second hand. The hands are protected behind a clear acrylic lens. The clock includes a reset button that allows the hands to be reset or adjusted to the desired time. Two Light Emitting Diode (LED) lamps provide panel lamps dimmer controlled back lighting for visibility at night when the exterior lighting is turned ON.

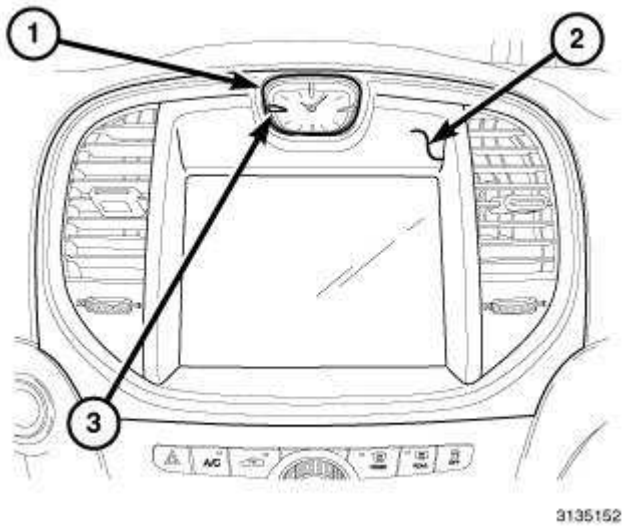


Fig. 1: Identifying Analog Clock, Center Stack Bezel, And Reset Button
Courtesy of CHRYSLER GROUP, LLC

The analog clock (1) is secured with three screws to the back of the instrument panel center stack bezel (2), between the two center panel air distribution outlets. The reset button (3) extends through a clearance hole in the clock lens at the 45 minute mark. The molded plastic clock housing includes two integral mounting tabs and an integral connector receptacle, which connects the clock to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The clock can not be repaired and, if ineffective or damaged, the entire clock unit must be replaced. The two incandescent bulb and bulb holder units are available for individual service replacement.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable

the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

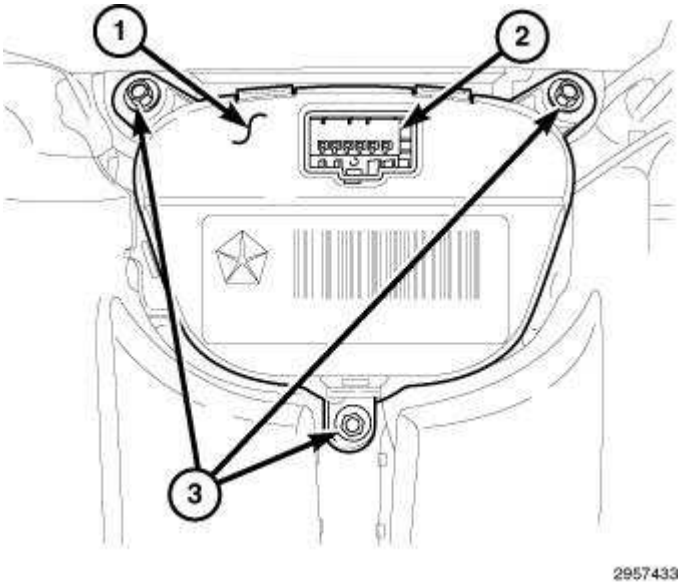


Fig. 2: Screws, Clock, And Back Of Center Bezel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the instrument panel center bezel. Refer to **BEZEL, INSTRUMENT PANEL, CENTER, REMOVAL** .
3. Remove the three screws (3) that secure the clock (1) to the back of the center bezel.
4. Remove the clock from the center bezel.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

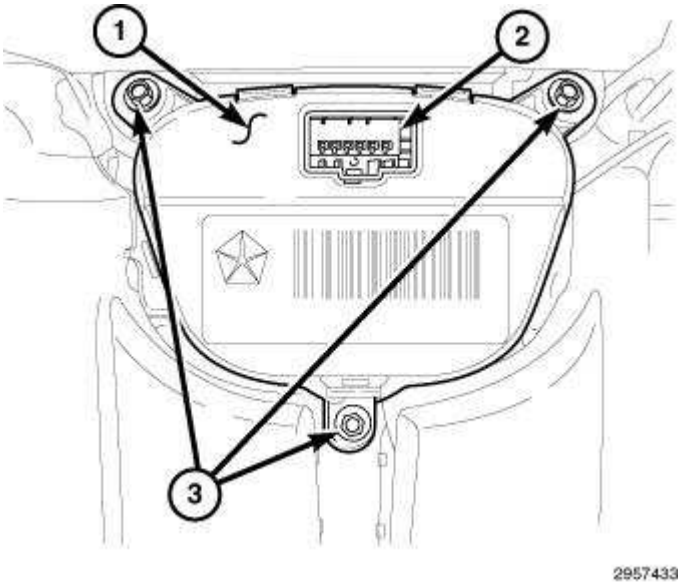


Fig. 3: Screws, Clock, And Back Of Center Bezel
Courtesy of CHRYSLER GROUP, LLC

1. Position the clock (1) to the back of the instrument panel center bezel.
2. Install and tighten the three screws (3) that secure the clock to the center bezel.
3. Position the center bezel assembly at the instrument panel.
4. Install the center bezel onto the instrument panel. Refer to **BEZEL, INSTRUMENT PANEL, CENTER, INSTALLATION** .
5. Connect the negative battery cable.
6. Depress the clock reset button (4) as necessary to adjust the clock to the proper time setting.

ACCESSORIES AND EQUIPMENT

Speed Control - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

Two electronic speed control systems are available factory-installed equipment on this vehicle: a conventional system and an adaptive system. Additional details of these two systems and their components can be found under the subheadings and paragraphs that follow.

CONVENTIONAL SPEED CONTROL

The standard equipment conventional electronic speed control system includes the following major components, which are described in further detail elsewhere in this service information:

- **Antilock Brake Module** - An Antilock Brake Module (ABM) (also known as Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module) is located below the antilock brake Hydraulic Control Unit (HCU) in the engine compartment. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .
- **Brake Lamp Switch** - The brake (also known as stop) lamp switch in this vehicle is actually a brake pedal position sensor. This sensor is located on the brake pedal support bracket under the driver side of the instrument panel. Refer to **SWITCH, STOP LAMP, DESCRIPTION** .
- **Instrument Cluster** - A CRUISE indicator is located in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) that provides an indication to the vehicle operator when the speed control system is turned ON. Refer to **DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) is located in the engine compartment. The PCM contains the software and hardware that monitors all of the speed control system inputs and controls all of the speed control system outputs. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Speed Control Switches** - A speed control switch pod containing four momentary switch push buttons is located in the right horizontal spoke of the steering wheel.
- **Steering Control Module** - A Steering Control Module (SCM) is integral to the Steering Column Control Module (SCCM) located at the top of the steering column just below the steering wheel. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** .
- **Wheel Speed Sensors** - A wheel speed sensor is located on the knuckle of each front and rear wheel. Refer to **SENSOR, WHEEL SPEED, FRONT, DESCRIPTION** .

The ABM, the IC, the PCM and the SCM each contain a microprocessor and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the SCM to relay the status of the speed control switches to the PCM, and by the PCM for control of the CRUISE indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the conventional electronic speed control system components to the

electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the speed control system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

ADAPTIVE SPEED CONTROL

The optional equipment adaptive electronic speed control system includes the following major components, which are described in further detail elsewhere in this service information:

- **Adaptive Speed Control Sensor** - An adaptive speed control sensor (also known as the Adaptive Cruise Control/ACC sensor or module and the radar sensor or module) is located on a bracket secured near the right outboard end of the front bumper support member of the Front End Module (FEM) behind the front fascia. Refer to **SENSOR AND BRACKET, ADAPTIVE SPEED CONTROL, DESCRIPTION** .
- **Antilock Brake Module** - An Antilock Brake Module (ABM) (also known as Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module) is located below the antilock brake Hydraulic Control Unit (HCU) in the engine compartment. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .
- **Brake Lamp Switch** - The brake (also known as stop) lamp switch in this vehicle is actually a brake pedal position sensor. This sensor is located on the brake pedal support bracket under the driver side of the instrument panel. Refer to **SWITCH, STOP LAMP, DESCRIPTION** .
- **Instrument Cluster** - A CRUISE indicator is located in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) that provides an indication to the vehicle operator when the speed control system is turned ON. Refer to **DESCRIPTION** .
- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) is located in the Integrated Center Stack (ICS) and provides an interface to the vehicle operator for setting the adaptive speed control customer preferences as well as a display of the adaptive speed control and Forward Collision Warning (FCW) system status messages. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) is located in the engine compartment. The PCM contains the software and hardware that monitors all of the speed control system inputs and controls all of the speed control system outputs. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Speed Control Switches** - A speed control switch pod containing six momentary switch push buttons is located in the right horizontal spoke of the steering wheel.
- **Steering Control Module** - A Steering Control Module (SCM) is integral to the Steering Column Control Module (SCCM) located at the top of the steering column just below the steering wheel. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** .
- **Wheel Speed Sensors** - A wheel speed sensor is located on the knuckle of each front and rear wheel. Refer to **SENSOR, WHEEL SPEED, FRONT, DESCRIPTION** .

The ACC sensor, the ABM, the IC, the EVIC, the PCM and the SCM each contain a microprocessor and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ACC sensor to provide inputs to the ABM, the EVIC and the PCM, is used by the ABM to provide inputs to the PCM, is used by the SCM to relay the status of the speed control switches to the PCM and is used by the PCM for control of the indicators in the IC and the indications in the EVIC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the adaptive electronic speed control system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the speed control system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

CONVENTIONAL SPEED CONTROL

The vehicle operator controls all conventional speed control system features through the speed control switch pod on the face of the right horizontal spoke of the steering wheel. When a push button of the switch pod is depressed, it provides a hard wired resistor multiplexed analog input to the Steering Control Module (SCM).

The SCM reads the speed control switch input, then relays an electronic **speed control switch** status message to the Powertrain Control Module (PCM) over the Controller Area Network (CAN) data bus. The PCM software continually monitors these inputs as well as electronic **vehicle distance** message inputs from the Antilock Brake Module (ABM) (also known as the Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module) and numerous hard wired inputs, then provides the appropriate electronic message and hard wired outputs to invoke the requested electronic speed control features.

The PCM microprocessor continuously monitors all of the speed control system electrical circuits to determine the system readiness. If the PCM detects a monitored system fault, it sets and stores a Diagnostic Trouble Code (DTC). The PCM uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the CAN data bus. This method of communication is used for control of the Malfunction Indicator Lamp (MIL) (also known as the Check Engine lamp) in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The hard wired inputs and outputs for the PCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic

methods will not prove conclusive in the diagnosis of the PCM or the electronic controls or communication between other modules and devices that provide features of the conventional speed control system. The most reliable, efficient, and accurate means to diagnose the PCM or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ADAPTIVE SPEED CONTROL

The vehicle operator controls all adaptive speed control system features through the speed control switch pod on the face of the right horizontal spoke of the steering wheel. When a push button of the switch pod is depressed, it provides a hard wired resistor multiplexed analog input to the Steering Control Module (SCM).

The SCM reads the speed control switch input, then relays an electronic **speed control switch** status message to the Powertrain Control Module (PCM) and to the adaptive speed control sensor (also known as the Adaptive Cruise Control/ACC sensor or module, or the radar sensor or module) over the Controller Area Network (CAN) data bus. The PCM and ACC sensor microprocessors continually monitor these inputs as well as electronic **wheel speed** message inputs from the Antilock Brake Module (ABM) (also known as the Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module), electronic **gear selector** message inputs from the Transmission Control Module TCM and numerous hard wired inputs, then provides the appropriate electronic message and hard wired outputs to invoke the requested electronic speed control features.

Using the MODE push button of the speed control switch pod on the face of the right horizontal spoke of the steering wheel, the vehicle operator can choose between adaptive speed control and conventional speed control modes of operation. As the name implies, when in the conventional speed control mode the speed control system is used as and functions exactly like a conventional speed control system. When in the adaptive speed control mode, the vehicle operator can use the DISTANCE push button of the speed control switch pod to select from one of three distance settings for the adaptive cruise system to maintain. These settings equate to the time in seconds separating the vehicle from a preceding vehicle. The ACC sensor then uses electronic message outputs to the ABM, the TCM and the PCM to maintain the selected separation distance. The available distance settings are:

- **1** - 1.0 second
- **2** - 1.5 seconds
- **3** - 2.0 seconds

The PCM and ACC sensor microprocessors continuously monitor all of the speed control system electrical circuits to determine the system readiness. If the PCM or ACC sensor detects a monitored system fault, it sets and stores a Diagnostic Trouble Code (DTC). The PCM and ACC sensor use On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the CAN data bus. This method of communication is used for control of the Malfunction Indicator Lamp (MIL) (also known as the Check Engine lamp) in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of

the instrument panel.

The hard wired inputs and outputs for the PCM and the ACC sensor may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PCM, the ACC sensor or the electronic controls or communication between other modules and devices that provide features of the adaptive speed control system. The most reliable, efficient, and accurate means to diagnose the PCM, the ACC sensor or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, SPEED CONTROL

DESCRIPTION

DESCRIPTION

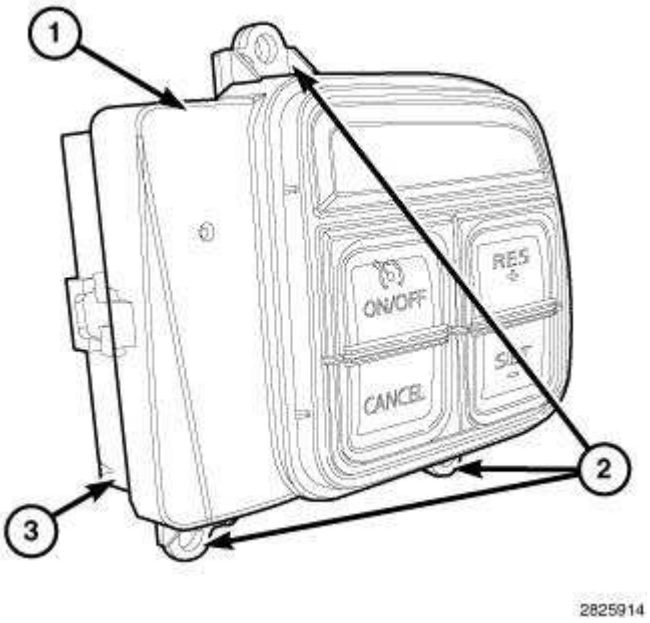


Fig. 1: Except Adaptive Speed Control
Courtesy of CHRYSLER GROUP, LLC

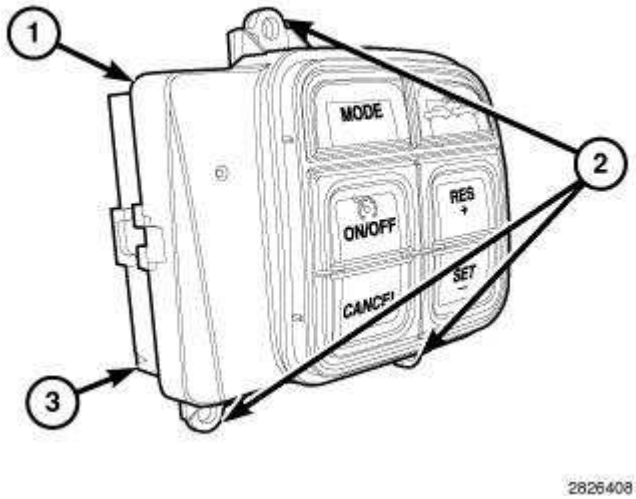


Fig. 2: With Adaptive Speed Control
Courtesy of CHRYSLER GROUP, LLC

The speed control switch pod (1) is located in the right spoke of the steering wheel spoke bezel. Two different switches are used. One switch has four buttons and is used on vehicles not equipped with the optional adaptive speed control (also known as the Adaptive Cruise Control/ACC) system. The other switch has six buttons and is used on vehicles equipped with the ACC system option. These switches are the primary control used by the vehicle operator to manage the particular speed control system installed in the vehicle. The only visible components of the switch pod are the switch push buttons and a decorative bezel around the push buttons, which stands slightly proud of the steering wheel spoke bezel. The remainder of the switch pod including its mounting provisions and its electrical connection are concealed beneath the spoke bezel.

The switch pod housing and push buttons are constructed of molded plastic. Each of the push buttons has white International Control and Display Symbol graphics or text applied to it, which clearly identify the function of each push button. The switch pod is secured through three integral mounting tabs (2) to mounting bosses on the back of the spoke bezel by three screws. A connector receptacle (3) integral to the inboard end of the switch pod housing connects the speed control switch and the Local Interface Network (LIN) slave node circuitry integral to the switch pod to the vehicle electrical system through a dedicated take out and connector of the steering wheel wire harness.

The speed control switch pod cannot be adjusted or repaired. If any function of the switch or the LIN slave node is ineffective or damaged, the entire switch pod unit must be replaced.

OPERATION

OPERATION

The speed control switch pod is a resistor multiplexed unit that provides hard wired inputs to the Steering Control Module (SCM) microprocessor integral to the Steering Column Control Module (SCCM). The speed control switch pod also contains the circuitry of a Local Interface Network (LIN) slave node, which provides source current for and communicates the switch or sensor states of the

Electronic Vehicle Information Center (EVIC) switches, the remote radio switches, the paddle shifter switches (if equipped), the horn switch and the heated steering wheel sensor (if equipped) over the LIN data bus to the SCM, which is the LIN master node.

The speed control switch pod for vehicles equipped with a conventional electronic speed control system and not equipped with the optional adaptive speed control (also known as the Adaptive Cruise Control/ACC) system contains four switch push buttons whose functions are:

- **On/Off** - This switch button enables or disables the speed control system and clears any previous speed control set speed from system memory.
- **Resume / +** - This switch button restores the vehicle to a previously stored set speed or accelerates the vehicle from an already attained set speed.
- **Cancel** - This switch button cancels the current speed control event, but does not turn the system OFF or clear the currently stored set speed.
- **Set / -** - This switch button sets the current vehicle speed as the stored set speed or decelerates (coasts) the vehicle to a speed that is slower than the already attained set speed.

The optional adaptive speed control switch pod for vehicles equipped with the ACC system option contains the same four switch push buttons as the conventional speed control switch pod, then adds two buttons whose functions are:

- **Mode** - This switch button toggles the speed control system between adaptive (ACC) or conventional (non-ACC) modes of operation.
- **Distance** - This switch button selects the separation or following distance (in seconds) that the ACC system maintains between this vehicle and any preceding vehicle. The three distance settings available are: **1** - about 1.0 second, **2** - about 1.5 seconds or **3** - about 2.0 seconds.

The SCM LIN master node provides a clean ground and fused B(+) current for all of the switches and sensors on the rotating steering wheel through the LIN slave node circuitry of the speed control switch pod as well as for the Light Emitting Diode (LED) back lighting of both the speed control and the EVIC switch pods. The SCM continually monitors all of the hard wired speed control switch circuits as well as the LIN bus data. The SCM will set a Diagnostic Trouble Code (DTC) for any problem it detects in the speed control switch circuits, and will store a Signal Not Available (SNA) code for any LIN bus input errors. The SCM also communicates with other electronic modules over the Controller Area Network (CAN) data bus. Therefore, any SCM DTC information can be retrieved using a diagnostic scan tool connected to the Data Link Connector (DLC).

The analog resistor multiplexed circuits of the speed control switch pod as well as the hard wired circuits between the switch pod and the SCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the LIN slave or master nodes, the SCM, the SCCM or the electronic controls and communication between

modules and other devices that provide some features of the speed control system. The most reliable, efficient, and accurate means to diagnose the speed control switch pod, the LIN slave or master nodes, the SCM or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SPEED CONTROL SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

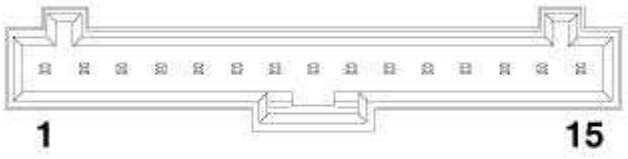


Fig. 3: Speed Control Switch Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: The following test confirms only correct speed control switch functions. It does not test or confirm any of the Local Interface Network (LIN) slave node inputs, outputs or functions. LIN slave node testing requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

1. Remove the speed control switch pod from the steering wheel. Refer to **SWITCH, SPEED CONTROL, REMOVAL**.
2. Disconnect the steering wheel wire harness connector from the back of the speed control switch pod.
3. Using an ohmmeter, test the resistance between the terminals of the switch as shown in the

Speed Control Switch Tests table.

SPEED CONTROL SWITCH TESTS	
SWITCH POSITION	**PINS (*RESISTANCE - OHMS)**
NO PUSH BUTTONS DEPRESSED	13 and 14 (20708) 14 and 15 (20591)
ON / OFF	13 and 14 (464) 14 and 15 (133)
CANCEL	13 and 14 (896) 14 and 15 (457)
DISTANCE (WITH ADAPTIVE SPEED CONTROL ONLY)	13 and 14 (1515) 14 and 15 (899)
MODE (WITH ADAPTIVE SPEED CONTROL ONLY)	13 and 14 (2468) 14 and 15 (1518)
SET / - (DECEL)	13 and 14 (4088) 14 and 15 (2471)
RESUME / + (ACCEL)	13 and 14 (7408) 14 and 15 (4091)
*All resistance values are plus or minus 5%.	

4. If the switch fails any of the tests, replace the ineffective speed control switch pod as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

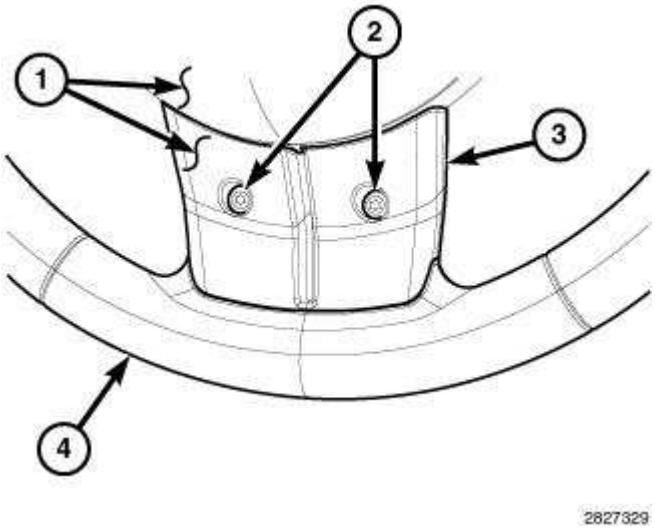


Fig. 4: Rear Cover, Two Screws, Steering Wheel Spoke Front Bezel & Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the driver airbag from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
3. From the back of the steering wheel (4), remove the two screws (2) that secure the center spoke of the rear cover (1) to the center spoke of the steering wheel spoke front bezel (3).

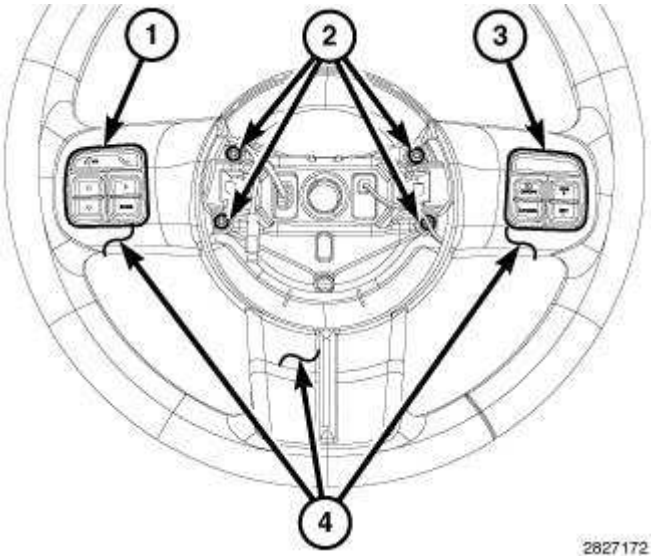


Fig. 5: EVIC Switch Pod, Speed Control Switch Pod, Four Screws & Front Spoke Bezel
Courtesy of CHRYSLER GROUP, LLC

4. From the face of the steering wheel, remove the four screws (2) that secure the front spoke bezel (4) to the steering wheel armature within the steering wheel hub cavity.
5. Using a trim stick or another suitable wide flat-bladed tool, carefully pry at the parting line between the front spoke bezel and the steering wheel rear cover enough to unsnap the two horizontal members of the bezel from those of the rear cover.

6. Pull the front spoke bezel away from the steering wheel far enough to access and disconnect the steering wheel wire harness connections from the Electronic Vehicle Information Center (EVIC) switch pod (1) and the speed control switch pod (3).

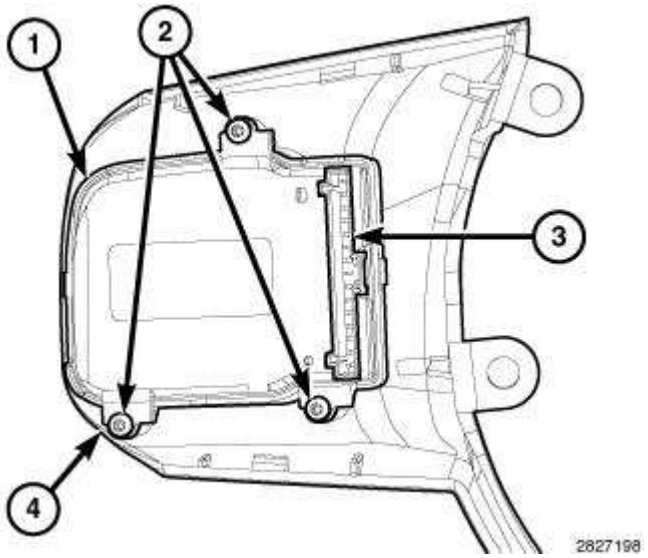


Fig. 6: Steering Wheel Spoke Front Bezel, Screws, Speed Control Switch Pod & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. From the back of the steering wheel spoke front bezel (4), remove the three screws (2) that secure the speed control switch pod (1) mounting tabs to the bezel.
8. Remove the switch from the bezel.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

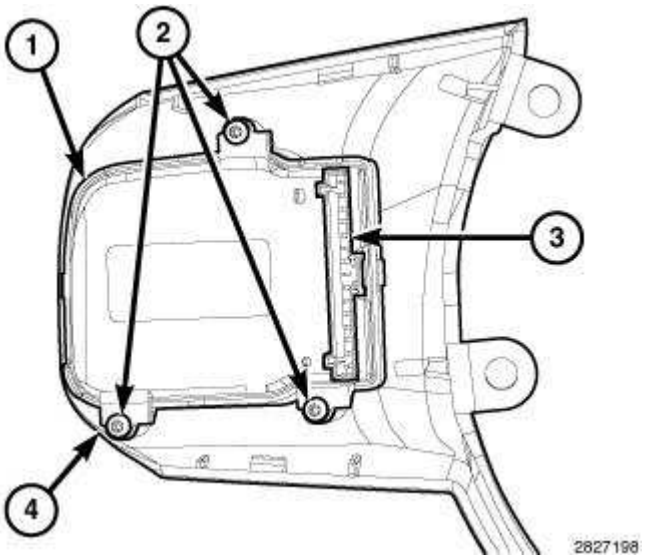


Fig. 7: Steering Wheel Spoke Front Bezel, Screws, Speed Control Switch Pod & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the speed control switch pod (1) to the back of the steering wheel spoke front bezel (4).
2. Install and tighten the three screws (2) that secure the switch mounting tabs to the bezel. Tighten the screws securely.
3. Position the front spoke bezel close enough to the steering wheel to reconnect the steering wheel wire harness connections to the Electronic Vehicle Information Center (EVIC) switch pod and the speed control switch pod connector receptacles (3).

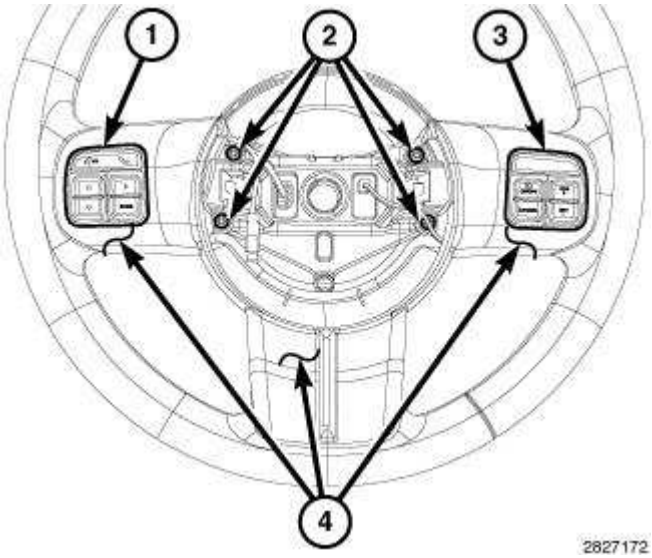


Fig. 8: EVIC Switch Pod, Speed Control Switch Pod, Four Screws & Front Spoke Bezel
Courtesy of CHRYSLER GROUP, LLC

4. Position the front spoke bezel (4), EVIC switch pod (1) and speed control switch pod (3) as a unit to the steering wheel. Be certain that the steering wheel wire harness is routed between the

lower or upper bezel stanchions and the inside circumference of the steering wheel hub cavity so that the wiring will not be pinched when the driver airbag is reinstalled.

5. Use hand pressure to squeeze the horizontal spokes of both the front spoke bezel and the steering wheel rear cover together until all of the snap features are fully engaged.
6. Install and tighten the four screws that secure the stanchions of the front spoke bezel to the steering wheel armature within the steering wheel hub cavity. Tighten the screws securely.

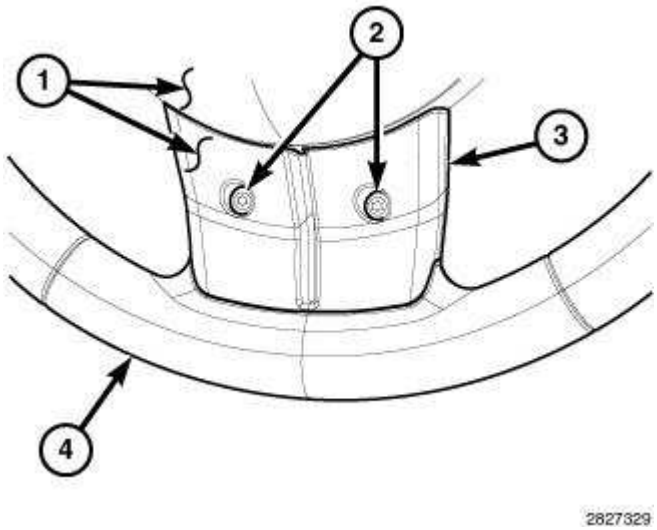


Fig. 9: Rear Cover, Two Screws, Steering Wheel Spoke Front Bezel & Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

7. From the back of the steering wheel (4), install and tighten the two screws (2) that secure the center spoke of the rear cover (1) to the center spoke of the steering wheel spoke front bezel (3). Tighten the screws securely.
8. Reinstall the driver airbag onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION** .
9. Reconnect the battery negative cable.

DTC INDEX

Chrysler 300

AMPLIFIER (AMP)

DIAGNOSTIC CODE INDEX

DTC	Description
B1460-11	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1460-12	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1460-13	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1460-92	CHANNEL 1 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1464-00	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1465-11	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1465-12	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1465-13	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1465-92	CHANNEL 2 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1469-00	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B146A-11	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B146A-12	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B146A-13	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B146A-92	CHANNEL 3 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B146E-00	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B146F-11	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B146F-12	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B146F-13	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B146F-92	CHANNEL 4 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1473	00 CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1474-11	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1474-12	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1474-13	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1474-92	CHANNEL 5 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1478-00	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER

B1479-11	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1479-12	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1479-13	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1479-92	CHANNEL 6 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B147D-00	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B147E-11	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B147E-12	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B147E-13	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B147E-92	CHANNEL 7 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1482-00	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1483-11	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1483-12	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1483-13	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1483-92	CHANNEL 8 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1487-00	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1488-00	CABIN EQ MISMATCH PERFORMANCE
B14B9-11	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B14B9-12	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B14B9-13	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B14B9-2B	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B14B9-92	CHANNEL 9 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B14BE-11	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BEATS
B14BE-12	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BEATS
B14BE-13	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BEATS
B14BE-2B	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - BEATS
B14BE-92	CHANNEL 10 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION - BEATS
B143C-11	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B143C-11	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BEATS
B143C-12	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO

	BATTERY - PREMIUM
B143C-12	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BEATS
B143C-13	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B143C-13	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BEATS
B143C-2B	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - PREMIUM
B143C-2B	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - BEATS
B143C-92	CHANNEL 11 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B14C8-11	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B14C8-11	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BEATS
B14C8-12	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B14C8-12	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BEATS
B14C8-13	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B14C8-13	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BEATS
B14C8-2B	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - PREMIUM
B14C8-2B	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - BEATS
B14C8-92	CHANNEL 12 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B221F-00	AMPLIFIER INTERNAL
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0197-00	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U103A	00 CAN-AT (AUDIO AND TELEMATICS) BUS
U103A	92 CAN AT (AUDIO AND TELEMATICS) BUS PERFORMANCE OR INCORRECT OPERATION
U11B8	00 LOST COMMUNICATION WITH INTEGRATED CENTER STACK (ICS)

AMPLIFIER (AMP), SRT8

DIAGNOSTIC CODE INDEX

DTC	Description

B1460-11	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1460-12	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1460-13	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1460-92	CHANNEL 1 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1464-00	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1465-11	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1465-12	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1465-13	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1465-92	CHANNEL 2 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1469-00	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B146A-11	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B146A-12	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B146A-13	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B146A-92	CHANNEL 3 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B146E-00	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B146F-11	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B146F-12	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B146F-13	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B146F-92	CHANNEL 4 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1473	00 CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1474-11	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1474-12	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1474-13	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1474-92	CHANNEL 5 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1478-00	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1479-11	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1479-12	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1479-13	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1479-92	CHANNEL 6 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B147D-00	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER

B147E-11	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B147E-12	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B147E-13	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B147E-92	CHANNEL 7 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1482-00	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1483-11	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1483-12	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1483-13	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1483-92	CHANNEL 8 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1487-00	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1488-00	CABIN EQ MISMATCH PERFORMANCE
B14B9-11	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B14B9-12	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B14B9-13	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B14B9-2B	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B14B9-92	CHANNEL 9 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B14BE-11	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B14BE-12	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B14BE-13	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B14BE-2B	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B14BE-92	CHANNEL 10 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B143C-11	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B143C-12	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B143C-13	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B143C-2B	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B147E-92	CHANNEL 11 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B14C8-11	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B14C8-12	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO

	BATTERY
B14C8-13	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B14C8-2B	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B14C8-92	CHANNEL 12 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B221F-00	AMPLIFIER INTERNAL
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0197-00	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U103A	00 CAN-AT (AUDIO AND TELEMATICS) BUS
U103A	92 CAN AT (AUDIO AND TELEMATICS) BUS PERFORMANCE OR INCORRECT OPERATION
U11B8	00 LOST COMMUNICATION WITH INTEGRATED CENTER STACK (ICS)

CLUSTER, INSTRUMENT

DIAGNOSTIC CODE INDEX

DTC	Description
B21DD-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE-SIGNAL VOLTAGE ABOVE ALLOWABLE RANGE
U0001-00	CAN C BUS
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0114-00	LOST COMMUNICATION WITH FINAL DRIVE CONTROL MODULE
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0127-00	LOST COMMUNICATION WITH TIRE PRESSURE MONITOR MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0151-00	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0159-00	LOST COMMUNICATION WITH PARK ASSIST CONTROL MODULE (PTS)
U0212-00	LOST COMMUNICATION WITH SCM
U11B9-00	LOST COMMUNICATION WITH RF HUB

CONTROLLER, OCCUPANT RESTRAINT (ORC)

DIAGNOSTIC CODE INDEX

DTC	Description
B0001-11	DRIVER FRONTAL SQUIB 1 - CIRCUIT SHORT TO GROUND
B0001-12	DRIVER FRONTAL SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0001-13	DRIVER FRONTAL SQUIB 1 - CIRCUIT OPEN
B0001-2B	DRIVER FRONTAL SQUIB 1 - WIRES SHORTED TOGETHER
B001-	B001-95-DRIVER FRONTAL SQUIB 1 - INCORRECT ASSEMBLY
B0001-9A	DRIVER FRONTAL SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0002-11	DRIVER FRONTAL SQUIB 2 - CIRCUIT SHORT TO GROUND
B0002-12	DRIVER FRONTAL SQUIB 2 - SHORT TO BATTERY
B0002-13	DRIVER FRONTAL SQUIB 2 - CIRCUIT OPEN
B0002-2B	DRIVER FRONTAL SQUIB 2 - WIRES SHORTED TOGETHER
B0002-95	DRIVER FRONTAL SQUIB 2 - INCORRECT ASSEMBLY
B0002-9A	DRIVER FRONTAL SQUIB 2 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0010-11	PASSENGER FRONTAL SQUIB 1 - CIRCUIT SHORT TO GROUND
B0010-12	PASSENGER FRONTAL SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0010-13	PASSENGER FRONTAL SQUIB 1 - CIRCUIT OPEN
B0010-2B	PASSENGER FRONTAL SQUIB 1 - WIRES SHORTED TOGETHER
B0010-95	PASSENGER FRONTAL SQUIB 1 - INCORRECT ASSEMBLY
B0010-9A	PASSENGER FRONTAL SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0011-11	PASSENGER FRONTAL SQUIB 2 - CIRCUIT SHORT TO GROUND
B0011-12	PASSENGER FRONTAL SQUIB 2 - CIRCUIT SHORT TO BATTERY
B0011-13	PASSENGER FRONTAL SQUIB 2 - CIRCUIT OPEN
B0011-2B	PASSENGER FRONTAL SQUIB 2 - WIRES SHORTED TOGETHER
B0011-95	PASSENGER FRONTAL SQUIB 2 - INCORRECT ASSEMBLY
B0011-9A	PASSENGER FRONTAL SQUIB 2 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0004-11	DRIVER KNEE BOLSTER SQUIB CONTROL - CIRCUIT SHORT TO GROUND
B0004-12	DRIVER KNEE BOLSTER SQUIB CONTROL - CIRCUIT SHORT TO BATTERY
B0004-13	DRIVER KNEE BOLSTER SQUIB CONTROL - CIRCUIT OPEN
B0004-2B	DRIVER KNEE BOLSTER SQUIB CONTROL - WIRES SHORTED TOGETHER
B0004-95	DRIVER KNEE BOLSTER SQUIB CONTROL - INCORRECT ASSEMBLY
B0004-9A	DRIVER KNEE BOLSTER SQUIB CONTROL - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0021-11	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO GROUND
B0021-12	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO

	BATTERY
B0021-13	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - CIRCUIT OPEN
B0021-2B	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - WIRES SHORTED TOGETHER
B0021-95	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - INCORRECT ASSEMBLY
B0021-9A	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0029-11	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO GROUND
B0029-12	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0029-13	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - CIRCUIT OPEN
B0029-2B	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - WIRES SHORTED TOGETHER
B0029-95	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - INCORRECT ASSEMBLY
B0029-9A	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0050-11	DRIVER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO GROUND
B0050-12	DRIVER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO BATTERY
B0050-13	DRIVER SEATBELT BUCKLE SENSOR - CIRCUIT OPEN
B0050-2B	DRIVER SEATBELT BUCKLE SENSOR - WIRES SHORTED TOGETHER
B0050-95	DRIVER SEATBELT BUCKLE SENSOR - INCORRECT ASSEMBLY
B0050-9A	DRIVER SEATBELT BUCKLE SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0052-11	PASSENGER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO GROUND
B0052-12	PASSENGER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO BATTERY
B0052-13	PASSENGER SEATBELT BUCKLE SENSOR - CIRCUIT OPEN
B0052-2B	PASSENGER SEATBELT BUCKLE SENSOR - WIRES SHORTED TOGETHER
B0052-95	PASSENGER SEATBELT BUCKLE SENSOR - INCORRECT ASSEMBLY
B0052-9A	PASSENGER SEATBELT BUCKLE SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0090-49	LEFT FRONTAL RESTRAINTS SENSOR - INTERNAL ELECTRONIC FAILURE
B0095-49	RIGHT FRONTAL RESTRAINTS SENSOR - INTERNAL ELECTRONIC FAILURE
B0091-49	LEFT SIDE RESTRAINTS SENSOR 1 - INTERNAL ELECTRONIC FAILURE
B0092-49	LEFT SIDE RESTRAINTS SENSOR 2 - INTERNAL ELECTRONIC FAILURE

B009A-49	LEFT SIDE RESTRAINTS SENSOR 4 - INTERNAL ELECTRONIC FAILURE
B0096-49	RIGHT SIDE RESTRAINTS SENSOR 1 - INTERNAL ELECTRONIC FAILURE
B0097-49	RIGHT SIDE RESTRAINTS 2 - INTERNAL ELECTRONIC FAILURE
B009D-49	RIGHT SIDE RESTRAINTS SENSOR 4 - INTERNAL ELECTRONIC FAILURE
B00B5-12	DRIVER SEAT TRACK POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B00B5-11	DRIVER SEAT TRACK POSITION SENSOR - CIRCUIT SHORT TO GROUND
B00B5-13	DRIVER TRACK POSITION SENSOR - CIRCUIT OPEN
B00B5-2B	DRIVER SEAT TRACK POSITION SENSOR - WIRES SHORTED TOGETHER
B00B5-95	DRIVER SEAT TRACK POSITION SENSOR - INCORRECT ASSEMBLY
B00B5-9A	DRIVER SEAT TRACK POSITION SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B00C5-11	PASSENGER SEAT TRACK POSITION SENSOR - CIRCUIT SHORT TO GROUND
B00C5-12	PASSENGER SEAT TRACK POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B00C5-13	PASSENGER SEAT TRACK POSITION SENSOR - CIRCUIT OPEN
B00C5-2B	PASSENGER SEAT TRACK POSITION SENSOR - WIRES SHORTED TOGETHER
B00C5-95	PASSENGER SEAT TRACK POSITION SENSOR - INCORRECT ASSEMBLY
B00C5-9A	PASSENGER SEAT TRACK POSITION SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B1BC7-00	DEPLOYMENT DATA RECORD FULL
B0020-11	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO GROUND
B0020-12	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0020-13	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT OPEN
B0020-2B	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - WIRES SHORTED TOGETHER
B0020-95	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - INCORRECT ASSEMBLY
B0020-9A	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0028-11	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO GROUND
B0028-12	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO

	BATTERY
B0028-13	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT OPEN
B0028-2B	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - WIRES SHORTED TOGETHER
B0028-95	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - INCORRECT ASSEMBLY
B0028-9A	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B2734-12	PASSENGER OCCUPANT DETECTION SENSOR CIRCUIT - SHORT TO BATTERY
B007E-11	DRIVER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT SHORT TO GROUND
B007E-12	DRIVER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT SHORT TO BATTERY
B007E-13	DRIVER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT OPEN
B007E-2B	DRIVER SEATBELT RETRACTOR PRETENSIONER - WIRES SHORTED TOGETHER
B007E-95	DRIVER SEATBELT RETRACTOR PRETENSIONER - INCORRECT ASSEMBLY
B007E-9A	DRIVER SEATBELT RETRACTOR PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0070-11	DRIVER SEATBELT BUCKLE PRETENSIONER - CIRCUIT SHORT TO GROUND
B0070-12	DRIVER SEATBELT PRETENSIONER - CIRCUIT SHORT TO BATTERY
B0070-13	DRIVER SEATBELT BUCKLE PRETENSIONER - CIRCUIT OPEN
B0070-2B	DRIVER SEATBELT BUCKLE PRETENSIONER - WIRES SHORTED TOGETHER
B0070-95	DRIVER SEATBELT BUCKLE PRETENSIONER - INCORRECT ASSEMBLY
B0070-9A	DRIVER SEATBELT BUCKLE PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0072-11	PASSENGER SEATBELT BUCKLE PRETENSIONER - CIRCUIT SHORT TO GROUND
B0072-12	PASSENGER SEATBELT BUCKLE PRETENSIONER - CIRCUIT SHORT TO BATTERY
B0072-13	PASSENGER SEATBELT BUCKLE PRETENSIONER - CIRCUIT OPEN
B0072-2B	PASSENGER SEATBELT BUCKLE PRETENSIONER - WIRES SHORTED TOGETHER
B0072-95	PASSENGER SEATBELT BUCKLE PRETENSIONER - INCORRECT ASSEMBLY
B0072-9A	PASSENGER SEATBELT BUCKLE PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B007F-11	PASSENGER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT

	SHORT TO GROUND
B007F-12	PASSENGER SEATBELT RETRACTOR - CIRCUIT SHORT TO BATTERY
B007F-13	PASSENGER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT OPEN
B007F-2B	PASSENGER SEATBELT RETRACTOR PRETENSIONER - WIRES SHORTED TOGETHER
B007F-95	PASSENGER SEATBELT RETRACTOR PRETENSIONER - INCORRECT ASSEMBLY
B007F-9A	PASSENGER SEATBELT RETRACTOR PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B21DD-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B21DD-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B212C-13	IGNITION RUN/START INPUT - CIRCUIT OPEN
B212C-16	IGNITION RUN/START INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B212C-17	IGNITION RUN/START INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B212D-13	IGNITION RUN ONLY INPUT - CIRCUIT OPEN
B212D-13	IGNITION RUN ONLY INPUT - CIRCUIT OPEN
B212D-16	IGNITION RUN ONLY INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B212D-17	IGNITION RUN ONLY INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B2207-00	OCCUPANT RESTRAINT CONTROLLER INTERNAL 1
B2208-00	OCCUPANT RESTRAINT CONTROLLER INTERNAL 2
B220B-00	OCCUPANT RESTRAINT CONTROLLER FIRING STORED ENERGY
B0099-96	ROLL OVER SENSOR - COMPONENT INTERNAL FAILURE
B222A-00	VEHICLE LINE MISMATCH
B2722-00	ORC UNLOCKED - ALL DEPLOYMENT DISABLED
U0002-00	CAN C BUS OFF PERFORMANCE
B0090-87	LEFT FRONTAL RESTRAINTS SENSOR - MISSING MESSAGE
B0090-95	LEFT FRONTAL RESTRAINTS SENSOR - INCORRECT ASSEMBLY
B0090-9A	LEFT FRONTAL RESTRAINTS SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0095-87	RIGHT FRONTAL ACCELERATION SENSOR - MISSING MESSAGE
B0095-95	RIGHT FRONTAL ACCELERATION SENSOR - INCORRECT ASSEMBLY
B0095-9A	RIGHT FRONTAL ACCELERATION SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0009	B00091-87-LEFT SIDE ACCELERATION SENSOR 1 - MISSING MESSAGE
B0091-95	LEFT SIDE ACCELERATION SENSOR 1 - INCORRECT ASSEMBLY
B0091-9A	LEFT SIDE ACCELERATION SENSOR 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0092-87	LEFT SIDE ACCELERATION SENSOR 2 - MISSING MESSAGE
B0092-95	LEFT SIDE ACCELERATION SENSOR 2 - INCORRECT ASSEMBLY

B092-	B092-9A-LEFT SIDE ACCELERATION SENSOR 2 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0096-87	RIGHT SIDE ACCELERATION SENSOR 1 - MISSING MESSAGE
B0096-95	RIGHT SIDE ACCELERATION SENSOR 1 - INCORRECT ASSEMBLY
B0096-9A	RIGHT SIDE ACCELERATION SENSOR 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0097-87	RIGHT SIDE ACCELERATION SENSOR 2 - MISSING MESSAGE
B0097-95	RIGHT SIDE ACCELERATION SENSOR 2 - INCORRECT ASSEMBLY
B0097-9A	RIGHT SIDE ACCELERATION SENSOR 2 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B009A-87	LEFT SIDE SATELLITE SENSOR 4 - MISSING MESSAGE
B009A-95	LEFT SIDE SATELLITE SENSOR 4 - INCORRECT ASSEMBLY
B009A-9A	LEFT SIDE SATELLITE SENSOR 4 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B009D-87	RIGHT SIDE SATELLITE SENSOR 4 - MISSING MESSAGE
B009D-95	RIGHT SIDE SATELLITE SENSOR 4 - INCORRECT ASSEMBLY
B009D-9A	RIGHT SIDE SATELLITE SENSOR 4 - COMPONENT OR SYSTEM OPERATING CONDITIONS
U0146-00	LOST COMMUNICATION WITH CENTRAL GATEWAY
U1110-00	LOST VEHICLE SPEED MESSAGE
U1415-00	IMPLAUSIBLE/MISSING VEHICLE CONFIGURATION DATA
U1601-00	ECU APPLICATION SOFTWARE CODE 1 MISSING OR CORRUPTED
U142A-00	IMPLAUSIBLE PRNDL SIGNAL RECEIVED

HVAC

DIAGNOSTIC CODE INDEX

DTC	Description
B1030-11	EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO GROUND
B1030-15	EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO BATTERY OR OPEN
B1058-11	RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO GROUND
B1058-12	RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO BATTERY
B1058-13	RECIRCULATION DOOR CONTROL - CIRCUIT OPEN
B1058-92	RECIRCULATION DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B105C-00	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D-00	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B10B2-00	A/C COOL DOWN TEST PERFORMANCE
B1107-11	CABIN TEMPERATURE SENSOR 1 - CIRCUIT SHORT TO GROUND
B1107-12	CABIN TEMPERATURE SENSOR 1 - CIRCUIT SHORT TO BATTERY

B11C2-11	FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO GROUND
B11C2-12	FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO BATTERY
B11C2-13	FRONT MODE DOOR 1 CONTROL - CIRCUIT OPEN
B11C2-92	FRONT MODE DOOR 1 CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C3-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO SMALL
B11C4-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO LARGE
B11C8-11	RIGHT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO GROUND
B11C8-12	RIGHT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO BATTERY
B11C8-13	RIGHT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN
B11C8-92	RIGHT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C9-00	RIGHT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CA-00	RIGHT TEMPERATURE DOOR TRAVEL TOO LARGE
B11CB-11	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO GROUND
B11CB-12	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO BATTERY
B11CB-13	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN
B11CB-92	MAIN/LEFT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11CC-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CD-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO LARGE
B11D3-00	A/C COOLDOWN TEST PERFORMANCE - COMPRESSOR NOT ENGAGED
B11D5-00	A/C COOLDOWN TEST PERFORMANCE - EVAP TEMP SENSOR ERROR
B1600-11	LEFT SOLAR SENSOR - CIRCUIT SHORT TO GROUND
B1600-12	LEFT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY
B1600-92	LEFT SOLAR SENSOR - PERFORMANCE OR INCORRECT OPERATION
B1603-11	RIGHT SOLAR SENSOR - CIRCUIT SHORT TO GROUND
B1603-12	RIGHT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY
B1603-92	RIGHT SOLAR SENSOR - PERFORMANCE OR INCORRECT OPERATION
B160F-11	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO GROUND
B160F-12	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO BATTERY
B160F-92	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - PERFORMANCE OR INCORRECT OPERATION
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE

B210B-85	SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B210D-84	BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210E-85	BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B222A-00	VEHICLE LINE MISMATCH
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY

MODULE, ACTIVE DAMPING CONTROL (ADCM), SRT8

DIAGNOSTIC CODE INDEX

DTC	Description
C15AF-1F	LOW SIDE DRIVER - CIRCUIT INTERMITTENT
C15B1-11	REAR ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B1-12	REAR ACCELERATION - CIRCUIT SHORT TO BATTERY
C15B2-11	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B2-12	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B3-11	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B3-12	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B4-04	LEFT FRONT DAMPING VALVE LOW SIDE 1 - SYSTEM INTERNAL FAILURES
C15B4-11	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B4-12	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B4-13	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B5-08	LEFT FRONT DAMPING VALVE LOW SIDE 2 - BUS SIGNAL/MESSAGE FAILURES
C15B5-11	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B5-12	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B5-13	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B6-11	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B6-12	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B6-13	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B7-11	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B7-12	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY

C15B7-13	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B8-11	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B8-12	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B8-13	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B8-14	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND OR OPEN
C15B9-11	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B9-12	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B9-13	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B9-18	LEFT REAR DAMPING VALVE LOW SIDE 2 - UNDER CURRENT
C15BA-11	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15BA-12	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15BA-13	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15BA-1C	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT VOLTAGE OUT OF RANGE
C15BB-11	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO GROUND
C15BB-12	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO BATTERY
C15BB-13	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT OPEN
C15BC-11	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BC-12	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BD-11	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BD-12	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BE-11	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BE-12	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BF-2A	DAMPING MODE BUTTON - STUCK
C15C2-19	LEFT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C3-19	LEFT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C4-19	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C5-19	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT

C15C6-19	LEFT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C7-19	LEFT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C8-19	RIGHT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C9-19	RIGHT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C211B-92	IGNITION RUN/START INPUT CIRCUIT PERFORMANCE - PERFORMANCE OR INCORRECT OPERATION
C211B-92	IGNITION RUN/START INPUT CIRCUIT PERFORMANCE - PERFORMANCE OR INCORRECT OPERATION
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-16	SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
C212A-85	SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
C212C-11	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO GROUND
C212C-12	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO BATTERY
C2202-00	ORIGINAL VIN MISMATCH / MISSING
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220C-00	ACTIVE SUSPENSION MODULE INTERNAL
U0001-00	CAN C BUS
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0102-00	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD
U0114-00	LOST COMMUNICATION WITH FINAL DRIVE CONTROL MODULE (DTCM)
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0141-00	LOST COMMUNICATION WITH IPM (BCM/TIPM)
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U0168-00	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER MODULE
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0403-00	IMPLAUSIBLE DATA RECEIVED FROM T-CASE
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0427-00	IMPLAUSIBLE DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE (RF HUB)
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM

U0431-00	IMPLAUSIBLE DATA RECEIVED FROM IPM (BCM)
U110A-00	LOSS OF COMMUNICATIONS WITH SCM - CAN-C

MODULE, ADAPTIVE CRUISE CONTROL (ACC)

DIAGNOSTIC CODE INDEX

DTC	Description
B222F-00	FLASH WRITE PERFORMANCE
C124B-00	XBW RULE VIOLATION 01
C124C-00	ACC DISABLED DUE TO ESP
C125E-00	ACC SENSOR ADJUSTMENT REQUIRED
C1266-00	ACC SENSOR BLINDED
C1267-92	ACC VEHICLE REACTION - PERFORMANCE OR INCORRECT OPERATION
C1268-00	XBW RULE VIOLATION 02
C1269-00	XBW RULE VIOLATION 03
C126A-00	XBW RULE VIOLATION 04
C126B-00	XBW RULE VIOLATION 05
C126C-00	XBW RULE VIOLATION 06
C126D-00	XBW RULE VIOLATION 07
C126E-00	XBW RULE VIOLATION 08
C126F-00	XBW RULE VIOLATION 09
C1270-00	XBW RULE VIOLATION 10
C1217-00	XBW RULE VIOLATION 11
C1277-00	ACC DISABLE DUE TO TCM
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
C212A-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
C2206-00	VEHICLE CONFIGURATION MISMATCH
C2210-00	ECU OVERTEMPERATURE
C2212-00	ECU IN - PLANT MODE ACTIVE
C2315-00	ACC DISABLE DUE TO PCM FAULT
P0585	00 SPEED CONTROL SWITCH 1/2 CORRELATION
P1593-2A	SPEED CONTROL SWITCH 1/2 STUCK
P1666-00	CRUISE CONTROL MODULE INTERNAL
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0114-00	LOST COMMUNICATION WITH FINAL DRIVE CONTROL MODULE (FDCM) (DTCM)

U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0146-00	LOST COMMUNICATION WITH CENTRAL GATEWAY
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0414-00	IMPLAUSIBLE DATA RECEIVED FROM FDCM (DTCM)
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0447-00	IMPLAUSIBLE DATA RECEIVED FROM CENTRAL GATEWAY
U110A-00	LOSS OF COMMUNICATIONS WITH SCM - CAN-C
U1600-00	ECU APPLICATION SOFTWARE MISMATCH

MODULE, ADAPTIVE FRONT LIGHTING SYSTEM

DIAGNOSTIC CODE INDEX

DTC	Description
B167D-00	FRONT HEADLAMP LEVELING SENSOR CIRCUIT PERFORMANCE
B1681-00	REAR HEADLAMP LEVELING SENSOR CIRCUIT PERFORMANCE
B1684-00	LEFT HEADLAMP LEVELING MOTOR CONTROL
B1685-00	LEFT HEADLAMP LEVELING MOTOR CONTROL CIRCUIT PERFORMANCE
B1689-00	RIGHT HEADLAMP LEVELING MOTOR CONTROL
B168A-00	RIGHT HEADLAMP LEVELING MOTOR CONTROL CIRCUIT PERFORMANCE
B2125-00	SENSOR SUPPLY VOLTAGE PERFORMANCE
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B2290-00	ADAPTIVE FRONT LIGHTING SYSTEM INTERNAL
B22A2-00	ADAPTIVE FRONT LIGHTING SYSTEM NOT PROGRAMMED
B22A4-00	ADAPTIVE FRONT LIGHTING SYSTEM NOT CALIBRATED
B2840-01	LEFT HEADLAMP SWIVELING CONTROL - GENERAL ELECTRICAL FAILURE
B2840-87	LEFT HEADLAMP SWIVELING CONTROL - MISSING MESSAGE
B2841-01	LEFT HEADLAMP SWIVELING CONTROL - GENERAL ELECTRICAL FAILURE
B2841-87	RIGHT HEADLAMP SWIVELING CONTROL - MISSING MESSAGE
C2205-00	STEERING ANGLE SENSOR INTERNAL
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH PCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS)

	CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U110A-00	LOST COMMUNICATION WITH SCM - CAN - C

MODULE, ANTILOCK BRAKE (ABS)

DIAGNOSTIC CODE INDEX

DTC	Description
C0020-01	ABS PUMP MOTOR CONTROL - GENERAL ELECTRICAL FAILURE
C0020-16	ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE BELOW THRESHOLD
C0020-35	ABS PUMP MOTOR CONTROL - SIGNAL HIGH TIME>MAXIMUM
C0020-1C	ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE OUT OF RANGE
C0021-02	BRAKE BOOSTER - GENERAL SIGNAL FAILURE
C0030-02	LEFT FRONT TONE WHEEL - GENERAL SIGNAL FAILURE
C0031-1D	LEFT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0031-2F	LEFT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0031-62	LEFT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0033-02	FRONT TONE WHEEL - GENERAL SIGNAL FAILURE
C0034-1D	RIGHT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0034-2F	RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0034-62	RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0036-02	LEFT REAR TONE WHEEL - GENERAL SIGNAL FAILURE
C0037-1D	LEFT REAR WHEEL SPEED SENSOR - CURRENT OUT OF RANGE
C0037-2F	LEFT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0037-62	LEFT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0039-02	RIGHT REAR TONE WHEEL - GENERAL SIGNAL FAILURE
C003A-1D	RIGHT REAR WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C003A-2F	RIGHT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC
C003A-62	RIGHT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0042-11	BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
C0042-12	BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY
C0042-28	BRAKE PEDAL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0042-2A	BRAKE PEDAL POSITION SENSOR - STUCK
C0042-54	BRAKE PEDAL POSITION SENSOR - MISSING CALIBRATION
C0042-62	BRAKE PEDAL POSITION SENSOR - SIGNAL COMPARE FAILURE
C0044-01	BRAKE PRESSURE SENSOR 1 - GENERAL ELECTRICAL FAILURE

C0044-28	BRAKE PRESSURE SENSOR 1 - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0044-62	BRAKE PRESSURE SENSOR 1 - SIGNAL COMPARE FAILURE
C0051-22	STEERING WHEEL POSITION SENSOR - SIGNAL AMPLITUDE > MAXIMUM
C0051-28	STEERING WHEEL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0051-49	STEERING WHEEL POSITION SENSOR - INTERNAL ELECTRONIC FAILURE
C0051-62	STEERING WHEEL POSITION SENSOR - SIGNAL COMPARE FAILURE
C006A-28	MULTI-AXIS ACCELERATION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C006A-49	MULTI-AXIS ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
C006A-56	MULTI-AXIS ACCELERATION SENSOR- INVALID / INCOMPATIBLE CONFIGURATION
C006A-62	MULTI-AXIS ACCELERATION SENSOR - SIGNAL COMPARE FAILURE
C0078-86	TIRE DIAMETER - SIGNAL INVALID
C1046-92	LEFT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1047-92	RIGHT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1048-92	LEFT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1049-92	RIGHT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1082-01	VACUUM PRESSURE SENSOR - GENERAL ELECTRICAL FAILURE
C1082-02	VACUUM PRESSURE SENSOR - PERFORMANCE OR INCORRECT OPERATION
C1082-2F	VACUUM PRESSURE SENSOR - SIGNAL ERRATIC
C1093-01	FRONT BRAKE PRESSURE SENSOR - GENERAL ELECTRICAL FAILURE
C1093-62	FRONT BRAKE PRESSURE SENSOR - SIGNAL COMPARE FAILURE
C1093-64	FRONT BRAKE PRESSURE SENSOR - SIGNAL PLAUSABILITY FAILURE
C1097-01	REAR BRAKE PRESSURE SENSOR - GENERAL ELECTRICAL FAILURE
C1097-62	REAR BRAKE PRESSURE SENSOR - SIGNAL COMPARE FAILURE
C1097-64	REAR BRAKE PRESSURE SENSOR - SIGNAL PLAUSABILITY FAILURE
C121A-09	STEERING ANGLE SENSOR NOT INITIALIZED - COMPONENT FAILURES
C121C-00	TORQUE REQUEST SIGNAL DENIED
C121C-09	TORQUE REQUEST SIGNAL DENIED
C1231-00	DRIVE TEST: STEERING ANGLE SENSOR
C1232-00	DRIVE TEST: PRESSURE SENSOR

C1234-00	DRIVE TEST: SENSOR CLUSTER INSTALLATION
C1235-00	DRIVE TEST: TEST ACTIVE
C1238-00	DRIVE TEST: UNSUCCESSFUL
C1239-00	EMISSION ROLLS TEST ACTIVE
C123B-4B	ESP SYSTEM CONTROL TOO LONG - OVER TEMPERATURE
C1246-1C	VACUUM PRESSURE SENSOR SUPPLY - CIRCUIT VOLTAGE
C124F-00	ESP REQUEST DENIED FROM ACC
C1252-92	VACUUM PUMP CONTROL CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
C2100-16	BATTERY VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C2101-17	BATTERY VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2114-16	DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2114-17	DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C211B-92	IGNITION RUN/START INPUT CIRCUIT PERFORMANCE - PERFORMANCE OR INCORRECT OPERATION
C212A-16	SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2200-41	ANTI-LOCK BRAKE MODULE INTERNAL - GENERAL CHECKSUM FAILURE
C2200-44	ANTI-LOCK BRAKE MODULE INTERNAL - DATA MEMORY FAILURE
C2200-45	ANTI-LOCK BRAKE MODULE INTERNAL - PROGRAM MEMORY FAILURE
C2200-46	ANTI-LOCK BRAKE MODULE INTERNAL - CALIBRATION / PARAMETER MEMORY FAILURE
C2200-47	ANTI-LOCK BRAKE MODULE INTERNAL - WATCHDOG / SAFETY AuC FAILURE
C2200-48	ANTI-LOCK BRAKE MODULE INTERNAL - SUPERVISION SOFTWARE FAILURE
C2200-49	ANTI-LOCK BRAKE MODULE INTERNAL - INTERNAL ELECTRONIC FAILURE
C2202-00	ORIGINAL VIN MISMATCH / MISSING
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220B-00	ABS ACC NOT CALIBRATED
U0002-88	CAN C BUS OFF PERFORMANCE - BUS OFF
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0102-00	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD
U0104-00	LOST COMMUNICATION WITH CRUISE CONTROL MODULE
U0125-00	LOST COMMUNICATION WITH MULTI - AXIS ACCELERATION SENSOR

	MODULE
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0405-00	INVALID DATA RECEIVED CRUISE CONTROL MODULE
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0432-00	INVALID DATA RECEIVED FROM MULTI - AXIS ACCELERATION SENSOR MODULE
U1003-88	ESP CAN C BUS PERFORMANCE - BUS OFF
U140E-00	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED

MODULE, BLIND SPOT (BSM)

DIAGNOSTIC CODE INDEX

DTC	Description
B128C-16	DRIVER BLIND SPOT SENSOR - CIRCUIT VOLTAGE BELOW THRESHOLD
B128C-17	DRIVER BLIND SPOT SENSOR - CIRCUIT VOLTAGE ABOVE THRESHOLD
B128C-2A	DRIVER BLIND SPOT SENSOR - SIGNAL STUCK IN RANGE
B128C-48	DRIVER BLIND SPOT SENSOR - SUPERVISION SOFTWARE FAILURE
B128C-4A	DRIVER BLIND SPOT SENSOR - INCORRECT COMPONENT INSTALLED
B128C-56	DRIVER BLIND SPOT SENSOR - INVALID/INCOMPATIBLE CONFIGURATION
B128C-57	DRIVER BLIND SPOT SENSOR - INVALID/INCOMPATIBLE SOFTWARE COMPONENT
B128C-64	DRIVER BLIND SPOT SENSOR - SIGNAL PLAUSIBILITY FAILURE
B128C-92	DRIVER BLIND SPOT SENSOR - PERFORMANCE OR INCORRECT OPERATION
B128C-96	DRIVER BLIND SPOT SENSOR - COMPONENT INTERNAL FAILURE
B128C-98	DRIVER BLIND SPOT SENSOR - COMPONENT OR SYSTEM OVER TEMPERATURE
B128D-16	PASSENGER BLIND SPOT SENSOR - CIRCUIT VOLTAGE BELOW THRESHOLD
B128D-17	PASSENGER BLINDSPOT SENSOR - CIRCUIT VOLTAGE ABOVE THRESHOLD
B128D-2A	PASSENGER BLIND SPOT SENSOR - SIGNAL STUCK IN RANGE
B128D-48	PASSENGER BLIND SPOT SENSOR - SUPERVISION SOFTWARE FAILURE
B128D-4A	PASSENGER BLIND SPOT SENSOR - INCORRECT COMPONENT

	INSTALLED
B128D-56	PASSENGER BLIND SPOT SENSOR - INVALID/INCOMPATIBLE CONFIGURATION
B128D-57	PASSENGER BLIND SPOT SENSOR - INVALID/INCOMPATIBLE SOFTWARE COMPONENT
B128D-64	PASSENGER BLIND SPOT SENSOR - SIGNAL PLAUSIBILITY FAILURE
B128D-92	PASSENGER BLIND SPOT SENSOR - PERFORMANCE OR INCORRECT OPERATION
B128D-96	PASSENGER BLIND SPOT SENSOR - COMPONENT INTERNAL FAILURE
B128D-98	PASSENGER BLIND SPOT SENSOR - COMPONENT OR SYSTEM OVER TEMPERATURE
B129A-00	DRIVER BLIND SPOT SENSOR - INCOMPATIBLE VERSION
B129B-00	PASSENGER BLIND SPOT SENSOR - INCOMPATIBLE VERSION
B210C-00	BATTERY VOLTAGE INPUT
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B223B-00	VEHICLE CONFIGURATION MISMATCH
B2598-00	DOOR MODULE FRONT LEFT
B2599-00	DOOR MODULE FRONT RIGHT
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0203-00	LOST COMMUNICATION WITH LEFT FRONT DOOR MODULE
U0204-00	LOST COMMUNICATION WITH RIGHT FRONT DOOR MODULE
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0485-00	IMPLAUSIBLE DATA RECEIVED FROM RADIO
U1034-88	BLIND SPOT MONITORING PRIVATE CAN-C - BUS OFF
U1034-88	BLIND SPOT MONITORING PRIVATE CAN-C - BUS OFF
U1193-00	LOST COMMUNICATION WITH DRIVER SIDE BLIND SPOT SENSOR
U1193-01	LOST COMMUNICATION WITH DRIVER SIDE BLIND SPOT SENSOR - GENERAL ELECTRICAL FAILURE
U1193-87	LOST COMMUNICATION WITH DRIVER SIDE BLIND SPOT SENSOR - MISSING MESSAGE
U1194-00	LOST COMMUNICATION WITH PASSENGER SIDE BLIND SPOT SENSOR
U1194-01	LOST COMMUNICATION WITH PASSENGER SIDE BLIND SPOT SENSOR - GENERAL ELECTRICAL FAILURE
U1194-87	LOST COMMUNICATION WITH PASSENGER SIDE BLIND SPOT SENSOR - MISSING MESSAGE

U1427-00	IMPLAUSIBLE DATA RECEIVED FROM TELEMATICS GATEWAY
U1434-82	IMPLAUSIBLE DATA RECEIVED FROM DRIVER BLIND SPOT SENSOR - ALIVE / SEQUENCE COUNTER INCORRECT / NOT UPDATED
U1434-8F	IMPLAUSIBLE DATA RECEIVED FROM DRIVER BLIND SPOT SENSOR - ERRATIC
U1435-82	IMPLAUSIBLE DATA RECEIVED FROM PASSENGER BLIND SPOT SENSOR - ALIVE / SEQUENCE COUNTER INCORRECT / NOT UPDATED
U1435-8F	IMPLAUSIBLE DATA RECEIVED FROM PASSENGER BLIND SPOT SENSOR - ERRATIC
U1438-00	ABS MODULE-IMPLAUSIBLE VEHICLE CONFIGURATION RECEIVED

MODULE, BODY CONTROL (BCM)

DIAGNOSTIC CODE INDEX

DTC	Description
B10B3-14	CABIN HEATER 1 CONTROL - CIRCUIT SHORT TO GROUND OR OPEN
B10B7-14	CABIN HEATER 2 CONTROL - CIRCUIT SHORT TO GROUND OR OPEN
B1137-14	CABIN HEATER 3 CONTROL - CIRCUIT SHORT TO GROUND OR OPEN
B1208-11	ANTI-THEFT INDICATOR - CIRCUIT SHORT TO GROUND
B1208-15	ANTI-THEFT INDICATOR - CIRCUIT SHORT TO BATTERY OR OPEN
B1606-95	HEADLAMP SWITCH INPUT - INCORRECT ASSEMBLY
B1609-11	PANEL DIMMER INPUT - CIRCUIT SHORT TO GROUND
B1609-15	PANEL DIMMER INPUT - CIRCUIT SHORT TO BATTERY OR OPEN
B161E-11	READING LAMP CONTROL - CIRCUIT SHORT TO GROUND
B162A-11	LEFT LOW BEAM CONTROL - CIRCUIT SHORT TO GROUND
B162A-15	LEFT LOW BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B162E-11	RIGHT LOW BEAM CONTROL - CIRCUIT SHORT TO GROUND
B162E-15	RIGHT LOW BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1632-11	LEFT HIGH BEAM CONTROL - CIRCUIT SHORT TO GROUND
B1632-15	LEFT HIGH BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1636-11	RIGHT HIGH BEAM CONTROL - CIRCUIT SHORT TO GROUND
B1636-15	RIGHT HIGH BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B163A-11	FRONT LEFT TURN LAMP CONTROL - CIRCUIT SHORT TO GROUND
B163A-15	FRONT LEFT TURN LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B163E-11	FRONT RIGHT TURN LAMP CONTROL - CIRCUIT SHORT TO GROUND
B163E-15	FRONT RIGHT TURN LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1642-11	REAR LEFT TURN LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1642-15	REAR LEFT TURN LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR

	OPEN
B1646-11	REAR RIGHT TURN LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1646-15	REAR RIGHT TURN LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B168E-2A	FRONT FOG LAMP SWITCH - STUCK
B16AB-11	TRUNK LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16AB-15	TRUNK LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16AF-11	LEFT STOP LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16AF-15	LEFT STOP LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16B3-11	RIGHT STOP LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16B3-15	RIGHT STOP LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16B7-11	CENTER STOP LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16B7-15	CENTER STOP LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16BF-11	FRONT LEFT SIDEMARKER LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16BF-15	FRONT LEFT SIDEMARKER LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16C3-11	FRONT RIGHT SIDEMARKER LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16C3-15	FRONT RIGHT SIDEMARKER LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16CF-11	LEFT DRL LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16CF-15	LEFT DRL LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16D3-11	RIGHT DRL LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16D3-15	RIGHT DRL LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16D7-11	LEFT TAIL LAMP 1 CONTROL - CIRCUIT SHORT TO GROUND
B16D7-15	LEFT TAIL LAMP 1 CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16DF-11	RIGHT TAIL LAMP 1 CONTROL - CIRCUIT SHORT TO GROUND
B16DF-15	RIGHT TAIL LAMP 1 CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16E7-11	LICENSE PLATE LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16E7-15	LICENSE PLATE LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16F7-11	FRONT LEFT FOG LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16F7-15	FRONT LEFT FOG LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16FB-11	FRONT RIGHT FOG LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16FB-15	FRONT RIGHT FOG LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN

B16FF-11	REAR LEFT FOG LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16FF-15	REAR LEFT FOG LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1703-11	REAR RIGHT FOG LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1703-15	REAR RIGHT FOG LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1707-11	LEFT REVERSE LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1707-15	LEFT REVERSE LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B170B-11	RIGHT REVERSE LAMP CONTROL - CIRCUIT SHORT TO GROUND
B170B-15	RIGHT REVERSE LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1751-11	COURTESY LAMP CONTROL - CIRCUIT SHORT TO GROUND
B178E-11	HEADLAMP SWITCH INPUT - CIRCUIT SHORT TO GROUND
B17A5-11	HALO LAMPS CONTROL - CIRCUIT SHORT TO GROUND
B17A5-15	HALO LAMPS CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B17F3-00	AUTO HIGH BEAM SYSTEM AIM
B17FB-00	AUTO HIGH BEAM CAMERA VIEW BLOCKED
B17FF-11	AMBIENT CABIN LIGHT DIMMER SWITCH - CIRCUIT SHORT TO GROUND
B17FF-15	AMBIENT CABIN LIGHT DIMMER SWITCH - CIRCUIT SHORT TO BATTERY OR OPEN
B181E-13	HOOD AJAR INPUT - CIRCUIT OPEN
B1825-11	TRUNK RELEASE SWITCH INPUT - CIRCUIT SHORT TO GROUND
B1825-2A	TRUNK RELEASE SWITCH INPUT - STUCK
B182C-11	ALL DOOR LOCK CONTROL - CIRCUIT SHORT TO GROUND
B182C-12	ALL DOOR LOCK CONTROL - CIRCUIT SHORT TO BATTERY
B182C-13	ALL DOOR LOCK CONTROL - CIRCUIT OPEN
B1830-11	ALL DOORS UNLOCK CONTROL - CIRCUIT SHORT TO GROUND
B1830-12	ALL DOORS UNLOCK CONTROL - CIRCUIT SHORT TO BATTERY
B1830-13	ALL DOORS UNLOCK CONTROL - CIRCUIT OPEN
B1E11-11	REAR SUN SHADE CONTROL 1 - CIRCUIT SHORT TO GROUND
B1ED2-11	REAR SUN SHADE SWITCH - CIRCUIT SHORT TO GROUND
B1ED2-2A	SUN SHADE SWITCH - STUCK
B2103-11	IGNITION RUN/START 1 CONTROL - CIRCUIT SHORT TO GROUND
B2103-15	IGNITION RUN/START 1 CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2119-11	IGNITION RUN/ACC/SPAD CONTROL - CIRCUIT SHORT TO GROUND
B2119-15	IGNITION RUN/ACC/SPAD CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2121-11	IGNITION RUN CONTROL 1 - CIRCUIT SHORT TO GROUND
B2121-15	IGNITION RUN CONTROL 1 - CIRCUIT SHORT TO BATTERY OR OPEN

B212E-11	IGNITION RUN/ACC CONTROL - CIRCUIT SHORT TO GROUND
B212E-15	IGNITION RUN/ACC CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2143-11	UGDO ENABLE CONTROL - CIRCUIT SHORT TO GROUND
B2193-00	INTELLIGENT BATTERY SENSOR INTERNAL
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21F7-11	ELECTRONIC SHIFTER POWER SUPPLY - CIRCUIT SHORT TO GROUND
B21F8-13	EXTERIOR LIGHTING POWER SUPPLY INPUT 1 - CIRCUIT OPEN
B21F9-13	EXTERIOR LIGHTING POWER SUPPLY INPUT 2 - CIRCUIT OPEN
B2206-00	CURRENT VIN MISSING / MISMATCH
B2211-00	LIGHT RAIN SENSOR MODULE INITIALIZATION PERFORMANCE
B2216-00	CENTRAL GATEWAY INTERNAL
B221D-00	RAIN SENSOR MODULE (RSM) INTERNAL
B222C-00	VEHICLE CONFIGURATION NOT PROGRAMMED
B223A-00	AUTO HIGH BEAM ECU INTERNAL
B225C-00	COMPASS MODULE INTERNAL
B2298-00	RAIN SENSOR OVER TEMPERATURE
B2303-11	WIPER PARK SWITCH INPUT - CIRCUIT SHORT TO GROUND
B2303-13	WIPER PARK SWITCH INPUT - CIRCUIT OPEN
B2312-11	WIPER ON/OFF CONTROL - CIRCUIT SHORT TO GROUND
B2312-15	WIPER ON/OFF CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2316-11	WIPER HIGH/LOW CONTROL - CIRCUIT SHORT TO GROUND
B2316-15	WIPER HIGH/LOW CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2322-11	HEADLAMP WASHER MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B2322-15	HEADLAMP WASHER MOTOR CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2335-11	HORN CONTROL - CIRCUIT SHORT TO GROUND
B2335-15	HORN CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B233D-11	FRONT/REAR WASHER MOTOR (+) CONTROL - CIRCUIT SHORT TO GROUND
B233D-13	FRONT/REAR WASHER MOTOR (+) CONTROL - CIRCUIT OPEN
B23AA-00	IMPLAUSIBLE DATA RECEIVED FROM RAIN SENSOR
B259F-11	TRUNK/LIFTGATE LOCK CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B259F-13	TRUNK/LIFTGATE LOCK CONTROL CIRCUIT - CIRCUIT OPEN
B2854-00	IMPLAUSIBLE DATA RECEIVED FROM AHBM
C1006-13	BRAKE FLUID LEVEL INPUT - CIRCUIT OPEN
P0070-11	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT - CIRCUIT SHORT TO

	GROUND
P0070-15	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT - CIRCUIT SHORT TO BATTERY OR OPEN
P0460-11	FUEL LEVEL SENSOR 1 - CIRCUIT SHORT TO GROUND
P0460-15	FUEL LEVEL SENSOR 1 - CIRCUIT SHORT TO BATTERY OR OPEN
P0928-11	BTSI CONTROL - CIRCUIT SHORT TO GROUND
P1009-00	HUMIDITY SENSOR MODULE
P1276-11	STARTER CONTROL 2 - CIRCUIT SHORT TO GROUND
P2065-11	FUEL LEVEL SENSOR 2 - CIRCUIT SHORT TO GROUND
P2065-15	FUEL LEVEL SENSOR 2 - CIRCUIT SHORT TO BATTERY OR OPEN
U0002-00	CAN C BUS OFF PERFORMANCE
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0139-00	LOST COMMUNICATION WITH ACTIVE DAMPING CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0151-00	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U0161-00	LOST COMMUNICATION WITH COMPASS MODULE
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0167-00	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE
U0182-00	LOST COMMUNICATION WITH ADAPTIVE FRONT LIGHTING CONTROL MODULE
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE
U0200-00	LOST COMMUNICATION WITH PASSENGER DOOR MODULE
U0212-00	LOST COMMUNICATION WITH SCM
U0231-00	LOST COMMUNICATION WITH LIGHT RAIN SENSING MODULE
U0232-00	LOST COMMUNICATION WITH BLIND SPOT DETECTION MODULE (BSM)
U0241-00	LOST COMMUNICATION WITH AUTO HIGHBEAM HEADLAMP CONTROL MODULE (AHBM)
U1008-00	LIN 1 BUS
U1009-00	LIN 2 BUS
U113E-00	LOST COMMUNICATION WITH INTELLIGENT BATTERY SENSOR
U1190-00	LOST COMMUNICATION WITH HUMIDITY SENSOR
U11B9-00	LOST COMMUNICATION WITH RF HUB

U1433-23	IMPLAUSIBLE IGNITION SWITCH STATUS MESSAGE RECEIVED - SIGNAL STUCK LOW
U1433-24	IMPLAUSIBLE IGNITION SWITCH STATUS MESSAGE RECEIVED - SIGNAL STUCK HIGH

MODULE, CENTER STACK SCREEN

DIAGNOSTIC CODE INDEX

DTC	Description
B11E7-00	HVAC SWITCH BANK DISCONNECTED
B11E8-2A	HVAC/AUDIO LOWER SWITCH BANK BUTTON(S) STUCK
B156C-2A	CENTER STACK SWITCH BANK BUTTON(S) STUCK
B156D-00	LOW VOLTAGE DIFFERENTIAL SIGNAL (LVDS) VIDEO CABLE
B156E-4B	INTEGRATED CENTER STACK (ICS) - OVER TEMPERATURE
B1571-00	LOW VOLTAGE DIFFERENTIAL SIGNAL (LVDS) VIDEO CABLE - PASSENGER
B210D-16	BATTERY VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
B210E-17	BATTERY VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0186-00	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U0197-00	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U103A	00 CAN-AT (AUDIO AND TELEMATICS) BUS
U103A	92 CAN AT (AUDIO AND TELEMATICS) BUS PERFORMANCE OR INCORRECT OPERATION
U11B8	00 LOST COMMUNICATION WITH INTEGRATED CENTER STACK (ICS)

MODULE, DRIVER DOOR (DDM), (DMFL/R)

DIAGNOSTIC CODE INDEX

DTC	Description
B164A-11	DRIVER MIRROR SIGNAL LAMP CONTROL - CIRCUIT SHORT TO GROUND
B164A-12	DRIVER MIRROR SIGNAL LAMP CONTROL - CIRCUIT SHORT TO BATTERY
B164A-13	DRIVER MIRROR SIGNAL LAMP CONTROL - CIRCUIT OPEN
B1672-11	DRIVER COURTESY LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1672-15	DRIVER COURTESY LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1800-2A	DRIVER DOOR LOCK/UNLOCK SWITCH - STUCK
B1853-11	DRIVER WINDOW CONTROL - CIRCUIT SHORT TO GROUND
B1853-12	DRIVER WINDOW CONTROL - CIRCUIT SHORT TO BATTERY
B1853-13	DRIVER WINDOW CONTROL - CIRCUIT OPEN

B1857-11	DRIVER WINDOW POSITION SENSOR POWER SUPPLY - CIRCUIT SHORT TO GROUND
B185A-31	DRIVER WINDOW POSITION SENSOR - NO SIGNAL
B18B5-00	MASTER SWITCH - FRONT LEFT WINDOW SWITCH - STUCK
B18B6-00	MASTER SWITCH - FRONT RIGHT WINDOW SWITCH - STUCK
B18B7-00	MASTER SWITCH - REAR LEFT WINDOW SWITCH - STUCK
B18B8-00	MASTER SWITCH - REAR RIGHT WINDOW SWITCH - STUCK
B1D00-2A	MIRROR FOLD SWITCH INPUT - STUCK
B1D04	MIRROR ADJUST SWITCH INPUT - STUCK
B1D08-11	DRIVER MIRROR POSITION SENSOR POWER SUPPLY - CIRCUIT SHORT TO GROUND
B1D0B-12	DRIVER MIRROR VERTICAL POSITION SENSOR INPUT - CIRCUIT SHORT TO BATTERY
B1D0B-14	DRIVER MIRROR VERTICAL POSITION SENSOR INPUT - CIRCUIT SHORT TO GROUND OR OPEN
B1D0E-12	DRIVER MIRROR HORIZONTAL POSITION SENSOR INPUT - CIRCUIT SHORT TO BATTERY
B1D0E-14	DRIVER MIRROR HORIZONTAL POSITION SENSOR INPUT - CIRCUIT SHORT TO GROUND OR OPEN
B1D1E-11	DRIVER MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1D1E-12	DRIVER MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1D1E-13	DRIVER MIRROR VERTICAL MOTOR CONTROL - CIRCUIT OPEN
B1D22-11	DRIVER MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1D22-12	DRIVER MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1D22-13	DRIVER MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT OPEN
B1D32-11	DRIVER MIRROR HEATER CONTROL - CIRCUIT SHORT TO GROUND
B1D32-15	DRIVER MIRROR HEATER CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1D4A-2A	MEMORY SWITCH INPUT - STUCK
B1E64-00	LEFT MIRROR SELECT SWITCH - STUCK
B1E65-00	RIGHT MIRROR SELECT SWITCH - STUCK
B1E66-11	DRIVER MIRROR FOLD CONTROL - CIRCUIT SHORT TO GROUND
B1E66-15	DRIVER MIRROR FOLD CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1E97-11	DRIVER ELECTROCHROMATIC CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E97-12	DRIVER ELECTROCHROMATIC CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E97-13	DRIVER ELECTROCHROMATIC CONTROL CIRCUIT - CIRCUIT OPEN

B210C-16	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT ABOVE THRESHOLD
B21A1	ECU RESET/RECOVERY OCCURRED
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL VOLTAGE ABOVE ALLOWABLE RANGE
B2218-54	DRIVER DOOR MODULE INTERNAL - MISSING CALIBRATION
B2218-96	DRIVER DOOR MODULE INTERNAL - COMPONENT INTERNAL FAILURE
B2830-11	DRIVER BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT SHORT TO GROUND
B2830-15	DRIVER BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2850-11	DRIVER DOOR AMBIENT LAMP CONTROL - CIRCUIT SHORT TO GROUND
B2850-15	DRIVER DOOR AMBIENT LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2851-11	DRIVER MIRROR APPROACH LIGHT CONTROL - CIRCUIT SHORT TO GROUND
B2851-15	DRIVER MIRROR APPROACH LIGHT CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
U0010-00	CAN INTERIOR BUS
U0037-11	LIN BUS - CIRCUIT SHORT TO GROUND
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0232-00	LOST COMMUNICATION WITH BLIND SPOT DETECTION MODULE
U113D	LOST COMMUNICATION WITH MASTER POWER WINDOW SWITCH

MODULE, DRIVETRAIN CONTROL (DTCM)

DIAGNOSTIC CODE INDEX

DTC	Description
C1078	TIRE REVOLUTIONS RANGE PERFORMANCE
C1456	AWD CLUTCH POWER CONTROL CIRCUIT LOW
C1457	AWD CLUTCH POWER CONTROL CIRCUIT HIGH
C145D	AWD CLUTCH POWER/RETURN CONTROL CIRCUIT OPEN
C1464	FRONT AXLE DISCONNECT CONTROL CIRCUIT LOW
C1465	FRONT AXLE DISCONNECT CONTROL CIRCUIT HIGH
C1477	TRANSFER CASE CLUTCH OVER TEMPERATURE
C147A	TRANSFER CASE TEMPERATURE SENSOR HIGH
C147B	FRONT AXLE DISCONNECT SENSOR CIRCUIT PERFORMANCE
C147C	FRONT AXLE DISCONNECT POWER CIRCUIT LOW
C147D	FRONT AXLE DISCONNECT POWER SUPPLY CIRCUIT HIGH

C2100	BATTERY VOLTAGE LOW
C2101	BATTERY VOLTAGE HIGH
C2112	SENSOR SUPPLY 1 VOLTAGE CIRCUIT HIGH
C2201	FDCM/DTCM INTERNAL
U0001	CAN C BUS
U0100	LOST COMMUNICATION WITH THE ECM/PCM
U0101	LOST COMMUNICATION WITH TCM
U0121	LOST COMMUNICATION WITH ABS
U0141	LOST COMMUNICATION WITH IPM (BCM)
U0212	LOST COMMUNICATION WITH SCM
U0401	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0429	IMPLAUSIBLE DATA RECEIVED FROM SCM

MODULE, ELECTRO-HYDRAULIC POWER STEERING (EHPS)

DIAGNOSTIC CODE INDEX

DTC	Description
C15A4-00	POWER STEERING ASSIST INHIBITED-VEHICLE SPEED TOO HIGH
C211B-00	IGNITION RUN/START INPUT
C211B-11	IGNITION RUN/START INPUT - CIRCUIT SHORT TO GROUND
C211B-12	IGNITION RUN/START INPUT - CIRCUIT SHORT TO BATTERY
C2128-00	ECU RESET/RECOVERY OCCURED
C212A-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
C212A-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220D-00	ELECTRICAL POWERED HYDRAULIC STEERING MODULE INTERNAL
C2210-00	ECU OVERTEMPERATURE
C221F-00	ECU NOT INITIALIZED
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH PCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0141-00	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM PCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0428-00	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE
U1601-00	ECU APPLICATION SOFTWARE CODE 1 MISSING OR CORRUPTED

U160B-00	ECU BOOT SOFTWARE 1 MISSING OR CORRUPTED

MODULE, ELECTRONIC SHIFT (ESM), NAG1

DIAGNOSTIC CODE INDEX

DTC	Description
P0562	BATTERY VOLTAGE LOW - ESM
P0562	BATTERY VOLTAGE LOW - ESM (COLUMN)
P0563	BATTERY VOLTAGE HIGH - ESM
P0563	BATTERY VOLTAGE HIGH - ESM (COLUMN SHIFT)
P0607	ECU INTERNAL PERFORMANCE - ESM
P0607	ECU INTERNAL PERFORMANCE - ESM (COLUMN SHIFT)
P0930	BTSI CONTROL CIRCUIT LOW
P0930	BTSI CONTROL CIRCUIT LOW - COLUMN SHIFT
P0931	BTSI CONTROL CIRCUIT HIGH
P0931	BTSI CONTROL CIRCUIT HIGH - COLUMN SHIFT
P2775	AUTOSTICK UPSHIFT SWITCH CIRCUIT PERFORMANCE
P2775	AUTOSTICK UPSHIFT SWITCH CIRCUIT PERFORMANCE (COLUMN SHIFT)
P2779	AUTOSTICK DOWNSHIFT SWITCH CIRCUIT PERFORMANCE
P2779	AUTOSTICK DOWNSHIFT SWITCH CIRCUIT PERFORMANCE (COLUMN SHIFT)
U0002	CAN C BUS OFF PERFORMANCE
U0100	LOST COMMUNICATION WITH ECM/PCM
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0141	LOST COMMUNICATION WITH IPM

MODULE, ELECTRONIC SHIFT (ESM), 8HP45

DIAGNOSTIC CODE INDEX

DTC	Description
P0607	ECU INTERNAL PERFORMANCE - ESM
P0814-00	TRANSMISSION RANGE DISPLAY CIRCUIT
P0820-00	GEAR LEVER X-Y POSITION SENSOR CIRCUIT
P1C73-00	PARK SWITCH CIRCUIT STUCK
P1C83-00	AUTOSTICK ENGAGE FAILURE
P1C84-14	AUTOSTICK DISENGAGE FAILURE-CIRCUIT SHORT TO GROUND OR OPEN
P1C85-2A	SHIFT LEVER-STUCK
P1C86-14	PRNDL DISPLAY-CIRCUIT SHORT TO GROUND OR OPEN
P1C87-2A	TRIGGER SWITCH-STUCK

P1C87-92	TRIGGER SWITCH-PERFORMANCE OR INCORRECT OPERATION
P1C88-00	PARK SWITCH CIRCUIT PERFORMANCE
P1C8B-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
P1C8B-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
P1C8C-16	SYSTEM VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
P1C8C-17	SYSTEM VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
U0002-88	CAN C BUS OFF PERFORMANCE-BUS OFF
U0074-00	DEDICATED POWERTRAIN (D-PT) CAN BUS OFF
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-08	LOST COMMUNICATION WITH TCM-BUS SIGNAL / MESSAGE FAILURES
U0146-08	LOST COMMUNICATION WITH CENTRAL GATEWAY-BUS SIGNAL / MESSAGE FAILURES
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U1175-00	LOST IGNITION STATUS MESSAGE
U11C3-00	ESM LOST COMMUNICATION WITH TCM ON D-PT CAN
U145D-00	IMPLAUSIBLE DATA RECEIVED FROM TCM ON D-PT

MODULE, HANDS FREE (HFM)

DIAGNOSTIC CODE INDEX

DTC	Description
B143A-13	MICROPHONE 1 - CIRCUIT OPEN
B143A-92	MICROPHONE 1 - PERFORMANCE OR INCORRECT OPERATION
B143D	13 MICROPHONE 2 - CIRCUIT OPEN
B143D	92 MICROPHONE 2 - PERFORMANCE OR INCORRECT OPERATION
B155C-11	MICROPHONE 1 CIRCUIT (+) - CIRCUIT SHORT TO GROUND
B155C-12	MICROPHONE 1 CIRCUIT (+) - CIRCUIT SHORT TO BATTERY
B155D-11	MICROPHONE 1 CIRCUIT (-) - CIRCUIT SHORT TO GROUND
B155D-12	MICROPHONE 1 CIRCUIT (-) - CIRCUIT SHORT TO BATTERY
B155E-11	MICROPHONE 2 CIRCUIT (+) - CIRCUIT SHORT TO GROUND
B155E-12	MICROPHONE 2 CIRCUIT (+) - CIRCUIT SHORT TO BATTERY
B155F-11	MICROPHONE 2 CIRCUIT (-) - CIRCUIT SHORT TO GROUND
B155F-12	MICROPHONE 2 CIRCUIT (-) - CIRCUIT SHORT TO BATTERY
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B2223-00	(HFM) HANDS FREE PHONE INTERNAL
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0186-00	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U103A	00 CAN-AT (AUDIO AND TELEMATICS) BUS

U103A	92 CAN AT (AUDIO AND TELEMATICS) BUS PERFORMANCE OR INCORRECT OPERATION
U11B8	00 LOST COMMUNICATION WITH INTEGRATED CENTER STACK (ICS)

MODULE, HEATED SEAT (HSM)

DIAGNOSTIC CODE INDEX

DTC	Description
B10C4-11	HEATED STEERING WHEEL CONTROL - CIRCUIT SHORT TO GROUND
B10C4-12	HEATED STEERING WHEEL CONTROL - CIRCUIT SHORT TO BATTERY
B10C4-13	HEATED STEERING WHEEL CONTROL - CIRCUIT OPEN
B1148-2A	LEFT REAR HEATED SEAT SWITCH - STUCK
B114D-2A	RIGHT REAR HEATED SEAT SWITCH - STUCK
B11C0-13	STEERING WHEEL HEATER POWER SUPPLY - CIRCUIT OPEN
B11DC-13	REAR HEATED SEATS POWER SUPPLY - CIRCUIT OPEN
B1E99-11	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E99-12	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E99-13	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT OPEN
B1E99-1E	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT RESISTANCE OUT OF RANGE
B1E9A-11	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9A-12	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E9A-13	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT OPEN
B1E9A-1E	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT RESISTANCE OUT OF RANGE
B1E9B-11	REAR LEFT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9B-12	REAR LEFT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E9B-13	REAR LEFT HEATER CONTROL CIRCUIT - CIRCUIT OPEN
B1E9B-1E	REAR LEFT HEATER CONTROL CIRCUIT - CIRCUIT RESISTANCE OUT OF RANGE
B1E9C-11	REAR RIGHT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9C-12	REAR RIGHT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E9C-13	REAR RIGHT HEATER CONTROL CIRCUIT - CIRCUIT OPEN
B1E9C-1E	REAR RIGHT HEATER CONTROL CIRCUIT - CIRCUIT RESISTANCE OUT OF RANGE

B1E9D-11	FRONT LEFT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9D-12	FRONT LEFT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E9D-13	FRONT LEFT VENT CONTROL CIRCUIT - CIRCUIT OPEN
B1E9E-11	FRONT RIGHT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9E-12	FRONT RIGHT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E9E-13	FRONT RIGHT VENT CONTROL CIRCUIT - CIRCUIT OPEN
B1EB1-1A	FRONT LEFT SEAT HEATER SENSOR - CIRCUIT RESISTANCE BELOW THRESHOLD
B1EB1-1B	FRONT LEFT SEAT HEATER SENSOR - CIRCUIT RESISTANCE ABOVE THRESHOLD
B1EB2-1A	FRONT RIGHT SEAT HEATER SENSOR - CIRCUIT RESISTANCE BELOW THRESHOLD
B1EB2-1B	FRONT RIGHT SEAT HEATER SENSOR - CIRCUIT RESISTANCE ABOVE THRESHOLD
B1EB3-1A	REAR LEFT SEAT HEATER SENSOR - CIRCUIT RESISTANCE BELOW THRESHOLD
B1EB3-1B	REAR LEFT SEAT HEATER SENSOR - CIRCUIT RESISTANCE ABOVE THRESHOLD
B1EB4-1A	REAR RIGHT SEAT HEATER SENSOR - CIRCUIT RESISTANCE BELOW THRESHOLD
B1EB4-1B	REAR RIGHT SEAT HEATER SENSOR - CIRCUIT RESISTANCE ABOVE THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B210C-18	BATTERY VOLTAGE INPUT - UNDER CURRENT
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B221A-00	(HSM) HEATED SEAT MODULE INTERNAL
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U1446-00	IMPLAUSIBLE HEATED STEERING WHEEL TEMPERATURE MESSAGE RECEIVED

MODULE, INTRUSION TRANSCEIVER (ITM)

DIAGNOSTIC CODE INDEX

DTC	Description
B1A20-00	PRE-ARM TIMEOUT
B1A3C-00	INTERNAL SIREN BATTERY
B1A3D	SIREN BATTERY TAMPER / LOSS OF POWER SUPPLY

B1A3E-00	SIREN / ITM MISMATCH
B1A3F-00	ITM ARMING SEQUENCE PERFORMANCE
B1A88-92	ULTRASONIC SENSOR CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210B-85	SYSTEM VOLTAGE LOW - SIGNAL ABOVE ALLOWABLE RANGE
B2206-00	CURRENT VIN MISSING/MISMATCH
B222A-00	VEHICLE LINE MISMATCH
B223C-00	INTRUSION TRANSCEIVER MODULE INTERNAL
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U110D-00	LOST COMMUNICATION WITH SECURITY SIREN
U140E-00	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED
U1415-00	IMPLAUSIBLE/MISSING VEHICLE CONFIGURATION DATA
U1416	IMPLAUSIBLE SECURITY SIREN SIGNAL RECEIVED

MODULE, MEMORY SEAT (MSMD)

DIAGNOSTIC CODE INDEX

DTC	Description
B1D5B-00	ADJUSTABLE PEDAL SWITCH CIRCUIT PERFORMANCE
B1D5C-23	ADJUSTABLE PEDAL SWITCH CIRCUIT STUCK FORWARD - SIGNAL STUCK LOW
B1D5D-23	ADJUSTABLE PEDAL SWITCH CIRCUIT STUCK REARWARD - SIGNAL STUCK LOW
B1D5E-13	POWER SEAT SWITCH-CIRCUIT OPEN
B1D62-2A	POWER SEAT SWITCH STUCK-STUCK
B1D67-00	ADJUSTABLE PEDAL CONTROL CIRCUIT PERFORMANCE
B1D6B-11	SEAT HORIZONTAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
B1D6B-12	SEAT HORIZONTAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B1D6F-11	SEAT FRONT VERTICAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
B1D6F-12	SEAT FRONT VERTICAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B1D73-11	SEAT REAR VERTICAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
B1D73-12	SEAT REAR VERTICAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY

B1D77-11	SEAT RECLINER POSITION SENSOR - CIRCUIT SHORT TO GROUND
B1D77-12	SEAT RECLINER POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B1D7B-00	SEAT HORIZONTAL MOTOR CONTROL CIRCUIT PERFORMANCE
B1D7F-00	SEAT FRONT VERTICAL MOTOR CONTROL CIRCUIT PERFORMANCE
B1D83-00	SEAT REAR VERTICAL MOTOR CONTROL CIRCUIT PERFORMANCE
B1D87-00	SEAT BACKREST MOTOR CONTROL - CIRCUIT PERFORMANCE
B1D8B-11	STEERING COLUMN TELESCOPE POSITION SENSOR-CIRCUIT SHORT TO GROUND
B1D8B-12	STEERING COLUMN TELESCOPE POSITION SENSOR-CIRCUIT SHORT TO BATTERY
B1D8F-11	STEERING COLUMN TILT POSITION SENSOR-CIRCUIT SHORT TO GROUND
B1D8F-12	STEERING COLUMN TILT POSITION SENSOR-CIRCUIT SHORT TO BATTERY
B1D93-00	STEERING COLUMN TELESCOPE MOTOR CONTROL CIRCUIT PERFORMANCE
B1D97-00	STEERING COLUMN TILT MOTOR CONTROL CIRCUIT PERFORMANCE
B1D9B-54	SEAT HORIZONTAL FRONT STOP NOT LEARNED-MISSING CALIBRATION
B1ED1-11	ADJUSTABLE PEDAL SENSOR - CIRCUIT SHORT TO GROUND
B1ED1-12	ADJUSTABLE PEDAL SENSOR-CIRCUIT SHORT TO BATTERY
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210B-85	SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B210D-21	BATTERY VOLTAGE LOW - SIGNAL AMPLITUDE < MINIMUM
B210E-22	BATTERY VOLTAGE HIGH - SIGNAL AMPLITUDE > MAXIMUM
B221C-42	(MSM) MEMORY SEAT MODULE INTERNAL-GENERAL MEMORY FAILURE
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0013-00	CAN INTERIOR BUS (+) CIRCUIT LOW
U0014-00	CAN INTERIOR BUS (+) CIRCUIT HIGH
U0016-00	CAN INTERIOR BUS (-) CIRCUIT LOW
U0017-00	CAN INTERIOR BUS (-) CIRCUIT HIGH
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE

MODULE, PARK ASSIST (PAM)

DIAGNOSTIC CODE INDEX

DTC	Description
B128E-11	PTS SENSOR 1 - CIRCUIT SHORT TO GROUND
B128E-12	PTS SENSOR 1 - CIRCUIT SHORT TO BATTERY

B128E-25	PTS SENSOR 1 - SIGNAL SHAPE / WAVEFORM FAILURE
B128E-92	PTS SENSOR 1 - PERFORMANCE OR INCORRECT OPERATION
B128F-11	PTS SENSOR 2 - CIRCUIT SHORT TO GROUND
B128F-12	PTS SENSOR 2 - CIRCUIT SHORT TO BATTERY
B128F-25	PTS SENSOR 2- SIGNAL SHAPE / WAVEFORM FAILURE
B128F-92	PTS SENSOR 2 - PERFORMANCE OR INCORRECT OPERATION
B1290-11	PTS SENSOR 3 - CIRCUIT SHORT TO GROUND
B1290-12	PTS SENSOR 3 - CIRCUIT SHORT TO BATTERY
B1290-25	PTS SENSOR 3 - SIGNAL SHAPE / WAVEFORM FAILURE
B1290-92	PTS SENSOR 3 - PERFORMANCE OR INCORRECT OPERATION
B1291-11	PTS SENSOR 4- CIRCUIT SHORT TO GROUND
B1291-12	PTS SENSOR 4 - CIRCUIT SHORT TO BATTERY
B1291-25	PTS SENSOR 4 - SIGNAL SHAPE / WAVEFORM FAILURE
B1291-92	PTS SENSOR 4 - PERFORMANCE OR INCORRECT OPERATION
B1292-11	PTS SENSOR 5 - CIRCUIT SHORT TO GROUND
B1292-12	PTS SENSOR 5 - CIRCUIT SHORT TO BATTERY
B1292-25	PTS SENSOR 5 - SIGNAL SHAPE / WAVEFORM FAILURE
B1292-92	PTS SENSOR 5 - PERFORMANCE OR INCORRECT OPERATION
B1293-11	PTS SENSOR 6 - CIRCUIT SHORT TO GROUND
B1293-12	PTS SENSOR 6 - CIRCUIT SHORT TO BATTERY
B1293-25	PTS SENSOR 6 - SIGNAL SHAPE / WAVEFORM FAILURE
B1293-92	PTS SENSOR 6 - PERFORMANCE OR INCORRECT OPERATION
B1295-11	PTS SENSOR 8 - CIRCUIT SHORT TO GROUND
B1295-12	PTS SENSOR 8 - CIRCUIT SHORT TO BATTERY
B1295-25	PTS SENSOR 8 - SIGNAL SHAPE / WAVEFORM FAILURE
B1295-92	PTS SENSOR 8 - PERFORMANCE OR INCORRECT OPERATION
B1296-11	PTS SENSOR 9 - CIRCUIT SHORT TO GROUND
B1296-12	PTS SENSOR 9 - CIRCUIT SHORT TO BATTERY
B1296-25	PTS SENSOR 9 - SIGNAL SHAPE / WAVEFORM FAILURE
B1296-92	PTS SENSOR 9 - PERFORMANCE OR INCORRECT OPERATION
B1297-11	PTS SENSOR 10 - CIRCUIT SHORT TO GROUND
B1297-12	PTS SENSOR 10 - CIRCUIT SHORT TO BATTERY
B1297-25	PTS SENSOR 10 - SIGNAL SHAPE / WAVEFORM FAILURE
B1297-92	PTS SENSOR 10 - PERFORMANCE OR INCORRECT OPERATION
B1298-11	PTS SENSOR 11 - CIRCUIT SHORT TO GROUND
B1298-12	PTS SENSOR 11 - CIRCUIT SHORT TO BATTERY
B1298-25	PTS SENSOR 11 - SIGNAL SHAPE / WAVEFORM FAILURE
B1298-92	PTS SENSOR 11 - PERFORMANCE OR INCORRECT OPERATION
B210C-16	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B2128-16	SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

	SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B21DD-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B222A-00	VEHICLE LINE MISMATCH
B2232-00	(PTS) PARKTRONICS INTERNAL
U0001-00	CAN C BUS
U0100-00	LOST COMMUNICATION WITH PCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0418-00	IMPLAUSIBLE DATA RECEIVED FROM BRAKE SYSTEM CONTROL MODULE
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

MODULE, PASSENGER DOOR (PDM), (DMFL/R)

DIAGNOSTIC CODE INDEX

DTC	Description
B164E-11	PASSENGER MIRROR SIGNAL LAMP CONTROL - CIRCUIT SHORT TO GROUND
B164E-12	PASSENGER MIRROR SIGNAL LAMP CONTROL - CIRCUIT SHORT TO BATTERY
B164E-13	PASSENGER MIRROR SIGNAL LAMP CONTROL - CIRCUIT OPEN
B1676-11	PASSENGER COURTESY LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1676-15	PASSENGER COURTESY LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16A3-11	PASSENGER WINDOW SWITCH BACKLIGHTING - CIRCUIT SHORT TO GROUND
B1805-2A	PASSENGER DOOR LOCK/UNLOCK SWITCH - STUCK
B185E-11	PASSENGER WINDOW CONTROL - CIRCUIT SHORT TO GROUND
B185E-12	PASSENGER WINDOW CONTROL - CIRCUIT SHORT TO BATTERY
B185E-13	PASSENGER WINDOW CONTROL - CIRCUIT OPEN
B1862-11	PASSENGER WINDOW POSITION SENSOR POWER SUPPLY - CIRCUIT SHORT TO GROUND
B1865-31	PASSENGER WINDOW POSITION SENSOR - NO SIGNAL
B1910-2A	PASSENGER WINDOW SWITCH - STUCK
B1D11-11	PASSENGER MIRROR POSITION SENSOR POWER SUPPLY - CIRCUIT SHORT TO GROUND

B1D14-12	PASSENGER MIRROR VERTICAL POSITION SENSOR INPUT - CIRCUIT SHORT TO BATTERY
B1D14-14	PASSENGER MIRROR VERTICAL POSITION SENSOR INPUT - CIRCUIT SHORT TO GROUND OR OPEN
B1D17-12	PASSENGER MIRROR HORIZONTAL POSITION SENSOR INPUT - CIRCUIT SHORT TO BATTERY
B1D17-14	PASSENGER MIRROR HORIZONTAL POSITION SENSOR INPUT - CIRCUIT SHORT TO GROUND OR OPEN
B1D2A-11	PASSENGER MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1D2A-12	PASSENGER MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1D2A-13	PASSENGER MIRROR VERTICAL MOTOR CONTROL - CIRCUIT OPEN
B1D2E-11	PASSENGER MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1D2E-12	PASSENGER MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1D2E-13	PASSENGER MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT OPEN
B1D36-11	PASSENGER MIRROR HEATER CONTROL - CIRCUIT SHORT TO GROUND
B1D36-15	PASSENGER MIRROR HEATER CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1E6A-11	PASSENGER MIRROR FOLD CONTROL - CIRCUIT SHORT TO GROUND
B1E6A-15	PASSENGER MIRROR FOLD CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1E98-11	PASSENGER ELECTROCHROMATIC CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E98-12	PASSENGER ELECTROCHROMATIC CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E98-13	PASSENGER ELECTROCHROMATIC CONTROL CIRCUIT - CIRCUIT OPEN
B210C-16	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT VOLAGE ABOVE THRESHOLD
B21A1-00	ECU RESET/RECOVERY OCCURRED
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B2219-54	PASSENGER DOOR MODULE CALIBRATED/LOST CALIBRATION
B2219-96	(PDM) PASSENGER DOOR MODULE INTERNAL - COMPONENT INTERNAL FAILURE
B2831-11	PASSENGER BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT SHORT TO GROUND
B2831-15	PASSENGER BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT

	SHORT TO BATTERY OR OPEN
B2852-11	PASSENGER DOOR AMBIENT LAMP CONTROL - CIRCUIT SHORT TO GROUND
B2852-15	PASSENGER DOOR AMBIENT LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2851-11	PASSENGER MIRROR APPROACH LIGHT CONTROL - CIRCUIT SHORT TO GROUND
B2851-15	PASSENGER MIRROR APPROACH LIGHT CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
U0010-00	CAN INTERIOR BUS
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE
U0232-00	LOST COMMUNICATION WITH BLIND SPOT DETECTION MODULE

MODULE, POWERTRAIN CONTROL (PCM), 3.0L DIESEL

DIAGNOSTIC CODE INDEX

DTC	Description
P0016	CRANKSHAFT/CAMSHAFT MISALIGNMENT-BANK 1- SENSOR 1
P0045	TURBOCHARGER BOOST CONTROL CIRCUIT/OPEN
P0046	TURBOCHARGER BOOST CONTROL CIRCUIT/EXCESSIVE CURRENT
P0047	TURBOCHARGER BOOST CONTROL CIRCUIT LOW
P0048	TURBOCHARGER BOOST CONTROL CIRCUIT HIGH
P0053	O2 SENSOR 1/1 HEATER RESISTANCE
P0069	MANIFOLD ABSOLUTE PRESSURE / BAROMETRIC PRESSURE CORRELATION
P0070	AMBIENT AIR TEMPERATURE SENSOR STUCK
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0087	FUEL RAIL PRESSURE TOO LOW
P0088	FUEL RAIL PRESSURE TOO HIGH
P0089	FUEL PRESSURE 1 CONTROL CIRCUIT/OPEN
P0090	FUEL PRESSURE 1 CONTROL CIRCUIT/OPEN
P0091	FUEL PRESSURE 1 CONTROL CIRCUIT LOW
P0092	FUEL PRESSURE 1 CONTROL CIRCUIT HIGH
P0097	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT LOW
P0098	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT HIGH
P0101	MASS AIR FLOW SENSOR PERFORMANCE
P0102	MASS AIR FLOW SENSOR CIRCUIT LOW
P0103	MASS AIR FLOW SENSOR CIRCUIT HIGH
P0112	INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW

P0113	INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH
P0130	O2 SENSOR 1/1 CIRCUIT OPEN
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0134	O2 SENSOR CIRCUIT NO ACTIVITY DETECTED - BANK 1 SENSOR 1
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0182	FUEL TEMPERATURE SENSOR CIRCUIT LOW
P0183	FUEL TEMPERATURE SENSOR CIRCUIT HIGH
P0192	FUEL RAIL PRESSURE SENSOR LOW
P0193	FUEL RAIL PRESSURE SENSOR HIGH
P0201	FUEL INJECTOR 1 CIRCUIT / OPEN
P0202	FUEL INJECTOR 2 CIRCUIT / OPEN
P0203	FUEL INJECTOR 3 CIRCUIT / OPEN
P0204	FUEL INJECTOR 4 CIRCUIT / OPEN
P0205	FUEL INJECTOR 5 CIRCUIT / OPEN
P0206	FUEL INJECTOR 6 CIRCUIT / OPEN
P020A	CYLINDER 1 INJECTION TIMING
P020B	CYLINDER 2 INJECTION TIMING
P0203	CYLINDER 3 INJECTION TIMING
P020D	CYLINDER 4 INJECTION TIMING
P020E	CYLINDER 5 INJECTION TIMING
P020F	CYLINDER 6 INJECTION TIMING
P0219	ENGINE OVERSPEED CONDITION
P0234	TURBOCHARGER OVERBOOST CONDITION
P0237	TURBO BOOST PRESSURE SENSOR CIRCUIT LOW
P0238	TURBO BOOST PRESSURE SENSOR CIRCUIT HIGH
P0251	INJECTION PUMP FUEL METERING CONTROL CIRCUIT OPEN
P0253	INJECTION PUMP FUEL METERING CONTROL CIRCUIT LOW
P0254	INJECTION PUMP FUEL METERING CONTROL CIRCUIT HIGH
P0257	INJECTION PUMP FUEL METERING CONTROL CIRCUIT PERFORMANCE
P0262	FUEL INJECTOR 1 CIRCUIT HIGH
P0265	FUEL INJECTOR 2 CIRCUIT HIGH
P0268	FUEL INJECTOR 3 CIRCUIT HIGH
P0271	FUEL INJECTOR 4 CIRCUIT HIGH
P0274	CYLINDER 5 INJECTOR CIRCUIT HIGH
P0277	CYLINDER 6 INJECTOR CIRCUIT HIGH
P0299	TURBOCHARGER UNDERBOOST CONDITION
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT

P0336	CRANKSHAFT POSITION SENSOR PERFORMANCE
P0340	CAMSHAFT POSITION SENSOR CIRCUIT
P0341	CAMSHAFT POSITION SENSOR - PERFORMANCE BANK 1 - SENSOR 1
P0383	GLOW PLUG CONTROL MODULE CONTROL CIRCUIT LOW
P0384	GLOW PLUG CONTROL MODULE CONTROL CIRCUIT HIGH
P0401	EGR FLOW INSUFFICIENT DETECTED
P0402	EGR FLOW EXCESSIVE DETECTED
P0403	EGR CONTROL CIRCUIT OPEN
P0404	EGR CONTROL CIRCUIT PERFORMANCE
P0405	EGR POSITION SENSOR CIRCUIT LOW
P0406	EGR POSITION SENSOR CIRCUIT HIGH
P042C	CATALYST TEMPERATURE SENSOR CIRCUIT LOW
P042D	CATALYST TEMPERATURE SENSOR CIRCUIT HIGH
P042E	EXHAUST GAS RECIRCULATION CONTROL STUCK OPEN
P0462	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0480	COOLING FAN 1 CONTROL CIRCUIT OPEN
P0481	COOLING FAN 2 CONTROL CIRCUIT OPEN
P0489	EGR CONTROL CIRCUIT LOW
P0490	EGR CONTROL CIRCUIT HIGH
P049D	EGR CONTROL POSITION EXCEEDED LEARNING LIMIT
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR "A" INTERMITTENT/ERRATIC/HIGH
P0504	BRAKE SWITCH A/B CORRELATION
P0513	INVALID SKIM KEY
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P053A	CRANKCASE VENT HEATER CONTROL CIRCUIT OPEN
P053B	CRANKCASE VENT HEATER CONTROL CIRCUIT LOW
P053C	CRANKCASE VENT HEATER CONTROL CIRCUIT HIGH
P053S	CRANKCASE VENT HEATER CONTROL CIRCUIT PERFORMANCE
P0545	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW - BANK 1 SENSOR 1
P0546	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH - BANK 1 SENSOR 1
P0562	SYSTEM VOLTAGE LOW
P0563	SYSTEM VOLTAGE HIGH
P0571	BRAKE SWITCH 1 PERFORMANCE
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR
P0606	INTERNAL CONTROL PROCESSOR

P0607	ECU INTERNAL PERFORMANCE
P060A	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE
P060B	INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE
P060D	INTERNAL CONTROL MODULE ACCELERATOR PEDAL POSITION PERFORMANCE
P0616	STARTER CONTROL CIRCUIT LOW
P0617	STARTER CONTROL CIRCUIT HIGH
P061A	INTERNAL CONTROL MODULE TORQUE PERFORMANCE
P061B	INTERNAL CONTROL MODULE TORQUE CALCULATION PERFORMANCE
P061C	INTERNAL CONTROL MODULE ENGINE RPM PERFORMANCE
P0627	FUEL PUMP CONTROL CIRCUIT OPEN
P0628	FUEL PUMP CONTROL CIRCUIT LOW
P0629	FUEL PUMP CONTROL CIRCUIT HIGH
P062A	FUEL PUMP "A" CONTROL CIRCUIT RANGE/PERFORMANCE
P062B	INTERNAL CONTROL MODULE FUEL INJECTOR CONTROL CIRCUIT PERFORMANCE
P062F	INTERNAL CONTROL MODULE EEPROM ERROR
P0633	INVALID SKIM KEY
P0638	ELECTRONIC THROTTLE CONTROL CIRCUIT PERFORMANCE
P0641	SENSOR REFERENCE VOLTAGE 1 CIRCUIT
P0645	A/C CLUTCH CONTROL CIRCUIT
P0646	A/C CLUTCH CONTROL CIRCUIT LOW
P0647	A/C CLUTCH CONTROL CIRCUIT HIGH
P064C	GLOW PLUG CONTROL CIRCUIT MODULE 1
P0651	SENSOR REFERENCE VOLTAGE 2 CIRCUIT
P0658	ACTUATOR SUPPLY VOLTAGE "A" CIRCUIT LOW
P0659	ACTUATOR SUPPLY VOLTAGE "A" CIRCUIT HIGH
P066A	CYLINDER 1 GLOW PLUG CIRCUIT LOW
P066C	CYLINDER 2 GLOW PLUG CIRCUIT LOW
P066E	CYLINDER 3 GLOW PLUG CIRCUIT LOW
P0670	GLOW PLUG CONTROL MODULE CONTROL CIRCUIT OPEN
P0671	CYLINDER 1 GLOW PLUG CIRCUIT
P0672	CYLINDER 2 GLOW PLUG CIRCUIT
P0673	CYLINDER 3 GLOW PLUG CIRCUIT
P0674	CYLINDER 4 GLOW PLUG CIRCUIT
P0675	CYLINDER 5 GLOW PLUG CIRCUIT
P0676	CYLINDER 6 GLOW PLUG CIRCUIT
P067A	CYLINDER 4 GLOW PLUG CIRCUIT LOW
P067A	CYLINDER 5 GLOW PLUG CIRCUIT LOW

P067A	CYLINDER 6 GLOW PLUG CIRCUIT LOW
P0683	GLOW PLUG CONTROL MODULE TO PCM COMMUNICATION
P0685	ASD/MAIN CONTROL CIRCUIT
P068A	PCM POWER DE-ENERGIZED PERFORMANCE - TOO EARLY
P0691	COOLING FAN 1 CONTROL CIRCUIT LOW
P0692	COOLING FAN 1 CONTROL CIRCUIT HIGH
P0693	COOLING FAN 2 CONTROL CIRCUIT LOW
P0694	COOLING FAN 2 CONTROL CIRCUIT HIGH
P0697	SENSOR REFERENCE VOLTAGE 3 CIRCUIT
P06E9	ENGINE STARTER PERFORMANCE
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1131	FUEL PRESSURE REGULATOR VALVE
P1649	GLOW PLUG MODULE POWER SUPPLY CIRCUIT
P1946	CRASH EVENT DETECTED - ENGINE SHUTDOWN
P198A	AWD SYSTEM PERFORMANCE
P1D30	OIL VISCOSITY TOO LOW
P1D38	INTERNAL CONTROL MODULE LEVEL 2 INJECTION CUT OFF ACTIVE
P1D39	INTERNAL CONTROL MODULE A/D VOLTAGE TEST ERROR
P1D3A	INTERNAL CONTROL MODULE A/D VOLTAGE RATIO ERROR
P1D3B	INTERNAL CONTROL MODULE MONITORING BYTE ERROR
P1D3C	INTERNAL CONTROL MODULE MONITORING RESPONSE TIME ERROR
P1D3D	INTERNAL CONTROL MODULE SERIAL LINK ERROR
P1D3E	INTERNAL CONTROL MODULE SHUT OFF TEST ERROR
P1D3F	INTERNAL CONTROL MODULE SHUT OFF TEST UNDERVOLTAGE ERROR
P1D40	INTERNAL CONTROL MODULE SHUT OFF TEST MONITORING MODULE ERROR
P1D41	INTERNAL CONTROL MODULE SHUT OFF TEST TIME OUT ERROR
P1D42	INTERNAL CONTROL MODULE SHUT OFF TEST POSTIIVE ERROR
P1D43	INTERNAL CONTROL MODULE SHUT OFF TEST MONITORING TIME ERROR
P1D44	INTERNAL CONTROL MODULE SHUT OFF TEST OVERVOLTAGE ERROR
P1D49	INTERNAL CONTROL MODULE POST INJECTION 2 SHUT OFF ERROR
P1D4A	INTERNAL CONTROL MODULE POST INJECTION 3 EFFICIENCY ERROR
P1D4B	INTERNAL CONTROL MODULE POST OVERRUN MONITORING ERROR
P1D4C	INTERNAL CONTROL MODULE QUANTITY WAVE PLAUSIBILITY ERROR
P1D4D	INTERNAL CONTROL MODULE RAIL PRESSURE PLAUSIBILITY ERROR
P1D4E	INTERNAL CONTROL MODULE MONITORING CURRENT TORQUE LIMITATION

P1D4F	INTERNAL CONTROL MODULE MONITORING LEAD TORQUE LIMITATION
P1D55	INTERNAL CONTROL MODULE WATCHDOG QUERY RESPONSE TIME ERROR
P1D56	INTERNAL CONTROL MODULE CPU UNDERVOLTAGE ERROR
P1D57	INTERNAL CONTROL MODULE CPU OVERVOLTAGE ERROR
P1D58	INTERNAL CONTROL MODULE WATCHDOG RESET ERROR
P2002	DIESEL PARTICULATE FILTER EFFICIENCY BELOW THRESHOLD
P2008	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT OPEN - BANK 1
P2009	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT LOW - BANK 1
P2010	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT HIGH - BANK 1
P2014	INTAKE MANIFOLD RUNNER (SWIRL) POSITION SENSOR CIRCUIT
P2015	INTAKE MANIFOLD RUNNER POSITION SENSOR PERFORMANCE - BANK 1
P2016	INTAKE MANIFOLD RUNNER (SWIRL) POSITION SENSOR CIRCUIT LOW - BANK 1
P2017	INTAKE MANIFOLD RUNNER (SWIRL) POSITION SENSOR CIRCUIT HIGH - BANK1
P2032	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW - BANK 1 SENSOR 2
P2033	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH - BANK 1 SENSOR 2
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT OPEN
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE
P2102	EGR AIR FLOW CONTROL VALVE CIRCUIT LOW
P2103	ELECTRONIC THROTTLE CONTROL MOTOR HIGH
P2107	ELECTRONIC THROTTLE CONTROL MODULE PERFORMANCE
P210C	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT LOW - BANK 2
P210D	ELECTRONIC THROTTLE CONTROL MOTOR HIGH - BANK 2
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2148	FUEL INJECTOR GROUP 1 SUPPLY VOLTAGE CIRCUIT HIGH
P2151	FUEL INJECTOR GROUP 2 SUPPLY VOLTAGE CIRCUIT HIGH
P2173	THROTTLE ACTUATOR CONTROL SYSTEM - HIGH AIR FLOW DETECTED
P2225	BAROMETRIC PRESSURE SENSOR CIRCUIT

P2228	BAROMETRIC PRESSURE SENSOR CIRCUIT LOW
P2229	BAROMETRIC PRESSURE SENSOR CIRCUIT HIGH
P2231	O2 SENSOR SIGNAL CIRCUIT SHORTED TO HEATER CIRCUIT - BANK 1 SENSOR 1
P2237	O2 SENSOR 1/1 PUMP CELL CURRENT CIRCUIT OPEN
P2243	O2 SENSOR 1/1 REFERENCE VOLTAGE CIRCUIT OPEN
P2244	O2 SENSOR REFERENCE VOLTAGE - BANK 1 SENSOR 1
P2266	WATER IN FUEL (WIF) SENSOR VOLTAGE TOO LOW
P244A	DIESEL PARTICULATE FILTER DIFFERENTIAL PRESSURE TOO LOW
P244B	DIESEL PARTICULATE FILTER DIFFERENTIAL PRESSURE TOO HIGH
P2453	DIESEL PARTICULATE FILTER DIFFERENTIAL PRESSURE SENSOR CIRCUIT PERFORMANCE
P245A	EGR COOLER BYPASS CONTROL CIRCUIT/OPEN
P245B	EGR COOLER BYPASS CONTROL CIRCUIT PERFORMANCE
P245C	EGR COOLER BYPASS CONTROL CIRCUIT LOW
P245D	EGR COOLER BYPASS CONTROL CIRCUIT HIGH
P2463	DIESEL PARTICULATE FILTER - SOOT ACCUMULATION
P253F	ENGINE OIL DETERIORATED
P2610	PCM INTERNAL ENGINE OFF TIMER PERFORMANCE
P268c	CYLINDER 1 INJECTOR DATA INCOMPATIBLE
P268D	CYLINDER 2 INJECTOR DATA INCOMPATIBLE
P268E	CYLINDER 3 INJECTOR DATA INCOMPATIBLE
P268F	CYLINDER 4 INJECTOR DATA INCOMPATIBLE
P2690	CYLINDER 5 INJECTOR DATA INCOMPATIBLE
P2691	CYLINDER 6 INJECTOR DATA INCOMPATIBLE
P2A00	O2 SENSOR 1/1 CIRCUIT PERFORMANCE
U0101	LOST COMMUNICATION WITH TCM
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0120	LOST COMMUNICATION WITH STARTER/GENERATOR CONTROL MODULE
U0121	LOST COMMUNICATION WITH ABS
U0122	LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0405	IMPLAUSIBLE DATA RECEIVED FROM CRUISE CONTROL MODULE
U0407	IMPLAUSIBLE DATA RECEIVED FROM GLOW PLUG CONTROL MODULE

U0415	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U0421	IMPLAUSIBLE DATA RECEIVED FROM SUSPENSION CONTROL MODULE
U0418	IMPLAUSIBLE DATA RECEIVED FROM BRAKE SYSTEM CONTROL MODULE
U0427	IMPLAUSIBLE DATA RECEIVED FROM VEHICLE SECURITY CONTROL MODULE
U0452	INVALID DATA RECEIVED FROM RESTRAINTS CONTROL MODULE
U1008	LIN 1 BUS
U11B9	LOST COMMUNICATION WITH RF HUB
U1431	IMPLAUSIBLE ACC TORQUE MESSAGE RECEIVED
U1432	IMPLAUSIBLE CABIN TEMPERATURE SIGNAL RECEIVED

MODULE, POWERTRAIN CONTROL (PCM), 3.6L

DIAGNOSTIC CODE INDEX

DTC	Description
P000A	BANK 1 CAMSHAFT 1 POSITION SLOW RESPONSE
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE
P000C	BANK 2 CAMSHAFT 1 POSITION SLOW RESPONSE
P000D	BANK 2 CAMSHAFT 2 POSITION SLOW RESPONSE
P0010	BANK 1 CAMSHAFT 1 POSITION ACTUATOR CIRCUIT OPEN
P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0017	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 2
P0018	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 2 SENSOR 1
P0019	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 2 SENSOR 2
P0020	BANK 2 CAMSHAFT 1 POSITION ACTUATOR CIRCUIT
P0023	BANK 2 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2 SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2 SENSOR 2/1 HEATER CIRCUIT LOW
P0052	O2 SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2 SENSOR 2/2 HEATER CIRCUIT HIGH

P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0129	BAROMETRIC PRESSURE OUT-OF-RANGE LOW
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 NO ACTIVITY DETECTED
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0151	O2 SENSOR 2/1 CIRCUIT LOW
P0152	O2 SENSOR 2/1 CIRCUIT HIGH
P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE
P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0160	O2 SENSOR 2/2 NO ACTIVITY DETECTED
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN
P0175	FUEL SYSTEM 2/1 RICH
P0196	ENGINE OIL TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW

	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT
P0202	FUEL INJECTOR 2 CIRCUIT
P0203	FUEL INJECTOR 3 CIRCUIT
P0204	FUEL INJECTOR 4 CIRCUIT
P0205	FUEL INJECTOR 5 CIRCUIT
P0206	FUEL INJECTOR 6 CIRCUIT
P0221	THROTTLE POSITION SENSOR 2 PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0298	ENGINE OIL TEMPERATURE TOO HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE
P0315	NO CRANK SENSOR LEARNED
P0325	KNOCK SENSOR 1 CIRCUIT
P0330	KNOCK SENSOR 2 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 1 SENSOR 1
P0345	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 2 SENSOR 1
P0349	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 2 SENSOR 1
P0365	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 2
P0369	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 1 SENSOR 2
P0390	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 2 SENSOR 2
P0394	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 2 SENSOR 2
P0420	CATALYST EFFICIENCY (BANK 1)
P0430	CATALYST EFFICIENCY (BANK 2)
P0440	GENERAL EVAP SYSTEM FAILURE
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK
P0457	LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE

	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0463	FUEL LEVEL SENSOR 1 CIRCUIT HIGH
P0480	COOLING FAN 1 CONTROL CIRCUIT
P0481	COOLING FAN 2 CONTROL CIRCUIT
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXCEPTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXCEPTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P050D	COLD START ROUGH IDLE
P0513	INVALID SKIM KEY
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0522	OIL PRESSURE TOO LOW
P0523	ENGINE OIL PRESSURE SENSOR CIRCUIT HIGH
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P054A	CAMSHAFT POSITION TIMING OVER - ADVANCED - BANK1
P054C	CAMSHAFT POSITION TIMING OVER - ADVANCED - BANK 2
P0562	BATTERY VOLTAGE LOW
P0563	BATTERY VOLTAGE HIGH
P0571	BRAKE SWITCH 1 PERFORMANCE
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL ECM PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P061A	ETC LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP RELAY CIRCUIT
P062C	ETC LEVEL 2 MPH PERFORMANCE

	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CLUTCH RELAY CIRCUIT
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0685	AUTO SHUTDOWN RELAY CONTROL CIRCUIT
P0688	AUTO SHUTDOWN RELAY SENSE CIRCUIT LOW
P06DA	DUAL STAGE OIL PUMP CIRCUIT
P06DD	DUAL STAGE OIL PUMP STUCK LOW
P06DE	DUAL STAGE OIL PUMP STUCK HIGH
P0703	BRAKE SWITCH 2 PERFORMANCE
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2
P113D	O2 SENSOR 1/1 SLOW RESPONSE
P113E	O2 SENSOR 2/1 SLOW RESPONSE (HIGH FREQUENCY)
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1456	FUEL TANK PRESSURE SENSOR CIRCUIT LOW
P1457	FUEL TANK PRESSURE SENSOR CIRCUIT HIGH
P1521	INCORRECT ENGINE OIL TYPE
P150D	COLD START ROUGH IDLE - OPEN THROTTLE START
P1524	OIL PRESSURE OUT OF RANGE - CAMSHAFT ADVANCE/RETARD DISABLED
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER RATIONALITY TOO SLOW
P1618	SENSOR REFERENCE VOLTAGE 1 CIRCUIT ERRATIC
P1628	SENSOR REFERENCE VOLTAGE 2 CIRCUIT ERRATIC
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1718	EEPROM INTEGRITY FAILURE
P1C4E	FAULT IN ABS/ESP MODULE
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN

P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2110	ELECTRONIC THROTTLE CONTROL - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2161	VEHICLE SPEED SENSOR 2 ERRATIC
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2175	LOW AIRFLOW/RESTRICTION DETECTED (SLOW ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P219A	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 1
P219B	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 2
P2245	O2 SENSOR 1/1, 2/1 REFERENCE VOLTAGE CIRCUIT LOW
P2246	O2 SENSOR 1/1, 2/1 REFERENCE VOLTAGE CIRCUIT HIGH
P2271	O2 SENSOR 1/2 SIGNAL STUCK RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION/ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION

P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2533	IGNITION SWITCH RUN/START POSITION CIRCUIT
P258A	ELECTRIC VACUUM PUMP CIRCUIT
P258B	ELECTRONIC VACUUM PUMP PERFORMANCE
P2610	PCM INTERNAL SHUTDOWN TIMER RATIONALITY TOO FAST
U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0102	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0104	LOST COMMUNICATION WITH CRUISE CONTROL MODULE
U0121	LOST COMMUNICATION WITH ABS
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U0300	INTERNAL CONTROL MODULE SOFTWARE INCOMPATIBILITY
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0403	IMPLAUSIBLE DATA RECEIVED FROM T-CASE
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U0428	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR
U1040	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1113	LOST A/C PRESSURE MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U1141	LOST ESP TORQUE REQUEST MESSAGE
U1186	LOST COMMUNICATION WITH ADAPTIVE CRUISE CONTROL MODULE
U11B9	LOST COMMUNICATION WITH RF HUB
U11BC	LOST BRAKE SWITCH MESSAGE
U11C2	LOST TRANSMISSION MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED

U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED
U1431	IMPLAUSIBLE DATA RECEIVED FROM CRUISE CONTROL MODULE

MODULE, POWERTRAIN CONTROL (PCM), 5.7L

DIAGNOSTIC CODE INDEX

DTC	Description
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE
P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2 SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2 SENSOR 2/1 HEATER CIRCUIT LOW
P0052	O2 SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2 SENSOR 2/2 HEATER CIRCUIT HIGH
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0129	BAROMETRIC PRESSURE OUT-OF-RANGE LOW
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE

P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 NO ACTIVITY DETECTED
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0151	O2 SENSOR 2/1 CIRCUIT LOW
P0152	O2 SENSOR 2/1 CIRCUIT HIGH
P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE
P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0160	O2 SENSOR 2/2 NO ACTIVITY DETECTED
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN
P0175	FUEL SYSTEM 2/1 RICH
P0196	ENGINE OIL TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT/OPEN
P0202	FUEL INJECTOR 2 CIRCUIT/OPEN
P0203	FUEL INJECTOR 3 CIRCUIT/OPEN
P0204	FUEL INJECTOR 4 CIRCUIT/OPEN
P0205	FUEL INJECTOR 5 CIRCUIT/OPEN
P0206	FUEL INJECTOR 6 CIRCUIT/OPEN
P0207	FUEL INJECTOR 7 CIRCUIT/OPEN
P0208	FUEL INJECTOR 8 CIRCUIT/OPEN
P0221	THROTTLE POSITION SENSOR 2 CIRCUIT PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0298	ENGINE OIL TEMPERATURE TOO HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE

	CYLINDER 7 MISFIRE
P0308	CYLINDER 8 MISFIRE
P0315	NO CRANK SENSOR LEARNED
P0325	KNOCK SENSOR 1 CIRCUIT
P0330	KNOCK SENSOR 2 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT
P0420	CATALYST EFFICIENCY (BANK 1)
P0430	CATALYST EFFICIENCY (BANK 2)
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0440	GENERAL EVAP SYSTEM FAILURE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK
P0457	LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0462	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0463	FUEL LEVEL SENSOR 1 CIRCUIT HIGH
P0480	COOLING FAN 1 CONTROL CIRCUIT
P0481	COOLING FAN 2 CONTROL CIRCUIT
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXCEPTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXCEPTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P050D	COLD START ROUGH IDLE
P0513	INVALID SKIM KEY
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0522	OIL PRESSURE TOO LOW
P0523	ENGINE OIL PRESSURE SENSOR CIRCUIT HIGH
P0524	ENGINE OIL PRESSURE TOO LOW
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P0562	BATTERY VOLTAGE LOW
P0563	BATTERY VOLTAGE HIGH
P0571	BRAKE SWITCH 1 PERFORMANCE
P0572	BRAKE SWITCH 1 STUCK ON

	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0593	SPEED CONTROL SWITCH 2 CIRCUIT HIGH
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL ECM PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P061A	ETC LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP RELAY CIRCUIT
P062C	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CLUTCH RELAY CIRCUIT
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0685	AUTO SHUTDOWN RELAY CONTROL CIRCUIT
P0688	AUTO SHUTDOWN RELAY SENSE CIRCUIT LOW
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)
P0703	BRAKE SWITCH 2 PERFORMANCE
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1411	CYLINDER 1 REACTIVATION CONTROL PERFORMANCE
P1414	CYLINDER 4 REACTIVATION CONTROL PERFORMANCE
P1416	CYLINDER 6 REACTIVATION CONTROL PERFORMANCE
P1417	CYLINDER 7 REACTIVATION CONTROL PERFORMANCE
P1456	FUEL TANK PRESSURE SENSOR CIRCUIT LOW

	FUEL TANK PRESSURE SENSOR CIRCUIT HIGH
P1521	INCORRECT ENGINE OIL TYPE
P1524	OIL PRESSURE OUT OF RANGE - CAMSHAFT ADVANCE/RETARD DISABLED
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER RATIONALITY TOO SLOW
P1618	SENSOR REFERENCE VOLTAGE 1 ERRATIC
P1628	SENSOR REFERENCE VOLTAGE 2 ERRATIC
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1718	EEPROM INTEGRITY FAILURE
P1C4E	FAULT IN ABS/ESP MODULE
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT/OPEN - BANK 1
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE - BANK 1
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2108	ELECTRONIC THROTTLE CONTROL MODULE PERFORMANCE
P2110	ELECTRONIC THROTTLE CONTROL SYSTEM - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION

P2161	VEHICLE SPEED SENSOR 2 ERRATIC
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2175	LOW AIRFLOW/RESTRICTION DETECTED (SLOW ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P219A	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 1
P219B	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 2
P2245	O2 SENSOR 1/1, 2/1 REFERENCE VOLTAGE CIRCUIT LOW
P2246	O2 SENSOR 1/1, 2/1 REFERENCE VOLTAGE CIRCUIT HIGH
P2271	O2 SENSOR 1/2 SIGNAL STUCK RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION/ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2320	IGNITION COIL 7 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2323	IGNITION COIL 8 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2610	PCM INTERNAL SHUTDOWN TIMER RATIONALITY TOO FAST
P3400	MDS RATIONALITY BANK 1
P3401	MDS SOLENOID 1 CIRCUIT
P3402	CYLINDER 1 DEACTIVATION CONTROL PERFORMANCE
P3425	MDS SOLENOID 4 CIRCUIT
P3426	CYLINDER 4 DEACTIVATION CONTROL PERFORMANCE
P3441	MDS SOLENOID 6 CIRCUIT
P3442	CYLINDER 6 DEACTIVATION CONTROL PERFORMANCE
P3449	MDS SOLENOID 7 CIRCUIT
P3450	CYLINDER 7 DEACTIVATION CONTROL PERFORMANCE
P3497	MDS RATIONALITY BANK 2

U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0102	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0104	LOST COMMUNICATION WITH CRUISE CONTROL MODULE
U0121	LOST COMMUNICATION WITH ABS
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U0300	INTERNAL CONTROL MODULE SOFTWARE INCOMPATIBILITY
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0403	IMPLAUSIBLE DATA RECEIVED FROM T-CASE
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U0428	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR
U1040	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1113	LOST A/C PRESSURE MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U1141	LOST ESP TORQUE REQUEST MESSAGE
U1186	LOST COMMUNICATION WITH ADAPTIVE CRUISE CONTROL MODULE
U11B9	LOST COMMUNICATION WITH RF HUB
U11BC	LOST BRAKE SWITCH MESSAGE
U11C2	LOST TRANSMISSION MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED
U1431	IMPLAUSIBLE DATA RECEIVED FROM CRUISE CONTROL MODULE

MODULE, POWERTRAIN CONTROL (PCM), 6.4L

DIAGNOSTIC CODE INDEX

DTC	Description
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE

P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2 SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2 SENSOR 2/1 HEATER CIRCUIT LOW
P0052	O2 SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2 SENSOR 2/2 HEATER CIRCUIT HIGH
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0129	BAROMETRIC PRESSURE OUT-OF-RANGE LOW
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 NO ACTIVITY DETECTED
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0151	O2 SENSOR 2/1 CIRCUIT LOW
P0152	O2 SENSOR 2/1 CIRCUIT HIGH
P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE

P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0160	O2 SENSOR 2/2 NO ACTIVITY DETECTED
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN
P0175	FUEL SYSTEM 2/1 RICH
P0196	ENGINE OIL TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT/OPEN
P0202	FUEL INJECTOR 2 CIRCUIT/OPEN
P0203	FUEL INJECTOR 3 CIRCUIT/OPEN
P0204	FUEL INJECTOR 4 CIRCUIT/OPEN
P0205	FUEL INJECTOR 5 CIRCUIT/OPEN
P0206	FUEL INJECTOR 6 CIRCUIT/OPEN
P0207	FUEL INJECTOR 7 CIRCUIT/OPEN
P0208	FUEL INJECTOR 8 CIRCUIT/OPEN
P0221	THROTTLE POSITION SENSOR 2 CIRCUIT PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0298	ENGINE OIL TEMPERATURE TOO HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE
P0307	CYLINDER 7 MISFIRE
P0308	CYLINDER 8 MISFIRE
P0315	NO CRANK SENSOR LEARNED
P0325	KNOCK SENSOR 1 CIRCUIT
P0330	KNOCK SENSOR 2 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT
P0420	CATALYST EFFICIENCY (BANK 1)

	CATALYST EFFICIENCY (BANK 2)
P0440	GENERAL EVAP SYSTEM FAILURE
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP PURGE SYSTEM SMALL LEAK
P0457	LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0462	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0463	FUEL LEVEL SENSOR 1 CIRCUIT HIGH
P0471	EXHAUST PRESSURE SENSOR 1 PERFORMANCE
P0472	EXHAUST PRESSURE SENSOR 1 LOW
P0473	EXHAUST PRESSURE SENSOR 1 HIGH
P0476	EXHAUST PRESSURE CONTROL VALVE RANGE/PERFORMANCE
P0480	COOLING FAN 1 CONTROL CIRCUIT
P0481	COOLING FAN 2 CONTROL CIRCUIT
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXCEPTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXCEPTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P050D	COLD START ROUGH IDLE
P0513	INVALID SKIM KEY
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0522	OIL PRESSURE TOO LOW
P0523	ENGINE OIL PRESSURE SENSOR CIRCUIT HIGH
P0524	ENGINE OIL PRESSURE TOO LOW
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P0562	BATTERY VOLTAGE LOW
P0563	BATTERY VOLTAGE HIGH
P0571	BRAKE SWITCH 1 PERFORMANCE
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE

	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0593	SPEED CONTROL SWITCH 2 CIRCUIT HIGH
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL ECM PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P061A	ETC LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP RELAY CIRCUIT
P062C	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CLUTCH RELAY CIRCUIT
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0685	ASD/MAIN CONTROL CIRCUIT
P0688	AUTO SHUTDOWN RELAY SENSE CIRCUIT LOW
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)
P0703	BRAKE SWITCH 2 PERFORMANCE
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1004	SHORT RUNNER VALVE CONTROL PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1411	CYLINDER 1 REACTIVATION CONTROL PERFORMANCE
P1414	CYLINDER 4 REACTIVATION CONTROL PERFORMANCE
P1416	CYLINDER 6 REACTIVATION CONTROL PERFORMANCE
P1417	CYLINDER 7 REACTIVATION CONTROL PERFORMANCE
P1456	FUEL TANK PRESSURE SENSOR CIRCUIT LOW
P1457	FUEL TANK PRESSURE SENSOR CIRCUIT HIGH
P150D	COLD START ROUGH IDLE - OPEN THROTTLE START
P1521	INCORRECT ENGINE OIL TYPE
P1524	OIL PRESSURE OUT OF RANGE - CAMSHAFT ADVANCE/RETARD DISABLED

P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER RATIONALITY TOO SLOW
P1618	SENSOR REFERENCE VOLTAGE 1 ERRATIC
P1628	SENSOR REFERENCE VOLTAGE 2 ERRATIC
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1718	EEPROM INTEGRITY FAILURE
P1C4E	FAULT IN ABS/ESP MODULE
P2008	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT OPEN - BANK 1
P2016	INTAKE MANIFOLD RUNNER POSITION SENSOR CIRCUIT LOW
P2017	INTAKE MANIFOLD RUNNER POSITION SENSOR CIRCUIT HIGH
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT/OPEN - BANK 1
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE - BANK 1
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2108	ELECTRONIC THROTTLE CONTROL MODULE PERFORMANCE
P2110	ELECTRONIC THROTTLE CONTROL SYSTEM - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION

P2161	VEHICLE SPEED SENSOR 2 ERRATIC
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2175	LOW AIRFLOW/RESTRICTION DETECTED (SLOW ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P219A	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 1
P219B	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 2
P2245	O2 SENSOR 1/1, 2/1 REFERENCE VOLTAGE CIRCUIT LOW
P2246	O2 SENSOR 1/1, 2/1 REFERENCE VOLTAGE CIRCUIT HIGH
P2271	O2 SENSOR 1/2 SIGNAL STUCK RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION/ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2320	IGNITION COIL 7 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2323	IGNITION COIL 8 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2610	PCM INTERNAL SHUTDOWN TIMER RATIONALITY TOO FAST
P3400	MDS RATIONALITY BANK 1
P3401	MDS SOLENOID 1 CIRCUIT
P3402	CYLINDER 1 DEACTIVATION CONTROL PERFORMANCE
P3425	MDS SOLENOID 4 CIRCUIT
P3426	CYLINDER 4 DEACTIVATION CONTROL PERFORMANCE
P3441	MDS SOLENOID 6 CIRCUIT
P3442	CYLINDER 6 DEACTIVATION CONTROL PERFORMANCE
P3449	MDS SOLENOID 7 CIRCUIT
P3450	CYLINDER 7 DEACTIVATION CONTROL PERFORMANCE
P3497	MDS RATIONALITY BANK 2

U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0102	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0104	LOST COMMUNICATION WITH CRUISE CONTROL MODULE
U0121	LOST COMMUNICATION WITH ABS
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U0300	INTERNAL CONTROL MODULE SOFTWARE INCOMPATIBILITY
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0403	IMPLAUSIBLE DATA RECEIVED FROM T-CASE
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U0428	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR
U1040	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1113	LOST A/C PRESSURE MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U1141	LOST ESP TORQUE REQUEST MESSAGE
U1186	LOST COMMUNICATION WITH ADAPTIVE CRUISE CONTROL MODULE
U11B9	LOST COMMUNICATION WITH RF HUB
U11BC	LOST BRAKE SWITCH MESSAGE
U11C2	LOST TRANSMISSION MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED
U1431	IMPLAUSIBLE DATA RECEIVED FROM CRUISE CONTROL MODULE

MODULE, RADIO FREQUENCY (RF HUB)

DIAGNOSTIC CODE INDEX

DTC	Description
B1A08-00	RKE FOB 1 PERFORMANCE

B1A09-00	RKE FOB 2 PERFORMANCE
B1A0A-00	RKE FOB 3 PERFORMANCE
B1A0B-00	RKE FOB 4 PERFORMANCE
B1A0C-00	RKE FOB 5 PERFORMANCE
B1A0D-00	RKE FOB 6 PERFORMANCE
B1A0E-00	RKE FOB 7 PERFORMANCE
B1A0F-00	RKE FOB 8 PERFORMANCE
B1A10-00	RKE FOB 1 BATTERY LOW
B1A11-00	RKE FOB 2 BATTERY LOW
B1A12-00	RKE FOB 3 BATTERY LOW
B1A13-00	RKE FOB 4 BATTERY LOW
B1A14-00	RKE FOB 5 BATTERY LOW
B1A15-00	RKE FOB 6 BATTERY LOW
B1A16-00	RKE FOB 7 BATTERY LOW
B1A17-00	RKE FOB 8 BATTERY LOW
B1A28-00	ECM MISMATCH WITH SKIM
B1A71-01	PASSIVE ENTRY ANTENNA 1 - GENERAL ELECTRICAL FAILURE
B1A71-11	PASSIVE ENTRY ANTENNA 1 - CIRCUIT SHORT TO GROUND
B1A71-12	PASSIVE ENTRY ANTENNA 1 - CIRCUIT SHORT TO BATTERY
B1A71-13	PASSIVE ENTRY ANTENNA 1 - CIRCUIT OPEN
B1A72-01	PASSIVE ENTRY ANTENNA 2 - GENERAL ELECTRICAL FAILURE
B1A72-11	PASSIVE ENTRY ANTENNA 2 - CIRCUIT SHORT TO GROUND
B1A72-12	PASSIVE ENTRY ANTENNA 2 - CIRCUIT SHORT TO BATTERY
B1A72-13	PASSIVE ENTRY ANTENNA 2 - CIRCUIT OPEN
B1A73-01	PASSIVE ENTRY ANTENNA 3 - GENERAL ELECTRICAL FAILURE
B1A73-11	PASSIVE ENTRY ANTENNA 3 - CIRCUIT SHORT TO GROUND
B1A73-12	PASSIVE ENTRY ANTENNA 3 - CIRCUIT SHORT TO BATTERY
B1A73-13	PASSIVE ENTRY ANTENNA 3 - CIRCUIT OPEN
B1A74-01	PASSIVE ENTRY ANTENNA 4 - GENERAL ELECTRICAL FAILURE
B1A74-11	PASSIVE ENTRY ANTENNA 4 - CIRCUIT SHORT TO GROUND
B1A74-12	PASSIVE ENTRY ANTENNA 4 - CIRCUIT SHORT TO BATTERY
B1A74-13	PASSIVE ENTRY ANTENNA 4 - CIRCUIT OPEN
B1A75-01	PASSIVE ENTRY ANTENNA 5 - GENERAL ELECTRICAL FAILURE
B1A75-11	PASSIVE ENTRY ANTENNA 5 - CIRCUIT SHORT TO GROUND
B1A75-12	PASSIVE ENTRY ANTENNA 5 - CIRCUIT SHORT TO BATTERY
B1A75-13	PASSIVE ENTRY ANTENNA 5 - CIRCUIT OPEN
B1A76-13	REMOTE START ANTENNA CIRCUIT - CIRCUIT OPEN
B1A7B-01	IMMOBILIZER ANTENNA (KIN) - GENERAL ELECTRICAL FAILURE
B1A7C-01	ELECTRONIC STEERING COLUMN LOCK CONTROL - GENERAL ELECTRICAL FAILURE
B1A7D-01	START BUTTON - GENERAL ELECTRICAL FAILURE

B1A7D-2A	START BUTTON - STUCK
B1A7F-00	ELECTRONIC STEERING COLUMN LOCK COMMUNICATION PERFORMANCE (TYPE 1)
B1A80-00	ELECTRONIC STEERING COLUMN LOCK COMMUNICATION PERFORMANCE (TYPE 2-3)
B1A81-00	ELECTRONIC STEERING COLUMN LOCK MODULE NOT PERSONALIZED
B1A89-00	ELV/ESCL CONFIGURATION MISMATCH
B1A8A-00	MULTI-MODULE VIN HANDSHAKE FAILURE
B215B-14	IGNITION RUN/START 2 CONTROL - CIRCUIT SHORT TO GROUND OR OPEN
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B2205-00	ORIGINAL VIN MISSING/MISMATCH
B2254	COLUMN LOCK MODULE INTERNAL
B22A0-49	RF HUB INTERNAL - INTERNAL ELECTRONIC FAILURE
B259E-01	TRUNK/LIFTGATE DOOR HANDLE SENSE - GENERAL ELECTRICAL FAILURE
B25A9-00	FRONT DRIVER DOOR HANDLE SENSE
B25A9-01	FRONT DRIVER DOOR HANDLE SENSE - GENERAL ELECTRICAL FAILURE
B25AA-00	FRONT PASSENGER DOOR HANDLE SENSE
B25AA-01	FRONT PASSENGER DOOR HANDLE SENSE - GENERAL ELECTRICAL FAILURE
U0001-00	CAN C BUS
U0002-00	CAN C BUS OFF PERFORMANCE
U0037-00	LIN BUS
U0100-00	LOST COMMUNICATION WITH PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U103C-00	KIN COMMUNICATION
U1197-00	SECURITY SEED RESPONSE NOT RECEIVED FROM ECM/PCM
U140E-00	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED
U1433-01	IMPLAUSIBLE IGNITION SWITCH STATUS MESSAGE RECEIVED - GENERAL ELECTRICAL FAILURE
U1454-00	IMPLAUSIBLE DATA RECEIVED FROM THE GATED PARK SWITCH
U140E-00	IMPLAUSIBLE POLICE CONFIGURATION

MODULE, STEERING CONTROL (SCM)

DIAGNOSTIC CODE INDEX

DTC	Description
B1425-2A	REMOTE RADIO SWITCH INPUT - STUCK
B1504-2A	LEFT STEERING WHEEL CONTROL SWITCH - STUCK
B1D9C-00	STEERING COLUMN TILT SWITCH
B1D9C-2A	STEERING COLUMN TILT SWITCH - STUCK
B2225-00	(SCM) STEERING COLUMN MODULE INTERNAL
B2306-2A	FRONT WASHER SWITCH - STUCK
B232E-00	REAR WASHER SWITCH - STUCK
B2332-2A	HORN SWITCH - STUCK
B23A1-2A	FLASH TO PASS/OPTICAL HORN SWITCH - STUCK
C1240-76	STEERING ANGLE SENSOR ANGLE OVERTRAVEL PERFORMANCE - WRONG MOUNTING POSITION
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2205-00	STEERING ANGLE SENSOR INTERNAL
C2205-29	STEERING ANGLE SENSOR INTERNAL - SIGNAL INVALID
C2205-2F	STEERING ANGLE SENSOR INTERNAL - SIGNAL ERRATIC
C2205-41	STEERING ANGLE SENSOR INTERNAL - GENERAL CHECKSUM FAILURE
C2205-96	STEERING ANGLE SENSOR INTERNAL - COMPONENT INTERNAL FAILURE
P0579-00	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580-00	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581-00	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585-00	SPEED CONTROL SWITCH 1/2 CORRELATION
P0591-00	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592-00	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0593-00	SPEED CONTROL SWITCH 2 CIRCUIT HIGH
P0815-2A	UPSHIFT SWITCH - STUCK
P0816-2A	DOWNSHIFT SWITCH - STUCK
P1593-2A	SPEED CONTROL SWITCH 1/2 STUCK
P172A-00	GEAR SELECTOR SWITCH
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH PCM
U0146-00	LOST COMMUNICATION WITH CENTRAL GATEWAY
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN

U1008-00	LIN 1 BUS
U1175-00	LOST IGNITION STATUS MESSAGE

MODULE, TELEMATICS GATEWAY

DIAGNOSTIC CODE INDEX

DTC	Description
B1400-11	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE
B1400-11	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B1400-12	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B1400-12	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B1400-13	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B1400-13	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B1400-2B	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - BASE
B1400-2B	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - PREMIUM
B1400-92	FRONT LEFT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1404-11	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE
B1404-11	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B1404-12	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B1404-12	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B1404-13	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B1404-13	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B1404-2B	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - BASE
B1404-2B	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - PREMIUM
B1404-92	FRONT RIGHT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1408-11	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE
B1408-11	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM

B1408-12	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B1408-12	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B1408-13	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B1408-13	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B1408-2B	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - BASE
B1408-2B	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - PREMIUM
B1408-92	REAR LEFT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B140C-11	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE
B140C-11	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B140C-12	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B140C	12 REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B140C-13	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B140C-13	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B140C-2B	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - BASE
B140C-2B	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER - PREMIUM
B140C-92	REAR RIGHT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1424-00	IMPROPER DVD - WRONG REGION
B142A-4B	RADIO UNIT HIGH TEMPERATURE - OVER TEMPERATURE
B142D-13	AUDIO ANTENNA NOT CONNECTED - OPEN CIRCUIT
B142E-13	GPS ANTENNA NOT CONNECTED - CIRCUIT OPEN
B142F-13	SATELLITE RADIO ANTENNA NOT CONNECTED - CIRCUIT OPEN
B143A-11	MICROPHONE 1 - CIRCUIT SHORT TO GROUND
B143A-12	MICROPHONE 1 - CIRCUIT SHORT TO BATTERY
B143A-13	MICROPHONE 1 - CIRCUIT OPEN
B143A-2B	MICROPHONE 1 - WIRES SHORTED TOGETHER
B143D-11	MICROPHONE 2 - CIRCUIT SHORT TO GROUND
B143D-12	MICROPHONE 2 - CIRCUIT SHORT TO BATTERY
B143D-13	MICROPHONE 2 - CIRCUIT OPEN
B143D-2B	MICROPHONE 2 - WIRES SHORTED TOGETHER
B1488	00 CABIN EQ MISMATCH PERFORMANCE

B1562-11	GPS ANTENNA - CIRCUIT TO GROUND
B1562-12	GPS ANTENNA - CIRCUIT TO BATTERY
B1562-2B	GPS ANTENNA - WIRES SHORTED TOGETHER
B156B	2B SATELLITE RADIO ANTENNA - WIRES SHORTED TOGETHER
B1570	00 USB COMMUNICATION
B1572-00	CD/DVD READ ERROR - INOPERABLE DISC
B1577	13 UNIVERSAL CONSUMER INTERFACE (UCI) - OPEN CIRCUIT
B1578	2B AUDIO ANTENNA - WIRES SHORTED TOGETHER
B1579-13	DIVERSITY ANTENNA - OPEN CIRCUIT
B1578-2B	AUDIO ANTENNA - WIRES SHORTED TOGETHER
B157B-00	SATELLITE REGION MISMATCH - US/CANADA
B157C-00	SATELLITE REGION MISMATCH - REST OF WORLD
B210A-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B210B-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B221E-00	RADIO INTERNAL
B222C-00	VEHICLE CONFIGURATION NOT PROGRAMMED
B223B-00	VEHICLE CONFIGURATION MISMATCH
U0010-00	CAN INTERIOR BUS
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0147	00 LOST COMMUNICATION WITH TELEMATICS GATEWAY
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0168-00	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER MODULE
U0186	00 LOST COMMUNICATION WITH AUDIO AMPLIFIER (AMP)
U0197-00	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE (HFM)
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE
U0200-00	LOST COMMUNICATION WITH PASSENGER DOOR MODULE
U0208-00	LOST COMMUNICATION WITH HEATED SEAT CONTROL MODULE
U103A	00 CAN-AT (AUDIO AND TELEMATICS) BUS
U103A	92 CAN-AT (AUDIO AND TELEMATICS) BUS- PERFORMANCE OR INCORRECT OPERATION
U11B8	00 LOST COMMUNICATION WITH INTEGRATED CENTER STACK (ICS)
U11B9-00	LOST COMMUNICATION WITH RF HUB

MODULE, TIRE PRESSURE (TPM)

DIAGNOSTIC CODE INDEX

DTC	Description
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL VOLTAGE BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE

C0077-00	LOW TIRE PRESSURE
C1501-96	TIRE PRESSURE SENSOR 1 - INTERNAL COMPONENT FAILURE
C1502-96	TIRE PRESSURE SENSOR 2 - INTERNAL COMPONENT FAILURE
C1503-96	TIRE PRESSURE SENSOR 3 - INTERNAL COMPONENT FAILURE
C1504-96	TIRE PRESSURE SENSOR 4 - INTERNAL COMPONENT FAILURE
C151C-00	TIRE PRESSURE SENSORS MISSING
C151D-00	TIRE PRESSURE SENSOR LOCATION UNDETERMINED
C1580-00	LEFT/RIGHT SIDE TIRE PRESSURE SENSOR LOCATION UNDETERMINED
C1581-00	FRONT/REAR TIRE PRESSURE SENSOR LOCATION UNDETERMINED
C1597-00	TPM SYSTEM DEACTIVATED-WINTER MODE
C2209-00	TIRE PRESSURE MONITOR INTERNAL
U0001-00	CAN C BUS
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN

MODULE, TRANSMISSION CONTROL (TCM), NAG1

DIAGNOSTIC CODE INDEX

DTC	Description
P0219	ENGINE OVERSPEED
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0562	BATTERY VOLTAGE LOW
P0563	BATTERY VOLTAGE HIGH
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0602	CONTROL MODULE PROGRAMMING ERROR/NOT PROGRAMMED
P0604	INTERNAL CONTROL MODULE RAM
P0605	INTERNAL CONTROL MODULE ROM
P0613	INTERNAL TRANSMISSION PROCESSOR
P0614	ECM/TCM INCOMPATIBLE
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0657	SOLENOID SUPPLY VOLTAGE CIRCUIT
P0710	TRANSMISSION TEMPERATURE SENSOR CIRCUIT
P0712	TRANSMISSION TEMPERATURE SENSOR LOW
P0714	TRANSMISSION TEMPERATURE SENSOR INTERMITTENT
P0717	INPUT SPEED SENSOR 1 CIRCUIT NO SIGNAL
P0730	INCORRECT GEAR RATIO

P0731	GEAR RATIO ERROR IN 1ST
P0732	GEAR RATIO ERROR IN 2ND
P0733	GEAR RATIO ERROR IN 3RD
P0734	GEAR RATIO ERROR IN 4TH
P0735	GEAR RATIO ERROR IN 5TH
P0741	TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE
P0742	TORQUE CONVERTER CLUTCH STUCK ON
P0743	TCC SOLENOID CIRCUIT
P0748	MODULATOR PRESSURE SOLENOID CIRCUIT
P0752	1-2/4-5 SOLENOID
P0753	1-2/4-5 SOLENOID CIRCUIT
P0757	2-3 SOLENOID
P0758	2-3 SOLENOID CIRCUIT
P0762	3-4 SOLENOID
P0763	3-4 SOLENOID CIRCUIT
P0778	SHIFT PRESSURE SOLENOID CIRCUIT
P0817	STARTER DISABLE (P/N) CIRCUIT/OPEN
P1629	TCM INTERNAL - SOLENOID SUPPLY/ WATCHDOG
P1631	TCM INTERNAL- PROCESSOR CLOCK PERFORMANCE
P1632	TCM INTERNAL - TEST INTERNAL WATCHDOG PERFORMANCE
P1633	TCM INTERNAL - TEST EXTERNAL WATCHDOG PERFORMANCE
P1634	TCM INTERNAL- INTERNAL WATCHDOG PERFORMANCE
P1636	TCM INTERNAL- EXTERNAL WATCHDOG PERFORMANCE
P1637	TCM INTERNAL-EEPROM PERFORMANCE
P1638	TCM INTERNAL-CAN 1 RAM PERFORMANCE
P1639	TCM INTERNAL-CAN 2 RAM PERFORMANCE
P1644	INCORRECT VARIANT/CONFIGURATION
P1704	INPUT SPEED SENSOR 1 OVERSPEED
P1705	INPUT SPEED SENSOR 2 OVERSPEED
P1731	INCORRECT GEAR ENGAGED
P2638	TORQUE MANAGEMENT FEEDBACK SIGNAL PERFORMANCE
P2767	INPUT SPEED SENSOR 2 CIRCUIT NO SIGNAL
P2783	TORQUE CONVERTER TEMPERATURE TOO HIGH
P2784	INPUT SPEED SENSOR 1/2 CORRELATION
U0002	CAN C BUS OFF PERFORMANCE
U0100	LOST COMMUNICATION WITH ECM/PCM
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0141	LOST COMMUNICATION WITH IPM
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE

	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0404	IMPLAUSIBLE DATA RECEIVED FROM ESM
U0414	IMPLAUSIBLE DATA RECEIVED FROM FDCM
U0415	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0423	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN
U0424	IMPLAUSIBLE DATA RECEIVED FROM HVAC CONTROL MODULE
U0431	IMPLAUSIBLE DATA FROM FCM/TIPM
U110B	LOST ENGINE COOLANT MESSAGE
U1118	LOST ENGINE MESSAGE
U1119	LOST FCM MESSAGE
U1400	IMPLAUSIBLE TPS SIGNAL RECEIVED
U1401	IMPLAUSIBLE ENGINE SPEED SIGNAL RECEIVED
U1402	IMPLAUSIBLE ENGINE TEMPERATURE SIGNAL RECEIVED
U1404	IMPLAUSIBLE STATIC ENGINE TORQUE SIGNAL RECEIVED
U1405	IMPLAUSIBLE MINIMUM ENGINE TORQUE SIGNAL RECEIVED
U1406	IMPLAUSIBLE MAXIMUM ENGINE TORQUE SIGNAL RECEIVED
U1407	IMPLAUSIBLE ENGINE TORQUE REQUEST SIGNAL RECEIVED
U1408	IMPLAUSIBLE BRAKE SIGNAL RECEIVED
U1409	IMPLAUSIBLE LEFT FRONT WHEEL SPEED SIGNAL RECEIVED
U140A	IMPLAUSIBLE RIGHT FRONT WHEEL SPEED SIGNAL RECEIVED
U140B	IMPLAUSIBLE LEFT REAR WHEEL SPEED SIGNAL RECEIVED
U140C	IMPLAUSIBLE RIGHT REAR WHEEL SPEED SIGNAL RECEIVED
U140D	IMPLAUSIBLE WHEEL SPEED SIGNALS RECEIVED
U140F	IMPLAUSIBLE ENGINE VARIANT DATA
U1410	IMPLAUSIBLE/MISSING FCM VARIANT DATA
U1505	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM FDCM
U1507	IMPLAUSIBLE ENGINE TEMPERATURE MESSAGE DATA LENGTH RECEIVED
U1508	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM ESM
U1509	IMPLAUSIBLE ENGINE VARIANT MESSAGE DATA LENGTH RECEIVED
U150A	IMPLAUSIBLE FCM VARIANT MESSAGE DATA LENGTH RECEIVED

MODULE, TRANSMISSION CONTROL (TCM), 8HP45

DIAGNOSTIC CODE INDEX

DTC	Description
P0219	ENGINE OVERSPEED
P0562	BATTERY/SYSTEM VOLTAGE LOW
P0563	SYSTEM VOLTAGE HIGH
P0601	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR
P060A	INTERNAL CONTROL MODULE MONITORING PROCESSOR

	PERFORMANCE
P0613	INTERNAL TRANSMISSION PROCESSOR
P061B	INTERNAL CONTROL MODULE TORQUE CALCULATION PERFORMANCE
P062F	INTERNAL CONTROL MODULE EEPROM ERROR
P0634	PCM/ECM/TCM INTERNAL TEMPERATURE TOO HIGH
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0657	ACTUATOR SUPPLY VOLTAGE "A" CIRCUIT/OPEN
P0658	ACTUATOR SUPPLY VOLTAGE "A" CIRCUIT LOW
P0659	ACTUATOR SUPPLY VOLTAGE "A" CIRCUIT HIGH
P0666	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT
P0667	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR 1 PERFORMANCE
P0668	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT LOW
P0669	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT HIGH
P06AB	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR "2" CIRCUIT
P06AC	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR 2 PERFORMANCE
P06AD	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT LOW
P06AE	PCM/ECM/TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT HIGH
P0710	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT
P0712	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW
P0713	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH
P0714	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT INTERMITTENT
P0716	INPUT SPEED SENSOR 1 PERFORMANCE
P0721	OUTPUT SPEED SENSOR CIRCUIT PERFORMANCE
P0729	GEAR 6 SHIFT INCORRECT RATIO
P0730	INCORRECT GEAR RATIO
P0731	GEAR 1 SHIFT INCORRECT RATIO
P0732	GEAR 2 SHIFT INCORRECT RATIO
P0733	GEAR 3 SHIFT INCORRECT RATIO
P0734	GEAR 4 SHIFT INCORRECT RATIO
P0735	GEAR 5 SHIFT INCORRECT RATIO
P0741	TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE/STUCK OFF
P0746	PRESSURE CONTROL SOLENOID "A" PERFORMANCE
P0750	SHIFT SOLENOID A CONTROL CIRCUIT / OPEN
P0755	SHIFT SOLENOID B CONTROL CIRCUIT / OPEN
P076F	GEAR 7 SHIFT INCORRECT RATIO
P077C	OUTPUT SPEED SENSOR CIRCUIT LOW
P077D	OUTPUT SPEED SENSOR CIRCUIT HIGH
P077E	TRANSMISSION FLUID TEMPERATURE - MULTIPLE SENSOR

	CORRELATION
P0795	PRESSURE CONTROL SOLENOID "C"
P07BF	INPUT/TURBINE SPEED SENSOR 1 CIRCUIT LOW
P07C0	INPUT/TURBINE SPEED SENSOR 1 CIRCUIT HIGH
P07D9	GEAR 8 SHIFT INCORRECT RATIO
P0801	REVERSE GEAR LOCKOUT CONTROL CIRCUIT
P0810	CLUTCH POSITION CONTROL ERROR
P081C	PARK INPUT CIRCUIT
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P0851	PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW
P0852	PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH
P0960	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT/OPEN
P0961	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0962	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT LOW
P0963	PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT HIGH
P0964	PRESSURE CONTROL SOLENOID 2 CONTROL CIRCUIT OPEN
P0972	SHIFT SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0973	SHIFT SOLENOID "A" CONTROL CIRCUIT LOW
P0974	SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH
P0975	SHIFT SOLENOID B CONTROL CIRCUIT PERFORMANCE
P0976	SHIFT SOLENOID "B" CONTROL CIRCUIT LOW
P0977	SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH
P0978	SHIFT SOLENOID "C" CONTROL CIRCUIT RANGE/PERFORMANCE
P0979	SHIFT SOLENOID C CONTROL CIRCUIT LOW
P0980	SHIFT SOLENOID C CONTROL CIRCUIT HIGH
P0981	SHIFT SOLENOID "D" CONTROL CIRCUIT RANGE/PERFORMANCE
P0982	SHIFT SOLENOID D CONTROL CIRCUIT LOW
P0983	SHIFT SOLENOID D CONTROL CIRCUIT HIGH
P0984	SHIFT SOLENOID "E" CONTROL CIRCUIT RANGE/PERFORMANCE
P0985	SHIFT SOLENOID "E" CONTROL CIRCUIT LOW
P0986	SHIFT SOLENOID "E" CONTROL CIRCUIT HIGH
P1601	INTERNAL TCM COMPUTER ERROR
P1614	ECU RESET/RECOVERY OCCURRED
P1634	TCM INTERNAL - INTERNAL WATCHDOG PERFORMANCE
P167A	CALIBRATION MISMATCH
P1731	INCORRECT GEAR ENGAGED
P1915	TRANSMISSION INHIBITED REMOTE START
P1B13	PARK-BY-WIRE - UNINTENDED OUT OF PARK POSITION
P1B14	PARK-BY-WIRE - UNINTENDED PARK POSITION
P1C4E	ABS DTC PRESENT

P1D20	MULTI MODULE HANDSHAKE FAILURE
P1D25	SHIFT CONTROL RATIONALITY
P1D6C	THERMAL DAMAGE TO CLUTCHES
P1D77	PARK SOLENOID RANGE/PERFORMANCE
P1D78	PARK SOLENOID CIRCUIT LOW
P1D79	PARK SOLENOID CIRCUIT HIGH
P1D8A	PARK PAWL SOLENOID CIRCUIT LOW
P1D8B	PARK PAWL SOLENOID CIRCUIT HIGH
P1D8C	PARK PAWL SOLENOID CIRCUIT OPEN
P1D8D	PARK SENSE CIRCUIT LOW
P1D8E	PARK SENSE CIRCUIT HIGH
P1D8F	INCORRECT GEAR RATIO - CLUTCH 1 DEFECTIVE
P1D90	INCORRECT GEAR RATIO - CLUTCH 2 DEFECTIVE
P1D91	INCORRECT GEAR RATIO - CLUTCH 3 DEFECTIVE
P1D92	INCORRECT GEAR RATIO - CLUTCH 4 DEFECTIVE
P1D93	INCORRECT GEAR RATIO - CLUTCH 5 DEFECTIVE
P1D94	TCM INTERNAL - SBW CALIBRATION MISMATCH
P1D95	TCM CLUTCH FAILURE UNDETERMINED
P1D96	INCORRECT GEAR RATIO: CLUTCH A OR B DEFECTIVE
P1D97	INCORRECT GEAR RATIO: CLUTCH A OR D DEFECTIVE
P1D98	INCORRECT GEAR RATIO: CLUTCH B OR D DEFECTIVE
P1D99	INCORRECT GEAR RATIO: CLUTCH B OR E DEFECTIVE
P1D9A	INCORRECT GEAR RATIO: CLUTCH C OR D DEFECTIVE
P1D9B	INCORRECT GEAR RATIO: CLUTCH A OR E DEFECTIVE
P1D9C	INCORRECT GEAR RATIO: CLUTCH A OR C DEFECTIVE
P1D9D	INCORRECT GEAR RATIO: CLUTCH B OR C DEFECTIVE
P1D9E	INCORRECT GEAR RATIO: CLUTCH C OR E DEFECTIVE
P1D9F	INCORRECT GEAR RATIO: CLUTCH D OR E DEFECTIVE
P1DA0	INCORRECT GEAR RATIO: CLUTCH A, B, OR C DEFECTIVE
P1DA1	INCORRECT GEAR RATIO: CLUTCH A, B, OR E DEFECTIVE
P1DA2	INCORRECT GEAR RATIO: CLUTCH B, C, OR E DEFECTIVE
P1DA3	INCORRECT GEAR RATIO: CLUTCH B, D, OR E DEFECTIVE
P1DA4	INCORRECT GEAR RATIO: CLUTCH B, C, OR D DEFECTIVE
P1DA5	INCORRECT GEAR RATIO: CLUTCH C, D, OR E DEFECTIVE
P1DA6	INCORRECT GEAR RATIO: CLUTCH A, C, OR D DEFECTIVE
P1DA7	INCORRECT GEAR RATIO: CLUTCH A, D, OR E DEFECTIVE
P1DA8	INCORRECT GEAR RATIO: CLUTCH A, B, OR D DEFECTIVE
P1DA9	TRANSMISSION FLUID TEMPERATURE RATIONALITY
P1DAA	TRANS TEMP UNDETERMINED
P1DAB	VEHICLE SPEED UNDETERMINED
P1DAC	ENGINE SPEED UNDETERMINED

	INPUT SHAFT/OUTPUT SHAFT DIRECTION CORRELATION
P1DAE	POSITION VALVE STUCK - 6TH GEAR TRANS LIMP IN
P1DAF	INCOMPATIBLE LIMP IN ACTION REQUESTED
P1DB0	IMPLAUSIBLE TORQUE REQUEST SIGNAL SENT
P1DB1	TCM SYSTEM VOLTAGE EXCESSIVELY LOW
P1DB2	ACTUATOR SUPPLY VOLTAGE "A" CIRCUIT
P1DB3	TCM ECU RESET/RECOVERY OCCURRED
P1DB4	INCORRECT GEAR RATIO DURING GEAR ENGAGEMENT OR IN GEAR
P1DB5	INCORRECT GEAR RATIO DURING SHIFT
P1DB6	VEHICLE SPEED SIGNAL PERFORMANCE
P1DB7	TORQUE CONVERTER CLUTCH PERFORMANCE
P1DB8	UNINTENDED TORQUE APPLIED WHILE IN NEUTRAL
P1DB9	TCM ECU RESET - EXTENDED LOW VOLTAGE
P1DC7	CLUTCH TEMP THRESHOLD ACHIEVED - SHIFT TIME REDUCTION
P1DC8	CLUTCH TEMP THRESHOLD ACHIEVED - AUTOSTICK INHIBIT
P1DC9	CLUTCH TEMP THRESHOLD ACHIEVED - SKIP SHIFT DOWN INHIBIT
P1DCA	PARK SENSE CIRCUIT OPEN
P1DCD	TCM MONITORING PROCESSOR PERFORMANCE - MULTIPLE CLUTCHES LOCKED UP
P1DCE	TCM MONITORING PROCESSOR PERFORMANCE - INCORRECT DRIVING DIRECTION
P1DCF	TCM MONITORING PROCESSOR PERFORMANCE - UNALLOWED PARK ENGAGEMENT DO TO ABS FAILURE
P1DD0	TCM MONITORING PROCESSOR PERFORMANCE - UNALLOWED PARK ENGAGEMENT
P1DD1	INPUT/TURBINE SPEED SENSOR 1 GRADIENT FAULT
P1DD2	TORQUE REQUEST SIGNAL FROM TCM DENIED
P1DDC	TCM MONITORING PROCESSOR PERFORMANCE - UNALLOWED REVERSE ENGAGEMENT
P1DDD	TCM MONITORING PERFORMANCE - UNABLE TO DISENGAGE DRIVE OR REVERSE
P1DDE	IGNITION RUN/START INPUT 1/2 CORRELATION
P1DEB	INCORRECT GEAR DISPLAYED DUE TO INCORRECT GEAR RATIO
P1DF3	ECU NOT INITIALIZED
P1DF7	ACTUAL DECREASE OF ENGINE TORQUE - LOW
P1DF8	ACTUAL DECREASE OF ENGINE TORQUE - HIGH
P1DF9	ACTUAL INCREASE OF ENGINE TORQUE - LOW
P1DFA	ACTUAL INCREASE OF ENGINE TORQUE - HIGH
P215C	OUTPUT SHAFT SPEED - WHEEL SPEED CORRELATION
P2713	PRESSURE CONTROL SOLENOID "D"
P2722	PRESSURE CONTROL SOLENOID "E"
P2761	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID

	CONTROL CIRCUIT/OPEN
P2762	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT RANGE/PERFORMANCE
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH
P2764	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW
U0001	CAN C BUS
U0002	CAN C BUS OFF PERFORMANCE
U0074	DEDICATED POWERTRAIN (D-PT) CAN BUS OFF
U0100	LOST COMMUNICATION WITH ECM/PCM
U0102	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE / AWD
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U0401	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0403	IMPLAUSIBLE DATA RECEIVED FROM T-CASE
U0404	IMPLAUSIBLE DATA RECEIVED FROM ESM
U0415	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN
U0429	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0452	IMPLAUSIBLE DATA RECEIVED FROM RESTRAINTS CONTROL MODULE
U11C3	ESM LOST COMMUNICATION WITH TCM ON D-PT CAN
U11E4	CAN COMMUNICATION MESSAGES MISSING
U1400	IMPLAUSIBLE TPS SIGNAL RECEIVED
U1401	IMPLAUSIBLE ENGINE SPEED SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1424	IMPLAUSIBLE ENGINE TORQUE SIGNAL RECEIVED
U1461	IMPLAUSIBLE DATA RECEIVED FROM ESM ON D-PT
U1465	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED
U1466	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON D-PT CAN
U1467	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON CAN

	AND D-PT CAN
U1469	IMPLAUSIBLE GEAR SHIFT POSITION SIGNAL SENT D-PT CAN/CAN
U1477	IMPLAUSIBLE PADDLE SHIFTER DATA RECEIVED
U1479	IMPLAUSIBLE DATA RECEIVED FROM SHIFTER - MECHANICAL FAILURE

STANDARD PROCEDURE

FLASH PROGRAMMING

NOTE: The wiTECH diagnostic application is the only recommended method for flashing ECUs.

NOTE: Help using the wiTECH diagnostic application for flashing an ECU is available by selecting "Help" then "Help Contents" at the top of the wiTECH diagnostic application window.

NOTE: The wiTECH software level must be at the latest release to perform this procedure.

FOBIK PROGRAMMING

The Radio Frequency Hub (RF-Hub) may be programmed to recognize up to a total of eight FOBIKs. When replacing or adding a FOBIK, the integrated key must be cut to match the door lock cylinder in the vehicle for which it will be used. Once an additional or new key has been cut, the RF-Hub must be programmed to recognize it as a valid FOBIK. When programming a FOBIK it may be necessary to have the vehicle PIN. Follow the instructions on the scan tool screen.

Programming

NOTE: All FOBICs that are to be used in this vehicle must remain on the front seat near the center console but behind the shifter.

NOTE: Do not put a Laptop or any wireless device (cell phone, audio device, etc.) on top of or near the center console. The RF Antenna is below the console.

1. Turn the ignition on.
2. With the scan tool select RFH.
3. Turn the ignition to the off/lock position. The ignition must be left off throughout this procedure on vehicles equipped with the RF-Hub.
4. With the scan tool select; "Misc. Functions" "Program Ignition FOBIKs".

NOTE: When programming a FOBIK, hold it near or on the center console top.

NOTE: When you are instructed to "Press the Unlock button" it is important that you do not hold the button. Press it One time quickly.

5. Press "Continue" and follow the instructions on the screen.

RF-HUB, BCM, PCM, FOBIK AND ELV REPLACEMENT AND PROGRAMMING ORDER GUIDE

Module	MODULE REPLACEMENT GUIDE (RF-HUB, BCM, PCM, FOBiK and ELV							
	Condition 1	**Condition 2**	**Condition 3**	**Condition 4**	**Condition 5**	**Condition 6**	**Condition 7**	**Co**
RF-HUB (and ELV/ESCL if equipped)	New	Existing	Existing	Existing	New	New	New	E
BCM	Existing	New	Existing	Existing	New	Existing	Existing	
FOBIKs	Existing	Existing	New	Existing	Existing	New	Existing	
PCM	Existing	Existing	Existing	New	Existing	Existing	New	E
PROGRAMMING ORDER	ASSOCIATED MODULE MISC. FUNCTION							
1	Program Ignition FOBIKs (ignition off)	Cycle ignition on and wait 10 seconds	Program Ignition FOBIKs (ignition off)	Flash update PCM (if PCM arrives in a generic state)	Run Restore Vehicle Configuration (should enable PCM and RF-HUB)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Pr Ig F (ig
2	RF-HUB Replace	----	----	Check PCM VIN and other PCM routines	Program Ignition FOBIKs (ignition off)	RF-HUB Replace	Flash PCM (if PCM arrives in a generic state)	Cy ign an 10 se
3	ELV or ESCL Replace (if ELV/ESCL equipped) (ignition on)	----	----	----	Run Restore Vehicle Configuration again to write full configuration	ELV or ESCL Replace (if ELV/ESCL equipped) (ignition on)	Check PCM VIN and other PCM routines	----
4	----	----	----	----	RF-HUB Replace	----	RF-HUB Replace	
5	----	----	----	----	ELV or ESCL Replace (if ELV/ESCL equipped) (ignition on)	----	ELV or ESCL Replace (if ELV/ESCL equipped) (ignition on)	

Module	MODULE REPLACEMENT GUIDE (RF-HUB, BCM, PCM, FOBiK and ELV)						
	Condition 9	**Condition 10**	**Condition 11**	**Condition 12**	**Condition 13**	**Condition 14**	**Condition 15**
RF-HUB (and ELV/ESCL if equipped)	Existing	Existing	Existing	New	New	New	New
BCM	New	Existing	New	Existing	New	New	New
FOBiKs	Existing	New	New	New	Existing	New	New
PCM	New	New	New	New	New	Existing	New
PROGRAMMING ORDER	ASSOCIATED MODULE MISC. FUNCTION						
1	Flash update PCM (if PCM arrives in a generic state)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Run Restore Vehicle Configuration (should enable PCM and RF-HUB)	Run Restore Vehicle Configuration (should enable PCM and RF-HUB)	Run Restor Vehicle Configuratio (should enable PCI and RF-HUB)
2	Check PCM VIN and other PCM routines	Flash update PCM (if PCM arrives in a generic state)	Flash update PCM (if PCM arrives in a generic state)	Flash update PCM (if PCM arrives in a generic state)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition of
3	----	Check PCM VIN and other PCM routines	Check PCM VIN and other PCM routines	Check PCM VIN and other PCM routines	Flash update PCM (if PCM arrives in a generic state)	Run Restore Vehicle Configuration again to write full configuration	Flash upda PCM (if PC arrives in a generic state)
4	----	----	----	RF-HUB Replace	Check PCM VIN and the other needed PCM routines	RF-HUB Replace	Check PCI VIN and th other neede PCM routines
5	----	----	----	ELV or ESCL Replace (if ELV/ESCL equipped) (ignition on)	Run Restore Vehicle Configuration again to write full configuration	ELV or ESCL Replace (if ELV/ESCL equipped) (ignition on)	Run Restor Vehicle Configuratio again to wri full configuratio
6	----	----	----	----	RF-HUB Replace	----	RF-HUB Replace

7	----	----	----	----	ELV or ESCL Replace (if ELV/ESCL equipped) (ignition on)	----	ELV or ESC Replace (i ELV/ESCL equipped) (ignition or

RF-HUB INITIALIZATION - EXPORT WITH COLUMN LOCK MODULE

CAUTION: On vehicles equipped with the optional export premium Vehicle Theft System, when either the Radio Frequency Hub RF-Hub) or the shaft lock module (also known as Elektrische Lenksaulen Verriegelung/ELV or Electric Steering Column Lock/ESCL) is replaced with a new unit, the existing RF-Hub or ELV/ESCL MUST also be replaced with a new unit. In other words, any time either the RF-Hub or the ELV/ESCL is replaced with a new unit, BOTH the RF-Hub and the ELV/ESCL MUST be replaced with new units, WITHOUT EXCEPTION. Following replacement of BOTH the RF-Hub and the column lock module/ELV/ESCL, the two modules MUST be initialized using diagnostic scan tool routines in the EXACT SEQUENCE that follows. Failure to follow this sequence may result in BOTH the new RF-Hub and the new ELV/ESCL being rendered unusable, requiring BOTH units to be replaced a second time.

NOTE: Do not put a laptop or any wireless device (cell phones, audio devices etc.) near the top of the center console (the RKE antenna is located below the center console).

1. After both the RF-Hub and the ELV/ESCL have been replaced with new units, connect the diagnostic scan tool to the Data Link Connector (DLC).
2. Turn the ignition ON
3. Navigate to the RF-Hub in the ECU View of the diagnostic scan tool.
4. Turn the ignition OFF
5. Put all the FOBICs used in this vehicle on the front seat away from the console.
6. With the scan tool select: "Program ignition FOBIKs" in the Miscellaneous Functions menu and follow the instructions on the screen.

NOTE: When programming a FOBIK, have it in your hand resting on the console.

7. After all the FOBIKs have been programmed, run the "RF-Hub Replace" routine.
8. Turn the ignition on.
9. Run the ELV Replaced routine, also found under the Miscellaneous Functions menu item of the RF-Hub in the ECU View of the diagnostic scan tool.
10. Turn the ignition to the OFF position, wait 30 seconds, then cycle the ignition back to the ON/RUN position.
11. Verify that the ELV Locks the steering column when the ignition is turned off and Unlocks the

steering column when the ignition is turned On.

COMMUNICATION

DESCRIPTION

DESCRIPTION

The primary on-board communication network between microprocessor-based electronic control modules in this vehicle is the Controller Area Network (CAN) data bus system. A data bus network minimizes redundant wiring connections; and, at the same time, reduces wire harness complexity, sensor current loads and controller hardware by allowing each sensing device to be connected to only one module (also referred to as a node). Each node reads, then broadcasts its sensor data over the bus for use by all other nodes requiring that data. Each node ignores the messages on the bus that it cannot use.

The CAN bus is a two-wire multiplex system. Multiplexing is any system that enables the transmission of multiple messages over a single channel or circuit. The CAN bus is used for communication between most vehicle nodes. However, in addition to the CAN bus network, certain nodes may also be equipped with a Local Interface Network (LIN) data bus. The LIN data bus is a single wire low-speed (9.6 Kbps) serial link bus used to provide direct communication between a LIN master module and certain switch or sensor inputs.

There are actually three separate CAN bus systems used in the vehicle. They are designated: the CAN-IHS, the CAN-C and the CAN-AT. The CAN-IHS and CAN-C systems provide on-board communication between all of the nodes that are connected to them. The CAN-C is the faster of the two systems providing near real-time communication (500 Kbps). The CAN-C is used typically for communications between more critical nodes, while the slower (125 Kbps). The CAN-IHS system is used for communications between less critical nodes.

The added speed of the CAN data bus is many times faster than previous data bus systems. This added speed facilitates the addition of more electronic control modules or nodes and the incorporation of many new electrical and electronic features in the vehicle.

The BCM is located under the instrument panel to right of the glove box. The central CAN gateway or hub module integral to the BCM is connected to CAN-IHS and CAN-C buses. This gateway physically and electrically isolates the CAN buses from each other and coordinates the bi-directional transfer of messages between them.

A third CAN bus on this vehicle is the CAN-AT (Audio and Telematics) Bus. The CTP Radio also known as the Telematics Gateway (TGW) transfers messages between the CAN-AT and CAN IHS buses. Examples of modules on the CAN-AT bus include the Amplifier, Integrated Center Stack (ICS) and the Hands Free Module (HFM). The TGW also stores DTCs for certain bus network faults.

All modules transmit and receive messages over one of these buses. Data exchange between the modules is achieved by serial transmission of encoded data messages (a form of transmission in which data bits are sent sequentially, one at a time, over a single line). Each module can both send

and receive serial data simultaneously. Each data bit of a CAN Bus message is carried over the bus as a voltage differential between the two bus circuits which, when strung together, form a message. Each module uses arbitration to sort the message priority if two competing messages are attempting to be broadcast at the same time. Corruption of a single bit within a message will corrupt the entire message. Each message contains a Cyclic Redundancy Check (CRC) which specifies the message size exactly. If the message detected conflicts with the CRC the ECU receiving it will determine the message to be an error and consider that communication has not been possible. Diagnosis of this condition using a lab scope may reveal activity that appears to be Bus data messages even if no actual communication is possible. Communication problems that affect the whole bus, as a result of opens and terminal push outs are more likely to occur on data busses that operate at a high speed than a data bus that operates at a lower speed

OPERATION

OPERATION

The primary communication network between electronic control modules on this vehicle is the Controller Area Network (CAN) data bus system. The Controller Area Network (CAN) data bus allows all electronic modules connected to the bus to share information with each other. Regardless of whether a message originates from a module on the higher speed CAN C (500K) Bus or on the lower speed CAN Interior High Speed (IHS) (125K) Bus the message structure and layout is similar, which allows the Body Control Module (BCM) to be a Central GateWay to process and transfer messages between the CAN C and CAN IHS buses. The BCM also stores Diagnostic Trouble Codes (DTCs) for certain bus network faults. A third CAN bus on this vehicle is the CAN-AT (Audio and Telematics) Bus. The CTP Radio also known as the Telematics Gateway (TGW) transfers messages between the CAN-AT and CAN IHS buses. Examples of modules on the CAN-AT bus include the Amplifier, Integrated Center Stack (ICS) and the Hands Free Module (HFM). The TGW also stores DTCs for certain bus network faults.

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When an open circuit or terminal push out occurs one or more modules can become isolated from the remainder of the bus. The isolated module will attempt to communicate, but will not be able to receive messages or determine arbitration from other modules. Each time the isolated module attempts to communicate it alters the bus voltage on the intact bus circuit. Without functioning arbitration the

isolated module alters the bus voltage while other bus messages are being sent thereby corrupting the messages on the remainder of the bus.

NOTE: All measurement of termination resistance is done with the vehicle battery disconnected.

The communication protocol being used for the CAN data bus is a non-proprietary, open standard adopted from the Bosch CAN Specification 2.0b. The CAN-C is the faster of the two primary buses in the CAN bus system, providing near real-time communication (500 Kbps). CAN-IHS and CAN-AT communicate at (125 Kbps).

The CAN bus nodes are connected in parallel to the two-wire bus using a twisted pair, where the wires are wrapped around each other to provide shielding from unwanted electromagnetic induction, thus preventing interference with the relatively low voltage signals being carried through them. The twisted pairs have between 33 and 50 twists per meter (yard). While the CAN bus is operating (active), one of the bus wires will carry a higher voltage and is referred to as the CAN High or CAN bus (+) wire, while the other bus wire will carry a lower voltage and is referred to as the CAN Low or CAN bus (-) wire. Refer to the CAN Bus Voltages table.

CAN Bus Voltages (Normal Operation)								
CAN-C Bus Circuits	**Sleep**	**Recessive (Bus Idle)**	**Dominant (Bus Active)**	**CAN-L Short to Ground**	**CAN-H Short to Ground**	**CAN-L Short to Battery**	**CAN-H Short to Battery**	**CAN-H Short to CAN-L**
CAN-L (-)	0 V	2.4 - 2.5 V	1.3 - 2.3 V	0 V	0.3 - 0.5V	Battery Voltage	Battery Voltage Less 0.75 V	2.45 V
CAN-H (+)	0 V	2.4 - 2.5 V	2.6 - 3.5 V	0.02 V	0 V	Battery Voltage Less 0.75 V	Battery Voltage	2.45 V
CAN-IHS Bus Circuits	**Key-Off (Bus Asleep)**		**Key-On (Bus Active)**	**CAN-L Short to Ground**	**CAN-H Short to Ground**	**CAN-L Short to Battery**	**CAN-H Short to Battery**	**CAN-H Short to CAN-L**
CAN-L (-)	0.0V		1.3 - 2.3 V	0 V	0.3 - 0.5 V	Battery Voltage	Battery Voltage Less 0.75 V	2.45 V
CAN-H (+)	0.0 V		2.6 - 3.5 V	0.02 V	0 V	Battery Voltage Less 0.75 V	Battery Voltage	2.45 V
Notes								
All measurements taken between node ground and CAN terminal with a standard DVOM. DVOM will display average network voltage.								

Total resistance of CAN networks can be measured with the battery disconnected. The average resistance is approximately 60 Ohms. The termination resistors are integral to the Star Connectors.

The CAN-IHS bus network remains active until all nodes on that network are ready for sleep. This is determined by the network using tokens in a manner similar to polling. When the last node that is active on the network is ready for sleep, and it has already received a token indicating that all other nodes on the bus are ready for sleep, it broadcasts a **bus sleep acknowledgment** message that causes the network to sleep. Once the CAN-IHS bus network is asleep, any node on the bus can awaken it by transmitting a message on the network. The BCM will keep either the CAN-IHS or the CAN-C bus awake for a timed interval after it receives a diagnostic message for that bus over the Diagnostic CAN-C bus.

In the CAN system, available options are configured into the BCM at the assembly plant, but additional options can be added in the field using the diagnostic scan tool. The configuration settings are stored in non-volatile memory. The BCM also has two 64-bit registers, which track each of the **as-built** and **currently responding** nodes on the CAN-B and CAN-C buses. The BCM stores a Diagnostic Trouble Code (DTC) in one of two caches for any detected active or stored faults in the order in which they occur. One cache stores powertrain (P-Code), chassis (C-Code) and body (B-Code) DTCs, while the second cache is dedicated to storing network (U-Code) DTCs.

MODULE, A/C AND HEATER

DESCRIPTION

DESCRIPTION

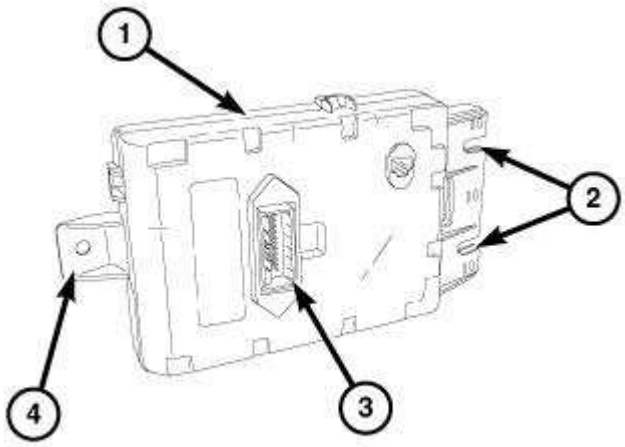

Fig. 1: A/C Heater Module, Mounting Tabs & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

The A/C heater module (1) is a microprocessor designed to operate the heating and A/C system,

using the Controller Area Network (CAN) data bus. The A/C heater module has a plastic housing with one integral electrical connector receptacle (3) and three mounting tabs (2 and 4).

The A/C heater module is located on the air inlet housing, on the passenger side of the vehicle.

OPERATION

OPERATION

The A/C heater module utilizes integrated circuitry and information carried over the Controller Area Network (CAN) data bus to monitor many sensors and switch inputs throughout the vehicle. In response to those inputs, the internal circuitry and programming of the A/C heater module allows it to control electronic functions and features of the heating and A/C system.

Some of the inputs received by the A/C heater module over the CAN bus are as follows:

- A/C Request
- Ambient Air Temperature
- Electric Back Light (EBL) Request
- Electrical System Voltage
- Engine Coolant Temperature
- Engine Speed
- Humidity, Windshield Glass Temperature and Dewpoint (ATC only)
- Refrigerant Pressure
- Vehicle Identification Number
- Vehicle Odometer

Some of the messages broadcasted by the A/C heater module on the CAN bus are as follows:

- A/C Clutch Engage
- Auto Headlamp Signal
- EBL Status

The A/C heater module receives the following information over hardwired circuits:

- Auto Headlamp Signal
- Evaporator Temperature
- Interior Air Temperature
- Left and Right Sun Load

The A/C heater module monitors and controls the following over hardwired circuits:

- Driver and Passenger Blend Door Positions

- Blower Motor Speed
- Mode Door Position
- Recirculation Door Position

The A/C heater module is diagnosed using a scan tool. Prior to replacing an A/C heater module, run the calibration procedure to verify that the concern is not an air door calibration issue. Refer to **STANDARD PROCEDURE** .

The A/C heater module cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Illustration shown with instrument panel removed from view for clarity.

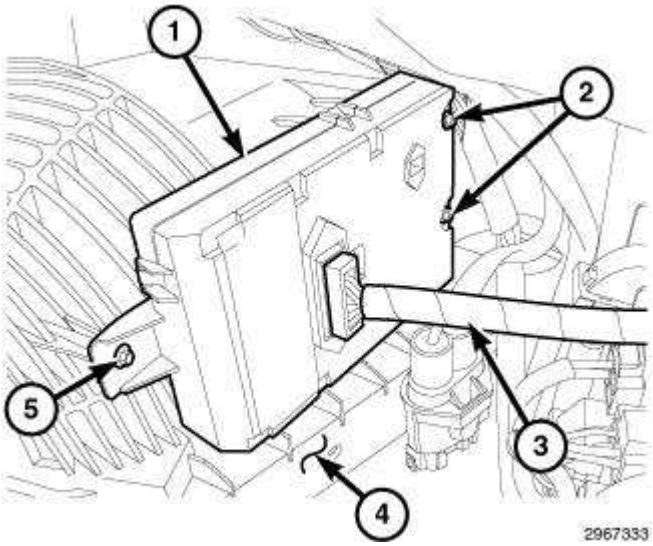

Fig. 2: Wire Harness Connector, A/C Heater Module & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the right side instrument panel silencer panel. Refer to **PANEL, SILENCER,**

REMOVAL .

3. Remove the glove box and the glove box trim panel from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
4. Disconnect the wire harness connector (3) from the A/C heater module (1), located on the air inlet housing (4).

NOTE: It is not necessary to fully remove the two front A/C heater module retaining screws. The front A/C heater module retaining tabs are slotted to aid in module service.

5. Loosen the two screws (2) that secure the front of the A/C heater module to the air inlet housing.
6. Remove the one screw (5) that secures the rear of the A/C heater module to the air inlet housing.
7. Slide the A/C heater module rearward to disengage the module from the two front retaining screws and remove the module.

INSTALLATION

INSTALLATION

NOTE: Illustration shown with instrument panel removed from view for clarity.

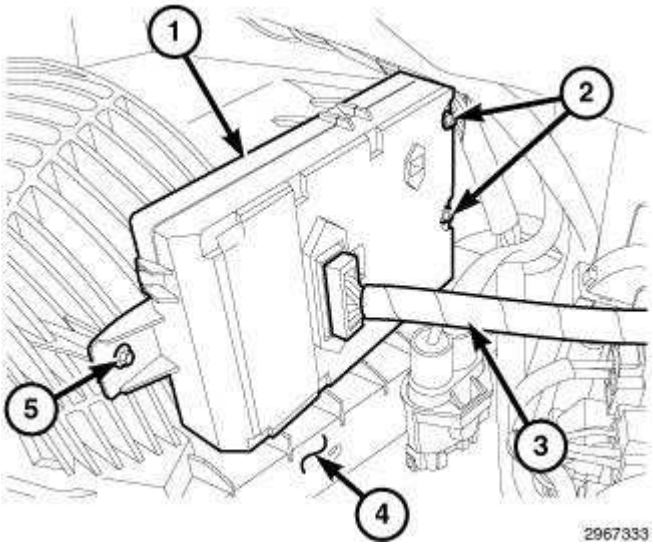

Fig. 3: Wire Harness Connector, A/C Heater Module & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the A/C heater module (1) to the air inlet housing (4) and engage the module to the two front retaining screws (2).
2. Loosely install the screw (5) that secures the rear of the A/C heater module to the air inlet housing.

3. Tighten all the screws that secure the A/C heater module to the air inlet housing to 2 N.m (17 in. lbs.).
4. Connect the wire harness connector (3) to the A/C heater module.
5. Install the glove box trim panel and glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
6. Install the right side instrument panel silencer. Refer to **PANEL, SILENCER, INSTALLATION** .
7. Reconnect the negative battery cable.
8. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

MODULE, ACTIVE DAMPING CONTROL

DESCRIPTION

DESCRIPTION

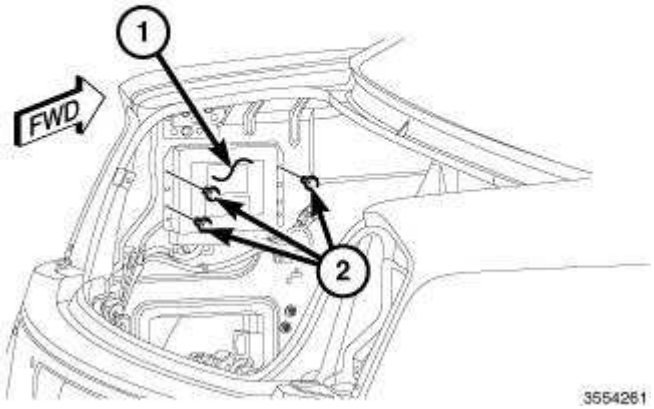

Fig. 4: ADCM & Three Mounting Screws
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with Active Damping Suspension (ADS) have an Active Damping Control Module (ADCM). The ADCM (1) is located in the left side of the trunk and is retained by three mounting screws (2). The carpet on the left side of the trunk has to be repositioned to access the ADCM.

OPERATION

OPERATION

The Active Damping Control Module (ADCM) uses the CAN bus to communicate with multiple modules. The ADCM has the following inputs: Vehicle Speed, Steering Angle Sensor (SAS) position, Throttle Position Sensor (TPS), Active Damping System (ADS) input switch, and 3 ADS sensors. There are solenoid-controlled ADS valving units on each shock absorber assembly which are the

outputs for the ADCM.

The ADS input switch is a soft touch button on the radio display. When the ADS input switch is pressed with the key in the ON or RUN position, a signal is sent over the CAN bus to the ADCM and the Transmission Control Module (TCM) to change modes. The resulting change is indicated on the radio display.

The Active Damping Control Module (ADCM) controls the suspension and ride for the SRT version of this vehicle by adjusting the rebound and jounce of the shock assemblies using the above information and predetermined settings for maximum vehicle control. The shock absorbers are unique to the Active Damping System (ADS). Each shock absorber has a valving unit that is external, but still part of the shock absorber. Inside each valving unit are two solenoids that control the damping valves to alter the ride of the vehicle. The shocks are replaced as an assembly, they cannot be disassembled for repair.

The two front ADS sensors are mounted with one on each wheel well. The rear ADS sensor is mounted in the right rear wheel well on the shock tower. The ADCM is located in the left side of the trunk.

Two Mode ADS

Early build vehicles have a two mode Active Damping System (ADS), which consists of Auto and Sport Modes. The normal operating mode is Auto, and it is switched to and from Sport with the soft button on the radio display. When Sport is selected, ADS is activated and there is no change with the transmission programming.

Three Mode ADS

Later vehicles have a three mode Active Damping System (ADS), which consists of Auto, Sport, and Track modes. The normal operating mode is Auto, and it is switched to and from Sport or Track with the soft button on the radio display. If either Sport or Track is active during an ignition on-off-on cycle, the mode reverts to Sport. When Sport is selected, ADS is activated and there is no change with the transmission programming. When Track is selected, ADS and sport shifting in the trasmission are activated.

REMOVAL

REMOVAL

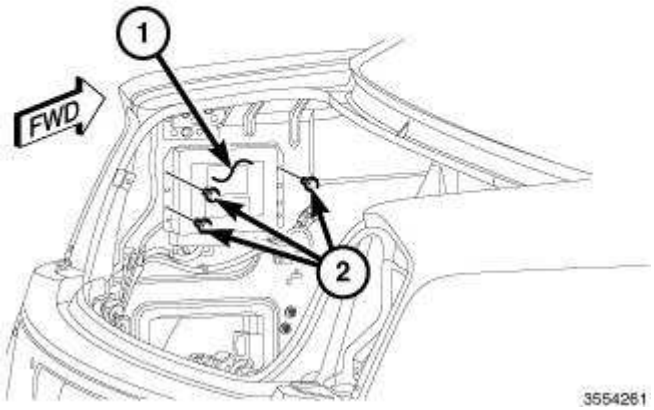

Fig. 5: ADCM & Three Mounting Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the left side inner trunk fasteners and position the carpet aside.
3. Disconnect the wire harness connectors and remove the three screws (2) from the Adaptive Damping Control Module (ADCM).
4. Release the integral latches that secure the ADCM (1) to the mounting bracket and slide the module upward to remove from the vehicle.

INSTALLATION

INSTALLATION

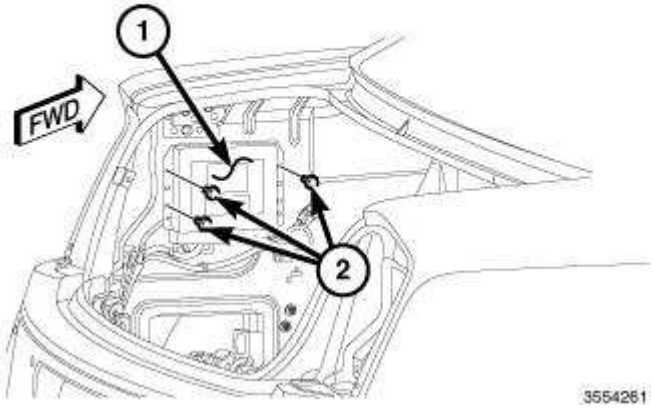

Fig. 6: ADCM & Three Mounting Screws
Courtesy of CHRYSLER GROUP, LLC

1. Slide the Active Damping Control Module (ADCM) (1) into position making sure the latches secure the ADCM.
2. Install the retaining screws (2) and tighten to 9 N.m (80 in. lbs.).
3. Connect the wire harness connectors to the ADCM (1).
4. Position the carpet back in the original location and install the fasteners.
5. Connect the negative battery cable. Refer to **CABLES, BATTERY, INSTALLATION** .
6. Perform the ADCM Verification Test.

MODULE, ADAPTIVE FRONT LIGHTING SYSTEM

DESCRIPTION

DESCRIPTION

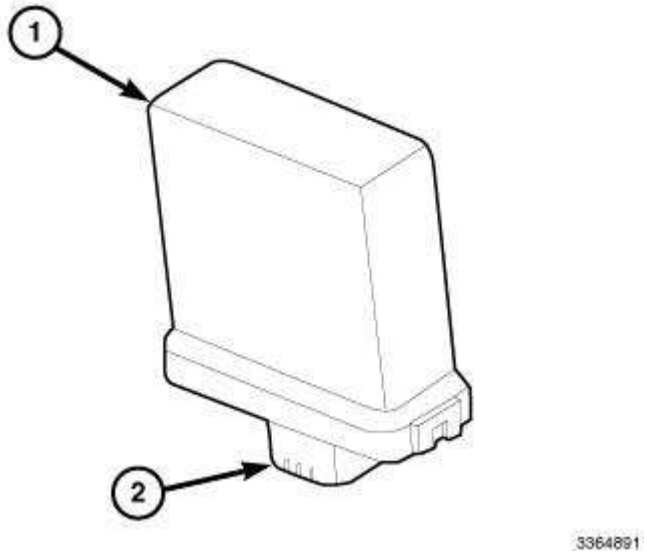

Fig. 7: AFLS Module & Integral Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional Adaptive Front Lighting System (AFLS) (which includes the features formerly known as the headlamp leveling system required in some export markets) are also equipped with an AFLS module (1). The AFLS module is located on a bracket at the right front corner of the Power Distribution Center (PDC) located in the right front corner of the engine compartment.

This module works in conjunction with the front and rear axle (leveling) sensors, the headlamp leveling motors, the headlamp swiveling motors and electronic message inputs received over the Controller Area Network (CAN) data bus from other electronic modules in the vehicle. The module provides automatic headlamp beam aim adjustment to compensate for changes in vehicle height or direction caused by changes in vehicle loading, acceleration, deceleration, steering wheel angle and YAW rate.

The molded black plastic AFLS module housing has an integral latching mount that secures the unit

to a stamped metal blade-type bracket integral to the PDC bracket. Concealed within the housing is the circuitry of the module, which includes a microprocessor. The module is connected to the vehicle electrical system through an integral connector receptacle (2) by a take out and connector of the headlamp and dash wire harness.

The AFLS module cannot be adjusted or repaired and, if ineffective or damaged, it must be replaced. The AFLS module is Flash programmable.

OPERATION

OPERATION

The microprocessor in the Adaptive Front Lighting System (AFLS) module contains the logic circuits and controls all of the features of the AFLS. The AFLS module also controls the functions previously performed by the Automatic Headlamp Leveling Module (AHLM). The AFLS module uses On-Board Diagnostics (OBD) and communicates with other electronic modules in the vehicle as well as with a diagnostic scan tool using the Controller Area Network (CAN) data bus. The AFLS module is also a Local Interface Network (LIN) master node and uses this method of communication to communicate with the two stepper motors within each right and left front lamp unit.

The AFLS module microprocessor continuously monitors electronic message inputs from the Body Control Module (BCM) (also known as the Common Body Controller/CBC), the Integrated Center Stack (ICS), the Steering Angle Sensor (SAS), the Steering Control Module (SCM) and the Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM, the Antilock Brake System/ABS module or the Electronic Stability Control/ESC module). The AFLS module also energizes or de-energizes the front and rear axle sensors as appropriate to monitor the vehicle height. When the axle sensors are energized, the AFLS module monitors and evaluates the Pulse Width Modulated (PWM) return signals from those sensors.

The AFLS module uses these inputs to determine steering wheel angle, vehicle speed, accelerator pedal position, vehicle yaw rate and ABS status. It then uses internal programming algorithms to compute the proper electronic message control outputs to provide over the LIN bus to the LIN slave headlamp leveling and headlamp swiveling stepper motors to adjust the headlamp beams vertically or horizontally as required. The AFLS module also continuously monitors return inputs from the leveling and swiveling motors to confirm stepper motor responsiveness as well as the proper positioning of the headlamp beams.

The AFLS module receives battery voltage on a fused ignition switch output (RUN) circuit, and is grounded at all times through a hard wired remote ground point. These connections allow the AFLS module to operate only when the ignition switch is in the ON position. The AFLS module also monitors all of the AFLS circuits and components, then sets active and stored Diagnostic Trouble Codes (DTC) for any monitored system faults it detects.

The hard wired circuits of the AFLS module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the AFLS module or the electronic controls or communication between modules and other devices that provide some features of the AFLS. The most reliable, efficient, and accurate means to diagnose the AFLS module or the electronic controls

and communication related to AFLS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AFLSM SYSTEM

The hard wired circuits to the Adaptive Front Lighting System Module (AFLSM) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the AFLSM or the electronic controls and communication between modules and other devices that provide some features of the Adaptive Front Lighting System (AFLS). The most reliable, efficient, and accurate means to diagnose the AFLSM or the electronic controls and communication related to AFLS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

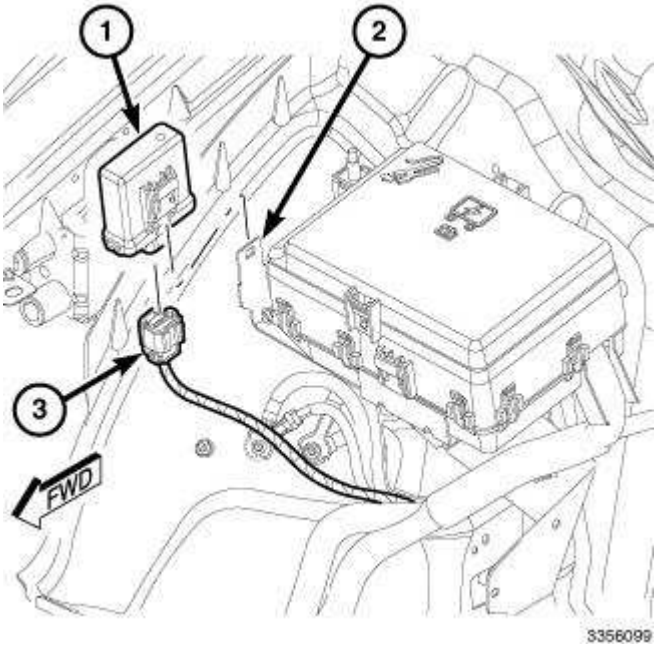

Fig. 8: (AFLS) Module, Blade-Type Mount & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Locate the Adaptive Front Lighting System (AFLS) module (1) at the right front corner of the Power Distribution Center (PDC) in the right front corner of the engine compartment.

3. Release the AFLS module latch tab by pressing it toward the PDC.
4. While holding the AFLS module latch tab in the released position, pull the module upward to disengage it from the blade-type mount (2) integral to the right front corner of the PDC bracket.
5. Disconnect the headlamp and dash wire harness connector (3) from the AFLS module connector receptacle.
6. Remove the AFLS module from the vehicle.

INSTALLATION

INSTALLATION

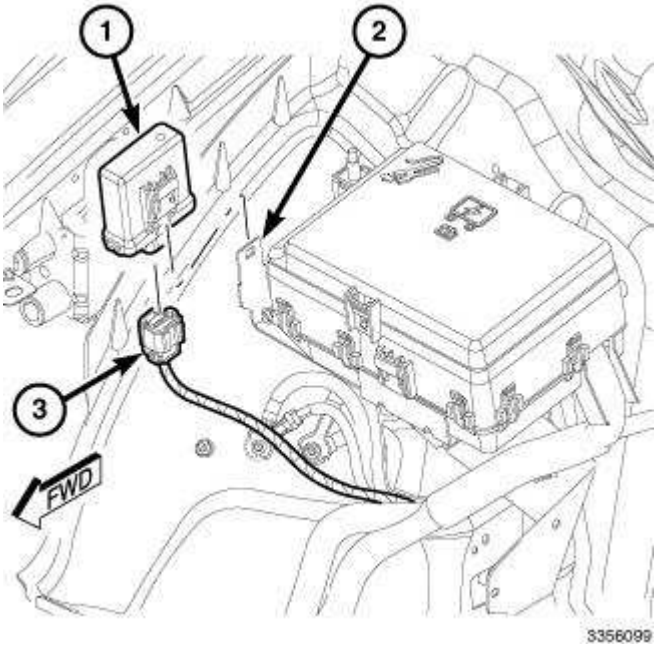

Fig. 9: (AFLS) Module, Blade-Type Mount & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the Adaptive Front Lighting System (AFLS) module (1) into the right front corner of the engine compartment.
2. Reconnect the headlamp and dash wire harness connector (3) to the AFLS module connector receptacle.
3. Align the AFLS module mount to the blade-type bracket (2) integral to the right front corner of the Power Distribution Center (PDC) bracket.
4. Push the AFLS module mount down over the bracket until the latch feature snaps into place.
5. Reconnect the battery negative cable.

NOTE: Whenever the Advanced Front Lighting System (AFLS) module is removed and reinstalled or replaced with a new unit, it is necessary for the AFLSM to be configured and calibrated to the vehicle using a calibration procedure. Follow the programming steps outlined in the diagnostic scan tool for the "AFLS

Module Calibrate" routine under "Miscellaneous Functions" for the "AFLS Module" menu item as appropriate.

MODULE, ANTI-LOCK BRAKE SYSTEM

DESCRIPTION

DESCRIPTION

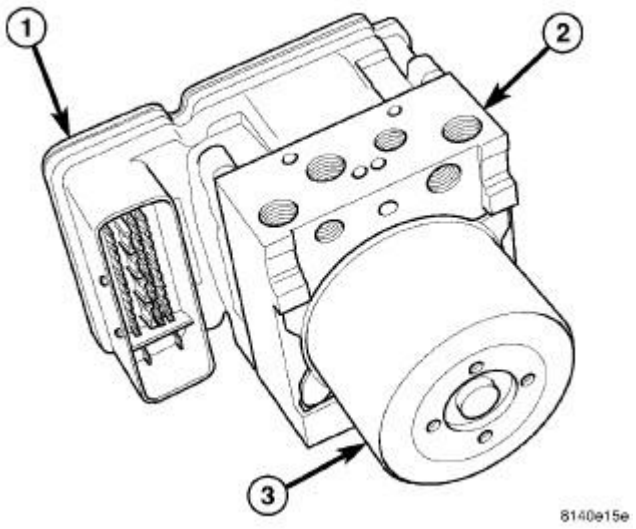

Fig. 10: Integrated Control Unit
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.

The Antilock Brake Module (ABM) is a microprocessor-based device which monitors the Antilock Brake System (ABS) during normal braking and controls it when the vehicle is in an ABS stop. The ABM also monitors the Electronic Stability Control (ESC).

The ABM (1) is mounted to the HCU (2) as part of the Integrated Control Unit (ICU). The ABM uses a 47-Way connector on the vehicle wiring harness. The power source for the ABM is through the ignition switch in the RUN or ON position. The ABM is on the CAN-C bus.

CAUTION: For Adaptive Cruise Control (ACC) equipped vehicles, the ABM and HCU are not separately serviceable. They must be replaced as an assembly.

OPERATION

OPERATION

The primary functions of the Antilock Brake Module (ABM) are to:

- Monitor the Antilock Brake System (ABS) and Electronic Stability Program (ESP) for proper operation.
- Detect wheel locking or wheel slipping tendencies by monitoring the speed of all four wheels of the vehicle.
- Control fluid modulation to the wheel brakes while the system is in ABS or traction control mode.
- Modulates fluid pressure to the wheel brakes to control vehicle yaw rate in ESP mode.
- Store diagnostic information.
- Provide communication to the scan tool while in diagnostic mode.
- Illuminate the amber TCS/ESP indicator in the instrument cluster.

The ABM constantly monitors the ABS and ESP (if equipped) for proper operation. If the ABM detects a fault, it will turn on the amber TCS/ESP indicator and disable the ABS or ESP if so equipped. The normal base braking system will remain operational at that time.

The ABM continuously monitors the speed of each wheel through the signals generated by the wheel speed sensors to determine if any wheel is beginning to lock. When a wheel locking tendency is detected, the ABM commands the ABM solenoid coils to actuate. The coils then open and close the valves in the HCU that modulate brake fluid pressure in some or all of the hydraulic circuits. The ABM continues to control pressure in individual hydraulic circuits until a locking tendency is no longer present.

REMOVAL

REMOVAL

CAUTION: For Adaptive Cruise Control (ACC) equipped vehicles, the ABM and HCU are not separately serviceable. They must be replaced as an assembly.

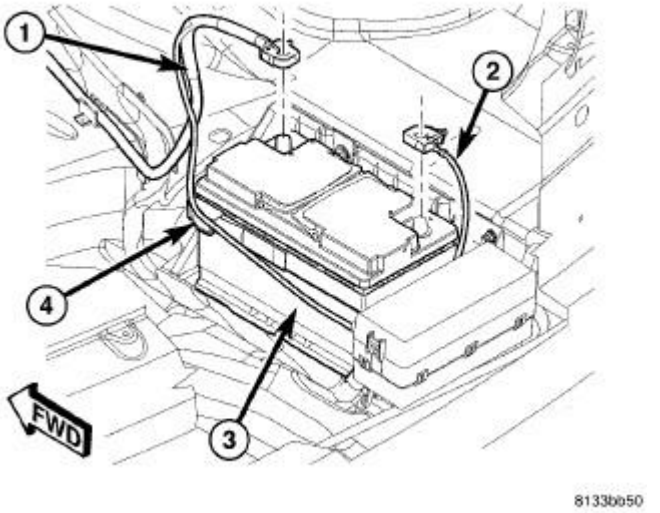

Fig. 11: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative (-) battery cable (2) from battery post and isolate.

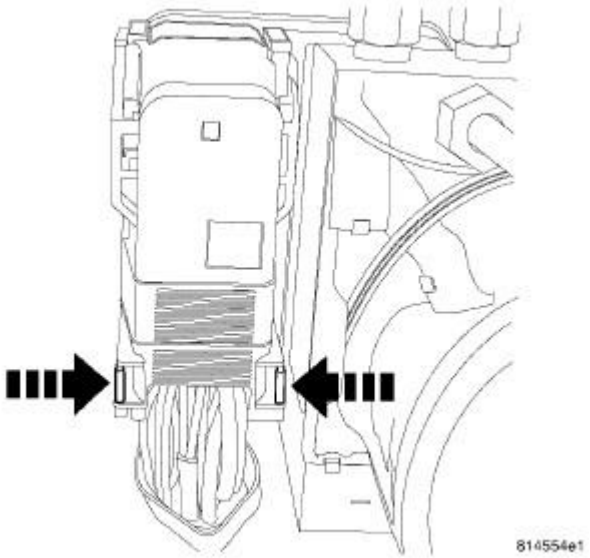

Fig. 12: ABM Connector Release Tabs
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use this figure in the following step to release the ABM harness connector cover. It shows the location of the release tabs.

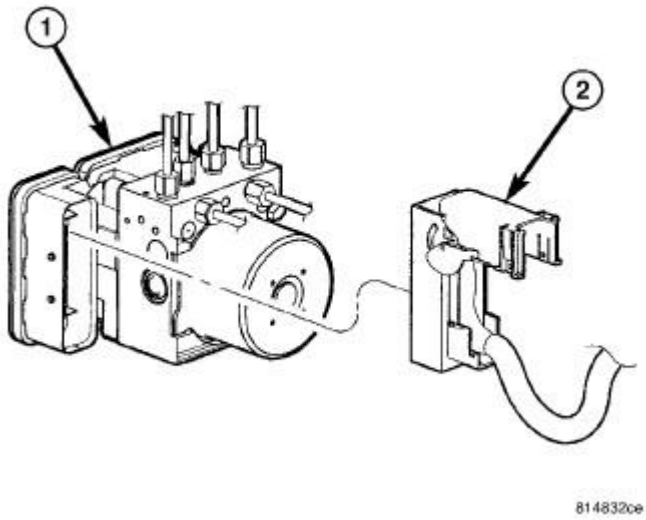

Fig. 13: Anti-Lock Brake Module Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect ABM harness connector from antilock brake module (ABM). To do so:
    1. Depress tabs on each side of connector cover, then
    2. Pull outward and upward on lower half of cover until it locks into position pointing straight outward (2). Connector can then be pulled straight outward off ABM (1).

NOTE: DO NOT remove any brake lines from the ICU fluid ports while performing the following steps. The ABM can be removed and installed without doing so.

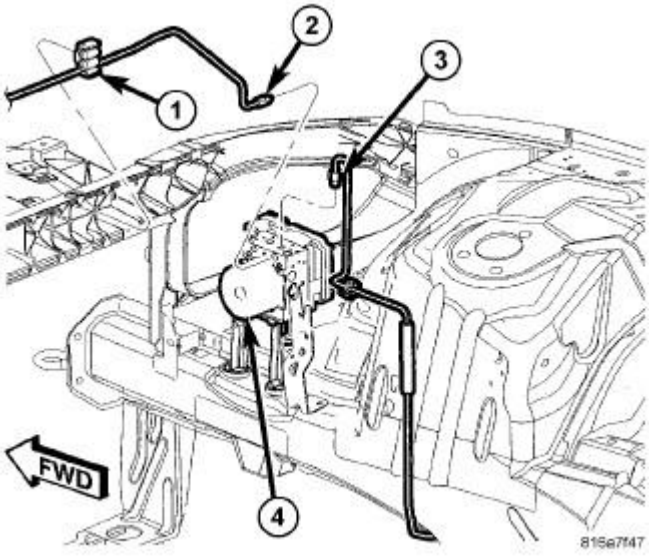

Fig. 14: Left Front And Right Front Brake Tubes AT ICU

Courtesy of CHRYSLER GROUP, LLC

3. Unclip all brake tubes from two routing clips (1) along upper radiator support.
4. Unclip right front brake tube (3) from routing clip on bracket below Fuse And Relay Center.

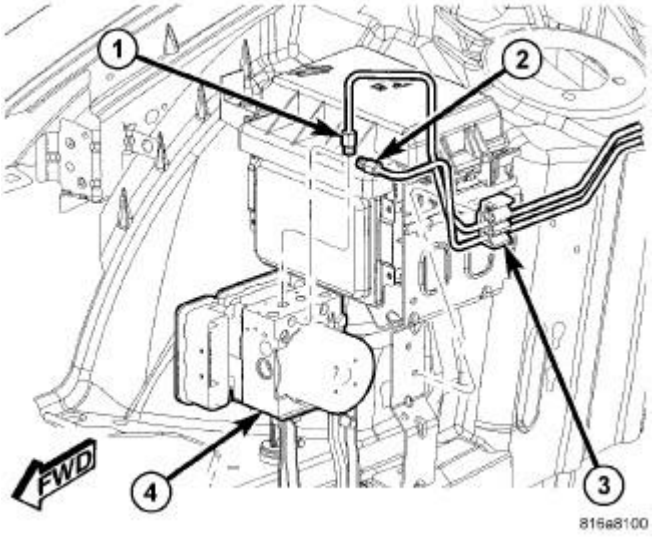

Fig. 15: Left Rear And Right Rear Brake Tubes AT ICU
Courtesy of CHRYSLER GROUP, LLC

5. Unclip rear brake tubes (1, 2) from routing clip (3) on bracket below Fuse And Relay Center.

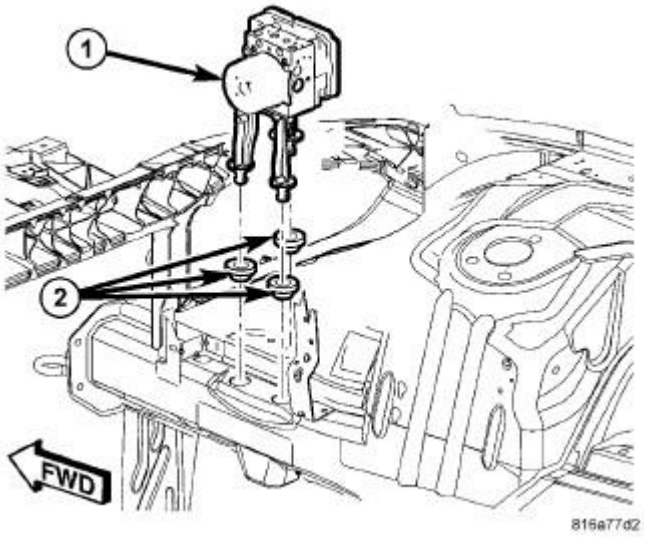

Fig. 16: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Lift ICU (1) from mounting grommets (2) and move inboard allowing access to ABM attaching screws. **Do not force brake tubes. Move assembly just enough to access mounting screws.**

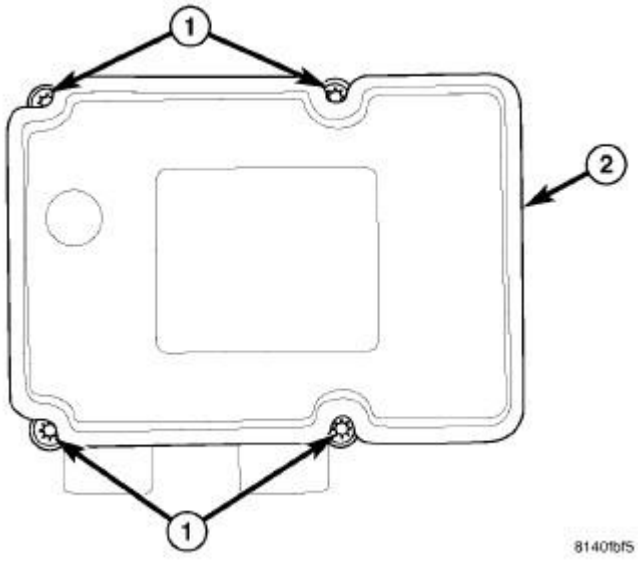

Fig. 17: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER GROUP, LLC

7. Remove four screws (1) attaching ABM (2) to HCU.

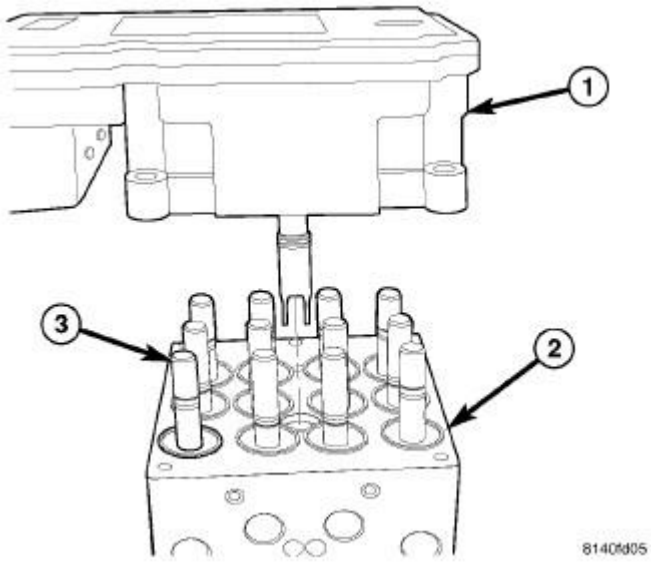

Fig. 18: ABM Assembly To HCU
Courtesy of CHRYSLER GROUP, LLC

8. Slide ABM (1) off HCU (2).

INSTALLATION

INSTALLATION

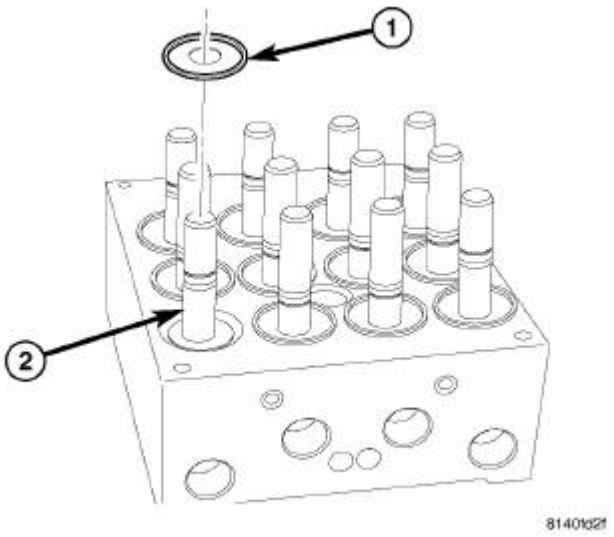

Fig. 19: Solenoid Valve Seal
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing new O-rings or solenoid valve stem seals, do not use any type of lubricant.

1. Clean any debris off the mating surfaces of the HCU and ABM.
2. If the seals (1) on the solenoid valve stems (2) are not new, replace them all. Each of the solenoid valve stem seals must be new to keep out moisture and debris; **do not reuse solenoid valve stem seals** .

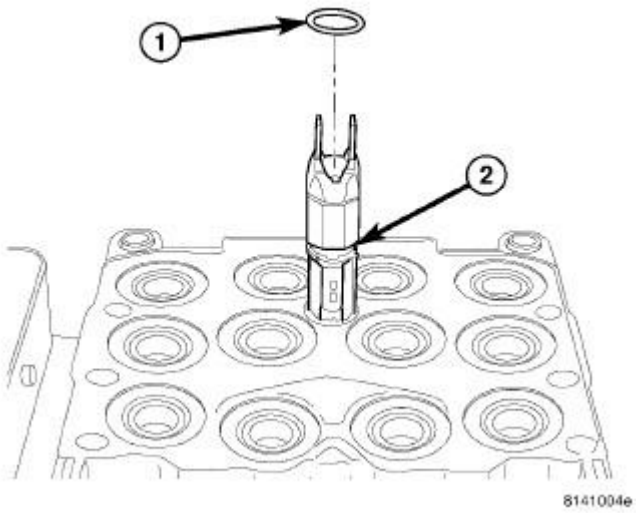

Fig. 20: Internal Pump Connector O-Ring
Courtesy of CHRYSLER GROUP, LLC

3. Replace the pump/motor connector O-ring (1) if it is not new. Be sure the O-ring is properly seated in the mounting groove (2).

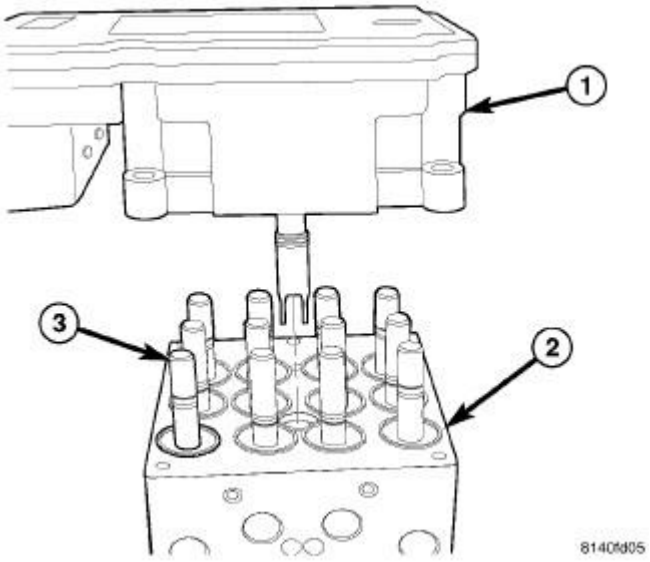

Fig. 21: ABM Assembly To HCU
Courtesy of CHRYSLER GROUP, LLC

4. Align components and install the ABM (1) on the HCU (2).

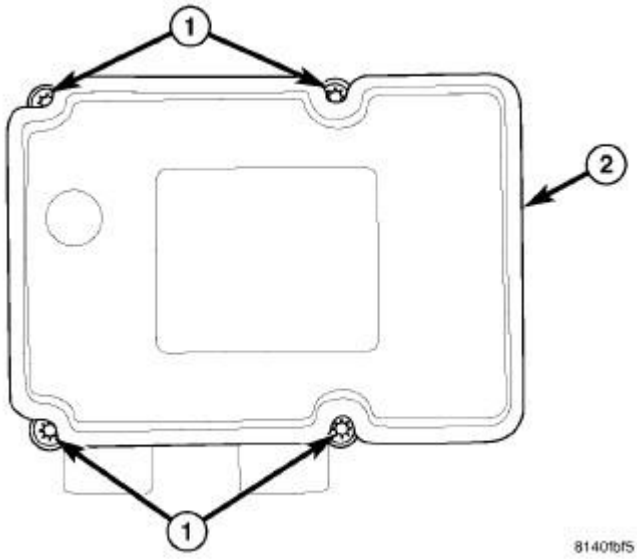

Fig. 22: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER GROUP, LLC

5. Install the four screws (1) attaching the ABM (2) to the HCU. Tighten the mounting screws to 2 N.m (17 in. lbs.).

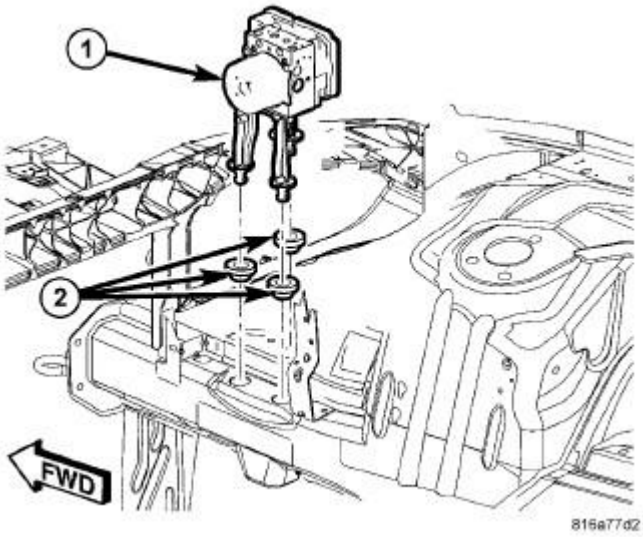

Fig. 23: ICU Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Position ICU (1) above mounting grommets (2) located in body side rail and press mounting bracket into place.

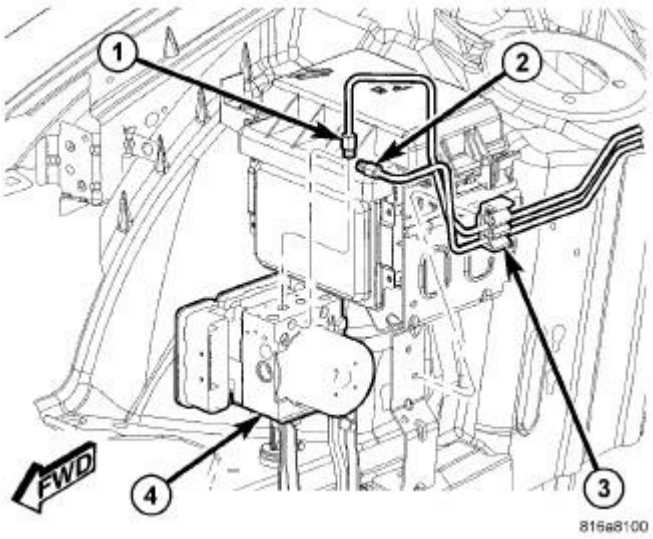

Fig. 24: Left Rear And Right Rear Brake Tubes AT ICU
Courtesy of CHRYSLER GROUP, LLC

7. Clip rear brake tubes (1, 2) to routing clip (3) on bracket below Fuse And Relay Center.

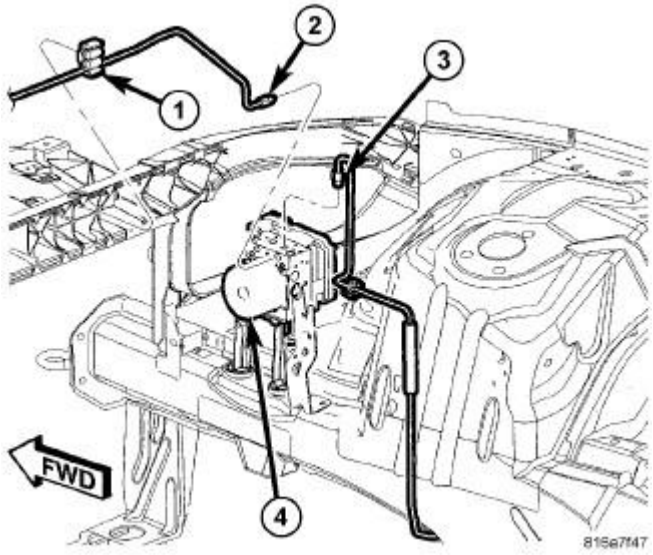

Fig. 25: Left Front And Right Front Brake Tubes AT ICU
Courtesy of CHRYSLER GROUP, LLC

8. Clip right front brake tube (3) to routing clip on bracket below Fuse And Relay Center.
9. Clip brake tubes to two routing clips (1) along upper radiator support.

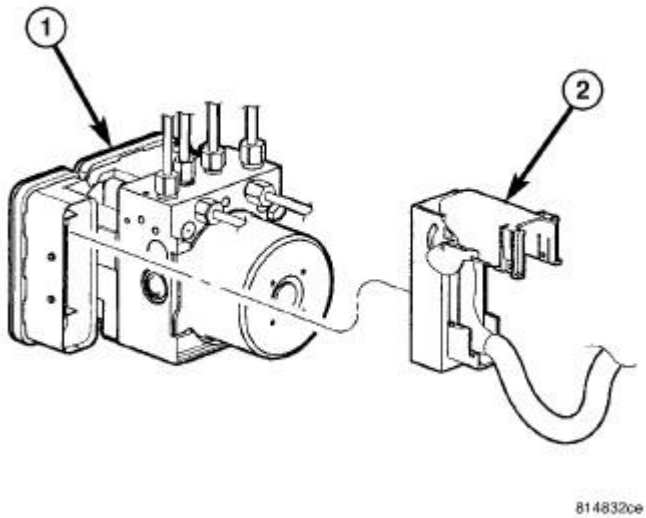

Fig. 26: Anti-Lock Brake Module Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before installing the ABM harness connector (2) on the ABM (1), be sure the seal is properly installed in the connector.

10. Insert ABM harness connector (2) into socket of ABM (1) and close cover, locking connector in place.

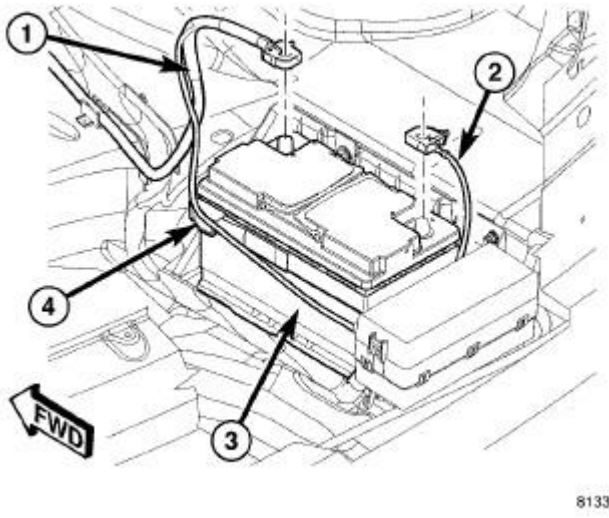

Fig. 27: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

11. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

12. Perform ABS Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

MODULE, BODY CONTROL

DESCRIPTION

DESCRIPTION

VEHICLE SYSTEMS SUPPORT

The electronic functions of the Body Control Module (BCM) supports or controls include the following:

- **Brake Fluid Level** - The continuously monitors the brake fluid level sensor through a hard-wired input to monitor the brake fluid level. the BCM transmits an electronic message over the Can data bus to Instrument Cluster (IC) to illuminate the Low Fluid indicator based on the input signal received from the fluid level sensor.
- **Enhanced Accident Response Support** - The BCM monitors an input from the Occupant Restraint Controller (ORC) and, following an airbag deployment, will immediately disable the power lock output, unlock all doors by activating the power unlock output, then enables the power lock output if the power lock switch input remains inactive for two seconds. The BCM also monitors an input from the Powertrain Control Module (PCM) to automatically turn ON the interior lighting after an airbag deployment event, 10 seconds after the vehicle speed is zero. The interior lighting remains illuminated until the ignition switch is turned to the OFF position, at which time the interior lighting returns to normal operation and control. These Enhanced Accident Response System (EARS) features are each dependent upon a functional vehicle electrical system following the vehicle impact event.
- **Exterior Lighting Switch Support** - The BCM continuously monitors the headlamp switch position to activate or deactivate the exterior lighting. The headlamp switch provides the appropriate resistor multiplexed output to the BCM over the CAN data bus. The BCM reads and responds to this input by energizing or de-energizing the right and left park lamp feed circuits and the right and left high or low beam driver circuits through internal High Side Drivers (HSD)'s and by sending an electronic confirmation message back to the IC, which controls the high beam indicator as appropriate. The BCM also remembers which headlamp beams were last selected with the multi-function switch, and energizes those beams by default the next time the headlamps are turned ON. If the vehicle is equipped with optional automatic headlamps and the **A** (Automatic) position is selected, the BCM also monitors an electronic **ambient light level** message received over the CAN data bus from the Heater and Vehicle Air Conditioning (HVAC) control module based upon a hard wired input from the rain sensor to turn the exterior lighting ON and OFF automatically while the ignition switch is in the ON position.
- **Fuel Level Data Support** - The BCM provides a current source for and receives a hard-wired analog input from the fuel level sending unit located on the fuel pump module in the fuel tank. Based upon this input, the BCM uses electronic messaging to transmit this data over the CAN data bus for use by other electronic modules in the vehicle. The IC calculates the proper fuel gauge needle position and to control low fuel indicator operation based on these messages.
- **Hazard Lamp Circuit Control** - The BCM monitors an input from the hazard switch and receives a hard-wired analog input from the switch. The BCM reads and responds to this input

by energizing or de-energizing the right and left park lamp feed circuits and the right and left high or low beam driver circuits through internal High Side Drivers (HSD)'s and by sending an electronic confirmation message to the IC over the CAN data bus, which controls the hazard light indicators as appropriate.

- **Headlamp Washer Control** - On vehicles equipped with headlamp washers, the BCM controls a relay in the Power distribution Center (PDC) based on electronic messages received over the Can data bus.
- **Ignition On and Ignition Accessory/On Relay Control** - The BCM monitors electronic **ignition switch status** messages received over the CAN bus from the RF hub and a hard-wired input from the ignition switch on the instrument panel, and provides high side driver outputs to control both the ignition ON and ignition ACCESSORY/ON relays in the Power Distribution Center (PDC) as appropriate.
- **Interior Lamp Load Shedding** - The BCM provides a battery saver feature which will automatically turn OFF all interior lamps if they remain ON after a timed interval of about eight minutes.
- **Interior Lighting Control** - The BCM monitors electronic messages and hard-wired inputs from the interior lighting switch, the door ajar switches, the liftgate ajar, and liftgate flip-up glass ajar switches (where applicable), the reading lamp switches and the RF hub to provide courtesy lamp control. This includes support for timed illuminated entry with theater-style fade-to-OFF and courtesy illumination DEFEAT features.
- **Local Interface Network Master Module** - The BCM is the master module for the LIN data bus. In this role it gathers information from the compass sensor, and the Intelligent Battery Sensor (IBS), then either acts on that information directly or places electronic messages on the CAN data bus for use by other modules
- **Power Inverter Support** - The BCM monitors a hard-wired input from the power inverter to determine the inverter status, then transmits electronic **inverter status** messages to other electronic modules in the vehicle over the CAN data bus.
- **Power Lock System Control** - The BCM monitors inputs from the power lock switches and the RF hub to provide control of the power lock motors through high side and low side driver outputs. This includes support for rolling door locks (also known as automatic door locks), automatic door unlock, and a door lock inhibit mode.
- **Remote Radio Switch Support** - The BCM receives electronic message inputs from the remote radio switches on the steering wheel over the CAN data bus, then provides electronic **radio request** messages over the CAN data bus to support the remote radio switch function.
- **Remote Start System Support** - The BCM receives electronic message inputs from the RF hub and then displays the appropriate remote start system textual reminder messages to the vehicle operator within the EVIC display.
- **Shipping Mode** - The new Chrysler Telematics Platform (CTP) vehicles no longer have a IOD fuse to use when transporting or storing for a long period of time. The BCM has a mode that takes the place of pulling the IOD fuse called **"Shipping Mode"** that is easily be enabled or disabled. Refer to **STANDARD PROCEDURE** .
- **Steering Wheel Switch Support** - The SCM receives electronic message inputs from the steering wheel switches on the steering wheel over the CAN data bus to control and configure many of the EVIC displays and functions.

- **Sunshade Control** - On LX models, an optional rear window sunshade is controlled by hard-wired signals received from the BCM. The BCM receives hard-wired signal from the rear sunshade switch or electronic Can bus messages received from the Integrated Center Stack (ICS) screen. The BCM then sends a hard-wired signal to the sunshade motor module to raise or lower the sunshade.
- **Vehicle Theft Security System Control** - The BCM monitors inputs from the door ajar switches, and the RF hub, on vehicles so equipped. The intrusion module provides electronic **horn** and **lighting request** messages to the BCM for the appropriate VTSS alarm output features.
- **Washer Fluid Level** - The continuously monitors the washer fluid level sensor through a hard-wired input to monitor washer fluid level. the BCM transmits an electronic message over the Can data bus to Instrument Cluster (IC) to illuminate the Low Fluid indicator based on the input signal received from the fluid level sensor.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

PROCEDURE

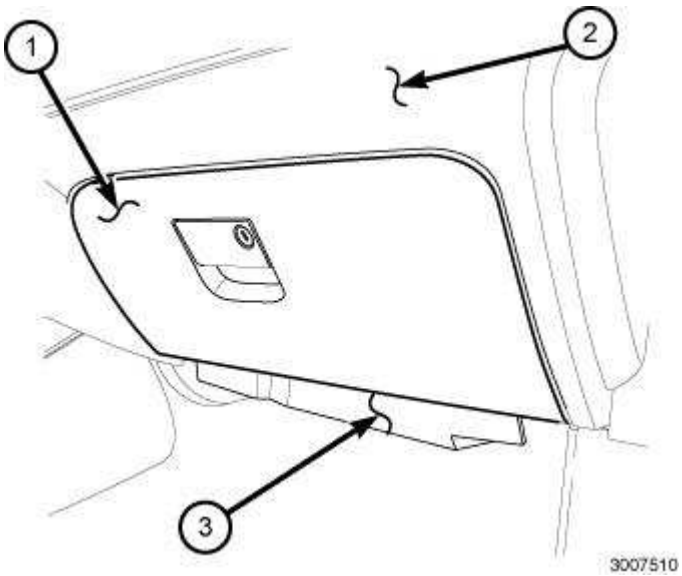

Fig. 28: Glove Box Assembly & Push Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the glove box assembly (1). Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Remove the Instrument Panel (IP) lower hush panel (3).

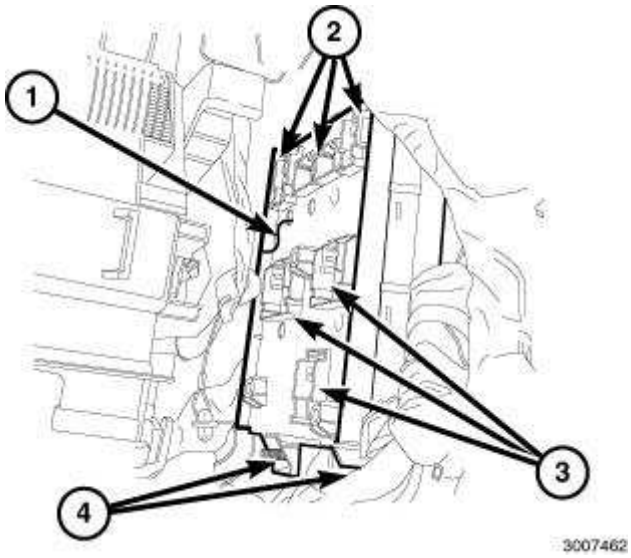

Fig. 29: Body Control Module (BCM), Receptacles & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connectors from the Body Control Module (BCM) (1) receptacles (2 and 3) as needed.
5. Remove the fasteners (4) that secure the module, two at the bottom, and one at the top.
6. Pull the module away from the side bulk head and down and remove the module.
7. Remove the BCM from the vehicle.

INSTALLATION

INSTALLATION

PROCEDURE

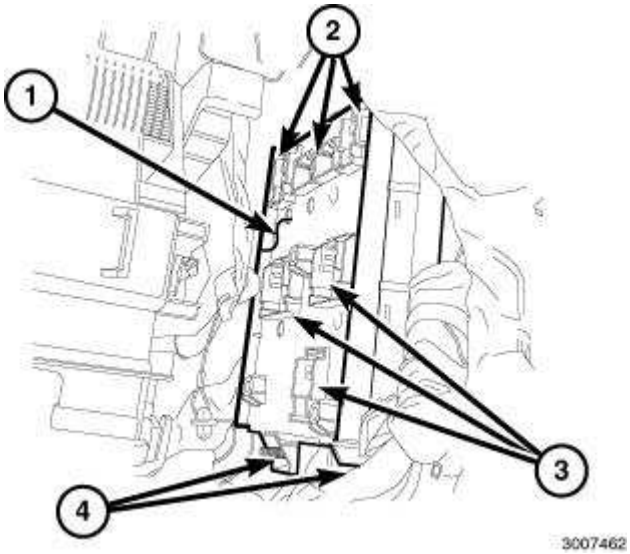

Fig. 30: Body Control Module (BCM), Receptacles & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position the BCM in the vehicle.
2. Install the fasteners (4), two at the bottom, and one at the top, and tighten the securely.
3. Connect the electrical connectors to the Body Control Module (BCM) (1) receptacles (2 and 3) as needed.

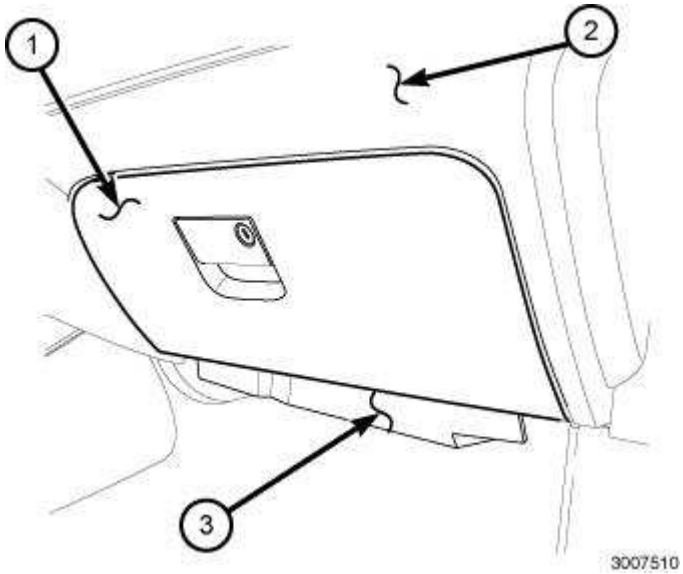

Fig. 31: Glove Box Assembly & Push Panel
Courtesy of CHRYSLER GROUP, LLC

4. Install the glove box assembly (1). Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
5. Install the lower hush panel (3) and install the two push-pin type retainers.
6. Connect the negative battery cable.

NOTE: **Program the BCM in accordance with the module replacement and programming guide. Refer to STANDARD PROCEDURE.**

MODULE, DOOR

DESCRIPTION

DESCRIPTION

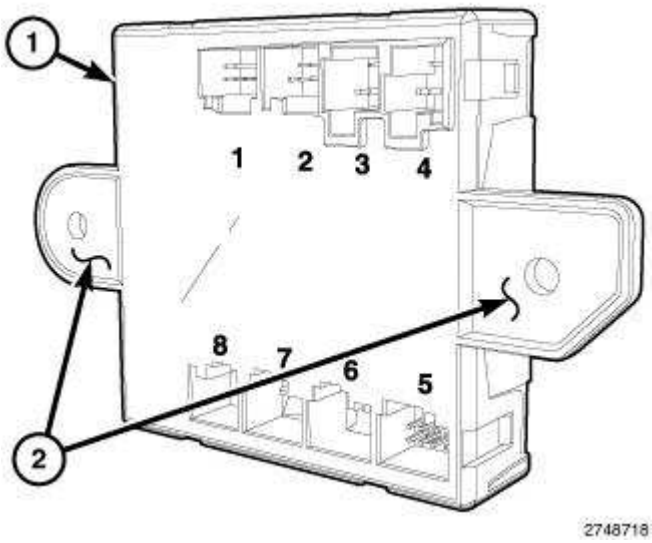

Fig. 32: Front Door Control Module
Courtesy of CHRYSLER GROUP, LLC

This vehicle is equipped with two electronic front door control modules (1) (also known as a Driver Door Module/DDM, a Passenger Door Module/PDM or Front Door Multiplex/MUX Modules), one each on both the driver and passenger front doors. Each door control module is concealed behind the front door trim panel where it is secured through two integral mounting tabs (2) to the door hardware module carrier by two screws. The front door control modules are located in the upper front corner of the front door hardware carriers, just below the mirror flag area of the front door.

Each door control module contains a microprocessor and is connected to the various switches on that door. In the case of the driver side module, it communicates with some switches over a Local Interface Network (LIN) data bus. Both the driver and passenger side module also receive various hard wired switch inputs and provide numerous hard wired outputs to various devices located on their respective doors. In addition, both front door control modules communicate with each other and with other electronic modules in the vehicle over the Controller Area Network (CAN) Interior High Speed (IHS) data bus system.

Concealed and protected within the molded plastic door control module housing is the printed circuit board and the other electronic circuitry of the module. The front door control modules are connected to the vehicle electrical system through up to eight connector receptacles that are integral to the module housing.

A door control module cannot be adjusted or repaired and, if damaged or ineffective, it must be replaced. The door control module software is flash programmable.

OPERATION

OPERATION

The microprocessor-based electronic front door control modules (also known as a Driver Door Module/DDM, a Passenger Door Module/PDM or Front Door Multiplex/MUX Modules) contain logic circuits that monitor various hard wired low current, multiplexed inputs from the power window, power lock, power mirror and memory switches on their respective door. They also receive Controller Area Network (CAN) Interior High Speed (IHS) data bus electronic message-based external inputs from the opposing front door control module as well as from other electronic modules in the vehicle. The front door control modules also monitor hard wired power window motor Hall effect sensors and memory mirror position sensor inputs.

In addition, the front door control module on the driver side front door receives electronic message inputs from the driver side front door switch module over the Local Interface Network (LIN) data bus network. The program logic within the front door control module allows the microprocessor to prioritize all of these inputs and determine the tasks it needs to perform. These tasks are then completed either by controlling hard wired outputs to the various motors, actuators or lamps on its own or the rear doors, or by sending electronic message requests over the CAN-IHS bus to the appropriate electronic module in the vehicle.

The front door control modules are powered by a fused B(+) circuit and are grounded at all times so that they can operate regardless of the ignition switch position. Both driver and passenger door control modules provide active and stored Diagnostic Trouble Codes (DTC) through On-Board Diagnostics (OBD) and communicate with a diagnostic scan tool using the CAN data bus.

The hard wired inputs and outputs of the front door control module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between modules and other devices that provide some features of the power window, power lock, memory, interior lighting or exterior lighting system features the front door control modules provide. The most reliable, efficient and accurate means to diagnose the front door control modules or the electronic controls and communication related to operation of these systems requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

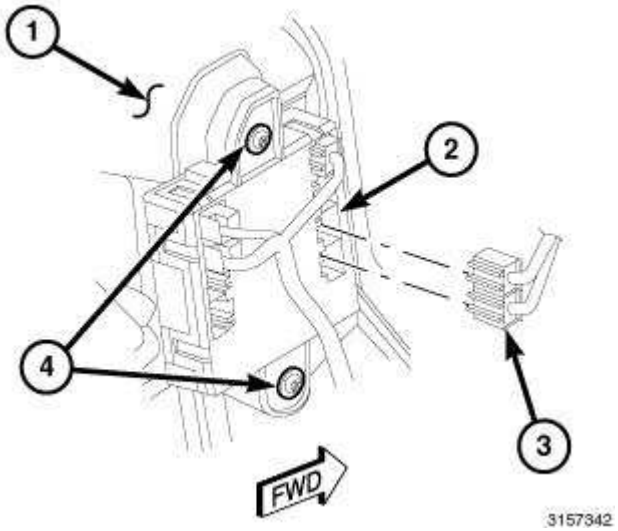

Fig. 33: Electrical Connectors, Door Control Module, Screws & Module Carrier
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trim panel from the inside of the front door. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Disconnect each of the electrical connectors (3) from the connector receptacles of the door control module (2).
4. Remove the two screws (4) that secure the door control module to the front door hardware module carrier (1).
5. Remove the door control module from the door hardware module carrier.

INSTALLATION

INSTALLATION

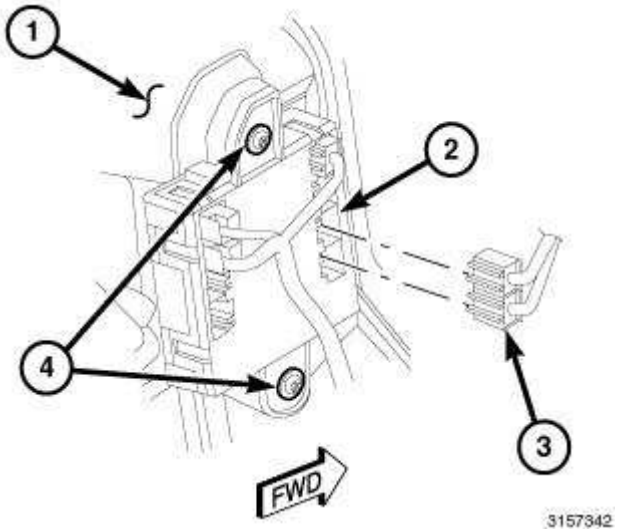

Fig. 34: Electrical Connectors, Door Control Module, Screws & Module Carrier
Courtesy of CHRYSLER GROUP, LLC

1. Position the door control module (2) to the front door hardware module carrier (1).
2. Install and tighten the two screws (4) that secure the door control module to the front door hardware module carrier. Tighten the screws securely.
3. Reconnect each of the electrical connectors (3) to the connector receptacles of the door control module.
4. Reinstall the trim panel to the inside of the front door. Refer to **PANEL, DOOR TRIM, INSTALLATION** .
5. Reconnect the battery negative cable.
6. The Clear/Relearn procedure should be performed following service of a door control module so that the module can learn the correct hard stops of the power window regulator. Refer to **STANDARD PROCEDURE** .

MODULE, DRIVETRAIN CONTROL

DESCRIPTION

DESCRIPTION

The Drivetrain Control Module (DTCM) controls the 4X4 transfer case shift functions via the actuation of a shift motor and utilizing the feedback of a mode sensor assembly. Communication is handled through the CAN bus. The user selectable transfer case modes include the following: 2WD, 4WD AUTO, 4WD LOCK, 4WD LOW, and Neutral (selections vary with the specific transfer case).

The DTCM is located in the drivers footwell, under the drivers foot rest.

OPERATION

OPERATION

During normal operation of an active transfer case the Drive Train Control Module (DTCM) control module learns and remembers the Clutch Engagement Point (Kiss Point), the position in the motor actuator's travel where torque begins to be transferred to the front wheels. The position is read out using the encoder as a 0 to 5 volt signal. This information is written into the module's EEPROM area at Ignition OFF. Over time the clutch pack wears and the Kiss Point changes in one direction (going from a lower voltage to a higher value).

POWER UP/DOWN

The DTCM will power up with an OFF/ON transition of the hard wired ignition switch input.

The DTCM will power down when the vehicle ignition switch transitions from ON to OFF, or there are no system requirements that dictate the controller to remain active

START-UP DIAGNOSTICS

When the DTCM is activated, the internal circuitry will undergo a diagnostic procedure. The controller will examine all inputs and outputs for short circuits to ground, short circuits to battery and open circuits and will also verify proper CPU and memory operation. If a fault is detected, a message will be sent out over the CAN C bus to the Cluster indicating that service is recommended.

After passing all diagnostic tests, the controller will receive and process inputs and produce the appropriate outputs. Proper monitoring of the controller inputs and outputs performance will continue.

INPUTS/OUTPUTS

The following are inputs to the DTCM:

- Transfer Case Mode Sensor Signal
- 1 Direct Battery Feed
- Ignition RUN Sense
- Sensor Ground
- Module Ground
- CAN C Bus

The following are outputs of the DTCM:

- Transfer Case Motor Brake Control
- 5V Sensor Supply
- Transfer Case Bi-directional Motor Control (A AND B)
- Switched B+ Solenoid Supply
- Transfer Case Motor Brake Control

TRANSFER CASE RANGE SELECT SWITCH INPUT (2WD, 4WD AUTO, 4WD LOCK, AND 4WD LOW SELECT SWITCH)

The transfer case range select switch is hardwired directly to the Cluster (CCN). The switch position is read by the CCN and is communicated to the TIPM (Gateway) via the CAN-B bus. The TIPM then rebroadcasts this information onto the CAN-C bus where the DTCM is a receiver.

The Cluster (CCN) will support circuitry which interfaces to the system's Transfer Case Range Select Switch, including a Transfer Case Range Select Switch voltage supply and a Transfer Case Range Select Switch input. The purpose of this circuitry is to determine the mode currently being requested by the operator via the resistance ladder network in the shifter assembly, where the Transfer Case Range Select Switch is packaged.

The NEUTRAL Select Switch Input will provide the operator with the ability to place the Transfer Case in Neutral. The Transfer Case Range Switch input will provide the operator with the ability to place the transfer case in 2WD, 4WD AUTO, 4WD LOCK, and 4WD LOW. The NEUTRAL Select Switch is a momentary pushpin switch; the Transfer Case Range Select Switch is a 4-position rotary contact

switch; both of these switches are provided through a resistor network for diagnostic purposes. The input will have an internal 1.0K +/- 1% pull-up resistor to 5V.

As the selected position in the switch varies and/or the NEUTRAL Switch is depressed or not, the resistance between the Cluster (CCN) voltage supply and Transfer Case Range Select Switches input will vary. Hardware, software, and calibrations within the Cluster will be provided that interpret the external resistance between the module's Transfer Case Range Select Switches voltage supply and Transfer Case Range Select Switches inputs as given in the table below:

NOTE: **There is no requirement for the DTCM to distinguish between a neutral request from the 4WD AUTO or the 4WD LOW position. Resistances in these ranges will be represented as a Neutral Switch Activation.**

TRANSFER CASE MODE SENSOR SIGNAL

The Transfer Case Mode Sensor Signal Input will provide the DTCM feedback about the position of the transfer case. The mode sensor is a linear analog position sensor with a 1.4K +/- 20% potentiometer and a 1 K +/- 20% wiper resistor that converts the motor shaft position into a multiplexed voltage. The mode sensor (on the active transfer case) is an active device where the sensor's current changes as the motor shaft position changes

TRANSFER CASE BI-DIRECTIONAL MOTOR CONTROL (A AND B)

This output will control a Bi-directional DC motor that controls a clutch pack in the Transfer Case that varies the torque transfer between the front and rear axles.

MODES OF OPERATION

NORMAL OPERATION

This mode is achieved by the ignition being switched in the RUN position, which powers up the 5V regulator and generates the appropriate RESET for the microprocessor. This mode also includes any required power-up system checks.

SHUT DOWN MODE

This mode is activated when the ignition switch turned to the off position. The DTCM will perform any required Shut Down tasks prior to turning off the 5V regulator.

LIMP-IN MODE

This mode is entered when the DTCM has detected an error condition that prevents the system from performing its required task. The DTCM operation will vary depending from modified operation to total system shut down based on the failure that has occurred.

REMOVAL

REMOVAL

1. To gain access to the Drive Train Contol Module (DTCM), remove the driver side foot rest. Refer to **FOOT REST, FLOOR, FRONT, REMOVAL** .

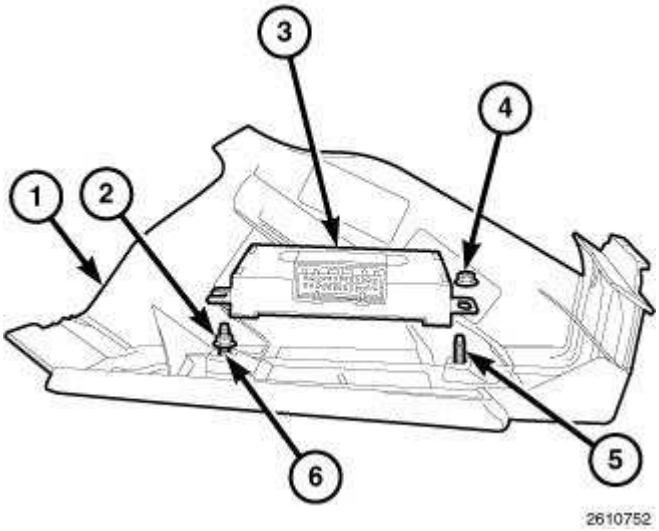

Fig. 35: Drive Train Control Module
Courtesy of CHRYSLER GROUP, LLC

2. Loosen the mounting nut (2) from mounting stud (6), remove mounting nut (4) from mounting stud (5).
3. Slide DTCM from mounting stud (6) and remove from drivers side foot rest (3).

INSTALLATION

INSTALLATION

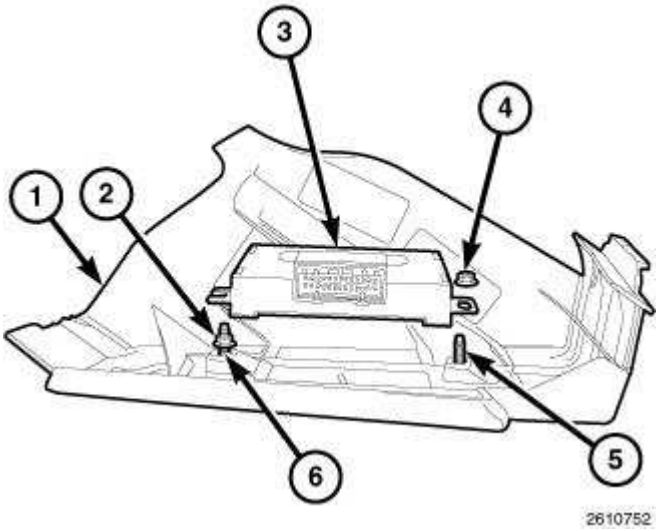

Fig. 36: Drive Train Control Module
Courtesy of CHRYSLER GROUP, LLC

1. Slide the Drive Train Control Module (3) on the mounting stud (6) and over mounting stud (5).
2. Intstall the mounting nuts (2 and 4). Tighten the nuts to 16 N.m (12 ft. lbs.).
3. Install the drivers side foot rest. Refer to **FOOT REST, FLOOR, FRONT, INSTALLATION** .

MODULE, ELECTRO-HYDRAULIC POWER STEERING

DESCRIPTION

DESCRIPTION

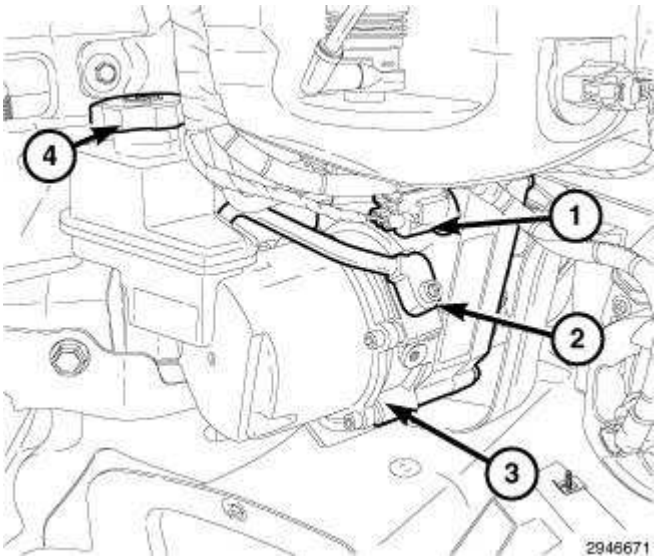

Fig. 37: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

CAUTION: There is an Electro Hydraulic Power Steering (EHPS) pump on Non-SRT vehicles which requires a different power steering fluid. Do not mix power steering fluid types. Damage may result to the power steering pump and system if any other fluid is used. The EHPS system uses fluid which meets material specification MS-11655 or equivalent. Do not overfill.

NOTE: There is no internal service of the Electro-Hydraulic Power Steering (EHPS) module. The EHPS module is integral to the EHPS pump (3). Replace the EHPS module as an assembly, including the brackets, and EHPS pump.

The EHPS pump is located in front of the right side tire and can be accessed by loosening and positioning aside the right front wheelhouse splash shield.

OPERATION

OPERATION

CAUTION: There is an Electro Hydraulic Power Steering (EHPS) pump on Non-SRT vehicles which requires a different power steering fluid. Do not mix power steering fluid types. Damage may result to the power steering pump and system if any other fluid is used. The EHPS system uses fluid which meets material specification MS-11655 or equivalent. Do not overfill.

Multiple modules work together to improve vehicle steering assist at different rates at different speeds. At slow speeds (parking maneuvers) more assist is available and at high speeds less assist is available. The EHPS module uses the CAN - C data bus for inputs and outputs of the information necessary for operation. The use of a scan tool is necessary for diagnostics. EHPS module faults are stored in a diagnostic program memory and are accessible with the scan tool. Faults remain in memory until cleared, or until after the vehicle is started approximately 50 times. Stored faults are not erased if the battery is disconnected. For descriptions and procedures related to DTCs. Refer to **DIAGNOSIS AND TESTING** .

The Electro-Hydraulic Power Steering (EHPS) Pump assembly contains a control module, brushless electric motor, and hydraulic pump integrated into a single unit. The EHPS Pump draws power from the 12-Volt electrical system and provides the necessary flow and pressure to the steering gear to provide normal power steering. The output flow of the EHPS Pump is varied as a function of Steering Wheel Rate (received from SAS) and Vehicle Speed (received from ABS Module) in order to provide the optimum flow of power steering fluid to the steering gear under all operating conditions. The EHPS Pump will start to provide steering assist when the Vehicle speed message greater than 5 km/h (3 mph) is received on CAN C. If the Vehicle Speed message is missing at vehicle startup, the EHPS Pump will not operate. If the Vehicle Speed message is lost during operation the EHPS pump will use a default vehicle speed of 85 km/h (59 mph) to calculate desired flow and as a result, steering effort will no longer be speed sensitive. If the Steering Wheel Position message is lost the EHPS Pump will use a default steering wheel rate of 230°/sec to calculate desired flow and as a result, steering effort may be higher on evasive steering maneuvers. The EHPS pump will resume normal operation automatically once any missing message or out of range condition noted above is restored to normal.

REMOVAL

REMOVAL

NOTE: There is no internal service of the Electro-Hydraulic Power Steering (EHPS) module. The EHPS module is integral to the EHPS pump. Replace the EHPS module as an assembly, including the brackets, and EHPS pump.

For replacement of the EHPS module. Refer to **PUMP, REMOVAL** .

INSTALLATION

INSTALLATION

NOTE: There is no internal service of the Electro-Hydraulic Power Steering (EHPS) module. The EHPS module is integral to the EHPS pump. Replace the EHPS

module as an assembly, including the brackets, and EHPS pump.

For installation of the EHPS module. Refer to **PUMP, INSTALLATION** .

MODULE, ELECTRONIC SHIFT

DESCRIPTION

8HP45

The Electronic Shift Module (ESM) on the 8HP45 is part of the shifter assembly called the E-Shifter. For more information on the E-Shifter and FLOOR SHIFT, refer to **SHIFTER, TRANSMISSION, DESCRIPTION** and **SHIFTER, TRANSMISSION, OPERATION** .

NAG1

The Electronic Shift Module (ESM) on the NAG1 is part of the shifter assembly called the Shift Lever Assembly (SLA). For more information on the SLA, refer to **SHIFTER, TRANSMISSION, DESCRIPTION** and **SHIFTER, TRANSMISSION, OPERATION** .

MODULE, GLOW PLUG, 3.0L DIESEL [EXF]

DESCRIPTION

DESCRIPTION

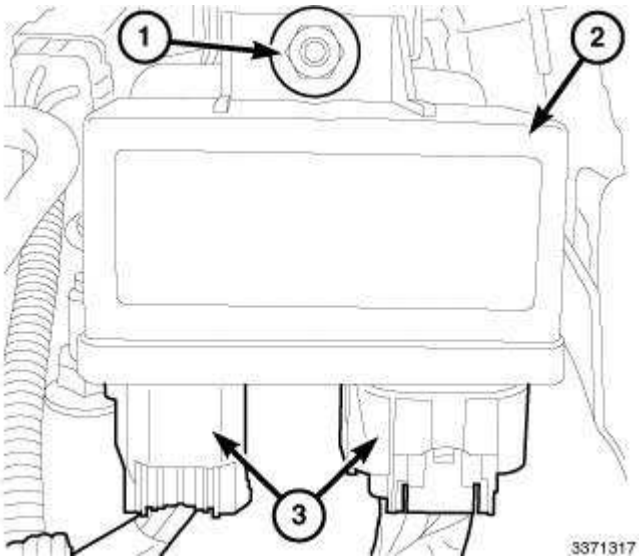

Fig. 38: Glow Plug Module & Connectors
Courtesy of CHRYSLER GROUP, LLC

The Glow Plug Module is located under the cowl panel cover behind the right front shock tower, and is attached to the strut tower support.

OPERATION

OPERATION

The Glow Plug Module is connected to a fused B(+) circuit and receives a path to ground at all times through the engine wiring harness. These connections allow it to remain functional regardless of the Electronic Ignition Switch (EIS) position. When the Powertrain Control Module (PCM) receives the On and Ignition Run signals from the EIS, it will send a signal through the LIN bus to actuate the Glow Plug Module for a period of time that depends on ambient air and engine coolant temperature.

The Glow Plug Module utilizes integrated relays and microprocessors to actuate the Glow Plugs based on input from the PCM. The Glow Plug Module has on-board diagnostic functions that will set powertrain DTCs, which will be transmitted to the PCM through the LIN bus. Because the Glow Plug Module uses microprocessors to control battery voltage to the Glow Plugs, conventional diagnostic methods will not always prove conclusive when diagnosing problems with the Glow Plug Module and related circuits. For proper diagnosis of the Glow Plug Module, the LIN data bus or electronic communication related to Glow Plug Module operation, a diagnostic scan tool is required. Refer to **COMMUNICATION, OPERATION**.

DIAGNOSIS AND TESTING

MODULE - GLOW PLUG

The Powertrain Control Module (PCM) actuates the glow plug module via the LIN bus. For glow plug module DTCs and related diagnostics, refer to appropriate Engine Electrical Diagnostics - Diesel.

REMOVAL

REMOVAL

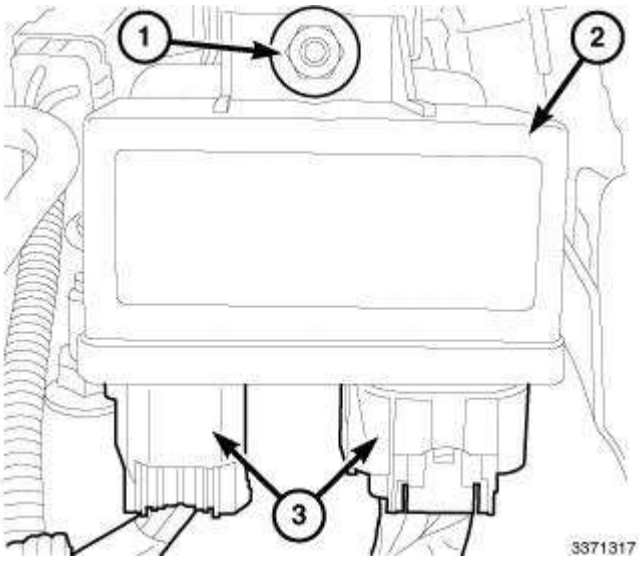

Fig. 39: Glow Plug Module & Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the cowl panel cover. Refer to **COVER, COWL PANEL, REMOVAL** .
3. Remove the nut (1) securing the glow plug module (2).
4. Pull up and disconnect the two glow plug wire harness connector (3).

INSTALLATION

INSTALLATION

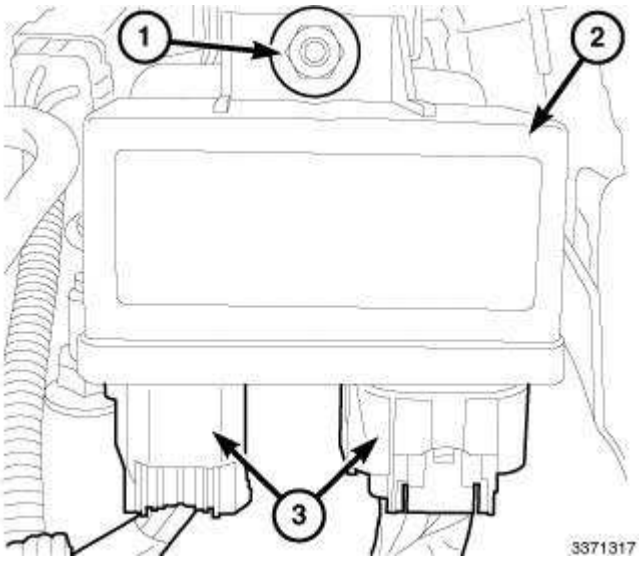

Fig. 40: Glow Plug Module & Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Connect the Glow Plug Module harness connector (3).
2. Install the glow plug module (2) and securely tighten the retaining nut (1).
3. Install the cowl panel cover. Refer to **COVER, COWL PANEL, INSTALLATION** .
4. Connect the negative battery cable.

MODULE, HANDS FREE

DESCRIPTION

DESCRIPTION

The hands-free cellular system on this vehicle uses Bluetooth™ technology to provide wireless communication between the operator's compatible cellular telephone and the vehicle's on-board receiver.

The system uses voice recognition technology to control operation. The incoming voice is broadcast through the vehicle's radio speakers, automatically overriding any other audio signals on the front speakers when the hands-free system is in use. A microphone in the rearview mirror picks up vehicle

occupant's voices.

The system will communicate with a telephone that is anywhere within the vehicle. However, covering the hand held phone or the hands-free phone module with a metal object may block the signal. The system will recognize up to a combine 10 phone and BTSA capable devices, each of which is given a spoken identification by the user during the setup process. The system includes Spanish and French voice recognition in addition to English.

The hands free module is located under the instrument panel to the left of the steering column mounted to the amplifier bracket.

OPERATION

OPERATION

STEERING WHEEL CONTROLS

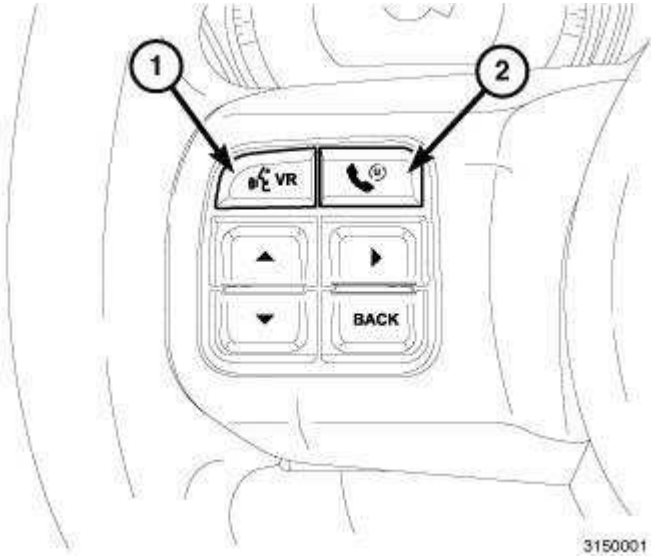

Fig. 41: Uconnect(TM) Phone Button & Uconnect(TM) Voice Command Button
Courtesy of CHRYSLER GROUP, LLC

The Uconnect™ Phone Button (2) is used to get into the phone mode and make calls, show recent, incoming, outgoing calls, view phonebook etc., When you press the button you will hear a BEEP. The beep is your signal to give a command.

The Uconnect™ Voice Command Button (1) is only used for "barge in" and when you are already in a call and you want to send Tones or make another call.

The Voice Command button (1) is also used to access the Voice Commands for the Uconnect™ Voice Command features if your vehicle is equipped. Please see the Uconnect™ Voice Command information for direction on how to use the button.

The Uconnect™ Phone is fully integrated with the vehicle's audio system. The volume of the

Uconnect™ Phone can be adjusted either from the radio volume control knob or from the steering wheel radio control (right switch), if so equipped.

Voice commands can be used to operate the Uconnect™ Phone and to navigate through the Uconnect™ Phone menu structure. Voice commands are required after most Uconnect™ Phone prompts.

UCONNECT TOUCH™ 4.3

The Uconnect™ Voice Command system allows you to control your AM, FM radio, satellite radio, disc player, SD Card, USB/iPod and Sirius Travel Link.

Uconnect™ Phone is a voice-activated, hands-free, invehicle communications system. Uconnect™ Phone allows you to dial a phone number with your mobile phone.

Uconnect Phone supports the following features:

Voice Activated features:

- Hands Free dialing via Voice ("Call John Smiths Mobile" or, "Dial 248 555-1212").
- Redialing last dialed numbers ("Redial").
- Calling Back the last incoming call number ("Call Back").
- View Call logs on screen ("Show incoming calls", "Show Outgoing calls", "Show missed Calls", "Show Recent Calls").
- Searching Contacts phone number ("Search for John Smith Mobile").

Screen Activated Features:

- Dialing via Keypad using touch screen.
- Viewing and Calling contacts from Phonebooks displayed on the touch screen.
- Setting Favorite Contact Phone numbers so the are easily accessible on the Main Phone screen.
- Viewing and Calling contacts from Recent Call logs.
- Listen to Music on your Bluetooth™ Device via the touch screen.
- Pairing up to 10 phones/audio devices for easy access to connect to them quickly.

UCONNECT TOUCH™ 8.4/8.4 NAV

The Uconnect™ Voice Command system allows you to control your AM, FM radio, satellite radio, disc player, SD Card, USB/iPod and Sirius Travel Link.

Uconnect Phone supports the following features:

Voice Activated Features:

- Hands Free dialing via Voice ("Call John Smiths Mobile" or, "Dial 248 555-1212").

- Hands Free text to speech listening of your incoming SMS messages.
- Hands Free text messaging ("Send a message to John Smiths Mobile").
- Redialing last dialed numbers ("Redial").
- Calling Back the last incoming call number ("Call Back").
- View Call logs on screen ("Show incoming calls", "Show Outgoing calls", "Show missed Calls", "Show Recent Calls").
- Searching Contacts phone number ("Search for John Smith Mobile").

Screen Activated Features:

- Dialing via Keypad using touch screen.
- Viewing and Calling contacts from Phonebooks displayed on the touch screen.
- Setting Favorite Contact Phone numbers so the are easily accessible on the Main Phone screen.
- Viewing and Calling contacts from Recent Call logs.
- Reviewing your recent Incoming SMS.
- Sending a text message via the touch screen.
- Listen to Music on your Bluetooth® Device via the touch screen.
- Pairing up to 10 phones/audio devices for easy access to connect to them quickly.

NOTE: Your phone must be capable of SMS messaging via Bluetooth™ for messaging features to work properly.

Your mobile phone's audio is transmitted through your vehicle's audio system; the system will automatically mute your radio when using the Uconnect™ Phone.

Two buttons on the rearview mirror, identified with ISO icons, control the system: A "phone" button turns the system on and off; a "voice recognition" (or voice command) button prompts the hands-free system to listen for a voice command. The system includes the following features:

REMOVAL

REMOVAL

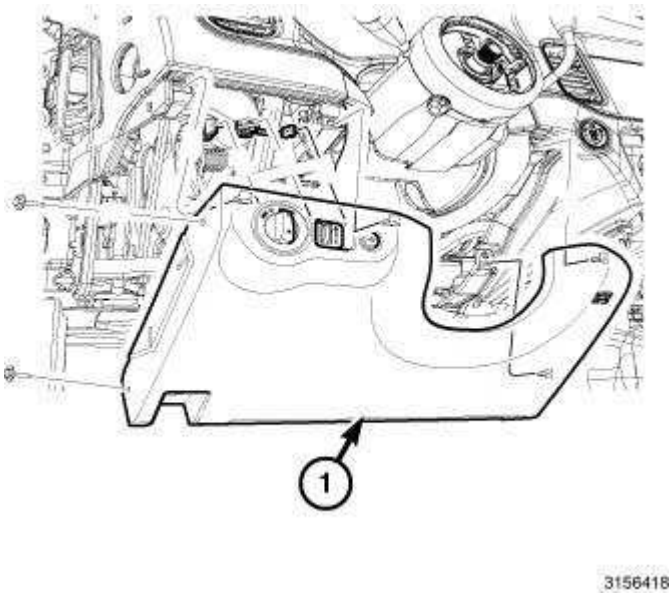

Fig. 42: Steering Column Opening Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable.
2. Remove the steering column opening cover (1). Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .

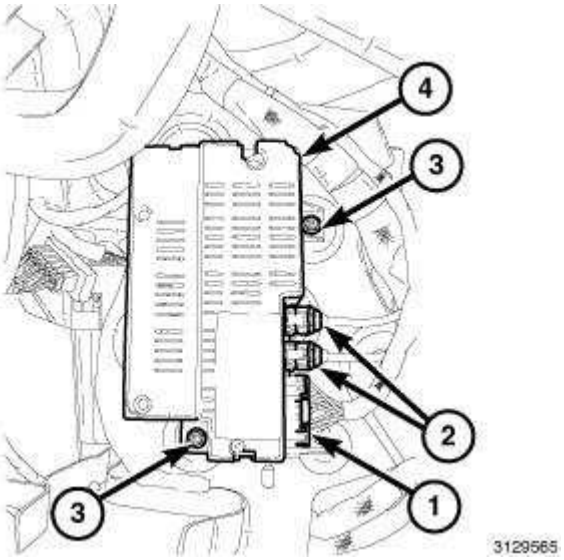

Fig. 43: HFM Electrical & USB Connectors
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the HFM electrical (1) and USB connectors (2).
4. Remove the HFM retainers.
5. Remove the HFM (4) from the mounting bracket.

INSTALLATION

INSTALLATION

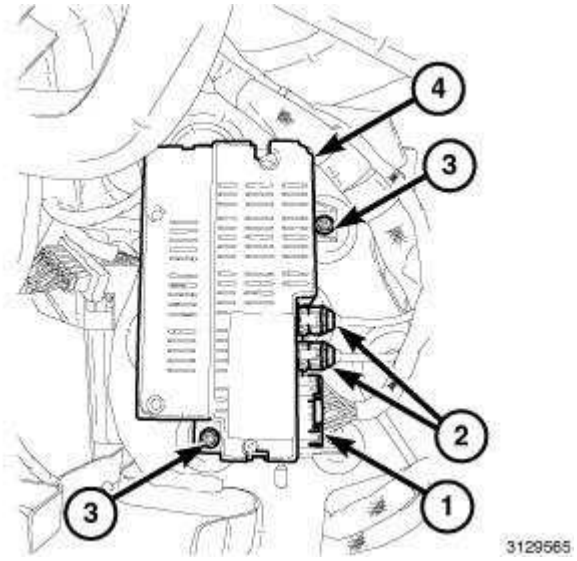

Fig. 44: HFM Electrical & USB Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Position the HFM (4) into the vehicle and install the retainers (3).
2. Connect the HFM electrical (1) and USB connectors (2).

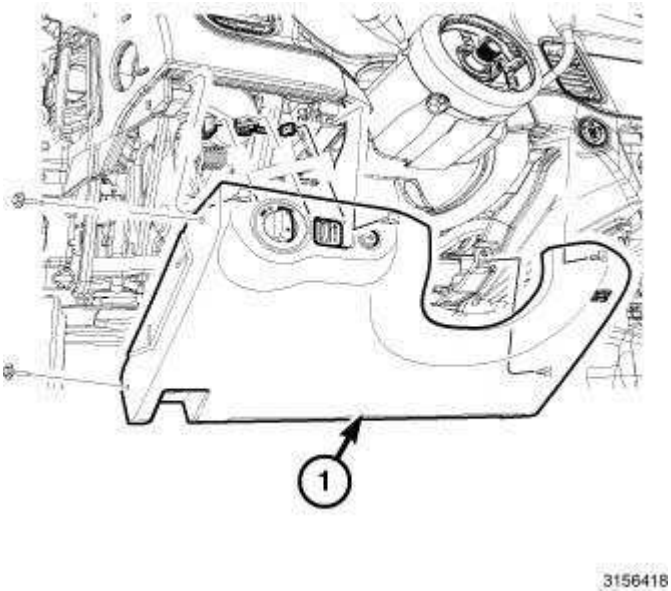

Fig. 45: Steering Column Opening Cover
Courtesy of CHRYSLER GROUP, LLC

3. Install the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .

4. Connect the negative battery cable.

MODULE, HEATED SEAT

DESCRIPTION

DESCRIPTION

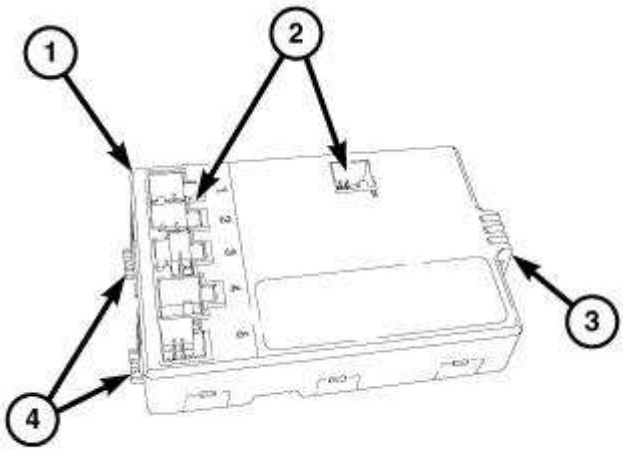

Fig. 46: Heated Seat Module (HSM), Electrical Connector Outlets & Tabs
Courtesy of CHRYSLER GROUP, LLC

The Heated Seat Module (HSM) (1), also know as the comfort seat wheel module, is a microprocessor designed to use the Controller Area Network (CAN) data bus messages from the U-Connect Touch™ screen module to operate the front heated seats, front vented seats, heated steering wheel and the rear heated seats, depending on how equipped.

When equipped with rear heated seats, the HSM receives request signals from the rear heated seat switches over hard-wired circuits.

The HSM has multiple electrical connector outlets (2) and three retaining tabs (3 and 4) that secure it to a bracket mounted to the underside of the front passenger seat.

OPERATION

OPERATION

The Heated Seat Module (HSM) controls the heated seat system, vented seat system and the heated steering wheel, depending on how equipped. The HSM is secured to a mounting bracket located under the front passenger seat. The HSM responds to heated and vented seat and heated steering wheel switch messages and ignition status inputs by controlling the 12 volt Direct Current (DC) output to the seat and steering wheel heating elements and front vented seat motors through integral solid-state relays.

When either of the front heated seat switches in the U-Connect Touch™ screen module are pressed, the module sends a message over the Controller Area Network (CAN) data bus to the HSM, signaling the HSM to energize the heating elements for the selected front seat. When equipped with rear heated seats, a request signal is sent to the HSM over a hard-wired circuit from the rear heated seat switch, to signal the HSM to supply power to the selected rear seat heating elements.

When either of the front vented seat switches in the U-Connect Touch™ screen module are pressed, the module sends a message over the CAN data bus to the HSM, signaling the HSM to operate the vented seat motors for the selected front seat.

When the heated steering wheel switch in the U-Connect Touch™ screen module is pressed, the module sends a message over the CAN data bus to the HSM, signaling the HSM to energize the heating element for the steering wheel.

The HSM energizes the integral solid-state relays that supply battery current to the heating elements. Heated seats turn off after 45 minutes of continuous operation. If high-level heating is selected, the control system will remain at the high level for 20 minutes and then drop to the low level. Normal heating cycle for the heated steering wheel is a minimum of 52 minutes.

The heated and vented seat and heated steering wheel system only operate when the ignition is in the Run position, and will turn off automatically whenever the ignition is set to any position other than Run.

The HSM is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** . The HSM will automatically turn off the heating seat and steering wheel elements if it detects an open or low short in a heating element circuit. The HSM will automatically turn off the vented seat motors if it detects an open or low short in a vented seat motor circuit.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

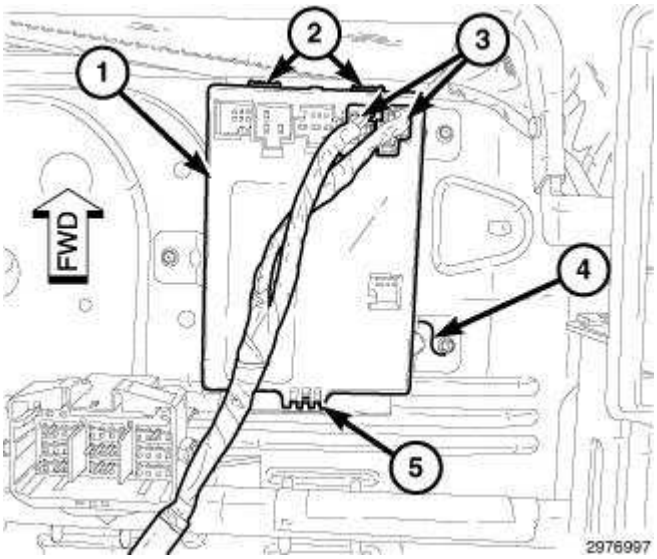

Fig. 47: Electrical Connectors, Heated Seat Module, Retaining Tab & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the fasteners that secure the front passenger seat to the body and tip the seat rearward to gain access to the underneath of the seat. Refer to **SEAT, FRONT, REMOVAL** .
3. Disconnect the electrical connectors (3) from the Heated Seat Module (HSM) (1).
4. Disengage the retaining tab (5) that secures the rear of the HSM to the bracket (4).
5. Disengage the two front retaining tabs (2) from the bracket and remove the HSM.

INSTALLATION

INSTALLATION

CAUTION: Properly align the Heated Seat Module (HSM) retaining tabs to the bracket, prior to engagement. Failure to follow these instructions may result in damage to the HSM.

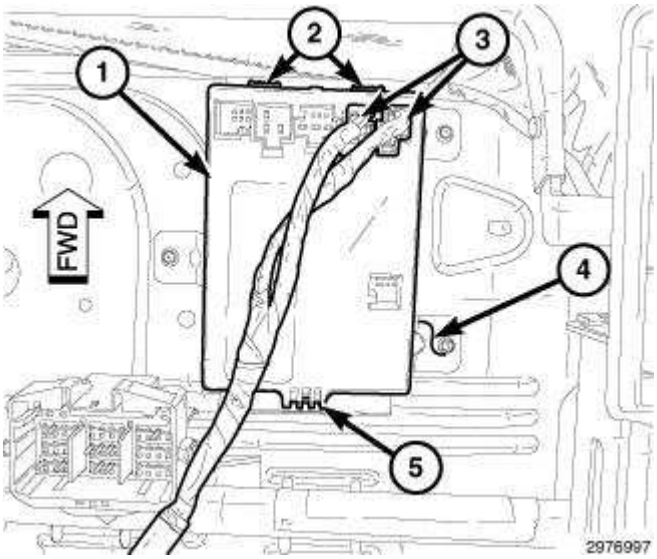

Fig. 48: Electrical Connectors, Heated Seat Module, Retaining Tab & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Position the Heated Seat Module (HSM) (1) to the bracket (4) and engage the two front retaining tabs (2). Make sure the front retaining tabs are correctly engaged to the bracket.
2. Engage the rear HSM retaining tab (5). Make sure the rear retaining tab is fully engaged to the bracket.
3. Connect the electrical connectors (3) to the HSM.
4. Install the seat. Refer to **SEAT, FRONT, INSTALLATION** .
5. Reconnect the negative battery cable.
6. Verify proper heated seat system operation.

MODULE, INTEGRATED CENTER STACK SCREEN

DESCRIPTION

DESCRIPTION

The LX only comes equipped with a 8.4 inch (Mid) Integrate Center Stack (ICS) Screen Modules. The ICS screen is located in the center of the instrument panel.

The 8.4 inch (mid) (1) is a full touch screen for audio system and HVAC operations.

OPERATION

OPERATION

The Integrated Center Stack (ICS) screen is the user interface for many functions and features in the vehicle.

When the user selects a function on the ICS screen, the touch sends a message to the Telematics Gateway Module and then to the bus to the module related to the users input. The module then makes the changes requested by the users input and sends a message back to reflect the change has been made.

The following features can be accessed through the ICS screen:

- All Radio functions including CD/DVD
- Media players
- Satellite Radio, if equipped
- GPS and navigation features, if equipped
- Heated seats, if equipped
- Climate controls
- Bluetooth functions, if equipped
- Personal convenience options
- Dealer Mode

REMOVAL

REMOVAL

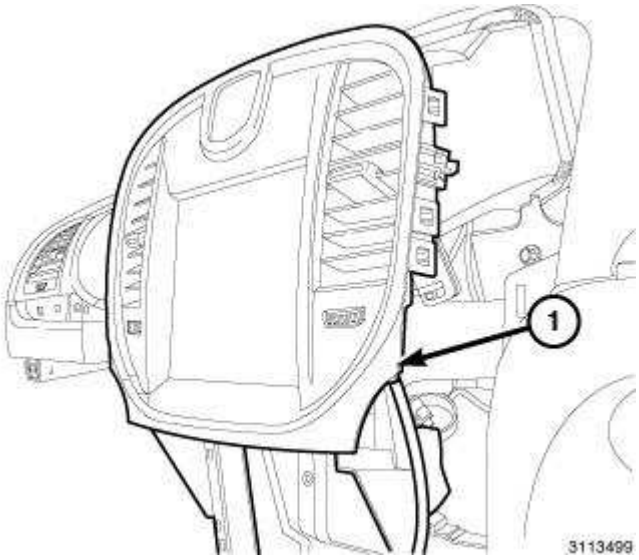

Fig. 49: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the instrument cluster bezel retainer (1) and remove the bezel (2). Refer to **BEZEL, INSTRUMENT PANEL, CENTER, REMOVAL** .

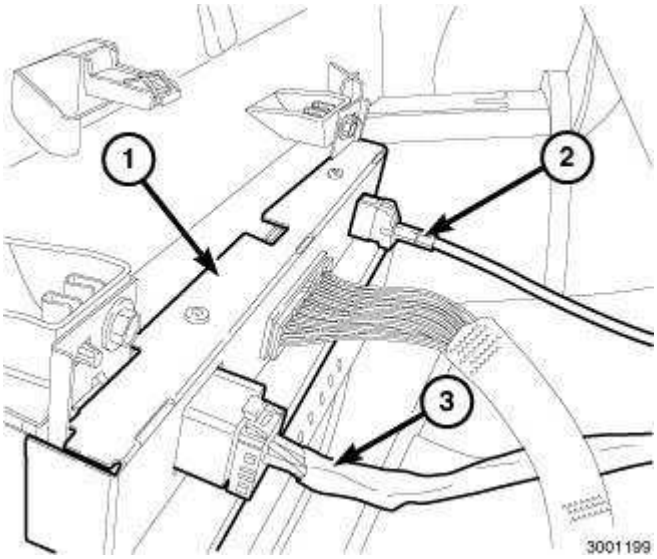

Fig. 50: Harness Connectors & Integrated Center Stack (ICS) Screen Module
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the harness connectors (2 & 3) from the rear of the Integrated Center Stack (ICS) screen module (1) to allow better access to the 40 - way connector.

CAUTION: Push the 40 way connector in before pushing on the locking clip. Failure to follow these instructions will damage or break the connector locking clip.

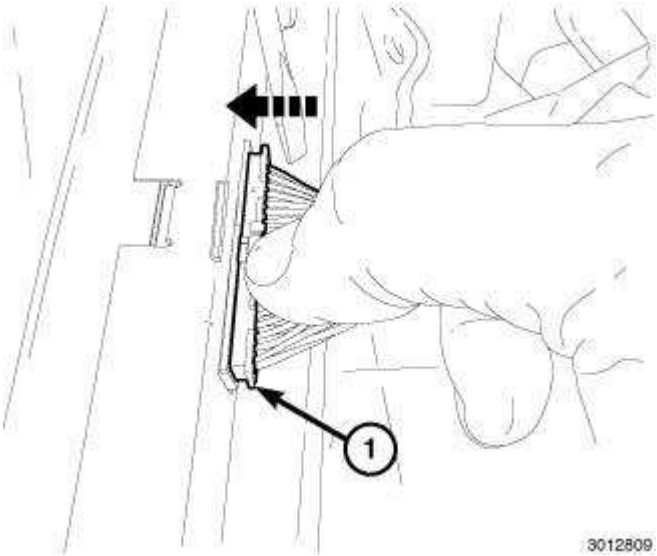

Fig. 51: 40 - Way Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: In the event that the locking tab breaks or is broken, do not replace the harness. The connector will still lock and the harness will still function as designed.

CAUTION: Never pull the connector out by the wires. Failure to follow these instructions will damage or break the wires and/or connector.

4. Push in on the 40 - way connector (1).

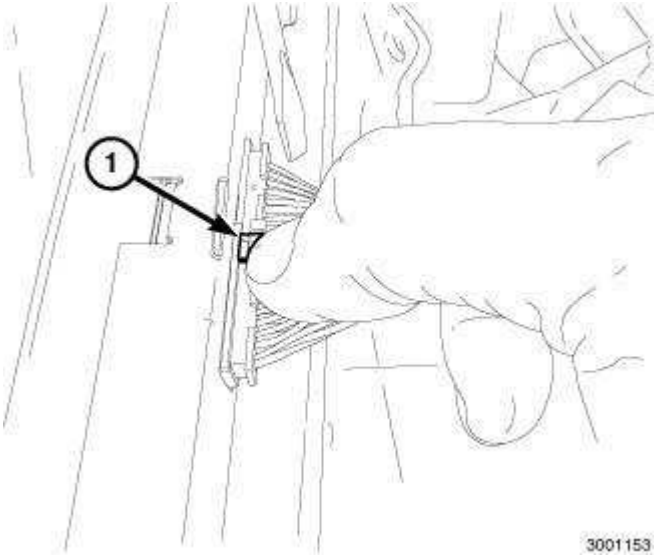

Fig. 52: Connector Release Lock
Courtesy of CHRYSLER GROUP, LLC

5. Gently push down on the connector release lock (1).

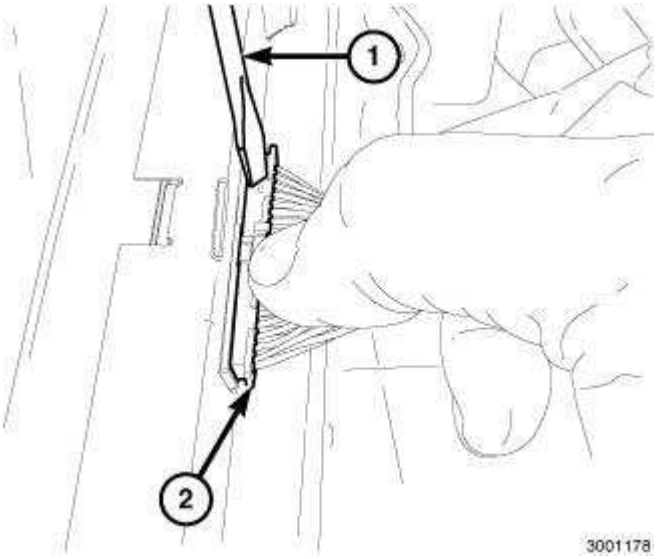

Fig. 53: Screw Driver & Connector
Courtesy of CHRYSLER GROUP, LLC

6. Using a pocket screw driver or a trim stick (special tool #C-4755, Trim Stick) or equivalent (1), gently pry on one side of the connector (2).

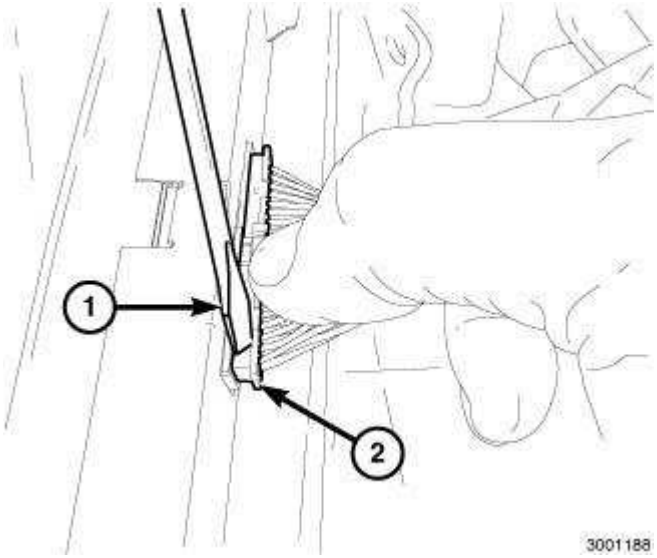

Fig. 54: Screw Driver & Connector
Courtesy of CHRYSLER GROUP, LLC

7. Using a pocket screw driver or a trim stick (special tool #C-4755, Trim Stick) or equivalent (1), gently pry on the other side of the connector (2).
8. Use steps 7 and 8 until the connector is out far enough to grab the connectors with your fingers.

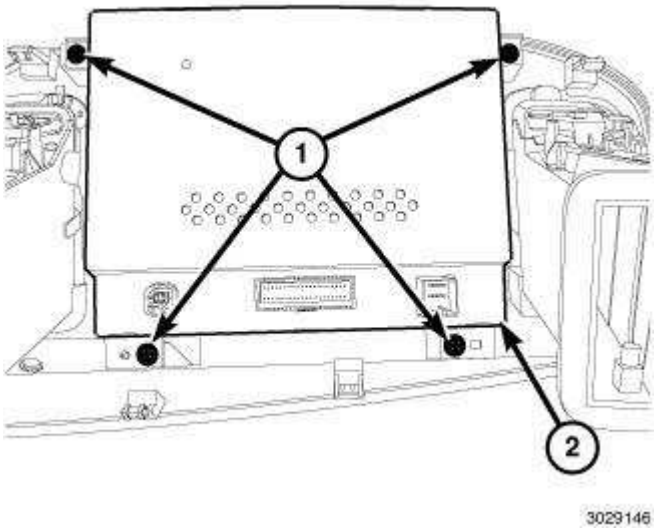

Fig. 55: Retainers
Courtesy of CHRYSLER GROUP, LLC

9. Remove the retainers (1) and remove the (ICS) screen module (2) from the instrument panel bezel.

INSTALLATION

INSTALLATION

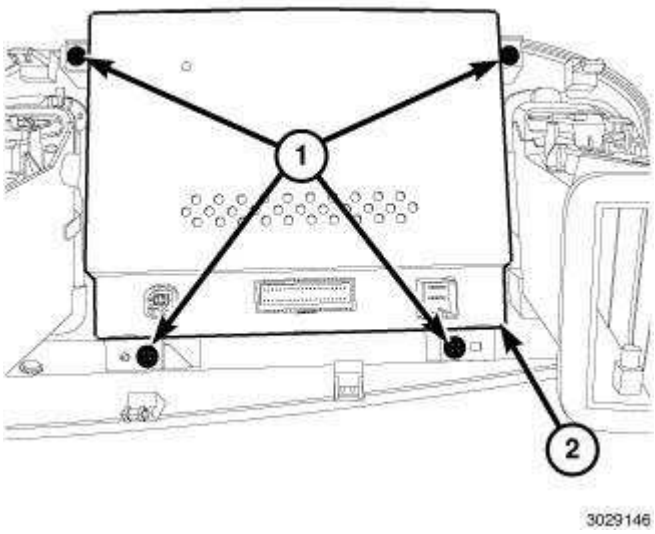

Fig. 56: Retainers
Courtesy of CHRYSLER GROUP, LLC

1. Position the (ICS) screen module (2) into the bezel and install the retainers (1).

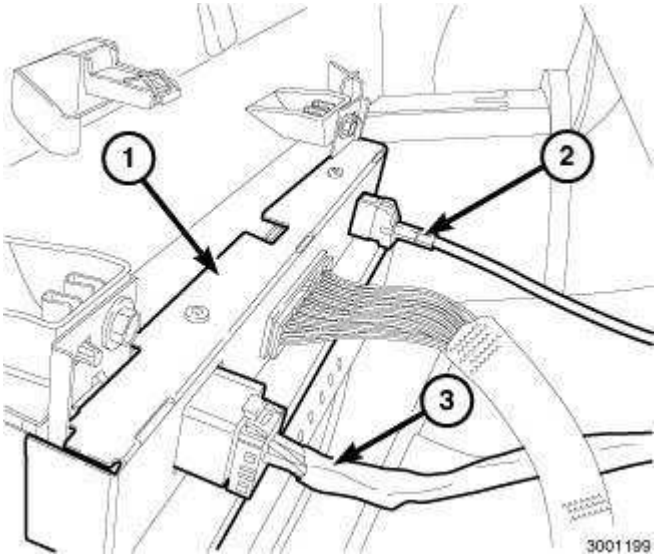

Fig. 57: Harness Connectors & Integrated Center Stack (ICS) Screen Module
Courtesy of CHRYSLER GROUP, LLC

2. Connect the harness connectors (2 & 3) to the rear of the Integrated Center Stack (ICS) screen module (1).

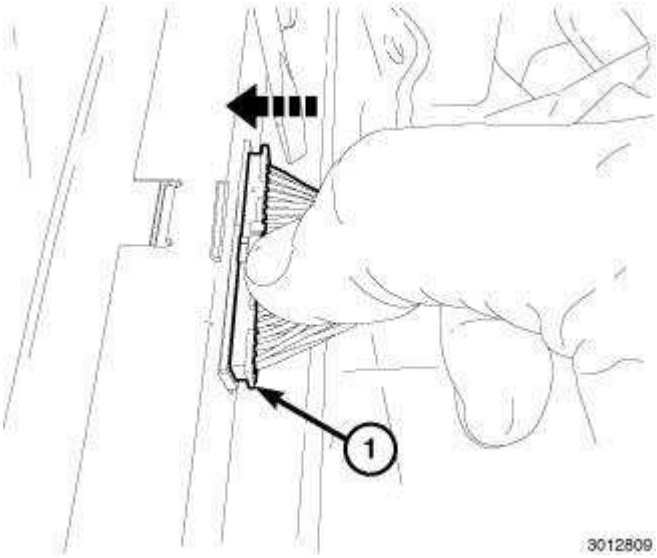

Fig. 58: 40 - Way Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: In the event that the locking tab breaks or is broken, do not replace the harness. The connector will still lock and the harness will still function as designed.

3. Carefully connect the 40 - way connector (1).

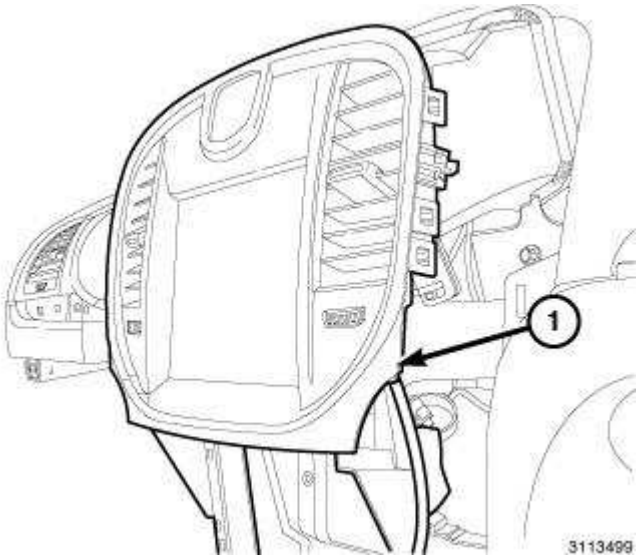

Fig. 59: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Install the instrument cluster center bezel (2). Refer to **BEZEL, INSTRUMENT PANEL, CENTER, INSTALLATION** .
5. Connect the negative battery cable.

MODULE, MEMORY

DESCRIPTION

DESCRIPTION

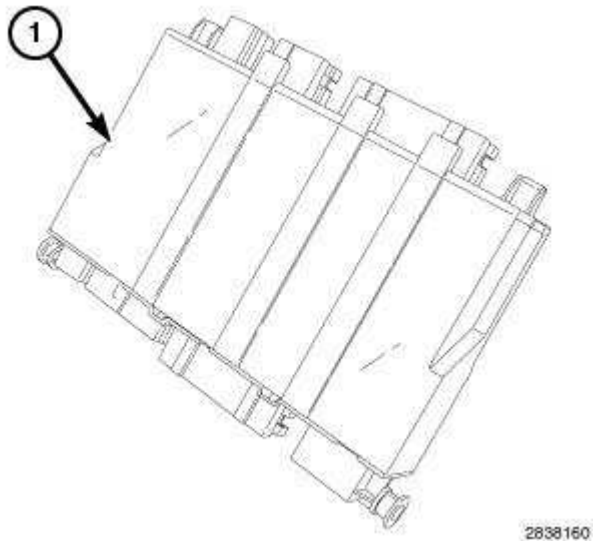

Fig. 60: seat
Courtesy of CHRYSLER GROUP, LLC

The Memory Seat Module (MSM) is located underneath the driver seat. It is used in conjunction with the other modules to recall the driver seat to one of two preset seat positions (horizontal, vertical, and recliner). The memory system is able to store and recall all driver side power seat positions, outside mirror positions, power tilt/telescopic steering column positions and power adjustable pedal position, as equipped. The memory seat system can be set for two different drivers. On vehicles with a factory installed radio connected to the Controller Area Network (CAN) data bus network, the memory system is also able to store and recall up to twelve radio station presets (six AM and six FM), also for two drivers. The memory system will also store and recall the last station listened to for each driver, even if it is not one of the twelve preset stations.

The memory seat system will automatically recall the settings when a button of the memory switch located in the driver door trim panel is pressed, or when the doors are unlocked using the Remote Keyless Entry (RKE) transmitter (if the "RKE Linked to Memory" feature is enabled). If the vehicle has more than two drivers the RKE transmitter recall of memory features can be disabled. This is a customer programmable feature.

OPERATION

OPERATION

The Memory Seat Module (MSM) receives battery current through a circuit breaker in the Power Distribution Center (PDC). The memory system remains operational, regardless of the ignition position. When the driver memory switch button or FOBIK transmitter button (when programmed) is

pushed, a signal is sent to the MSM over the Controller Area Network (CAN) data bus. The MSM is responsible for the 12 volt Direct Current (DC) feed and ground path to the power seat adjuster motors and to the other memory system components.

The MSM also receives hard-wired input from the hall effect sensors, mounted on each of the driver power seat adjuster motors, driver side view mirror motors, power adjustable steering column motors and power adjustable pedal motor, when equipped. The programmed software in the MSM allows it to know where the driver seat, mirror, steering column and pedals, as equipped, are located in there designed travel by a pulse count, generated from hall effect sensors. This way, when a memory seat switch is pressed the MSM will power these components until the correct preset location is achieved. The MSM will prevent the seat memory recall function from being initiated, if the transmission gear selector is not in the Park position. These inputs are monitored over the CAN bus by the MSM.

A memory setting is saved by pressing the "Set" button, then pressing either the memory "1" or "2" button within five seconds of pressing the "Set" button.

A memory setting is recalled by pressing either the memory "1" or "2" button, or by pressing the unlock button on a "linked" FOBIK transmitter.

The MSM performs the following functions:

- Positions the driver power seat (fore/aft, up/down, tilt and recline positions).
- Sends the memory save or recall (number 1 or number 2) command over the CAN bus circuit to the other memory system components, radio station pre-sets and power mirror positions.
- Provides for the easy entry/exit feature.

When a memory button is pressed (number 1 or number 2) on the memory seat switch, it provides resistive signal to the MSM. The MSM will then position the driver seat to the pre-set location. When a FOBIK transmitter button is pressed, depending on which transmitter (number 1 or number 2), the WIN/SKIM receiver sends the recall request and FOBIK number (number 1 or number 2) data message. The FOBIK transmitter function depends on if the MSM is programmed to trigger the recall (linked FOBIKs).

A FOBIK is "linked" to a memory setting by pressing the "Set" button and then pressing either the memory "1" or "2" button within 5 seconds of pressing the set button, then by pressing the "lock" button on the selected FOBIK.

The memory seat system "Easy Entry and Exit" feature provides the driver with more room to enter or exit the vehicle. When the driver seat is in a memorized position, it will move rearward 55 millimeters (2.2 inches) or to the end of its travel, whichever occurs first, when the ignition is pressed to OFF. The seat will return to the pre-set position when the ignition is pressed to RUN.

The memory seat system "learns" the seat, mirror, column and pedal motors maximum end positions, when the motor reaches the limit of travel in any direction and stalls. Subsequently, movement will stop just short of that position to avoid extra stress on the motors and mechanisms. If the system learned a maximum position as a result of an obstruction, as for instance if a large object was placed on the floor behind the seat, the system can relearn the "true" maximum position through manually

operating the power seat after the obstruction is removed.

NOTE: **It is normal for the power accessories contained in the memory system to stop at the maximum "learned" position and then continue to the "true" maximum position when the control switch is released and then applied in the same direction a second time.**

Certain functions and features of the memory seat system rely upon resources shared with other electronic modules in the vehicle over the CAN bus. The CAN bus allows the sharing of sensor information. This helps to reduce wire harness complexity, internal controller hardware and component sensor current loads. At the same time, the memory seat system provides increased reliability, enhanced diagnostics and allows the addition of new feature capabilities.

NOTE: **Anytime a Memory Seat Module (MSM) or a driver power seat motor or seat track is replaced, the MSM must be cleared of all learned parameters using a scan tool and the Power Seat System Verification test must be performed.**

The use of a scan tool is needed for diagnosis of the MSM, CAN bus and other electronic modules. Refer to **DIAGNOSIS AND TESTING** .

REMOVAL

REMOVAL

NOTE: **Anytime a Memory Seat Module (MSM) is replaced, the MSM must be cleared of all learned parameters using a scan tool, and the Power Seat System Verification test must be performed.**

NOTE: **Depending on how equipped, more memory seat module electrical connectors may be present than shown in the illustration.**

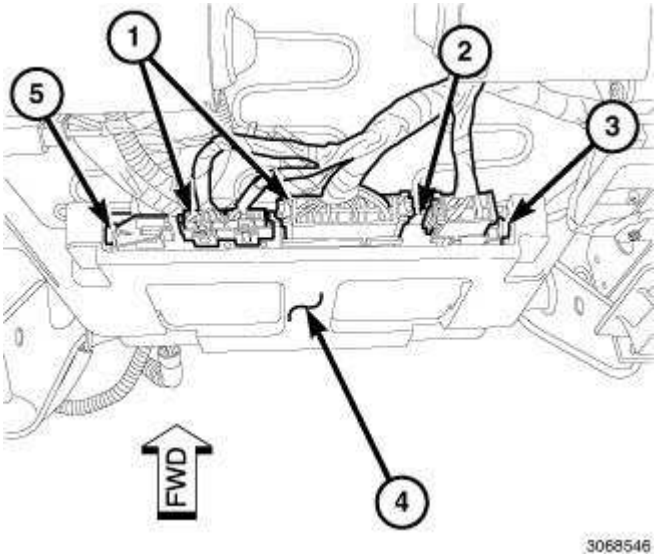

Fig. 61: Electrical Connectors, Memory Seat Module (MSM), MSM Retaining Tabs & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the fasteners that secure the driver seat to the body and tip the seat rearward to gain access to the underneath of the seat. Refer to **SEAT, FRONT, REMOVAL** .
3. Disconnect all the electrical connectors (1) from the front of the Memory Seat Module (MSM) (2).
4. Disengage the two front MSM retaining tabs (3 and 5) from the bracket (4) by carefully pushing up on the front of the MSM.
5. Disengage the two rear MSM retaining tabs from the bracket by carefully pulling the MSM forward.
6. Disconnect all electrical connectors from the rear of the MSM and remove the MSM.

INSTALLATION

INSTALLATION

NOTE: Depending on how equipped, more memory seat module electrical connectors may be present than shown in the illustration.

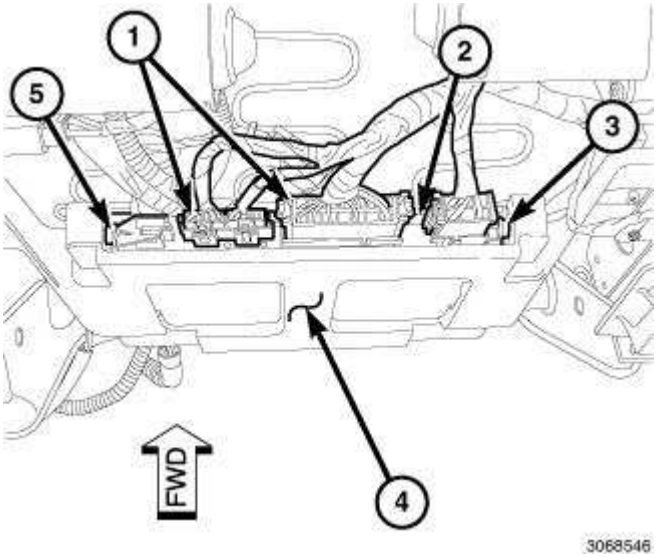

Fig. 62: Electrical Connectors, Memory Seat Module (MSM), MSM Retaining Tabs & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Position the Memory Seat Module (MSM) (2) to the bracket (4) and connect all electrical connectors to the rear of the MSM.

CAUTION: Properly align the Memory Seat Module (MSM) retaining tabs to the bracket, prior to engagement. Failure to follow these instructions may result damage to the MSM retaining tabs.

2. Install the MSM into the bracket and engage the two rear MSM retaining tabs to the bracket.
3. Engage the two front MSM retaining tabs (3 and 5) to the bracket by carefully pulling down on the front of the MSM.
4. Connect all the electrical connectors (1) to the front of the MSM.
5. Install the driver seat. Refer to **SEAT, FRONT, INSTALLATION** .
6. Reconnect the negative battery cable.

NOTE: Anytime a Memory Seat Module (MSM) is replaced, the MSM must be cleared of all learned parameters using a scan tool, and the Power Seat System Verification test must be performed.

7. Using a scan tool, select Clear All MSM Learned Parameters, found under the Memory Seat Module, Miscellaneous Functions tab.
8. Perform the Power Seat System Verification test. Refer to **STANDARD PROCEDURE** .
9. Verify proper memory seat system operation.

MODULE, POWERTRAIN CONTROL

DESCRIPTION

PCM

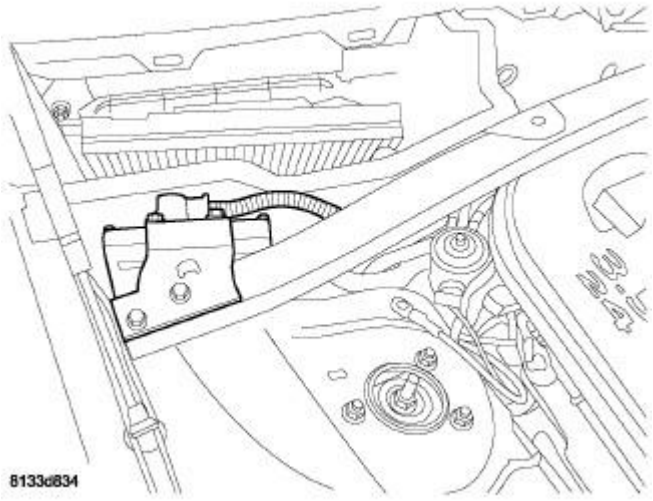

Fig. 63: PCM Location In Vehicle
Courtesy of CHRYSLER GROUP, LLC

The Powertrain Control Module (PCM) is located in the engine compartment. The PCM is referred to as NGC.

MODES OF OPERATION

As input signals to the Powertrain Control Module (PCM) change, the PCM adjusts its response to the output devices. For example, the PCM must calculate different injector pulse width and ignition timing for idle than it does for wide open throttle (WOT).

The PCM will operate in two different modes: **Open Loop and Closed Loop** .

During Open Loop modes, the PCM receives input signals and responds only according to preset PCM programming. Input from the oxygen (O2S) sensors is not monitored during Open Loop modes.

During Closed Loop modes, the PCM will monitor the oxygen (O2S) sensors input. This input indicates to the PCM whether or not the calculated injector pulse width results in the ideal air-fuel ratio. This ratio is 14.7 parts air-to-1 part fuel. By monitoring the exhaust oxygen content through the O2S sensor, the PCM can fine tune the injector pulse width. This is done to achieve optimum fuel economy combined with low emission engine performance.

The fuel injection system has the following modes of operation:

- Ignition switch ON
- Engine start-up (crank)
- Engine warm-up
- Idle
- Cruise
- Acceleration
- Deceleration
- Wide open throttle (WOT)
- Ignition switch OFF

The ignition switch On, engine start-up (crank), engine warm-up, acceleration, deceleration and wide open throttle modes are Open Loop modes. The idle and cruise modes, (with the engine at operating temperature) are Closed Loop modes.

IGNITION SWITCH (KEY-ON) MODE

This is an Open Loop mode. When the fuel system is activated by the ignition switch, the following actions occur:

- The PCM determines atmospheric air pressure from the MAP sensor input to determine basic fuel strategy.
- The PCM monitors the engine coolant temperature sensor input. The PCM modifies fuel strategy based on this input.
- Intake manifold air temperature sensor input is monitored.
- Throttle position sensors (TPS) and pedal value sensors are monitored.

- The auto shutdown (ASD) relay is energized by the PCM for approximately three seconds.
- The fuel pump is energized through the fuel pump relay by the PCM. The fuel pump will operate for approximately three seconds unless the engine is operating or the starter motor is engaged.
- The O2S sensor heater element is energized via the O2S heater drivers (solid state devices) internal to the PCM. These drivers provide a PWM 0-12V signal to heat the O2S heater elements to optimize the O2S sensor signal output. The O2S sensor input is not used by the PCM to calibrate air-fuel ratio during this mode of operation.

ENGINE START-UP MODE

This is an Open Loop mode. The following actions occur when the starter motor is engaged.

The PCM receives inputs from:

- Direct Battery voltage
- Pedal Value Sensors (PVS)
- Engine coolant temperature sensor
- Crankshaft position sensor
- Intake manifold air temperature sensor
- Manifold absolute pressure (MAP) sensor
- Throttle position sensors (TPS)
- Camshaft position sensor signal

The PCM monitors the crankshaft position sensor. If the PCM does not receive a crankshaft position sensor signal within approximately 3 seconds of cranking the engine, it will shut down the fuel injection system.

The fuel pump is activated by the PCM through the fuel pump relay located in the IPM.

Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control the injection sequence and injector pulse width by actuating ground circuit to each individual injector on and off.

The PCM determines the proper ignition timing according to input received from the crankshaft position sensor.

ENGINE WARM-UP MODE

This is an Open Loop mode. During engine warm-up, the PCM receives inputs from:

- Direct Battery voltage
- Crankshaft position sensor
- Engine coolant temperature sensor
- Intake manifold air temperature sensor

- Manifold absolute pressure (MAP) sensor
- Throttle position sensors (TPS)
- Camshaft position sensor signal
- Park/neutral switch (gear indicator signal)
- Pedal Value Sensors (PVS)
- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)

Based on these inputs the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control the injection sequence and injector pulse width by turning the ground circuit to each individual injector on and off.
- The PCM adjusts engine idle speed through the electronic throttle control (ETC) motor and adjusts ignition timing accordingly.
- The PCM operates the A/C compressor clutch through the clutch relay. This is done if A/C has been selected by the vehicle operator and requested by the A/C thermostat.
- When the heating element has reached operating temperature located in the O2S, the PCM will begin monitoring O2 sensor output readings. The system will then leave the warm-up (open loop) mode and go into closed loop operation.

IDLE MODE

When the engine is at operating temperature, this is a Closed Loop mode. At idle speed, the PCM receives inputs from:

- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)
- Battery voltage
- Crankshaft position sensor
- Engine coolant temperature sensor
- Intake manifold air temperature sensor
- Manifold absolute pressure (MAP) sensor
- Pedal Value Sensors (PVS)
- Throttle position sensors (TPS)
- Camshaft position sensor signal
- Battery voltage
- Park/neutral switch (gear indicator signal)
- Oxygen sensors

Based on these inputs, the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control injection sequence and injector pulse width by turning the ground circuit to each individual injector on and off.
- The PCM monitors the O2S sensor input and adjusts air-fuel ratio by varying injector pulse width. It also adjusts engine idle speed through the electronic throttle control (ETC) motor.
- The PCM adjusts ignition timing by increasing and decreasing spark advance.
- The PCM operates the A/C compressor clutch through the A/C clutch relay. This happens if A/C has been selected by the vehicle operator and requested by the A/C thermostat.

CRUISE MODE

When the engine is at operating temperature, this is a Closed Loop mode. At cruising speed, the PCM receives inputs from:

- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)
- Battery voltage
- Engine coolant temperature sensor
- Crankshaft position sensor
- Intake manifold air temperature sensor
- Manifold absolute pressure (MAP) sensor
- Pedal Value Sensors (PVS)
- Throttle position sensors (TPS)
- Camshaft position sensor signal
- Park/neutral switch (gear indicator signal)
- Oxygen (O2S) sensors

Based on these inputs, the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then adjust the injector pulse width by turning the ground circuit to each individual injector on and off.
- The PCM monitors the O2S sensor input and adjusts air-fuel ratio.
- The PCM adjusts ignition timing by turning the ground path to the coils on and off.
- The PCM operates the A/C compressor clutch through the clutch relay. This happens if A/C has been selected by the vehicle operator and requested by the A/C thermostat.

ACCELERATION MODE

This is an Open Loop mode. The PCM recognizes an abrupt increase in throttle position or MAP pressure as a demand for increased engine output and vehicle acceleration. The PCM increases injector pulse width in response to increased throttle opening.

DECELERATION MODE

When the engine is at operating temperature, this is an Open Loop mode. During hard deceleration, the PCM receives the following inputs.

- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)
- Battery voltage
- Engine coolant temperature sensor
- Crankshaft position sensor
- Intake manifold air temperature sensor
- Manifold absolute pressure (MAP) sensor
- Pedal Value Sensors (PVS)
- Throttle position sensors (TPS)
- Camshaft position sensor signal
- Park/neutral switch (gear indicator signal)
- Vehicle speed

If the vehicle is under hard deceleration with the proper RPM and closed throttle conditions, the PCM will ignore the oxygen sensor input signal. The PCM will enter a fuel cut-off strategy in which it will not supply a ground to the injectors. If a hard deceleration does not exist, the PCM will determine the proper injector pulse width and continue injection.

The PCM adjusts ignition timing by turning the ground path to the coils on and off.

WIDE OPEN THROTTLE MODE

This is an Open Loop mode. During wide open throttle operation, the PCM receives the following inputs.

- Battery voltage
- Crankshaft position sensor
- Engine coolant temperature sensor
- Intake manifold air temperature sensor
- Manifold absolute pressure (MAP) sensor
- Pedal Value Sensors (PVS)
- Throttle position sensors (TPS)
- Camshaft position sensor signal

During wide open throttle conditions, the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control the injection sequence and injector pulse width by turning the ground circuit to each individual injector on and off. The PCM ignores the oxygen sensor input signal and provides a predetermined amount of additional fuel. This is done by adjusting injector pulse width.

- The PCM adjusts ignition timing by turning the ground path to the coil on and off.

IGNITION SWITCH OFF MODE

When ignition switch is turned to OFF position, the PCM stops operating the injectors, ignition coil, ASD relay and fuel pump relay.

STANDARD PROCEDURE

TCM QUICK LEARN - 42RLE ONLY (NON ABS)

The quick learn procedure requires the use of the appropriate scan tool.

This program allows the electronic transmission system to recalibrate itself. This will provide the proper transmission operation. The quick learn procedure should be performed if any of the following procedures are performed:

- Transmission Assembly Replacement
- Transmission Control Module Replacement
- Solenoid Pack Replacement
- Clutch Plate and/or Seal Replacement
- Valve Body Replacement or Recondition

To perform the Quick Learn Procedure, the following conditions must be met:

- The brakes must be applied
- The engine speed must be above 500 RPM
- The throttle angle (TPS) must be less than 3 degrees
- The shift lever position must stay in PARK until prompted to shift to overdrive
- The shift lever position must stay in overdrive after the Shift to Overdrive prompt until the scan tool indicates the procedure is complete.
- The calculated oil temperature must be above 60° and below 200°

TCM ADAPTATION - NAG1 ONLY

The adaptation procedure requires the use of the appropriate scan tool. This program allows the electronic transmission system to re-calibrate itself. This will provide the proper baseline transmission operation. The adaptation procedure should be performed if any of the following procedures are performed:

- Transmission Assembly Replacement
- Transmission Control Module Replacement
- Clutch Plate and/or Seal Replacement
- Electrohydraulic Unit Replacement or Recondition

1. With the scan tool, reset the Transmission adaptives. Resetting the adaptives will set the adaptives to factory settings.

   NOTE: Perform the Coast Down Adaptations first. The Transmission Temperature must be greater than 60°C (140°F) and less than 70°C (158°F). Failure to stay within these temperature ranges will void the procedure.

2. Drive the vehicle until the transmission temperature is in the specified range.
3. Perform 4 to 5 coast downs from 5th to 4th gear and then 4th to 3rd gear.

   NOTE: For Upshift adaptation, the Transmission temperature must be greater than 60°C (140°F) and less than 100°C (212°F). Failure to stay within these temperature ranges will void this procedure.

4. From a stop, moderately accelerate the vehicle and obtain all forward gear ranges while keeping the Engine RPM below 1800 RPM. Repeat this procedure 4 to 5 times.
5. Obtaining 5th gear may be difficult at 1800 RPM. Allow the transmission to shift into 5th gear at a higher RPM then lower the RPM to 1800 and perform manual shifts between 4th and 5th gears using the shift lever.
6. The TCM will store the adaptives every 10 minutes. After completion of the adaptation procedure make sure the vehicle stays running for at least 10 minutes.
7. It is possible to manually store the adaptives under the 10 minute time frame using the scan tool Store Adaptives procedure.

PCM/TCM REPROGRAMMING - GAS

And perform the PCM/TCM PROGRAMMING procedure. Refer to appropriate diagnostic information .

REMOVAL

DIESEL

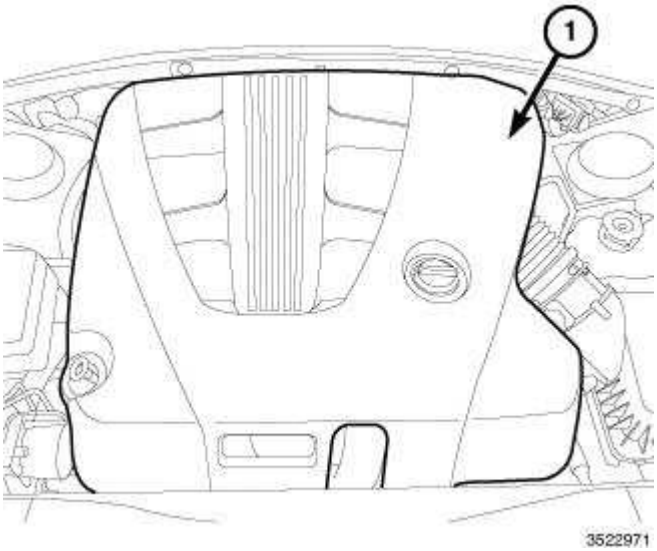

Fig. 64: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

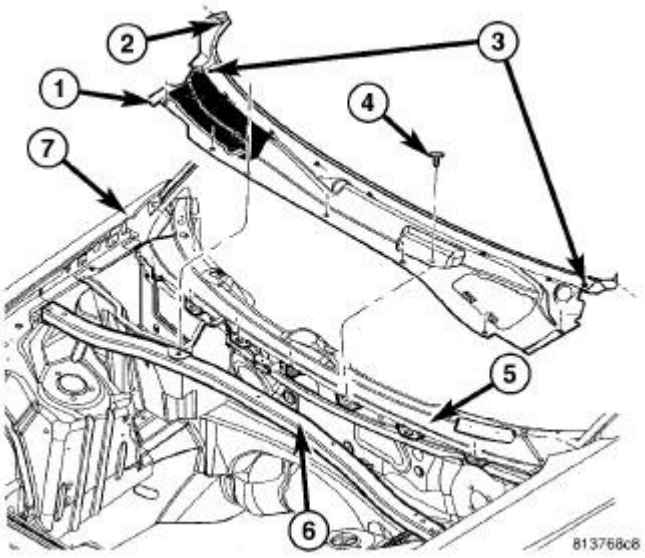

Fig. 65: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

3. Remove the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, REMOVAL** .
4. Remove bolts and the strut support brace (6).

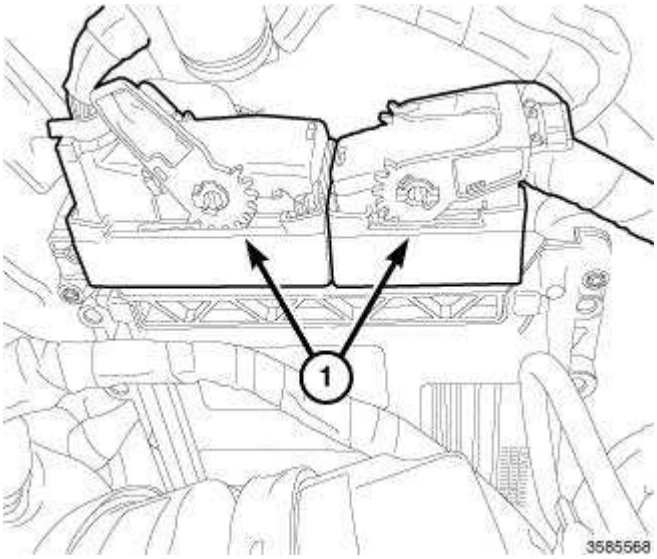

Fig. 66: Powertrain Control Module (PCM) Connectors
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the Powertrain Control Module (PCM) wire harness connector (1).

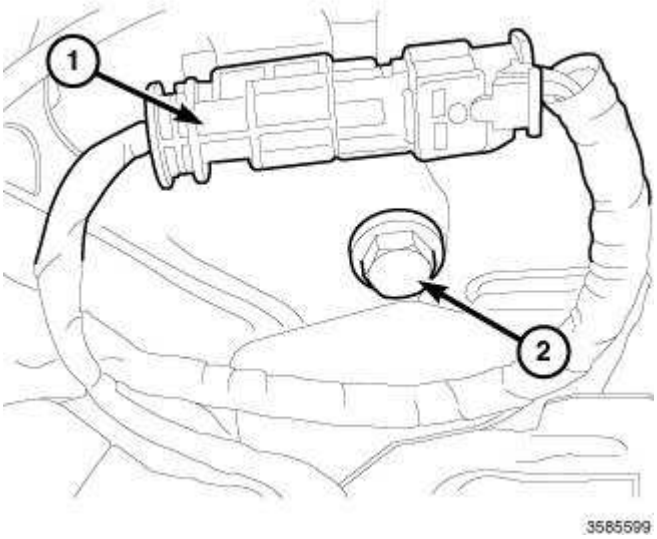

Fig. 67: Crash Sensor Wire Harness Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the crash sensor wire harness connector (1) from inner fender.
7. Remove bolt (2) and the PCM with mounting bracket.

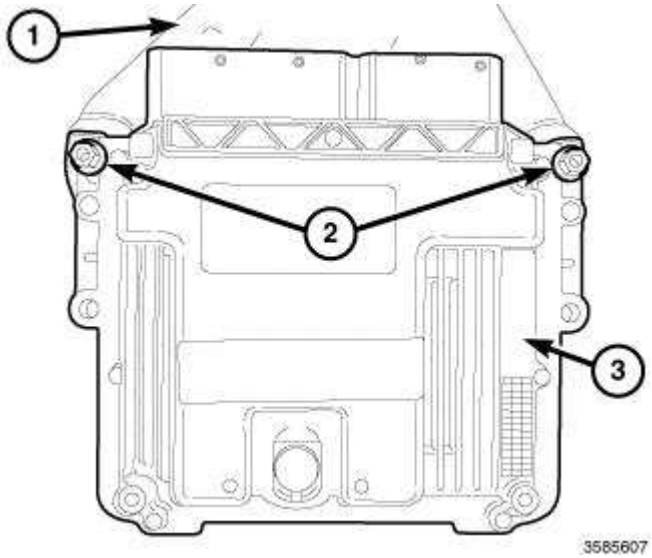

Fig. 68: Nuts, PCM & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

8. Remove nuts (2) and the PCM (3) from mounting bracket (1).

GAS

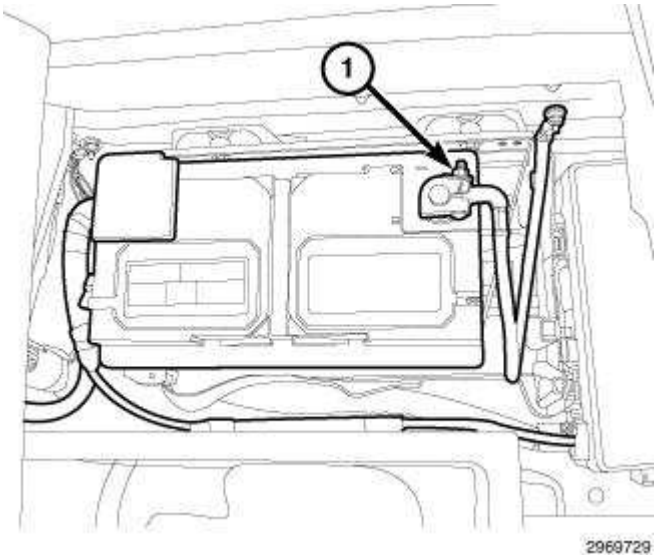

Fig. 69: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

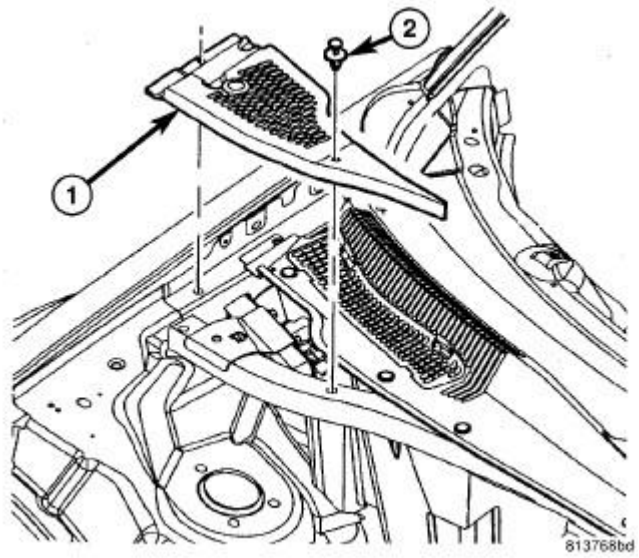

Fig. 70: Cowl Panel 1
Courtesy of CHRYSLER GROUP, LLC

2. Remove the two push pins (2) that secure the front cowl top panel (1) to the right rear corner of the engine compartment
3. Remove the front cowl top panel.

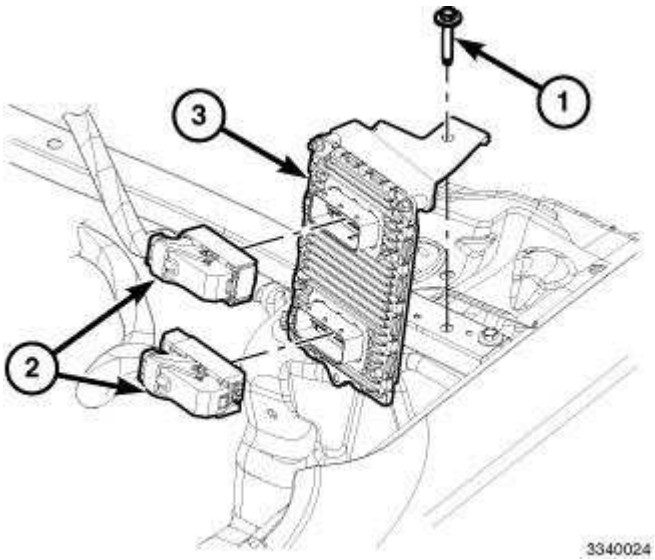

Fig. 71: Retaining Bolt, PCM Electrical Connectors & PCM
Courtesy of CHRYSLER GROUP, LLC

4. Remove the Powertrain Control Module (PCM) retaining bolt (1).
5. Disconnect the PCM electrical connectors (2).
6. Remove the PCM (3) from the vehicle.

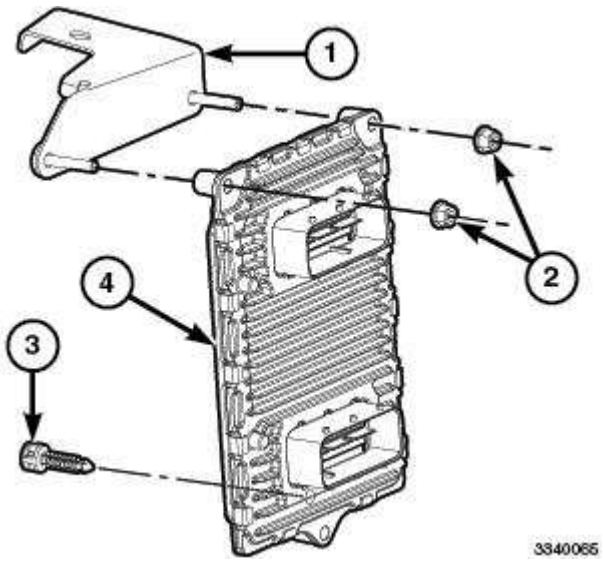

Fig. 72: NVH Rubber Bumper, PCM, Bracket & Nuts
Courtesy of CHRYSLER GROUP, LLC

7. If required, remove the NVH rubber bumper (3) from the PCM (4).
8. If required, remove the PCM mounting bracket (1) retaining nuts (2) and remove the bracket.

INSTALLATION

DIESEL

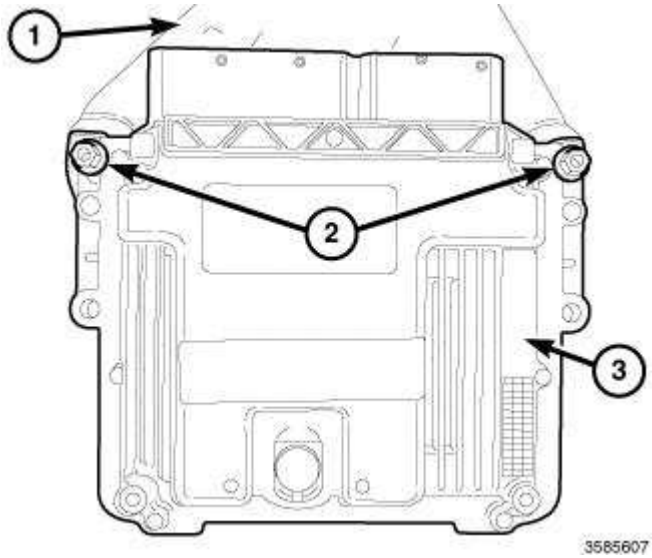

Fig. 73: Nuts, PCM & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Install the Powertrain Control Module (PCM) (3) onto mounting bracket (1) and securely tighten the nuts (2).

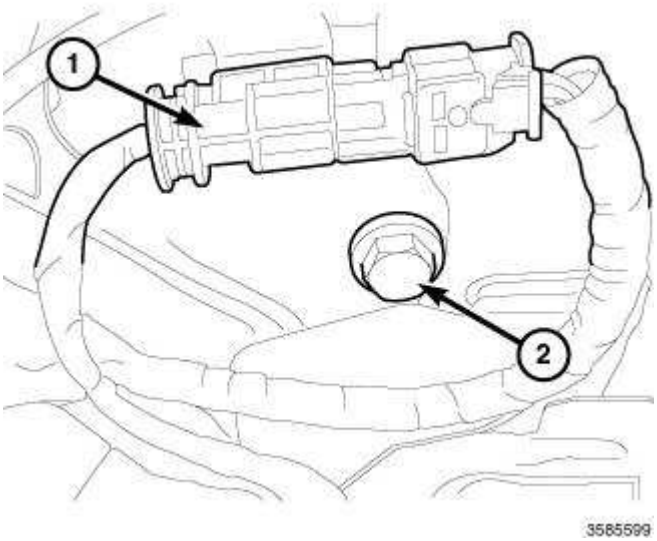

Fig. 74: Crash Sensor Wire Harness Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the PCM with mounting bracket and securely tighten the bolt (2).
3. Install the crash sensor wire harness connector (1) to the inner fender.

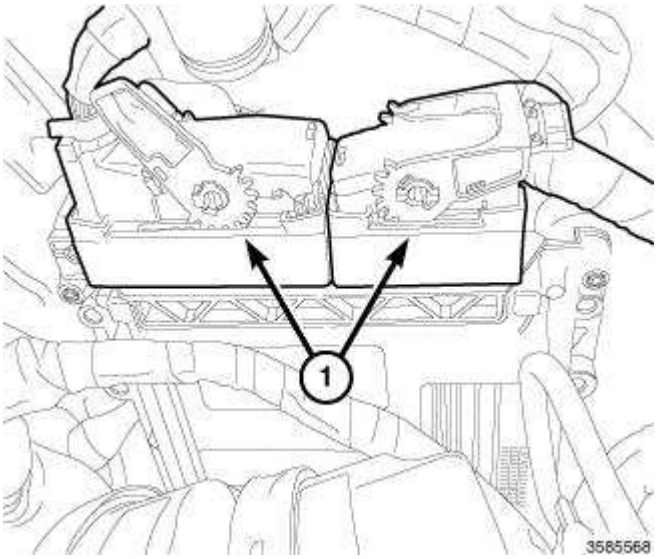

Fig. 75: Powertrain Control Module (PCM) Connectors
Courtesy of CHRYSLER GROUP, LLC

4. Connect the PCM wire harness connector (1).

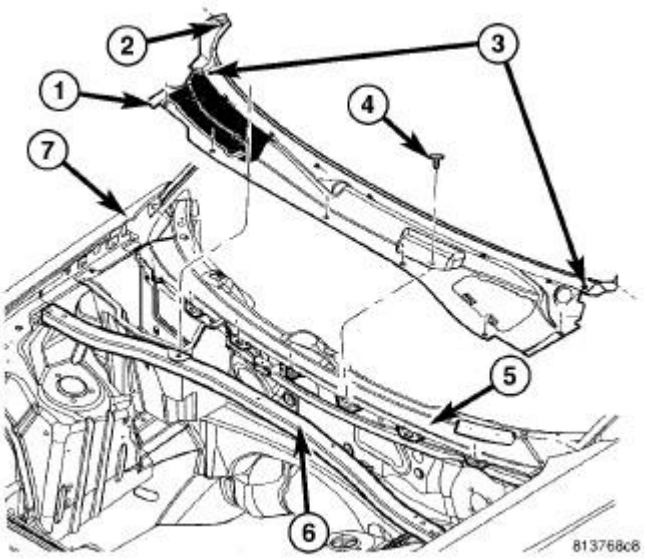

Fig. 76: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

5. Install the strut support brace (6). Tighten bolts to 38 N.m (28 ft. lbs.).
6. Install the wiper arm linkage. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .

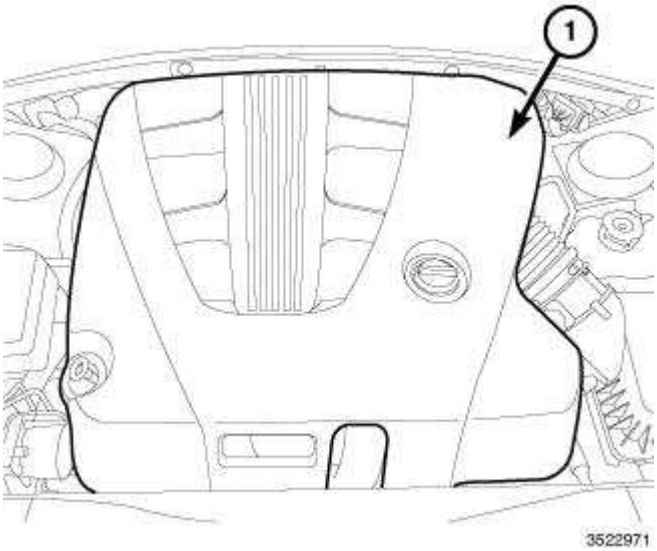

Fig. 77: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

7. Install the engine cover (1).
8. Connect the negative battery cable.

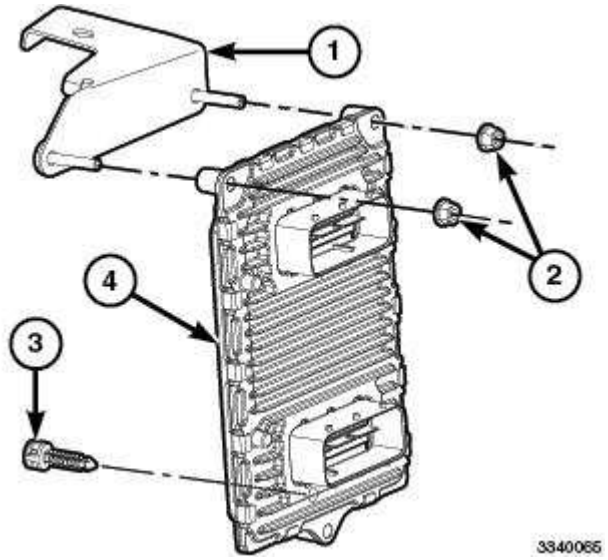

Fig. 78: NVH Rubber Bumper, PCM, Bracket & Nuts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the Powertrain Control Module (PCM) mounting bracket (1) onto the PCM (4), install the two retaining nuts (2) and tighten to 8 N.m (71 in. lbs.).
2. If removed, install the NVH rubber bumper (3) onto the PCM.

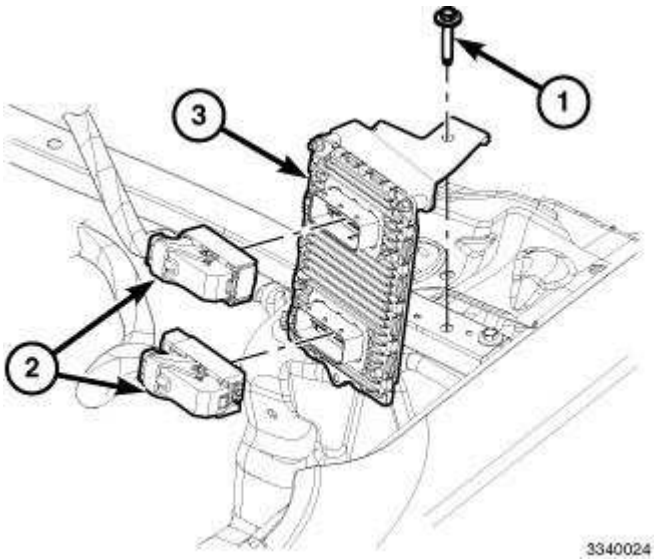

Fig. 79: Retaining Bolt, PCM Electrical Connectors & PCM
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to reconnecting the electrical connectors to the PCM, check the pins in the electrical connectors for misalignment and/or damage. Repair as necessary.

3. Position the PCM (3) into the vehicle.

4. Connect the PCM harness connectors (2).
5. Position the PCM bracket to the cross support, install the retaining bolt (1) and tighten to 16 N.m (12 ft. lbs.).

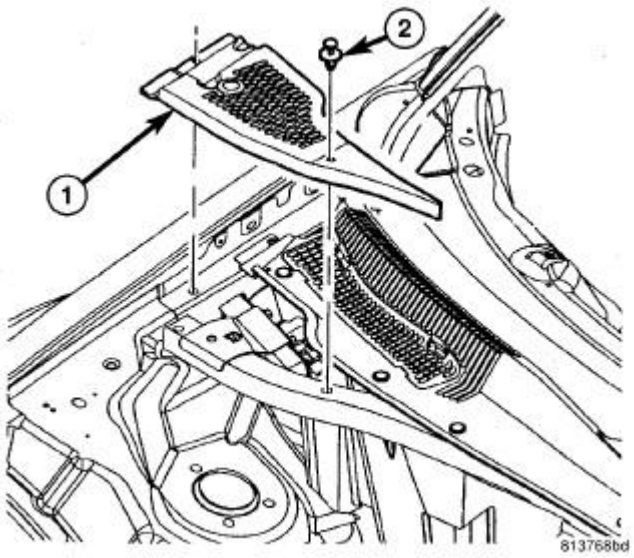

Fig. 80: Cowl Panel 1
Courtesy of CHRYSLER GROUP, LLC

6. Position the front cowl top panel (1) to the right rear corner of the engine compartment.
7. Install the two push-pins (2) that secure the front cowl top panel.

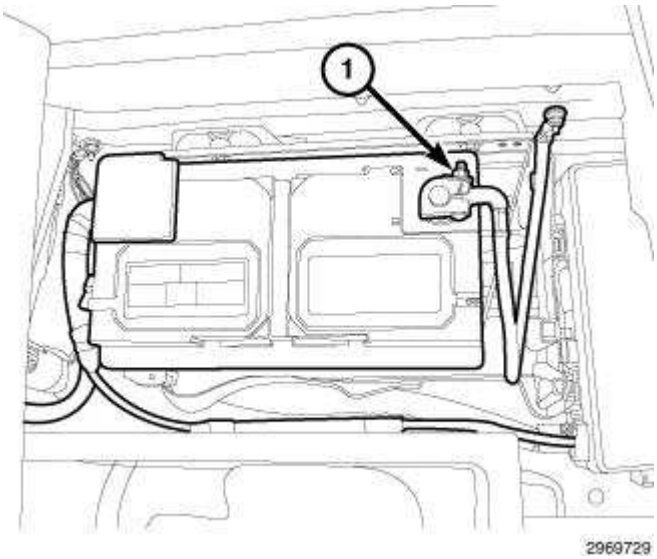

Fig. 81: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

8. Connect the negative battery cable and tighten nut (1) to 5 N.m (45 in. lbs.).

NOTE: **If a new PCM is installed, it must be programed with the original Vehicle Identification Number (VIN) and mileage. If this is not done, a Diagnostic Trouble Code (DTC) may set.**

NOTE: **If a new PCM is installed. Refer to STANDARD PROCEDURE.**

9. If a new PCM is being installed, use a scan tool and program the new PCM with the original VIN and vehicle mileage.

MODULE, RADIO FREQUENCY (RF HUB)

DESCRIPTION

DESCRIPTION

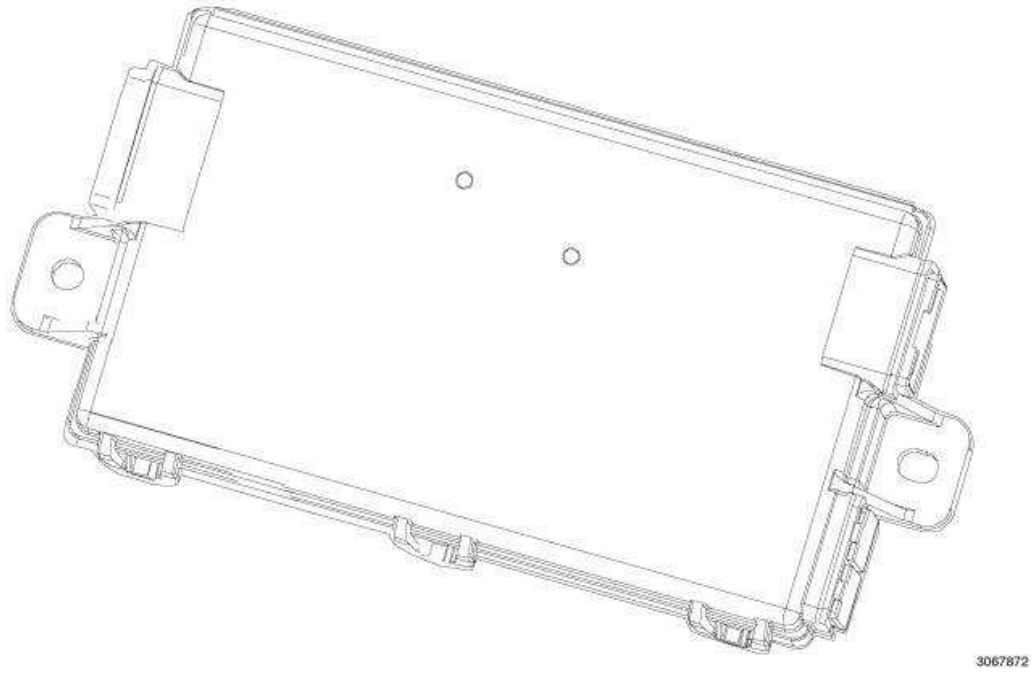

Fig. 82: RF Hub Module
Courtesy of CHRYSLER GROUP, LLC

The RF Hub is located on the rear center of the package shelf under the trim panel.

OPERATION

OPERATION

There are 5 other component categories that make up the new ignition system.

The components are:

- Radio Frequency (RF) HUB (1)
- LF Antennas (5)
- FOB (2, 4 for Police)
- Special Door Handles (2)
- Special Liftgate Handle (1)

This new ignition system operation begins when an owner approaches their vehicle with a FOB somewhere on their person or belongings, i.e., in their gym bag. When the owner touches the handle to pull the door open, door handle electronics signal the RF HUB with a "request to open". The RF HUB uses all of the 5 LF (low frequency) antennas to communicate with the FOB. Once located, the FOB's response is evaluated by the RF HUB to determine if the person pulling on the door handle is in fact the owner. This process completes 'FOB authentication'.

Once authentication is successfully completed, the RF HUB requests the Body Control Module (BCM) to unlock the affected door. Once the doors unlock, the owner is then free to continue pulling the door handle in an attempt to enter their vehicle. This process of opening the door without actively using a FOB or key is called 'passive entry'. The LD/LX trunk handle is outfitted with a passive entry switch, allowing the trunk to pop open when it's pressed after FOB authentication completes successfully.

After the vehicle's owner is buckled, the customer then pushes the KIN's SSB (Keyless Ignition Node's Start/Stop Button) while pushing the brake pedal as if braking while coming to a stoplight. (For manual transmission vehicles the clutch pedal is depressed instead of the brake pedal to initiate a start procedure). Before the vehicle is allowed to start, another 'FOB authentication' cycle must be completed. Once successfully completed, the RF HUB next sends the BCM the ignition switch position, which equates to a 'request to start' command. The process of starting a vehicle without the act of using a bladed key or FOB is called 'Keyless Go'.

The passive entry works when the FOB can be located outside the vehicle using the LF antennas. Keyless go operates when the RF HUB can locate the FOB inside the vehicle. Please refer to the owner's manual for more information on authentication zones.

After putting the vehicle into park, pushing the KIN's SSB allows the vehicle's engine to be shut off. In an emergency, pressing the SSB continuously for 2 seconds or repeatedly (one hit every 30-500msec) shuts off the engine.

REMOVAL

REMOVAL

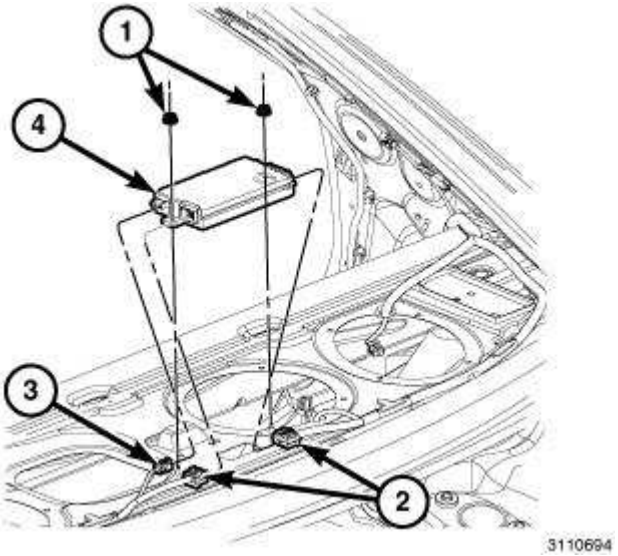

Fig. 83: RF Hub Retainers, Connectors & Remote Start Antenna
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the rear shelf cover. Refer to **PANEL, REAR SHELF, REMOVAL** .
3. Remove the RF Hub retainers (1).
4. Disconnect the electrical connectors (2).
5. If equipped, disconnect the remote start antenna (3).
6. Remove the RF Hub (4) from the vehicle.

INSTALLATION

INSTALLATION

NOTE: Replace and Program the module(s) per the RF-Hub, BCM, PCM FOBik and ELV Replacement and Programming Order Guide. Refer to STANDARD PROCEDURE.

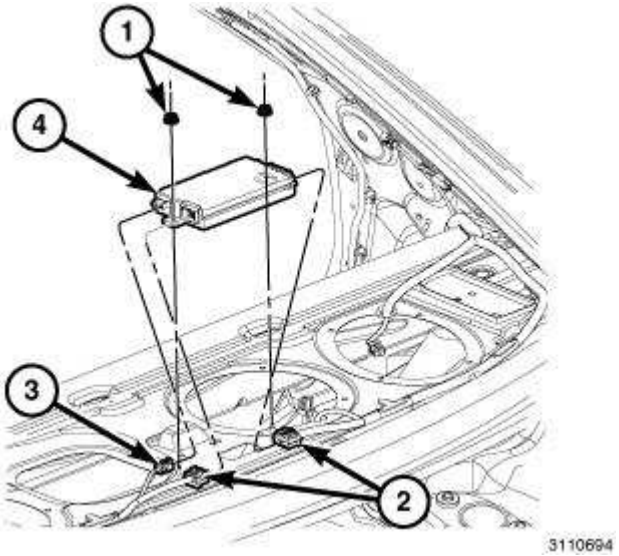

Fig. 84: RF Hub Retainers, Connectors & Remote Start Antenna
Courtesy of CHRYSLER GROUP, LLC

1. Position into place and install the RF Hub (4) and retainers (1).
2. Connect the electrical connectors (2).
3. If equipped, connect the remote start antenna (3).
4. Install the rear shelf cover. Refer to **PANEL, REAR SHELF, INSTALLATION** .
5. Connect the Intelligent Battery Sensor (IBS) to the negative battery post.

NOTE: Program the RF-Hub. Refer to STANDARD PROCEDURE.

MODULE, STEERING COLUMN

DESCRIPTION

DESCRIPTION

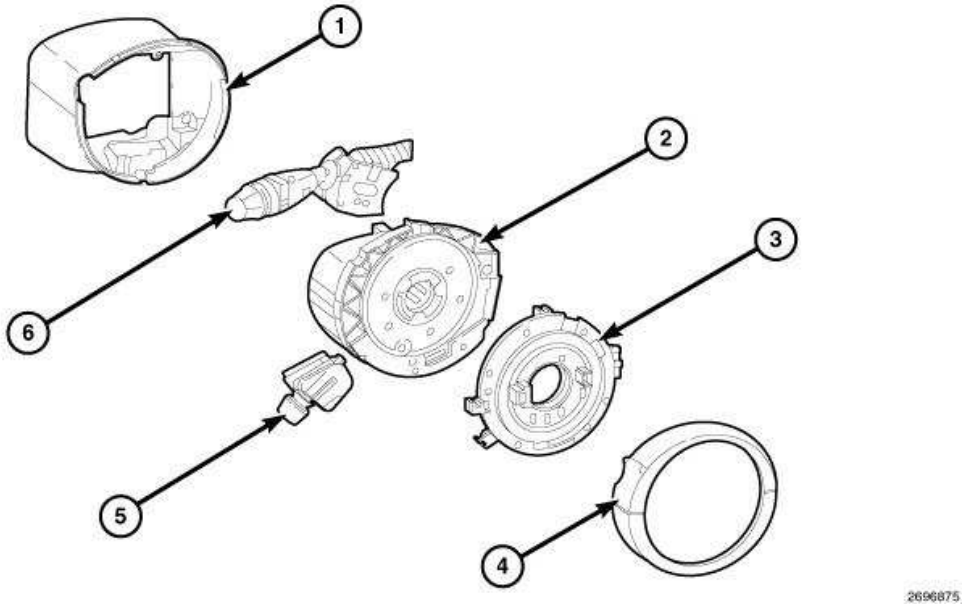

Fig. 85: Steering Column Shroud, Steering Angle Sensor (SAS), Clockspring, Telescope Switch & Trim Cover
Courtesy of CHRYSLER GROUP, LLC

The Steering Control Module (SCM) for this vehicle is integral to the Steering Column Control Module (SCCM). The SCCM is located near the top of the steering column below the steering wheel. The SCCM includes the steering column shroud (1), the Steering Angle Sensor (SAS) (2), the clockspring (3), the multi-function switch (6), a steering column power tilt and telescope switch (5) for vehicles so equipped and a trim cover (4).

The SCCM is secured to the steering column by a unique mounting system using no external fasteners. The SCCM has two key stone features that snap into slots in the upper column jacket to secure the SCCM. In addition, a mechanical red indicator on the lower surface of the column shroud will be flush with the shroud surface when the SCCM is properly installed, but will stand proud of the shroud surface if the key stones are incompletely or improperly seated in the slots of the column jacket.

There are also unique lugs cast into the outer circumference of the steering wheel hub that must be engaged into slots within the inner circumference of the clockspring rotor hub to unlock and drive both the clockspring and the SAS, and the steering wheel must be tightened to specification to ensure proper clockspring and SAS function.

The SCCM includes an integral connector receptacle that faces toward the instrument panel and is connected to the vehicle electrical system through a single take out and connector of the instrument panel wire harness. The instrument panel wire harness take out has been intentionally provided with additional length to facilitate service removal and installation of the SCCM. However, following SCCM installation, this additional length must be pulled back and secured to the instrument panel structure to prevent the potential for undesirable rattling and buzzing noises while driving.

The SCM cannot be adjusted or repaired. If ineffective or damaged the entire SCCM unit must be

replaced.

OPERATION

OPERATION

The Steering Column Control Module (SCCM) includes an electronic circuit board, sometimes referred to as the Steering Control Module (SCM). The SCM is a Local Interface Network (LIN) bus master and a gateway for the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, DESCRIPTION**.

The microprocessor-based SCM provides power and ground to the multi-function and power tilt and telescope steering column switches of the SCCM, then utilizes integrated circuitry to monitor hard wired analog and digital return inputs from both of these switches. Except for the circuits for the optional heated steering wheel and the standard equipment Driver AirBag (DAB), which are pass-through circuits of the SCCM, the SCM also provides power and ground to all of the electronics carried on the steering wheel through a microprocessor contained in the right steering wheel switch, which is also a LIN slave.

The steering wheel-mounted electronics monitored by the SCM include the horn switch, the speed control switches, the remote radio switches, the hands-free communication switches and the Electronic Vehicle Information Center (EVIC) control switches, if the vehicle is so equipped. The LIN slave monitors the changing states of these switches through both hard wired analog and digital return inputs, then communicates those switch states to the SCM over the LIN bus. In response to those inputs, the internal circuitry of the SCM gateway then transmits electronic message outputs communicating all of the monitored switch state changes as well as SAS data to other electronic modules in the vehicle over the CAN bus.

A fixed connector receptacle of the SCCM connects the SCM to the vehicle electrical system through a single take out with connector from the instrument panel wire harness. The instrument panel wire harness take out has been intentionally provided with additional length to facilitate service removal and installation of the SCCM. However, following SCCM installation, this additional length must be pulled back and secured to the instrument panel structure to prevent the potential for undesirable rattling or buzzing noises while driving.

The SCM is connected to a fused B(+) circuit and receives a path to ground at all times. These connections allow it to remain functional regardless of the ignition switch position. Any input to the SCM that controls a vehicle system function that does not require that the ignition switch be in the ON position such as depressing the horn switch, prompts the SCM to wake up and transmit on the CAN data bus.

The service replacement SCCM is shipped with the clockspring pre-centered within the SCCM and with a plastic locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the steering wheel is installed on a steering column, clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black boxes of the clockspring tape are not visible in the inspection window, the entire SCCM must be replaced with a new unit. Refer to **CLOCKSPRING, STANDARD PROCEDURE** . Proper clockspring installation may also be confirmed by viewing the

Steering Angle Sensor (SAS) data using a diagnostic scan tool.

The hard wired circuits between components related to the SCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SCCM, the SCM or the electronic controls or communication between modules and other devices that provide some features of the SCCM. The most reliable, efficient, and accurate means to diagnose the SCCM, the SCM or the electronic controls and communication related to SCCM or SCM operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SCM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the Steering Column Control Module (SCCM) and the Steering Control Module (SCM) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SCCM, the SCM or the electronic controls and communication between modules and other devices that provide some features of the SCCM or SCM. The most reliable, efficient, and accurate means to diagnose the SCCM, the SCM or the electronic controls and communication related to SCCM or SCM operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

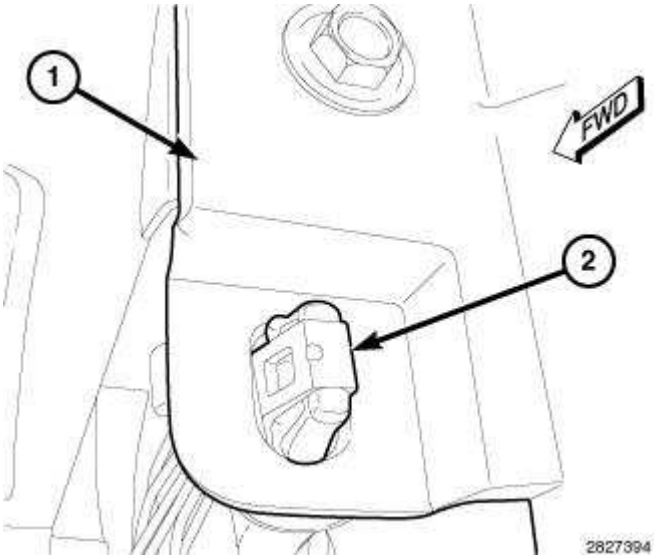

Fig. 86: Retainer Clip & Instrument Panel Base Trim
Courtesy of CHRYSLER GROUP, LLC

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: Always turn the steering wheel until the front wheels are in the straight-ahead position. Then, prior to disconnecting the steering column from the steering gear, lock the steering wheel to the steering column. If clockspring centering has been compromised for ANY reason, the entire Steering Column Control Module (SCCM) and clockspring unit MUST be replaced with a new unit.

1. Place the front wheels in the straight ahead position.
2. Disconnect and isolate the battery negative cable.
3. Remove the driver airbag from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
4. Disconnect the steering wheel wire harness connectors from the upper Steering Column Control Module (SCCM) connector receptacles.
5. Remove the steering wheel from the upper steering column shaft. Refer to **WHEEL, STEERING, REMOVAL** .
6. Using a trim stick or another suitable wide flat-bladed tool, disengage the snap clips that secure the molded hard plastic outer edges of the steering column gap hider bezel to the instrument panel.
7. Pull the gap hider bezel up and away from the instrument panel far enough to access and

disengage the retainer clip (2) of the service length of the instrument panel wire harness SCCM take out that secures it to the instrument panel base trim (1) on the right side of the steering column opening.

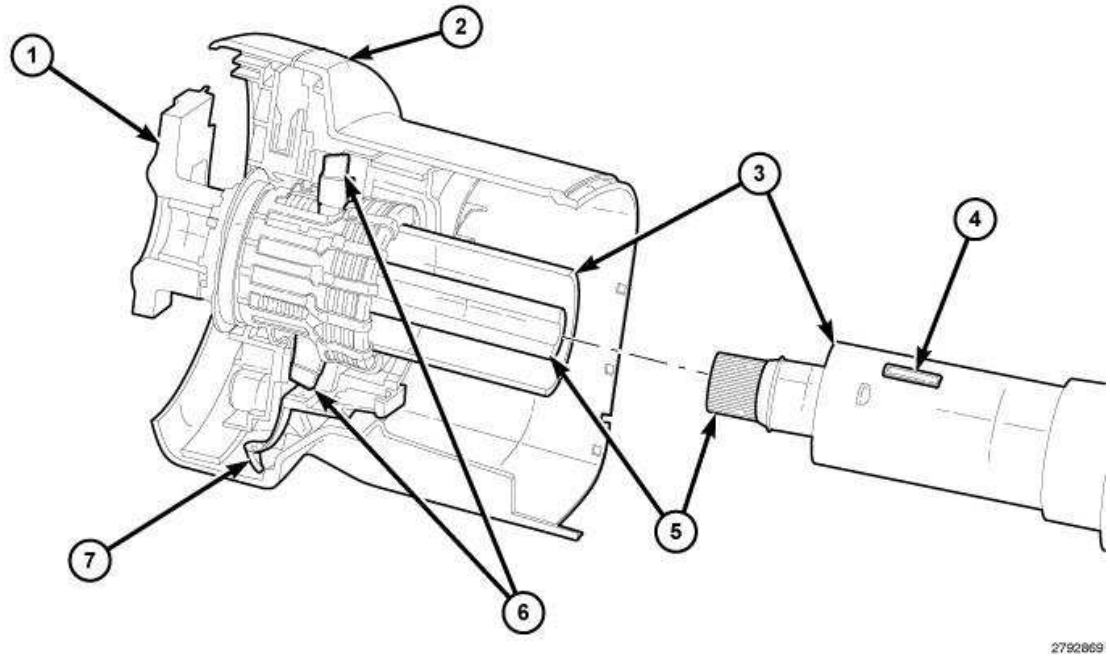

Fig. 87: SCCM Shroud, Lower Keystones, Slots & Steering Column Jacket
Courtesy of CHRYSLER GROUP, LLC

8. Firmly grasp each side of the SCCM shroud (2) on the edges nearest the instrument panel. Use a short, firm tug rearward on the shroud to disengage the spring-loaded upper and lower keystones (6) from the slots (4) in the top and bottom of the steering column jacket (3).
9. Pull the SCCM away from the top of the steering column far enough to reach through the back of the gap hider and shroud to access and disconnect the instrument panel wire harness connector from the lower SCCM connector receptacle.
10. Remove the SCCM from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: Always turn the steering wheel until the front wheels are in the straight-ahead position. Then, prior to disconnecting the steering column from the steering gear, lock the steering wheel to the steering column. If clockspring centering has been compromised for ANY reason, the entire Steering Column Control Module (SCCM) and clockspring unit MUST be replaced with a new unit.

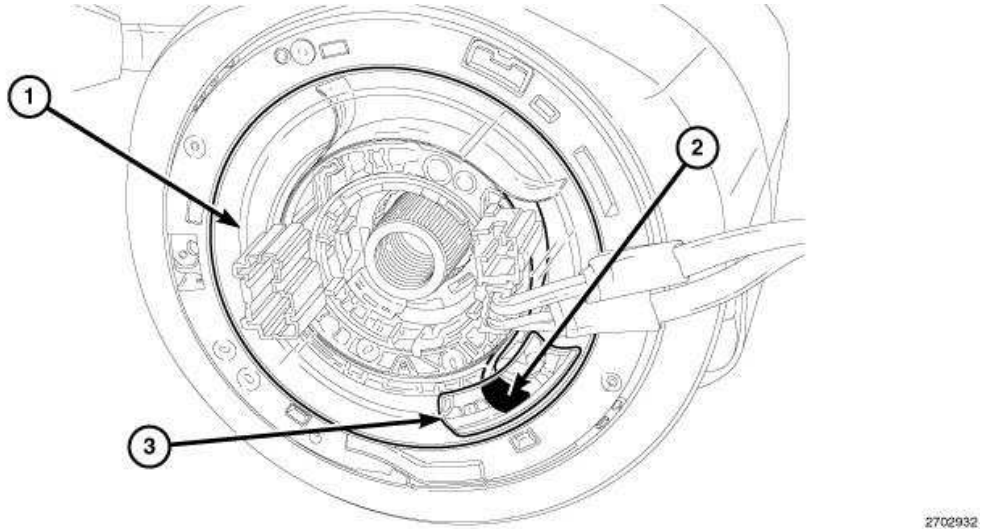

Fig. 88: Inspection Window, Clockspring Rotor & Black Squares
Courtesy of CHRYSLER GROUP, LLC

1. Before reinstalling a Steering Column Control Module (SCCM) onto a steering column, clockspring centering must be confirmed by viewing the inspection window (3) on the clockspring rotor (1). If the black squares (2) on the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the SCCM **MUST** be replaced with a new unit.

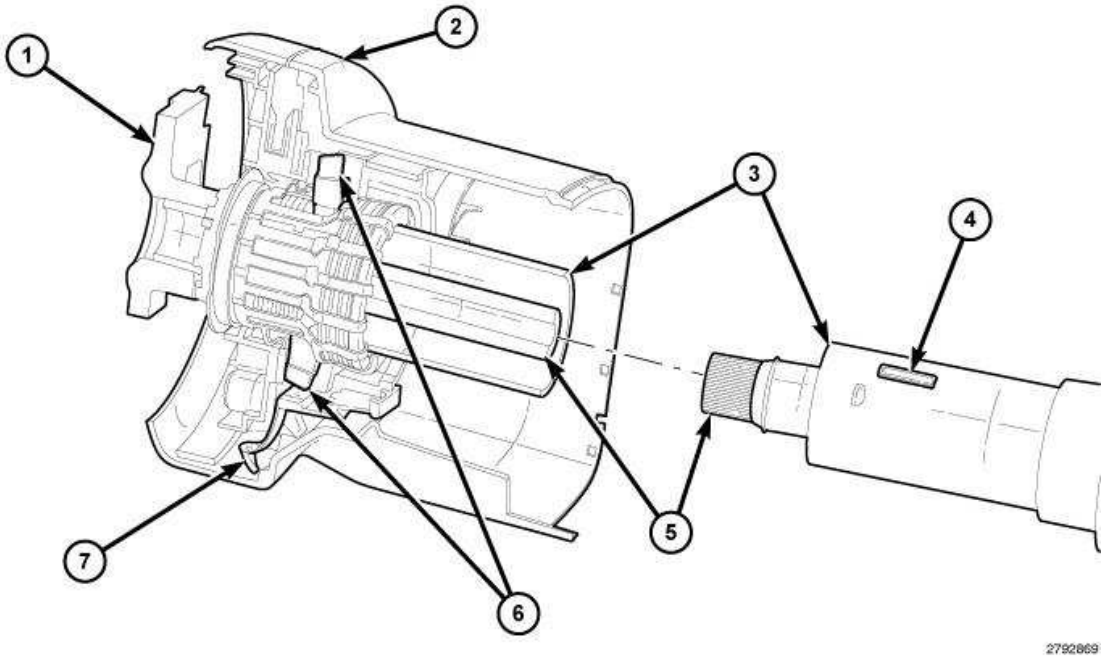

Fig. 89: SCCM Shroud, Lower Keystones, Slots & Steering Column Jacket
Courtesy of CHRYSLER GROUP, LLC

2. Be certain that the front wheels are still in the straight ahead position.
3. If a new SCCM is being installed, disengage the steering column gap hider from the lower edge of the used SCCM shroud and transfer it to the new one.
4. Position the SCCM close enough to the top of the steering column to reach through the back of the gap hider and shroud to reconnect the instrument panel wire harness connector SCCM take out to the lower SCCM connector receptacle.
5. Align the hub of the SCCM with the upper steering column shaft (5) and jacket (3).
6. Slide the SCCM over the top of the steering column jacket far enough for the spring-loaded upper and lower keystones (6) to engage the slots (4) in the top and bottom of the steering column jacket.
7. Confirm that the keystones are fully engaged in the column jacket slots by inspecting the round red indicator (7) visible on the lower surface of the SCCM shroud. The indicator should be flush with the shroud. If the indicator stands proud of the shroud, the keystones are **NOT** fully engaged. Carefully slide the SCCM slightly up and down, or rotate it slightly right and left as necessary for the keystones to snap into their slots and the indicator to become flush with the shroud.

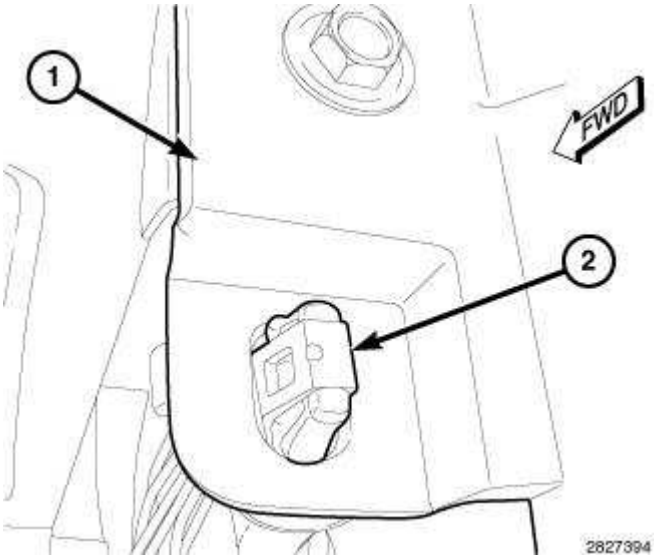

Fig. 90: Retainer Clip & Instrument Panel Base Trim
Courtesy of CHRYSLER GROUP, LLC

NOTE: The service length of the instrument panel wire harness take out for the SCCM MUST be pulled back out of the SCCM shroud and secured to the instrument panel base trim. Failure to properly accomplish this task will result in unsatisfactory buzzes, squeaks or rattles during vehicle operation.

8. Pull the gap hider bezel up and away from the instrument panel far enough to access and engage the retainer clip (2) of the service length of the instrument panel wire harness SCCM take out to the instrument panel base trim (1) on the right side of the steering column opening.
9. Align and engage the snap clips that secure the molded hard plastic steering column gap hider bezel to the instrument panel.
10. If a new SCCM is being installed, remove (break off) the red locking tab that secures the clockspring rotor to the clockspring case.
11. Reinstall the steering wheel onto the upper steering column shaft. Be certain to align and insert the rotational lugs on the steering wheel hub into the slots in the hub of the clockspring. Also, the steering wheel fastener **MUST** be tightened to the proper torque specification to ensure proper clockspring and Steering Angle Sensor (SAS) operation. Refer to **WHEEL, STEERING, INSTALLATION** .
12. Reconnect the steering wheel wire harness connectors to the upper SCCM connector receptacles.
13. Reinstall the driver airbag onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION** .
14. Reconnect the battery negative cable.

MODULE, TELEMATICS GATEWAY

DESCRIPTION

DESCRIPTION

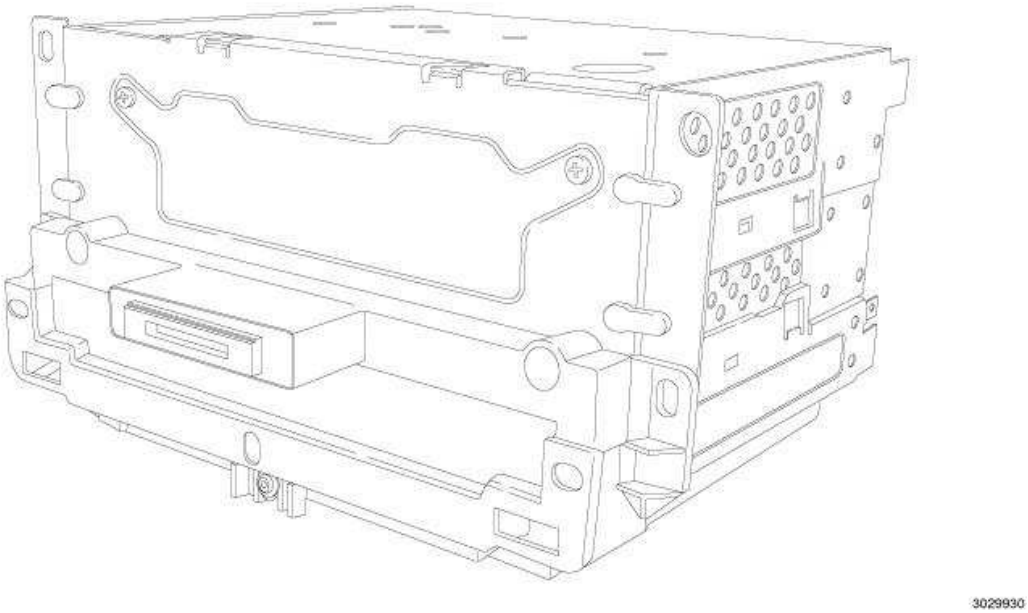

Fig. 91: Mid level Telematics Gateway Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mid level Telematics Gateway Module shown in illustration, Base level similar.

The Telematics Gateway Module (TGM) is located behind the switch bank assembly in the center of the instrument panel.

If repair or replacement of the TGM is required, the radio will require a four digit code for it to function.

There are two different levels of the TGM which are:

- Base - includes CD player.
- Mid - includes CD/DVD player and SD card reader.

OPERATION

OPERATION

The Telematics Gateway Module (TGM) is responsible for the displayed information on the Integrated Center Stack (ICS) Screen Module over the CAN-AT bus.

The user input from the ICS Screen Module sends the information over the CAN-AT to the TGM, the TGM then sends the command out to the CAN-I bus to the requested module. The requested module then makes the changes requested by the users input and sends a message back to the TGM, the TGM then send the message over the CAN-AT to the ICS to reflect the users input selection has

been activated and or changed.

The TGM is responsible for the following.

- Displaying information on the Integrated Center Stack (ICS) Screen Module.
- Passing user input to the correct module on the CAN bus.
- Turning the specific areas (buttons) on the screen usable for user interaction.
- CD/DVD operations
- SD card operations (Mid level only)

If the screen displays **"Shipping Mode"** . Refer to **STANDARD PROCEDURE** .

REMOVAL

REMOVAL

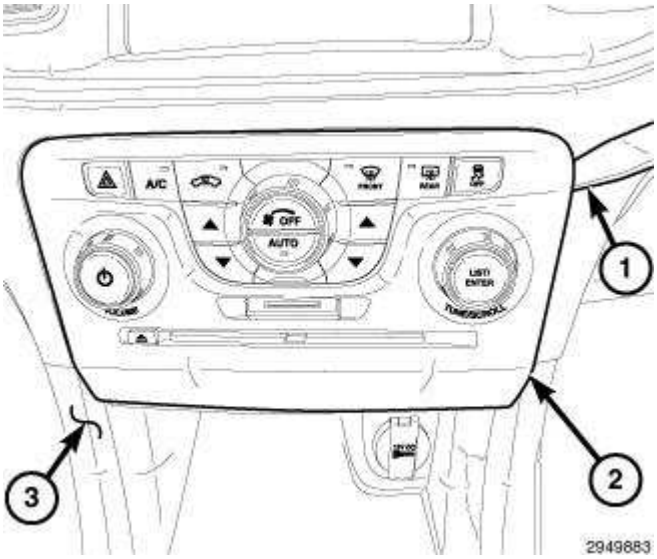

Fig. 92: Switch Bank
Courtesy of CHRYSLER GROUP, LLC

1. Perform a complete backup of user data. Refer to **STANDARD PROCEDURE** .
2. Disconnect the negative battery cable.
3. Before proceeding with the following repair procedure, review all warnings and cautions.
4. Remove the switch bank. Refer to **POD, SWITCH BANK, REMOVAL** .

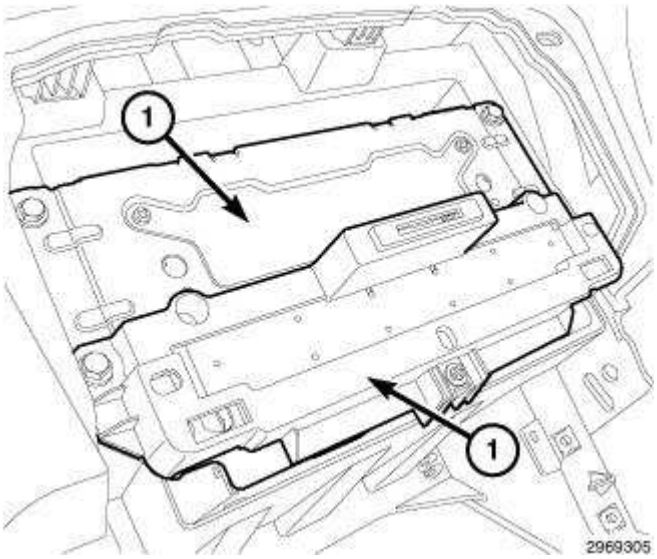

Fig. 93: Telematics Gateway Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove the Telematics Gateway Module (TGM) (1) retainers.

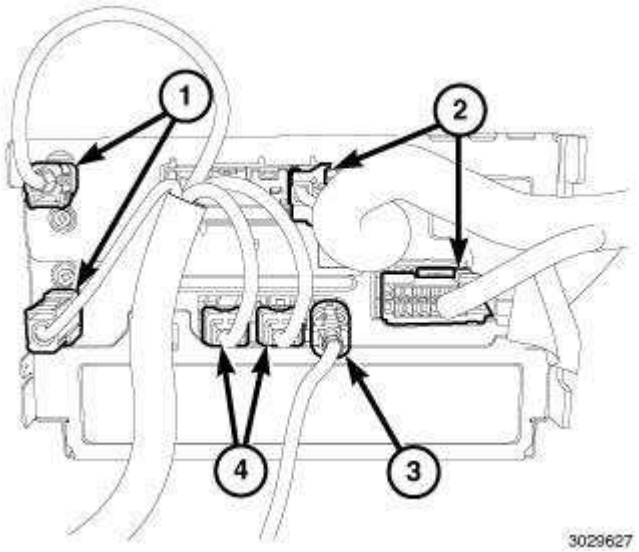

Fig. 94: Antenna(s), Video Cable, RF HUB, Wiring Connectors And UCI Cables
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Pulling the antenna cable straight out of the radio without pulling on the locking antenna connector could damage the cable or radio.

6. Pull the TGM out far enough to access the harness connectors.
7. If equipped, disconnect the antenna(s) (1), RF HUB and UCI cables (4), video cable (3) and wiring connectors (2) from the TGM.
8. Remove the TGM from the vehicle.

INSTALLATION

INSTALLATION

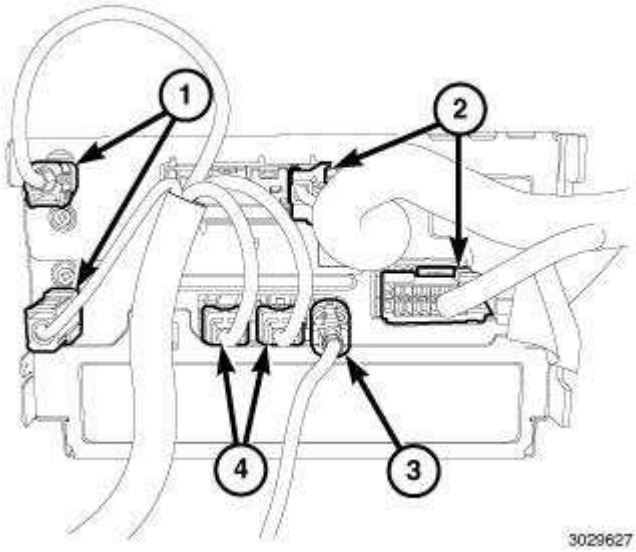

Fig. 95: Antenna(s), Video Cable, RF HUB, Wiring Connectors And UCI Cables
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mid level shown in illustration, base similar.

1. Position the Telematics Gateway Module (TGM) close to the instrument panel to connect the electrical connectors.
2. If equipped, connect the antenna(s) (1), RF HUB and UCI cables (4), video cable (3) and wiring connectors (2) to the TGM.

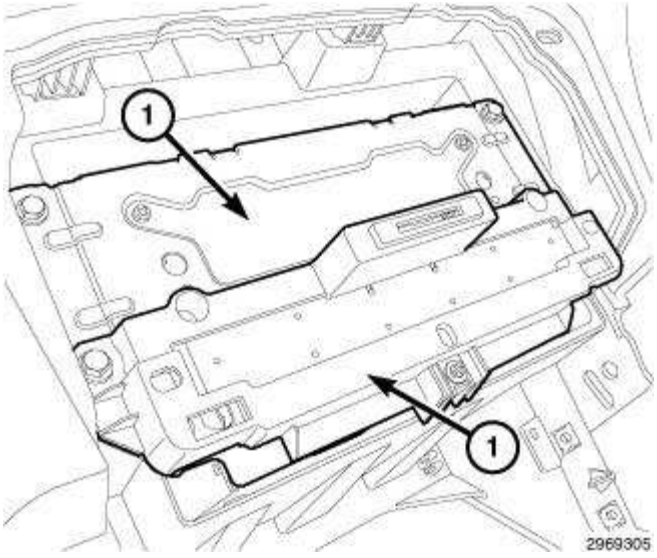

Fig. 96: Telematics Gateway Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Position the telematics gateway module into the instrument panel cavity and install the TGM (1) retainers. Tighten the fasteners securely.

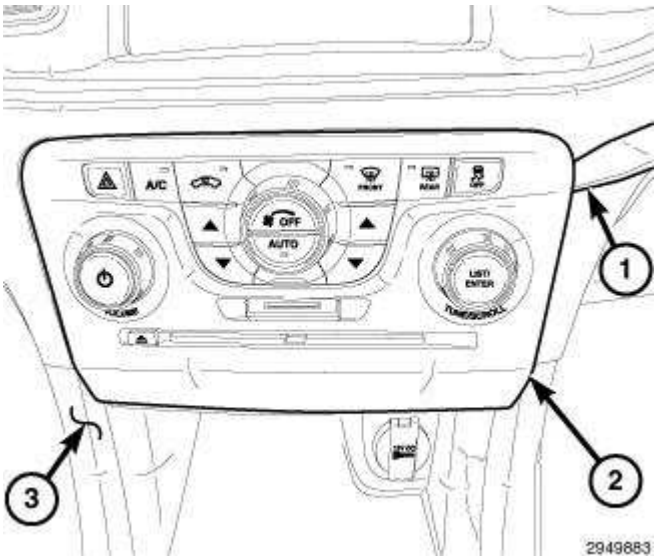

Fig. 97: Switch Bank
Courtesy of CHRYSLER GROUP, LLC

4. Install the switch bank (2). Refer to **POD, SWITCH BANK, INSTALLATION** .
5. Connect the negative battery cable.
6. Restore user data from backup. Refer to **STANDARD PROCEDURE** .

MODULE, TRANSMISSION CONTROL

DESCRIPTION

TRANSMISSION CONTROL MODULE - NAG1

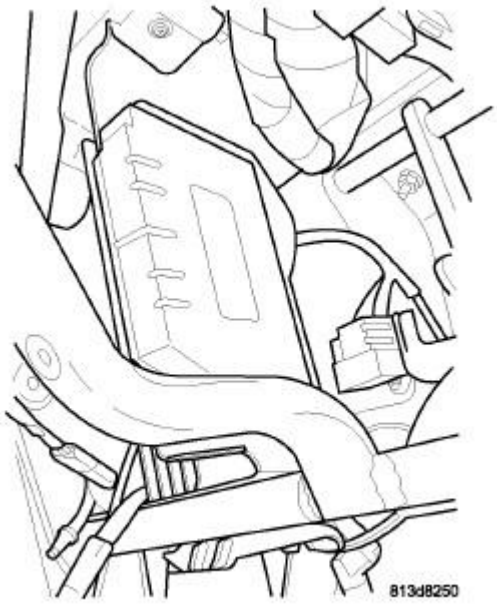

Fig. 98: TCM Location
Courtesy of CHRYSLER GROUP, LLC

The TCM is located under the left side of the instrument panel for left hand drive vehicles. For right hand drive vehicles, the TCM is located in the mirrored location under the right side of the instrument panel.

The electronic control system consists of various components providing inputs to the transmission control module (TCM). The TCM monitors transmission sensors, shift lever position, and bus messages to determine transmission shift strategy. After shift strategies are determined, the TCM controls the actuation of transmission solenoids, which controls the routing of hydraulic fluid within the transmission, by moving a sequence of four valves to make a shift occur.

The NAG1 electronic transmission has a fully adaptive control system. The system performs its functions based on continuous real-time sensor feedback information. In addition the TCM receives information from the PCM (engine management) and ABS (chassis systems) controllers over the CAN bus. The CAN bus is a high-speed communication bus that allows real time control capability between various controllers. Most messages are sent every 20 milliseconds. This means critical information can be shared between the transmission, engine, and ABS controllers. The CAN bus is a two wire bus with a CAN Bus (+) circuit and a CAN Bus (-) circuit. These circuits are twisted pairs in the harness to reduce the potential of radio and noise interference.

The transmission control system automatically adapts to changes in engine performance, vehicle speed, and transmission temperature variations to provide consistent shift quality. The control system ensures that clutch operation during up-shifting and downshifting is more responsive without increased harshness. The TCM activates the solenoid valves and moves valves in the valve body to achieve the necessary gear changes. The required pressure level is calculated from the load condition, engine speed. Vehicle speed (from ABS module) and transmission oil temperature,

matched to the torque to be transmitted. The TCM is located under the left side of the instrument panel for left hand drive vehicles. For right hand drive vehicles, the TCM is located in the mirrored location under the right side of the instrument panel.

TRANSMISSION CONTROL MODULE - 8HP45

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Refer to STANDARD PROCEDURE . Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body includes the Transmission Control Module (TCM), all solenoids and sensors, and can be referred to as the Transmission Control Module Assembly (TCMA). The TCM is attached to the valve body between the transmission case and the valve body. If any component of the valve body **including the TCM** sensors or solenoids needs to be replaced, the complete TCMA (valve body) must be replaced. For further information of the TCMA. Refer to **VALVE BODY, DESCRIPTION** .

OPERATION

TRANSMISSION CONTROL MODULE - NAG1

The transmission control module (TCM) determines the current operating conditions of the vehicle and controls the shifting process for shift comfort and driving situations. It receives this operating data from sensors and broadcast messages from other modules.

The TCM uses inputs from several sensors that are directly hardwired to the controller and it uses several indirect inputs that are used to control shifts. This information is used to actuate the proper solenoids in the valve body to achieve the desired gear.

The shift lever assembly (SLA) has sensors that are monitored by the TCM to calculate shift lever position. The reverse light switch, an integral part of the SLA, controls the reverse light relay control circuit. The Brake/Transmission Shift Interlock (BTSI) solenoid and the park lockout solenoid (also part of the SLA) are controlled by the TCM.

The PCM and ABS broadcast messages over the controller area network (CAN) bus for use by the TCM. The TCM uses this information, with other inputs, to determine the transmission operating conditions.

The TCM:

- determines the momentary operating conditions of the vehicle.
- controls all shift processes.
- considers shift comfort and the driving situation.

The TCM controls the solenoid valves for modulating shift pressures and gear changes. Relative to

the torque being transmitted, the required pressures are calculated from load conditions, engine RPM, vehicle speed, and ATF temperature.

The following functions are contained in the TCM:

- Shift Program
- Downshift Safety
- Torque Converter Lock-Up Clutch.
- Adaptation.

The TCM continuously checks for electrical problems, mechanical problems, and some hydraulic problems. When a problem is sensed, the TCM stores a diagnostic trouble code (DTC). Some of these codes cause the transmission to go into "Limp-In" or "default" mode. Some DTCs cause permanent Limp-In and others cause temporary Limp-In. The NAG1 defaults in the current gear position if a DTC is detected, then after a key cycle the transmission will go into Limp-in, which is mechanical 2nd gear. Some DTCs may allow the transmission to resume normal operation (recover) if the detected problem goes away. A permanent Limp-In DTC will recover when the key is cycled, but if the same DTC is detected for three key cycles the system will not recover and the DTC must be cleared from the TCM with the appropriate scan tool.

NOTE: **If the TCM has been replaced, the "TCM Adaptation Procedure" must be performed. Refer to MODULE, TRANSMISSION CONTROL, STANDARD PROCEDURE.**

TCM SIGNALS

The TCM registers one part of the input signals by direct inputs, the other part by CAN bus. In addition to the direct control of the actuators, the TCM sends various output signals by CAN bus to other control modules.

SELECTOR LEVER POSITION

A series of sensors in the SLA inform the TCM of the position of the selector lever.

The TCM monitors the SLA for all shift lever positions through five position circuits. The SLA provides a low-current 12-volt signal to the TCM. The TCM compares the on/off signals to programmed combinations to determine the exact position of the shift lever.

ATF TEMPERATURE SENSOR

The ATF temperature sensor is a positive temperature co-efficient (PTC) thermistor. It measures the temperature of the transmission fluid and is a direct input signal for the TCM. The temperature of the ATF has an influence on the shifttime and resulting shift quality. As the temperature rises, resistance rises, and therefore, the probing voltage is decreasing. Because of its registration, the shifting process can be optimized in all temperature ranges.

The ATF temperature sensor is wired in series with the park/neutral contact. The temperature signal

is transmitted to the TCM only when the reed contact of the park/neutral contact is closed because the TCM only reads ATF temperature while in any forward gear, or REVERSE. When the transmission is in PARK or NEUTRAL, the TCM will substitute the engine temperature for the ATF temperature.

STARTER INTERLOCK

The TCM monitors a contact switch wired in series with the transmission temperature sensor to determine PARK and NEUTRAL positions. The contact switch is open in PARK and NEUTRAL. The TCM senses transmission temperature as high (switch supply voltage), confirming switch status as open. The TCM then broadcasts a message over CAN bus to confirm switch status. The PCM receives this information and allows operation of the starter circuit.

N2 AND N3 SPEED SENSORS

The N2 and N3 Input Speed Sensors are two Hall-effect speed sensors that are mounted internally in the transmission and are used by the TCM to calculate the transmission's input speed. Since the input speed cannot be measured directly, two of the drive elements are measured. Two input speed sensors were required because both drive elements are not active in all gears.

CAN BUS INDIRECT INPUT SIGNALS

A 2.5-volt bias (operating voltage) is present on the CAN bus any time the ignition switch is in the RUN position. Both the TCM and the ABS apply this bias. On this vehicle, the CAN bus is used for module data exchange only. The indirect inputs used on the NAG1 electronic control system are:

- Wheel Speed Sensors.
- Transfer Case Switch Status.
- Brake Switch.
- Engine RPM.
- Engine Temperature.
- Cruise Control Status.
- Gear Limit Request.
- Throttle Position - 0% at idle, 100% at WOT. If open, TCM assumes idle (0% throttle opening).
- Odometer Mileage
- Maximum Effective Torque.
- Engine in Limp-In Mode/Mileage Where DTC Was Set.

BRAKE TRANSMISSION SHIFT INTERLOCK (BTSI)

The BTSI solenoid prevents shifting out of the PARK position until the ignition key is in the RUN position and the brake pedal is pressed. The TCM controls the ground while the ignition switch supplies power to the BTSI solenoid. The PCM monitors the brake switch and broadcasts brake switch status messages over the CAN C bus. If the park brake is depressed and there is power (Run/Start) to SLA, the BTSI solenoid deactivates. The TCM monitors this for the SLA because the

SLA does not communicate on the CAN bus.

SHIFT SCHEDULES

The basic shift schedule includes up and downshifts for all five gears. The TCM adapts the shift program according to driving style, accelerator pedal position and deviation of vehicle speed. Influencing factors are:

- Road Conditions.
- Incline, Decline and Altitude.
- Trailer Operation, Loading.
- Engine Coolant Temperature.
- Cruise Control Operation.
- Sporty Driving Style.
- Low and High ATF Temperature.

Upshift To:	1-2	2-3	3-4	4-5
Activated By Solenoid:	1-2/4-5	2-3	3-4	1-2/4-5
Shift Point (at 35.2% of throttle)	29 km/h (18 mph)	48 km/h (30 mph)	68 km/h (42 mph)	85 km/h (53 mph)

Downshift From:	5-4	4-3	3-2	2-1
Activated By Solenoid:	1-2/4-5	3-4	2-3	1-2/4-5
Shift Point	55.7 km/h (34.61 mph)	40.5 km/h (25.17 mph)	24.4 km/h (15.16 mph)	15.1 km/h (9.38 mph)

DOWNSHIFT SAFETY

Selector lever downshifts are not performed if inadmissible high engine RPM is sensed.

ADAPTATION

To equalize tolerances and wear, an automatic adaptation takes place for:

- Shift Time.
- Clutch Filling Time.
- Clutch Filling Pressure.
- Torque Converter Lock-Up Control.

Adaptation data may be stored permanently and to some extent, can be diagnosed.

DRIVING STYLE ADAPTATION

The shift point is modified in steps based on the information from the inputs. The control module looks at inputs such as:

- vehicle acceleration and deceleration (calculated by the TCM).
- rate of change as well as the position of the throttle pedal (fuel injection information from the PCM).
- lateral acceleration (calculated by the TCM).
- gear change frequency (how often the shift occurs).

Based on how aggressive the driver is, the TCM moves up the shift so that the present gear is held a little longer before the next upshift. If the driving style is still aggressive, the shift point is modified up to ten steps. If the driving returns to normal, then the shift point modification also returns to the base position.

This adaptation has no memory. The adaptation to driving style is nothing more than a shift point modification meant to assist an aggressive driver. The shift points are adjusted for the moment and return to base position as soon as the inputs are controlled in a more normal manner.

CONTROLLER MODES OF OPERATION

PERMANENT LIMP-IN MODE

When the TCM determines there is a non-recoverable condition present that does not allow proper transmission operation, it places the transmission in permanent Limp-In Mode. When the condition occurs the TCM turns off all solenoids as well as the solenoid supply output circuit. If this occurs while the vehicle is moving, the transmission remains in the current gear position until the ignition is turned off or the shifter is placed in the "P" position. When the shifter has been placed in "P," the transmission only allows 2nd gear operation. If this occurs while the vehicle is not moving, the transmission only allows operation in 2nd gear.

TEMPORARY LIMP-IN MODE

This mode is the same as the permanent Limp-In Mode except if the condition is no longer present, the system resumes normal operation.

UNDER VOLTAGE LIMP-IN MODE

When the TCM detects that system voltage has dropped below 8.5 volts, it disables voltage-dependant diagnostics and places the transmission in the temporary Limp-In Mode. When the TCM senses that the voltage has risen above 9.0 volts, normal transmission operation is resumed.

HARDWARE ERROR MODE

When the TCM detects a major internal error, the transmission is placed in the permanent Limp-In Mode and ceases all communication over the CAN bus. When the TCM has entered this mode normal transmission operation does not resume until all DTCs are cleared from the TCM.

LOSS OF DRIVE

If the TCM detects a situation that has resulted or may result in a catastrophic engine or transmission problem, the transmission is placed in the neutral position. Improper Ratio, Input Sensor Overspeed or Engine Overspeed DTCs cause the loss of drive.

CONTROLLED LIMP-IN MODE

When a failure does not require the TCM to shut down the solenoid supply, but the failure is severe enough that the TCM places the transmission into a predefined gear, there are several shift performance concerns. For instance, if the transmission is slipping, the controller tries to place the transmission into 3rd gear and maintain 3rd gear for all forward drive conditions.

STANDARD PROCEDURE

TCM ADAPTATION - NAG1 ONLY

The adaptation procedure requires the use of the appropriate scan tool. This program allows the electronic transmission system to re-calibrate itself. This will provide the proper baseline transmission operation. The adaptation procedure should be performed if any of the following procedures are performed:

- Transmission Assembly Replacement
- Transmission Control Module Replacement
- Clutch Plate and/or Seal Replacement
- Electrohydraulic Unit Replacement or Recondition

1. With the scan tool, reset the Transmission adaptives. Resetting the adaptives will set the adaptives to factory settings.

   NOTE: Perform the Coast Down Adaptations first. The Transmission Temperature must be greater than 60°C (140°F) and less than 70°C (158°F). Failure to stay within these temperature ranges will void the procedure.

2. Drive the vehicle until the transmission temperature is in the specified range.
3. Perform 4 to 5 coast downs from 5th to 4th gear and then 4th to 3rd gear.

   NOTE: For Upshift adaptation, the Transmission temperature must be greater than 60°C (140°F) and less than 100°C (212°F). Failure to stay within these temperature ranges will void this procedure.

4. From a stop, moderately accelerate the vehicle and obtain all forward gear ranges while keeping the Engine RPM below 1800 RPM. Repeat this procedure 4 to 5 times.
5. Obtaining 5th gear may be difficult at 1800 RPM. Allow the transmission to shift into 5th gear at a higher RPM then lower the RPM to 1800 and perform manual shifts between 4th and 5th gears using the shift lever.
6. The TCM will store the adaptives every 10 minutes. After completion of the adaptation

procedure make sure the vehicle stays running for at least 10 minutes.

7. It is possible to manually store the adaptives under the 10 minute time frame using the scan tool Store Adaptives procedure.

TCM ADAPTATION - 8HP45

The 8HP45 transmission continuously self calibrates and learns shift points and clutch apply times. It is necessary to perform a drive cycle to provide the proper baseline transmission adaptation. The adaptation procedure should be performed if any of the following procedures are performed:

- Transmission Assembly Replacement
- Transmission Control Module Assembly (TCMA) Replacement
- Internal Transmission repairs.
- Torque Converter Replacement.

1. With the scan tool, clear any DTCs that may be set.
2. Drive the vehicle until the vehicle temperature is greater than 30°C (86°F).
3. After the vehicle has reached normal operating temperature, and with the scan tool, monitor actual gear state. Drive the vehicle normally with the accelerator pedal between 10% and 20% until 7th gear has been achieved, approximately 76 km/h (47 mph). After 7th gear has been achieved, coast down to 30 mph with no application of the brake or accelerator to allow a 6-5 shift. Brake the vehicle to a stop. Repeat this procedure 5 times.

RECEIVER, KEYLESS IGNITION NODE

DESCRIPTION

DESCRIPTION

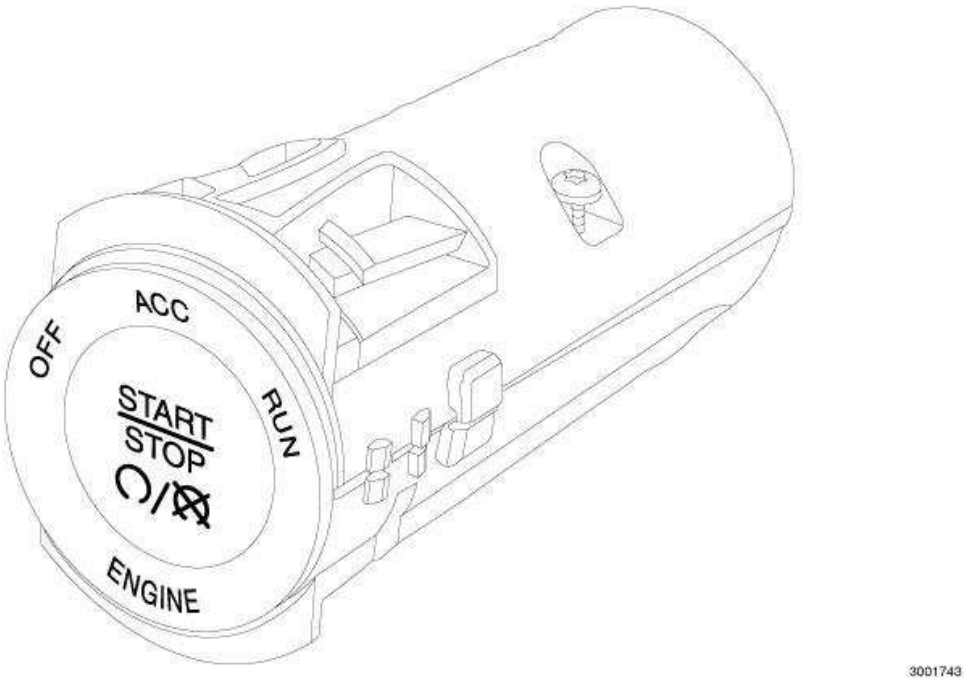

Fig. 99: Keyless Ignition Node (KIN)
Courtesy of CHRYSLER GROUP, LLC

Keyless Ignition Node (KIN) is part of the new ignition system.

The KIN module is located in the instrument panel to the left of the center stack.

OPERATION

OPERATION

There are 5 other component categories that make up the new ignition system.

The components are:

- Radio Frequency (RF) HUB (1)
- LF Antennas (5)
- FOB (2, 4 for Police)
- Special Door Handles (2)
- Special Liftgate Handle (1)

This new ignition system operation begins when an owner approaches their vehicle with a FOB somewhere on their person or belongings, i.e., in their gym bag. When the owner touches the handle to pull the door open, door handle electronics signal the RF HUB with a "request to open". The RF HUB uses all of the 5 LF (low frequency) antennas to communicate with the FOB. Once located, the FOB's response is evaluated by the RF HUB to determine if the person pulling on the door handle is in fact the owner. This process completes 'FOB authentication'.

Once authentication is successfully completed, the RF HUB requests the Body Control Module (BCM) to unlock the affected door. Once the doors unlock, the owner is then free to continue pulling the door handle in an attempt to enter their vehicle. This process of opening the door without actively using a FOB or key is called 'passive entry'. The LD/LX trunk handle is outfitted with a passive entry switch, allowing the trunk to pop open when it's pressed after FOB authentication completes successfully.

After the vehicle's owner is buckled, the customer then pushes the KIN's SSB (Keyless Ignition Node's Start/Stop Button) while pushing the brake pedal as if braking while coming to a stoplight. (For manual transmission vehicles the clutch pedal is depressed instead of the brake pedal to initiate a start procedure). Before the vehicle is allowed to start, another 'FOB authentication' cycle must be completed. Once successfully completed, the RF HUB next sends the BCM the ignition switch position, which equates to a 'request to start' command. The process of starting a vehicle without the act of using a bladed key or FOB is called 'Keyless Go'.

The passive entry works when the FOB can be located outside the vehicle using the LF antennas. Keyless go operates when the RF HUB can locate the FOB inside the vehicle. Please refer to the owner's manual for more information on authentication zones.

After putting the vehicle into park, pushing the KIN's SSB allows the vehicle's engine to be shut off. In an emergency, pressing the SSB continuously for 2 seconds or repeatedly (one hit every 30-500msec) shuts off the engine.

REMOVAL

REMOVAL

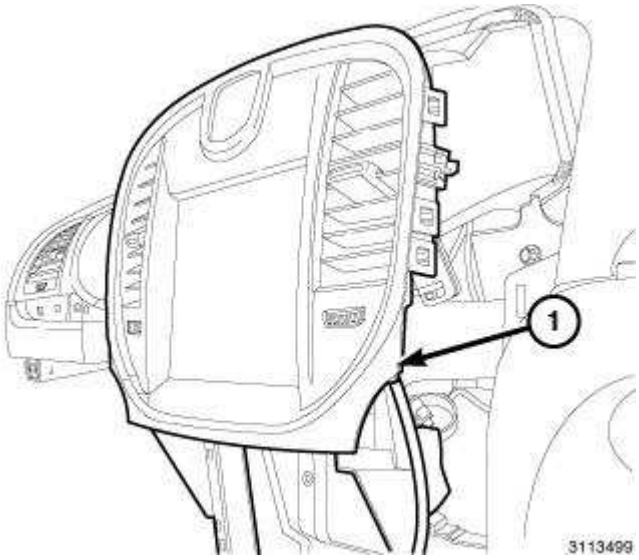

Fig. 100: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mid ICS shown in illustration, base similar.

1. Disconnect the negative battery cable.

2. Remove the instrument cluster bezel (1). Refer to **BEZEL, INSTRUMENT CLUSTER, REMOVAL** .
3. Reach through the Integrated Center Stack (ICS) screen opening and disconnect the Keyless Ignition Node (KIN) electrical connector.
4. Press on the three tabs (two on top and one on bottom) and push the KIN out the front of the instrument panel.

INSTALLATION

INSTALLATION

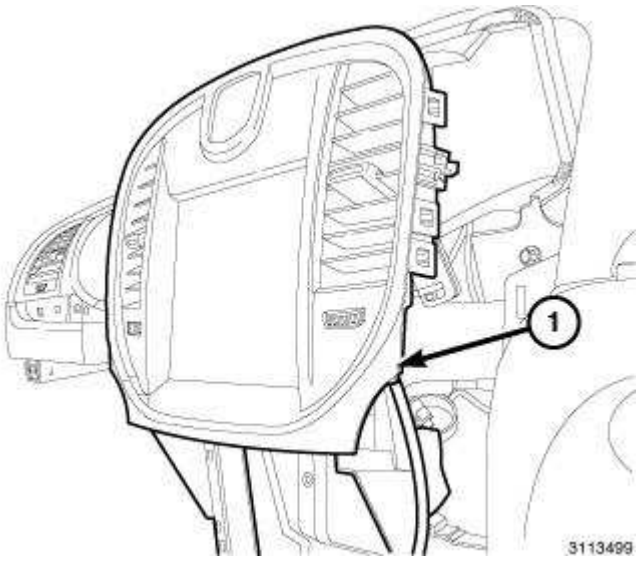

Fig. 101: Instrument Cluster Bezel Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Push the Keyless Ignition Node (KIN) into the instrument panel until it snaps into place.
2. Reach through the Integrated Center Stack (ICS) screen opening and connect the KIN electrical connector.
3. Install the instrument cluster bezel (1). Refer to **BEZEL, INSTRUMENT CLUSTER, INSTALLATION** .
4. Connect the negative battery cable.

SENSOR AND BRACKET, ADAPTIVE SPEED CONTROL

DESCRIPTION

DESCRIPTION

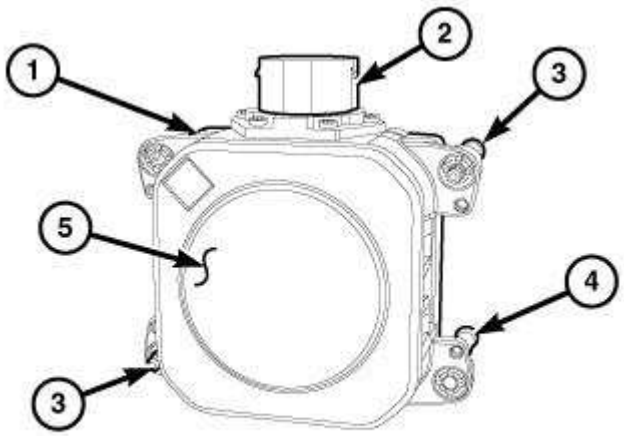

Fig. 102: Adaptive Speed Control Sensor, One Fixed Ball Stud, Two Adjustable Ball Studs & Radar Dome
Courtesy of CHRYSLER GROUP, LLC

The adaptive speed control sensor (1) (also known as the Adaptive Cruise Control/ACC sensor or module, or the radar sensor or module) is located on a bracket secured near the right frame rail below the front bumper support member of the Front End Module (FEM) behind the front fascia. The stamped steel ACC sensor mounting bracket is secured by two screws to rivet nuts installed in the face of the bumper support member. This sensor is also the primary component of the Forward Collision Warning (FCW) feature of the Electronic Vehicle Information Center (EVIC).

One fixed ball stud (4) and two adjustable ball studs (3) secure the sensor housing through a snap fit into three molded plastic ball socket clips installed in the mounting bracket. The sensor pivots on the fixed ball stud while the two adjustable ball studs allow the sensor to be vertically aligned after installation using an ACC vertical alignment special tool and a 3.5 millimeter hex nut driver special tool. Horizontal alignment is performed electronically using a diagnostic scan tool during a ten minute drive at a steady, predetermined speed following completion of the vertical alignment.

The ACC sensor electronic circuitry is sealed and protected within a die cast aluminum housing. A molded plastic sensor bezel or mirror cover with a center clearance hole for the sensor lens snaps over the sensor and conceals a small square mirror in one corner of the sensor cover that is used for calibration purposes during the sensor manufacturing process. A molded plastic cover and a lens or radar dome (5) faces forward through an opening in the center of the front fascia lower airflow grille texture and right fog lamp bezel unit that is snapped into the opening.

The ACC sensor includes an applied connector receptacle (2) that is sealed and secured to the sensor housing with screws and faces downward when installed on the mounting bracket. The ACC sensor is connected to the vehicle electrical system through a single dedicated takeout and connector of the FEM wire harness.

The adjustable ball studs and the ACC sensor cannot be repaired. If ineffective or damaged the entire sensor unit must be replaced. The three plastic ball socket clips in the sensor mounting bracket must

also be replaced each time the ACC sensor is removed from and reinstalled onto the mounting bracket.

OPERATION

OPERATION

The microprocessor in the adaptive speed control sensor (also known as the Adaptive Cruise Control/ACC sensor or module, or as the radar sensor or module) contains the logic circuits and controls many of the features of the adaptive speed control system. The ACC sensor receives battery voltage on a fused ignition switch output (run) circuit and is grounded at all times through a hard wired remote ground point. These connections allow the ACC sensor to operate only when the ignition switch is in the ON position. Likewise, the ACC sensor sleeps whenever the ignition switch is in any position except ON.

The ACC sensor is also a RAdio Detection And Ranging (RADAR) transceiver. The ACC sensor transmits electromagnetic signal bursts at an operating frequency of 77 gigahertz. Those signal bursts are scattered by any objects they strike within the 40 degree field of view of the transceiver, which changes the strength and frequency of the signal. The ACC sensor antenna receives and interprets the returned signals to detect any objects in the path of the vehicle as well as their speed and direction.

The ACC sensor receives electronic **speed control switch status** message inputs from the Steering Control Module (SCM) integral to the Steering Column Control Module (SCCM) over the Controller Area Network (CAN) data bus. The sensor also monitors electronic message inputs from the Powertrain Control Module (PCM), the Antilock Brake Module (ABM) (also known as the Controller Antilock Brake/CAB or the Electronic Stability Control/ESC module) and the Transmission Control Module (TCM).

The ACC sensor logic processes all of those inputs, then provides the appropriate electronic message outputs over the CAN data bus to the PCM, the TCM and the ABM to control and maintain the separation setting selected by the vehicle operator between the vehicle and any preceding vehicles. The ACC sensor also provides electronic message outputs to the instrument cluster and the Electronic Vehicle Information Center (EVIC) to invoke the Forward Collision Warning (FCW) features.

Among other features, the sensor also contains an electronic ambient temperature sensor and a heating element. When appropriate ambient temperatures are sensed, the heating element is energized by the sensor control circuitry to keep the sensor lens or radar dome clear of ice and snow accumulations that might otherwise blind the sensor to proper reception of returned signals.

The ACC sensor microprocessor continuously monitors all of its internal electronics to determine the sensor readiness. If the ACC sensor detects a monitored sensor fault, it sets and stores a Diagnostic Trouble Code (DTC). The ACC sensor uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the CAN data bus. This method of communication is used for control of the indicators and indications provided to the vehicle operator through the instrument cluster and the EVIC. The ACC sensor is also Flash programmable, allowing the sensor software to be updated using a diagnostic scan tool.

The hard wired inputs for the ACC sensor may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ACC sensor or the electronic controls or communication between other modules and devices that provide features of the adaptive speed control and FCW system features. The most reliable, efficient, and accurate means to diagnose the ACC sensor or the electronic controls and communication related to adaptive speed control or FCW system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ACC SYSTEM

The hard wired circuits to the adaptive speed control sensor (also known as the Adaptive Cruise Control/ACC sensor or module, or the radar sensor or module) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ACC sensor or the electronic controls and communication between modules and other devices that provide some features of the adaptive speed control and Forward Collision Warning (FCW) systems. The most reliable, efficient, and accurate means to diagnose the ACC sensor or the electronic controls and communication related to adaptive speed control or FCW system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

STANDARD PROCEDURE

STANDARD PROCEDURE - ADAPTIVE SPEED CONTROL SENSOR ALIGNMENT

The adaptive speed control sensor (also known as the Adaptive Cruise Control/ACC sensor or module, or the radar sensor or module) requires alignment whenever the ACC sensor is removed and reinstalled, whenever front end structural repairs are performed or whenever a Diagnostic Trouble Code (DTC) indicates ACC sensor adjustment is required. Sensor alignment consists of performing the mechanical vertical alignment described in the following procedure, followed by the electronic horizontal alignment that is performed with a diagnostic scan tool and the appropriate diagnostic information.

VEHICLE PREPARATION FOR SENSOR VERTICAL ALIGNMENT

1. Verify correct vehicle suspension height.
2. Repair or replace any ineffective, worn or damaged body components. Repair any loose or cracked fascia components that might interfere with the sensor field of view. The radar dome of the sensor module should be roughly centered in the opening of the fascia.
3. Verify proper tire inflation pressures.
4. Remove any accumulations of mud, snow or ice from the vehicle underbody.

5. Verify that there is no load in the vehicle (cargo or passengers), except for the driver.

NOTE: The vehicle MUST be placed on a known level horizontal surface such as a wheel or frame alignment rack to achieve satisfactory sensor vertical alignment results.

6. Rock the vehicle side-to-side three times to allow the suspension to stabilize.
7. Jounce the front and rear suspension three times by pushing downward on the front and rear bumpers and releasing.

SENSOR VERTICAL ALIGNMENT

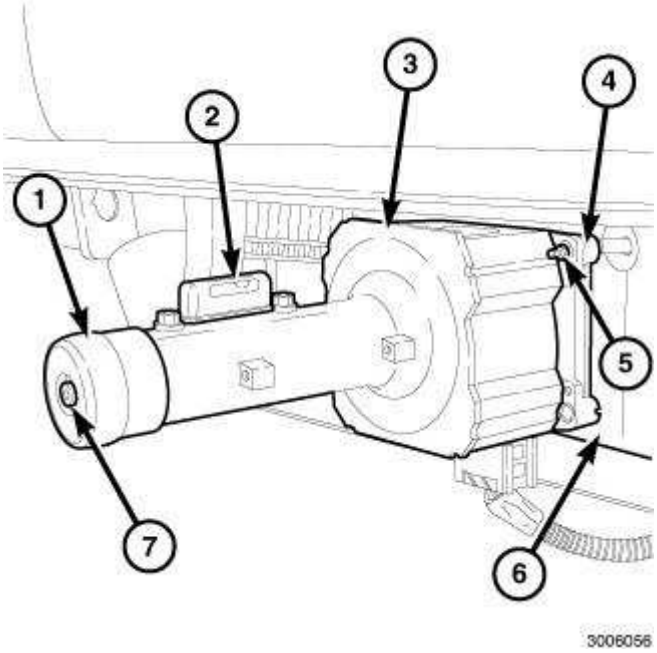

Fig. 103: Adaptive Speed Control Sensor, Bracket, Vertical Alignment Tool & Plunger
Courtesy of CHRYSLER GROUP, LLC

NOTE: The graphic shows Special Tool No. (special tool #10243-1, Fixture, Alignment, Accessory) installed on the adaptive speed control sensor with the front fascia removed for clarity; however, on EXPORT MARKET VEHICLES ONLY it is NOT necessary to remove the front fascia to install the special tool or to perform the following procedure.

1. The adaptive speed control sensor (4) (also known as the Adaptive Cruise Control/ACC sensor or module and the radar sensor or module) is located on a bracket (6) secured near the right frame rail on the underside of the front bumper support member of the Front End Module (FEM) behind the front fascia.
2. For domestic market vehicles only, remove the front fascia from the vehicle. Refer to **FASCIA, FRONT, REMOVAL** .
3. For domestic market vehicles only, working from behind the removed front fascia release the

latch features that secure the molded plastic ACC fascia closeout bezel to the fascia and remove the bezel from the right lower air intake opening.

4. For export market vehicles only, unsnap and remove the molded plastic ACC fascia closeout bezel from the right lower air intake opening of the front fascia to gain access to the ACC adjustment screws.
5. Unsnap and remove the smaller plastic bezel (mirror cover) from over the front of the sensor housing.
6. Using standard glass cleaner and a clean soft towel, remove any dirt or road salt from the convex molded dark plastic lens (radar dome) on the face of the sensor as well as from the suction cup of the vertical alignment tool (3) (Special Tool No. (special tool #10243-1, Fixture, Alignment, Accessory)).
7. Carefully slide the vertical alignment tool over the sensor housing until the suction cup rests against the lens of the sensor.

NOTE: It may take several attempts to get the suction cup of the special tool to fasten securely to the sensor. If necessary, lightly wet the suction cup with clean water to help improve adhesion.

8. Depress the plunger (1) of the vertical alignment tool to engage the suction cup and attach the special tool securely to the lens of the sensor.

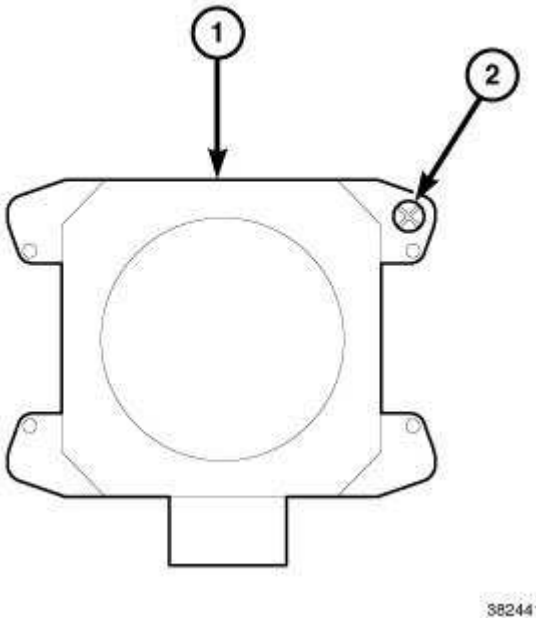

Fig. 104: Sensor & Ball Stud
Courtesy of CHRYSLER GROUP, LLC

9. Use the 3.5 millimeter hex nut driver (Special Tool No. (special tool #10243-2, Driver, Nut)) to rotate the vertical adjustment ball stud (2) that secures the sensor (1) to the mounting bracket as necessary to center the bubble of the spirit level between the two center marks on the vial of the level located on the top of the vertical alignment tool.

10. Depress the center release button of the special tool to release the suction cup from the sensor lens and remove the special tool from the sensor.
11. On domestic market vehicles only, reinstall the front fascia onto the vehicle. Refer to **FASCIA, FRONT, INSTALLATION** .
12. Perform the ACC sensor horizontal alignment using a diagnostic scan tool and the appropriate diagnostic information.
13. Reinstall the smaller plastic bezel (mirror cover) onto the front of the sensor housing. Care must be taken to orient the bezel properly to ensure proper retention.
14. Reinstall the molded plastic ACC fascia closeout bezel into the right lower air intake opening of the front fascia.

REMOVAL

BRACKET

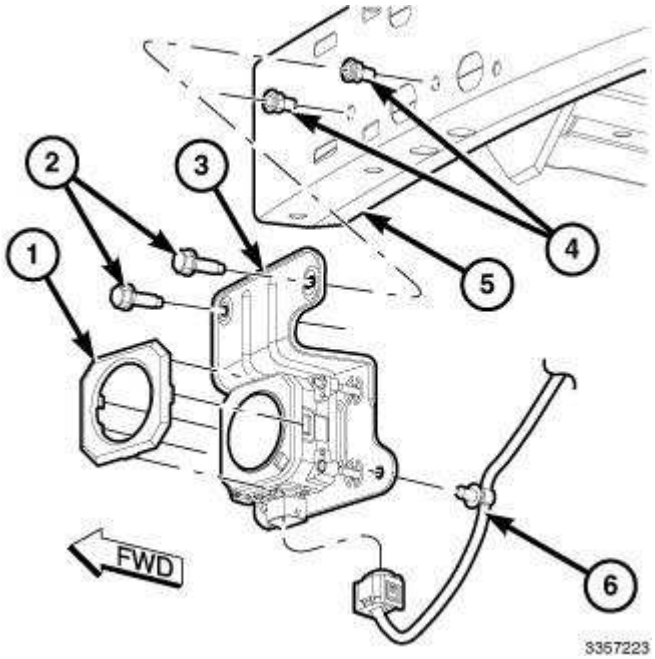

Fig. 105: Two Screws, Front Bumper Support Bar & Wire Harness
Courtesy of CHRYSLER GROUP, LLC

1. Remove the adaptive speed control (also known as the Adaptive Cruise Control/ACC) sensor from the mounting bracket (3). Refer to **SENSOR AND BRACKET, ADAPTIVE SPEED CONTROL, REMOVAL**.
2. Remove the two screws (2) that secure the bracket to the front bumper support bar (5).
3. Disengage the retainer that secures the Front End Module (FEM) wire harness (6) to the back of the bracket.
4. Remove the mounting bracket from the bumper support bar.

NOTE: The three molded plastic ball socket clips in the ACC sensor mounting

bracket MUST be removed, discarded and replaced with new ball socket clips any time the sensor is removed from the bracket.

5. Remove the three molded plastic ball socket clips from the back side of the ACC sensor mounting bracket and discard. The clips are removed by rotating them counterclockwise.

SENSOR

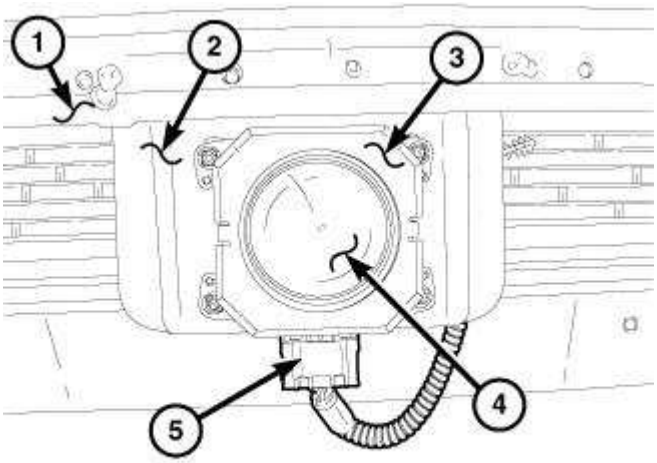

Fig. 106: Sensor Bezel (Mirror Cover) & Front Bumper Support Bar
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Remove the front fascia from the vehicle. Refer to **FASCIA, FRONT, REMOVAL** .
4. If equipped, unsnap and remove the sensor bezel (mirror cover) (3) from the face of the adaptive speed control (also known as Adaptive Cruise Control/ACC) sensor (4) located below the right side of the front bumper support bar (1).
5. Disconnect the Front End Module (FEM) wire harness connector (5) from the ACC sensor connector receptacle.
6. Firmly grasp the ACC sensor housing and pull it sharply forward from the sensor mounting bracket (2) until the one fixed and the two adjustable ball studs of the sensor unsnap from the three molded plastic ball socket clips in the bracket.
7. Remove the ACC sensor from the vehicle.

NOTE: The three molded plastic ball socket clips in the ACC sensor mounting bracket MUST be removed, discarded and replaced with new ball socket clips any time the sensor is removed from the bracket.

8. Remove the three molded plastic ball socket clips (5) from the back side of the ACC sensor mounting bracket and discard. The clips are removed by rotating them counterclockwise.

INSTALLATION

BRACKET

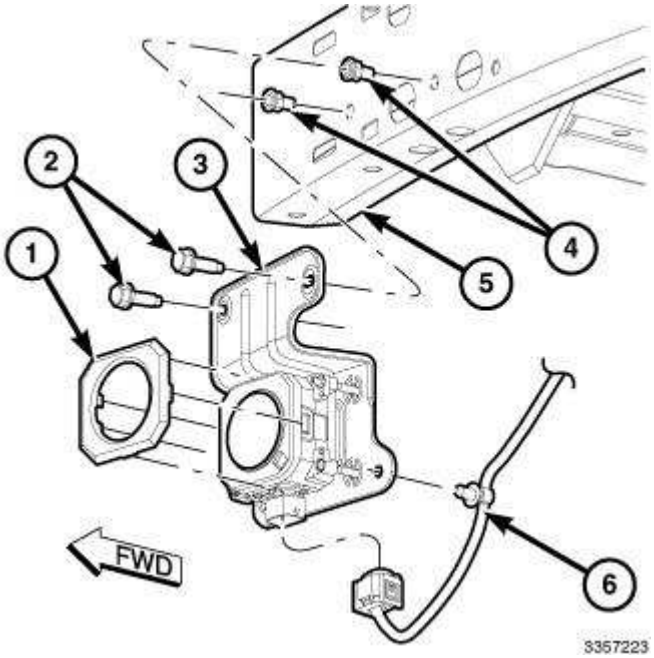

Fig. 107: Two Screws, Front Bumper Support Bar & Wire Harness
Courtesy of CHRYSLER GROUP, LLC

NOTE: The molded plastic ball socket clips in the ACC sensor mounting bracket MUST be removed, discarded and replaced with new ball socket clips any time the sensor is removed from the bracket.

1. Check to be certain that the two rivet nuts (4) are properly installed and in good condition in the front bumper support bar (5).
2. Install three new molded plastic ball socket clips into the adaptive speed control (also known as Adaptive Cruise Control/ACC) sensor mounting bracket (3). The clips are installed from the back side of the bracket by rotating them clockwise.
3. Position the mounting bracket to the bumper support bar.
4. Engage the retainer that secures the Front End Module (FEM) wire harness (6) to the back of the bracket.
5. Starting with the outboard (round) mounting hole followed by the inboard (slotted) mounting hole, install and tighten the two screws (2) that secure the mounting bracket to the support bar. Tighten the screws securely.
6. Reinstall the ACC sensor onto the mounting bracket. Refer to **SENSOR AND BRACKET, ADAPTIVE SPEED CONTROL, INSTALLATION**.

SENSOR

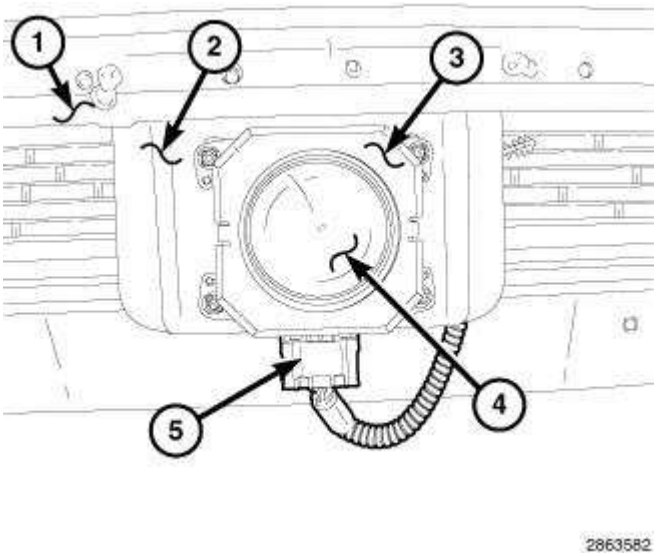

Fig. 108: Sensor Bezel (Mirror Cover) & Front Bumper Support Bar
Courtesy of CHRYSLER GROUP, LLC

NOTE: The molded plastic ball socket clips in the ACC sensor mounting bracket MUST be removed, discarded and replaced with new ball socket clips any time the sensor is removed from the bracket.

1. Install three new molded plastic ball socket clips into the adaptive speed control (also known as Adaptive Cruise Control/ACC) sensor mounting bracket (2) located below the right side of the front bumper support bar (1). The clips are installed from the back side of the bracket by rotating them clockwise.
2. Position the ACC sensor (4) to the mounting bracket.
3. Align the one fixed and the two adjustable ball studs of the sensor with the three plastic ball socket clips in the bracket.
4. Using hand pressure, press firmly and evenly on the face of the sensor until each of the ball studs snaps into the ball socket clips.
5. Reconnect the Front End Module (FEM) wire harness connector (5) to the ACC sensor connector receptacle.
6. If equipped, snap the sensor bezel (mirror cover) (3) over the face of the ACC sensor.
7. Check the ACC sensor vertical alignment. Refer to **SENSOR AND BRACKET, ADAPTIVE SPEED CONTROL, STANDARD PROCEDURE**.
8. Reinstall the front fascia onto the vehicle. Refer to **FASCIA, FRONT, INSTALLATION** .
9. Use a diagnostic scan tool and the appropriate diagnostic information to perform the horizontal sensor alignment procedure.

ENGINE

Cooling System - Chrysler 300

DESCRIPTION

DESCRIPTION

The cooling system regulates engine operating temperature. It allows the engine to reach normal operating temperature as quickly as possible, maintains normal operating temperature and prevents overheating.

The cooling system also provides a means of heating the passenger compartment. The cooling system is pressurized and uses a centrifugal water pump to circulate coolant throughout the system. A separate and remotely mounted, coolant bottle is used.

COOLING SYSTEM COMPONENTS

The cooling system consists of:

- Electric cooling fan
- Radiator
- A coolant recovery system
- Thermostat
- Water pump
- Radiator pressure cap
- Coolant
- Water pump
- Hoses and hose clamps

OPERATION

OPERATION

The cooling system regulates engine operating temperature. It allows the engine to reach normal operating temperature as quickly as possible. It also maintains normal operating temperature and prevents overheating.

The cooling system also provides a source of hot coolant for heating the passenger compartment and cooling the automatic transmission fluid (if equipped). The cooling system is pressurized and uses a centrifugal water pump to circulate coolant throughout the system.

- When engine is cold the thermostat is closed. The cooling system has no flow through the radiator. The coolant flows through the engine, water pump, and heater.

- When engine is warm the thermostat is full open. On the gas engine coolant flows through the engine, radiator, heater, and water pump.

An optional factory installed maximum duty cooling package is available on most models. This package will provide additional cooling capacity for vehicles used under extreme conditions such as trailer towing in high ambient temperatures.

DIAGNOSIS AND TESTING

COOLING SYSTEM LEAKS

ULTRAVIOLET LIGHT METHOD

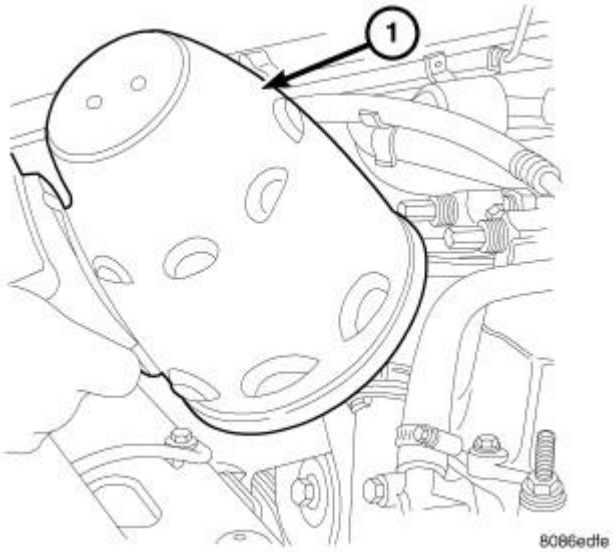

Fig. 1: Identifying Ultraviolet Light Method
Courtesy of CHRYSLER GROUP, LLC

1 - TYPICAL BLACK LIGHT TOOL

A leak detection additive is available through the parts department that can be added to cooling system. The additive is highly visible under ultraviolet light (black light). Pour one ounce of additive into cooling system. Place heater control unit in HEAT position. Start and operate engine until radiator upper hose is warm to touch. Aim the commercially available black light tool at components to be checked. If leaks are present, black light will cause additive to glow a bright green color.

The black light can be used in conjunction with a pressure tester to determine if any external leaks exist.

PRESSURE TESTER METHOD

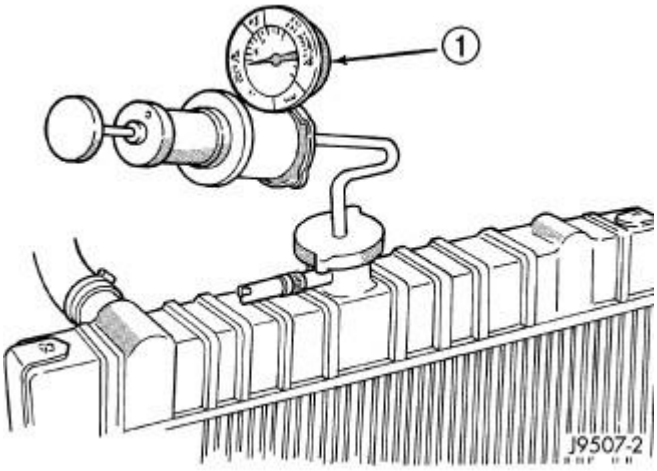

Fig. 2: Pressure Testing Cooling System - Typical - Gas
Courtesy of CHRYSLER GROUP, LLC

1 - TYPICAL COOLING SYSTEM PRESSURE TESTER

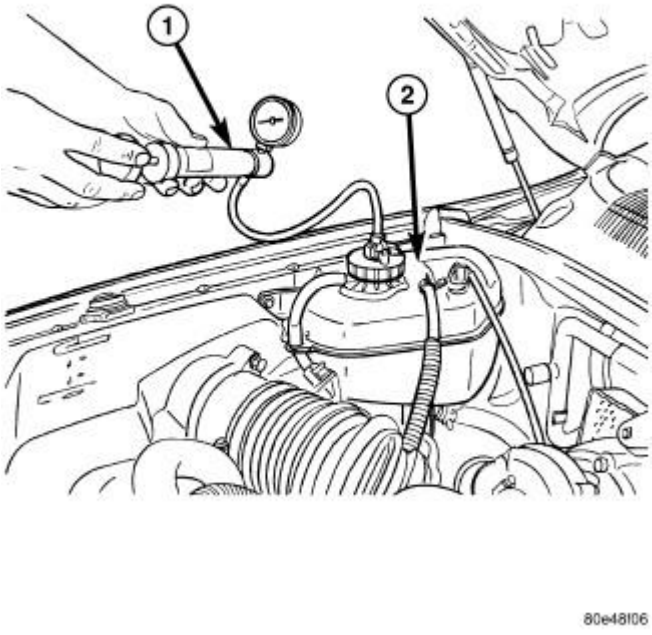

Fig. 3: Pressure Testing Cooling System - Typical - Diesel
Courtesy of CHRYSLER GROUP, LLC

1 - TYPICAL COOLING SYSTEM PRESSURE TESTER

The engine should be at normal operating temperature. Recheck the system cold if cause of coolant loss is not located during the warm engine examination.

WARNING: Hot, pressurized coolant can cause injury by scalding.

Carefully remove radiator pressure cap from filler neck and check coolant level. Push down on cap to disengage it from stop tabs. Wipe inside of filler neck and examine lower inside sealing seat for nicks, cracks, paint, dirt and solder residue. Inspect radiator-to- reserve/overflow tank hose for internal obstructions. Insert a wire through the hose to be sure it is not obstructed.

Inspect cams on outside of filler neck. If cams are damaged, seating of pressure cap valve and tester seal will be affected.

Attach pressure tester ((special tool #7700, Tester, Cooling System) or an equivalent) to radiator filler neck.

Operate tester pump to apply 103.4 kPa (15 psi) pressure to system. If hoses enlarge excessively or bulges while testing, replace as necessary. Observe gauge pointer and determine condition of cooling system according to following criteria:

Holds Steady: If pointer remains steady for two minutes, serious coolant leaks are not present in system. However, there could be an internal leak that does not appear with normal system test pressure. If it is certain that coolant is being lost and leaks cannot be detected, inspect for interior leakage or perform **COMBUSTION LEAKAGE TEST - WITHOUT PRESSURE TESTER** .

Drops Slowly: Indicates a small leak or seepage is occurring. Examine all connections for seepage or slight leakage with a flashlight. Inspect radiator, hoses, gasket edges and heater. Seal small leak holes with a Sealer Lubricant (or equivalent). Repair leak holes and inspect system again with pressure applied.

Drops Quickly: Indicates that serious leakage is occurring. Examine system for external leakage. If leaks are not visible, inspect for internal leakage. Large radiator leak holes should be repaired by a reputable radiator repair shop.

INTERNAL LEAKAGE INSPECTION

Remove engine oil pan drain plug and drain a small amount of engine oil. If coolant is present in the pan, it will drain first because it is heavier than oil. An alternative method is to operate engine for a short period to churn the oil. After this is done, remove engine dipstick and inspect for water globules. Also inspect transmission dipstick for water globules and transmission fluid cooler for leakage.

WARNING: With radiator pressure tester tool installed on radiator, do not allow pressure to exceed 110 kPa (20 psi). Pressure will build up quickly if a combustion leak is present. To release pressure, rock tester from side to side. When removing tester, do not turn tester more than 1/2 turn if

system is under pressure.

Operate engine without pressure cap on radiator until thermostat opens. Attach a Pressure Tester to filler neck. If pressure builds up quickly it indicates a combustion leak exists. This is usually the result of a cylinder head gasket leak or crack in engine. Repair as necessary.

If there is not an immediate pressure increase, pump the Pressure Tester. Do this until indicated pressure is within system range of 110 kPa (16 psi). Fluctuation of gauge pointer indicates compression or combustion leakage into cooling system.

Because the vehicle is equipped with a catalytic converter, **do not** remove spark plug cables or short out cylinders to isolate compression leak.

If the needle on dial of pressure tester does not fluctuate, race engine a few times to check for an abnormal amount of coolant or steam. This would be emitting from exhaust pipe. Coolant or steam from exhaust pipe may indicate a faulty cylinder head gasket, cracked engine cylinder block or cylinder head.

A convenient check for exhaust gas leakage into cooling system is provided by a commercially available Block Leak Check tool. Follow manufacturers instructions when using this product.

COMBUSTION LEAKAGE TEST - WITHOUT PRESSURE TESTER

DO NOT WASTE reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

WARNING: Do not remove cylinder block drain plugs or loosen radiator draincock with system hot and under pressure. Serious burns from coolant can occur.

Drain sufficient coolant to allow thermostat removal. Refer to **THERMOSTAT, REMOVAL**. Remove accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL**.

Add coolant to radiator to bring level to within 6 mm (1/4 in) of top of thermostat housing.

CAUTION: Avoid overheating. Do not operate engine for an excessive period of time. Open draincock immediately after test to eliminate boil over.

Start engine and accelerate rapidly three times, to approximately 3000 RPM while observing coolant. If internal engine combustion gases are leaking into cooling system, bubbles will appear in coolant. If bubbles do not appear, internal combustion gas leakage is not present.

PRELIMINARY CHECKS

ENGINE COOLING SYSTEM OVERHEATING

Establish what driving conditions caused the complaint. Abnormal loads on the cooling system such

as the following may be the cause:

- Prolonged idle
- Debris blocking the grill or cooling module
- Slight tail wind at idle
- Slow traffic
- Traffic jams
- High speed
- Trailer towing
- Steep grades
- Any accessory addition that fully or partially blocks the grille opening

RECENT SERVICE OR ACCIDENT REPAIR:

Determine if any recent service has been performed on vehicle that may effect cooling system. This may be:

- Engine adjustments (incorrect timing)
- Slipping engine accessory drive belt(s)
- Brakes (possibly dragging)
- Changed parts. Incorrect water pump, or pump rotating in wrong direction due to belt not correctly routed
- Reconditioned radiator or cooling system refilling (possibly under filled or air trapped in system).

NOTE: If investigation reveals none of the previous items as a cause for an engine overheating complaint, refer to following Cooling System Diagnosis charts.

These charts are to be used as a quick-reference only. Refer to the group text for information.

COOLING SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
TEMPERATURE GAUGE READS LOW	1. Has a Diagnostic Trouble Code (DTC) been set indicating a stuck open thermostat?	1. for On-Board Diagnostics and DTC information. Refer to **DESCRIPTION** . Replace thermostat if necessary.
	2. Is the temperature sending unit connected?	2. Check the temperature sensor connector. Repair connector if necessary.
	3. Is the temperature gauge operating OK?	3. Check gauge operation. Repair as necessary.
	4. Coolant level low in cold ambient temperatures accompanied with poor	4. Check coolant level in the coolant reserve/overflow tank and the radiator.

	heater performance.	Inspect system for leaks. Repair leaks as necessary.
	5. Improper operation of internal heater doors or heater controls.	5. Inspect heater and repair as necessary. Refer to **DIAGNOSIS AND TESTING** .
TEMPERATURE GAUGE READS HIGH OR THE COOLANT LAMP ILLUMINATES. COOLANT MAY OR MAY NOT BE LOST OR LEAKING FROM THE COOLING SYSTEM	1. Trailer is being towed, a steep hill is being climbed, vehicle is operated in slow moving traffic, or engine is being idled with very high ambient (outside) temperatures and the air conditioning is on. Higher altitudes could aggravate these conditions.	1. This may be a temporary condition and repair is not necessary. Turn off the air conditioning and attempt to drive the vehicle without any of the previous conditions. Observe the temperature gauge. The gauge should return to the normal range. If the gauge does not return to the normal range, determine the cause for overheating and repair.
	2. Is the temperature gauge reading correctly?	2. Check gauge. (Refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION**). Repair as necessary.
	3. Is the temperature warning illuminating unnecessarily?	3. Check warning lamp operation. (Refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION**). Repair as necessary.
	4. Coolant low in coolant reserve/overflow tank and radiator?	4. Check for coolant leaks and repair as necessary. Refer to **DIAGNOSIS AND TESTING**.
	5. Pressure cap not installed tightly. If cap is loose, boiling point of coolant will be lowered. Also refer to the following Step 6.	5. Tighten cap
	6. Poor seals at the radiator cap.	6. (a) Check condition of cap and cap seals. Refer to **CAP, RADIATOR, DIAGNOSIS AND TESTING**.
		(b) Check condition of radiator filler neck. If neck is bent or damaged, replace radiator.

7. Coolant level low in radiator but not in coolant reserve/overflow tank. This means the radiator is not drawing coolant from the coolant reserve/overflow tank as the engine cools	7. (a) Check condition of radiator cap and cap seals. Refer to **CAP, RADIATOR, DIAGNOSIS AND TESTING**.
	(b) Check condition of radiator filler neck. If neck is bent or damaged, replace radiator.
	(c) Check condition of the hose from the radiator to the coolant tank. It should fit tight at both ends without any kinks or tears. Replace hose if necessary.
	(d) Check coolant reserve/overflow tank and tanks hoses for blockage. Repair as necessary.
8. Incorrect coolant concentration	8. Check coolant. for correct coolant/water mixture ratio. Refer to **COOLANT, DESCRIPTION**.
9. Coolant not flowing through system	9. Check for coolant flow at radiator filler neck with some coolant removed, engine warm and thermostat open. Coolant should be observed flowing through radiator. If flow is not observed, determine area of obstruction and repair as necessary.
10. Radiator or A/C condenser fins are dirty or clogged.	10. Remove insects and debris from radiator or A/C Condenser fins.
11. Radiator core is corroded or plugged.	11. Have radiator re-cored or replaced.
12. Aftermarket A/C installed without proper radiator.	12. Install proper radiator.
13. Fuel or ignition system problems.	13. Refer to **FUEL SYSTEM** for diagnosis.
14. Dragging brakes.	14. Check and correct as necessary.
15. Bug screen or cardboard is being used, reducing	15. Remove bug screen or cardboard.

	airflow.	
	16. Thermostat partially or completely shut.	16. Check thermostat operation and replaces necessary.
	17. Cylinder head gasket leaking.	17. Check for cylinder head gasket leaks. Refer to **DIAGNOSIS AND TESTING**. For repair. Refer to **CYLINDER HEAD, REMOVAL** or **CYLINDER HEAD, REMOVAL** or **CYLINDER HEAD, REMOVAL, 5.7L** or **CYLINDER HEAD, REMOVAL** .
	18. Cooling fan operation failure.	18. (a) Check for possible blow fuse. Replace as necessary.
		(b) Check for power at the fan. Repair as necessary.
		(c) Fan motor failure. Repair as necessary.
	19. Heater core leaking.	19. Check heater core for leaks. Refer to **CORE, HEATER, REMOVAL** . Repair as necessary.
TEMPERATURE GAUGE READING IS INCONSISTENT (FLUCTUATES, CYCLES OR IS ERRATIC)	1. During cold weather operation, with the heater blower in the high position, the gauge reading may drop slightly.	1. A normal condition. No correction is necessary.
	2. Temperature gauge or engine mounted gauge sensor defective or shorted. Also, corroded or loose wiring in this circuit.	2. Check operation of gauge and repair if necessary. Refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION** .
	3. Gauge reading rises when vehicle is brought to a stop after heavy use (engine still running)	3. A normal condition. No correction is necessary. Gauge should return to normal range after vehicle is driven.
	4. Gauge reading high after re-starting a warmed up (hot) engine.	4. A normal condition. No correction is necessary. The gauge should return to normal range after a few minutes of engine operation.

	5. Coolant level low in radiator (air will build up in the cooling system causing the thermostat to open late).	5. Check and correct coolant leaks. Refer to **DIAGNOSIS AND TESTING**.
	6. Cylinder head gasket leaking allowing exhaust gas to enter cooling system causing a thermostat to open late.	6. (a) Check for cylinder head gasket leaks. Refer to **DIAGNOSIS AND TESTING**.
		(b) Check for coolant in the engine oil. Inspect for white steam emitting from the exhaust system. Repair as necessary.
	7. Water pump impeller loose on shaft.	7. Check water pump and replace as necessary.
	8. Loose accessory drive belt. (water pump slipping)	8. Refer to **BELT, SERPENTINE, DIAGNOSIS AND TESTING**. Check and correct as necessary.
	9. Air leak on the suction side of the water pump allows air to build up in cooling system causing thermostat to open late.	9. Locate leak and repair as necessary.
PRESSURE CAP IS BLOWING OFF STEAM AND/OR COOLANT TO COOLANT TANK. TEMPERATURE GAUGE READING MAY BE ABOVE NORMAL BUT NOT HIGH. COOLANT LEVEL MAY BE HIGH IN COOLANT RESERVE/OVERFLOW TANK	1. Pressure relief valve in radiator cap is defective.	1. Check condition of radiator cap and cap seals. Refer to **CAP, RADIATOR, DIAGNOSIS AND TESTING**. Replace cap as necessary.
COOLANT LOSS TO THE GROUND WITHOUT PRESSURE CAP BLOWOFF. GAUGE READING HIGH OR HOT	1. Coolant leaks in radiator, cooling system hoses, water pump or engine.	1. Pressure test and repair as necessary. Refer to **DIAGNOSIS AND TESTING**.
DETONATION OR PRE-IGNITION (NOT CAUSED BY IGNITION SYSTEM). GAUGE MAY OR MAY NOT BE READING HIGH	1. Engine overheating.	1. Check reason for overheating and repair as necessary.
	2. Freeze point of coolant not correct. Mixture is too rich or too lean.	2. Check coolant concentration. and adjust ratio as required. Refer to **COOLANT, DESCRIPTION**.
HOSE OR HOSES COLLAPSE WHILE ENGINE IS RUNNING	1. Vacuum created in cooling system on engine cool-down is not being	1. (a) Radiator cap relief valve stuck. Refer to **CAP, RADIATOR, DIAGNOSIS**

	relieved through coolant reserve/overflow system.	**AND TESTING**. Replace if necessary (b) Hose between coolant reserve/overflow tank and radiator is kinked. Repair as necessary.
		(c) Vent at coolant reserve/overflow tank is plugged. Clean vent and repair as necessary.
		(d) Reserve/overflow tank is internally blocked or plugged. Check for blockage and repair as necessary.
INADEQUATE HEATER PERFORMANCE.	1.Thermostat failed in open position	1. Check thermostat operation and replaces necessary
	2. Has a Diagnostic trouble Code (DTC) been set?	2. for correct procedures and replace thermostat if necessary. Refer to **DESCRIPTION** .
	3. Coolant level low	3. Refer to **DIAGNOSIS AND TESTING**.
	4. Obstructions in heater hose/fittings	4. Remove heater hoses at both ends and check for obstructions
	5. Heater hose kinked	5. Locate kinked area and repair as necessary
	6. Water pump is not pumping water to/through the heater core. When the engine is fully warmed up, both heater hoses should be hot to the touch. If only one of the hoses is hot, the water pump may not be operating correctly or the heater core may be plugged. Accessory drive belt may be slipping causing poor water pump operation.	6. If a slipping belt is detected. Refer to **BELT, SERPENTINE, REMOVAL**. If heater core obstruction is detected, for cooling system reverse flushing. Refer to **STANDARD PROCEDURE**.
STEAM IS COMING FROM THE FRONT OF VEHICLE NEAR THE GRILL AREA WHEN WEATHER IS WET, ENGINE IS WARMED UP	1. During wet weather, moisture (snow, ice or rain condensation) on the radiator will evaporate when	1. Occasional steam emitting from this area is normal. No repair is necessary.

AND RUNNING, AND VEHICLE IS STATIONARY. TEMPERATURE GAUGE IS IN NORMAL RANGE	the thermostat opens. This opening allows heated water into the radiator. When the moisture contacts the hot radiator, steam may be emitted. This usually occurs in cold weather with no fan or airflow to blow it away.	
COOLANT COLOR	1. Coolant color is not necessarily an indication of adequate corrosion or temperature protection. Do not rely on coolant color for determining condition of coolant.	1. for coolant concentration information. Refer to **COOLANT, DESCRIPTION**. Adjust coolant mixture as necessary.
COOLANT LEVEL CHANGES IN COOLANT RESERVE/OVERFLOW TANK. TEMPERATURE GAUGE IS IN NORMAL RANGE	1. Level changes are to be expected as coolant volume fluctuates with engine temperature. If the level in the tank was between the FULL and ADD marks at normal operating temperature, the level should return to within that range after operation at elevated temperatures.	1. A normal condition. No repair is necessary.
FAN RUNS ALL THE TIME	1. Fan control sensors inoperative.	1. Check for DTC's. Verify sensor readings.
	2. Fan control solenoid stuck "on".	2. Check fan operation speeds. Refer to fan speed operation table.
	3. Fan control solenoid harness damaged.	3. Check for DTC 1499. Repair as required.
	4. Transmission temperature too high.	4. Check for transmission over temp. DTC.
	5. Engine coolant temperature too high.	5. (a) Check coolant level. Correct level as required.
		(b) Thermostat stuck. Replace thermostat.
		(c) Water pump failed. Replace water pump.
		(d) Coolant flow restricted. Clean radiator.
		(e) Air flow over radiator obstructed. Remove obstruction.

STANDARD PROCEDURE

DRAINING

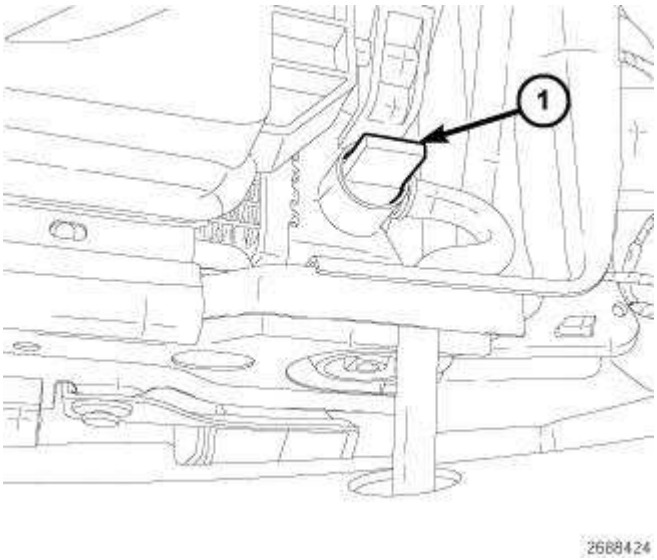

Fig. 4: Radiator Petcock
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not remove cylinder block drain plugs or loosen radiator draincock with system hot and under pressure. Serious burns from coolant can occur.

NOTE: Typical drain plug shown in illustration.

DO NOT WASTE reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

1. Remove radiator pressure cap.
2. Raise and secure vehicle.
3. If equipped, remove the underbody splash shield.
4. Loosen radiator petcock.
5. Drain coolant into a clean container.

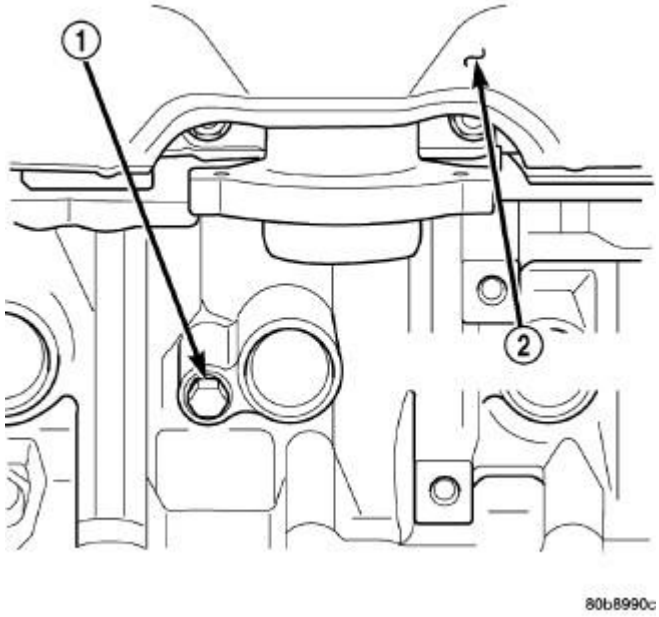

Fig. 5: Identifying Cylinder Block Drain Plugs
Courtesy of CHRYSLER GROUP, LLC

6. If necessary, to perform a complete coolant drain of the engine, remove the drain plug (1) from the engine block.

STANDARD PROCEDURE - COOLANT AIR EVACUATION

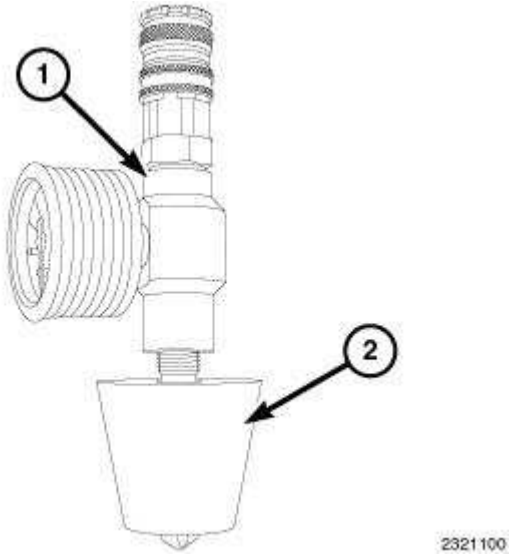

Fig. 6: Pressurized Air Operated Vacuum Generator
Courtesy of CHRYSLER GROUP, LLC

Evacuating or purging air from the cooling system involves the use of a pressurized air operated vacuum generator. The vacuum created allows for a quick and complete coolant refilling while removing any airlocks present in the system components.

NOTE: **To avoid damage to the cooling system, ensure that no component would be susceptible to damage when a vacuum is drawn on the system.**

WARNING: **ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASED COOLANT PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE; PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED; PERSONAL INJURY CAN RESULT.**

WARNING: **WEAR APPROPRIATE EYE AND HAND PROTECTION WHEN PERFORMING THIS PROCEDURE.**

NOTE: **The service area where this procedure is performed should have a minimum shop air requirement of 80 PSI (5.5 bar) and should be equipped with an air dryer system.**

NOTE: **For best results, the radiator should be empty. The vehicle's heater control should be set to the heat position (ignition may need to be turned to the on position but do not start the motor).**

1. Refer to the Chrysler Pentastar Service Equipment (Chrysler PSE) Coolant Refiller #85-15-0650 or equivalent tool's operating manual for specific assembly steps.
2. Choose an appropriate adapter cone that will fit the vehicle's radiator filler neck or reservoir tank.
3. Attach the adapter cone (2) to the vacuum gauge (1).

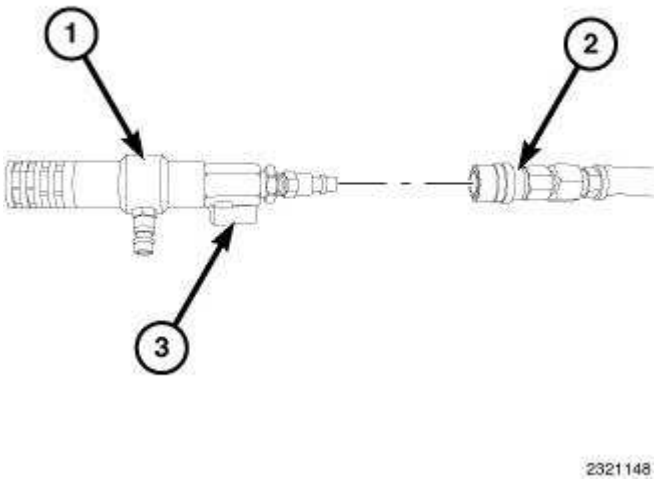

Fig. 7: Vacuum Generator/Venturi Ball Valve
Courtesy of CHRYSLER GROUP, LLC

4. Make sure the vacuum generator/venturi ball valve (3) is closed and attach an airline hose (2) (minimum shop air requirement of 80 PSI/5.5 bar) to the vacuum generator/venturi (1).
5. Position the adaptor cone/vacuum gauge assembly into the radiator filler neck or reservoir tank. Ensure that the adapter cone is sealed properly.

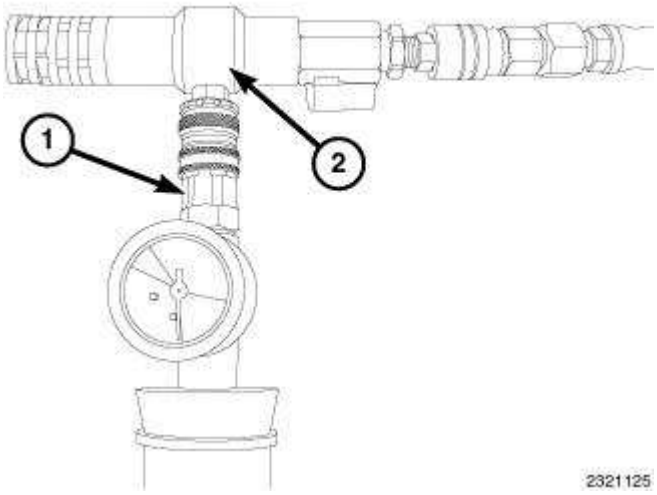

Fig. 8: Vacuum Generator/Venturi
Courtesy of CHRYSLER GROUP, LLC

6. Connect the vacuum generator/venturi (2) to the positioned adaptor cone/vacuum gauge assembly (1).
7. Open the vacuum generator/venturi ball valve.

NOTE: **Do not bump or move the assembly as it may result in loss of vacuum. Some radiator overflow hoses may need to be clamped off to obtain vacuum.**

8. Let the system run until the vacuum gauge shows a good vacuum through the cooling system. Refer to the tool's operating manual for appropriate pressure readings.

NOTE: **If a strong vacuum is being created in the system, it is normal to see the radiator hoses to collapse.**

9. Close the vacuum generator/venturi ball valve.

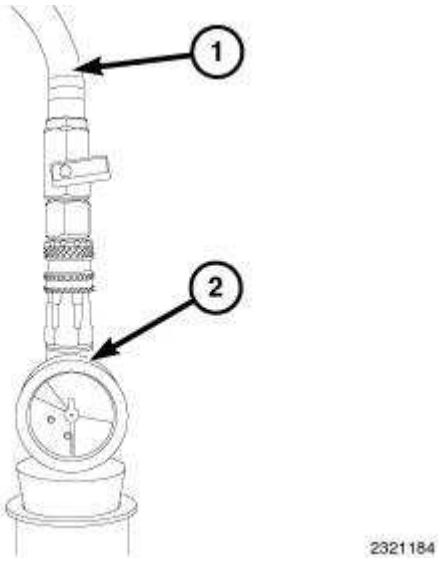

Fig. 9: Vacuum Generator/Venturi And Air Line
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the vacuum generator/venturi and airline from the adaptor cone/vacuum gauge assembly.
11. Wait approximately 20 seconds, if the pressure readings do not move, the system has no leaks. If the pressure readings move, a leak could be present in the system and the cooling system should be checked for leaks and the procedure should be repeated.
12. Place the tool's suction hose into the coolant's container.

NOTE: **Ensure there is a sufficient amount of coolant, mixed to the required strength/protection level available for use. For best results and to assist the refilling procedure, place the coolant container at the same height as the radiator filler neck. Always draw more coolant than required. If the coolant level is too low, it will pull air into the cooling system which could result in airlocks in the system.**

13. Connect the tool's suction hose (1) to the adaptor cone/vacuum gauge assembly (2).

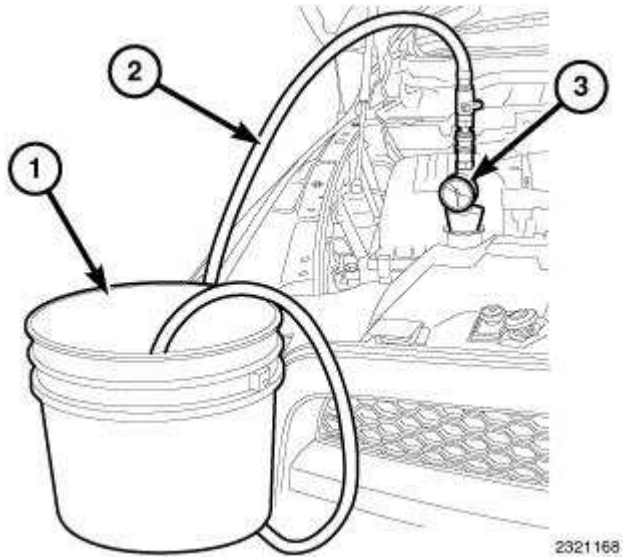

Fig. 10: Suction Hose Ball Valve
Courtesy of CHRYSLER GROUP, LLC

14. Open the suction hose's ball valve to begin refilling the cooling system.
15. When the vacuum gauge reads zero, the system is filled.

NOTE: On some remote pressurized tanks, it is recommended to stop filling when the proper level is reached.

16. Close the suction hose's ball valve and remove the suction hose from the adaptor cone/vacuum gauge assembly.
17. Remove the adaptor cone/vacuum gauge assembly from the radiator filler neck or reservoir tank.
18. With heater control unit in the HEAT position, operate engine with container cap in place.
19. After engine has reached normal operating temperature, shut engine off and allow it to cool. When engine is cooling down, coolant will be drawn into the radiator from the pressure container.
20. Add coolant to the recovery bottle/container as necessary. **Only add coolant to the container when the engine is cold. Coolant level in a warm engine will be higher due to thermal expansion.** Add necessary coolant to raise container level to the COLD MINIMUM mark after each cool down period.
21. Once the appropriate coolant level is achieved, attach the radiator cap or reservoir tank cap.

ADDING ADDITIONAL COOLANT

The use of aluminum cylinder blocks, cylinder heads and water pumps requires special corrosion protection. Only Mopar® Antifreeze/Coolant, 5 Year/100, 000 Mile Formula (glycol base coolant with corrosion inhibitors called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% distilled water to obtain to obtain a freeze point of -37°C (-35°F). If it loses color or becomes contaminated, drain, flush, and

replace with fresh properly mixed coolant solution.

CAUTION: Do not use coolant additives that are claimed to improve engine cooling.

COOLANT LEVEL CHECK

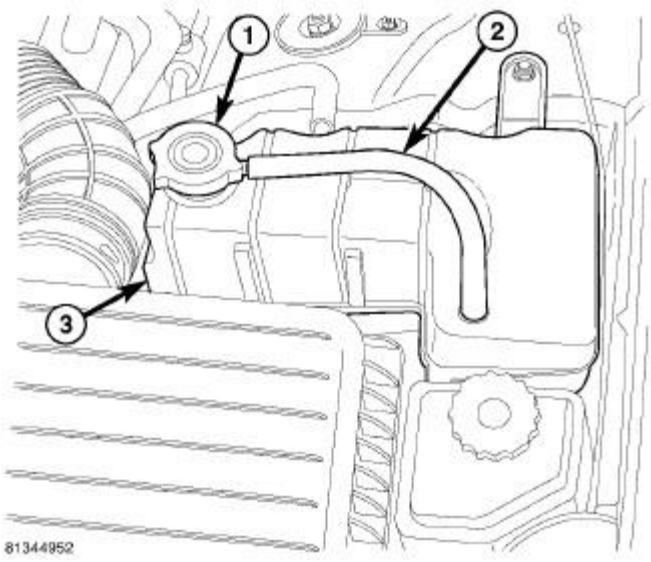

Fig. 11: Coolant Recovery Container
Courtesy of CHRYSLER GROUP, LLC

1 - COOLANT RECOVER CONTAINER PRESSURE CAP
2 - COOLANT RECOVERY CONTAINER
3 - ADD/FULL MARKS

NOTE: Do not remove radiator cap for routine coolant level inspections. The coolant level can be checked at coolant recovery bottle (2).

The coolant reserve/overflow system provides a quick method for determining coolant level. With engine not running, the coolant level should be between MIN and MAX marks (3). If the coolant level is at or below the MIN mark, fill the recovery bottle with a 50/50 mixture of antifreeze and water ONE QUART AT A TIME. Repeat this procedure until the coolant level is at the FULL mark.

CLEANING/REVERSE FLUSHING

CLEANING

Drain cooling system and refill with water. Run engine with radiator cap installed until upper radiator hose is hot. Stop engine and drain water from system. If water is dirty, fill system with water, run engine and drain system. Repeat until water drains clean.

REVERSE FLUSHING

Reverse flushing of cooling system is the forcing of water through the cooling system. This is done using air pressure in the opposite direction of normal coolant flow. It is usually only necessary with very dirty systems with evidence of partial plugging.

REVERSE FLUSHING RADIATOR

Disconnect radiator hoses from radiator inlet and outlet. Attach a section of radiator hose to radiator bottom outlet fitting and insert flushing gun. Connect a water supply hose and air supply hose to flushing gun.

CAUTION: Internal radiator pressure must not exceed 138 kPa (20 psi) as damage to radiator may result.

Allow radiator to fill with water. When radiator is filled, apply air in short blasts. Allow radiator to refill between blasts. Continue this reverse flushing until clean water flows out through rear of radiator cooling tube passages. Have radiator cleaned more extensively by a radiator repair shop.

REVERSE FLUSHING ENGINE

Drain cooling system. Remove thermostat housing and thermostat. Install thermostat housing. Disconnect radiator upper hose from radiator and attach flushing gun to hose. Disconnect radiator lower hose from water pump and attach a lead-away hose to water pump inlet fitting.

CAUTION: On vehicles equipped with a heater water control valve, be sure heater control valve is closed (heat off). This will prevent coolant flow with scale and other deposits from entering heater core.

Connect water supply hose and air supply hose to flushing gun. Allow engine to fill with water. When engine is filled, apply air in short blasts, allowing system to fill between air blasts. Continue until clean water flows through the lead away hose.

Remove lead away hose, flushing gun, water supply hose and air supply hose. Remove thermostat housing and install thermostat. Install thermostat housing with a replacement gasket. Refer to **REMOVAL** . Connect radiator hoses. Refill cooling system with correct antifreeze/water mixture. Refer to **ADDING ADDITIONAL COOLANT** .

CHEMICAL CLEANING

In some instances, use a radiator cleaner (Mopar® Radiator Kleen or equivalent) before flushing. This will soften scale and other deposits and aid flushing operation.

CAUTION: Follow manufacturers instructions when using these products.

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	SPECIFICATION	
	US	Metric
3.0L Engine	12.7 Quarts	12 Liters
3.6L Engine	10 Quarts	9.5 Liters
5.7L Engine	14.7 Quarts	13.9 Liters
6.4L Engine	14.5 Quarts	13.7 Liters

TORQUE

DESCRIPTION		N.m	Ft. Lbs.	In. Lbs.
Automatic Belt Tensioner to Mounting Bracket Bolt				
	5.7L/6.4L	41	30	-
	3.0L	41	30	-
Automatic Belt Tensioner Pulley Bolt				
	3.6L	55	41	-
	5.7L/6.4L	61	45	-
Block Heater Bolt				
	3.6L	12	-	106
	5.7L/6.4L	12	-	106
Idler Pulley Bolts		29	21	
Radiator Upper Isolator to Crossmember Nuts		3	-	20
Radiator Upper Isolator to Radiator Nuts		4	-	36
Radiator Brace Bolts		10	-	89
Thermostat Housing Bolts				
	3.6L	12	-	106
	5.7L/6.4L	13	-	115
	3.0L	11	-	97
Upper Radiator Crossmember to Body Bolts		10	-	89
Water Pump Bolts	3.6L			
	M6	12	9	-
	M8	25	18	-
	M10	55	41	-
	5.7L/6.4L	24	18	-
	3.0	24	18	-

SPECIAL TOOLS

SPECIAL TOOLS

	7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.) 8286 - Refractometer 8875A - Disconnect, Transmission Cooler Line (Originally Shipped In Kit Number(s) 9202, 9328, 9328-CAN, 9329, 9516, 9575.)

ACCESSORY DRIVE

BELT, SERPENTINE

DESCRIPTION

DESCRIPTION

The cooling system regulates engine operating temperature. It allows the engine to reach normal operating temperature as quickly as possible, maintains normal operating temperature and prevents overheating.

The cooling system also provides a means of heating the passenger compartment. The cooling system is pressurized and uses a centrifugal water pump to circulate coolant throughout the system. A separate and remotely mounted, coolant bottle is used.

COOLING SYSTEM COMPONENTS

The cooling system consists of:

- Electric cooling fan
- Radiator
- A coolant recovery system
- Thermostat
- Water pump
- Radiator pressure cap
- Coolant
- Water pump
- Hoses and hose clamps

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ACCESSORY DRIVE BELT

VISUAL DIAGNOSIS

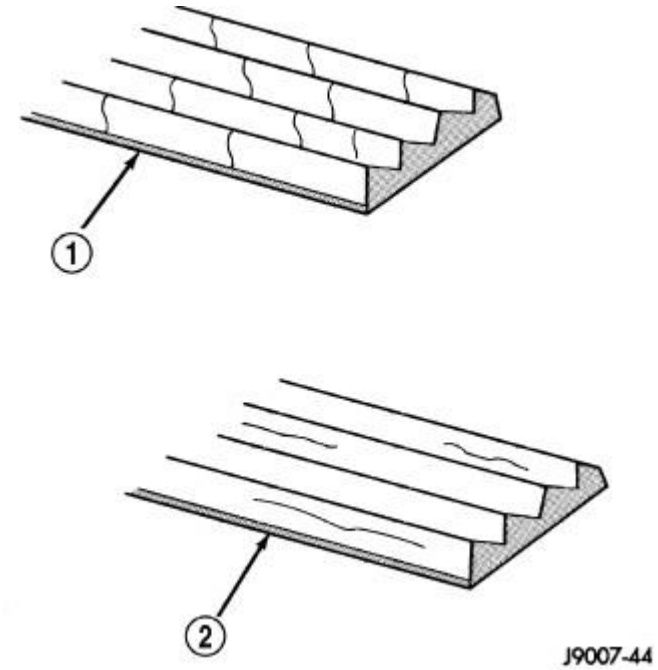

Fig. 12: Belt Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

1 - NORMAL CRACKS BELT OK
2 - NOT NORMAL CRACKS REPLACE BELT

When diagnosing serpentine accessory drive belts, small cracks (1) that run across the ribbed surface of the belt from rib to rib, are considered normal. These are not a reason to replace the belt. However, cracks (2) running along a rib (not across) are **not** normal. Any belt with cracks running along a rib must be replaced. Also replace the belt if it has excessive wear, frayed cords, severe glazing or chunking.

Any belt with bumps, surface coming apart, or any other uneven indications along the flat surface of the belt must be remove and inspected and replaced if necessary.

for further belt diagnosis. Refer to **ACCESSORY DRIVE BELT DIAGNOSIS CHART**.

NOISE DIAGNOSIS

Noises generated by the accessory drive belt are most noticeable at idle. Before replacing a belt to resolve a noise condition, inspect all of the accessory drive pulleys for alignment, glazing, or excessive end play.

ACCESSORY DRIVE BELT DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
RIB CHUNKING (One or more ribs has separated from belt body)	1. Foreign objects imbedded in pulley grooves.	1. Remove foreign objects from pulley grooves. Replace belt.
	2. Installation damage	2. Replace belt

RIB OR BELT WEAR	1. Pulley misaligned	1. Align pulley(s)
	2. Abrasive environment	2. Clean pulley(s). Replace belt if necessary
	3. Rusted pulley(s)	3. Clean rust from pulley(s)
	4. Sharp or jagged pulley groove tips	4. Replace pulley. Inspect belt.
	5. Belt rubber deteriorated	5. Replace belt
BELT SLIPS	1. Belt slipping because of insufficient tension	1. Inspect/Replace tensioner if necessary
	2. Belt or pulley exposed to substance that has reduced friction (belt dressing, oil, ethylene glycol)	2. Replace belt and clean pulleys
	3. Driven component bearing failure (seizure)	3. Replace faulty component or bearing
	4. Belt glazed or hardened from heat and excessive slippage	4. Replace belt.
LONGITUDINAL BELT CRACKING	1. Belt has mis-tracked from pulley groove	1. Replace belt
	2. Pulley groove tip has worn away rubber to tensile member	2. Replace belt
"GROOVE JUMPING" (Belt does not maintain correct position on pulley)	1. Incorrect belt tension	1. Inspect/Replace tensioner if necessary
	2. Pulley(s) not within design tolerance	2. Replace pulley(s)
	3. Foreign object(s) in grooves	3. Remove foreign objects from grooves
	4. Pulley misalignment	4. Align component
	5. Belt cord line is broken	5. Replace belt
BELT BROKEN (Note: Identify and correct problem before new belt is installed)	1. Incorrect belt tension	1. Replace Inspect/Replace tensioner if necessary
	2. Tensile member damaged during belt installation	2. Replace belt
	3. Severe misalignment	3. Align pulley(s)
	4. Bracket, pulley, or bearing failure	4. Replace defective component and belt
NOISE (Objectionable squeal, squeak, or rumble is heard or felt while drive belt is in operation)	1. Incorrect belt tension	1. Inspect/Replace tensioner if necessary
	2. Bearing noise	2. Locate and repair
	3. Belt misalignment	3. Align belt/pulley(s)
	4. Belt to pulley mismatch	4. Install correct belt
	5. Driven component induced vibration	5. Locate defective driven component and repair

	6. Belt flat surface coming apart	6. Replace belt
TENSION SHEETING FABRIC FAILURE (Woven fabric on outside, circumference of belt has cracked or separated from body of belt)	1. Tension sheeting contacting stationary object	1. Correct rubbing condition
	2. Excessive heat causing woven fabric to age	2. Replace belt
	3. Tension sheeting splice has fractured	3. Replace belt
CORD EDGE FAILURE (Tensile member exposed at edges of belt or separated from belt body)	1. Incorrect belt tension	1. Inspect/Replace tensioner if necessary
	2. Belt contacting stationary object	2. Replace belt
	3. Pulley(s) out of tolerance	3. Replace pulley
	4. Insufficient adhesion between tensile member and rubber matrix	4. Replace belt

REMOVAL

3.6L

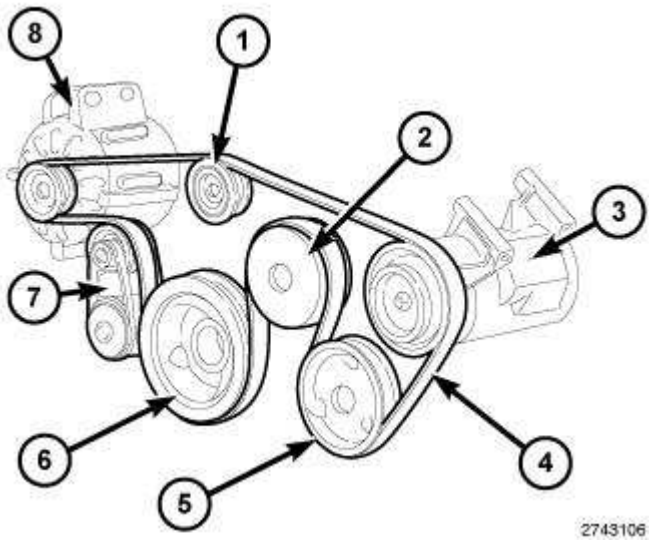

Fig. 13: Drive Belt Tensioners & Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let tensioner arm snap back to the freearm position, severe damage may occur to the tensioner.

1. Disconnect negative battery cable from battery.
2. Rotate belt tensioner (7) until it contacts its stop. Remove belt (4), then slowly rotate the tensioner (7) into the freearm position.

3.6L ELECTRONIC POWER STEERING

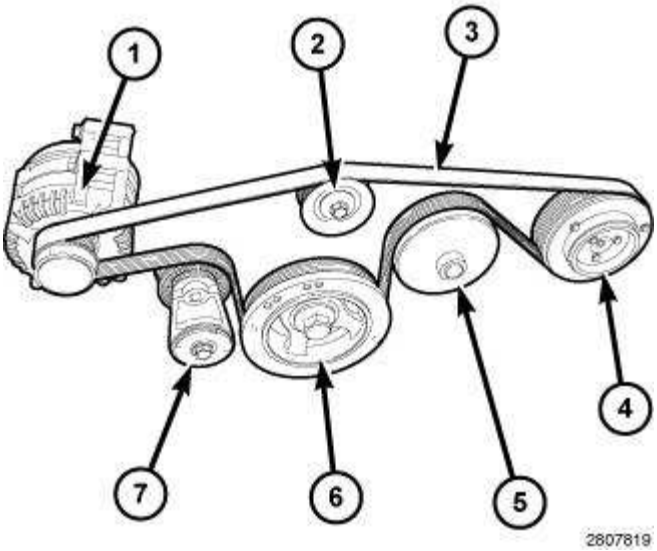

Fig. 14: New Belt, Idler Pulley, Tensioner Arm, Belt, Idler & Tensioner
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, severe damage may occur to the tensioner.

1. Disconnect negative battery cable from battery.
2. Remove the air cleaner intake system.
3. Rotate belt tensioner (7) until it contacts its stop. Remove belt (3), then slowly rotate the tensioner (7) into the freearm position.

5.7L ELECTRONIC POWER STEERING

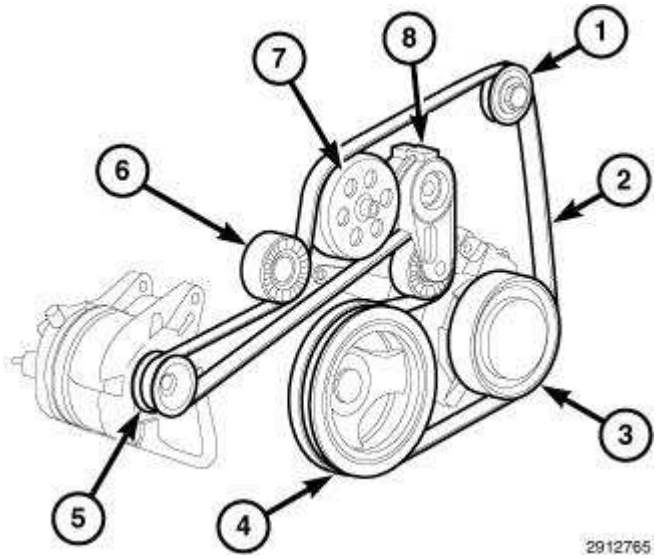

Fig. 15: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the air intake tube between intake manifold and air filter assembly.
3. Using a suitable square drive tool, release the belt tension by rotating the tensioner (8) clockwise. Rotate the belt tensioner (8) until the belt (2) can be removed from pulleys.
4. Remove the belt (2).
5. Gently release the tensioner (8).

3.0L

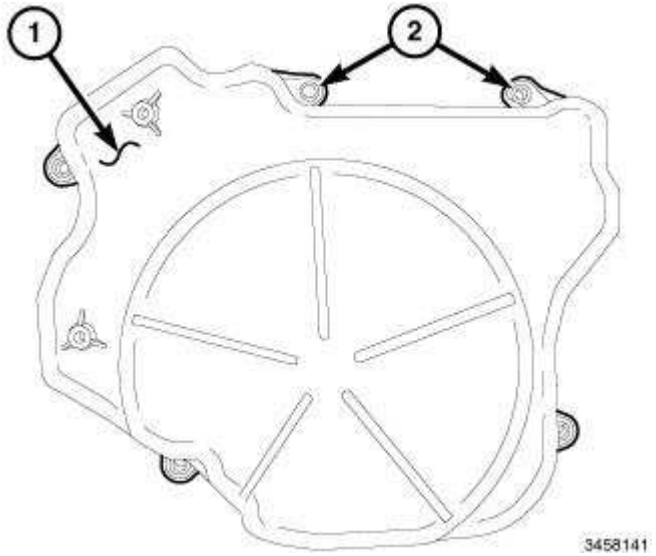

Fig. 16: Front Harmonic Vibration Dampener Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable from battery.
2. Remove the front harmonic vibration dampener cover (1).

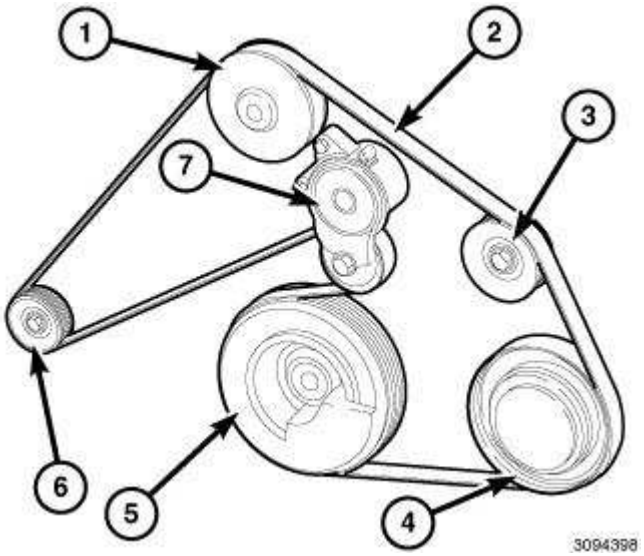

Fig. 17: Pulleys, Tensioner & Drive Belt Routing 3.0L
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let tensioner arm snap back to the freearm position, severe damage may occur to the tensioner.

3. Rotate belt tensioner (7) until it contacts its stop. Remove belt (2), then slowly rotate the tensioner (7) into the freearm position.

INSTALLATION

3.6L

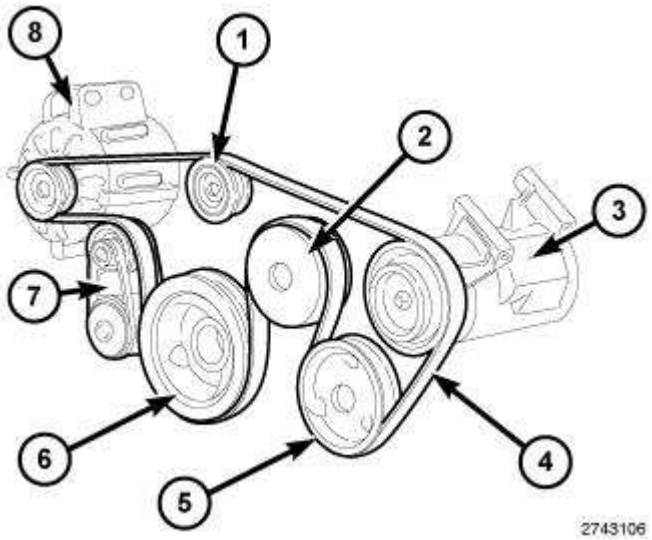

Fig. 18: Drive Belt Tensioners & Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

1. Check condition of all pulleys.

CAUTION: When installing the serpentine accessory drive belt, the belt MUST be routed correctly. If not, the engine may overheat due to the water pump rotating in the wrong direction.

2. Install new belt (4). Route the belt around all pulleys except the idler pulley (1). Rotate the tensioner arm (7) until it contacts its stop position. Route the belt (4) around the idler (1) and slowly let the tensioner (7) rotate into the belt. Make sure the belt (4) is seated onto all pulleys.

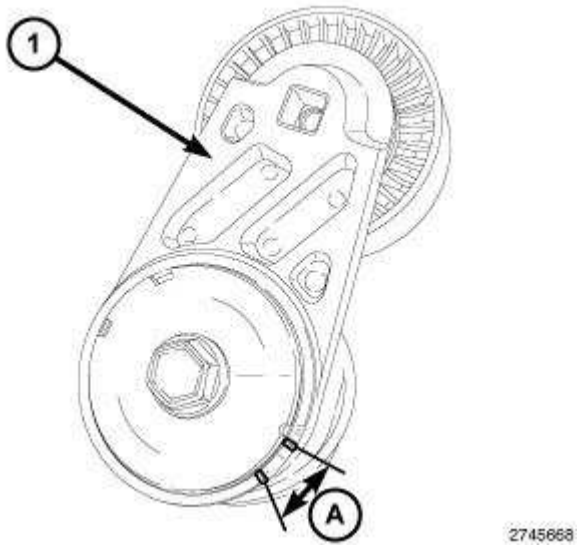

Fig. 19: Measurement A
Courtesy of CHRYSLER GROUP, LLC

3. With the drive belt installed, inspect the belt wear indicator. The gap between the tang and the housing stop (measurement A) must not exceed 24 mm (.94 inches).

3.6L ELECTRONIC POWER STEERING

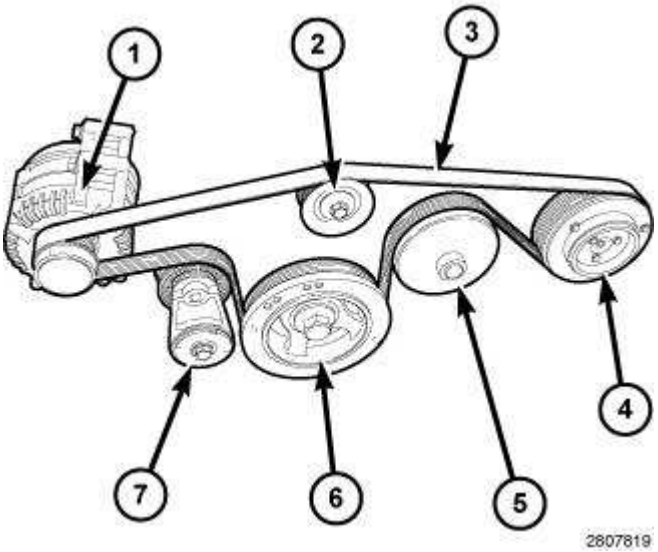

Fig. 20: New Belt, Idler Pulley, Tensioner Arm, Belt, Idler & Tensioner
Courtesy of CHRYSLER GROUP, LLC

1. Check condition of all pulleys.

CAUTION: When installing the serpentine accessory drive belt, the belt MUST be routed correctly. If not, the engine may overheat due to the water pump rotating in the wrong direction.

2. Install new belt (3). Route the belt around all pulleys except the idler pulley (2). Rotate the tensioner arm (7) until it contacts its stop position. Route the belt (3) around the idler (2) and slowly let the tensioner (7) rotate into the belt. Make sure the belt (3) is seated onto all pulleys.

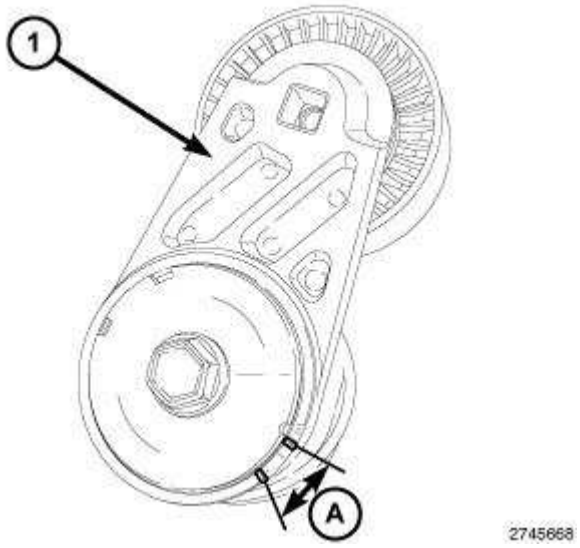

Fig. 21: Measurement A
Courtesy of CHRYSLER GROUP, LLC

3. With the drive belt installed, inspect the belt wear indicator. The gap between the tang and the housing stop (measurement A) must not exceed 24 mm (.94 inches).
4. Install the air cleaner intake system.

5.7L ELECTRONIC POWER STEERING

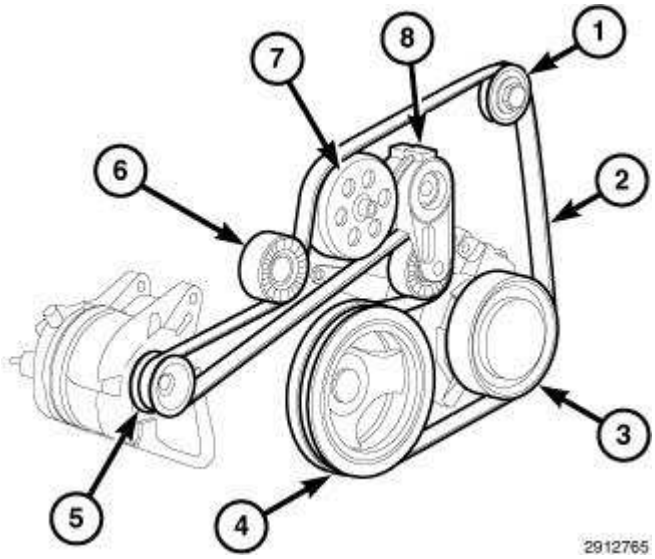

Fig. 22: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing accessory drive belt onto pulleys, make sure that belt is properly routed and all V-grooves make proper contact with pulleys.

1. Position the drive belt (2) over all pulleys except for the water pump pulley (7).
2. Rotate the tensioner (8) **clockwise** and slip the belt (2) over the water pump pulley (7).
3. Gently release tensioner (8).
4. Install the air intake tube between intake manifold and the air filter assembly.
5. Connect the negative battery cable.

3.0L

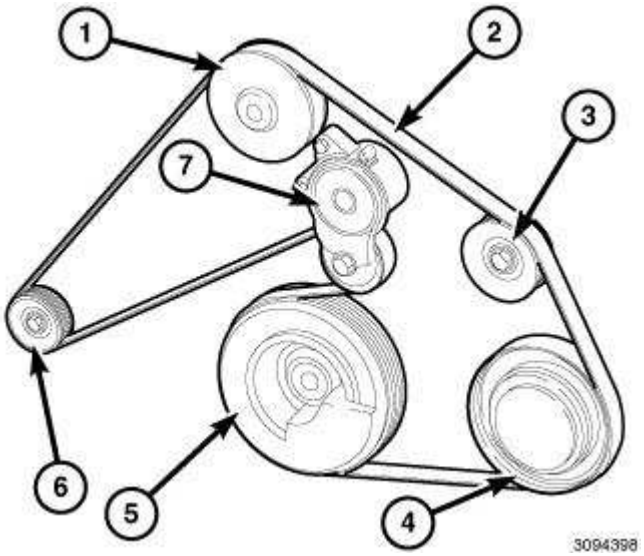

Fig. 23: Pulleys, Tensioner & Drive Belt Routing 3.0L
Courtesy of CHRYSLER GROUP, LLC

1. Check condition of all pulleys.

CAUTION: When installing the serpentine accessory drive belt, the belt MUST be routed correctly. If not, the engine may overheat due to the water pump rotating in the wrong direction.

2. Install new belt (2). Route the belt around all pulleys except the idler pulley (3). Rotate the tensioner arm (7) until it contacts its stop position. Route the belt (2) around the idler (3) and slowly let the tensioner (7) rotate into the belt. Make sure the belt (2) is seated onto all pulleys.

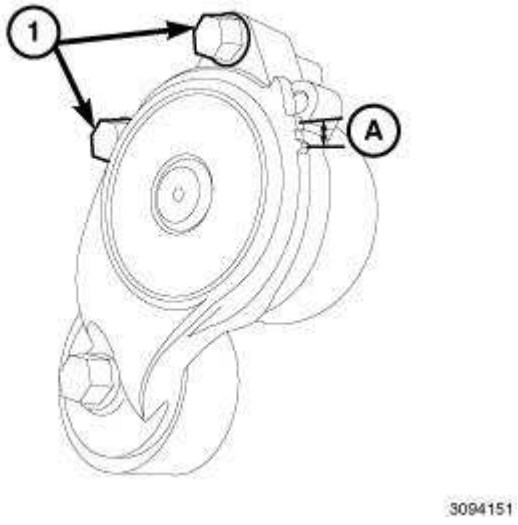

Fig. 24: Belt Wear Indicator (Measurement A)
Courtesy of CHRYSLER GROUP, LLC

3. With the drive belt installed, inspect the belt wear indicator. The gap between the tang and the housing stop (measurement A).

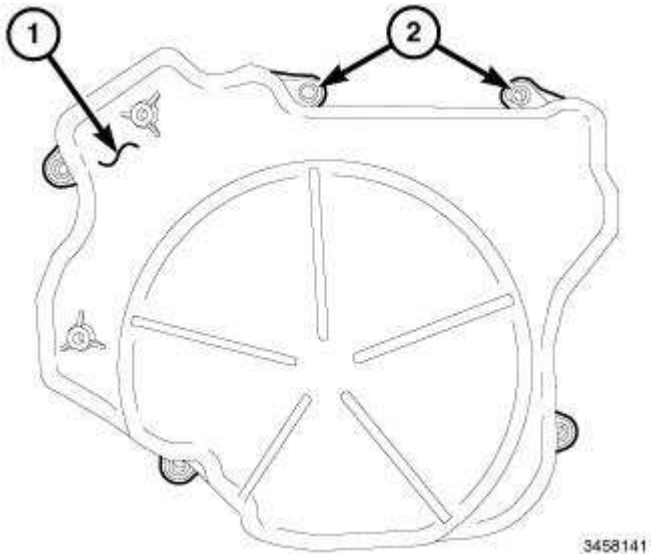

Fig. 25: Front Harmonic Vibration Dampener Cover
Courtesy of CHRYSLER GROUP, LLC

4. Install the harmonic vibration dampener cover (1). Tighten the bolts to 10 N.M (89 in. lbs.).
5. Connect the negative battery.

PULLEY, IDLER

REMOVAL

5.7/6.4L

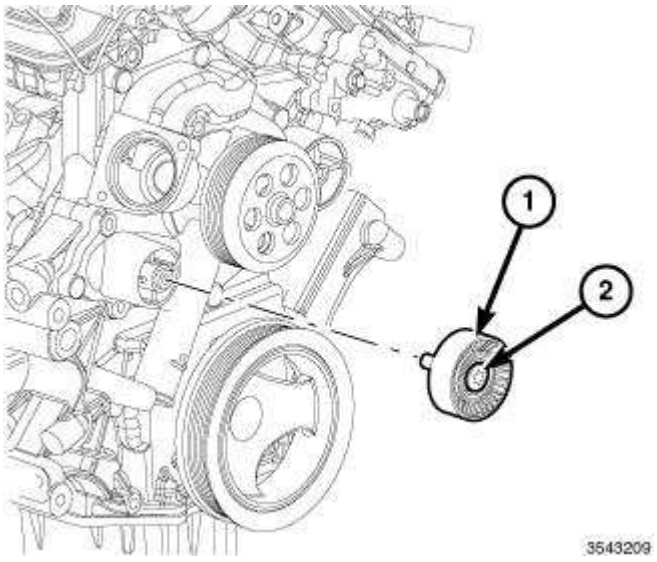

Fig. 26: Idler Pulley - 5.7L/6.4L Engine

Courtesy of CHRYSLER GROUP, LLC

1. Remove accessory drive belt. Refer to **TENSIONER, BELT, REMOVAL**.
2. Remove bolt (2) and idler pulley (1).

5.7L IDLER BRACKET

NOTE: The idler bracket takes the place of the power steering pump on the vehicles that use electronic power steering.

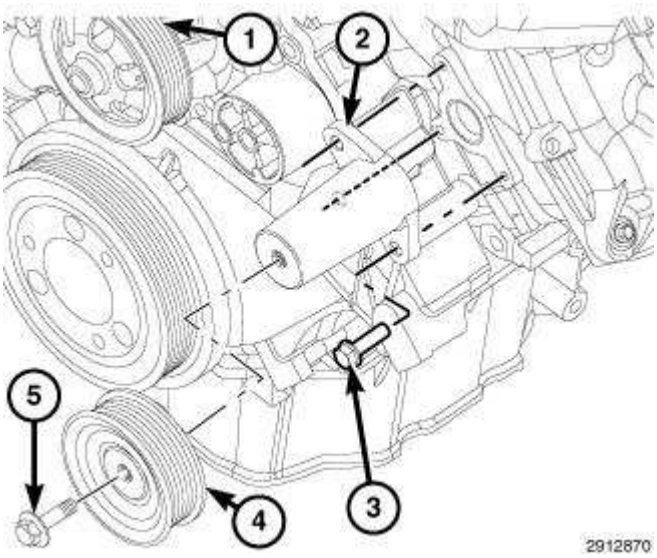

Fig. 27: Idler Pulley, Idler Bracket & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL**.
2. Remove the idler pulley (4) from the idler bracket (2).
3. Remove the three mounting bolts (3) that hold the idler bracket (2) to the block.

3.6L

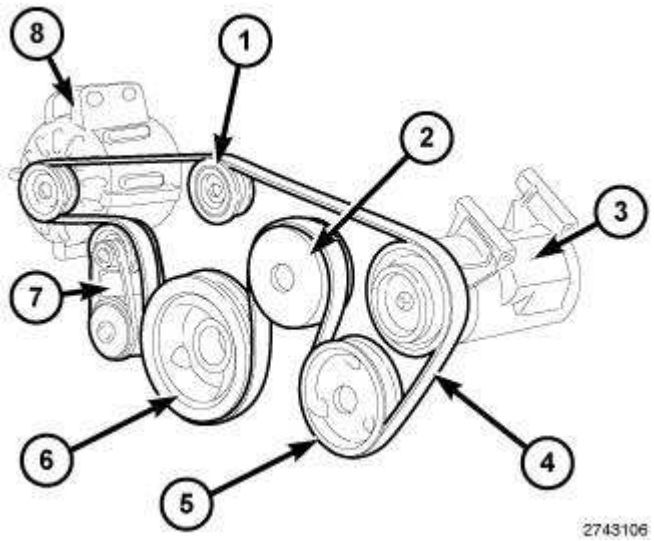

Fig. 28: Drive Belt Tensioners & Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

1. Remove main drive belt (4). Refer to **BELT, SERPENTINE, REMOVAL**.
2. Remove the mounting bolt holding the idler pulley (1).

3.0L

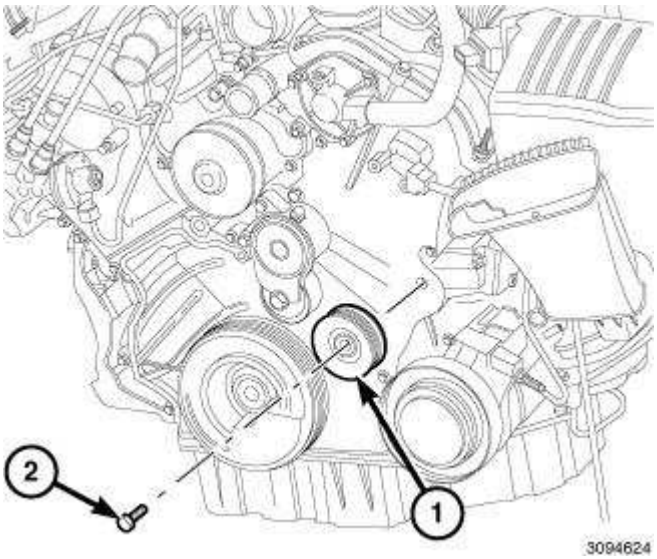

Fig. 29: Idler Pulley 3.0L
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery.
2. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL**.
3. Remove the idler pulley.

INSTALLATION

5.7/6.4L

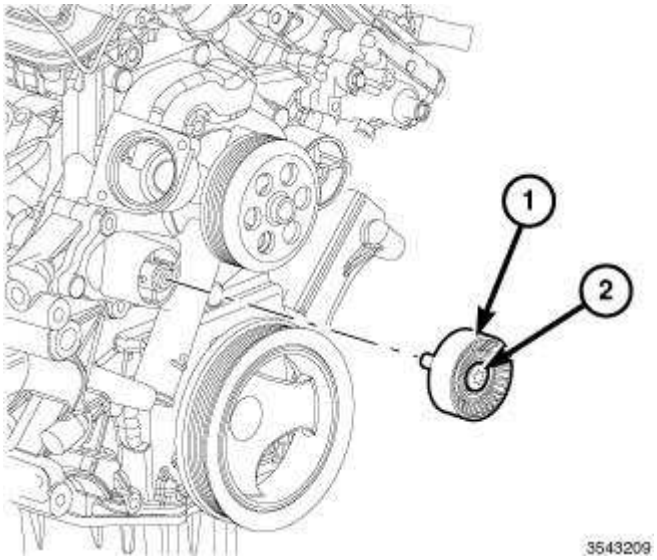

Fig. 30: IDLER PULLEY - 5.7L/6.4L ENGINE
Courtesy of CHRYSLER GROUP, LLC

1. Position idler pulley (1).
2. Tighten bolt (2) to 29 N.m (21 ft. lbs.).
3. Install accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

5.7L IDLER BRACKET

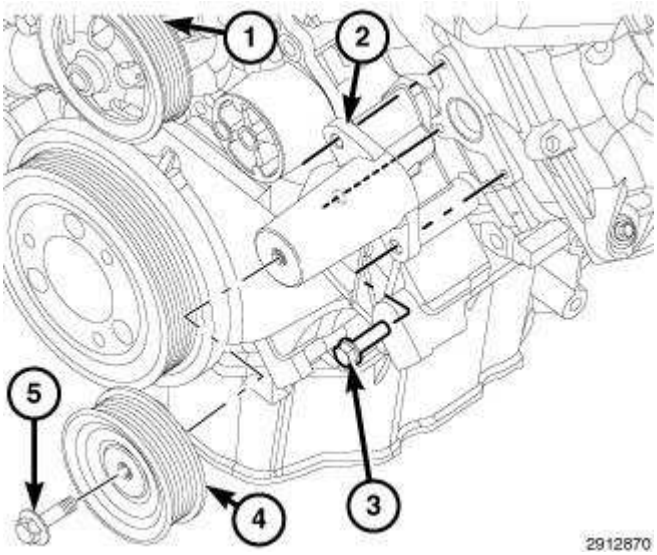

Fig. 31: Idler Pulley, Idler Bracket & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the idler bracket to the engine block. Install the three mounting bolts (3). Tighten bolts to 29 N.m (21 ft. lbs.).

2. Install the idler pulley (4). Tighten bolt (5) to 29 N.m (21 ft. lbs.).
3. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

3.6L

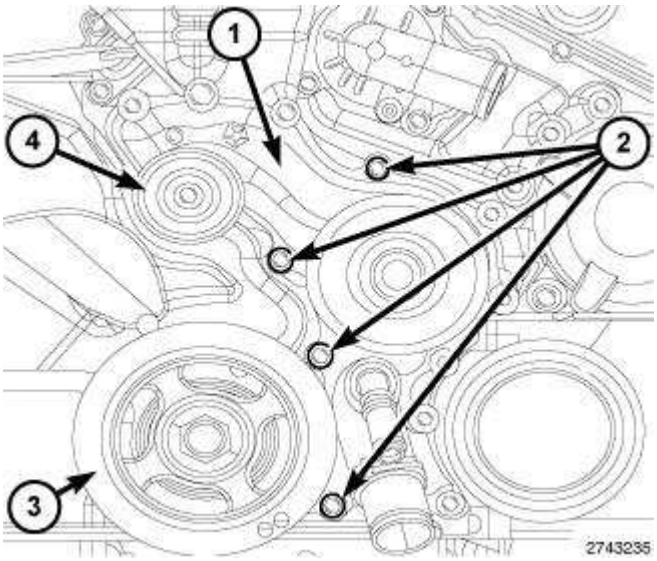

Fig. 32: Idler Pulley, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install bolt for idler pulley (4).
2. Install main drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

3.0L

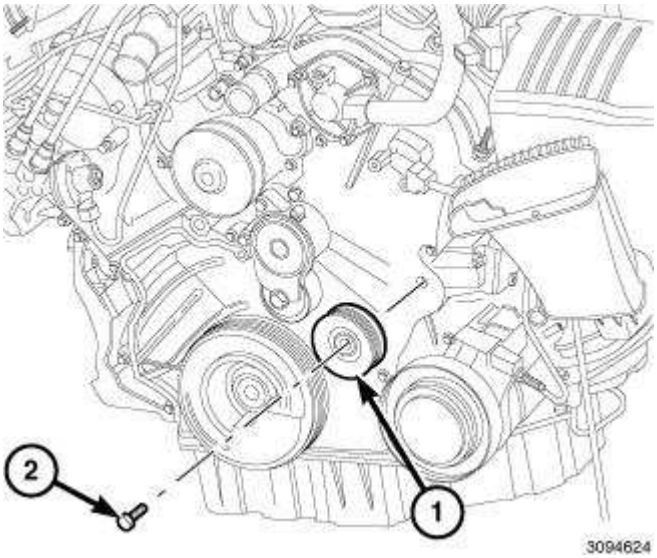

Fig. 33: Idler Pulley 3.0L
Courtesy of CHRYSLER GROUP, LLC

1. Position the pulley onto engine. Tighten bolt (2) to 54 N.m (40 ft. lbs.).
2. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
3. Connect the negative battery cable.

TENSIONER, BELT

DESCRIPTION

DESCRIPTION

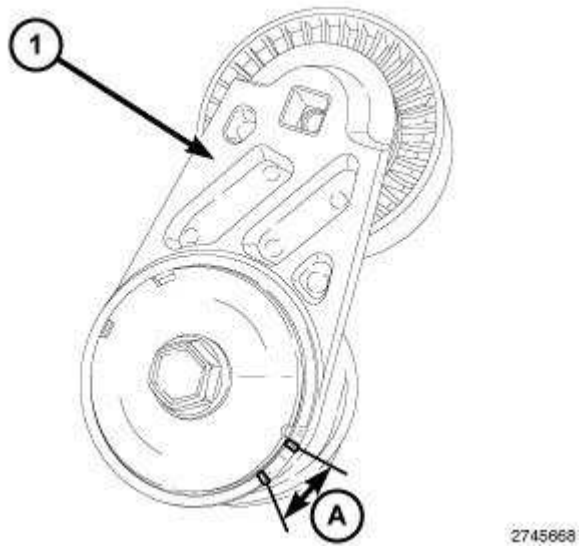

Fig. 34: Measurement A
Courtesy of CHRYSLER GROUP, LLC

Correct drive belt tension is required to ensure optimum performance of the belt driven engine accessories. If specified tension is not maintained, belt slippage may cause; engine overheating, lack of power steering assist, loss of air conditioning capacity, reduced generator output rate, and greatly reduced belt life.

It is not necessary to adjust belt tension. All engines are equipped with an automatic belt tensioner. The tensioner maintains correct accessory drive belt tension at all times.

REMOVAL

3.6L

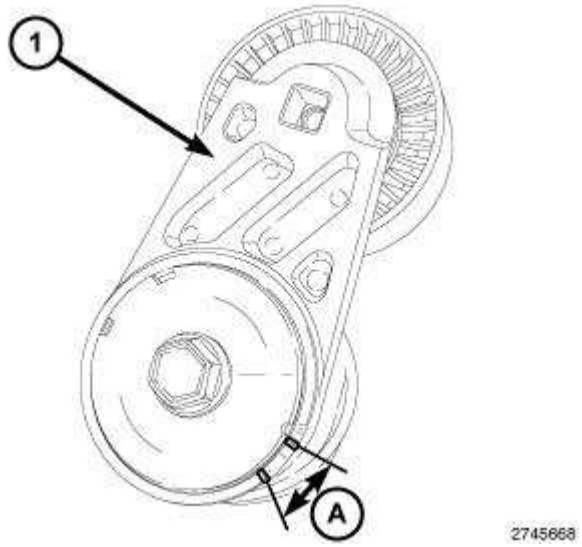

Fig. 35: Measurement A
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the air intake system. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Remove main drive belt. Refer to **BELT, SERPENTINE, REMOVAL**.
4. Remove tensioner assembly from engine front cover.

WARNING: Because of high spring tension, do not attempt to disassemble automatic tensioner. Unit is serviced as an assembly (except for pulley on tensioner).

5.7L

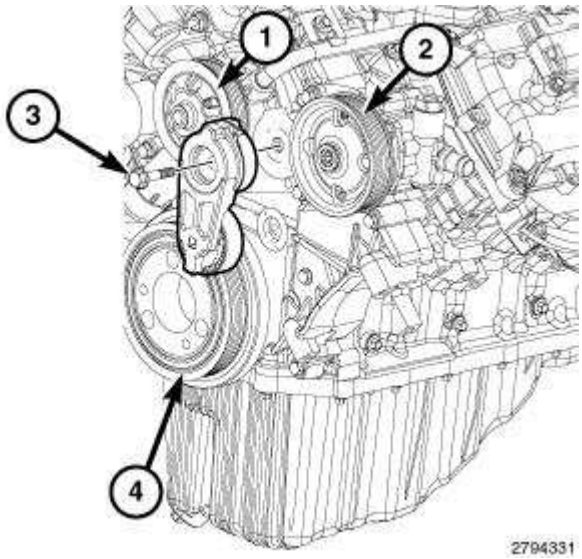

Fig. 36: Tensioner Assembly & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the air intake system. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Remove accessory drive belt Refer to **BELT, SERPENTINE, REMOVAL**.
4. Remove bolt (3) and tensioner assembly.

3.0L

WARNING: Because of high spring tension, do not attempt to disassemble automatic tensioner. Unit is serviced as an assembly (except for pulley on tensioner).

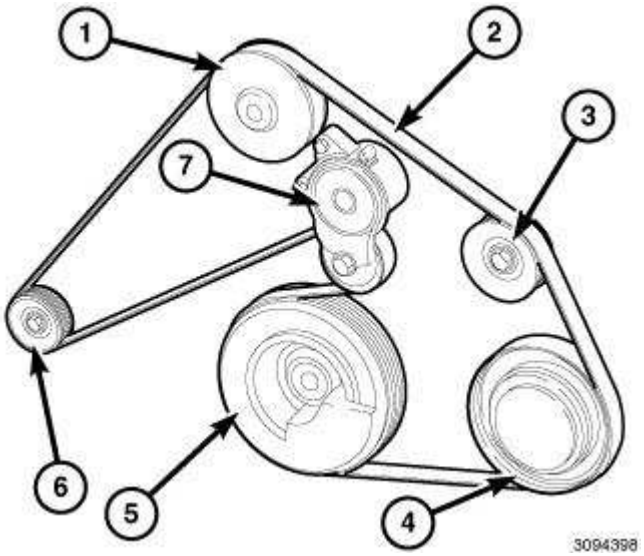

Fig. 37: Pulleys, Tensioner & Drive Belt Routing 3.0L
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the air intake system. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Remove main drive belt (2). Refer to **BELT, SERPENTINE, REMOVAL**.

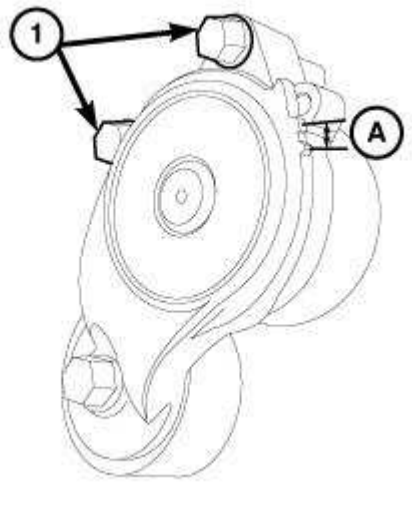

Fig. 38: Belt Wear Indicator (Measurement A)
Courtesy of CHRYSLER GROUP, LLC

4. Remove the belt tensioner assembly from the engine front cover.

INSTALLATION

3.6L

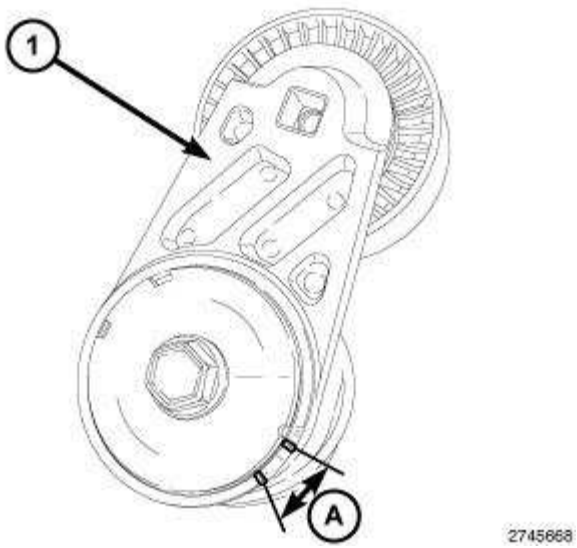

Fig. 39: Measurement A
Courtesy of CHRYSLER GROUP, LLC

1. An indexing slot is located on back of tensioner. Align this slot to the head of the bolt on the front cover. Install the mounting bolt. Tighten bolt to 41 N.m (30 ft. lbs.).
2. Install main drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
3. Check belt indexing marks.

4. Install the air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
5. Connect the negative battery.

5.7L

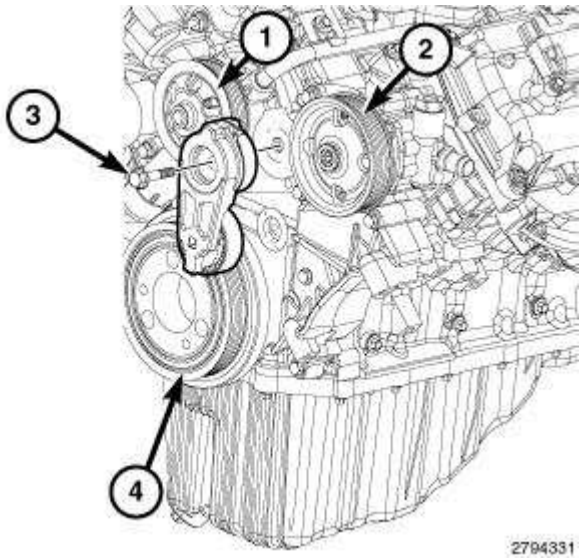

Fig. 40: Tensioner Assembly & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Align locator tang on tensioner with slot in front cover.
2. Install tensioner and mounting bolt (3) to front cover. Tighten bolt to 41 N.m (30 ft. lbs.).
3. Install accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
4. Install the air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
5. Connect the negative battery.

3.0L

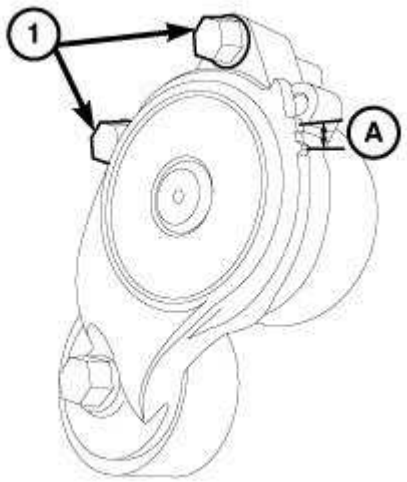

Fig. 41: Belt Wear Indicator (Measurement A)
Courtesy of CHRYSLER GROUP, LLC

1. Position the belt tensioner onto the front cover. Install the mounting bolt. Tighten bolts (1) to 41 N.m (30 ft. lbs.).
2. Install main drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
3. Check belt indexing marks.
4. Install the air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
5. Connect the negative battery.

ENGINE

BOTTLE, COOLANT RECOVERY

REMOVAL

REMOVAL

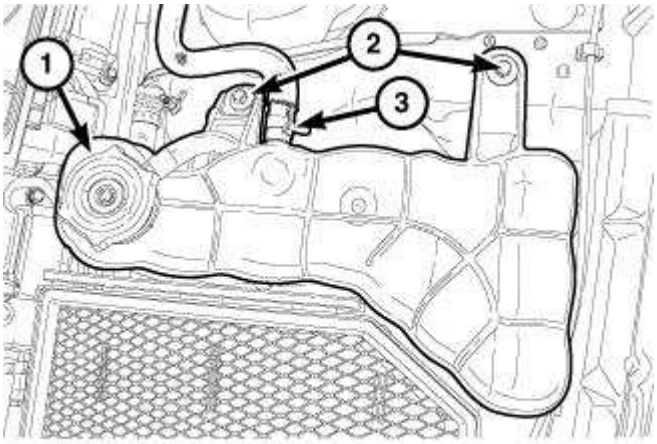

Fig. 42: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Partially drain cooling system using the draincock only. Refer to **STANDARD PROCEDURE**. Drain system below level of the coolant recovery pressure container.
2. Remove coolant recovery container pressure cap (1).
3. Remove and plug coolant recovery tube (3).
4. Remove mounting screws (2).
5. Pull the coolant recovery container away from the body.
6. Remove the coolant supply line from the coolant recovery container.
7. Remove coolant recovery container from vehicle.

INSTALLATION

INSTALLATION

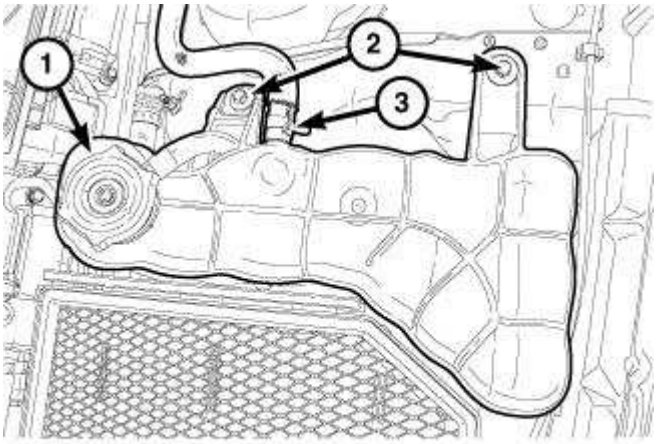

Fig. 43: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Install the lower supply line to the coolant recovery container (3)
2. Position the coolant recovery container.
3. Install mounting screws (2). Tighten to 10 N.m (89 in. lbs.).
4. Install the coolant recovery return tube (3).
5. Fill cooling system. Refer to **STANDARD PROCEDURE**.
6. Install coolant recovery container pressure cap (1).

CAP, RADIATOR

DESCRIPTION

DESCRIPTION

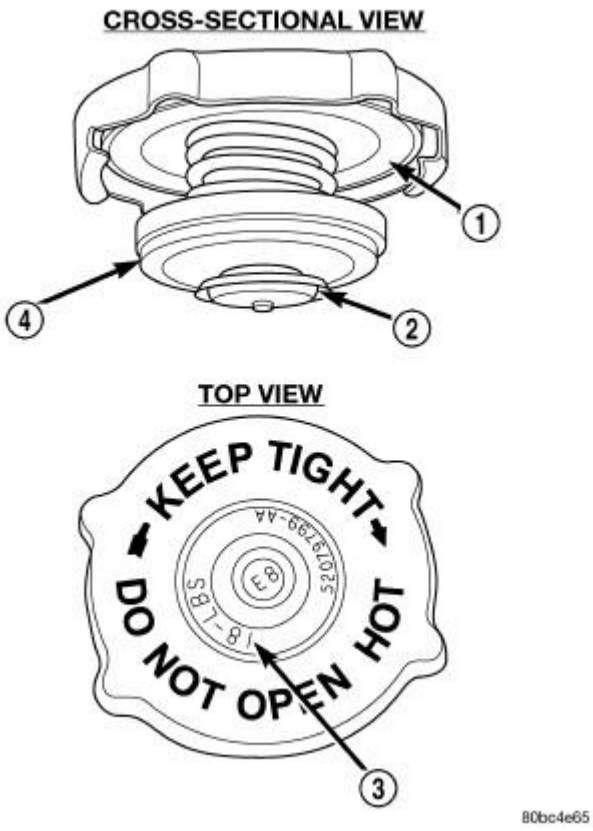

Fig. 44: Radiator Pressure Cap - Typical
Courtesy of CHRYSLER GROUP, LLC

All cooling systems are equipped with a pressure cap on the radiator. This cap releases pressure at some point within a range of 110-138 kPa (16-20 psi). The pressure relief point (in pounds) is engraved on top of the cap (3).

The cooling system will operate at pressures slightly above atmospheric pressure. This results in a higher coolant boiling point allowing increased radiator cooling capacity. The cap contains a spring-loaded pressure relief valve (4). This valve opens when system pressure reaches the release range of 110-138 kPa (16-20 psi).

A rubber gasket (2) seals the radiator filler neck. This is done to maintain vacuum during coolant cool-down and to prevent leakage when system is under pressure.

DIAGNOSIS AND TESTING

RADIATOR CAP-TO-FILLER NECK SEAL

The pressure cap upper gasket (seal) pressure relief can be tested by removing overflow hose from radiator filler neck nipple. Attach hose of pressure tester tool (special tool #7700, Tester, Cooling System) (or equivalent) to nipple. It will be necessary to disconnect hose from its adapter for filler neck. Pump air into radiator. The pressure cap upper gasket should relieve at 124 kPa (18 psi) and

hold pressure at a minimum of 110 kPa (186psi).

WARNING: The warning words "DO NOT OPEN HOT" on radiator pressure cap, are a safety precaution. When hot, pressure builds up in cooling system. To prevent scalding or injury, radiator cap should not be removed while system is hot and/or under pressure.

Do not remove radiator cap at any time **except** for the following purposes:

1. Check and adjust antifreeze freeze point.
2. Refill system with new antifreeze.
3. Conducting service procedures.
4. Checking for vacuum leaks.

WARNING: If vehicle has been run recently, wait at least 15 minutes before removing radiator cap. With a rag, squeeze radiator upper hose to check if system is under pressure. Place a rag over cap and without pushing cap down, rotate it counter-clockwise to first stop. Allow fluid to escape through the coolant reserve/overflow hose into reserve/overflow tank. Squeeze radiator upper hose to determine when pressure has been released. When coolant and steam stop being pushed into tank and system pressure drops, remove radiator cap completely.

RADIATOR PRESSURE CAP

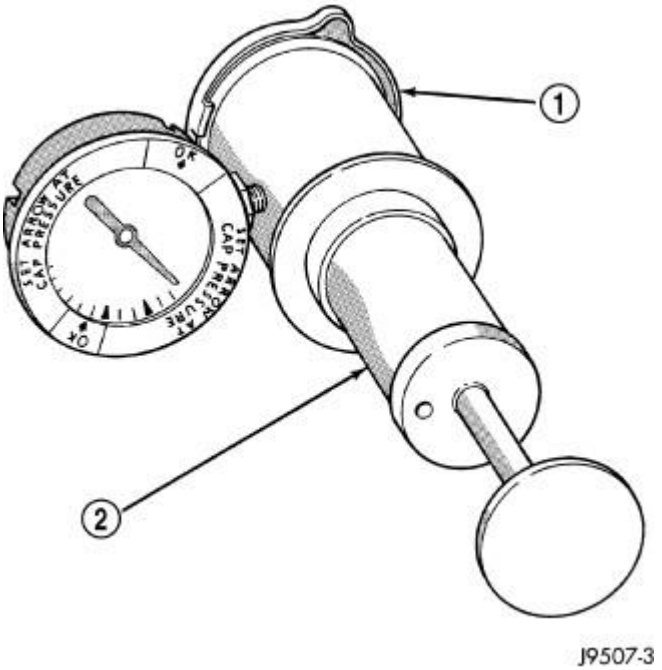

Fig. 45: Pressure Testing Radiator Pressure Cap-Typical
Courtesy of CHRYSLER GROUP, LLC

Remove cap (1) from radiator. Be sure that sealing surfaces are clean. Moisten rubber gasket with water and install cap (1) on pressure tester (special tool #7700, Tester, Cooling System) (2) or an equivalent.

Operate tester pump to bring pressure to 124 kPa (18 psi) on gauge. If pressure cap (1) fails to hold pressure of at least 110 kPa (16 psi) replace cap. Refer to the following **CAUTION** .

The pressure cap may test properly while positioned on tool (special tool #7700, Tester, Cooling System) (or equivalent). It may not hold pressure or vacuum when installed on radiator. If so, inspect radiator filler neck and cap's top gasket for damage. Also inspect for dirt or distortion that may prevent cap from sealing properly.

CAUTION: Radiator pressure testing tools are very sensitive to small air leaks, which will not cause cooling system problems. A pressure cap that does not have a history of coolant loss should not be replaced just because it leaks slowly when tested with this tool. Add water to tool. Turn tool upside down and recheck pressure cap to confirm that cap needs replacement.

INSPECTION

INSPECTION

Hold cap at eye level, right side up. The vent valve at bottom of cap should open. If rubber gasket has swollen and prevents vent valve from opening, replace cap.

Hold cap at eye level, upside down. If any light can be seen between vent valve and rubber gasket, replace cap. **Do not use a replacement cap that has a spring to hold vent shut.** A replacement cap must be the type designed for a coolant reserve/overflow system with a completely sealed diaphragm spring and a rubber gasket. This gasket is used to seal to radiator filler neck top surface. Use of proper cap will allow coolant return to radiator.

COOLANT

DESCRIPTION

DESCRIPTION

GAS ENGINES AND DIESEL ENGINES

WARNING: Antifreeze is an ethylene glycol based coolant and is harmful if swallowed or inhaled. If swallowed, drink two glasses of water and induce vomiting. If inhaled, move to fresh air area. Seek medical attention immediately. Do not store in open or unmarked containers. Wash skin and clothing thoroughly after coming in contact with ethylene glycol. Keep out of reach of children. Dispose of glycol based coolant properly, contact your government agency for location of collection center in your area. Do not open a cooling system when the engine is at operating temperature or hot under pressure, personal injury can result. Avoid radiator cooling fan

when engine compartment related service is performed, personal injury can result.

CAUTION: Use of Propylene Glycol based coolants is not recommended, as they provide less freeze protection and less boiling protection.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Mopar® Antifreeze/Coolant, 5 Year/100, 000 Mile Formula (MS-9769), or the equivalent ethylene glycol based coolant with hybrid organic corrosion inhibitors (called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% Ethylene Glycol and 50% distilled water to obtain a freeze point of -37°C (-35°F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

The green coolant **MUST NOT BE MIXED** with the orange or magenta coolants. When replacing coolant the complete system flush must be performed before using the replacement coolant.

CAUTION: Mopar® Antifreeze/Coolant, 5 Year/100, 000 Mile Formula (MS-9769) may not be mixed with any other type of antifreeze. Doing so will reduce the corrosion protection and may result in premature water pump seal failure. If non-HOAT coolant is introduced into the cooling system in an emergency, it should be replaced with the specified coolant as soon as possible.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - COOLANT CONCENTRATION TESTING

Coolant concentration should be checked when any additional coolant was added to system or after a coolant drain, flush and refill. The coolant mixture offers optimum engine cooling and protection against corrosion when mixed to a freeze point of -37°C (-34°F) to -46°C (-50°F). The use of a hydrometer or a refractometer can be used to test coolant concentration.

A hydrometer will test the amount of glycol in a mixture by measuring the specific gravity of the mixture. The higher the concentration of ethylene glycol, the larger the number of balls that will float, and higher the freeze protection (up to a maximum of 60% by volume glycol).

A refractometer Tool (special tool #8286, Refractometer) will test the amount of glycol in a coolant mixture by measuring the amount a beam of light bends as it passes through the fluid. Refer to **SPECIAL TOOLS**.

Some coolant manufactures use other types of glycols into their coolant formulations. Propylene

glycol is the most common new coolant. However, propylene glycol based coolants do not provide the same freezing protection and corrosion protection and is not recommended.

CAUTION: Do not mix types of coolant - corrosion protection will be severely reduced.

FAN, COOLING

REMOVAL

3.6L SINGLE FAN

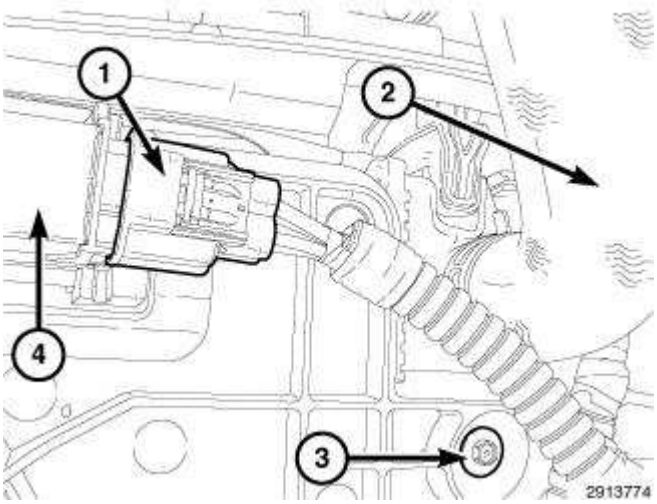

Fig. 46: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

1. Disconnect negative battery cable.
2. Remove the air filter housing assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Disconnect the cooling fan electrical connector (1).
4. Remove the upper cooling fan mounting bolts (3).
5. Remove the cooling fan assembly from the vehicle taking care not to damage the fins on the radiator.

5.7/6.4L SINGLE FAN

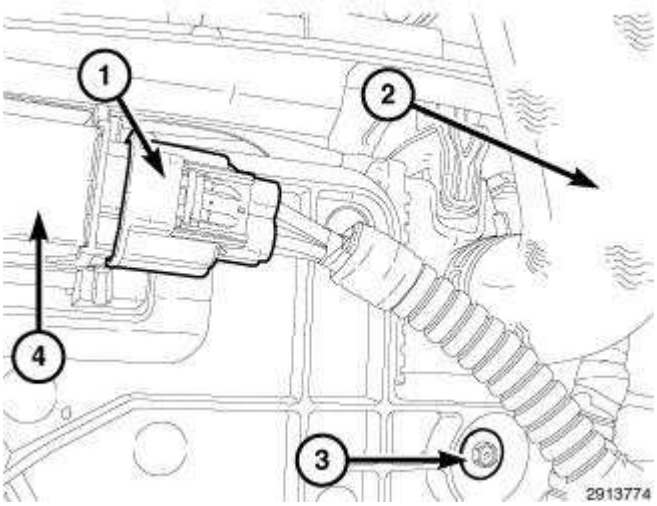

Fig. 47: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

1. Disconnect negative battery cable.
2. Remove the air filter housing assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Disconnect the cooling fan electrical connector (1).
4. Remove the upper cooling fan mounting bolts (3).

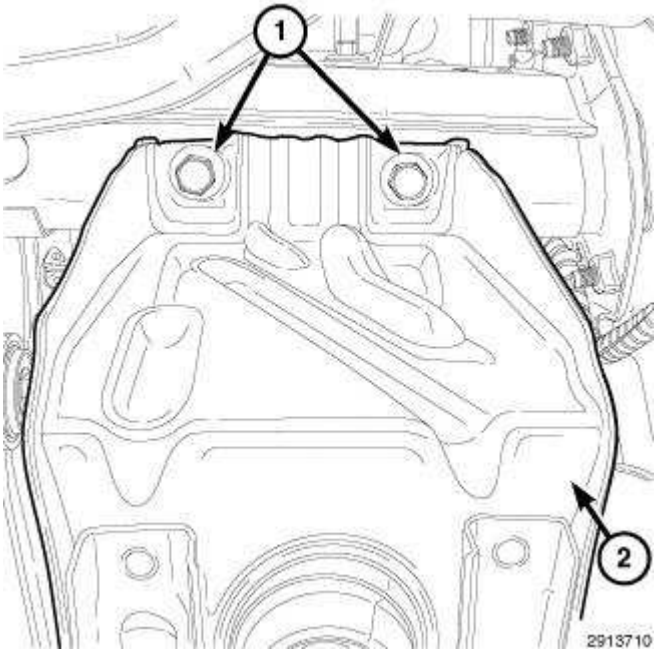

Fig. 48: Lower Radiator Core Support Bolts & Core Support
Courtesy of CHRYSLER GROUP, LLC

NOTE: The lower radiator support does not need to be removed. The bolts can be loosened so that the support can be positioned forward enough for the cooling fan to be removed from the bottom of the vehicle.

5. Raise vehicle.
6. If equipped, remove the lower engine belly pan.
7. **Loosen** the lower radiator core support bolts (1).

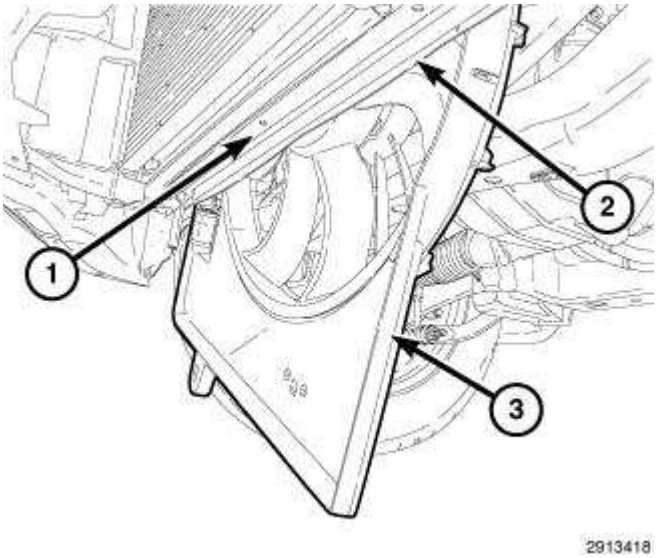

Fig. 49: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

8. Remove the radiator cooling fan assembly (1) from the radiator by pushing up and away from the radiator mounts.
9. While moving the lower core support forward, slowly lower the left side of the cooling fan assembly from the bottom of the vehicle.
10. Remove the cooling fan assembly from the vehicle taking care not to damage the fins on the radiator.

3.6L DUAL FAN

NOTE: If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

1. Disconnect negative battery cable.
2. Remove the air filter housing assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

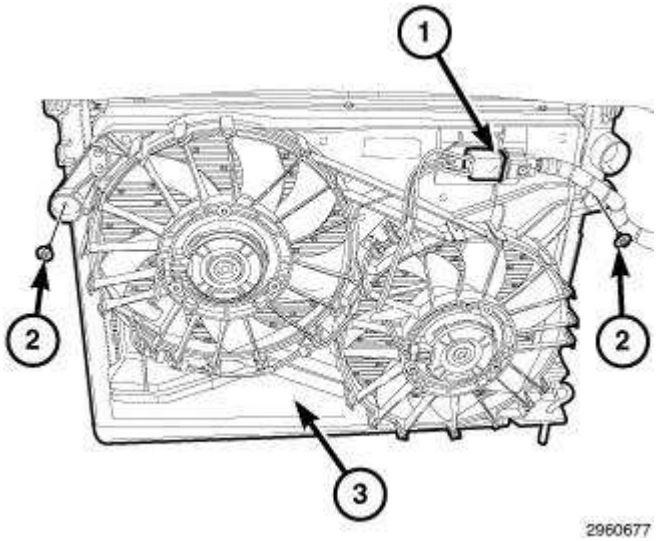

Fig. 50: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the cooling fan electrical connector (1).
4. Remove the cooling fan mounting bolts (2).
5. Using care. Remove the radiator cooling fan assembly (3) from vehicle.

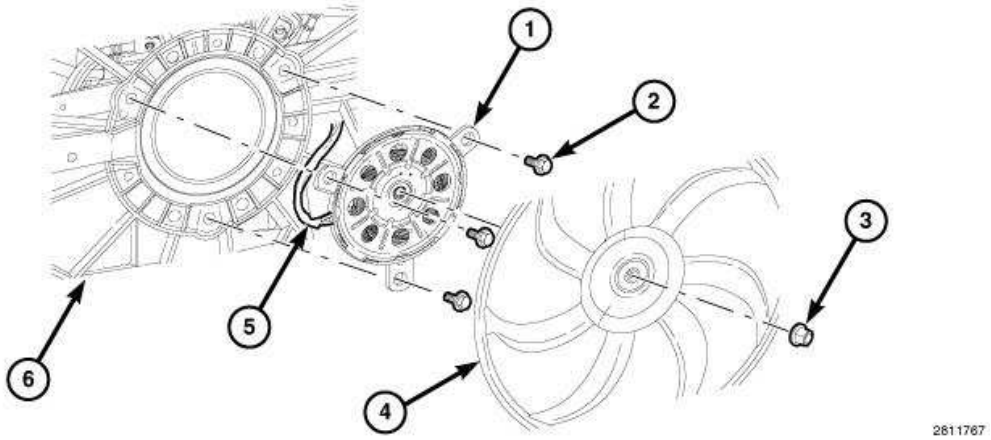

Fig. 51: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Removing the fan motor wiring harness (5) from the fan shroud (6).
7. Remove the fan blade (4) from the fan motor.
8. Remove the bolts (2) that support the fan motor to the shroud.

5.7L DUAL FAN

1. Disconnect negative battery cable.
2. Remove the air filter housing assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Raise and support vehicle.
4. If equipped, remove the lower closeout panel.
5. Drain the coolant into a clean container. Refer to **STANDARD PROCEDURE**.
6. If equipped, install the lower closeout panel.
7. Lower vehicle.

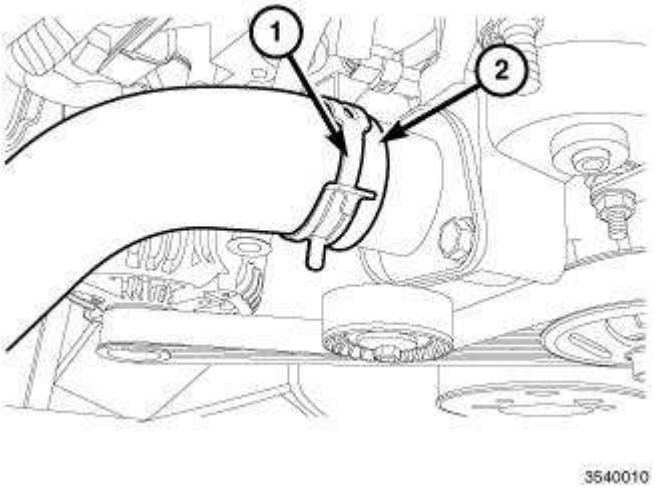

Fig. 52: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

8. Remove the upper radiator hose (2).

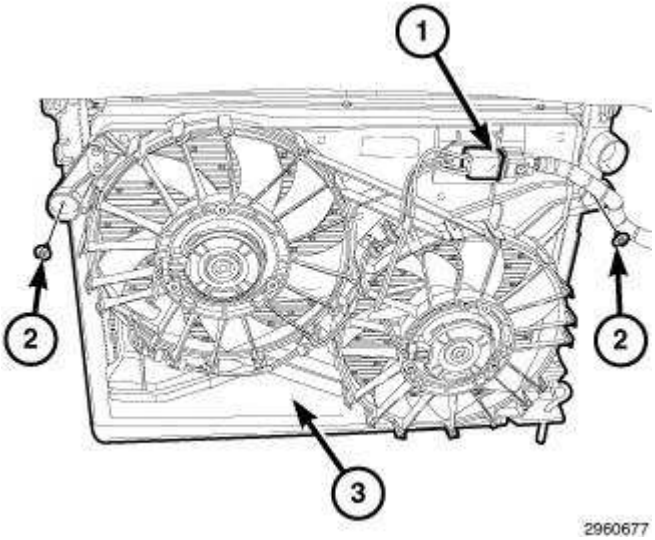

Fig. 53: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the cooling fan electrical connector (1).
10. Remove the cooling fan mounting bolts (2).
11. Using care. Remove the radiator cooling fan assembly (3) from vehicle.

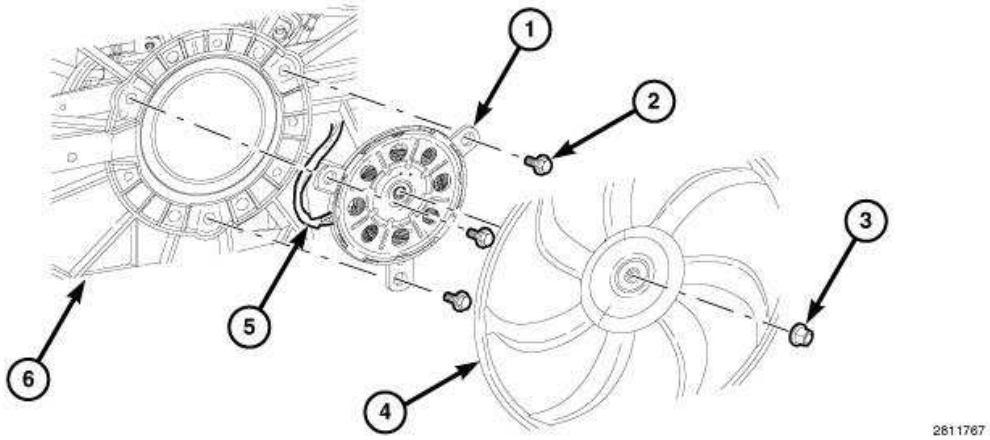

Fig. 54: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Removing the fan motor wiring harness (5) from the fan shroud (6).
13. Remove the fan blade (4) from the fan motor.
14. Remove the bolts (2) that support the fan motor to the shroud.

6.4L DUAL FAN

1. Disconnect negative battery cable.
2. Remove the air filter housing assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

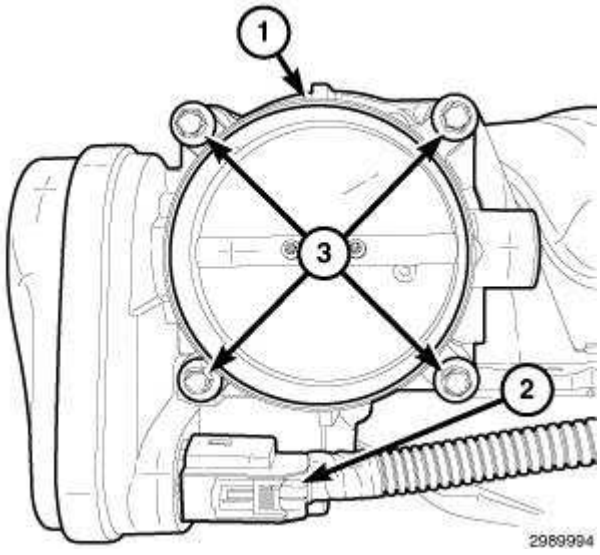

Fig. 55: Throttle Body, Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the throttle body (1). Refer to **THROTTLE BODY, REMOVAL** .

4. Raise and secure vehicle.
5. If equipped, remove the lower closeout panel.
6. Drain coolant into a clean container. Refer to **STANDARD PROCEDURE**.
7. Lower vehicle.

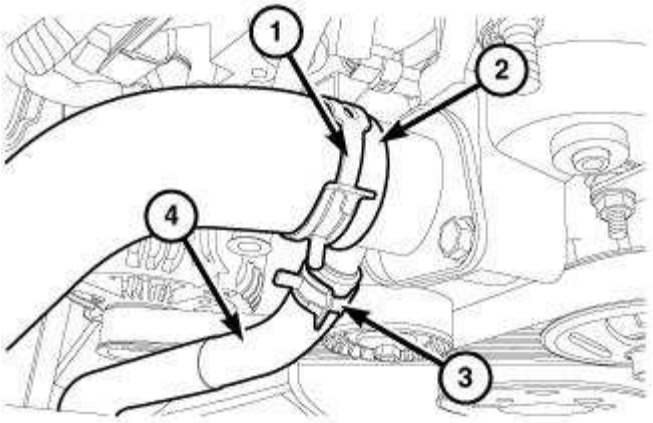

Fig. 56: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

8. Remove the oil cooler return line (4) from the upper radiator hose (2).
9. Remove the upper radiator hose (2).

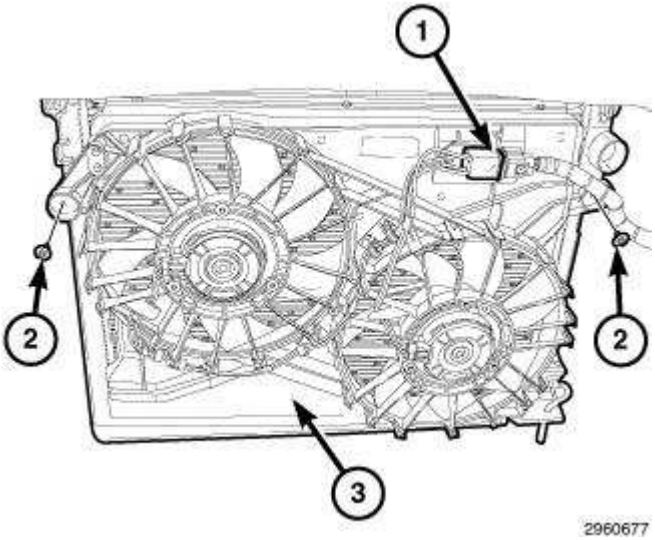

Fig. 57: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the cooling fan electrical connector (1).
11. Remove the cooling fan mounting bolts (2).
12. Using care. Remove the radiator cooling fan assembly (3) from vehicle.

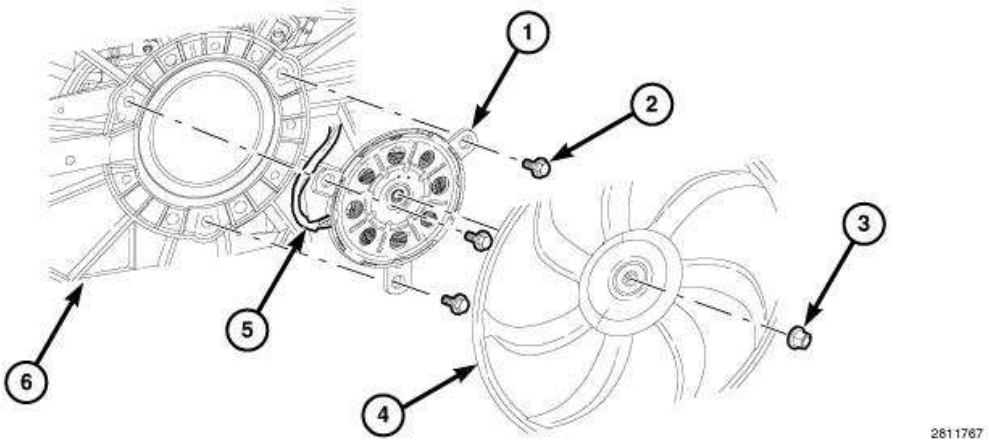

Fig. 58: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Removing the fan motor wiring harness (5) from the fan shroud (6).
14. Remove the fan blade (4) from the fan motor.
15. Remove the bolts (2) that support the fan motor to the shroud.

3.0L

NOTE: The dual motor fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

1. Disconnect negative battery cable.

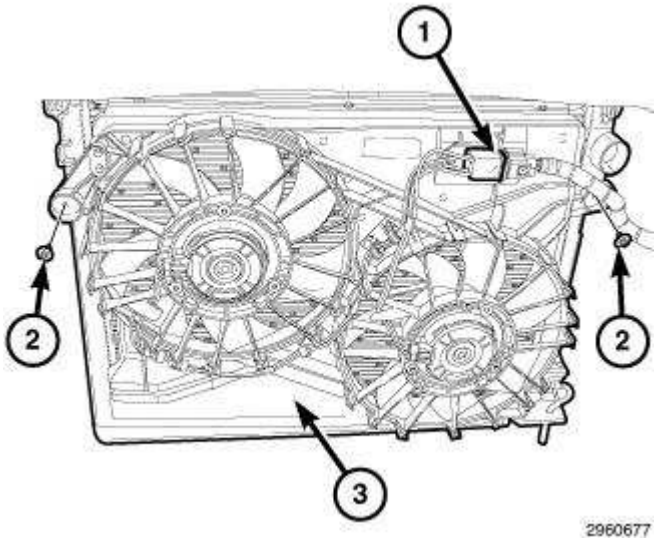

Fig. 59: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the cooling fan electrical connector (1).
3. Raise and support vehicle.
4. Remove the lower engine covers.

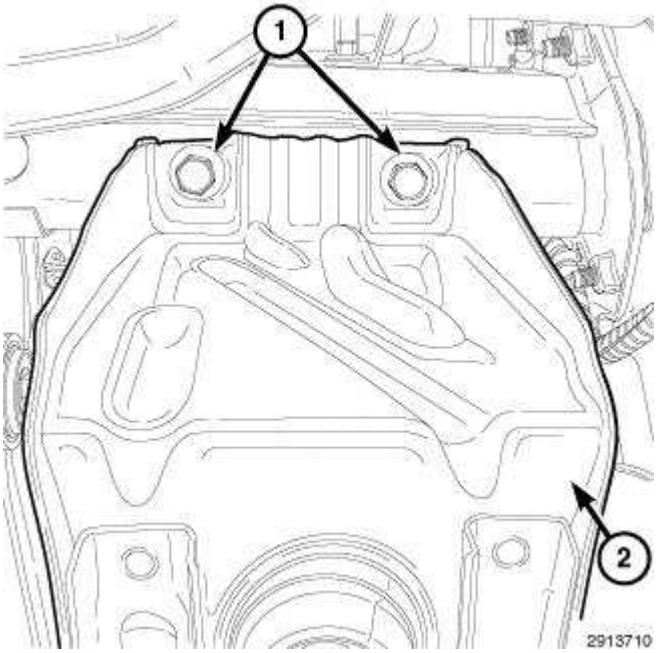

Fig. 60: Lower Radiator Core Support Bolts & Core Support
Courtesy of CHRYSLER GROUP, LLC

5. **Loosen but do not remove** the radiator lower support bolts.

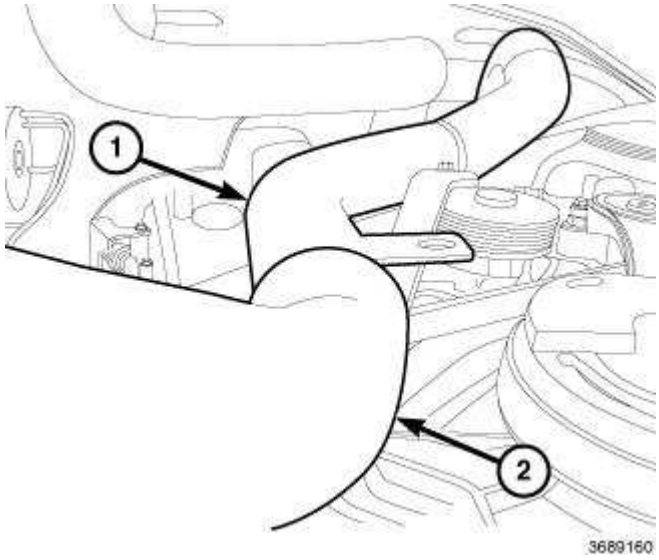

Fig. 61: Charge Air Hose & Charge Air Tube
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the charge air hose (2) from the charge air tube (1) and position the hose to the side.
7. Remove the cooling fan mounting bolts.

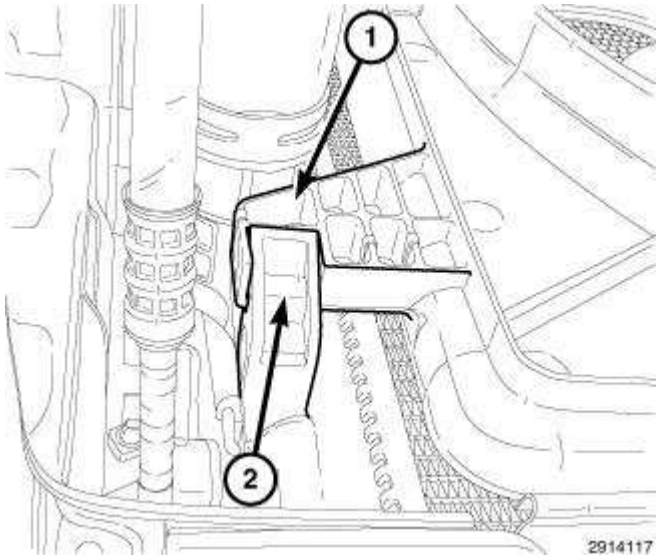

Fig. 62: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

8. Lift the radiator fan assembly upward to clear the lower retainers (2).

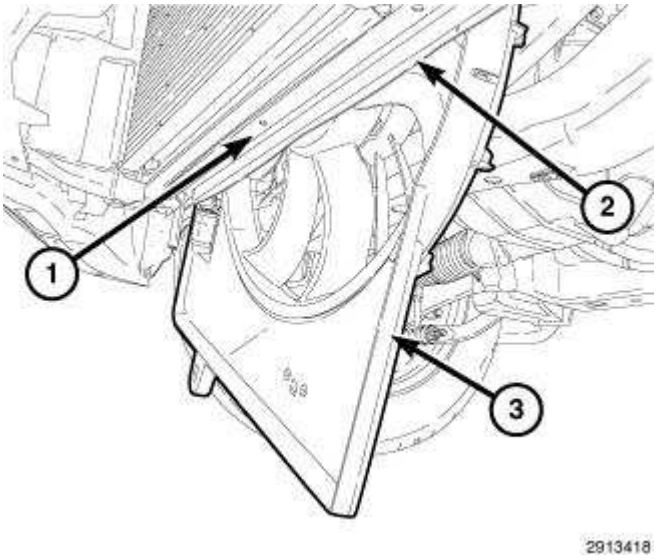

Fig. 63: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

9. Tilt the radiator lower support (1) forward, rotate the right side of the fan assembly (3) down.
10. Carefully slide the assembly out of the vehicle through the gap (2) between the support and the engine cradle.

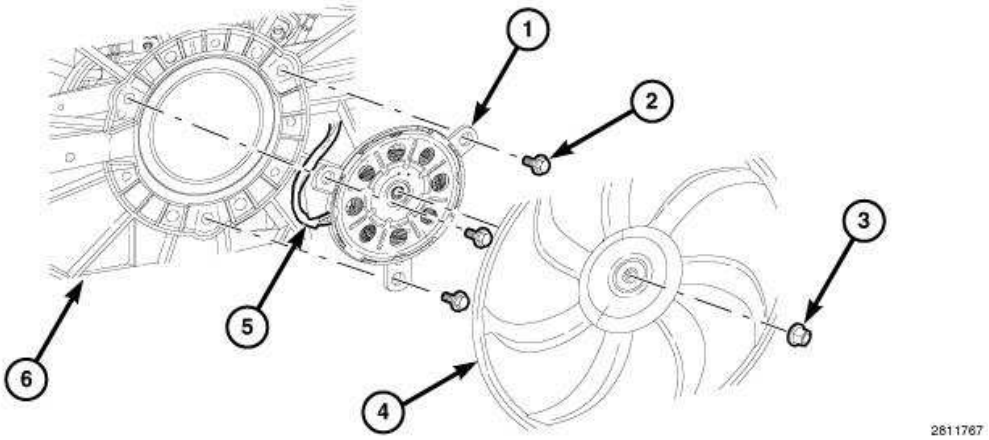

Fig. 64: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove the fan motor wiring harness (5) from the fan shroud (6).
12. Remove the fan blade (4) from the fan motor.
13. Remove the bolts (2) that secure the fan motor to the shroud.

INSTALLATION

3.6L SINGLE FAN

NOTE: If replacing the fan blades. The dual fan blades can be replaced separately from

the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

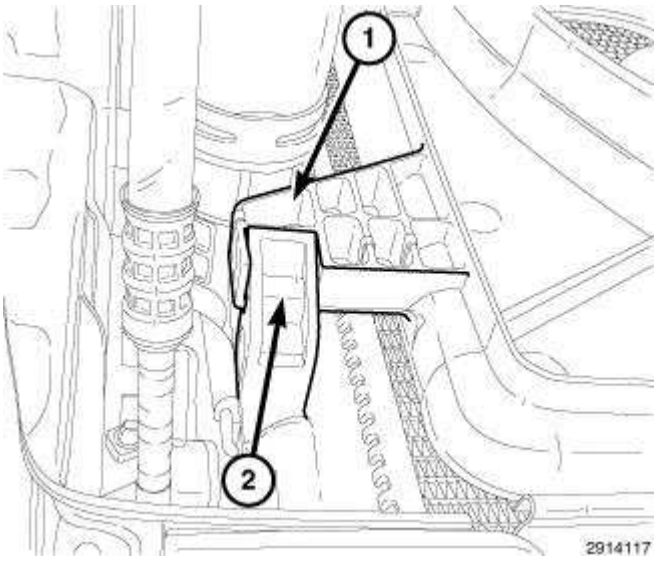

Fig. 65: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing the cooling fan assembly. Care must be used so that the fan shroud does not contact the radiator or the radiator fins. Damaged may cause leaking.

1. Position radiator cooling fan assembly (1) in vehicle.

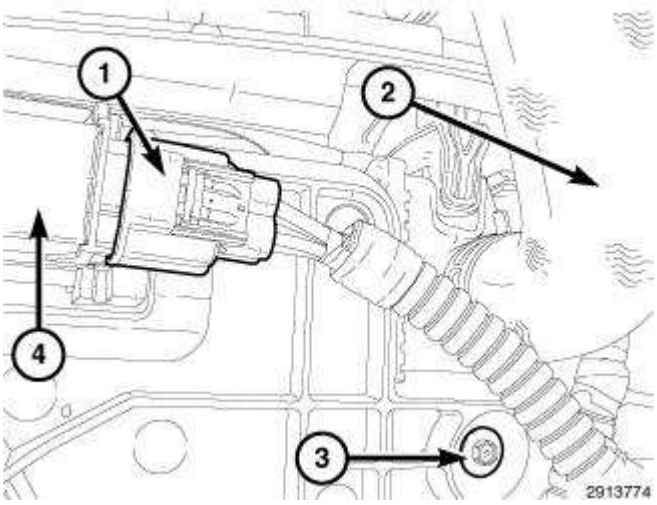

Fig. 66: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the cooling fan assembly mounting bolts (3). Tighten to 6 N.m (50 in. lbs.).

3. Connect cooling fan electrical connector (1).
4. Install the air filter housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
5. Connect the negative battery cable.
6. Operate engine until it reaches normal operating temperature. Check the fan for proper operation.

5.7/6.4L SINGLE FAN

NOTE: If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

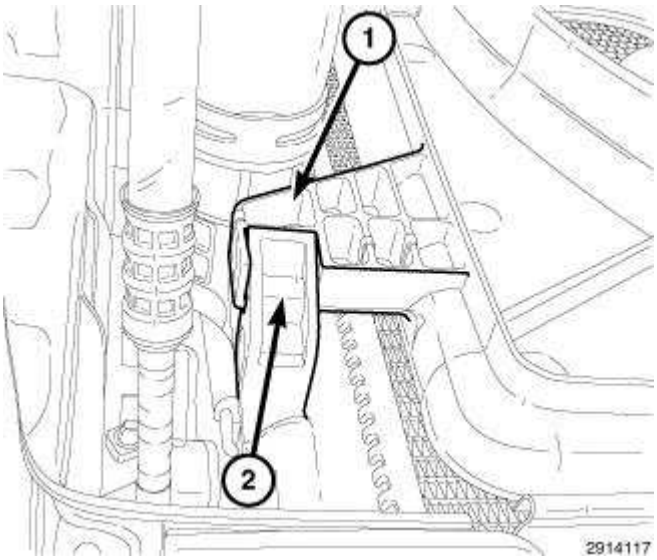

Fig. 67: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing the cooling fan assembly. Care must be used so that the fan shroud does not contact the radiator or the radiator fins. Damaged may cause leaking.

1. Position radiator cooling fan assembly (1) in vehicle.
2. Align the lower cooling fan assembly mounting tabs (1) with the radiator mounts (2).

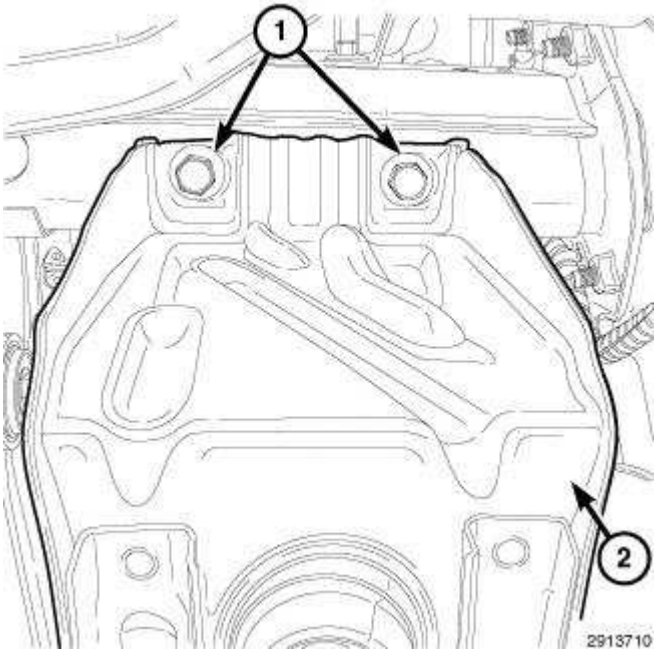

Fig. 68: Lower Radiator Core Support Bolts & Core Support
Courtesy of CHRYSLER GROUP, LLC

3. Tighten the lower radiator support (2) bolts (1) to 16 N.m (50 in. lbs.)
4. If equipped, install the lower engine belly pan.
5. Lower vehicle.

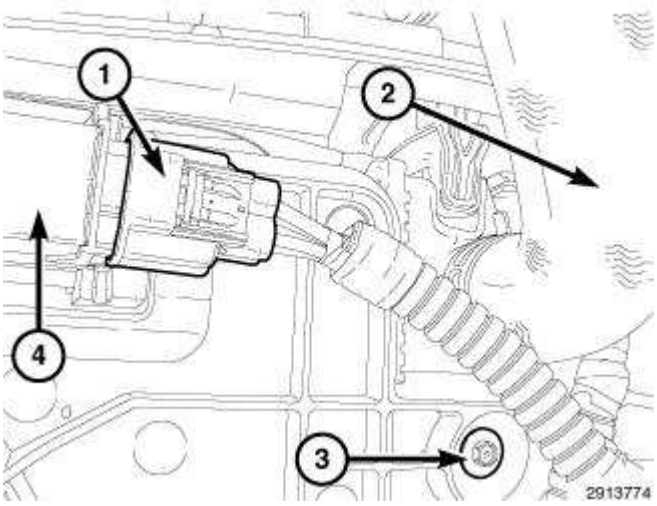

Fig. 69: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the cooling fan assembly mounting bolts (3). Tighten to 6 N.m (50 in. lbs.).
7. Connect cooling fan electrical connector (1).
8. Install the air filter housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR**

CLEANER, INSTALLATION or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .

9. Connect the negative battery cable.
10. Operate engine until it reaches normal operating temperature. Check the fan for proper operation.

3.6L DUAL FAN

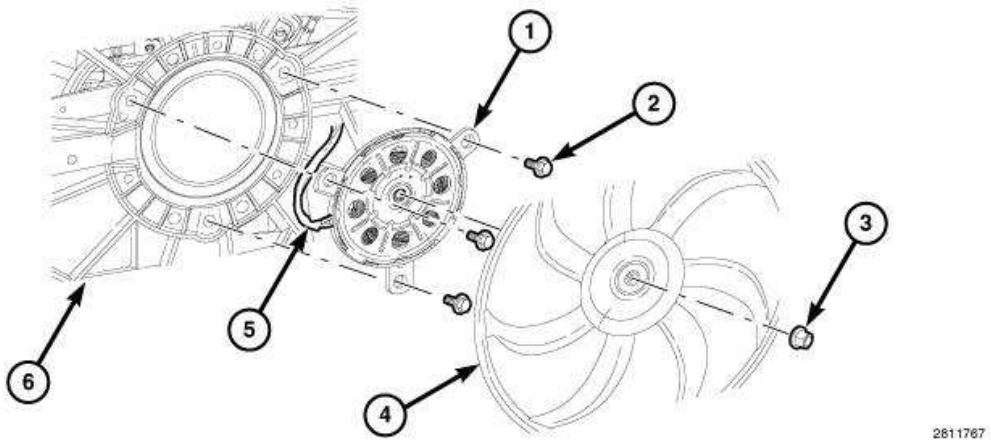

Fig. 70: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fan blade (4) to the fan motor. Tighten the nut (3) to 6 N.M (50 in. lbs.).
2. Position the fan motor assembly to the shroud (6).
3. Install the bolts (2) that support the fan motor to the shroud. Tighten the nut (3) to 6 N.M (50 in. lbs.).
4. Route the fan motor wiring harness (5) through the fan shroud (6).

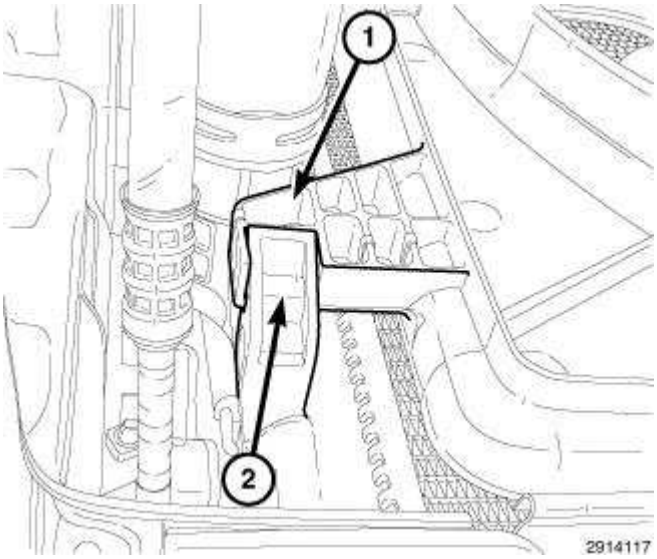

Fig. 71: Radiator Cooling Fan Assembly & Radiator Mounts

Courtesy of CHRYSLER GROUP, LLC

5. Position radiator cooling fan assembly (1) in vehicle.
6. Guide the fan (1) into the lower radiator mounts (2).

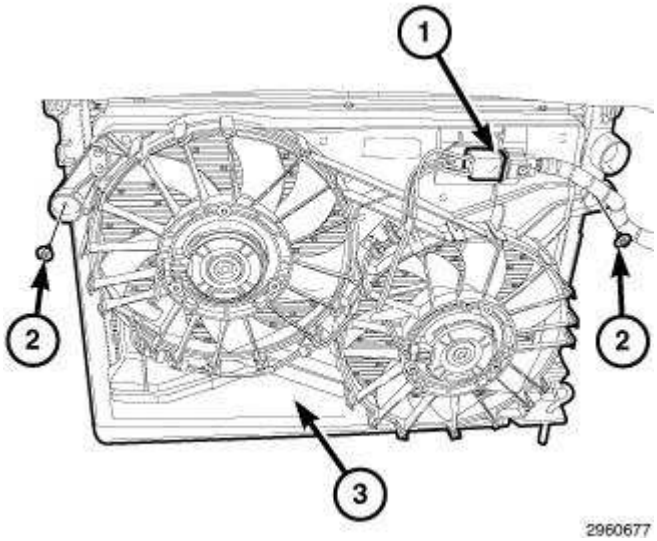

Fig. 72: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Install cooling fan mounting bolts (2). Tighten to 6 N.m (50 in. lbs.)
8. Connect cooling fan electrical connector (1).
9. Install the air filter housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
10. Connect the negative battery cable.
11. Operate engine until it reaches normal operating temperature.

5.7L DUAL FAN

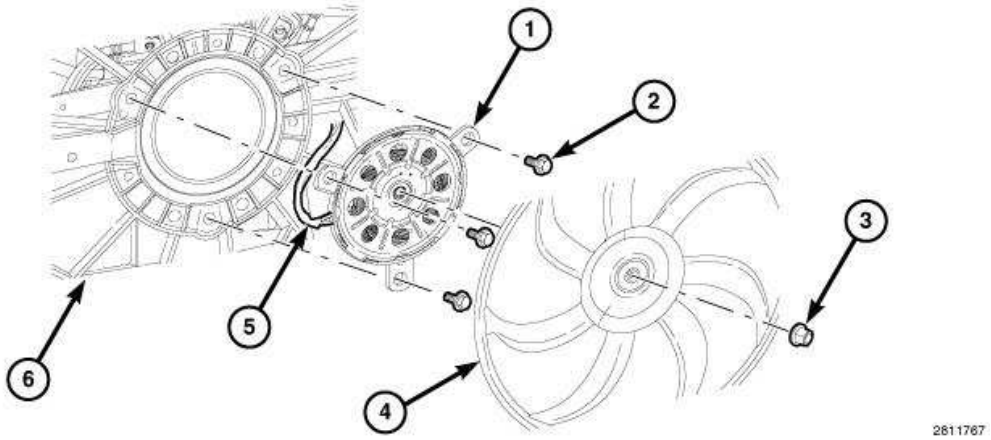

Fig. 73: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fan blade (4) to the fan motor. Tighten the nut (3) to 6 N.M (50 in. lbs.).
2. Position the fan motor assembly to the shroud (6).
3. Install the bolts (2) that support the fan motor to the shroud. Tighten the nut (3) to 6 N.M (50 in. lbs.).
4. Route the fan motor wiring harness (5) through the fan shroud (6).

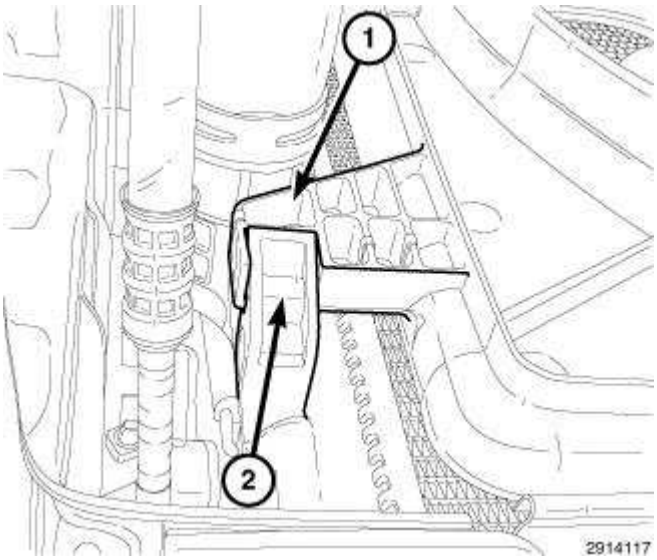

Fig. 74: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

5. Position radiator cooling fan assembly (1) in vehicle.
6. Guide the fan (1) into the lower radiator mounts (2).

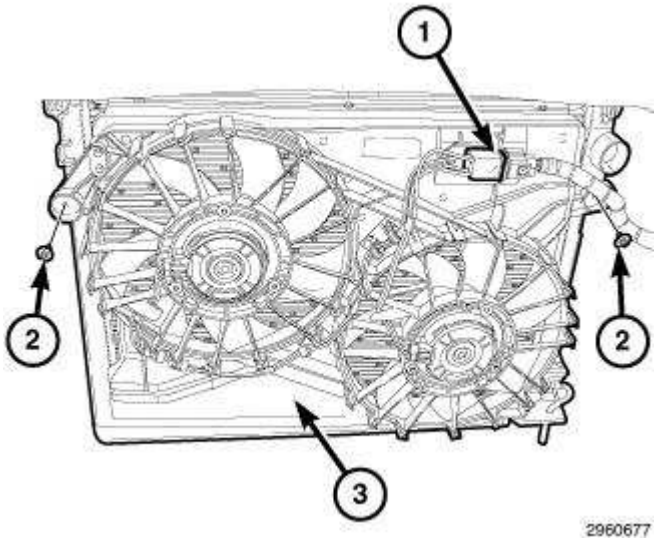

Fig. 75: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Install cooling fan mounting bolts (2). Tighten to 6 N.m (50 in. lbs.)
8. Connect cooling fan electrical connector (1).

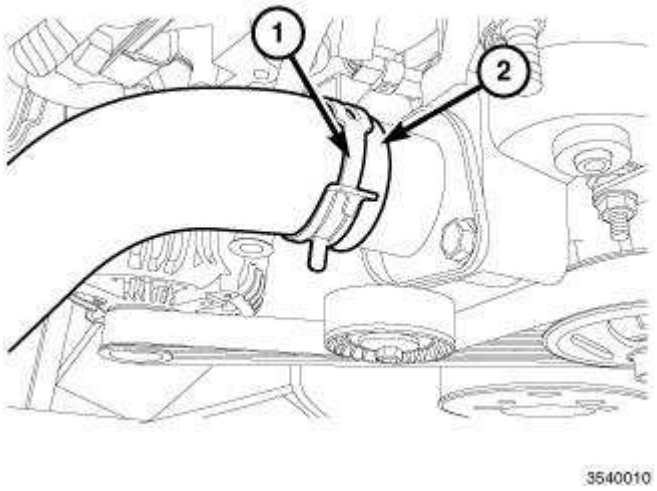

Fig. 76: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

9. Install the upper radiator hose.
10. Install the air filter housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
11. Fill the cooling system. Refer to **STANDARD PROCEDURE**.

12. Operate engine until it reaches normal operating temperature.

6.4L DUAL FAN

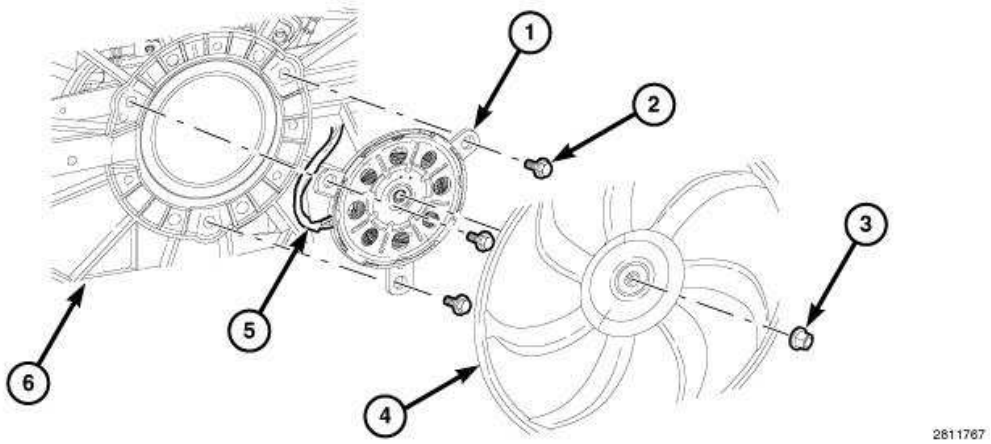

Fig. 77: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fan blade (4) to the fan motor. Tighten the nut (3) to 6 N.M (50 in. lbs.).
2. Position the fan motor assembly to the shroud (6).
3. Install the bolts (2) that support the fan motor to the shroud. Tighten the nut (3) to 6 N.M (50 in. lbs.).
4. Route the fan motor wiring harness (5) through the fan shroud (6).

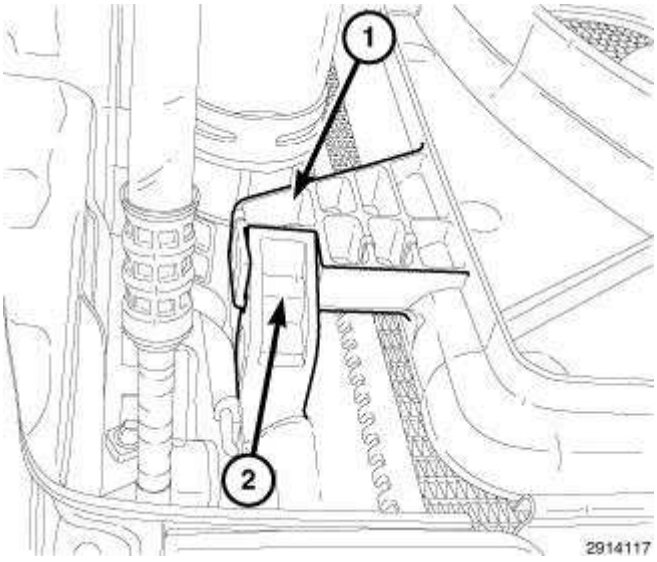

Fig. 78: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

5. Position radiator cooling fan assembly (1) in vehicle.
6. Guide the fan (1) into the lower radiator mounts (2).

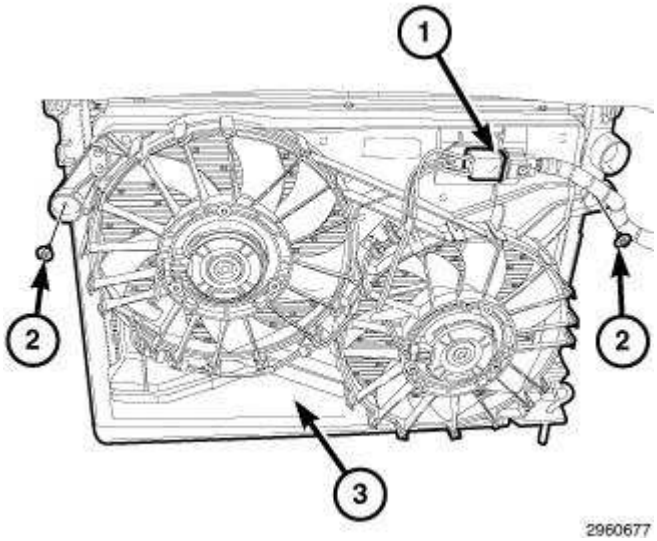

Fig. 79: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Install cooling fan mounting bolts (2). Tighten to 6 N.m (50 in. lbs.)
8. Connect cooling fan electrical connector (1).

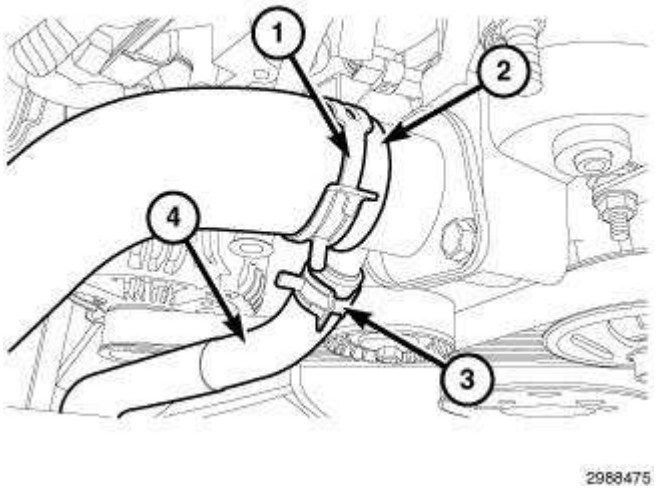

Fig. 80: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

9. Install the upper radiator hose (2).
10. Install the oil cooler return line (4) to the upper radiator hose.

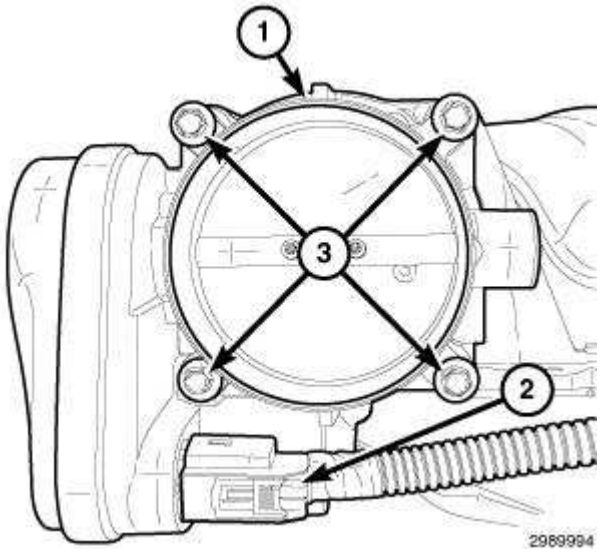

Fig. 81: Throttle Body, Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the throttle body. Tighten the screws (3) to 12 N.M (106 in. lbs). Refer to **THROTTLE BODY, INSTALLATION** .
12. Install the air filter housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
13. Fill cooling system. Refer to **STANDARD PROCEDURE**.
14. Operate engine until it reaches normal operating temperature.

3.0L

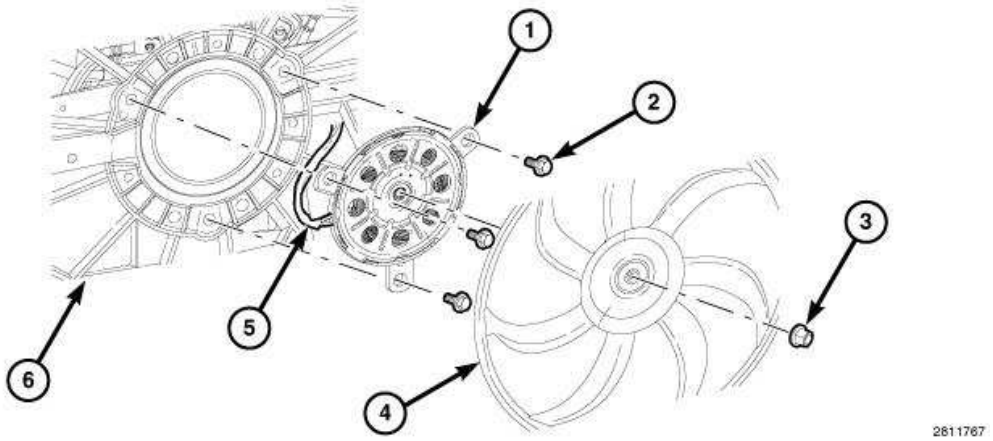

Fig. 82: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fan blade (4) to the fan motor. Tighten the nut (3) to 6 N.m (50 in. lbs.).
2. Position the fan motor assembly to the shroud (6).

3. Install the bolts (2) that secure the fan motor to the shroud. Tighten to 6 N.m (50 in. lbs.).
4. Route the fan motor wiring harness (5) through the fan shroud (6).

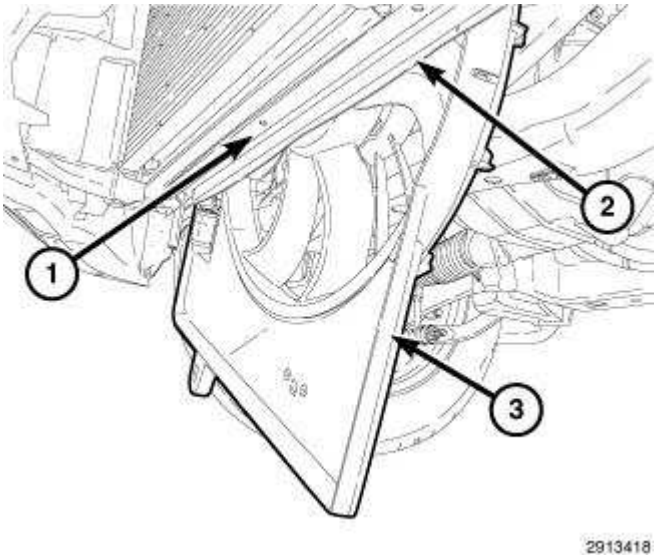

Fig. 83: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

5. While tilting the radiator lower support forward, feed the cooling fan assembly up into position.

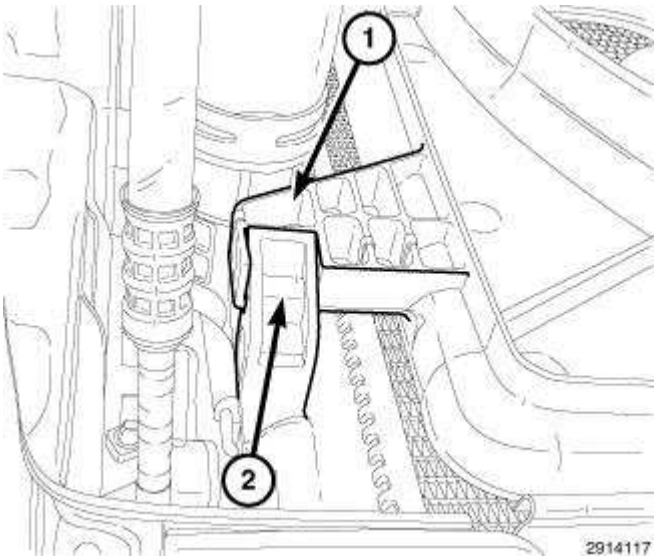

Fig. 84: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

6. Guide the fan (1) into the lower radiator mounts (2).

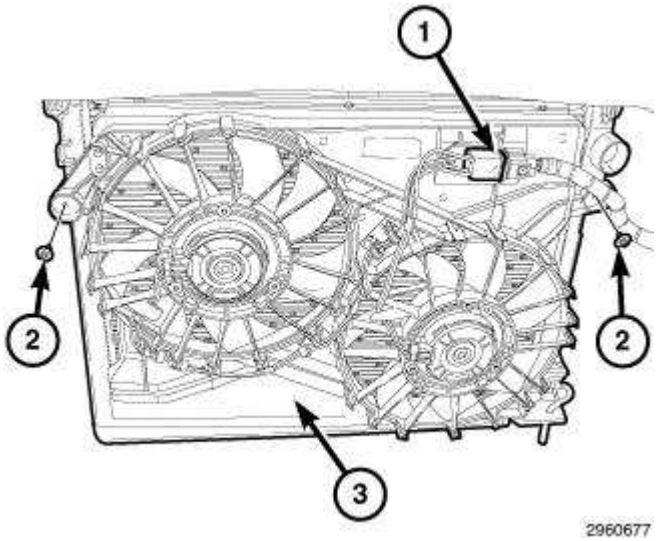

Fig. 85: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Install the cooling fan mounting bolts (2). Tighten to 6 N.m (50 in. lbs.)
8. Attach the charge air hose and tighten the clamp.

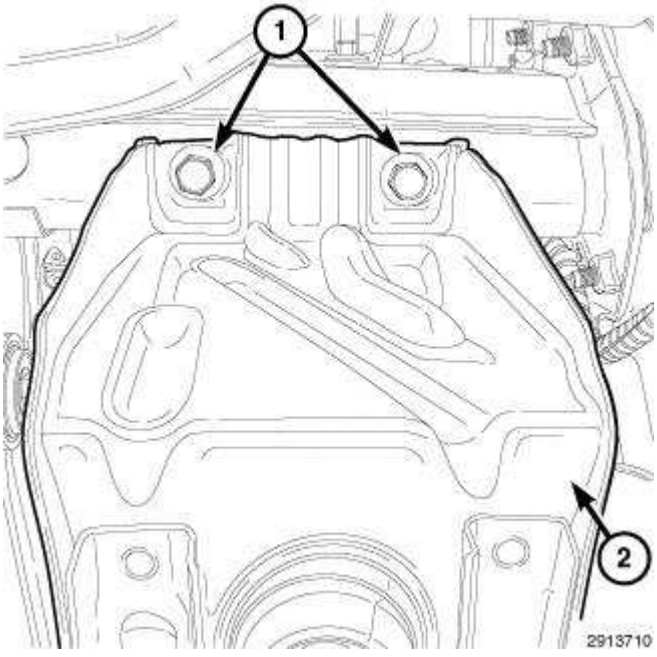

Fig. 86: Lower Radiator Core Support Bolts & Core Support
Courtesy of CHRYSLER GROUP, LLC

9. Tighten the radiator lower support bolts (1) to 40 N.m (30 Ft. lbs.).
10. Install the lower engine covers.
11. Connect the cooling fan electrical connector.

12. Connect the negative battery cable.
13. Operate engine until it reaches normal operating temperature. Verify normal cooling fan operation.

HEATER, ENGINE BLOCK

DESCRIPTION

DESCRIPTION

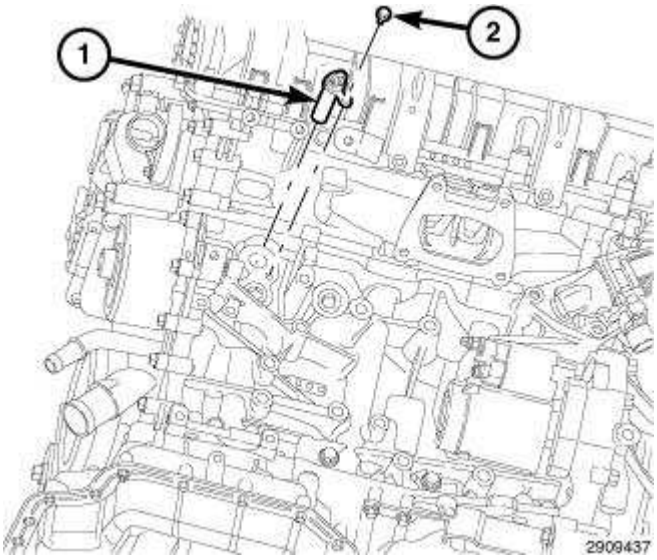

Fig. 87: 3.6L Engine Block Heater & Cylinder Block
Courtesy of CHRYSLER GROUP, LLC

The 3.6L engine block heater (1) is mounted in the cylinder block (2), near the front drivers side corner. The engine block heater (1) is a dry cylinder type design and is powered by 110 volt AC.

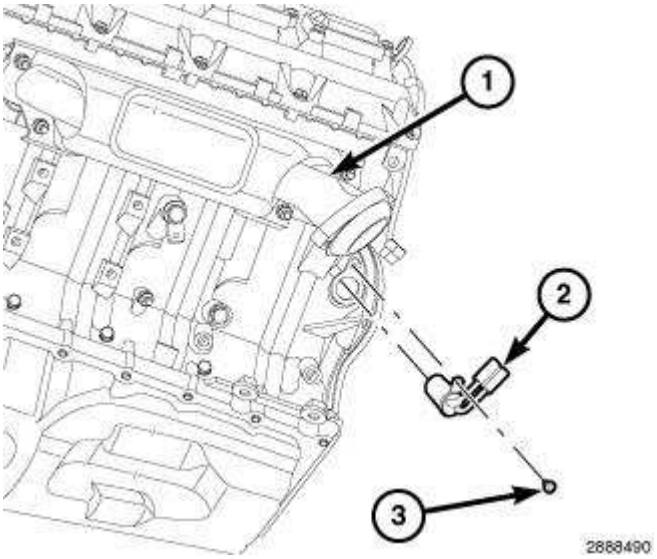

Fig. 88: PIA Bolt, Engine Block Heater Element & PIA Bolt
Courtesy of CHRYSLER GROUP, LLC

The 5.7L engine block heater (1) is mounted in the cylinder block, near the left rear corner. The engine block heater (1) is a dry cylinder type design and is powered by 110 volt AC.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ENGINE BLOCK HEATER

If unit does not operate, trouble can be in either the power cord or the heater element. Test power cord for continuity with a 110-volt voltmeter or 110-volt test light; test heater element continuity with an ohmmeter or 12-volt test light.

REMOVAL

3.6L

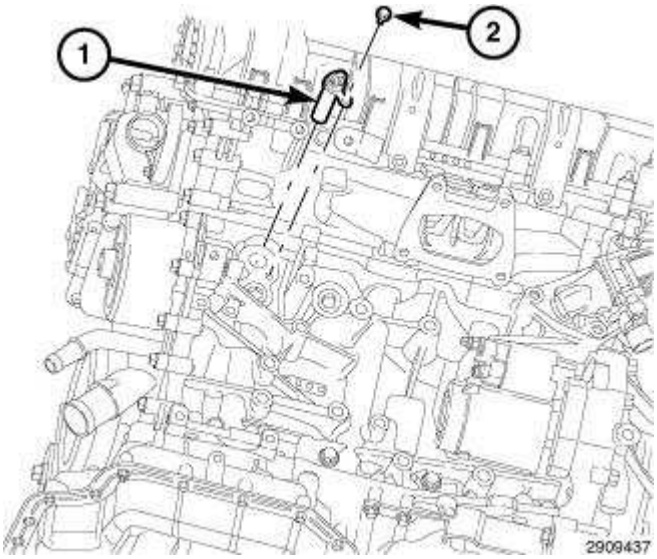

Fig. 89: 3.6L Engine Block Heater & Cylinder Block
Courtesy of CHRYSLER GROUP, LLC

1. Raise vehicle on hoist.
2. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .
3. Detach power cord plug from block heater (1).
4. Remove block heater attaching screw located below heater terminals.
5. Remove block heater from cylinder block (2).

5.7L/6.4L

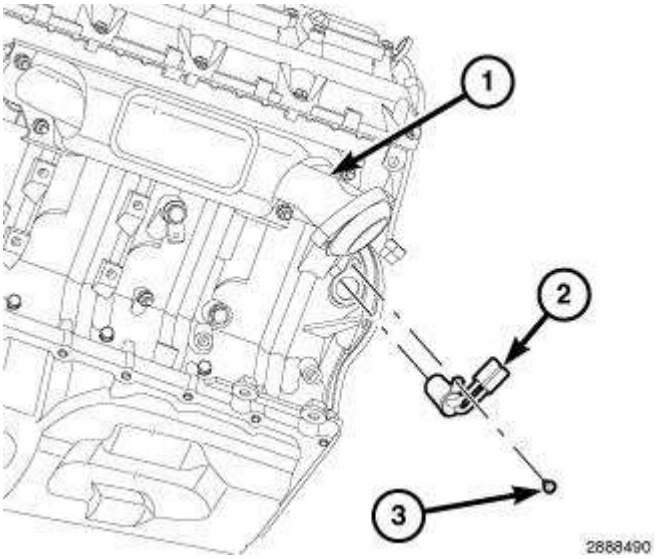

Fig. 90: PIA Bolt, Engine Block Heater Element & PIA Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the power cord from the block heater (1).
3. Remove the bolt (2) on the block heater (1). Remove the block heater assembly (1).

INSTALLATION

3.6L

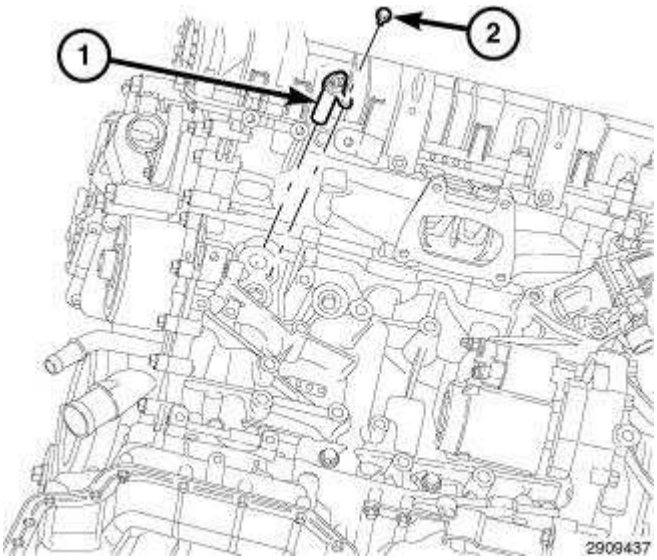

Fig. 91: 3.6L Engine Block Heater & Cylinder Block
Courtesy of CHRYSLER GROUP, LLC

1. Thoroughly clean cylinder block heater cavity.
2. Insert heater assembly (1) into block (2) with mounting hole is located below heater terminals.

3. Install mounting screw and tighten to 12 N.m (105 in. lbs.).

CAUTION: To prevent damage, the power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds.

4. Attach power cord to heater.
5. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .
6. Lower vehicle.

5.7L/6.4L

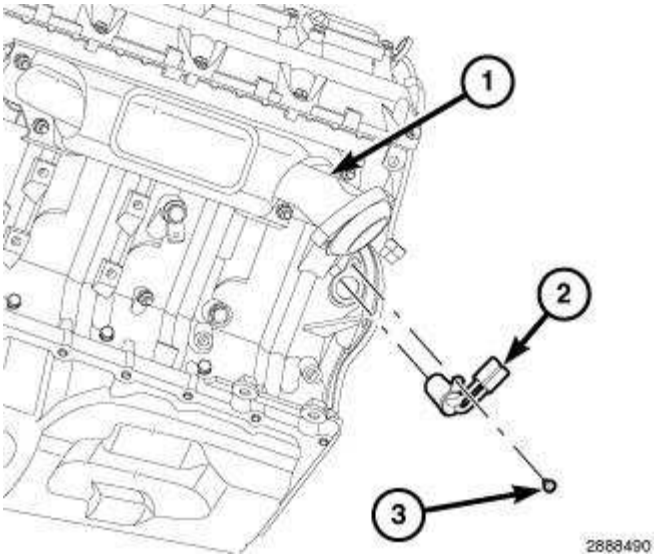

Fig. 92: PIA Bolt, Engine Block Heater Element & PIA Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Thoroughly clean the cylinder block core hole and the block heater seat.
2. Insert the block heater assembly (1) into the block.
3. With the block heater fully seated, tighten bolt (1) to 12 N.m (106 in. lbs.).
4. If equipped, install lower engine cover.
5. Lower vehicle.

PUMP, WATER

DESCRIPTION

DESCRIPTION

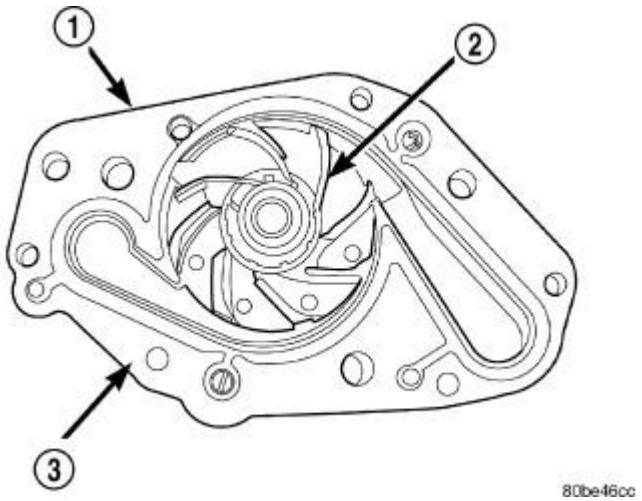

Fig. 93: Identifying Transmission Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

A centrifugal water pump (2) circulates coolant through the water jackets, passages, intake manifold, radiator core, cooling system hoses and heater core. The pump is driven from the engine crankshaft by a single serpentine main drive belt.

The water pump impeller is pressed onto the rear of a shaft that rotates in bearings pressed into the housing. The housing has two small holes to allow seepage to escape. The water pump seals are lubricated by the antifreeze in the coolant mixture. No additional lubrication is necessary.

The water pump (1) is mounted directly to the timing chain cover and is equipped with a non serviceable integral pulley.

STANDARD PROCEDURE

STANDARD PROCEDURE - COOLANT AIR EVACUATION

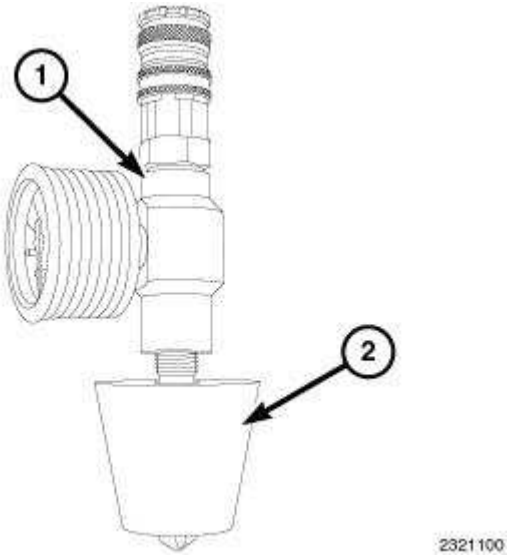

Fig. 94: Pressurized Air Operated Vacuum Generator
Courtesy of CHRYSLER GROUP, LLC

Evacuating or purging air from the cooling system involves the use of a pressurized air operated vacuum generator. The vacuum created allows for a quick and complete coolant refilling while removing any airlocks present in the system components.

NOTE: To avoid damage to the cooling system, ensure that no component would be susceptible to damage when a vacuum is drawn on the system.

WARNING: ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASED COOLANT PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE; PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED; PERSONAL INJURY CAN RESULT.

WARNING: WEAR APPROPRIATE EYE AND HAND PROTECTION WHEN PERFORMING THIS PROCEDURE.

NOTE: The service area where this procedure is performed should have a minimum shop air requirement of 80 PSI (5.5 bar) and should be equipped with an air dryer system.

NOTE: For best results, the radiator should be empty. The vehicle's heater control should be set to the heat position (ignition may need to be turned to the on position but do not start the motor).

1. Refer to the Chrysler Pentastar Service Equipment (Chrysler PSE) Coolant Refiller #85-15-0650 or equivalent tool's operating manual for specific assembly steps.
2. Choose an appropriate adapter cone that will fit the vehicle's radiator filler neck or reservoir tank.
3. Attach the adapter cone (2) to the vacuum gauge (1).

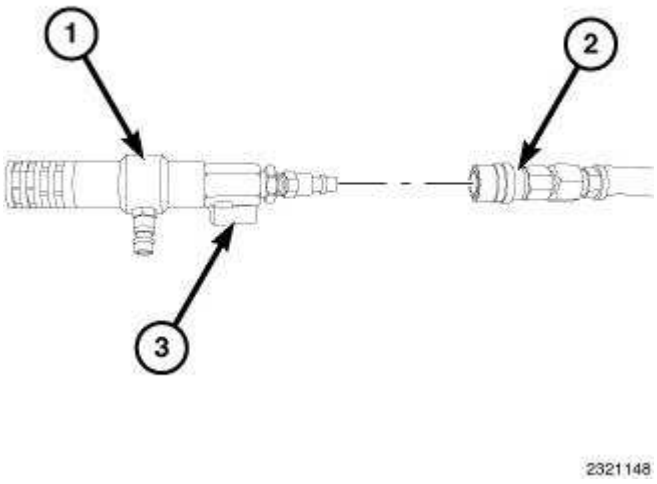

Fig. 95: Vacuum Generator/Venturi Ball Valve
Courtesy of CHRYSLER GROUP, LLC

4. Make sure the vacuum generator/venturi ball valve (3) is closed and attach an airline hose (2) (minimum shop air requirement of 80 PSI/5.5 bar) to the vacuum generator/venturi (1).
5. Position the adaptor cone/vacuum gauge assembly into the radiator filler neck or reservoir tank. Ensure that the adapter cone is sealed properly.

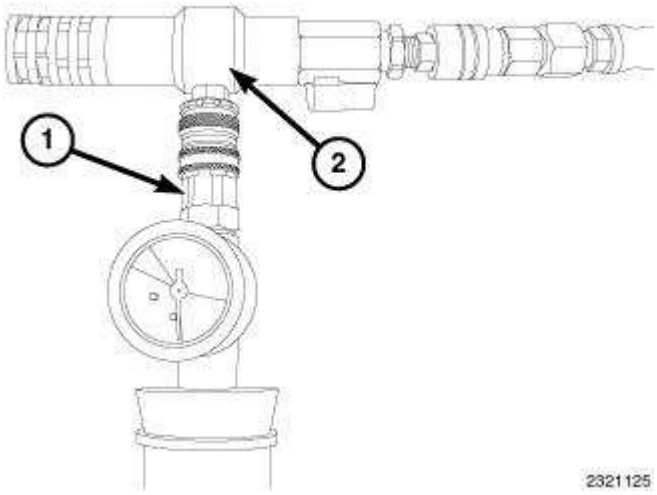

Fig. 96: Vacuum Generator/Venturi
Courtesy of CHRYSLER GROUP, LLC

6. Connect the vacuum generator/venturi (2) to the positioned adaptor cone/vacuum gauge assembly (1).
7. Open the vacuum generator/venturi ball valve.

NOTE: **Do not bump or move the assembly as it may result in loss of vacuum. Some radiator overflow hoses may need to be clamped off to obtain vacuum.**

8. Let the system run until the vacuum gauge shows a good vacuum through the cooling system. Refer to the tool's operating manual for appropriate pressure readings.

NOTE: **If a strong vacuum is being created in the system, it is normal to see the radiator hoses to collapse.**

9. Close the vacuum generator/venturi ball valve.

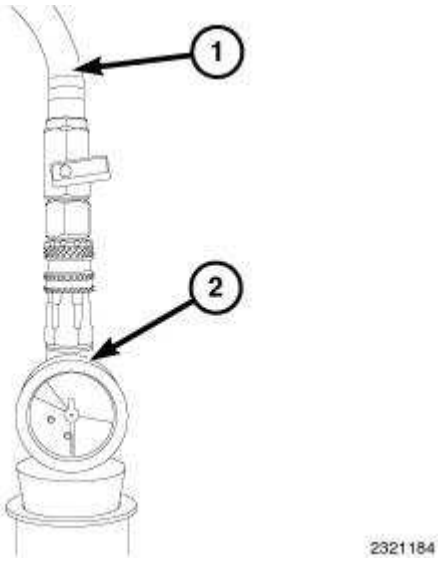

Fig. 97: Vacuum Generator/Venturi And Air Line
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the vacuum generator/venturi and airline from the adaptor cone/vacuum gauge assembly.
11. Wait approximately 20 seconds, if the pressure readings do not move, the system has no leaks. If the pressure readings move, a leak could be present in the system and the cooling system should be checked for leaks and the procedure should be repeated.
12. Place the tool's suction hose into the coolant's container.

NOTE: **Ensure there is a sufficient amount of coolant, mixed to the required strength/protection level available for use. For best results and to assist the refilling procedure, place the coolant container at the same height as the radiator filler neck. Always draw more coolant than required. If the coolant level is too low, it will pull air into the cooling system which could result in airlocks in the system.**

13. Connect the tool's suction hose (1) to the adaptor cone/vacuum gauge assembly (2).

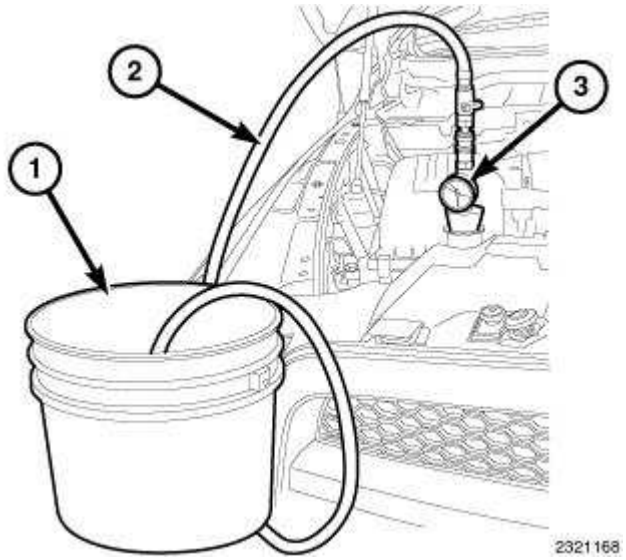

Fig. 98: Suction Hose Ball Valve
Courtesy of CHRYSLER GROUP, LLC

14. Open the suction hose's ball valve to begin refilling the cooling system.
15. When the vacuum gauge reads zero, the system is filled.

NOTE: On some remote pressurized tanks, it is recommended to stop filling when the proper level is reached.

16. Close the suction hose's ball valve and remove the suction hose from the adaptor cone/vacuum gauge assembly.
17. Remove the adaptor cone/vacuum gauge assembly from the radiator filler neck or reservoir tank.
18. With heater control unit in the HEAT position, operate engine with container cap in place.
19. After engine has reached normal operating temperature, shut engine off and allow it to cool. When engine is cooling down, coolant will be drawn into the radiator from the pressure container.
20. Add coolant to the recovery bottle/container as necessary. **Only add coolant to the container when the engine is cold. Coolant level in a warm engine will be higher due to thermal expansion.** Add necessary coolant to raise container level to the COLD MINIMUM mark after each cool down period.
21. Once the appropriate coolant level is achieved, attach the radiator cap or reservoir tank cap.

REMOVAL

3.6L

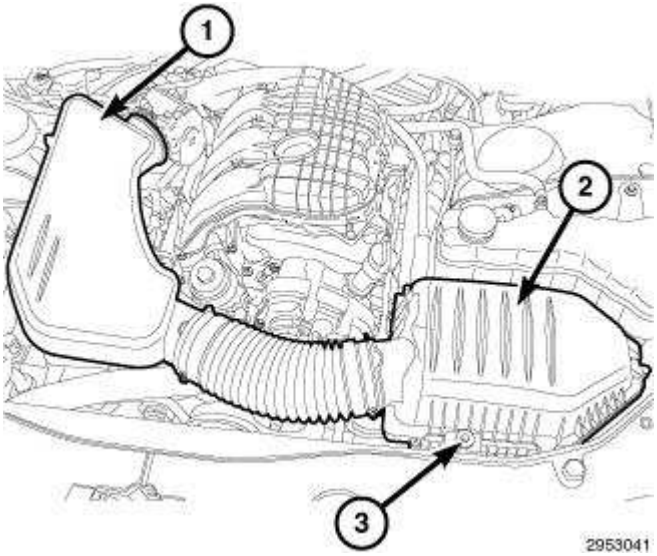

Fig. 99: Air Intake System And The Air Filter Box Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The water pump on 3.6L engines is bolted directly to the engine timing chain case cover.

1. Disconnect negative battery cable from battery.
2. Remove the air intake system and the air filter box cover (2) as an assembly.
3. Drain the cooling system. Refer to **STANDARD PROCEDURE**.

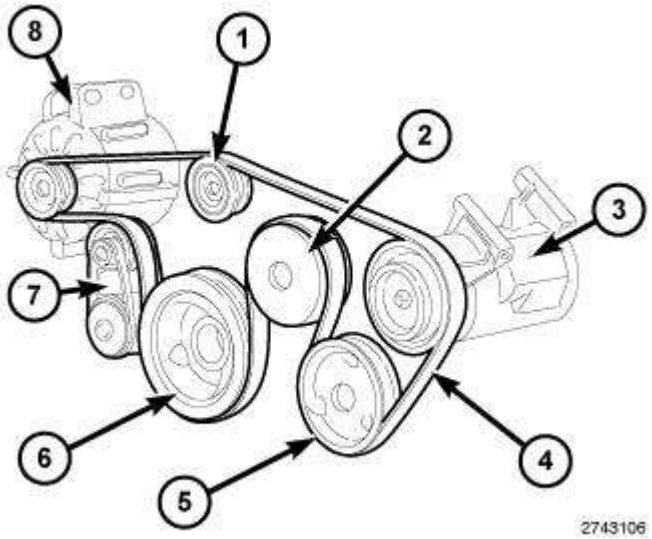

Fig. 100: Drive Belt Tensioners & Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL**.

WARNING: Constant tension hose clamps are used on most cooling system hoses. When removing or installing, use only tools designed for servicing this type of clamp. Always wear safety glasses when servicing constant tension clamps.

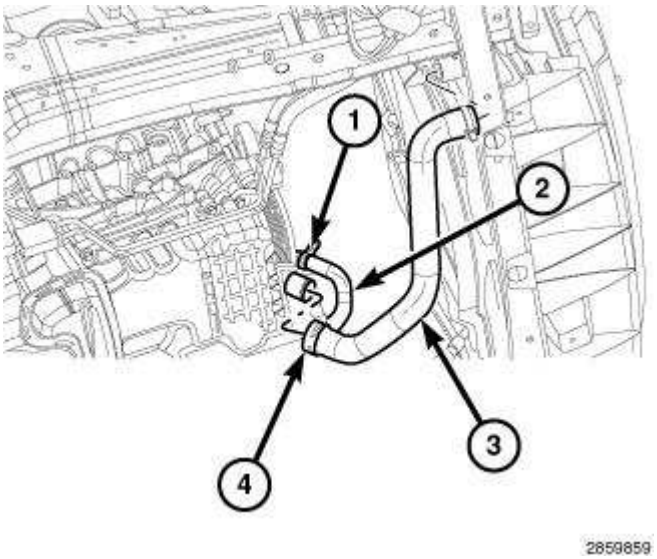

Fig. 101: Lower Heater Hose, Lower Radiator Hose & Tension Clamps
Courtesy of CHRYSLER GROUP, LLC

CAUTION: A number or letter is stamped into the tongue of constant tension clamps (4). If replacement is necessary, use only an original equipment clamp with matching number or letter.

5. Remove the lower heater hose (1) at the water pump and position aside.
6. Remove the lower radiator hose (3) from the water pump and position aside.

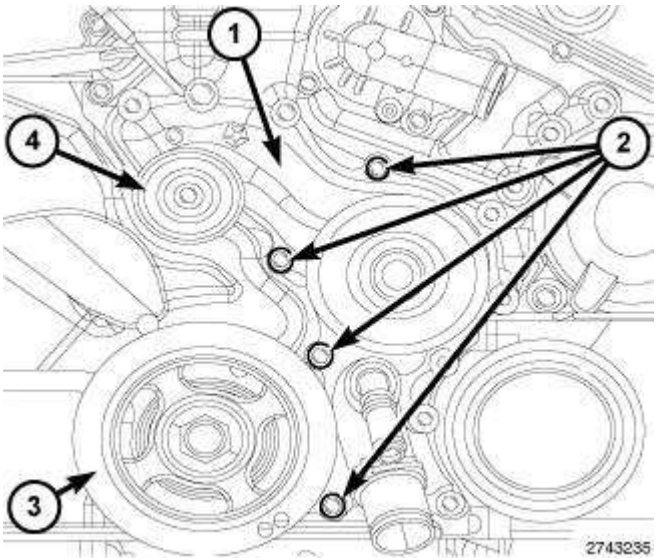

Fig. 102: Idler Pulley, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove idler pulley (4). Refer to **PULLEY, IDLER, REMOVAL**.
8. Remove the eleven water pump mounting bolts. Take notice to the four water pump bolts (2) that bolt directly to the timing cover.

CAUTION: Do not pry on the water pump at the timing chain case/cover. The machined surfaces may be damaged resulting in leaks.

9. Remove water pump (1) and discard gasket.

5.7L/6.4L

1. Disconnect negative battery cable.
2. Remove the air intake assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Remove the resonator mounting bracket.
4. Remove cooling fan assembly. Refer to **FAN, COOLING, REMOVAL**.
5. Drain coolant into a clean container. Refer to **STANDARD PROCEDURE**.

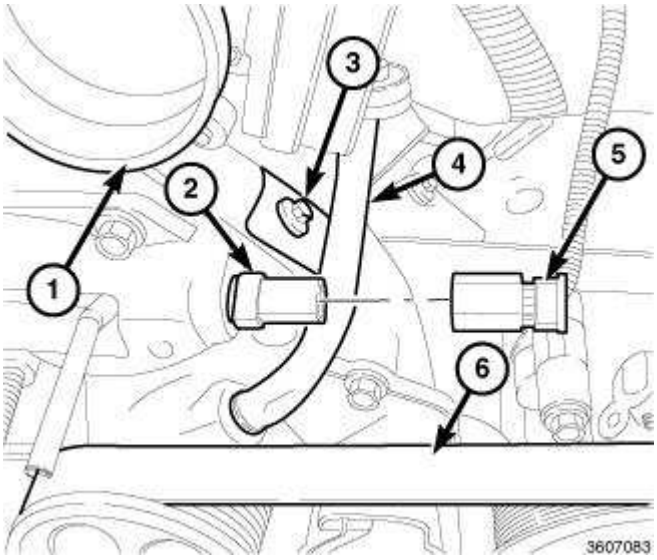

Fig. 103: Temperature Sensor, Connector, Metal Tube, Bolt & Drive Belt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the accessory drive belt (6). Refer to **BELT, SERPENTINE, REMOVAL**.
7. Remove the bolt (3) that secures the metal tube (4) to the engine.
8. Using care. Partially remove the metal bypass tube from the water pump.
9. Disconnect the temperature sensor (2) electrical connector (5)

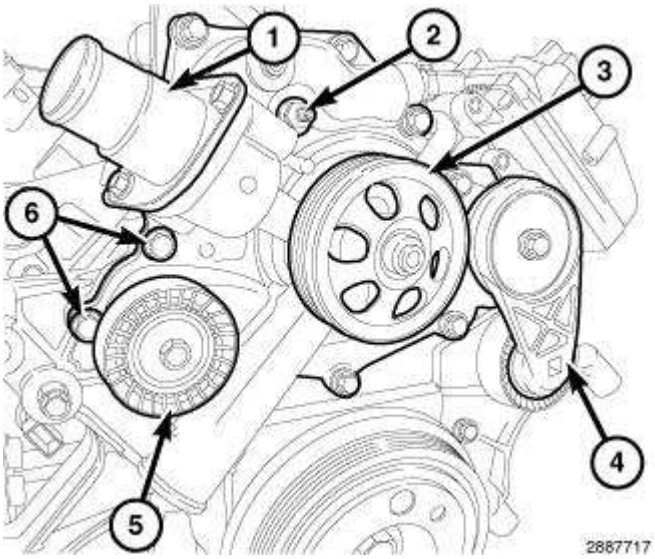

Fig. 104: Thermostat Housing, Water Pump, Belt Tensioner, & Idler Pulley
Courtesy of CHRYSLER GROUP, LLC

10. Remove the upper radiator hose from the thermostat housing (1) and position aside.
11. Remove idler pulley (5).
12. Remove belt tensioner assembly (4). Refer to **TENSIONER, BELT, REMOVAL**.
13. Remove lower radiator hose from the water pump and position aside.
14. Remove the upper stud bolt (2).
15. Remove the water pump mounting bolts (6) and carefully remove pump (3) from the cover while removing the metal bypass tube.

3.0L DIESEL

1. Disconnect negative battery cable.
2. Remove the air intake assembly.
3. Drain coolant into a clean container. Refer to **STANDARD PROCEDURE**.

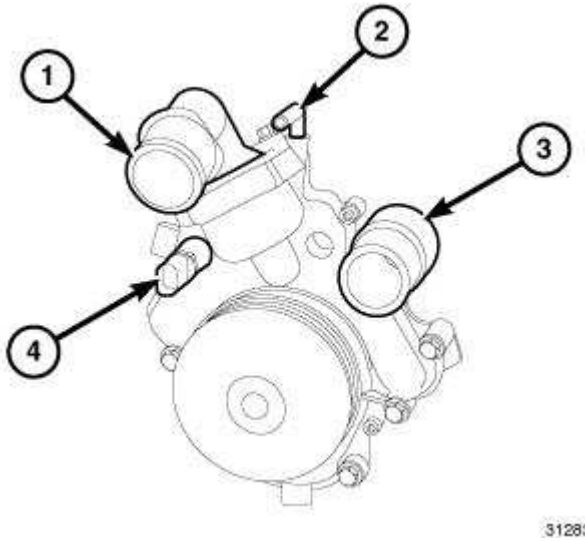

Fig. 105: Thermostat Housing, Purge Tube, Heater Supply Hose Fitting & Bypass Housing
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the temperature sensor (4) electrical connector.
5. Remove the upper radiator hose from the thermostat housing (1) and position aside.
6. Remove the coolant recovery bottle purge hose from purge tube (2).
7. Remove the lower radiator hose from the bypass housing (3) and position aside.

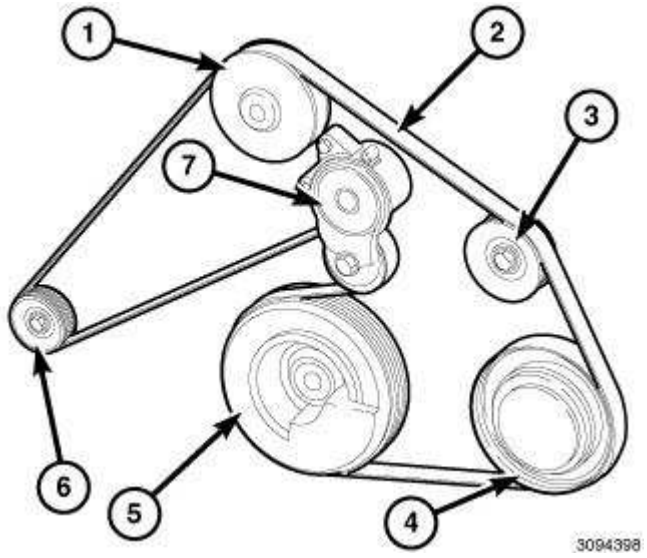

Fig. 106: Pulleys, Tensioner & Drive Belt Routing 3.0L
Courtesy of CHRYSLER GROUP, LLC

8. Remove belt tensioner assembly (7). Refer to **TENSIONER, BELT, REMOVAL**.
9. Remove the belt tensioner mounting bracket.

CAUTION: The fuel lines are a one time torque. If the fuel lines are removed. They would require replacing.

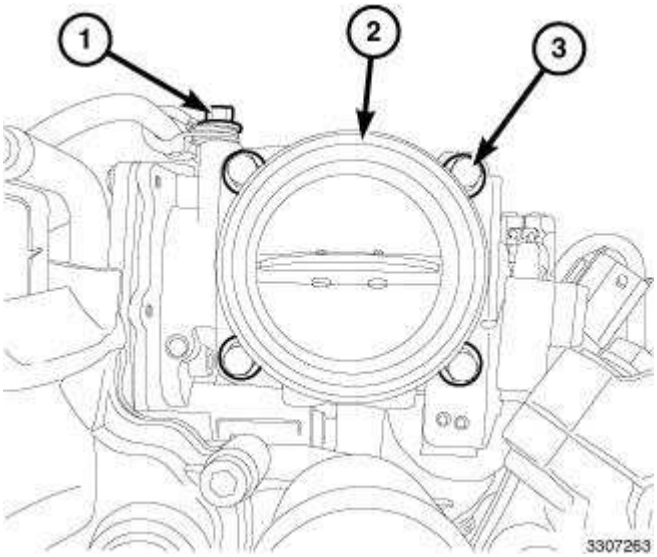

Fig. 107: (EGR) Air Flow Control Valve
Courtesy of CHRYSLER GROUP, LLC

10. Remove the EGR air control valve (2). Refer to **VALVE, EXHAUST GAS RECIRCULATION (EGR) AIRFLOW CONTROL, REMOVAL** .

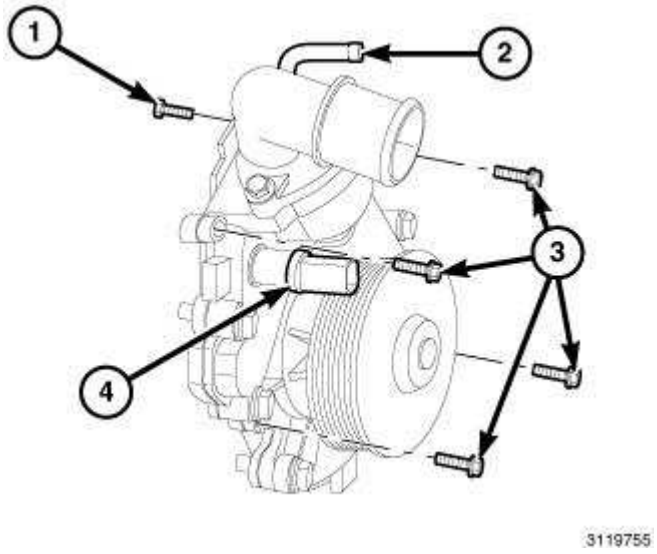

Fig. 108: Temperature Sensor & Torx Head Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Remove the temperature sensor (4).
12. Remove the four front torx head fasteners (3) and one upper rear torx head fasteners (1).

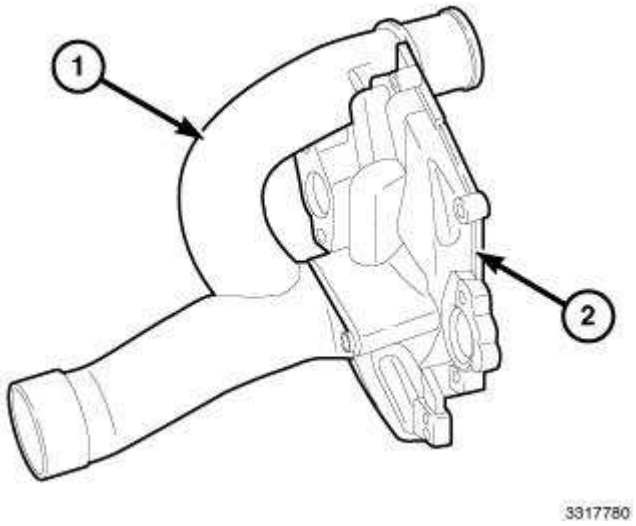

Fig. 109: Coolant Pipe
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is not necessary to remove the rear section of the water pump assembly (2).

CAUTION: Removal of the housing may cause the coolant pipe (1) to separate from under the intake assembly which can disturb the seal and may leak if not installed properly.

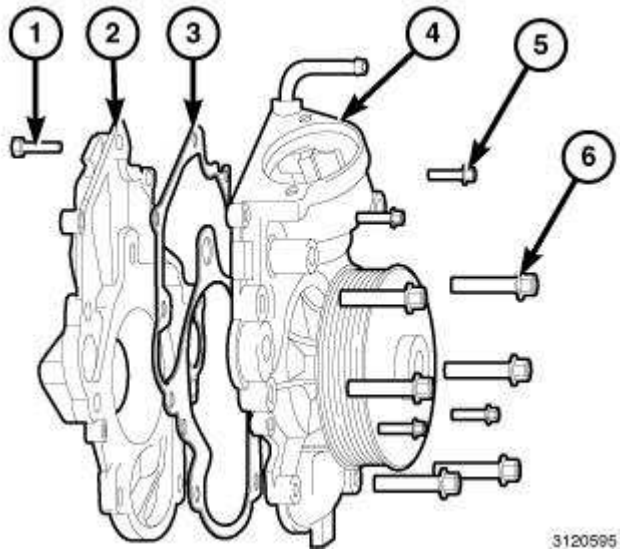

Fig. 110: Exploded View Of Water Pump
Courtesy of CHRYSLER GROUP, LLC

13. Remove the thermostat assembly.
14. Remove water pump mounting bolts (6).

15. Separated the water pump front housing (4) from the rear housing (2) and discard the gasket (3).

INSPECTION

5.7L/6.4L

1. Disconnect negative battery cable.
2. Remove the air intake assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Remove the resonator mounting bracket.
4. Remove cooling fan assembly. Refer to **FAN, COOLING, REMOVAL**.
5. Drain coolant into a clean container. Refer to **STANDARD PROCEDURE**.

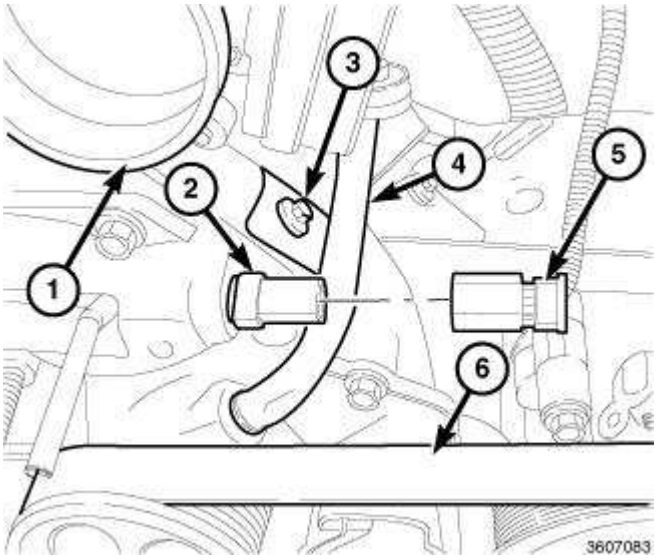

Fig. 111: Temperature Sensor, Connector, Metal Tube, Bolt & Drive Belt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the accessory drive belt (6). Refer to **BELT, SERPENTINE, REMOVAL**.
7. Remove the bolt (3) that secures the metal tube (4) to the engine.
8. Using care. Partially remove the metal bypass tube from the water pump.
9. Disconnect the temperature sensor (2) electrical connector (5)

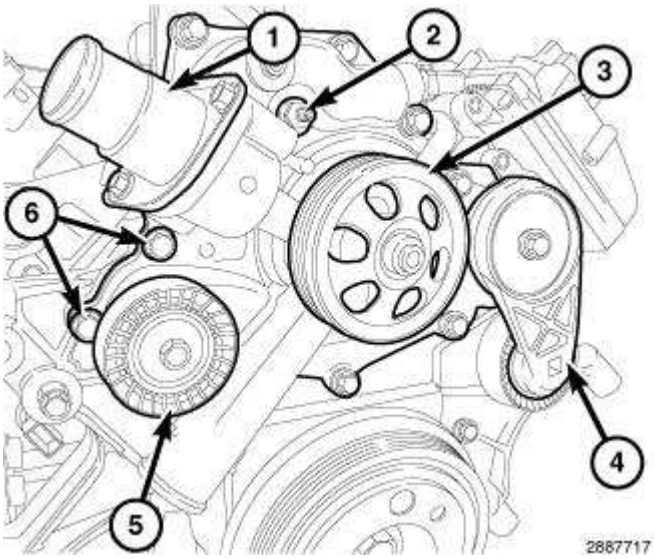

Fig. 112: Thermostat Housing, Water Pump, Belt Tensioner, & Idler Pulley
Courtesy of CHRYSLER GROUP, LLC

10. Remove the upper radiator hose from the thermostat housing (1) and position aside.
11. Remove idler pulley (5).
12. Remove belt tensioner assembly (4). Refer to **TENSIONER, BELT, REMOVAL**.
13. Remove lower radiator hose from the water pump and position aside.
14. Remove the upper stud bolt (2).
15. Remove the water pump mounting bolts (6) and carefully remove pump (3) from the cover while removing the metal bypass tube.

INSTALLATION

3.6L

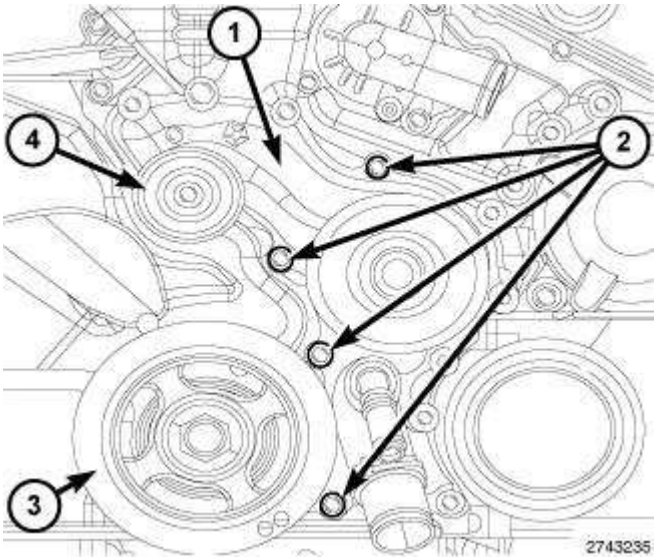

Fig. 113: Idler Pulley, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean mating surfaces.

NOTE: Take notice the lengths of the mounting bolts. Some M6 bolts mount directly to the timing cover (2).

2. Using a new gasket, position water pump (1) and hand tighten the M6 mounting bolts.
3. Hand tighten the idler pulley (4) bolt.
4. Hand tighten the upper M8 and M10 water pump to engine block mounting bolts.

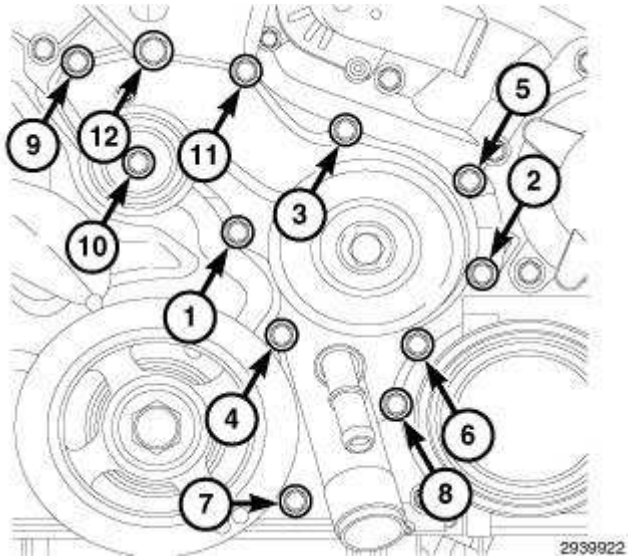

Fig. 114: Water Pump Fasteners Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Tightening the water pump fasteners in sequential order, will insure proper sealing surface.

5. Tighten the bolts 1 - 12 in the sequence shown in illustration. Tighten the bolts to their respective torque:
   - Tighten M6 mounting bolts to 12 N.m (9 ft. lbs.).
   - Tighten M8 bolts to 25 N.m (18 ft. lbs.).
   - Tighten M10 bolt to 55 N.m (41 ft. lbs.).
   - Repeat the tightening sequence until the proper torque has been met.
6. Spin water pump to be sure that pump impeller does not rub against timing chain case/cover.

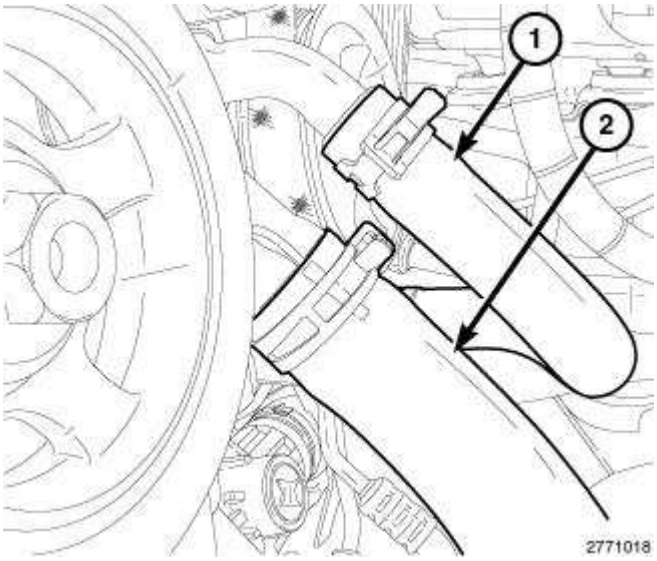

Fig. 115: Radiator Hose & Heater Hose
Courtesy of CHRYSLER GROUP, LLC

CAUTION: A number or letter is stamped into the tongue of constant tension clamps (4). If replacement is necessary, use only an original equipment clamp with matching number or letter.

7. Install the lower radiator hose (2).
8. Install the lower return heater hose (1).

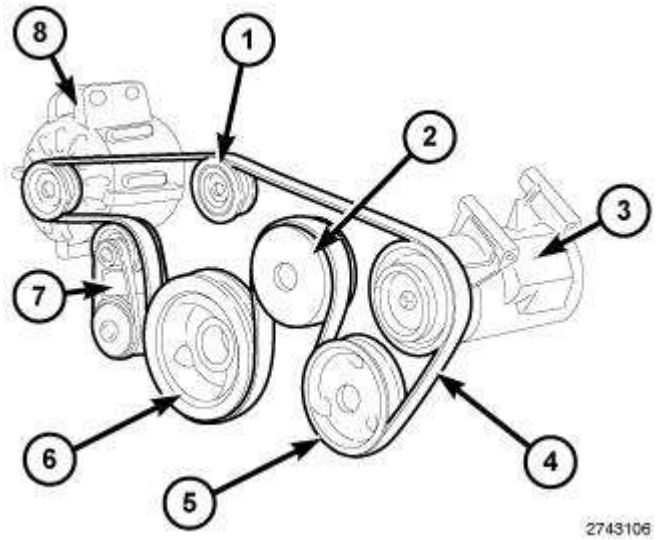

Fig. 116: Drive Belt Tensioners & Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing the serpentine accessory drive belt, belt must be routed correctly. If not, engine may overheat due to water pump

rotating in wrong direction.

9. Install accessory drive belt (4). Refer to **BELT, SERPENTINE, INSTALLATION**.
10. Evacuate air and refill cooling system. Refer to **STANDARD PROCEDURE**.

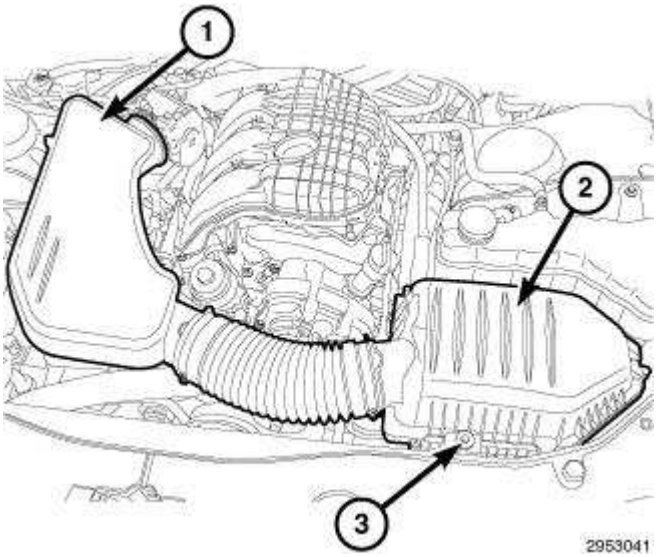

Fig. 117: Air Intake System And The Air Filter Box Cover
Courtesy of CHRYSLER GROUP, LLC

11. Install the air intake hose and resonator (1) assembly at the air filter housing.
12. Connect the intake air temperature sensor.
13. Connect negative battery cable.
14. Check the cooling system for leaks. Refer to **DIAGNOSIS AND TESTING**.

5.7L/6.4L

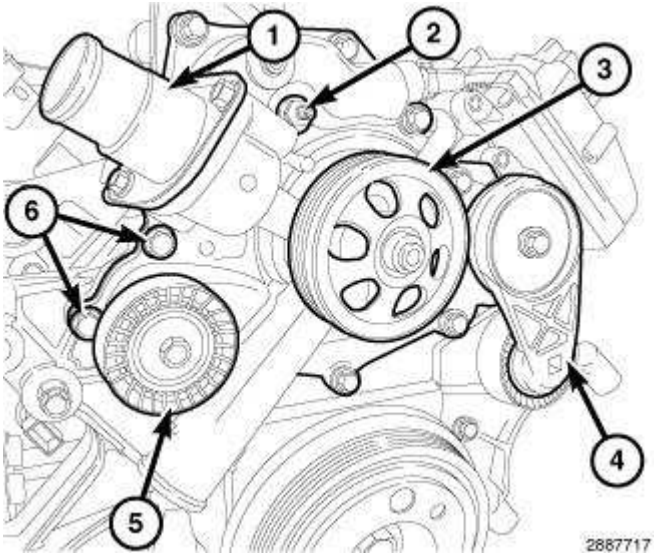

Fig. 118: Thermostat Housing, Water Pump, Belt Tensioner, & Idler Pulley
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the mating surfaces of the timing chain cover and the waterpump.
2. Install the metal bypass tube while positioning the water pump (3) to the timing chain cover. Tighten mounting bolts (6) to 24 N.m (18 ft. lbs.).
3. Install the upper stud bolt (2). Tighten mounting bolts (6) to 24 N.m (18 ft. lbs.).
4. Install the lower radiator hose.
5. Install belt tensioner assembly (4). Refer to **TENSIONER, BELT, INSTALLATION**.
6. Install idler pulley (5).

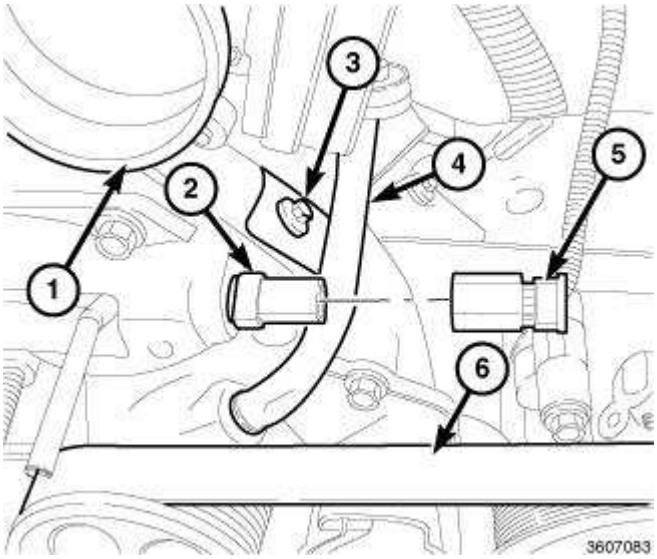

Fig. 119: Temperature Sensor, Connector, Metal Tube, Bolt & Drive Belt
Courtesy of CHRYSLER GROUP, LLC

7. Install upper metal heater tube. Tighten mounting bolts to 12 N.m (106 in. lbs.).
8. Connect the temperature sensor (2) electrical connector (5).
9. Install serpentine belt (6). Refer to **BELT, SERPENTINE, INSTALLATION**.
10. Install the resonator mounting bracket.
11. Install cooling fan assembly. Refer to **FAN, COOLING, INSTALLATION**.
12. Install the upper radiator hose to the thermostat housing (1).
13. Install the air intake assembly. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
14. Connect negative battery cable.
15. Evacuate air and refill cooling system. Refer to **STANDARD PROCEDURE**.
16. Check cooling system for leaks. Refer to **DIAGNOSIS AND TESTING**.

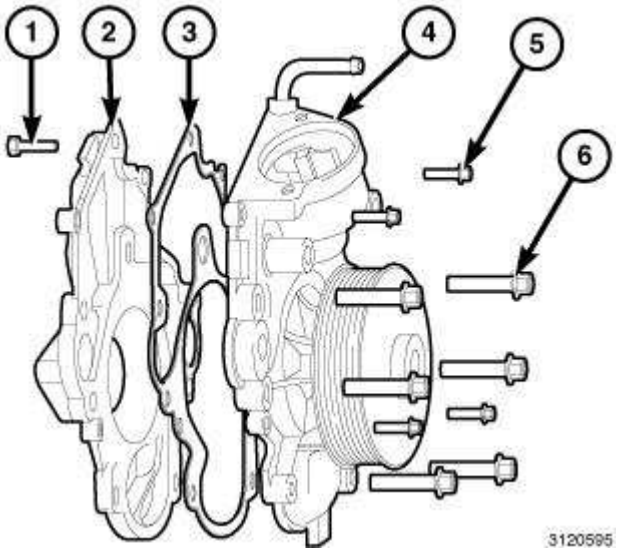

Fig. 120: Exploded View Of Water Pump
Courtesy of CHRYSLER GROUP, LLC

1. Clean mating surfaces. Install a new water pump gasket (3).
2. Install the water pump (4) onto the rear water pump housing (2). Loosely install the bolts (6).
3. Tighten front (5) and rear (1) fasteners to 11 N.m (97 in. lbs.).
4. Tighten mounting bolts (6) to 24 N.m (18 ft. lbs.).

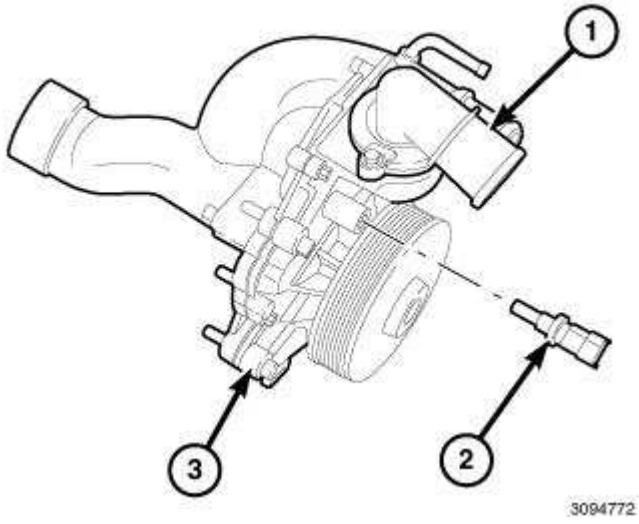

Fig. 121: Temperature Sensor & Thermostat Housing
Courtesy of CHRYSLER GROUP, LLC

5. Install the temperature sensor (2).
6. Install the thermostat housing assembly (1). Tighten to 11 N.m (97 in. lbs.)

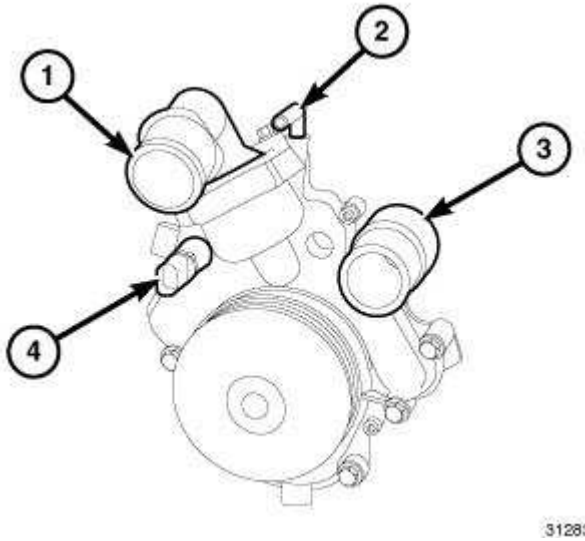

Fig. 122: Thermostat Housing, Purge Tube, Heater Supply Hose Fitting & Bypass Housing
Courtesy of CHRYSLER GROUP, LLC

7. Connect the temperature sensor (4) electrical connector.
8. Install the lower radiator hose to the bypass housing (3).
9. Install the coolant recovery bottle purge hose to the purge tube (2).
10. Install the upper radiator hose to the thermostat housing (1).

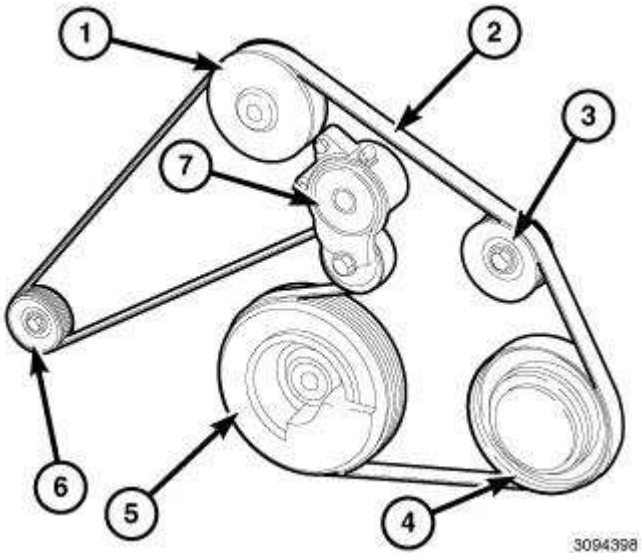

Fig. 123: Pulleys, Tensioner & Drive Belt Routing 3.0L
Courtesy of CHRYSLER GROUP, LLC

11. Install the belt tensioner mounting bracket.
12. Install belt tensioner assembly (7). Refer to **TENSIONER, BELT, INSTALLATION**.

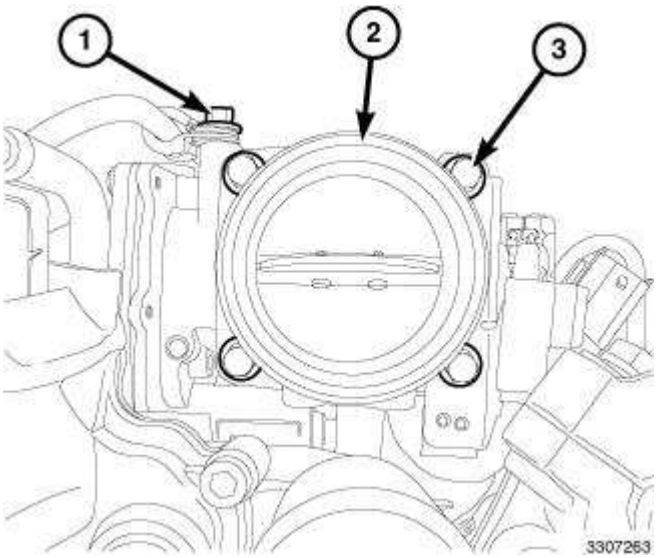

Fig. 124: (EGR) Air Flow Control Valve
Courtesy of CHRYSLER GROUP, LLC

13. Install the EGR air control valve (2). Refer to **VALVE, EXHAUST GAS RECIRCULATION (EGR), INSTALLATION** .
14. Install the air intake assembly. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
15. Connect negative battery cable.
16. Evacuate air and refill cooling system. Refer to **STANDARD PROCEDURE**.
17. Check cooling system for leaks. Refer to **DIAGNOSIS AND TESTING**.

RADIATOR, ENGINE COOLING

REMOVAL

3.6L

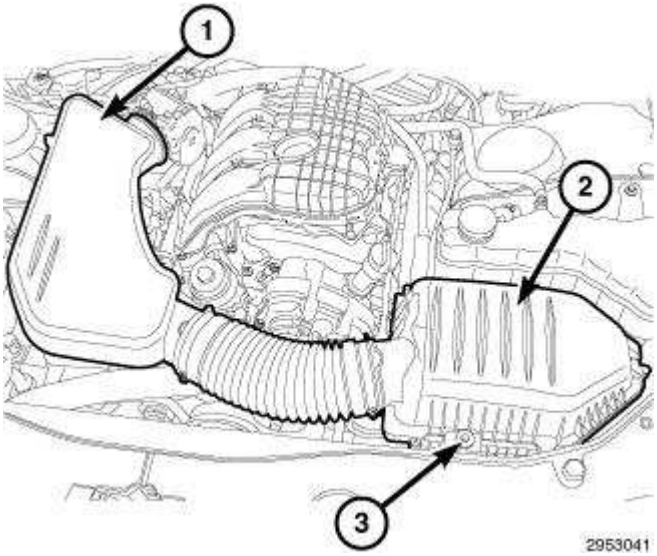

Fig. 125: Air Intake System And The Air Filter Box Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Remove the air intake assembly.
3. Drain cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove upper radiator hose.

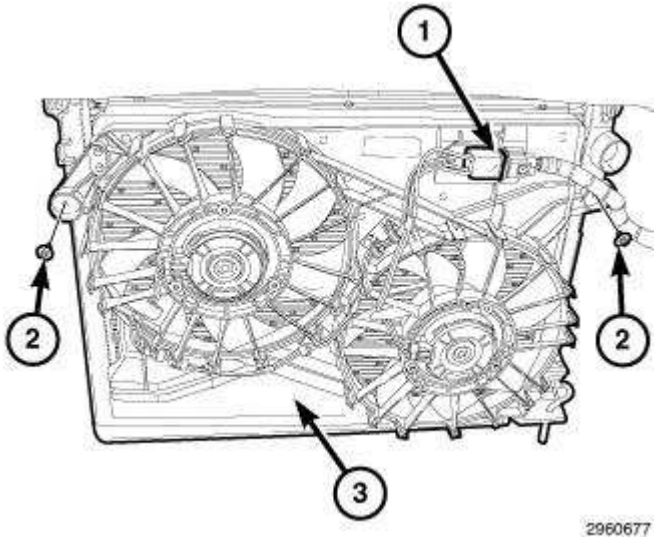

Fig. 126: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove radiator fan assembly (3). Refer to **FAN, COOLING, REMOVAL**.
6. Raise vehicle.

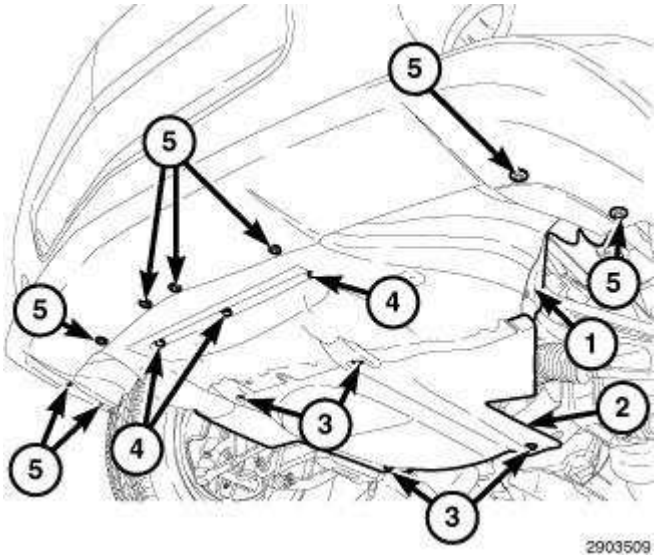

Fig. 127: Lower Engine Cover & Front Air Shield
Courtesy of CHRYSLER GROUP, LLC

7. Remove the lower engine cover.

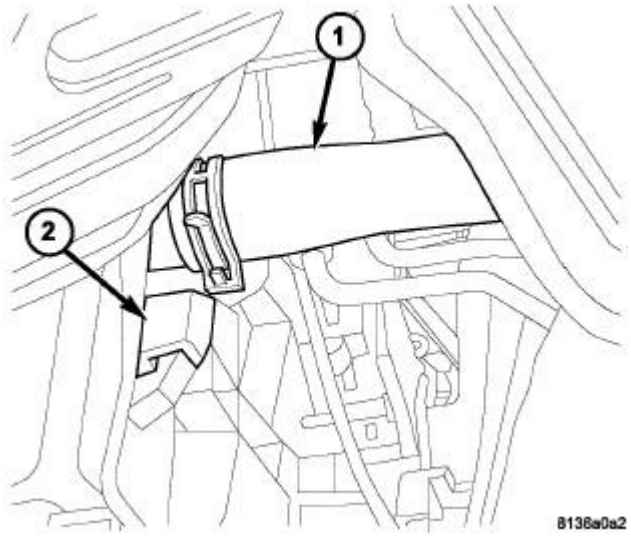

Fig. 128: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

8. Remove lower radiator hose (1).
9. Lower vehicle.

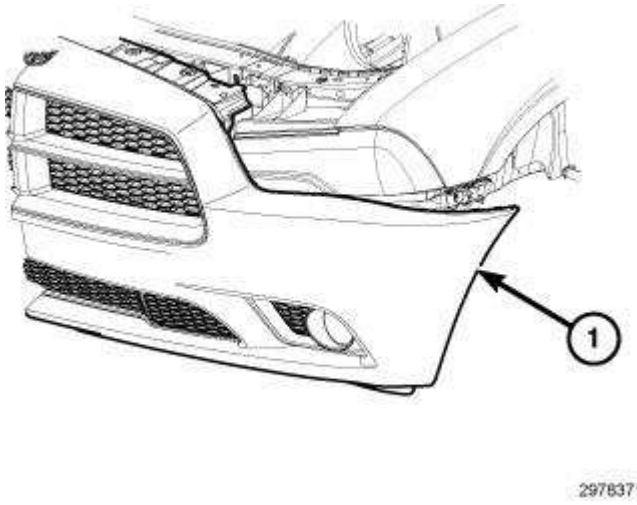

Fig. 129: Front Bumper Fascia
Courtesy of CHRYSLER GROUP, LLC

10. Remove the front bumper fascia. Refer to **FASCIA, FRONT, REMOVAL** .

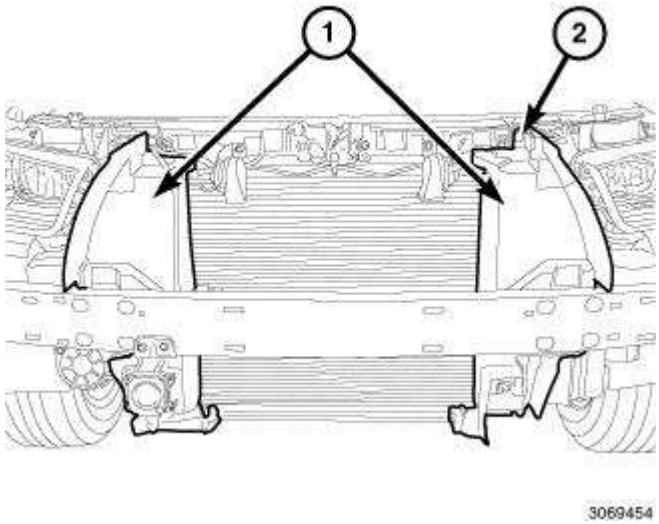

Fig. 130: Air Deflectors
Courtesy of CHRYSLER GROUP, LLC

11. Remove the air deflectors (1).

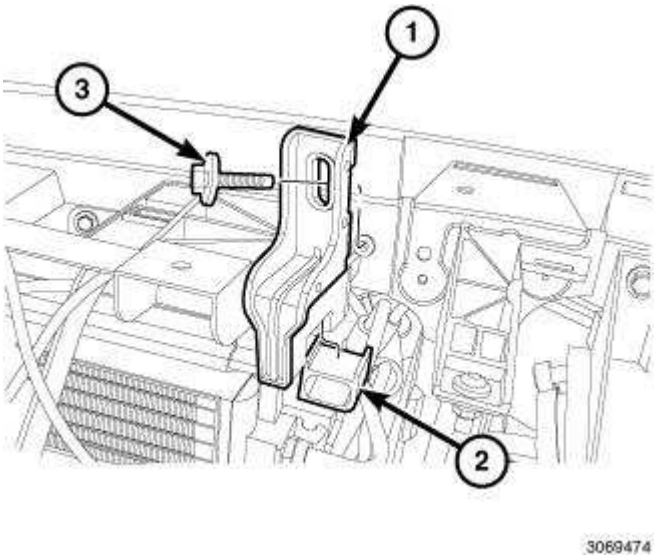

Fig. 131: Upper Radiator Mounting Brackets Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Bolts are installed with threadlocker. Use hand tools to remove the upper radiator mounting bolts.

12. Remove upper radiator mounting brackets bolts (3).
13. Remove the upper radiator brackets (1) from the radiator supports (2)

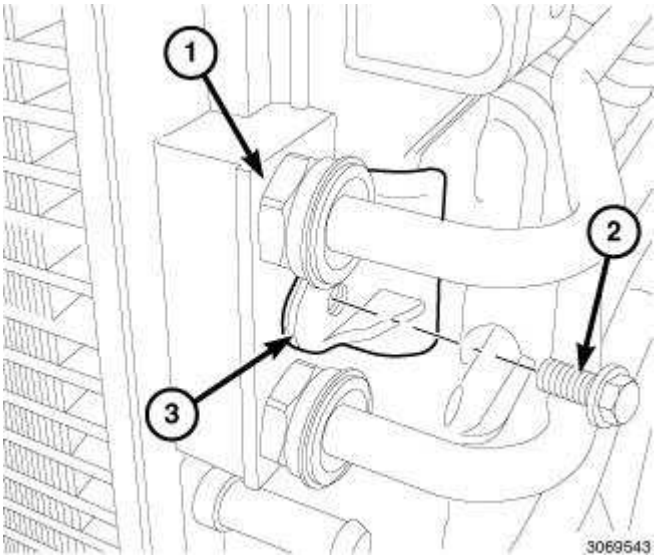

Fig. 132: Support Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Remove the lower condenser mounting bolts.
15. Remove the support bolt (2) located between the cooler lines.
16. Using a suitable hanger. Support the condensor and remove the right side upper mounting bolt.

17. Separate condenser assembly from radiator.
18. Tilt radiator toward engine and remove radiator from vehicle.

5.7L/6.4L

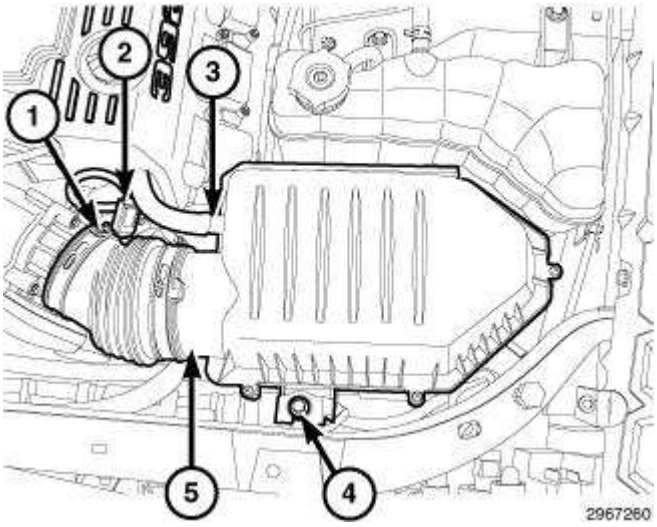

Fig. 133: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Remove the air intake assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Drain cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove upper radiator hose.
5. Raise vehicle.

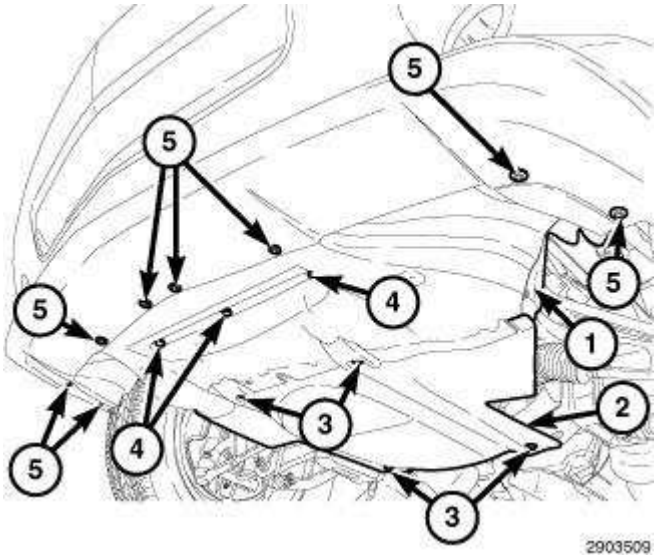

Fig. 134: Lower Engine Cover & Front Air Shield
Courtesy of CHRYSLER GROUP, LLC

6. Remove the lower engine cover.

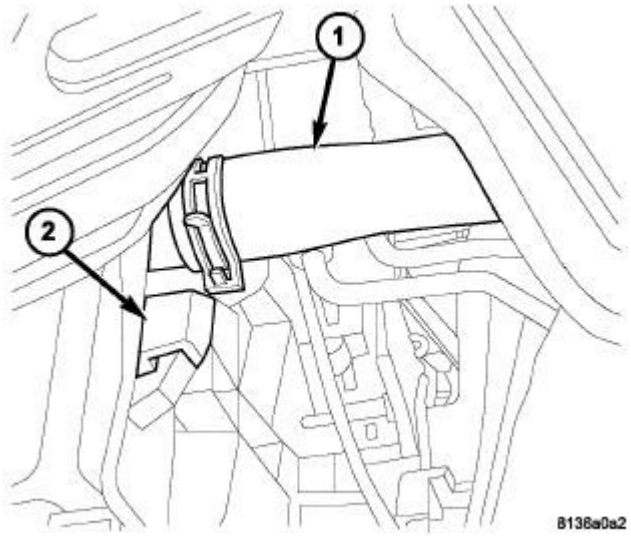

Fig. 135: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

7. Remove lower radiator hose (1).

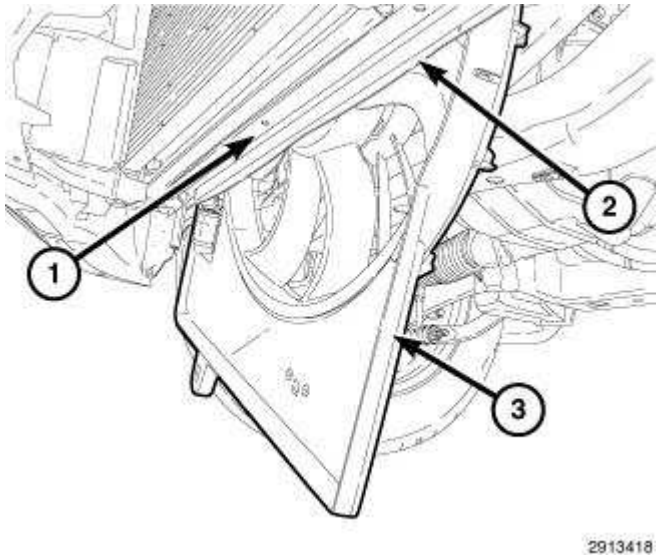

Fig. 136: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

8. Remove radiator fan assembly (3). Refer to **FAN, COOLING, REMOVAL**.

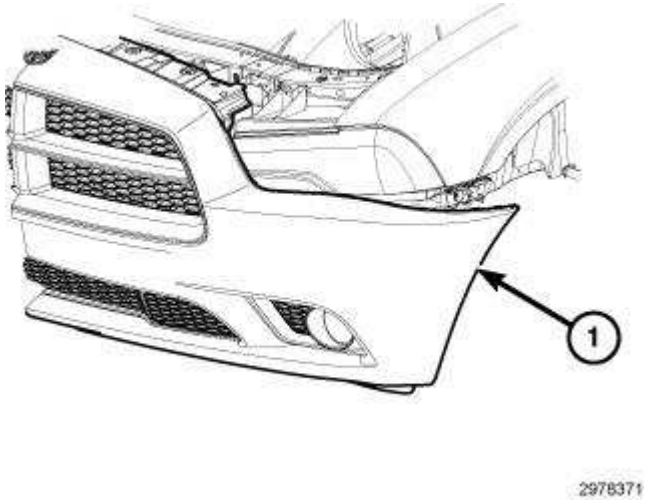

Fig. 137: Front Bumper Fascia
Courtesy of CHRYSLER GROUP, LLC

9. Remove the front bumper fascia. Refer to **FASCIA, FRONT, REMOVAL** .
10. Lower vehicle.

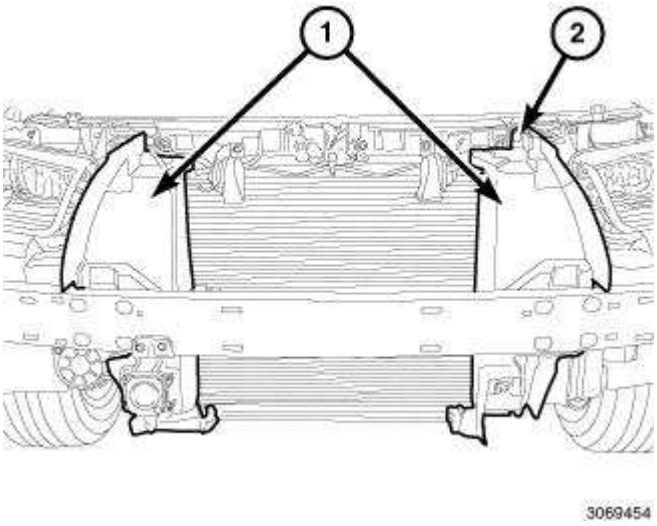

Fig. 138: Air Deflectors
Courtesy of CHRYSLER GROUP, LLC

11. Remove the air deflectors (1).

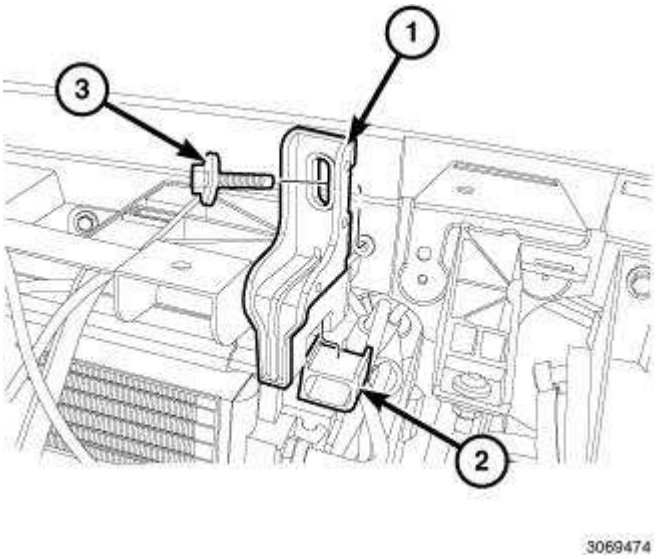

Fig. 139: Upper Radiator Mounting Brackets Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Bolts are installed with threadlocker. Use hand tools to remove the upper radiator mounting bolts.

12. Remove upper radiator mounting brackets bolts (3).
13. Remove the upper radiator brackets (1) from the radiator supports (2)

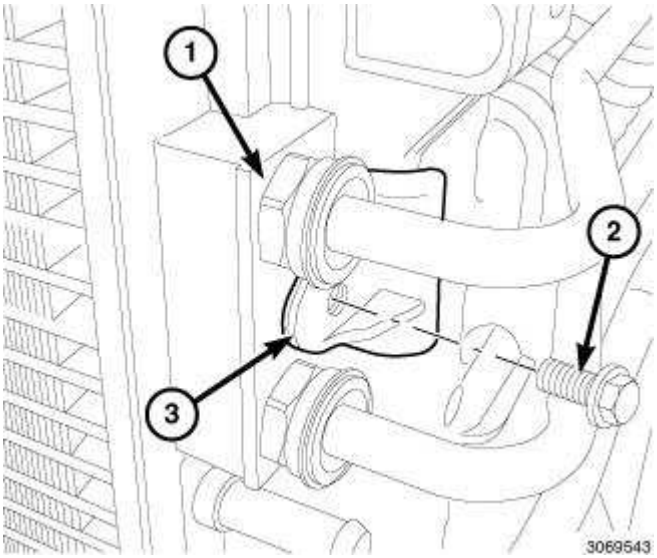

Fig. 140: Support Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Remove the lower condenser mounting bolts.
15. Remove the support bolt (2) located between the cooler lines.
16. Using a suitable hanger. Support the condensor and remove the right side upper mounting bolt.

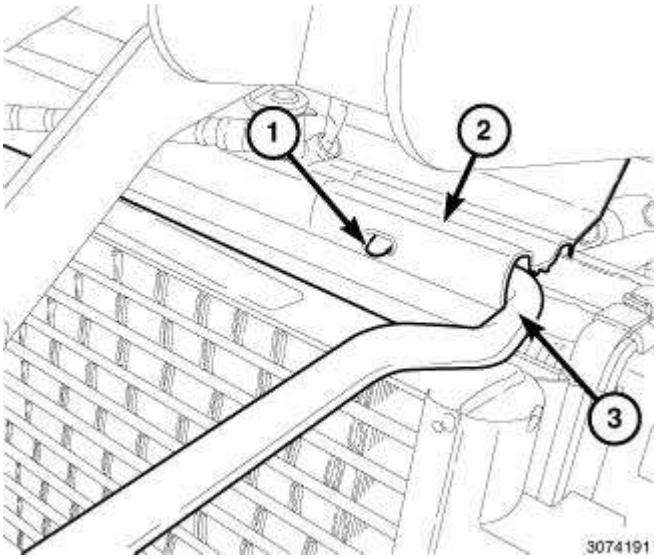

Fig. 141: Upper Shroud Cover, Pick & Clip
Courtesy of CHRYSLER GROUP, LLC

NOTE: To aid in removal. The upper shroud cover must be removed before the radiator. Leaving the cover on may cause the radiator to become jammed against the upper core support.

17. Carefully remove the upper shroud cover (2) by using a pick (3) to pull the cover retaining hole away from the clip (1) along the edge.

18. Tilt radiator toward engine for clearance from condensor.
19. Raise vehicle.

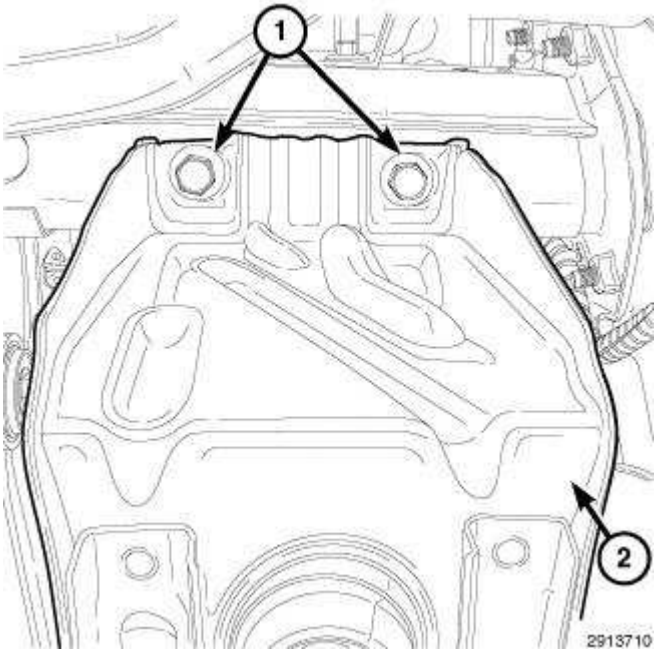

Fig. 142: Lower Radiator Core Support Bolts & Core Support
Courtesy of CHRYSLER GROUP, LLC

20. Using a suitable jack. Remove the lower radiator core support bolts (1).
21. Using care not to damage condensor or radiator fins. Lower the core support with the radiator.
22. Remove the radiator from the core support.

INSPECTION

INSPECTION

Inspect the radiator tanks for cracks, broken or missing fittings also inspect the joint where the tanks seam up to the radiator core for signs of leakage and/or deteriorating seals.

Inspect radiator core for corroded, bent or missing cooling fins. Inspect the core for bent or damaged cooling tubes.

INSTALLATION

3.6L

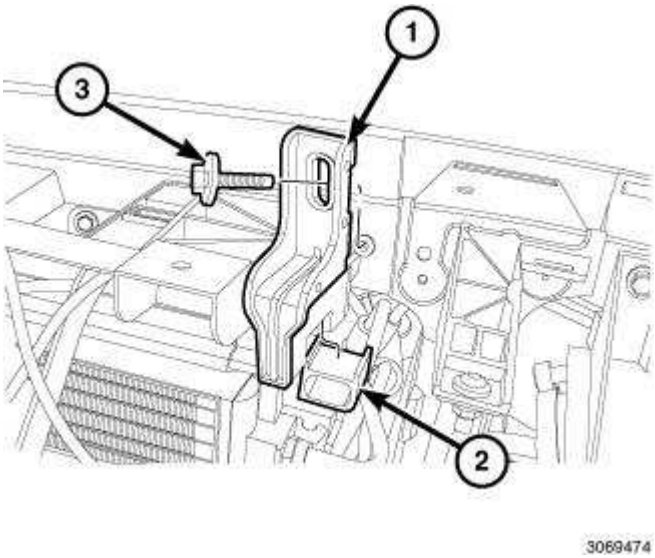

Fig. 143: Upper Radiator Mounting Brackets Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the radiator into engine compartment. Seat the radiator assembly lower rubber isolators into the mounting holes in radiator lower support.
2. Install the radiator mounting bracket (1) and bolts (2). Tighten to 12 N.m (106 in. lbs.).

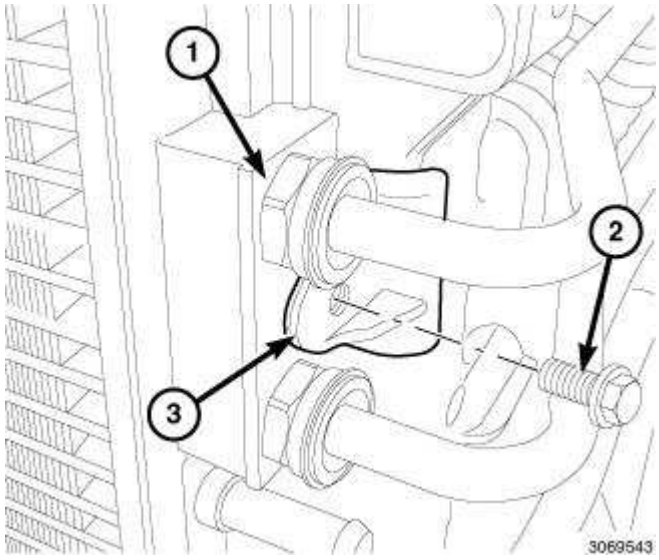

Fig. 144: Support Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Position the condenser on radiator and loosely install the support bolt.
4. Install upper and lower mounting bolt. Tighten bolts to 10 N.m (88 in. lbs.).
5. Tighten the support bolt to 10 N.m (88 in. lbs.).

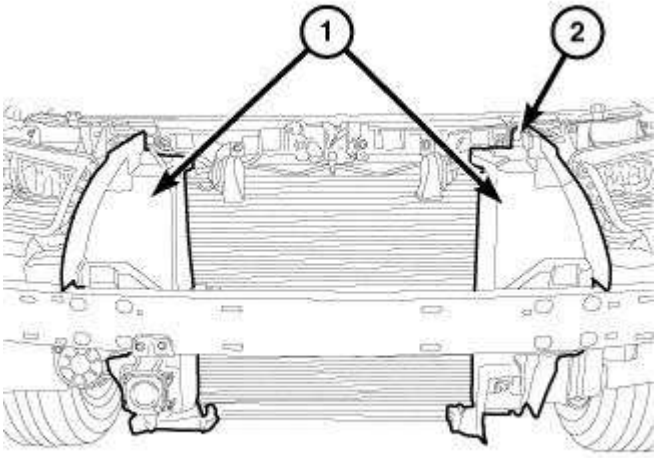

Fig. 145: Air Deflectors
Courtesy of CHRYSLER GROUP, LLC

6. Install the air deflectors (1).
7. Position the hood latch release cable (2) through the notch in deflector.

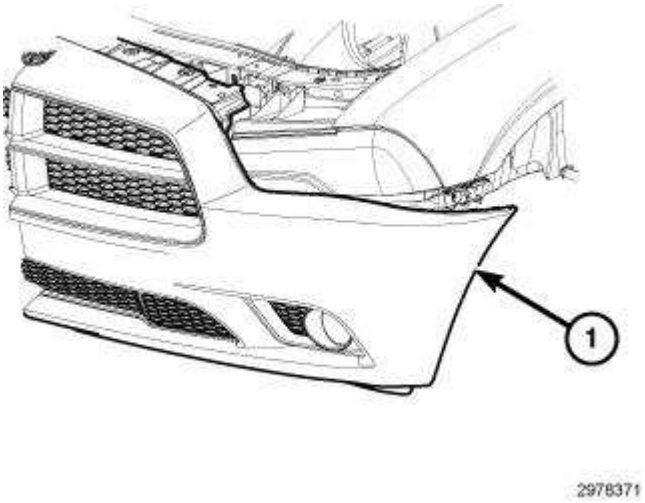

Fig. 146: Front Bumper Fascia
Courtesy of CHRYSLER GROUP, LLC

8. Install the front bumper fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
9. Raise the vehicle.

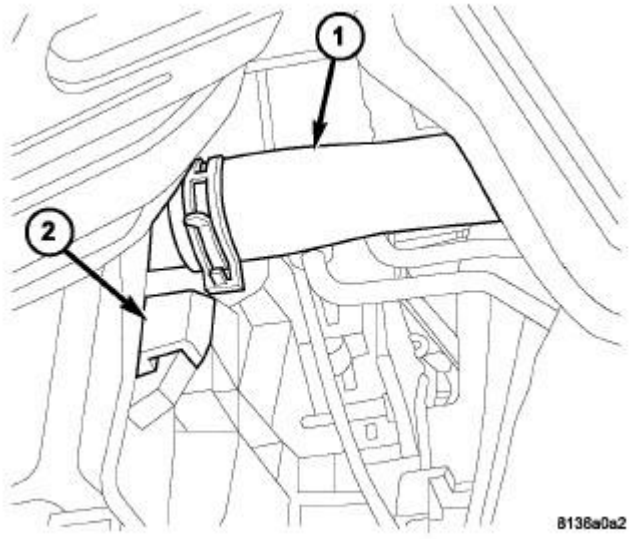

Fig. 147: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

10. Install the lower radiator hose (1) and clamp.

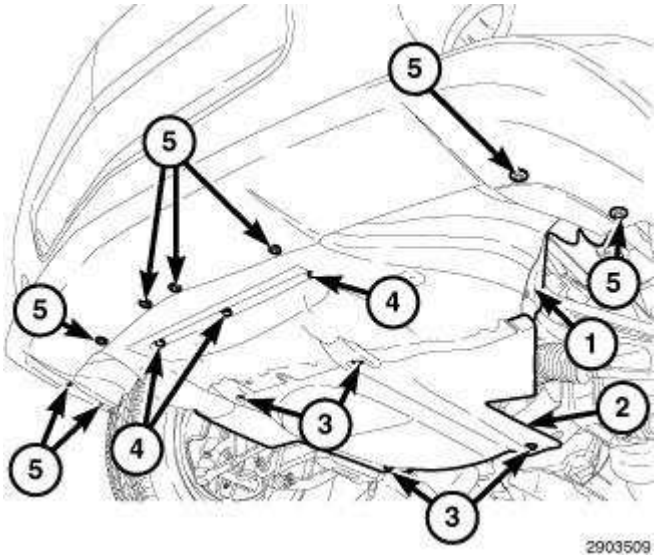

Fig. 148: Lower Engine Cover & Front Air Shield
Courtesy of CHRYSLER GROUP, LLC

11. Install the lower engine cover.
12. Lower vehicle.

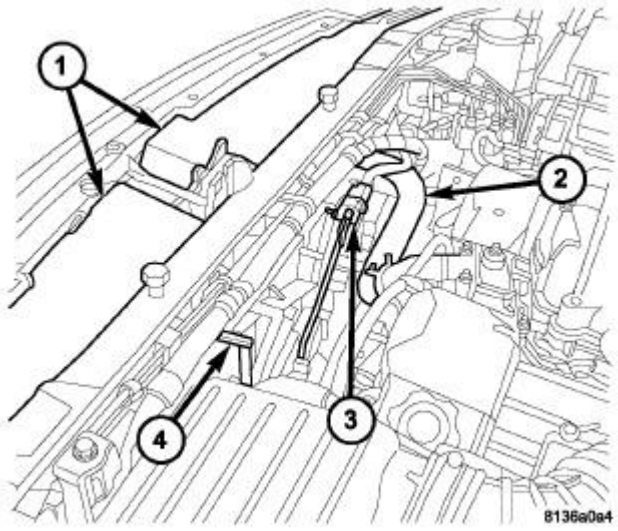

Fig. 149: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - UPPER RADIATOR CLOSURE PANELS
2 - UPPER RADIATOR HOSE
3 - RADIATOR FAN ELECTRICAL CONNECTOR
4 - RADIATOR FAN ASSEMBLY

13. Install the radiator fan. Refer to **FAN, COOLING, INSTALLATION**.
14. Install the upper radiator upper hose (2). Align hose so it does not interfere with the accessory drive belt or engine. Position hose clamp so it will not interfere with the hood.
15. Connect the negative cable.
16. Fill the cooling system with coolant. Refer to **STANDARD PROCEDURE**.
17. Operate the engine until it reaches normal operating temperature. Check the cooling system and automatic transmission for the correct fluid levels.

5.7L/6.4L

NOTE: Assistance may be required for radiator placement into vehicle till the lower radiator core support has been installed.

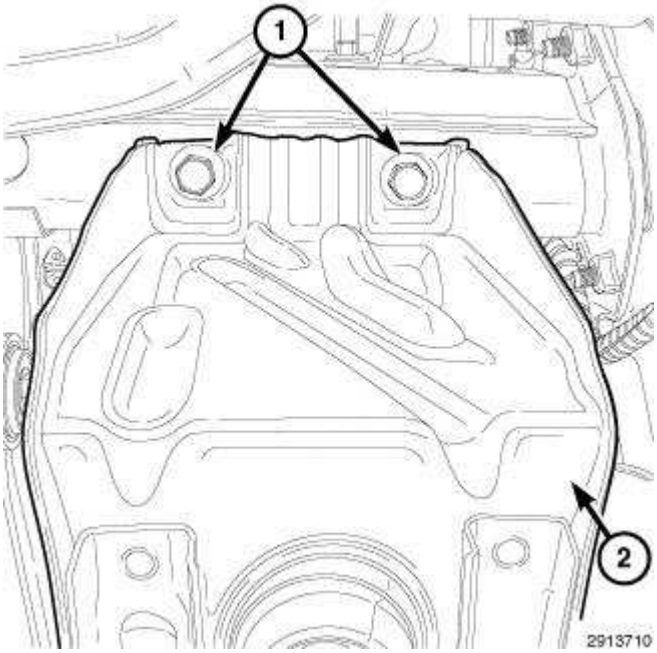

Fig. 150: Lower Radiator Core Support Bolts & Core Support
Courtesy of CHRYSLER GROUP, LLC

1. Position the radiator onto engine compartment.
2. Position the lower radiator core support in vehicle.
3. **Loosely** install the lower radiator core support (2) Bolts (1).
4. Seat the radiator assembly lower rubber isolators into the mounting holes in radiator lower support.

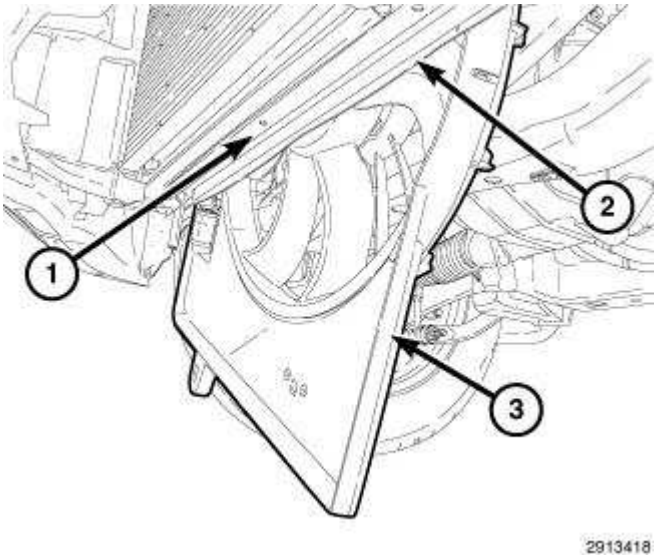

Fig. 151: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Install the radiator fan. Refer to **FAN, COOLING, INSTALLATION**.

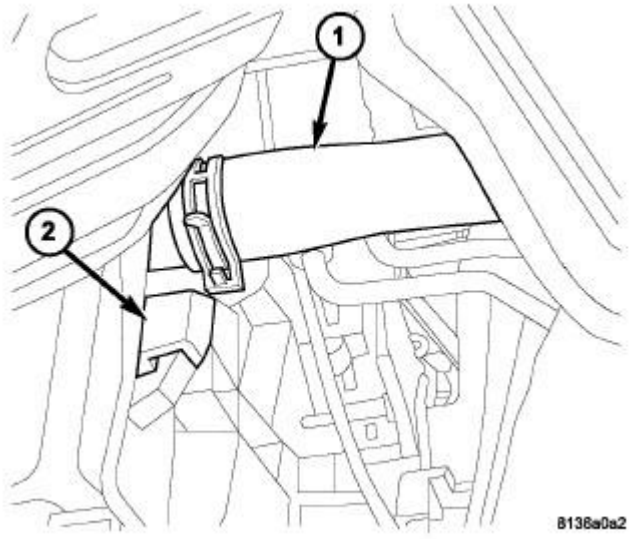

Fig. 152: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

1 - LOWER RADIATOR HOSE
2 - RADIATOR FAN ASSEMBLY

6. Install the lower radiator hose (1) and clamp.

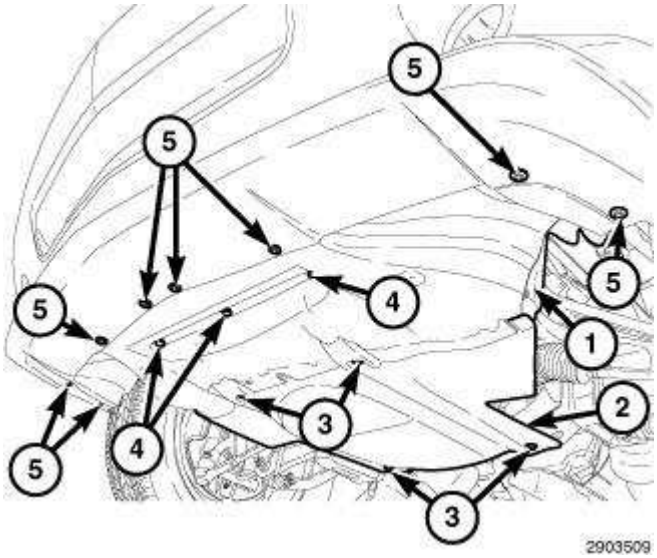

Fig. 153: Lower Engine Cover & Front Air Shield
Courtesy of CHRYSLER GROUP, LLC

7. Install the lower engine cover.
8. Lower vehicle.

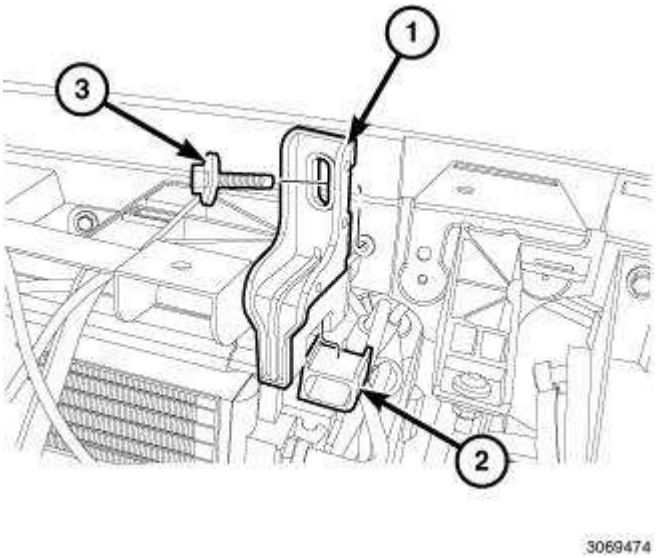

Fig. 154: Upper Radiator Mounting Brackets Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the upper shroud cover by applying pressure downwards till the snap into place.
10. Install the radiator mounting bracket (1) and bolts (2). Tighten to 12 N.m (106 in. lbs.).

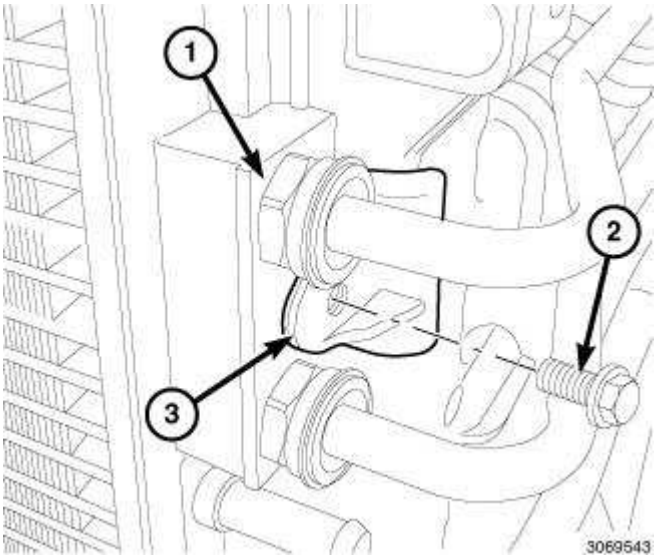

Fig. 155: Support Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Position the condenser on radiator and loosely install the support bolt (3).
12. Install the condensors upper and lower mounting bolts. Tighten bolts to 10 N.m (88 in. lbs.).
13. Tighten the support bolt (3) to 10 N.m (88 in. lbs.).

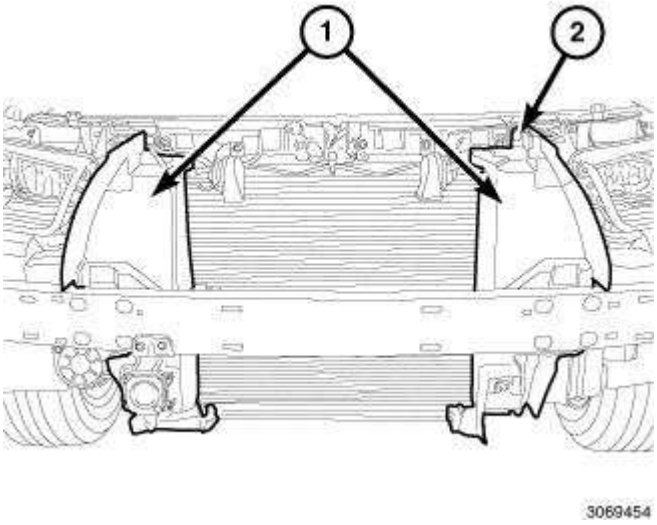

Fig. 156: Air Deflectors
Courtesy of CHRYSLER GROUP, LLC

14. Install the air deflectors (1).
15. Position the hood latch release cable (2) through the notch in deflector.

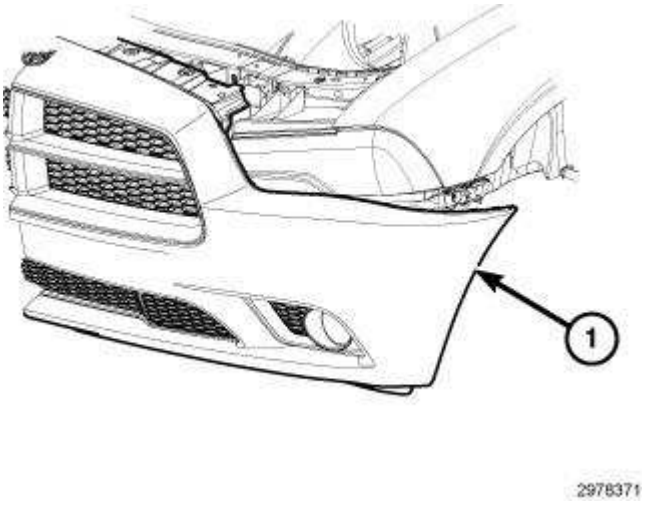

Fig. 157: Front Bumper Fascia
Courtesy of CHRYSLER GROUP, LLC

16. Install the front bumper fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
17. Install the upper radiator upper hose (2). Align hose so it does not interfere with the accessory drive belt or engine.
18. Connect the negative cable.

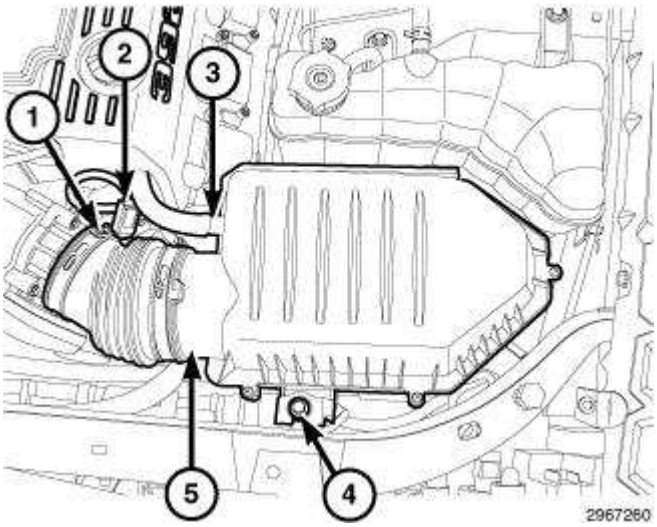

Fig. 158: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

19. Install the air intake assembly. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
20. Fill the cooling system with coolant. Refer to **STANDARD PROCEDURE**.
21. Operate the engine until it reaches normal operating temperature. Check the cooling system and automatic transmission for the correct fluid levels.

SENSOR, COOLANT TEMPERATURE

REMOVAL

3.6L

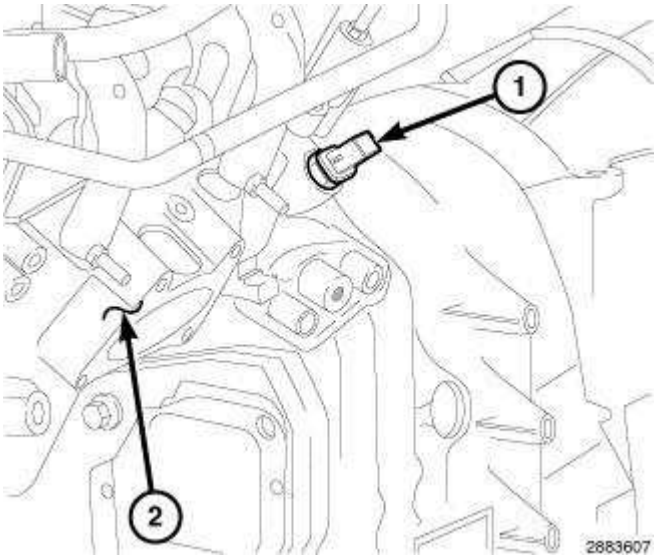

Fig. 159: Engine Coolant Temperature (ECT) Sensor
Courtesy of CHRYSLER GROUP, LLC

The Engine Coolant Temperature (ECT) sensor on the 3.6L engine is installed into a water jacket at rear of the cylinder head on the left side of the engine.

WARNING: Hot, pressurized coolant can cause injury by scalding. Cooling system must be partially drained before removing the coolant temperature sensor.

NOTE: Do not waste reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

1. Partially drain the cooling system. Refer to **STANDARD PROCEDURE**.
2. Disconnect the electrical connector from the sensor.
3. Remove the sensor from the cylinder head.

5.7L/6.4L

The Engine Coolant Temperature (ECT) sensor is located on the upper portion of the water pump housing. It is installed into a water jacket inline with the thermostat.

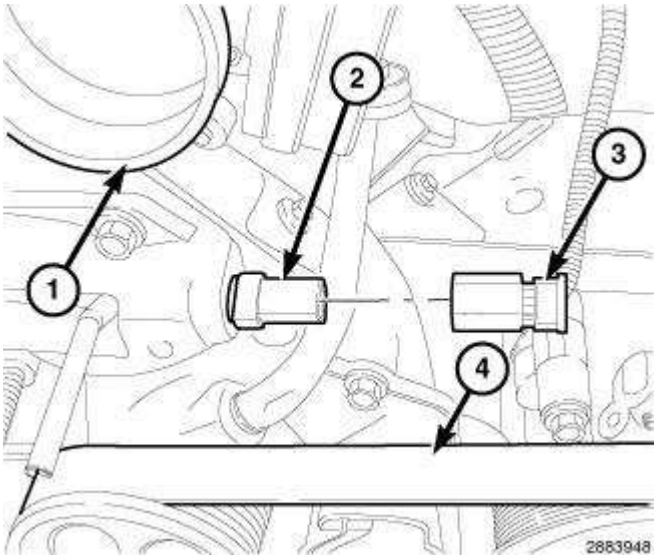

Fig. 160: Electrical Connector, Sensor & Water Pump Housing
Courtesy of CHRYSLER GROUP, LLC

WARNING: Hot, pressurized coolant can cause injury by scalding. Cooling system must be partially drained before removing the coolant temperature sensor.

1. Remove the air intake system. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

NOTE: Do not waste reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

2. Partially drain the cooling system. Refer to **STANDARD PROCEDURE**.
3. Disconnect electrical connector (3) from sensor (2).
4. Remove sensor from the water pump housing.

3.0L

The Engine Coolant Temperature (ECT) sensor is located on the upper portion of the water pump housing. It is installed into a water jacket inline with the thermostat.

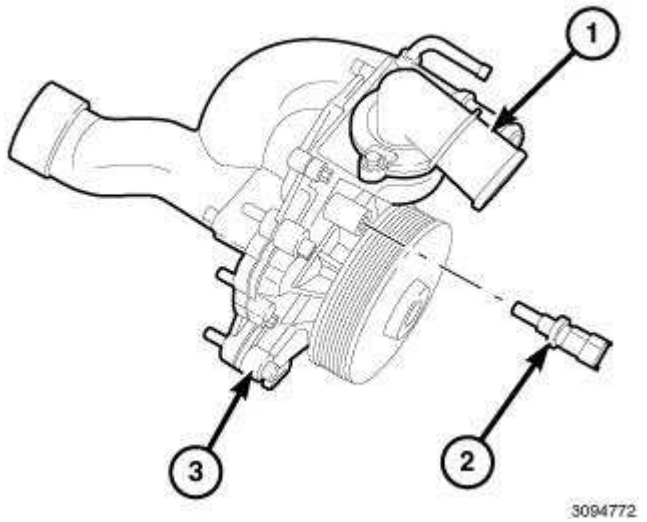

Fig. 161: Temperature Sensor & Thermostat Housing
Courtesy of CHRYSLER GROUP, LLC

WARNING: Hot, pressurized coolant can cause injury by scalding. Cooling system must be partially drained before removing the coolant temperature sensor.

1. Disconnect the negative battery cable.
2. Remove the air intake system.

NOTE: Do not waste reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

3. Partially drain the cooling system. Refer to **STANDARD PROCEDURE**.
4. Disconnect electrical connector from sensor.
5. Remove sensor (2) from the water pump housing.

INSTALLATION

3.6L

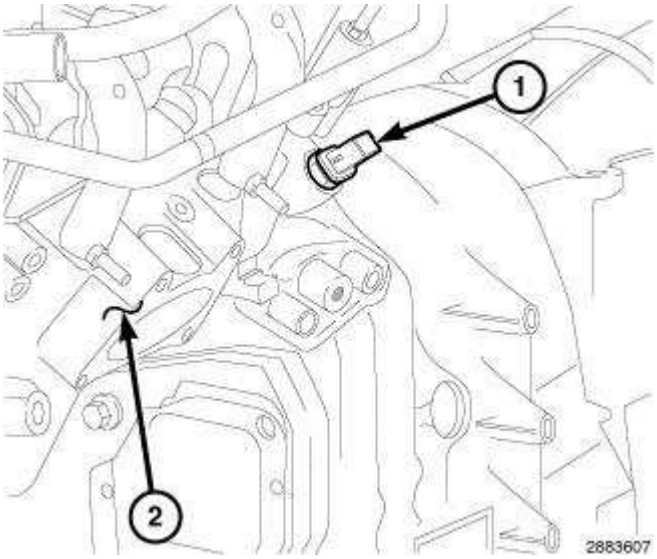

Fig. 162: Engine Coolant Temperature (ECT) Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Apply MOPAR™ thread sealant with PFTE part number 04318034 to sensor threads.
2. Install sensor (1) to cylinder head.
3. Tighten sensor to 11 N.m (8 ft. lbs.) torque.
4. Connect electrical connector to sensor.
5. Replace any lost engine coolant. Refer to **STANDARD PROCEDURE**.

5.7L / 6.4L

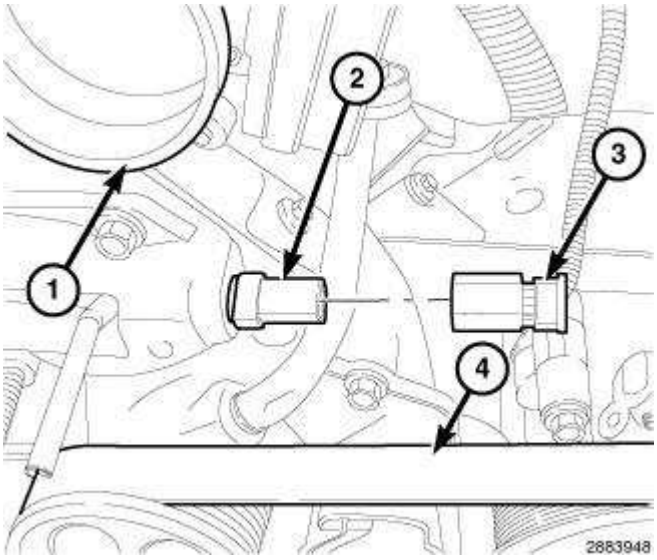

Fig. 163: Electrical Connector, Sensor & Water Pump Housing
Courtesy of CHRYSLER GROUP, LLC

1. Apply MOPAR® thread sealant with PFTE to the sensor threads.

2. Install the coolant temperature sensor (2) into water pump housing.
3. Tighten the coolant temperature sensor to 11 N.m (8 ft. lbs.).
4. Connect the coolant temperature sensor electrical connector (3).
5. Install air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
6. Replace any lost engine coolant. Refer to **STANDARD PROCEDURE**.

3.0L

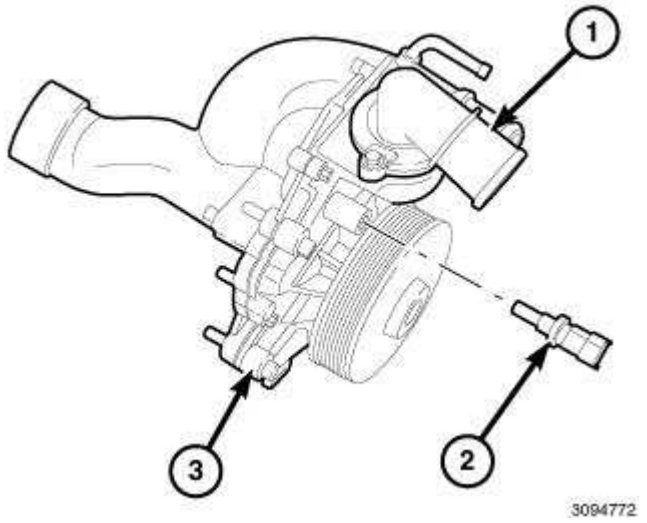

Fig. 164: Temperature Sensor & Thermostat Housing
Courtesy of CHRYSLER GROUP, LLC

1. Apply MOPAR® thread sealant with PFTE to the sensor threads.
2. Install the coolant temperature sensor (2) into water pump housing (3).
3. Tighten the coolant temperature sensor to 11 N.m (8 ft. lbs.).
4. Connect the coolant temperature sensor electrical connector.
5. Install air intake system.
6. Replace any lost engine coolant. Refer to **STANDARD PROCEDURE**.

THERMOSTAT

DESCRIPTION

DESCRIPTION

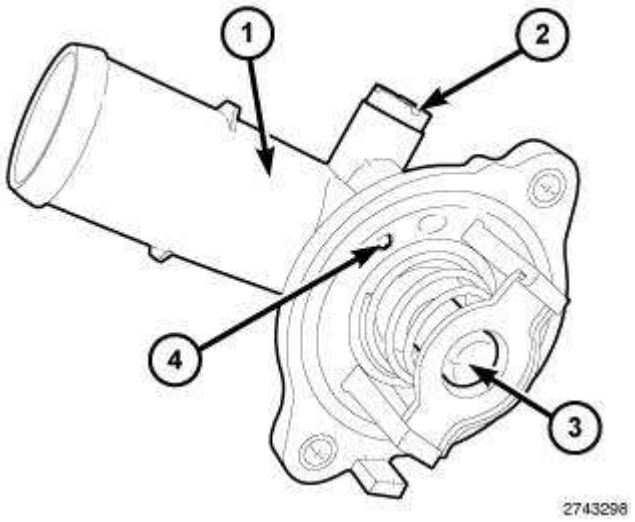

Fig. 165: Thermostat Is Part Of The Housing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not operate an engine without a thermostat, except for servicing or testing.

A pellet-type thermostat controls the operating temperature of the engine by controlling the amount of coolant flow to the radiator. On all engines the thermostat is closed below 195°F (90°C). Above this temperature, coolant is allowed to flow to the radiator. This provides quick engine warm up and overall temperature control.

The same thermostat is used for winter and summer seasons. An engine should not be operated without a thermostat, except for servicing or testing. Operating without a thermostat causes other problems. These are: longer engine warm-up time, unreliable warm-up performance, increased exhaust emissions and crankcase condensation. This condensation can result in sludge formation.

The thermostat is part of the housing.

OPERATION

OPERATION

WARM-UP PHASE

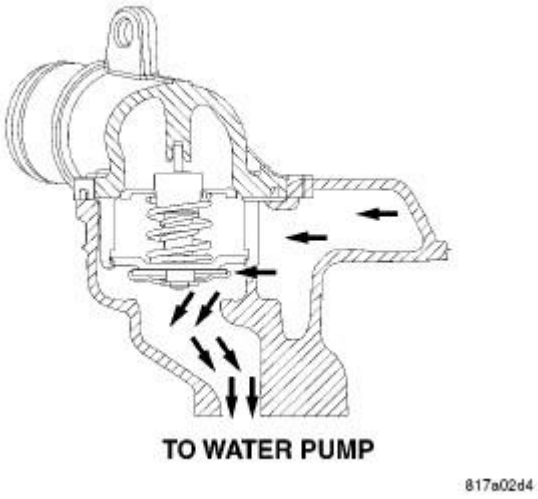

Fig. 166: Warm-Up Phase
Courtesy of CHRYSLER GROUP, LLC

Up to a coolant temperature of approximately 87° C (189° F), the main valve is closed and the bypass valve fully open. The flow through the radiator is interrupted and coolant flows through the bypass passage directly to the inlet side of the water pump.

PARTIAL-LOAD PHASE

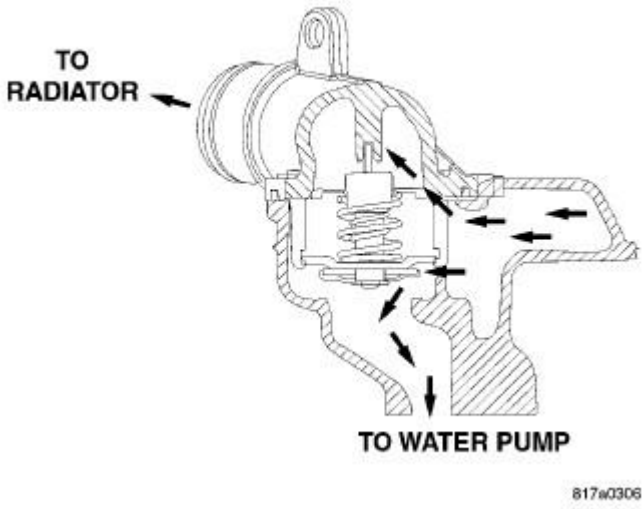

Fig. 167: Partial-Load Phase
Courtesy of CHRYSLER GROUP, LLC

The main valve begins to open at a coolant temperature of 86° C (189° F), and a small amount of coolant flows through the radiator. As the engine temperature increases, the main valve opens further

and the bypass valve gradually closes. More coolant flows through the radiator and less coolant flows through the bypass passage.

FULL-LOAD PHASE

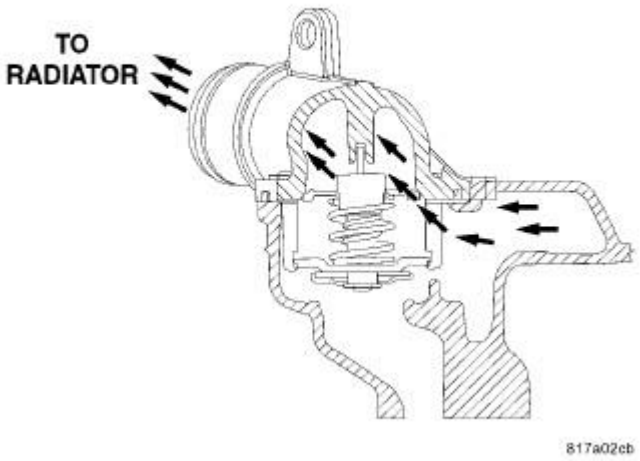

Fig. 168: Full-Load Phase
Courtesy of CHRYSLER GROUP, LLC

The main valve is fully open at a coolant temperature above 102° C (216° F). The bypass plate seals off the bypass passage. The entire quantity of coolant flows through the radiator.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ENGINE COOLANT THERMOSTAT

The thermostat is operated by a wax filled chamber (pellet) which is sealed. When heated coolant reaches a predetermined temperature the wax pellet expands enough to overcome the closing spring and water pump pressure, which forces the valve to open. Coolant leakage into the pellet will cause a thermostat to fail open. Do not attempt to free up a thermostat with a screwdriver.

Thermostat diagnostics is included in powertrain control module's (PCM) programing for on-board diagnosis. The malfunction indicator light (MIL) will illuminate and a diagnostic trouble code (DTC) will be set when an "open too soon" condition occurs. Do not change a thermostat for lack of heater performance or temperature gauge position, unless a DTC is present. For other probable causes. Refer to **DIAGNOSIS AND TESTING**. Thermostat failing shut is the normal long term mode of failure, and normally, only on high mileage vehicles. The temperature gauge will indicate this .

REMOVAL

3.6L

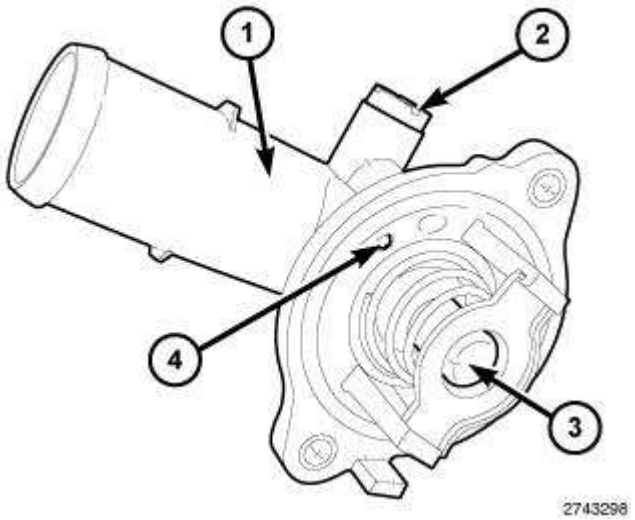

Fig. 169: Thermostat Is Part Of The Housing
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not loosen radiator draincock with system hot and pressurized. Serious burns from coolant can occur.

CAUTION: The Thermostat and housing is serviced as an assembly. Do not remove the thermostat from the housing, damage to the thermostat may occur.

Do not waste reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

If thermostat is being replaced, be sure that replacement is specified thermostat for vehicle model and engine type.

1. Disconnect negative battery cable at battery.
2. Remove the air intake assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Drain cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove upper radiator hose clamp and upper radiator hose at thermostat housing (1).
5. Remove thermostat housing mounting bolts, thermostat housing (1) and thermostat (3).

3.6L COOLANT CROSSOVER

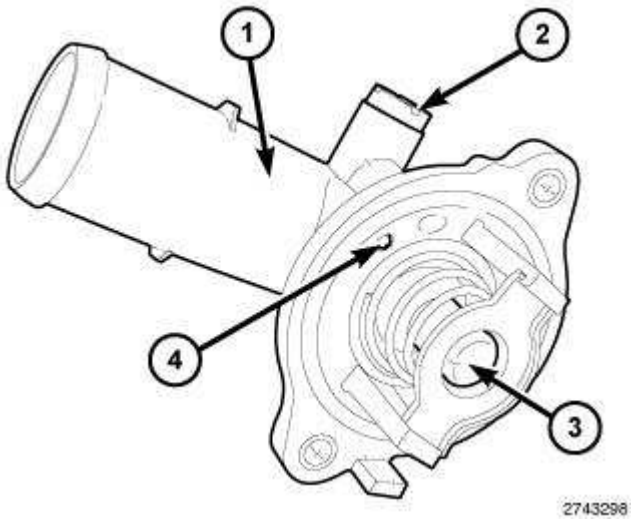

Fig. 170: Thermostat Is Part Of The Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the thermostat housing assembly. Refer to **THERMOSTAT, REMOVAL**.

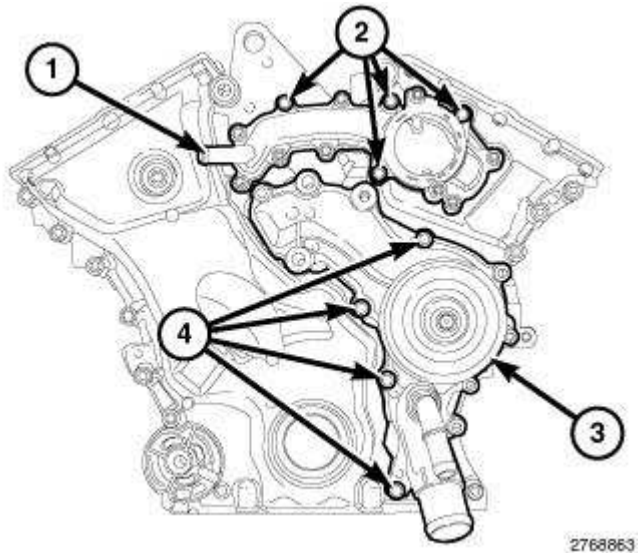

Fig. 171: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove the Heater supply hose from the coolant crossover (1).
3. Remove the coolant crossover mounting bolts. Take notice to the four bolts (2) that bolt directly to the timing cover.
4. Remove the coolant crossover and discard Gaskets.

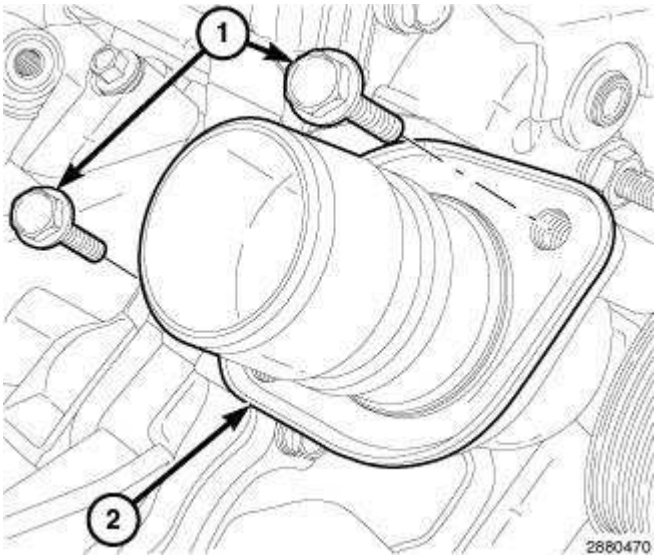

Fig. 172: Thermostat Housing & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not loosen the radiator draincock with the cooling system hot and pressurized. Serious burns from the coolant can occur.

Do not waste reusable coolant. If the solution is clean, drain the coolant into a clean container for reuse.

If the thermostat is being replaced, be sure that the replacement is the specified thermostat for the vehicle model and engine type.

1. Disconnect the negative battery cable.
2. Remove the air intake system. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Partially drain the cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove the upper radiator hose at the thermostat housing (2) and position aside.
5. Remove the thermostat housing mounting bolts (1), thermostat housing (2) and thermostat.

3.0L

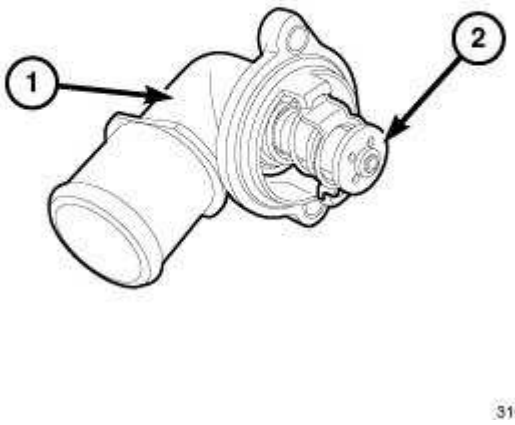

Fig. 173: Thermostat & Housing
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not loosen radiator draincock with system hot and pressurized. Serious burns from coolant can occur.

CAUTION: The Thermostat and housing is serviced as an assembly. Do not remove the thermostat from the housing, damage to the thermostat may occur.

Do not waste reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

If thermostat is being replaced, be sure that replacement is specified thermostat for vehicle model and engine type.

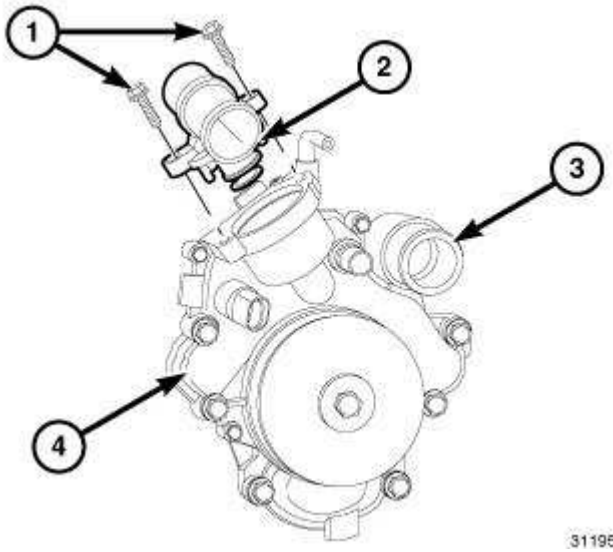

Fig. 174: Water Pump, Thermostat Housing & Bolts

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable at battery.
2. Remove the air intake assembly. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Drain cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove upper radiator hose at the thermostat housing (1) and position aside.
5. Remove thermostat housing mounting bolts, thermostat housing (1) assembly.

INSTALLATION

3.6L

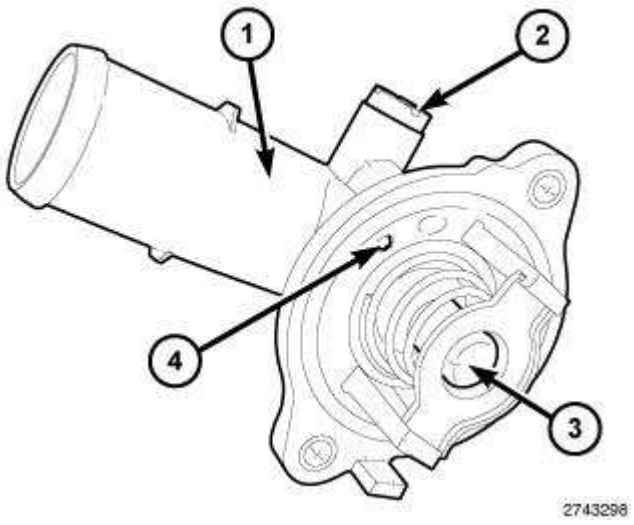

Fig. 175: Thermostat Is Part Of The Housing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The Thermostat and housing is serviced as an assembly. Do not remove the thermostat from the housing, damage to the thermostat may occur.

1. Clean mating areas of timing chain cover and thermostat housing (1).
2. Install a new gasket on to the thermostat housing.
3. Position thermostat housing (1) on the water crossover.
4. Install two thermostat housing bolts. Tighten bolts to 12 N.m (106 in. lbs.).
5. Install upper radiator hose on thermostat housing (1).
6. Fill cooling system. Refer to **STANDARD PROCEDURE**.
7. Install the air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .

8. Connect negative battery cable to battery.
9. Start and warm the engine. Check for leaks.

3.6L COOLANT CROSSOVER

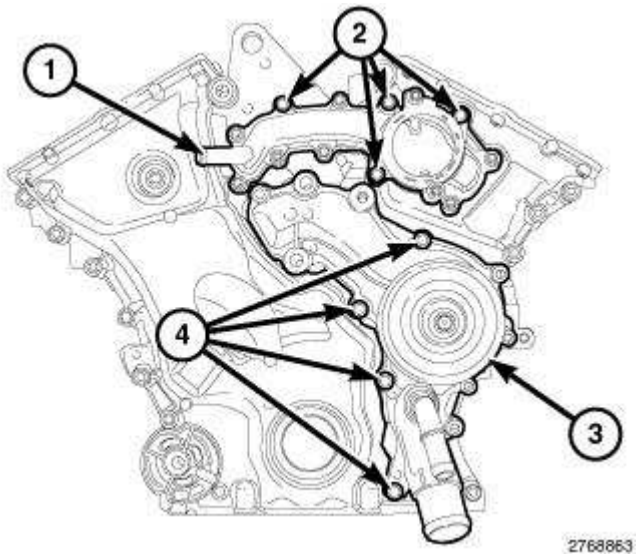

Fig. 176: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean gasket sealing surfaces.
2. Install new gasket onto the coolant crossover.

NOTE: The shorter M6 mounting bolts (2), bolt directly to the engine timing cover.

3. Hand tighten the M6 mounting bolts. Tighten the bolts in a criss cross pattern to 12 N.m (106 in. lbs.).
4. Install the heater supply hose to the coolant crossover (1).

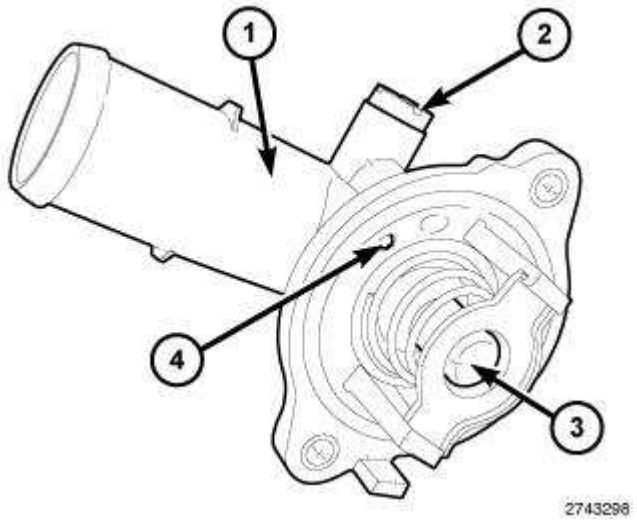

Fig. 177: Thermostat Is Part Of The Housing
Courtesy of CHRYSLER GROUP, LLC

5. Install the thermostat housing. Refer to **THERMOSTAT, INSTALLATION**.

5.7/6.4L

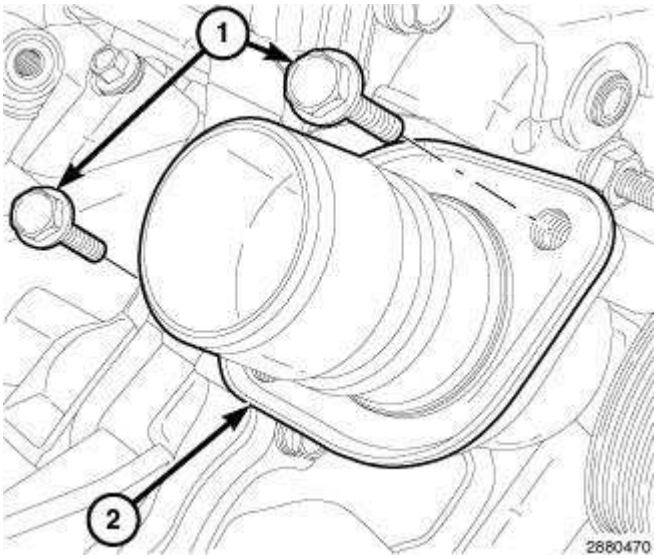

Fig. 178: Thermostat Housing & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the thermostat and housing (2) on the front cover.
2. Install thermostat housing bolts (1). Tighten the bolts (1) to 13 N.m (115 in. lbs.).
3. Install the radiator hose onto the thermostat housing (2).
4. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
5. Connect negative battery cable.

6. Install the air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
7. Start and warm the engine. Check for leaks. Refer to **DIAGNOSIS AND TESTING**.

3.0L

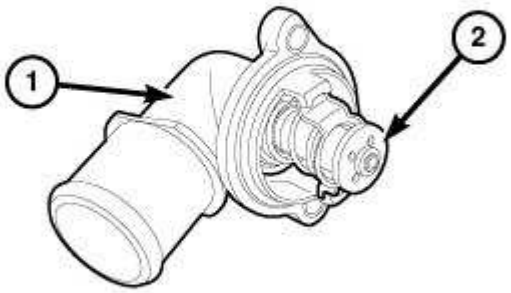

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Fig. 179: Thermostat & Housing
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The Thermostat and housing is serviced as an assembly. Do not remove the thermostat from the housing, damage to the thermostat may occur.

1. Install a new seal on to the thermostat housing.

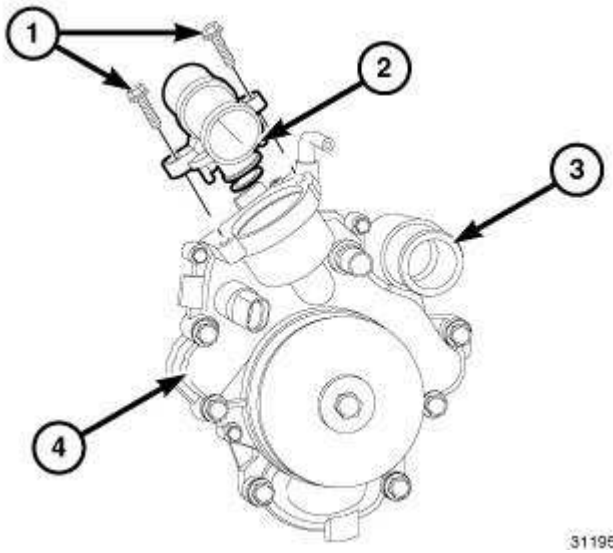

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Fig. 180: Water Pump, Thermostat Housing & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position thermostat housing (2) onto the water pump.
3. Install two thermostat housing bolts (1). Tighten bolts to 11 N.m (97 in. lbs.).
4. Install upper radiator hose on thermostat housing (2).
5. Fill cooling system. Refer to **STANDARD PROCEDURE**.
6. Install the air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
7. Connect negative battery cable to battery.
8. Start and warm the engine. Check for leaks.

TUBE, HEATER HOSE, SUPPLY

REMOVAL

5.7L/6.4L

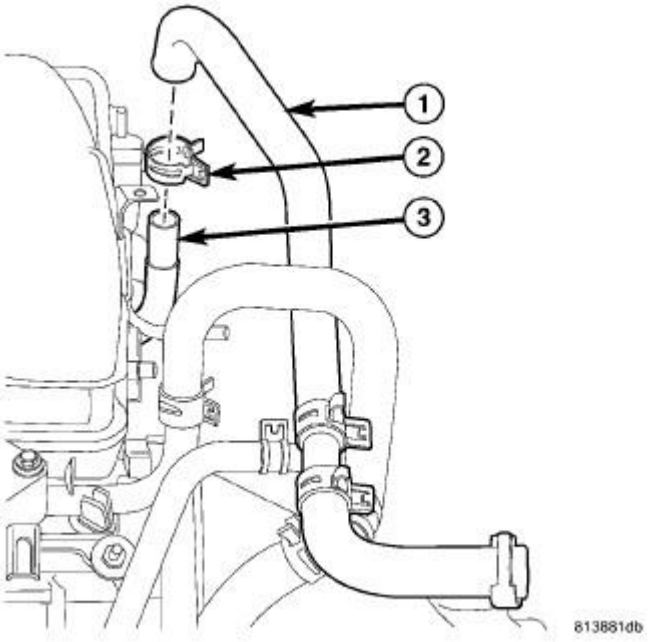


Fig. 181: Heater Supply Hose
Courtesy of CHRYSLER GROUP, LLC

1 - Heater Hose
2 - Clamp
3 - Tube

1. Disconnect negative battery cable.
2. Drain cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD, INTAKE, REMOVAL** .
4. Remove heater hoses from heater tubes.
5. Remove heater tube mounting bolts.
6. Remove heater tubes from water pump housing and remove from vehicle.

INSTALLATION

5.7L/6.4L

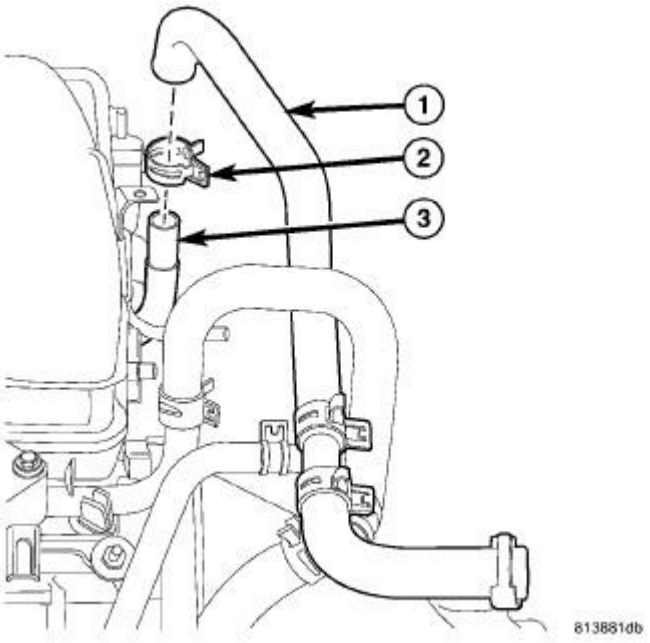


Fig. 182: Heater Supply Hose
Courtesy of CHRYSLER GROUP, LLC

1 - Heater Hose
2 - Clamp
3 - Tube

1. Position heater tubes into water pump housing.
2. Install mounting bolts. Tighten bolts to 10 N.m (88 in. lbs.).
3. Install heater hose onto heater tubes.
4. Install intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .

5. Connect negative battery cable.
6. Fill cooling system. Refer to **STANDARD PROCEDURE**.
7. Start vehicle and check for cooling system leaks.

TRANSMISSION

STANDARD PROCEDURE

STANDARD PROCEDURE - TRANSMISSION COOLER LINE QUICK CONNECT FITTING DISASSEMBLY/ASSEMBLY

DISCONNECT

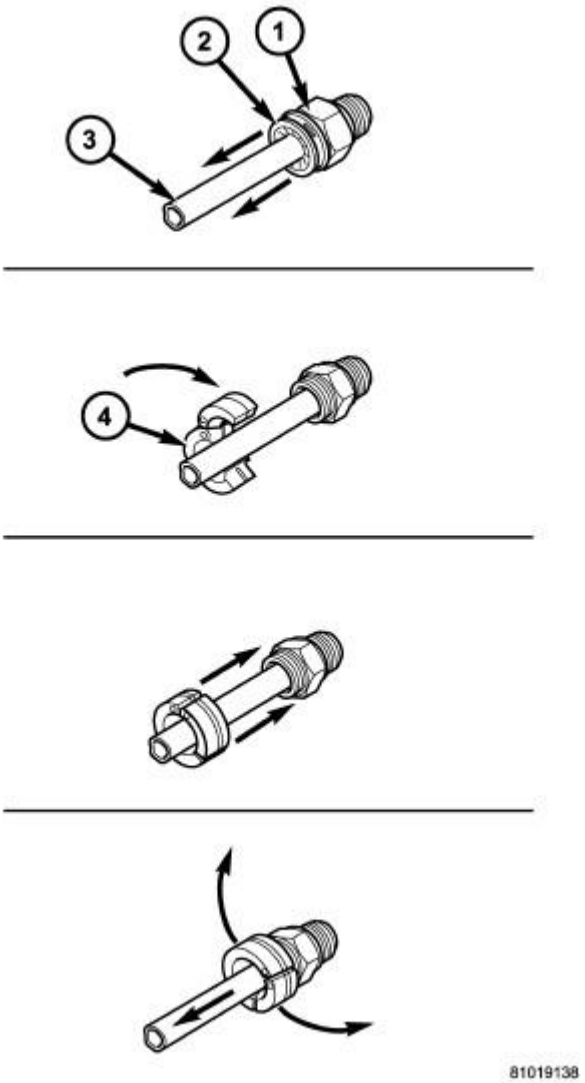


Fig. 183: Oil Cooler Line Quick Connect Fitting - Disassembly
Courtesy of CHRYSLER GROUP, LLC

1 - QUICK CONNECT FITTING
2 - DUST CAP
3 - OIL COOLER LINE
4 - SPECIAL TOOL 8875A

1. Remove dust cap by pulling it straight back off of quick connect fitting.
2. Place disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line) onto transmission cooler line with the fingers of the tool facing the quick connect fitting.
3. Slide disconnect tool down the transmission line and engage the fingers of the tool into the retaining clip. When properly engaged in the clip, the tool will fit flush against the quick connect fitting.
4. Rotate the disconnect tool 60° to expand the retaining clip.
5. While holding the disconnect tool against the quick connect fitting, pull back on the transmission cooler line to remove.

CONNECT

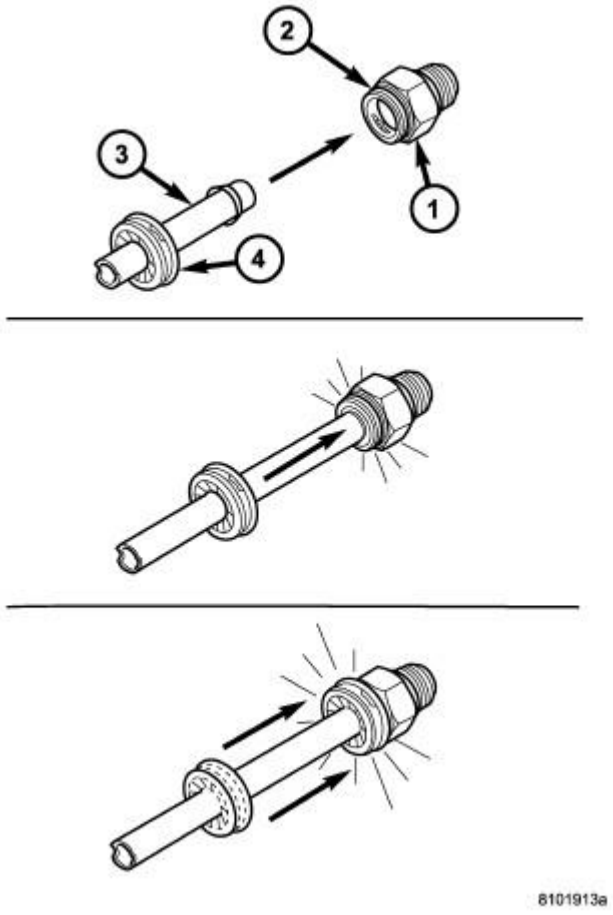


Fig. 184: Oil Cooler Line Quick Connect Fitting - Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - QUICK CONNECT FITTING
2 - CLIP
3 - OIL COOLER LINE
4 - DUST CAP

1. Align transmission cooler line with quick connect fitting while pushing straight into the fitting.
2. Push in on transmission cooler line until a "click" is heard or felt.
3. Slide dust cap down the transmission cooler line and snap it over the quick connect fitting until it is fully seated and rotates freely. Dust cap will only snap over quick connect fitting when the transmission cooler line is properly installed.

NOTE: If dust cap will not snap into place, repeat assembly step #2.

COOLER, TRANSMISSION OIL

DESCRIPTION

DESCRIPTION

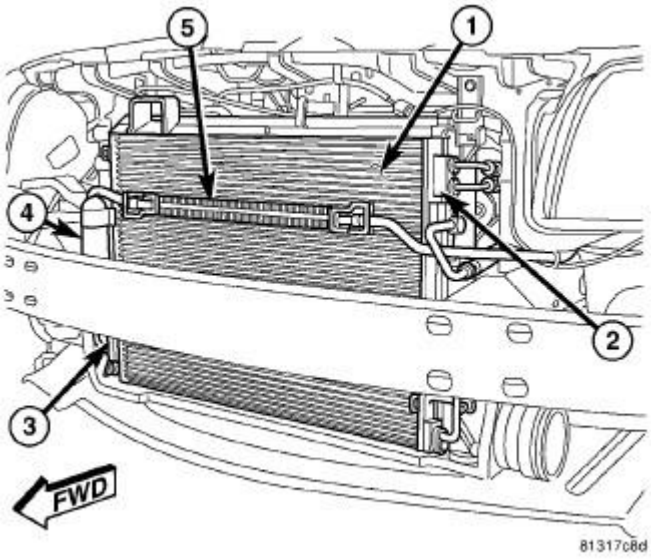


Fig. 185: Condenser-A/C Description
Courtesy of CHRYSLER GROUP, LLC

The automatic transmission cooler (2) is located in the front of the radiator and behind the front fascia and is combined with the A/C condenser. The transmission cooler is a heat exchanger that allows heat in the transmission fluid to be transferred to the air passing over the cooler fins.

The Transmission oil cooler/A/C condenser assembly is equipped with quick connect fitting for the transmission oil cooler lines, a tapping block (3) for the receiver/drier (4) and mounting provisions for the power steering cooler (5).

The transmission oil cooler/AC condenser is service as an assembly. For removal and installation, refer to **CONDENSER, A/C, REMOVAL** or **CONDENSER, A/C, INSTALLATION** .

TUBES AND HOSES, TRANSMISSION OIL COOLER

REMOVAL

REMOVAL

1. Remove upper radiator closure panels
2. Using Release Tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove transmission cooler lines from transmission cooler. Refer to **STANDARD PROCEDURE**.
3. Raise vehicle on hoist.
4. Remove front transmission cooler lines from the thermal bypass valve block.
5. Remove rear transmission cooler lines from the thermal bypass valve block

6. Remove the transmission cooler lines from the transmission.

INSTALLATION

INSTALLATION

1. Install rear transmission cooler lines at transmission. Tighten fittings to 20 N.m (18 ft. lbs.).
2. Install rear transmission cooler lines to thermal bypass valve. Tighten fittings to 20 N.m (18 ft. lbs.).
3. Install front transmission cooler lines to thermal bypass valve. Tighten fittings to 20 N.m (18 ft. lbs.).
4. Install front transmission cooler lines into transmission cooler. Refer to **STANDARD PROCEDURE**.
5. Lower vehicle.
6. Check transmission fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

VALVE, THERMO BYPASS

DESCRIPTION

DESCRIPTION

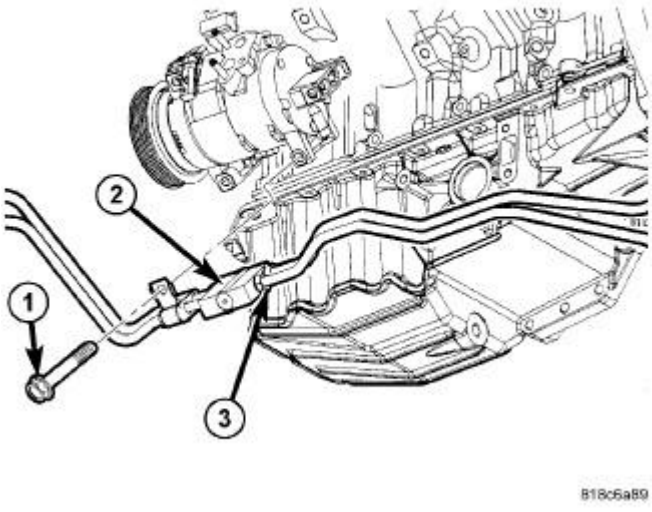


Fig. 186: Thermal Bypass Valve
Courtesy of CHRYSLER GROUP, LLC

The transmission thermal bypass valve is mounted on LH side of the engine at the A/C compressor.

OPERATION

OPERATION

The air-to-oil transmission cooler system has a thermal bypass valve assembly that controls fluid flow through the cooler. When the transmission fluid is cold (less then operating temperature), the fluid is routed through the cooler bypass valve without flowing through the transmission cooler. When the transmission fluid reaches operating temperatures 71°C (160°F) and above, the thermostat closes off the bypass and allowing fluid to flow through the transmission cooler. The thermal bypass valve is serviced as an assembly.

REMOVAL

REMOVAL

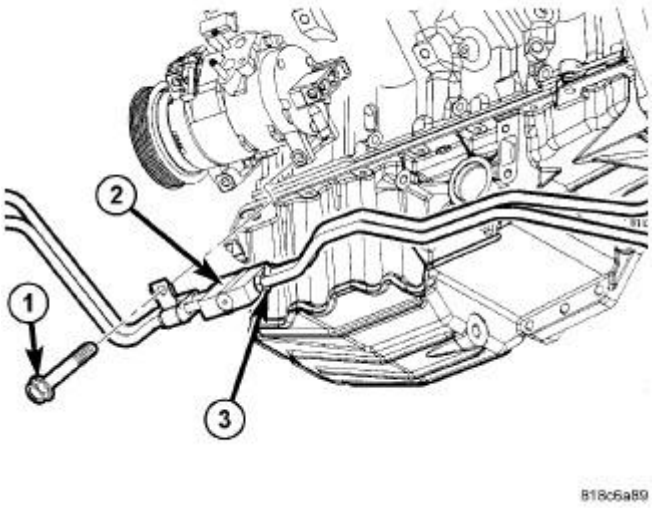


Fig. 187: Thermal Bypass Valve
Courtesy of CHRYSLER GROUP, LLC

1 - MOUNTING BOLT
2 - THERMAL BYPASS VALVE BLOCK
3 - COOLER LINE FITTING

1. Raise and support vehicle.
2. Remove front transmission cooler lines from the thermal bypass valve block (2).
3. Remove rear transmission cooler lines from the thermal bypass valve block (2).
4. Remove thermal bypass valve block (2).

INSTALLATION

INSTALLATION

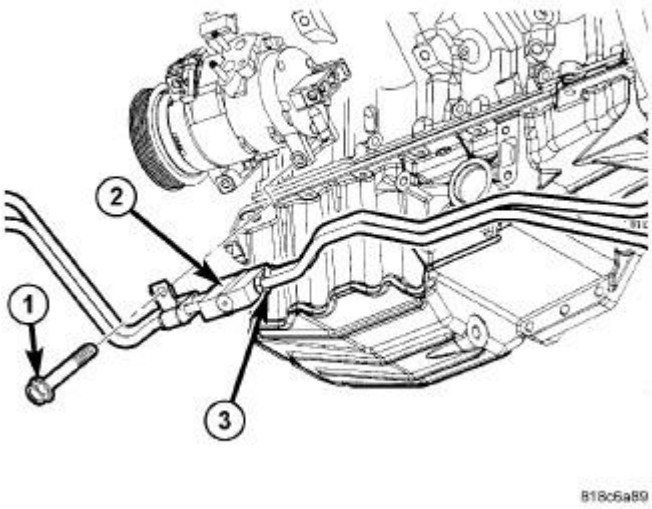


Fig. 188: Thermal Bypass Valve
Courtesy of CHRYSLER GROUP, LLC

1 - MOUNTING BOLT
2 - THERMAL BYPASS VALVE BLOCK
3 - COOLER LINE FITTING

1. Position thermal bypass valve. Install mounting bolt. Tighten mounting bolt to: 2.7L/5.7L/6.1L engine 50 N.m (37 ft. lbs.), 3.0L/3.5L engine 26 N.m (19 ft.lbs.).
2. Install rear transmission cooler lines to thermal bypass valve. Tighten fittings to 20 N.m (18 ft. lbs.).
3. Install front transmission cooler lines to thermal bypass valve. Tighten fittings to 20 N.m (18 ft. lbs.).

ENGINE

Exhaust System - Chrysler 300

DESCRIPTION

DESCRIPTION

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

CAUTION: Avoid application of rust prevention compounds or undercoating materials to exhaust system floor pan heat shields. Light overspray near the edges is permitted. Application of coating will result in excessive floor pan temperatures and objectionable fumes.

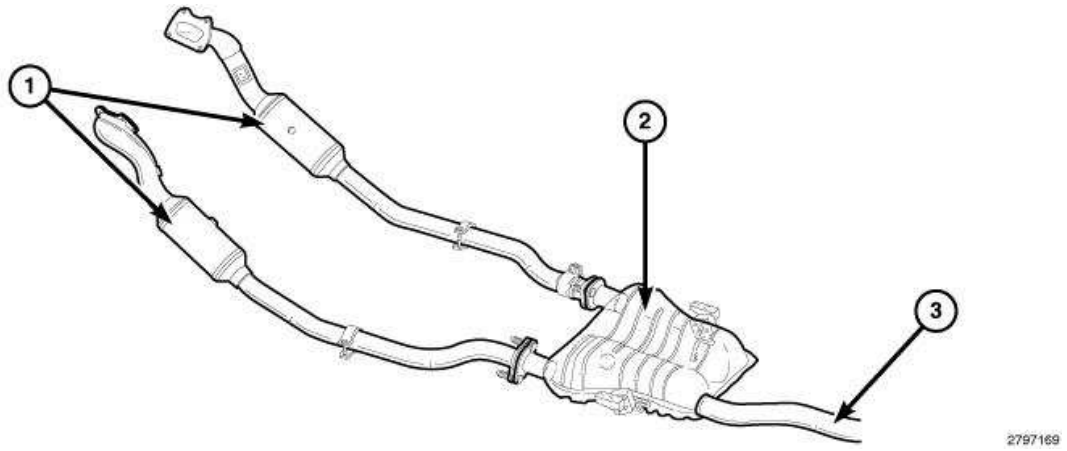


Fig. 1: Two Catalytic Converters & Single Muffler
Courtesy of CHRYSLER GROUP, LLC

The 3.6L converters are mounted to an integrated exhaust manifold. Refer to **3.6L** .

The 3.6L exhaust system uses two catalytic converters (1) located in the front exhaust pipe and a single muffler (2), with a single resonator/tailpipe assembly.

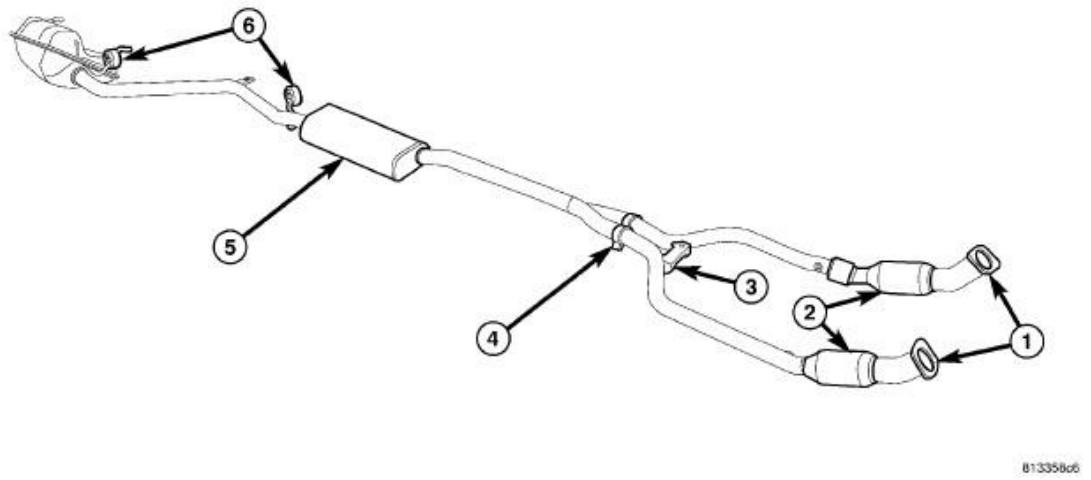


Fig. 2: Exhaust System - V6 Single System
Courtesy of CHRYSLER GROUP, LLC

The exhaust system consists of two front close coupled catalytic converters, a RH rear muffler and resonator assembly, and on vehicles equipped with dual exhaust, LH resonator and tailpipe assembly.

For the single exhaust systems, the RH muffler, resonator and tailpipe (4) are one single unit.

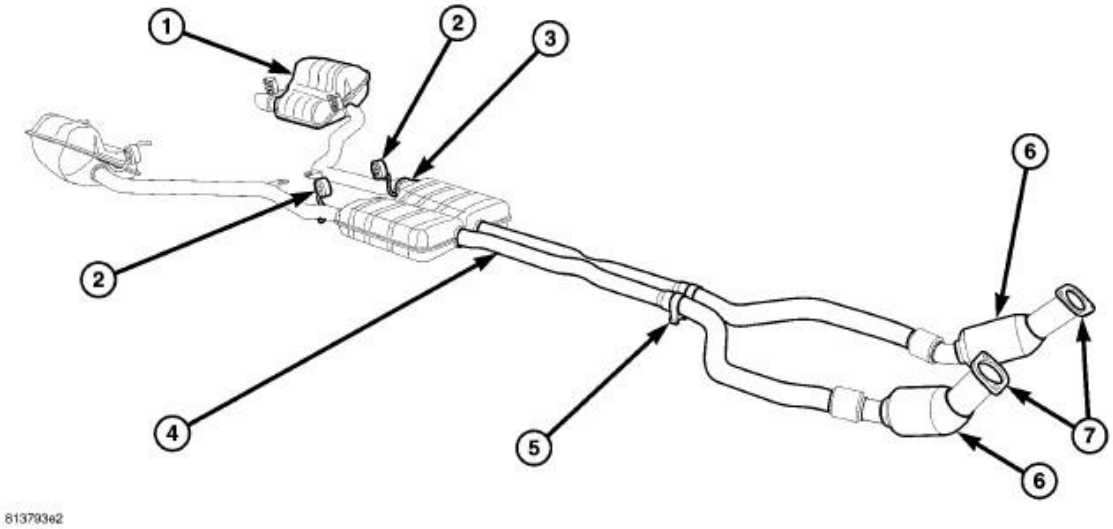


Fig. 3: Exhaust System - V8 Dual System
Courtesy of CHRYSLER GROUP, LLC

1 - LH REAR RESONATOR AND TAIL PIPE
2 - ISOLATOR
3 - BALL FLARE FLANGE 5.7L/6.4L
4 - RH REAR MUFFLER AND RESONATOR

5 - BAND CLAMPS
6 - CATALYTIC CONVERTER ASSEMBLY
7 - BALL FLANGE

On a 5.7L/6.4L, both catalytic converters attach directly to the exhaust manifold using studs and nuts.

The exhaust down pipes exit the converters and connect into the rear muffler and resonator (s).

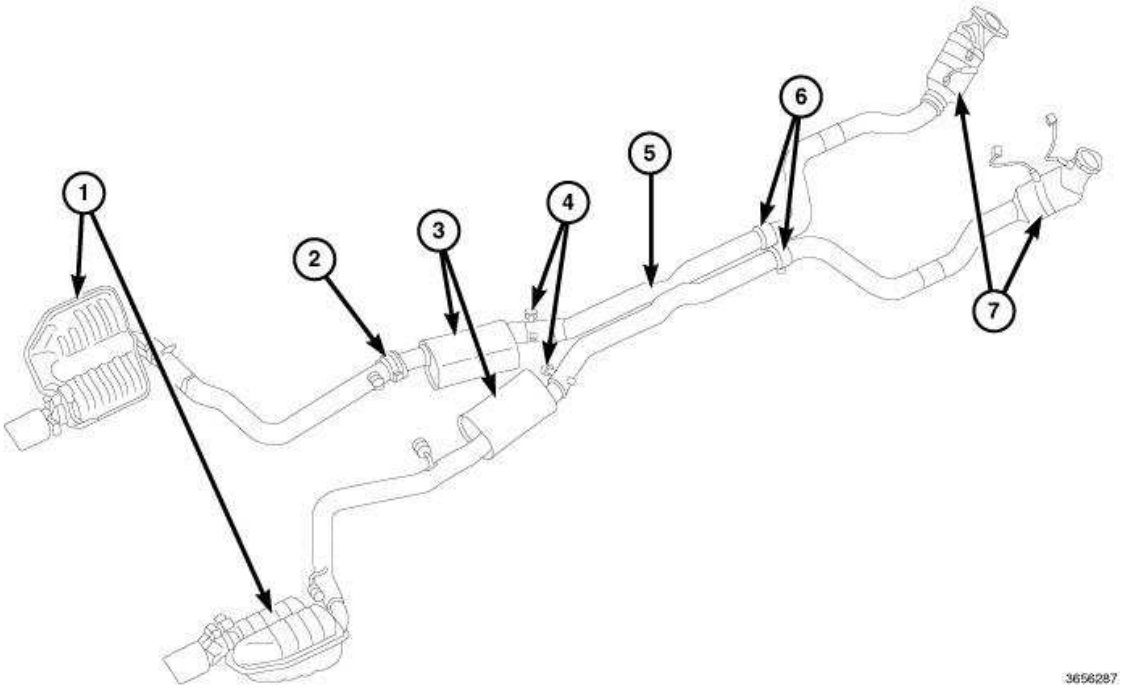


Fig. 4: Two Catalytic Converters, Dual Mufflers, Dual Resonator/Tailpipe Assembly, Active Exhaust Valve & Exhaust Pipes
Courtesy of CHRYSLER GROUP, LLC

Performance exhaust systems use two catalytic converters (7) located in the front exhaust pipe, and dual mufflers (3), a dual resonator/tailpipe assembly (1), and an active exhaust valve (4) located at the exhaust pipes (5).

The front exhaust pipe/catalytic converter assembly is a hydra-form thin wall air gap design. This design is used to reduce heat, noise and improve emissions. When replacement is required, use original equipment parts (or their equivalent).

The exhaust manifolds are equipped with ball flange outlets to assure a tight seal and strain free connections.

The exhaust system must be properly aligned to prevent stress, leakage and body contact. If the system contacts any body panel, it may amplify objectionable noises originating from the engine or body.

When inspecting an exhaust system, critically inspect for cracked or loose joints, stripped screw or bolt threads, corrosion damage and worn, cracked or broken hangers. Replace all components that are badly corroded or damaged. DO NOT attempt to repair.

When replacement is required, use original equipment parts (or their equivalent). This will assure proper alignment and provide acceptable exhaust noise levels.

The exhaust system consists of exhaust manifold(s), exhaust pipe with active exhaust valves, differential pressure sensor, catalytic converter(s) with oxygen sensors, muffler and tailpipe.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

EXHAUST SYSTEM DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
EXCESSIVE EXHAUST NOISE	1. Leaks at pipe joints.	1. Tighten flanges to specified torque at leaking joints. Refer to **SPECIFICATIONS**.
	2. Burned, rusted-out, or blown out muffler.	2. Replace muffler/tailpipe assembly. Refer to **MUFFLER, EXHAUST, REMOVAL**. Check exhaust system.
	3. Burned or rusted-out exhaust pipe.	Replace exhaust pipe.
	4. Exhaust pipe leaking at manifold flange.	4. Tighten connection attaching nuts. Refer to **SPECIFICATIONS**.
	5. Exhaust manifold cracked or broken.	5. Replace exhaust manifold. Refer to **MANIFOLD, EXHAUST, REMOVAL** or **MANIFOLD, EXHAUST, REMOVAL, 5.7L** or **MANIFOLD, EXHAUST, REMOVAL** .
	6. Leak between exhaust manifold and cylinder head.	6. Tighten exhaust manifold to cylinder head stud nuts or bolts. Refer to **SPECIFICATIONS** or **SPECIFICATIONS** or **SPECIFICATIONS** or **SPECIFICATIONS** .
	7. Restriction in muffler or tailpipe.	7. Remove restriction, if possible. Replace muffler or tailpipe, as necessary.
	8. Exhaust system contacting body or chassis.	8. Re-align exhaust system to clear surrounding components. 9. Clean spring and joints.

	9. Exhaust valve stuck open	Replace the exhaust pipe, as necessary.
LEAKING EXHAUST GASES	1. Leaks at pipe joints.	1. Tighten flanges. Refer to **SPECIFICATIONS**.
LACK OF POWER	1. Exhaust valve stuck closed	1. Clean spring and joints. Replace the exhaust pipe, as necessary.
	2. Restriction in muffler or tailpipe.	2. Remove restriction, if possible. Replace muffler or tailpipe, as necessary.
	3. Restriction in catalytic converter or diesel particulate filter.	3. Remove restriction, if possible. Replace catalytic converter or diesel particulate filter, as necessary.

ADJUSTMENTS

ADJUSTMENTS

A misaligned exhaust system is usually indicated by a vibration, rattling noise, or binding of exhaust system components. These noises are sometimes hard to distinguish from other chassis noises. Inspect exhaust system for broken or loose clamps, heat shields, isolators, and brackets. Replace or tighten as necessary. It is important that exhaust system clearances and alignment be maintained.

Perform the following procedures to align the exhaust system:

1. Loosen clamps and support brackets.
2. Align the exhaust system starting at the front, working rearward.
3. Tighten all clamps and brackets once alignment and clearances are achieved.

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Nut - Catalytic Converter to Ball Flange Snug fit	12	9	-
Nut - Catalytic Converter to Ball Flange	41	30	-
Band Clamp	50	36	-
Nut - Catalytic Converter to Support	55	40	-

Bracket			
Fasteners - Exhaust Support Bracket	25	18	-
Retainers - Heat Shield	10	7	98
Nuts - Tunnel Reinforcement	25	18	-
Fastener - Exhaust tips	30	22	-

INSPECTION

INSPECTION

Inspect the exhaust pipes, catalytic converters, muffler, and resonators for cracked joints, broken welds and corrosion damage that would result in a leaking exhaust system. Inspect the clamps, support brackets, and insulators for cracks and corrosion damage.

CONVERTER, CATALYTIC

DESCRIPTION

DESCRIPTION

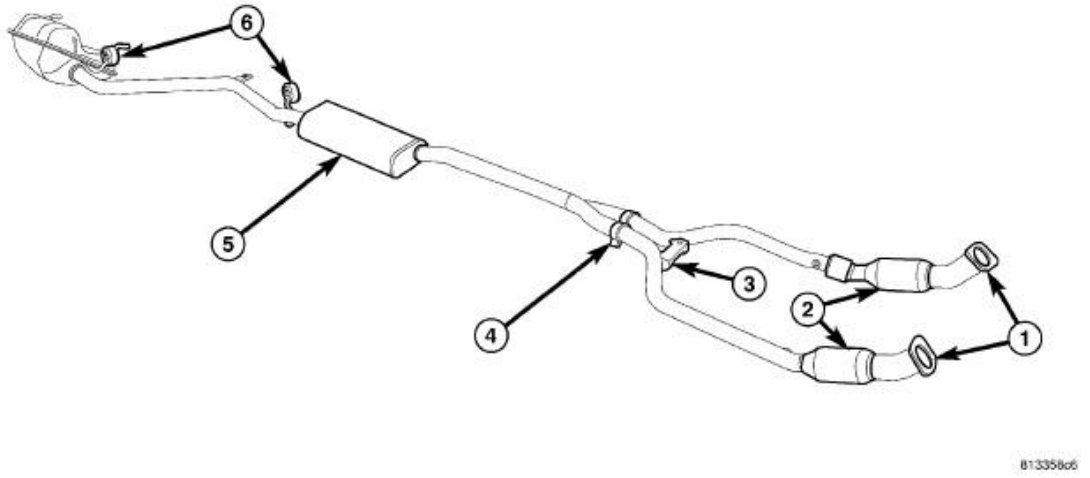


Fig. 5: Exhaust System - V6 Single System
Courtesy of CHRYSLER GROUP, LLC

The 5.7L close coupled, three-way catalytic converter inlets are connected to the exhaust manifolds by the use of ball flange (1). The left and right side converter outlet pipe connects to the exhaust system. The 5.7L is bolted to the exhaust header. The 3.6L bolts directly to the integrated exhaust manifold. Refer to **3.6L** .

REMOVAL

5.7L/6.4L

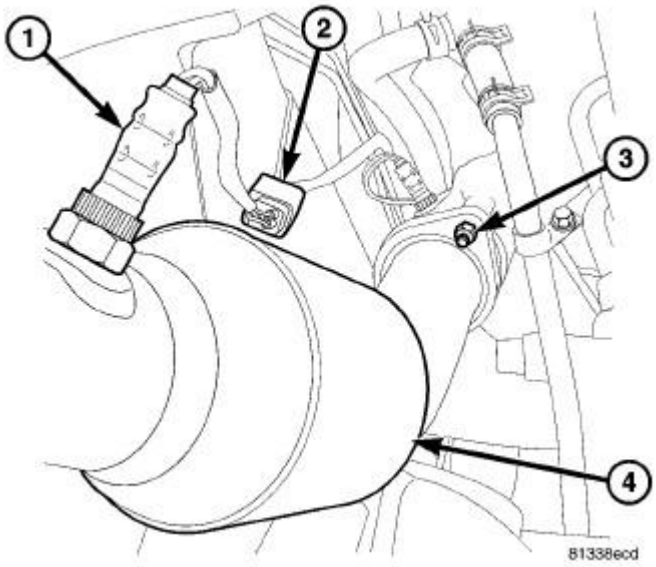


Fig. 6: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

1 - OXYGEN SENSOR
2 - OXYGEN SENSOR CONNECTOR
3 - BALL FLANGE NUT
4 - LH CATALYTIC CONVERTER

CAUTION: When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters hanging from the oxygen sensor wires damages the harness and/or sensors.

NOTE: Left side shown in illustration, right side similar.

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Saturate all exhaust bolts and nuts with Mopar® Rust Penetrant. Allow five minutes for penetration.
4. Disconnect the O2S sensor electrical connectors (2).
5. Remove the catalytic converter to manifold flange nuts (3) and separate the catalytic converters (4) from the exhaust manifolds.

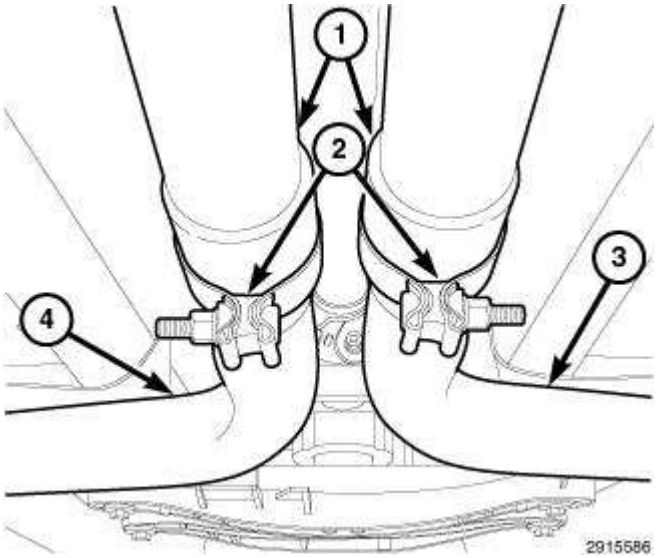


Fig. 7: View Of Exhaust Pipe Band Clamps, Resonator Assembly, And Catalytic Converters
Courtesy of CHRYSLER GROUP, LLC

6. Remove the front exhaust pipe band clamps (2) on the exhaust pipe/muffler and resonator assembly (1).
7. Separate the exhaust pipe/muffler and resonator assembly from the catalytic converters (3 and 4).
8. Remove the catalytic converters.

3.6L

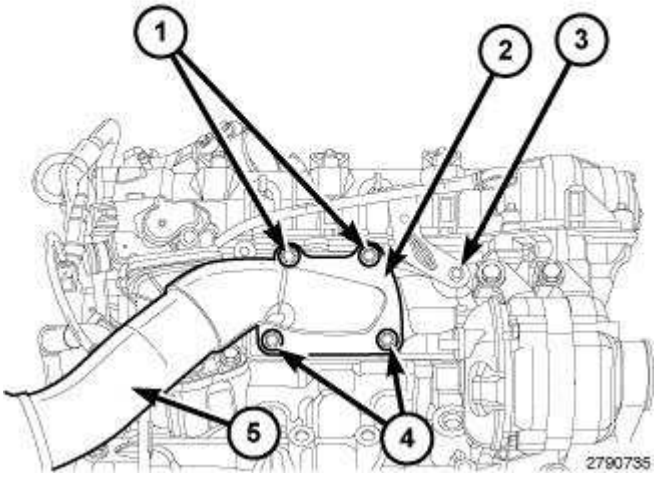


Fig. 8: Catalytic Flange Bolts, Reinforcement Brackets And Oxygen Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

WARNING: If torches are used when servicing the exhaust system, do not allow any flame near the fuel lines or the fuel tank. Failure to follow these instructions may result in possible serious or fatal injury.

1. Disconnect negative battery cable.
2. Remove the engine cover.
3. Saturate the exhaust flange bolts with heat valve lubricant. Allow 5 minutes for penetration.
4. Remove the upper catalytic flange bolts (1).
5. Raise and support the vehicle.
6. If equipped, remove skid plate.
7. Remove the lower catalytic flange bolts (4).

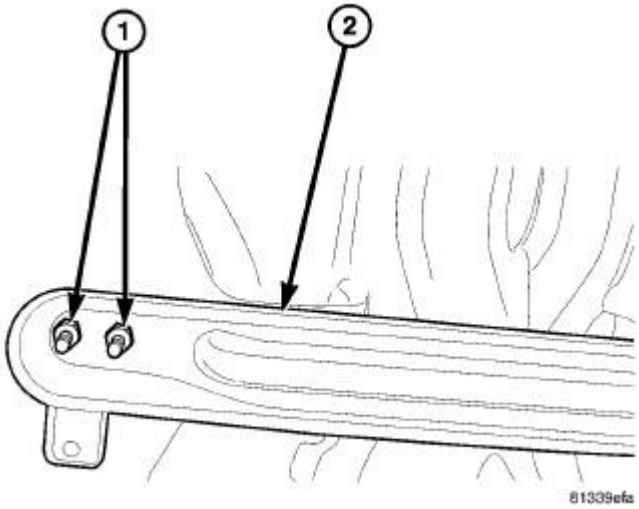


Fig. 9: Tunnel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

8. Remove tunnel reinforcement brackets (2).
9. Disconnect oxygen sensor (2) electrical connectors.

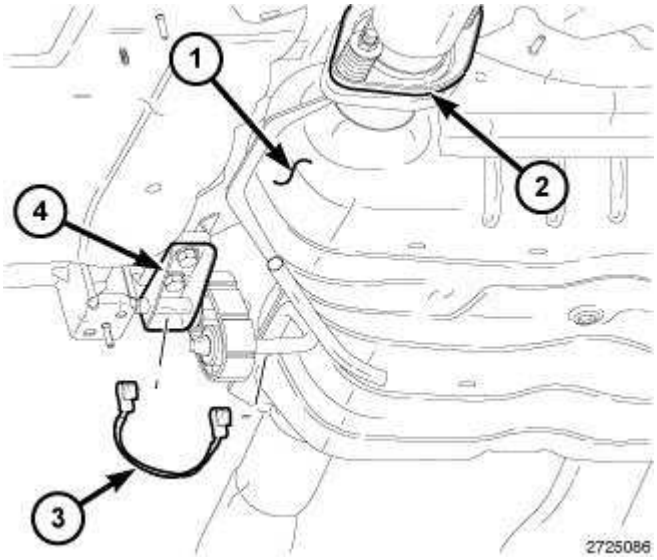


Fig. 10: Muffler Flange & Exhaust Pipe/Catalytic Converter Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Remove the nuts from the front exhaust pipe/catalytic converter assembly to the muffler flange (2).
11. Remove the front exhaust pipe/catalytic converter assembly (1) from the vehicle.

INSPECTION

INSPECTION

Check catalytic converter for a flow restriction. Exhaust System Restriction Check for procedure. Refer to **DIAGNOSIS AND TESTING**.

Visually inspect the catalytic converter element by using a borescope or equivalent. Remove oxygen sensor(s) and insert borescope. If borescope is not available, remove converter and inspect element using a flashlight. Inspect element for cracked or melted substrate.

NOTE: Before replacing a catalytic converter, determine the root cause of failure. Most catalytic converter failures are caused by air, fuel or ignition problems. (Refer to Appropriate Diagnostic Information) for test procedures.

INSTALLATION

5.7L/6.4L

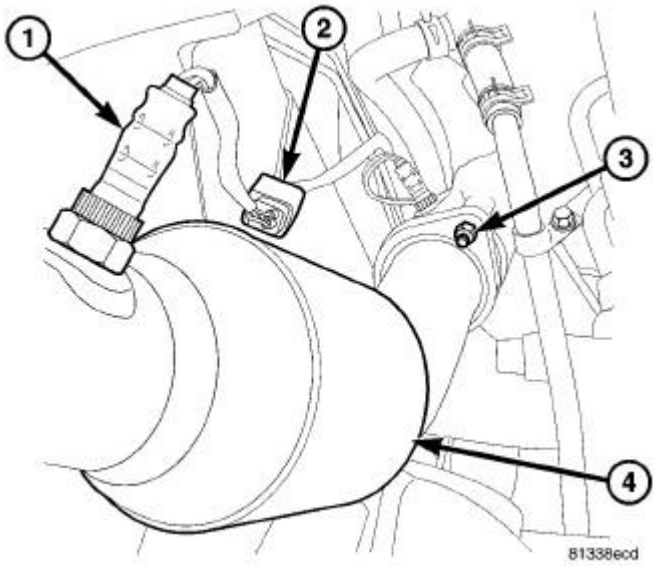


Fig. 11: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

1 - OXYGEN SENSOR
2 - OXYGEN SENSOR CONNECTOR
3 - BALL FLANGE NUT
4 - LH CATALYTIC CONVERTER

NOTE: Left side shown in illustration, right side similar.

1. Position the catalytic converter (4) onto the exhaust manifold flange, install ball flange nuts (3) finger tight.
2. Connect the O2S sensor electrical connectors (2).

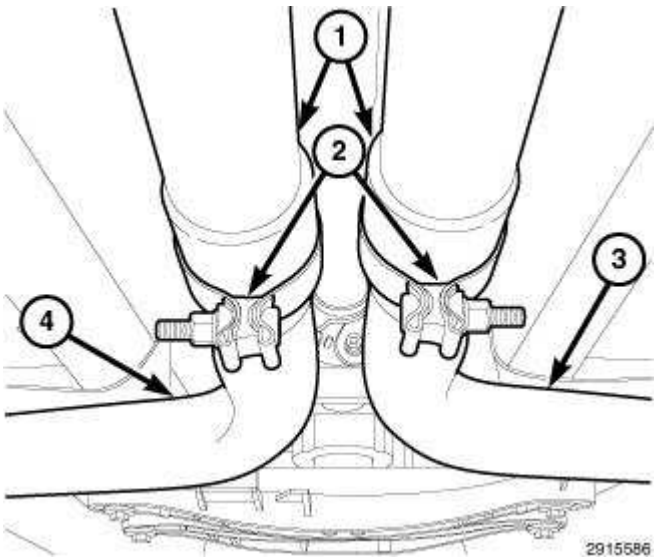


Fig. 12: View Of Exhaust Pipe Band Clamps, Resonator Assembly, And Catalytic Converters
Courtesy of CHRYSLER GROUP, LLC

3. Position the front exhaust pipe band clamps (2) on the exhaust pipe/muffler and resonator assembly (1).
4. Connect the exhaust pipe/muffler and resonator assembly into the catalytic converters (3, 4).
5. Tighten the exhaust manifold flange nuts to 41 N.m (30 ft. lbs.).
6. Tighten the band clamps to 61 N.m (45 ft. lbs.).
7. Lower the vehicle.
8. Connect the negative battery cable.
9. Start the engine and check for exhaust leaks.

3.6L

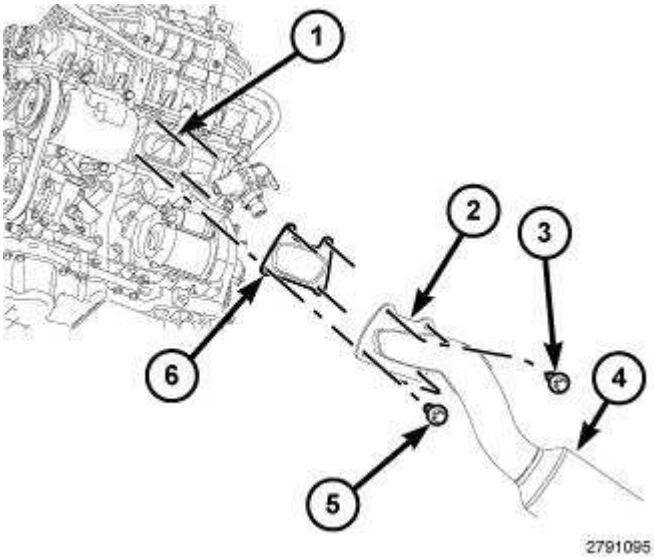


Fig. 13: Exhaust Gasket, Flange, Catalytic Converter Assemblies And Lower Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position new exhaust gasket (6) onto flange (1).
2. Position the front exhaust pipe/catalytic converter assemblies (4) into vehicle.
3. Install the lower bolts (5) at the front exhaust pipe/catalytic converter (4) assembly to exhaust manifold (1) flange. Do not tighten.
4. Lower vehicle.
5. Install the upper bolts at the front exhaust pipe/catalytic converter assemblies to exhaust manifold flanges. Tighten bolts to 23 N.m (17 ft. lbs.).
6. Raise vehicle.
7. Tighten lower flange bolts to 23 N.m (17 ft. lbs.).

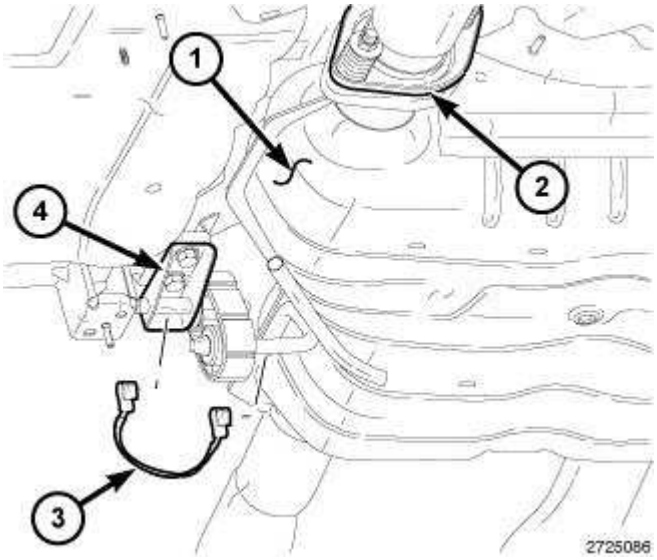


Fig. 14: Muffler Flange & Exhaust Pipe/Catalytic Converter Assembly
Courtesy of CHRYSLER GROUP, LLC

8. Position the exhaust system for proper clearance with the frame and underbody parts. A minimum clearance of 25.4 mm (1.0 in.) is required.
9. Tighten the front exhaust pipe/catalytic converter assembly to muffler flange (2) nuts to 47 N.m (35 ft. lbs.) torque.

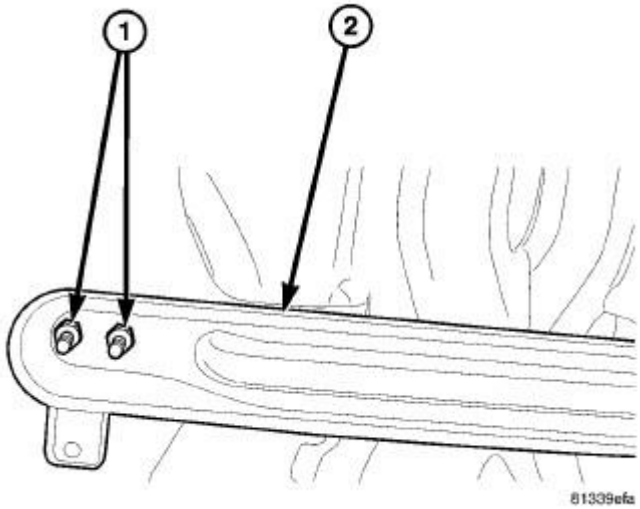


Fig. 15: Tunnel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

10. Connect oxygen sensor (2) electrical connectors.
11. Install tunnel reinforcement brackets (2). Tighten nuts (1) to 55 N.m (41 ft. lbs.).
12. If equipped, install skid plates.

13. Lower vehicle.
14. Start the vehicle and inspect for exhaust leaks. Repair exhaust leaks as necessary.

FILTER, DIESEL PARTICULATE

DESCRIPTION

DESCRIPTION

A diesel particulate filter (DPF) is installed for exhaust gas after-treatment. The DPF filters, stores and burns particulate matter (soot) that is generated during the combustion process. The soot is oxidized to carbon dioxide CO2 at exhaust temperatures over 600° C (1, 112° F).

OPERATION

OPERATION

The oxidation catalysts raise the exhaust gas temperatures to regenerate the DPF, which is passive regeneration. If the passive regeneration cannot keep up with the build up of soot in the DPF, the ECM will actively regenerate the DPF to burn off the soot. Residue remains inside the DPF in the form of non burnable ash. Ash comes from the oils and other materials that are trapped in the oils and are present in the soot. Ash is not eliminated by the regeneration cycle. Excessive ash accumulation requires the replacement of the DPF. The DPF uses a silicon carbide wall-flow monolith with a platinum coating to trap particulates. The monolith contains a large number of square parallel channels, which run in the axial direction and are separated by thin porous walls. The channels are alternatively open at one end, but plugged at the other. The exhaust gases flow through the walls and escape through the pores in the wall material. Particulates, however, are too large to escape and are trapped in the monolith walls. The ECM starts the regeneration of the DPF if the soot load exceeds a performance map value. The ECM determines the load condition of the DPF based upon the exhaust gas pressure upstream and downstream of the DPF. A pressure differential sensor provides the pressure input to the ECM. During the regeneration process, the ECM raises the temperature in the DPF to burn off the soot accumulated. Under normal operation, the engine does not produce enough heat to oxidize the soot inside the DPF. This process requires temperatures above 550 °C (1, 022 ° F). After regeneration, the ECM reads the actual pressure difference at the DPF and compares it with a reference value. From this comparison, the ECM determines the ash quantity inside the DPF.

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the engine cover.

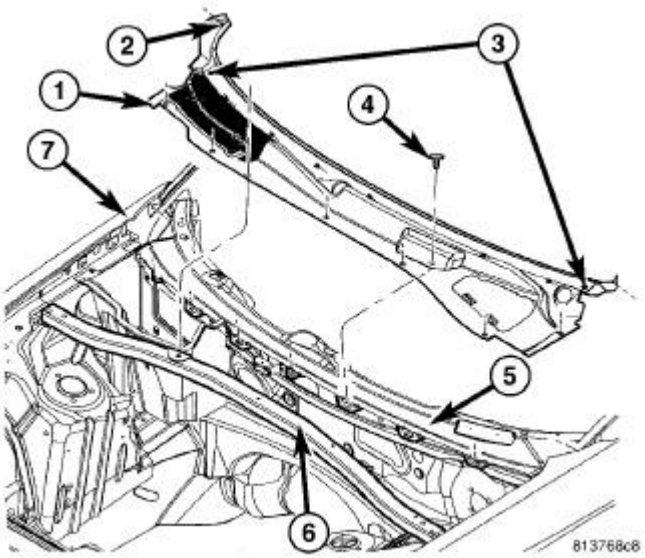


Fig. 16: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

3. Remove the cowl assembly (1). Refer to **COVER, COWL PANEL, REMOVAL** .
4. Remove the heat shield.

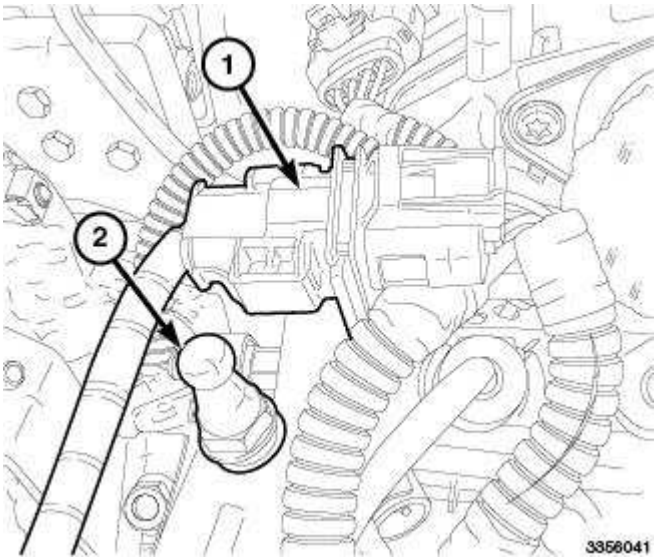


Fig. 17: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the electrical connectors (1) for the O2 sensor.
6. Remove the connectors from the transmission fill tube support bracket.
7. Remove the O2 sensor from the downpipe.
8. Remove the ball stud (2) that secures the transmission fill tube.

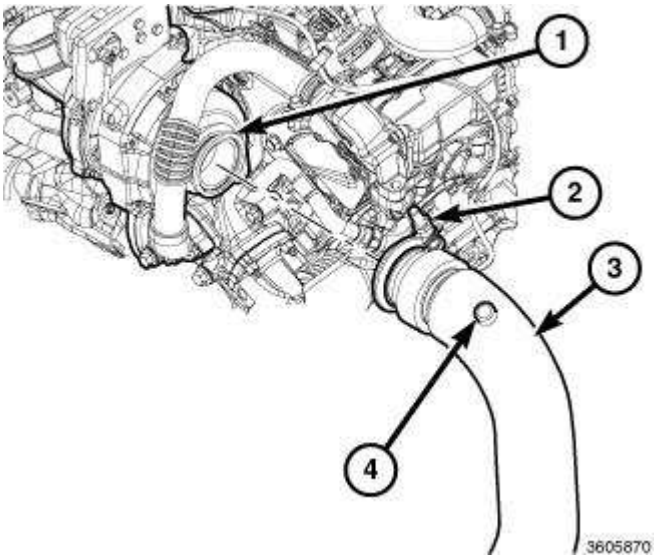


Fig. 18: Clamp, Downpipe & Turbocharger Flange
Courtesy of CHRYSLER GROUP, LLC

9. Loosen the clamp (2) and separate the downpipe (3) from the turbocharger flange (1).
10. Raise and support the vehicle.

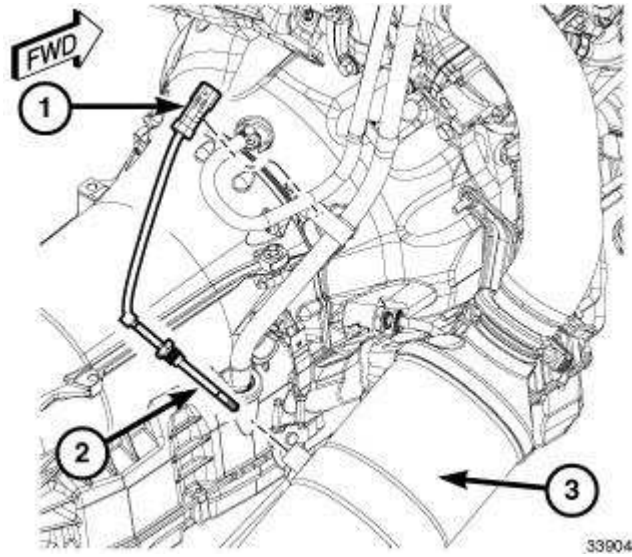


Fig. 19: Temperature Sensor, DPF & Connector
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the temperature sensor electrical connector (1).
12. Remove the temperature sensor (2).

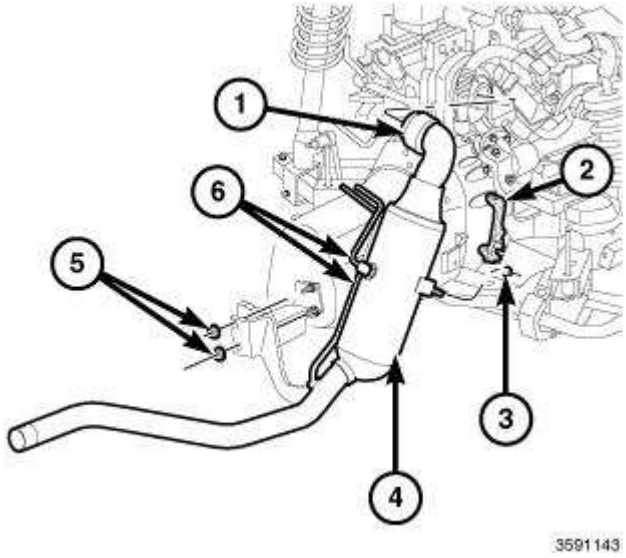


Fig. 20: Steel Lines, Nut, DPF & Rear Bracket Support Nuts
Courtesy of CHRYSLER GROUP, LLC

13. Separate the muffler/resonator from the DPF outlet pipe.
14. Disconnect the differential pressure hoses from the steel lines (6).
15. Remove the nut (3) the secures the DPF (4) to the transmission front steady rest bracket (2).
16. Remove the front steady rest bracket (2) from the transmission.
17. Remove the rear bracket support nuts (5) that secure the DPF outlet to the transmission.

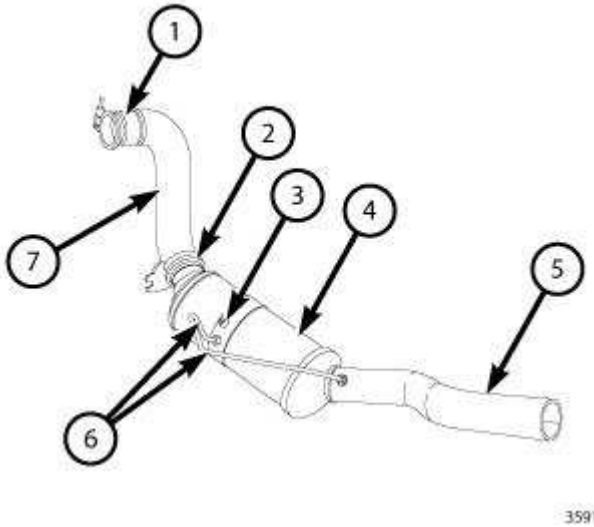


Fig. 21: DPF & Steel Differential Pressure Lines
Courtesy of CHRYSLER GROUP, LLC

18. Remove the DPF (4) from the vehicle.
19. Discard the steel gasket.
20. Remove the steel differential pressure lines (6).

INSTALLATION

INSTALLATION

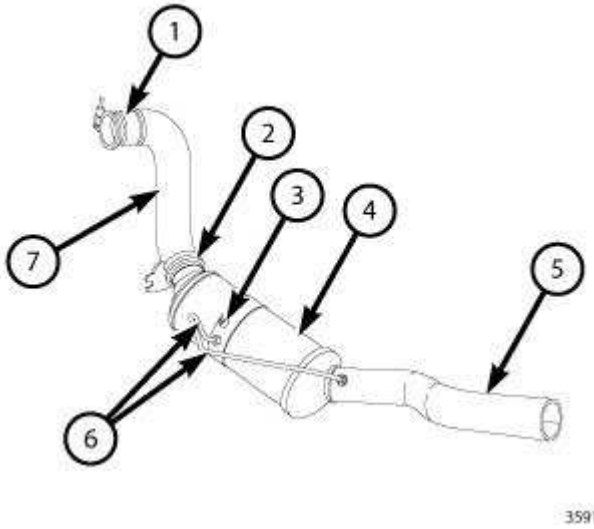


Fig. 22: DPF & Steel Differential Pressure Lines
Courtesy of CHRYSLER GROUP, LLC

1. Install the steel differential pressure lines (6).
2. Position the Diesel Particulate Filter (DPF) (4) into the vehicle.
3. Loosely install the DPF outlet pipe (5) into the muffler/resonator pipe.
4. Lower the vehicle.

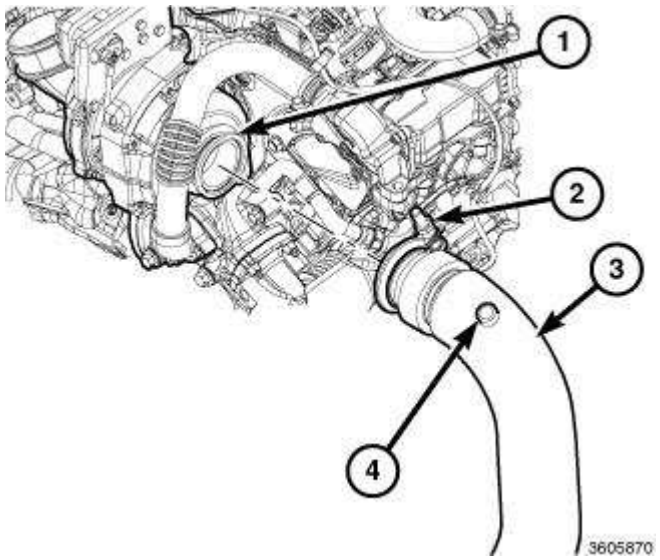


Fig. 23: Clamp, Downpipe & Turbocharger Flange
Courtesy of CHRYSLER GROUP, LLC

5. Position new steel gasket onto the downpipe (3).

6. Position the downpipe (3) to the turbocharger flange (1) and loosely tighten the clamp (2).
7. Raise and support the vehicle.

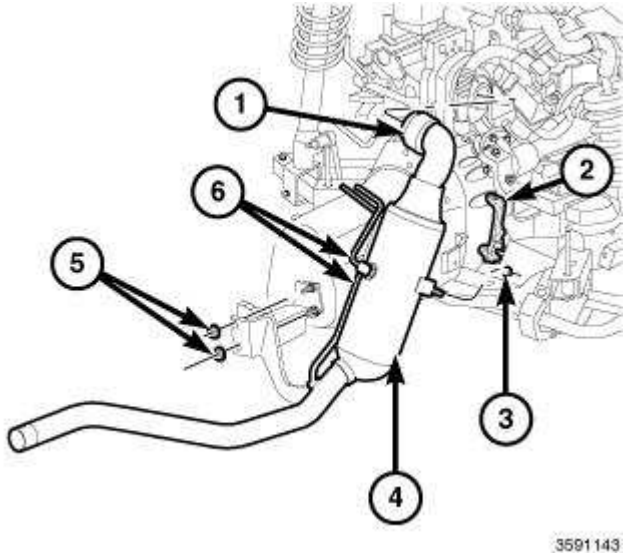


Fig. 24: Steel Lines, Nut, DPF & Rear Bracket Support Nuts
Courtesy of CHRYSLER GROUP, LLC

8. Install the front steady rest bracket (2) to the transmission. Tighten the nuts to 26 N.M (19 ft. lbs.).
9. Connect the differential pressure hoses to the steel lines (6).
10. Align the DPF to their respective mounts.
11. Tighten the front steady bracket retainer nut (3) for the DPF to 26 N.M (19 ft. lbs.).
12. Install the rear bracket support nuts (5). Tighten the nuts to 10 N.M (89 in. lbs.).
13. Tighten the muffler/resonator clamp.

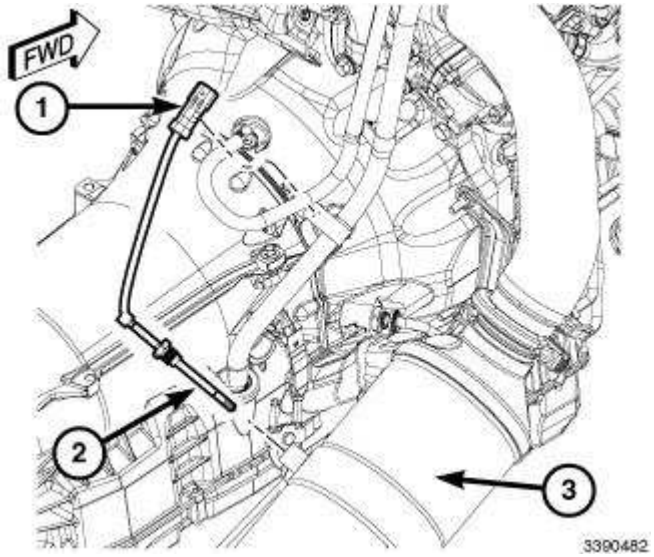


Fig. 25: Temperature Sensor, DPF & Connector

Courtesy of CHRYSLER GROUP, LLC

14. Install the temperature sensor (2).
15. Lower vehicle.

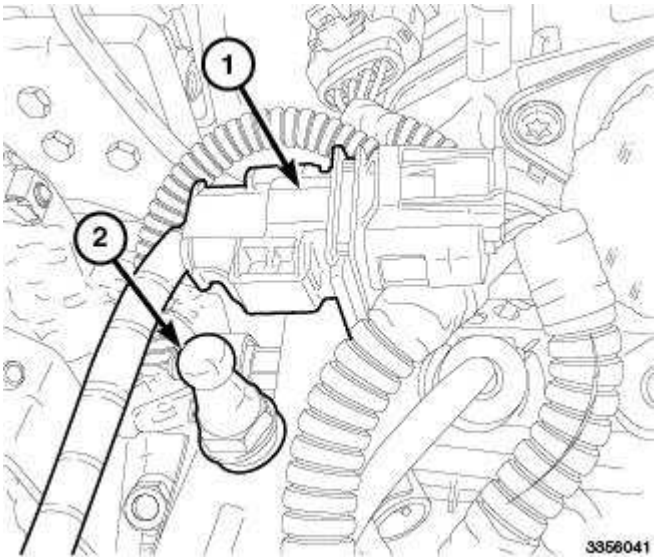


Fig. 26: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

16. Tighten the DPF to turbocharger outlet clamp (3) to 25 N.M (18 ft. lbs.).
17. Install the O2 sensor.
18. Reposition the transmission dipstick to the bracket and install the ball stud (2).
19. Connect the O2 sensor electrical connector (1) and mount it to the transmission fill tube support bracket.

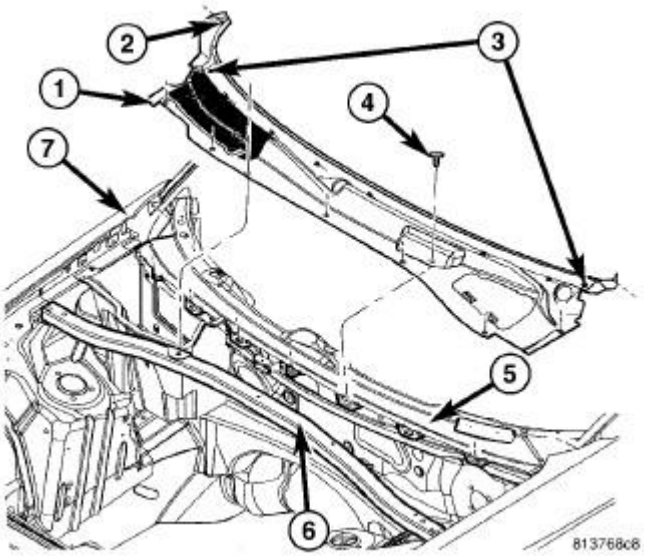


Fig. 27: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

20. Install the cowl assembly (1). Refer to **COVER, COWL PANEL, INSTALLATION** .
21. Install the engine cover.
22. Connect the negative battery cable.

MUFFLER, EXHAUST

DESCRIPTION

DESCRIPTION

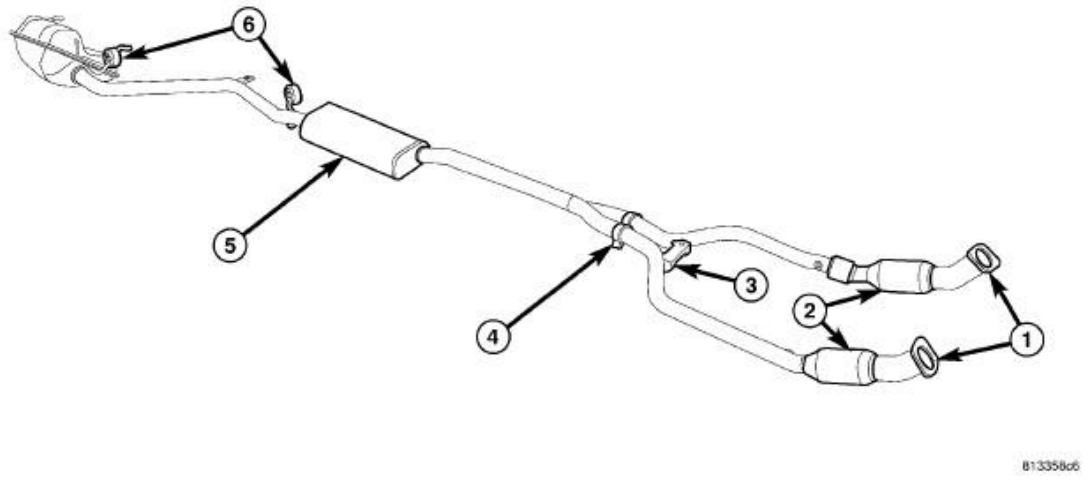


Fig. 28: Exhaust System - V6 Single System
Courtesy of CHRYSLER GROUP, LLC

The 3.6L exhaust pipe assembly consists of:

- Muffler and resonator assembly module (5)
- Isolators (6)

The muffler and resonator assembly is serviced as an assembly.

The 5.7L/6.4L RH muffler and tailpipe assembly consists of:

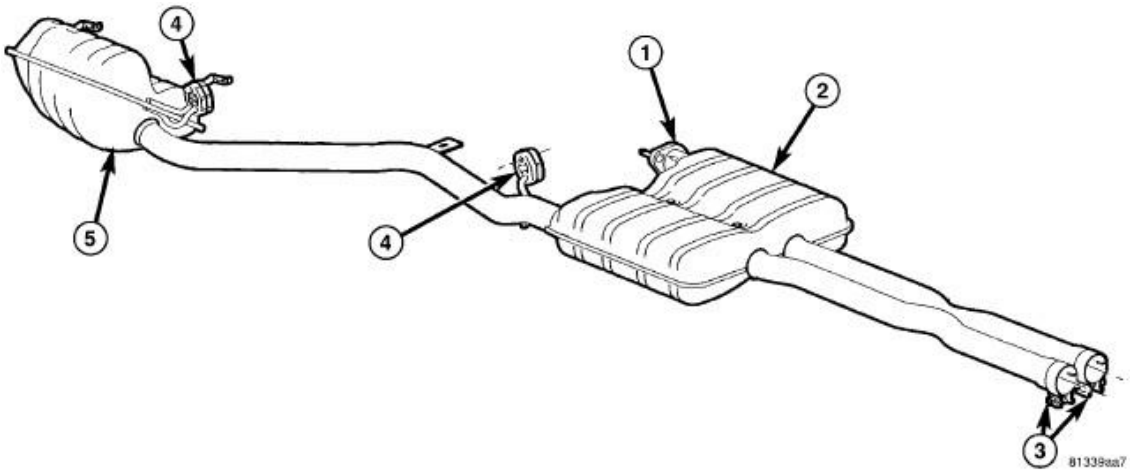


Fig. 29: Front Exhaust Pipe, Muffler And Resonator
Courtesy of CHRYSLER GROUP, LLC

- Front exhaust pipe and muffler (2) and resonator (5)
- Ball flange (1)
- Isolators (4)
- Band clamps (3)

The muffler and resonator assembly is serviced as an assembly.

REMOVAL

SINGLE MUFFLER

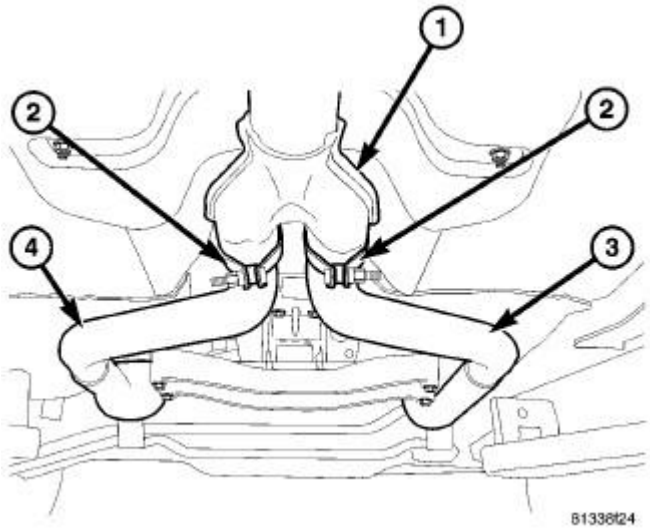


Fig. 30: Front Exhaust Pipe And Resonator Module Clamps
Courtesy of CHRYSLER GROUP, LLC

1 - MUFFLER AND RESONATOR ASSEMBLY
2 - CLAMPS
3 - RH CATALYTIC CONVERTER
4 - LH CATALYTIC CONVERTER

1. Raise the vehicle.
2. Remove the catalytic converter to muffler and resonator clamps (2).

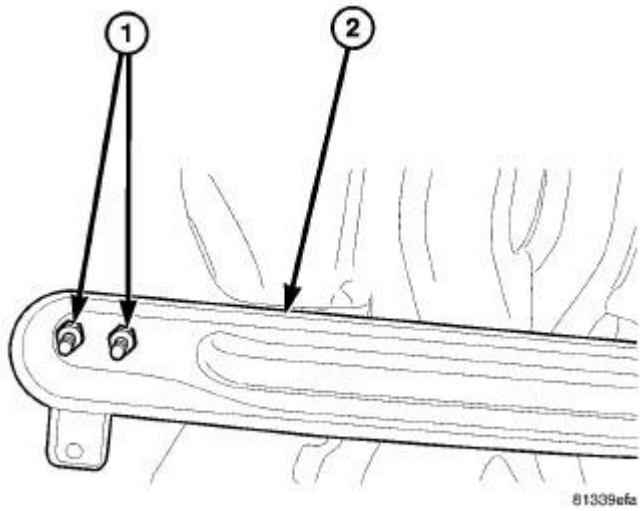


Fig. 31: Tunnel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1 - NUTS
2 - TUNNEL REINFORCEMENT

3. Remove the nuts (1) and tunnel reinforcement (2).

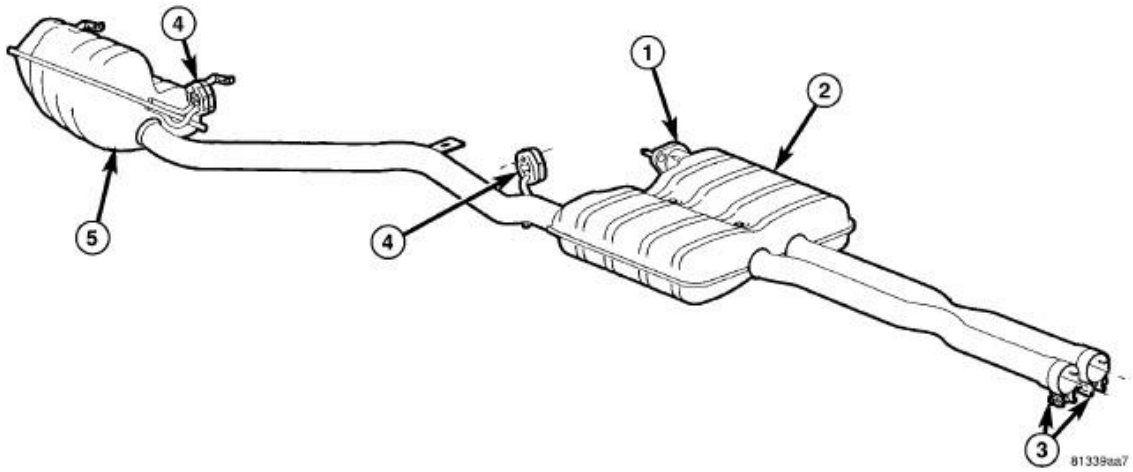


Fig. 32: Exhaust Pipe Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - BALL FLANGE
2 - MUFFLER AND TAIL PIPE ASSEMBLY
3 - BAND CLAMPS
4 - ISOLATOR
5 - RH REAR RESONATOR AND TAILPIPE ASSEMBLY

4. 3.6L/5.7L Engines - If equipped, remove the LH resonator and tailpipe assembly. Refer to **RESONATOR, EXHAUST, REMOVAL**.
5. Remove the isolators (4).
6. Remove the muffler and tailpipe assembly (5) by twisting/turning while pulling assembly out of catalytic converters.

DUAL MUFFLER

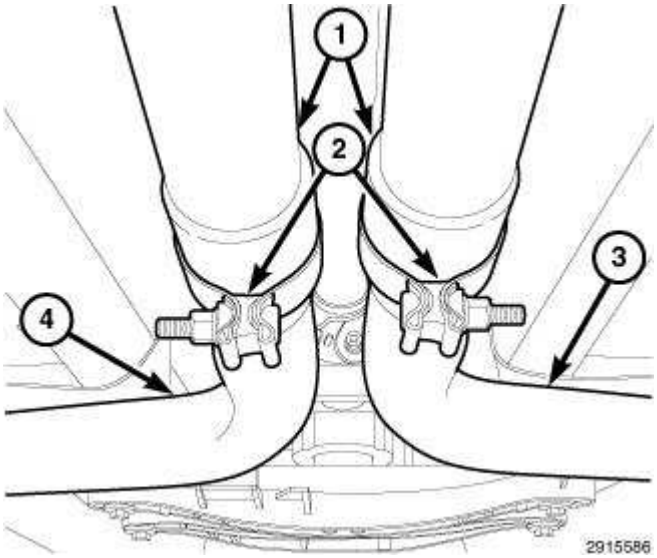


Fig. 33: View Of Exhaust Pipe Band Clamps, Resonator Assembly, And Catalytic Converters
Courtesy of CHRYSLER GROUP, LLC

1. Raise the vehicle.

CAUTION: Do not use any tools to remove the rubber isolators-remove by hand only. Soapy water or silicone based lubricant spray may be used to assist removal/installation of isolators. DO NOT use a petroleum based lubricant on the isolators, as damage to the rubber material can occur.

2. Apply penetrating oil to band clamps.

3. Remove the catalytic converter to muffler and resonator clamps (2).

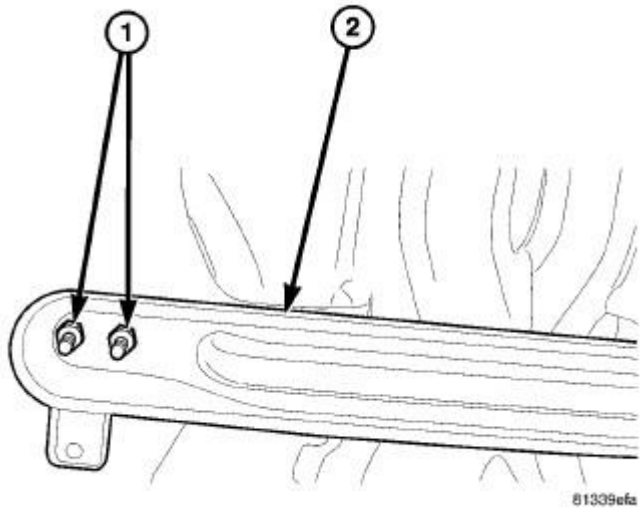


Fig. 34: Tunnel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1 - NUTS
2 - TUNNEL REINFORCEMENT

4. Remove the nuts (1) from the front and rear tunnel reinforcement brackets (2).

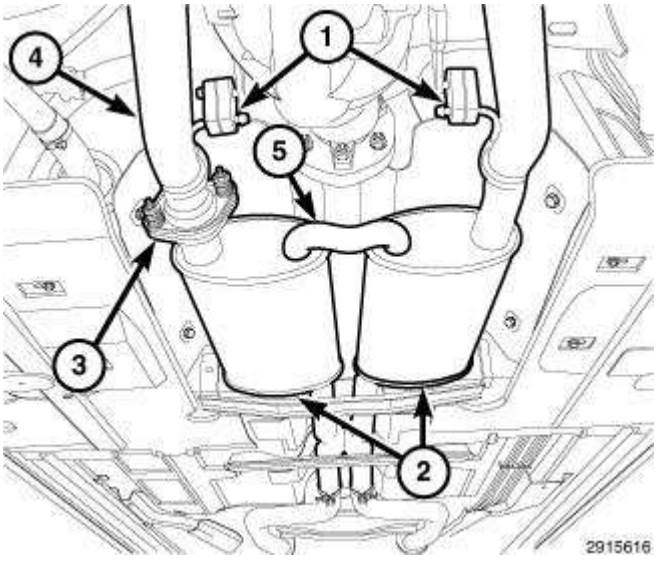


Fig. 35: Muffler/Tailpipe Assembly, Isolators, LH Resonator & Tailpipe Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right side resonator is part of the muffler assembly and must be

replaced with the mufflers if need replacing.

5. 5.7L Engines - If equipped, remove LH resonator and tailpipe assembly (4). Refer to **RESONATOR, EXHAUST, REMOVAL**.
6. Remove the isolators (1).
7. Remove the muffler and tailpipe assembly (2) by twisting/turning while pulling assembly out of catalytic converters.

INSTALLATION

SINGLE MUFFLER

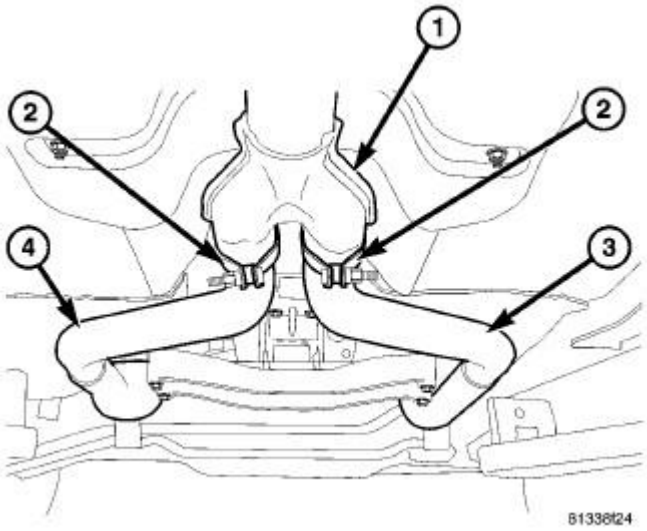


Fig. 36: Front Exhaust Pipe And Resonator Module Clamps
Courtesy of CHRYSLER GROUP, LLC

1 - FRONT EXHAUST MODULE
2 - FRONT EXHAUST PIPE MODULE CLAMP
3 - RH CATALYTIC CONVERTER
4 - LH CATALYTIC CONVERTER

1. Position the front exhaust pipe module clamps (2) on exhaust pipe assembly.
2. Install the exhaust pipe assembly into catalytic converters (3 and 4).

NOTE: Isolators will have an approximately 10° forward angle when installed.

3. Install the isolators.

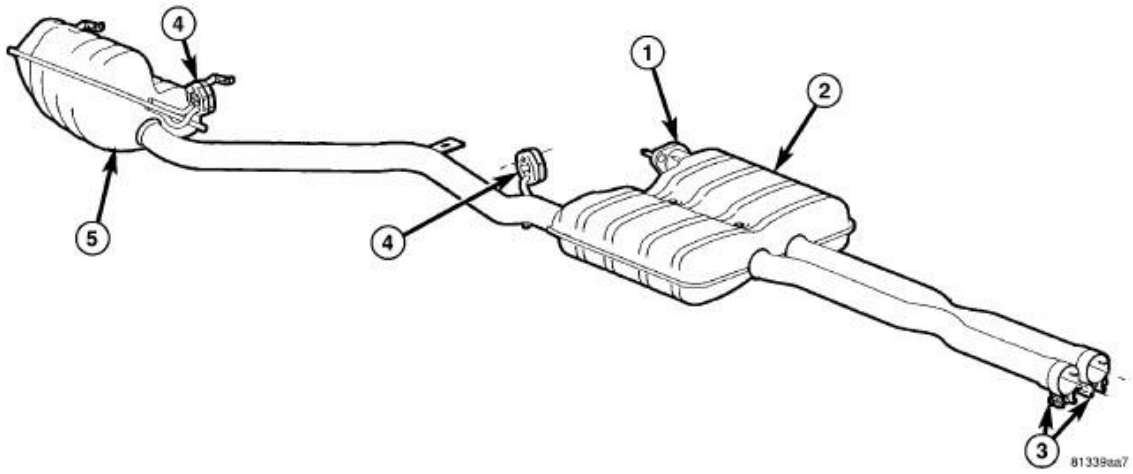


Fig. 37: Muffler And Resonator Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - BALL FLANGE
2 - MUFFLER AND RESONATOR ASSEMBLY
3 - BAND CLAMPS
4 - ISOLATOR
5 - RH REAR RESONATOR AND TAILPIPE ASSEMBLY

4. 3.6L/5.7L Engines - If equipped, install the LH rear resonator and tailpipe assembly. Refer to **RESONATOR, EXHAUST, INSTALLATION**.
5. Check for proper alignment and clearance to underbody and engine compartment components before tightening clamps.
6. Tighten band clamps to 61 N.m (45 ft. lbs.).

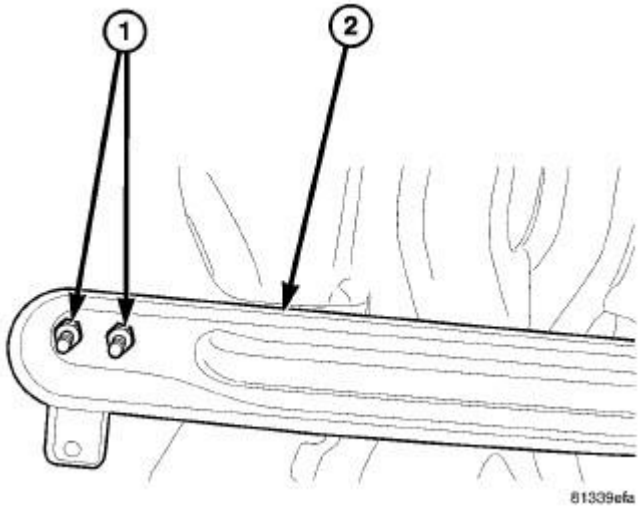


Fig. 38: Tunnel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1 - NUTS
2 - TUNNEL REINFORCEMENT

7. Install the tunnel reinforcement (2) and nuts (1). Tighten nuts to 25 N.m (215 in. lbs.)
8. Check the clearance between muffler and resonator assembly and the fuel tank. Clearance is 14mm (.55 in.) for V8 engine and 16mm (.62 in.) for V6 engine.
9. Check the clearance at rear tunnel reinforcement. Clearance is 15 - 20mm (.59 -.78 in.).
10. The tailpipe should be centered in the rear fascia opening.
11. Adjust clearance as necessary.
12. Lower the vehicle.
13. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

DUAL MUFFLER

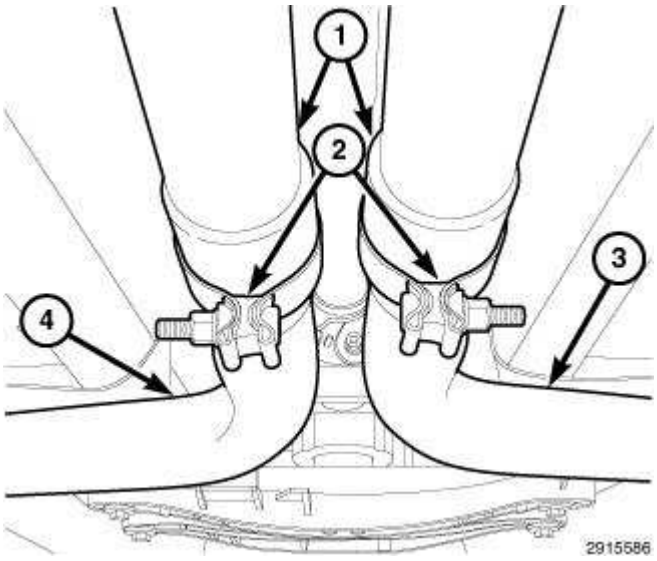


Fig. 39: View Of Exhaust Pipe Band Clamps, Resonator Assembly, And Catalytic Converters
Courtesy of CHRYSLER GROUP, LLC

NOTE: When replacement is required on any component of the exhaust system, it is most important that original equipment parts (or their equivalent) be used.

1. Position the front exhaust pipe module clamps (2) on exhaust pipe assembly.
2. Install the exhaust pipe assembly into catalytic converters (3 and 4).

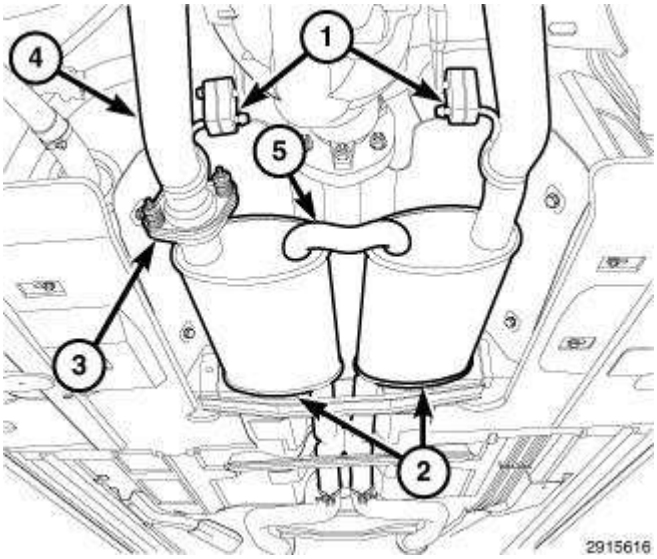


Fig. 40: Muffler/Tailpipe Assembly, Isolators, LH Resonator & Tailpipe Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: Isolators will have an approximately 10° forward angle when installed.

3. Install the isolators (1).
4. 5.7L/6.4L Engines - If equipped, install LH rear resonator and tailpipe assembly. Refer to **RESONATOR, EXHAUST, INSTALLATION**.
5. Check for proper alignment and clearance to underbody and engine compartment components before tightening clamps.
6. Tighten the band clamps to 61 N.m (45 ft. lbs.).

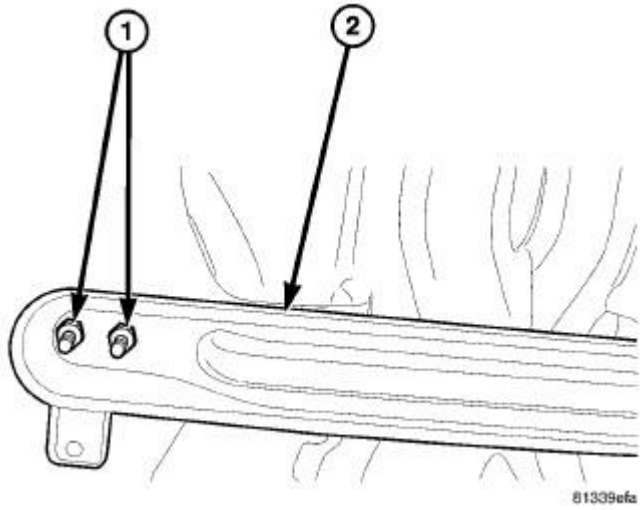


Fig. 41: Tunnel Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1 - NUTS
2 - TUNNEL REINFORCEMENT

7. Install both tunnel reinforcement brackets (2) and nuts (1). Tighten nuts to 25 N.m (215 in. lbs.)
8. Check the clearance between muffler and resonator assembly and fuel tank. Clearance is 14mm (.55 in.) for V8 engine.
9. Check the clearance at rear tunnel reinforcement. Clearance is 15 - 20mm (.59 -.78 in.).
10. The tailpipe should be centered in the rear fascia opening.
11. Adjust clearance as necessary.
12. Lower the vehicle.
13. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

RESONATOR, EXHAUST

REMOVAL

SINGLE MUFFLER/RESONATOR

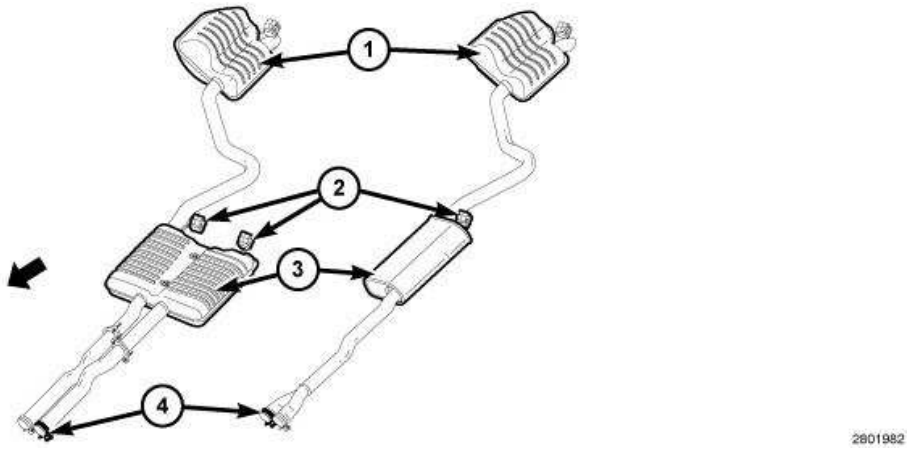


Fig. 42: Single Exhaust Systems, Muffler, Resonator And Tailpipe
Courtesy of CHRYSLER GROUP, LLC

NOTE: On single exhaust systems, the muffler, resonator and tailpipe (4) are one single unit.

1. Apply penetrating oil to band clamp nut and bolt (4).
2. Remove ground straps.
3. Support the exhaust system with a stand.
4. Remove the muffler/resonator assembly from the catalytic converter down pipes at the clamps (4).

CAUTION: Do not use any tools to remove the rubber isolators-remove by hand

only. Soapy water or silicone based lubricant spray may be used to assist removal/installation of isolators. DO NOT use a petroleum based lubricant on the isolators, as damage to the rubber material can occur.

5. Remove the isolators (2).
6. Remove the muffler/resonator assembly.

DUAL MUFFLER/RESONATOR

3.6L

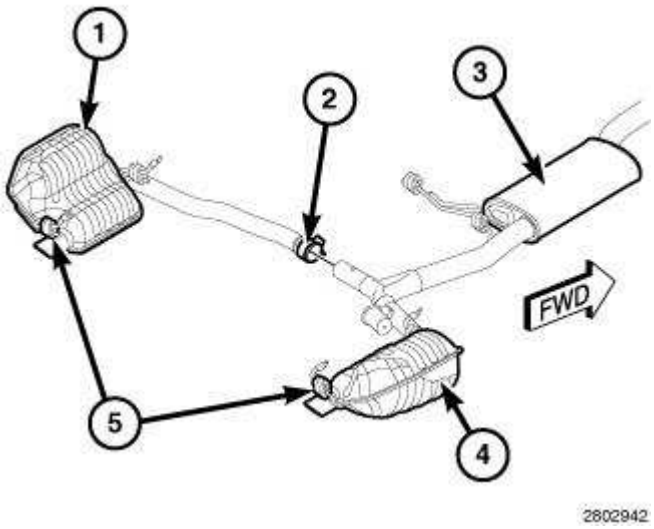


Fig. 43: Pipe Strap Clamp, Isolators And Tailpipe Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Raise the vehicle.
2. Loosen the pipe strap clamp (2) for the left side resonator pipe.
3. Remove the isolators (5) at the left side resonator.
4. Remove the left side resonator and tailpipe assembly (1).
5. Loosen the front strap clamps at the catalytic convertor down pipes.
6. Remove the isolator to the muffler/resonator assembly.
7. Remove the right side muffler/resonator assembly.

5.7L/6.4L

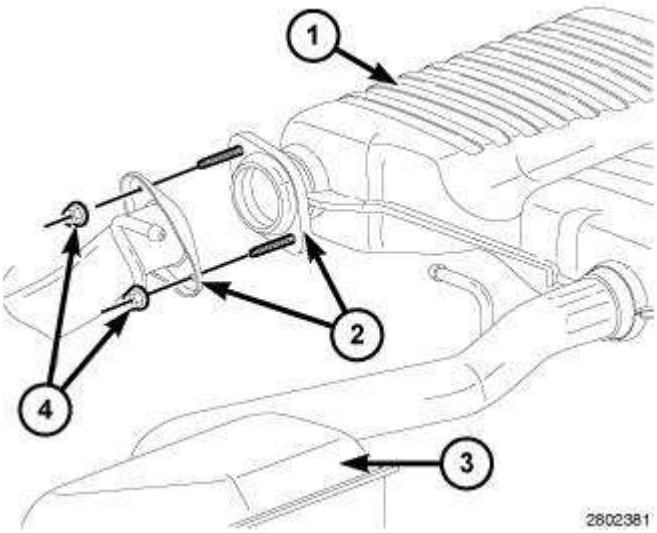


Fig. 44: Side Muffler Resonator Assembly, Flange And Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Raise the vehicle.
2. Remove the two mounting nuts (4) at the muffler flange (2).
3. Remove the isolators to the left side resonator.
4. Remove left side resonator/tailpipe assembly from the muffler flange (2).
5. Loosen the front strap clamps at the catalytic convertor down pipes.
6. Remove the isolators to the muffler/resonator assembly.
7. Remove the right side muffler/resonator (1) assembly.

INSTALLATION

SINGLE MUFFLER/RESONATOR

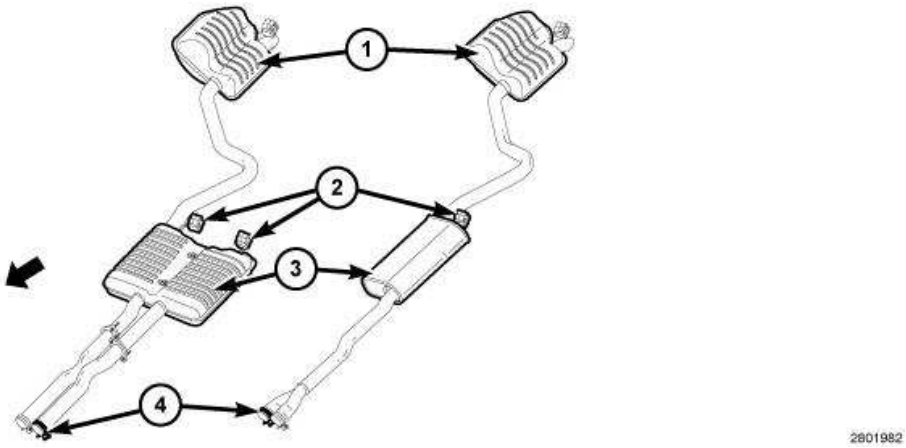


Fig. 45: Single Exhaust Systems, Muffler, Resonator And Tailpipe
Courtesy of CHRYSLER GROUP, LLC

NOTE: **NOTE: Always work from the front to rear of exhaust system when aligning and tightening exhaust system components.**

1. Position muffler/resonator assembly (2) onto the catalytic exhaust pipes.
2. Install support isolators.
3. Align muffler/resonator assembly to maintain position and proper clearance with underbody parts. All support isolators should have equal load on them.
4. Tighten the exhaust clamps (4) to 50 N.m (37 ft. lbs.).
5. Connect the ground straps.
6. Lower vehicle.
7. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary

DUAL MUFFLER/RESONATOR

3.6L

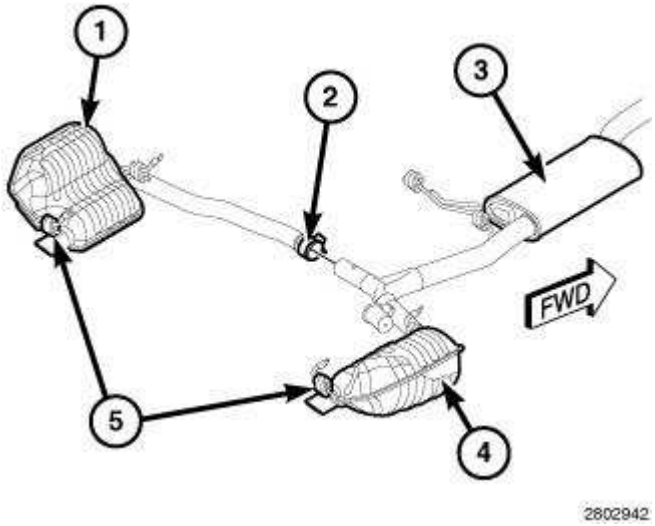


Fig. 46: Pipe Strap Clamp, Isolators And Tailpipe Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Place the muffler/resonator into position.
2. Install the isolators (5).
3. Place the left side resonator/tailpipe (1) assembly into position.
4. Install the isolators (5).
5. The tailpipe should be centered in the rear fascia opening.
6. Check the clearance between muffler and tailpipe assembly and the fuel tank. Clearance is 14mm (.55 in.) for V8 engine and 16mm (.62 in.) for V6 engine.
7. Check the clearance at rear tunnel reinforcement. Clearance is 15 - 20mm (.59 -.78 in.).
8. Tighten the strap clamps (2) to 50 N.m (37 ft. lbs.).

9. Lower the vehicle.
10. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

5.7L/6.4L

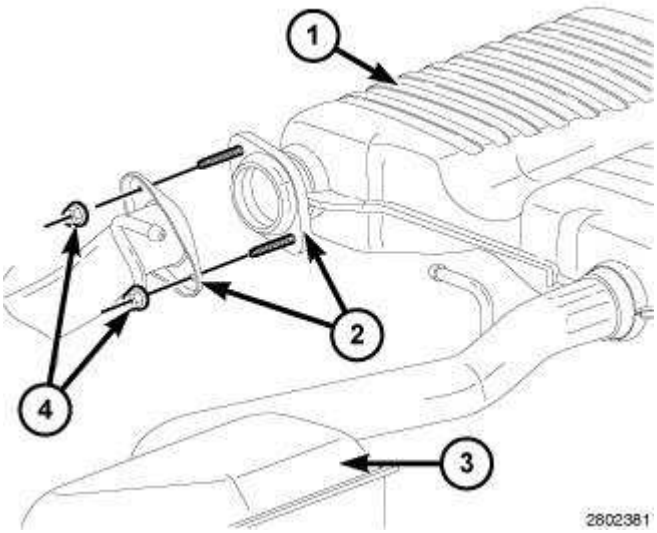


Fig. 47: Side Muffler Resonator Assembly, Flange And Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Place the muffler/resonator into position.
2. Install the isolators.
3. Place left side resonator/ tailpipe assembly into position.
4. Install the ball flange nuts (2). Tighten nuts finger tight.
5. Check the clearance between muffler and tailpipe assembly and the fuel tank. Clearance is 14mm (.55 in.) for V8 engine and 16mm (.62 in.) for V6 engine.
6. Check the clearance at rear tunnel reinforcement. Clearance is 15 - 20mm (.59 -.78 in.).
7. The tailpipe should be centered in the rear fascia opening.
8. Tighten strap clamps (2) to 50 N.m (37 ft. lbs.).
9. Tighten ball flange nuts (2) to 30 N.m (22 ft. lbs.).
10. Lower the vehicle.
11. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

SENSOR, DIFFERENTIAL PRESSURE

DESCRIPTION

DIESEL

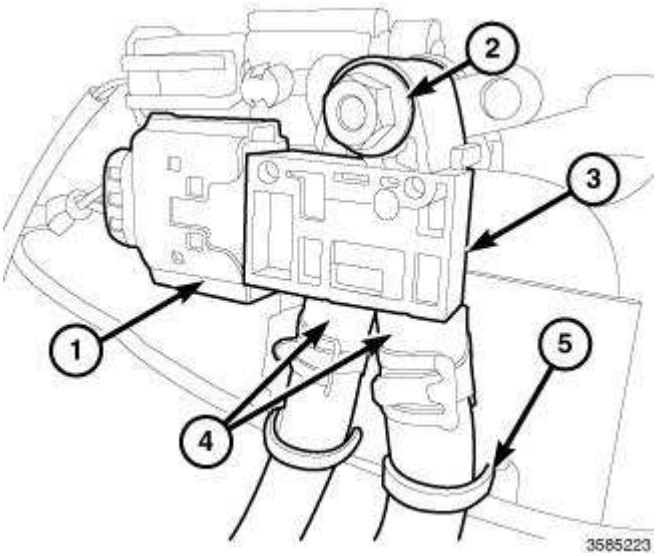


Fig. 48: Differential Pressure Sensor Wire Harness Connector, Zip Tie, Differential Pressure Sensor Hoses, Nut & Differential Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

The Exhaust Differential Pressure Sensor (3) is remotely mounted on the transmission housing. Two pressure tubes (4) measure pressure before and after the Diesel Particulate Filter (DPF)/Diesel Oxidation Catalyst (DOC). The sensor is critical for fail-safe of regeneration strategy, because it interprets high pressure drops as possible high soot loads.

6.4L

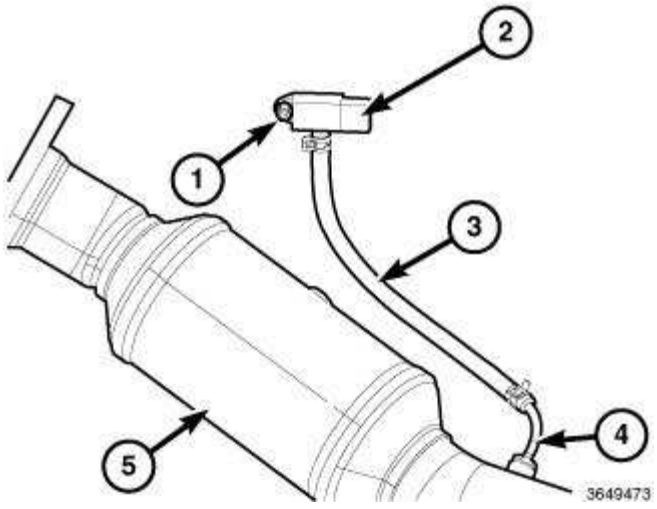


Fig. 49: Differential Pressure Sensor (DPS) Metal Tubing Fitting, DPS Electrical Connector, DPS Hose & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Exhaust Differential Pressure Sensor (2) is remotely mounted on the transmission housing. One pressure tube (3) measures back-pressure created by the valves located at the cold end of the

exhaust system. The sensor monitors the pressure in the exhaust system and determines if the valves are working properly for engine performance.

6.4L ACTIVE EXHAUST VALVE

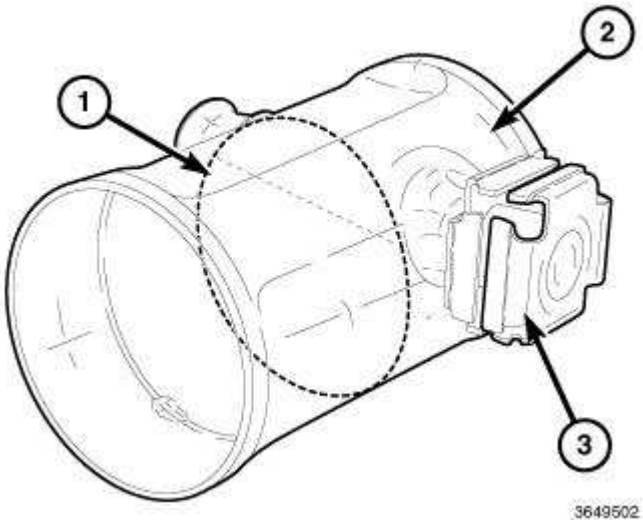


Fig. 50: Active Exhaust Valves (AEV), Valve & Spring Tension
Courtesy of CHRYSLER GROUP, LLC

The Active Exhaust Valves (AEV) (2) are located at the cold end of the exhaust pipe before the muffler, after the catalytic converters. The pressure created by the engine allows the valve (1) to over come the spring tension (3) and open for optimal engine performance. When the valve is closed. The back pressure created in the exhaust system assist in engine performance by:

- Increasing the fuel economy due to the increased use of MDS
- Increased use of the MDS from the AEV improvement
- No loss of vehicle performance
- Emissions remain the same.

The AEV is welded into the cold end of the exhaust pipe. If replacement of the valve is required. The exhaust pipe must be replaced. The AEV is non repairable.

REMOVAL

6.4L

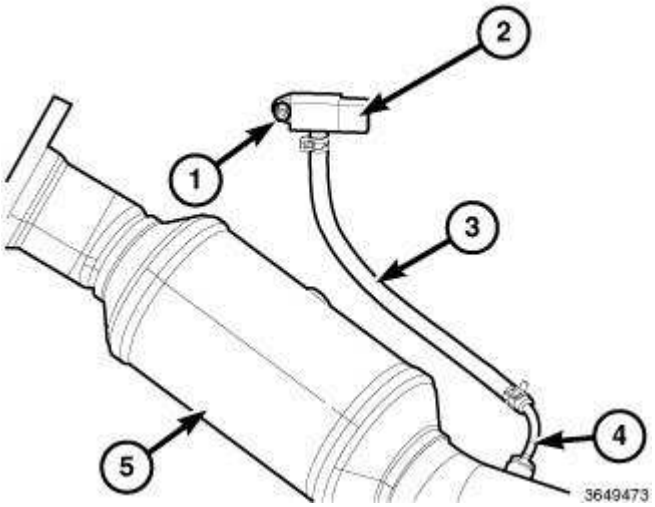


Fig. 51: Differential Pressure Sensor (DPS) Metal Tubing Fitting, DPS Electrical Connector, DPS Hose & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Raise and support vehicle.
3. If required, remove the Differential Pressure Sensor (DPS) metal tubing fitting (4).
4. Disconnect the DPS electrical connector (2).
5. Disconnect the DPS hose (3).
6. Remove the bolt (1) with the DPS.
7. Remove the DPS from the bracket.

DIESEL

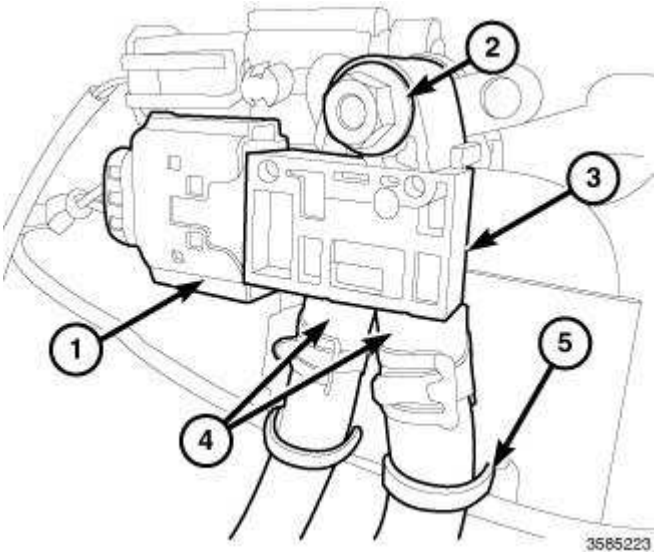


Fig. 52: Differential Pressure Sensor Wire Harness Connector, Zip Tie, Differential Pressure

Sensor Hoses, Nut & Differential Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Disconnect the differential pressure sensor wire harness connector (1).
4. Remove the zip tie (5) securing the differential pressure sensor hoses (4).
5. Disconnect the differential pressure sensor hoses (4).
6. Remove nut (2) and the differential pressure sensor (3).

INSTALLATION

6.4L

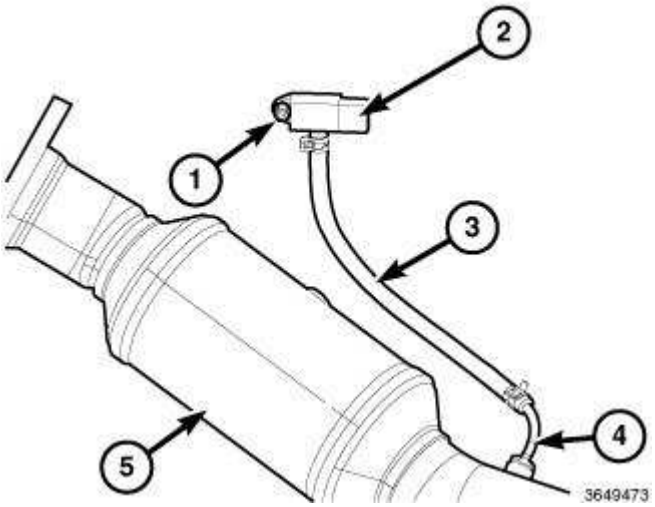


Fig. 53: Differential Pressure Sensor (DPS) Metal Tubing Fitting, DPS Electrical Connector, DPS Hose & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the Differential Pressure Sensor (DPS) metal tubing fitting (4).
2. Install the DPS (1) to the bracket.
3. Install the DPS and bracket in vehicle.
4. Connect the DPS hose.
5. Lower the vehicle.
6. Connect the negative battery cable.

DIESEL

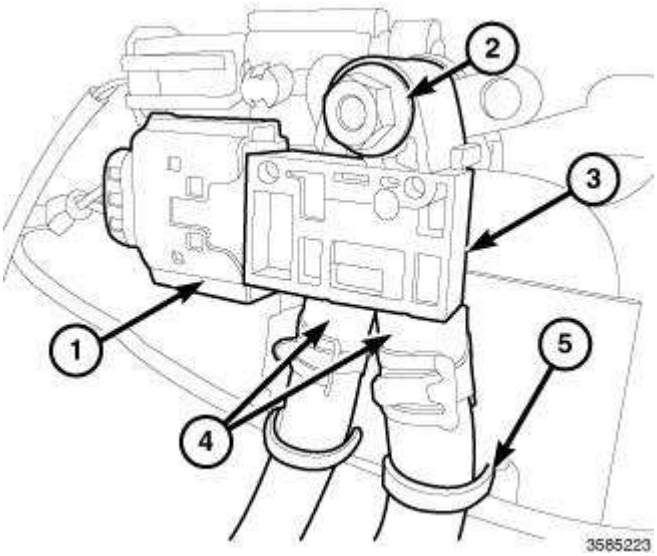


Fig. 54: Differential Pressure Sensor Wire Harness Connector, Zip Tie, Differential Pressure Sensor Hoses, Nut & Differential Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install the differential pressure sensor (3) and securely tighten the nut (2) to 18 N.m (159 in. lbs.).

NOTE: Before installing, inspect both pressure hoses and make sure there is not any dip across the hoses. In cases where water is frozen, a dip across the hoses can cause condensation which can set a MIL.

2. Connect the differential pressure sensor hoses (4).
3. Install the zip tie (5) to secure the differential pressure sensor hoses (4).
4. Connect the differential pressure sensor wire harness connector (1).
5. Lower the vehicle.
6. Connect the negative battery cable.

SENSOR, EXHAUST TEMPERATURE

DESCRIPTION

DESCRIPTION

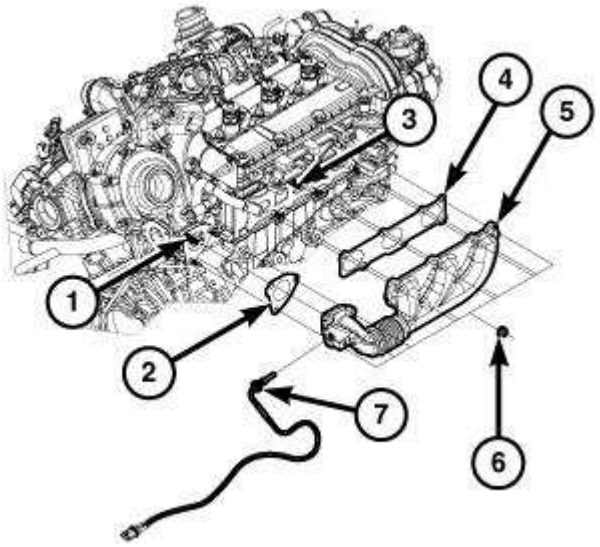


Fig. 55: Exhaust Manifold, Gaskets, Turbocharger, Cylinder Head & Fasteners
Courtesy of CHRYSLER GROUP, LLC

The Exhaust Gas Temperature Sensor (7) 1/1 is located the outlet of the Exhaust Manifold and is accessible from the top of the engine compartment. The Exhaust Gas Temperature Sensor 1/1 operates as a typical two wire 5-Volt sensor. It sends a signal to the Powertrain Control Module (PCM) indicating the temperature of the exhaust gases entering the Diesel Particulate Filter.

REMOVAL

EXHAUST TEMPERATURE SENSOR 1/1

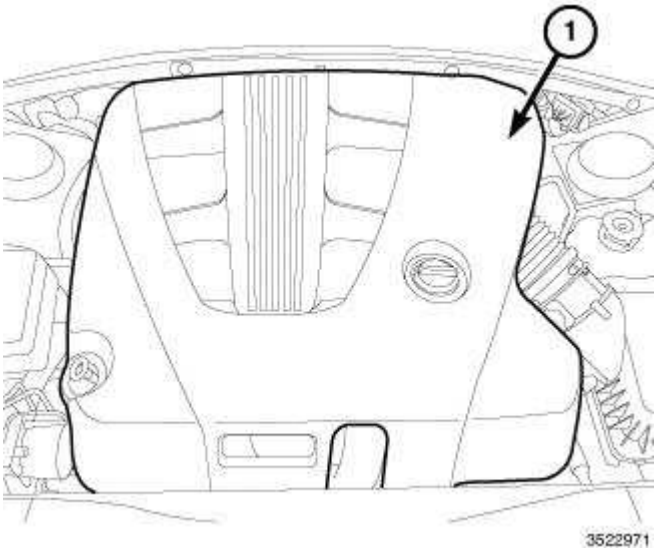


Fig. 56: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.

2. Remove the engine cover (1).
3. Remove the cowl extension and the side extensions. Refer to **COVER, COWL PANEL, REMOVAL** .

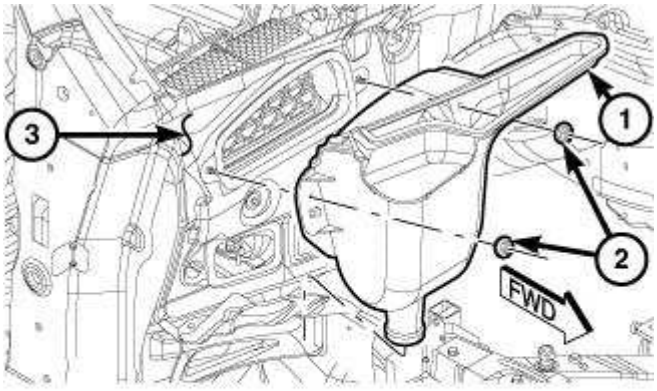


Fig. 57: Two Nuts, Air Inlet Duct & Dash Panel
Courtesy of CHRYSLER GROUP, LLC

4. Remove nuts and the HVAC air inlet housing (1).

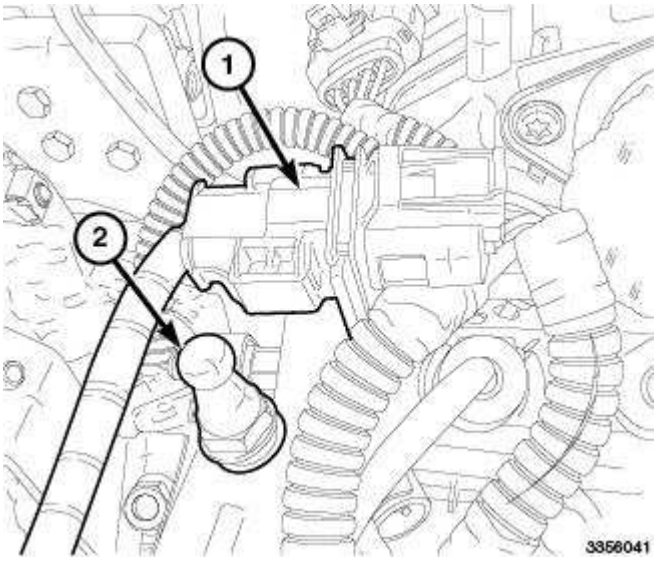


Fig. 58: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the oxygen sensor wire harness connector (1).
6. Disconnect the upstream exhaust temperature sensor wire harness connector.

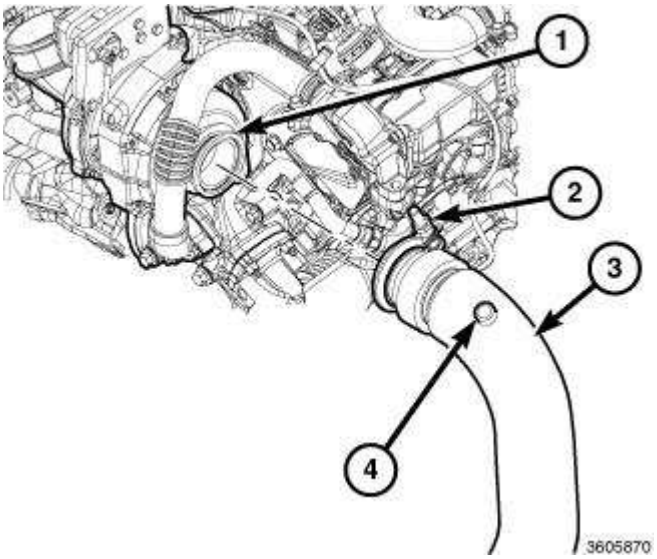


Fig. 59: Clamp, Downpipe & Turbocharger Flange
Courtesy of CHRYSLER GROUP, LLC

7. Loosen the clamp (2) and separate the Diesel Particulate Filter (DPF) from turbocharger.

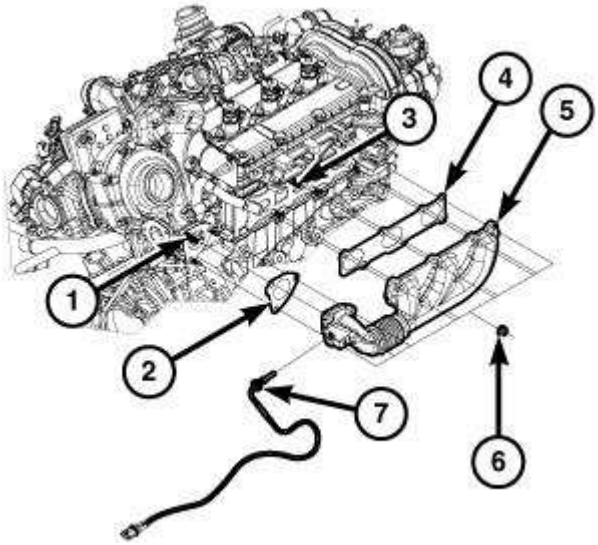


Fig. 60: Exhaust Manifold, Gaskets, Turbocharger, Cylinder Head & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Remove the exhaust temperature sensor (7).

EXHAUST TEMPERATURE SENSOR 1/2

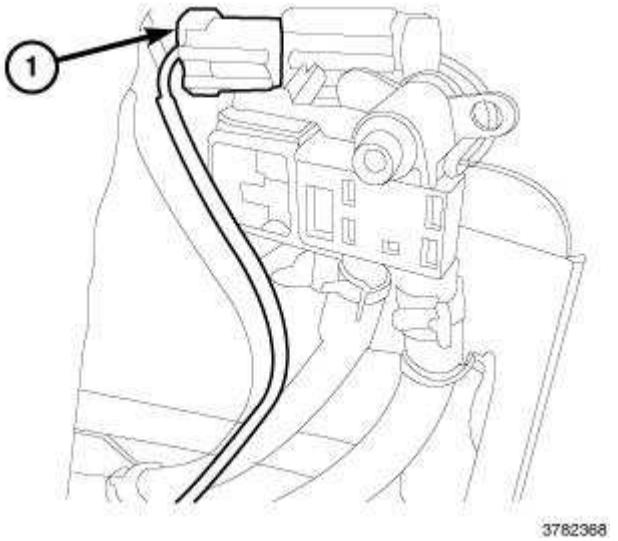


Fig. 61: Exhaust Temperature Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the transmission belly pan.
3. Disconnect the exhaust temperature sensor wire harness connector (1).

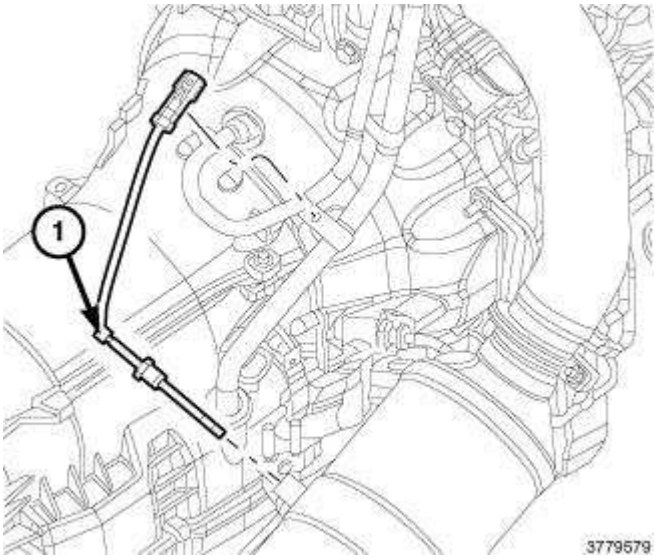


Fig. 62: Exhaust Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the exhaust temperature sensor (1).

INSTALLATION

EXHAUST TEMPERATURE SENSOR 1/1

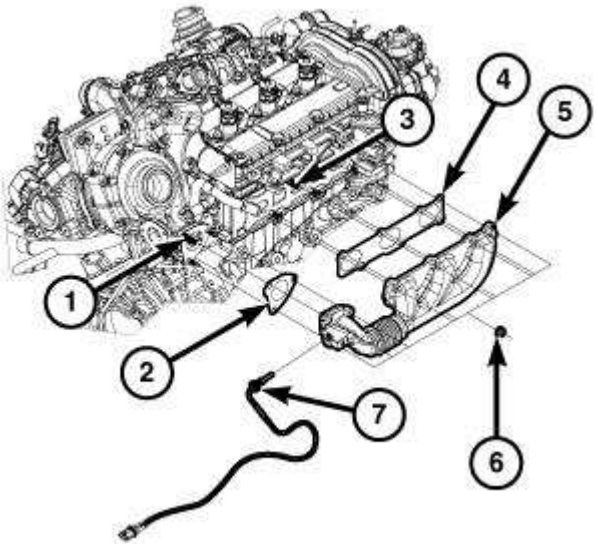


Fig. 63: Exhaust Manifold, Gaskets, Turbocharger, Cylinder Head & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Install the exhaust temperature sensor (7) and tighten to 45 N.m (33 ft. lbs.).

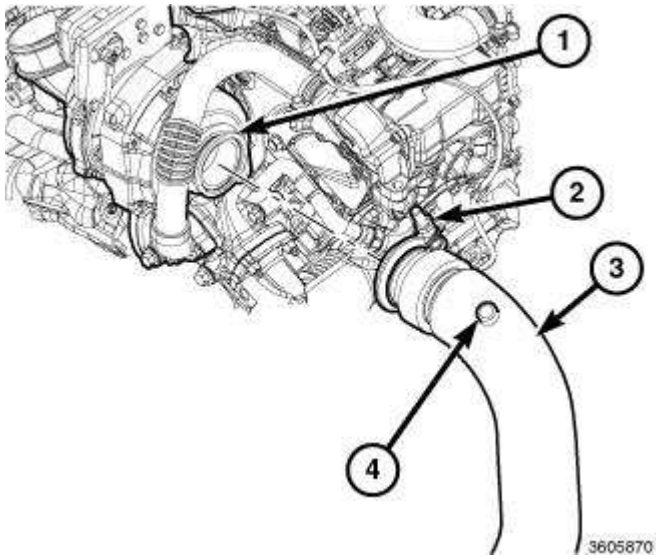


Fig. 64: Clamp, Downpipe & Turbocharger Flange
Courtesy of CHRYSLER GROUP, LLC

2. Align the Diesel Particulate Filter (DPF) pipe to the turbocharger. Tighten the clamp (2) to 25 N.m (18 ft. lbs.)

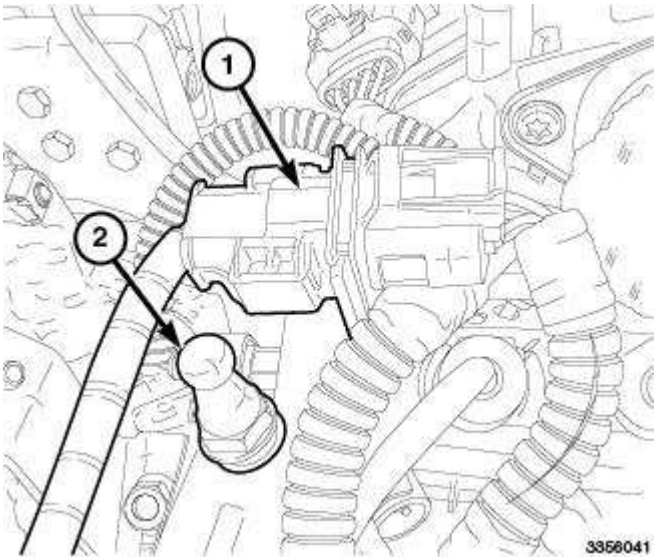


Fig. 65: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

3. Connect the upstream exhaust temperature sensor wire harness connector.
4. Connect the oxygen sensor wire harness connector (1).

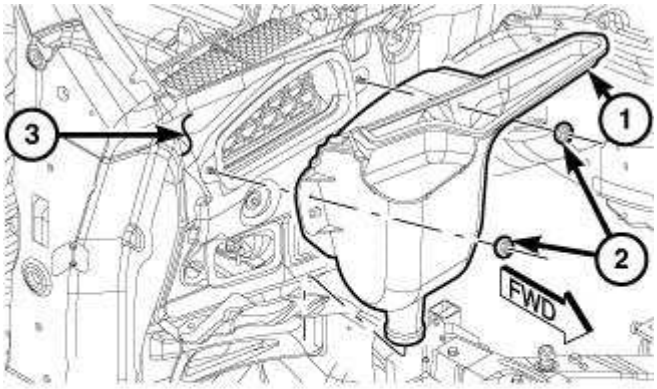


Fig. 66: Two Nuts, Air Inlet Duct & Dash Panel
Courtesy of CHRYSLER GROUP, LLC

5. Install the HVAC air inlet housing (1) and securely tighten nuts.
6. Install the cowl extension and the side extensions. Refer to **COVER, COWL PANEL, INSTALLATION** .

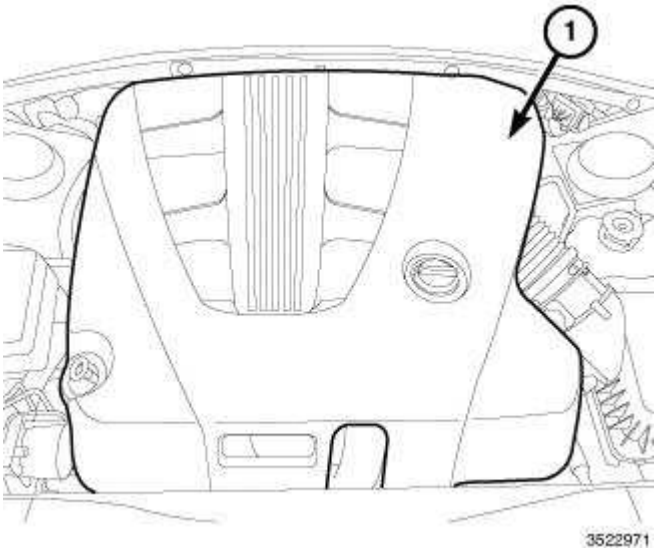


Fig. 67: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

7. Install the engine cover (1).
8. Connect the negative battery cable.

EXHAUST TEMPERATURE SENSOR 1/2

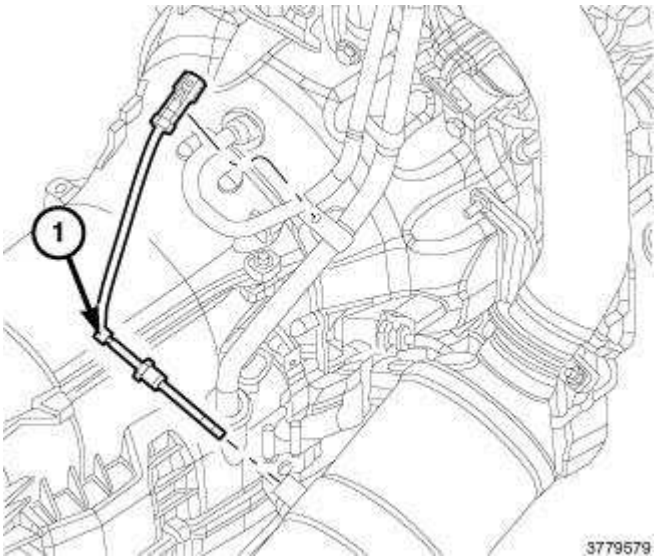


Fig. 68: Exhaust Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install the exhaust temperature sensor (1) and tighten to 47 N.m (35 ft. lbs.).

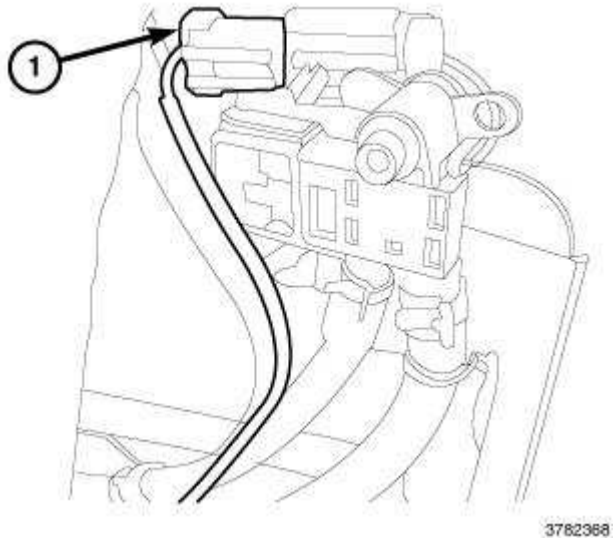


Fig. 69: Exhaust Temperature Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the exhaust temperature sensor wire harness connector (1).
3. Install the transmission belly pan.
4. Connect the negative battery cable.

SHIELD, HEAT

REMOVAL

REMOVAL

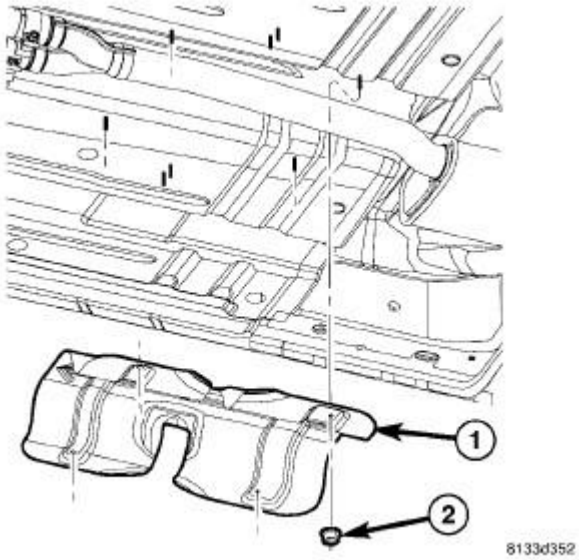


Fig. 70: Heat Shields

Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD
2 - NUT

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

1. Raise and secure the vehicle.
2. Remove the floor pan mid support bracket.
3. Remove the nuts (2).
4. Remove the heat shields (1).

INSTALLATION

INSTALLATION

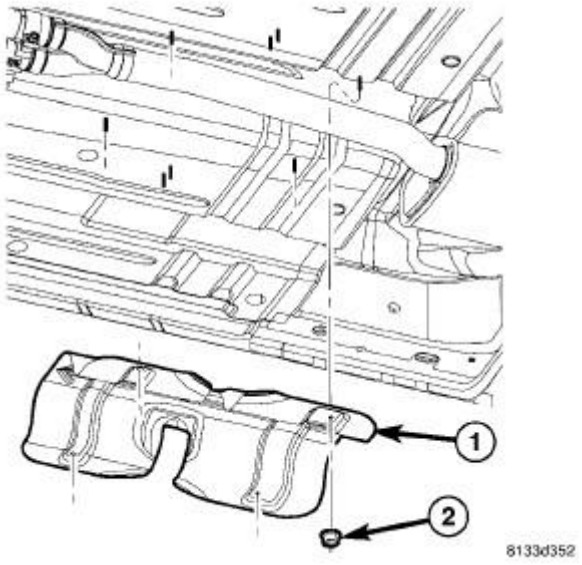


Fig. 71: Heat Shields
Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD
2 - NUT

1. Position the heat shields (1).
2. Install the nuts (2). Tighten the nuts (2) to 10 N.m (98 in. lbs.).

3. Install the floor pan mid support bracket.
4. Lower the vehicle.

TAILPIPE, EXHAUST

REMOVAL

REMOVAL

NOTE: Assistance in removal is recommended. Never allow the muffler to hang from the isolators this may cause damage to either the isolators or the tailpipe/muffler assembly.

NOTE: Some exhaust systems are equipped with adjustable tail pipes and can be removed without removing the resonator assembly.

1. Raise and support the vehicle.
2. Saturate the bolts and nuts with heat valve lubricant. Allow 5 minutes for penetration.
3. If equipped with adjustable tail pipes. Separate the tailpipe from the resonator outlet pipe.

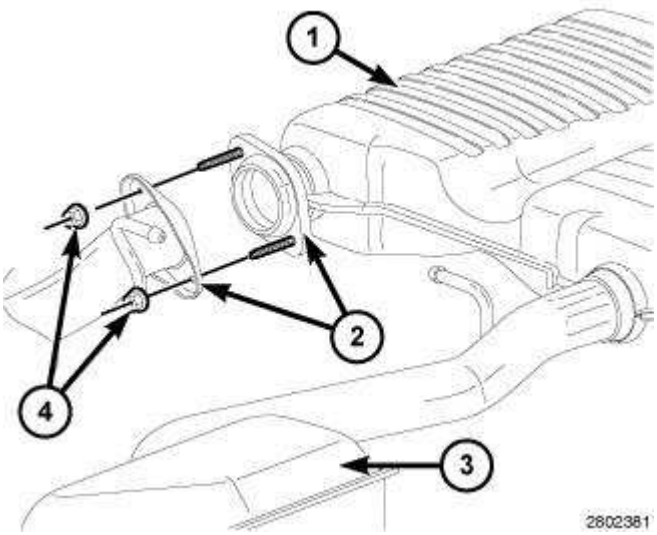


Fig. 72: Side Muffler Resonator Assembly, Flange And Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

4. If equipped with non adjustable tailpipes, separate the left side tailpipe/resonator at the flange (2).

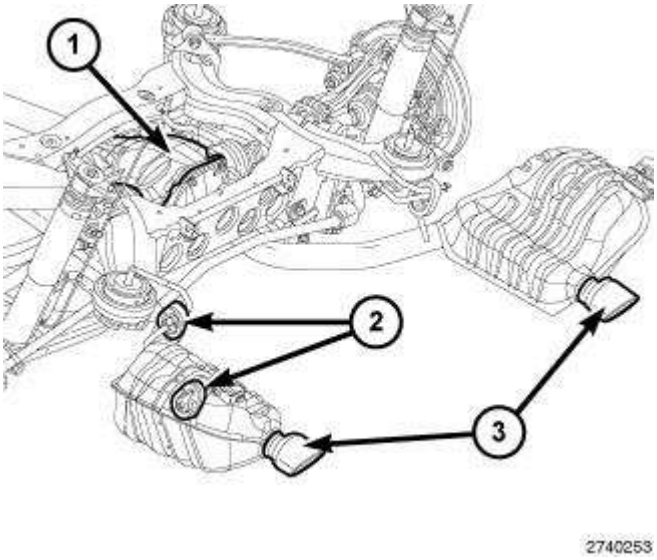


Fig. 73: Tailpipe/Muffler Assembly & Isolators
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear isolators (2).
6. Remove the tailpipe/resonator assembly.

WITH MUFFLER

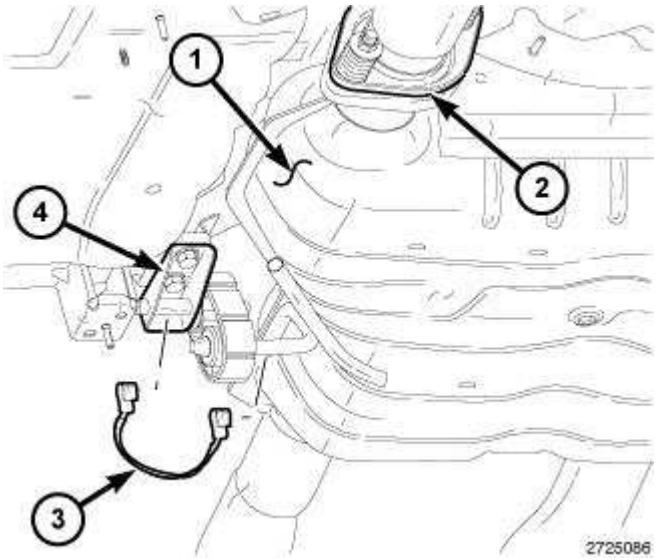


Fig. 74: Muffler Flange & Exhaust Pipe/Catalytic Converter Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Remove the tailpipe/resonator to muffler assembly flange (2) nuts.
2. Remove tailpipe/resonator and muffler as an assembly from vehicle.

INSTALLATION

INSTALLATION

NOTE: Muffler installation is a two-man operation. Never allow the muffler to hang from the isolators. A helper is required so no damage will come to the isolators or to the tailpipe/muffler assembly.

NOTE: Some exhaust systems are equipped with adjustable tail pipes and can be removed without removing the resonator assembly.

1. If equipped with adjustable tail pipes. Install the tailpipe to the resonator outlet pipe and tighten clamp.

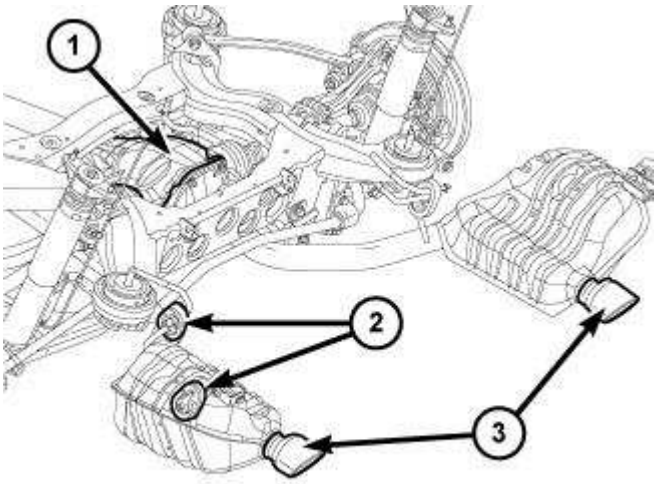


Fig. 75: Tailpipe/Muffler Assembly & Isolators
Courtesy of CHRYSLER GROUP, LLC

2. If equipped with non adjustable tailpipes, position the tailpipe/resonator (3) assembly in vehicle.
3. If equipped, install the left side tailpipe/resonator at the flange. Tighten the nuts to 28 N.M (21 ft. lbs.).
4. Install tailpipe/resonator insulators (2).
5. Install the tailpipe into the exhaust pipe.

WITH MUFFLER

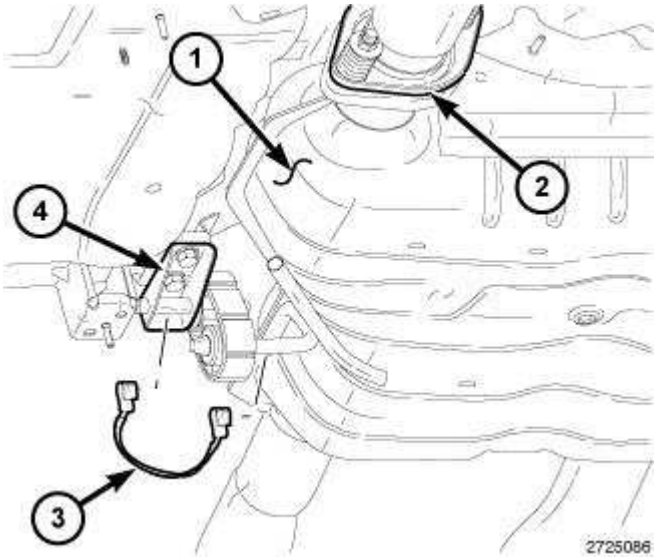


Fig. 76: Muffler Flange & Exhaust Pipe/Catalytic Converter Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Install muffler insulators (4) and ground straps (3)
2. Align muffler (1) to the catalytic convertor pipe flange. Install and Tighten flange (2) nuts to 47 N.m (35 ft. lbs.).
3. Make sure the tailpipe/resonator assembly is correctly positioned and the properly aligned. The minimum clearance between components is 25mm (1 inch).
4. Lower the vehicle.
5. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

SPECIAL TOOLS

SPECIAL TOOLS

8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.)
9031-1 - Bushing Removal Receiver (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-10 - Brace (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-11 - Clamp (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-12 - Brace (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-2 - Remover, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-3 - Receiver, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-4 - Installer, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-5A - Remover, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-6 - Receiver (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-7A - Installer, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-8A - Receiver, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9031-9 - Clamp (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

9032-1 - Receiver, Bushing (Originally Shipped In Kit Number(s) 9076, 9090, 9090CC.)
9032-2 - Receiver, Bushing (Originally Shipped In Kit Number(s) 9076, 9090, 9090CC.)
9032-3 - Pusher, Bushing (Originally Shipped In Kit Number(s) 9076, 9090, 9090CC.)
9360 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
9520 - Remover/Installer, Bushing (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9520-1 - Installer Disc (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9520-2 - Installer, Bushing (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9520-3 - Remover, Bushing (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
9520-4 - Cup, Receiver (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
C-4212F - Press, Ball Joint (Originally Shipped In Kit Number(s) 6745, 6880, 6881, MLR-C03.)

BUMPERS

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Front bumper bolts	28	21	-
Rear bumper bolts	28	21	-

BUMPER, FRONT

REMOVAL

REMOVAL

PEDESTRIAN PROTECTION REINFORCEMENT

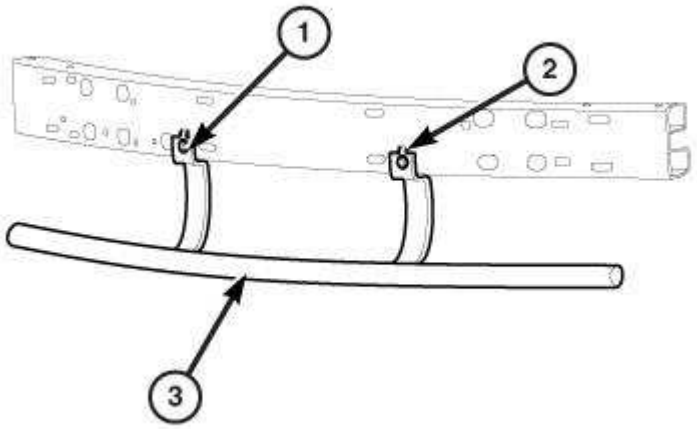


Fig. 1: Two Fasteners, Reinforcement & Hooks
Courtesy of CHRYSLER GROUP, LLC

NOTE: BUX vehicles only.

1. Remove the fascia assembly. Refer to **FASCIA, FRONT, REMOVAL**.
2. Remove the two fasteners (1) securing the pedestrain protection reinforcement (3) to the front bumper reinforcement.
3. Lift the pedestrain protection reinforcement (3) up and out to disengage the hooks (2) from the front bumper reinforcement.
4. Remove the pedestrain protection reinforcement (3).

BUMPER REINFORCEMENT

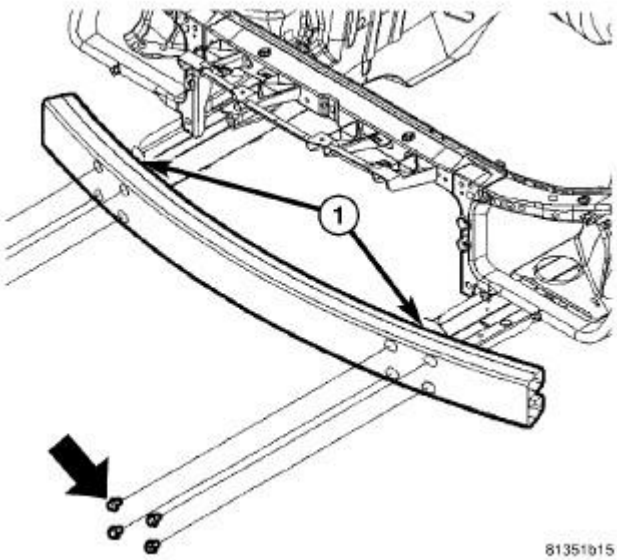


Fig. 2: Bumper
Courtesy of CHRYSLER GROUP, LLC

1. Remove fascia assembly. Refer to **FASCIA, FRONT, REMOVAL**.
2. Drill out the four spot welds (2 per side) between the bumper bracket and rail end cap (1).
3. Remove the eight screws (4 per side) and remove the bumper.

INSTALLATION

INSTALLATION

BUMPER REINFORCEMENT

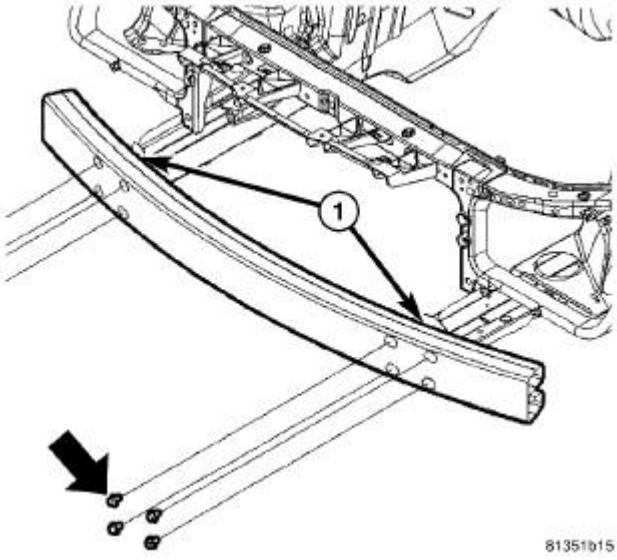


Fig. 3: Bumper

Courtesy of CHRYSLER GROUP, LLC

1. Position the bumper (1).

NOTE: It is not necessary to spot weld the bumper back into place.

2. Install the bolts and tighten to 28 N.m (21 ft. lbs.).
3. Install the fascia. Refer to **FASCIA, FRONT, INSTALLATION**.

PEDESTRIAN PROTECTION REINFORCEMENT

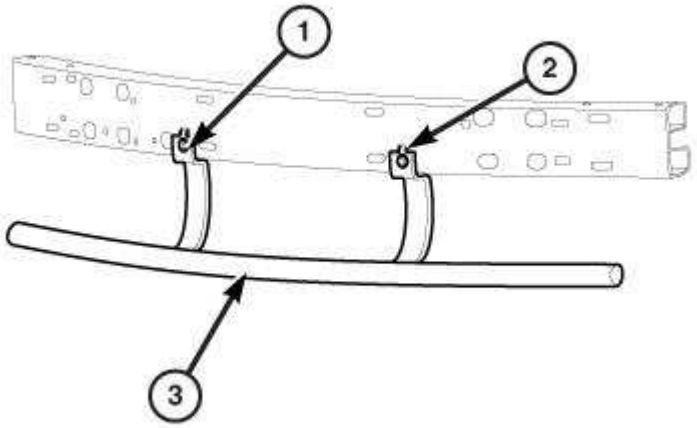


Fig. 4: Two Fasteners, Reinforcement & Hooks
Courtesy of CHRYSLER GROUP, LLC

NOTE: BUX vehicles only.

1. Position the pedestrain protection reinforcement (3) to the front bumper reinforcement by aligning and engaging the hook features (2).
2. Install the two fasteners (1) securing the pedestrain protection reinforcement (3) to the front bumper reinforcement. Tighten the fasteners to 9 N-m (80 in. lbs.).
3. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION**.

BUMPER, REAR

REMOVAL

REMOVAL

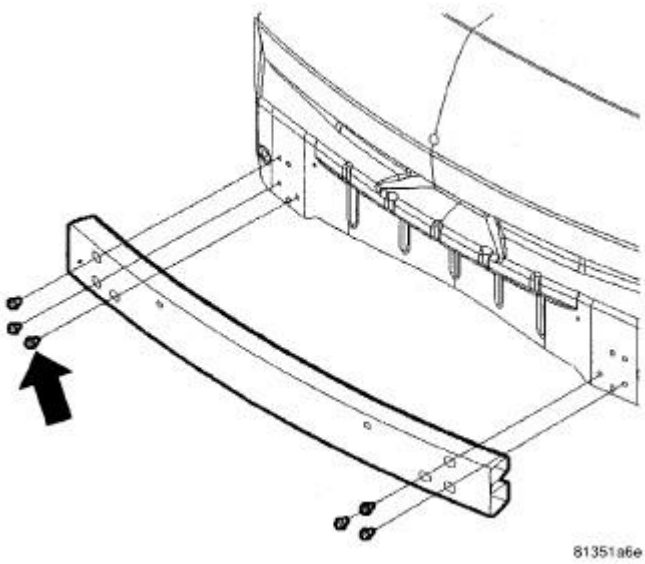


Fig. 5: Bumper
Courtesy of CHRYSLER GROUP, LLC

NOTE: 300 Shown in illustration. Magnum and Charger similar.

1. Remove the fascia assembly. Refer to **FASCIA, REAR, REMOVAL**.
2. Remove the six nuts and washers and remove the bumper.

INSTALLATION

INSTALLATION

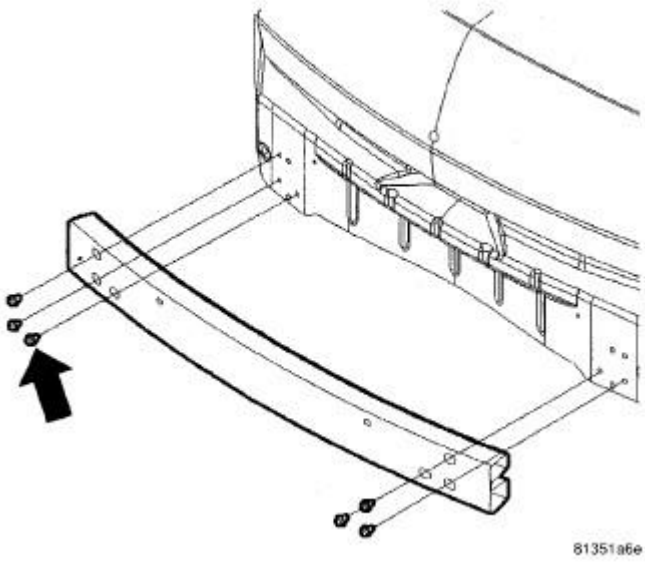


Fig. 6: Bumper

Courtesy of CHRYSLER GROUP, LLC

1. Position the bumper.
2. Install the nuts and washers and tighten to 28 N.m (21 ft. lbs.).
3. Install the fascia assembly. Refer to **FASCIA, REAR, INSTALLATION**.

FASCIA, FRONT

REMOVAL

REMOVAL

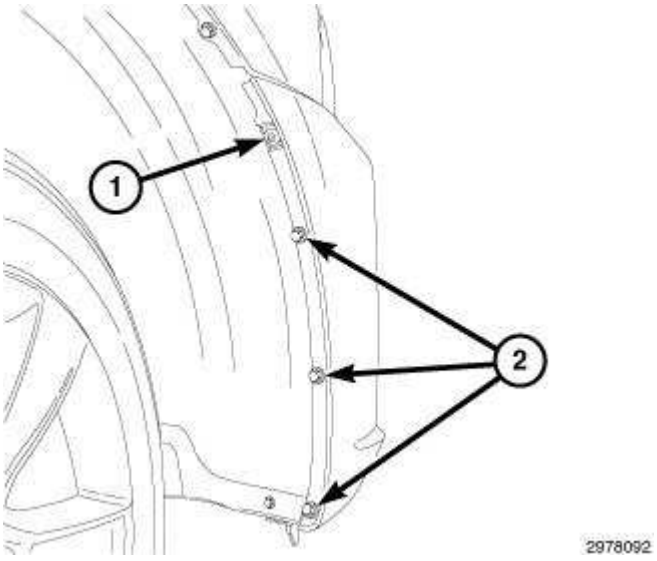


Fig. 7: Fastener & Three Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Base model shown in illustration, SRT models similar.

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the fastener (1) that secure the front fascia assembly to the fender.
4. Remove the three fasteners (2) that secure each front wheel house splash shield to the front fascia assembly.
5. Repeat the removal steps for the opposite side.

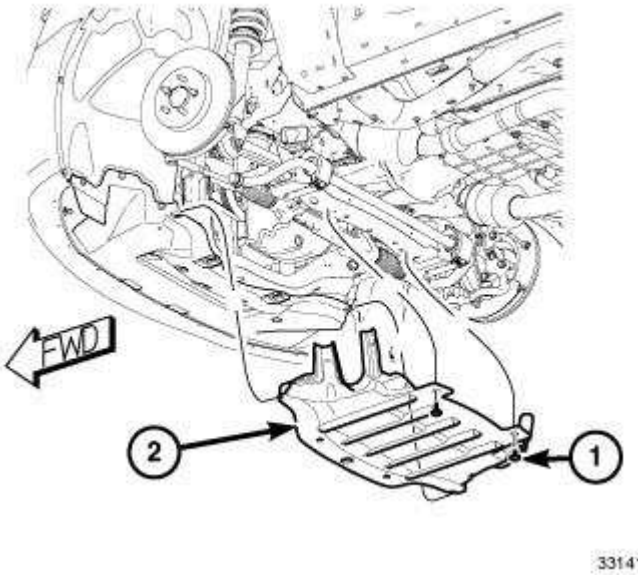


Fig. 8: Rear & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rear belly pan (1). Refer to **BELLY PAN, REMOVAL**.

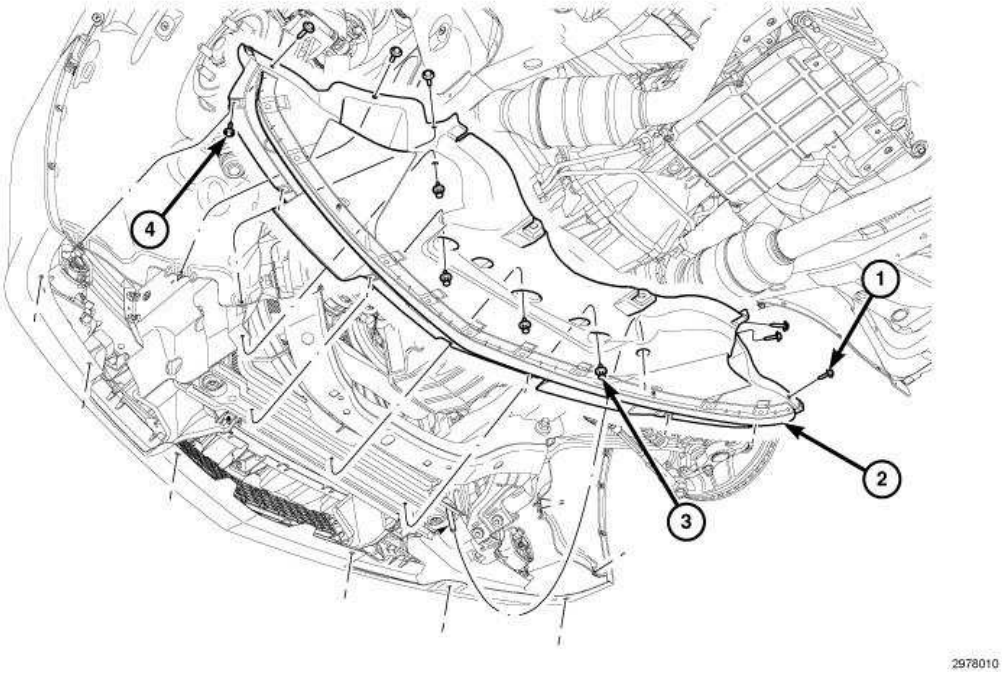
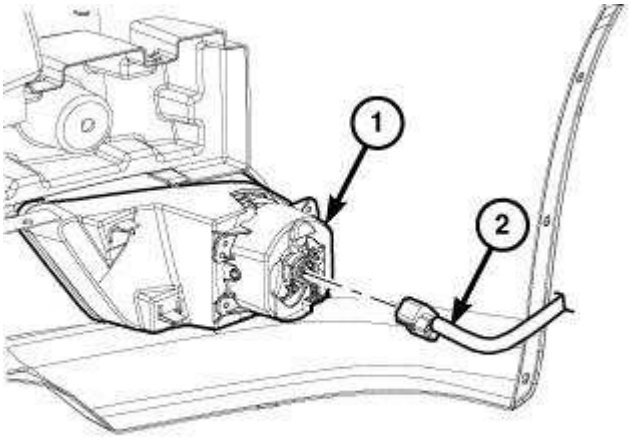


Fig. 9: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

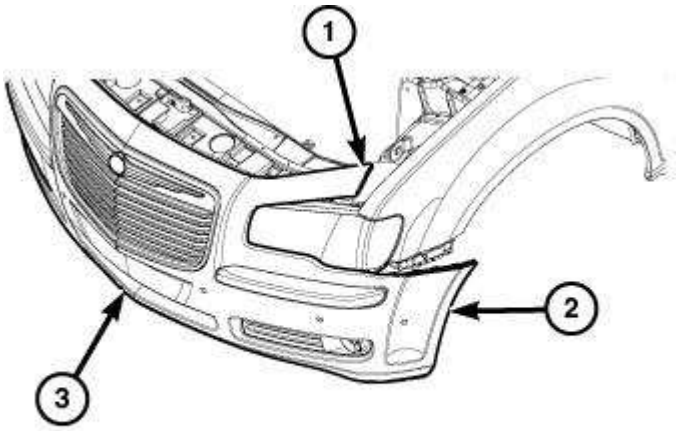
7. Remove the front belly pan (2). Refer to **BELLY PAN, REMOVAL**.



2978302

Fig. 10: Harness & Fog Lamps
Courtesy of CHRYSLER GROUP, LLC

8. If equipped, disconnect the harness (2) from the fog lamps (1). Repeat on the opposite side.



3314026

Fig. 11: Fascia At The Upper Fender & Fascia At The Wheel House Opening
Courtesy of CHRYSLER GROUP, LLC

9. Lower the vehicle.
10. Remove the upper radiator deflectors.
11. Pull out on the fascia at the upper fender to disengage the fascia (1) from the upper fender retaining bracket. Repeat on the opposite side.
12. Pull out on the fascia at the wheel house opening to disengage the fascia (2) from the fender retaining bracket. Repeat on the opposite side.

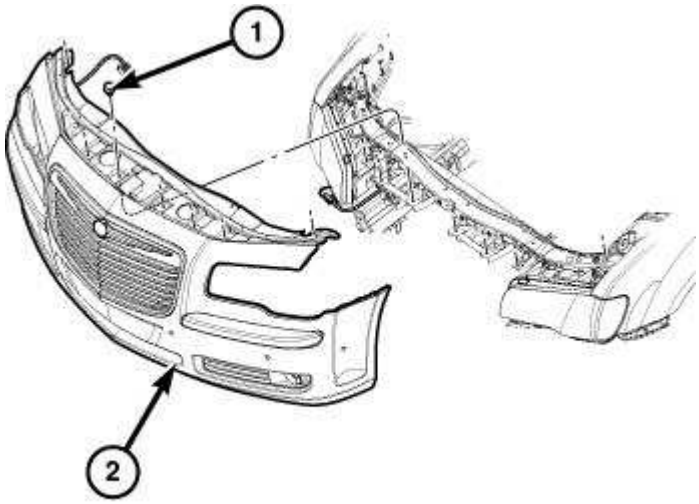


Fig. 12: Support Fasteners & Fascia
Courtesy of CHRYSLER GROUP, LLC

13. Remove the eight fascia to radiator support fasteners (1).
14. With the help of an assistant, remove the fascia (2) from the vehicle.

INSTALLATION

INSTALLATION

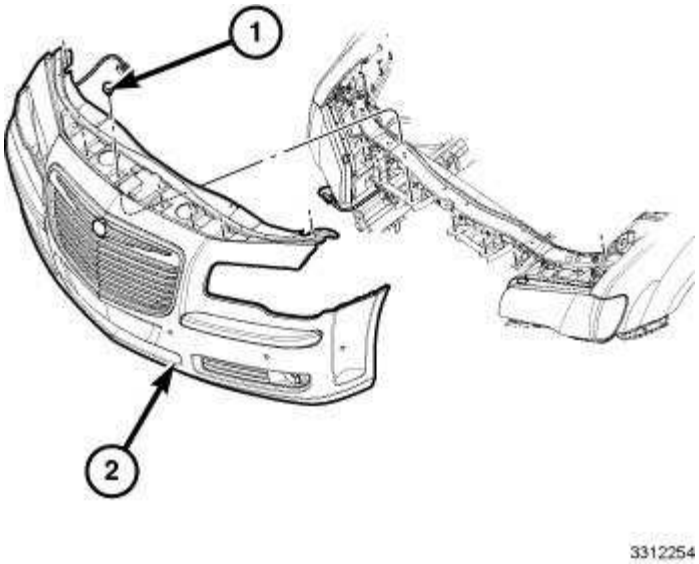


Fig. 13: Support Fasteners & Fascia
Courtesy of CHRYSLER GROUP, LLC

NOTE: Base model shown in illustration, SRT models similar.

1. With the help of an assistant, position the fascia (2) to the vehicle.

2. Install the eight fascia to radiator support fasteners (1).

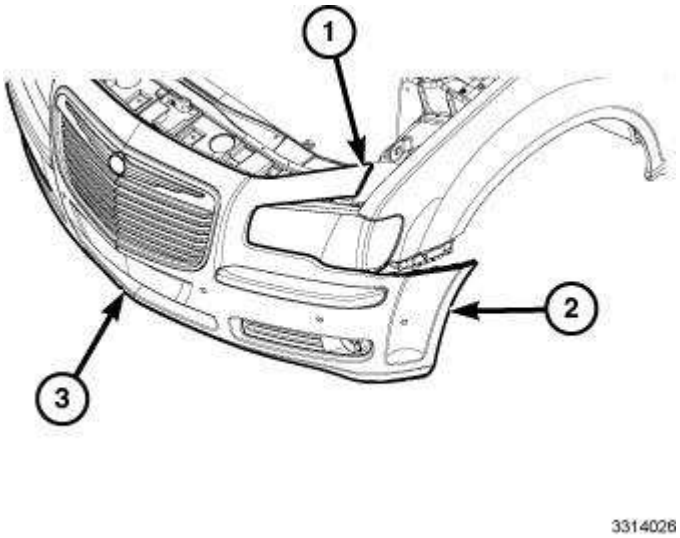


Fig. 14: Fascia At The Upper Fender & Fascia At The Wheel House Opening
Courtesy of CHRYSLER GROUP, LLC

3. Align the retaining tabs on the upper fascia (1) with the upper fender retaining bracket. Repeat on the opposite side.
4. Align the retaining tabs on the fascia (2) with the fender retaining bracket located between the bottom corner of the headlamp and the lower front corner of the fender. Repeat on the opposite side.
5. Once aligned, firmly hand tap the fascia (1, 2) to engage the retaining tabs.
6. Install the upper radiator deflectors.
7. Raise and support the vehicle.

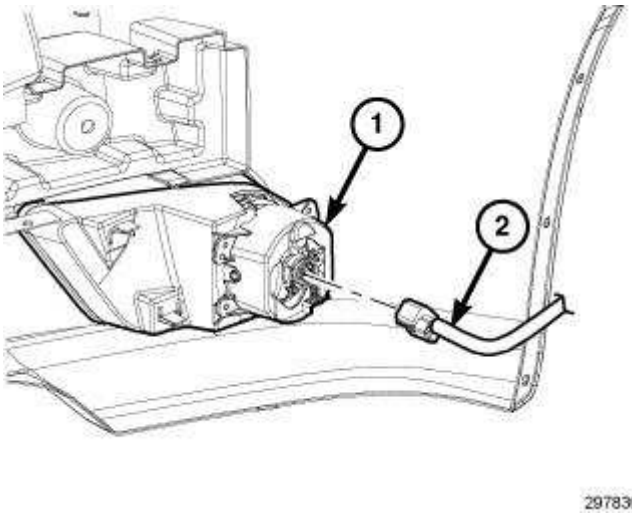


Fig. 15: Harness & Fog Lamps
Courtesy of CHRYSLER GROUP, LLC

8. If equipped, connect the harness (2) to the fog lamps (1).

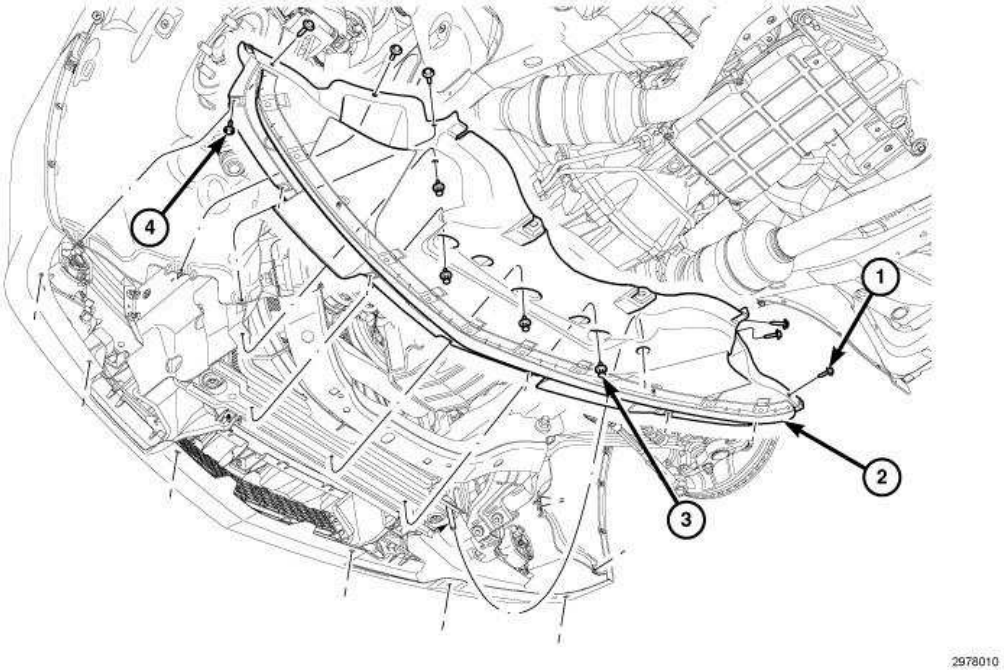


Fig. 16: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

9. Install the front belly pan (2). Refer to **BELLY PAN, INSTALLATION**.

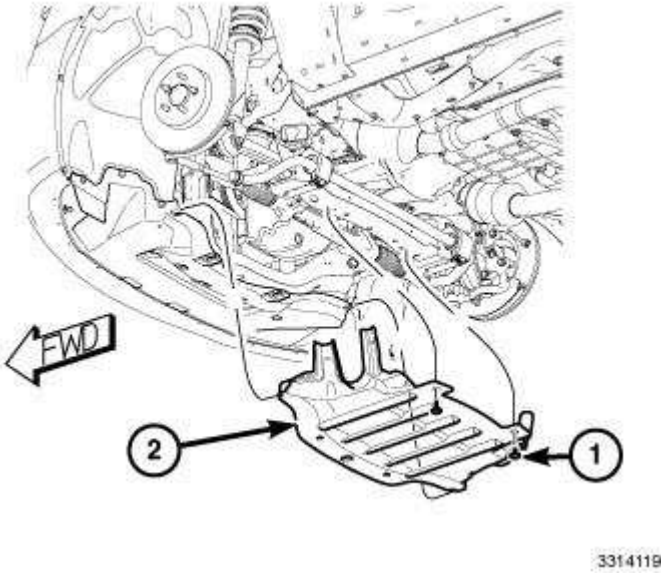


Fig. 17: Rear & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

10. Install the rear belly pan (2). Refer to **BELLY PAN, INSTALLATION**.

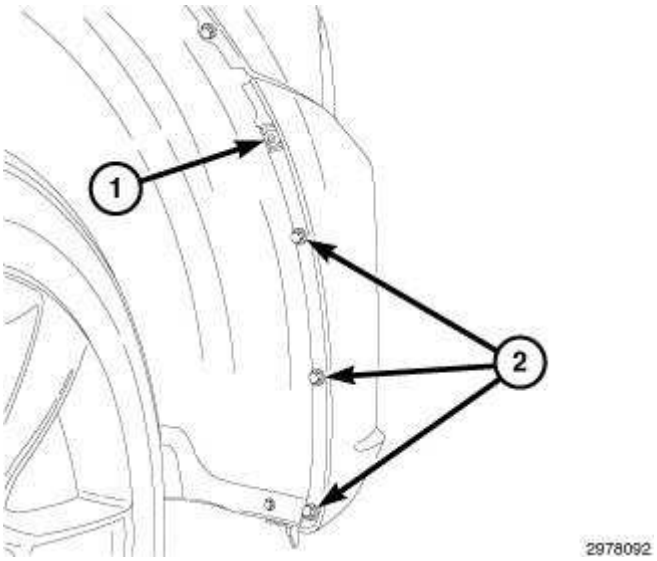


Fig. 18: Fastener & Three Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Install the three fasteners (2) that secure each front wheel house splash shield to the front fascia assembly.
12. Install the fastener (1) that secure the front fascia assembly to the fender. Tighten the fastener securely.
13. Lower the vehicle.
14. Connect the negative battery cable.

FASCIA, REAR

REMOVAL

REMOVAL

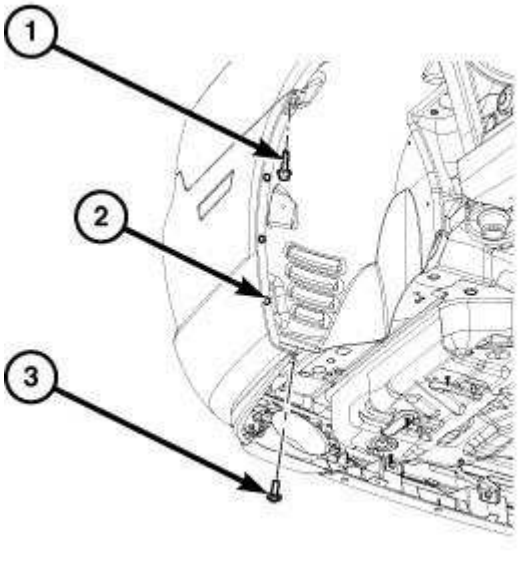


Fig. 19: Three Push-Pin Retainers & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Base model shown in illustration, SRT models similar.

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the three push-pin retainers (2) that secure each rear wheel house splash shield to the rear fascia assembly.
4. Remove the fastener (1) that secures the rear fascia assembly to the rear quarter.
5. Remove the fastener (3) that secures the rear fascia assembly to the rear fascia support bracket.
6. Repeat the removal steps on the opposite side.

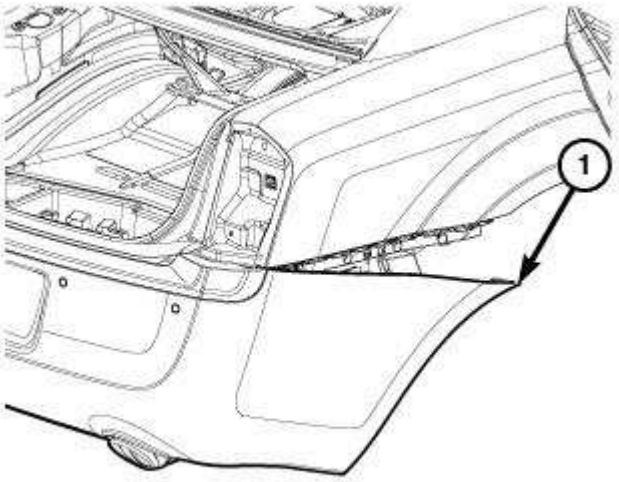


Fig. 20: Pull Out On The Fascia
Courtesy of CHRYSLER GROUP, LLC

7. Pull out on the fascia (2) at the wheel house opening to disengage the fascia from the retaining bracket. Repeat on the opposite side.

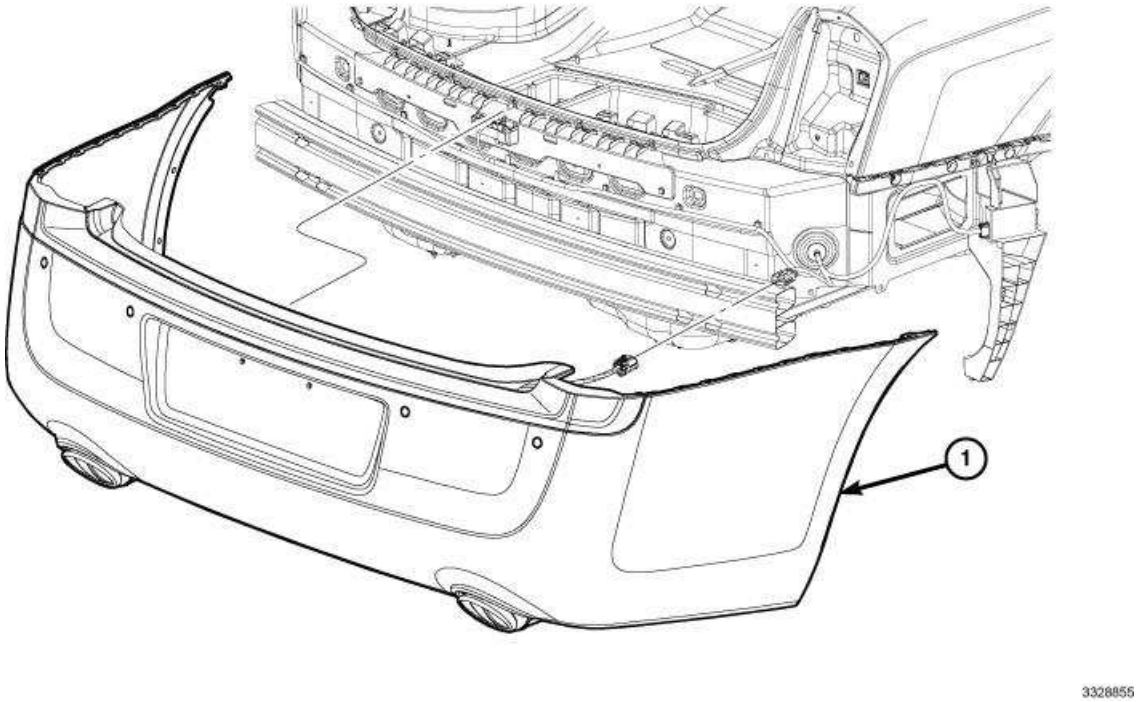


Fig. 21: Disengage The Fascia
Courtesy of CHRYSLER GROUP, LLC

8. With the help of an assistant, pull rearward to disengage the fascia (1) from the rear retaining

bracket.**Do not completely remove at this time.**

9. Disconnect the vehicle wiring harness.
10. With the help of an assistant, remove the fascia (1) from the vehicle.

INSTALLATION

INSTALLATION

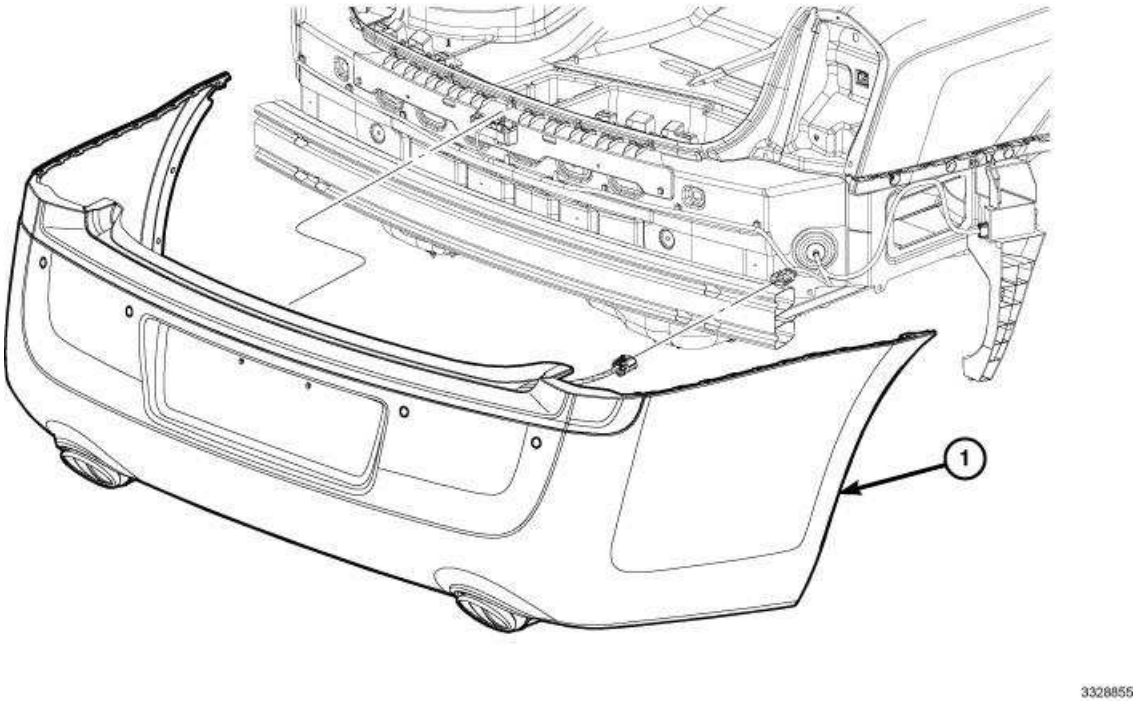


Fig. 22: Disengage The Fascia
Courtesy of CHRYSLER GROUP, LLC

NOTE: Base model shown in illustration, SRT models similar.

1. With the help of an assistant, position the fascia (2) to the vehicle.
2. Connect the vehicle wiring harness.
3. With the help of an assistant and using firm pressure, align and push forward to engage the fascia to the rear retaining bracket.

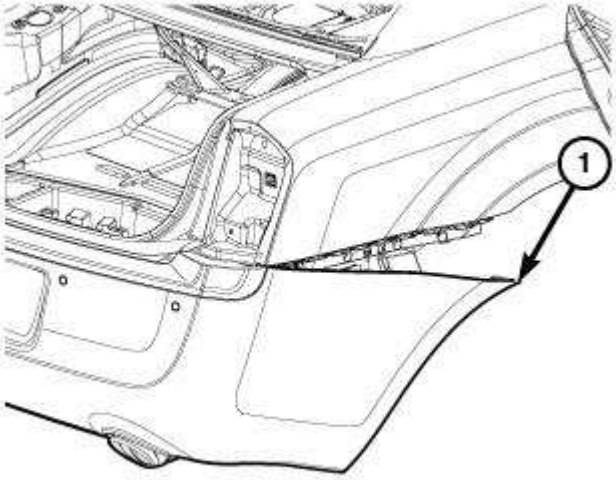


Fig. 23: Pull Out On The Fascia
Courtesy of CHRYSLER GROUP, LLC

4. Align the fascia (2) with the retaining bracket and using firm pressure push in to engage. Repeat on the opposite side.

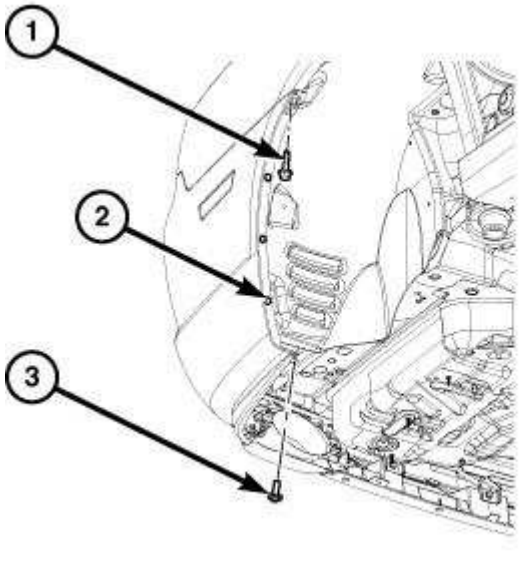


Fig. 24: Three Push-Pin Retainers & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Install the three push-pin retainers (2) that secure each rear wheel house splash shield to the rear fascia assembly. Repeat for opposite side.
6. Install the fastener (1) that secures the rear fascia assembly to the rear quarter. Tighten the fastener securely. Repeat for opposite side.

7. Install the fastener (3) that secures the rear fascia assembly to the rear fascia support bracket. Tighten the fastener securely. Repeat for opposite side.
8. Connect the negative battery cable.

FRAME

WARNING

USE OF HEAT DURING REPAIR

WARNING: Chrysler Group LLC engineering's position on the use of heat during collision repair is as follows:

- **Any body panel or frame component damaged which is to be repaired and reused, must be repaired using the "cold straightening" method. No heat may be used during the straightening process.**
- **During rough straightening prior to panel replacement, damaged panels or frame components may be heated to assist in body/frame realignment. The application of heat must be constrained to the parts which will be replaced and not allowed to affect any other components.**

This "no heat" recommendation is due to the extensive use of high strength and advanced high strength steels in Chrysler Group LLC products. High-strength materials can be substantially and negatively affected from heat input which will not be obviously known to the repairer or consumer.

Ignoring these recommendations may lead to serious compromises in the ability to protect occupants in a future collision event, reduce the engineered qualities and attributes, or decrease the durability and reliability of the vehicle.

This statement supersedes any previously released information by the Chrysler Group LLC.

Failure to follow these instructions may result in serious or fatal injury.

WARNINGS

WARNING: Use an Occupational Safety and Health Administration (OSHA) approved breathing filter, when spraying paint or solvents in a confined area. Failure to follow these instructions may result in possible serious or fatal injury.

- **avoid prolonged skin contact with petroleum or alcohol based**

cleaning solvents.

- **do not stand under a hoisted vehicle that is not properly supported on safety stands. Failure to follow these instructions may result in possible serious or fatal injury.**

CAUTION: When holes are drilled or punched in an inner body panel, verify the depth of space to the outer body panel, electrical wiring or other components. Damage to the vehicle can result.

- **do not weld exterior panels unless combustible material on the interior of vehicle is removed from the repair area. Fire or hazardous conditions, can result.**
- **always have a fire extinguisher ready for use when welding.**
- **disconnect the negative (-) cable clamp from the battery when servicing electrical components that are live when the ignition is off. Damage to electrical system can result.**
- **do not use abrasive chemicals or compounds on painted surfaces. Damage to finish can result.**
- **do not use harsh alkaline based cleaning solvents on painted or upholstered surfaces. Damage to finish or color can result.**
- **do not hammer or pound on plastic trim panel when servicing interior trim. Plastic panels can break.**

RESTRAINT WARNINGS

WARNING: To avoid potential physical injury, or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the ORC capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 30 cm (12 in) of an electronic module/harness, then that module/harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens. Failure to follow these instructions may result in serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with the Supplemental Restraint System (SRS), never attempt to repair the electrically conductive circuits or wiring components related to the SRS for which there is no MOPAR wiring repair kit. It is important to use ONLY the recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR Connector Web Site at

the following address on the internet: (http://dto.vftis.com/mopar/disclaimer.asp). Inappropriate repairs can compromise the conductivity and current carrying capacity of those critical electrical circuits, which may cause SRS components not to deploy when required, or to deploy when not required. Only minor cuts or abrasions of wire and terminal insulation where the conductive material has not been damaged, or connector insulators where the integrity of the latching and locking mechanisms have not been compromised may be repaired using appropriate methods.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side curtain airbags in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side curtain airbags will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

WARNING: **To avoid potential physical injury or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the Occupant Restraint Controller (ORC) capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 12 inches (30 centimeters) of an electronic module or wiring harness, then that module or harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens.**

WARNING: **To avoid serious or fatal injury, do not attempt to dismantle an airbag unit or tamper with its inflator. Do not puncture, incinerate or bring into contact with electricity. Do not store at temperatures exceeding 93° C (200° F). An airbag inflator unit may contain sodium azide and potassium nitrate. These materials are poisonous and extremely flammable. Contact with acid, water, or heavy metals may produce harmful and irritating gases (sodium hydroxide is formed in the presence of moisture) or combustible compounds. An airbag inflator unit may also contain a gas canister pressurized to over 17.24 kPa (2500 psi). Failure to follow these instructions may result in possible serious or fatal injury.**

WARNING: **To avoid serious or fatal injury when handling a seat belt tensioner retractor. Exercise proper care to keep fingers out from under the retractor cover and away from the seat belt webbing where it exits from the retractor cover. Failure to follow these instructions may result in possible serious or fatal injury.**

WARNING: **To avoid serious or fatal injury, replace all Supplemental Restraint System (SRS) components only with parts specified in the Chrysler Mopar® Parts Catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection.**

WARNING: **To avoid serious or fatal injury, the fasteners, screws, and bolts originally used for the Supplemental Restraint System (SRS) components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the SRS. Anytime a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler Mopar® Parts Catalog.**

WARNING: **To avoid serious or fatal injury when a steering column has an airbag unit attached, never place the column on the floor or any other surface with the steering wheel or airbag unit face down. Failure to follow these**

instructions may result in possible serious or fatal injury.

STANDARD PROCEDURE

STANDARD PROCEDURE - REAR FRAME RAIL REPLACEMENT

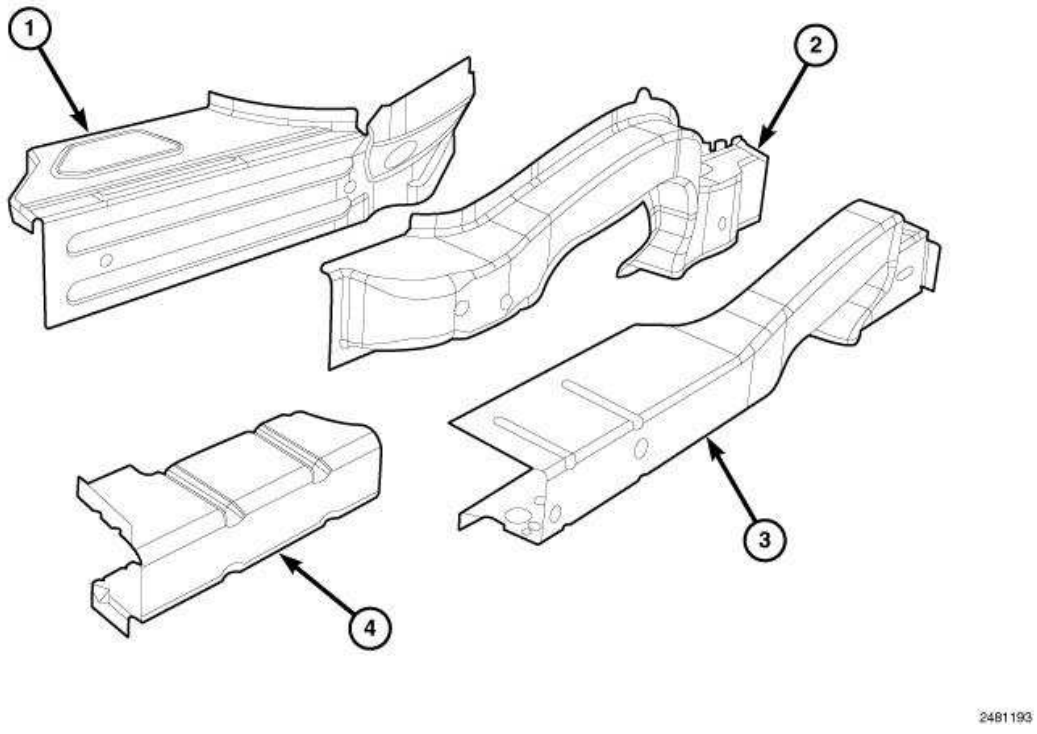


Fig. 25: Rail Terminology
Courtesy of CHRYSLER GROUP, LLC

1 - COVER PLATE
2 - RAIL, REAR, OUTER
3 - RAIL, REAR, INNER
4 - REINFORCEMENT, REAR RAIL INNER, REAR

"Rail, rear, outer" (2) - this portion of the rear rail assembly is not visible as it is gloved inside the "rail, rear, inner" (3) and the "cover plate, rear rail extension" (1). **This rail may not be sectioned!**

"Reinforcement, rear rail inner rear" (4) - welded inside of the "rail, rear, inner" (3) and extends from the end of that rail to the "panel, deck opening lower".

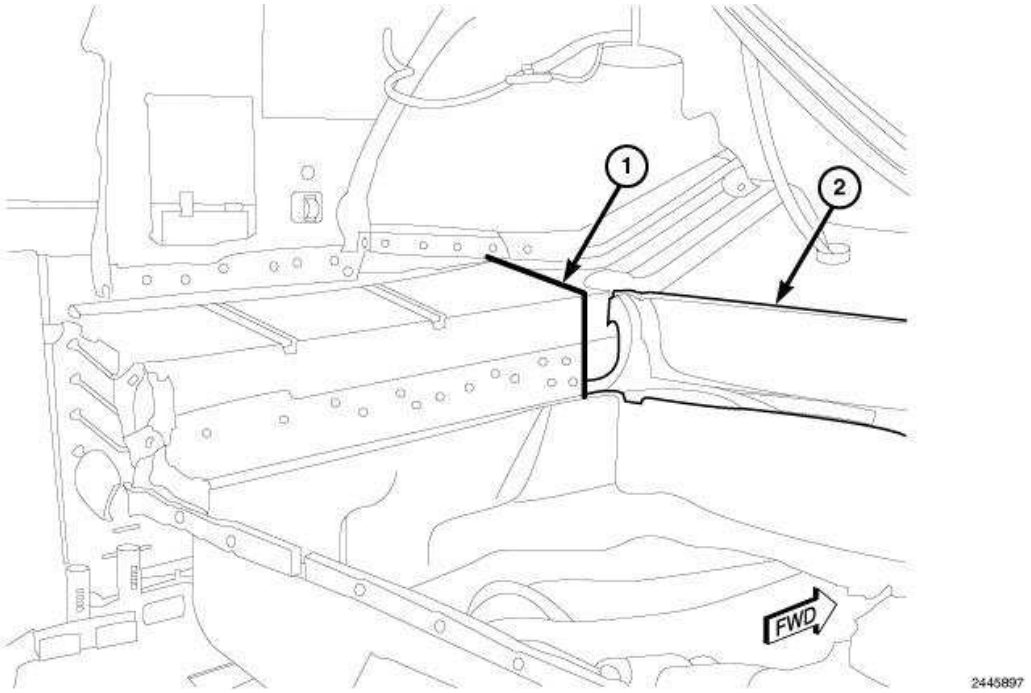


Fig. 26: Rear Inner Rail
Courtesy of CHRYSLER GROUP, LLC

"Rail, rear inner" may be sectioned at this location (1), greatly reducing vehicle disruption and repair costs.

This partial replacement procedure presumes that all damage to the "rail, rear inner" is aft of the crossmember (2).

Left side

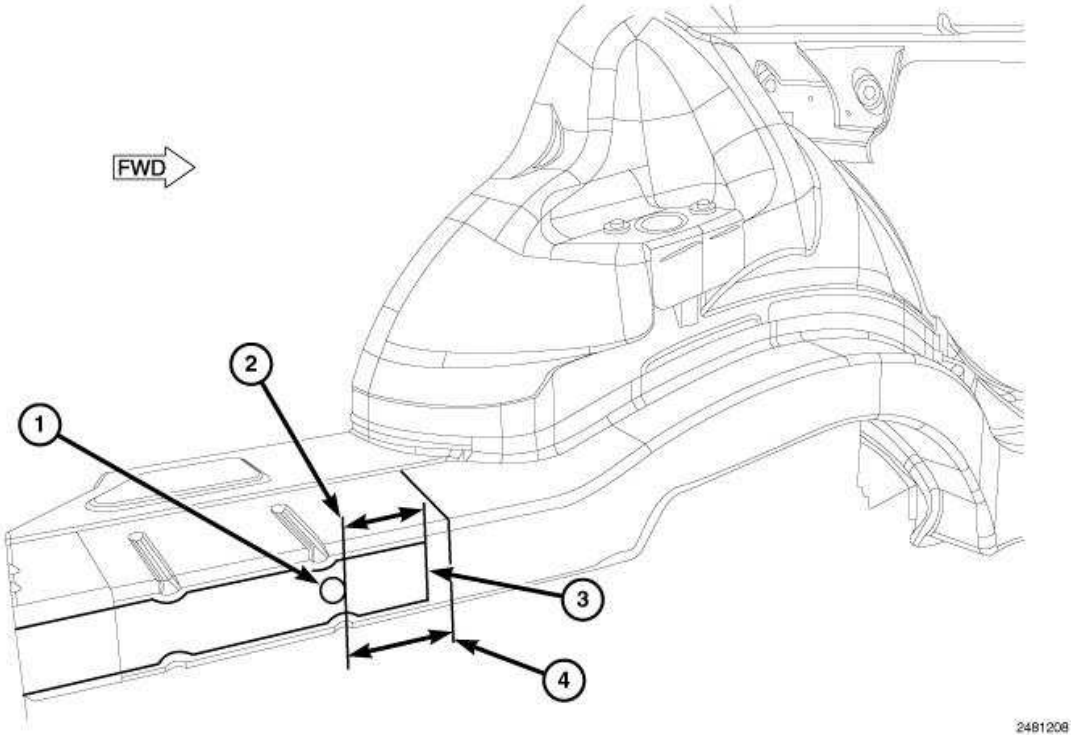


Fig. 27: Lx/Lc Left Rear Rail Cut Locations
Courtesy of CHRYSLER GROUP, LLC

1 - HOLE 2 - 100 mm (4 in.) 3 - REINFORCEMENT, REAR RAIL INNER, REAR 4 - CUT LOCATION 125 mm (5 in.)

The "Reinforcement, Rear Rail Inner, Rear" (3) ends 100 mm (4 in.) (2) forward of round hole (1) on inner face of "Rail, Rear Inner" - recommended cut location is 125 mm (5 in.) (4) from forward edge of the hole (1).

Right Side

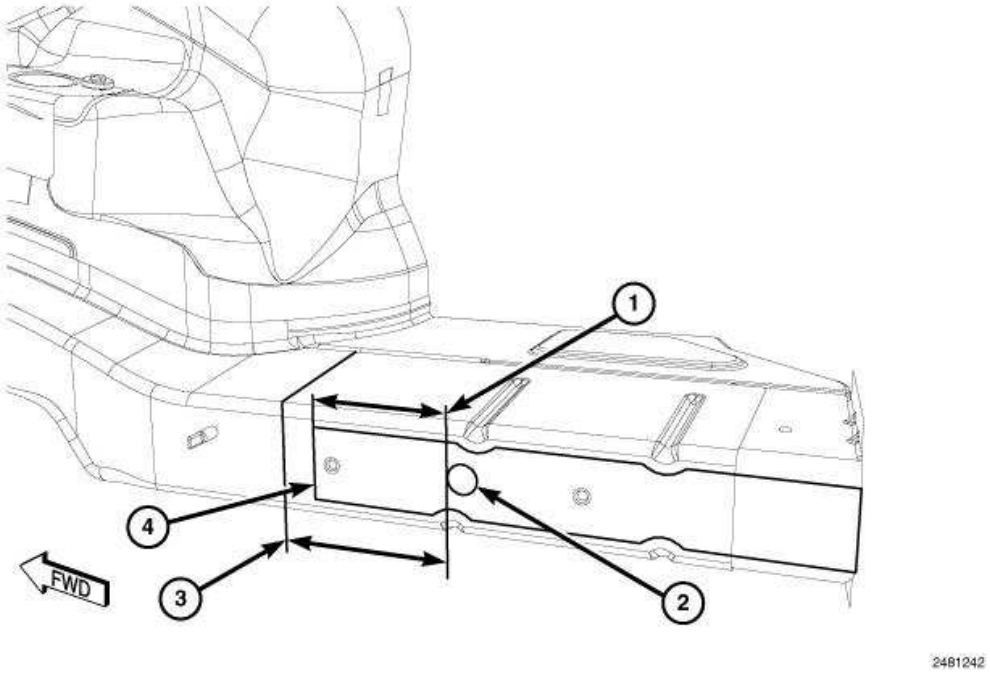


Fig. 28: Lx/Lc Right Rear Rail Cut Locations
Courtesy of CHRYSLER GROUP, LLC

1 - 125 mm (5 in.)
2 - HOLE
3 - CUT LOCATION 150 mm (6 in.)
4 - REINFORCEMENT, REAR RAIL INNER, REAR

The "Reinforcement, Rear Rail Inner Rear" (4) ends 125 mm (5 in.) (1) forward of round hole (2) on inner face of "rail, rear inner" - recommended cut location (3) is 150 mm (6 in.) from forward edge of hole (2).

The following procedure details key points of the repair. I-CAR training is presumed, and should be followed for best-practice repair procedures.

1. Mount the damaged vehicle onto a structural straightening bench and check/correct any body misalignment utilizing three dimensional measuring equipment.
2. Remove all components in area of repair allowing unimpeded access for cutting and welding operations.
3. Trunk floor should be removed if being replaced, or the necessary welds released and the weld flange bent inboard to provide access to the rail for the butt-joint.
4. Using the round hole in the "Rail, Rear, Inner" as a point of reference, measure 125 mm (5 in.) forward for the left rail, or 150 mm (6 in.) forward for the right rail, and scribe a vertical line on the rail.

5. With the vertical line just made as reference, cut off the damaged "Rail, Rear, Inner" taking care not to damage the "Rail, Rear, Outer", using a reciprocating saw or cut-off wheel, and remove the damaged portion.
6. Utilize the same measuring and cutting process above to remove the replacement portion from the service part.
7. Using a surface conditioning disk, remove all e-coat within 25 mm (1 in.) of the cut location and de-bur the cut edge.
8. If the "Rail, Rear, Outer" was damaged during the cutting operation, MIG-weld the damage and dress the weld.
9. Fabricate 19 mm (0.75 in.) weld backers from the damaged component, or the remains of the service part, and tack in place on the replacement rail section at the butt-joint location.
10. Position and clamp the replacement rail and confirm proper position with measuring equipment.
11. Weld the service part in position using a skip-stitch process.
12. Complete remaining repairs in the damaged area.
13. Clean and dress all welded areas.
14. Apply epoxy primer to the exterior of the rail at the repair location.
15. Apply quality body sealer to all areas previously sealed to duplicate the original appearance. Note that additional sealer may be applied to better protect the exterior exposed seams from road spray.
16. Refinish all exposed surfaces in trunk and on underbody using quality refinish materials.
17. Apply inner panel rust proofing, such as Mopar # 05093981AA, or equivalent, to the rail inner cavity areas in two applications with a 30-minute flash period between the applications. Pay particular attention to areas which have been welded.
18. Reassemble vehicle and complete repairs.

ADDITIONAL INFORMATION

Observe all cautions and warnings per the Chrysler service information. Refer to **FRAME, WARNING**.

Reference the Chrysler weld process chart. Refer to **FRAME, SPECIFICATIONS**.

Butt joint should be metal finished without thinning the base rail material or weldment. This is a cosmetic finishing process to disguise the repair and should have the surface coating (paint) duplicated as well.

Restore corrosion protection when complete with all welding operations.

SPECIFICATIONS

WELD PROCESS

COMPONENT PARTS	TRUCK FRAME	BODYSHELL EXTERIOR & UNDERBODY PANELS

	Zinc and Zinc Iron Alloy coated sheet steels					
WELDING PROCESS	GAS METAL ARC (Note: 1)	FLUX CORED ARC	GAS METAL ARC (Note: 1)	MIG BRAZE (Note: 2)	GAS METAL ARC (Note: 1)	FLUX CORED ARC
Material Type	High Strength and Structural Quality Steels which includes HSLA, Martensitic, and Dual Phase materials					
Material Thickness Range	2 mm - 4 mm		0.6 mm - 1.02 mm		>1.02 mm - 3.0 mm	
ELECTRODE TYPE (AWS SPEC. A5.18)	AWS CLASS. ER70S-6	AWS CLASS. E71T-11 (Note 3)	AWS CLASS. ER70S-6	AWS CLASS. ERCuSi - A Silicon Bronze	AWS CLASS. ER70S-6	AWS CLASS. E71T-11 (Note 3)
ELECTRODE SIZE	0.035	0.045	0.023 - 0.025	0.035	0.035	0.045
ELECTRODE MAKER	Lincoln®	Lincoln® NR-211-MP	Lincoln®		Lincoln®	Lincoln® NR-211-MP
WIRE FEED SPEED (in/min)	245-250 Vertical Down 70-90 Flat & Horizontal	110 Vertical Down 70-90 Flat & Horizontal	95-115 All Welds	150-155 Flat & Horizontal	245-250 Vertical Down 70-90 Flat & Horizontal	110 Vertical Down 70-90 Flat & Horizontal
TRAVEL SPEED (in/min)			10			
VOLTAGE	19-20	15-18	16-19	18-19	19-20	15-18
POLARITY	DCEP	DCEN	DCEP	DCEP	DCEP	DCEN
GAS FLOW (cfh)	25-35	N/A	25-35	25-35	25-35	N/A
ELECTRICAL STICKOUT (in)	1/2 - 5/8	3/8 - 1/2	1/2 - 5/8	5/8 - 3/4	1/2- 5/8	3/8 - 1/2
GAS TYPE	75% Ar 25% CO2	N/A	75% Ar 25% CO2	100% Ar	75% Ar 25% CO2	N/A
TYPE OF ARC TRANSFER	Short Circuit		Short Circuit	Pulse	Short Circuit	

These Procedure Specifications are appropriate as of this publication. Procedures may be superceeded with new spec's at a later date.

Always process to the thinner material thickness (TMT)

All persons performing welding must be qualified to weld in all positions.

NOTE:

1. **Must remove Zinc Coating on both sides of metal at the weld zone.**
2. **MIG Braze welding process requires use of Pulse Arc® or STT® welding**

machine.

3. **Must use Lincoln® product since E 71T-11 product differs from other suppliers.**

SPECIFICATIONS

NOTE: Frame dimensions are listed in metric scale millimeter (mm). All dimensions are from center to center of Principal Locating Point (PLP), or from center to center of PLP and fastener location.

VEHICLE PREPARATION

Position the vehicle on a level work surface. Using screw or bottle jacks, adjust the vehicle PLP heights to the specified dimension above a level work surface. Vertical dimensions can be taken from the work surface to the locations indicated were applicable.

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DESCRIPTION	FIGURE
Under Body Dimensions	
Under Hood	

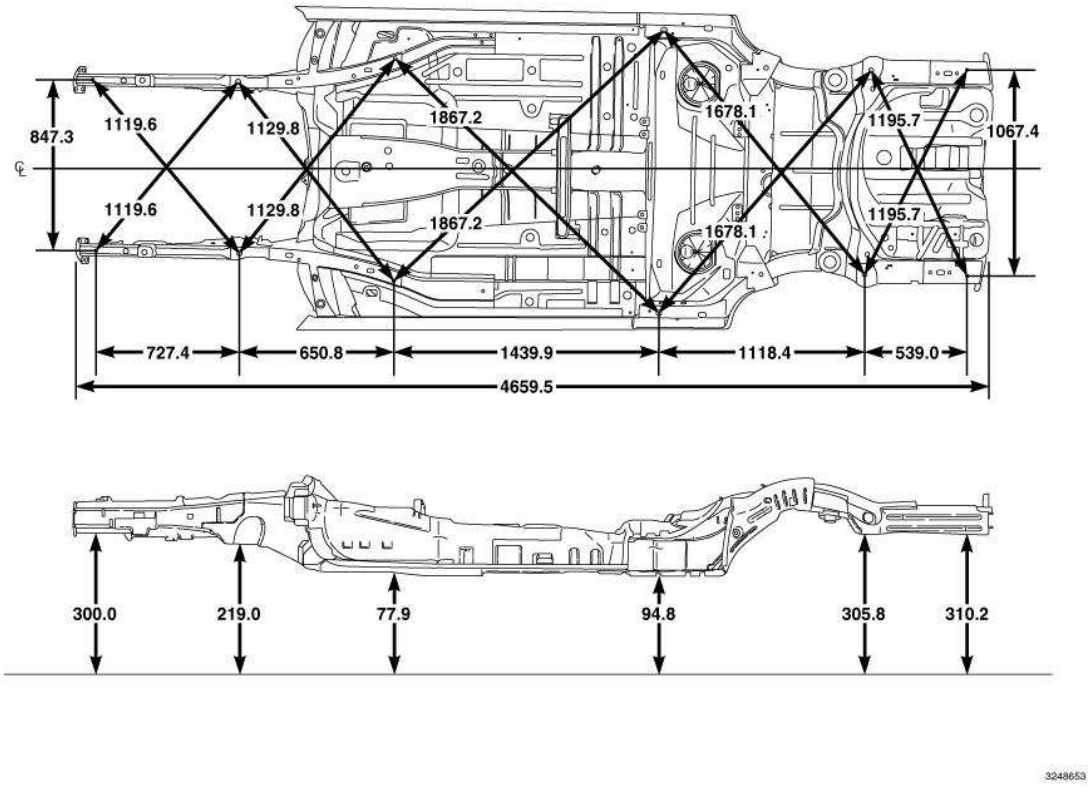


Fig. 29: Underbody Dimensions
Courtesy of CHRYSLER GROUP, LLC

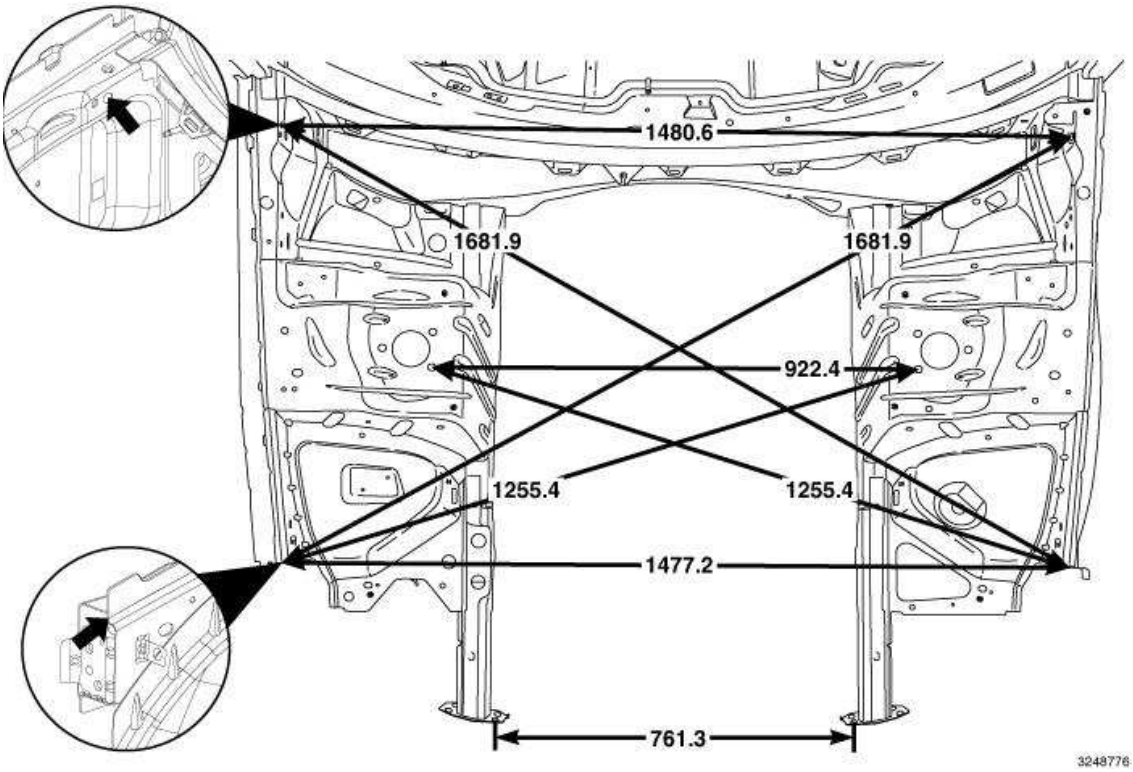


Fig. 30: Under Hood
Courtesy of CHRYSLER GROUP, LLC

FASTENER TORQUE

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Axle Flange Bolts	81	60	-
Ball Joint Nut	122	90	-
Caliper Guide Pins	31	23	-
Camber Link Bolt	85	63	-
Compression Link Bolt	85	63	-
Cushion Retainer Mounting Bolts	60	44	-
Engine Cradle bolts	185	136	-
Engine Mount Nuts	60	44	-
Front Suspension Crossmember Front Attaching Bolts	109	80	-
Front Suspension Crossmember Rear Attaching Bolts	102	75	-
Hub Nut	213	157	-
Outer Tie Rod End Nut	86	63	-
Radiator Support Crossmember Attaching Bolts	61	45	-
Rear Bumper Reinforcement Attaching Nuts	28	21	-
Rear Crossmember Mounting Bolts	180	133	-
Shock Absorber Lower Mounting Bolt	72	53	-

Shock Clevis Bracket to Lower Control Arm	174	128	-
Spring Link Bolt	108	80	-
SRT Rear Disc Brake Caliper Mounting Bolt	130	96	-
Stabilizer Link Ball Joint	81	60	-
Stabilizer Link Bolt	61	45	-
Standard Disc Brakes Guide Pins	31	23	-
Steering Gear Lower Mounting Bolt	142	105	-
Tension Link Bolt	85	63	-
Toe Link Cam Bolt Nut	108	80	-
Wheel Mounting Nuts	150	110	-

CROSSMEMBER, CRADLE, ENGINE

REMOVAL

REMOVAL

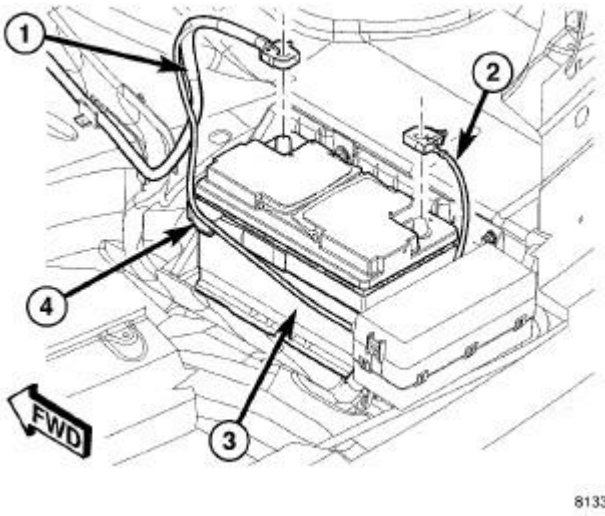


Fig. 31: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Siphon power steering fluid from pump reservoir.

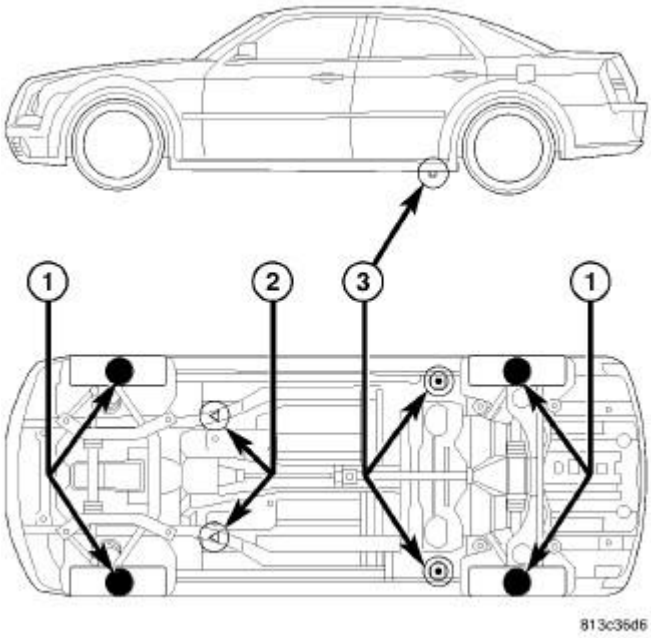


Fig. 32: Lifting Points
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVE ON LIFT
2 - SAE HOISTING SYMBOLS
2 - FRAME CONTACT LIFT (SINGLE POST)
2 - CHASSIS LIFT (DUAL LIFT)
2 - OUTBOARD LIFT (DUAL LIFT)
2 - FLOOR JACK
3 - HOISTING PADS
3 - FRAME CONTACT LIFT (SINGLE POST)
3 - CHASSIS LIFT (DUAL LIFT)
3 - OUTBOARD LIFT (DUAL LIFT)
3 - FLOOR JACK

3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

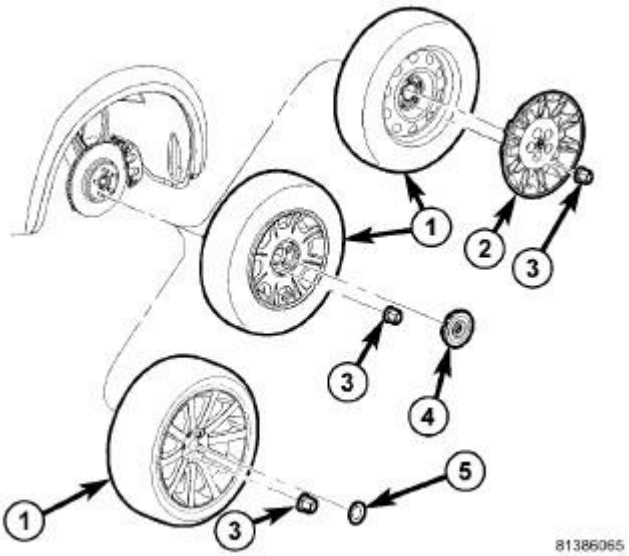


Fig. 33: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove the left and right front wheels (1). Refer to **REMOVAL** .

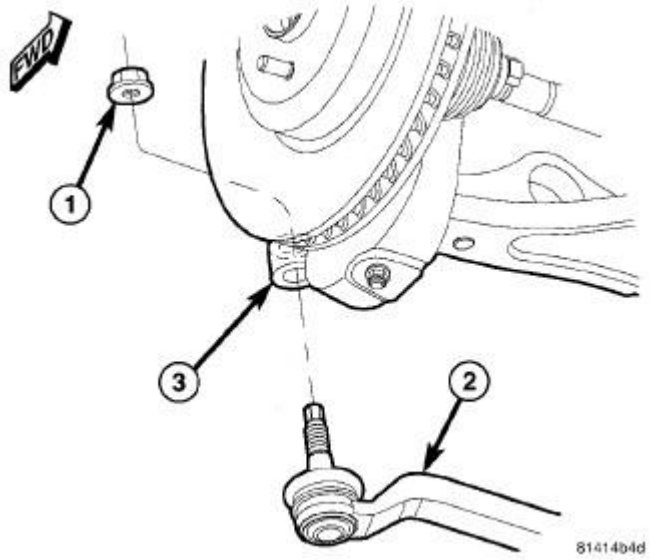


Fig. 34: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

5. Remove outer tie rod (2) end nut (1) at each knuckle (3).

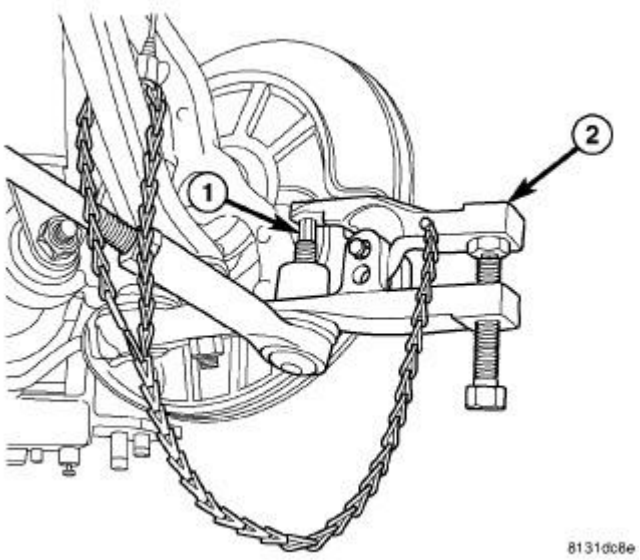


Fig. 35: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

6. Using, Special Tool (special tool #9360, Remover, Ball Joint) ball joint remover (2), separate outer tie rod (1) from each knuckle.

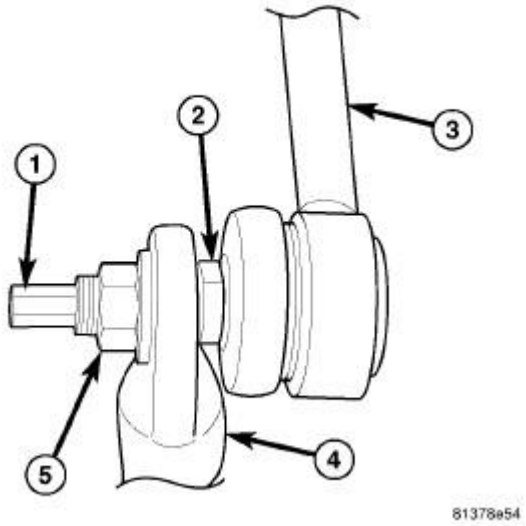


Fig. 36: Link Ball Joint AT Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

7. On each side of vehicle, remove nut (5) fastening stabilizer link (3) to stabilizer bar (4). Slide link ball joint stem (1) from bar.

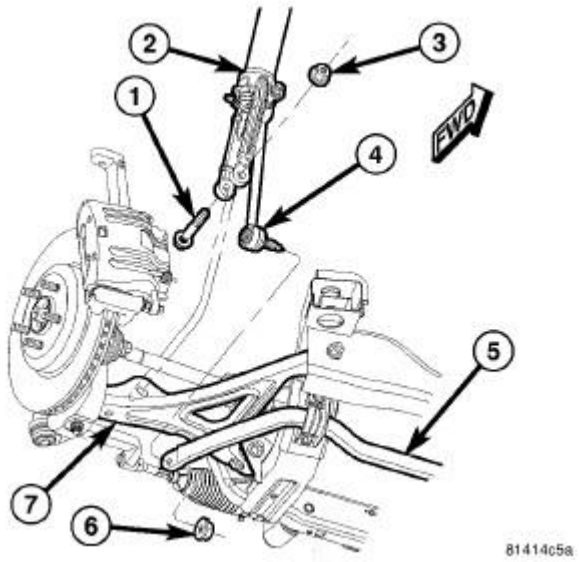


Fig. 37: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

8. Back off nut (3) from bolt (1) attaching shock clevis bracket (2) to lower control arm (7) until it is flush with end of bolt.
9. Using a brass drift punch, tap the bolt out of the clevis bracket until bolt serrations clear bracket.
10. Remove nut (3) and bolt (1) for clevis bracket and control arm.
11. Install engine support tool (special tool #8534B, Fixture, Driveline Support).
12. Remove upper airbox inlet tube.
13. Install left and right engine lift bracket to cylinder head.

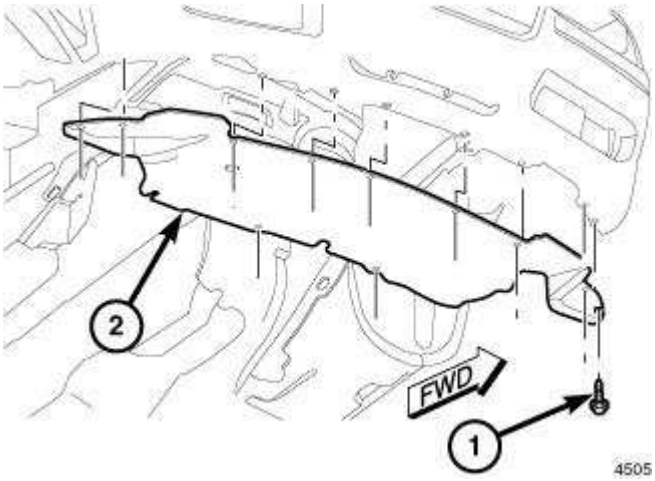


Fig. 38: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

14. Remove the front belly pan. Refer to **BELLY PAN, REMOVAL**.

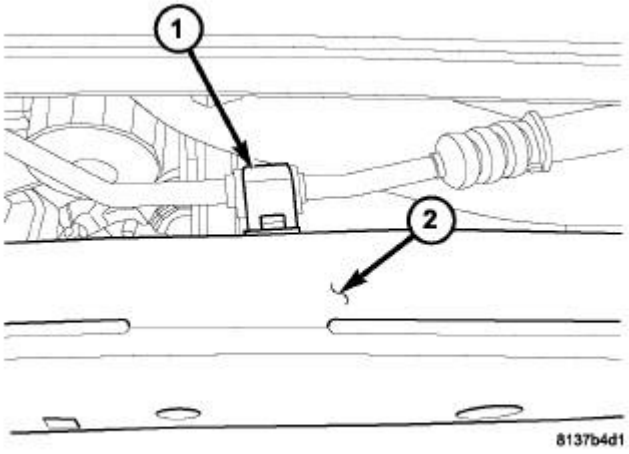


Fig. 39: Hose Mounting Bracket To Cradle
Courtesy of CHRYSLER GROUP, LLC

15. Remove two pressure line retainer bolts (1) from cradle (2).

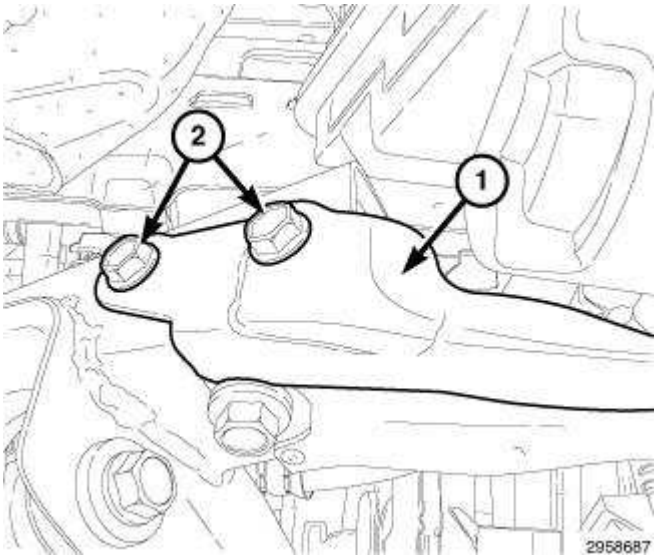


Fig. 40: Two Mounting Bolts & Electro Hydraulic Power Steering (EHPS) Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

16. Remove two mounting bolts (2) from the Electro Hydraulic Power Steering (EHPS) mounting bracket (1).

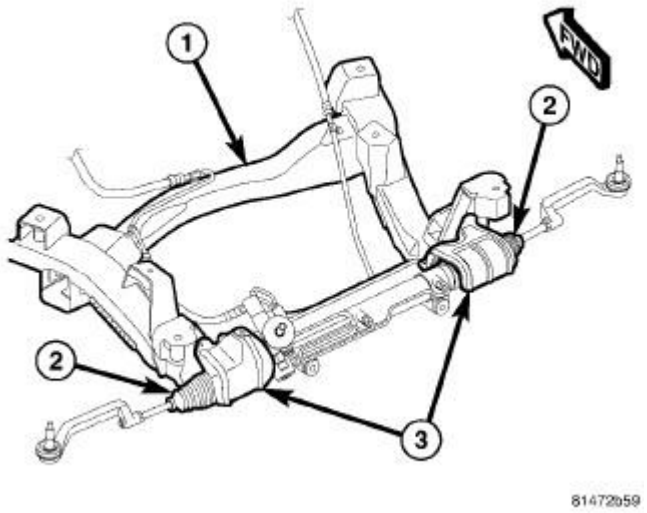


Fig. 41: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

17. Remove mounting screws, then heat shield (3) above each inner tie rod bellows (2).

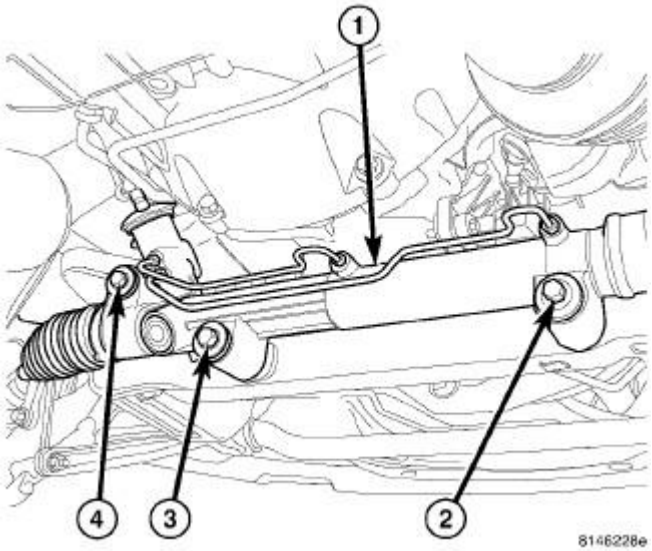


Fig. 42: Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

18. Remove steering gear upper mounting bolt (4) and nut.
19. Remove steering gear lower mounting bolts (2 and 3).
20. Remove steering gear (1) and support from the exhaust system.

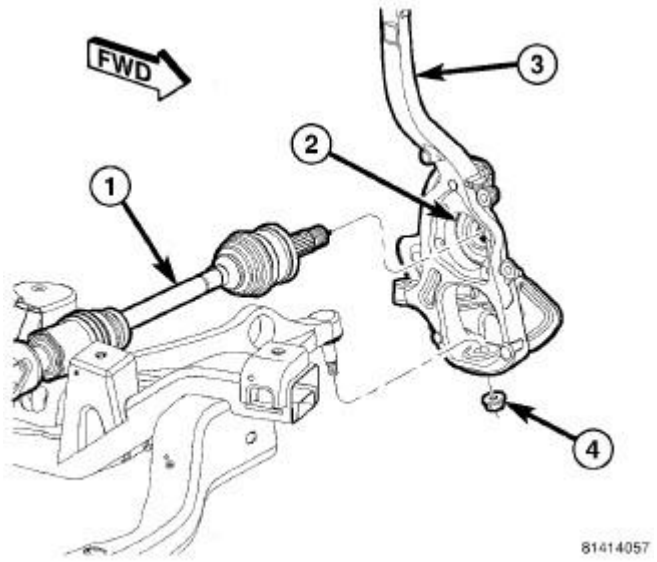


Fig. 43: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

21. Loosen nut (4) attaching lower control arm ball joint stud to knuckle (3). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

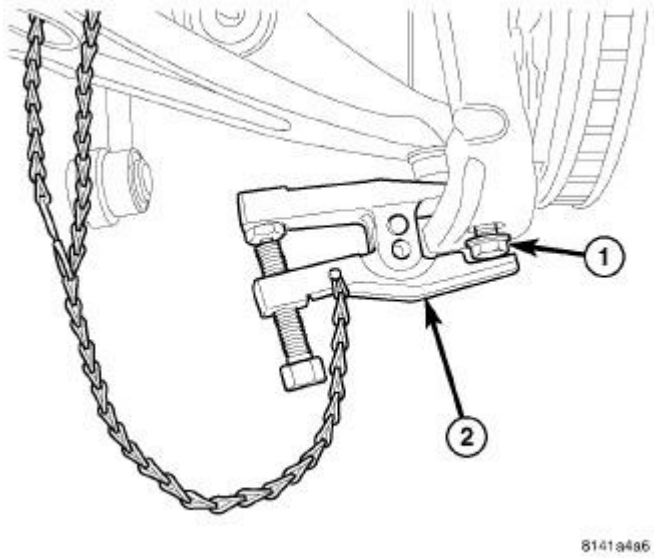


Fig. 44: Using Puller On Lower Ball Joint - AWD
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

22. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint) Ball Joint Removal tool, separate ball joint stud from knuckle.
23. Remove tool.
24. Remove left and right engine mount nut.
25. Remove nut (1) from end of ball joint stud.

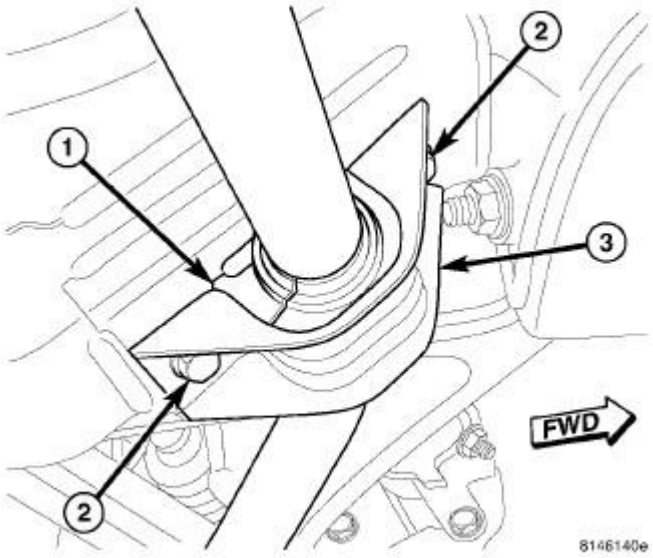


Fig. 45: Stabilizer Bar Bushing & Retainer
Courtesy of CHRYSLER GROUP, LLC

26. On each side of vehicle, remove bolts (2) fastening stabilizer bar isolator retainer (3) in place.
27. Remove stabilizer bar with isolators and retainers from vehicle.
28. Support the engine cradle (special tool (special tool #8534B, Fixture, Driveline Support) Engine Support Fixture) with a suitable lifting device.
29. Using a grease pencil or equivalent, mark the position of the engine cradle to aid installation.
30. Remove the four engine cradle bolts and lower the cradle.
31. Remove the control arms, if required.

INSTALLATION

INSTALLATION

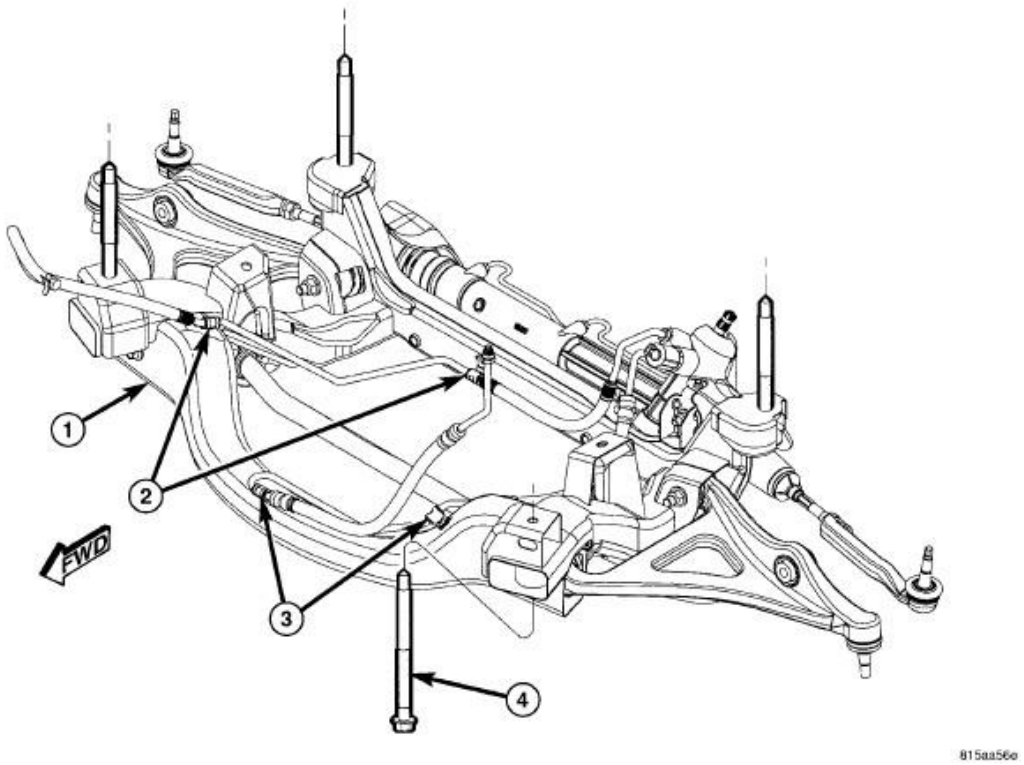


Fig. 46: Engine Cradle
Courtesy of CHRYSLER GROUP, LLC

NOTE: Although AWD and RWD upper control arms are similar in appearance, they are not interchangeable.

1. Install control arms. Refer to **ARM, LOWER CONTROL, AWD, INSTALLATION** and **ARM, LOWER CONTROL, RWD, INSTALLATION** .
2. To aid installation, raise engine cradle to marked location.
3. Install four engine cradle bolts (4) and raise cradle. Tighten cradle bolts to 185 N.m (136 ft. lbs.).
4. Install stabilizer with isolators and retainers onto cradle. Refer to **STABILIZER BAR, FRONT, INSTALLATION** .

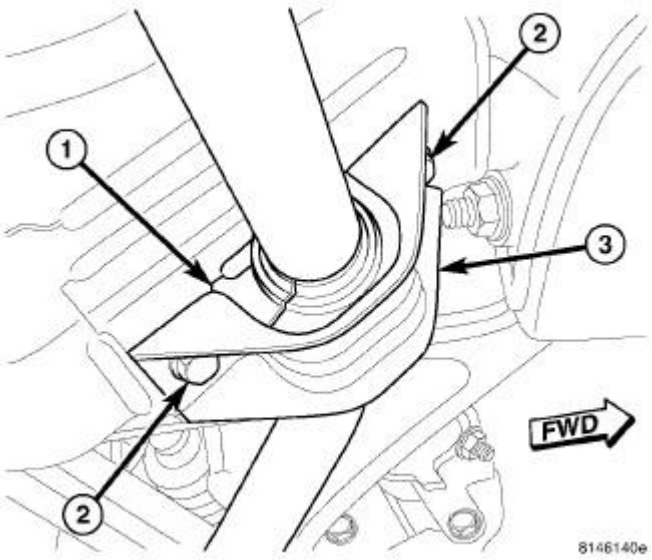


Fig. 47: Stabilizer Bar Bushing & Retainer
Courtesy of CHRYSLER GROUP, LLC

5. On each side of vehicle, install bolts (2) fastening stabilizer bar isolator retainer (3) in place. Tighten bolts to 60 N.m (44 ft. lbs.).

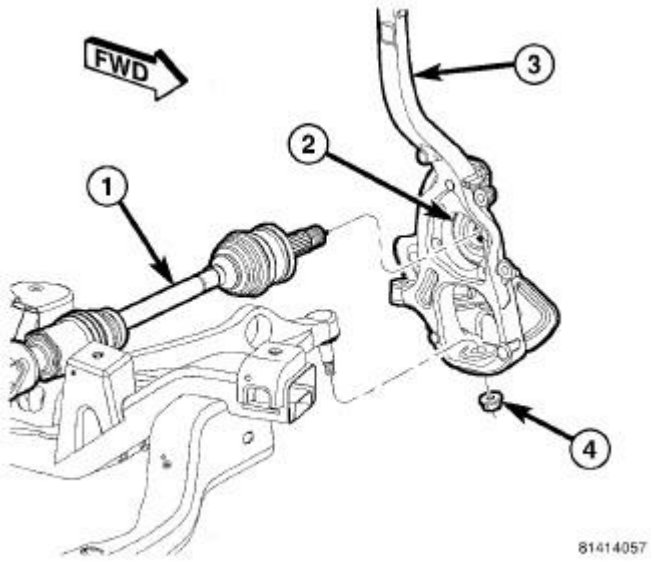


Fig. 48: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

6. Tighten engine mount nuts to 60 N.m (44 ft. lbs.).
7. Tighten left and right ball joint nut (4) to 122 N.m (90 ft. lbs.) attaching lower control arm ball joint stud to knuckle (3).

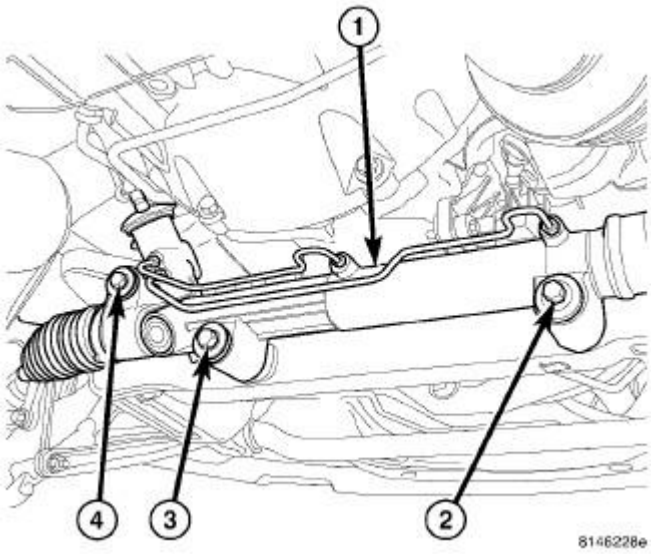


Fig. 49: Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install steering gear (1) and support from the exhaust system. Refer to **GEAR, INSTALLATION** .
9. Install steering gear lower mounting bolts (2 and 3). Tighten to 142 N.m (105 ft. lbs.).
10. Install steering gear upper mounting bolt (4) and nut.

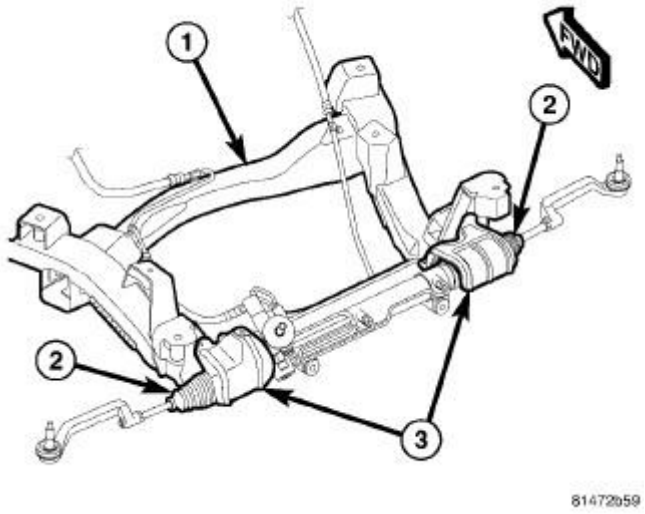


Fig. 50: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

11. Install heat shield (3) and mounting screws above each inner tie rod bellow.

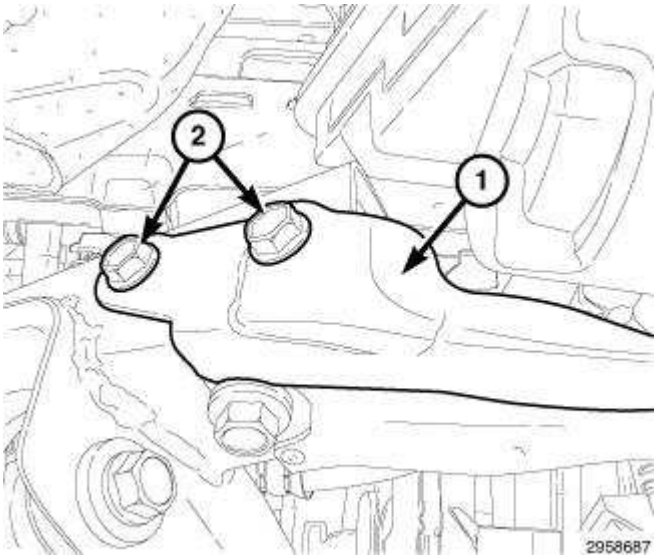


Fig. 51: Two Mounting Bolts & Electro Hydraulic Power Steering (EHPS) Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

12. Install Electro Hydraulic Power Steering (EHPS) pump bracket (1) mounting bolts (2) and tighten to 50 N.m (37 ft. lbs.).

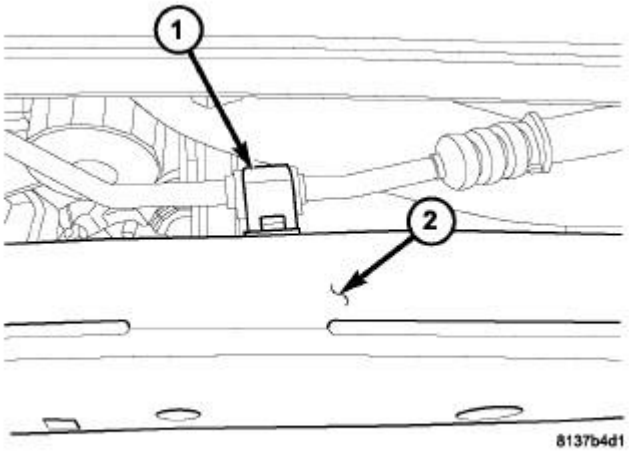


Fig. 52: Hose Mounting Bracket To Cradle
Courtesy of CHRYSLER GROUP, LLC

13. Install two pressure line retainer bolts (1) on cradle (2).

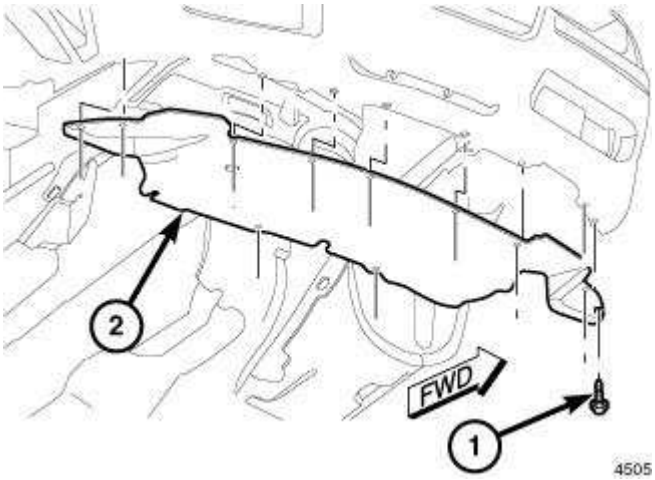


Fig. 53: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

14. Install front belly pan. Refer to **BELLY PAN, INSTALLATION**.

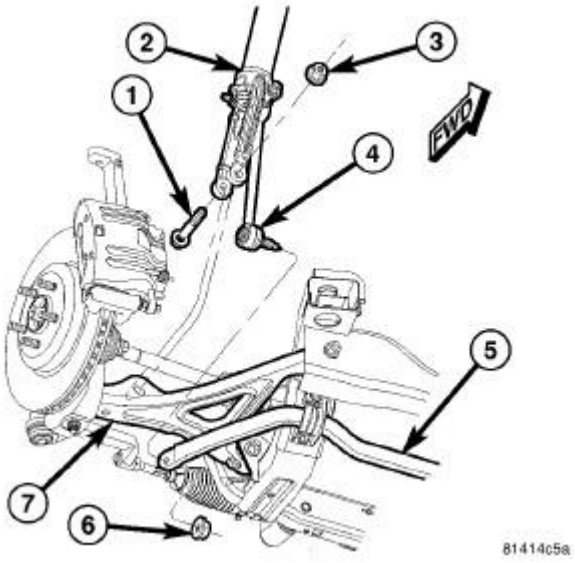


Fig. 54: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

15. Install nut (3) and bolt (1) attaching shock clevis bracket (2) to lower control arm (7). Tighten to 174 N.m (128 ft. lbs.).
16. On each side of vehicle, install nut (3) fastening stabilizer link (4) to stabilizer bar (5). Slide link ball joint stem on to bar. Tighten link nut to 81 N.m (60 ft. lbs.).

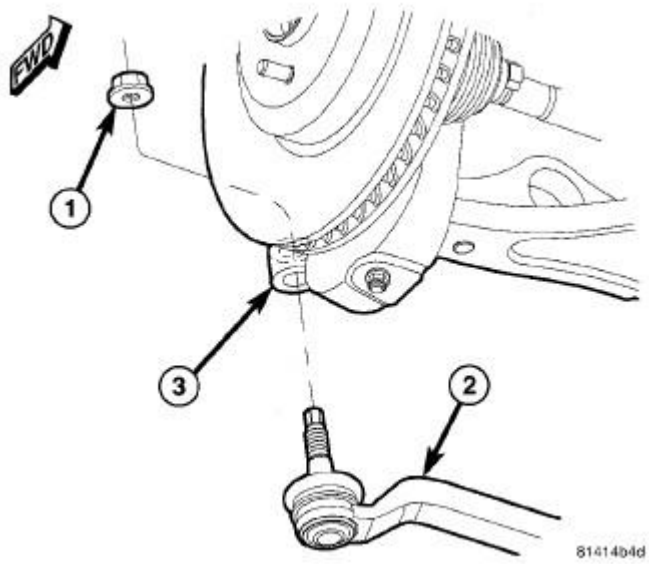


Fig. 55: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

17. Install outer tie rod (2) end nut (1) at each knuckle (3). Tighten end nut to 86 N.m (63 ft. lbs.).

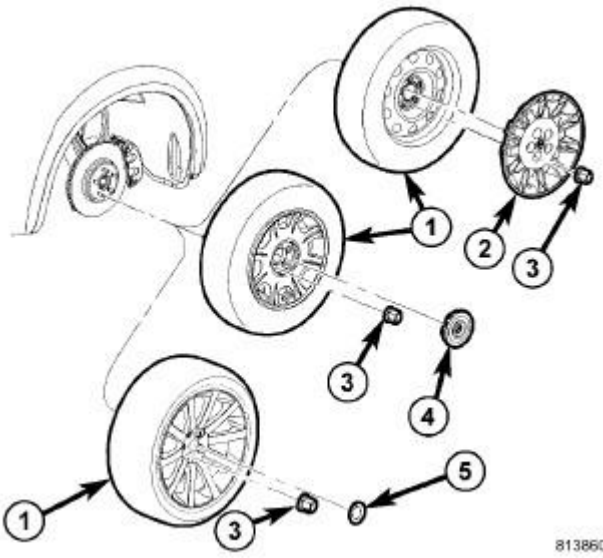


Fig. 56: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

18. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) (Police - 190 N.m (140 ft. lbs.)). Refer to **INSTALLATION** .
19. Lower vehicle from hoist.
20. Install power steering fluid into pump reservoir. Refer to **FLUID, STANDARD PROCEDURE** .

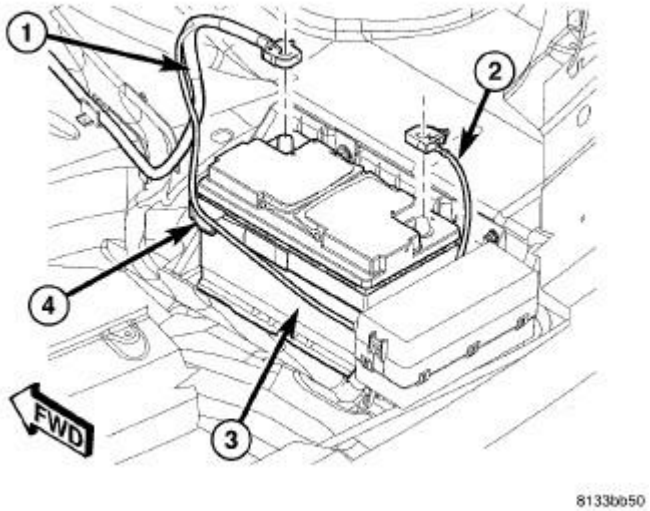


Fig. 57: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

21. Connect negative battery cable (2) to battery post.
22. Perform vehicle alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

CROSSMEMBER, REAR

REMOVAL

REMOVAL

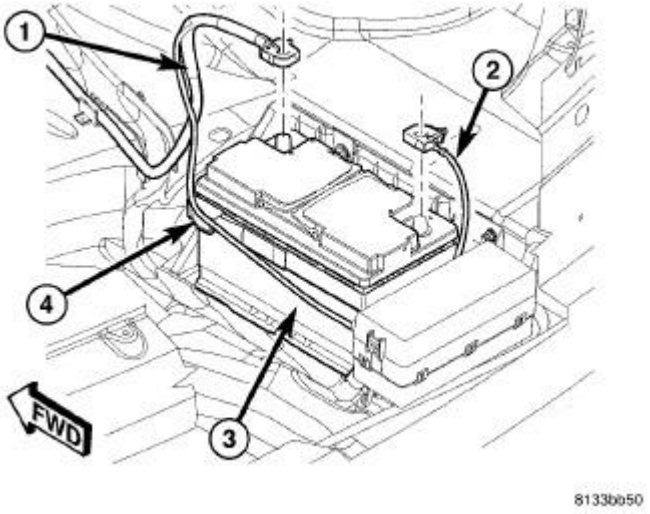


Fig. 58: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

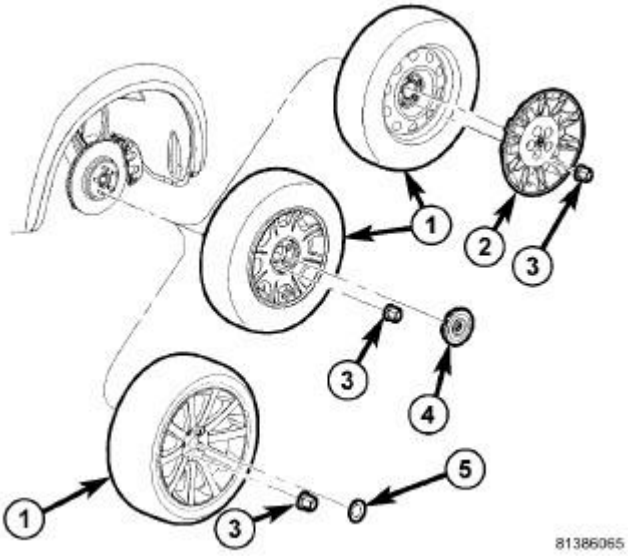


Fig. 59: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

3. On each side of vehicle rear, remove wheel mounting nuts (3), then tire and wheel assembly (1).

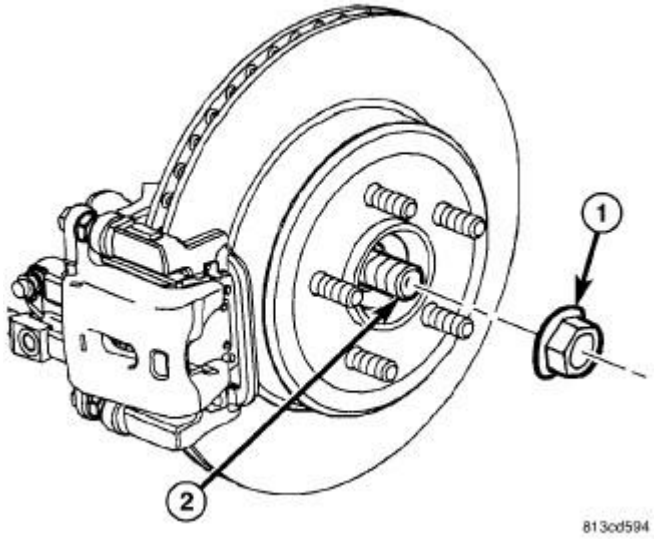


Fig. 60: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

4. On each side of vehicle rear, while a helper applies brakes to keep hub from rotating, remove

hub nut (1) from half shaft (2).

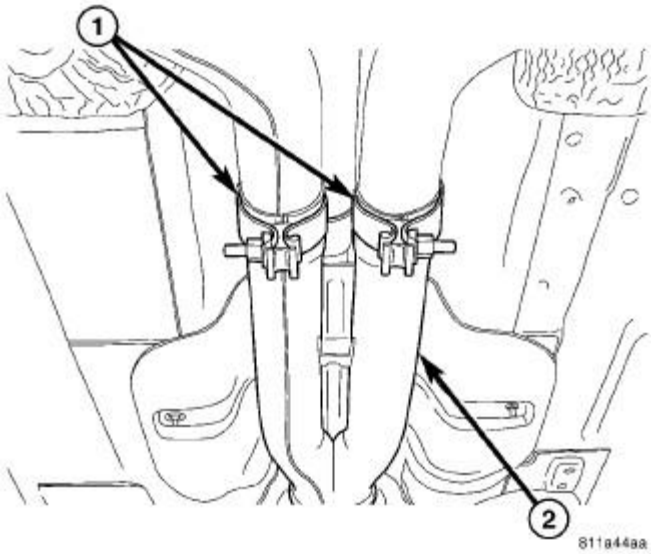


Fig. 61: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

5. Remove rear exhaust system (2) (dual-outlet exhaust shown in figure).
6. Remove rear axle differential. Refer to **REMOVAL** or **REMOVAL** .
7. Slide each axle half shaft from hub and bearing and remove from vehicle.

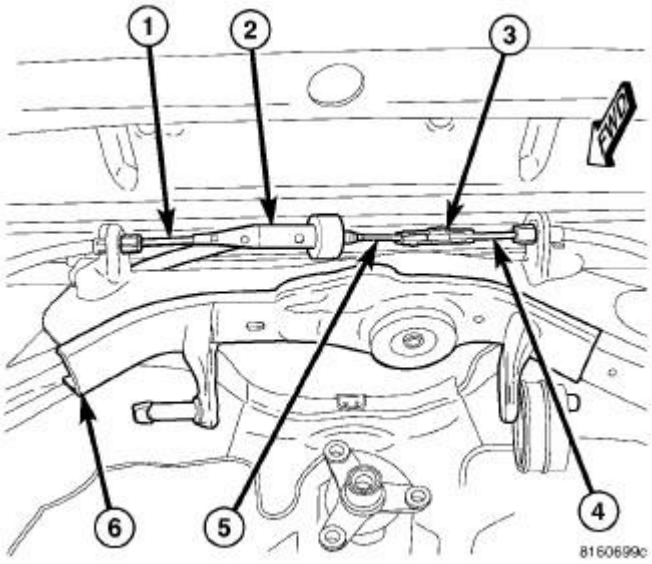


Fig. 62: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out

parking brake lever to service parking brake components.

8. Disconnect right rear parking brake cable (4) at connector (3) to front parking brake cable (5).
9. Disconnect left rear parking brake cable (1) at equalizer (2). **Leave equalizer on front cable.**

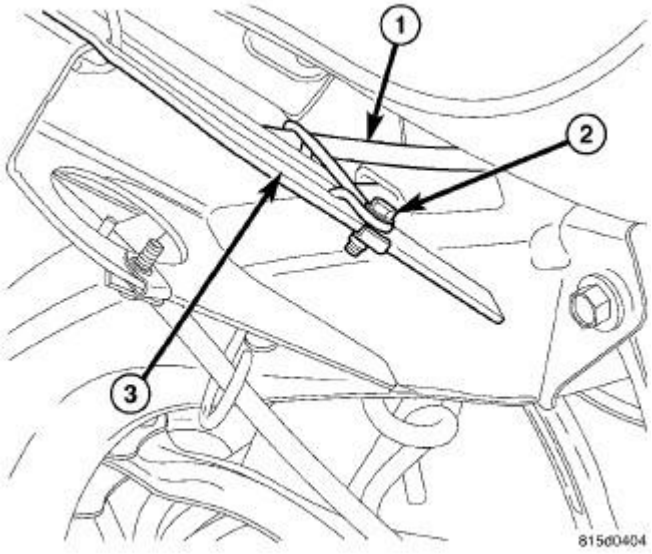


Fig. 63: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

10. Remove screw (2) fastening front parking brake cable (1) routing bracket to rear crossmember front flange (3). Remove J-nut from crossmember.

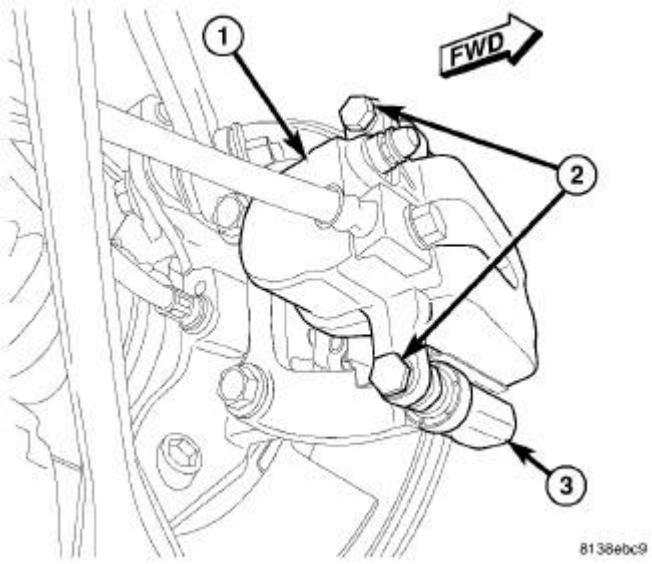


Fig. 64: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

11. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. While holding guide pins from turning, remove disc brake caliper guide pin bolts (2).
    2. Remove brake caliper (1) from brake adapter (3) and pads.
    3. Guide brake caliper up through suspension, following brake hose path. Support caliper above rear suspension using with bungee cord or wire to keep caliper from overextending brake hose when crossmember is lowered.

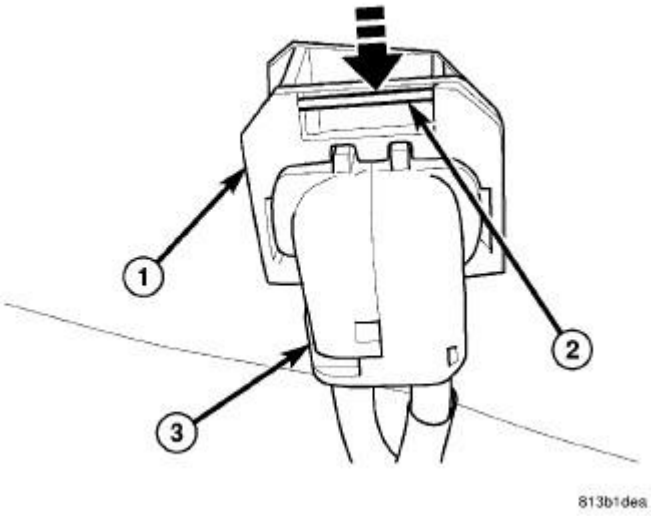


Fig. 65: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove wheel speed sensor connector from body wiring harness connector, move retaining clip (2) and pull sensor connector outward.

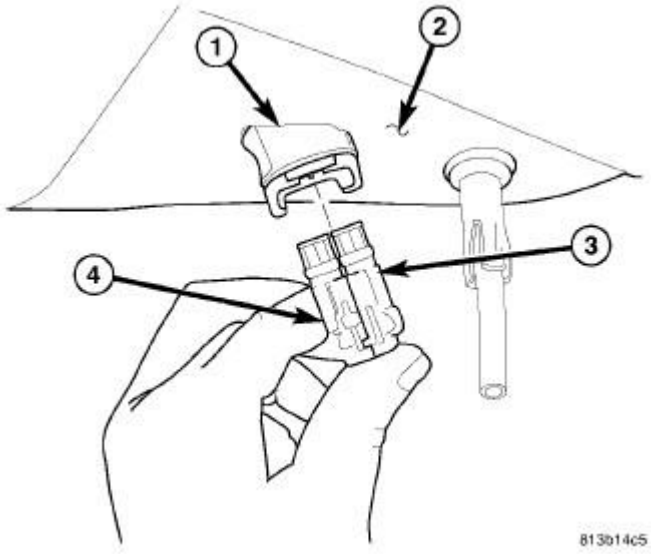


Fig. 66: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

12. Remove wheel speed sensor connectors (3 and 4) from body wiring harness connector (1) located in luggage compartment floor pan (2).

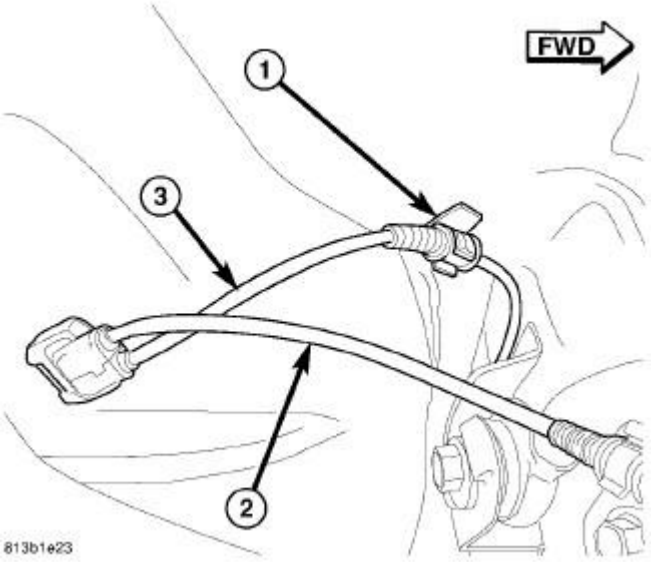


Fig. 67: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

13. Unclip left wheel speed sensor cable (3) from routing clip (1) near body connector.

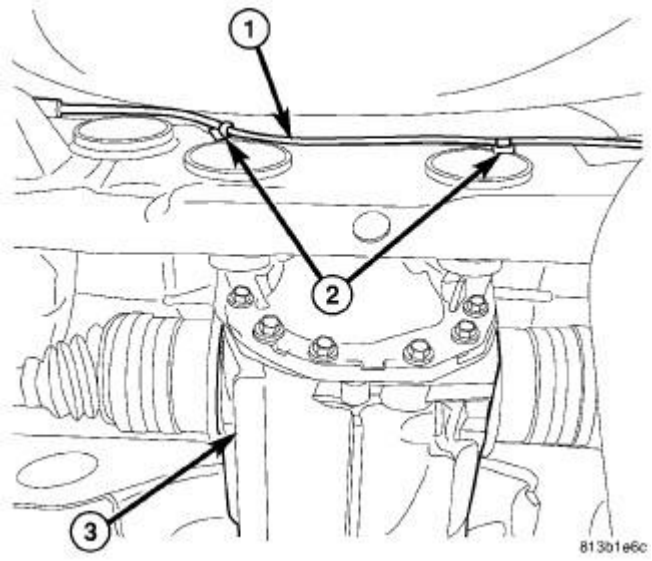


Fig. 68: Left Wheel Speed Sensor Routing Over Rear Differential
Courtesy of CHRYSLER GROUP, LLC

14. Unclip left sensor cable (1) from routing clips (2) along rear of crossmember near rear differential (3).

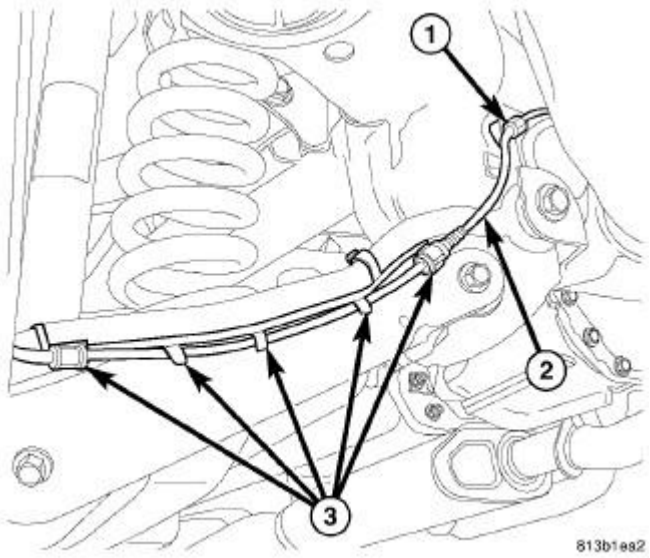


Fig. 69: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

15. Unclip left sensor cable (2) from routing clip (1) above toe link mount on rear crossmember.

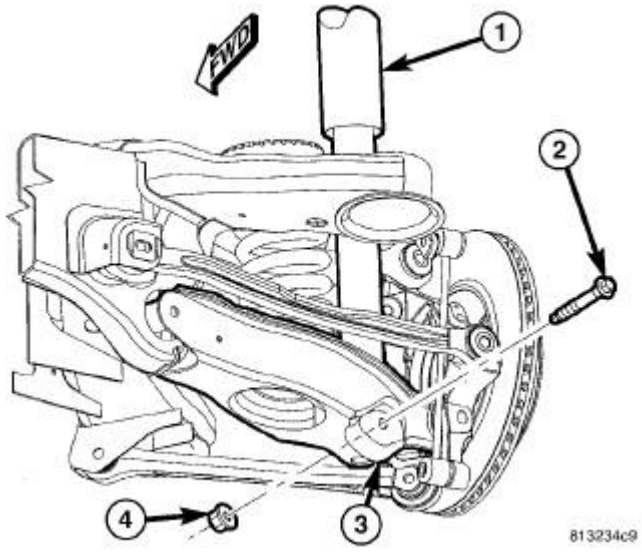


Fig. 70: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

16. On each side of vehicle, remove shock absorber (1) lower mounting bolt (2) and nut (4).

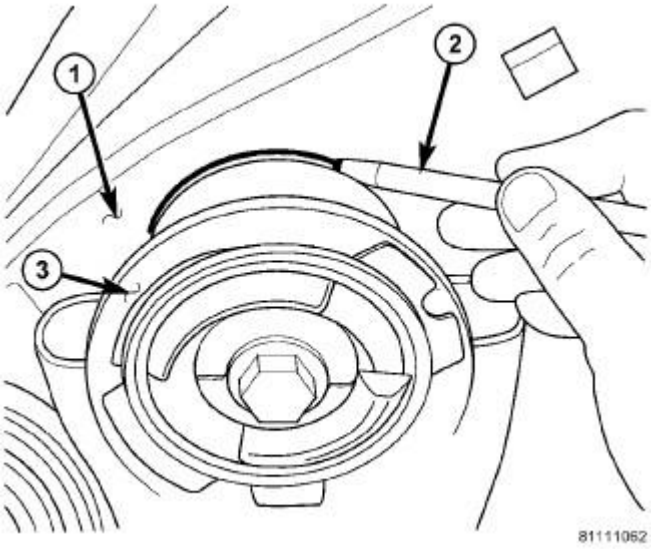


Fig. 71: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

17. Carefully mark location of rear crossmember on body at all four mount (bushing) locations using a marker or crayon. **Do not use a scratch awl to mark location.**
18. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.

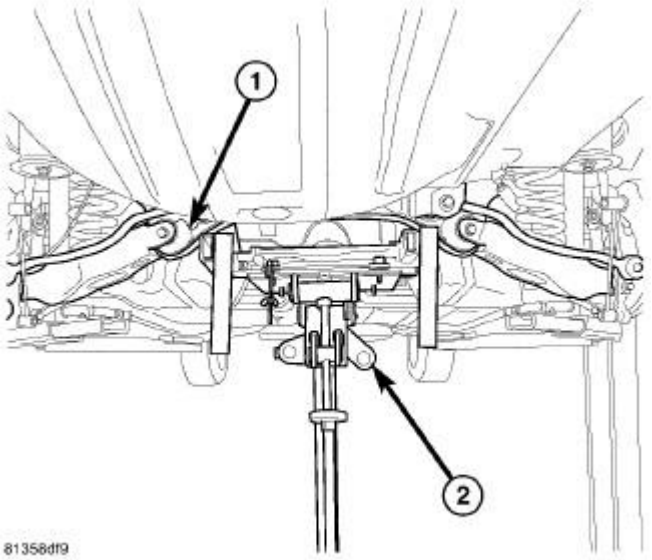


Fig. 72: Jack Positioned Beneath Crossmember

Courtesy of CHRYSLER GROUP, LLC

19. Position under-hoist utility jack or transmission jack (2) under center of rear crossmember (1). Raise jack head to contact crossmember and secure in place. **When securing crossmember to jack, be sure not to secure stabilizer bar.**

Fig. 73: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

20. Remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .

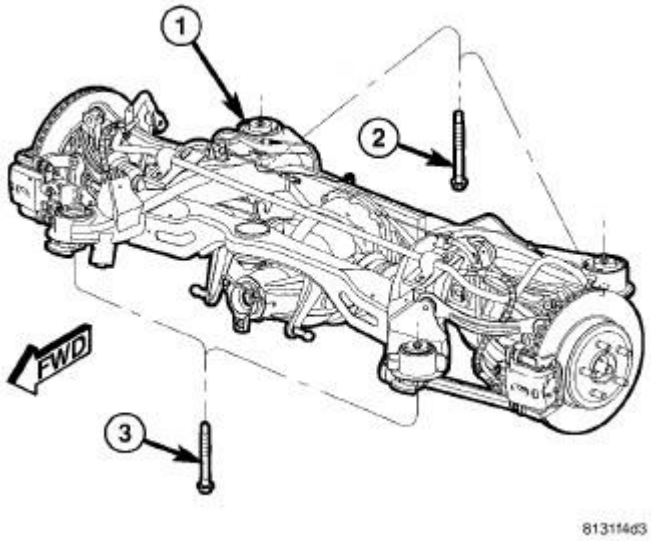


Fig. 74: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove both front (3) and both rear (2) mounting bolts fastening crossmember (1) in place.
22. **Slowly** lower crossmember using jack until crossmember is at a comfortable working level to access link and stabilizer bar fasteners.

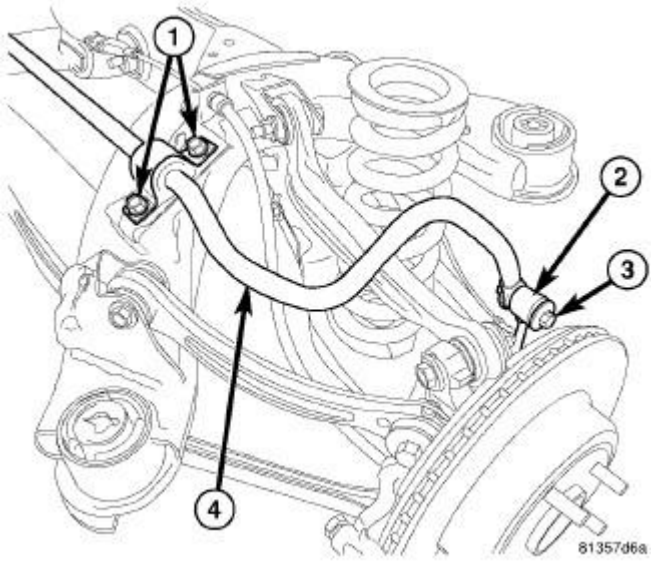


Fig. 75: Rear Stabilizer Bar Mounting
Courtesy of CHRYSLER GROUP, LLC

23. On each end, remove bolt (3) and nut fastening stabilizer bar (4) to stabilizer link (2).
24. Remove bolts (1) fastening each stabilizer bar cushion retainer to crossmember.
25. Remove stabilizer bar (4) with cushions and retainers.

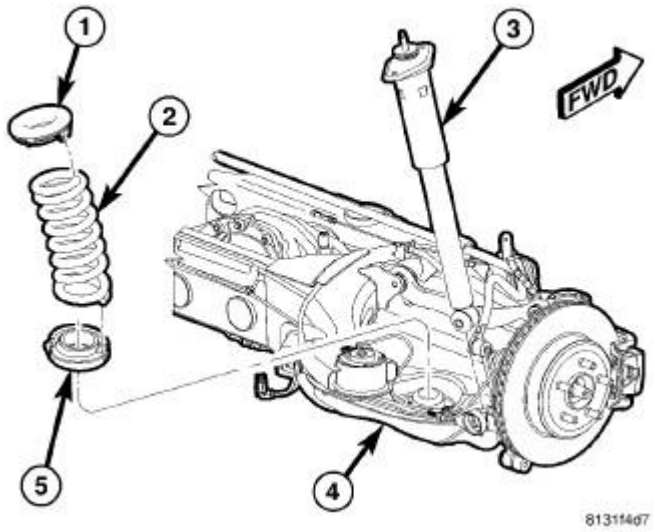


Fig. 76: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

26. Remove coil springs and isolators (1, 2 and 5) from spring links.

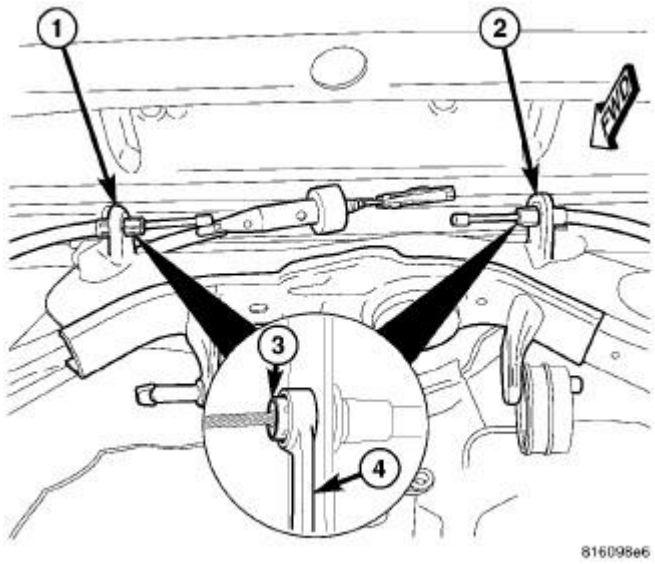


Fig. 77: Cables AT Crossmember Bracket
Courtesy of CHRYSLER GROUP, LLC

27. For each parking brake cable, place 13 mm 12-point box wrench (4) over cable strand and completely onto cable retainer (3) as shown at crossmember bracket (1 - left) (2 - right). It may be necessary to wiggle wrench around somewhat to collapse retainer fingers. With wrench in place, pull cable from bracket.

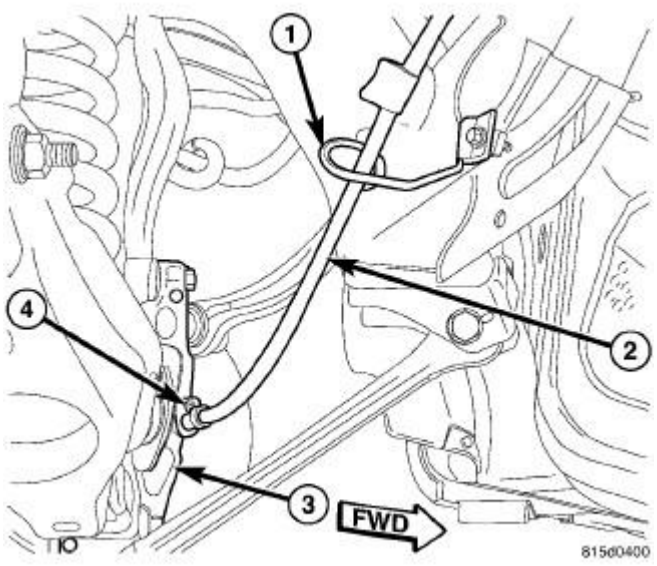


Fig. 78: Rear Cable Routing To Knuckle
Courtesy of CHRYSLER GROUP, LLC

28. On each side, remove screw fastening parking brake cable routing guide (1) to crossmember. Remove J-nuts from crossmember.

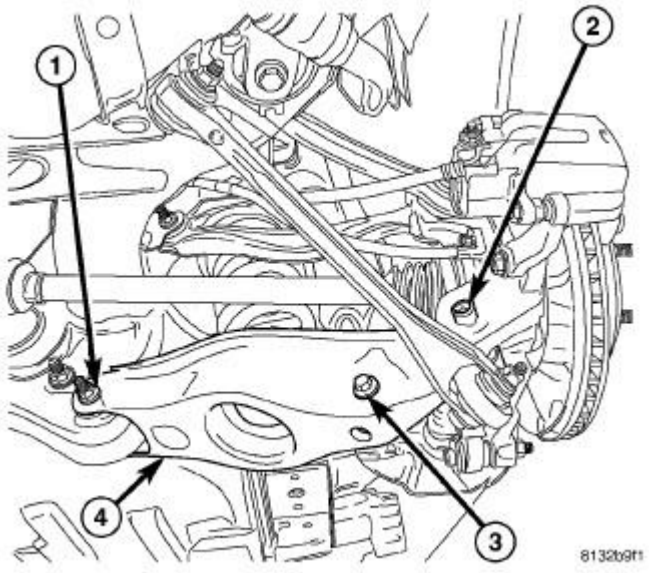


Fig. 79: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: For installation purposes, when removing fasteners for any rear suspension links, it is important to note which bolt fastens what component and in what direction it is installed in.

29. On each side of crossmember, remove bolt and nut (1) fastening spring link (4) to crossmember.

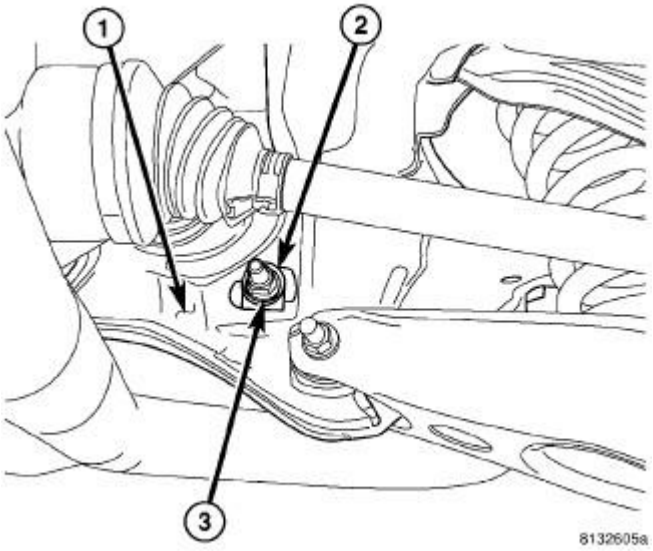


Fig. 80: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

30. On each side of crossmember, while holding toe adjustment cam bolt from rotating, remove nut (3) securing toe link at crossmember (1).

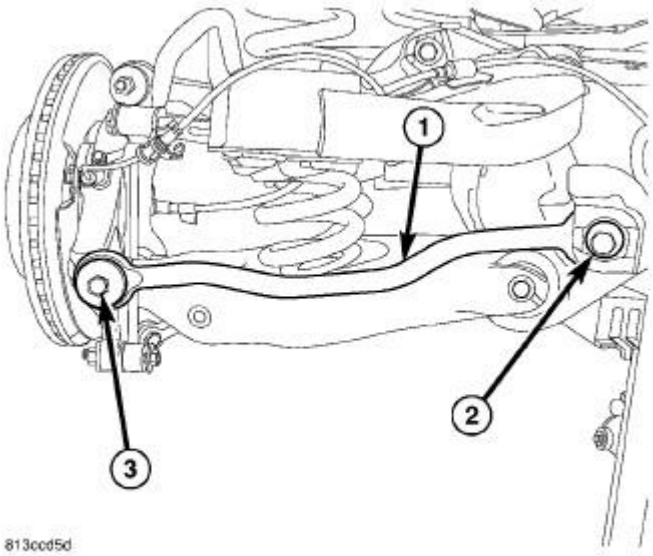


Fig. 81: Toe Link Mounting
Courtesy of CHRYSLER GROUP, LLC

31. On each side of crossmember, slide cam bolt (2) attaching toe link rearward, out of

crossmember and link (1).

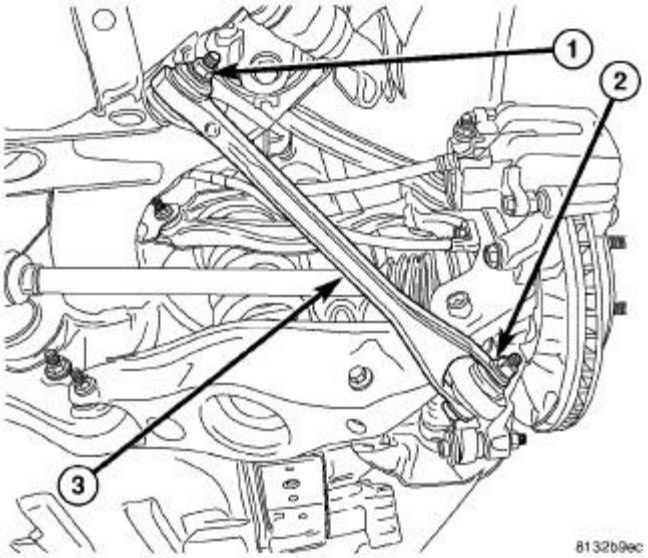


Fig. 82: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

32. On each side of crossmember, remove bolt and nut (1) mounting link (3) at crossmember.

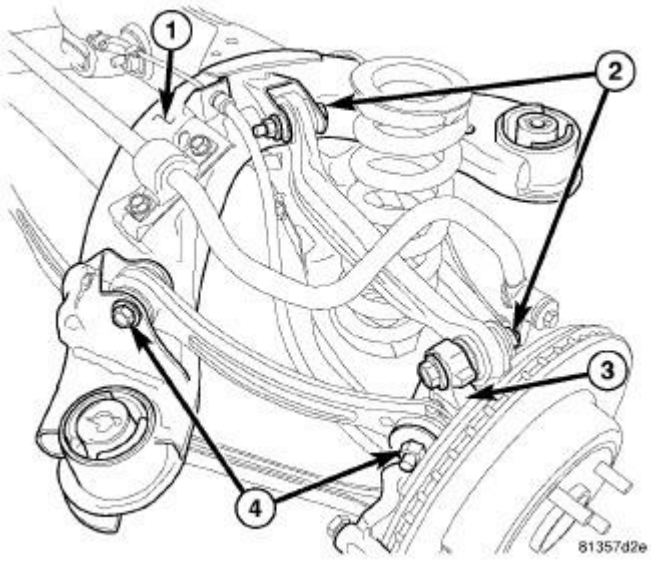


Fig. 83: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

33. On each side of crossmember, remove nut and bolt (4) mounting tension link to crossmember (1).
34. On each side of crossmember, remove nut and bolt (2) mounting camber link to crossmember

(1).

35. Carefully lift knuckle with links and parking brake cable attached from rear suspension crossmember.
36. Remove crossmember from jack.

INSTALLATION

INSTALLATION

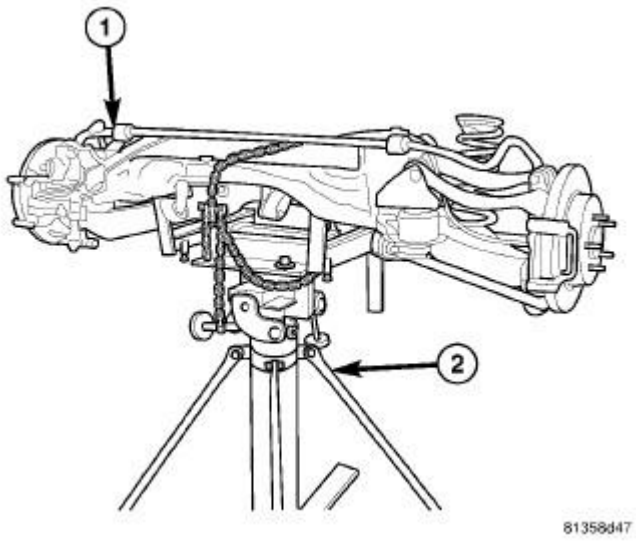


Fig. 84: Rear Crossmember Positioned On Jack
Courtesy of CHRYSLER GROUP, LLC

1. Install rear crossmember (1) on jack (2) head in same position in which it was removed and secure in place.

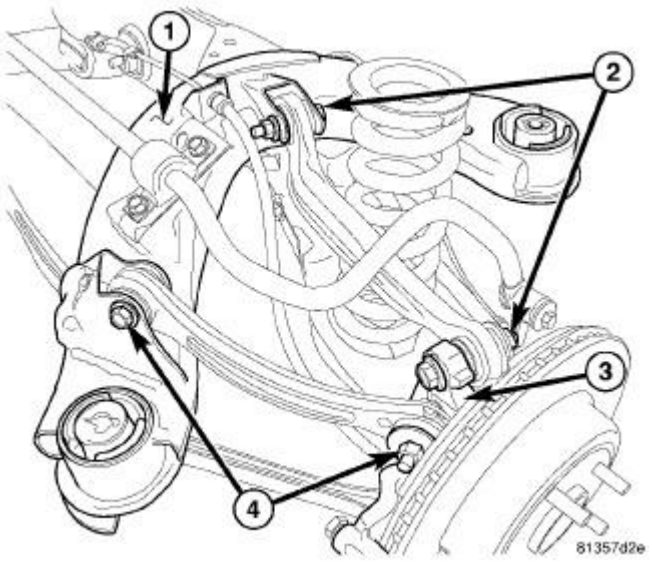


Fig. 85: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

2. Carefully place one side knuckle with links and parking brake cable attached as an assembly into mounted position on rear suspension crossmember. Install nut and bolt (2) mounting camber link to crossmember (1) to hold assembly in place. **Do not tighten at this time.**
3. Carefully place opposite side knuckle with links and parking brake cable attached as an assembly into mounted position on rear suspension crossmember. Install nut and bolt (2) mounting camber link to crossmember (1) to hold assembly in place. **Do not tighten at this time.**
4. On each side of crossmember, install nut and bolt (4) mounting each tension link to crossmember (1). **Do not tighten at this time.**

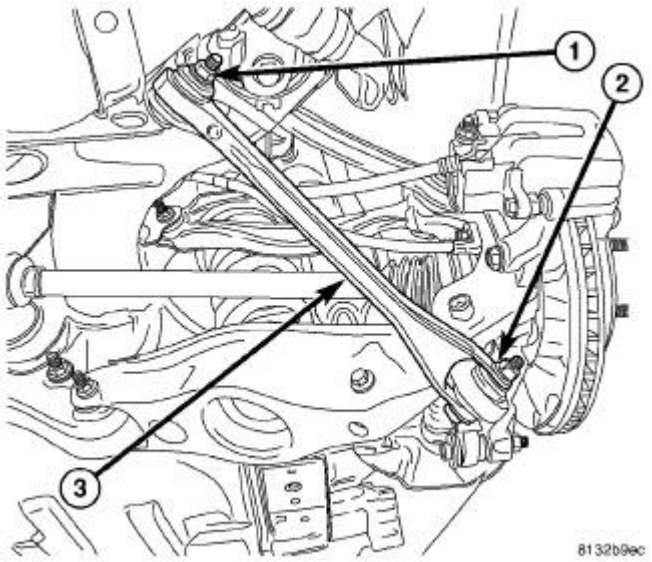


Fig. 86: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

5. On each side of crossmember, Install bolt and nut (1) mounting each compression link (3) at crossmember. **Do not tighten at this time.**

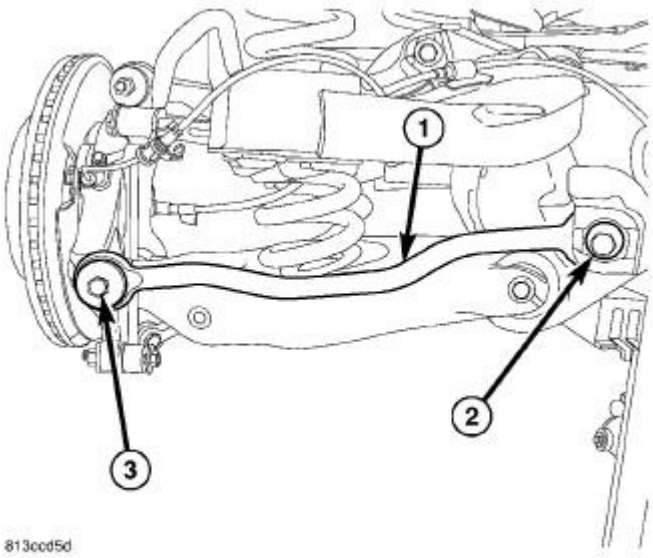


Fig. 87: Toe Link Mounting
Courtesy of CHRYSLER GROUP, LLC

6. On each side of crossmember, slide cam bolt (2) attaching toe link through crossmember and link (1) from rear.

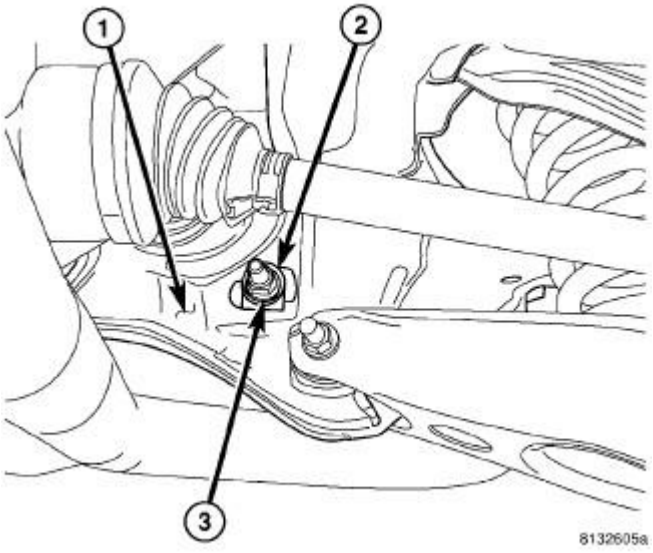


Fig. 88: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

7. On each side of crossmember, while holding toe adjustment cam bolt from rotating, install cam washer (2) and nut (3) securing toe link at crossmember (1). **Do not tighten at this time.**

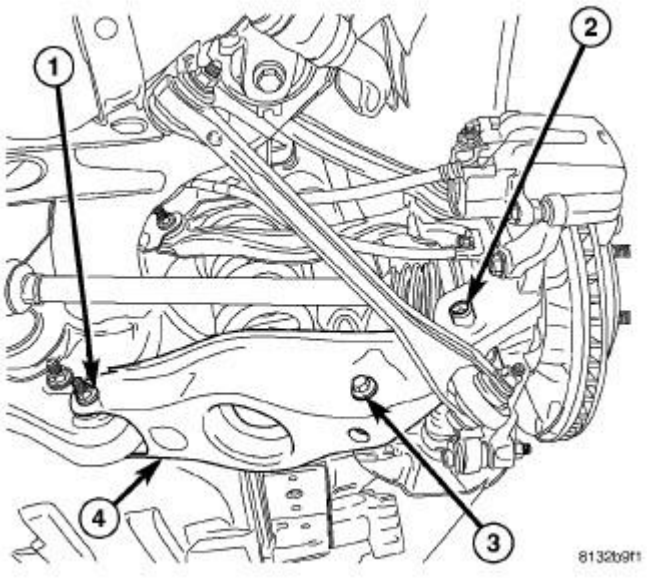


Fig. 89: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

8. On each side of crossmember, install bolt and nut (1) fastening spring link (4) to crossmember. **Do not tighten at this time.**

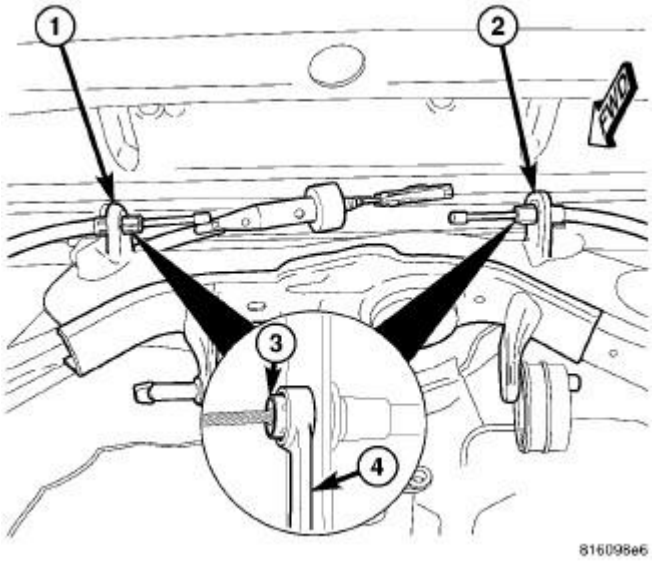


Fig. 90: Cables AT Crossmember Bracket
Courtesy of CHRYSLER GROUP, LLC

9. On each side of crossmember rear, guide leading end of rear parking brake through

crossmember bracket (1 - left) (2 - right) near equalizer and press cable housing retainer into bracket allowing retainer fingers to lock cable in place.

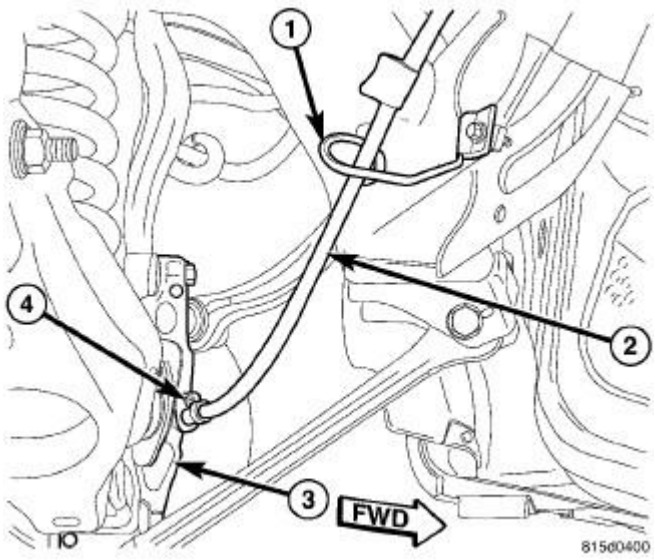


Fig. 91: Rear Cable Routing To Knuckle
Courtesy of CHRYSLER GROUP, LLC

10. On each side of crossmember rear, install J-nut for parking brake cable guide.
11. On each side, install screw fastening parking brake cable routing guide (1) to crossmember.

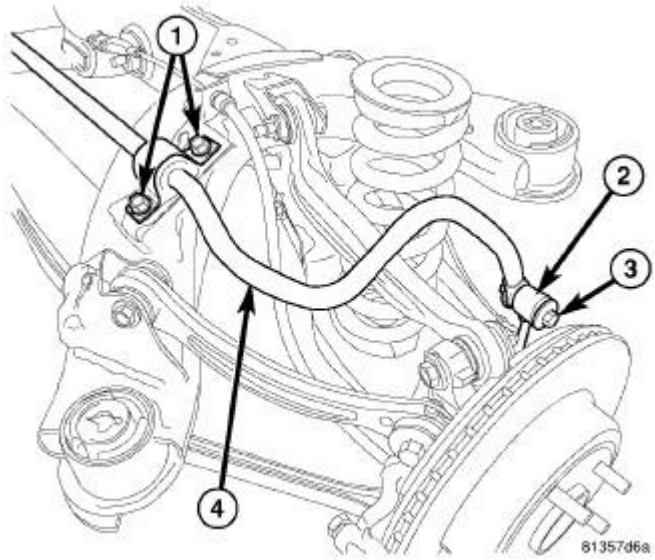


Fig. 92: Rear Stabilizer Bar Mounting
Courtesy of CHRYSLER GROUP, LLC

12. Install stabilizer bar (4) with cushions and retainers on crossmember.

13. Install cushion retainer mounting bolts (1). **Do not tighten at this time.**
14. Install bolt (3) and nut fastening stabilizer bar ends to each stabilizer link (2). **Do not tighten at this time.**
15. Tighten cushion retainer mounting bolts (1) to 60 N.m (44 ft. lbs.).

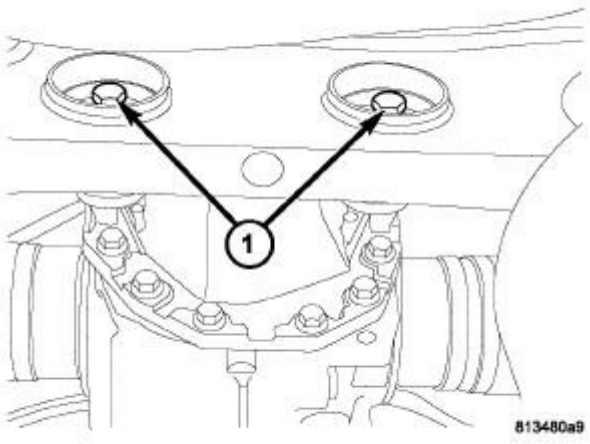


Fig. 93: Rear Axle-To-Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Differential mounting bolts (1) must be installed through bushings prior to crossmember installation in vehicle. Bolts cannot be inserted through bushings once crossmember is installed.

16. Transfer differential mounting bolts (1) from original crossmember differential mount bushings to bushings in replacement crossmember. Install bolts from rear. Be sure to insert bolts through correct mount bushings in crossmember depending on rear axle differential (198 mm axle differential shown in figure).

NOTE: Do not install coil springs on spring links at this time.

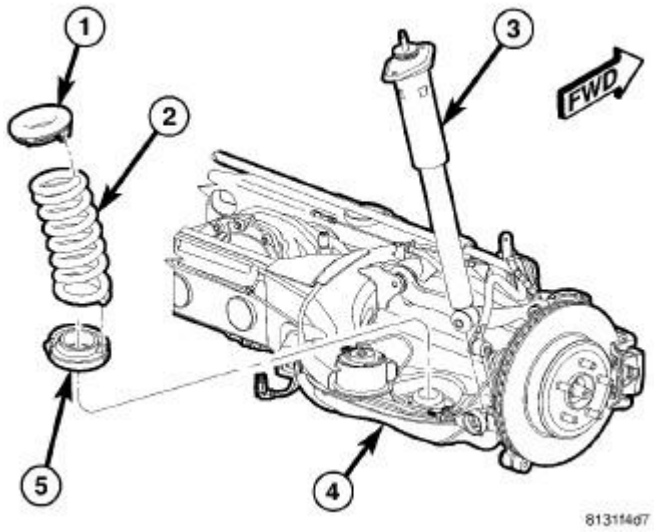


Fig. 94: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

17. Raise crossmember to body mounting points. As crossmember is raised, align shocks (3) with pockets in spring links. **Do not install bolts at this time.**

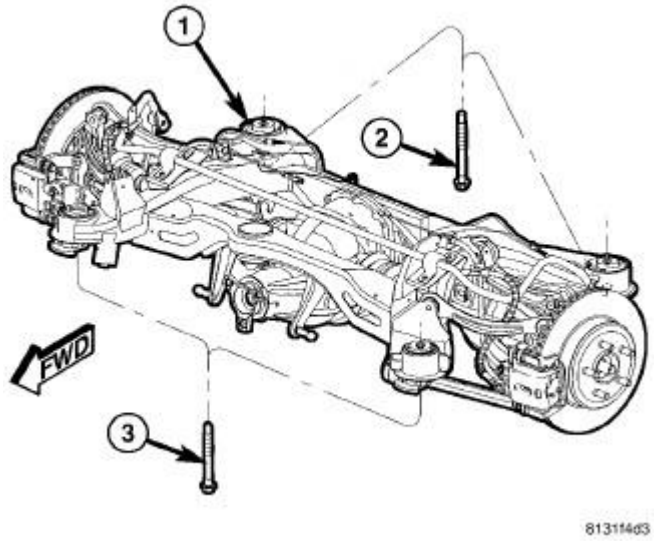


Fig. 95: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

18. Continue to raise crossmember (1) with jack until crossmember mounting bolts (2 and 3) can be

installed. Install left side crossmember mounting bolts, but not the right side bolts. It is not necessary to tighten bolts at this point.

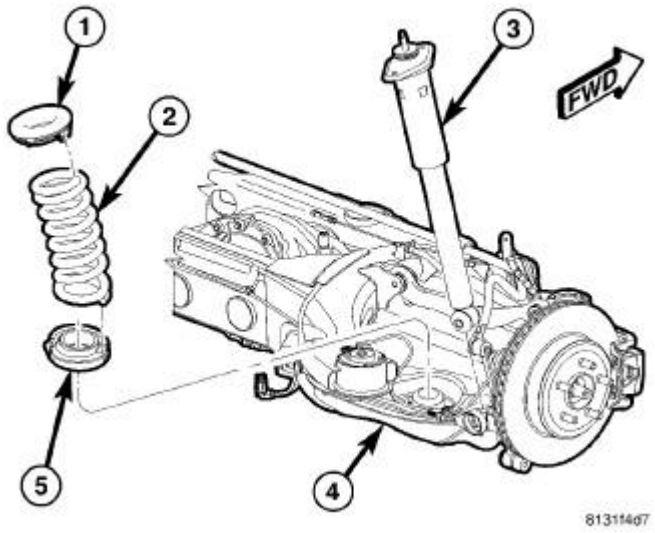


Fig. 96: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

19. **Slowly** lower jack allowing right side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

20. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

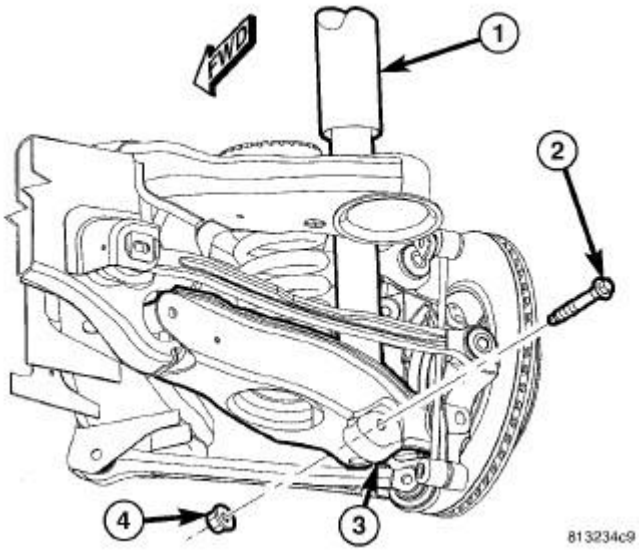


Fig. 97: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

21. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
22. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

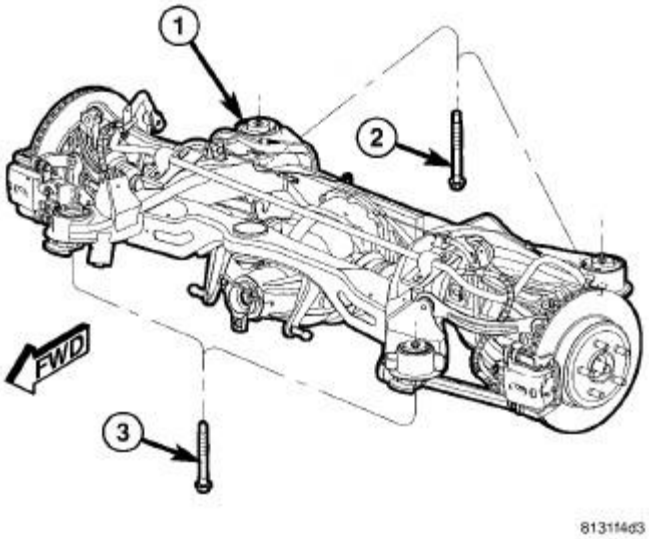


Fig. 98: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

23. Raise right side of crossmember (1) into mounted position. Install right side crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**
24. Remove both front and rear crossmember mounting bolts (2 and 3) on **left** side of vehicle.

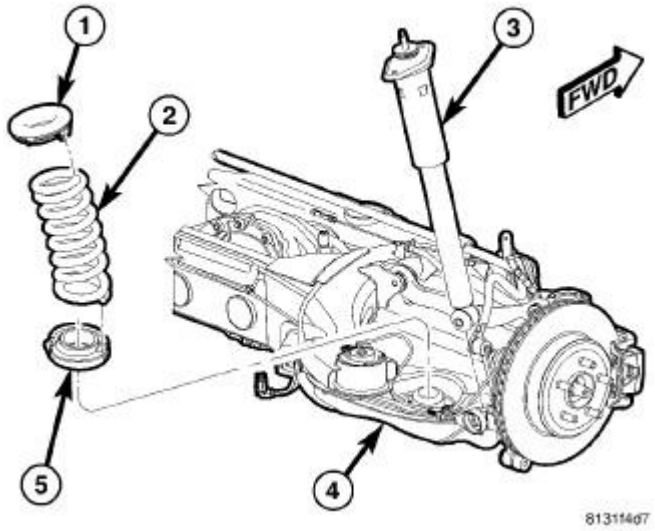


Fig. 99: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

25. **Slowly** lower jack allowing left side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

26. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

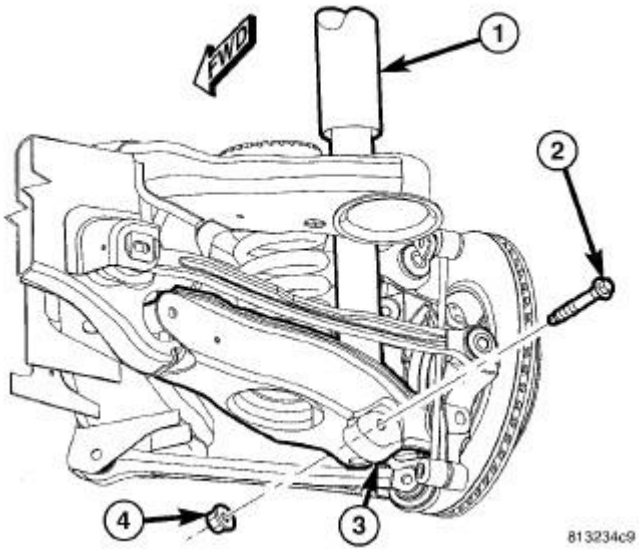


Fig. 100: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

27. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
28. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

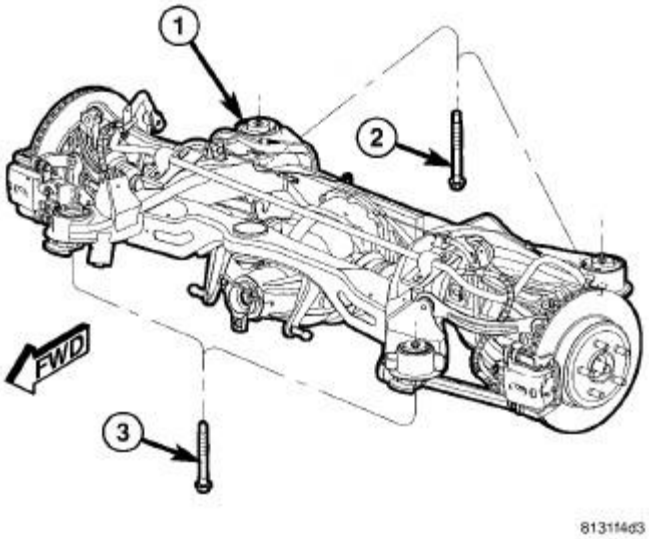


Fig. 101: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

29. Raise left side of crossmember (1) into mounted position. Install left side crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

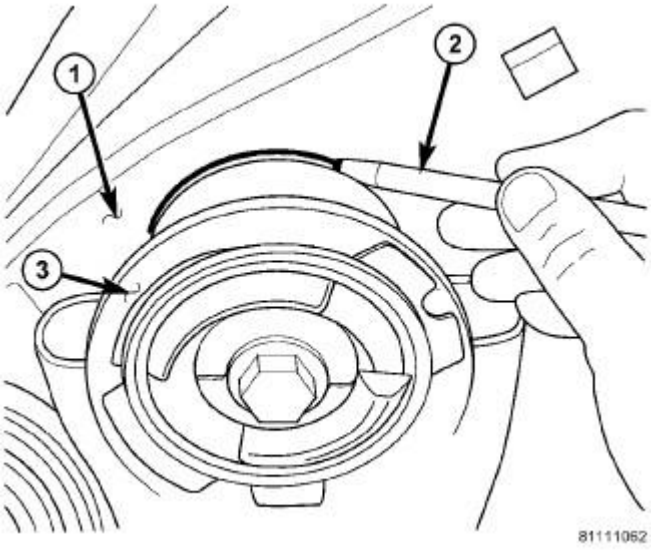


Fig. 102: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

30. Shift crossmember as necessary to line up mounts (3) with location marks drawn on body (1) before removal.

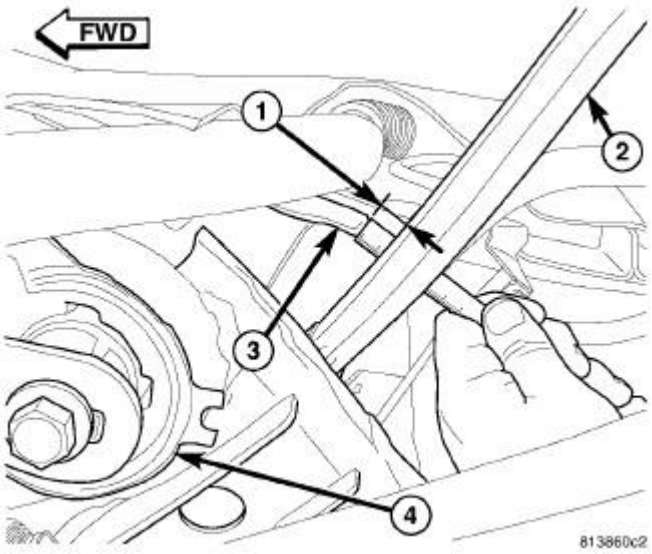


Fig. 103: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

31. Once mounts are lined up with location marks, on both sides of vehicle, measure distance (1) between the tension link (2) and weld flange (3) on body directly in front of it, just outboard of the front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm on either side of vehicle, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Remeasure opposite side to be sure it still maintains minimum 12 mm distance.

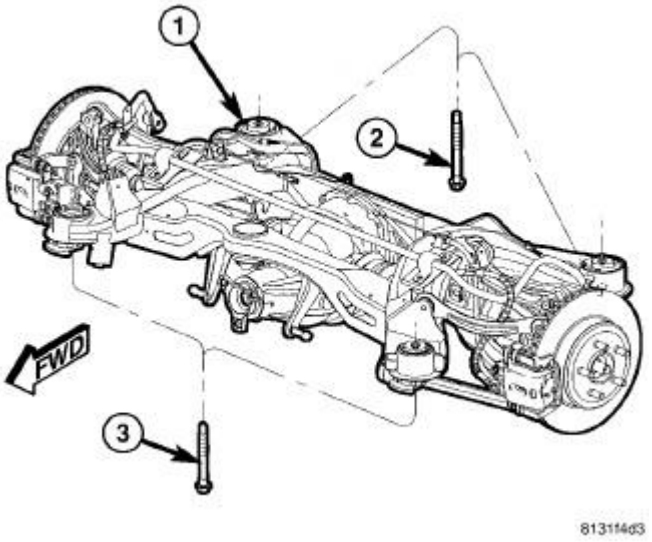


Fig. 104: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

32. Tighten all four crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

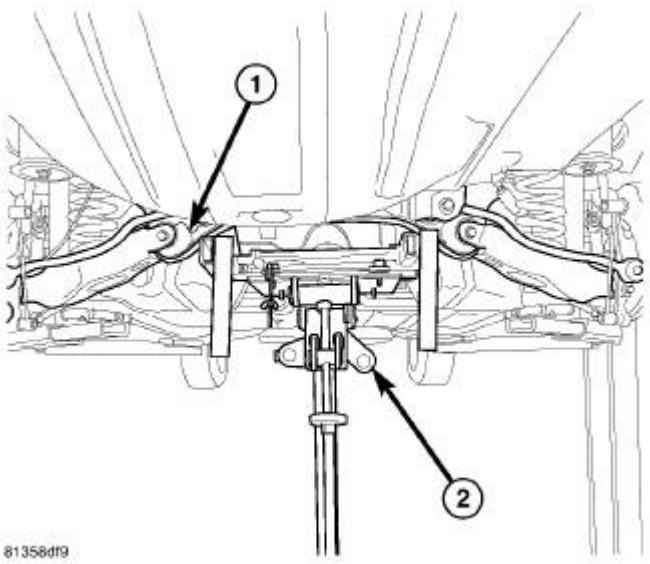


Fig. 105: Jack Positioned Beneath Crossmember
Courtesy of CHRYSLER GROUP, LLC

33. Remove jack (2) from under rear crossmember.

Fig. 106: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

34. Install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

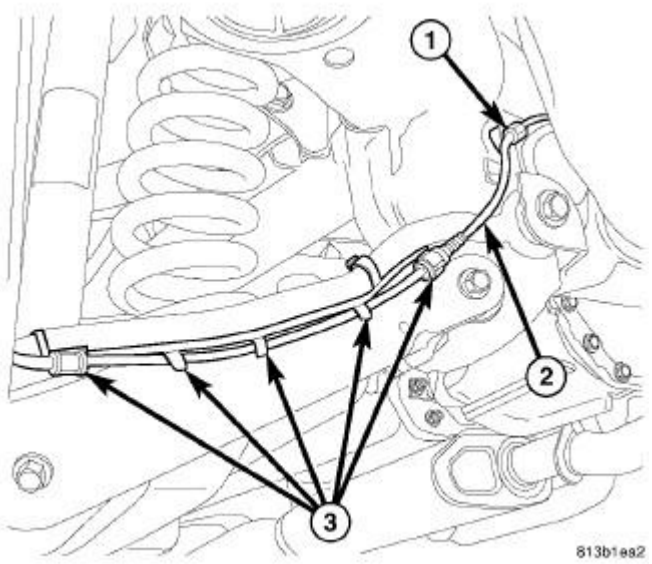


Fig. 107: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

35. Clip left rear wheel speed sensor cable (2) to routing clip (1) above toe link mount on rear crossmember.

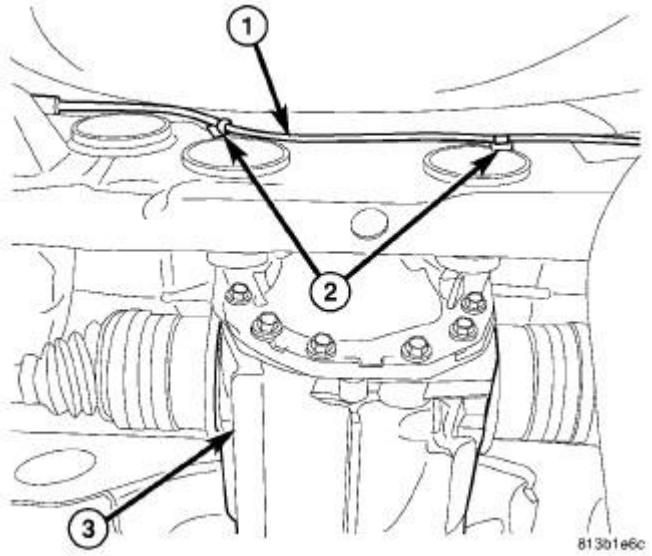


Fig. 108: Left Wheel Speed Sensor Routing Over Rear Differential
Courtesy of CHRYSLER GROUP, LLC

36. Clip left rear wheel speed sensor cable (1) to routing clips (2) along rear of crossmember near rear differential (3).

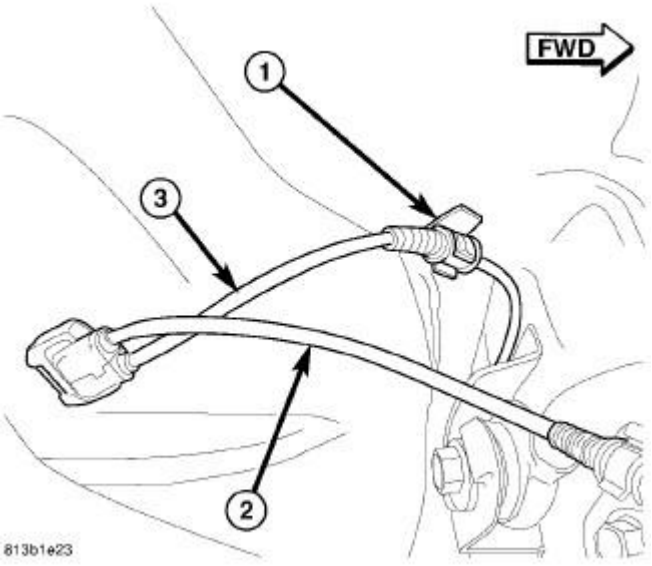


Fig. 109: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

37. Clip left rear wheel speed sensor cable (3) to routing clip (1) near body connector.

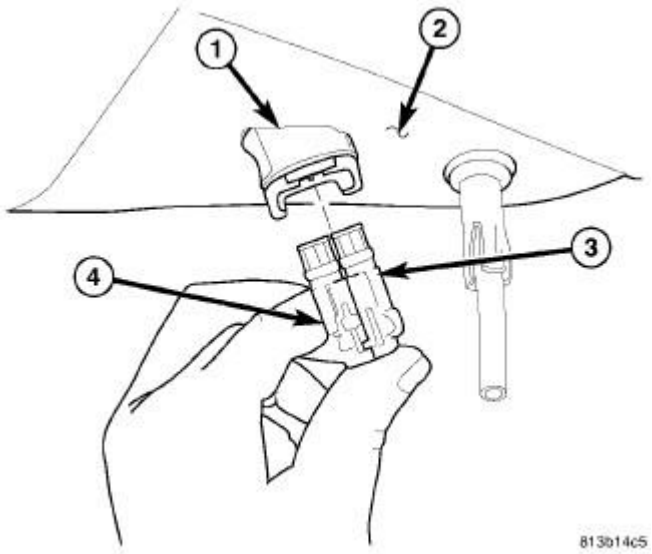


Fig. 110: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

38. Match left rear wheel speed sensor connector (4) to right sensor connector (3) to make one connector.
39. Insert speed sensor connectors (3 and 4) into body wiring harness connector (1) located in luggage compartment floor pan (2). When installing connector, make sure retaining clip on body connector is properly in place and sensor connector cannot be pulled out.

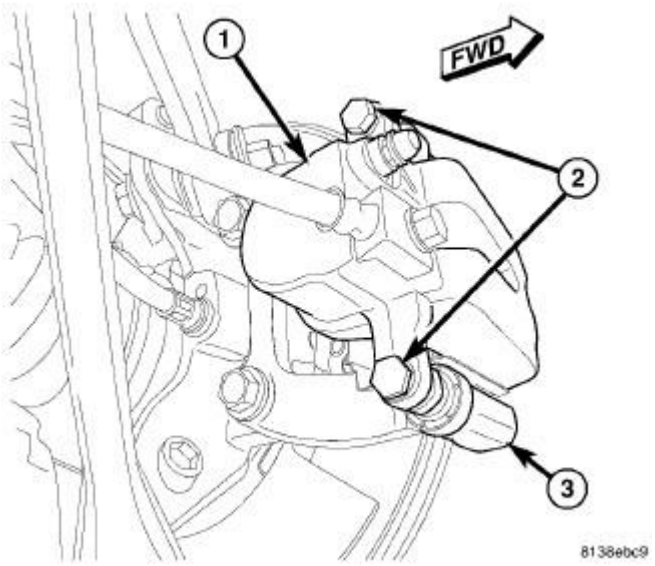


Fig. 111: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

40. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.
    2. Guide caliper and brake hose down through rear suspension, then slide caliper over brake pads and onto caliper adapter (3).

CAUTION: Extreme caution should be taken not to cross-thread caliper guide pin bolts (2) when they are installed.

    3. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 31 N.m (23 ft. lbs.) torque.
    4. Make sure brake hose is properly routed and will not come in contact with suspension components.

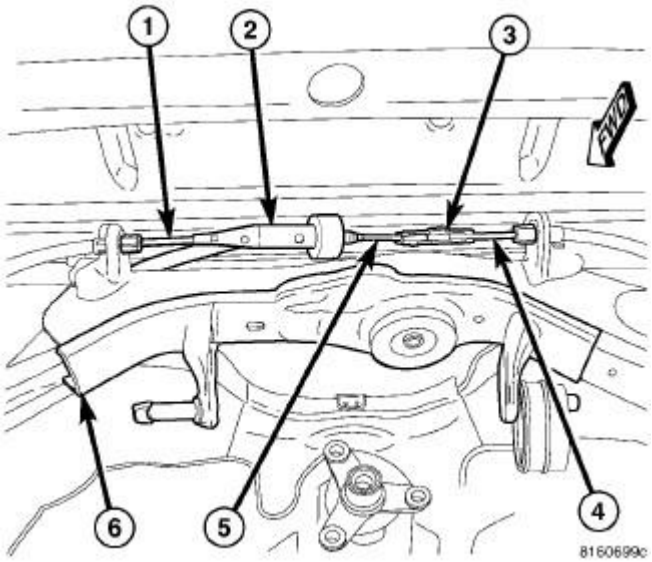


Fig. 112: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

41. Route front parking brake cable with equalizer above rear crossmember.

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

42. Connect left rear parking brake cable (1) to equalizer (2).
43. Connect right rear parking brake cable (4) to connector (3) already attached to front parking brake cable (5).

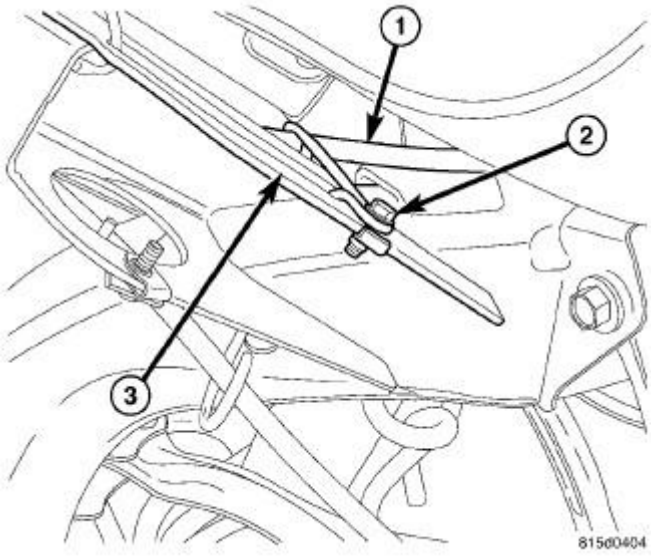


Fig. 113: Front Cable AT Left Front Of Crossmember

Courtesy of CHRYSLER GROUP, LLC

44. Install J-nut for mounting parking brake cable routing bracket to crossmember.
45. Insert front parking brake cable routing bracket locating pin into front flange of crossmember (3), then install screw (2) fastening cable (1) routing bracket to rear crossmember.

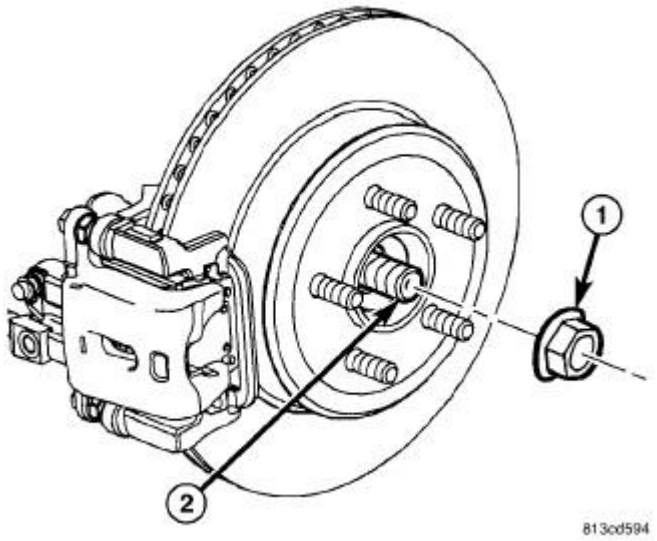


Fig. 114: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

46. On each side of vehicle, slide an axle half shaft (2) through hub and bearing and install hub nut (1). **Do not tighten hub nuts at this time.**
47. Install rear axle differential. Refer to **INSTALLATION** or **INSTALLATION** .
48. While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.).

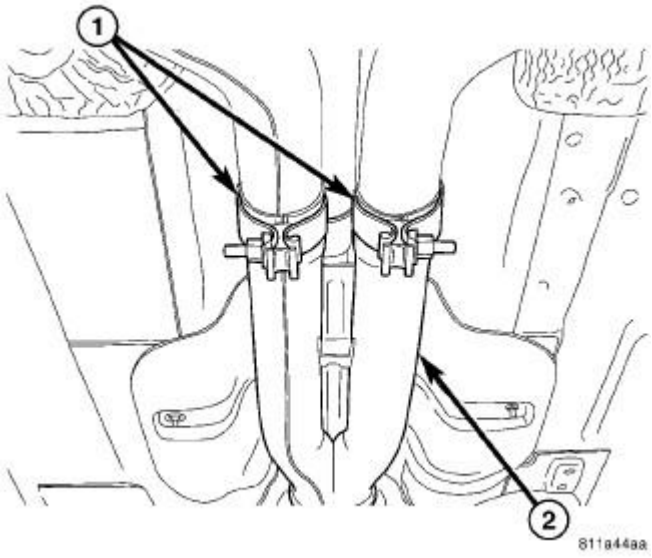


Fig. 115: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

49. Install rear exhaust system (2) (dual-outlet exhaust shown in figure).

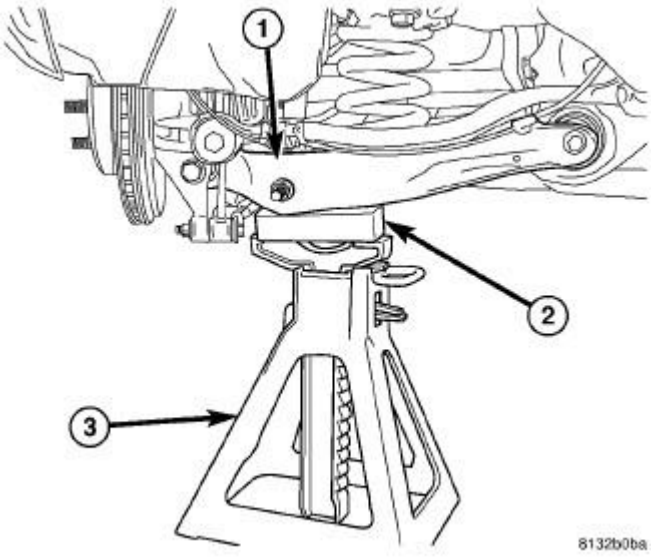


Fig. 116: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

50. Lower vehicle until front tires contact floor but rear is still suspended. Place jack stands under each rear suspension spring link. Place an appropriate wooden block between stand and link to avoid damaging spring link, then lower vehicle until full vehicle weight is supported by suspension.

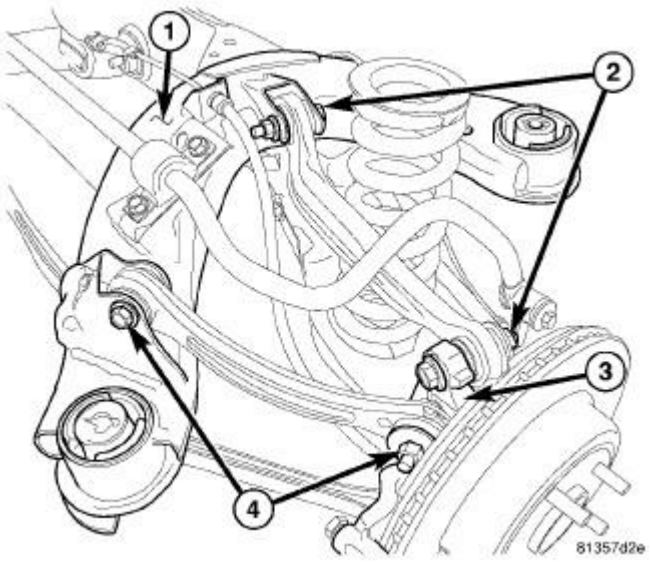


Fig. 117: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

51. Tighten camber link bolt (2) at crossmember to 85 N.m (63 ft. lbs.).
52. Tighten tension link bolt nut (2) at crossmember to 85 N.m (63 ft. lbs.).

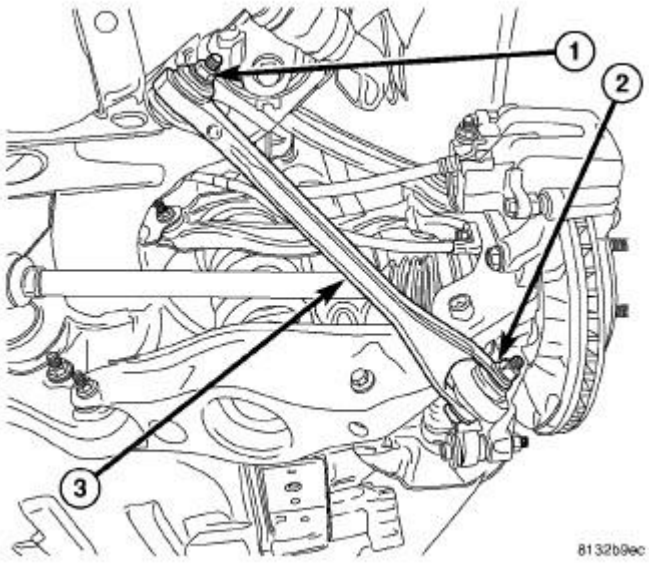


Fig. 118: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

53. Tighten compression link bolt (2) at crossmember to 85 N.m (63 ft. lbs.) torque.

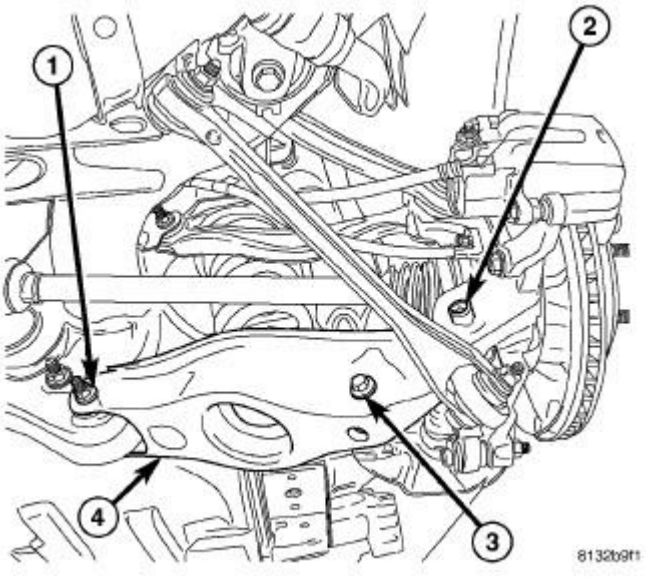


Fig. 119: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

54. Tighten spring link bolt (1) at crossmember to 108 N.m (80 ft. lbs.).

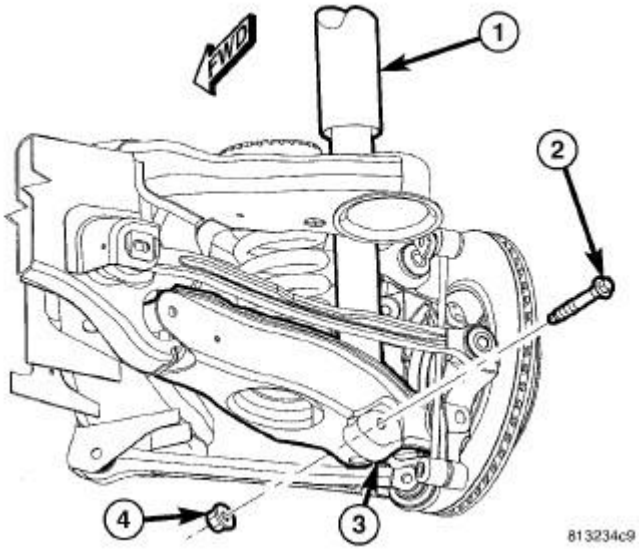


Fig. 120: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

55. Tighten shock absorber lower mounting bolt nut (4) to 72 N.m (53 ft. lbs.).

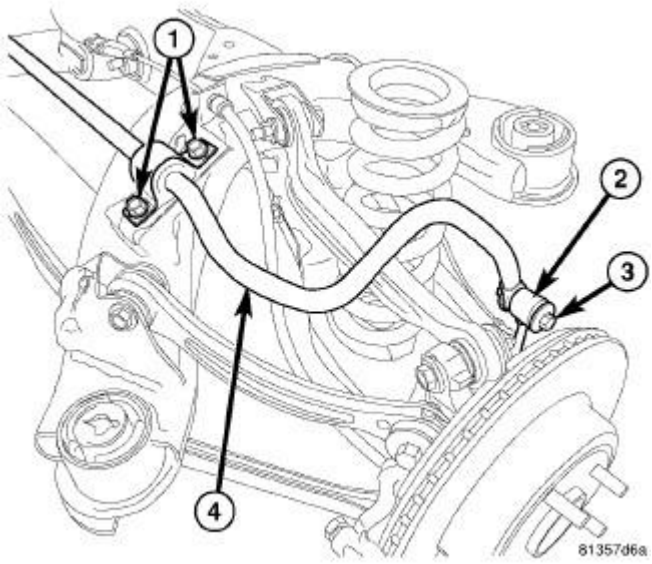


Fig. 121: Rear Stabilizer Bar Mounting
Courtesy of CHRYSLER GROUP, LLC

56. Tighten stabilizer link bolts (3) to 61 N.m (45 ft. lbs.).

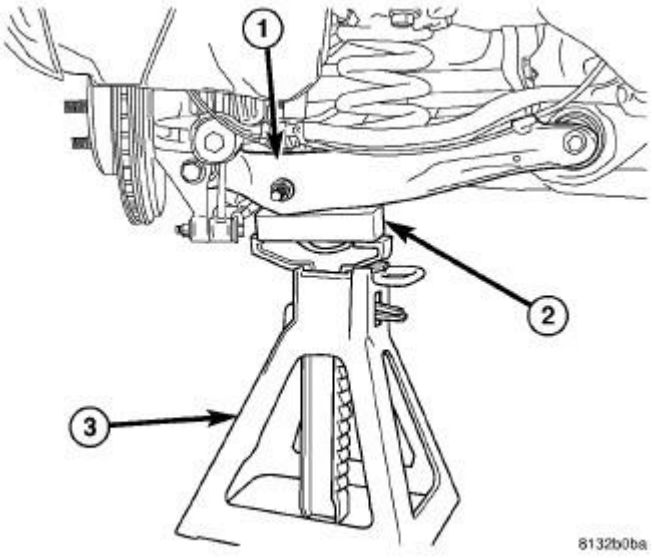


Fig. 122: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

57. Raise vehicle and remove jack stands (3).

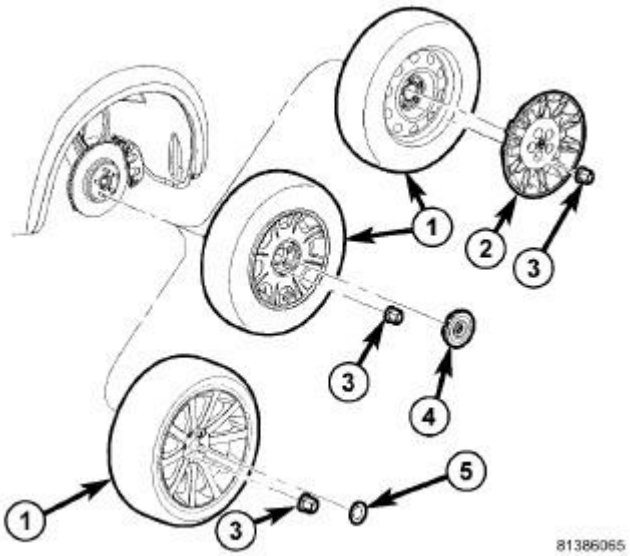


Fig. 123: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

58. Install tire and wheel assemblies (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) (Police - 190 N.m (140 ft. lbs.)). Refer to **INSTALLATION** .
59. Lower vehicle.

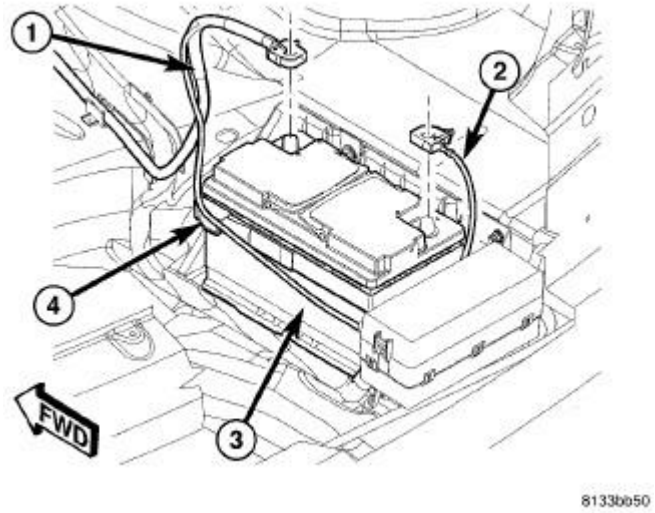


Fig. 124: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

60. Connect battery negative cable (2) to battery post. It is important that this is performed properly. Refer to **STANDARD PROCEDURE** .
61. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving

vehicle.

62. Perform wheel alignment, paying special attention to thrust angle. If rear crossmember needs to be shifted to align thrust angle, try to avoid compromising tension link clearance (). Refer to 31 and **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

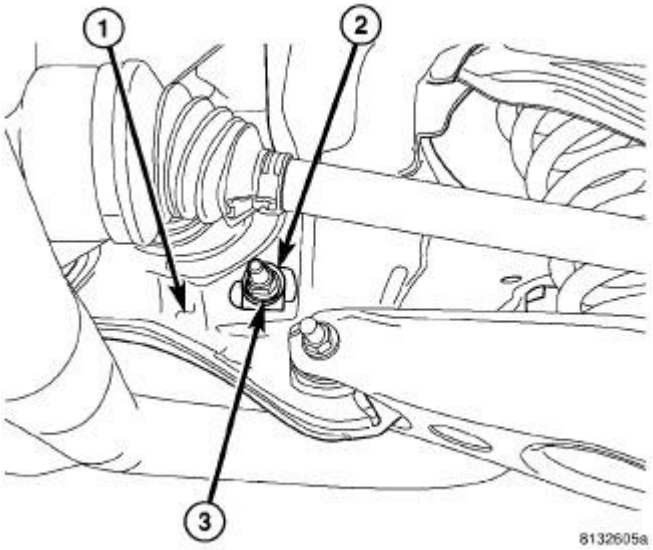


Fig. 125: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

63. On each side of crossmember, while holding cam bolt from turning, tighten toe link cam bolt nut (2) to 108 N.m (80 ft. lbs.) torque.

ISOLATOR, REAR CROSSMEMBER, DIFFERENTIAL

REMOVAL

REMOVAL

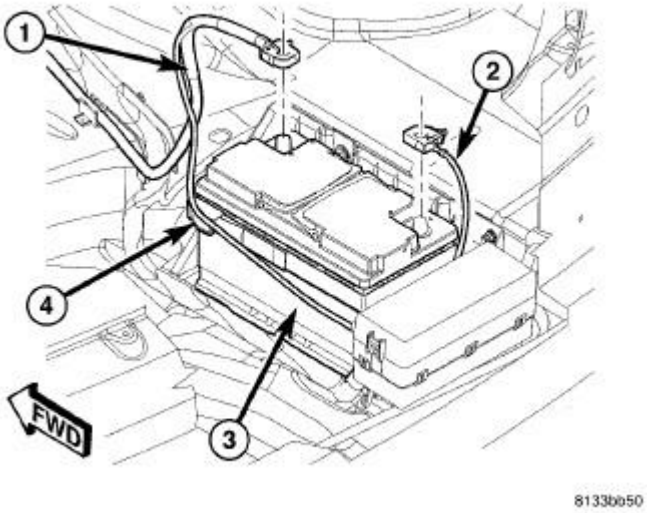


Fig. 126: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

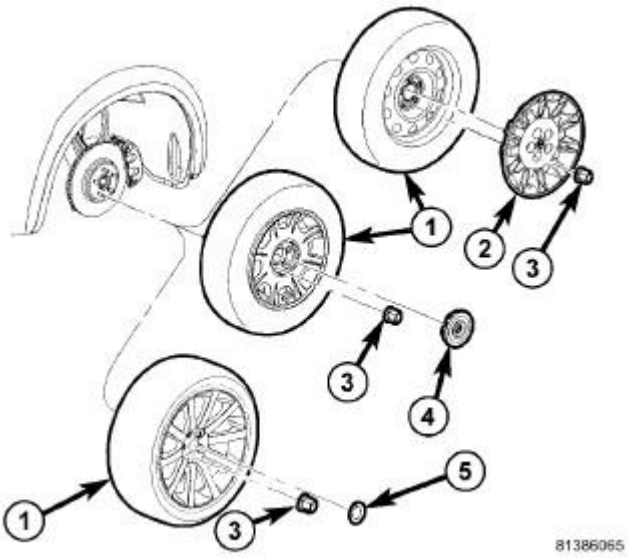


Fig. 127: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

3. On each side of vehicle rear, remove wheel mounting nuts (3), then tire and wheel assembly (1).

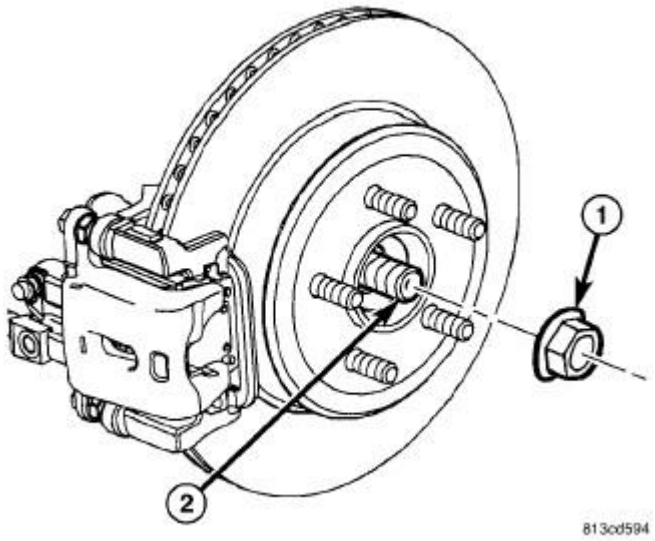


Fig. 128: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

4. On each side of vehicle rear, while a helper applies brakes to keep hub from rotating, remove hub nut (1) from half shaft (2).

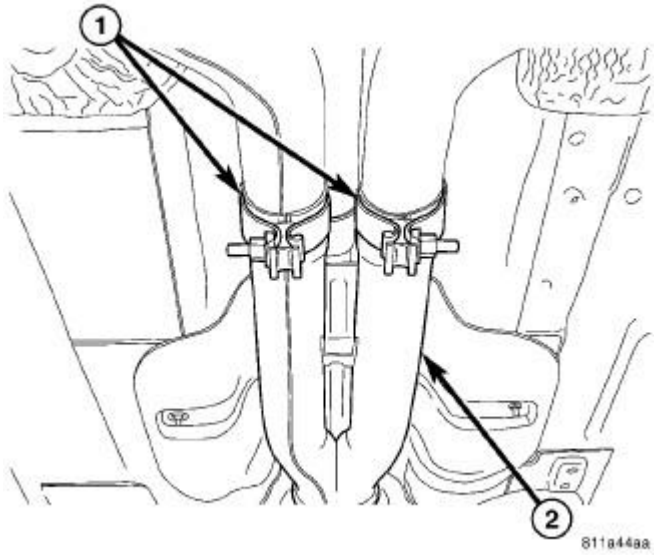


Fig. 129: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

5. Remove rear exhaust system (2) (dual-outlet exhaust shown in figure).
6. Remove rear axle differential. Refer to **REMOVAL** .
7. Slide each axle half shaft from hub and bearing and remove from vehicle.

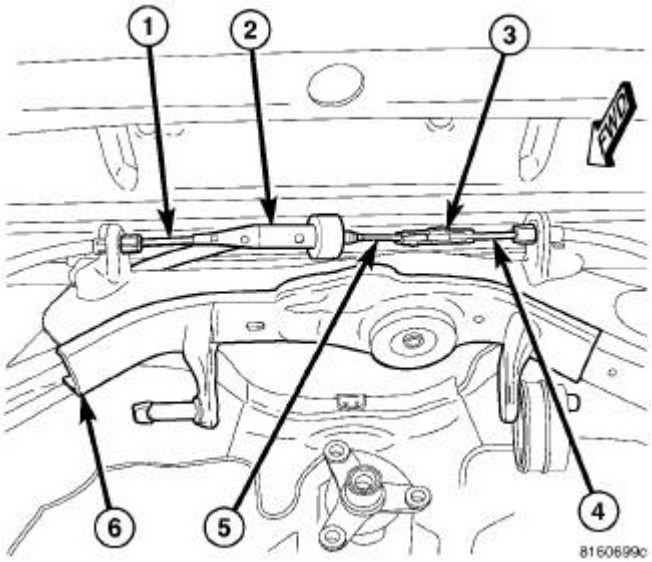


Fig. 130: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

8. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable (4) above axle differential.

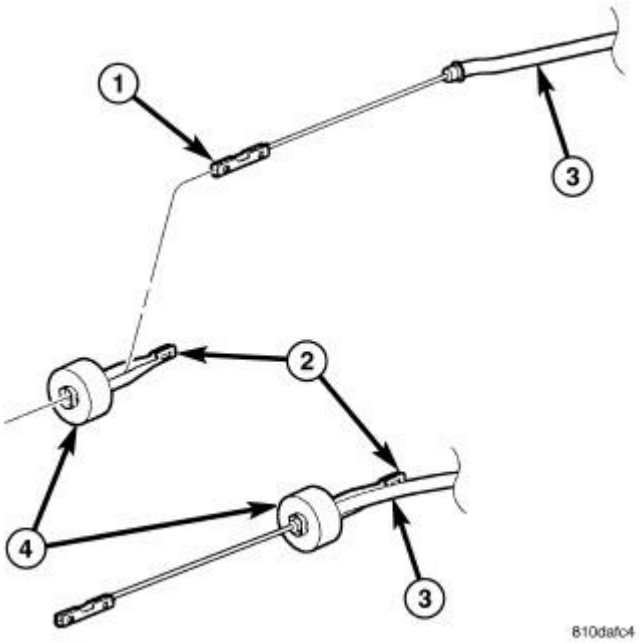


Fig. 131: Front Cable Installation Into Equalizer

Courtesy of CHRYSLER GROUP, LLC

9. Remove front parking brake cable (3) from equalizer (2).

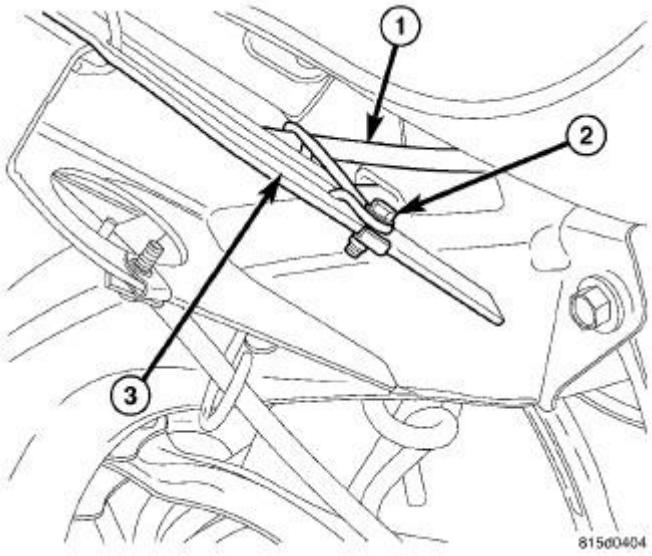


Fig. 132: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

10. Remove screw (2) fastening front parking brake cable (1) routing bracket to rear crossmember front flange (3).

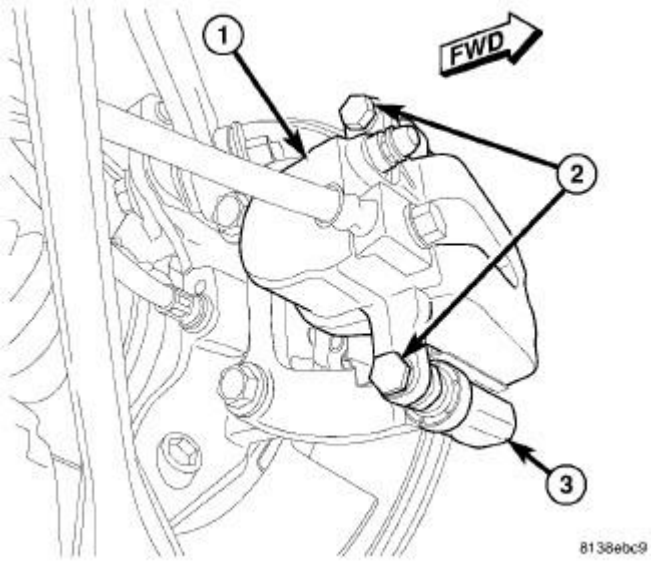


Fig. 133: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

11. If equipped with standard or premium disc brakes, on each rear disc brake:

1. While holding guide pins from turning, remove disc brake caliper guide pin bolts (2).
2. Remove brake caliper (1) from brake adapter (3) and pads.
3. Guide brake caliper up through suspension, following brake hose path. Support caliper above rear suspension using with bungee cord or wire to keep caliper from overextending brake hose when crossmember is lowered.

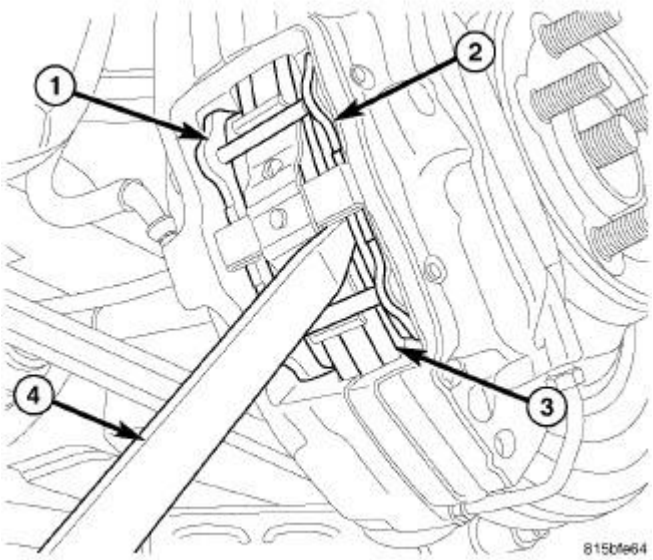


Fig. 134: Pushing Back Pistons In Bore
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

12. If equipped with SRT8 disc brakes, on each rear disc brake, place trim stick (4) between brake pad (2) and outer edge of rotor (3).
13. If equipped with SRT8 disc brakes, on each rear disc brake, using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

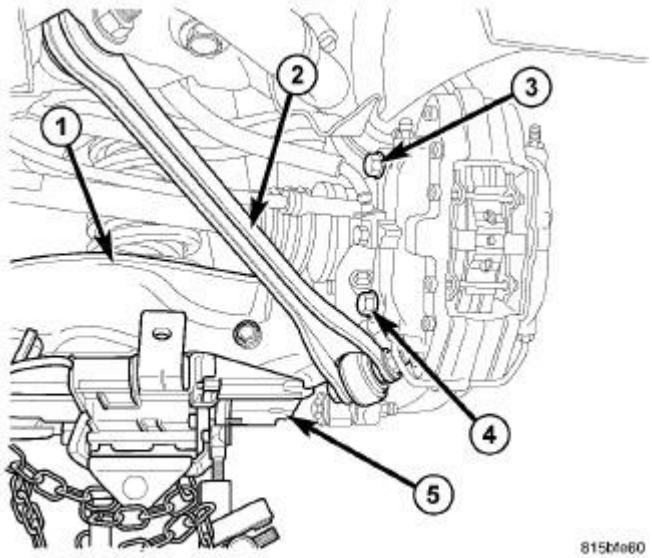


Fig. 135: Accessing Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

14. If equipped with SRT8 disc brakes, on each rear disc brake, support spring link (1) using a transmission jack (5) or other appropriate jack. Raise spring link just enough to access brake caliper lower mounting bolt (4) from above compression link (2).

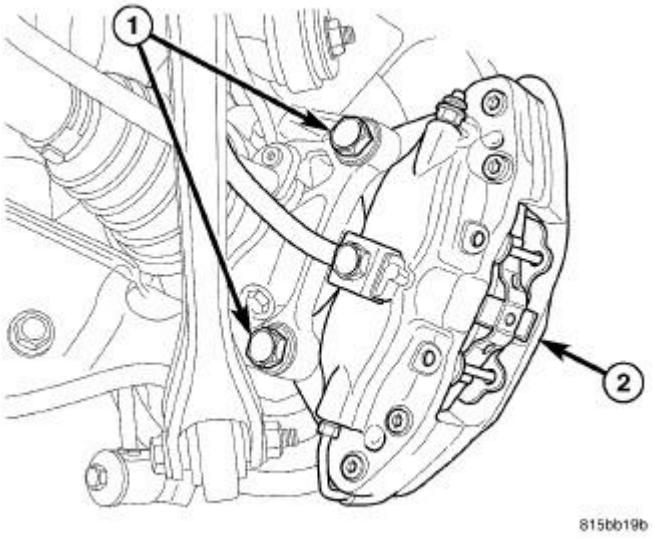


Fig. 136: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

15. If equipped with SRT8 disc brakes, on each rear disc brake, remove the lower and upper caliper mounting bolts (1).
16. If equipped with SRT8 disc brakes, on each rear disc brake, remove brake caliper (2) with pads from knuckle and brake rotor. Hang assembly out of way using wire or a bungee cord. Use care

not to overextend brake hose when doing this.

17. If equipped with SRT8 disc brakes, remove jack from under spring link.

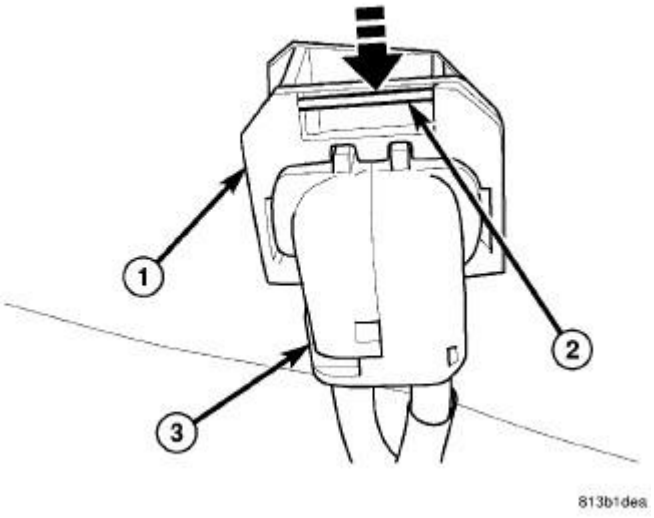


Fig. 137: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove wheel speed sensor connector from body wiring harness connector, move retaining clip (2) and pull sensor connector outward.

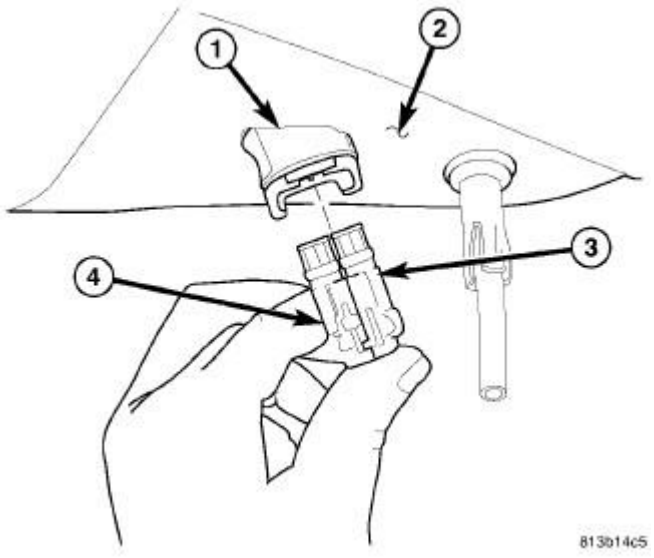


Fig. 138: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

18. Remove wheel speed sensor connectors (3 and 4) from body wiring harness connector (1)

located in luggage compartment floor pan (2).

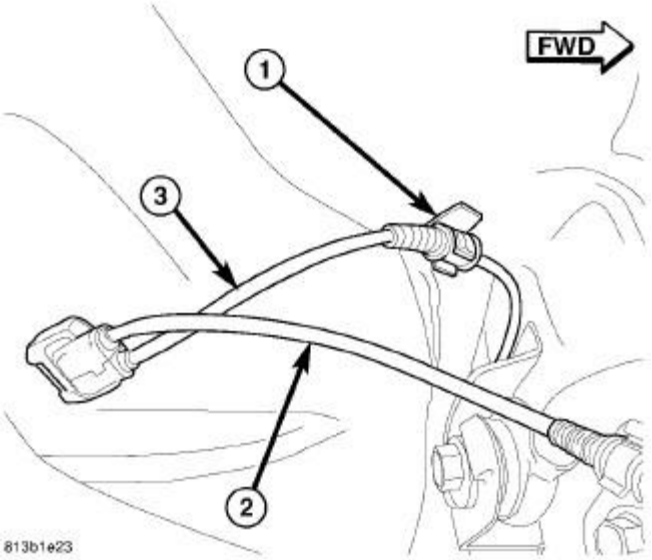


Fig. 139: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

19. Unclip left wheel speed sensor cable (3) from routing clip (1) near body connector.

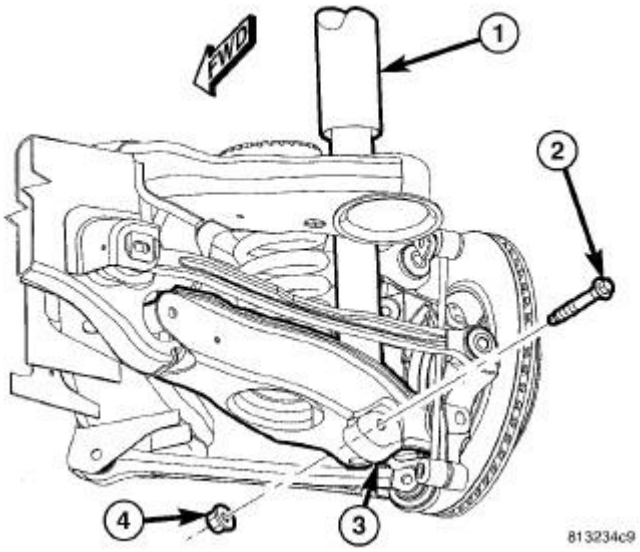


Fig. 140: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

20. On each side of vehicle, remove shock absorber (1) lower mounting bolt (2) and nut (4).

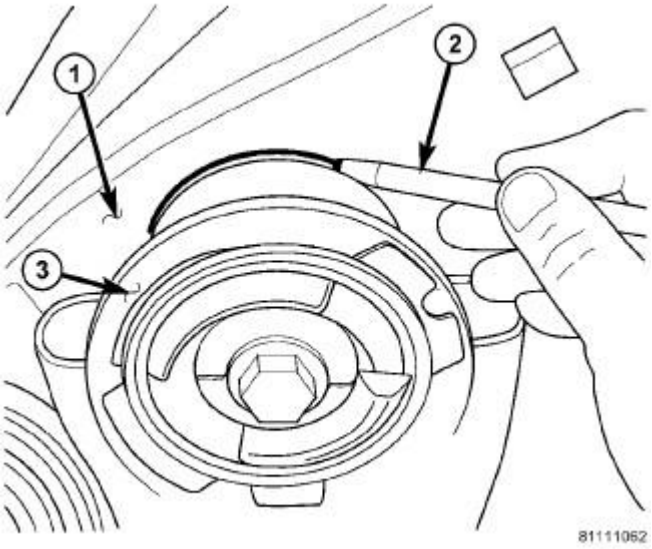


Fig. 141: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

21. Carefully mark location of rear crossmember on body at all four mount (bushing) locations using a marker or crayon. **Do not use a scratch awl to mark location.**
22. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.

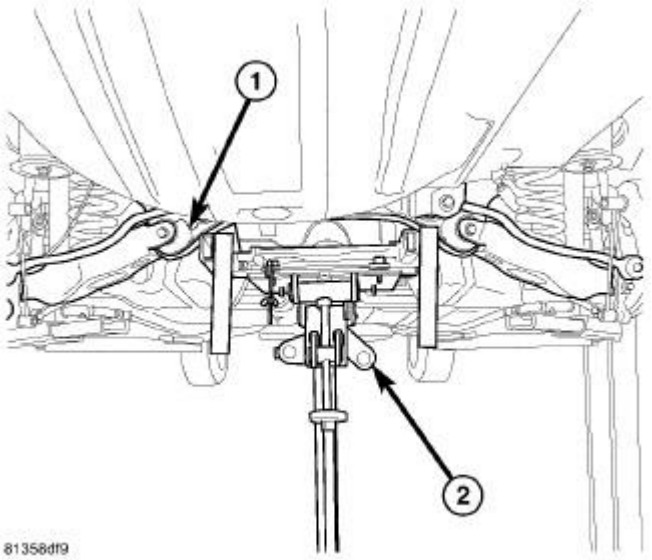


Fig. 142: Jack Positioned Beneath Crossmember

Courtesy of CHRYSLER GROUP, LLC

23. Position under-hoist utility jack or transmission jack (2) under center of rear crossmember (1). Raise jack head to contact crossmember and secure in place.

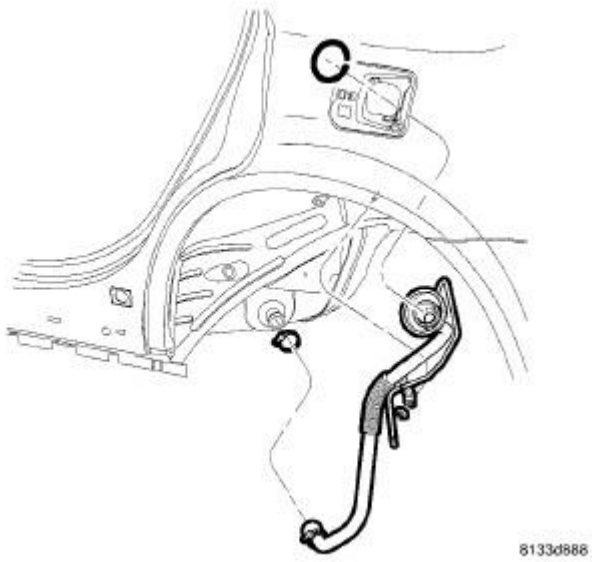


Fig. 143: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

24. Remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .

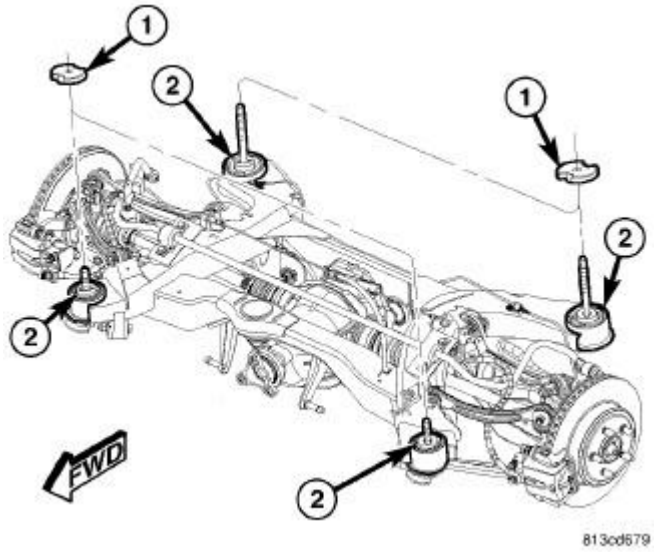


Fig. 144: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If equipped with AWD, when removing crossmember mounting bolts in following step, be sure to not to misplace spacers (1) between crossmember mounts (2) and body.**

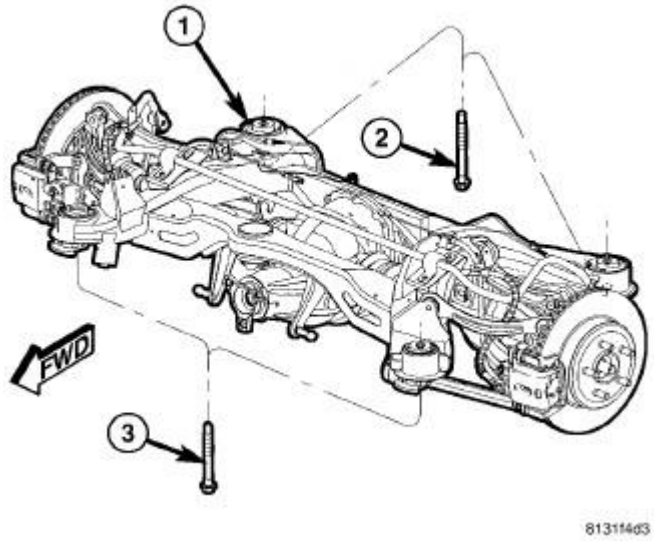


Fig. 145: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

25. Remove both front (3) and both rear (2) mounting bolts fastening crossmember (1) in place.
26. **Slowly** lower crossmember using jack until crossmember is at a comfortable working level.

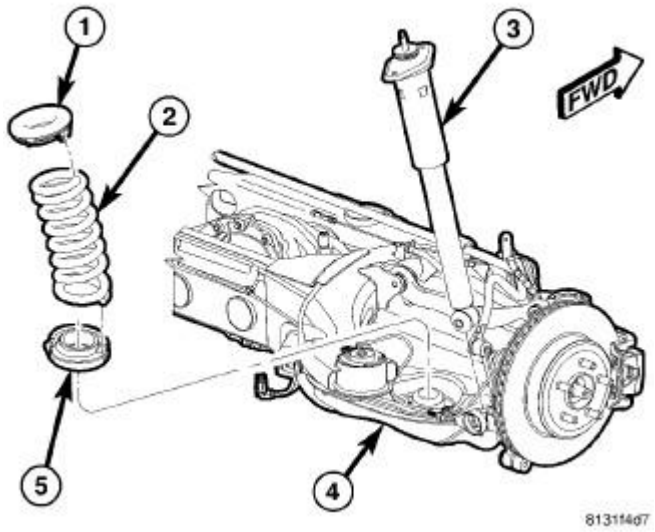


Fig. 146: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

27. Remove coil springs and isolators (1, 2 and 5) from spring links.

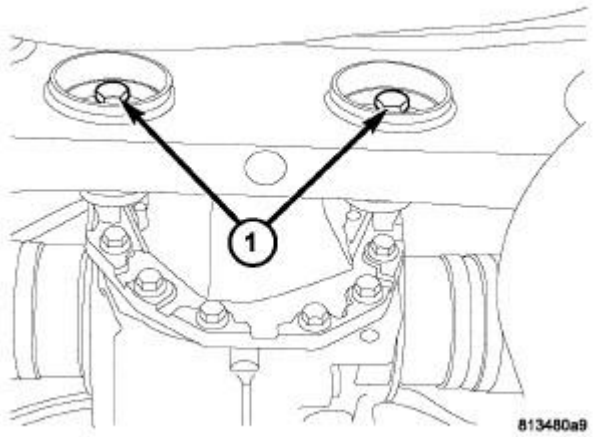


Fig. 147: Rear Axle-To-Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

28. Remove bolt (1) from bushing prior to removal.

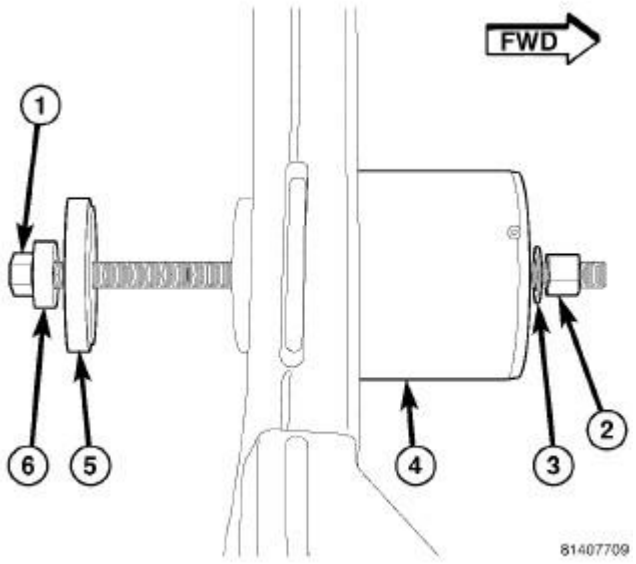


Fig. 148: Tools Assembled For Removal
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using Special Tool (special tool #9520, Remover/Installer, Bushing), lubricate Bolt (1) threads to provide ease of use and promote tool longevity.

NOTE: When installing Thrust Bearing (6), be sure to place hardened side toward Bolt head.

29. Assemble tools (See following list) over bushing as shown in illustration.
    - (1) Bolt
    - (2) Nut
    - (3) Washer
    - (4) Receiver (special tool #9520-4, Cup, Receiver)
    - (5) Remover (special tool #9520-3, Remover, Bushing)
    - (6) Thrust Bearing
30. While holding Nut (2) from rotating, **using hand tools** , tighten Bolt (1) until Remover (5) comes in contact with bushing and Receiver (4) sets squarely against crossmember.
31. Continue to tighten Bolt (1), pressing bushing out of crossmember.
32. Remove tools with bushing.

INSTALLATION

INSTALLATION

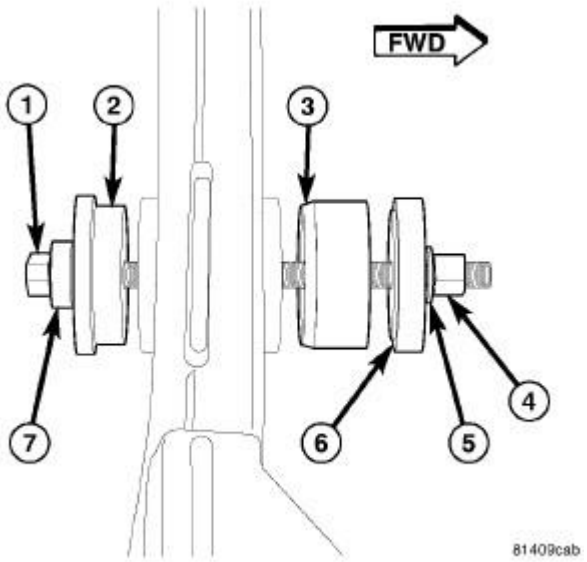


Fig. 149: Tools Assembled For Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is important that tapered end (3) of bushing be installed first into forward end of crossmember to ease installation.

NOTE: When installing Thrust Bearing (7), be sure to place hardened side toward Bolt head.

1. Insert tapered end of NEW bushing (3) into forward end of crossmember bushing bore.
2. Assemble tools (See following list) through crossmember and bushing as shown in illustration.
   - (1) Bolt
   - (2) Disc (special tool #9520-1, Installer Disc)
   - (3) Bushing
   - (4) Nut
   - (5) Washer
   - (6) Installer (special tool #9520-2, Installer, Bushing)
   - (7) Thrust Bearing
3. Insert Installer (6) into end of bushing and Disc (2) into opposite end of crossmember bushing bore.
4. While holding Nut (4) from rotating, tighten Bolt (1) **using hand tools** , pressing bushing into crossmember. Stop when Installer (6) bottoms against bushing bore.
5. Remove tools.

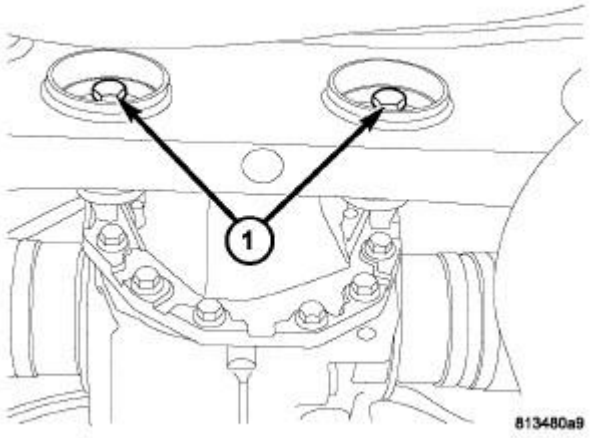


Fig. 150: Rear Axle-To-Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Differential mounting bolts (1) must be installed through bushings prior to crossmember installation in vehicle. Bolts cannot be inserted through bushings once crossmember is installed.

6. Insert differential mounting bolt (1) through mount bushing from rear (198 mm axle differential shown in figure. Other axles differ, but similar).

NOTE: Do not install coil springs on spring links at this time.

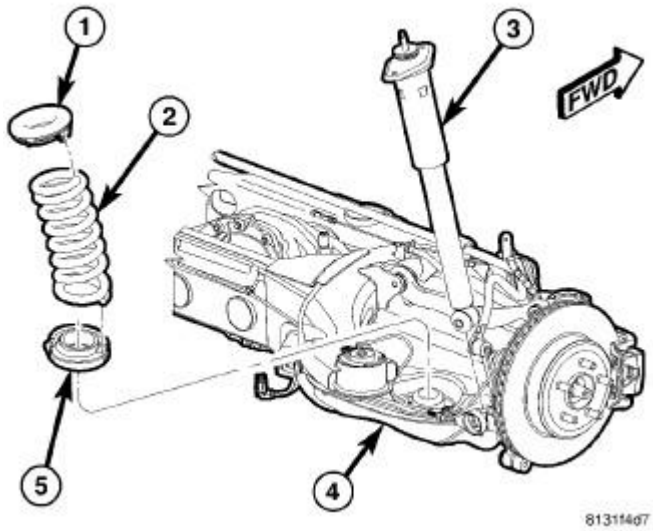


Fig. 151: Coil Spring And Shock Assy.

Courtesy of CHRYSLER GROUP, LLC

7. Raise crossmember to body mounting points. As crossmember is raised, align shocks (3) with pockets in spring links. **Do not install bolts at this time.**

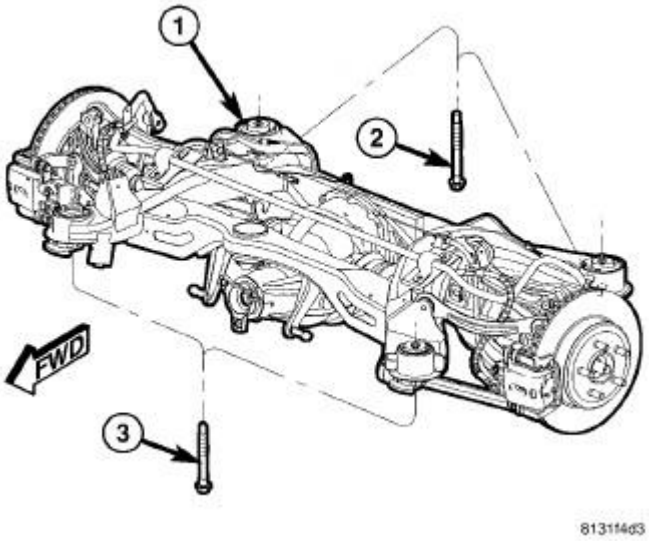


Fig. 152: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

8. Continue to raise crossmember (1) with jack until crossmember mounting bolts (2 and 3) can be installed. Install left side crossmember mounting bolts, but not the right side bolts. It is not necessary to tighten bolts at this point.

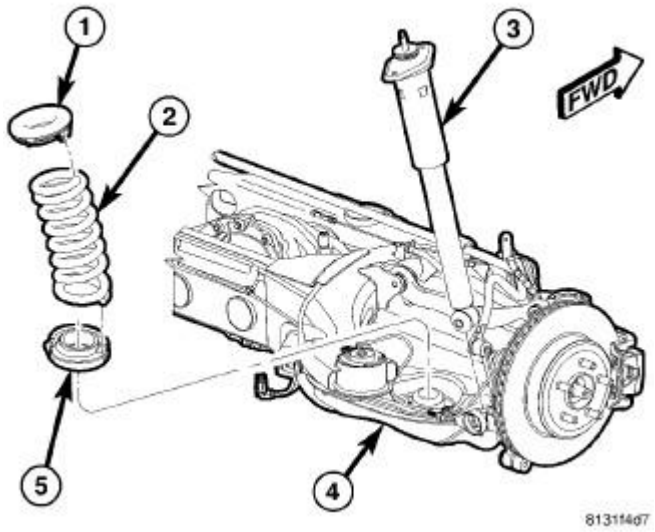


Fig. 153: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

9. **Slowly** lower jack allowing right side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

10. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

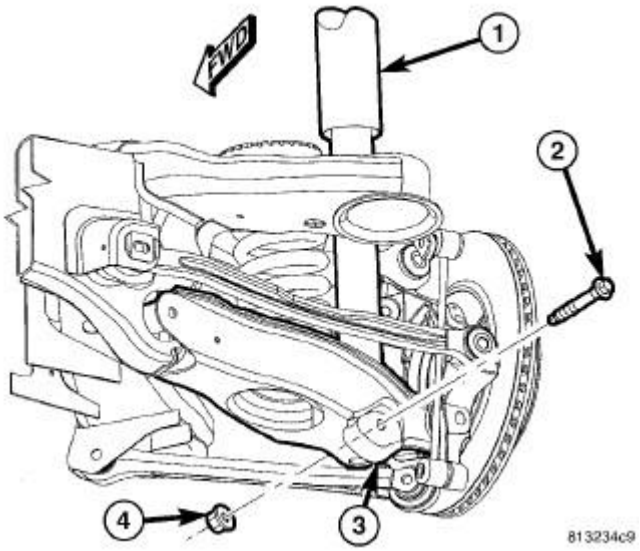


Fig. 154: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

11. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
12. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

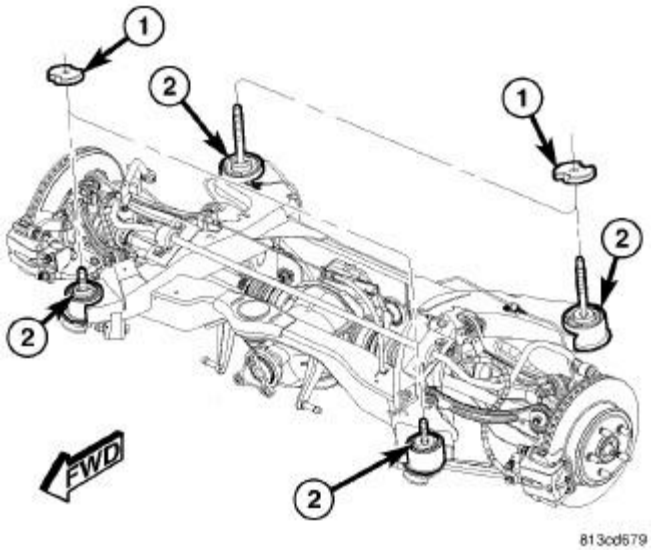


Fig. 155: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

13. If vehicle is equipped with AWD, insert spacers (1) on top of right crossmember mount bushings (2) before crossmember is raised into place.

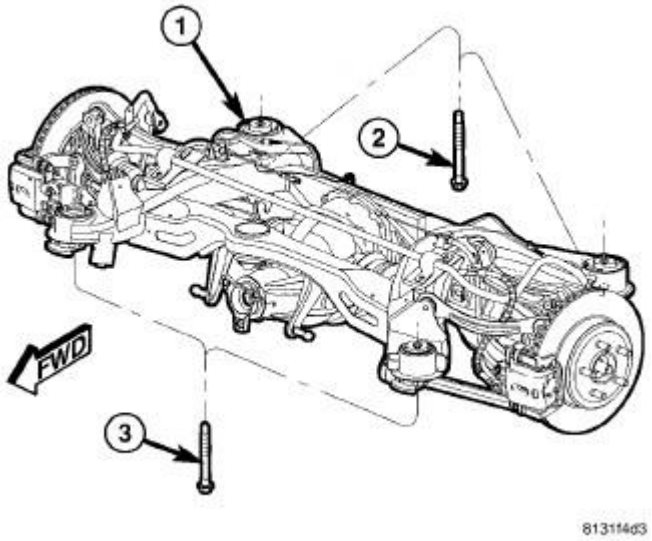


Fig. 156: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

14. Raise right side of crossmember (1) into mounted position. Install right side crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**
15. Remove both front and rear crossmember mounting bolts (2 and 3) on **left** side of vehicle.

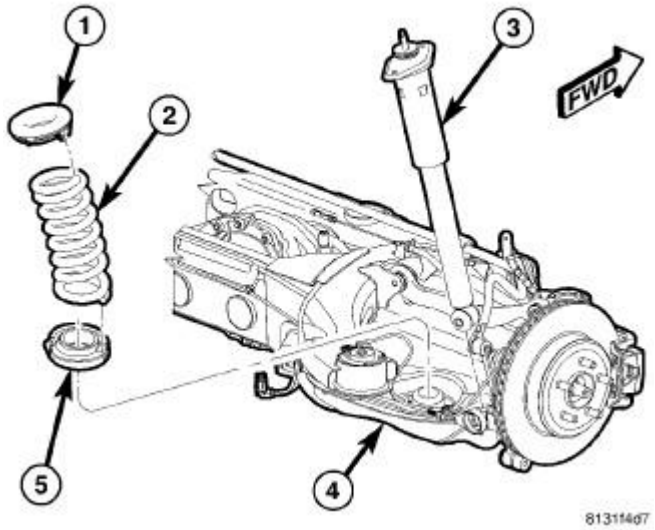


Fig. 157: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

16. **Slowly** lower jack allowing left side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

17. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

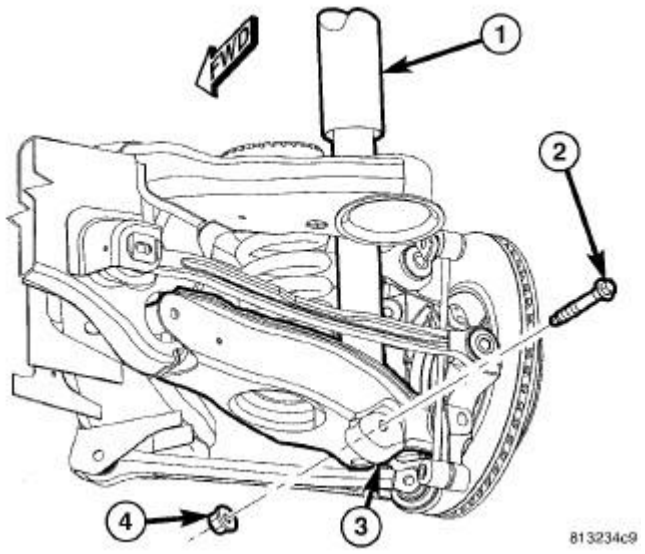


Fig. 158: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

18. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
19. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

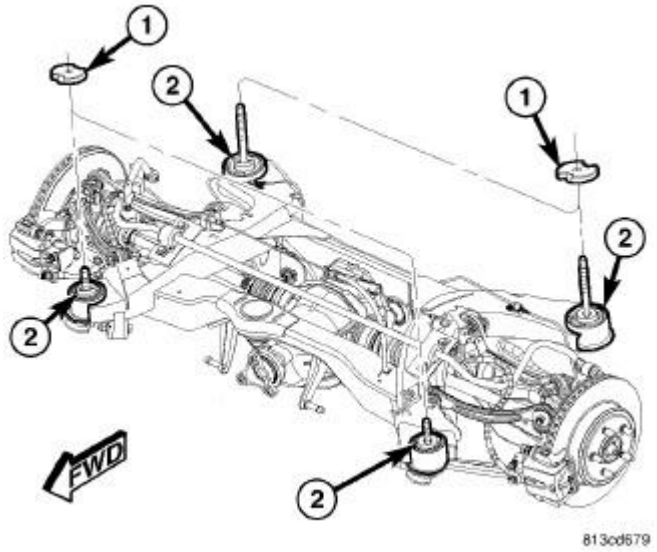


Fig. 159: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

20. If vehicle is equipped with AWD, insert spacers (1) on top of left crossmember mount bushings (2) before crossmember is raised into place.

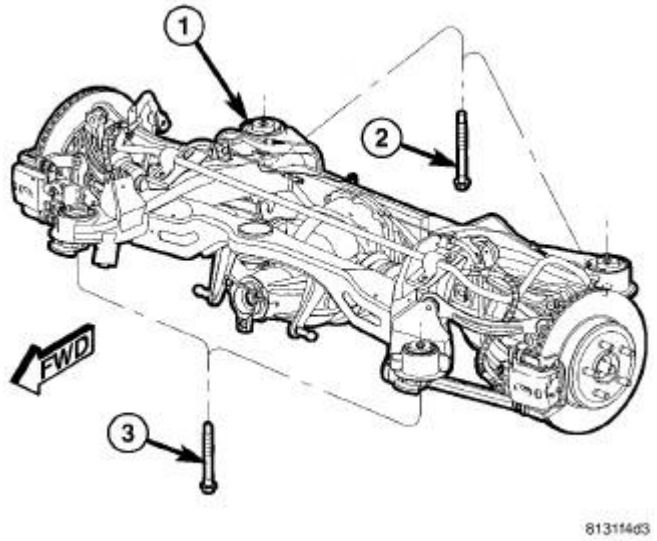


Fig. 160: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

21. Raise left side of crossmember (1) into mounted position. Install left side crossmember

mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

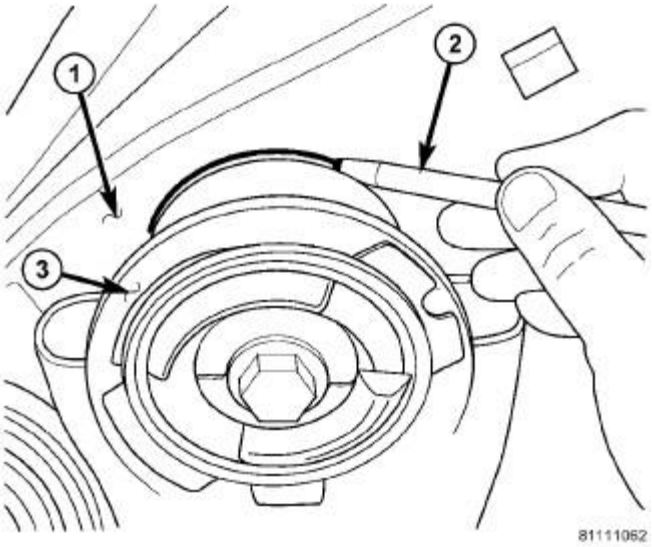


Fig. 161: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

22. Shift crossmember as necessary to line up mounts (3) with location marks drawn on body (1) before removal.

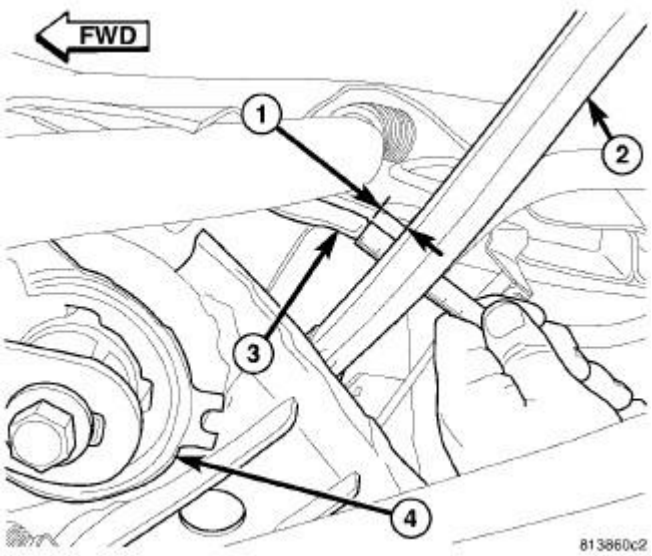


Fig. 162: Measuring Tension Link Clearance

Courtesy of CHRYSLER GROUP, LLC

23. Once mounts are lined up with location marks, on both sides of vehicle, measure distance (1) between the tension link (2) and weld flange (3) on body directly in front of it, just outboard of the front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm on either side of vehicle, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Remeasure opposite side to be sure it still maintains minimum 12 mm distance.

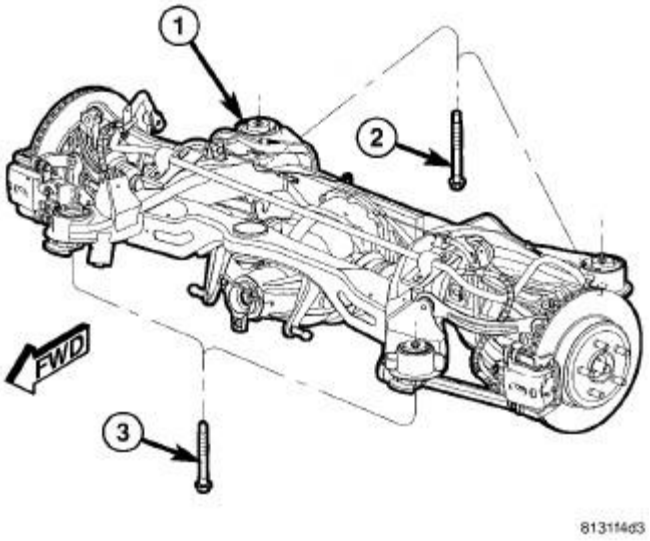


Fig. 163: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

24. Tighten all four crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

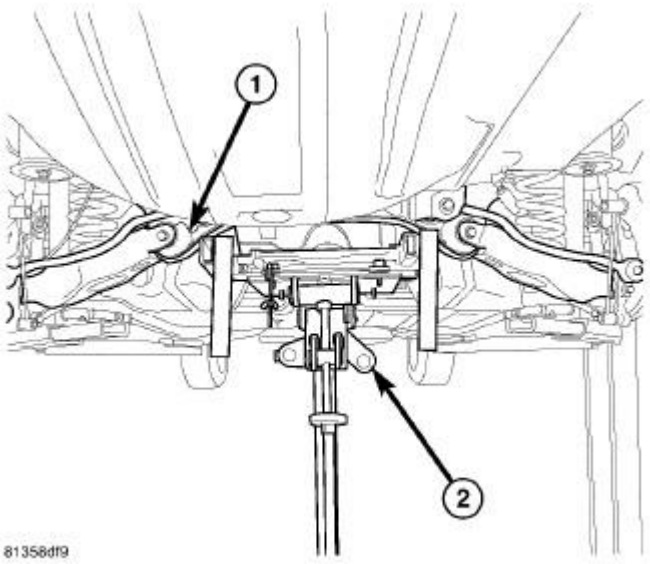


Fig. 164: Jack Positioned Beneath Crossmember
Courtesy of CHRYSLER GROUP, LLC

25. Remove jack (2) from under rear crossmember.

Fig. 165: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

26. Install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

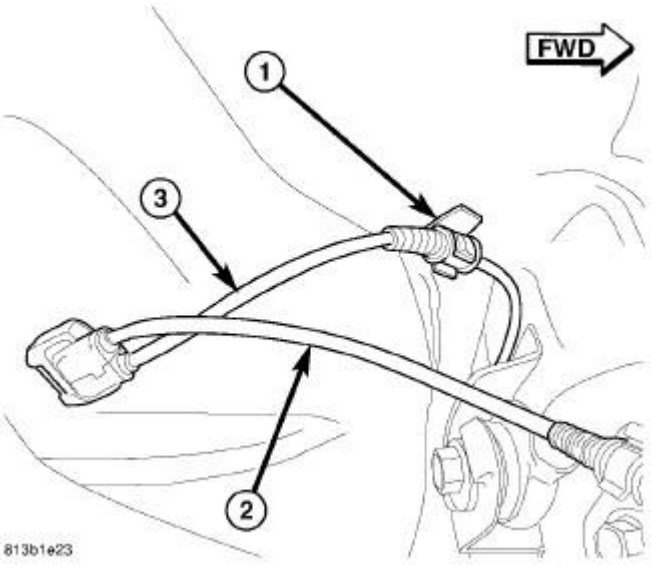


Fig. 166: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

27. Clip left rear wheel speed sensor cable (3) to routing clip (1) near body connector.

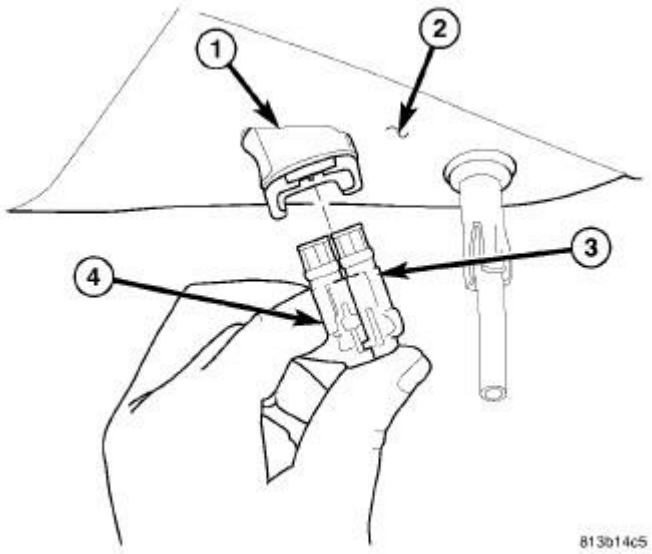


Fig. 167: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

28. Match left rear wheel speed sensor connector (4) to right sensor connector (3) to make one connector.
29. Insert speed sensor connectors (3 and 4) into body wiring harness connector (1) located in luggage compartment floor pan (2). When installing connector, make sure retaining clip on body connector is properly in place and sensor connector cannot be pulled out.

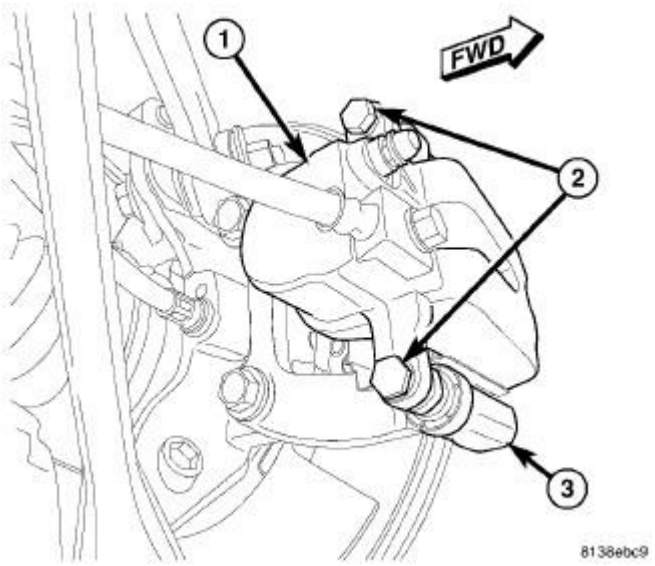


Fig. 168: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Extreme caution should be taken not to cross-thread caliper guide pin bolts (2) when they are installed.

30. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.
    2. Guide caliper and brake hose down through rear suspension, then slide caliper over brake pads and onto caliper adapter (3).
    3. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 31 N.m (23 ft. lbs.) torque.
    4. Make sure brake hose is properly routed and will not come in contact with suspension components.
31. If equipped with SRT8 disc brakes, at each rear disc brake, support spring link using a transmission jack or other appropriate jack as indicated in removal procedure. Refer to **ISOLATOR, REAR CROSSMEMBER, DIFFERENTIAL, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, FRONT MOUNT, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, REAR MOUNT, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, SPRING LINK, REMOVAL**.

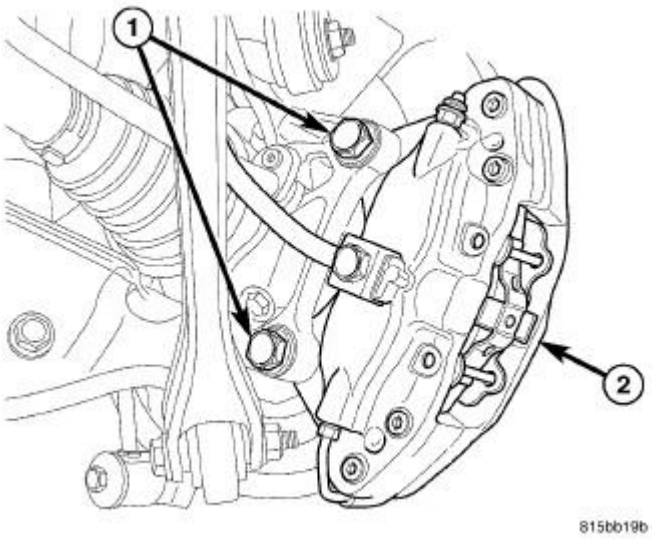


Fig. 169: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

32. If equipped with SRT8 disc brakes, on each rear disc brake, slide caliper with pads (2) over brake rotor and align with knuckle.
33. If equipped with SRT8 disc brakes, on each rear disc brake, install caliper mounting bolts (1). Tighten bolts to 130 N.m (96 ft. lbs.) torque.
34. If equipped with SRT8 disc brakes, on each rear disc brake, remove jack from under spring link.

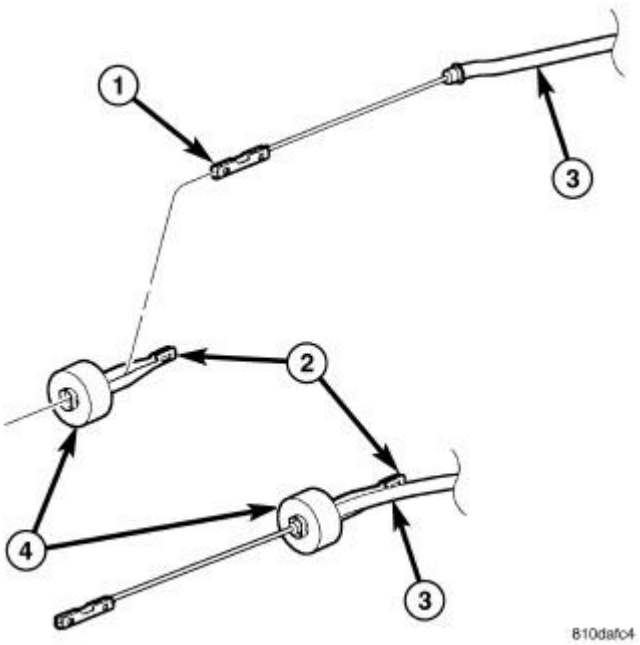


Fig. 170: Front Cable Installation Into Equalizer

Courtesy of CHRYSLER GROUP, LLC

35. Route parking brake cable above rear crossmember, then slide cable (1, 3) through equalizer (2) above rear axle differential (once installed).

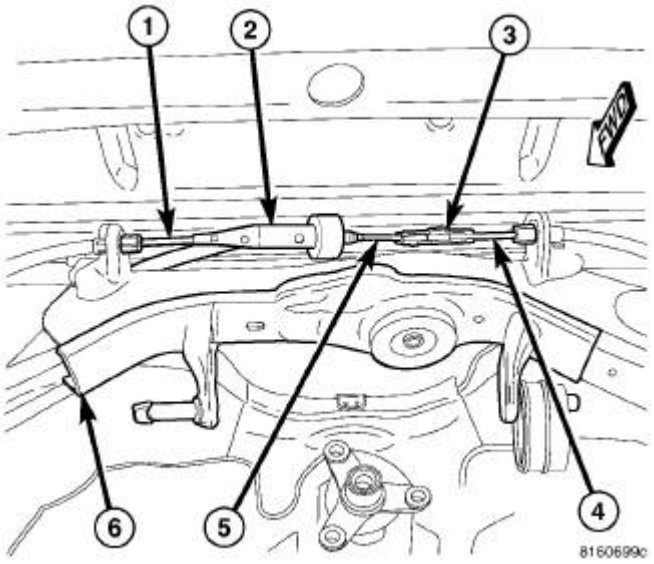


Fig. 171: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

36. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4).

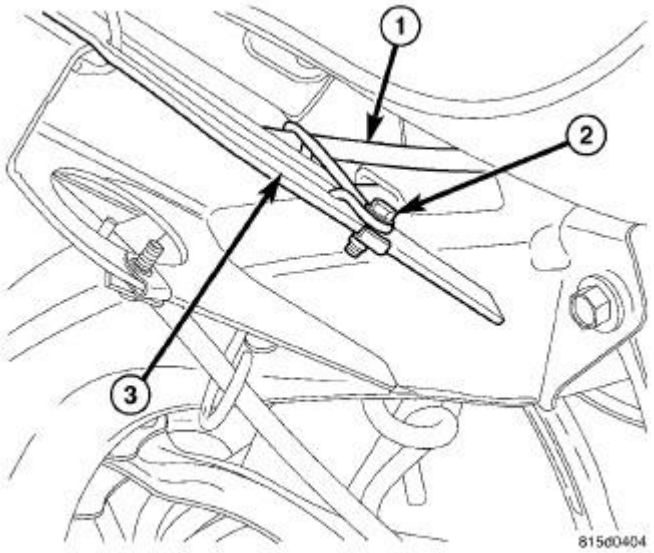


Fig. 172: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

37. Insert front parking brake cable routing bracket locating pin into front flange of crossmember (3), then install screw (2) fastening cable (1) routing bracket to rear crossmember.

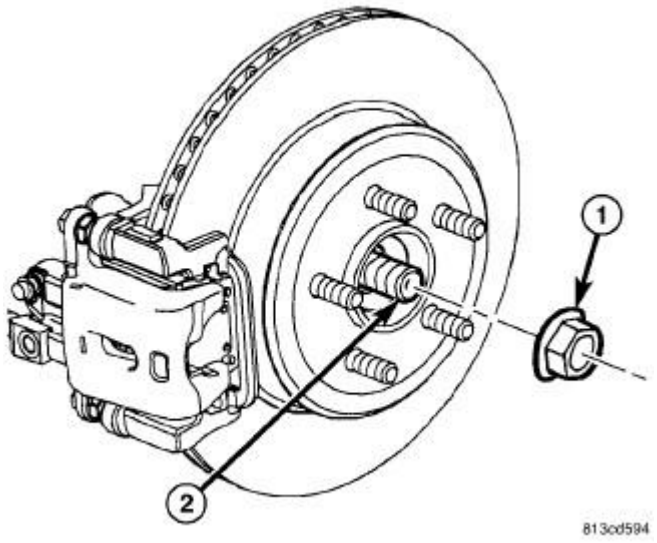


Fig. 173: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

38. On each side of vehicle, slide an axle half shaft (2) through hub and bearing and install hub nut (1). **Do not tighten hub nuts at this time.**
39. Install rear axle differential. Refer to **INSTALLATION** .
40. While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.).

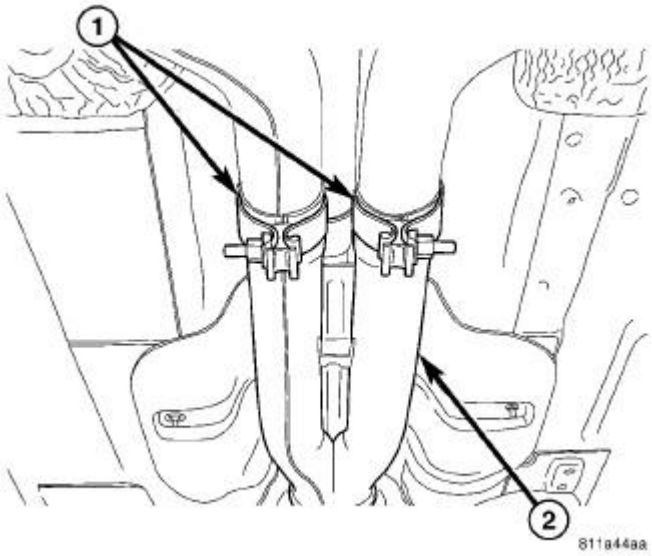


Fig. 174: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

41. Install rear exhaust system (2) (dual-outlet exhaust shown in figure).

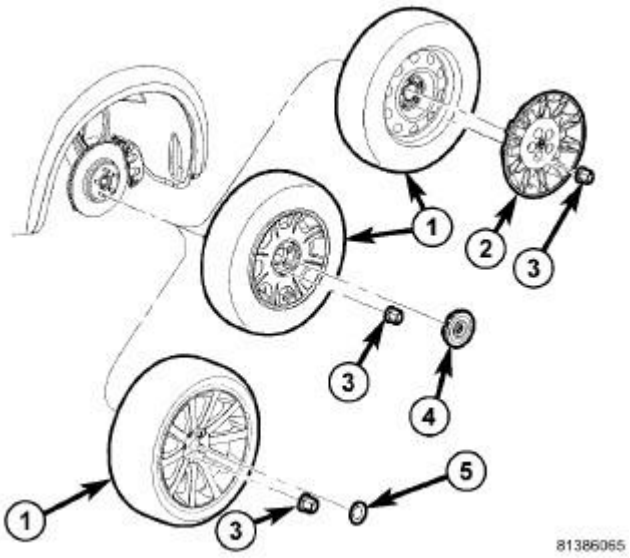


Fig. 175: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

42. Install tire and wheel assemblies (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.). Refer to **INSTALLATION** .
43. Lower vehicle.

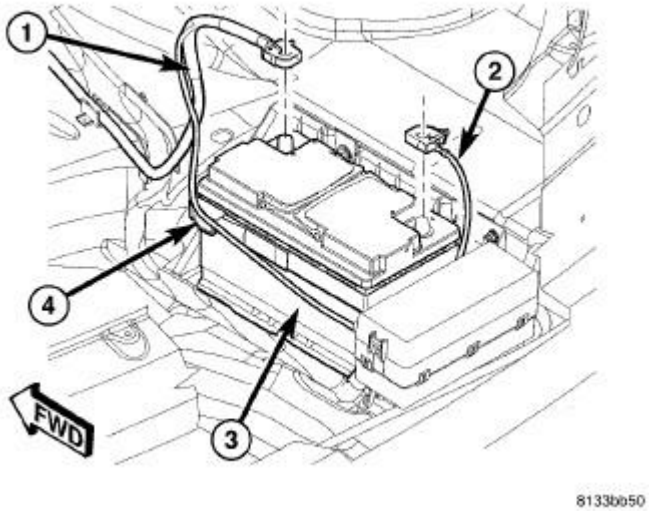


Fig. 176: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

44. Connect battery negative cable (2) to battery post. It is important that this is performed properly. Refer to **STANDARD PROCEDURE** .
45. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
46. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolts.

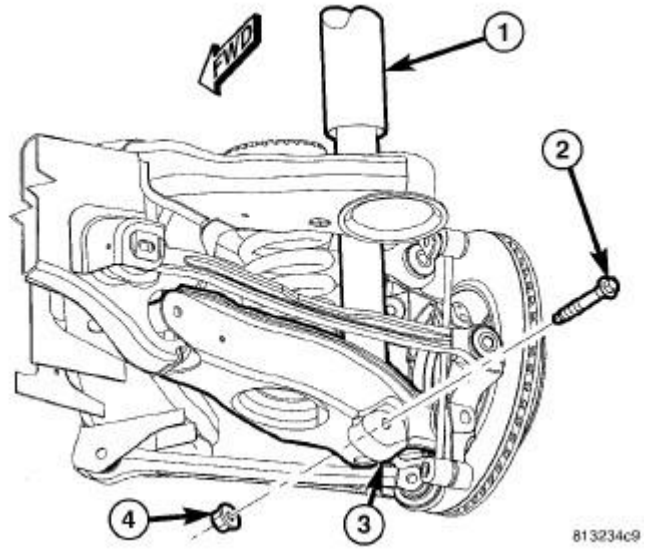


Fig. 177: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

47. Tighten shock absorber lower mounting bolt nuts (4) to 72 N.m (53 ft. lbs.).
48. Perform wheel alignment, paying special attention to thrust angle. If rear crossmember needs to be shifted to align thrust angle, try to avoid compromising tension link clearance (). Refer to 23 or **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

ISOLATOR, REAR CROSSMEMBER, FRONT MOUNT

REMOVAL

REMOVAL

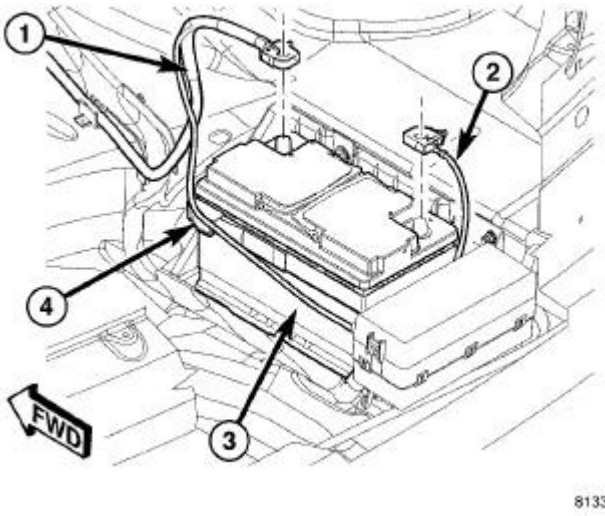


Fig. 178: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

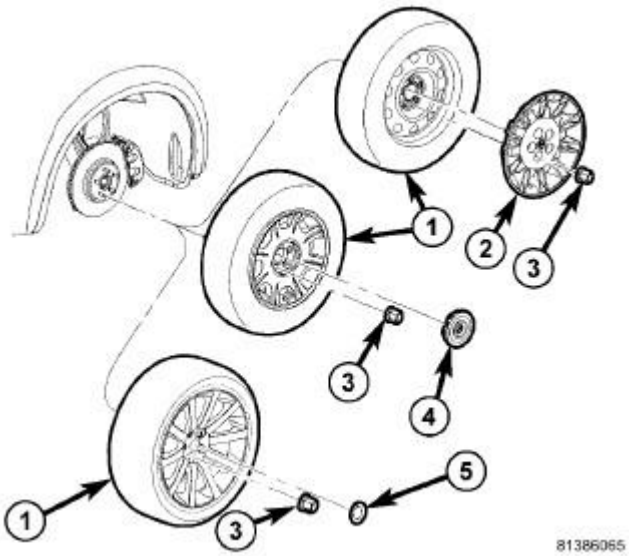


Fig. 179: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

3. On each side of vehicle rear, remove wheel mounting nuts (3), then tire and wheel assembly (1).

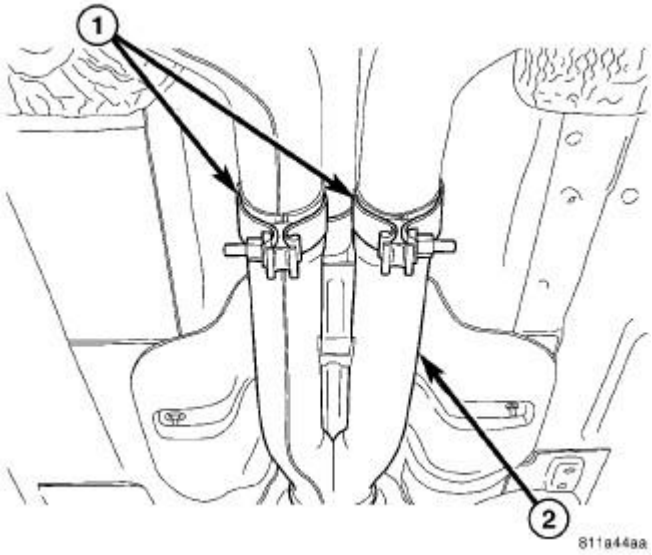


Fig. 180: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

4. Remove rear exhaust system (2) (dual-outlet exhaust shown in figure).

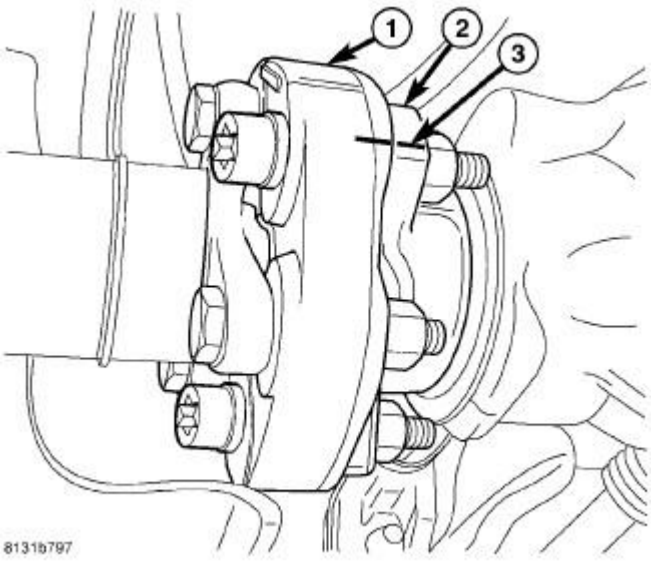


Fig. 181: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

5. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).

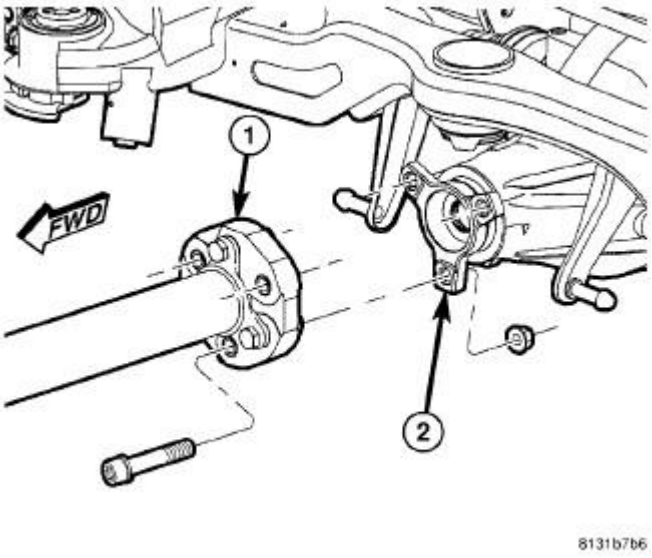


Fig. 182: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove three (four if equipped with 215 MM axle) propeller shaft coupler-to-axle flange bolts and nuts.

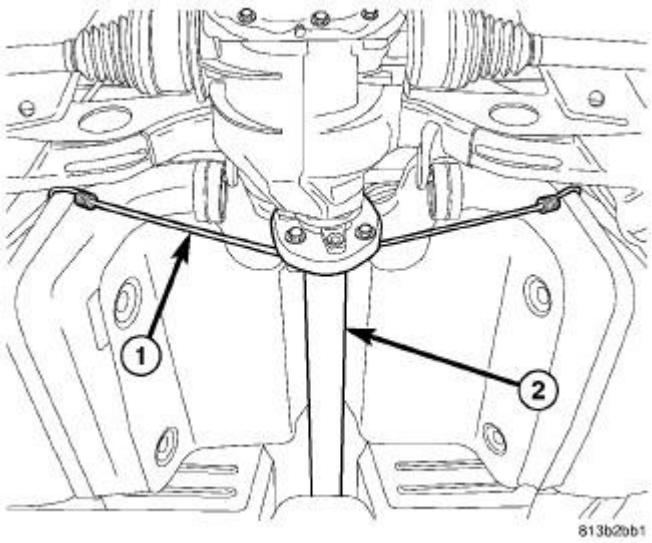


Fig. 183: Prop Shaft Support By Bungee Cord
Courtesy of CHRYSLER GROUP, LLC

7. Support propeller shaft (2) using a bungee cord (1). Attach ends of cord to fuel tank straps as shown in illustration.

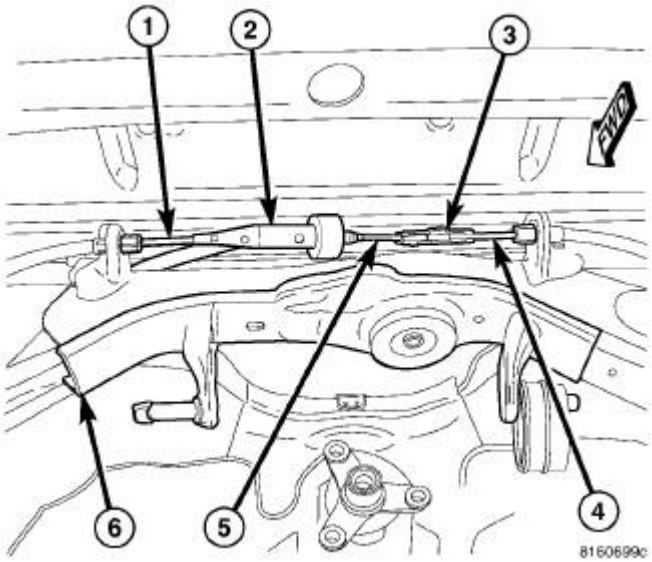


Fig. 184: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

8. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable (4)

above axle differential.

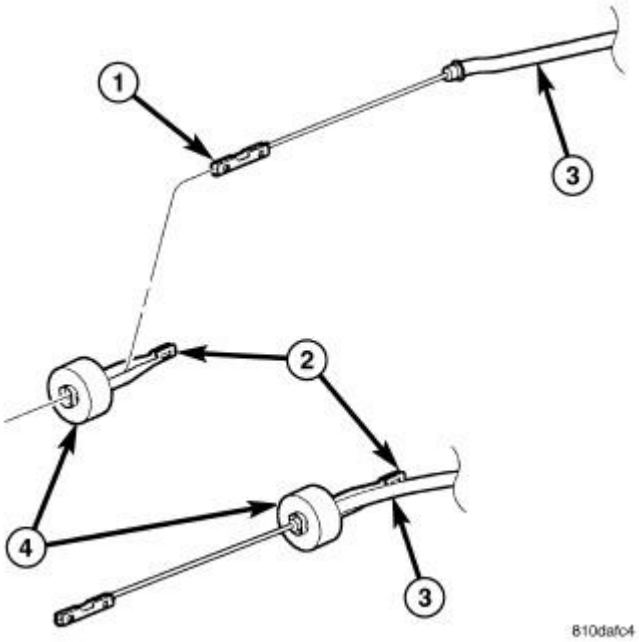


Fig. 185: Front Cable Installation Into Equalizer
Courtesy of CHRYSLER GROUP, LLC

9. Remove front parking brake cable (3) from equalizer (2).

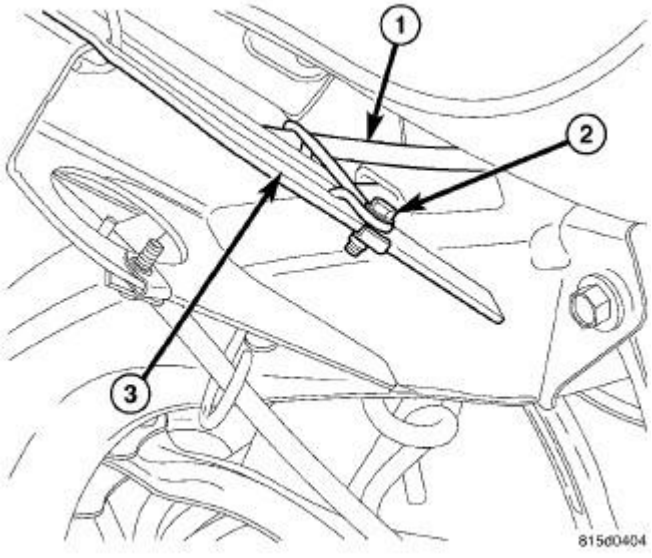


Fig. 186: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

10. Remove screw (2) fastening front parking brake cable (1) routing bracket to rear crossmember

front flange (3).

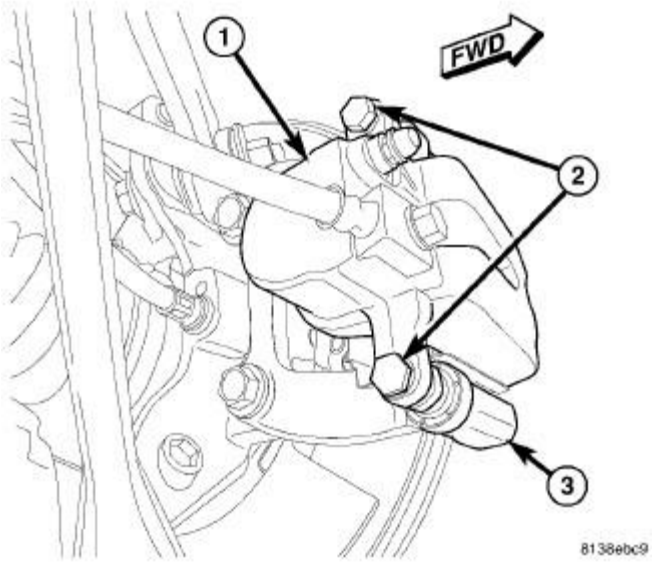


Fig. 187: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

11. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. While holding guide pins from turning, remove disc brake caliper guide pin bolts (2).
    2. Remove brake caliper (1) from brake adapter (3) and pads.
    3. Guide brake caliper up through suspension, following brake hose path. Support caliper above rear suspension using with bungee cord or wire to keep caliper from overextending brake hose when crossmember is lowered.

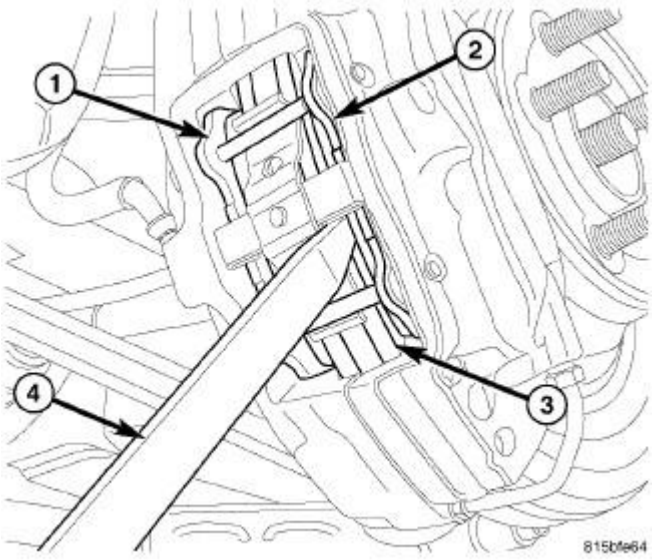


Fig. 188: Pushing Back Pistons In Bore

Courtesy of CHRYSLER GROUP, LLC

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

12. If equipped with SRT8 disc brakes, on each rear disc brake, place trim stick (4) between brake pad (2) and outer edge of rotor (3).
13. If equipped with SRT8 disc brakes, on each rear disc brake, using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

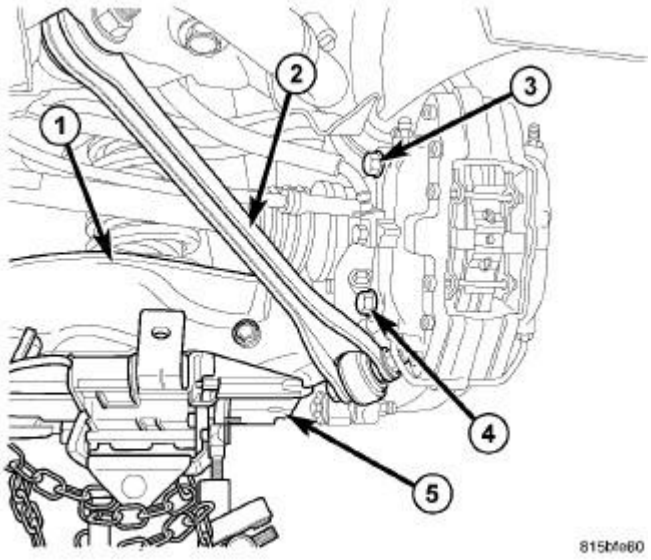


Fig. 189: Accessing Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

14. If equipped with SRT8 disc brakes, on each rear disc brake, support spring link (1) using a transmission jack (5) or other appropriate jack. Raise spring link just enough to access brake caliper lower mounting bolt (4) from above compression link (2).

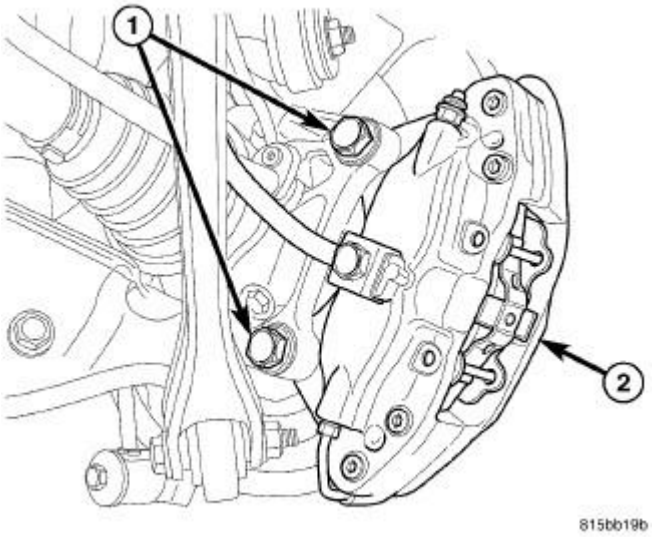


Fig. 190: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

15. If equipped with SRT8 disc brakes, on each rear disc brake, remove the lower and upper caliper mounting bolts (1).
16. If equipped with SRT8 disc brakes, on each rear disc brake, remove brake caliper (2) with pads from knuckle and brake rotor. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.
17. If equipped with SRT8 disc brakes, remove jack from under spring link.

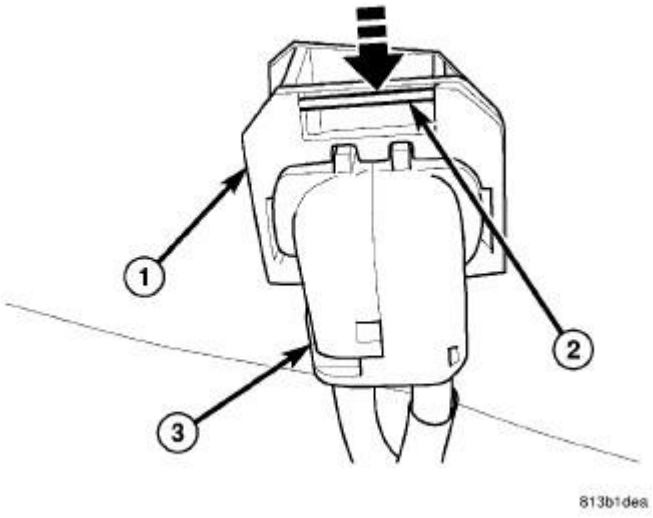


Fig. 191: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To remove wheel speed sensor connector from body wiring harness connector, move retaining clip (2) and pull sensor connector outward.**

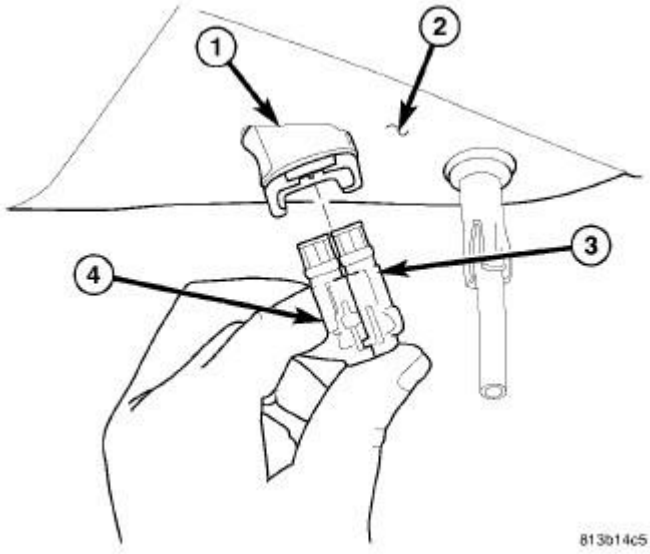


Fig. 192: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

18. Remove wheel speed sensor connectors (3 and 4) from body wiring harness connector (1) located in luggage compartment floor pan (2).

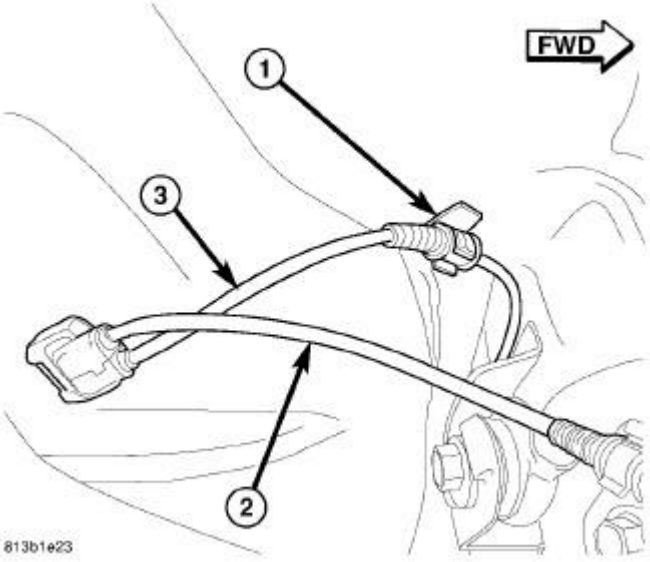


Fig. 193: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

19. Unclip left wheel speed sensor cable (3) from routing clip (1) near body connector.

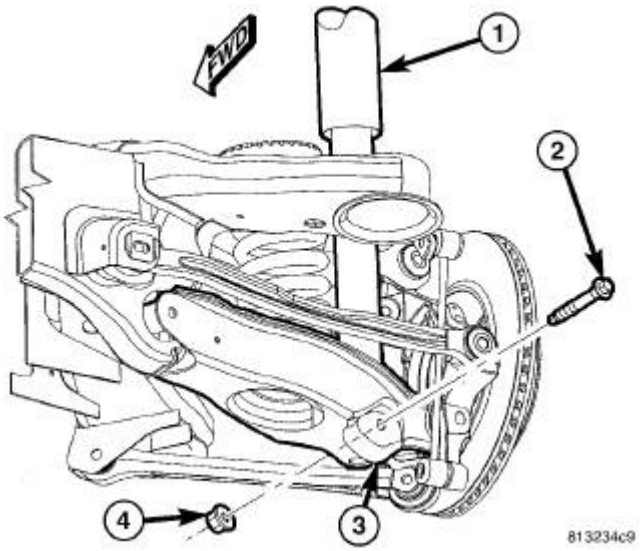


Fig. 194: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

20. On each side of vehicle, remove shock absorber (1) lower mounting bolt (2) and nut (4).

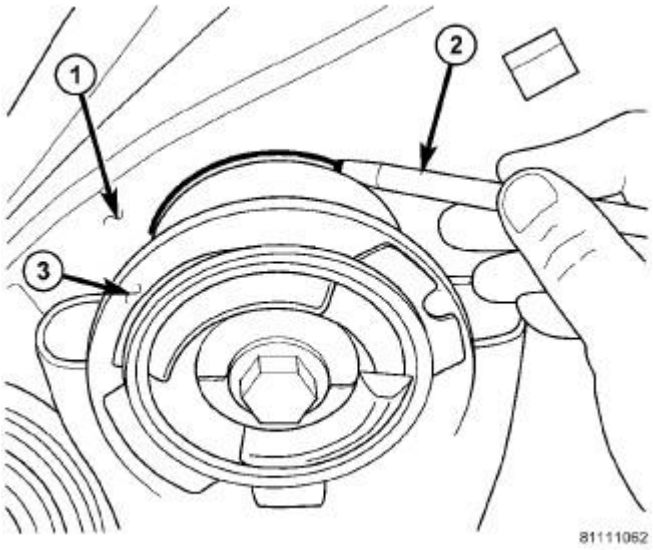


Fig. 195: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

21. Carefully mark location of rear crossmember on body at all four mount (bushing) locations using

a marker or crayon. **Do not use a scratch awl to mark location.**

22. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.

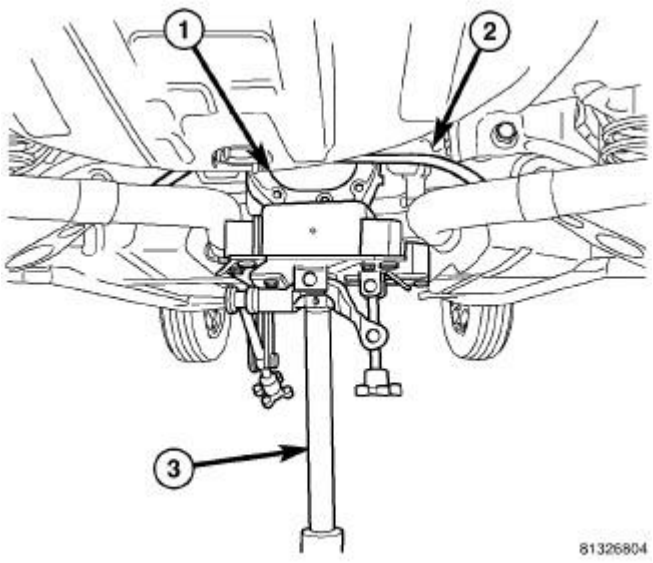


Fig. 196: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

23. Position under-hoist utility jack or transmission jack (3) under center of rear axle differential (1). Raise jack head to contact differential and secure in place. **When securing crossmember to jack, be sure not to secure stabilizer bar.**

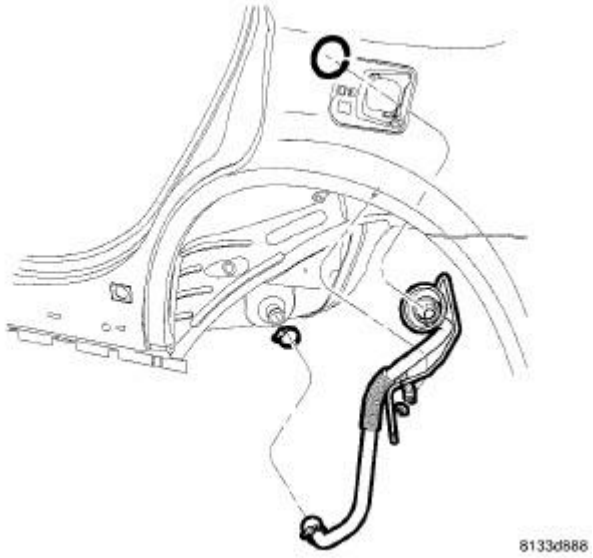


Fig. 197: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

24. Remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .

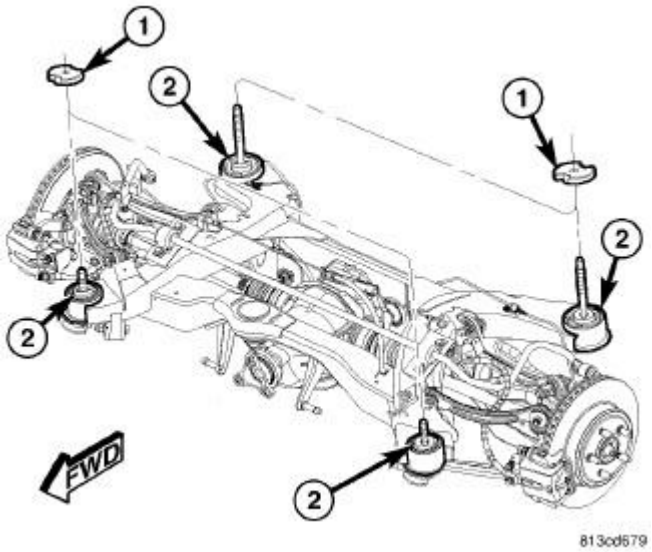


Fig. 198: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

NOTE: If equipped with AWD, when removing crossmember mounting bolts in following step, be sure to not to misplace spacers (1) between crossmember mounts (2) and body.

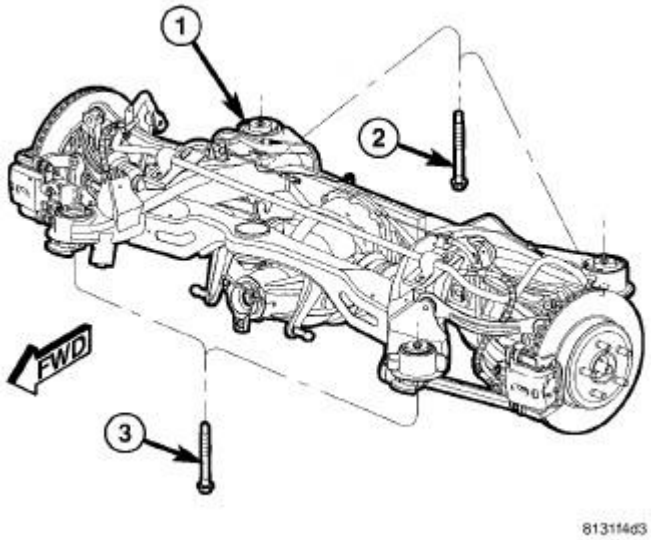


Fig. 199: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

25. Remove both front (3) and both rear (2) mounting bolts fastening crossmember (1) in place.
26. **Slowly** lower crossmember using jack. **Do not lower jack at a fast rate.** Lower just enough to allow propeller shaft removal from rear axle differential. **Do not lower jack any further than necessary.** Slide propeller shaft out of rear axle differential and allow bungee cord previously installed to support.
27. Lower crossmember until crossmember is at a comfortable working level to access bushings. Support rear suspension assembly using jack stands to help stabilize assembly during bushing service.

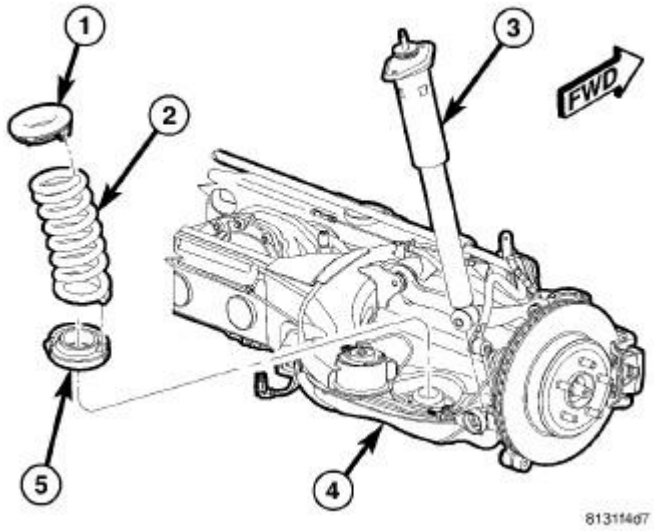


Fig. 200: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

28. Remove coil springs (2) with isolators (1 and 5) from spring links (4).

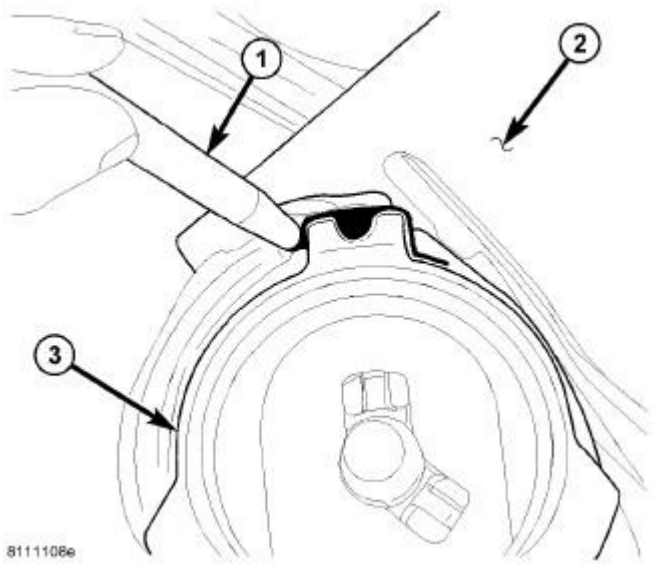


Fig. 201: Marking Location Of Front Bushing
Courtesy of CHRYSLER GROUP, LLC

1 - MARKER OR CRAYON
2 - CROSSMEMBER
3 - BUSHING CAN FLANGE

29. As an installation reference, carefully mark location of bushing requiring removal on crossmember (around bushing can flange) using a marker or crayon. **Do not use a scratch awl to mark location.**

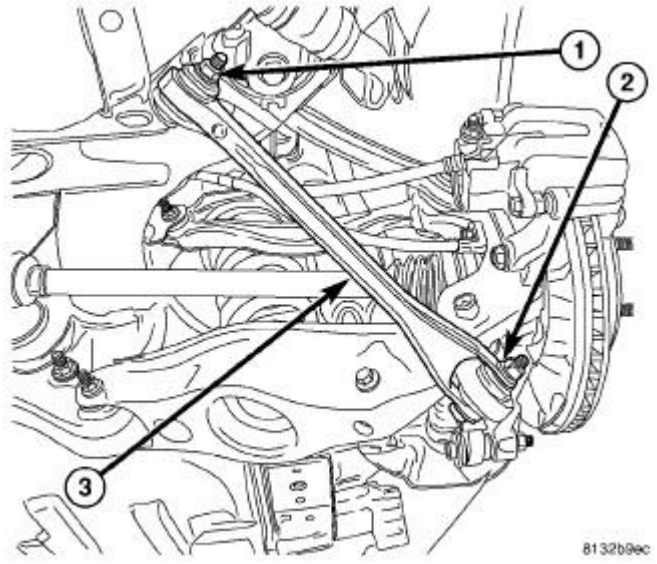


Fig. 202: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

30. Remove nut and bolt (1) fastening compression link (3) to crossmember.

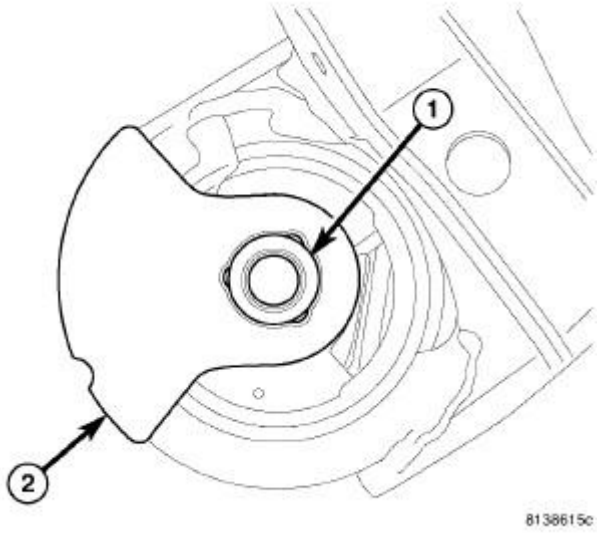


Fig. 203: Front Bushing Ear
Courtesy of CHRYSLER GROUP, LLC

31. Remove travel limiter (2) from bushing inner metal sleeve (1). To do so, use an appropriate grinding tool to remove inner metal sleeve material until limiter can be safely removed.

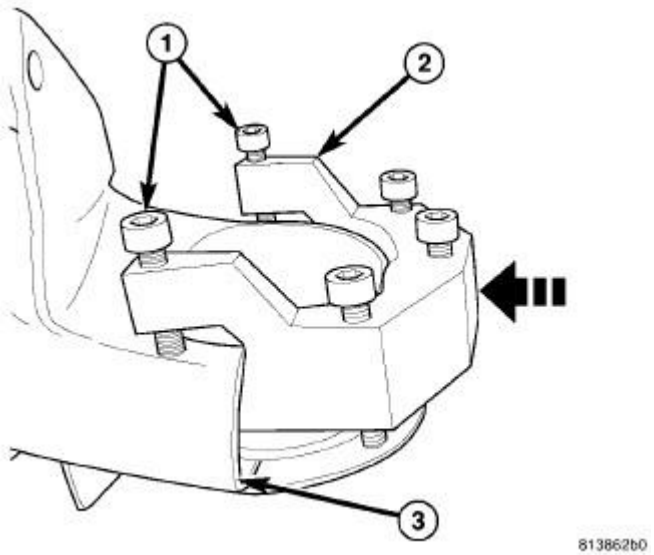


Fig. 204: Installing Support 9031-9
Courtesy of CHRYSLER GROUP, LLC

32. Slide Support (2), Special Tool (special tool #9031-9, Clamp), into end of crossmember (3) surrounding bushing bore as shown in illustration.

33. Snug set-screws (1) securing Support (2) to crossmember.

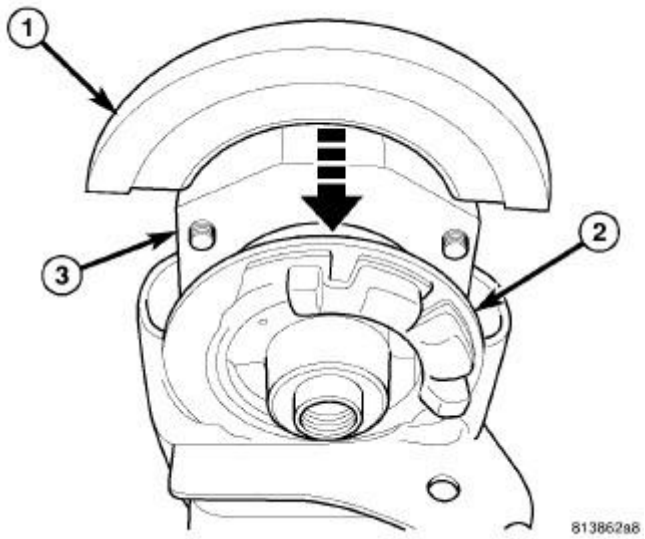


Fig. 205: Inserting Brace, Support & Bushing Bore Flange
Courtesy of CHRYSLER GROUP, LLC

34. Insert Brace (1), Special Tool (special tool #9031-10, Brace), between Support (special tool #9031-9, Clamp) (3) and bushing bore flange (2) matching step in Brace to bore flange.

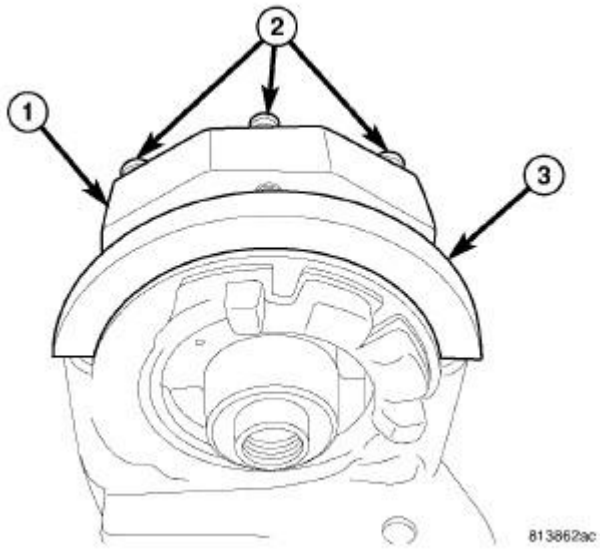


Fig. 206: Set-Screws & Brace
Courtesy of CHRYSLER GROUP, LLC

35. Snug set-screws (2) against Brace (special tool #9031-10, Brace). **Do not overtighten set-screws as they will distort and bend bushing bore flange.**

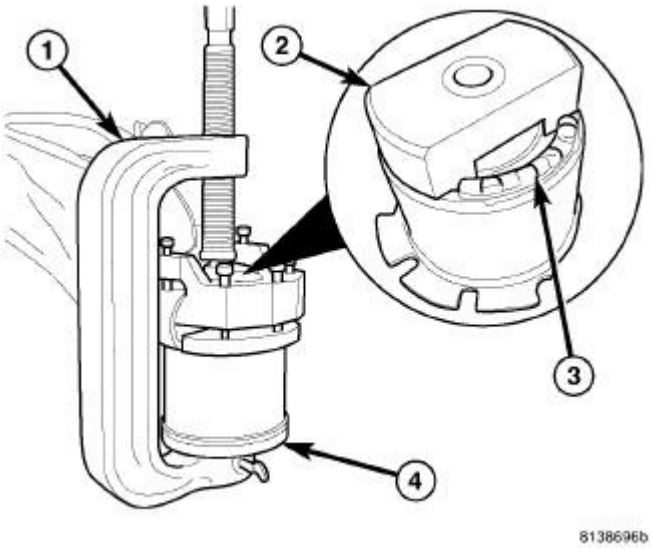


Fig. 207: Tools Positioned To Remove Front Bushing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using Press (1), Special Tool (special tool #C-4212F, Press, Ball Joint) Ball Joint Press Installer/Removal, lubricate screw-drive threads to provide ease of use and promote tool longevity.

36. Assemble tools (See following list) over bushing as shown in illustration. Ensure Remover lies between ridges (3) on bushing to properly contact bushing can.
    - (1) Press (special tool #C-4212F, Press, Ball Joint)
    - (2) Remover (special tool #9031-5A, Remover, Bushing)
    - (4) Receiver (special tool #9031-8A, Receiver, Bushing)
37. Tighten Press (1) screw-drive, pressing bushing out of crossmember.
38. Remove all tools.

INSTALLATION

INSTALLATION

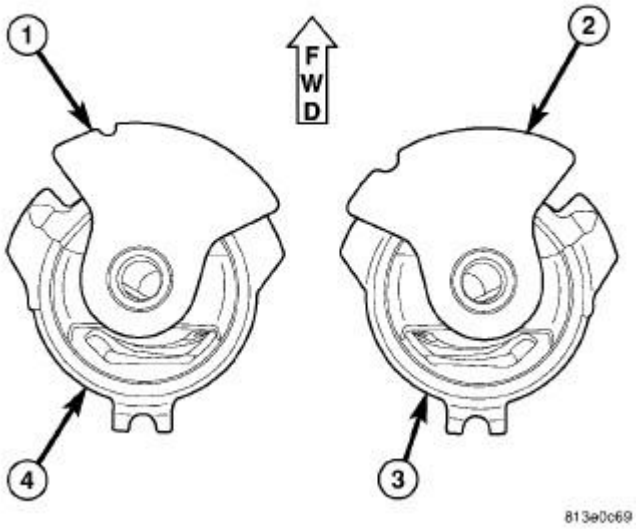


Fig. 208: Front Bushings - Left & Right
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Prior to bushing installation, inspect the bushing to make sure it is the correct side bushing for the job. Left side bushings have the travel limiter (1) tipped to the right in relationship to the bushing (4) can flange as shown in illustration. Right side bushings have the travel limiter (2) tipped to the left in relationship to the bushing (3) can flange as shown in illustration. Once installed, the travel limiters with face slightly outward from straight-ahead position.

CAUTION: It is very important that bushing be installed in same position as original to maintain vehicle ride quality and bushing longevity. That is why bushing, once installed, needs to closely match reference marks applied upon removal of original bushing.

1. Position bushing on crossmember bushing bore aligning bushing can flange with reference marks applied during removal.

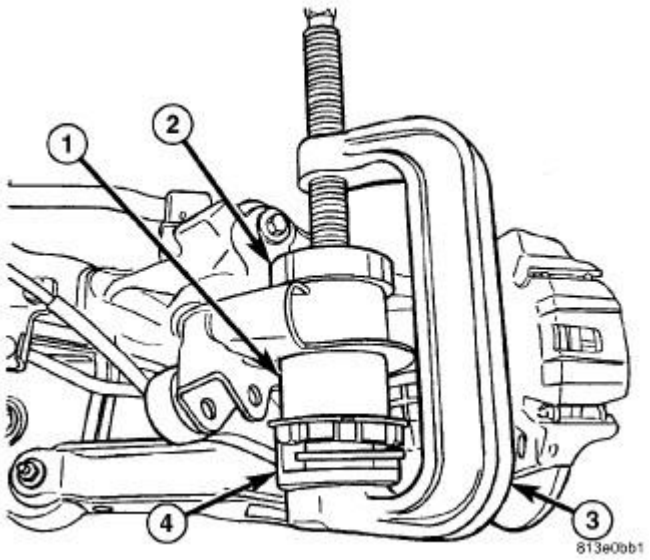


Fig. 209: Installing Front Bushing
Courtesy of CHRYSLER GROUP, LLC

2. Assemble tools (See following list) over bushing and crossmember as shown in illustration.
    - (2) Receiver (special tool #9031-6, Receiver)
    - (3) Press (special tool #C-4212F, Press, Ball Joint)
    - (4) Installer (special tool #9031-7A, Installer, Bushing)

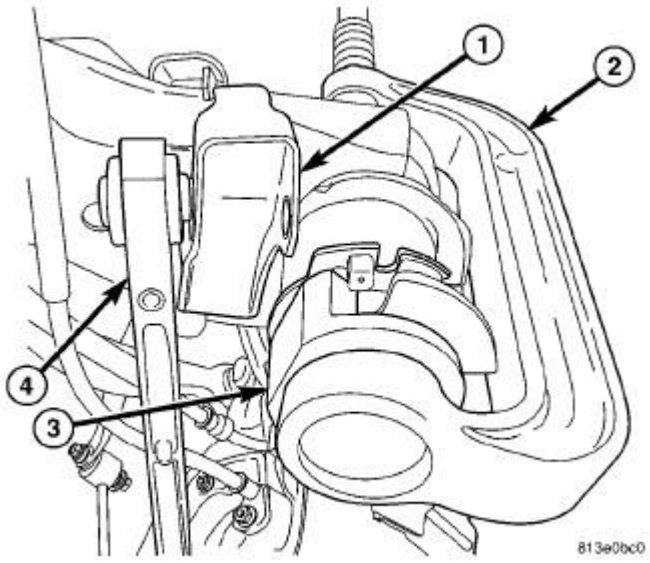


Fig. 210: Installer Positioned On Bushing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Ensure Installer (3), Special Tool (special tool #9031-7A, Installer, Bushing), is positioned that it will clear compression link bracket (1) while

bushing is being installed.

3. Tighten Press (2) screw-drive, pressing bushing into crossmember. Install bushing until bushing can flange contacts surface of crossmember.
4. Remove tools.
5. Verify bushing closely lines up with reference marks applied during removal.

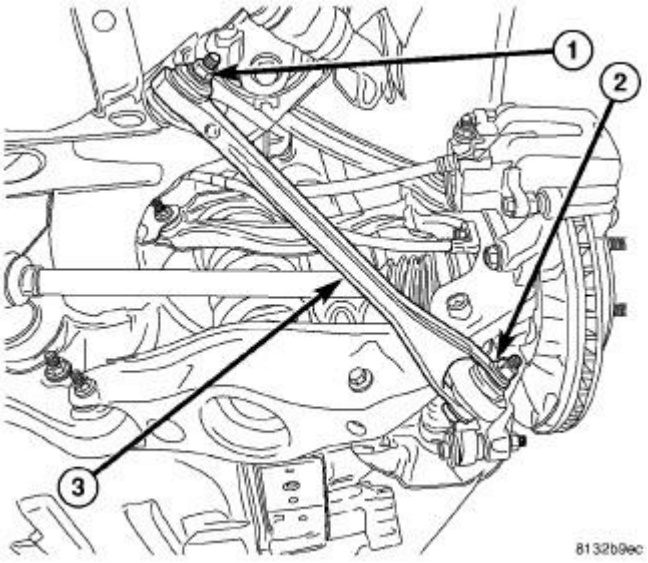


Fig. 211: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install bolt and nut as shown in illustration (1) fastening compression link (3) to crossmember. **Do not tighten bolt at this time.**

NOTE: Do not reinstall coil springs on spring links at this time. Install as directed in later steps.

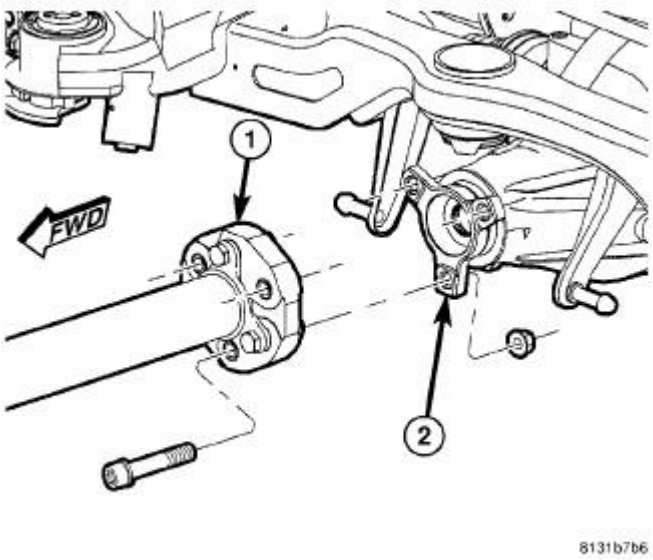


Fig. 212: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

7. Raise crossmember to body mounting points. As crossmember is raised, slide propeller shaft (1) onto rear axle differential flange (2) and align shock absorbers with pockets in spring links.

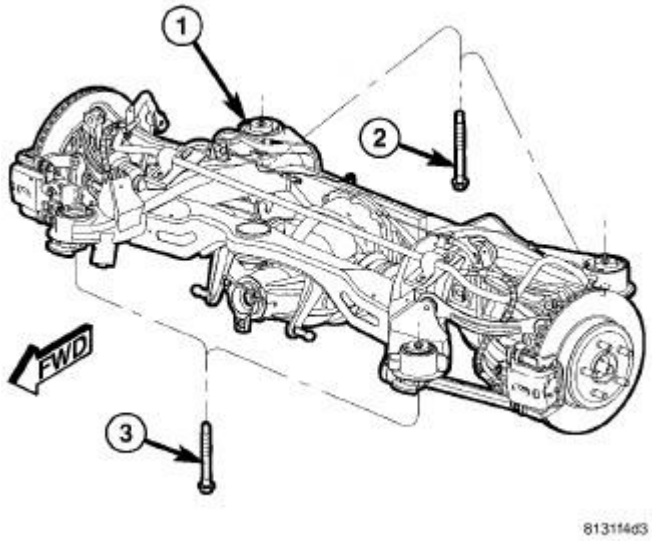


Fig. 213: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

8. Continue to raise crossmember (1) with jack until crossmember mounting bolts (2 and 3) can be

installed. Install left side crossmember mounting bolts, but not the right side bolts. It is not necessary to tighten bolts at this point.

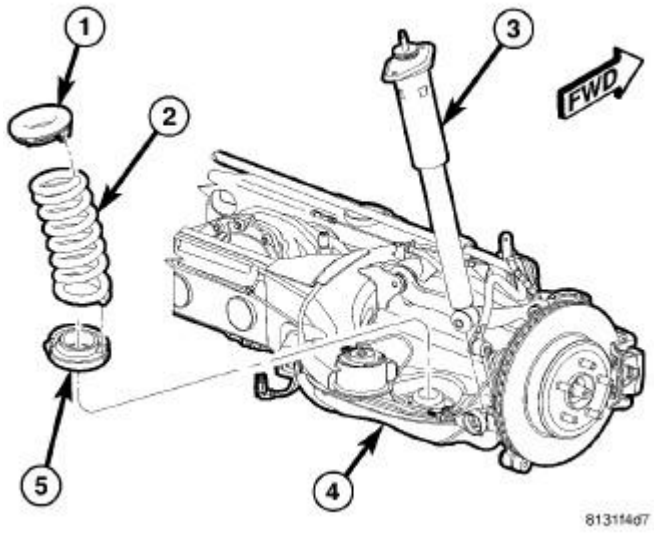


Fig. 214: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

9. **Slowly** lower jack allowing right side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

10. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

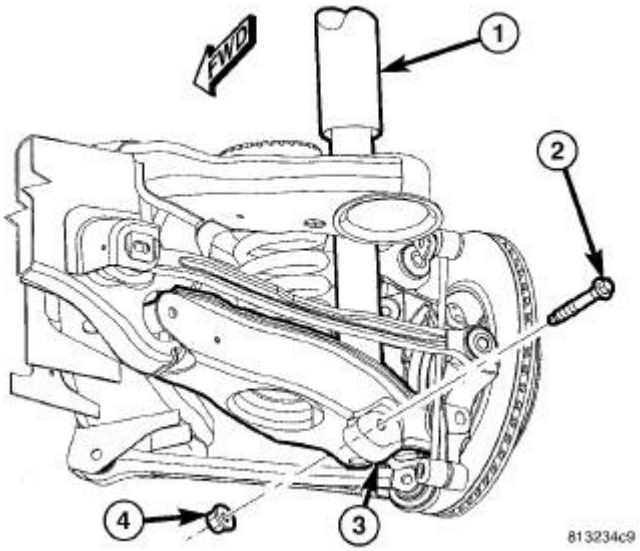


Fig. 215: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

11. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
12. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

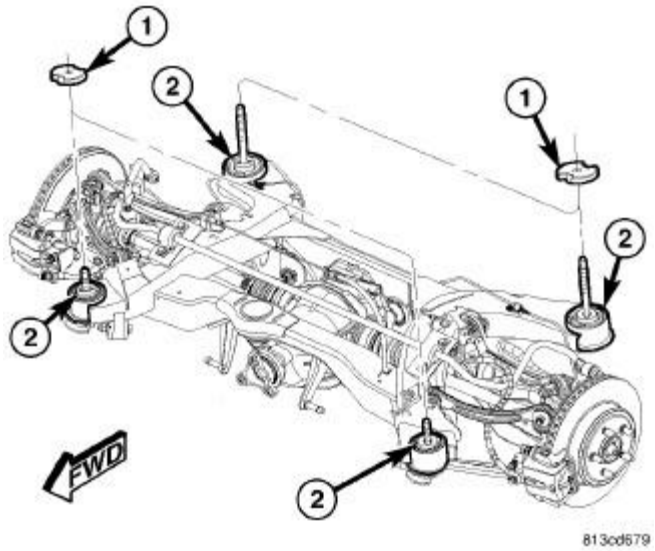


Fig. 216: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

13. If vehicle is equipped with AWD, insert spacers (1) on top of right crossmember mount bushings (2) before crossmember is raised into place.

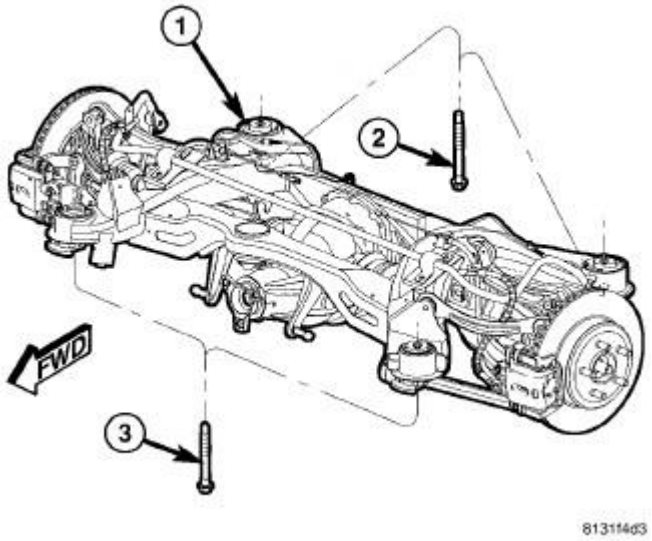


Fig. 217: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

14. Raise right side of crossmember (1) into mounted position. Install right side crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**
15. Remove both front and rear crossmember mounting bolts (2 and 3) on **left** side of vehicle.

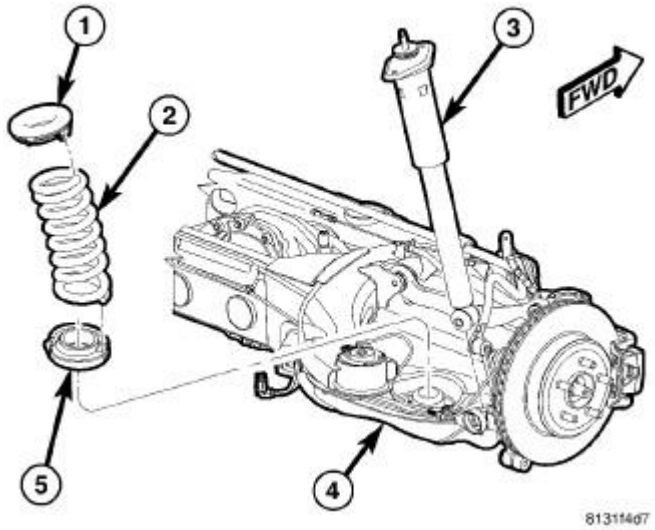


Fig. 218: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

16. **Slowly** lower jack allowing left side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

17. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

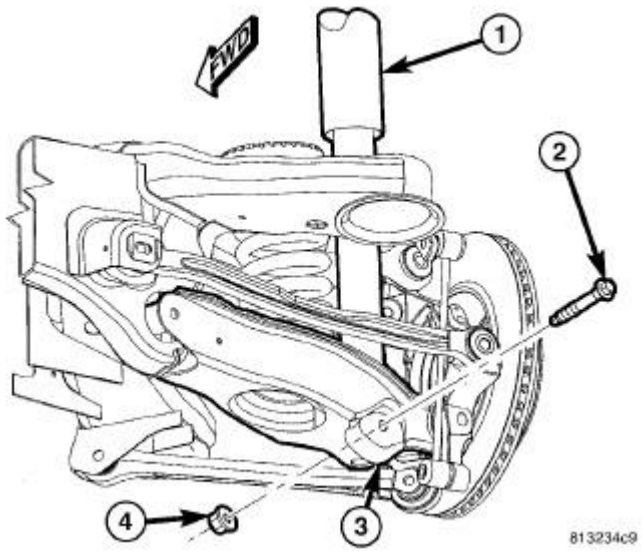


Fig. 219: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

18. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
19. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

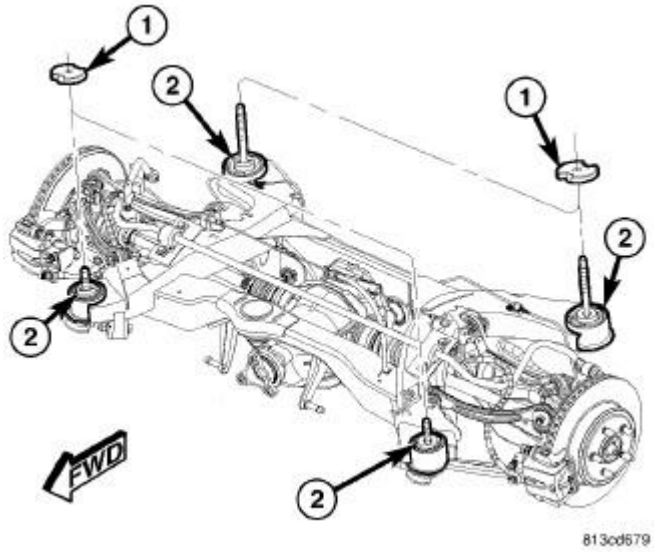


Fig. 220: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

20. If vehicle is equipped with AWD, insert spacers (1) on top of left crossmember mount bushings (2) before crossmember is raised into place.

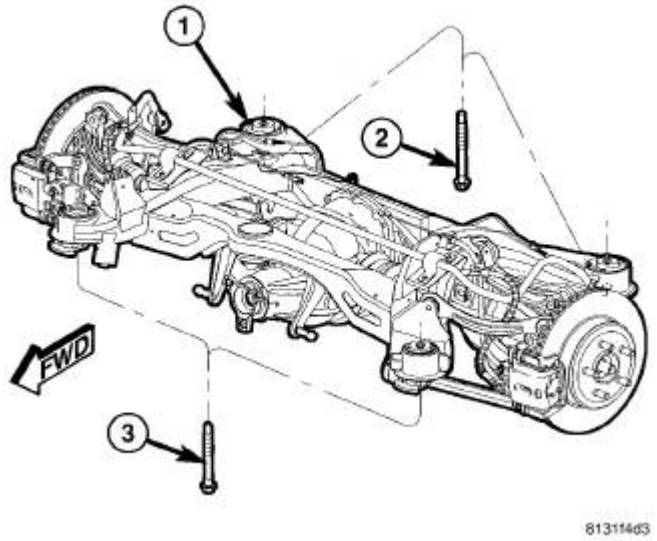


Fig. 221: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

21. Raise left side of crossmember (1) into mounted position. Install left side crossmember

mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

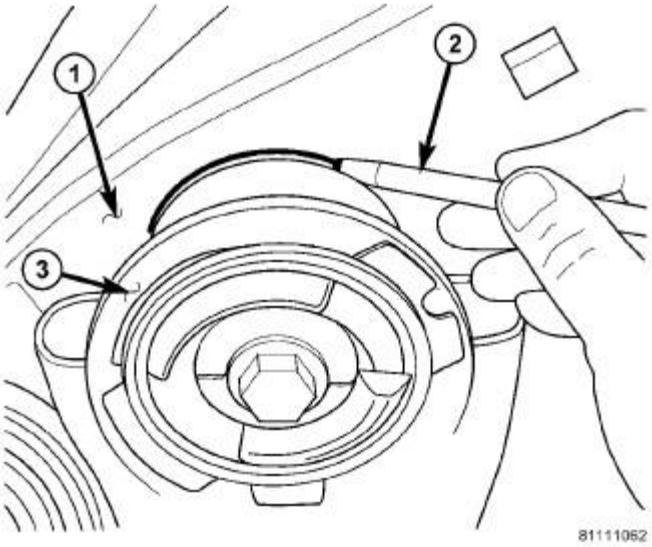


Fig. 222: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

22. Shift crossmember as necessary to line up mounts (3) with location marks drawn on body (1) before removal.

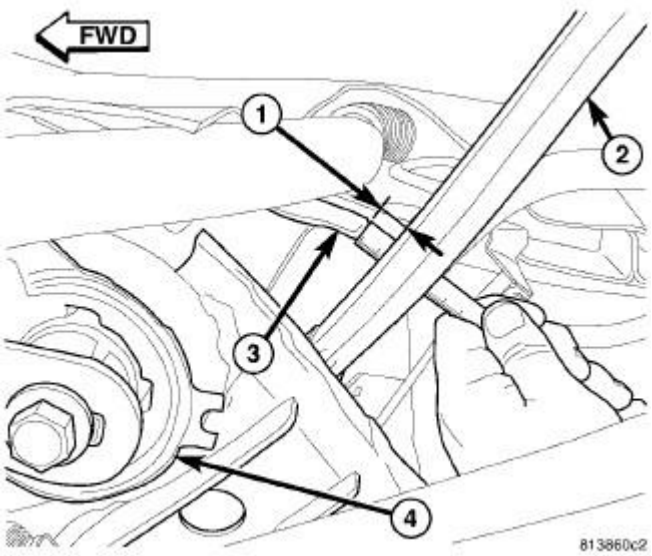


Fig. 223: Measuring Tension Link Clearance

Courtesy of CHRYSLER GROUP, LLC

23. Once mounts are lined up with location marks, on both sides of vehicle, measure distance (1) between the tension link (2) and weld flange (3) on body directly in front of it, just outboard of the front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm on either side of vehicle, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Remeasure opposite side to be sure it still maintains minimum 12 mm distance.

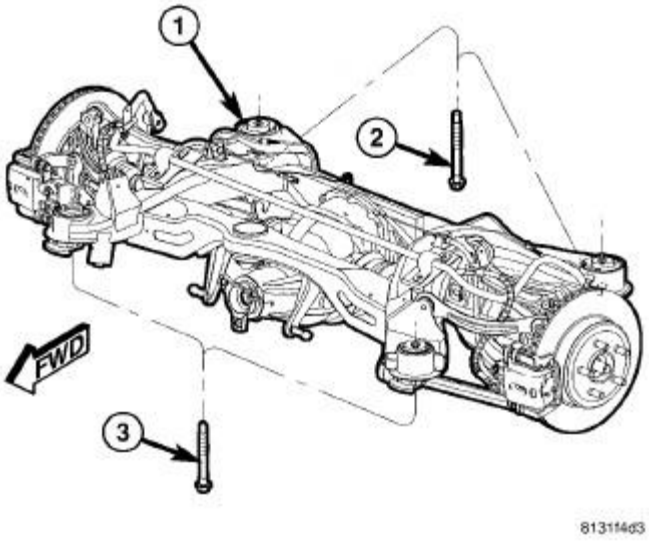


Fig. 224: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

24. Tighten all four crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

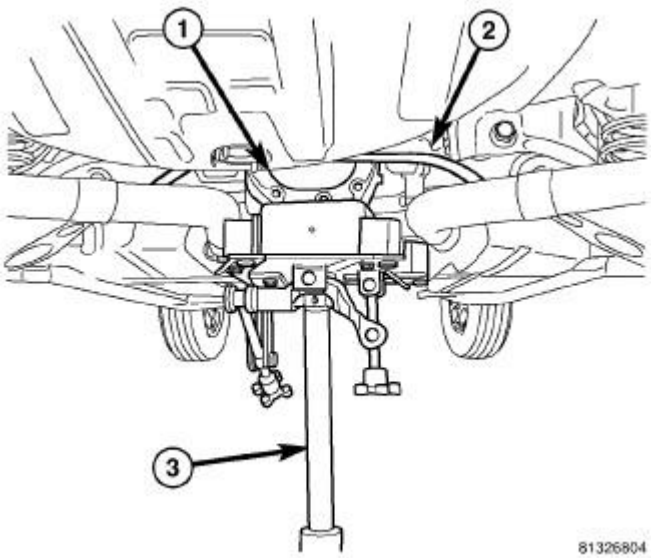


Fig. 225: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

25. Remove jack (3) from under rear axle differential.

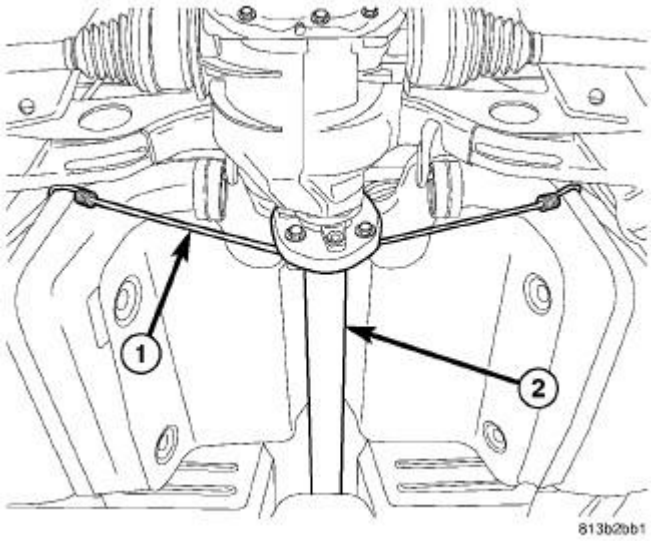


Fig. 226: Prop Shaft Support By Bungee Cord
Courtesy of CHRYSLER GROUP, LLC

26. Remove bungee cord (1) supporting propeller shaft (2).

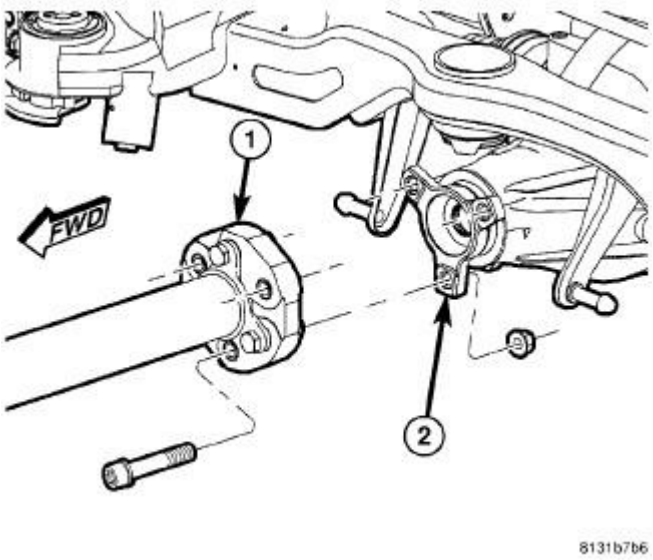


Fig. 227: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

27. Align propeller shaft index marks placed upon removal. Install propeller shaft rear coupler-to-axle flange bolts and nuts by hand. Tighten propeller shaft rear coupler-to-axle flange bolts to 81 N.m (60 ft. lbs.).

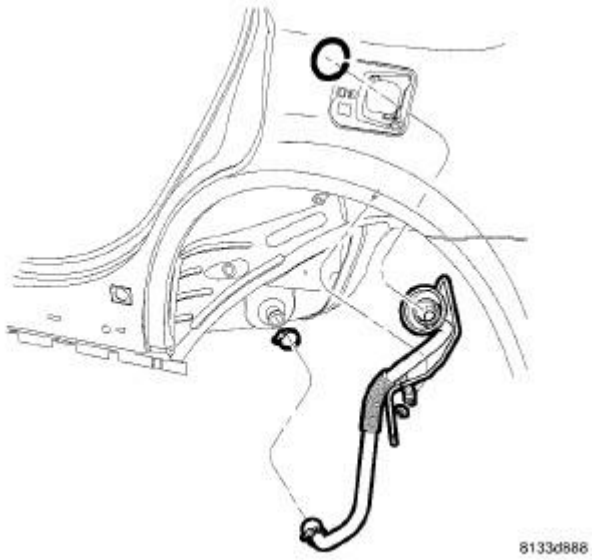


Fig. 228: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

28. Install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

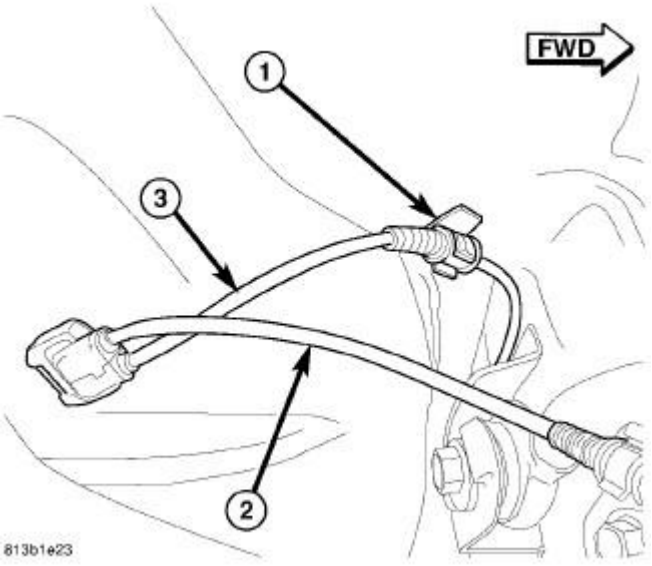


Fig. 229: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

29. Clip left rear wheel speed sensor cable (3) to routing clip (1) near body connector.

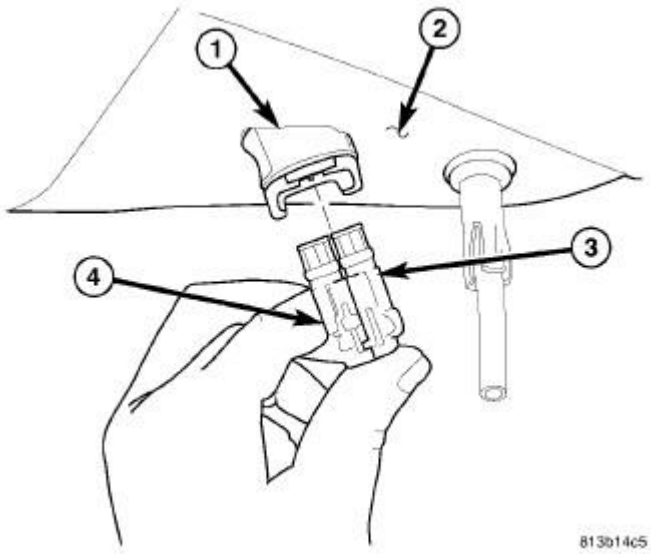


Fig. 230: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

30. Match left rear wheel speed sensor connector (4) to right sensor connector (3) to make one connector.
31. Insert speed sensor connectors (3 and 4) into body wiring harness connector (1) located in luggage compartment floor pan (2). When installing connector, make sure retaining clip on body connector is properly in place and sensor connector cannot be pulled out.

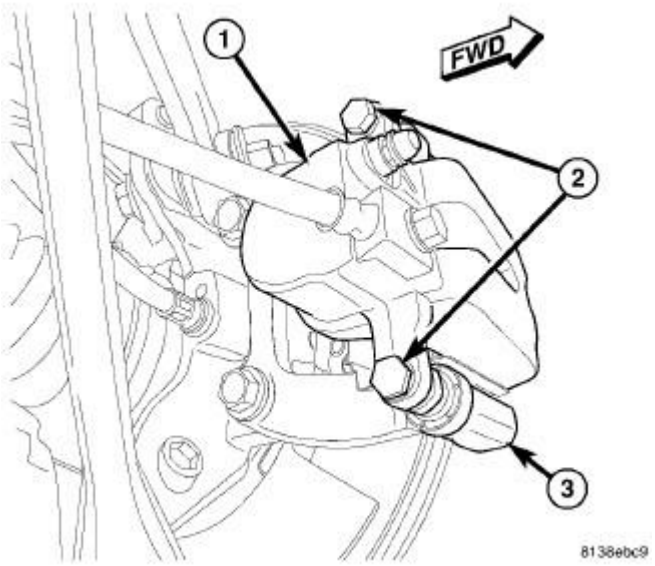


Fig. 231: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

32. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.
    2. Guide caliper and brake hose down through rear suspension, then slide caliper over brake pads and onto caliper adapter (3).

    CAUTION: Extreme caution should be taken not to cross-thread caliper guide pin bolts (2) when they are installed.

    3. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 31 N.m (23 ft. lbs.) torque.
    4. Make sure brake hose is properly routed and will not come in contact with suspension components.
33. If equipped with SRT8 disc brakes, at each rear disc brake, support spring link using a transmission jack or other appropriate jack as indicated in removal procedure. Refer to **ISOLATOR, REAR CROSSMEMBER, DIFFERENTIAL, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, FRONT MOUNT, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, REAR MOUNT, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, SPRING LINK, REMOVAL**.

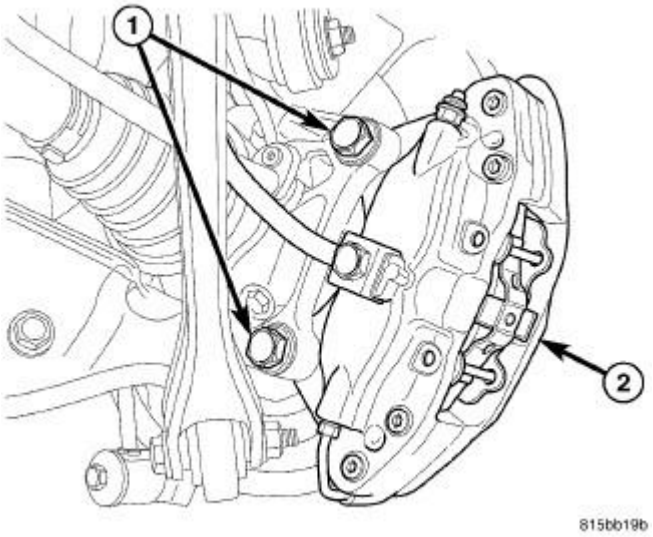


Fig. 232: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

34. If equipped with SRT8 disc brakes, on each rear disc brake, slide caliper with pads (2) over brake rotor and align with knuckle.
35. If equipped with SRT8 disc brakes, on each rear disc brake, install caliper mounting bolts (1). Tighten bolts to 130 N.m (96 ft. lbs.) torque.
36. If equipped with SRT8 disc brakes, on each rear disc brake, remove jack from under spring link.

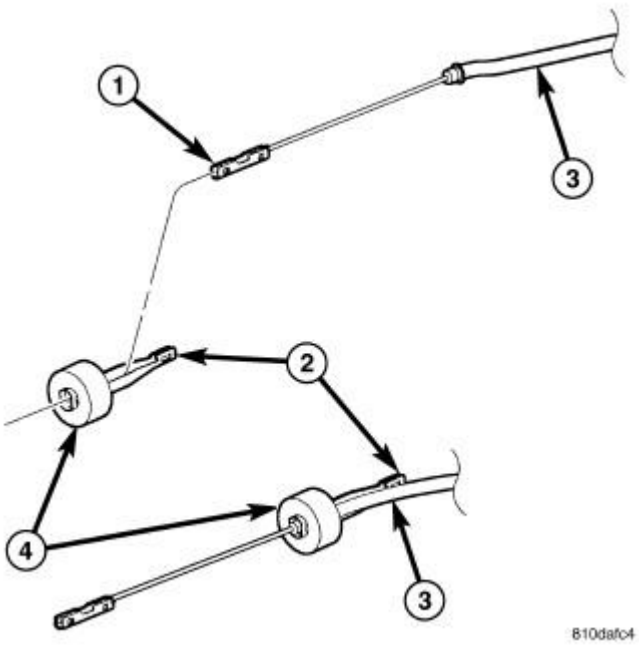


Fig. 233: Front Cable Installation Into Equalizer

Courtesy of CHRYSLER GROUP, LLC

37. Route parking brake cable above rear crossmember, then slide cable (1, 3) through equalizer (2) above rear axle differential (once installed).

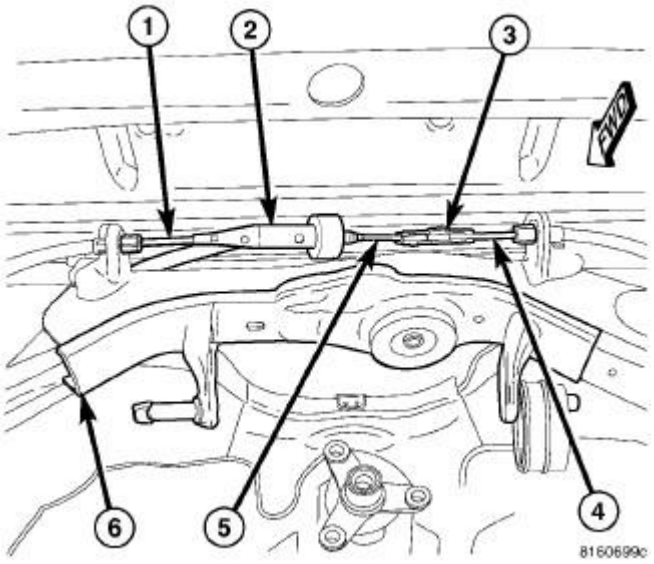


Fig. 234: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

38. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4).

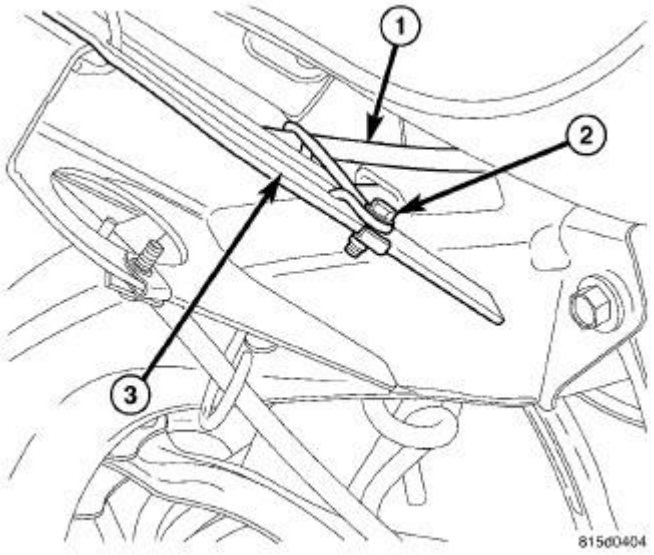


Fig. 235: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

39. Insert front parking brake cable routing bracket locating pin into front flange of crossmember (3), then install screw (2) fastening cable (1) routing bracket to rear crossmember.

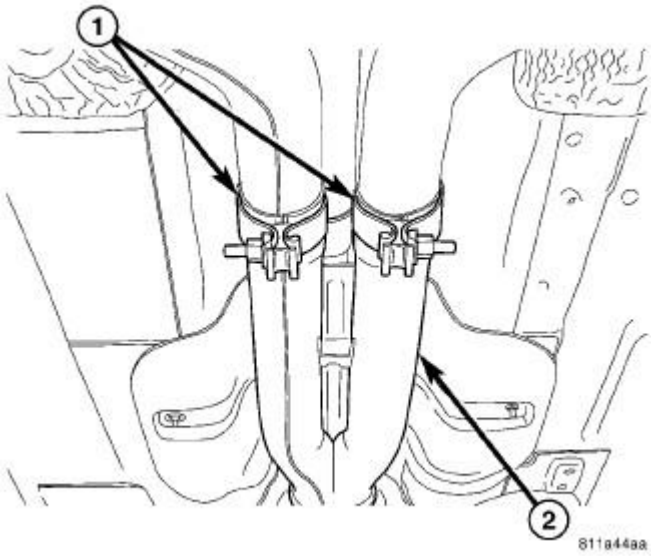


Fig. 236: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

40. Install rear exhaust system (2) (dual-outlet exhaust shown in figure).

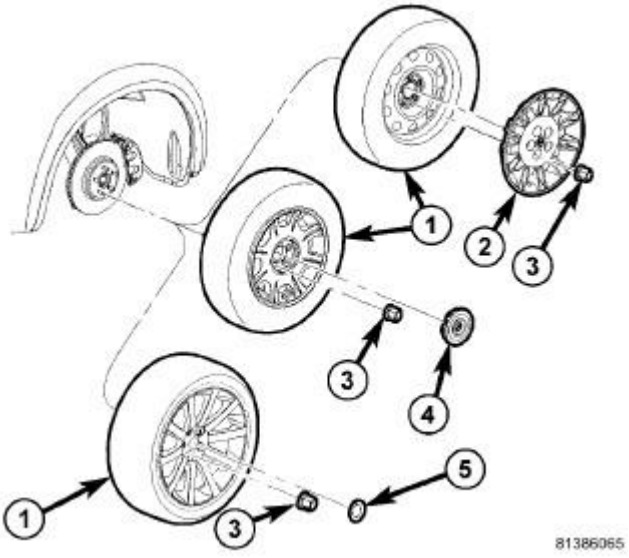


Fig. 237: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

41. Install tire and wheel assemblies (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.). Refer to **INSTALLATION** .
42. Lower vehicle until rear wheels are just above floor level.
43. Apply parking brake lever. Release lever, then reapply.
44. Check to make sure rear wheels will not rotate with lever applied.
45. Lower vehicle.

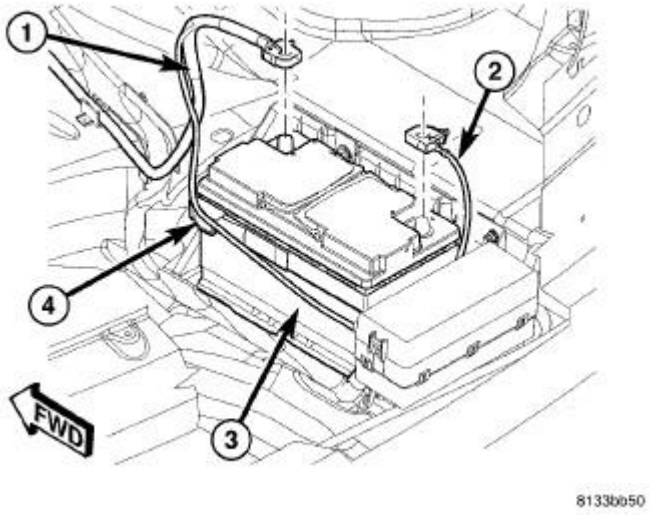


Fig. 238: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

46. Connect battery negative cable (2) to battery post.
47. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
48. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolts.

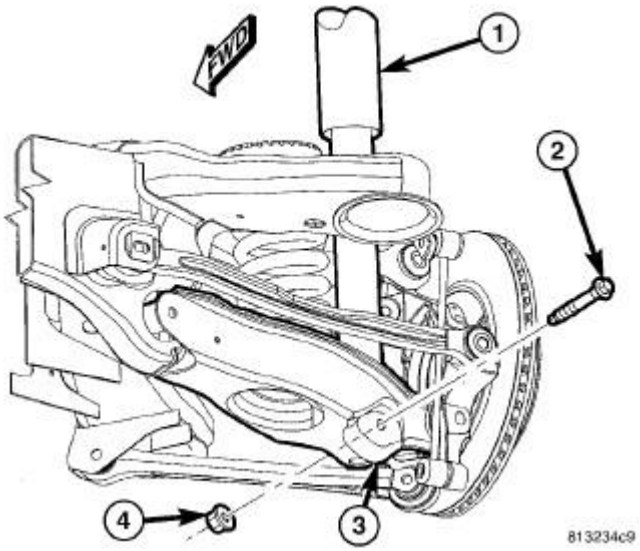


Fig. 239: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

49. Tighten shock absorber lower mounting bolt nuts (4) to 72 N.m (53 ft. lbs.).

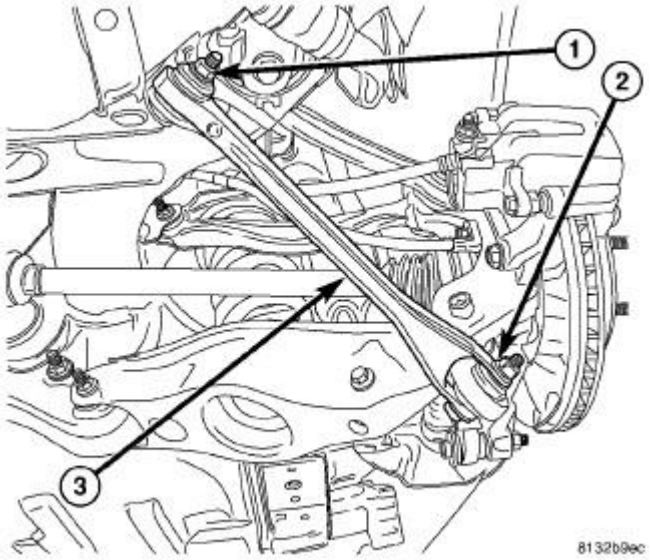


Fig. 240: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

50. Tighten compression link bolt and nut (1) at crossmember to 85 N.m (63 ft. lbs.).
51. Perform wheel alignment, paying special attention to thrust angle. If rear crossmember needs to be shifted to align thrust angle, try to avoid compromising tension link clearance (). Refer to 23 and **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

ISOLATOR, REAR CROSSMEMBER, REAR MOUNT

REMOVAL

REMOVAL

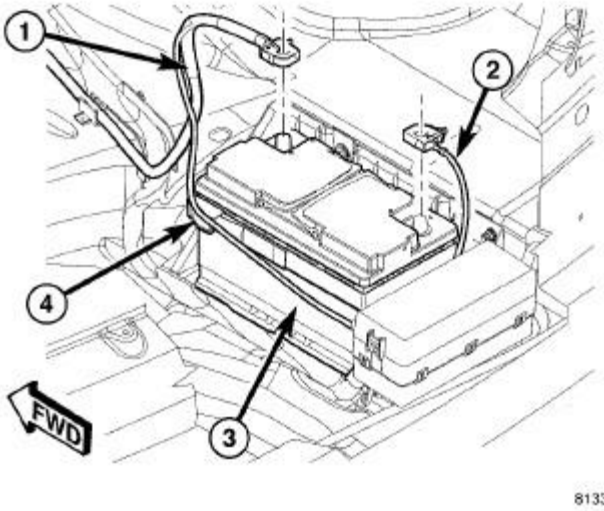


Fig. 241: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

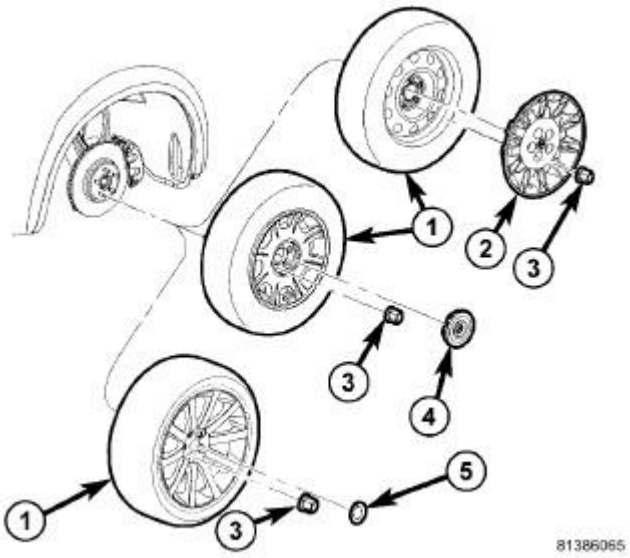


Fig. 242: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

3. On each side of vehicle rear, remove wheel mounting nuts (3), then tire and wheel assembly (1).

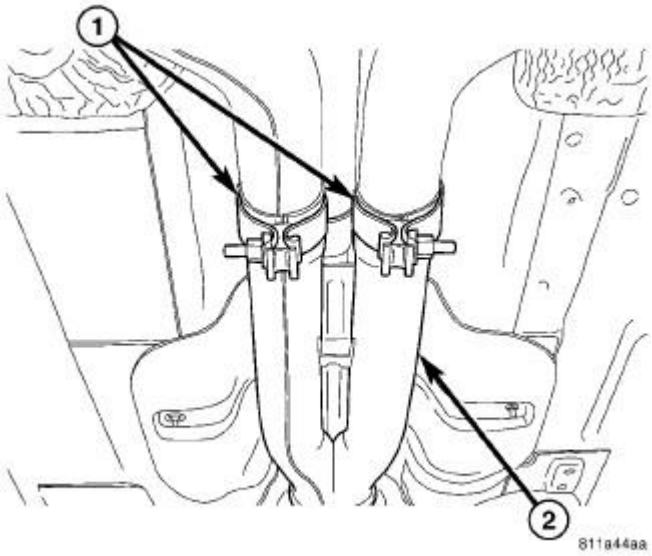


Fig. 243: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

4. Remove rear exhaust system (2) (dual-outlet exhaust shown in figure).

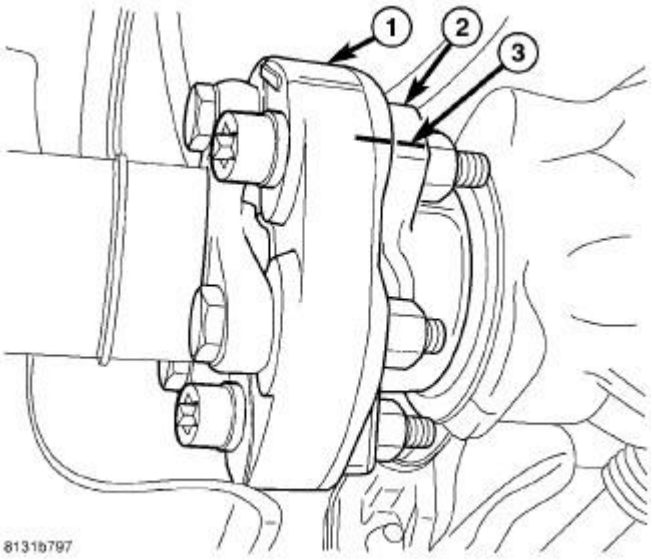


Fig. 244: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

5. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).

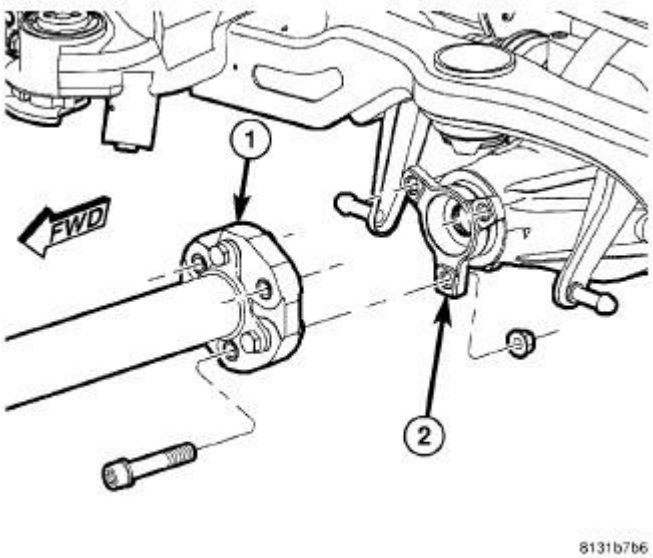


Fig. 245: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove three (four if equipped with 215MM axle) propeller shaft coupler-to-axle flange bolts and nuts.

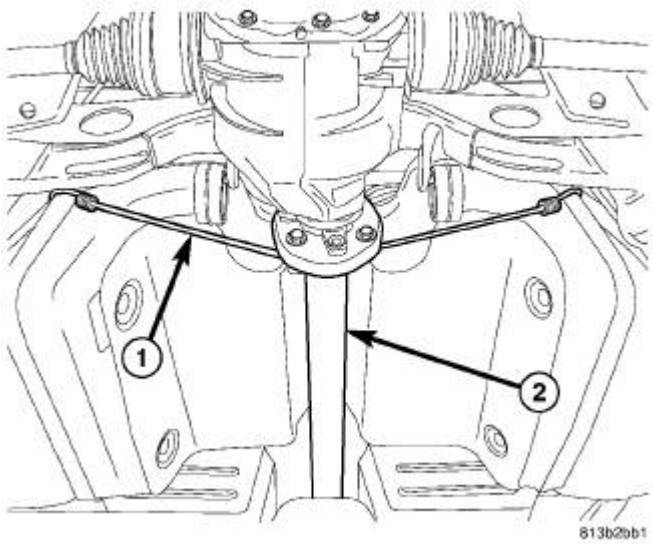


Fig. 246: Prop Shaft Support By Bungee Cord
Courtesy of CHRYSLER GROUP, LLC

7. Support propeller shaft (2) using a bungee cord (1). Attach ends of cord to fuel tank straps as shown in illustration.

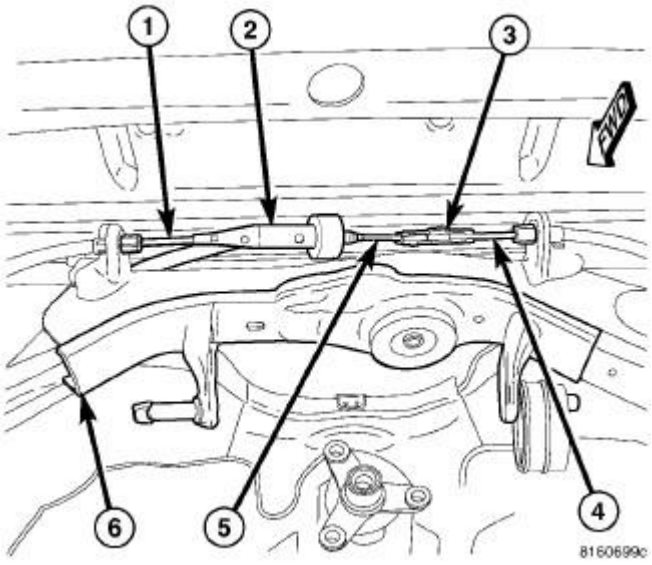


Fig. 247: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

8. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable (4) above axle differential.

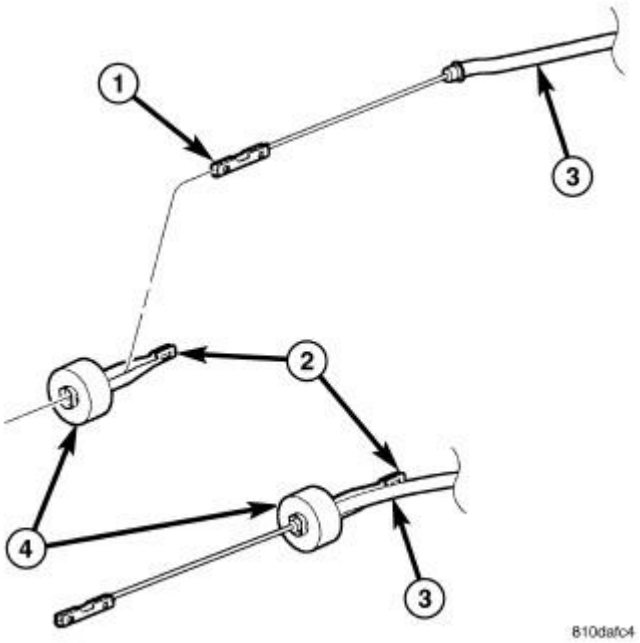


Fig. 248: Front Cable Installation Into Equalizer

Courtesy of CHRYSLER GROUP, LLC

9. Remove front parking brake cable (3) from equalizer (2).

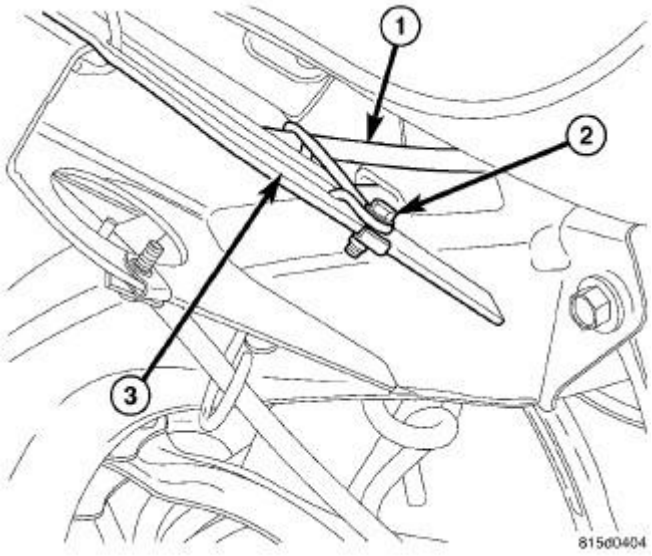


Fig. 249: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

10. Remove screw (2) fastening front parking brake cable (1) routing bracket to rear crossmember front flange (3).

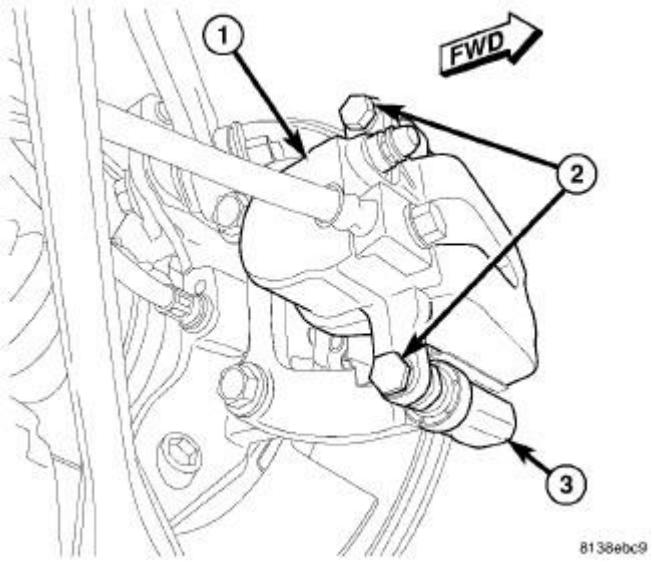


Fig. 250: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

11. If equipped with standard or premium disc brakes, on each rear disc brake:

1. While holding guide pins from turning, remove disc brake caliper guide pin bolts (2).
2. Remove brake caliper (1) from brake adapter (3) and pads.
3. Guide brake caliper up through suspension, following brake hose path. Support caliper above rear suspension using with bungee cord or wire to keep caliper from overextending brake hose when crossmember is lowered.

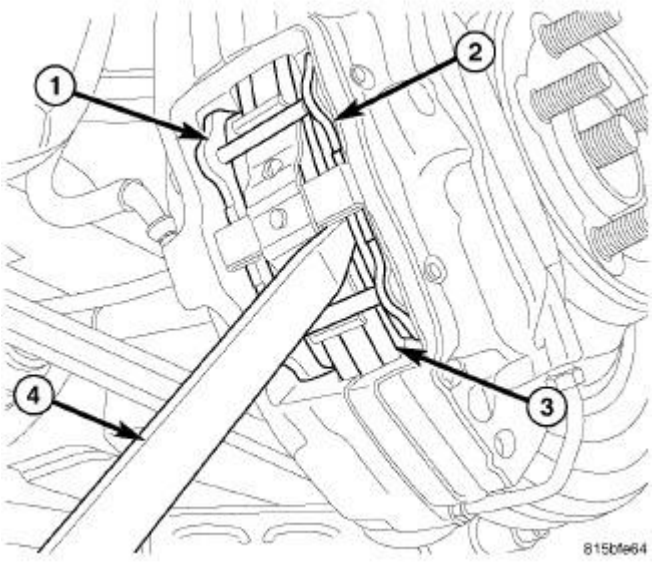


Fig. 251: Pushing Back Pistons In Bore
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

12. If equipped with SRT8 disc brakes, on each rear disc brake, place trim stick (4) between brake pad (2) and outer edge of rotor (3).
13. If equipped with SRT8 disc brakes, on each rear disc brake, using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

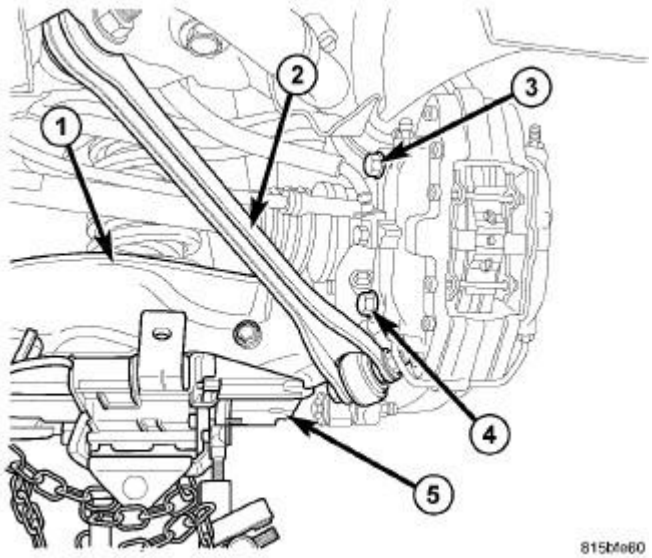


Fig. 252: Accessing Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

14. If equipped with SRT8 disc brakes, on each rear disc brake, support spring link (1) using a transmission jack (5) or other appropriate jack. Raise spring link just enough to access brake caliper lower mounting bolt (4) from above compression link (2).

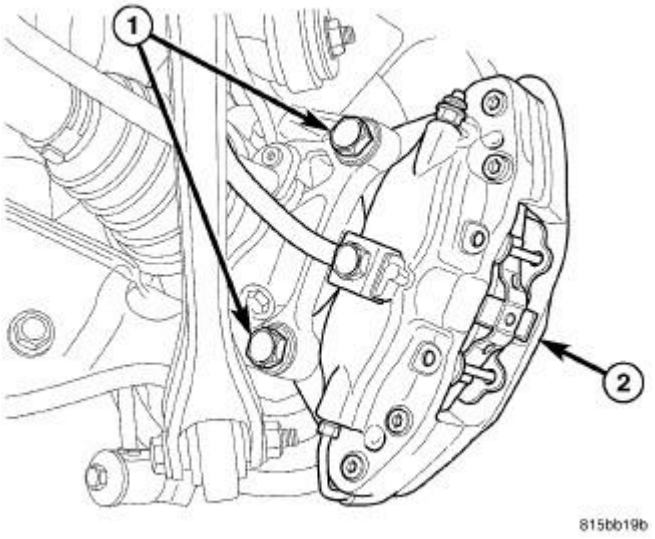


Fig. 253: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

15. If equipped with SRT8 disc brakes, on each rear disc brake, remove the lower and upper caliper mounting bolts (1).
16. If equipped with SRT8 disc brakes, on each rear disc brake, remove brake caliper (2) with pads from knuckle and brake rotor. Hang assembly out of way using wire or a bungee cord. Use care

not to overextend brake hose when doing this.

17. If equipped with SRT8 disc brakes, remove jack from under spring link.

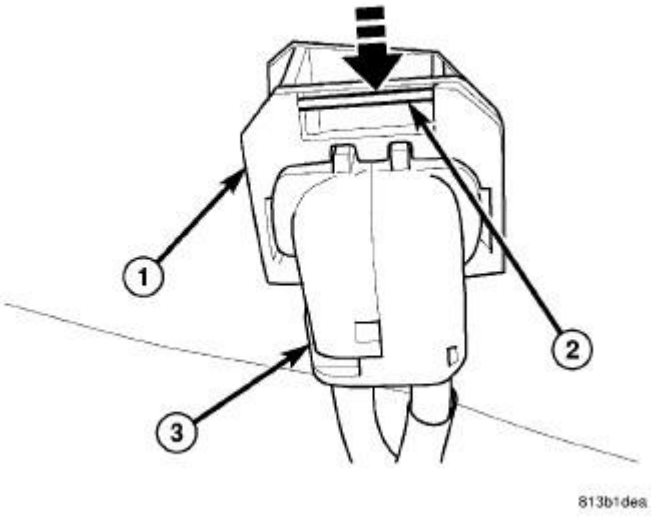


Fig. 254: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove wheel speed sensor connector from body wiring harness connector, move retaining clip (2) and pull sensor connector outward.

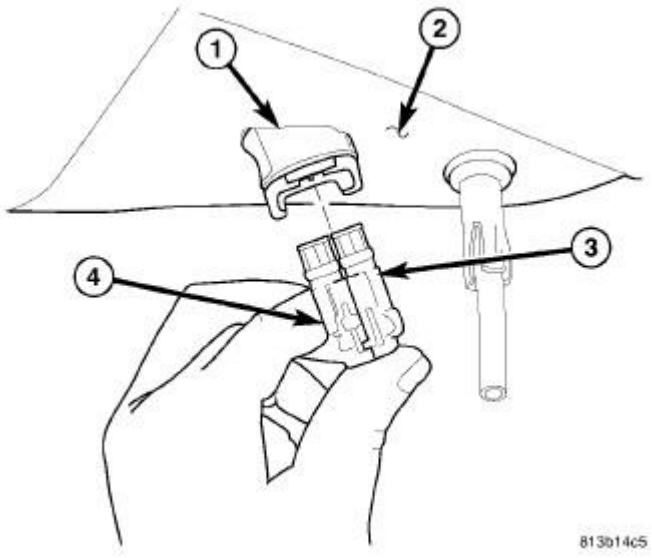


Fig. 255: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

18. Remove wheel speed sensor connectors (3 and 4) from body wiring harness connector (1)

located in luggage compartment floor pan (2).

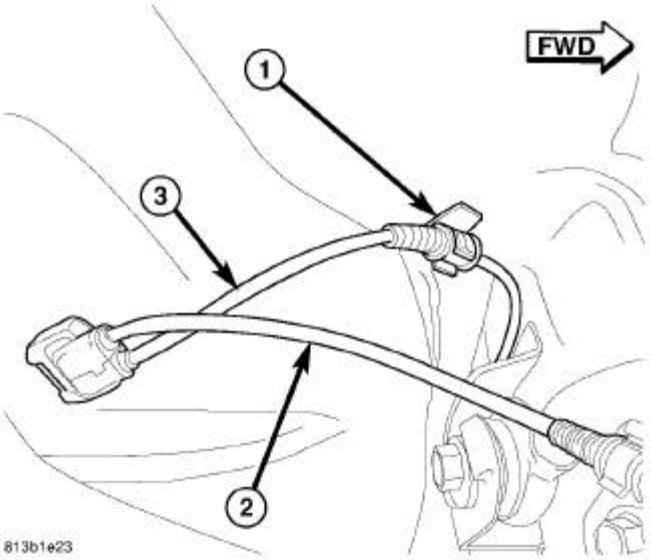


Fig. 256: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

19. Unclip left wheel speed sensor cable (3) from routing clip (1) near body connector.

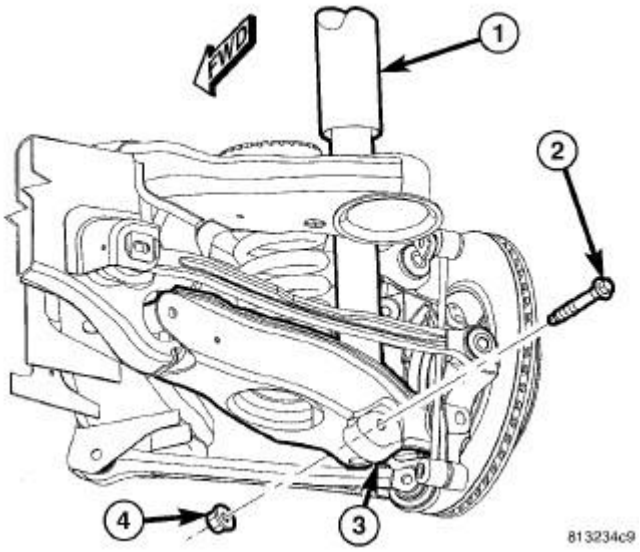


Fig. 257: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

20. On each side of vehicle, remove shock absorber (1) lower mounting bolt (2) and nut (4).

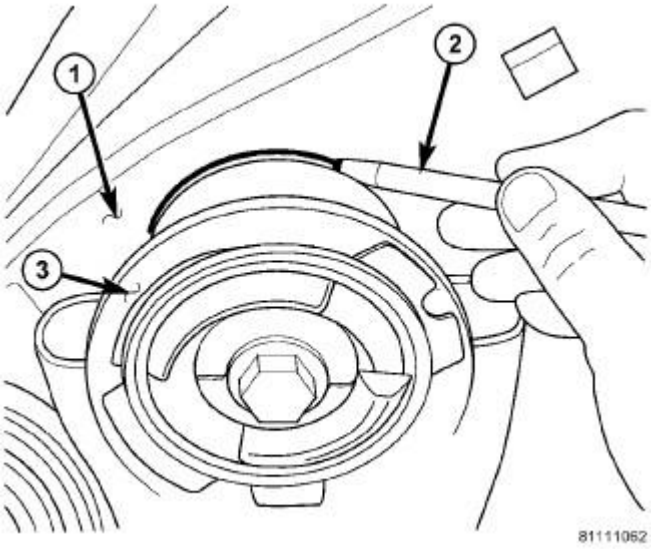


Fig. 258: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

21. Carefully mark location of rear crossmember on body at all four mount (bushing) locations using a marker or crayon. **Do not use a scratch awl to mark location.**
22. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.

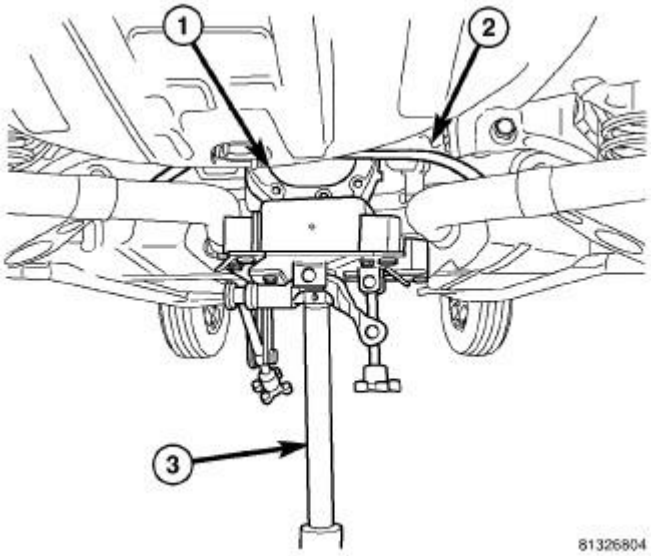


Fig. 259: Support Rear Suspension Using Jack

Courtesy of CHRYSLER GROUP, LLC

23. Position under-hoist utility jack or transmission jack (3) under center of rear axle differential (1). Raise jack head to contact differential and secure in place. **When securing crossmember to jack, be sure not to secure stabilizer bar.**

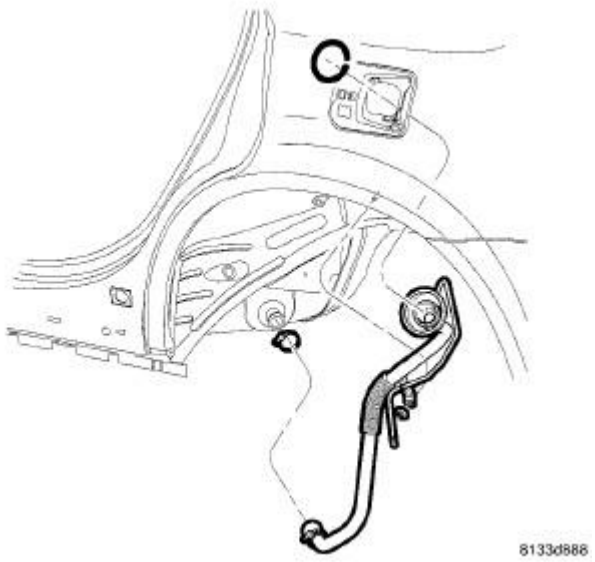


Fig. 260: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

24. Remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .

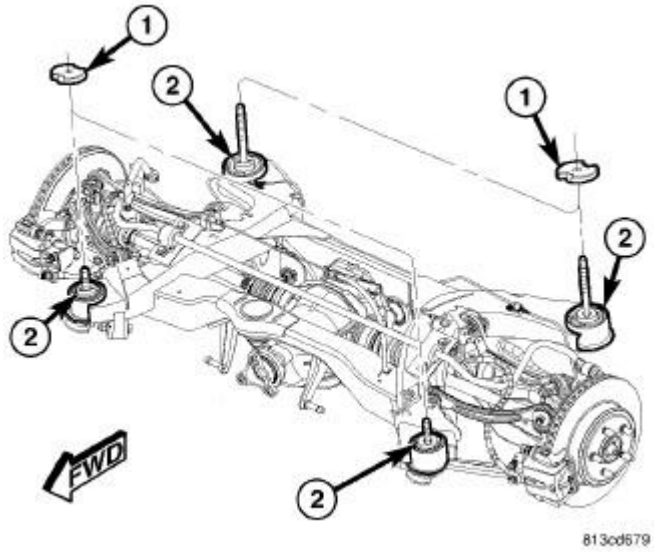


Fig. 261: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

NOTE: If equipped with AWD, when removing crossmember mounting bolts in following step, be sure to not to misplace spacers (1) between crossmember mounts (2) and body.

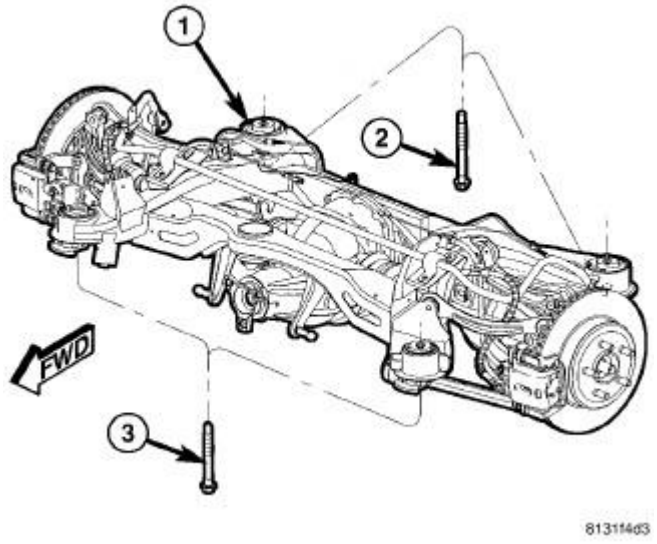


Fig. 262: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

25. Remove both front (3) and both rear (2) mounting bolts fastening crossmember (1) in place.
26. **Slowly** lower crossmember using jack. **Do not lower jack at a fast rate.** Lower just enough to allow propeller shaft removal from rear axle differential. **Do not lower jack any further than**

necessary. Slide propeller shaft out of rear axle differential and allow bungee cord previously installed to support.

27. Lower crossmember until crossmember is at a comfortable working level to access bushings. Support rear suspension assembly using jack stands to help stabilize assembly during bushing service.

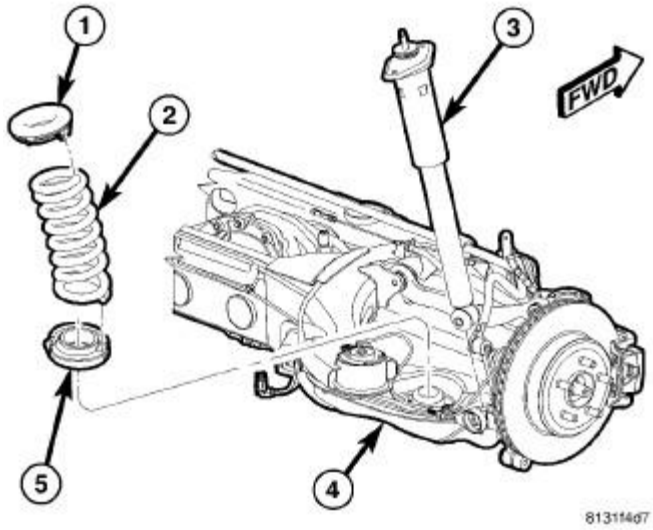


Fig. 263: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

28. Remove coil springs (2) with isolators (1 and 5) from spring links (4).

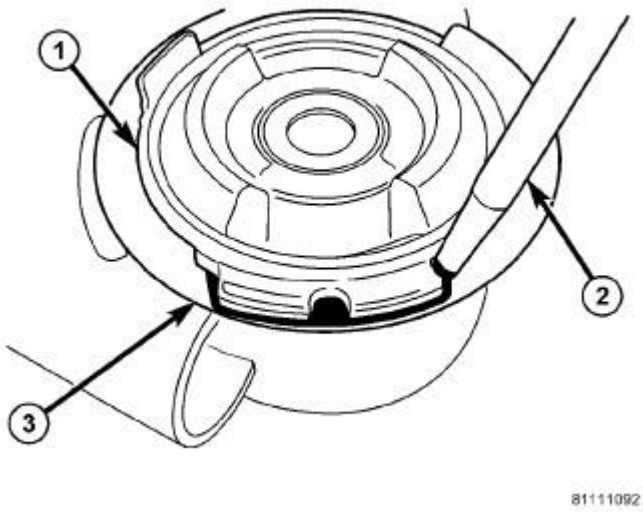


Fig. 264: Marking Location Of Rear Bushing
Courtesy of CHRYSLER GROUP, LLC

1 - BUSHING CAN FLANGE
2 - MARKER OR CRAYON
3 - CROSSMEMBER

29. As an installation reference, carefully mark location of bushing requiring removal on crossmember (around bushing can flange) using a marker or crayon. **Do not use a scratch awl to mark location.**

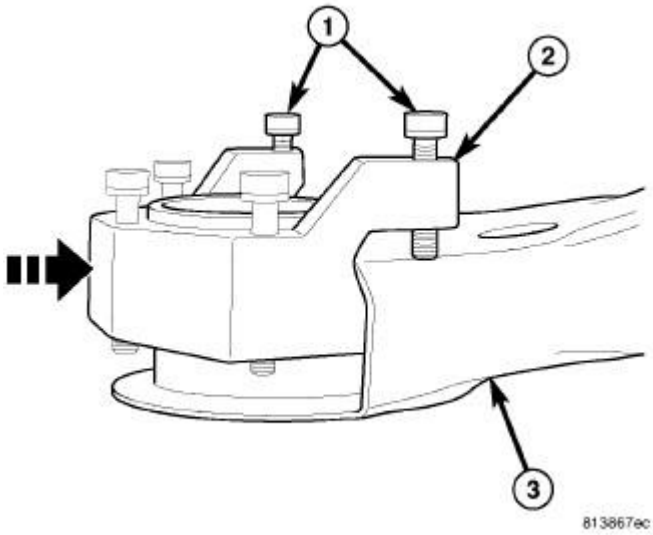


Fig. 265: Installing Support, Slide Support & Crossmember
Courtesy of CHRYSLER GROUP, LLC

30. Slide Support (2), Special Tool (special tool #9031-11, Clamp), into end of crossmember (3) surrounding bushing bore as shown in illustration.
31. Snug set-screws (1) securing Support (2) to crossmember.

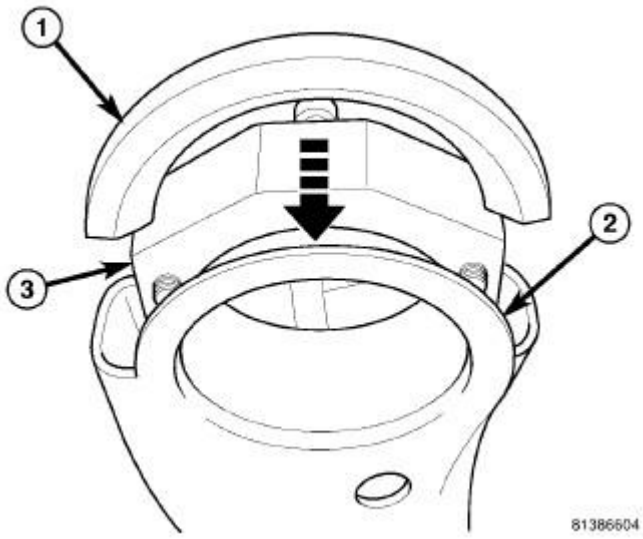


Fig. 266: Inserting Brace, Support & Bushing Bore Flange
Courtesy of CHRYSLER GROUP, LLC

32. Insert Brace (1), Special Tool (special tool #9031-12, Brace), between Support (special tool #9031-11, Clamp) (3) and bushing bore flange (2) matching angle cut in Brace to bore flange.

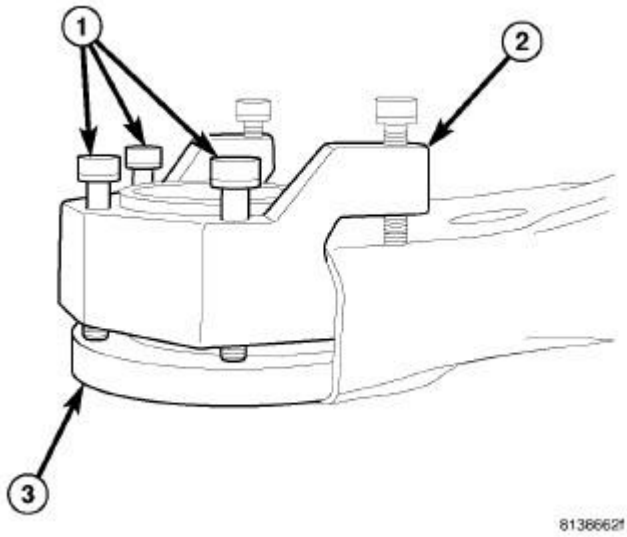


Fig. 267: Set-Screws & Brace
Courtesy of CHRYSLER GROUP, LLC

33. Snug set-screws (1) against Brace (special tool #9031-12, Brace). **Do not overtighten set-screws as they will distort and bend bushing bore flange.**

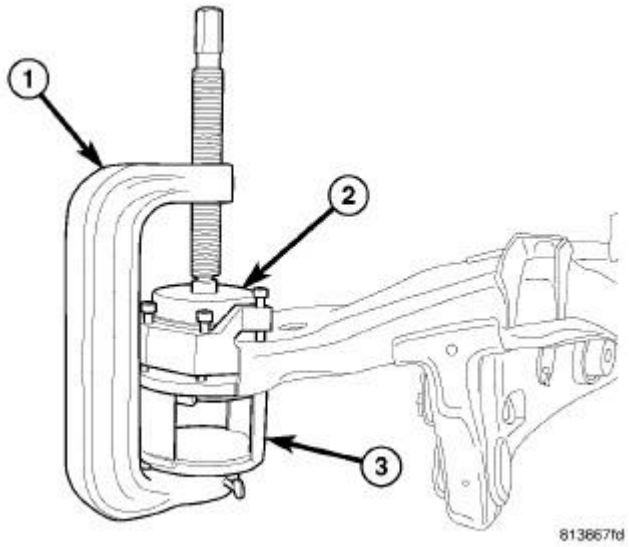


Fig. 268: Tools Positioned To Remove Rear Bushing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using Press (1), Special Tool (special tool #C-4212F, Press, Ball Joint), lubricate screw-drive threads to provide ease of use and promote tool longevity.

34. Assemble tools (See following list) over bushing as shown in illustration.
    - (1) Press (special tool #C-4212F, Press, Ball Joint)
    - (2) Remover (special tool #9031-2, Remover, Bushing)
    - (3) Receiver (special tool #9031-1, Bushing Removal Receiver)
35. Tighten Press (1) screw-drive, pressing bushing out of crossmember.
36. Remove all tools.

INSTALLATION

INSTALLATION

CAUTION: It is very important that bushing be installed in same position as original to maintain vehicle ride quality and bushing longevity. That is why bushing, once installed, needs to closely match reference marks applied upon removal of original bushing.

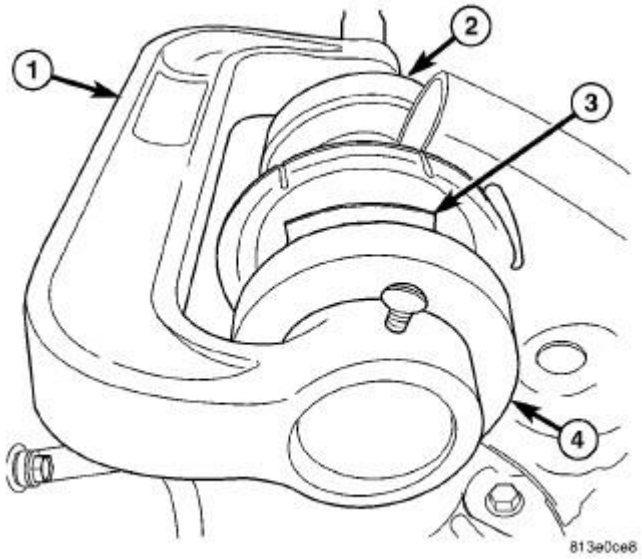


Fig. 269: Installing Rear Bushing
Courtesy of CHRYSLER GROUP, LLC

1. Position bushing on crossmember bushing bore aligning bushing can flange (3) with reference marks applied during removal.
2. Assemble tools (See following list) over bushing (3) and crossmember as shown in illustration.
   - (1) Press (special tool #C-4212F, Press, Ball Joint)
   - (2) Receiver (special tool #9031-3, Receiver, Bushing)
   - (4) Installer (special tool #9031-4, Installer, Bushing)
3. Tighten Press (1) screw-drive, pressing bushing into crossmember. Install bushing until bushing can flange contacts surface of crossmember.
4. Remove tools.
5. Verify bushing closely lines up with reference marks applied during removal.

NOTE: Do not reinstall coil springs on spring links at this time. Install as directed in later steps.

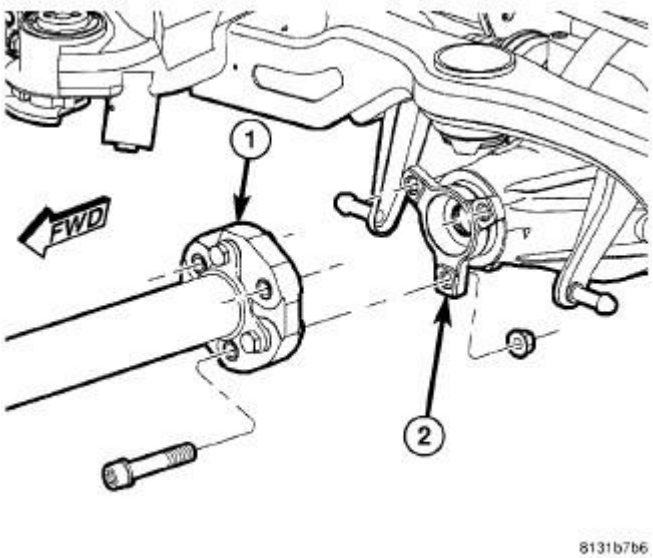


Fig. 270: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

6. Raise crossmember to body mounting points. As crossmember is raised, slide propeller shaft (1) onto rear axle differential flange (2) and align shock absorbers with pockets in spring links.

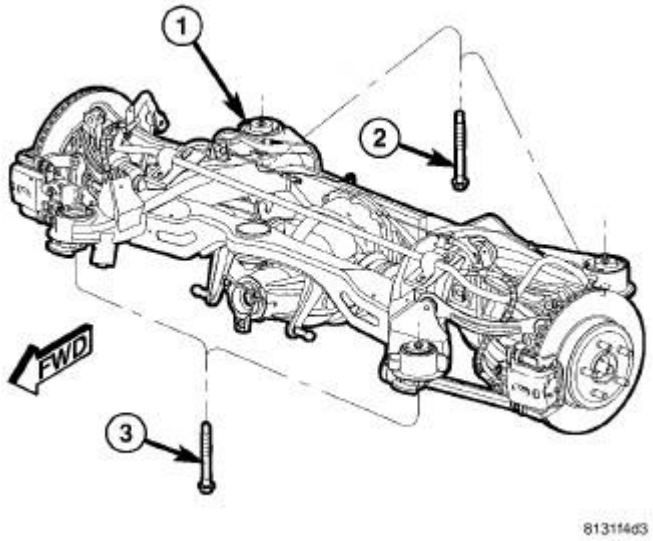


Fig. 271: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

7. Continue to raise crossmember (1) with jack until crossmember mounting bolts (2 and 3) can be

installed. Install left side crossmember mounting bolts, but not the right side bolts. It is not necessary to tighten bolts at this point.

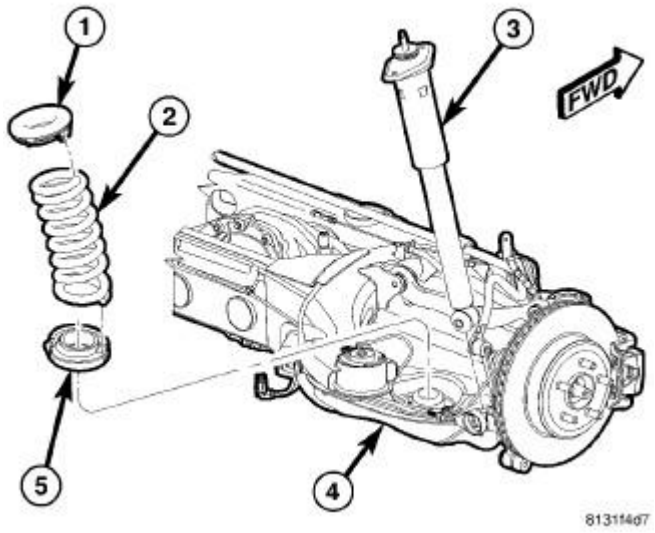


Fig. 272: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

8. **Slowly** lower jack allowing right side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

9. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

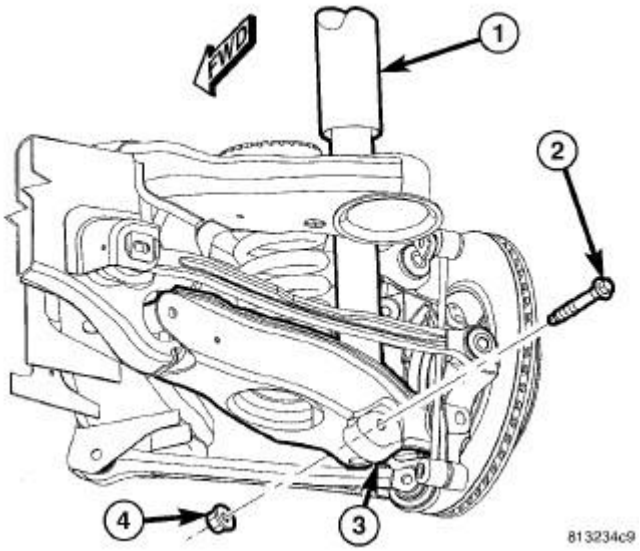


Fig. 273: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

10. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
11. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

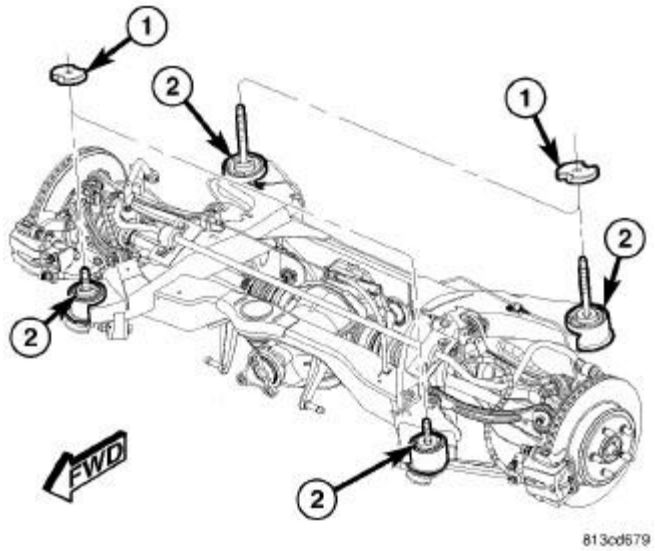


Fig. 274: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

12. If vehicle is equipped with AWD, insert spacers (1) on top of right crossmember mount bushings (2) before crossmember is raised into place.

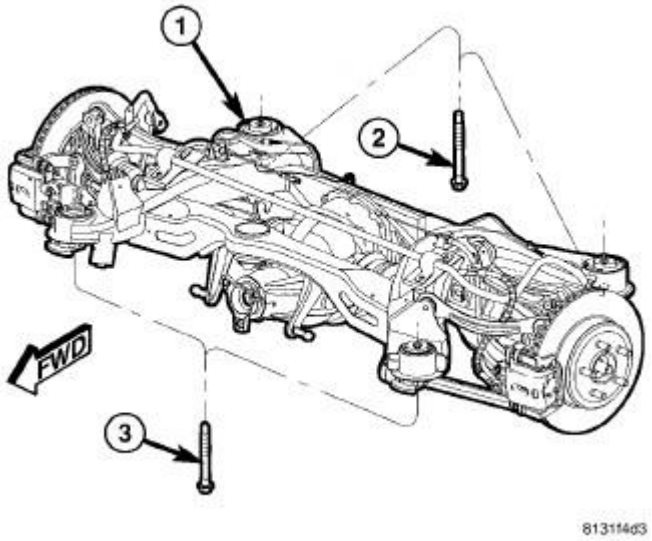


Fig. 275: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

13. Raise right side of crossmember (1) into mounted position. Install right side crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**
14. Remove both front and rear crossmember mounting bolts (2 and 3) on **left** side of vehicle.

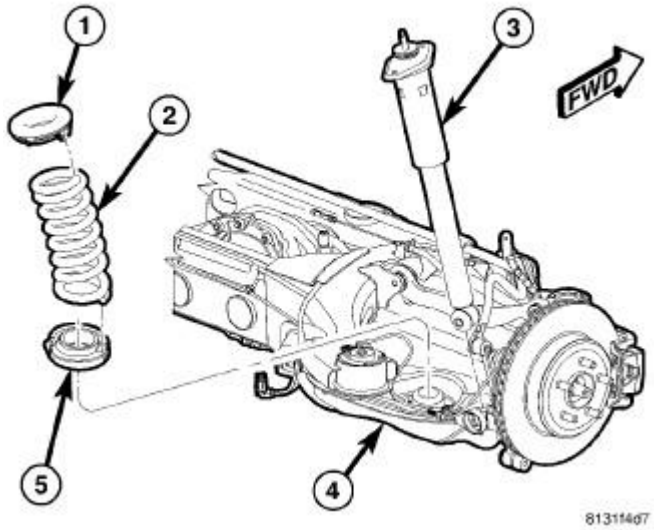


Fig. 276: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

15. **Slowly** lower jack allowing left side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

16. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

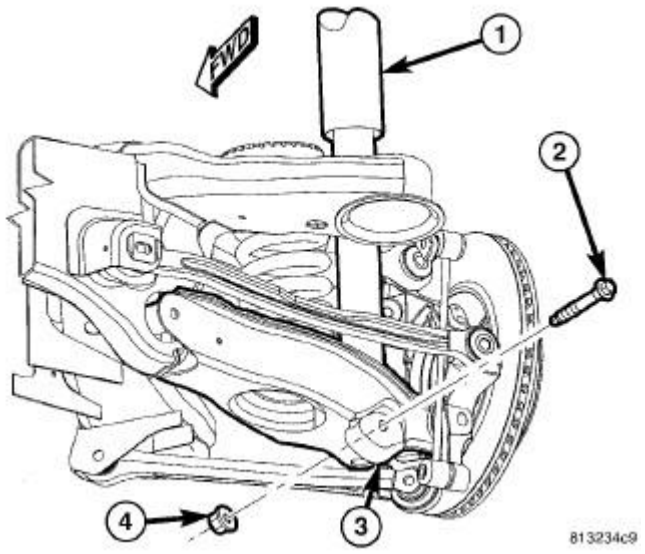


Fig. 277: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

17. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
18. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

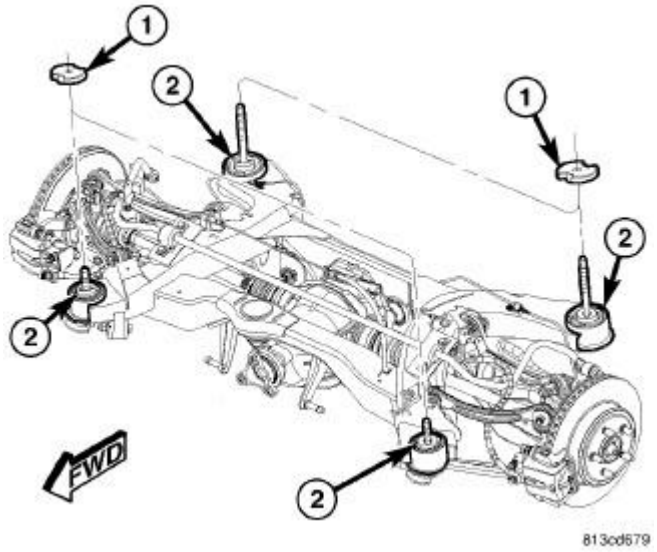


Fig. 278: AWD Crossmember Spacers
Courtesy of CHRYSLER GROUP, LLC

19. If vehicle is equipped with AWD, insert spacers (1) on top of left crossmember mount bushings (2) before crossmember is raised into place.

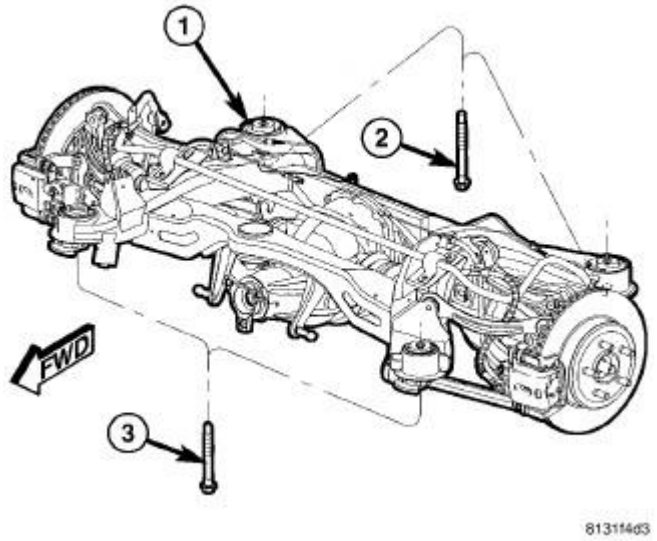


Fig. 279: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

20. Raise left side of crossmember (1) into mounted position. Install left side crossmember

mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

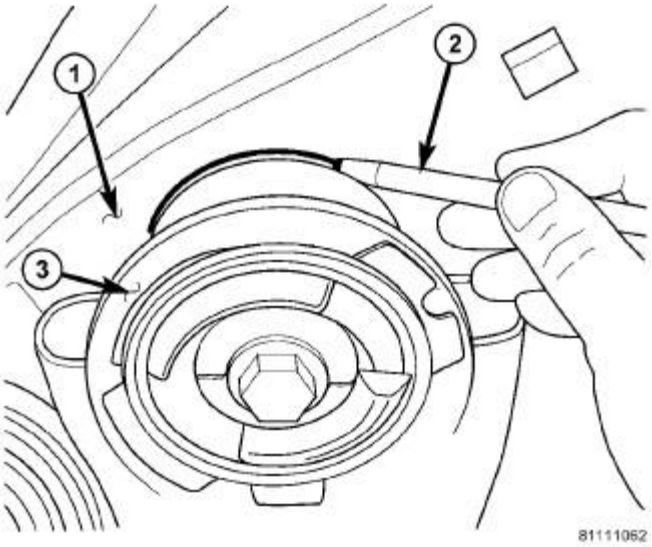


Fig. 280: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

21. Shift crossmember as necessary to line up mounts (3) with location marks drawn on body (1) before removal.

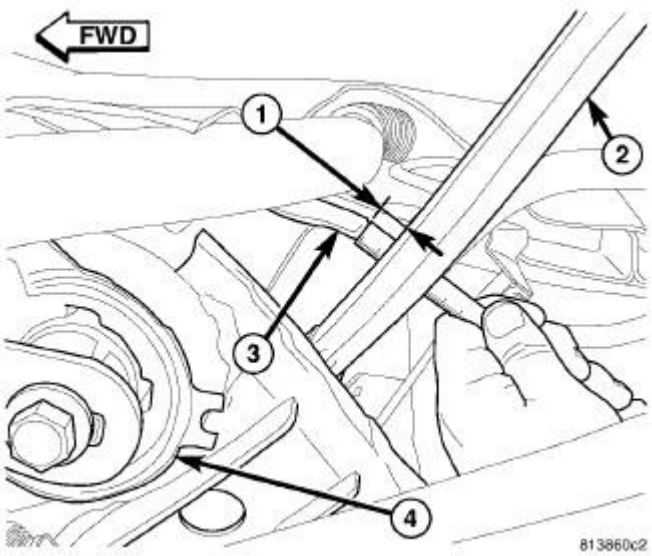


Fig. 281: Measuring Tension Link Clearance

Courtesy of CHRYSLER GROUP, LLC

22. Once mounts are lined up with location marks, on both sides of vehicle, measure distance (1) between the tension link (2) and weld flange (3) on body directly in front of it, just outboard of the front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm on either side of vehicle, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Remeasure opposite side to be sure it still maintains minimum 12 mm distance.

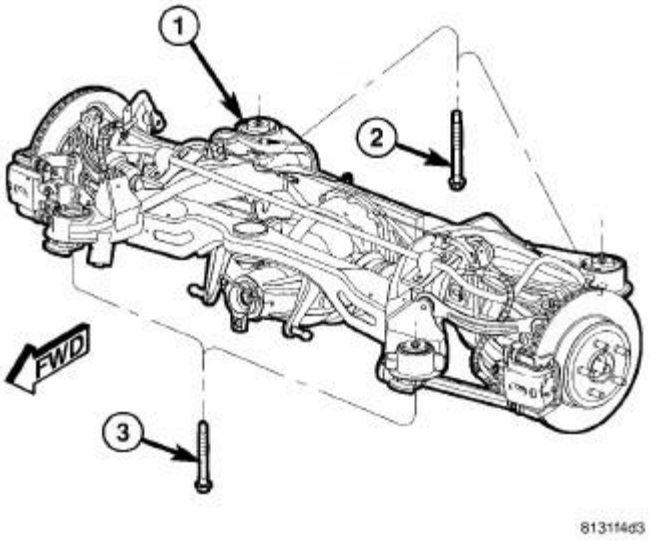


Fig. 282: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

23. Tighten all four crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

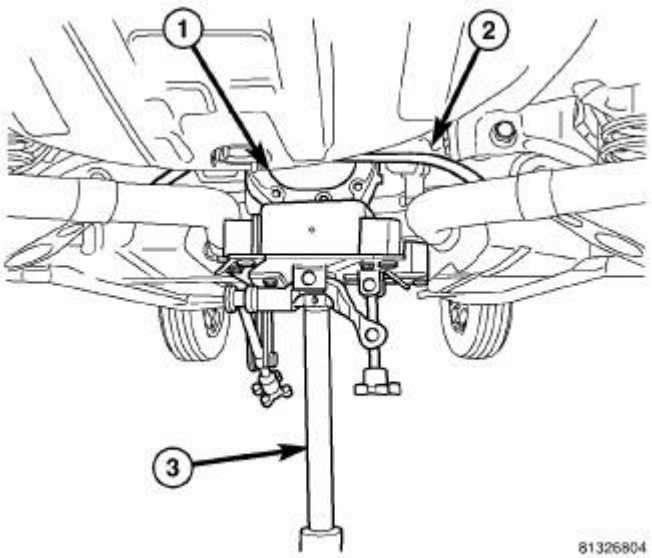


Fig. 283: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

24. Remove jack (3) from under rear axle differential.

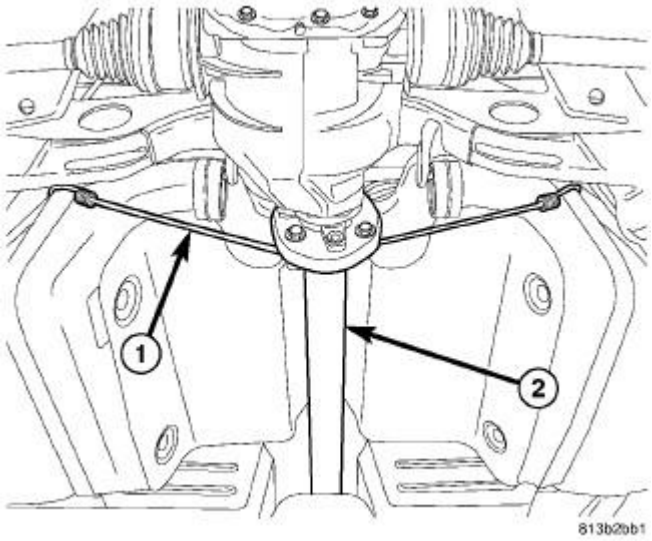


Fig. 284: Prop Shaft Support By Bungee Cord
Courtesy of CHRYSLER GROUP, LLC

25. Remove bungee cord (1) supporting propeller shaft (2).

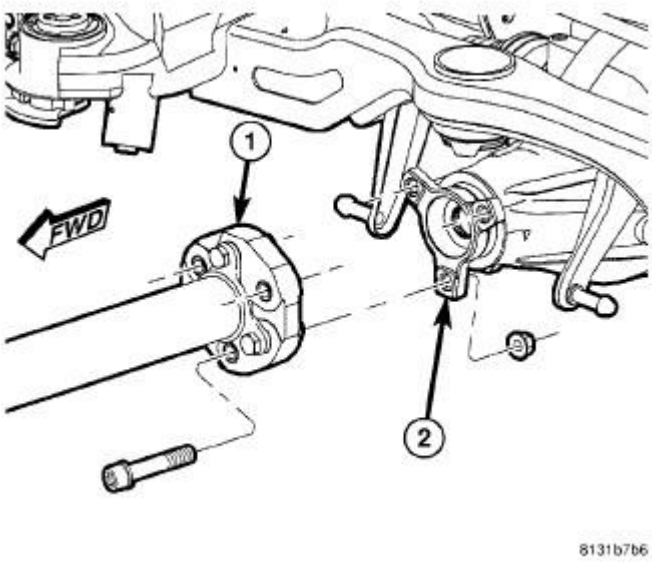


Fig. 285: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

26. Align propeller shaft index marks placed upon removal. Install propeller shaft rear coupler-to-axle flange bolts and nuts by hand. Tighten propeller shaft rear coupler-to-axle flange bolts to 81 N.m (60 ft. lbs.).

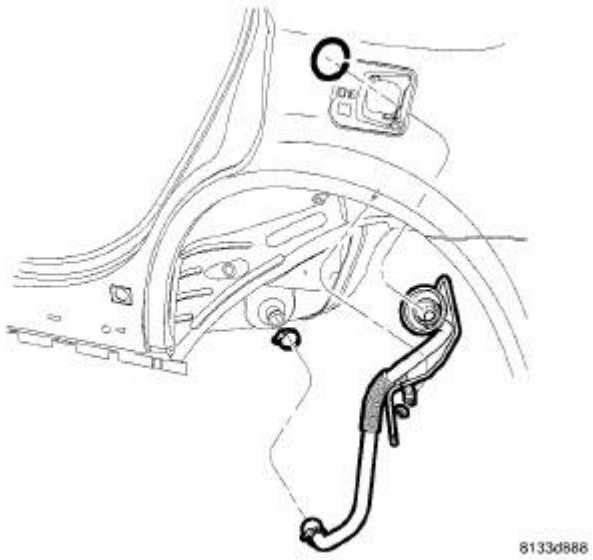


Fig. 286: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

27. Install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

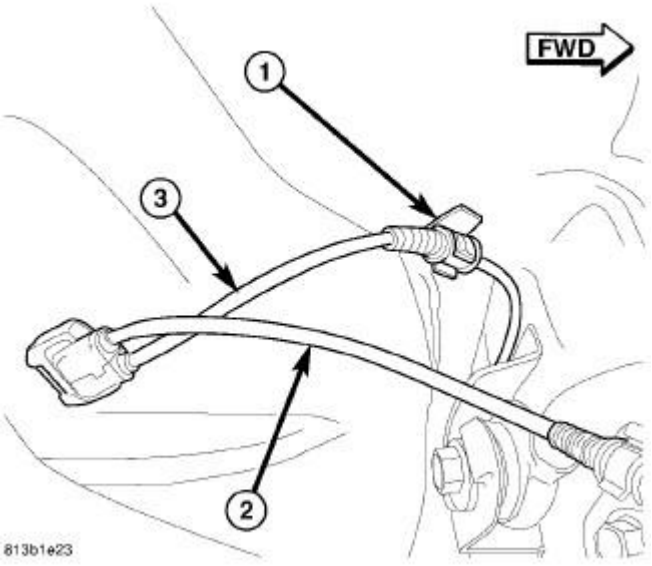


Fig. 287: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

28. Clip left rear wheel speed sensor cable (3) to routing clip (1) near body connector.

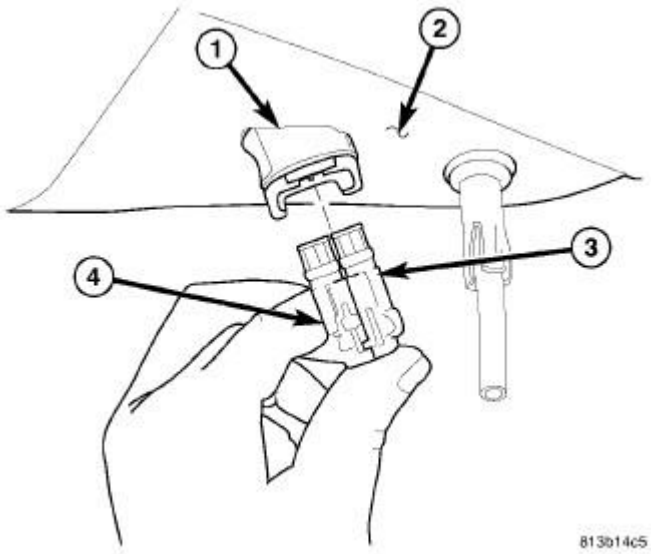


Fig. 288: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

29. Match left rear wheel speed sensor connector (4) to right sensor connector (3) to make one connector.
30. Insert speed sensor connectors (3 and 4) into body wiring harness connector (1) located in luggage compartment floor pan (2). When installing connector, make sure retaining clip on body connector is properly in place and sensor connector cannot be pulled out.

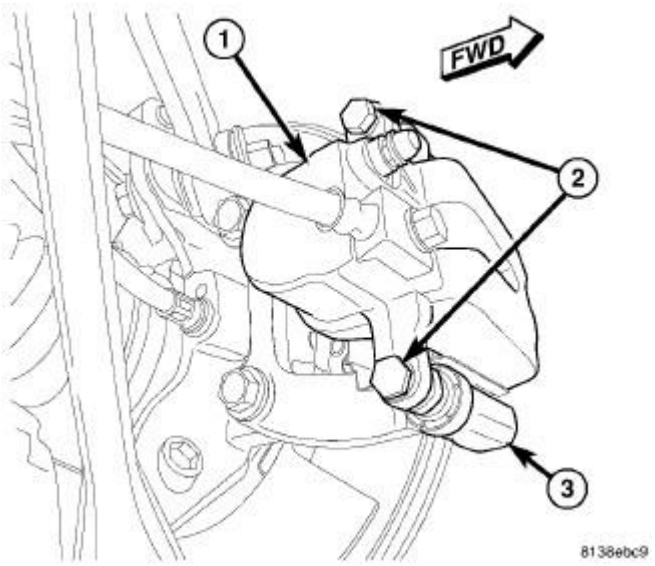


Fig. 289: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

31. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.
    2. Guide caliper and brake hose down through rear suspension, then slide caliper over brake pads and onto caliper adapter (3).

       CAUTION: Extreme caution should be taken not to cross-thread caliper guide pin bolts (2) when they are installed.

    3. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 31 N.m (23 ft. lbs.) torque.
    4. Make sure brake hose is properly routed and will not come in contact with suspension components.
32. If equipped with SRT8 disc brakes, at each rear disc brake, support spring link using a transmission jack or other appropriate jack as indicated in removal procedure. Refer to **ISOLATOR, REAR CROSSMEMBER, DIFFERENTIAL, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, FRONT MOUNT, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, REAR MOUNT, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, SPRING LINK, REMOVAL**.

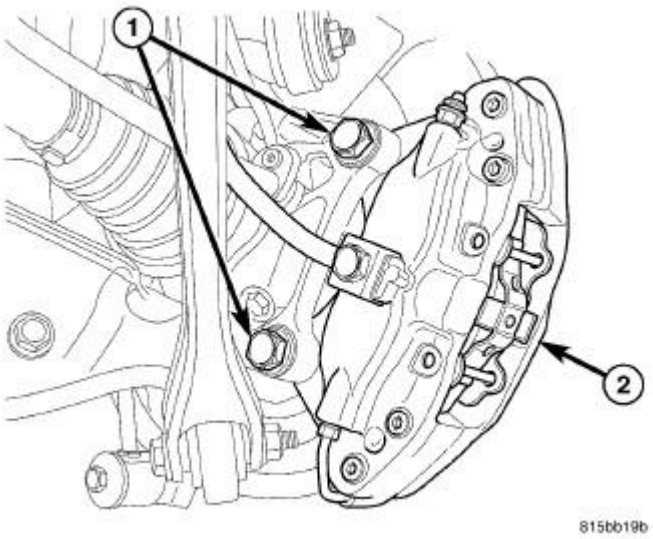


Fig. 290: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

33. If equipped with SRT8 disc brakes, on each rear disc brake, slide caliper with pads (2) over brake rotor and align with knuckle.
34. If equipped with SRT8 disc brakes, on each rear disc brake, install caliper mounting bolts (1). Tighten bolts to 130 N.m (96 ft. lbs.) torque.
35. If equipped with SRT8 disc brakes, on each rear disc brake, remove jack from under spring link.

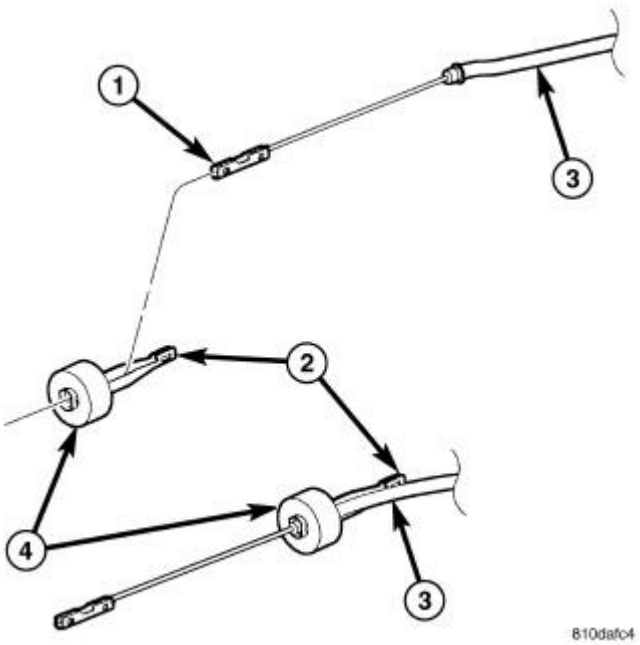


Fig. 291: Front Cable Installation Into Equalizer

Courtesy of CHRYSLER GROUP, LLC

36. Route parking brake cable above rear crossmember, then slide cable (1, 3) through equalizer (2) above rear axle differential (once installed).

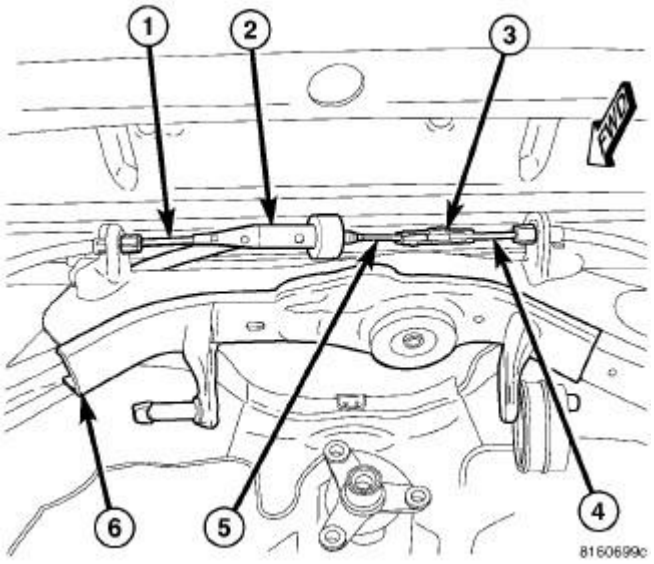


Fig. 292: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

37. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4).

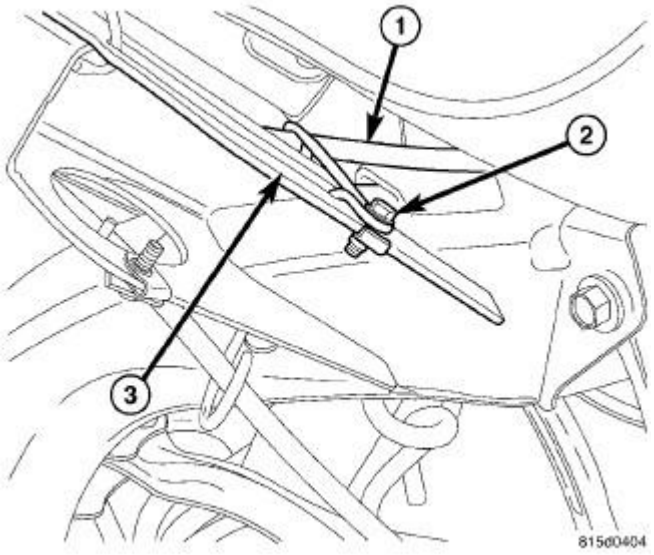


Fig. 293: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

38. Insert front parking brake cable routing bracket locating pin into front flange of crossmember (3), then install screw (2) fastening cable (1) routing bracket to rear crossmember.

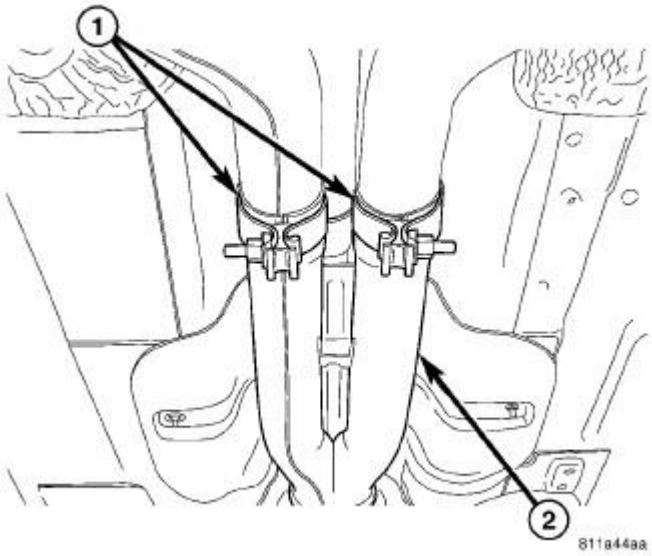


Fig. 294: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

39. Install rear exhaust system (2) (dual-outlet exhaust shown in figure).

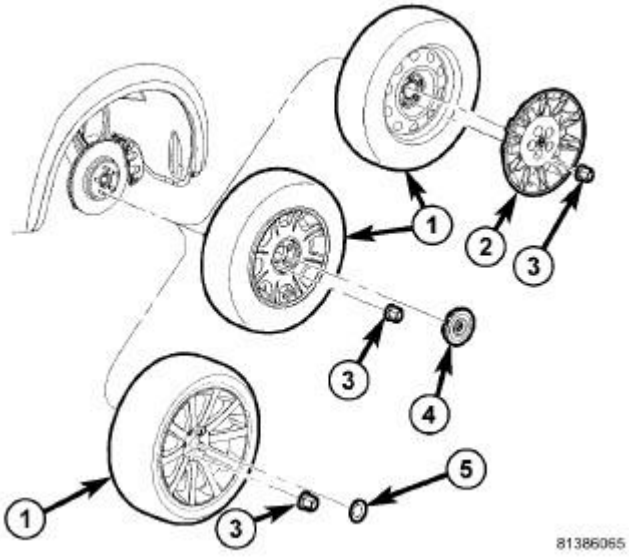


Fig. 295: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

40. Install tire and wheel assemblies (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.). Refer to **INSTALLATION** .
41. Lower vehicle until rear wheels are just above floor level.
42. Apply parking brake lever. Release lever, then reapply.
43. Check to make sure rear wheels will not rotate with lever applied.
44. Lower vehicle.

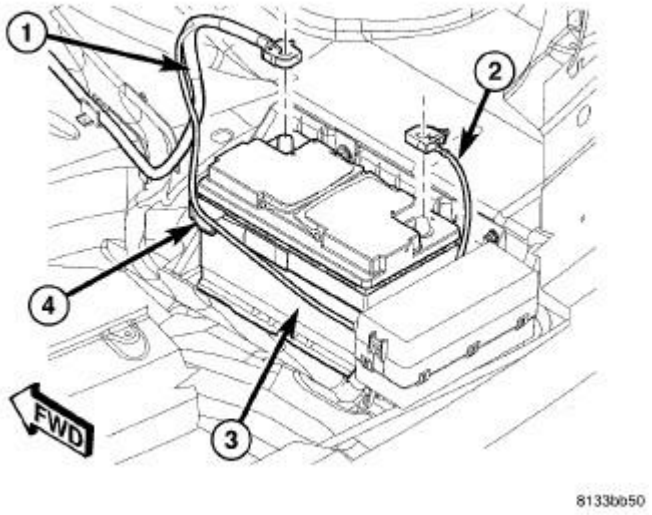


Fig. 296: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

45. Connect battery negative cable (2) to battery post.
46. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
47. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolts.

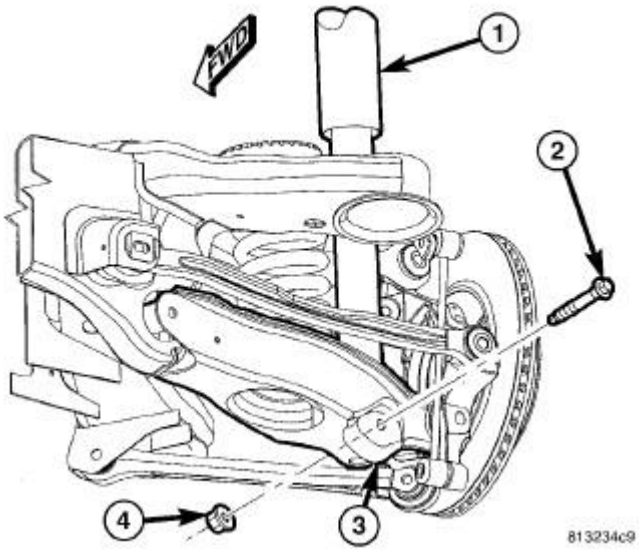


Fig. 297: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

48. Tighten shock absorber lower mounting bolt nuts (4) to 72 N.m (53 ft. lbs.).
49. Perform wheel alignment, paying special attention to thrust angle. If rear crossmember needs to be shifted to align thrust angle, try to avoid compromising tension link clearance (). Refer to 22 and **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

ISOLATOR, REAR CROSSMEMBER, SPRING LINK

REMOVAL

REMOVAL

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Access and remove rear spring on side of repair. Refer to **SPRING(S), REMOVAL** .

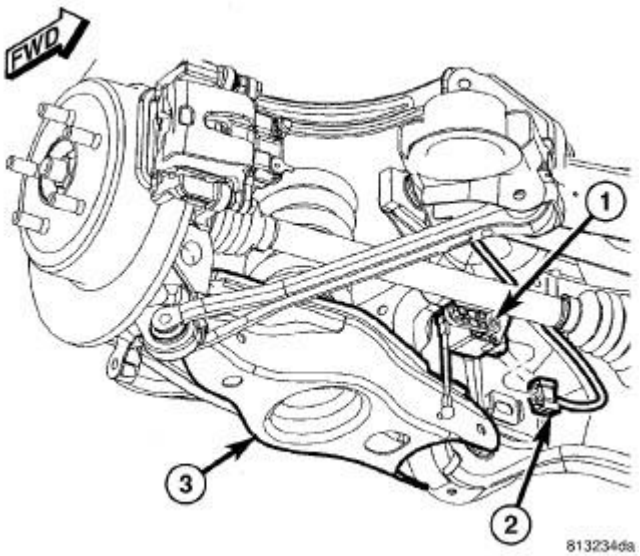


Fig. 298: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Export Only - If servicing right side bushing, disconnect headlamp leveling sensor (1) link at spring link (3).

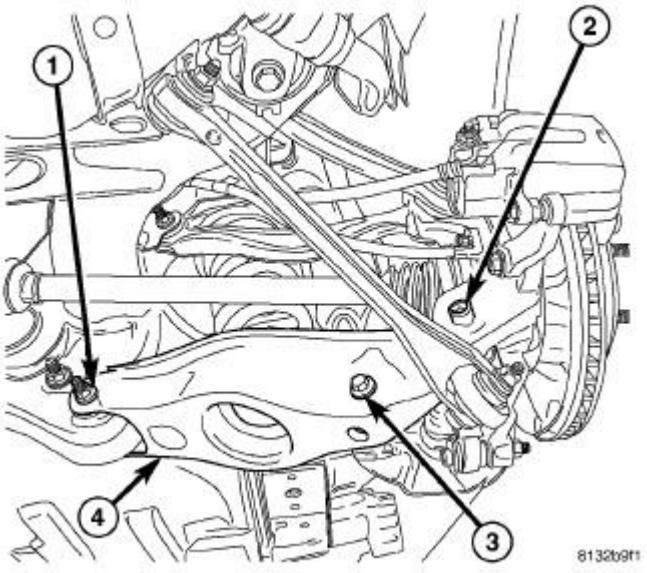


Fig. 299: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolt and nut (1) fastening spring link (4) to crossmember.
5. Position spring link downward, away from bushing in crossmember.

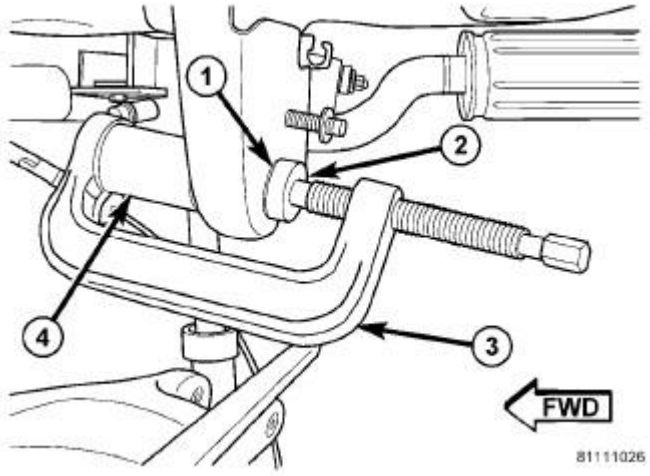


Fig. 300: Spring Link Bushing Removal
Courtesy of CHRYSLER GROUP, LLC

1 - BUSHING
2 - REMOVER 9032-2
3 - PRESS C-4212F
4 - RECEIVER 9032-1

NOTE: Prior to using Press (3), Special Tool (special tool #C-4212F, Press, Ball Joint), lubricate screw-drive threads to provide ease of use and promote tool longevity.

6. Assemble tools over bushing as shown (See list). Ensure Receiver, Special Tool (special tool #9032-1, Receiver, Bushing), sets against crossmember and not welds.
   - (2) Remover (special tool #9032-2, Receiver, Bushing)
   - (3) Press (special tool #C-4212F, Press, Ball Joint)
   - (4) Receiver (special tool #9032-1, Receiver, Bushing)
7. Tighten Press screw-drive, pressing bushing out of crossmember.

INSTALLATION

INSTALLATION

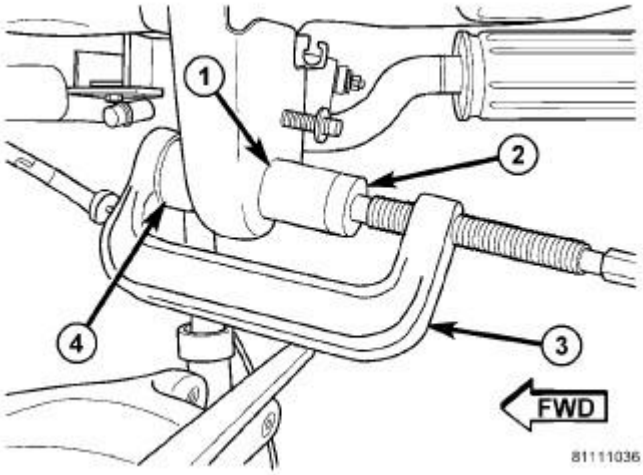


Fig. 301: Spring Link Bushing Installation
Courtesy of CHRYSLER GROUP, LLC

1 - BUSHING
2 - REMOVER/INSTALLER 9032-2
3 - PRESS C-4212F
4 - RECEIVER 9032-3

1. Position bushing (1) over rear of crossmember bushing bore.
2. Assemble tools over bushing and crossmember as shown (See list). Ensure Receiver, Special Tool (special tool #9032-3, Pusher, Bushing), is positioned to avoid welds on rear of crossmember bushing bore.
    - (2) Remover/Installer (special tool #9032-2, Receiver, Bushing)
    - (3) Press (special tool #C-4212F, Press, Ball Joint)
    - (4) Receiver (special tool #9032-3, Pusher, Bushing)
3. Tighten Press screw-drive, pressing bushing into crossmember. Install bushing until screw-drive stops, when bushing contacts Receiver on opposite side of crossmember.
4. Remove tools.

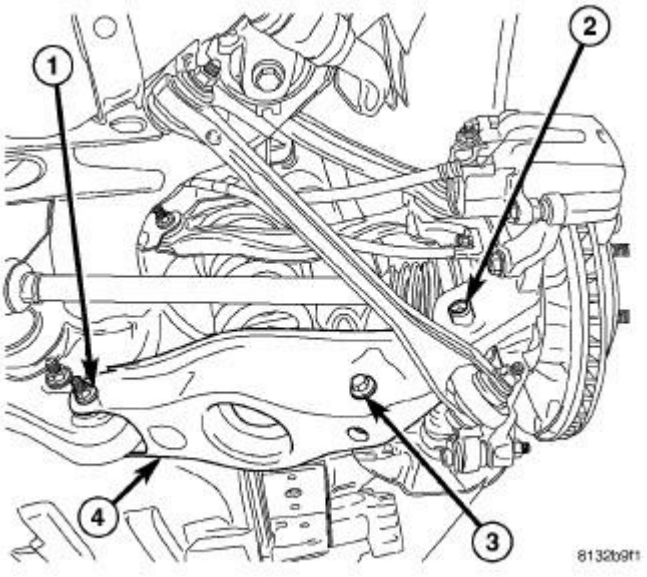


Fig. 302: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Swing spring link up to bushing in crossmember and install bolt and nut (1) fastening spring link (4) to crossmember. **Do not tighten bolt at this time.**

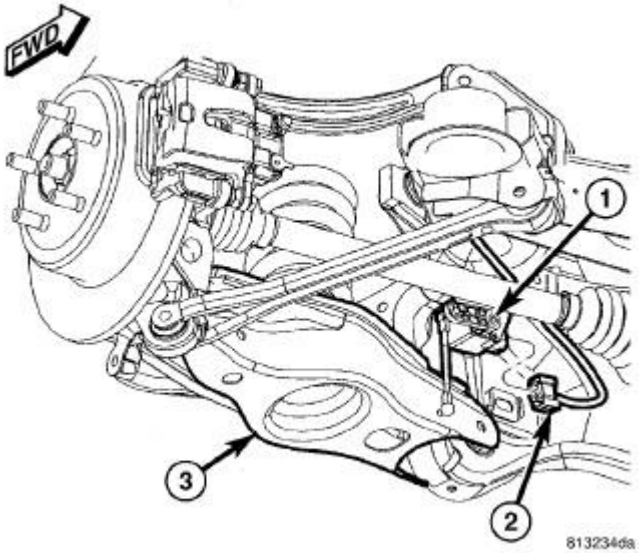


Fig. 303: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

6. Export Only - If servicing right side bushing, connect headlamp leveling sensor (1) link at spring link (3).
7. Install rear spring as well as all components necessary to access it. Refer to **SPRING(S), INSTALLATION** .

8. Lower vehicle.
9. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolt.

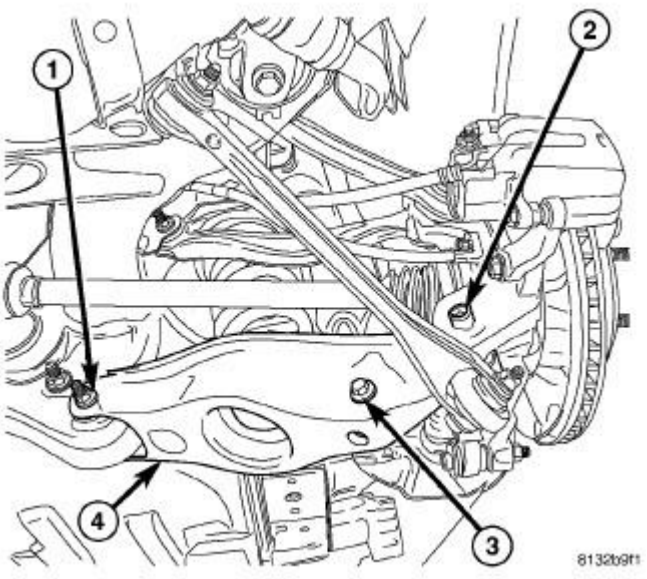


Fig. 304: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Tighten spring link bolt (1) at crossmember to 108 N.m (80 ft. lbs.).
11. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

UNDER BODY PROTECTION

BELLY PAN

REMOVAL

REMOVAL

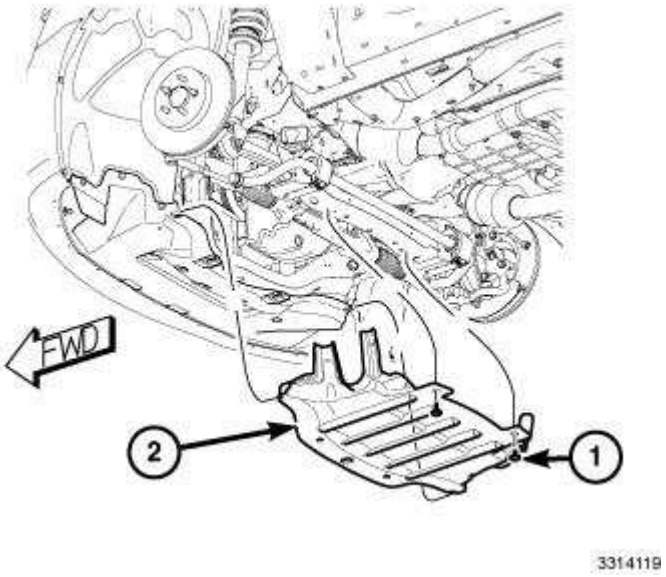


Fig. 305: Rear & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: Base model shown in illustration, SRT models similar.

1. Raise and support the vehicle.
2. Remove the four fasteners (1) that secure the rear belly pan (2) to the underside of the vehicle.
3. Pull the rear belly pan (2) rearward out of the from the front belly pan to remove from the vehicle.

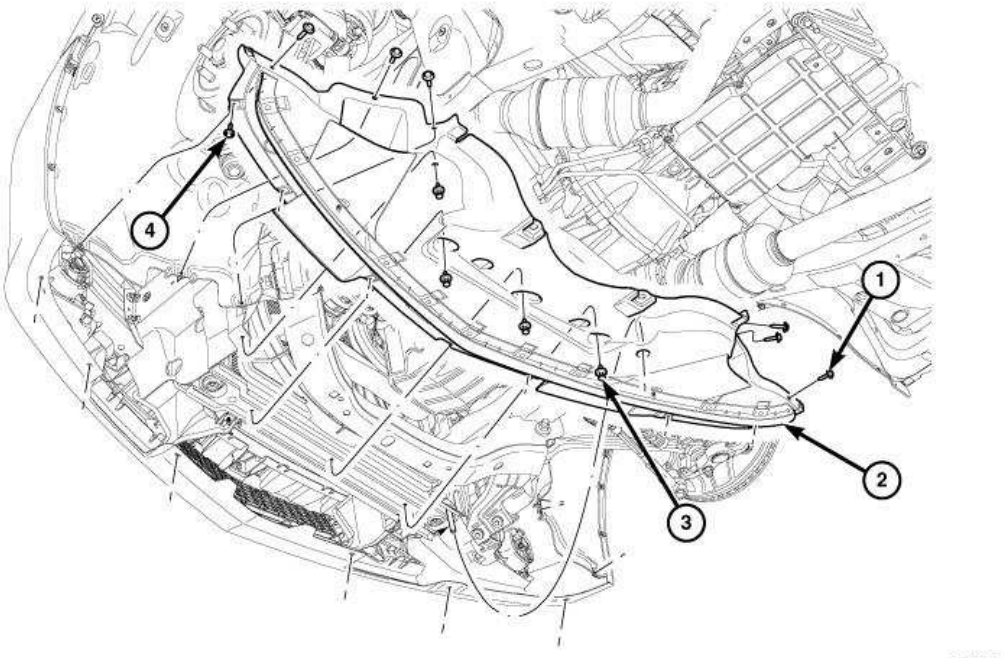


Fig. 306: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

4. Remove the six screws (4) that secure the front belly pan (2) to the underside of the vehicle's front fascia.
5. Remove the three screws (1) that secure the front belly pan (2) to the underside of the vehicle's wheelhouse inner. Repeat for the other side.
6. Remove the four push pin fasteners (3) that secure the front belly pan (2) to the underside of the vehicle's lower crossmember. Repeat for the other side.
7. Remove the front belly pan (2) from the underside of the vehicle.

INSTALLATION

INSTALLATION

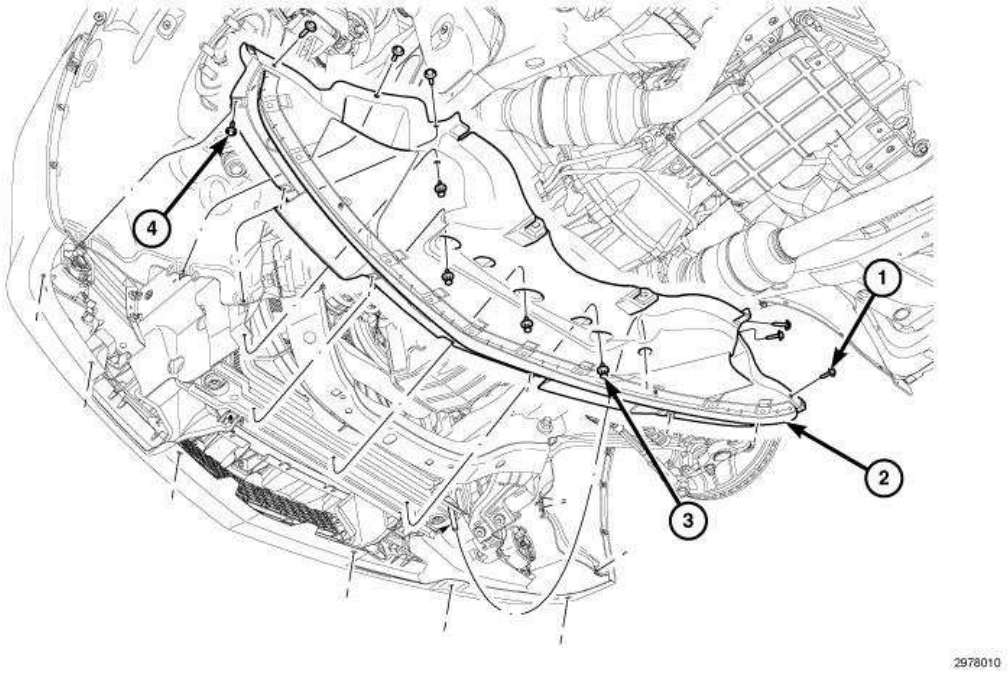


Fig. 307: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: Base model shown in illustration, SRT models similar.

1. Position the front belly pan (2) to the underside of the vehicle.
2. Install the four push pin fasteners (3) that secure the front belly pan (2) to the underside of the vehicle's lower crossmember.
3. Install the six screws (4) that secure the front belly pan (2) to the underside of the vehicle's front fascia.
4. Install the three screws (1) that secure the front belly pan (2) to the underside of the vehicle's

wheelhouse inner. Tighten the screws securely. Repeat for the other side.

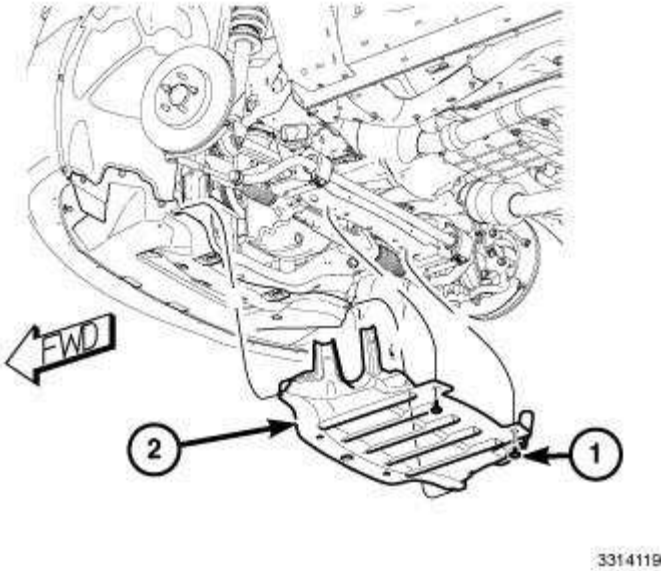


Fig. 308: Rear & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: During installation, ensure rear belly pan is shingled underneath front belly pan. Failure to do so may result in damage to belly pan.

5. Position the rear belly pan (2) to the underside of the vehicle and to the front fascia.
6. Install the fasteners (1) that secure the rear belly pan (2) to the underside of the vehicle. Tighten the fasteners securely.
7. Lower the vehicle.

SHIELD, UNDERBODY

REMOVAL

REMOVAL

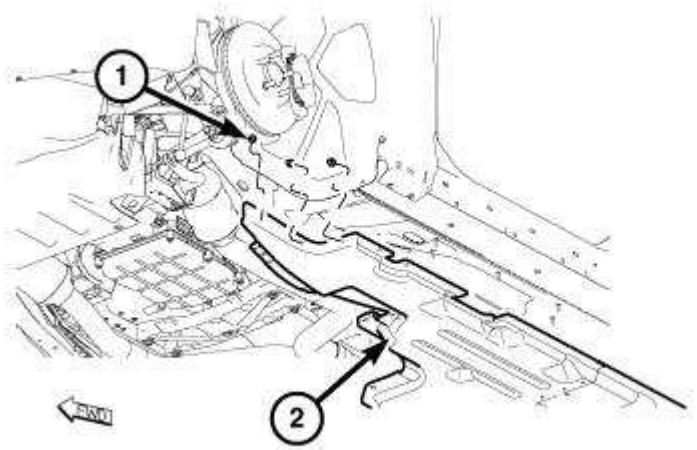


Fig. 309: Three Fasteners & Underbody Shield
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side typical.

1. Raise and support the vehicle.
2. Remove the three fasteners (1) that secure the underbody shield (2) to the front wheelhouse splash shield.

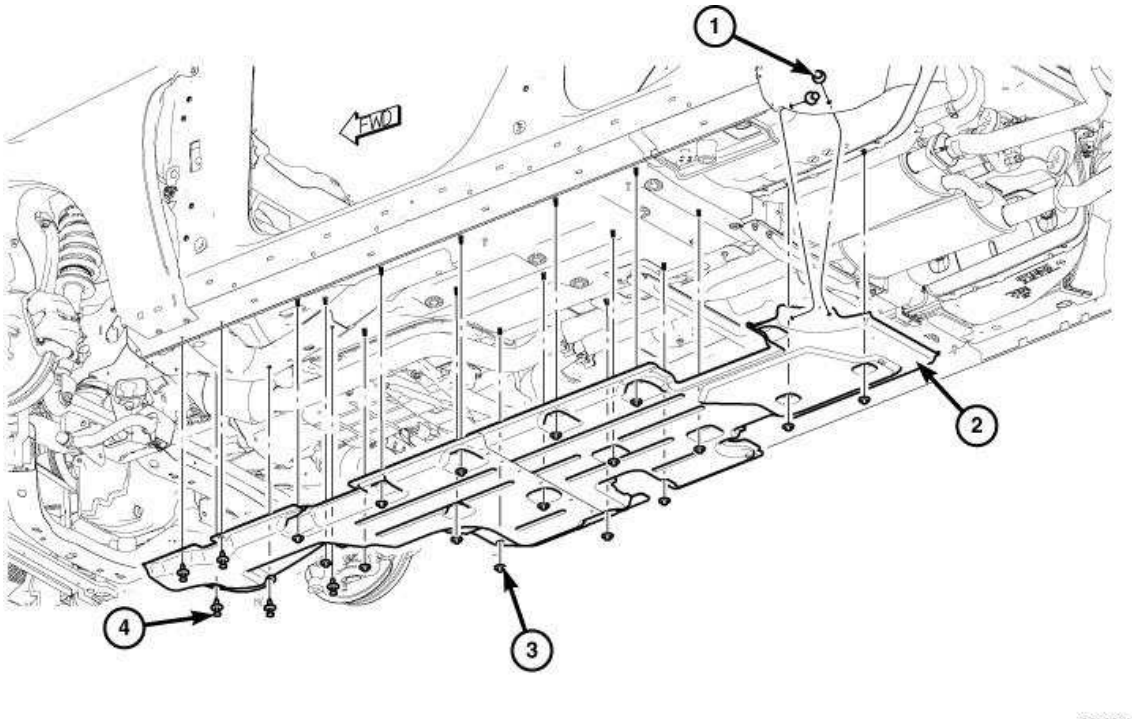


Fig. 310: Fasteners, Underbody Shield & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the two fasteners (1) that secure the underbody shield (2) to the rear wheelhouse splash shield.
4. Remove the five fasteners (4) located near the front of the shield that secure the underbody shield (2) to the vehicle.
5. Remove the sixteen retaining nuts (3) that secure the underbody shield (1) to the vehicle underbody.
6. Remove the underbody shield from the vehicle.

INSTALLATION

INSTALLATION

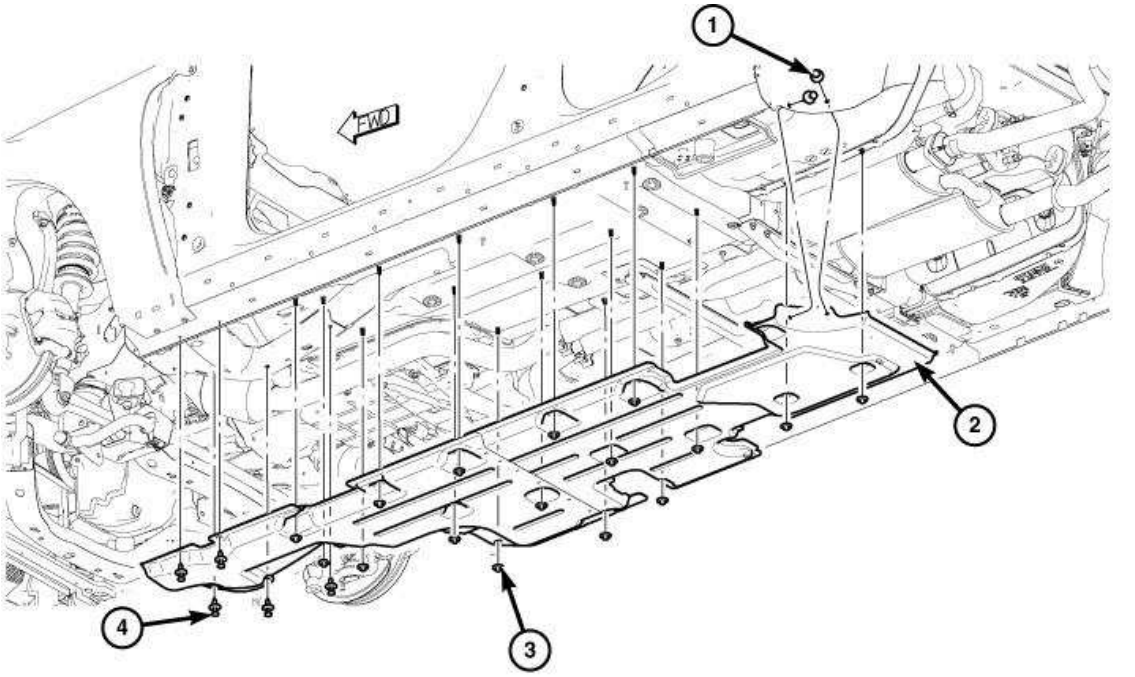


Fig. 311: Fasteners, Underbody Shield & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side typical.

1. Position the underbody shield (1) to the vehicle.
2. Install the sixteen retaining nuts (3) that secure the underbody shield (1) to the vehicle underbody. Tighten the nuts securely.
3. Install the five fasteners (4) located near the front of the shield that secure the underbody shield (2) to the vehicle.
4. Install the two fasteners (1) that secure the underbody shield (1) to the rear wheelhouse splash shield.

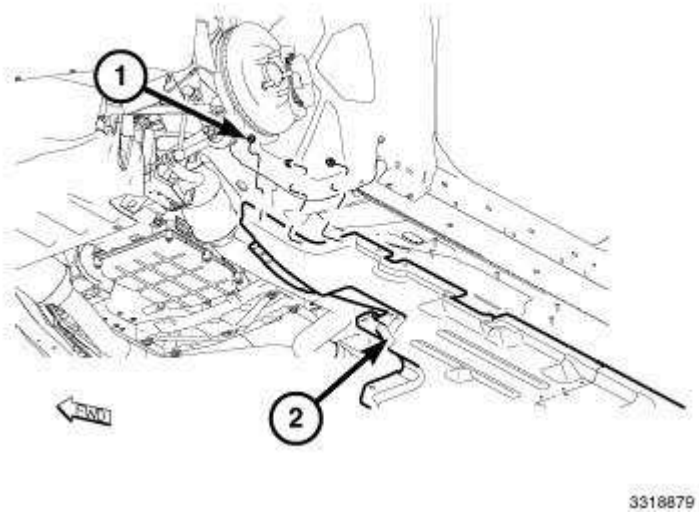


Fig. 312: Three Fasteners & Underbody Shield
Courtesy of CHRYSLER GROUP, LLC

5. Install the three fasteners (1) that secure the underbody shield (2) to the front wheelhouse splash shield. Tighten the fasteners securely.
6. Lower the vehicle.

SHIELD, REAR MOUNT

REMOVAL

REMOVAL

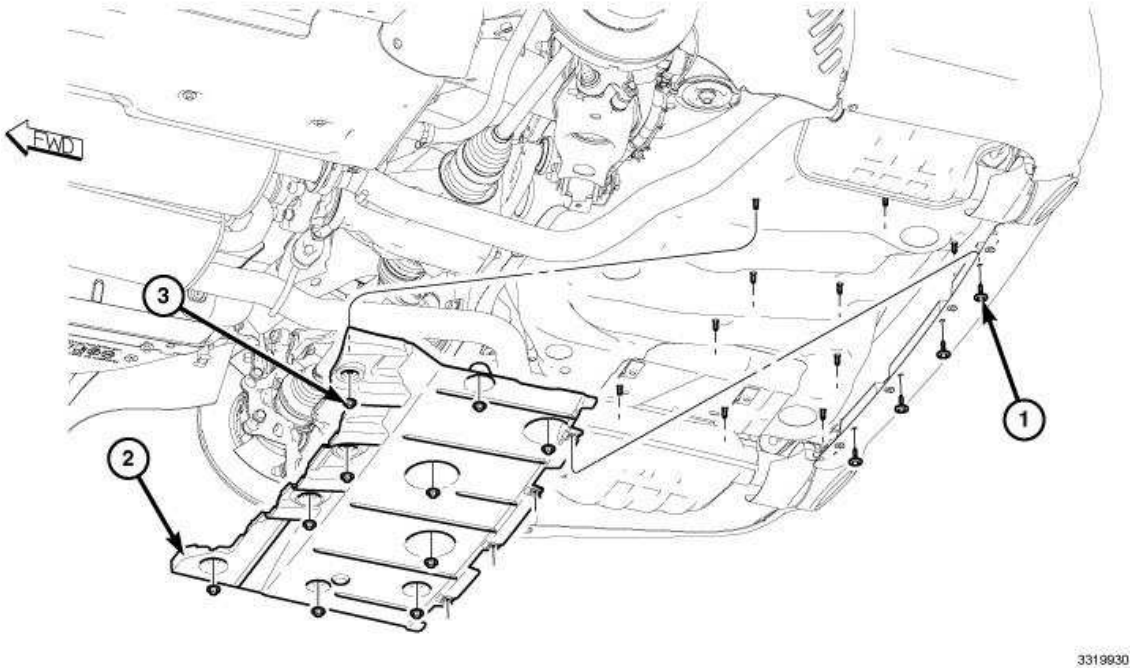


Fig. 313: Retaining Screws, Underbody Shield/Panel & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the four retaining screws (1) that secure the rear underbody shield/panel (2) to the rear fascia.
3. Remove the ten retaining nuts (3) that secure the rear underbody shield/panel (2) to the tire tub area located forward of the rear fascia.
4. Remove the rear underbody shield/panel (2) from the vehicle.

INSTALLATION

INSTALLATION

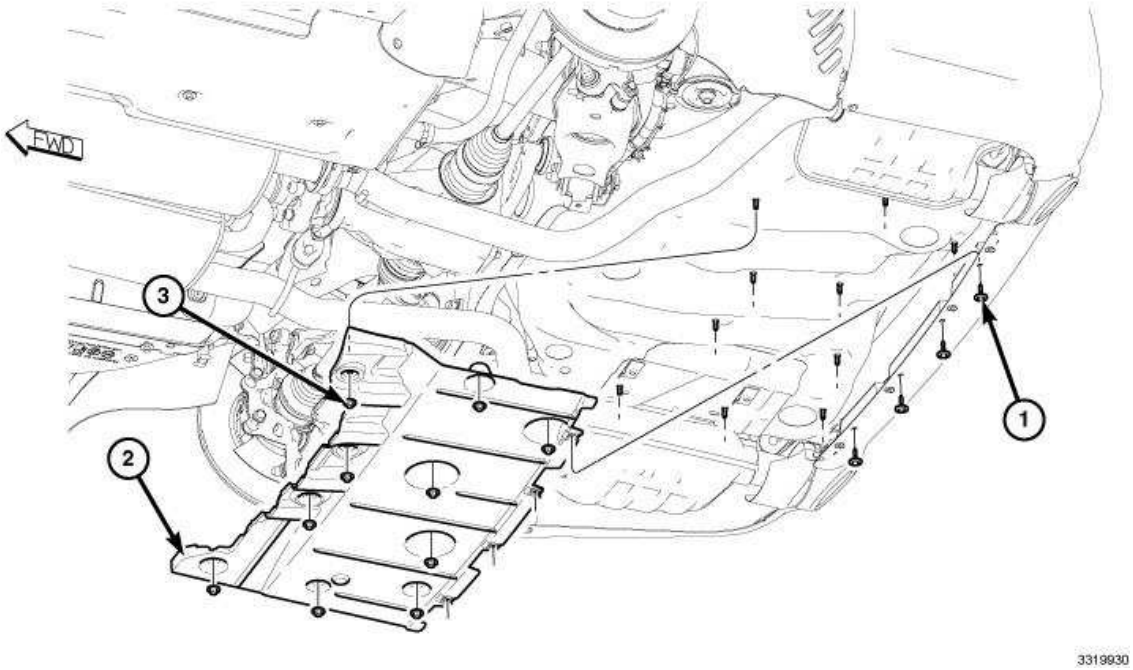


Fig. 314: Retaining Screws, Underbody Shield/Panel & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear underbody shield/panel (2) to the vehicle.
2. Install the ten retaining nuts (3) that secure the underbody shield (2) to the vehicle underbody. Tighten the nuts securely.
3. Install the four retaining screws (1) that secure the underbody shield (2) to the vehicle underbody. Tighten the nuts securely.
4. Lower the vehicle.

DRIVELINE/AXLES

Front Axle - Chrysler 300

DESCRIPTION

DESCRIPTION

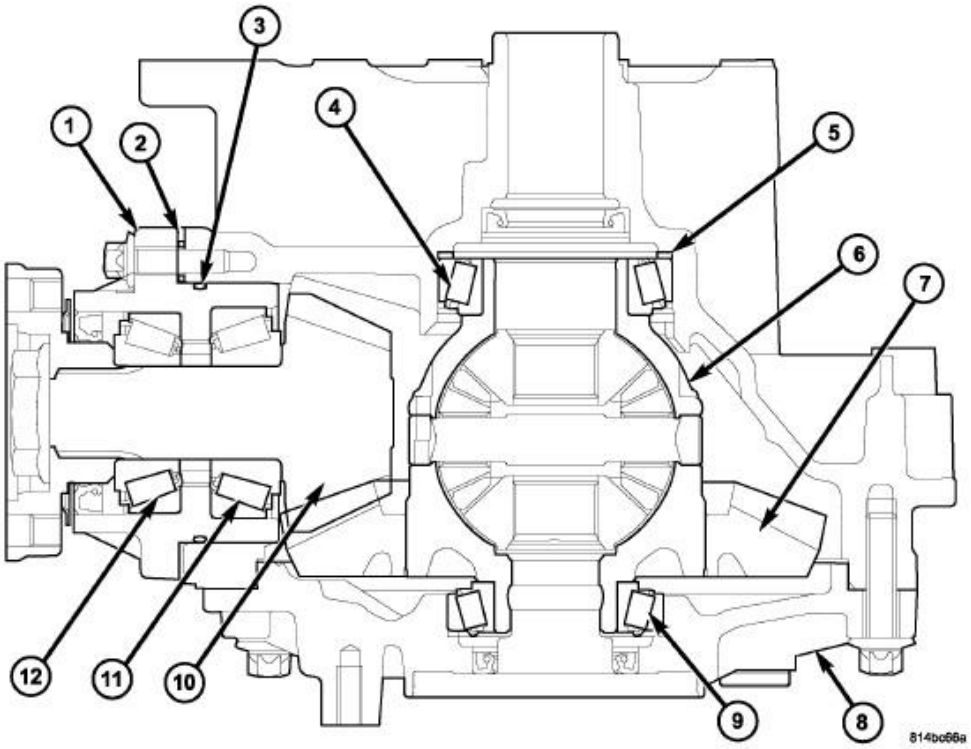


Fig. 1: Fia Axle Section View
Courtesy of CHRYSLER GROUP, LLC

1 - PINION HOUSING ASSEMBLY	7 - RING GEAR
2 - SHIM, PINION DEPTH	8 - COVER, AXLE
3 - O-RING SEAL, PINION HOUSING	9 - BEARING, DIFFERENTIAL SIDE (SMALL)
4 - BEARING, DIFFERENTIAL SIDE (LARGE)	10 - GEAR, PINION
5 - SHIM, SELECT	11 - BEARING, PINION HEAD
6 - DIFFERENTIAL ASSEMBLY	12 - BEARING, PINION TAIL

The 175MM FIA (Front Independent Aluminum). is an independent assembly with an aluminum housing and cast iron differential. The 175MM FIA uses an open differential which is supported by two tapered roller bearings located on either side of the case. Differential bearing preload and ring gear backlash are controlled with select shims located on the outside of the differential bearing cups. Pinion height is set with a select shim sandwiched between the pinion housing assembly and the axle housing.

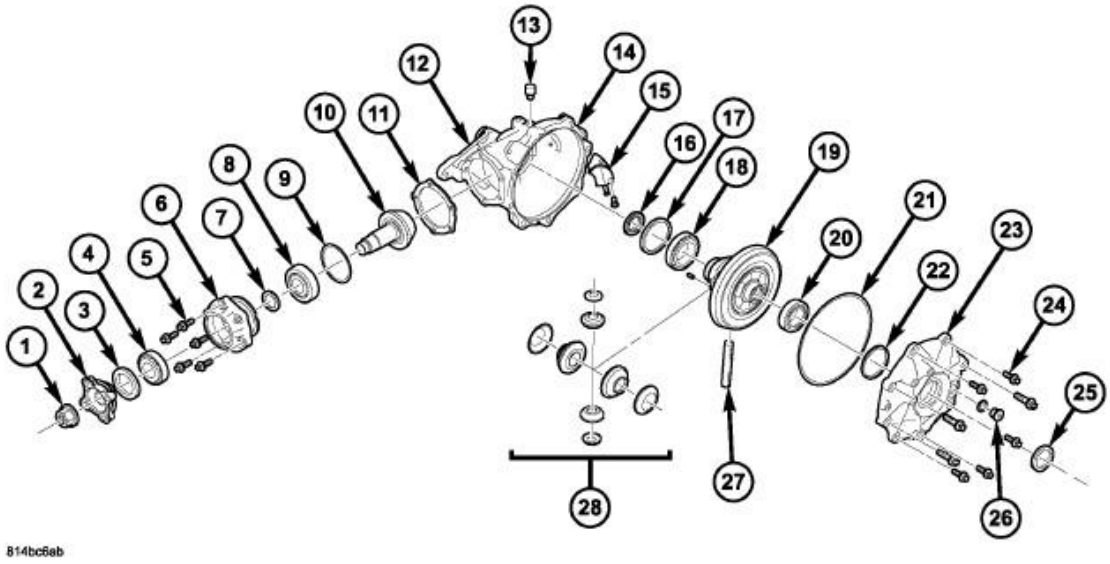


Fig. 2: 175mm Fia Front Axle Exploded View
Courtesy of CHRYSLER GROUP, LLC

1 - NUT, PINION FLANGE1	15 - BAFFLE, VENT
2 - FLANGE, PINION	16 - SEAL, AXLE
3 - SEAL, PINION	17 - SHIM, PRELOAD
4 - BEARING, PINION TAIL	18 - BEARING, DIFFERENTIAL SIDE
5 - BOLT, PINION HOUSING	19 - ASSEMBLY, RING GEAR/DIFFERENTIAL
6 - HOUSING, PINION	20 - BEARING, DIFFERENTIAL SIDE
7 - SPACER, SELECT	21 - SEAL, AXLE COVER O-RING
8 - BEARING, PINION HEAD	22 - SHIM, BEARING PRELOAD
9 - SEAL, PINION HOUSING O-RING	23 - COVER, AXLE HOUSING
10 - GEAR, PINION	24 - BOLT, AXLE HOUSING COVER
11 - SHIM, PINION DEPTH (SELECT)	25 - SEAL, AXLE
12 - HOUSING, AXLE	26 - PLUG, AXLE FILL
13 - VENT, HOUSING	27 - SHAFT, DIFFERENTIAL PINION
14 - HOUSING, AXLE	28 - SIDE GEAR ASSEMBLY

The 175MM FIA Axle is available only in All-Wheel Drive models, and only in a 3:07:1 ratio. Refer to **Fig. 2**.

ADJUSTMENTS

BEARING PRELOAD

PINION BEARING PRELOAD

NOTE: **Pinion bearing preload is controlled and adjusted by means of a select-thickness spacer sandwiched between the pinion head and tail bearing cones.**

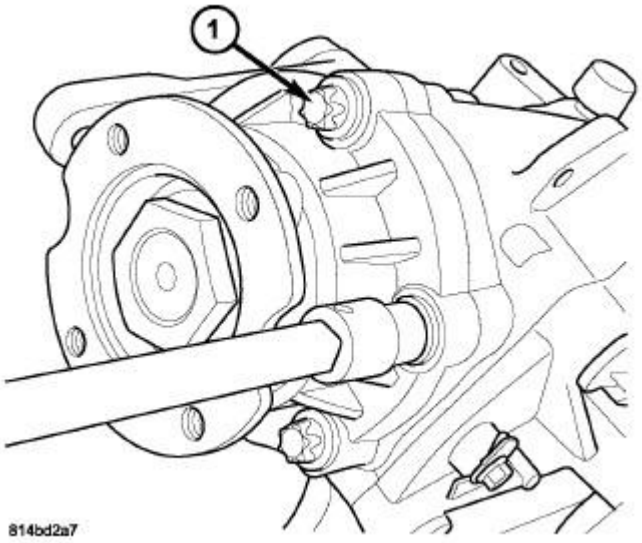


Fig. 3: Pinion Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove pinion housing bolts (1) and remove pinion housing assembly from axle housing. Refer to **Fig. 3**.

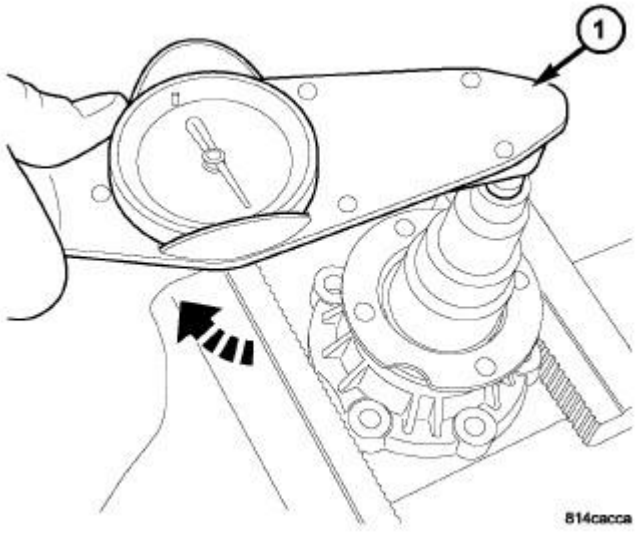


Fig. 4: Measuring Pinion Housing Assembly Turning Torque
Courtesy of CHRYSLER GROUP, LLC

2. Using a dial-type torque wrench (1), measure pinion housing rotating torque. Refer to **Fig. 4**.

Rotating torque should be within 130-260 N.m (12-23 in. lbs.). If rotating torque is below this range, disassemble pinion housing, measure and install a slightly thinner spacer (1), reassemble and reverify. If rotating torque is above this range, disassemble pinion housing, install a slightly thicker spacer, reassemble and re-verify rotating torque.

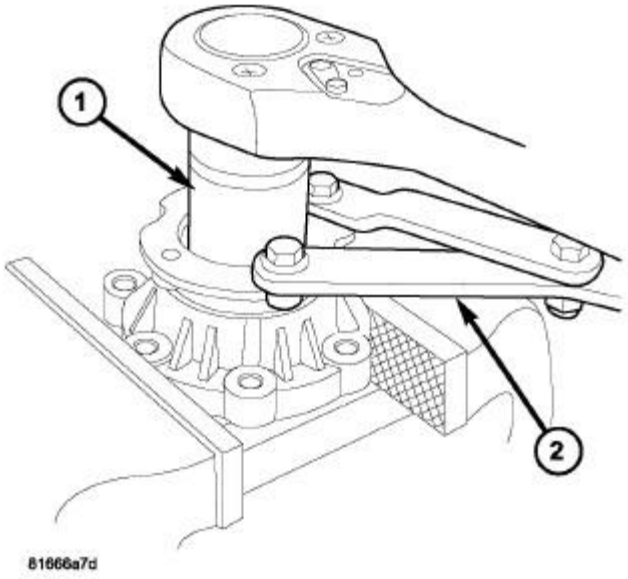


Fig. 5: Install Pinion Flange Nut/Vice
Courtesy of CHRYSLER GROUP, LLC

3. Using Spanner Wrench (special tool #6958, Wrench, Spanner) (2), remove pinion flange nut. Refer to **Fig. 5**.

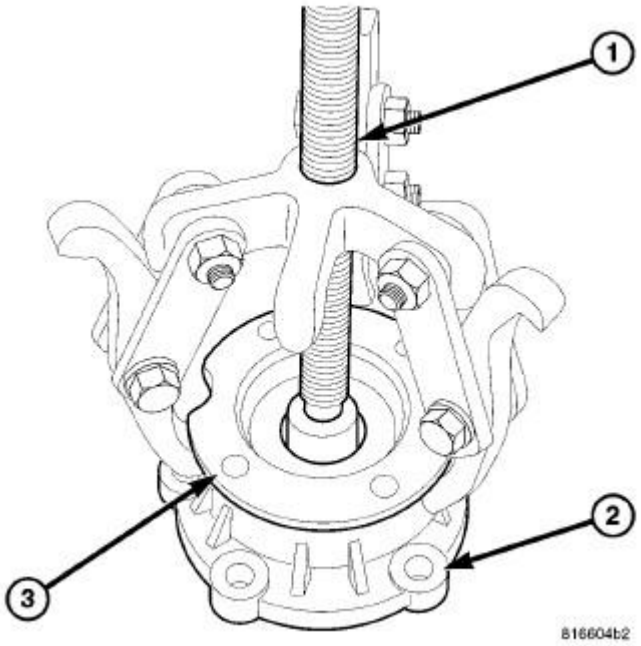


Fig. 6: Pinion Puller
Courtesy of CHRYSLER GROUP, LLC

4. Using Puller (special tool #1026, Puller) (1), remove pinion flange. Refer to **Fig. 6**.

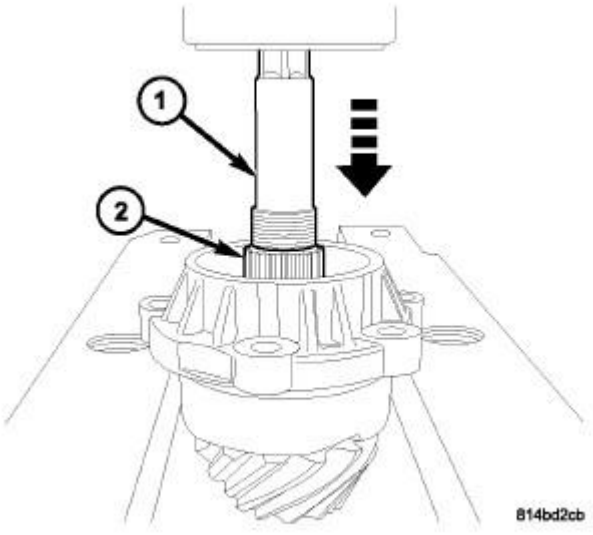


Fig. 7: Press Pinion Gear Out Of Housing
Courtesy of CHRYSLER GROUP, LLC

5. Press pinion gear (2) out of housing. Refer to **Fig. 7**.

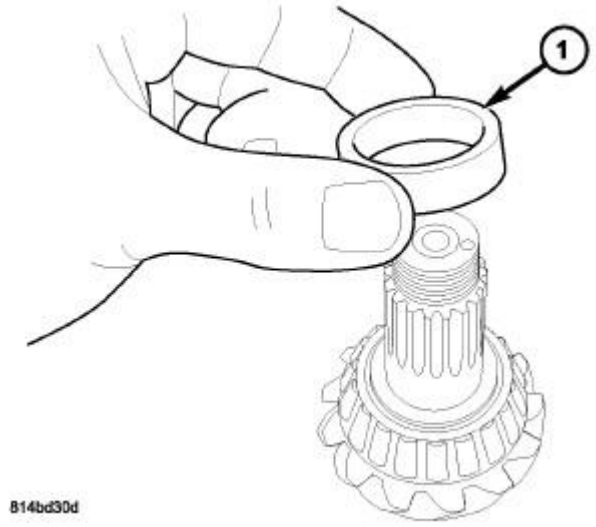


Fig. 8: Pinion Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

6. Remove pinion bearing preload spacer (1). Refer to **Fig. 8**.

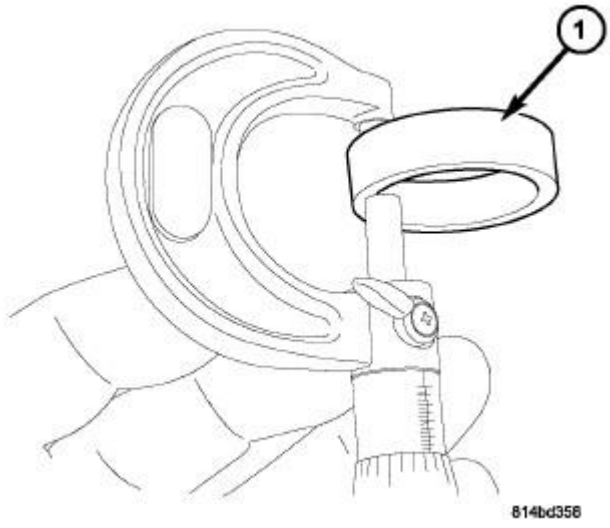


Fig. 9: Measure Pinion Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

7. Measure spacer (1) and correct per rotating torque measurement. Refer to **Fig. 9**.

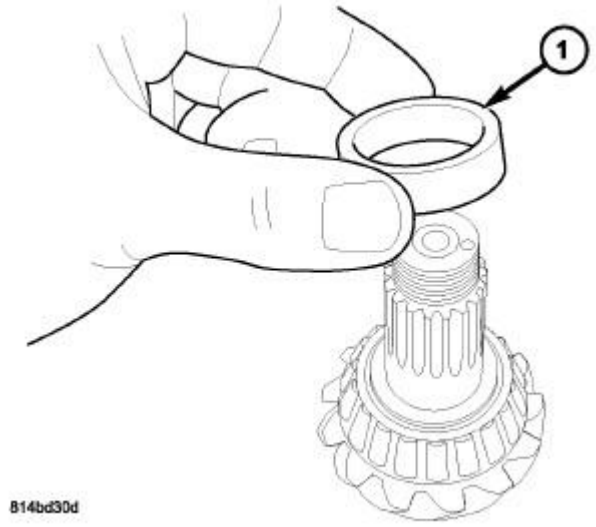


Fig. 10: Pinion Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

8. Install proper pinion bearing preload spacer (1). Refer to **Fig. 10**.

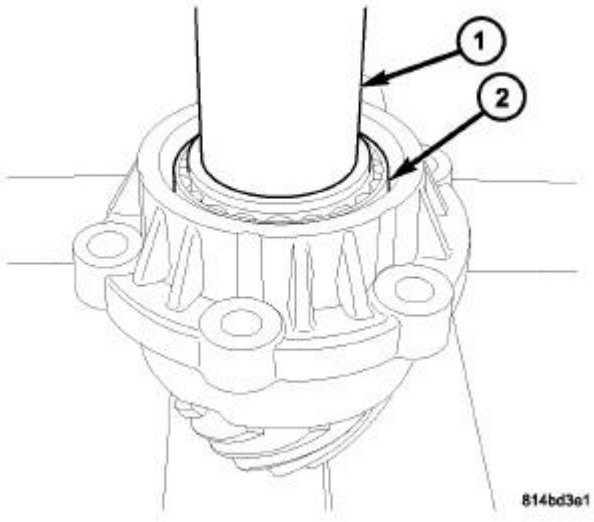


Fig. 11: Installing Pinion Tail Bearing Cone
Courtesy of CHRYSLER GROUP, LLC

9. Install pinion gear/bearing assembly to housing. Using Installer (special tool #L-4507, Installer, Bearing) (1), press pinion tail bearing (2) onto shaft until it bottoms. Refer to **Fig. 11**.

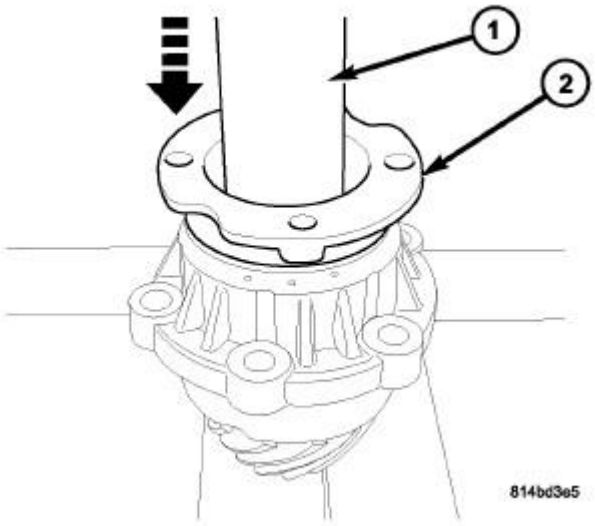


Fig. 12: Installing Pinion Flange
Courtesy of CHRYSLER GROUP, LLC

10. Using Installer (special tool #L-4507, Installer, Bearing) (1), press on pinion flange (2). Refer to **Fig. 12**.

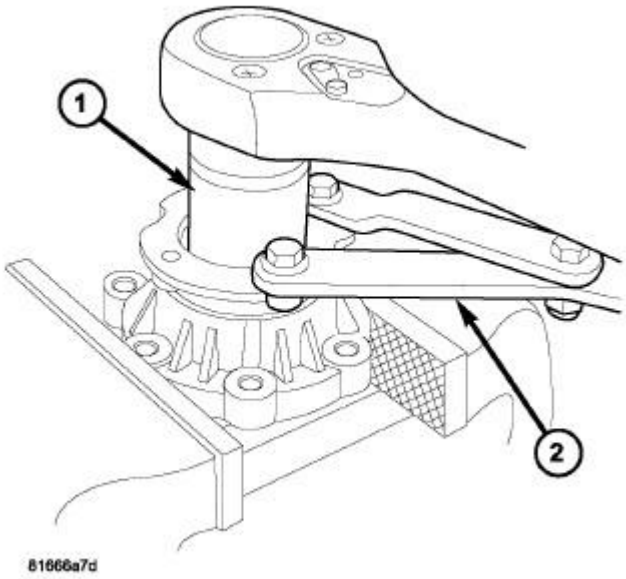


Fig. 13: Install Pinion Flange Nut/Vice
Courtesy of CHRYSLER GROUP, LLC

11. Install and torque (1) pinion flange nut to 475 N.m (350 ft. lbs.). Refer to **Fig. 13**

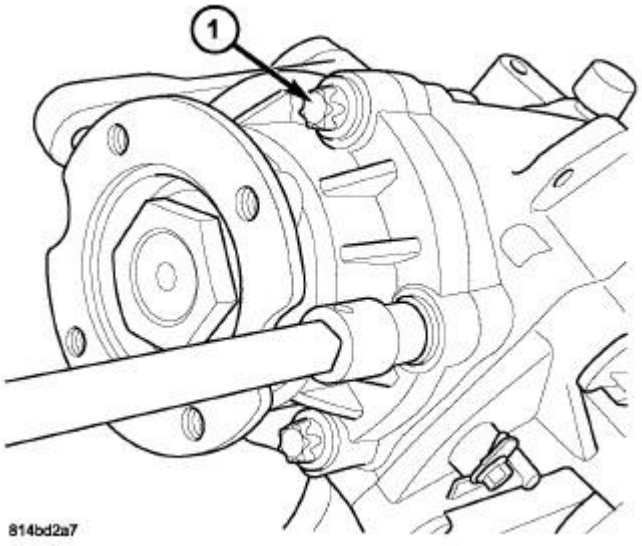


Fig. 14: Pinion Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install pinion housing assembly and depth shim to axle assembly.
13. Install and torque pinion housing-to-axle housing bolts (1) to 34 N.m (25 ft. lbs.). Refer to **Fig. 14**

DIFFERENTIAL SIDE BEARING PRELOAD

NOTE: Differential side bearing preload is controlled and adjusted by means of select-thickness shims sandwiched between the side bearing cups and the housing/cover.

NOTE: For accurate results, differential side bearing preload must only be measured when the pinion housing assembly is removed from the axle.

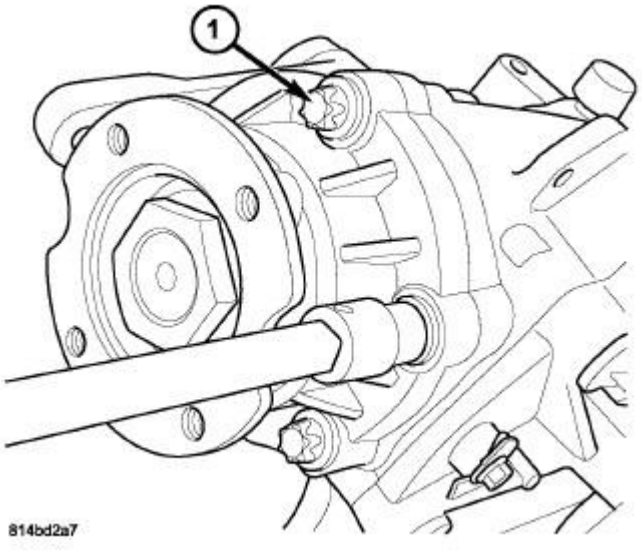


Fig. 15: Pinion Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove pinion housing-to-axle housing bolts (1). Refer to **Fig. 15**.

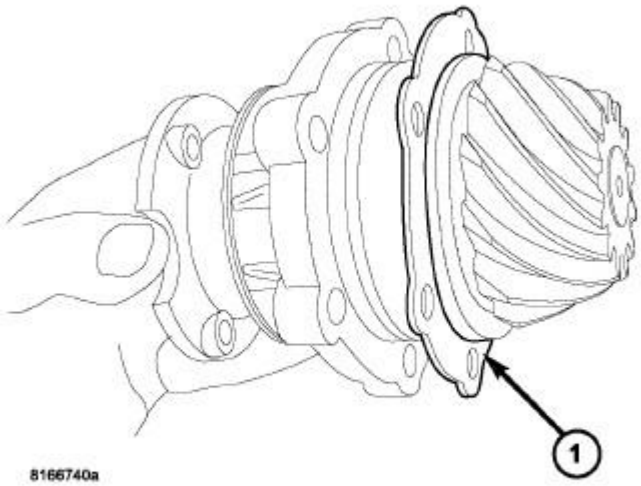


Fig. 16: Pinion Depth Shim
Courtesy of CHRYSLER GROUP, LLC

2. Remove pinion housing and depth shim (1) from axle assembly. Refer to **Fig. 16**.

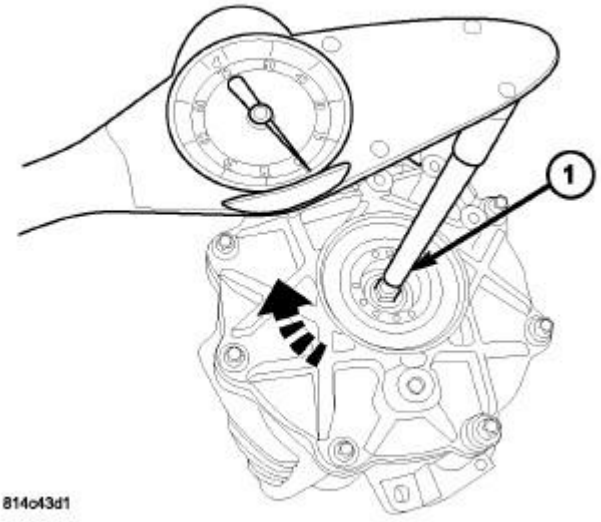


Fig. 17: Measure Differential Rotating Torque
Courtesy of CHRYSLER GROUP, LLC

3. Install Torque Tool (special tool #C-4995A, Tool, Differential Bearing Torque) (1) to differential housing as shown in illustration. Refer to **Fig. 17**. Measure and record differential rotating torque. **Differential rotating torque should be within 190-260 N.m (17-23 in. lbs.).** If rotating torque is below this range, disassemble housing, measure and install slightly thicker preload shims (1). Add thickness equally to both sides. If rotating torque is above this range, disassemble housing, measure and install slightly thinner preload shims. Remove thickness equally from both sides.

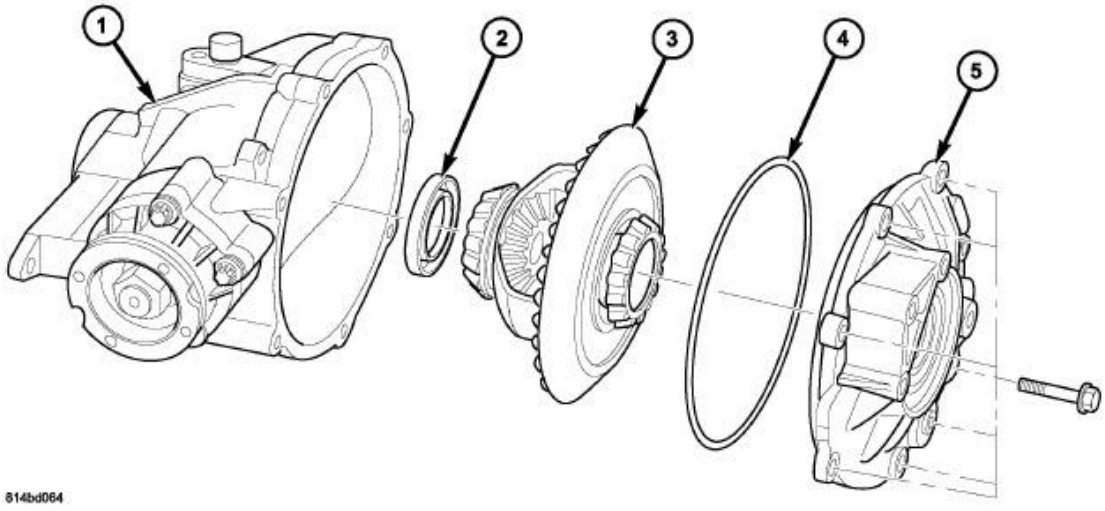


Fig. 18: Differential And Seal Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

4. Remove axle housing cover (5) and differential assembly (3). Refer to **Fig. 18**.

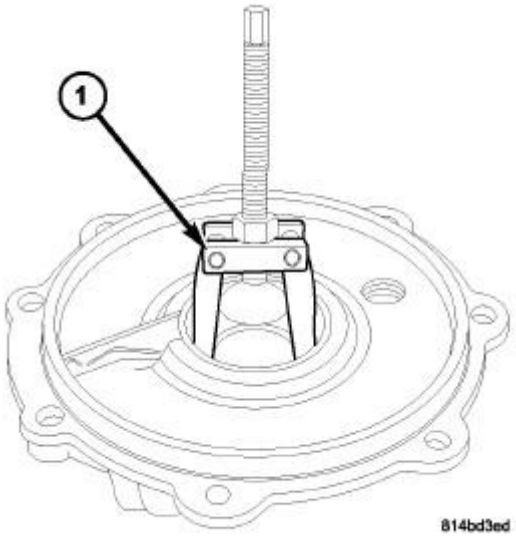


Fig. 19: Bearing Cup Remover
Courtesy of CHRYSLER GROUP, LLC

5. Remove differential side bearing cup from axle housing cover. Install Bearing Remover (special tool #6514, Remover, Bearing Cup) (1). Refer to **Fig. 19**.

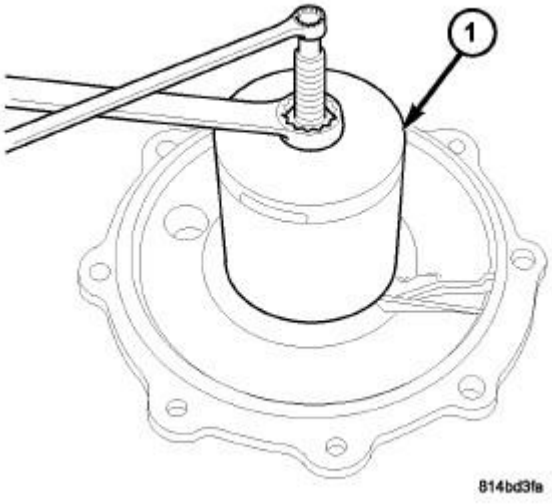


Fig. 20: Removing Differential Side Bearing Cup (Cover)
Courtesy of CHRYSLER GROUP, LLC

6. Remove differential side bearing cup with Bearing Remover (special tool #6514, Remover, Bearing Cup) (1). Refer to **Fig. 20**.

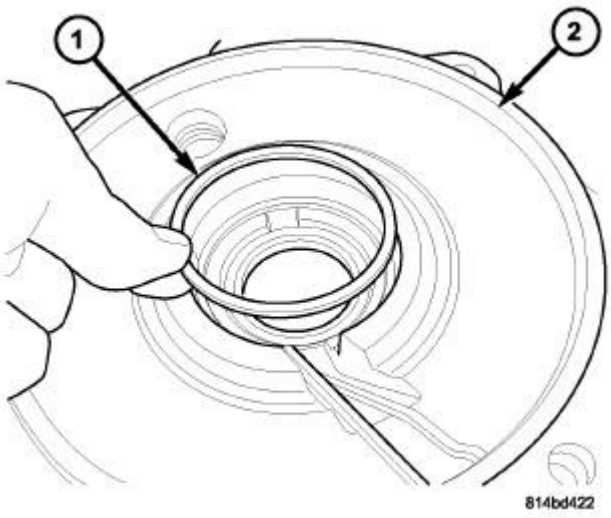


Fig. 21: Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

7. Remove side bearing preload shim (1). Refer to **Fig. 21**.

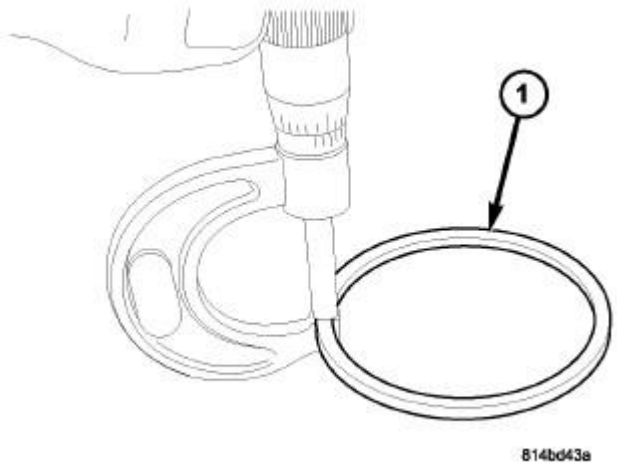


Fig. 22: Measure Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

8. Measure preload shim (1) to identify for replacement. Refer to **Fig. 22**.

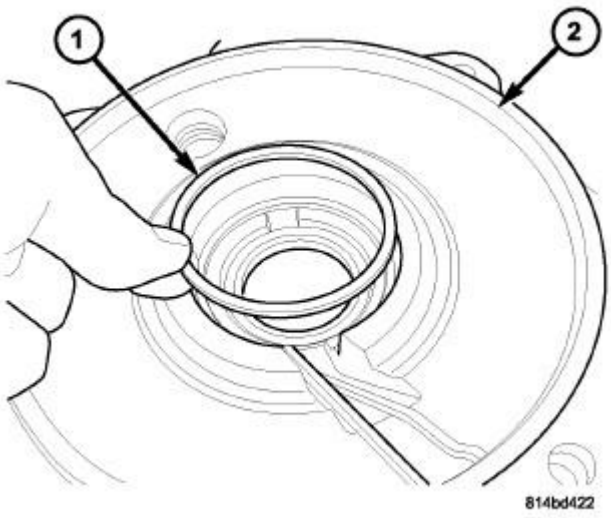


Fig. 23: Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

9. Install new differential side bearing preload shim (1) into axle housing cover (2). Refer to **Fig. 23**.

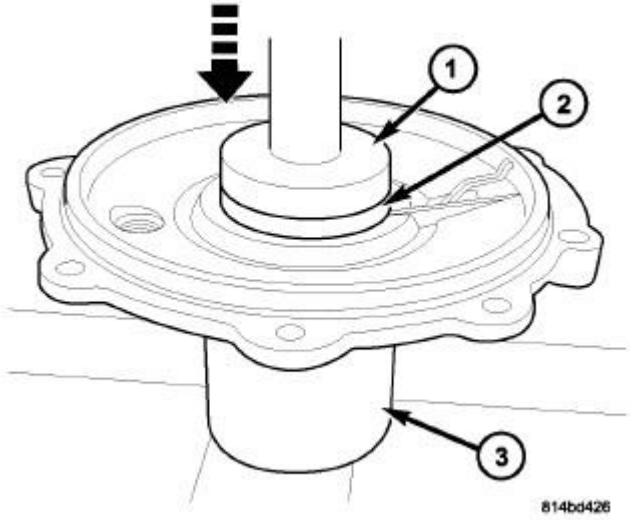


Fig. 24: Installing Side Bearing Cup (Cover)
Courtesy of CHRYSLER GROUP, LLC

10. Using Handle (special tool #C-4171, Driver Handle, Universal) and Installer (special tool #D-129, Installer, Bearing Cup) press new side bearing cup into cover until it bottoms. Use suitable cup (3) to support and protect cover.

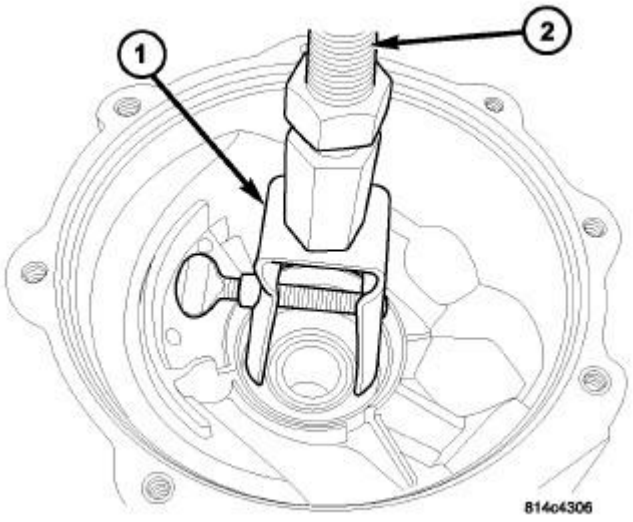


Fig. 25: Removing Inner Diff Side Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

11. Using Remover (special tool #9664, Remover, Bearing Cup) (1) and Slide Hammer (special tool #C-637, Slide Hammer, Universal) (2), remove differential side bearing (inboard) cup. Refer to **Fig. 25**.

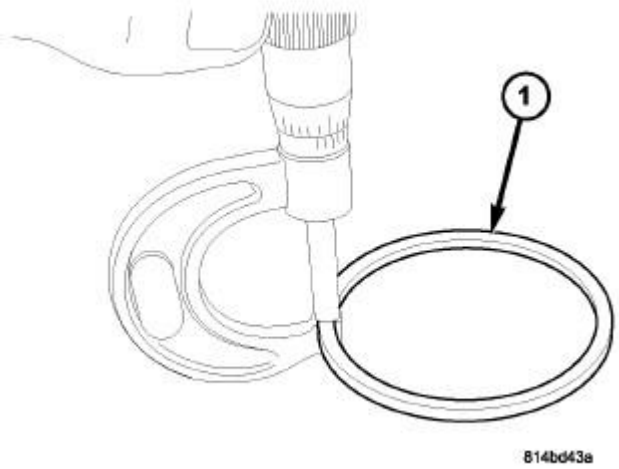


Fig. 26: Measure Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

12. Measure preload shim (1) to identify for replacement.
13. Install new differential side bearing preload shim (1) into axle housing. Refer to **Fig. 26**.
14. Using Handle (special tool #C-4171, Driver Handle, Universal) and Installer (special tool #D-

145, Installer, Bearing Cup), press differential side bearing cup into housing until it bottoms.

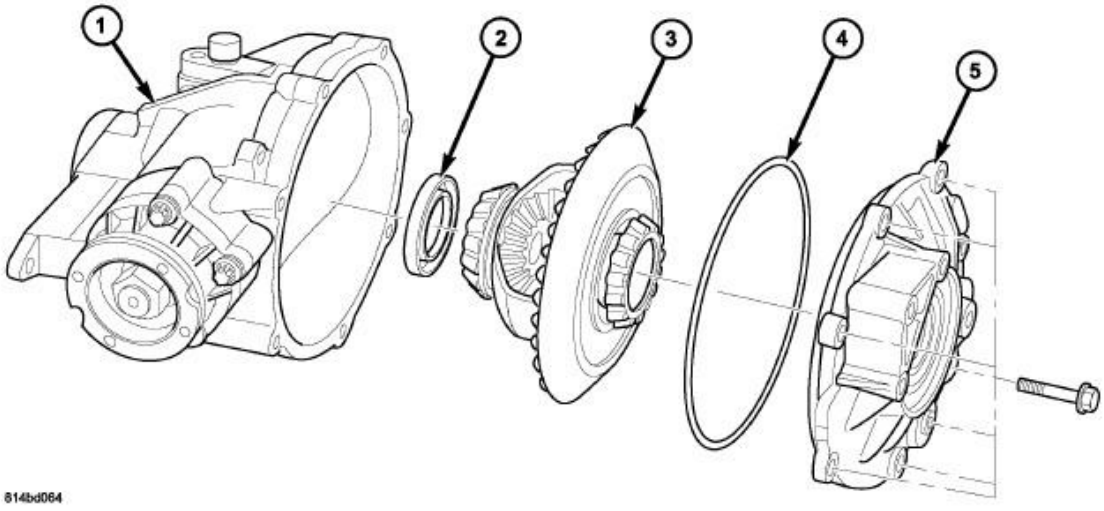


Fig. 27: Differential And Seal Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

15. Install differential/ring gear assembly (3), new cover o-ring seal (4), and cover (5). Refer to **Fig. 27**.
16. Install and torque cover-to-housing bolts to:
    - M10x40 - 65 N.m (48 ft. lbs.)
    - M8x25 - 34 N.m (25 ft. lbs.)

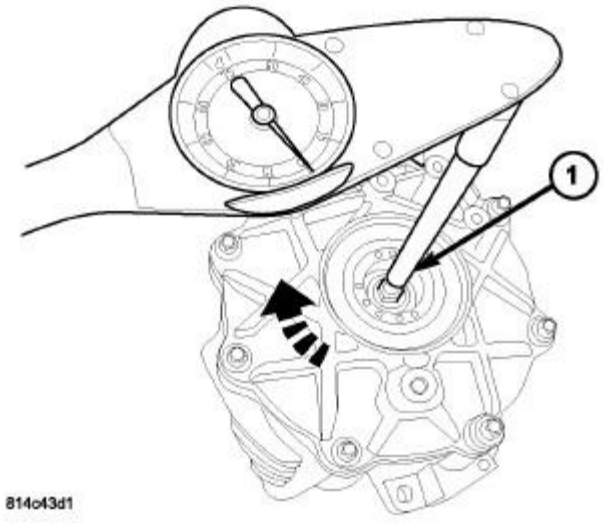


Fig. 28: Measure Differential Rotating Torque

Courtesy of CHRYSLER GROUP, LLC

17. Again verify rotating torque measurement (1). Refer to **Fig. 28**. Repeat adjustment procedure until proper rotating torque is obtained.

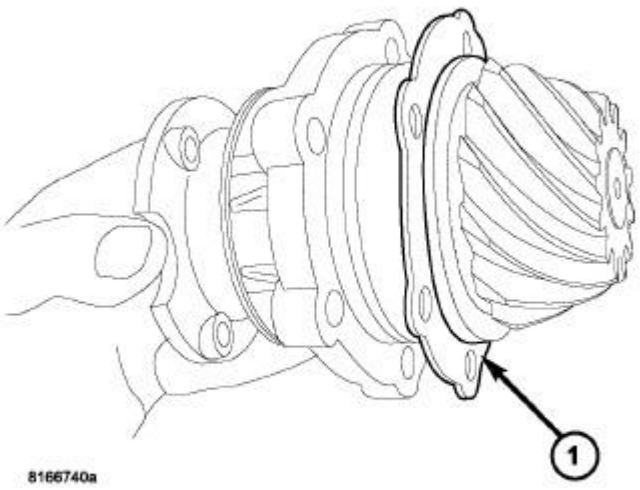


Fig. 29: Pinion Depth Shim
Courtesy of CHRYSLER GROUP, LLC

18. Install pinion housing assembly and depth shim (1). Refer to **Fig. 29**. Use new o-ring on housing.

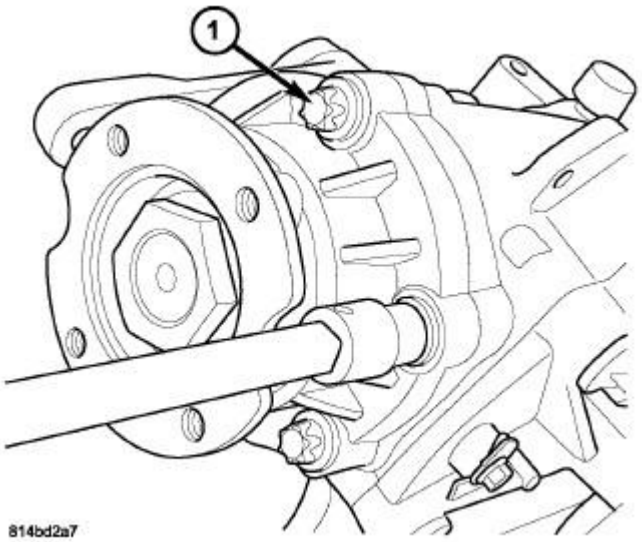


Fig. 30: Pinion Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Install and torque pinion housing-to-axle housing bolts (1) to 34 N.m (25 ft. lbs.). Refer to **Fig. 30**.

PINION DEPTH

PINION DEPTH VARIANCE

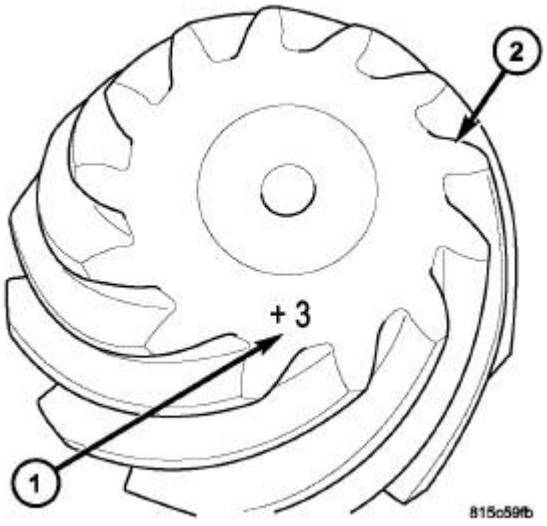


Fig. 31: Pinion Variance Marking
Courtesy of CHRYSLER GROUP, LLC

Identifying numbers for the ring gear and pinion are marked on the pinion (1). Refer to **Fig. 31**. A plus (+) number, minus (-) number or zero (0). The pinion depth variance/deviation (1) is the amount the depth varies from the standard depth setting of a pinion marked with a (0). The standard depth provides the best gear tooth contact pattern.

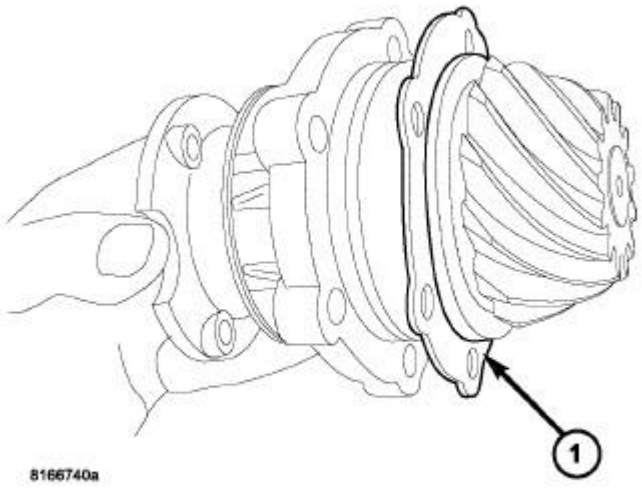


Fig. 32: Pinion Depth Shim
Courtesy of CHRYSLER GROUP, LLC

The pinion depth is set by selecting the shim (1) that fits between the pinion housing and the axle housing. Refer to **Fig. 32**.

PINION DEPTH MEASUREMENT

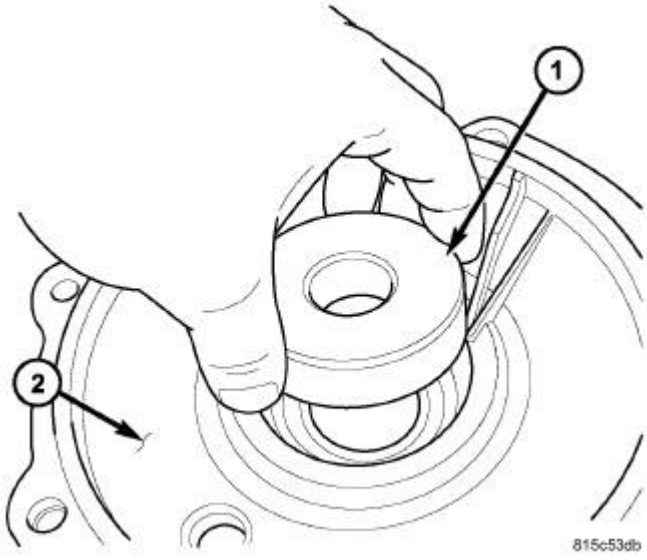


Fig. 33: Arbor Disc
Courtesy of CHRYSLER GROUP, LLC

1. Install arbor disc (special tool #9681-4, Disc, Arbor) (1) into differential cover (2). Refer to **Fig. 33**.

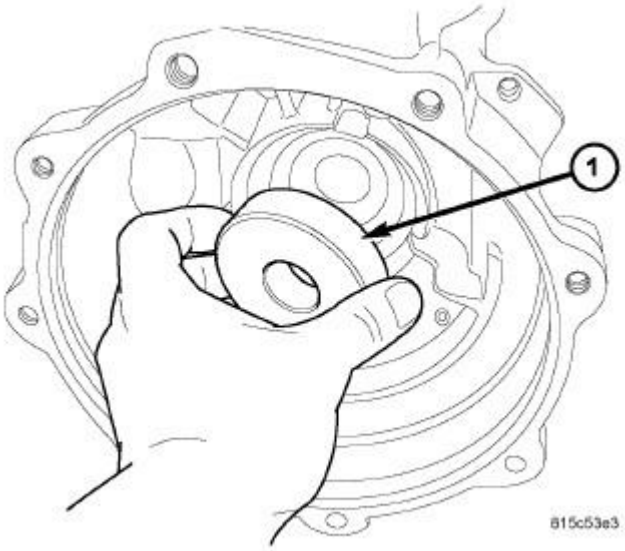


Fig. 34: Arbor Disc
Courtesy of CHRYSLER GROUP, LLC

2. Install arbor disc (special tool #9681-5, Disc, Arbor) (1) into differential case. Refer to **Fig. 34**.

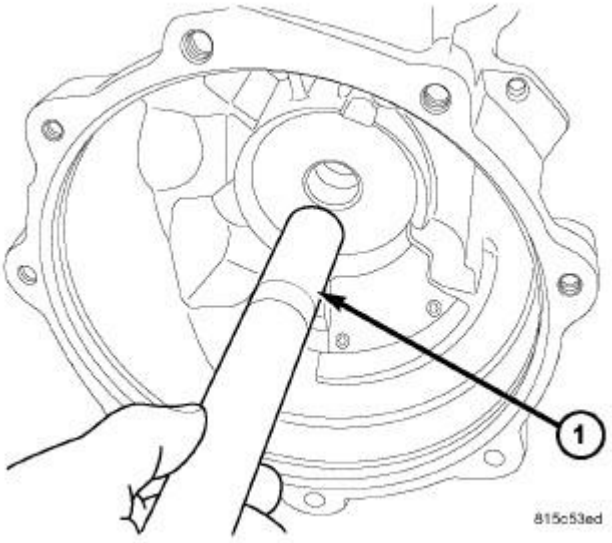


Fig. 35: Arbor Bar
Courtesy of CHRYSLER GROUP, LLC

3. Install arbor bar (special tool #D-115-3, Arbor) (1) into arbor disc (special tool #9681-5, Disc, Arbor).

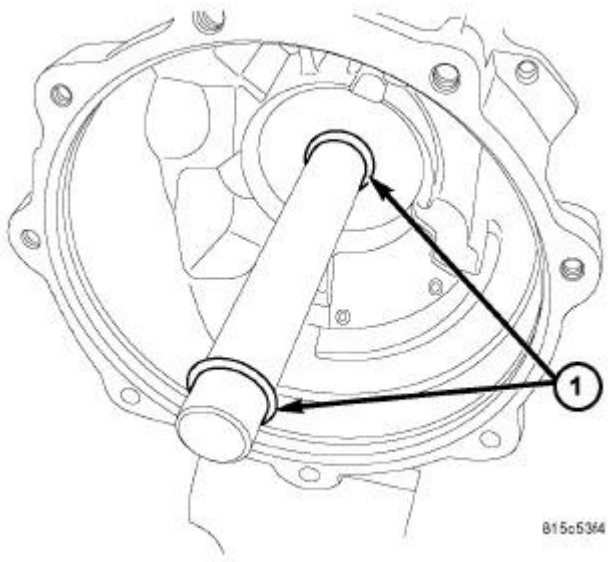


Fig. 36: Space O-Rings
Courtesy of CHRYSLER GROUP, LLC

4. Install O-rings (1) on arbor bar (special tool #D-115-3, Arbor). Refer to **Fig. 36**.

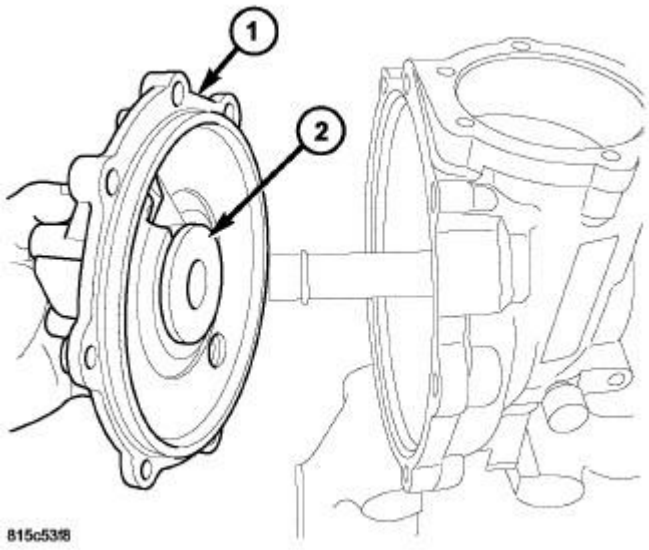


Fig. 37: Install Cover To Housing
Courtesy of CHRYSLER GROUP, LLC

5. Install cover (1) to housing. Refer to **Fig. 37**.
6. Install and torque cover-to-housing bolts to:
    - M10x40 - 65 N.m (48 ft. lbs.)
    - M8x25 - 34 N.m (25 ft. lbs.)

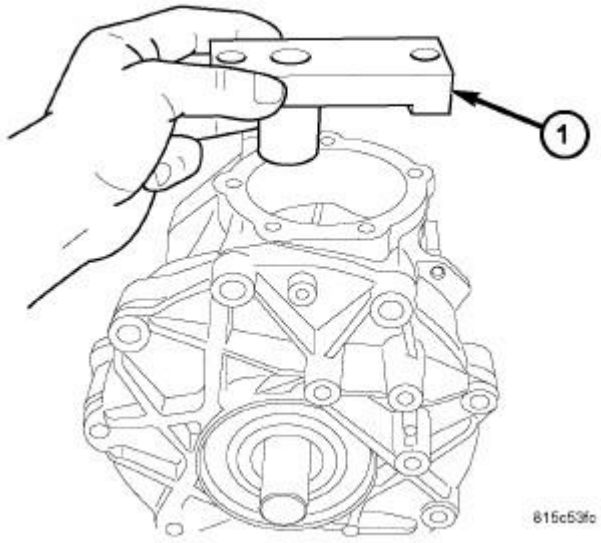


Fig. 38: Plate
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make sure gauge plate surfaces are clean to insure an accurate reading

7. Install gauge plate (special tool #9681-2, Plate, Gage) (1) to pinion opening. Refer to **Fig. 38**.

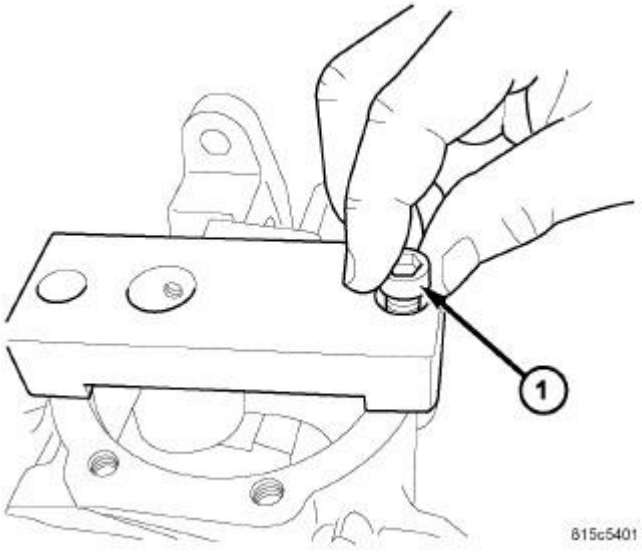


Fig. 39: Plate-To-Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install plate-to-housing bolts (1). Refer to **Fig. 39**.

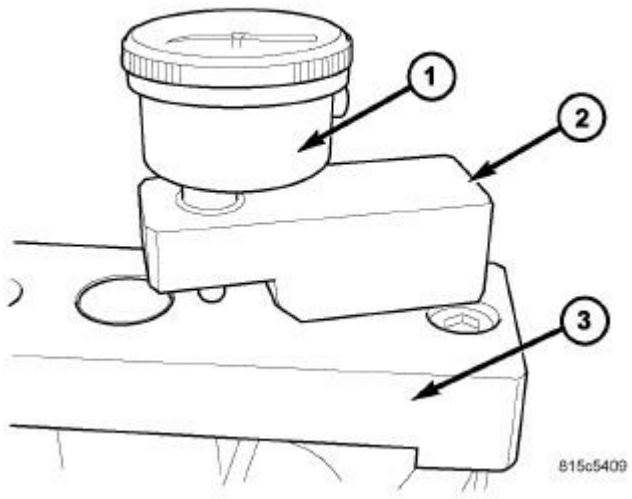


Fig. 40: Scooter Block & Dial Indicator On Gauge Plate
Courtesy of CHRYSLER GROUP, LLC

9. Install Scooter Block (2) and dial Indicator (1) on gauge plate (special tool #9681-2, Plate, Gage) (3). Refer to **Fig. 40**.

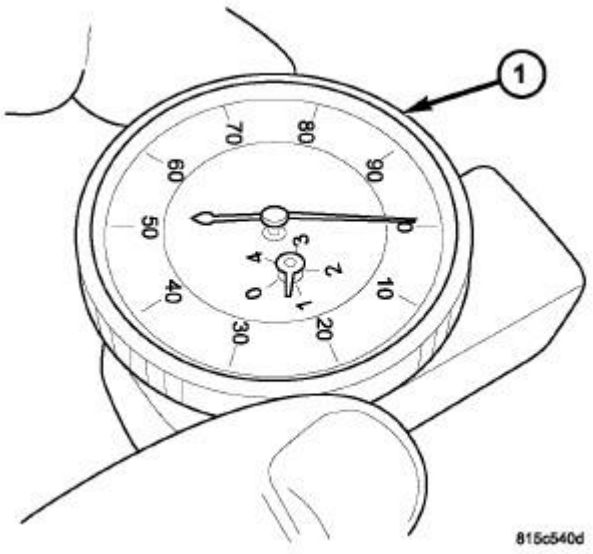


Fig. 41: Zero Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

10. Zero dial indicator (1). Refer to **Fig. 41**.

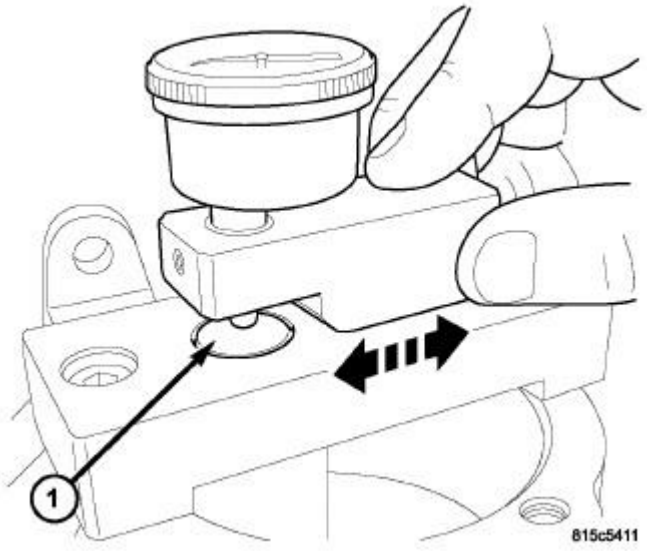


Fig. 42: Measure Gage Rod Protrusion
Courtesy of CHRYSLER GROUP, LLC

11. Take reading (1) with the dial indicator, measure gage rod protrusion. Refer to **Fig. 42**.
12. Record gage rod protrusion reading on the dial indicator. The dial indicator reading represents the amount that this particular assembly deviates from the design height.

PINION ASSEMBLY HEIGHT MEASUREMENT

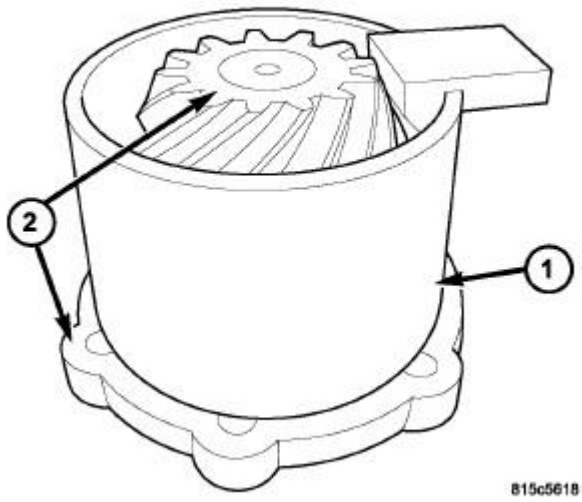


Fig. 43: Measuring Sleeve
Courtesy of CHRYSLER GROUP, LLC

1. Install measuring sleeve (special tool #9681-1, Gauge, Pinion Height) (1) over pinion assembly (2). Refer to **Fig. 43**.

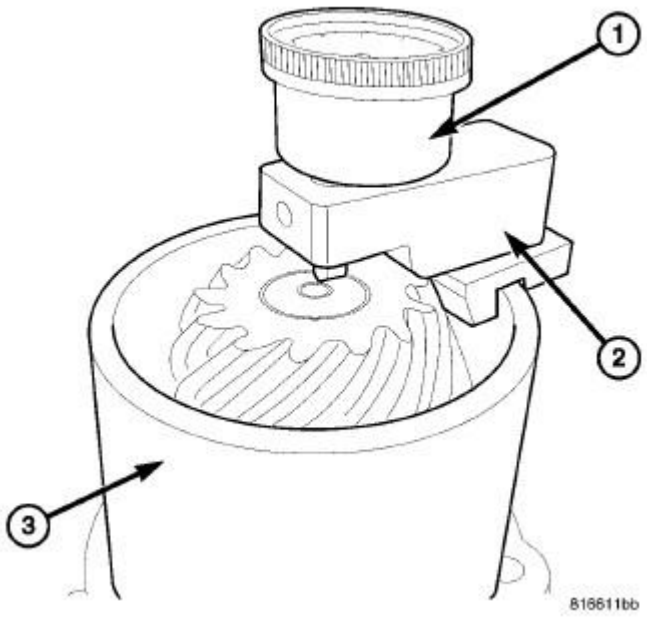


Fig. 44: Checking Pinion Height Using Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

2. Install Scooter Block (2) and dial Indicator on (1) measuring sleeve (special tool #9681-1, Gauge, Pinion Height) (3). Refer to **Fig. 44**.
3. Record reading on the dial indicator. The dial indicator reading represents the amount that this particular assembly deviates from the design height.

SHIM CALCULATION

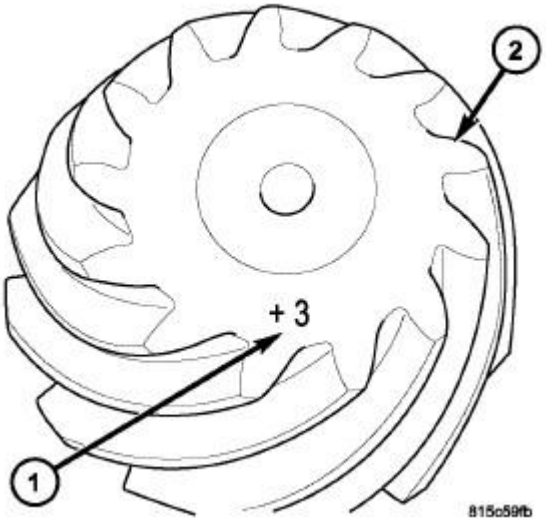


Fig. 45: Pinion Variance Marking

Courtesy of CHRYSLER GROUP, LLC

By adding the sum of the above readings you will be able to determine the correct shim needed.

Your base line shim will be 2.047 mm, add this to the pinion depth variance/deviation (1). Refer to **Fig. 45**. The variance/deviation marking on the pinion head in 0.01 mm increments. Therefore, for the graphic shown, 0.03 mm (0.0012 in.) would be added to the shim thickness.

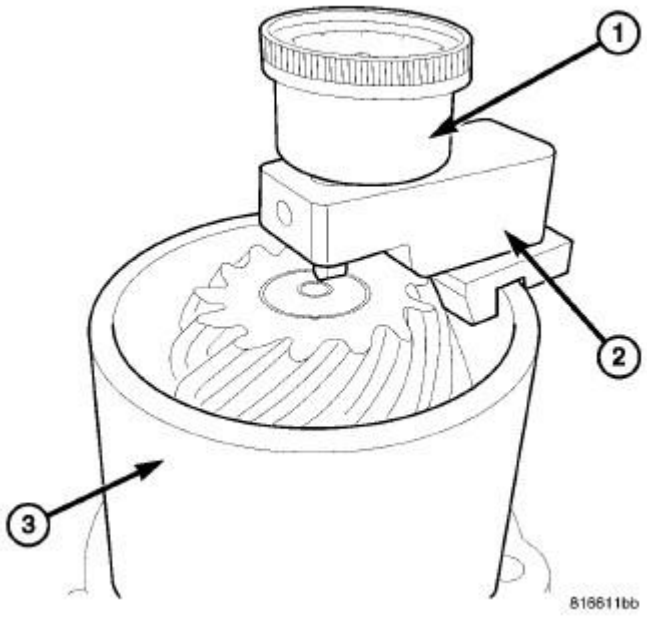


Fig. 46: Checking Pinion Height Using Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

Add your dial indicator reading measurement for pinion height (1). Refer to **Fig. 46**.

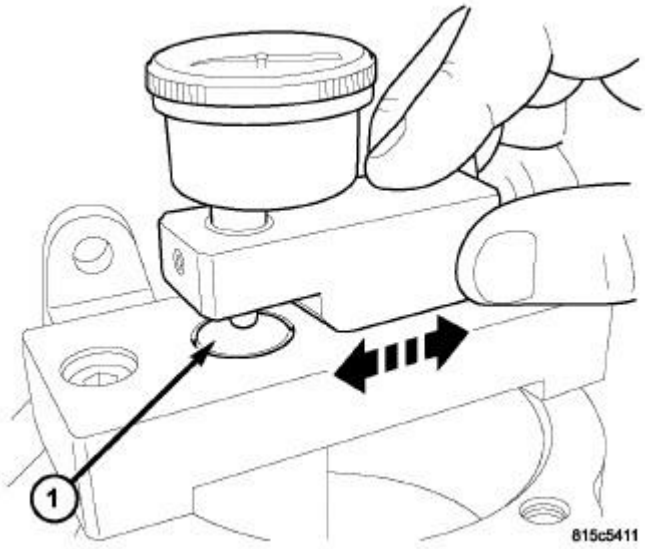


Fig. 47: Measure Gage Rod Protrusion
Courtesy of CHRYSLER GROUP, LLC

Add your gage rod protrusion measurement (1). Refer to **Fig. 47**.

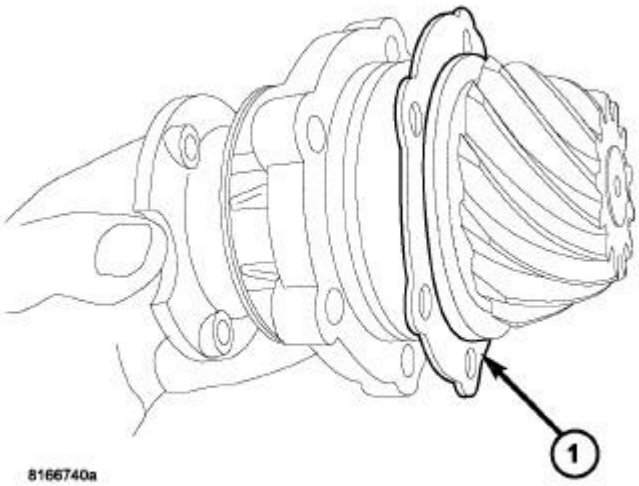


Fig. 48: Pinion Depth Shim
Courtesy of CHRYSLER GROUP, LLC

The sum of the above will be the shim size needed (1). Refer to **Fig. 48**.

MEASURING BACKLASH

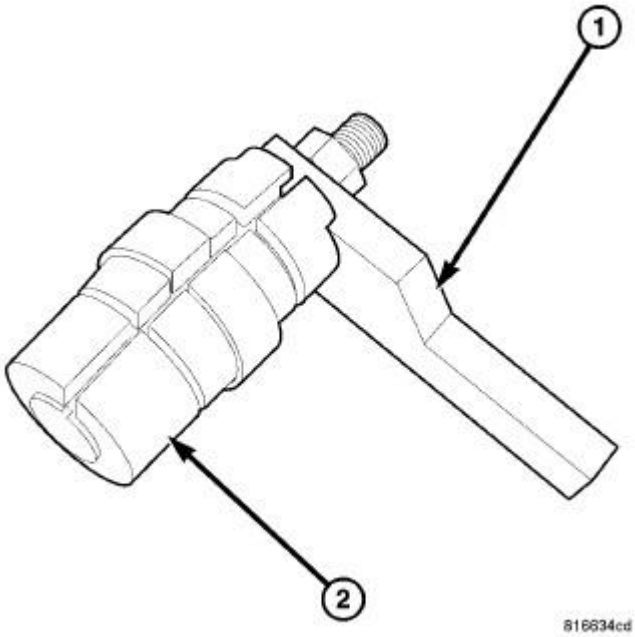


Fig. 49: Backlash Measuring Tool
Courtesy of CHRYSLER GROUP, LLC

1. Use Backlash Tool (special tool #9682, Backlash Measuring Tool) (1) to check backlash.

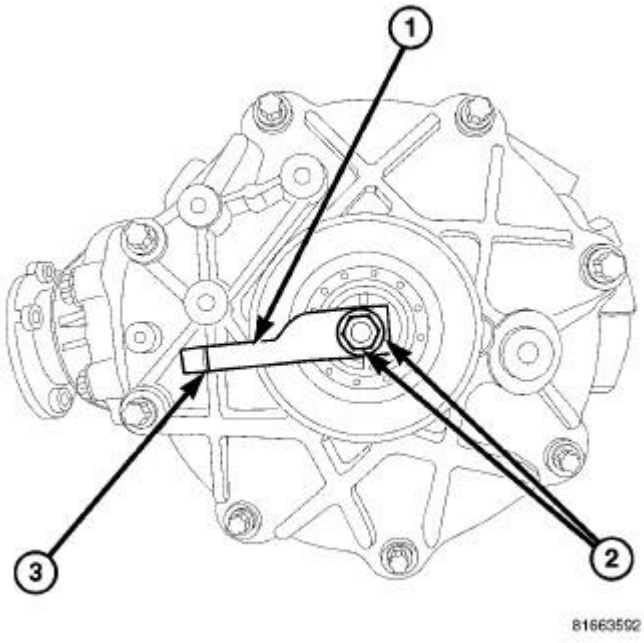


Fig. 50: Backlash Tool
Courtesy of CHRYSLER GROUP, LLC

2. Install Backlash Tool (special tool #9682, Backlash Measuring Tool) (1) into the side gear and tighten the lock down nut. Refer to **Fig. 50**.

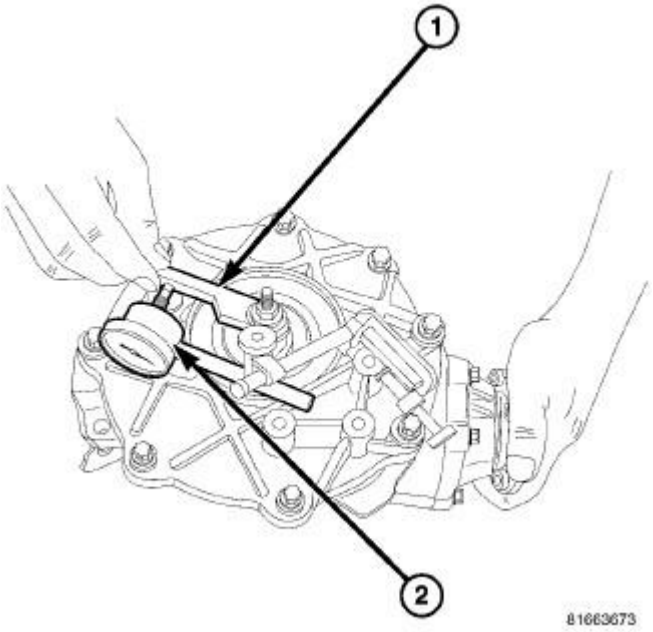


Fig. 51: Checking Backlash Using Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

3. Install Dial Indicator (special tool #C-3339A, Set, Dial Indicator) (2) to the differential cover and align the measuring tip of the Dial Indicator with the line on Backlash Tool (1). Refer to **Fig. 51**.
4. Zero the Dial Indicator.
5. While holding the pinion flange, rock the measuring arm back and forth stop - to - stop.
6. Record the reading on the Dial Indicator.
7. To bring backlash with in specifications, subtract from one side and add equal amount of cup shims to the other side of the differential case and the differential cover as needed. (1.34-2.98 mm (0.053-0.117 in.) Available in 0.04 mm (0.0015 in.) increments).

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratio	3.07
Ring Gear Diameter	175 mm (6.9 in.)
Ring Gear Backlash	0.05-0.11 mm (0.002-0.004 in.)
Differential Torque-to-Rotate	190-260 N.cm (17-23 in. lbs.)
Pinion Housing Torque-to-Rotate	130-260 N.cm (12-23 in. lbs.)

Pinion Depth Shim Size	1.15-2.11mm (0.045-0.083 in.) Available in 0.04 mm (0.0015 in.) increments
Pinion Bearing Preload Spacer Size	9.60-10.59mm (0.378-0.417 in.) Available in 0.03 mm (0.001 in.) increments
Differential Bearing Preload Shim Size	1.31-2.51 mm (0.051-0.099 in.) Available in 0.04 mm (0.0015 in.) increments
Differential Backlash Shim Size	1.34-2.98 mm (0.053-0.117 in.) Available in 0.04 mm (0.0015 in.) increments

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolt, Axle Cover-to-Housing (M10x40)	65	48	-
Bolt, Axle Cover-to-Housing (M8x25)	34	25	-
Bolt, Axle Housing-to-Engine	65	48	-
Bolt, Intermediate Shaft-to-Engine	25	19	-
Bolt, Pinion Housing-to-Axle Housing	34	25	-
Nut, Pinion Flange	475	350	-
Plug, Axle Housing Fill	30	22	-
Bolts, Axle Assembly Support Bracket	28	21	-

REMOVAL

REMOVAL

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove both front halfshafts. Refer to **REMOVAL** and **REMOVAL** .
3. Remove front intermediate shaft assembly. Refer to **REMOVAL** or **REMOVAL** .
4. Remove front propeller shaft. Refer to **REMOVAL** .
5. Remove RH catalytic converter/exhaust pipe assembly. Refer to **CONVERTER, CATALYTIC, REMOVAL** .

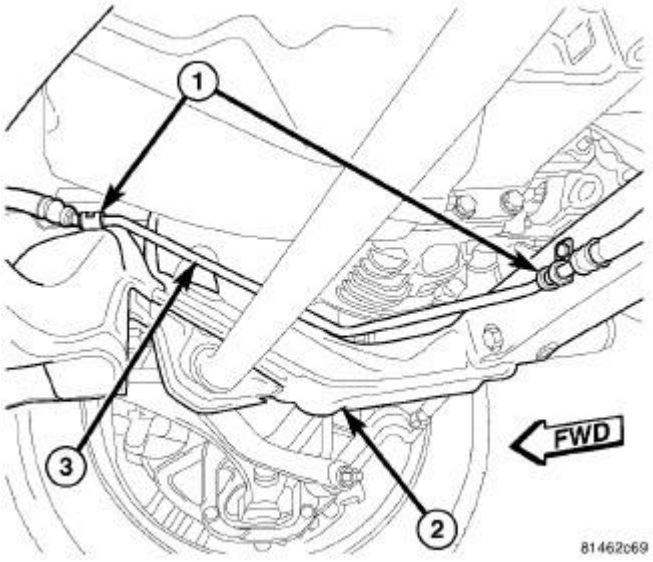


Fig. 52: Return Hose Routing Clips
Courtesy of CHRYSLER GROUP, LLC

6. Separate power steering return line (3) from cradle by unfastening clips (1). Refer to **Fig. 52**.

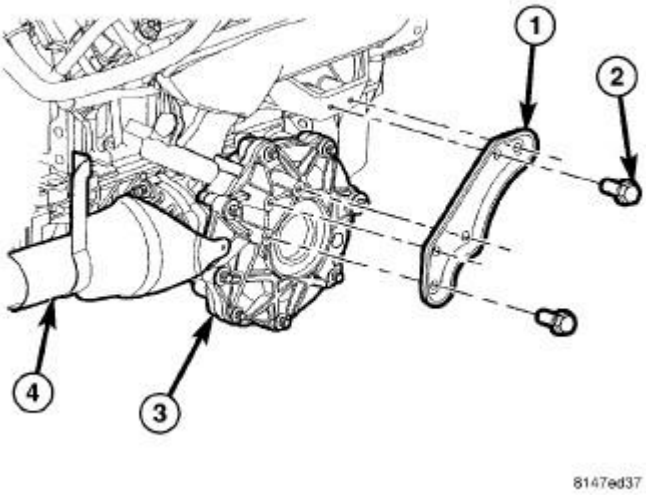


Fig. 53: Front Drive Axle Housing
Courtesy of CHRYSLER GROUP, LLC

7. Remove front axle housing support bracket (1). Refer to **Fig. 53**.

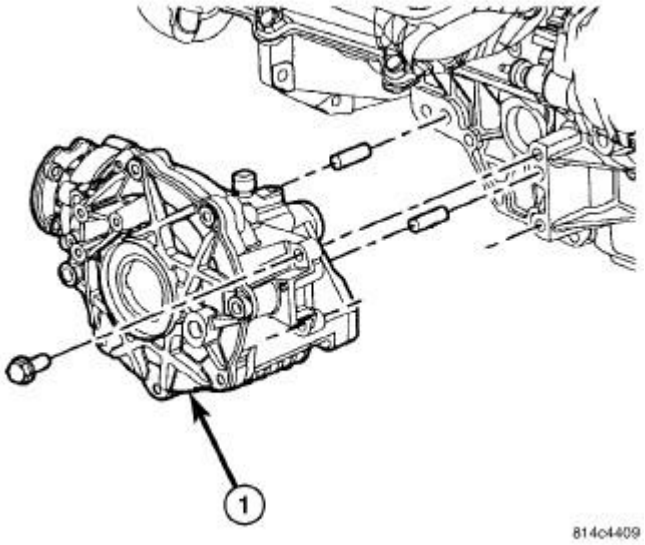


Fig. 54: Removing/Installing Front Axle
Courtesy of CHRYSLER GROUP, LLC

8. Remove seven front axle assembly-to-oil pan bolts. Remove axle assembly (1) from vehicle. Refer to **Fig. 54**.

DISASSEMBLY

DISASSEMBLY

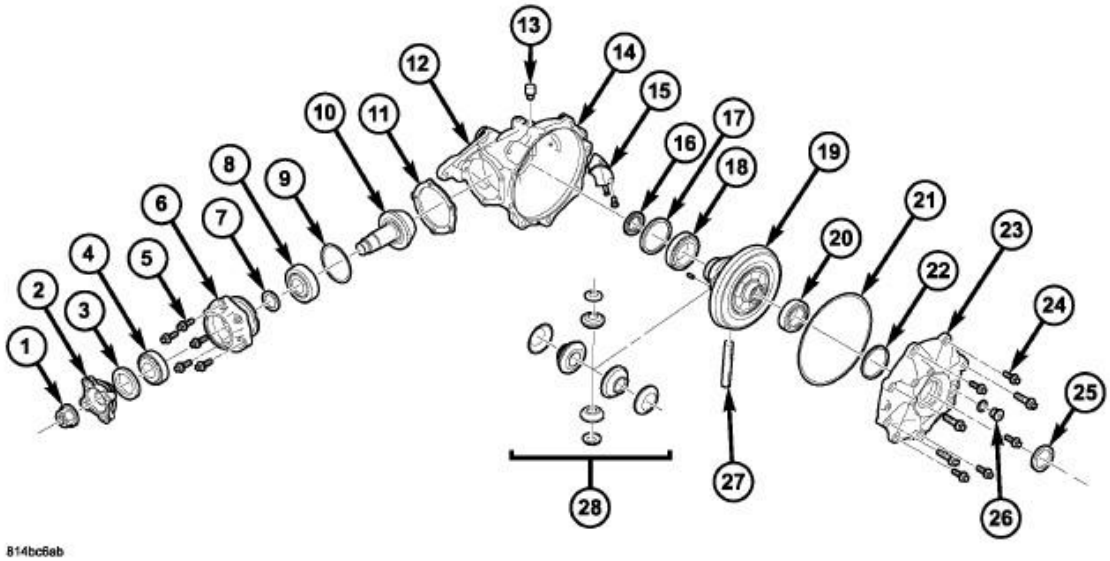


Fig. 55: 175mm Fia Front Axle Exploded View
Courtesy of CHRYSLER GROUP, LLC

1 - NUT, PINION FLANGE1	15 - BAFFLE, VENT
2 - FLANGE, PINION	16 - SEAL, AXLE
3 - SEAL, PINION	17 - SHIM, PRELOAD
4 - BEARING, PINION TAIL	18 - BEARING, DIFFERENTIAL SIDE
5 - BOLT, PINION HOUSING	19 - ASSEMBLY, RING GEAR/DIFFERENTIAL
6 - HOUSING, PINION	20 - BEARING, DIFFERENTIAL SIDE
7 - SPACER, SELECT	21 - SEAL, AXLE COVER O-RING
8 - BEARING, PINION HEAD	22 - SHIM, BEARING PRELOAD
9 - SEAL, PINION HOUSING O-RING	23 - COVER, AXLE HOUSING
10 - GEAR, PINION	24 - BOLT, AXLE HOUSING COVER
11 - SHIM, PINION DEPTH (SELECT)	25 - SEAL, AXLE
12 - HOUSING, AXLE	26 - PLUG, AXLE FILL
13 - VENT, HOUSING	27 - SHAFT, DIFFERENTIAL PINION
14 - HOUSING, AXLE	28 - SIDE GEAR ASSEMBLY

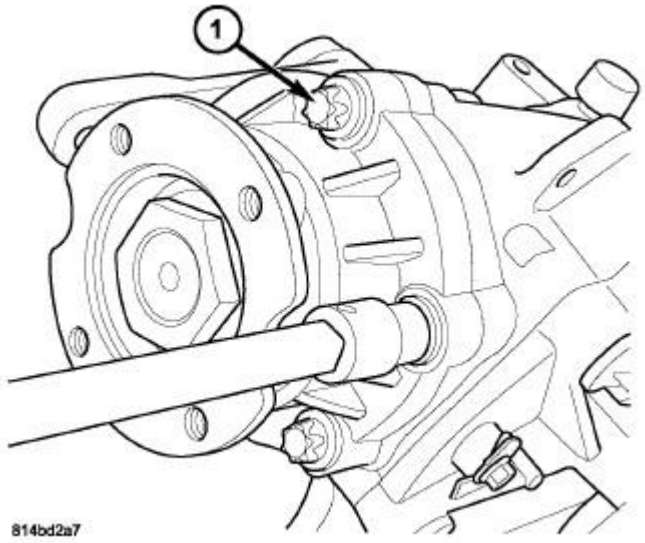


Fig. 56: Pinion Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove pinion housing assembly bolts (1).

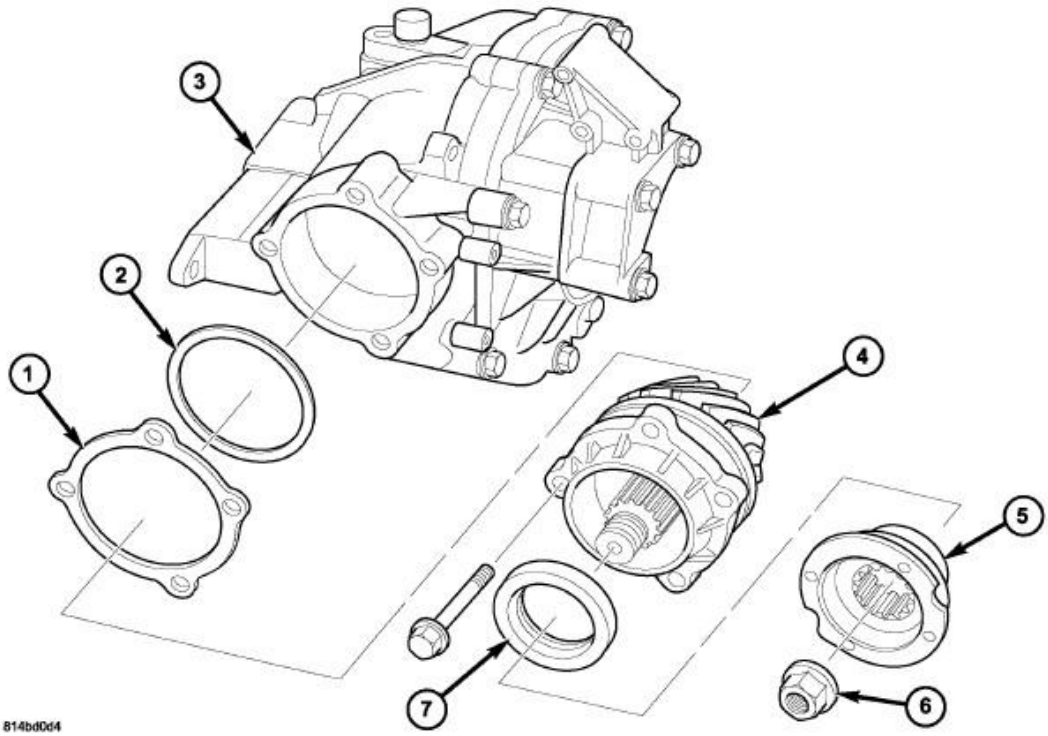


Fig. 57: Removing/Installing Pinion Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Remove pinion housing assembly (4). Refer to **Fig. 57**.

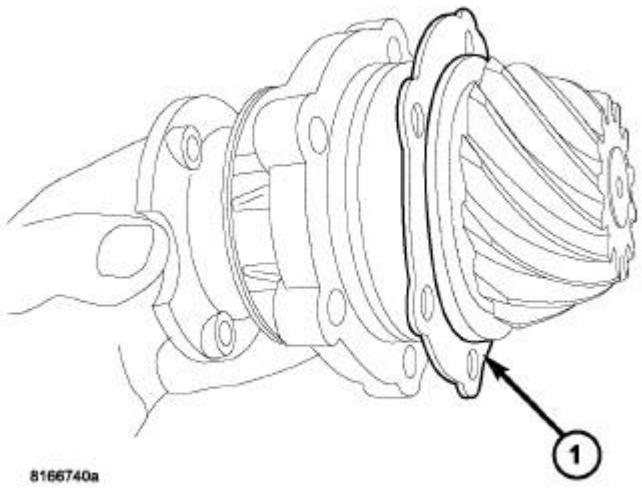


Fig. 58: Pinion Depth Shim

Courtesy of CHRYSLER GROUP, LLC

3. Remove pinion depth shim (1).

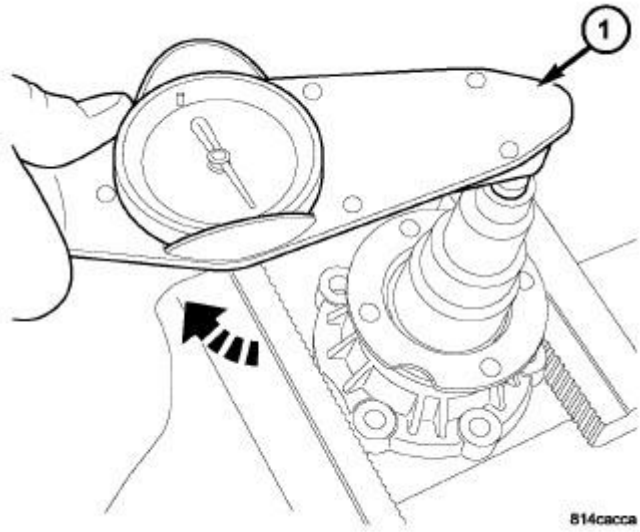


Fig. 59: Measuring Pinion Housing Assembly Turning Torque
Courtesy of CHRYSLER GROUP, LLC

4. Measure pinion housing assembly rotating torque (1). Rotating torque should be 130-250 N.cm (12-22 in. lbs.). If rotating torque is outside of this range, bearing replacement is required. Refer to Pinion Housing Disassembly.

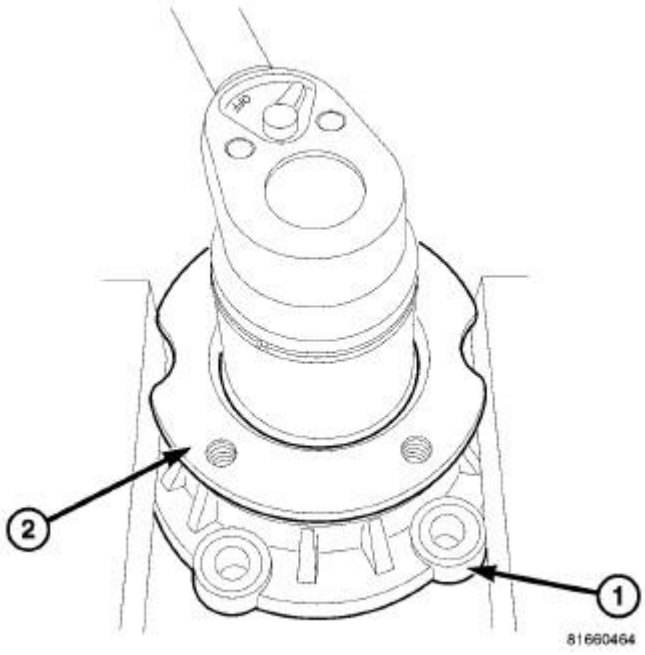


Fig. 60: Pinion In Vice
Courtesy of CHRYSLER GROUP, LLC

5. Remove pinion flange nut (1). Refer to **Fig. 60**.

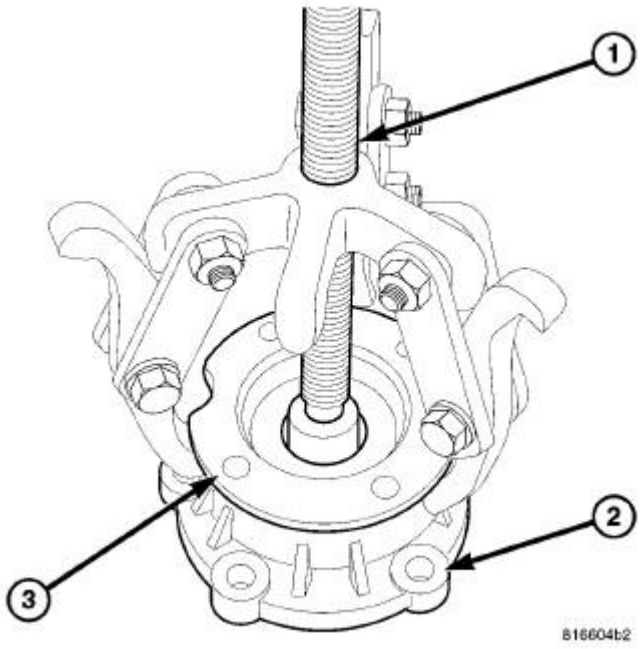


Fig. 61: Pinion Puller
Courtesy of CHRYSLER GROUP, LLC

6. Using puller (special tool #1026, Puller) (1), pull pinion flange from shaft. Refer to **Fig. 61**.

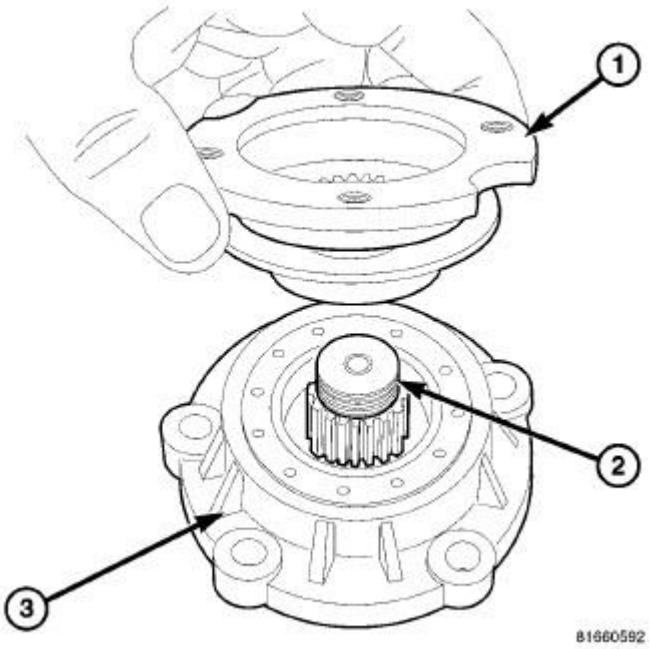


Fig. 62: Pinion Flange Remove/Install
Courtesy of CHRYSLER GROUP, LLC

7. Remove pinion flange (1). Refer to **Fig. 62**.

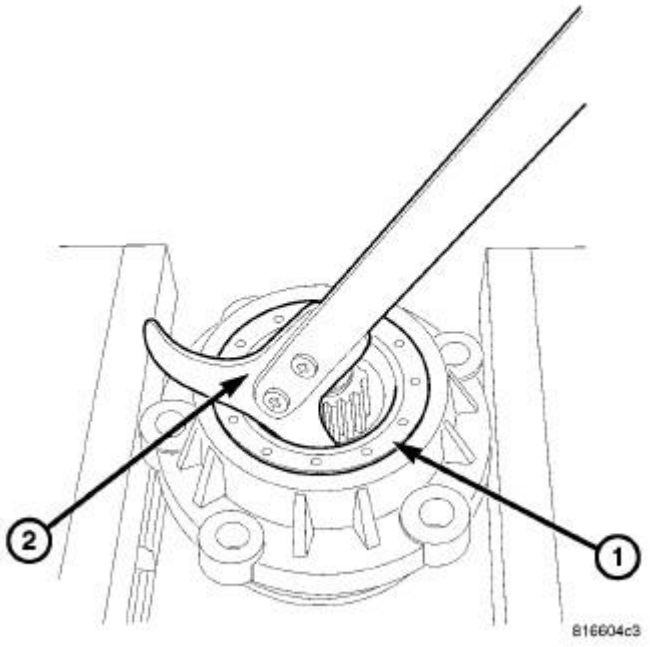


Fig. 63: Remove Pinion Seal/Tool
Courtesy of CHRYSLER GROUP, LLC

8. Using suitable tool, remove pinion seal (1).

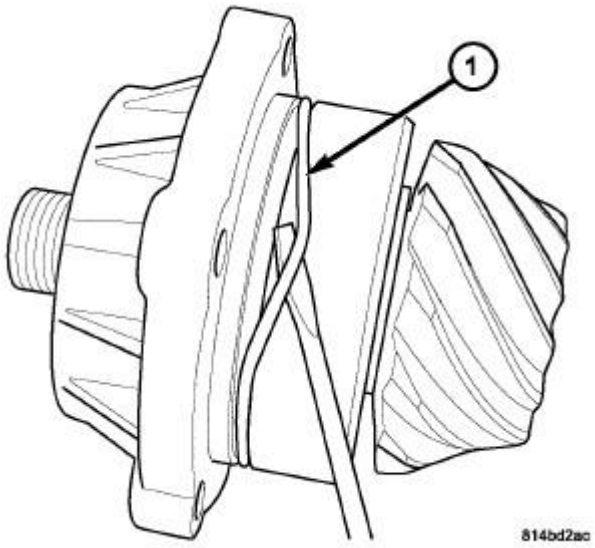


Fig. 64: Pinion Housing O-Ring
Courtesy of CHRYSLER GROUP, LLC

9. Remove pinion housing O-ring seal (1).

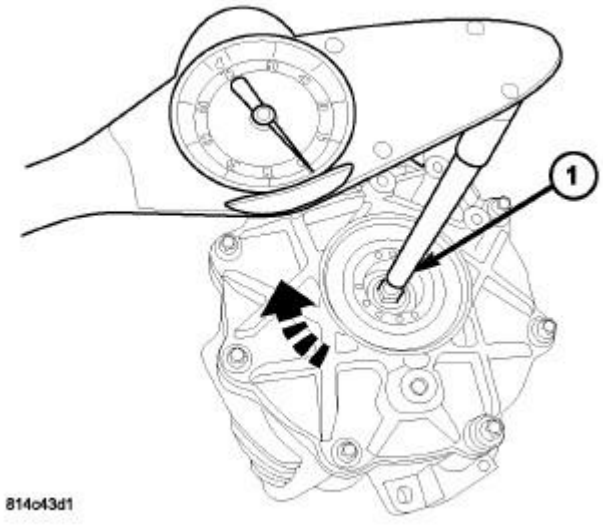


Fig. 65: Measure Differential Rotating Torque
Courtesy of CHRYSLER GROUP, LLC

10. Measure differential rotating torque with Torque Tool C-4995A. Rotating torque should be within 190-250 N.cm (17-22 in. lbs). Measurements recorded out of this range require differential side bearing replacement and/or side bearing preload adjustment.

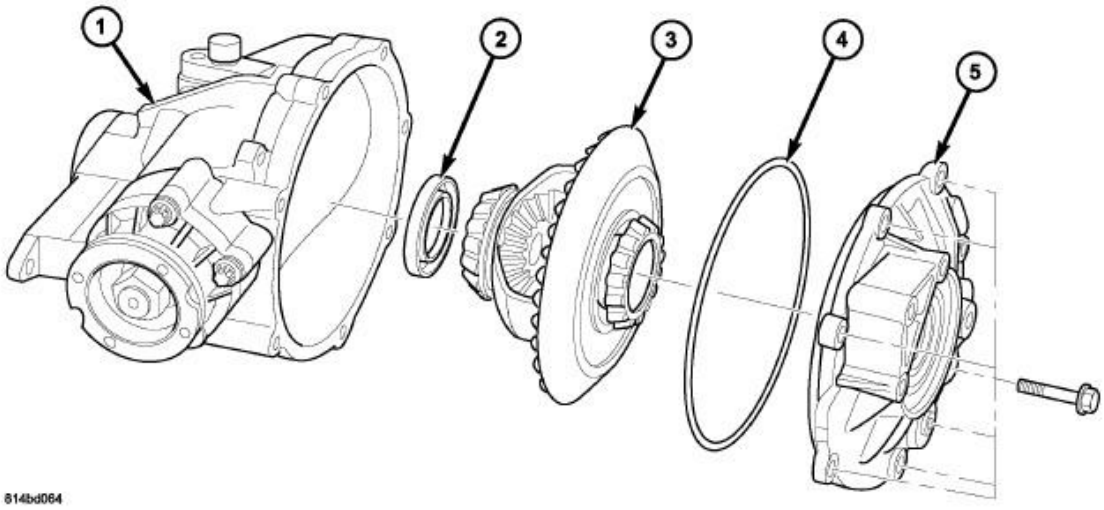


Fig. 66: Differential And Seal Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

11. Remove axle housing cover (5). Remove differential assembly (3) and inboard axle seal (2).

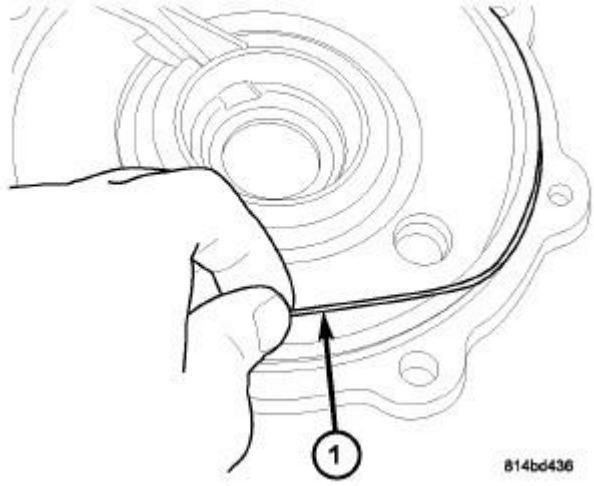


Fig. 67: Axle Housing Cover O-Ring
Courtesy of CHRYSLER GROUP, LLC

12. Remove axle housing cover o-ring (1).

PINION HOUSING DISASSEMBLY

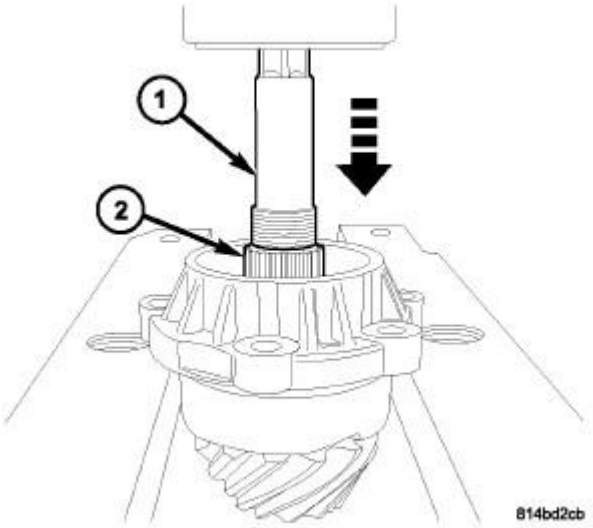


Fig. 68: Press Pinion Gear Out Of Housing
Courtesy of CHRYSLER GROUP, LLC

1. Press pinion gear/shaft (2) out of housing. Use suitable adapter (1) to protect end of shaft.

Fig. 69: Remove Bearing
Courtesy of CHRYSLER GROUP, LLC

2. Remove pinion bearing (1). Refer to **Fig. 69**.

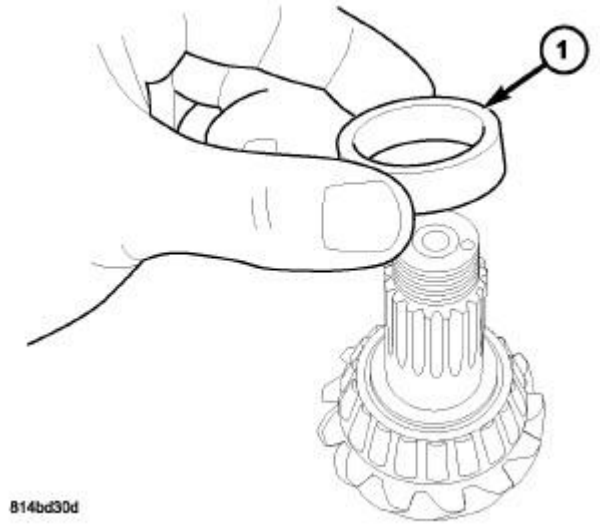


Fig. 70: Pinion Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

3. Remove pinion bearing spacer (1). Refer to **Fig. 70**.

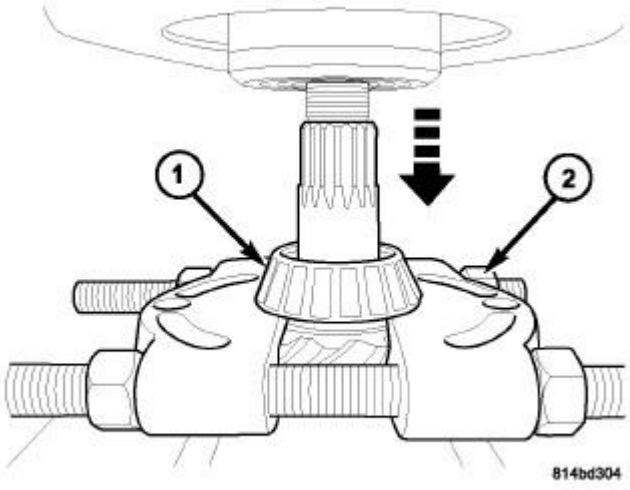


Fig. 71: Press Off Pinion Head Bearing
Courtesy of CHRYSLER GROUP, LLC

Using splitter (special tool #1130, Splitter, Bearing/Gear) or equivalent (2), press off pinion head bearing (1). Refer to **Fig. 71**.

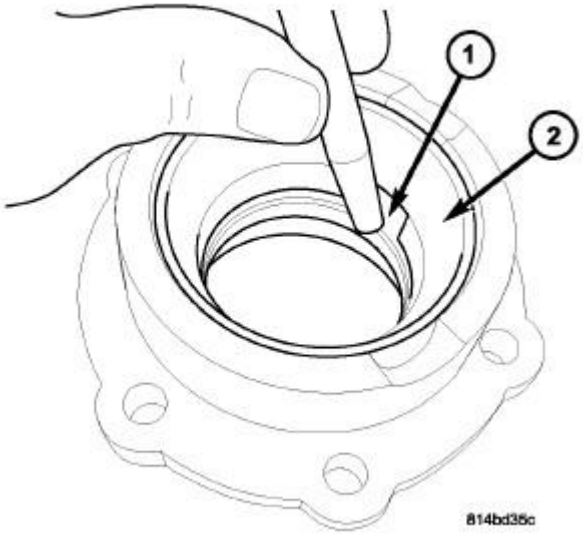


Fig. 72: Removing Pinion Tail Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

4. Using a suitable punch, remove pinion tail bearing cup (1). Refer to **Fig. 72**.

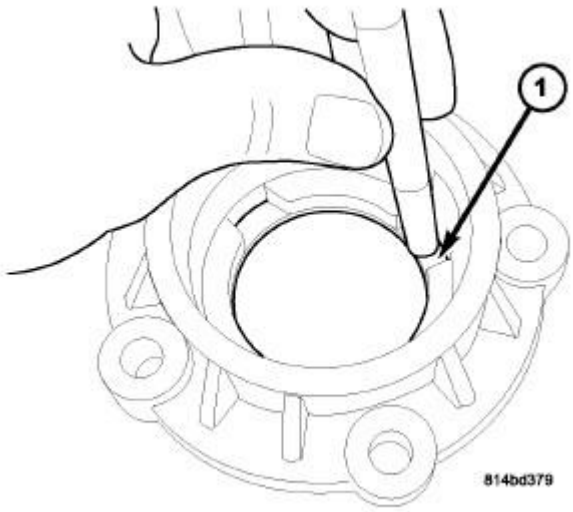


Fig. 73: Removing Pinion Head Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

5. Using suitable punch, remove pinion head bearing cup (1). Refer to **Fig. 73**.

DIFFERENTIAL DISASSEMBLY

NOTE: The differential ring gear is welded to the differential case and is not serviceable separately.

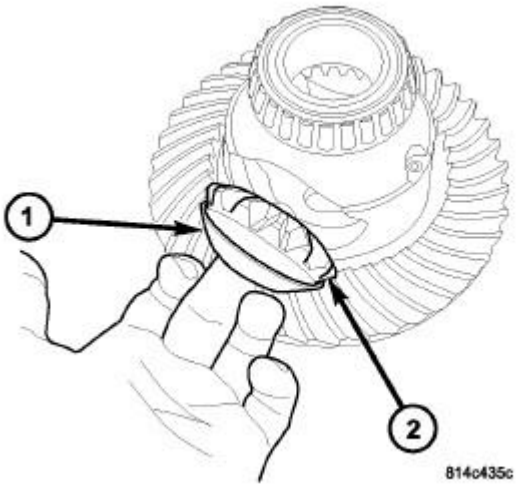


Fig. 74: Side Gear & Washer
Courtesy of CHRYSLER GROUP, LLC

1. Rotate differential side gears about case and remove side gears (2) and thrust washers (1). Refer to **Fig. 74**.

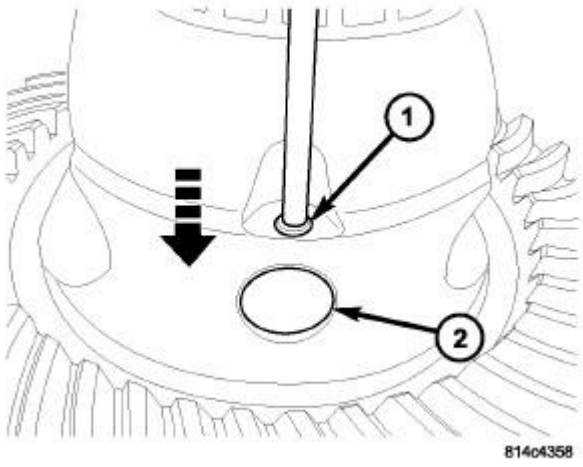


Fig. 75: Pinion Shaft Roll Pin
Courtesy of CHRYSLER GROUP, LLC

2. Using suitable punch, drive pinion shaft roll pin (1) into case until it bottoms.
3. Drive old roll pin from shaft and discard old pin.

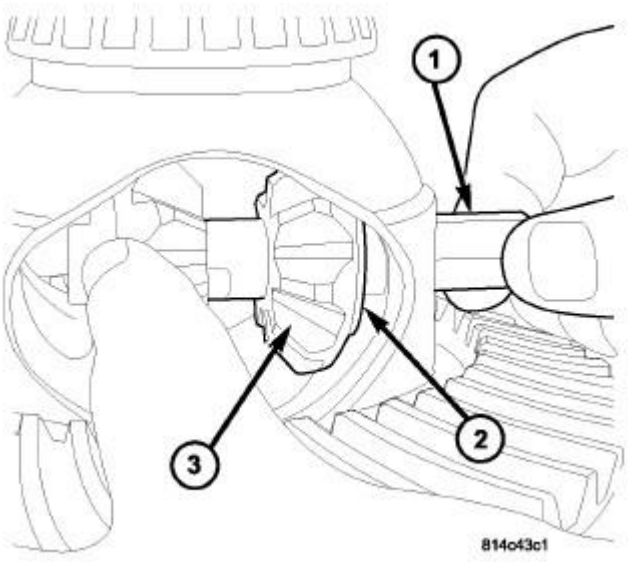


Fig. 76: Removing/Installing Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

4. Remove pinion shaft (1), pinion gears (3) and thrust washers (2). Drive out and discard pinion shaft roll pin.

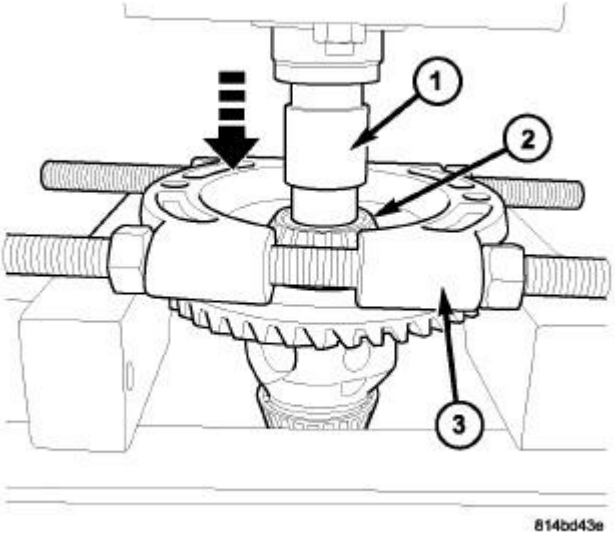


Fig. 77: Measure Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

5. Using Plug (special tool #9676, Adapter Plug) (1) and Bearing Splitter (special tool #1130, Splitter, Bearing/Gear) (3), press differential side bearing (2) off of ring gear side and discard.

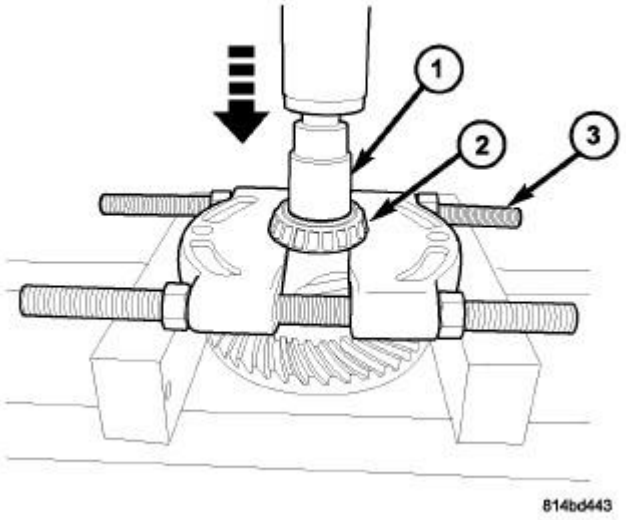


Fig. 78: Removing Side Bearing
Courtesy of CHRYSLER GROUP, LLC

6. Using Plug (special tool #9676, Adapter Plug) (1) and Bearing Splitter (special tool #1130, Splitter, Bearing/Gear) (3), press differential side bearing (2) off of opposite side and discard.

AXLE HOUSING

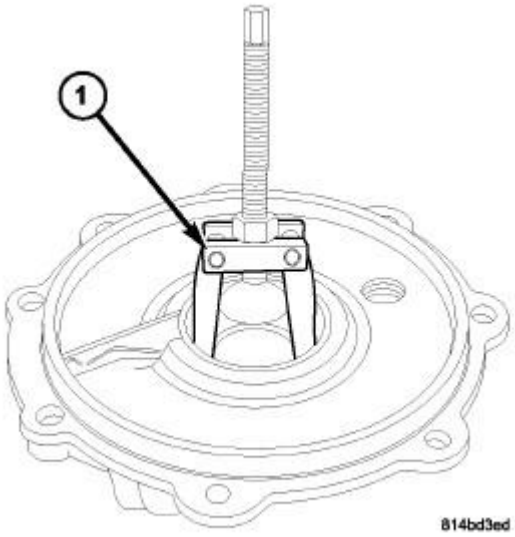


Fig. 79: Bearing Cup Remover
Courtesy of CHRYSLER GROUP, LLC

1. Remove differential side bearing cup from axle housing cover. Install Bearing Remover (special tool #6514, Remover, Bearing Cup) (1).

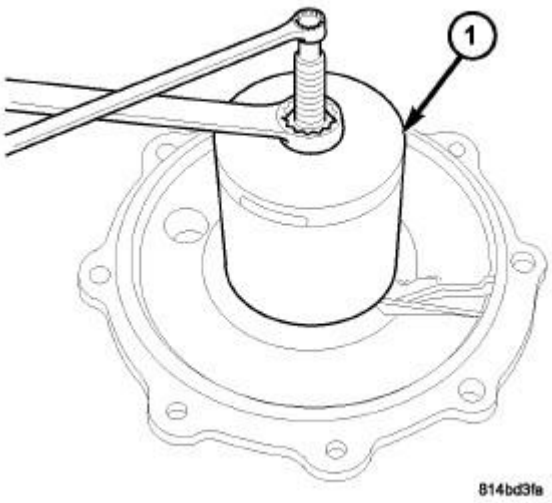


Fig. 80: Removing Differential Side Bearing Cup (Cover)
Courtesy of CHRYSLER GROUP, LLC

2. Remove differential side bearing cup with Bearing Remover (special tool #6514, Remover, Bearing Cup) (1).

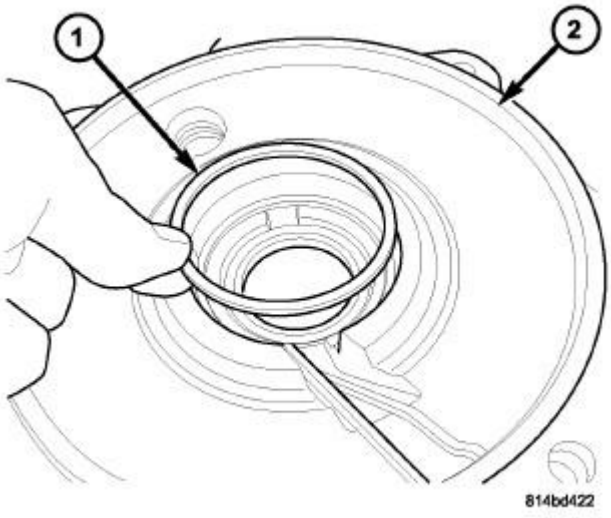


Fig. 81: Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

NOTE: Side bearing preload shims affect adjust differential bearing preload and ring gear backlash and must not be mixed up. Measure and tag side bearing preload shims upon removal.

3. Remove side bearing preload shim (1).

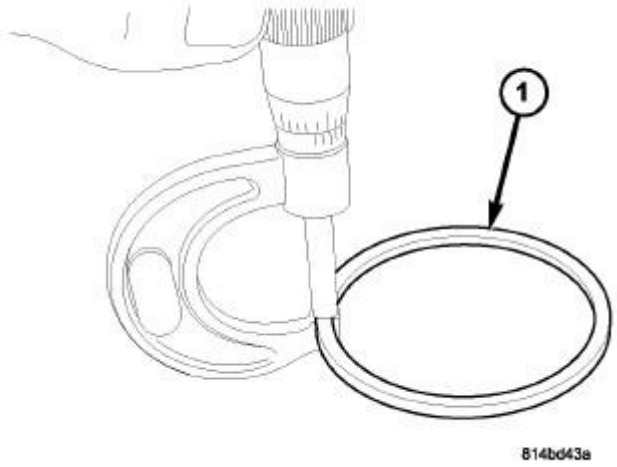


Fig. 82: Measure Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

4. Measure preload shim (1) to identify for replacement.

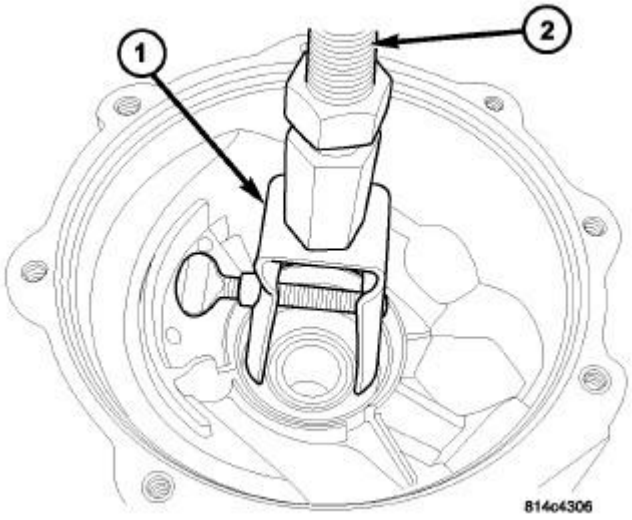


Fig. 83: Removing Inner Diff Side Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

5. Using Remover (special tool #9664, Remover, Bearing Cup) (1) and Slide Hammer (special tool #C-637, Slide Hammer, Universal) (2), remove and discard inboard differential side bearing cup.

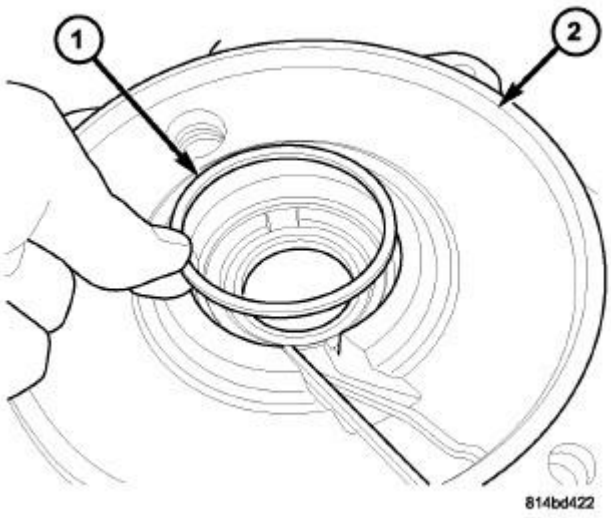


Fig. 84: Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

6. Remove side bearing preload shim from housing (1).

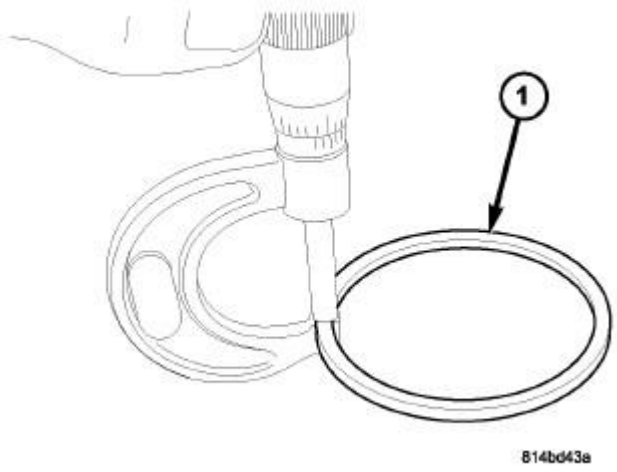


Fig. 85: Measure Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

7. Measure preload shim (1) to identify for replacement or installation.

ASSEMBLY

ASSEMBLY

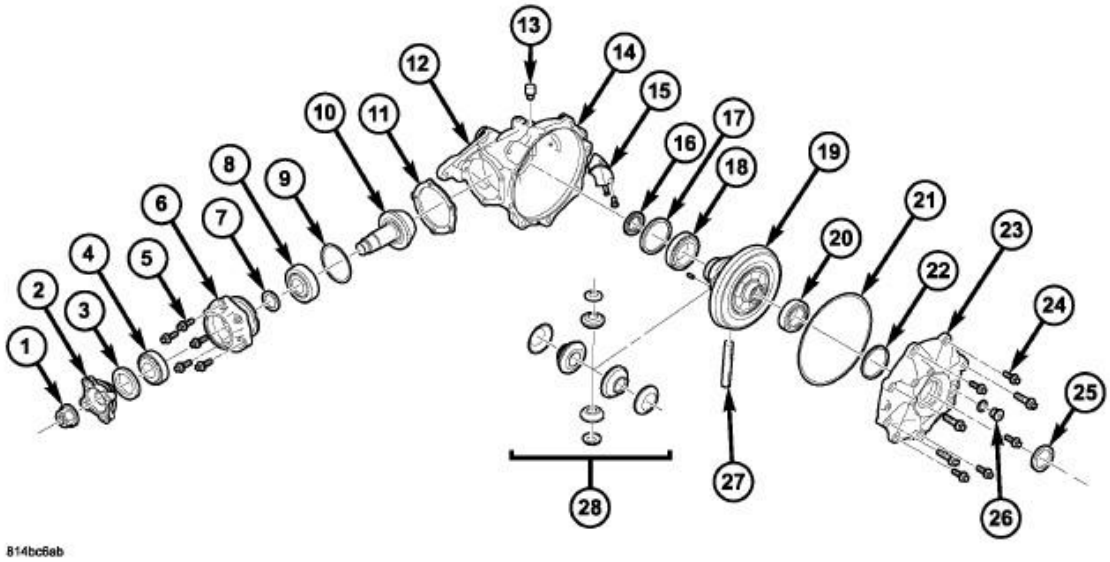


Fig. 86: Fia Front Axle Exploded View
Courtesy of CHRYSLER GROUP, LLC

1 - NUT, PINION FLANGE1	15 - BAFFLE, VENT
2 - FLANGE, PINION	16 - SEAL, AXLE
3 - SEAL, PINION	17 - SHIM, PRELOAD
4 - BEARING, PINION TAIL	18 - BEARING, DIFFERENTIAL SIDE
5 - BOLT, PINION HOUSING	19 - ASSEMBLY, RING GEAR/DIFFERENTIAL
6 - HOUSING, PINION	20 - BEARING, DIFFERENTIAL SIDE
7 - SPACER, SELECT	21 - SEAL, AXLE COVER O-RING
8 - BEARING, PINION HEAD	22 - SHIM, BEARING PRELOAD
9 - SEAL, PINION HOUSING O-RING	23 - COVER, AXLE HOUSING
10 - GEAR, PINION	24 - BOLT, AXLE HOUSING COVER
11 - SHIM, PINION DEPTH (SELECT)	25 - SEAL, AXLE
12 - HOUSING, AXLE	26 - PLUG, AXLE FILL
13 - VENT, HOUSING	27 - SHAFT, DIFFERENTIAL PINION
14 - HOUSING, AXLE	28 - SIDE GEAR ASSEMBLY

DIFFERENTIAL/RING GEAR ASSEMBLY

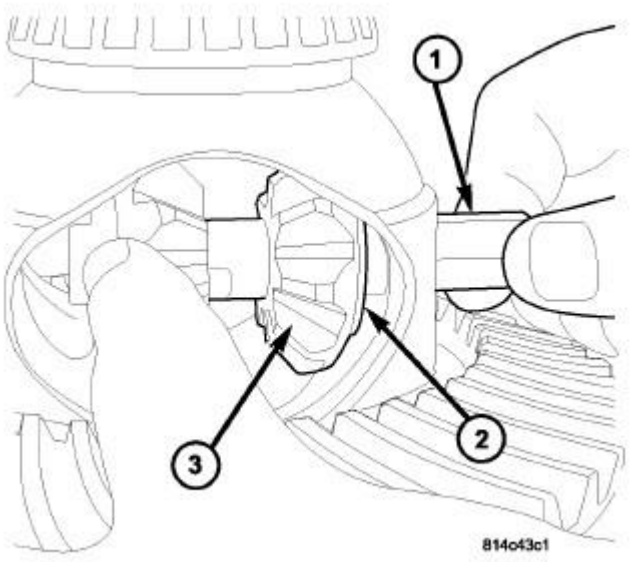


Fig. 87: Removing/Installing Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

1. Install pinion shaft (1), pinion gears (3) and thrust washers (2). Refer to **Fig. 87**.

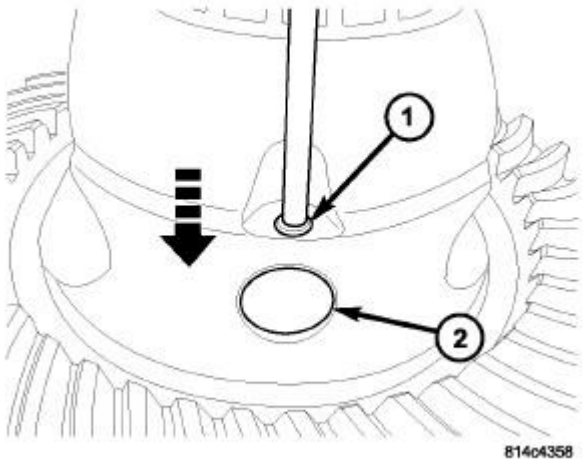


Fig. 88: Pinion Shaft Roll Pin
Courtesy of CHRYSLER GROUP, LLC

2. Using suitable punch, install **new** roll pin and install flush to differential case (1).

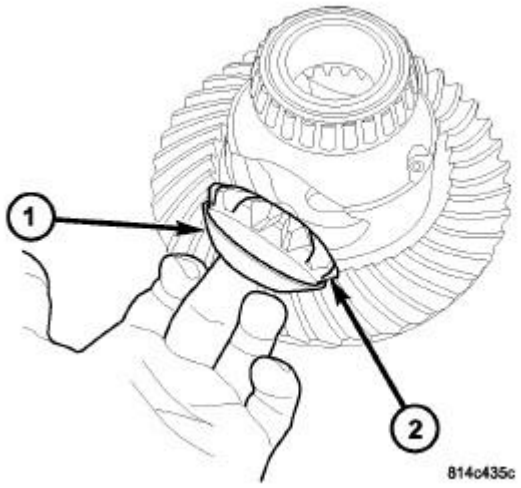


Fig. 89: Side Gear & Washer
Courtesy of CHRYSLER GROUP, LLC

3. Install differential side gears (2) and thrust washers (1). Rotate into position.

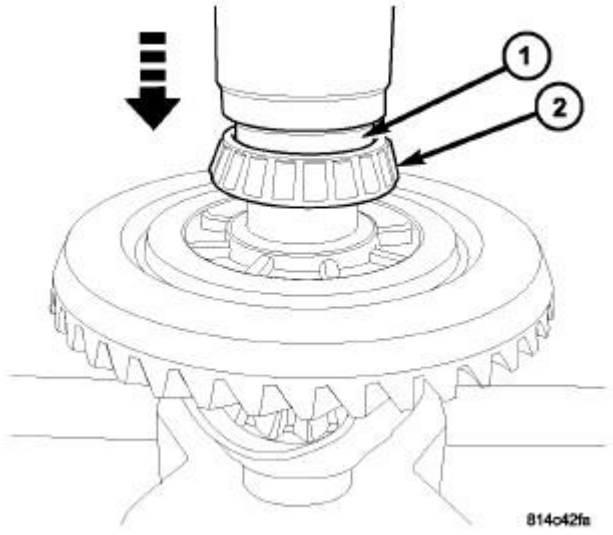


Fig. 90: Install Differential Side Bearing (Ring Gear Side)
Courtesy of CHRYSLER GROUP, LLC

4. Using Installer (special tool #9666, Installer, Bearing) (1), install **new** differential side bearing (ring gear side).

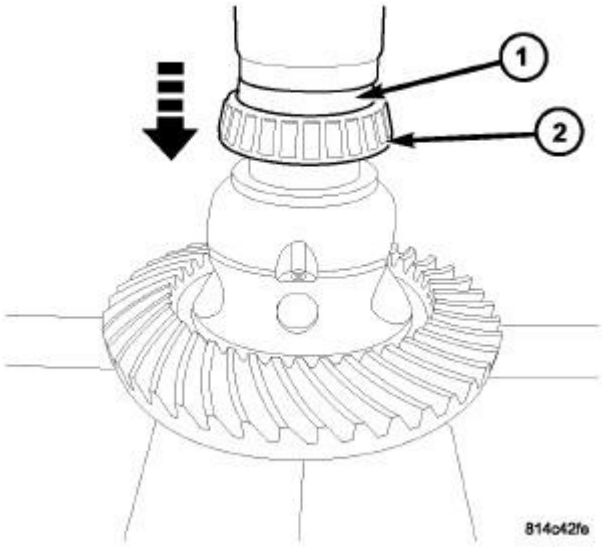


Fig. 91: Installing Differential Side Bearing (Ring Gear Side)
Courtesy of CHRYSLER GROUP, LLC

5. Using Installer (special tool #9665, Installer, Bearing) (1), install **new** differential side bearing (opposite side).

PINION HOUSING ASSEMBLY

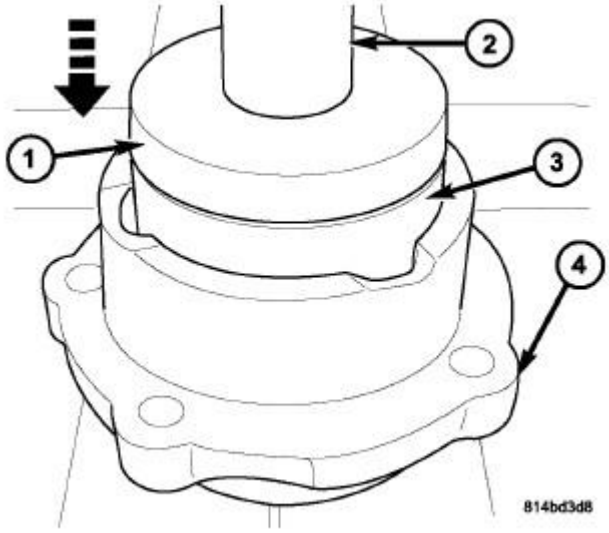


Fig. 92: Installing Pinion Head Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

1. Using Handle (special tool #C-4171, Driver Handle, Universal) (2) and Installer (special tool #D-129, Installer, Bearing Cup) (1), press **new** pinion head bearing cup (3) into pinion gear housing.

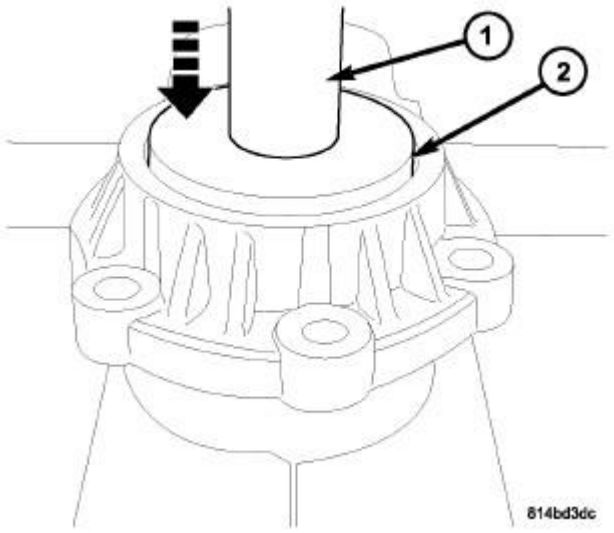


Fig. 93: Installing Pinion Tail Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

2. Using Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #D-130, Installer, Bearing Cup) (2), press new pinion tail bearing cup into pinion gear housing.

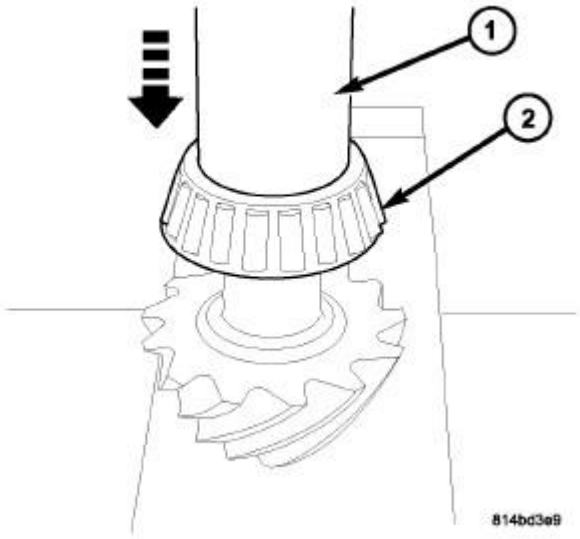


Fig. 94: Installing Pinion Head Bearing Cone
Courtesy of CHRYSLER GROUP, LLC

3. Using Installer (special tool #L-4507, Installer, Bearing), install **new** pinion head bearing.

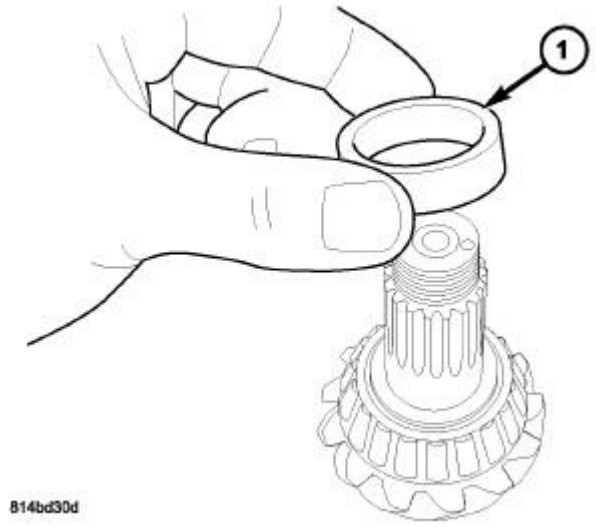


Fig. 95: Pinion Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

4. Install pinion bearing select spacer (1) removed upon disassembly. Spacer thickness will be measured/verified at end of assembly.

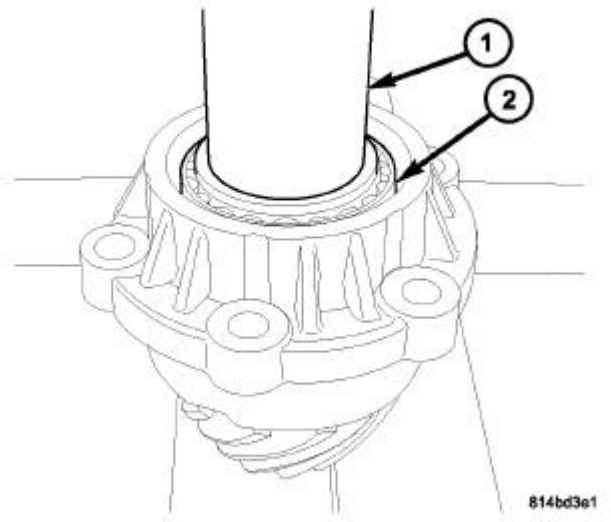


Fig. 96: Installing Pinion Tail Bearing Cone
Courtesy of CHRYSLER GROUP, LLC

5. Install pinion gear/bearing assembly into pinion housing. Using Installer (special tool #L-4507, Installer, Bearing) (1), press **new** pinion tail bearing (2) onto shaft.

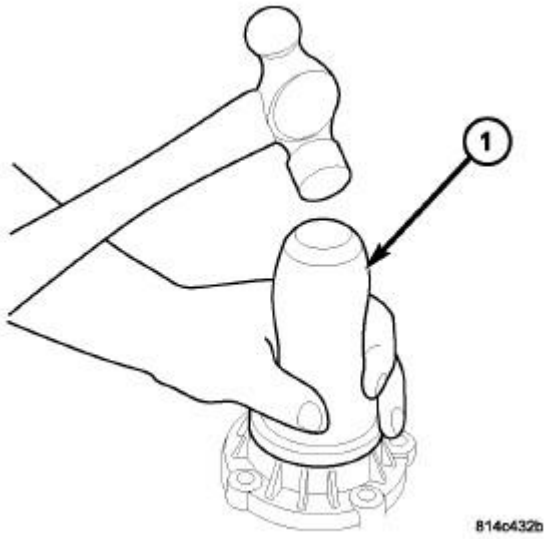


Fig. 97: Installing Pinion Flange Seal
Courtesy of CHRYSLER GROUP, LLC

6. Using Installer (special tool #9677, Installer, Seal) (1), install **new** pinion seal.

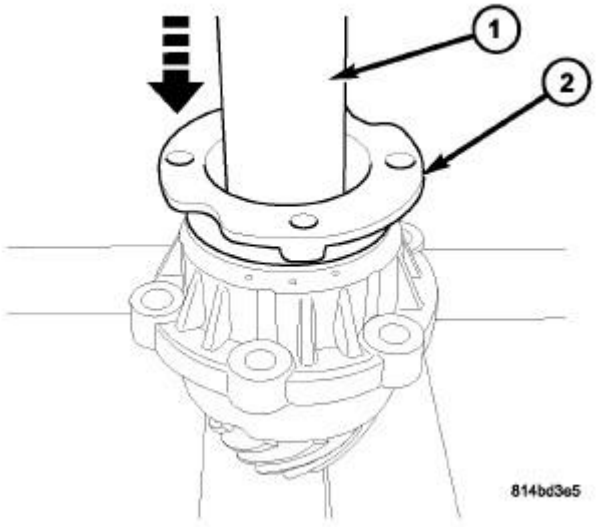


Fig. 98: Installing Pinion Flange
Courtesy of CHRYSLER GROUP, LLC

7. Using Installer (special tool #L-4507, Installer, Bearing) (1), install pinion flange (2) until it bottoms.

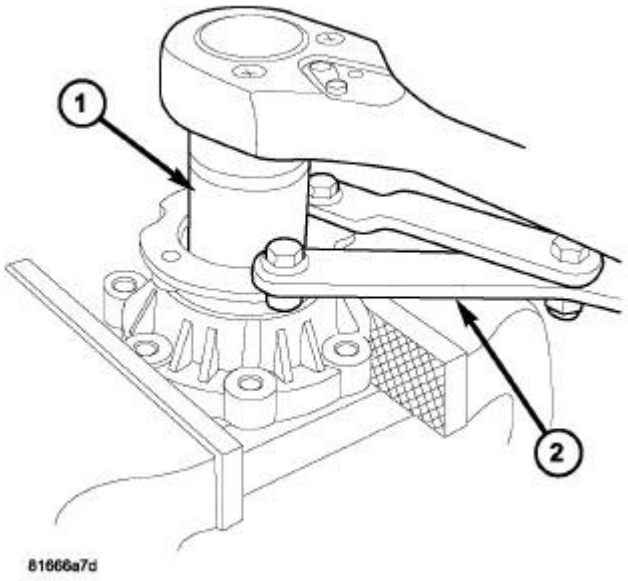


Fig. 99: Install Pinion Flange Nut/Vice
Courtesy of CHRYSLER GROUP, LLC

8. Using Spanner Wrench (special tool #6958, Wrench, Spanner) (2), install pinion flange nut and torque to 475 N.m (350 ft. lbs.). Refer to **Fig. 99**.

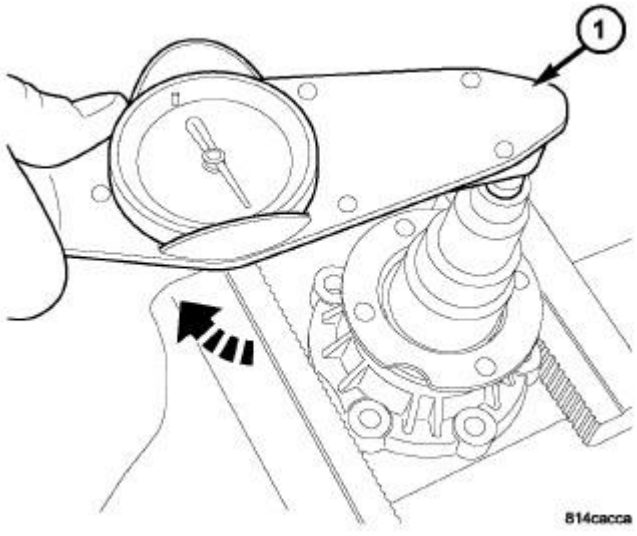


Fig. 100: Measuring Pinion Housing Assembly Turning Torque
Courtesy of CHRYSLER GROUP, LLC

9. Measure pinion housing assembly rotating torque (1). Rotating torque should be within 130-260 N.cm (12-23 in. lbs.).

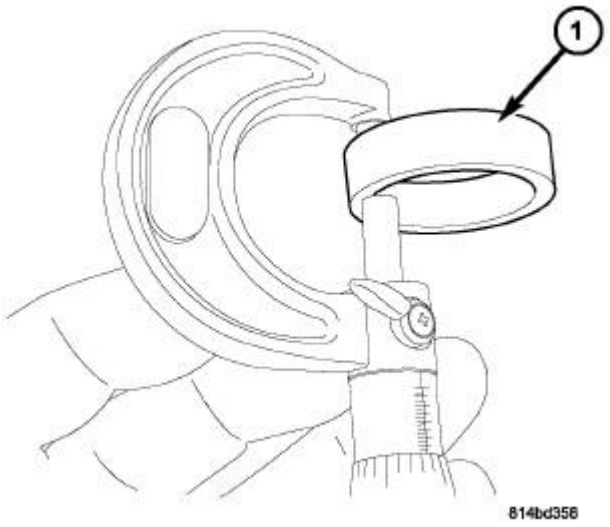


Fig. 101: Measure Pinion Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

10. If rotating torque is lower than this range, disassemble pinion housing, measure and install a slightly thinner spacer (1), reassemble and re-verify. If rotating torque is higher than this range, disassemble pinion housing, install a slightly thicker spacer, reassemble and re-verify rotating torque.
11. Select the pinion depth shim required for this axle assembly. Refer to **ADJUSTMENTS**.

AXLE HOUSING ASSEMBLY

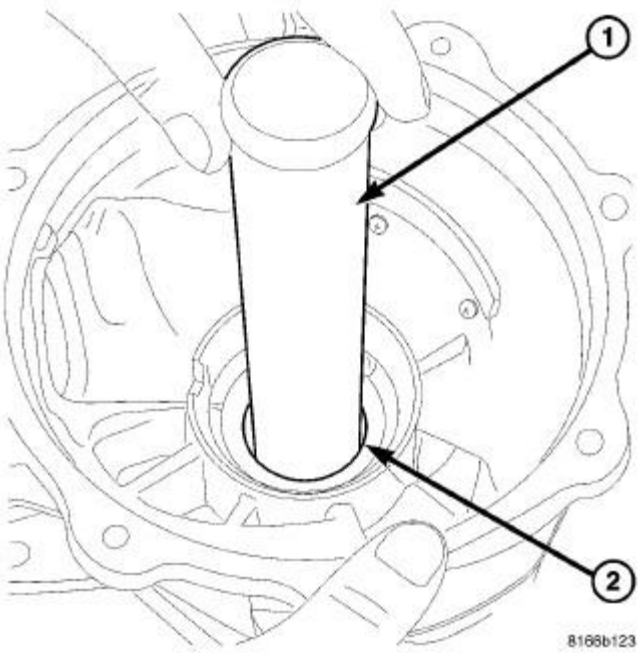


Fig. 102: Install Inner Differential Seal
Courtesy of CHRYSLER GROUP, LLC

1. Using Installer (special tool #L-4507, Installer, Bearing) (1), install new axle seal (inner) (2) into housing. Refer to **Fig. 102**.

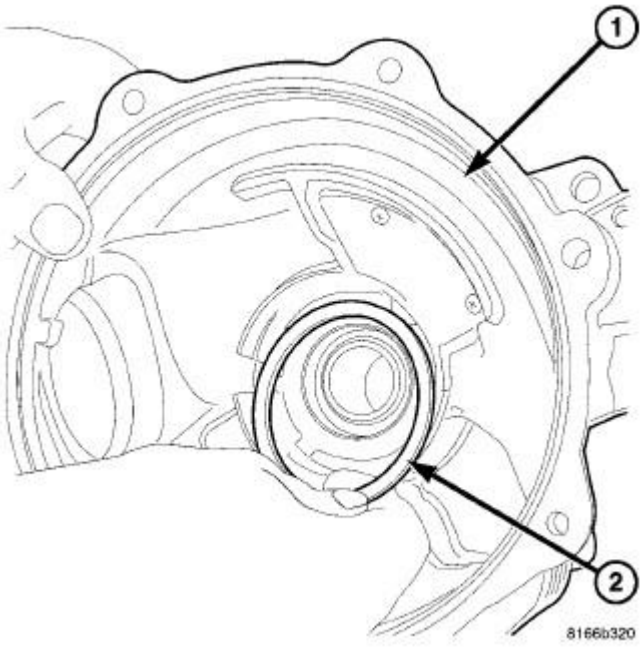


Fig. 103: Inner Differential Shim
Courtesy of CHRYSLER GROUP, LLC

2. Install side bearing preload shim (2) into axle housing (1).

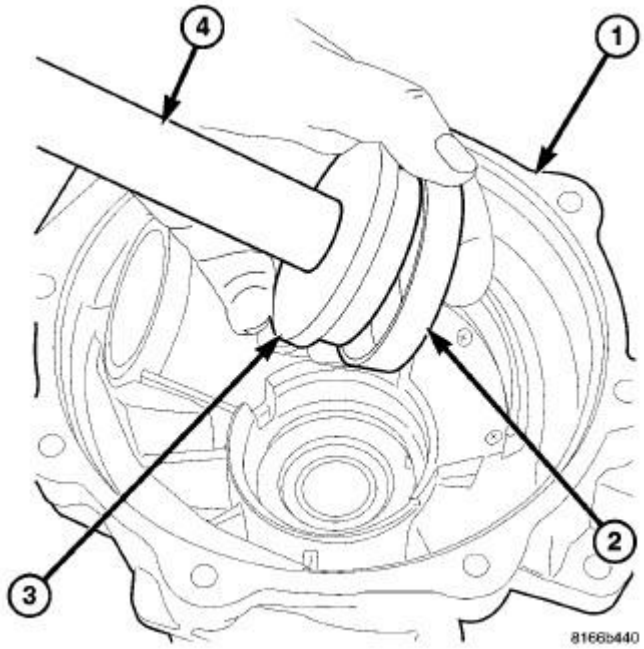


Fig. 104: Install Inner Diff Cup
Courtesy of CHRYSLER GROUP, LLC

3. Using Handle (special tool #C-4171, Driver Handle, Universal) (4) and Installer (special tool #D-145, Installer, Bearing Cup) (3) press new side bearing cup (2) into housing (1) until it bottoms.

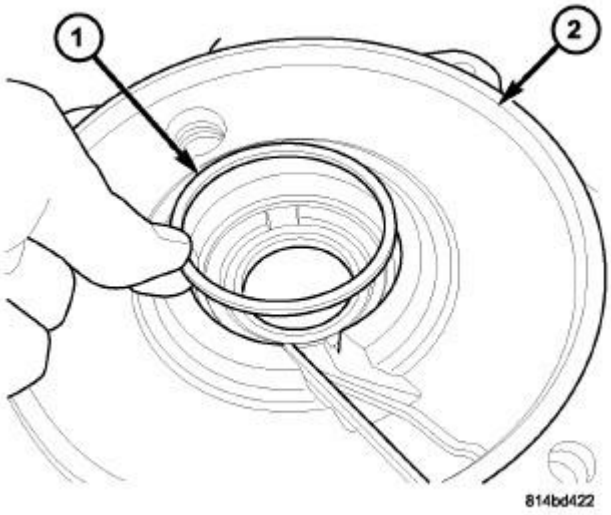


Fig. 105: Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

4. Install differential side bearing preload shim (1) into axle housing cover (2).

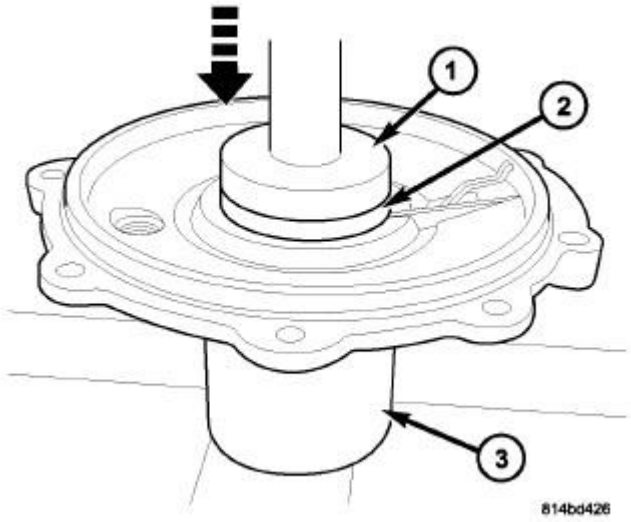


Fig. 106: Installing Side Bearing Cup (Cover)
Courtesy of CHRYSLER GROUP, LLC

5. Using Handle (special tool #C-4171, Driver Handle, Universal) and Installer (special tool #D-129, Installer, Bearing Cup) (1), press new side bearing cup into cover until it bottoms. Use suitable cup (3) to support and protect cover.

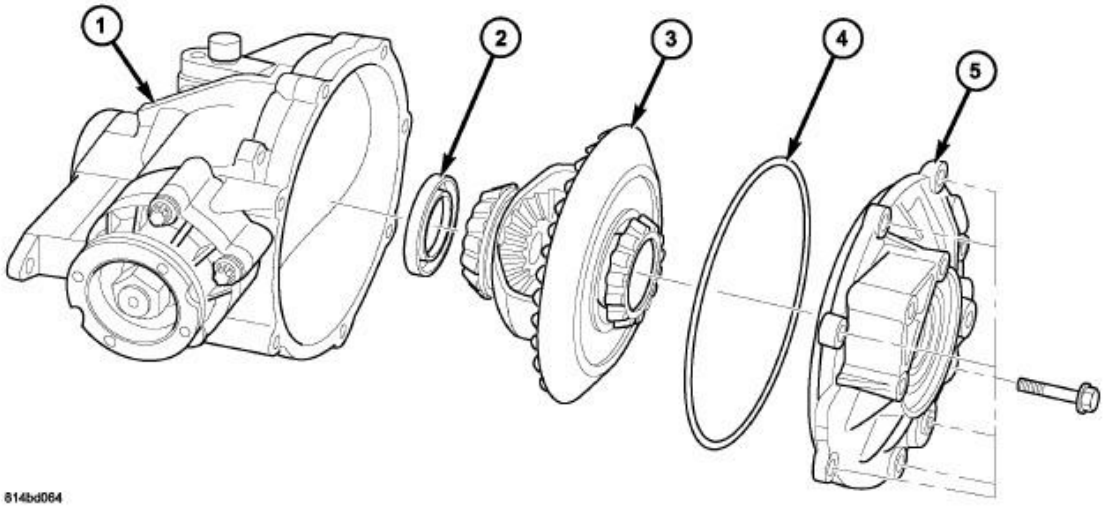


Fig. 107: Differential And Seal Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

6. Install differential/ring gear assembly (3), new cover o-ring seal (4), and cover (5).
7. Install and torque cover-to-housing bolts to:
   - M10x40 - 65 N.m (48 ft. lbs.)

- M8x25 - 34 N.m (25 ft. lbs.)

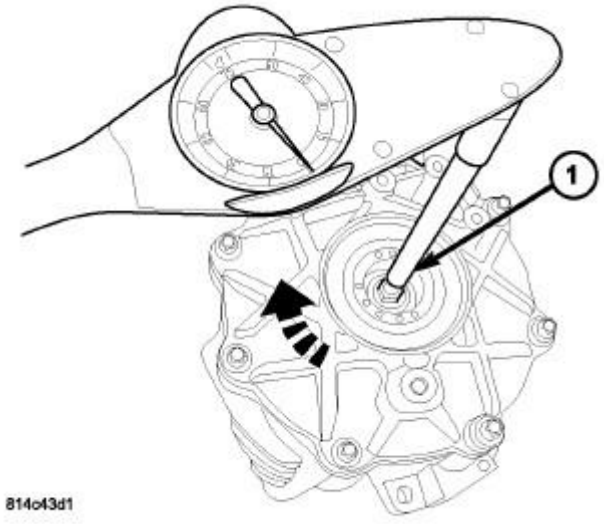


Fig. 108: Measure Differential Rotating Torque
Courtesy of CHRYSLER GROUP, LLC

8. Using Torque Tool (special tool #C-4995A, Tool, Differential Bearing Torque) (1), measure differential side bearing rotating torque (preload). Rotating torque should be within 190-250 N.cm (17-22 in. lbs.).

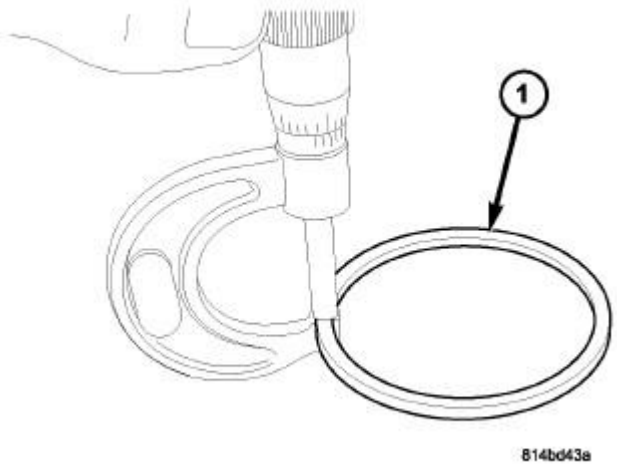


Fig. 109: Measure Side Bearing Preload Shim
Courtesy of CHRYSLER GROUP, LLC

9. If rotating torque is below this range, disassemble housing, measure and install slightly thicker

preload shims (1). Add thickness equally to both sides. If rotating torque is above this range, disassemble housing, measure and install slightly thinner preload shims. Remove thickness equally from both sides.

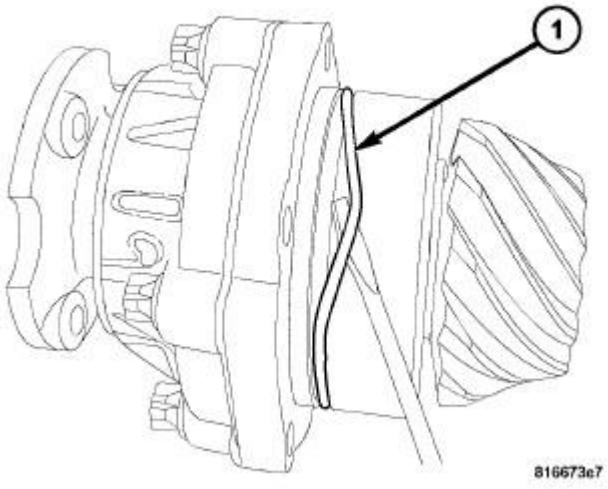


Fig. 110: N Pinion Housing O-Ring
Courtesy of CHRYSLER GROUP, LLC

10. Install new pinion housing o-ring seal (1). Refer to **Fig. 110**.

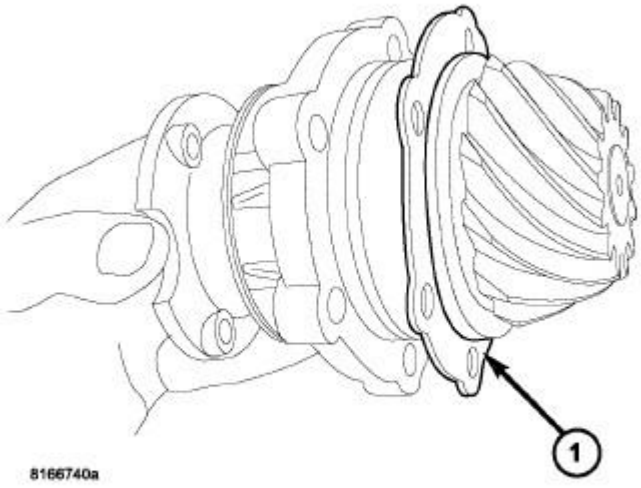


Fig. 111: Pinion Depth Shim
Courtesy of CHRYSLER GROUP, LLC

11. Install pinion housing assembly into axle housing with proper pinion depth shim (1). Refer to **Fig. 111** and **ADJUSTMENTS**.

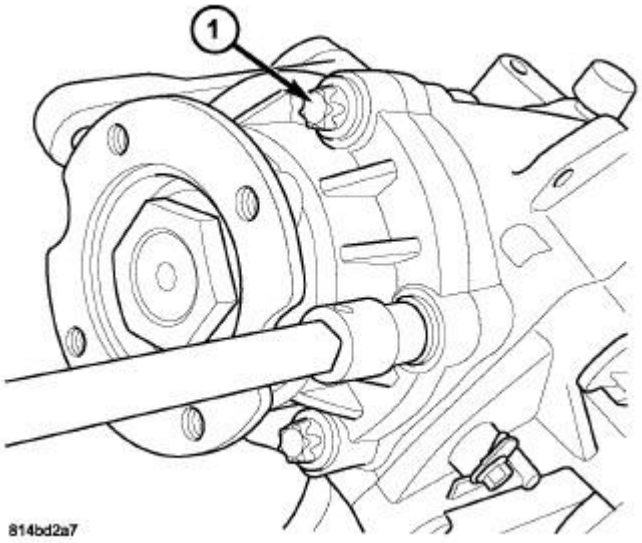


Fig. 112: Pinion Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install and torque pinion housing-to-axle housing bolts (1) to 34 N.m (25 ft. lbs.)
13. Measure and adjust ring gear backlash. Backlash should be within 0.05-0.11mm (0.002-0.004 in.). Refer to **ADJUSTMENTS**.

INSTALLATION

INSTALLATION

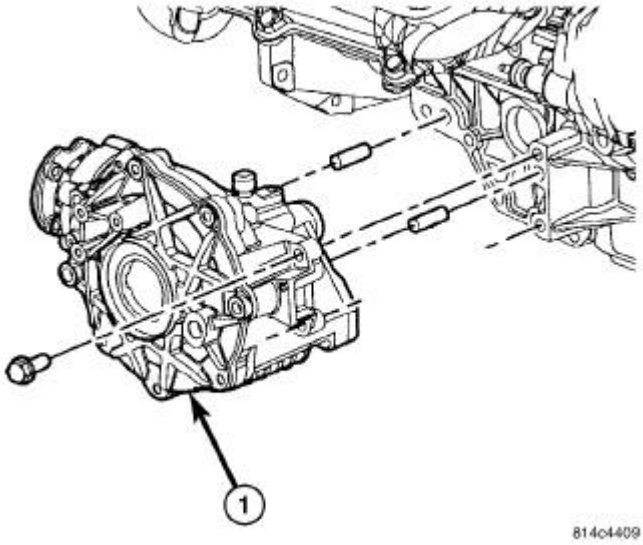


Fig. 113: Removing/Installing Front Axle
Courtesy of CHRYSLER GROUP, LLC

1. Install front axle assembly (1) into position. Refer to **Fig. 113**. Install and tighten axle housing-to-engine bolts to 65 N.m (48 ft. lbs.).

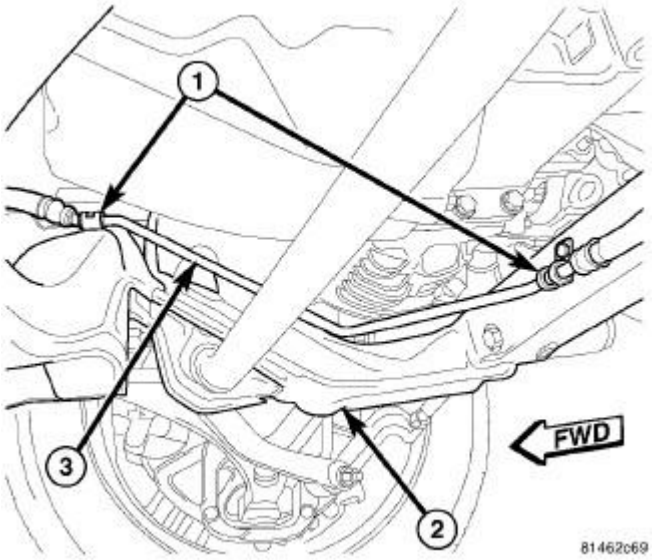


Fig. 114: Return Hose Routing Clips
Courtesy of CHRYSLER GROUP, LLC

2. Install power steering return line to cradle by fastening clips (1).

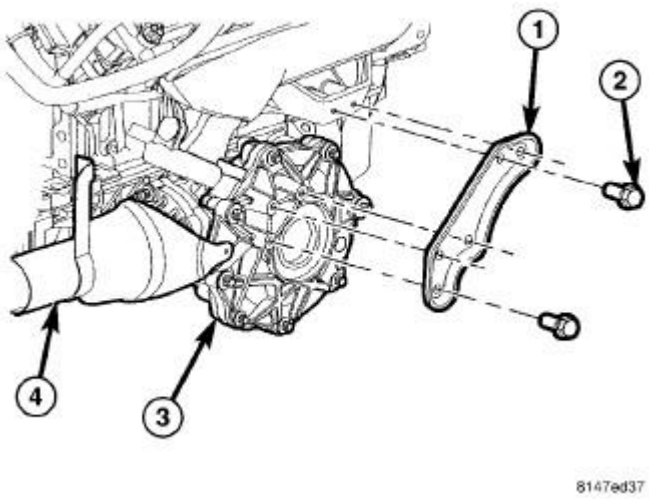


Fig. 115: Front Drive Axle Housing
Courtesy of CHRYSLER GROUP, LLC

3. Install axle assembly support bracket (1) and torque bolts to 28 N.m (21 ft. lbs.). Refer to **Fig. 115**.
4. Install RH catalytic converter/exhaust pipe assembly. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .
5. Install front propeller shaft. Refer to **INSTALLATION** .
6. Install intermediate shaft. Refer to **REMOVAL** or **REMOVAL** .
7. Install both front halfshafts. Refer to **INSTALLATION** or **INSTALLATION** .

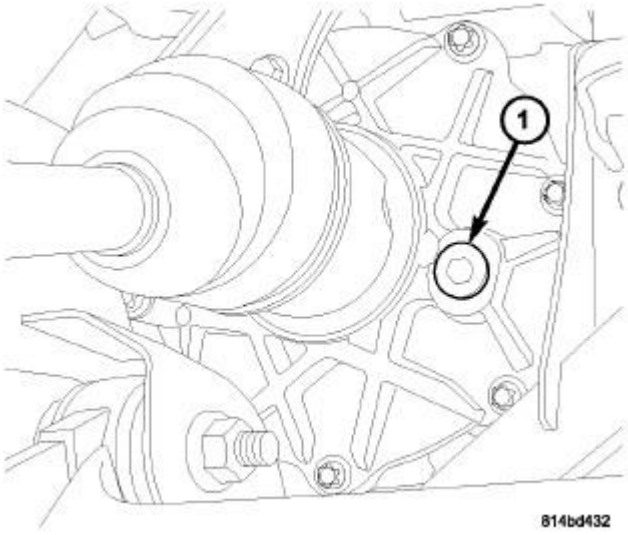


Fig. 116: Fluid Fill Plug Location
Courtesy of CHRYSLER GROUP, LLC

8. Fill axle with 600ml (0.64 qts.) of Mopar® 75W-90 Synthetic Gear Lubricant. Fluid level should be at or near bottom of fill hole. Torque fill plug (1) to 30 N.m (22 ft. lbs.). Refer to **Fig. 116**.
9. Lower vehicle.

SPECIAL TOOLS

SPECIAL TOOLS

	1026 - Puller (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC.) 1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.) 6514 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 6546.) 6958 - Wrench, Spanner (Originally Shipped In Kit Number(s) 6947, 6949, 6966, 8204, 8204CC, 8667.) 9664 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9675, 9685, 9695.) 9665 - Installer, Bearing (Originally Shipped In Kit Number(s) 9675, 9685, 9695.) 9666 - Installer, Bearing (Originally Shipped In Kit Number(s) 9675, 9685, 9695.) 9676 - Adapter Plug (Originally Shipped In Kit Number(s) 9675, 9685, 9695.) 9677 - Installer, Seal (Originally Shipped In Kit Number(s) 9675, 9685, 9695.) 9681-1 - Gauge, Pinion Height (Originally Shipped In Kit Number(s) 9674.) 9681-2 - Plate, Gage (Originally Shipped In Kit Number(s) 9674.) 9681-4 - Disc, Arbor (Originally Shipped In Kit Number(s) 9674.) 9681-5 - Disc, Arbor (Originally Shipped In Kit Number(s) 9674.) 9682 - Backlash Measuring Tool (Originally Shipped In Kit Number(s) 9674.) C-3339A - Set, Dial Indicator (Originally Shipped In Kit Number(s) 9202.) C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.) C-4995A - Tool, Differential Bearing Torque C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)

	D-115-3 - Arbor (Originally Shipped In Kit Number(s) 8667, 9516A-CAN.) D-129 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 6947, 6949, 8667.) D-130 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 9695.) D-145 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 8667, 9695.) L-4507 - Installer, Bearing (Originally Shipped In Kit Number(s) 9685, 9695.)

DISCONNECT, FRONT AXLE

REMOVAL

FRONT AXLE DISCONNECT

1. Raise and support the vehicle.

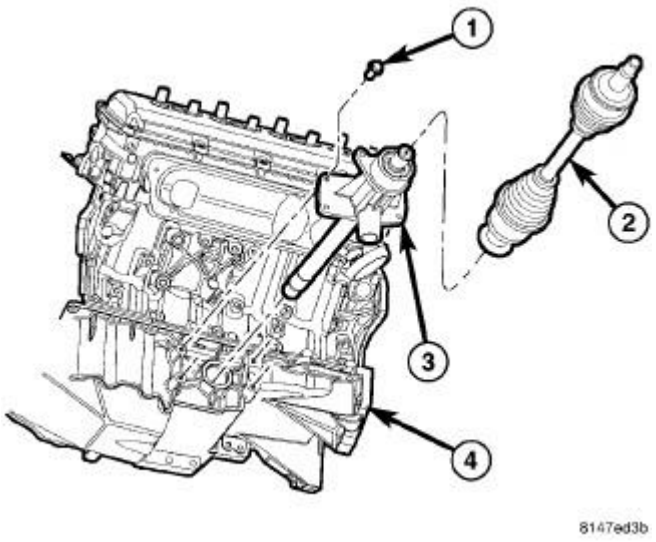


Fig. 117: Left Drive Axle & Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: The intermediate shaft is serviced only as a complete assembly.

2. Remove left halfshaft assembly (2). Refer to **REMOVAL** or **REMOVAL** .

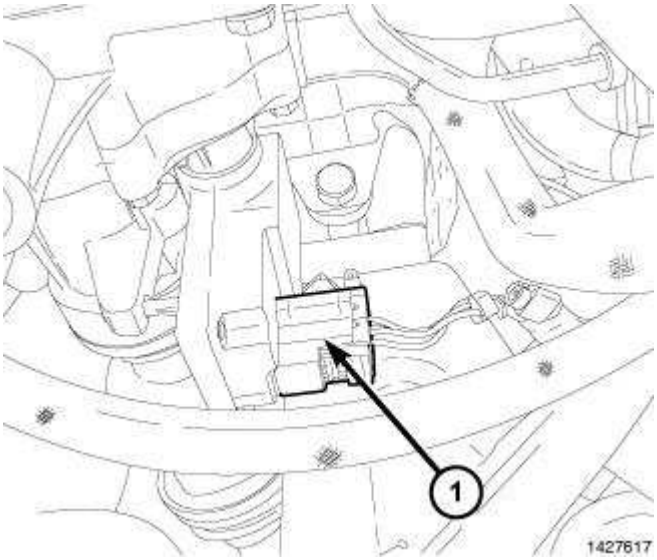


Fig. 118: Front Axle Disconnect Solenoid Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the front axle disconnect solenoid harness connector (1).

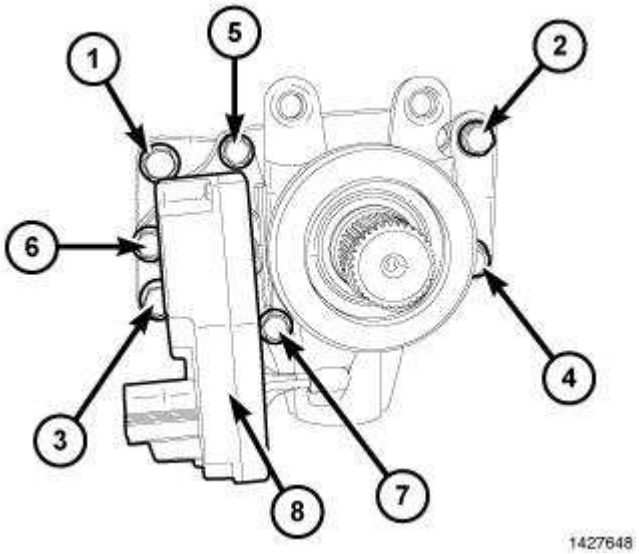


Fig. 119: Bolts From Front Axle Disconnect Solenoid
Courtesy of CHRYSLER GROUP, LLC

4. Remove the 3 bolts (5), (6), (7) from the front axle disconnect solenoid, and remove the front axle disconnect solenoid (8).

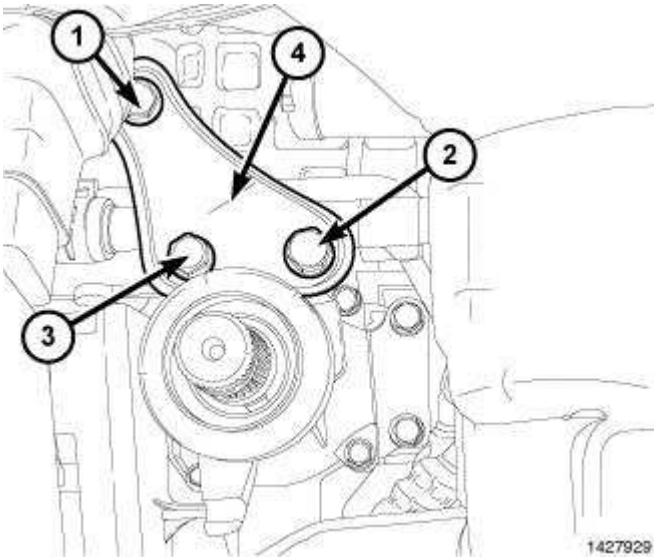


Fig. 120: Bolts From Front Axle Disconnect Bracket
Courtesy of CHRYSLER GROUP, LLC

5. Remove the 3 bolts (1), (2), (3) from the front axle disconnect bracket, and remove the front axle disconnect bracket (4).

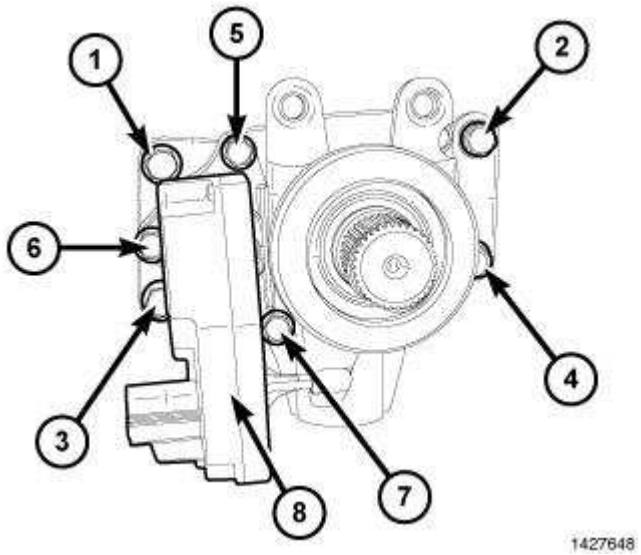


Fig. 121: Bolts From Front Axle Disconnect Solenoid
Courtesy of CHRYSLER GROUP, LLC

6. Remove four bolts (1) from the front axle disconnect (3) and remove it from the engine

FRONT AXLE DISCONNECT SOLENOID

1. Raise and support the vehicle.

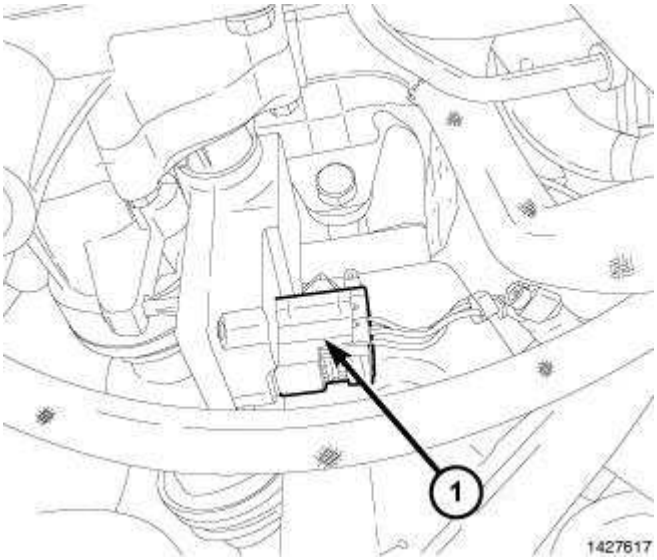


Fig. 122: Front Axle Disconnect Solenoid Harness Connector
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the front axle disconnect solenoid harness connector (1).

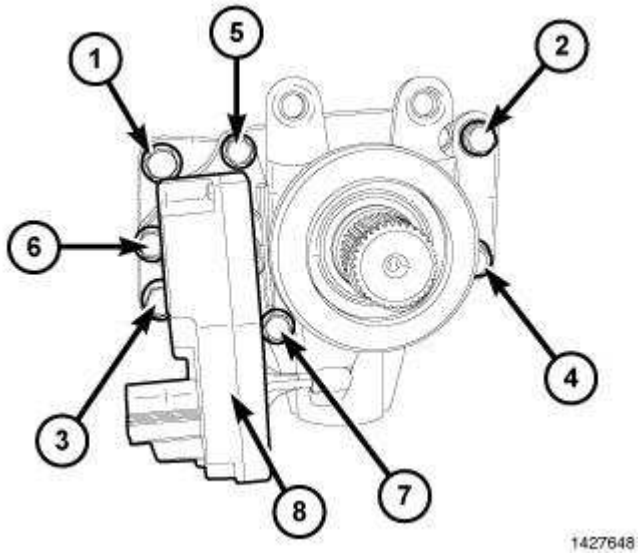


Fig. 123: Bolts From Front Axle Disconnect Solenoid
Courtesy of CHRYSLER GROUP, LLC

3. Remove the 3 bolts (5), (6), and (7) from the front axle disconnect solenoid (8).
4. Remove the front axle disconnect solenoid (8).

INSTALLATION

FRONT AXLE DISCONNECT

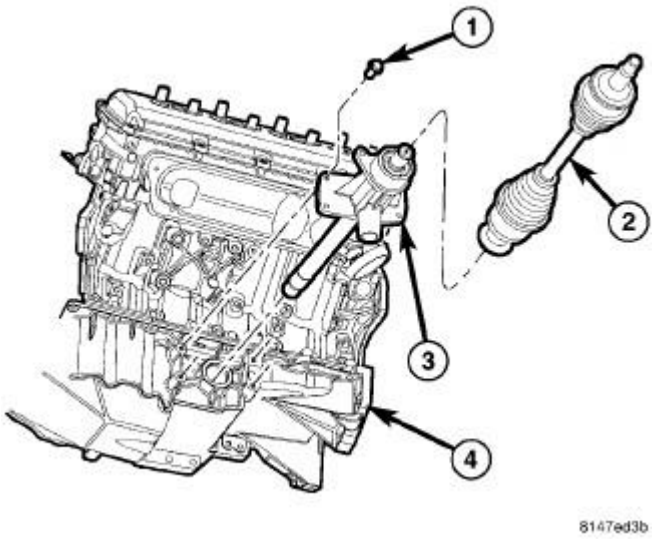


Fig. 124: Left Drive Axle & Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

1. Install the front axle disconnect (3).
2. Install and torque the four front axle disconnect-to-oil pan bolts (1) to 25 N.m (18 ft. lbs.).

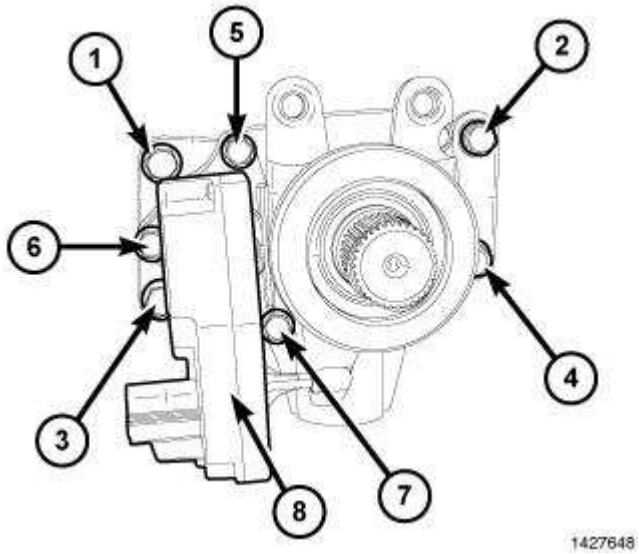


Fig. 125: Bolts From Front Axle Disconnect Solenoid
Courtesy of CHRYSLER GROUP, LLC

3. Install the front axle disconnect solenoid (8), and the 3 bolts (5), (6) and (7).

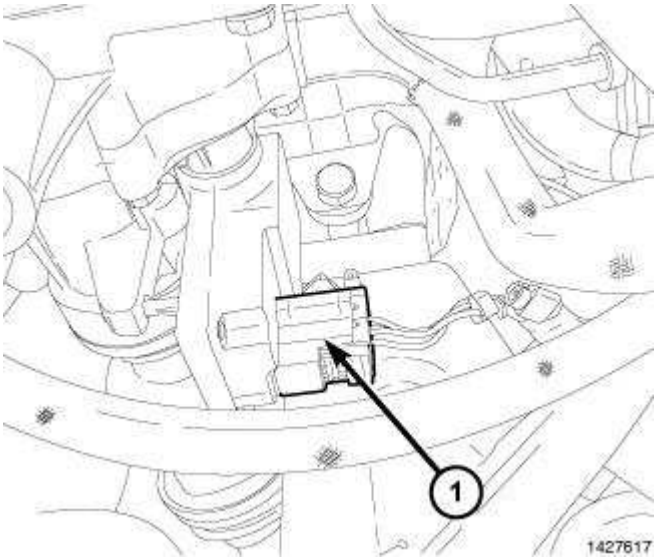


Fig. 126: Front Axle Disconnect Solenoid Harness Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect the front axle disconnect solenoid harness connector (1).

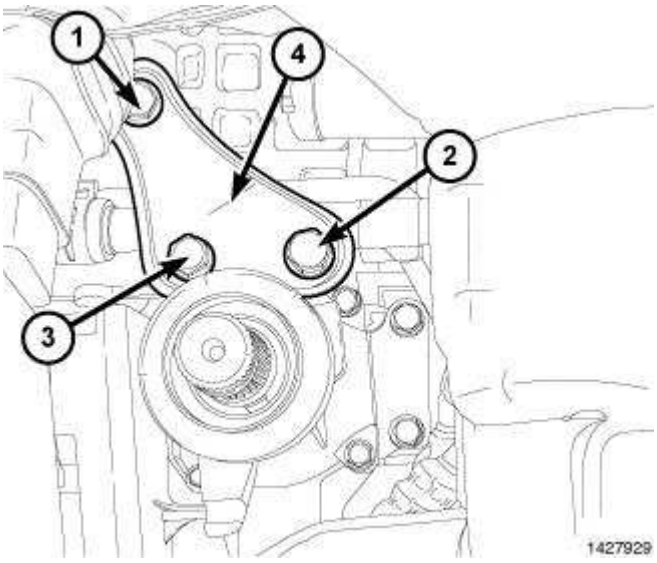


Fig. 127: Bolts From Front Axle Disconnect Bracket
Courtesy of CHRYSLER GROUP, LLC

5. Install the front axle disconnect solenoid bracket (4), and the 3 bolts (1), (2), and (3).

FRONT AXLE DISCONNECT SOLENOID

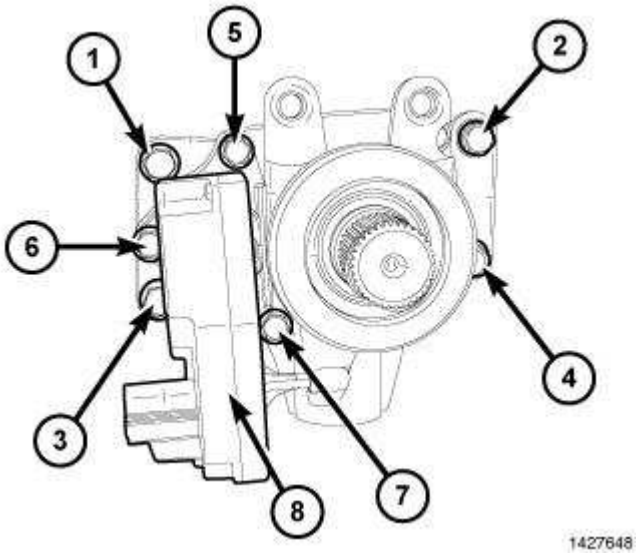


Fig. 128: Bolts From Front Axle Disconnect Solenoid
Courtesy of CHRYSLER GROUP, LLC

1. Install the front axle disconnect solenoid (8), and the 3 bolts (5), (6), (7).

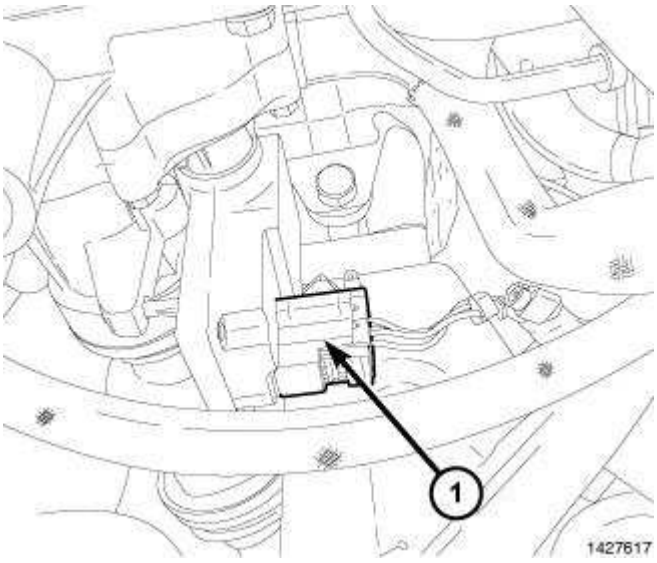


Fig. 129: Front Axle Disconnect Solenoid Harness Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the front axle disconnect harness connector (1).

FLUID

STANDARD PROCEDURE

STANDARD PROCEDURE - FLUID FILL

NOTE: **The 175MM FIA Front Axle assembly is designed for 'fill for life' and is not manufactured with a fluid drain plug.**

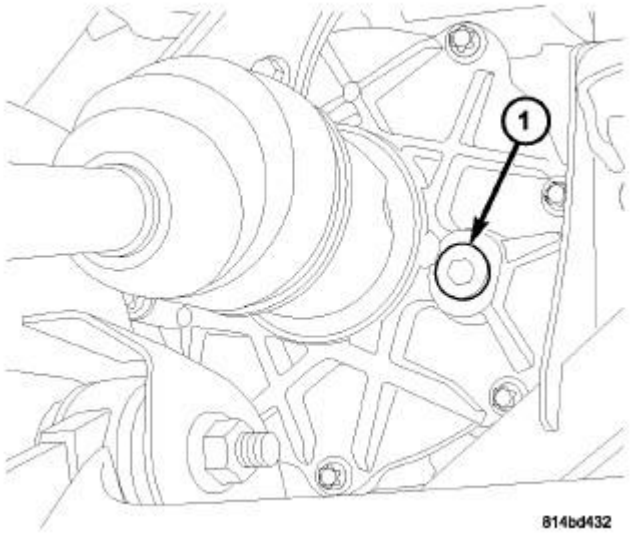


Fig. 130: Fluid Fill Plug Location
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove axle fill plug (1). Refer to **Fig. 130**.
3. Fill axle with 600ml (0.64 qts.) of Mopar® 75W-90 Synthetic Gear Lubricant. Fluid should be within 3/16" of bottom of fill hole.

SEAL, AXLE DRIVE SHAFT

REMOVAL

RIGHT AXLE SEAL

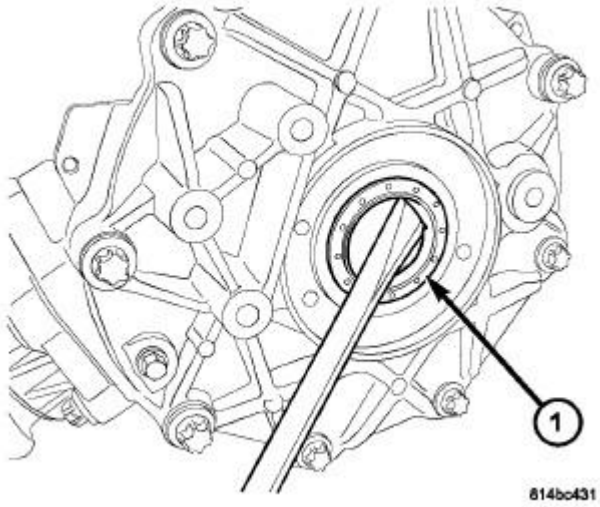


Fig. 131: Removing Axle Seal
Courtesy of CHRYSLER GROUP, LLC

1. Remove right halfshaft assembly. Refer to **REMOVAL** or **REMOVAL** .
2. Using suitable screwdriver, remove axle seal (1). Refer to **Fig. 131**.

LEFT AXLE SEAL

NOTE: Inboard (Left) axle seal replacement requires removal and disassembly of the axle assembly.

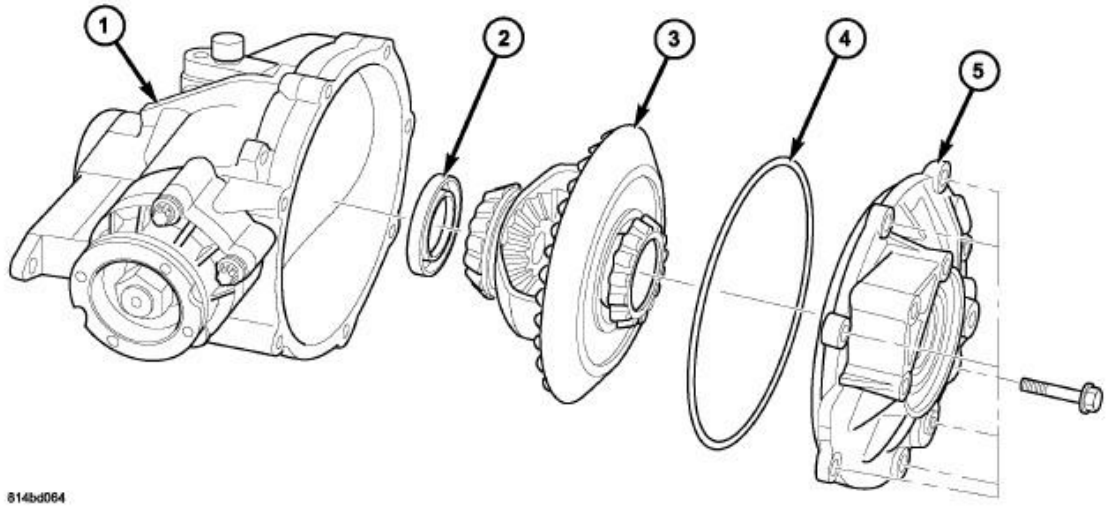


Fig. 132: Differential And Seal Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1. Remove front axle assembly. Refer to **REMOVAL**.
2. Drain axle lubricant by turning housing on its side and draining out of left output bore.
3. Remove differential cover (5) and differential (3). Refer to **Fig. 132**. Remove and discard o-ring seal.
4. Using Remover (special tool #9664, Remover, Bearing Cup) and Slide Hammer (special tool #C-637, Slide Hammer, Universal), remove left axle seal.

INSTALLATION

RIGHT AXLE SEAL

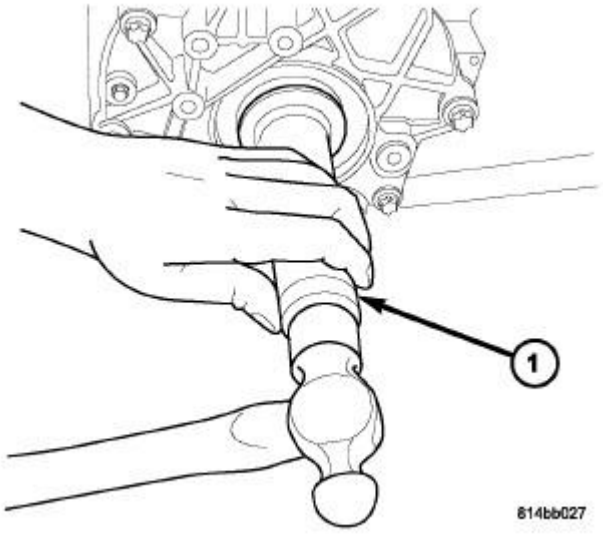


Fig. 133: Installing Axle Seal
Courtesy of CHRYSLER GROUP, LLC

1. Using Seal Installer C-4193A (1, install new axle shaft seal. Refer to **Fig. 133**.
2. Install right halfshaft assembly. Refer to **INSTALLATION** or **INSTALLATION** .

LEFT AXLE SEAL

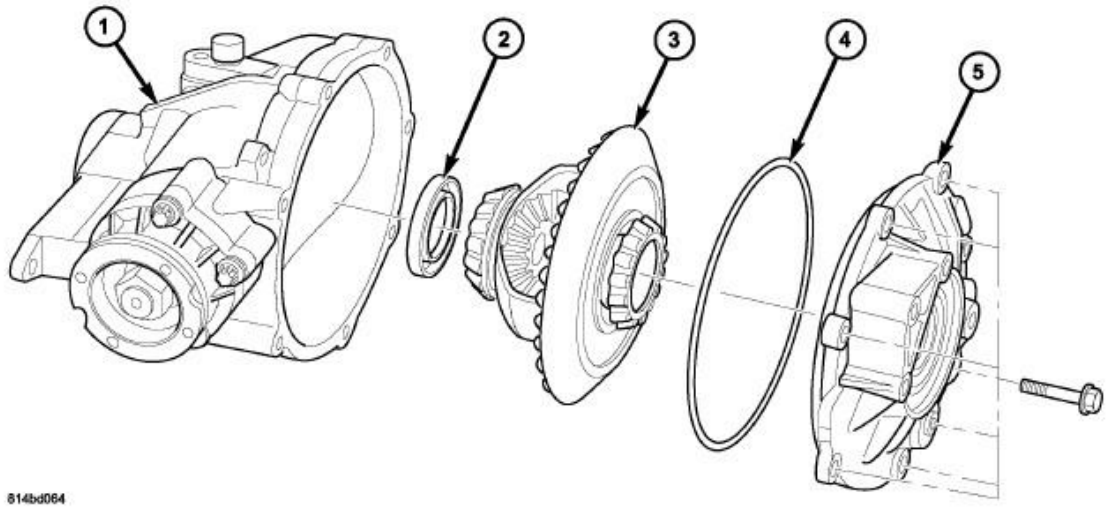


Fig. 134: Differential And Seal Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1. Using Installer (special tool #L-4507, Installer, Bearing), install left (inboard) axle seal (2).
2. Install differential (3). Refer to **Fig. 134**. Install cover (5) with new o-ring seal (4).
3. Install and torque cover-to-housing bolts to:
    - M10x40 - 65 N.m (48 ft. lbs.)
    - M8x25 - 34 N.m (25 ft. lbs.)

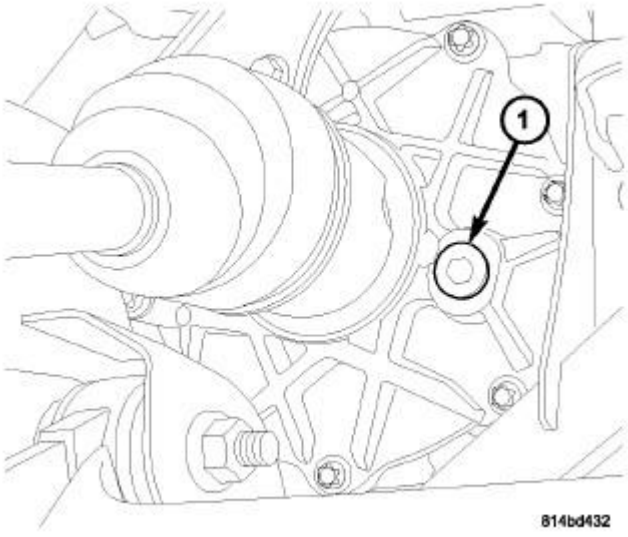


Fig. 135: Fluid Fill Plug Location
Courtesy of CHRYSLER GROUP, LLC

4. Install axle assembly into vehicle. Refer to **INSTALLATION**.
5. Fill axle (1) with 600ml (0. 64 qts.) Mopar® 75W-90 Synthetic Gear Lubricant. Refer to **Fig. 135**. Torque fill plug (1) to 30 N.m (22 ft. lbs.)

SEAL, PINION

REMOVAL

REMOVAL

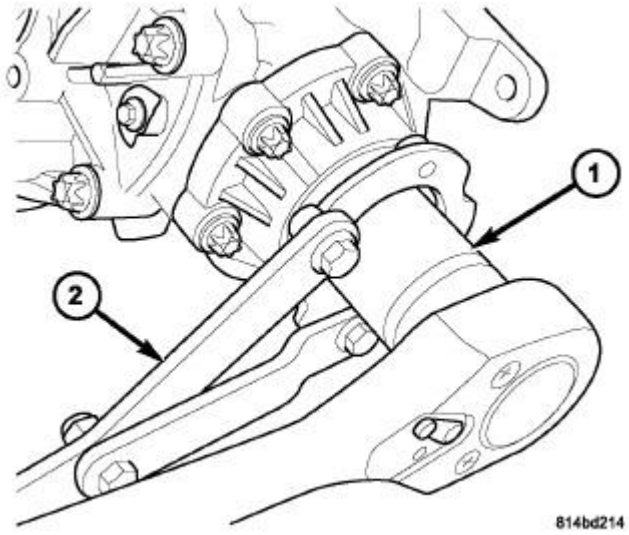


Fig. 136: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1. Remove propeller shaft and heat shield. Refer to **REMOVAL** .
2. Using Spanner Wrench (special tool #6958, Wrench, Spanner) (2), remove pinion flange nut. Refer to **Fig. 136**.

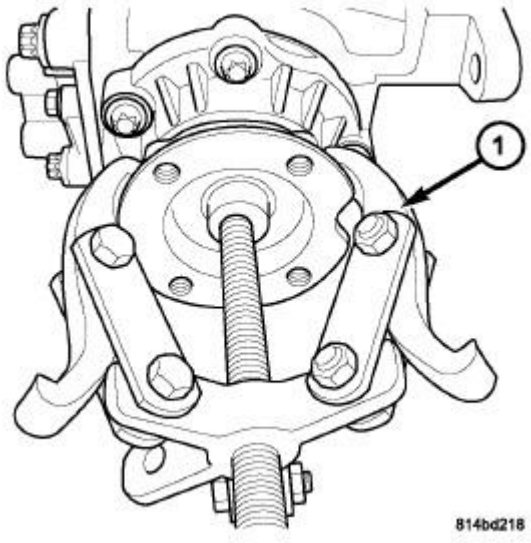


Fig. 137: Removing Pinion Flange
Courtesy of CHRYSLER GROUP, LLC

3. Using Puller (special tool #1026, Puller) (1), remove pinion flange. Refer to **Fig. 137**.
4. Remove pinion flange seal with suitable screwdriver and discard.

INSTALLATION

INSTALLATION

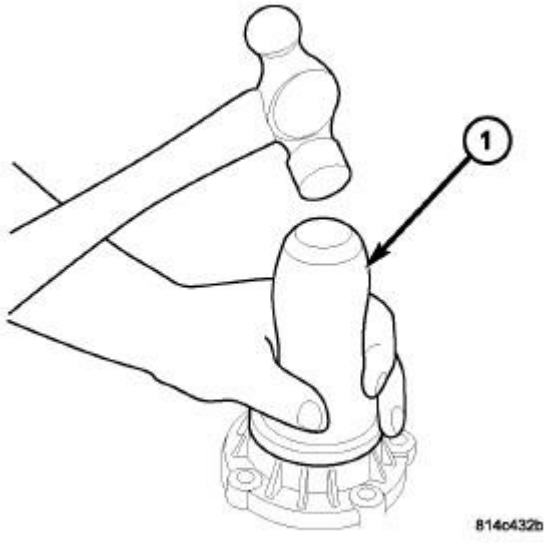


Fig. 138: Installing Pinion Flange Seal
Courtesy of CHRYSLER GROUP, LLC

1. Using Installer (special tool #9677, Installer, Seal) (1), install new pinion flange seal. Refer to

Fig. 138.

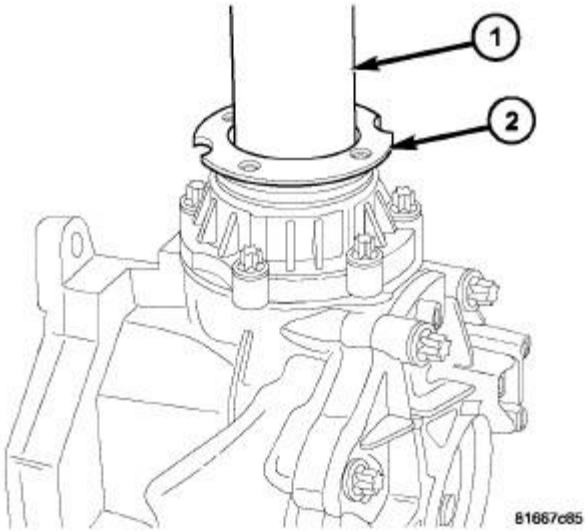


Fig. 139: Installing Pinion Flange
Courtesy of CHRYSLER GROUP, LLC

1 - Installer
2 - Pinion Flange

2. Using Installer (special tool #L-4507, Installer, Bearing) (1), **lightly tap** pinion flange (2)onto shaft, just enough to start flange nut by hand. Refer to **Fig. 139**.

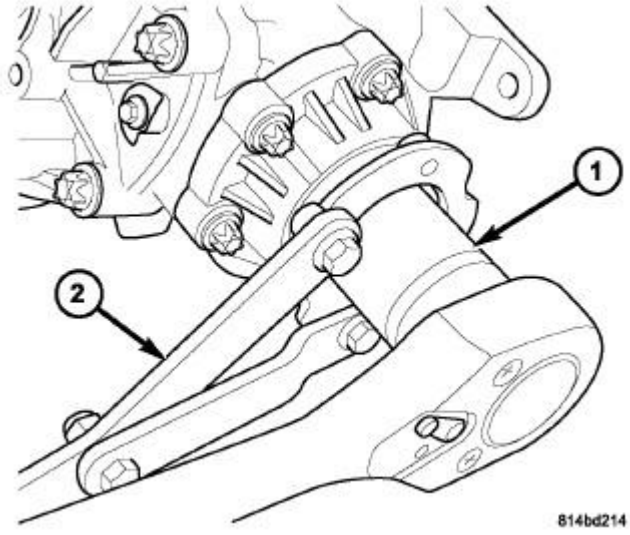


Fig. 140: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

3. Install pinion flange nut and torque to 475 N.m (350 ft. lbs.) (2). Refer to **Fig. 140**.
4. Install propeller shaft and heat shield. Refer to **INSTALLATION** .

DRIVELINE/AXLES

Front Half Shaft - Chrysler 300

DESCRIPTION

DESCRIPTION

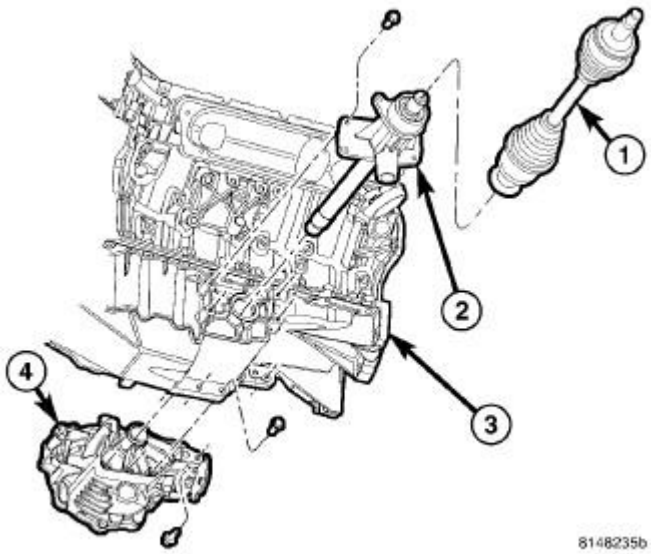


Fig. 1: Front Drive Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - LEFT HALFSHAFT ASSEMBLY
2 - INTERMEDIATE SHAFT ASSEMBLY
3 - ENGINE/OIL PAN
4 - FRONT AXLE ASSEMBLY

The inner joints of both half shaft assemblies are cross-groove joints. The outer joints of both assemblies are Rzeppa Joints. The cross-groove joints are true constant velocity (CV) joint assemblies, which allow for the changes in half shaft length through the jounce and rebound travel of the rear suspension.

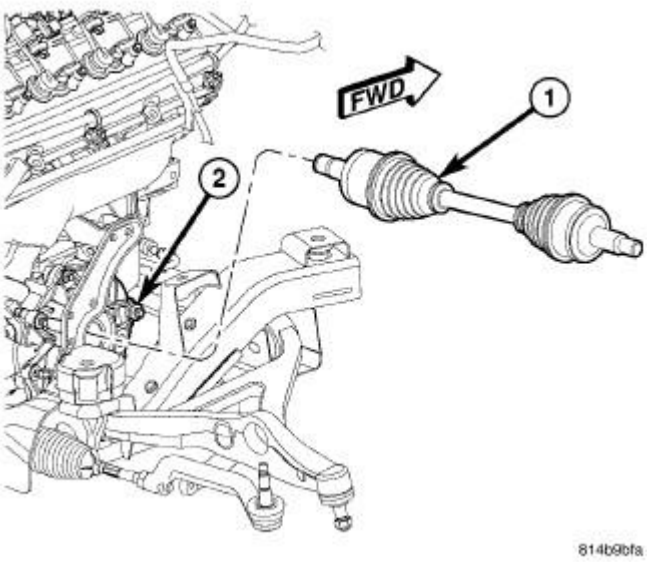


Fig. 2: Removing/Installing Right Halfshaft
Courtesy of CHRYSLER GROUP, LLC

1 - RIGHT HALFSHAFT ASSEMBLY
2 - FRONT AXLE ASSEMBLY

The inner cross-groove joint of the left halfshaft assembly is splined to the front axle disconnect and retained with a snap ring. The right halfshaft is splined to the front axle assembly and retained with a snap ring. The outer CV joint has a stub shaft that is splined into the wheel hub and retained by a steel hub nut.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HALF SHAFT

VEHICLE INSPECTION

1. Check for grease in the vicinity of both the inboard and outboard joints. This is a sign of inner or outer joint seal boot or seal boot clamp damage.

NOISE AND/OR VIBRATION IN TURNS

A clicking noise and/or a vibration in turns could be caused by one of the following conditions:

- Damaged outer CV or inner cross-groove joint seal boot or seal boot clamps. This will result in the loss and/or contamination of the joint grease, resulting in inadequate lubrication of the joint.
- Noise may also be caused by another component of the vehicle coming in contact with the half shafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a result of one of the following conditions:

- Damaged joint due to contamination caused by a torn seal boot on the inner or outer joint of the half shaft assembly.
- A loose or missing clamp on the inner or outer joint of the half shaft assembly.
- A damaged or worn half shaft CV joint.
- A worn front axle disconnect shaft bearing (AWD Models).

SHUDDER OR VIBRATION DURING ACCELERATION

This problem could be a result of:

- A worn or damaged half shaft inner cross-groove joint.
- A worn intermediate shaft bearing (AWD Models).
- Improper wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

VIBRATION AT HIGHWAY SPEEDS

This problem could be a result of:

- Foreign material (mud, etc.) packed on the backside of the wheel(s).
- Out of balance tires or wheels. Refer to **STANDARD PROCEDURE** .
- A worn intermediate shaft bearing (AWD Models).
- Improper tire and/or wheel runout due to a bent rim or damaged tire. Refer to **DIAGNOSIS AND TESTING** .

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Nut, Halfshaft Hub	213	157	-
Bolt, Intermediate Shaft-to-Oil Pan	25	18	-
Nut, at ball joint	47 + 90°	37 + 90°	-
Bolts, Caliper to mounting bracket	169	125	-
Pinch bolt, Clevis bracket to Shock assembly	61	45	-
Nut, at Stabilizer link	146	108	-
Nuts, Wheel Mounting	150	110	-
Nut, Lower Clevis			

Bracket	174	128	-

REMOVAL

REMOVAL

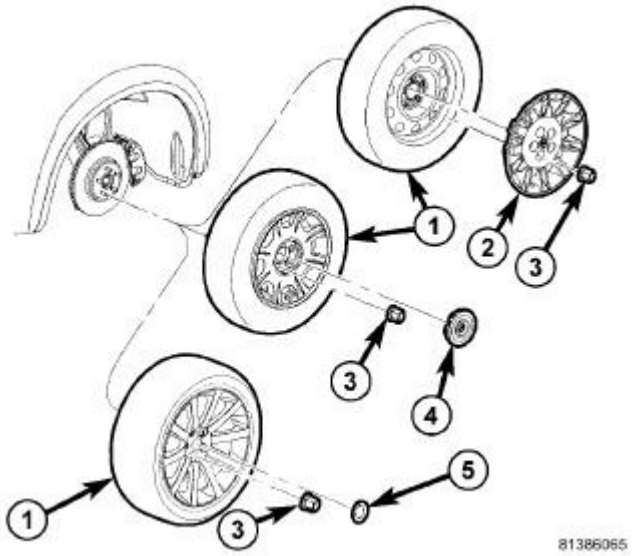


Fig. 3: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

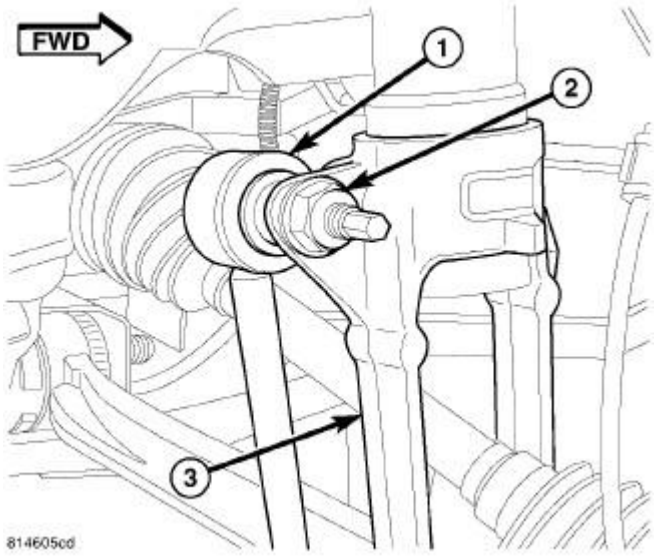


Fig. 4: Locating Stabilizer Link Attachment AT Shock Clevis

Courtesy of CHRYSLER GROUP, LLC

3. While holding link ball joint stem from rotating, remove nut (2) fastening stabilizer link (1) to shock clevis bracket (3). Slide link ball joint stem from clevis bracket.

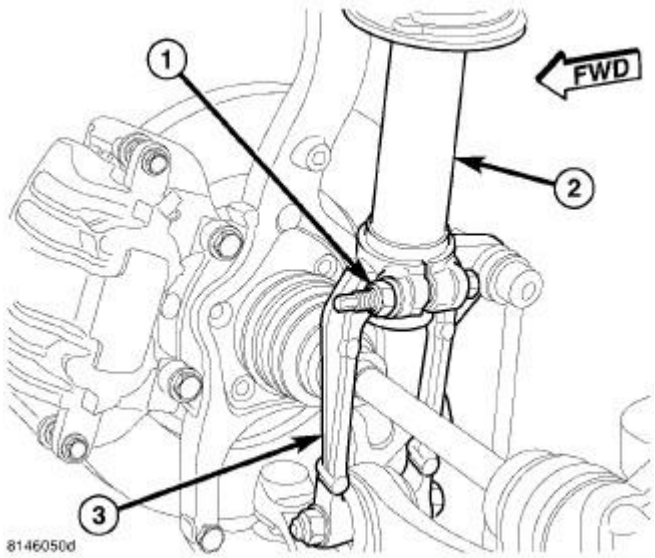


Fig. 5: Removing/Installing Shock Clevis Pinch Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove nut and pinch bolt (1) fastening clevis bracket (3) to bottom of shock assembly (2).

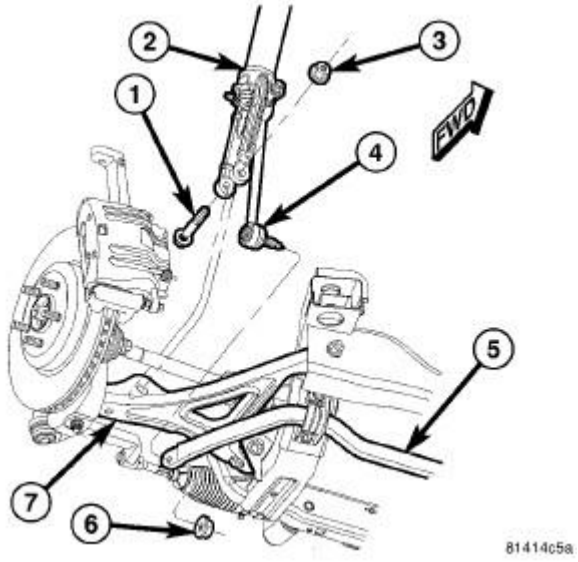


Fig. 6: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

5. Remove nut (3) and bolt (1) attaching shock clevis bracket (2) to lower control arm (7).

6. Pull lower end of clevis bracket outward away from lower control arm bushing, then slide it off shock assembly. It may be necessary to use an appropriate prying tool to spread clamp area of clevis bracket allowing removal from shock assembly.

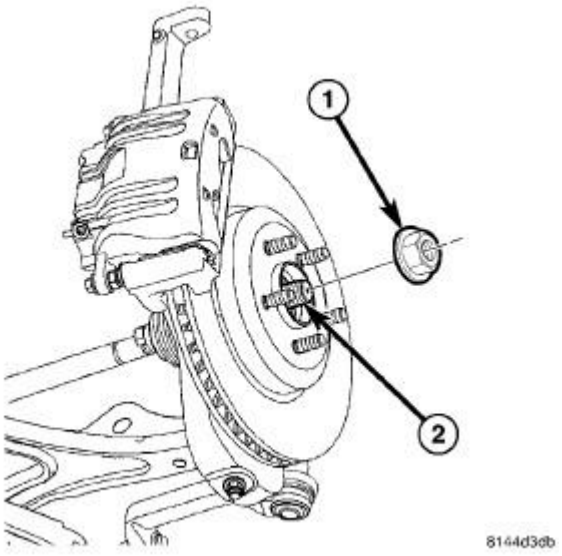


Fig. 7: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

7. While a helper applies brakes to keep hub from rotating, remove hub nut (1) from axle half shaft (2).

NOTE: **In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be accomplished before mounting bolts are removed, by grasping rear of caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.**

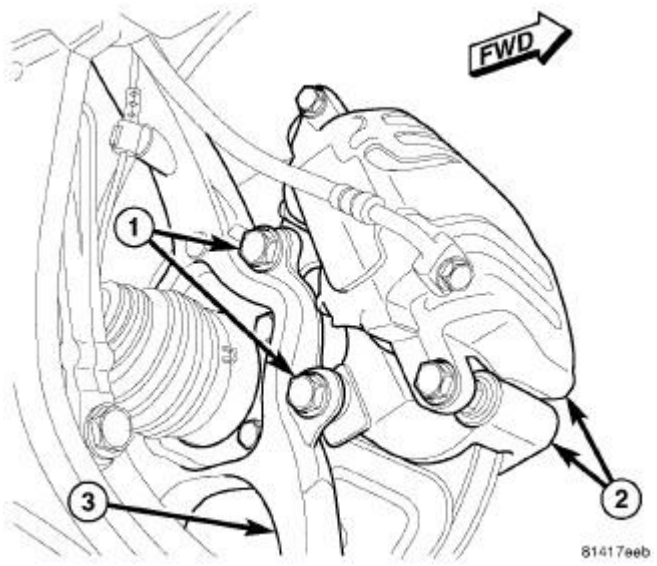


Fig. 8: Locating Front Caliper Bolts AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

8. Remove two bolts (1) securing disc brake caliper and adapter (2) to knuckle (3).
9. Remove disc brake caliper and adapter (2) from knuckle (3) as an assembly. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

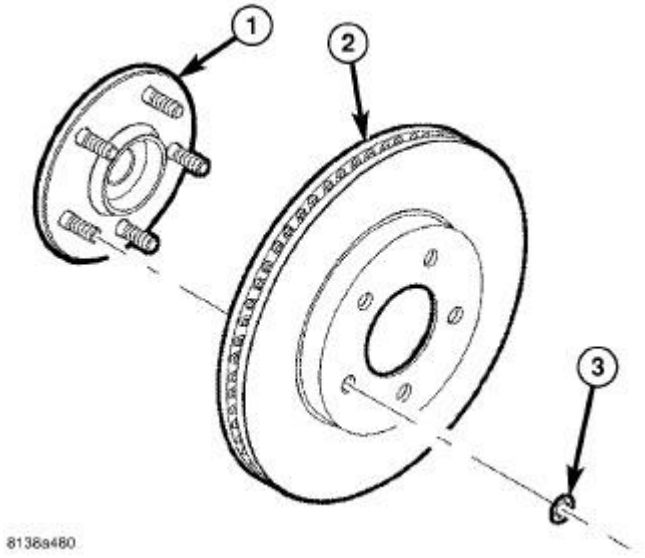


Fig. 9: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

10. Remove any clips (3) retaining brake rotor (2) to wheel studs.
11. Slide brake rotor (2) off hub and bearing (1).

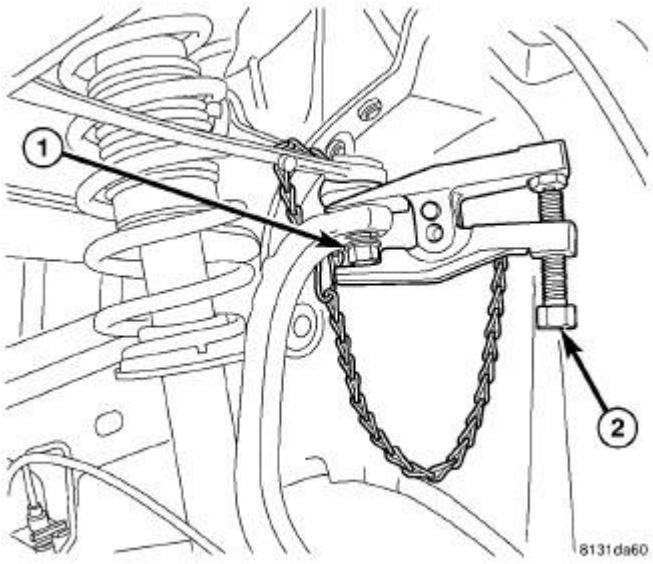


Fig. 10: Using Puller On Upper Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller (special tool #9360, Remover, Ball Joint), into place past seal boot.

12. Using Puller (special tool #9360, Remover, Ball Joint) (2), separate upper ball joint stud (1) from knuckle.
13. Remove tool.
14. Remove nut (1) from end of upper ball joint stud.

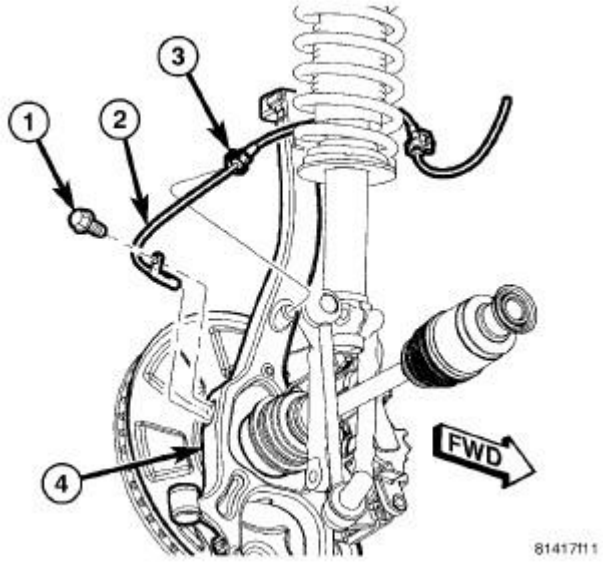


Fig. 11: Wheel Speed Sensor AT Front Knuckle - AWD

Courtesy of CHRYSLER GROUP, LLC

15. Remove clip (3) fastening wheel speed sensor (2) to knuckle (4).

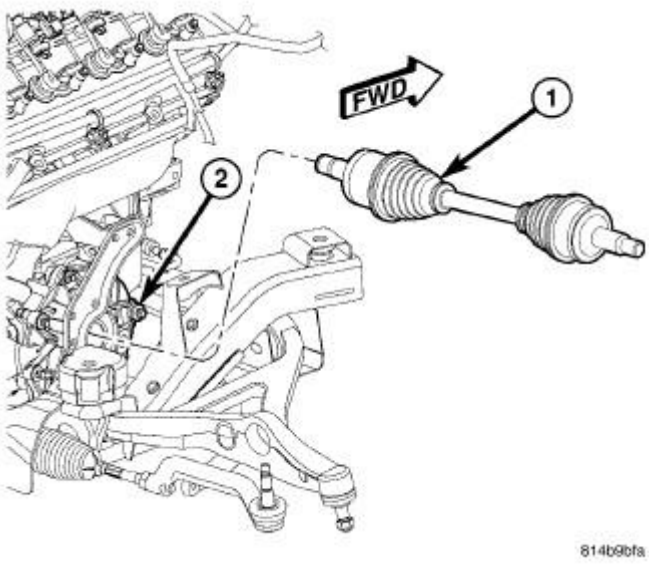


Fig. 12: Removing/Installing Right Halfshaft
Courtesy of CHRYSLER GROUP, LLC

16. Disengage right halfshaft (1) from axle and remove from vehicle.

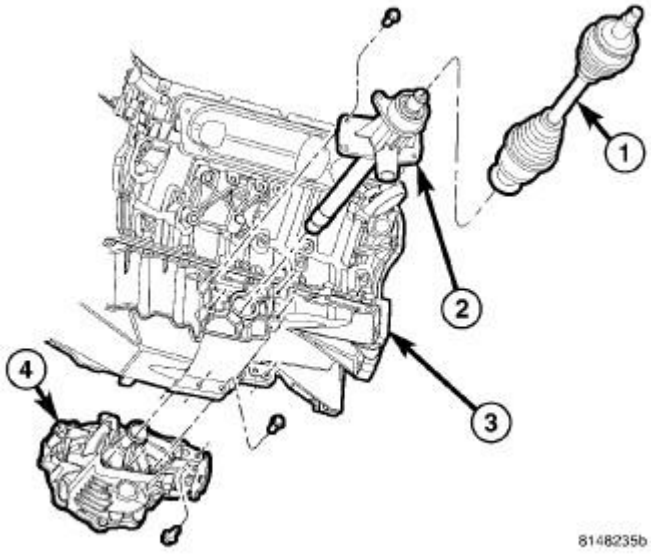


Fig. 13: Front Drive Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

17. Remove left halfshaft (1) from vehicle.

INSTALLATION

INSTALLATION

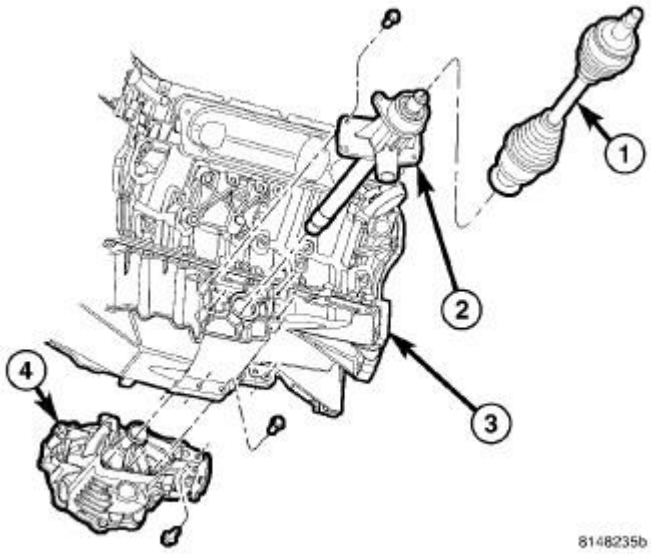


Fig. 14: Front Drive Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Install left halfshaft assembly (1).

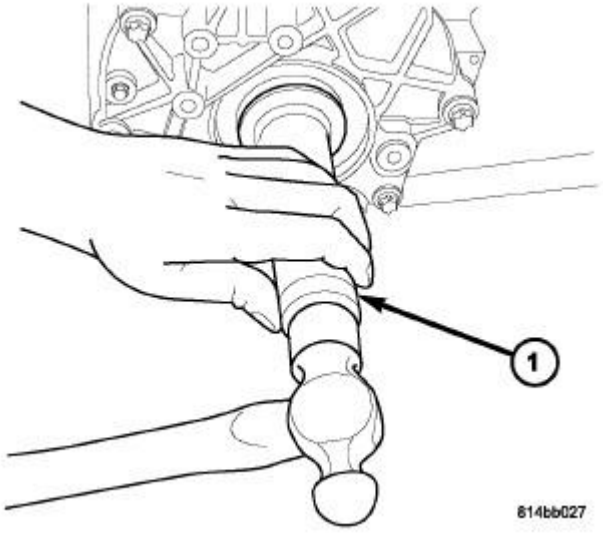


Fig. 15: Installing Axle Seal
Courtesy of CHRYSLER GROUP, LLC

2. Using Seal Installer C-4193A (1), install **new** axle seal.

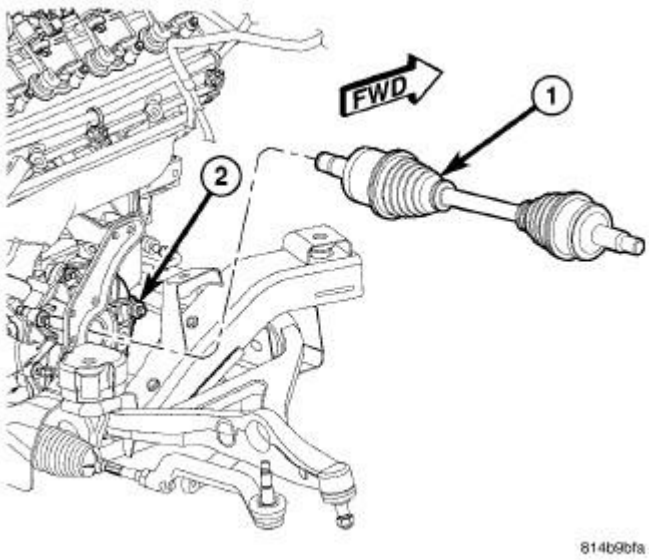


Fig. 16: Removing/Installing Right Halfshaft
Courtesy of CHRYSLER GROUP, LLC

3. Install right halfshaft assembly (1).

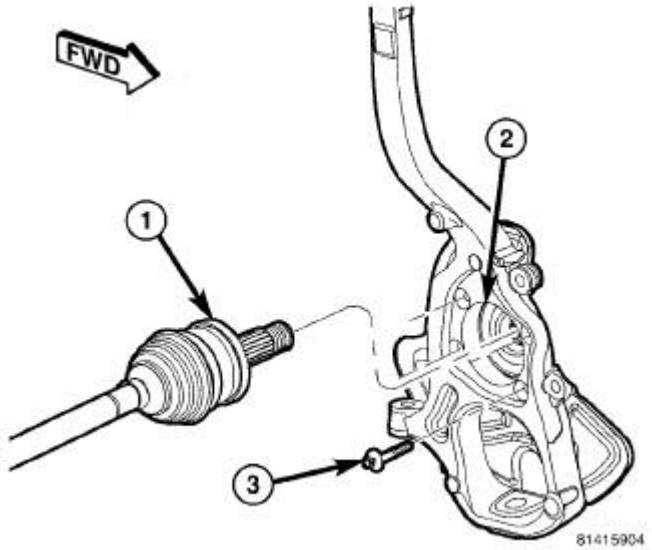


Fig. 17: Locating Halfshaft AT Hub/Bearing Assembly
Courtesy of CHRYSLER GROUP, LLC

4. Install halfshaft (1) into hub/bearing assembly (2).

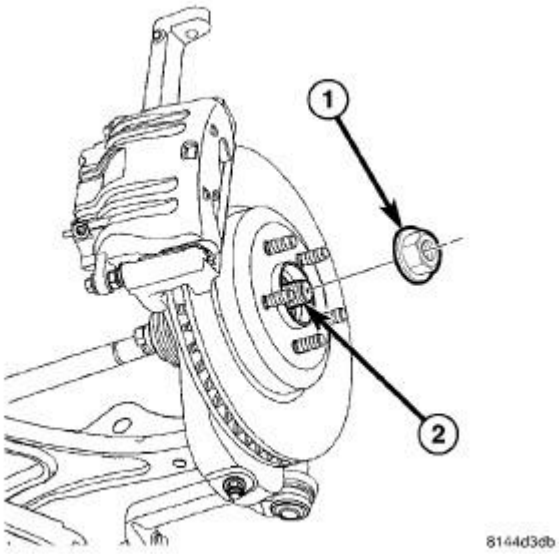


Fig. 18: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

5. Loosely install halfshaft hub nut (1), and do not tighten at this time.

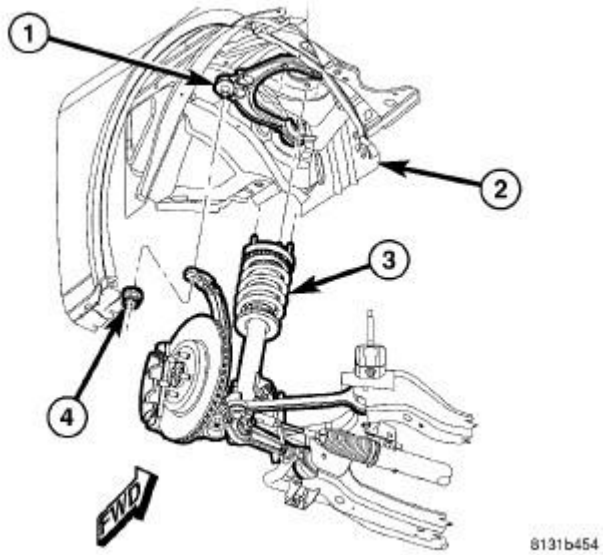


Fig. 19: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

6. Place upper ball joint stud (1) through hole in top of knuckle and install nut (4). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 47 N.m + 90° turn (35 ft. lbs. + 90° turn) torque.

NOTE: **Inspect brake shoes (pads) before installation. Refer to HYDRAULIC/MECHANICAL .**

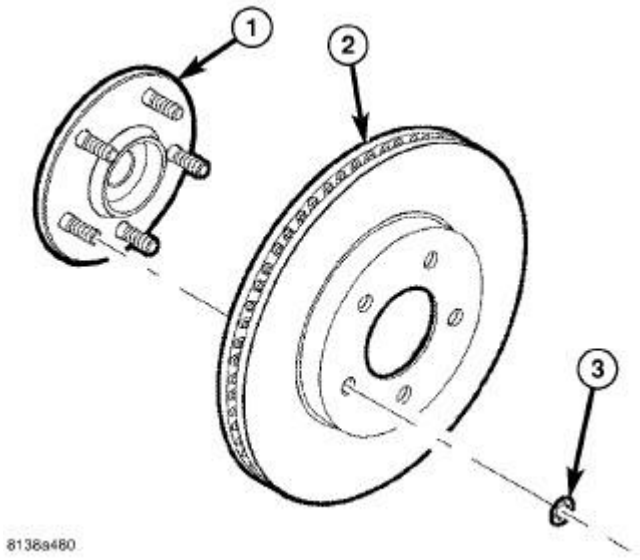


Fig. 20: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

7. Clean hub face (1) to remove any dirt or corrosion where rotor mounts.
8. Install brake rotor (2) over studs on hub and bearing.

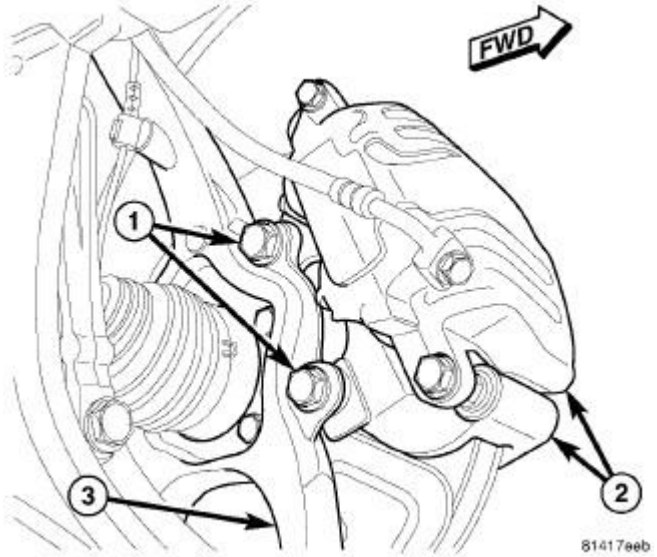


Fig. 21: Locating Front Caliper Bolts AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

9. Install disc brake caliper and adapter assembly (2) over brake rotor.
10. Install mounting bolts (1) securing caliper adapter (2) to knuckle (3). Tighten bolts to 169 N.m (125 ft. lbs.) torque.

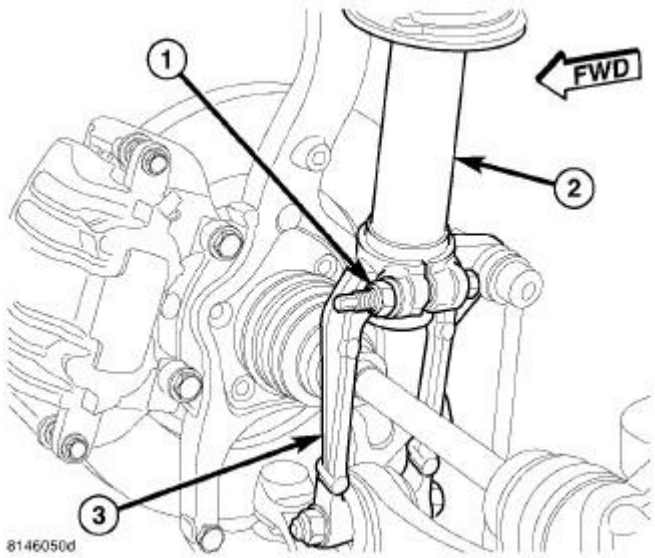


Fig. 22: Removing/Installing Shock Clevis Pinch Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Pull lower end of shock assembly outward, then slide clevis bracket (3) onto lower end. Slide clevis bracket onto shock assembly until bracket contacts collar on shock housing (2).
12. Install pinch bolt and nut (1) fastening clevis bracket (3) to bottom of shock assembly (2). Install pinch bolt from rear. **Do not tighten at this time.**

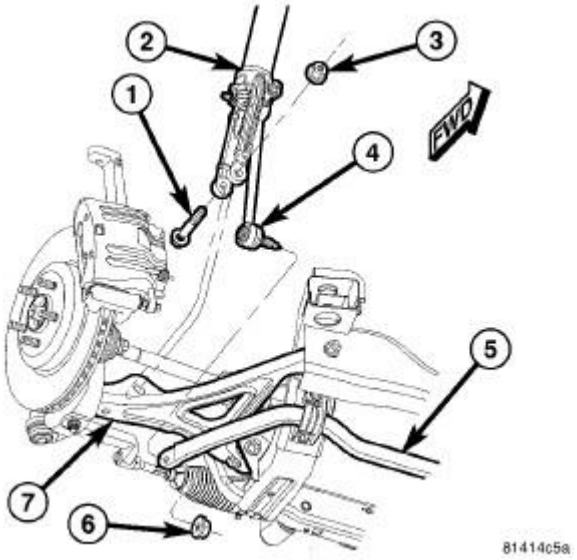


Fig. 23: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

13. Slide clevis bracket (2) over bushing mounted in lower control arm (7).
14. Install bolt (1) and nut (3) attaching shock clevis bracket (2) to lower control arm (7). **Do not tighten at this time.**

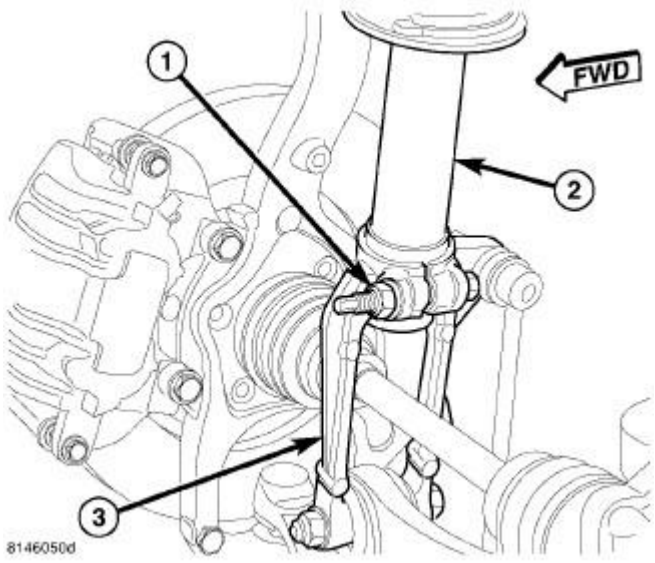


Fig. 24: Removing/Installing Shock Clevis Pinch Bolt
Courtesy of CHRYSLER GROUP, LLC

15. Tighten pinch bolt (1) attaching clevis bracket to shock assembly to 61 N.m (45 ft. lbs.) torque.

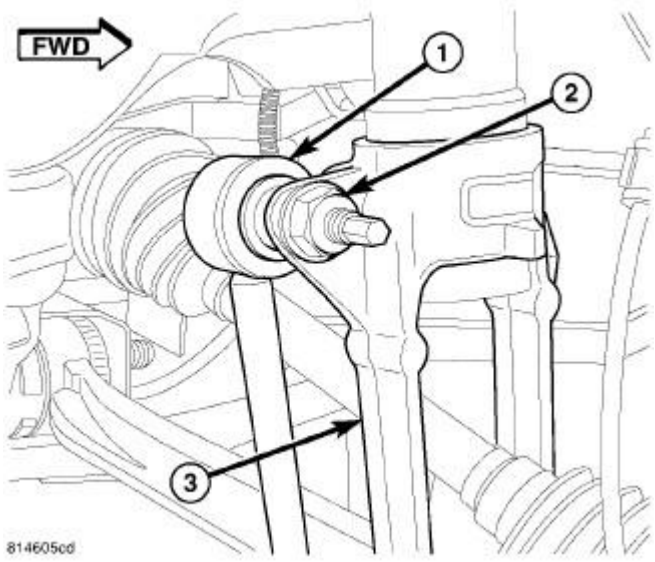


Fig. 25: Locating Stabilizer Link Attachment AT Shock Clevis
Courtesy of CHRYSLER GROUP, LLC

16. Slide stabilizer link ball joint stem into clevis bracket. Install nut (2) fastening link to clevis bracket (3). Tighten nut by holding ball joint stud while turning nut. Tighten nut using crow foot wrench on torque wrench to 146 N.m (108 ft. lbs.) torque.

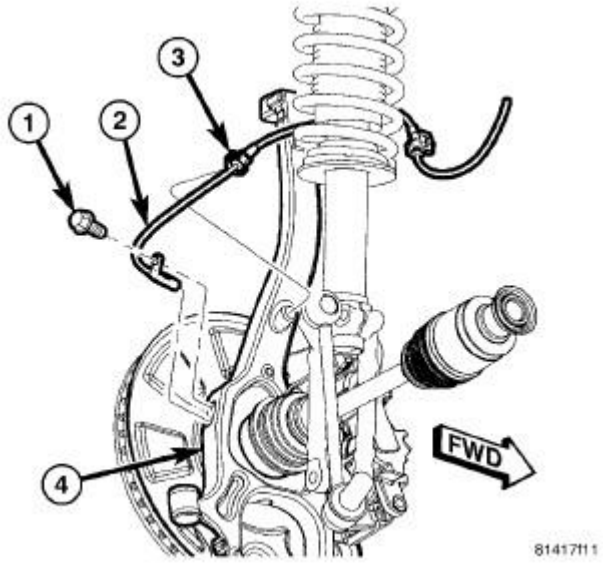


Fig. 26: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

17. Attach wheel speed sensor cable routing clip (3) at knuckle (4).

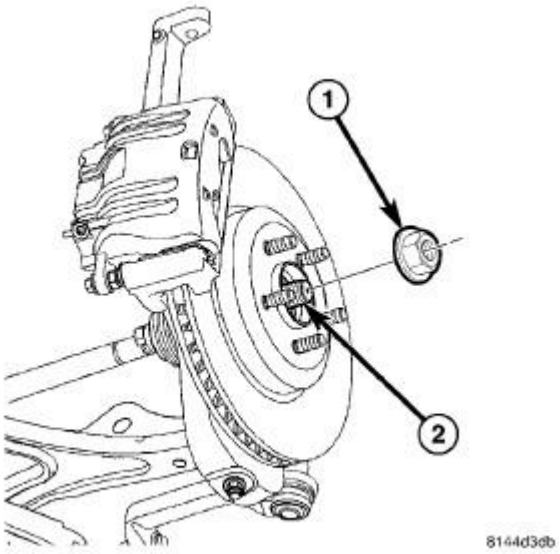


Fig. 27: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

18. Install hub nut (1) on end of axle half shaft (2). While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.) torque.

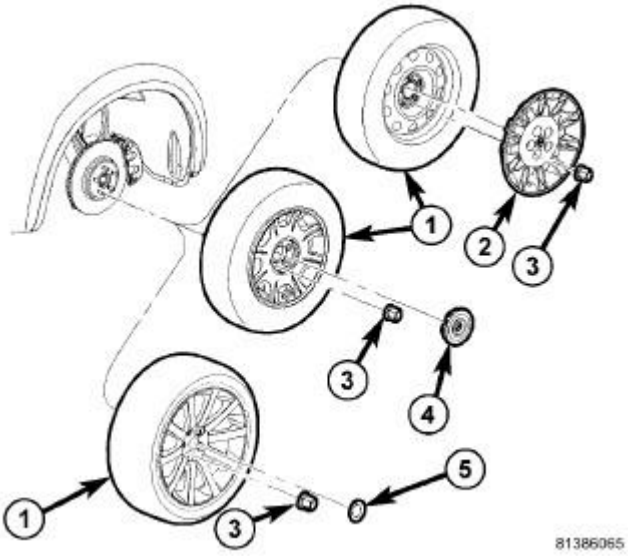


Fig. 28: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

19. Install tire and wheel assembly (1). Refer to **INSTALLATION** . Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) torque.
20. Lower vehicle.

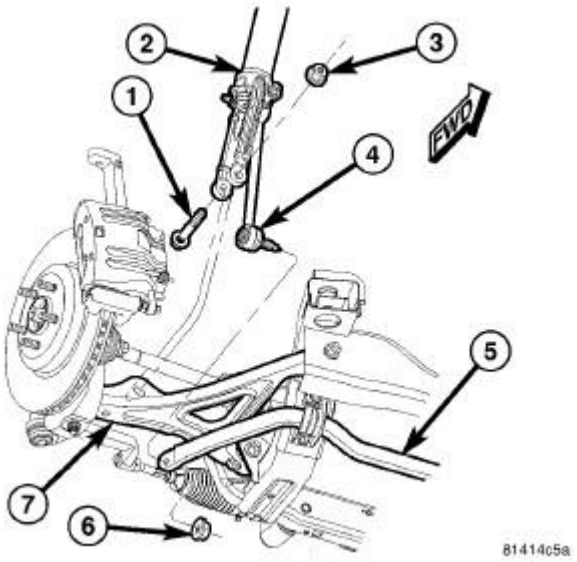


Fig. 29: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

NOTE: When tightening lower shock clevis mounting bolt, do not attempt rotating bolt. Bolt shaft is serrated. Turn nut only.

21. Tighten lower shock clevis bracket bolt nut (3) to 174 N.m (128 ft. lbs.) torque.

SPECIAL TOOLS

SPECIAL TOOLS

	9360 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.) C-4975A - Installer, Axle Clamp

BOOT, DRIVE SHAFT, INNER

REMOVAL

REMOVAL

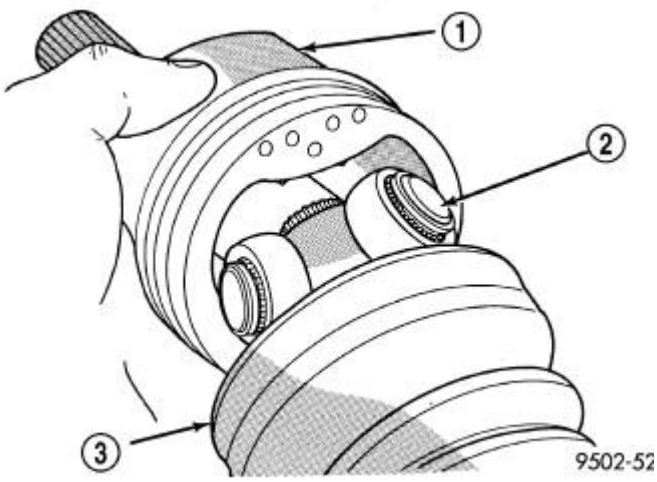


Fig. 30: Installing Tripod Housing On Spider Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Remove large boot clamp which retains inner tripod joint sealing boot to tripod joint housing and discard. Remove small clamp which retains inner tripod joint sealing boot to interconnecting shaft and discard. Remove the sealing boot (3) from the tripod housing and slide it down the interconnecting shaft.

   CAUTION: When removing the tripod joint housing from the spider assembly, hold the bearings in place on the spider trunnions to prevent the bearings from falling away.

2. Slide the tripod joint housing (1) off the spider assembly and the interconnecting shaft.

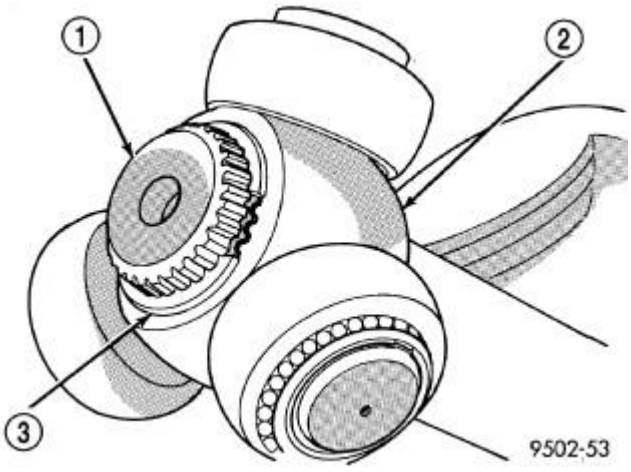


Fig. 31: Spider Assembly Retaining Snap Ring Installed
Courtesy of CHRYSLER GROUP, LLC

3. Remove snap ring (3) which retains spider assembly to interconnecting shaft (1). **Do not hit the outer tripod bearings in an attempt to remove spider assembly from interconnecting**

shaft.

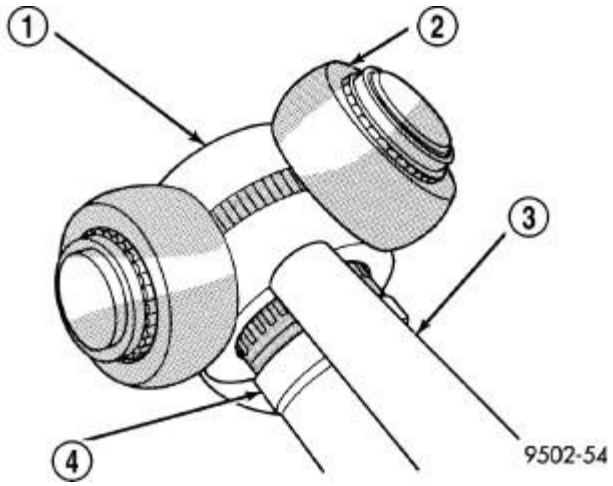


Fig. 32: Spider Assembly Removal From Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

4. Remove the spider assembly (1) from interconnecting shaft (4). If spider assembly will not come off interconnecting shaft by hand, it can be removed by tapping spider assembly with a brass drift (3).
5. Slide sealing boot off interconnecting shaft.
6. Thoroughly clean and inspect spider assembly, tripod joint housing, and interconnecting shaft for any signs of excessive wear. **If any parts show signs of excessive wear, the driveshaft assembly will require replacement. Component parts of these driveshaft assemblies are not serviceable.**

INSTALLATION

INSTALLATION

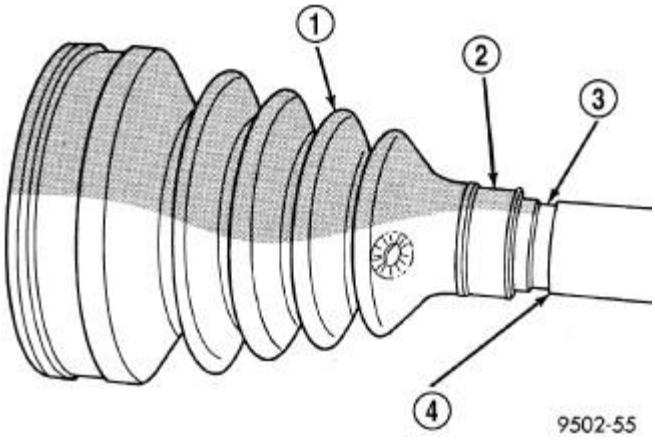


Fig. 33: Sealing Boot Installation On Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

1. Slide inner tripod joint seal boot retaining clamp, onto interconnecting shaft. Then, slide the replacement inner tripod joint sealing boot (1) onto the interconnecting shaft. **Inner tripod joint seal boot MUST be positioned on interconnecting shaft, so the raised bead on the inside of the seal boot is in groove (3) on interconnecting shaft (4).**

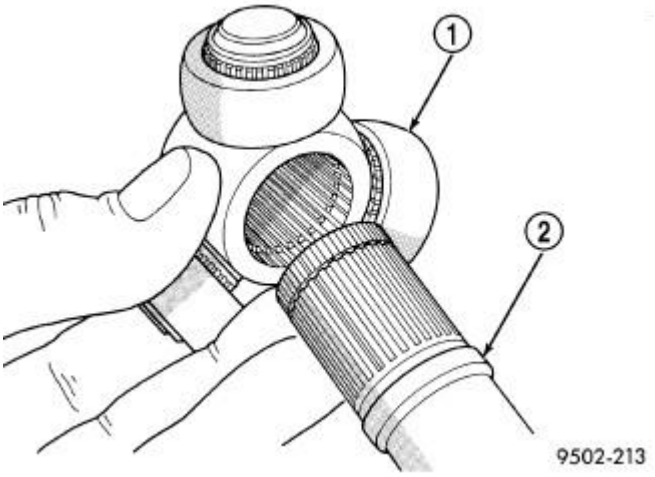


Fig. 34: Spider Assembly Installation On Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

2. Install spider assembly (1) onto interconnecting shaft (2). Spider assembly must be installed on interconnecting shaft far enough to fully install spider retaining snap ring.

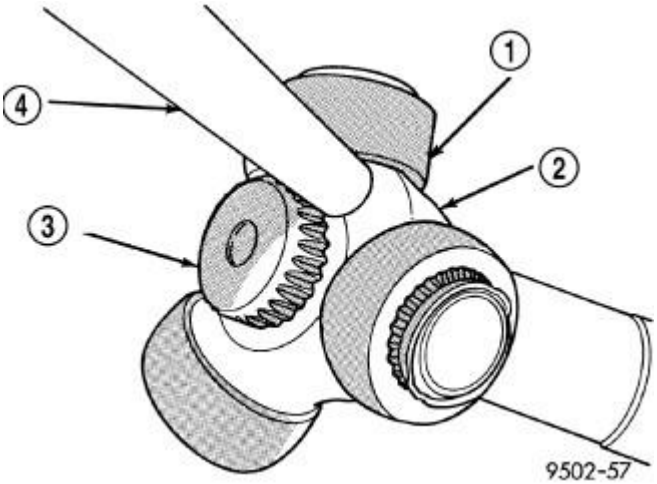


Fig. 35: Installing Spider Assembly On Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

3. If spider assembly (2) will not fully install on interconnecting shaft by hand, it can be installed by tapping the spider body with a brass drift (4). **Do not hit the outer tripod bearings in an attempt to install spider assembly on interconnecting shaft.**

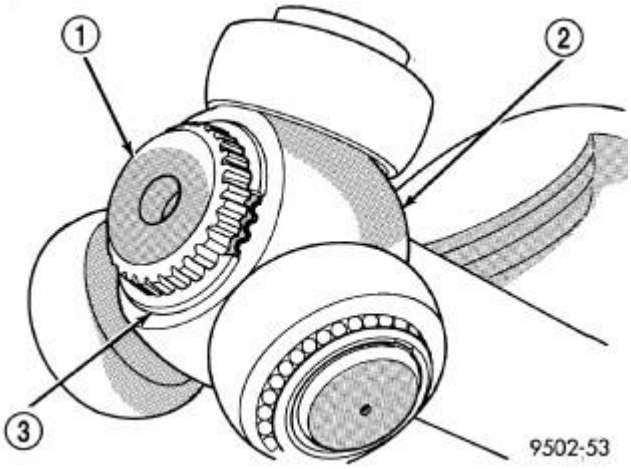


Fig. 36: Spider Assembly Retaining Snap Ring Installed
Courtesy of CHRYSLER GROUP, LLC

4. Install the spider assembly to interconnecting shaft retaining snap ring (3) into groove on end of interconnecting shaft. Be sure the snap ring is fully seated into groove on interconnecting shaft.

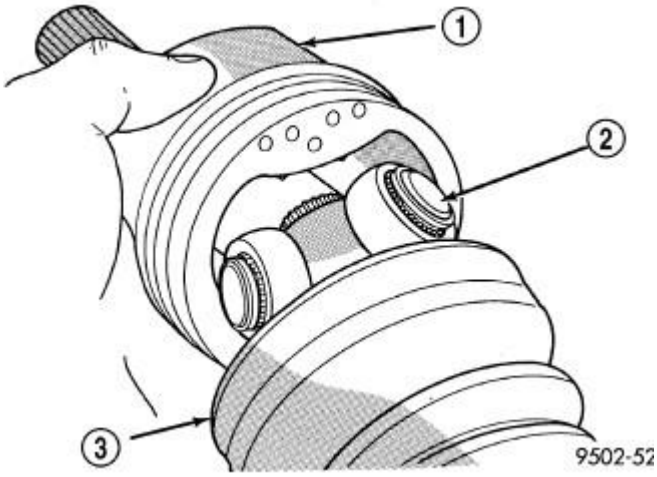


Fig. 37: Installing Tripod Housing On Spider Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Distribute 1/2 the amount of grease provided in the seal boot service package (DO NOT USE ANY OTHER TYPE OF GREASE) into tripod housing. Put the remaining amount into the sealing boot.
6. Align tripod housing (1) with spider assembly (2) and then slide tripod housing over spider assembly and interconnecting shaft.

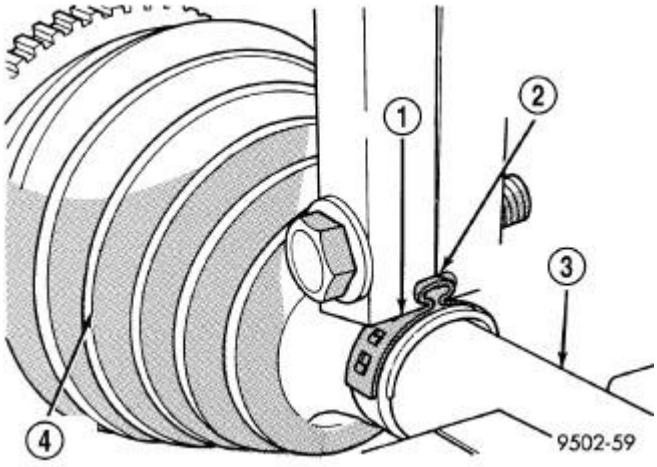


Fig. 38: Sealing Boot Retaining Clamp Installed
Courtesy of CHRYSLER GROUP, LLC

7. Install inner tripod joint seal boot to interconnecting shaft clamp evenly on sealing boot.
8. Clamp sealing boot (4) onto interconnecting shaft (3) using Crimping tool (special tool #C-4975A, Installer, Axle Clamp) and the following procedure. Place Crimping tool C-4975A over bridge of clamp. Tighten nut on Crimping tool (special tool #C-4975A, Installer, Axle Clamp) until jaws on tool (2) are closed completely together, face to face.

CAUTION: Seal must not be dimpled, stretched or out of shape in any way. If seal is NOT shaped correctly, equalize pressure in seal and shape it by hand.

9. Position sealing boot into the tripod housing retaining groove. Install seal boot retaining clamp evenly on sealing boot.

CAUTION: The following positioning procedure determines the correct air pressure inside the inner tripod joint assembly prior to clamping the sealing boot to inner tripod joint housing. If this procedure is not done prior to clamping sealing boot to tripod joint housing sealing boot durability can be adversely affected.

CAUTION: When venting the inner tripod joint assembly, use care so inner tripod sealing boot does not get punctured, or in any other way damaged. If sealing boot is punctured, or damaged in any way while being vented, the sealing boot can not be used.

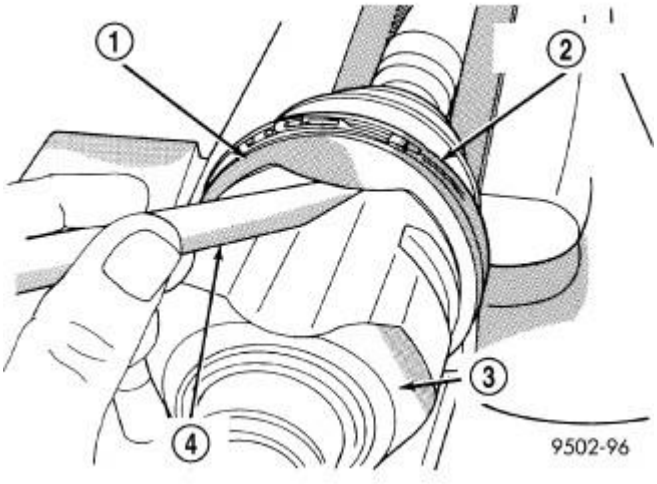


Fig. 39: Trim Stick Inserted For Venting Tripod Joint
Courtesy of CHRYSLER GROUP, LLC

10. Insert a trim stick (4) between the tripod joint (3) and the sealing boot (2) to vent inner tripod joint assembly. **When inserting trim stick between tripod housing and sealing boot ensure trim stick is held flat and firmly against the tripod housing. If this is not done damage to the sealing boot can occur.** If inner tripod joint has a Hytrel (hard plastic) sealing boot, be sure trim stick is inserted between soft rubber insert and tripod housing not the hard plastic sealing boot and soft rubber insert.

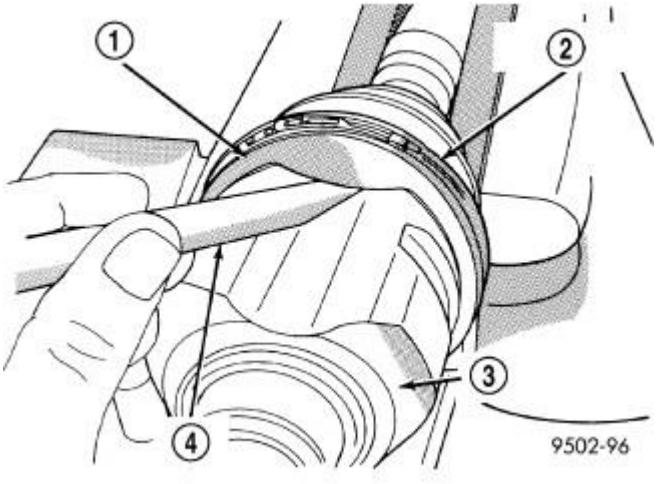


Fig. 40: Trim Stick Inserted For Venting Tripod Joint
Courtesy of CHRYSLER GROUP, LLC

11. With trim stick inserted between sealing boot and tripod joint housing, position the interconnecting shaft so it is at the center of its travel in the tripod joint housing. Remove the trim stick from between the sealing boot and the tripod joint housing. **This procedure will equalize the air pressure in the tripod joint, preventing premature sealing boot failure.**
12. Position trilobal boot to interface with the tripod housing. The lobes of the boot must be properly aligned with the recess's of the tripod housing.

13. Clamp tripod joint sealing boot to tripod joint, using required procedure for type of boot clamp application.

CRIMP TYPE BOOT CLAMP

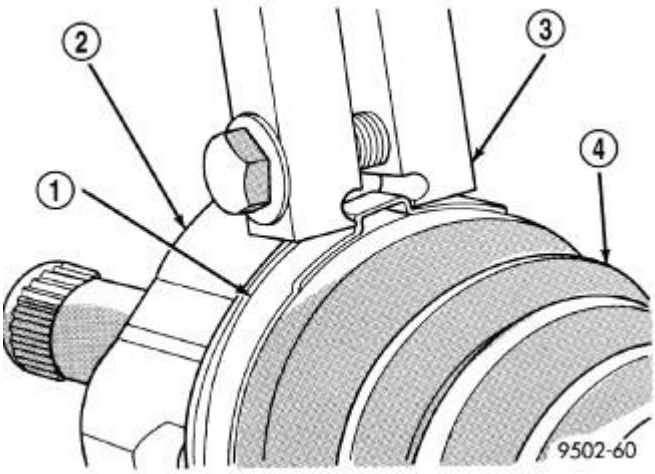


Fig. 41: Crimping Tool Installed On Sealing Boot Clamp
Courtesy of CHRYSLER GROUP, LLC

1. Clamp sealing boot onto tripod housing using Crimping tool (special tool #C-4975A, Installer, Axle Clamp) (3).
2. Place Crimping tool (special tool #C-4975A, Installer, Axle Clamp) over bridge of clamp.

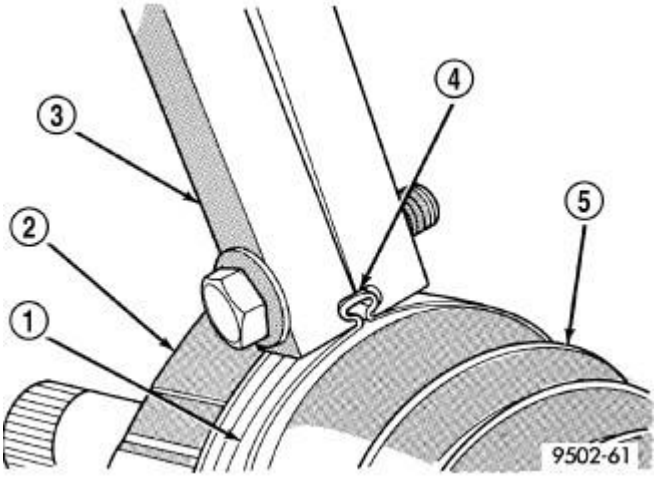


Fig. 42: Sealing Boot Retaining Clamp Installed
Courtesy of CHRYSLER GROUP, LLC

3. Tighten nut on Crimping tool (special tool #C-4975A, Installer, Axle Clamp) (3) until jaws on tool are closed completely together, face to face (4).

LATCHING TYPE BOOT CLAMP

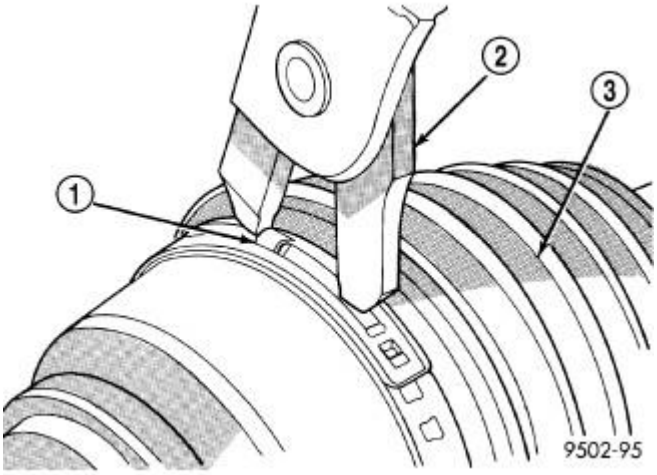


Fig. 43: Clamping Tool Installed On Sealing Boot Clamp
Courtesy of CHRYSLER GROUP, LLC

1. Clamp sealing boot (3) onto tripod housing using clamp locking tool, Snap-On YA3050 (2) or an equivalent.
2. Place prongs of clamp locking tool in the holes of the clamp (1).

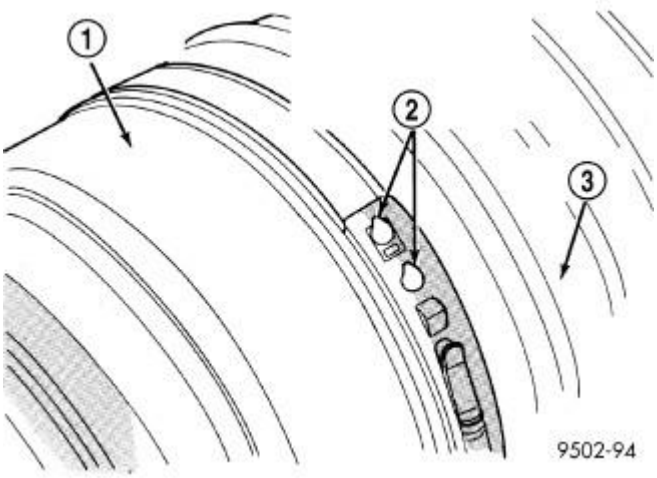


Fig. 44: Sealing Boot Clamp Correctly Installed
Courtesy of CHRYSLER GROUP, LLC

3. Squeeze tool together until top band of clamp is latched behind the two tabs on lower band of clamp (2).

BOOT, DRIVE SHAFT, OUTER

REMOVAL

REMOVAL

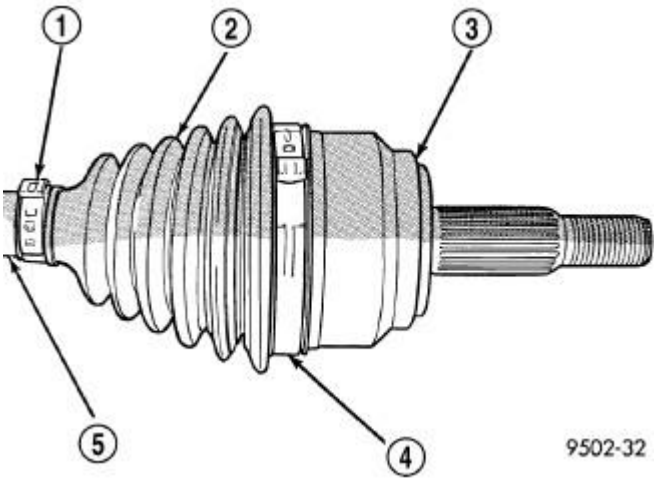


Fig. 45: Outer C/V Joint Seal Boot Clamps
Courtesy of CHRYSLER GROUP, LLC

1. Remove large boot clamp (4) retaining C/V joint sealing boot to C/V joint housing and discard. Remove small clamp (1) that retains outer C/V joint sealing boot to interconnecting shaft and discard. Remove sealing boot from outer C/V joint housing and slide it down interconnecting shaft.
2. Wipe away grease to expose outer C/V joint and interconnecting shaft.

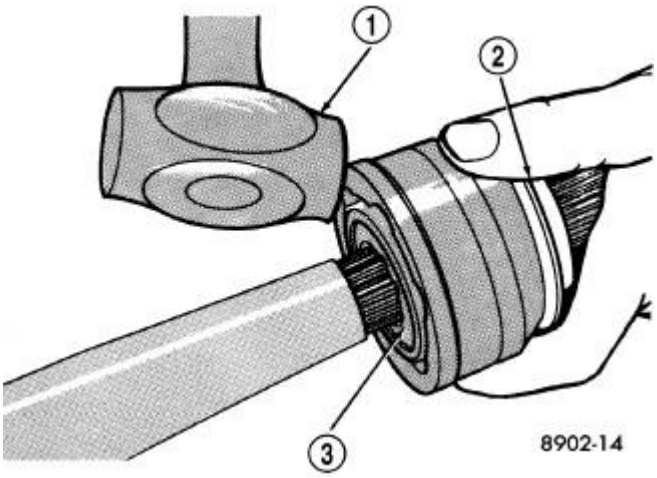


Fig. 46: Outer C/V Joint Removal From Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

3. Remove outer C/V joint from interconnecting shaft using the following procedure: Support interconnecting shaft in a vise **equipped with protective caps on jaws of vise to prevent damage to interconnecting shaft.** Then, using a **soft-faced hammer,** sharply hit the end of the C/V joint housing to dislodge housing from internal circlip on interconnecting shaft. Refer to **Fig. 46**. Then slide outer C/V joint off end of interconnecting shaft, joint may have to be tapped off shaft using a **soft-faced** hammer.

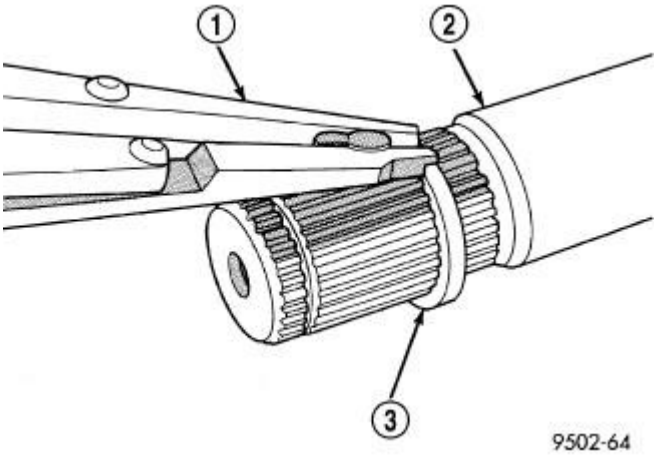


Fig. 47: Circlip Removal From Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

4. Remove large circlip from the interconnecting shaft (3) before attempting to remove outer C/V joint sealing boot.
5. Slide failed sealing boot off interconnecting shaft.
6. Thoroughly clean and inspect outer C/V joint assembly and interconnecting joint for any signs of excessive wear. **If any parts show signs of excessive wear, the driveshaft assembly will require replacement. Component parts of these driveshaft assemblies are not serviceable.**

INSTALLATION

INSTALLATION

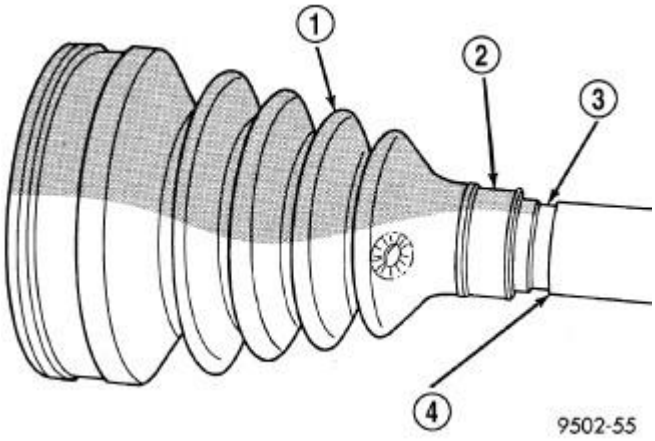


Fig. 48: Sealing Boot Installation On Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

1. Slide new sealing boot (1) to interconnecting shaft retaining clamp onto interconnecting shaft. Slide the outer C/V joint assembly sealing boot onto the interconnecting shaft. **Seal boot MUST be positioned on interconnecting shaft so the raised bead on the inside of the seal boot**

is in groove on interconnecting shaft.

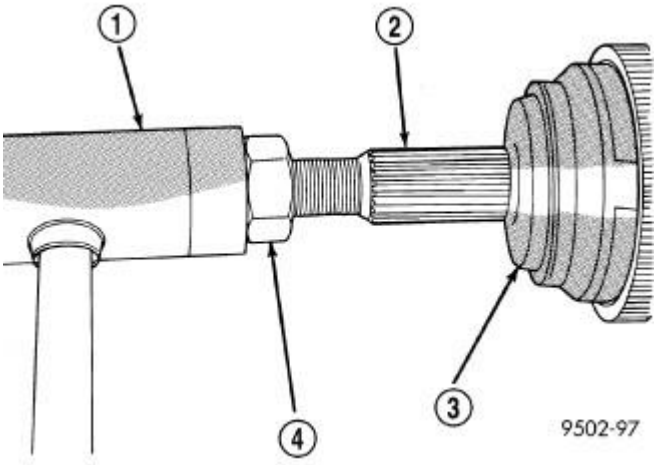


Fig. 49: Outer C/V Joint Installation On Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

2. Align splines on interconnecting shaft with splines on cross of outer C/V joint assembly and start outer C/V joint onto interconnecting shaft.
3. Install outer C/V joint assembly onto interconnecting shaft by using a **soft-faced** hammer (1) and tapping end of stub axle (with nut installed) until outer C/V joint is fully seated on interconnecting shaft.

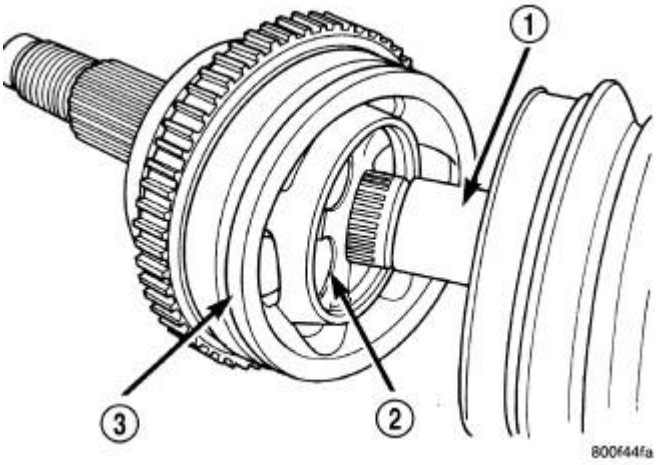


Fig. 50: Outer C/V Joint Correctly Installed On Interconnecting Shaft
Courtesy of CHRYSLER GROUP, LLC

4. Outer C/V joint assembly must be installed on interconnecting shaft until cross of outer C/V joint assembly is seated against circlip on interconnecting shaft (1).

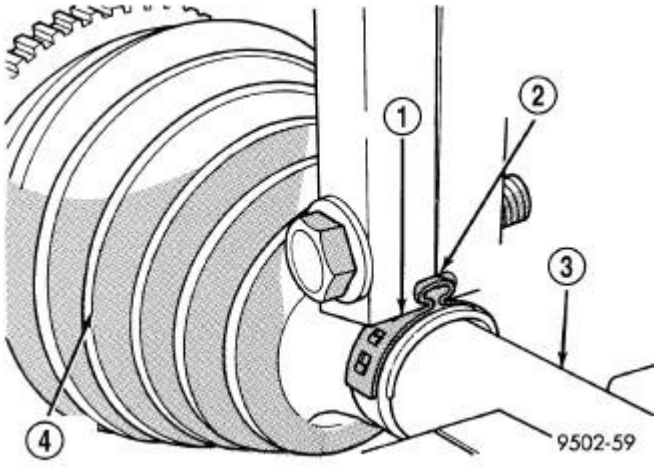


Fig. 51: Sealing Boot Retaining Clamp Installed
Courtesy of CHRYSLER GROUP, LLC

5. Distribute 1/2 the amount of grease provided in seal boot service package (DO NOT USE ANY OTHER TYPE OF GREASE) into outer C/V joint assembly housing. Put the remaining amount into the sealing boot.
6. Install outer C/V joint sealing boot to interconnecting shaft clamp evenly on sealing boot.
7. Clamp sealing boot onto interconnecting shaft using crimper (special tool #C-4975A, Installer, Axle Clamp) and the following procedure. Place crimping tool C-4975A over bridge of clamp. Tighten nut on crimping tool (special tool #C-4975A, Installer, Axle Clamp) until jaws on tool are closed completely together, face to face (2).

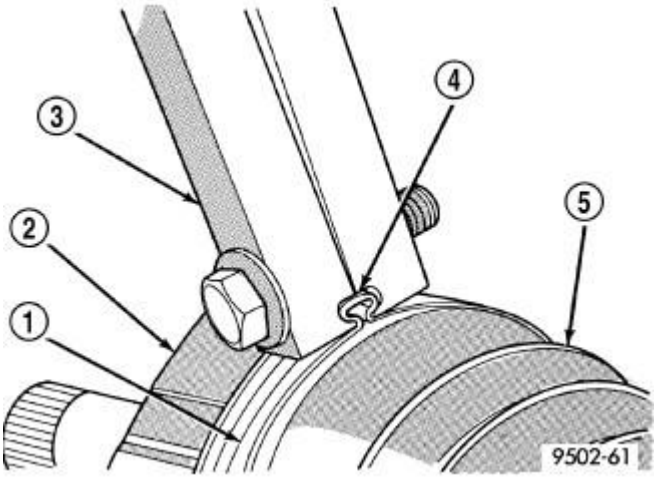


Fig. 52: Sealing Boot Retaining Clamp Installed
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Seal must not be dimpled, stretched, or out-of-shape in any way. If seal is NOT shaped correctly, equalize pressure in seal and shape it by hand.

8. Position outer C/V joint sealing boot into its retaining groove on outer C/V joint housing. Install sealing boot to outer C/V joint retaining clamp evenly on sealing boot.
9. Clamp sealing boot onto outer C/V joint housing using Crimper (special tool #C-4975A, Installer, Axle Clamp) (3) and the following procedure. Place crimping tool (special tool #C-4975A, Installer, Axle Clamp) over bridge of clamp. Tighten nut on crimping tool (special tool #C-4975A, Installer, Axle Clamp) until jaws on tool are closed completely together, face to face (2).

SUSPENSION

Front Suspension & Wheel Alignment - Chrysler 300

STANDARD PROCEDURE

STANDARD PROCEDURE - LUBRICATION

There are no serviceable lubrication points on the front or rear suspension. The ball joints are sealed-for-life and require no maintenance.

SPECIAL TOOLS

SPECIAL TOOLS

	9320 - Remover/Installer, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9320-1 - Plate, Ball Joint Remover (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9320-3 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9320-4 - Installer Cup (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9320-5 - Receiver Cup (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9360 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9362 - Wrench, Strut Nut (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	C-4212F - Press, Ball Joint (Originally Shipped In Kit Number(s) 6745, 6880, 6881, MLR-C03.)

FRONT

DESCRIPTION

NON SRT

The front suspension for both All-Wheel-Drive (AWD) and Non SRT Rear-Wheel-Drive (RWD)

vehicles is a long and short arm design.

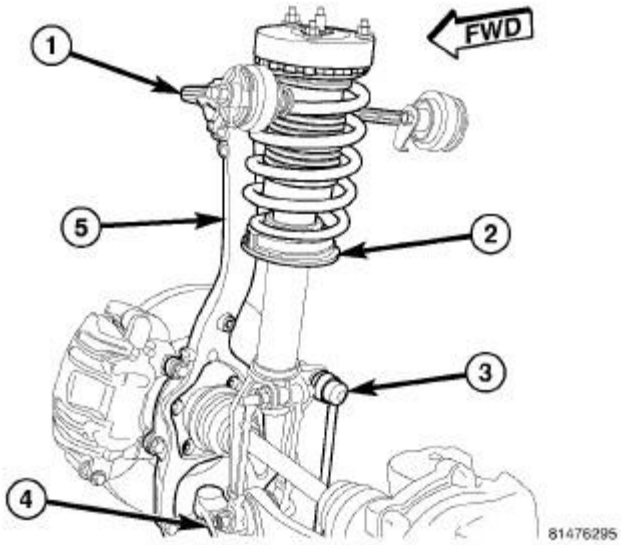


Fig. 1: Front Suspension - AWD
Courtesy of CHRYSLER GROUP, LLC

Each side of the AWD front suspension includes the following components:

- Hub And Bearing
- Knuckle (5)
- Lower Control Arm (4)
- Shock Assembly (2)
- Stabilizer Bar and Link (3)
- Upper Control Arm (1)

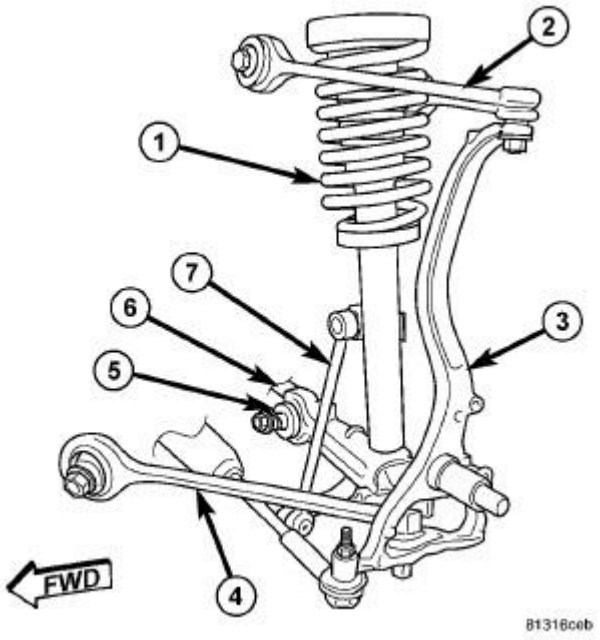


Fig. 2: Front Suspension
Courtesy of CHRYSLER GROUP, LLC

Each side of the Non SRT RWD front suspension includes the following components:

- Hub And Bearing
- Knuckle (3)
- Lower Control Arm (5)
- Shock Assembly (1)
- Stabilizer Bar and Link (7)
- Tension Strut (4)
- Upper Control Arm (2)

SRT

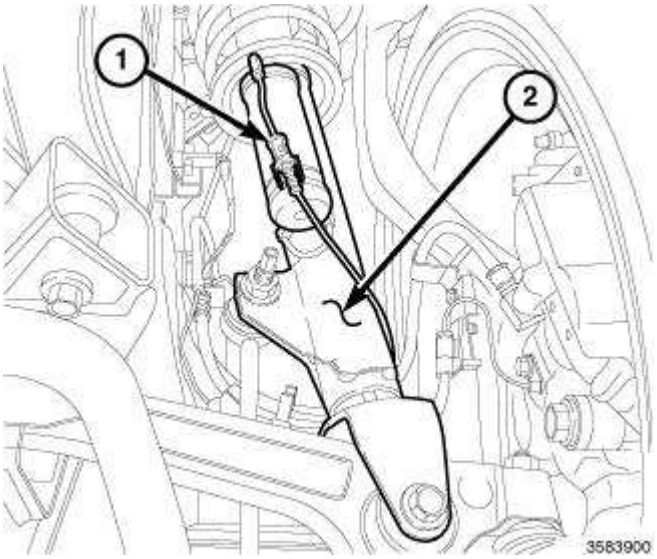


Fig. 3: Front Shock Assembly & Shock Solenoid Assembly
Courtesy of CHRYSLER GROUP, LLC

The SRT front suspension is part of an Active Damping System (ADS). The ADS includes unique shock absorbers, an Active Damping Control Module (ADCM), and three accelerometers that work together to modify the ride of the suspension over varying road conditions.

The Active Damping System (ADS) front shock assembly (2) is similar to a conventional coil over shock with the addition of a shock solenoid assembly (1) mounted on the side of its body with a three wire harness connector attached to it. The ADS shock assembly is serviced the same as a conventional shock absorber, with the addition of disconnecting the ADS harness connector from behind the splash shield.

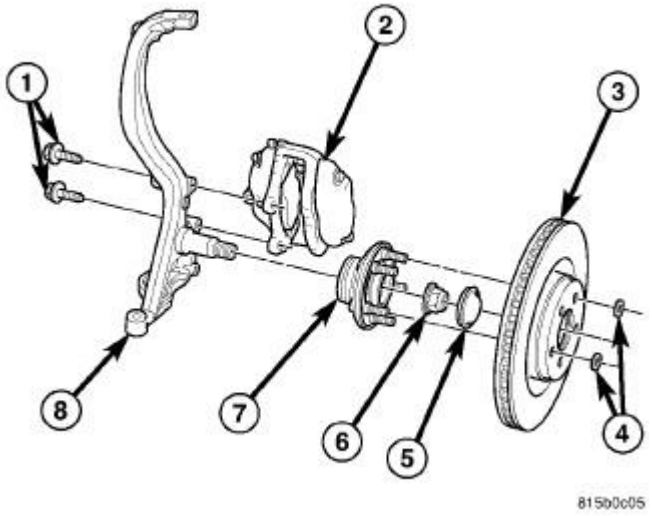


Fig. 4: Exploded View Of Front Disc Brakes - Srt-8
Courtesy of CHRYSLER GROUP, LLC

The SRT front suspension is similar to the standard front suspension but some components have been modified for unique ride, handling, and steering performance. Service of all front suspension components remain the same as the standard components. When components differ, be sure to use only SRT components on SRT vehicles.

The front knuckle (8) for the SRT is different from the standard knuckle. Although similar in appearance, the knuckle has been modified to accept the larger tire and wheel assembly. Also, the mounting bosses for the disc brake caliper have been moved downward to allow for mounting of the Brembo four-piston disc brake caliper (2).

The front stabilizer bar diameter has been increased for the SRT. It is serviced in the same manner as the standard bar.

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Electro Hydraulic Power Steering (EHPS) Pump to Front Bumper Mounting Bolts and Nut	12	9	108
Engine Cradle Mounting Bolts	185	136	-
Hub And Bearing Mounting Bolts	68	50	-
Hub Nut - AWD	213	157	-
Hub Nut - RWD	250	184	-
Knuckle Dust Shield Screws	10	7	89
Lower Control Arm Cradle Nut	176	130	-
Lower Control Arm Ball Joint Nut - AWD	68 + 90° TURN	50 + 90° TURN	-
Lower Control Arm Ball Joint Nut - RWD	68 + 90° TURN	50 + 90° TURN	-
Tension Strut Cradle Nut	176	130	-
Tension Strut Ball Joint Nut	68 + 90° TURN	50 + 90° TURN	-
Shock Absorber Clevis Bracket Lower Bolt - AWD	174	128	-
Shock Absorber Clevis Bracket Pinch Bolt - AWD	61	45	-
Shock Absorber Lower Mounting Bolt - RWD	174	128	-
Shock Absorber Upper Mounting Nuts	27	20	239
Shock Absorber Shaft Nut	95	70	-
Stabilizer Bar Link Upper (Shock) Nut	128	95	-
Stabilizer Bar Link Lower Nut	128	95	-
Stabilizer Bar Isolator Retainer Bolts	60	44	-
Stabilizer Bar Heat Shield Screws	7	5	62
Upper Control Arm Ball Joint Nut	47 + 90° TURN	35 + 90° TURN	-

Upper Control Arm Body Nuts	75	55	-
Outer Tie Rod Ball Joint Nut	35 + 90° TURN	26 + 90° TURN	-
Tie Rod Jam Nut	75	55	-

ARM, LOWER CONTROL, AWD

REMOVAL

REMOVAL

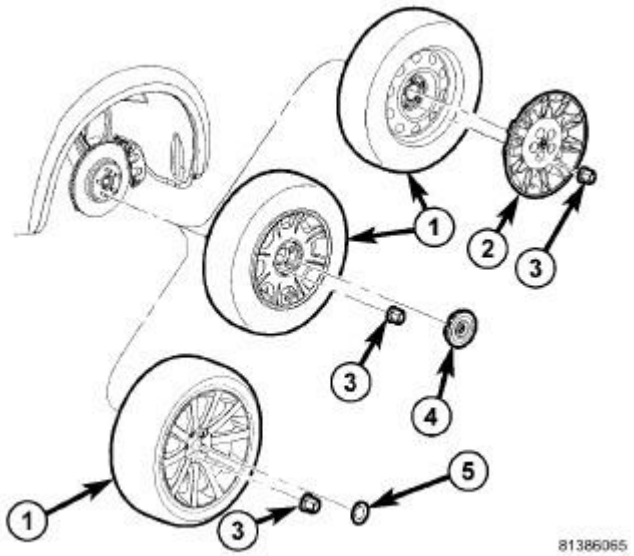


Fig. 5: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

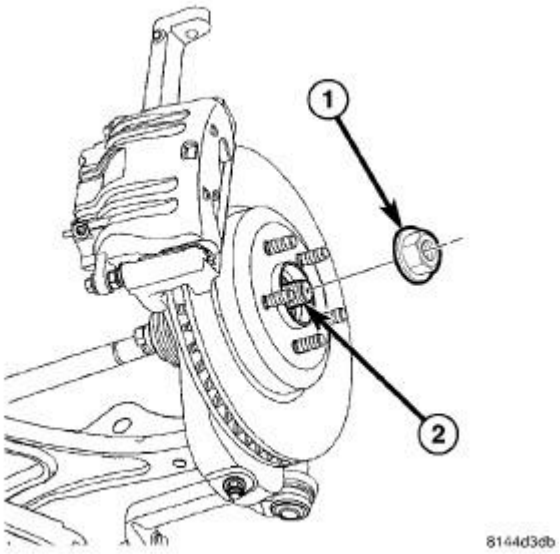


Fig. 6: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

3. While a helper applies brakes to keep hub from rotating, remove hub nut (1) from the axle half shaft (2).
4. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .

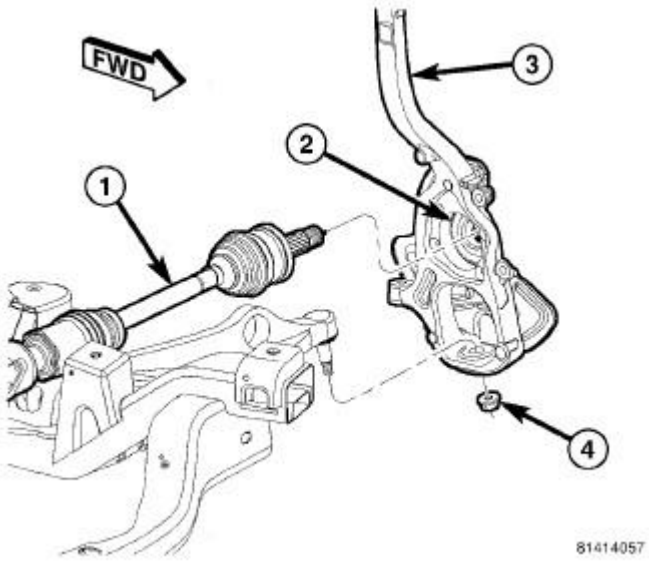


Fig. 7: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

5. Loosen nut (4) attaching lower control arm ball joint stud to knuckle (3). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

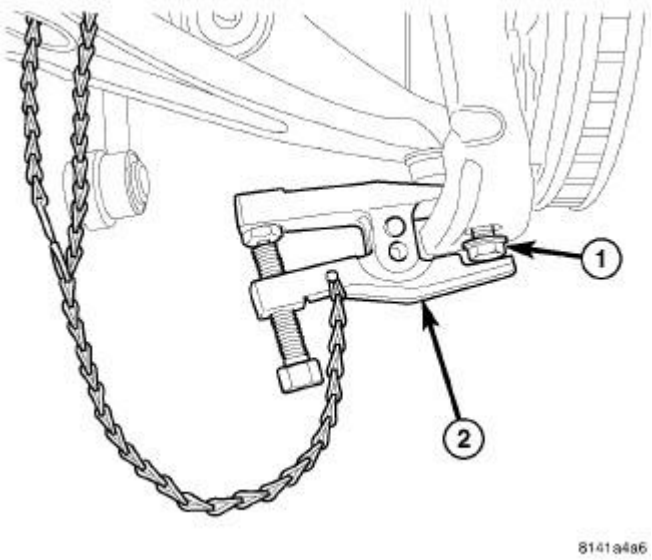


Fig. 8: Using Puller On Lower Ball Joint - AWD
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

6. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint), separate ball joint stud from knuckle.
7. Remove tool.
8. Remove nut (1) from end of ball joint stud.

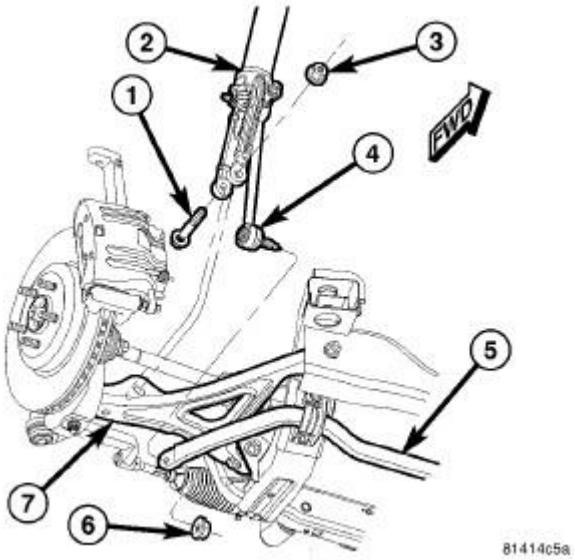


Fig. 9: Shock Attachment AT Lower Control Arm

Courtesy of CHRYSLER GROUP, LLC

9. Back off nut (3) from bolt (1) attaching shock clevis bracket (2) to lower control arm (7) until it is flush with end of bolt.
10. Using a brass drift punch, tap the bolt out of the clevis bracket until bolt serrations clear bracket.
11. Remove nut (3) and bolt (1) for clevis bracket and control arm.

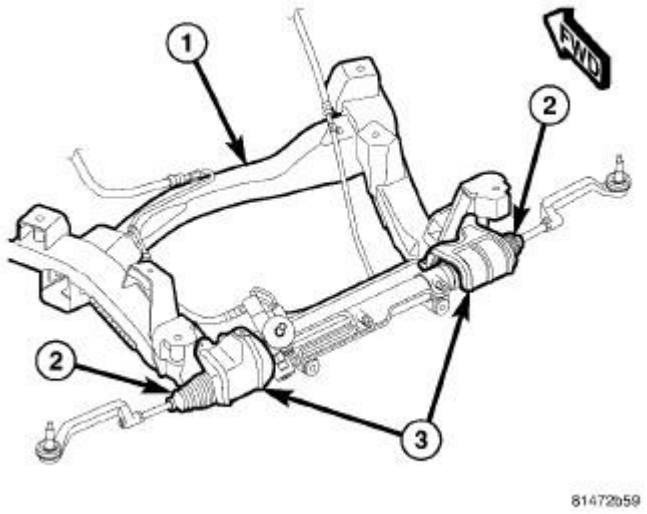


Fig. 10: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

12. Remove mounting screws, then heat shields (3) above both inner tie rod bellows (2).

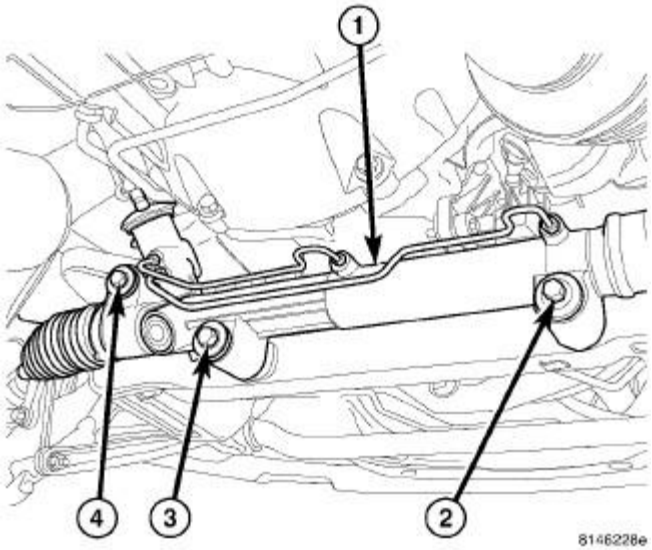


Fig. 11: Steering Gear Mounting Bolts

Courtesy of CHRYSLER GROUP, LLC

CAUTION: While steering gear bolts are removed, it important to avoid putting downward force on steering gear.

13. Remove steering gear mounting bolts as listed:
    1. Left side arm - Remove bolts (3) and (4). Loosen, but do not remove, bolt (2). It is important leave bolt (2) installed to avoid dropping gear too far, putting excessive force on steering coupling.
    2. Right side arm - Remove bolts (2) and (3). Loosen, but do not remove, bolt (4). It is important to leave bolt (4) installed to avoid dropping gear too far, putting excessive force on steering coupling.

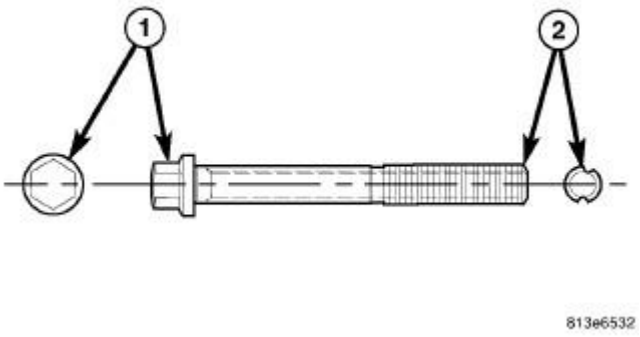


Fig. 12: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lower control arm bolt at the engine cradle has a lengthwise grooved shaft (2), it is a special wheel alignment adjustment bolt and the bolt head (1) must not be rotated in the vehicle or damage to the bolt and engine cradle will result. While holding the bolt in place with a wrench, remove the nut, then slide the bolt out of the bushing and cradle taking note of bolt positioning in engine cradle for reassembly purposes. The bolt needs to be installed in the same position as removed to make sure wheel camber and caster return to adjusted position.

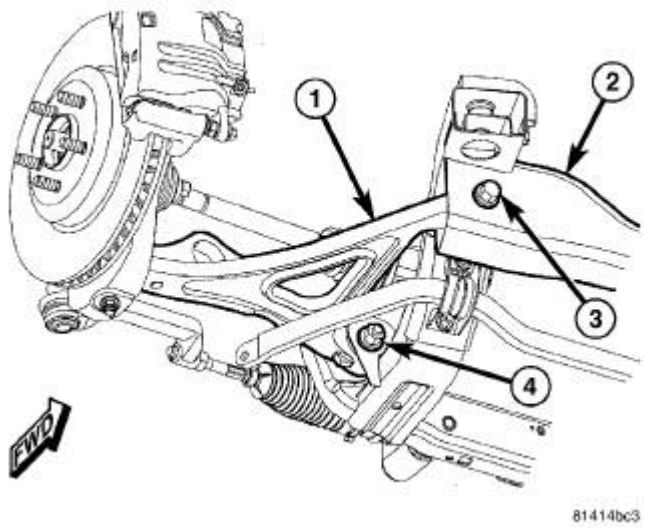


Fig. 13: Arm Attachment AT Crossmember
Courtesy of CHRYSLER GROUP, LLC

14. Remove bolt (3) and nut securing forward end of lower control arm (1) to engine cradle (2). If bolt has a lengthwise grooved shaft (see above note), remove bolt and nut by holding bolt stationary with a wrench, removing nut, then sliding bolt out of bushing and cradle while taking note of bolt positioning in engine cradle for reassembly purposes.
15. Remove bolt and nut (4) securing rearward end of lower control arm (1) to engine cradle (2). If bolt has a lengthwise grooved shaft (see above note), remove bolt and nut by holding bolt stationary with a wrench, removing nut, then sliding bolt out of bushing and cradle while taking note of bolt positioning in engine cradle for reassembly purposes.
16. Slide lower control arm (1) from engine cradle (2) and knuckle, and remove from vehicle.

INSTALLATION

INSTALLATION

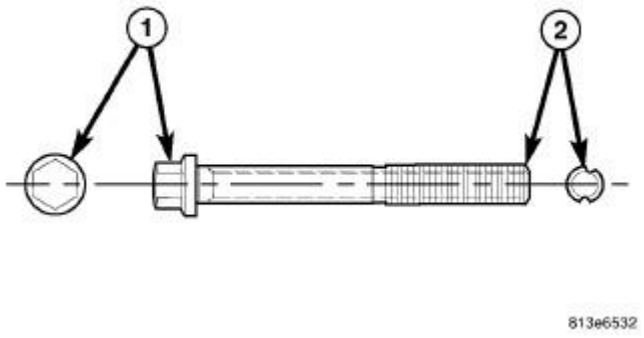


Fig. 14: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If installing a lower control arm engine cradle bolt that is a wheel alignment adjustment bolt (1) (identifying lengthwise grooved shaft (2)), make sure to install it in the same position which it was in upon removal. For more details on installation of this special bolt. Refer to WHEEL ALIGNMENT, STANDARD PROCEDURE.**

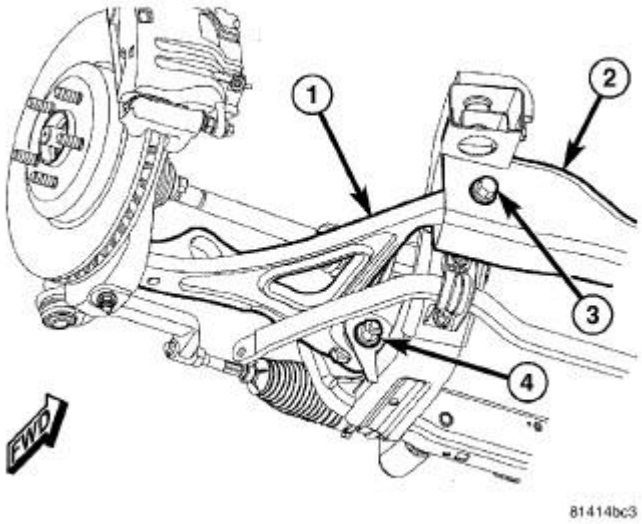


Fig. 15: Arm Attachment AT Crossmember
Courtesy of CHRYSLER GROUP, LLC

1. Slide lower control arm (1) into position in engine cradle (2) and place ball joint stem into mounting hole in knuckle.

   NOTE: **When installing lower control arm engine cradle bolts, it important to note that the forward bolt is installed front-to-rear and the rearward bolt is installed rear-to-front.**

2. Install lower control arm mounting bolts and nuts (3 and 4). **Do not tighten bolts at this time.**

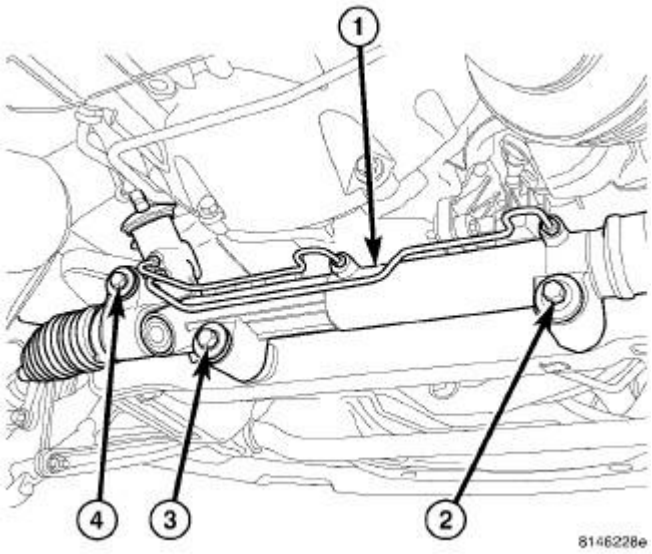


Fig. 16: Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Raise steering gear to mounted position and install lower mounting bolts (2 and 3). Install upper mounting bolt (4) and nut. Tighten all mounting bolts to 122 N.m (90 ft. lbs.).

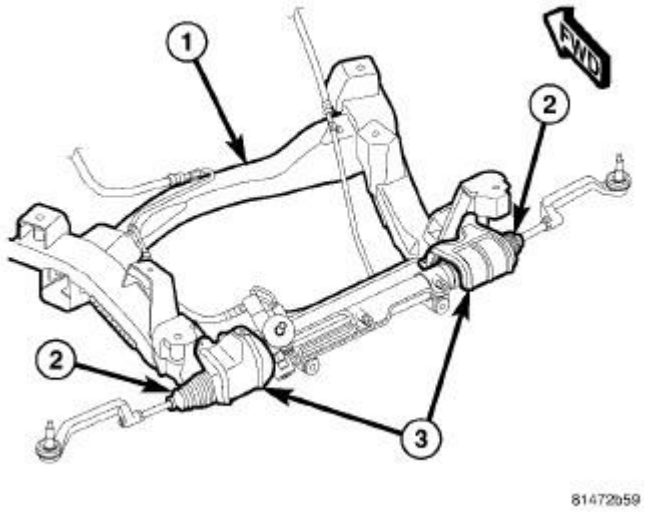


Fig. 17: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

4. Install heat shields (3) above both inner tie rod bellows (2). Tighten mounting screws to 7 N.m (62 in. lbs.).

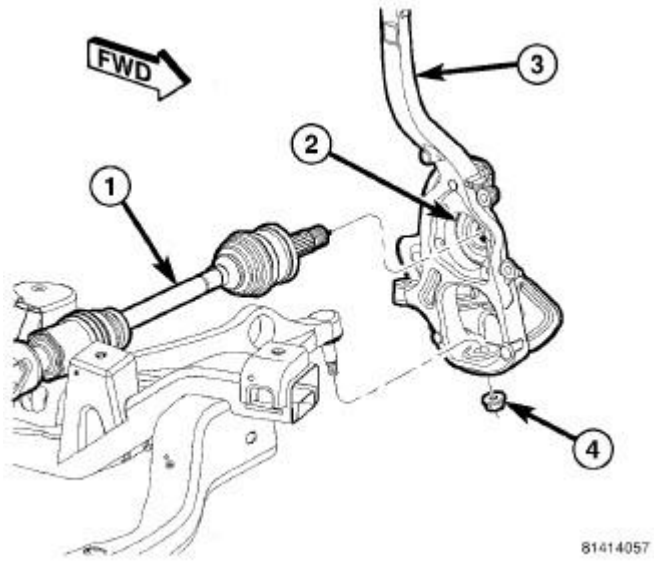


Fig. 18: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

5. Pull downward on control arm and guide ball joint stud into knuckle (3). Install NEW nut (4) on ball joint stud. Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 68 N.m + 90° turn (50 ft. lbs. + 90° turn).

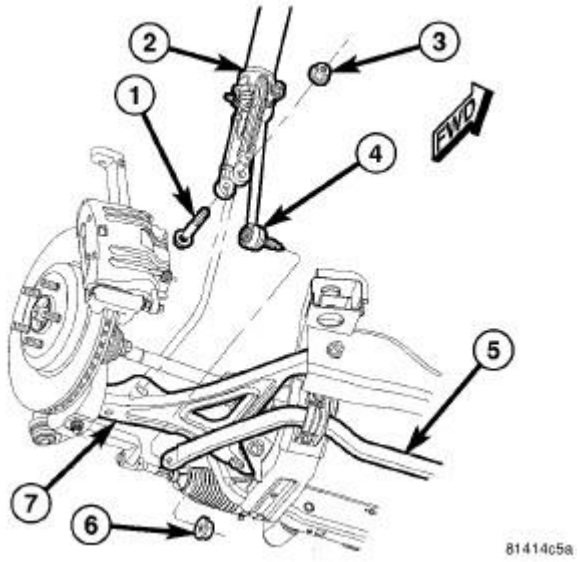


Fig. 19: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

6. Align shock clevis bracket (2) with lower control arm (7) bushing and install mounting bolt (1) and nut (3). **Do not tighten nut at this time.**

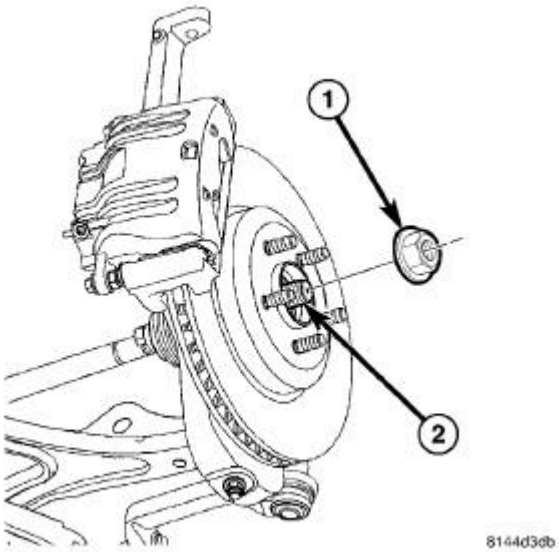


Fig. 20: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

7. Install hub nut (1) on end of axle half shaft (2). While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.).

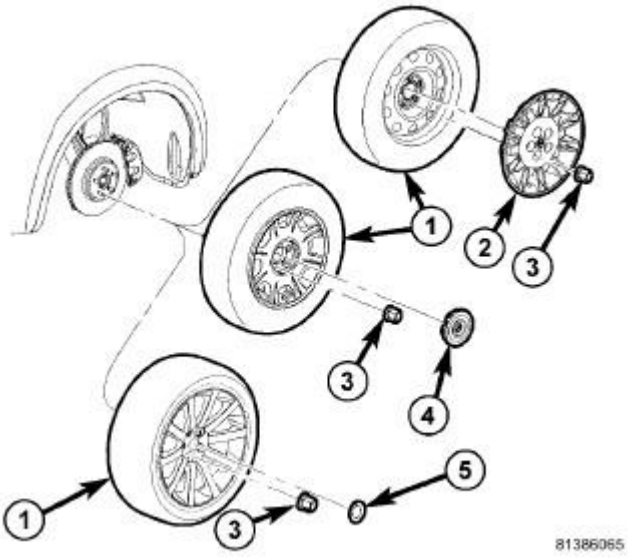


Fig. 21: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

8. Install tire and wheel assembly (1). Refer to **INSTALLATION** .

9. Lower vehicle.
10. Position vehicle on an alignment rack/drive-on lift.

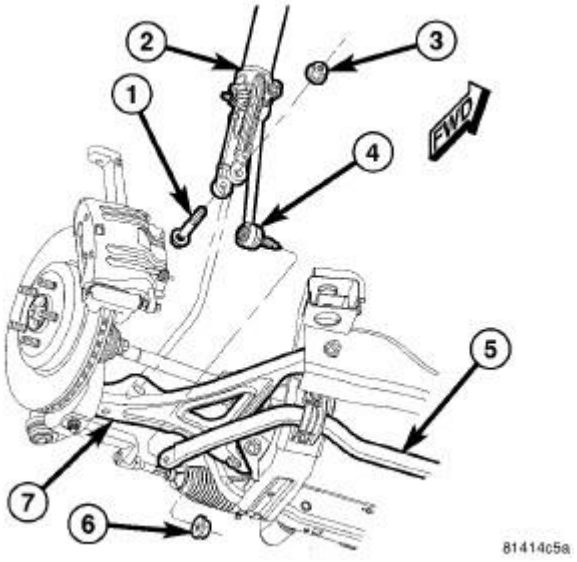


Fig. 22: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

NOTE: When tightening lower shock clevis mounting bolt, do not attempt rotating bolt. Bolt shaft is serrated. Turn nut only.

11. Tighten lower shock clevis bracket bolt nut (3) to 174 N.m (128 ft. lbs.).
12. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

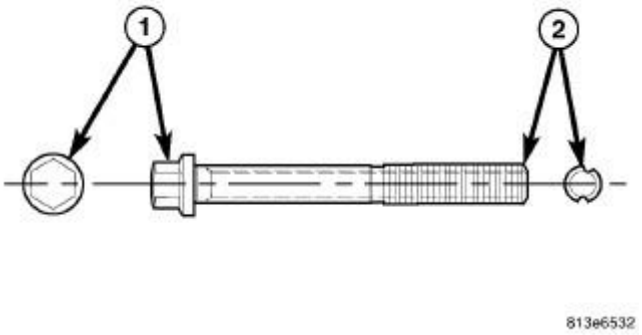


Fig. 23: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If lower control arm engine cradle bolt is a wheel alignment adjustment bolt (lengthwise grooved shaft (2)), be sure to only tighten nut. Do not rotate bolt or damage to cradle will occur.

13. Once camber is found to be within specifications, tighten lower control arm cradle bolt nuts to 176 N.m (130 ft. lbs.) while holding the bolts stationary.
14. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .

ARM, LOWER CONTROL, RWD

REMOVAL

REMOVAL

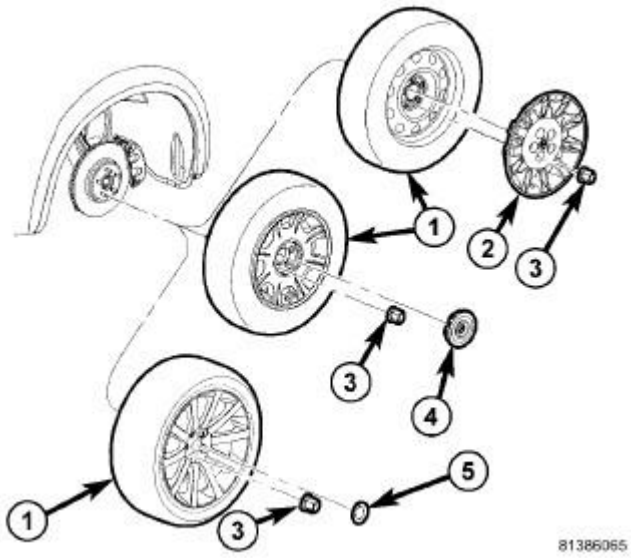


Fig. 24: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).
3. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .

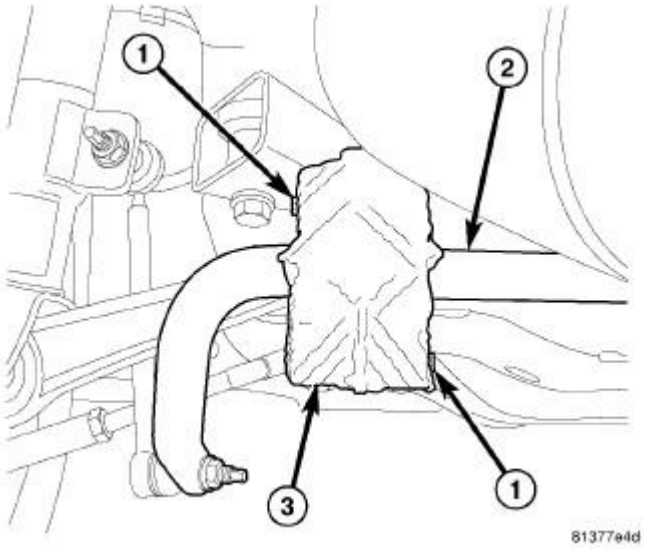


Fig. 25: Front Stabilizer Bar Heat Shield
Courtesy of CHRYSLER GROUP, LLC

4. Remove screws (1) fastening stabilizer bar heat shield (3) on side of control arm repair.

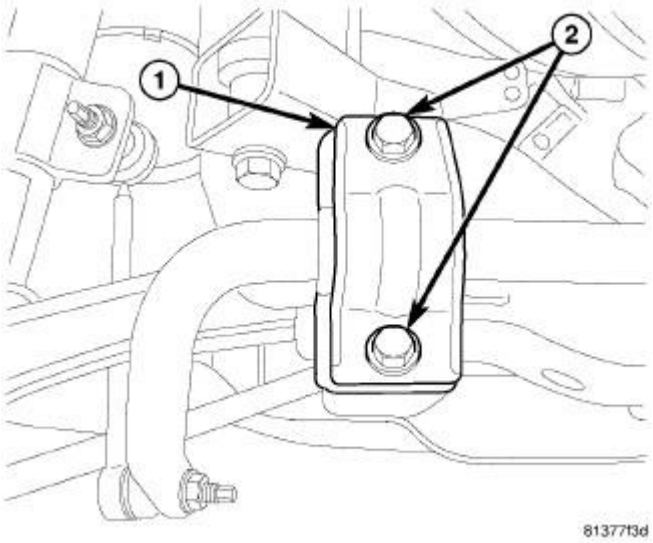


Fig. 26: Front Stabilizer Bar Bushing Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (2) fastening stabilizer bar bushing retainer (1) in place on side of control arm repair.

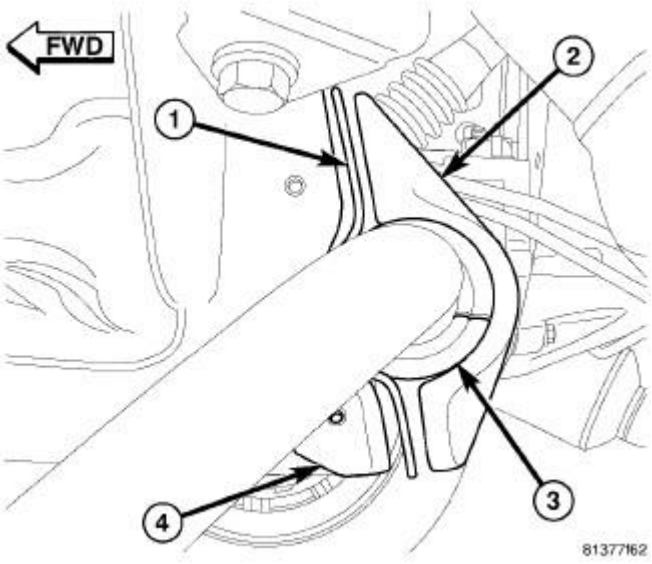


Fig. 27: Front Stabilizer Bar Bushing Retainer
Courtesy of CHRYSLER GROUP, LLC

6. Remove retainer halves (1) (2) from around stabilizer bar bushing (3).

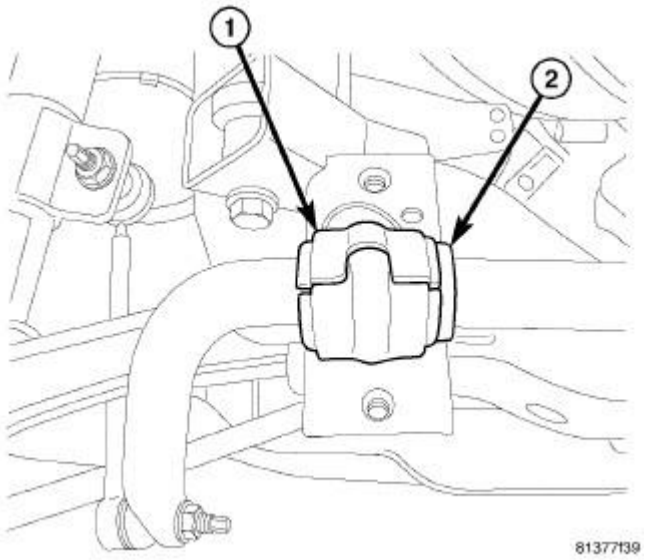


Fig. 28: Front Stabilizer Bar Bushing On Bar
Courtesy of CHRYSLER GROUP, LLC

7. Utilizing slit, remove bushing (1) from stabilizer bar (2).

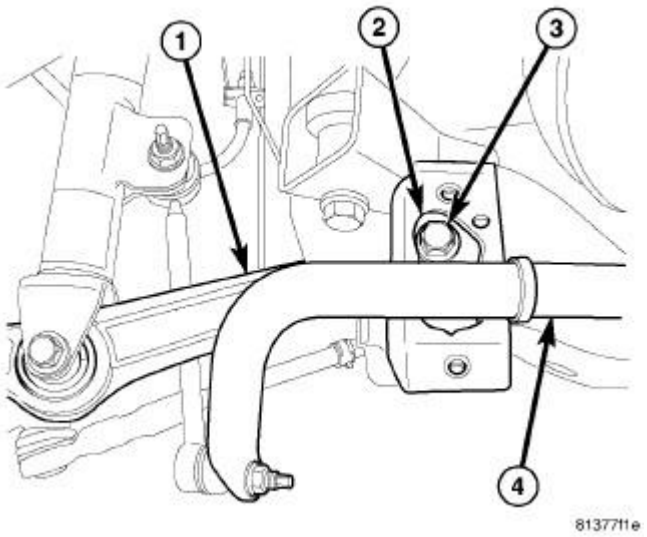


Fig. 29: Control Arm Cradle Bolt Head
Courtesy of CHRYSLER GROUP, LLC

NOTE: In the following step, the lower control arm cradle bolt (3) is accessed through the opening (2) created by removal of the bushing from the stabilizer bar (4).

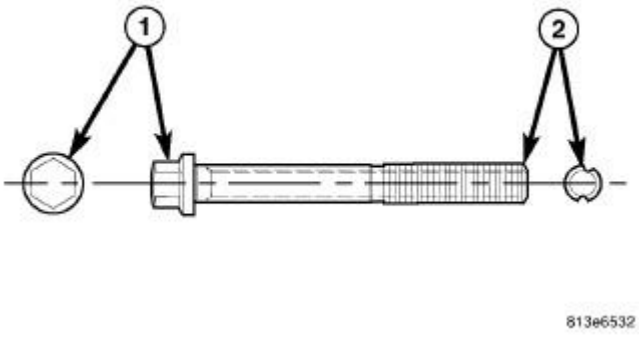


Fig. 30: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lower control arm bolt at the engine cradle has a lengthwise grooved shaft (2), it is a special wheel alignment adjustment bolt and the bolt head (1) must not be rotated in the vehicle or damage to the bolt and engine cradle will result. While holding the bolt in place with a wrench, remove the nut, then slide the bolt out of the bushing and cradle taking note of bolt positioning in engine cradle and control arm for reassembly purposes. The bolt needs to be installed in the same position as removed to make sure wheel camber and caster return to adjusted position.

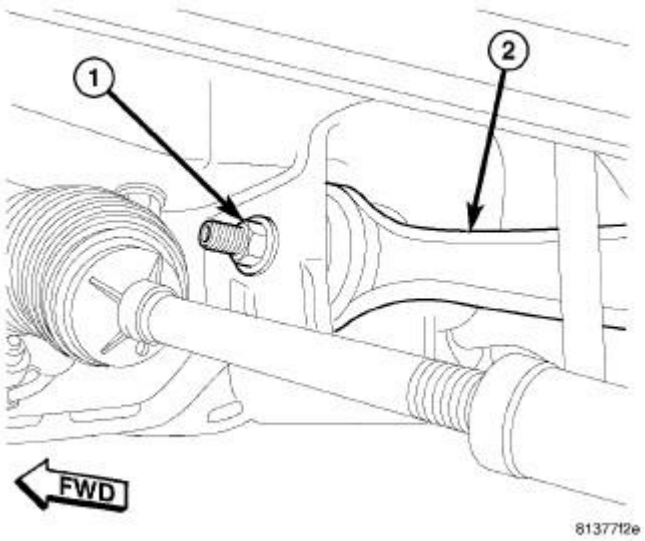


Fig. 31: Control Arm Cradle Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

8. Remove bolt and nut (1) securing lower control arm (2) to engine cradle. If bolt has a lengthwise grooved shaft (see above note), remove bolt and nut by holding the bolt in place with a wrench, removing nut, then sliding bolt out of bushing and cradle while taking note of bolt positioning in lower control arm bushing for reassembly purposes.

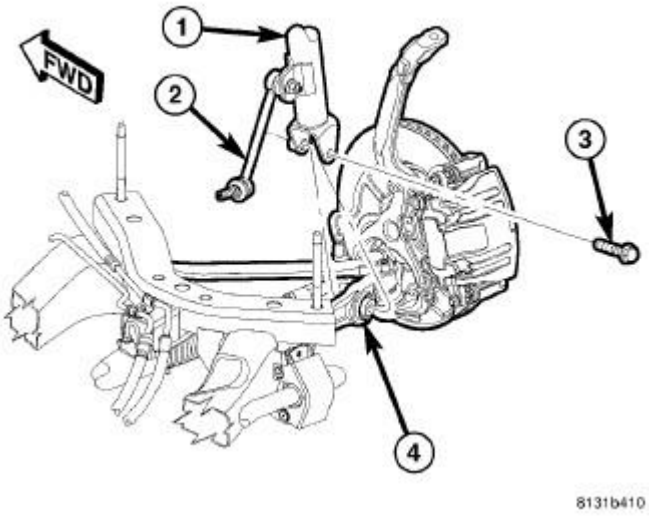


Fig. 32: Lower Shock Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolt (3) securing shock assembly (1) to lower control arm (4).

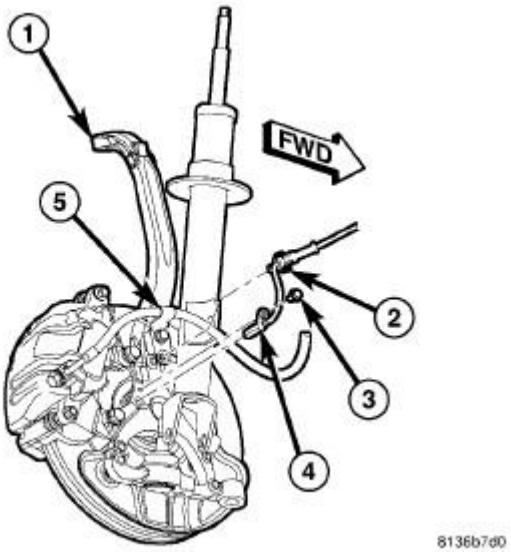


Fig. 33: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

10. Remove screw (3) fastening wheel speed sensor to knuckle (1). Pull sensor head (4) out of knuckle.
11. Remove wheel speed sensor cable routing clip (2) from brake flex hose routing bracket (5).

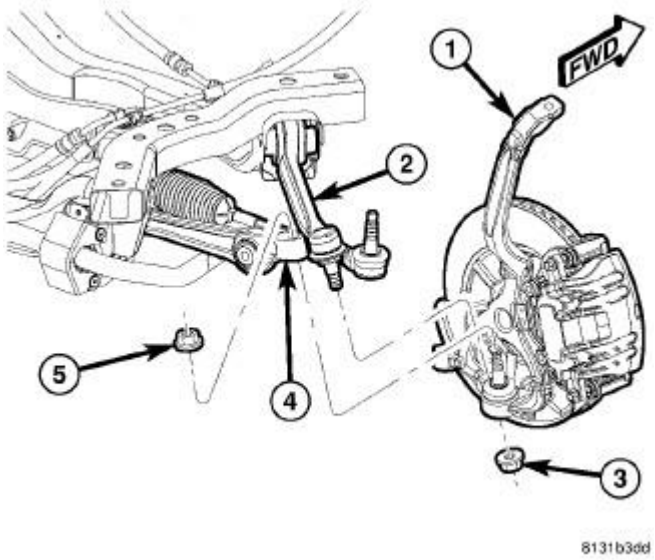


Fig. 34: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

12. Loosen nut (5) attaching ball joint stud to lower control arm (4). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

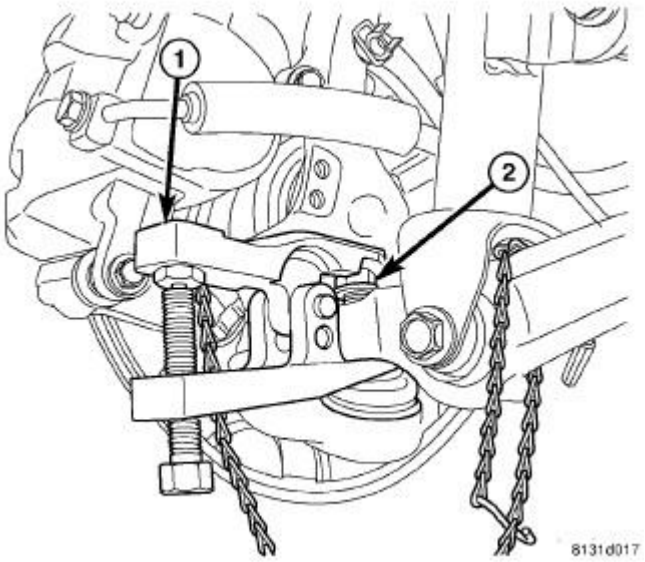


Fig. 35: Using Puller On LCA Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

13. Using Puller (1), Special Tool (special tool #9360, Remover, Ball Joint), separate ball joint stud (2) from lower control arm.

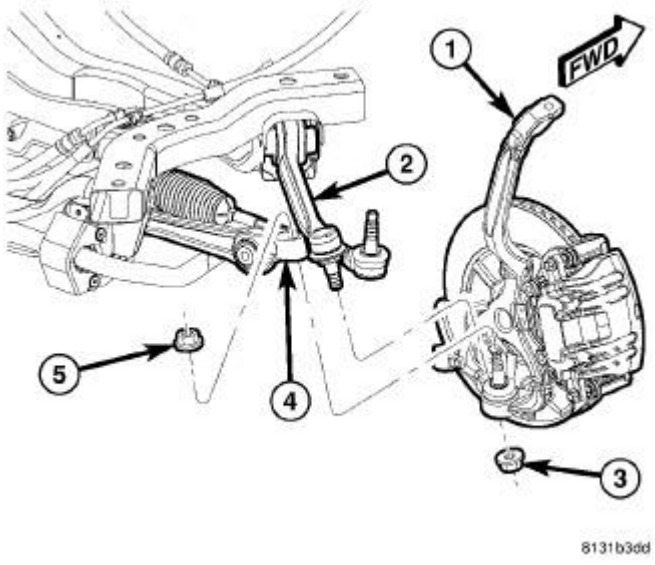


Fig. 36: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

14. Remove nut (5) from end of ball joint stud attaching lower control arm to knuckle.
15. Pry knuckle downward and slide ball joint stud out of lower control arm. Position knuckle outward, away from lower control arm.
16. Slide lower control arm out of engine cradle and remove from vehicle.

INSTALLATION

INSTALLATION

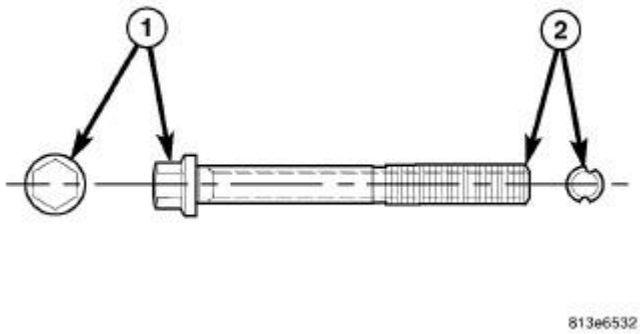


Fig. 37: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: If installing a lower control arm engine cradle bolt that is a wheel alignment adjustment bolt (1) (lengthwise grooved shaft (2)), make sure to install it in the same position which it was in upon removal. For more details on installation of this special bolt. Refer to WHEEL ALIGNMENT, STANDARD PROCEDURE.

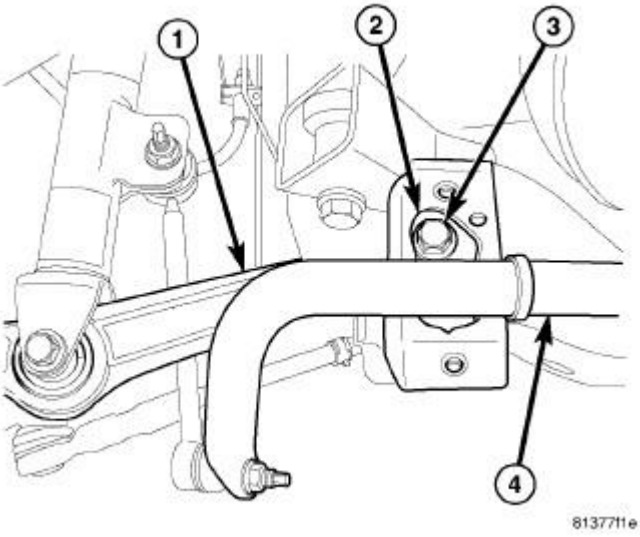


Fig. 38: Control Arm Cradle Bolt Head

Courtesy of CHRYSLER GROUP, LLC

1. Slide lower control arm (4) into position in engine cradle and install mounting bolt from rear.

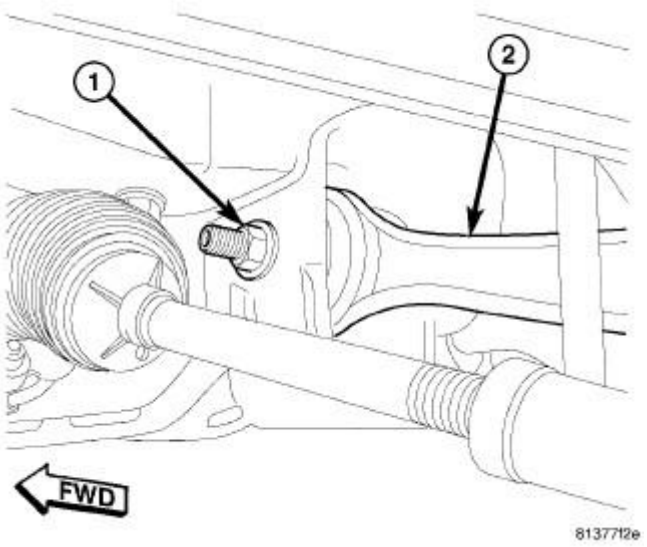


Fig. 39: Control Arm Cradle Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

2. Install nut (1) on lower control arm cradle bolt, but **do not tighten at this time** .

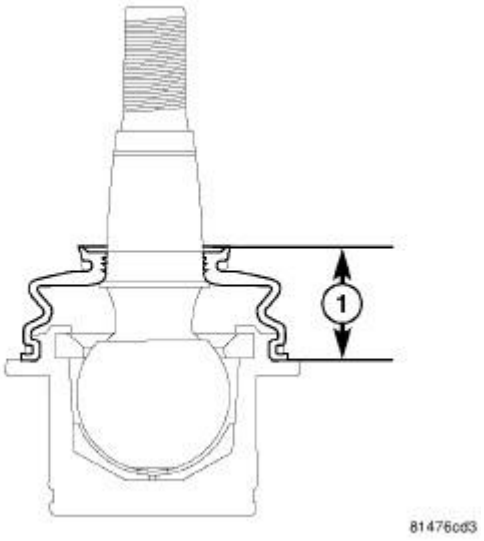


Fig. 40: Ball Joint Seal Boot Height
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before installing knuckle to lower control arm, measure height of ball

joint seal boot (1) mounted on knuckle. If seal boot height is above 25.5 mm, any air inside seal boot must be expelled. To do so, follow these steps.

a. **Tip ball joint stud completely to one side.**
b. **Using thumb and index finger, gently squeeze seal boot together at center expelling any air. Do not allow grease to be release.**
c. **Push down very top of seal boot.**
d. **Return ball joint stud to original "centered" position.**
e. **Measure ball joint seal boot height (1) making sure it is within specification.**
f. **Wipe any grease from ball joint stud.**

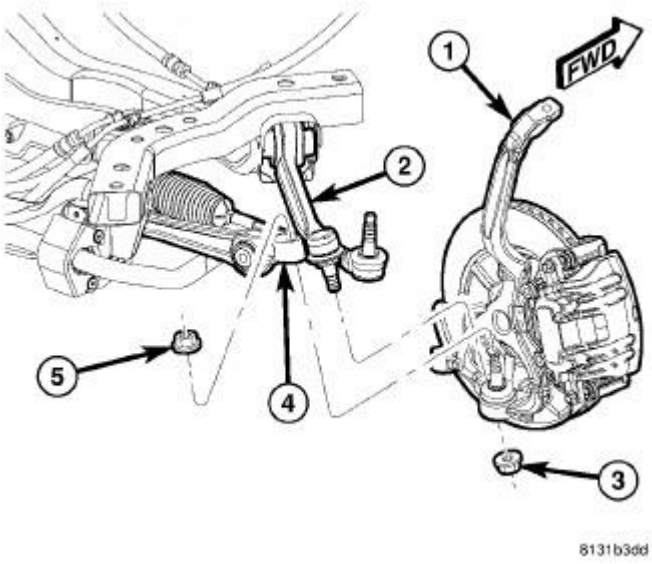


Fig. 41: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

3. Pull knuckle (1) downward and position lower control arm (4) over ball joint stud. Release knuckle, guiding stud into lower control arm. Install NEW nut (5) on ball joint stud attaching lower control arm (4) to knuckle (1). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 68 N.m + 90° turn (50 ft. lbs. + 90° turn).

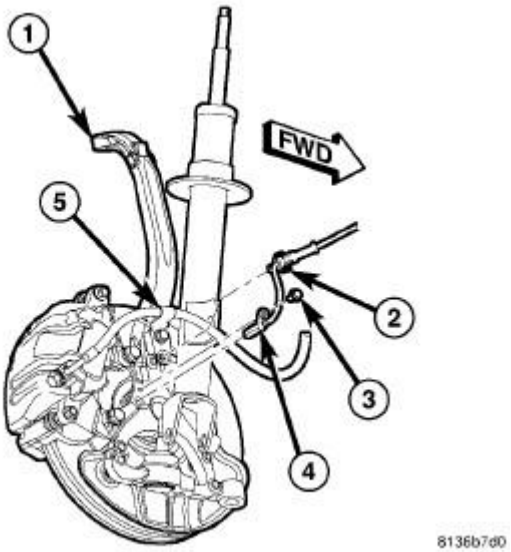


Fig. 42: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

4. Install wheel speed sensor head (4) into knuckle and install mounting screw (3). Tighten screw to 11 N.m (95 in. lbs.).
5. Attach wheel speed sensor cable and routing clip (2) to brake flex hose routing bracket (5).

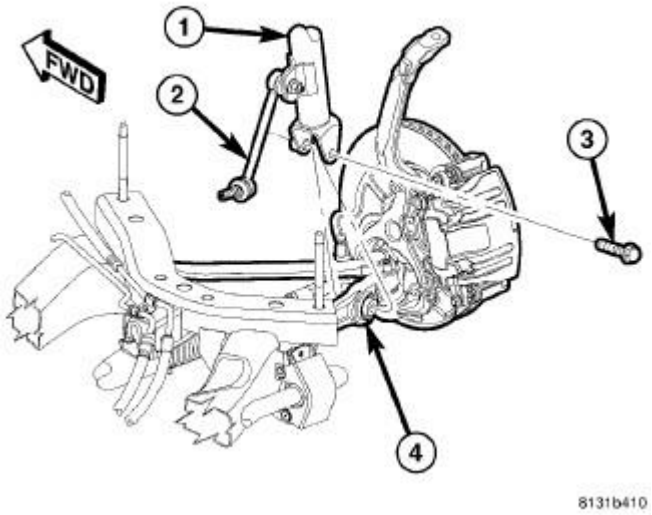


Fig. 43: Lower Shock Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install lower shock mounting bolt (3) attaching shock assembly (1) to lower control arm (4) **Do not tighten bolt at this time.**

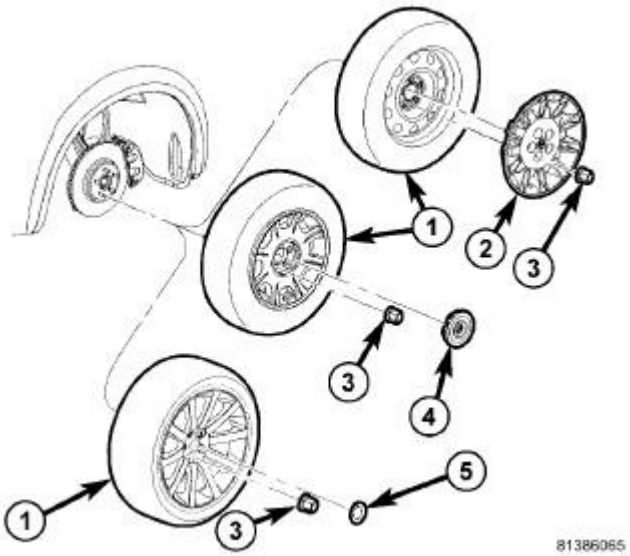


Fig. 44: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
8. Lower vehicle.

CAUTION: Because stabilizer bar is disconnected at cradle it is important to use extra care while moving vehicle to alignment rack/drive-on lift.

9. Position vehicle on an alignment rack/drive-on lift.
10. Tighten lower shock mounting bolt (3) to 174 N.m (128 ft. lbs.).

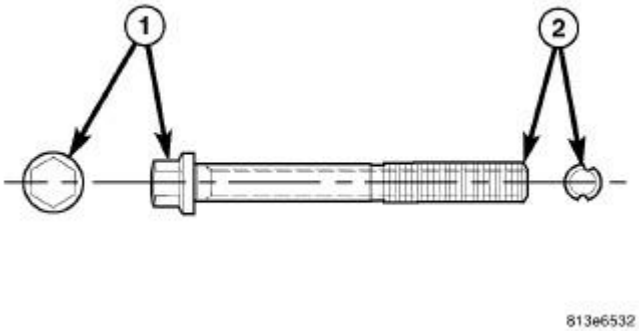


Fig. 45: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

CAUTION: If the control arm engine cradle bolt is a wheel alignment adjustment

bolt (lengthwise grooved shaft (2)), be sure to only tighten the nut. Do not rotate the bolt head (1) or damage to the bushing will occur.

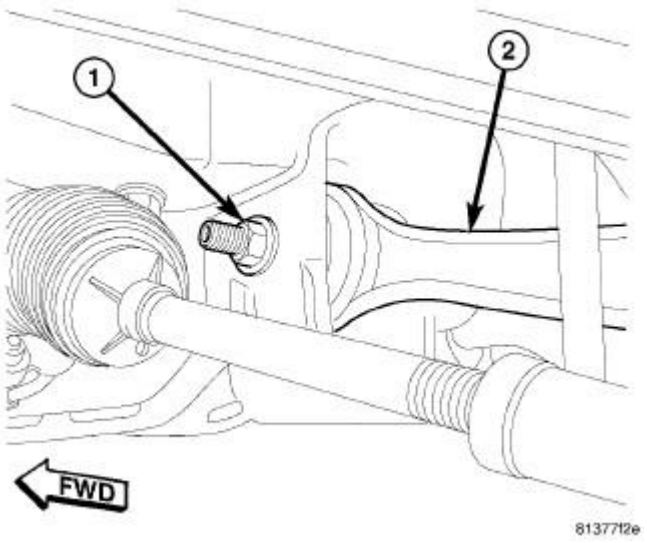


Fig. 46: Control Arm Cradle Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

12. Once camber is found to be within specifications, using a crowfoot wrench, tighten lower control arm cradle bolt nut (1) to 176 N.m (130 ft. lbs.) while holding the bolt stationary.

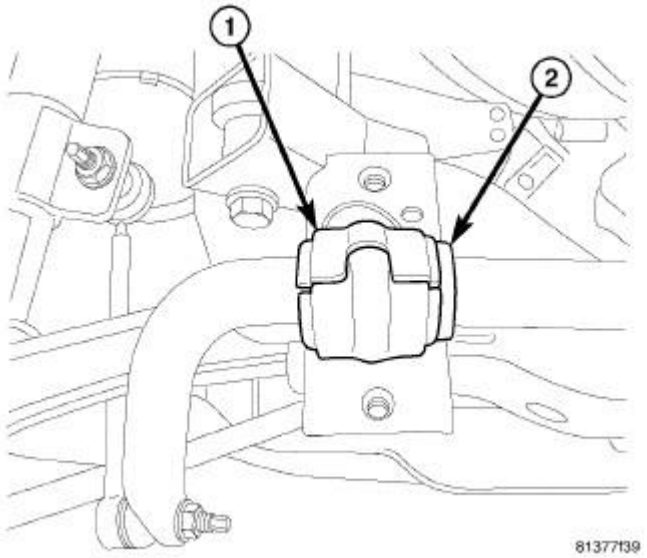


Fig. 47: Front Stabilizer Bar Bushing On Bar
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Because of stabilizer bushing outer shape, it is very important to

install bushings in position discussed in following step.

13. Utilizing slit in bushing, install stabilizer bar bushing (1) against locating collar on stabilizer bar (2) as shown in illustration. Make sure slit in bushing is positioned toward rear of vehicle.

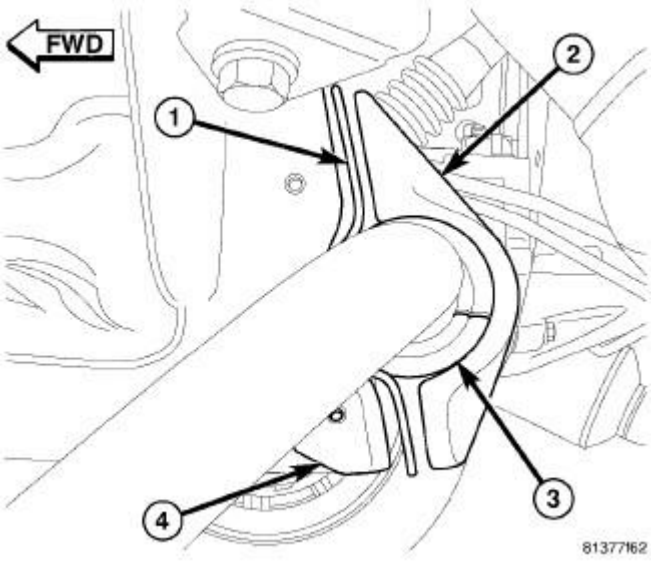


Fig. 48: Front Stabilizer Bar Bushing Retainer
Courtesy of CHRYSLER GROUP, LLC

14. Install stabilizer bar bushing retainer halves (1),(2) around bushing (3).

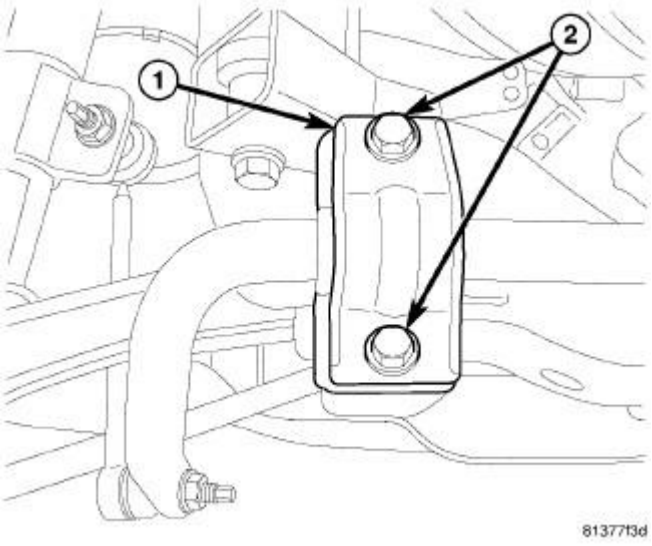


Fig. 49: Front Stabilizer Bar Bushing Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install bolts (2) securing stabilizer bar bushing retainer halves (1) to cradle. Tighten bolts to 60 N.m (44 ft. lbs.).

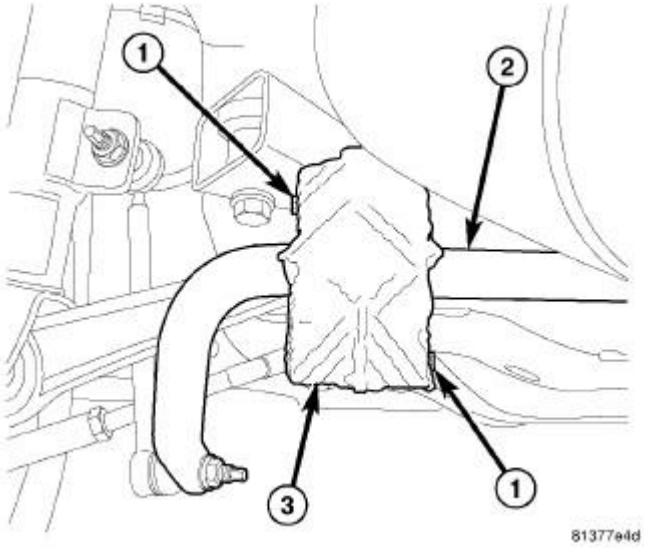


Fig. 50: Front Stabilizer Bar Heat Shield
Courtesy of CHRYSLER GROUP, LLC

16. Install stabilizer bar heat shield (3) over stabilizer bar bushing retainer. Install mounting screws (1).
17. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .

ARM, UPPER CONTROL

REMOVAL

REMOVAL

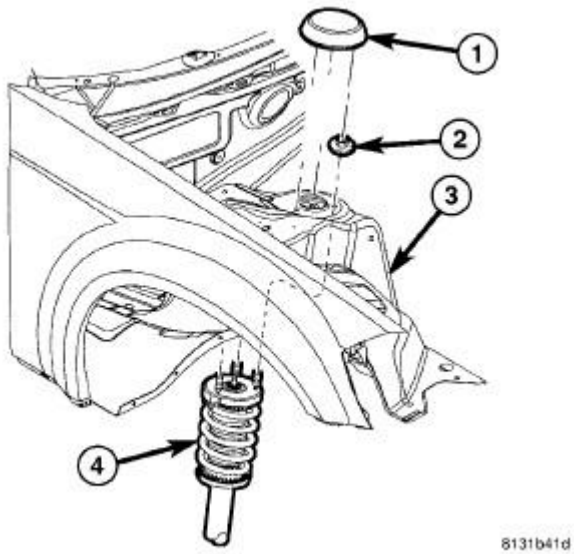


Fig. 51: Upper Shock Mounting
Courtesy of CHRYSLER GROUP, LLC

1. If removing left upper control arm, remove and reposition coolant recovery container. Refer to **BOTTLE, COOLANT RECOVERY, REMOVAL** .
2. If removing right upper control arm, remove IPM from mount and reposition.
3. If equipped, remove front shock tower cap (1) from top of shock assembly (4).
4. Remove three nuts (2) fastening shock assembly (4) to shock tower (3).

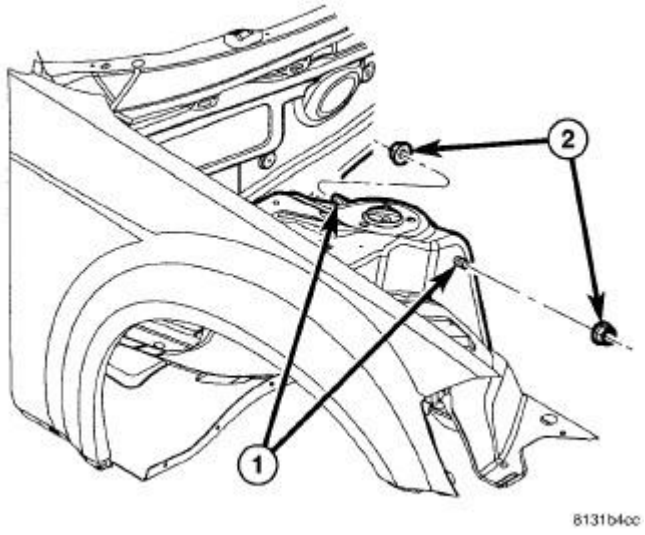


Fig. 52: Upper Control Arm Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

5. Remove nuts (2) from upper control arm mounting bolts (1).

6. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

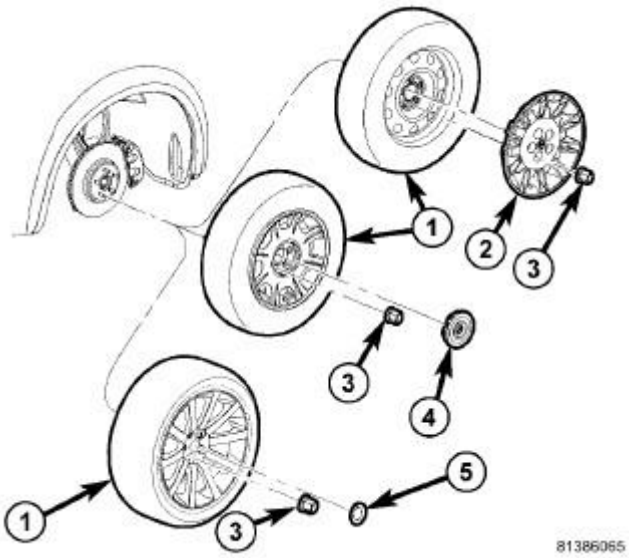


Fig. 53: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

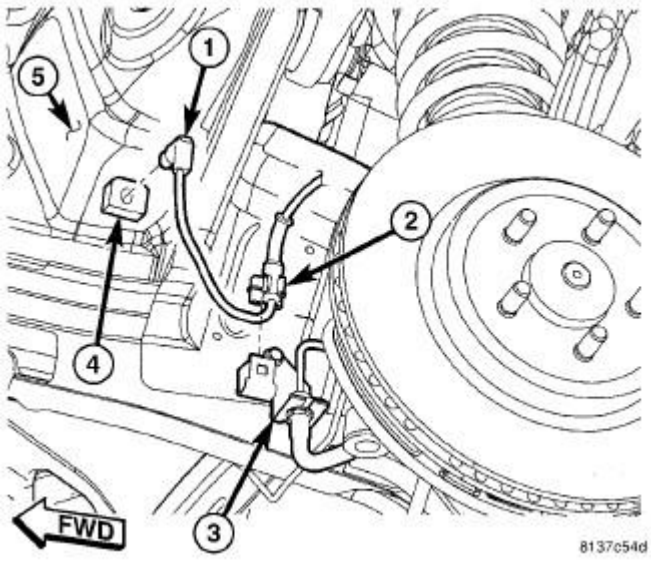


Fig. 54: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect wheel speed sensor cable routing clip (2) at brake tube bracket (3).

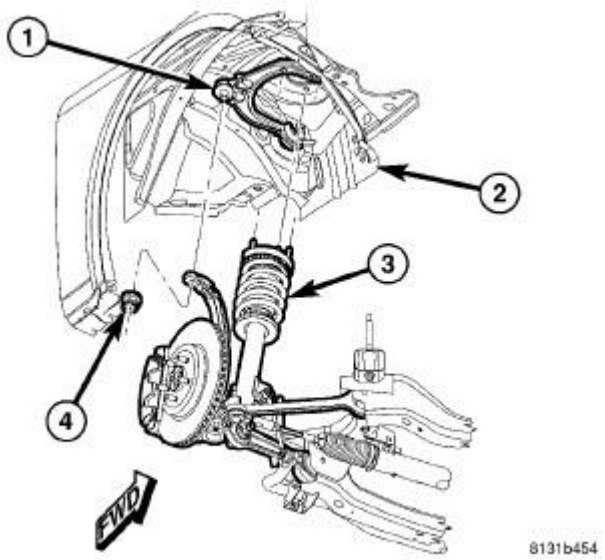


Fig. 55: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Loosen nut (4) attaching upper ball joint stud (1) to knuckle. Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

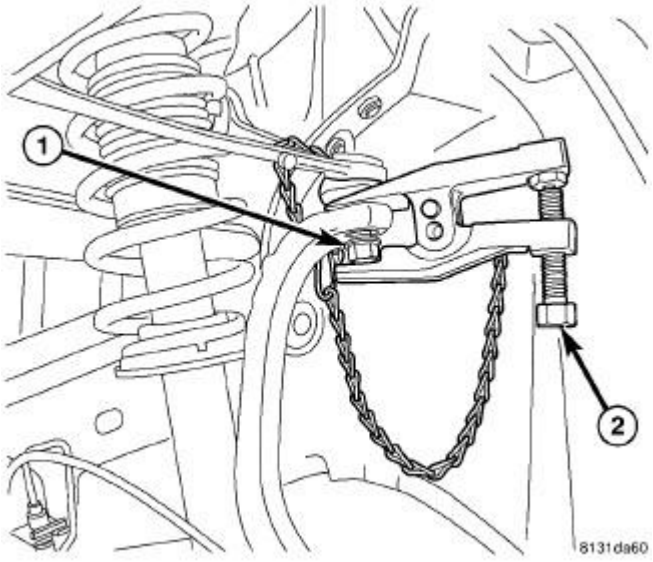


Fig. 56: Using Puller On Upper Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

10. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint), separate upper ball joint stud (1) from knuckle.

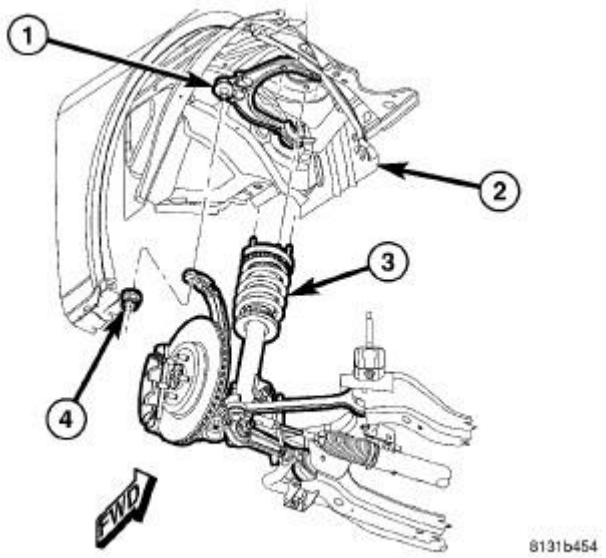


Fig. 57: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

11. Remove nut (4) from end of upper ball joint stud (1).
12. Pull shock assembly (3) downward until studs clear shock tower (2), then pull it outward allowing access to upper control arm mounting bolts.

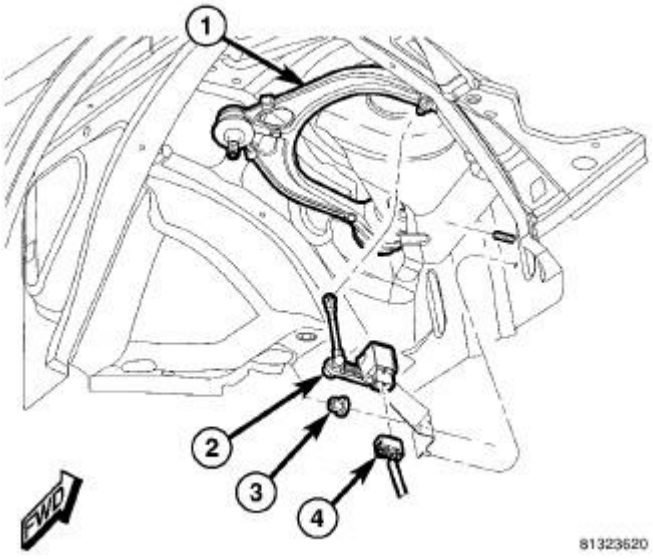


Fig. 58: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

13. Export Only - If servicing right upper control arm, disconnect headlamp leveling sensor (2) link at upper control arm (1).

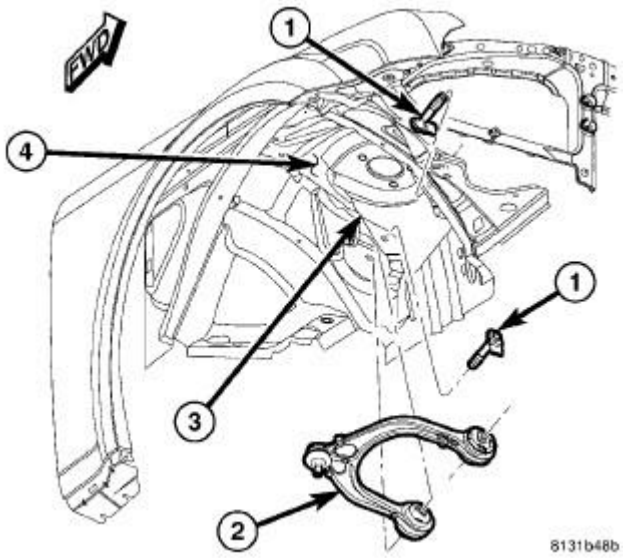


Fig. 59: Upper Control Arm Mounting
Courtesy of CHRYSLER GROUP, LLC

14. Remove upper control arm mounting (flag) bolts (1).
15. Remove upper control arm (2) from bracket (3) in shock tower (4).

INSTALLATION

INSTALLATION

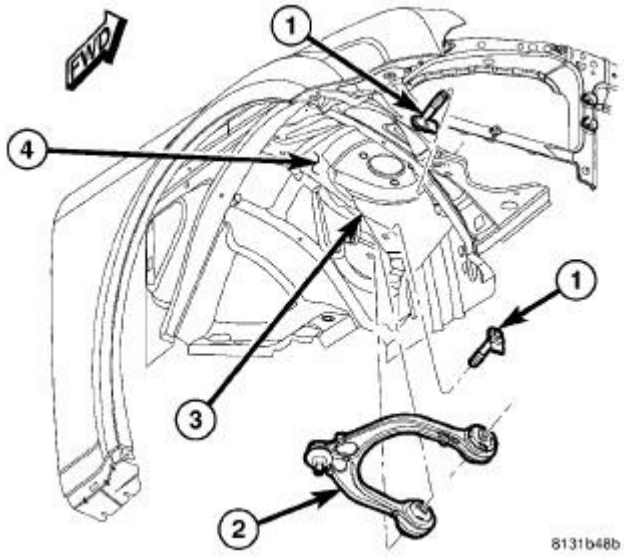


Fig. 60: Upper Control Arm Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: Although All-Wheel-Drive and Rear-Wheel-Drive upper control arms are similar in appearance, they are not interchangeable.

1. Slide upper control arm (2) into bracket (3) located in shock tower (4).
2. Install upper control arm mounting (flag) bolts (1) through bracket, arm and tower. Position flags on bolt heads outward, toward wheel opening.

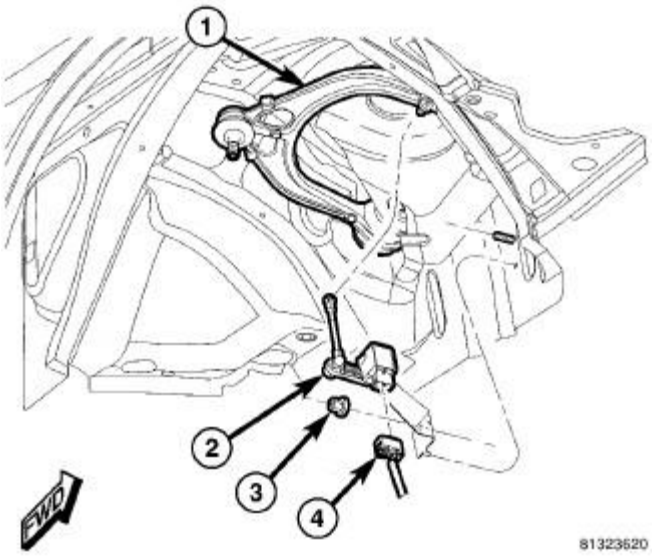


Fig. 61: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Export Only - If servicing right upper control arm, connect headlamp leveling sensor (2) link at upper control arm (1).

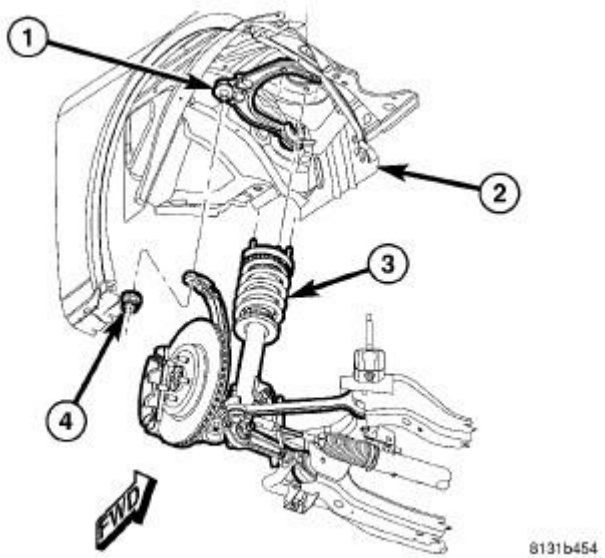


Fig. 62: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Move shock assembly (3) allowing studs to be inserted through shock tower (2) mounting holes.
5. Place upper ball joint stud (1) through hole in top of knuckle and install nut (4). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 47 N.m + 90° turn (35 ft. lbs. + 90° turn).

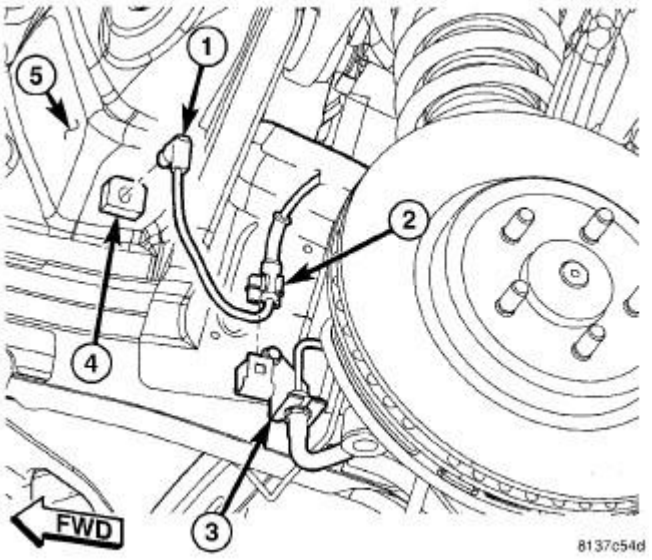


Fig. 63: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

6. Connect wheel speed sensor cable routing clip (2) at brake tube bracket (3).

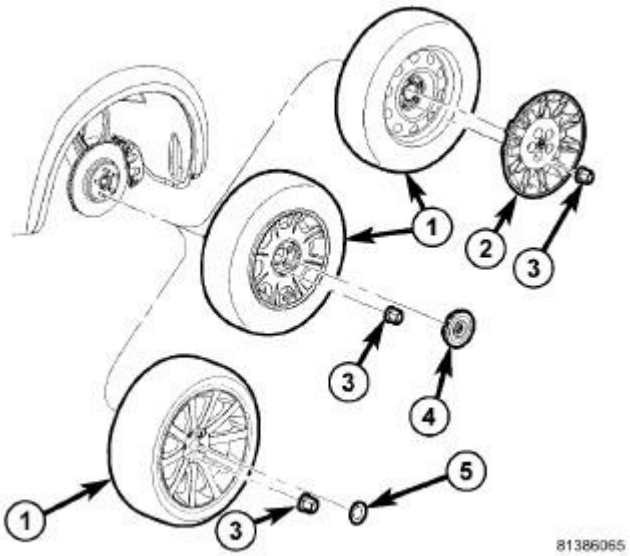


Fig. 64: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
8. Lower vehicle to curb position.

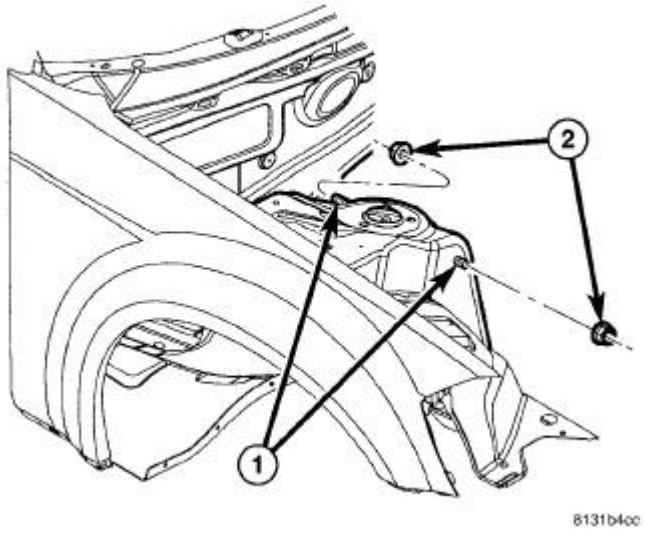


Fig. 65: Upper Control Arm Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

9. Install nuts (2) on upper control arm body mounting bolts (1). Tighten nuts to 75 N.m (55 ft. lbs.).

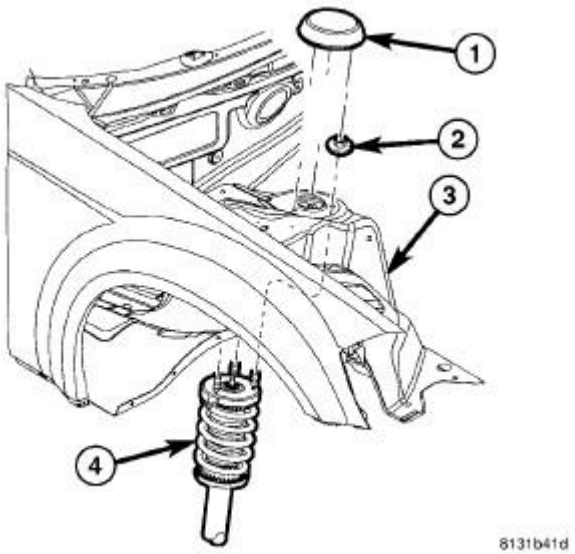


Fig. 66: Upper Shock Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Install three nuts (2) fastening shock assembly (4) to shock tower (3). Tighten nuts to 27 N.m (20 ft. lbs.).
11. If equipped, align shock tower cap (1) with shock mounting nuts (2) and snap into place.
12. If installing left upper control arm, install coolant recovery container. Refer to **BOTTLE, COOLANT RECOVERY, INSTALLATION** .
13. If installing right upper control arm, install IPM.

BALL JOINT, SUSPENSION, LOWER

DESCRIPTION

DESCRIPTION

AWD

The ball joint for the lower control arm is pressed into the lower control arm. The ball joint is a "sealed for life" component and cannot be maintenance lubricated. The ball joint is lubricated for life at the time of assembly. **No attempt should be made to ever add any lubrication to these ball joints.**

Neither the ball joint, nor the seal boot for the lower control arm can be serviced as a separate component. They entire arm must be replaced if either are damaged.

RWD

There are two lower ball joints on the RWD version of this vehicle. One is for the lower control arm and the other for the tension strut. The ball joint for the lower control arm is pressed into the knuckle and the ball joint for the tension strut is part of the tension strut. The ball joints are both "sealed for

life" components and cannot be maintenance lubricated. These ball joints are lubricated for life at the time of assembly. **No attempt should be made to ever add any lubrication to these ball joints.**

The ball joint for the lower control arm is a ball joint and seal boot cartridge type and can be replaced as a separate component of the knuckle. The boot cannot be serviced separately. To service this ball joint. Refer to **KNUCKLE, STEERING, RWD, DISASSEMBLY**.

Neither the ball joint, nor the seal boot for the tension strut can be serviced as a separate component. They entire tension strut must be replaced if either are damaged.

The ball joint connection to the lower control arm and the ball joint connection at the knuckle is achieved by an interference fit created by the tapered stud of the ball joint and a tapered hole in the steering knuckle. The ball joint stud is retained in the steering knuckle using a locking nut.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - LOWER BALL JOINT

1. Raise vehicle on a drive-on hoist.

   NOTE: If a drive-on hoist is not available, use wooden blocks with jack stands to support the lower control arm in the ball joint area. Place the jack stands appropriately and lower the hoist placing weight on the lower control arm. The lower control arms should now be supporting the vehicle weight.

2. Using a jack, lift the front end off the hoist and position a wooden block underneath lower control arm supporting that corner of the vehicles weight.
3. Remove tire and wheel assembly. Refer to **REMOVAL** .
4. Attach a dial indicator as follows:
   1. AWD Lower Control Arm - Attach a dial indicator to base of lower control arm, then align dial indicator's contact pointer with direction of stud axis and touch machined flat on knuckle near ball joint. Zero dial indicator.
   2. RWD Tension Strut - Attach a dial indicator to base of tension strut, then align dial indicator's contact pointer with direction of stud axis and touch machined flat on knuckle near ball joint. Zero dial indicator.
   3. RWD Lower Control Arm - Attach a dial indicator to base of lower control arm, then align dial indicator's contact pointer with direction of stud axis and touch machined flat on knuckle near ball joint. Zero dial indicator.

   NOTE: Use care when applying the load to the knuckle so as to not damage components of the suspension.

5. Insert a pry bar and rest it against lower control arm or tension strut (depending on which is being tested) and use lever principle to push knuckle upward until dial indicator no longer moves.

6. Record any ball joint movement. If movement in the lower control arm exceeds 1.5 mm (.059 in.), the ball joint is faulty.
7. If the lower ball joint for an All-Wheel-Drive vehicle needs replaced, the lower control arm needs to be replaced. Refer to **ARM, LOWER CONTROL, AWD, REMOVAL** and **ARM, LOWER CONTROL, RWD, REMOVAL**.
8. If the ball joint for the lower control arm on a Rear-Wheel-Drive vehicle needs replaced, it can be serviced separately. Refer to **KNUCKLE, STEERING, RWD, DISASSEMBLY**.
9. If the tension strut ball joint (RWD vehicle) needs replaced, the entire tension strut needs to be replaced. Refer to **STRUT, TENSION, REMOVAL**.

REMOVAL

REMOVAL

To service the lower ball joint for the lower control arm on rear-wheel-drive vehicles, the knuckle must be removed from the vehicle, then the ball joint can be removed. Refer to **KNUCKLE, STEERING, RWD, DISASSEMBLY** or **KNUCKLE, STEERING, AWD, REMOVAL** or **KNUCKLE, STEERING, RWD, REMOVAL**.

INSTALLATION

INSTALLATION

To install the ball joint for the lower control arm on rear-wheel-drive vehicles, refer to the following information. Refer to **KNUCKLE, STEERING, RWD, ASSEMBLY**.

BALL JOINT, SUSPENSION, UPPER

DESCRIPTION

DESCRIPTION

The upper ball joint is pressed into the upper control arm. The ball joint is a "sealed for life" component and cannot be maintenance lubricated. This ball joint is lubricated for life at the time of assembly. **No attempt should be made to ever add any lubrication to this ball joint.**

Neither the upper ball joint, nor the seal boot can be serviced as a separate component. The entire upper control arm must be replaced if either are damaged.

The ball joint connection at the knuckle is achieved by an interference fit created by the tapered stud of the ball joint and a tapered hole in the steering knuckle. The ball joint stud is retained in the steering knuckle using a locking nut.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - UPPER BALL JOINT

1. Raise vehicle on a drive-on hoist.

NOTE: If a drive-on hoist is not available, use wooden blocks with jack stands to support the lower control arm in the ball joint area. Place the jack stands appropriately and lower the hoist placing weight on the lower control arm. The lower control arms should now be supporting the vehicle weight.

2. Using a jack, lift the front end off the hoist and position a wooden block underneath lower control arm supporting that corner of the vehicles weight.
3. Remove tire and wheel assembly. Refer to **REMOVAL** .
4. Attach a dial indicator to body of upper control arm, then align dial indicator's contact pointer with direction of stud axis and touch machined flat on end of knuckle near ball joint. Zero dial indicator.

NOTE: Use care when applying the load to the knuckle so as to not damage components of suspension.

5. Insert a pry bar and rest it against bottom of upper control arm and use lever principle to push arm upward until dial indicator no longer moves.
6. Record any ball joint movement. If movement in the control arm exceeds 1.5 mm (.059 in.), the ball joint is faulty.
7. If the ball joint needs replaced, the entire upper control arm needs to be replaced. Refer to **ARM, UPPER CONTROL, REMOVAL**.

HUB AND BEARING

DESCRIPTION

DESCRIPTION

The front wheel bearing and wheel hub of this vehicle are a one piece sealed unit or hub and bearing unit type assembly.

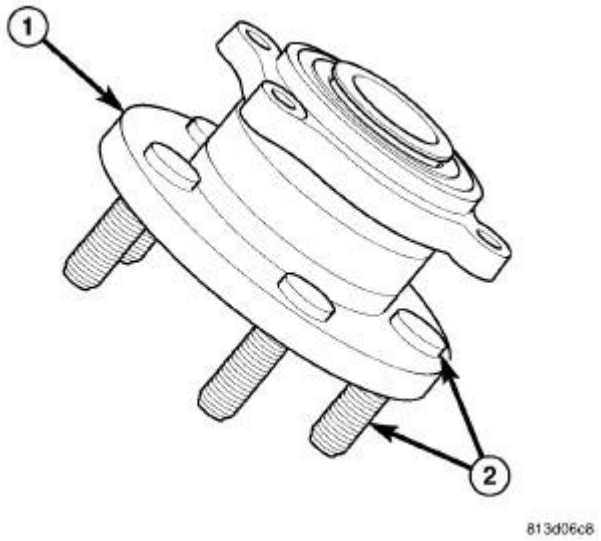


Fig. 67: Rear Hub & Bearing
Courtesy of CHRYSLER GROUP, LLC

On All-Wheel-Drive (AWD) vehicles, the hub and bearing (1) is mounted to the knuckle using four mounting bolts and to the axle half shaft using a retaining nut. The center of the AWD hub and bearing is splined to match the outer joint of the axle half shaft.

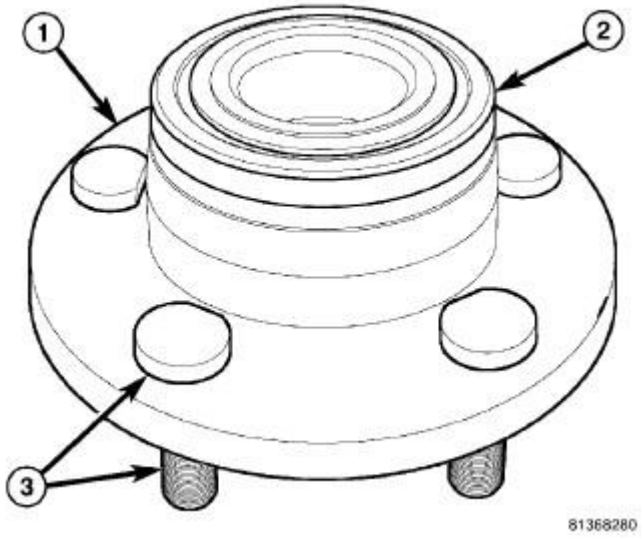


Fig. 68: Front Hub & Bearing
Courtesy of CHRYSLER GROUP, LLC

On Rear-Wheel-Drive (RWD) vehicles, the hub and bearing (1) is mounted to the center of the spindle using a retaining nut.

All front hub and bearings have five wheel mounting studs (3) on the hub flange for mounting the

wheel to the vehicle. The wheel mounting studs are the only replaceable components of the hub and bearing. Otherwise, the hub and bearing is serviced only as a complete assembly.

On RWD vehicles, a magnetic encoder (2) for the wheel speed sensor is pressed onto the hub and bearing. A magnetic encoder is not located on the AWD hub and bearing. It is pressed onto the axle half shaft outer joint.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HUB AND BEARING

NOTE: The hub and bearing is designed for the life of the vehicle and should require no maintenance.

With wheel and brake rotor removed, rotate flanged outer ring of hub. Excessive roughness, lateral play or resistance to rotation may indicate dirt intrusion or bearing failure. If the rear wheel bearings exhibit these conditions during inspection, the hub and bearing assembly should be replaced.

Damaged bearing seals and resulting excessive grease loss may also require bearing replacement. Moderate grease loss from bearing is considered normal and should not require replacement of the hub and bearing assembly.

To diagnose a bent hub, measure hub runout. Refer to **ROTOR, BRAKE, DIAGNOSIS AND TESTING** .

REMOVAL

AWD

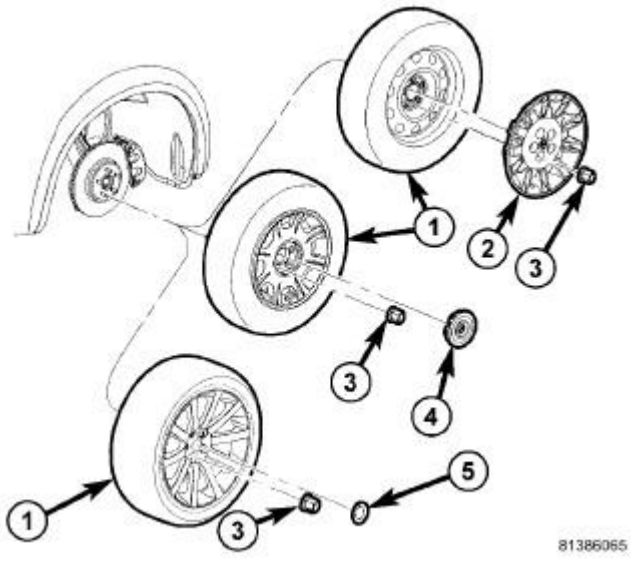


Fig. 69: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

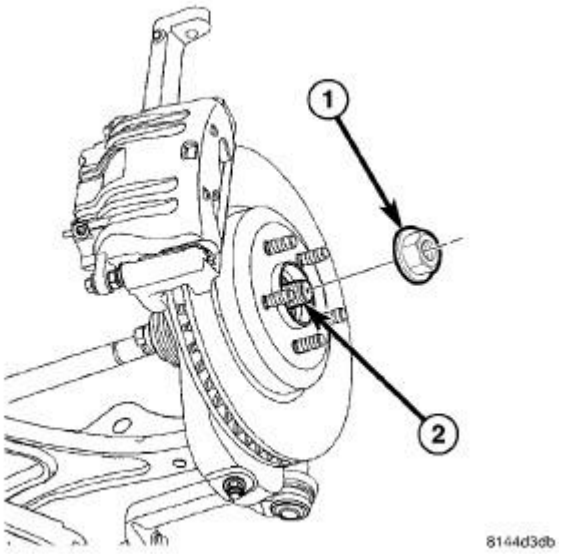


Fig. 70: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

3. While a helper applies brakes to keep hub from rotating, remove hub nut (1) from the axle half shaft (2).
4. Access and remove front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

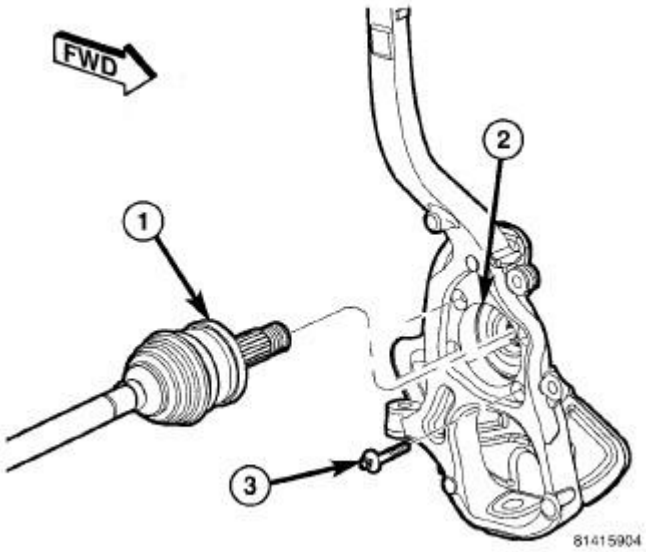


Fig. 71: Locating Halfshaft AT Hub/Bearing Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove four bolts (3) fastening hub and bearing (2) to knuckle.
6. Slide hub and bearing (2) off axle half shaft (1) and knuckle.

RWD

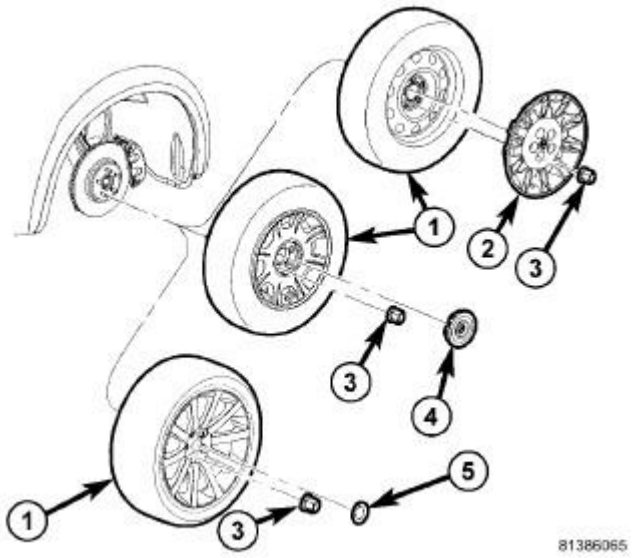


Fig. 72: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).
3. Access and remove front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

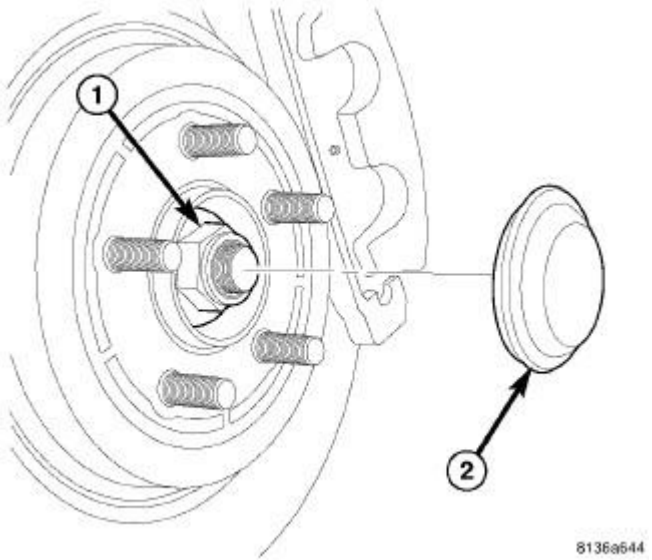


Fig. 73: Dust Cap & Hub Nut

Courtesy of CHRYSLER GROUP, LLC

4. Remove dust cap (2). When doing this, avoid damaging internal bore of hub to preserve seal integrity.
5. Remove hub nut (1).
6. Slide hub and bearing off knuckle spindle.

INSTALLATION

AWD

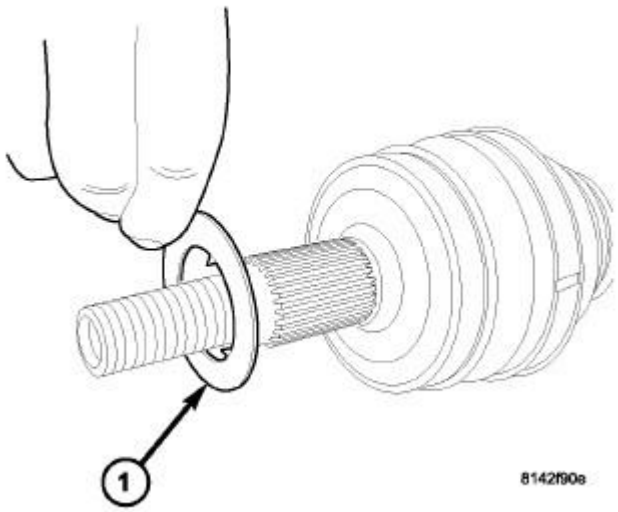


Fig. 74: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before installing hub and bearing on end of axle half shaft, ensure isolation washer is present on end of half shaft. Inspect washer making sure it is not worn or damaged. Washer can be installed in either direction on shaft.

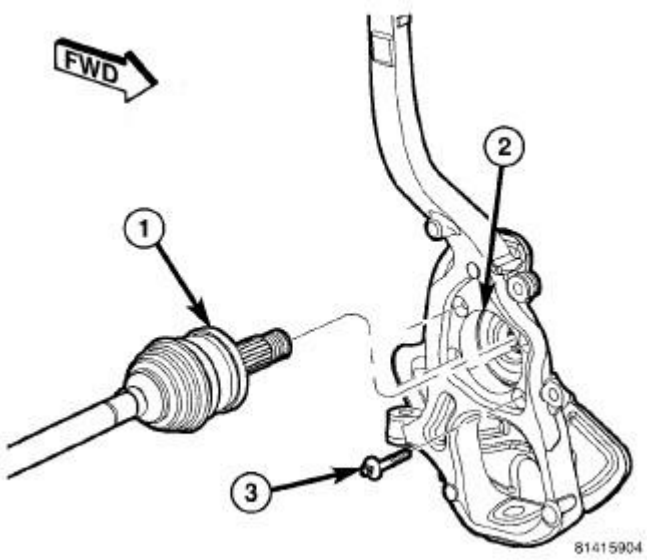


Fig. 75: Locating Halfshaft AT Hub/Bearing Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Slide hub and bearing (2) onto axle half shaft (1). Position hub and bearing onto knuckle, lining up mounting bolt holes.
2. Install four bolts (3) fastening hub and bearing in place. Tighten mounting bolts to 68 N.m (50 ft. lbs.).
3. Install brake rotor, then disc brake caliper and adapter assembly. Refer to **ROTOR, BRAKE, INSTALLATION** .

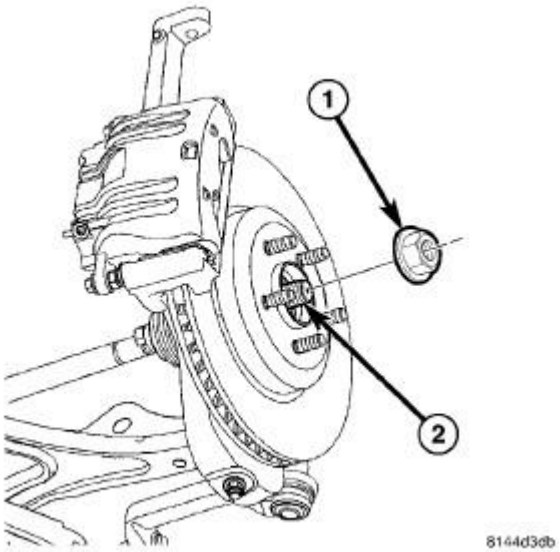


Fig. 76: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.**

4. Install hub nut (1) on end of axle half shaft (2). While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.).

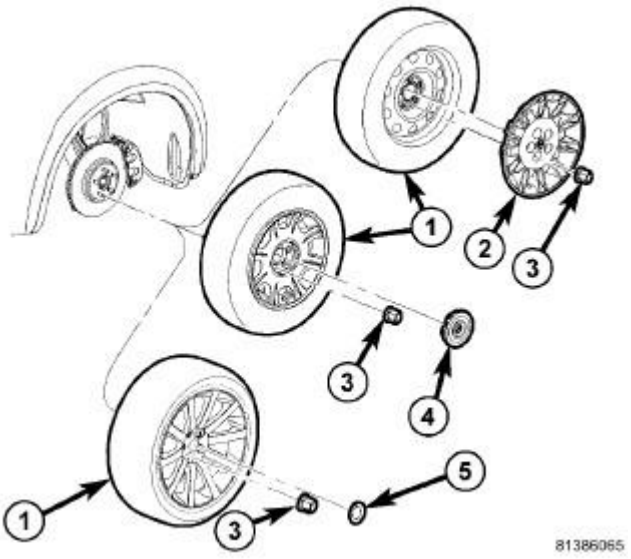


Fig. 77: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
6. Lower vehicle.

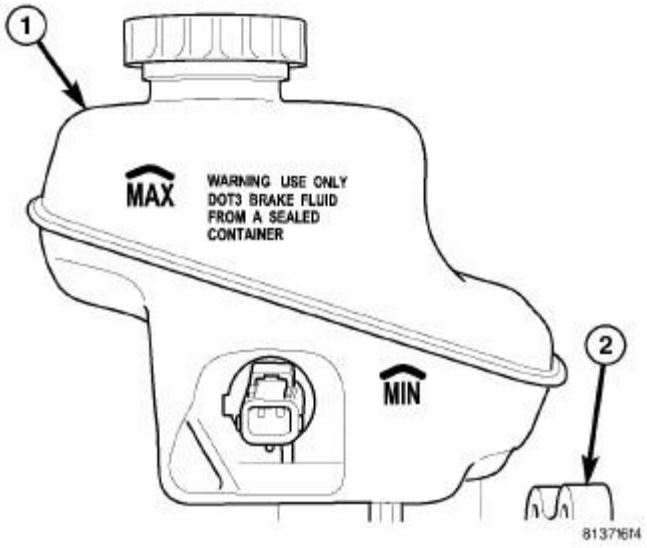


Fig. 78: Reservoir Fluid Level Markings

Courtesy of CHRYSLER GROUP, LLC

7. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
8. Check and adjust brake fluid level in reservoir (1) as necessary.
9. Road test vehicle and make several stops to wear off any foreign material on brakes and to seat brake pads.

RWD

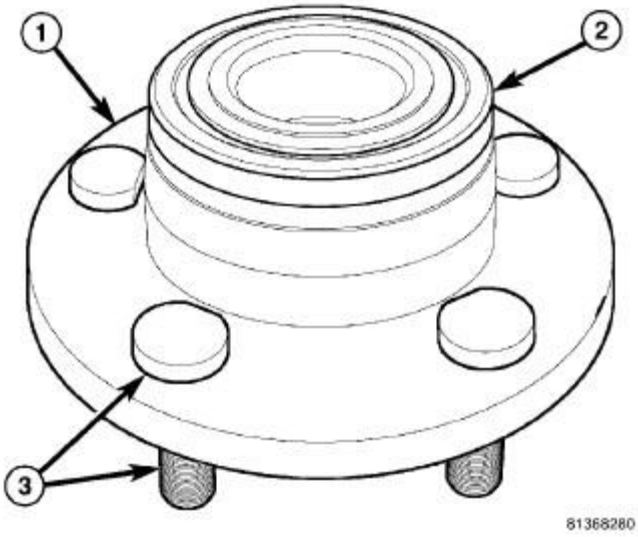


Fig. 79: Front Hub & Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to installation, inspect magnetic encoder (for wheel speed sensor) (2) for any damage and make sure any metal debris sticking to it is removed.

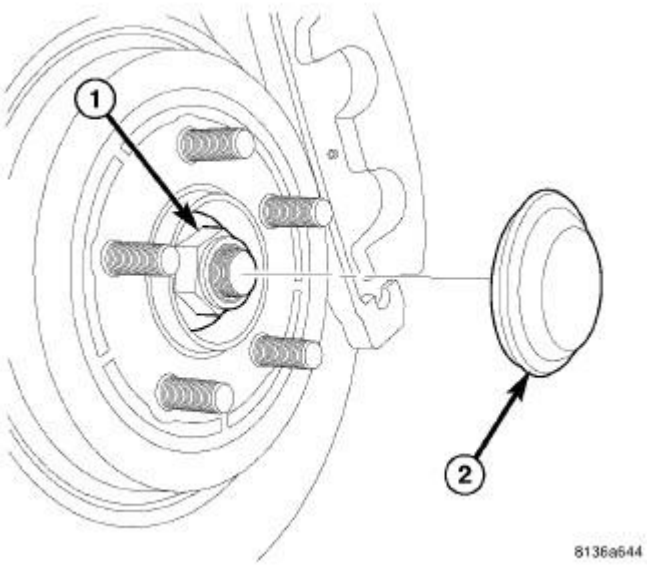


Fig. 80: Dust Cap & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

1. Slide hub and bearing onto knuckle spindle.
2. Install hub nut (1) on end of spindle. Tighten hub nut to 213 N.m (152 ft. lbs.).
3. Install brake rotor, then disc brake caliper and adapter assembly. Refer to **ROTOR, BRAKE, INSTALLATION** .

   NOTE: Install a new dust cap to preserve seal integrity.

4. Install NEW dust cap (2) on hub and bearing.

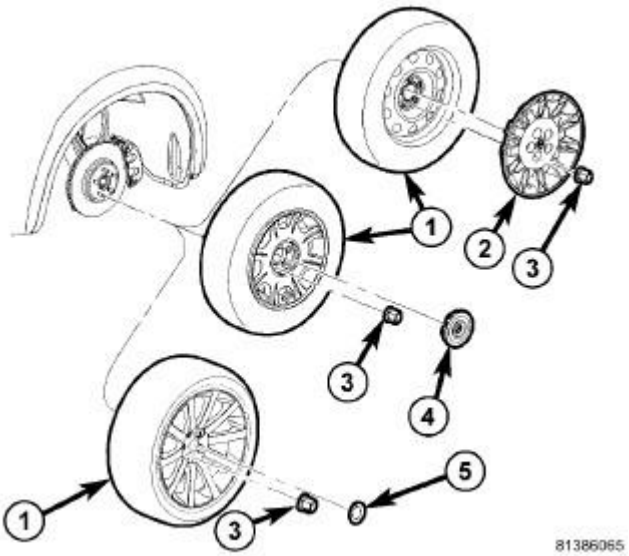


Fig. 81: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
6. Lower vehicle.

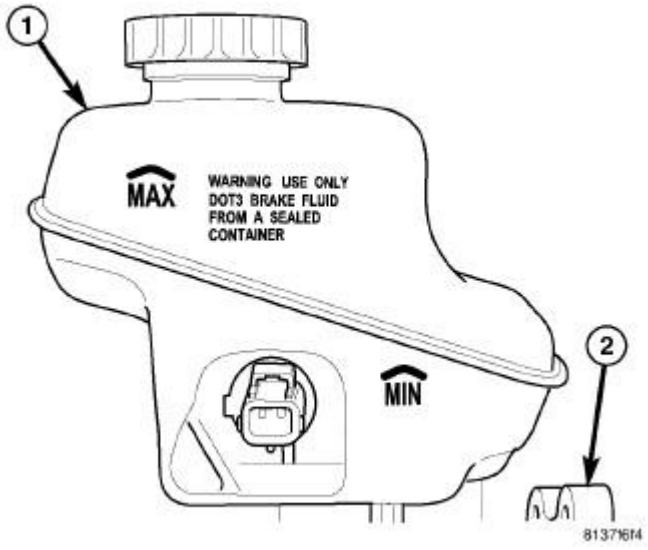


Fig. 82: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

7. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
8. Check and adjust brake fluid level in reservoir (1) as necessary.
9. Road test vehicle and make several stops to wear off any foreign material on brakes and to seat

brake pads.

KNUCKLE, STEERING, AWD

REMOVAL

REMOVAL

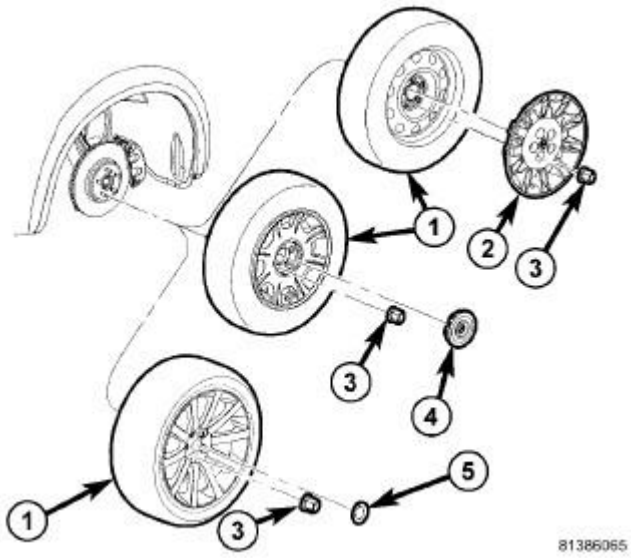


Fig. 83: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

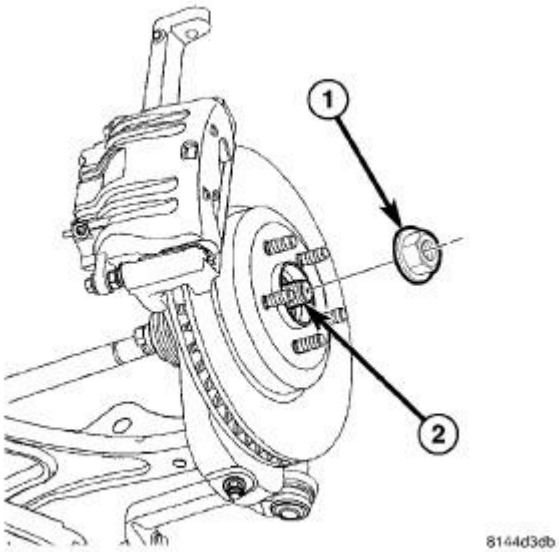


Fig. 84: Locating Axle Shaft Hub Nut
Courtesy of CHRYSLER GROUP, LLC

3. While a helper applies brakes to keep hub from rotating, remove hub nut (1) from axle half shaft (2).

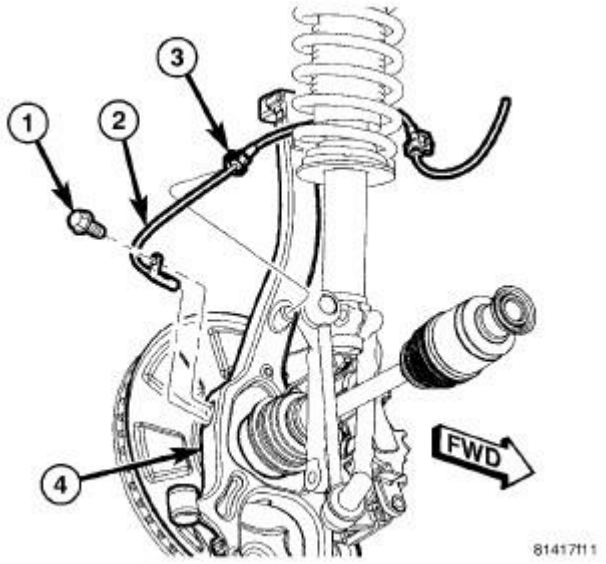


Fig. 85: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

4. Remove clip (3) fastening wheel speed sensor (2) to knuckle (4).
5. Remove screw (1) fastening wheel speed sensor (2) to knuckle (4). Pull sensor head (4) out of knuckle.
6. Access and remove front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

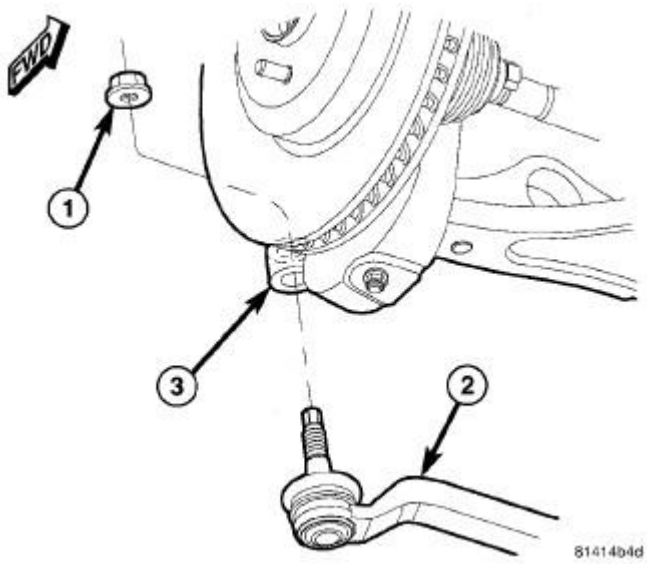


Fig. 86: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

7. Remove nut (1) from outer tie rod end (2) stud.

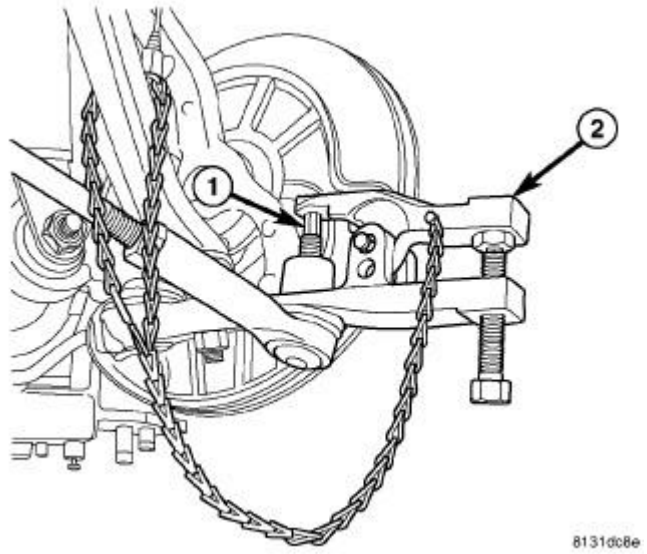


Fig. 87: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

8. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint), separate tie rod stud (1) from knuckle.

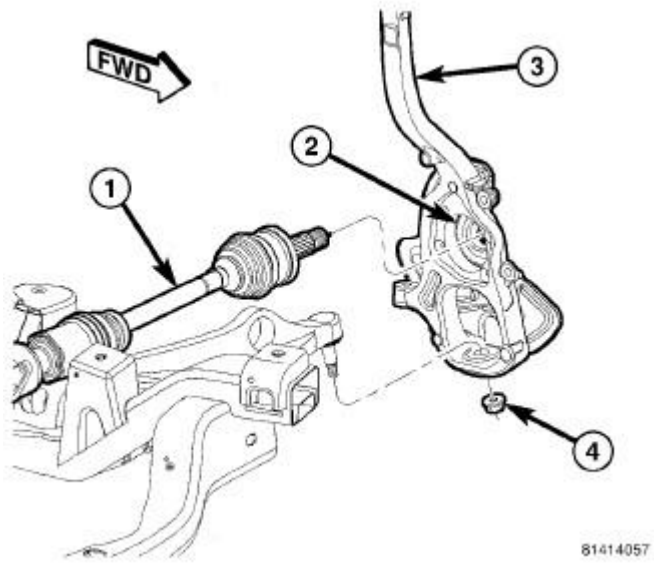


Fig. 88: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

9. Loosen nut (4) attaching lower control arm ball joint stud to knuckle (3). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

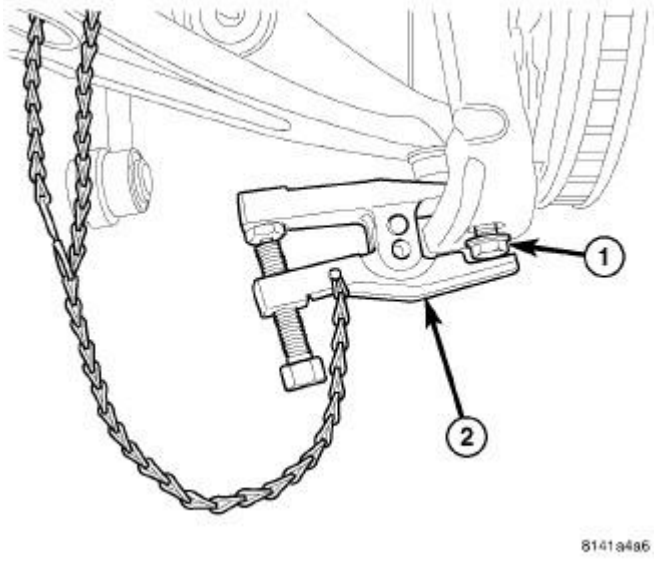


Fig. 89: Using Puller On Lower Ball Joint - AWD
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

10. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint), separate ball joint stud from knuckle.
11. Remove tool.
12. Remove nut (1) from end of ball joint stud.

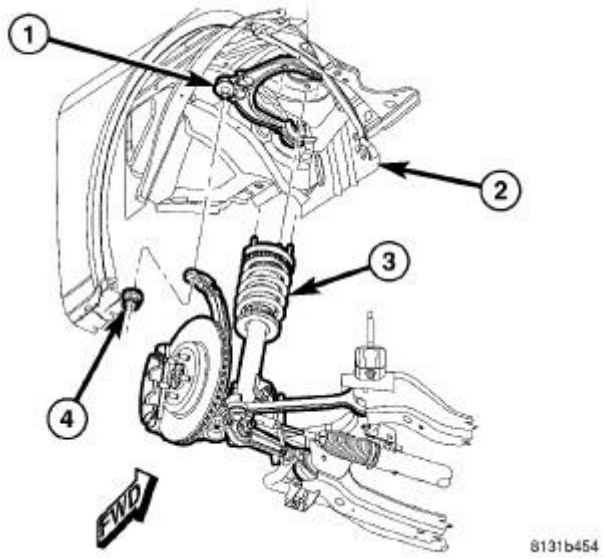


Fig. 90: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

13. Loosen nut (4) attaching upper ball joint stud (1) to knuckle. Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

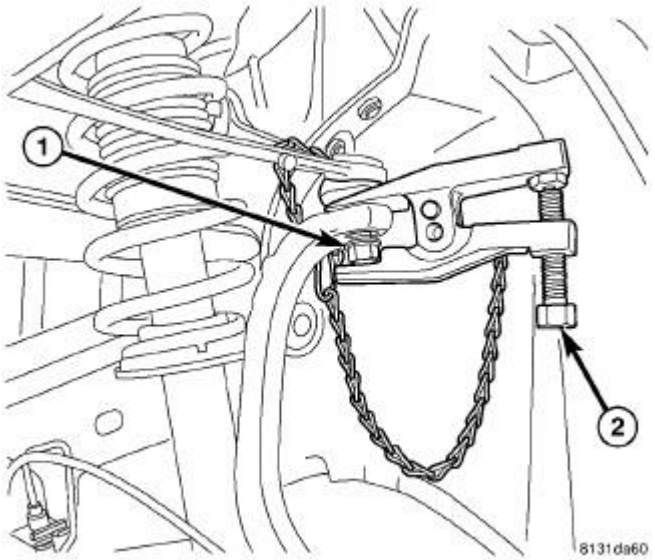


Fig. 91: Using Puller On Upper Ball Joint

Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

14. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint), separate upper ball joint stud (1) from knuckle.
15. Remove tool.
16. Remove nut (1) from end of upper ball joint stud.

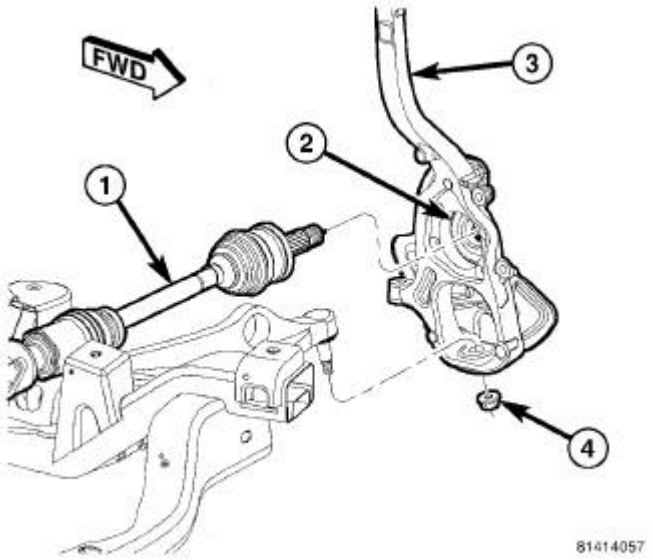


Fig. 92: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

17. Slide knuckle (3) off half shaft (1) and remove from vehicle.

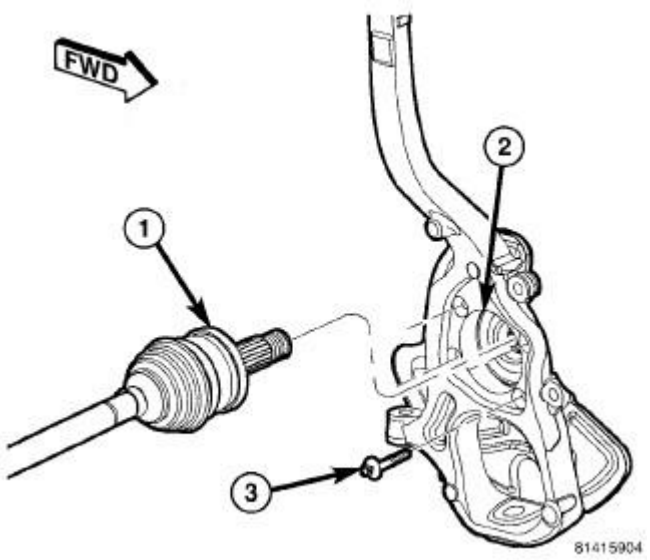


Fig. 93: Locating Halfshaft AT Hub/Bearing Assembly
Courtesy of CHRYSLER GROUP, LLC

18. If hub and bearing and dust shield need to be removed:
    1. Remove four bolts (3) fastening hub and bearing (2) to knuckle.
    2. Slide hub and bearing out of knuckle along with shield.

INSTALLATION

INSTALLATION

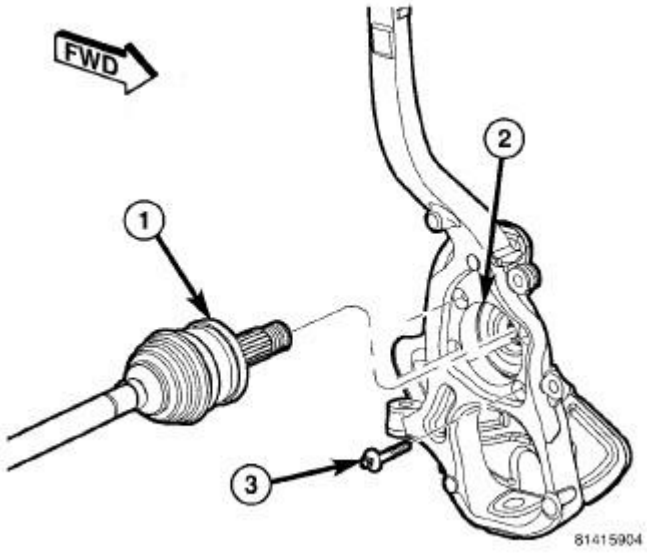


Fig. 94: Locating Halfshaft AT Hub/Bearing Assembly
Courtesy of CHRYSLER GROUP, LLC

1. If hub and bearing and dust shield needs to be installed on knuckle, perform following:
    1. Slide shield onto rear of hub and bearing.
    2. Slide hub and bearing into knuckle, lining up mounting holes in hub and bearing with those in shield and knuckle
    3. Install four bolts (3) fastening hub and bearing in place. Tighten mounting bolts to 68 N.m (50 ft. lbs.).

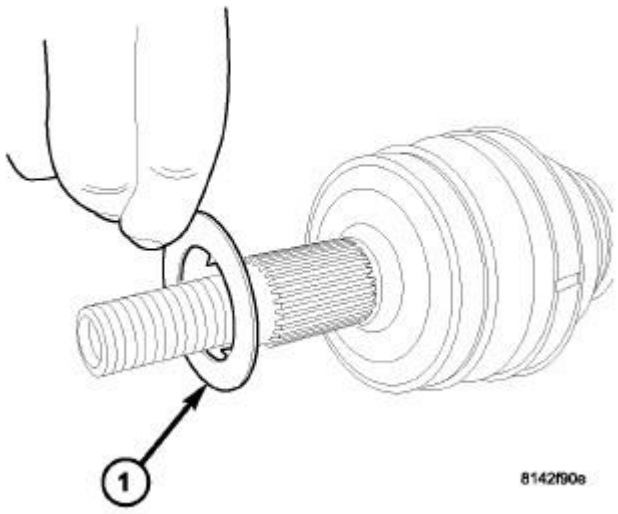


Fig. 95: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before installing hub and bearing on end of axle half shaft, ensure isolation washer is present on end of half shaft. Inspect washer making sure it is not worn or damaged. Washer can be installed in either direction on shaft.

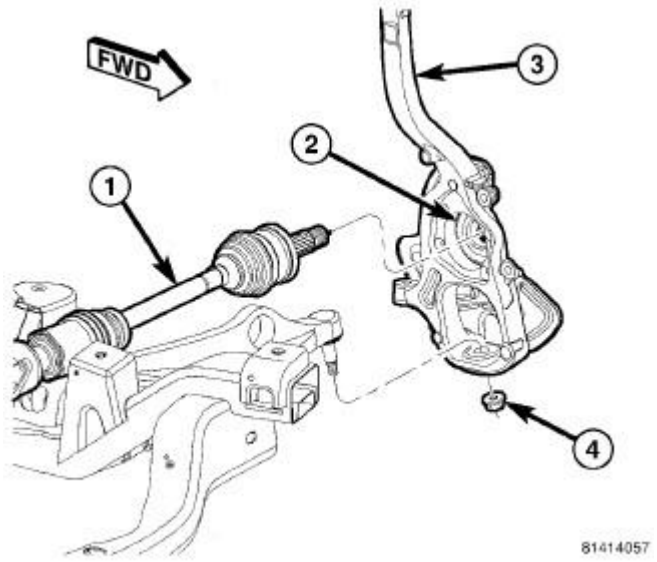


Fig. 96: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

2. Place knuckle (3) over lower ball joint stud and guide hub and bearing (2) onto axle half shaft (1).
3. Start NEW nut (4) on lower ball joint stud. **Do not tighten at this time.**

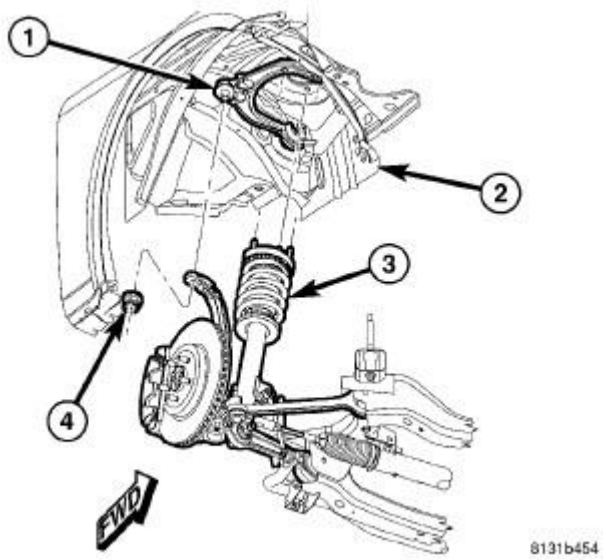


Fig. 97: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

4. Place upper ball joint stud (1) through hole in top of knuckle and install nut (4). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 47 N.m + 90° turn (35 ft. lbs. + 90° turn).

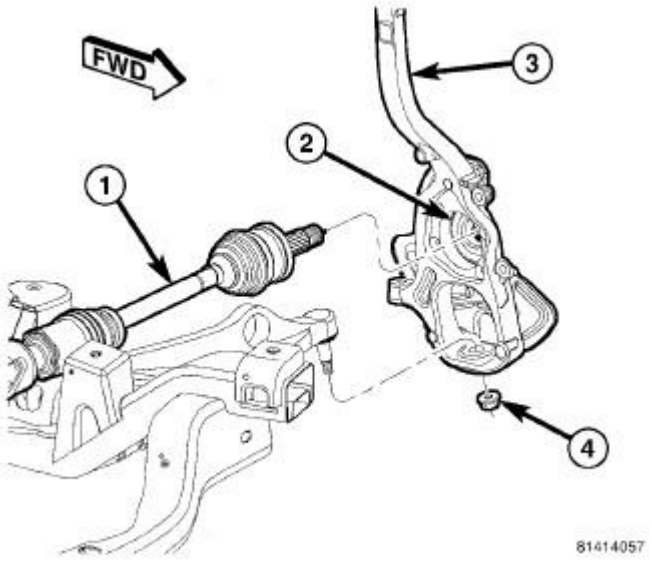


Fig. 98: Ball Joint & Axle Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

5. Tighten lower ball joint nut (4) by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 68 N.m + 90° turn (50 ft. lbs. + 90° turn).

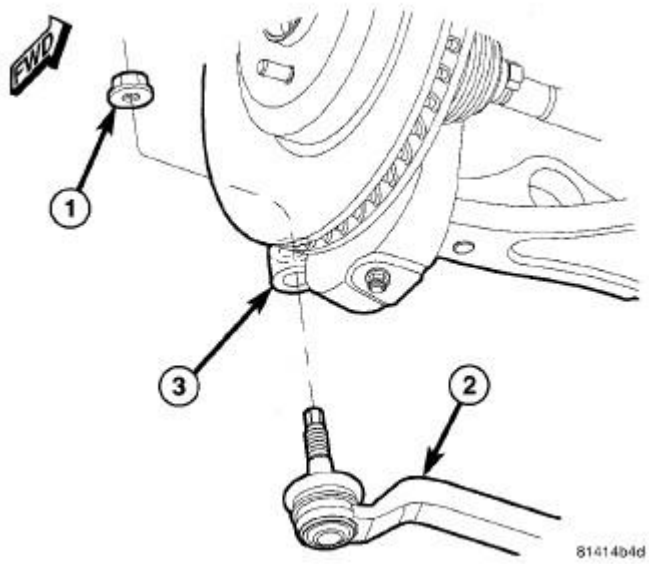


Fig. 99: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

6. Place outer tie rod stud through hole in knuckle (3) and install nut (1). Tighten nut by holding stud with a wrench while turning nut with another wrench. Tighten nut using crow foot wrench on torque wrench to 35 N.m + 90° turn (26 ft. lbs. + 90° turn).
7. Install brake rotor, then disc brake caliper and adapter assembly. Refer to **ROTOR, BRAKE, INSTALLATION** .

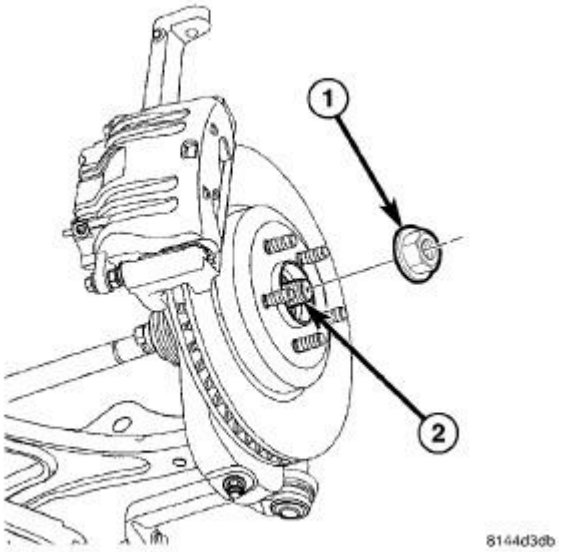


Fig. 100: Locating Axle Shaft Hub Nut

Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

8. Install hub nut (1) on end of axle half shaft (2). While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.).

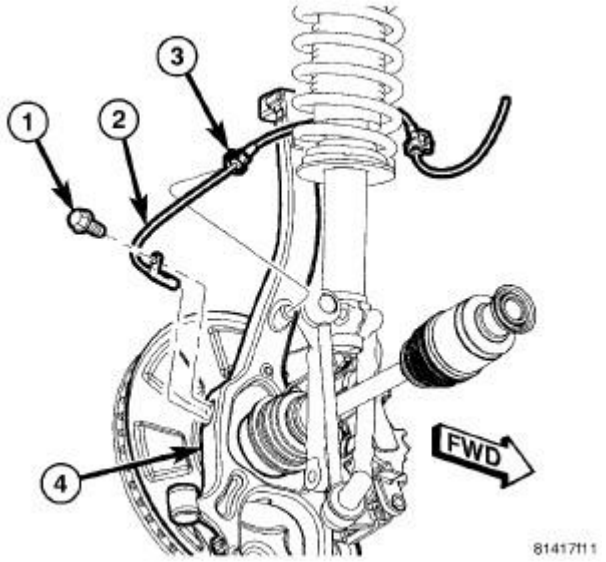


Fig. 101: Wheel Speed Sensor AT Front Knuckle - AWD
Courtesy of CHRYSLER GROUP, LLC

9. Install wheel speed sensor (2) head into knuckle (4) and install mounting screw (1). Tighten screw to 11 N.m (95 in. lbs.).
10. Attach wheel speed sensor cable routing clip (3) at knuckle (4).

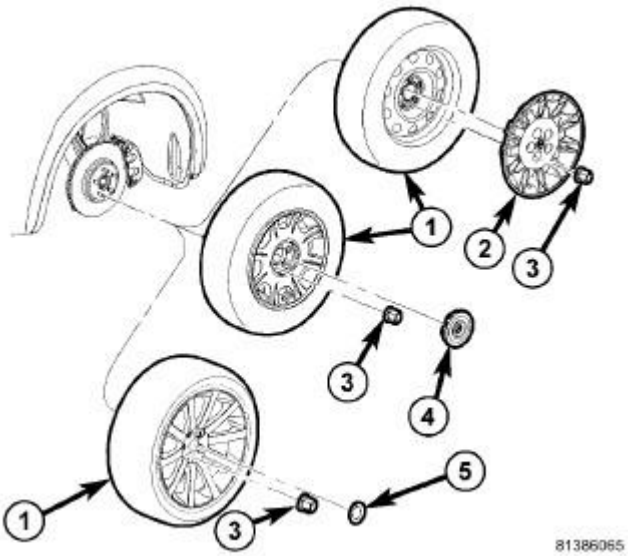


Fig. 102: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

11. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
12. Lower vehicle.

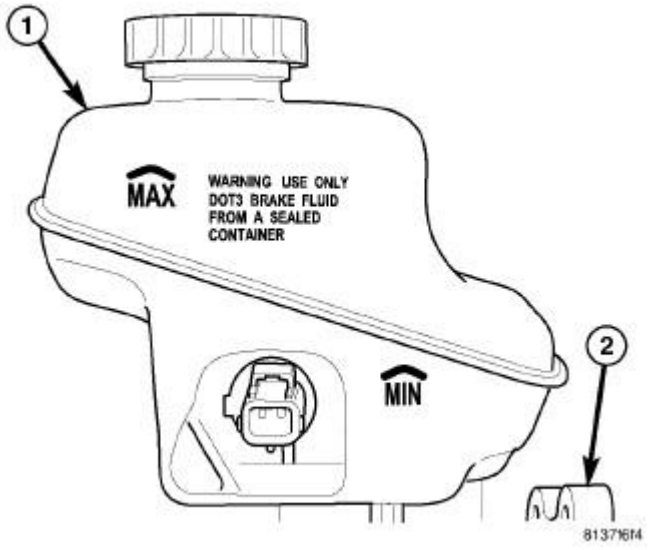


Fig. 103: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

13. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
14. Check and adjust brake fluid level in reservoir (1) as necessary.
15. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

KNUCKLE, STEERING, RWD

REMOVAL

REMOVAL

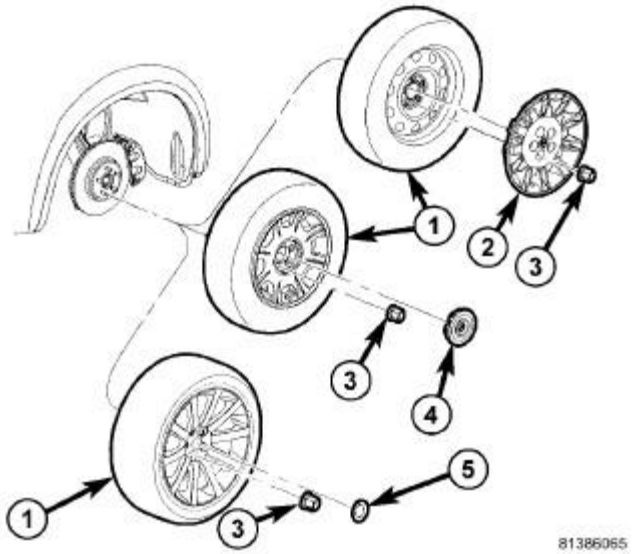


Fig. 104: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

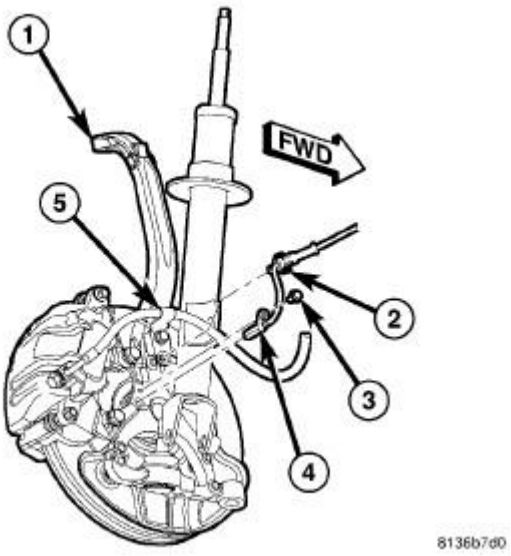


Fig. 105: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

3. Remove screw (3) fastening wheel speed sensor to knuckle (1). Pull sensor head (4) out of knuckle.
4. Remove wheel speed sensor cable routing clip (2) from brake flex hose routing bracket (5).

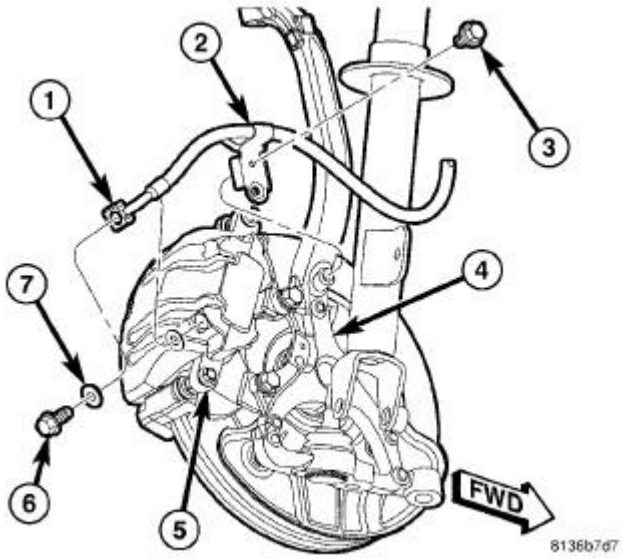


Fig. 106: Front Brake Flex Hose AT Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Remove screw (3) fastening brake flex hose routing bracket (2) to knuckle (4).
6. Access and remove front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

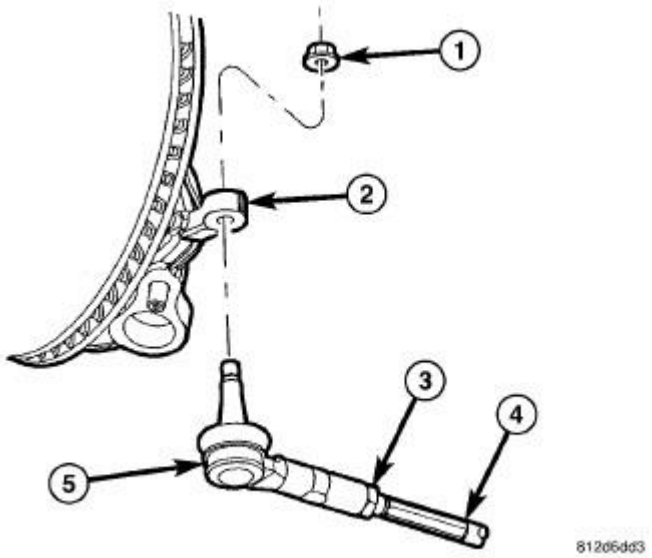


Fig. 107: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

7. Remove nut (1) from outer tie rod end stud.

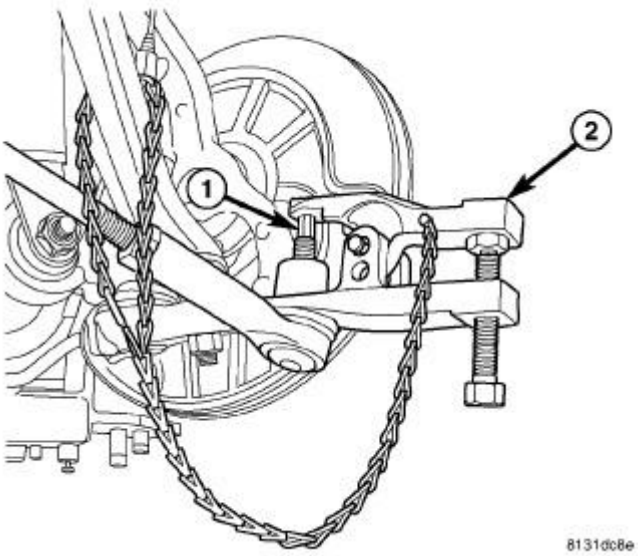


Fig. 108: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

8. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint), separate tie rod stud (1) from knuckle.

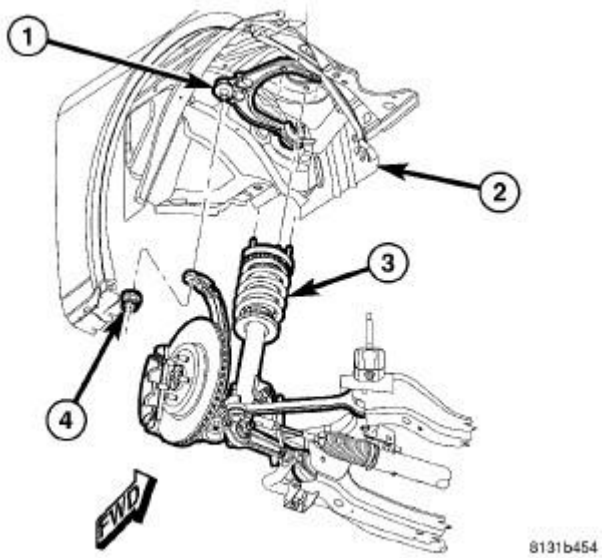


Fig. 109: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Loosen nut (4) attaching upper ball joint stud (1) to knuckle. Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting**

while using Puller in next step.

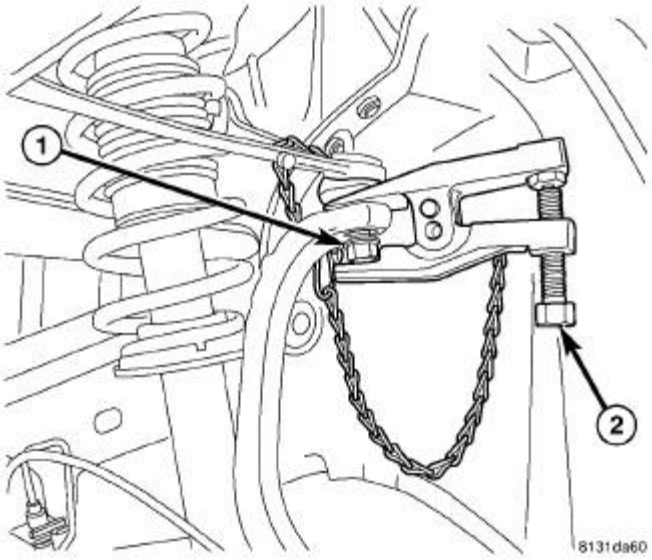


Fig. 110: Using Puller On Upper Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

10. Using Puller (2), Special Tool (special tool #9360, Remover, Ball Joint), separate upper ball joint stud (1) from knuckle.

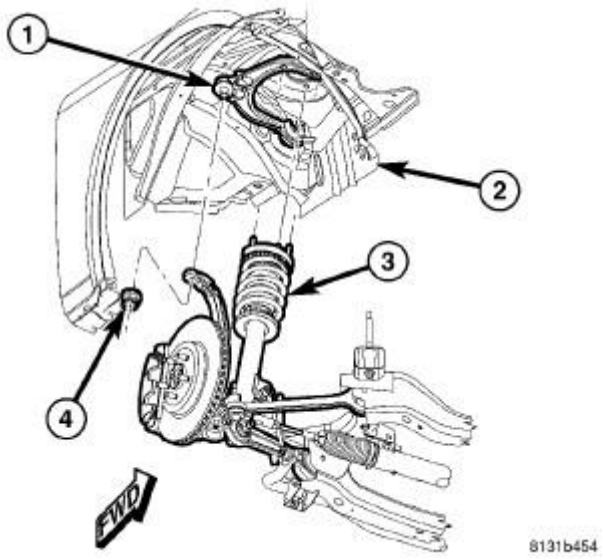


Fig. 111: View Of Upper Ball Joint, Spindle & Strut Mounting

Courtesy of CHRYSLER GROUP, LLC

11. Remove nut (4) from end of upper ball joint stud (1).

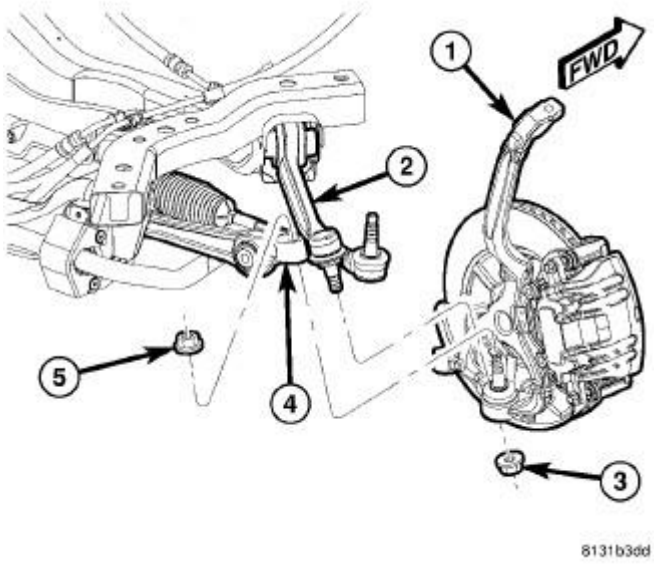


Fig. 112: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

12. Loosen nut (3) attaching tension strut (2) ball joint stud to knuckle. Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

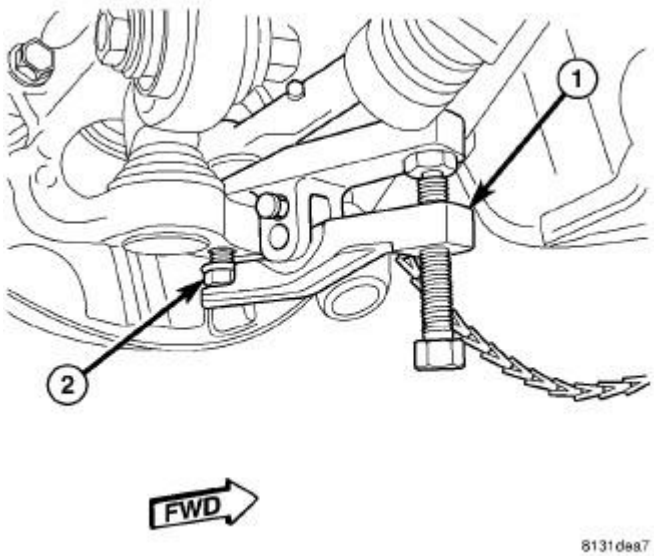


Fig. 113: Using Puller On Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

13. Using Puller (1), Special Tool (special tool #9360, Remover, Ball Joint), separate tension strut ball joint stud (2) from knuckle.

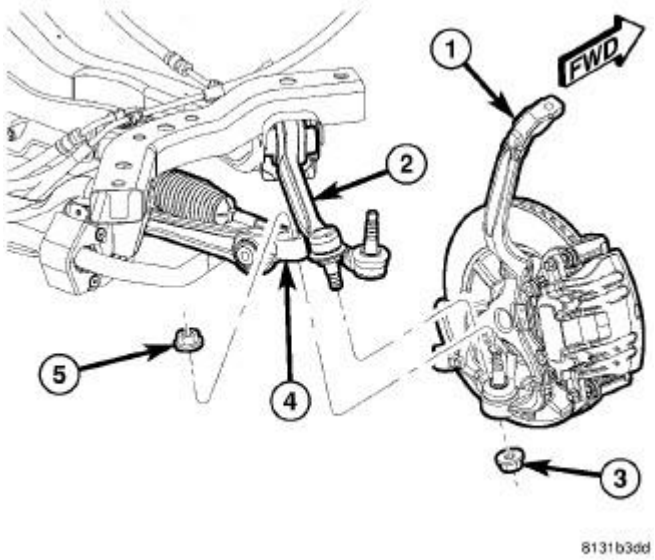


Fig. 114: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

14. Remove nut (3) from end of tension strut (2) ball joint stud.
15. Loosen nut (5) attaching ball joint stud to lower control arm (4). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

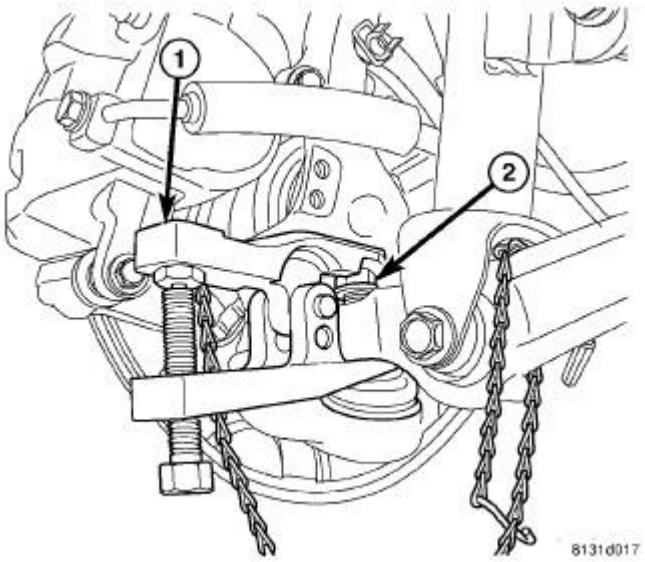


Fig. 115: Using Puller On LCA Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding Puller, Special Tool (special tool #9360, Remover, Ball Joint), into place past seal boot.

16. Using Puller (1), Special Tool (special tool #9360, Remover, Ball Joint), separate ball joint stud (2) from lower control arm.

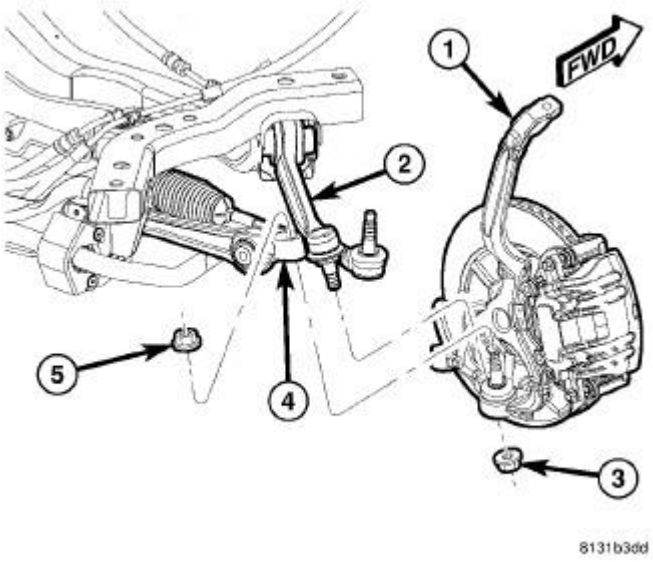


Fig. 116: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

17. Remove nut (5) from end of ball joint stud attaching lower control arm to knuckle.
18. Remove knuckle from vehicle.

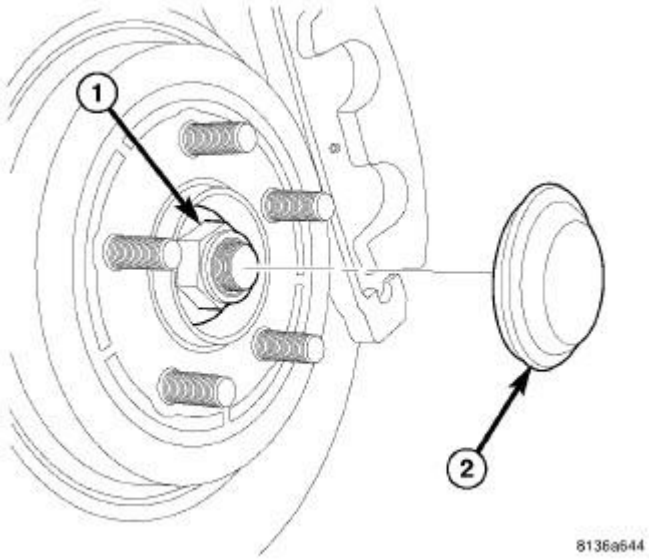


Fig. 117: Dust Cap & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

19. If hub and bearing needs to be removed, perform the following:
    1. Remove dust cap (2). When doing this, avoid damaging internal bore of hub to preserve seal integrity.
    2. Remove hub nut (1).
    3. Slide hub and bearing off knuckle spindle.
20. If shield needs to be removed from knuckle, remove 3 mounting screws, then shield.
21. If lower control arm ball joint needs to be removed from knuckle. Refer to **KNUCKLE, STEERING, RWD, DISASSEMBLY**.

DISASSEMBLY

DISASSEMBLY

NOTE: To perform this procedure, it works best to mount Ball Joint Press (special tool #C-4212F, Press, Ball Joint) in a vise.

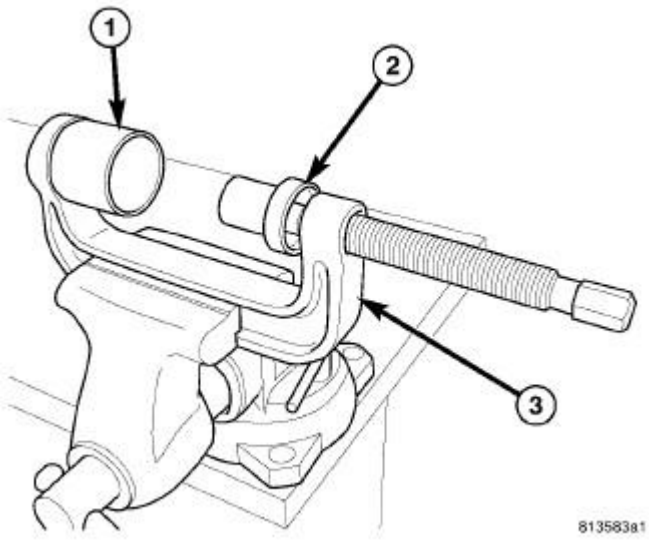


Fig. 118: Tools Assembled For Ball Joint Removal
Courtesy of CHRYSLER GROUP, LLC

1. Place Ball Joint Remover/Installer (special tool #9320, Remover/Installer, Ball Joint) (1) into cup area of Ball Joint Press (special tool #C-4212F, Press, Ball Joint) (3) as shown in illustration and tighten set screw.
2. Place Ball Joint Remover/Installer (special tool #9320-3, Remover, Ball Joint) (2) onto end of screw-drive of Ball Joint Press (special tool #C-4212F, Press, Ball Joint) (3) as shown in illustration.

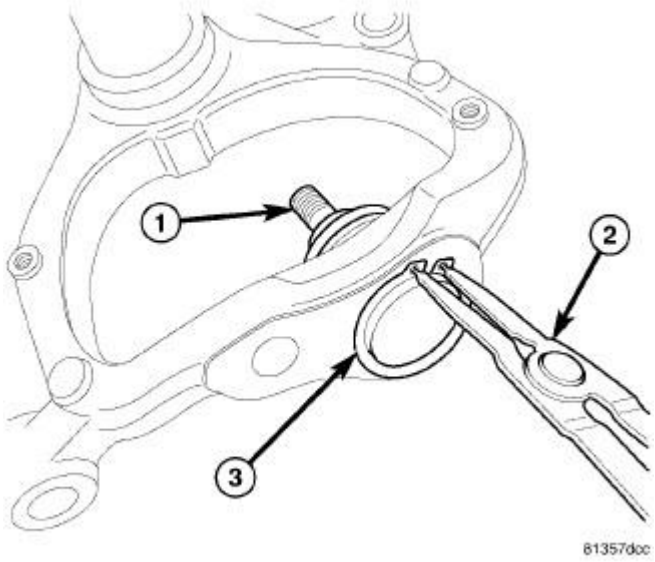


Fig. 119: Ball Joint Snap Ring
Courtesy of CHRYSLER GROUP, LLC

3. Using a pair of snap-ring pliers (2), remove snap-ring (3) from bottom of ball joint (1).

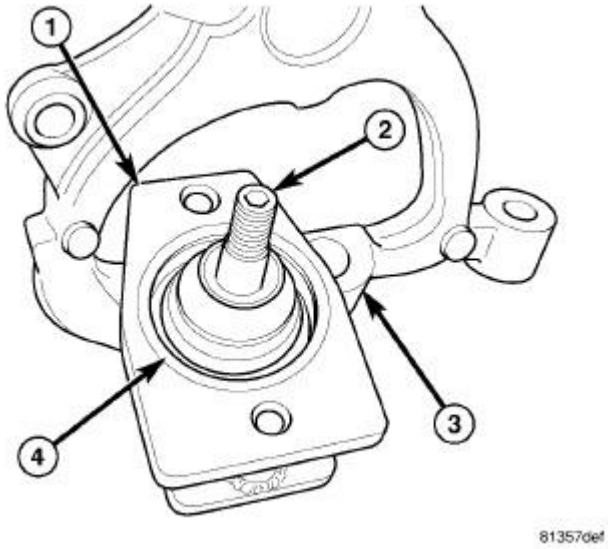


Fig. 120: Support Clamp Positioned Over Ball Joint
Courtesy of CHRYSLER GROUP, LLC

4. Install halves of Support Clamp (1), Ball Joint Remover/Installer (special tool #9320-1, Plate, Ball Joint Remover) (2) over ball joint (2) and around knuckle surface (3) as shown in illustration. Install and snug Support Clamp (1) screws from underside.

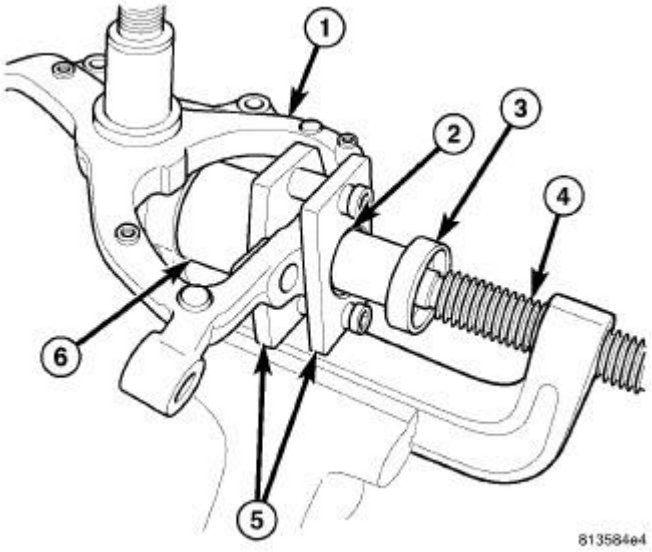


Fig. 121: Tools Positioned For Ball Joint Removal
Courtesy of CHRYSLER GROUP, LLC

5. Position knuckle (1) over tools guiding top of ball joint inside of Receiver (6), then hand tighten Press screw-drive (4) until Remover (3) comes into contact with bottom of ball joint (2).

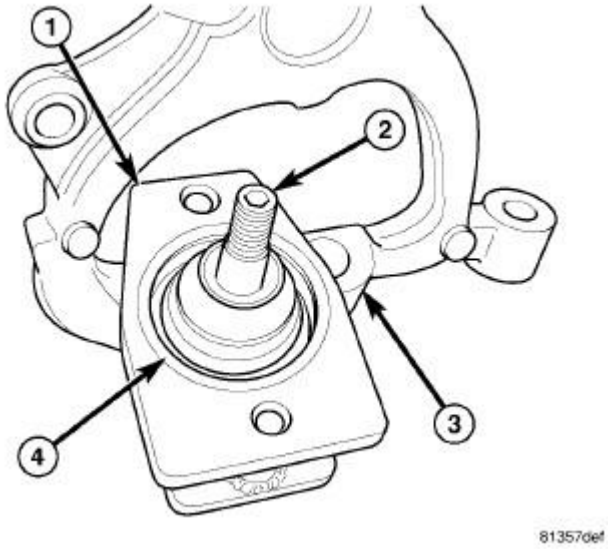


Fig. 122: Support Clamp Positioned Over Ball Joint
Courtesy of CHRYSLER GROUP, LLC

NOTE: When positioning knuckle over tools, make sure Receiver, Ball Joint Remover/Installer (special tool #9320-5, Receiver Cup), sets into recessed area (4) of Support Clamp, Ball Joint Remover/Installer (special tool #9320-1, Plate, Ball Joint Remover).

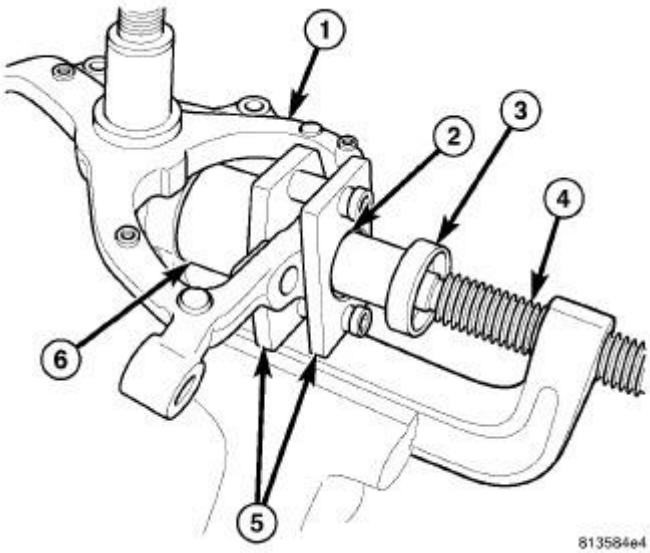


Fig. 123: Tools Positioned For Ball Joint Removal
Courtesy of CHRYSLER GROUP, LLC

6. Tighten Press screw-drive (4) forcing ball joint out of knuckle (1) and into Receiver (6).
7. Loosen screw-drive (4) and remove knuckle (1) from Press. Remove ball joint from Receiver (6).

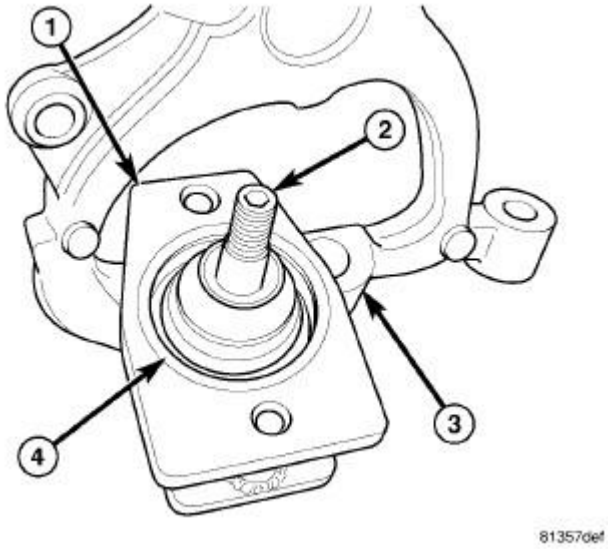


Fig. 124: Support Clamp Positioned Over Ball Joint
Courtesy of CHRYSLER GROUP, LLC

8. Remove Support Clamp (1) from knuckle (3).

ASSEMBLY

ASSEMBLY

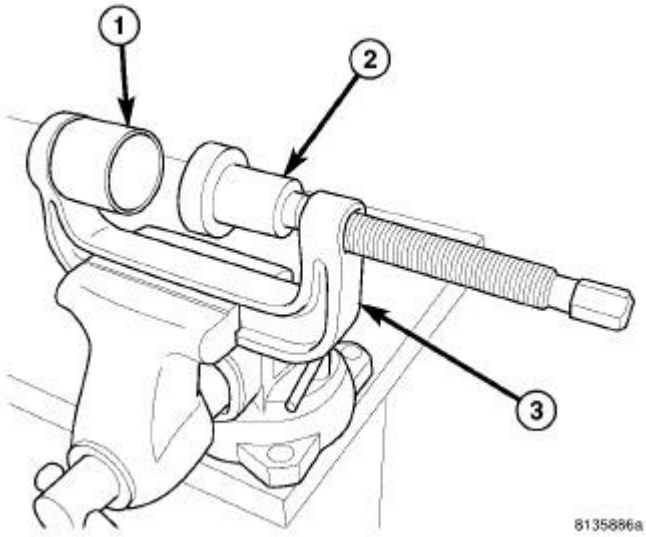


Fig. 125: Tools Assembled For Ball Joint Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: To perform this procedure it works best to mount Press (3), Special Tool (special tool #C-4212F, Press, Ball Joint), in a vise and hold the component in

your hands.

1. Place Installer (1), Special Tool (special tool #9320-4, Installer Cup), into cup area of Press (3), Special Tool (special tool #C-4212F, Press, Ball Joint), as shown in illustration and tighten set screw.
2. Place Remover (2), Special Tool (special tool #9320-3, Remover, Ball Joint), onto end of screw-drive of Press (3), Special Tool (special tool #C-4212F, Press, Ball Joint), as shown in illustration.

   Note: This is the reverse of how Remover is installed on screw-drive for removal.

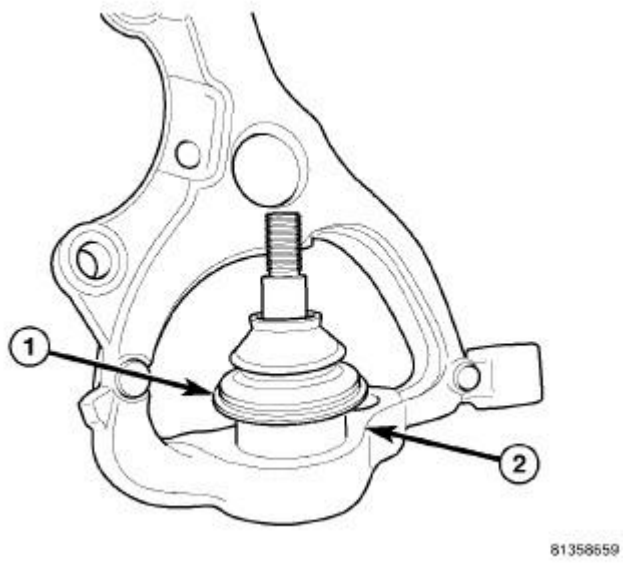


Fig. 126: Start Ball Joint In Knuckle
Courtesy of CHRYSLER GROUP, LLC

3. Start NEW ball joint (1) into bore of knuckle (2).

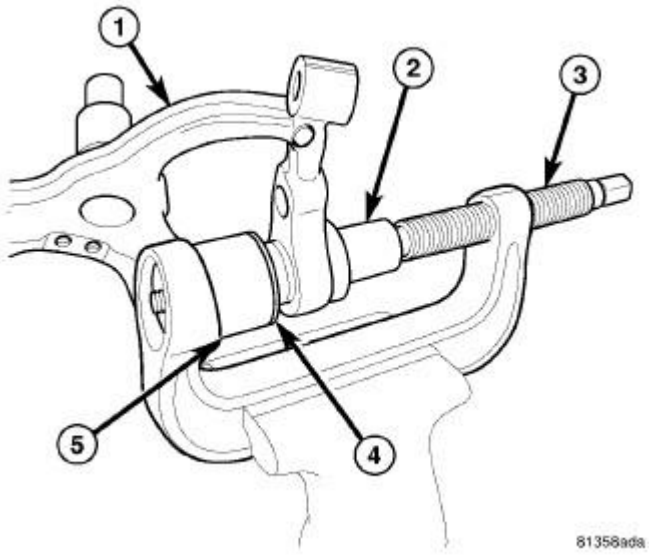


Fig. 127: Tools Positioned For Ball Joint Installation
Courtesy of CHRYSLER GROUP, LLC

4. Position knuckle (1) over tools guiding top of ball joint inside of Installer (5) until outside flange of ball joint (4) comes into contact with Installer, then hand tighten Press screw-drive (3) until Remover (2) comes into contact with bottom of knuckle (1).
5. Using hand tools, tighten screw-drive (3), pressing ball joint into knuckle until flange (4) comes to a stop against the knuckle.
6. Loosen screw-drive and remove knuckle from Press.

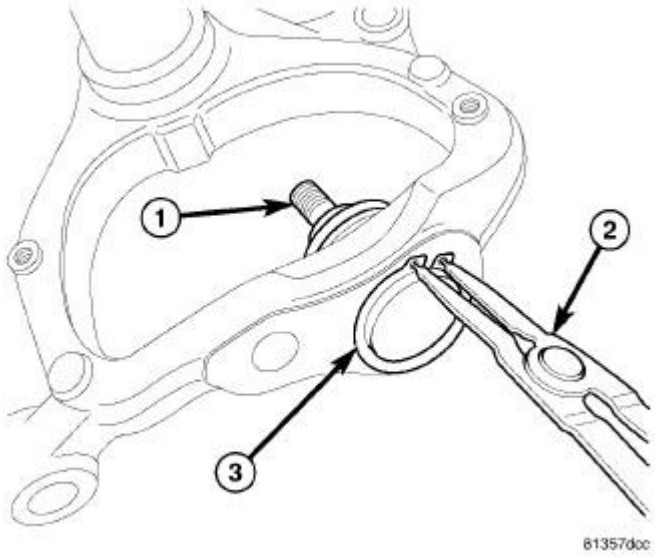


Fig. 128: Ball Joint Snap Ring
Courtesy of CHRYSLER GROUP, LLC

7. Install snap-ring (3) into groove on bottom of ball joint.
8. Inspect ball joint for proper fit. Make sure seal boot is uniform and wire rings are in place.
9. Install knuckle on vehicle. Refer to **KNUCKLE, STEERING, AWD, INSTALLATION** or **KNUCKLE, STEERING, RWD, INSTALLATION**.

INSTALLATION

INSTALLATION

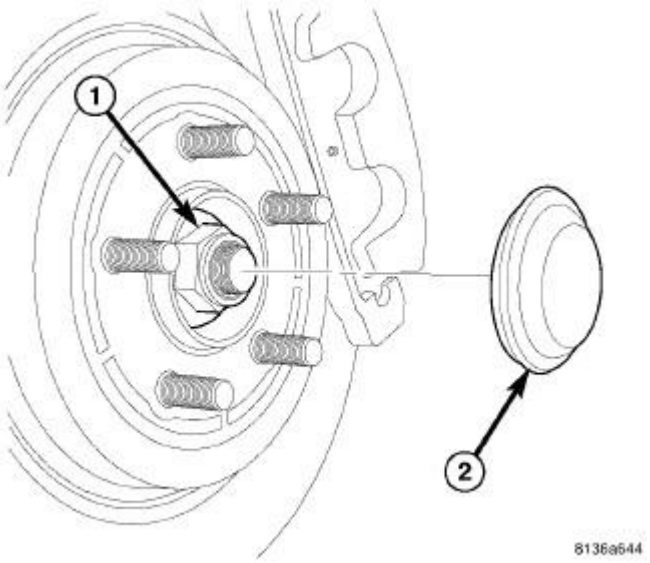


Fig. 129: Dust Cap & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

1. If shield needs to be installed on knuckle, place shield in place and attach to knuckle using 3 screws. Tighten screws to 10 N.m (89 in. lbs.).
2. If hub and bearing needs to be installed on knuckle, perform the following:
    1. Slide hub and bearing onto knuckle spindle.
    2. Install hub nut (1) on end of spindle. Tighten hub nut to 213 N.m (152 ft. lbs.).
    3. Install NEW dust cap (2).

NOTE: Install a new dust cap to preserve seal integrity.

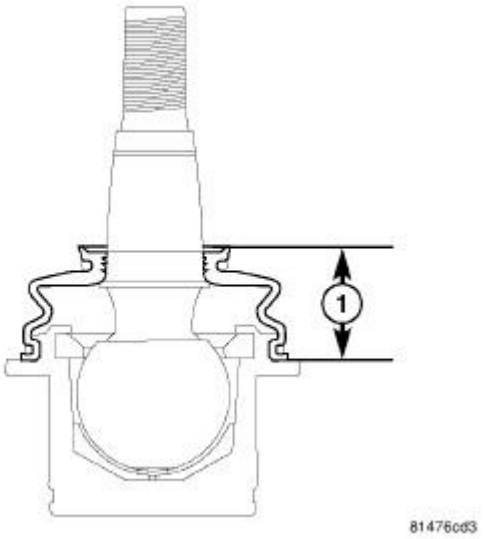


Fig. 130: Ball Joint Seal Boot Height
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before installing knuckle on lower control arm, measure height of ball joint seal boot (1) mounted on knuckle. If seal boot height is above 25.5 mm, any air inside seal boot must be expelled. To do so, follow these steps.

a. **Tip ball joint stud completely to one side.**
b. **Using thumb and index finger, gently squeeze seal boot together at center expelling any air. Do not allow grease to be release.**
c. **Push down very top of seal boot.**
d. **Return ball joint stud to original "centered" position.**
e. **Measure ball joint seal boot height (1) making sure it is within specification.**
f. **Wipe any grease from ball joint stud.**

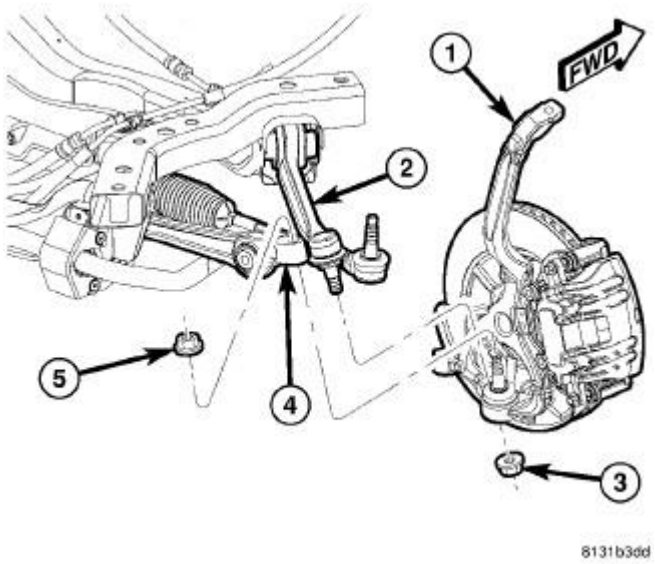


Fig. 131: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

3. Place knuckle (1) over lower ball joint studs on vehicle and loosely install NEW nuts by hand.

CAUTION: It is important to tighten nuts as described in following steps to avoid damaging ball stud joints.

4. Completely install NEW nut (5) on ball joint stud attaching lower control arm (4) to knuckle (1). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 68 N.m + 90° turn (50 ft. lbs. + 90° turn).
5. Completely install NEW nut (3) on ball joint stud attaching tension strut (2) to knuckle (1). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 68 N.m + 90° turn (50 ft. lbs. + 90° turn).

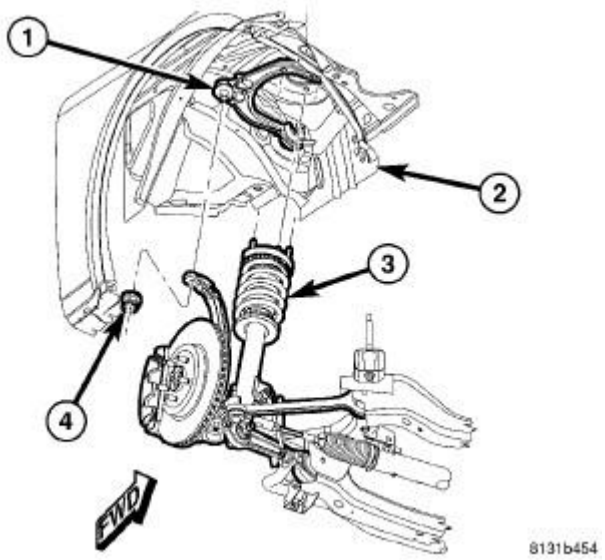


Fig. 132: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

6. Place upper ball joint stud (1) through hole in top of knuckle and install nut (4). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 47 N.m + 90° turn (35 ft. lbs. + 90° turn).

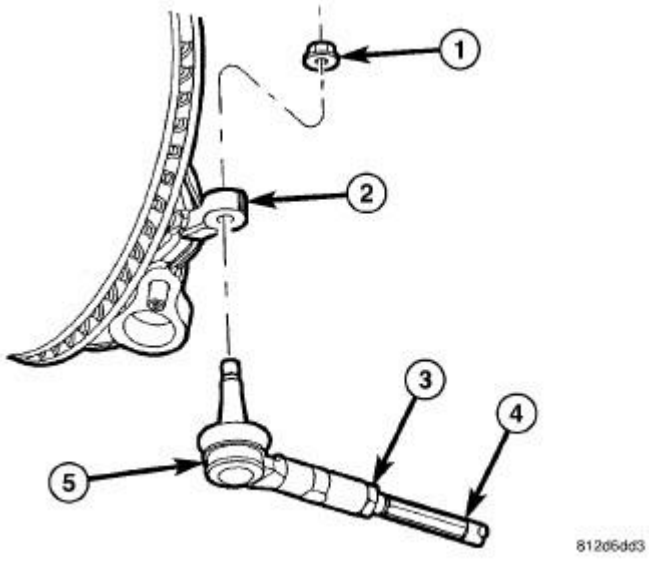


Fig. 133: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

7. Place outer tie rod stud through hole in knuckle (2) and install nut (1). Tighten nut by holding stud with a wrench while turning nut with another wrench. Tighten nut using crow foot wrench on torque wrench to 35 N.m + 90° turn (26 ft. lbs. + 90° turn).
8. Install brake rotor, then disc brake caliper and adapter assembly. Refer to **ROTOR, BRAKE, INSTALLATION** .

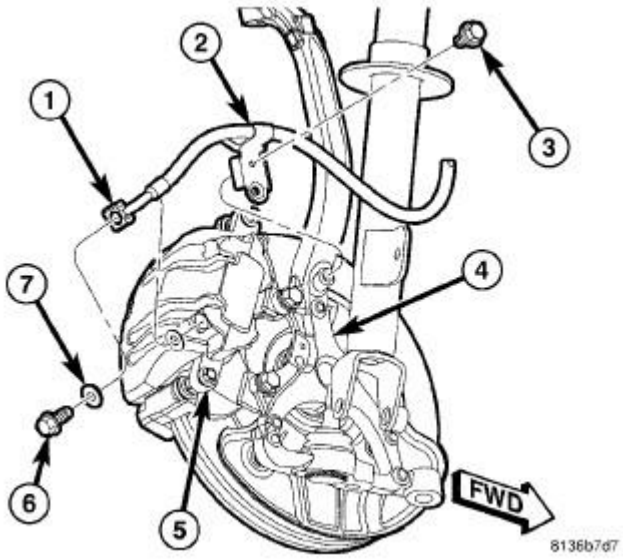


Fig. 134: Front Brake Flex Hose AT Caliper
Courtesy of CHRYSLER GROUP, LLC

9. Install screw (3) fastening brake flex hose routing bracket (2) to knuckle (4). Tighten screw to 12 N.m (106 in. lbs.).

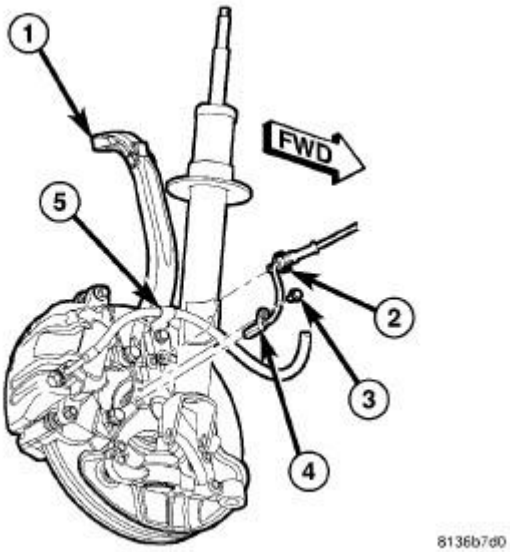


Fig. 135: Wheel Speed Sensor AT Front Knuckle
Courtesy of CHRYSLER GROUP, LLC

10. Install wheel speed sensor head (4) into knuckle and install mounting screw (3). Tighten screw to 11 N.m (95 in. lbs.).
11. Attach wheel speed sensor cable and routing clip (2) to brake flex hose routing bracket (5).

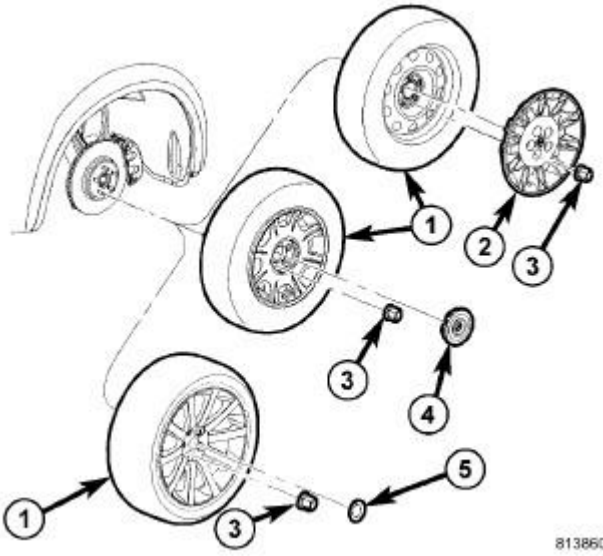


Fig. 136: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

12. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
13. Lower vehicle.

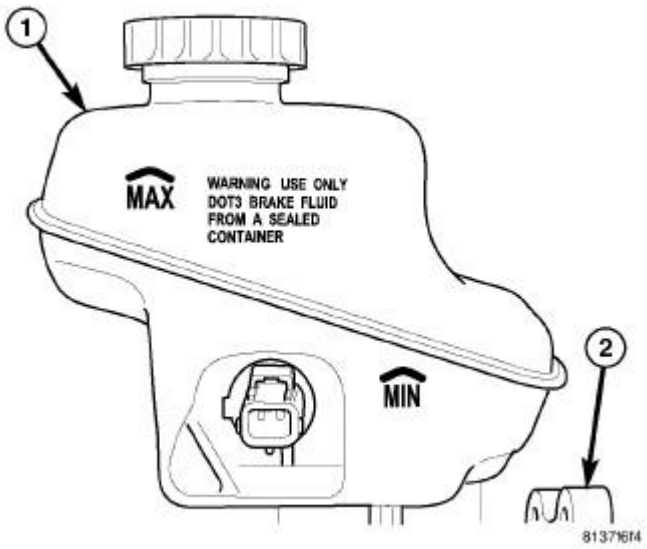


Fig. 137: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

14. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
15. Check and adjust brake fluid level in reservoir (1) as necessary.
16. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

SENSOR, ACTIVE DAMPING

DESCRIPTION

DESCRIPTION

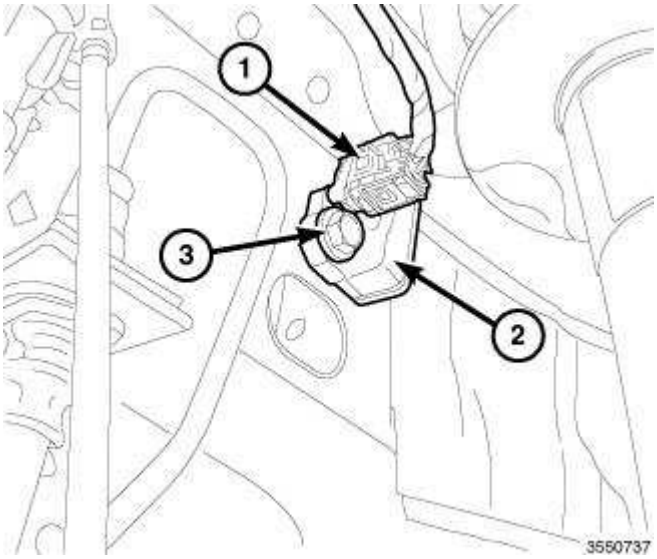


Fig. 138: Damping Sensors

Courtesy of CHRYSLER GROUP, LLC

NOTE: Right front sensor shown in illustration.

There are three active damping sensors (2). The front sensors are located in each front wheel well next to the brake line junction. The rear sensor is mounted in the right rear wheel well on the shock tower. The sensors are 3 wire, 5V reference sensors wired directly to the Active Damping Control Module (ADCM).

OPERATION

OPERATION

The Active Damping Control Module (ADCM) uses the CAN bus to communicate with multiple modules. The ADCM has the following inputs: Vehicle Speed, Steering Angle Sensor (SAS) position, Throttle Position Sensor (TPS), Active Damping System (ADS) Switch, and three active damping sensors.

There are two operating modes of the ADS, Auto and Sport. At each ignition key on cycle, the vehicle defaults to Auto mode. When Sport mode is selected, the suspension has unique handling characteristics.

The Active Damping Control Module (ADCM) controls the suspension and ride for the SRT version of this vehicle by adjusting the rebound and jounce of the shock assemblies using the above information and predetermined settings for maximum vehicle control. The shock absorbers are unique to the ADS. Each shock absorber has a valving unit that is external, but still part of the shock absorber. Inside each valving unit are two solenoids that control the damping valves to alter the ride of the vehicle. The shocks are replaced as an assembly, they cannot be disassembled for repair.

Additionally, there are three active damping sensors, two in the front of the vehicle and one in the rear. These sensors measure the plane of the vehicle.

REMOVAL

FRONT

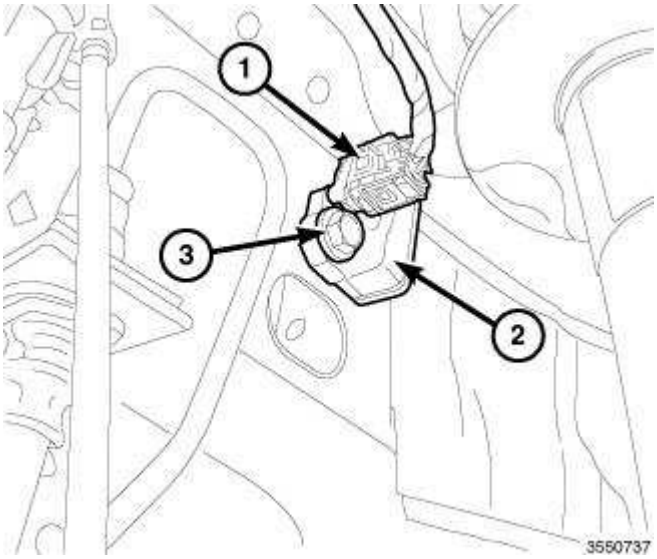


Fig. 139: Damping Sensors
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

1. Raise and support the vehicle.
2. Release the terminal locking tab and disconnect the wiring harness connector (1).
3. Remove the sensor retaining bolt (3) and remove the sensor (2) from the vehicle.

REAR

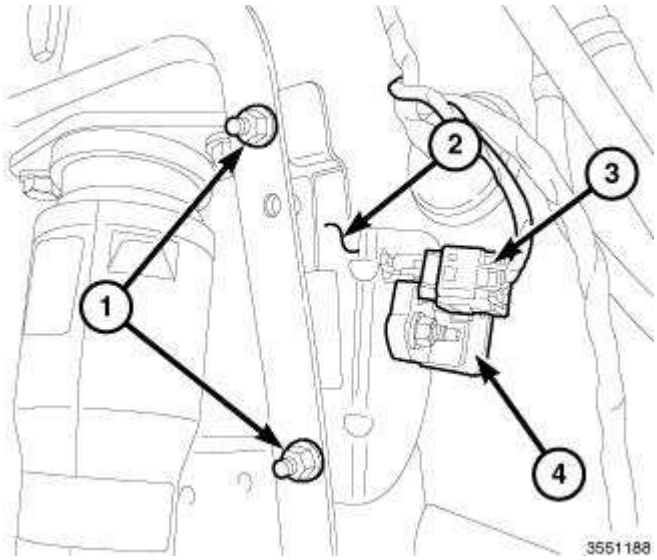


Fig. 140: Wiring Harness Connector, Two Mounting Nuts & ADS Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.

2. Release the terminal locking tab and disconnect the wiring harness connector (3) from the rear Active Damping Suspension (ADS) sensor (4).
3. Remove the two mounting nuts (1) securing the ADS bracket (2) to the shock tower.
4. Remove the bracket (2) from the vehicle with the ADS sensor attached.

INSTALLATION

FRONT

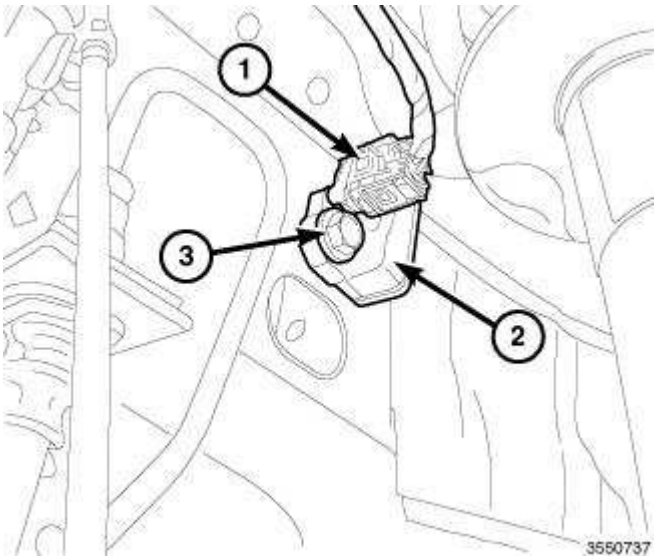


Fig. 141: Damping Sensors
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

1. Position the sensor (2), install the sensor retaining bolt (3) and tighten to 9 N.m (80 in. lbs.).
2. Connect the wiring harness connector (1) and seat the terminal locking tab.

REAR

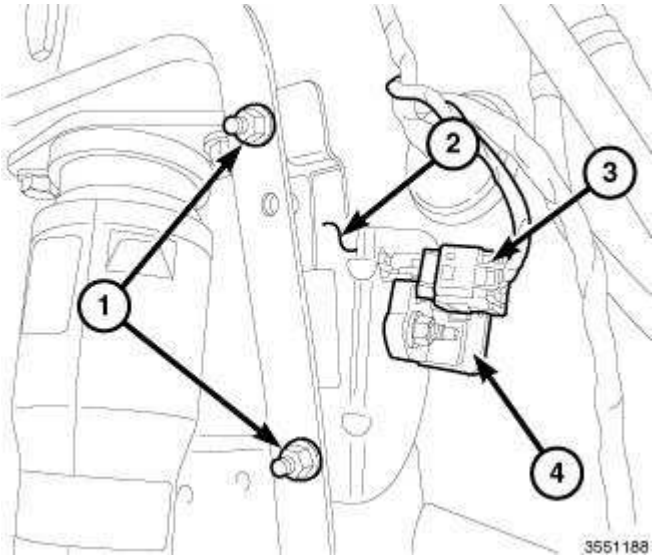


Fig. 142: Wiring Harness Connector, Two Mounting Nuts & ADS Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Install the bracket (2) and place the studs through the holes in the rear shock tower.
2. Install the mounting nuts (1) and tighten to 9 N.m (60 in. lbs.).
3. Connect the wiring harness connector (3) to the Active Damping Suspension (ADS) sensor (4) and seat the terminal locking tab.

SHOCK ABSORBER, SUSPENSION, COIL-OVER

REMOVAL

ALL-WHEEL-DRIVE

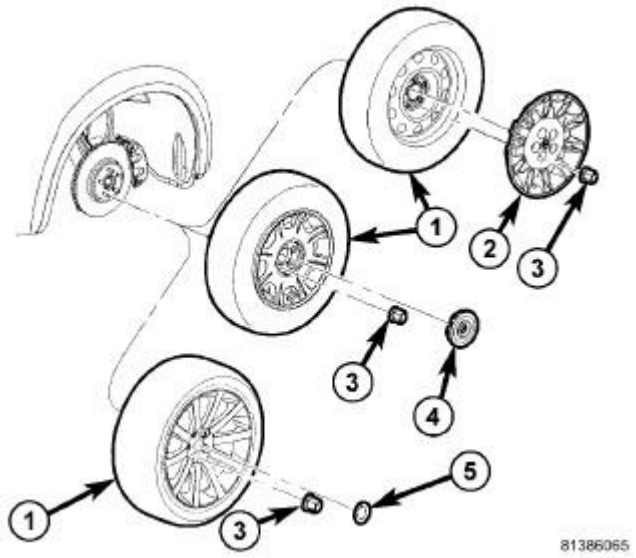


Fig. 143: Tire And Wheel Mounting

Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

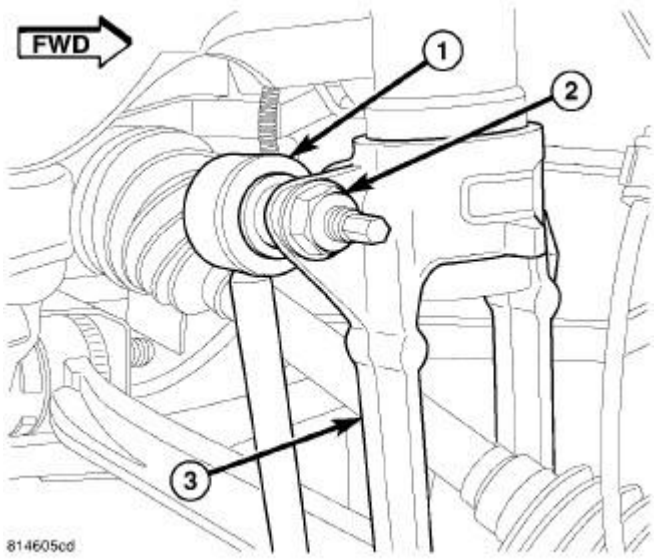


Fig. 144: Locating Stabilizer Link Attachment AT Shock Clevis
Courtesy of CHRYSLER GROUP, LLC

3. While holding link ball joint stem from rotating, remove nut (2) fastening stabilizer link (1) to shock clevis bracket (3). Slide link ball joint stem from clevis bracket.

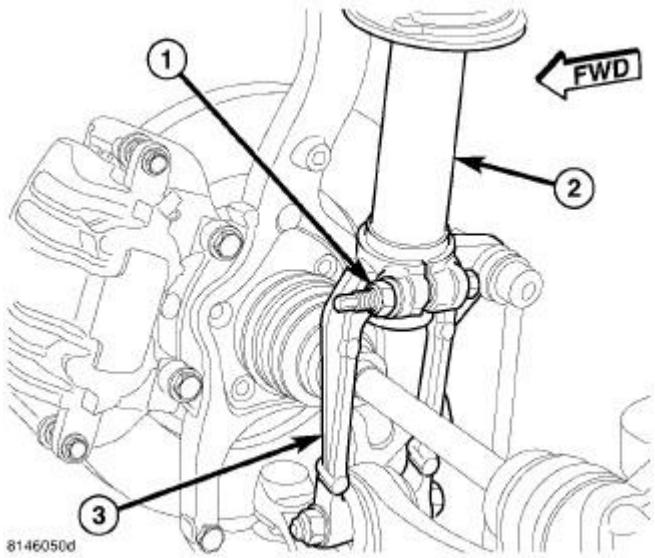


Fig. 145: Removing/Installing Shock Clevis Pinch Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove nut and pinch bolt (1) fastening clevis bracket (3) to bottom of shock assembly (2).

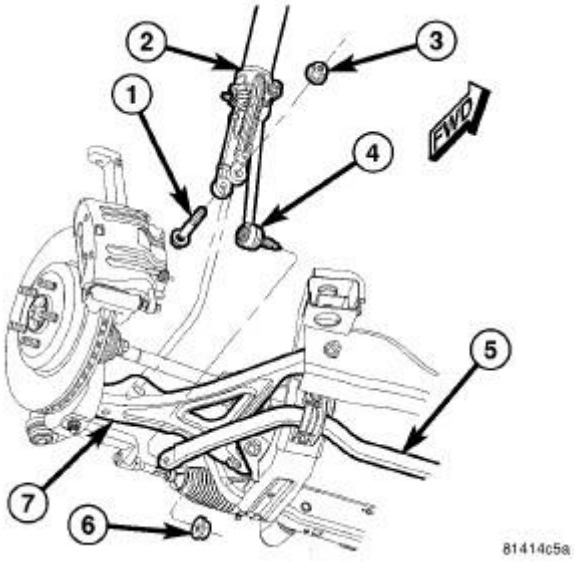


Fig. 146: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

5. Remove nut (3) and bolt (1) attaching shock clevis bracket (2) to lower control arm (7).
6. Pull lower end of clevis bracket outward away from lower control arm bushing, then slide it off shock assembly. It may be necessary to use an appropriate prying tool to spread clamp area of clevis bracket allowing removal from shock assembly.

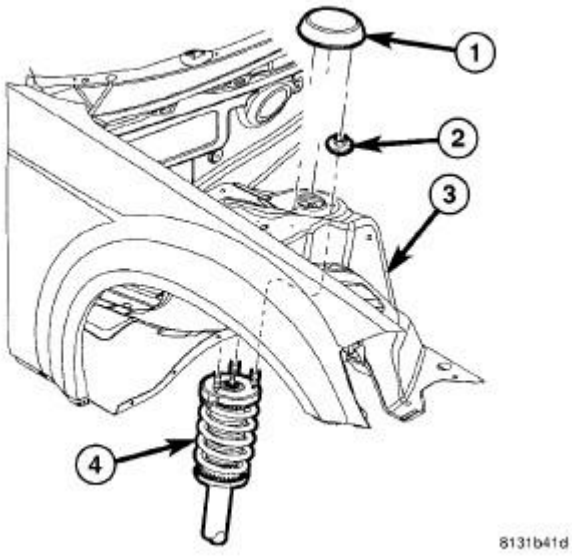


Fig. 147: Upper Shock Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Lower vehicle just enough to access upper shock assembly mounting nuts (2).
8. If equipped, remove shock tower cap (1) from top of shock assembly (4).
9. Remove three nuts (2) fastening shock assembly (4) to shock tower (3).
10. Remove shock assembly from vehicle.

REAR-WHEEL-DRIVE

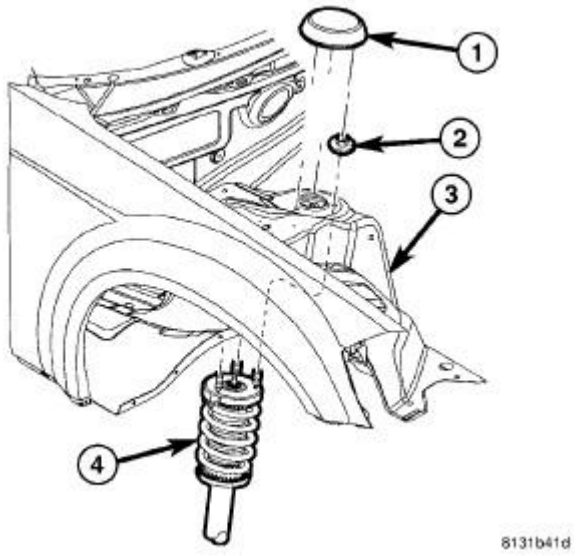


Fig. 148: Upper Shock Mounting
Courtesy of CHRYSLER GROUP, LLC

1. If equipped, remove front shock tower cap (1) from top of shock assembly (4).
2. Remove three nuts (2) fastening shock assembly (4) to shock tower (3).
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

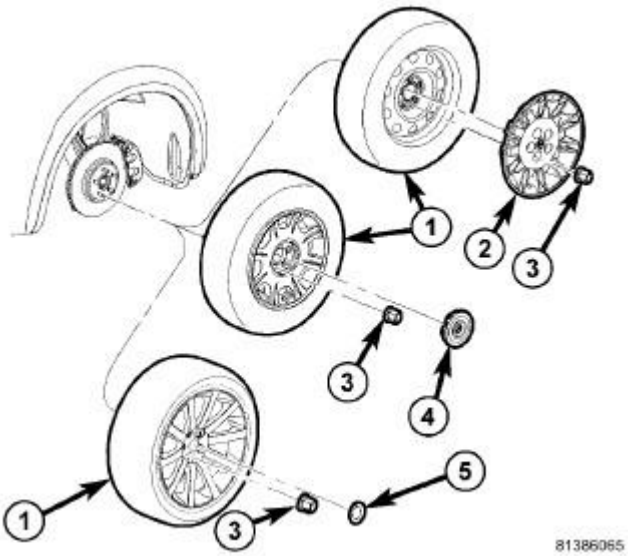


Fig. 149: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

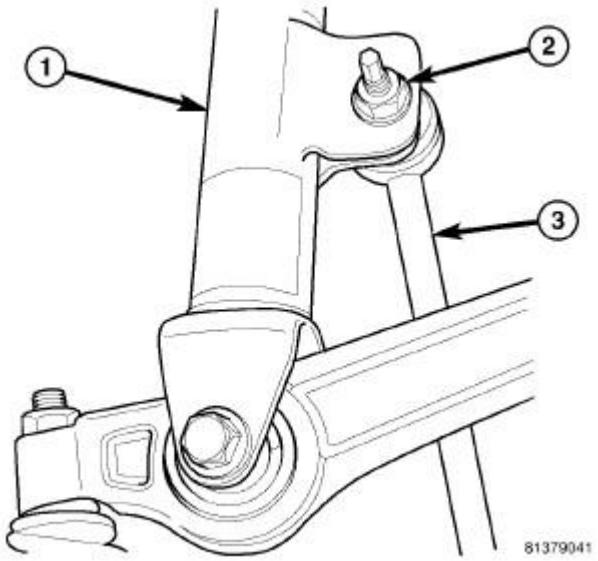


Fig. 150: Stabilizer Link AT Shock Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove nut (2) fastening stabilizer link (3) to shock assembly (1). Slide link ball joint stem from shock assembly.

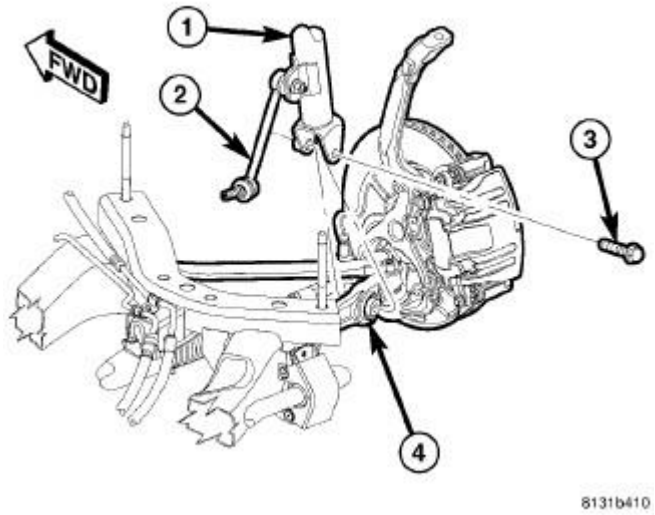


Fig. 151: Lower Shock Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove bolt (3) securing shock assembly (1) to lower control arm (4).

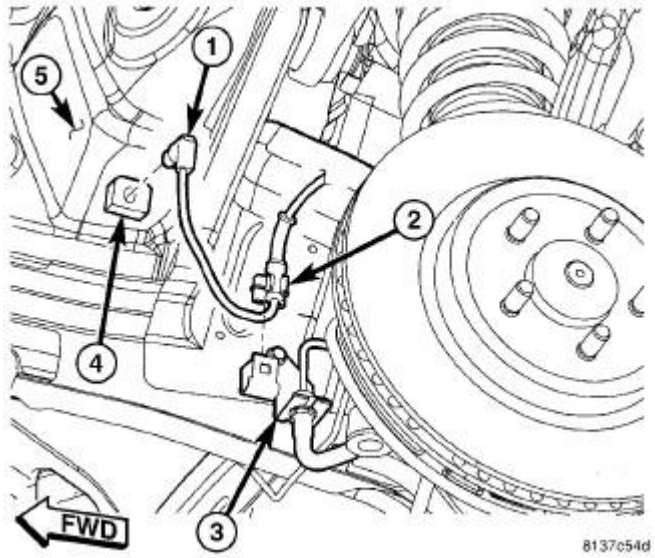


Fig. 152: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect wheel speed sensor cable routing clip (2) at brake tube bracket (3).

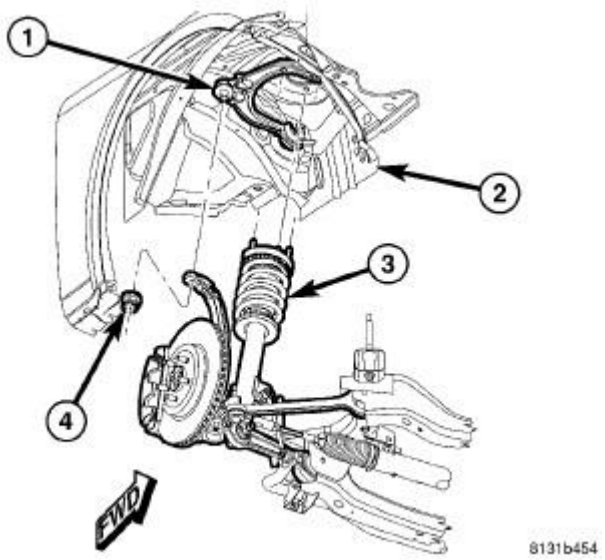


Fig. 153: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

8. Loosen nut (4) attaching upper ball joint stud (1) to knuckle. Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

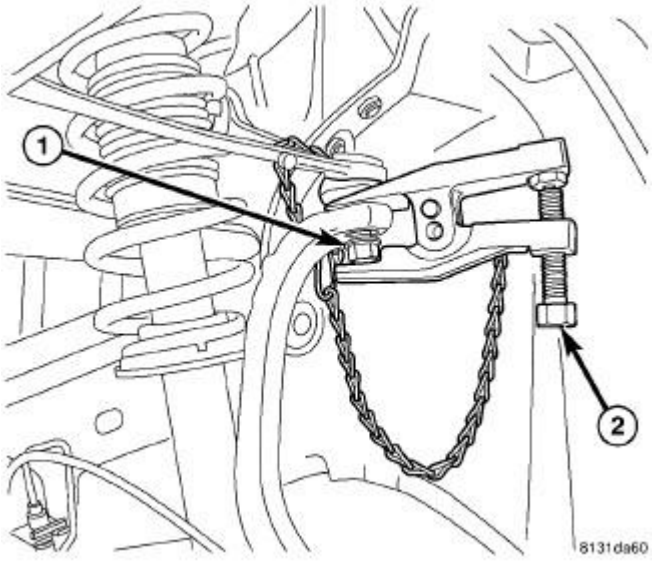


Fig. 154: Using Puller On Upper Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding (special tool #9360, Remover, Ball Joint) into place past seal boot.

9. Using (special tool #9360, Remover, Ball Joint) (2), separate upper ball joint stud (1) from knuckle.

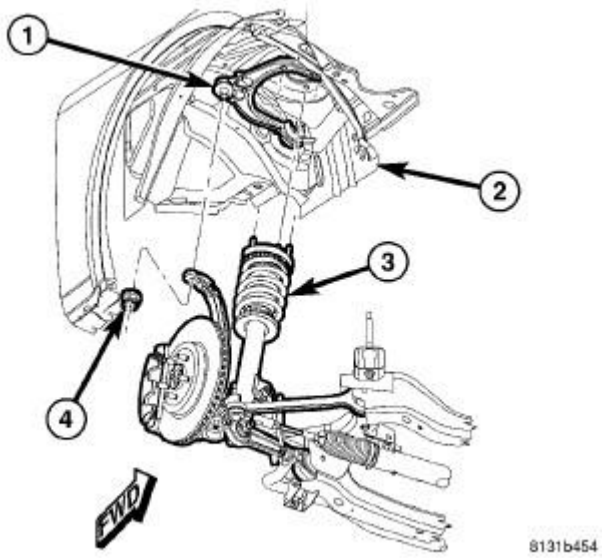


Fig. 155: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Remove nut (4) from end of upper ball joint stud (1).
11. Tip top of knuckle outward using care not to overextend brake flex hose.
12. Remove shock assembly from vehicle.

SRT

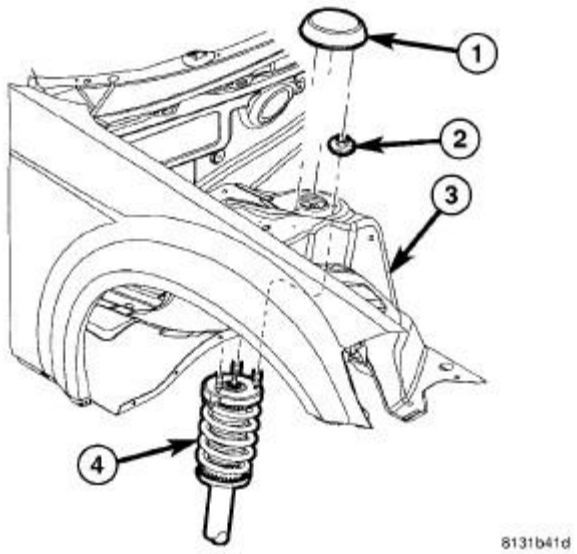


Fig. 156: Upper Shock Mounting

Courtesy of CHRYSLER GROUP, LLC

1. If equipped, remove front shock tower cap (1) from top of shock assembly (4).
2. Remove three nuts (2) fastening shock assembly (4) to shock tower (3).
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

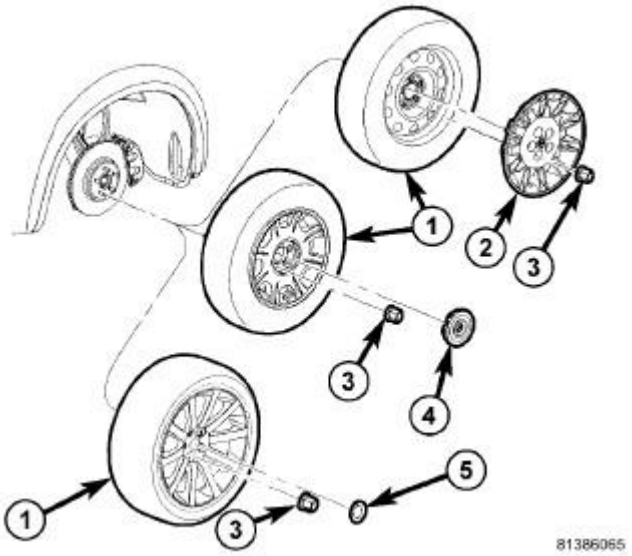


Fig. 157: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).
5. Remove the right front splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .

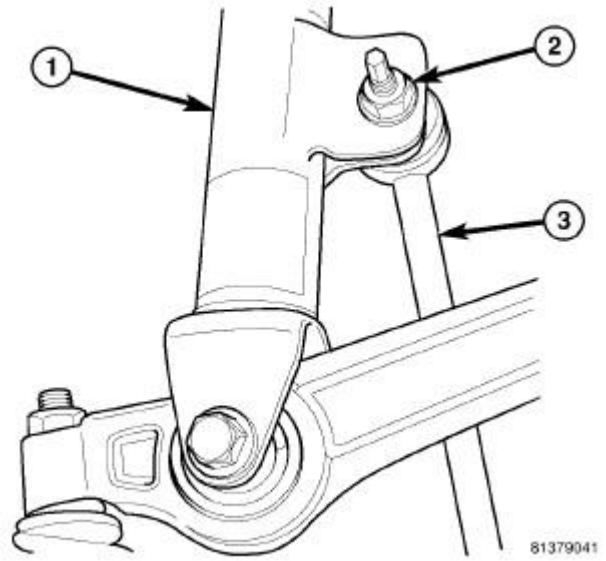


Fig. 158: Stabilizer Link AT Shock Assembly
Courtesy of CHRYSLER GROUP, LLC

6. Remove nut (2) fastening stabilizer link (3) to shock assembly (1). Slide link ball joint stem from shock assembly.

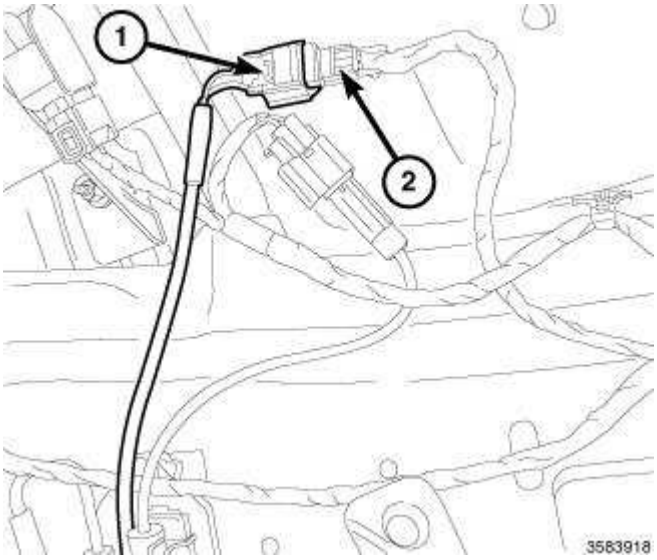


Fig. 159: ADS Shock Connector & Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the Active Damping Suspension (ADS) shock connector (1) from the harness (2) on the wheel well.

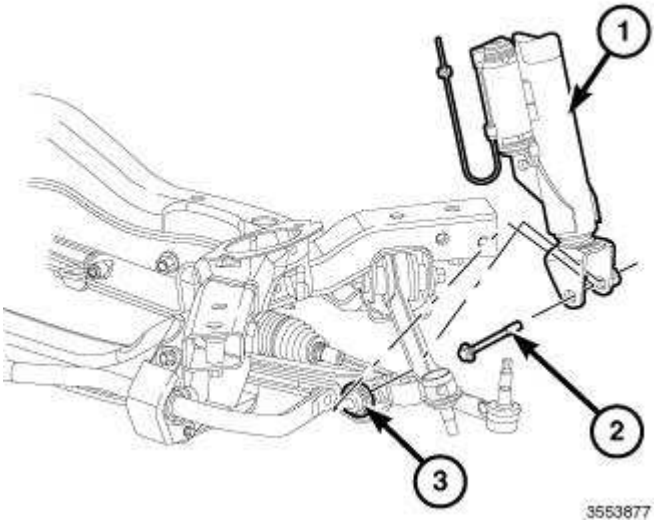


Fig. 160: Bolt, Shock Assembly & Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

8. Remove bolt (2) securing shock assembly (1) to lower control arm (3).

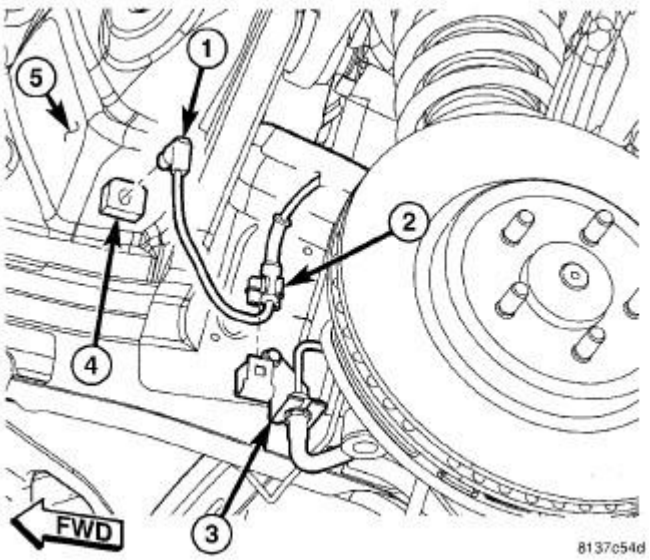


Fig. 161: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect wheel speed sensor cable routing clip (2) at brake tube bracket (3).

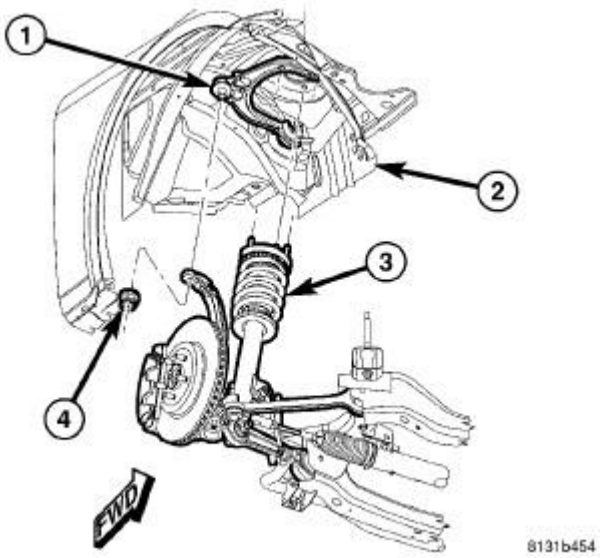


Fig. 162: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Loosen nut (4) attaching upper ball joint stud (1) to knuckle. Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

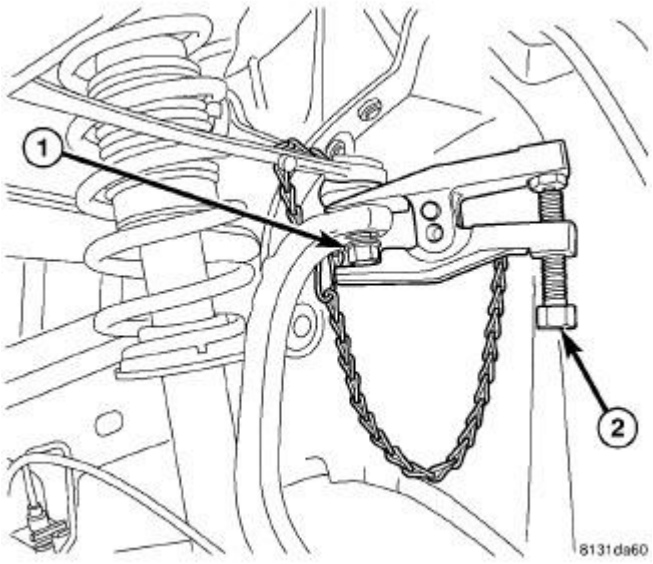


Fig. 163: Using Puller On Upper Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding (special tool #9360, Remover, Ball Joint) into place past seal boot.

11. Using (special tool #9360, Remover, Ball Joint)separate upper ball joint stud (1) from knuckle.

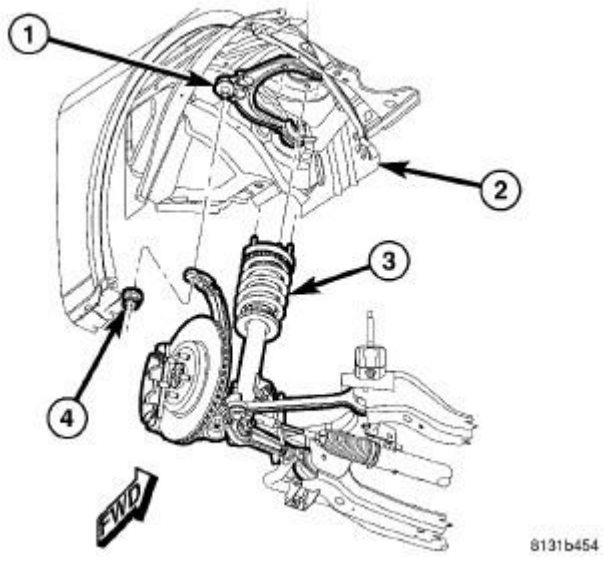


Fig. 164: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

12. Remove nut (4) from end of upper ball joint stud (1).

13. Tip top of knuckle outward using care not to overextend bake flex hose.
14. Remove shock assembly from vehicle.

DISASSEMBLY

DISASSEMBLY

The shock assembly must be removed from vehicle for it to be disassembled and assembled.

For shock assembly disassembly and assembly, use of shock Spring Compressor, Pentastar Service Equipment (PSE) tool W-7200, or equivalent, is recommended to compress coil spring. Follow manufacturer's instructions closely.

WARNING: Do not remove shock shaft nut before coil spring is compressed. Coil spring is held under pressure and must be compressed, removing spring tension from upper and lower mounts, before shock removal.

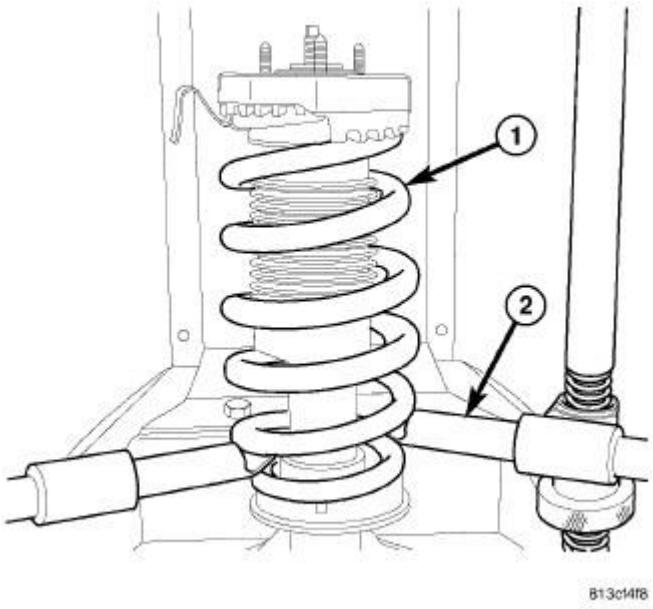


Fig. 165: Shock Assembly In Lower Hooks Of Tool
Courtesy of CHRYSLER GROUP, LLC

1. Position shock assembly coil spring (1) on hooks (2) of Compressor following manufacturers instructions. Install clamp securing shock to lower spring coil.

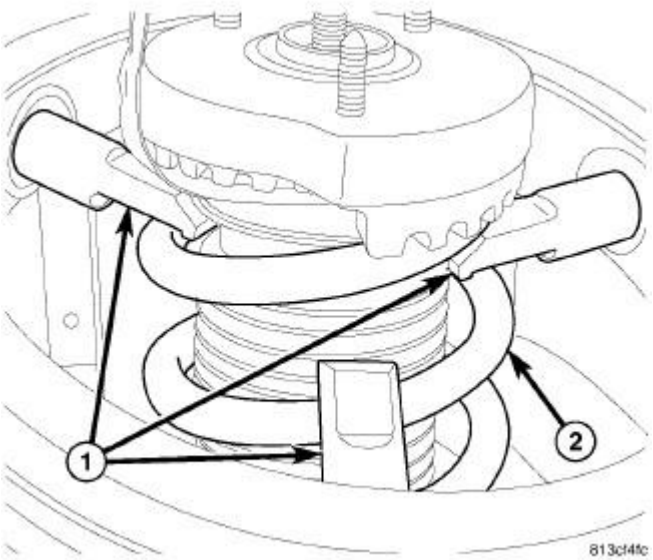


Fig. 166: Upper Hooks Positioned
Courtesy of CHRYSLER GROUP, LLC

2. Position Compressor upper hooks (1) on upper coil spring (2) following manufacturers instructions. To ease installation, rotate shock as necessary positioning shock in compressor so that upper spring coil ends (step in upper mount) at straight outward position from Compressor.
3. Compress coil spring until all spring tension is removed from upper mount.

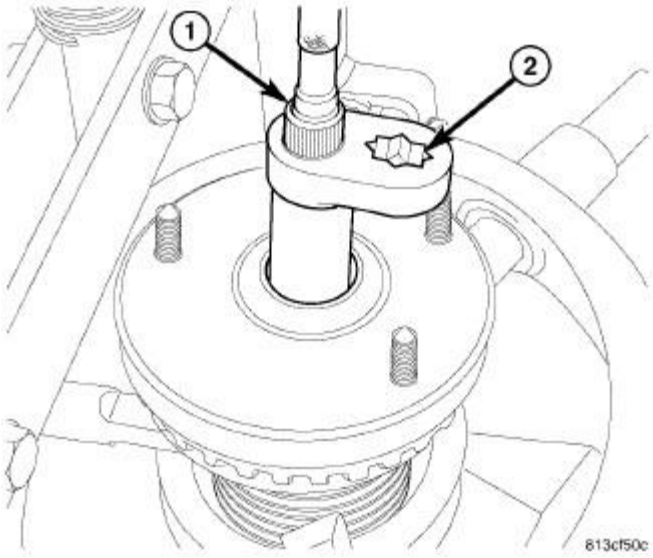


Fig. 167: Retaining Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

4. Position Wrench (2), Special Tool (special tool #9362, Wrench, Strut Nut), on shock shaft retaining nut. Next, insert 8 mm socket though Wrench onto hex located on end of shock shaft. While holding shock shaft from turning, remove nut from shock shaft using Wrench.

5. Remove clamp from bottom of coil spring and remove shock and lower isolator out through bottom of coil spring.

NOTE: If upper mount or coil spring needs to be serviced, proceed with next step, otherwise, proceed with step 8.

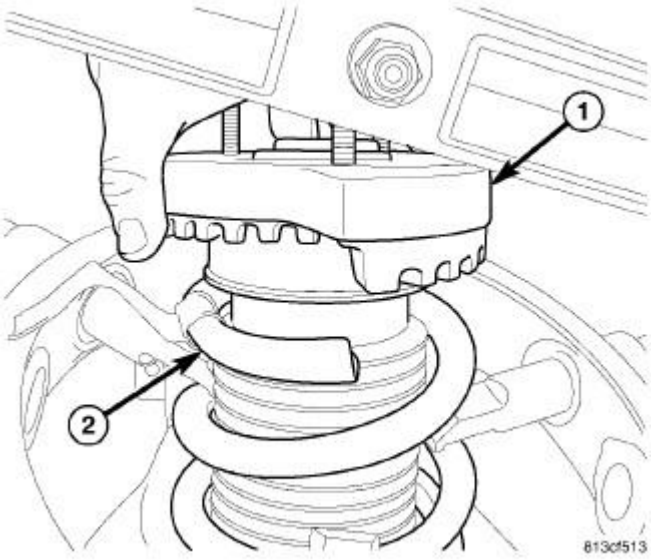


Fig. 168: Upper Mount Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

6. Remove upper mount (1) from shock shaft and coil spring.

NOTE: Prior to removing spring from compressor, note location of lower spring coil end in relationship to compressor to ease assembly of components later.

7. Back off Compressor drive, releasing tension from coil spring. Push back compressor upper hooks and remove coil spring from Compressor.

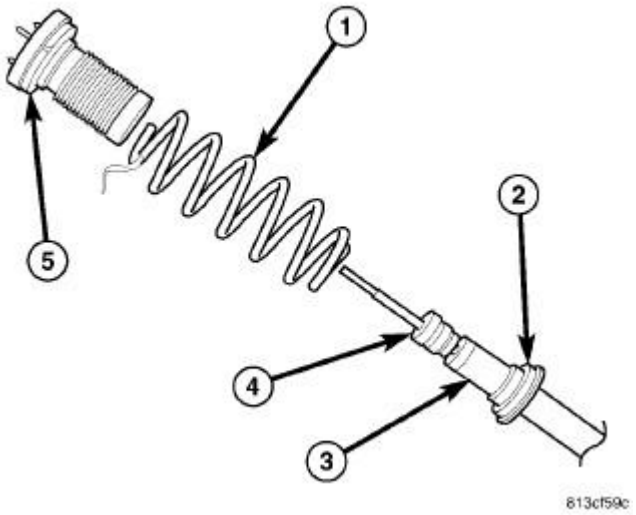


Fig. 169: Shock Assembly Exploded View
Courtesy of CHRYSLER GROUP, LLC

8. Remove jounce bumper (4) from shock shaft by pulling straight up and off.
9. Remove lower isolator (2) from shock body by pulling straight up and off shock shaft.
10. Inspect shock assembly components for following and replace as necessary:

- Inspect shock (3) for any condition of shaft binding over full stroke of shaft.
- Inspect upper mount (5) for cracks and distortion and its retaining studs for any sign of damage.
- Inspect upper spring isolator (5) for severe deterioration.
- Inspect lower spring isolator (2) for severe deterioration.
- Inspect dust shield for tears and deterioration.
- Inspect coil spring (1) for cracks in the coating and corrosion.
- Inspect jounce bumper (4) for cracks and signs of deterioration.

ASSEMBLY

ASSEMBLY

CAUTION: Use care not to damage coil spring coating during spring assembly. Damage to coating will jeopardize its corrosion protection.

NOTE: Left and right springs must not be interchanged.

NOTE: If coil spring has been removed from spring compressor, proceed with next step, otherwise, proceed with step 4.

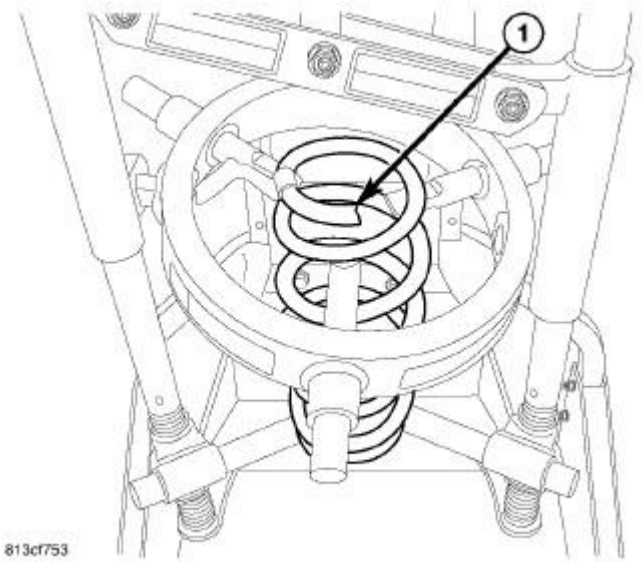


Fig. 170: Spring Positioned In Compressor
Courtesy of CHRYSLER GROUP, LLC

1. Place coil spring **(part number tag end upward)** in compressor lower hooks following manufacturers instructions. To ease shock reassembly, rotate coil spring around until upper coil (1) ends at straight outward position from Compressor. Proper orientation of spring to upper mount (once installed) is necessary.
2. Position compressor upper hooks over coil spring following manufacturers instructions.
3. Compress coil spring far enough to allow shock installation.

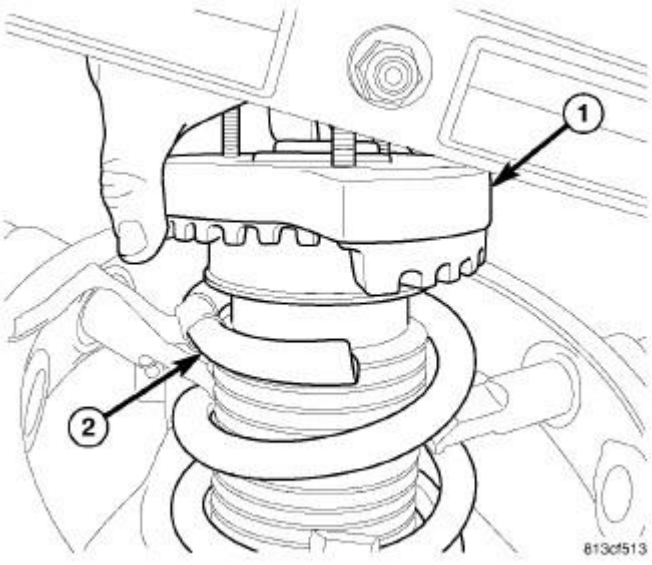


Fig. 171: Upper Mount Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

4. If separated, install upper mount (1) onto coil spring (2). Match step in upper isolator to end of spring coil.

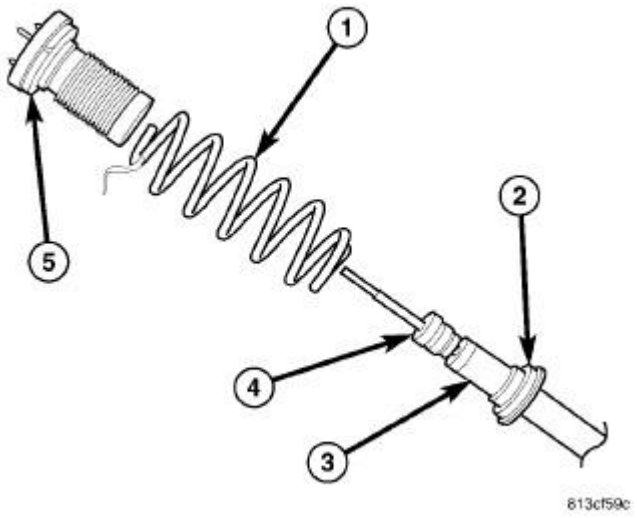


Fig. 172: Shock Assembly Exploded View
Courtesy of CHRYSLER GROUP, LLC

5. Install lower spring isolator (2) on shock body (3).
6. Install jounce bumper (4) on shock shaft, small end first.

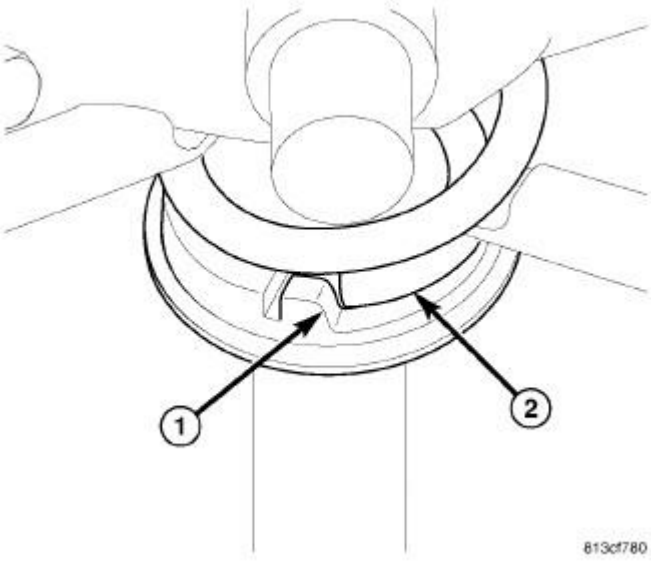


Fig. 173: Spring Positioned Against Lower Isolator
Courtesy of CHRYSLER GROUP, LLC

7. Install shock through bottom of coil spring until lower spring isolator (on shock) contacts lower

end of coil spring. Match step built into isolator (1) to lower coil end (2). Once in this position, stabilizer bar bracket, or clevis key on AWD models, should point straight inward toward Compressor body. If not, rotate isolator on shock body until alignment is achieved when isolator is correctly positioned with lower spring coil.

8. Install clamp to hold shock and coil spring together.

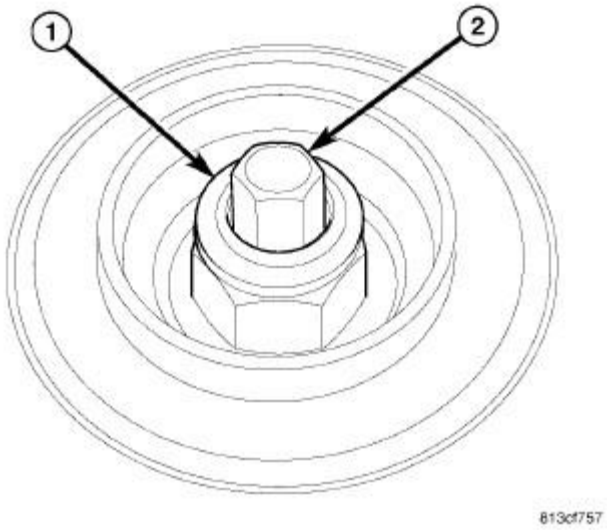


Fig. 174: Shock Rod Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

9. Install retaining nut (1) on shock shaft (2) as far as possible by hand. Make sure nut is installed far enough for 8 mm socket to grasp hex (2) on end of shaft for tightening.

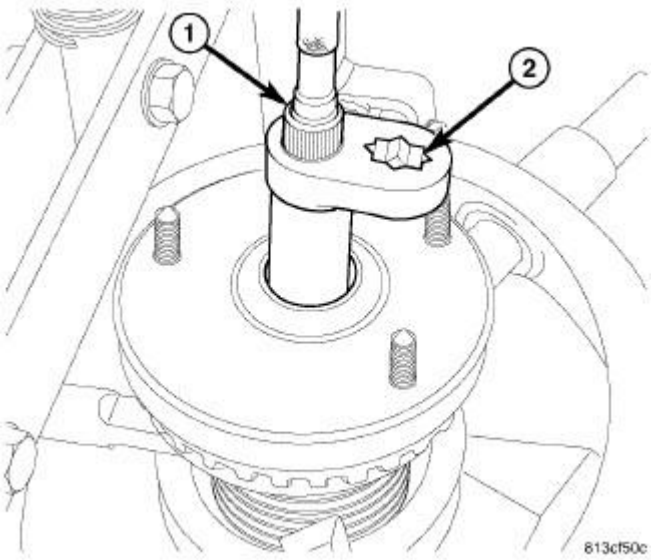


Fig. 175: Retaining Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

10. Install Wrench (on end of a torque wrench) (special tool #9362, Wrench, Strut Nut) on shock shaft retaining nut. Next, insert 8 mm socket though Wrench onto hex located on end of shock shaft. While holding shock shaft from turning, tighten nut using Wrench to 90 N.m (66 ft. lbs.).
11. Slowly release tension from coil spring by backing off Compressor drive fully. As tension is relieved, make sure shock components are properly in place.
12. Remove clamp from lower end of coil spring and shock. Push back spring compressor upper and lower hooks, then remove shock assembly from spring compressor.
13. Install shock assembly on vehicle. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, INSTALLATION**.

INSTALLATION

ALL-WHEEL-DRIVE

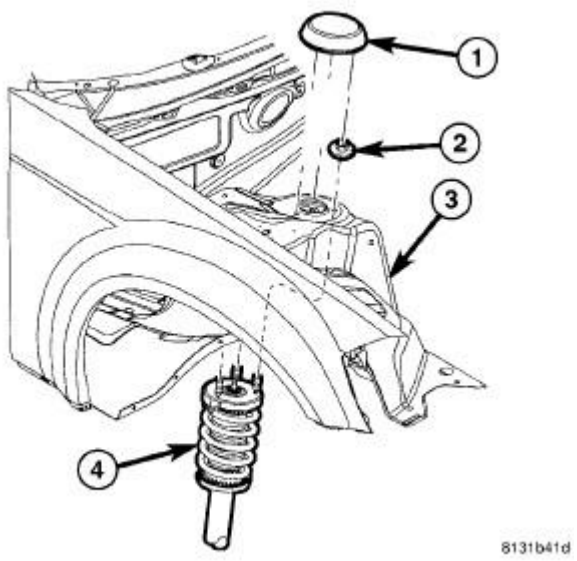


Fig. 176: Upper Shock Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Guide shock assembly up into shock tower (3) and into mounting holes.
2. Install three nuts (2) fastening shock assembly (4) to shock tower (3). Tighten nuts to 27 N.m (20 ft. lbs.).
3. If equipped, align shock tower cap (1) with shock mounting nuts (2) and snap into place.
4. Raise and support vehicle.

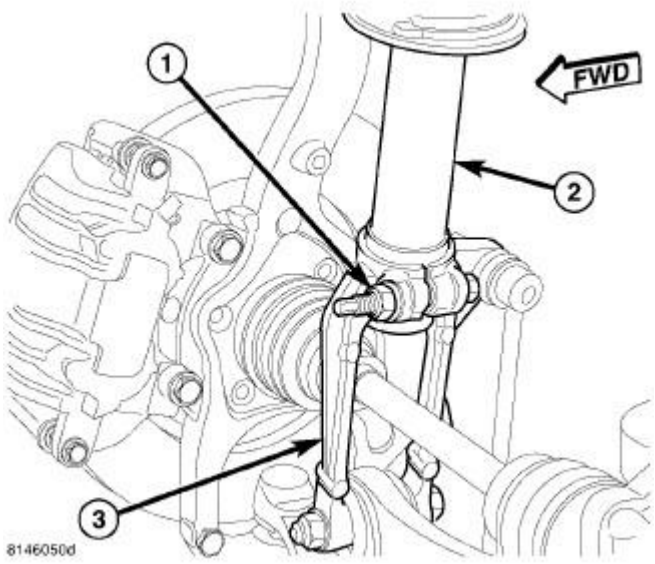


Fig. 177: Removing/Installing Shock Clevis Pinch Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Pull lower end of shock assembly outward, then slide clevis bracket (3) onto lower end. Slide clevis bracket onto shock assembly until bracket contacts collar on shock housing (2).
6. Install pinch bolt and nut (1) fastening clevis bracket (3) to bottom of shock assembly (2). Install pinch bolt from rear. **Do not tighten at this time.**

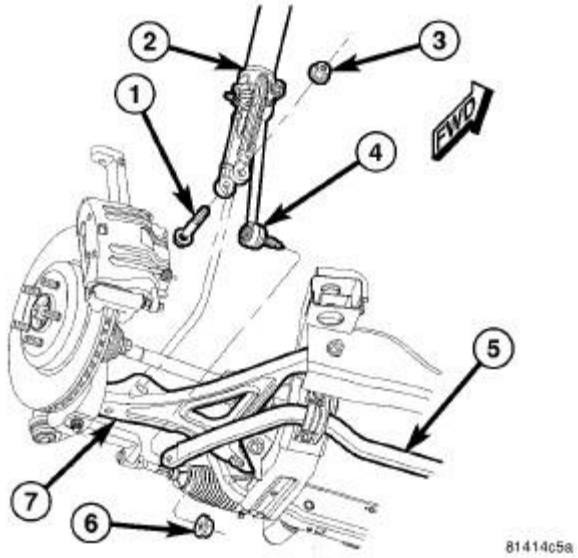


Fig. 178: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

7. Slide clevis bracket (2) over bushing mounted in lower control arm (7).
8. Install bolt (1) and nut (3) attaching shock clevis bracket (2) to lower control arm (7). **Do not**

tighten at this time.

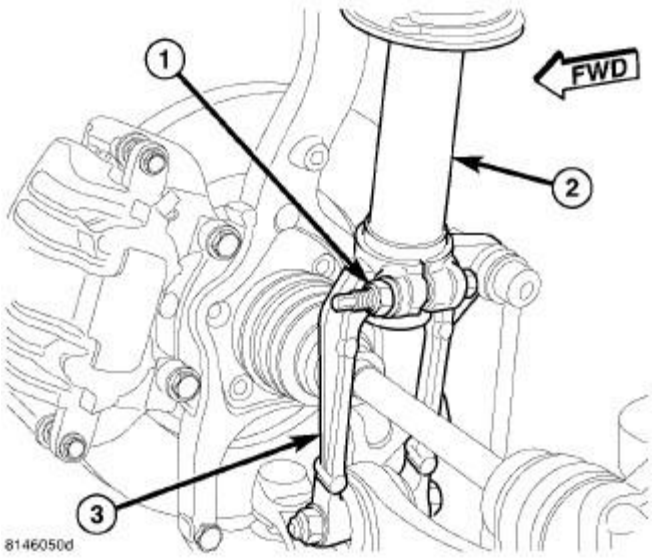


Fig. 179: Removing/Installing Shock Clevis Pinch Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Tighten pinch bolt (1) attaching clevis bracket to shock assembly to 61 N.m (45 ft. lbs.).

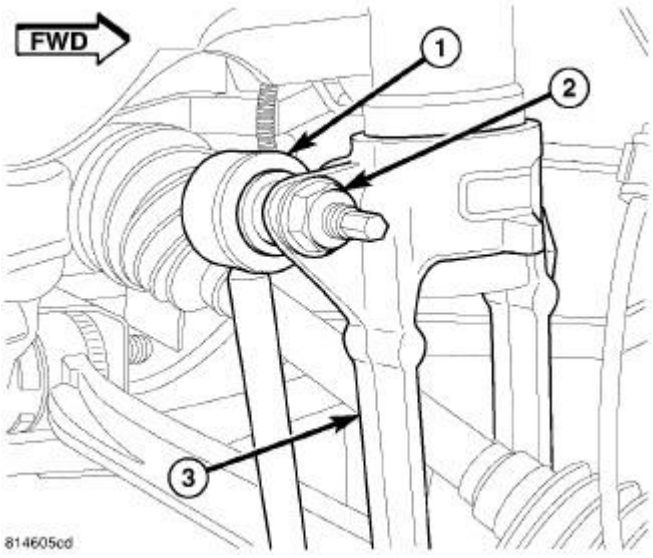


Fig. 180: Locating Stabilizer Link Attachment AT Shock Clevis
Courtesy of CHRYSLER GROUP, LLC

10. Slide stabilizer link ball joint stem into clevis bracket. Install nut (2) fastening link to clevis bracket (3). Tighten nut by holding ball joint stud while turning nut. Tighten nut using crow foot wrench on torque wrench to 128 N.m (95 ft. lbs.).

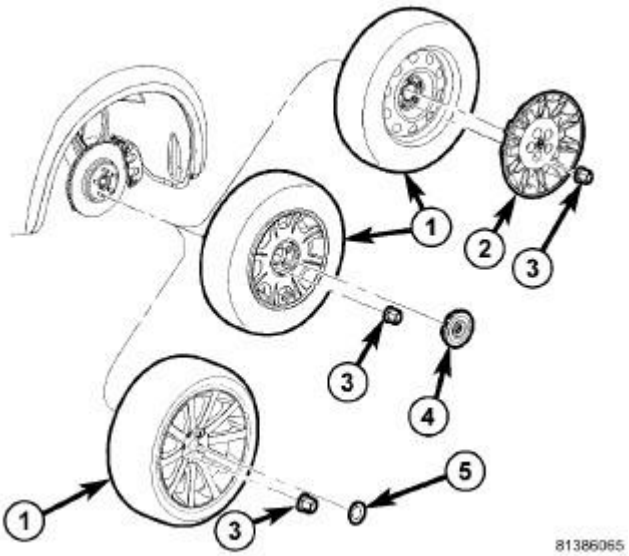


Fig. 181: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

11. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
12. Lower vehicle.

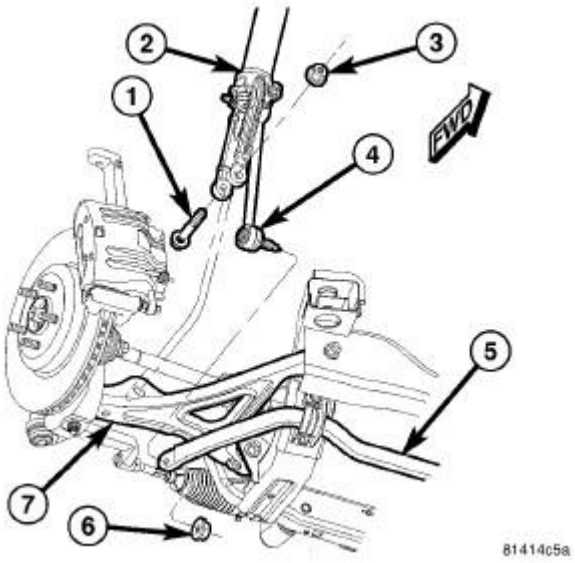


Fig. 182: Shock Attachment AT Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

NOTE: When tightening lower shock clevis mounting bolt, do not attempt rotating bolt. Bolt shaft is serrated. Turn nut only.

13. Tighten lower shock clevis bracket bolt nut (3) to 174 N.m (128 ft. lbs.).

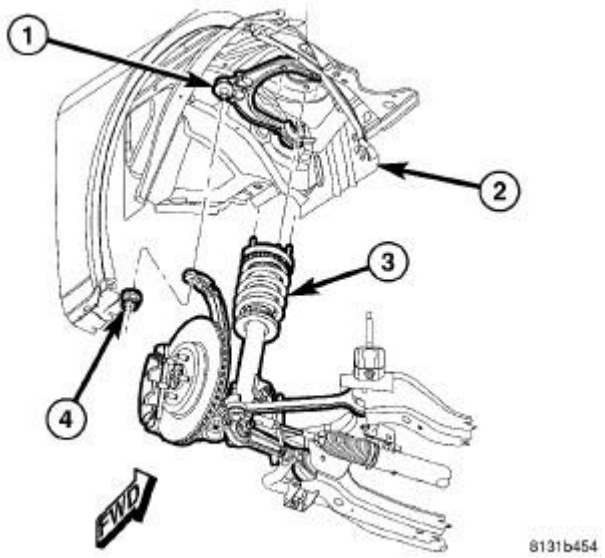


Fig. 183: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Place shock assembly into front suspension using reverse direction in which it was removed.

   CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

2. Place upper ball joint stud (1) through hole in top of knuckle and install nut (4). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 47 N.m + 90° turn (35 ft. lbs. + 90° turn).

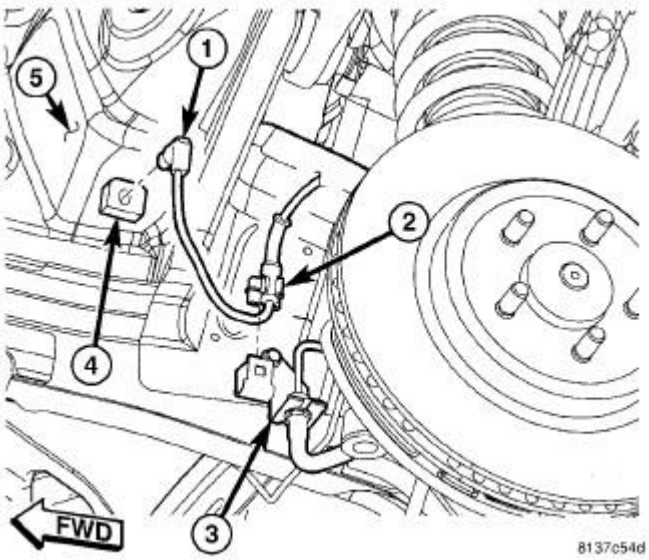


Fig. 184: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

3. Connect wheel speed sensor cable routing clip (2) at brake tube bracket (3).

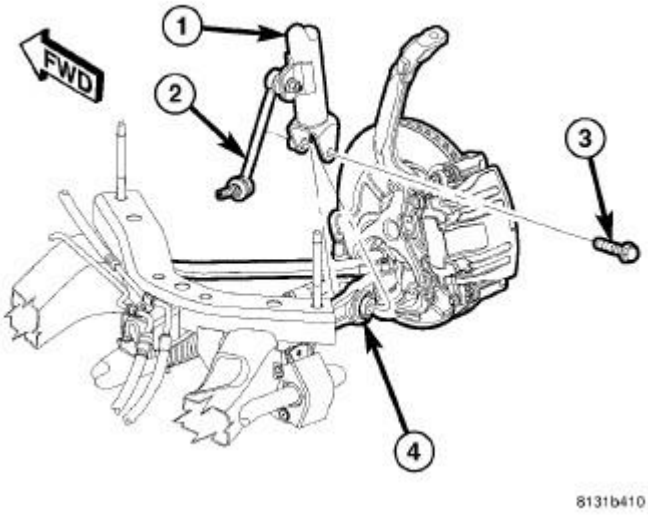


Fig. 185: Lower Shock Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Install lower shock mounting bolt (3) attaching shock assembly (1) to lower control arm (4). **Do not tighten bolt at this time.**

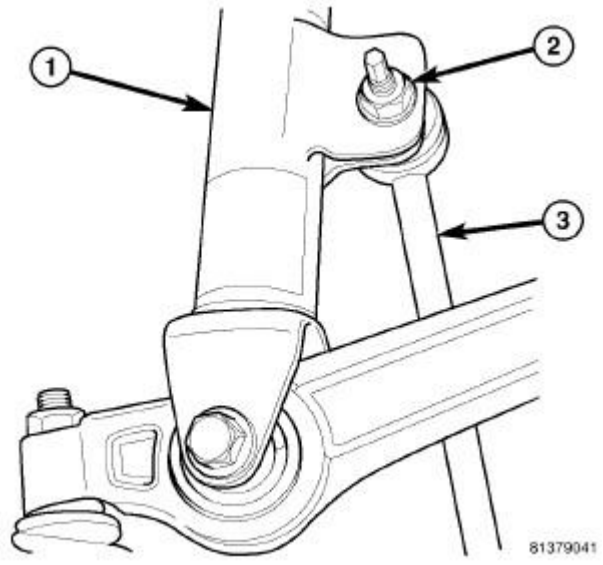


Fig. 186: Stabilizer Link AT Shock Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Slide stabilizer link (3) ball joint stem into shock assembly from front. Install nut fastening link (3) to shock assembly (1). Tighten nut by holding ball joint stud while turning nut. Tighten nut using crow foot wrench on torque wrench to 128 N.m (95 ft. lbs.).

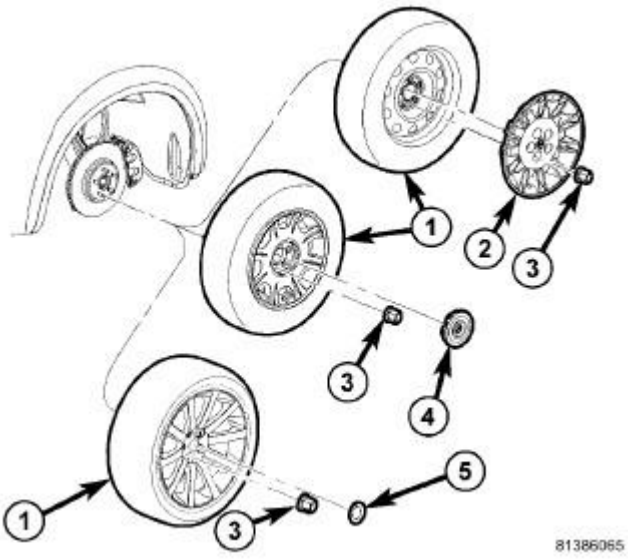


Fig. 187: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
7. Lower vehicle.

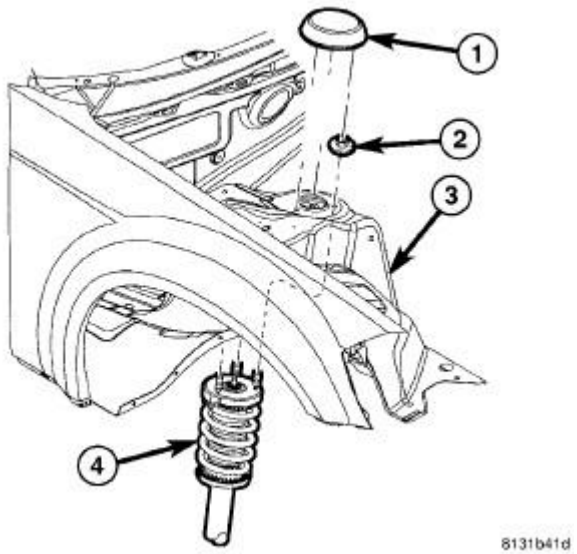


Fig. 188: Upper Shock Mounting
Courtesy of CHRYSLER GROUP, LLC

8. Install three nuts (2) fastening shock assembly (4) to shock tower (3). Tighten nuts to 27 N.m (20 ft. lbs.).
9. If equipped, align shock tower cap (1) with shock mounting nuts (2) and snap into place.

SRT

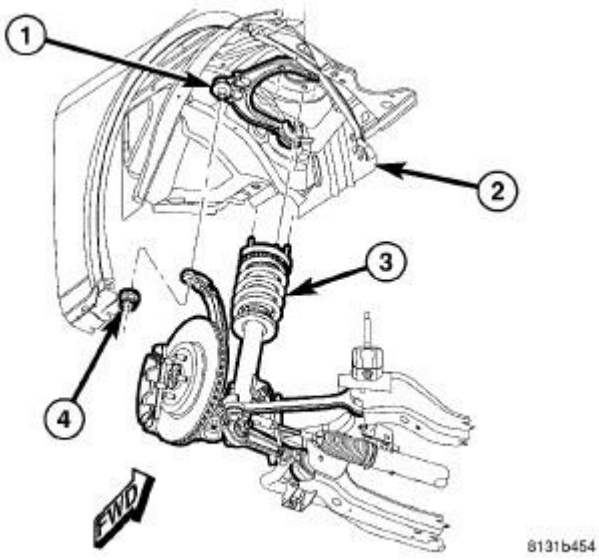


Fig. 189: View Of Upper Ball Joint, Spindle & Strut Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: If equipped with Active Damping System (ADS), position the shock solenoid

assembly on the side of the shock with the same orientation as when removed.

1. Place shock assembly into front suspension using reverse direction in which it was removed.

CAUTION: It is important to tighten nut as described in following step to avoid damaging ball stud joint.

2. Place upper ball joint stud (1) through hole in top of knuckle and install nut (4). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 47 N.m + 90° turn (35 ft. lbs. + 90° turn).

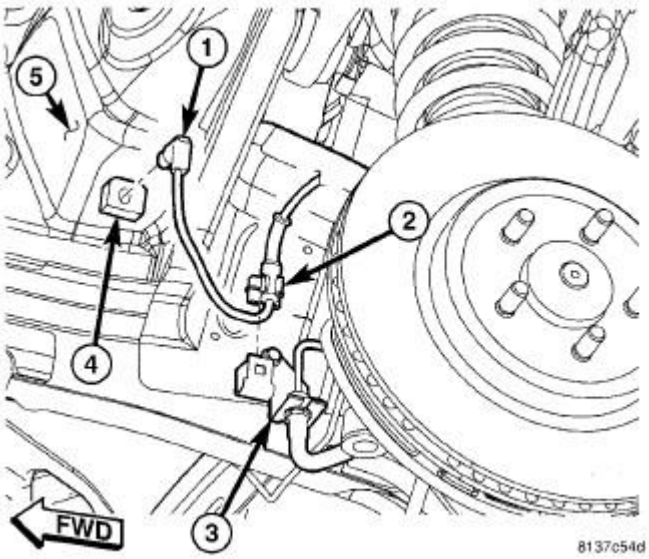


Fig. 190: Locating Speed Sensor Cable Routing Clip AT Brake Tube Bracket
Courtesy of CHRYSLER GROUP, LLC

3. Connect wheel speed sensor cable routing clip (2) at brake tube bracket (3).

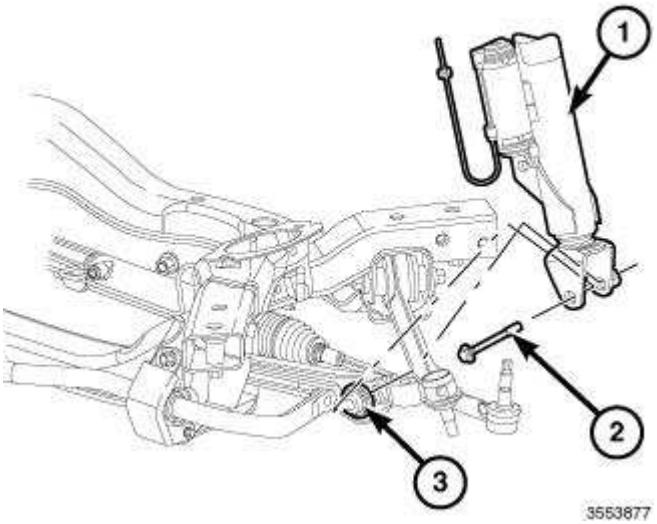


Fig. 191: Bolt, Shock Assembly & Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

4. Install lower shock mounting bolt (2) attaching shock assembly (1) to lower control arm (3). **Do not tighten bolt at this time.**

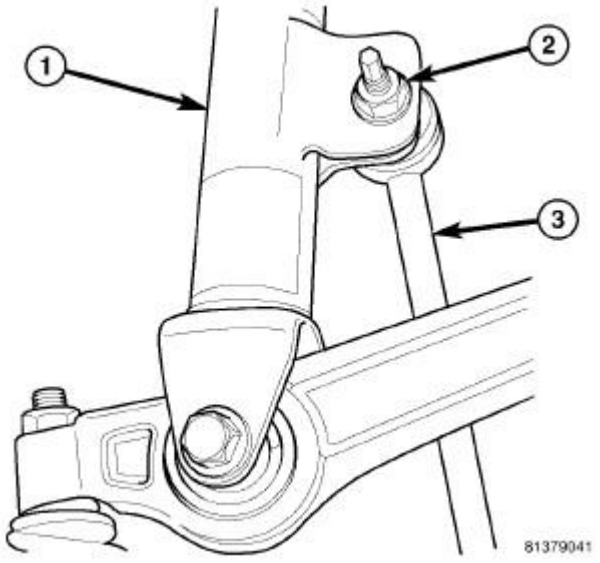


Fig. 192: Stabilizer Link AT Shock Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Slide stabilizer link (3) ball joint stem into shock assembly from front. Install nut fastening link (3) to shock assembly (1). Tighten nut by holding ball joint stud while turning nut. Tighten nut using crow foot wrench on torque wrench to 128 N.m (95 ft. lbs.).

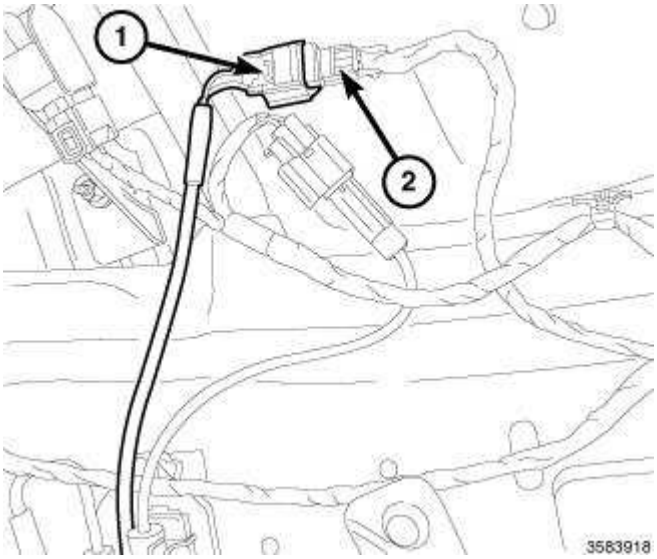


Fig. 193: ADS Shock Connector & Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Connect the ADS shock connector (1) to the vehicle wiring harness connector (2).
7. Install the splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** or **SHIELD, SPLASH, REAR WHEELHOUSE, INSTALLATION** .

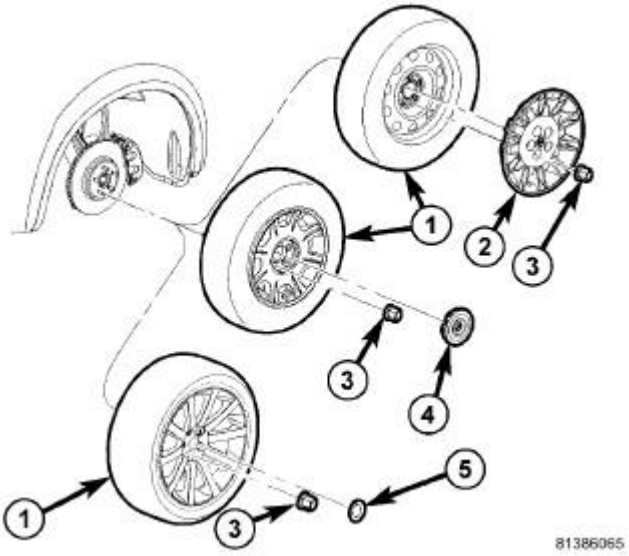


Fig. 194: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

8. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
9. Lower vehicle.

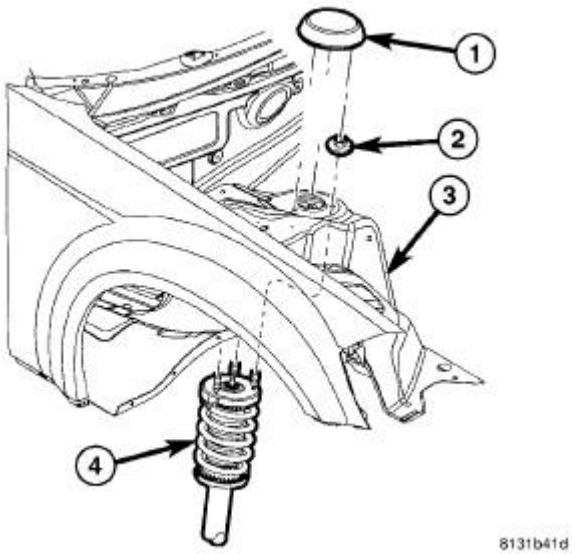


Fig. 195: Upper Shock Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Install three nuts (2) fastening shock assembly (4) to shock tower (3). Tighten nuts to 27 N.m (20 ft. lbs.).
11. If equipped, align shock tower cap (1) with shock mounting nuts (2) and snap into place.

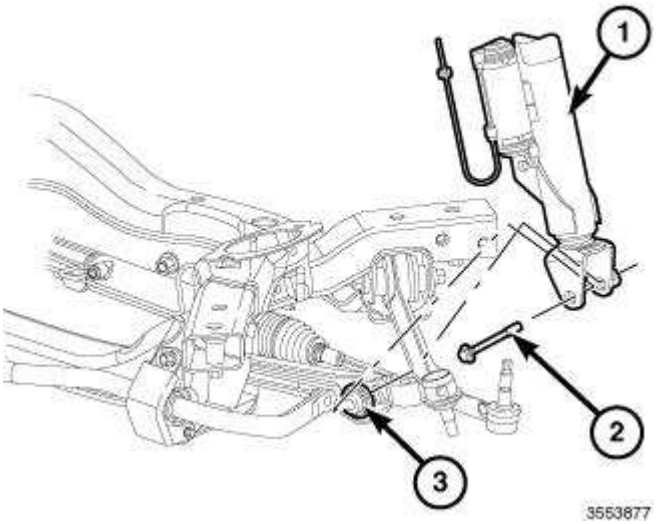


Fig. 196: Bolt, Shock Assembly & Lower Control Arm
Courtesy of CHRYSLER GROUP, LLC

12. Tighten lower shock clevis bracket bolt (2) to 174 N.m (128 ft. lbs.).

STABILIZER BAR, FRONT

REMOVAL

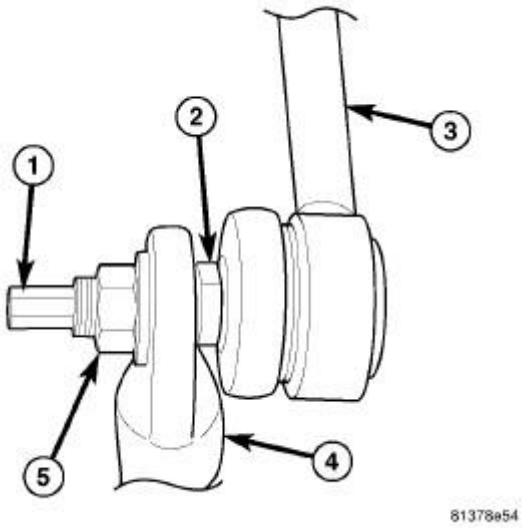


Fig. 197: Link Ball Joint AT Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .
3. On each side of vehicle, remove nut (5) fastening stabilizer link (3) to stabilizer bar (4). Slide link ball joint stem (1) from bar.

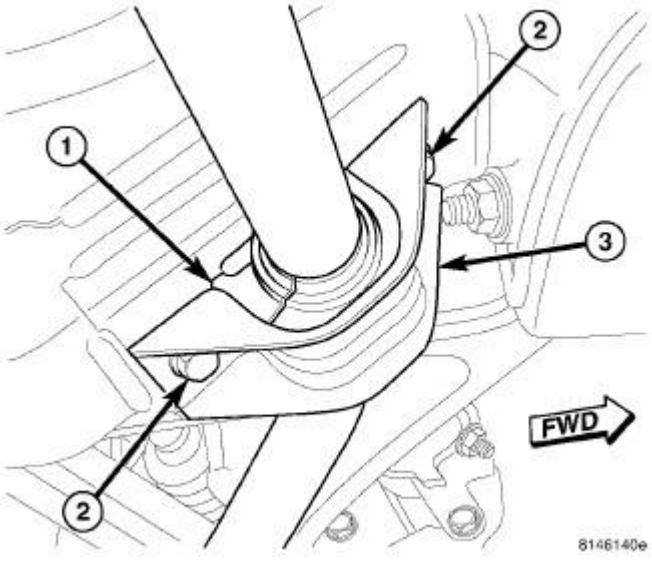


Fig. 198: Stabilizer Bar Bushing & Retainer
Courtesy of CHRYSLER GROUP, LLC

4. On each side of vehicle, remove bolts (2) fastening stabilizer bar isolator retainer (3) in place.
5. Remove stabilizer bar with isolators and retainers from vehicle.
6. On each side of bar, remove retainers (3) from around stabilizer bar isolators (1).
7. Utilizing slit, remove each isolator (1) from stabilizer bar (2).

REAR-WHEEL-DRIVE

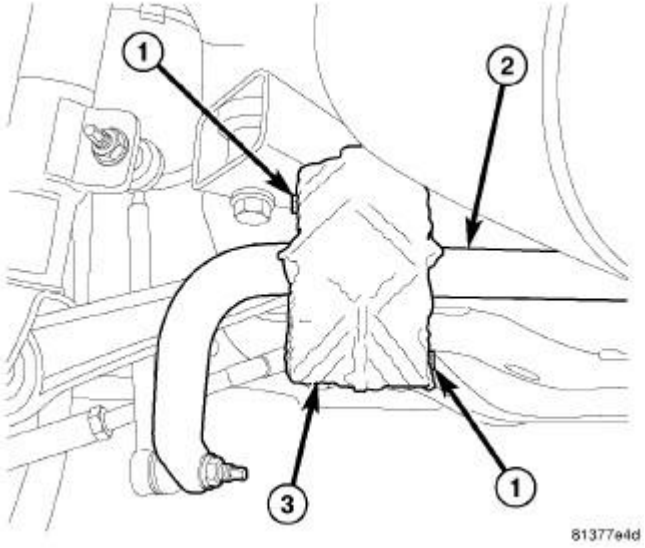


Fig. 199: Front Stabilizer Bar Heat Shield
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .
3. On each side of vehicle, remove screws (1) fastening stabilizer bar heat shield (3). Remove heat shield.

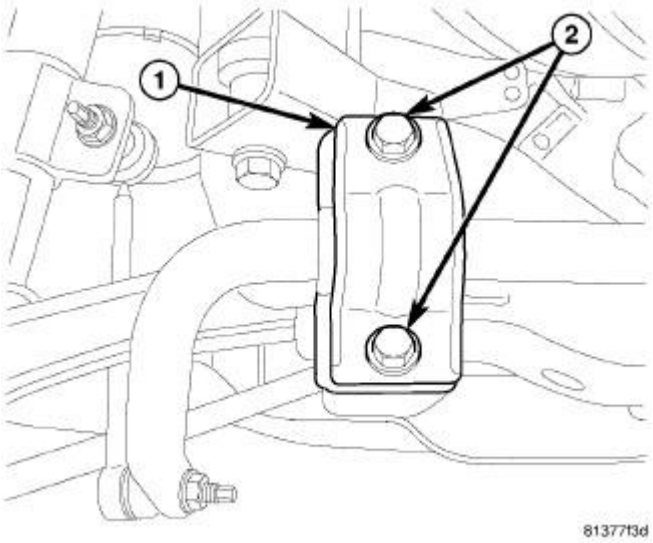


Fig. 200: Front Stabilizer Bar Bushing Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

4. On each side of vehicle, remove bolts (2) fastening stabilizer bar isolator retainer (1) in place.

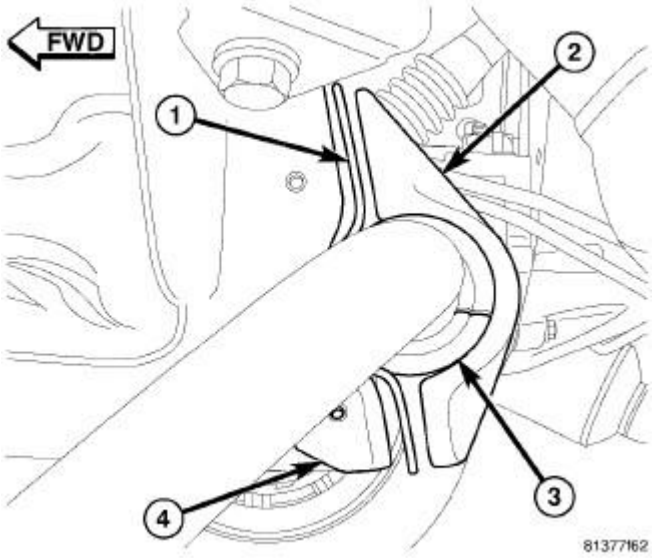


Fig. 201: Front Stabilizer Bar Bushing Retainer
Courtesy of CHRYSLER GROUP, LLC

5. On each side of vehicle, remove retainer halves (1) (2) from around stabilizer bar isolator (3).

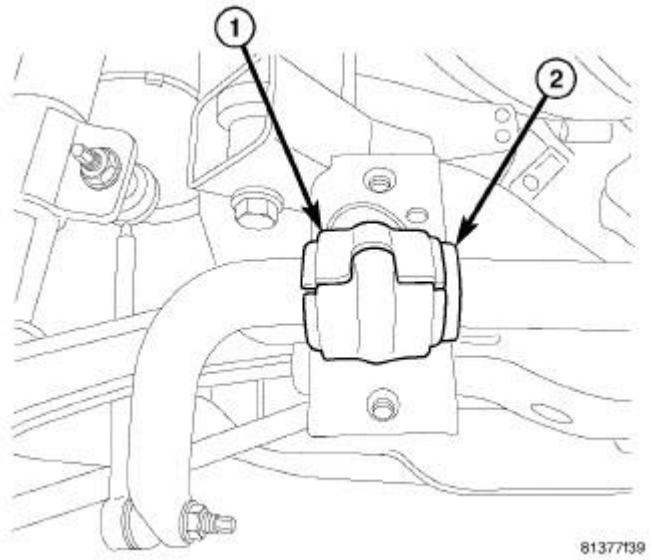


Fig. 202: Front Stabilizer Bar Bushing On Bar
Courtesy of CHRYSLER GROUP, LLC

6. Utilizing slit, remove each isolator (1) from stabilizer bar (2).

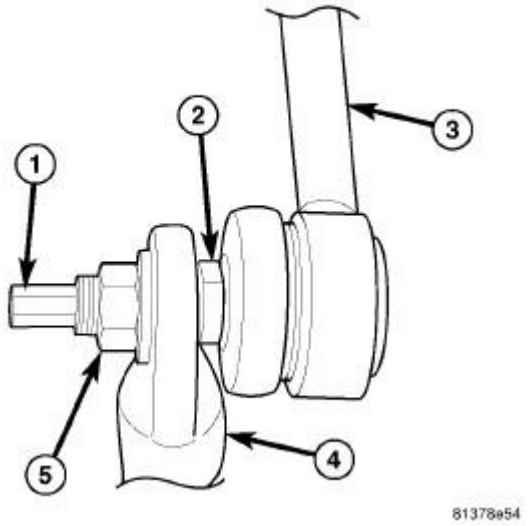


Fig. 203: Link Ball Joint AT Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

7. On each side of vehicle, remove nut (5) fastening stabilizer link (3) to stabilizer bar (4). Slide link ball joint stem (1) from bar, then remove bar from vehicle.

INSTALLATION

ALL-WHEEL-DRIVE

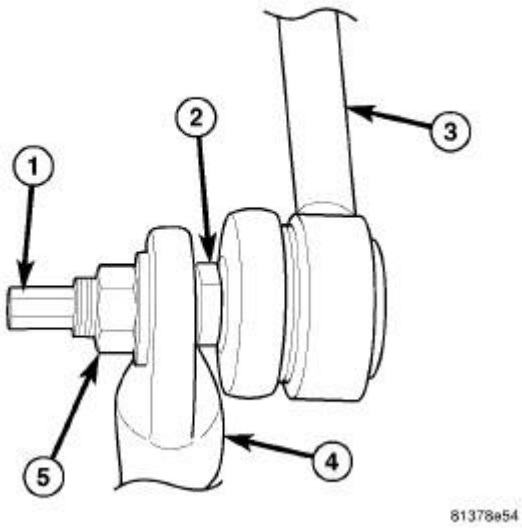


Fig. 204: Link Ball Joint AT Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

1. Utilizing slit in isolator, install each stabilizer bar isolator on bar. Make sure slit in isolator is positioned toward rear of vehicle once installed on vehicle.
2. Install stabilizer bar isolator retainer over each isolator.

NOTE: When attaching stabilizer link to stabilizer bar, make sure link ball joint stem is pointed inboard toward engine cradle.

3. Install stabilizer bar ends (4) to each stabilizer link (3). Slide link ball joint stem (1) through mounting hole in bar. Loosely install nuts (5) at this time.

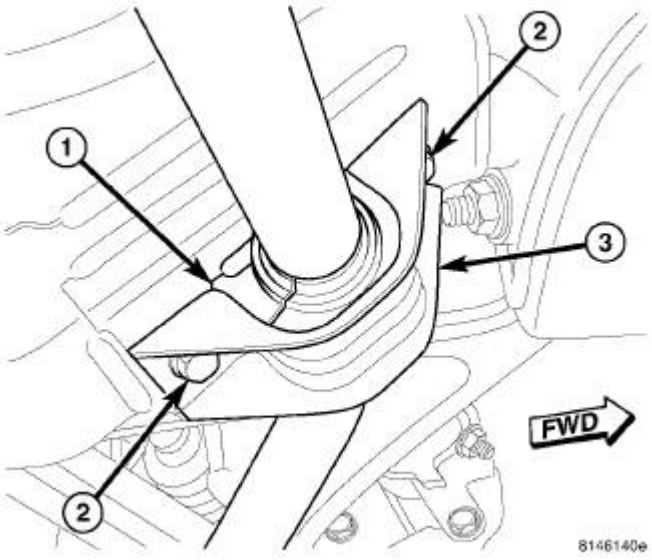


Fig. 205: Stabilizer Bar Bushing & Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Raise stabilizer bar to engine cradle, placing bushings (1) into mounted position.
5. Install bolts (2) securing each stabilizer bar isolator retainer (3) to cradle. Tighten bolts to 60 N.m (44 ft. lbs.).

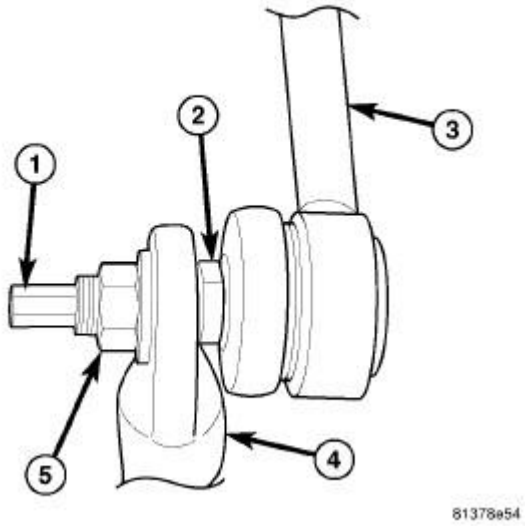


Fig. 206: Link Ball Joint AT Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

6. While holding stem from rotating at hex (1) or flat (2) tighten stabilizer link nuts at each end of stabilizer bar (4) to 128 N.m (95 ft. lbs.).
7. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .
8. Lower vehicle.

REAR-WHEEL-DRIVE

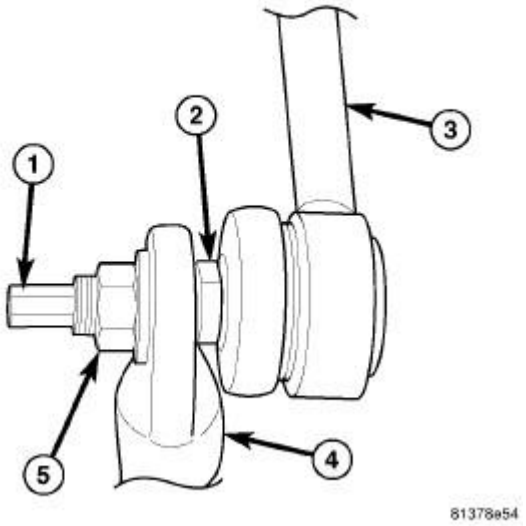


Fig. 207: Link Ball Joint AT Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

NOTE: When attaching stabilizer link to stabilizer bar, make sure link ball joint stem is pointed inboard toward engine cradle.

1. On each side of vehicle, raise stabilizer bar (4) to stabilizer link (3) and slide link ball joint stem (1) through mounting hole in bar. Loosely install nut (5) at this time.

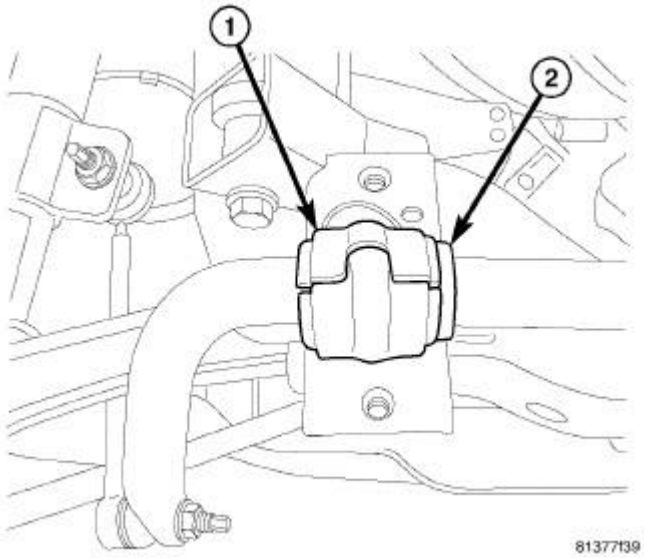


Fig. 208: Front Stabilizer Bar Bushing On Bar
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Because of stabilizer isolator outer shape, it is very important to

install isolators in position discussed in following step.

2. Utilizing slit in isolator, install each stabilizer bar isolator (1) on bar resting against locating collar (2) as shown in illustration. Make sure slit in isolator is positioned toward rear of vehicle.

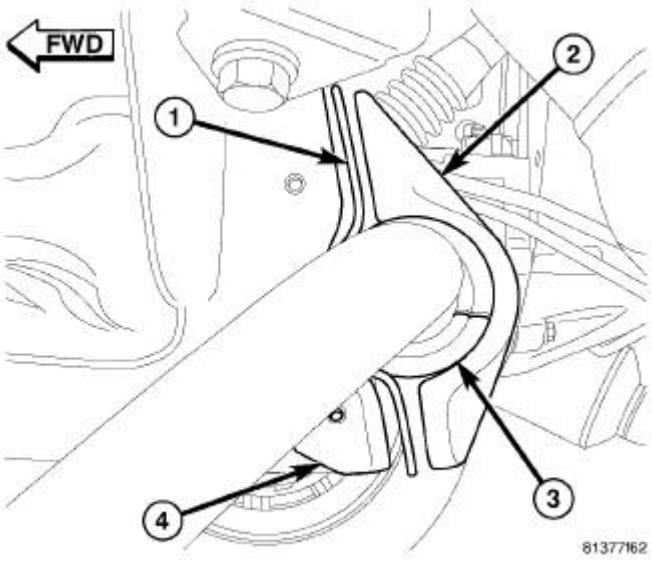


Fig. 209: Front Stabilizer Bar Bushing Retainer
Courtesy of CHRYSLER GROUP, LLC

3. On each side of vehicle, install stabilizer bar isolator retainer halves (1) (2) around isolator (3).

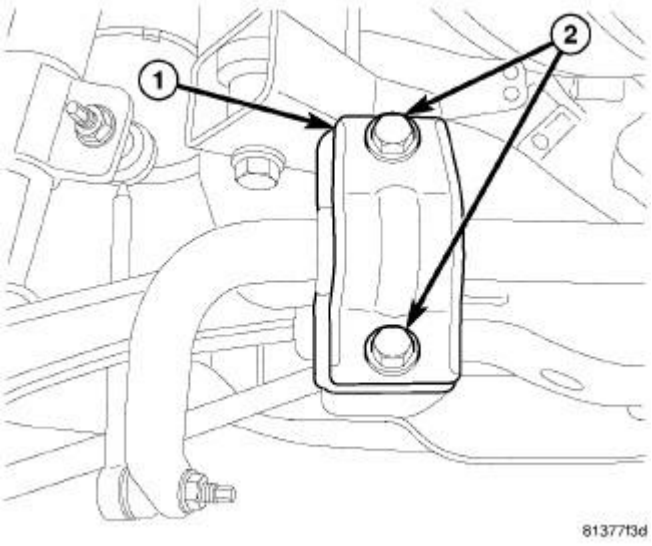


Fig. 210: Front Stabilizer Bar Bushing Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

4. On each side of vehicle, install bolts (2) securing stabilizer bar isolator retainer halves (1) to cradle. Tighten bolts to 60 N.m (44 ft. lbs.).

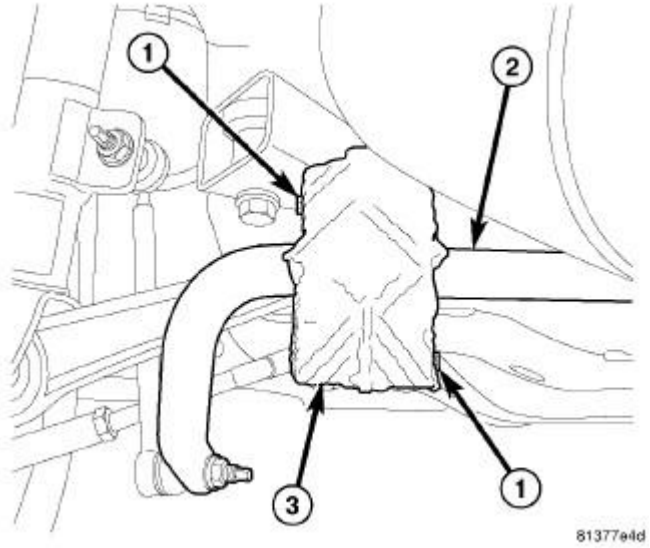


Fig. 211: Front Stabilizer Bar Heat Shield
Courtesy of CHRYSLER GROUP, LLC

5. On each side of vehicle, install stabilizer bar heat shield (3) over stabilizer bar isolator retainer. Install mounting screws (1).

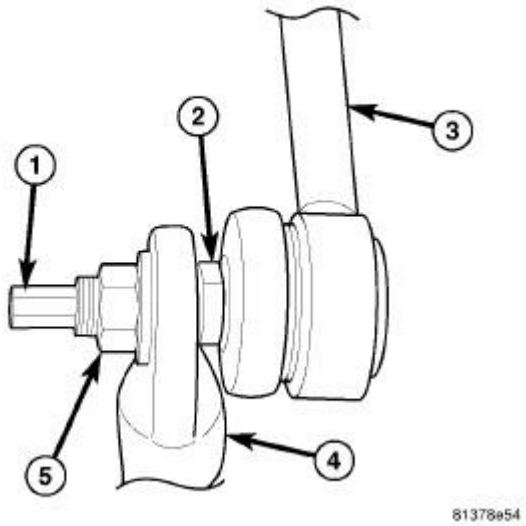


Fig. 212: Link Ball Joint AT Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

6. While holding stem from rotating at hex (1) or flat (2) tighten stabilizer link nuts at each end of

stabilizer bar (4) to 128 N.m (95 ft. lbs.)

7. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .
8. Lower vehicle.

STRUT, TENSION

REMOVAL

REMOVAL

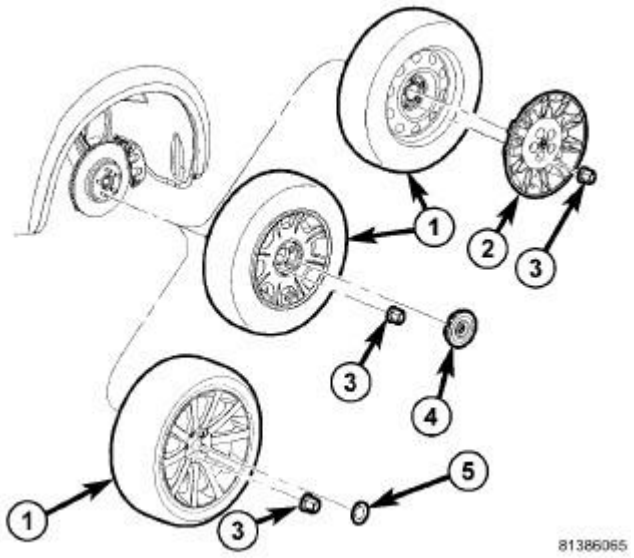


Fig. 213: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).
3. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .

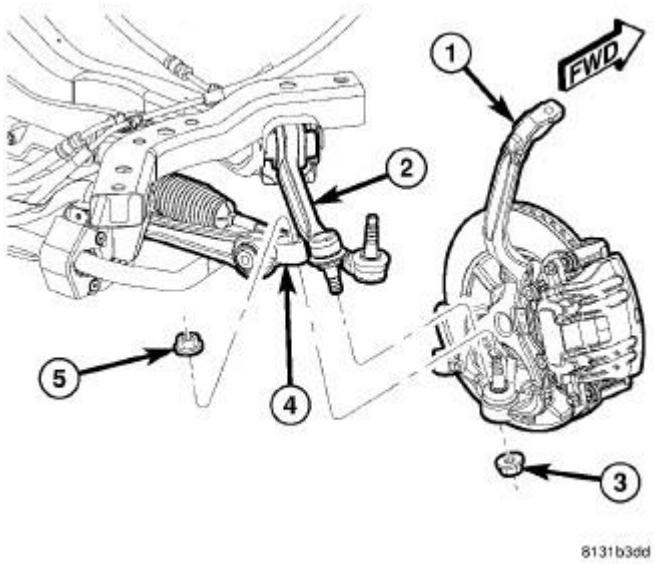


Fig. 214: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

4. Loosen nut (3) attaching tension strut (2) ball joint stud to knuckle. Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

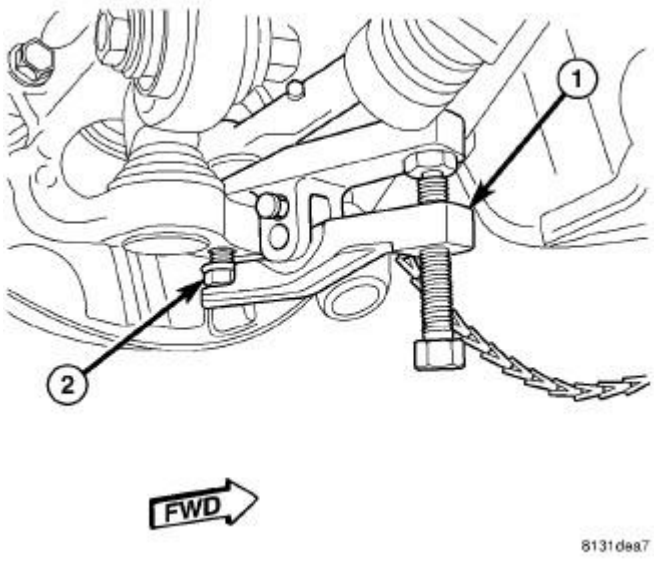


Fig. 215: Using Puller On Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding (special tool #9360, Remover, Ball Joint) into place past seal boot.

5. Using (special tool #9360, Remover, Ball Joint) (1), separate tension strut ball joint stud (2) from knuckle.

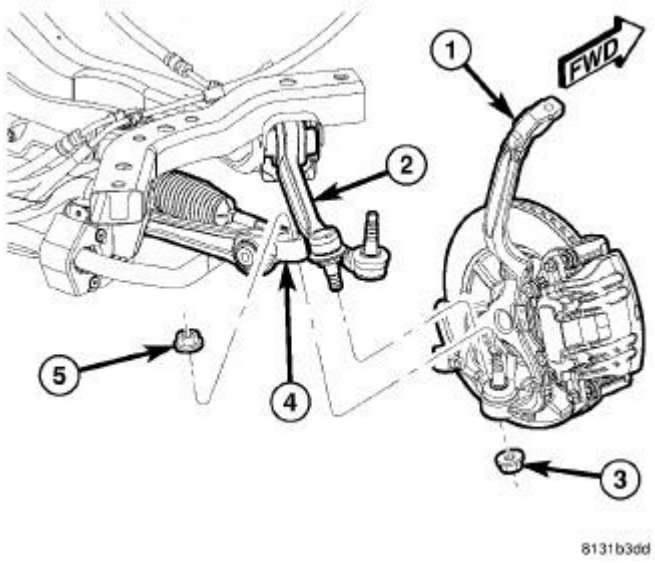


Fig. 216: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

6. Remove nut (3) from end of tension strut (2) ball joint stud.
7. Rotate knuckle outward and push ball joint upward, out of knuckle.

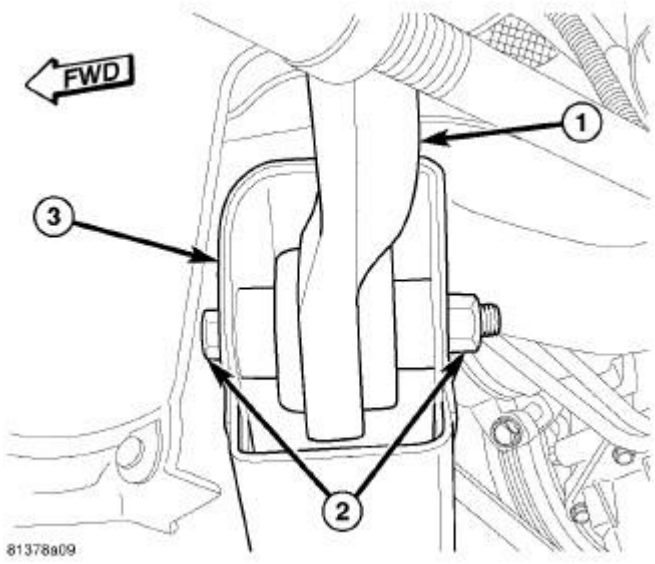


Fig. 217: Tension Strut Cradle Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

8. Remove nut and bolt (2) securing tension strut (1) to engine cradle (3).

9. Slide tension strut out of cradle bracket and remove from vehicle.

INSTALLATION

INSTALLATION

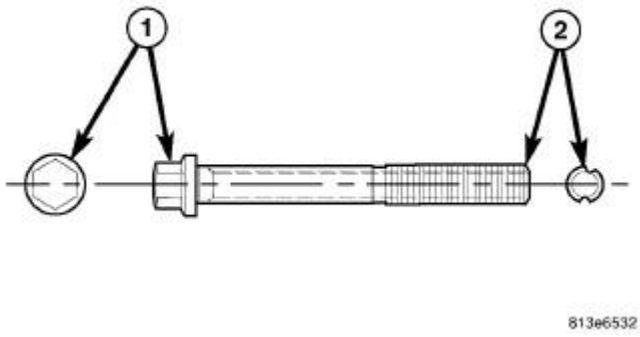


Fig. 218: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: If installing a tension strut engine cradle bolt that is a wheel alignment adjustment bolt (lengthwise grooved shaft (2)), make sure to install it in the same position which it was in upon removal. For more details on installation of this special bolt. Refer to WHEEL ALIGNMENT, STANDARD PROCEDURE.

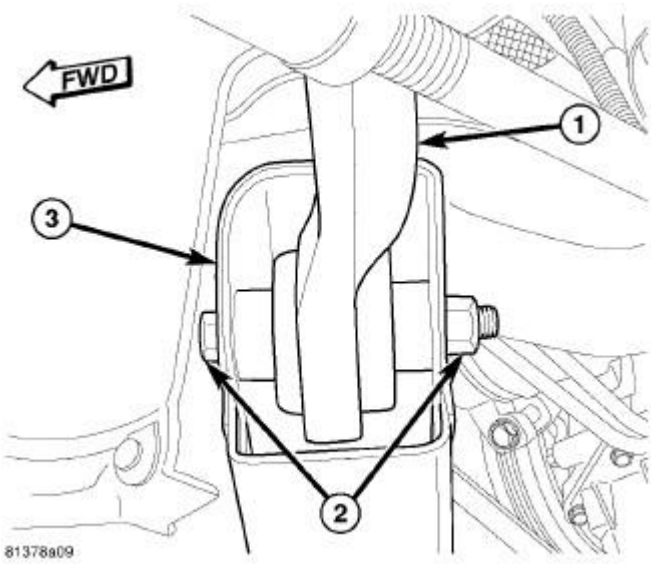


Fig. 219: Tension Strut Cradle Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fasteners for the tension strut must be tightened to specification with vehicle weight on wheels and at curb height. If it is tightened while on a vehicle

hoist, premature failure of the hydrobushing may occur.

1. Slide bushing end of tension strut (1) into cradle bracket (3).
2. Install mounting bolt (2) from front through cradle and bushing.
3. Install nut (2), but **do not tighten at this time** .

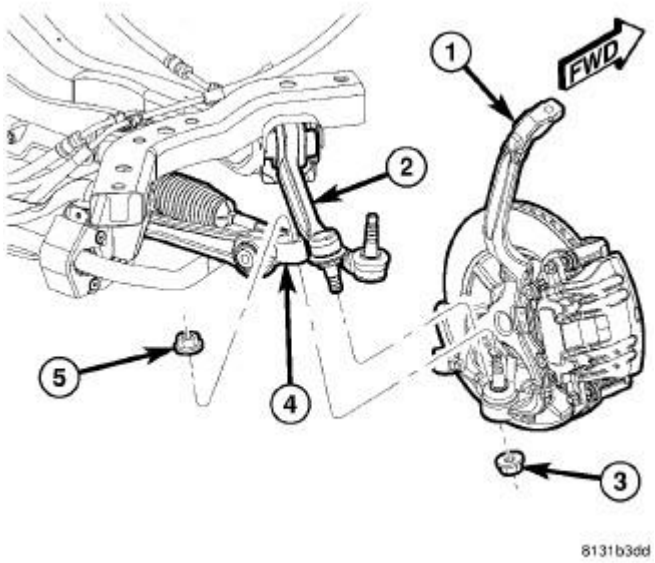


Fig. 220: Ball Joint, Spindle And Outer Tie Rod Attachment
Courtesy of CHRYSLER GROUP, LLC

4. Insert tension strut (2) ball joint stud downward, into knuckle hole.
5. Completely install NEW nut (3) on ball joint stud attaching tension strut (2) to knuckle (1). Tighten nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten nut using crow foot wrench on torque wrench to 68 N.m + 90° turn (50 ft. lbs. + 90° turn).

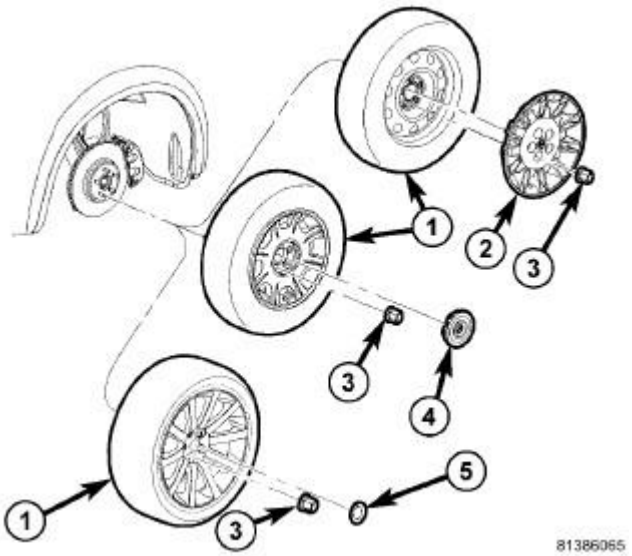


Fig. 221: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
7. Lower vehicle.
8. Position vehicle on an alignment rack/drive-on lift.

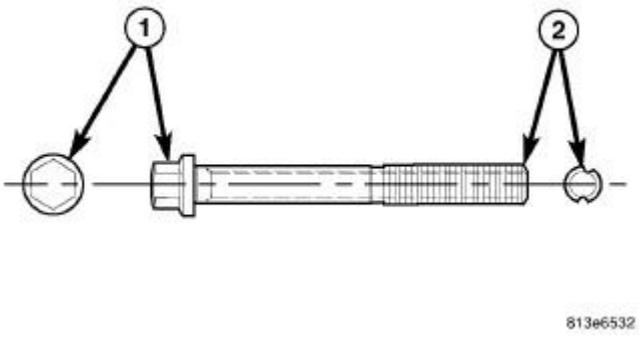


Fig. 222: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

CAUTION: If the tension strut engine cradle bolt is a wheel alignment adjustment bolt (lengthwise grooved shaft (2)), be sure to only tighten the nut. Do not rotate the bolt head (1) or damage to the bushing will occur.

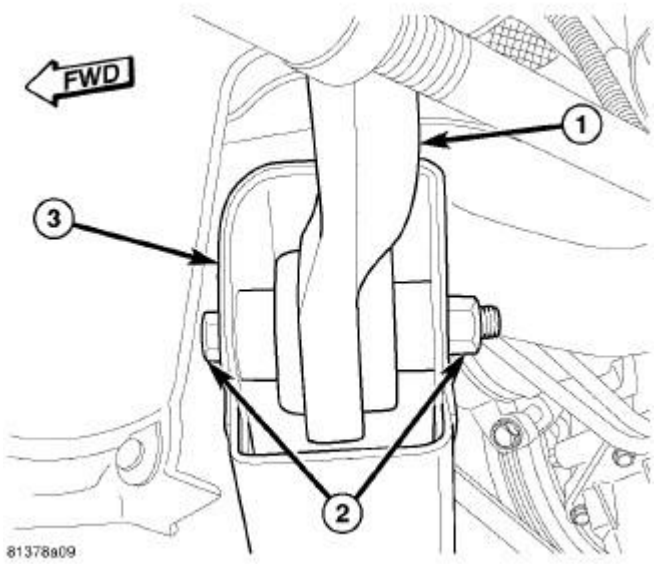


Fig. 223: Tension Strut Cradle Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

10. Once alignment is found to be within specifications, using a crowfoot wrench, tighten tension strut cradle bolt nut (2) to 176 N.m (130 ft. lbs.) while holding the bolt stationary.
11. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .

WHEEL ALIGNMENT

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING

CONDITION	POSSIBLE CAUSES	CORRECTION
Front End Whine On Turns	1. Defective wheel bearing	1. Replace wheel bearing
	2. Incorrect wheel alignment	2. Check and reset wheel alignment
	3. Worn tires	3. Replace tires
Front End Growl Or Grinding On Turns	1. Defective wheel bearing	1. Replace wheel bearing
	2. Engine mount grounding	2. Check for motor mount hitting frame rail and reposition engine as required
	3. AWD - Worn or broken C/V joint	3. Replace C/V joint
	4. Loose wheel lug nuts	4. Verify wheel lug nut torque
	5. Incorrect wheel alignment	5. Check and reset wheel alignment
	6. Worn tires	6. Replace tires

Front End Clunk Or Snap On Turns	1. Loose lug nuts	1. Tighten wheel lug nuts to specifications
	2. Worn or loose tie rod	2. Tighten or replace tie rod end
	3. Worn or loose ball joint	3. Tighten or replace ball joint
	4. Worn/loose control arm bushing	4. Replace control arm or bushing
	5. Loose control arm fasteners	5. Tighten control arm fasteners to specified torque
	6. Loose stabilizer bar	6. Tighten stabilizer bar fasteners to specified torque
	7. Loose crossmember bolts	7. Tighten crossmember bolts to specified torque
Front End Whine With Vehicle Going Straight At A Constant Speed	1. Defective wheel bearing	1. Replace hub and bearing assembly
	2. Incorrect wheel alignment	2. Check and reset wheel alignment
	3. Worn tires	3. Replace tires
Front End Growl Or Grinding With Vehicle Going Straight At A Constant Speed	1. Engine mount grounding	1. Reposition engine/mount as required
Front End Clunk When Accelerating Or Decelerating	1. Worn or broken engine mount	1. Replace engine mount
	2. Loose lug nuts	2. Tighten wheel lug nuts to specified torque
	3. Worn or loose ball joint	3. Replace ball joint/control arm
	4. Worn or loose control arm bushing	4. Replace control arm or bushing
	5. Loose control arm fasteners	5. Tighten fasteners to specified torque
	6. Loose crossmember bolts	6. Tighten crossmember bolts to specified torque
	7. Worn tie rod end	7. Replace tie rod end
Road Wander	1. Incorrect tire pressure	1. Inflate tires to recommended pressure
	2. Incorrect front or rear wheel toe	2. Check and reset wheel toe
	3. Worn wheel bearing	3. Replace hub and bearing
	4. Worn control arm bushings	4. Replace control arm or bushing
	5. Excessive friction in steering gear	
		5. Replace steering gear
	6. Excessive friction in steering shaft coupling	6. Replace steering intermediate shaft/coupler

Lateral Pull	1. Unequal tire pressure	1. Inflate all tires to recommended pressure
	2. Radial tire lead	2. Perform lead correction procedure
	3. Incorrect front wheel camber	3. Check and reset front wheel camber
	4. Power steering gear imbalance	4. Replace power steering gear
	5. Wheel braking	5. Correct braking condition causing lateral pull
Excessive Steering Free Play	1. Incorrect Steering Gear Adjustment	1. Replace Steering Gear
	2. Worn or loose tie rod ends	2. Replace tie rod ends
	3. Loose steering gear mounting bolts	3. Tighten steering gear mounting bolts to specified torque
	4. Loose or worn steering shaft coupler	4. Replace steering intermediate shaft/coupler
Excessive Steering Effort	1. Low tire pressure	1. Inflate all tires to recommended pressure
	2. Lack of lubricant in steering gear	2. Replace steering gear
	3. Low power steering fluid level	3. Fill power steering fluid reservoir to correct level. Bleed as necessary
	4. Loose drive belt	4. Replace adjuster or drive belt
	5. Lack of lubricant in ball joints	5. Replace ball joints
	6. Steering gear malfunction	6. Replace steering gear
	7. Lack of lubricant in steering shaft coupler	7. Replace steering intermediate shaft/coupler

VEHICLE LEAD/PULL

To assure correct diagnosis, it is important to follow the steps outlined below in the order shown in illustration. Road test the vehicle before and after each step to verify that the lead condition has been corrected. When evaluating a vehicle, always drive the same road in both directions to get a feel for the effect of road crown and cross wind. A neutral vehicle will exhibit a small amount of drift on both right and left crowned roads (normal crown sensitivity). A vehicle with pronounced lead/pull may have one or more of the following conditions:

1. UNEQUAL TIRE PRESSURE. Adjust tire pressure to the pressure stated on door placard. Make sure the tire pressure is equal on all four tires and evaluate the car. Also verify that the tire size and type are correct and match each other. If the car still has a lead condition go to step (2).
2. TIRE CONICITY. Excessive tire conicity is one of the more frequent causes of vehicle lead. Cross-switch the front tires and evaluate the car. If the car still leads in the same direction or

gets worse, return the front tires to their original position, then go to step (3).

3. SUSPENSION ALIGNMENT. Check and record the wheel alignment settings. Non-symmetrical front caster or camber can sometimes cause a lead condition or can be used to fix a lead condition. Adjust the wheel alignment as necessary to preferred settings. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**. If the car still leads, go to step (4).
4. STEERING GEAR VALVE IMBALANCE. Steering gear valve imbalance can sometimes cause a vehicle lead. Although there is no quick test or measurement that can be performed to verify a good or bad steering gear valve, generally the steering efforts will feel much lighter in the lead direction and heavier in the opposite direction with an unbalanced valve. Replace the steering gear only as a "last resort" to solve the problem. To replace the steering gear. Refer to **GEAR, REMOVAL** .

STANDARD PROCEDURE

WHEEL ALIGNMENT

NOTE: If the vehicle is equipped with Adaptive Cruise Control (ACC), the ACC module must be realigned following any wheel alignment changes. Refer to SENSOR AND BRACKET, ADAPTIVE SPEED CONTROL, STANDARD PROCEDURE .

PRE-WHEEL ALIGNMENT INSPECTION

Before any attempt is made to change or correct the wheel alignment, the following inspection and necessary corrections must be made to ensure proper alignment.

1. Verify that the fuel tank is full of fuel. If the tank is not full, the reduction in weight will affect the curb height of the vehicle and the alignment angles.
2. The vehicle's passenger and luggage compartments should be free of any load that is not factory equipment.
3. Check the tires on the vehicle. All tires must be the same size and in good condition with approximately the same amount of tread wear. Inflate all the tires to the recommended air pressure.
4. Check the wheel and tire assemblies for excessive radial runout.
5. Inspect lower ball joints and all steering linkage for looseness, binding, wear or damage. Repair as necessary.
6. Check suspension fasteners for proper torque and tighten as necessary.
7. Inspect all suspension component rubber bushings for signs of wear or deterioration. Replace any faulty bushings or components before aligning the vehicle.
8. Check the vehicle's curb height to verify it is within specifications. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

WHEEL ALIGNMENT SETUP

NOTE: Confirm the wheel alignment equipment is calibrated to the manufacturers requirements prior to attempting any wheel alignment.

1. Position the vehicle on an alignment rack.
2. Install all required alignment equipment on the vehicle per the alignment equipment manufacturer's instructions. On this vehicle, a four-wheel alignment is recommended.

NOTE: **Prior to reading the vehicle's alignment readouts, the front and rear of vehicle should be jounced (suspension compressed/released). Induce jounce (rear first, then front) by grasping the center of the bumper and jouncing each end of vehicle an equal number of times. The bumper should always be released when vehicle is at the bottom of the jounce cycle.**

3. Read the vehicle's current front and rear alignment settings. Compare the vehicle's current alignment settings to the vehicle specifications for camber, caster and toe. Refer to **WHEEL ALIGNMENT, SPECIFICATIONS**.
4. If front camber and caster are not within specifications, proceed to CAMBER AND CASTER below. If caster and camber are within specifications, proceed to TOE which can be found following CAMBER AND CASTER. Rear camber can be adjusted. Refer to CAMBER AND CASTER below. Rear caster is not adjustable. If found not to be within specifications, reinspect for damaged suspension or body components and replace as necessary. If rear toe is not within specifications, adjust rear toe before proceeding to adjust front toe.

CAMBER AND CASTER

Camber and caster settings on this vehicle are determined at the time the vehicle is designed, by the location of the vehicle's suspension components. This is referred to as NET BUILD. The result is no required adjustment of camber and caster after the vehicle is built or when servicing the suspension components. Thus, when performing a wheel alignment, caster and camber are not normally considered adjustable angles. Camber and caster should be checked to ensure they meet vehicle specifications.

CAUTION: Do not attempt to adjust a vehicles wheel alignment by heating, bending or by performing any other modification to the vehicle's suspension components or body.

If individual front camber or caster is found not to meet alignment specifications, each can be adjusted by shifting the engine cradle if cross-camber and cross-caster are within specifications, or by using an available service adjustment bolt package. Always try to shift the cradle first **(if camber and caster are off slightly)** to correct the misalignment before installing an adjustment bolt package. If an adjustment bolt package installation is necessary, inspect the suspension components for any signs of damage or bending first. Refer to the following procedures for adjustments.

If individual rear camber is found not to meet alignment specifications, repair camber links are available in Plus or Minus One Millimeter (1 mm) lengths. A Plus or Minus 1 mm repair camber link will change camber approximately 0.5-0.7 degrees in the preferred direction. Before installing non-standard length camber links on a vehicle found to be outside the specifications, inspect the suspension components for any signs of damage or bending. To install either repair camber link.

Refer to **LINK, CAMBER, INSTALLATION** or **LINK, COMPRESSION, INSTALLATION** or **LINK, SPRING, INSTALLATION** or **LINK, TENSION, INSTALLATION** or **LINK, TOE, INSTALLATION** .

ADJUSTMENT BY SHIFTING CRADLE

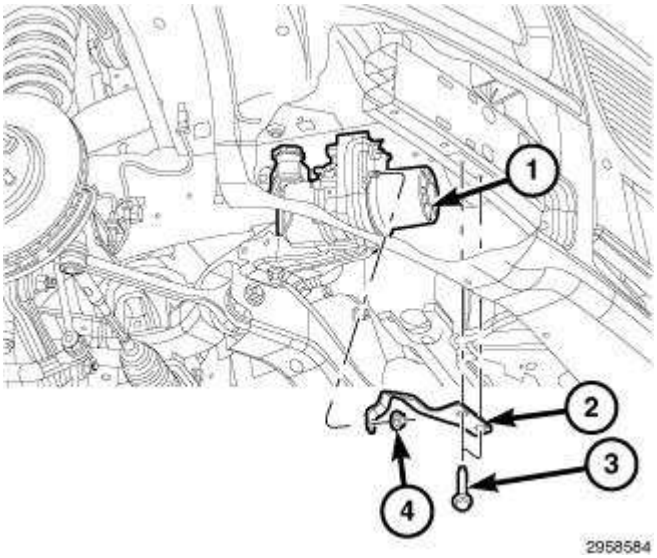


Fig. 224: EHPS Pump Bracket Retaining Nut & EHPS Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: This vehicle is equipped with an Electro Hydraulic Power Steering (EHPS) system. The bolts (3) for the EHPS front mounting bracket (2) must be loosened before shifting the cradle. After the cradle has been shifted and the cradle mounting fasteners have been tightened to the correct specification, tighten the EHPS mounting bracket bolts to the correct specification.

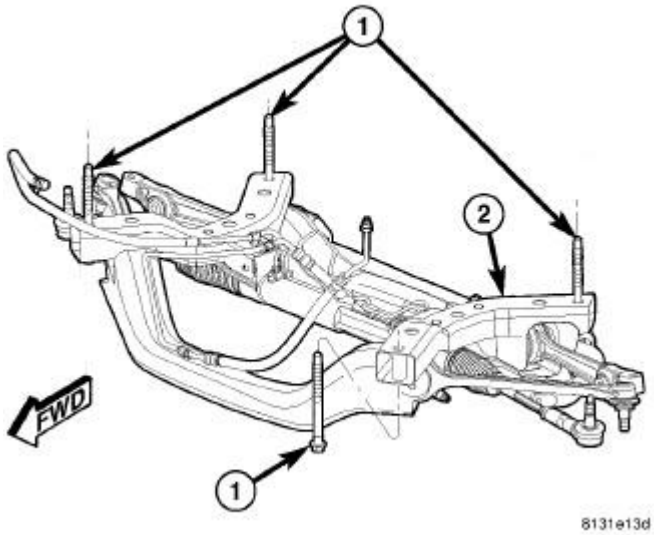


Fig. 225: Engine Cradle Mounting Bolts

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always use care when shifting cradle to avoid damaging other components on the vehicle.

1. Loosen the four bolts (1) fastening the engine cradle (2) to the frame just enough to allow movement of the cradle.
2. Shift cradle as necessary to bring camber or caster into specifications. When shifting cradle, use care not to move other angles (camber or caster) that are within specifications, out of specifications.
3. Tighten the four bolts (1) fastening the engine cradle (2) to the frame to specifications.
4. Jounce the rear, then front of the vehicle an equal amount of times.
5. Measure camber and caster. If camber and caster are within specifications, proceed to TOE. If camber or caster cannot be brought into specifications, perform the ADJUSTMENT BOLT PACKAGE INSTALLATION below.

ADJUSTMENT BOLT PACKAGE INSTALLATION - ALL-WHEEL-DRIVE (AWD)

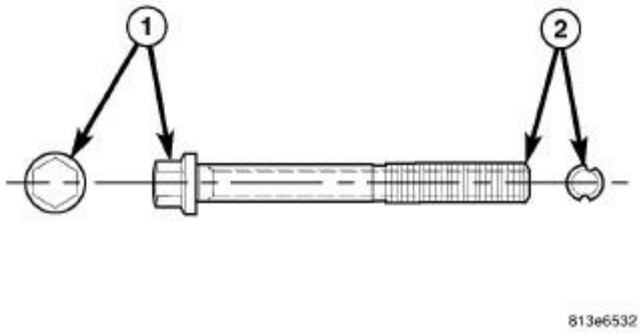


Fig. 226: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

The adjustment bolt package contains 2 special bolts (1). These bolts can be identified by the offset grooves cut into the thread section (2). These bolts are designed to replace the inboard mounting bolts of the lower control arm at the engine cradle. Each bolt allows approximately 0.3 degrees of movement. To adjust camber only, use both bolts, one at each leg of the control arm. To adjust caster only, use one bolt at the front leg only.

1. Raise the vehicle by the frame until the tires are not supporting the weight of the vehicle.
2. Remove the belly pan as necessary. Refer to **BELLY PAN, REMOVAL** .
3. Lower control arm rear bolt only:
    1. Remove the screws fastening the heat shields covering the steering gear inner tie rod boots. Remove the heat shields.
    2. Loosen (do not remove) the steering gear mounting bolt furthest from the side of

adjustment bolt installation.

3. Remove the two remaining steering gear mounting bolts and allow steering gear to relax on the side of adjustment bolt installation, giving access to the lower control arm rear mounting bolt.

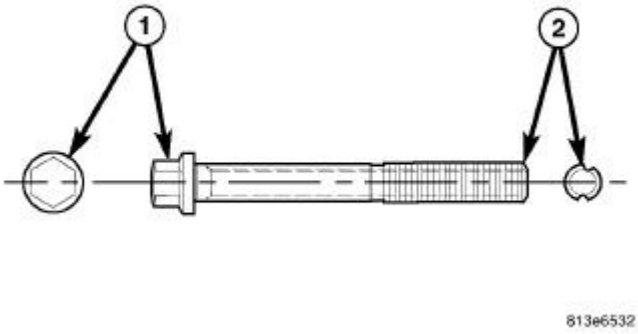


Fig. 227: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Wheel alignment adjustment bolts have offset grooves cut into the length of the bolt (2). If removing or installing lower control arm or tension strut mounting bolts that have these grooves, DO NOT ROTATE THE BOLT. To remove the bolt, hold the bolt head stationary and rotate the nut, then slide the bolt straight out of the bushing. This is necessary to avoid damaging the bat wings in the bushing inner metal or cradle.

4. Hold the head of the control arm or tension strut mounting bolt stationary and remove the nut. Slide the bolt straight out of the bushing and discard.

CAUTION: When installing an adjustment bolt, be sure to install it in the correct direction. Lower control arm rear mounting bolts must be installed from the rear-forward and lower control arm front mounting bolts must be installed from the front-rearward.

NOTE: The grooves on the adjustment bolts are off-center forcing the bolt to be installed in one of two ways depending on whether more positive or negative camber or caster is necessary. The Bolts must be rotated 180° to achieve either more positive or negative camber or caster. DO NOT force the adjustment bolt.

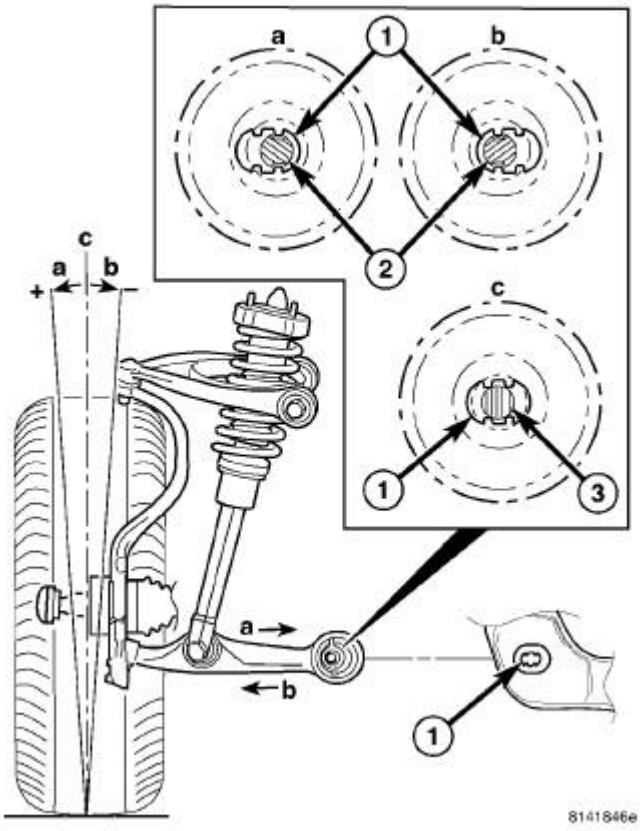


Fig. 228: Installing Camber Bolt - AWD
Courtesy of CHRYSLER GROUP, LLC

NOTE: The original (non-grooved) mounting bolt (3) lies through the center of the hole (1), between the "bat wings" as shown in illustration (c).

5. Camber Adjustment - The adjustment bolts are designed to work in conjunction with "bat wing" holes that are formed into the engine cradle (1) allowing for lower control arm movement approximately 0.3° in either direction.
    - To achieve more positive camber, refer to (a) in the figure. Move the control arm in the desired direction, then insert the adjustment bolt (2) with a washer installed through the bat wing hole in the engine cradle (1) and round hole in the bushing inner metal.
    - To achieve more negative camber, refer to (b) in the figure. Move the control arm in the desired direction, then insert the adjustment bolt (2) with a washer installed through the bat wing hole in the engine cradle (1) and round hole in the bushing inner metal.

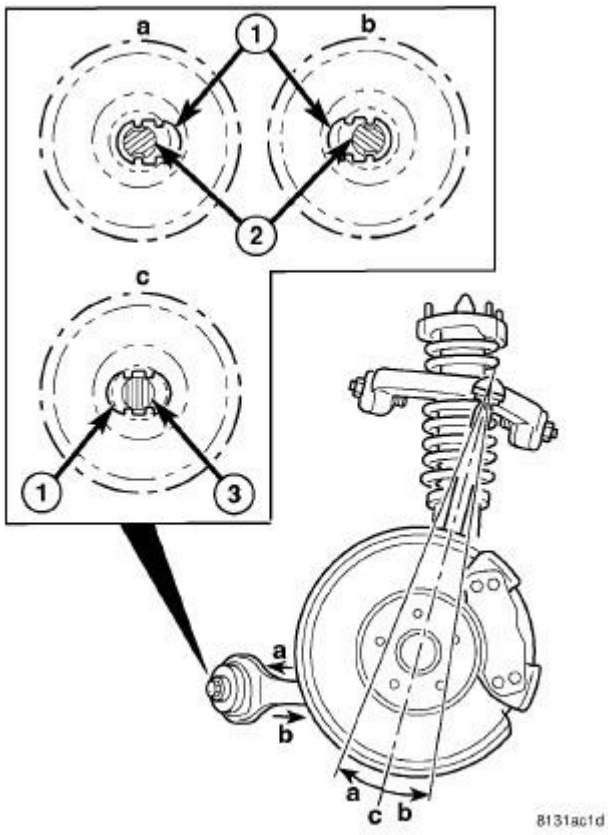


Fig. 229: Installing Caster Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The original (non-grooved) mounting bolt (3) lies through the center of the hole (1), between the "bat wings" as shown in illustration (c).

6. Caster Adjustment - The adjustment bolts are designed to work in conjunction with "bat wings" that are formed into the engine cradle (1) allowing for lower control arm movement approximately 0.3° in either direction.
   - To achieve more positive caster, refer to (a) in the figure. Move the lower control arm in the desired direction, then insert the adjustment bolt (2) with a washer installed through the bat wing hole in the engine cradle (1) and the round hole in the bushing inner metal.
   - To achieve more negative caster, refer to (b) in the figure. Move the lower control arm in the desired direction, then insert the adjustment bolt (2) with a washer installed through the bat wing hole in engine cradle (1) and round hole in the bushing inner metal.
7. Start a NEW nut on the end of the mounting bolt by hand, then while holding the head of the bolt stationary, install the nut. **Do not tighten the nut at this time.**
8. Rear adjustment bolt only - Reinstall the steering gear and heat shields. Refer to **GEAR, INSTALLATION** .
9. Lower the vehicle to curb position. Jounce the rear, then the front of the vehicle an equal amount of times.

10. Using a crowfoot wrench, tighten the adjustment bolt **nut** to 176 N.m (130 ft. lbs.) while holding the bolt stationary. A socket on the end of a breaker bar works well for holding the rear bolt stationary with the steering gear is installed.
11. Measure camber and caster. If camber and caster are not within specifications, inspect the suspension components for any signs of damage or bending. If camber and caster (and cross-camber and cross-caster) are within specifications, proceed with TOE to check and adjust toe.
12. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .

TENSION STRUT CAMBER BOLT INSTALLATION - REAR-WHEEL-DRIVE (RWD)

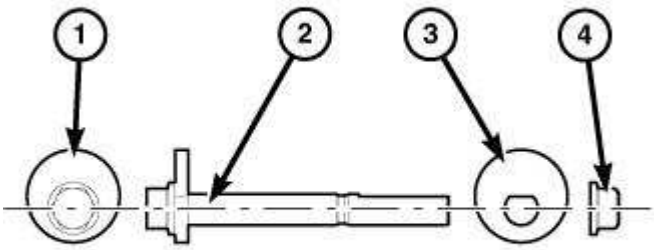


Fig. 230: Camber Bolt, Eccentric Washer & Eccentric Washer
Courtesy of CHRYSLER GROUP, LLC

Camber on rear wheel drive (RWD) vehicles can be adjusted by grinding out the tension strut mounting holes in the cradle and installing a camber bolt kit. The camber bolt (2) has an eccentric washer (1) built into the shoulder of the bolt head. There is an eccentric washer (3) that is keyed to a flat machined into the threads of the bolt. The keyed washer rotates in exactly the same way that the washer on the bolt head end rotates.

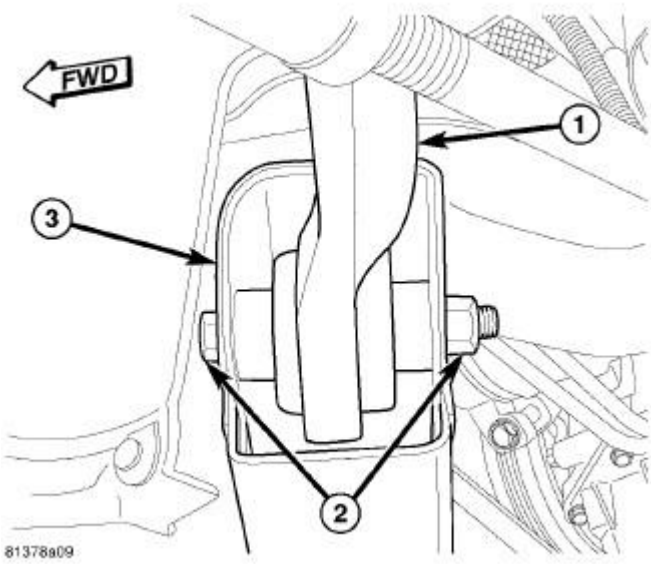


Fig. 231: Tension Strut Cradle Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the belly pan as necessary. Refer to **BELLY PAN, REMOVAL** .
3. Remove nut and bolt (2) securing tension strut (1) to engine cradle (3).
4. Slide tension strut out of cradle bracket and discard.

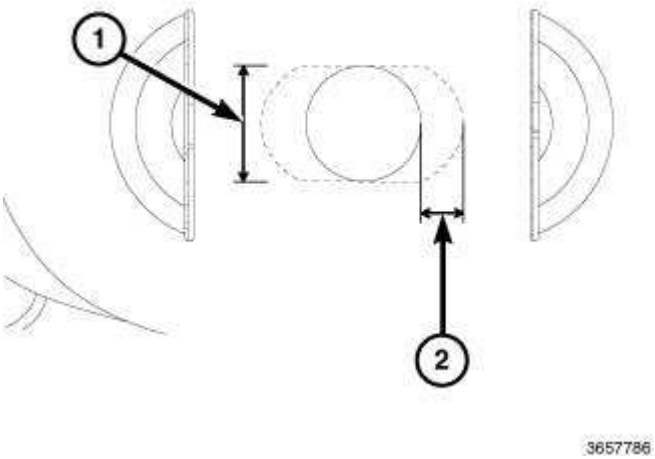


Fig. 232: Original Height
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove more than 5mm (0.2 in) (2) of material on either side of the existing mounting hole so that the strength of the tension strut mounting area is maintained. Also do not exceed the original height

(1) of the mounting hole.

NOTE: Grind out both the front and rear holes of the tension strut mounting area.

5. Grind out the area in the figure that is represented with dotted lines. Remove 5 mm (0.2 in) of material (2) from each side of the existing bolt hole. While cutting the material, maintain the original height (1) of the bolt hole.

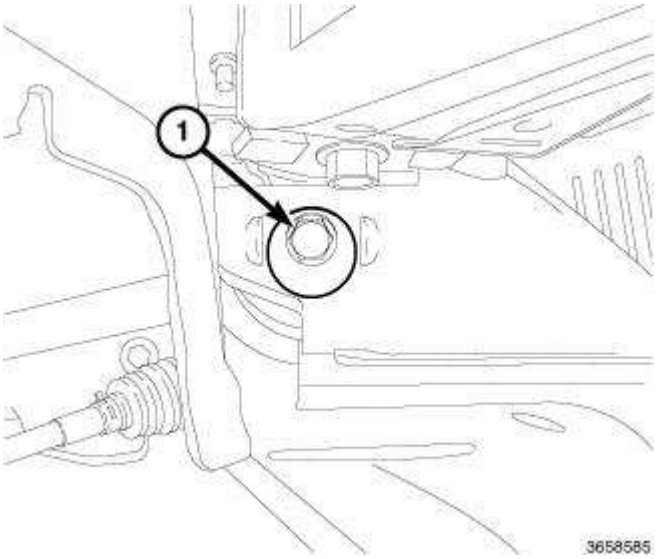


Fig. 233: Camber Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the camber bolt (1) into the front hole and install the eccentric washer on the bolt on the rear side of crossmember.
7. To adjust the camber, rotate the camber bolt (1) until the desired camber values are obtained.
8. Once the desired camber values are obtained, tighten the camber bolt (1) to 176 N.m (130 Ft. Lbs.).

TOE

CAUTION: If the steering wheel is excessively off-center while driving, outside of Chassis specifications, inadvertent ESC activations may occur on a vehicle so equipped.

1. Center the steering wheel and lock in place using a steering wheel clamp.

NOTE: When performing the toe adjustment procedure, set rear toe to specifications before setting front toe.

2. If rear toe is not within specifications, perform the REAR TOE procedure below.
3. If front toe is not within specifications, perform the FRONT TOE procedure below.

4. Remove the steering wheel clamp.
5. Remove the alignment equipment.
6. Road test the vehicle to verify the steering wheel is straight and the vehicle does not wander or pull.

REAR TOE

NOTE: Perform the following procedure to each side of the vehicle as necessary.

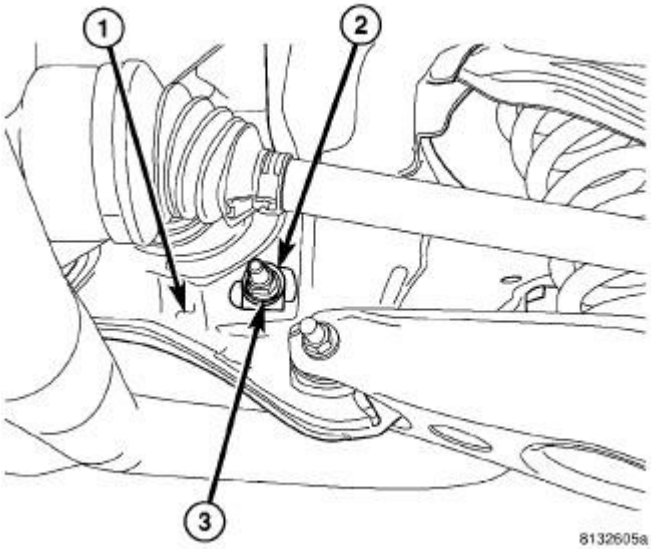


Fig. 234: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

1. Loosen the cam bolt nut securing the toe link to the rear crossmember (front of rear crossmember) just enough to rotate the cam bolt (1).

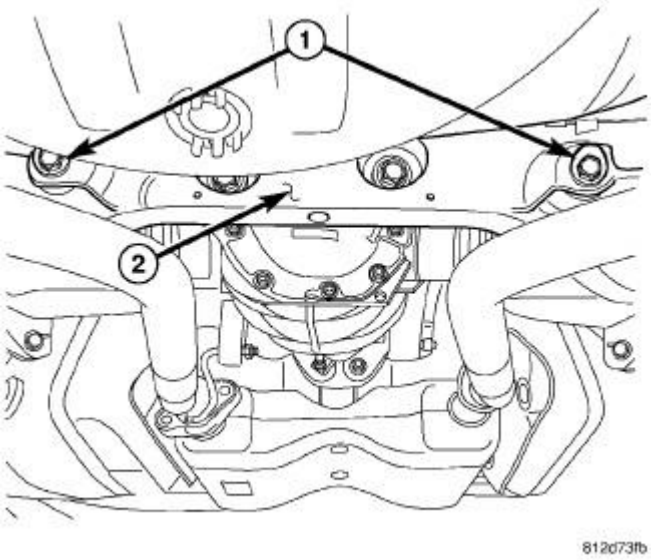


Fig. 235: Rear Toe Adjustment Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: When adjusting rear toe, the eccentric lobes on the toe adjustment cam bolts and washers are not to be facing downward. The lobes should only be facing upward or up to 90° to one side or the other from the 12 O'clock position.

2. Rotate the cam bolt head on the opposite side (rear) of the crossmember in either direction until the preferred specification is obtained. Refer to **WHEEL ALIGNMENT, SPECIFICATIONS**.
3. While holding the cam bolt (1) from turning, tighten the cam bolt nut to specifications.
4. Adjust rear toe on opposite side of vehicle using above procedure as necessary.
5. Once rear toe is set, proceed to FRONT TOE to set the vehicle's front toe.

FRONT TOE

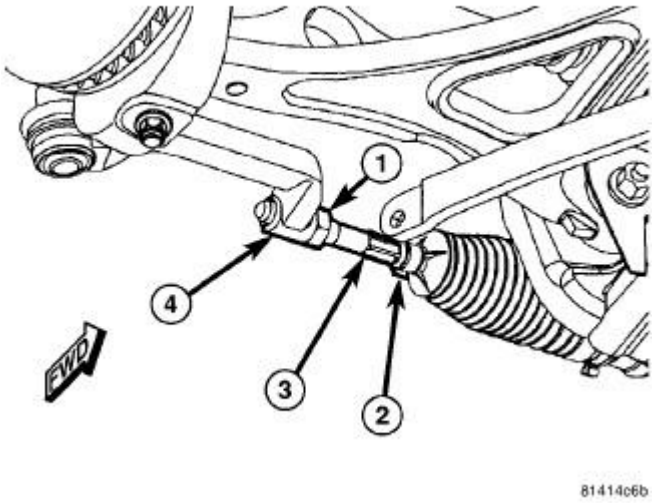


Fig. 236: Removing/Installing Tie Rods (AWD)
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform the following procedure to each side of the vehicle as necessary.

CAUTION: Do not twist the inner tie rod-to-steering gear boots during front wheel Toe adjustment. Remove the boot clamps (2) at the inner tie rods and make sure the boots move freely on the inner tie rods.

1. AWD - Loosen the jam nut (1) at the inner-to-outer tie rod (3-4) connection.

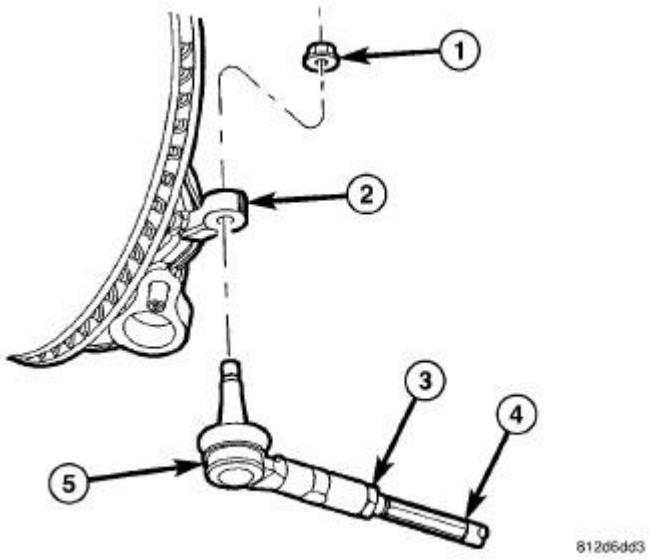


Fig. 237: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

2. RWD - Loosen the jam nut (3) at the inner-to-outer tie rod (4-5) connection.

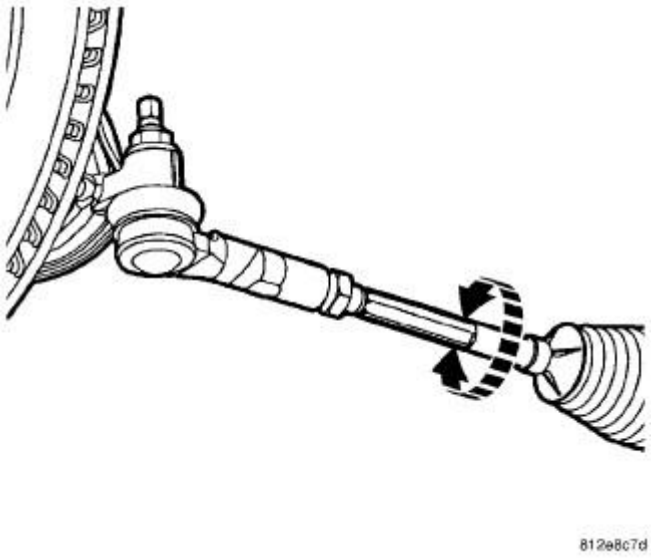


Fig. 238: Front Toe Adjustment
Courtesy of CHRYSLER GROUP, LLC

3. Grasp the inner tie rod at the hex and rotate as necessary to adjust front toe to the preferred toe specification. Refer to **WHEEL ALIGNMENT, SPECIFICATIONS**.

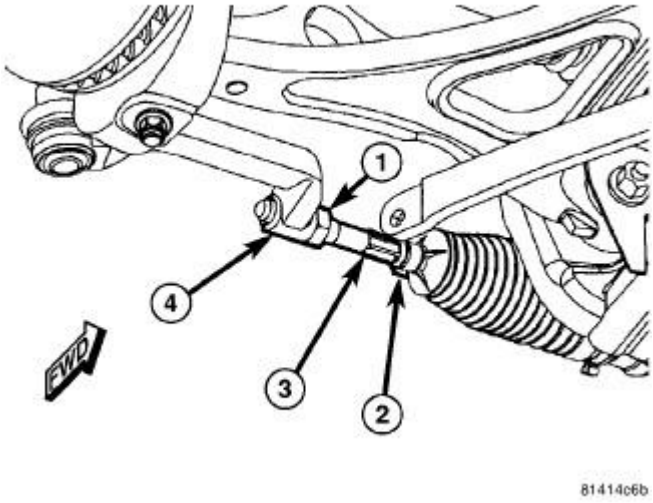


Fig. 239: Removing/Installing Tie Rods (AWD)
Courtesy of CHRYSLER GROUP, LLC

4. AWD - Tighten the tie rod jam nut (3) to 75 N.m (55 ft. lbs.) using care not to lose adjustment.

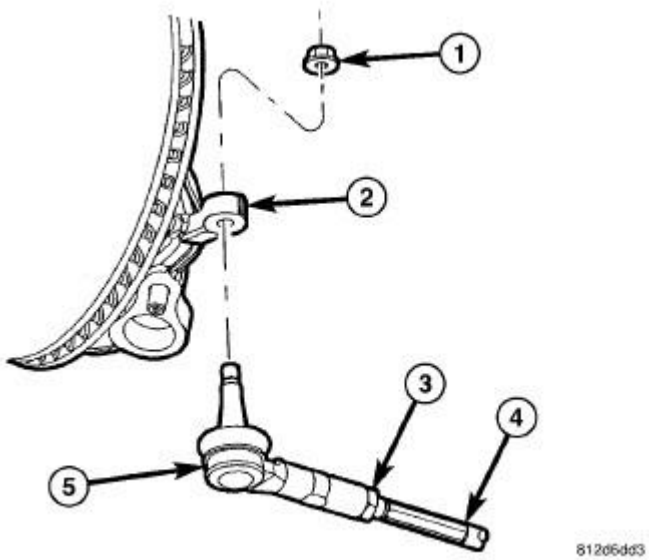


Fig. 240: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

5. RWD - Tighten the tie rod jam nut (3) to 75 N.m (55 ft. lbs.) using care not to lose adjustment.
6. Make sure the inner tie rod-to-steering gear boot is not twisted, then reinstall the boot clamp at the inner tie rod.
7. Adjust front toe on opposite side of vehicle using the above procedure as necessary.

CURB HEIGHT MEASUREMENT

The wheel alignment is to be checked and all alignment adjustments made with the vehicle at its required curb height specification.

Vehicle height is to be checked with the vehicle on a flat, level surface, preferably a vehicle alignment rack. The tires are to be inflated to the recommended pressure. All tires are to be the same size as standard equipment. Vehicle height is checked with the fuel tank full of fuel, and no passenger or luggage compartment load.

Vehicle height is not adjustable. If the measurement is not within specifications, inspect the vehicle for bent or weak suspension components. Compare the parts tag on the suspect coil spring(s) to the parts book and the vehicle sales code, checking for a match. Once removed from the vehicle, compare the coil spring height to a correct new or known good coil spring. The heights should vary if the suspect spring is weak.

NOTE: When measuring, the maximum left-to-right differential is not to exceed 12.5 mm (0.5 in.).

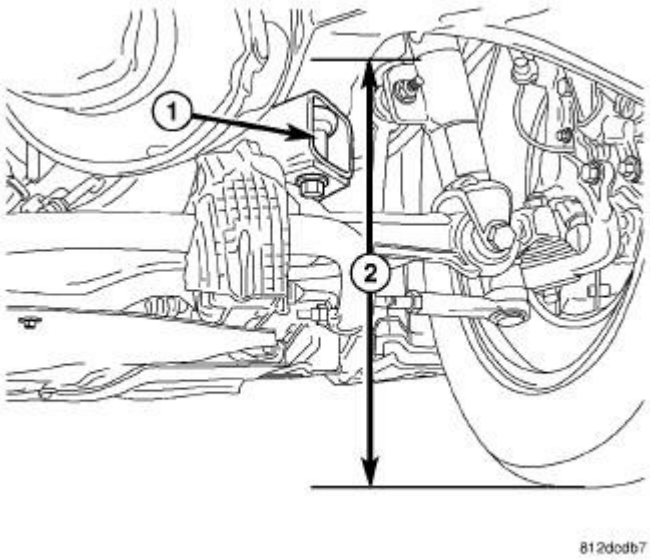


Fig. 241: Front Curb Height Measurement
Courtesy of CHRYSLER GROUP, LLC

1. Front - On each side of the vehicle, measure the distance (2) from the frame rail just behind the engine cradle rear mount (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge, placed from lift runway to runway, to get an accurate measurement.

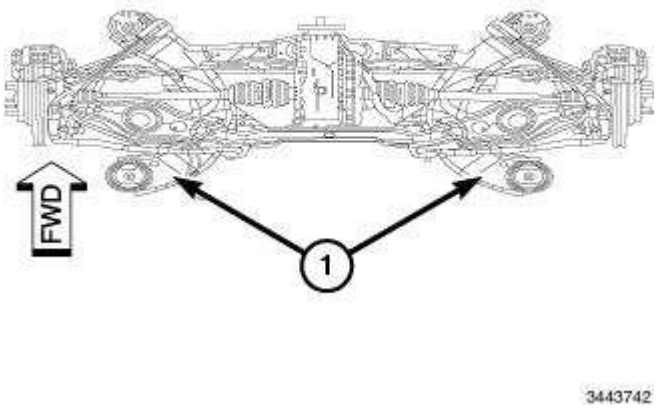


Fig. 242: Cradle Frame
Courtesy of CHRYSLER GROUP, LLC

2. Rear - On each side of the vehicle, measure the distance from the cradle frame (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge, placed from lift runway to runway, to get an accurate measurement.
3. Compare the measurements to the specifications listed in the following Curb Height

Specifications chart.

CURB HEIGHT SPECIFICATIONS

MODEL	FRONT	REAR
ALL-WHEEL-DRIVE	344 mm ± 12 mm 13.54 in. ± 0.47 in	367 mm ± 12 mm 14.45 in. ± 0.47 in.
REAR-WHEEL-DRIVE WITH 17 INCH WHEELS	317 mm ± 12 mm 12.48 in. ± 0.47 in	344 mm ± 12 mm 13.54 in. ± 0.47 in.
REAR-WHEEL-DRIVE WITH 18 INCH WHEELS	325 mm ± 12 mm 12.80 in. ± 0.47 in	352 mm ± 12 mm 13.86 in. ± 0.47 in.
REAR-WHEEL-DRIVE WITH 20 INCH WHEELS	331 mm ± 12 mm 13.03 in. ± 0.47 in	358 mm ± 12 mm 14.09 in. ± 0.47 in.

SPECIFICATIONS

WHEEL ALIGNMENT

NOTE: All specifications are given in degrees.

NOTE: All wheel alignments are to be set at curb height. Refer to WHEEL ALIGNMENT, STANDARD PROCEDURE.

ALL-WHEEL-DRIVE

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER - LEFT	0.00	-0.55° to +0.55°
CAMBER - RIGHT	-0.40°	-0.95° to +0.15°
CROSS-CAMBER (Maximum side-to-side difference)*(1)	+0.40°	-0.15° to +0.95°
CASTER - LEFT	+5.40°	+4.40° to +6.40°
CASTER - RIGHT	+5.40°	+4.40° to +6.40°
CROSS-CASTER* (1) (Maximum side-to-side difference)	0.00	-0.60° to +0.60°
TOE - TOTAL**(2)	+0.10°	-0.10° to +0.30°
Maximum side-to-side difference	0.00°	0.06°

Notes:

(1) * Cross Alignment values are determined by taking the left side value minus the right side value.

(2) ** TOTAL TOE is the sum of both left and right wheel toe settings. TOTAL TOE should be equally split between each wheel on the same axle to ensure the steering wheel is centered

after setting toe.

Positive toe is toe-in and negative toe is toe-out.

REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.75°	-1.30° to -0.20°
CROSS-CAMBER (Maximum side-to-side difference)	0.00°	-0.80° to +0.80°
TOE - INDIVIDUAL LEFT	+0.10°	-0.05° to +0.25°
TOE - INDIVIDUAL RIGHT	+0.10°	-0.05° to +0.25°
THRUST ANGLE	0.00°	-0.15° to +0.15°

REAR-WHEEL-DRIVE - NON SRT8

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER - LEFT	-0.85°	-1.40° to -0.30°
CAMBER - RIGHT	-1.25°	-1.80° to -0.70°
CROSS-CAMBER* (Maximum side-to-side difference)	+0.40°	-0.15° to +0.95°
CASTER - LEFT	+8.00°	+7.00° to +9.00°
CASTER - RIGHT	+8.70°	+7.70° to +9.70°
CROSS-CASTER * (1) (Maximum side-to-side difference)	-0.70°	-1.30° to -0.10°
TOE - TOTAL**(2)	+0.20°	0.00° to +0.40°
Maximum side-to-side difference	0.00°	0.06°

Notes:

(1) * Cross Alignment values are determined by taking the left side value minus the right side value.

(2) ** TOTAL TOE is the sum of both left and right wheel toe settings. TOTAL TOE should be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe.

Positive toe is toe-in and negative toe is toe-out.

REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-1.75°	-2.30° to -1.20°
CROSS-CAMBER (Maximum side-to-side difference)	0.00°	-0.80° to +0.80°
TOE - INDIVIDUAL LEFT	+0.10°	-0.05° to +0.25°

TOE - INDIVIDUAL RIGHT	+0.10°	-0.05° to +0.25°
THRUST ANGLE	0.00°	-0.15° to +0.15°

SRT8

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER - LEFT	-1.05°	-1.60° to -0.50°
CAMBER - RIGHT	-1.35°	-1.90° to -0.80°
CROSS-CAMBER * (Maximum side-to-side difference)(1)	+0.30°	-0.25° to +0.85°
CASTER - LEFT	+8.30°	+7.30° to +9.30°
CASTER - RIGHT	+9.00°	+8.00° to +10.00°
CROSS-CASTER * (Maximum side-to-side difference)(1)	-0.70°	-1.30° to -0.10°
TOE - TOTAL**(2)	+0.20°	0.00° to +0.40°
Notes: (1) * Cross Alignment values are determined by taking the left side value minus the right side value. (2) ** TOTAL TOE is the sum of both left and right wheel toe settings. TOTAL TOE must be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe. Positive toe is toe-in and negative toe is toe-out		

REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER*(1)	-0.75°	-1.30° to -0.20°
CROSS-CAMBER (Maximum side-to-side difference)	0.00°	-0.80° to +0.80°
TOE - INDIVIDUAL LEFT	+0.10°	-0.05° to +0.25°
TOE - INDIVIDUAL RIGHT	+0.10°	-0.05° to +0.25°
THRUST ANGLE	0.00°	-0.15° to +0.15°
Notes: (1) * For reference only. These are nonadjustable angles.		

FUEL DELIVERY, DIESEL

STANDARD PROCEDURE

DIESEL FUEL SYSTEM CONTAMINATION

NOTE: Fuel system damage that was caused by incorrect or contaminated fuel that was introduced into the fuel system by the customer is not covered under warranty.

IF THE ENGINE WAS NOT STARTED AFTER INCORRECT OR CONTAMINATED FUEL WAS USED DURING REFUELING

If the fuel system has been contaminated (with gasoline, water, etc.) AND the engine WAS NOT STARTED, the following procedure must be followed:

1. Drain the fuel from the fuel tank. Refer to **DRAINING FUEL TANK - DIESEL** . Use an appropriate fuel container. Dispose of the contaminated fuel using the proper procedures.

   CAUTION: Dispose of petroleum based products in a manner consistent with all applicable Local, State, Federal, and Provincial regulations.

2. Remove the fuel tank. Refer to **TANK, FUEL, REMOVAL** or **TANK, FUEL, REMOVAL**.
3. Ensure the swirl pot indentation below the in the fuel tank electric fuel pump inlet is completely drained of any contaminated fuel.
4. Completely drain the low pressure fuel lines, and install a new fuel filter.
5. Install the fuel tank, and fill with clean diesel fuel.
6. Road test the vehicle to verify normal operation.

IF THE ENGINE WAS STARTED AFTER INCORRECT OR CONTAMINATED FUEL WAS USED DURING REFUELING

If the fuel system has been contaminated (with gasoline, water, etc.) AND the engine WAS STARTED, the following procedure must be followed:

1. Remove all fuel from the fuel tank. Refer to **DRAINING FUEL TANK - DIESEL** . Use an appropriate fuel container. Dispose of the contaminated fuel using the proper procedures.

   CAUTION: Dispose of petroleum based products in a manner consistent with all applicable Local, State, Federal, and Provincial regulations.

2. Remove the fuel tank. Refer to **TANK, FUEL, REMOVAL** or **TANK, FUEL, REMOVAL**.

3. Ensure the swirl pot indentation below the in the fuel tank electric fuel pump inlet is completely drained of any contaminated fuel.
4. Completely drain the low pressure fuel lines, and install a new fuel filter.
5. Install the fuel tank, and fill with clean diesel fuel.
6. Lift up on locking retaining tab to unlock the lock the fuel injector return line from injector
7. Disconnect the low pressure fuel injector return line T-Fitting from fuel injector.
8. Connect a clean hose to the T-Fitting orifice, and place the other end in a suitable clean container.
9. Turn the ignition ON, and collect the fuel escaping from the T-Fitting orifice in a clean container. Check the fuel sample for metal chips, dirt, or other foreign matter.
10. If any dirt or metal chips are present in the fuel sample, completely clean the high pressure side of the fuel injection system, then install new the fuel injectors, and the high pressure fuel pump.
11. If there are no metal chips or dirt present in the fuel sample, the fuel system is OK. Reconnect the T-Fitting orifice, and road test the vehicle to verify normal operation.

DRAINING FUEL TANK - DIESEL

CONVENTIONAL PROCEDURE

A one-way check valve is located within the fuel fill fitting on the fuel tank. Because of this valve, the tank cannot be drained the conventional way through the fuel fill opening. To drain the tank, the fuel pump module must be removed.

1. Disconnect the fuel supply line at the quick-connect fitting. Refer to **STANDARD PROCEDURE** .
2. Install the appropriate Fuel Line Adapters / Fitting from the (special tool #8978A, Decay Tool, Fuel). Route the opposite end of this hose to an diesel fuel draining station.

NOTE: Activation of the fuel pump module may time out and need to be restarted several times to completely drain the fuel tank.

3. Using a diagnostic scan tool, activate the fuel pump module until the fuel tank has been evacuated.

ALTERNATIVE PROCEDURE

NOTE: If the electric fuel pump is not operating, the fuel tank must be removed and drained through the fuel pump module opening of the fuel tank.

1. Disconnect the negative battery cable.
2. Remove fuel pump module. Refer to **MODULE, FUEL PUMP, REMOVAL** or **MODULE, FUEL PUMP, REMOVAL**.
3. After fuel pump module has been removed, drain fuel into an approved diesel fuel oil draining station.

SPECIFICATIONS

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Fuel Filter Cap	20	-	177
Fuel Filter/Water Separator Bracket Nuts	20	-	177
Fuel Filler Tube Nut	12	-	106
Fuel Heater/Temperature Sensor Bolts	10	-	89
Fuel Injection Pump Cover Bolts	25	18	-
Fuel Injection Pump Gear Nut	80	59	-
Fuel Injection Pump Bolts	25	18	-
Fuel Rail Bolt	25	18	-
Fuel Tank Strap Bolts	27	20	-
Fuel Tube Union Nut at Fuel Injector	11 + 75°	-	97 + 75°
Fuel Tube Union Nut at Fuel Rail	5 + 75°	-	44 + 75°
High Pressure Crossover Fuel Tube Union Nut	5 + 75°	-	44 + 75°
High Pressure Pump Fuel Tube Union Nut at Fuel Rail	5 + 75°	-	44 + 75°
High Pressure Pump Fuel Tube Union Nut at High Pressure Pump	11 + 75°	-	97 + 75°
High Pressure Fuel Tube support Bracket Bolt	11	-	97
High Pressure Fuel Tube Support Bracket Nut	11	-	97

FUEL SYSTEM PRESSURE - DIESEL

The correct fuel pressure from the in-tank electric fuel pump to the high pressure injection pump for this vehicle is 59 psi +/- 2 psi. The correct flow rate for the in-tank electric fuel pump is approximately 53 gph (200 lph) at an ambient temperature of 73° F (23° C) and a constant battery voltage of 13 volts DC.

SPECIAL TOOLS

SPECIAL TOOLS

	8978A - Decay Tool, Fuel 9340 - SAE Fuel Pump Lock Ring Wrench (Originally Shipped In Kit Number(s) 9327, 9327CC, 9397, 9575.) VM.10339 - Tool, Crankshaft Timing VM.10344 - Tool, Oil Separator Remover/Installer VM.10345 - Tool, High Pressure Pump Installation

FILTER, FUEL

REMOVAL

REMOVAL

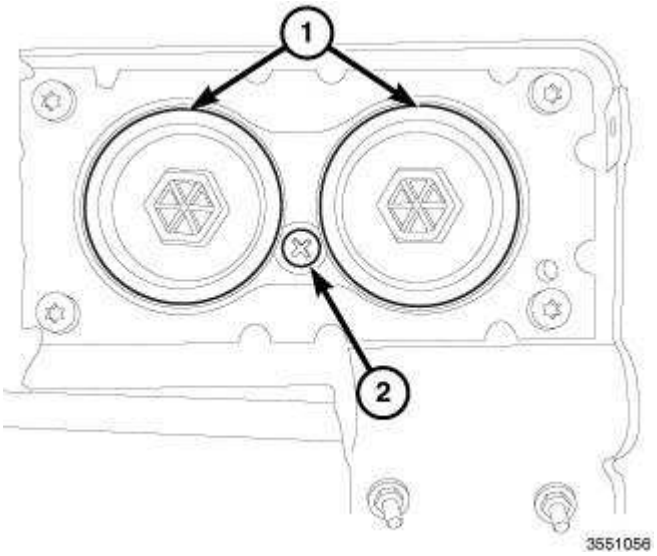


Fig. 1: Drain Plug & Filter Cover
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Loosen drain plug (2) and drain fuel filter/water separator into a suitable container.
3. Securely tighten drain plug (2).
4. Remove each filter cover (1) and the fuel filter.

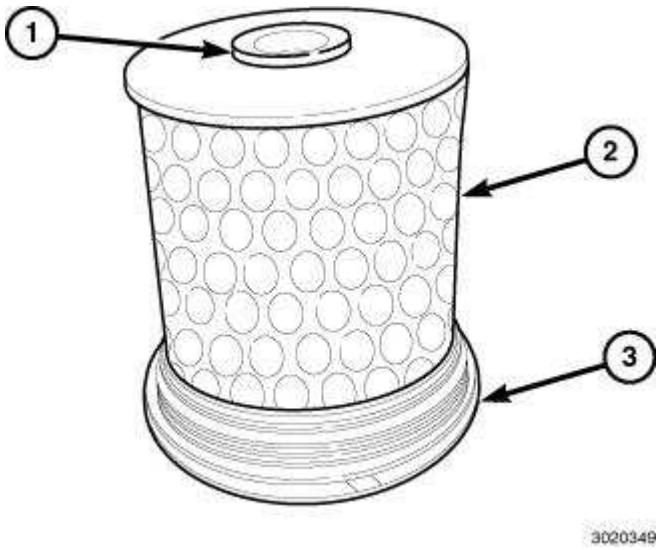


Fig. 2: Fuel Filter Cover & Fuel Filter
Courtesy of CHRYSLER GROUP, LLC

5. While holding the fuel filter cover (3), pull up on fuel filter (2) to separate from cover (3).

INSTALLATION

INSTALLATION

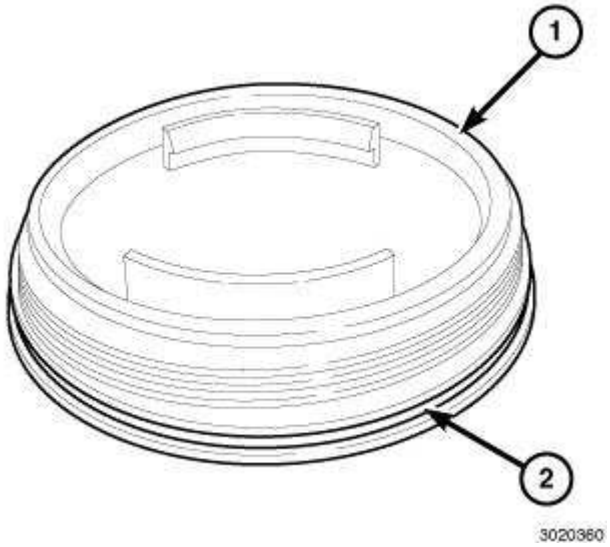


Fig. 3: New O-Ring Seal & Filter Covers
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate and install a new O-ring seal (2) onto filter covers (1).

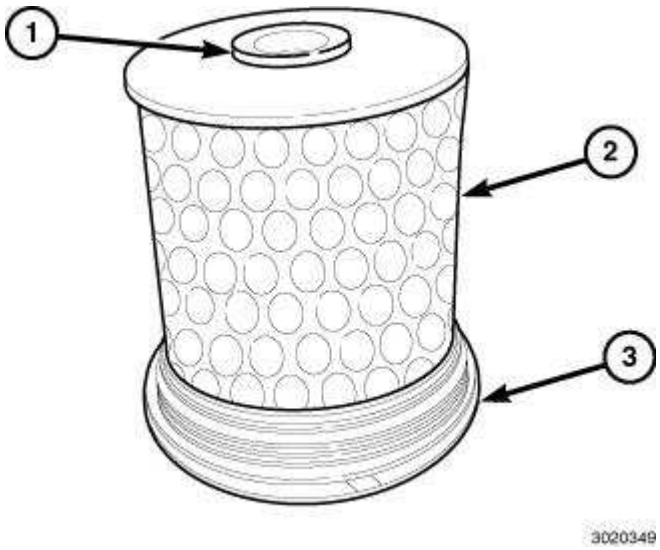


Fig. 4: Fuel Filter Cover & Fuel Filter
Courtesy of CHRYSLER GROUP, LLC

2. Position and push down on new fuel filters (2) to install filter onto cover (3).
3. Lubricate the rubber grommet seal (1) with clean diesel fluid.

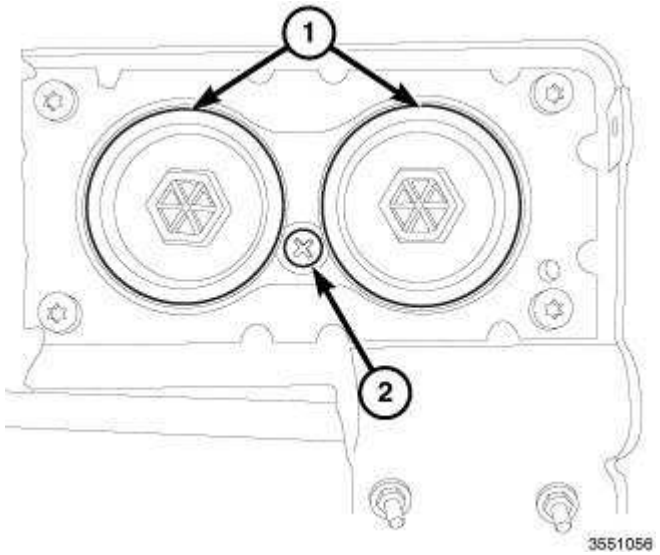


Fig. 5: Drain Plug & Filter Cover
Courtesy of CHRYSLER GROUP, LLC

4. Install the fuel filters. Tighten each cover (1) to 20 N.m (177 in. lbs.).
5. Lower the vehicle.
6. Start the vehicle and inspect for leaks.

FITTING, QUICK CONNECT

DESCRIPTION

DESCRIPTION

Different types of quick-connect fittings are used to attach the various fuel system components, lines and tubes. These are: a single-button type shown in illustration above. a two-button type, a pinch type, a single-tab type, a two-tab type or a plastic retainer ring type. Some are equipped with safety latch clips. Some may require the use of a special tool for disconnection and removal. Refer to **QUICK-CONNECT FITTINGS** for more information.

CAUTION: Before separating a Quick-Connect fitting, pay attention to what type of fitting is being used. Refer to QUICK-CONNECT FITTINGS . This will prevent unnecessary fitting or fitting latch breakage.

CAUTION: The interior components (O-rings, clips and latches) of Quick-Connect fittings are not serviced separately, but new plastic spacers and latches are available for some types. If service parts are not available, do not attempt to repair the damaged fitting or fuel line (tube). If repair is necessary, replace the complete fuel line (tube) assembly.

STANDARD PROCEDURE

QUICK-CONNECT FITTINGS

Different types of quick-connect fittings are used to attach the various fuel system components, lines and tubes. These are: a single-button type, a two-button type, a pinch type, a single-tab type, a two-tab type or a plastic retainer ring type. Some are equipped with safety latch clips. Some may require the use of a special tool for disconnection and removal.

These are the quick-connect fittings:

- Redundant Latch Single Button Type Fitting
- Single Button Type Fitting
- Pinch Type Fitting
- Single Tab Type Fitting
- Two Tab Type Fitting
- Plastic Retainer Ring Type Fitting
- Latch Clip Type 1 Fitting
- Latch Clip Type 2 Fitting
- Wing Type Fitting

DISCONNECTING

CAUTION: Before separating a Quick-Connect fitting, pay attention to what type of fitting is being used. This will prevent unnecessary fitting or fitting latch breakage.

CAUTION: The interior components (O-rings, clips) of quick-connect fittings are not serviced separately, but new plastic spacers and latches are available for some types. If service parts are not available, do not attempt to repair the damaged fitting or fuel line (tube). If repair is necessary, replace the complete fuel line (tube) assembly.

REDUNDANT LATCH SINGLE BUTTON TYPE FITTING:

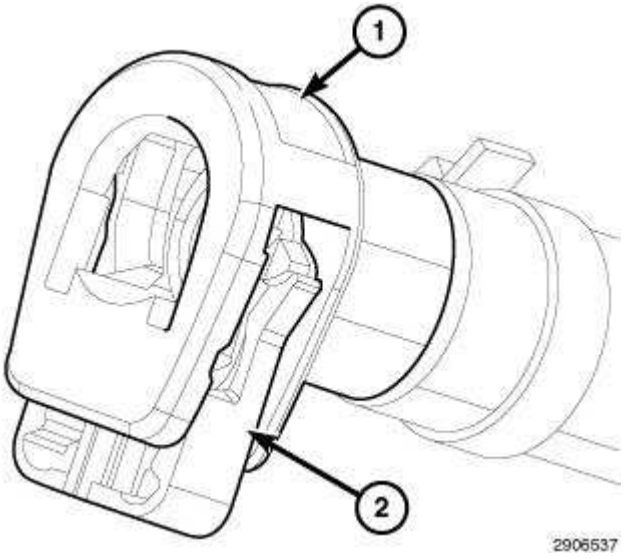


Fig. 6: Redundant Latch & Push Button
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting is equipped with a redundant latch (2) and a single push button (1) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

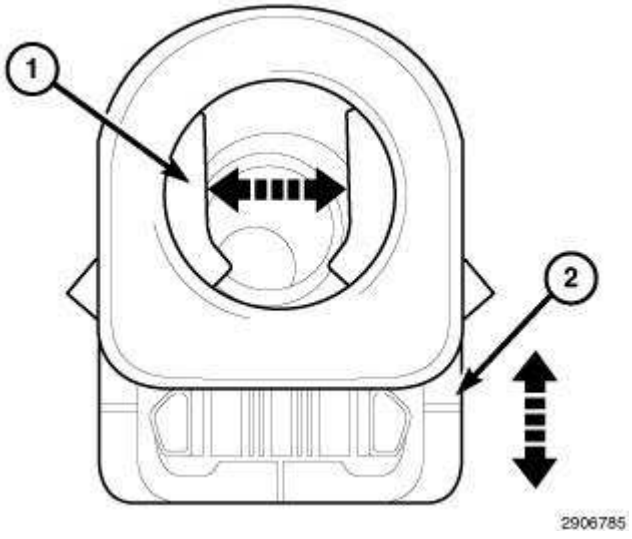


Fig. 7: Redundant Latch & Internal Latches

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry or pull up on the push button as damage to the latches of the quick-connect fitting will occur.

1. Pull the redundant latch (2) out away from the quick-connect fitting.
2. Press on the push button with your thumb, release the internal latches (1) and remove the quick-connect fitting from the fuel system component.

SINGLE BUTTON TYPE FITTING:

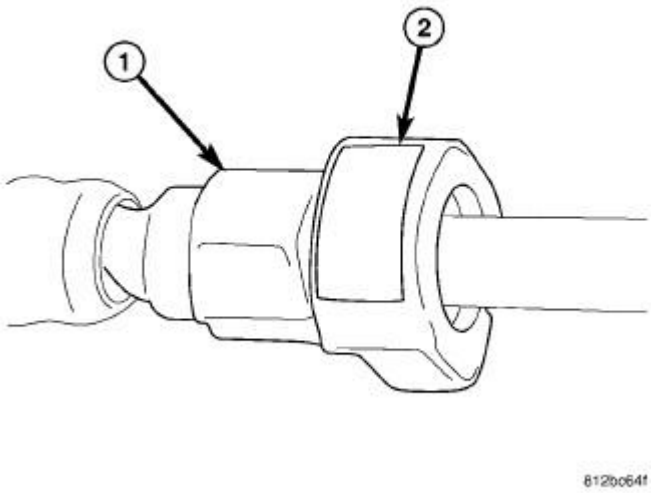


Fig. 8: Single Button Fitting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry or pull up on the push button as damage to the latches of the quick-connect fitting will occur.

This type of quick-connect fitting is equipped with a single push button (2) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

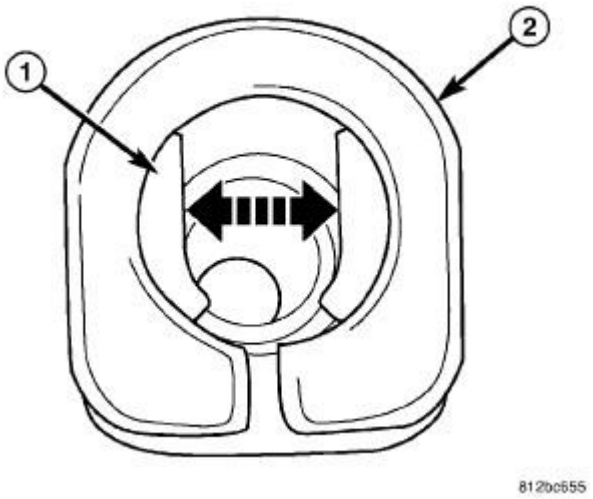


Fig. 9: Ouick-Connect Fitting Latches
Courtesy of CHRYSLER GROUP, LLC

1. Press on the push button with your thumb, release the internal latches (1).
2. Remove the quick-connect fitting from the fuel system component.

2 BUTTON TYPE FITTING

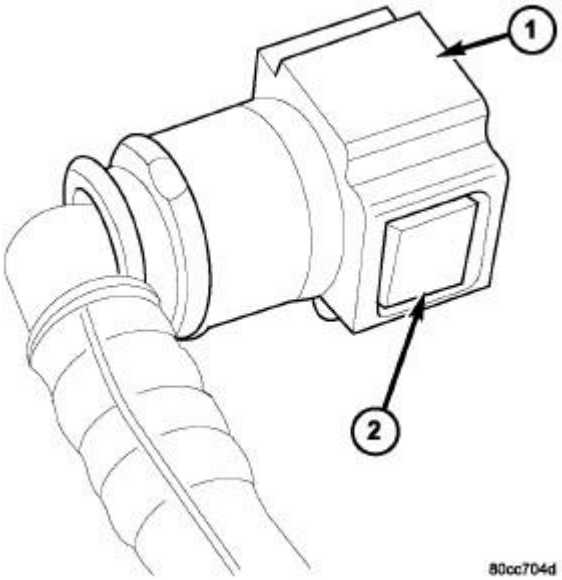


Fig. 10: View Of 2-Button Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (1) is equipped with two push buttons (2) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

1. Press on both push buttons with your thumb, release the internal latches.
2. While holding the two push buttons simultaneously, remove the quick-connect fitting from the fuel system component.

PINCH TYPE FITTING

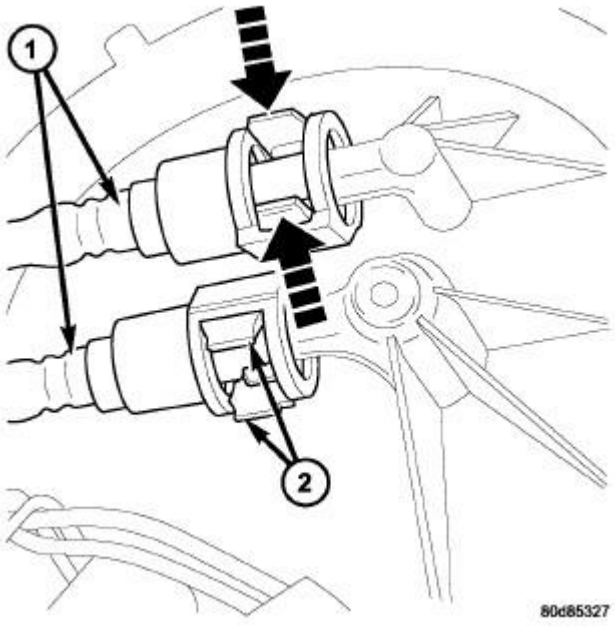


Fig. 11: View Of Pinch Type Quick-Connect Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (1) is equipped with two finger tabs (2). Special tools are not required for removal.

1. Pinch both tabs (2) together and release the quick-connect fitting.
2. Remove the quick-connect fitting from the fuel system component.

SINGLE TAB TYPE FITTING

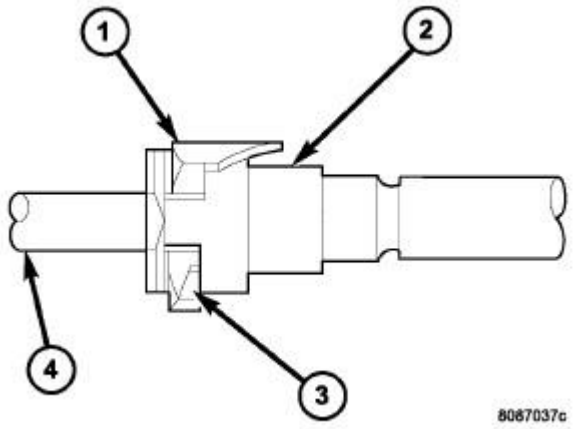


Fig. 12: View Of Single-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (3) is equipped with a single pull tab (1). The tab is removable. After tab is removed the quick-connect fitting can be separated from the fuel system component. Special tools are not required for removal.

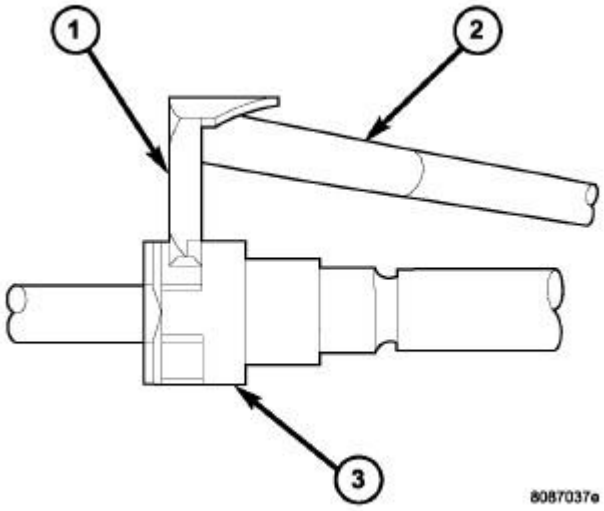


Fig. 13: Disconnecting Single-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

1. Press release tab on side of fitting to release pull tab (1). **If release tab is not pressed prior to releasing pull tab, pull tab will be damaged.**
2. While pressing the release tab on the side of the quick-connect fitting use a screwdriver (2) to pry up the pull tab.
3. Raise the pull tab until it separates from the quick-connect fitting.
4. Remove the quick-connect fitting from the fuel system component.

TWO TAB TYPE FITTING

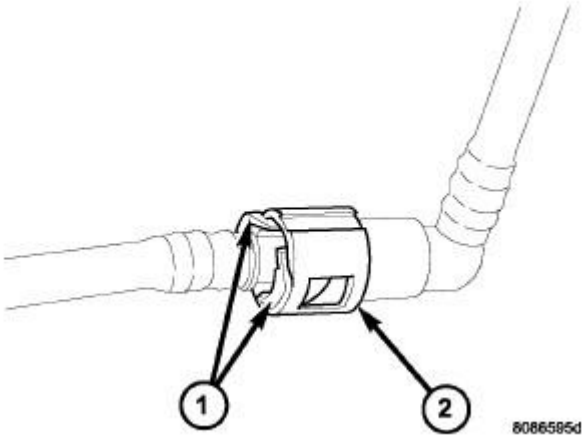


Fig. 14: Identifying Typical 2-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (2) is equipped with tabs located on both sides of the fitting (1). These tabs are integral to the fuel system component. The plastic tabs will remain on the component being serviced after the quick-connect fitting is removed. The O-ring and spacer will remain in the quick-connect fitting. Special tools are not required for removal.

1. Squeeze the plastic tabs (1) against the sides of component being serviced with your fingers.
2. Remove the quick-connect fitting from the fuel system component.

PLASTIC RETAINER RING TYPE FITTING

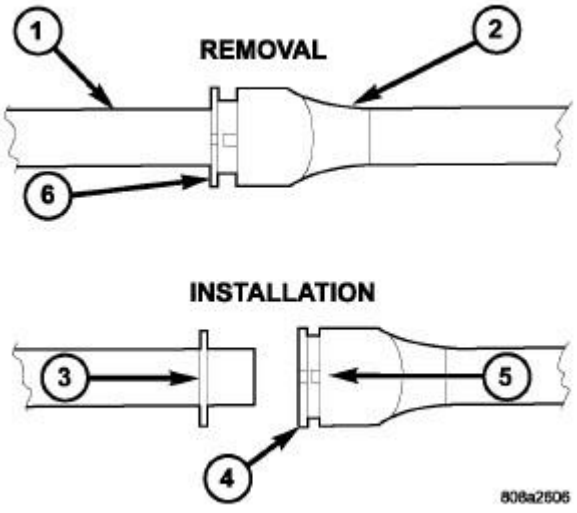


Fig. 15: Plastic Retainer Ring Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of fitting can be identified by the use of a round plastic retainer ring (4) usually black in color. Special tools are not required for removal.

NOTE: The round plastic retainer ring must be pressed squarely into the quick-connect fitting body. If this retainer is cocked during removal it will be difficult to disconnect the quick-connect fitting. Use an open-end wrench on the shoulder of the plastic retainer ring to aid in disconnection.

1. Firmly push the quick-connect fitting (5) towards the component being serviced while firmly pushing the round plastic retainer ring into the quick-connect fitting (6). With the round plastic ring depressed, remove the quick-connect fitting from the fuel system component.
2. After removal the plastic retainer ring will remain with the quick-connect fitting.

LATCH CLIP TYPE 1 FITTING

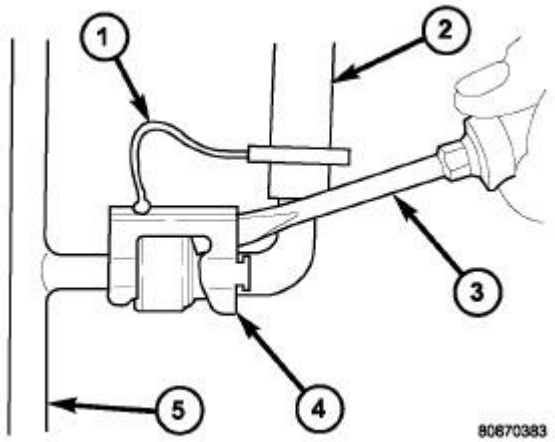


Fig. 16: Tethered, Latch Clip & Screwdriver
Courtesy of CHRYSLER GROUP, LLC

Depending on vehicle model and engine, 2 different types of safety latch clips are used. One is tethered (1) to fuel line and the other is not. A special tool will be necessary to disconnect the fuel line after latch clip is removed. The latch clip may be used on certain fuel line and fuel rail connections or to join fuel lines together.

1. Pry up on the latch clip (4) with a screwdriver (3).
2. Slide the latch clip away from the quick-connect fitting while lifting the screwdriver and position aside.

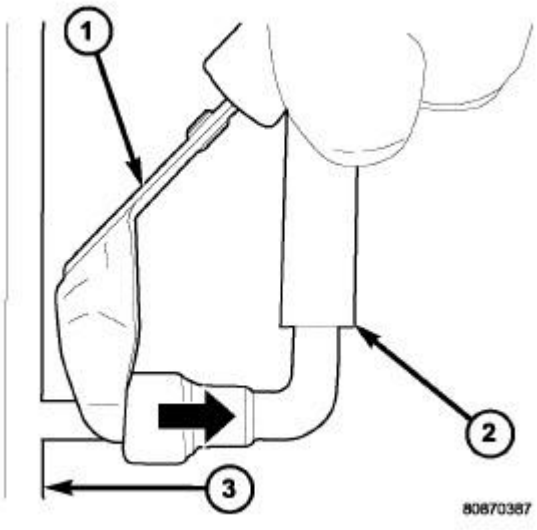


Fig. 17: Fuel Line Disconnection Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

3. Insert the commercially available fuel line removal tool (1) into the quick-connect fitting and release the internal latches.

NOTE: After removal the internal latches will remain in the quick-connect fitting.

4. With the commercially available fuel line removal tool (1) still inserted, remove the quick-connect fitting from the fuel system component.

LATCH CLIP TYPE 2 FITTING

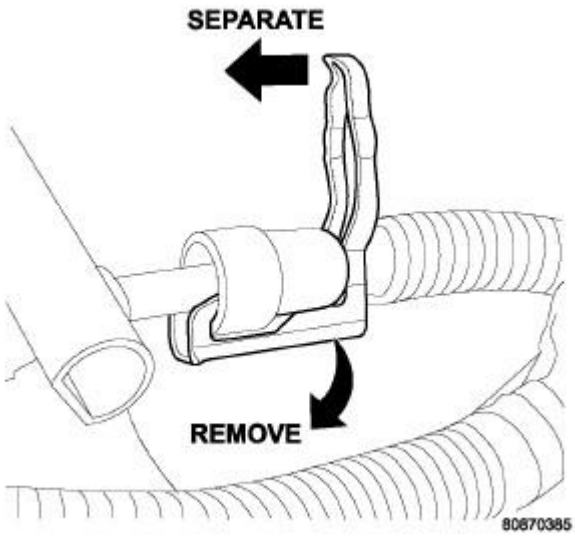


Fig. 18: Latch Clip

Courtesy of CHRYSLER GROUP, LLC

Depending on vehicle model and engine, 2 different types of safety latch clips are used. One is tethered to the fuel line and the other is not. A special tool will be necessary to disconnect the fuel line after the latch clip is removed. The latch clip may be used on certain fuel line and fuel rail connections or to join fuel lines together.

1. Unlatch the small arms on the end of clip, swing away and separate from the fuel system component.
2. Slide the latch clip away from the quick-connect fitting while lifting with a screwdriver and position aside.

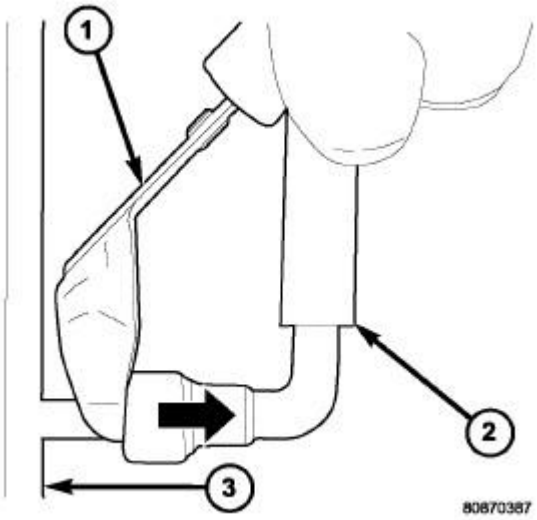


Fig. 19: Fuel Line Disconnection Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

3. Insert the commercially available fuel line removal tool (1) into the quick-connect fitting and release the internal latches.

NOTE: After removal the internal latches will remain in the quick-connect fitting.

4. With the commercially available fuel line removal tool (1) inserted, remove the quick-connect fitting from the fuel system component.

WING TYPE FITTING

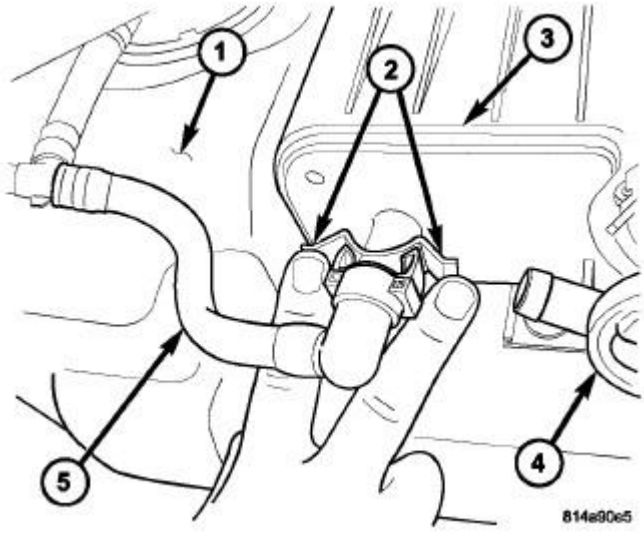


Fig. 20: EVAP Can. Vapor Hose
Courtesy of CHRYSLER GROUP, LLC

The wing type fitting is used on fuel system and emission components. The wing type fitting is most commonly used on the EVAP canister (3). Special tools are not required for removal.

1. Using two fingers, press both wings (2) and release the locking tabs.

   NOTE: After removal the locking tabs will remain with the quick-connect fitting.

2. While holding the wings, remove the quick-connect fitting from the fuel system component.

CONNECTING

1. Inspect the quick-connect fitting body and fuel system components for damage. Replace as necessary.
2. Prior to connecting any quick-connect fitting to components, check condition of fitting and components. Clean parts with a lint-free cloth. Lubricate with clean engine oil.
3. Insert the quick-connect fitting onto the fuel tube or fuel system component until the built-in stop on the fuel tube or component rests against the back of fitting.
4. Continue pushing until a click is felt.
5. If Equipped:
   - **Redundant Latch Single Button Type Fitting:** Push redundant latch until it locks into position in the quick-connect fitting.
   - **Single Tab Type Fitting:** Push new tab down until it locks into position in the quick-connect fitting.
   - **Latch Clip Type Fitting:** Install latch clip (snaps into position). **If latch clip will not snap into position, this indicates the quick-connect fitting is not properly installed onto fuel system component, recheck the connection.**

6. Verify a locked condition by firmly pulling on the quick-connect fitting connection of the fuel system component.

HEATER, FUEL

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the fuel filter/water separator assembly. Refer to **SEPARATOR AND FILTER, FUEL AND WATER, REMOVAL**.

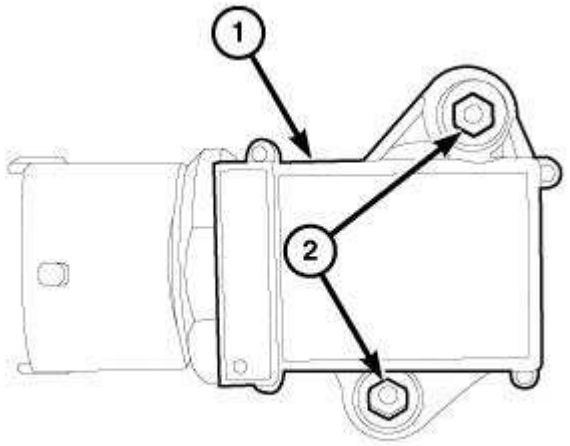


Fig. 21: Bolts & Fuel Heater/Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts (2), and the fuel heater/temperature sensor (1).
4. Remove and discard O-ring seal.

INSTALLATION

INSTALLATION

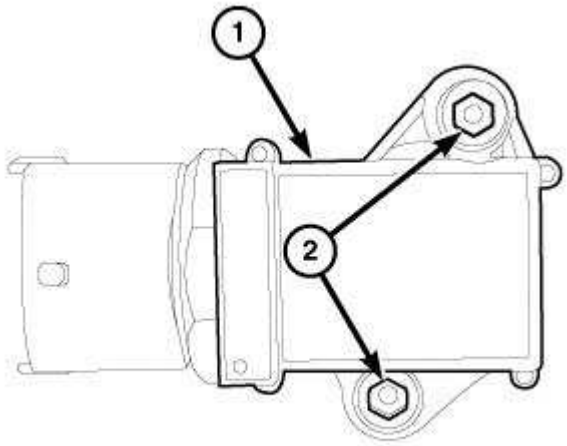


Fig. 22: Bolts & Fuel Heater/Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Clean the O-ring surface sealing area.

NOTE: Lubricate the O-ring seal with clean diesel fluid.

2. Using a new O-ring seal, install the fuel heater/temperature sensor (1). Tighten bolts (2) to 10 N.m (89 in. lbs.).
3. Install the fuel filter/water separator assembly. Refer to **SEPARATOR AND FILTER, FUEL AND WATER, INSTALLATION**.
4. Connect the negative battery cable.

MODULE, FUEL PUMP

REMOVAL

REMOVAL

MAIN FUEL PUMP MODULE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved

containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: If the electric fuel pump module is not operating or the fuel level sending unit is not operating and the fuel level cannot be determined, the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle

1. Verify the fuel level is below 5/8 of a tank.
2. If required, perform the draining fuel tank procedure. Refer to **DRAINING FUEL TANK** .
3. Disconnect the negative battery cable.

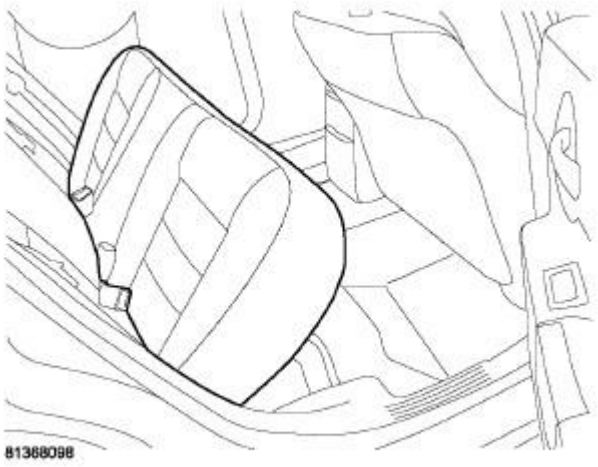


Fig. 23: Pulling Rear Seat Up
Courtesy of CHRYSLER GROUP, LLC

4. Push the rear lower seat cushion up and back and remove the seat cushion.

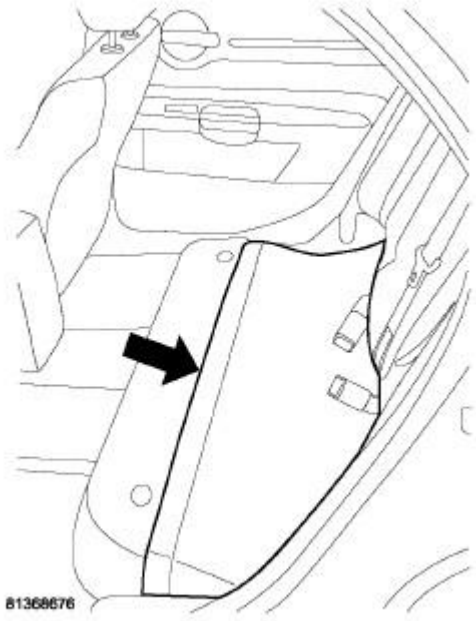


Fig. 24: Foam Pad Under Seat
Courtesy of CHRYSLER GROUP, LLC

5. Fold back the foam pad covering the fuel pump module plastic access covers.

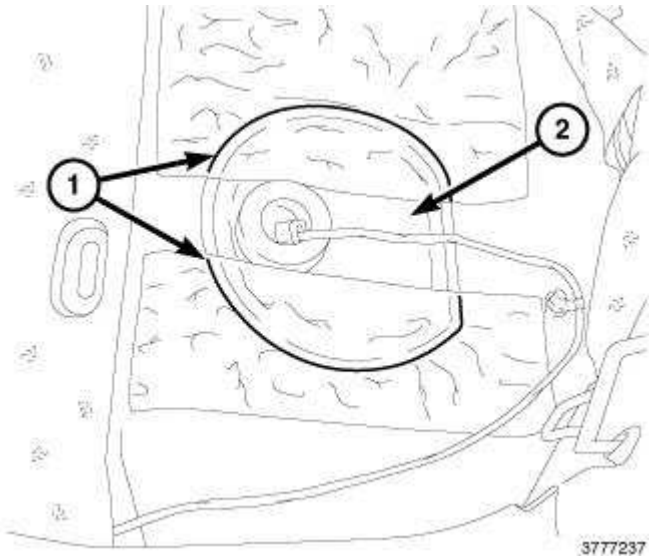


Fig. 25: Mastic Sound Deadener & Left Side Main Fuel Pump Module Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

6. Using a razor knife, cut the mastic sound deadener as shown in illustration (1).
7. Remove the left side main fuel pump module plastic access cover (2).

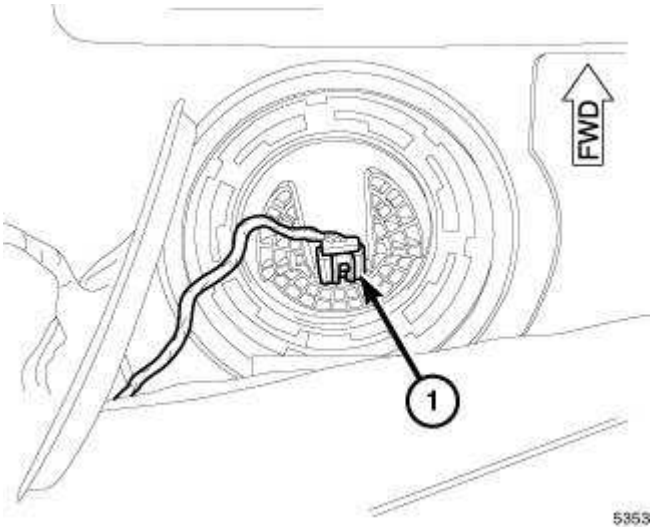


Fig. 26: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the electrical connector from the main fuel pump module.

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank, note it's location for reassembly.

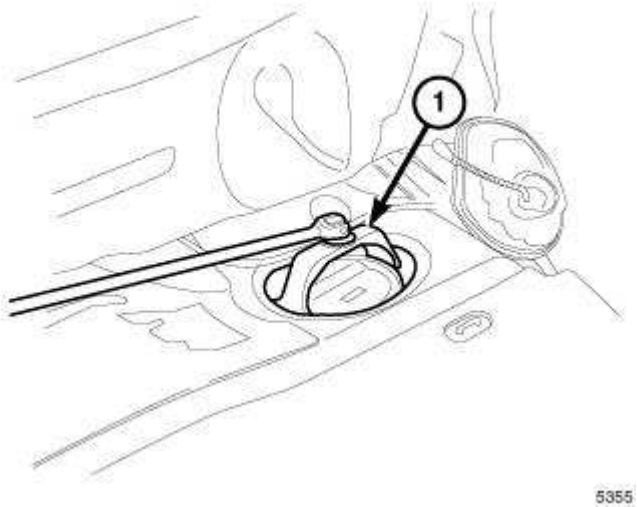


Fig. 27: Left Side Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.

9. Mark the main fuel pump module orientation.
10. Position the (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the

outside edge of the lock ring.

11. Install a 1/2 inch drive breaker bar into the (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).

NOTE: The main fuel pump module will spring up slightly when the lock ring is removed.

12. Rotate the breaker bar counterclockwise and remove the lock ring.

CAUTION: Do not allow the float arm of the Main Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

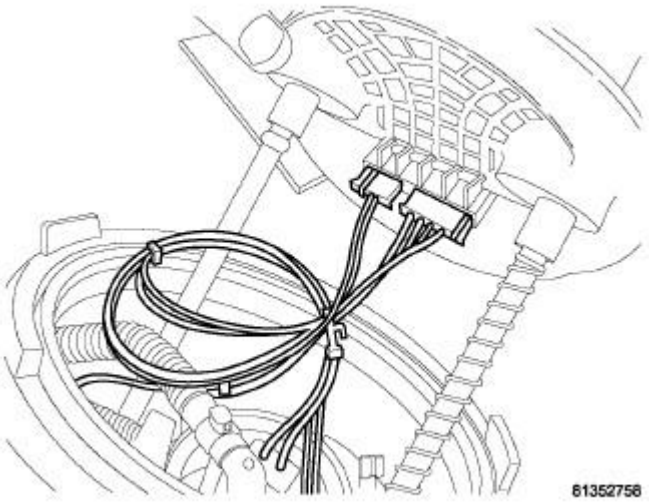


Fig. 28: Module Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

13. Raise and separate the top section from the bottom section of the main fuel pump module.
14. Disconnect the electrical connectors from under the top section of the main fuel pump module.
15. Remove the top section of the main fuel pump module from the vehicle.

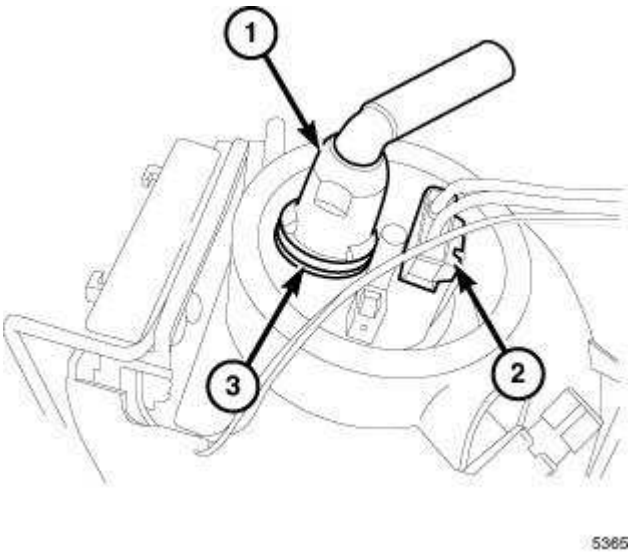


Fig. 29: Line Release
Courtesy of CHRYSLER GROUP, LLC

16. Press the quick connect release tab (3) and remove the fuel supply line (1) from the main fuel pump module.

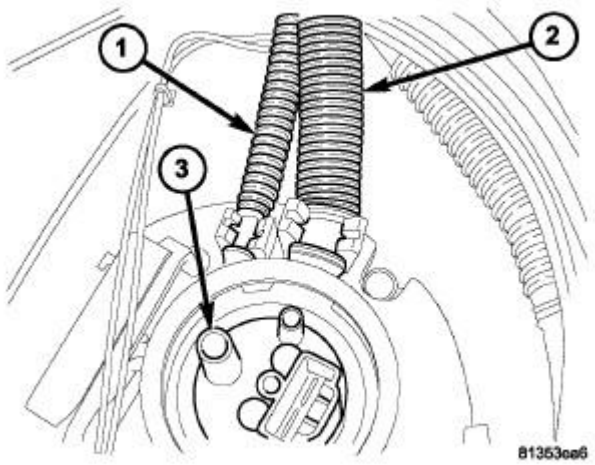


Fig. 30: Hose Connections Drivers Side
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the fuel return lines (1, 2) from the main fuel pump module.

NOTE: Do not spill fuel into the interior of the vehicle.

18. Carefully lift the bottom section of the main fuel pump module out of the fuel tank, tip the bottom section on its side and drain the remaining fuel from the bottom reservoir into the fuel tank and

remove from vehicle.

NOTE: Whenever a fuel pump module is serviced, the rubber O-ring seal must be replaced.

19. Remove and discard the rubber O-ring seal.

AUXILIARY FUEL PUMP MODULE

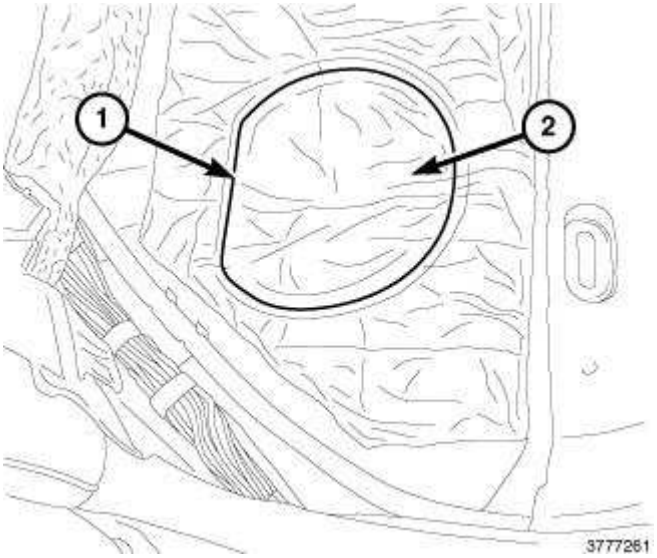


Fig. 31: Mastic Sound Deadener & Auxiliary Fuel Pump Module Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Main Fuel Pump Module must be removed for Auxiliary Fuel Pump Module removal.

1. Remove the main fuel pump module. Refer to **MAIN FUEL PUMP MODULE**.
2. Using a razor knife, cut the mastic sound deadener as shown in illustration (1).
3. Remove the auxiliary fuel pump module plastic access cover (2) from the floor pan.

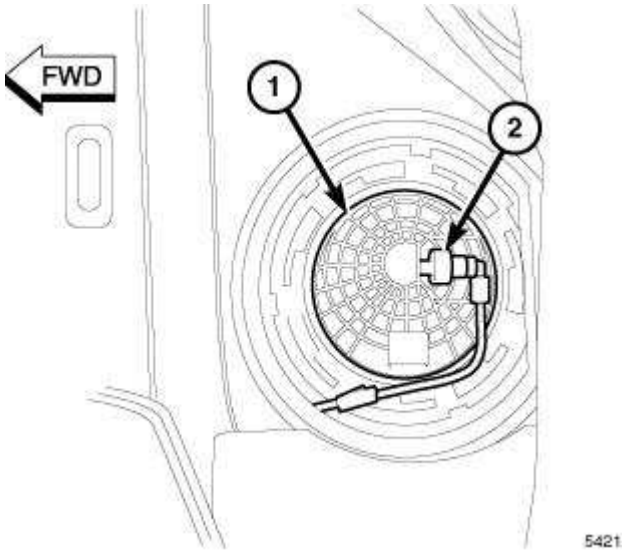


Fig. 32: Right Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.

4. Disconnect the fuel supply line (2) from the auxiliary fuel pump module (1).
5. Mark the auxiliary fuel pump module orientation.

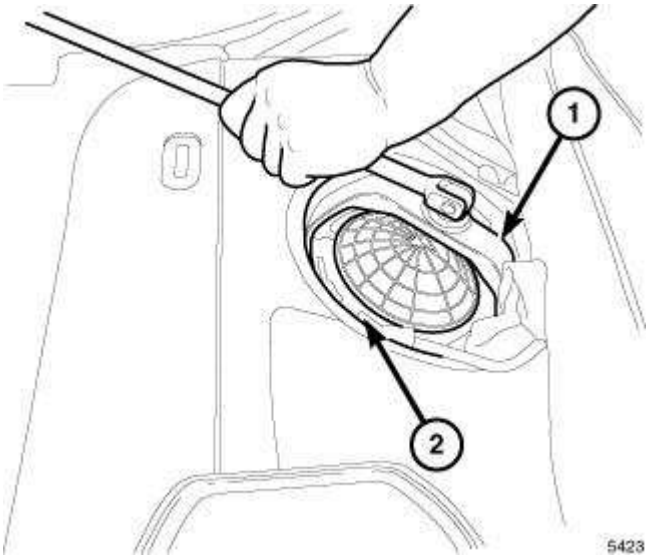


Fig. 33: Right Side Module
Courtesy of CHRYSLER GROUP, LLC

6. Position the (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
7. Install a 1/2 inch drive breaker bar into the (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).

8. Rotate the breaker bar counterclockwise and remove the lock ring (2).

CAUTION: Do not allow the float arm of the Auxiliary Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

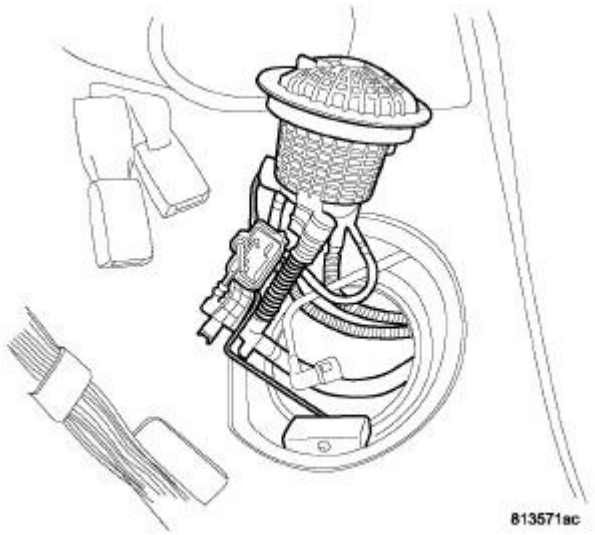


Fig. 34: Remove/Install Right Side Module
Courtesy of CHRYSLER GROUP, LLC

9. Lift the auxiliary fuel pump module up and out of fuel tank while guiding the fuel supply and return lines out from the left side of the fuel tank.

NOTE: Whenever a fuel pump module is serviced, the rubber O-ring seal must be replaced.

10. Remove and discard the rubber O-ring seal.

INSTALLATION

INSTALLATION

MAIN FUEL PUMP MODULE

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: Do not allow the float arm of the Main Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

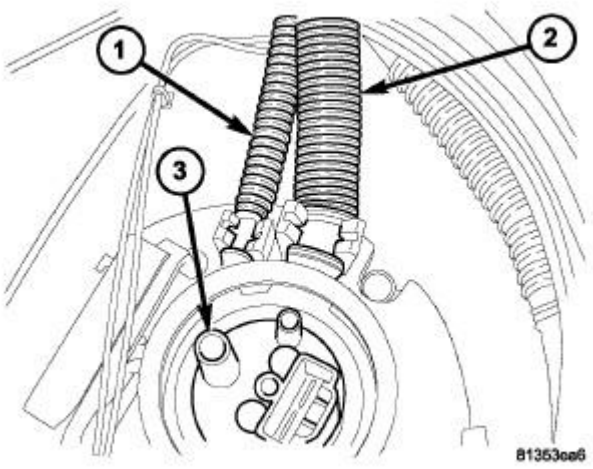


Fig. 35: Hose Connections Drivers Side
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Auxiliary Fuel Pump Module must be installed before the Main Fuel Pump Module.

1. If the auxiliary fuel pump module is removed. Refer to **AUXILIARY FUEL PUMP MODULE**.

   NOTE: Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.

2. Install a new rubber O-ring seal.
3. Using caution not to bend the float arm, lower the bottom section of the main fuel pump module into the fuel tank.
4. Connect the fuel return lines (1, 2) to the main fuel pump module.

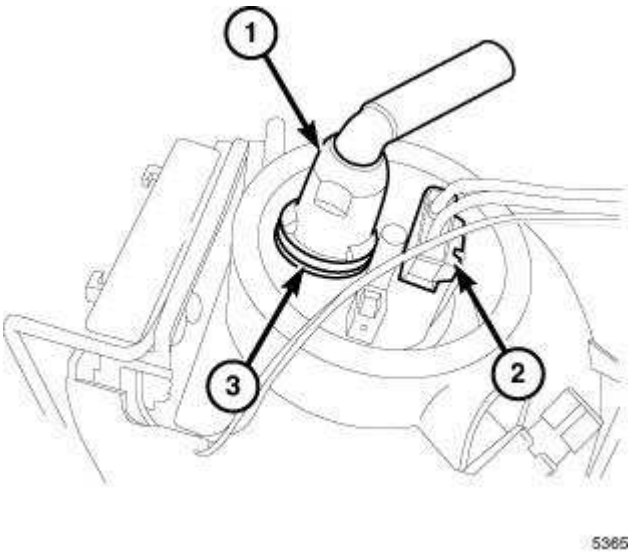


Fig. 36: Line Release
Courtesy of CHRYSLER GROUP, LLC

5. Connect the fuel supply line (1) to the main fuel pump module.

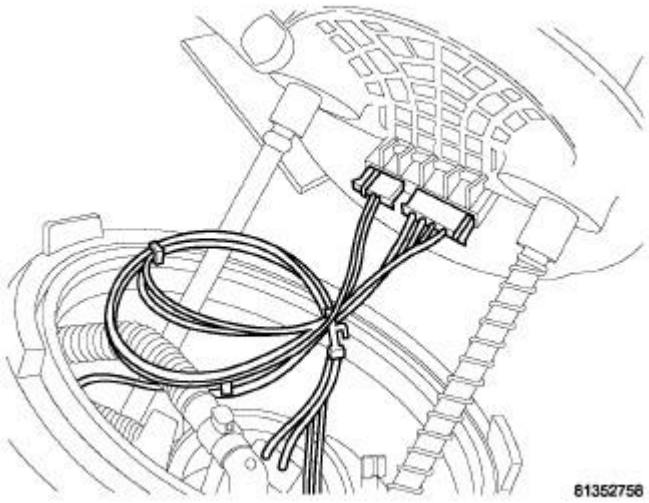


Fig. 37: Module Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

6. Connect the electrical connectors at the top section of the main fuel pump module.
7. Join the upper section and lower section of the main fuel pump module together.
8. Position the main fuel pump module as noted during removal.

CAUTION: Verify the electrical wires are tucked away into the fuel tank so they don't get pinched between the top of the fuel pump module and the

rubber O-ring seal.

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.

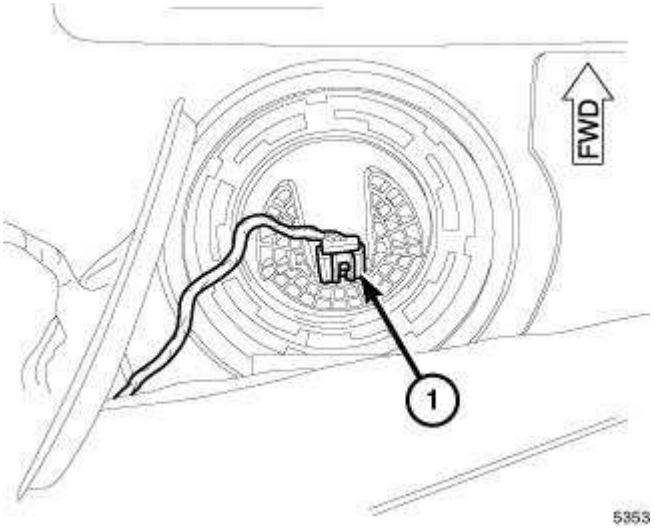


Fig. 38: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

9. Align the rubber O-ring seal and lower the main fuel pump module into position.
10. Verify the main fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.

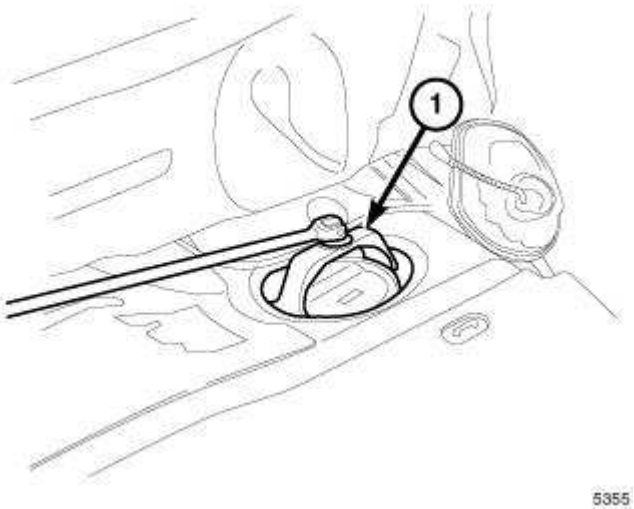


Fig. 39: Left Side Module
Courtesy of CHRYSLER GROUP, LLC

11. Position the lock ring over top of the main fuel pump module.
12. Position the (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring.
13. Install a 1/2 inch drive breaker bar into the (special tool #9340, SAE Fuel Pump Lock Ring Wrench).
14. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged.

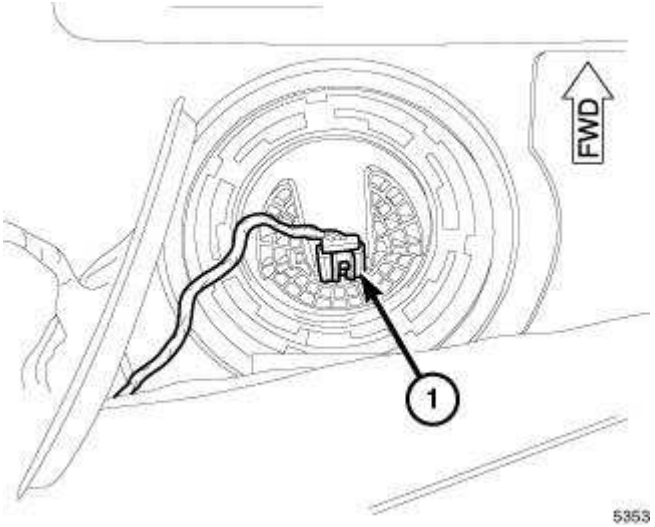


Fig. 40: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

15. Connect the electrical connector (1) to the main fuel pump module.
16. Fill the fuel tank and check for leaks around the rubber O-ring seal.

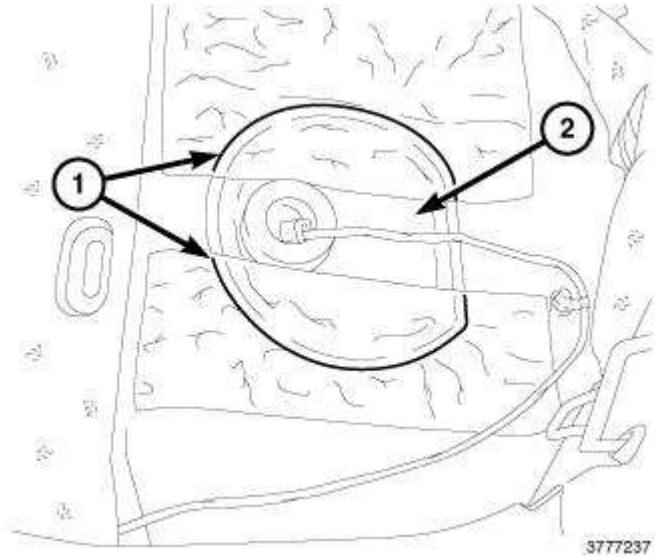


Fig. 41: Mastic Sound Deadener & Left Side Main Fuel Pump Module Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

17. Install the main fuel pump module plastic access cover (2).

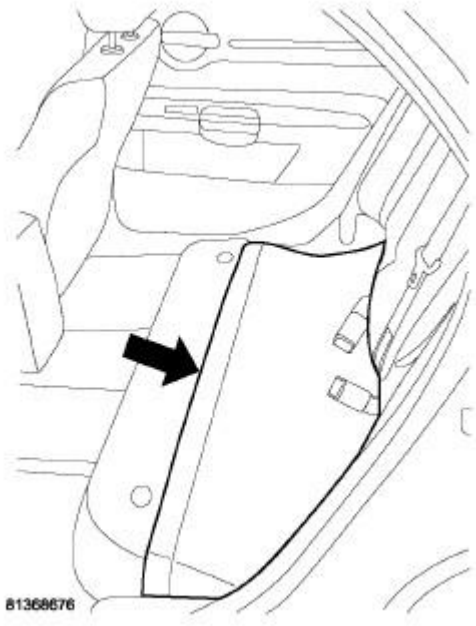


Fig. 42: Foam Pad Under Seat
Courtesy of CHRYSLER GROUP, LLC

18. Lower the foam pad covering back into place.

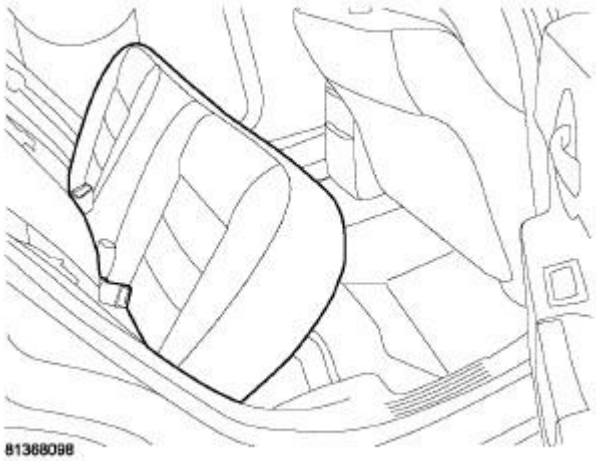


Fig. 43: Pulling Rear Seat Up
Courtesy of CHRYSLER GROUP, LLC

19. Push the rear lower seat cushion back and down and install the seat cushion.

20. Connect the negative battery cable.

AUXILIARY FUEL PUMP MODULE

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.

CAUTION: Do not allow the float arm of the Auxiliary Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

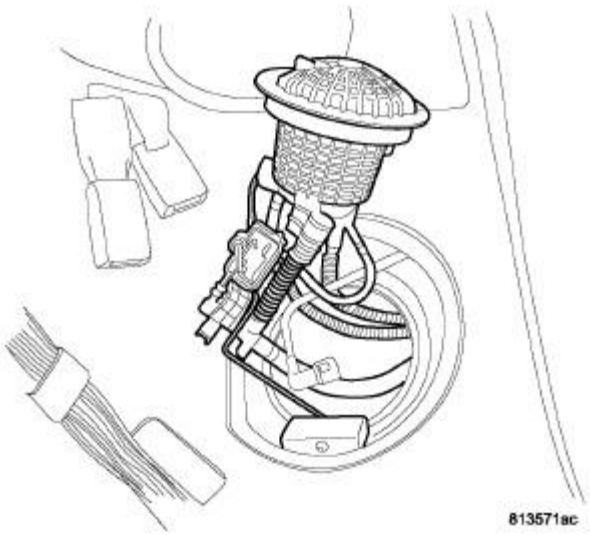


Fig. 44: Remove/Install Right Side Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.

1. Install a new rubber O-ring seal.
2. Using caution not to bend the float arm, lower the auxiliary fuel pump module into the fuel tank while guiding the fuel return lines, fuel supply line and electrical connector over to the left side of the fuel tank.
3. Align the rubber O-ring seal and lower the auxiliary fuel pump module into position as noted during removal.
4. Position the lock ring over top of the auxiliary fuel pump module.
5. Verify the auxiliary fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.

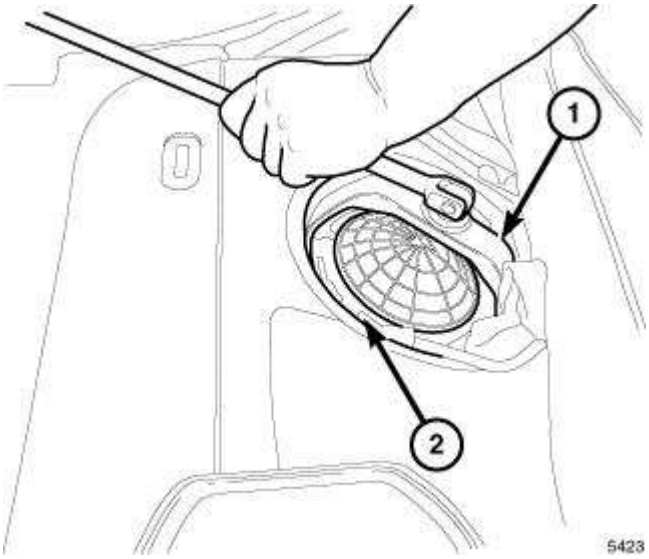


Fig. 45: Right Side Module
Courtesy of CHRYSLER GROUP, LLC

6. Position (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
7. Install a 1/2 inch drive breaker bar into the (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).
8. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged.

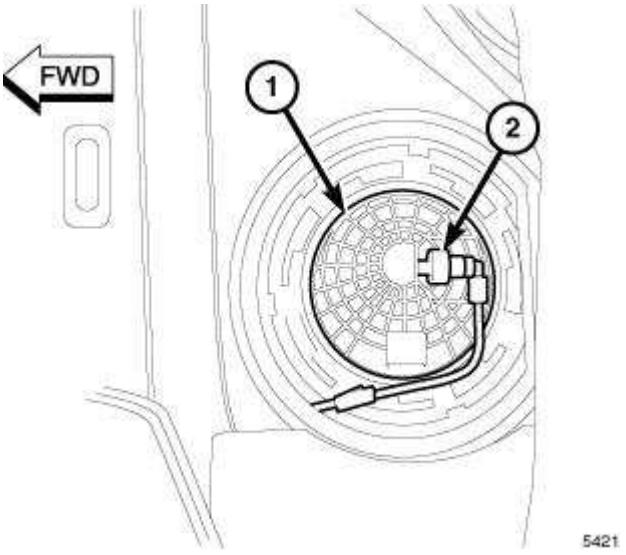


Fig. 46: Right Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

9. Connect the fuel supply line (2) to auxiliary fuel pump module (1).

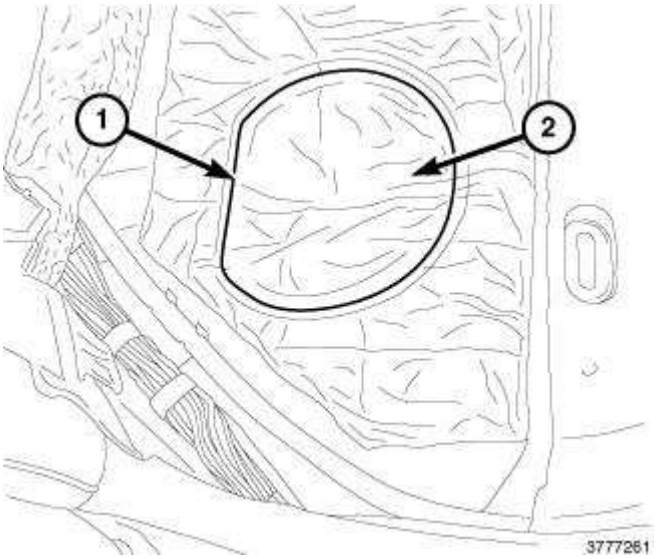


Fig. 47: Mastic Sound Deadener & Auxiliary Fuel Pump Module Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

10. Install the auxiliary fuel pump module plastic access cover (1).
11. Install the main fuel pump module. Refer to **MAIN FUEL PUMP MODULE**.

PUMP, FUEL INJECTION, HIGH PRESSURE

DESCRIPTION

DESCRIPTION

WARNING: High pressure fuel lines deliver diesel fuel under extreme pressure from the injection pump to the fuel injectors. This may be as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high pressure fuel leaks. Fuel under this amount of pressure can penetrate skin causing personal injury or death. Inspect for high pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system.

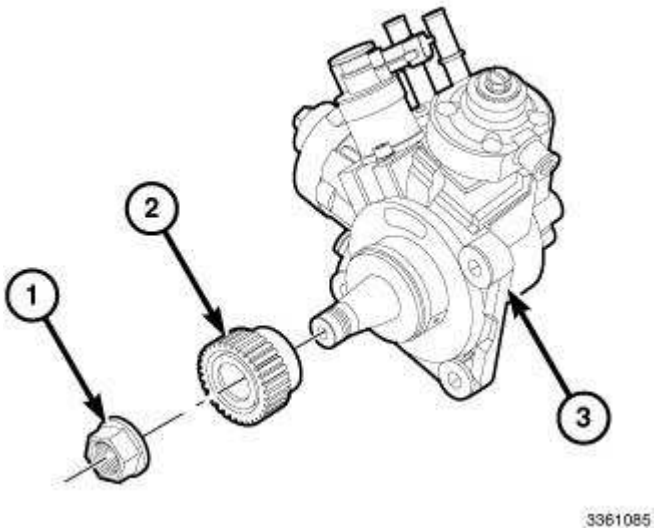


Fig. 48: High Pressure Pump, Gear & Nut
Courtesy of CHRYSLER GROUP, LLC

The high pressure pump (3) is mounted to the left rear of the cylinder head and there is a protection blocker plate attached to the front of the high pressure pump. The only serviceable part on the high pressure pump is the fuel quantity solenoid, the drive gear, and the O-ring seal. The high pressure pump must not be disassembled or opened. The high pressure pump has a screen filter that is not serviceable. If diagnosis has led you to believe that the filter is restricted of plugging up then the high pressure pump needs to be replaced.

OPERATION

OPERATION

WARNING: High pressure fuel lines deliver diesel fuel under extreme pressure from the injection pump to the fuel injectors. This may be as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high pressure fuel leaks. Fuel under this amount of pressure can penetrate skin causing personal injury or death. Inspect for high pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system.

CAUTION: Cranking the engine for an extended time without a fuel supply may damage the fuel injection pressure pump.

The High Pressure Delivery Pump (HPDP) supplies pressurized fuel between 200-1800 bar (2, 900 - 26, 106 psi) to the fuel rail and fuel injectors. The cascade valve, located inside the HPDP regulates the pressure in the low side and diverts some of the fuel entering for lubrication of the pump. The Powertrain Control Module (PCM) monitors high side fuel pressure via a fuel pressure sensor. Based on readings from the fuel pressure sensor, the PCM controls the output pressure of the pump using the Fuel Quantity Solenoid (FQS), which mounts to the HPDP.

NOTE: **The high pressure pump must not be disassembled or opened. The only serviceable items are the fuel quantity solenoid, the pump gear, and the O-ring seal.**

REMOVAL

REMOVAL

WARNING: **High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.**

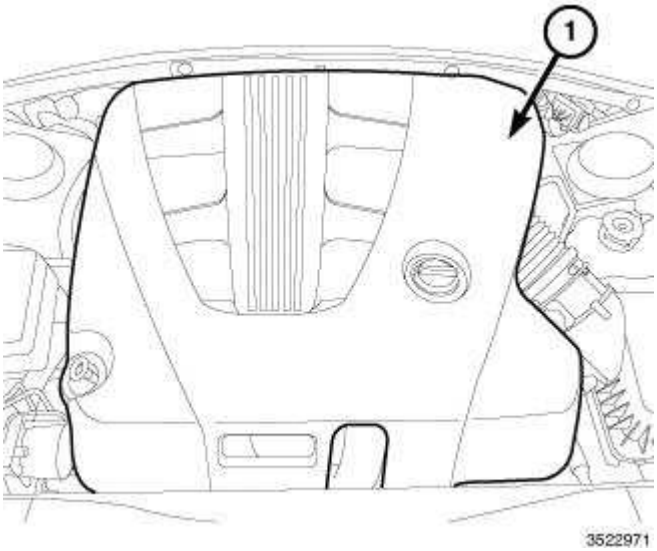


Fig. 49: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove engine cover (1).

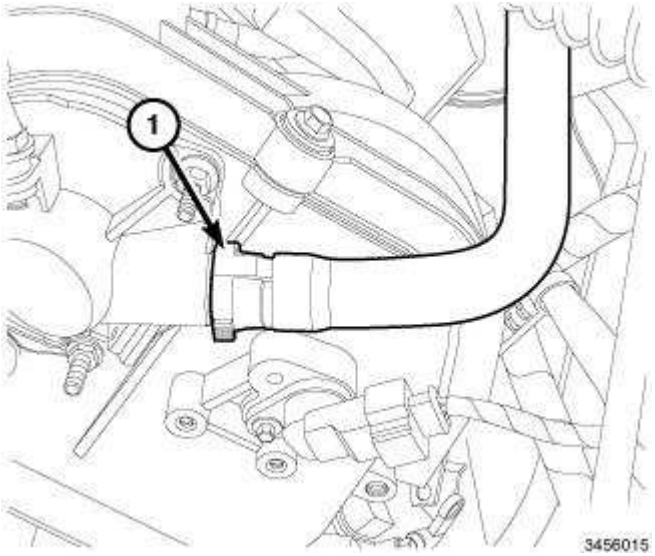


Fig. 50: CCV Hose
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the CCV hose (1) from oil breather/camshaft seal housing.

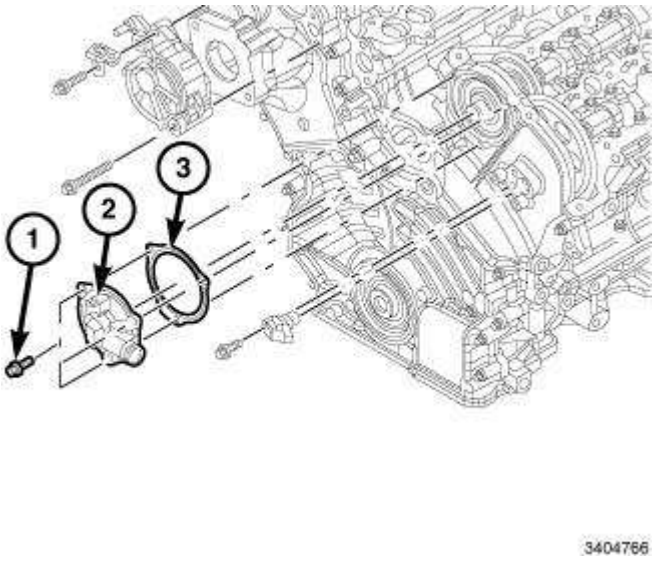


Fig. 51: Oil Breather/Camshaft Seal Housing, Gasket & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts (1) and the oil breather/camshaft seal housing (2).
5. Remove and discard gasket (3).

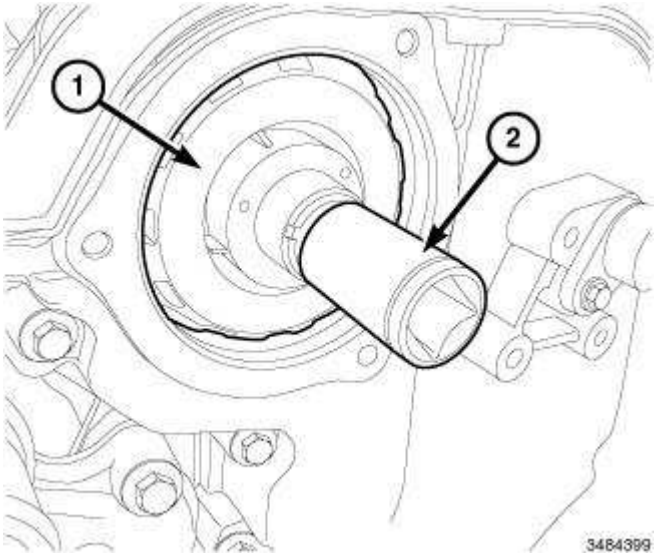


Fig. 52: Oil Separator Remover/Installer & Oil Separator
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #VM.10344, Tool, Oil Separator Remover/Installer) (2), remove the oil separator (1) from the left intake camshaft.

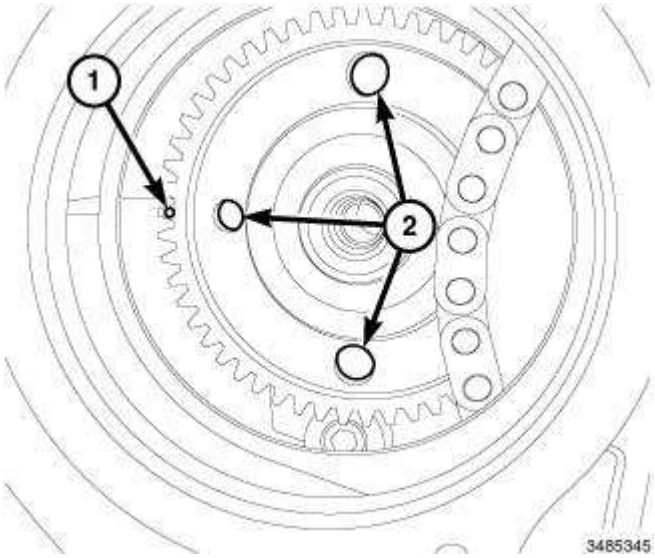


Fig. 53: Holes & Small Dimple
Courtesy of CHRYSLER GROUP, LLC

7. Rotate the engine and observe the location of holes (2) on the camshaft gear and the small dimple (1). If these marks facing the intake manifold the engine is 180° off time.
8. Lock the engine at 30° ATDC. Refer to **STANDARD PROCEDURE** ,**STANDARD PROCEDURE** , **VALVE TIMING** &**VALVE TIMING** .
9. Remove the cowl panel cover. Refer to **COVER, COWL PANEL, REMOVAL** .
10. Remove bolts and the strut tower support.

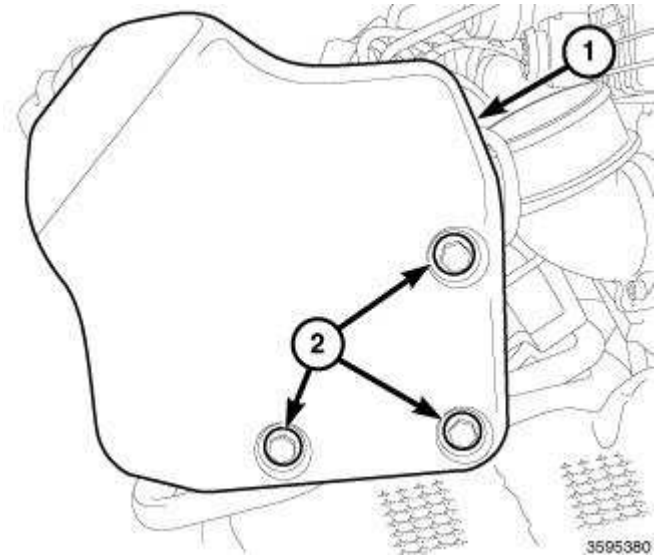


Fig. 54: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove bolts (2) and the high pressure pump blocker (1).

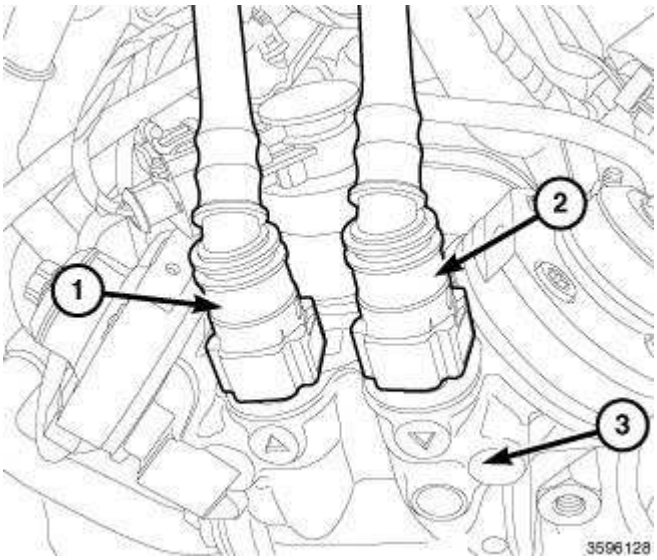


Fig. 55: Low Pressure Supply & Return
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the low pressure supply (2) and return (1) lines from high pressure pump (3). Refer to **FITTING, QUICK CONNECT** .

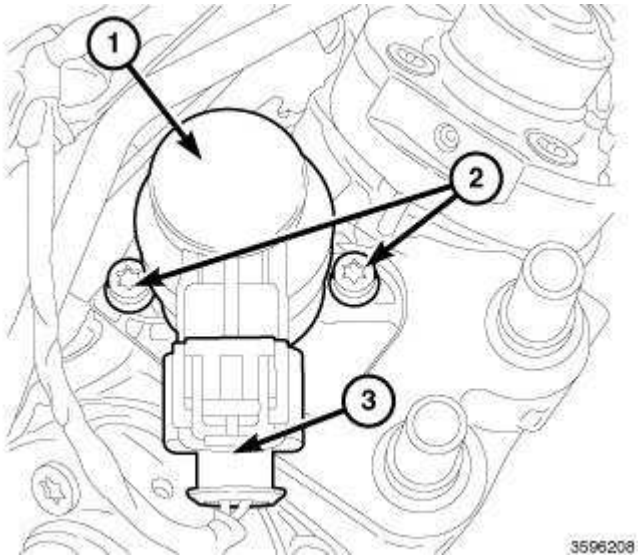


Fig. 56: Fuel Quantity Solenoid Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the fuel quantity solenoid wire harness connector (3).

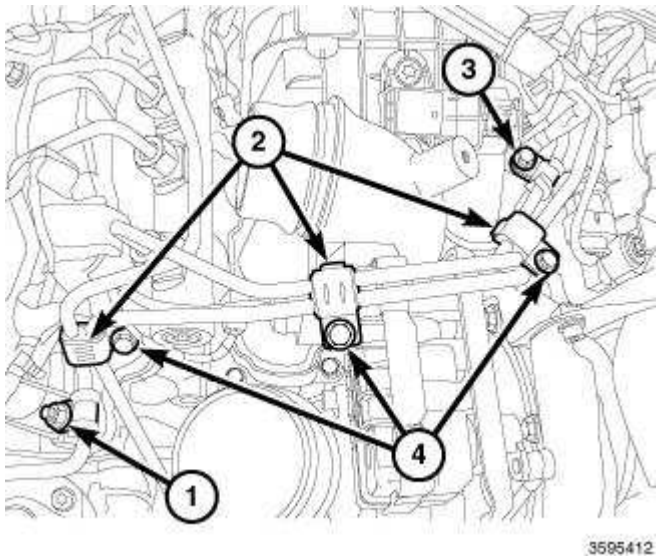


Fig. 57: Fuel Tube Securing Bolts & Bracket
Courtesy of CHRYSLER GROUP, LLC

14. Remove the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), REMOVAL** .
15. Remove nut (1) securing the fuel tube.
16. Remove bolt (3) securing the fuel tube.
17. Remove bolts (4) and the bracket (2) securing the fuel tubes.

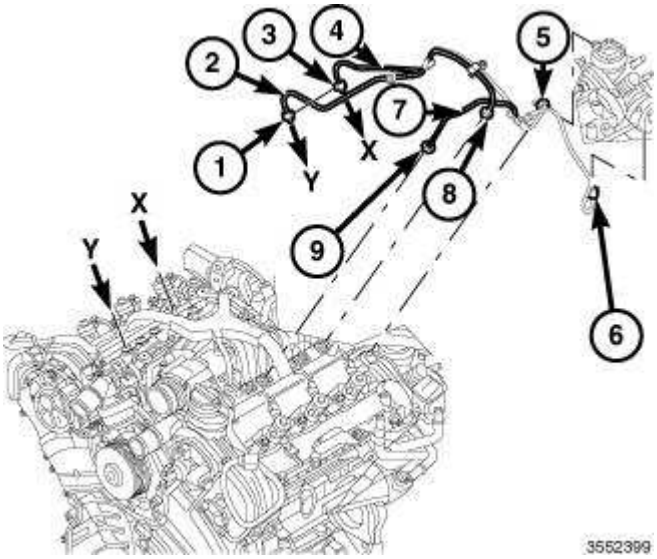


Fig. 58: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

18. Loosen union nuts (1, 5) and remove the right high pressure fuel tube (2) and discard fuel tube.
19. Loosen union nuts (6, 9) and remove the left high pressure fuel tube (7) and discard fuel tube.

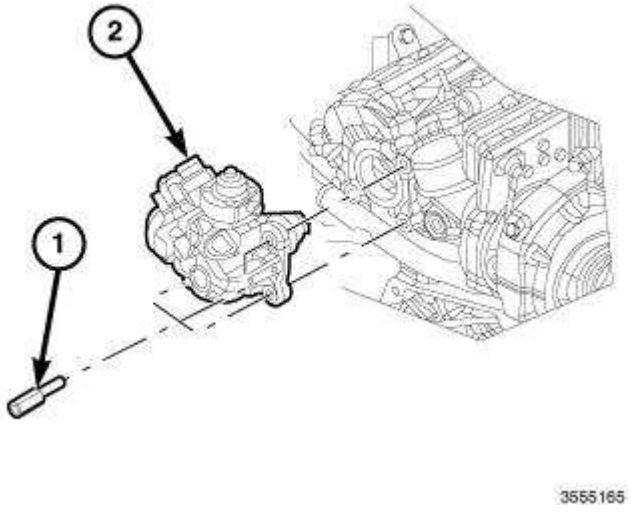


Fig. 59: Fuel Injection Pump
Courtesy of CHRYSLER GROUP, LLC

20. Remove the three bolts (1) and the high pressure pump (2).

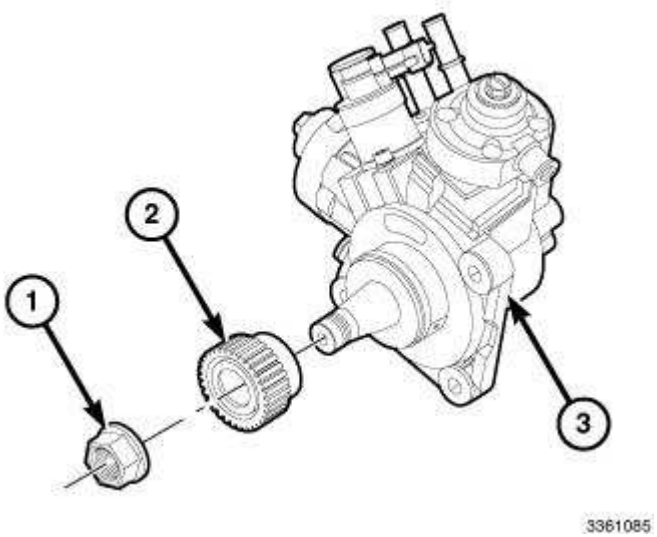


Fig. 60: High Pressure Pump, Gear & Nut
Courtesy of CHRYSLER GROUP, LLC

21. If necessary, remove nut (1) and gear (2) from the high pressure pump (3).

INSTALLATION

INSTALLATION

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

CAUTION: Do Not Force the high pressure pump into the right timing cover or attempt to seat it by drawing it in with the bolts. The pump gear must be properly aligned with the drive gear on the camshaft before the high pressure pump will seat on the cylinder head mounting surface. Failure to properly align drive gears will damage the high pressure pump or camshaft drive gear.

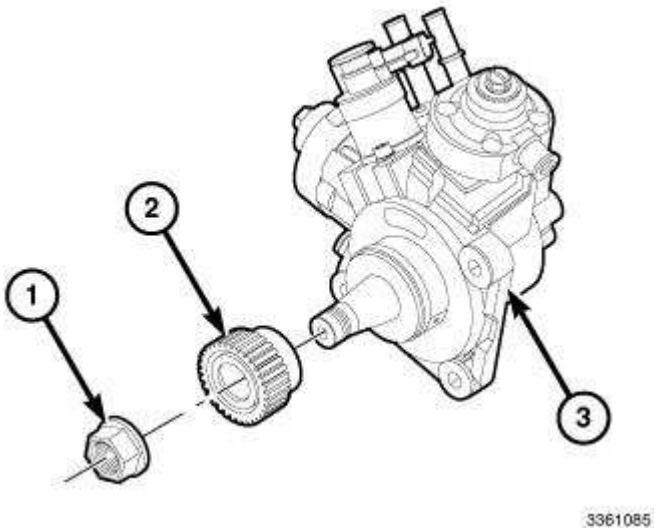


Fig. 61: High Pressure Pump, Gear & Nut
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the gear (2) and nut (1) onto the high pressure pump (3). Tighten nut (1) to 80 N.m (59 ft. lbs.).

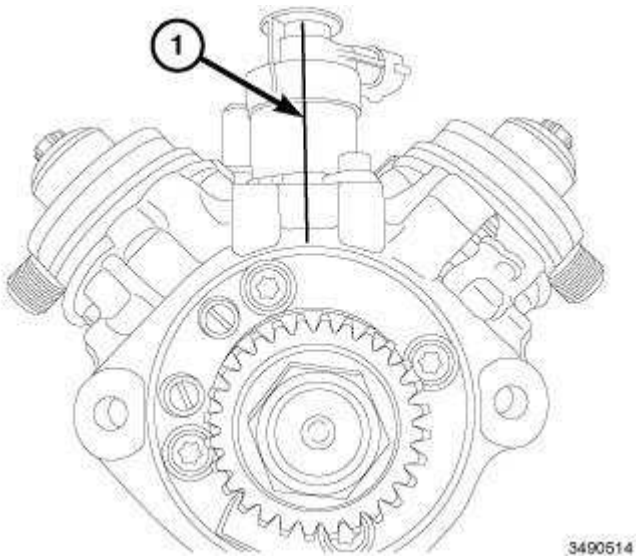


Fig. 62: Fuel Quantity Solenoid
Courtesy of CHRYSLER GROUP, LLC

2. Mark the center line on the fuel quantity solenoid (1) with a paint pan as making a reference to zero 0°.

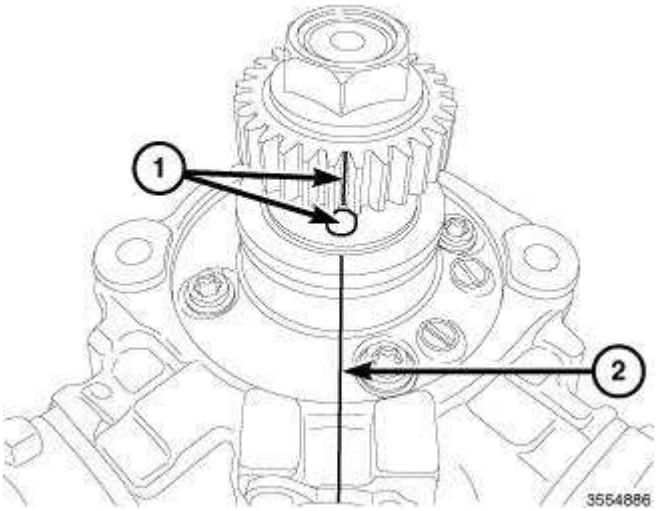


Fig. 63: Hole On The Gear & Reference Mark
Courtesy of CHRYSLER GROUP, LLC

3. Using a paint pen, mark the gear and the hole as a reference mark.
4. Rotate the pump shaft so the paint mark and hole on the gear (1) aligns with the 0° reference mark (2) on pump.

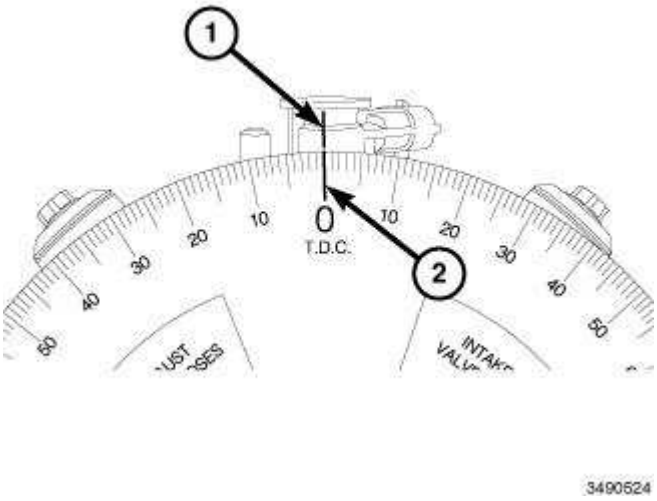


Fig. 64: Degree Wheel To Zero & Fuel Quantity Solenoid
Courtesy of CHRYSLER GROUP, LLC

5. Align the commercially available degree wheel to zero (2) with the center line on fuel quantity solenoid (1).

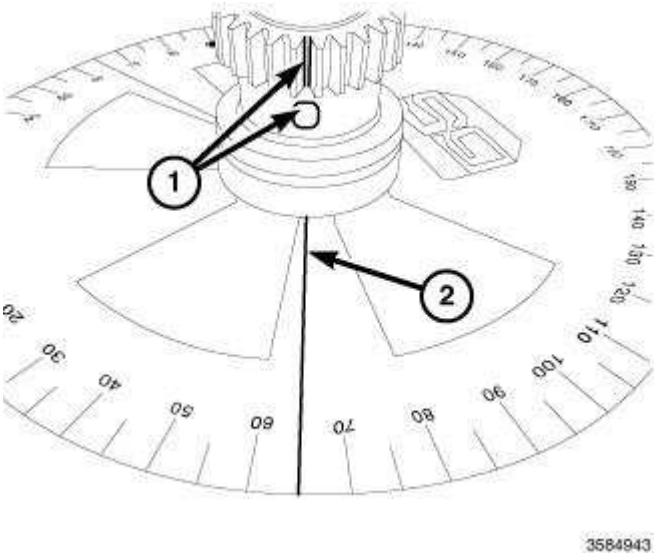


Fig. 65: Index Mark
Courtesy of CHRYSLER GROUP, LLC

6. Rotate the pump gear **clockwise** so the index mark (1) on drive gear aligns at the 65° mark on the degree wheel (2).

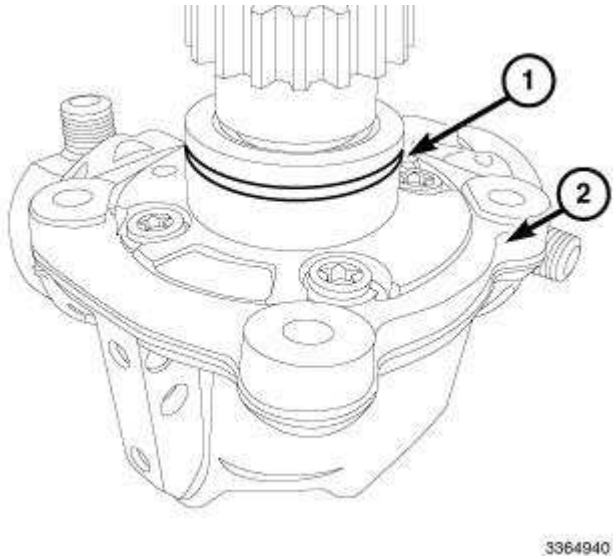


Fig. 66: High Pressure Pump & O-Ring
Courtesy of CHRYSLER GROUP, LLC

7. Install a new O-ring seal (1) onto the high pressure pump (2).

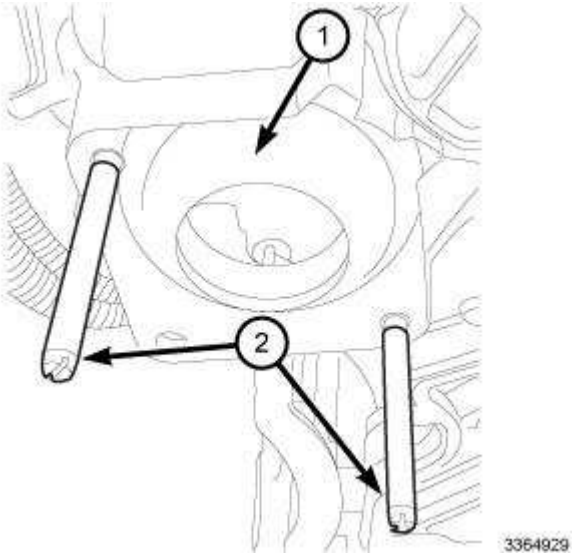


Fig. 67: Pump Installer Tool & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

8. Install the (special tool #VM.10345, Tool, High Pressure Pump Installation) (2) into the rear cover (1).
9. Position the high pressure pump onto the (special tool #VM.10345, Tool, High Pressure Pump Installation) and install the high pressure pump.
10. Remove the (special tool #VM.10345, Tool, High Pressure Pump Installation) (2).

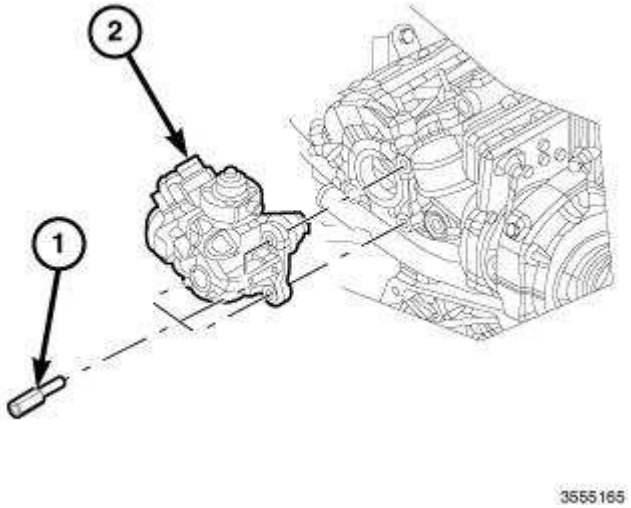


Fig. 68: Fuel Injection Pump
Courtesy of CHRYSLER GROUP, LLC

11. Install the three high pressure pump bolts (1) and tighten to 25 N.m (18 ft. lbs.).

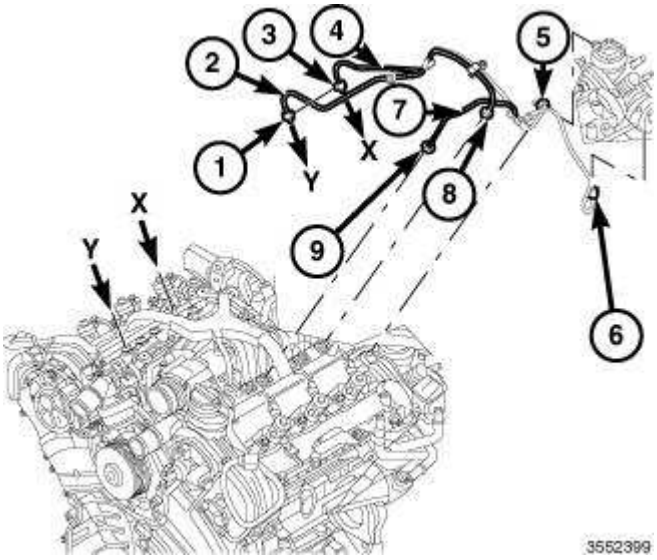


Fig. 69: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Fuel tubes are a one time only use and must be replaced anytime they have been removed.

12. Install the new left high pressure fuel tube (7) and tighten union nuts (6, 9) finger tight.
13. Install the new right high pressure fuel tube (2) and tighten union nuts (1, 5) finger tight.

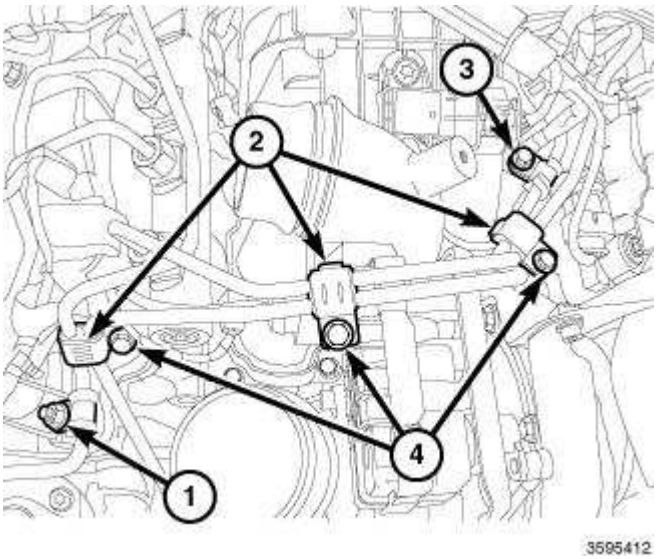


Fig. 70: Fuel Tube Securing Bolts & Bracket
Courtesy of CHRYSLER GROUP, LLC

14. Install the bracket (2) securing the fuel tubes. Tighten bolts (4) to 11 N.m (97 in. lbs.).
15. Install bolt (3) securing the right fuel tube and tighten to 11 N.m (97 in. lbs.).
16. Install nut (1) securing the left fuel tube and tighten to 11 N.m (97 in. lbs.).

17. Install the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), INSTALLATION** .

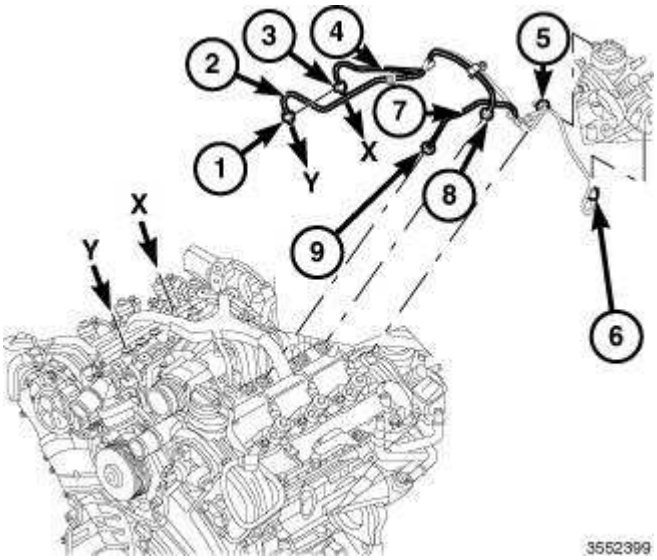


Fig. 71: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

18. Tighten the union nuts as follows:
    - Tighten union nut (1 and 9) to 5 N.m (44 in. lbs.) plus an additional 75 degrees turn.
    - Tighten union nut (5 and 6) to 11 N.m (97 in. lbs.) plus an additional 75 degrees turn.

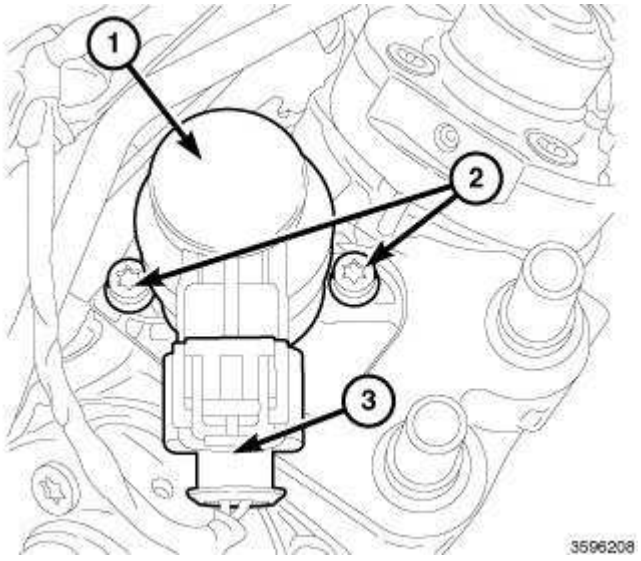


Fig. 72: Fuel Quantity Solenoid Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

19. Connect the fuel quantity solenoid harness connector (3).

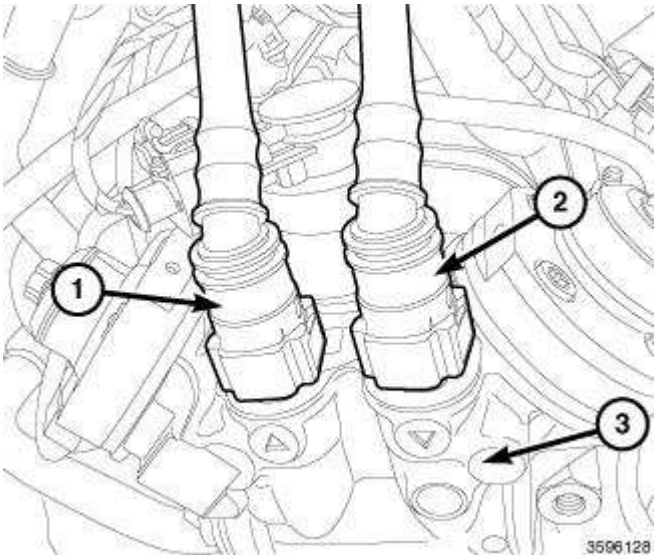


Fig. 73: Low Pressure Supply & Return
Courtesy of CHRYSLER GROUP, LLC

20. Connect the low pressure supply (2) and return (1) lines to the high pressure pump.

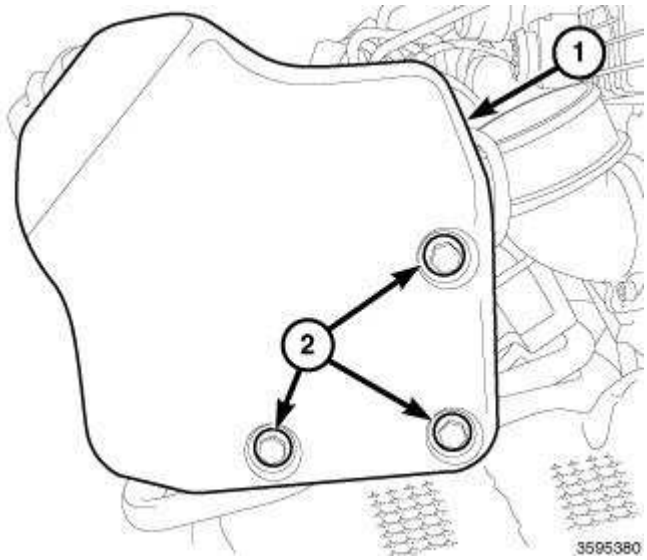


Fig. 74: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Install the fuel pump blocker (1). Tighten bolts (2) to 25 N.m (18 ft. lbs.).

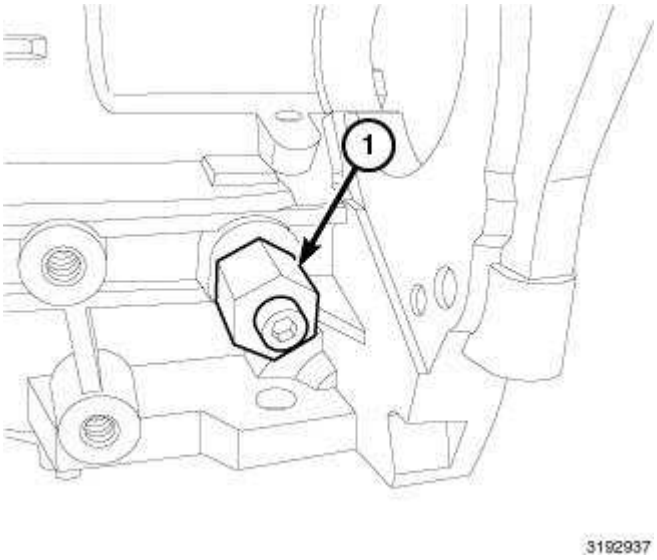


Fig. 75: Crankshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

22. Remove (special tool #VM.10339, Tool, Crankshaft Timing) (1).

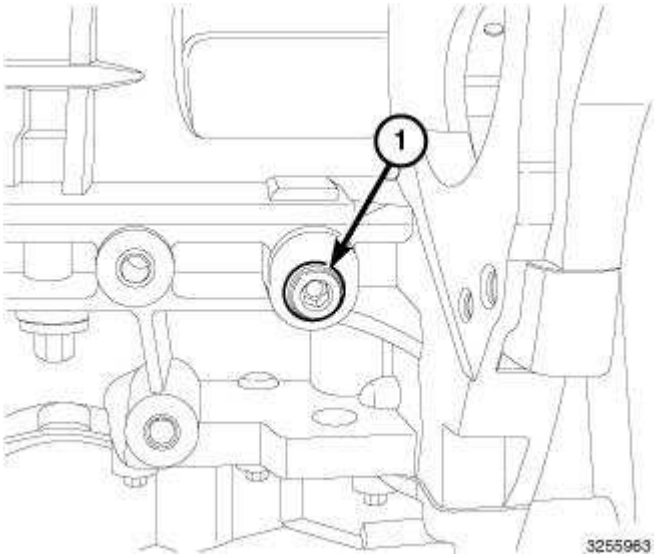


Fig. 76: Engine Block Plug
Courtesy of CHRYSLER GROUP, LLC

23. Install the engine block plug (1) and tighten 30 N.m (22 ft. lbs.).
24. Install the strut tower support and securely tighten bolts.
25. Install the cowl panel cover. Refer to **COVER, COWL PANEL, INSTALLATION** .

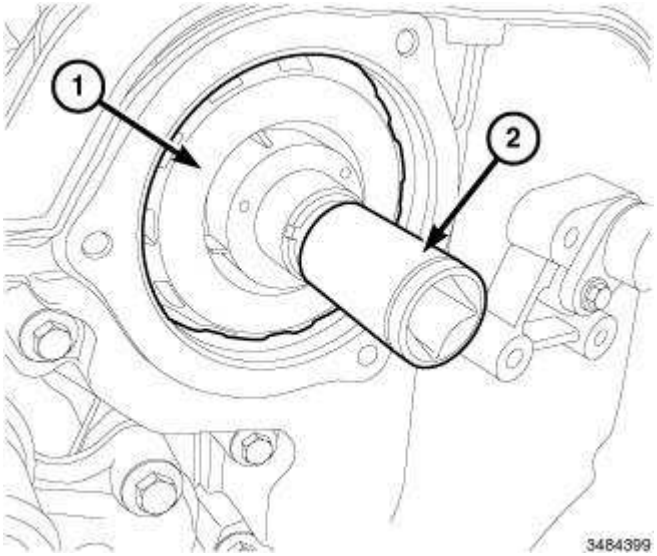


Fig. 77: Oil Separator Remover/Installer & Oil Separator
Courtesy of CHRYSLER GROUP, LLC

26. Using the (special tool #VM.10344, Tool, Oil Separator Remover/Installer) (2) Install the oil separator (1) and tighten to 30 N.m (22 ft. lbs.).

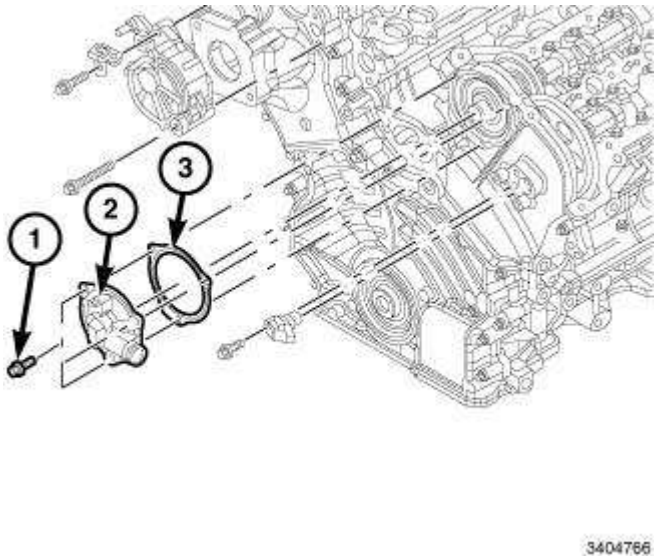


Fig. 78: Oil Breather/Camshaft Seal Housing, Gasket & Bolt
Courtesy of CHRYSLER GROUP, LLC

27. Using a new gasket (3), install the oil breather/camshaft seal housing (2). Tighten bolts (1) to 14 N.m (124 in. lbs.).

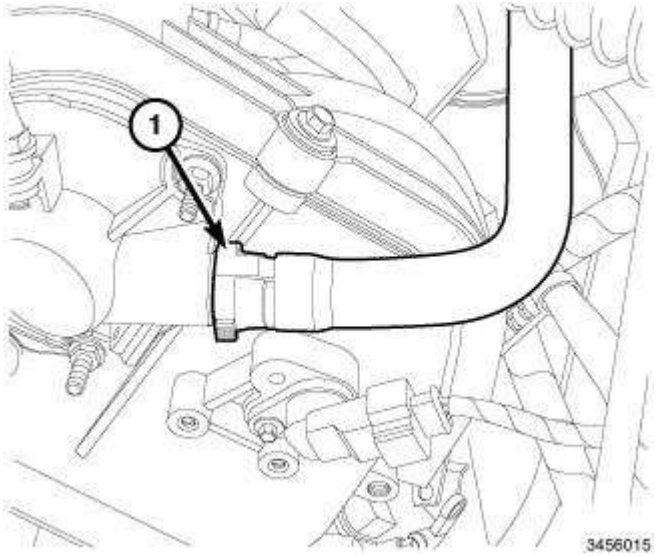


Fig. 79: CCV Hose
Courtesy of CHRYSLER GROUP, LLC

28. Connect the CCV hose (1) from oil breather/camshaft seal housing.

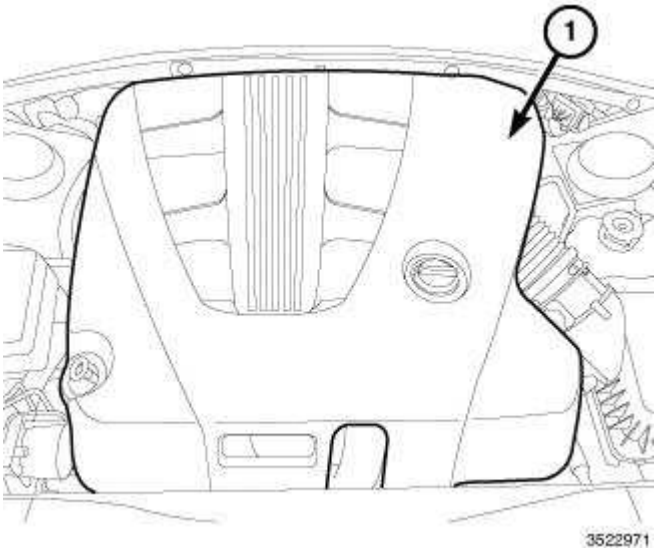


Fig. 80: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

29. Connect the negative battery cable.
30. Start engine and check for leaks.
31. Install the engine cover (1).

RAIL, FUEL

DESCRIPTION

DESCRIPTION

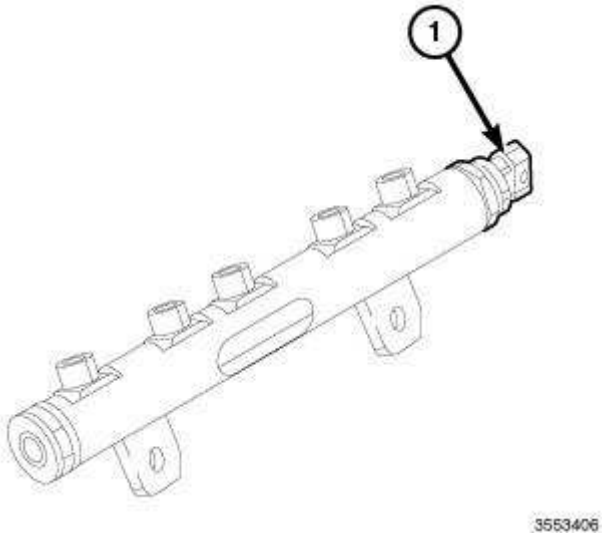


Fig. 81: High Pressure Pump
Courtesy of CHRYSLER GROUP, LLC

The high pressure pump supplies diesel fuel to the fuel rail which deliveries high pressure fuel to all injectors. A fuel rail pressure sensor, fuel rail pressure solenoid, and the return flow line are all combine to keep the fuel pressure in the fuel rail at the required pressure. The fuel rail is attached to the cylinder head.

OPERATION

OPERATION

The stored fuel volume inside the rail acts as a damper for pressure fluctuations which result because of pulsating supply and brief large extractions of fuel during injector firing. The rail primarily influences the atomization of fuel at the injector nozzle, and the accuracy of injected quantity during injection.

REMOVAL

LEFT FUEL RAIL

> **WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.**

1. Disconnect the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD, INTAKE, REMOVAL** .

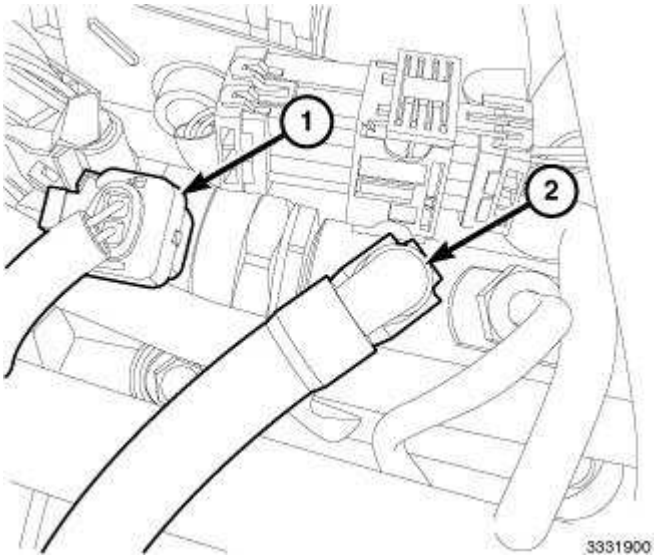


Fig. 82: Fuel Rail Return Line & Fuel Rail Solenoid Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the fuel rail solenoid wire harness connector (1).
4. Disconnect the fuel rail return line (2) and position aside.
5. Remove the left bank high pressure fuel tubes. Refer to **TUBE(S), FUEL, REMOVAL**.

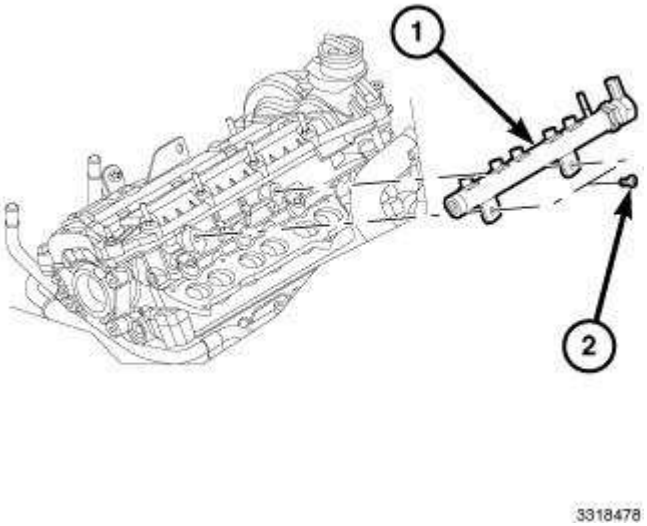


Fig. 83: Left Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove bolts (2) and the left fuel rail (1).

RIGHT FUEL RAIL

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel.

Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

1. Disconnect the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD, INTAKE, REMOVAL** .

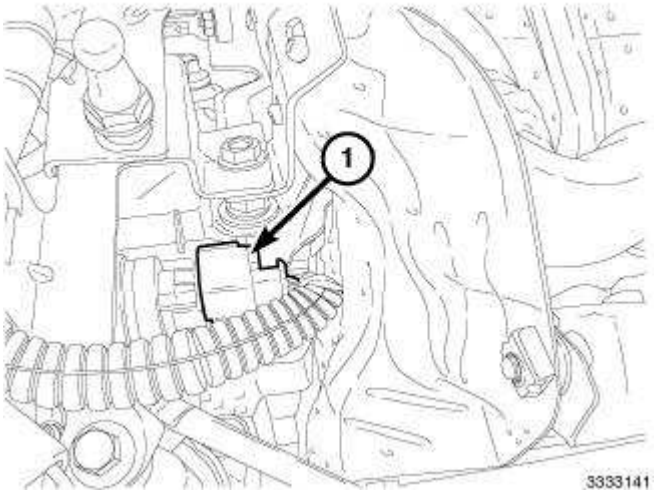


Fig. 84: Fuel Rail Pressure Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the fuel rail pressure sensor wire harness connector (1).

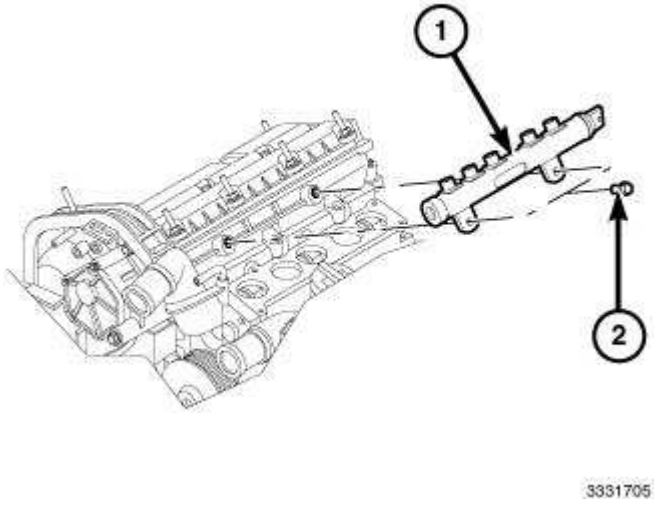


Fig. 85: Right Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the right bank high pressure fuel tubes. Refer to **TUBE(S), FUEL, REMOVAL**.
5. Remove bolts (2) the right fuel rail (1).

INSTALLATION

LEFT FUEL RAIL

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

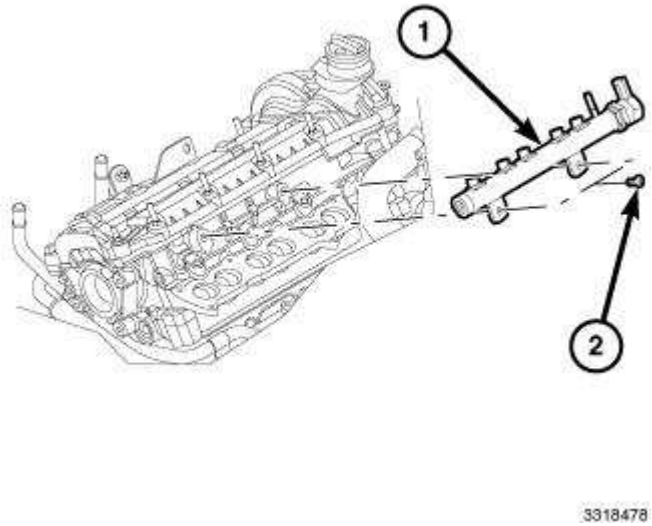


Fig. 86: Left Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fuel rail (1). Tighten bolts (2) to 25 N.m (18 ft. lbs.).

NOTE: Fuel tubes must be replaced anytime they are removed.

2. Install the high pressure fuel rail tubes. Refer to **TUBE(S), FUEL, INSTALLATION**.

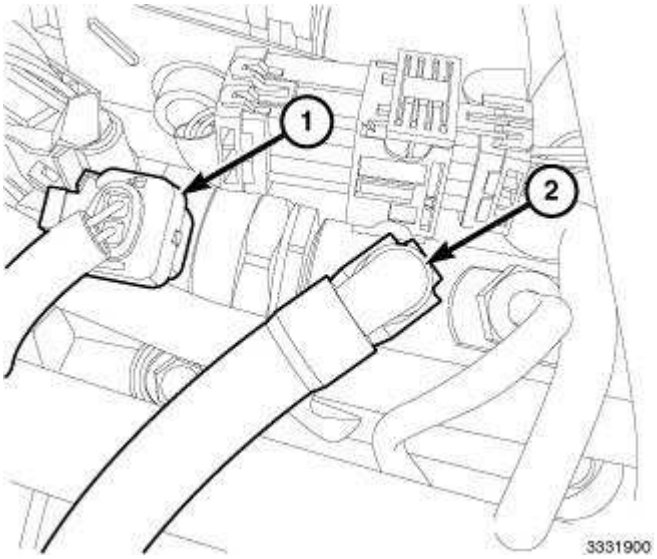


Fig. 87: Fuel Rail Return Line & Fuel Rail Solenoid Connector
Courtesy of CHRYSLER GROUP, LLC

3. Position fuel rail return line (2) and connect to fuel rail.
4. Connect the fuel rail pressure solenoid harness connector (1).
5. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .
6. Connect the negative battery cable.
7. Start engine and inspect for leaks.

RIGHT FUEL RAIL

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

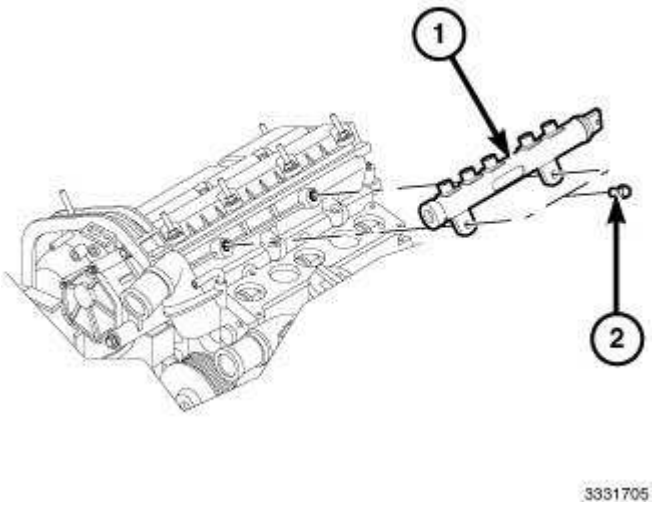


Fig. 88: Right Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fuel rail (1). Tighten bolts (2) to 25 N.m (18 ft. lbs.).

   NOTE: Fuel tubes must be replaced anytime they are removed.

2. Install the high pressure fuel rail tubes. Refer to **TUBE(S), FUEL, INSTALLATION**.

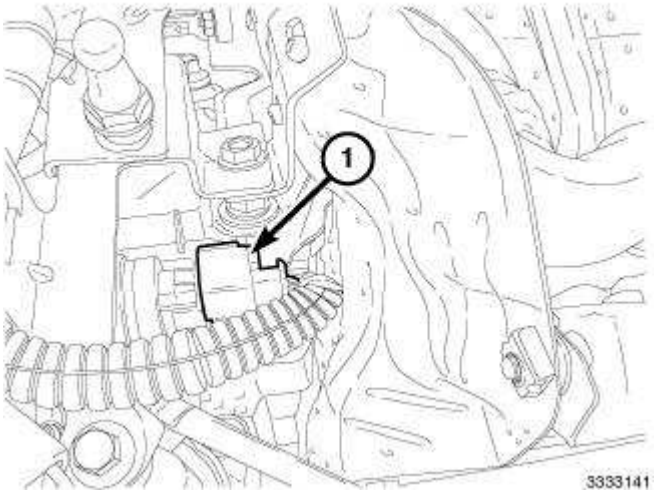


Fig. 89: Fuel Rail Pressure Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect the fuel rail pressure sensor wire harness connector (1).
4. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .

5. Connect the negative battery cable.
6. Start the engine and inspect for leaks.

REGULATOR, FUEL PRESSURE

DESCRIPTION

DESCRIPTION

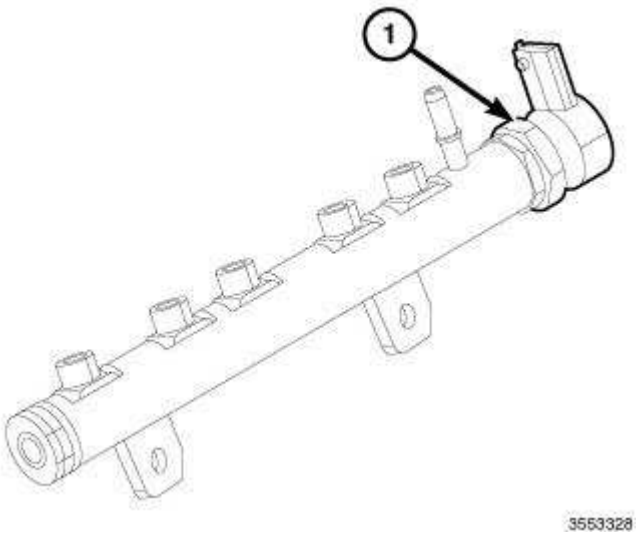


Fig. 90: Fuel Pressure Regulator
Courtesy of CHRYSLER GROUP, LLC

The fuel pressure regulator (1) is attached to the front of the left fuel rail. The fuel pressure regulator is not a serviceable item. In the event that the fuel pressure regulator fails, the fuel rail must be replaced. The fuel pressure regulator controls and maintains constant rail pressure with a control current transmitted by the Powertrain Control Module (PCM).

OPERATION

OPERATION

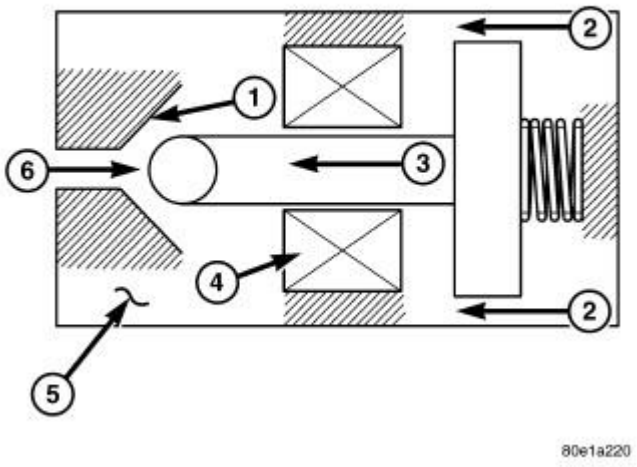


Fig. 91: Fuel Pressure Solenoid Operation
Courtesy of CHRYSLER GROUP, LLC

High pressure which is present in the fuel rail flows to the ball seat (1) of the solenoid (5). The specified pressure required by the system is built up in the rail by the fuel pressure regulator building up a magnetic force which corresponds to this specific pressure by means of a control current from the Powertrain Control Module (PCM). This magnetic force equals a certain outlet cross section at the ball seat of the solenoid. The rail pressure is altered as a result of the quantity of fuel which flows off. The current fuel pressure is signaled by the fuel pressure sensor to the (PCM). The controlled fuel flows back along the return fuel line, into the tank.

In a de-energized state, the fuel pressure solenoid is closed as the spring force (2) presses the ball into the ball seat. When driving, the fuel pressure solenoid is constantly open. When engine is started, the fuel pressure solenoid is held closed by magnetic force. When driving, the pressure of the fluid counteracts the magnetic force of the coil and the slight spring force.

REMOVAL

REMOVAL

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks.

Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

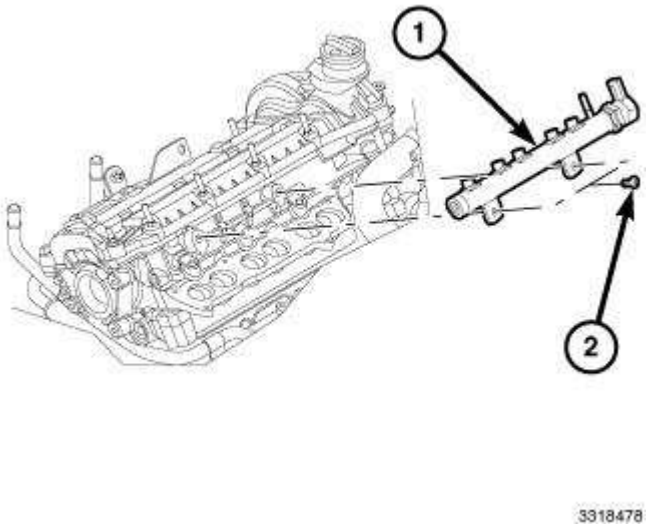


Fig. 92: Left Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fuel pressure regulator is not a serviceable item. If diagnosis has lead you to replace the fuel pressure regulator, then a new fuel rail must to be installed.

1. Disconnect the negative battery cable.
2. Remove the left fuel rail (1). Refer to **RAIL, FUEL, INSTALLATION** or **RAIL, FUEL, INSTALLATION**.

INSTALLATION

INSTALLATION

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system.

Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

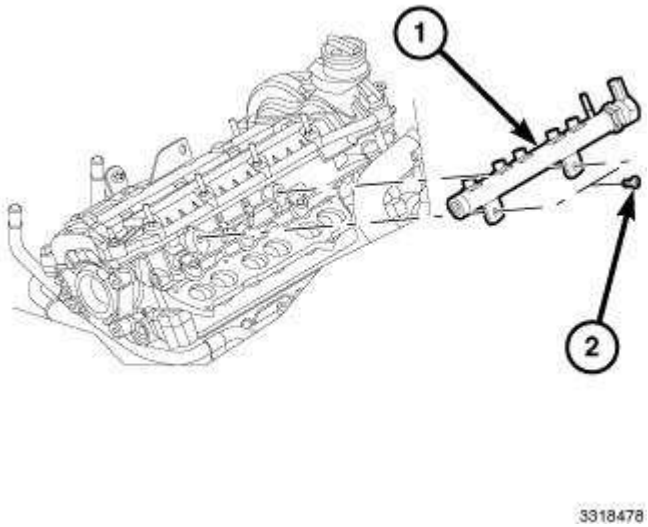


Fig. 93: Left Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the left fuel rail (1). Refer to **RAIL, FUEL, INSTALLATION** or **RAIL, FUEL, INSTALLATION**.
2. Connect the negative battery cable.

SENDING UNIT AND SENSOR, FUEL LEVEL

DESCRIPTION

FUEL LEVEL SENDING UNIT AND SENSOR

The fuel level sending units and sensors are integrated with both the main fuel pump module and the auxiliary fuel pump module and are not serviced separately. The appropriate fuel pump module must be replace if either fuel level sending unit is to be replaced.

For fuel pump module removal. Refer to **MODULE, FUEL PUMP, REMOVAL** or **MODULE, FUEL PUMP, REMOVAL**.

SENSOR, FUEL PRESSURE

DESCRIPTION

DESCRIPTION

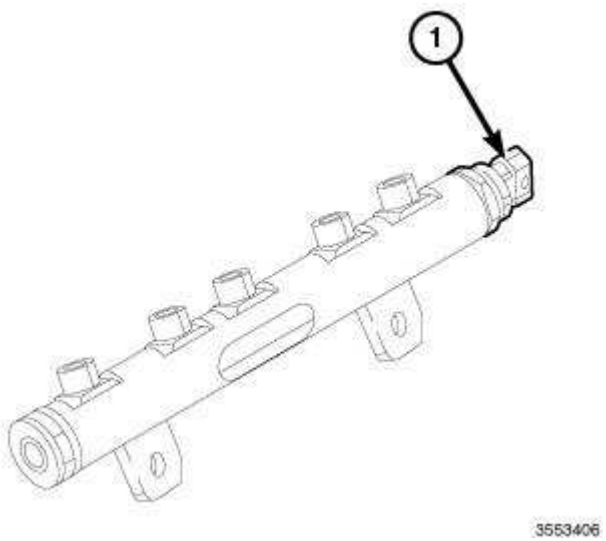


Fig. 94: High Pressure Pump
Courtesy of CHRYSLER GROUP, LLC

The fuel rail pressure sensor screws into the right fuel rail at the back of the engine. The Powertrain Control Module (PCM) uses this sensor to monitor the fuel rail pressure. The fuel rail pressure sensor is not a serviceable item, if diagnosis has led you to replace the fuel rail pressure sensor then the complete fuel rail has to be replaced.

OPERATION

OPERATION

The fuel rail pressure sensor measures the current fuel rail pressure and supplies an appropriate voltage signal to the Powertrain Control Module (PCM).

REMOVAL

REMOVAL

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or

fatal injury.

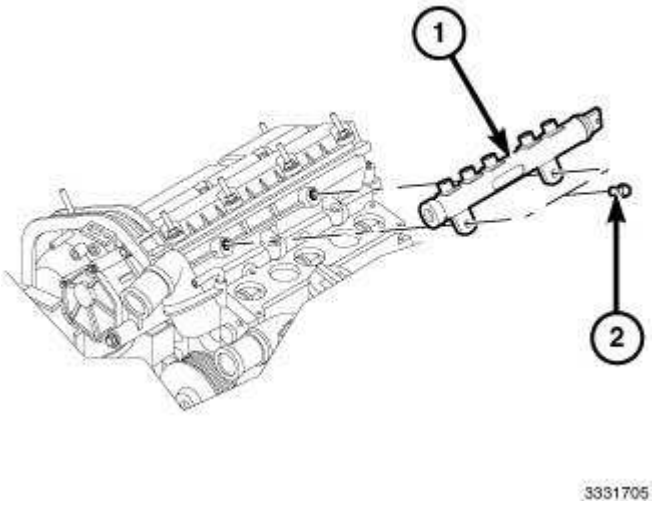


Fig. 95: Right Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fuel rail pressure sensor is not a serviceable item. If diagnosis has lead you to replace the fuel rail pressure sensor, then a new fuel rail must to be installed.

1. Disconnect the negative battery cable.
2. Remove the right fuel rail (1). Refer to **RAIL, FUEL, REMOVAL** or **RAIL, FUEL, REMOVAL**.

INSTALLATION

INSTALLATION

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

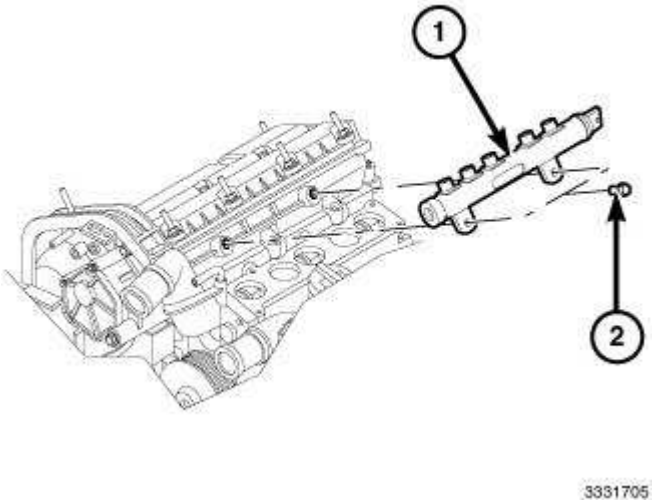


Fig. 96: Right Fuel Rail & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the right fuel rail (1). Refer to **RAIL, FUEL, INSTALLATION** or **RAIL, FUEL, INSTALLATION**.
2. Connect the negative battery cable.

SENSOR, FUEL TEMPERATURE

REMOVAL

REMOVAL

The fuel temperature sensor is a combination fuel heater/temperature sensor. Refer to **HEATER, FUEL, REMOVAL**.

SENSOR, WATER IN FUEL

DESCRIPTION

DESCRIPTION

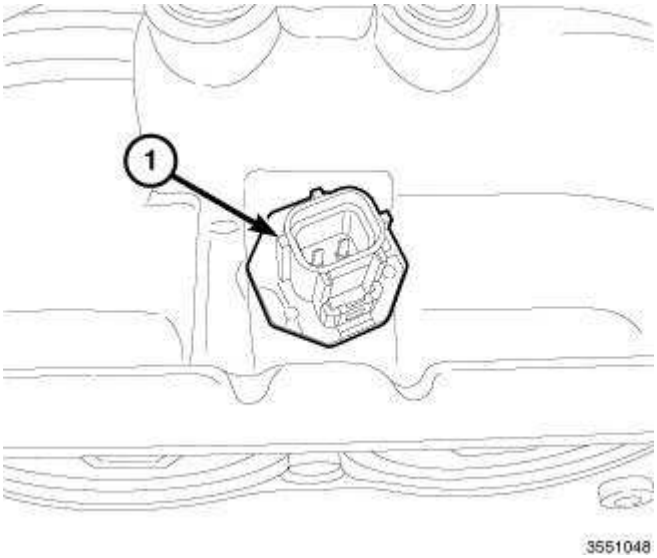


Fig. 97: Fuel (WIF) Sensor
Courtesy of CHRYSLER GROUP, LLC

The Water In Fuel (WIF) sensor (1) is located in the fuel filter housing. The WIF sensor (1) detects the presence of water in the fuel. If water is present in the fuel, a signal is sent to the Powertrain Control Module (PCM) and the PCM signals the instrument cluster, over the CAN bus, to illuminate the water in fuel warning.

OPERATION

OPERATION

The non-dielectric properties of the water allow the sensors probes to close the electronic circuit when water is present in the system. When diesel fuel is present in the system, its dielectric (does not conduct electricity well) properties do not allow any electrical contact between the probes. A 12V power signal is always present in order to illuminate the indicator on the instrument cluster.

REMOVAL

REMOVAL

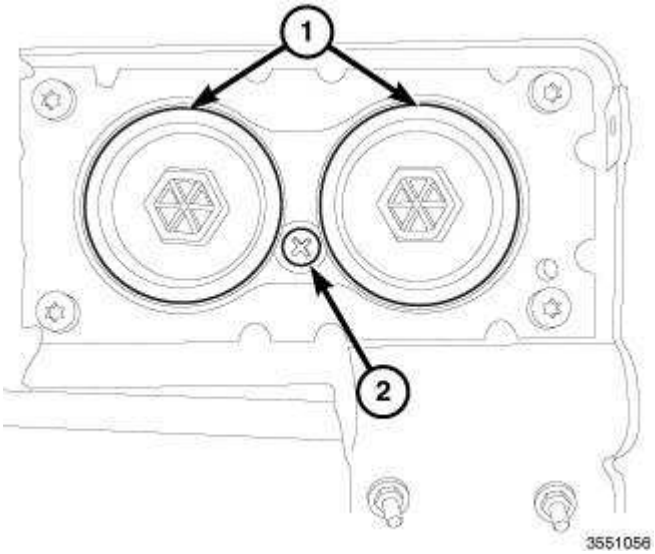


Fig. 98: Drain Plug & Filter Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: Remove any dirt and debris around the fuel filter assembly using a suitable solvent or compressed air. Area around the fuel filter assembly must be clean and dry.

1. Disconnect the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Loosen drain plug (2) and drain fuel filter/water separator into a suitable container.
4. Securely tighten drain plug (2).

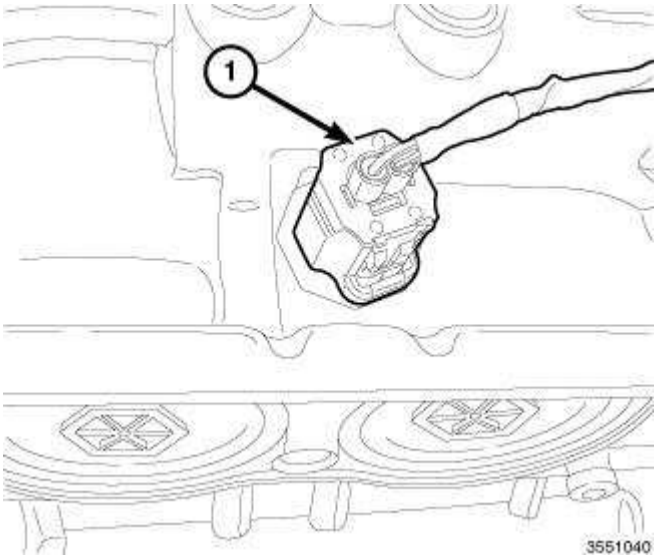


Fig. 99: Water In Fuel (WIF) Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the Water In Fuel (WIF) sensor wire harness connector (1).

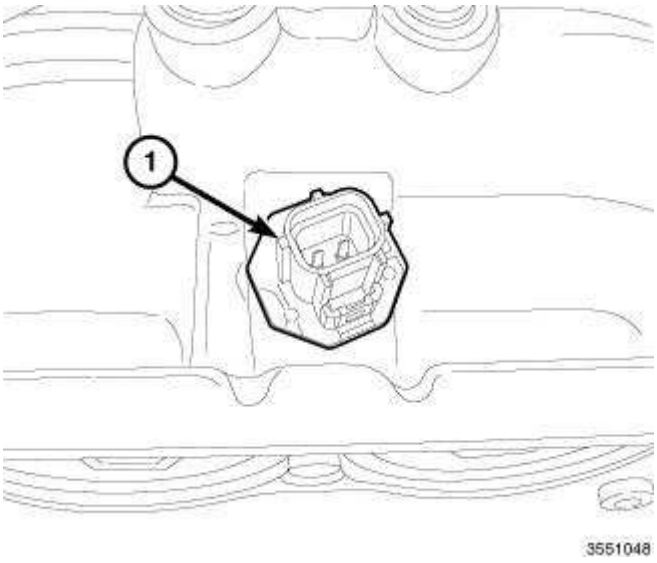


Fig. 100: Fuel (WIF) Sensor
Courtesy of CHRYSLER GROUP, LLC

6. Remove the water in fuel sensor (5).
7. Remove and discard O-ring seal.

INSTALLATION

INSTALLATION

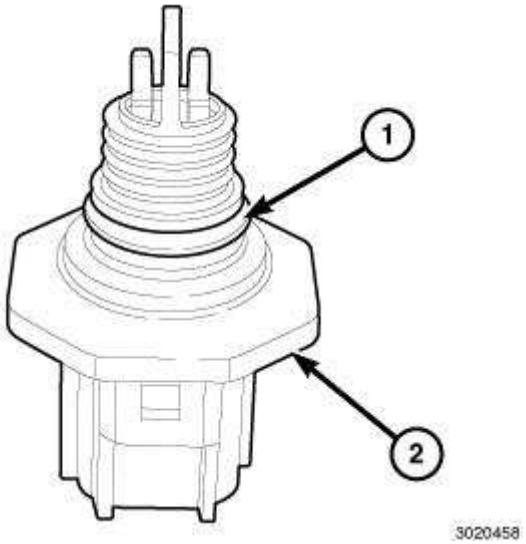


Fig. 101: O-Ring Seal & Water In Fuel Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Clean the O-ring sealing area of housing.

NOTE: Lubricate the O-ring seal with clean diesel fluid.

2. Install a new O-ring seal (1) onto Water in Fuel (WIF) sensor (2).

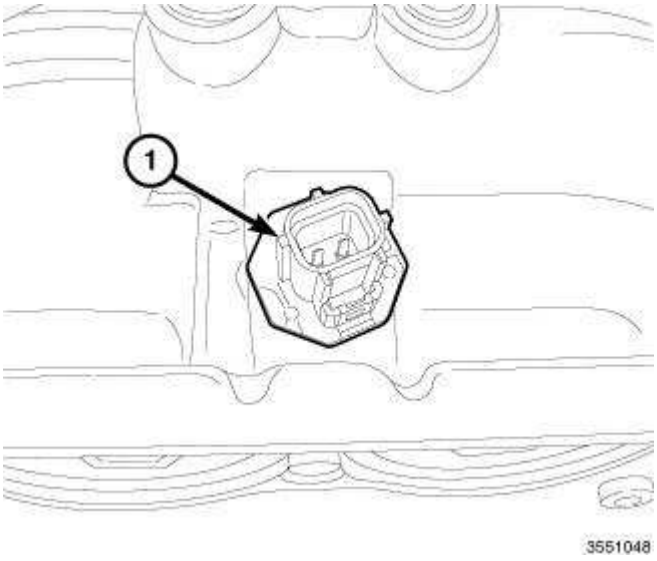


Fig. 102: Fuel (WIF) Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Install the WIF sensor (1) and securely tighten sensor.

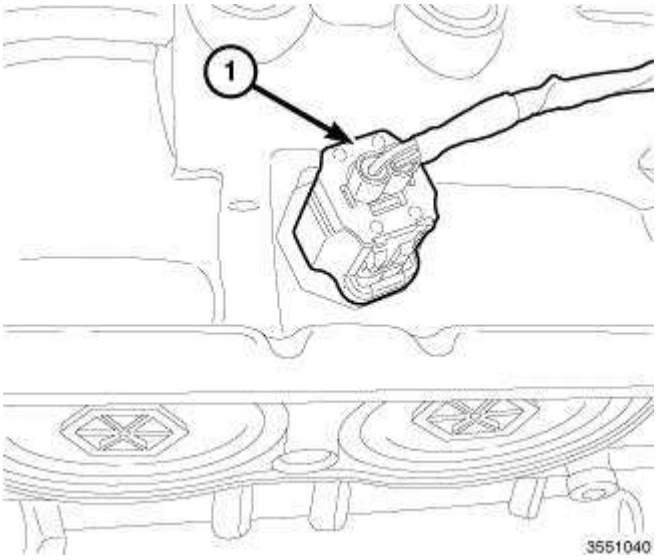


Fig. 103: Water In Fuel (WIF) Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect the Water In Fuel (WIF) sensor wire harness connector (1).
5. Lower the vehicle.
6. Connect the negative battery cable.

SEPARATOR AND FILTER, FUEL AND WATER

DESCRIPTION

DESCRIPTION

The fuel filter/water separator housing is located on the left side of the vehicle in front of the fuel tank. The filter has the task of cleaning the fuel before it is fed to the high-pressure system and ultimately to the injector nozzles.

1. The fuel filter/water separator housing incorporates the following components:
    - Two 5 micron fuel filter element.
    - Water separator
    - Drain plug
    - Water In Fuel sensor (WIF)
    - Fuel heater/temperature sensor

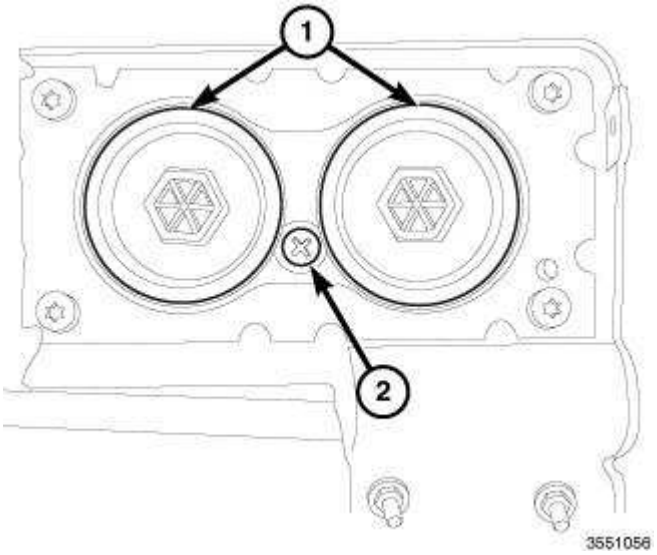


Fig. 104: Drain Plug & Filter Cover
Courtesy of CHRYSLER GROUP, LLC

Fuel filtering is critical in common-rail systems. Small amounts of impurities may damage the precision mechanical components over time. Water entering the injection system can also lead to damage. Servicing the fuel filters (1) is done from the bottom of the fuel filter/water separator housing.

A water reservoir is located at the bottom of the filter to collect any water contained in the fuel. A drain plug (2) is located on the bottom of the filter housing. The filter housing should be drained if a Water-in-Fuel message is displayed in the instrument cluster. Water is drained by removing the drain plug.

REMOVAL

REMOVAL

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

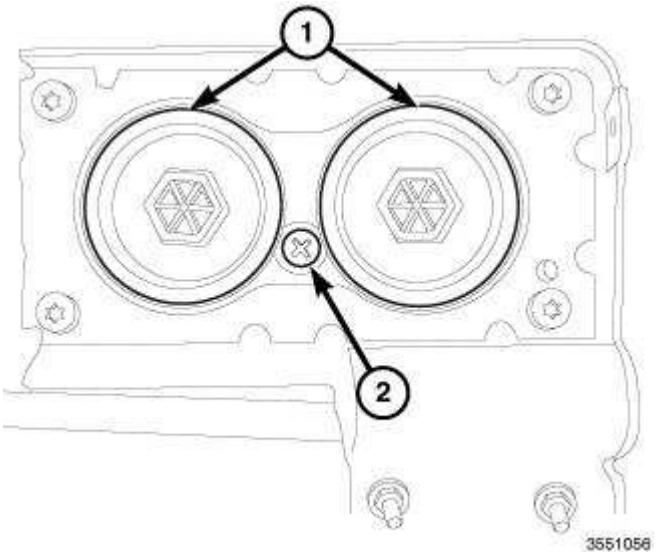


Fig. 105: Drain Plug & Filter Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Loosen drain plug (2) and drain fuel filter/water separator into a suitable container.
4. Securely tighten drain plug (2).

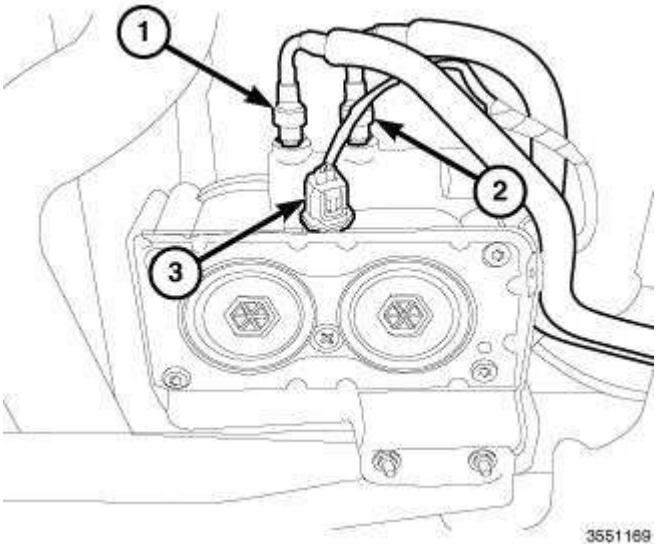


Fig. 106: Fuel Filter/Water Separator Outlet Fuel Line, Inlet Fuel Line & Fuel (WIF) Sensor Harness Connector

Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the fuel filter/water separator outlet fuel line (1). Refer to **FITTING, QUICK CONNECT** .
6. Disconnect the fuel filter/water separator inlet fuel line (2). Refer to **FITTING, QUICK CONNECT** .
7. Disconnect the Water In Fuel (WIF) sensor harness connector (3).

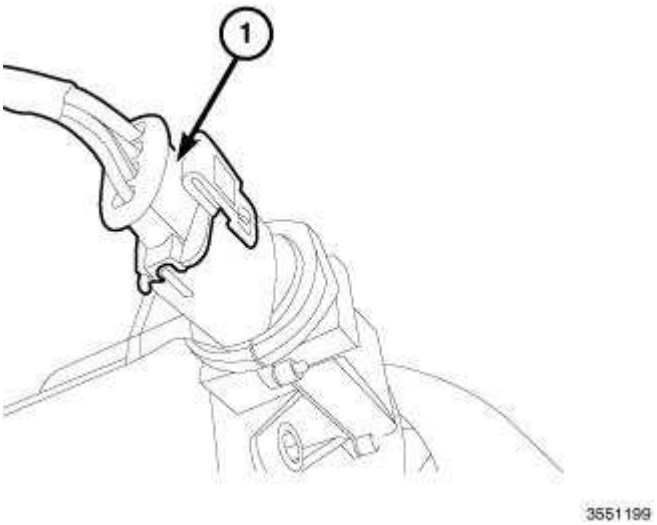


Fig. 107: Combination Fuel Heater/Temperature Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the combination fuel heater/temperature sensor wire harness connector (1).

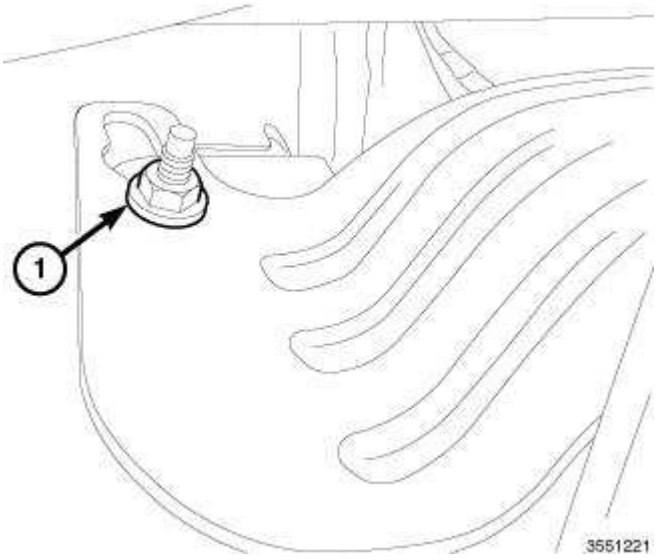


Fig. 108: Fuel Filter/Water Separator Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

9. Loosen the fuel filter/water separator bracket nut (1).

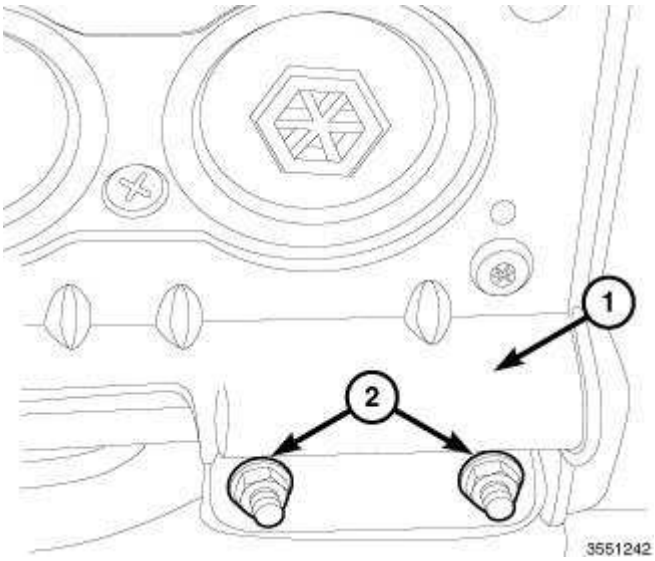


Fig. 109: Nuts & Fuel Filter/Water Separator Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Remove nuts (2) and the fuel filter/water separator assembly (1).

INSTALLATION

INSTALLATION

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

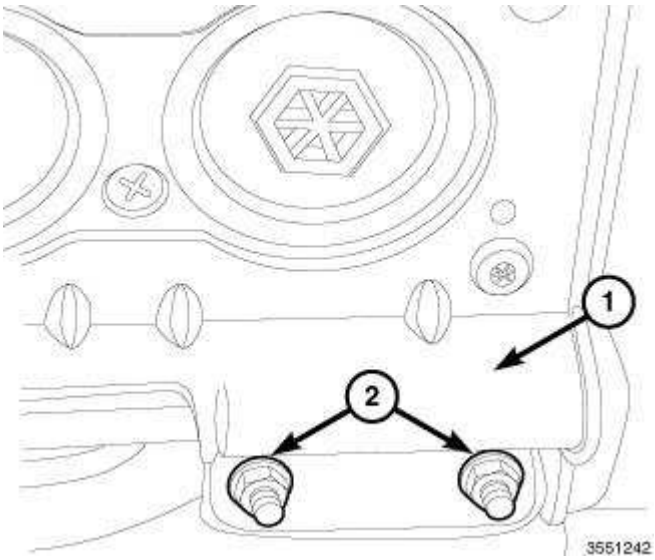


Fig. 110: Nuts & Fuel Filter/Water Separator Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Install the fuel filter/water separator assembly (1). Tighten two nuts (2) to 20 N.m (177 in. lbs.).

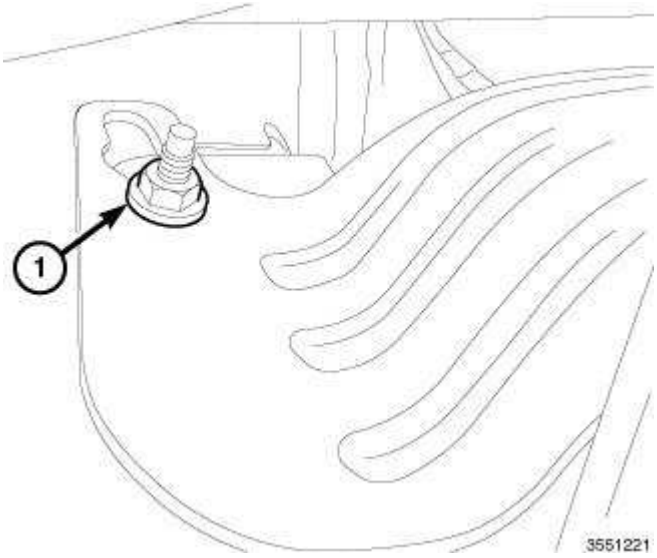


Fig. 111: Fuel Filter/Water Separator Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

2. Tighten the fuel filter/water separator bracket nut (1) to 20 N.m (177 in. lbs.).

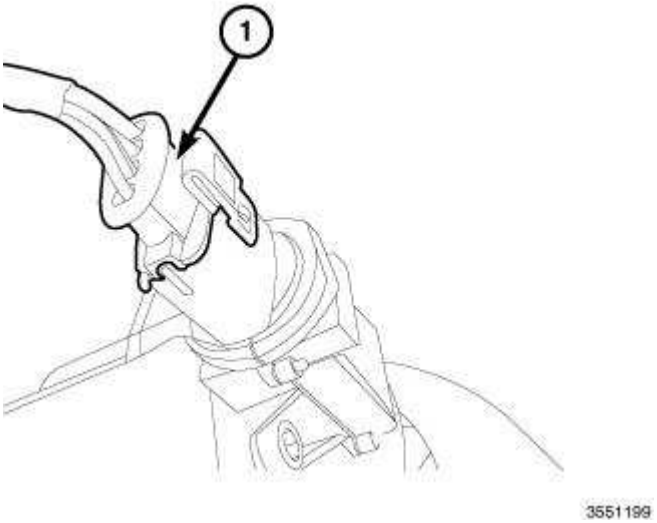


Fig. 112: Combination Fuel Heater/Temperature Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect the combination fuel heater/temperature sensor wire harness connector (1).

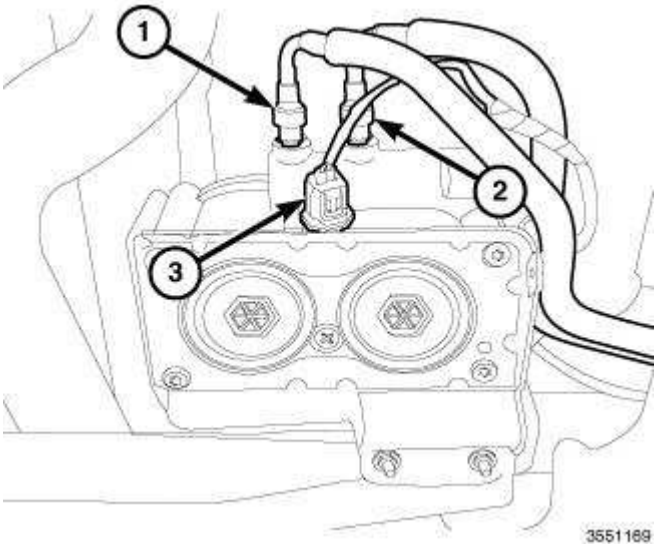


Fig. 113: Fuel Filter/Water Separator Outlet Fuel Line, Inlet Fuel Line & Fuel (WIF) Sensor Harness Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect the Water In Fuel (WIF) sensor wire harness connector (3).
5. Connect the fuel filter/water separator inlet fuel line (2).
6. Connect the fuel filter/water separator outlet fuel line (1).

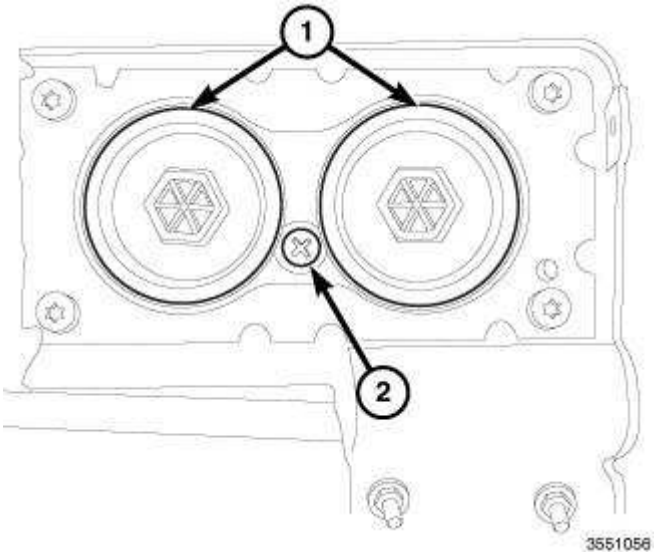


Fig. 114: Drain Plug & Filter Cover
Courtesy of CHRYSLER GROUP, LLC

7. Make sure fuel filter drain port (2) is closed.
8. Lower the vehicle.
9. Connect the negative battery cable.
10. Start the engine and inspect for leaks.

SOLENOID, FUEL QUANTITY

DESCRIPTION

DESCRIPTION

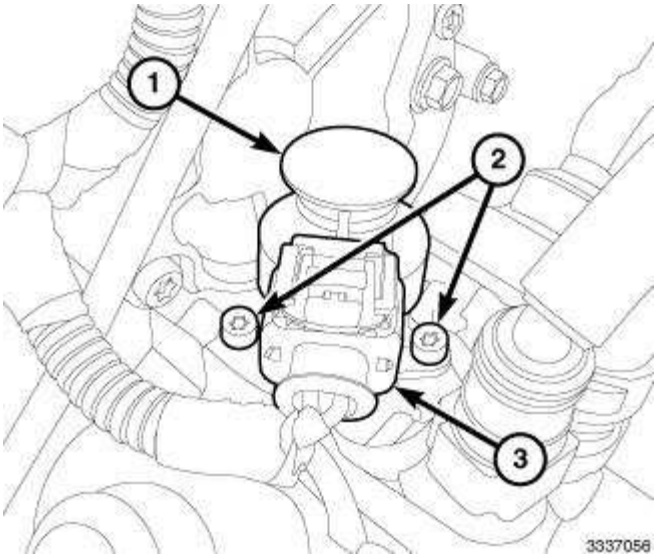


Fig. 115: Fuel Quantity Solenoid, Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

The fuel quantity solenoid is located in the top of the high pressure pump. The solenoid is pulse width modulated by the Powertrain Control Module (PCM) and meters the amount of fuel that flows into the high pressure elements inside of the high pressure pump. The solenoid is also inactive during the first 30 seconds to allow maximum fuel pressure to the fuel rail during start up.

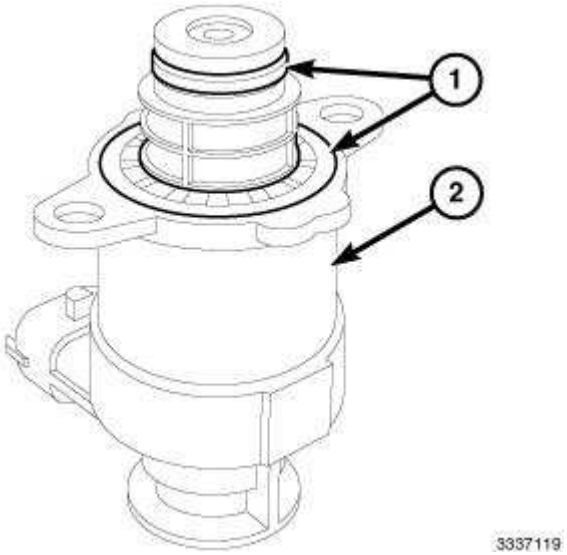


Fig. 116: Fuel Quantity Sensor & O-Ring Seals
Courtesy of CHRYSLER GROUP, LLC

1. The fuel quantity solenoid incorporates a screen filter (1) that may require periodic cleaning. In the invent that screen filter gets dirty or restricted driveability issues and or fault codes may occur.

OPERATION

OPERATION

The fuel quantity solenoid is a pulse width modulated valve that controls the amount of fuel sent or delayed to the high pressure pump elements inside of the high pressure pump. The Powertrain Control Module (PCM) determines the fuel pressure set point based on engine sensor inputs. If the actual fuel rail pressure is too low, the PCM commands the solenoid to allow more fuel to flow to the high pressure pump. This minimizes the difference between the actual fuel rail pressure reading and the set point. The PCM will also operate the solenoid, delaying fuel if the fuel rail pressure becomes to high.

The fuel quantity solenoid is commanded open by the PCM to allow the high pressure pump to build maximum pressure 1800 bar (26, 106 psi) the solenoid also has fuel tank heat protection function that meters the exact amount of fuel to prevent excess heated fuel from returning to the fuel tank.

REMOVAL

REMOVAL

> **WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.**

1. Disconnect the negative battery cable.
2. Remove the cowl panel cover. Refer to **COVER, COWL PANEL, REMOVAL** .
3. Remove bolts and the strut tower support.

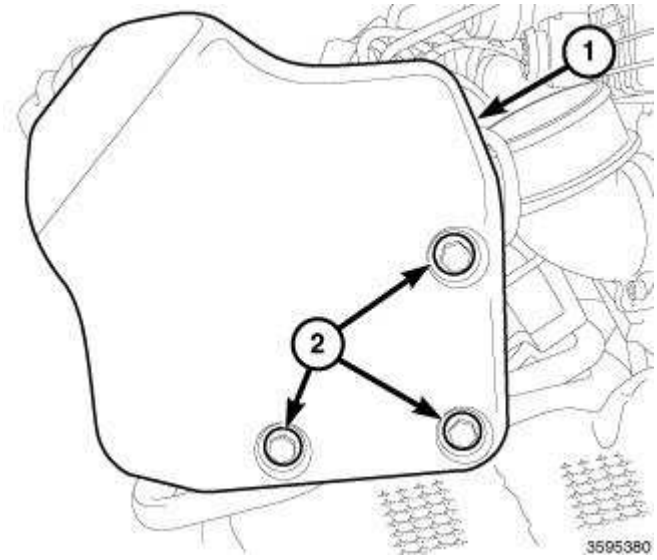


Fig. 117: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts (2) and the high pressure pump blocker shield (1).

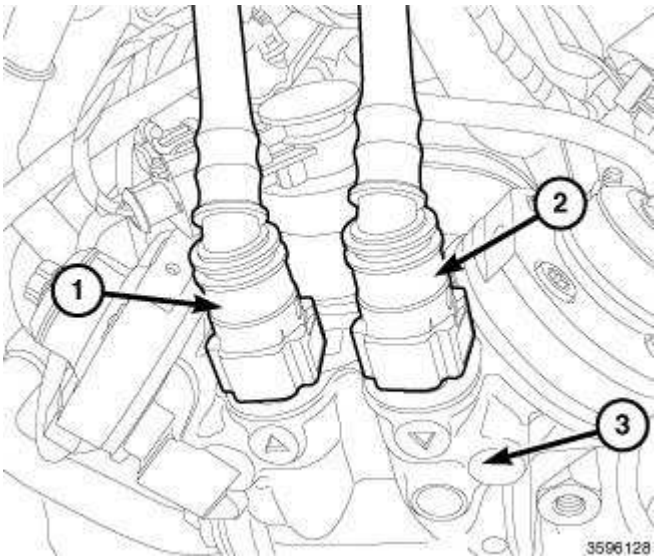


Fig. 118: Low Pressure Supply & Return
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the low pressure supply (2) and return (1) lines from high pressure pump. Refer to **FITTING, QUICK CONNECT** .

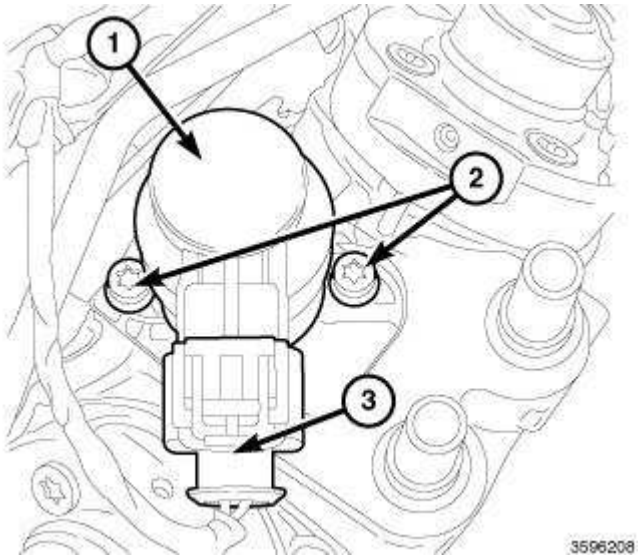


Fig. 119: Fuel Quantity Solenoid Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the fuel quantity solenoid wiring harness connector (3).
7. Clean the surrounding area of the fuel quantity solenoid.
8. Remove fasteners (2) and the fuel quantity solenoid (1).

INSTALLATION

INSTALLATION

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

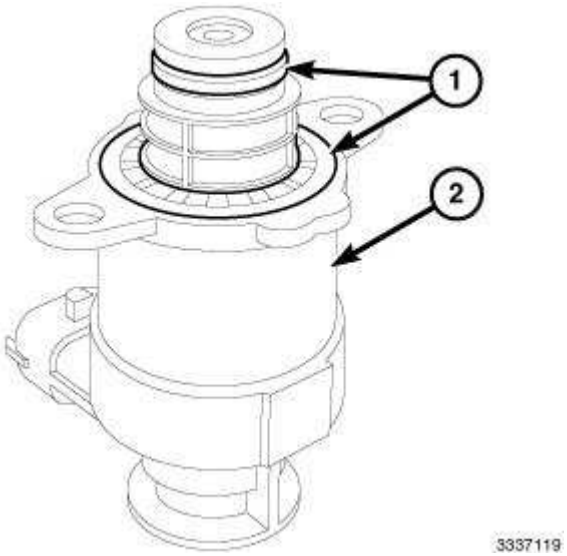


Fig. 120: Fuel Quantity Sensor & O-Ring Seals
Courtesy of CHRYSLER GROUP, LLC

1. Clean the sealing surfaces.
2. Inspect the fuel quantity solenoid screen filter (1) and clean as necessary.
3. Install new O-ring seals (1) onto the fuel quantity sensor (2).

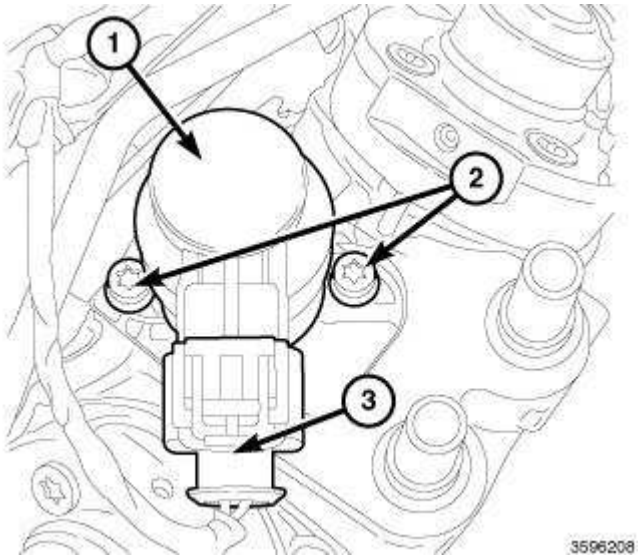


Fig. 121: Fuel Quantity Solenoid Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

4. Install the fuel quantity solenoid (1) and securely tighten fasteners (2).
5. Connect the fuel quantity solenoid wiring harness connector (3).

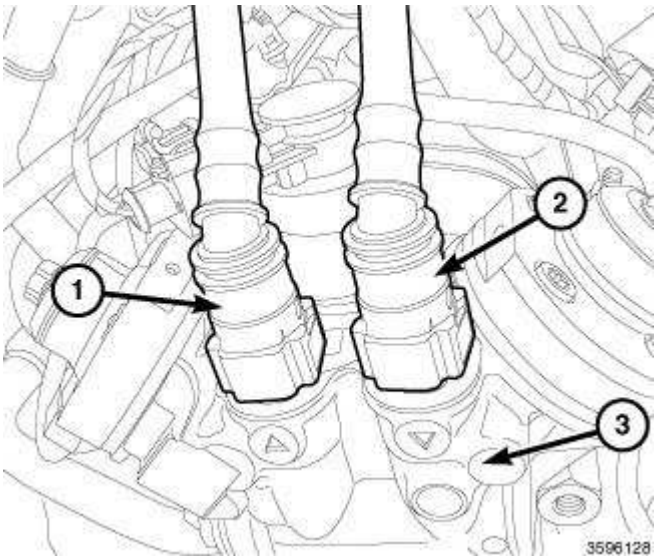


Fig. 122: Low Pressure Supply & Return
Courtesy of CHRYSLER GROUP, LLC

6. Connect the low pressure supply (2) and return (1) lines from high pressure pump.

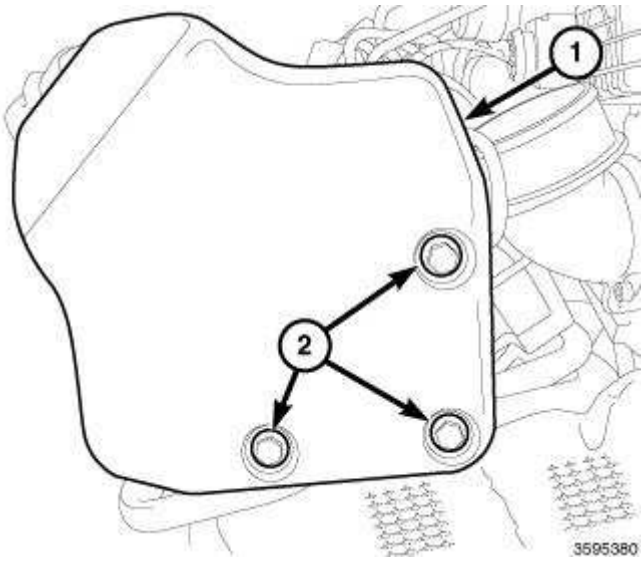


Fig. 123: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the high pressure pump blocker shield (1). Tighten bolts (2) to 25 N.m (18 ft. lbs.).
8. Install the strut tower support and securely tighten bolts.
9. Install the cowl panel cover. Refer to **COVER, COWL PANEL, INSTALLATION** .
10. Connect the negative battery cable.
11. Start the engine and inspect for leaks.

TANK, FUEL

REMOVAL

REMOVAL

1. Perform the draining fuel tank procedure. Refer to **DRAINING FUEL TANK** .
2. Disconnect the negative battery cable.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the left rear tire.

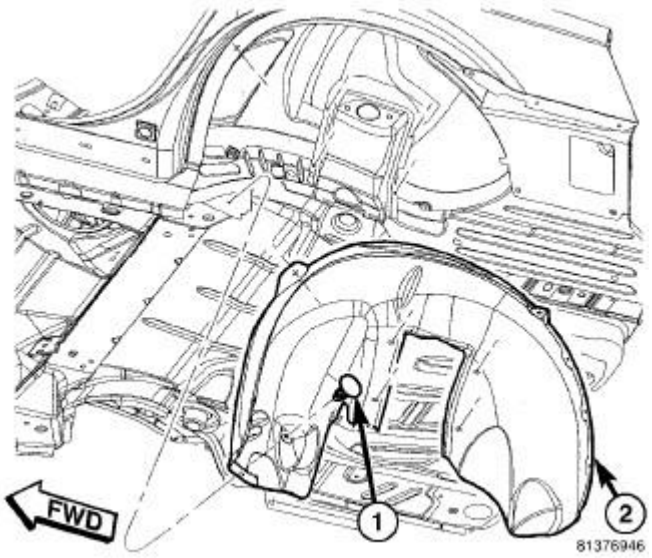


Fig. 124: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

5. Remove the push-pins (1) that secure the rear wheelhouse shield to the body.
6. Remove the left rear wheelhouse splash shield (2).

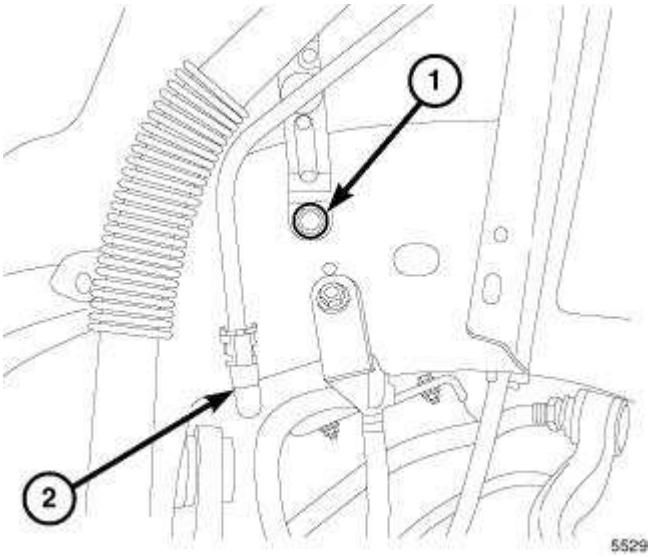


Fig. 125: Filler Tube Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the fuel filler tube ORVR vent line (2).
8. Remove the fuel filler tube retaining bolt (1).

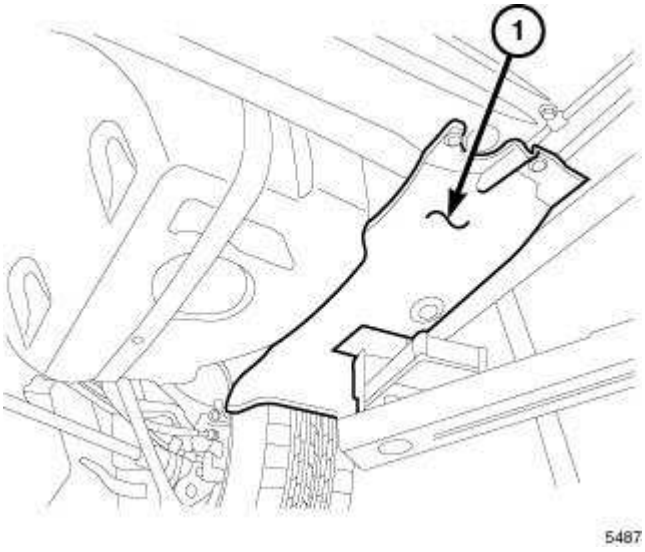


Fig. 126: Splash Shield DR Side
Courtesy of CHRYSLER GROUP, LLC

9. Remove the left under body splash shield (1).

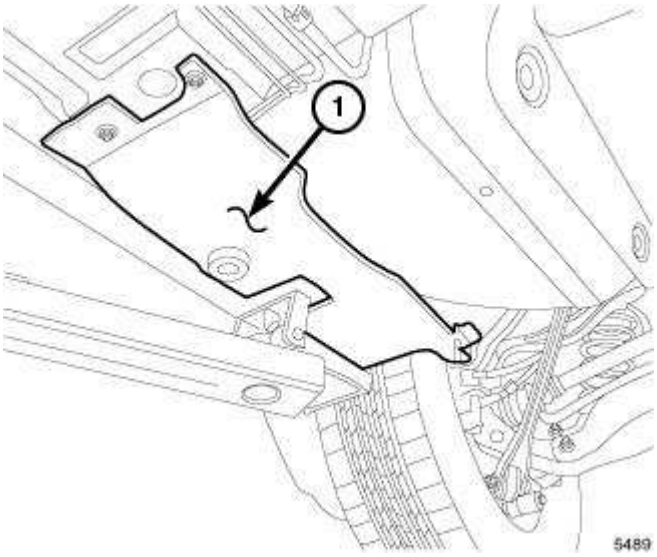


Fig. 127: Splash Shield PASS Side
Courtesy of CHRYSLER GROUP, LLC

10. Remove the right underbody splash shield (1).

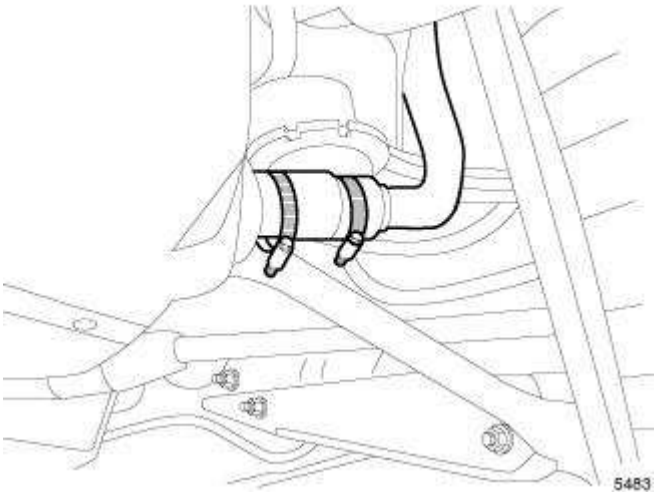


Fig. 128: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

11. Remove the hose clamp from the fuel filler tube.

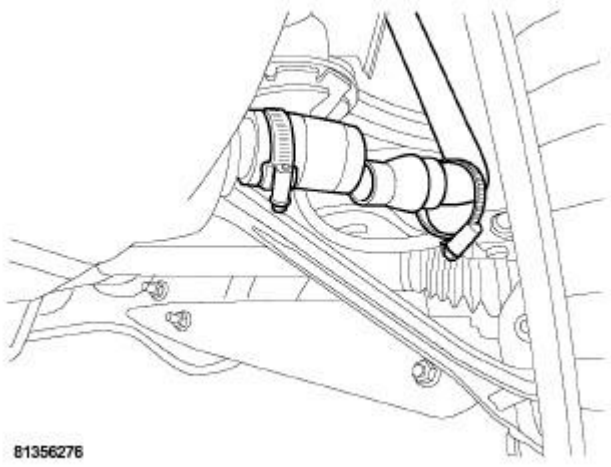


Fig. 129: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

12. Remove fuel filler tube from the rubber hose on the fuel tank and position aside.
13. Remove the muffler and tailpipe assembly. Refer to **MUFFLER, EXHAUST, REMOVAL** .

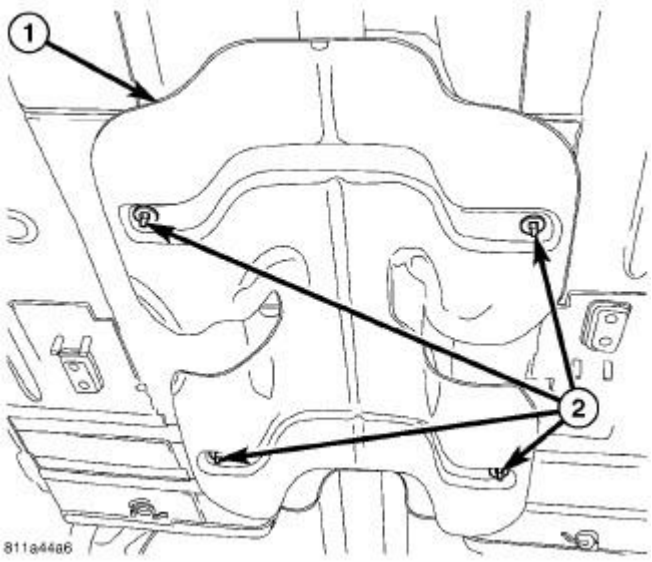


Fig. 130: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

14. Remove the propeller shaft. Refer to **REMOVAL** .
15. Remove the fuel filter/water separator assembly. Refer to **SEPARATOR AND FILTER, FUEL AND WATER, REMOVAL**.
16. Remove the heat shield retainers (2) and remove the heat shield (1).

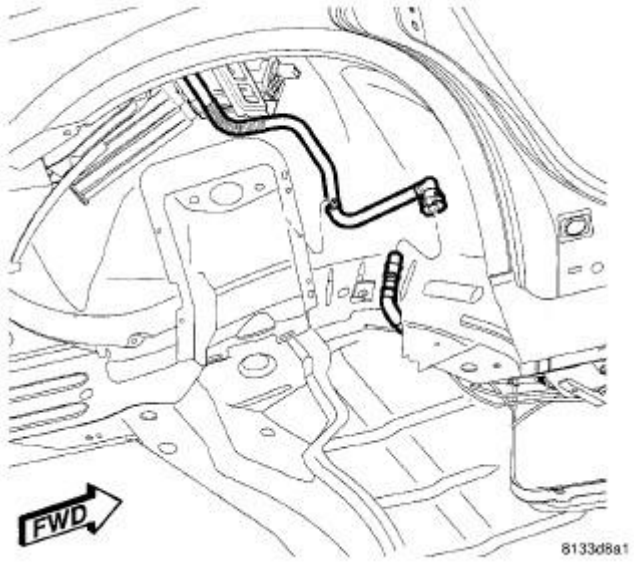


Fig. 131: EVAP Line
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the EVAP line in the right rear wheel well.

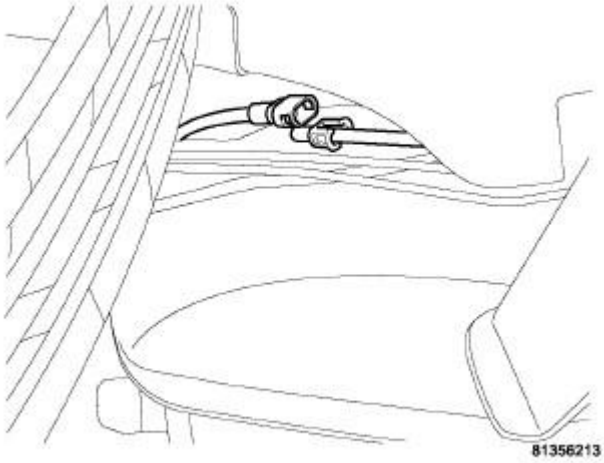


Fig. 132: Vapor Connection On Tank
Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the vapor line.

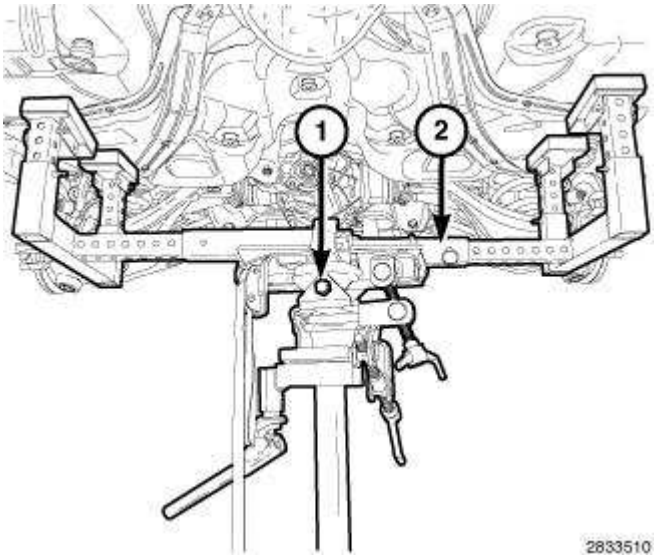


Fig. 133: Suitable Hydraulic Jack & Fuel Tank Adapter
Courtesy of CHRYSLER GROUP, LLC

19. Using a suitable hydraulic jack (1) and a fuel tank adapter (2), support the fuel tank.

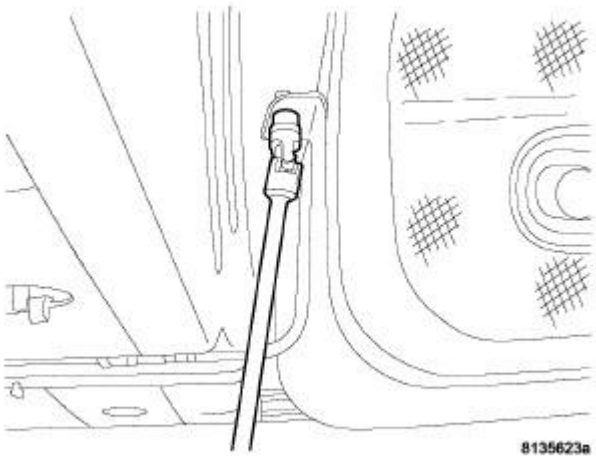


Fig. 134: Tank Strap Bolts
Courtesy of CHRYSLER GROUP, LLC

20. Remove the fuel tank support strap retaining bolts.

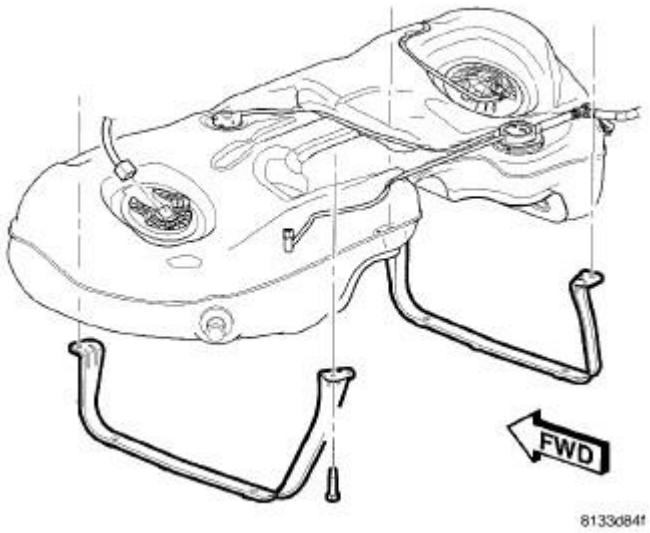


Fig. 135: Tank Straps
Courtesy of CHRYSLER GROUP, LLC

21. Remove the fuel tank support straps.

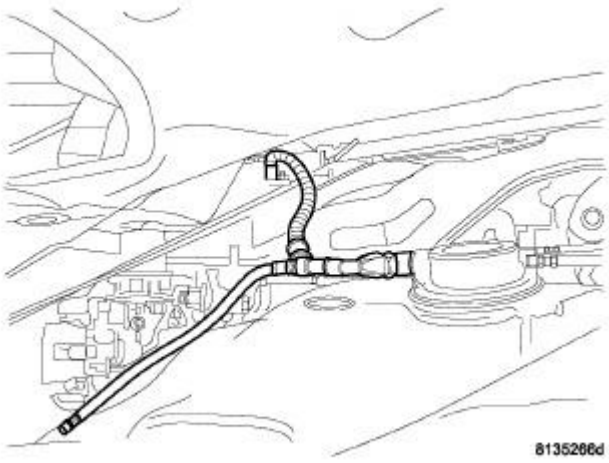


Fig. 136: Tank Vent Line Routing
Courtesy of CHRYSLER GROUP, LLC

22. Carefully lower the fuel tank and pull the ORVR vent line through bracket.

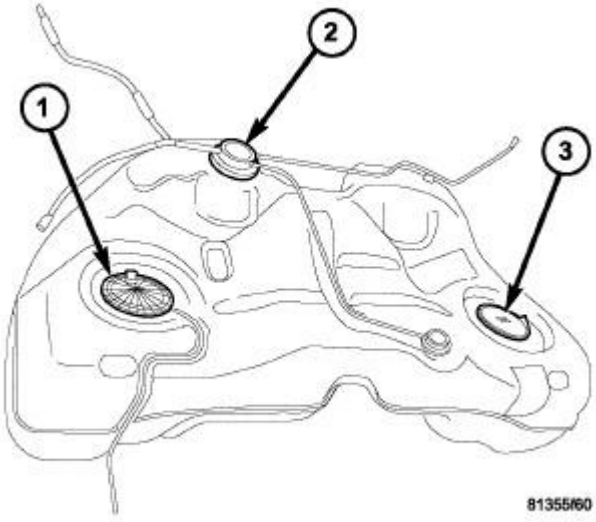


Fig. 137: Fuel Tank Assembly
Courtesy of CHRYSLER GROUP, LLC

23. Lower and remove the fuel tank from the vehicle.

INSTALLATION

INSTALLATION

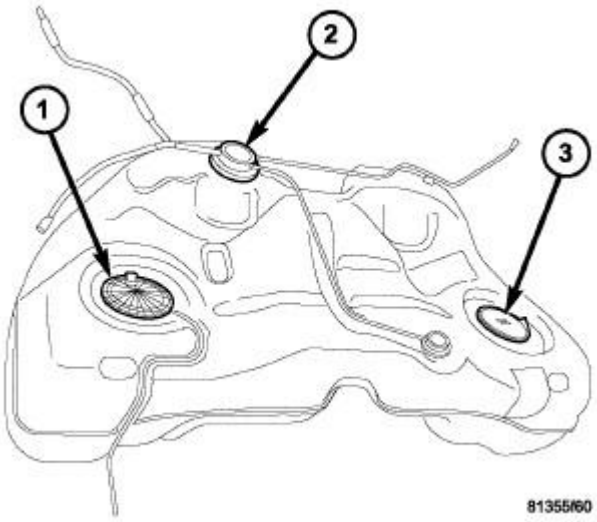


Fig. 138: Fuel Tank Assembly
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the fuel pump modules (1 and 3). Refer to **MODULE, FUEL PUMP, INSTALLATION** or **MODULE, FUEL PUMP, INSTALLATION**.

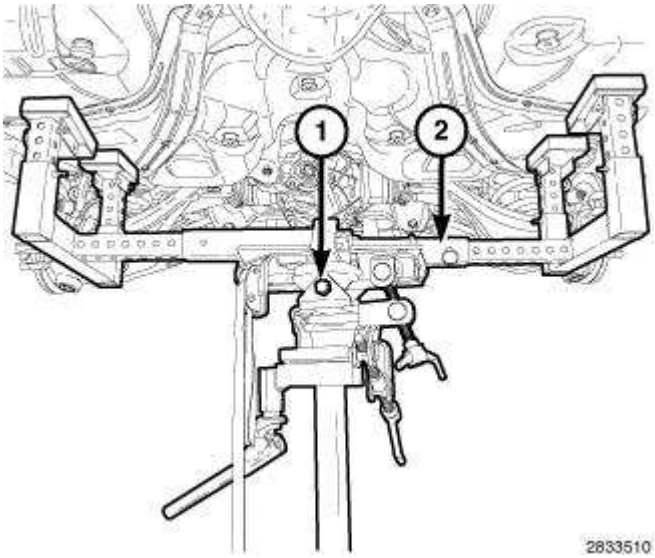


Fig. 139: Suitable Hydraulic Jack & Fuel Tank Adapter
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable hydraulic jack (1) and a fuel tank adapter (2), support the fuel tank.
3. Carefully raise the fuel tank into position while guiding the ORVR vent line through bracket.

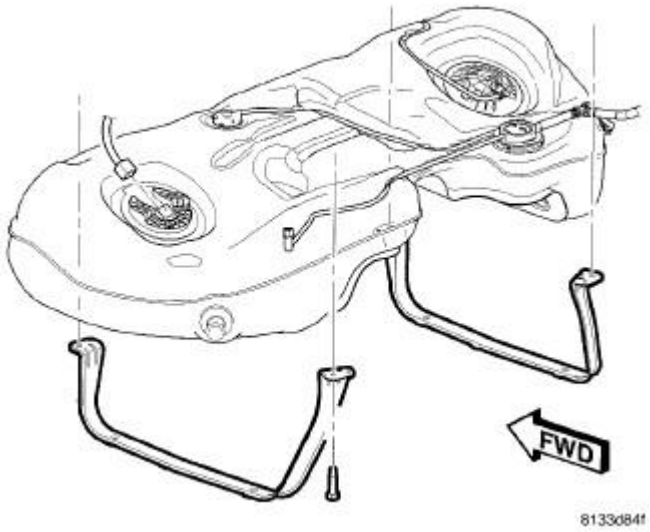


Fig. 140: Tank Straps
Courtesy of CHRYSLER GROUP, LLC

4. Position the fuel tank support straps.

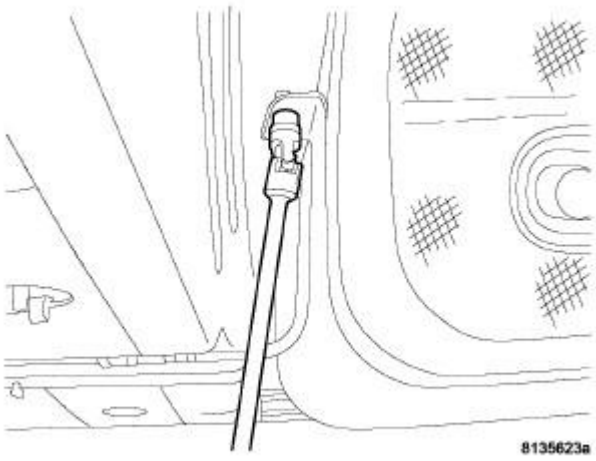


Fig. 141: Tank Strap Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install fuel tank support strap retaining bolts and tighten to 27 N.m (20 ft. lbs.).

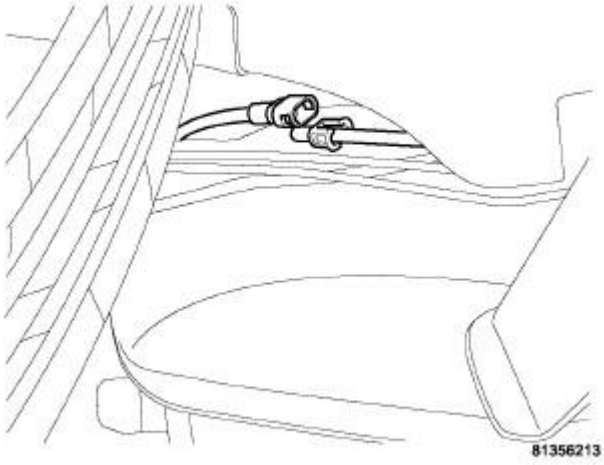


Fig. 142: Vapor Connection On Tank
Courtesy of CHRYSLER GROUP, LLC

6. Connect the vapor line.

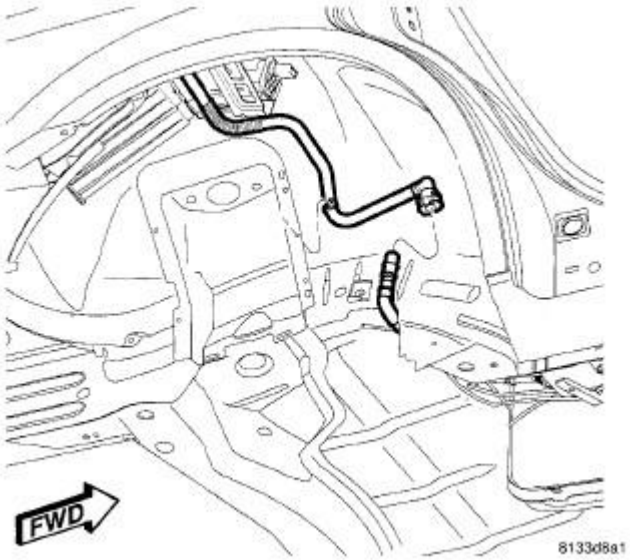


Fig. 143: EVAP Line
Courtesy of CHRYSLER GROUP, LLC

7. Connect the EVAP line in the right rear wheel well.

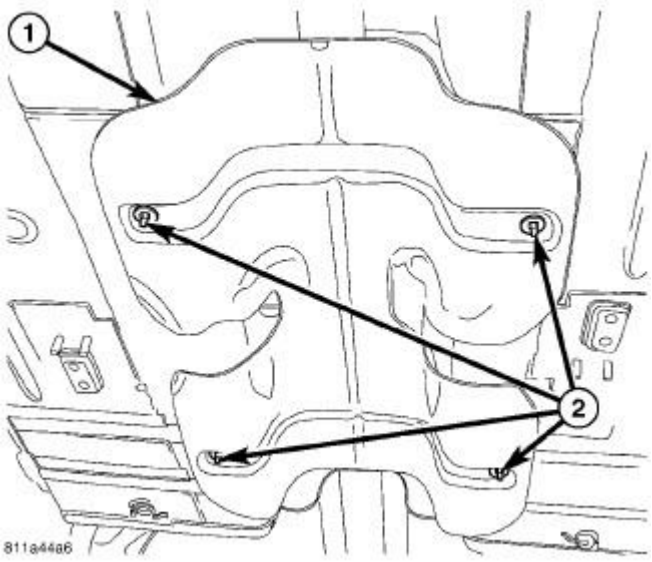


Fig. 144: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

8. Position the heat shield (1) and install the heat shield retainers (2).
9. Install the fuel filter/water separator assembly. Refer to **SEPARATOR AND FILTER, FUEL AND WATER, INSTALLATION**.
10. Install the propeller shaft. Refer to **INSTALLATION** .
11. Install the muffler and tailpipe assembly. Refer to **MUFFLER, EXHAUST, INSTALLATION** .

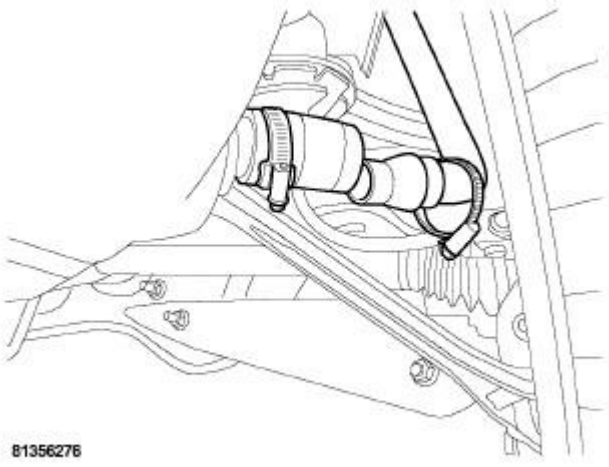


Fig. 145: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

12. Connect the fuel filler tube to the rubber hose on the fuel tank.

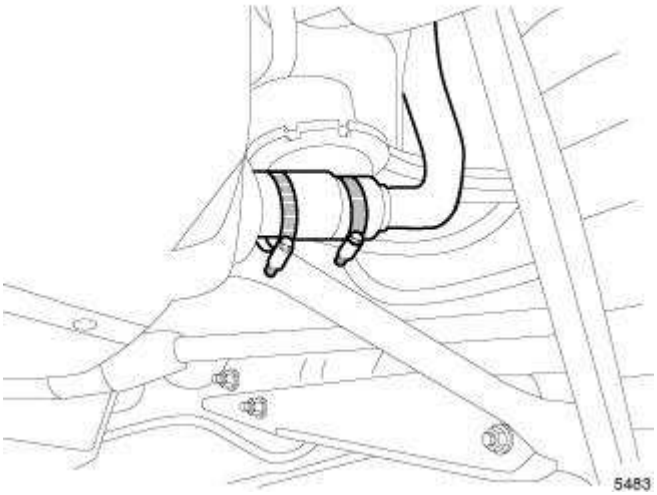


Fig. 146: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

13. Install the hose clamp to the rubber hose connecting the fuel filler tube to the fuel tank and tighten the clamp to 4 N.m (35 in. lbs.).

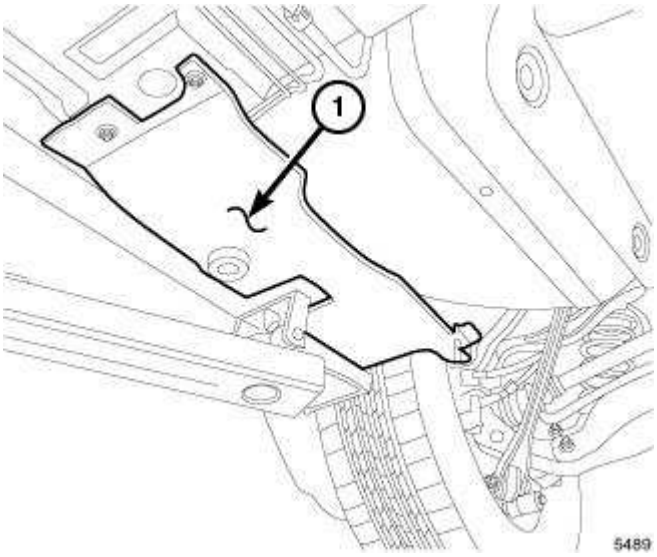


Fig. 147: Splash Shield PASS Side
Courtesy of CHRYSLER GROUP, LLC

14. Install the right underbody splash shield (1).

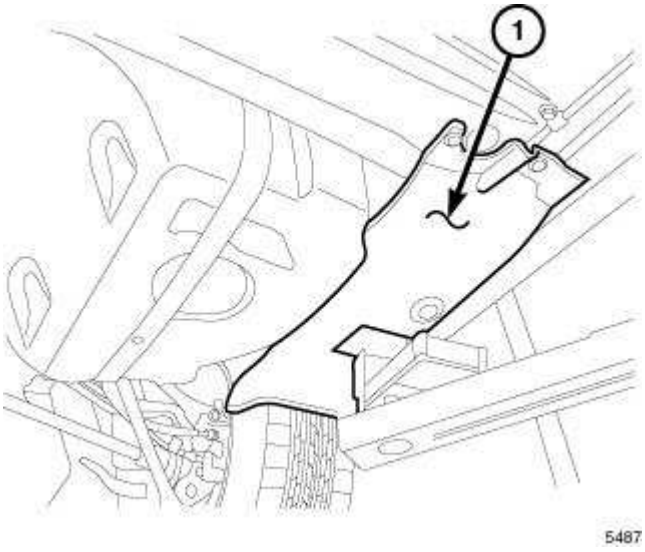


Fig. 148: Splash Shield DR Side
Courtesy of CHRYSLER GROUP, LLC

15. Install the left underbody splash shield (1).

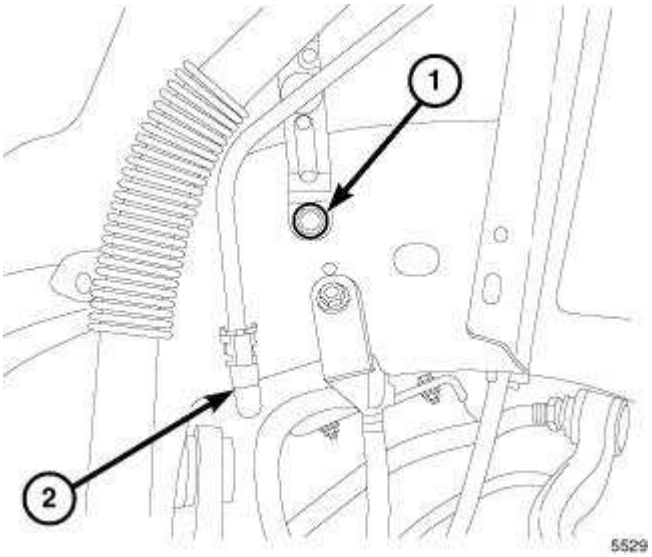


Fig. 149: Filler Tube Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

16. Connect the ORVR vent line (2).
17. Install the fuel filler tube retaining bolt (1) and tighten to 7 N.m (62 in. lbs.).

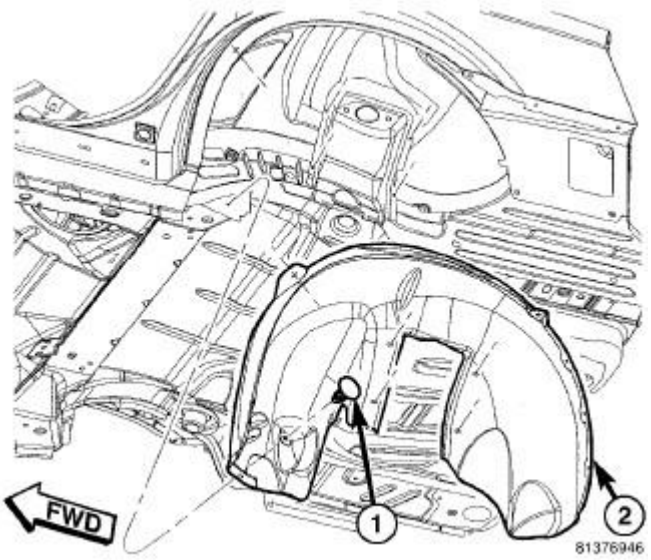


Fig. 150: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

18. Position the left rear wheelhouse splash shield (2).
19. Install the push-pins (1) that secure the rear wheelhouse shield to the body.
20. Install the left rear tire.
21. Lower the vehicle.
22. Fill the fuel tank.
23. Connect the negative battery cable.
24. Use the scan tool to pressurize the fuel system and check for leaks.

TUBE(S), FUEL

REMOVAL

FUEL TUBES

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system.

Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

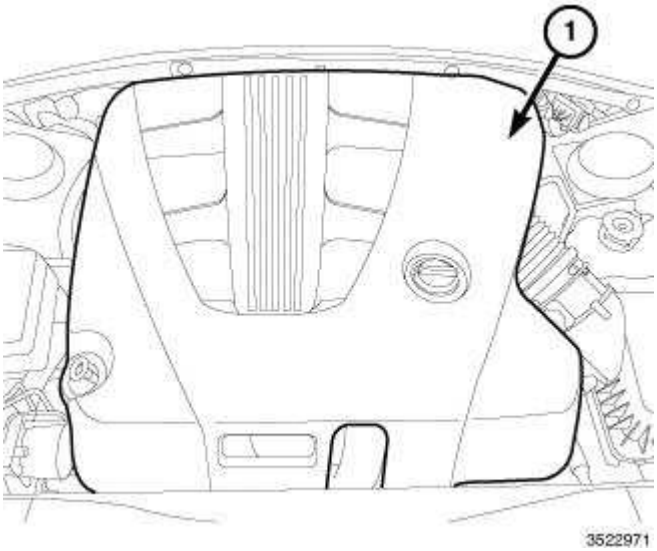


Fig. 151: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

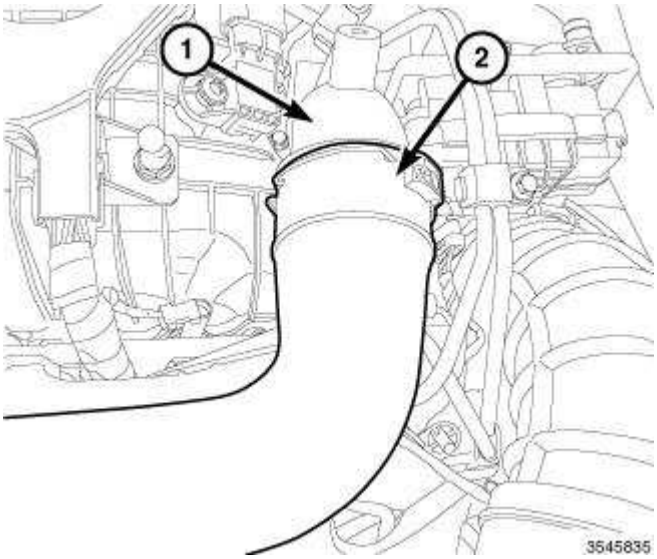


Fig. 152: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).
4. Remove the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

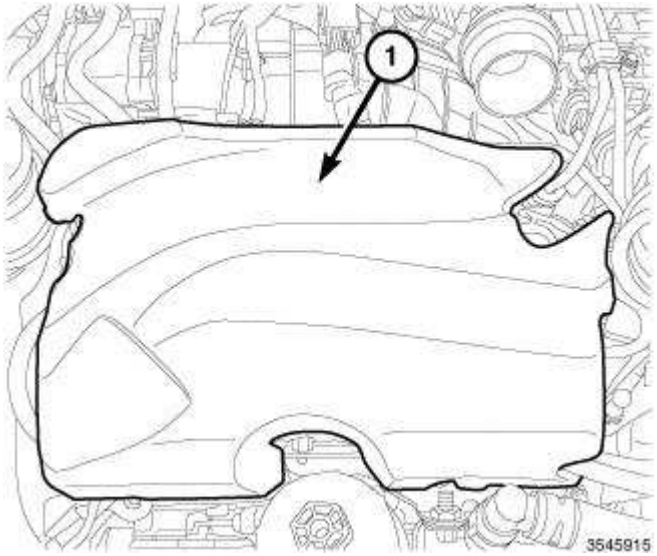


Fig. 153: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the left side fuel injector silencer (1).

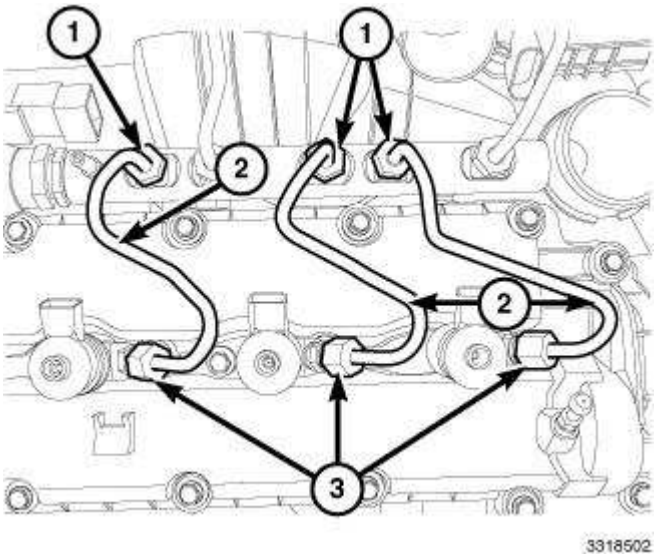


Fig. 154: Left Side Fuel Tubes & Union Nuts
Courtesy of CHRYSLER GROUP, LLC

6. Unscrew union nuts (1 and 3) and remove and discard the left side fuel tubes (2).
7. Install protective caps onto the fuel injectors and fuel rail.

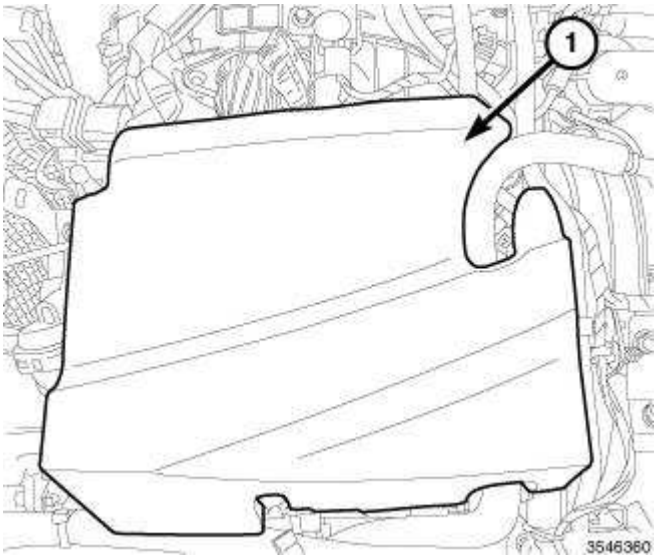


Fig. 155: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

8. Remove the right side fuel injector silencer (1).

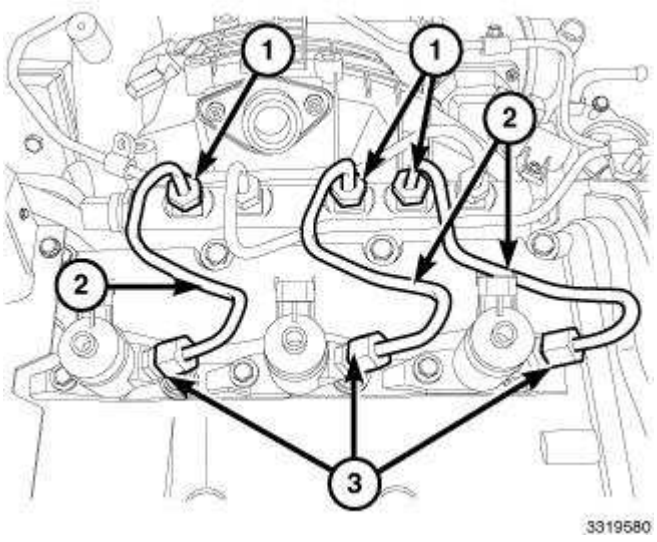


Fig. 156: Right Side Fuel Tubes & Union Nuts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), REMOVAL** .
10. Unscrew union nuts (1 and 3) and remove and discard the right side fuel tubes (2).
11. Install protective caps onto the fuel injectors and fuel rail.

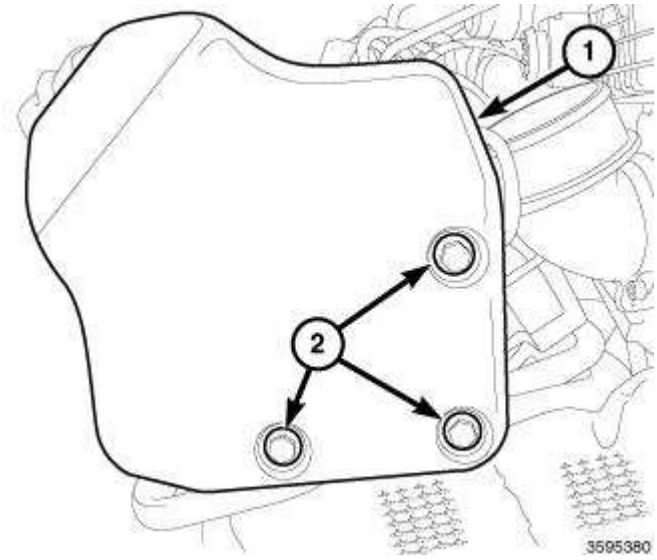


Fig. 157: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove bolts (2) and the fuel pump blocker (1).

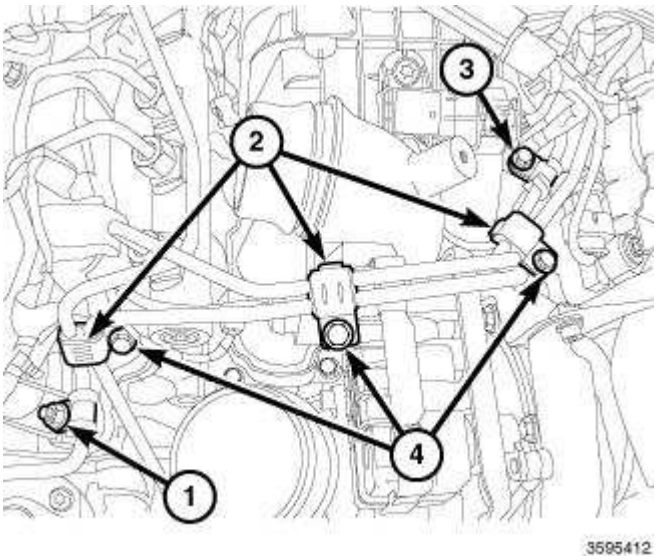


Fig. 158: Fuel Tube Securing Bolts & Bracket
Courtesy of CHRYSLER GROUP, LLC

13. Remove nut (1) securing the fuel tube.
14. Remove bolt (3) securing the fuel tube.
15. Remove bolts (4) and the bracket (2) securing the fuel tubes.

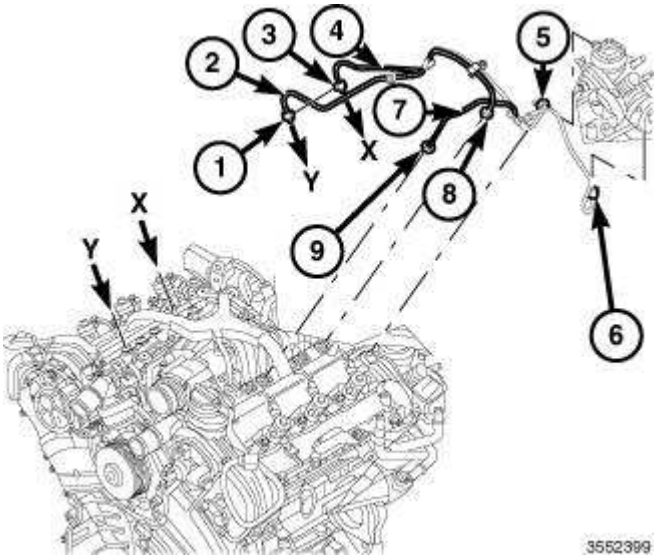


Fig. 159: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

16. Loosen union nuts (1, 5) and remove the right high pressure fuel tube (2) and discard fuel tube.
17. Loosen union nuts (3, 8) and remove the high pressure fuel crossover tube (4) and discard fuel tube.
18. Loosen union nuts (6, 9) and remove the left high pressure fuel tube (7) and discard fuel tube.

FUEL INJECTOR RETURN LINES

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

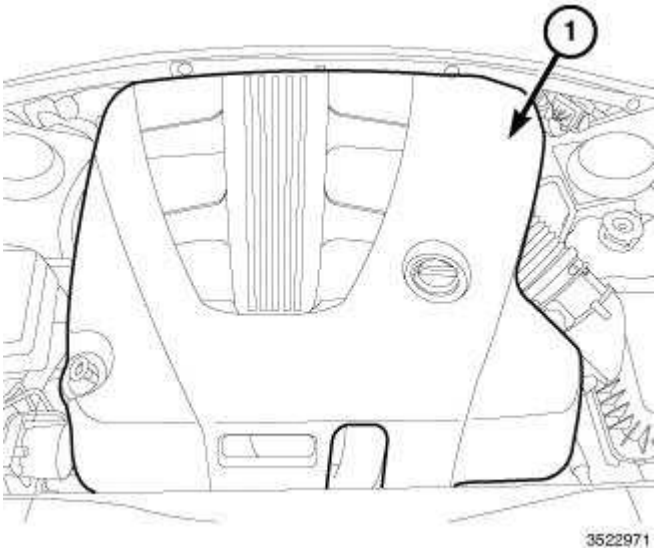


Fig. 160: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Remove the cowl panel cover. Refer to **COVER, COWL PANEL, REMOVAL** .
4. Remove the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

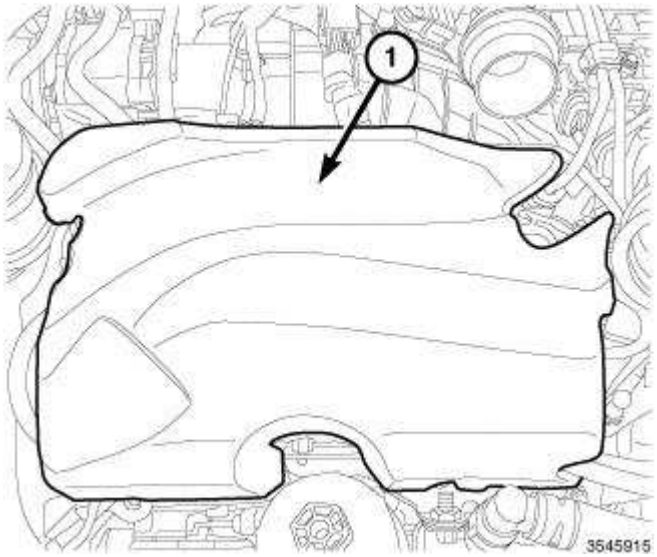


Fig. 161: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).
6. Remove the left bank fuel injector silencer (1).

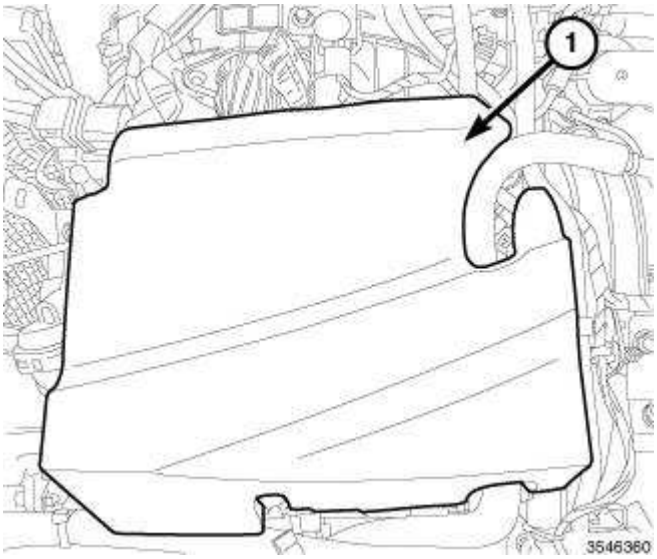


Fig. 162: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

7. Remove the right bank fuel injector silencer (1).

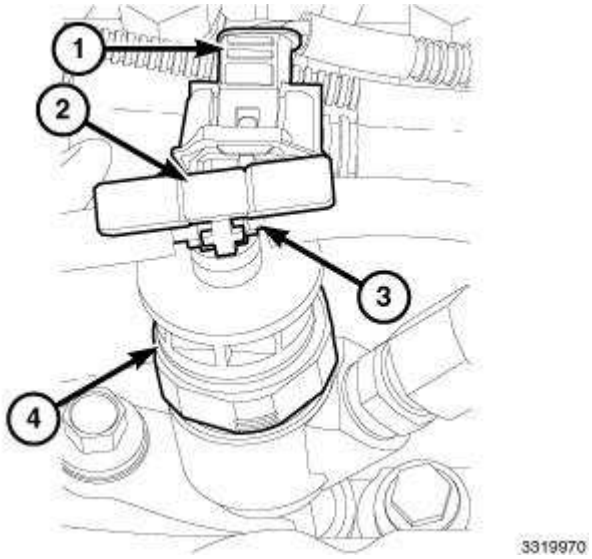


Fig. 163: Fuel Injector, Return Hose, Retaining Tab & Connector
Courtesy of CHRYSLER GROUP, LLC

8. Lift up on locking retaining tab (2) to unlock the lock.
9. Remove the fuel return hose (3) by wiggling hose free at the fuel injector (4).

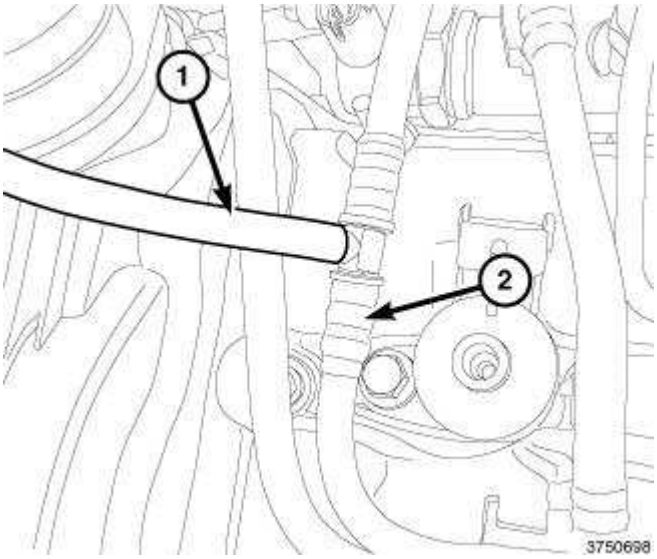


Fig. 164: Fuel Injector Return Line & Main Low Pressure Return Line
Courtesy of CHRYSLER GROUP, LLC

10. Remove the fuel injector return line (1) from the main low pressure return line (2).

INSTALLATION

FUEL TUBES

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 186 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

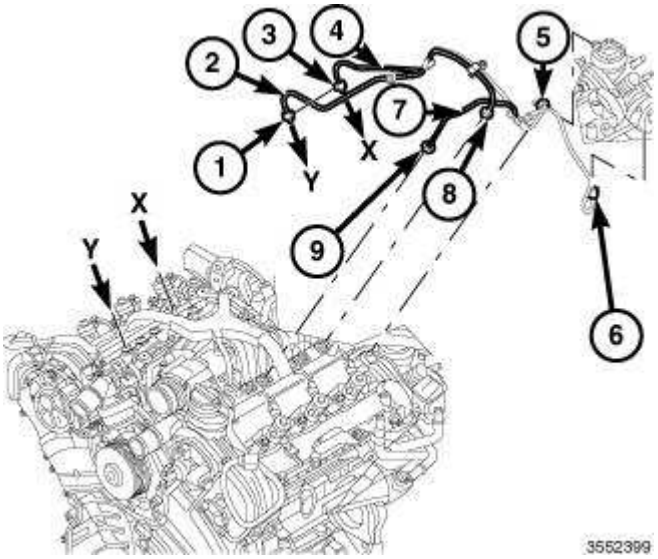


Fig. 165: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Fuel tubes are a one time only use and must be replaced anytime they have been removed.

1. Install the new left high pressure fuel tube (7) and tighten union nuts (6, 9) finger tight.
2. Install the new high pressure fuel crossover tube (4) and tighten union nuts (3, 8) finger tight.
3. Install the new right high pressure fuel tube (2) and tighten union nuts (1, 6) finger tight.

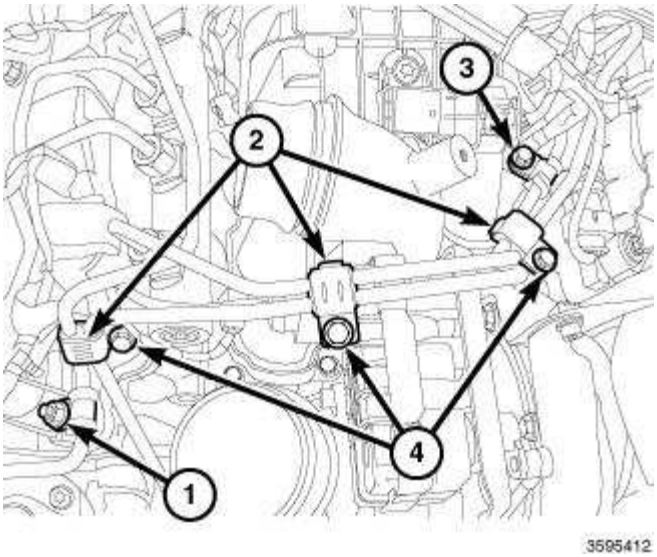


Fig. 166: Fuel Tube Securing Bolts & Bracket
Courtesy of CHRYSLER GROUP, LLC

4. Install the bracket (2) securing the fuel tubes. Tighten bolts (4) to 11 N.m (97 in. lbs.).
5. Install bolt (3) securing the right fuel tube and tighten to 11 N.m (97 in. lbs.).

6. Install nut (1) securing the left fuel tube and tighten to 11 N.m (97 in. lbs.).

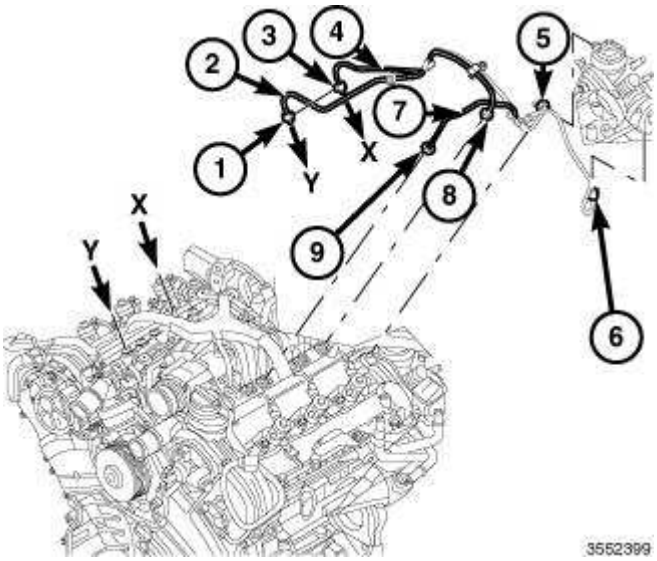


Fig. 167: High Pressure Fuel Crossover Tube, Left High Pressure Fuel Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the union nuts as follows:
   - Tighten union nut (1, 3, 8, 9) to 5 N.m (44 in. lbs.) plus an additional 75 degrees turn.
   - Tighten union nut (5 and 6) to 11 N.m (97 in. lbs.) plus an additional 75 degrees turn.

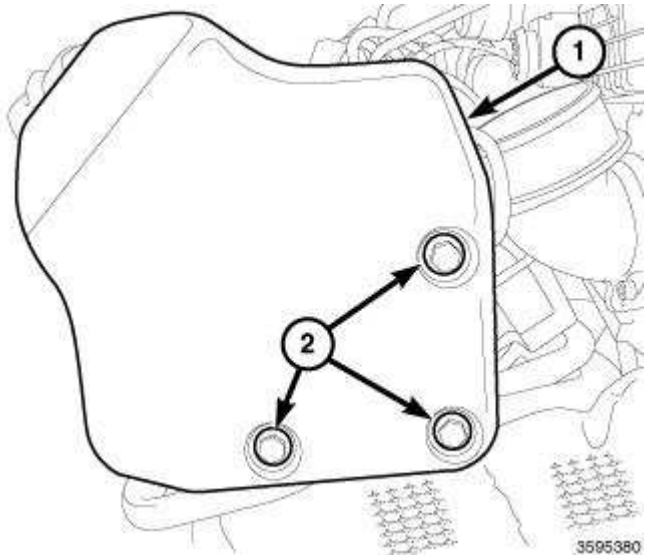


Fig. 168: High Pressure Pump Blocker & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the fuel pump blocker (1). Tighten bolts (2) to 25 N.m (18 ft. lbs.).

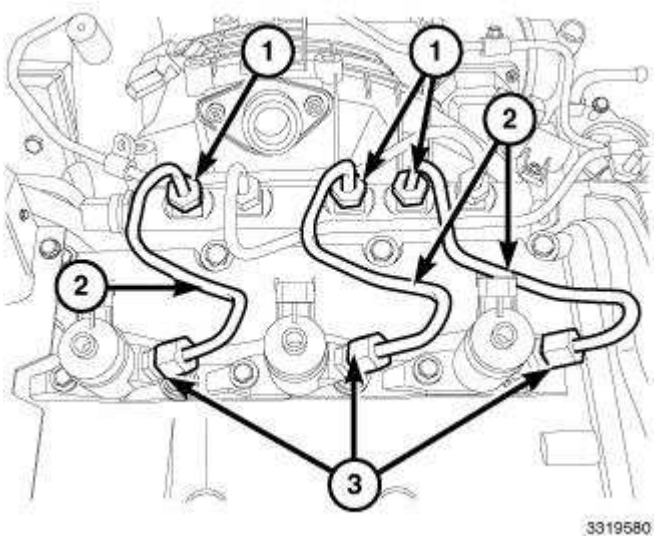


Fig. 169: Right Side Fuel Tubes & Union Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Fuel tubes are a one time only use and must be replaced anytime they have been removed.**

9. Remove the protective caps from the fuel injectors and fuel rail.
10. Install the new right side fuel tubes (2) and tighten union nuts (1, 3) finger tight:
    - Tighten union nut (1) to 5 N.m (44 in. lbs.) plus an additional 75 degrees turn.
    - Tighten union nut (3) to 11 N.m (97 in. lbs.) plus an additional 75 degrees turn.
11. Install the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), INSTALLATION** .

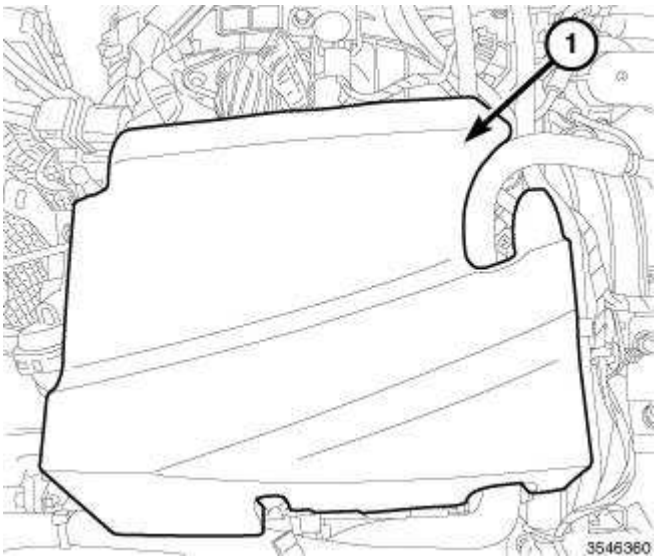


Fig. 170: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

12. Install the right side fuel injector silencer (1).

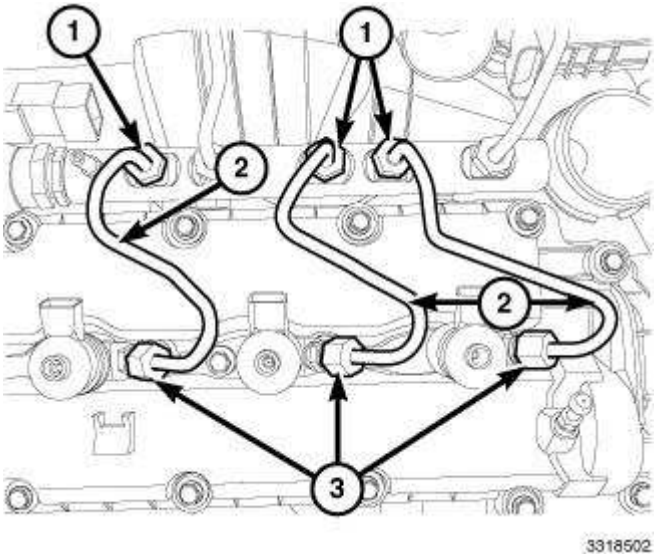


Fig. 171: Left Side Fuel Tubes & Union Nuts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the protective caps from the fuel injectors and fuel rail.
14. Install new left side fuel tubes (2) and tighten union nuts (1 and 3) finger tight.
    - Tighten union nut (1) to 5 N.m (44 in. lbs.) plus an additional 75 degrees turn.
    - Tighten union nut (3) to 11 N.m (97 in. lbs.) plus an additional 75 degrees turn.

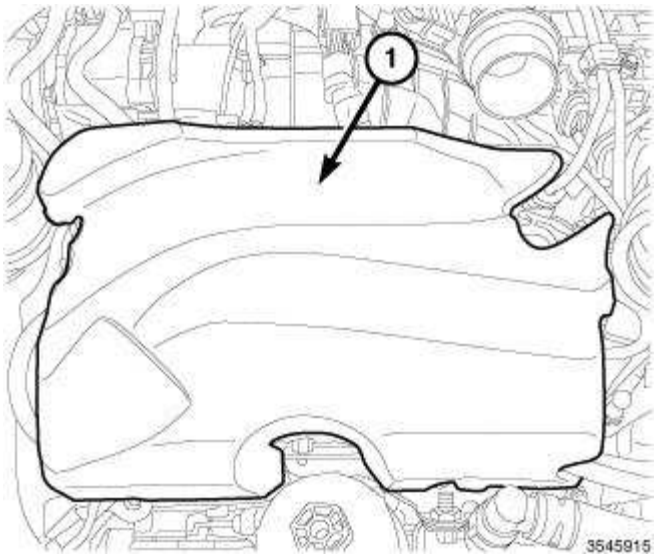


Fig. 172: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

15. Install the left side fuel injector silencer (1).

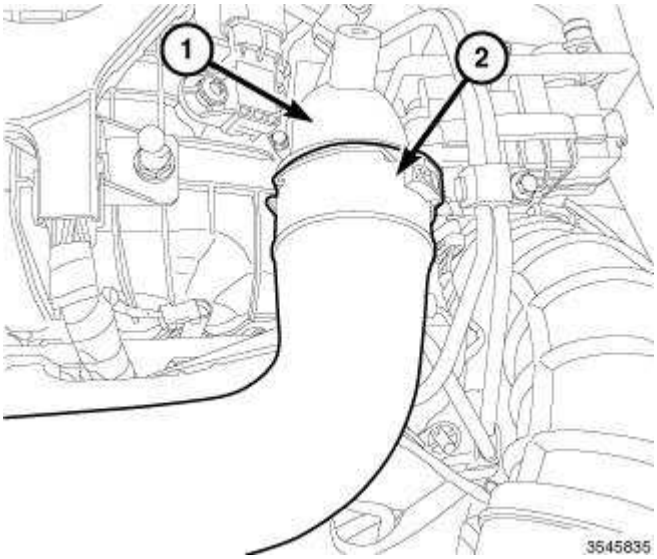


Fig. 173: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

16. Install the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
17. Connect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).

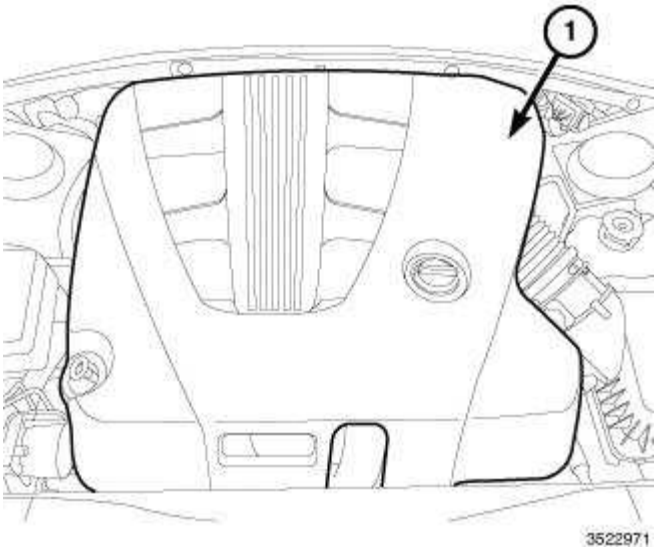


Fig. 174: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

18. Connect the negative battery cable.
19. Start engine, allow to warm, turn engine off and inspect for leaks.
20. Install the engine cover (1).

FUEL INJECTOR RETURN LINES

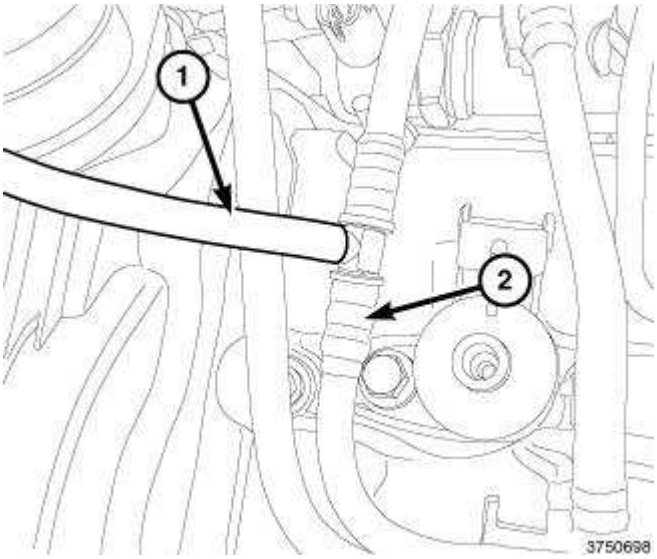


Fig. 175: Fuel Injector Return Line & Main Low Pressure Return Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: The one-way check valves on the fuel injector lines are not serviceable and should not be taken apart. If the one-way check valve is bad then a new fuel injector return line will need to be installed.

1. Inspect the fuel injector return line for cracks and inspect the O-ring seals for damage. Replace the fuel injector return line if a problem exists.
2. Install the fuel injector return line (1) to the main low pressure return line (2).

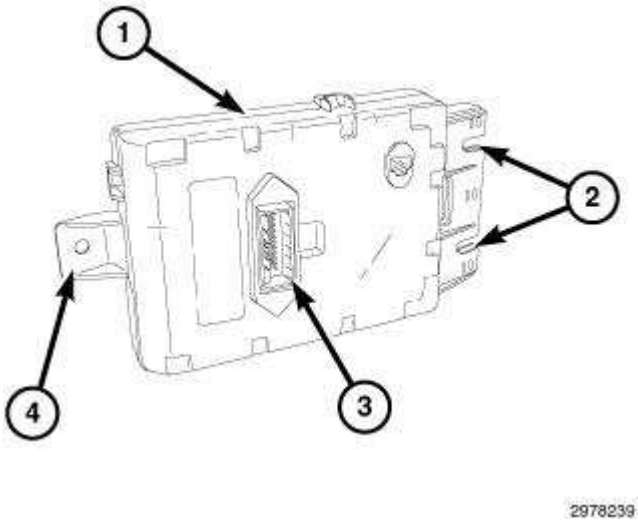


Fig. 176: Fuel Injector, Return Hose, Retaining Tab & Connector
Courtesy of CHRYSLER GROUP, LLC

3. Install the fuel injector return line (3) and push down on the lock retaining tab (2) to lock in place.

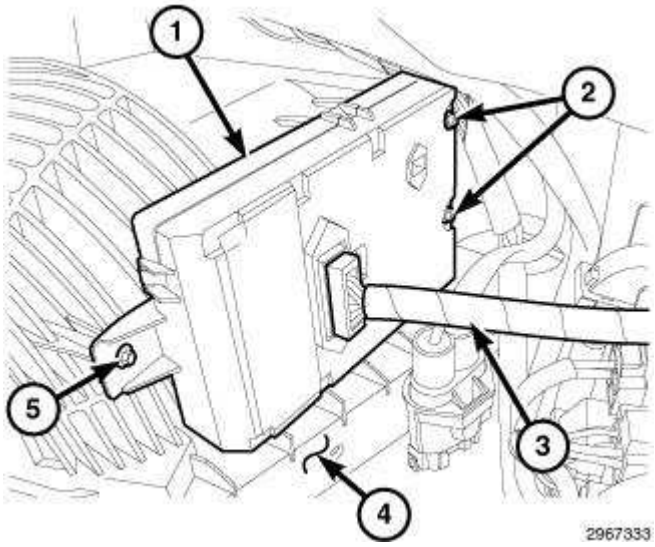


Fig. 177: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

4. Install the right bank fuel injector silencer (1).

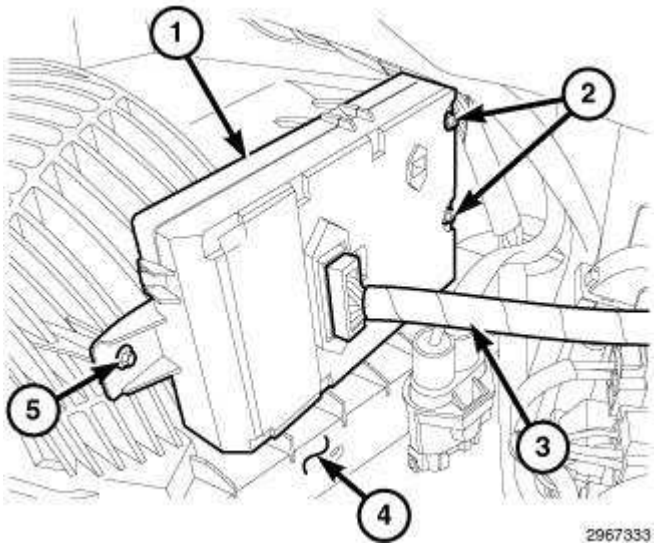


Fig. 178: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

5. Install the left bank fuel injector silencer (1).
6. Connect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).
7. Install the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
8. Install the cowl panel cover. Refer to **COVER, COWL PANEL, INSTALLATION** .

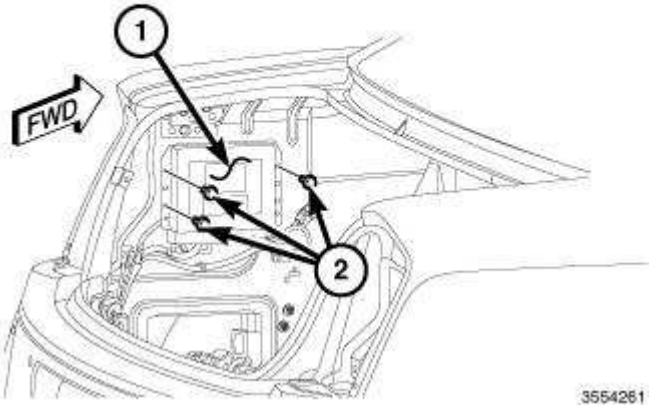


Fig. 179: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine cover (1).
10. Connect the negative battery cable.

TUBE, FUEL TANK FILLER

REMOVAL

REMOVAL

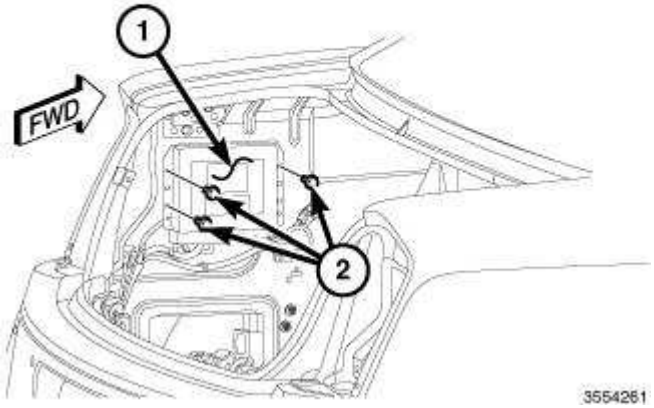


Fig. 180: Filler Tube Door
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel tank draining procedure. Refer to **DRAINING FUEL TANK** .

2. Disconnect the negative battery cable.
3. Open the fuel filler door.
4. Remove the fuel filler cap.

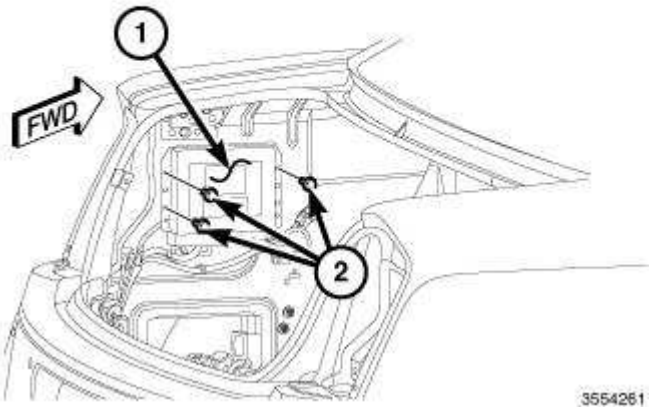


Fig. 181: Removing/Installing Retaining Wire
Courtesy of CHRYSLER GROUP, LLC

5. Remove the retaining wire from inside the fuel filler tube rubber seal.

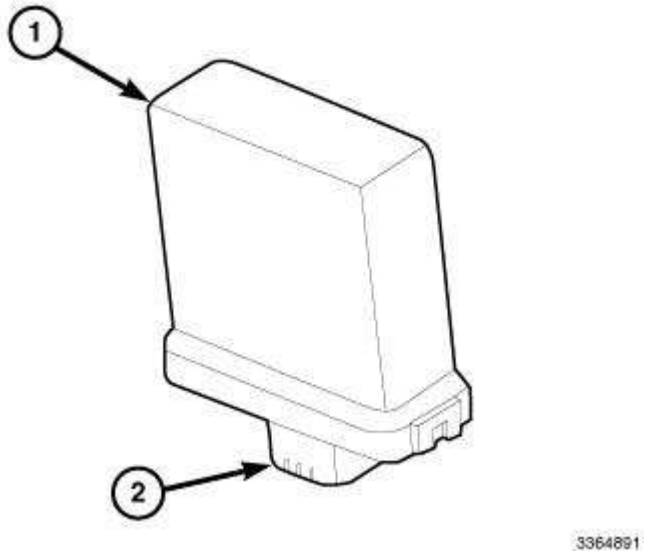


Fig. 182: Pushing Rubber Back
Courtesy of CHRYSLER GROUP, LLC

6. Start removing the rubber seal from the fuel filler housing.

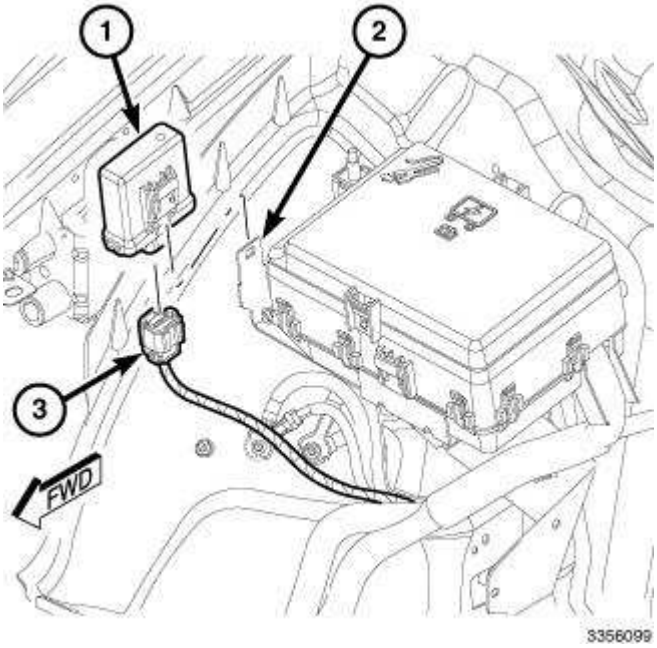


Fig. 183: Squeezing Rubber And Pushing In
Courtesy of CHRYSLER GROUP, LLC

7. Squeeze the fuel filler tube rubber seal (1).

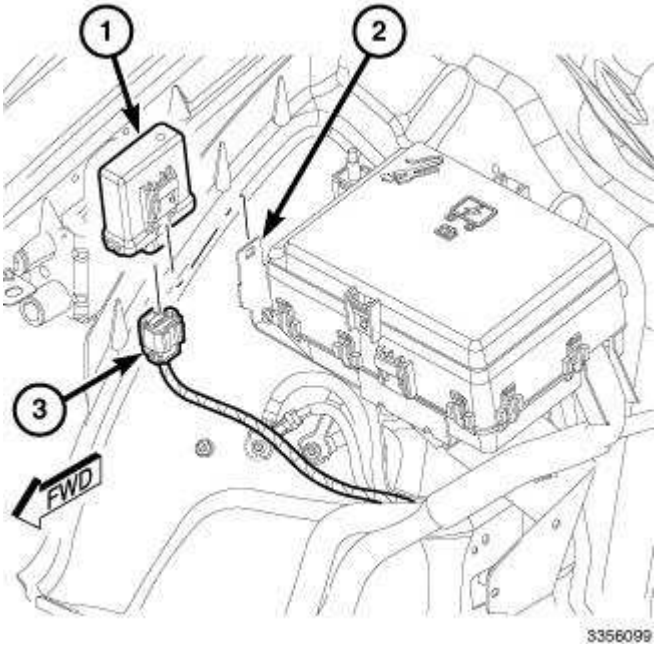


Fig. 184: Filler Tube Rubber AT Body Opening
Courtesy of CHRYSLER GROUP, LLC

8. Push the fuel filler tube seal in and out of the fuel filler housing.
9. Raise and the support vehicle.

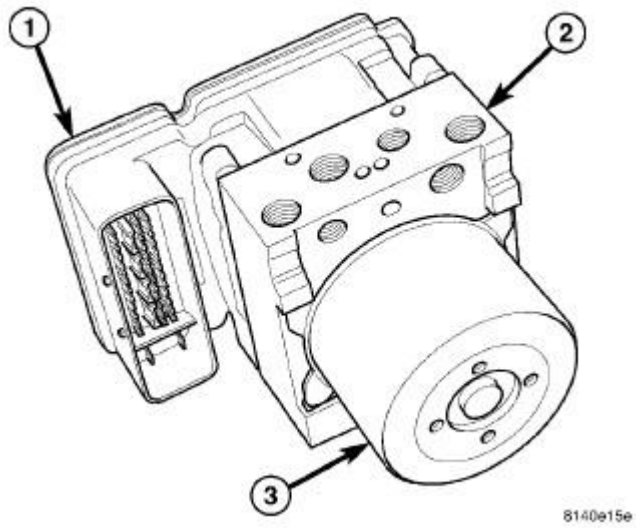


Fig. 185: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

10. Remove the left rear tire.
11. Remove the push-pins (1) that secure the rear wheelhouse splash shield (2) to the body.
12. Remove the rear wheelhouse splash shield from the vehicle.

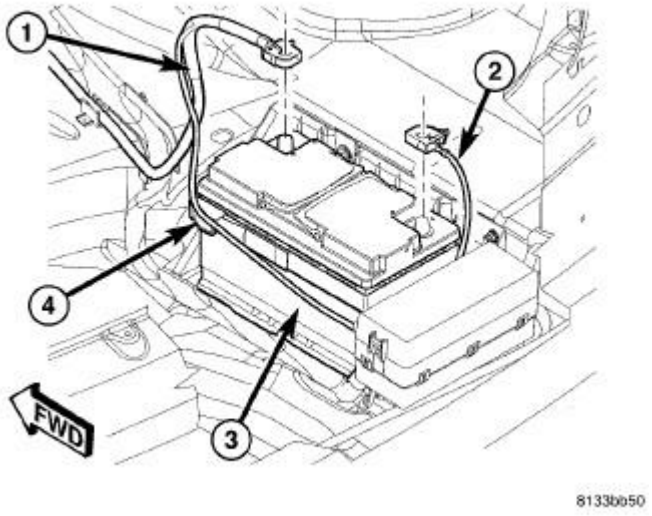


Fig. 186: Filler Tube Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the fuel filler tube ORVR vent line (2).
14. Remove the fuel filler tube retaining nut (1).

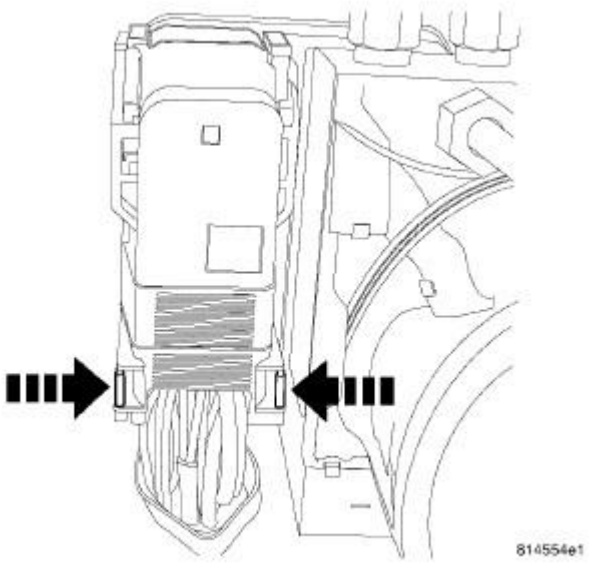


Fig. 187: Splash Shield DR Side
Courtesy of CHRYSLER GROUP, LLC

15. Remove the under body splash shield (1).

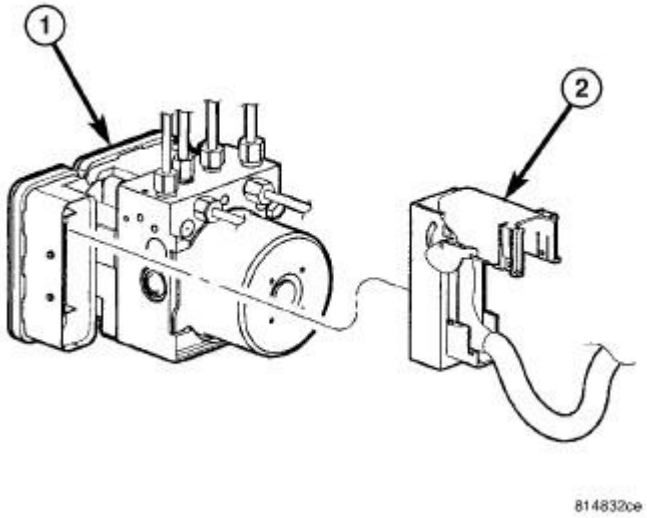


Fig. 188: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

16. Remove the hose clamp from the fuel filler tube. Leave the hose clamp tight at the fuel tank filler neck.

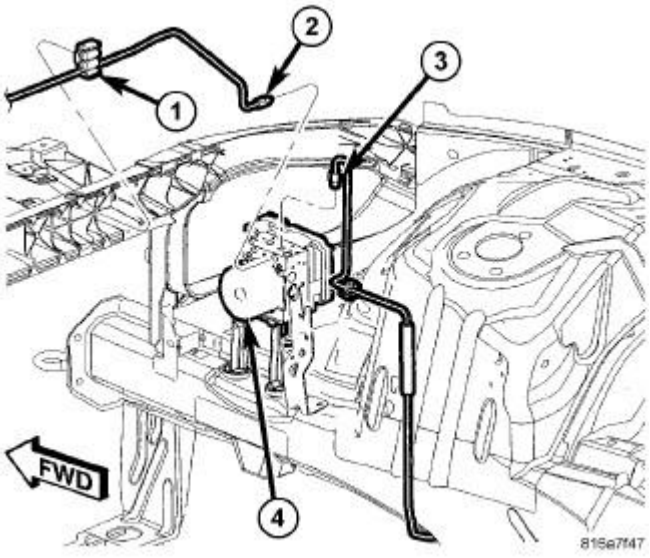


Fig. 189: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

17. Remove the fuel filler tube from the rubber hose on the fuel tank and remove the fuel filler tube from the vehicle.

INSTALLATION

INSTALLATION

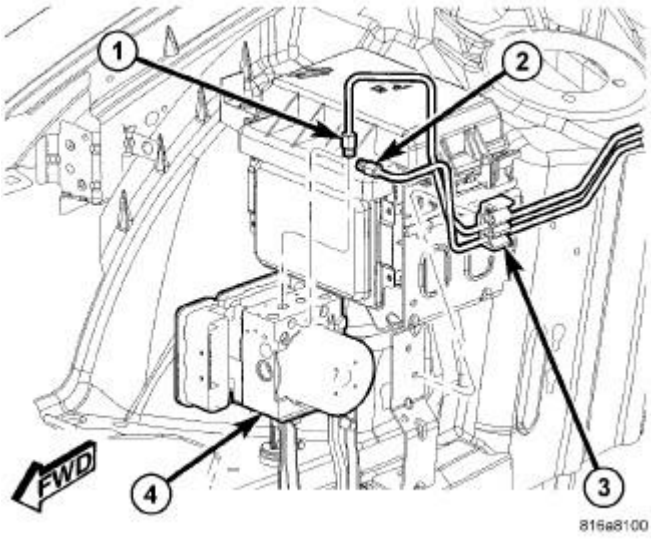


Fig. 190: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

1. Position the fuel filler tube into the vehicle.

2. Insert the fuel filler tube into the rubber hose at the fuel tank filler neck.

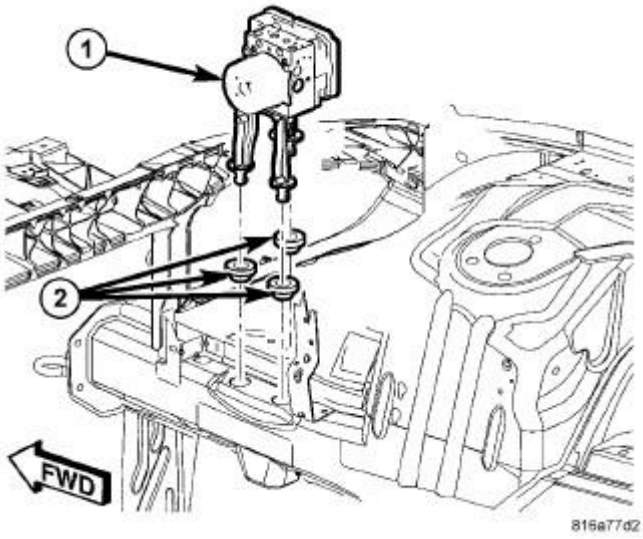


Fig. 191: Filler Tube
Courtesy of CHRYSLER GROUP, LLC

3. Slide the fuel filler tube hose clamp into position and tighten.

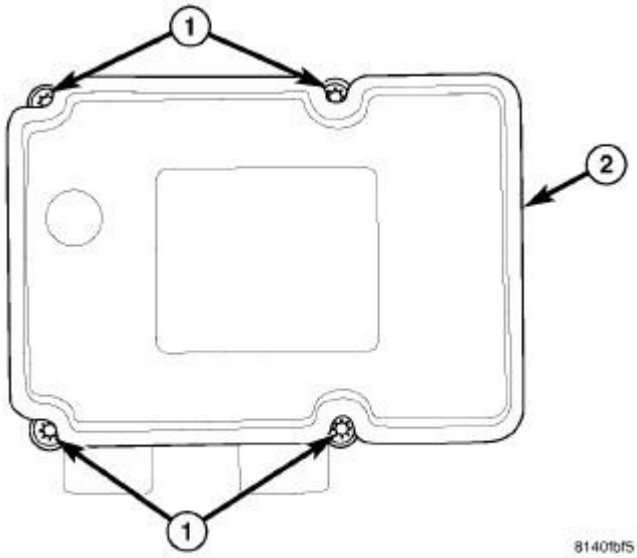


Fig. 192: Filler Tube Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

4. Install the fuel filler tube retaining nut (1) and tighten to 12 N.m (106 in. lbs.).
5. Connect the fuel filler tube ORVR vent line (2).

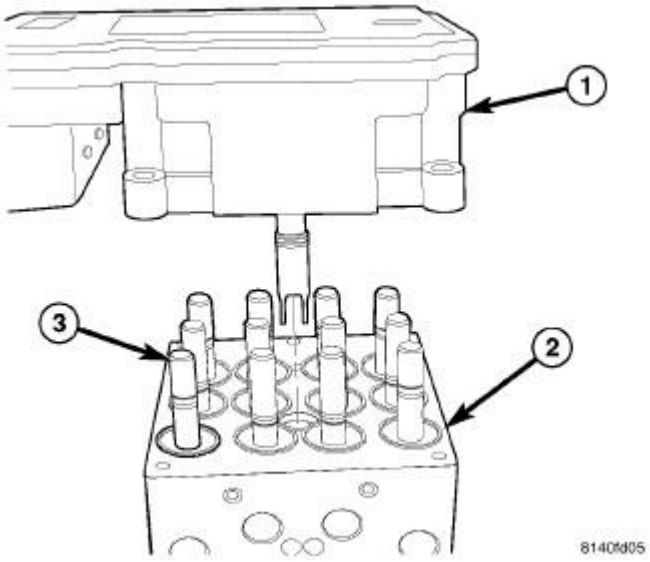


Fig. 193: Splash Shield DR Side
Courtesy of CHRYSLER GROUP, LLC

6. Install the underbody splash shield (1).

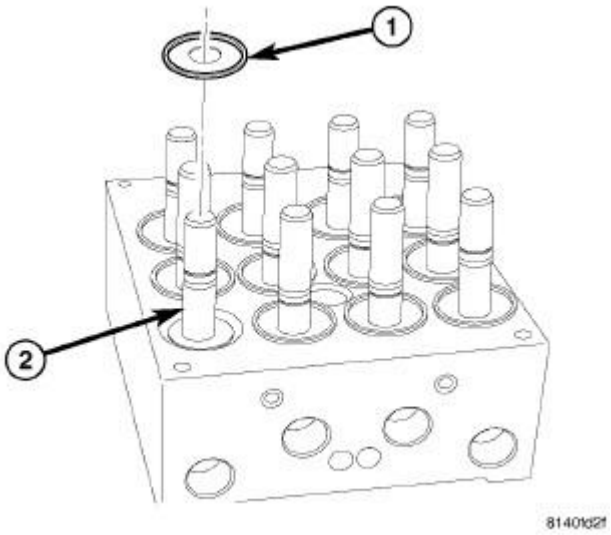


Fig. 194: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

7. Position the rear wheelhouse splash shield (2) to the body and install the push-pins (1).
8. Install the left rear tire.
9. Lower the vehicle.

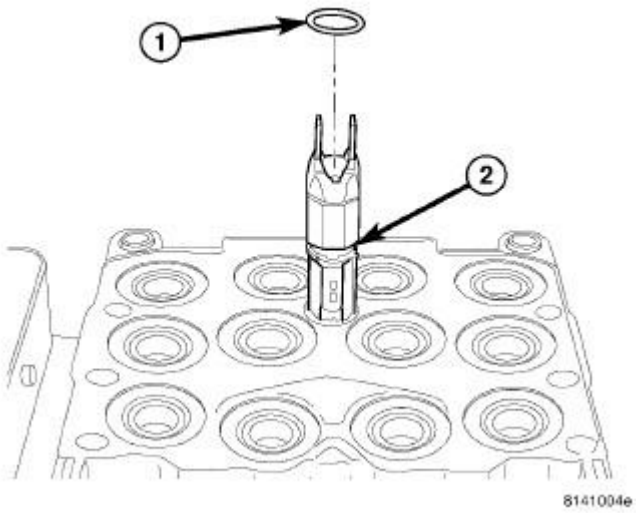


Fig. 195: Filler Tube Rubber AT Body Opening
Courtesy of CHRYSLER GROUP, LLC

10. Align the fuel filler tube rubber seal to the fuel filler housing.
11. Pull the fuel filler rubber seal through the fuel filler housing opening.
12. Verify the sheet metal of the fuel filler housing is in the groove of the rubber seal.

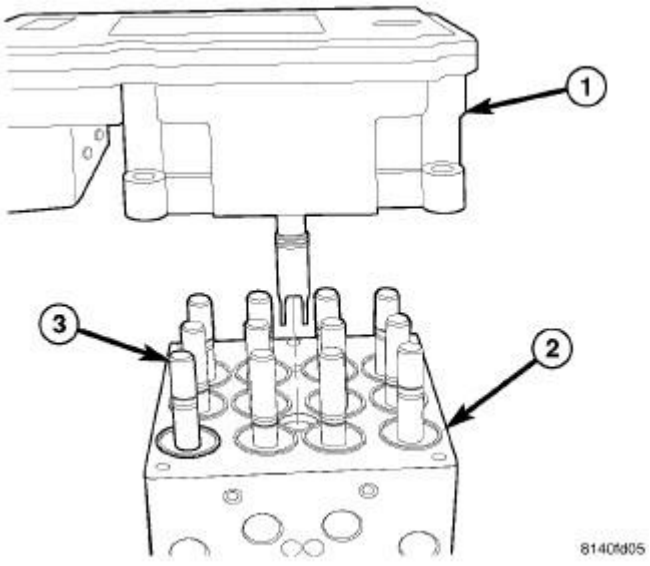


Fig. 196: Metal Wire Retaining Wire
Courtesy of CHRYSLER GROUP, LLC

13. Start the metal retaining wire (1) into the groove on the inside of the filler tube rubber seal.
14. Work the retaining wire around the fuel filler tube rubber seal until the fuel filler tube is locked into position.

15. Connect the negative battery cable.
16. Fill the fuel tank and check for leaks.

FUEL INJECTION, DIESEL

OPERATION

FUEL ECONOMY AND MAINTENANCE

A vehicle that is not properly tuned and maintained cannot be expected to perform at its maximum efficiency and can have an adverse effect on fuel economy. The following recommendations will ensure that the vehicle is performing at its maximum efficiency:

- **Use the recommended motor oil grade.** Using the manufacturer's recommended grade of Mopar® motor oil can improve fuel mileage by 1-2%. Mopar® motor oil labeled "Energy Conserving" contains friction-reducing additives.
- **Check and replace air filters.** Replacing a clogged air filter with a new Mopar® air filter can improve fuel mileage by as much as 10%.
- **Keep the engine tuned.** Repairing a vehicle that is noticeably out of tune can improve fuel mileage by an average of 4%. Maintaining a vehicle and repairing problems, such as a faulty oxygen sensor, can improve mileage by as much as 40%.
- **Keep tires properly inflated.** Underinflated tires can lower fuel mileage by 0.4% for every 1 psi drop in pressure of all four tires.

STANDARD PROCEDURE

INJECTOR QUANTITY ADJUSTMENT

The injector quantity adjustment, or classification of injectors describes the quantity, or fuel delivery characteristic of the injector. This will make it possible to match the Powertrain Control Module (PCM) fuel delivery strategy to the mechanical characteristics of the injector within a more narrowly graduated range. Injector classification can only be performed with a scantool.

The fuel injectors used in this vehicle have a seven digit alphanumeric code, which allows the PCM to determine the fuel quantity characteristic of each injector.

When carrying out service procedures where the injectors are removed from the cylinder head, it is important to observe the original locations of each individual injector, as installing an original injector in the wrong location, vehicle driveability and smoking concerns could result.

If an injector(s) is replaced, or if there is any concern that an injector may not be installed in its original location, the injector quantity adjustment procedure must be performed with the scan tool in order to program the quantity classification (seven digit alphanumeric code) to the corresponding cylinder in the engine control module.

INJECTOR CLASSIFICATION PROCEDURE

NOTE: **The engine must not be running for this procedure.**

NOTE: **If installing a new injector, make a note of the seven digit alphanumeric code. You will need to enter it into the scan tool during the Injector Quantity Adjustment procedure.**

NOTE: **Before performing this procedure, if the PCM has been replaced, or if any injector has been installed anywhere but its original location, make a note of the seven digit alphanumeric codes and the physical location of each injector. You will need to enter them into the scan tool during the Injector Quantity Adjustment procedure.**

1. Turn ignition switch "ON".
2. Using a scantool, select PCM View, then MISCELLANEOUS FUNCTIONS.
3. Select Injector Quantity Adjustment, then NEXT.
4. If the PCM was replaced, the Injector EEPROM Location procedure must be performed. Select YES, then NEXT, and follow the directions on the scan tool. Otherwise, go to step 5.
5. Select the injector(s) that has been replaced, access the keyboard function, and type the seven digit alphanumeric code next to the cylinder number that corresponds to the physical location where the injector has been installed.
6. Click NEXT. The scan tool will prompt to turn the ignition switch off for 12 seconds.
7. Repeat step 5 and 6 for any other injectors that are new, or have been moved from their original location. Once injectors are classified, cycle ignition to complete.
8. Once the seven digit alphanumeric codes for all injectors have been entered into the PCM, cycle ignition to complete the procedure.

SPECIFICATIONS

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Accelerator Pedal Position Sensor Nut	34	25	-
Crankshaft Position Sensor Cover Bolt	6	-	53
Crankshaft Position Sensor Wire Harness Connector Bracket Bolt	8	-	71
Fuel Injector Tensioning Claw Bolt	33	24	-
Fuel Rail-to-Cylinder Head Bolt	25	18	-
High Pressure Fuel	25	18	-

Pump Bolt			
High Pressure Fuel Pump Nut	80	59	-
High Pressure Tube Support Bracket Bolt	11	-	97
High Pressure Tube Support Bracket Nut	11	-	97
High Pressure Fuel Tube to Fuel Injector Union Nut	11 + 75°	-	97 + 75°
High Pressure Tube to Fuel Rail Union Nut	5 + 75°	-	44 + 75°
High Pressure Tube to High Pressure Pump Union Nut	11 + 75°	-	97 + 75°
Oxygen Sensor	50	37	-

SPECIAL TOOLS

SPECIAL TOOLS

	9717 - Brush, Injector Bore (Originally Shipped In Kit Number(s) 9910.) VM.10358 - Remover, Fuel Injector

INJECTOR(S), FUEL

DESCRIPTION

DESCRIPTION - FUEL INJECTORS

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This may be as high as 1800 bar (26, 106 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Fuel under this amount of pressure can penetrate skin causing personal injury or death. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing the fuel system.

Three electronically controlled fuel injectors are located on top of each cylinder bank. The injectors generate a fine fuel atomization at injection pressures of up to 1, 800 bar (26, 106 psi). Each injector is held in place by a tensioning claw and retaining bolt. A copper seal ring is located on the injector tip to seal off the injector to the combustion chamber. When servicing the injectors, always replace the copper seal ring and inspect the seal in the cylinder head cover. Lubricate the body of the injector with Mopar® 05012249AA - Nickel Antisieze Compound, or Molikote Anti-Fretting Paste (MB part number A001-989-42-51-10).

OPERATION

OPERATION

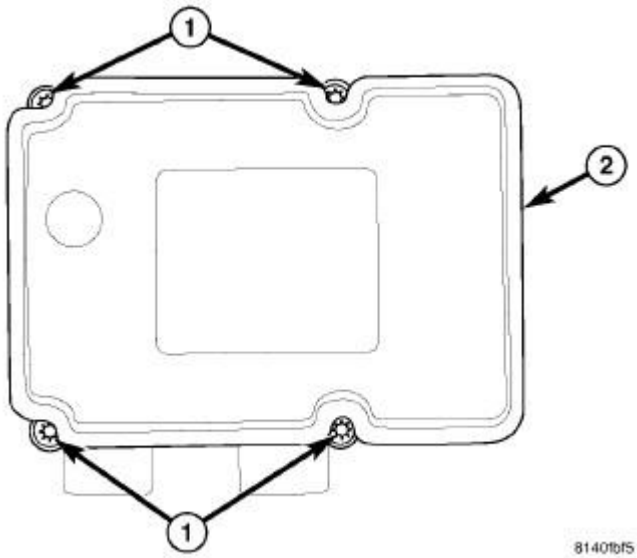


Fig. 197: "Z" Port (Inlet), "A" Port (Outlet)
Courtesy of CHRYSLER GROUP, LLC

The injector receives a single high pressure supply which, once inside the injector, is distributed in two distinct flows. One mainly supplies the nozzle and the other controls the pressure rod. Both of these flows also contribute to the lubrication of the injector's moving parts, thanks to consistent seepage present in an injection system that operates at such a high pressure. There is also recirculation, which is necessary to dissipate the diesel used to operate the pilot valve for channelling the seepage. The temperature of the diesel recirculated by the injector can reach very high levels 100 °C (212 °F). The recirculation systems must therefore be equipped with pipes that can withstand these temperatures. In order to better understand its operation, the injector may be considered as comprising two parts:

- 1. The actuator/nozzle, comprising the jet and pressure rod-pin assembly.
- 2. The control solenoid, comprising the solenoid and valve.

The volume inside the pilot valve and immediately above the actuator is known as the control capacity, and carries out a vital role in the operation of the injector. It is permanently supplied with diesel via a "Z" port (inlet) (4). The diesel flows out from this reservoir through a second "A" port (outlet) (2), whose opening is controlled by the control solenoid valve. The diesel contained in the control reservoir exerts a pressure that can be modulated and which acts upon the upper surface of the pressure rod, whose area is AC; the force acting on this area therefore depends on the pressure within the control volume.

The actuator/nozzle comprises a jet with 7 openings at the end, for the output of diesel, and a pressure rod-pin assembly. The jet is supplied with pressurized diesel when the pressure rod-pin assembly is in the raised position. This is raised by an imbalance between the opposing forces acting

on the assembly. There are three forces acting on the pressure rod-pin system:

- Spring force Fe exerted in the closing direction and created by the spring which acts on the pin; this force guarantees the seal of the nozzle when the line pressure drops to zero, avoiding the formation of drops of fuel in the cylinder.
- Force FC which also acts in the closing direction; this is caused by the pressure of the diesel present in the control volume. This pressure acts on the upper area of the pressure rod.
- Force FA exerted in the opening direction, created by the pressure of the fuel present in the supply volume and acting on the area of the circular crown marked out on the outside by the sliding diameter of the pin in the jet and on the inside by the sealing diameter of the conical housing.

The equilibrium of the pressure rod-pin assembly depends on the balance between these three forces; when the injector is not energized, the pressures in the supply and control volumes are identical and equal to the line pressure provided by the rail. In this condition: FC + Fe > FA.

REMOVAL

LEFT BANK

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 206 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

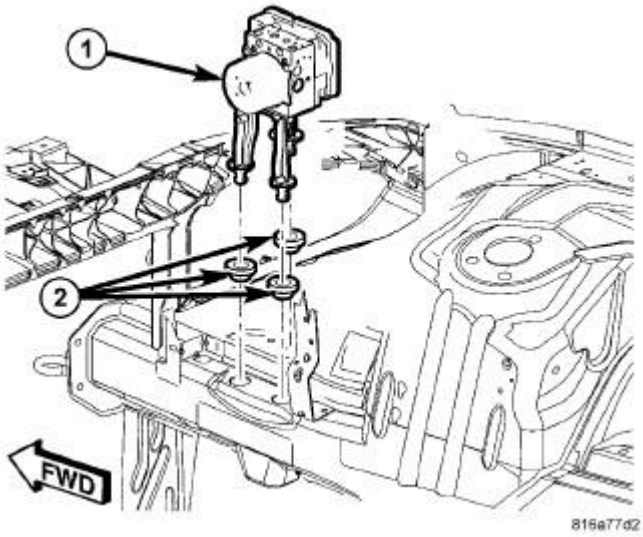


Fig. 198: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

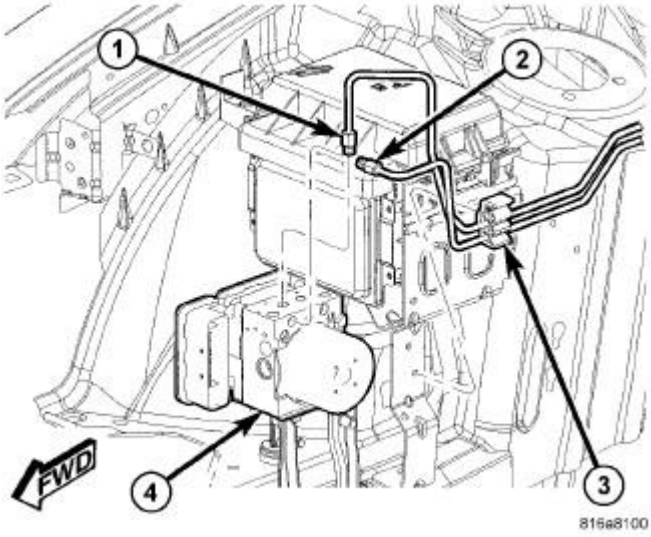


Fig. 199: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Charge Air Cooler (CAC) hose (2) from turbocharger (1).

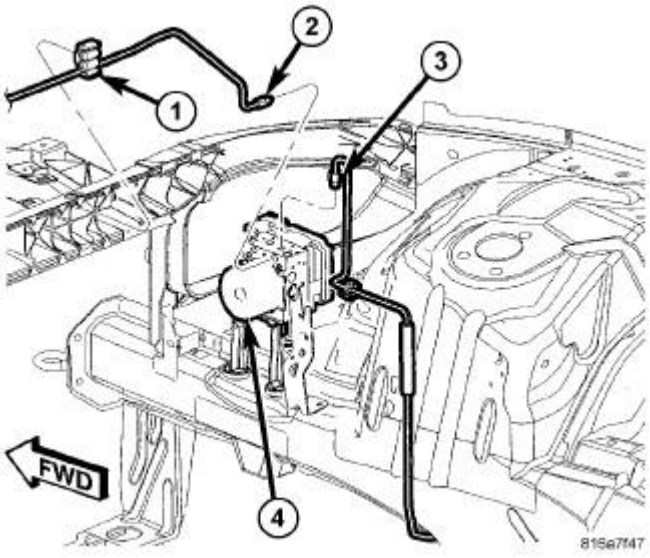


Fig. 200: CAC Hose Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the two (1) bolts securing the CAC hose and bracket (2) to timing cover and position aside.
5. Remove the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

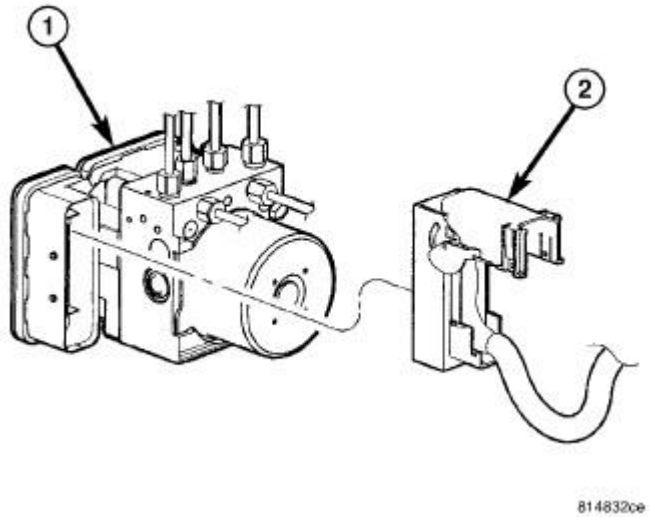


Fig. 201: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

6. Remove the fuel injector silencer (1).

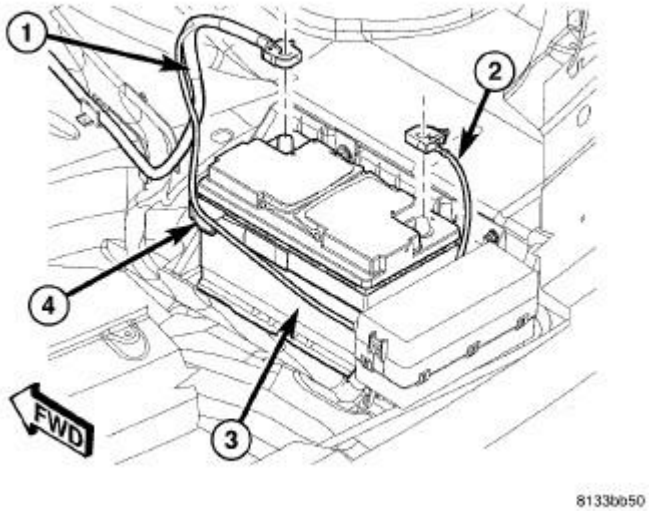


Fig. 202: Fuel Injector, Return Hose, Retaining Tab & Connector
Courtesy of CHRYSLER GROUP, LLC

7. Using shop air, clean the area surrounding the fuel injector.
8. Lift up on locking retaining tab (2) to unlock the lock.
9. Disconnect the fuel return hose (3) by wiggling hose free from the top of fuel injector (4).
10. Disconnect the fuel injector harness connector (1).

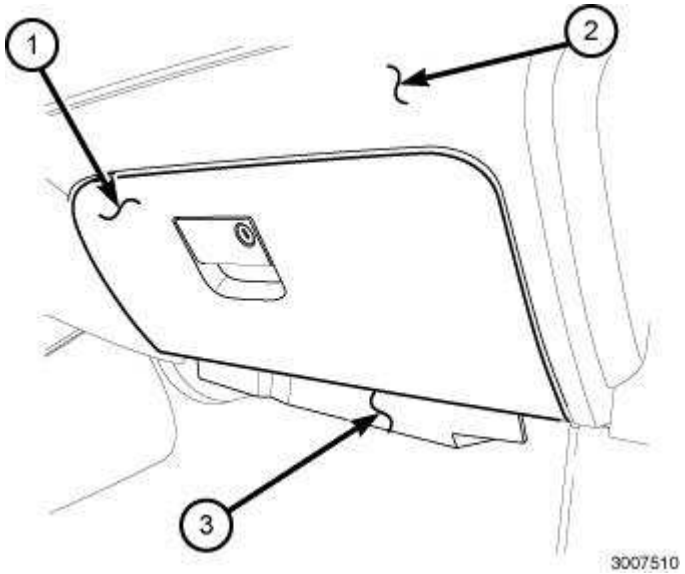


Fig. 203: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

11. Remove the high pressure fuel tubes. Refer to **TUBE(S), FUEL, REMOVAL**.
12. Remove the fuel injector hold down bolt (2), washer (3), and retaining claw (4).

13. Using your hand, pull fuel injector (1) straight up from cylinder head for removal. Discard lower sealing washer and place a protective cap over the nozzle.

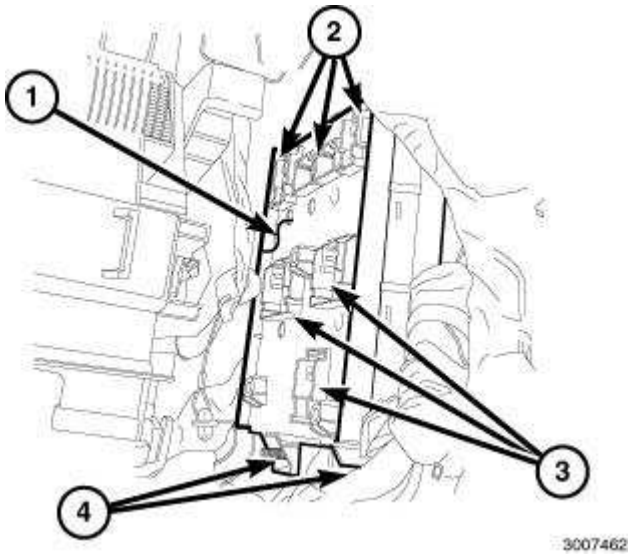


Fig. 204: Fuel Injector & Removal Tool
Courtesy of CHRYSLER GROUP, LLC

14. If injector can't be removed by hand, install the (special tool #VM.10358, Remover, Fuel Injector) tool (1) to remove the fuel injector (2). Discard lower sealing washer and place a protective cap over the nozzle.

RIGHT BANK

WARNING: Observe the following precautions when working on fuel systems: No sparks, open flames or smoking. Avoid inhaling and swallowing fuel. Avoid eye and skin contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing. Failure to observe these precautions may result in fire, explosion, property damage, and serious or fatal injury.

WARNING: High-pressure fuel lines deliver fuel under extreme pressure from the injection pump to the injectors. This maybe as high as 1800 bar (26, 206 psi). Use extreme caution when inspecting for high-pressure fuel leaks. Inspect high-pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Fuel under this amount of pressure can penetrate skin causing serious or fatal injury.

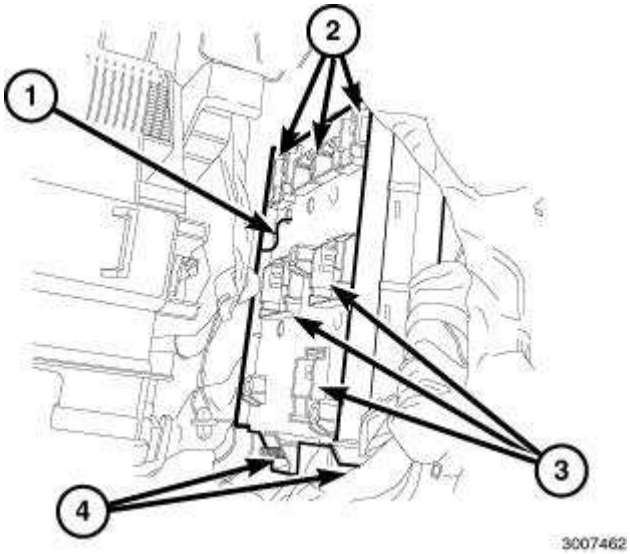


Fig. 205: EGR Tube & Clamps
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), REMOVAL** .

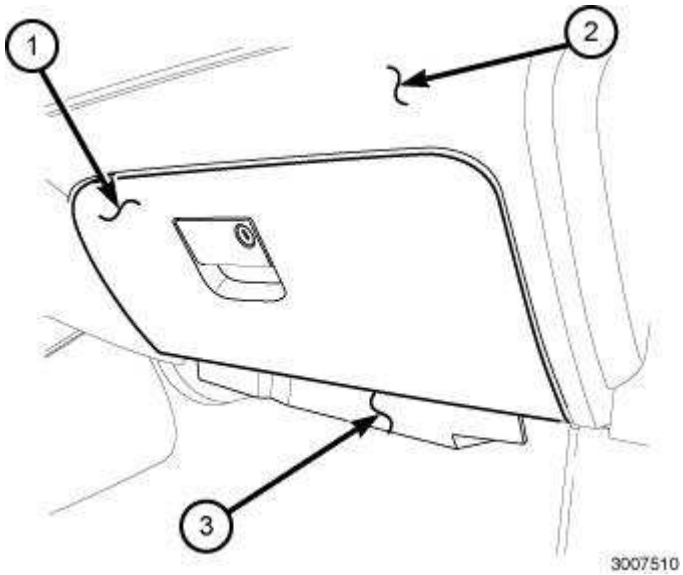


Fig. 206: Fuel Injector, Return Hose, Retaining Tab & Connector
Courtesy of CHRYSLER GROUP, LLC

3. Using shop air, clean the area surrounding the fuel injector.
4. Lift up on locking retaining tab (2) to unlock the lock.
5. Disconnect the fuel return hose (3) by wiggling hose free at the fuel injector (4).
6. Disconnect the fuel injector harness connector (1).
7. Remove the high pressure fuel tubes. Refer to **TUBE(S), FUEL, REMOVAL**.

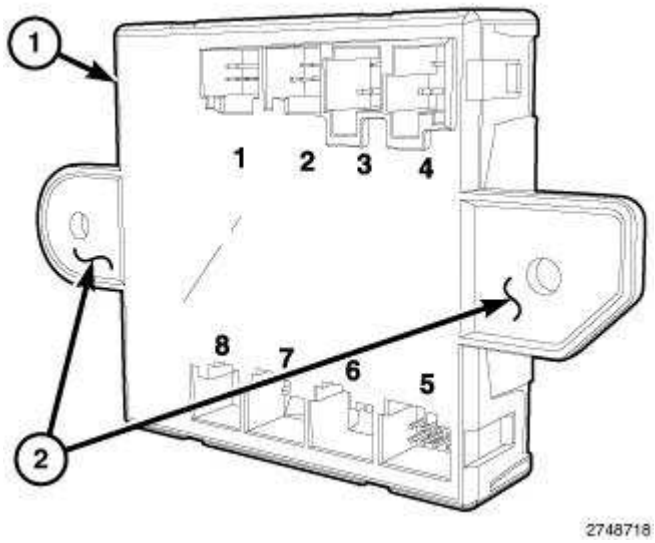


Fig. 207: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

8. Remove the fuel injector hold down bolt (2), washer (3), and retaining claw (4).
9. Using your hand, pull fuel injector (1) straight up from cylinder head for removal. Discard lower sealing washer and place a protective cap over the nozzle and cylinder head.

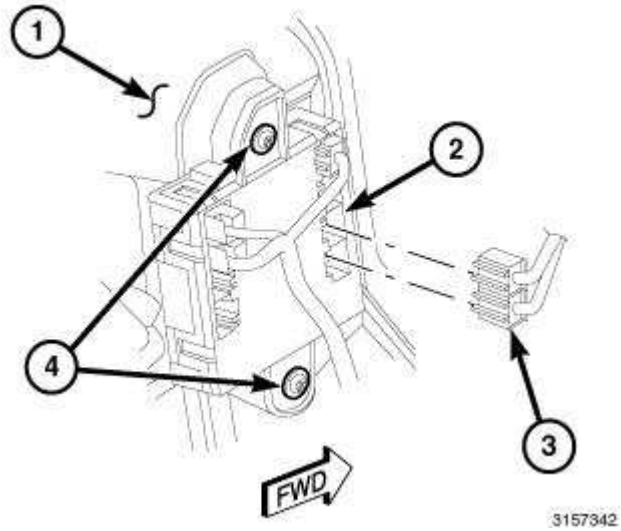


Fig. 208: Fuel Injector & Removal Tool
Courtesy of CHRYSLER GROUP, LLC

10. If injector can't be removed by hand, install the (special tool #VM.10358, Remover, Fuel Injector) (1) to remove the fuel injector (2). Discard lower sealing washer and place a protective cap over the nozzle.

CLEANING

CLEANING FUEL INJECTORS

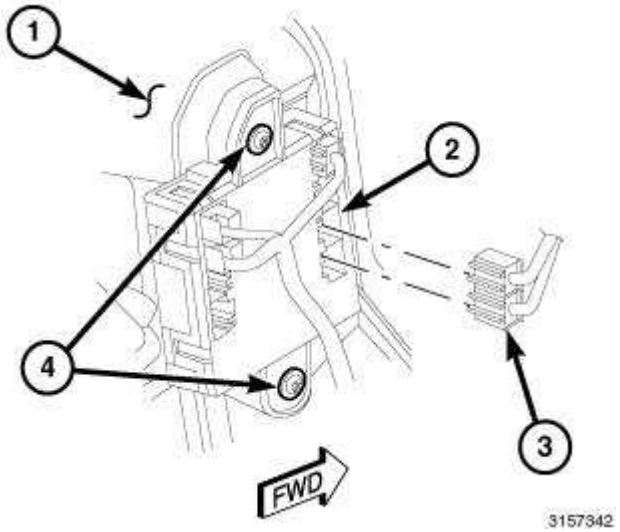


Fig. 209: Fuel Injector & Sealing Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before cleaning the injector recesses, seal the injector holes in the injector recesses with the appropriate pin to prevent debris from falling into the recesses and entering the motor.

1. Using a lint-free rag, wipe the cylinder head around the fuel injector.
2. Wipe out injector recesses with a lint-free cloth, then clean with the (special tool #9717, Brush, Injector Bore).
3. Clean the bottom of the cylinder recess with a round brush.
4. Blow out the recess and clean again with a lint-free cloth and cover over.
5. Perform these steps for each injector recess.

NOTE: DO NOT clean the tip of the injector with a wire brush. Use a lint-free cloth.

6. Clean injector body (1) with a wire brush.
7. Clean injector tips with a lint-free cloth.

NOTE: Do Not apply antiseize lubricant to the injector nozzle, apply only to the injector body.

8. Grease injector body with antiseize lubricant.

NOTE: Always replace the seals that seal off the injectors at the cylinder head to the combustion chamber.

INSTALLATION

LEFT BANK

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

NOTE: Any time a new injector is installed, or if an existing injector is installed in any location other than its original location, the injector quantity adjustment procedure must be performed. Refer to FUEL INJECTION, DIESEL, STANDARD PROCEDURE.

NOTE: DO NOT use a brush to clean around the injector nozzle. DO NOT lubricate area around injector nozzle. The injector may become restricted with debris.

NOTE: Be sure a new copper washer/seal is installed on end of injector and the old seal is removed, before installing in cylinder head.

NOTE: No force should be used in installing the fuel injector. Do not apply any pressure to the electrical connector or the fuel return port during the installation process.

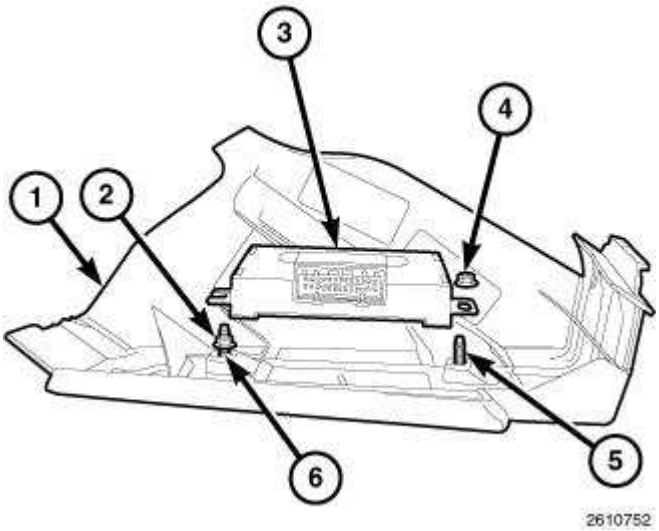


Fig. 210: Fuel Injector Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean injectors and injector bore. Refer to **INJECTOR(S), FUEL, CLEANING**.
2. Lubricate the new fuel injector seal (1) with clean engine oil, diesel fuel, or all purpose white grease.

3. Install a new fuel injector seal (1) in the cylinder head cover (2).

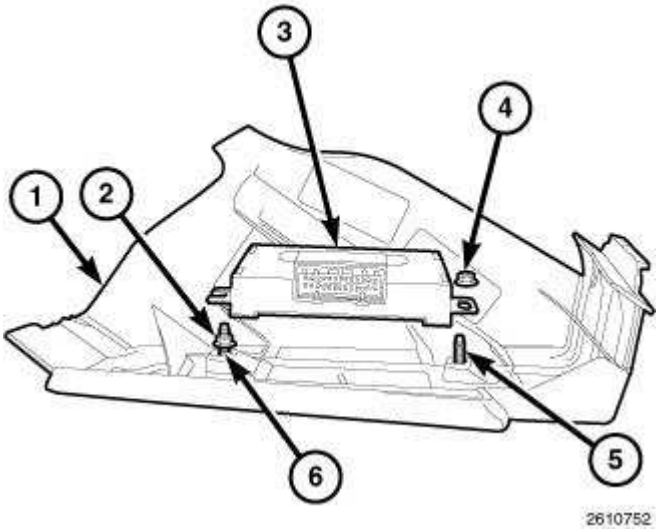


Fig. 211: Fuel Injector & Sealing Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do Not apply any lubricant to the fuel injector nozzle. Care must be taken not to restrict the discharge orifices in the nozzle.

4. Lubricate the fuel injector body with Mopar® White Lithium Grease.
5. Install a new sealing washer (2) onto the fuel injector (1).

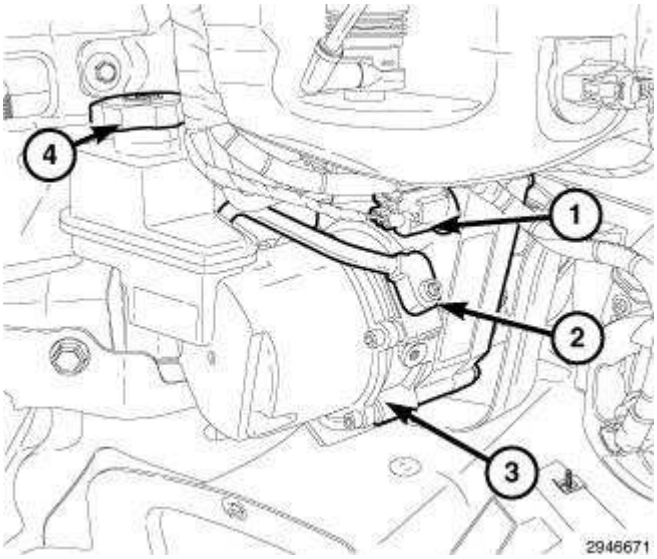


Fig. 212: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

6. Install the fuel injector (1), tensioning claws (4), washer (3) and bolt (2). Tighten bolts (2) 33 N.m

(24 ft. lbs.).

7. Install new high pressure fuel tubes. Refer to **TUBE(S), FUEL, INSTALLATION**.

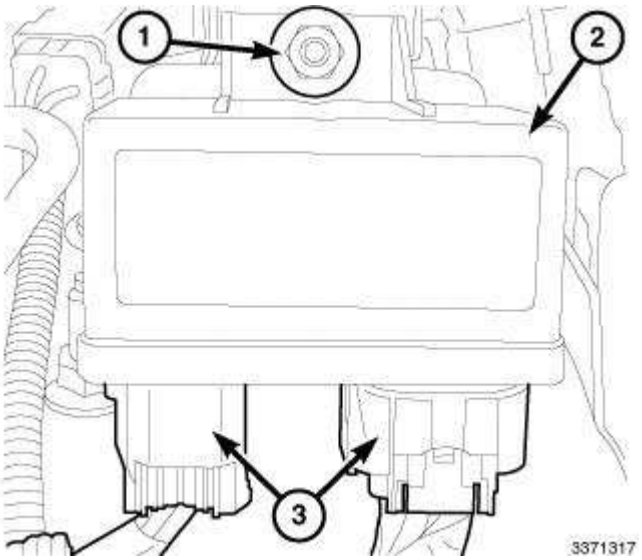


Fig. 213: Fuel Injector, Return Hose, Retaining Tab & Connector
Courtesy of CHRYSLER GROUP, LLC

8. Connect the fuel injector harness connector (1).
9. Install the fuel injector return hose (3) and push down on the lock retaining tab (2) to lock in place.

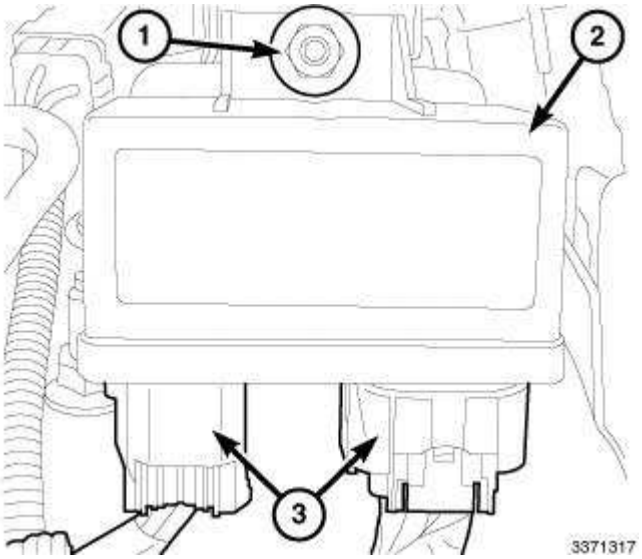


Fig. 214: Left Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

10. Install the fuel injector silencer (1).
11. Install the air cleaner body and air tube. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or

BODY, AIR CLEANER, INSTALLATION .

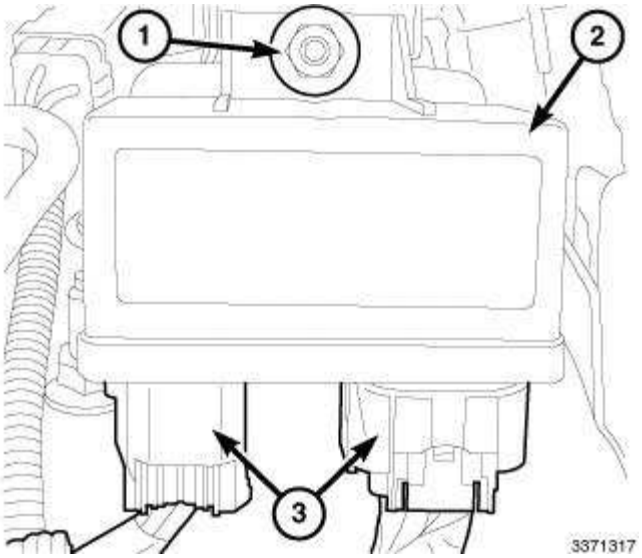


Fig. 215: CAC Hose Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Position the CAC hose and bracket (2) to timing cover. Tighten bolts (1) to 11 N.m (97 in. lbs.).

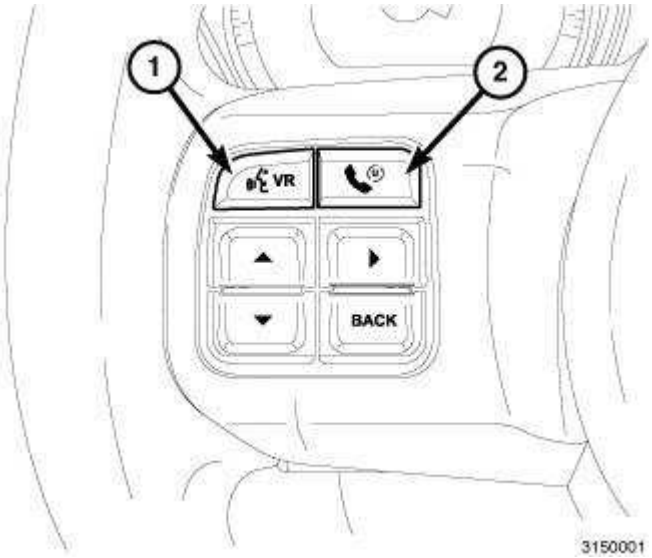


Fig. 216: Turbocharger & Charge Air Cooler (CAC) Hose
Courtesy of CHRYSLER GROUP, LLC

13. Connect the Charge Air Cooler (CAC) hose (2) to turbocharger (1).
14. Connect the negative battery cable.
15. Start the engine and inspect for leaks.

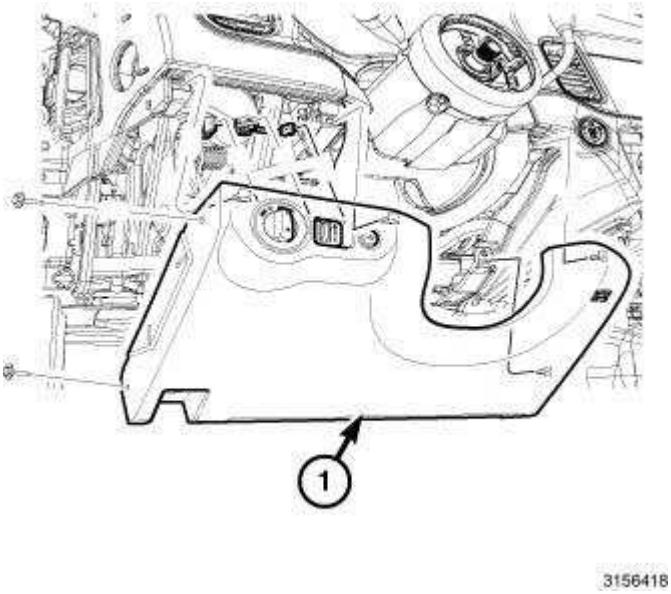


Fig. 217: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Install the engine cover (1).

RIGHT BANK

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury to eyes and skin from contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing.

NOTE: Any time a new injector is installed, or if an existing injector is installed in any location other than its original location, the injector quantity adjustment procedure must be performed. Refer to FUEL INJECTION, DIESEL, STANDARD PROCEDURE.

NOTE: DO NOT use a brush to clean around the injector nozzle. DO NOT lubricate area around injector nozzle. The injector may become restricted with debris.

NOTE: Be sure a new copper washer/seal is installed on end of injector and the old seal is removed, before installing in cylinder head.

NOTE: No force should be used in installing the fuel injector. Do not apply any pressure to the electrical connector or the fuel return port during the installation process.

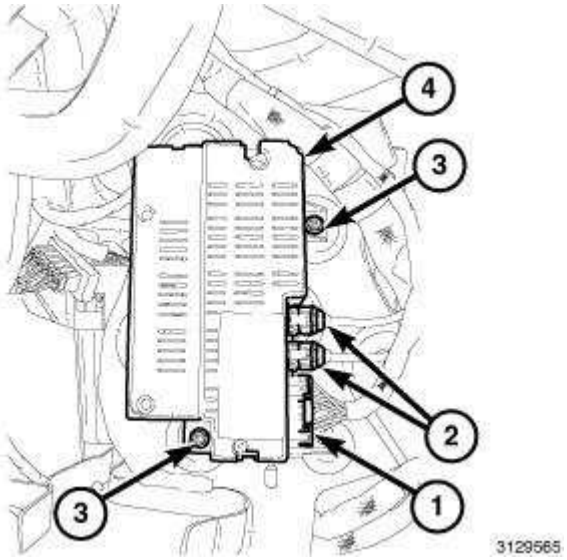


Fig. 218: Fuel Injector Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean injectors and injector bore. Refer to **INJECTOR(S), FUEL, CLEANING**.
2. Lubricate the new fuel injector seal (1) with clean engine oil, diesel fuel, or all purpose white grease.
3. Install a new fuel injector seal (1) into the cylinder head cover (2).

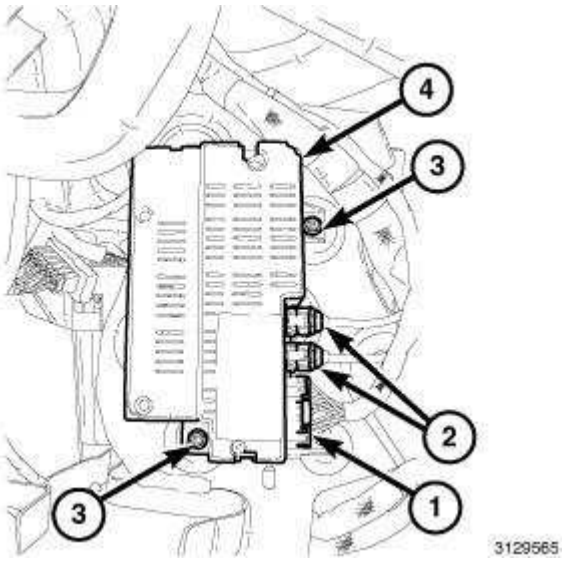


Fig. 219: Fuel Injector & Sealing Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do Not apply any lubricant to the fuel injector nozzle. Care must be taken not to restrict the discharge orifices in the nozzle.

4. Lubricate the fuel injector body with Mopar® White Lithium Grease.

5. Install a new sealing washer (2) onto the fuel injector (1).

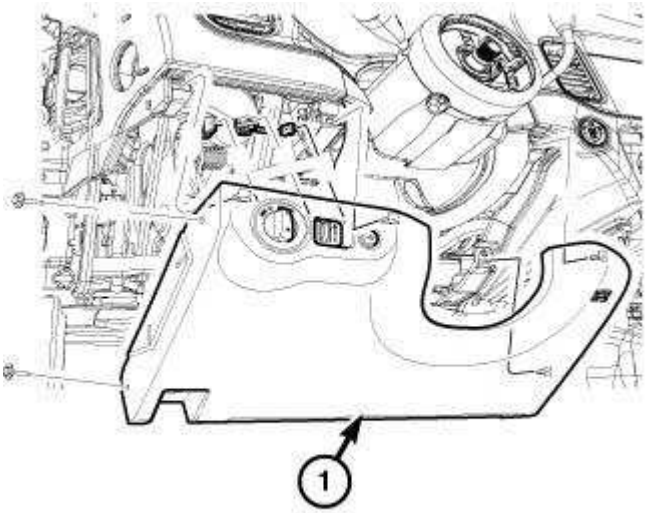


Fig. 220: Fuel Injector, Hold Down Bolt, Washer & Retaining Claw
Courtesy of CHRYSLER GROUP, LLC

6. Install the fuel injector (1), tensioning claws (4), washer (3) and bolt (2). Tighten bolts (2) 33 N.m (24 ft. lbs.).
7. Install new high pressure fuel tubes. Refer to **TUBE(S), FUEL, INSTALLATION**.

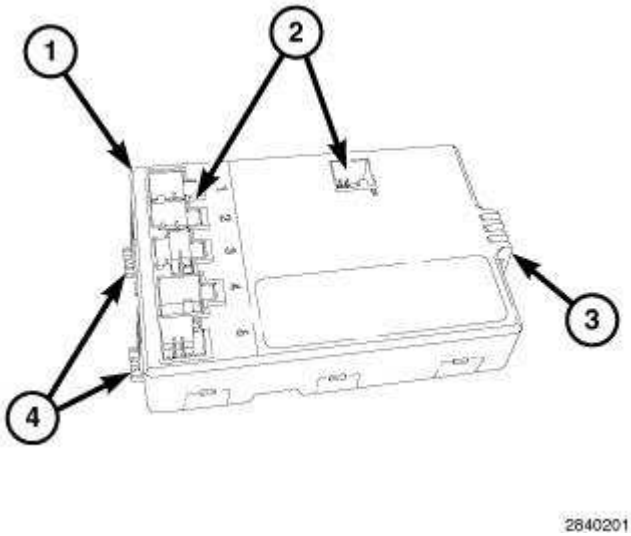


Fig. 221: Fuel Injector, Return Hose, Retaining Tab & Connector
Courtesy of CHRYSLER GROUP, LLC

8. Connect the fuel injector wire harness connector (1).
9. Install the fuel injector return hose (3) and push down on the lock retaining tab (2) to lock in place.

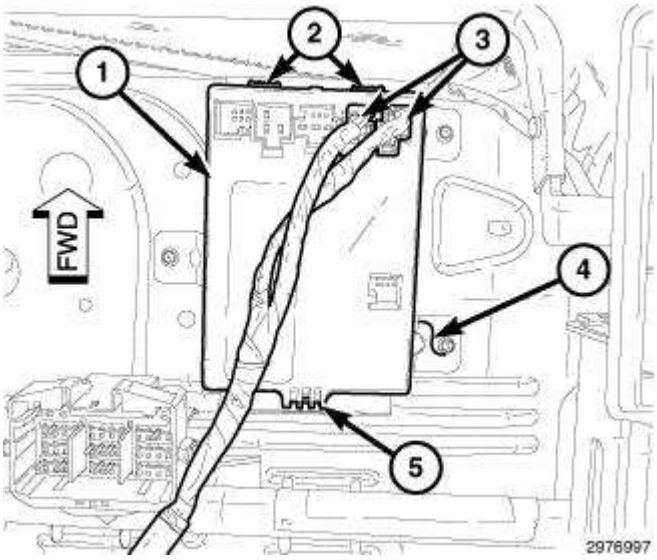


Fig. 222: EGR Tube & Clamps
Courtesy of CHRYSLER GROUP, LLC

10. Install the EGR tube. Refer to **TUBE, EXHAUST GAS RECIRCULATION (EGR), INSTALLATION** .
11. Connect the negative battery cable.
12. Start engine and inspect for leaks.

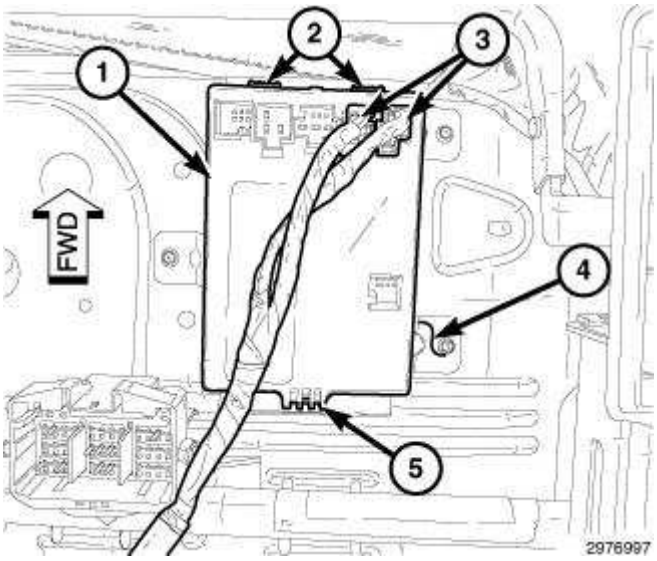


Fig. 223: Right Side Fuel Injector Silencer
Courtesy of CHRYSLER GROUP, LLC

13. Install the fuel injector silencer (1).

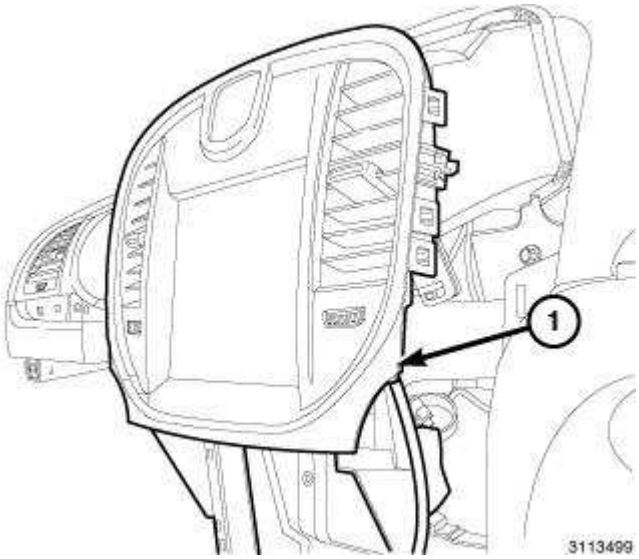


Fig. 224: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

14. Install the engine cover (1).

SENSOR, ACCELERATOR PEDAL POSITION

DESCRIPTION

DESCRIPTION

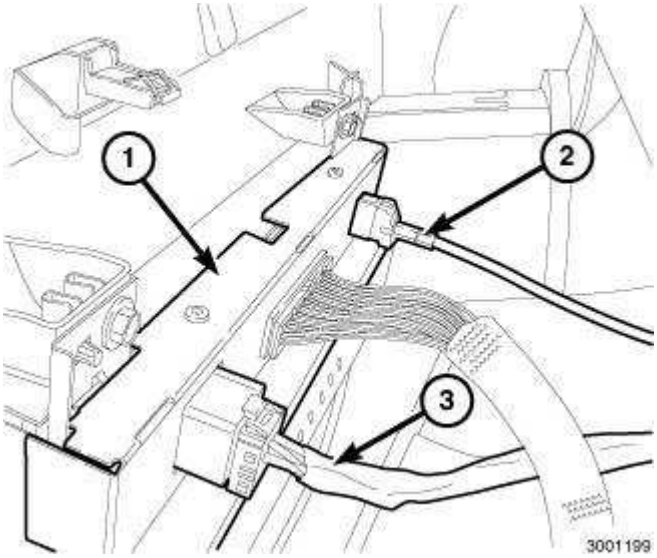


Fig. 225: Accelerator Pedal Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - ACCELERATOR PEDAL POSITION SENSOR (APPS)
2 - ACCELERATOR PEDAL ASSEMBLY

The accelerator pedal position sensor (1) is located on the accelerator pedal assembly (2). The driver supplies the torque requirements for the engine by operating the accelerator pedal in accordance with the desired speed or acceleration. The pedal sensor converts the mechanical operation of the pedal into an electrical signal and sends the information to the Powertrain Control Module (PCM). The PCM adjusts the quantity of the fuel that is injected into the engine.

The accelerator pedal position sensor (1) is serviced as an assembly with the accelerator pedal assembly (2).

REMOVAL

REMOVAL

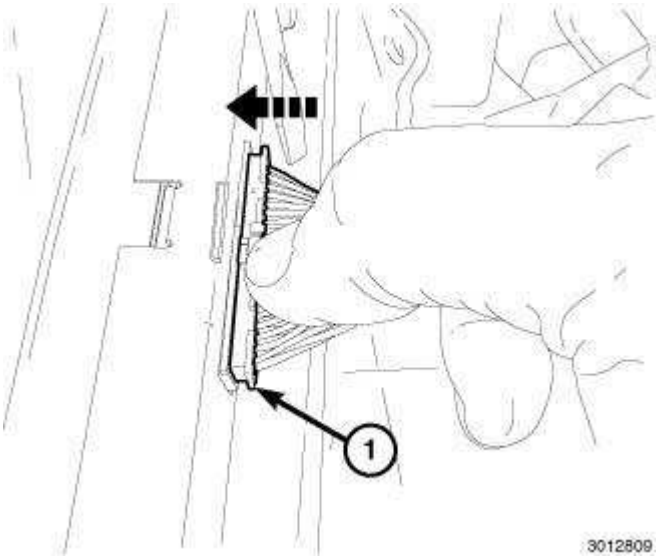


Fig. 226: View Of Accelerator Pedal Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - HARNESS CONNECTOR
2 - FASTENERS
3 - ACCELERATOR PEDAL ASSEMBLY

1. Disconnect the negative battery cable.
2. Remove the drivers side lower dash board close out panel.
3. Disconnect the APPS wire harness connector (1).
4. Remove the nuts (2) and the accelerator pedal assembly (3).

INSTALLATION

INSTALLATION

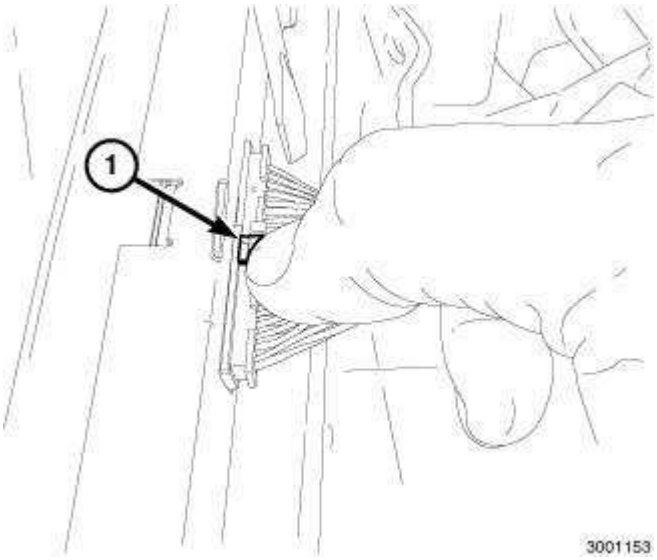


Fig. 227: View Of Accelerator Pedal Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - HARNESS CONNECTOR
2 - FASTENERS
3 - ACCELERATOR PEDAL ASSEMBLY

1. Install the accelerator pedal assembly (3). Tighten nuts (2) to 34 N.m (25 ft. lbs.).
2. Connect the APPS wire harness connector (1).
3. Install the drivers lower dash board close out panel.
4. Connect the negative battery cable.

SENSOR, AIR TEMPERATURE, NUMBER 2

DESCRIPTION

DESCRIPTION

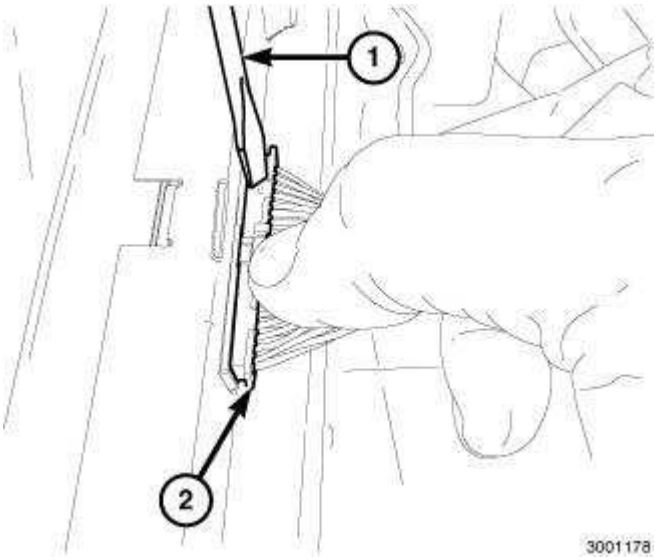


Fig. 228: Intake Air Temperature Sensor/Boost Pressure Sensor, Fastener & Connector
Courtesy of CHRYSLER GROUP, LLC

The Intake Air Temperature (IAT) sensor 2 (2) is combined with the Boost Pressure sensor is a mounted on the top of the intake manifold.

OPERATION

OPERATION

The Intake Air Temperature (IAT) sensor 2 operates as a typical two wire sensor and is used to monitor the temperature of the air in the Intake Manifold. It receives a 5-Volt signal on the (K48) Intake Air Temperature Sensor 2 Signal circuit and shares the (K690) ground circuit with the Boost Pressure Sensor.

REMOVAL

REMOVAL

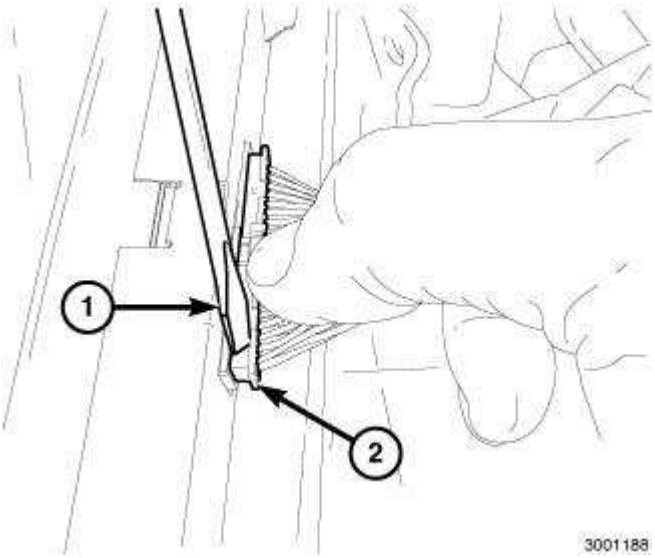


Fig. 229: Intake Air Temperature Sensor/Boost Pressure Sensor, Fastener & Connector
Courtesy of CHRYSLER GROUP, LLC

1. The Intake Air Temperature (IAT) sensor 2 (2) is incorporated with the boost pressure sensor. For removal, refer to **SENSOR, BOOST PRESSURE, REMOVAL**.

INSTALLATION

INSTALLATION

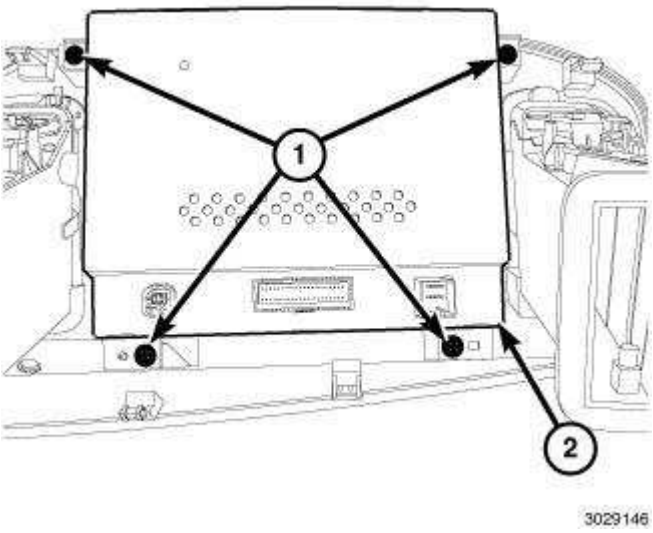


Fig. 230: Intake Air Temperature Sensor/Boost Pressure Sensor, Fastener & Connector
Courtesy of CHRYSLER GROUP, LLC

1. The Intake Air Temperature (IAT) sensor 2 (2) is incorporated with the boost pressure sensor. For installation, refer to **SENSOR, BOOST PRESSURE, INSTALLATION**.

SENSOR, BOOST PRESSURE

DESCRIPTION

DESCRIPTION

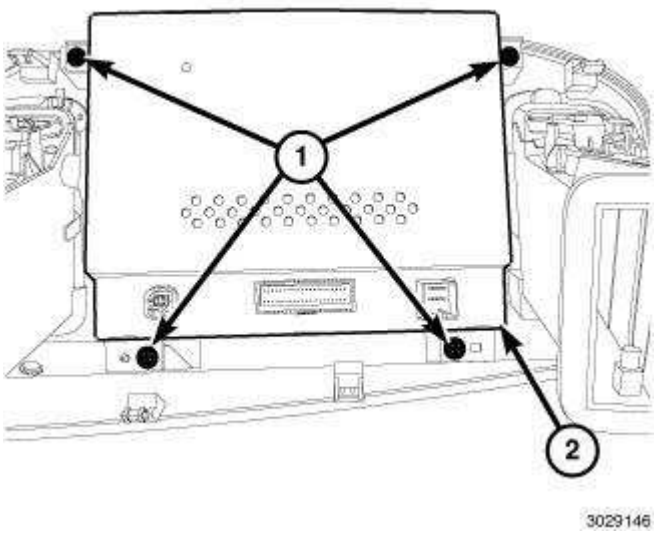


Fig. 231: Intake Air Temperature Sensor/Boost Pressure Sensor, Fastener & Connector
Courtesy of CHRYSLER GROUP, LLC

The Boost Pressure Sensor (2) is combined with the Intake Air Temperature (IAT) Sensor 2 is a mounted on the top of the intake manifold.

OPERATION

OPERATION

The Boost Pressure Sensor operates as a typical three wire sensor. It is used to measure the pressure of the air entering the Turbocharger. It receives a 5-Volt feed on the (K668) Boost Pressure Sensor 5-Volt Supply circuit and shares the (K690) ground circuit with the Intake Air Temperature Sensor. The Powertrain Control Module (PCM) receives a signal from the sensor via the (K37) Boost Pressure Sensor Signal circuit.

DIAGNOSIS AND TESTING

BOOST PRESSURE SENSOR

If the boost pressure sensor fails, the PCM records a DTC into memory and continues to operate the engine in one of the three limp-in modes. When the PCM is operating in this mode, a loss of power will be present, as if the turbocharger was not operating. The best method for diagnosing faults with the boost pressure sensor is with the scan tool. Refer to the Diesel Powertrain Diagnostic information.

REMOVAL

REMOVAL

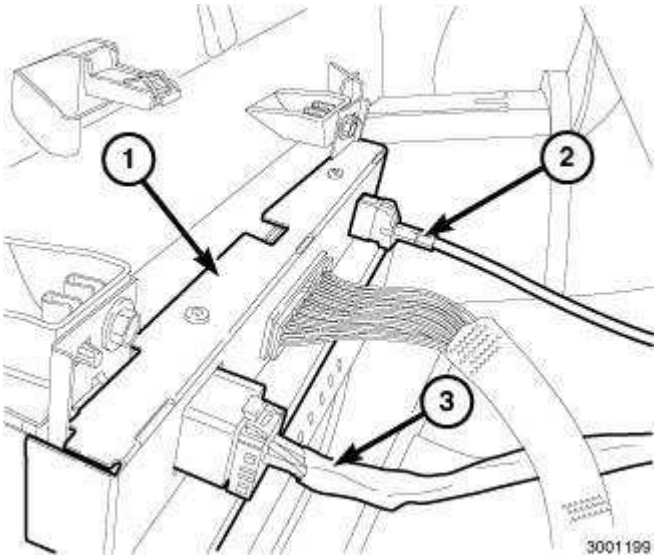


Fig. 232: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

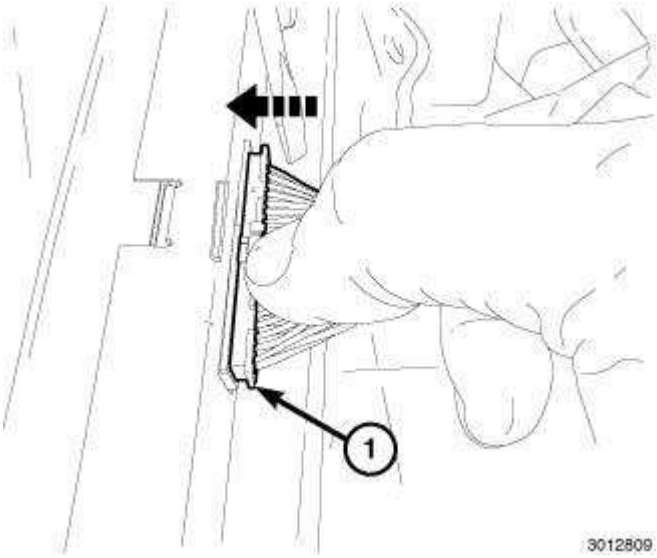


Fig. 233: Intake Air Temperature Sensor/Boost Pressure Sensor, Fastener & Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the boost pressure sensor wire harness connector (1).
4. Remove fastener (3), and the boost pressure sensor (2).

INSTALLATION

INSTALLATION

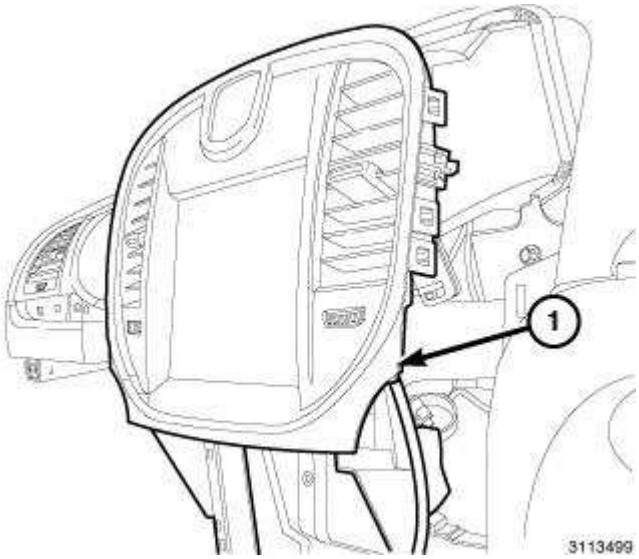


Fig. 234: Intake Air Temperature Sensor/Boost Pressure Sensor, Fastener & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Install the boost pressure sensor (2) and securely tighten fastener (3).
2. Connect the boost pressure sensor harness connector (1).

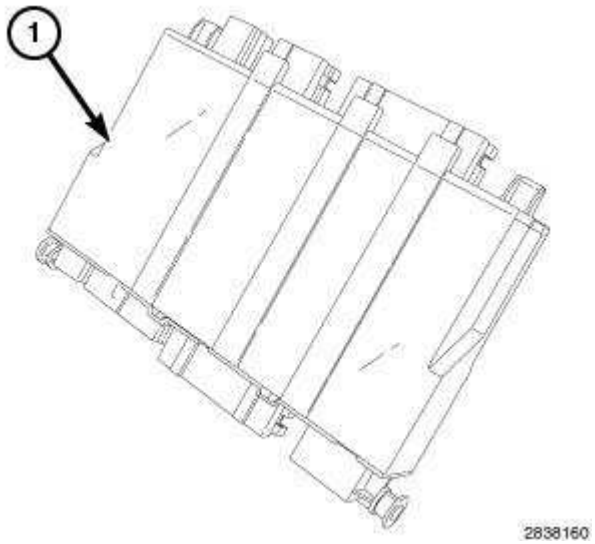


Fig. 235: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine cover (1).
4. Connect the negative battery cable.

SENSOR, CAMSHAFT POSITION

DESCRIPTION

DESCRIPTION

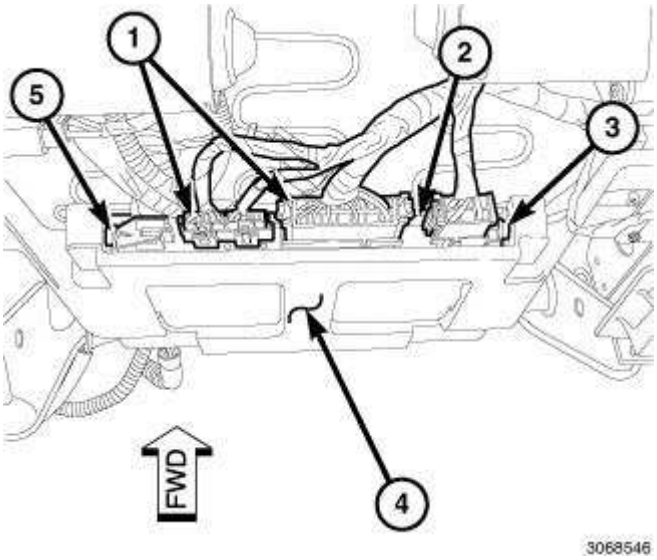


Fig. 236: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Camshaft Position (CMP) sensor is mounted on the left upper timing cover. The hall effect sensor supplies a signal to the Powertrain Control Module (PCM). The PCM uses the signals sent by the CMP and the Crankshaft Position (CKP) sensor to determine injection timing.

OPERATION

OPERATION

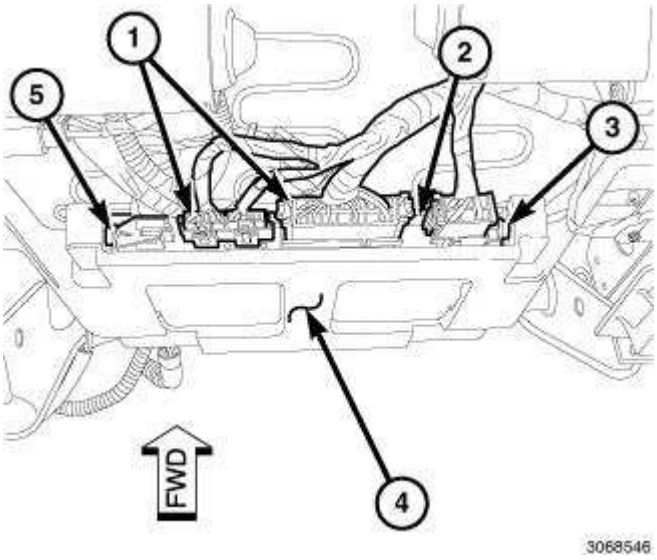


Fig. 237: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

The signal circuit of the camshaft sensor has a voltage of approximately 5V. The camshaft has a

reluctor wheel bolted to the front of left exhaust camshaft, the camshaft signal is approximately 0V. This 0V to 5V signal is used by the Powertrain Control Module (PCM) for detecting ignition TDC of cylinder 1 as the engine rotates. If no signal is supplied by the camshaft position sensor, the vehicle will not start.

REMOVAL

REMOVAL

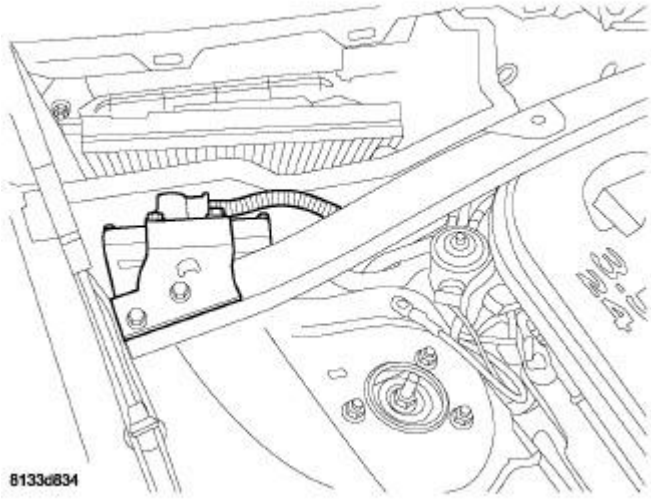


Fig. 238: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Disconnect Camshaft Position (CMP) sensor wire harness connector (3).
3. Remove bolt (1) and the CMP sensor (2).

INSTALLATION

INSTALLATION

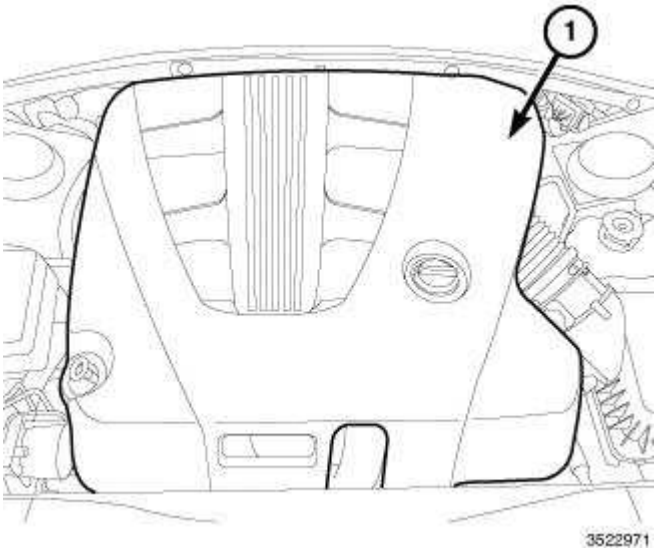


Fig. 239: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install Camshaft Position (CMP) sensor (2). Tighten bolt (1) to 8 N.m (71 in. lbs.).
2. Connect the CMP wire harness connector (3).
3. Connect the negative battery cable.

SENSOR, CRANKSHAFT POSITION

DESCRIPTION

DESCRIPTION

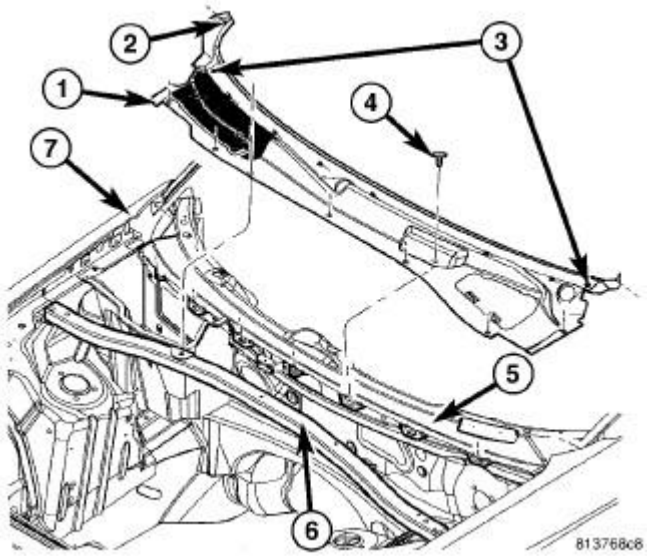


Fig. 240: Crankshaft Position Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Crankshaft Position (CKP) sensor (2) is located at the rear of the engine below the crankshaft. The sensor detects the crankshaft position through a (hall effect) by means of missing segments on the tone wheel behind flex plate. The powertrain Control Module (PCM) detects TDC position of cylinder 1 by means of the signal supplied by the sensor. Injection timing is synchronized by means of the camshaft signal and the crankshaft signal. This sensor is used to detect engine speed.

OPERATION

OPERATION

The crankshaft position and engine speed are detected through a (hall effect) signal. The distance between the Crankshaft Position (CKP) sensor and the gaps of the tone wheel is fixed by the installation position.

When the crankshaft rotates, an alternating voltage is generated in the crankshaft position sensor by the gaps of the tone wheel located behind the flex plate.

In this case, the metal portion of the tone wheel generates a positive voltage pulse and the gap in the tone wheel a negative voltage pulse. The distance from the positive to the negative voltage peak equals the length of the gap.

REMOVAL

REMOVAL

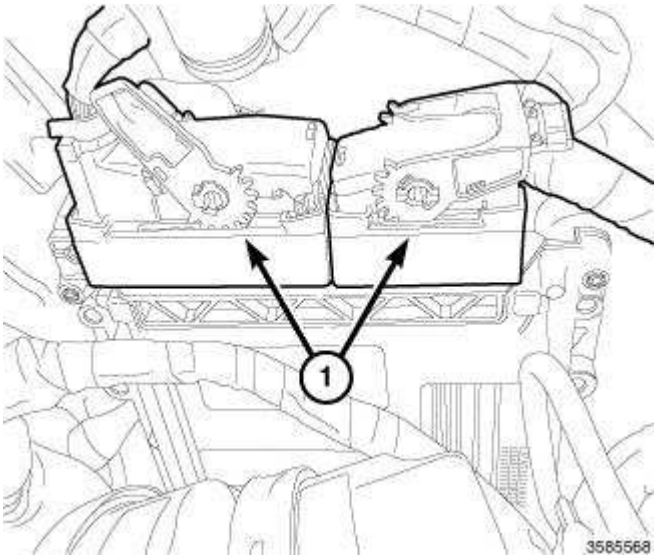


Fig. 241: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** .
3. Remove the transmission belly pan.
4. Disconnect the Crankshaft Position Sensor (CKP) wiring harness connector (1).

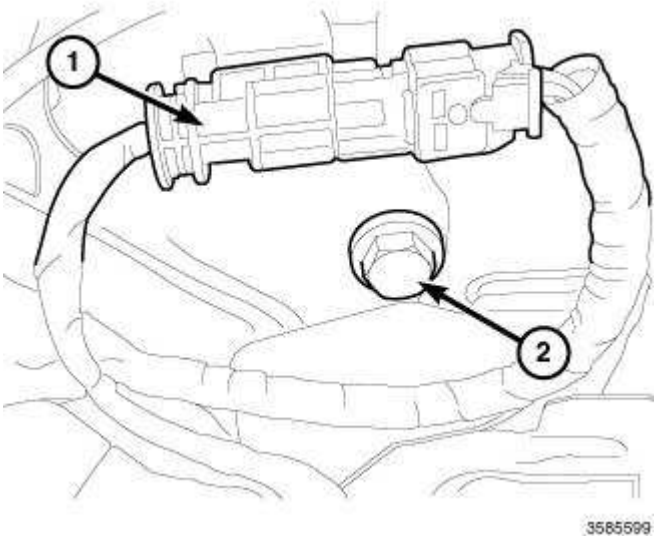


Fig. 242: Rear Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the two bolts (4) from the rear engine mount isolator.
6. Using a suitable transmission jack, positioned under the transmission oil pan, raise the transmission to gain enough clearance to remove the CKP cover.

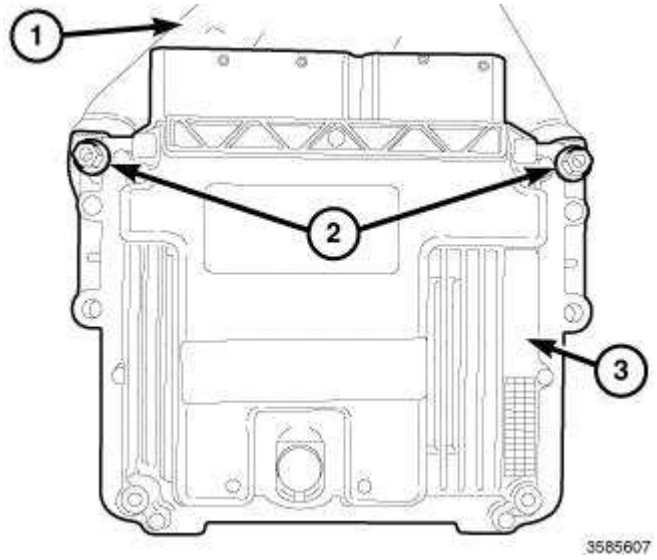


Fig. 243: CKP Sensor, Seal & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Remove bolts (1) and the CKP cover.

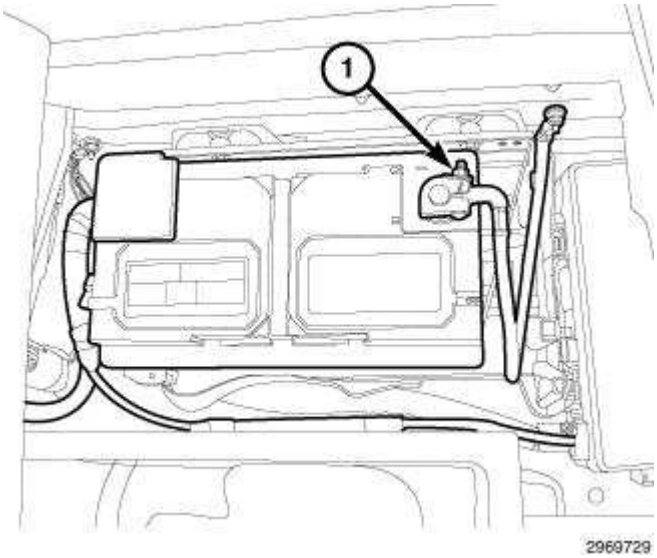


Fig. 244: Access Hole, Bolt & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

8. Using the access hole shown in illustration, remove bolt (3) and the CKP sensor (2).

INSTALLATION

INSTALLATION

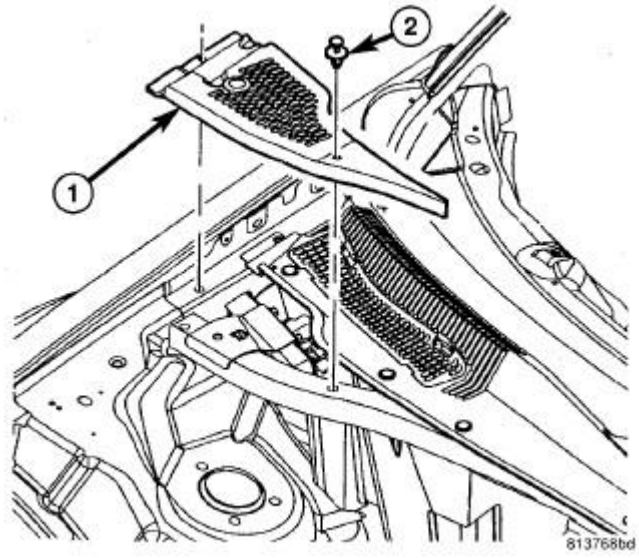


Fig. 245: Access Hole, Bolt & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Clean the area and bore around Crankshaft Position (CKP) sensor.
2. Install the CKP sensor (2). Tighten bolt (3) to 6 N.m (53 in. lbs.).

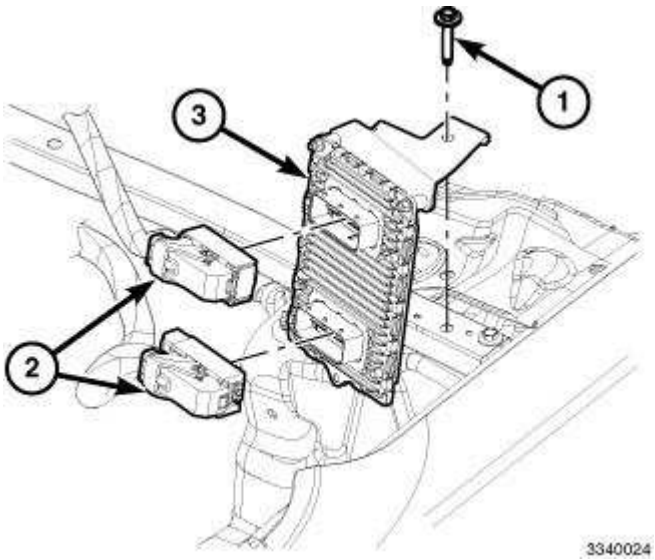


Fig. 246: CKP Sensor, Seal & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Install the CKP sensor cover. Tighten bolts (1) to 8 N.m (71 in. lbs.).

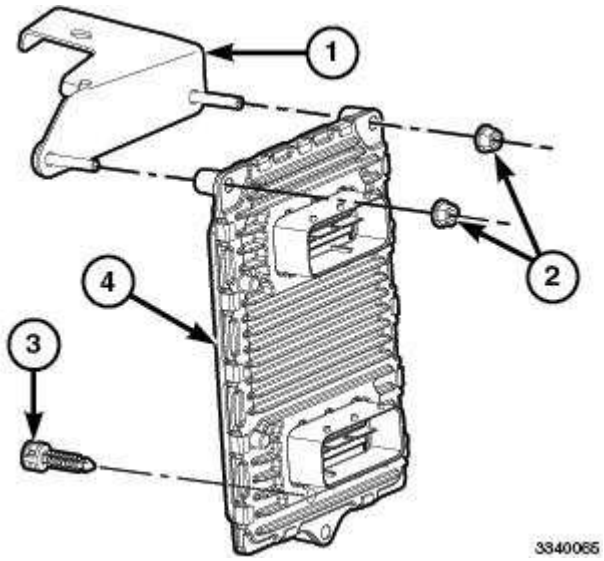


Fig. 247: Rear Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Lower the transmission jack so the weight is resting on the isolator.
5. Install the rear engine mount isolator bolts (4) and tighten to 61 N.m (45 ft. lbs.).

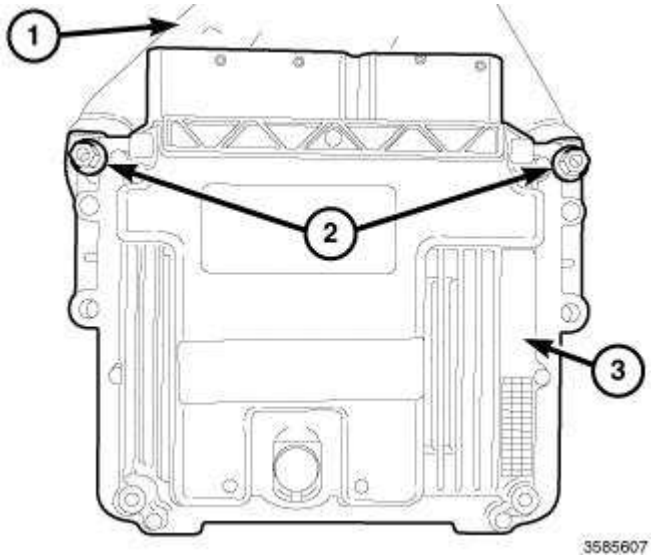


Fig. 248: Crankshaft Position Sensor (CKP) Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Connect the CKP wire harness connector (1).
7. Install the transmission belly pan.
8. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .
9. Connect the negative battery cable.

SENSOR, MASS AIRFLOW (MAF)

DESCRIPTION

DESCRIPTION

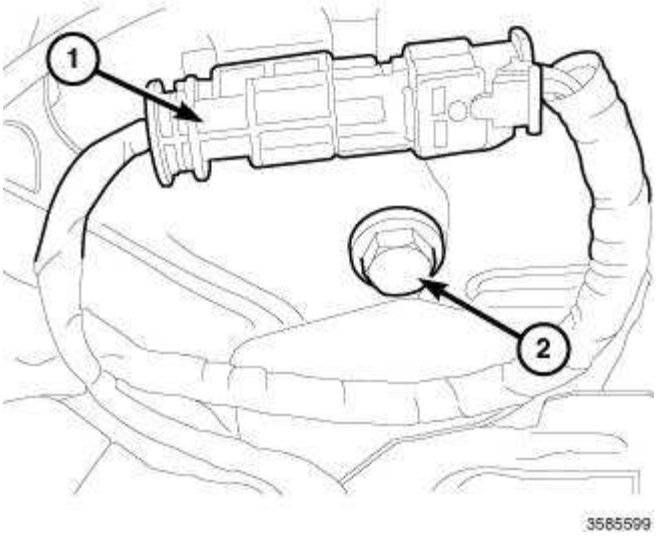


Fig. 249: Mass Air Flow Sensor, Air Cleaner Housing Cover & Screws
Courtesy of CHRYSLER GROUP, LLC

The Mass Air Flow (MAF) sensor (3) is located in the air intake port between the air filter and the turbocharger. The MAF sensor is a hot film thermal flowmeter with an Integrated Temperature sensor which detects the intake air temperature. The sensor is designed for recording load on combustion engines with diesel fuel injection and has a cylinder size in accordance with the required air flow rate.

OPERATION

OPERATION

The Powertrain Control Module (PCM) uses the Mass Air Flow (MAF) sensor to measure air density. The temperature resistor located at the front of the MAF sensor measures the temperature of the inlet air. By varying the voltage, the electronic circuit regulates the temperature of the heating resistor in the rear so that it is 320° F (160°C) higher than the temperature of the intake air. The temperature at the heating resistor is measured by a sensor resistor in-between.

Because the incoming air has a cooling effect, the greater the amount of air that flows in, then the higher the voltage of the heating resistor. The heating resistor is therefore a measure of mass of air flowing past. If a temperature change occurs as a result of a increase or reduction of air flow, the PCM corrects the voltage at the heating resistor until the temperature difference is again achieved. This control voltage is use by the PCM as a unit measure for metered air mass.

REMOVAL

REMOVAL

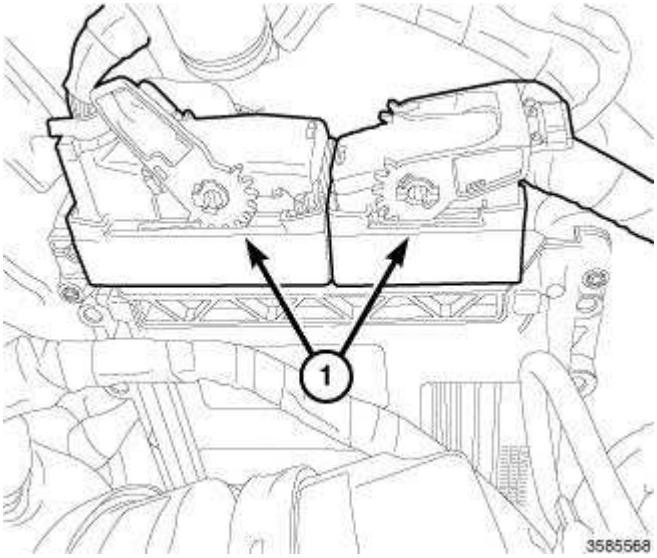


Fig. 250: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

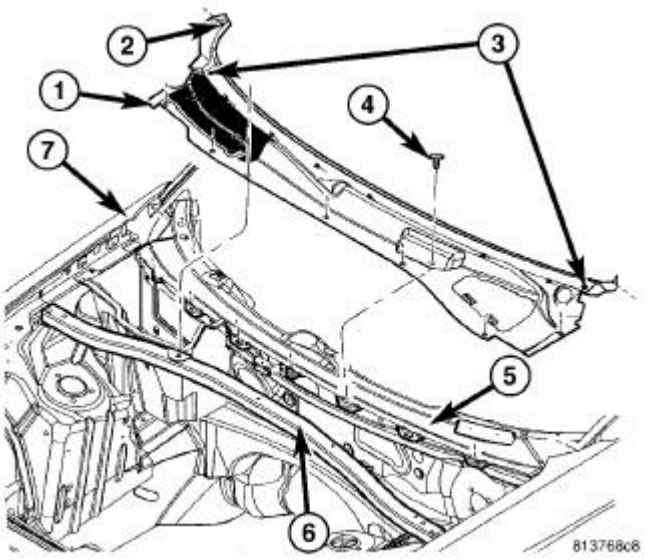


Fig. 251: Mass Air Flow (MAF) Sensor, Connector, Clamp, Air Cleaner Body & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Loosen screw clamp (2) and detach the air hose from the Mass Air Flow (MAF) sensor (3).
4. Disconnect the MAF wiring harness connector (1).

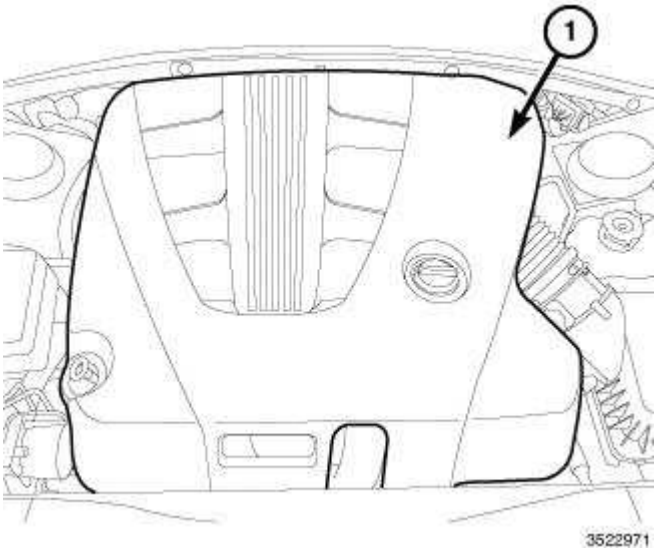


Fig. 252: Mass Air Flow Sensor, Air Cleaner Housing Cover & Screws
Courtesy of CHRYSLER GROUP, LLC

5. Remove the screws (2) and the MAF sensor (3) from the air cleaner housing cover (1).

INSTALLATION

INSTALLATION

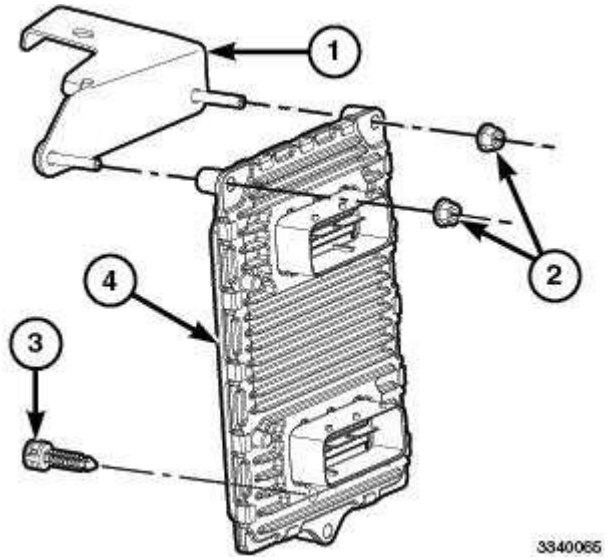


Fig. 253: Mass Air Flow Sensor, Air Cleaner Housing Cover & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the Mass Air Flow (MAF) sensor (3) to air cleaner housing (1) and install the retaining screws (2).

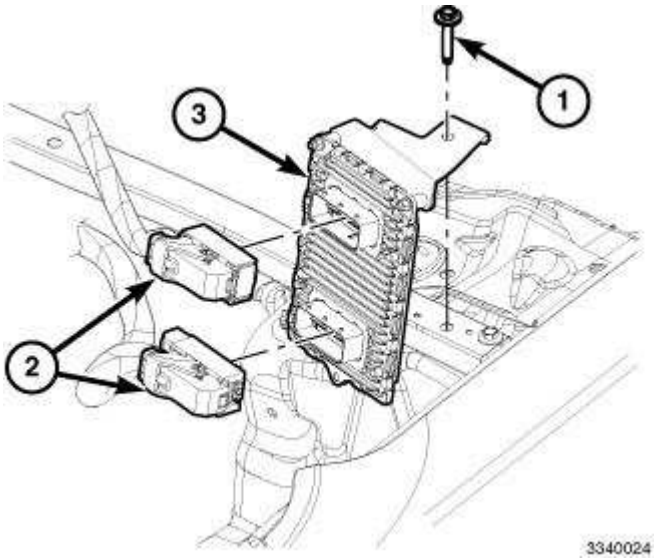


Fig. 254: Mass Air Flow (MAF) Sensor, Connector, Clamp, Air Cleaner Body & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Connect the air intake hose to the MAF sensor (3) and securely tighten clamp (2).
3. Connect the MAF wiring harness connector (1).

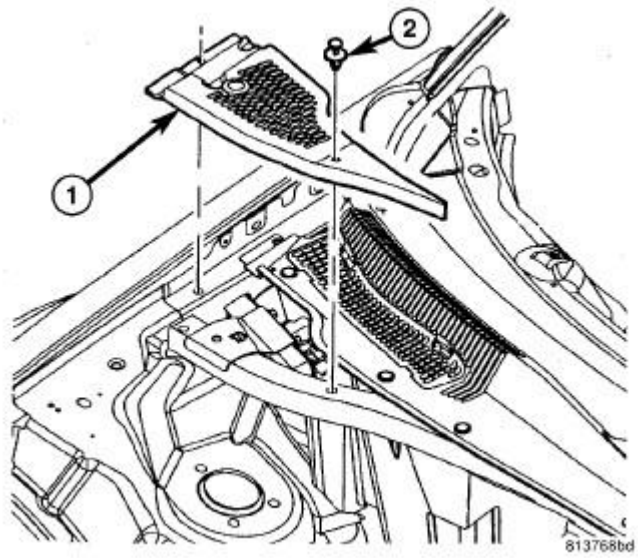


Fig. 255: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

4. Install the engine cover (1).
5. Connect the negative battery cable.

SENSOR, OXYGEN

REMOVAL

REMOVAL

LEFT HAND DRIVE

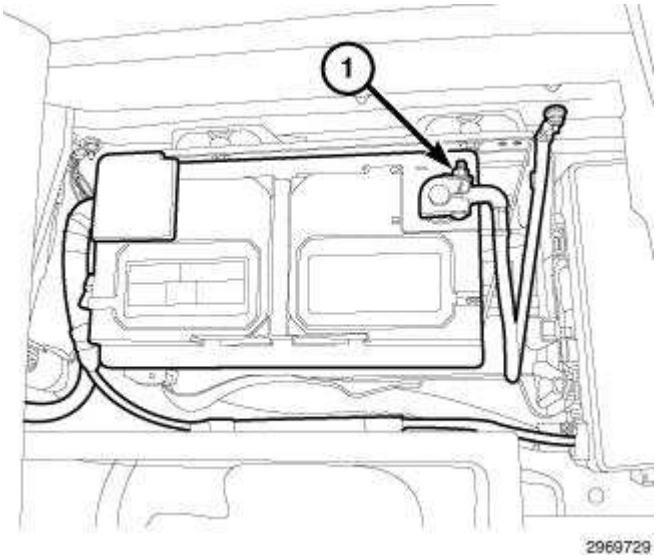


Fig. 256: Engine Cover

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

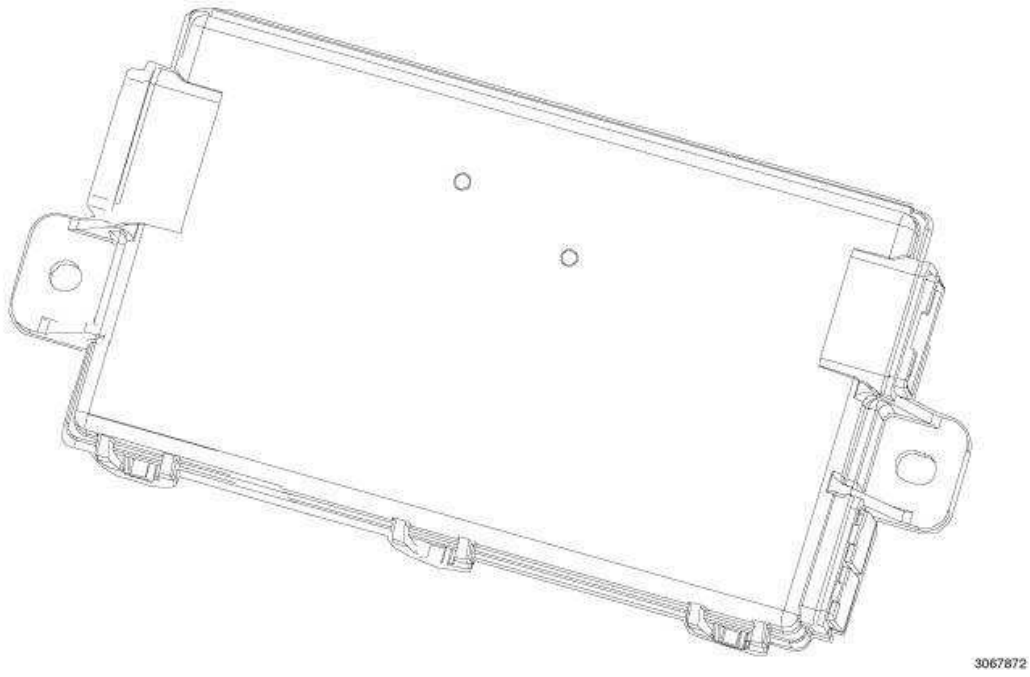


Fig. 257: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (1) and wire harness retainer at transmission fill tube.

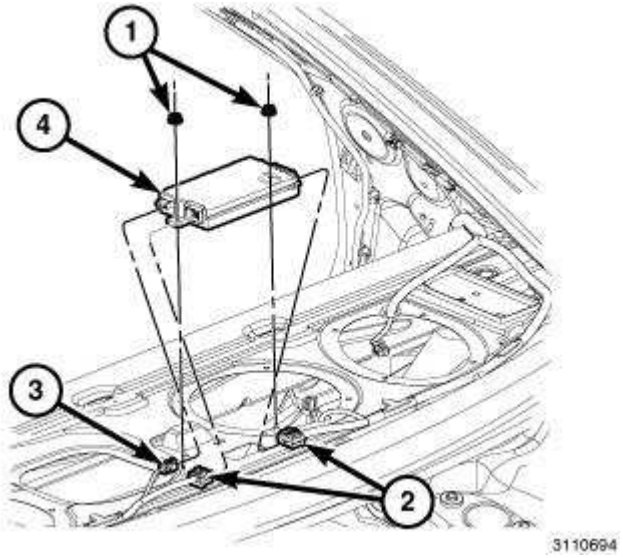


Fig. 258: Oxygen Sensor

Courtesy of CHRYSLER GROUP, LLC

4. Remove the oxygen sensor (1).

RIGHT HAND DRIVE

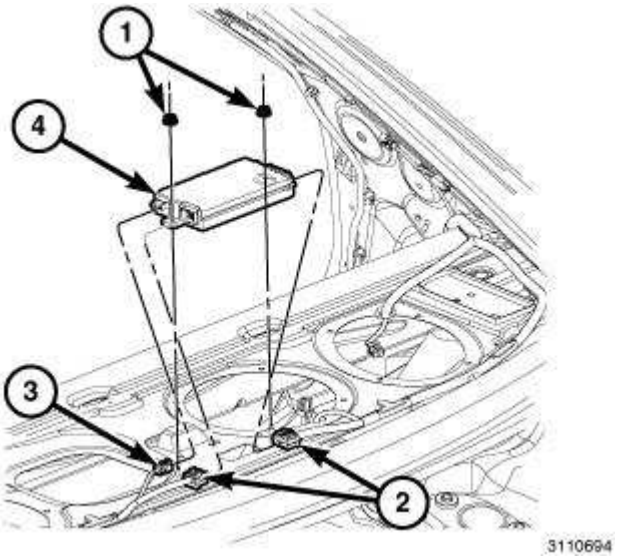


Fig. 259: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

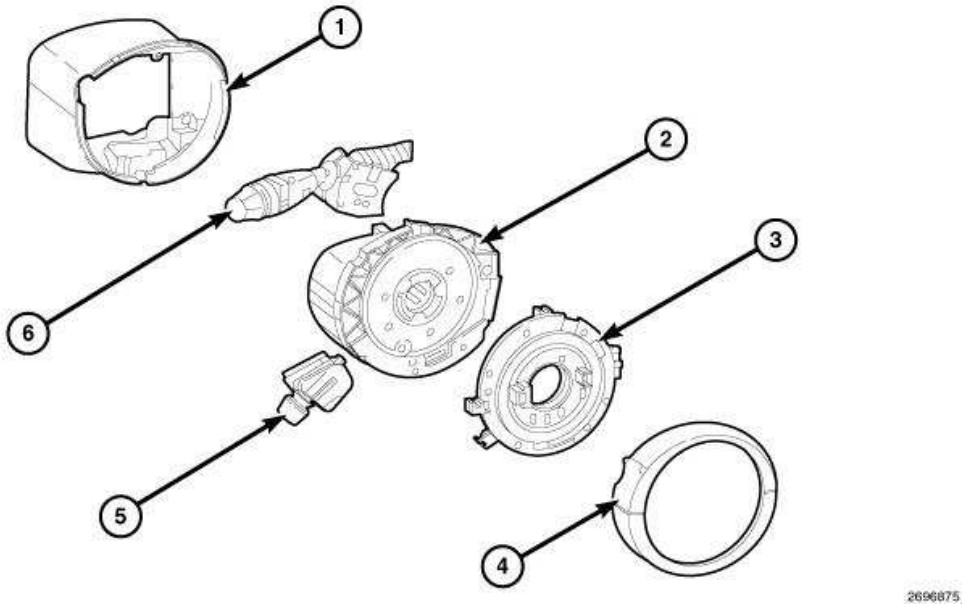


Fig. 260: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (1) and wire harness retainer at transmission fill tube.

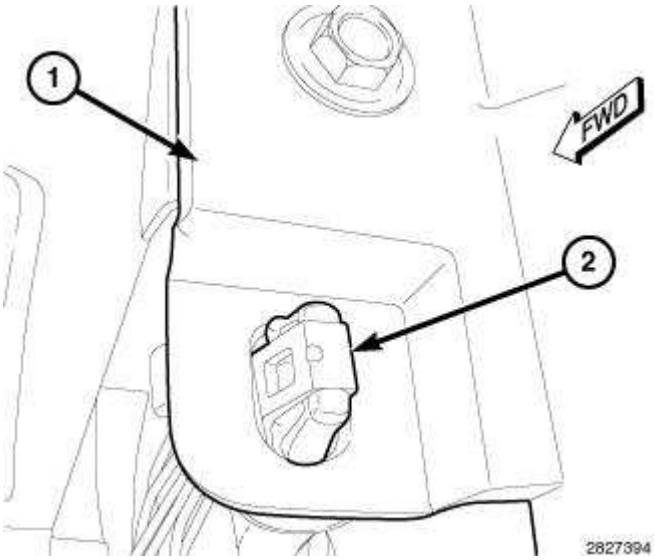


Fig. 261: Oxygen Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oxygen sensor (1).

INSTALLATION

INSTALLATION

LEFT HAND DRIVE

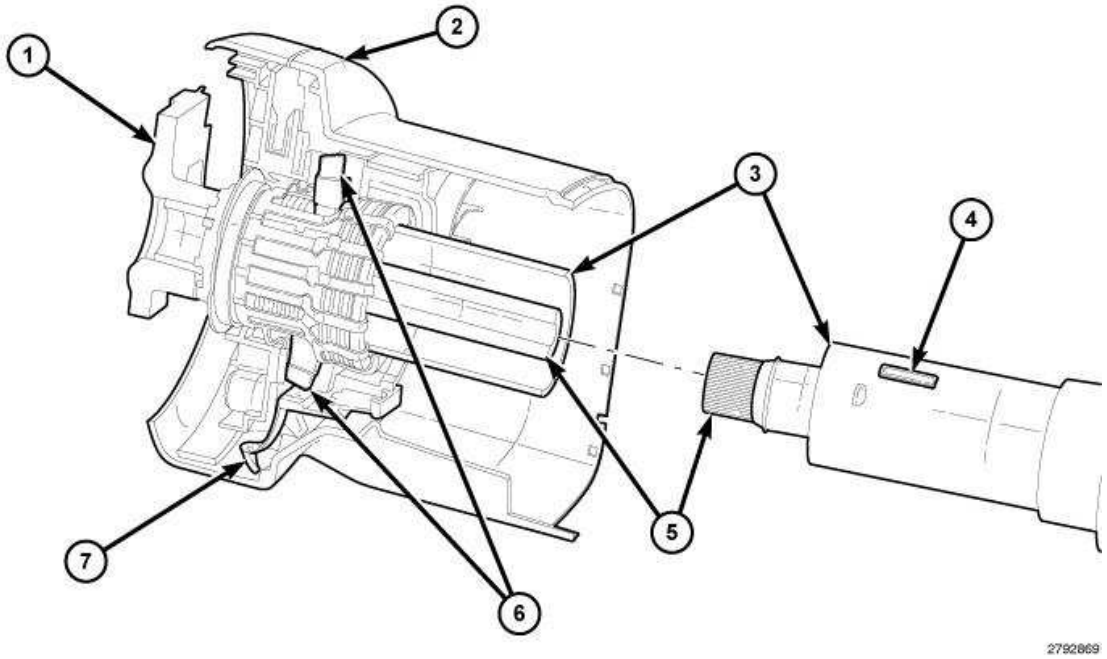


Fig. 262: Oxygen Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (1) and tighten to 50 N.m (37 ft. lbs.).

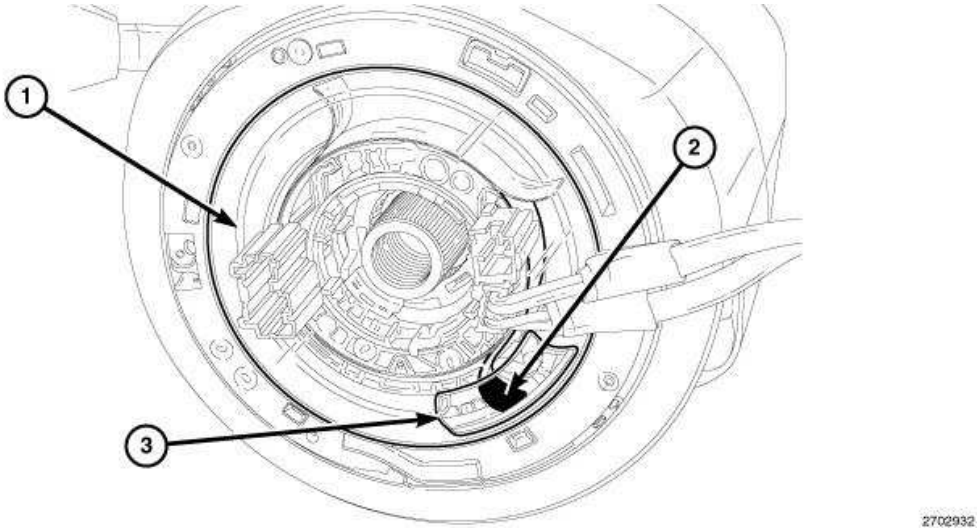


Fig. 263: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oxygen sensor harness connector (1).

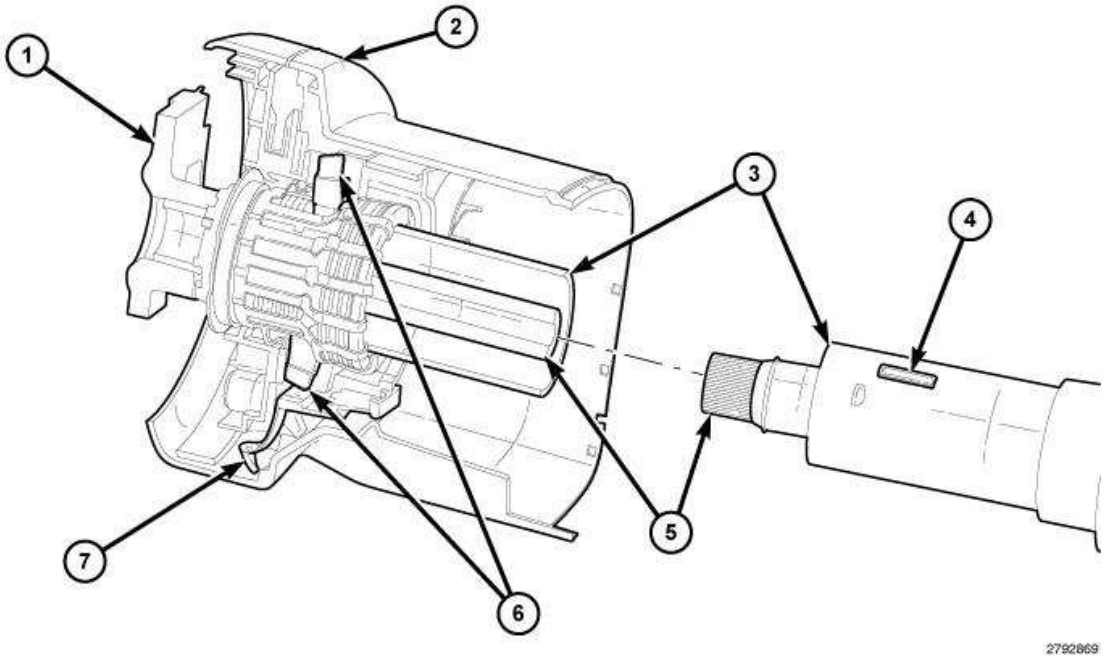


Fig. 264: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine cover (1).
4. Connect the negative battery cable.

RIGHT HAND DRIVE

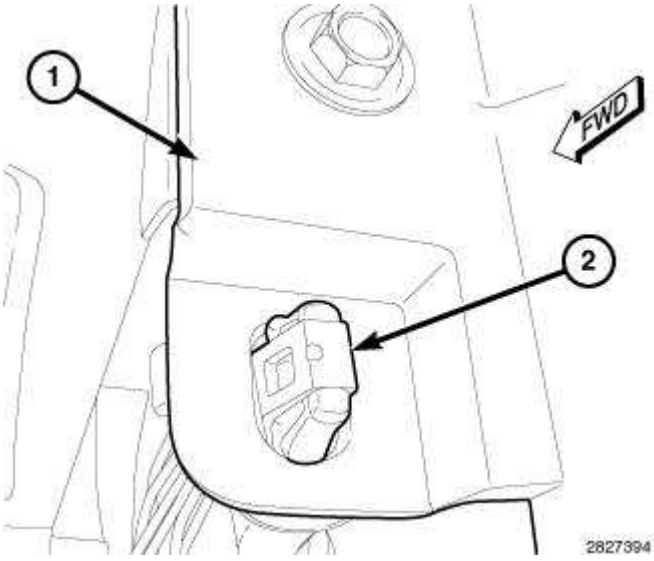


Fig. 265: Oxygen Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (1) and tighten to 50 N.m (37 ft. lbs.).

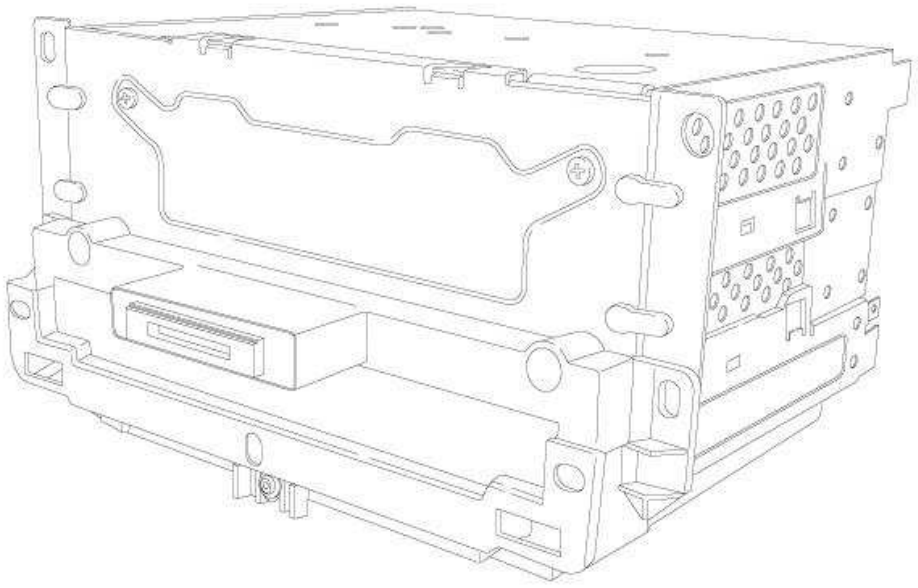


Fig. 266: Oxygen Sensor Connector & Ball Stud Fastener
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oxygen sensor harness connector (1).

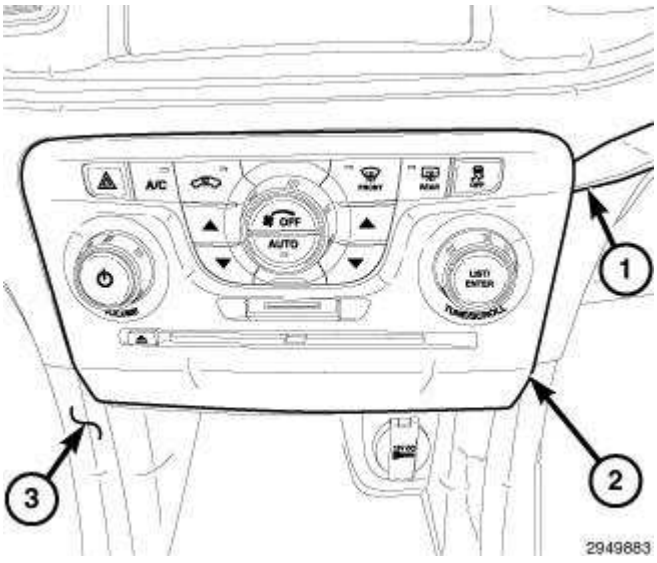


Fig. 267: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine cover (1).
4. Connect the negative battery cable.

FUEL DELIVERY, GAS

STANDARD PROCEDURE

FUEL SYSTEM PRESSURE RELEASE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

1. Remove the fuel pump relay from the Power Distribution Center (PDC). Refer to **FUSE LOCATIONS AND TYPES, SPECIFICATIONS** . A relay location label can also be found on the underside of the PDC cover.
2. Start and run the engine until it stalls.
3. Attempt restarting engine until it will no longer run.
4. Turn ignition key to the OFF position.
5. Return fuel pump relay to the Power Distribution Center (PDC).

NOTE: After servicing the fuel system, one or more Diagnostic Trouble Codes (DTC's) may have been stored in the Powertrain Control Module (PCM) memory due to disconnecting the fuel pump module circuit. A diagnostic scan tool must be used to erase a DTC.

DRAINING FUEL TANK

CONVENTIONAL PROCEDURE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: If the electric fuel pump is not operating, and the fuel level is above 5/8 of a tank, the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel

will spill into the interior of the vehicle.

CAUTION: If the fuel level sending unit is not operating, and the fuel level cannot be determined the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

NOTE: Due to a one-way check valve installed into the fuel fill fitting at the tank, the tank cannot be drained at the fuel filler tube.

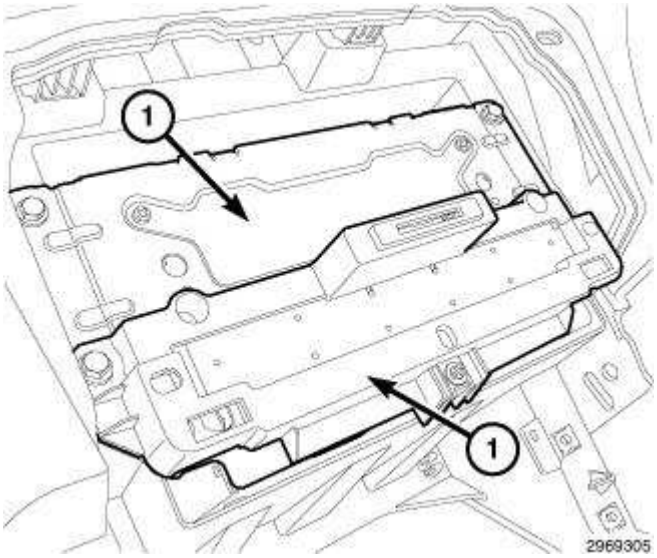


Fig. 268: Fuel Supply Line
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the fuel supply line (2) from the fuel rail. Refer to **STANDARD PROCEDURE** .

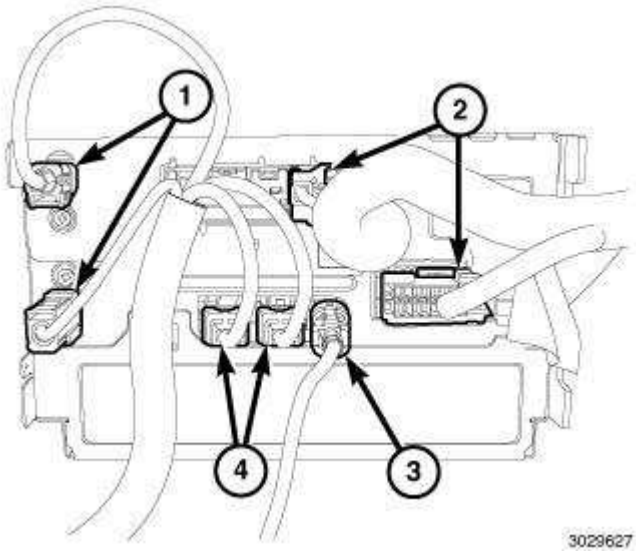


Fig. 269: Fuel Line Adapters
Courtesy of CHRYSLER GROUP, LLC

NOTE: Tool number 8978-2 is used on 5/16" fuel lines while tool number 8531-1 is used on 3/8" fuel lines.

3. Install the appropriate fuel line adapter fitting from the (special tool #8978A, Decay Tool, Fuel) to the fuel supply line. Route the opposite end of this hose to an OSHA approved fuel storage tank such as the JohnDow Gas Caddy 320-FC-P30-A or equivalent.

NOTE: Due to a built in time out feature of the diagnostic scan tool, the fuel pump may need to be reactivated several times before the fuel tank evacuation is complete.

4. Using a diagnostic scan tool, activate the fuel pump until the fuel tank has been evacuated.

ALTERNATIVE PROCEDURE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: The fuel level of the vehicle must be below 5/8 of a tank before using the "Alternative Procedure". If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

CAUTION: If the electric fuel pump is not operating, and the fuel level is above 5/8 of a tank, the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

CAUTION: If the fuel level sending unit is not operating, and the fuel level cannot be determined the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

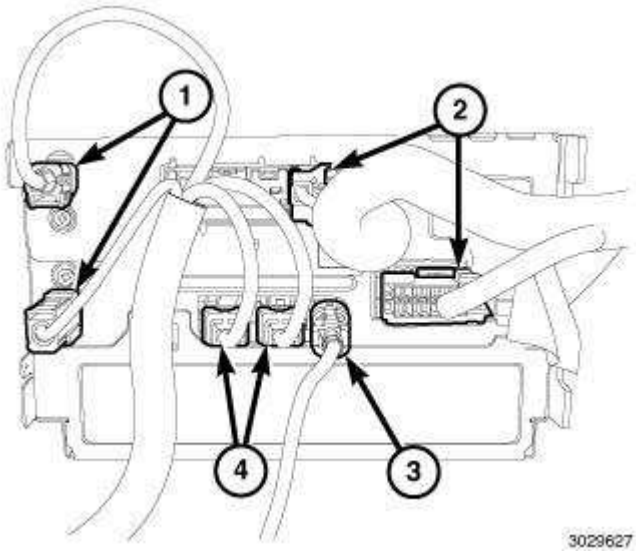


Fig. 270: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Verify the fuel level is below 5/8 of a tank.
2. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
3. Disconnect the negative battery cable (1).

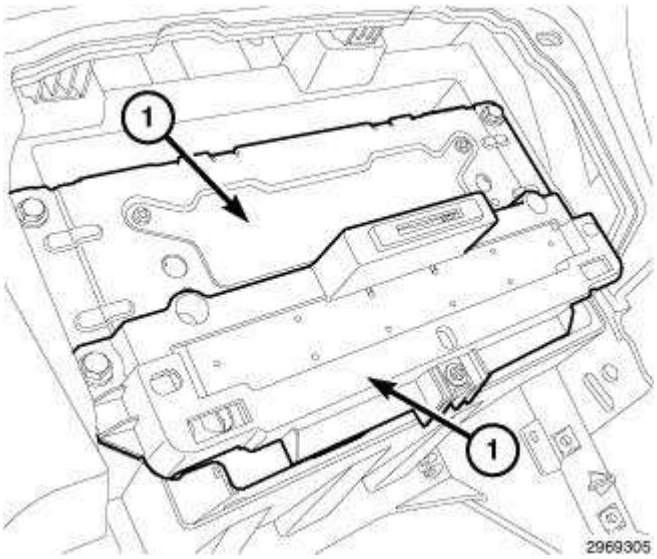


Fig. 271: Pulling Rear Seat Up
Courtesy of CHRYSLER GROUP, LLC

4. Push the rear lower seat cushion up and back and remove the seat cushion.

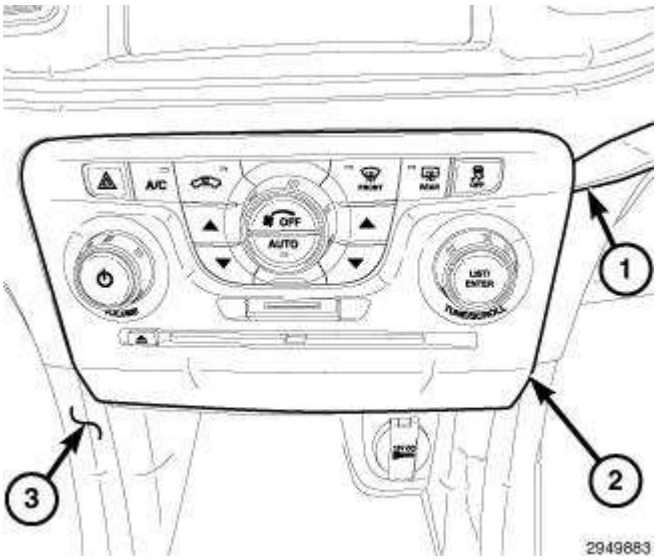


Fig. 272: Foam Pad Under Seat
Courtesy of CHRYSLER GROUP, LLC

5. Fold back the foam pad covering the fuel pump module plastic access covers.

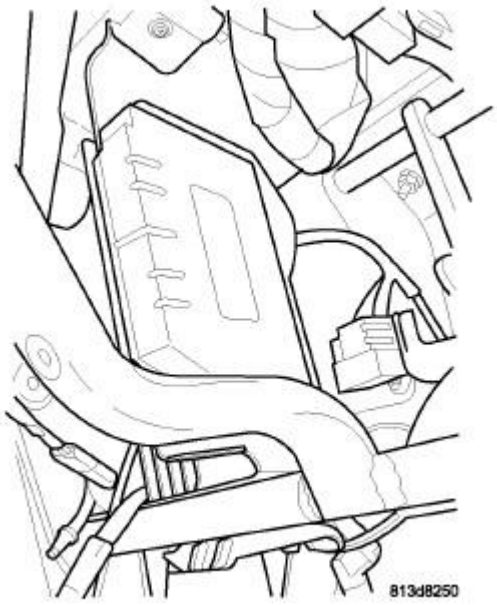


Fig. 273: Locating Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

6. Remove the left side fuel pump module plastic access cover.

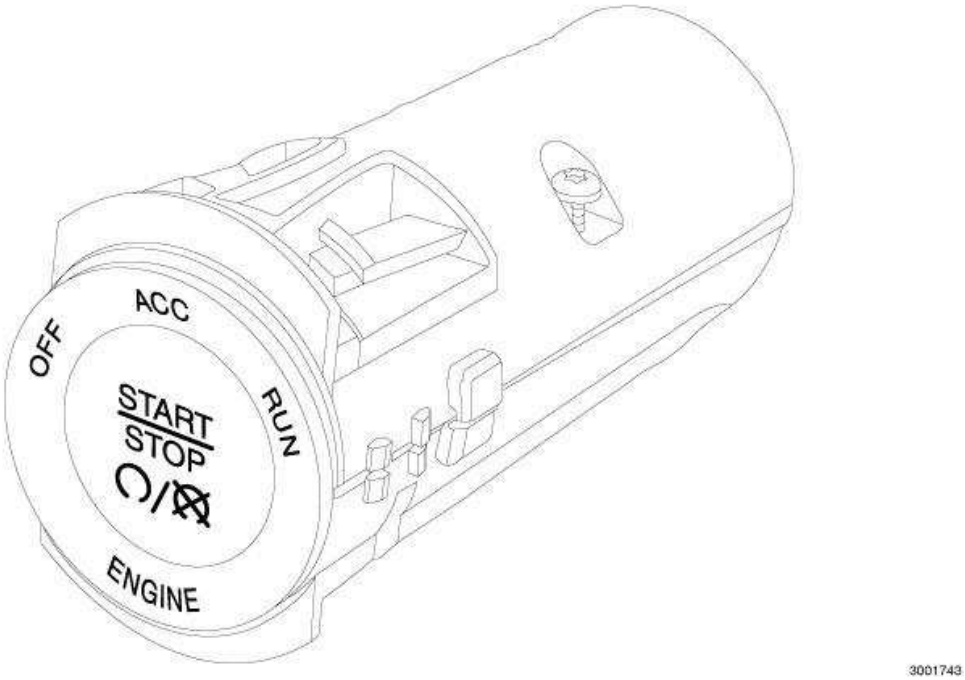


Fig. 274: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the electrical connector from the fuel pump module.

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank, note it's location for reassembly.

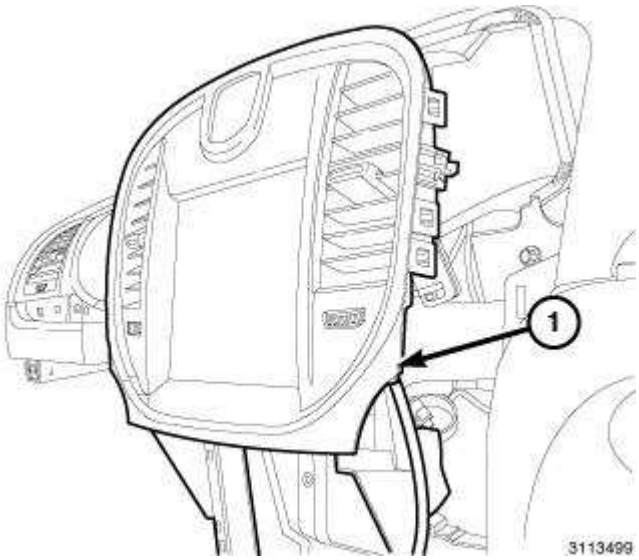


Fig. 275: Left Side Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.

8. Mark the fuel pump module orientation.
9. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring.
10. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (1).
11. Rotate the breaker bar counterclockwise and remove the lock ring.

CAUTION: Do not spill fuel into the interior of the vehicle.

CAUTION: The lower reservoir of the fuel pump module must be drained before removal or fuel can spill into the interior of the vehicle.

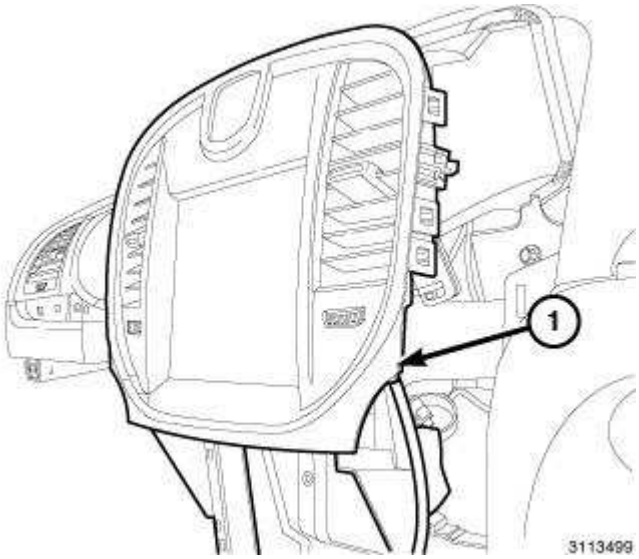


Fig. 276: Draining Left Side
Courtesy of CHRYSLER GROUP, LLC

12. Lift the fuel pump module up enough to push a 3/8 inch hose into the fuel tank.
13. Attach the opposite end of this hose to an OSHA approved fuel storage tank such as the JohnDow Gas Caddy 320-FC-P30-A or equivalent.
14. Using the gas caddy, evacuate the left side of the fuel tank.

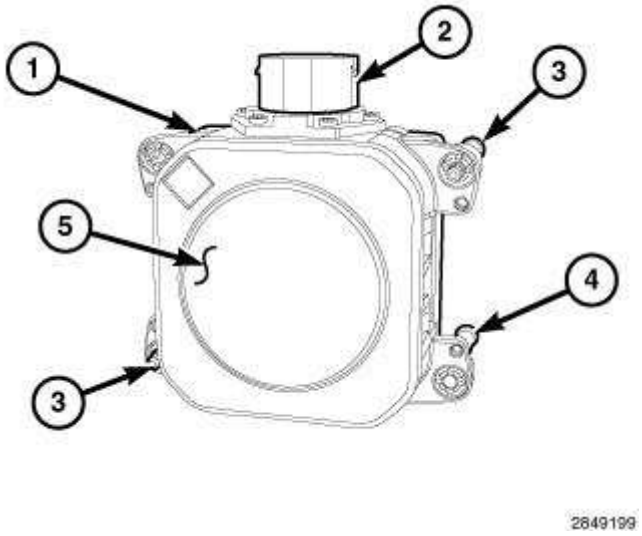


Fig. 277: Access Cover Right Side Module
Courtesy of CHRYSLER GROUP, LLC

15. Remove the right side auxiliary fuel pump module plastic access cover (1).

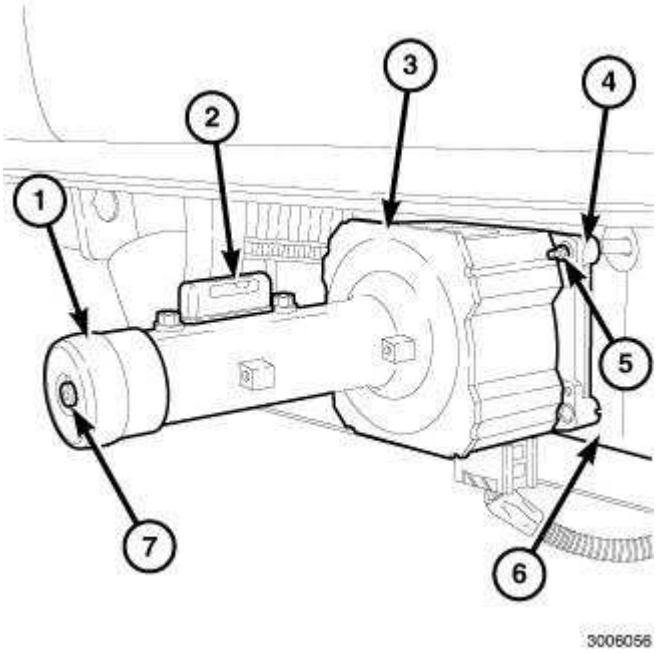


Fig. 278: Right Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the fuel supply line (2) at the auxiliary fuel pump module (1).

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank, note it's location for reassembly.

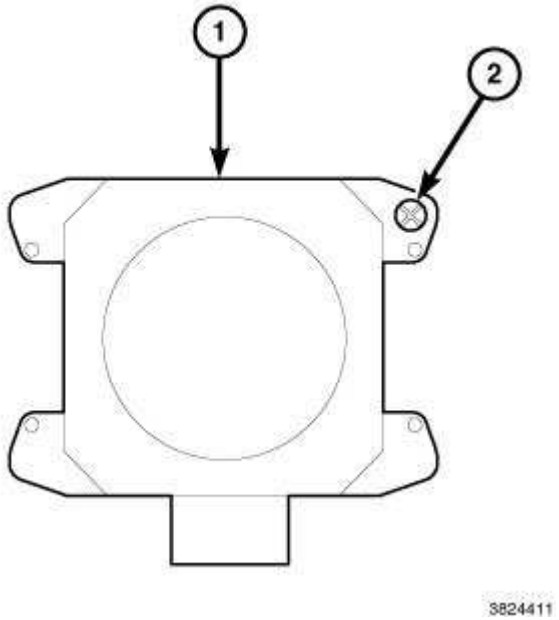


Fig. 279: Right Side Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to removing the auxiliary fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.

17. Mark the auxiliary fuel pump module orientation.
18. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
19. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).
20. Rotate the breaker bar counterclockwise and remove the lock ring.

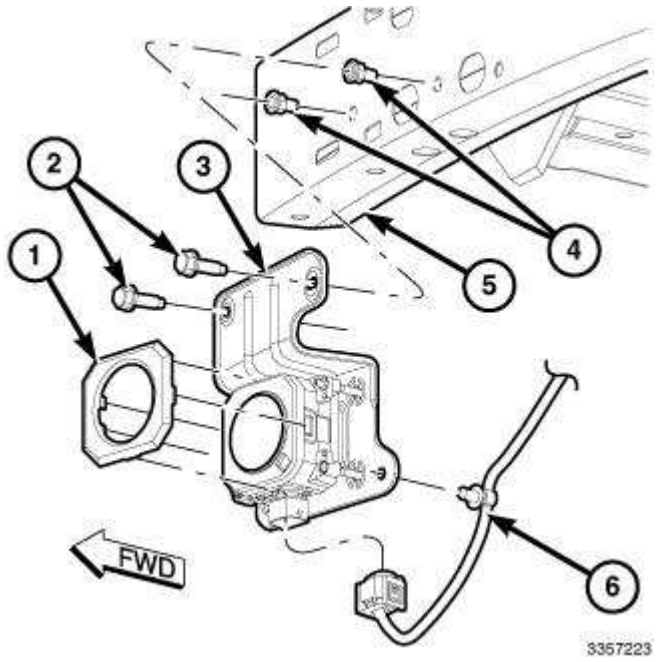


Fig. 280: Draining Right Side
Courtesy of CHRYSLER GROUP, LLC

21. Lift the auxiliary fuel pump module up enough to push a 3/8 inch hose (1) into the fuel tank.
22. Attach the opposite end of this hose to an OSHA approved fuel storage tank such as the JohnDow Gas Caddy 320-FC-P30-A or equivalent.
23. Using the gas caddy, evacuate the right side of the fuel tank.

SPECIFICATIONS

FUEL SYSTEM PRESSURE

DESCRIPTION	SPECIFICATION	
Fuel Pressure	400 kpa ±34 kpa	58 psi ± 5 psi

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Accelerator Pedal to Dash - Nuts	12	9	-
Fuel Tank Filler Tube - Nut	12	9	-
Fuel Rail - Bolts (3.6L)	9	-	80
Fuel Rail - Bolts (5.7L)	11	8	-
Fuel Tank Strap - Bolts	27	20	-
Hose Clamps	4	-	35
Vapor Canister - Nut	9	-	80

SPECIAL TOOLS

SPECIAL TOOLS

	8978A - Decay Tool, Fuel 9340 - SAE Fuel Pump Lock Ring Wrench (Originally Shipped In Kit Number(s) 9327, 9327CC, 9397, 9575.)

FITTING, QUICK CONNECT

STANDARD PROCEDURE

QUICK-CONNECT FITTINGS

Different types of quick-connect fittings are used to attach the various fuel system components, lines and tubes. Some quick-connect fittings require the use of a special tool for disconnection and removal.

These are the quick-connect fittings:

- Redundant Latch Single Button Type Fitting
- Single Button Type Fitting
- Pinch Type Fitting
- Single Tab Type Fitting
- Two Tab Type Fitting
- Plastic Retainer Ring Type Fitting
- Latch Clip Type 1 Fitting
- Latch Clip Type 2 Fitting
- Wing Type Fitting

DISCONNECTING

WARNING: The fuel system is under a constant pressure (even with engine off). Before servicing any fuel system hose, fitting or line, fuel system

pressure must be released. Refer to FUEL SYSTEM PRESSURE RELEASE .

CAUTION: Before separating a Quick-Connect fitting, pay attention to what type of fitting is being used. Refer to QUICK-CONNECT FITTINGS . This will prevent unnecessary fitting or fitting latch breakage.

CAUTION: The interior components (O-rings, clips) of quick-connect fittings are not serviced separately, but new plastic spacers and latches are available for some types. If service parts are not available, do not attempt to repair the damaged fitting or fuel line (tube). If repair is necessary, replace the complete fuel line (tube) assembly.

REDUNDANT LATCH SINGLE BUTTON TYPE FITTING:

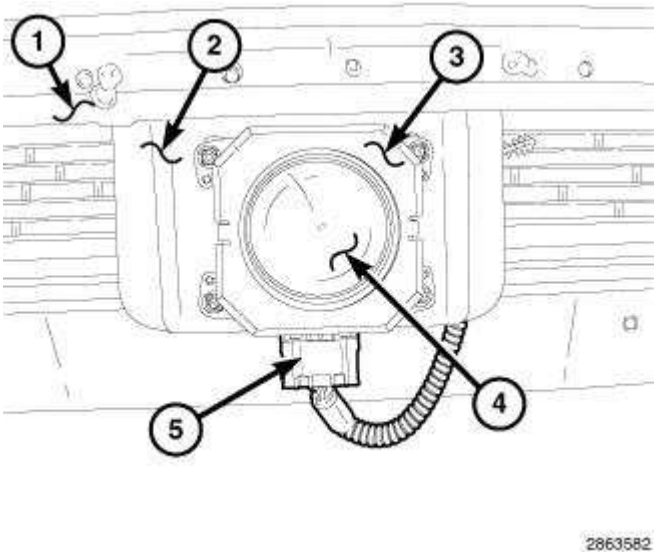


Fig. 281: Redundant Latch & Push Button
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting is equipped with a redundant latch (2) and a single push button (1) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

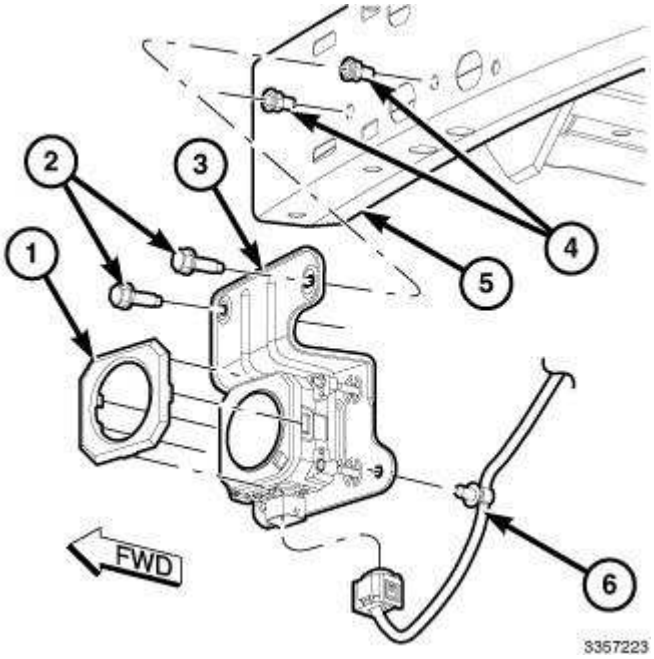


Fig. 282: Redundant Latch & Internal Latches
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry or pull up on the push button as damage to the latches of the quick-connect fitting will occur.

1. Pull the redundant latch (2) out away from the quick-connect fitting.
2. Press on the push button with your thumb, release the internal latches (1) and remove the quick-connect fitting from the fuel system component.

SINGLE BUTTON TYPE FITTING:

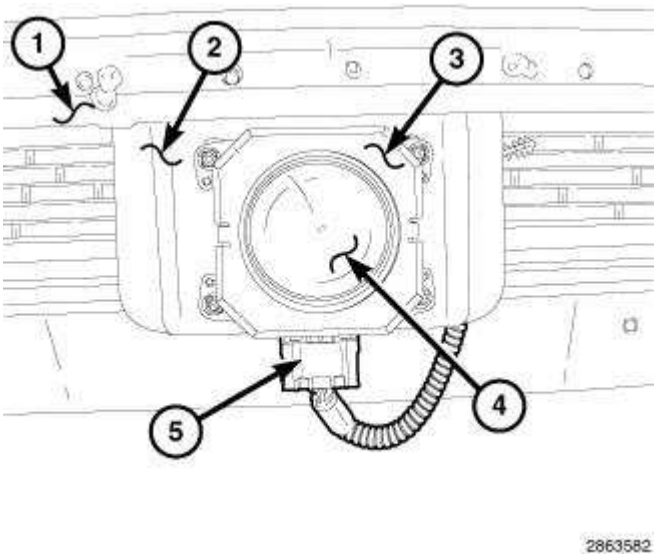


Fig. 283: Single Button Fitting

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry or pull up on the push button as damage to the latches of the quick-connect fitting will occur.

This type of quick-connect fitting is equipped with a single push button (2) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

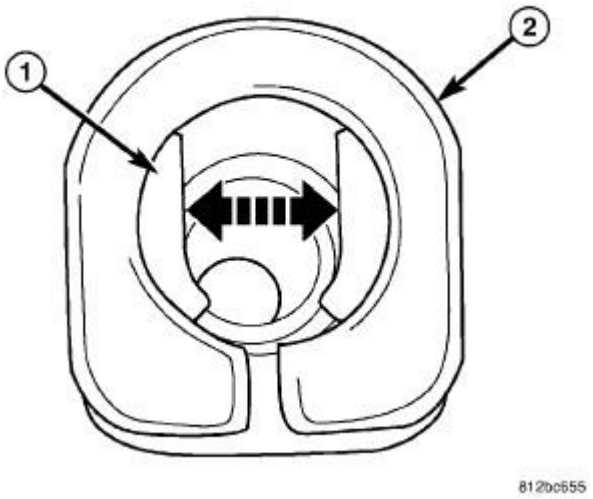


Fig. 284: Ouick-Connect Fitting Latches
Courtesy of CHRYSLER GROUP, LLC

1. Press on the push button with your thumb, release the internal latches (1).
2. Remove the quick-connect fitting from the fuel system component.

2 BUTTON TYPE FITTING

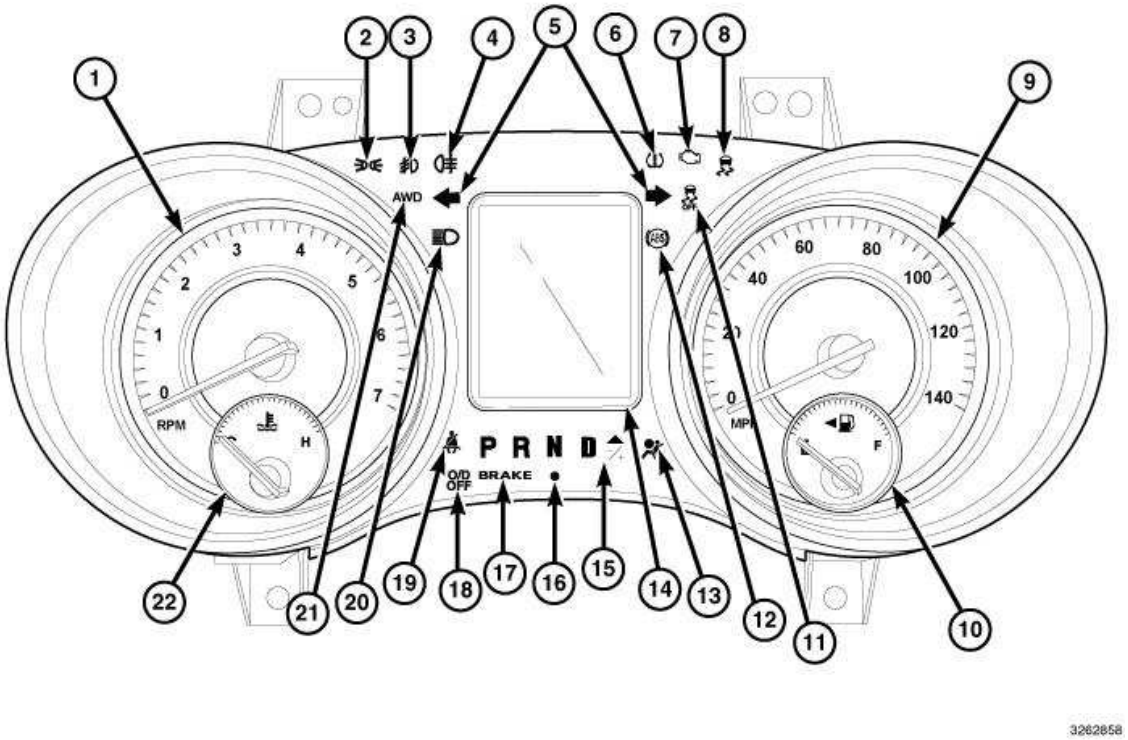


Fig. 285: View Of 2-Button Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (1) is equipped with two push buttons (2) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

1. Press on both push buttons with your thumb, release the internal latches.
2. While holding the two push buttons simultaneously, remove the quick-connect fitting from the fuel system component.

PINCH TYPE FITTING

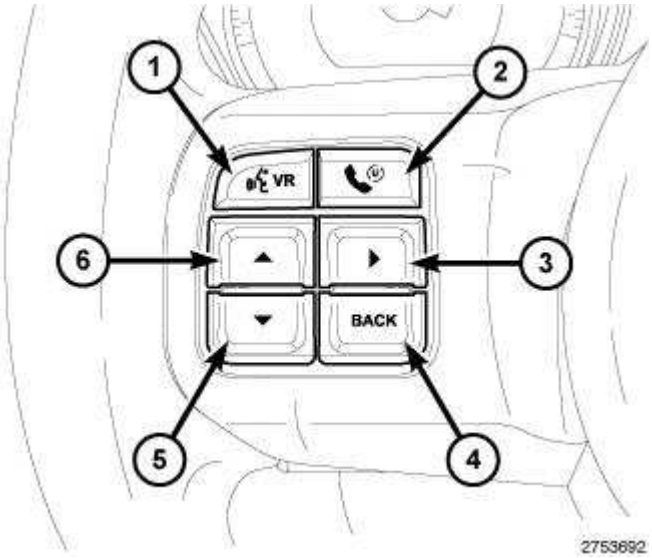


Fig. 286: View Of Pinch Type Quick-Connect Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (1) is equipped with two finger tabs (2). Special tools are not required for removal.

1. Pinch both tabs (2) together and release the quick-connect fitting.
2. Remove the quick-connect fitting from the fuel system component.

SINGLE TAB TYPE FITTING

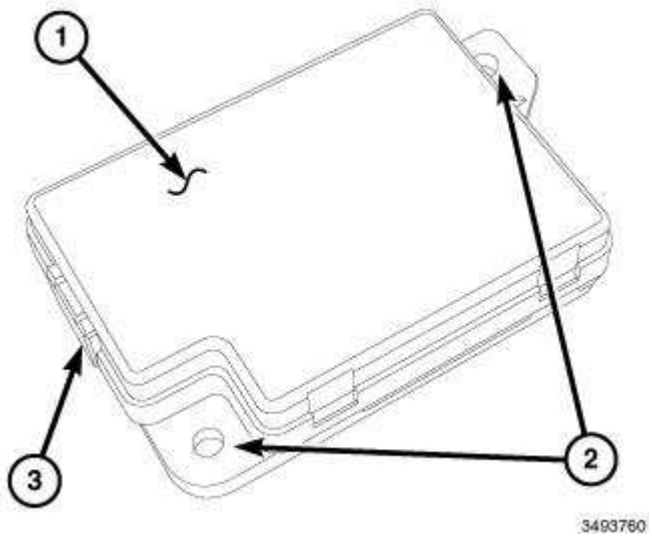


Fig. 287: View Of Single-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (3) is equipped with a single pull tab (1). The tab is removable. After tab is removed the quick-connect fitting can be separated from the fuel system component. Special

tools are not required for removal.

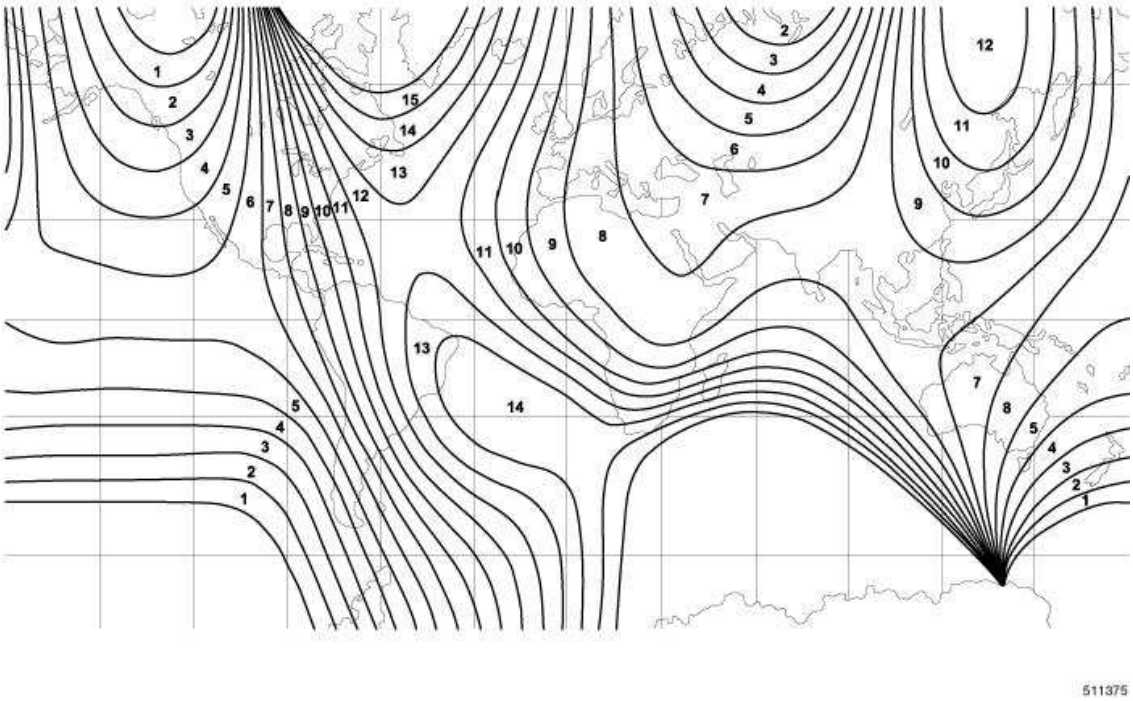


Fig. 288: Disconnecting Single-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

1. Press release tab on side of fitting to release pull tab (1). **If release tab is not pressed prior to releasing pull tab, pull tab will be damaged.**
2. While pressing the release tab on the side of the quick-connect fitting use a screwdriver (2) to pry up the pull tab.
3. Raise the pull tab until it separates from the quick-connect fitting.
4. Remove the quick-connect fitting from the fuel system component.

TWO TAB TYPE FITTING

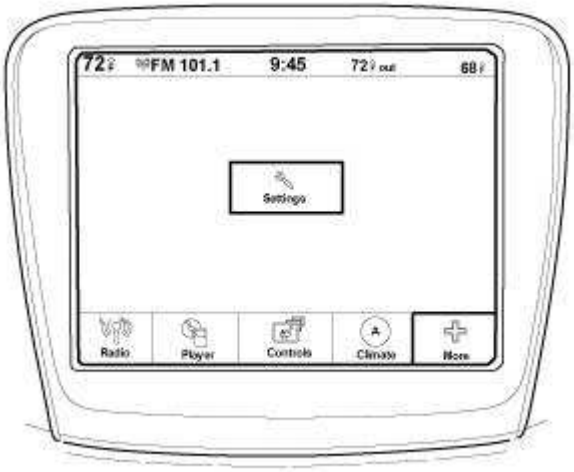


Fig. 289: Identifying Typical 2-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (2) is equipped with tabs located on both sides of the fitting (1). These tabs are integral to the fuel system component. The plastic tabs will remain on the component being serviced after the quick-connect fitting is removed. The O-ring and spacer will remain in the quick-connect fitting. Special tools are not required for removal.

1. Squeeze the plastic tabs (1) against the sides of component being serviced with your fingers.
2. Remove the quick-connect fitting from the fuel system component.

PLASTIC RETAINER RING TYPE FITTING

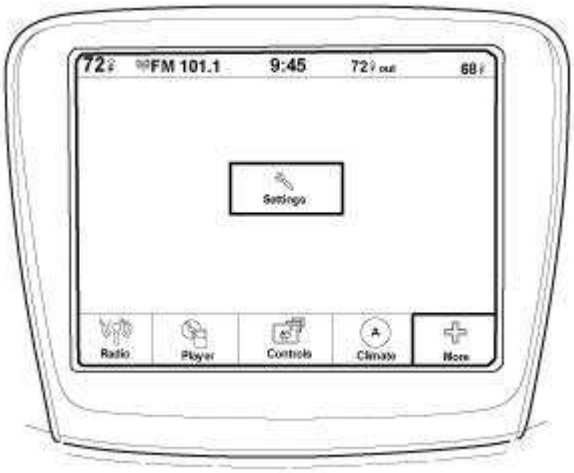


Fig. 290: Plastic Retainer Ring Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of fitting can be identified by the use of a round plastic retainer ring (4) usually black in color. Special tools are not required for removal.

NOTE: The round plastic retainer ring must be pressed squarely into the quick-connect fitting body. If this retainer is cocked during removal it will be difficult to disconnect the quick-connect fitting. Use an open-end wrench on the shoulder of the plastic retainer ring to aid in disconnection.

1. Firmly push the quick-connect fitting (5) towards the component being serviced while firmly pushing the round plastic retainer ring into the quick-connect fitting (6). With the round plastic ring depressed, remove the quick-connect fitting from the fuel system component.
2. After removal the plastic retainer ring will remain with the quick-connect fitting.

LATCH CLIP TYPE 1 FITTING

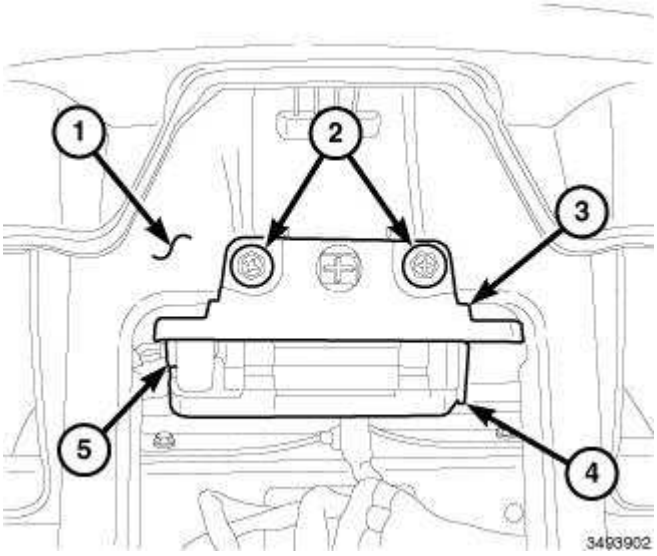


Fig. 291: Tethered, Latch Clip & Screwdriver
Courtesy of CHRYSLER GROUP, LLC

Depending on vehicle model and engine, 2 different types of safety latch clips are used. One is tethered (1) to fuel line and the other is not. A special tool will be necessary to disconnect the fuel line after latch clip is removed. The latch clip may be used on certain fuel line and fuel rail connections or to join fuel lines together.

1. Pry up on the latch clip (4) with a screwdriver (3).
2. Slide the latch clip away from the quick-connect fitting while lifting the screwdriver and position aside.

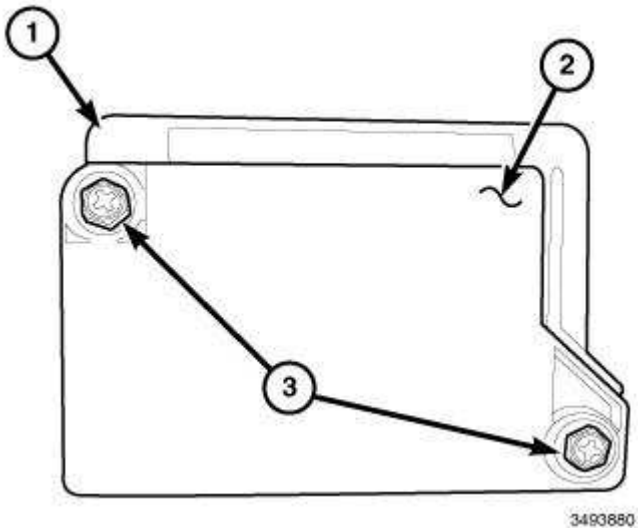


Fig. 292: Fuel Line Disconnection Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

3. Insert an appropriate fuel line removal tool (1) into the quick-connect fitting and release the internal latches.

NOTE: After removal the internal latches will remain in the quick-connect fitting.

4. With the special tool still inserted, remove the quick-connect fitting from the fuel system component.

LATCH CLIP TYPE 2 FITTING

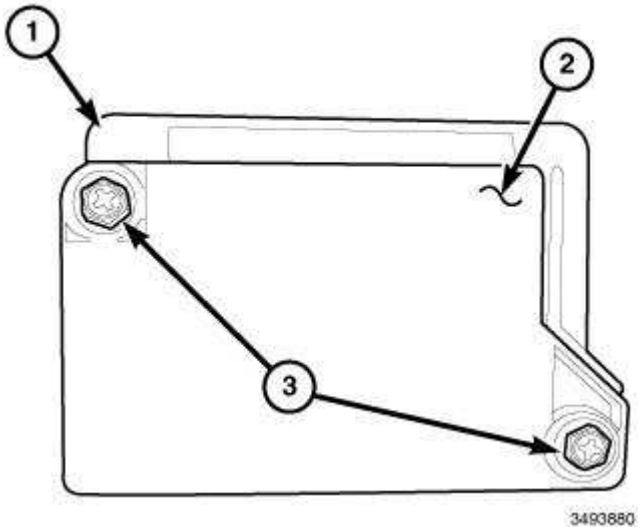


Fig. 293: Latch Clip
Courtesy of CHRYSLER GROUP, LLC

Depending on vehicle model and engine, 2 different types of safety latch clips are used. One is tethered to the fuel line and the other is not. A special tool will be necessary to disconnect the fuel line after the latch clip is removed. The latch clip may be used on certain fuel line and fuel rail connections or to join fuel lines together.

1. Unlatch the small arms on the end of clip, swing away and separate from the fuel system component.
2. Slide the latch clip away from the quick-connect fitting while lifting with a screwdriver and position aside.

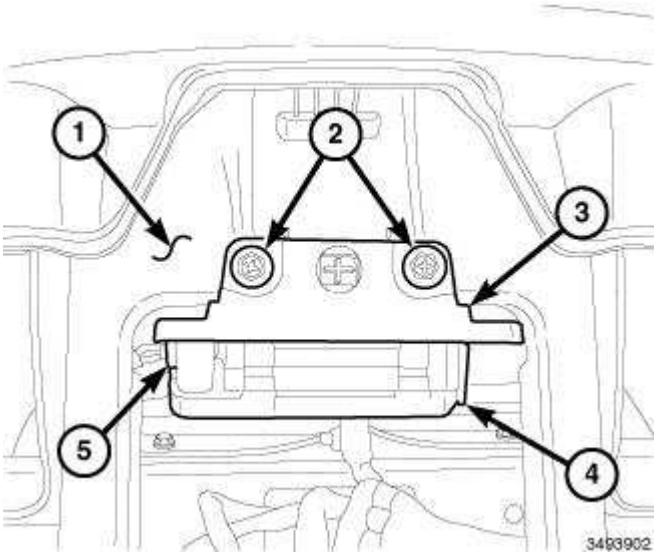


Fig. 294: Fuel Line Disconnection Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

3. Insert an appropriate fuel line removal tool (1) into the quick-connect fitting and release the internal latches.

NOTE: After removal the internal latches will remain in the quick-connect fitting.

4. With the special tool still inserted, remove the quick-connect fitting from the fuel system component.

WING TYPE FITTING

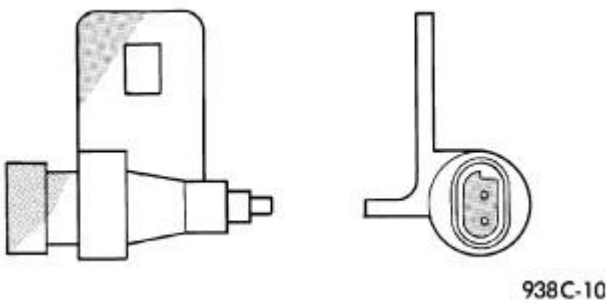


Fig. 295: EVAP Can. Vapor Hose
Courtesy of CHRYSLER GROUP, LLC

The wing type fitting is used on fuel system and emission components. The wing type fitting is most commonly used on the EVAP canister (3). Special tools are not required for removal.

1. Using two fingers, press both wings (2) and release the locking tabs.

   NOTE: After removal the locking tabs will remain with the quick-connect fitting.

2. While holding the wings, remove the quick-connect fitting from the fuel system component.

CONNECTING

1. Inspect the quick-connect fitting body and fuel system components for damage. Replace as necessary.
2. Prior to connecting any quick-connect fitting to components, check condition of fitting and components. Clean parts with a lint-free cloth. Lubricate with clean engine oil.
3. Insert the quick-connect fitting onto the fuel tube or fuel system component until the built-in stop on the fuel tube or component rests against the back of fitting.
4. Continue pushing until a click is felt.
5. If Equipped:
   - **Redundant Latch Single Button Type Fitting:** Push redundant latch until it locks into position in the quick-connect fitting.
   - **Single Tab Type Fitting:** Push new tab down until it locks into position in the quick-connect fitting.
   - **Latch Clip Type Fitting:** Install latch clip (snaps into position). **If latch clip will not snap into position, this indicates the quick-connect fitting is not properly installed onto fuel system component, recheck the connection.**
6. Verify a locked condition by firmly pulling on the quick-connect fitting connection of the fuel system component.

MODULE, FUEL PUMP

DESCRIPTION

DESCRIPTION

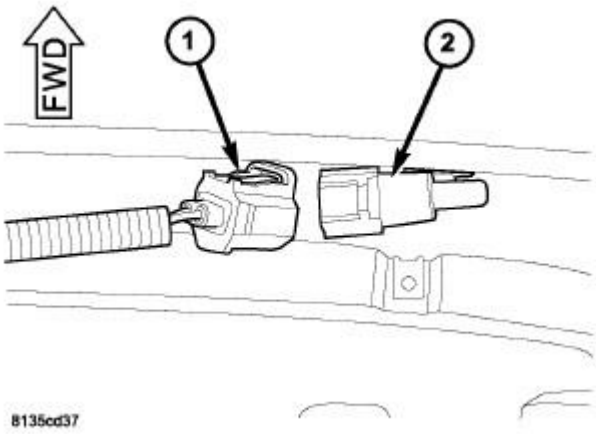


Fig. 296: Main Fuel Pump Module & Auxiliary Fuel Pump Module
Courtesy of CHRYSLER GROUP, LLC

This vehicle uses a saddle type tank that has a reservoir on both sides of the rear drive shaft. The main fuel pump module (2) is located on the left side of the vehicle and is a high flow fuel pump specifically designed for the 6.4L HEMI Engine. The auxiliary fuel pump module (1) is located the right side of the vehicle. The fuel outlet or fuel supply line is on the auxiliary fuel pump module (right side) and supplies fuel to the engine. The electrical connector is on the main fuel pump module (left side) and controls both modules. The fuel pressure regulator is integrated into the auxiliary fuel pump module and is not a serviceable component.

Both modules have fuel level sending cards. The fuel level sending cards are not serviceable components. There are 3 hoses that connect the main and auxiliary fuel pump modules together, one is the fuel supply line the other two are fuel return lines. These lines are removed from the main fuel pump module when servicing either unit. One fuel filter is used and is located at the bottom of the main fuel pump module and is designed for extended life. A separate frame mounted fuel filter is not used with any engine. The fuel filter is not a serviceable component.

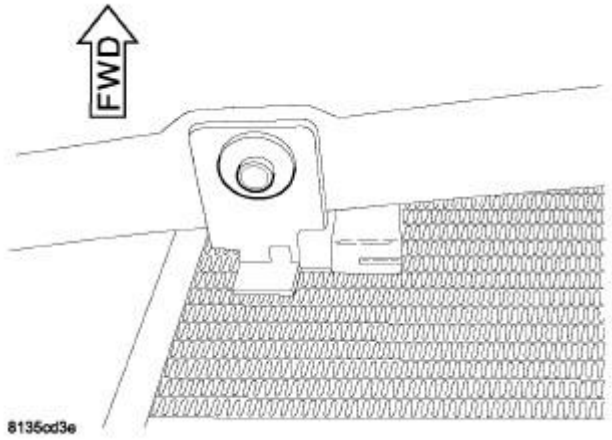


Fig. 297: Electrical Connector And Fuel Level Sending Card
Courtesy of CHRYSLER GROUP, LLC

Left side main fuel pump module with electrical connector (1) and fuel level sending card (2).

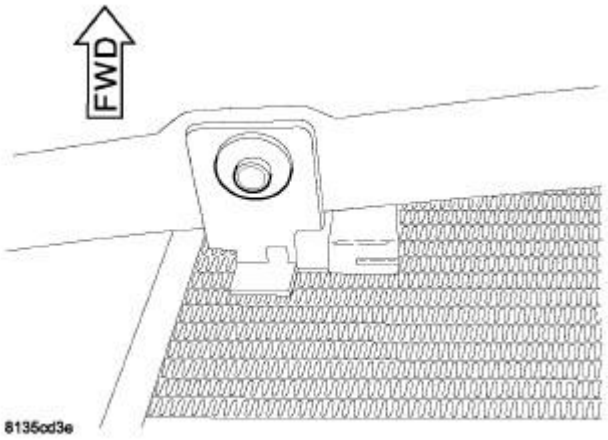


Fig. 298: Fuel Supply Fitting, Fuel Return Lines, Fuel Supply Line, Fuel Pressure Regulator And Fuel Level Sending Card
Courtesy of CHRYSLER GROUP, LLC

Right side auxiliary fuel pump module with the fuel supply fitting (1), fuel return lines (2), fuel supply line (3), fuel pressure regulator (4) and fuel level sending card (5).

OPERATION

OPERATION

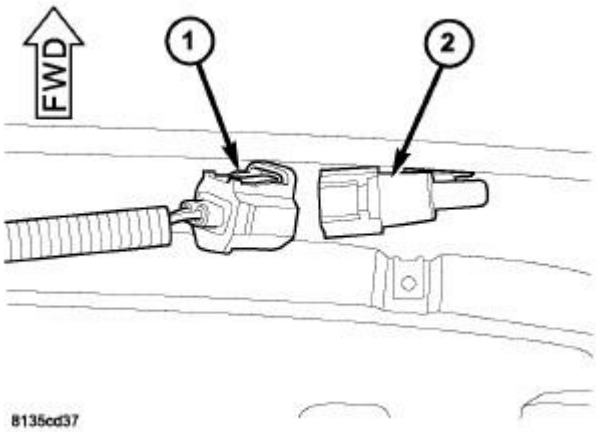


Fig. 299: Fuel System
Courtesy of CHRYSLER GROUP, LLC

The way the fuel pumps work is as follows, fuel enters the reservoir of the main fuel pump module

(driver side). The main fuel pump module (2) pumps the fuel through the filter to the auxiliary fuel pump module (1) (passenger side) through a supply line inside the fuel tank. The fuel pressure regulator inside the auxiliary fuel pump module regulates the pressure at 58 psi and sends fuel to the engine. All unused fuel that is not sent to the engine is fed through a venturi at the bottom of the auxiliary fuel pump module. This creates a low pressure siphoning effect and draws fuel from the passenger side of the tank and transfers it to the drivers side tank via siphon hose inside the tank. While the vehicle is running the fuel in the passenger side of tank is continuously transferred to the drivers side. Fuel will continue to fill the drivers side tank till it reaches the bridge section and then starts to spill over to the passenger side.

Both main and auxiliary fuel pumps have fuel level sender cards and the reading of these senders are averaged out to give us the fuel gauge reading. When diagnosing a fuel level sender concern, the passenger side reading should never be higher than the drivers side reading. However it is possible, depending on fuel level and driving habit before diagnosing, to spill fuel over to the passenger side that might indeed show a lower resistance value than the driver side.

The fuel gauge gives an indication to the vehicle operator the level of fuel in the fuel tank. This fuel gauge is controlled by the instrument cluster circuit board based upon cluster programming and a hard wired inputs received by the cluster from the fuel level sending units integrated into the fuel pump modules.

The instrument cluster continually monitors both fuel pump sender cards to determine the level of fuel in the fuel tank. The cluster then sends the proper fuel level messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. For further diagnosis of the fuel gauge or the instrument cluster circuitry that controls the gauge. Refer to **DIAGNOSIS AND TESTING** . The fuel gauge is serviced as a unit with the instrument cluster.

The technician needs to order the correct part when replacing the main fuel pump module, auxiliary fuel pump module and/or fuel tank as all are replaced individually.

REMOVAL

REMOVAL

MAIN FUEL PUMP MODULE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from

contact with fuel.

CAUTION: If the electric fuel pump module is not operating or the fuel level sending unit is not operating and the fuel level cannot be determined, the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle

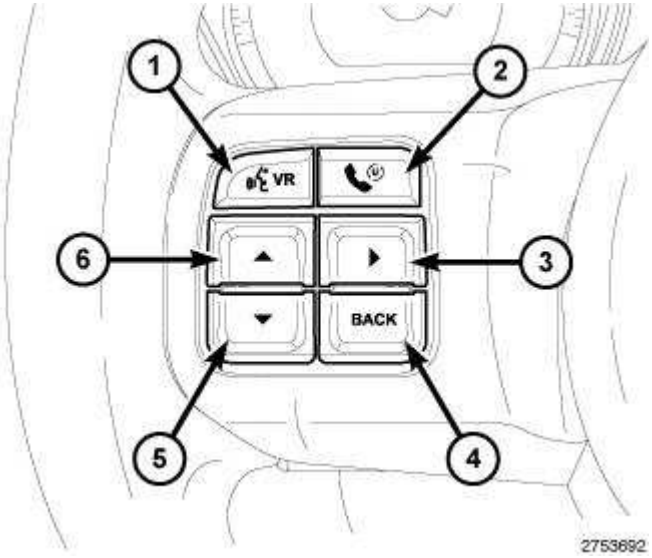


Fig. 300: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Verify the fuel level is below 5/8 of a tank.
2. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
3. If required, perform the draining fuel tank procedure. Refer to **DRAINING FUEL TANK** .
4. Disconnect the negative battery cable.

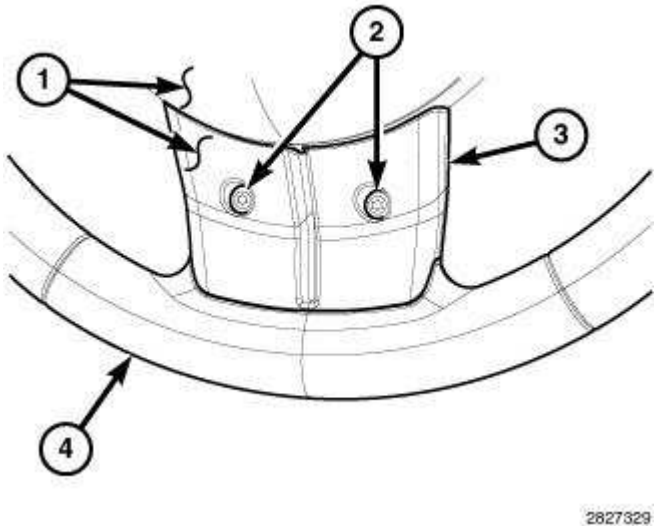


Fig. 301: Pulling Rear Seat Up
Courtesy of CHRYSLER GROUP, LLC

5. Push the rear lower seat cushion up and back and remove the seat cushion.

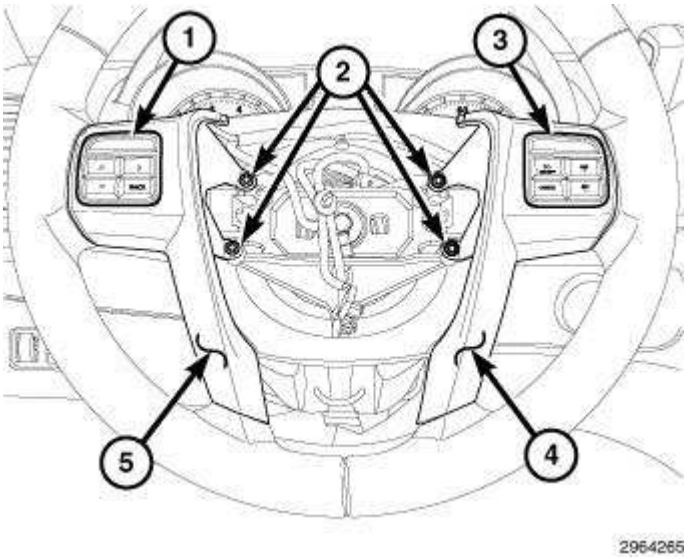


Fig. 302: Foam Pad Under Seat
Courtesy of CHRYSLER GROUP, LLC

6. Fold back the foam pad covering the fuel pump module plastic access covers.

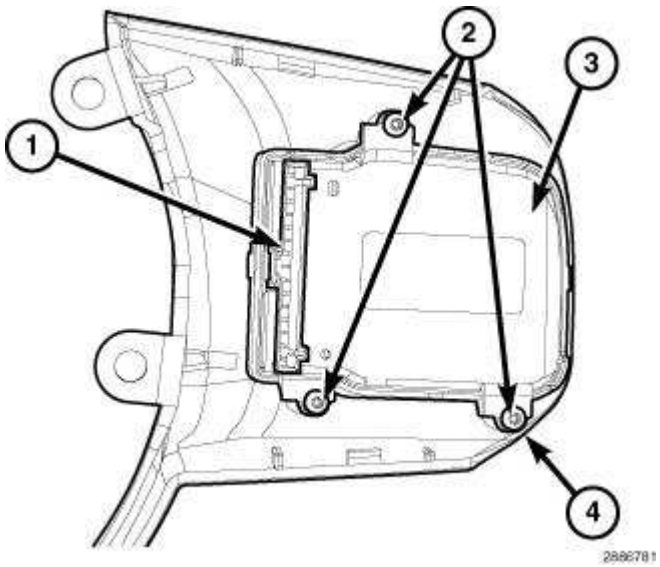


Fig. 303: Locating Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

7. Remove the left side main fuel pump module plastic access cover.

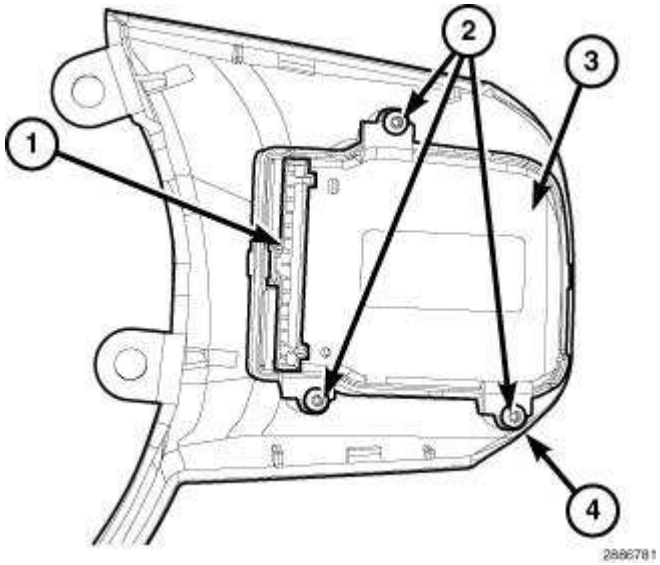


Fig. 304: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the electrical connector from the main fuel pump module.

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank, note it's location for reassembly.

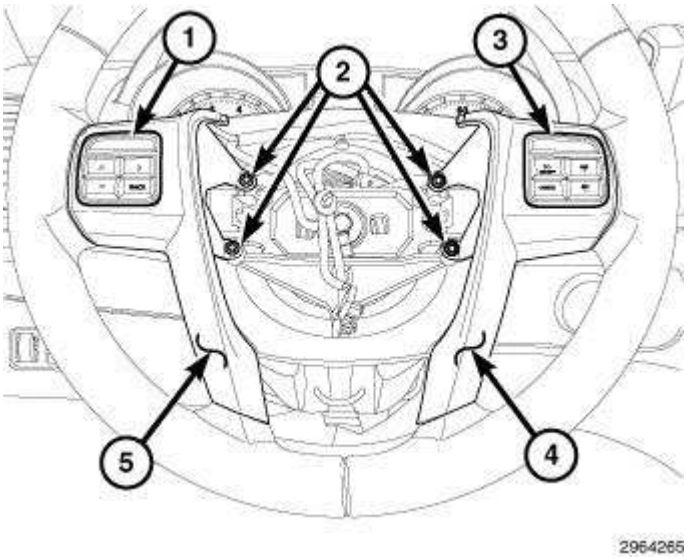


Fig. 305: Left Side Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.

9. Mark the main fuel pump module orientation.
10. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring.
11. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).

NOTE: The main fuel pump module will spring up slightly when the lock ring is removed.

12. Rotate the breaker bar counterclockwise and remove the lock ring.

CAUTION: Do not allow the float arm of the Main Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

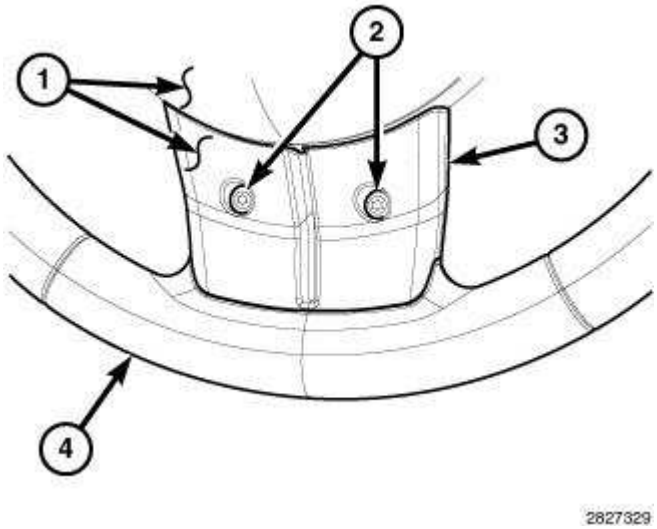


Fig. 306: Module Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

13. Raise and separate the top section from the bottom section of the main fuel pump module.
14. Disconnect the electrical connectors from under the top section of the main fuel pump module.
15. Remove the top section of the main fuel pump module from the vehicle.

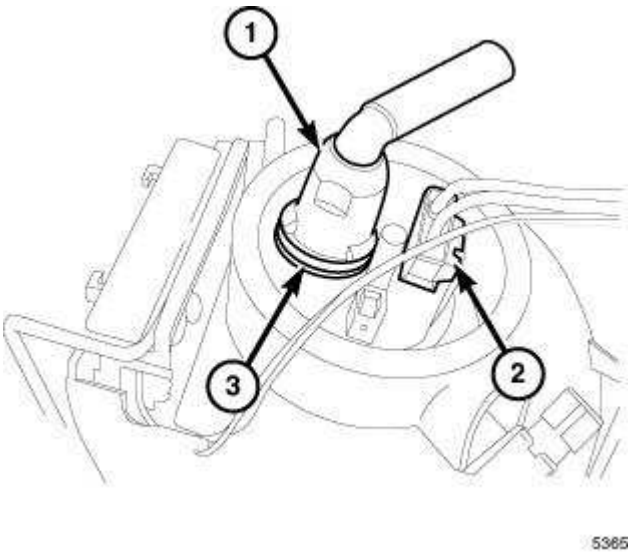


Fig. 307: Line Release
Courtesy of CHRYSLER GROUP, LLC

16. Press the quick connect release tab (3) and remove the fuel supply line (1) from the main fuel pump module.

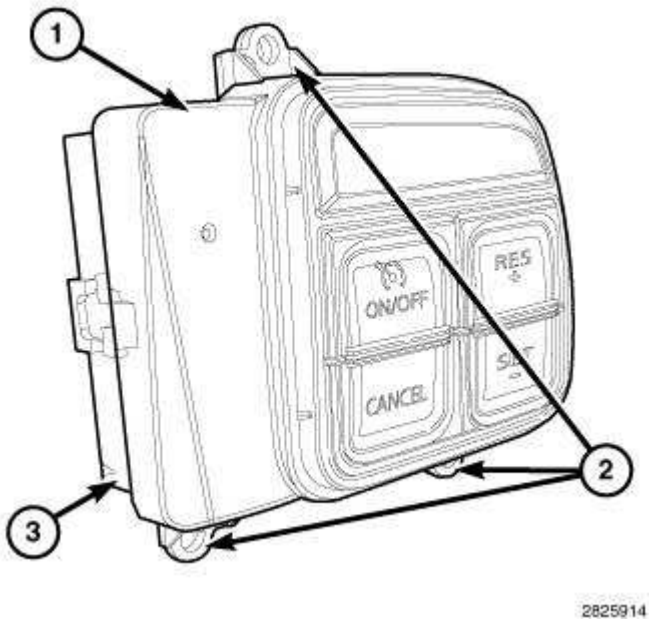


Fig. 308: Hose Connections Drivers Side
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the fuel return lines (1, 2) from the main fuel pump module.

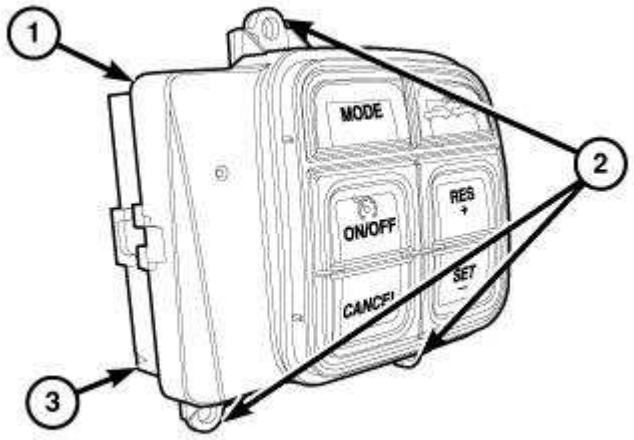
    NOTE: Do not spill fuel into the interior of the vehicle.

18. Carefully lift the bottom section of the main fuel pump module out of the fuel tank, tip the bottom section on its side and drain the remaining fuel from the bottom reservoir into the fuel tank and remove from vehicle.

    NOTE: Whenever a fuel pump module is serviced, the rubber O-ring seal must be replaced.

19. Remove and discard the rubber O-ring seal.

AUXILIARY FUEL PUMP MODULE

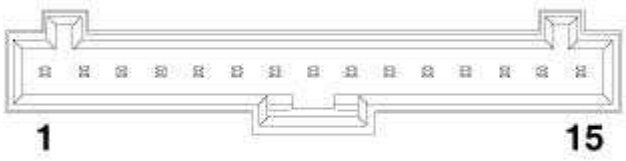


2826408

Fig. 309: Access Cover Right Side Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Main Fuel Pump Module must be removed for Auxiliary Fuel Pump Module removal.

1. Remove the main fuel pump module. Refer to **MAIN FUEL PUMP MODULE**.
2. Remove the auxiliary fuel pump module plastic access cover (1) from the floor pan.



2827003

Fig. 310: Right Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.

3. Disconnect the fuel supply line (2) from the auxiliary fuel pump module (1).
4. Mark the auxiliary fuel pump module orientation.

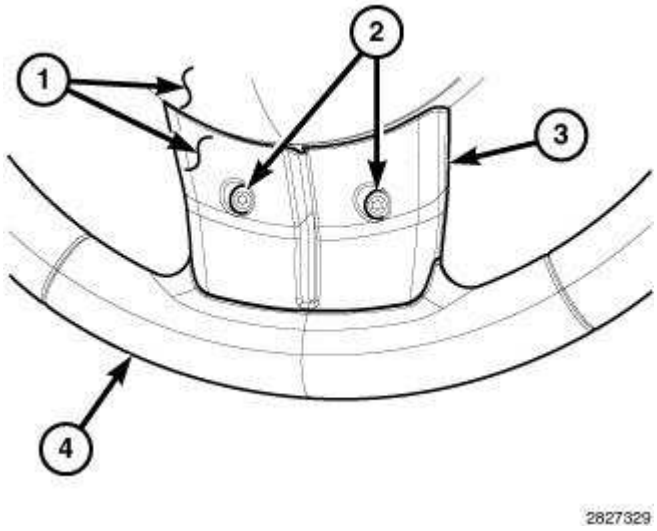


Fig. 311: Right Side Module
Courtesy of CHRYSLER GROUP, LLC

5. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
6. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).
7. Rotate the breaker bar counterclockwise and remove the lock ring (2).

CAUTION: Do not allow the float arm of the Auxiliary Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

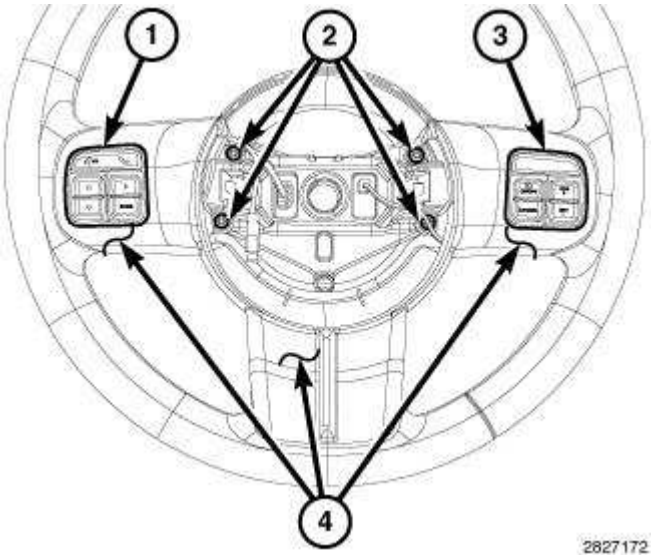


Fig. 312: Remove/Install Right Side Module
Courtesy of CHRYSLER GROUP, LLC

8. Lift the auxiliary fuel pump module up and out of fuel tank while guiding the fuel supply and return lines out from the left side of the fuel tank.

NOTE: Whenever a fuel pump module is serviced, the rubber O-ring seal must be replaced.

9. Remove and discard the rubber O-ring seal.

INSTALLATION

INSTALLATION

MAIN FUEL PUMP MODULE

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: Do not allow the float arm of the Main Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

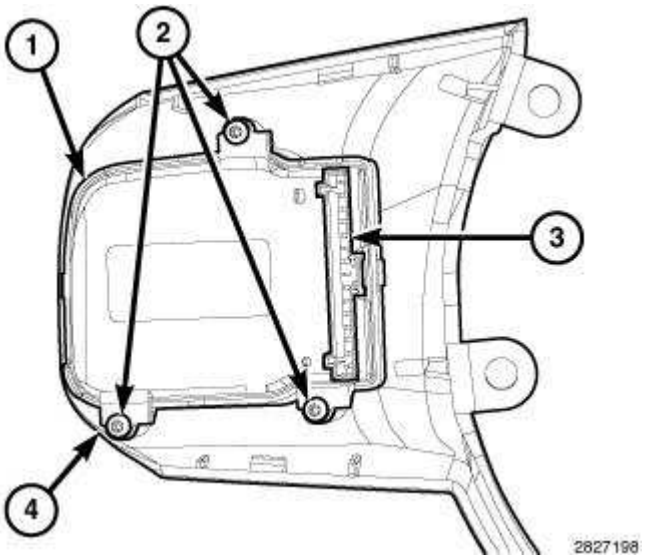


Fig. 313: Hose Connections Drivers Side
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Auxiliary Fuel Pump Module must be installed before the Main Fuel Pump Module.

1. If the auxiliary fuel pump module is removed. Refer to **AUXILIARY FUEL PUMP MODULE**.

   NOTE: Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.

2. Install a new rubber O-ring seal.
3. Using caution not to bend the float arm, lower the bottom section of the main fuel pump module into the fuel tank.
4. Connect the fuel return lines (1, 2) to the main fuel pump module.

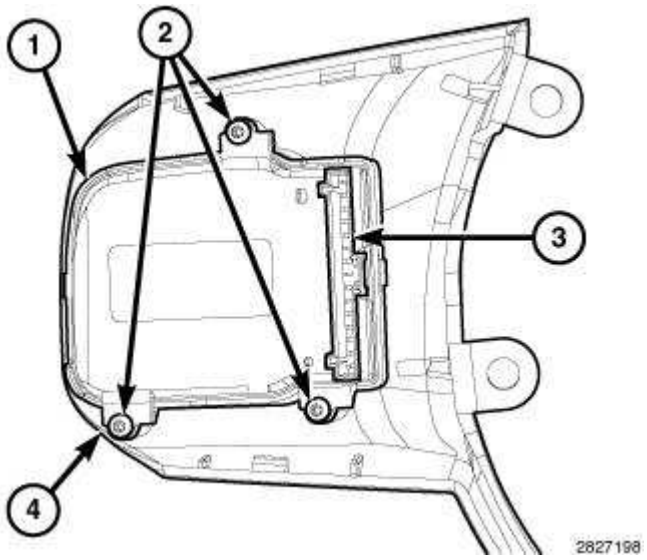


Fig. 314: Line Release
Courtesy of CHRYSLER GROUP, LLC

5. Connect the fuel supply line (1) to the main fuel pump module.

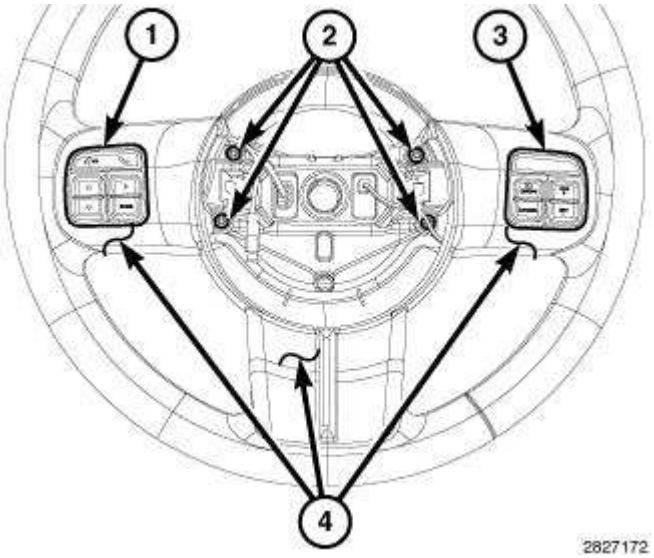


Fig. 315: Module Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

6. Connect the electrical connectors at the top section of the main fuel pump module.
7. Join the upper section and lower section of the main fuel pump module together.
8. Position the main fuel pump module as noted during removal.

CAUTION: Verify the electrical wires are tucked away into the fuel tank so they don't get pinched between the top of the fuel pump module and the rubber O-ring seal.

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.

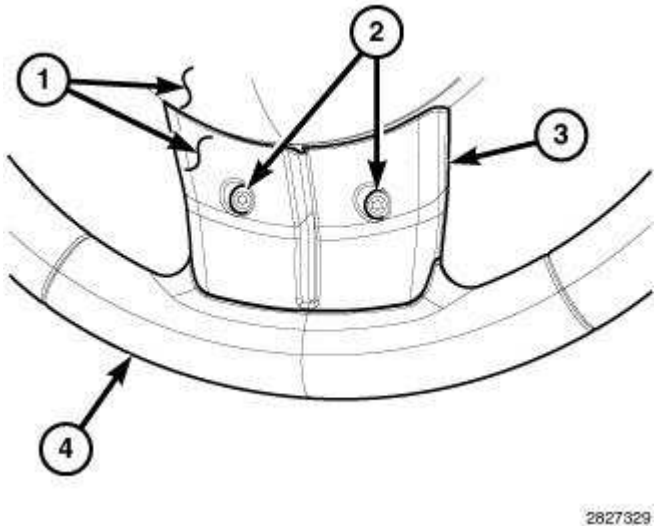


Fig. 316: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

9. Align the rubber O-ring seal and lower the main fuel pump module into position.
10. Verify the main fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.

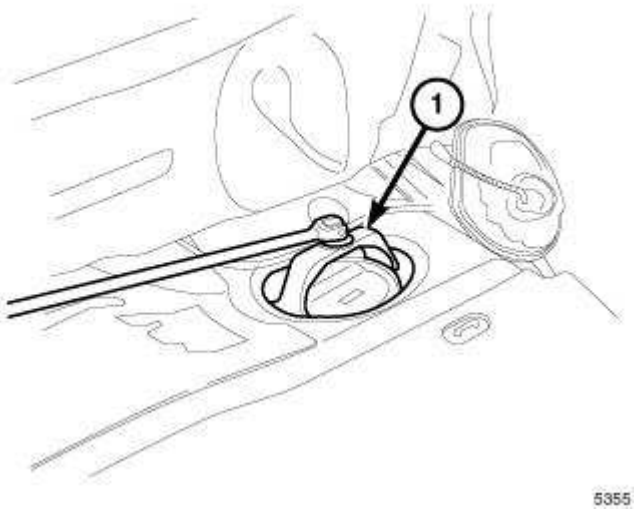


Fig. 317: Left Side Module
Courtesy of CHRYSLER GROUP, LLC

11. Position the lock ring over top of the main fuel pump module.

12. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring.
13. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench).
14. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged.

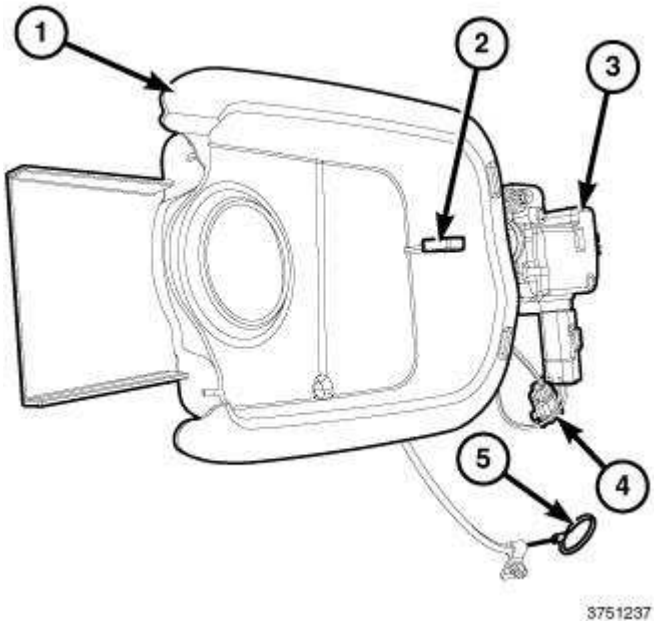


Fig. 318: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

15. Connect the electrical connector (1) to the main fuel pump module.
16. Fill the fuel tank and check for leaks around the rubber O-ring seal.

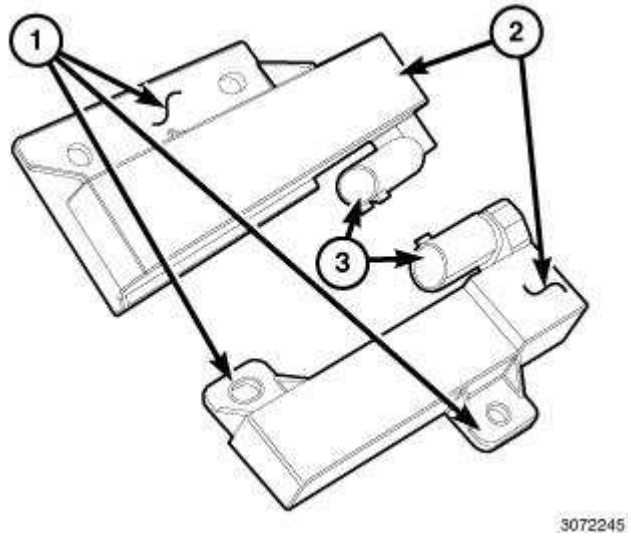


Fig. 319: Locating Plastic Access Cover

Courtesy of CHRYSLER GROUP, LLC

17. Install the main fuel pump module plastic access cover.

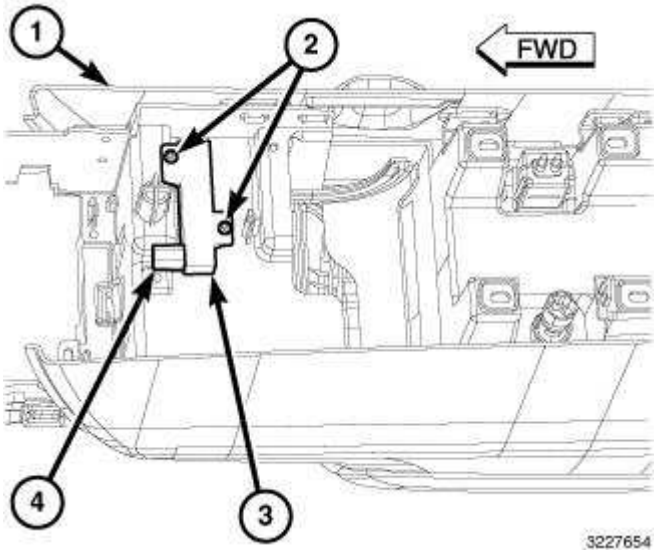


Fig. 320: Foam Pad Under Seat
Courtesy of CHRYSLER GROUP, LLC

18. Lower the foam pad covering back into place.

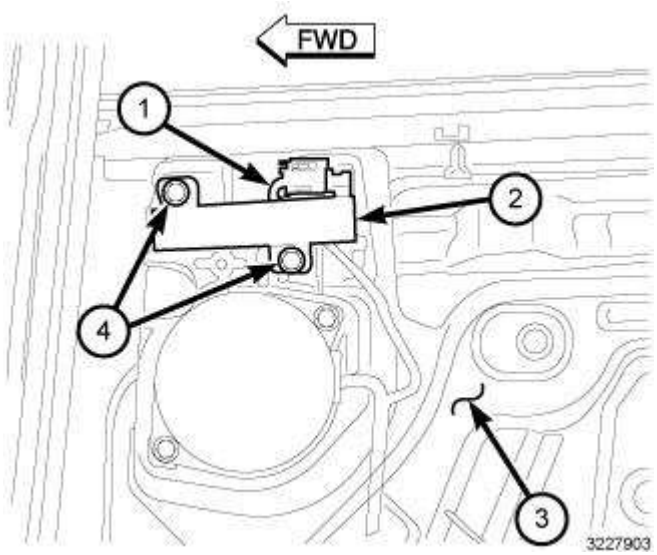


Fig. 321: Pulling Rear Seat Up
Courtesy of CHRYSLER GROUP, LLC

19. Push the rear lower seat cushion back and down and install the seat cushion.

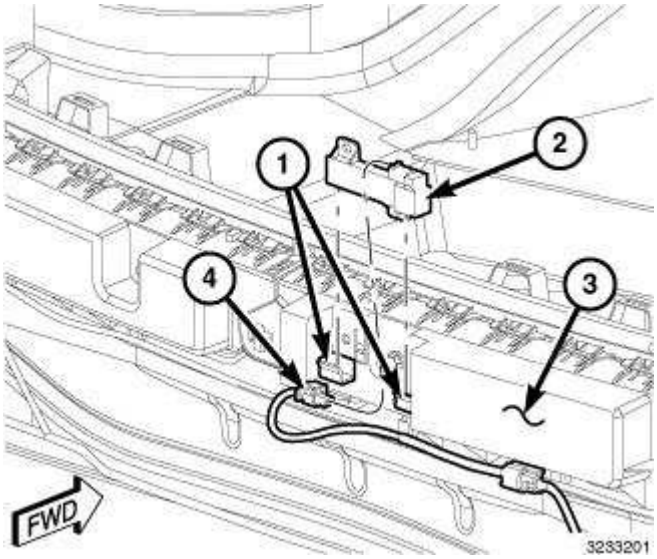


Fig. 322: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

20. Connect the negative battery cable.

AUXILIARY FUEL PUMP MODULE

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.

CAUTION: Do not allow the float arm of the Auxiliary Fuel Pump Module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

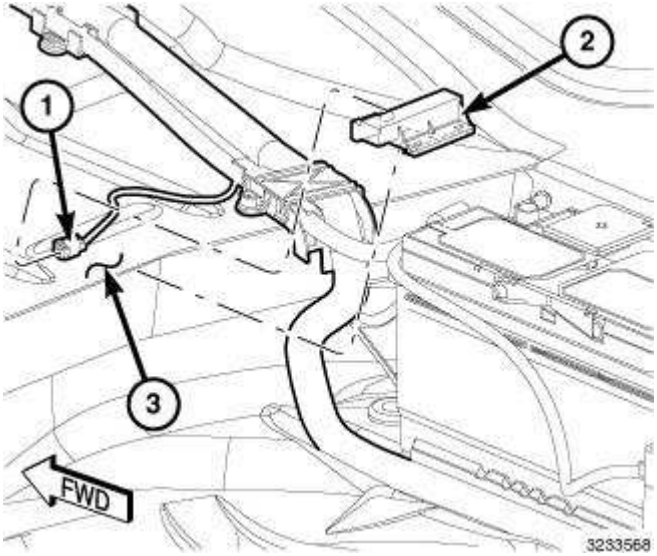


Fig. 323: Remove/Install Right Side Module

Courtesy of CHRYSLER GROUP, LLC

NOTE: Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.

1. Install a new rubber O-ring seal.
2. Using caution not to bend the float arm, lower the auxiliary fuel pump module into the fuel tank while guiding the fuel return lines, fuel supply line and electrical connector over to the left side of the fuel tank.
3. Align the rubber O-ring seal and lower the auxiliary fuel pump module into position as noted during removal.
4. Position the lock ring over top of the auxiliary fuel pump module.
5. Verify the auxiliary fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.

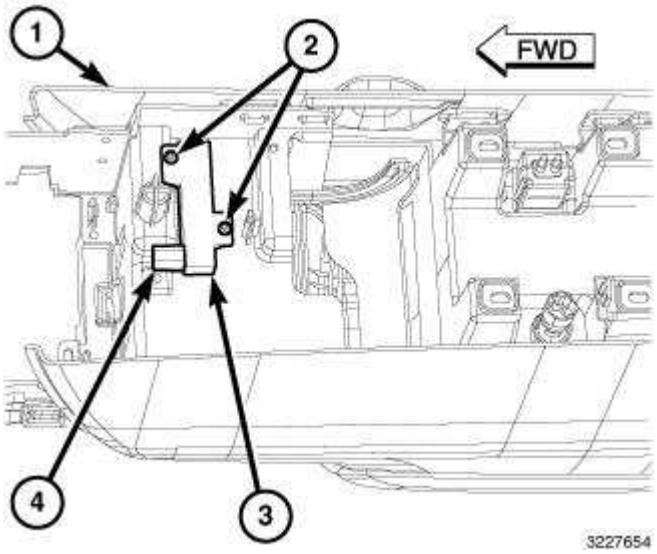


Fig. 324: Right Side Module
Courtesy of CHRYSLER GROUP, LLC

6. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
7. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).
8. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged.

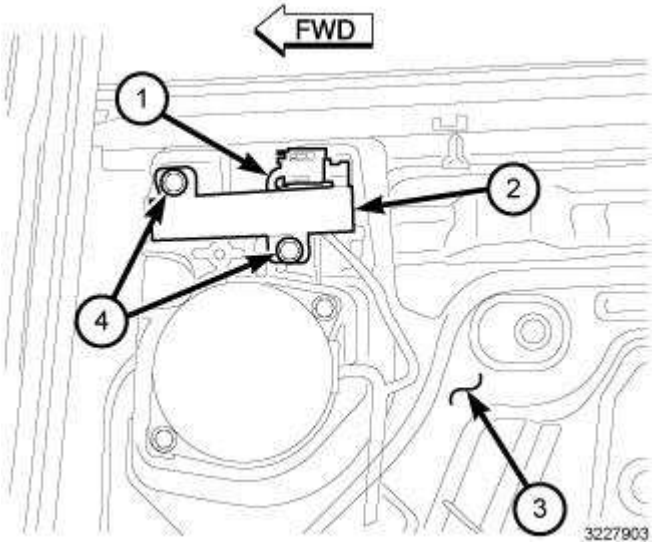


Fig. 325: Right Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

9. Connect the fuel supply line (2) to auxiliary fuel pump module (1).

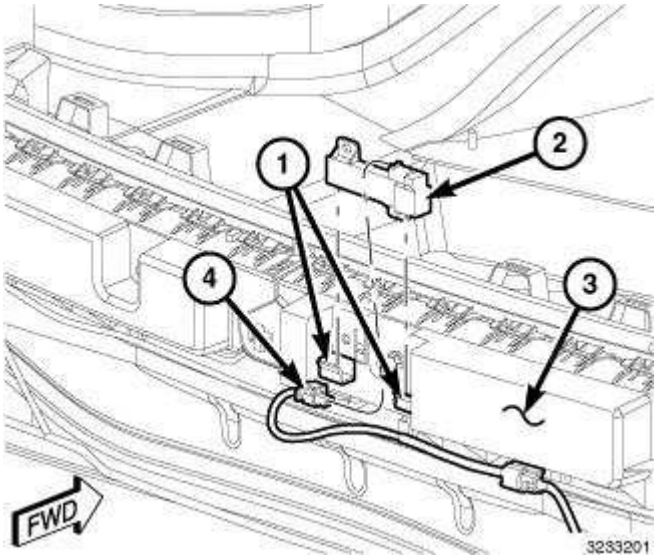


Fig. 326: Access Cover Right Side Module
Courtesy of CHRYSLER GROUP, LLC

10. Install the auxiliary fuel pump module plastic access cover (1).
11. Install the main fuel pump module, see. Refer to **MAIN FUEL PUMP MODULE**.

RAIL, FUEL

REMOVAL

3.6L

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

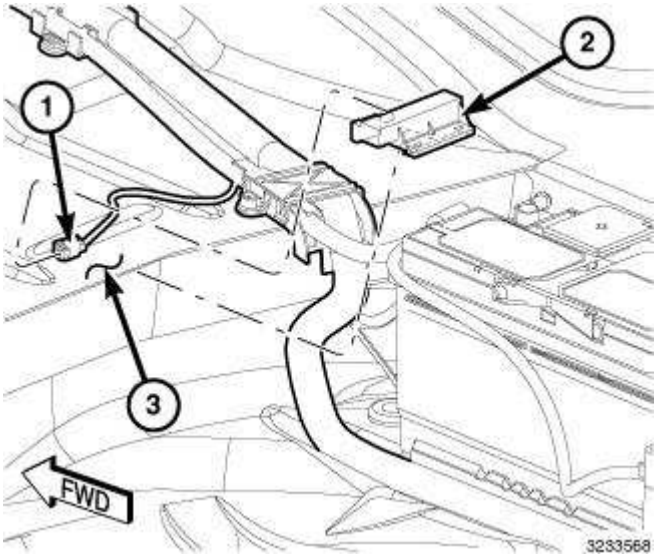


Fig. 327: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable (1).

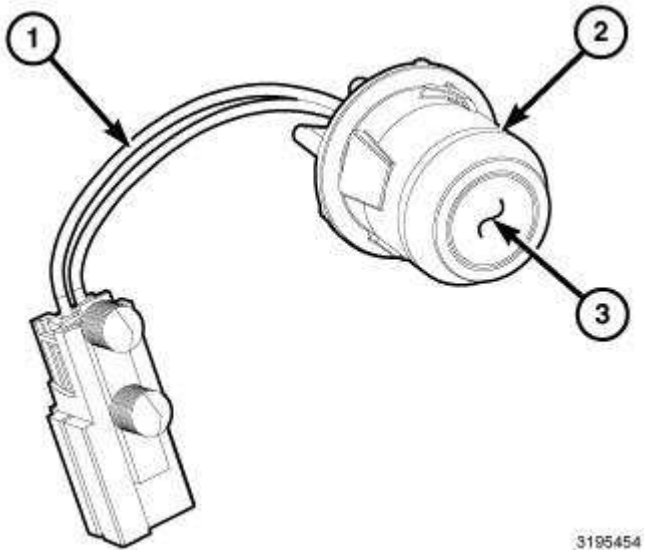


Fig. 328: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

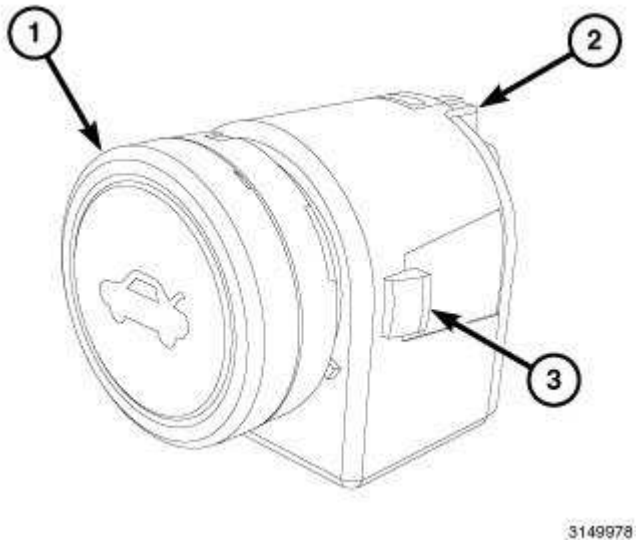


Fig. 329: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
5. Loosen the clamp (2) at the throttle body.
6. Loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
8. Remove the air inlet hose assembly (5).

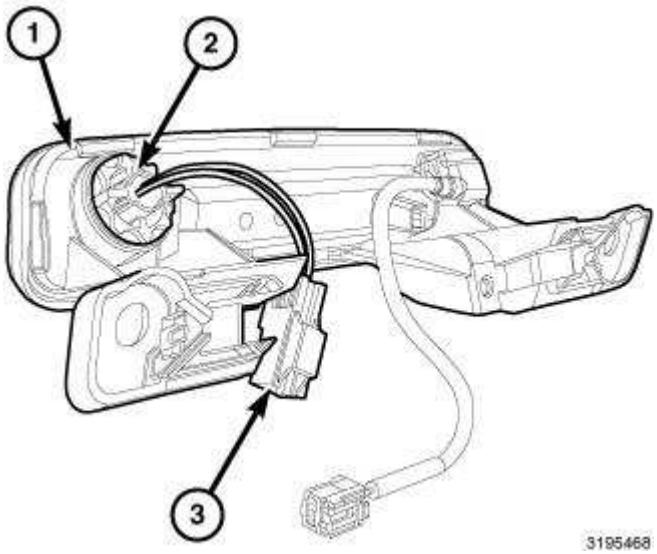


Fig. 330: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the upper intake manifold (2). Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD,**

INTAKE, REMOVAL .

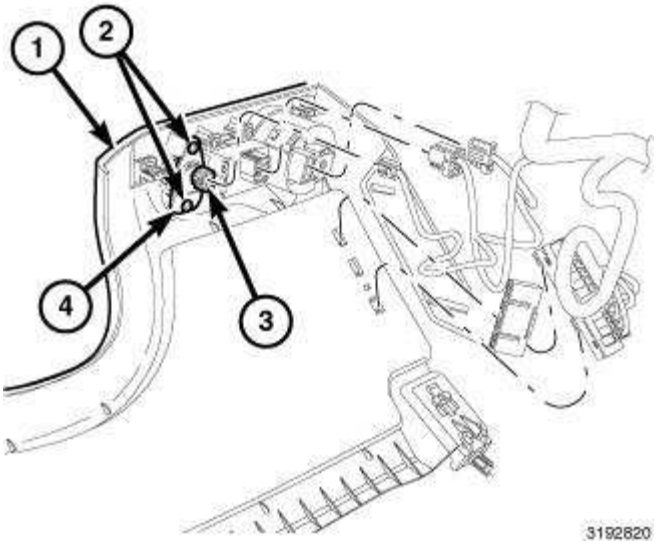


Fig. 331: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the insulator (2) from the left cylinder head cover.

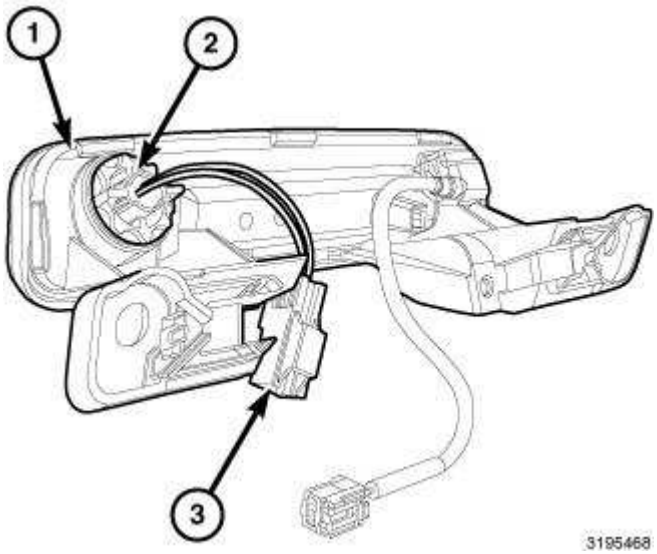


Fig. 332: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the fuel injector electrical connectors (2).
12. Disconnect the fuel supply hose (1) from the fuel rail. Refer to **FITTING, QUICK CONNECT** .

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate the rail halves at the connector tube. Due to the design of this tube, it does not use any clamps. Never attempt to

install a clamping device of any kind on the tube. When removing the fuel rail assembly for any reason, be careful not to bend or kink the tube.

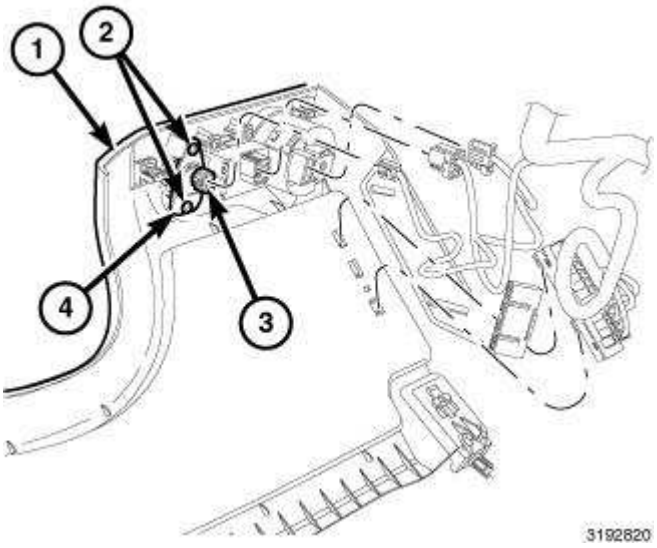


Fig. 333: Fuel Rail & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the fuel rail (2) four retaining bolts (1).
14. Lift the fuel rail and the fuel injectors from the lower intake manifold.

CAUTION: When removing the fuel rail from the lower intake manifold, one or more fuel injectors may remain in the intake manifold resulting in residual fuel spilling onto the engine from the fuel rail.

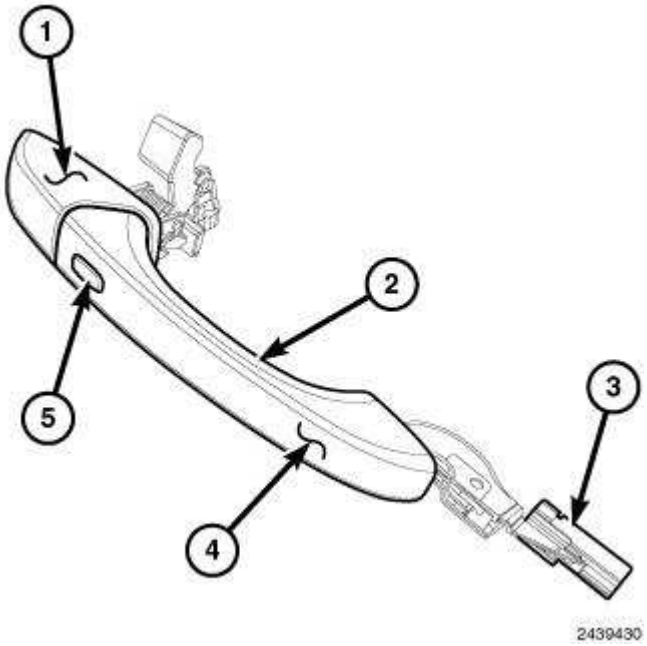


Fig. 334: Fuel Injectors
Courtesy of CHRYSLER GROUP, LLC

15. If required, remove any remaining fuel injectors (1) from the lower intake manifold.

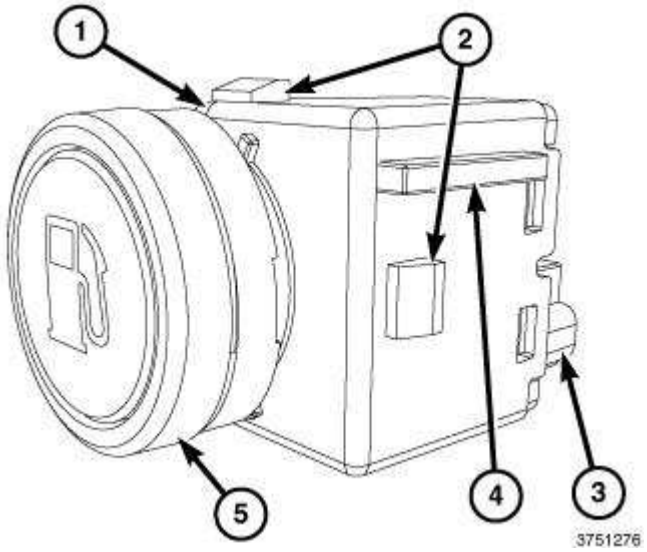


Fig. 335: Fuel Injectors & The Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 2 fuel injector removal shown in illustration, all other fuel injectors similar.

16. If required, remove any remaining fuel injectors (1) from the fuel rail (2).

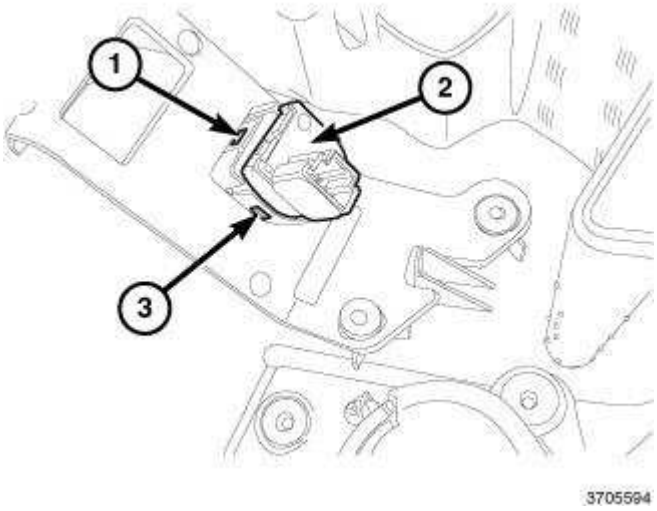


Fig. 336: O-ring Seals
Courtesy of CHRYSLER GROUP, LLC

17. Remove and discard all fuel injector O-ring seals (1).

5.7L

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.

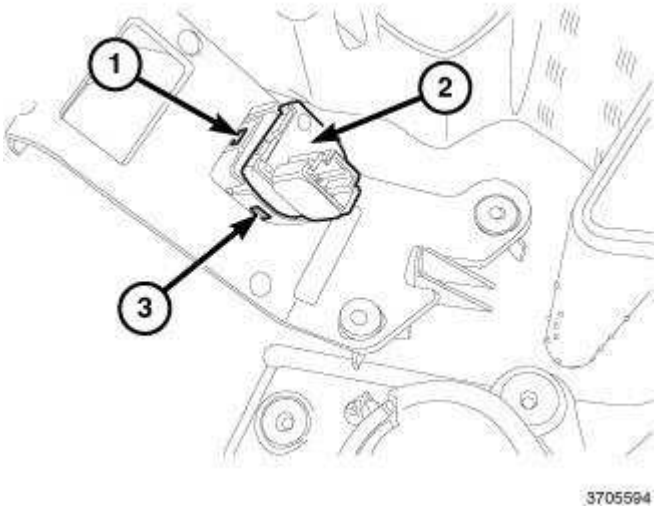


Fig. 337: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the negative battery cable.
3. Remove fuel tank filler cap.

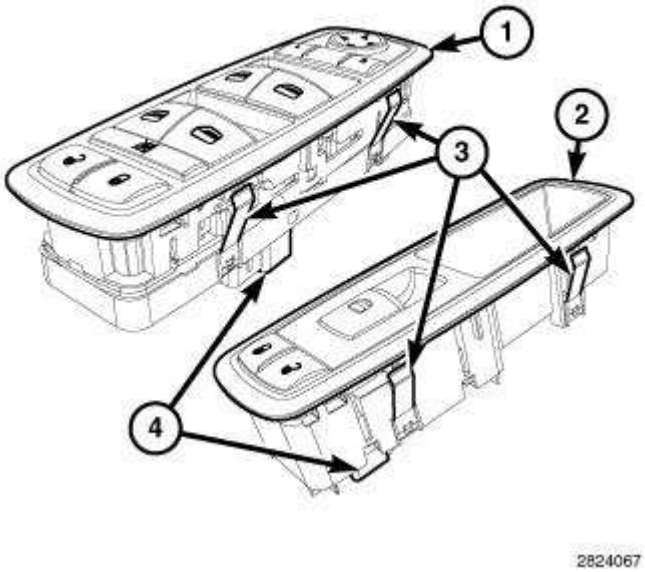


Fig. 338: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

4. Remove the engine cover (2).

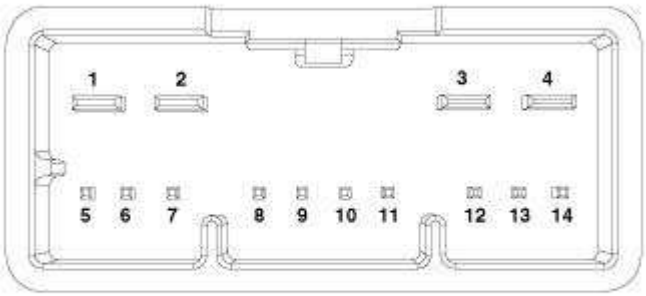


Fig. 339: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
6. Loosen the hose clamp at the air cleaner housing (2).
7. Remove the resonator retaining bolt (3).
8. Loosen the hose clamp at the throttle body (4) and remove the resonator.
9. Disconnect electrical connectors at all 8 fuel injectors. Push red colored slider away from injector (1). While pushing slider, depress tab (2) and remove the connector (3) from the injector.
10. Disconnect throttle body electrical connectors.

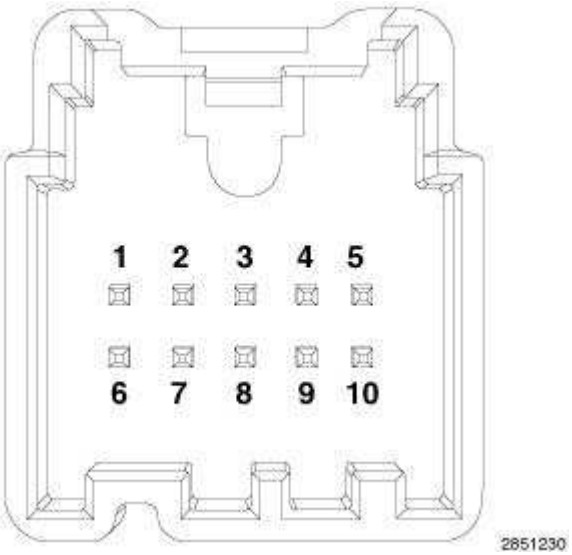


Fig. 340: Fuel Rail Mounting Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the fuel supply line at the fuel rail. Refer to **QUICK-CONNECT FITTINGS** .
12. Disconnect the PCV hose.
13. Using the sequence shown in illustration, remove the four fuel rail retaining bolts.
14. Gently rock and lift the left side fuel rail until the fuel injectors just start to clear the machined holes in the intake manifold.
15. Gently rock and lift the right side fuel rail until the fuel injectors just start to clear the machined holes in the intake manifold. Repeat this procedure (left/right) until all injectors have cleared the machined holes.
16. Remove the fuel rail (with injectors attached) from the engine.
17. If the fuel injectors are to be removed. Refer to **INJECTOR(S), FUEL, REMOVAL** or **INJECTOR (S), FUEL, REMOVAL**.

6.4L

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.

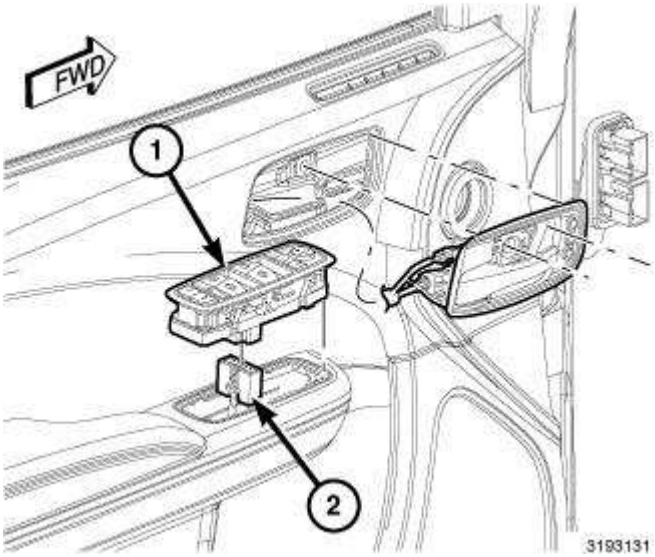


Fig. 341: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .

2. Disconnect the negative battery cable.
3. Remove fuel tank filler cap.

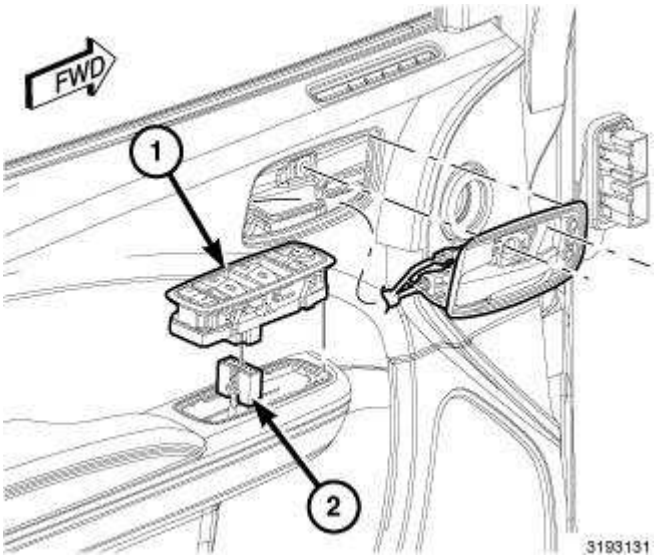


Fig. 342: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

4. Remove the engine cover (2).

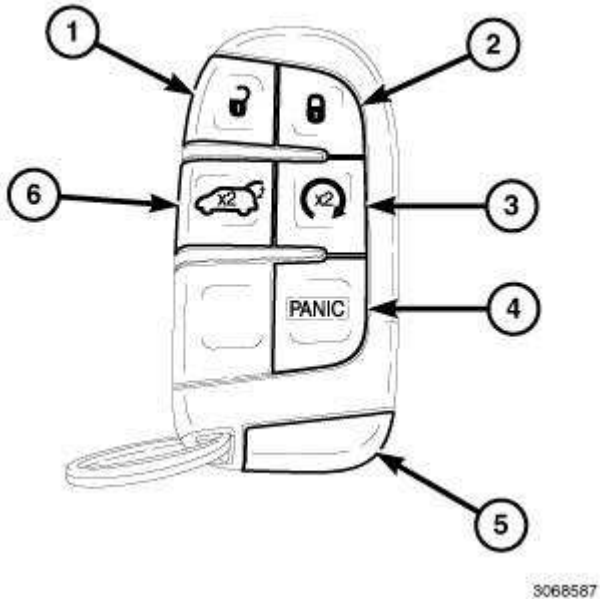


Fig. 343: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing & Duct
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (4).
6. Loosen the hose clamp at the air cleaner housing (2).

7. Loosen the hose clamp at the throttle body (2) and remove the duct (3).

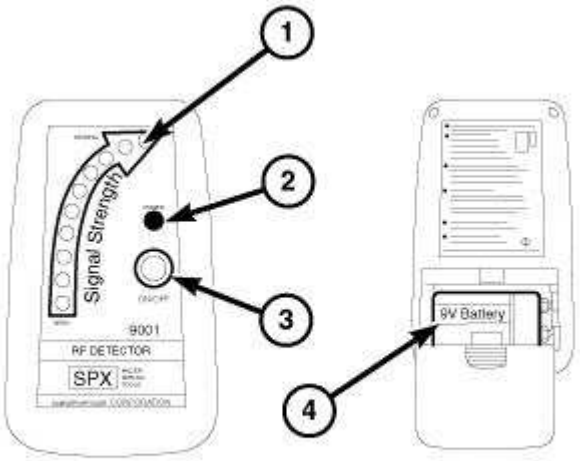


Fig. 344: Throttle Body, Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect throttle body electrical connector (2).

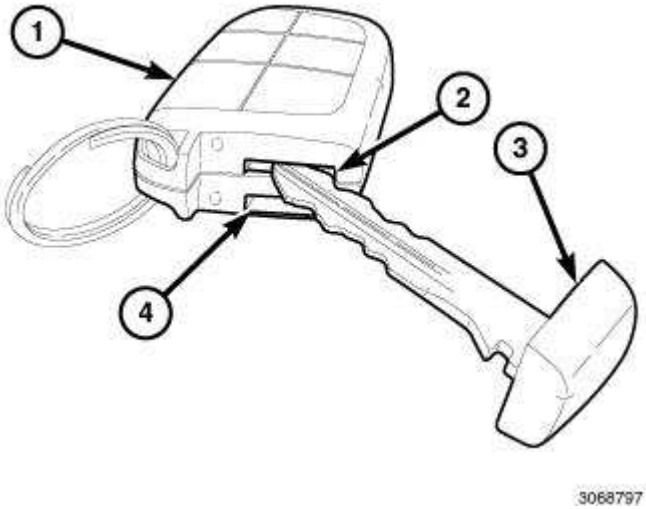


Fig. 345: Fuel Rail Mounting Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect electrical connectors at all 8 fuel injectors. Push red colored slider away from injector (1). While pushing slider, depress tab (2) and remove the connector (3) from the injector.

10. Disconnect the fuel supply line at the fuel rail. Refer to **FITTING, QUICK CONNECT** .
11. Disconnect the PCV hose.
12. Using the sequence shown in illustration, remove the four fuel rail retaining bolts.
13. Gently rock and lift the left side fuel rail until the fuel injectors just start to clear the machined holes in the intake manifold.
14. Gently rock and lift the right side fuel rail until the fuel injectors just start to clear the machined holes in the intake manifold. Repeat this procedure (left/right) until all injectors have cleared the machined holes.
15. Remove the fuel rail (with injectors attached) from the engine.
16. If the fuel injectors are to be removed. Refer to **INJECTOR(S), FUEL, REMOVAL** or **INJECTOR (S), FUEL, REMOVAL**.

INSTALLATION

3.6L

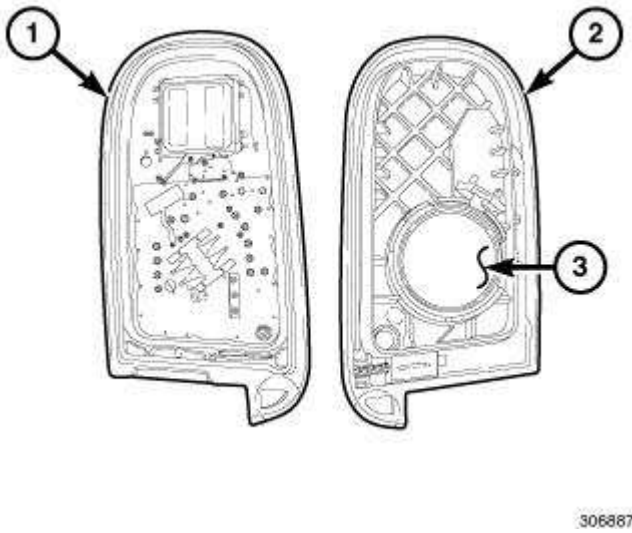


Fig. 346: O-ring Seals
Courtesy of CHRYSLER GROUP, LLC

1. Lightly lubricate the new O-ring seals (1) with clean engine oil and position the seals onto the fuel injector (2).

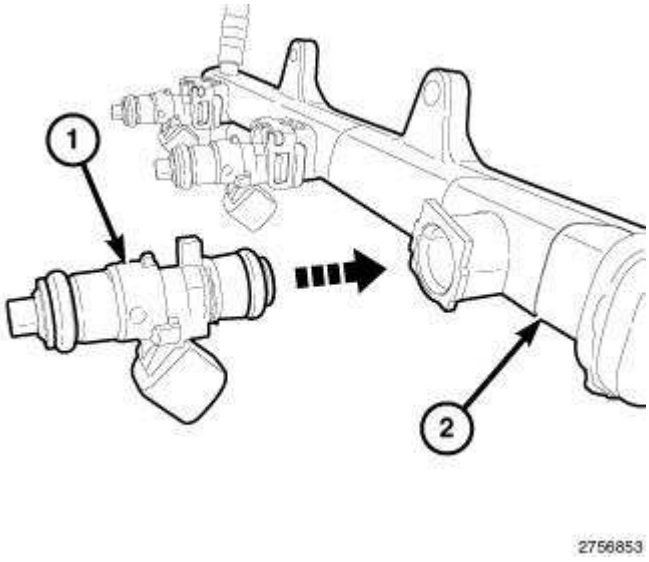


Fig. 347: O-ring Seals & Fuel Injector
Courtesy of CHRYSLER GROUP, LLC

2. Install the six fuel injectors into the fuel rail.

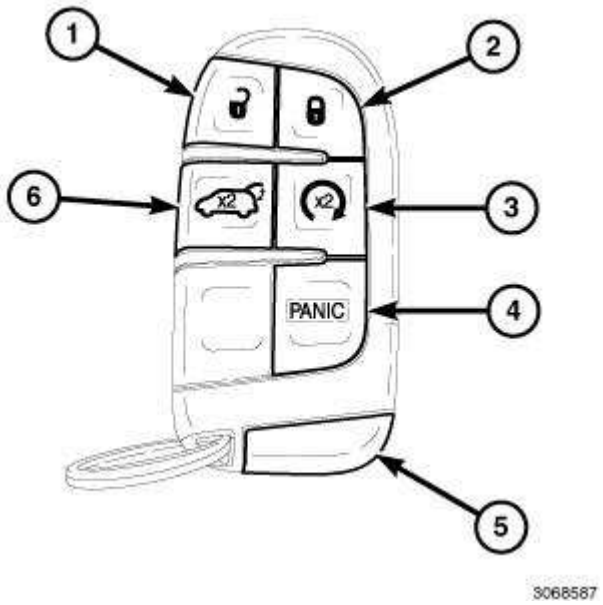


Fig. 348: Fuel Rail Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Clean out the fuel injector bores in the lower intake manifold.
4. Position the fuel rail (1) onto the lower intake manifold, install the four retaining bolts and using the sequence shown in illustration, tighten to 7 N.m (62 in. lbs.).

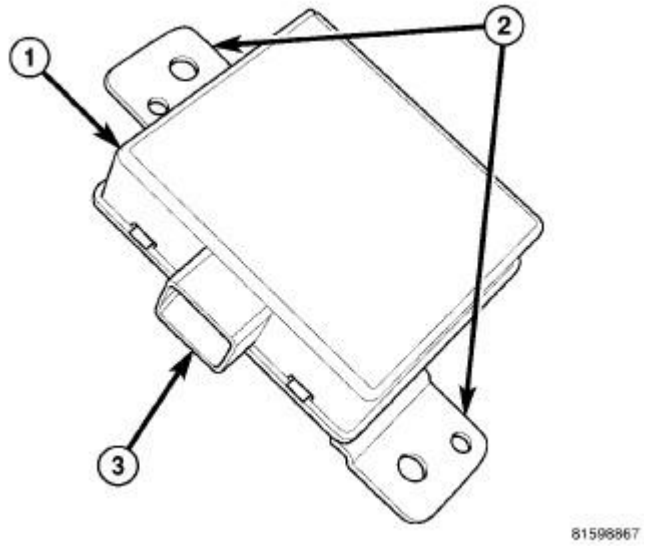


Fig. 349: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

5. Connect the fuel injector electrical connectors (2).
6. Connect the fuel supply hose to the fuel rail (1). Refer to **FITTING, QUICK CONNECT** .

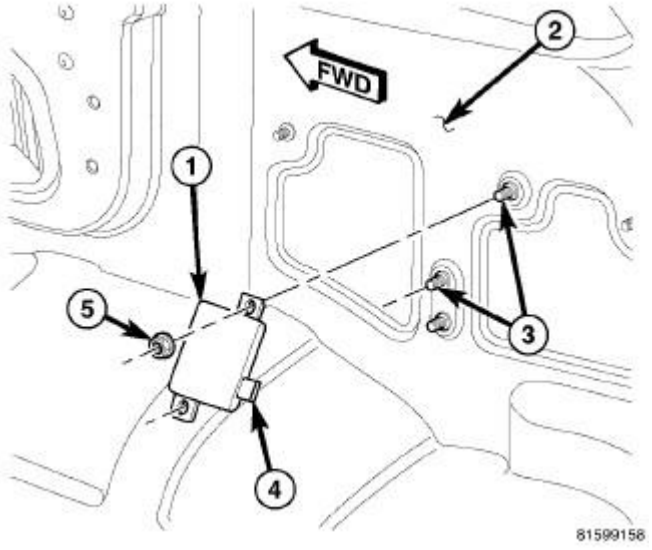


Fig. 350: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

7. Install the insulator (2) to the two alignment posts (3) on top of the left cylinder head cover.

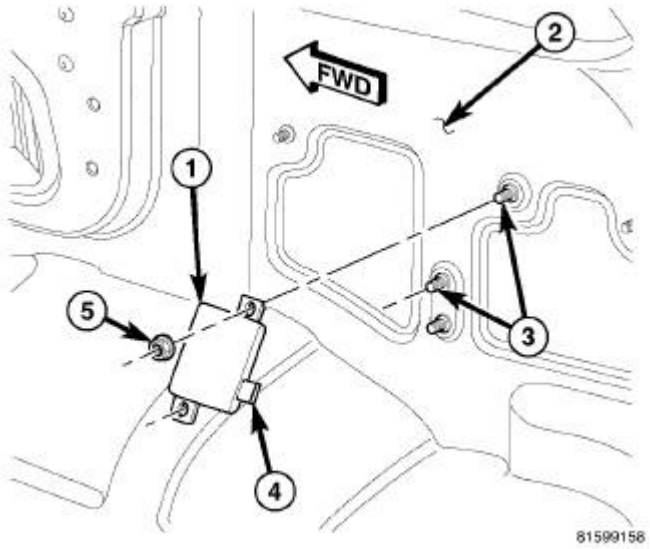


Fig. 351: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Install the upper intake manifold (1) and support brackets. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .

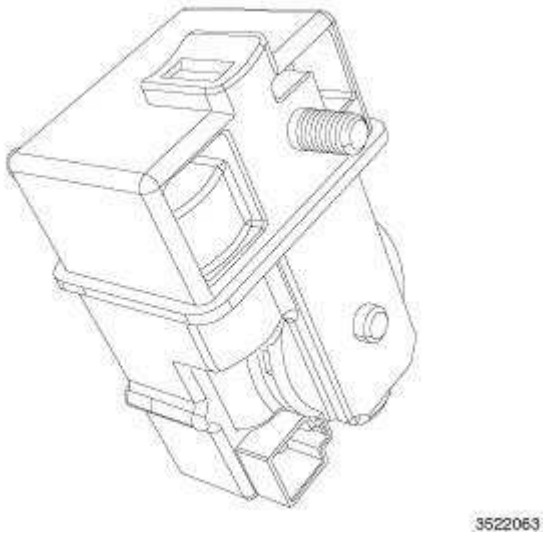


Fig. 352: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
10. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
11. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).

12. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
13. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

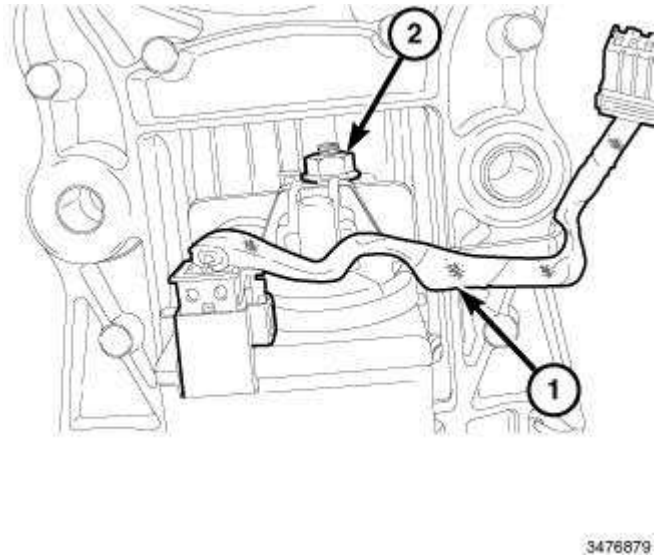


Fig. 353: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

14. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

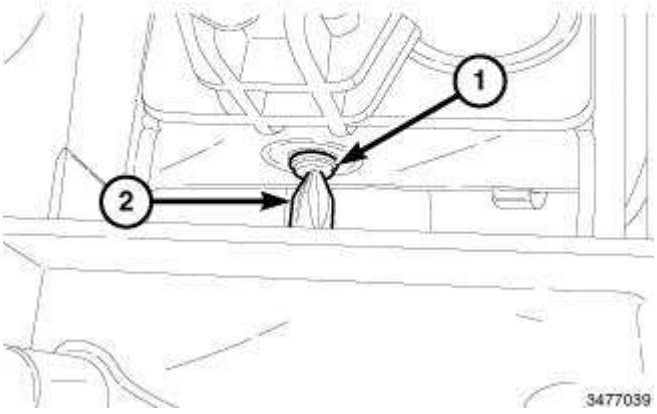


Fig. 354: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

15. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
16. Start the engine and check for leaks.

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.

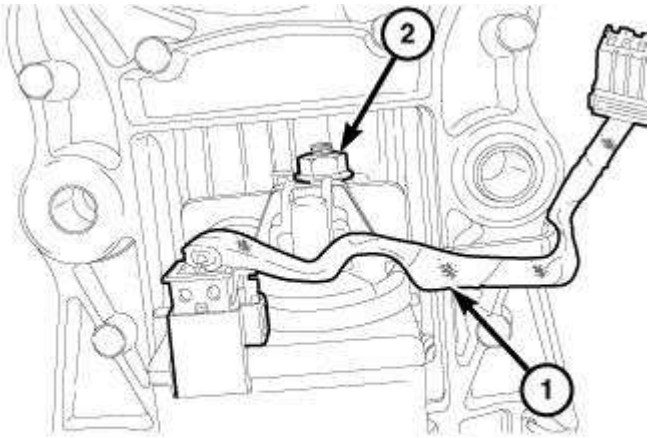


Fig. 355: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fuel injector O-rings may be used again, provided no cuts, tears, or deformation have occurred.

1. If removed, install the fuel injectors onto the fuel rail. Refer to **INJECTOR(S), FUEL, INSTALLATION** or **INJECTOR(S), FUEL, INSTALLATION**.
2. Inspect the fuel injector O-rings (3) and replace if necessary.
3. Clean out the fuel injector machined bores in the intake manifold.
4. Apply a small amount of engine oil to each fuel injector O-ring (3).

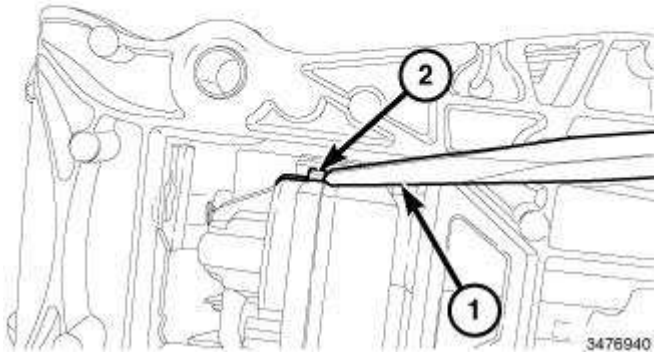


Fig. 356: Fuel Rail Mounting Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Position fuel rail/fuel injector assembly (1) into the machined fuel injector bores of the intake manifold.
6. Guide each injector into the intake manifold using care not to tear the fuel injector O-rings.
7. Push the right fuel rail down until the fuel injectors have bottomed on shoulders.
8. Push the left fuel rail down until the injectors have bottomed on shoulders.
9. Using the sequence shown in illustration, install the four fuel rail retaining bolts (2) and tighten to 11 N.m (8 ft. lbs.).
10. Connect the fuel line (1) to the fuel rail. Refer to **STANDARD PROCEDURE** .
11. Connect the fuel injector electrical connectors.
12. Connect the PCV hose.

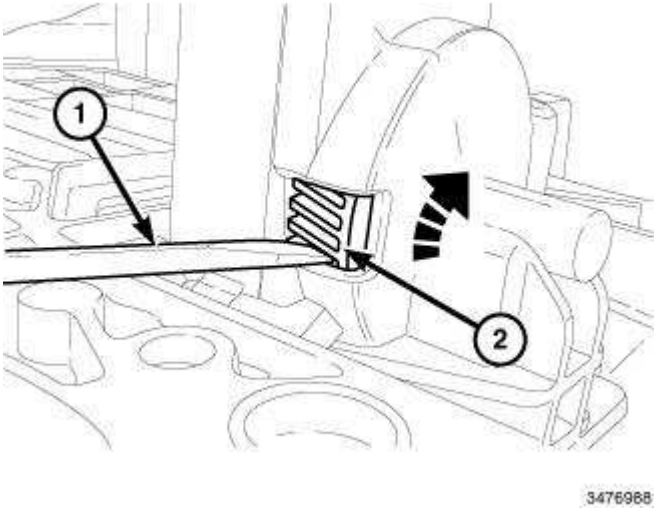


Fig. 357: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining

Bolt & Hose Clamp
Courtesy of CHRYSLER GROUP, LLC

13. Position the resonator onto the throttle body and air cleaner housing.
14. Tighten the hose clamp at the throttle body (4) to 5 N.m (45 in. lbs.).
15. Install the resonator retaining bolt (3) and tighten to 5 N.m (45 in. lbs.).
16. Tighten the hose clamp at the air cleaner housing (2) to 5 N.m (45 in. lbs.).
17. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (1).

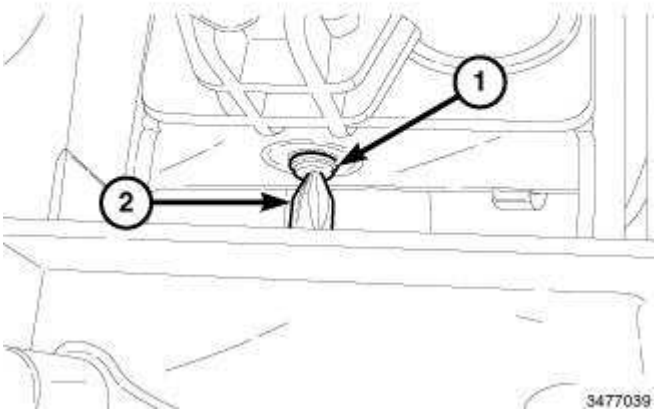


Fig. 358: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

18. Install the engine cover (2).
19. Start the engine and check for leaks.

6.4L

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.

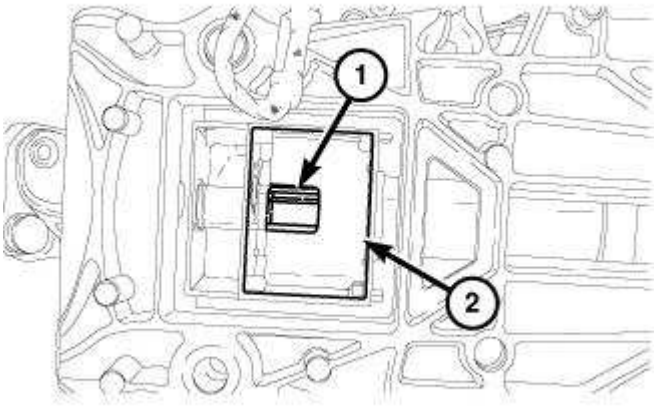


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Fig. 359: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fuel injector O-rings may be used again, provided no cuts, tears, or deformation have occurred.

1. If removed, install the fuel injectors onto the fuel rail. Refer to **INJECTOR(S), FUEL, INSTALLATION** or **INJECTOR(S), FUEL, INSTALLATION**.
2. Inspect the fuel injector O-rings (3) and replace if necessary.
3. Clean out the fuel injector machined bores in the intake manifold.
4. Apply a small amount of engine oil to each fuel injector O-ring (3).

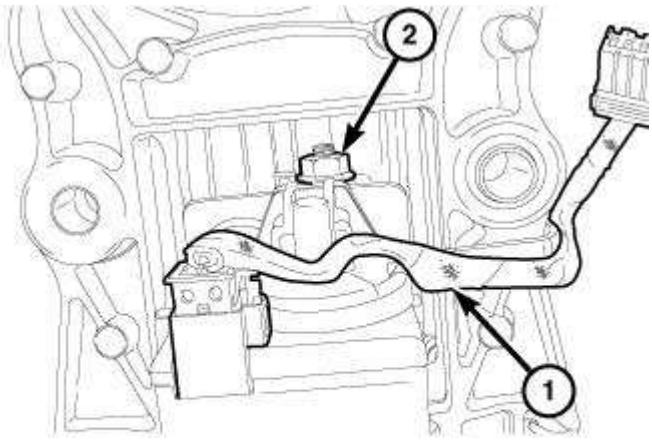

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Fig. 360: Fuel Rail Mounting Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Position fuel rail/fuel injector assembly (1) into the machined fuel injector bores of the intake manifold.
6. Guide each injector into the intake manifold using care not to tear the fuel injector O-rings.
7. Push the right fuel rail down until the fuel injectors have bottomed on shoulders.
8. Push the left fuel rail down until the injectors have bottomed on shoulders.
9. Using the sequence shown in illustration, install the four fuel rail retaining bolts (2) and tighten to 11 N.m (8 ft. lbs.).
10. Connect the fuel line (1) to the fuel rail. Refer to **STANDARD PROCEDURE** .
11. Connect the fuel injector electrical connectors.
12. Connect the PCV hose.

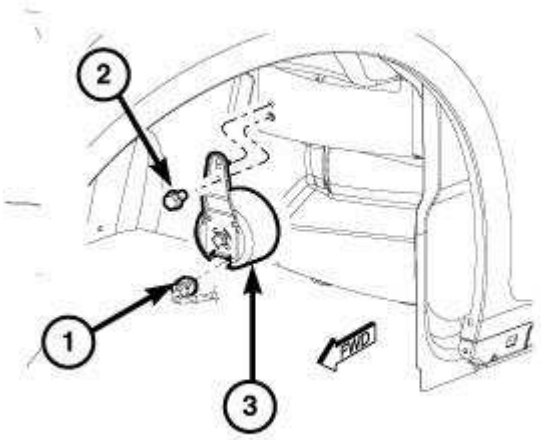


Fig. 361: Throttle Body, Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Install the throttle body electrical connector (2).

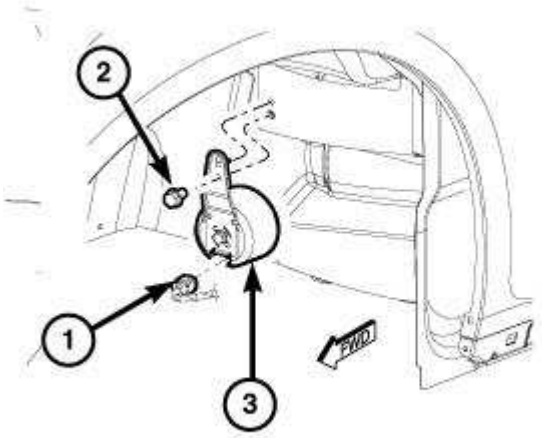


Fig. 362: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing & Duct
Courtesy of CHRYSLER GROUP, LLC

14. Position the duct (3) onto the throttle body and air cleaner housing (1).
15. Tighten the hose clamp at the throttle body and at the air cleaner housing (2) to 5 N.m (45 in. lbs.).
16. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (4).

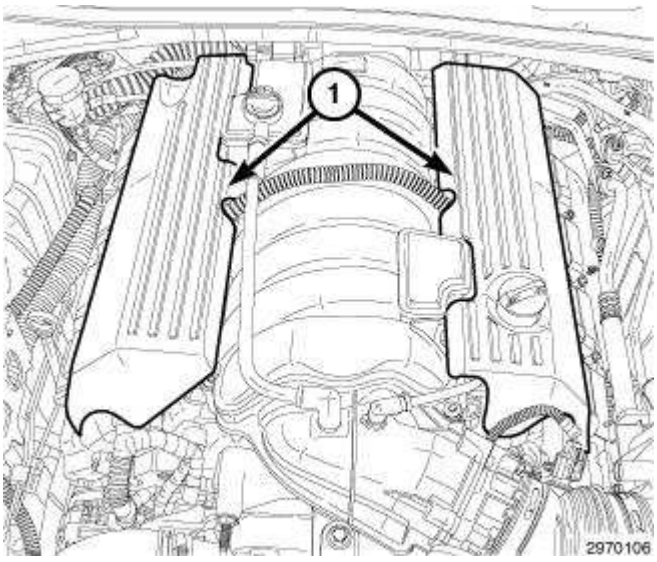


Fig. 363: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

17. Install the engine cover (2).
18. Connect the negative battery cable.
19. Start the engine and check for leaks.

REGULATOR, FUEL PRESSURE

DESCRIPTION

DESCRIPTION

The fuel pressure regulator is integrated with the auxiliary fuel pump module and is not serviced separately. The auxiliary fuel pump module must be replace if the fuel pressure regulator is to be replaced.

For auxiliary fuel pump module removal. Refer to **MODULE, FUEL PUMP, REMOVAL** or **MODULE, FUEL PUMP, REMOVAL**.

SENDING UNIT AND SENSOR, FUEL LEVEL

DESCRIPTION

DESCRIPTION

The fuel level sending units and sensors are integrated with both the main fuel pump module and the auxiliary fuel pump module and are not serviced separately. The appropriate fuel pump module must be replace if either fuel level sending unit is to be replaced.

For fuel pump module removal. Refer to **MODULE, FUEL PUMP, REMOVAL** or **MODULE, FUEL PUMP, REMOVAL**.

TANK, FUEL

REMOVAL

REMOVAL

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

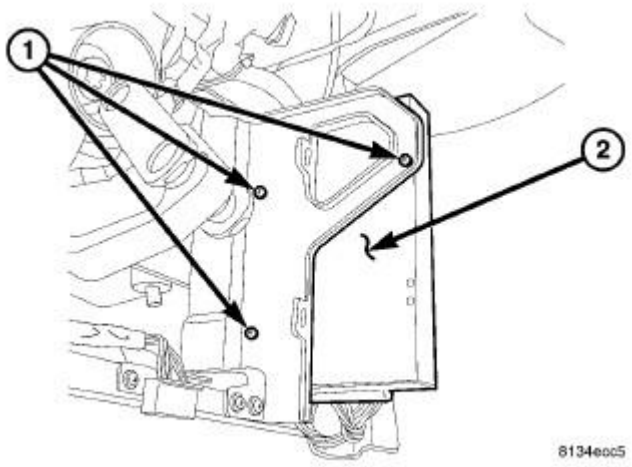


Fig. 364: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Perform the draining fuel tank procedure. Refer to **DRAINING FUEL TANK** .
3. Disconnect the negative battery cable (1).
4. Raise and support the vehicle.
5. Remove the left rear tire.

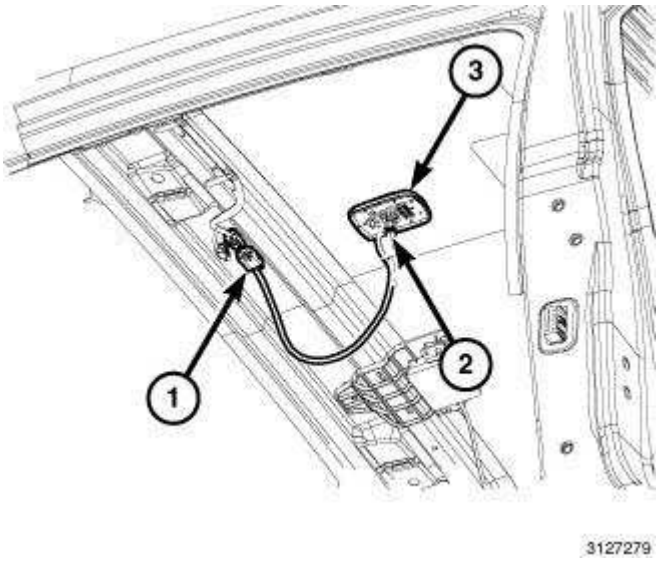


Fig. 365: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

6. Remove the push-pins (1) that secure the rear wheelhouse shield to the body.
7. Remove the left rear wheelhouse splash shield (2).

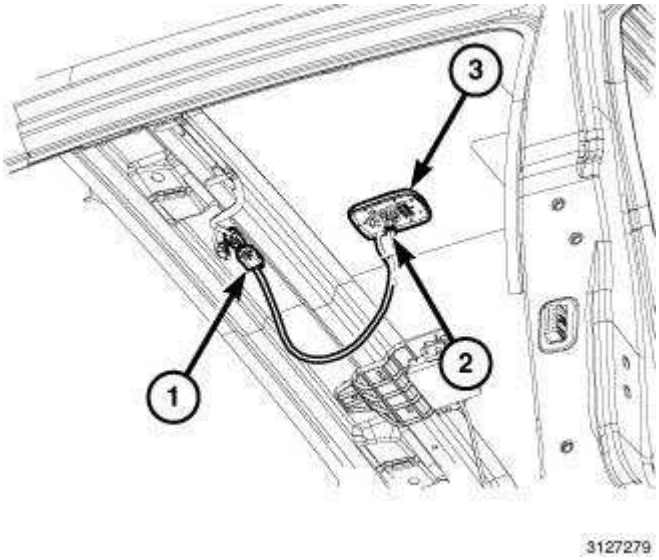


Fig. 366: Filler Tube Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the fuel filler tube ORVR vent line (2).
9. Remove the fuel filler tube retaining bolt (1).

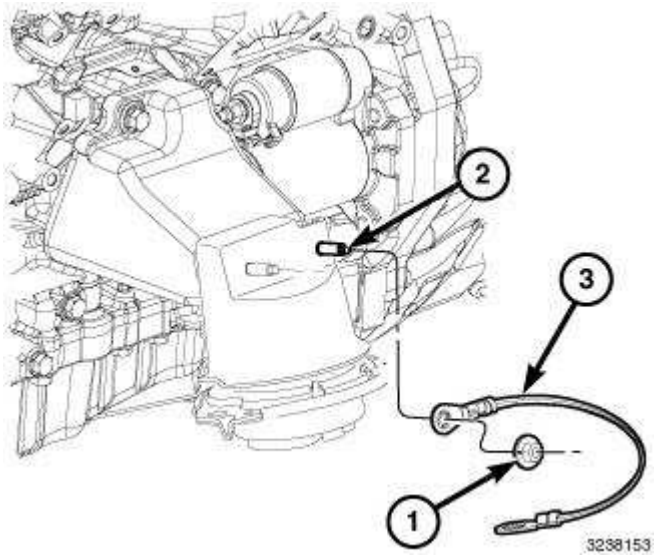


Fig. 367: Splash Shield DR Side
Courtesy of CHRYSLER GROUP, LLC

10. Remove the under body splash shield (1).

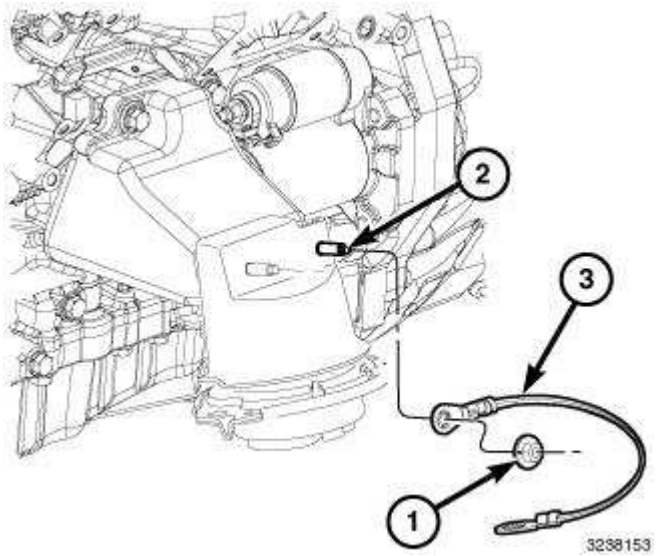


Fig. 368: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

11. Remove the hose clamp from the fuel filler tube.

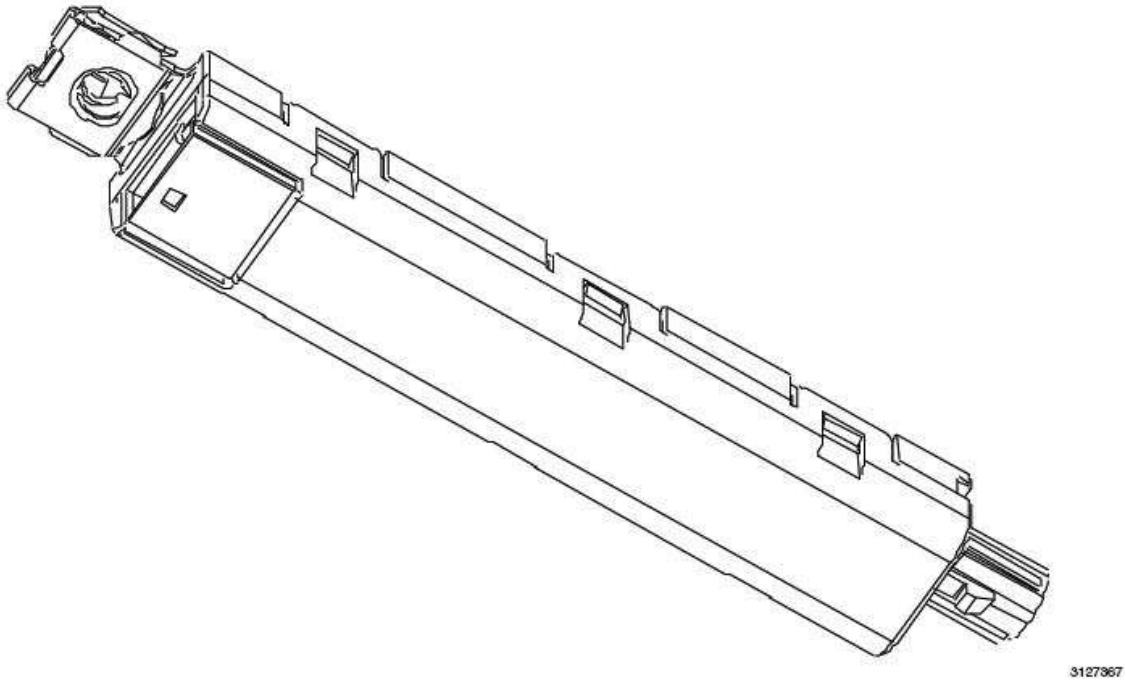


Fig. 369: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

12. Remove fuel filler tube from the rubber hose on the fuel tank and position aside.

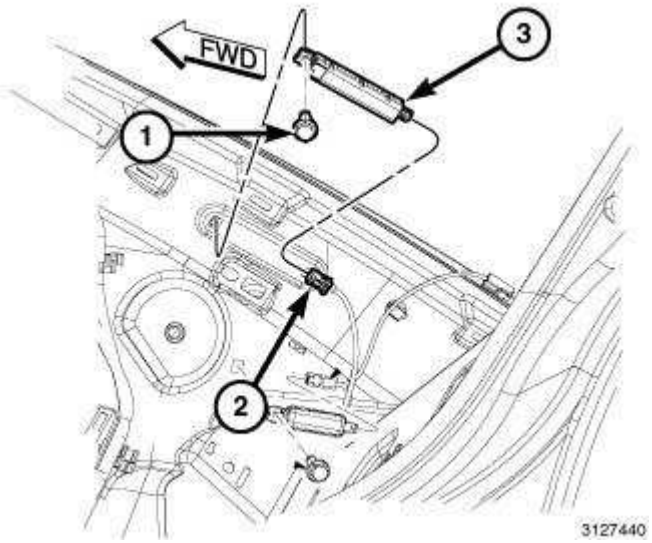


Fig. 370: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

13. Remove the muffler and tailpipe assembly (2). Refer to **MUFFLER, EXHAUST, REMOVAL** .

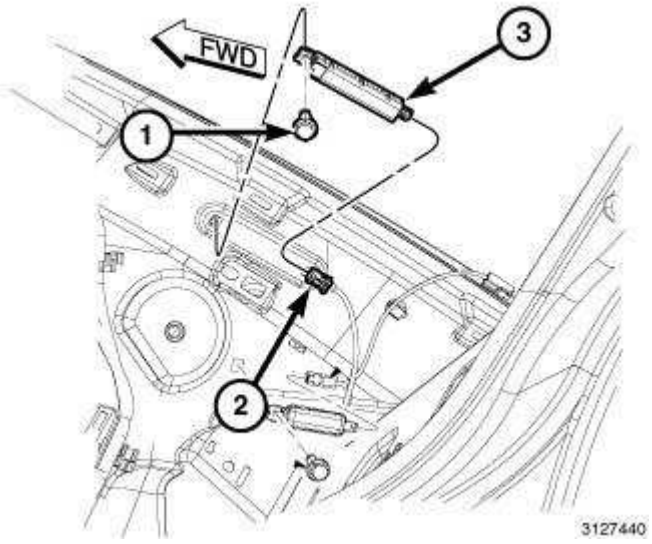


Fig. 371: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

14. Remove the propeller shaft. Refer to **REMOVAL** .
15. Remove the heat shield retainers (2) and remove the heat shield (1).

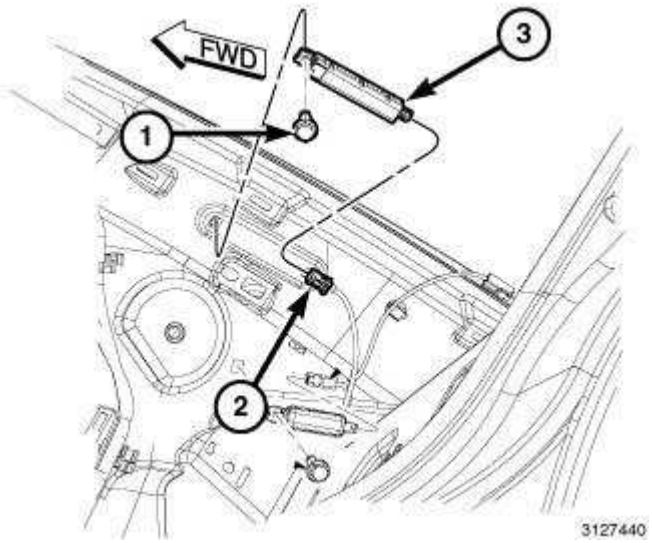


Fig. 372: Splash Shield PASS Side
Courtesy of CHRYSLER GROUP, LLC

16. Remove the right underbody splash shield (1).

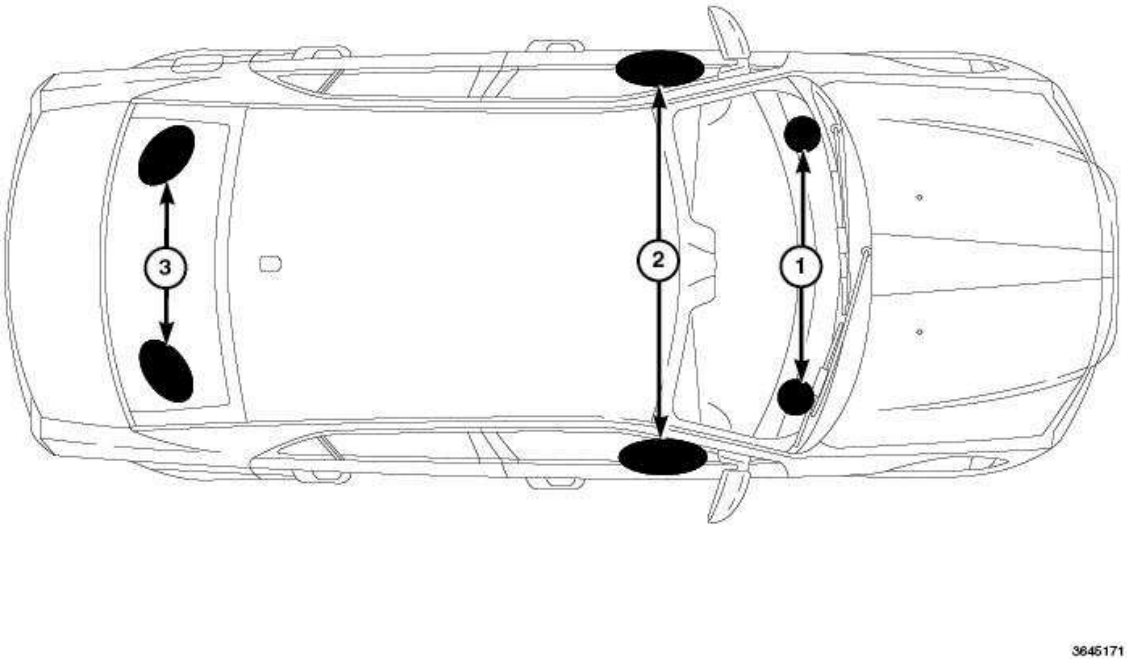


Fig. 373: EVAP Line
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the EVAP line in the right rear wheel well.

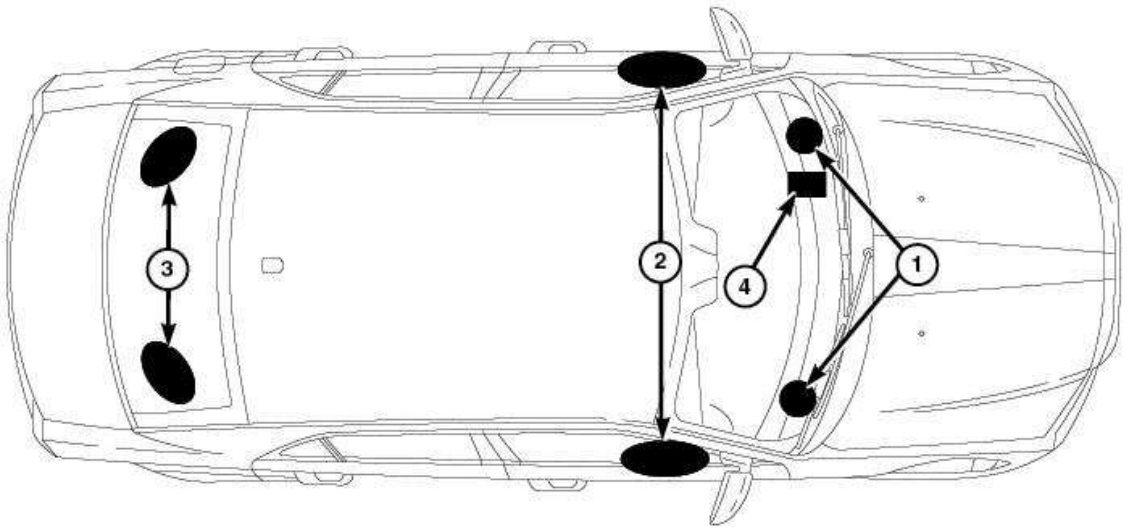


Fig. 374: Vapor Connection On Tank
Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the vapor line.

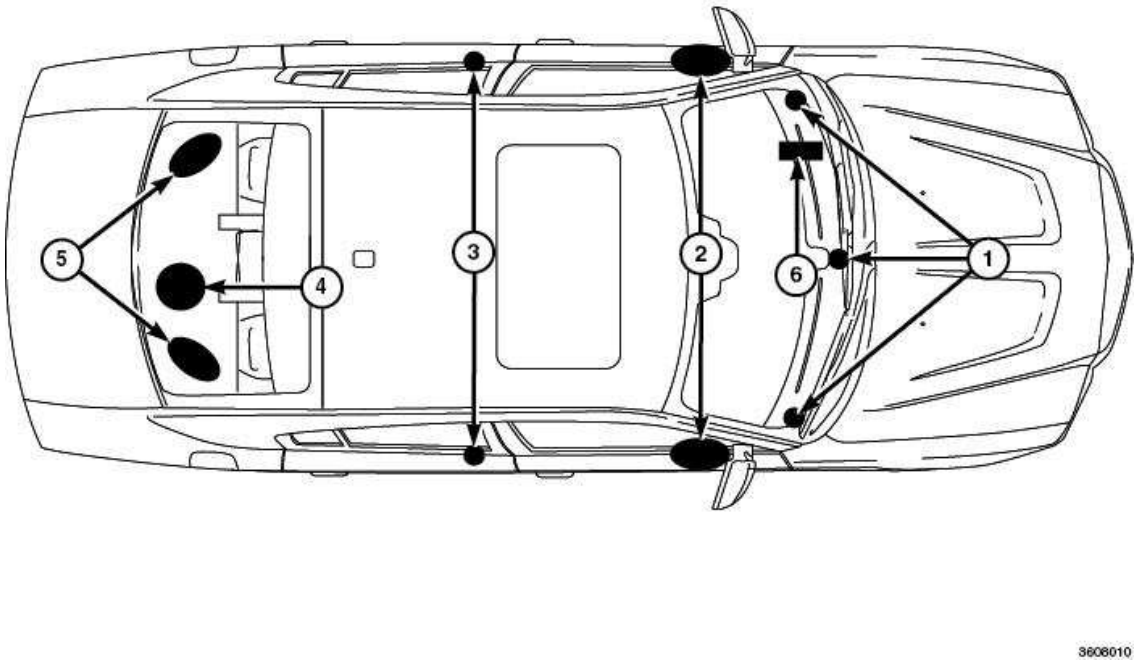


Fig. 375: Fuel Line Disconnected
Courtesy of CHRYSLER GROUP, LLC

19. Disconnect the fuel supply line.
20. Using a suitable hydraulic jack with a fuel tank adapter, support the fuel tank.

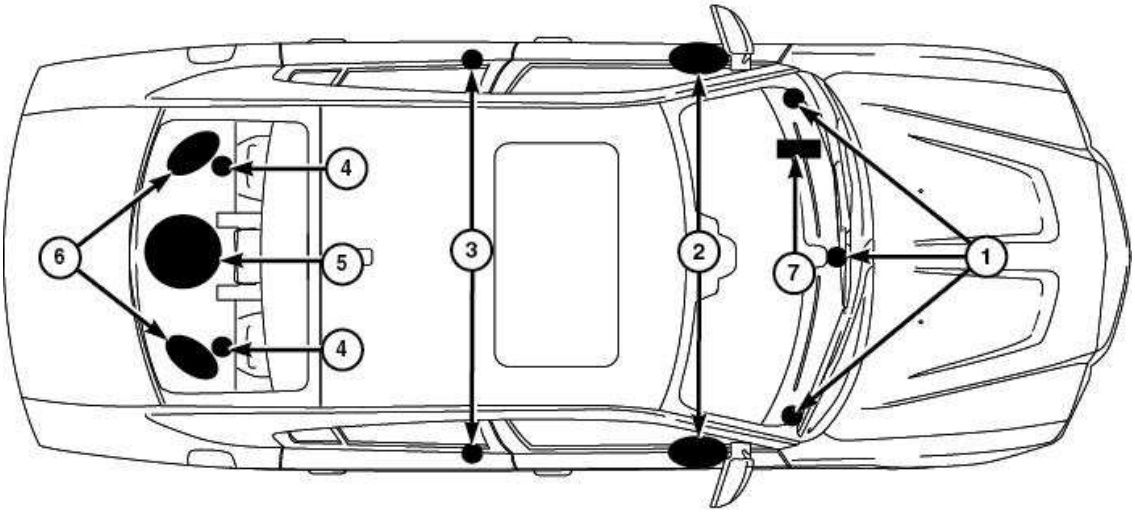


Fig. 376: Tank Strap Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove the fuel tank support strap retaining bolts.

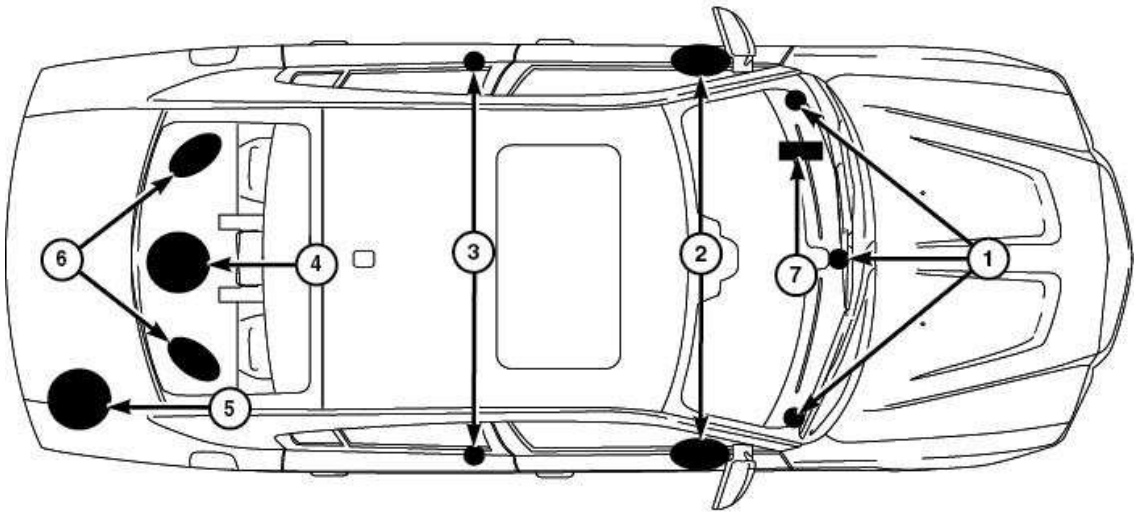


Fig. 377: Tank Straps
Courtesy of CHRYSLER GROUP, LLC

22. Remove the fuel tank support straps.

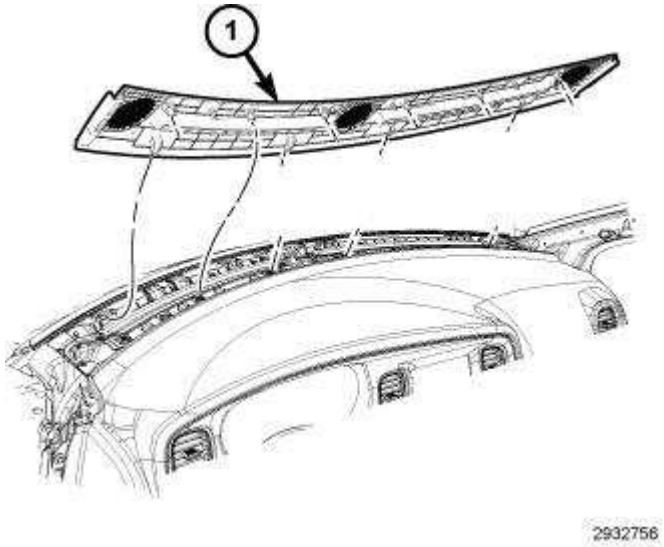


Fig. 378: Tank Vent Line Routing
Courtesy of CHRYSLER GROUP, LLC

23. Carefully lower the fuel tank and pull the ORVR vent line through bracket.

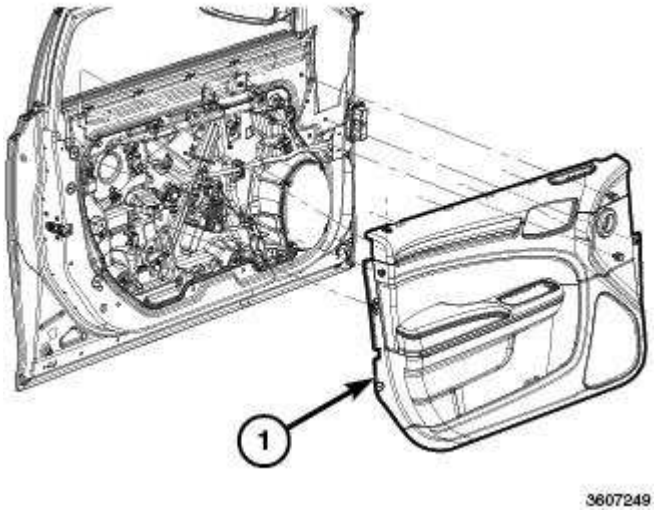


Fig. 379: Fuel Tank Assembly
Courtesy of CHRYSLER GROUP, LLC

24. Lower and remove the fuel tank from the vehicle.

INSTALLATION

INSTALLATION

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

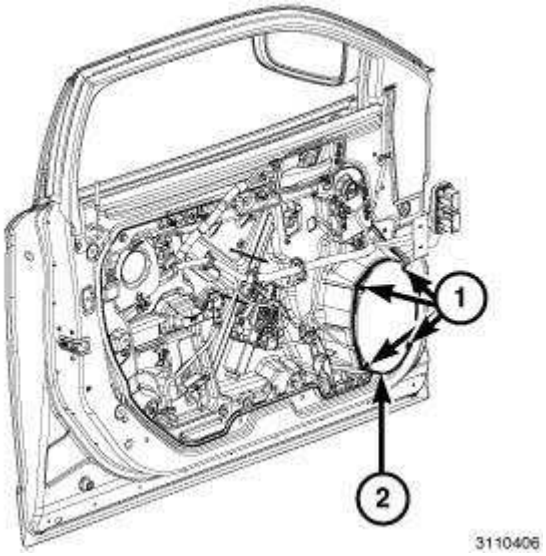


Fig. 380: Tank Straps
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the fuel pump modules. Refer to **MODULE, FUEL PUMP, INSTALLATION** or **MODULE, FUEL PUMP, INSTALLATION**.
2. Using a suitable hydraulic jack with a fuel tank adapter, support the fuel tank.
3. Carefully raise the fuel tank into position while guiding the ORVR vent line through bracket.
4. Position the fuel tank support straps.
5. Install fuel tank support strap retaining bolts and tighten to 27 N.m (20 ft. lbs.).

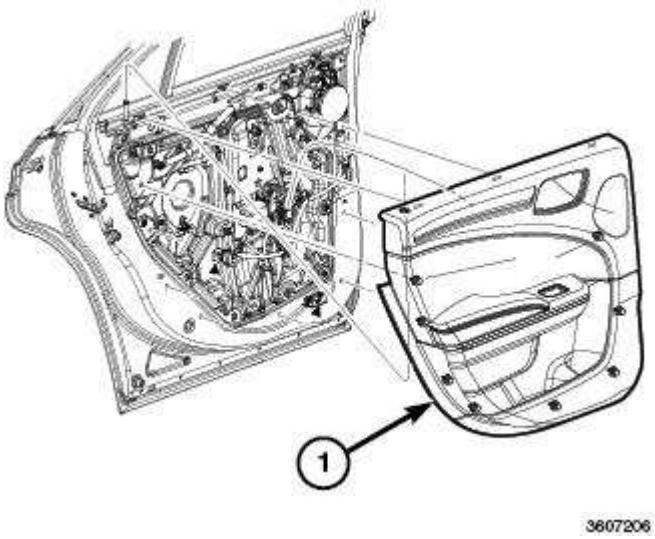


Fig. 381: Fuel Line Disconnected
Courtesy of CHRYSLER GROUP, LLC

6. Connect the fuel supply line.

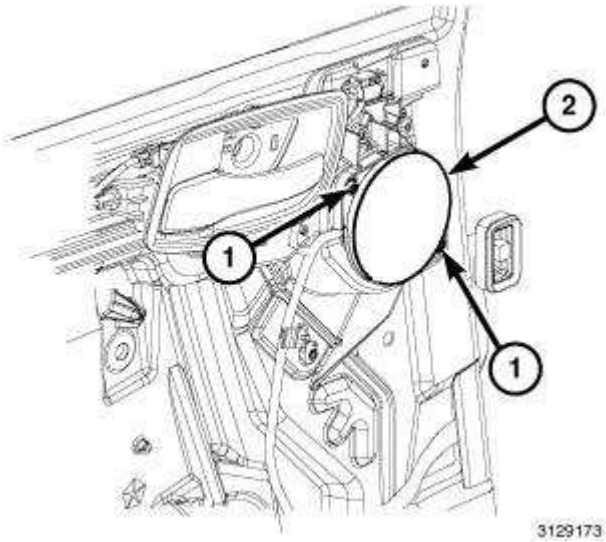


Fig. 382: Vapor Connection On Tank
Courtesy of CHRYSLER GROUP, LLC

7. Connect the vapor line.

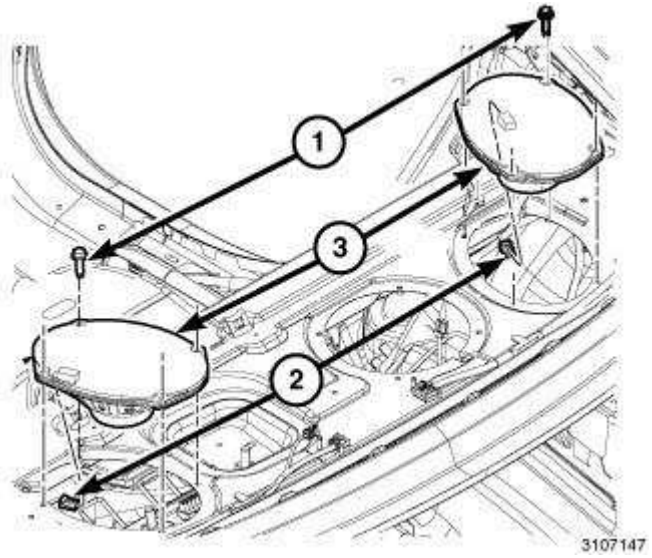


Fig. 383: EVAP Line
Courtesy of CHRYSLER GROUP, LLC

8. Connect the EVAP line in the right rear wheel well.

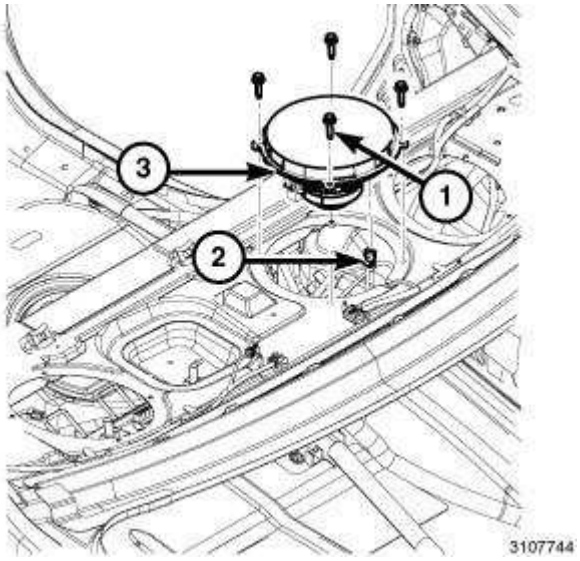


Fig. 384: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

9. Position the heat shield (1) and install the heat shield retainers (2).
10. Install the propeller shaft. Refer to **INSTALLATION** .

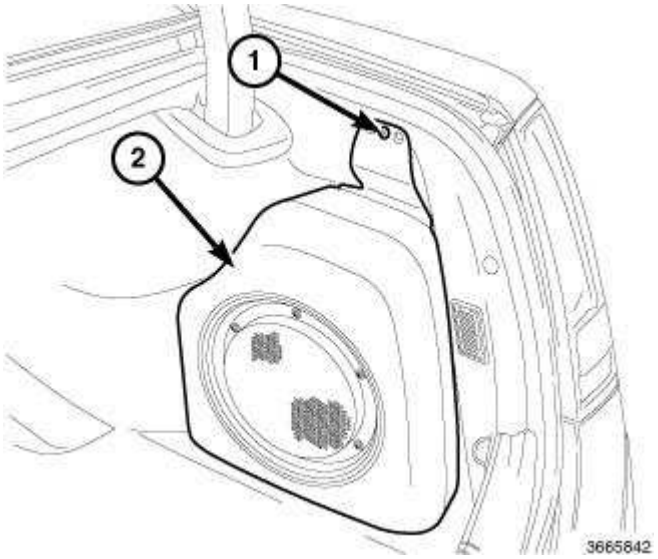


Fig. 385: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

11. Install the muffler and tailpipe assembly (2). Refer to **MUFFLER, EXHAUST, INSTALLATION** .

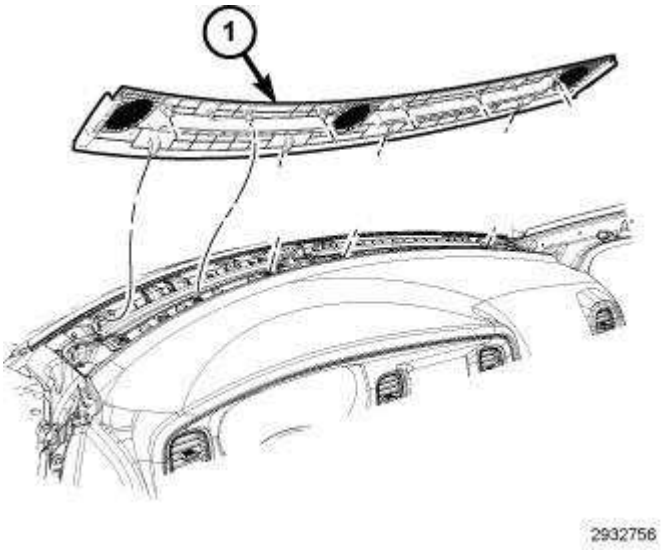


Fig. 386: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

12. Connect the fuel filler tube to the rubber hose on the fuel tank.

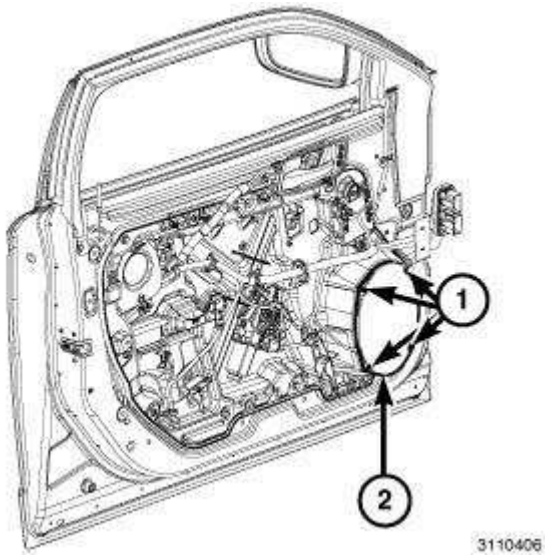


Fig. 387: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

13. Install the hose clamp to the rubber hose connecting the fuel filler tube to the fuel tank and tighten the clamp to 4 N.m (35 in. lbs.).

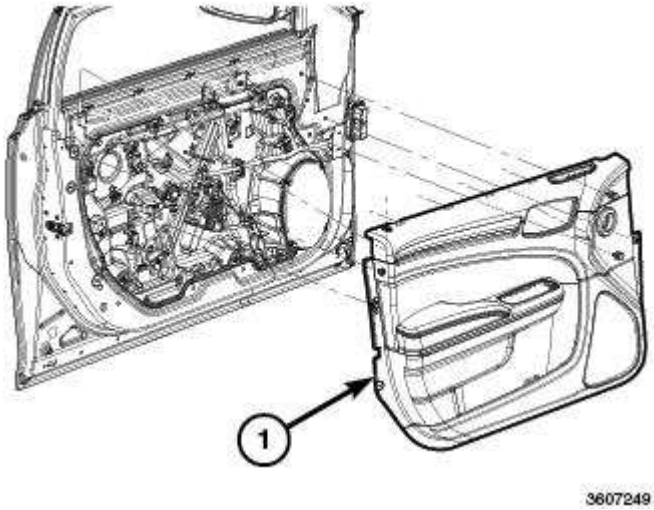


Fig. 388: Filler Tube Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

14. Connect the ORVR vent line (2).
15. Install the fuel filler tube retaining bolt (1) and tighten to 7 N.m (62 in. lbs.).

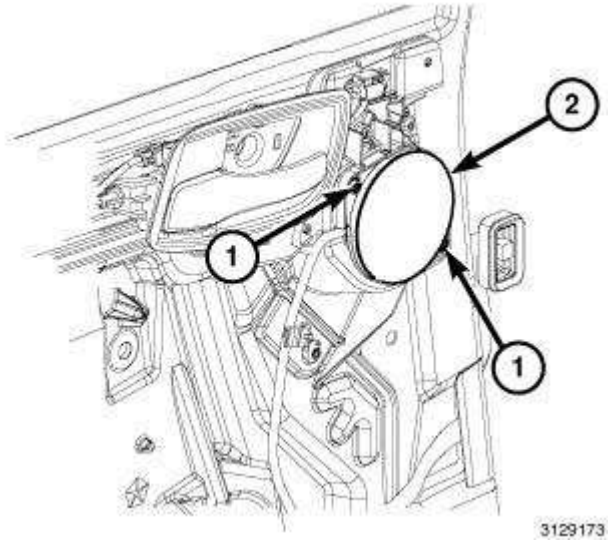


Fig. 389: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

16. Position the left rear wheelhouse splash shield (2).
17. Install the push-pins (1) that secure the rear wheelhouse shield to the body.
18. Install the left rear tire.

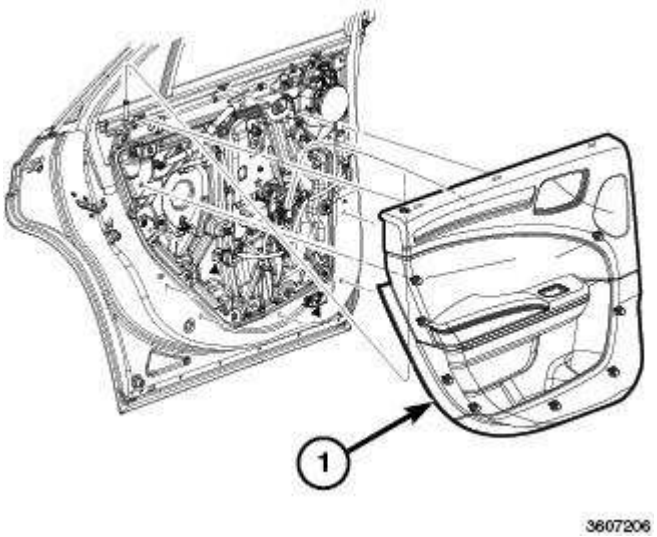


Fig. 390: Splash Shield DR Side
Courtesy of CHRYSLER GROUP, LLC

19. Install the left underbody splash shield (1).

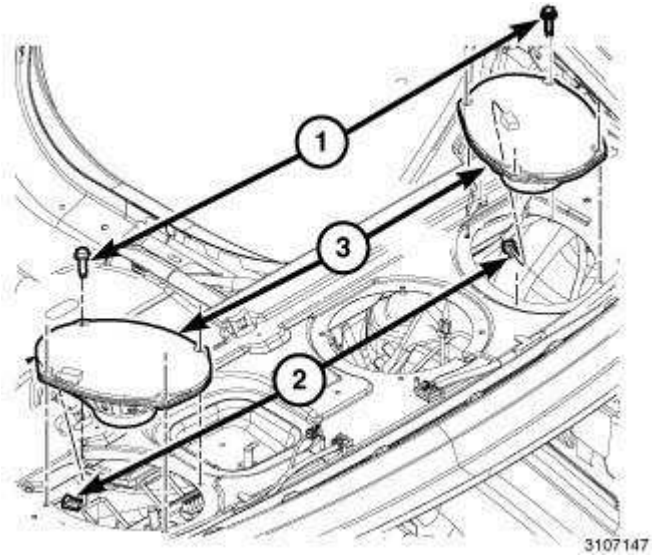


Fig. 391: Splash Shield PASS Side
Courtesy of CHRYSLER GROUP, LLC

20. Install the right underbody splash shield (1).
21. Lower the vehicle.

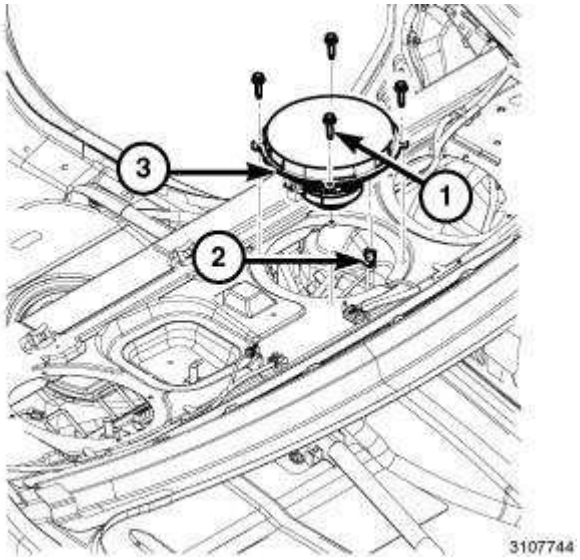


Fig. 392: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

22. Fill the fuel tank.
23. Connect the negative battery cable (1).
24. Use the scan tool to pressurize the fuel system and check for leaks.

TUBE, FUEL TANK FILLER

REMOVAL

REMOVAL

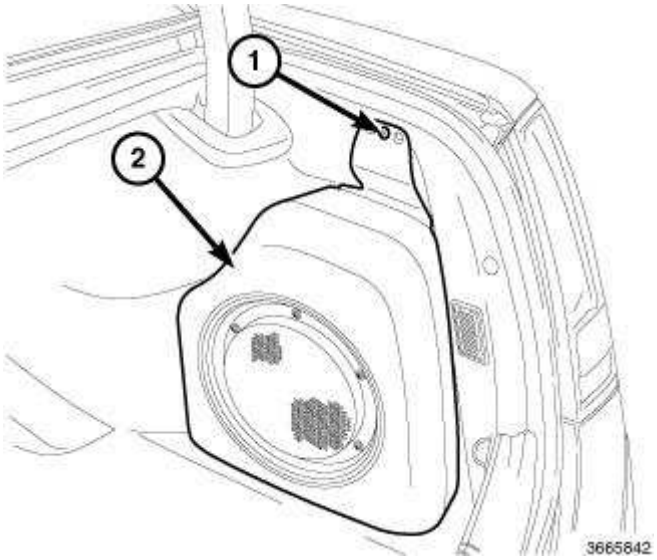


Fig. 393: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel tank draining procedure. Refer to **DRAINING FUEL TANK** .
2. Disconnect the negative battery cable (1).

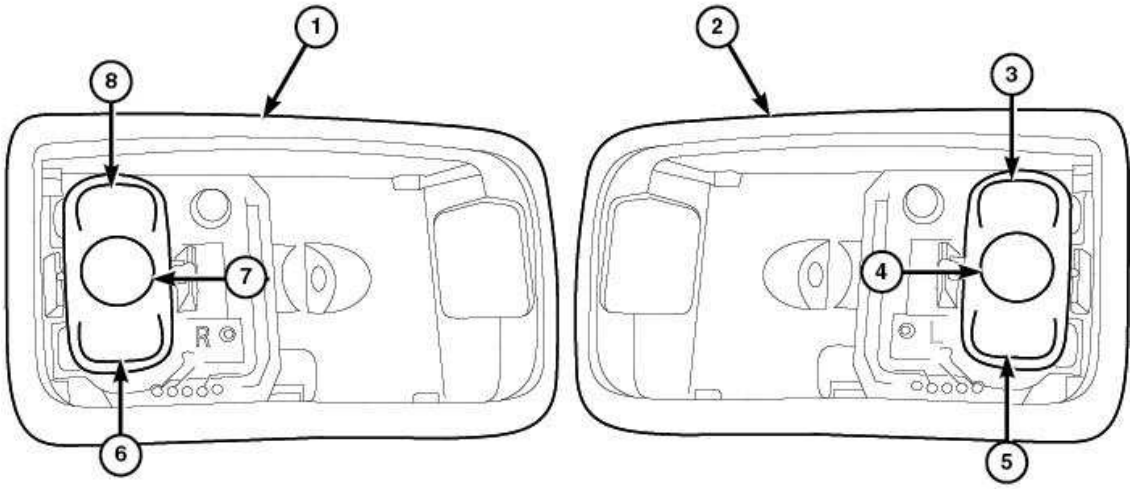


Fig. 394: Fuel Filler Door
Courtesy of CHRYSLER GROUP, LLC

3. Open the fuel filler door.
4. Partially raise and support vehicle.

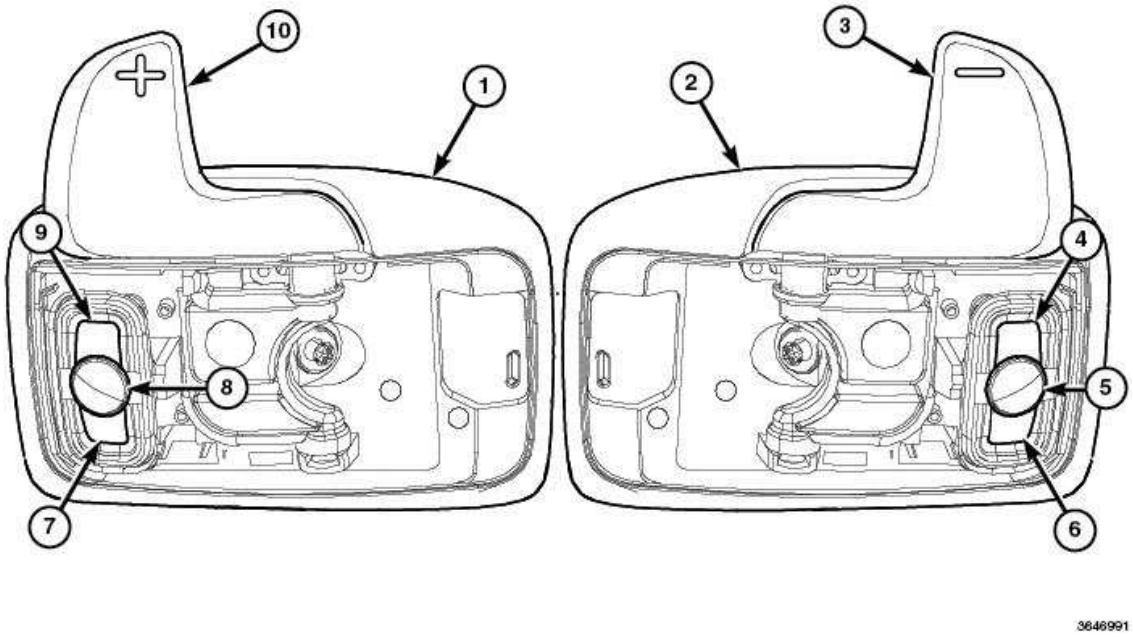


Fig. 395: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

5. Remove the left rear tire.
6. Remove the push-pins (1) that secure the rear wheelhouse splash shield (2) to the body.
7. Remove the rear wheelhouse splash shield from the vehicle.

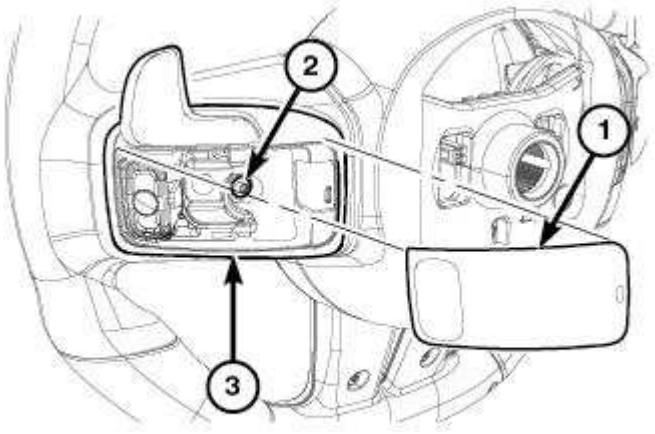


Fig. 396: Fuel Door Release Solenoid, Electrical Connector, Tabs & Fuel Filler Tube Housing

Courtesy of CHRYSLER GROUP, LLC

8. From behind the fender. Disconnect the fuel door release solenoid (4) electrical connector (5).
9. Press in the tabs (3) that hold the fuel filler tube housing (1) to the fender.

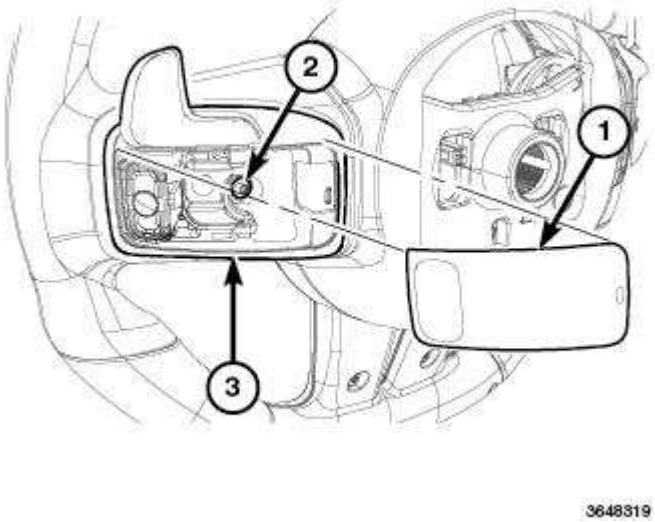


Fig. 397: Fuel Filler Support Housing And Position Aside
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual release cable for the fuel door is routed through a rubber grommet into the trunk. Complete removal of the filler tube housing is not necessary for filler tube service.

10. Remove the fuel filler support housing and position aside.

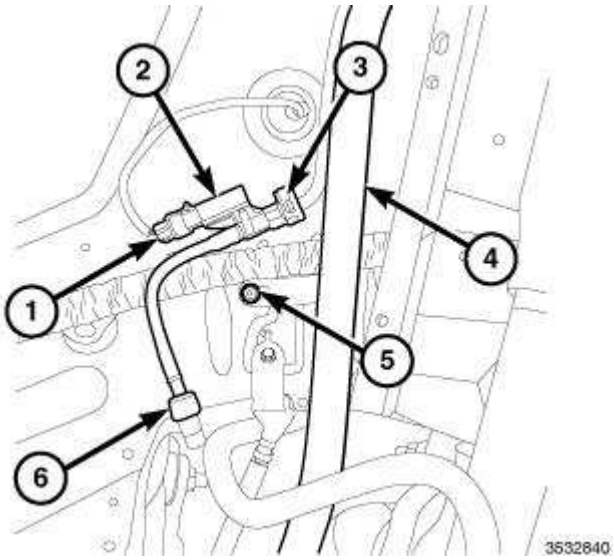


Fig. 398: Fuel Tank Pressure Sensor Electrical Connector, Filler Tube & Fuel Tank Vent Steel Line

Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the ORVR line (3) at the filler tube.
12. Remove the fuel filler tube retaining nut (5).
13. Raise and support the vehicle.

NOTE: The filler tube connecting hose to the fuel tank is pressure fitted to the filler tube. To remove the hose. It must be removed from the fuel tank side.

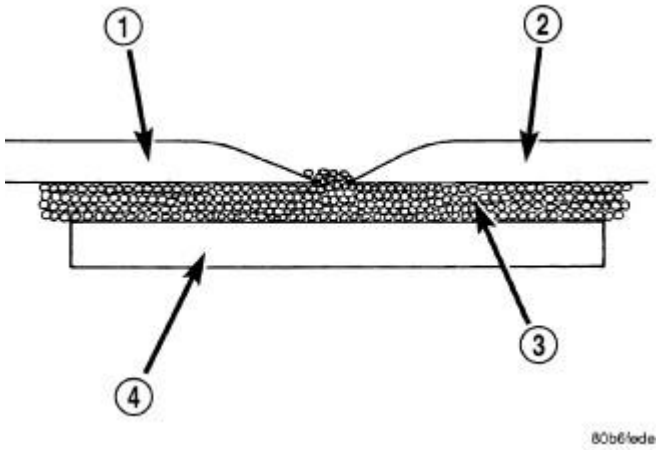


Fig. 399: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

14. Remove the hose clamp from the fuel tank. Leave the hose clamp tight at the fuel filler neck.

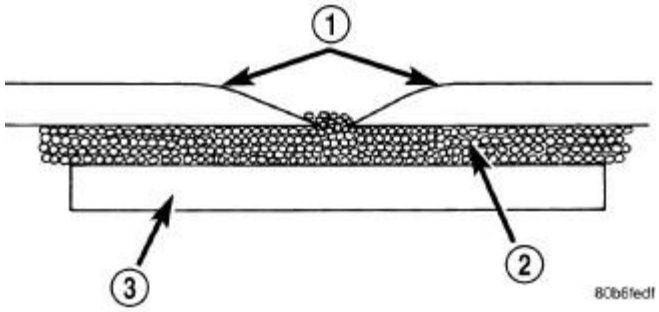


Fig. 400: Filler Tube Disconnected
Courtesy of CHRYSLER GROUP, LLC

15. Remove the fuel filler tube from the fuel tank and remove the fuel filler tube from below the vehicle.

INSTALLATION

INSTALLATION

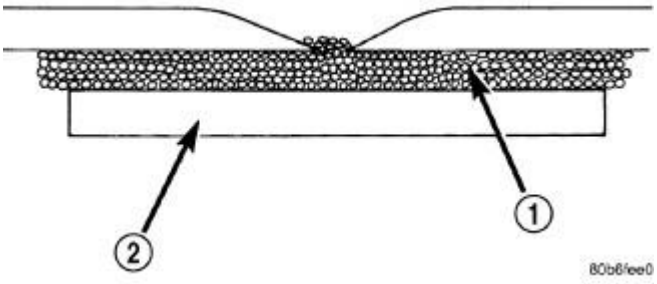


Fig. 401: Filler Tube Disconnected
Courtesy of CHRYSLER GROUP, LLC

1. Position the fuel filler tube into the vehicle.
2. Insert the fuel filler tube hose into the fuel tank filler neck.

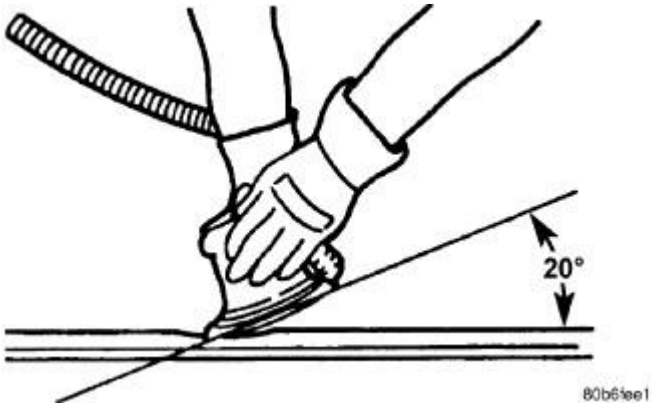


Fig. 402: Filler Tube
Courtesy of CHRYSLER GROUP, LLC

3. Slide the fuel filler tube hose clamp into position and tighten.

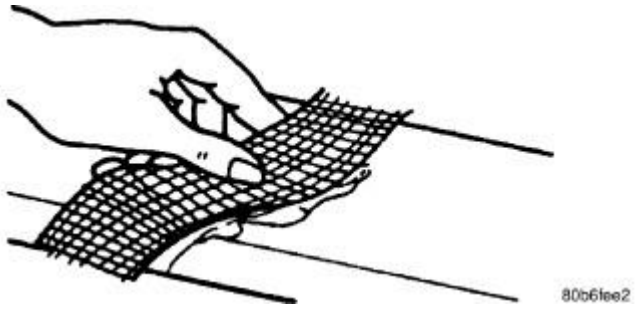


Fig. 403: Fuel Tank Pressure Sensor Electrical Connector, Filler Tube & Fuel Tank Vent Steel Line
Courtesy of CHRYSLER GROUP, LLC

4. Install the fuel filler tube retaining nut (5) and tighten to 12 N.m (9 ft. lbs.).
5. Reconnect the fuel filler tube ORVR line (3).
6. Partially lower vehicle.

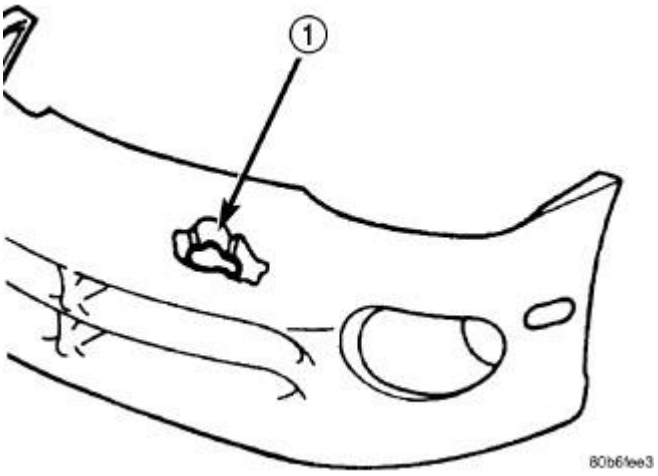


Fig. 404: Fuel Filler Housing
Courtesy of CHRYSLER GROUP, LLC

7. Install the fuel filler housing to the fender.
8. Align the fuel filler tube to the fuel filler housing rubber seal and press the housing into place.
9. Press the housing till it locks into place.

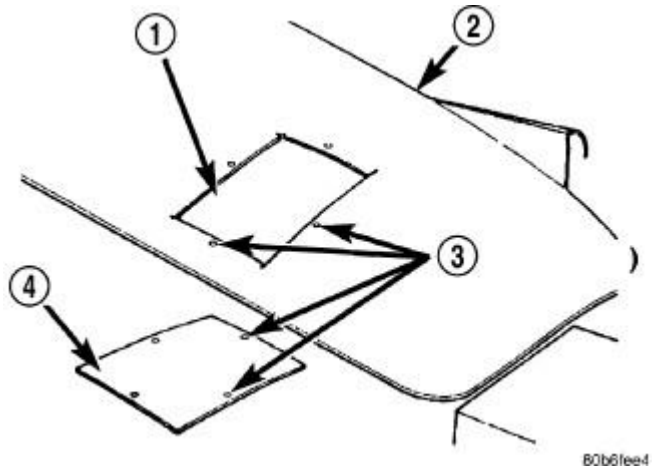


Fig. 405: Fuel Door Release Solenoid, Electrical Connector, Tabs & Fuel Filler Tube Housing
Courtesy of CHRYSLER GROUP, LLC

10. Connect the fuel door release solenoid electrical connector (5).

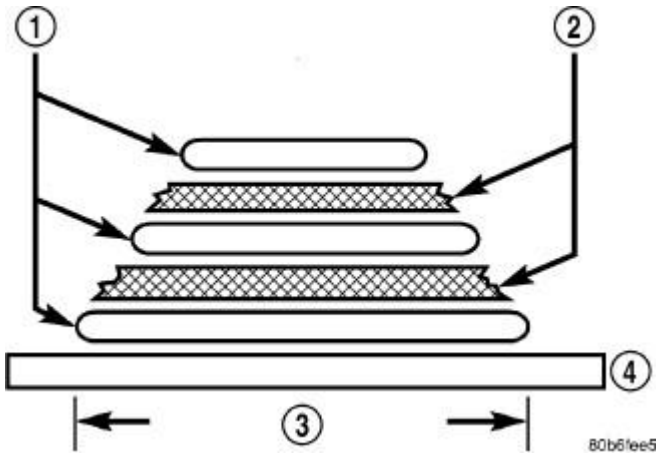


Fig. 406: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

11. Position the rear wheelhouse splash shield (2) to the body and install the push-pins (1).
12. Install the left rear tire.
13. Lower the vehicle.

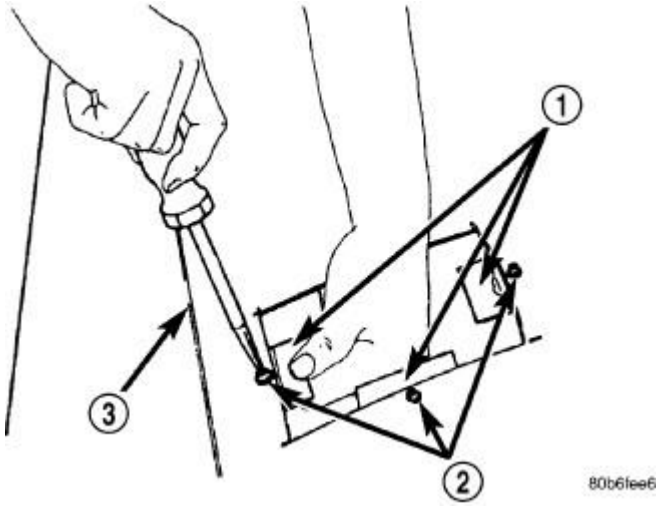


Fig. 407: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

14. Connect the negative battery cable (1).
15. Fill the fuel tank and check for leaks.

FUEL INJECTION, GAS

OPERATION

INJECTION SYSTEM

All engines used in this information have a sequential Multi-Port Electronic Fuel Injection system. The

MPI system is computer regulated and provides precise air/fuel ratios for all driving conditions. The Powertrain Control Module (PCM) operates the fuel injection system.

The PCM regulates:

- Ignition timing
- Air/fuel ratio
- Emission control devices
- Cooling fan
- Charging system
- Idle speed
- Vehicle speed control

Various sensors provide the inputs necessary for the PCM to correctly operate these systems. In addition to the sensors, various switches also provide inputs to the PCM.

The PCM can adapt its programming to meet changing operating conditions.

Fuel is injected into the intake port above the intake valve in precise metered amounts through electrically operated injectors. The PCM fires the injectors in a specific sequence. Under most operating conditions, the PCM maintains an air fuel ratio of 14.7 parts air to 1 part fuel by constantly adjusting injector pulse width. Injector pulse width is the length of time the injector is open.

The PCM adjusts injector pulse width by opening and closing the ground path to the injector. Engine RPM (speed) and manifold absolute pressure (air density) are the **primary** inputs that determine injector pulse width.

MODES OF OPERATION

As input signals to the PCM change, the PCM adjusts its response to output devices. For example, the PCM must calculate a different injector pulse width and ignition timing for idle than it does for Wide Open Throttle (WOT). There are several different modes of operation that determine how the PCM responds to the various input signals.

The multi-port fuel injection systems has the following modes of operation:

- Ignition switch ON (Zero RPM)
- Engine start-up
- Engine warm-up
- Cruise
- Idle
- Acceleration
- Deceleration
- Wide-Open-Throttle

- Ignition switch OFF

Within these modes of operation, there are two different types of operation, OPEN LOOP and CLOSED LOOP.

During OPEN LOOP operation the PCM receives input signals and responds according to preset PCM programming. Inputs from the upstream and downstream heated oxygen sensors are not monitored during OPEN LOOP operation, except for heated oxygen sensor diagnostics (they are checked for shorted conditions at all times).

During CLOSED LOOP operation the PCM monitors the inputs from the upstream and downstream heated oxygen sensors. The upstream heated oxygen sensor input tells the PCM if the calculated injector pulse width resulted in the ideal air-fuel ratio of 14.7 to one. By monitoring the exhaust oxygen content through the upstream heated oxygen sensor, the PCM can fine tune injector pulse width. Fine tuning injector pulse width allows the PCM to achieve optimum fuel economy combined with low emissions.

For the PCM to enter CLOSED LOOP operation, the following must occur:

1. Engine coolant temperature must be over 35°F (1.7°C).
    - If the coolant is over 35°F (1.7°C) the PCM will wait 38 seconds.
    - If the coolant is over 50°F (10°C) the PCM will wait 15 seconds.
    - If the coolant is over 167°F (75°C) the PCM will wait 3 seconds.
    - For other temperatures the PCM will interpolate the correct waiting time.
2. O2 sensor must read either greater than 0.745 volts or less than 0.29 volt.

OPEN LOOP operation is used for engine start-up (crank), engine warm-up, deceleration with fuel shutoff and wide open throttle. Under most conditions, acceleration, deceleration (with A/C on), idle and cruise modes, **with the engine at operating temperature** occur in CLOSED LOOP operation.

IGNITION SWITCH ON (ZERO RPM) MODE

When the ignition switch activates the fuel injection system, the following actions occur:

- The PCM monitors the engine coolant temperature sensor and throttle position sensor input. The PCM determines basic fuel injector pulse width from this input.
- The PCM determines atmospheric air pressure from the MAP sensor input to modify injector pulse width.

When the key is in the ON position and the engine is not running (zero RPM), the Auto Shutdown (ASD) and fuel pump relays de-energize after approximately 1 second. Therefore, battery voltage is not supplied to the fuel pump, ignition coil, fuel injectors and heated oxygen sensors.

ENGINE START-UP MODE

This is an OPEN LOOP mode. If the vehicle is in park or neutral (automatic transaxles) or the clutch

pedal is depressed (manual transaxles) the ignition switch energizes the starter relay when the engine is not running. The following actions occur when the starter motor is engaged.

- If the PCM receives the camshaft position sensor and crankshaft position sensor signals, it energizes the Auto Shutdown (ASD) relay and fuel pump relay. If the PCM does not receive both signals within approximately one second, it will not energize the ASD relay and fuel pump relay. The ASD and fuel pump relays supply battery voltage to the fuel pump, fuel injectors, ignition coil, (EGR solenoid and PCV heater if equipped) and heated oxygen sensors.
- The PCM energizes the injectors (on the 69° falling edge) for a calculated pulse width until it determines crankshaft position from the camshaft position sensor and crankshaft position sensor signals. The PCM determines crankshaft position within 1 engine revolution.
- After determining crankshaft position, the PCM begins energizing the injectors in sequence. It adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.
- When the engine idles within ±64 RPM of its target RPM, the PCM compares current MAP sensor value with the atmospheric pressure value received during the Ignition Switch On (zero RPM) mode.

Once the ASD and fuel pump relays have been energized, the PCM determines injector pulse width based on the following:

- MAP
- Engine RPM
- Battery voltage
- Engine coolant temperature
- Inlet/Intake air temperature (IAT)
- Throttle position
- The number of engine revolutions since cranking was initiated

During Start-up the PCM maintains ignition timing at 9° BTDC.

ENGINE WARM-UP MODE

This is an OPEN LOOP mode. The following inputs are received by the PCM:

- Manifold Absolute Pressure (MAP)
- Crankshaft position (engine speed)
- Engine coolant temperature
- Inlet/Intake air temperature (IAT)
- Camshaft position
- Knock sensor
- Throttle position
- A/C switch status

- Battery voltage
- Vehicle speed
- Speed control
- O2 sensors

The PCM adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.

The PCM adjusts ignition timing and engine idle speed. Engine idle speed is adjusted through the idle air control motor.

CRUISE OR IDLE MODE

When the engine is at operating temperature this is a CLOSED LOOP mode. During cruising or idle the following inputs are received by the PCM:

- Manifold absolute pressure
- Crankshaft position (engine speed)
- Inlet/Intake air temperature
- Engine coolant temperature
- Camshaft position
- Knock sensor
- Throttle position
- Exhaust gas oxygen content (O2 sensors)
- A/C switch status
- Battery voltage
- Vehicle speed

The PCM adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.

The PCM adjusts engine idle speed and ignition timing. The PCM adjusts the air/fuel ratio according to the oxygen content in the exhaust gas (measured by the upstream and downstream heated oxygen sensor).

The PCM monitors for engine misfire. During active misfire and depending on the severity, the PCM either continuously illuminates or flashes the malfunction indicator lamp (Check Engine light on instrument panel). Also, the PCM stores an engine misfire DTC in memory, if 2nd trip with fault.

The PCM performs several diagnostic routines. They include:

- Oxygen sensor monitor
- Downstream heated oxygen sensor diagnostics during open loop operation (except for shorted)

- Fuel system monitor
- EGR monitor (if equipped)
- Purge system monitor
- Catalyst efficiency monitor
- All inputs monitored for proper voltage range, rationality.
- All monitored components (refer to **ON-BOARD DIAGNOSTICS**).

The PCM compares the upstream and downstream heated oxygen sensor inputs to measure catalytic convertor efficiency. If the catalyst efficiency drops below the minimum acceptable percentage, the PCM stores a diagnostic trouble code in memory, after 2 trips.

During certain idle conditions, the PCM may enter a variable idle speed strategy. During variable idle speed strategy the PCM adjusts engine speed based on the following inputs.

- A/C status
- Battery voltage
- Battery temperature or Calculated Battery Temperature
- Engine coolant temperature
- Engine run time
- Inlet/Intake air temperature
- Vehicle mileage

ACCELERATION MODE

This is a CLOSED LOOP mode. The PCM recognizes an abrupt increase in Throttle Position sensor output voltage or MAP sensor output voltage as a demand for increased engine output and vehicle acceleration. The PCM increases injector pulse width in response to increased fuel demand.

- Wide Open Throttle-open loop

DECELERATION MODE

This is a CLOSED LOOP mode. During deceleration the following inputs are received by the PCM:

- A/C status
- Battery voltage
- Inlet/Intake air temperature
- Engine coolant temperature
- Crankshaft position (engine speed)
- Exhaust gas oxygen content (upstream heated oxygen sensor)
- Knock sensor
- Manifold absolute pressure

- Throttle position sensor
- IAC motor (solenoid) control changes in response to MAP sensor feedback

The PCM may receive a closed throttle input from the Throttle Position Sensor (TPS) when it senses an abrupt decrease in manifold pressure. This indicates a hard deceleration (Open Loop). In response, the PCM may momentarily turn off the injectors. This helps improve fuel economy, emissions and engine braking.

WIDE-OPEN-THROTTLE MODE

This is an OPEN LOOP mode. During wide-open-throttle operation, the following inputs are used by the PCM:

- Inlet/Intake air temperature
- Engine coolant temperature
- Engine speed
- Knock sensor
- Manifold absolute pressure
- Throttle position

When the PCM senses a wide-open-throttle condition through the Throttle Position Sensor (TPS) it de-energizes the A/C compressor clutch relay. This disables the air conditioning system and disables EGR (if equipped).

The PCM adjusts injector pulse width to supply a predetermined amount of additional fuel, based on MAP and RPM.

IGNITION SWITCH OFF MODE

When the operator turns the ignition switch to the OFF position, the following occurs:

- All outputs are turned off, unless 02 Heater Monitor test is being run. Refer to **ON-BOARD DIAGNOSTICS** .
- No inputs are monitored except for the heated oxygen sensors. The PCM monitors the heating elements in the oxygen sensors and then shuts down.

FUEL ECONOMY AND MAINTENANCE

A vehicle that is not properly tuned and maintained cannot be expected to perform at its maximum efficiency and can have an adverse effect on fuel economy. The following recommendations will ensure that the vehicle is performing at its maximum efficiency:

- **Use the recommended motor oil grade.** Using the manufacturer's recommended grade of Mopar® motor oil can improve fuel mileage by 1-2%. Mopar® motor oil labeled "Energy Conserving" contains friction-reducing additives.

- **Check and replace air filters.** Replacing a clogged air filter with a new Mopar® air filter can improve fuel mileage by as much as 10%.
- **Keep the engine tuned.** Repairing a vehicle that is noticeably out of tune can improve fuel mileage by an average of 4%. Maintaining a vehicle and repairing problems, such as a faulty oxygen sensor, can improve mileage by as much as 40%.
- **Keep tires properly inflated.** Underinflated tires can lower fuel mileage by 0.4% for every 1 psi drop in pressure of all four tires.

FUEL CORRECTION OR ADAPTIVE MEMORIES

OPERATION

SHORT TERM

Short Term Adaptive or Short Term Fuel Trim (STFT) is an immediate correction to fuel injector pulse width. During Closed Loop operation, Short Term Adaptive makes immediate adjustments to fuel delivery in direct response to the signal from the upstream O2 sensor. The PCM infers air/fuel ratio by monitoring oxygen content measured by the upstream O2 stream sensor.

This is an immediate response to the O2 sensor signal that is not switching or is consistently high or low. If the upstream oxygen sensor voltage is not consistently switching between 2.5 and 3.5 volts, the PCM knows that the base pulse width calculation needs to be modified by adjusting the injector pulse width until the correct O2 sensor voltage is achieved. The need to adjust the injector pulse width may be a result of vehicle operating conditions, engine wear, fuel quality, etc. The maximum range of authority for Short Term Adaptive is ±33%. Short Term Adaptive values are not stores when the ignition is off.

LONG TERM

The main function of Long Term Adaptive is to make fuel corrections that permit Short Term Adaptive to hover around zero. In order to maintain correct emissions throughout all operating ranges of the engines, a cell structure based on engine RPM and load (MAP) is used.

There are 26 cells used for the NGC. Two of the cells are used only during idle, as determined by throttle position and park/neutral switch input. The other cells each represent a given off-idle manifold pressure and RPM range.

After the vehicle has reached full operating temperature, short term correction factors will update Long Term Adaptive Memory cells based on vehicle load (RPM/MAP) to allow the Short Term Adaptive value to be brought back to near zero. Once this correction factor is updated in the memory, it will be used by the PCM under all operating conditions, open loop and closed loop. However, the values stored in the Long-term are updated only after the vehicle has entered long-term closed loop at full operating temperature. This is done to prevent any transition temperature or start-up compensation form corrupting long term fuel correction.

Long Term and Short Term Adaptive can each change the pulse width by as much as ±33% for a maximum total correction of ±66% from base pulse width calculation. Long Term Adaptive values are

used during both Open Loop and Closed Loop operation.

SYSTEM DIAGNOSIS

OPERATION

The PCM can test many of its own input and output circuits. If the PCM senses a fault in a major system, the PCM stores a Diagnostic Trouble Code (DTC) in memory.

For DTC information see On-Board Diagnostics. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Camshaft Position Sensor - Bolt (3.6L)	8	-	71
Camshaft Position Sensor - Bolt (5.7L)	12	9	-
Crankshaft Position Sensor - Bolt (3.6L)	12	9	-
Crankshaft Position Sensor - Bolt (5.7L)	12	9	-
Coolant Temperature Sensor (3.6L/5.7L)	11	8	-
Knock Sensor - Bolt (3.6L)	23	17	-
Knock Sensor - Bolt (5.7L)	20	15	-
Oxygen Sensor (3.6L/5.7L)	41	30	-
Powertrain Control Module - Bolts	4	-	35
Throttle Body - Bolts (3.6L)	6	-	53
Throttle Body - Bolts (5.7L)	12	9	-
Throttle Body Bracket - Bolts (3.6L)	27	20	-
Short Runner Valve - Bolts (5.7L)	7	-	62
Fuel Rail - Bolts (3.6L)	9	-	80
Fuel Rail - Bolts (5.7L)	11	8	-

INJECTOR(S), FUEL

REMOVAL

3.6L

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

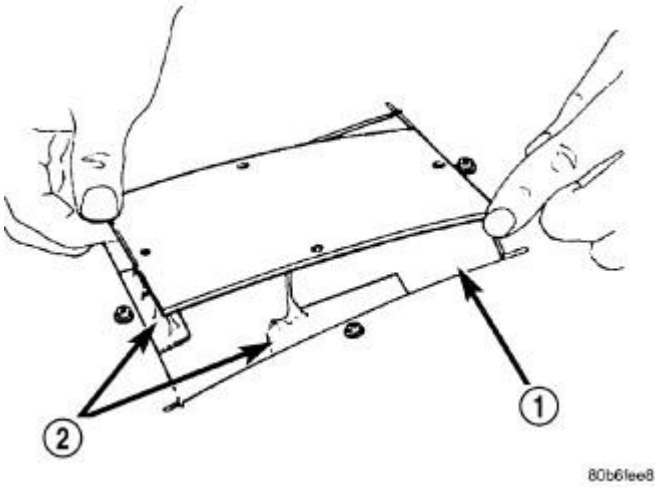


Fig. 408: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect and isolate the negative battery cable (1).

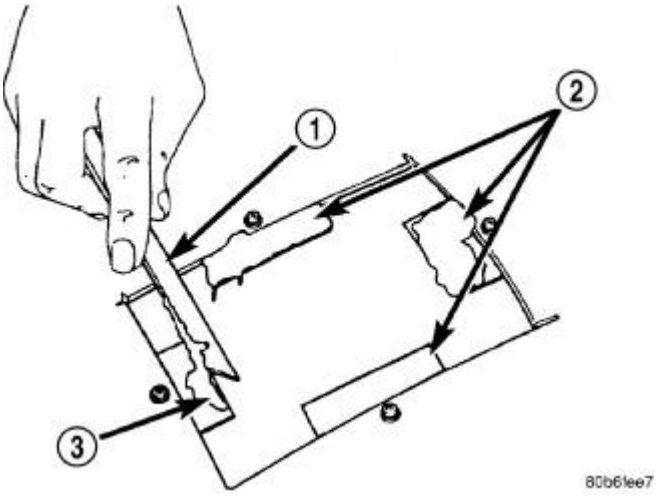


Fig. 409: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

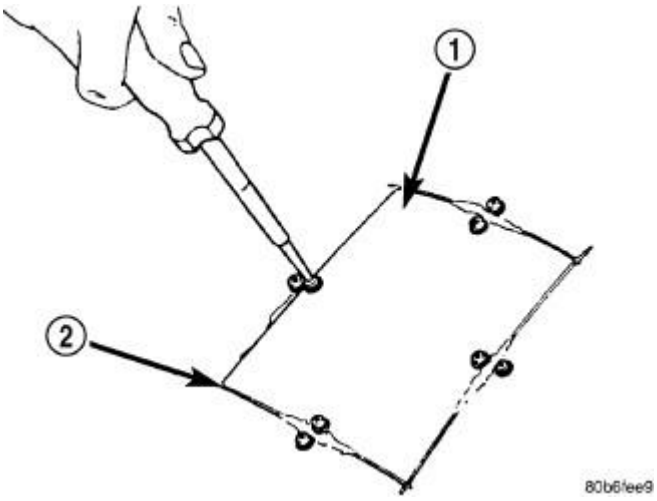


Fig. 410: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
5. Loosen the clamp (2) at the throttle body.
6. Loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
8. Remove the air inlet hose assembly (5).

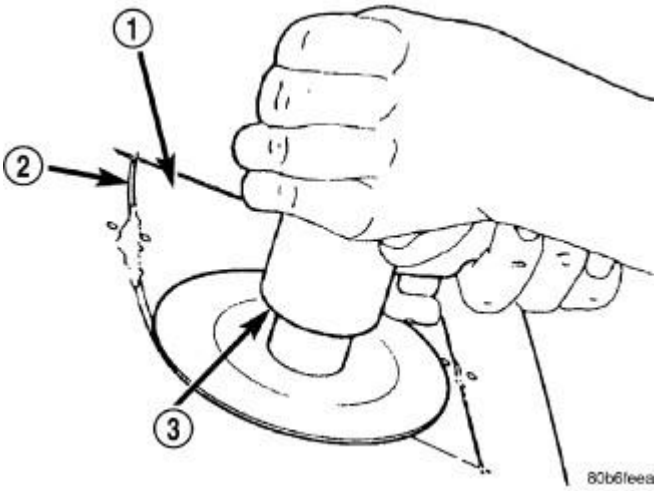


Fig. 411: Fuel Rail & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing the fuel rail from the lower intake manifold, one or more fuel injectors may remain in the intake manifold resulting in residual fuel spilling onto the engine from the fuel rail.

9. Remove the upper intake manifold and fuel rail (2). Refer to **RAIL, FUEL, REMOVAL** or **RAIL,**

FUEL, REMOVAL.

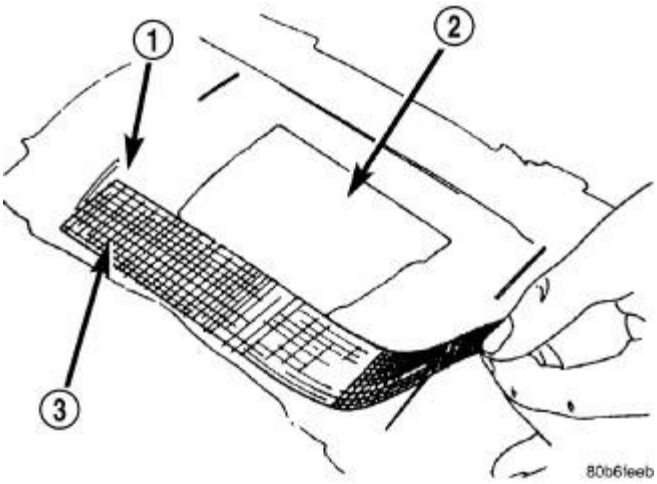


Fig. 412: Fuel Injectors & The Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 2 fuel injector removal shown in illustration, all other fuel injectors similar.

10. Remove the fuel injectors (1) from the fuel rail (2).

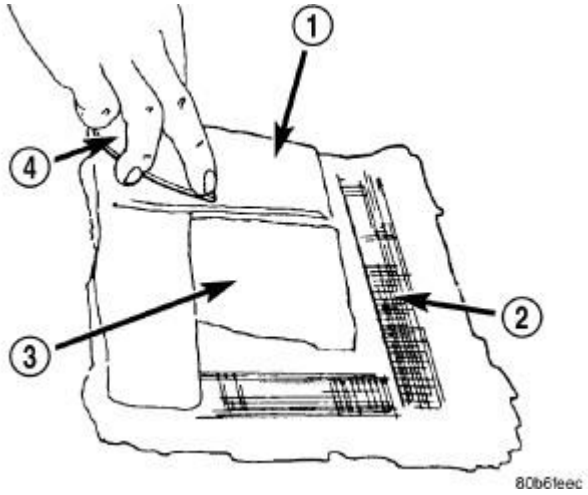


Fig. 413: Fuel Injectors
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 2 fuel injector removal shown in illustration, all other fuel injectors similar.

11. Remove the fuel injectors (1) from the lower intake manifold.

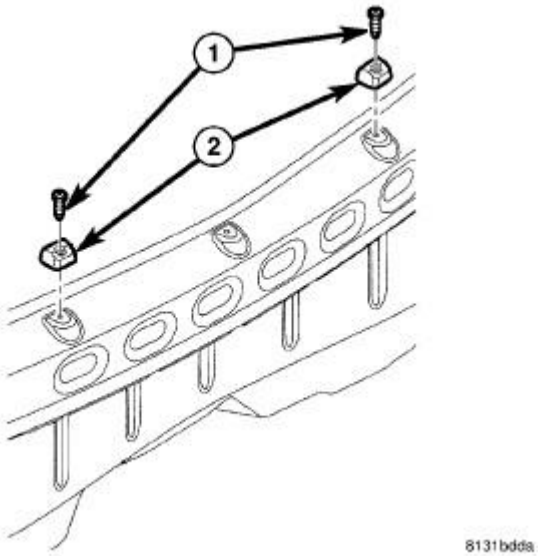


Fig. 414: O-ring Seals
Courtesy of CHRYSLER GROUP, LLC

12. Remove and discard all fuel injector O-ring seals (1).

5.7L

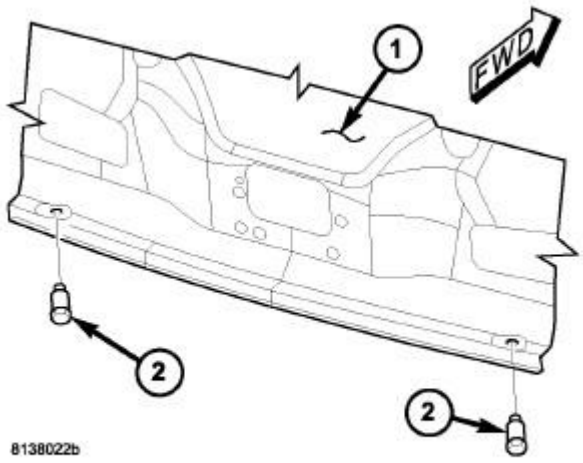


Fig. 415: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

WARNING: The fuel system is under constant pressure even with engine off. Before servicing fuel injector(s), fuel system pressure must be released.

NOTE: To remove one or more fuel injectors, the fuel rail assembly must be removed from engine.

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove the fuel rail assembly (1). Refer to **RAIL, FUEL, REMOVAL** or **RAIL, FUEL, REMOVAL**.
3. Remove the fuel injector retaining clip(s) (2) from the fuel rail (1).
4. Remove the injector(s) from the fuel rail assembly.

INSTALLATION

3.6L

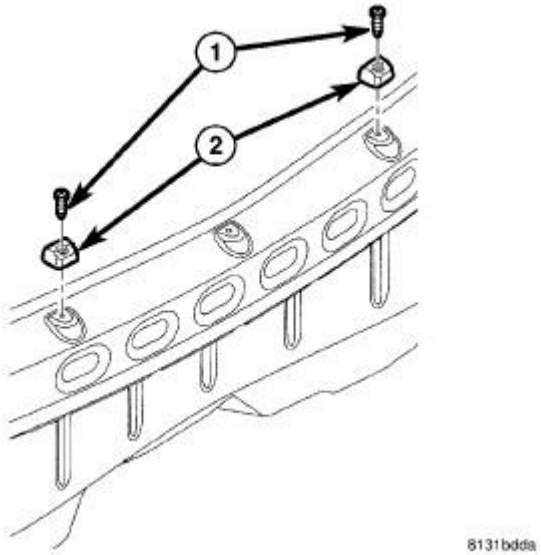


Fig. 416: O-ring Seals
Courtesy of CHRYSLER GROUP, LLC

1. Lightly lubricate the new O-ring seals (1) with clean engine oil and position the seals onto the fuel injector (2).

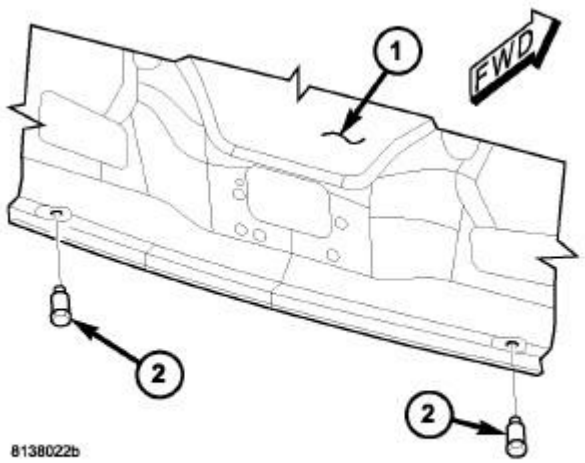


Fig. 417: O-ring Seals & Fuel Injector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 2 fuel injector installation shown in illustration, all other fuel injectors similar.

2. Install the fuel injectors (1) into the fuel rail (2).

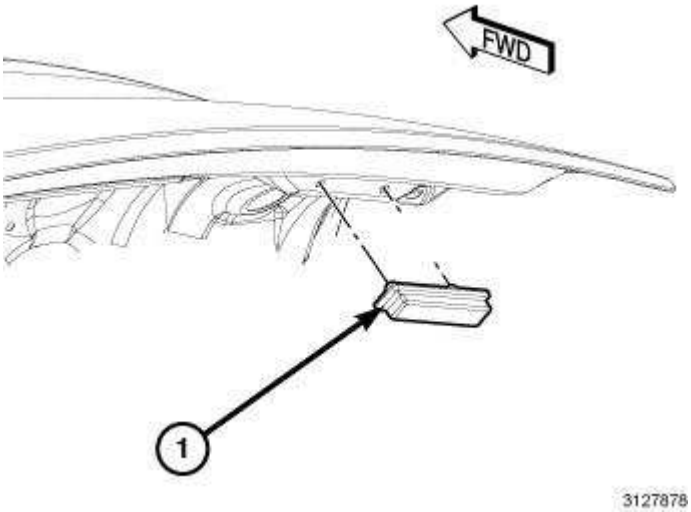


Fig. 418: Fuel Rail Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Install the fuel rail and upper intake manifold. Refer to **RAIL, FUEL, INSTALLATION** or **RAIL, FUEL, INSTALLATION**.

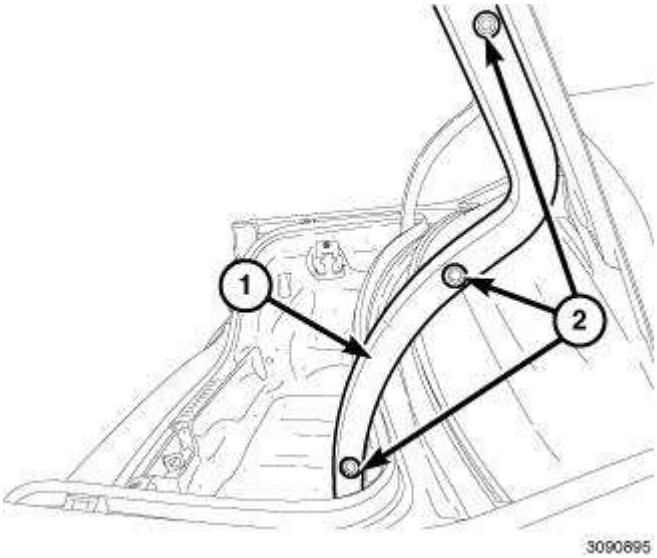


Fig. 419: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
5. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
6. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
7. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
8. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

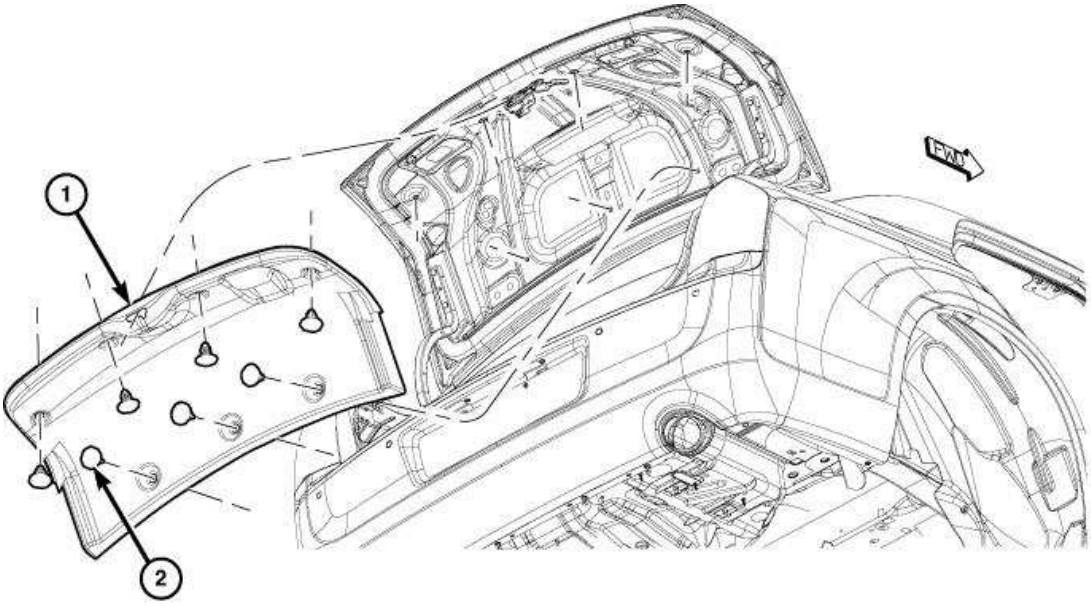


Fig. 420: Engine Cover

Courtesy of CHRYSLER GROUP, LLC

9. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

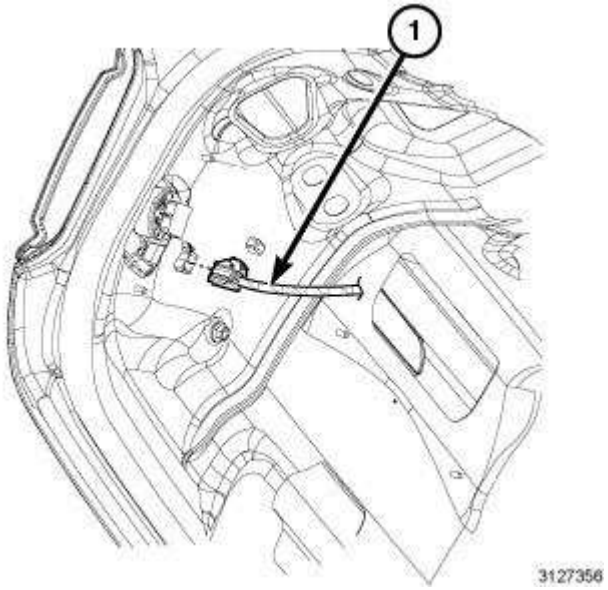


Fig. 421: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

10. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
11. Start the engine and check for leaks.

5.7L

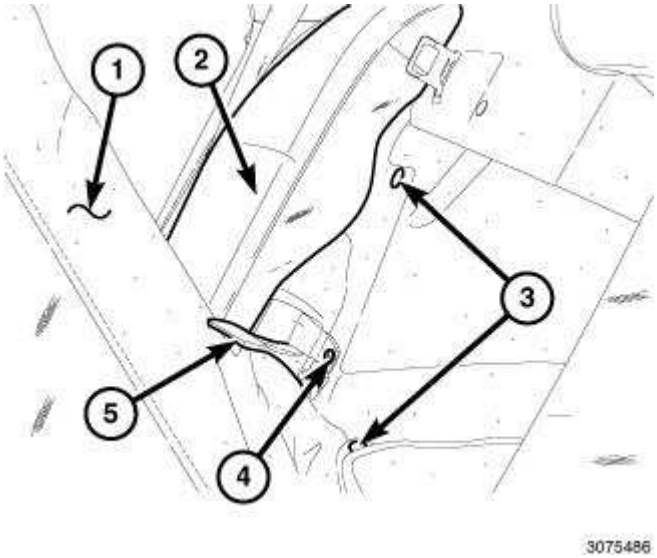


Fig. 422: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Right side shown in illustration, left side similar.**

NOTE: **The fuel injector O-rings may be used again, provided no cuts, tears, or deformation have occurred.**

1. Inspect the fuel injector O-rings (3) and replace if necessary.
2. Apply a small amount of engine oil to each fuel injector O-rings.
3. Install the fuel injector(s) into the fuel rail and install the retaining clip(s) (2).
4. Install the fuel rail assembly (1) Refer to **RAIL, FUEL, INSTALLATION** or **RAIL, FUEL, INSTALLATION**.
5. Start the engine and check for leaks.

PEDAL, ACCELERATOR

REMOVAL

REMOVAL

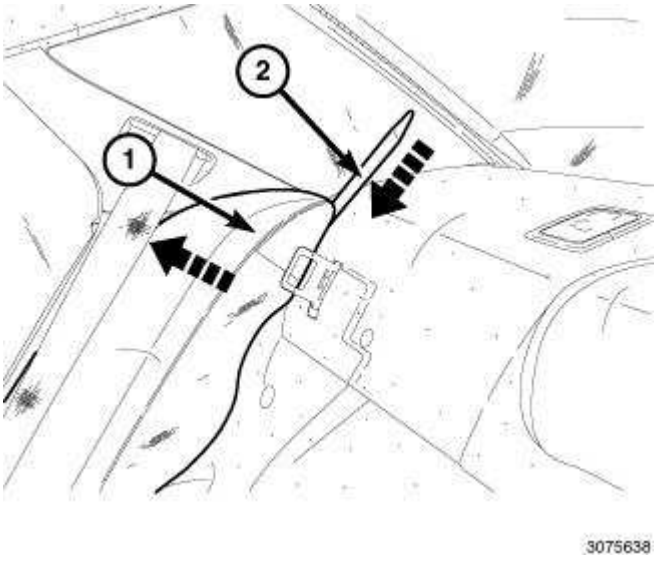


Fig. 423: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).

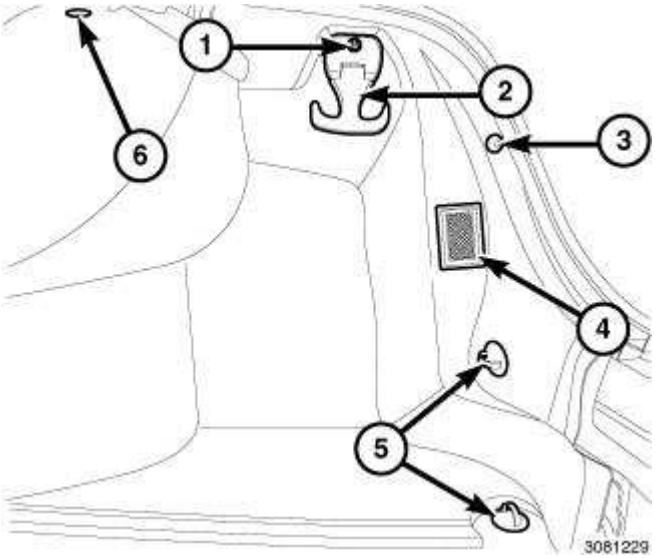


Fig. 424: Cable Attachment To Accelerator Module
Courtesy of CHRYSLER GROUP, LLC

2. If equipped with adjustable pedals, remove the adjuster cable (1) at accelerator pedal adjuster motor (2).

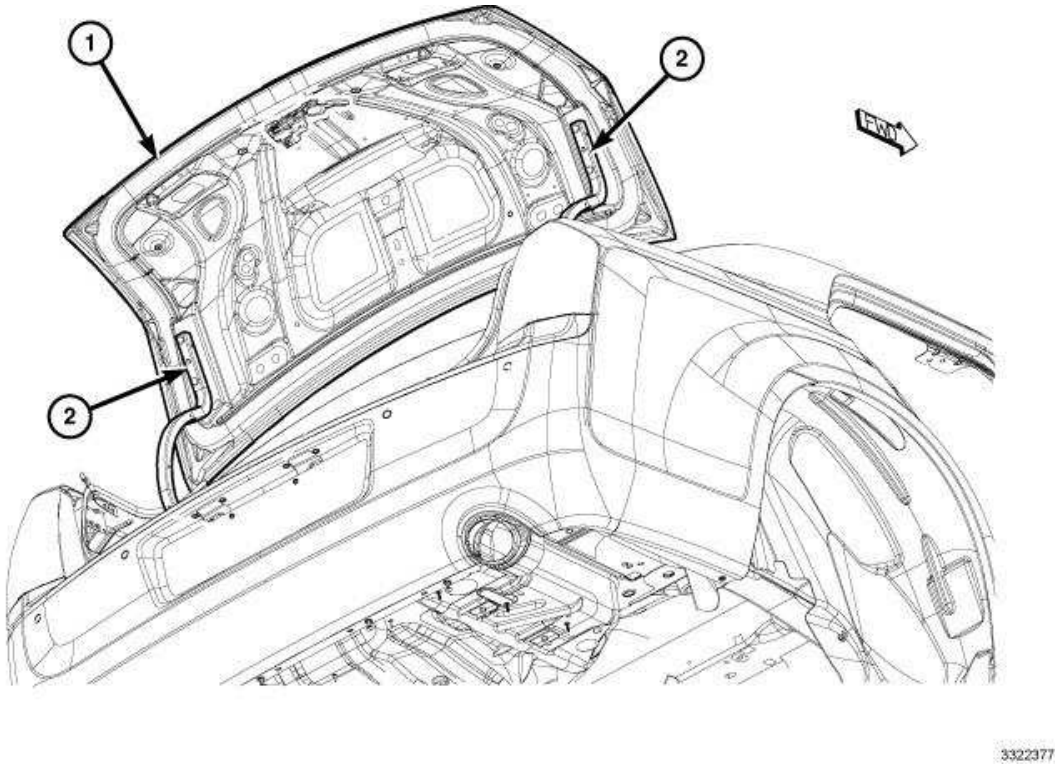


Fig. 425: Accelerator Pedal Adjuster Motor & Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not attempt to separate or remove the Accelerator Pedal Position

Sensor (APPS) from the accelerator pedal assembly. The APPS and the accelerator pedal is replaced as an assembly. If the sensor is removed from the pedal, the electronic calibration may be destroyed.

3. Disconnect the electrical connector at the accelerator pedal adjuster motor (1).
4. Disconnect both electrical connectors at the APPS (2).

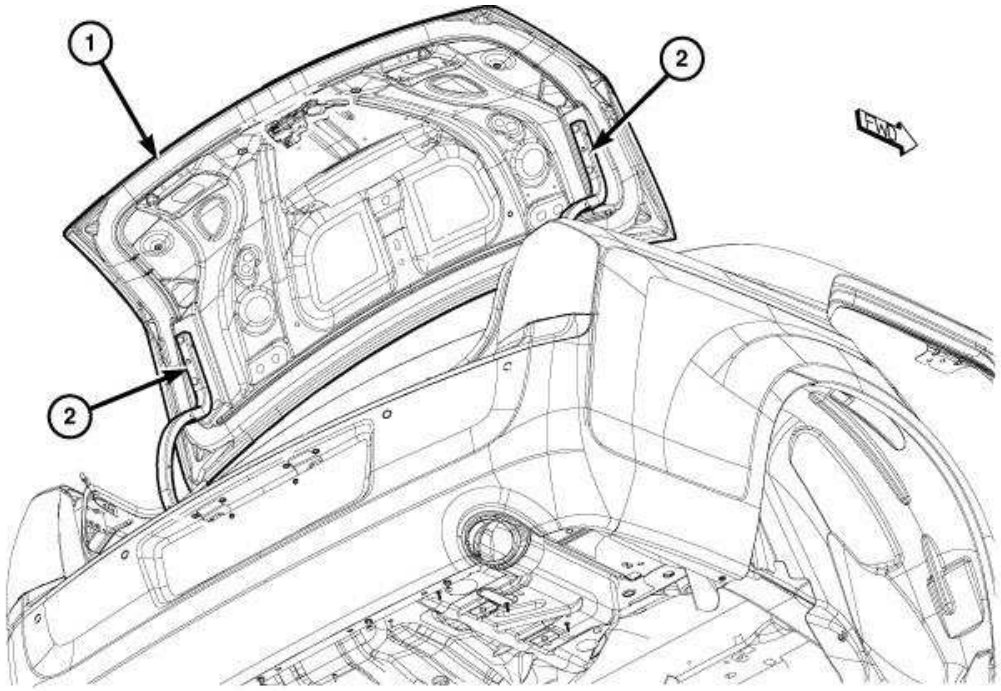


Fig. 426: 3 Retaining Nuts & Pedal Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove the pedal assembly 3 retaining nuts (2, 3).
6. Remove the pedal assembly (1).

INSTALLATION

INSTALLATION

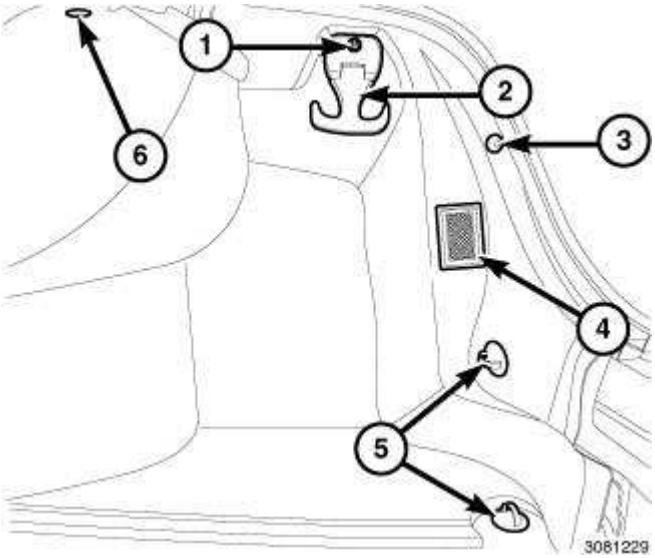


Fig. 427: 3 Retaining Nuts & Pedal Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Position the pedal assembly (1) to the mounting studs.
2. Install the pedal assembly 3 retaining nuts (2, 3) and tighten to 34 N.m (25 ft. lbs.).

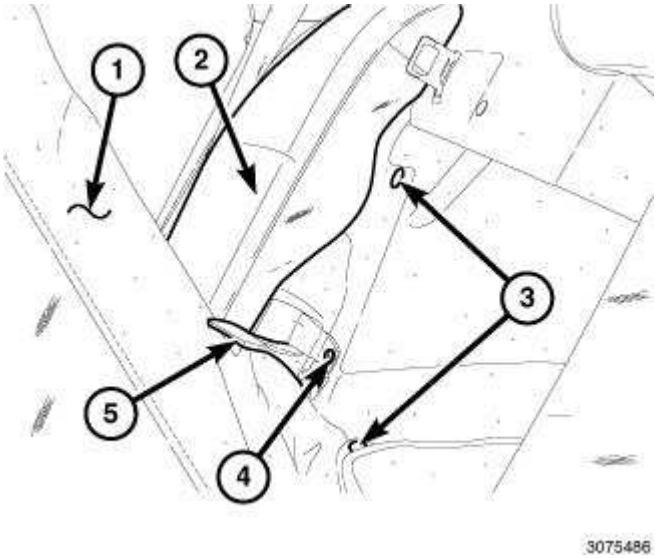


Fig. 428: Accelerator Pedal Adjuster Motor & Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

3. Connect both electrical connectors at the APPS (2).
4. Connect the electrical connector at the accelerator pedal adjuster motor (1).

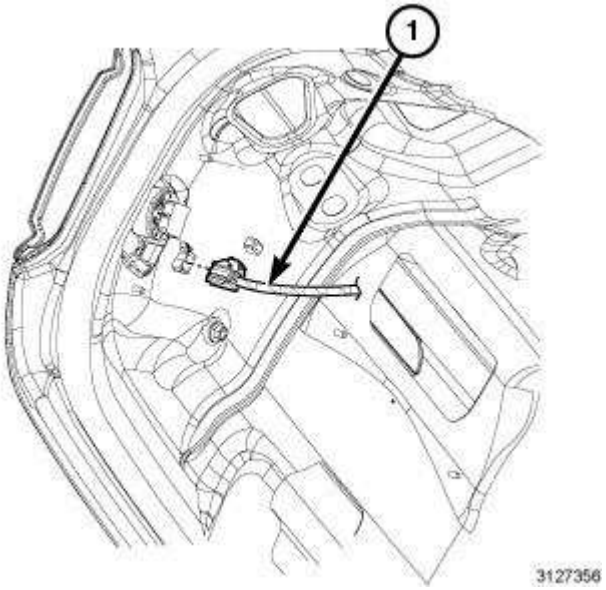


Fig. 429: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

5. Connect the negative battery cable (1).

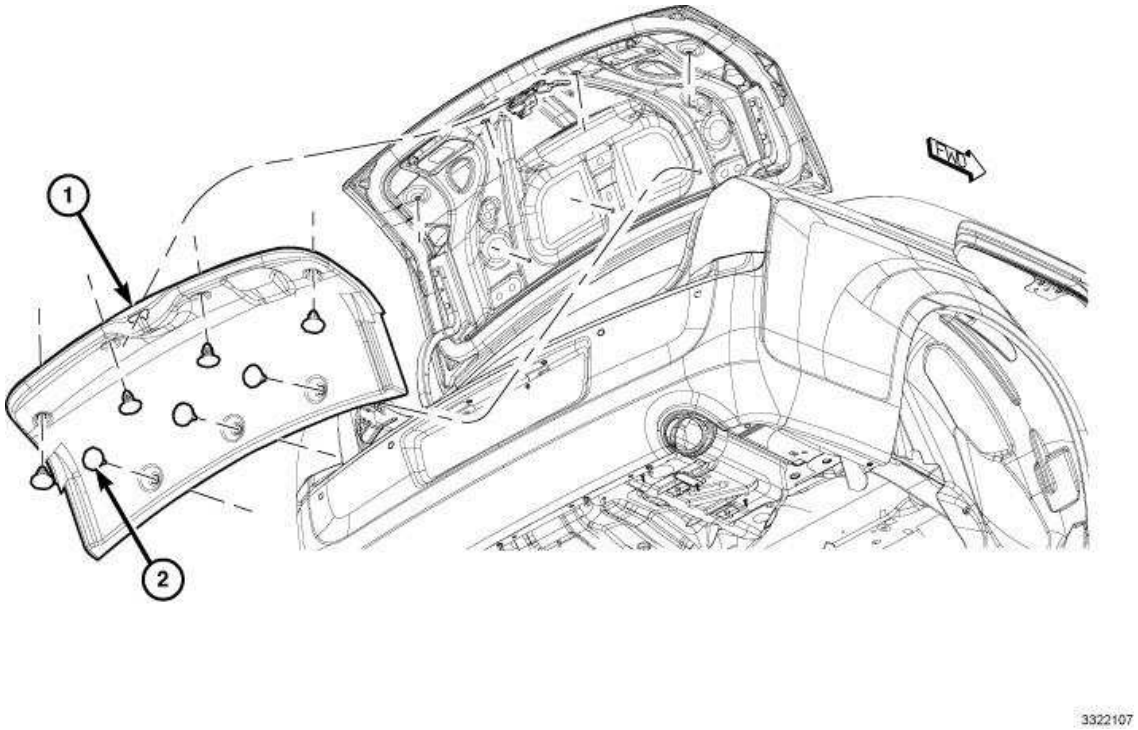


Fig. 430: Cable Attachment To Accelerator Module
Courtesy of CHRYSLER GROUP, LLC

6. If equipped with adjustable pedals, synchronize the accelerator pedal to the brake pedal and then connect the adjuster cable (1) to the accelerator pedal adjuster motor (2). Refer to **PEDAL (S), BRAKE AND/OR ACCELERATOR, INSTALLATION** or **PEDAL(S), BRAKE AND/OR**

ACCELERATOR, ADJUSTABLE, INSTALLATION .

SENSOR, AIR TEMPERATURE, INLET

REMOVAL

3.6L

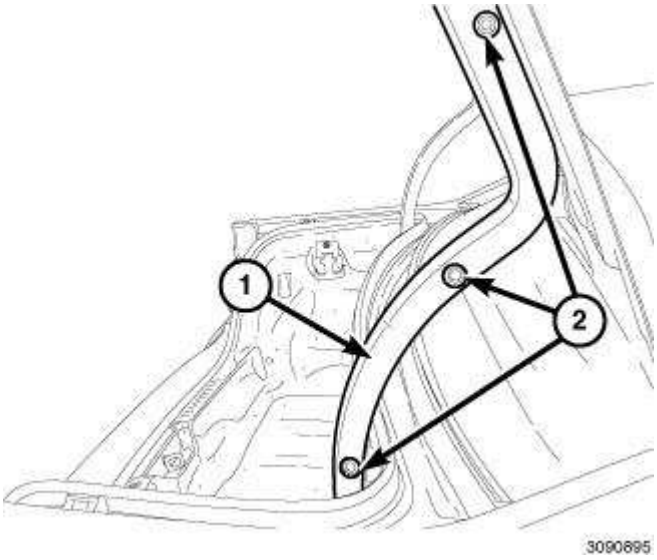


Fig. 431: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

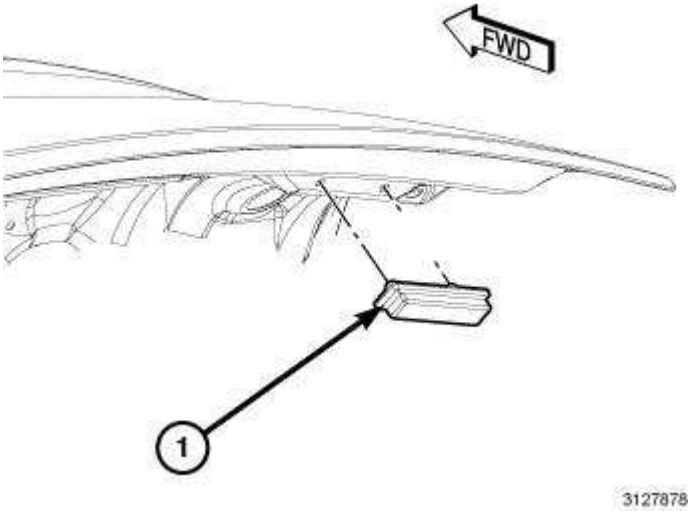


Fig. 432: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

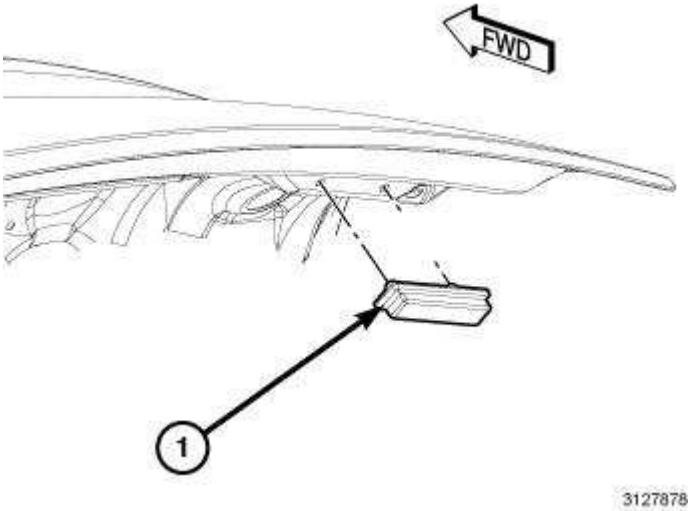


Fig. 433: Inlet Air Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.

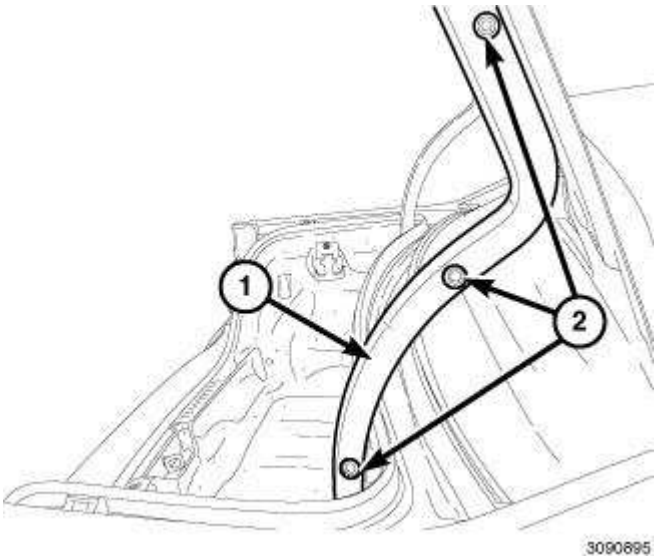


Fig. 434: View Of IAT Sensor Tab/O-Ring - 3.7L/4.7L/5.7L
Courtesy of CHRYSLER GROUP, LLC

4. Clean any dirt from the air inlet tube at the IAT sensor base.
5. Gently lift the small plastic release tab (3), rotate the sensor about 1/4 turn counterclockwise and remove the sensor from the inlet air hose.
6. The IAT sensor O-ring (2) can be reused if not damaged.

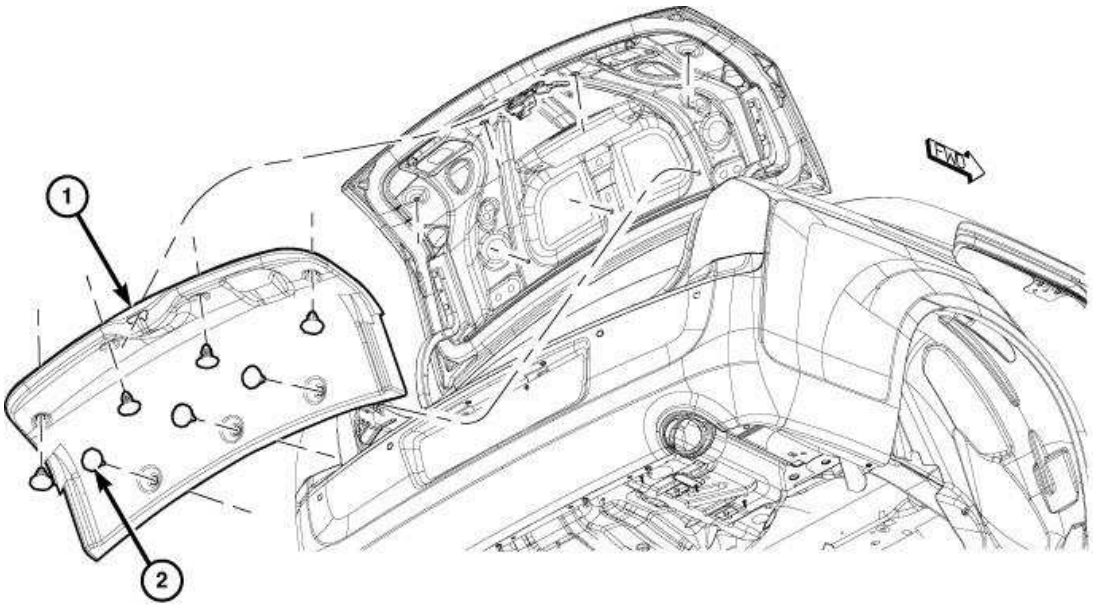


Fig. 435: Sensor Location
Courtesy of CHRYSLER GROUP, LLC

The Inlet Manifold Air Temperature (IAT) sensor is installed into the rubber air intake hose near front of throttle body.

1. Disconnect electrical connector from IAT sensor.
2. Clean dirt from sensor base.
3. Pull sensor from rubber hose.

INSTALLATION

3.6L

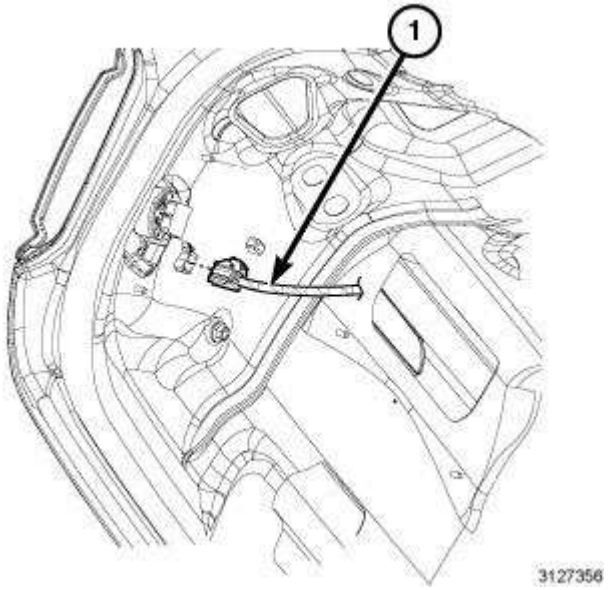


Fig. 436: View Of IAT Sensor Tab/O-Ring - 3.7L/4.7L/5.7L
Courtesy of CHRYSLER GROUP, LLC

1. The Inlet Air Temperature (IAT) sensor O-ring seal (2) can be reused if not damaged.
2. Clean the IAT sensor mounting hole in the air inlet hose.
3. Install the IAT sensor into the air inlet hose and rotate clockwise until the release tab (3) engages.

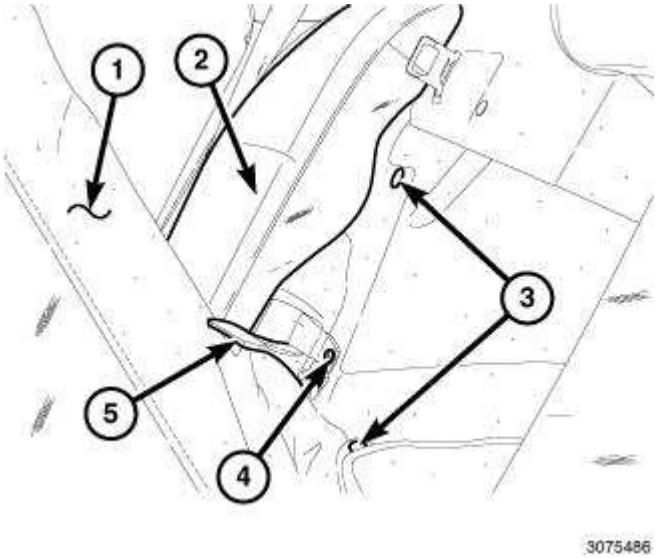


Fig. 437: Inlet Air Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

4. Install the electrical connector (1) to the IAT sensor.

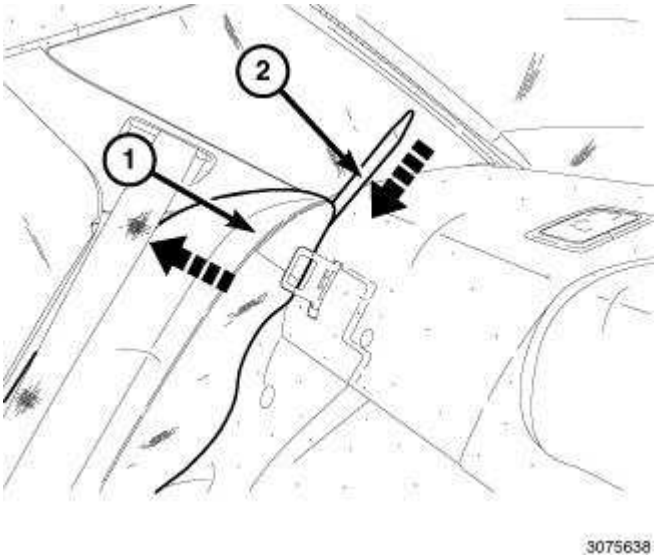


Fig. 438: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

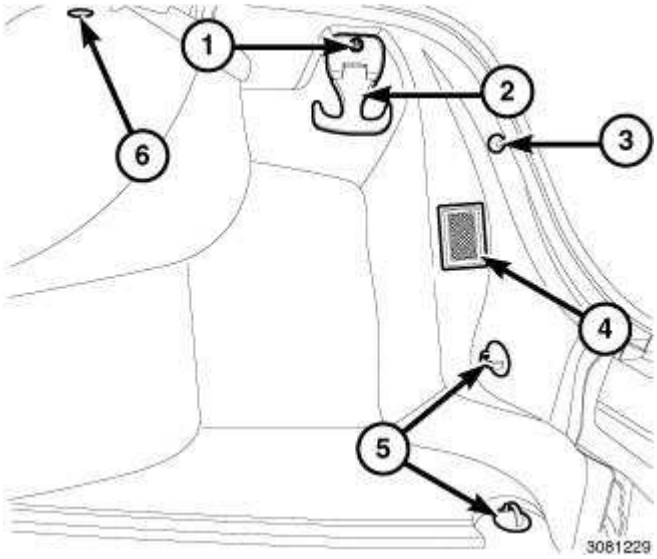


Fig. 439: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

6. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

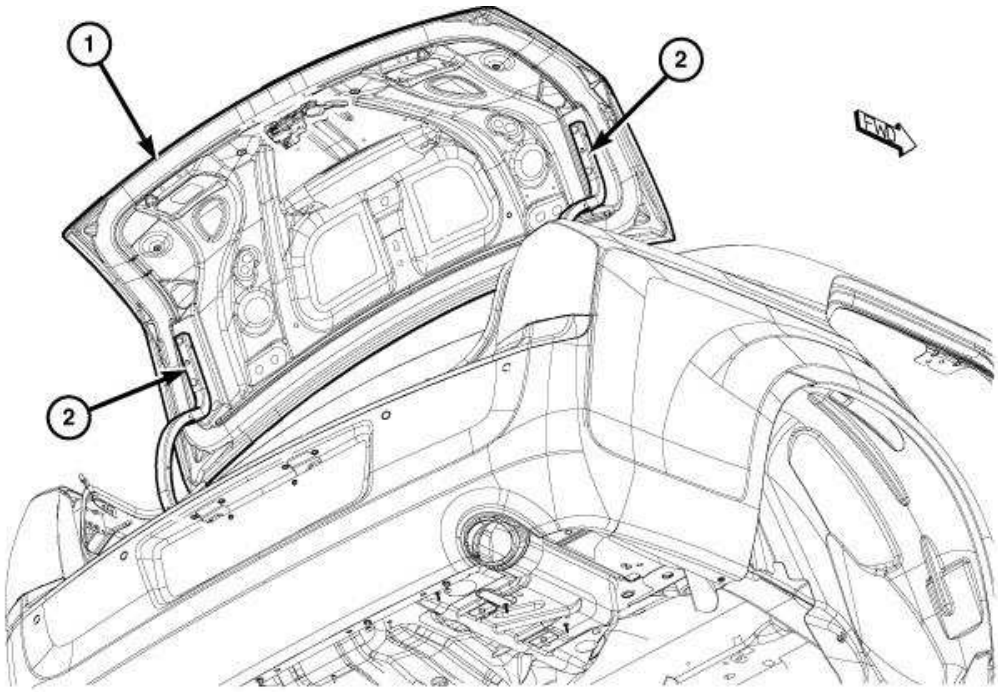


Fig. 440: Sensor Orientation
Courtesy of CHRYSLER GROUP, LLC

1. Press sensor into rubber air hose.
2. Rotate sensor into position as shown in illustration. **For proper system operation, sensor must be positioned as shown in illustration.**

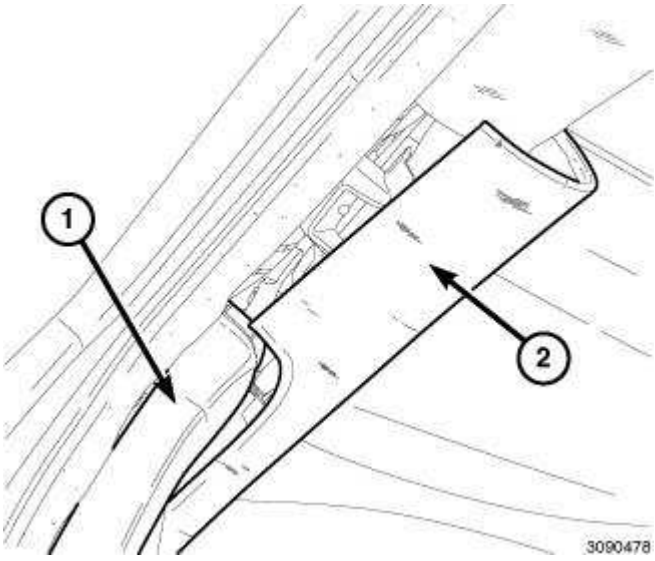


Fig. 441: Sensor Location
Courtesy of CHRYSLER GROUP, LLC

3. Connect electrical connector to sensor.

SENSOR, CRANKSHAFT POSITION

DESCRIPTION

DESCRIPTION

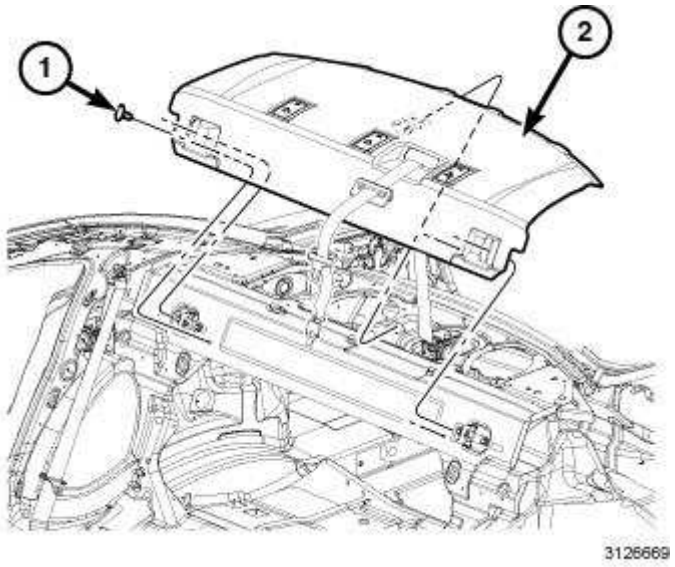


Fig. 442: Crankshaft Position Sensor
Courtesy of CHRYSLER GROUP, LLC

The Crankshaft Position (CKP) sensor (1) is a hall effect device combined with an internal magnet.

The CKP sensor is mounted into the right rear side of the cylinder block. It is positioned and bolted into a machined hole.

OPERATION

OPERATION

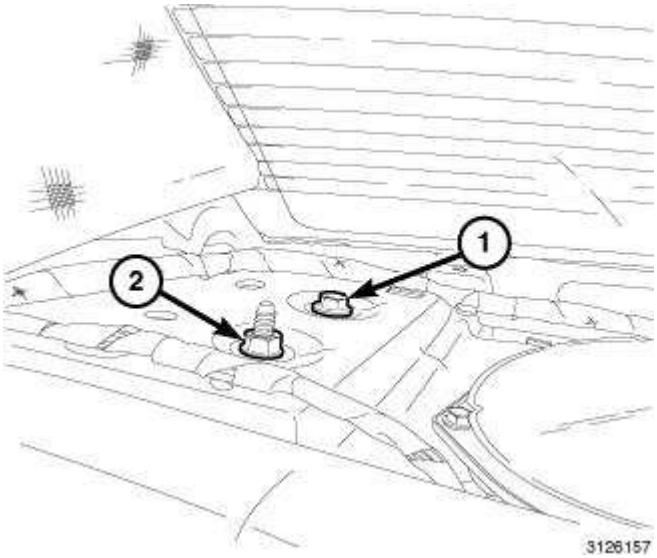


Fig. 443: Identifying Crankshaft Position Sensor And Tone Wheel (3.7L V-6)
Courtesy of CHRYSLER GROUP, LLC

The engine speed and crankshaft position are provided through the CKP (Crankshaft Position) sensor (3). The sensor generates pulses which sends an input signal to the Powertrain Control Module (PCM). The PCM interprets the sensor input signal to determine the crankshaft position. The PCM then uses this information, along with other inputs, to determine injector sequence and ignition timing.

A tonewheel (targetwheel) is bolted to the engine crankshaft (1). This tonewheel has notches (2) on the outer edge.

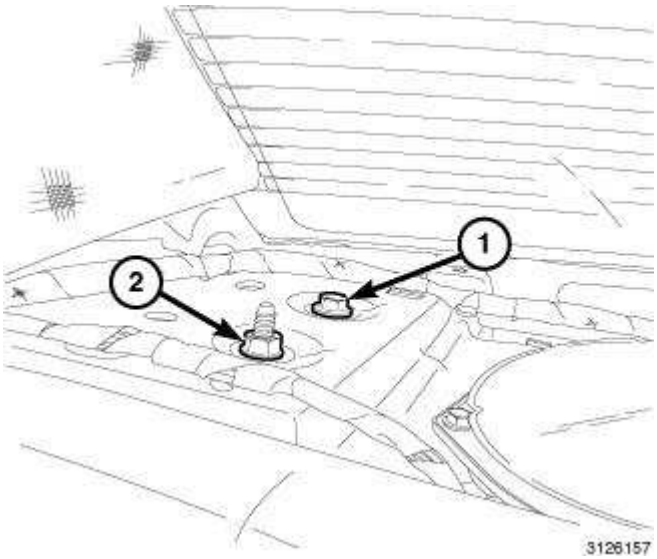


Fig. 444: Crankshaft Position Sensor
Courtesy of CHRYSLER GROUP, LLC

The sensor (1) is a hall effect device combined with an internal magnet. It is also sensitive to steel within a certain distance from it.

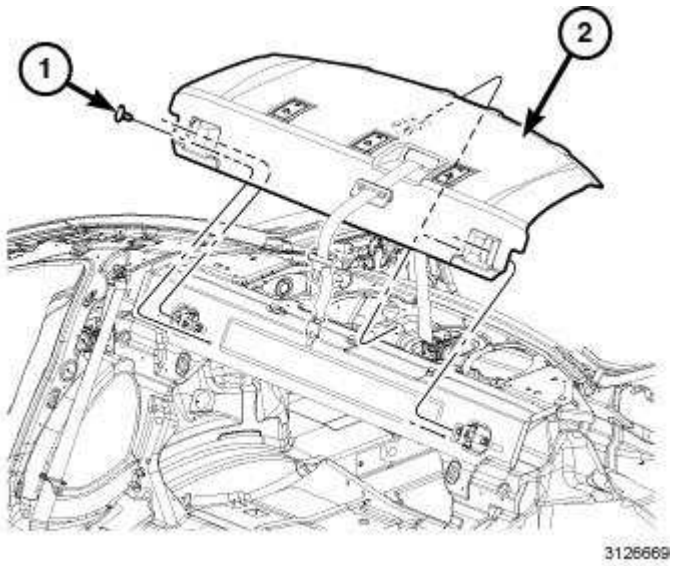


Fig. 445: Crankshaft Position Sensor Operation & Notches - 5.7L
Courtesy of CHRYSLER GROUP, LLC

The notches (3) cause a pulse to be generated when they pass under the sensor. The generated pulses are the input signal to the PCM.

REMOVAL

3.6L

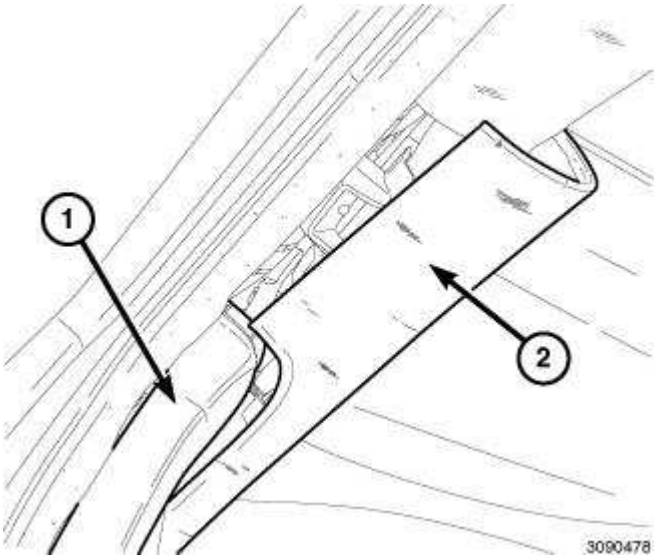


Fig. 446: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

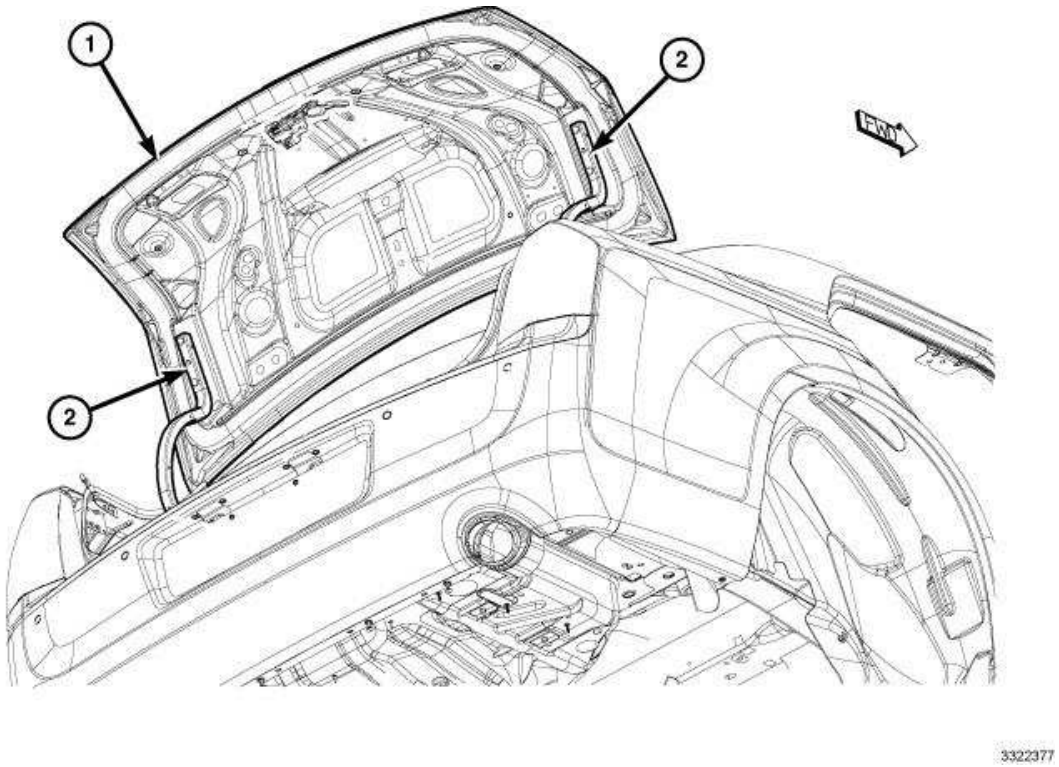


Fig. 447: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the belly pan retainers (1) and remove the belly pan.

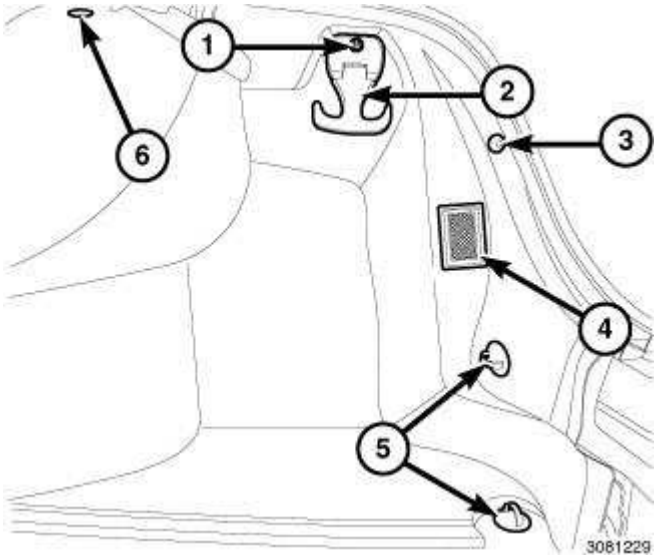


Fig. 448: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

The crankshaft position (CKP) sensor is mounted into the right rear side of the cylinder block.

4. Push back the heat shield (1) from the crankshaft position (CKP) sensor.

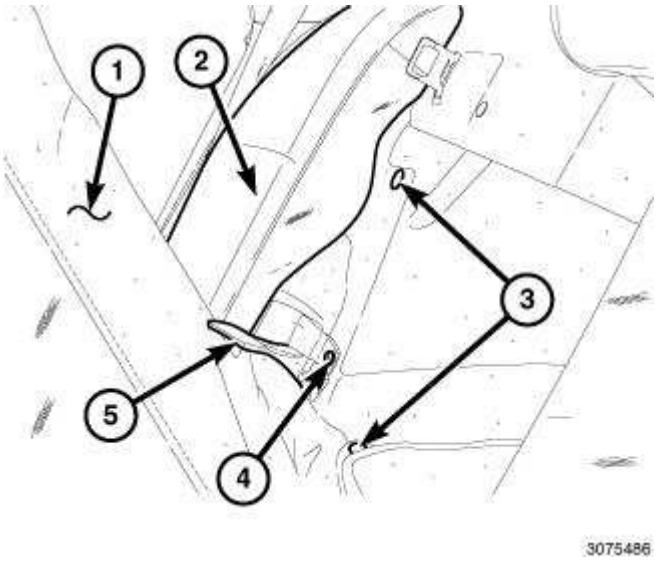


Fig. 449: Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the electrical connector (1) from the crankshaft position (CKP) sensor.

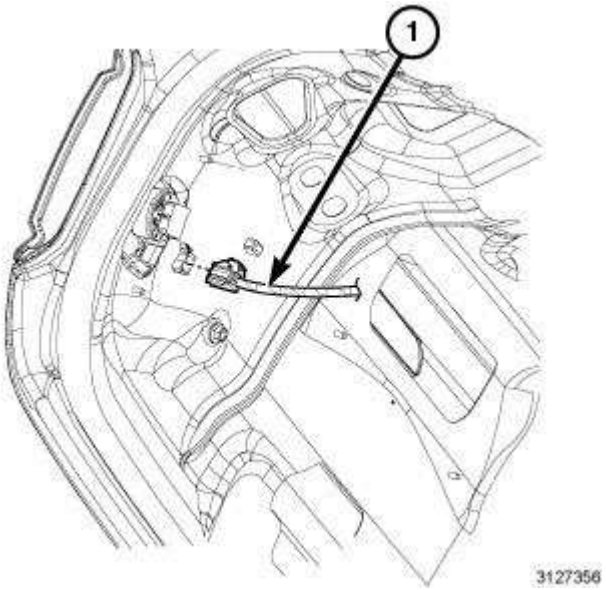


Fig. 450: Sensor Mounting Bolt & Sensor
Courtesy of CHRYSLER GROUP, LLC

6. Remove the sensor mounting bolt (2).
7. Carefully twist the sensor (1) from the cylinder block.

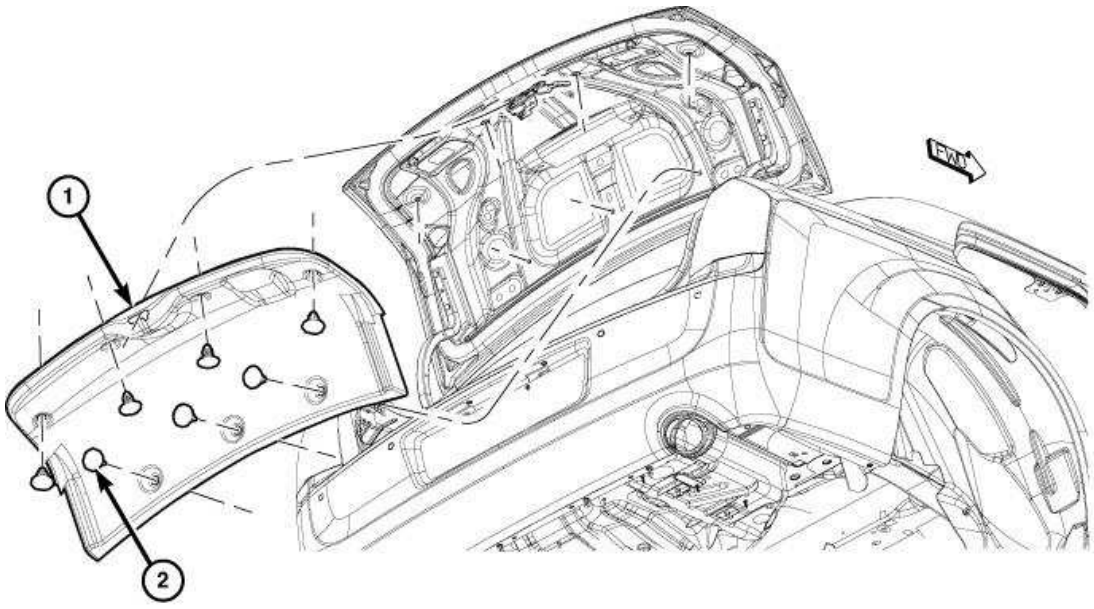


Fig. 451: O-Ring
Courtesy of CHRYSLER GROUP, LLC

8. The CKP sensor O-ring (1) can be reused if not damaged.

5.7L

The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block (1). It is positioned and bolted into a machined hole in the engine block.

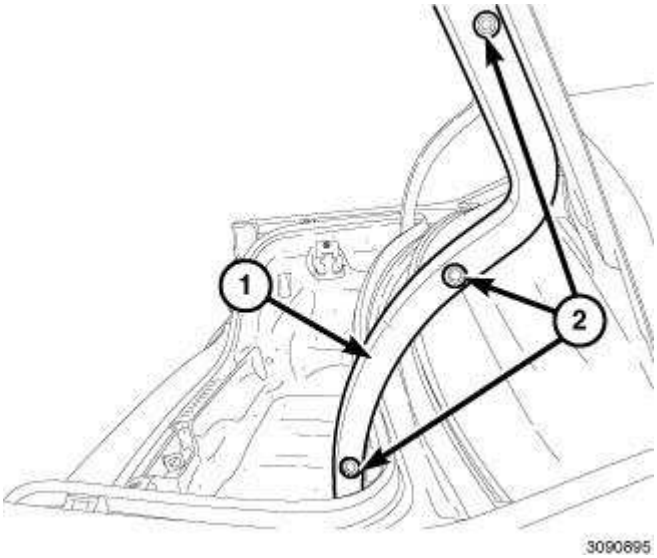


Fig. 452: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove the starter motor Refer to **STARTER, REMOVAL** .
4. Disconnect the CKP sensor electrical connector (1).

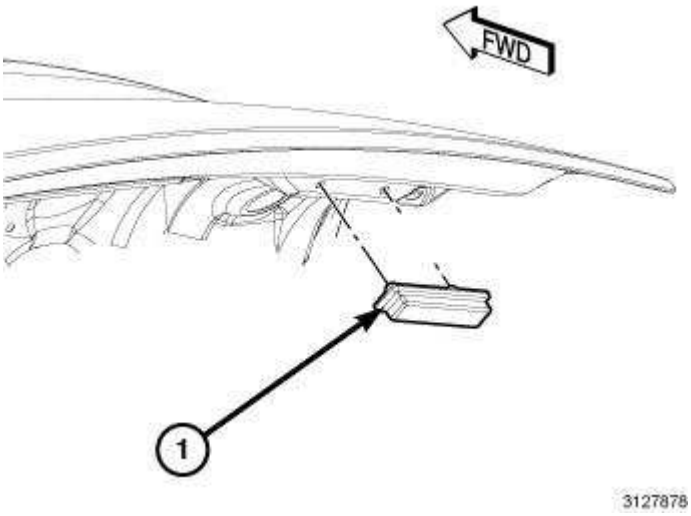


Fig. 453: Crankshaft Position Sensor Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the CKP sensor mounting bolt (1).
6. Using a slight twisting motion, remove the CKP sensor from the engine block.

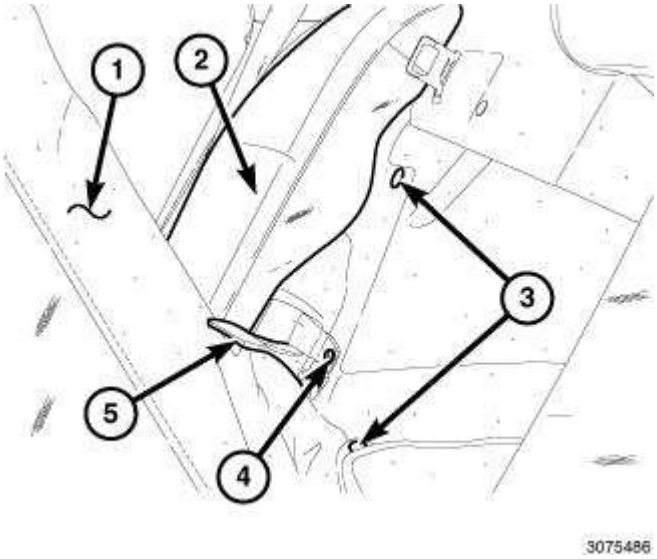


Fig. 454: Crankshaft Position Sensor
Courtesy of CHRYSLER GROUP, LLC

7. Check the condition of the sensor O-ring (1) and replace if necessary.

INSTALLATION

3.6L

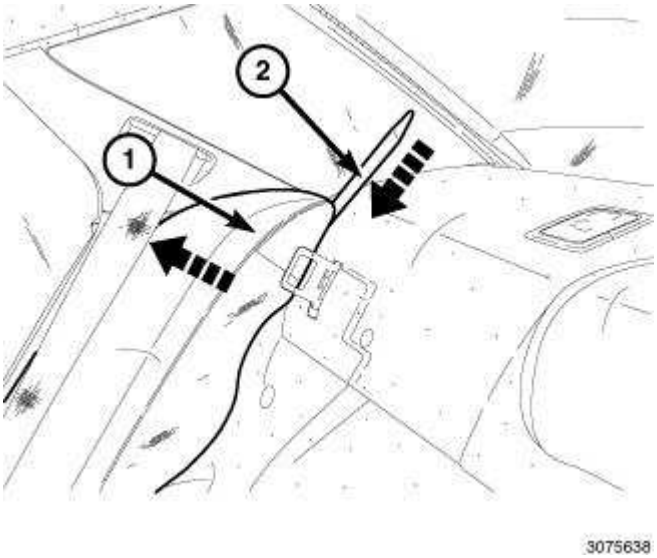


Fig. 455: O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. The crankshaft position (CKP) sensor O-ring (1) can be reused if not damaged.
2. Apply a small amount of engine oil to the sensor O-ring (1).

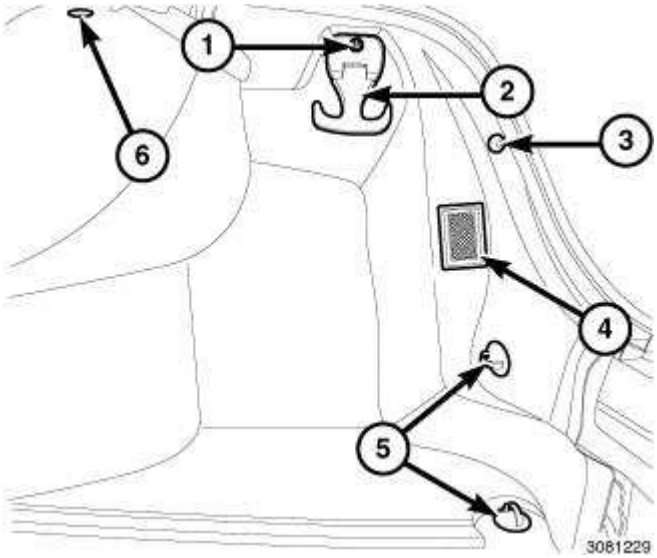


Fig. 456: Sensor Mounting Bolt & Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Clean out the CKP sensor mounting bolt hole in the engine block.
4. Install the sensor (1) into the engine block with a slight rocking and twisting motion.

CAUTION: Before tightening the CKP sensor mounting bolt, be sure the sensor is completely flush to the cylinder block. If the CKP sensor is not flush, damage to the sensor mounting tang may result.

5. Install the mounting bolt (2) and tighten to 12 N.m (9 ft. lbs.).

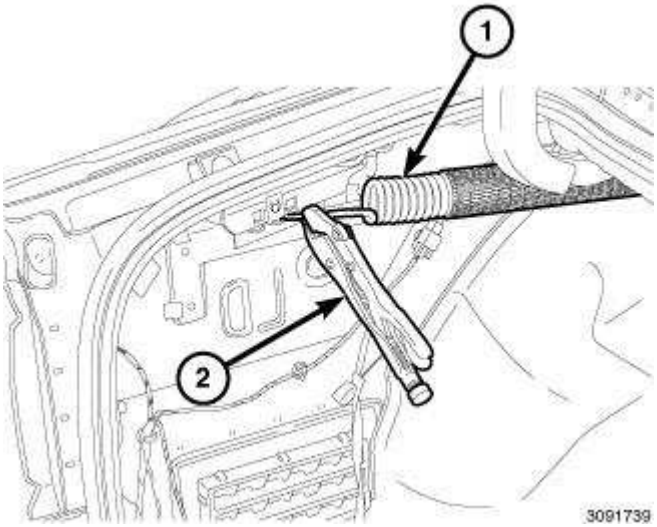


Fig. 457: Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

6. Connect the CKP sensor electrical connector (1).

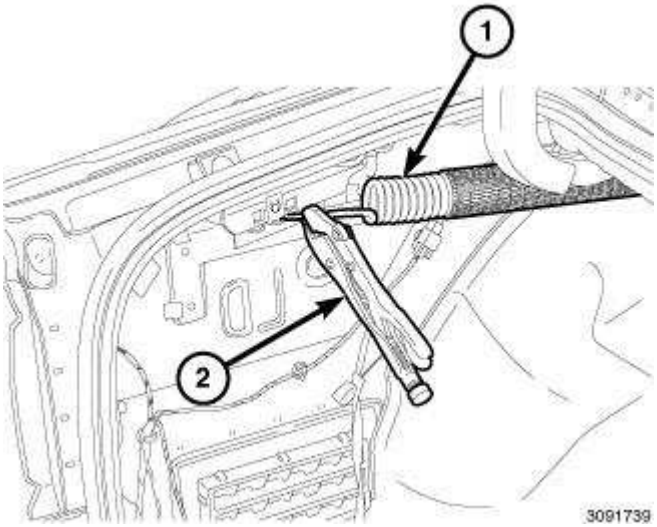


Fig. 458: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

7. Position the heat shield (1) over the CKP sensor.

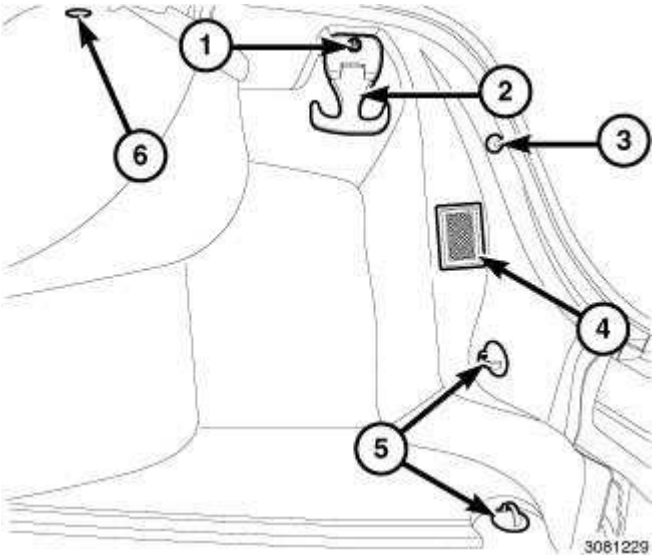


Fig. 459: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Position the belly pan and install the retainers (1).
9. Lower the vehicle.

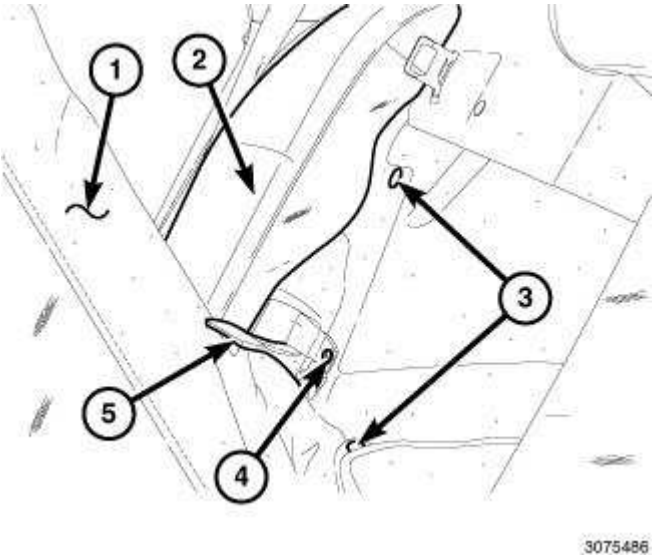


Fig. 460: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

10. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

5.7L

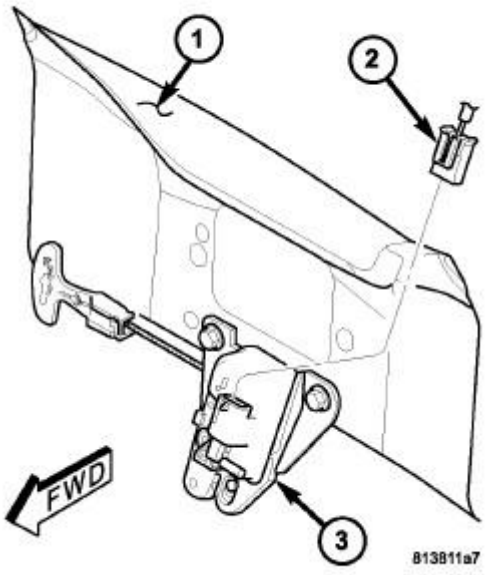


Fig. 461: Crankshaft Position Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before installing the Crankshaft Position (CKP) sensor, check the condition of the sensor O-ring (1) and replace if necessary.

1. Clean the machined hole in the engine block.
2. Apply a small amount of engine oil to the CKP sensor O-ring (1).
3. Install the CKP sensor into the engine block with a slight twisting motion.

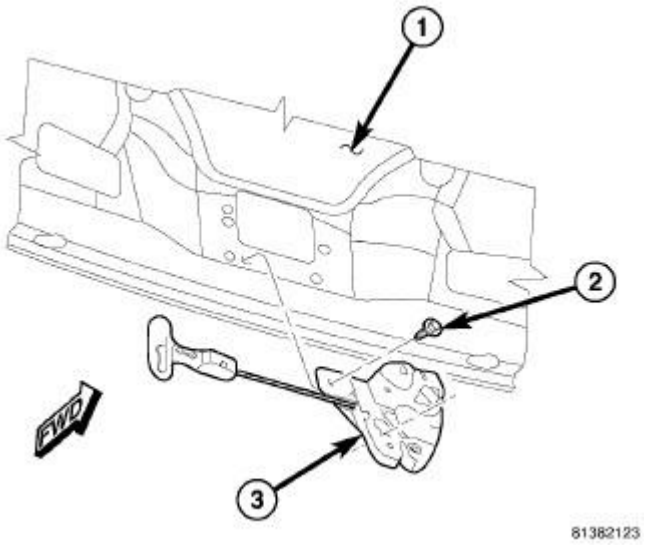


Fig. 462: Crankshaft Position Sensor Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before tightening the CKP sensor mounting bolt (1), be sure the sensor is completely flush to the cylinder block. If sensor is not flush, damage to the sensor mounting tang may result.

4. Install the CKP sensor mounting bolt (1) and tighten to 12 N.m (9 ft. lbs.).

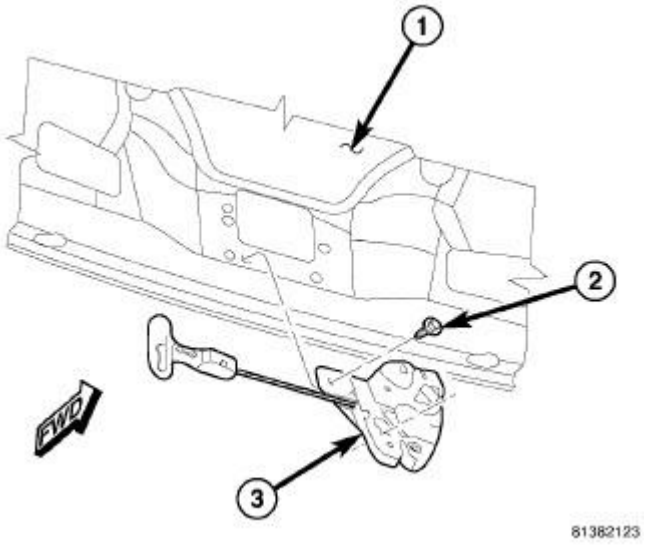


Fig. 463: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

5. Connect the CKP sensor electrical connector (1).

6. Install the starter motor. Refer to **STARTER, INSTALLATION** .
7. Lower the vehicle.
8. Install the negative battery cable.

SENSOR, MANIFOLD AIR PRESSURE (MAP)

REMOVAL

3.6L

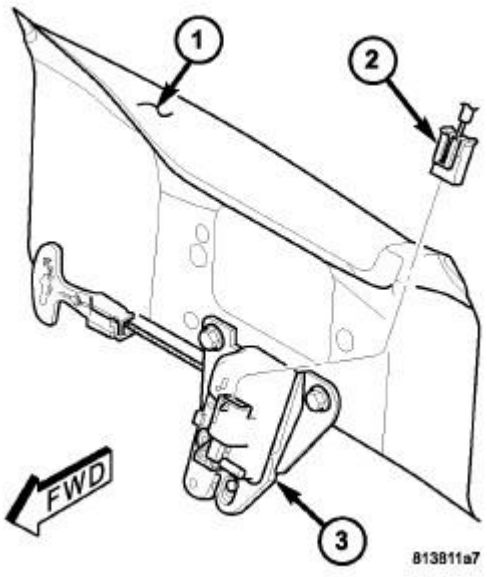


Fig. 464: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

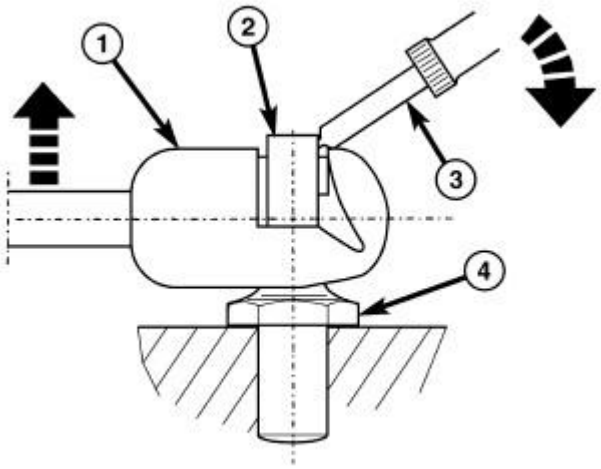


Fig. 465: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

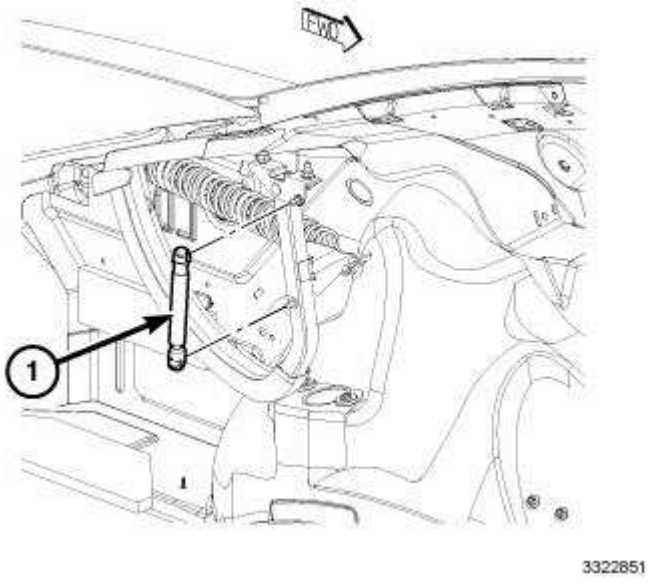


Fig. 466: MAP Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Unlock and disconnect the electrical connector (1) from the MAP sensor.

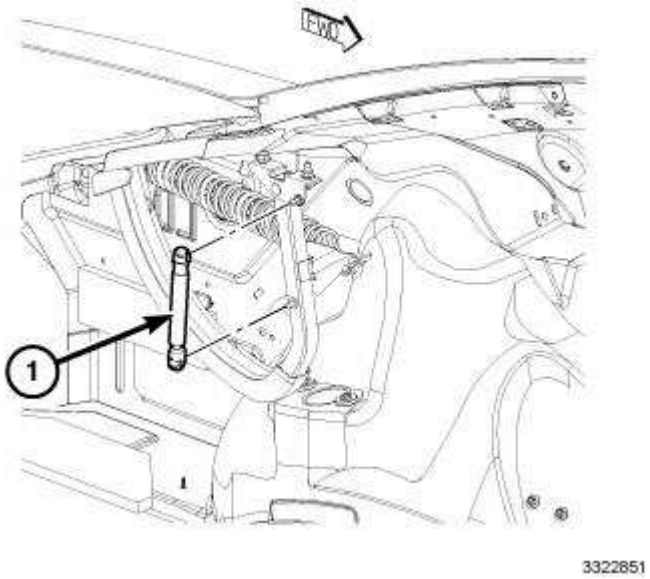


Fig. 467: Removing MAP Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Rotate the MAP sensor 1/4 turn counterclockwise and pull the sensor straight up and out of the upper intake manifold.

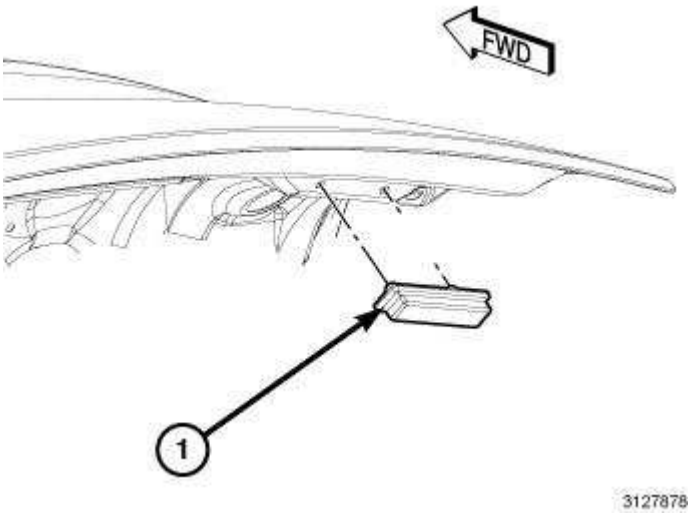


Fig. 468: O-Ring
Courtesy of CHRYSLER GROUP, LLC

5. The MAP sensor O-ring (1) can be reused if not damaged.

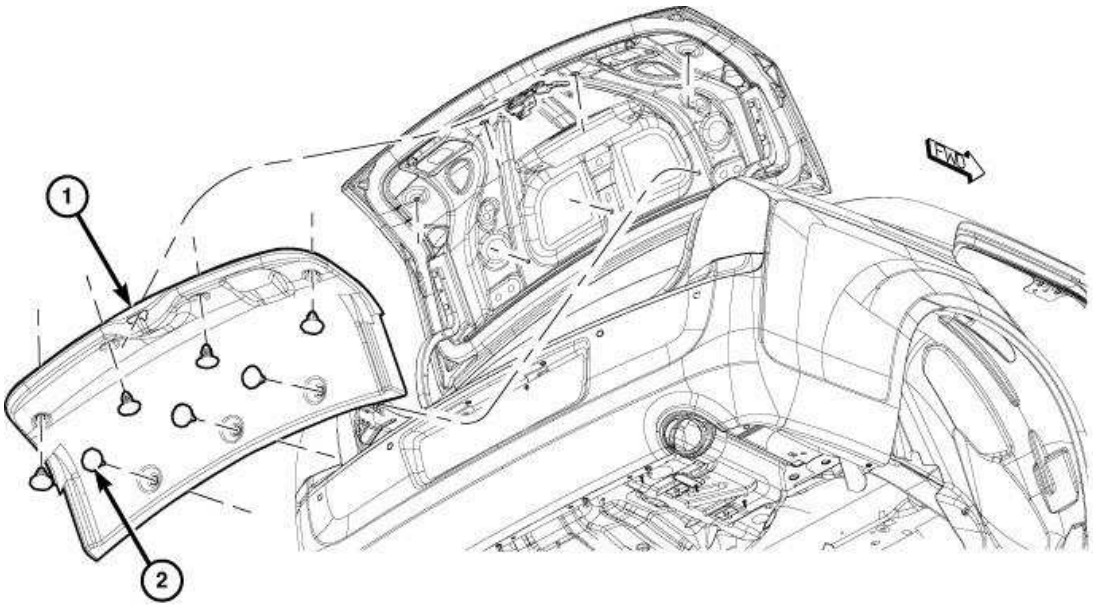


Fig. 469: MAP Sensor Location - 5.7L
Courtesy of CHRYSLER GROUP, LLC

The Manifold Absolute Pressure (MAP) sensor (3) is mounted into the top/rear of the intake manifold (4) near the cowl/hood seal (1).

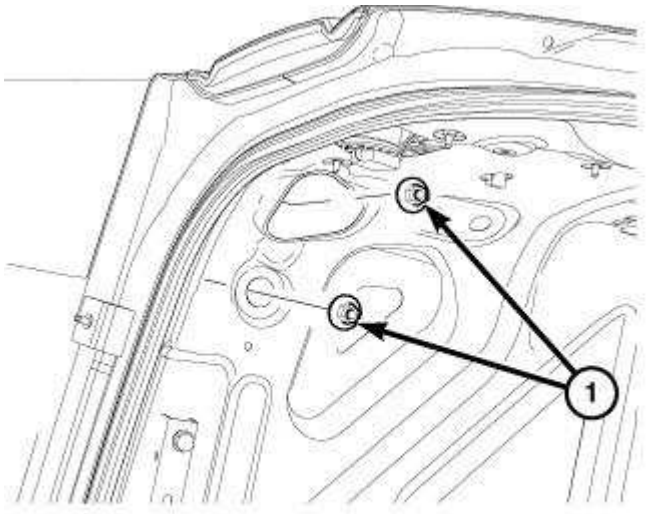


Fig. 470: 5.7L MAP Sensor R/I
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect electrical connector at sensor by sliding release lock out (1). Press down on lock tab

(2) for removal.

2. Rotate sensor 1/4 turn counter-clockwise for removal.
3. Check condition of sensor o-ring.

INSTALLATION

3.6L

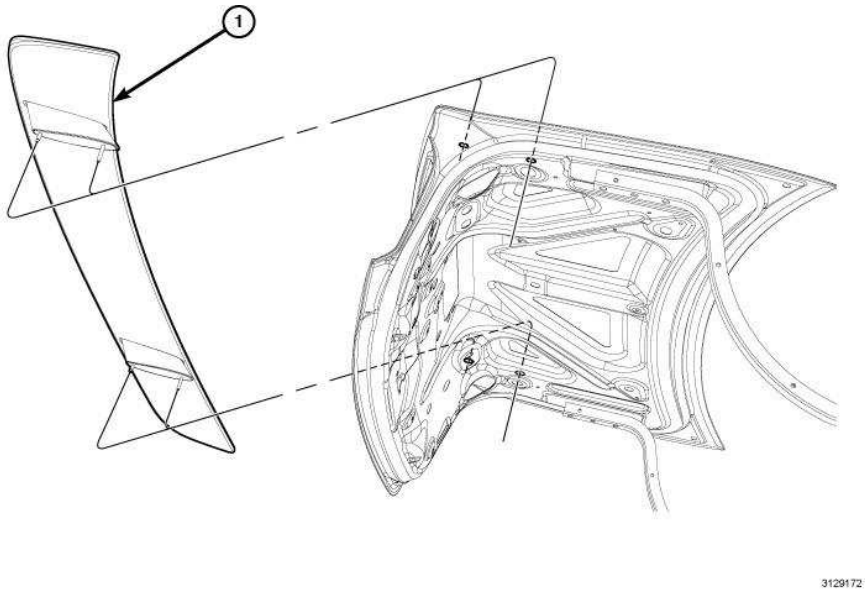


Fig. 471: O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. The manifold air pressure (MAP) sensor O-ring (1) can be reused if not damaged.
2. Apply a small amount of engine oil to the sensor O-ring (1).

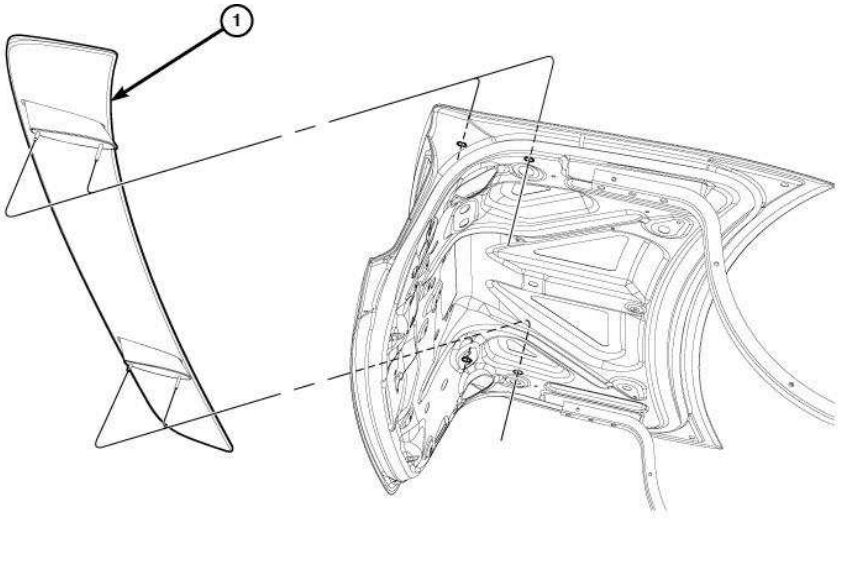
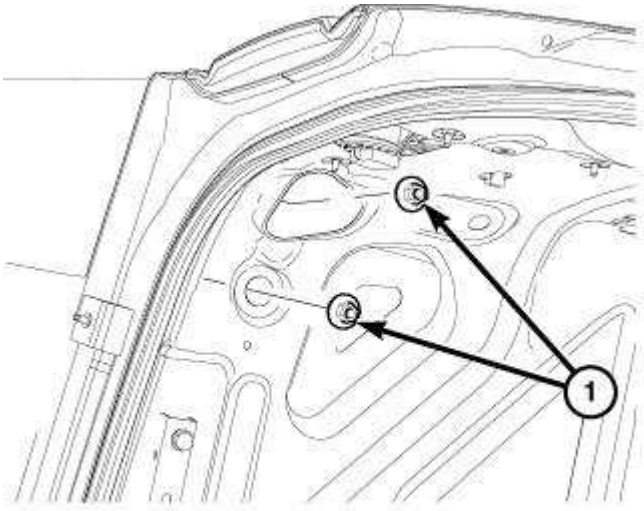


Fig. 472: MAP Sensor And Rotate 1/4 Turn Clockwise
Courtesy of CHRYSLER GROUP, LLC

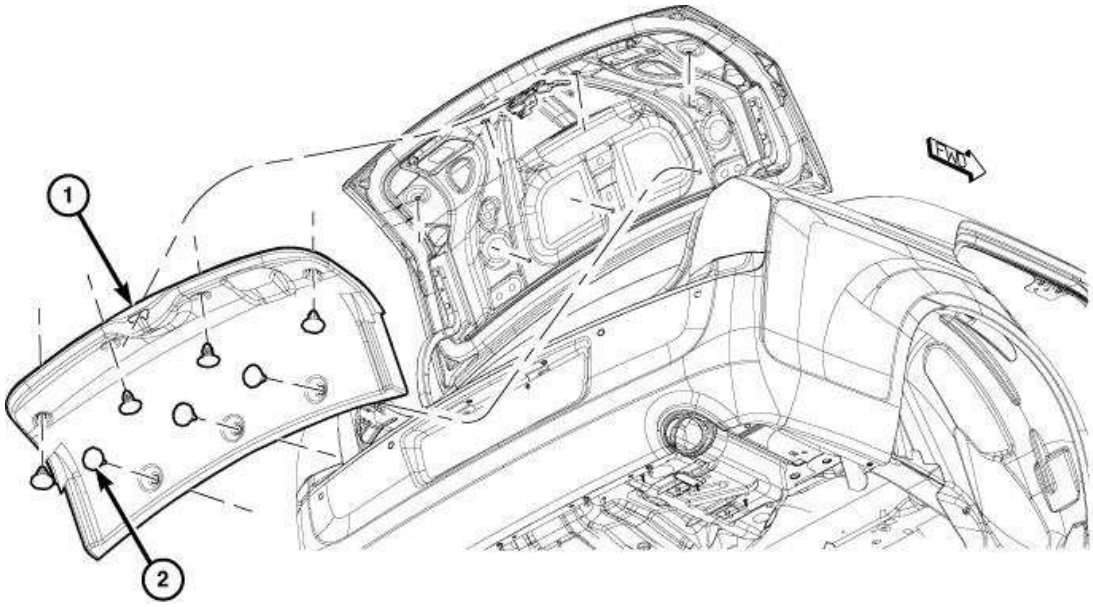
3. Install the MAP sensor (1) into the upper intake manifold and rotate 1/4 turn clockwise.



3129136

Fig. 473: MAP Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect and lock the electrical connector (1) to the sensor.



3322107

Fig. 474: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

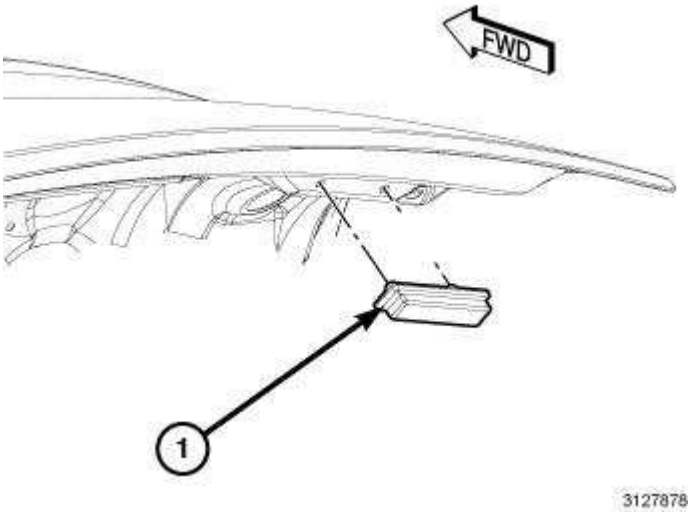


Fig. 475: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

6. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

5.7L

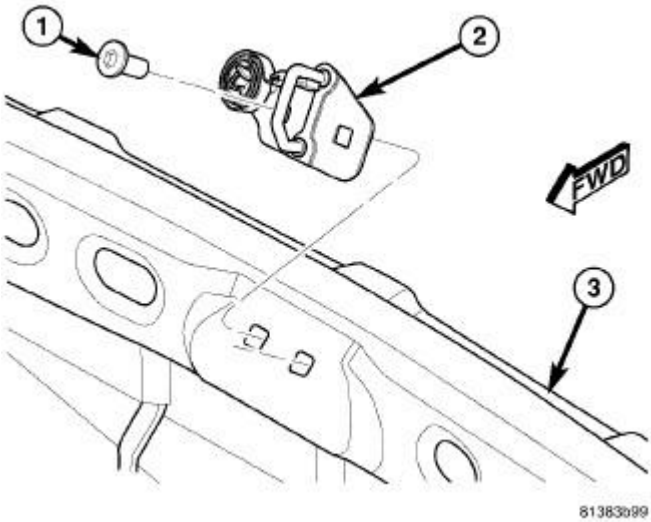


Fig. 476: MAP Sensor Location - 5.7L
Courtesy of CHRYSLER GROUP, LLC

1. Clean MAP sensor mounting hole at intake manifold.

2. Check MAP sensor o-ring seal for cuts or tears.
3. Position sensor (3) into intake manifold.
4. Rotate sensor 1/4 turn clockwise for installation.
5. Connect electrical connector (2) to sensor (3).

SENSOR, OXYGEN

REMOVAL

3.6L

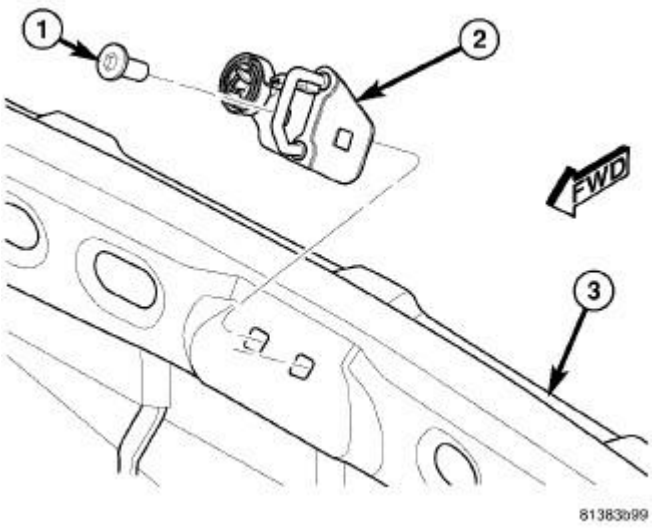


Fig. 477: Right Upstream/Downstream Oxygen Sensors & Left Upstream/Downstream Oxygen Sensors
Courtesy of CHRYSLER GROUP, LLC

The engine is equipped with four heated oxygen sensors:

- The right upstream oxygen sensor (1) is referred to as the 1/1 sensor.
- The right downstream oxygen sensor (2) is referred to as the 1/2 sensor.
- The left upstream oxygen sensor (4) is referred to as the 2/1 sensor.
- The left downstream oxygen sensor (3) is referred to as the 2/2 sensor.

WARNING: The exhaust pipes and catalytic converter become very hot during engine operation. Allow the engine to cool before removing the oxygen sensor.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

CAUTION: When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.

3. Disconnect the heated oxygen sensor electrical connector.
4. Remove the oxygen sensor.
5. Clean the exhaust pipe threads using an appropriate tap.

5.7L

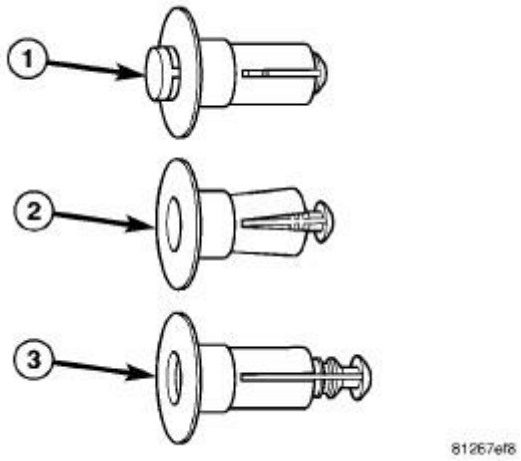


Fig. 478: O2S Sensors
Courtesy of CHRYSLER GROUP, LLC

UPSTREAM O2S SENSORS

1. Raise and support the vehicle.

WARNING: The exhaust pipes and catalytic converter become very hot during engine operation. Allow the engine to cool before removing the oxygen sensor.

CAUTION: When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.

2. Disconnect the O2S sensors (1, 2) electrical connectors.
3. Remove the left catalytic converter heat shield.
4. Using the appropriate oxygen sensor removal/installation tool, remove the O2S sensors.
5. Clean the threads in the exhaust pipes using an appropriate tap.

DOWNSTREAM O2S SENSORS

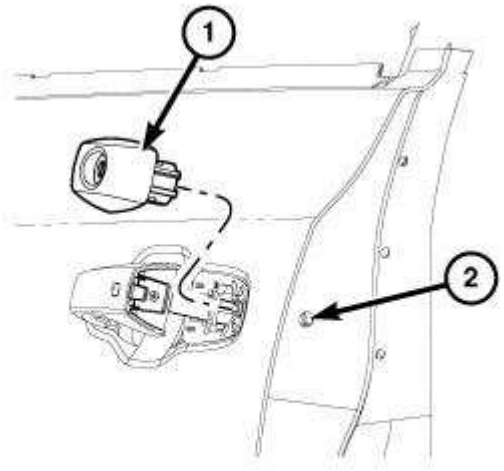
1. Raise and support the vehicle.
2. Support the transmission with a safety stand or suitable jack, remove the crossmember retaining bolts and slightly lower the transmission to gain access to the O2S sensor electrical connectors.

CAUTION: When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.

3. Disconnect the O2S sensors (3, 4) electrical connectors.
4. Using the appropriate oxygen sensor removal/installation tool, remove the O2S sensors.
5. Clean the threads in the catalytic converters using an appropriate tap.

INSTALLATION

3.6L



3328990

Fig. 479: Right Upstream/Downstream Oxygen Sensors & Left Upstream/Downstream Oxygen Sensors
Courtesy of CHRYSLER GROUP, LLC

The engine is equipped with four heated oxygen sensors:

- The right upstream oxygen sensor (1) is referred to as the 1/1 sensor.
- The right downstream oxygen sensor (2) is referred to as the 1/2 sensor.
- The left upstream oxygen sensor (4) is referred to as the 2/1 sensor.
- The left downstream oxygen sensor (3) is referred to as the 2/2 sensor.

1. If reinstalling the original oxygen sensor, coat the sensor threads with an anti-seize compound

such as Loctite 771- 64 or equivalent. New sensors have compound on the threads and do not require an additional coating. **Do Not add any additional anti-seize compound to the threads of a new oxygen sensor.**

2. Install the oxygen sensor and tighten to 50 N.m (37 ft. lbs.).

CAUTION: Never apply any type of grease to the oxygen sensor electrical connector, or attempt any repair of the sensor wiring harness.

3. Connect the heated oxygen sensor electrical connector.
4. Lower the vehicle.
5. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

5.7L

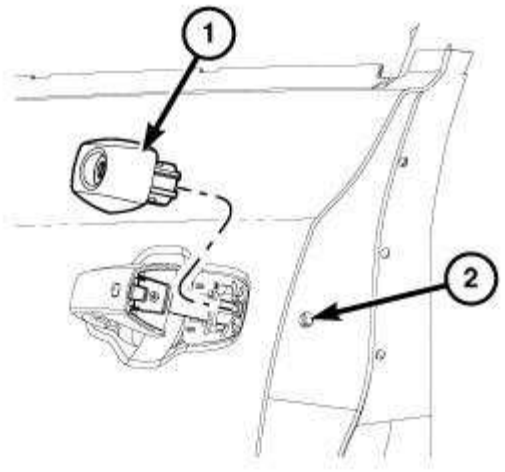


Fig. 480: O2S Sensors
Courtesy of CHRYSLER GROUP, LLC

DOWNSTREAM O2S SENSORS

Threads of new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**

1. Using the appropriate oxygen sensor removal/installation tool, install the O2S sensors (3, 4) and tighten to 41 N.m (30 ft. lbs.).
2. Connect the O2S sensors electrical connectors.
3. Raise the transmission and install the crossmember to frame bolts and tighten to 68 N.m (50 ft. lbs.), remove the safety stand or jack.
4. Lower the vehicle.

UPSTREAM O2S SENSORS

Threads of new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**

1. Using the appropriate oxygen sensor removal/installation tool, install the O2S sensors (1, 2) and tighten to 41 N.m (30 ft. lbs.).
2. Install the left catalytic converter heat shield.
3. Connect the O2S sensors electrical connectors.
4. Lower the vehicle.

SOLENOID, SHORT RUNNER VALVE

OPERATION

OPERATION

The SRV system operates under WOT conditions above 5000 RPM to maximize engine performance. When actuated by the PCM, the SRV solenoid energizes, allowing mechanical linkage to redirect the intake air flow to six short runners. The PCM looks for a current spike when actuating the solenoid. If the spike is not present, the PCM sets the DTC.

REMOVAL

REMOVAL - 5.7L

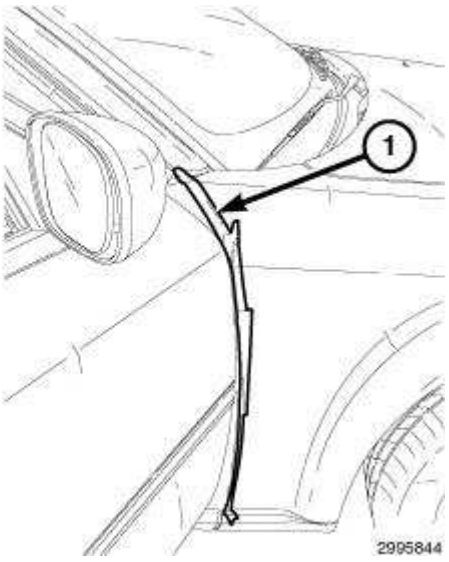


Fig. 481: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).

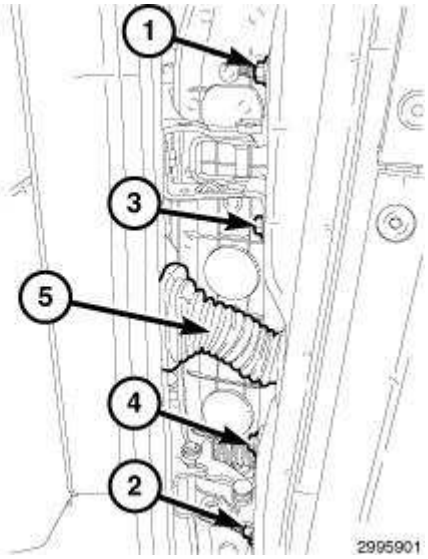


Fig. 482: Intake Manifold Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Remove the intake manifold and throttle body as an assembly Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD, INTAKE, REMOVAL** .

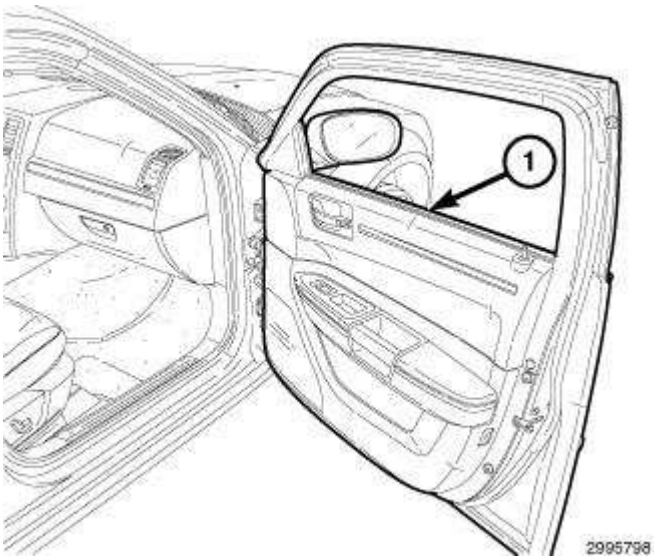


Fig. 483: Short Runner Valve Actuator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the short runner valve actuator retaining bolts (1) and remove valve.

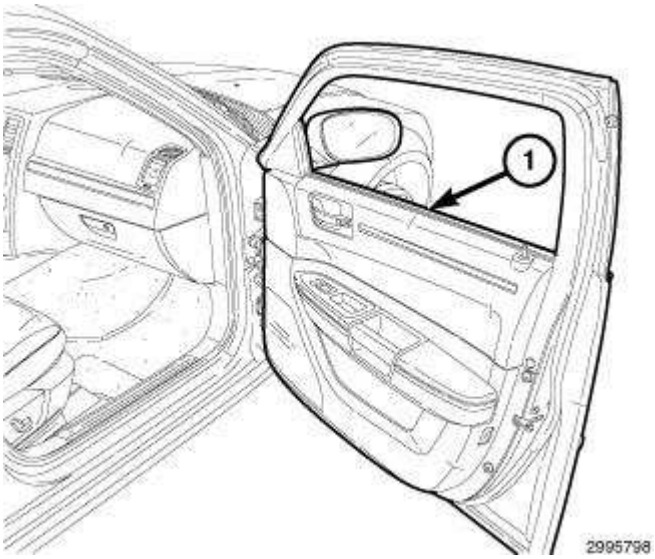


Fig. 484: Short Runner Valve Actuator Rubber O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

4. Remove and discard the short runner valve actuator rubber O-ring seal (1).

INSTALLATION

INSTALLATION - 5.7L

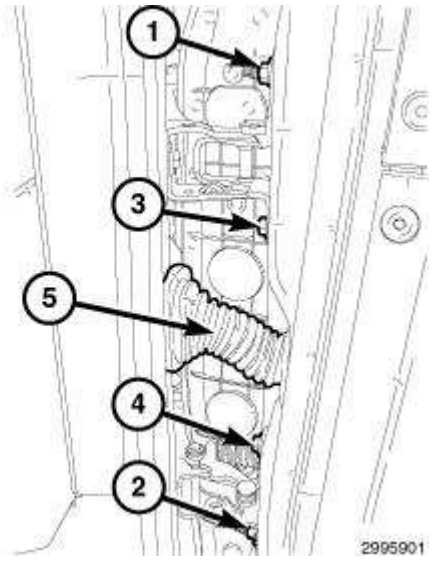


Fig. 485: Short Runner Valve Actuator Rubber O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install a new short runner valve actuator rubber O-ring seal (1).

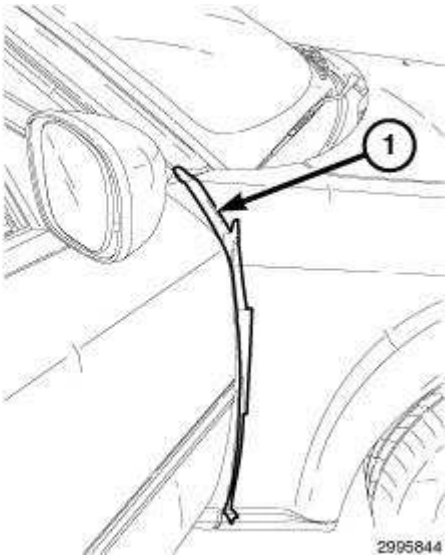


Fig. 486: Short Runner Valve Actuator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the short runner valve actuator, install the retaining bolts (1) and tighten to 5 N.m (44 in. lb.).

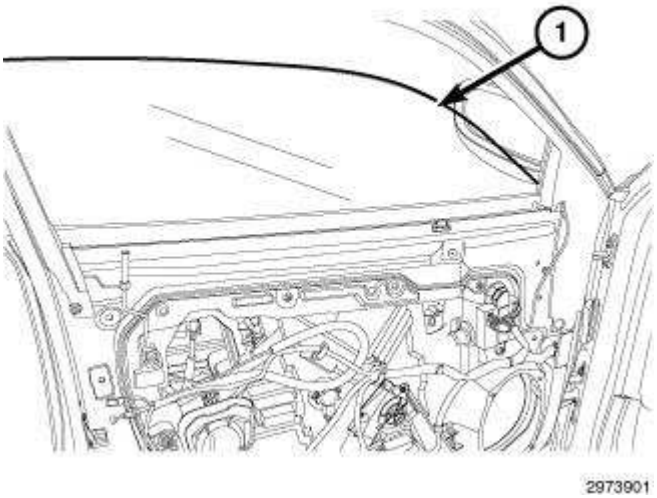


Fig. 487: Intake Manifold Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Install the intake manifold and throttle body as an assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .

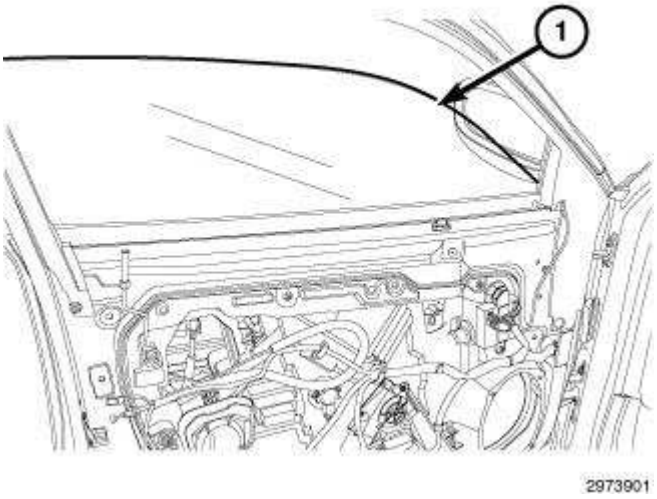


Fig. 488: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

4. Connect the negative battery cable (1).

THROTTLE BODY

REMOVAL

3.6L

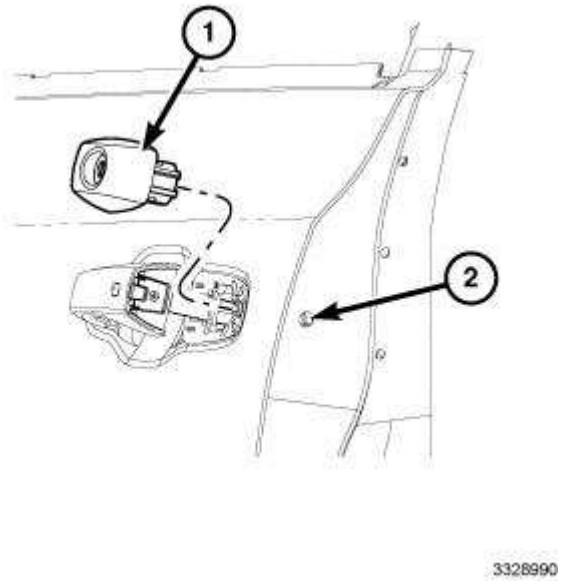
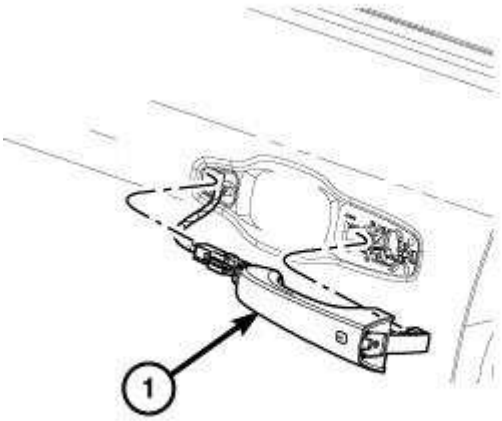


Fig. 489: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

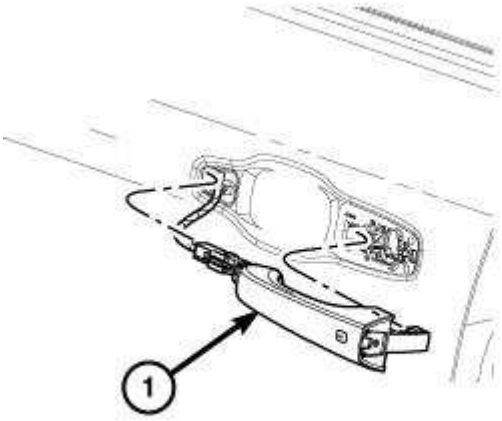
1. Disconnect and isolate the negative battery cable (1).



3329122

Fig. 490: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

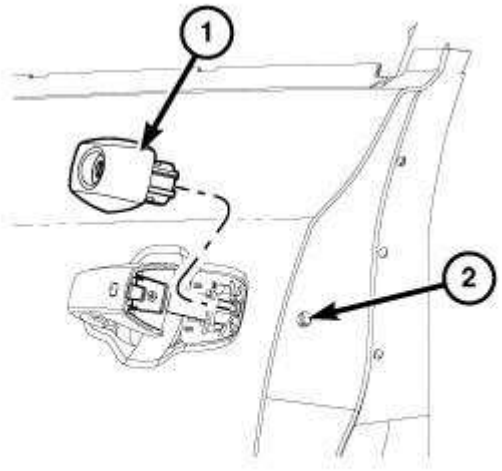


3329122

Fig. 491: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

CAUTION: Never have the ignition key in the ON position when checking the throttle body shaft for a binding condition. This may set DTC's.



3328990

Fig. 492: Electrical Connector, Electronic Throttle Control (ETC), Clip & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the electrical connector (1) from the Electronic Throttle Control (ETC) (2) and unfasten the ETC harness from the clip (4) on the throttle body.
9. Remove four throttle body mounting bolts (3).
10. Remove the throttle body from the upper intake manifold.
11. Check the condition of the throttle body-to-intake manifold seal. The seal can be reused if not damaged.

5.7L

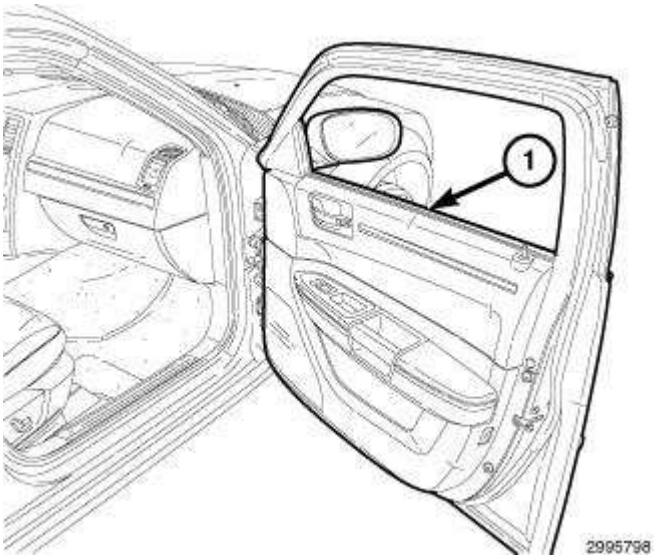


Fig. 493: Removing/Installing Throttle Body - 5.7L
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.

1. Remove rubber air duct at front of throttle body.
2. Disconnect electrical connector (3) at throttle body (1).
3. Remove four throttle body mounting bolts (2).
4. Remove throttle body from intake manifold.

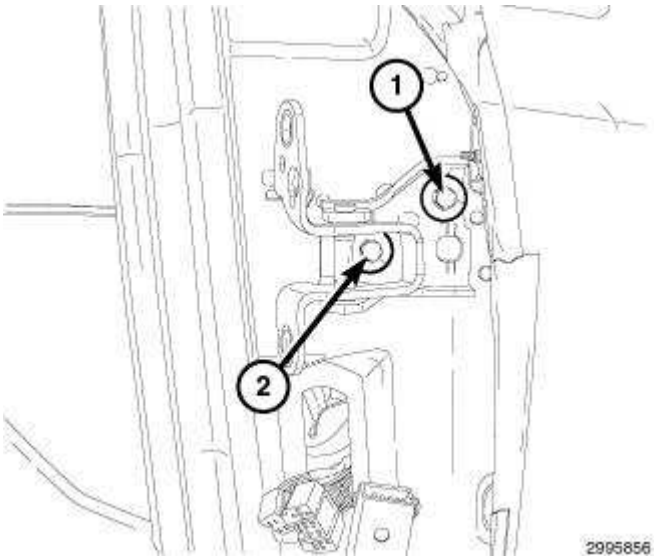


Fig. 494: Locating Throttle Body O-Ring AT Intake Manifold - 5.7L
Courtesy of CHRYSLER GROUP, LLC

5. Check condition of throttle body o-ring (2) at front of intake manifold (1).

INSTALLATION

3.6L

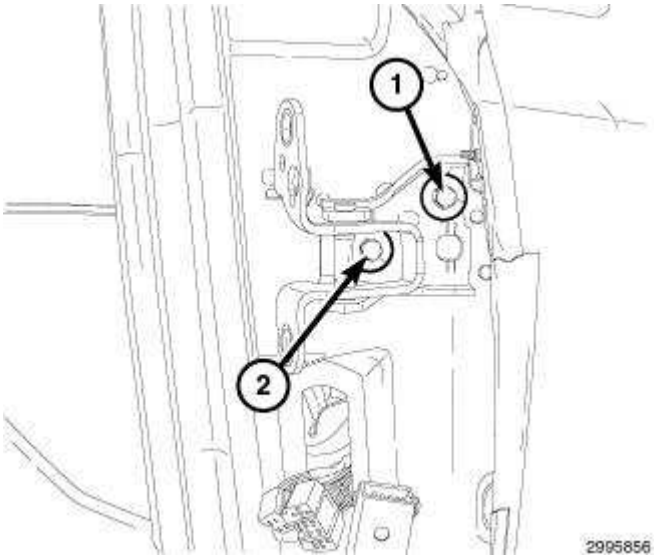


Fig. 495: Throttle Body-To-Intake Manifold Seal
Courtesy of CHRYSLER GROUP, LLC

1. Check the condition of the throttle body-to-intake manifold seal (1). The seal can be reused if not damaged.
2. Clean the mating surfaces of the throttle body and intake manifold.

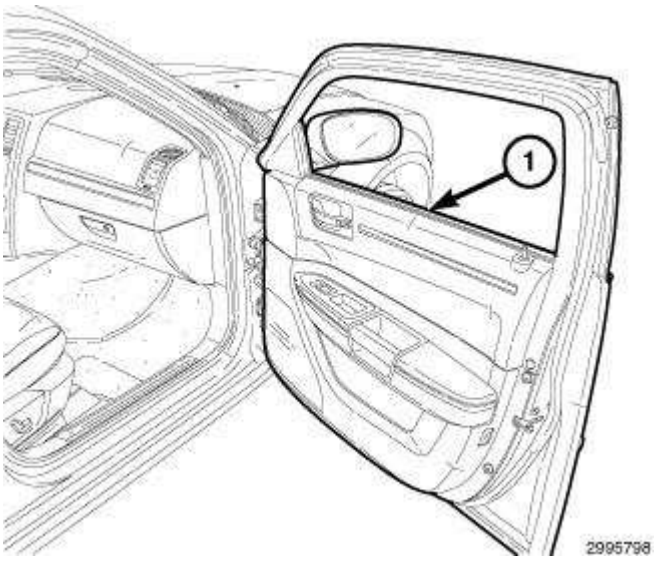


Fig. 496: Electrical Connector, Electronic Throttle Control (ETC), Clip & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Position the throttle body (2) to the intake manifold.
4. Install the throttle body mounting bolts (3) and tighten in a crisscross pattern sequence to 6 N.m

(53 in. lbs.).

5. Connect the electrical connector (1) to the Electronic Throttle Control (ETC) (2) and secure the ETC harness to the clip (4) on the throttle body.

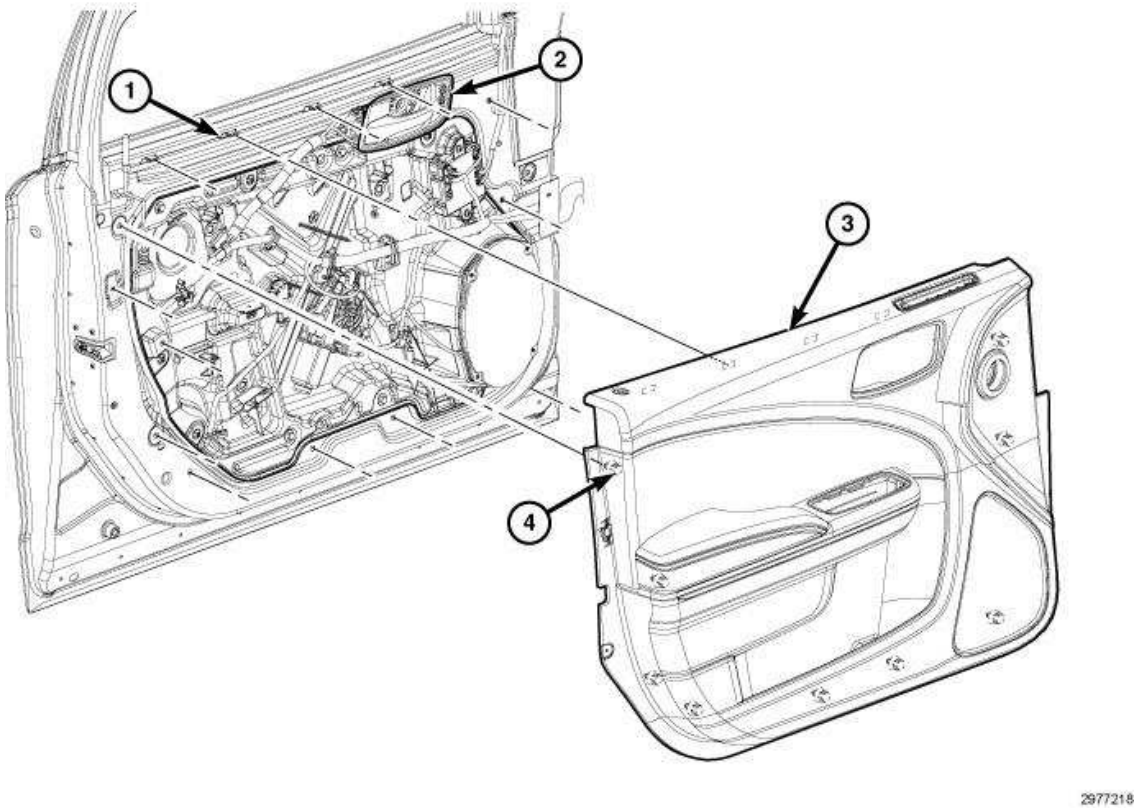


Fig. 497: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
7. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
8. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
9. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
10. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

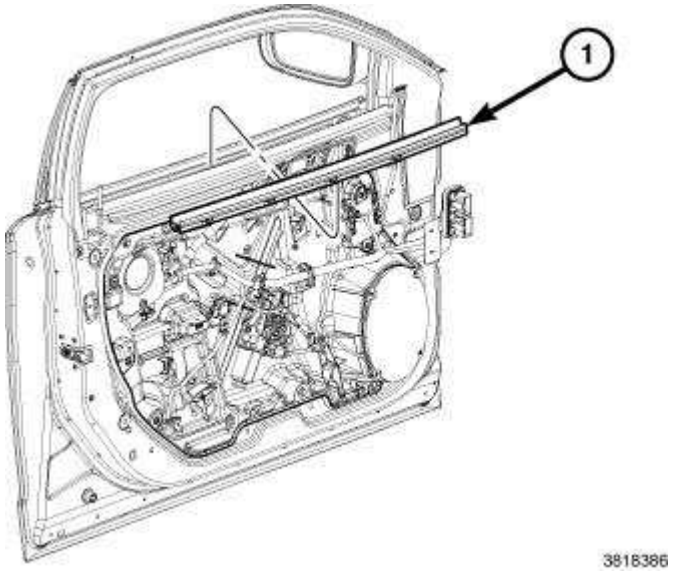


Fig. 498: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

11. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

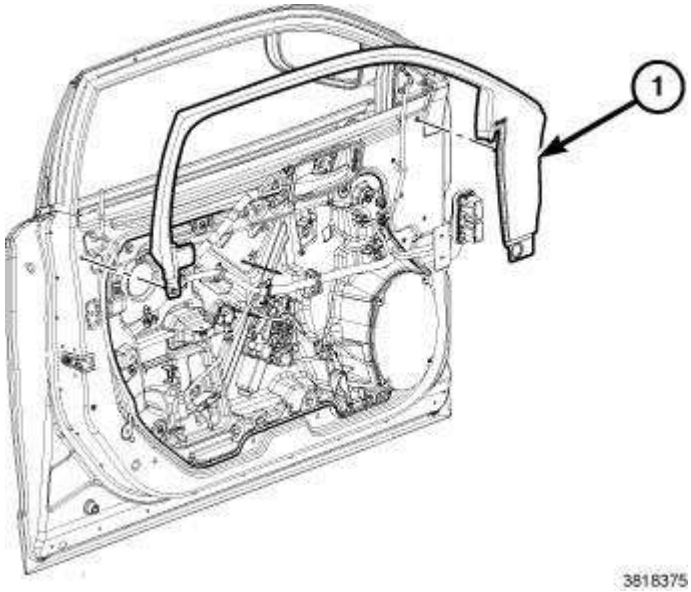


Fig. 499: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

12. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

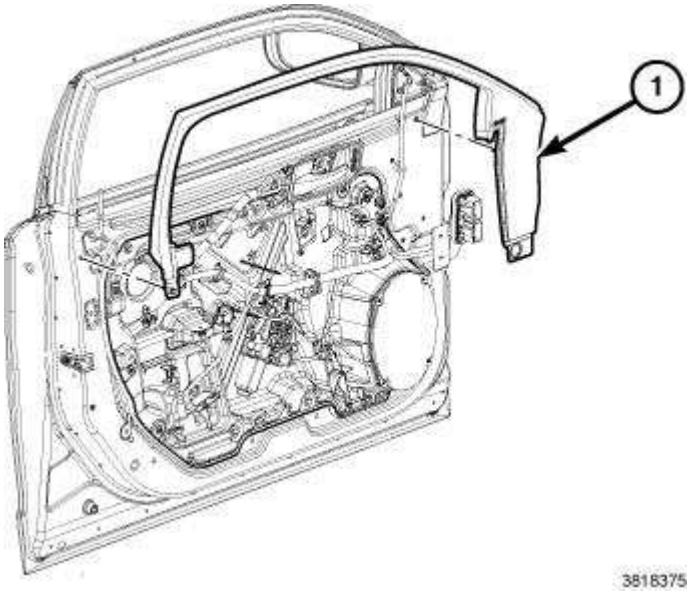


Fig. 500: Locating Throttle Body O-Ring AT Intake Manifold - 5.7L
Courtesy of CHRYSLER GROUP, LLC

1. Clean and check condition of throttle body-to-intake manifold o-ring (2).
2. Clean mating surfaces of throttle body and intake manifold (1).

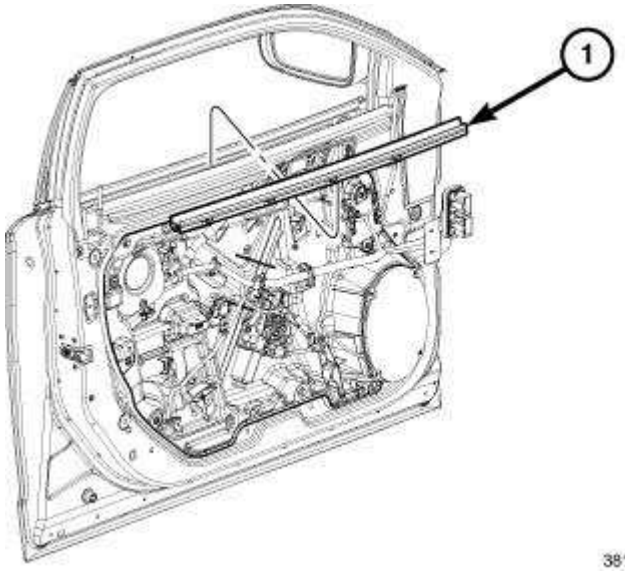


Fig. 501: Removing/Installing Throttle Body - 5.7L
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.

3. Install throttle body to intake manifold by positioning throttle body to manifold alignment pins.
4. Install and tighten four mounting bolts (2). Refer to **TORQUE** .

5. Install electrical connector (3).
6. Install rubber air hose to throttle body.
7. A Scan Tool may be used to learn electrical parameters. Go to the Miscellaneous menu, and then select ETC Relearn. If the relearn is not performed, a Diagnostic Trouble Code (DTC) will be set. If necessary, use a scan tool to erase any Diagnostic Trouble Codes (DTC's) from PCM.

VALVE, SHORT RUNNER

DESCRIPTION

DESCRIPTION

The intake manifold features a dual shaft Short Runner Valve (SRV) system to maximize both low end torque and peak power. The SRV is bolted to the rear of the intake manifold and can be service separately from the manifold.

The SRV system operates under Wide Open Throttle conditions to maximize engine performance. When activated by the PCM, the SRV actuates a mechanical linkage to redirect the intake air flow to eight short runners. The PCM looks for a signal feedback when the actuator is activated. If the signal feedback is not present, the PCM sets the DTC.

REMOVAL

REMOVAL

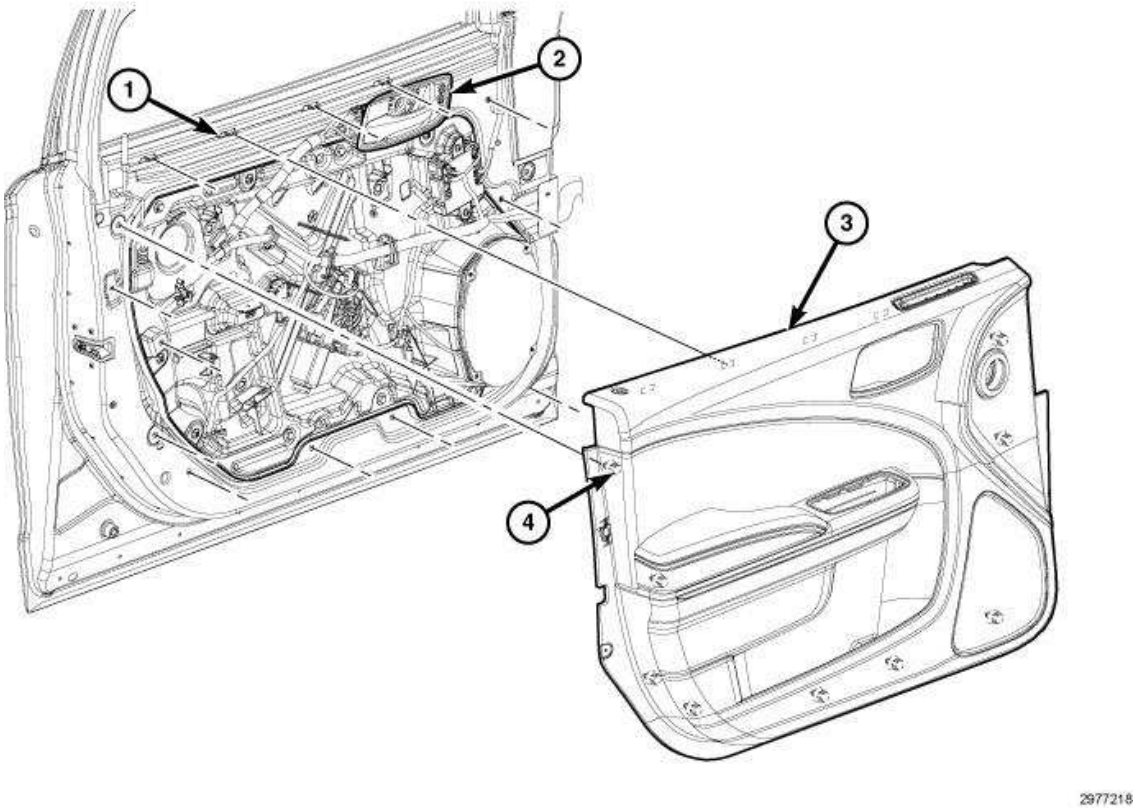


Fig. 502: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable (1).

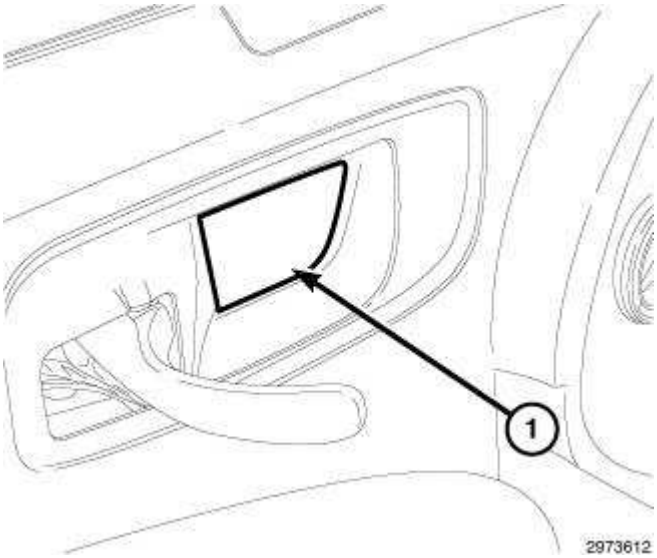


Fig. 503: Intake Manifold And Throttle Body
Courtesy of CHRYSLER GROUP, LLC

2. Remove the intake manifold and throttle body as an assembly. Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD, INTAKE, REMOVAL** .

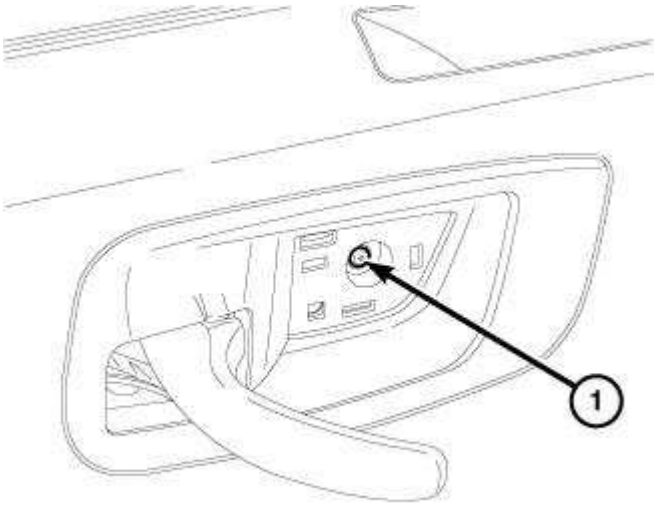


Fig. 504: Short Runner Valve (SRV) Actuator Retaining Bolts & SRV Actuator
Courtesy of CHRYSLER GROUP, LLC

3. Remove the Short Runner Valve (SRV) actuator retaining bolts (1) and remove the SRV actuator (2).

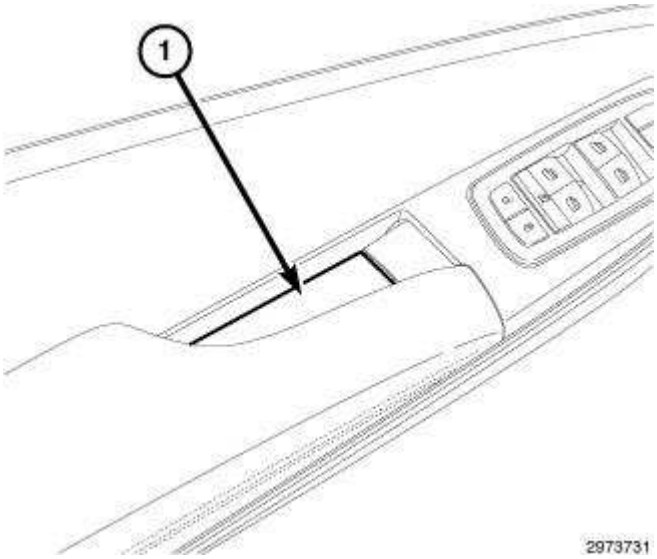


Fig. 505: Rubber O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the SRV actuator is removed, a new rubber O-ring seal must be installed. The old O-ring cannot be reused.

4. Remove and discard the SRV actuator rubber O-ring seal (1).

INSTALLATION

INSTALLATION

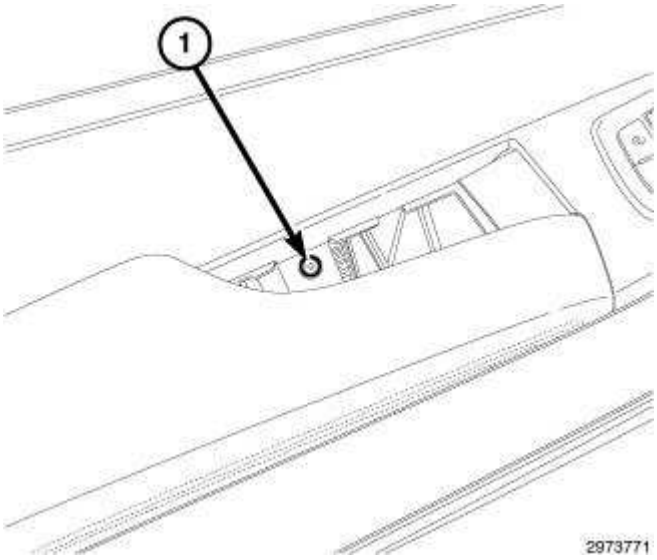


Fig. 506: Rubber O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the SRV actuator is removed, a new rubber O-ring seal must be installed. The old O-ring cannot be reused.

1. Install a new SRV actuator rubber O-ring seal (1).

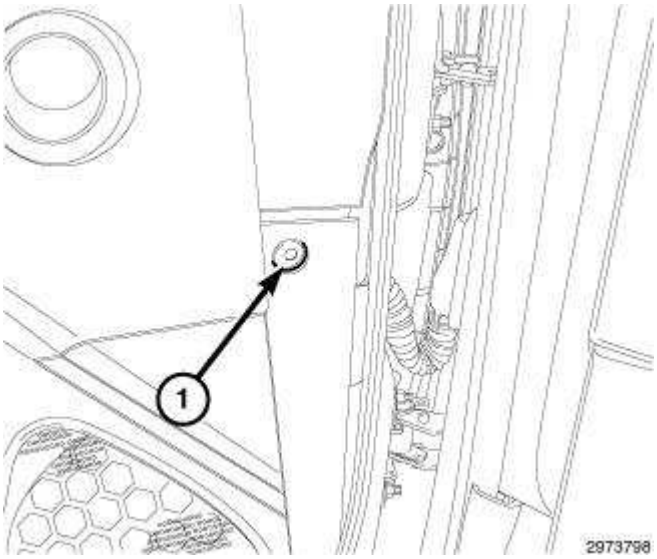


Fig. 507: Short Runner Valve (SRV) Actuator Retaining Bolts & SRV Actuator
Courtesy of CHRYSLER GROUP, LLC

2. Position the SRV actuator (2), install the retaining bolts (1) and tighten to 5 N.m (44 in. lb.).

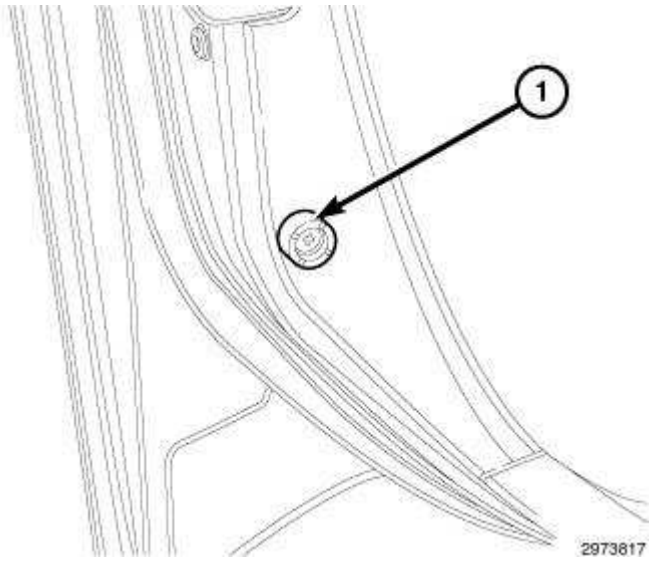


Fig. 508: Intake Manifold And Throttle Body
Courtesy of CHRYSLER GROUP, LLC

3. Install the intake manifold and throttle body as an assembly. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .

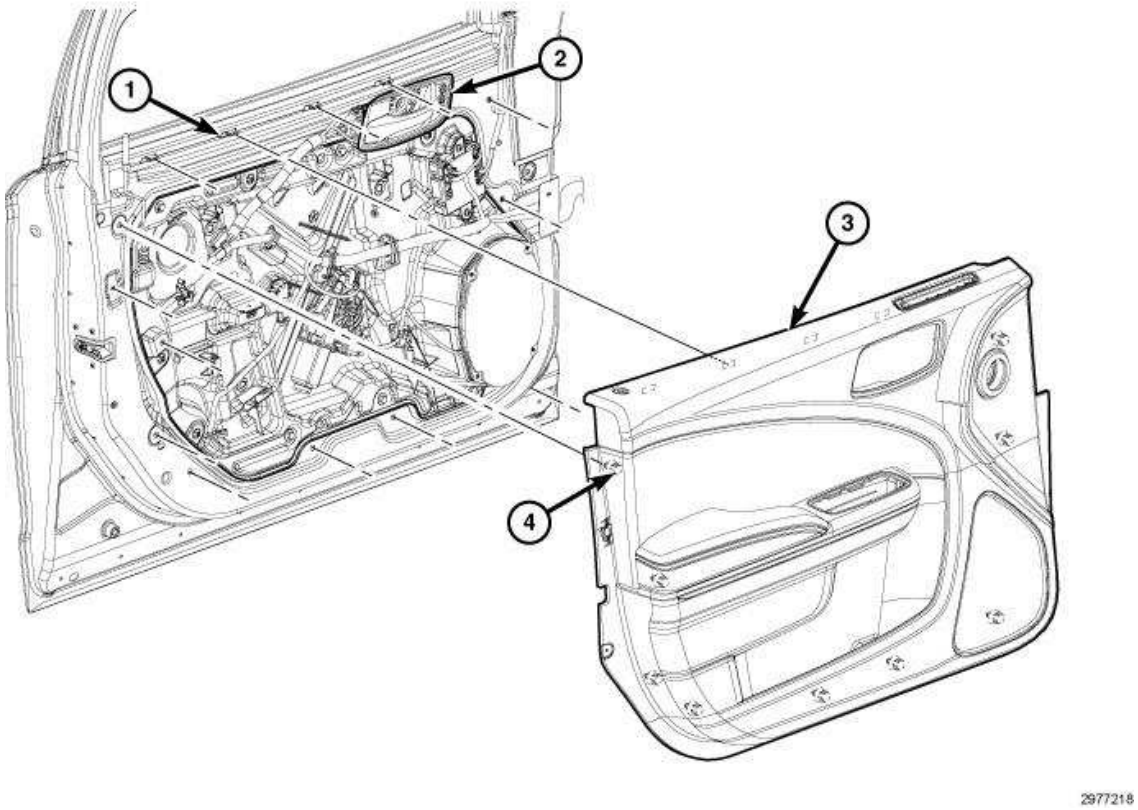


Fig. 509: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

4. Connect the negative battery cable (1).

ACCESSORIES AND EQUIPMENT

Hands Free System - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

For more information. Refer to **MODULE, HANDS FREE, DESCRIPTION** .

ACCESSORIES AND EQUIPMENT

Heated/Cooled Accessories - Service Information - Chrysler 300

DESCRIPTION

HEATED/COOLED CUPHOLDER

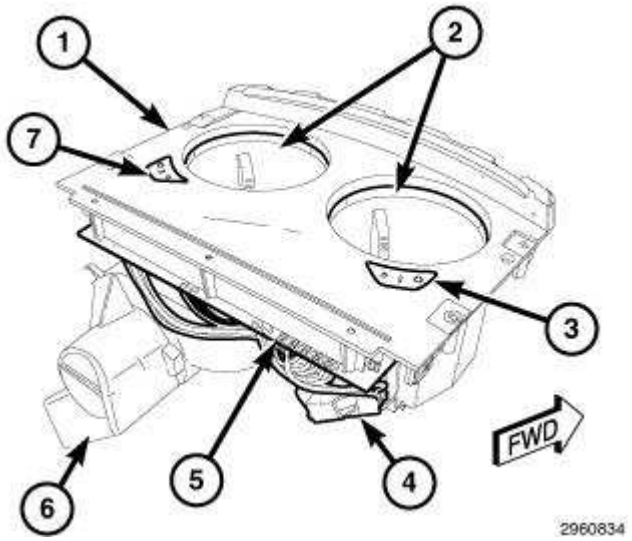


Fig. 1: Heated And Cooled Cupholder Assembly
Courtesy of CHRYSLER GROUP, LLC

The heated and cooled cupholder assembly (1) is located in the center console, when equipped. The two heated and cooled cupholders (2) can heat the container placed within them to 60° C (140° F) or cool the container to near 1.6° C (35° F). Each heated and cooled cupholder has a Positive Temperature Coefficient (PTC) ceramic element attached to an aluminum cylinder, that forms the side of the cupholder. A circuit board (5) with a heat sink controls the unit's function, and the wiring connector (4) connects it to a lead of the center console wire harness. The integral ventilation duct (6) helps dissipate the heat from within the cupholder assembly. The each cupholder is controlled through a switch (3 and 7). The Light Emitting Diodes (LEDs) in each switch, illuminate blue to indicate when the cupholder is set to cool, or red when set to heat.

HEATED STEERING WHEEL

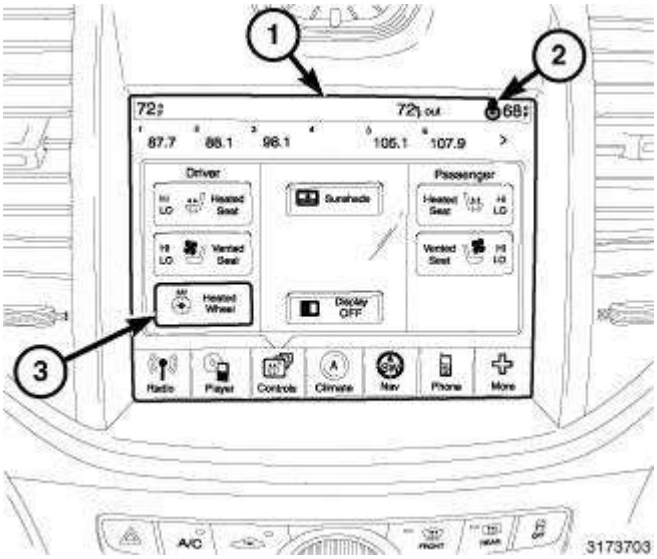


Fig. 2: U-Connect Touch(TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

The heated steering wheel system is designed to enhance the thermal comfort of the driver by heating the steering wheel, when desired. The steering wheel heating element is made of copper wire and is sandwiched between the leather and the substrate material of the steering wheel. A vehicle with a heated steering wheel can easily be identified by the heated steering wheel switch (3) located in the U-Connect Touch ™ screen module (1), at the center of the instrument panel. When the heated steering wheel switch is pressed on, the heated steering wheel switch illuminates and an International Standards Organization (ISO) symbol (2) appears in the top corner of the U-Connect Touch ™ screen module.

The heated steering wheel system consists of the following major components

- **Heated Steering Wheel Switch** - Refer to **SWITCH, HEATED STEERING WHEEL, DESCRIPTION**.
- **Heated Seat Module (HSM)** - (also know as the comfort seat wheel module). Refer to **MODULE, HEATED SEAT, DESCRIPTION** .
- **Heated Steering Wheel** - Refer to **OPERATION**.

VENTED SEATS

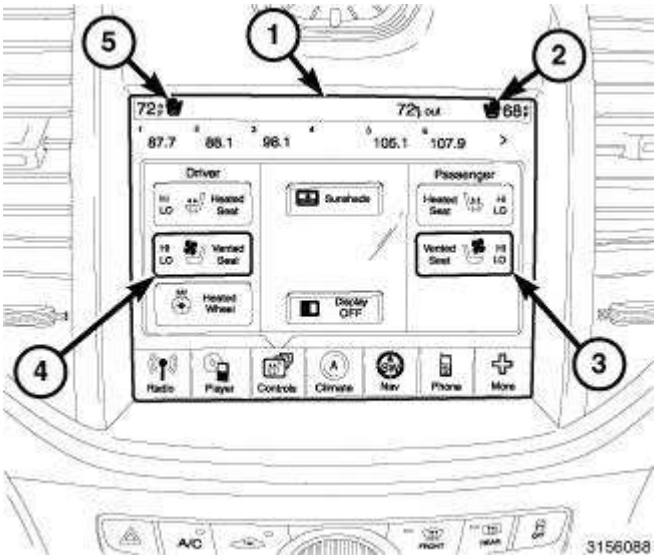


Fig. 3: U-Connect Touch(TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

The vented seat system is designed to enhance the thermal comfort of the driver and front seat occupant, when desired. Occupant comfort is achieved by pulling air from the outside of the seating surfaces into the seat back and cushion of the seat. Vehicles with the optional vented seat system can be visually identified by the two vented seat switches (3 and 4) located in the U-Connect Touch™ screen module (1), in the center of the instrument panel. The vented seat system allows a ventilated seat occupant to select from two different levels of seat venting (HI and LO).

The vented seat system consist of the following major components:

- **Vented Seat Motors** - Four vented seat motors are used per vehicle. Two vented seat motors for each front seat, one for the seat back cushion and the other for the seat bottom cushion. Refer to **MOTOR, VENTED SEAT, DESCRIPTION**.
- **Vented Seat Pads** - Four vented seat pads are used per vehicle. Two vented seat pads for each front seat, one on the seat back cushion and the other on the seat bottom cushion.
- **Vented Seat Switches** - Two vented seat switches are used per vehicle, one for each front seat. The vented seat switches are integral to the U-Connect Touch™ screen module and communicate over the Controller Area Network (CAN) data bus. Refer to **SWITCH, VENTED SEAT, DESCRIPTION**.
- **Heated Seat Module** - One Heated Seat Module (HSM) is used per vehicle. The HSM is mounted under the front passenger seat and contains the control logic and software for the vented seat system. The HSM communicates over the CAN data bus. Refer to **MODULE, HEATED SEAT, DESCRIPTION** .

OPERATION

HEATED/COOLED CUPHOLDER

When the ignition is in the Run position, battery voltage is supplied through a fuse to the heated and

cooled cupholder assembly circuit board. The two heated and cooled cupholders can heat up to 60° C (140° F) or cool to near 1.6° C (35° F). When a cupholder is on, either the red or blue Light Emitting Diode (LED) in the cupholder switch illuminates to indicate which function is operating. The blue LED illuminates when a cupholder is set to cool, and red illuminates when set to heat.

A Positive Temperature Coefficient (PTC) ceramic element provides the temperature change in each of the cupholders. Direct Current (DC) either heats or cools the PTC ceramic element, depending on which way current is applied through the element. Each PTC ceramic element is attached to an aluminum cylinder that forms the side of a cupholder. The PTC material used in each heated and cooled cupholder has the unique property of very low resistance to electric current. This allows them to change temperature rapidly and to transfer heat quickly. The PTC ceramic elements are self-regulating. As a PTC ceramic element reaches the desired temperature, the resistance increases dramatically, preventing an excessive temperature. The desired temperature is determined by the chemical makeup of the ceramic material. The aluminum cylinders distribute and transfer the heat from the relatively small PTC elements to the beverage containers. In addition, a heat sink is used to increase heat transfer area.

A special mug is included with the heated and cooled cupholder to increase its effectiveness. The lower section of the mug is aluminum and fits closely within the cupholder to maximize the heat transfer potential. The upper section of the mug is insulated to keep the contents at the desired temperature.

The heated and cooled cupholder assembly cannot be adjusted or repaired and must be replaced if inoperative or damaged.

HEATED STEERING WHEEL

Operation of the steering wheel heating element is controlled by the Heated Seat Module (HSM), also know as the comfort seat wheel module. A temperature sensor is integrated into the steering wheel heating element that sends the temperature of the steering wheel to the HSM, which adjusts the temperature of the steering wheel heating element accordingly. The normal heating cycle of the steering wheel will last a minimum of 52 minutes, unless the switch is pressed again. The heated steering wheel system will automatically shut off if the heating element reaches a temperature greater than 50° C (122° F), or if a fault is detected. If for any reason a fault in the heated steering wheel system becomes present, a Diagnostic Trouble Code (DTC) will set.

The heated steering wheel system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The steering wheel heating element is not serviced separately from the steering wheel and if inoperative or damaged, the entire steering wheel assembly must be replaced. Refer to **WHEEL, STEERING, REMOVAL** .

VENTED SEATS

The vented seat assemblies are located internally to both front seats. The driver and front passenger vented seats are turned on and off by two separate switches located in the U-Connect Touch™

screen module. The vented seats will only operate when the engine is running, and will always stay off unless a vented seat switch is pressed. The vented seats are controlled by the Heated Seat Module (HSM), also know as the comfort seat wheel module. The HSM provides variable analog voltages that drive two 12 volt Direct Current (DC) motors. One motor is located in the seat back and the other motor is mounted to the seat bottom pan. Each press of a vented seat switch will cause the vented seat fan to change speeds from off to HI, HI to LO and LO to off. Both vented seats operate separately from each other and will not operate at the same time as the heated seats.

The vented seat system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HEATED AND COOLED CUPHOLDER

NOTE: **NOTE: The heated and cooled cupholder has a low and high voltage cut-off feature that turns the cupholder off if vehicle voltage falls below 9.8 volts, or if voltage goes above 16.2 volts. Be certain to check the vehicle electrical system for proper operation anytime the heated and cooled cupholder appears inoperative.**

NOTE: **See Wiring Information for complete circuit schematics and connector pin-out details.**

The heated and cooled cupholders only operate when the ignition is in RUN. The heated and cooled cupholders have a low and high voltage cut-off feature that turns the cupholders off if vehicle voltage falls below 9.8 volts, or if voltage goes above 16.2 volts. Before any testing of the heated and cooled cupholder assembly is attempted, the battery should be fully charged and the charging system checked for proper operation. Refer to **BATTERY, STANDARD PROCEDURE** and **DIAGNOSIS AND TESTING** .

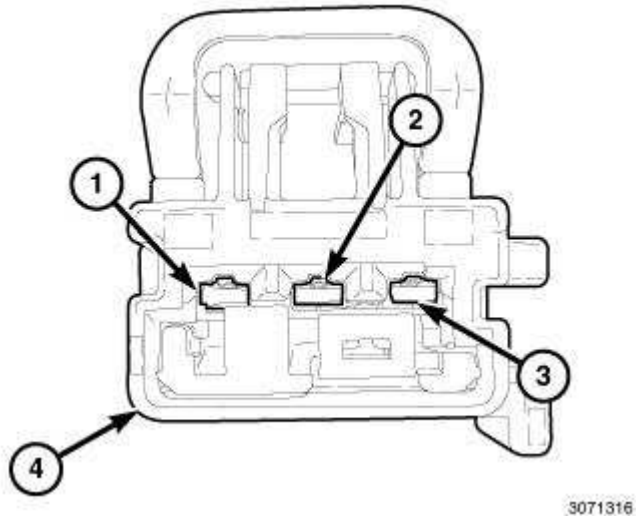


Fig. 4: Fuses & Power Distribution Center (PDC)

Courtesy of CHRYSLER GROUP, LLC

1. Check the ignition run fuse in the Power Distribution Center (PDC). If the fuse is OK, proceed to Step 2. If the fuse is not OK, see Wiring Information, repair the shorted circuit and replace the fuse.
2. Remove the heated and cooled cupholder assembly to gain access to the vehicle wire harness connector (4) for the cupholder. Refer to **CUPHOLDER, HEATED/COOLED, REMOVAL**.
3. Using a Digital Voltage and Ohm Meter (DVOM), with the ignition in RUN, check pin 1 for battery voltage. If OK, go to Step 4. If not OK, see Wiring Information and repair the vehicle wiring as required.
4. Using a DVOM, with the vehicle lights on, check pin 2 for battery voltage. If OK, go to Step 5. If not OK, see Wiring Information and repair the vehicle wiring as required.
5. Using a DVOM, check pin 3 for a good ground. If OK, replace the heated and cooled cupholder assembly. Refer to **CUPHOLDER, HEATED/COOLED, REMOVAL**. If not OK, see Wiring Information and repair the vehicle wiring as required.

HEATED STEERING WHEEL

NOTE: Vehicles equipped with the heated steering wheel option utilize a low voltage cut-off feature. This feature turns off power to the heated steering wheel anytime vehicle voltage is below 11.7 volts or above 15.5 volts. Be certain to check the vehicle electrical system for proper voltage anytime the heated steering wheel appears inoperative.

NOTE: If a Diagnostic Trouble Code (DTC) can not be verified, it is a good indication that an INTERMITTENT fault condition may be present. To help find an intermittent problem, move the steering wheel around while testing continuity. also wiggle the heated steering wheel wire harness and electrical connectors while testing continuity.

NOTE: For complete circuit diagrams, see Wiring Information. Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.

Before testing any individual components in the heated steering wheel system, check the following:

- Check the ignition fuse in the Power Distribution Center (PDC). Repair as necessary.
- Using a scan tool, check for any Diagnostic Trouble Codes (DTCs) related to the Heated Seat Module (HSM), U-Connect Touch ™ screen module and the Telematics Gateway (TGW). If any DTCs are found, repair as necessary (Refer to appropriate Diagnostics for more information).
- Check the vehicles battery open-circuit voltage and charging system performance. If the vehicle's electrical system is defective or weak it may not be suppling sufficient energy to operate the heated steering wheel system.
- If there are no DTCs and the heated steering wheel system functions properly, but the heated

steering wheel indicator does not illuminate, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

VENTILATED SEATS

NOTE: Vehicles equipped with the ventilated seat option utilize a low voltage cut-off feature. This feature turns off power to the ventilated seat system anytime vehicle voltage is below 11.7 volts or above 15.5 volts. Be certain to check the vehicle electrical system for proper voltage anytime the ventilated seat system appears inoperative.

NOTE: If a Diagnostic Trouble Code (DTC) can not be verified, it is a good indication that an INTERMITTENT fault condition may be present. To help find an intermittent problem, sit in the seat in question and move around within the seat while testing continuity. also wiggle the ventilated seat wire harness and electrical connectors while testing continuity.

NOTE: For complete circuit diagrams, see Wiring Information. Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.

Before testing any individual components in the ventilated seat system, check the following:

- Check the ignition fuse in the Power Distribution Center (PDC). Repair as necessary.
- Using a scan tool, check for any Diagnostic Trouble Codes (DTCs) related to the Heated Seat Module (HSM), U-Connect Touch ™ screen module and the Telematics Gateway (TGW). If any DTCs are found, repair as necessary (Refer to appropriate DTC-Based Diagnostics for more information).
- Check the vehicles battery open-circuit voltage and charging system performance. If the vehicle's electrical system is defective or weak it may not be suppling sufficient energy to operate the front vented seat system.
- If there are no DTCs and the front vented seat system functions properly, but a vented seat indicator does not illuminate, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

CUPHOLDER, HEATED/COOLED

REMOVAL

REMOVAL

NOTE: Take the proper precautions to protect the center floor console from cosmetic damage.

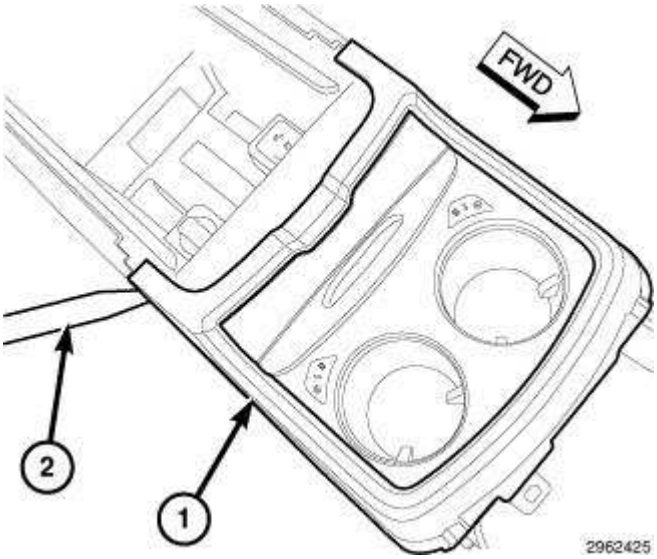


Fig. 5: Center Console Bezel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the shifter bezel from the center floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Using Trim Stick (special tool #C-4755, Trim Stick) (2) or equivalent, carefully disengage the retaining clips that secure the center console bezel (1) to the center floor console and remove the bezel.

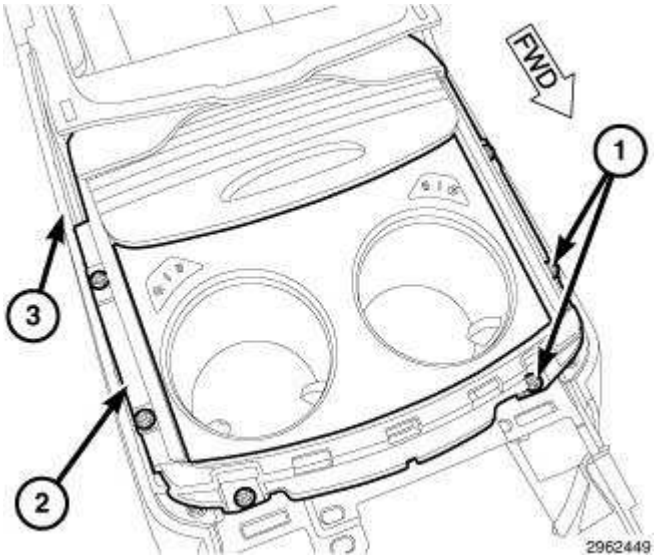


Fig. 6: Screws, Shade Door & Center Floor Console
Courtesy of CHRYSLER GROUP, LLC

4. Remove the six screws (1) that secure the shade door (2) to the center floor console (3) and remove the door.

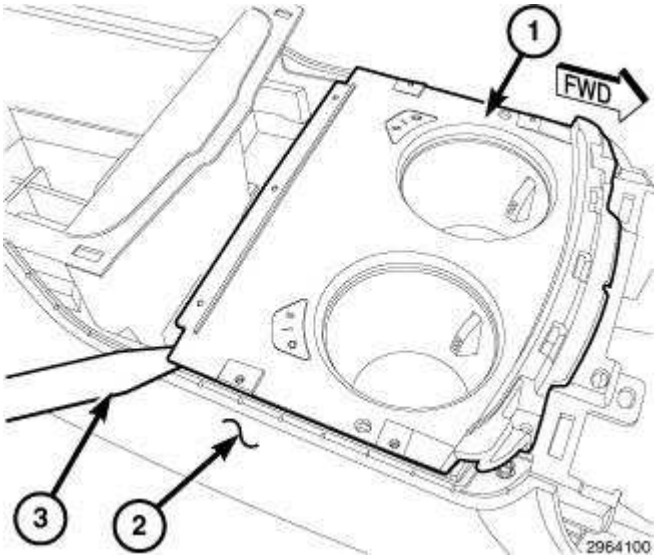


Fig. 7: Shade Door
Courtesy of CHRYSLER GROUP, LLC

5. Using Trim Stick (special tool #C-4755, Trim Stick) (3) or equivalent, carefully disengage the retaining clips that secure the heated/cooled cupholder assembly (1) to the center floor console (2).

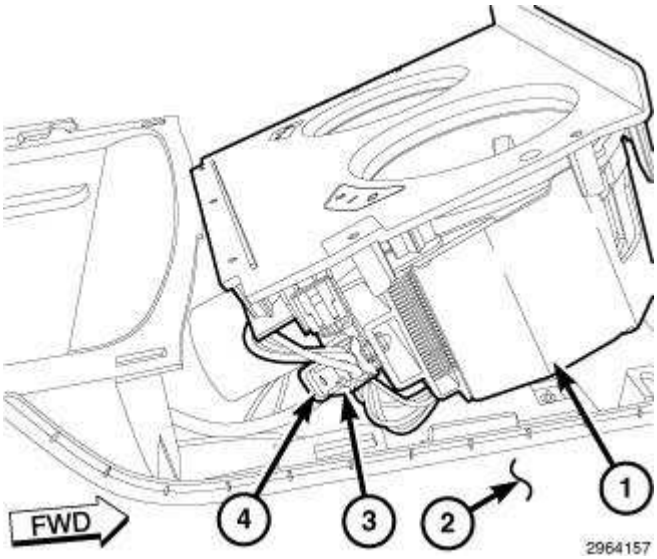


Fig. 8: Heated/Cooled Cupholder Assembly
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the console wire harness (4) from the cupholder connector (3) and remove the heated/cooled cupholder assembly (1) from the center floor console (2).

INSTALLATION

INSTALLATION

NOTE: **Take the proper precautions to protect the center floor console from cosmetic damage.**

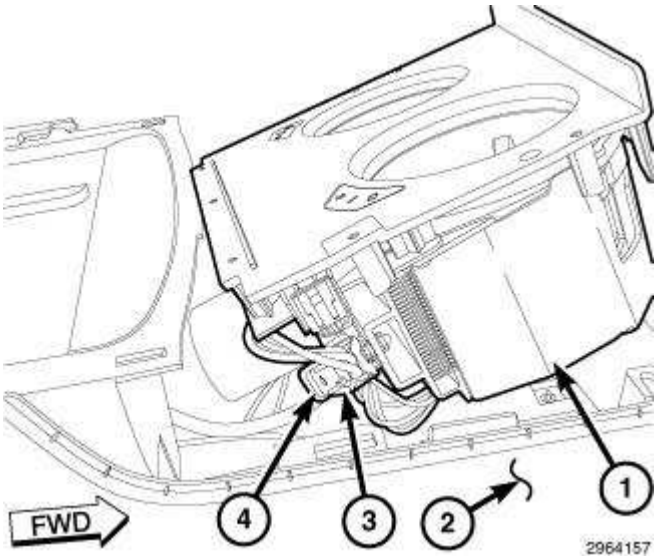


Fig. 9: Heated/Cooled Cupholder Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Position the heated/cooled cupholder assembly (1) to the center floor console and (2) connect the console wire harness (4) to the cupholder connector (3).

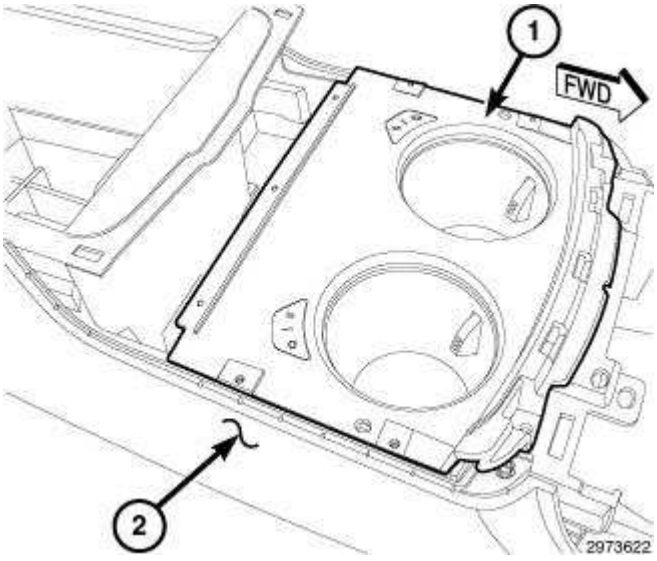


Fig. 10: Heated/Cooled Cupholder Assembly & Center Floor Console
Courtesy of CHRYSLER GROUP, LLC

2. Engage the retaining clips that secure the heated/cooled cupholder assembly (1) to the center floor console (2).

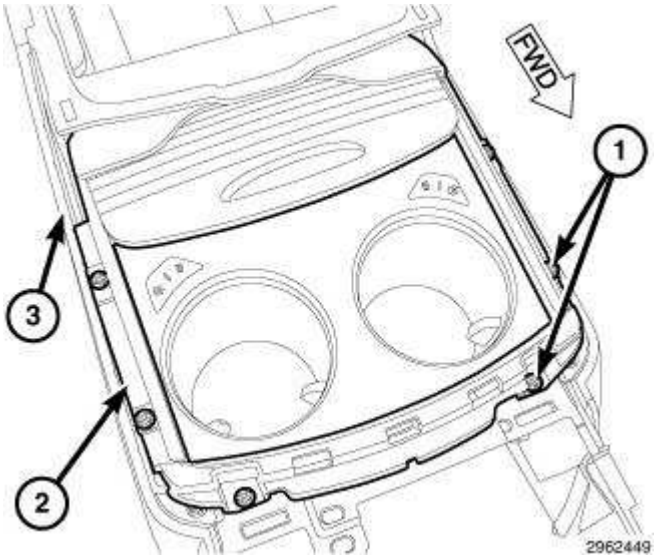


Fig. 11: Screws, Shade Door & Center Floor Console
Courtesy of CHRYSLER GROUP, LLC

3. Install the six screws (1) that secure the shade door (2) to the center floor console (3). Tighten the screws to 2 N.m (17 in. lbs.).

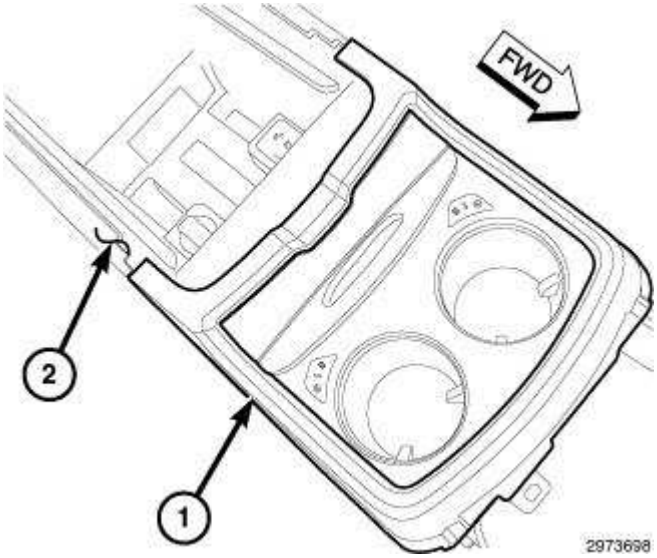


Fig. 12: Center Console Bezel & Center Floor Console
Courtesy of CHRYSLER GROUP, LLC

4. Position the center console bezel (1) to the center floor console (2) and engage the retaining clips. Make sure the retaining clips are fully engaged.
5. Install the shifter bezel to the center floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .
6. Reconnect the negative battery cable.
7. Verify proper heated/cooled cupholder operation.

MOTOR, VENTED SEAT

DESCRIPTION

DESCRIPTION

NOTE: Seat bottom motor shown in illustration. Seat back motor similar.

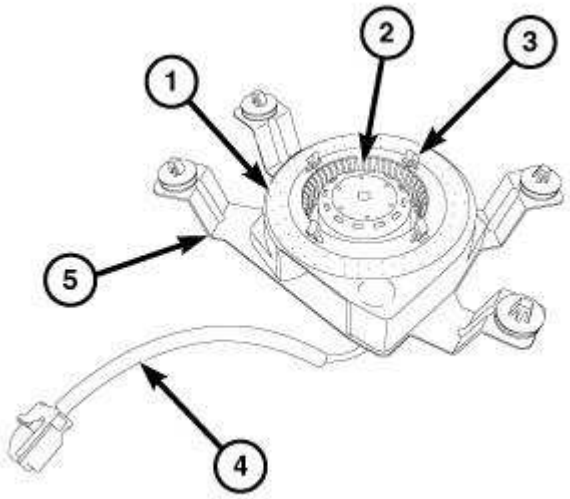


Fig. 13: Vented Seat Motors, Integral Fan Blade, Wire Lead And Connector & Metal Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

When equipped, each front seat has two vented seat motors (1). One motor is mounted to the seat back frame and the second motor is mounted to the seat bottom pan. Each vented seat motor is attached to a vented seat pad.

Each vented seat motor consists of a 12 volt Direct Current (DC) motor with an integral fan blade (2) and a wire lead and connector (4). Each vented seat motor is attached to a metal mounting bracket (5) and has four plastic tabs (3) that secure the motor to the vented pad.

OPERATION

OPERATION

The vented seat motors will only operate with the engine running and will not operate at the same time as the heated seats. The vented seat motors are controlled by the Heated Seat Module (HSM), also know as the comfort seat wheel module. The HSM provides the vented seat motors with variable analog voltages giving the motors two selectable speeds. These speeds are selected by the driver and/or front passenger by pressing the vented seat switches, located in the U-Connect Touch™ screen module. Switching the vented seats on while the heated seats are already operating will disable the heating of the seat and start the venting of the seat. Both front vented seats work independently from each other, so that the driver and front passenger can choose there own settings

for individual comfort preferences.

The vented seat system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The vented seat motor located in the seat bottom pan cannot be adjusted or repaired and must be replaced if inoperative or damaged. Refer to **MOTOR, VENTED SEAT, REMOVAL**.

The vented seat motor located in the seat back frame cannot be adjusted or repaired and the entire seat back frame must be replaced if the motor is inoperative or damaged. Refer to **COVER, SEAT BACK, FRONT, REMOVAL** .

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The vented seat motor located in the seat back frame cannot be serviced separately. The entire seat back frame must be replaced if the vented seat back motor is inoperative or damaged. Refer to COVER, SEAT BACK, FRONT, REMOVAL .

NOTE: On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC). Refer to MODULE, OCCUPANT RESTRAINT CONTROLLER, DESCRIPTION .

NOTE: Driver seat shown in illustrations. Passenger seat similar.

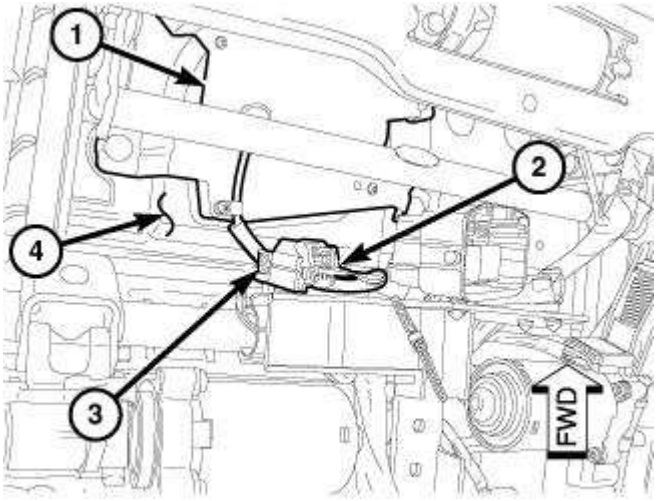


Fig. 14: Electrical Connectors & Vented Seat Motor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the appropriate seat and place it on a workbench. Refer to **SEAT, FRONT, REMOVAL** .
3. When servicing the driver seat, remove the memory seat module and bracket. Refer to **MODULE, MEMORY, REMOVAL** .
4. When servicing the passenger seat, remove the heated seat module and bracket. Refer to **MODULE, HEATED SEAT, REMOVAL** .
5. Disconnect the electrical connectors (2 and 3) for the vented seat motor (1), located on the seat bottom pan (4).

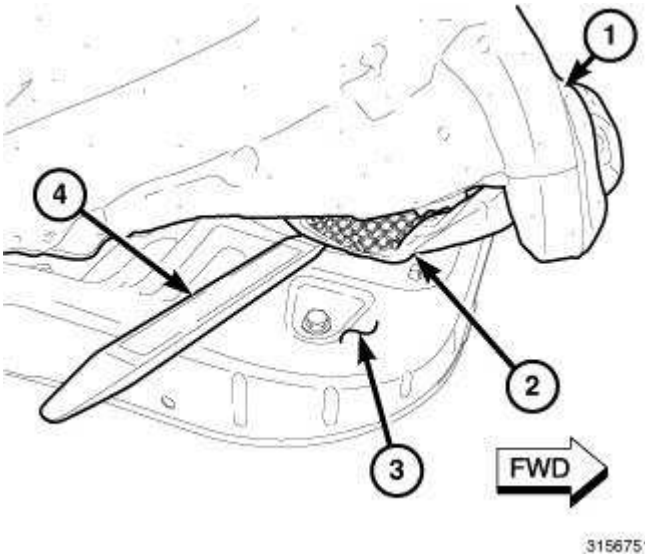


Fig. 15: Seat Bottom Pan, Trim Stick & Seat Bottom Cushion And Cover
Courtesy of CHRYSLER GROUP, LLC

6. Partially remove the seat bottom cushion and cover (1) from the seat bottom pan (3) to gain access to the vented seat motor. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** or **COVER, SEAT CUSHION, SECOND ROW, REMOVAL** .
7. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent (4), carefully disengage the four retaining tabs that secure the vented seat pad (2) to the vented seat motor.

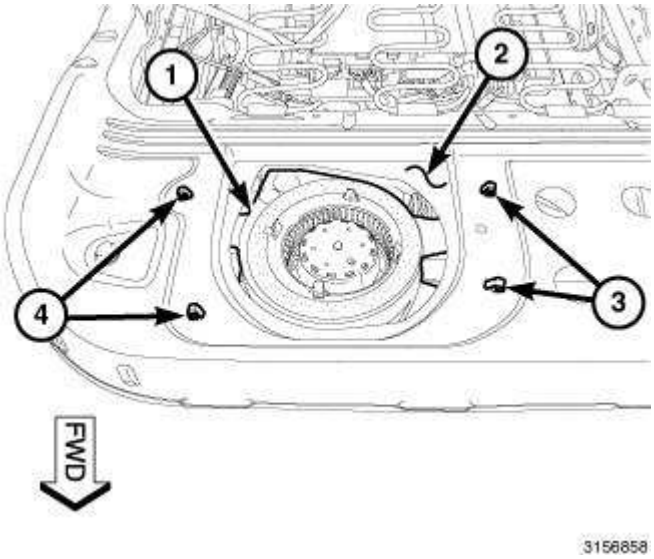


Fig. 16: Seat Bottom Pan, Vented Seat Motor & Four Plastic Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with seat cushion and cover removed from view for clarity. It is not necessary to completely remove the seat bottom cushion and cover from the seat bottom pan to service the vented seat motor.

8. Disengage the four plastic retainers (3 and 4) that secure the vented seat motor (1) to the seat bottom pan (2).
9. Remove the vented seat motor from underneath the seat bottom pan.

INSTALLATION

INSTALLATION

NOTE: On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC). Refer to MODULE, OCCUPANT RESTRAINT CONTROLLER, DESCRIPTION .

NOTE: Driver seat shown in illustrations. Passenger seat similar.

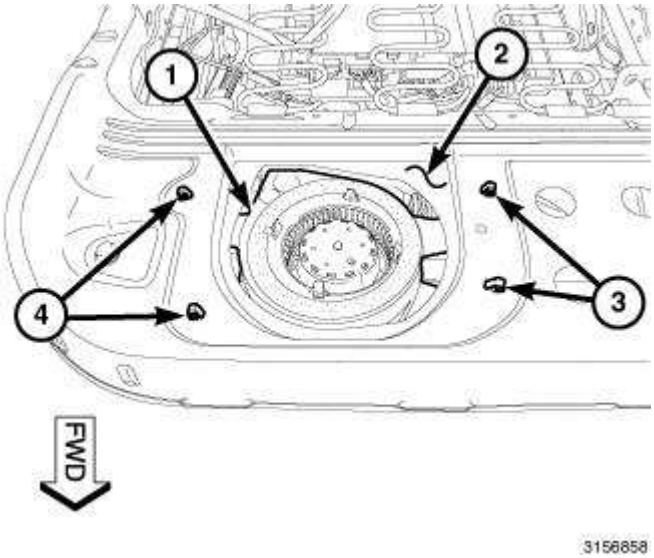


Fig. 17: Seat Bottom Pan, Vented Seat Motor & Four Plastic Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with seat cushion and cover removed from view for clarity. It is not necessary to completely remove the seat bottom cushion and cover from the seat bottom pan to service the vented seat motor.

1. Position the vented seat motor (1) underneath the seat bottom pan (2) and engage the four plastic retainers (3 and 4) to the pan. Be sure the retainers are fully engaged.

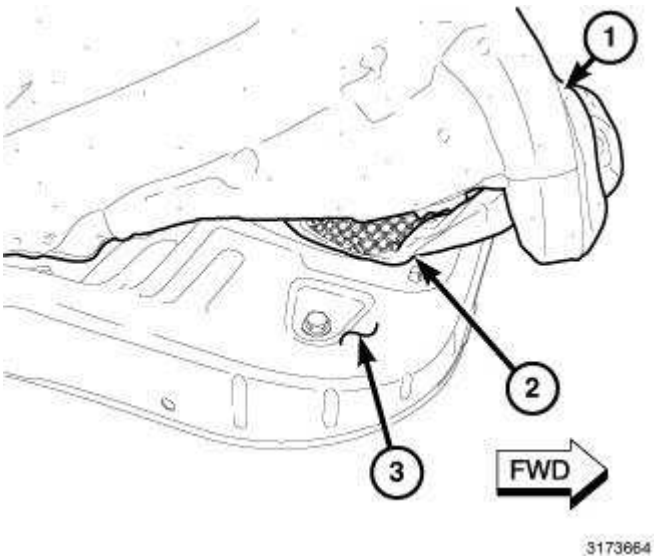


Fig. 18: Seat Bottom Pan, Vented Seat Motor Four Plastic Retainers
Courtesy of CHRYSLER GROUP, LLC

2. Connect the vented seat pad (2) to the vented seat motor and engage the four retaining tabs that secure the pad to the motor. Be sure the retaining tabs are fully engaged.
3. Install the seat bottom cushion and cover (1) onto the seat bottom pan (3). Refer to **COVER,**

SEAT CUSHION, FRONT, INSTALLATION or **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION** .

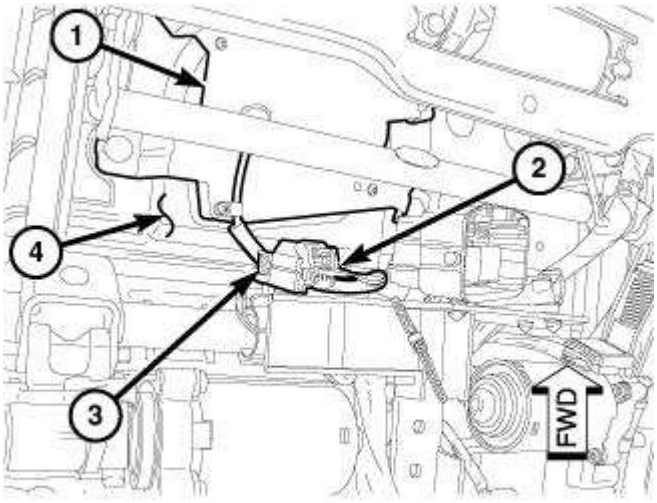


Fig. 19: Electrical Connectors & Vented Seat Motor
Courtesy of CHRYSLER GROUP, LLC

4. Connect the electrical connectors (2 and 3) for the vented seat motor (1), located under the seat bottom pan (4).
5. When servicing the driver seat, install the memory seat module and bracket. Refer to **MODULE, MEMORY, INSTALLATION** .
6. When servicing the passenger seat, install the heated seat module and bracket. Refer to **MODULE, HEATED SEAT, INSTALLATION** .
7. Install the seat. Refer to **SEAT, FRONT, INSTALLATION** .
8. Reconnect the negative battery cable.
9. Verify proper vented seat system operation.

SWITCH, HEATED STEERING WHEEL

DESCRIPTION

DESCRIPTION

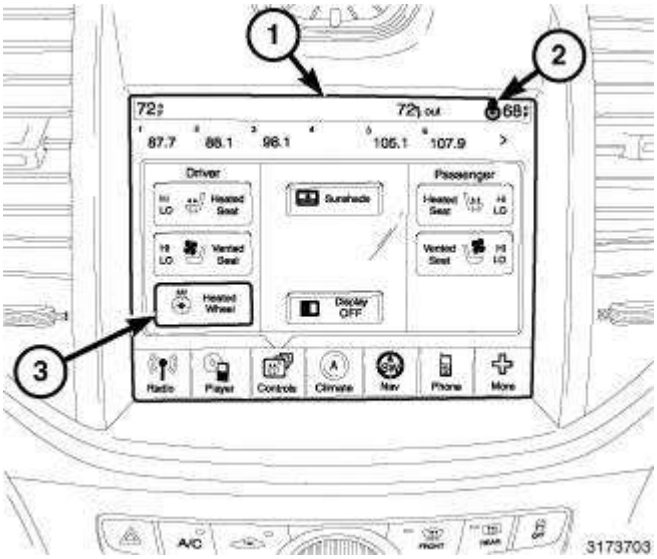


Fig. 20: U-Connect Touch(TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

The switch (3) for the optional heated steering wheel is located in the U-Connect Touch ™ screen module (1), at the center of the instrument panel. When the heated steering wheel switch is pressed on, the heated steering wheel switch illuminates and an International Standards Organization (ISO) symbol (2) appears at the top of the U-Connect Touch ™ screen module.

OPERATION

OPERATION

The heated steering wheel switch allows the driver to turn on and off the heated steering wheel. The heated steering wheel will remain off until the driver presses the switch. Once the switch is pressed, the switch will illuminate and an International Standards Organization (ISO) symbol appears in to top corner of the U-Connect Touch™ screen module, indicating that the heating element in the steering wheel is operating. Pressing the switch while the heated steering wheel is on, will turn the heating steering wheel off.

The heated steering wheel switch also functions as a visual indicator for a fault with the heated steering wheel system. When the heated steering wheel switch is pressed and a fault is present in the heated steering wheel system, the switch will illuminate for two seconds and then immediately turn off.

The heated steering wheel switch is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The heated steering wheel switch located in the U-Connect Touch™ screen module cannot be adjusted or repaired. If a heated steering wheel switch or indicator lamp is inoperative or damaged, the entire U-Connect Touch™ screen module must be replaced (Refer to appropriate service information).

SWITCH, VENTED SEAT

DESCRIPTION

DESCRIPTION

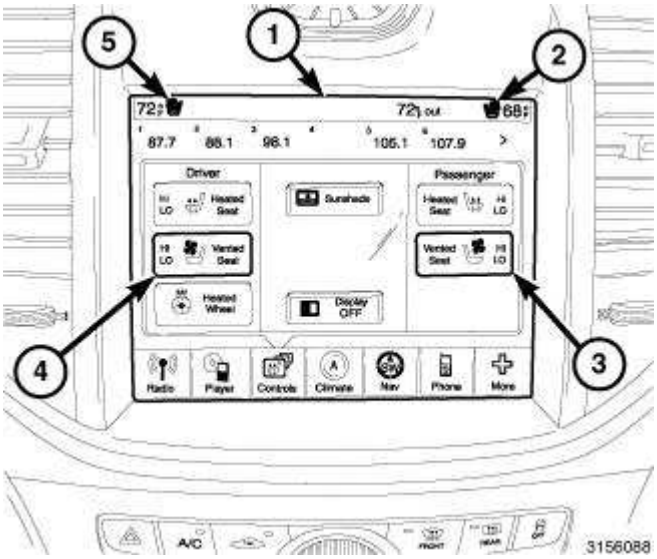


Fig. 21: U-Connect Touch(TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

The switches (3 and 4) for the optional front vented seat system are located in the U-Connect Touch ™ screen module (1), at the center of the instrument panel. The vented seat system allows the driver and front seat passenger to select from two different speed of electrical seat ventilation (HI and LO). When the vented seat switches are pressed on, each switch illuminates either HI or LO, and an International Standards Organization (ISO) symbol (2 and 5) appears at the top of the U-Connect Touch ™ screen module. Pressing a vented seat switch once will select HI. Pressing the same switch a second time will select LO. Pressing the switch a third time will turn the ventilating function of the seat off.

OPERATION

OPERATION

When either of the front vented seat switches located in the U-Connect Touch ™ screen module are pressed with the engine running, a request signal is sent to the Heated Seat Module (HSM) (also know as the comfort seat wheel module), over the Controller Area Network (CAN) data bus. The HSM then provides variable analog voltages that drive the two 12 volt Direct Current (DC) motors, located in each front ventilated seat. There are three settings for each vented seat; off, HI and LO. Pressing a vented seat switch once will select HI. Pressing the same switch a second time will select LO. Pressing the switch a third time will shut the vented seat motors off.

The vented seat system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The individual front vented seat switches located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If a front vented seat switch or indicator is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

ACCESSORIES AND EQUIPMENT

Heated Glass - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

CAUTION: Grid lines can be damaged or scraped off with sharp instruments. Care should be taken in cleaning glass or removing foreign materials, decals or stickers. Normal glass cleaning solvents or hot water used with rags or toweling is recommended.

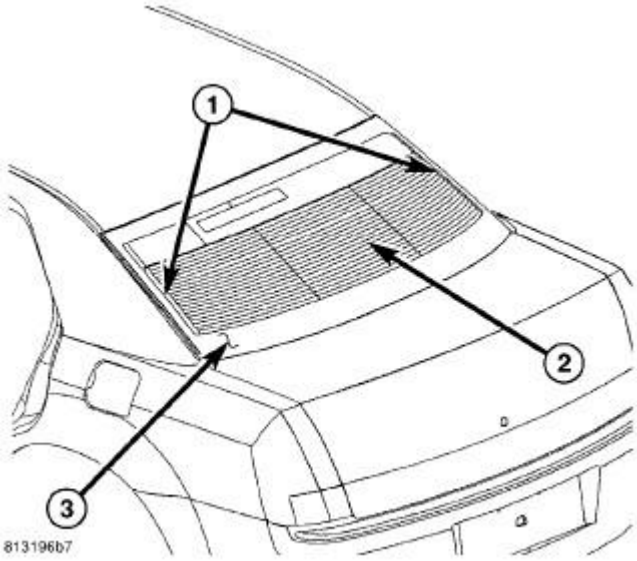


Fig. 1: Grid-EBL Description 48
Courtesy of CHRYSLER GROUP, LLC

The rear window defogger system, also known as electric backlight (EBL), consists of two vertical bus bars (1) linked by a series of grid lines (2) fired onto the inside surface of the rear window (3).

The EBL system is turned On or Off by a switch and timing circuit integral to the A/C-heater control located at the center of the instrument panel.

Circuit protection is provided by two cartridge fuses located in the power distribution center (PDC). One fuse is for the heated rear window grid circuit and the other fuse is for the heated outside mirror grid circuit, when equipped.

OPERATION

OPERATION

The rear window defogger (Electric Back Light) (EBL) system is actuated by a momentary switch located in the switchbank, or by using the control located in the U-Connect Touch ™ screen module. When a rear window defogger switch is pressed to on, the A/C heater module energizes the EBL relay in the Power Distribution Center (PDC), and fused battery current is directed to the rear window defogger grid lines, and to the heated outside rear view mirrors, when equipped. The grid lines heat the glass to help clear the rear window and outside mirror surfaces of fog or frost.

An indicator lamp in the switchbank illuminates when the EBL system is on. The A/C heater module contains the EBL system control circuitry, including the timer logic.

NOTE: The EBL system turns off automatically after ten minutes of initial operation. Each following activation cycle of the EBL system will last five minutes.

The EBL system automatically turns off after an initial programmed time interval of about ten minutes, as long as the ignition is left in the Run position. If a rear window defogger switch is pressed to on again after the initial time interval has expired, the EBL system will automatically turn off after about five minutes. The EBL system will also turn off if the ignition is set to any position other than Run, or by manually pressing the rear window defogger switch a second time.

Repair of the rear window defogger grid lines, bus bars, terminals or pigtail wires can be accomplished using the Mopar® Rear Window Defogger Repair Kit (Part Number 04549275) or equivalent. Refer to **GRID, DEFOGGER, REAR, STANDARD PROCEDURE**.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ELECTRIC BACKLIGHT (EBL) SYSTEM

NOTE: Illumination of the defogger switch indicator lamp does not necessarily mean that electrical current is reaching the rear glass heating grid lines.

NOTE: See Wiring Information for circuit descriptions and diagrams of the rear window defogger system.

Operation of the rear window defogger (Electric Back Light (EBL)) system can be confirmed by the following:

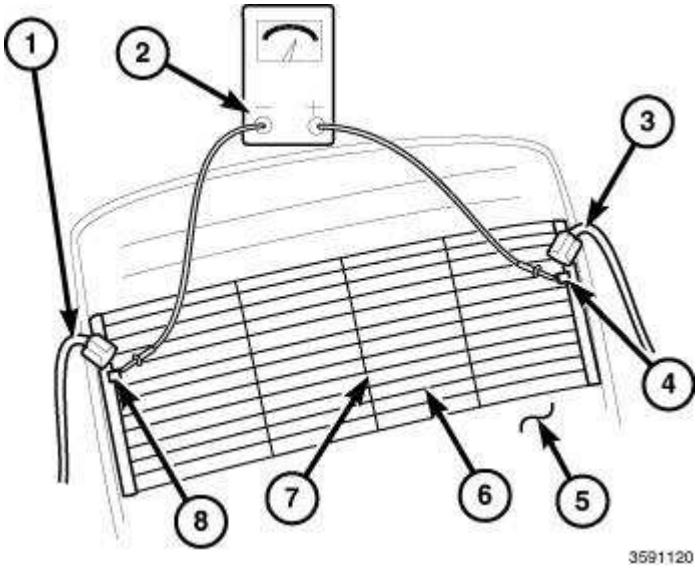


Fig. 2: Rear Window Glass Grid Test
Courtesy of CHRYSLER GROUP, LLC

1. Use a scan tool and check for Diagnostic Trouble Codes (DTCs) related to the U-Connect Touch ™ screen module, Telematics Gateway (TGW) or the A/C heater module. If no DTCs are found, go to 2. If any DTCs are found, repair as required, then proceed to 2.
2. With the ignition in the Run position, press a rear window defogger switch to on.
3. Rear window defogger operation can be checked by feeling the rear window glass (5), or the heated outside rear view mirror glass, when equipped with heated mirrors. After three to four minutes of operation, a distinct difference in temperature should be detected between the clear glass area and the heated glass area, or the heated mirror glass.
4. If a temperature difference is not detected, use a 12 volt Direct Current (DC) voltmeter and contact the rear glass heating grid terminal A (8) with the negative lead, and terminal B (4) with the positive lead. The voltmeter should read battery voltage. If the voltmeter does not read battery voltage, check the following:
    - Confirm the ignition is in the Run position.
    - Confirm the rear window defogger switch is on.
    - Check the EBL fuse in the Power Distribution Center (PDC). The fuse must be tight in its receptacle and its electrical connections must be secure.
    - Confirm the EBL feed wire (3) is connected to the heating grid positive terminal and that there is continuity between the heating grid and the EBL relay in the PDC.
    - Confirm the EBL ground wire (1) is connected to the heating grid negative terminal and that there is continuity to ground.
5. Visually inspect the bus bars, horizontal defogger grid lines (6) and vertical defogger grid lines (7) for damage which could cause an open circuit condition. If a broken grid line or bus bar is found, repair as required. Refer to **GRID, DEFOGGER, REAR, STANDARD PROCEDURE**.
6. If the EBL system operation has been verified but the rear window defogger indicator lamp in the switchbank does not illuminate, replace the entire switchbank pod. Refer to **POD, SWITCH BANK, REMOVAL** .

GRID, DEFOGGER, REAR

STANDARD PROCEDURE

STANDARD PROCEDURE - GRID LINE AND TERMINAL REPAIR

WARNING: Materials contained in the Repair Kit (Part Number 04549275) may cause skin or eye irritation. The kit contains epoxy resin and amine type hardener, which are harmful if swallowed. Avoid contact with the skin and eyes. For skin contact, wash the affected areas with soap and water. For contact with the eyes, flush with plenty of water. Do not take internally. If taken internally, induce vomiting and call a physician immediately. Use with adequate ventilation. Do not use near fire or flame. Contains flammable solvents. Keep out of the reach of children. Failure to follow these instructions may result in serious or fatal injury.

Repair of the rear glass heating grid lines, bus bars, terminals or pigtail wires can be accomplished using the Mopar® Rear Window Defogger Repair Kit (Part Number 04549275) or equivalent.

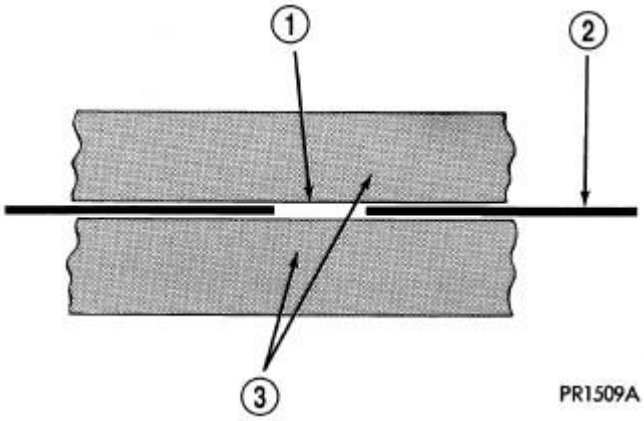


Fig. 3: Grid Line Repair - Typical
Courtesy of CHRYSLER GROUP, LLC

1. Mask the repair area with masking tape (3) so that the conductive epoxy can be applied neatly. Extend the epoxy application onto the grid line (2) or the bus bar on each side of the break (1).
2. Follow the instructions in the repair kit for preparing the damaged area.
3. Remove the package separator clamp and mix the two conductive epoxy components thoroughly within the packaging. Fold the package in half and cut the center corner to dispense the epoxy.
4. Apply the epoxy through the slit in the masking tape or template. Overlap both ends of the break by at least 19 millimeters (0.75 inch).
5. For a terminal or pigtail wire replacement, mask the adjacent areas so the epoxy can be extended onto the adjacent grid line as well as the bus bar. Apply a thin layer of epoxy to the area where the terminal or pigtail wire was fastened and onto the adjacent grid line.

6. Apply a thin layer of conductive epoxy to the terminal or bare wire end of the pigtail and place it in the proper location on the bus bar. To prevent the terminal or pigtail wire from moving while the epoxy is curing, it must be wedged or clamped.
7. Carefully remove the masking tape or template.

CAUTION: Do not allow the glass surface to exceed 204° C (400° F) when using a heat gun, or the glass may fracture.

8. Allow the epoxy to cure 24 hours at room temperature, or carefully use a heat gun for 15 minutes. When using a heat gun, hold it approximately 25.4 centimeters (10 inches) from the repair and do not allow the glass surface to exceed 204° C (400° F).
9. After the conductive epoxy is properly cured, remove the wedge or clamp from the terminal or pigtail wire.
10. Connect the wire harness leads to the grid terminals or pigtail wires and verify EBL operation.

RELAY, DEFOGGER, REAR

DESCRIPTION

DESCRIPTION

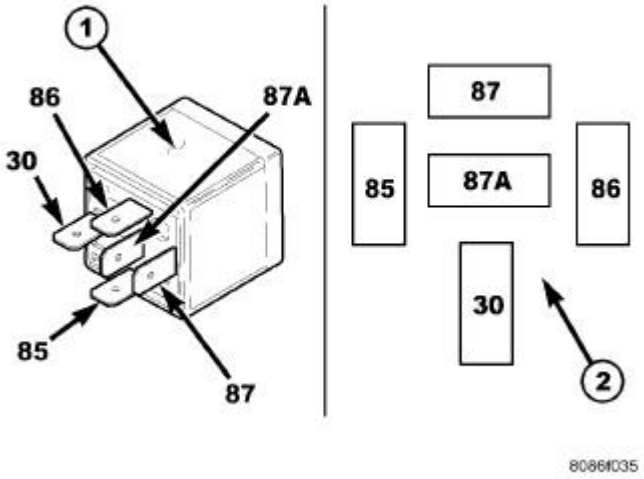


Fig. 4: EBL Relay
Courtesy of CHRYSLER GROUP, LLC

The relay (1) for the rear window defogger system, also known as the Electric Back Light (EBL), is an International Standards Organization (ISO) type relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal functions and patterns (2). The EBL relay is a electromechanical device that switches battery current through a fuse in the Power Distribution Center (PDC) to the rear window defogger grid and to the heated outside rear view

mirrors, when equipped.

The EBL relay is located in the PDC, in the luggage compartment, near the spare tire.

REMOVAL

REMOVAL

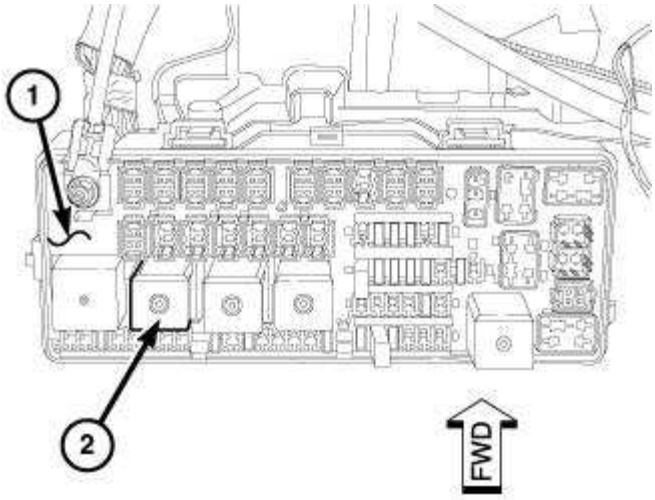


Fig. 5: Power Distribution Center (PDC) And EBL Relay
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Open the cover of the Power Distribution Center (PDC) (1), located in the luggage compartment, near the spare tire.
3. Remove the EBL relay (2) from the PDC.

INSTALLATION

INSTALLATION

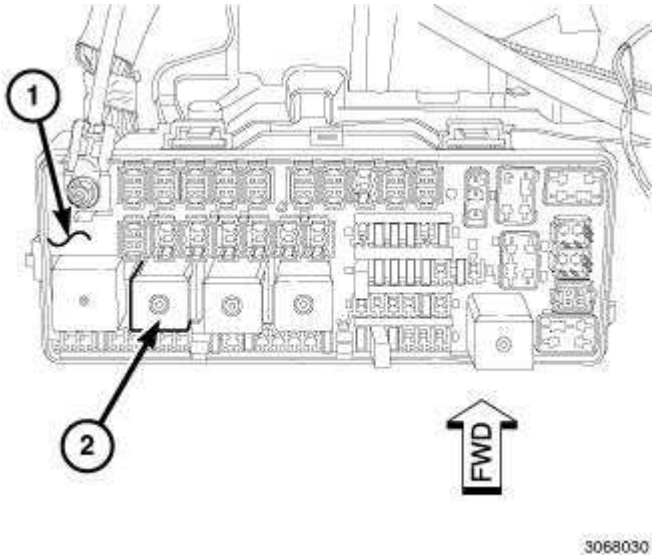


Fig. 6: Power Distribution Center (PDC) And EBL Relay
Courtesy of CHRYSLER GROUP, LLC

1. Position the EBL relay (2) into the proper receptacle of the Power Distribution Center (PDC) (1).
2. Align the EBL relay terminals with the terminal cavities in the PDC receptacle and push down firmly on the relay until the terminals are fully seated.
3. Close the cover of the PDC.
4. Reconnect the negative battery cable.

SWITCH, DEFOGGER, REAR

DESCRIPTION

DESCRIPTION

NOTE: Automatic Temperature Control (ATC) shown in illustration. Manual Temperature Control (MTC) similar.

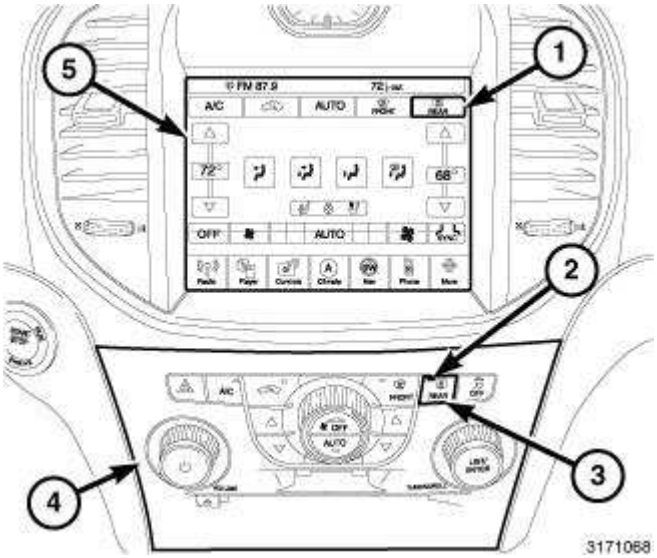


Fig. 7: Identifying U-Connect Touch Defogger, EBL System And Switchbank Indicator Lamp
Courtesy of CHRYSLER GROUP, LLC

The controls (1 and 3) for the rear window defogger, also know as the Electric Back Light (EBL) system, are located in the switchbank (4) and in the U-Connect Touch ™ screen module (5), at the center of the instrument panel. An amber indicator lamp (2) in the switchbank illuminates when the EBL system is on.

OPERATION

OPERATION

The rear window defogger (Electric Back Light) (EBL) system is actuated by a momentary switch located in the switchbank, or by using the control located in the U-Connect Touch ™ screen module. When a rear window defogger switch is pressed to on, the A/C heater module energizes the EBL relay in the Power Distribution Center (PDC) and fused battery current is directed to the rear window defogger grid lines and the heated outside rear view mirrors, when equipped. The grid lines heat the glass to help clear the rear window and outside mirror surfaces of fog or frost.

An amber indicator lamp in the switchbank illuminates when the EBL system is on. The A/C heater module contains the EBL system control circuitry, including the timer logic.

NOTE: The EBL system turns off automatically after ten minutes of initial operation. Each following activation cycle of the EBL system will last five minutes.

The EBL system automatically turns off after an initial programmed time interval of about ten minutes, as long as the ignition is left in the Run position. If a rear window defogger switch is pressed to on again after the initial time interval has expired, the EBL system will automatically turn off after about five minutes. The EBL system will also turn off if the ignition is turned to any position other than run, or by manually pressing the rear window defogger switch a second time.

The individual rear window defogger switch located in the switchbank cannot be adjusted or repaired.

If a rear window defogger switch or indicator lamp is inoperative or damaged, the entire switchbank must be replaced. Refer to **POD, SWITCH BANK, REMOVAL** .

The individual rear window defogger switch located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If a rear window defogger switch is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

ACCESSORIES AND EQUIPMENT

Heated Seats - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

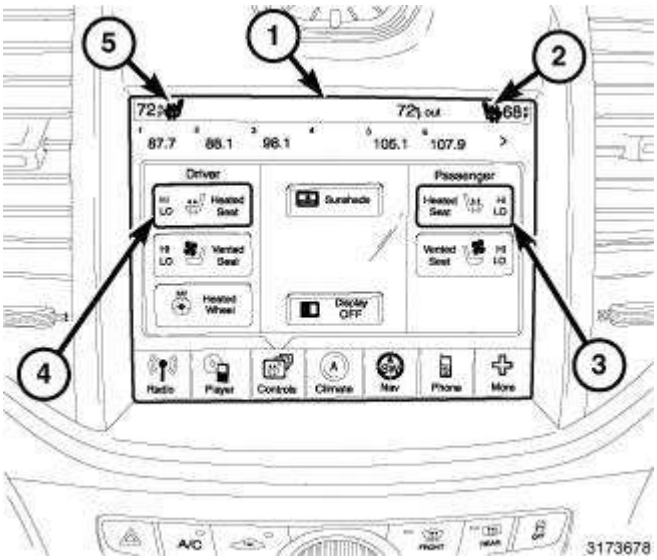


Fig. 1: U-Connect Touch(TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

Vehicles with the optional heated seat system can be visually identified by the two heated seat switches (3 and 4) located in the U-Connect Touch™ screen module (1), in the center of the instrument panel. The heated seat system allows a heated seat occupant to select from two different levels of electrical seat heating (HI and LO).

The heated seat system includes the following major components:

- **Heated Seat Switches** - Up to four heated seat switches are used per vehicle, one for each front heated seat and one for each rear heated seat, when equipped. Both front switches are integral to the U-Connect Touch™ screen module and communicate over the Controller Area Network (CAN) data bus. Refer to **SWITCH, HEATED SEAT, DESCRIPTION**. Both rear heated seat switches are hard-wired to the HSM .
- **Heated Seat Module** - One Heated Seat Module (HSM) is used per vehicle. The HSM is mounted under the front passenger seat and contains the control logic and software for the heated seat system. The HSM communicates over the CAN data bus. Refer to **MODULE, HEATED SEAT, DESCRIPTION** .
- **Heated Seat Elements** - Up to eight heated seat elements are used per vehicle. Two heated seat elements for each heated seat, one on the seat back cushion and the other on the seat bottom cushion. The heated seat elements are hard-wired to the HSM. Refer to **PAD, HEATER, DESCRIPTION**.

OPERATION

OPERATION

The heated seat system operates on battery current received through a fused ignition Run circuit, so that the system will only operate when the engine is running. If the engine is turned off with a heated seat on, the heated seat system will turn off and remain off, until the engine is restarted and a heated seat switch is pressed to on again.

A Heated Seat Module (HSM) is used to control the heated seat system. The HSM is mounted under the front passenger seat. The HSM responds to heated seat switch messages and ignition status inputs by controlling the 12 volt Direct Current (DC) output to the seat heating elements through integral solid-state relays and hard-wired circuits.

When either of the front heated seat switches in the U-Connect Touch™ screen module are pressed, the module sends a message over the Controller Area Network (CAN) data bus, signaling the HSM to energize the heating elements for the selected front heated seat.

If equipped, when a rear heated seat switch in the floor console are pressed, the switch sends a resistive signal to the HSM over hard-wired circuits, signaling the HSM to energize the heating elements for the selected rear heated seat.

The HSM energizes the integral solid-state relays that supply battery current to the heating elements. When high-temperature level heating is initially selected, the HSM provides a boosted high-heat level during the first four minutes of operation. After the first four minutes have passed, the HSM then drops the heat output to the normal high-temperature level for the next 26 minutes of operation. During high-temperature level operation, the HI indicator illuminates in the switch. After 30 minutes of high-temperature level heating, the HSM automatically lowers the heat level to low. At that time, the LO indicator illuminates. Operation on the low-temperature level setting will automatically turn off after 30 minutes.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HEATED SEAT SYSTEM

NOTE: **Vehicles equipped with the heated seat option utilize a low voltage cut-off feature. This feature turns off power to the heated seat system anytime vehicle voltage is below 11.7 volts or above 15.5 volts. Be certain to check the vehicle electrical system for proper voltage anytime the heated seat system appears inoperative.**

NOTE: **If a Diagnostic Trouble Code (DTC) can not be verified, it is a good indication that an INTERMITTENT fault condition may be present. To help find an intermittent problem, sit in the seat in question and move around the heating elements within the seat while testing continuity. also wiggle the heated seat wire harness and electrical connectors while testing continuity.**

NOTE: **For complete circuit diagrams, see Wiring Information. Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.**

Before testing any individual components in the heated seat system, check the following:

- Check to see if the concern is isolated to only one seat. Operate the other heated seat.
- Check the ignition fuse in the Power Distribution Center (PDC). Repair as necessary.
- Using a scan tool, check for any Diagnostic Trouble Codes (DTCs) related to the Heated Seat Module (HSM), U-Connect Touch ™ screen module and the Telematics Gateway (TGW). If any DTCs are found, repair as necessary (Refer to appropriate diagnostic information).
- Check the vehicles battery open-circuit voltage and charging system performance. If the vehicle's electrical system is defective or weak it may not be suppling sufficient energy to operate the heated seat system.
- If there are no DTCs and the front heated seat system functions properly, but a heated seat switch indicator does not illuminate, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).
- If there are no DTCs and the rear heated seat system functions properly, but one or both of the indicator lamps in a rear heated seat switch do not illuminate, check the rear heated switch circuits and repair as necessary. See Wiring information. If the wiring is OK, replace the inoperative second row heated seat switch. Refer to **SWITCH, HEATED SEAT, REMOVAL**.

PAD, HEATER

DESCRIPTION

DESCRIPTION

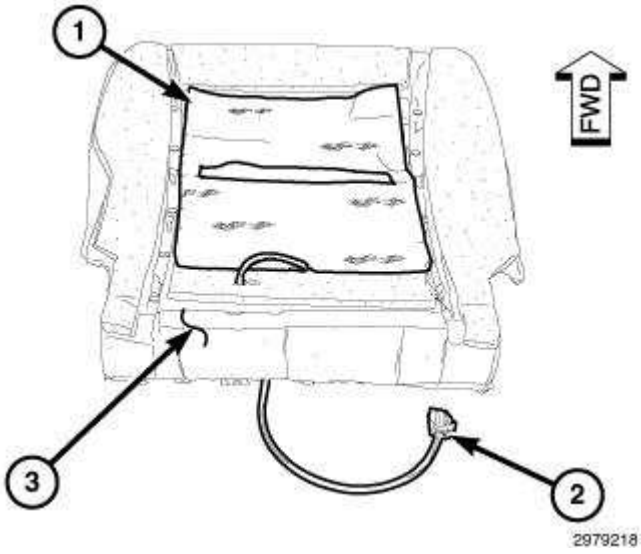


Fig. 2: One Heating Element, Wire Lead And Connector & Seat Bottom Cushion

Courtesy of CHRYSLER GROUP, LLC

NOTE: Front seat shown in illustration. Back seat similar.

Vehicles equipped with the optional heated seat system have up to four heated seats. One heating element (1) is used for each seat bottom cushion (3) and another heating element is used for each seat back cushion.

All of the heated seat elements consist of multiple heating circuits operating in parallel throughout the element and a wire lead and connector (2). The heated seat elements are captured between the seat trim cover and the seat cushion. If a malfunction occurs in one or more of the individual circuits, the remaining operational circuits will continue to provide heat.

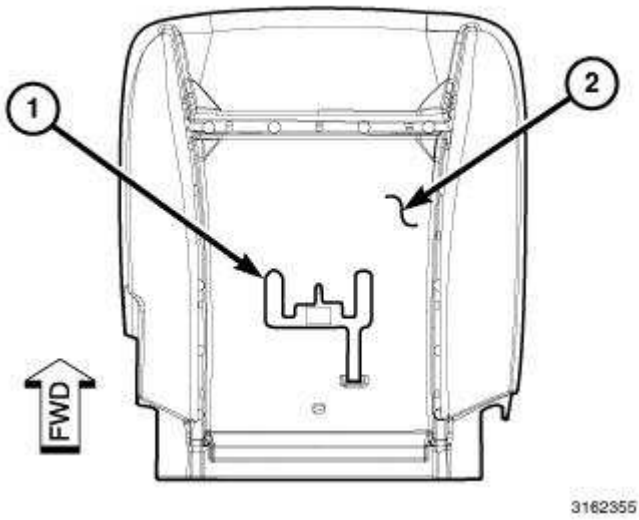


Fig. 3: One heating Element & Wire Lead And Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical Occupant Detection Sensor (ODS) shown in illustration.

All models have an Occupant Detection Sensor (ODS) (1) mounted directly to the front passenger seat bottom cushion (2). This sensor provides information to the Occupant Restraint Controller (ORC) used for control of the passenger belt alert feature. Refer to **SENSOR, OCCUPANT DETECTION, DESCRIPTION** .

If the ODS is removed from the seat bottom cushion, it must be replaced with a new ODS unit. Refer to **SENSOR, OCCUPANT DETECTION, REMOVAL** .

OPERATION

OPERATION

Battery current is directed to each heated seat element by the Heated Seat Module (HSM). The HMS

will energize the heated seat elements when the heated seat switch is pressed.

As electrical current passes through the heated seat element, the resistance of the wire used in the element disperse some of the electrical current in the form of heat. The heat produced by the heated seat element then radiates through the seat cushion covers, warming the seat covers and its occupant.

The heated seat elements cannot be repaired and if damaged or inoperative must be replaced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HEATED SEAT ELEMENT

NOTE: For complete circuit diagrams, see Wiring Information. Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.

NOTE: The wire harness connectors for the heating elements are located under the seat.

NOTE: When testing the heated seat elements for resistance, be certain to sit in the seat in question and move around the heating elements within the seat while testing. Moving the heating elements will help eliminate the possibility of an intermittent open in the element, which would only be evident in a certain position.

1. Locate and disconnect the seat heating element electrical connectors as necessary.
2. Check the resistance between the circuits leading in and out of the suspect heated seat element. The resistance should be between the specifications listed in the following Heated Seat Element Resistance chart. If OK, refer to **DIAGNOSIS AND TESTING**. If not OK, replace the inoperative heated seat element. Refer to **PAD, HEATER, REMOVAL**.

HEATED SEAT ELEMENT RESISTANCE

Location and Type	Acceptable Resistance Value
Front Seat Bottom Cushion - Heated only	9.0 - 5.1 ohms
Front Seat Back Cushion - Heated only	7.8 - 5.2 ohms
Front Seat Bottom Cushion - Heated and Vented	7.9 - 5.3 ohms
Front Seat Back Cushion - Heated and Vented	8.5 - 5.6 ohms
Rear Seat Bottom Cushion - Heated only	9.9 - 6.6 ohms
Rear Seat Back Cushion - Heated only	9.0 - 6.0 ohms

REMOVAL

FRONT SEAT

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC).

NOTE: Seat bottom cushion shown in illustration. Seat back cushion similar.

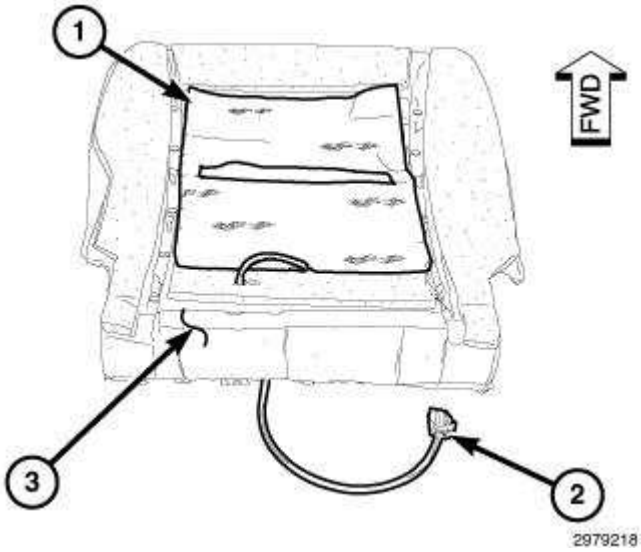


Fig. 4: One Heating Element, Wire Lead And Connector & Seat Bottom Cushion
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the appropriate front seat bottom or front seat back cushion and place it on a workbench (Refer to **SEATS**).
3. Remove the cover from the cushion (3) (Refer to **SEATS**).
4. Make note of the installed location of the heated seat element (1) on the cushion.
5. Route the wire lead and connector (2) out through the opening in the cushion.
6. Remove the heated seat element from the foam cushion by carefully peeling the element away from the cushion. Be careful not to remove excessive foam from the cushion.

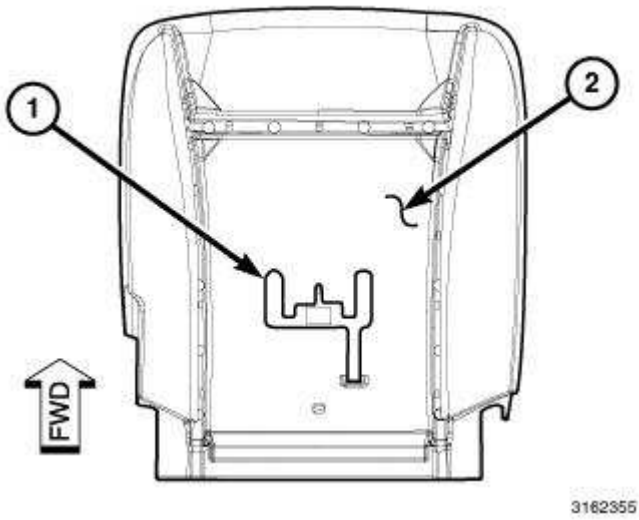


Fig. 5: One heating Element & Wire Lead And Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical Occupant Detection Sensor (ODS) shown in illustration.

7. When servicing the front passenger seat, if required, remove the Occupant Detection Sensor (ODS) (1) from the seat bottom cushion (2) and discard the sensor. Refer to **SENSOR, OCCUPANT DETECTION, REMOVAL** .

REAR SEAT

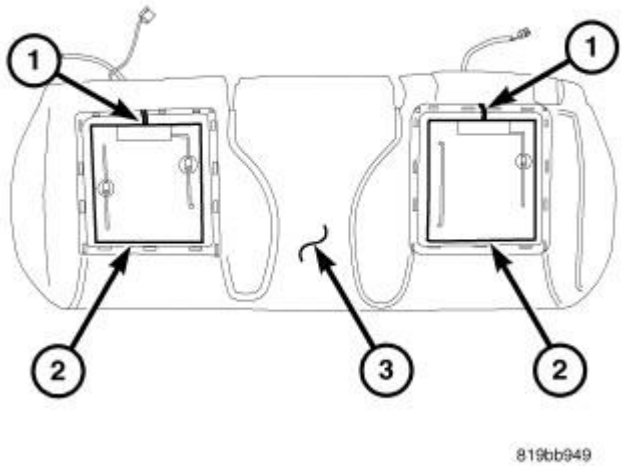


Fig. 6: Heated Rear Seat Elements
Courtesy of CHRYSLER GROUP, LLC

NOTE: Seat bottom cushion shown in illustration. Seat back cushion similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the appropriate rear seat bottom or rear seat back cushion and place it on a workbench (Refer to **SEATS**).
3. Remove the cover from the cushion (3) (Refer to **SEATS**).
4. Make note of the installed location of the heated seat element (2) on the cushion being serviced.
5. Route the wire lead and connector (1) out through the opening in the cushion.
6. Remove the heated seat element from the foam cushion by carefully peeling the element away from the cushion. Be careful not to remove excessive foam from the cushion.

INSTALLATION

FRONT SEAT

CAUTION: During heated seat element replacement, be careful not to fold or crease the new heating element. Folds or creases will cause premature heated seat element failure.

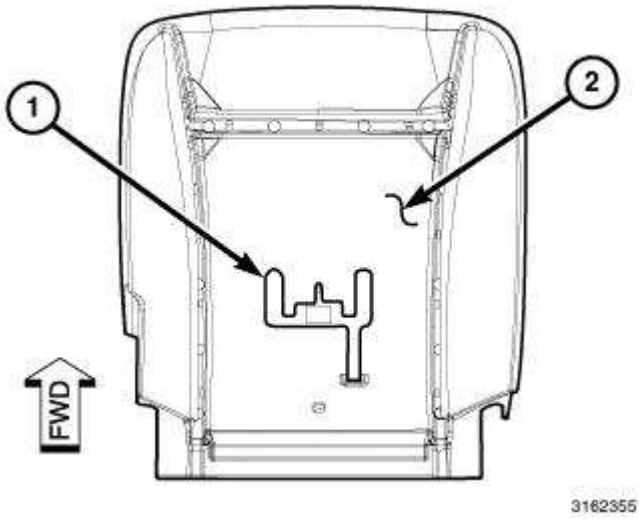


Fig. 7: One heating Element & Wire Lead And Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical Occupant Detection Sensor (ODS) shown in illustration.

1. When servicing the front passenger seat, if required, install a new Occupant Detection Sensor (ODS) (1) onto the seat bottom cushion (2). Refer to **SENSOR, OCCUPANT DETECTION, INSTALLATION** .

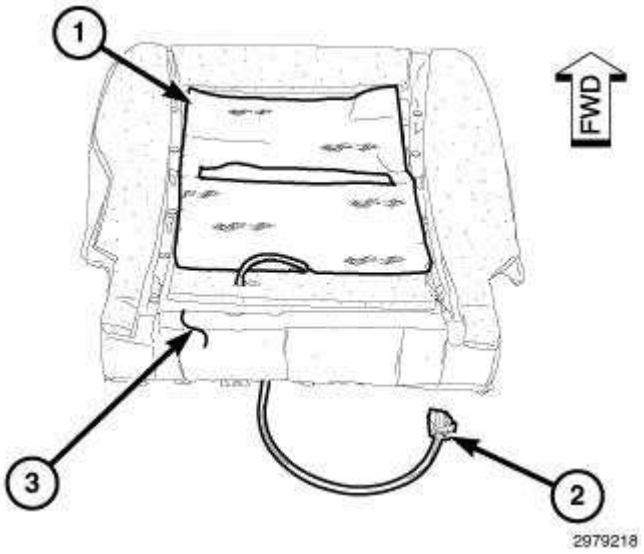


Fig. 8: One Heating Element, Wire Lead And Connector & Seat Bottom Cushion
Courtesy of CHRYSLER GROUP, LLC

NOTE: Seat bottom cushion shown in illustration. Seat back cushion similar.

2. Peel off the adhesive backing from the replacement heated seat element (1).
3. Position the heated seat element onto the foam cushion (3) directly where the original heater element was located. There will be adhesive marks on the cushion outlining the factory installed location.
4. Firmly press the heated seat element onto the foam cushion. Make sure the adhesive is fully adhered to the cushion. Be careful not to fold or crease the new heating element.
5. Route the wire lead and connector (2) through the opening in the cushion.
6. Install the seat bottom or seat back cover onto the cushion (Refer to **SEATS**).

NOTE: Make certain the heated seat element wire harness, airbag harness and ODS harness (when equipped) is correctly routed. Any excess wire should be securely placed between the rear of the bottom cushion and the rear seat cover flap.

7. Install the seat bottom or seat back cushion (Refer to **SEATS**).
8. Install the seat. Refer to **SEAT, FRONT, INSTALLATION** .
9. Reconnect the negative battery cable.
10. Verify proper front heated seat system operation.

REAR SEAT

CAUTION: During heated seat element replacement, be careful not to fold or crease the new heating element. Folds or creases will cause premature heated seat element failure.

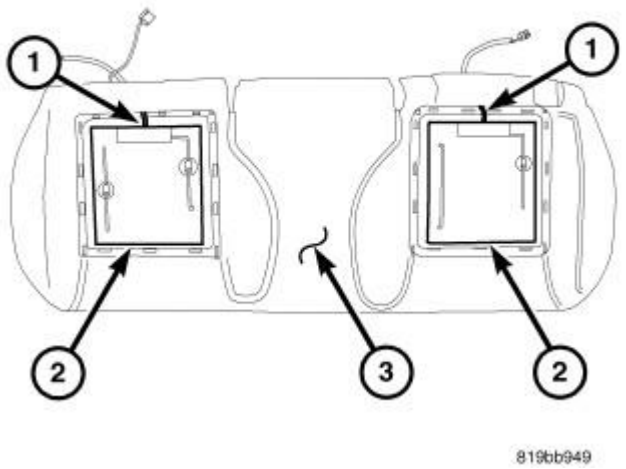


Fig. 9: Heated Rear Seat Elements
Courtesy of CHRYSLER GROUP, LLC

NOTE: Seat bottom cushion shown in illustration. Seat back cushion similar.

1. Peel off the adhesive backing from the replacement heated seat element (2).
2. Position the heated seat element onto the foam cushion (3) directly where the original heater element was located. There will be adhesive marks on the cushion outlining the factory installed location.
3. Firmly press the heated seat element onto the foam cushion. Make sure the adhesive is fully adhered to the cushion. Be careful not to fold or crease the new heating element.
4. Route the wire lead and connector (1) through the opening in the cushion.
5. Install the seat bottom or seat back cover onto the cushion (Refer to **SEATS**).
6. Install the rear seat bottom or rear seat back cushion (Refer to **SEATS**).
7. Reconnect the negative battery cable.
8. Verify proper rear heated seat system operation.

SWITCH, HEATED SEAT

DESCRIPTION

FRONT

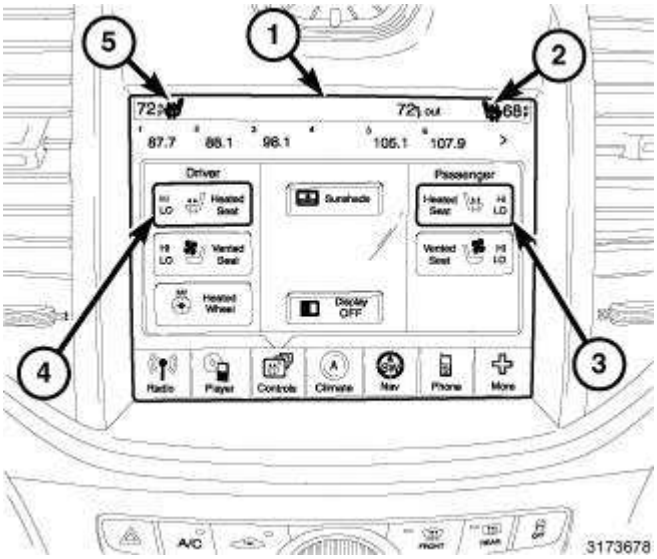


Fig. 10: U-Connect Touch(TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

The switches (3 and 4) for the optional front heated seat system are located in the U-Connect Touch ™ screen module (1), at the center of the instrument panel. The heated seat system allows the driver and front seat passenger to select from two different levels of electrical seat heating (HI and LO). When the heated seat switches are pressed on, each heated seat switch illuminates either HI or LO, and an International Standards Organization (ISO) symbol (2 and 5) appears at the top of the U-Connect Touch ™ screen module.

REAR

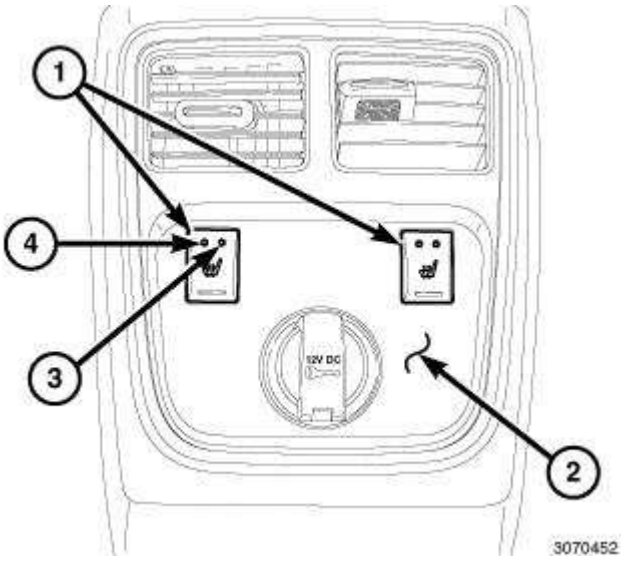


Fig. 11: Rear Heated Seat Switches
Courtesy of CHRYSLER GROUP, LLC

The rear heated seat switches (1) are momentary contact push button type switches that are mounted at the rear of the center floor console (2). These switches allow the rear seat passengers to

select from two different levels of electrical seat heating (high and low). Amber Light Emitting Diodes (LEDS) (3 and 4) in each switch indicate the level of heat in use: Two LEDs illuminate for high, one for low, and none for off. Pressing a heated seat switch once will select high level heating. Pressing the same switch a second time will select low level heating. Pressing the switch a third time will shut the heating elements in the seat off.

OPERATION

FRONT

When either of the front heated seat switches located in the U-Connect Touch ™ screen module are pressed with the engine running, a signal is sent to the Heated Seat Module (HSM) (also know as the comfort seat wheel module) over the Controller Area Network (CAN) data bus, signaling the module to energize the heating elements for the selected seat. Indicator lamps illuminate for each heated seat switch and indicate the level of heat in use (HI or LO). Pressing a heated seat switch once will select high-level heating and pressing the same switch a second time will select low-level heating. Pressing the switch a third time will shut the heating elements off.

The HSM energizes the integral solid-state relays that supply battery current to the heating elements. When high-temperature level heating is initially selected, the HSM provides a boosted high-heat level during the first four minutes of operation. After the first four minutes have passed, the HSM then drops the heat output to the normal high-temperature level for the next 26 minutes of operation. During high-temperature level operation, the HI indicator illuminates in the switch. After 30 minutes of high-temperature level heating, the HSM automatically lowers the heat level to low. At that time, the LO indicator illuminates. Operation on the low-temperature level setting will automatically turn off after 30 minutes.

The individual front heated seat switches located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If a front heated seat switch or indicator is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

REAR

The two rear heated seat switches are momentary, push button-type switches, that provide a hard-wired resistance signal to the Heated Seat Module (HSM) (also know as the comfort seat wheel module), signaling it to energize the heating elements for the selected seat. Light Emitting Diodes (LED) in each switch indicate the level of heat in use. The rear seat switch LEDs are controlled by the HSM.

The rear heated seat switches are diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The rear heated seat switches cannot be adjusted or repaired and if a switch or its LEDs are damaged or inoperative, the entire switch must be replaced.

REMOVAL

REMOVAL

NOTE: **Take the proper precautions to protect the face of the floor console panel from cosmetic damage while performing this procedure.**

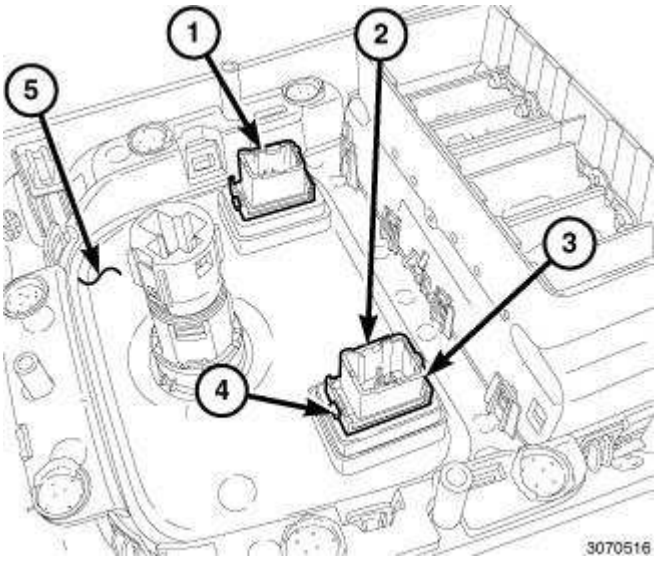


Fig. 12: Trim Panel, Retaining Tabs & Heated Switch
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the trim panel (5) from the back of the floor console using Trim Stick (special tool #C-4755, Trim Stick) or equivalent. Disconnect any necessary electrical connectors and place the trim panel on a workbench.
3. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, gently disengage the two retaining tabs (3 and 4) that secure each 2nd row heated switch (1 and 2) to the back of the floor console rear trim panel.
4. Remove the 2nd row heated switches, as necessary, from the floor console rear trim panel.

INSTALLATION

INSTALLATION

NOTE: **Take the proper precautions to protect the face of the floor console panel from cosmetic damage while performing this procedure.**

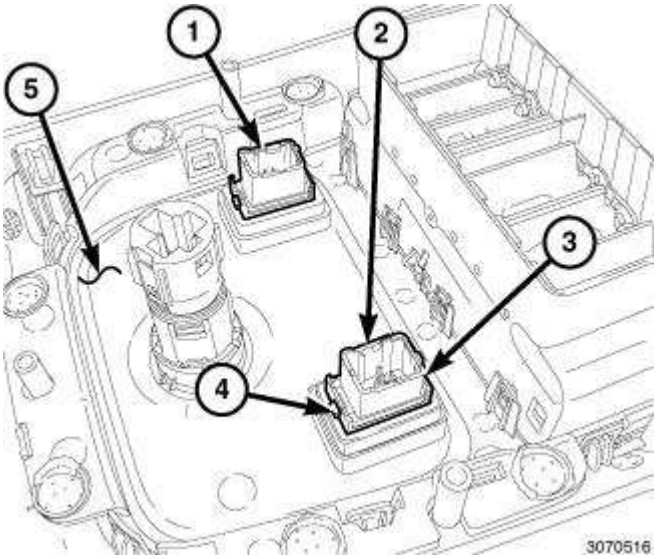


Fig. 13: Trim Panel, Retaining Tabs & Heated Switch
Courtesy of CHRYSLER GROUP, LLC

1. Align the tabs on each 2nd row heated seat switch (1 and 2) with the openings in the floor console rear trim panel (5) and install the switches, as necessary. Push the switches firmly into the trim panel until the two retaining tabs (3 and 4) are fully engaged.
2. Install the trim panel onto the back of the center floor console. Be sure to connect any necessary electrical connectors and properly align the console ducts.
3. Reconnect the negative battery cable.
4. Verify proper 2nd row heated seat system operation.

ACCESSORIES AND EQUIPMENT

Horn System - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

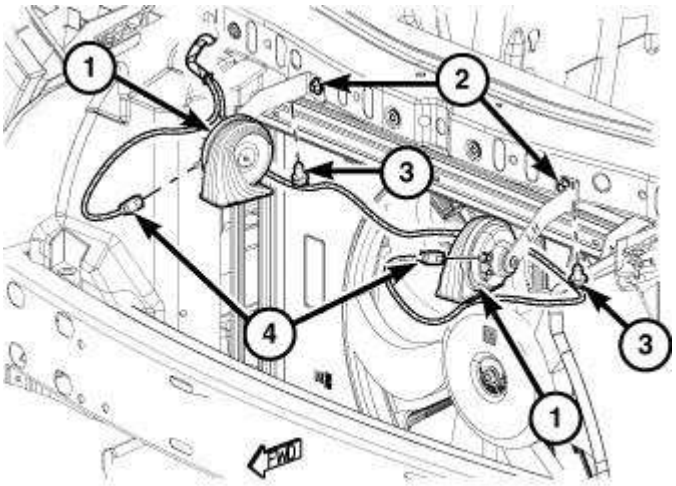


Fig. 1: Identifying Push-Pin Retainer, Harness, Mounting Fastener And Horn
Courtesy of CHRYSLER GROUP, LLC

The dual-note horn system features two electromagnetic horn units. The horn system includes the following major components:

- **Horns** - The two horns are located behind the grille below a trim cover.
- **Horn Switch** - The horn switch is located beneath the driver airbag.

OPERATION

DIAGNOSIS AND TESTING - HORN SYSTEM

The most reliable, efficient, and accurate means to diagnose the horn system requires the use of a scan tool and the proper Diagnostic Procedures information.

Refer to the appropriate wiring information.

In most cases, any problem involving continually sounding horns can be quickly alleviated by removing the horn fuse from the Power Distribution Center (PDC).

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag, or instrument panel component

diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HORN SYSTEM

The most reliable, efficient, and accurate means to diagnose the horn system requires the use of a scan tool and the proper Diagnostic Procedures information.

Refer to the appropriate wiring information.

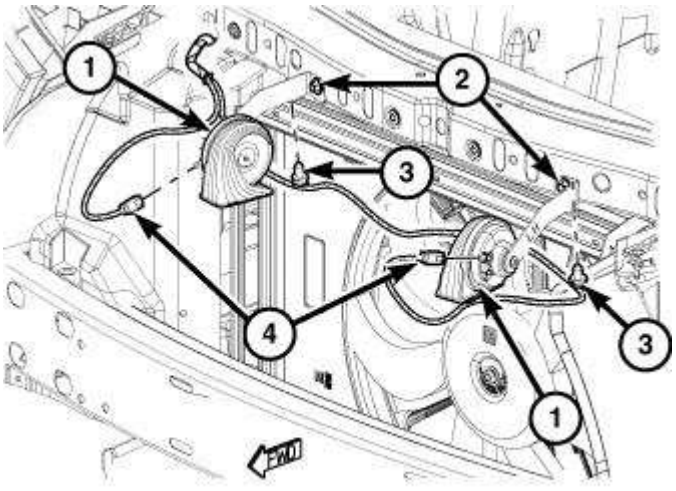
In most cases, any problem involving continually sounding horns can be quickly alleviated by removing the horn fuse from the Power Distribution Center (PDC).

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury.

HORN

REMOVAL

REMOVAL



2954308

Fig. 2: Identifying Push-Pin Retainer, Harness, Mounting Fastener And Horn
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the front fascia assembly. Refer to **FASCIA, FRONT, REMOVAL** .
3. Disconnect electrical harness connector (4).
4. Release the push-pin retainer (3) and separate the harness from the horn mounting bracket.
5. Remove mounting fastener (2) and remove horn (1).

INSTALLATION

INSTALLATION

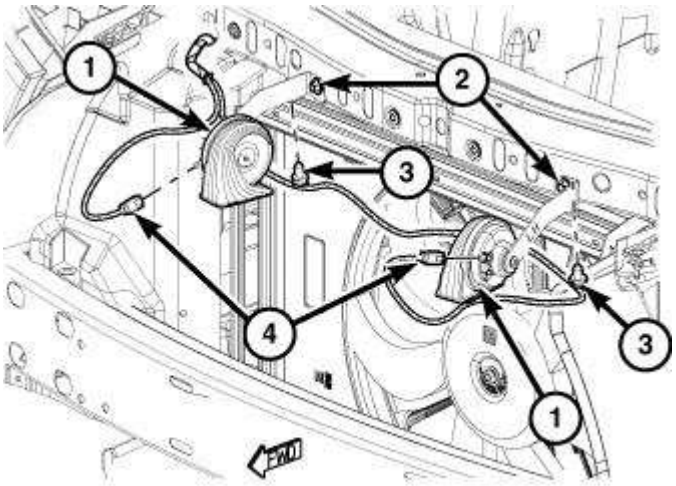


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Fig. 3: Identifying Push-Pin Retainer, Harness, Mounting Fastener And Horn
Courtesy of CHRYSLER GROUP, LLC

1. Position horn (1). Install and tighten mounting fastener (2).
2. Connect electrical harness connector (4).
3. Position the harness and install the push-pin retainer (3)
4. Install the front fascia assembly. Refer to **FASCIA, FRONT, INSTALLATION** .
5. Connect battery negative cable.

SWITCH, HORN

REMOVAL

REMOVAL

WARNING: On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE INFORMATION for electrical, restraints before attempting any steering

wheel, steering column, or instrument panel component diagnosis or service. Failure to take the proper precautions could result in accidental airbag deployment and possible serious or fatal injury.

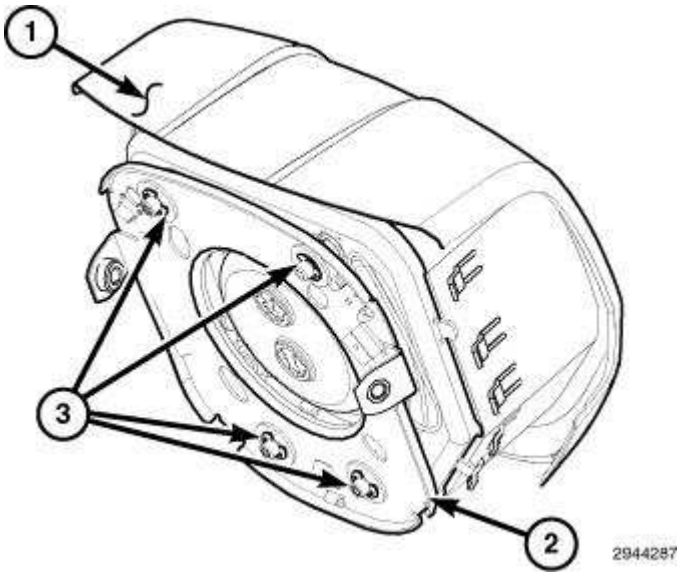


Fig. 4: Identifying E-Clip Retainers, Mounting Bracket And Airbag Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Remove the driver side airbag assembly (1). Refer to **AIR BAG, DRIVER, REMOVAL** .
2. Disconnect the electrical connectors.

NOTE: The horn switch pads are only serviced as an assembly with the airbag mounting bracket.

3. Remove the four e-clip retainers (3) that secure the airbag mounting bracket (3) to the airbag.

INSTALLATION

INSTALLATION

WARNING: On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE INFORMATION or electrical, restraints before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Failure to take the proper precautions could result in accidental airbag deployment and possible serious or fatal injury.

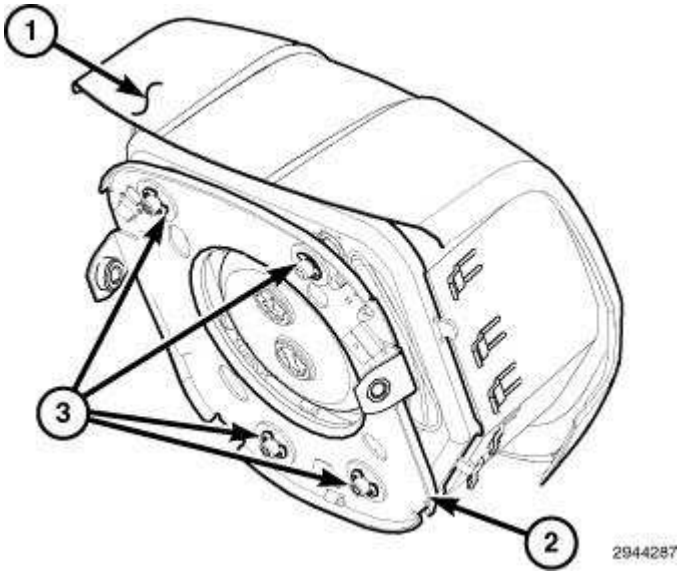


Fig. 5: Identifying E-Clip Retainers, Mounting Bracket And Airbag Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: The horn switch pads are only serviced as an assembly with the airbag mounting bracket.

1. Position the airbag mounting bracket (3).
2. Press down to compress the springs and install the four e-clip retainers (3), securing bracket (2) to the airbag.
3. Position the airbag assembly (1) and connect the electrical connectors.
4. Install the driver side airbag assembly. Refer to **AIR BAG, DRIVER, INSTALLATION** .
5. Connect the battery negative cable.

HVAC

Heating And Air Conditioning - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

A Manual Temperature Control (MTC) or an Automatic Temperature Control (ATC) Dual Zone heating and A/C system is available on this vehicle.

To maintain the performance level of the Heating, Ventilation and Air Conditioning (HVAC) system, the engine cooling system must be properly maintained. The use of a bug screen is not recommended. Any obstructions in front of the radiator or A/C condenser will reduce the performance of the A/C and engine cooling systems.

The engine cooling system includes the radiator, thermostat, radiator hoses and the engine coolant pump. See **ENGINE COOLING SYSTEM** for more information before opening or attempting any service to the engine cooling system.

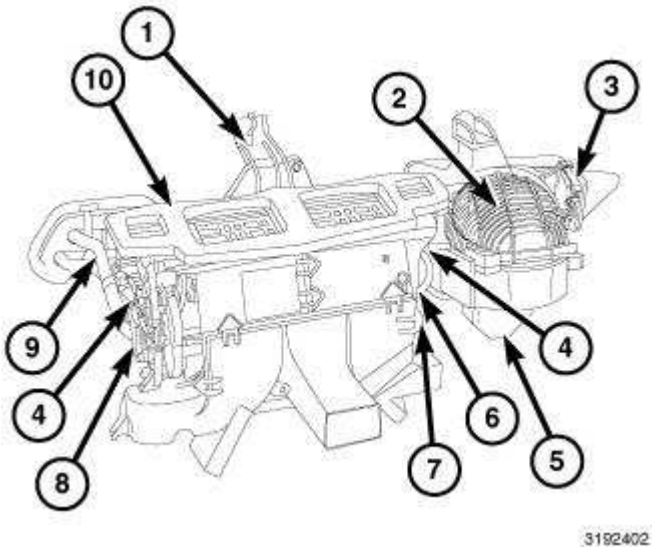


Fig. 1: Housing-HVAC Description
Courtesy of CHRYSLER GROUP, LLC

All vehicles are equipped with a common front Dual Zone HVAC housing (1). The heating and A/C system combines heating, ventilating and A/C capabilities into a single unit mounted within the passenger compartment, behind the instrument panel. The HVAC housing includes:

- Recirculation-air door and actuator (2)
- A/C heater module (3)
- Blend-air doors and actuators (4)
- Blower motor (5)

- Blower motor power module (6)
- Evaporator temperature sensor (7)
- Mode-air doors and actuator (8)
- Heater core (9)
- A/C evaporator (10)

NOTE: **An electric positive temperature coefficient (PTC) heater is used on vehicles when equipped with the 3.0L diesel engine. The PTC heater unit compensates for the lower engine coolant temperatures produced by the diesel engine. The PTC heater unit is mounted in the HVAC air distribution housing, downstream of the heater core. Refer to UNIT, HEATER, DESCRIPTION.**

Based upon the system and selected mode, conditioned air can exit the HVAC housing through one or a combination of the three main housing outlets: defrost, panel or floor. The defrost and panel outlets are located on the top of the HVAC housing and the floor outlets are located on the bottom of the HVAC housing. Once the conditioned air exits the HVAC housing, it is further directed through molded plastic ducts to the outlets within the vehicle interior. These outlets and their locations are as follows:

- **Defroster Outlets** - Two large defroster outlets are located near the center of the instrument panel top cover, near the base of the windshield.
- **Side Window Demister Outlets** - Two front side window demister outlets, one located on each front door, near the A-pillars.
- **Panel Outlets** - There are four panel outlets in the instrument panel, one located near each outboard end of the instrument panel facing the rear of the vehicle and one located on each side of the touch screen interface, at the center of the instrument panel.
- **Floor Outlets** - There are four floor outlets, one located above each front footwell and one located under each front seat.
- **Console Outlets** - There are two console outlets located at the back of the center floor console, facing the rear of the vehicle.

OPERATION

OPERATION

The heating and A/C systems used in this vehicle are blend-air type systems. In a blend air system, a blend-air door controls the amount of conditioned air that is allowed to flow through, or around the heater core. In the Dual Zone system, separate blend-air doors are used to provide completely independent side-to-side temperature control of the discharge air. The temperature controls determine the discharge air temperatures by operating the blend door actuators, which move the blend-air doors. This design allows almost immediate control of output air temperatures.

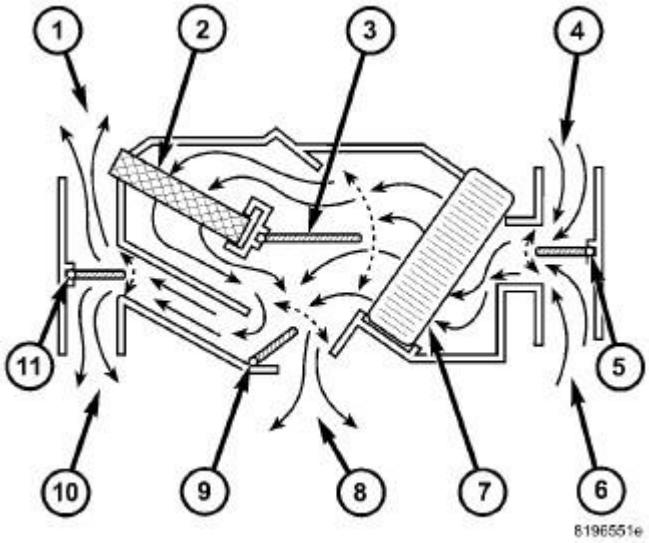


Fig. 2: Blend Air System Schematic
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical blend air system shown in illustration.

The heating and A/C system pulls outside (ambient) air through the fresh air intake (4) located at the cowl panel at the base of the windshield and into the air inlet housing above the Heating, Ventilation and Air Conditioning (HVAC) housing and passes through the A/C evaporator (7). Air flow is then directed either through or around the heater core (2). This is done by adjusting the position of the blend-air doors (3) with the temperature controls on the switchbank or the U-Connect Touch ™ screen module. Air flow is then directed out the floor outlet (8), instrument panel outlet (10) or the defroster outlet (1) in various combinations by adjusting the position of the mode-air doors (9 and 11) using the mode controls on the switchbank or the U-Connect Touch ™ screen module. The temperature and mode controls use electrical actuators to operated the air doors.

The velocity of the air flow out of the outlets can be manually or automatically adjusted, depending on the system. using the blower motor control on the switchbank or the U-Connect Touch ™ screen module.

The fresh air intake can be shut off by pressing the Recirculation button on the switchbank or the U-Connect Touch ™ screen module. This will operate the electrically actuated recirculation-air door (5), which closes off the fresh air intake. With the fresh air intake closed, the conditioned air within the vehicle is pulled back into the HVAC housing through the recirculation air intake (6).

The A/C compressor can be engaged by pressing the A/C (snowflake) button on the switchbank or the U-Connect Touch ™ screen module. The A/C compressor will automatically engage based on humidity sensor readings to help prevent windshield fogging.

The defroster outlets receive airflow from the HVAC housing through the molded plastic defroster duct, which is secured to the top of the HVAC housing. The airflow from the defroster duct is directed

by fixed vanes in the defroster outlet grille and cannot be adjusted.

The side window demister outlets receive airflow from the HVAC housing through the defroster duct and molded plastic demister ducts, which are secured to the instrument panel support. The airflow from the side window demister outlets is directed by fixed vanes and cannot be adjusted. The demisters operate when the mode control is set in any Floor to Defrost position.

The instrument panel outlets receive airflow from the HVAC housing through a molded plastic center panel duct and two end panel ducts. The two end panel ducts direct airflow to the left and right instrument panel outlets, while the center panel duct directs airflow to the two center panel outlets. Each of these outlets can be individually adjusted to direct or shut off the flow of air leaving the outlets.

The front and rear floor outlets receive airflow from the HVAC housing through the front and rear floor ducts which are secured to each side of the HVAC housing. The rear seat ducts direct airflow beneath the carpet to the outlets located near the front of each rear seat foot well. None of the floor outlets can be adjusted.

NOTE: **It is important to keep the air intake opening clear of debris. Leaf particles and other debris that is small enough to pass through the cowl opening screen can accumulate within the HVAC housing. The closed, warm, damp and dark environment created within the housing is ideal for the growth of certain molds, mildews and other fungi. Any accumulation of decaying plant matter provides an additional food source for fungal spores, which enter the housing with the fresh intake-air. Excess debris, as well as objectionable odors created by decaying plant matter and growing fungi can be discharged into the passenger compartment during heater-A/C operation if the air intake opening is not kept clear of debris.**

The A/C system is designed for use of non-CFC, R-134a refrigerant and uses an A/C expansion valve (TXV) to meter the flow of refrigerant to the A/C evaporator. To maintain minimum evaporator temperature and prevent evaporator freezing, an evaporator temperature sensor input is supplied to the A/C heater module. In turn, the Powertrain Control Module (PCM) cycles the A/C clutch on and off as necessary to optimize A/C system performance and to protect the A/C system from evaporator freezing.

DIAGNOSIS AND TESTING

A/C PERFORMANCE

The A/C system is designed to provide the passenger compartment with low temperature and low humidity air. The A/C evaporator, located in the Heating, Ventilation and Air Conditioning (HVAC) housing is cooled to temperatures near the freezing point. As warm damp air passes over the fins of the A/C evaporator, the air transfers its heat to the refrigerant in the evaporator coils and the moisture in the air condenses on the evaporator fins. During periods of high heat and humidity, an A/C system will be more effective in the Recirculation mode (max A/C). With the system in the Recirculation mode, only air from the passenger compartment passes through the A/C evaporator. As the

passenger compartment air dehumidifies, the A/C system performance levels rise.

Humidity has an important bearing on the temperature of the air delivered to the interior of the vehicle. It is important to understand the effect that humidity has on the performance of the A/C system. When humidity is high, the A/C evaporator has to perform a double duty. It must lower the air temperature, and it must lower the temperature of the moisture in the air that condenses on the evaporator fins. Condensing the moisture in the air transfers heat energy into the evaporator fins and coils. This reduces the amount of heat the A/C evaporator can absorb from the air. High humidity greatly reduces the ability of the A/C evaporator to lower the temperature of the air.

However, evaporator capacity used to reduce the amount of moisture in the air is not wasted. Wringing some of the moisture out of the air entering the vehicle adds to the comfort of the passengers. Although, an owner may expect too much from their A/C system on humid days. A performance test is the best way to determine whether the system is performing up to design standards. This test also provides valuable clues as to the possible cause of trouble with the A/C system.

A/C PERFORMANCE TEST

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in possible serious or fatal injury.

CAUTION: The use of an A/C recycling/charging station for purposes of determining the actual charge level of an A/C system is not recommend. Service recycling/charging stations do not reflect the correct amount of refrigerant charge in the A/C system after a single "reclaim" cycle. Tests have shown that it can take two or more "reclaim" cycles to remove all of the refrigerant charge, depending on the equipment being used. Use only the following procedure for determining the proper charge level.

NOTE: The A/C Cooldown test which can be initiated on the MTC or ATC system is not a valid test to determine A/C performance. It is intended to be only used at the assembly plant and should not be used at a dealer or repair facility. Use only the following procedure to check A/C performance.

1. Make sure the following conditions are met in the area where this test is to be performed:
   - Maximum ambient temperature: 43.3°C (110°F)
   - Minimum ambient temperature: 15.5°C (60°F)
   - Maximum relative humidity: 90%
   - Minimum relative humidity: 20%
2. Using a scan tool, check for Diagnostic Trouble Codes (DTCs) related to the Controller Area Network (CAN) data bus, Telematics Gateway (TGW), A/C heater module, Body Control Module (BCM) and Powertrain Control Module (PCM). If no DTCs are found, go to Step 3. If any DTCs

are found, repair as required, then proceed to Step 3.

3. Operate the heating and A/C system under the following conditions.
   - Engine at normal operating temperature
   - Engine at normal idle speed
   - No sun-load in the cabin of the vehicle
   - Vehicle doors and windows closed
   - Transmission in Park or Neutral with the park brake On.
   - A/C heater controls set to Recirculation mode, full cool, panel mode, high blower and with A/C compressor engaged. If the A/C compressor does not engage, see **A/C SYSTEM DIAGNOSIS** table
   - All panel outlet vanes open and positioned straight rearward

   NOTE: If the following step is not performed, the results of this test will not be accurate.

4. Using a scan tool, operate the engine cooling fans at high speed.
5. Insert a thermometer in the driver side center panel air outlet and operate the A/C system until the thermometer temperature stabilizes or a minimum of five minutes.

   NOTE: This procedure requires you to know what the temperature and relative humidity is in your location at the time of the test. This information can be obtained from multiple sources, such as the internet or local news media.

6. With the A/C clutch engaged, compare the observed panel outlet air temperature along with the ambient temperature of the work area and the relative humidity to the Maximum Panel Outlet Temperature chart.
7. If the air outlet temperature fails to meet the specifications shown in the Maximum Panel Outlet Temperature chart, see **A/C SYSTEM DIAGNOSIS** table.

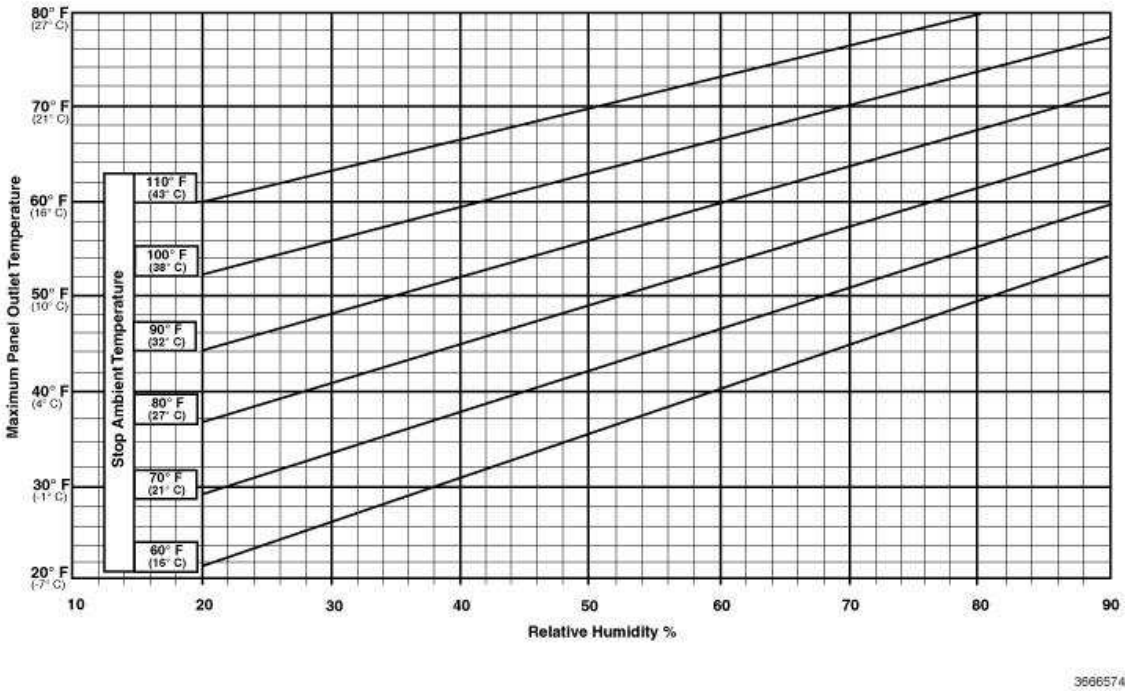


Fig. 3: Maximum Panel Outlet Temperature
Courtesy of CHRYSLER GROUP, LLC

A/C SYSTEM DIAGNOSIS

Condition	Possible Causes	Correction
Rapid A/C clutch cycling (ten or more cycles per minute).	1. Low refrigerant system charge.	1. See **REFRIGERANT SYSTEM LEAKS** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Equal pressures, but the A/C clutch does not engage.	1. No refrigerant in the refrigerant system.	1. See **REFRIGERANT SYSTEM LEAKS** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	2. Open fuse.	2. See Wiring Information. Check the fuses in the Totally Integrated Power Module (TIPM) and the Rear Power Distribution Center (PDC). Repair the shorted circuit or component and replace the fuse(s), if required.
	3. Inoperative A/C clutch.	3. See **COMPRESSOR, A/C** . Test the A/C clutch and coil and replace, if required.
	4. Improperly installed or inoperative evaporator temperature sensor.	4. See **SENSOR, EVAPORATOR TEMPERATURE** . Test the sensor and replace, if required.

	5. Inoperative A/C pressure transducer.	5. See **TRANSDUCER, A/C PRESSURE** Test the sensor and replace, if required.
	6. Inoperative control module, CAN bus or wiring.	6. See the appropriate Electrical Diagnostic Procedures for testing of the modules and CAN bus, and see Wiring Information for compressor control circuit repair, if required.
Normal pressures, but A/C Performance Test air temperatures at center panel outlet are too high.	1. Excessive refrigerant oil in system.	1. See **REFRIGERANT OIL LEVEL** . Recover the refrigerant from the refrigerant system and inspect the refrigerant oil content. Restore the refrigerant oil to the proper level, if required.
	2. Blend door actuator(s) improperly installed or inoperative.	2. See **ACTUATOR, BLEND DOOR** . Inspect the actuator(s) for proper operation and replace, if required.
	3. Blend-air door(s) inoperative or sealing improperly.	3. See **HOUSING, HVAC** . Inspect the blend-air door(s) for proper operation and sealing. Repair if required.
The low side pressure is normal or slightly low, and the high side pressure is too low.	1. Low refrigerant system charge.	1. See **REFRIGERANT SYSTEM LEAKS** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	2. Refrigerant flow through the A/C evaporator is restricted.	2. See **EVAPORATOR, A/C** . Replace the restricted A/C evaporator, if required.
	3. Inoperative A/C compressor.	3. See **COMPRESSOR, A/C** . Replace the A/C compressor, if required.
The low side pressure is normal or slightly high, and the high side pressure is too high.	1. A/C condenser air flow restricted.	1. See **CONDENSER, A/C** . Check the A/C condenser for damaged fins, foreign objects obstructing air flow through the condenser fins, and missing or improperly installed air seals. Clean, repair, or replace components as required.
	2. Refrigerant flow through the A/C receiver/drier is restricted.	2. See **DRIER, A/C RECEIVER** . Replace the restricted A/C receiver/drier, if required.
	3. Inoperative radiator cooling fan.	3. See **ENGINE COOLING SYSTEM** . Test the radiator cooling fan and replace, if required.
	4. Refrigerant system overcharged.	4. See **REFRIGERANT SYSTEM CHARGE** . Recover the refrigerant from the refrigerant system. Charge the refrigerant system to the proper level, if

		required.
	5. Air in the refrigerant system.	5. See **REFRIGERANT SYSTEM LEAKS** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	6. Engine overheating.	6. See **ENGINE COOLING SYSTEM** . Test the engine cooling system and repair, if required.
The low side pressure is too high, and the high side pressure is too low.	1. Accessory drive belt slipping.	1. See **ENGINE COOLING SYSTEM** . Inspect the accessory drive belt condition and tension. Repair as required.
	2. Inoperative A/C expansion valve.	2. See **VALVE, A/C EXPANSION** . Replace the valve, if required.
	3. Inoperative A/C compressor.	3. See **COMPRESSOR, A/C** . Replace the A/C compressor, if required.
The low side pressure is too low, and the high side pressure is too high.	1. Restricted refrigerant flow through the refrigerant lines.	1. See **LINE, A/C DISCHARGE**, **LINE, A/C SUCTION** and **LINE, A/C DISCHARGE** . Inspect the refrigerant lines for kinks, tight bends or improper routing. Correct the routing or replace the refrigerant line, if required.
	2. Restricted refrigerant flow through the A/C expansion valve.	2. See **VALVE, A/C EXPANSION** . Replace the valve, if required.
	3. Restricted refrigerant flow through the A/C condenser.	3. See **CONDENSER, A/C** . Replace the restricted A/C condenser, if required.

HEATER PERFORMANCE

See **ENGINE COOLING SYSTEM** before performing the following tests. Check the engine coolant level and flow, engine coolant reserve/recovery system operation, accessory drive belt condition and tension, radiator air flow and the fan drive operation. Perform the A/C System Performance Test, which is found within the HVAC System Test. Refer to **STANDARD PROCEDURE** . If any Diagnostic Trouble Codes (DTCs) are found, repair as necessary (Refer to appropriate diagnostic information).

MAXIMUM HEATER OUTPUT

Engine coolant is delivered to the heater core through two heater hoses. With the engine idling at normal operating temperature, set the temperature control to the full hot position, the mode control to the floor position, and the blower motor control to the highest speed position. Using a test thermometer, check the temperature of the air being discharged at the front floor outlets. Compare the test thermometer reading to the Heater Temperature Reference chart.

HEATER TEMPERATURE REFERENCE

Ambient Air Temperature	16° C (60° F)	21° C (70° F)	27° C (80° F)	32° C (90° F)
Minimum Heater System Air Outlet Temperature	52° C (125° F)	56° C (133° F)	59° C (139° F)	62° C (144° F)

See **ENGINE COOLING SYSTEM** if the heater outlet air temperature is below the minimum specification. Both of the heater hoses should be hot to the touch. The coolant return heater hose should be slightly cooler than the coolant supply heater hose. If the return hose is much cooler than the supply hose, locate and repair the engine coolant flow obstruction in the cooling system.

OBSTRUCTED COOLANT FLOW

Possible locations or causes of obstructed coolant flow are as follows:

- Low coolant level
- Inoperative water pump
- Inoperative thermostat
- Pinched or kinked heater hoses
- Improper heater hose routing
- Plugged heater hoses or supply and return ports at the cooling system connections
- Plugged heater core

If proper coolant flow through the cooling system is verified, and heater outlet air temperature is low, a mechanical problem may exist.

MECHANICAL PROBLEMS

Possible locations or causes of insufficient heat due to mechanical problems are as follows:

- Obstructed cowl air intake
- Obstructed heater system outlets
- Inoperative engine thermostat
- Inoperative blower motor system
- Inoperative A/C heater control or module
- Inoperative blend door actuator(s)
- Inoperative, obstructed or improperly installed blend-air door(s)

TEMPERATURE CONTROL

If the air outlet temperature cannot be adjusted with the temperature controls, the following may require service:

- Inoperative switchbank, U-Connect Touch ™ screen module or A/C heater module.
- Inoperative blend door actuator(s).

- Inoperative, obstructed or improperly installed blend-air door.
- Inoperative related wiring harness or connectors.

STANDARD PROCEDURE

STANDARD PROCEDURE - A/C EVAPORATOR CLEANING

Some vehicle operators may experience a musty odor from the A/C system, primarily at start up in hot and humid climates. This odor may be the result of microbial growth on the cooling coil. During normal A/C system operation, condensation forms in and around the A/C cooling coil. When airborne pollutants mix with this condensation, bacteria and fungi growth begins and odor may result.

If the vehicle operator experiences a musty odor when operating the A/C system, perform the following procedure.

> **WARNING: Always use eye protection, rubber gloves and protective clothing when performing the following procedure. Avoid continuous breathing of vapors from evaporator coil cleaning and sealing fluids. Avoid contact with skin and eyes. Failure to follow these instruction may result in possible serious or fatal injury.**

1. On models equipped with a particulate air filter, remove the filter and inspect for dirt and debris. Refer to **FILTER, PARTICULATE AIR, REMOVAL**. Discard the used particulate filter if required.
2. Remove the cowl panel cover (refer to **PANEL, COWL TRIM** for more information).
3. Clean any dirt and debris that may be present at the HVAC fresh air inlet screen and at the top of the cowl panel.
4. Install the cowl panel cover.
5. Raise and support the vehicle.
6. Inspect the evaporator drain hose or tube (depending on application) for foreign material that may be blocking the drain and repair as necessary.
7. Once drain operation has been verified;
   - when equipped with a rubber drain hose, temporarily pinch the drain hose closed using an appropriate pair of heater hose pliers.
   - when equipped with a solid plastic drain tube, obtain an appropriate size rubber or plastic cap or plug and temporarily cap or plug the drain tube.
8. Lower the vehicle.
9. Place a protective cover over the front passenger side floor and seat area.
10. Remove the blower motor. Refer to **MOTOR, BLOWER, REMOVAL**.
11. Remove the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, REMOVAL**.
12. Clean any dirt and debris that may be present inside the HVAC blower motor housing and all readily accessible areas inside the HVAC housing. If necessary, use a vacuum with a small

flexible hose, and take caution not to damage the evaporator core fins.

13. Using PSE Flex Spray Delivery Tool 534-62637 or equivalent, completely coat the entire surface of A/C evaporator with three bottles of Mopar® Cooling Coil Cleaner through the blower motor and power module or resistor openings. Be sure to use all of the coil cleaner in each container.
14. Allow the vehicle to sit for 30 minutes.
15. Raise and support the vehicle.

WARNING: Excess cooling coil cleaner will drain from the evaporator housing when the clamp, cap or plug is removed from the evaporator drain hose or tube. Always use eye protection, rubber gloves and protective clothing. Avoid continuous breathing of vapors from evaporator coil cleaning fluid. Avoid contact with skin and eyes. Failure to follow these instruction may result in possible serious or fatal injury.

16. Remove the previously installed clamp, cap or plug from the evaporator drain hose or tube and allow excess coil cleaner to drain from the HVAC housing.
17. Lower the vehicle.
18. Refill the three empty coil cleaner bottles with clean tap water.
19. Using PSE Flex Spray Delivery Tool 534-62637 or equivalent, completely rinse the entire surface of A/C evaporator with the three bottles of clean tap water through the blower motor and power module openings. Be sure to use all of the water in each container.
20. Install the blower motor. Refer to **MOTOR, BLOWER, INSTALLATION**.
21. Install the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, INSTALLATION**.
22. Disconnect the wire harness connector from the A/C compressor to disable compressor operation. Refer to **COMPRESSOR, A/C, REMOVAL**.
23. Start the engine
24. Adjust all the windows so they are open approximately 8 mm (0.5 in.).
25. Set the A/C heater controls to the following:
    - air distribution to Panel and Recirculation mode
    - temperature to full heat
26. Allow the vehicle to run for 20 minutes.
27. Turn the engine off.
28. Raise and support the vehicle.
29. Inspect the evaporator drain hose or tube (depending on application) for foreign material that may have blocked the drain during evaporator coil cleaning and repair as necessary.
30. Once drain operation has been verified;
    - when equipped with a rubber drain hose, temporarily pinch the drain hose closed using an appropriate pair of heater hose pliers.
    - when equipped with a solid plastic drain tube, obtain an appropriate size rubber or plastic

cap or plug and temporarily cap or plug the drain tube.

31. Lower the vehicle.
32. Remove the blower motor. Refer to **MOTOR, BLOWER, REMOVAL**.
33. Remove the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, REMOVAL**.
34. Using PSE Flex Spray Delivery Tool 534-62637 or equivalent, completely coat the entire surface of A/C evaporator with one bottle of Mopar® Cooling Coil Coating through the blower motor and power module openings. Be sure to use all of the coil coating in the container.

NOTE: Be sure to thoroughly clean out the spray delivery tool with warm water once coil coating is complete to prevent damage to the tool.

35. Refill the empty bottles with clean warm tap water and completely rinse out the PSE Flex Spray Delivery Tool 534-62637, or equivalent.
36. Allow the vehicle to sit for 30 minutes.
37. Install the blower motor. Refer to **MOTOR, BLOWER, INSTALLATION**.
38. Install the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, INSTALLATION**.
39. Raise and support the vehicle.

WARNING: Excess cooling coil coating will drain from the evaporator housing when the clamp, cap or plug is removed from the evaporator drain hose or tube. Always use eye protection, rubber gloves and protective clothing. Avoid continuous breathing of vapors from evaporator coil sealing fluid. Avoid contact with skin and eyes. Failure to follow these instruction may result in possible serious or fatal injury.

40. Remove the previously installed clamp, cap or plug from the evaporator drain hose or tube and allow excess coil coating to drain from the HVAC housing.
41. Lower the vehicle.
42. Start the engine
43. Adjust all the windows so they are open approximately 8 mm (0.5 in.).
44. Set the A/C heater controls to the following:
    - air distribution to Panel and Recirculation mode
    - temperature to full heat
45. Allow the vehicle to run for 20 minutes.
46. Turn vehicle off.
47. Remove protective cover from front passenger side floor and seat area.
48. On models equipped with a particulate air filter, install the filter. Refer to **FILTER, PARTICULATE AIR, INSTALLATION**.
49. Connect the wire harness connector to the A/C compressor. Refer to **COMPRESSOR, A/C,**

INSTALLATION.

50. Verify proper heating and A/C system operation.

SPECIFICATIONS

A/C SYSTEM

Item	Description	Notes
A/C Compressor	Denso 10SRE18 - 3.0L/5.7L/6.4L Engines	* Use only ND-8 PAG oil
	Visteon RS-18 - 3.6L Engine	* Use only VC-46 PAG oil
A/C Clutch Air Gap	0.35 - 0.60 mm (0.014 - 0.024 in.)	All Engines
A/C Clutch Coil Draw	3.2 Max amps @ 12V ± 0.5V @ 21° C (70° F)	3.0L/5.7L/6.4L Engines
	3.1 - 4.0 amps @ 12V ± 0.5V @ 21° C (70° F)	3.6L Engine
A/C Clutch Coil Resistance	3.3 - 3.5 ohms	3.0L/5.7L/6.4L Engines
	3.0 - 4.0 ohms	3.6L Engine
Freeze-up Control	Evaporator Temperature Sensor	HVAC housing mounted
Pressure Control	A/C Pressure Transducer	A/C liquid line mounted
Refrigerant Charge Capacity - R-134a	709 g (1.56 lbs.)	See A/C Underhood Specification Label located in the engine compartment

* Always use the type of PAG oil listed for the model being serviced. See A/C Underhood Specification Label located in the engine compartment. Do not mix different types of PAG oils. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

FASTENER TORQUE

Description	N.m	Ft. Lbs.	In. Lbs.
All Screws NOT Listed Below	2	-	17
A/C Compressor to Engine	Specific fastener placement and torque pattern required. Refer to **COMPRESSOR, A/C, INSTALLATION**.		
A/C Condenser to Radiator Bolts	5	-	44
A/C Expansion Valve to Evaporator Tube Tapping Block Bolts	11	-	97
Air Distribution Housing Halves Screws	2.2	-	20

Air Distribution Housing to HVAC Housing Screws	2.2	-	20
Air Inlet Housing to HVAC Housing Screws	2.2	-	20
Blower Motor Screws	2.2	-	20
Compressor Shaft Bolt	19	-	168
Flange to HVAC Housing Screws	2.2	-	20
Floor Console Duct to Floor Panel Screws	2.2	-	20
Fresh Air Inlet Housing to Dash Panel Nuts	7	-	62
Heater Core Retaining Bracket to Air Distribution Housing Screw	2.2	-	20
HVAC Housing Halves Screws	2.2	-	20
HVAC Housing to Engine Side of Dash Panel Nuts	7	-	62
HVAC Housing to Passenger Side of Dash Panel Nuts	3	-	26
Instrument Panel/demister Ducts to Instrument Panel Screw	2.2	-	20
Liquid Line Front to Rear Section Nut	22	16	-
Refrigerant Lines to A/C Expansion Valve Nut	23	17	-
Refrigerant Line to A/C Compressor Nut	23	17	-
Refrigerant Line to A/C Condenser Nut	22	16	-
Refrigerant Line Bracket to Strut Tower Bolt	11	-	97
Receiver/drier to A/C Condenser Bolt	22	16	-
Receiver/drier Bracket to A/C Condenser	5	-	44

Screw			
Suction Line Front to Rear Section Nut	22	16	-
Strut Support to Strut Tower Bolts	38	28	-

SPECIAL TOOLS

SPECIAL TOOLS

	6801 - Terminal Probe (Originally Shipped In Kit Number(s) 10190.) 9764 - Pliers, A/C Snap Ring (Originally Shipped In Kit Number(s) 9909.) C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)

CONTROLS

ACTUATOR, BLEND DOOR

DESCRIPTION

DESCRIPTION

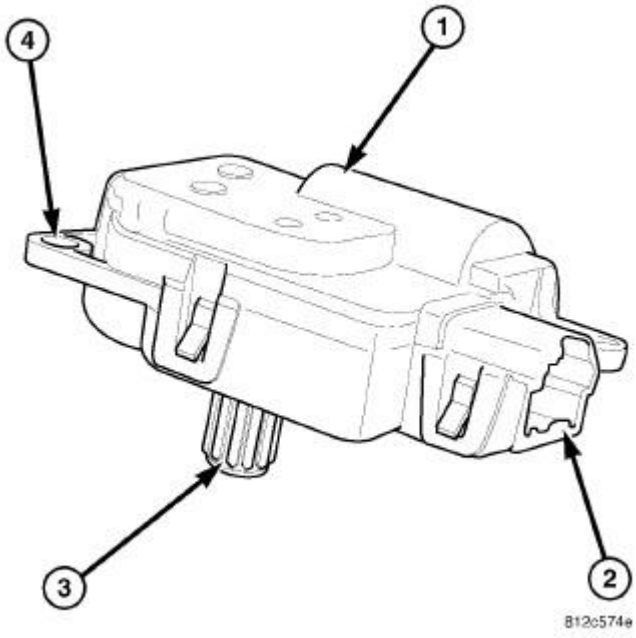


Fig. 4: Identifying Actuator Components

Courtesy of CHRYSLER GROUP, LLC

The two blend door actuators (1) for the Dual Zone heating and A/C system are reversible, 12 volt Direct Current (DC) servo motors. One blend door actuator is located on each side the of air distribution housing.

The blend door actuators are contained within a black molded plastic case with an integral wire connector receptacle (2). An output shaft with splines (3) connect each blend door actuator to the respective blend door linkage. Three integral mounting tabs (4) allow each actuator to be secured to the air distribution housing.

The blend door actuators do not require mechanical indexing to the blend door linkage, as they are electronically calibrated by the A/C heater module. The heating and A/C system must be recalibrated each time an actuator motor is replaced. Refer to **STANDARD PROCEDURE** .

The blend door actuators are interchangeable with each other, and with the actuators for the recirculation and mode-air doors.

OPERATION

OPERATION

The two blend door actuators are connected to the A/C heater module through the vehicle electrical system by dedicated two-wire lead and connectors of the HVAC wire harness. The blend door actuators can move the blend-air doors in two directions. When the A/C heater module pulls the voltage on one side of the motor connection high and the other connection low, the blend-air door will move in one direction. When the A/C heater module reverses the polarity of the voltage to the motor, the blend-air door moves in the opposite direction.

When the A/C heater module makes the voltage to both connections high or both connections low, the blend-air doors stops and will not move. The A/C heater module uses a pulse-count positioning system to monitor the operation and relative position of the blend door actuators and the blend-air doors. The A/C heater module learns the blend-air doors stop positions during the calibration procedure and will store a Diagnostic Trouble Code (DTC) for any problems it detects in the blend door actuator circuits.

The blend door actuators are diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The blend door actuators cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for

the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The Dual Zone heating and A/C system has two blend door actuators, one for the driver side and one for the passenger side.

LEFT SIDE

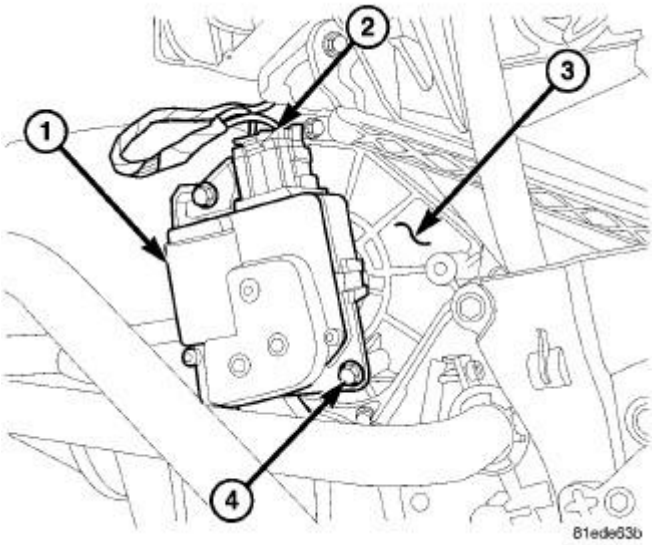


Fig. 5: Actuator-Blend Door-Single/Dual Driver
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the left side instrument panel silencer. Refer to **PANEL, SILENCER, REMOVAL** .
3. Remove the two screws (4) that secure the blend door actuator (12) to the left side of the HVAC air distribution housing (3).
4. Remove the blend door actuator from the air distribution housing and disconnect the HVAC wire harness connector (2) and remove the actuator from the vehicle.

RIGHT SIDE

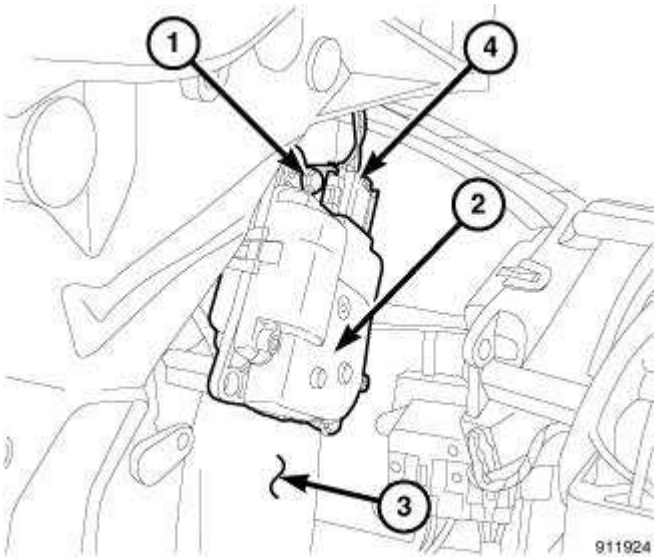


Fig. 6: Actuator-Blend Door-Dual Passenger
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the right side instrument panel silencer. Refer to **PANEL, SILENCER, REMOVAL** .
3. Remove the glove box and the glove box trim panel from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
4. Remove the two screws (1) that secure the blend door actuator (4) to the right side of the HVAC air distribution housing (3).
5. Remove the blend door actuator from the air distribution housing and disconnect the HVAC wire harness connector (2) and remove the actuator from the vehicle.

INSTALLATION

INSTALLATION

NOTE: The Dual Zone heating and A/C system has two blend door actuators, one for the driver side and one for the passenger side.

LEFT SIDE

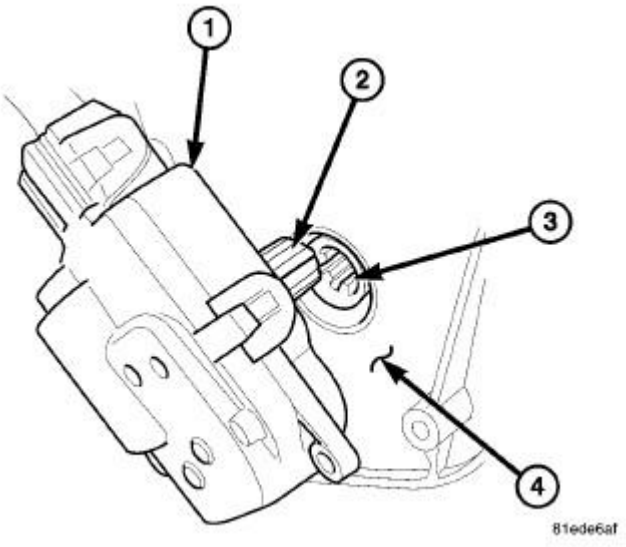


Fig. 7: Actuator-Blend Door-Lf Align
Courtesy of CHRYSLER GROUP, LLC

1. Position the blend door actuator (1) into the vehicle.
2. Install the blend door actuator onto the left side of the HVAC air distribution housing (4). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (2) with those on the blend door cam (3).

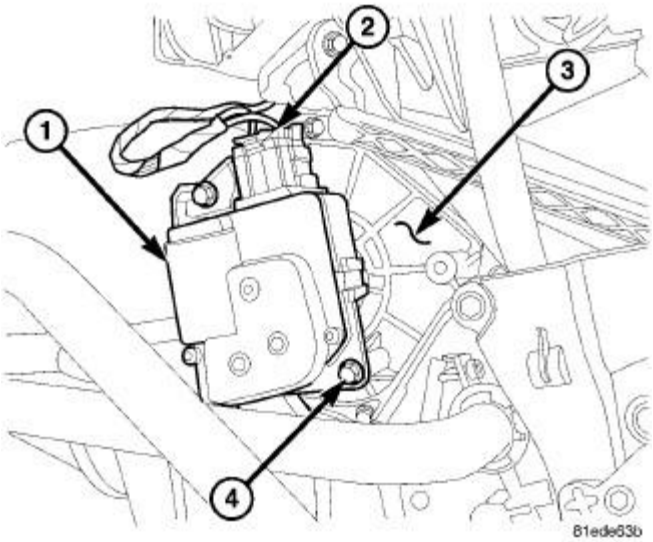


Fig. 8: Actuator-Blend Door-Single/Dual Driver
Courtesy of CHRYSLER GROUP, LLC

3. Install the two screws (4) that secure the blend door actuator (1) to the air distribution housing (3). Tighten the screws to 2 N.m (17 in. lbs.).

4. Connect the HVAC wire harness connector (2) to the blend door actuator.
5. Install the left side instrument panel silencer. Refer to **PANEL, SILENCER, INSTALLATION** .
6. Reconnect the negative battery cable.
7. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

RIGHT SIDE

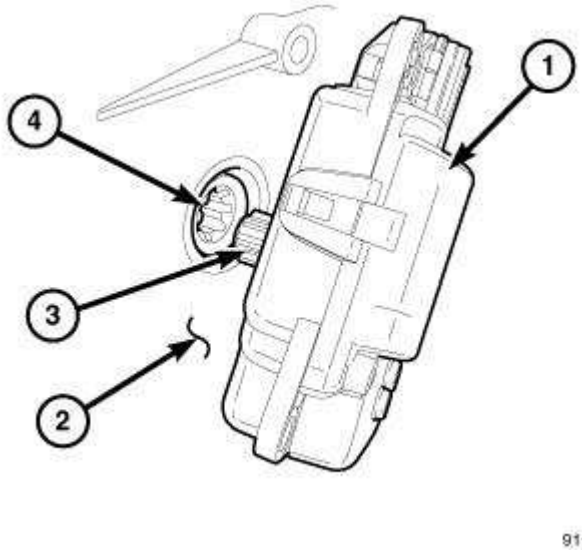


Fig. 9: Actuator-Blend Door
Courtesy of CHRYSLER GROUP, LLC

1. Position the blend door actuator (1) into the vehicle.
2. Install the blend door actuator onto the right side of the HVAC air distribution housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the blend door cam (4).

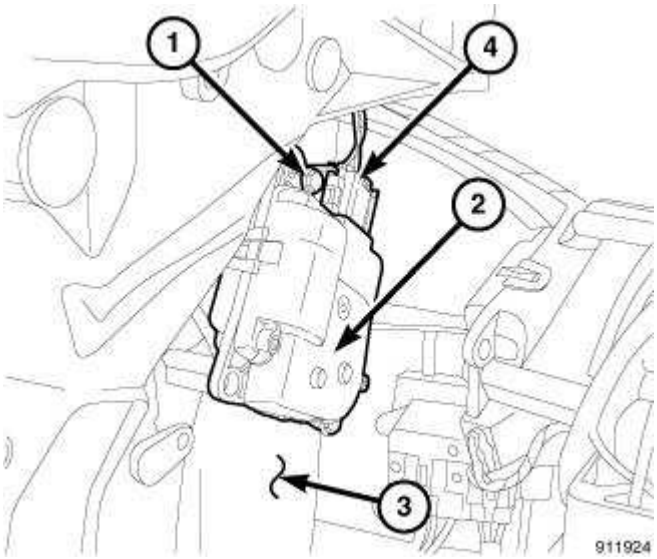


Fig. 10: Actuator-Blend Door-Dual Passenger
Courtesy of CHRYSLER GROUP, LLC

3. Install the screws (1) that secure the blend door actuator (4) to the air distribution housing (3). Tighten the screws to 2 N.m (17 in. lbs.).
4. Connect the HVAC wire harness connector (2) to the blend door actuator.
5. Install the glove box trim panel and glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
6. Install the right side instrument panel silencer. Refer to **PANEL, SILENCER, INSTALLATION** .
7. Reconnect the negative battery cable.
8. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

ACTUATOR, MODE DOOR

DESCRIPTION

DESCRIPTION

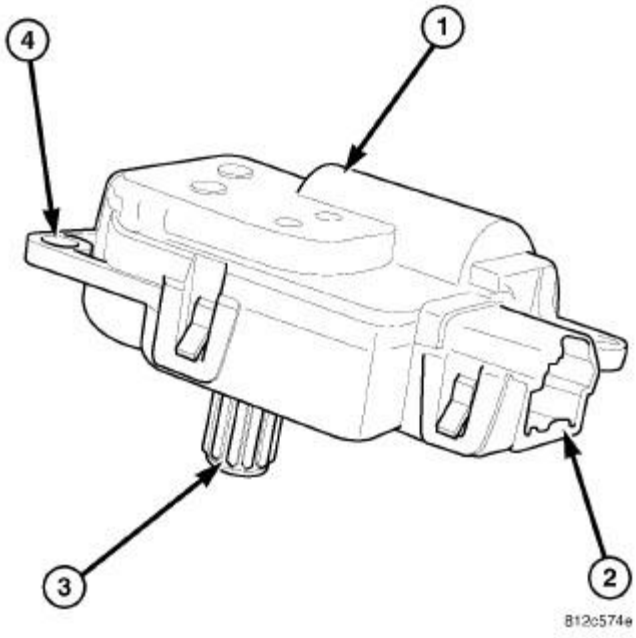


Fig. 11: Identifying Actuator Components
Courtesy of CHRYSLER GROUP, LLC

The mode door actuator (1) for the Dual Zone heating and A/C system is a reversible, 12 volt Direct Current (DC) servo motor, which is mechanically connected to the mode-air doors. The mode door actuator is located on the driver side end of the air distribution housing

The mode door actuator is contained within a black molded plastic case with an integral wire connector receptacle (2). An output shaft with splines (3) connect it to mode door linkage and integral

mounting tabs (4) allow the actuator to be secured to the air distribution housing.

The mode door actuator does not require mechanical indexing to the mode door linkage, as it is electronically calibrated by the A/C heater module. The heating and A/C system must be recalibrated each time an actuator motor is replaced. Refer to **STANDARD PROCEDURE** .

The mode door actuator is interchangeable with the actuators for the recirculation and blend-air doors.

OPERATION

OPERATION

The mode door actuator is connected to the A/C heater module through the vehicle electrical system by a dedicated two-wire lead and connector of the HVAC wire harness.

The mode door actuator can move the floor, defrost/demist and the panel-air doors in two directions. When the A/C heater module pulls the voltage on one side of the motor connection high and the other connection low, the mode-air doors will move in one direction. When the A/C heater module reverses the polarity of the voltage to the motor, the mode-air doors moves in the opposite direction.

When the A/C heater module makes the voltage to both connections high or both connections low, the mode-air doors stop and will not move. The A/C heater module uses a pulse-count positioning system to monitor the operation and relative position of the mode door actuator and the mode-air doors. The A/C heater module learns the mode-air doors stop position during the calibration procedure and will store a Diagnostic Trouble Code (DTC) for any problems it detects in the mode door actuator circuits.

The mode door actuator is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The mode door actuator cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

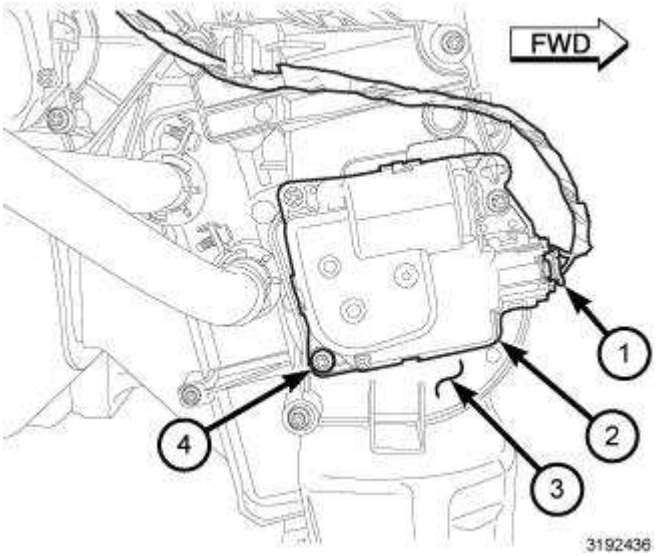


Fig. 12: HVAC Wire Harness Connector, Screws, Bracket & Mode Door Actuator
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the left side instrument panel silencer. Refer to **PANEL, SILENCER, REMOVAL** .
3. On LHD models, remove the knee blocker. Refer to **AIR BAG, KNEE BLOCKER, REMOVAL** .
4. Disconnect the HVAC wire harness connector (1) from the mode door actuator (2).
5. Remove the two screws (4) that secure the mode door actuator to the bracket (3) and remove the actuator.

INSTALLATION

INSTALLATION

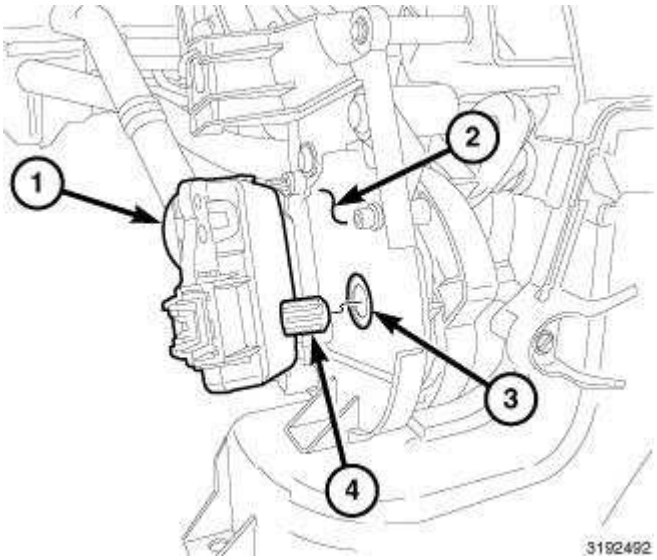


Fig. 13: Mode Door Actuator, Bracket, Actuator Output Shaft & Mode Door Cam
Courtesy of CHRYSLER GROUP, LLC

1. Position the mode door actuator (1) to the left side of the HVAC air distribution housing.
2. Install the mode door actuator onto the bracket (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (4) with those on the mode door cam (3).

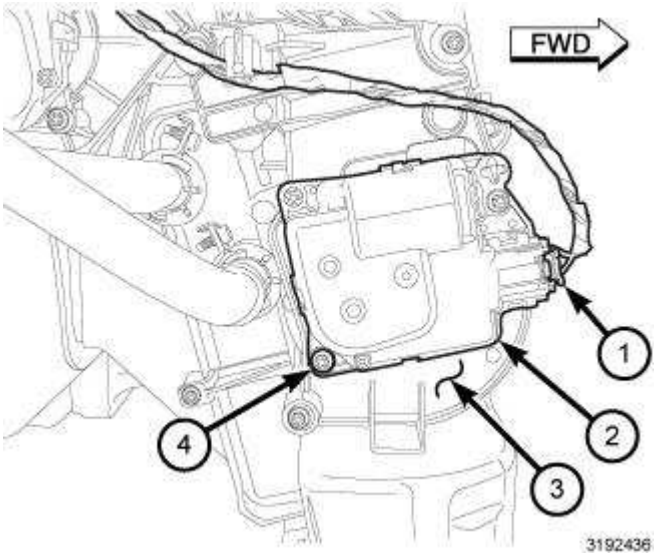


Fig. 14: HVAC Wire Harness Connector, Screws, Bracket & Mode Door Actuator
Courtesy of CHRYSLER GROUP, LLC

3. Install the screws (4) that secure the mode door actuator (2) to the bracket (3). Tighten the screws to 2 N.m (17 in. lbs.).
4. Connect the HVAC wire harness connector (1) to the mode door actuator.
5. On LHD models, install the knee blocker. Refer to **AIR BAG, KNEE BLOCKER, INSTALLATION** .
6. Install the left side instrument panel silencer. Refer to **PANEL, SILENCER, INSTALLATION** .
7. Reconnect the negative battery cable.
8. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

ACTUATOR, RECIRCULATION DOOR

DESCRIPTION

DESCRIPTION

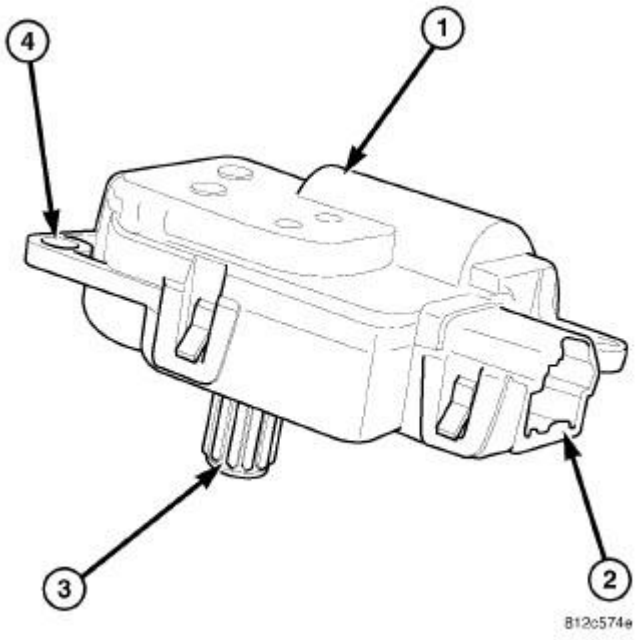


Fig. 15: Identifying Actuator Components
Courtesy of CHRYSLER GROUP, LLC

The recirculation door actuator (1) for the Dual Zone heating and A/C system is a reversible, 12 volt Direct Current (DC) servo motor, which is directly connected to the pivot shaft of the recirculation-air door. The recirculation door actuator is located on the left side of the air inlet housing.

The recirculation door actuator is contained within a black molded plastic case with an integral wire connector receptacle (2). An output shaft with splines (3) connect it to recirculation door shaft and integral mounting tabs (4) allow the actuator to be secured to the air inlet housing.

The recirculation door actuator does not require mechanical indexing to the recirculation-air door, as it is electronically calibrated by the A/C heater module. The heating and A/C system must be recalibrated each time an actuator motor is replaced. Refer to **STANDARD PROCEDURE** .

The recirculation door actuator is interchangeable with the actuators for the blend and mode air doors.

OPERATION

OPERATION

The recirculation door actuator is connected to the A/C heater control through the vehicle electrical system by a dedicated two-wire lead and connector of the HVAC wire harness.

The recirculation door actuator can move the recirculation-air door in two directions. When the A/C heater module pulls the voltage on one side of the motor connection high and the other connection low, the recirculation-air door will move in one direction. When the A/C heater module reverses the

polarity of the voltage to the motor, the recirculation-air door moves in the opposite direction. When the A/C heater module makes the voltage to both connections high or both connections low, the recirculation-air door stops and will not move.

The A/C heater module uses a pulse-count positioning system to monitor the operation and relative position of the recirculation door actuator and the recirculation-air door. The A/C heater module learns the recirculation-air door stop positions during the calibration procedure and will store a Diagnostic Trouble Code (DTC) for any problems it detects in the recirculation door actuator circuits.

The recirculation door actuator is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The recirculation door actuator cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

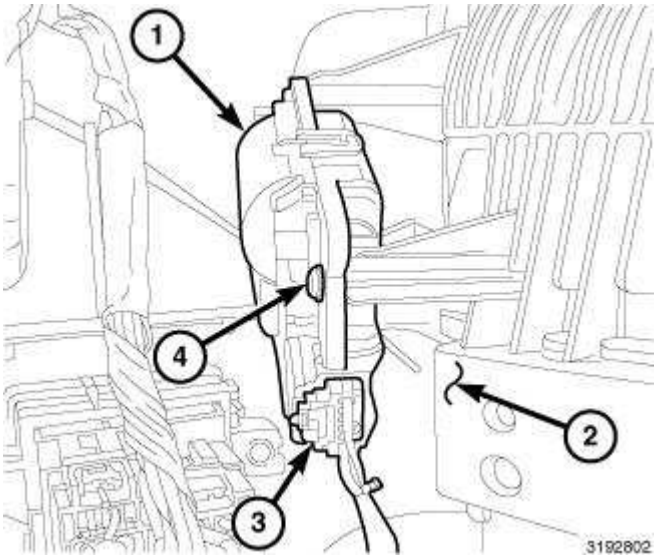


Fig. 16: HVAC Wire Harness Connector, Recirculation Door Actuator, Two Screws & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the right side instrument panel silencer panel. Refer to **PANEL, SILENCER,**

REMOVAL .

3. Remove the glove box and the glove box trim panel from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
4. Disconnect the HVAC wire harness connector (3) from the recirculation door actuator (1).
5. Remove the two screws (4) that secure the recirculation door actuator to the air inlet housing (2) and remove the actuator.

INSTALLATION

INSTALLATION

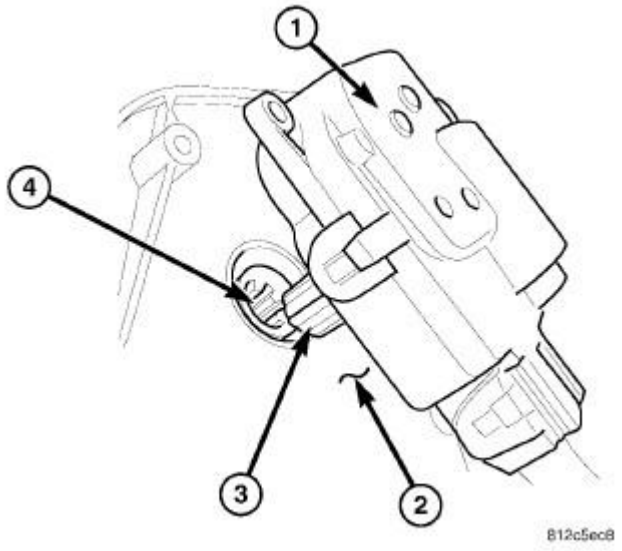


Fig. 17: Aligning Left Front Blend Door Actuator
Courtesy of CHRYSLER GROUP, LLC

1. Position the recirculation door actuator (1) into the vehicle.
2. Install the recirculation door actuator onto the HVAC air inlet housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the recirculation door pivot shaft (4).

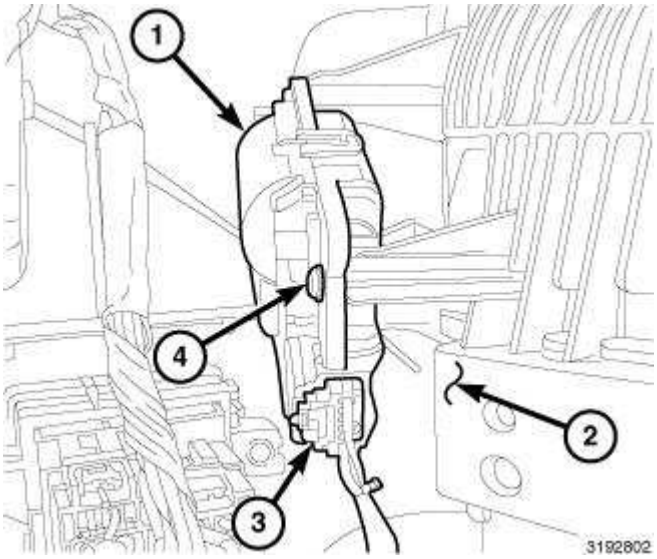


Fig. 18: HVAC Wire Harness Connector, Recirculation Door Actuator, Two Screws & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

3. Install the two screws (4) that secure the recirculation door actuator (1) to the air inlet housing (2). Tighten the screws to 2 N.m (17 in. lbs.).
4. Connect the HVAC wire harness connector (3) to the recirculation door actuator.
5. Install the glove box trim panel and glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
6. Install the right side instrument panel silencer. Refer to **PANEL, SILENCER, INSTALLATION** .
7. Reconnect the negative battery cable.
8. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

CONTROL, A/C AND HEATER

DESCRIPTION

DESCRIPTION

A Manual Temperature Control (MTC) and an Automatic Temperature Control (ATC) Dual Zone heating and A/C system are available for this vehicle. The Dual Zone heating and A/C system allows both the driver and the front seat passenger the ability to individually regulate air temperature for their side of the vehicle. All controls are identified by International Standards Organization (ISO) graphic symbols.

The ATC heating and A/C system can automatically adjust the air temperature, airflow volume, airflow distribution and amount of inside air recirculation to maintain occupant comfort, even under changing outside weather conditions, and offers several manual override features, such as, fan speed, airflow distribution, defrost and recirculation modes.

Both heating and A/C systems provide the vehicle occupants with a number of options to help control

climate and comfort within the vehicle (Refer to the Owner's Manual for more information on the features of the heating and A/C system).

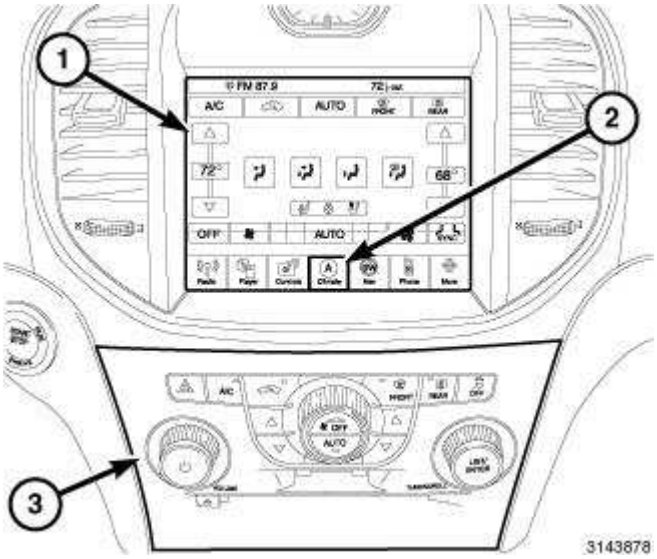


Fig. 19: A/C Systems Are Located In The U-Connect Touch (TM) Screen Module, Climate Tab & Switchbank
Courtesy of CHRYSLER GROUP, LLC

NOTE: Automatic Temperature Control (ATC) shown in illustration. Manual Temperature Control (MTC) similar.

The controls for both of the Dual Zone heating and A/C systems are located in the U-Connect Touch ™ screen module (1), under the Climate tab (2), and on the switchbank (3) at the center of the instrument panel.

OPERATION

AUTOMATIC TEMPERATURE CONTROL (ATC)

Each of the A/C heater controls in the front switchbank are resistor type controls. When a button is pushed, or a knob is turned, the switchbank sends a resistive signal over hard-wired circuits to the U-Connect Touch ™ screen module. The controls in the U-Connect Touch ™ screen module mimic the action selected on the switchbank. The U-Connect Touch ™ screen module communicates the heater and A/C control request signals to the A/C heater module.

The A/C heater module is a dedicated microprocessor that automatically drives the electrically operated air-door actuators for the Dual Zone Automatic Temperature Control (ATC) heating and A/C systems. The ATC A/C heater module obtains sun load, in-car temperature and evaporator temperature information through hard-wired circuits, and occupant heating and A/C settings and other required vehicle information over the Controller Area Network (CAN) data bus. Refer to **MODULE, A/C AND HEATER, OPERATION** .

The Dual Zone ATC heating and A/C system is diagnosed using a scan tool. Refer to **DIAGNOSIS**

AND TESTING .

Prior to replacing an A/C heater control or A/C heater module, check for any Diagnostic Trouble Codes (DTCs) related to the heating and A/C system, and run the calibration procedure to verify that the concern is not an air-door calibration issue. Refer to **STANDARD PROCEDURE** .

The individual A/C heater controls located in the switchbank cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire switchbank pod must be replaced. Refer to **POD, SWITCH BANK, REMOVAL** .

The individual A/C heater controls located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

MANUAL TEMPERATURE CONTROL (MTC)

Each of the A/C heater controls in the front switchbank are resistor type controls. When a button is pushed, or a knob is turned, the switchbank sends a resistive signal over hard-wired circuits to the U-Connect Touch ™ screen module. The controls in the U-Connect Touch ™ screen module mimic the action selected on the switchbank. The U-Connect Touch ™ screen module communicates the heater and A/C control request signals to the A/C heater module.

The A/C heater module is a dedicated microprocessor for the Dual Zone Manual Temperature Control (MTC) heating and A/C system. The MTC A/C heater module obtains evaporator temperature information through hard-wired circuits, and occupant heating and A/C settings and other required vehicle information over the Controller Area Network (CAN) data bus. Refer to **MODULE, A/C AND HEATER, OPERATION** .

The Dual Zone MTC heating and A/C system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

Prior to replacing an A/C heater control or A/C heater module, check for any Diagnostic Trouble Codes (DTCs) related to the heating and A/C system, and run the calibration procedure to verify that the concern is not an air-door calibration issue. Refer to **STANDARD PROCEDURE** .

The individual A/C heater controls located in the switchbank cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire switchbank pod must be replaced. Refer to **POD, SWITCH BANK, REMOVAL** .

The individual A/C heater controls located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

MODULE, POWER, BLOWER MOTOR

DESCRIPTION

DESCRIPTION

NOTE: Automatic Temperature Control (ATC) shown in illustration. Manual Temperature Control (MTC) similar.

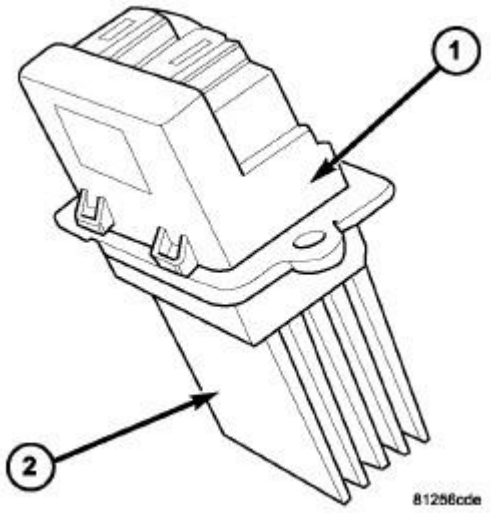


Fig. 20: Integral Connector Receptacles
Courtesy of CHRYSLER GROUP, LLC

Both the Automatic Temperature Control (ATC) and Manual Temperature Control (MTC) heating and A/C systems use a blower motor power module to control the blower motor speed.

The blower motor power module is mounted to the rear of the HVAC housing, directly behind the glove box. The blower motor power module consists of a molded plastic mounting plate with two integral connector receptacles (1). Concealed behind the mounting plate is the power module electronic circuitry and a large finned heat sink (2).

The blower motor power module is accessed for service by removing the glove box.

OPERATION

OPERATION

The blower motor power module is connected to the vehicle electrical system through a dedicated lead and connector of the HVAC wire harness. A second lead and connector of the wire harness is connected to the blower motor.

On the Automatic Temperature Control (ATC) system, the blower motor power module allows the microprocessor-based A/C heater module to calculate and provide infinitely variable blower motor speeds based upon either manual blower switch input or the ATC programming.

On the Manual Temperature Control (ATC) system, the blower motor power module allows the A/C-

heater module to provide an infinite amount of blower motor speeds throughout its operating range, based upon blower switch input.

Both the ATC and MTC systems use a Pulse Width Modulated (PWM) circuit strategy. PWM voltage is applied to a comparator circuit which compares the PWM signal voltage to the blower motor feedback voltage. The resulting output drives the power module circuitry, which provides a linear output voltage to change or maintain the desired blower speed.

The blower motor power module is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The blower motor power module cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: The heat sink for the blower motor power module may get very hot during normal operation. If the blower motor was turned on prior to servicing the blower motor power module, wait five minutes to allow the heat sink to cool before performing diagnosis or service. Failure to take this precaution may result in possible serious injury.

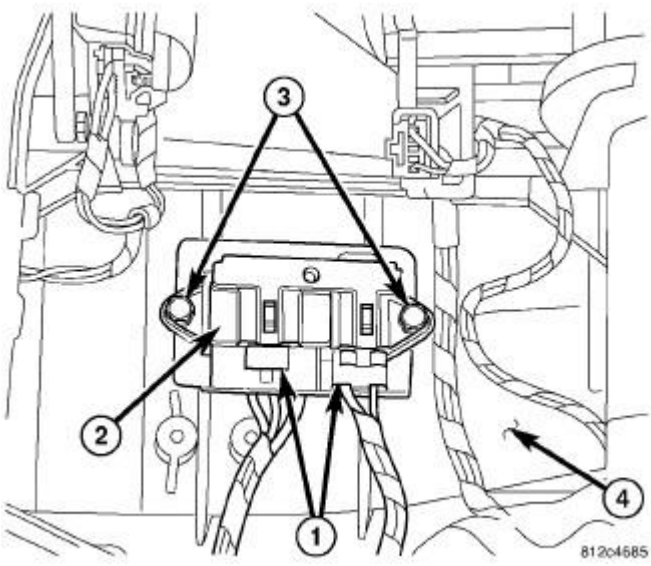


Fig. 21: Removing/Installing Blower Motor Power Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the glove box from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Disconnect the two wire harness connectors (1) from the blower motor power module (2).
4. Remove the two screws (3) that secure the blower motor power module to the HVAC housing (4) and remove the power module.

INSTALLATION

INSTALLATION

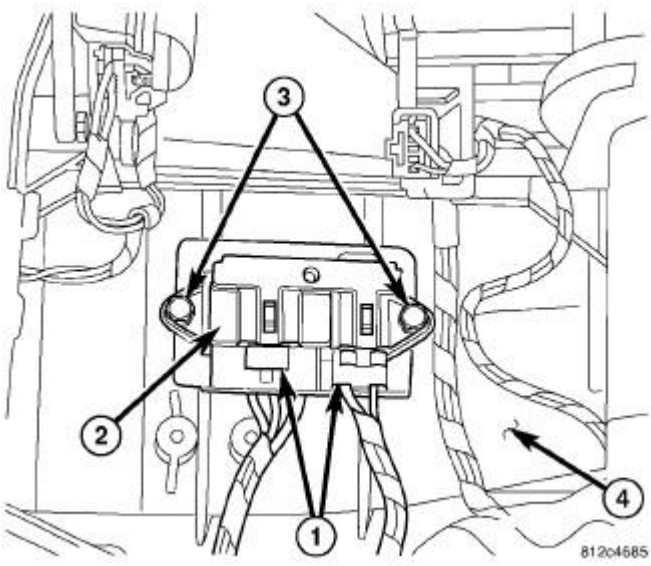


Fig. 22: Removing/Installing Blower Motor Power Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the blower motor power module (2) into the HVAC housing (4).
2. Install the two screws (3) that secure the blower motor power module to the HVAC housing. Tighten the screws to 2 N.m (17 in. lbs.).
3. Connect the two wire harness connectors (1) to the blower motor power module.
4. Install the glove box into the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
5. Reconnect the negative battery cable.

SENSOR, AMBIENT TEMPERATURE

DESCRIPTION

DESCRIPTION

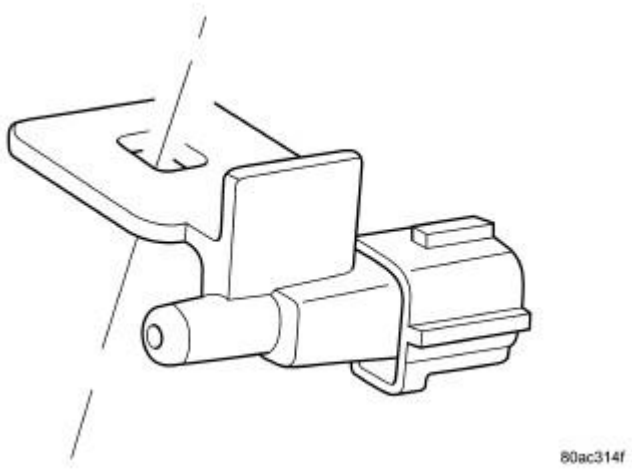


Fig. 23: Identifying Ambient Air Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

The ambient air temperature sensor is a variable resistor that monitors the air temperature outside of the vehicle. The ATC system uses the sensor data to maintain optimum cabin temperature levels. The ambient air temperature sensor is mounted to the front bumper beam.

OPERATION

OPERATION

The ambient air temperature sensor is a variable resistor that operates on a 5 volt Direct Current (DC) reference signal sent by the Body Control Module (BCM). The ambient air temperature sensor is connected to the BCM through a two-wire lead and connector of the vehicle wire harness. The ambient air temperature sensor changes its internal resistance in response to changes in the outside air temperature, which either increases or decreases the reference signal voltage read by the BCM. The BCM converts and broadcasts the sensor data over the Controller Area Network (CAN) data bus, where it is read by the Automatic Temperature Control (ATC) A/C heater module, Powertrain Control Module (PCM) and other vehicle control modules.

The ambient air temperature sensor is diagnosed using a scan tool (Refer to appropriate diagnostic information).

The ambient air temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged. Refer to **SENSOR, AMBIENT TEMPERATURE, REMOVAL** .

SENSOR, EVAPORATOR TEMPERATURE

DESCRIPTION

DESCRIPTION

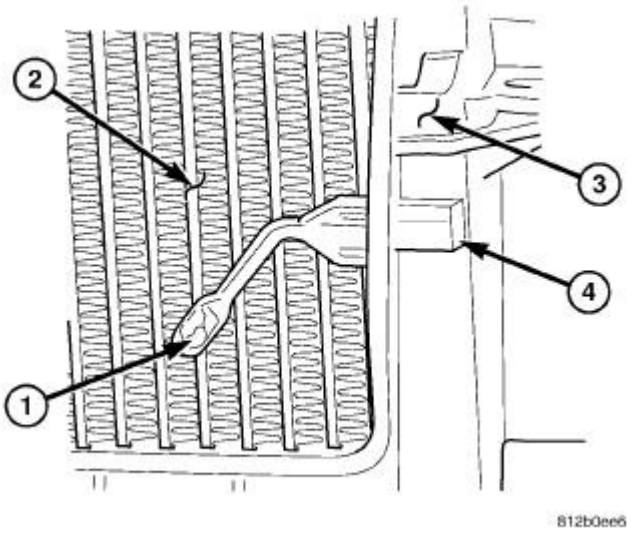


Fig. 24: Sensor-Evaporator Temperature
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

The evaporator temperature sensor (1) measures the temperature of the conditioned air downstream of the A/C evaporator (2). The evaporator temperature sensor is an electrical thermistor within a molded plastic case that is inserted into the HVAC housing (3) near the coldest point of the A/C evaporator. Two terminals within the connector receptacle (4) connect the sensor to the vehicle electrical system through a wire lead and connector of the HVAC wire harness.

The external location of the evaporator temperature sensor allows the sensor to be removed or installed without disturbing the refrigerant in the A/C system.

OPERATION

OPERATION

The evaporator temperature sensor monitors the temperature of the conditioned air downstream of the A/C evaporator and supplies an input signal to the A/C heater module. The A/C heater module uses the evaporator temperature sensor input signal to optimize A/C system performance and to protect the A/C system from evaporator freezing. The evaporator temperature sensor will change its internal resistance in response to the temperatures it monitors and is connected to the A/C heater module through sensor ground circuit and a 5 volt Direct Current (DC) reference signal circuit. As the temperature of the A/C evaporator decreases, the internal resistance of the evaporator temperature sensor decreases.

The A/C heater module uses the monitored voltage reading as an indication of evaporator temperature. The A/C heater module is programmed to respond to this input by requesting the Powertrain Control Module (PCM) to cycle the A/C clutch as necessary to optimize A/C system performance and to protect the A/C system from evaporator freezing.

The evaporator temperature sensor is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The evaporator temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

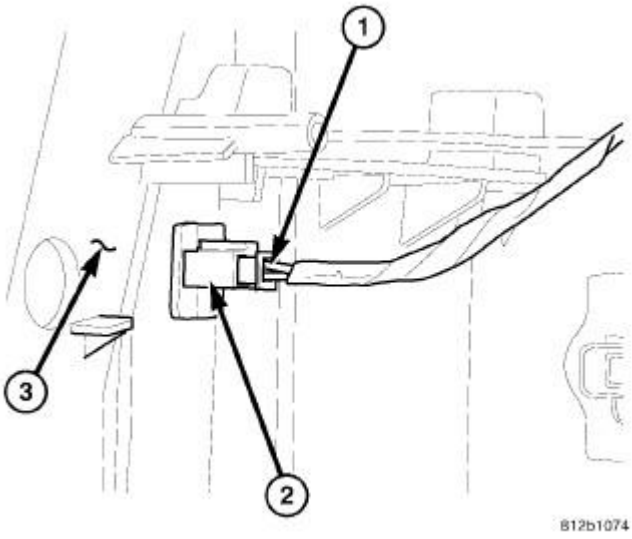


Fig. 25: Sensor-Evaporator Temperature
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the right side instrument panel silencer. Refer to **PANEL, SILENCER, REMOVAL** .
3. Remove the glove box and the glove box trim panel from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
4. Disconnect the HVAC wire harness connector (1) from the evaporator temperature sensor (2) located on the HVAC housing (3) and remove the sensor.

INSTALLATION

INSTALLATION

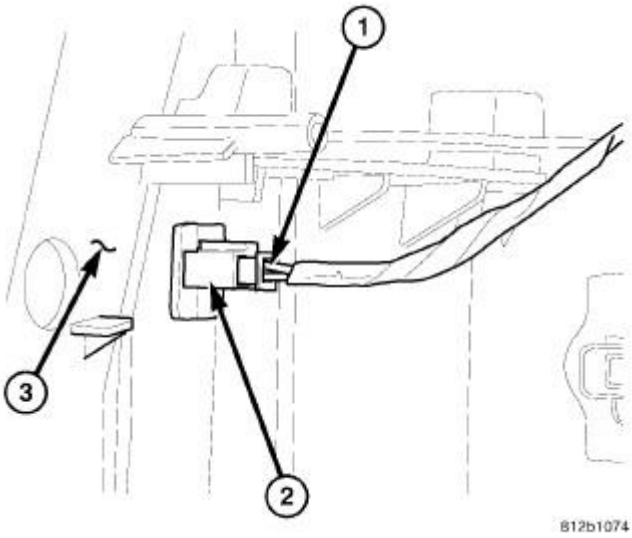


Fig. 26: Sensor-Evaporator Temperature
Courtesy of CHRYSLER GROUP, LLC

1. Install the evaporator temperature sensor (2) into HVAC housing (3).
2. Connect the HVAC wire harness connector (1) to the evaporator temperature sensor.
3. Install the glove box trim panel and glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
4. Install the right side instrument panel silencer. Refer to **PANEL, SILENCER, INSTALLATION** .
5. Reconnect the negative battery cable.

SENSOR, HUMIDITY

DESCRIPTION

DESCRIPTION

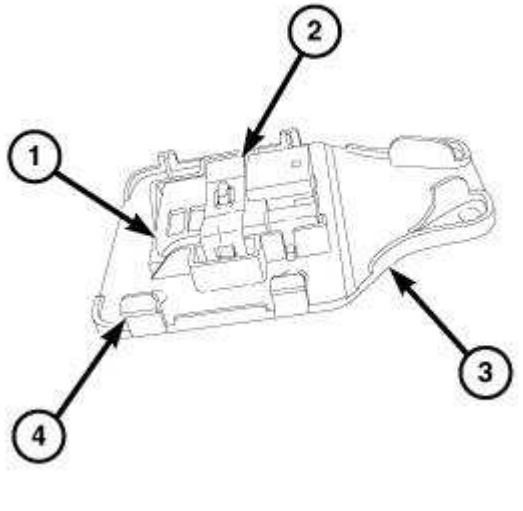


Fig. 27: Humidity Sensor, Bracket, Retaining Clip & Plastic Tabs
Courtesy of CHRYSLER GROUP, LLC

A humidity sensor (1) is used on Automatic Temperature Control (ATC) models to detect humidity levels inside the vehicle to optimize the dehumidifying effect of the A/C system. The humidity sensor is attached to a plastic bracket (3) by a metal retaining clip (2). The sensor bracket is attached to the inside of the windshield by an adhesive. A cover is attached to the sensor bracket by four plastic tabs (4). The humidity sensor is connected to the Body Control Module (BCM) by a dedicated three wire lead and connector that protrudes out from under the front of the headliner.

CAUTION: Use care when servicing the humidity sensor. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

The humidity sensor can be serviced without the use of any special tools.

OPERATION

OPERATION

The humidity sensor detects humidity, dew point and windshield glass temperature, and sends this information to the Body Control Module (BCM) over a Local Interconnect Network (LIN) data bus connection. The BCM then broadcasts the message over the Controller Area Network (CAN) data bus to the A/C heater module. The A/C heater module automatically adjusts A/C clutch operation, amount of recirculated air, blower motor speeds and outlet modes to prevent fogging on the inside of the windshield glass. If the humidity sensor message is not received by the A/C heater module, a Diagnostic Trouble Code (DTC) will set. The information the A/C heater module receives from the humidity sensor can be viewed using a scan tool.

The humidity sensor is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The humidity sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

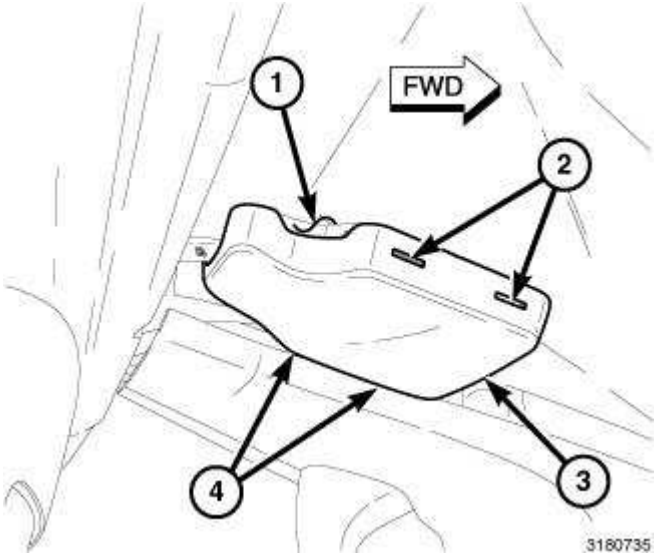


Fig. 28: Humidity Sensor Cover, Sensor Bracket & Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable

   CAUTION: Use care when removing the humidity sensor cover. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

2. Carefully disengage the four retaining tabs (2 and 4) that secure the cover (3) to the humidity sensor bracket (1) by pressing in on the right side of the cover, while rocking the left side of the cover off the bracket.

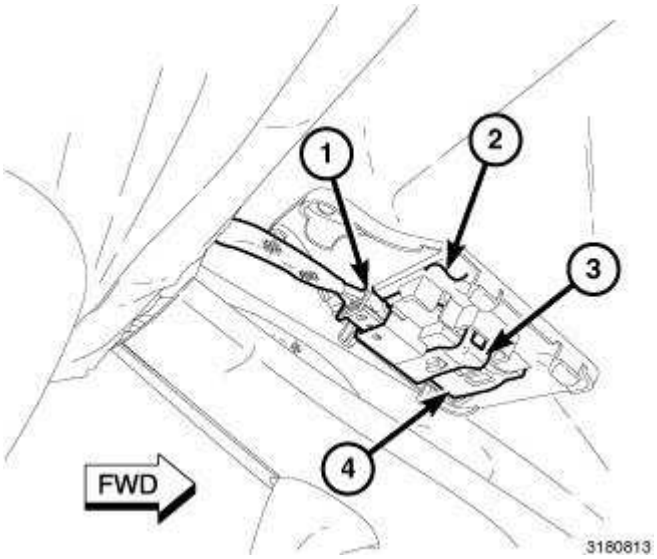


Fig. 29: Wire Harness Connector, Humidity Sensor, Bracket & Clip
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use care when removing the humidity sensor. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

3. Using a small screwdriver or similar tool, carefully disengage the metal retaining clip (3) from the sensor bracket (2) and remove the humidity sensor (4) and the clip as an assembly.
4. Disconnect the wire harness connector (1) from the humidity sensor.
5. If the humidity sensor bracket is damaged and cannot be reused, replace the windshield. Refer to **WINDSHIELD, REMOVAL** .

INSTALLATION

INSTALLATION

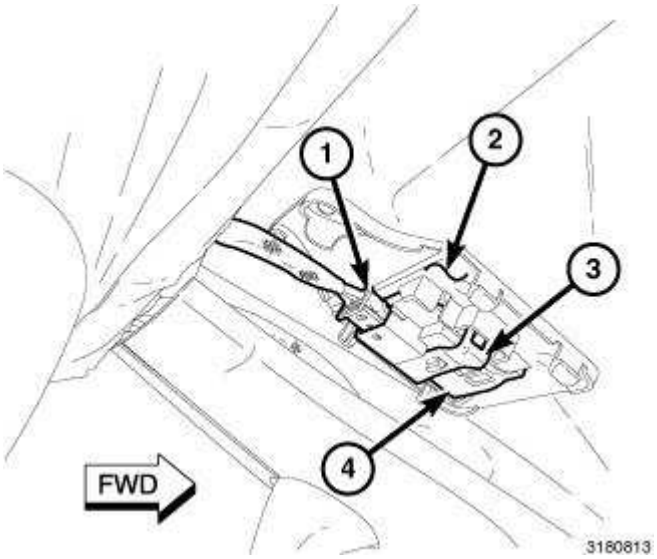


Fig. 30: Wire Harness Connector, Humidity Sensor, Bracket & Clip
Courtesy of CHRYSLER GROUP, LLC

1. If the humidity sensor bracket (1) is damaged and cannot be reused, install a new windshield. Refer to **WINDSHIELD, INSTALLATION** .
2. Connect the wire harness connector (1) to the humidity sensor (4).

CAUTION: Use care when installing the humidity sensor. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

3. Position the humidity sensor to the sensor bracket (2) and engage the metal retaining clip (3) to the bracket. Make sure both sides of the retaining clip are fully engaged to the bracket.

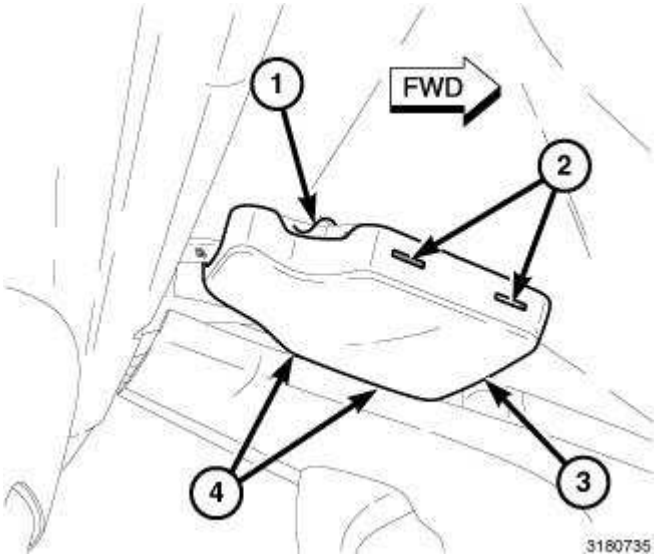


Fig. 31: Humidity Sensor Cover, Sensor Bracket & Retaining Tabs

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use care when install the humidity sensor cover. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

4. Carefully install the humidity sensor cover (3) onto the sensor bracket (1). Make sure the four retaining tabs (2 and 4) are fully engaged to the bracket
5. Reconnect the negative battery cable.

SENSOR, SUN

DESCRIPTION

DESCRIPTION

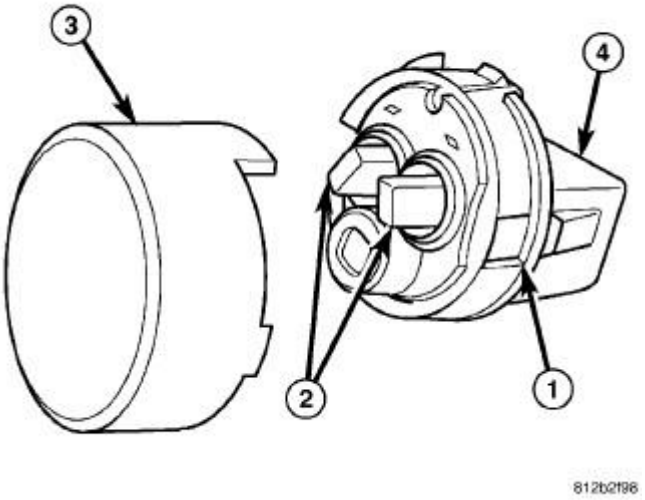


Fig. 32: Sun Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical sun sensor assembly shown in illustration.

The Automatic Temperature Control (ATC) heating-A/C system uses a sun sensor assembly (1) to measure sun light intensity. The sun sensor assembly incorporates two sun sensors (2) within a molded plastic case with a clear lens (3), that protrudes through the center of the defroster grille. The wire harness receptacle (4) connects the sun sensors to the vehicle electrical system through a wire lead and connector of the instrument panel wire harness.

OPERATION

OPERATION

The Automatic Temperature Control (ATC) Dual Zone heating and A/C system uses two sun sensors to balance the system in response to side-to-side variations of sun light intensity. Passengers in sun and shadow require different functional settings because they experience very different temperatures. The sun sensor assembly provides data to the A/C heater module to help determine proper mode and blend-air door positions and blower motor speeds. The sun sensors are not thermistor type sensors, but rather photo diodes. For this reason the sun sensors responds to sun light intensity rather than temperature. The sun sensor assembly is also used to sense day and night conditions for automatic headlight control, if equipped.

The sun sensor is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The sun sensor assembly cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUN SENSOR

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in possible serious or fatal injury.

The sun sensor assembly is located so that the sun rays will hit the sensors in the same way that it will hit the driver and the passenger. It is important that the area in front of the sun sensor assembly be unobstructed. If the vehicle exhibits a lack of passenger comfort in sunny weather such as in the early afternoon, check for the following:

- Any items laying on top of the instrument panel are not covering the sun sensor.
- Any stickers on the windshield are not directly in front of the sun sensor.
- Confirm that the windshield wipers are properly adjusted.
- Confirm that the sun sensor is properly installed. Refer to **SENSOR, SUN, INSTALLATION**.
- Confirm that the defroster grille is properly installed. Refer to **GRILLE, DEFROSTER, INSTALLATION** .

The A/C heater module continually monitors the sun sensor circuits and will store Diagnostic Trouble Codes (DTCs) for any problem it detects. The sun sensor can be tested in the vehicle with a scan tool. Refer to **DIAGNOSIS AND TESTING** .

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in an accidental airbag deployment and possible serious or fatal injury.

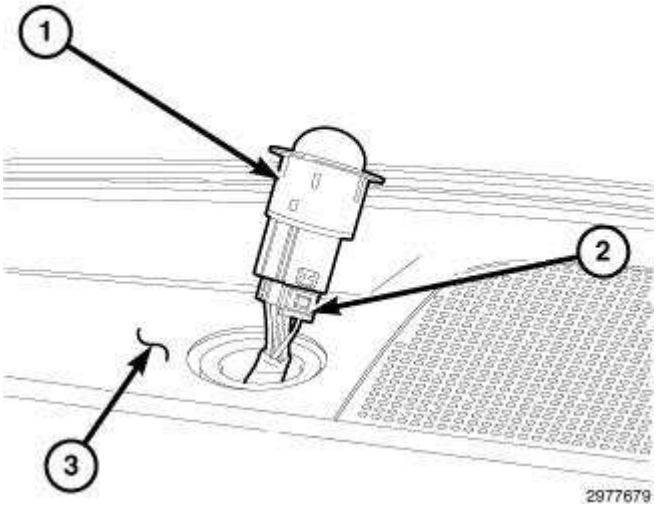


Fig. 33: Sun Sensor, Panel & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Using a small flat bladed tool, gently pry the sun sensor (1) out of the top of the instrument panel (3).
3. Disconnect the wire harness connector (2) and remove the sensor.

INSTALLATION

INSTALLATION

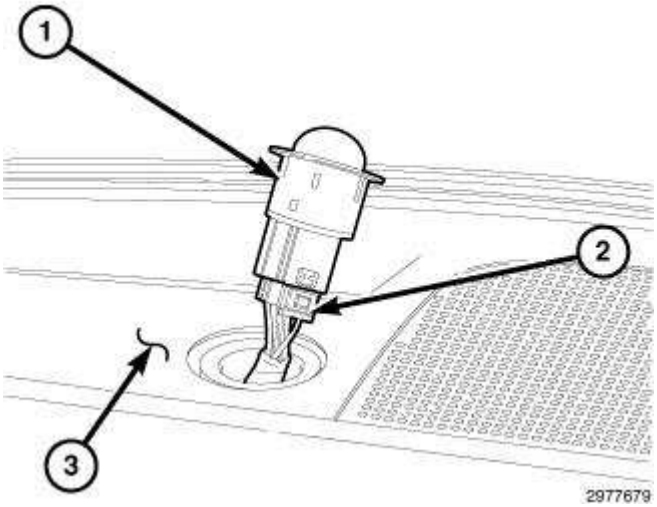


Fig. 34: Sun Sensor, Panel & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the sun sensor (1) near the instrument panel (3).
2. Connect the wiring harness connector (2) to the sun sensor.
3. Align the tab on the sun sensor with the slot in the opening of the instrument panel and gently push the sensor into the instrument panel. Make sure the sensor is fully engaged and lies flat in the instrument panel.
4. Reconnect the negative battery cable.

SENSOR, TEMPERATURE, IN-CAR

DESCRIPTION

DESCRIPTION

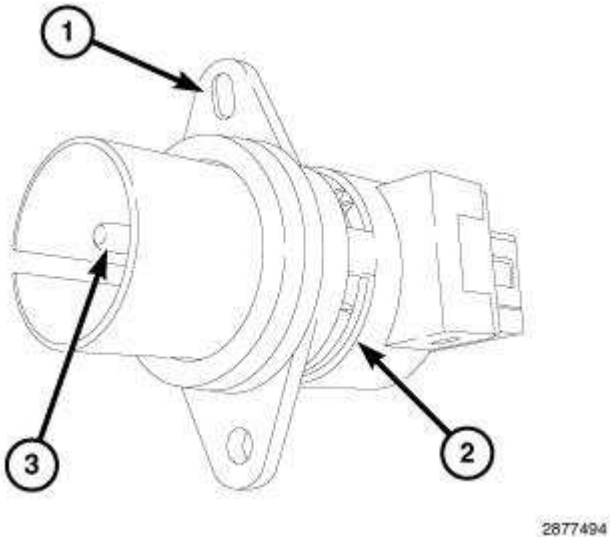


Fig. 35: In-Car Temperature Sensor, Aspirator Motor & Thermistor
Courtesy of CHRYSLER GROUP, LLC

The in-car temperature sensor (1) is used in the Automatic Temperature Control (ATC) heating and A/C system only. The in-car temperature sensor consists of an aspirator motor (2) and a temperature thermistor (3). The in-car temperature sensor sends a resistance signal to the ATC A/C heater module and is attached to the instrument panel, below the steering column.

OPERATION

OPERATION

Air is drawn from the passenger compartment by the aspirator motor and flows over the temperature thermistor. The thermistor changes resistance with air temperature. The A/C heater module for the Automatic Temperature Control (ATC) system receives the resistance signal over hard-wired circuits and calculates the temperature of the air in the passenger compartment. The ATC system then automatically makes adjustments to maintain the optimum passenger compartment comfort.

The in-car temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING -

NOTE: For complete circuit diagrams, see Wiring Information. Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.

Using a scan tool, check for Diagnostic Trouble Codes (DTCs) related to the in-car temperature sensor and the A/C heater module. If any DTCs are found, repair as necessary. Refer to **DIAGNOSIS AND TESTING** . If no DTCs are found, perform the two following tests. Replace the in-car temperature sensor if the sensor fails either test.

IN-CAR TEMPERATURE SENSOR

ASPIRATOR MOTOR TEST

The in-car temperature sensor uses an aspirator motor to draw air from the passenger compartment and flow the air over the temperature thermistor. Test the motor as follows.

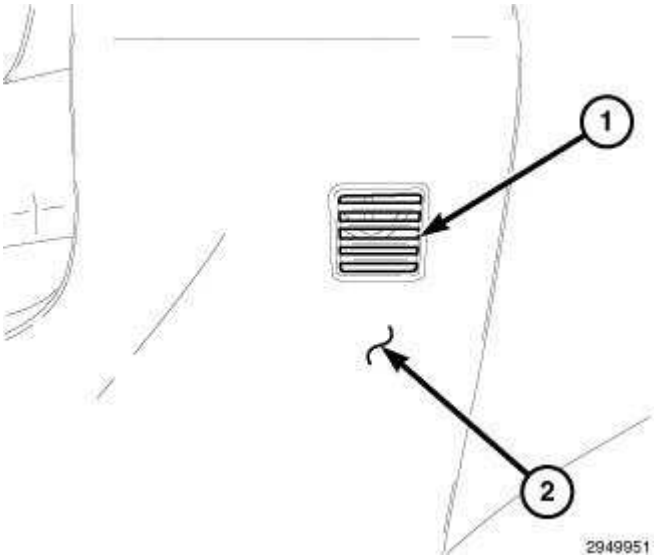


Fig. 36: Opening Grille & Opening Cover
Courtesy of CHRYSLER GROUP, LLC

1. Place the ignition in the Run position.
2. Place a small piece of newspaper in front of the aspirator motor opening grille (1), located on the steering column opening cover (2). If the paper sticks to the grille, the aspirator motor is operating properly. The piece of paper should be only large enough to cover the opening.
3. If the paper does not stick to the grille, check the in-car temperature sensor electrical connections and wiring. If connections and wiring are OK, replace the in-car temperature sensor.

TEMPERATURE THERMISTOR TEST

The in-car temperature sensor uses a temperature thermistor to provide resistance values that correlate with temperature change. Test the thermistor as follows.

1. Remove the in-car temperature sensor and place it on a workbench. Refer to **SENSOR, TEMPERATURE, IN-CAR, REMOVAL**.
2. Note the current ambient air temperature of the work area.
3. Use an ohm meter and check the resistance between pins 1 and 2 of the in-car temperature sensor. Compare the temperature of the work area to the found resistance value. The resistance should be within specifications as listed in the Resistance and Temperature chart. If not OK, replace the in-car temperature sensor.

RESISTANCE AND TEMPERATURE

Air Temperature Range	Low Resistance Range (kohm)	High Resistance Range (kohm)
-21° to -15°C (-5° to 5°F)	292 ± 1.0	223 ± 0.9
-14° to -9°C (6° to 15°F)	198 ± 0.9	161 ± 0.8
-8° to -4°C (16° to 25°F)	144 ± 0.8	123 ± 0.8

-3° to 1°C (26° to 35°F)	111 ± 0.7	95 ± 0.7
2 to 7°C (36° to 45°F)	86 ± 0.7	70 ± 0.6
8 to 12°C (46° to 55°F)	64 ± 0.6	55 ± 0.5
13° to 18°C (56° to 65°F)	51 ± 0.5	42 ± 0.4
19° to 23°C (66° to 75°F)	39 ± 0.4	33 ± 0.3
24° to 29°C (76° to 85°F)	31 ± 0.3	26 ± 0.3
30° to 35°C (86° to 95°F)	24 ± 0.3	20 ± 0.3
36° to 40°C (96° to 105°F)	18 ± 0.3	16 ± 0.3
41° to 46°C (106° to 115°F)	15 ± 0.3	13 ± 0.3

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Take the proper precautions to protect the face of the steering column opening cover from cosmetic damage while performing this procedure.

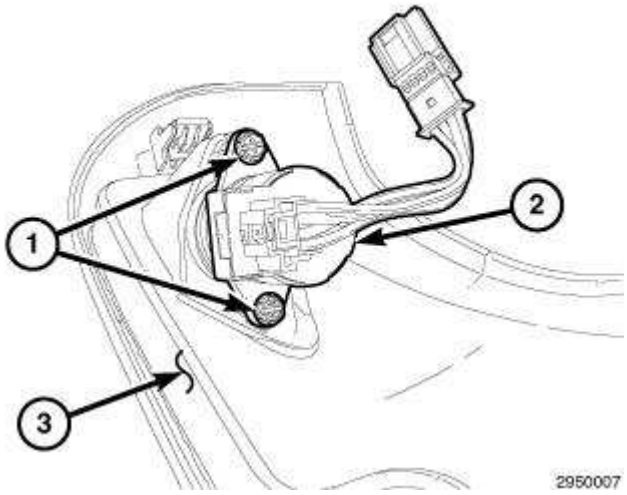


Fig. 37: Two Screws & In-Car Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the steering column opening cover (3) and place it on a workbench. Refer to **COVER,**

STEERING COLUMN OPENING, REMOVAL .

3. Remove the two screws (1) that secure the in-car temperature sensor (2) to the steering column opening cover and remove the sensor.

INSTALLATION

INSTALLATION

NOTE: Take the proper precautions to protect the face of the steering column opening cover from cosmetic damage while performing this procedure.

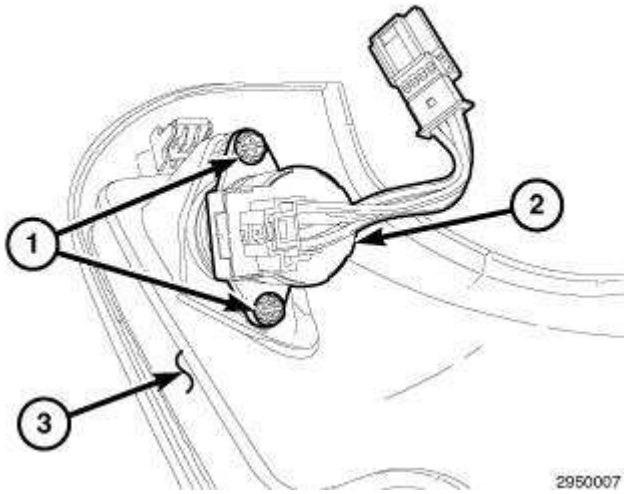


Fig. 38: Two Screws & In-Car Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Position the in-car temperature sensor (2) onto the steering column opening cover (3).
2. Install the two screws (1) that secure the in-car temperature sensor to the steering column opening cover. Tighten the screws securely.
3. Install the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
4. Reconnect the negative battery cable.

TRANSDUCER, A/C PRESSURE

DESCRIPTION

DESCRIPTION

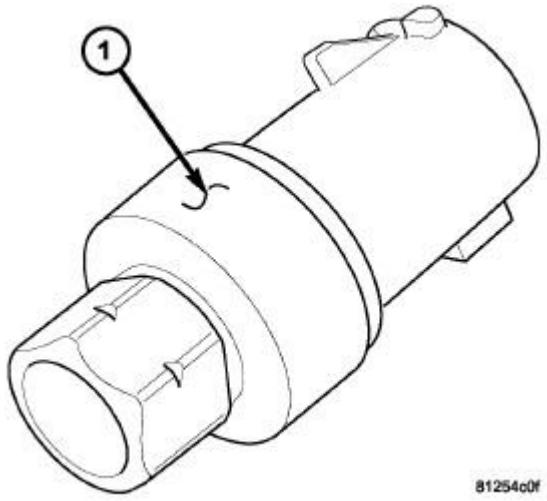


Fig. 39: A/C Pressure Transducer
Courtesy of CHRYSLER GROUP, LLC

The A/C pressure transducer (1) is a switch that is installed on a fitting located on the A/C liquid line. An internally threaded fitting on the A/C pressure transducer connects it to the externally threaded Schrader-type fitting on the A/C liquid line. A rubber O-ring seals the connection between the A/C pressure transducer and the liquid line fitting. The A/C pressure transducer is connected to the vehicle electrical system by a molded plastic connector with three terminals.

OPERATION

OPERATION

The A/C pressure transducer monitors the pressures in the high side of the refrigerant system through its connection to a fitting on the A/C liquid line. The A/C pressure transducer will change its internal resistance in response to the pressures it monitors. A Schrader-type valve in the liquid line fitting permits the A/C pressure transducer to be removed or installed without disturbing the refrigerant in the A/C system.

The Powertrain Control Module (PCM) provides a five volt reference signal and a sensor ground to the A/C pressure transducer, then monitors the output voltage of the A/C pressure transducer on a sensor return circuit to determine refrigerant pressure. The PCM is programmed to respond to the A/C pressure transducer and other sensor inputs and control the operation of the A/C clutch and the radiator cooling fan, to help optimize A/C system performance, and to protect the A/C system from damage. The PCM will disengage the A/C clutch when high side pressure rises above 3082 kPa (447 psi) and reengage the clutch when high side pressure drops below 2937 kPa (426 psi). The A/C pressure transducer will also disengage the A/C clutch if the high side pressure drops below 110 kPa (16 psi) and will reengage the clutch when the high side pressure rises above 221 kPa (32 psi). If the refrigerant pressure rises above 1655 kPa (240 psi), the PCM will actuate the cooling fan. The A/C pressure transducer input to the PCM will also prevent the A/C clutch from engaging when ambient temperatures are below about 4.5° C (40° F) due to the pressure/temperature relationship of the

refrigerant.

The A/C pressure transducer is tested using a scan tool. Refer to appropriate diagnostic information .

The A/C pressure transducer cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

NOTE: It is not necessary to discharge the refrigerant system to replace the A/C pressure transducer.

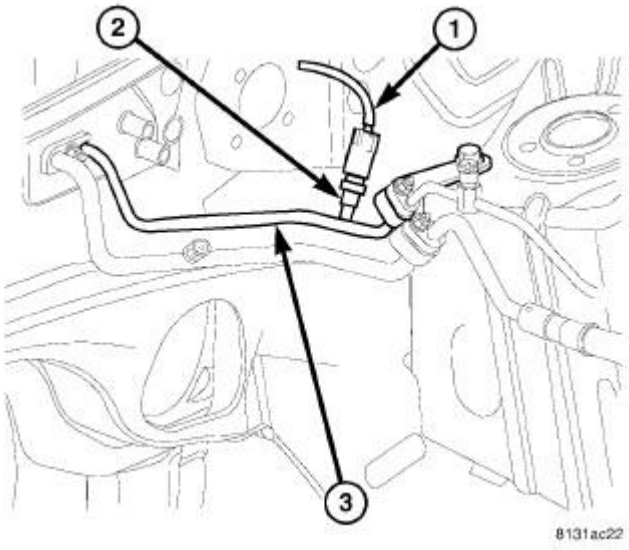


Fig. 40: Removing/Installing A/C Pressure Transducer
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector (1) from the A/C pressure transducer (2).
3. Remove the A/C pressure transducer from the A/C liquid line (3) and remove and discard the O-ring seal.

INSTALLATION

INSTALLATION

NOTE: Use only the specified O-ring as it is made of special material for R-134a. Use only refrigerant oil of the type required for the A/C compressor.

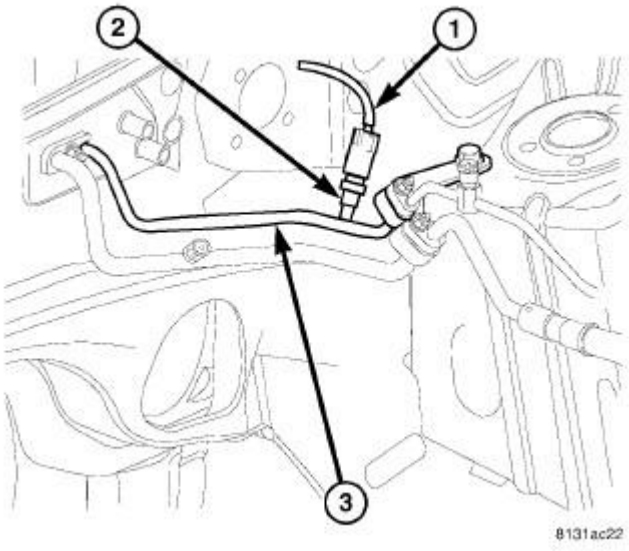


Fig. 41: Removing/Installing A/C Pressure Transducer
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate a new rubber O-ring seal with clean refrigerant oil and install it onto the liquid line fitting.
2. Install the A/C pressure transducer (2) onto the A/C liquid line (3). Tighten the A/C pressure transducer securely.
3. Connect the wire harness connector (1) to the A/C pressure transducer.
4. Reconnect the negative battery cable.

DISTRIBUTION

DUCT, DEFROSTER

REMOVAL

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage.

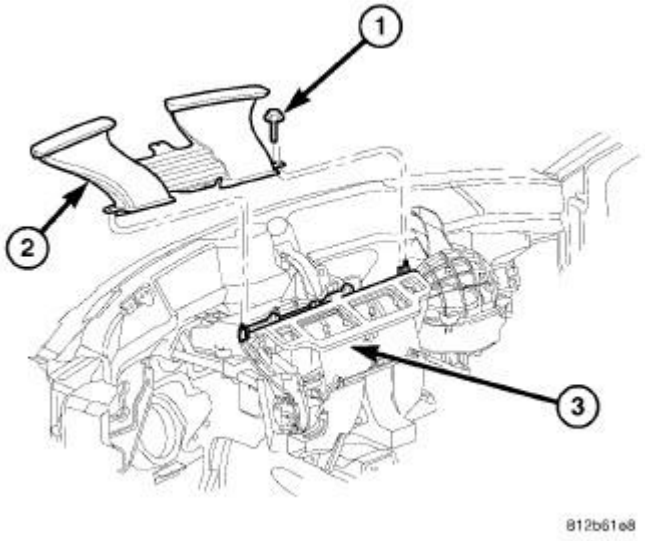


Fig. 42: Removing/Installing Defroster Duct
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Remove the instrument panel and place it on a workbench. Refer to **PANEL, INSTRUMENT, REMOVAL** .
2. Remove the four screws (1) that secure the defroster duct (2) to the top of the HVAC air distribution housing (3) and remove the duct.

INSTALLATION

INSTALLATION

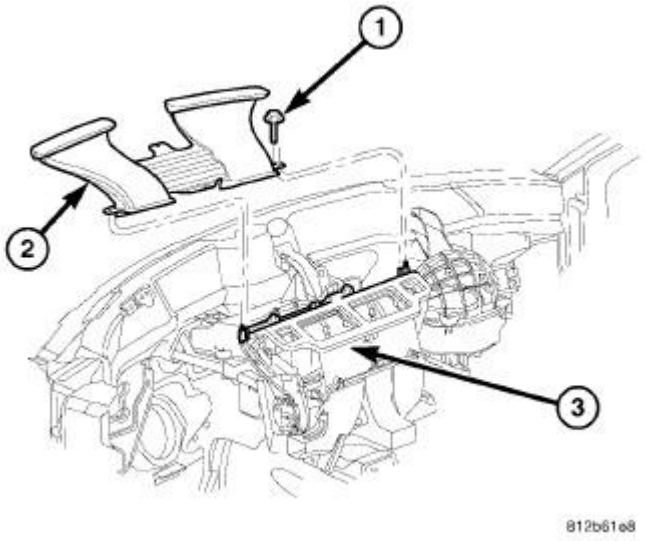


Fig. 43: Removing/Installing Defroster Duct
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Position the defroster duct (2) onto the top of the HVAC air distribution housing (3).
2. Install the four screws (1) that secure the defroster duct to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
3. Install the instrument panel. Refer to **PANEL, INSTRUMENT, INSTALLATION** .

DUCT, FLOOR CONSOLE

REMOVAL

REMOVAL

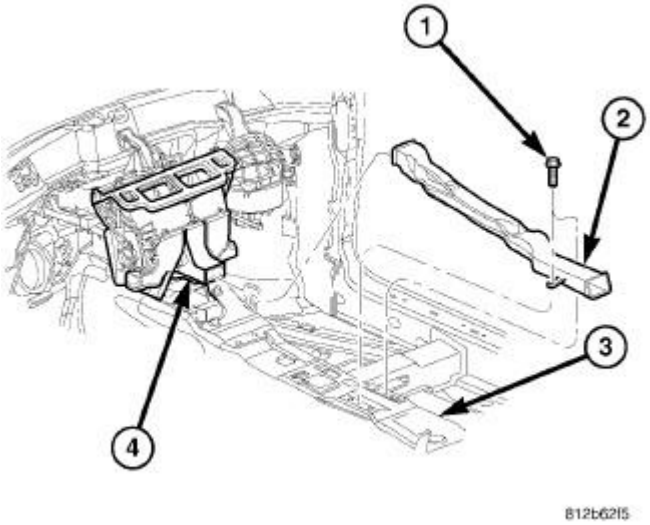


Fig. 44: Removing/Installing Floor Console Duct
Courtesy of CHRYSLER GROUP, LLC

1. Remove the center floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
2. Remove the two fasteners (1) that secure the floor console duct (2) to the center floor panel (3).
3. Disconnect the floor console duct from the floor distribution duct (4) and remove the floor console duct from the vehicle.

INSTALLATION

INSTALLATION

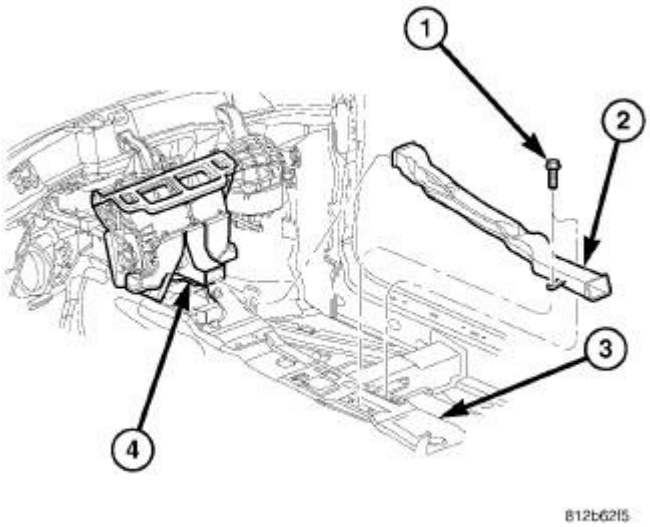


Fig. 45: Removing/Installing Floor Console Duct
Courtesy of CHRYSLER GROUP, LLC

1. Position the floor console duct (2) into the vehicle.
2. Connect the floor console duct to the floor distribution duct (4).
3. Install the two fasteners (1) that secure the floor console duct to the center floor panel (3).
4. Install the center floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .

DUCT, FLOOR DISTRIBUTION

REMOVAL

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage.

NOTE: LHD model shown in illustration. RHD model similar.

FRONT FLOOR DISTRIBUTION DUCT

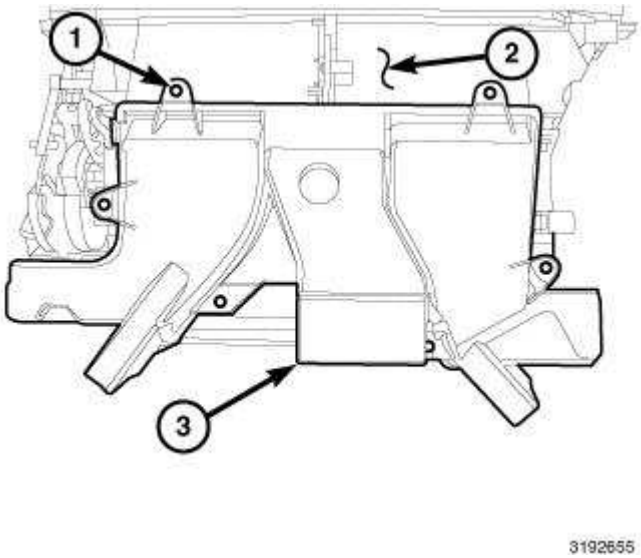


Fig. 46: Six Screws, Front Floor Distribution Duct & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC air distribution housing. Refer to **HOUSING, HVAC, REMOVAL**.
2. Remove the six screws (1) that secure the front floor distribution duct (3) to the air distribution housing (2) and remove the duct.

INTERMEDIATE FLOOR DISTRIBUTION DUCTS

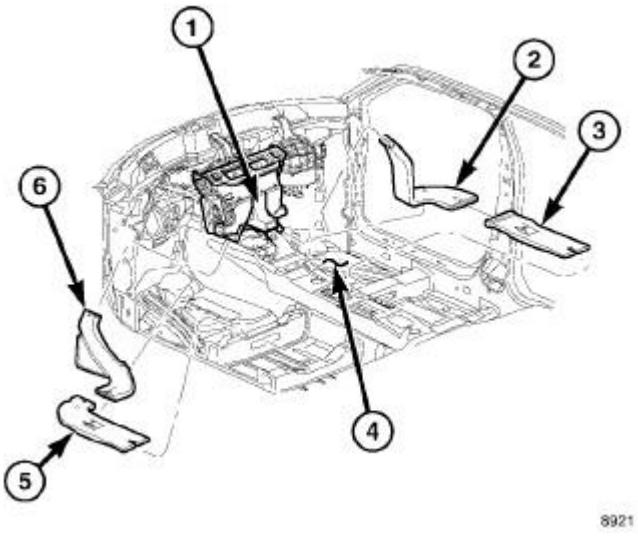


Fig. 47: Ducts-Intermediate Floor Distribution
Courtesy of CHRYSLER GROUP, LLC

1. Remove the center floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
2. Remove the front seats. Refer to **SEAT, FRONT, REMOVAL** .

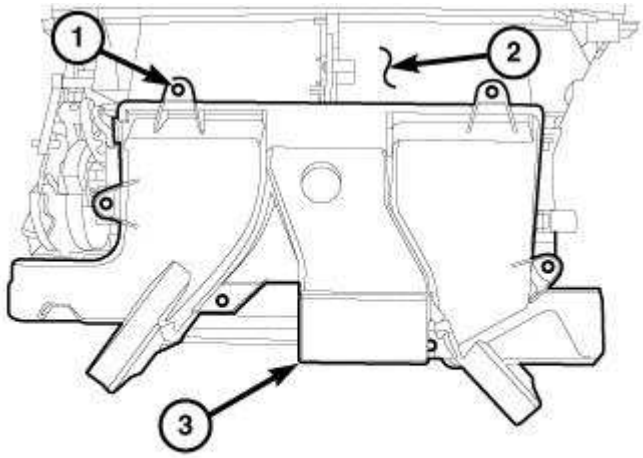
3. Roll back the front floor carpet from under the instrument panel toward the rear of the vehicle. Refer to **CARPET, REMOVAL** .
4. Remove the push pin fastener that secures the passenger side front intermediate floor distribution duct (2) to the floor support (4).
5. Disconnect the passenger side front intermediate floor distribution duct (2) from the front floor distribution duct (1).
6. Disconnect the passenger side front intermediate floor distribution duct (2) from the passenger side rear intermediate floor distribution duct (3).
7. Remove the passenger side rear intermediate floor distribution duct (3) from the floor support (4).
8. Remove the push pin fastener that secures the driver side rear intermediate floor distribution duct (5) to the floor support (4).
9. Disconnect the driver side front intermediate floor distribution duct (6) from the front floor distribution duct (1).
10. Disconnect the driver side front intermediate floor distribution duct (6) from the driver side rear intermediate floor distribution duct (5).
11. Remove the driver side rear intermediate floor distribution duct (5) from the floor support (4).

INSTALLATION

INSTALLATION

NOTE: LHD model shown in illustration. RHD model similar.

FRONT FLOOR DISTRIBUTION DUCT



3192655

Fig. 48: Six Screws, Front Floor Distribution Duct & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the front floor distribution duct (3) to the bottom of the HVAC air distribution housing (2).

2. Install the six screws (1) that secure the front floor distribution duct to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
3. Install the air distribution housing. Refer to **HOUSING, HVAC, INSTALLATION**.

INTERMEDIATE FLOOR DISTRIBUTION DUCTS

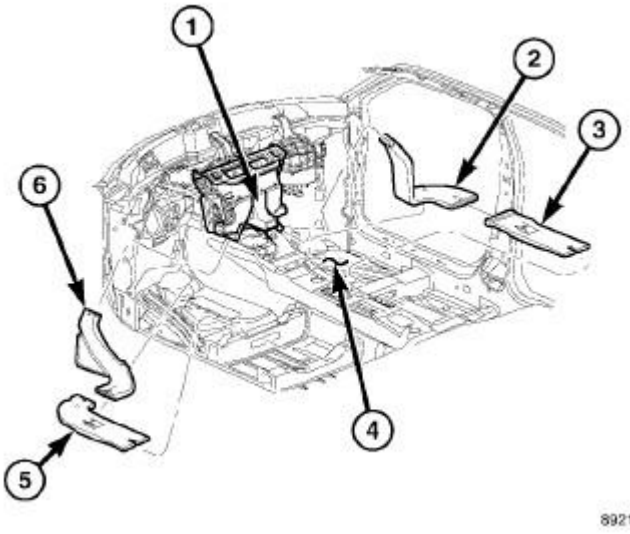


Fig. 49: Ducts-Intermediate Floor Distribution
Courtesy of CHRYSLER GROUP, LLC

1. Install the driver side rear intermediate floor distribution duct (5) and the passenger side rear intermediate floor distribution duct (3) into the slots in the floor support (4).
2. Connect the driver side front intermediate floor distribution duct (6) to the driver side rear intermediate floor distribution duct (5).
3. Connect the driver side front intermediate floor distribution duct (6)to the front floor distribution duct (1).
4. Install the push-pin fastener that secures the driver side rear intermediate floor distribution duct (5) to the floor support (4).
5. Connect the passenger side front intermediate floor distribution duct (2) to the passenger side rear intermediate floor distribution duct (3).
6. Connect the passenger side front intermediate floor distribution duct (2) to the front floor distribution duct (1).
7. Install the push-pin fastener that secures the passenger side front intermediate floor distribution duct (2) to the floor support (4).
8. Install the carpet onto the front floor panel and under the instrument panel. Refer to **CARPET, INSTALLATION** .
9. Install the front seats. Refer to **SEAT, FRONT, INSTALLATION** .
10. Install the center floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .

DUCT, INSTRUMENT PANEL

REMOVAL

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage.

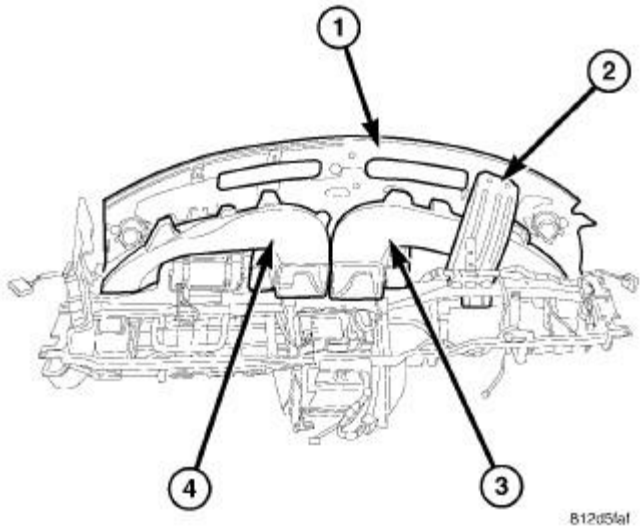


Fig. 50: Removing/Installing Instrument Panel Ducts
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Remove the instrument panel and place it on a workbench. Refer to **PANEL, INSTRUMENT, REMOVAL** .
2. Remove the screw that secures the instrument panel top pad (1) to the reinforcement bracket (2).
3. Remove the four screws that secure the driver side instrument panel duct and demister duct assembly (3) to the instrument panel and remove the duct assembly.

4. Remove the four screws that secure the passenger side instrument panel duct and demister duct assembly (4) to the instrument panel and remove the duct assembly.

INSTALLATION

INSTALLATION

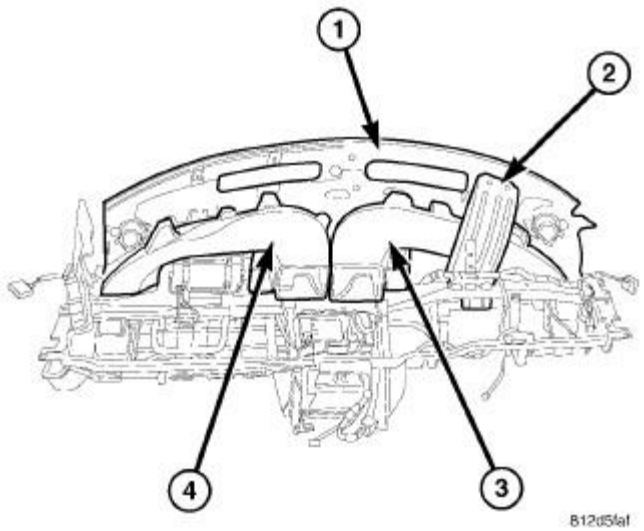


Fig. 51: Removing/Installing Instrument Panel Ducts
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Position the passenger side instrument panel duct and demister duct assembly (4) into the instrument panel.
2. Install the passenger side instrument panel duct and demister duct assembly onto the outlets of the instrument panel. Make sure that the ducts are correctly installed over the instrument panel and demister outlet seals.
3. Install the four screws that secure the passenger side instrument panel duct and demister duct assembly to the instrument panel. Tighten the screws to 2.2 N.m (20 in. lbs.).
4. Position the driver side instrument panel duct and demister duct assembly (3) into the instrument panel.
5. Install the driver side instrument panel duct and demister duct assembly onto the outlets of the instrument panel. Make sure that the ducts are correctly installed over the instrument panel and demister outlet seals.
6. Install the four screws that secure the driver side instrument panel duct and demister duct assembly to the instrument panel. Tighten the screws to 2.2 N.m (20 in. lbs.).
7. Install the screw that secures the instrument panel top pad (1) to the reinforcement bracket (2). Tighten the screw to 2.2 N.m (20 in. lbs.).

8. Install the instrument panel. Refer to **PANEL, INSTRUMENT, INSTALLATION** .

DUCT, INSTRUMENT PANEL DEMISTER

REMOVAL

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage.

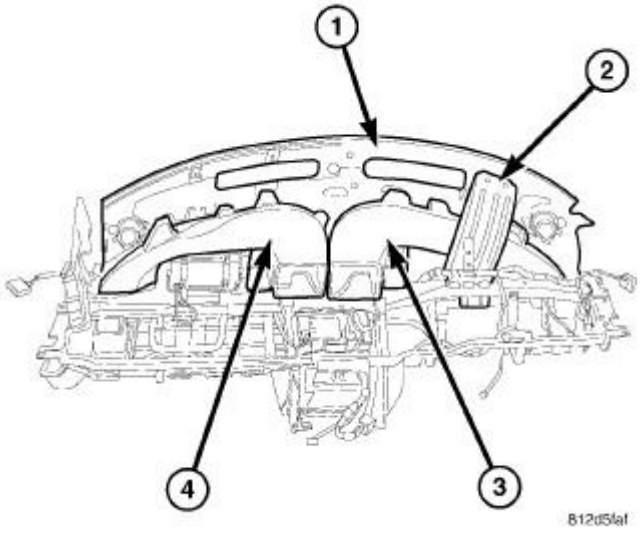


Fig. 52: Removing/Installing Instrument Panel Ducts
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Remove the instrument panel and place it on a workbench. Refer to **PANEL, INSTRUMENT, REMOVAL** .
2. Remove the screw that secures the instrument panel top pad (1) to the reinforcement bracket (2).

3. Remove the four screws that secure the driver side instrument panel duct and demister duct assembly (3) to the instrument panel and remove the duct assembly.
4. Remove the four screws that secure the passenger side instrument panel duct and demister duct assembly (4) to the instrument panel and remove the duct assembly.

INSTALLATION

INSTALLATION

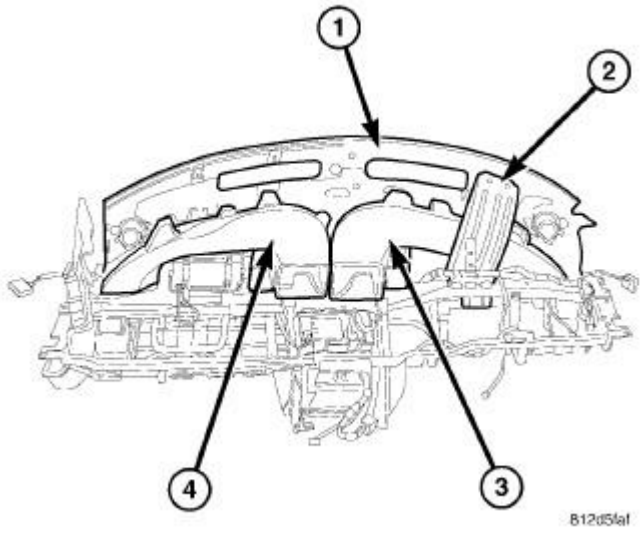


Fig. 53: Removing/Installing Instrument Panel Ducts
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Position the passenger side instrument panel duct and demister duct assembly (4) into the instrument panel.
2. Install the passenger side instrument panel duct and demister duct assembly onto the outlets of the instrument panel. Make sure that the ducts are correctly installed over the instrument panel and demister outlet seals.
3. Install the four screws that secure the passenger side instrument panel duct and demister duct assembly to the instrument panel. Tighten the screws to 2.2 N.m (20 in. lbs.).
4. Position the driver side instrument panel duct and demister duct assembly (3) into the instrument panel.
5. Install the driver side instrument panel duct and demister duct assembly onto the outlets of the instrument panel. Make sure that the ducts are correctly installed over the instrument panel and demister outlet seals.
6. Install the four screws that secure the driver side instrument panel duct and demister duct assembly to the instrument panel. Tighten the screws to 2.2 N.m (20 in. lbs.).

7. Install the screw that secures the instrument panel top pad (1) to the reinforcement bracket (2). Tighten the screw to 2.2 N.m (20 in. lbs.).
8. Install the instrument panel. Refer to **PANEL, INSTRUMENT, INSTALLATION** .

FILTER, PARTICULATE AIR

DESCRIPTION

DESCRIPTION

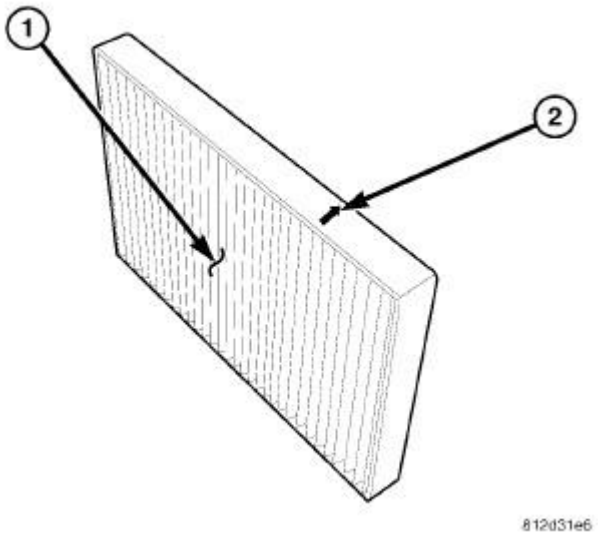


Fig. 54: Filter-Particulate Air Description
Courtesy of CHRYSLER GROUP, LLC

All models are equipped with a particulate air filter (1) that helps purify the outside air entering the HVAC housing. The filter is mounted in the engine compartment, inside of the fresh air inlet housing of the heating-A/C system.

The filter should be replaced at least every 24, 000 km (15, 000 miles) or each year and checked if heating-A/C system performance seems lower than expected. The particulate air filter is labeled with "REAR OF VEHICLE" and an arrow (2) to indicate air flow direction through the filter.

REMOVAL

REMOVAL

NOTE: LHD model shown in illustrations. RHD model similar.

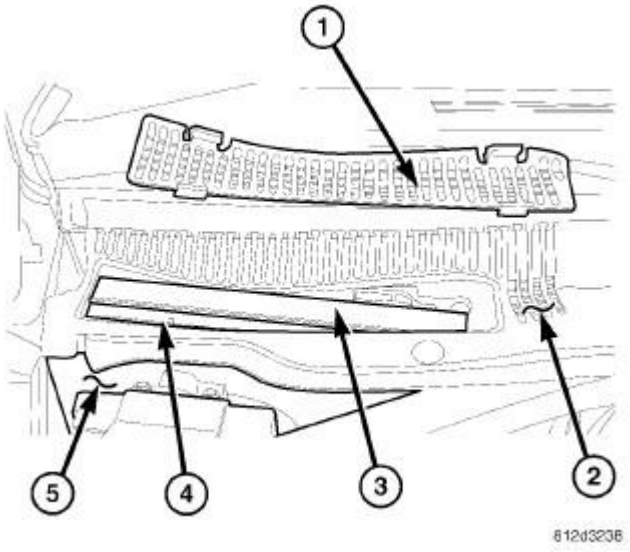


Fig. 55: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air inlet grille (1) from the wiper module screen (2) located near the dash panel in the engine compartment.
2. Open the filter door (3) on the top of the particulate air filter housing (4) located inside of the dash panel plenum (5).

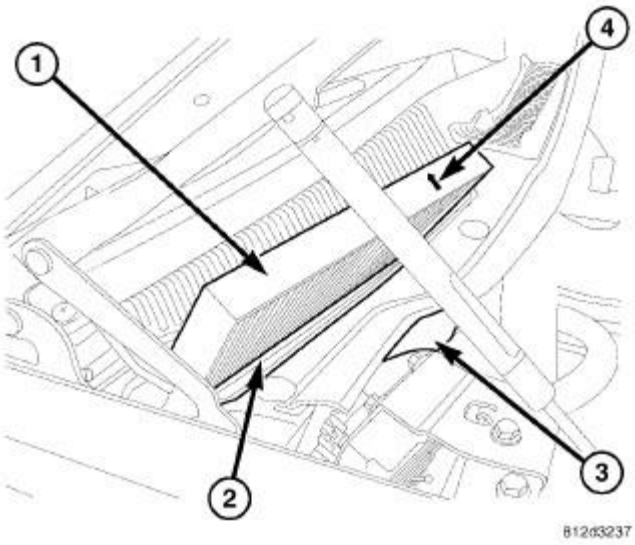


Fig. 56: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

NOTE: To aid in reinstallation, note the installed position of the particulate air filter prior to removal of the filter.

3. Remove the particulate air filter (1) from the particulate air filter housing (2) located inside of the dash panel plenum (3). Note the direction of air flow indicated by an arrow (4) on the filter.

INSTALLATION

INSTALLATION

NOTE: The particulate air filter is labeled with "REAR OF VEHICLE" and an arrow to indicate air flow direction through the filter. Make sure to properly install the particulate air filter. Failure to properly install the filter will result in the need to replace the filter sooner than required by design.

NOTE: LHD model shown in illustrations. RHD model similar.

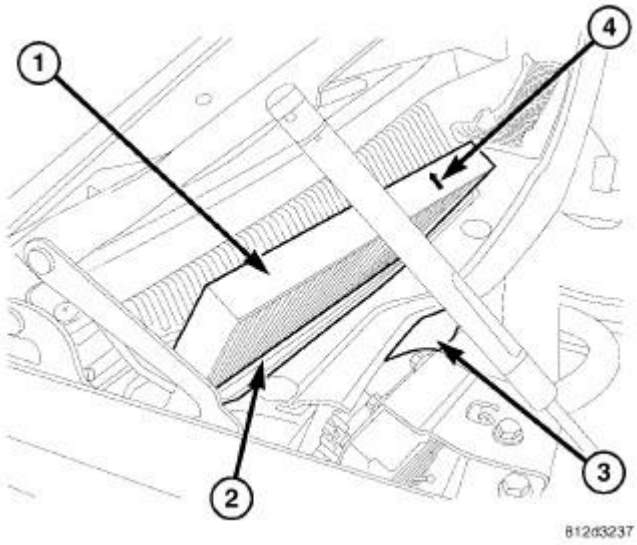


Fig. 57: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

1. Install the particulate air filter (1) into the particulate air filter housing (2) located inside of the dash panel plenum (3). Insert the particulate air filter down directly into the filter housing with the arrow (4) on the filter pointing to the rear of the vehicle. The particulate air filter is held in place by friction between the filter element and the filter housing, so no fasteners are required.

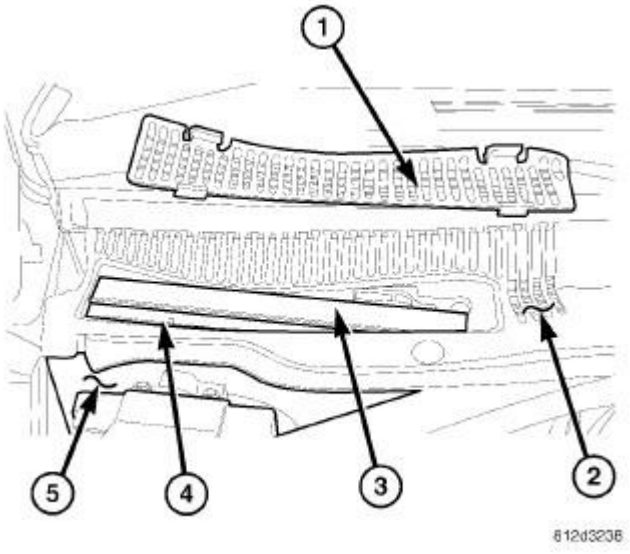


Fig. 58: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

2. Close the filter door (3) on the top of the particulate air filter housing (4) located inside of the dash panel plenum (5).
3. Install the air inlet grille (1) onto the wiper module screen (2).

HOUSING, HVAC

REMOVAL

HOUSING-AIR DISTRIBUTION

WARNING: Refer to the applicable Warnings and Cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The air distribution housing must be removed from the HVAC housing and disassembled for service of the mode-air and blend-air doors.

NOTE: **LHD model shown in illustrations. RHD model similar.**

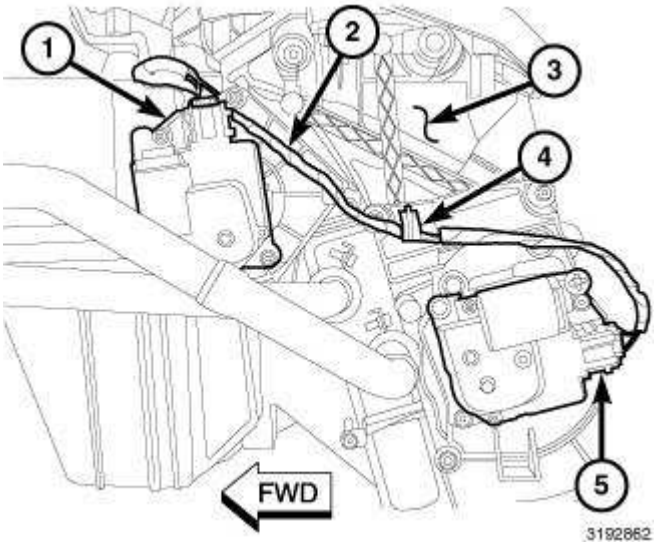


Fig. 59: HVAC Wire Harness, Mode Door Actuator, Blend Door Actuator & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC housing assembly and place it on a suitable workbench. Refer to **HOUSING, HVAC, REMOVAL**.
2. Disconnect the HVAC wire harness (2) from the mode door actuator (5) and the blend door actuator (1), located on the left side of the air distribution housing (3).
3. Disengage the HVAC wire harness from the retaining tab (4).

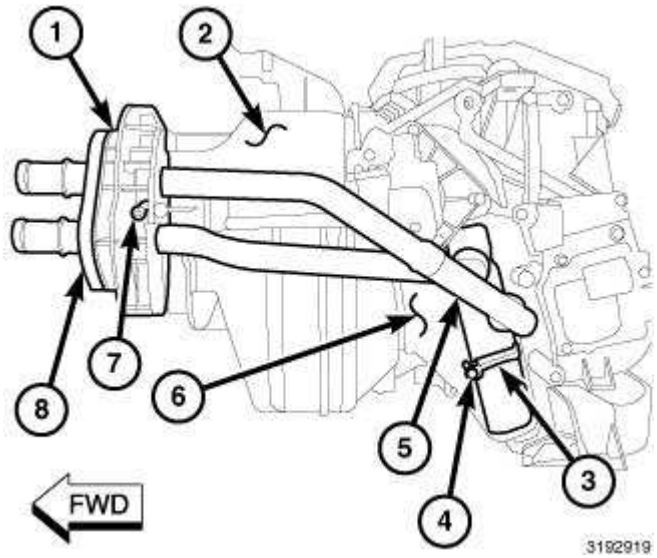


Fig. 60: Screw, Flange, HVAC Housing, Retaining Screw, Bracket, Housing
Courtesy of CHRYSLER GROUP, LLC

4. Remove the screw (7) that secure the flange (1) to the front of the HVAC housing (2) and

remove the flange.

5. Remove the reatining screw (4) that secures the heater core bracket (3) to the driver side of the air distribution housing (6) and remove the bracket.
6. Disengage the heater core tubes from the foam seal (8) and carefully pull the heater core (5) straight out of the side of the air distribution housing.

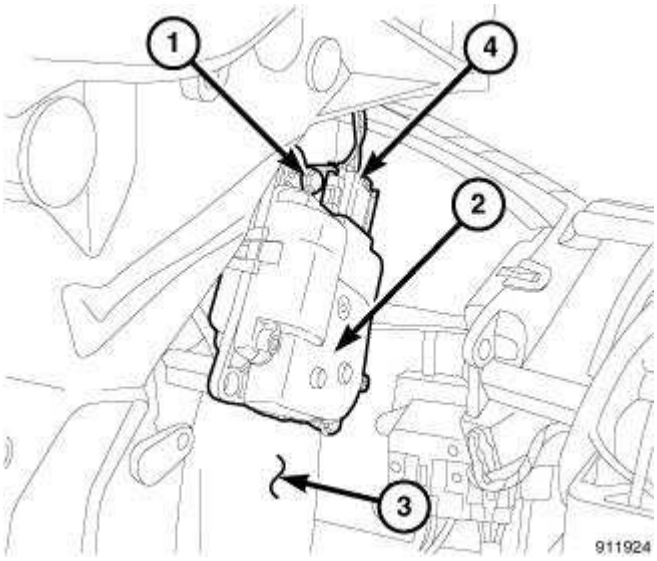


Fig. 61: Actuator-Blend Door-Dual Passenger
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the HVAC wire harness (4) from the blend door actuator (2) located on the passenger side of the air distribution housing (3).

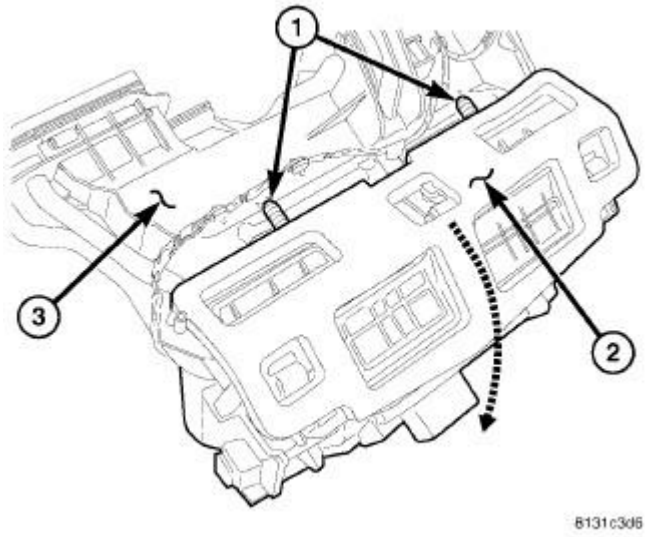


Fig. 62: Removing Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

8. Remove the two screws (1) and disengage the two tabs that secure the top of the air distribution housing (2) to the HVAC housing (3).
9. Tilt the top of the air distribution housing downward and disengage the two tab-and-slot type retainers, located at the bottom of the housing.
10. If required, disassemble the air distribution housing. Refer to **HOUSING, HVAC, DISASSEMBLY**.

HOUSING-AIR INLET

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow the warnings and cautions could result in possible personal injury or death.

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible serious or fatal inury.

NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

NOTE: LHD model shown in illustration. RHD model similar.

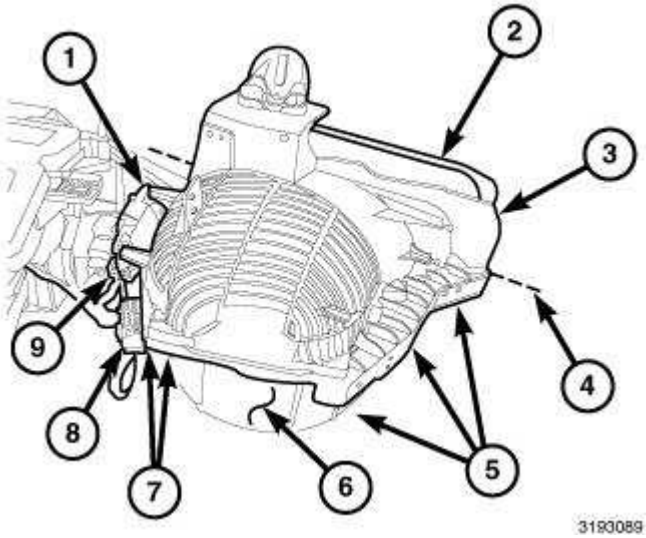


Fig. 63: Wire Harness Connector, Door Actuator, Wire Harness Connector & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC housing assembly and place it on a workbench. Refer to **HOUSING, HVAC, REMOVAL**.
2. Remove the A/C heater module. Refer to **MODULE, A/C AND HEATER, REMOVAL** .
3. Disconnect the HVAC wire harness connector (9) from the recirculation door actuator (1).
4. Disengage the HVAC wire harness connector (8) from the air inlet housing (3).
5. Carefully cut the foam seal (2) along the parting line (4) of the air inlet housing. If the seal is deformed or damaged, it must be replaced.
6. Remove the five screws (5 and 7) that secure the air inlet housing to HVAC housing (6).
7. Remove the air inlet housing from the HVAC housing.
8. If required, disassemble the air inlet housing. Refer to **HOUSING, HVAC, DISASSEMBLY**.

HOUSING-FRESH AIR INLET

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in possible serious or fatal injury.

NOTE: The fresh air inlet housing must be removed from the vehicle for removal of the HVAC housing.

NOTE: LHD model shown in illustrations. RHD model similar.

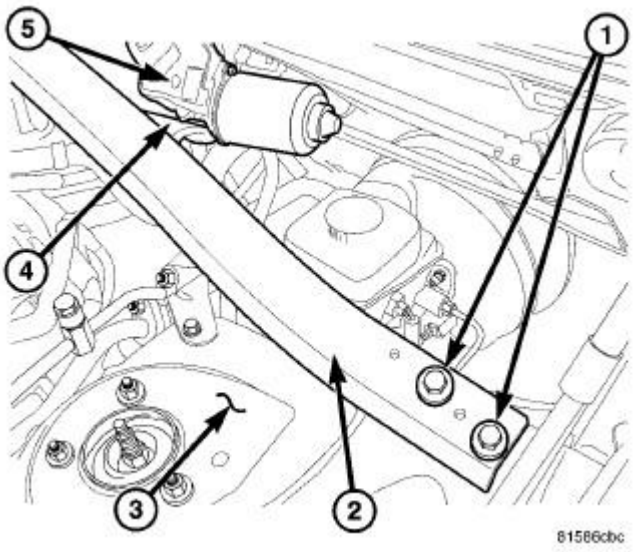


Fig. 64: Strut Support- Driver Side
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.

2. Remove the cowl top panel from the dash panel. Refer to **COVER, COWL PANEL, REMOVAL** .
3. Remove the two bolts (1) that secure the strut support (2) to the driver side strut tower (3).
4. Disengage the wiper motor (5) from the bracket (4) located on the strut support.

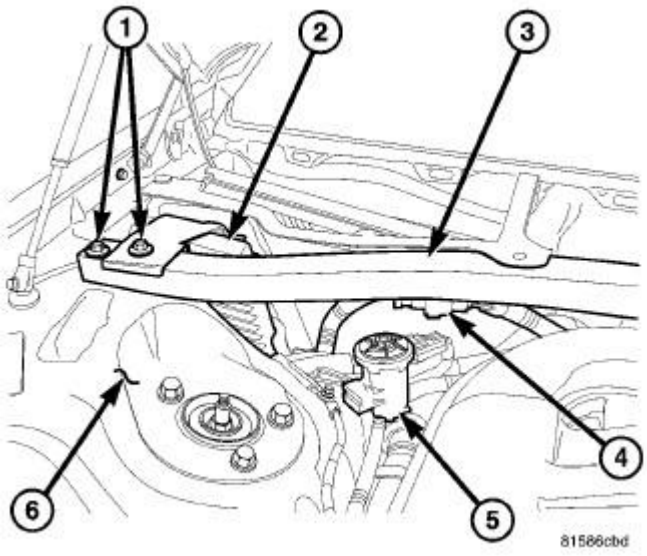


Fig. 65: Strut Support- Passenger Side
Courtesy of CHRYSLER GROUP, LLC

5. Disengage the retainer that secures the wire harness (4) to the bottom of the strut support (3).
6. On LHD models, remove the purge solenoid (5) from its mounting bracket and position the solenoid out of the way.
7. Remove the two bolts (1) that secure the strut support to the passenger side strut tower (6) and remove the support from the engine compartment.
8. Position the powertrain control module (PCM) or the engine control module (ECM) (2) (depending on engine application) out of the way.

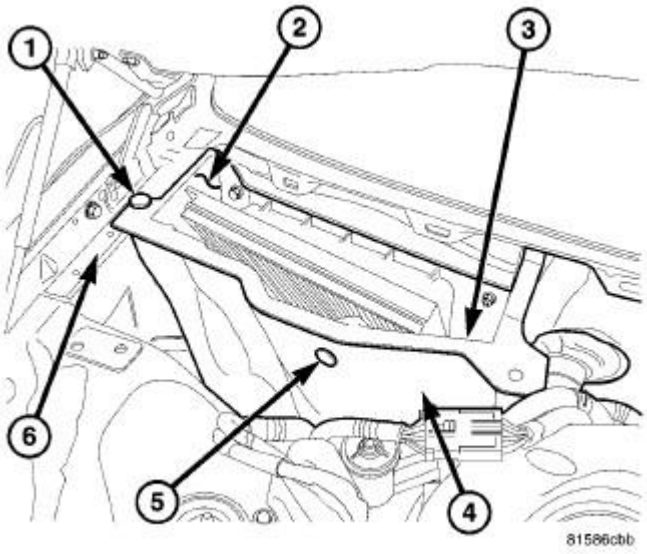


Fig. 66: Push Pins-Fresh Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

9. Remove the push-pin retainer (1) that secures the fresh air inlet housing (2) to the passenger side inner fender (6).
10. Disengage the wire harness retainer (3) from inside the bottom of the fresh air inlet housing, if equipped.
11. Remove the push-pin retainer (5) that secures the insulator (4) to the front of the fresh air inlet housing and position the insulator out of the way.

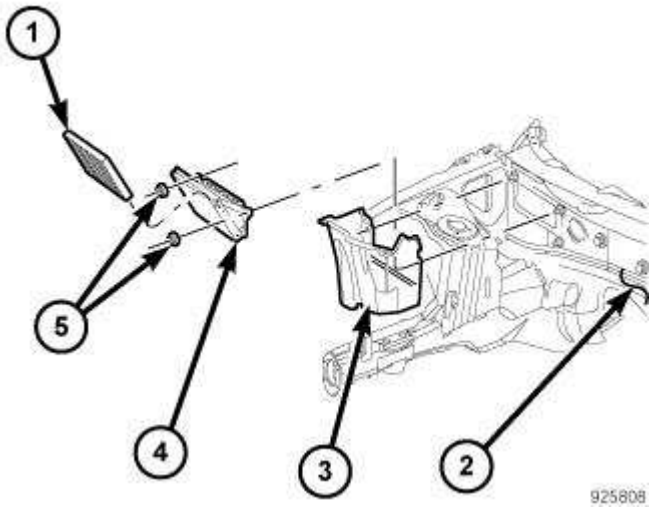


Fig. 67: 06 Fresh Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

12. Remove the two nuts (5) that secure the fresh air inlet housing (3), particulate air filter (1) and filter housing (4) to the dash panel (2).

13. Remove the fresh air inlet housing, particulate air filter and filter housing as an assembly from the dash panel.

HOUSING-HVAC ASSEMBLY

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow the warnings and cautions could result in possible personal injury or death.

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator.

NOTE: LHD model shown in illustrations. RHD model similar.

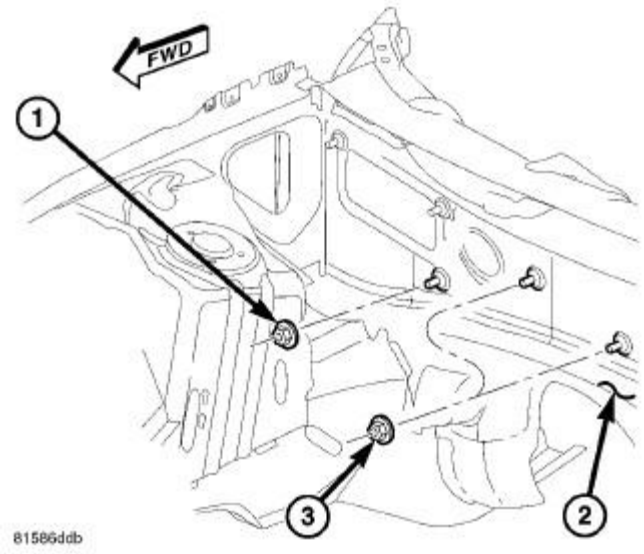


Fig. 68: Remove/Install Housing-HVAC-Exterior
Courtesy of CHRYSLER GROUP, LLC

1. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

2. Drain the engine cooling system. Refer to **STANDARD PROCEDURE** .
3. Disconnect and isolate the negative battery cable.
4. Remove the fresh air inlet housing from the dash panel. Refer to **HOUSING, HVAC, REMOVAL**.
5. Disconnect the A/C liquid line and the A/C suction line from the A/C evaporator. Refer to **LINE, A/C LIQUID, REMOVAL**.
6. Disconnect the heater hoses from the heater core tubes.
7. Remove the three nuts (1 and 3) that secure the HVAC housing to the engine compartment side of the dash panel (2).

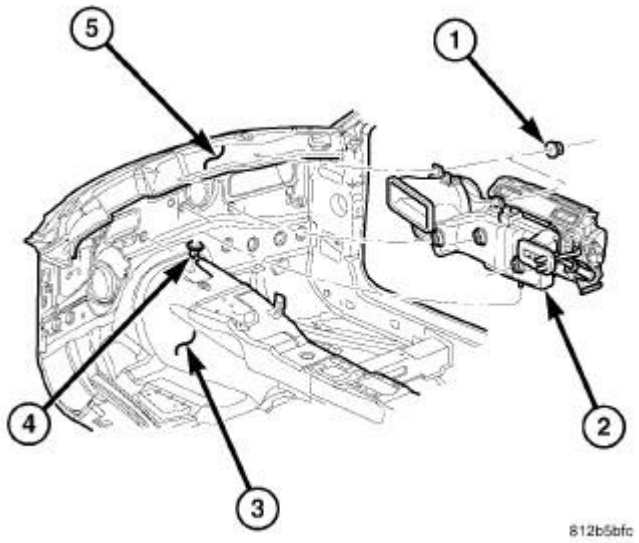


Fig. 69: Housing-Hvac-Interior
Courtesy of CHRYSLER GROUP, LLC

8. Remove the instrument panel from the passenger compartment. Refer to **PANEL, INSTRUMENT, REMOVAL** .
9. Disconnect the floor console duct. Refer to **DUCT, FLOOR CONSOLE, REMOVAL**.
10. Disconnect the rear floor distribution ducts. Refer to **DUCT, FLOOR DISTRIBUTION, REMOVAL**.
11. Remove the defroster ducts. Refer to **DUCT, DEFROSTER, REMOVAL**.
12. Remove the two nuts (1) that secure the HVAC housing (2) to the passenger compartment side of the dash panel (5).
13. Pull the HVAC housing assembly rearward so that the mounting studs clear the dash panel.
14. Lift the HVAC housing assembly upwards so that the condensate drain tube clears the grommet (4) in the floor panel (3) and remove the HVAC housing assembly from the passenger compartment.
15. If required, disassemble the HVAC housing assembly. Refer to **HOUSING, HVAC, DISASSEMBLY**.

DISASSEMBLY

HOUSING-AIR DISTRIBUTION

NOTE: The air distribution housing must be removed from the HVAC housing and disassembled for service of the mode-air and blend-air doors.

NOTE: LHD model shown in illustration. RHD model similar.

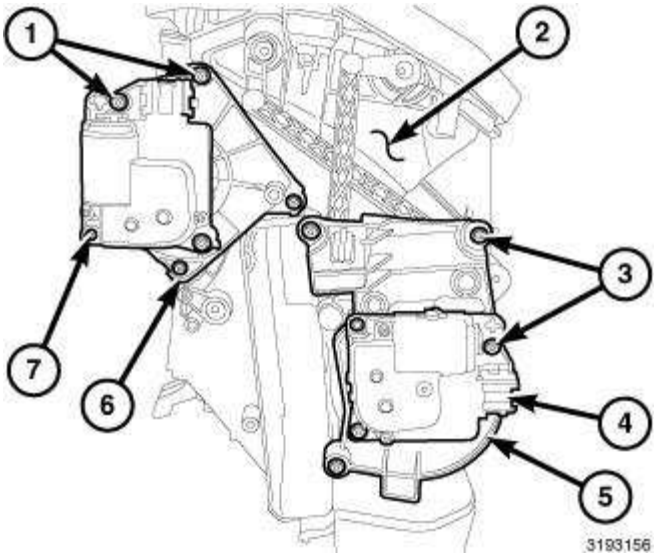


Fig. 70: Screws, Blend Door Actuator & Actuator Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air distribution housing (2) from the HVAC housing and place it on a workbench. Refer to **HOUSING, HVAC, REMOVAL**.
2. On models equipped with the 3.0L diesel engine, remove the electric Positive Temperature Coefficient (PTC) heater from the air distribution housing. Refer to **UNIT, HEATER, REMOVAL**.
3. Remove the screws (1) that secure the blend door actuator (7) and the blend door actuator bracket (6) to the left side of the air distribution housing and remove the actuator and bracket.
4. Remove the screws (3) that secure the mode door actuator (4) and the mode door actuator bracket (5) to the air distribution housing and remove the actuator and bracket.

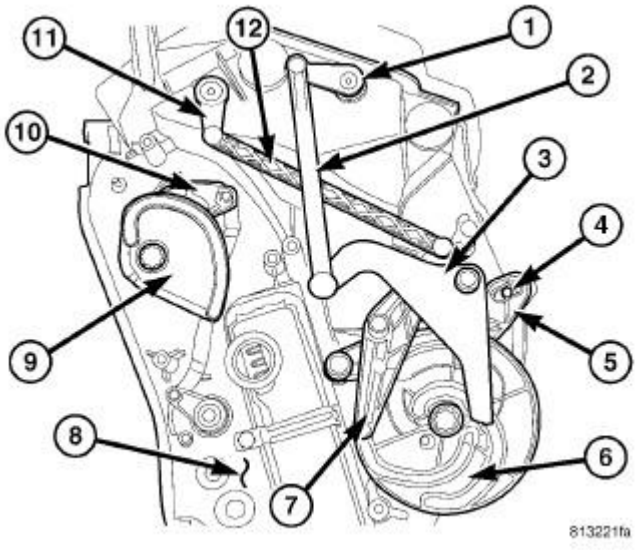


Fig. 71: Removing/Installing LH Actuator Linkages Air Housing
Courtesy of CHRYSLER GROUP, LLC

5. Remove the instrument panel door linkage (3) from the pivot shaft located on the left side of the air distribution housing (8) and carefully disconnect the linkage rod (2) from the instrument panel door lever (1).
6. Remove the defrost/demister door linkage (7) from the pivot shaft on the air distribution housing and carefully disconnect the linkage rod (12) from the defrost/demister door lever (11).
7. Remove the mode door cam (6) from the air distribution housing.
8. Remove the floor door linkage (5) from the floor door lever (4) and the air distribution housing.
9. Remove the blend door cam (9) from the blend door lever (10) and the air distribution housing.

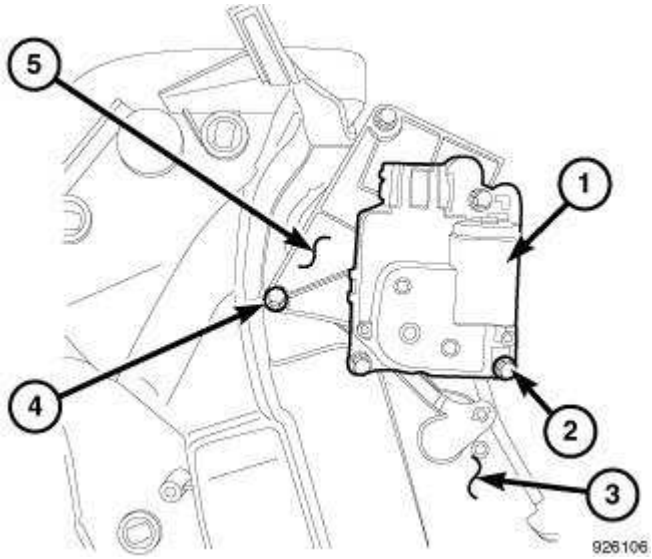


Fig. 72: Air Housing-Blend Actuator And Bracket-RH
Courtesy of CHRYSLER GROUP, LLC

10. Remove the screws (2) that secure the blend door actuator (1) to the right side of the air distribution housing (3) and remove the actuator.
11. Remove the screws (4) that secure the blend door actuator mounting bracket (5) to the passenger side of the air distribution housing and remove the mounting bracket.

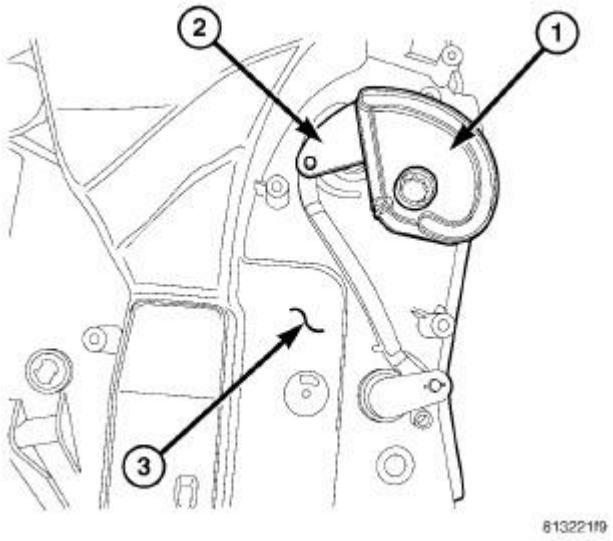


Fig. 73: Removing/Installing Air Housing-Blend Actuator Cam-RH
Courtesy of CHRYSLER GROUP, LLC

12. Remove the blend door cam (1) from blend door lever (2) and the pivot shaft located on the right side of the air distribution housing (3).

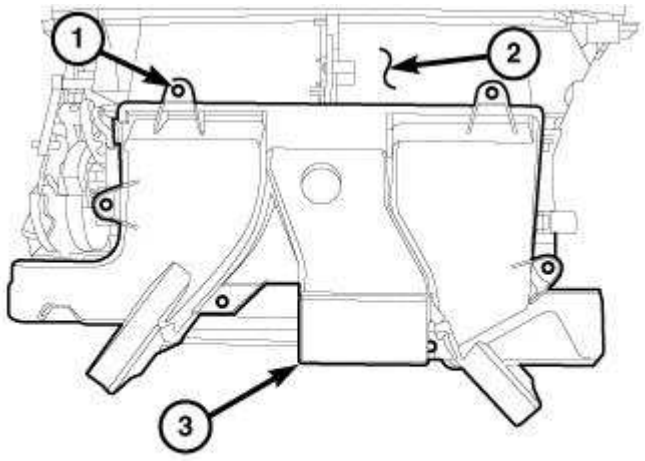


Fig. 74: Six Screws, Front Floor Distribution Duct & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

13. Remove the six screws (1) that secure the floor distribution duct (3) to the air distribution

housing (2) and remove the duct.

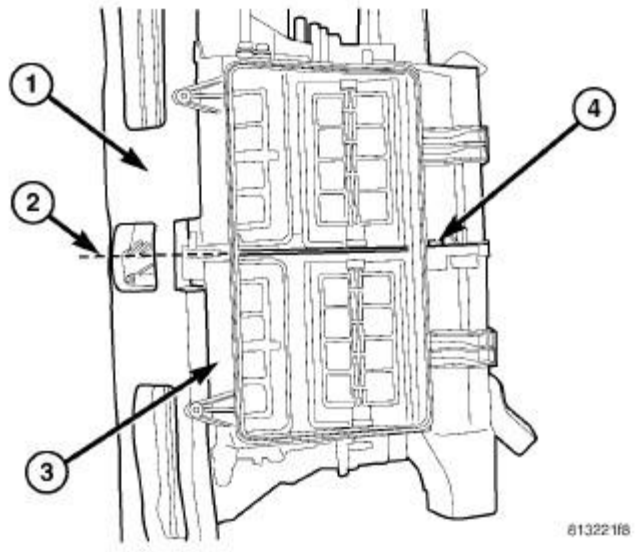


Fig. 75: Removing/Installing Air Housing-Seal & Screws
Courtesy of CHRYSLER GROUP, LLC

14. Carefully cut the foam seal (1) along the parting line (2) of the two halves of the air distribution housing (3). If the seal is deformed or damaged, it must be replaced.
15. Remove the screws (4) that secure the two halves of the air distribution housing together.

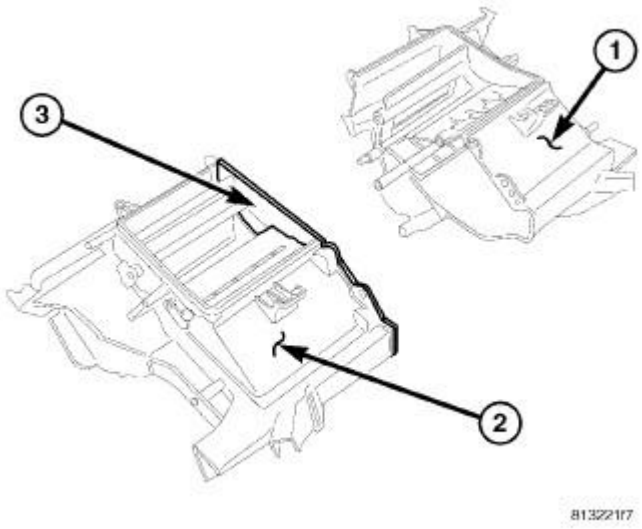


Fig. 76: Removing/Installing Partition Air Housing
Courtesy of CHRYSLER GROUP, LLC

16. Carefully separate the left half of the air distribution housing (1) from the right half of the housing

(2).

17. Remove the center partition (3).

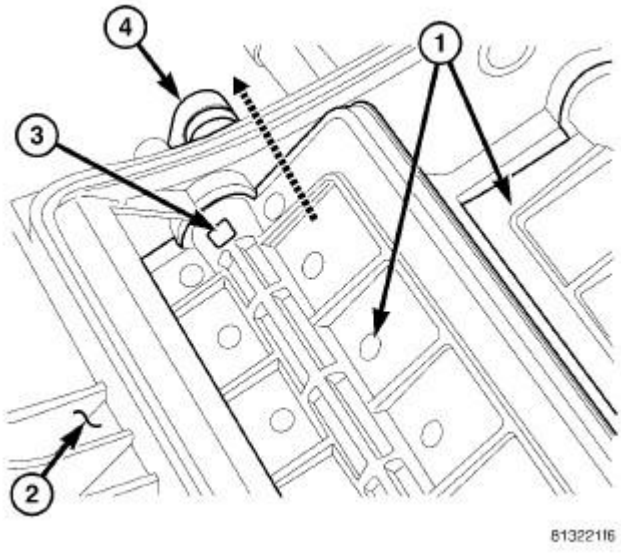


Fig. 77: Removing Air Doors From Air Housing
Courtesy of CHRYSLER GROUP, LLC

18. To remove the air doors (1) from the air distribution housing (2), first carefully push down on the tab (3) of the air door lever (4) located in the pivot shaft of the air door being removed.

NOTE: If the seal on the air door is deformed or damaged, the air door must be replaced.

19. Gently pull the air door lever out of the pivot shaft and remove the air door(s) from the air distribution housing as required.

HOUSING-AIR INLET

NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

NOTE: LHD model shown in illustration. RHD model similar.

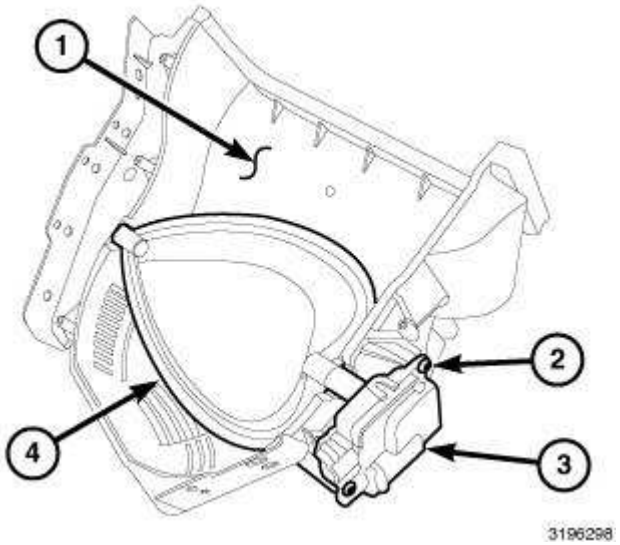


Fig. 78: Air Inlet Housing, Two Screws, Door Actuator & Recirculation-Air Door
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air inlet housing (1) from the HVAC housing and place it on a workbench. Refer to **HOUSING, HVAC, REMOVAL**.
2. Remove the two screws (2) that secure the recirculation door actuator (3) to the air inlet housing and remove the actuator.
3. Remove the recirculation-air door (4) from the air inlet housing.

HOUSING-HVAC

NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator.

NOTE: LHD model shown in illustration. RHD model similar.

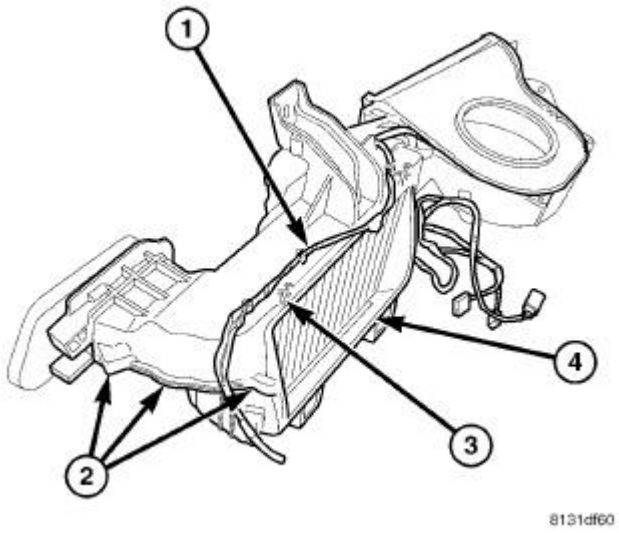


Fig. 79: Locating HVAC Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC housing assembly and place it on a workbench. Refer to **HOUSING, HVAC, REMOVAL**.
2. Remove the air inlet housing. Refer to **HOUSING, HVAC, REMOVAL**.
3. Remove the air distribution housing. Refer to **HOUSING, HVAC, REMOVAL**.
4. Remove the blower motor. Refer to **MOTOR, BLOWER, REMOVAL**.
5. Remove the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, REMOVAL**.
6. Remove the evaporator temperature sensor. Refer to **SENSOR, EVAPORATOR TEMPERATURE, REMOVAL**.
7. Remove the HVAC wiring harness (1).
8. Remove the ten screws (2) that secure the upper half of the HVAC housing (3) to the lower half of the HVAC housing (4) and remove the upper housing.

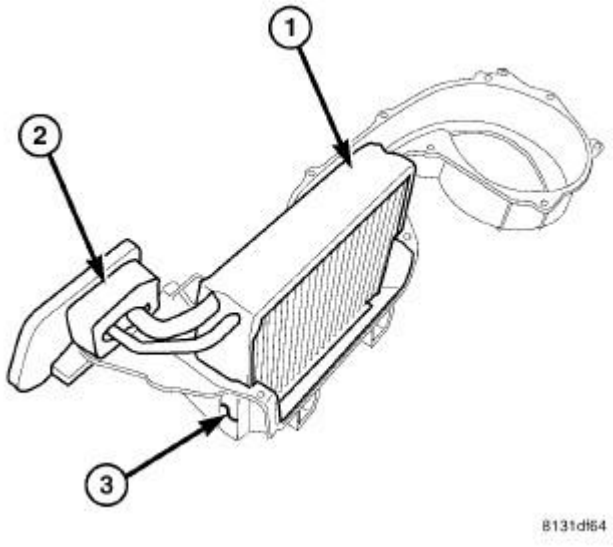


Fig. 80: Removing/Installing A/C Evaporator
Courtesy of CHRYSLER GROUP, LLC

9. Carefully lift the A/C evaporator (1) and foam seal (2) out of the lower half of the HVAC housing (3).

NOTE: If the foam seal at the front of the HVAC housing is deformed or damaged, the seal must be replaced.

10. If required, remove the A/C expansion valve, tapping block and foam seal from the A/C evaporator. Refer to **VALVE, A/C EXPANSION, REMOVAL**.

ASSEMBLY

HOUSING-AIR DISTRIBUTION

NOTE: The air distribution housing must be removed from the HVAC housing and disassembled for service of the mode-air and blend-air doors.

NOTE: LHD model shown in illustration. RHD model similar.

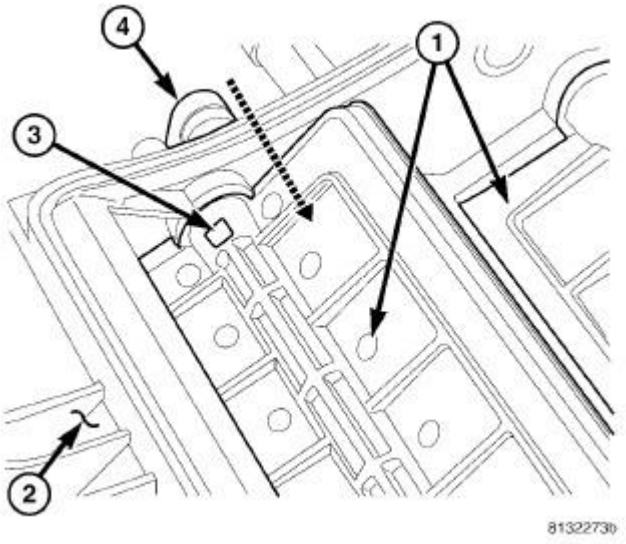


Fig. 81: Installing Air Housing-Air Doors
Courtesy of CHRYSLER GROUP, LLC

1. Install the air door(s) (1) into the air distribution housing (2) as required. Align the air door with the pivot shaft hole in the housing.
2. Align and install the air door lever (4) into the pivot shaft of the air door. Make sure that the tab (3) on the door lever is securely engaged to the pivot shaft.

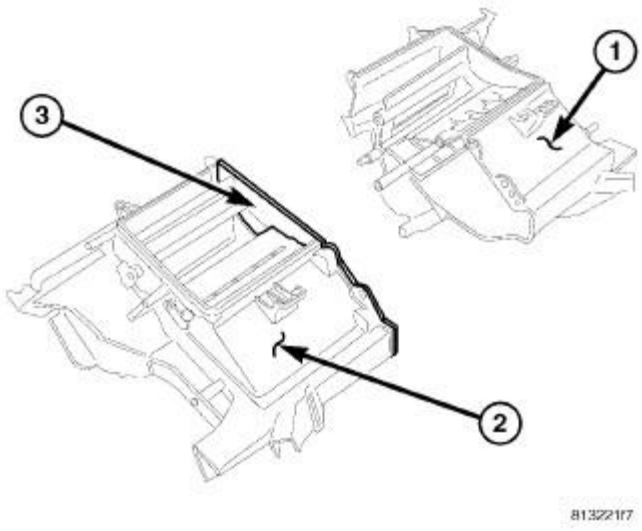


Fig. 82: Removing/Installing Partition Air Housing
Courtesy of CHRYSLER GROUP, LLC

3. Align the air door pivot shafts with the pivot holes in the center partition (3) and install the partition onto the left half of the air distribution housing (1).

4. Align the air door pivot shafts to each other and carefully install the left half of the air distribution housing to the right half of the housing (2).

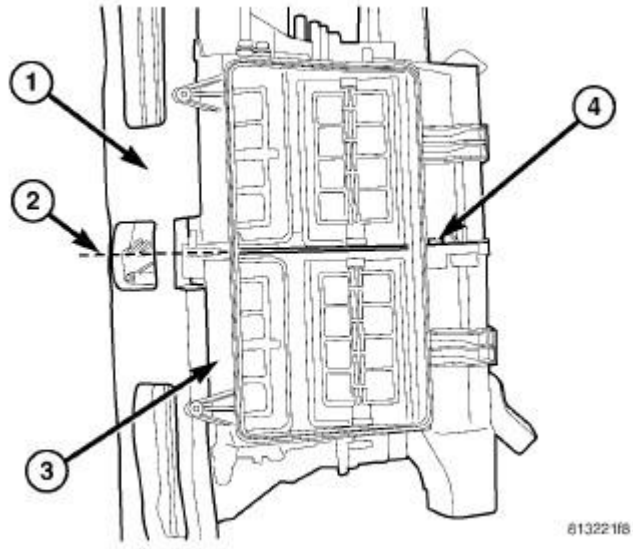


Fig. 83: Removing/Installing Air Housing-Seal & Screws
Courtesy of CHRYSLER GROUP, LLC

5. Install the screws (4) that secure the two halves of the air distribution housing (3) together. Tighten the screws to 2.2 N.m (20 in. lbs.).
6. Inspect the foam seal (1), especially at the parting line (2). If the seal is deformed or damaged, it must be replaced.

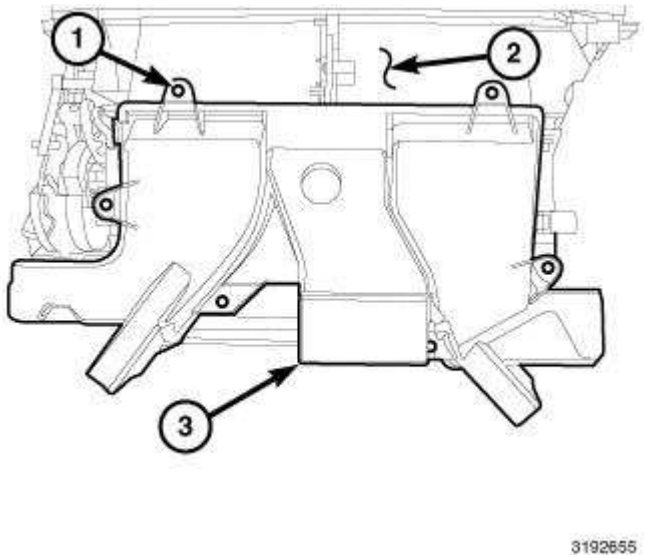


Fig. 84: Six Screws, Front Floor Distribution Duct & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

7. Position the floor distribution duct (3) onto the air distribution housing (2).

8. Install the six screws (1) that secure the floor distribution duct to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).

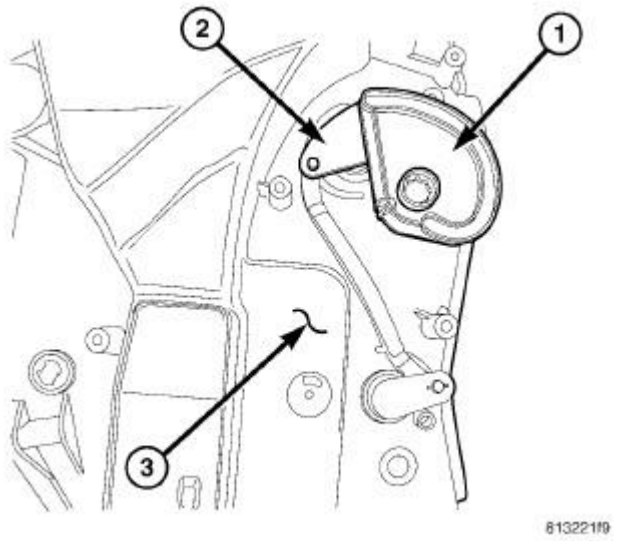


Fig. 85: Removing/Installing Air Housing-Blend Actuator Cam-RH
Courtesy of CHRYSLER GROUP, LLC

9. Install the blend door cam (1) onto the blend door lever (2) and the pivot shaft located on the right side of the air distribution housing (3).

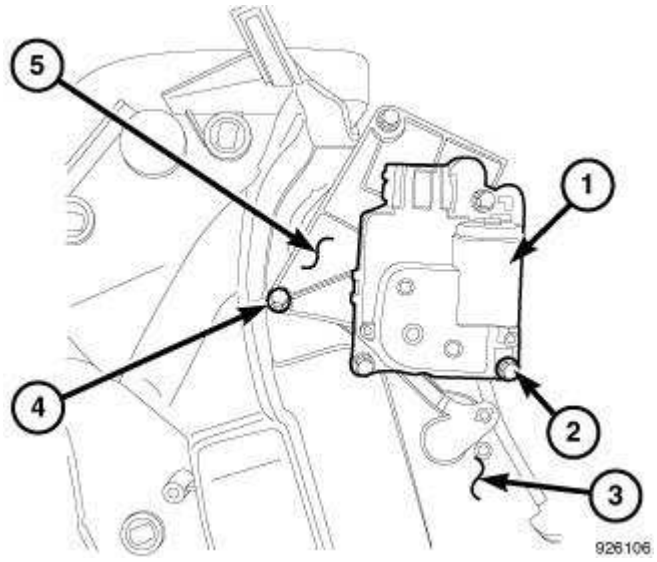


Fig. 86: Air Housing-Blend Actuator And Bracket-RH
Courtesy of CHRYSLER GROUP, LLC

10. Install the blend door actuator mounting bracket (5) onto the right side of the air distribution housing (3).

11. Install the screws (4) that secure the blend door actuator mounting bracket to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
12. Install the blend door actuator (1) onto the air distribution housing. If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the blend door cam. Refer to **ACTUATOR, BLEND DOOR, INSTALLATION**.
13. Install the screws (2) that secure the blend door actuator to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).

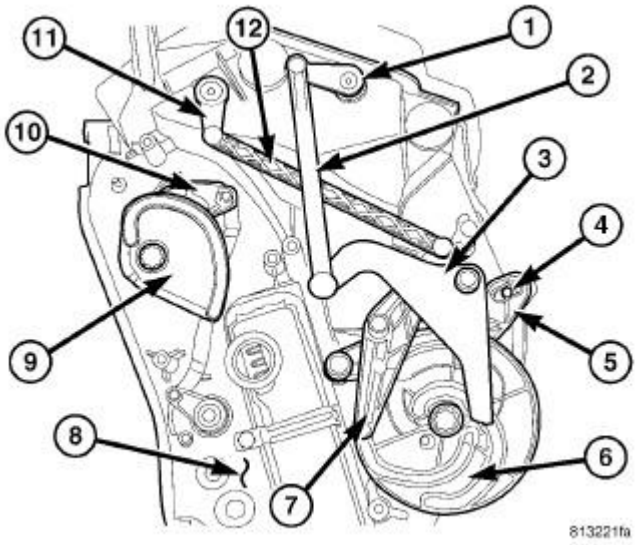


Fig. 87: Removing/Installing LH Actuator Linkages Air Housing
Courtesy of CHRYSLER GROUP, LLC

14. Install the blend door cam (9) onto the blend door lever (10) and the pivot shaft located on the left side of the air distribution housing (8).
15. Install the floor door linkage (5) onto the floor door lever (4) and the pivot shaft on air distribution housing.

NOTE: Align the guide pin on the floor door linkage with the guides on the mode door cam during installation of the floor door linkage.

16. Install the mode door cam (6) onto the pivot shaft on air distribution housing.
17. Connect the defrost/demister door linkage rod (12) onto the defrost/demister door lever (11).

NOTE: Align the guide pin on the defrost/demister linkage with the guides on the mode door cam during installation of the defrost/demister linkage.

18. Install the defrost/demister linkage (7) onto the pivot shaft on air distribution housing.
19. Connect the instrument panel door linkage rod (2) onto the instrument panel door lever (1).

NOTE: **Align the guide pin on the instrument panel linkage with the guides on the mode door cam during installation of the instrument panel linkage.**

20. Install the instrument panel linkage (3) onto the pivot shaft on air distribution housing.

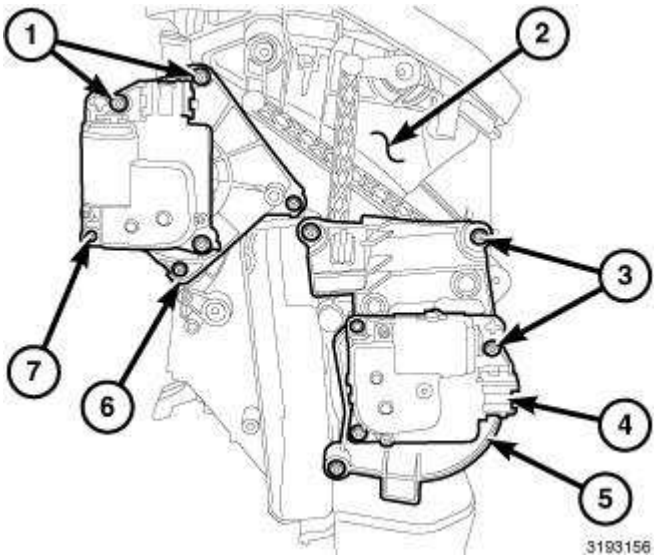


Fig. 88: Screws, Blend Door Actuator & Actuator Bracket
Courtesy of CHRYSLER GROUP, LLC

21. Position the blend door actuator mounting bracket (6) and the mode door actuator mounting bracket (5) onto the left side of the air distribution housing (2).
22. Install the screws (1 and 3) that secure the mounting brackets to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
23. Install the blend door actuator (7) onto the air distribution housing. If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the blend door cam. Refer to **ACTUATOR, BLEND DOOR, INSTALLATION**.
24. Install the mode door actuator (4) onto the air distribution housing. If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the mode door cam. Refer to **ACTUATOR, MODE DOOR, INSTALLATION**.
25. Install the screws (1 and 3) that secure the blend door actuator to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
26. On models equipped with the 3.0L diesel engine, install the electric Positive Temperature Coefficient (PTC) heater. Refer to **UNIT, HEATER, INSTALLATION**.
27. Install the air distribution housing. Refer to **HOUSING, HVAC, INSTALLATION**.

HOUSING-AIR INLET

NOTE: **The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.**

NOTE: **LHD model shown in illustration. RHD model similar.**

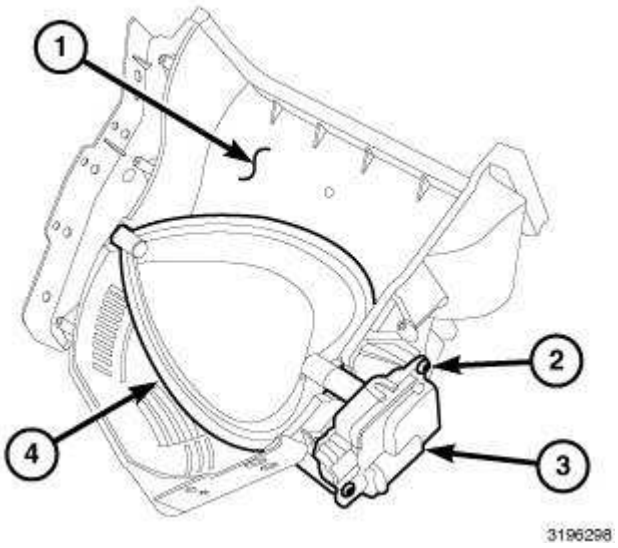


Fig. 89: Air Inlet Housing, Two Screws, Door Actuator & Recirculation-Air Door
Courtesy of CHRYSLER GROUP, LLC

1. Position the recirculation-air door (4) into the air inlet housing (1).

CAUTION: Make sure that the recirculation-air door pivot shaft is properly seated in the pivot seats located on the air inlet housing.

2. Install the recirculation door actuator (3) onto the air inlet housing. If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the recirculation door pivot shaft. Refer to **ACTUATOR, RECIRCULATION DOOR, INSTALLATION**.
3. Install the two screws (2) that secure the recirculation door actuator to the air inlet housing. Tighten the screws to 2 N.m (17 in. lbs.).
4. Install the air inlet housing. Refer to **HOUSING, HVAC, INSTALLATION**.

HOUSING-HVAC

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: **When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.**

NOTE: **If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

NOTE: **LHD model shown in illustration. RHD model similar.**

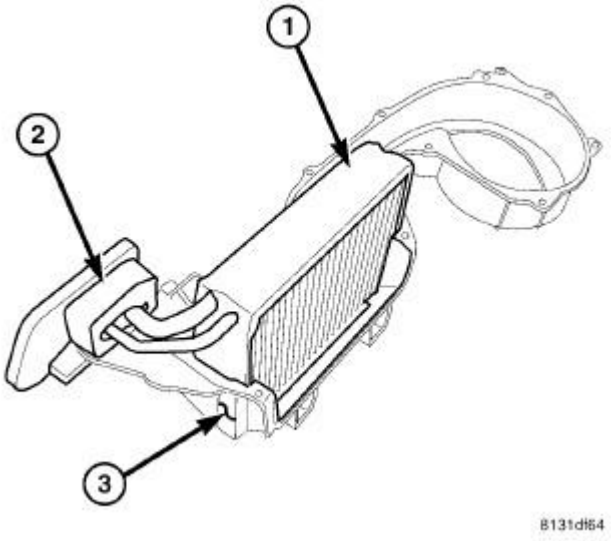


Fig. 90: Removing/Installing A/C Evaporator
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the foam seal (2), tapping block and A/C expansion valve onto the A/C evaporator (1). Refer to **VALVE, A/C EXPANSION, INSTALLATION**.
2. Install the A/C evaporator into the lower half of the HVAC housing (3). Make sure that the evaporator drain within the HVAC housing is clean and unrestricted and that the insulator around the A/C evaporator is properly installed.

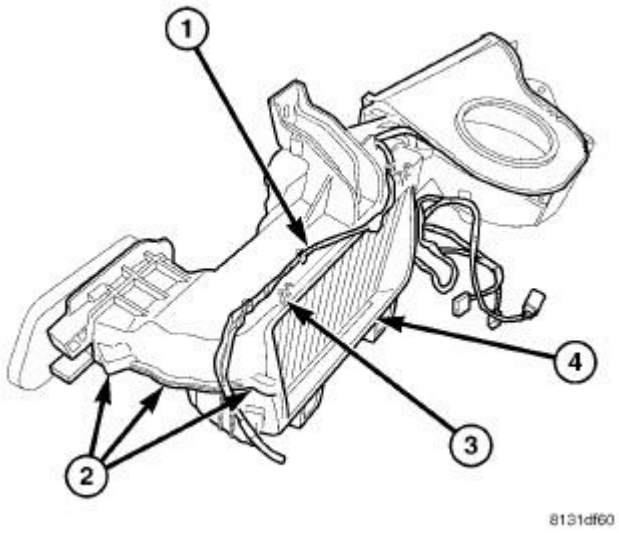


Fig. 91: Locating HVAC Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

3. Install the upper half of the HVAC housing (3) onto the lower half of the HVAC housing (4).
4. Install the ten screws (2) that secure the two halves of the HVAC housing together. Tighten the screws to 2.2 N.m (20 in lbs.).
5. Install the HVAC wiring harness (1). Make sure the harness is routed through all wiring retainers.
6. Install the evaporator temperature sensor. Refer to **SENSOR, EVAPORATOR TEMPERATURE, INSTALLATION**.
7. Install the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, INSTALLATION**.
8. Install the blower motor. Refer to **MOTOR, BLOWER, INSTALLATION**.
9. Install the air inlet housing. Refer to **HOUSING, HVAC, INSTALLATION**.
10. Install the air distribution housing. Refer to **HOUSING, HVAC, INSTALLATION**.

NOTE: If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

11. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

INSTALLATION

HOUSING-AIR DISTRIBUTION

NOTE: **LHD model shown in illustrations. RHD model similar.**

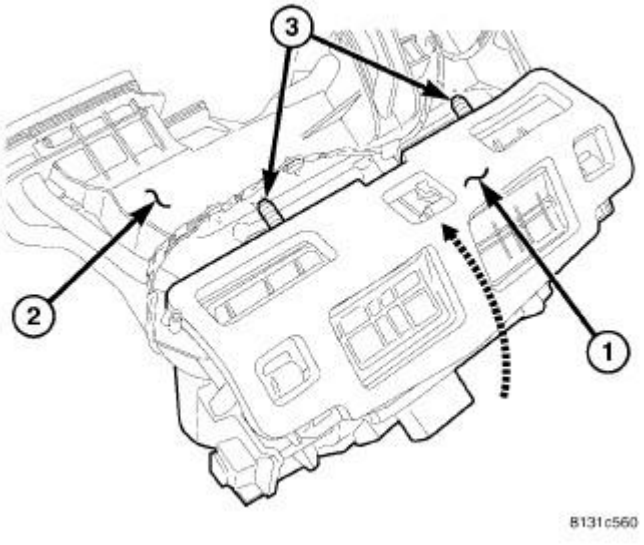


Fig. 92: Installing Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Install the air distribution housing onto the rear of the HVAC housing (2) by inserting the tabs on the bottom of the distribution housing into the slots located on the bottom of the HVAC housing and tipping the distribution housing upward until it is properly aligned with the HVAC housing.
2. Install the two screws (3) that secure the air distribution housing to the HVAC housing. Tighten the screws to 2.2 N.m (20 in. lbs.).

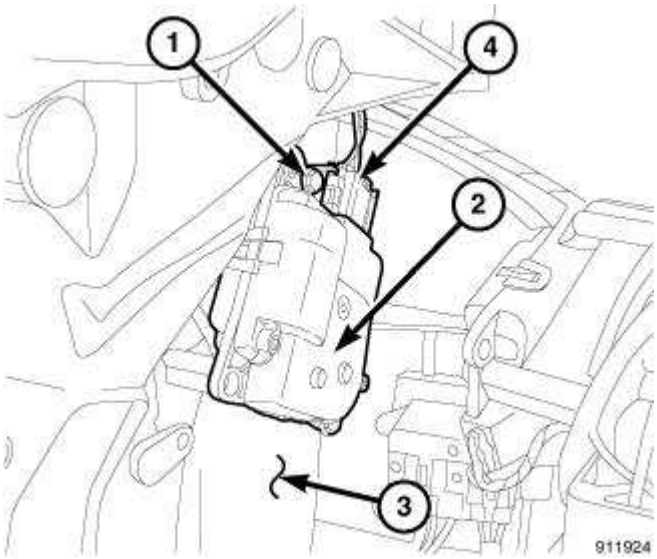


Fig. 93: Actuator-Blend Door-Dual Passenger
Courtesy of CHRYSLER GROUP, LLC

3. Connect the HVAC wire harness (4) to the blend door actuator (2) located on the passenger side of the air distribution housing (3).

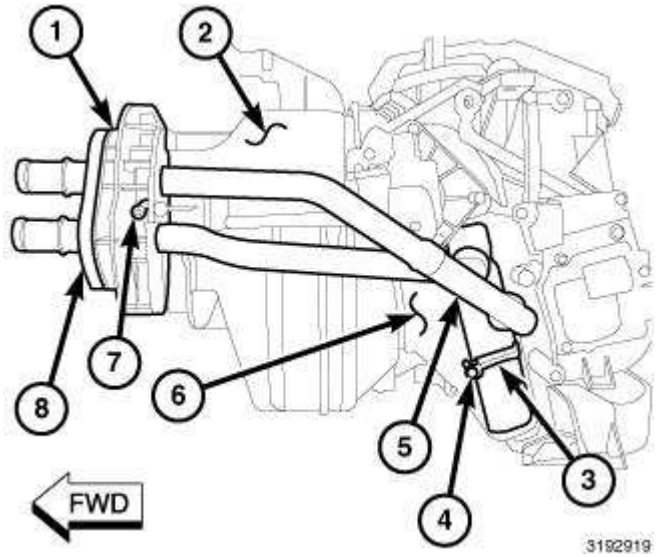


Fig. 94: Screw, Flange, HVAC Housing, Retaining Screw, Bracket, Housing
Courtesy of CHRYSLER GROUP, LLC

4. Install the heater core (5) into the driver side of the air distribution housing (6) and engage the heater core tubes to the foam seal (8).
5. Install heater core bracket (3) and retaining screw (4). Tighten the screw to 2.2 N.m (20 in. lbs.).
6. Install the flange (1) over the heater core tubes and onto the HVAC housing (2).
7. Install the screw (7) that secure the flange to the front of the HVAC housing. Tighten the screw to 2.2 N.m (20 in. lbs.).

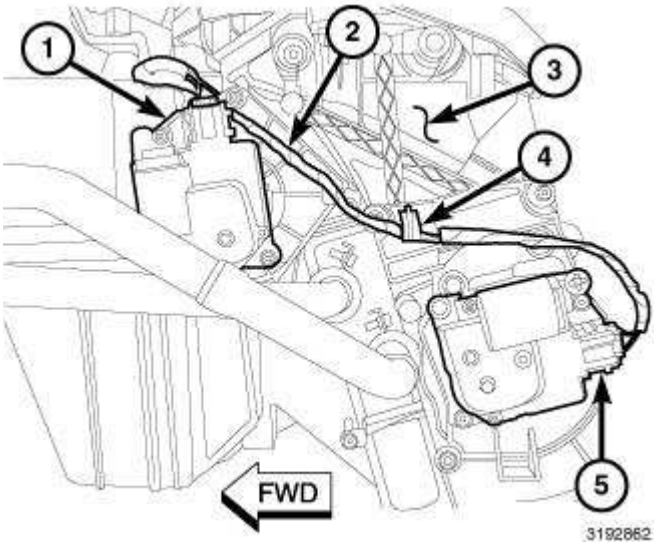


Fig. 95: HVAC Wire Harness, Mode Door Actuator, Blend Door Actuator & Air Distribution Housing

Courtesy of CHRYSLER GROUP, LLC

8. Connect the HVAC wire harness (2) to the mode door actuator (5) and the blend door actuator (1), located on the driver side of the air distribution housing (3).
9. Engage the HVAC wire harness to the retaining tab (4).
10. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

HOUSING-AIR INLET

NOTE: LHD model shown in illustration. RHD model similar.

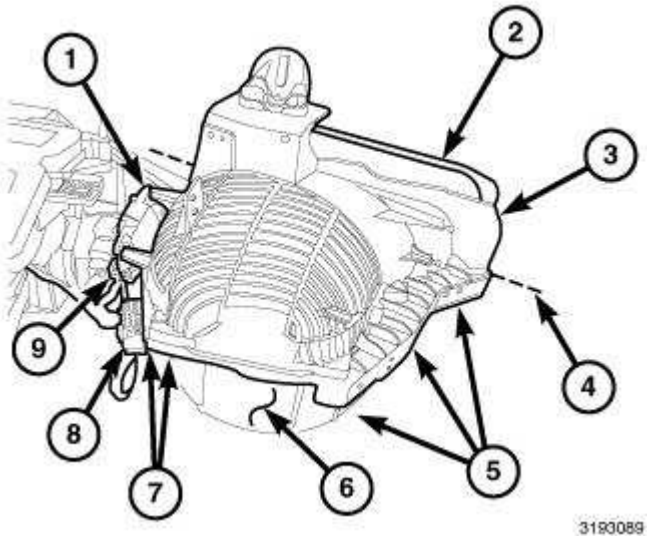


Fig. 96: Wire Harness Connector, Door Actuator, Wire Harness Connector & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the air inlet housing (3) onto the HVAC housing (6).

CAUTION: Make sure that the recirculation-air door pivot shaft is properly seated in the pivot seats located on the top of the HVAC housing.

2. Install the five screws (5 and 7) that secure the air inlet housing to the HVAC housing. Tighten the screws to 2.2 N.m (20 in. lbs.).
3. Inspect the foam seal (2), especially along the parting line (4). If the seal is deformed or damaged, it must be replaced.
4. Connect the HVAC wire harness connector (9) to the recirculation door actuator (1).
5. Engage the HVAC wire harness connector (8) to the air inlet housing.
6. Install the A/C heater module. Refer to **MODULE, A/C AND HEATER, INSTALLATION** .
7. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

HOUSING-FRESH AIR INLET

NOTE: **The fresh air inlet housing must be removed from the vehicle for removal of the HVAC housing.**

NOTE: **LHD model shown in illustrations. RHD model similar.**

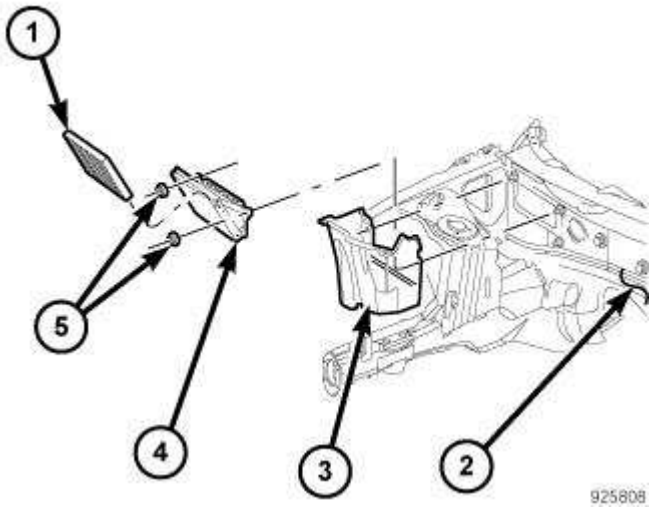


Fig. 97: 06 Fresh Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the fresh air inlet housing (3), particulate air filter (1) and filter housing (4) as an assembly onto the engine compartment side of the dash panel (2).
2. Install the two nuts (5) that secure the fresh air inlet housing and filter housing to the dash panel. Tighten the nuts to 7 N.m (62 in. lbs.).

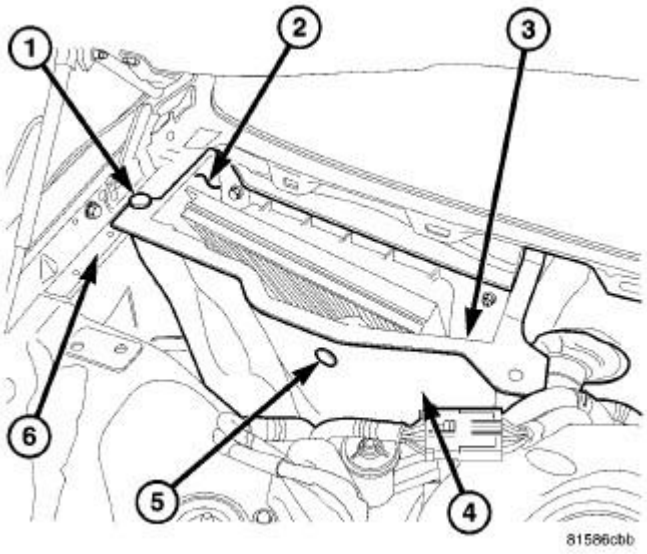


Fig. 98: Push Pins-Fresh Air Inlet Housing

Courtesy of CHRYSLER GROUP, LLC

3. Position the insulator (4) into its installed location and install the push-pin retainer (5) that secures the insulator to the front of the fresh air inlet housing (2).
4. Install the push-pin retainer (1) that secures the fresh air inlet housing to the right inner fender (6).
5. Reach under the fresh air inlet housing and install the wire harness retainer (3) into the bottom of the air inlet housing, if equipped.

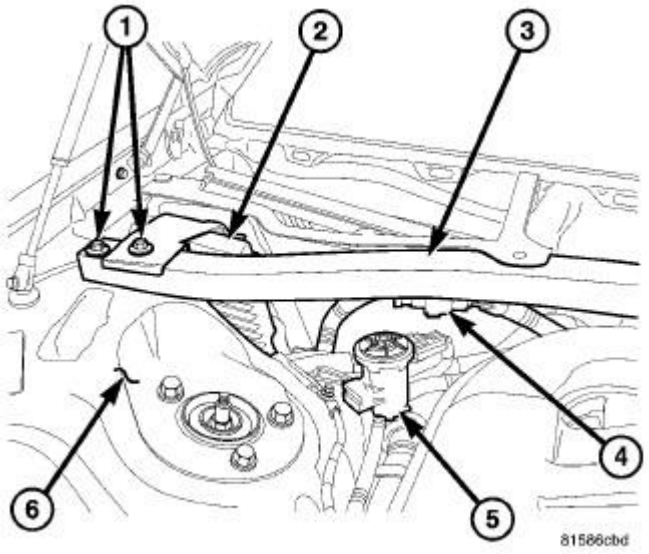


Fig. 99: Strut Support- Passenger Side
Courtesy of CHRYSLER GROUP, LLC

6. Position the powertrain control module (PCM) or the engine control module (ECM) (2) (depending on engine application) into its installed location.
7. Position the strut support (3) into the engine compartment and loosely install the two bolts (1) that secure the strut support and the ECM/PCM to the passenger side strut tower (6).
8. On LHD models, install the purge solenoid (5) onto its mounting bracket located on the right strut tower.
9. Engage the retainer that secures the wire harness (4) to the bottom of the strut support.

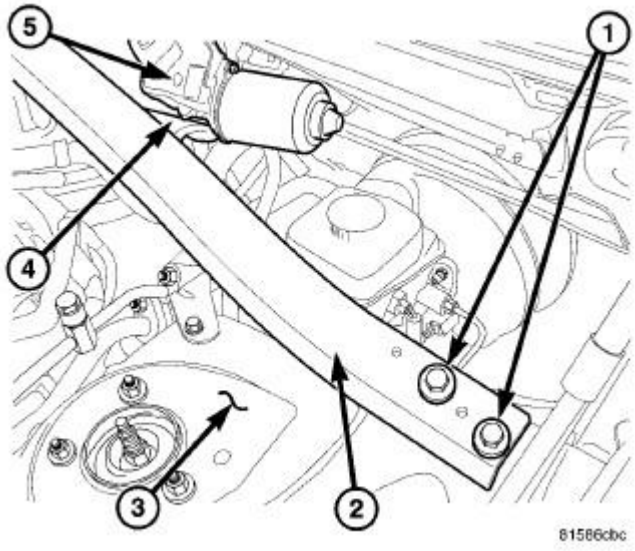


Fig. 100: Strut Support- Driver Side
Courtesy of CHRYSLER GROUP, LLC

10. Engage the wiper motor (5) to the bracket (4) located on the strut support (2).
11. Position the strut support to the driver side strut tower and loosely install the two bolts (1) that secure the support to the tower.
12. Tighten all four bolts that secure the strut support to 38 N.m (28 ft. lbs.).
13. Install the cowl top panel onto the dash panel. Refer to **COVER, COWL PANEL, INSTALLATION** .
14. Reconnect the negative battery cable.

HOUSING-HVAC ASSEMBLY

NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator.

NOTE: LHD model shown in illustrations. RHD model similar.

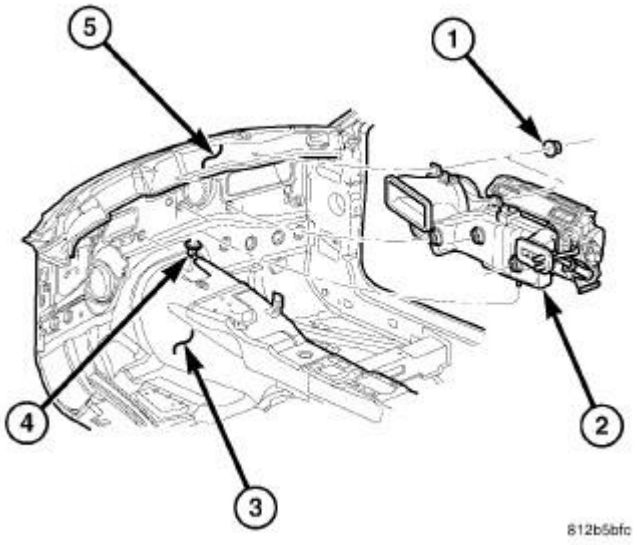


Fig. 101: Housing-Hvac-Interior
Courtesy of CHRYSLER GROUP, LLC

1. Position the HVAC housing (2) into the passenger compartment with the mounting studs in their proper locations in the dash panel (5) and the condensate drain tube into the grommet (4) on the floor panel (3).
2. Install the two nuts (1) that secure the HVAC housing to the passenger compartment side of the dash panel. Tighten the nuts to 3 N.m (26 in. lbs.).
3. Install the defroster ducts. Refer to **DUCT, DEFROSTER, INSTALLATION**.
4. Connect the floor distribution ducts. Refer to **DUCT, FLOOR DISTRIBUTION, INSTALLATION**.
5. Connect the floor console duct. Refer to **DUCT, FLOOR CONSOLE, INSTALLATION**.
6. Install the instrument panel. Refer to **PANEL, INSTRUMENT, INSTALLATION** .

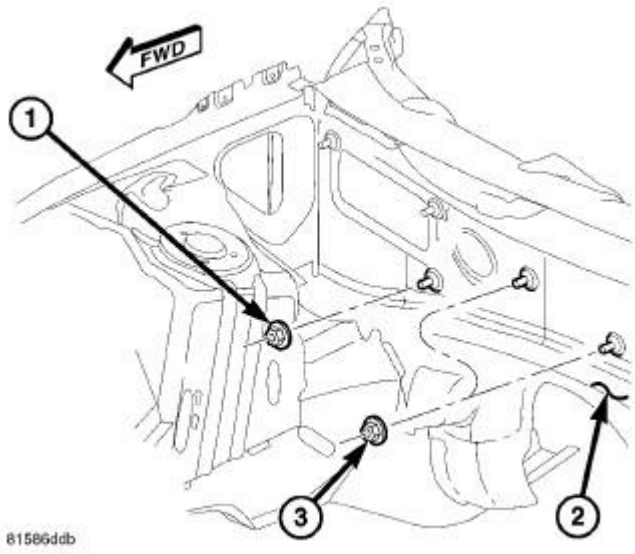


Fig. 102: Remove/Install Housing-HVAC-Exterior
Courtesy of CHRYSLER GROUP, LLC

7. Install the three nuts (1 and 3) that secure the HVAC housing to the engine compartment side of the dash panel (2). Tighten the nuts to 7 N.m (62 in. lbs.).
8. Connect the heater hoses to the heater core tubes.
9. Connect the A/C suction line and A/C liquid line to the A/C evaporator. Refer to **LINE, A/C LIQUID, INSTALLATION**.
10. Install the fresh air inlet housing to the engine compartment side of the dash panel. Refer to **HOUSING, HVAC, INSTALLATION**.
11. Reconnect the negative battery cable.
12. If the heater core is being replaced, flush the cooling system. Refer to **STANDARD PROCEDURE** .
13. Refill the engine cooling system. Refer to **STANDARD PROCEDURE** .
14. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
15. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
16. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

MOTOR, BLOWER

DESCRIPTION

DESCRIPTION

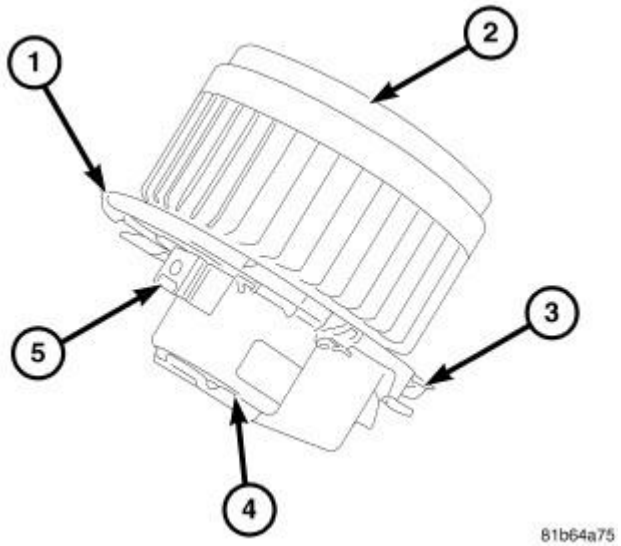


Fig. 103: Blower Motor
Courtesy of CHRYSLER GROUP, LLC

The blower motor is mounted to the bottom of the HVAC housing, on the passenger side of the vehicle. The blower motor assembly is a squirrel type blower cage (2) connected to a 12 volt Direct Current (DC) motor, located within a plastic housing (4). The blower motor has an integral wire

harness bracket (1), three mounting provisions (3) and a wire connector receptacle (5).

The blower motor can be accessed for service from underneath the instrument panel.

OPERATION

OPERATION

The blower motor controls the velocity of air moving through the HVAC housing by spinning the blower wheel within the HVAC air inlet housing at the selected speed.

Both the Manual Temperature Control (MTC) and the Automatic Temperature Control (ATC) heating and A/C system use an electronic blower motor power module to control blower motor speed. The power module uses a Pulse Width Modulated (PWM) input from the A/C heater module and a feedback signal from the blower motor to regulate the blower motor ground path. On both systems, the blower motor receives battery current through a relay in the Power Distribution Center (PDC) whenever the ignition is in the Run position.

The blower motor control system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The blower motor and wheel are factory balanced as an assembly and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BLOWER MOTOR

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: See Wiring Information for circuit descriptions and diagrams.

OPERATION

Possible causes of an inoperative blower motor include:

- Open fuse
- Inoperative A/C heater module
- Inoperative blower motor
- Inoperative blower motor power module
- Inoperative blower motor relay

- Inoperative blower motor switch
- Inoperative blower motor wiring or wire harness connectors

NOISE

To determine if the blower motor is the source of the noise, simply switch the blower motor on and off. To verify that the blower motor is the source of the noise, unplug the blower motor wire harness connector and operate the heating and A/C system. If the noise goes away, possible causes include:

- Deformed or damaged blower wheel
- Foreign material in blower wheel
- Foreign material in the HVAC housing
- Foreign material on fresh air inlet screen
- Improper blower motor mounting
- Worn blower motor bearings or brushes

VIBRATION

Possible causes of blower motor vibration include:

- Deformed or damaged blower wheel
- Foreign material in blower wheel
- Improper blower motor mounting
- Worn blower motor bearings

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible serious or fatal injury.

NOTE: LHD model shown in illustration. RHD model similar.

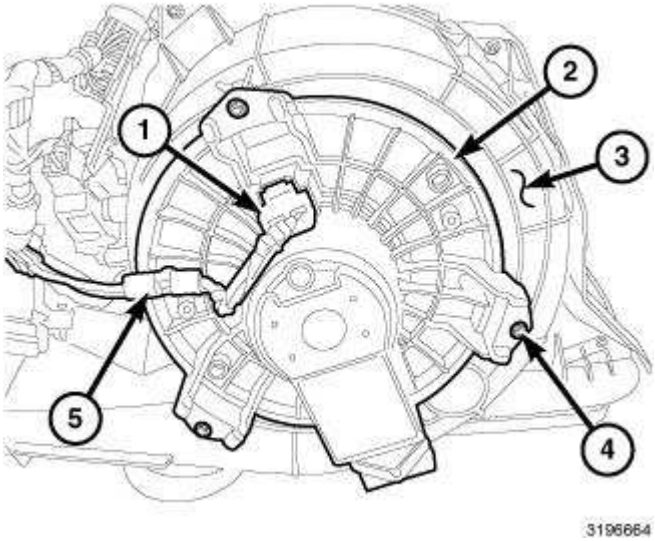


Fig. 104: Wire Harness Connector, Blower Motor, Wire Harness Retainer, Three Screws & HVAC Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the passenger side instrument panel silencer. Refer to **PANEL, SILENCER, REMOVAL** .
3. Disengage the wire harness connector (1) from the blower motor (2).
4. Disengage the wire harness retainer (5).
5. Remove the three screws (4) that secure the blower motor to the HVAC housing (3) and remove the blower motor.

INSTALLATION

INSTALLATION

NOTE: LHD model shown in illustration. RHD model similar.

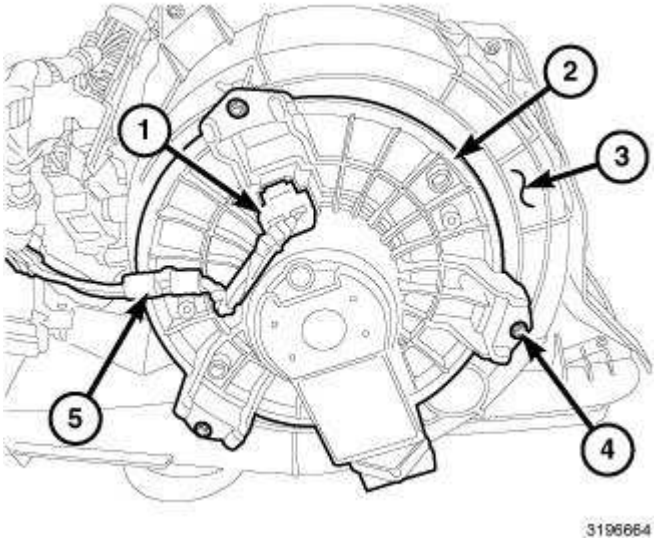


Fig. 105: Wire Harness Connector, Blower Motor, Wire Harness Retainer, Three Screws & HVAC Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the blower motor (2) into the HVAC housing (3).
2. Install the three screws (4) that secure the blower motor to the HVAC housing. Tighten the screws to 2.2 N.m (20 in. lbs.).
3. Connect the wire harness connector (1) to the blower motor and engage the wire harness retainer (5).
4. Install the passenger side instrument panel silencer. Refer to **PANEL, SILENCER, INSTALLATION** .
5. Reconnect the negative battery cable.

OUTLET, AIR

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

CENTER OUTLETS

NOTE: Take the proper precautions to protect the face of center bezel from cosmetic damage while performing this procedure.

NOTE: Passenger side shown in illustration. Driver side similar.

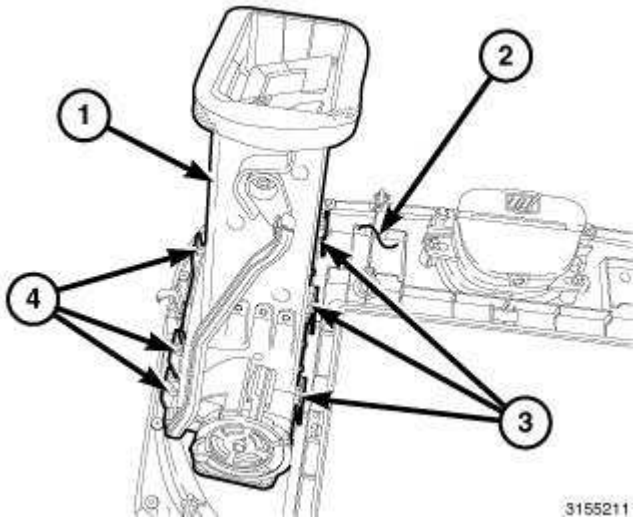


Fig. 106: Center Bezel, Six Retaining Tabs & Each Air Outlet
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the center bezel (2) from the instrument panel and place it on a workbench. Refer to **BEZEL, INSTRUMENT PANEL, CENTER, REMOVAL** .

   NOTE: If the foam seal on an air outlet is deformed or damaged, the seal must be replaced.

3. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, disengage the six retaining tabs (3 and 4) that secure each air outlet (1) to the center bezel and remove the outlets as required.

OUTBOARD OUTLETS

NOTE: Passenger side shown in illustration. Driver side similar.

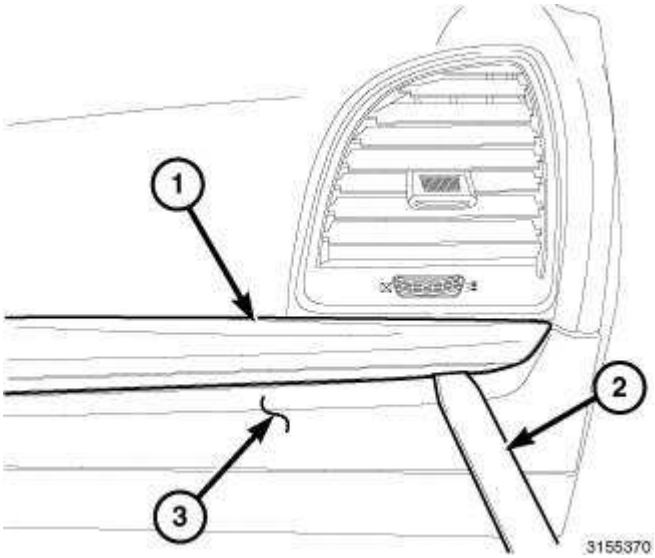


Fig. 107: Trim Stick, Trim Panel Insert & Instrument Panel Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent (2), disengage the retaining tabs that secure the trim panel insert (1) to the instrument panel cover (3) and remove the insert.

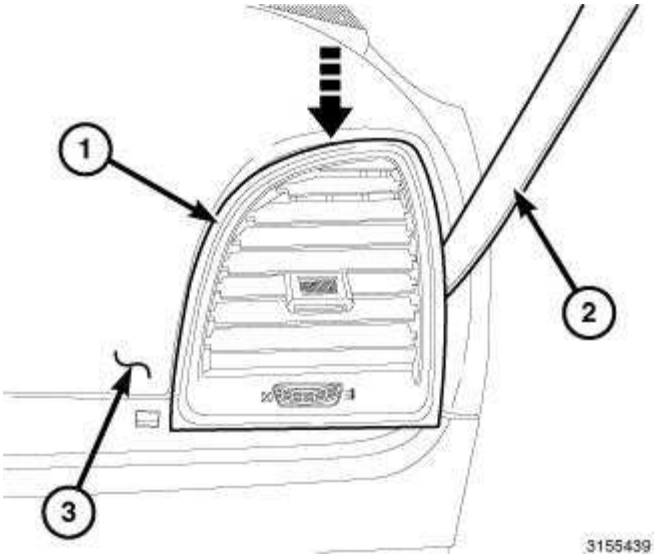


Fig. 108: Instrument Panel Air Outlet, Trim Stick & Instrument Panel Cover
Courtesy of CHRYSLER GROUP, LLC

3. Carefully pull the instrument panel air outlet (1) downward.
4. Using Trim Stick (special tool #C-4755, Trim Stick) (2) or equivalent, disengage the three retaining tabs that secure the outboard side of the air outlet to the instrument panel cover (3).

NOTE: If the foam seal on an air outlet is deformed or damaged, the seal must be

replaced.

5. With Trim Stick (special tool #C-4755, Trim Stick) or equivalent still in place as shown in illustration, wiggle and rotate the air outlet to disengage the inboard side of the outlet from the instrument panel cover and remove the outlet.

FLOOR CONSOLE OUTLETS

NOTE: Take the proper precautions to protect the face of the floor console rear trim panel from cosmetic damage while performing this procedure.

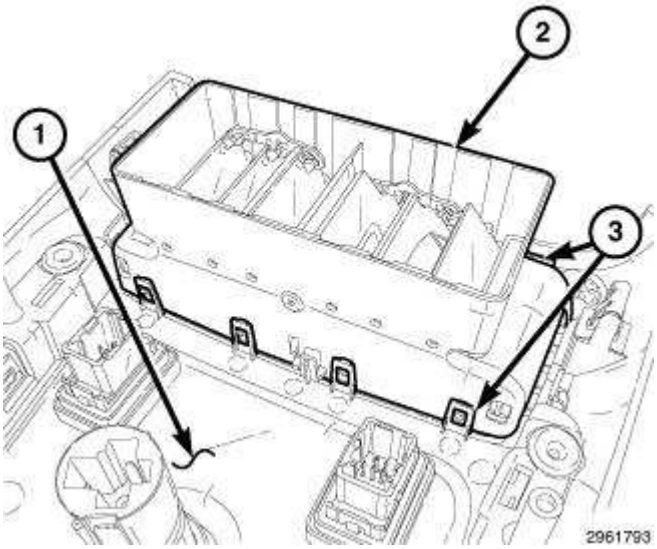


Fig. 109: Trim Panel, Retaining Tabs & Air Outlet
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the trim panel (1) from the back of the floor console and place it on a workbench. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, disengage the retaining tabs (3) that secure the air outlet (2) to the trim panel and remove the outlet.

INSTALLATION

INSTALLATION

CENTER OUTLETS

NOTE: Take the proper precautions to protect the face of center bezel from cosmetic damage while performing this procedure.

NOTE: Passenger side shown in illustration. Driver side similar.

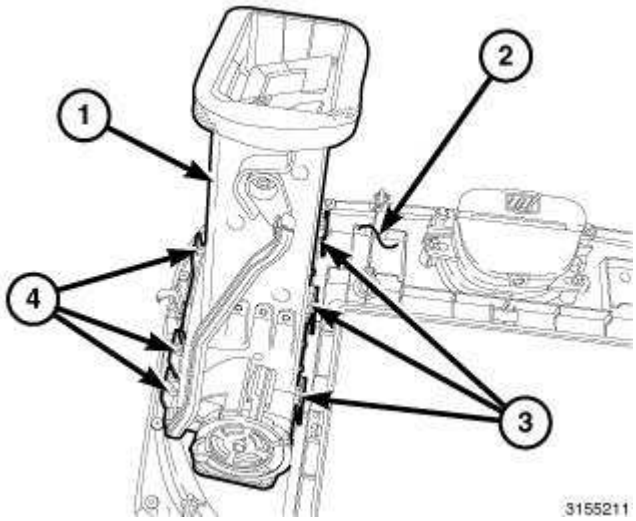


Fig. 110: Center Bezel, Six Retaining Tabs & Each Air Outlet
Courtesy of CHRYSLER GROUP, LLC

1. Position each air outlet (1) to the instrument panel center bezel (2).
2. Engage the six retaining tabs (3 and 4) that secure each air outlet to the center bezel. Make sure the retaining tabs are fully engaged.

NOTE: Make sure that the air outlets are properly aligned to the ducts within the instrument panel and that the foam seals on the outlets are properly installed.

3. Install the center bezel. Refer to **BEZEL, INSTRUMENT PANEL, CENTER, INSTALLATION** .
4. Reconnect the negative battery cable.

OUTBOARD OUTLETS

NOTE: Passenger side shown in illustration. Driver side similar.

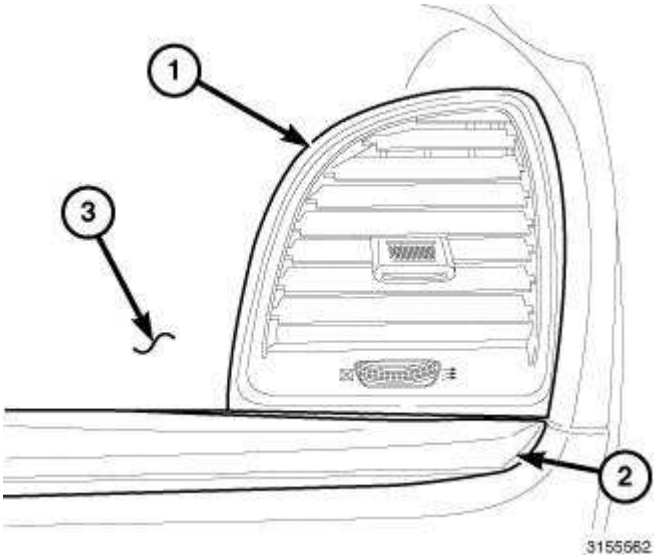


Fig. 111: Air Outlet, Air Outlet & Trim Insert
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make sure that the air outlet is properly aligned to the duct within the instrument panel and that the foam seal on the outlet is properly installed.

1. Position the air outlet (1) into the instrument panel and connect it to the duct.
2. Engage the retaining tabs that secure the air outlet to the instrument panel cover (3). Make sure the retaining tabs are fully engaged.
3. Install the trim insert (2) onto the instrument panel cover and engage the retaining tabs. Make sure the retaining tabs are fully engaged.
4. Reconnect the negative battery cable.

FLOOR CONSOLE OUTLETS

NOTE: Take the proper precautions to protect the face of the floor console rear trim panel from cosmetic damage while performing this procedure.

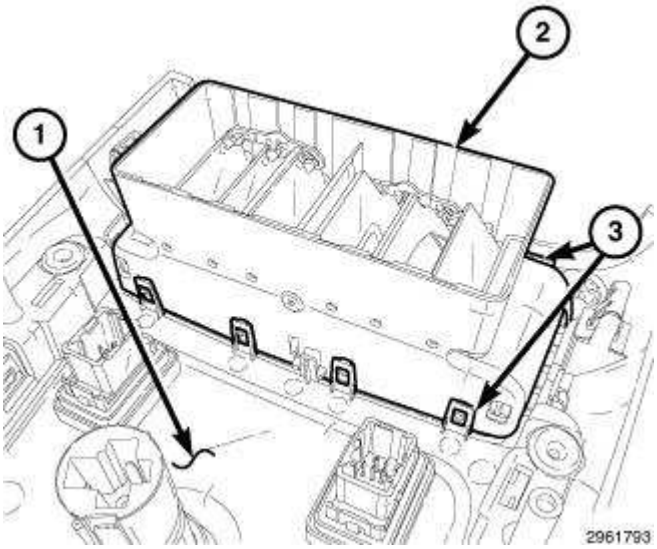


Fig. 112: Trim Panel, Retaining Tabs & Air Outlet
Courtesy of CHRYSLER GROUP, LLC

1. Position the air outlet (2) onto the floor console trim panel (1).
2. Engage the retaining tabs (3) that secure the air outlet to the trim panel. Make sure the retaining tabs are fully engaged to the outlet.

NOTE: Make sure that the air outlet is properly aligned to the duct within the floor console and that the foam seal on the duct is properly installed.

3. Install the trim panel (1) onto the back of the floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .
4. Reconnect the negative battery cable.

PLUMBING

WARNING

WARNING

WARNING: The A/C system contains refrigerant under high pressure. Repairs should only be performed by qualified service personnel. Serious or fatal injury may result from improper service procedures.

WARNING: Avoid breathing the refrigerant and refrigerant oil vapor or mist. Exposure may irritate the eyes, nose, and/or throat. Wear eye protection when servicing the A/C refrigerant system. Serious eye injury can result from direct contact with the refrigerant. If eye contact occurs, seek medical attention immediately.

WARNING: Do not expose the refrigerant to open flame. Poisonous gas is created when refrigerant is burned. An electronic leak detector is recommended. Serious or fatal injury may result from improper service procedures.

WARNING: If accidental A/C system discharge occurs, ventilate the work area before resuming service. Large amounts of refrigerant released in a closed work area will displace the oxygen and cause suffocation and serious or fatal injury.

WARNING: The evaporation rate of R-134a refrigerant at average temperature and altitude is extremely high. As a result, anything that comes in contact with the refrigerant will freeze. Always protect the skin or delicate objects from direct contact with the refrigerant.

WARNING: The R-134a service equipment or the vehicle refrigerant system should not be pressure tested or leak tested with compressed air. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures are potentially dangerous, and may result in fire or explosion causing property damage and serious or fatal injury.

WARNING: The engine cooling system is designed to develop internal pressures up to 145 kPa (21 psi). Do not remove or loosen the coolant pressure cap, cylinder block drain plugs, radiator drain, radiator hoses, heater hoses, or hose clamps while the engine cooling system is hot and under pressure. Allow the vehicle to cool for a minimum of 15 minutes before opening the cooling system for service. Failure to observe this warning can result in serious burns from the heated engine coolant.

CAUTION

CAUTION

CAUTION: Never add R-12 to a refrigerant system designed to use R-134a. Do not use R-12 equipment or parts on an R-134a A/C system. These refrigerants are not compatible and damage to the A/C system will result.

CAUTION: Never use R-12 refrigerant oil in an A/C system designed to use R-134a refrigerant oil. These refrigerant oils are not compatible and damage to the A/C system will result.

CAUTION: The use of A/C system sealers may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or A/C system. Many federal, state/provincial and local regulations prohibit the recharge of A/C systems with known leaks. Chrysler LLC recommends the detection of A/C system leaks through the use of approved leak detectors and fluorescent

leak detection dyes. Vehicles found with A/C system sealers should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners voids the warranty for the A/C system.

CAUTION: Recover the refrigerant before opening any fitting or connection. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

CAUTION: If equipped, do not remove the secondary retention clip from any spring-lock coupler connection while the refrigerant system is under pressure. Recover the refrigerant before removing the secondary retention clip. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

CAUTION: The internal parts of the A/C system will remain stable as long as moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability. This may cause operational troubles or even serious damage if present in more than very small quantities. Before disconnecting a component, clean the outside of the fittings thoroughly to prevent contamination from entering the refrigerant system. Keep service tools and the work area clean. Do not open the refrigerant system or uncap a replacement component until you are ready to service the system. Immediately after disconnecting a component from the refrigerant system, seal the open fittings with a cap or plug. This will prevent contamination from entering the A/C system.

CAUTION: Refrigerant oil will absorb moisture from the atmosphere if left uncapped. Do not open a container of refrigerant oil until you are ready to use it. Replace the cap on the oil container immediately after using. Store refrigerant oil only in a clean, airtight, and moisture-free container.

CAUTION: Do not overcharge the refrigerant system. Overcharging will cause excessive compressor head pressure and can cause compressor noise and A/C system failure.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

WARNING: R-134a service equipment or vehicle A/C system should not be pressure tested or leak tested with compressed air. Mixture of air and R-134a can be combustible at elevated pressures. These mixtures are potentially dangerous and may result in fire or explosion causing property damage

and possible serious or fatal injury.

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved service equipment meeting SAE requirements to discharge an R-134a system. If accidental system discharge occurs, ventilate work area before resuming service.

NOTE: If the A/C system refrigerant charge is empty or low, a leak in the A/C system is likely. When searching for a refrigerant leak in the A/C system, use an electronic leak detector and refrigerant leak detection dye with an Ultra Violet (UV) light that is designed for R-134a refrigerant. It is important to use only high-quality refrigerant leak detection equipment to properly locate refrigerant system leaks, such as the equipment listed in the teamPSE Service Equipment Catalog. Use only Chrysler approved R-134a leak detection dye, available through Mopar®.

1. Visually inspect all A/C lines, A/C fittings and A/C components under the hood for an oily residue. Oil residue can be an indicator of a leak location.
2. Connect a high-quality manifold gauge set or refrigerant recovery machine to the A/C system and determine if the static A/C system pressure is above or below 345 kPa (50 psi). Refer to **PLUMBING, STANDARD PROCEDURE**. If static A/C system pressure is less than 345 kPa (50 psi), proceed to **SYSTEM EMPTY**. If static A/C system pressure is greater than 345 kPa (50 psi), go to **SYSTEM LOW**.

REFRIGERANT SYSTEM LEAKS

SYSTEM EMPTY

1. Evacuate the refrigerant system to the lowest degree of vacuum possible (approximately -8 kPa (-26 in. Hg) or greater vacuum) for at least 30 minutes. Refer to **PLUMBING, STANDARD PROCEDURE**.

CAUTION: Use only Chrysler LLC approved R-134a leak detection dye. It is important to use only high-quality refrigerant leak detection equipment. Small leaks may not be found using low-budget equipment. Failure to follow these instructions may result in an incomplete diagnosis and possible remaining refrigerant leaks.

2. Prepare an R-134a dye injector with a Chrysler approved R-134a leak detection dye.
3. Prepare the vehicle specific amount of R-134a refrigerant. Refer to **REFRIGERANT, SPECIFICATIONS**.

NOTE: Anytime an R-134a leak detection dye has been added to the refrigerant system, a label indicating that dye has been added should be placed on the vehicle in plain view, for other technicians.

4. Dispense the leak detection dye and the correct amount of R-134a refrigerant into the

evacuated refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

5. Proceed to **LEAK TEST**.

SYSTEM LOW

CAUTION: Use only Chrysler LLC approved R-134a leak detection dye. It is important to use only high-quality refrigerant leak detection equipment. Small leaks may not be found using low-budget equipment. Failure to follow these instructions may result in an incomplete diagnosis and possible remaining refrigerant leaks.

1. Prepare an R-134a dye injector with a Chrysler approved R-134a leak detection dye.

NOTE: Anytime an R-134a leak detection dye has been added to the refrigerant system, a label indicating that dye has been added should be placed on the vehicle in plain view, for other technicians.

2. Dispense the leak detection dye and 0.284 kilograms (10 ounces) of R-134a refrigerant into the evacuated refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Proceed to **LEAK TEST**.

LEAK TEST

1. Position the vehicle in a wind-free work area. This will aid in detecting small leaks.
2. Operate the heating and A/C system with the engine at idle under the following conditions for at least 15 minutes.
   - Doors or windows open
   - Transmission in Park or Neutral with the parking brake set (depending on transmission application)
   - Front A/C and heater controls set to outside air, full cool, panel mode, high blower and A/C compressor engaged
   - If equipped, rear A/C and heater controls set to full cool and high blower.
3. Shut the vehicle off and wait at least 5 minutes.

CAUTION: Use it is important to use only a high-quality Ultra Violet (UV) light when searching for a leak in the refrigerant system. Small leaks may not be found using budget equipment. Failure to follow these instructions may result in an incomplete diagnosis and possible remaining refrigerant leaks.

4. Begin searching for leaks using a high quality UV light to detect the fluorescent R-134a leak detection dye. Inspect all connections, plumbing fittings, brazed joints, hoses, hose crimps, service ports, compressor housing, pressure relief valve and A/C condenser for dye. Inspect the evaporator drain tube and condensate for presence of dye, which indicates a leak from the A/C evaporator.

WARNING: Use extreme care when working around a running engine. Keep hands and fingers clear of the radiator fan, accessory drive belt and all other moving components. Keep away when wearing loose clothing, jewelry or long hair that is not properly secured. Underhood components may become hot to the touch. Be careful not to come into contact with hot engine, A/C and engine cooling system components. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: Use only an electronic leak detector designed for R-134a refrigerant. It is important to use only high-quality refrigerant leak detection equipment. Small leaks may not be found using budget equipment. Failure to follow these instructions may result in an incomplete diagnosis and possible remaining refrigerant leaks.

5. If a leak is not found with the R-134a detection dye, use a high-quality electronic R-134a leak detector and insert it into the evaporator drain tube, and into the instrument panel air outlets, to check for evaporator leaks. Check the evaporator tubes at the A/C expansion valve, for leaks not visible behind the valve. Check around the front of the A/C compressor, for compressor shaft seal leaks. Check between the A/C condenser and radiator for condenser leaks not previously visible.

STANDARD PROCEDURE

REFRIGERANT SYSTEM RECOVERY

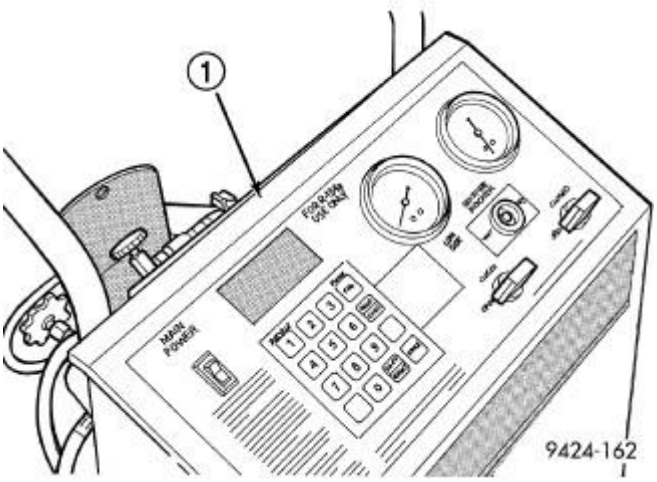


Fig. 113: Identifying Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

The R-134a refrigerant must be recovered from the A/C system prior to performing any repairs that require disconnection of an A/C refrigerant line.

When recovering the A/C refrigerant system, use an R-134a refrigerant recovery/recycling/charging

station (1) that meets SAE standard J2788. Per SAE standard J2788, refrigerant recovery stations must recover 95% of the refrigerant system within 30 minutes at 21.1° C (70° F) and be able to measure the amount of refrigerant removed from the system to an accuracy of 28 grams (1 oz.). See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

NOTE: A/C system should be tested prior to refrigerant recovery if the use of A/C system sealants are suspected. These sealants have the potential to clog refrigerant recovery equipment and cause vehicle A/C component damage. Various tool manufacturers make tool kits that detect A/C system sealants. See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

If sealants are detected in an A/C system, the system should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners void the warranty for the A/C system.

RECOVERY PROCEDURE

WARNING: Review safety precautions and warnings before performing this procedure. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: Various aftermarket manufacturers produce A/C system sealants that are designed to stop A/C refrigerant system leaks. The use of A/C system sealants may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or the vehicle A/C system and are not recommended for use by Chrysler LLC.

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.

1. If use of aftermarket A/C system sealant is suspected, the A/C system should be tested for sealant prior to refrigerant system recovery. See the operating instructions supplied by the equipment manufacturer for proper use and care of this equipment.
2. Connect an R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 to the refrigerant system.
3. Recover the A/C refrigerant system following the operating instructions supplied by the recovery/recycling/charging station manufacturer.
4. Disconnect the refrigerant recovery/recycling/charging station from the refrigerant system service ports.

5. Reinstall the caps onto the refrigerant system service ports.

REFRIGERANT SYSTEM EVACUATE

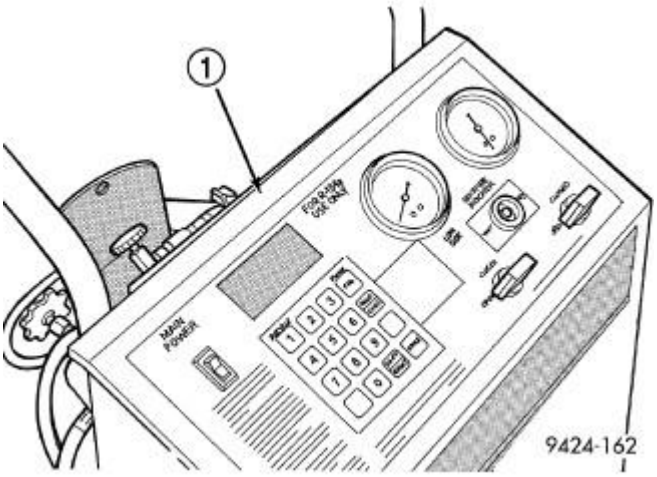


Fig. 114: Identifying Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

If the A/C refrigerant system has been open to the atmosphere, it must be evacuated before the A/C system can be recharged with R-134a refrigerant.

NOTE: Special effort must be used to prevent moisture from entering the A/C system oil. Moisture in the oil is very difficult to remove and will cause a reliability problem with the A/C compressor.

Moisture and air in the A/C refrigerant system will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the A/C system and damage the A/C compressor. Moisture will boil at near room temperature when exposed to vacuum. Always use an R-134a refrigerant recovery/recycling/charging station with a vacuum pump (1) that meets SAE standard J2788, or an R-134a compatible manifold gauge set and a stand-alone vacuum pump.

If an A/C compressor is left open to the atmosphere for an extended period of time, it is recommended that the refrigerant oil in the compressor be drained and replaced with new refrigerant oil to reduce the possibility of contaminating the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

EVACUATION PROCEDURE

WARNING: Review safety precautions and warnings before performing this procedure. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging

the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.

1. Recover the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

NOTE: **When connecting service equipment couplers to refrigerant line service ports, verify that the valve of each coupler is fully closed prior to connecting. This will reduce the amount of effort required to make the connections.**

2. Connect an R-134a refrigerant recovery/recycling/charging station with a vacuum pump that meets SAE standard J2788 to the refrigerant system, or an R-134a compatible manifold gauge set and a stand-alone vacuum pump (depending on available equipment).
3. Open the refrigerant recovery/recycling/charging station or manifold gauge set valves and start the vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to recharge to eliminate all moisture in system. When the low-side gauge reads to the lowest degree of vacuum possible (approximately -88 kPa (- 26 in. Hg) or greater) for 30 minutes, close all valves and turn off vacuum pump. If the refrigerant system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected. If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the valves and allow the refrigerant system to evacuate an additional 10 minutes.
4. Close the refrigerant recovery/recycling/charging station or manifold gauge set valves. Turn off and disconnect the vacuum pump.
5. Disconnect the refrigerant recovery/recycling/charging station or manifold gauge set from the refrigerant system service ports.
6. Reinstall the caps onto the refrigerant system service ports.

REFRIGERANT SYSTEM CHARGE

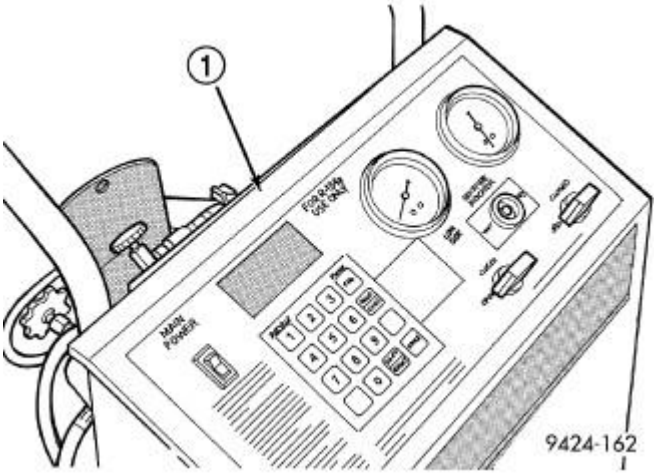


Fig. 115: Identifying Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

After all A/C refrigerant system repairs have been completed and the refrigerant system has been evacuated, the A/C system can be recharged with R-134a refrigerant.

When charging the A/C system, use an R-134a refrigerant recovery/recycling/charging station (1) that meets SAE standard J2788. Per SAE standard J2788, refrigerant recovery stations must charge the system to an accuracy of 14 grams (0.5 oz.). See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

CHARGING PROCEDURE

WARNING: Review safety precautions and warnings before performing this procedure. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.

1. Recover and evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
2. Connect an R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 to the refrigerant system.
3. When required, adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

NOTE: A/C system refrigerant capacity can be found on the HVAC Specification Label, located in the engine compartment.

4. Measure the proper amount of refrigerant and heat it to 52° C (125° F) with the charging station. Refer to **REFRIGERANT, SPECIFICATIONS**. See the operating instructions supplied by the equipment manufacturer for proper use of this equipment.
5. Open both the low and high side valves, then open the charge valve to allow the heated refrigerant to flow into the refrigerant system.
6. When the transfer of refrigerant has stopped, close the valves.

WARNING: Take care not to open the high side (high pressure) valve while performing Step 7. Failure to follow these instructions may result in possible serious or fatal injury.

7. Perform the following if all of the refrigerant charge did not transfer from the dispensing device.
   a. Open all of the windows in the vehicle.
   b. Set the heating and A/C system so that the A/C compressor is operating and the blower motor is operating at its lowest speed setting.

c. Run the engine at a steady high idle (about 1400 RPM).
d. If the A/C compressor does not operate, test the compressor control circuits and repair as required.
e. Open the low side valve and the charge valve to allow the remaining refrigerant to flow into the refrigerant system.
f. When the transfer of refrigerant has stopped, close the valves.

8. Disconnect the refrigerant recovery/recycling/charging station from the refrigerant system service ports.
9. Reinstall the caps onto the refrigerant system service ports.

COMPRESSOR, A/C

DESCRIPTION

A/C CLUTCH

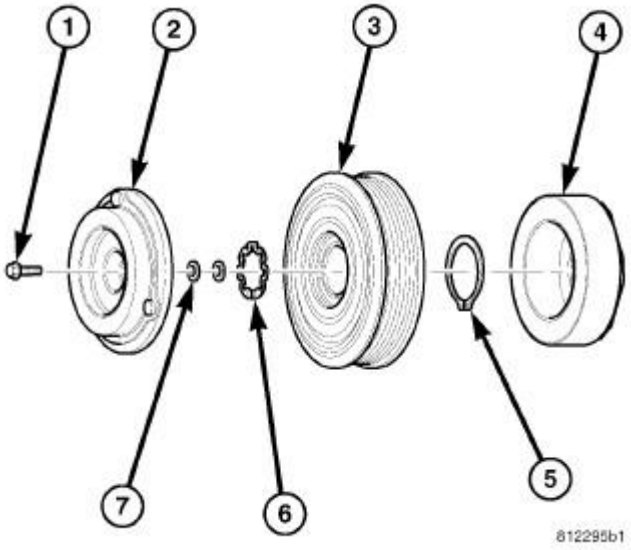


Fig. 116: A/C Compressor Clutch Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C clutch assembly shown in illustration.

The A/C compressor clutch assembly consists of a stationary electromagnetic A/C clutch field coil (4), pulley bearing and pulley assembly (3), clutch plate (2) and shims (7). These components provide the means to engage and disengage the A/C compressor from the engine accessory drive belt.

The A/C clutch field coil and the pulley bearing and pulley assembly are both retained on the nose of the A/C compressor with snap rings (5 and 6). The clutch plate is splined to the compressor shaft and secured with a bolt (1).

A/C COMPRESSOR

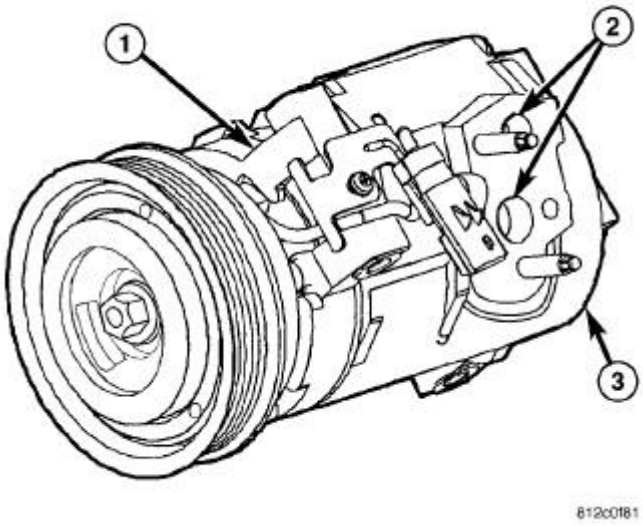


Fig. 117: Discharge Ports & Compressor Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor shown in illustration.

Models equipped with the 3.6L engine, use a Visteon RS-18 A/C compressor. Models equipped with the 3.0L, 5.7L and 6.4L engine, use a Denso 10SRE18 A/C compressor.

Both A/C compressors have a fixed displacement of 180 cubic centimeters (11 cubic inches) and have the suction and discharge ports (2) located on the compressor cylinder head (3), along with a label identifying the use of R-134a refrigerant.

HIGH PRESSURE RELIEF VALVE

A high pressure relief valve is located on the compressor cylinder head at the rear of the A/C compressor. Refer to **COMPRESSOR, A/C, DESCRIPTION**. This mechanical valve is designed to vent refrigerant from the A/C system to protect against damage to the A/C compressor and other A/C system components caused by condenser air flow restriction or an overcharge of refrigerant.

OPERATION

A/C CLUTCH

The A/C clutch components provide the means to engage and disengage the A/C compressor from the moving engine accessory drive belt. A/C clutch engagement is controlled by the Powertrain Control Module (PCM). When the PCM energizes the electromagnetic A/C clutch coil, it magnetically draws the clutch plate into contact with the clutch pulley and drives the compressor shaft. When the coil is not energized, the pulley freewheels on the clutch hub bearing, which is part of the pulley assembly.

A/C clutch components cannot be repaired and must be replaced if inoperative or damaged.

A/C COMPRESSOR

The A/C compressor is driven by the engine through an electric clutch, drive pulley and belt arrangement. The A/C compressor is lubricated by refrigerant oil that is circulated throughout the refrigerant system with the refrigerant.

The A/C compressor draws in low-pressure refrigerant vapor from the A/C evaporator through its suction port. It then compresses the refrigerant into a high-pressure, high-temperature refrigerant vapor, which is then pumped to the A/C condenser through the compressor discharge port.

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level can prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

The A/C compressor cannot be repaired and must be replaced if inoperative or damaged. The compressor clutch, pulley and bearing assembly, and clutch field coil are available for service. If an internal failure of the A/C compressor has occurred, the A/C receiver/drier must also be replaced. Refer to **DRIER, A/C RECEIVER, REMOVAL**.

HIGH PRESSURE RELIEF VALVE

The high pressure relief valve vents refrigerant from the A/C system when a discharge pressure of 3445 to 4135 kPa (500 to 600 psi) or above is reached. The high pressure relief valve closes with a minimum discharge pressure of 2756 kPa (400 psi) is reached.

The high pressure relief valve should not open when the A/C system is operating correctly. If the high pressure relief valve vents refrigerant, there is most likely a problem within the A/C refrigerant system. The high pressure relief valve vents only enough refrigerant to reduce the A/C system pressure, and then re-seats itself. If the high pressure relief valve vents refrigerant, see the A/C System Diagnosis chart. Refer to **DIAGNOSIS AND TESTING**.

The high pressure relief valve is factory-calibrated and cannot be adjusted or repaired, and must not be removed or otherwise disturbed. The valve is only serviced as a part of the A/C compressor.

DIAGNOSIS AND TESTING

A/C CLUTCH COIL

The A/C clutch coil electrical circuit is controlled by the Powertrain Control Module (PCM), through a relay in the Power Distribution Center (PDC). See Wiring Information for complete HVAC wiring diagrams. Begin testing of a suspected A/C clutch coil problem by performing the preliminary checks.

PRELIMINARY CHECKS

1. Using a scan tool, check for Diagnostic Trouble Codes (DTCs) related to the A/C heater module, Body Control Module (BCM), PCM and PDC. If no DTCs are found, go to 2. If any DTCs are found, repair as required.
2. Check the A/C clutch fuse in the PDC. If OK, go to 3. If not OK, repair the shorted circuit and replace the fuse.
3. If the A/C clutch still will not engage, verify the refrigerant charge level by conducting the A/C Performance test. Refer to **DIAGNOSIS AND TESTING**. If the refrigerant charge level is OK, go to **COIL RESISTANCE TEST** and **COIL CURRENT DRAW TEST**. If the refrigerant charge level is not OK, adjust the refrigerant charge as required.

COIL RESISTANCE TEST

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the A/C clutch coil connector.
3. Use an ohm meter and Back Probe Tool (special tool #6801, Terminal Probe) and measure the resistance of the A/C clutch coil at the coil connector terminals.
4. See **A/C CLUTCH COIL SPECIFICATIONS** for acceptable A/C clutch coil resistance. Specifications apply for a work area temperature of 21° C (70° F).
    1. If the A/C clutch coil reading is below specifications, the coil is shorted and must be replaced.
    2. If the A/C clutch coil reading is above specifications, the coil is open and must be replaced.

COIL CURRENT DRAW TEST

1. Verify the battery state of charge. Refer to **BATTERY, DIAGNOSIS AND TESTING** .
2. Connect an ammeter (0 to 10 ampere scale selected) in series with the A/C clutch coil feed terminal using Back Probe Tool (special tool #6801, Terminal Probe). Connect a voltmeter (0 to 20 volt scale selected) to measure voltage across the battery and the A/C clutch coil.
3. With the A/C heater control in the A/C mode and the blower motor at low speed, start the engine and allow it to run at a normal idle speed.
4. The A/C clutch should engage immediately and the clutch coil supply voltage should be within two volts of the battery voltage. If the clutch coil supply voltage is OK, go to5. If the coil supply voltage is not within two volts of battery voltage, test the clutch coil feed circuit for excessive voltage drop and repair as necessary.
5. See **A/C CLUTCH COIL SPECIFICATIONS** table for acceptable A/C clutch coil current draw. Specifications apply for a work area temperature of 21° C (70° F). If voltage is more than 12.5 volts, add electrical loads by turning on electrical accessories until voltage reads below 12.5 volts.
    1. If the A/C clutch coil current reading is zero, the coil is open and must be replaced.
    2. If the A/C clutch coil current reading is above specifications, the coil is shorted and must be replaced.

A/C CLUTCH COIL SPECIFICATIONS

Application	Coil Resistance	Coil Current Draw
3.0L/5.7L/6.4L Engines	3.3 - 3.5 ohms	3.2 amps Max @ 12V ± 0.5V @ 21° C (70° F)
3.6L Engine	3.0 - 4.0 ohms	3.1 - 4.0 amps @ 12V ± 0.5V @ 21° C (70° F)

A/C SYSTEM NOISE TESTING

When investigating an A/C system related noise, you must first know the conditions under which the noise occurs. These conditions include: weather, vehicle speed, transmission in gear or neutral, engine speed, engine temperature, and any other special conditions. Noises that develop during A/C operation can often be misleading. For example: What sounds like a failed front engine bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets or a loose compressor clutch assembly.

Drive belts are speed sensitive. At different engine speeds and depending upon drive belt tension, drive belts can develop noises that are mistaken for an A/C compressor noise. Improper drive belt tension can cause a misleading noise when the compressor clutch is engaged, which may not occur when the compressor clutch is disengaged. Check the accessory drive belt condition and tension as described in Cooling before beginning this procedure.

1. Select a quiet area for testing. Duplicate the complaint conditions as much as possible. Turn the A/C compressor On and Off several times to clearly identify the compressor noise. Listen to the A/C compressor while the clutch is engaged and disengaged. Probe the A/C compressor with an engine stethoscope or a long screwdriver with the handle held to your ear to better localize the source of the noise.
2. Loosen all of the compressor mounting hardware and retighten. Check the compressor clutch retainer. Be certain that the clutch field coil is mounted securely to the A/C compressor, and that the clutch plate and pulley are properly aligned and have the correct air gap. Refer to **COMPRESSOR, A/C, INSTALLATION**.
3. To duplicate high-ambient temperature conditions (high head pressure), restrict the air flow through the A/C condenser. Install a manifold gauge set or a scan tool to be certain that the discharge pressure does not exceed 2760 kPa (400 psi).
4. Check the refrigerant system plumbing for incorrect routing, rubbing or interference, which can cause unusual noises. Also check the refrigerant lines and hoses for kinks or sharp bends that will restrict refrigerant flow, which can cause noises.
5. If the noise is from opening and closing of the high pressure relief valve, recover, evacuate and recharge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**. and **PLUMBING, STANDARD PROCEDURE**.
6. If the high pressure relief valve still does not seat properly, replace the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL**.

STANDARD PROCEDURE

STANDARD PROCEDURE - A/C CLUTCH PLATE INSPECTION

NOTE: **The A/C clutch can be serviced in the vehicle. The refrigerant system can remain fully-charged during compressor clutch, pulley and bearing assembly, or coil replacement.**

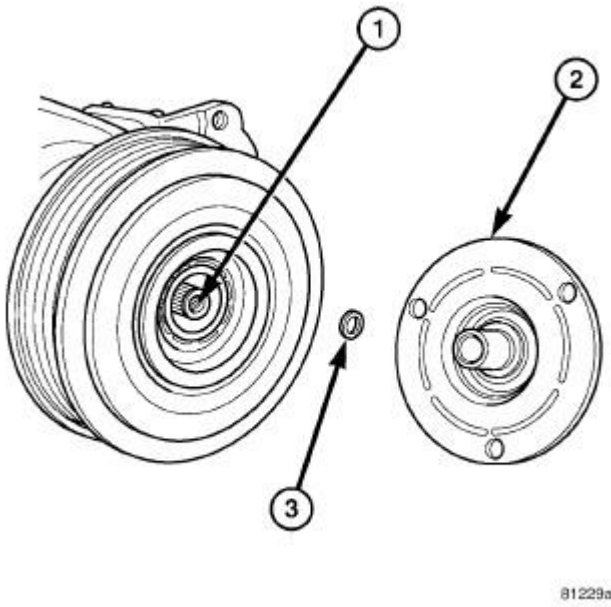


Fig. 118: Identifying Compressor Shaft, Clutch Plate & Shim
Courtesy of CHRYSLER GROUP, LLC

Examine the friction surfaces of the pulley and the clutch plate (2) for wear. The pulley and clutch plate should be replaced if excessive wear or scoring is found.

If the friction surfaces are oily, inspect the shaft and nose area of the A/C compressor (1) for refrigerant oil. If refrigerant oil is found, the compressor shaft seal is leaking and the A/C compressor must be replaced.

Check the pulley bearing for roughness or excessive leakage of grease. The pulley and clutch plate should be replaced if bearing roughness or excessive leakage is found.

REMOVAL

A/C CLUTCH

NOTE: **The compressor clutch assembly can be serviced with the refrigerant system fully-charged and with the A/C compressor installed on the engine.**

NOTE: **Typical A/C compressor and clutch assembly shown in illustrations.**

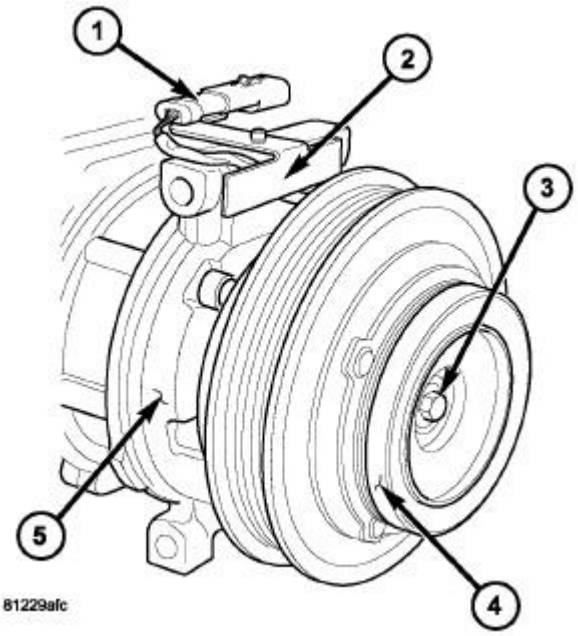


Fig. 119: Locating A/C Compressor Shaft Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. On 5.7L and 6.4L engine equipped models, remove the air intake hose and the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
3. Remove the radiator fan and shroud assembly. Refer to **FAN, COOLING, REMOVAL** .
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. Disconnect the engine wire harness from the compressor clutch field coil connector (1) located on the top of the A/C compressor (5).

   NOTE: Some models (depending on engine application) may require the A/C compressor to be removed from its installed location to gain access to the compressor shaft bolt and/or pulley and field coil snap rings. However, the refrigerant system can still remain fully charged.

6. Carefully remove the A/C clutch coil connector and wire lead from the connector bracket (2).
7. Remove the compressor shaft bolt (3). A band-type oil filter wrench or a strap wrench may be used to hold the clutch plate (4) from rotating during bolt removal.

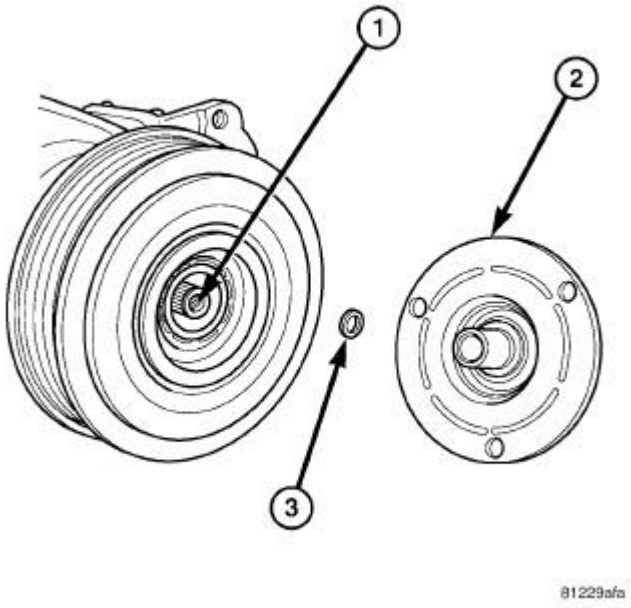


Fig. 120: Identifying Compressor Shaft, Clutch Plate & Shim
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry between the clutch plate and the pulley and bearing assembly to remove the clutch plate from the compressor shaft as this may damage the clutch plate.

NOTE: Use care not to lose any clutch shim(s) during removal of the clutch plate, as they may be reused during the clutch plate installation process.

8. Tap the clutch plate (2) lightly with a plastic mallet to release it from the splines on the compressor shaft (1) and remove the clutch plate and shim(s) (3).

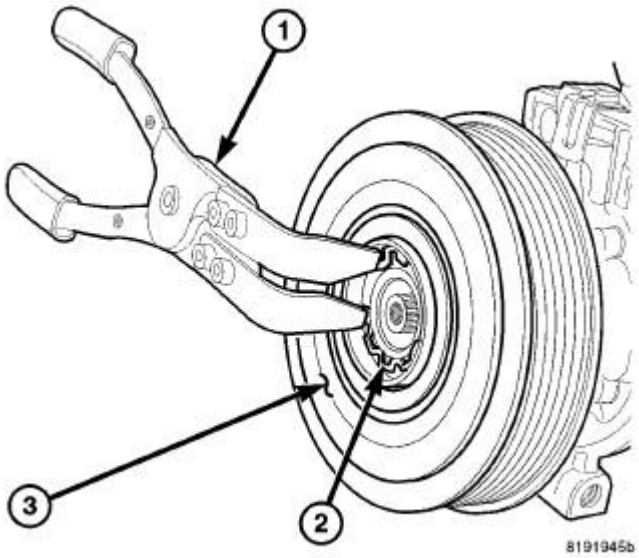


Fig. 121: Clutch Pulley & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

9. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, remove the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor and remove the pulley and bearing assembly.

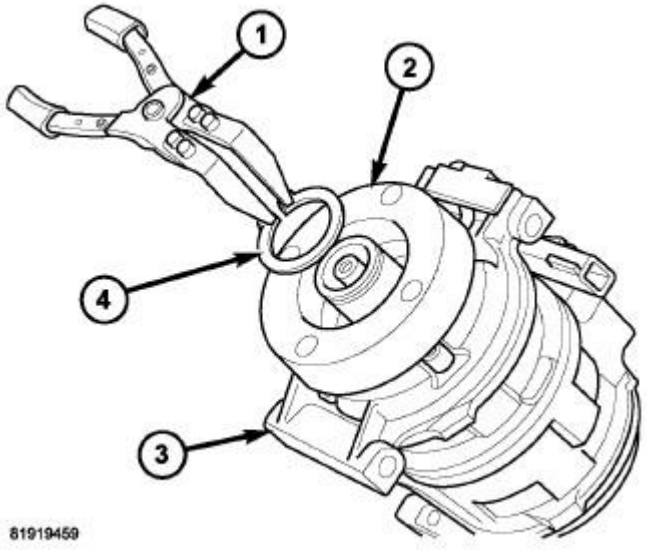


Fig. 122: Clutch Coil And Snap Ring
Courtesy of CHRYSLER GROUP, LLC

10. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, remove the snap ring (4) that secures the A/C clutch coil (2) to the front of the A/C compressor (3) and remove the coil.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and.PLUMBING, CAUTION. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor. Refer to DRIER, A/C RECEIVER, REMOVAL.

NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the A/C clutch, clutch coil or engine.

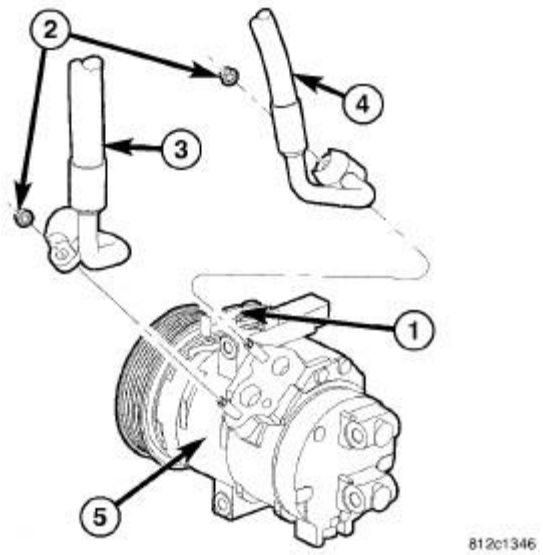


Fig. 123: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines show.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Disconnect the mass air flow sensor wire harness connector and remove the engine air cleaner housing.
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. Remove the nuts (2) that secure the A/C suction line (3) and A/C discharge line (4) to the A/C

compressor (5).

6. Disconnect the suction and discharge lines from the A/C compressor and remove and discard the seals.
7. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.

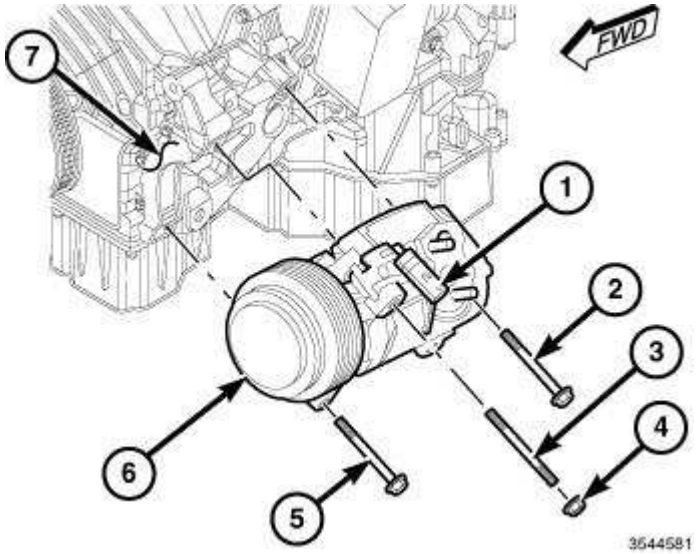


Fig. 124: bolts, A/C Clutch Electrical Connector, A/C Compressor & Bracket
Courtesy of CHRYSLER GROUP, LLC

8. Raise and support the vehicle.
9. Remove the front belly pan.
10. Remove the bolts (2 and 5) that secure the A/C compressor (6) to the A/C compressor bracket (7).
11. Lower the vehicle.
12. Disconnect the engine wire harness from the A/C clutch electrical connector (1).
13. Support the A/C compressor, remove the nut (4) and stud (3) that secures the A/C compressor to the bracket and remove the compressor.

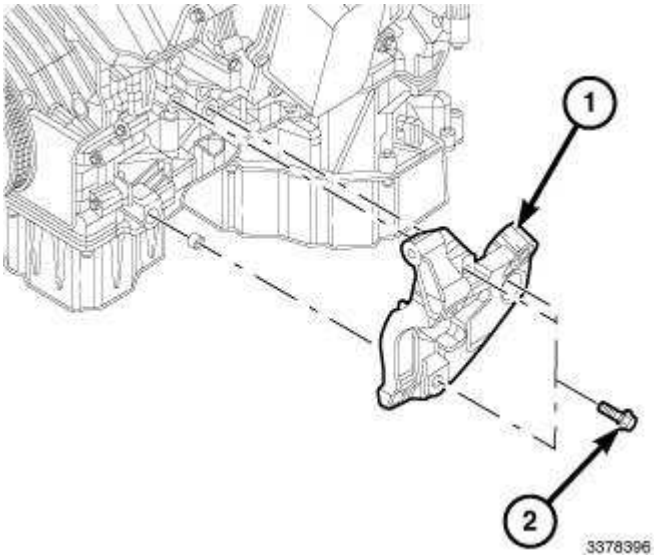


Fig. 125: A/C Compressor Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. If required, remove the bolts (2) that secure the A/C compressor bracket (1) to the engine and remove the bracket.

3.6L ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.

NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the A/C clutch, clutch coil or engine.

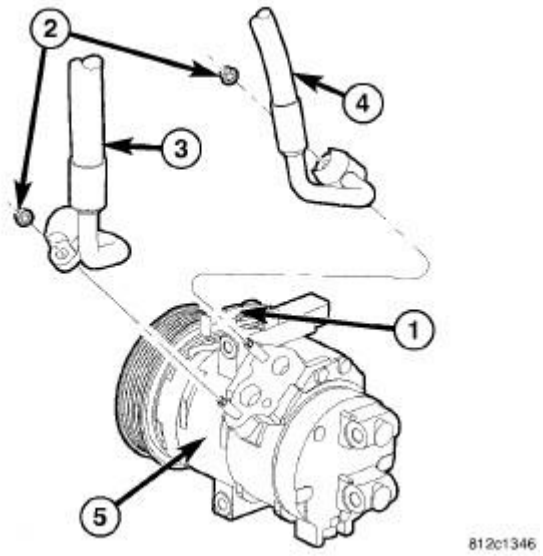


Fig. 126: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines show.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. Disconnect the engine wire harness from the A/C clutch connector (1).
6. Remove the nuts (2) that secure the A/C suction line (3) and A/C discharge line (4) to the A/C compressor (5).
7. Disconnect the suction and discharge lines from the A/C compressor and remove and discard the dual plane seals.
8. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.

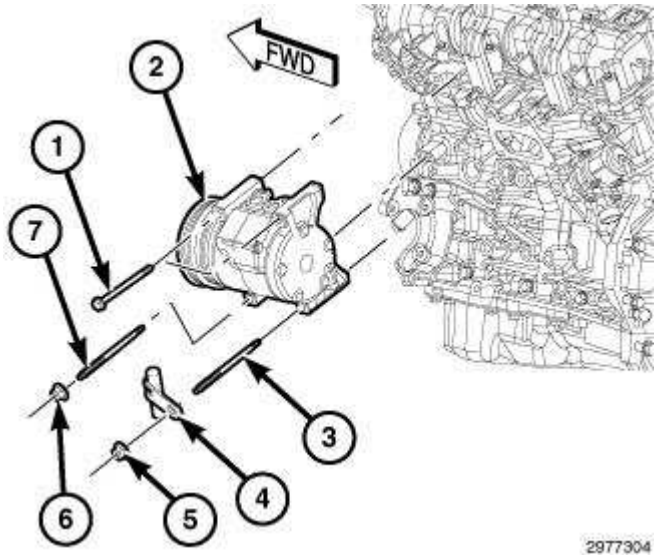


Fig. 127: Two Nuts, Two Studs, Bracket & Two Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the front belly pan. Refer to **BELLY PAN, REMOVAL** .
10. Remove the two nuts (5 and 6) and two studs (3 and 7).

CAUTION: Use care not to deform or damage the heater tube and bracket when servicing the A/C compressor.

11. Carefully position the heater tube and bracket (4) out of the way.
12. Support the A/C compressor and remove the two bolts (1).
13. Remove the A/C compressor from the engine compartment.

5.7L/6.4L ENGINES

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and. Refer to PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor. Refer to DRIER, A/C RECEIVER, REMOVAL.

NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the A/C clutch, clutch coil or engine.

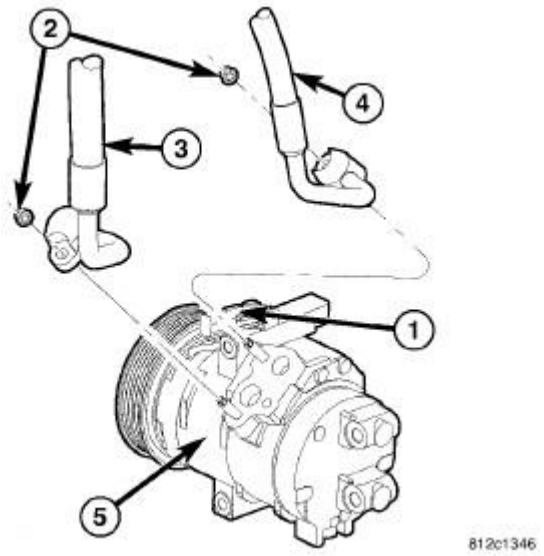


Fig. 128: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines shown in illustration.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing.
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. On SRT models, position the power steering pump and reservoir out of the way. Refer to **RESERVOIR, POWER STEERING PUMP, REMOVAL** .
6. Remove the nuts (2) that secure the A/C suction line (3) and A/C discharge line (4) to the A/C compressor (5).
7. Disconnect the suction and discharge lines from the A/C compressor and remove and discard the dual plane seals.
8. Disconnect the engine wire harness from the A/C clutch connector (1).
9. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.

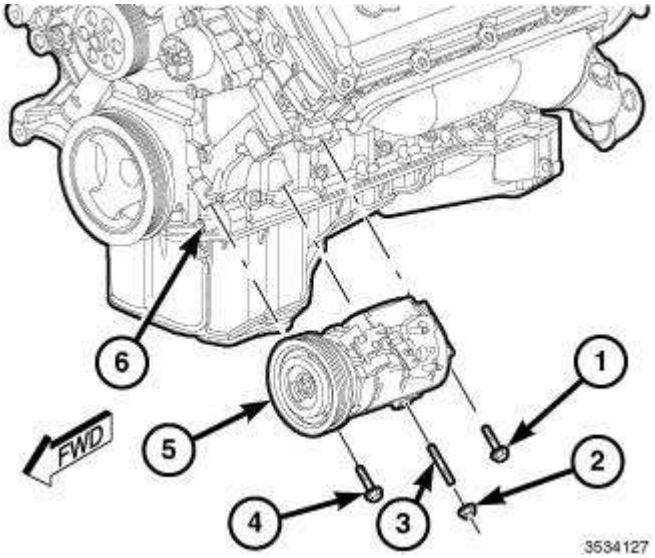


Fig. 129: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

10. Remove the front belly pan.
11. Remove the two bolts (1 and 4) that secure the A/C compressor (5) to the engine (6).
12. Support the A/C compressor and remove the nut (2) and stud (3).
13. Remove the A/C compressor from the engine compartment.

INSTALLATION

A/C CLUTCH

NOTE: Typical A/C compressor and clutch assembly shown in illustrations.

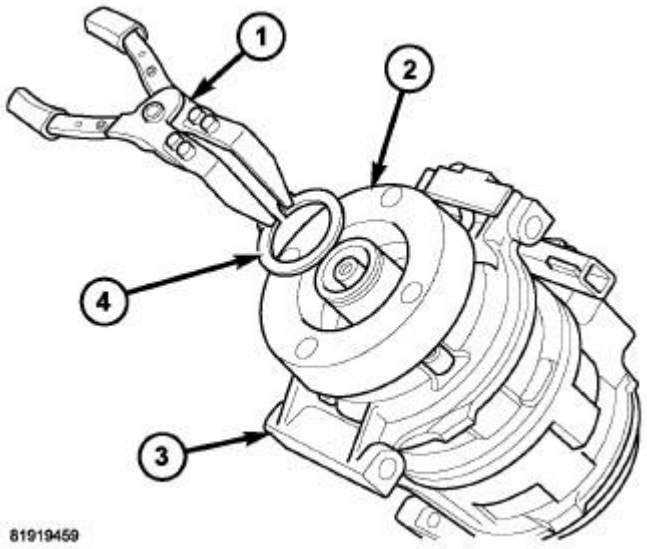


Fig. 130: Clutch Coil And Snap Ring
Courtesy of CHRYSLER GROUP, LLC

1. Align the dowel pin on the back of the A/C clutch coil (2) with the hole in the front of the A/C compressor (3) and position the coil onto the compressor. Be certain that the A/C clutch coil wire lead is properly routed so that it is not pinched between the compressor housing and the coil.

CAUTION: The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.

NOTE: A new snap ring must be used to secure the A/C clutch coil to the A/C compressor. The bevel side of the snap ring must face outward and both snap ring eyelets must be oriented to the right or to the left of the coil dowel pin location on the A/C compressor.

2. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, install the snap ring (4) that secures the A/C clutch coil to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove and oriented correctly.

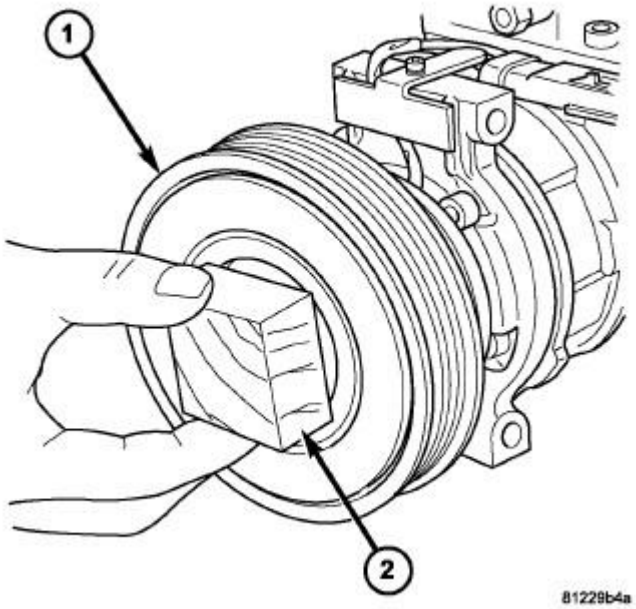


Fig. 131: Identifying Pulley & Bearing Assembly
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Be certain to position the A/C clutch coil wire lead so that it is not damaged during A/C compressor pulley and bearing installation.

CAUTION: When installing the pulley and bearing assembly, DO NOT mar the friction surfaces of the pulley or premature failure of the clutch will result.

3. Install the pulley and bearing assembly (1) onto the front of the A/C compressor. If necessary, tap the pulley gently with a block of wood (2) placed on the pulley friction surface.

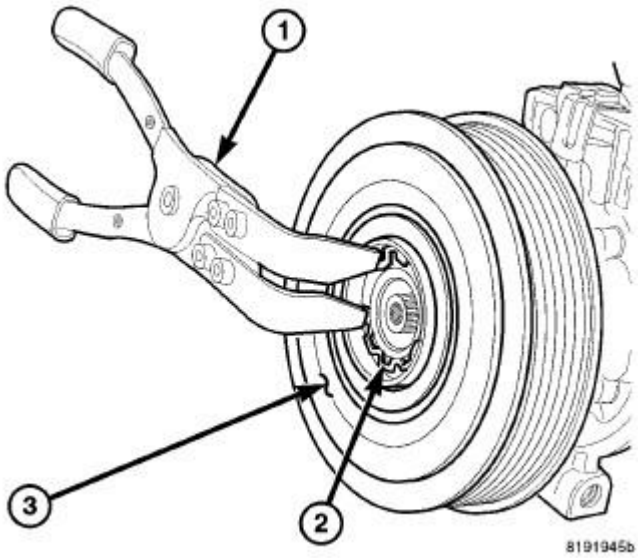


Fig. 132: Clutch Pulley & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.

NOTE: A new snap ring must be used to secure the pulley and bearing assembly to the A/C compressor. The bevel side of the snap ring must face outward.

4. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, install the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove.

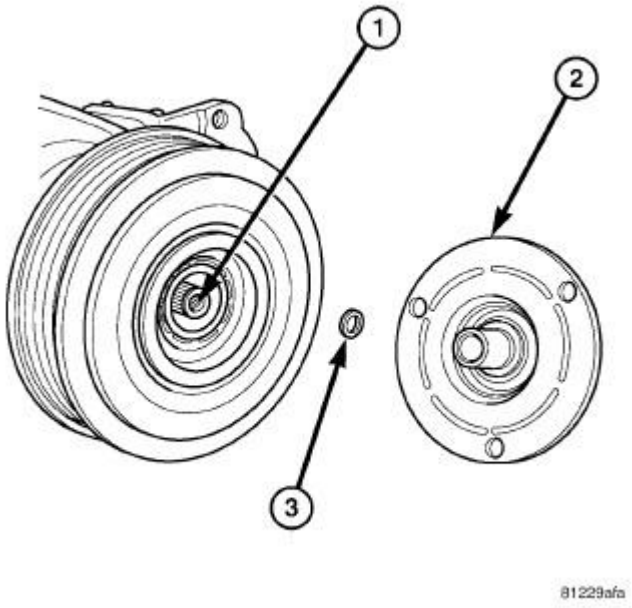


Fig. 133: Identifying Compressor Shaft, Clutch Plate & Shim
Courtesy of CHRYSLER GROUP, LLC

5. If the original clutch plate (2) and pulley and bearing assembly are to be reused, reinstall the original shim(s) (3) onto the compressor shaft (1). If a new clutch plate and pulley and bearing assembly are being used, install a trial stack of shims 2.54 mm (0.010 in.) thick onto the compressor shaft.

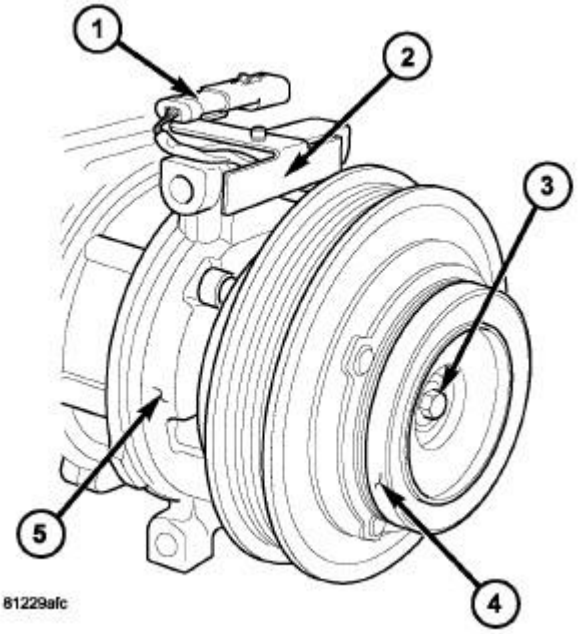


Fig. 134: Locating A/C Compressor Shaft Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the clutch plate (4) onto the front of the A/C compressor (5).
7. Install the compressor shaft bolt (3). Tighten the bolt to 19 N.m (168 in. lbs.).

NOTE: The shims may compress after tightening the shaft bolt. Check the air gap in four or more places to verify the air gap is correct. Spin the pulley before performing a final check of the air gap.

NOTE: On models with the clutch plate recessed into the pulley, use a 90° wire gap gauge to measure the clutch air gap. On other models, use a blade type feeler gauge to measure the air gap.

8. With the clutch plate assembled tight against the shim(s), measure the air gap between the clutch plate and the pulley and bearing assembly. The air gap should be between 0.35 - 0.60 mm (0.014 - 0.024 in.). If the air gap is not between specifications, add or subtract shims as needed until the correct air gap is obtained.

CAUTION: Be certain that the A/C clutch coil wire lead is routed so that it is not pinched between the compressor housing and the coil connector bracket.

9. Carefully route the A/C clutch coil wire lead behind the connector bracket (2).
10. Install the A/C clutch coil connector (1) onto the connector bracket.
11. Connect the engine wire harness to the A/C clutch coil connector.
12. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
13. Install the radiator fan and shroud assembly. Refer to **FAN, COOLING, INSTALLATION** .
14. On 5.7L and 6.4L engine equipped models, install the air cleaner housing and air intake hose. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
15. Reconnect the negative battery cable.
16. Verify proper A/C clutch operation.

3.0L ENGINE

CAUTION: If the A/C compressor is being replaced, be certain to adjust the refrigerant system oil level. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can

cause serious damage to the replacement A/C compressor. Refer to DRIER, A/C RECEIVER, REMOVAL.

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be removed from the new A/C compressor. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

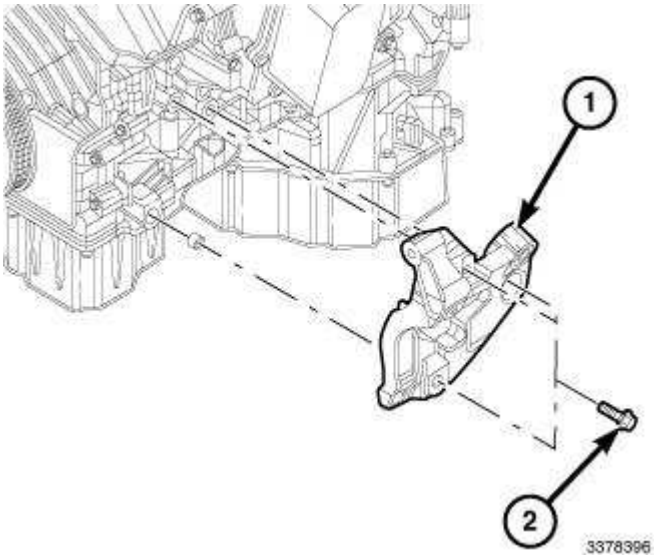


Fig. 135: A/C Compressor Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the A/C compressor bracket (1) and retaining bolts (2). Tighten the bolts 45 N.m (33 ft. lbs.).

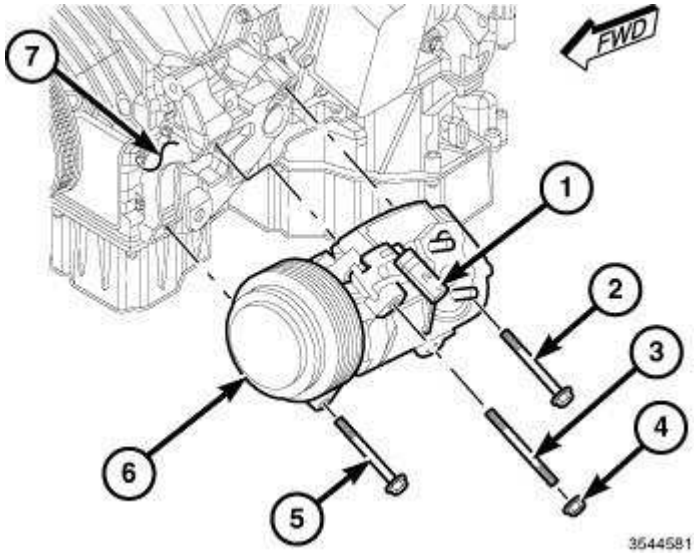


Fig. 136: bolts, A/C Clutch Electrical Connector, A/C Compressor & Bracket
Courtesy of CHRYSLER GROUP, LLC

2. If the A/C compressor (6) is being replaced, the refrigerant oil in the old compressor must be first drained and measured. Then the oil in the new A/C compressor must be drained. Finally, the new compressor must be refilled with the same amount of new refrigerant oil that was drained out of the old compressor. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Position the A/C compressor to the A/C compressor bracket (7) and install the stud (3). Tighten the stud to 10 N.m (89 in. lbs.).
4. Install and hand tighten the nut (4) that secures the A/C compressor to the bracket.
5. Raise and support the vehicle.
6. Install and hand tighten the two bolts (2 and 5) that secure A/C compressor to the bracket.
7. Tighten the two bolts to 28 N.m (21 ft. lbs.) using the following sequence:
   - Bolt at rear of compressor.
   - Bolt at front of compressor.
8. Install the belly pan.
9. Lower the vehicle.
10. Tighten the nut at the front of the A/C compressor to 28 N.m (21 ft. lbs.).
11. Connect the engine wire harness to the A/C clutch electrical connector (1).

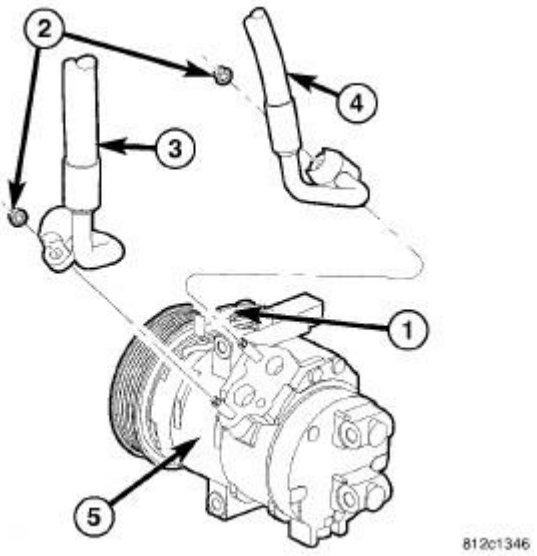


Fig. 137: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines show.

12. Remove the tape or plugs from the opened fittings on the A/C suction line (3) and the A/C discharge line (4) and the compressor ports.
13. Lubricate new dual plane seals with clean refrigerant oil and install them onto the suction and the discharge line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
14. Connect the suction and discharge lines onto the A/C compressor (5).
15. Install the nuts (2) that secure the suction and discharge lines to the A/C compressor. Tighten the nuts to 23 N.m (17 ft. lbs.).

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor. Refer to DRIER, A/C RECEIVER, REMOVAL.

16. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
17. Install the engine air cleaner housing and connect the wire harness to the mass air flow sensor.
18. Evacuate and charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
19. Install the engine trim cover.
20. Reconnect the negative battery cable.

CAUTION: If the A/C compressor is being replaced, be certain to adjust the refrigerant system oil level. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be removed from the new A/C compressor. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

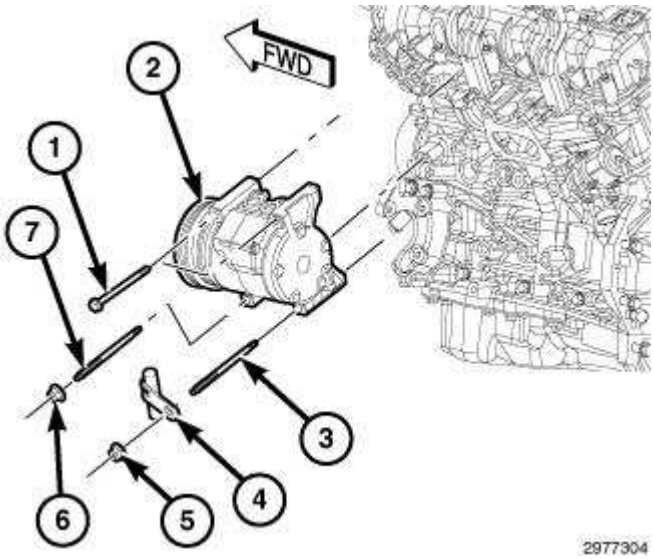


Fig. 138: Two Nuts, Two Studs, Bracket & Two Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If the A/C compressor (2) is being replaced, the refrigerant oil in the old compressor must be first drained and measured. Then the oil in the new A/C compressor must be drained. Finally, the new compressor must be refilled with the same amount of new refrigerant oil that was drained out of the old compressor. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Position the A/C compressor to the engine and install the two studs (3 and 7). Tighten the studs to 10 N.m (89 in. lbs.).

3. Loosely install the two bolts (1)
4. Reposition the heater tube and bracket (4) and loosely install the two nuts (5 and 6).
5. Tighten the bolts and nuts to 28 N.m (21 ft. lbs.) using the following sequence:
    - Bolt at front of compressor.
    - Nut at front of compressor.
    - Bolt at rear of compressor.
    - Nut at rear of compressor.
6. Install the front belly pan. Refer to **BELLY PAN, INSTALLATION** .

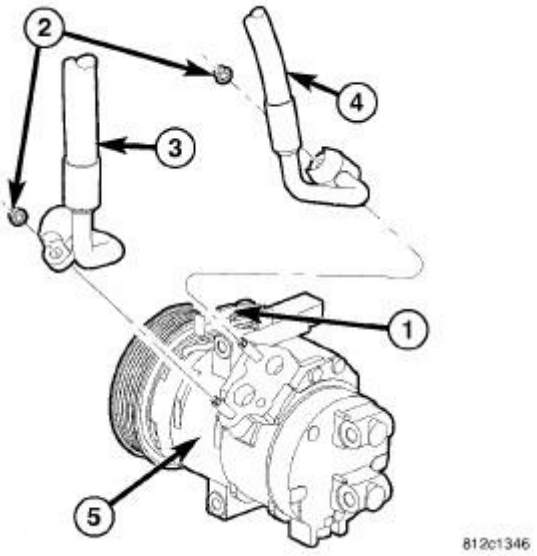


Fig. 139: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines show.

7. Remove the tape or plugs from the opened fittings on the A/C suction line (3) and the A/C discharge line (4) and the compressor ports.
8. Lubricate new dual plane seals with clean refrigerant oil and install them onto the suction and the discharge line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
9. Connect the suction and discharge lines onto the A/C compressor (5).
10. Install the nuts (2) that secure the suction and discharge lines to the A/C compressor. Tighten the nuts to 23 N.m (17 ft. lbs.).
11. Connect the engine wire harness to the A/C clutch connector (1).
12. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
13. Replace the A/C receiver/drier if the A/C compressor is being replaced due to an internal failure. Refer to **DRIER, A/C RECEIVER, REMOVAL**.

14. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
15. Reconnect the negative battery cable.
16. Evacuate and charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

5.7L/6.4L ENGINES

CAUTION: If the A/C compressor is being replaced, be certain to adjust the refrigerant system oil level. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor. Refer to DRIER, A/C RECEIVER, REMOVAL.

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be removed from the new A/C compressor. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

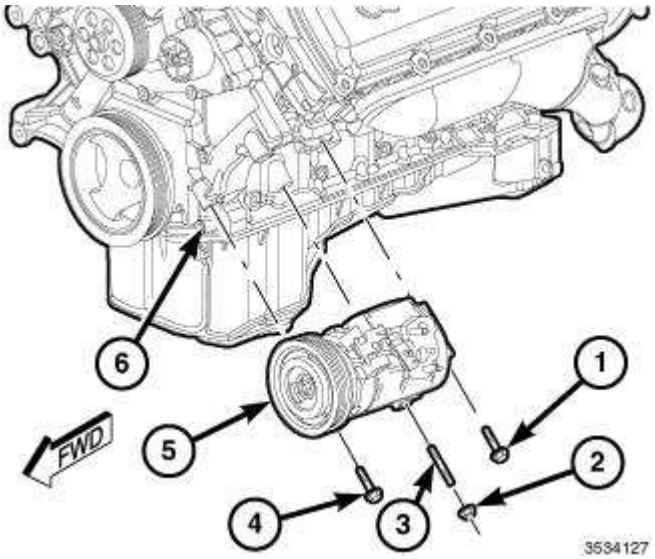


Fig. 140: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

1. If the A/C compressor (5) is being replaced, the refrigerant oil in the old compressor must be first drained and measured. Then the oil in the new A/C compressor must be drained. Finally, the new compressor must be refilled with the same amount of new refrigerant oil that was drained out of the old compressor. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Position the A/C compressor to the engine (6) and install the stud (3). Tighten the stud to 10 N.m (89 in. lbs.).
3. Loosely install the two bolts (1 and 4) and one nut (2) that secure the A/C compressor to the engine.
4. Tighten the nut and bolts to 28 N.m (21 ft. lbs.) using the following sequence:
    - Nut at front of compressor.
    - Bolt at front of compressor.
    - Bolt at rear of compressor.
5. Install the front belly pan.

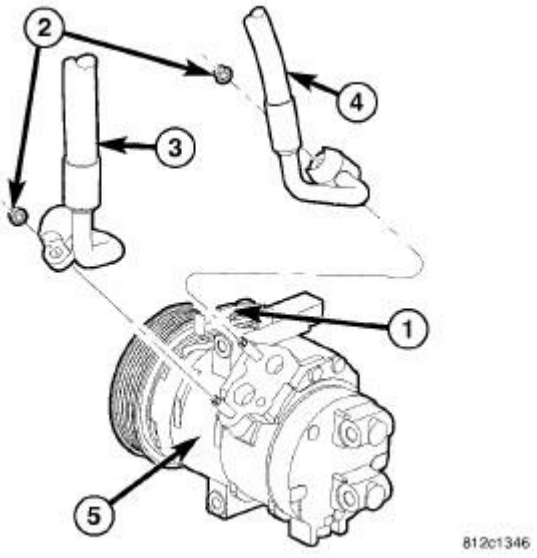


Fig. 141: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines shown in illustration.

6. Connect the engine wire harness to the A/C clutch connector (1).
7. Remove the tape or plugs from the opened fittings on the A/C suction line (3) and the A/C discharge line (4) and the compressor ports.
8. Lubricate new dual plane seals with clean refrigerant oil and install them onto the suction and the discharge line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C

compressor in the vehicle.

9. Connect the A/C suction and discharge lines onto the A/C compressor (5).
10. Install the nuts (2) that secure the A/C suction and discharge lines to the A/C compressor. Tighten the nuts to 23 N.m (17 ft. lbs.).

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor. Refer to DRIER, A/C RECEIVER, REMOVAL.

11. On SRT models, reposition the power steering pump and reservoir. Refer to **RESERVOIR, POWER STEERING PUMP, INSTALLATION** .
12. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
13. Install the air cleaner housing.
14. Reconnect the negative battery cable.
15. Evacuate and charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

CONDENSER, A/C

DESCRIPTION

DESCRIPTION

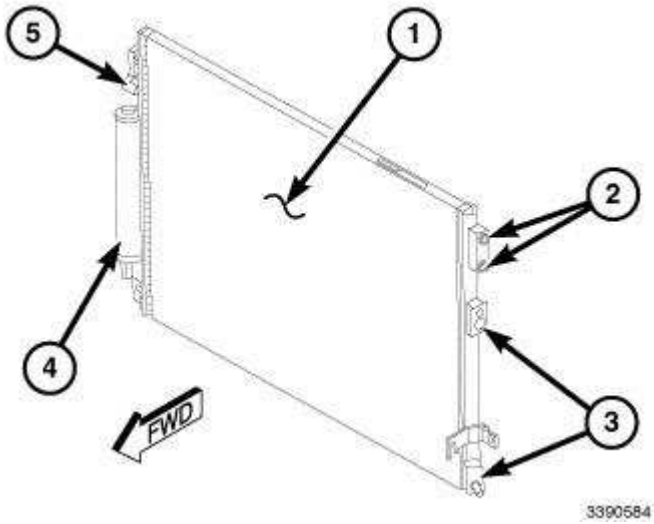


Fig. 142: A/C Condenser, A/C Refrigerant Lines, Receiver/Drier, Brackets & Integral Automatic Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

The A/C condenser (1) is located in the front of the engine compartment behind the front fascia. The A/C condenser is a heat exchanger that allows the high-pressure refrigerant gas being discharged by the A/C compressor to give up its heat to the air passing over the condenser fins, which causes the

refrigerant to cool and change to a liquid state.

The A/C condenser is equipped with tapping blocks for the A/C refrigerant lines (3) and for the receiver/drier (4), mounting brackets (5) and fittings for the integral automatic transmission cooler (2).

OPERATION

OPERATION

When air passes through the fins of the A/C condenser, the high-pressure refrigerant gas within the A/C condenser gives up its heat. The refrigerant then condenses as it leaves the A/C condenser and becomes a high-pressure liquid. The volume of air flowing over the condenser fins is critical to the proper cooling performance of the A/C system. Therefore, it is important that there are no objects placed in front of the radiator grille openings at the front of the vehicle or foreign material on the condenser fins that might obstruct proper air flow. Also, any factory-installed air seals or shrouds must be properly reinstalled following radiator or A/C condenser service.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The A/C condenser has no serviceable parts. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever a refrigerant line is disconnected from the A/C condenser.

The A/C condenser cannot be repaired and must be replaced if leaking or damaged.

REMOVAL

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

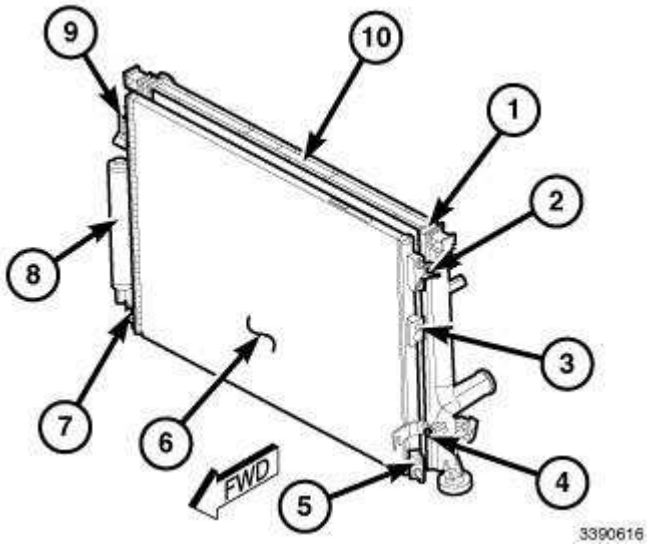


Fig. 143: Transmission Cooler Ports, Refrigerant Line Fittings, Four Bolts, Secure A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with A/C condenser and radiator removed from vehicle for clarity.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
4. Disconnect the automatic transmission cooler lines from the automatic transmission cooler ports (1) and install plugs in the cooler ports.
5. If equipped with 3.0L diesel engine, remove the charge air cooler. Refer to **COOLER AND HOSES, CHARGE AIR, REMOVAL** .
6. Disconnect the A/C discharge line and A/C liquid line from refrigerant line fittings (3 and 5). Refer to **LINE, A/C LIQUID, REMOVAL** and **LINE, A/C DISCHARGE, REMOVAL**.
7. Install plugs in, or tape over, the opened refrigerant line fittings and condenser ports.
8. Remove the four bolts (2, 4, 7 and 9) that secure A/C condenser (6) to the radiator (10).
9. Carefully tilt the bottom of the A/C condenser forward and lower the condenser out of the vehicle.
10. If required, place the A/C condenser onto a workbench and remove the A/C receiver/drier (8). Refer to **DRIER, A/C RECEIVER, REMOVAL**.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C

refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets may result in a refrigerant system leak.

NOTE: Be certain that each of the radiator and condenser air seals are installed in their proper locations. These air seals are required for the A/C and engine cooling systems to perform as designed.

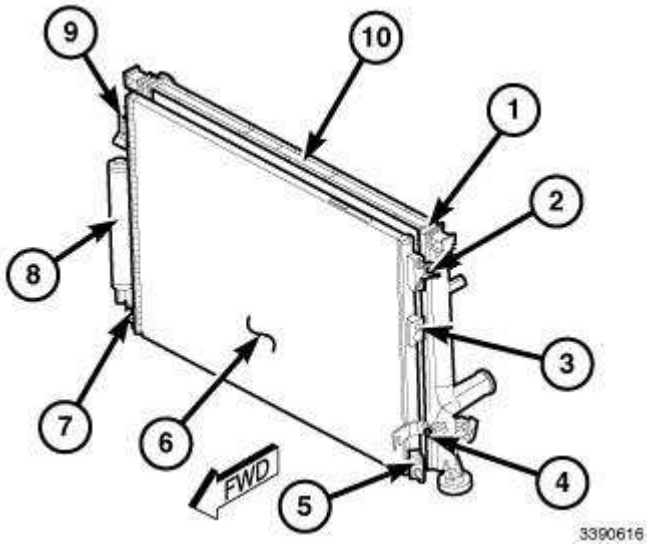


Fig. 144: Transmission Cooler Ports, Refrigerant Line Fittings, Four Bolts, Secure A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

NOTE: Illustration shown with A/C condenser and radiator removed from vehicle for clarity.

1. If required, install the A/C receiver/drier (8) onto the A/C condenser (6). Refer to **DRIER, A/C RECEIVER, INSTALLATION**.

2. Carefully position the A/C condenser to the radiator (10).
3. Install the four bolts (2, 4, 7 and 9) that secure the A/C condenser to the radiator. Tighten the bolts to 5 N.m (44 in. lbs.).
4. Remove the tape or plugs from the opened refrigerant line fittings and condenser ports.
5. Connect the A/C discharge line and the A/C liquid line to the refrigerant line tapping blocks (3 and 5). Refer to **LINE, A/C DISCHARGE, INSTALLATION** and **LINE, A/C LIQUID, INSTALLATION**.
6. If equipped with 3.0L diesel engine, install the charge air cooler. Refer to **COOLER AND HOSES, CHARGE AIR, INSTALLATION** .
7. Remove the plugs and connect the automatic transmission cooler lines to the cooler ports (1).
8. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
9. Reconnect the negative battery cable.
10. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
11. If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
12. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
13. Check the automatic transmission fluid level and fill as required.

CORE, HEATER

DESCRIPTION

DESCRIPTION

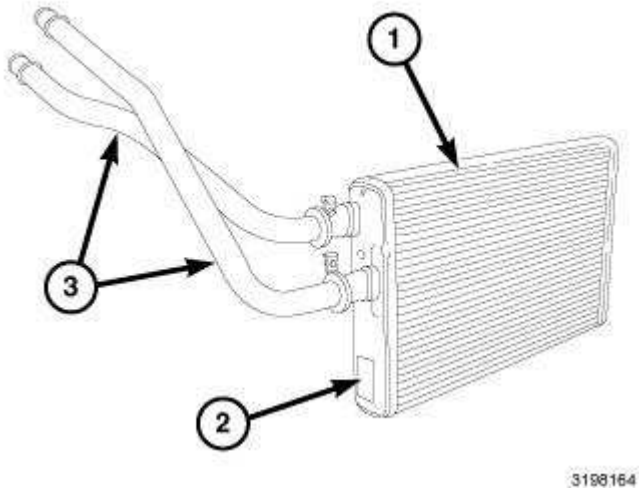


Fig. 145: Heater Core, Tubes & Tank
Courtesy of CHRYSLER GROUP, LLC

The heater core (1) is mounted into the left side of the air distribution housing, which is located behind the instrument panel. The heater core is a heat exchanger made of rows of tubes with fins. The heater core is positioned within the air distribution housing so that only the selected amount of air entering the housing passes through the heater core, before being distributed through the heating and A/C system ducts and outlets. One end of the heater core has a tank (2) that includes fittings for the heater core tubes (3) and O-ring seals.

The heater core be serviced without removing the HVAC housing from the vehicle.

OPERATION

OPERATION

Engine coolant is circulated through the heater hoses to the heater core at all times. As the coolant flows through the heater core, heat is removed from the engine and is transferred to the heater core tubes and fins. Air directed through the heater core picks up the heat from the heater core fins. The blend-air door(s) allows control of the heater output air temperature by regulating the amount of air flowing through the heater core. The blower motor speed controls the volume of air flowing through the HVAC housing.

The heater core cannot be repaired and must be replaced if restricted, leaking or damaged.

REMOVAL

REMOVAL

WARNING: Refer to the applicable Warnings and Cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: LHD model shown in illustration. RHD model similar.

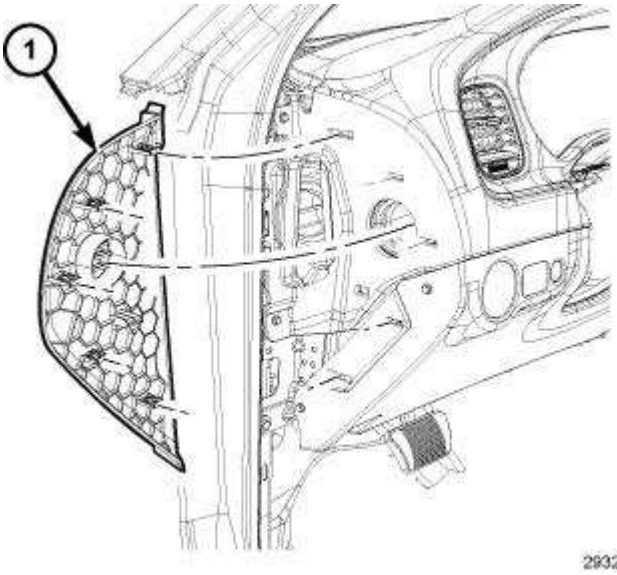


Fig. 146: End Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration. Right side similar.

1. Disconnect and isolate the negative battery cable.
2. Drain the engine cooling system. Refer to **STANDARD PROCEDURE** .
3. Remove the left and right side instrument panel silencers. Refer to **PANEL, SILENCER, REMOVAL** .
4. Using (special tool #C-4755, Trim Stick) or equivalent, remove the left and right side instrument panel end caps (1).

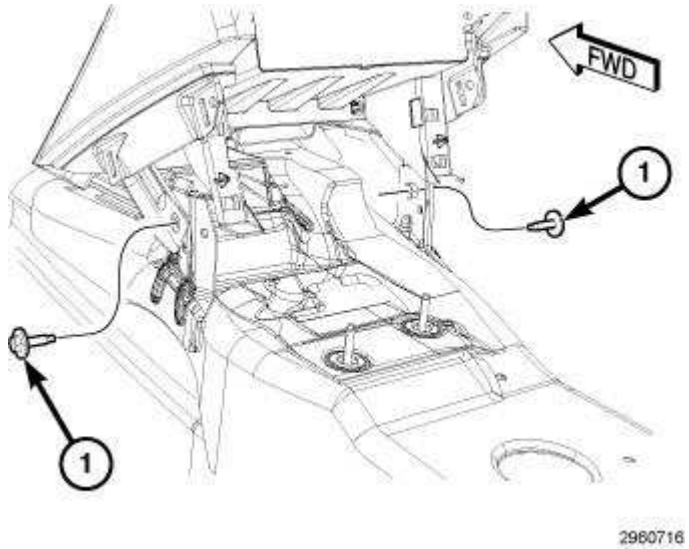


Fig. 147: Floor Pan Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the steering column. Refer to **COLUMN, REMOVAL** .
6. Remove the center floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
7. Remove the two bolts (1) that secure the center of the instrument panel to the floor pan.

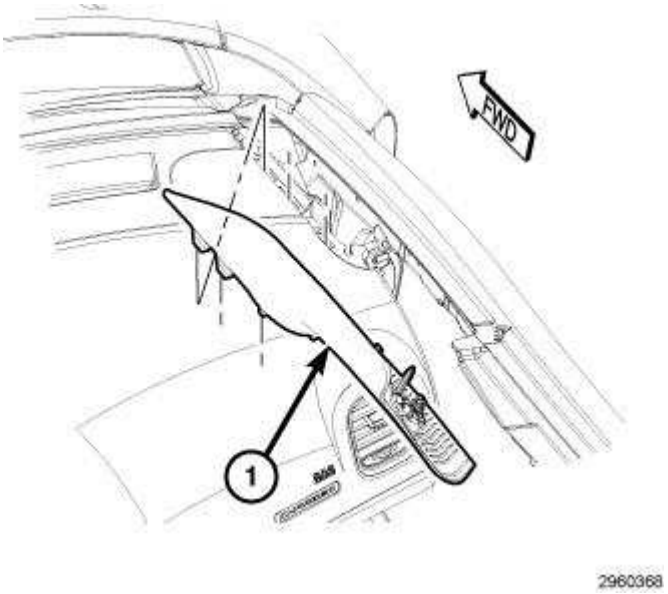


Fig. 148: A-Pillar Trim Panels
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration. Right side similar.

8. Remove the left and right side A-pillar trim panels (1). Refer to **PANEL, A-PILLAR TRIM, REMOVAL** .

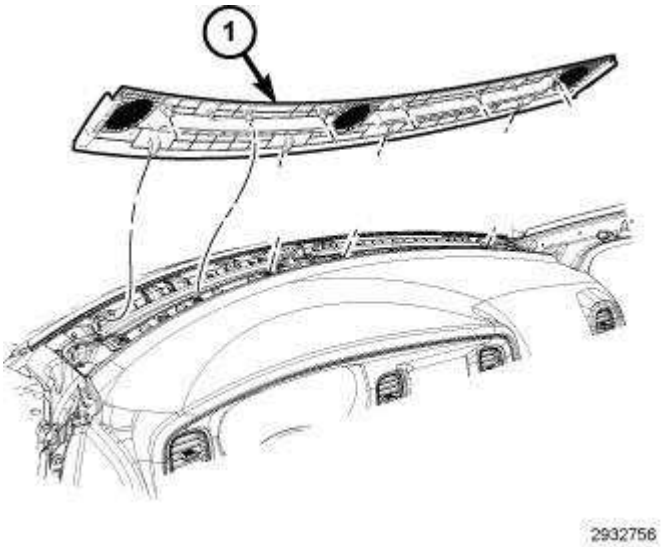


Fig. 149: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

9. Using (special tool #C-4755, Trim Stick) or equivalent, remove the defroster grille (1).

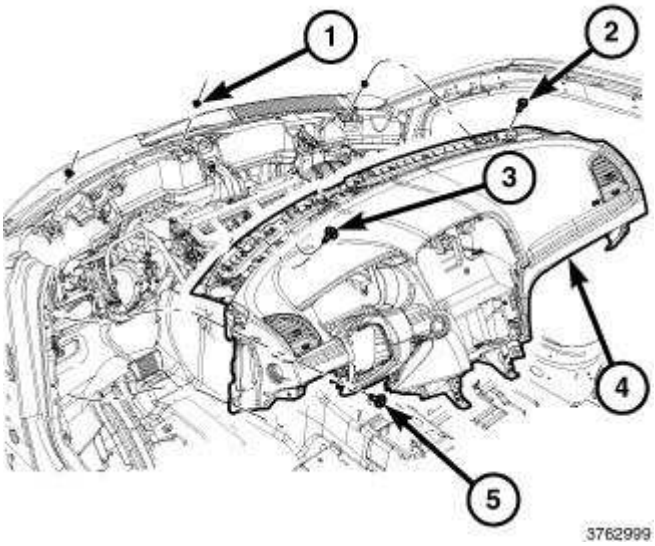


Fig. 150: Defroster Grille, Screws, Instrument Panel, Two Bolts & Two Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the three screws (2) that secure the top of the instrument panel (4) to the spring nuts (1).
11. Remove the two bolts (3) that secure the top of the instrument panel to the cowl panel.
12. Remove the two bolts (5) that secure the left and right side of the instrument panel to the body.
13. Disengage the retaining tabs that secure the left and right side of the instrument panel to the body.

NOTE: Make sure to leave the right side door open when repositioning the left side of the instrument panel.

14. For clearance, carefully position the left side of the instrument panel rearward approximately 50 mm (2 in.).

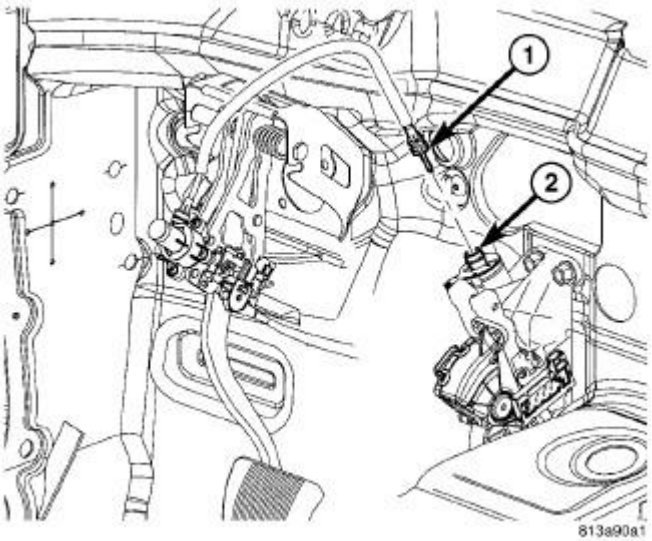


Fig. 151: Cable Attachment To Accelerator Module
Courtesy of CHRYSLER GROUP, LLC

15. When equipped with power adjustable pedals, disconnect the adjuster cable (1) from the accelerator pedal adjuster motor (2) and position the cable out of the way.

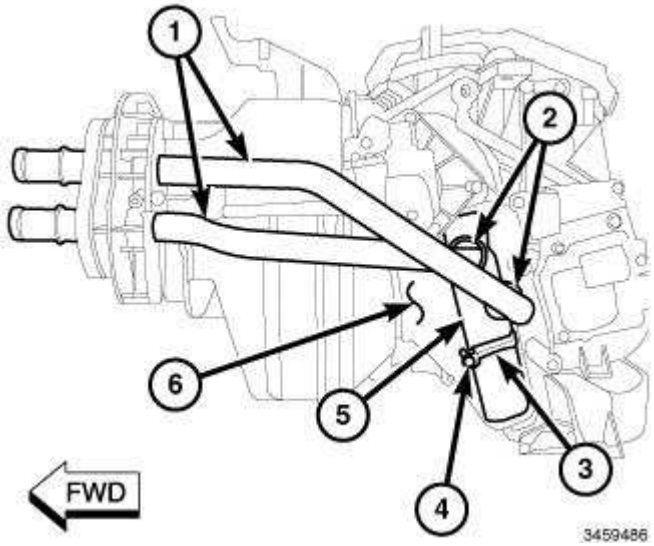


Fig. 152: Two Clamps, Heater Core Tubes, Heater Core, Screw, Heater Core Bracket & HVAC Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Take proper precautions to protect the carpeting and interior trim from engine coolant. Have absorbent toweling readily available to clean up any spills.

NOTE: **If required, use your fingers to rotate the clamps to gain access to the clamp retaining screws.**

16. Remove the two clamps (2) that secure the heater core tubes (1) to the heater core (5).
17. Disconnect the heater core tubes from the heater core and position the tubes out of the way.
18. Remove and discard the heater core tube O-ring seals and install plugs in, or tape over, the opened tubes and heater core ports.
19. Remove the retaining screw (4) that secures the heater core bracket (3) to the driver side of the HVAC air distribution housing (6) and remove the bracket.

NOTE: **If the foam seal around the heater core is deformed or damaged, it must be replaced.**

20. Carefully pull the heater core straight out of the air distribution housing.

INSTALLATION

INSTALLATION

NOTE: **LHD model shown in illustration. RHD model similar.**

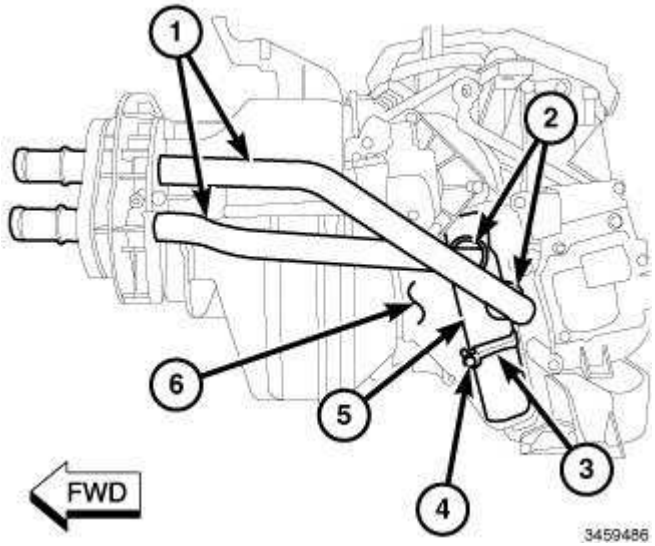


Fig. 153: Two Clamps, Heater Core Tubes, Heater Core, Screw, Heater Core Bracket & HVAC Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Carefully install the heater core (5) into the driver side of the HVAC air distribution housing (6).
2. Install the heater core bracket (3) and retaining screw (4). Tighten the screw to 2.2 N.m (20 in. lbs.).
3. Remove the tape or plugs from the heater core tubes (1) and the heater core ports.
4. Lubricate new O-ring seals with clean engine coolant and install them onto the heater core

tubes. Use only the specified O-ring seals as they are made of a special material for the engine cooling system.

5. Connect the heater core tubes to the heater core.
6. Install the two clamps (2) that secure the heater core tubes to the heater core. Tighten the screws on the clamps to 1.7 N.m (15 in. lbs.).

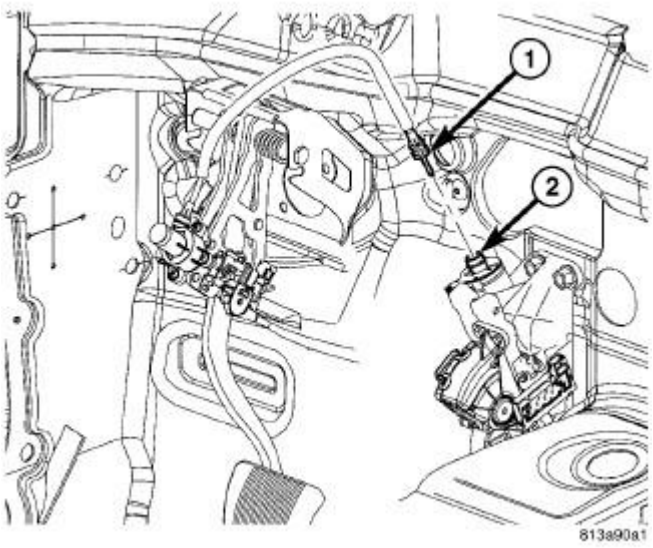


Fig. 154: Cable Attachment To Accelerator Module
Courtesy of CHRYSLER GROUP, LLC

7. When equipped with power adjustable pedals, reconnect the adjuster cable (1) to the accelerator pedal adjuster motor (2).

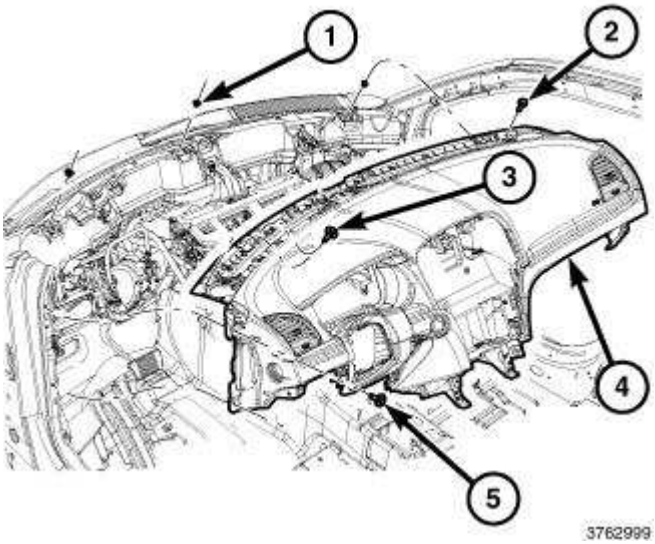


Fig. 155: Defroster Grille, Screws, Instrument Panel, Two Bolts & Two Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Carefully reposition the instrument panel (4) and engage the retaining tabs that secure the left and right side of the instrument panel to the body.
9. Install the two bolts (5) that secure the left and right side of the instrument panel to the body. Tighten the bolts to 16 N.m (12 ft. lbs.).
10. Install the three screws (2) that secure the top of the instrument panel to the spring nuts (1). Tighten the screws securely.
11. Install the two bolts (3) that secure the top of the instrument panel to the cowl panel. Tighten the bolts to 21 N.m (15 ft. lbs.).

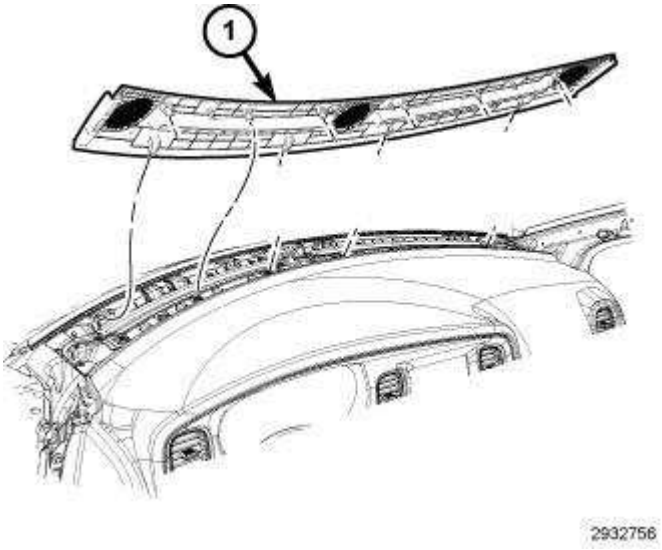


Fig. 156: Defroster Grille
Courtesy of CHRYSLER GROUP, LLC

12. Install the defroster grille (1). Make sure the retaining tabs are fully engaged.

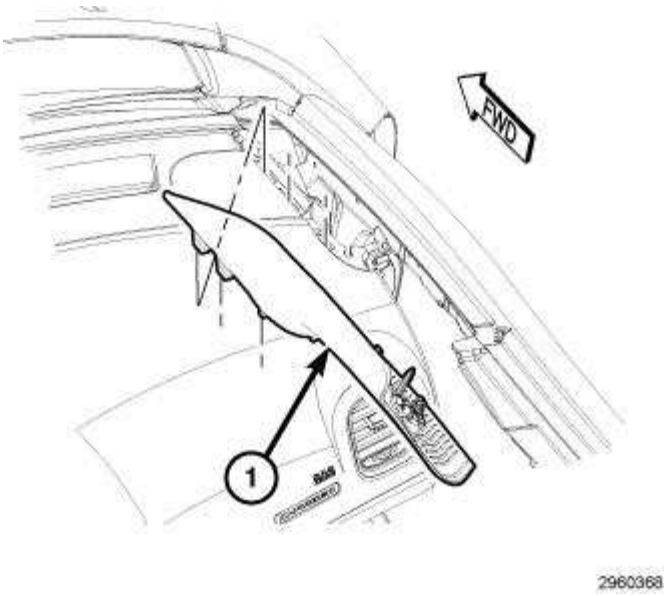


Fig. 157: A-Pillar Trim Panels
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration. Right side similar.

13. Install the left and right side A-pillar trim panels (1). Refer to **PANEL, A-PILLAR TRIM, INSTALLATION** .

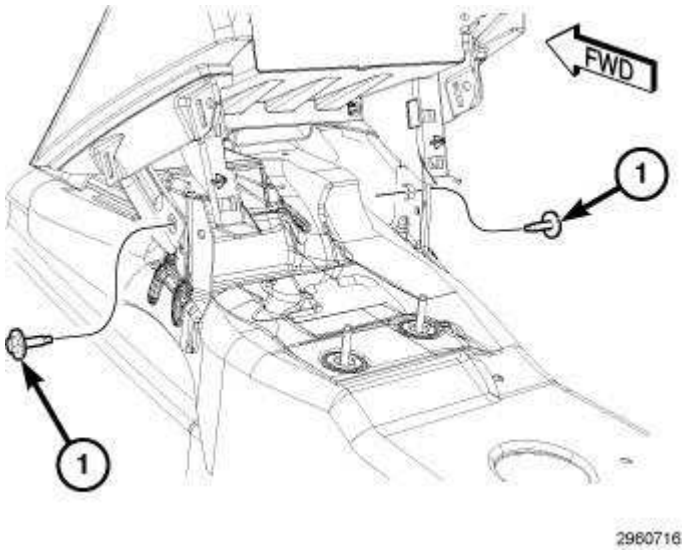


Fig. 158: Floor Pan Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install the two bolts (1) that secure the center of the instrument panel to the floor pan. Tighten the bolts to 16 N.m (12 ft. lbs.).

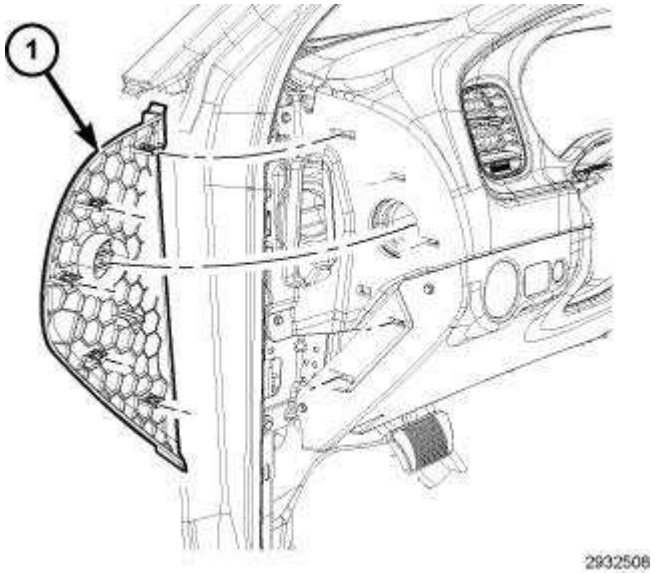


Fig. 159: End Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration. Right side similar.

15. Install the center floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .
16. Install the steering column. Refer to **COLUMN, INSTALLATION** .
17. Install the left and right side instrument panel end caps (1). Make sure the retaining tabs are fully engaged.
18. Install the left and right side instrument panel silencers. Refer to **PANEL, SILENCER, INSTALLATION** .
19. Reconnect the negative battery cable.
20. If the heater core is being replaced, flush the cooling system. Refer to **STANDARD PROCEDURE** .
21. Refill the engine cooling system. Refer to **STANDARD PROCEDURE** .

CORE, SERVICE PORT VALVE

DESCRIPTION

DESCRIPTION

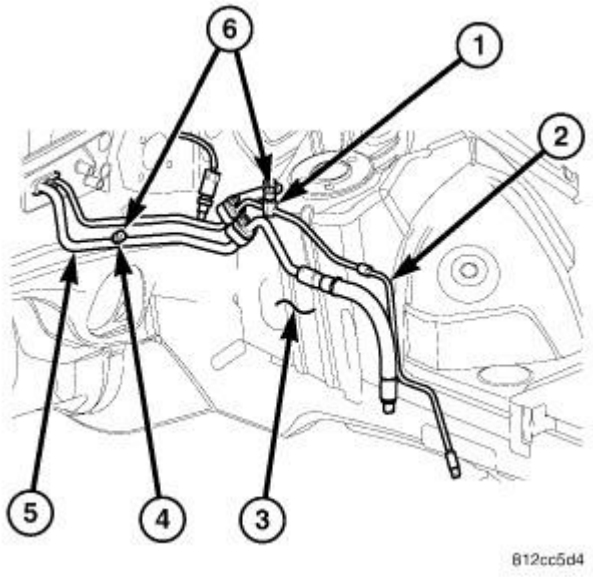


Fig. 160: Refrigerant System Service Ports Description
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

Refrigerant system service ports are used to recover, recycle, evacuate, charge and test the A/C refrigerant system. Unique sizes are used on the two service ports for the R-134a refrigerant system to ensure the system is not accidentally contaminated with R-12 refrigerant or by service equipment used for R-12 refrigerant.

The high side service port (1) is located on the liquid line (2) near the left shock tower (3). The low side service port (4) is located on the suction line (5) near the left shock tower. Both the high side and low side A/C service port valve cores are serviceable.

NOTE: The protective cap aids in service port sealing and helps protect the refrigerant system from contamination. Remember to always reinstall the protective cap onto the service port when refrigerant system service is complete.

Each of the service ports has a threaded plastic protective cap (6) installed over it from the factory. The service port caps are serviceable items.

REMOVAL

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

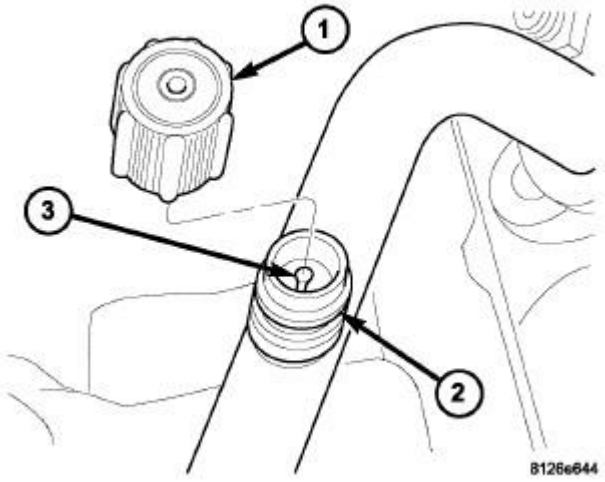


Fig. 161: Identifying A/C Service Port Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C service port shown in illustration.

1. Remove the protective cap (1) from the service port (2).
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Using a Schrader-type valve core tool, remove the valve core (3) from the service port.

4. Install a plug in, or tape over the opened service port(s).

INSTALLATION

INSTALLATION

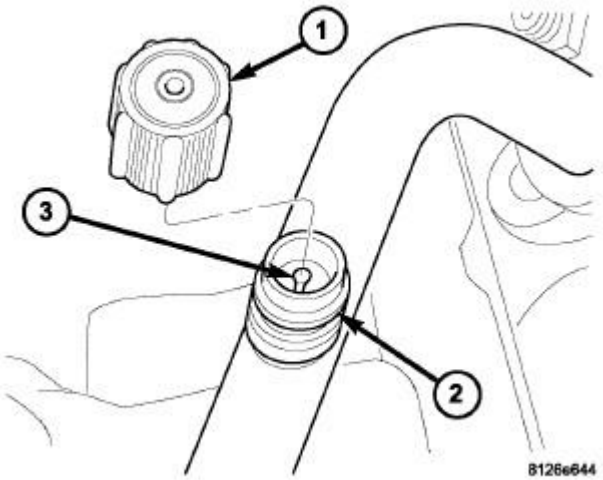


Fig. 162: Identifying A/C Service Port Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C service port shown in illustration.

1. Lubricate the valve core (3) with clean refrigerant oil prior to installation. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Remove the tape or plug from the service port (2).

CAUTION: Damage may result to a service port valve core if the valve core is not fully seated in the A/C service port. Such damage can result in a loss of refrigerant.

3. Install and tighten the valve core into the service port(s) using a Schrader type valve core tool.
4. Evacuate and charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

NOTE: The protective cap helps aid in service port sealing and helps protect the refrigerant system from contamination. Remember to always reinstall the protective cap onto the service port when refrigerant system service is complete.

5. Install the protective cap (1) onto the service port.

DRIER, A/C RECEIVER

DESCRIPTION

DESCRIPTION

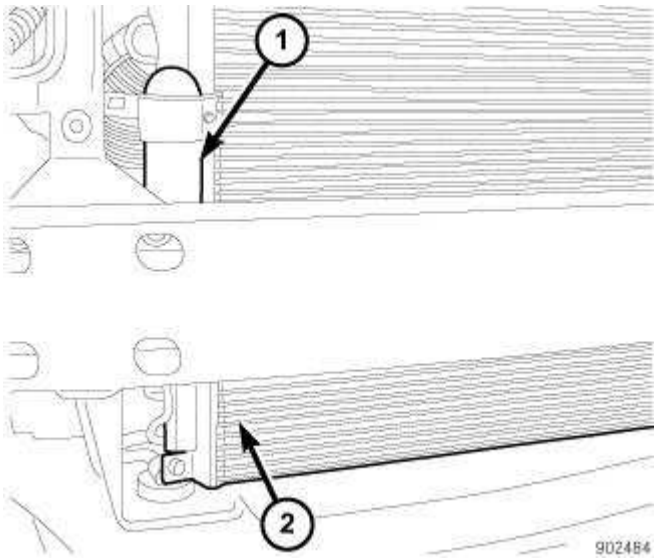


Fig. 163: Receiver/Drier Description
Courtesy of CHRYSLER GROUP, LLC

The receiver/drier (1) stores unnecessary refrigerant, filters the refrigerant, helps remove moisture from the refrigerant and retains any refrigerant vapor that may leave the A/C condenser (2) until it becomes a liquid. The receiver/drier is installed on the high-side of the A/C system and is connected directly to the right end of the A/C condenser. The receiver/drier can be easily serviced by removing the front fascia.

OPERATION

OPERATION

The A/C receiver/drier performs a filtering action to prevent foreign material in the refrigerant from contaminating the A/C expansion valve. Refrigerant enters the A/C receiver/drier as a high-pressure, low temperature liquid. Desiccant inside the A/C receiver/drier absorbs any moisture which may have entered and become trapped within the refrigerant system. In addition, during periods of high demand operation of the A/C system, the A/C receiver/drier acts as a reservoir to store surplus refrigerant.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The A/C receiver/drier has no serviceable parts except for the O-ring seals, gaskets and the high side service port valve and cap. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever

the A/C receiver/drier is removed.

The A/C receiver/drier cannot be repaired and must be replaced if leaking or damaged, or if an internal failure of the A/C compressor has occurred.

REMOVAL

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

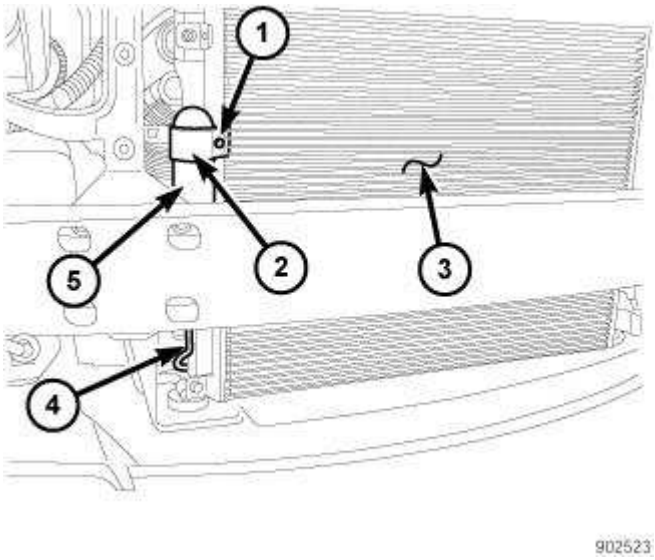


Fig. 164: Receiver/Drier
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
4. Remove the screw (1) that secures the receiver/drier mounting bracket (2) to the right end of the A/C condenser (3).
5. Remove the bolt (4) that secures the receiver/drier (5) to the A/C condenser.
6. Disconnect the receiver/drier from the A/C condenser and remove and discard the dual-plane seal.
7. Install plugs in, or tape over the opened receiver/drier fitting and the condenser ports.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level prevents the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.

NOTE: When replacing multiple A/C system components, refer to the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: If only the A/C receiver/drier is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

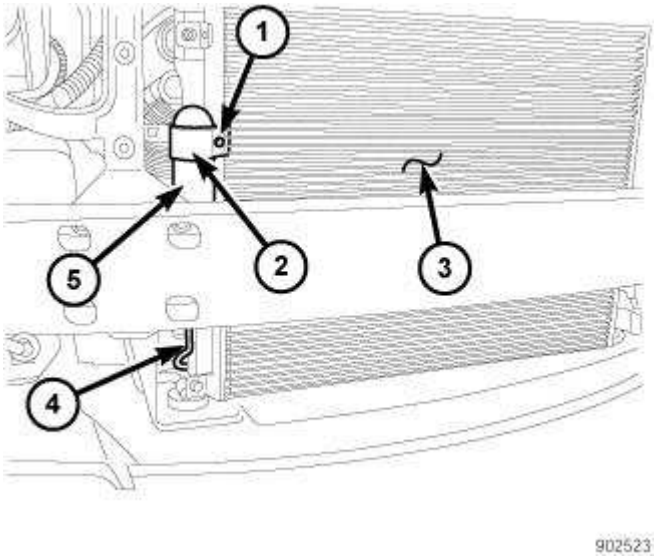


Fig. 165: Receiver/Drier
Courtesy of CHRYSLER GROUP, LLC

1. Position the receiver/drier (5) into the engine compartment.
2. Remove the tape or plugs from the receiver/drier fitting and the ports of the A/C condenser (3).
3. Lubricate a new dual-plane seal with clean refrigerant oil and install it onto the receiver/drier

fitting. Use only the specified seal, as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

4. Connect the receiver/drier to the right end of the A/C condenser.
5. Install the bolt (4) that secures the receiver/drier to the A/C condenser. Tighten the bolt to 22 N.m (16 ft. lbs.).
6. Install the receiver/drier mounting bracket (2) onto the A/C condenser.
7. Install the screw (1) securing the receiver/drier mounting bracket onto the A/C condenser. Tighten the screw to to 5 N.m (44 in. lbs.).
8. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
9. Reconnect the negative battery cable.
10. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
11. If the A/C receiver/drier is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, refer to the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
12. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

EVAPORATOR, A/C

DESCRIPTION

DESCRIPTION

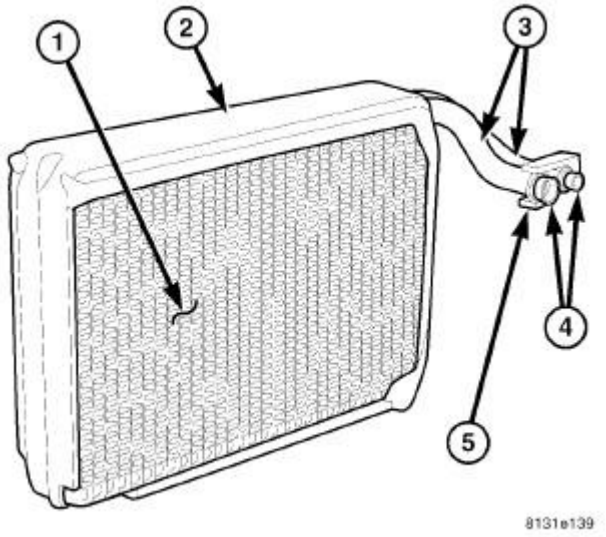


Fig. 166: Evaporator-A/C Description
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

The A/C evaporator (1) for the heating-A/C system is located within the HVAC housing, behind the instrument panel. The A/C evaporator and its insulator (2) are positioned in the HVAC housing so that all air entering the housing must pass over the evaporator fins before it is distributed through the heating-A/C system ducts and outlets. However, air passing over the evaporator fins will only be conditioned when the A/C compressor is engaged and circulating refrigerant through the A/C evaporator.

The A/C evaporator tubes (3) are connected and sealed to the A/C expansion valve by use of rubber O-rings (4) and a tapping block (5).

The A/C evaporator can only be serviced by removing and disassembling the HVAC housing assembly.

OPERATION

OPERATION

Refrigerant enters the A/C evaporator from the A/C expansion valve as a low-temperature, low-pressure mixture of liquid and gas. As air flows over the fins of the A/C evaporator, the humidity in the air condenses on the fins, and the heat from the air is absorbed by the refrigerant. Heat absorption causes the refrigerant to boil and vaporize. The refrigerant becomes a low-pressure gas when it leaves the A/C evaporator.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line or expansion valve is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The A/C evaporator has no serviceable parts except for the O-ring seals. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the A/C expansion valve is removed from the A/C evaporator.

The A/C evaporator cannot be repaired and must be replaced if leaking or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: LHD model shown in illustration. RHD model similar.

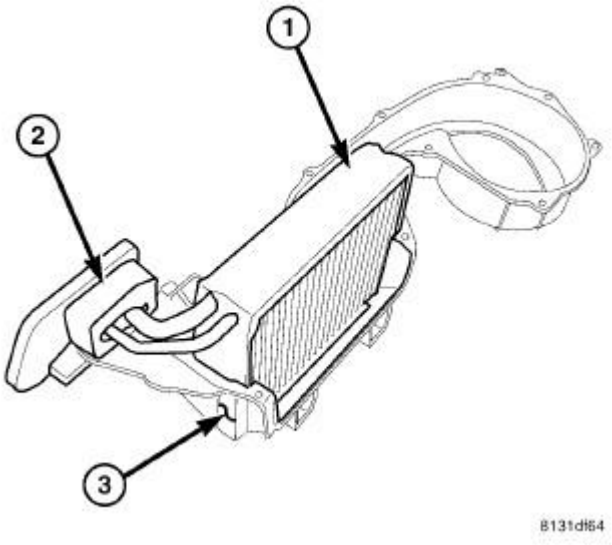


Fig. 167: Removing/Installing A/C Evaporator
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC housing assembly. Refer to **HOUSING, HVAC, REMOVAL**.
2. Disassemble the HVAC housing as necessary to access the A/C evaporator (1). Refer to **HOUSING, HVAC, DISASSEMBLY**.
3. Carefully lift the A/C evaporator and the foam seal (2) out of the lower half of the HVAC housing (3).

NOTE: If the foam seal at the front of the HVAC housing is deformed or damaged, the seal must be replaced.

4. Remove the A/C expansion valve, tapping block and foam seal from the A/C evaporator. Refer to **VALVE, A/C EXPANSION, REMOVAL**.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: **If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

NOTE: **LHD model shown in illustration. RHD model similar.**

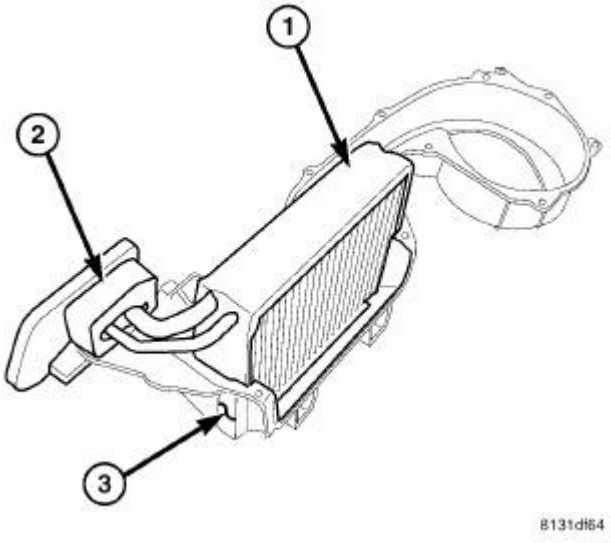


Fig. 168: Removing/Installing A/C Evaporator
Courtesy of CHRYSLER GROUP, LLC

1. Install the foam seal (2), tapping block and A/C expansion valve onto the A/C evaporator (1). Refer to **VALVE, A/C EXPANSION, INSTALLATION**.
2. Install the A/C evaporator into the lower half of the HVAC housing (3). Make sure that the evaporator drain within the HVAC housing is clean and unrestricted and that the insulator around the A/C evaporator is properly installed.
3. Assemble the HVAC housing. Refer to **HOUSING, HVAC, ASSEMBLY**.

   NOTE: **If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

4. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

LINE, A/C DISCHARGE

REMOVAL

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

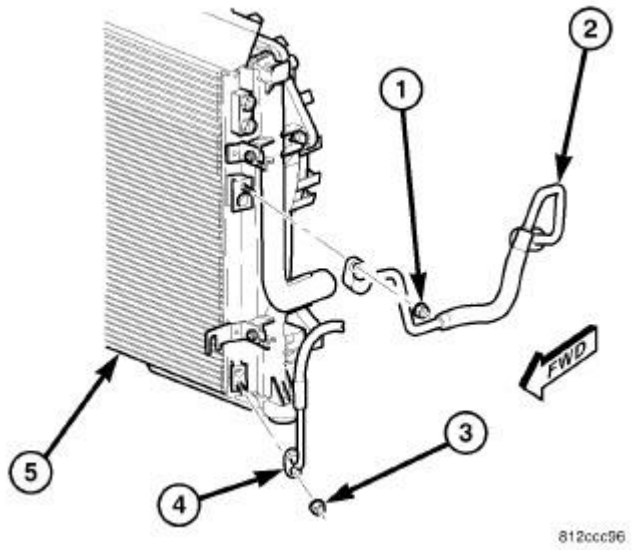


Fig. 169: Removing/Installing A/C Lines AT Condenser
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** and **BODY, AIR CLEANER, REMOVAL** and **BODY, AIR CLEANER, REMOVAL, 5.7L** and **BODY, AIR CLEANER, REMOVAL** .
4. Reach through the headlamp opening in the upper radiator support and remove the nut (1) that secures the A/C discharge line (2) to the A/C condenser (5).
5. Disconnect the A/C discharge line from the A/C condenser and remove and discard the dual plane seal.
6. Install plugs in, or tape over the discharge line fitting and condenser inlet port.

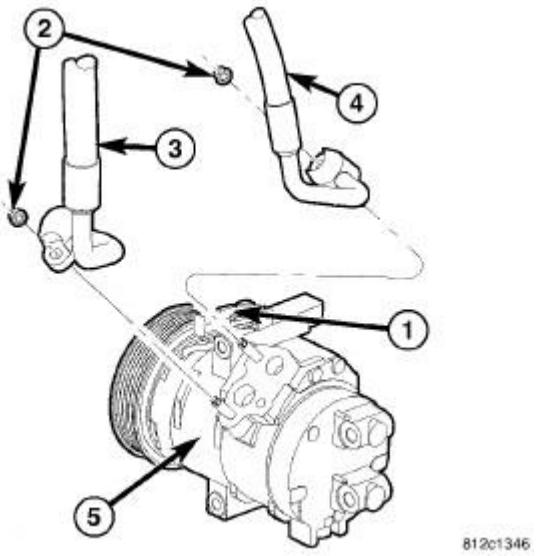


Fig. 170: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines shown in illustration.

7. Remove the nut (2) that secures the A/C discharge line (4) to the A/C compressor (5).
8. Disconnect the A/C discharge line from the A/C compressor and remove and discard the dual plane seal.
9. Install plugs in, or tape over the opened refrigerant line fitting and the compressor port.
10. Remove the A/C discharge line from the engine compartment.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

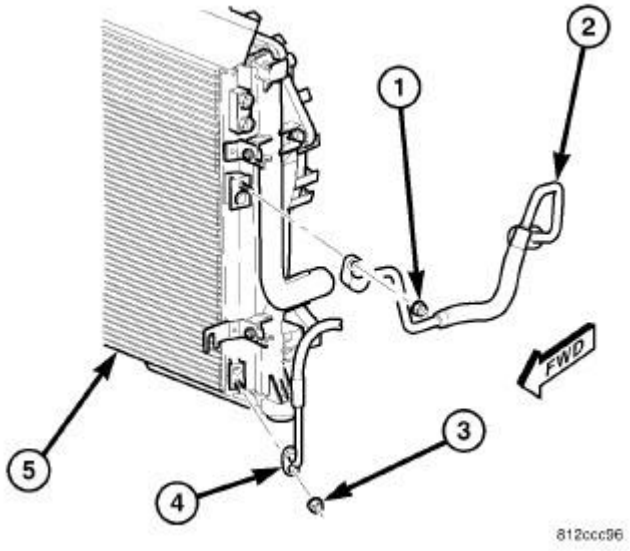


Fig. 171: Removing/Installing A/C Lines AT Condenser
Courtesy of CHRYSLER GROUP, LLC

1. Position the A/C discharge line (2) into the engine compartment.
2. Remove the tape or plugs from the opened discharge line fitting and the inlet port on the A/C condenser (5).
3. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Install the A/C discharge line onto the A/C condenser.
5. Reach through the headlamp opening in the upper radiator support and install the nut (1) that secures the A/C discharge line to the A/C condenser. Tighten the nut to 22 N.m (16 ft. lbs.).

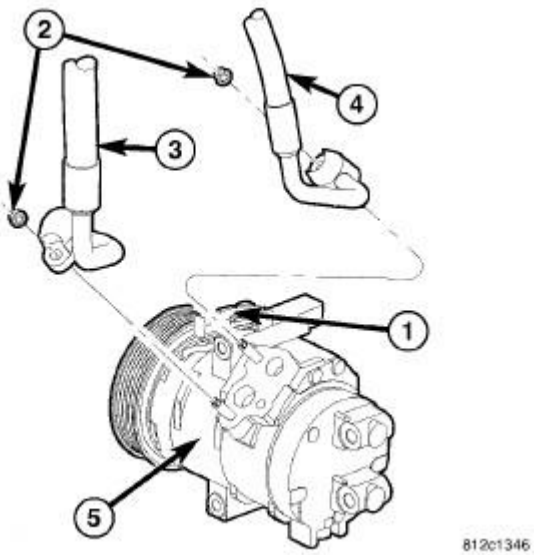


Fig. 172: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines shown in illustration.

6. Remove the tape or plugs from the opened fitting on the A/C discharge line (4) and the outlet port on the A/C compressor (5).
7. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Install the A/C discharge line onto the A/C compressor.
9. Install the nut (2) that secures the A/C discharge line to the A/C compressor. Tighten the nut to 23 N.m (17 ft. lbs.).
10. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** and **BODY, AIR CLEANER, INSTALLATION** and **BODY, AIR CLEANER, INSTALLATION, 5.7L** and **BODY, AIR CLEANER, INSTALLATION** .
11. Reconnect the negative battery cable.
12. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
13. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
14. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

LINE, A/C LIQUID

REMOVAL

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

NOTE: The A/C liquid line is serviced in two sections. The rear section of the liquid line is serviced as an assembly with the rear section of the A/C suction line.

FRONT SECTION

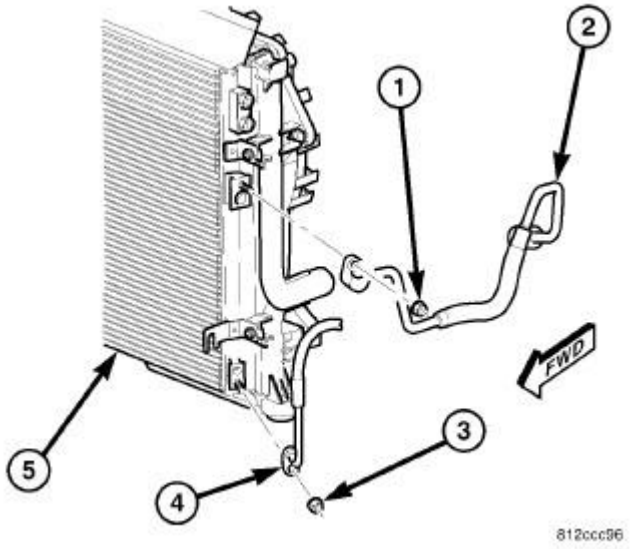


Fig. 173: Removing/Installing A/C Lines AT Condenser
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
4. Raise and support the vehicle.
5. Remove the front belly pan. Refer to **BELLY PAN, REMOVAL** .
6. Remove the nut (3) that secures the front section of the A/C liquid line (4) to the A/C condenser (5).
7. Disconnect the A/C liquid line from the A/C condenser and remove and discard the dual plane seal.
8. Install plugs in, or tape over the opened liquid line fitting and condenser outlet port.

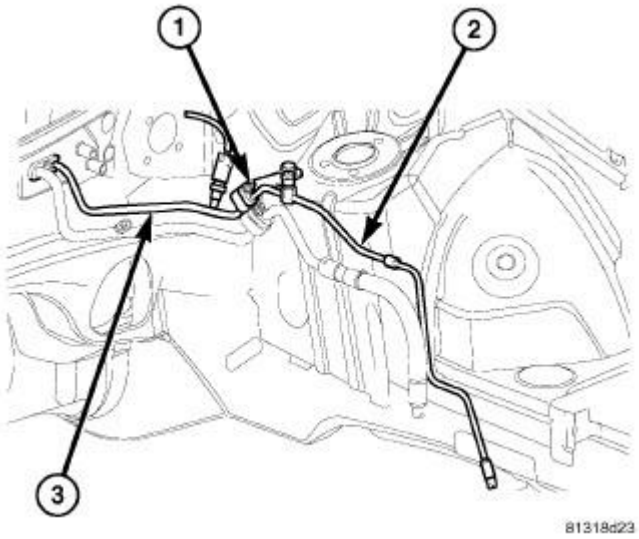


Fig. 174: Removing/Installing A/C Liquid Front Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

9. Lower the vehicle.
10. Remove the nut (1) that secures the front section of the A/C liquid line (2) to the rear section of the liquid line (3).
11. Disconnect the front section of the A/C liquid line from the rear section of the liquid line and remove and discard the dual plane seal.
12. Install plugs in, or tape over the opened liquid line fittings.
13. Remove the front section of the A/C liquid line from the engine compartment.

REAR SECTION

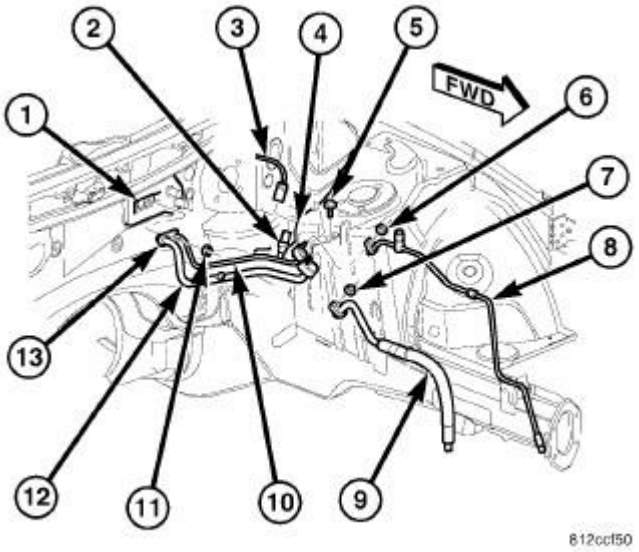


Fig. 175: Removing/Installing Rear A/C Liquid/Suction Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. On LHD models, remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
4. Remove the nut (6) that secures the front section of the A/C liquid line (8) to the rear section of the liquid line (10).
5. Disconnect the front section of the A/C liquid line from the rear section of the liquid line and remove and discard the dual plane seal.
6. Install plugs in, or tape over the opened liquid line fittings.
7. Remove the nut (7) that secures the front section of the A/C suction line (9) to the rear section of the suction line (12).
8. Disconnect the front section of the A/C suction line from the rear section of the suction line and remove and discard the dual plane seal.
9. Install plugs in, or tape over the opened suction line fittings.
10. Disconnect the wire harness (3) from the A/C pressure transducer (2).
11. Remove the bolt (5) that secures the refrigerant line mounting bracket to the left front shock tower (4).
12. Remove the nut (11) that secures the liquid and suction line tapping block (13) to the A/C expansion valve (1).
13. Disconnect the rear section of the A/C liquid and suction lines from the A/C expansion valve.

14. Remove the dual plane seal from the suction and liquid line fittings and discard.
15. Install plugs in, or tape over the opened suction and liquid line fittings and the expansion valve ports.
16. Remove the rear section of the A/C liquid and suction lines as an assembly from the engine compartment.
17. If required, remove the A/C pressure transducer from the rear section of the A/C liquid line. Refer to **TRANSDUCER, A/C PRESSURE, REMOVAL**.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

NOTE: The A/C liquid line is serviced in two sections. The rear section of the liquid line is serviced as an assembly with the rear section of the A/C suction line.

FRONT SECTION

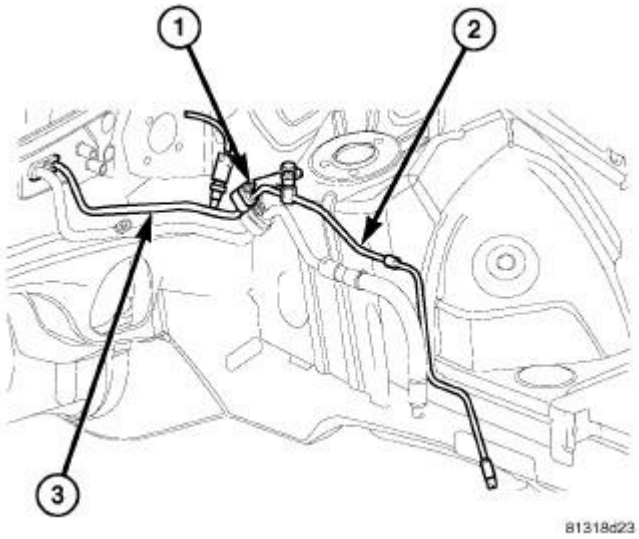


Fig. 176: Removing/Installing A/C Liquid Front Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Position the front section of the liquid line (2) into the engine compartment.
2. Remove the tape or plugs from the fittings that connect the front section of the A/C liquid line to the rear section of the A/C liquid line (3).
3. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the front section of the A/C liquid line to the rear section of the A/C liquid line.
5. Install the nut (1) that secures the front section of the A/C liquid line to the rear section of the A/C liquid line. Tighten the nut to 22 N.m (16 ft. lbs.).

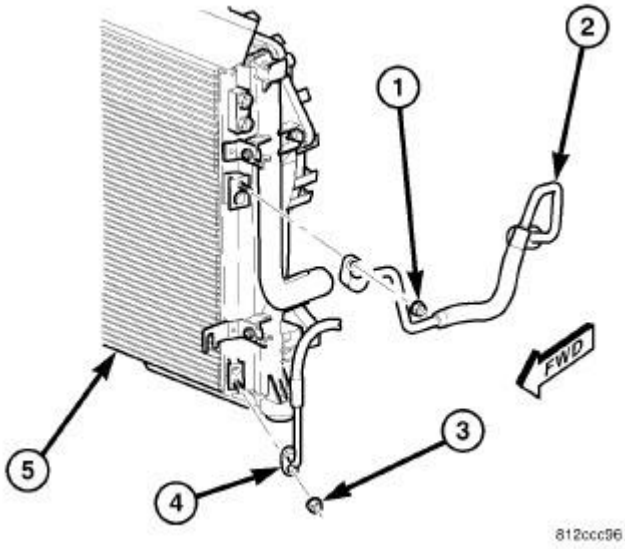


Fig. 177: Removing/Installing A/C Lines AT Condenser
Courtesy of CHRYSLER GROUP, LLC

6. Raise and support the vehicle.
7. Remove the tape or plugs from the fitting on the front section of the A/C liquid line (4) and the outlet port of the A/C condenser (5).
8. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
9. Connect the A/C liquid line to the A/C condenser.
10. Install the nut (3) that secures the front section of the A/C liquid line to the A/C condenser. Tighten the nut to 22 N.m (16 ft. lbs.).
11. Install the front belly pan. Refer to **BELLY PAN, INSTALLATION** .
12. Lower the vehicle.
13. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
14. Reconnect the negative battery cable.
15. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
16. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
17. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

REAR SECTION

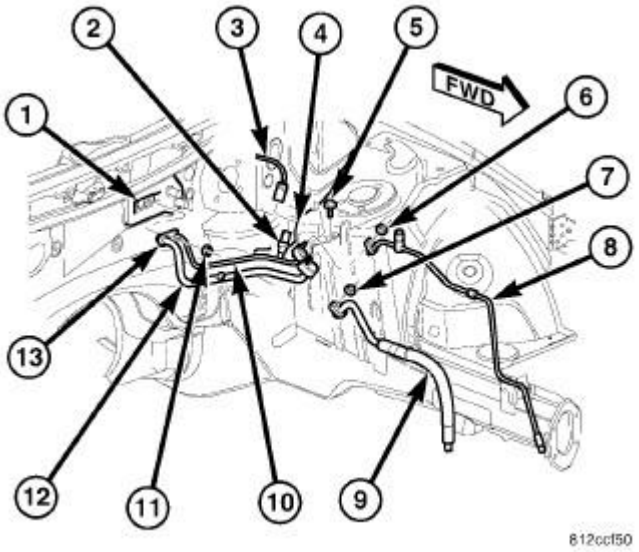


Fig. 178: Removing/Installing Rear A/C Liquid/Suction Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. If removed, install the A/C pressure transducer (2) onto the A/C liquid line (10). Refer to **TRANSDUCER, A/C PRESSURE, INSTALLATION**.
2. Position the rear section of the A/C liquid line (10) and the rear section of the A/C suction line (12) as an assembly into the engine compartment.
3. Remove the tape or plugs from the suction and liquid line fittings and the ports in the A/C expansion valve (1).
4. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction and liquid line fittings. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the rear section of the A/C liquid and suction lines to the A/C expansion valve.
6. Install the nut (11) that secures the liquid and suction line tapping block (13) to the A/C expansion valve. Tighten the nut to 23 N.m (17 ft. lbs.).
7. Install the bolt (5) that secures the refrigerant line mounting bracket to the left front shock tower (4). Tighten the bolt to 11 N.m (97 in. lbs.).
8. Connect the wire harness (3) to the A/C pressure transducer.
9. Remove the tape or plugs from the fittings that connect the front section of the A/C liquid line (8) to the rear section of the A/C liquid line.
10. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
11. Connect the front section of the A/C liquid line to the rear section of the A/C liquid line.
12. Install the nut (6) that secures the front section of the A/C liquid line to the rear section of the

A/C liquid line. Tighten the nut to 22 N.m (16 ft. lbs.).

13. Remove the tape or plugs from the fittings that connect the front section of the A/C suction line (9) to the rear section of the A/C suction line.
14. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
15. Connect the front section of the A/C suction line to the rear section of the A/C suction line.
16. Install the nut (7) that secures the front section of the A/C suction line to the rear section of the A/C suction line. Tighten the nut to 22 N.m (16 ft. lbs.).
17. Install the air cleaner housing (refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL**).
18. Reconnect the negative battery cable.
19. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
20. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
21. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

LINE, A/C SUCTION

REMOVAL

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

NOTE: The A/C suction line is serviced in two sections. The rear section of the suction line is serviced as an assembly with the rear section of the A/C liquid line.

FRONT SECTION

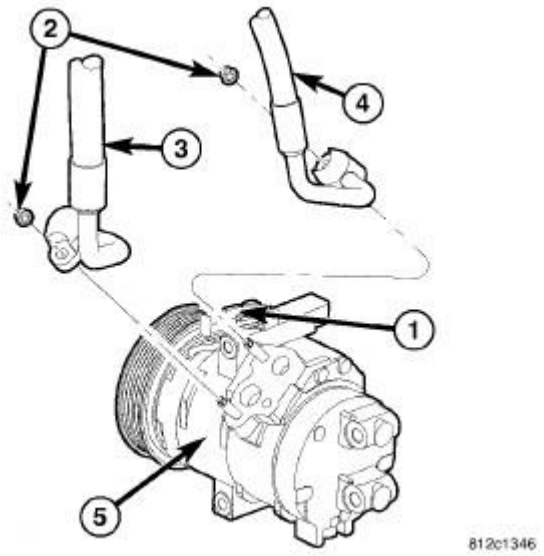


Fig. 179: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines shown in illustration.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
4. Remove the nut (2) that secures the front section of the A/C suction line (3) to the A/C compressor (5).
5. Disconnect the A/C suction line from the A/C compressor and remove and discard the dual plane seal.
6. Install plugs in, or tape over the opened suction line fitting and compressor inlet port.

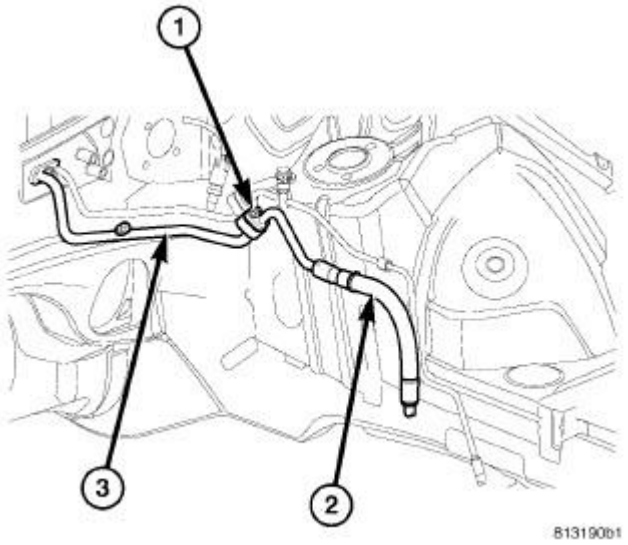


Fig. 180: Removing/Installing A/C Suction Front Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

7. Remove the nut (1) that secures the front section of the A/C suction line (2) to the rear section of the suction line (3).
8. Disconnect the front section of the A/C suction line from the rear section of the suction line and remove and discard the dual plane seal.
9. Install plugs in, or tape over the opened suction line fittings.
10. Remove the front section of the A/C suction line from the engine compartment.

REAR SECTION

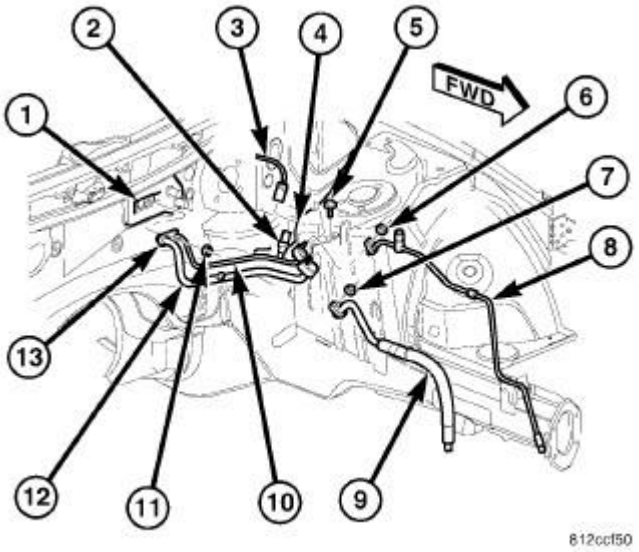


Fig. 181: Removing/Installing Rear A/C Liquid/Suction Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .
4. Remove the nut (7) that secures the front section of the A/C suction line (9) to the rear section of the suction line (12).
5. Disconnect the front section of the A/C suction line from the rear section of the suction line and remove and discard the dual plane seal.
6. Install plugs in, or tape over the opened suction line fittings.
7. Remove the nut (6) that secures the front section of the A/C liquid line (8) to the rear section of the liquid line (10).
8. Disconnect the front section of the A/C liquid line from the rear section of the liquid line and remove and discard the dual plane seal.
9. Install plugs in, or tape over the opened liquid line fittings.
10. Disconnect the wire harness (3) from the A/C pressure transducer (2).
11. Remove the bolt (5) that secures the refrigerant line mounting bracket to the left front shock tower (4).
12. Remove the nut (11) that secures the liquid and suction line tapping block (13) to the A/C expansion valve (1).
13. Disconnect the rear section of the A/C suction and liquid lines from the A/C expansion valve.

14. Remove the dual plane seal from the suction and liquid line fittings and discard.
15. Install plugs in, or tape over the opened suction and liquid line fittings and the expansion valve ports.
16. Remove the rear section of the A/C suction and liquid lines as an assembly from the engine compartment.
17. If required, remove the A/C pressure transducer from the rear section of the A/C liquid line. Refer to **TRANSDUCER, A/C PRESSURE, REMOVAL**.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

NOTE: The A/C suction line is serviced in two sections. The rear section of the suction line is serviced as an assembly with the rear section of the A/C liquid line.

FRONT SECTION

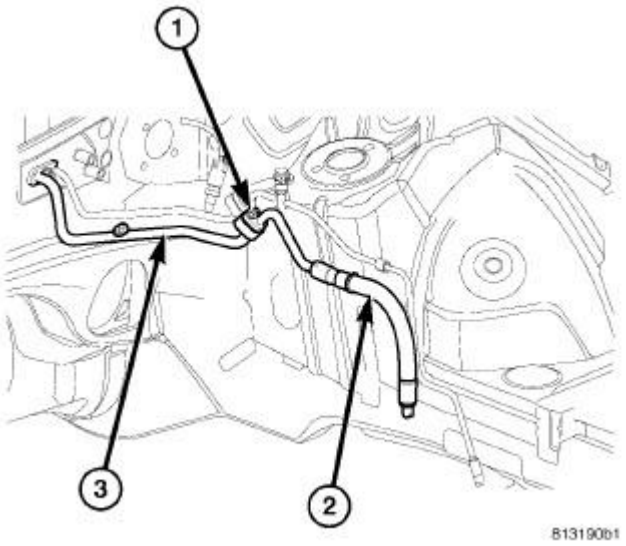


Fig. 182: Removing/Installing A/C Suction Front Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Position the front section of the A/C suction line (2) into the engine compartment.
2. Remove the tape or plugs from the fittings that connect the front section of the A/C suction line to the rear section of the A/C suction line (3).
3. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the front section of the A/C suction line to the rear section of the A/C suction line.
5. Install the nut (1) that secures the front section of the A/C suction line to the rear section of the A/C suction line. Tighten the nut to 22 N.m (16 ft. lbs.).

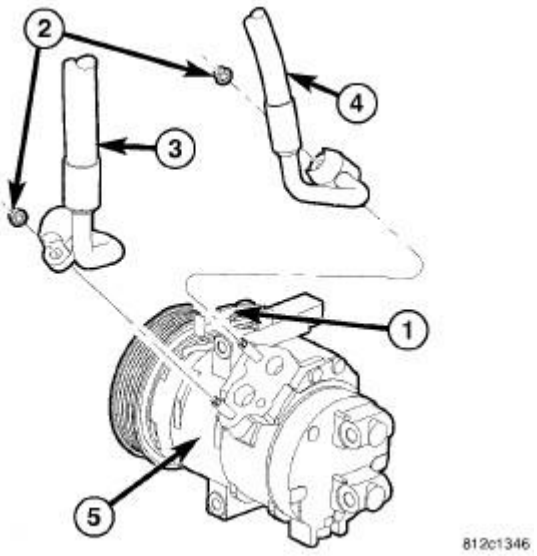


Fig. 183: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and refrigerant lines shown in illustration.

6. Remove the tape or plugs from the fitting on the front section of the A/C suction line (3) and the inlet port of the A/C compressor (5).
7. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the A/C suction line to the A/C compressor.
9. Install the nut (2) that secures the front section of the A/C suction line to the A/C compressor. Tighten the nut to 23 N.m (17 ft. lbs.).
10. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION** .
11. Reconnect the negative battery cable.
12. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
13. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
14. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

REAR SECTION

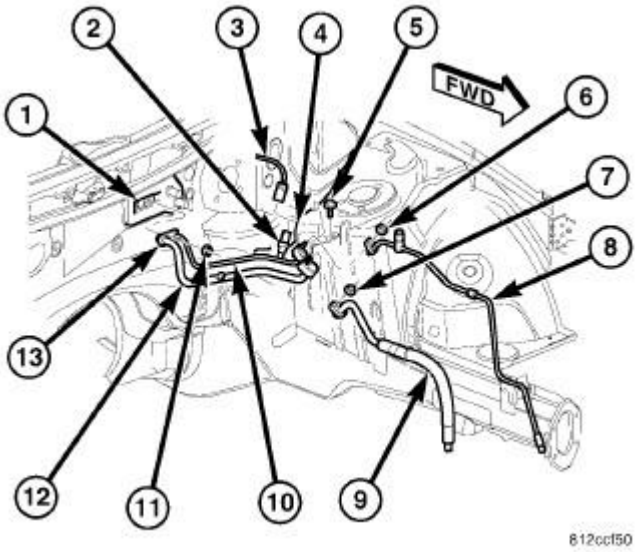


Fig. 184: Removing/Installing Rear A/C Liquid/Suction Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. If removed, install the A/C pressure transducer (2) onto the A/C liquid line (10). Refer to **TRANSDUCER, A/C PRESSURE, INSTALLATION**.
2. Position the rear section of the A/C suction line (12) and the rear section of the A/C liquid line (10) as an assembly into the engine compartment.
3. Remove the tape or plugs from the suction and liquid line fittings and the ports in the A/C expansion valve (1).
4. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction and liquid line fittings. Use only the specified seal as it made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the rear section of the A/C liquid and suction lines to the A/C expansion valve.
6. Install the nut (11) that secures the liquid and suction line tapping block (13) to the A/C expansion valve. Tighten the nut to 23 N.m (17 ft. lbs.).
7. Install the bolt (5) that secures the refrigerant line mounting bracket to the left front shock tower (4). Tighten the bolt to 11 N.m (97 in. lbs.).
8. Connect the wire harness (3) to the A/C pressure transducer.
9. Remove the tape or plugs from the fittings that connect the front section of the A/C liquid line (8) to the rear section of the A/C liquid line.
10. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
11. Connect the front section of the A/C liquid line to the rear section of the A/C liquid line.
12. Install the nut (6) that secures the front section of the A/C liquid line to the rear section of the

A/C liquid line. Tighten the nut to 22 N.m (16 ft. lbs.).

13. Remove the tape or plugs from the fittings that connect the front section of the A/C suction line (9) to the rear section of the A/C suction line.
14. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
15. Connect the front section of the A/C suction line to the rear section of the A/C suction line.
16. Install the nut (7) that secures the front section of the A/C suction line to the rear section of the A/C suction line. Tighten the nut to 22 N.m (16 ft. lbs.).
17. Install the air cleaner housing (refer to **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION** or **BODY, AIR CLEANER, INSTALLATION, 5.7L** or **BODY, AIR CLEANER, INSTALLATION**).
18. Reconnect the negative battery cable.
19. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
20. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
21. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

OIL, REFRIGERANT

STANDARD PROCEDURE

REFRIGERANT OIL LEVEL

When an A/C system is assembled at the factory, all components except the A/C compressor are refrigerant oil free. After the refrigerant system has been charged and operated, the refrigerant oil in the A/C compressor is dispersed throughout the refrigerant system. The receiver/drier, A/C evaporator, A/C condenser and the A/C compressor will each retain a significant amount of the needed refrigerant oil.

It is important to have the correct amount of refrigerant oil in the A/C system. This ensures proper lubrication of the A/C compressor. Too little oil will result in damage to the A/C compressor, while too much oil will reduce the cooling capacity of the A/C system and consequently result in higher discharge air temperatures.

CAUTION: The refrigerant oil in the A/C system is unique depending on the A/C compressor used. Use only PAG oils that are designed to work with the refrigerant type and A/C compressor in the vehicle. Always refer to the A/C Underhood Specification Label for the correct oil designation. The refrigerant oil container should be kept tightly capped until it is ready for use, and then tightly recapped after use to prevent contamination from dirt and moisture. Refrigerant oil will quickly absorb any moisture it comes in contact with, therefore, special effort must be used to keep all R-134a system components moisture-free. Moisture in the refrigerant oil is very difficult to remove and will cause a reliability problem with the A/C compressor.

NOTE: **Most reclaim/recycling equipment will measure the lubricant being removed during recovery. This amount of lubricant should be added back into the system. Refer to the reclaim/recycling equipment manufacturers instructions.**

It will not be necessary to check the oil level in the A/C compressor or to add oil, unless there has been an oil loss. An oil loss may occur due to a rupture or leak from a refrigerant line, a connector fitting, a component, or a component seal. If a leak occurs, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system after the repair has been made. Refrigerant oil loss will be evident at the leak point by the presence of a wet, shiny surface around the leak.

Refrigerant oil must be added when an A/C condenser, A/C evaporator or A/C receiver/drier is replaced. See **REFRIGERANT OIL CAPACITIES** chart.

The refrigerant oil level in a new A/C compressor must first be adjusted prior to compressor installation. See the **COMPRESSOR OIL DRAIN PROCEDURE**.

REFRIGERANT OIL TYPE

A/C Compressor	Oil Type
Denso 10SRE18 - 3.0L/5.7L/6.4L Engines	* Use only ND-8 PAG oil
Visteon RS-18 - 3.6L Engine	* Use only VC-46 PAG oil

* Always use the type of PAG oil listed for the model being serviced. See A/C Underhood Specification Label located in the engine compartment. Do not mix different types of PAG oils.

REFRIGERANT OIL CAPACITIES

COMPONENT	ml.	oz.
Total System Fill	180	6.1
A/C Condenser	30	1.0
A/C Evaporator	60	2.0
A/C Receiver/drier	30	1.0
A/C Compressor	Drain and measure the oil from the old compressor (See Compressor Oil Drain Procedure below)	

COMPRESSOR OIL DRAIN PROCEDURE

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. Failure to properly drain and measure the refrigerant oil from the A/C compressor can prevent the A/C system from operating as designed and cause serious compressor damage.

The A/C compressor is filled with refrigerant oil from the factory. Use the following procedure to drain and measure refrigerant oil from the A/C compressor.

1. Drain all of the refrigerant oil from the old A/C compressor into a clean measured container.
2. Drain all of the refrigerant oil from the new A/C compressor into a clean measured container.

3. Refill the new A/C compressor with the same amount of refrigerant oil that was drained out of the old compressor. Use only clean refrigerant oil of the type specified for the A/C compressor in the vehicle.
4. Install the new A/C compressor onto the engine. Refer to **COMPRESSOR, A/C, INSTALLATION**.

REFRIGERANT

SPECIFICATIONS

SPECIFICATIONS

REFRIGERANT CHARGE CAPACITY

Application	Capacity
All Models	709 g (1.56 lbs.)

VALVE, A/C EXPANSION

DESCRIPTION

DESCRIPTION

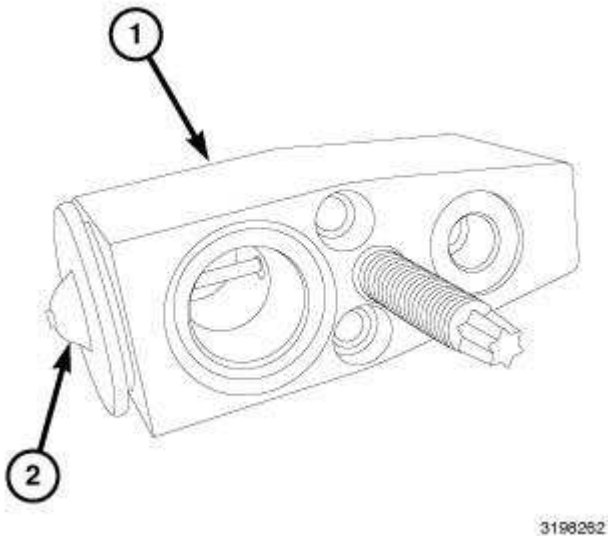


Fig. 185: H-valve Type Body & Thermal Sensor
Courtesy of CHRYSLER GROUP, LLC

The A/C expansion valve controls the amount of refrigerant entering the A/C evaporator. The A/C expansion valve is of a thermostatic expansion valve (TXV) design and consists of an aluminum H-valve type body (1), with an integral thermal sensor (2). The A/C expansion valve is located at the dash panel between the A/C refrigerant lines and the A/C evaporator.

OPERATION

OPERATION

The A/C expansion valve controls the high-pressure, low temperature liquid refrigerant from the A/C liquid line and converts it into a low-pressure, low-temperature mixture of liquid and gas before it enters the A/C evaporator. A mechanical sensor in the A/C expansion valve monitors the temperature and pressure of the refrigerant leaving the A/C evaporator through the A/C suction line, and adjusts the orifice size at the liquid line port to let the proper amount of refrigerant into the evaporator to meet the vehicle A/C cooling requirements. Controlling the refrigerant flow through the A/C evaporator ensures that none of the refrigerant leaving the A/C evaporator is still in a liquid state, which could damage the A/C compressor.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line is disconnected from the expansion valve. Failure to replace the rubber O-ring seals could result in a refrigerant system leak.

The A/C expansion valve is factory calibrated and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - A/C EXPANSION VALVE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

NOTE: The A/C expansion valve should only be tested following testing of the A/C compressor.

NOTE: Liquid CO^2 is required to test the A/C expansion valve. This material is available from most welding supply facilities. Liquid CO^2 is also available from companies which service and sell fire extinguishers.

When testing the A/C expansion valve, the work area and the vehicle temperature must be 21° to 27° C (70° to 85°F). To test the expansion valve:

1. Connect a charging station or manifold gauge set to the refrigerant system service ports. Refer to **PLUMBING, STANDARD PROCEDURE**.
2. Verify the refrigerant system charge level by conducting the A/C Performance Test. Refer to **DIAGNOSIS AND TESTING**.
3. Close all doors, windows and vents to the passenger compartment.
4. Set the A/C-heater controls so that the A/C compressor is operating, the temperature control is in the highest temperature position, the mode-air doors is directing air output to the floor and the blower motor operating is operating at the highest speed.

5. Start the engine and allow it to idle. After the engine has reached normal operating temperature, allow the passenger compartment to heat up. This will create the need for maximum refrigerant flow into the A/C evaporator.
6. If the refrigerant charge is sufficient, the discharge (high pressure) gauge should read 827 kPa to 1655 kPa (120 psi to 240 psi). The suction (low pressure) gauge should read 207 kPa to 345 kPa (30 psi to 50 psi). If OK, go to 7. If not OK, replace the inoperative A/C expansion valve.

WARNING: Protect the skin and eyes from exposure to liquid CO^2 or personal injury can result.

7. If the suction (low pressure) gauge reads within the specified range, freeze the A/C expansion valve for 30 seconds using liquid CO^2 or another suitable super-cold material. **Do not spray R-134a or R-12 refrigerant on the A/C expansion valve for this test.** The suction (low pressure) gauge reading should drop by 69 kPa (10 psi). If OK, go to 8. If not OK, replace the inoperative A/C expansion valve. Refer to **VALVE, A/C EXPANSION, REMOVAL**.
8. Allow the A/C expansion valve to thaw. The suction (low pressure) gauge reading should stabilize at 207 kPa to 345 kPa (30 psi to 50 psi). If not OK, replace the inoperative A/C expansion valve. Refer to **VALVE, A/C EXPANSION, REMOVAL**.

REMOVAL

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. Refer to PLUMBING, WARNING and PLUMBING, CAUTION. Failure to follow these instructions may result in serious or fatal injury.

NOTE: LHD model shown in illustration. RHD model similar.

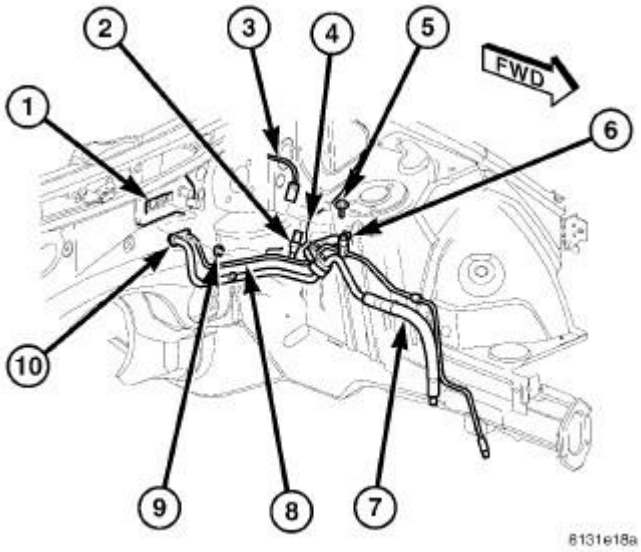


Fig. 186: Removing/Installing A/C Expansion Valve Refrigerant Lines
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the bolt (5) that secures the refrigerant line mounting bracket (6) to the left front shock tower (4).
4. Remove the nut (9) that secures the refrigerant line tapping block (10) to the A/C expansion valve (1).
5. Disconnect the wire harness (3) from the A/C pressure transducer (2) to help allow access to the A/C expansion valve.
6. Disconnect the A/C suction line (7) and the A/C liquid line (8) from the A/C expansion valve and position the refrigerant lines out of the way.
7. Remove the seal from the suction and liquid line fittings and discard.
8. Install plugs in, or tape over the opened suction and liquid line fittings.

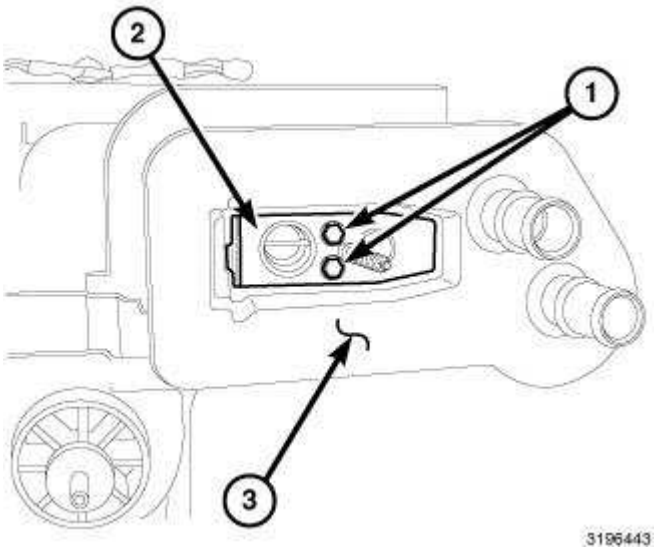


Fig. 187: Valve-A/C Expansion
Courtesy of CHRYSLER GROUP, LLC

9. Remove the two bolts (1) that secure the A/C expansion valve (2) to the evaporator tube tapping block located within the seal (3).
10. Remove the A/C expansion valve from the evaporator tube tapping block.
11. Remove the O-ring seals from the evaporator tube fittings and discard.
12. Install plugs in, or tape over the opened evaporator tube fittings.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

NOTE: LHD model shown in illustration. RHD model similar.

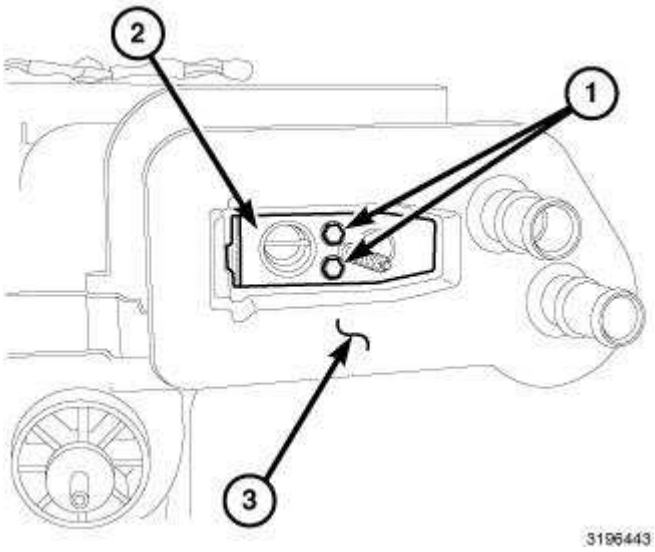


Fig. 188: Valve-A/C Expansion
Courtesy of CHRYSLER GROUP, LLC

1. Remove the tape or plugs from the evaporator tube fittings and all of the expansion valve ports.
2. Lubricate new O-ring seals with clean refrigerant oil and install them onto the evaporator tube fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Install the A/C expansion valve (2) onto the evaporator tube tapping block.
4. Install the two bolts (1) that secure the A/C expansion valve to the evaporator tube tapping block. Tighten the bolts to 11 N.m (97 in. lbs.).

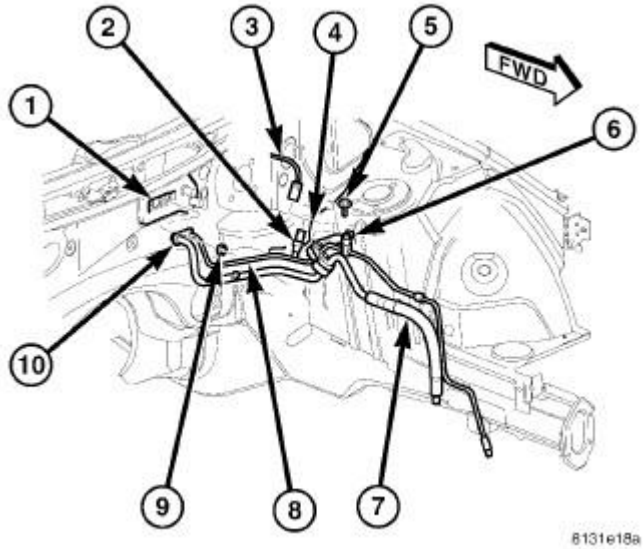


Fig. 189: Removing/Installing A/C Expansion Valve Refrigerant Lines
Courtesy of CHRYSLER GROUP, LLC

5. Remove the tape or plugs from the suction and liquid line fittings.
6. Lubricate a new seal with clean refrigerant oil and install onto the suction and liquid line fittings. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
7. Connect the A/C suction line (7) and the A/C liquid line (8) to the A/C expansion valve (1).
8. Install the nut (9) that secures the refrigerant line tapping block (10) to the A/C expansion valve. Tighten the nut to 23 N.m (17 ft. lbs.).
9. Install the bolt (5) that secures the refrigerant line mounting bracket (6) to the left front shock tower (4). Tighten the bolt to 11 N.m (97 in. lbs.).
10. Connect the wire harness (3) to the A/C pressure transducer (2).
11. Reconnect the negative battery cable.
12. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
13. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
14. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

CABIN HEATER

RELAY, HEATER UNIT

DESCRIPTION

DESCRIPTION

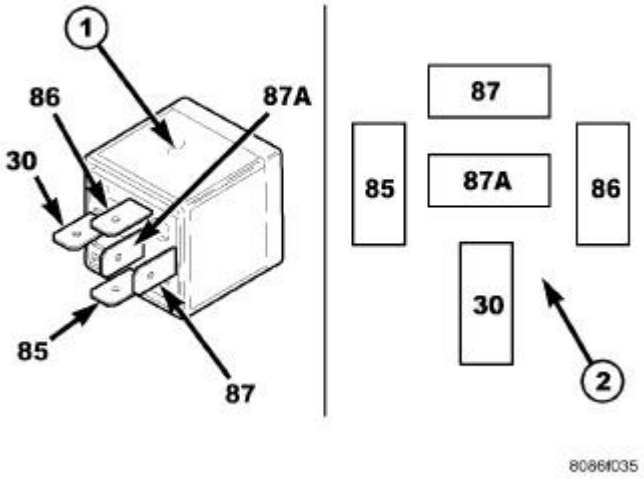


Fig. 190: EBL Relay
Courtesy of CHRYSLER GROUP, LLC

Three relays (1) are used for the electric Positive Temperature Coefficient (PTC) heater unit. The relays are International Standards Organization (ISO) type relay. Relays conforming to the ISO

specifications have common physical dimensions, current capacities, terminal functions and patterns (2). The PTC relays are electromechanical devices that switch fused battery current directly to the heating elements of the PTC heater unit as determined by the Powertrain Control Module (PCM).

The three PTC relays are located in the diesel accessory fuse/relay block in the engine compartment.

REMOVAL

REMOVAL

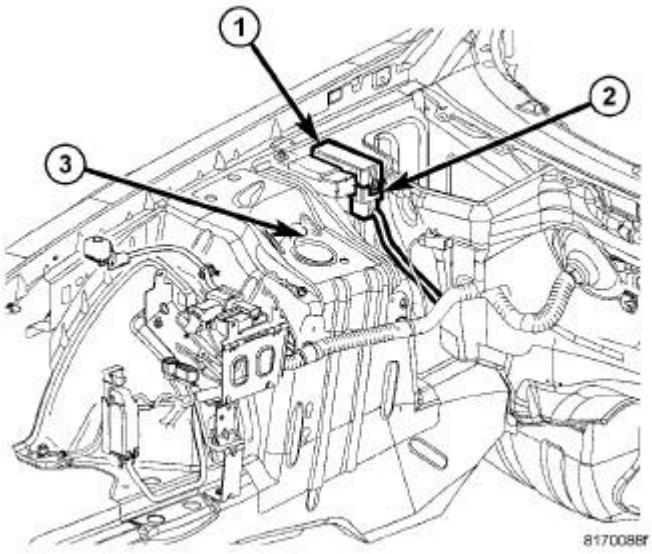


Fig. 191: Diesel Accessory Fuse/Relay Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Open the cover (1) of the diesel accessory fuse/relay block (2) located in the engine compartment behind the right side shock tower (3).
3. Remove the positive temperature coefficient (PTC) relays as necessary from the fuse/relay block.

INSTALLATION

INSTALLATION

NOTE: LHD model shown in illustration. RHD model similar.

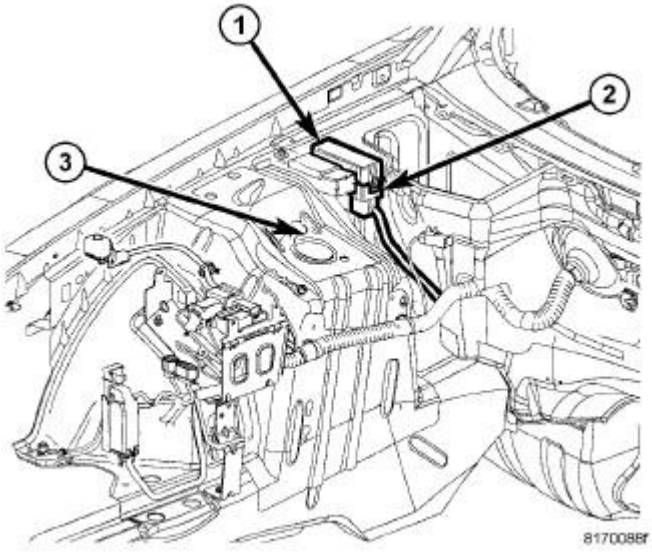


Fig. 192: Diesel Accessory Fuse/Relay Block
Courtesy of CHRYSLER GROUP, LLC

1. Position the positive temperature coefficient (PTC) relays as necessary into the proper receptacle of the diesel accessory fuse/relay block (2) located behind the right side shock tower (3).
2. Align the PTC relay terminals with the terminal cavities in the fuse/relay block and push down firmly on each relay until the terminals are fully seated.
3. Close the cover (1) of the diesel accessory fuse/relay block.
4. Reconnect the negative battery cable.

UNIT, HEATER

DESCRIPTION

DESCRIPTION

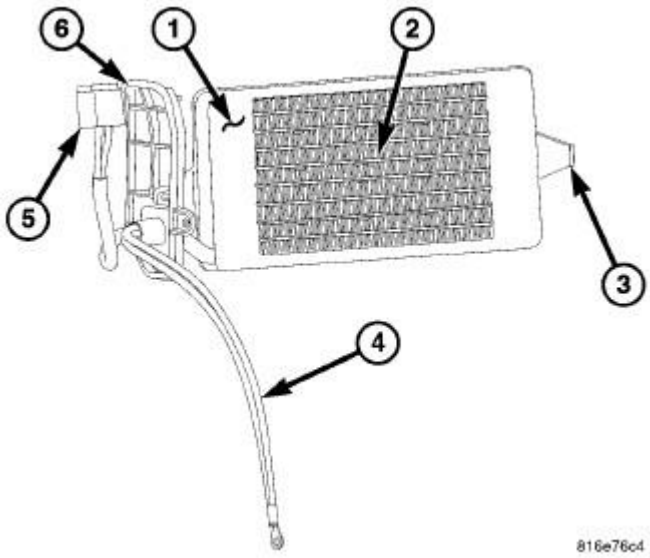


Fig. 193: PTC Heater Unit
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

An electric Positive Temperature Coefficient (PTC) heater unit (1) is used in vehicles equipped with the 3.0L diesel engine. The PTC heater unit aids in passenger compartment heating by compensating for the slower warm up rate of the diesel engine.

The PTC heater unit is located in the HVAC air distribution housing, downstream of the heater core and is controlled by the Powertrain Control Module (PCM) through three relays.

The PTC heater consists of three heating elements with fins (2) that transfer the heat to the conditioned air flowing within the air distribution housing and a retaining feature (3) that is molded onto end of the PTC heater unit to support the heater unit inside the air distribution housing. The PTC heater unit is connected to the vehicle electrical system by a ground strap (4) and a plastic wire connector with three terminals (5) which is connected to the headlamp and dash wire harness. If service of the PTC heater unit is required, a plastic mounting plate (6) is provided with the replacement heater unit.

The PTC heater unit can be accessed for service from underneath the instrument panel.

OPERATION

OPERATION

The Positive Temperature Coefficient (PTC) heater unit dissipates 1 kW of electrical power through 3 heating bars. The Powertrain Control Module (PCM) controls the three relays for the PTC heater unit. The PTC heater unit is split into three "banks". Control logic calls for all PTC heaters to be on all of the time, however, due to limitations in electrical power some of the elements may be turned off occasionally based on alternator load. This allows for lower in-rush current and optimum battery

charging. Electrical power output is between 900-1050 W.

The control system for the PTC heater unit is diagnosed using a scan tool. Prior to replacing a PTC heater unit, check for any diagnostic trouble codes (DTCs) related to the PCM and heating and A/C system. Initiate the Actuator Calibration function to verify that the concern is not a heating and A/C system calibration issue. Refer to **STANDARD PROCEDURE** .

The PTC heater unit cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

POSITIVE TEMPERATURE COEFFICIENT (PTC) HEATER UNIT

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury

NOTE: See Wiring Information for circuit descriptions and diagrams. Wiring Information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

Prior to replacing the Positive Temperature Coefficient (PTC) heater unit, check the fuses located in the two diesel accessory fuse blocks and check for any Diagnostic Trouble Codes (DTCs) related to the Powertrain Control Module (PCM) and the heating and A/C system and repair as necessary. Initiate the Actuator Calibration function to verify that the concern is not a heating and A/C system calibration issue. Refer to **STANDARD PROCEDURE** .

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the PTC heater unit. Refer to **UNIT, HEATER, REMOVAL**.
3. Using an ohmmeter, check for continuity between each of the terminals of the PTC wire lead connector and the PTC heater ground strap. In each case there should be continuity. If OK, verify the PTC ground strap has a good connection to the body and/or repair the wire harness circuits between the PTC heater unit, Power Distribution Center (PDC) and the PCM. If NOT OK, replace the PTC heater unit.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

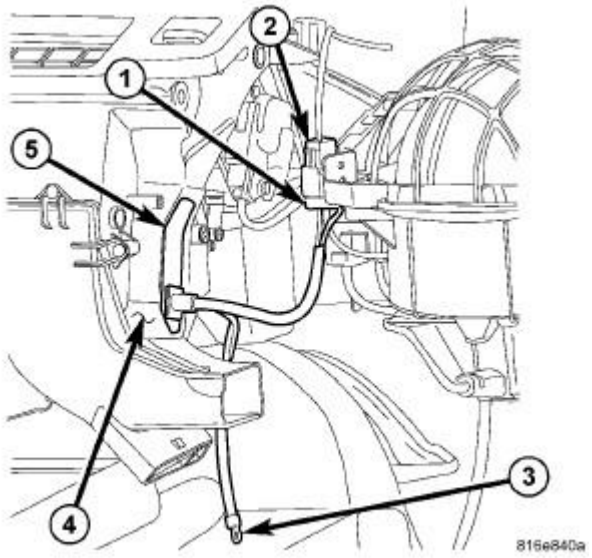


Fig. 194: PTC Heater Unit Removal
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the glove box bin from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Disconnect the wire harness connector (1) of the positive temperature coefficient (PTC) heater unit from the headlamp and dash wire harness lead (2).
4. Remove the PTC ground strap (3) from the body.

WARNING: Use care when cutting the air distribution housing to remove the PTC heater unit. Failure to take proper precautions may result in possible serious injury.

CAUTION: Use a sharp utility knife or a hot knife to cut the air distribution housing around the PTC heater unit. Do not use a saw of any kind or damage to the air distribution housing will result.

5. Carefully cut the passenger side of the air distribution housing (4) around the PTC heater unit following the cut line (5) molded into the side of the housing.
6. Remove the PTC heater unit from the air distribution housing by pulling it straight out of the housing.

INSTALLATION

INSTALLATION

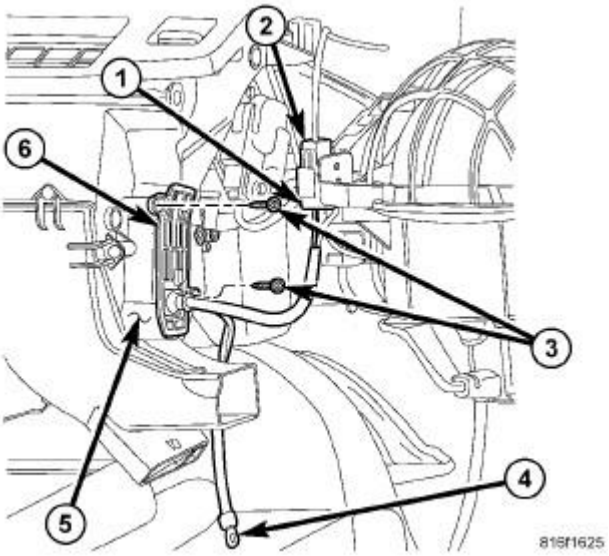


Fig. 195: PTC Heater Unit Install
Courtesy of CHRYSLER GROUP, LLC

NOTE: LHD model shown in illustration. RHD model similar.

1. Position the positive temperature coefficient (PTC) heater unit and adapter plate (6) into the passenger side of the air distribution housing (5). Make sure to engage the end of the heater unit into the molded locator area in the driver side of the air distribution housing and make sure that the rubber wiring grommet is fully engage over the adapter plate.
2. Install the two screws (3) that secure the PTC heater unit to the air distribution housing. Tighten the screws to 2.2 N.m (20 in. lbs.).
3. Install the PTC ground strap (4). Tighten the retainer securely to ensure a good ground.
4. Connect the PTC wire harness connector (1) to the headlamp and dash wire harness lead (2).
5. Install the glove box bin. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
6. Reconnect the negative battery cable.

ENGINE

Ignition System - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

NOTE: All engines use a fixed ignition timing system. Basic ignition timing is not adjustable. All spark advance is determined by the Powertrain Control Module (PCM).

The ignition system used on these engines is referred to as coil on plug. The system's four main components are the coils, crankshaft position sensor, spark plugs, and camshaft position sensors. The coil on plug ignition system utilizes an ignition coil for every cylinder. The ignition coils are mounted directly over the each spark plug.

OPERATION

OPERATION

The crankshaft position sensor and camshaft position sensor are hall effect devices. The camshaft position sensor and crankshaft position sensor generate square wave pulses that are inputs to the Powertrain Control Module (PCM). The PCM determines engine position from these sensors. The PCM calculates injector sequence and ignition timing from crankshaft AND camshaft position.

SPECIFICATIONS

FIRING ORDER

3.6L

The firing order for the 3.6L V-6 is 1-2-3-4-5-6.

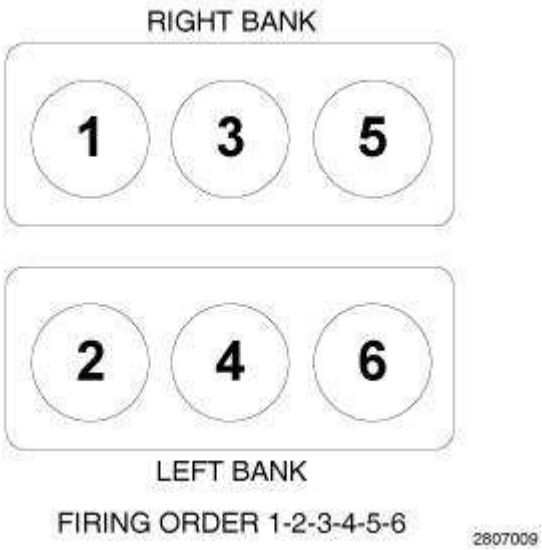


Fig. 1: Firing Order: 1 - 2 - 3 - 4 - 5 - 6
Courtesy of CHRYSLER GROUP, LLC

5.7L / 6.4L

The firing order for the 5.7L and 6.4L V-8 is 1-8-4-3-6-5-7-2.

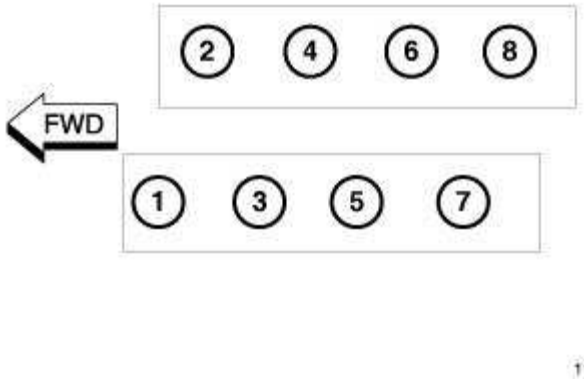


Fig. 2: Engine Cylinder Arrangement - 5.7L
Courtesy of CHRYSLER GROUP, LLC

SPARK PLUGS

Engine	Supplier	Spark Plug	Electrode Gap
3.6L	NGK	RER8ZWYCB4	1.00 mm (0.040 in.)
5.7L	NGK	SPLZF R5C11	1.00 mm (0.040 in.)
6.4L	NGK	LZTR6AP11EG	1.00 mm (0.040 in.)

IGNITION COIL RESISTANCE

Engine	Primary Resistance 21°C - 27°C (70°F - 80°F)	Secondary Resistance 21°C - 27°C (70°F - 80°F)
3.6L	0.6 to 0.9 ohms	6.0K to 9.0K ohms
5.7L	0.540 to 0.660 ohms	* 9.24K to 11.76K ohms
6.4L	0.540 to 0.660 ohms	* 9.24K to 11.76K ohms
* Not directly measurable due to diode in circuit.		

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Camshaft Position Sensor (CMP) - 3.6L	9	-	80
Camshaft Position Sensor - 5.7L	12	9	-
Camshaft Position Sensor (CMP) - 6.4L	12	9	-
Crankshaft Position Sensor (CKP) - 3.6L	12	9	-
Crankshaft Position Sensor - 5.7L	12	9	-
Crankshaft Position Sensor (CKP) - 6.4L	12	9	-
Ignition Capacitor - 3.6L	10	-	89
Ignition Coil Mounting - 3.6L	8	-	71
Ignition Coil Mounting - 5.7L	12	9	-
Ignition Coil Mounting - 6.4L	12	9	-
* Knock Sensor - 3.6L	22	16	-
* Knock Sensor - 5.7L	20	15	-
* Knock Sensor - 6.4L	20	15	-
Spark Plugs - 3.6L	17.5	13	-
Spark Plugs - 5.7L	25 - 30	18.5 - 22	-
** Spark Plugs - 6.4L	10 - 20	7.5 - 15	-
Variable Valve Timing Solenoids - 3.6L	4	-	35
Negative Battery Cable Nut	5	-	45
* Do not apply any sealant, thread-locker or adhesive to bolts. Poor sensor performance may result.			
** Torque critical tapered design. Do not exceed 15 ft. lbs.			

CAPACITOR, IGNITION

REMOVAL

3.6L

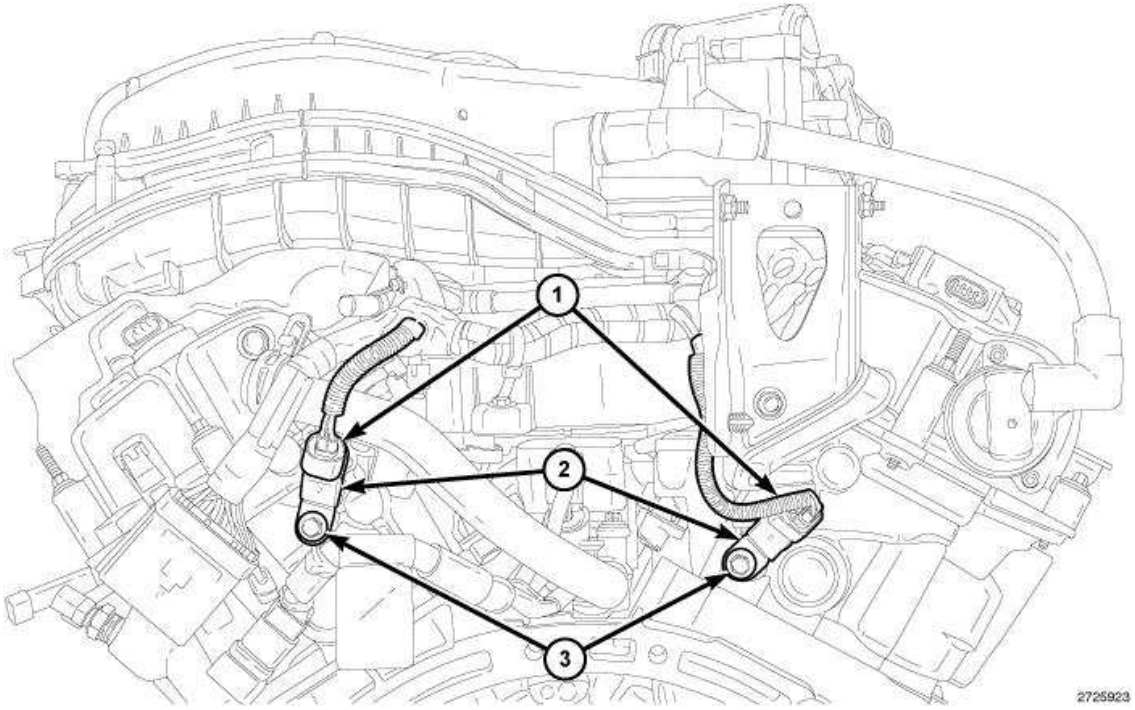


Fig. 3: Electrical Connector, Mounting Bolt & Ignition Capacitor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the electrical connector (1).
3. Remove the mounting bolt (3) and the ignition capacitor (2).

5.7L / 6.4L

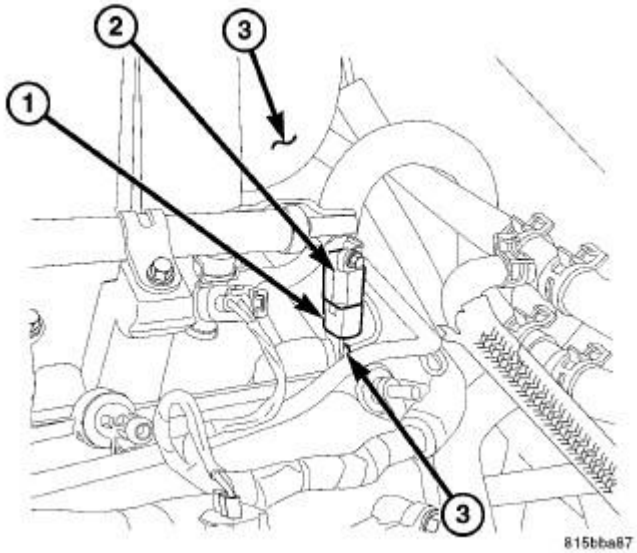


Fig. 4: Capacitor - 6.1L
Courtesy of CHRYSLER GROUP, LLC

The ignition capacitor (2) is attached at the left rear corner of the intake manifold (3).

1. Disconnect and isolate the negative battery cable.
2. Remove the electrical connector (1).
3. Remove the retaining bolt and remove capacitor (2).

INSTALLATION

3.6L

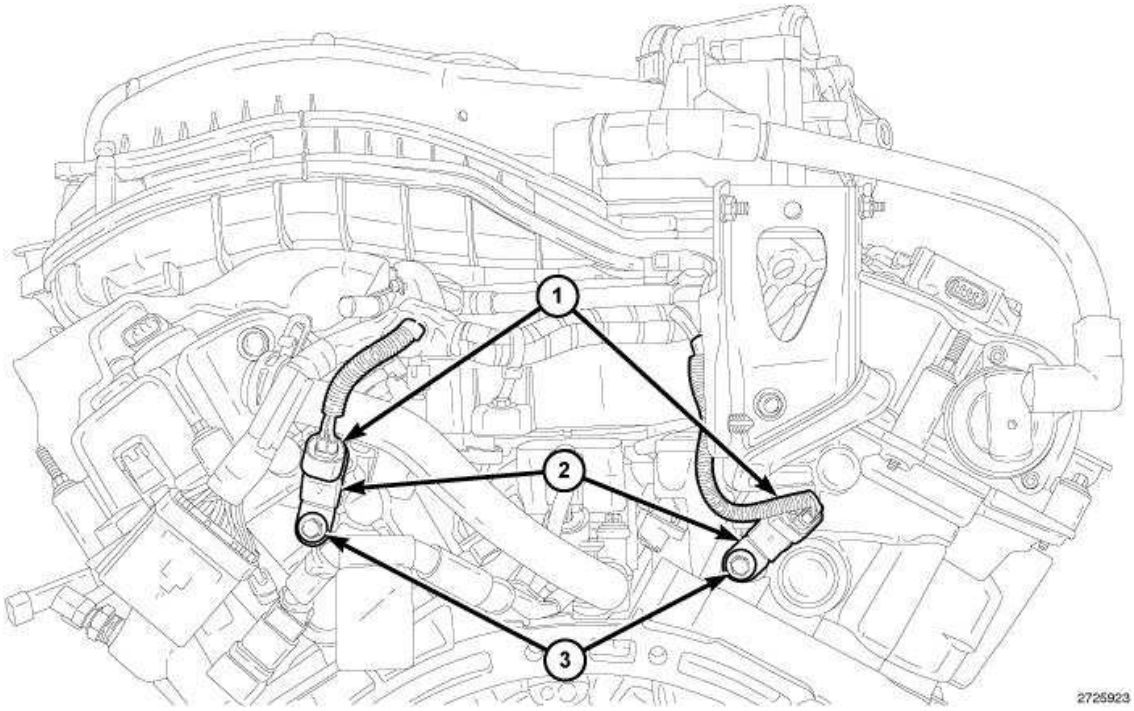


Fig. 5: Electrical Connector, Mounting Bolt & Ignition Capacitor
Courtesy of CHRYSLER GROUP, LLC

1. Install the ignition coil capacitor (2) and bolt (3). Tighten the bolt to 10 N.m (89 in. lbs.).
2. Connect the electrical connector (1).
3. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

5.7L / 6.4L

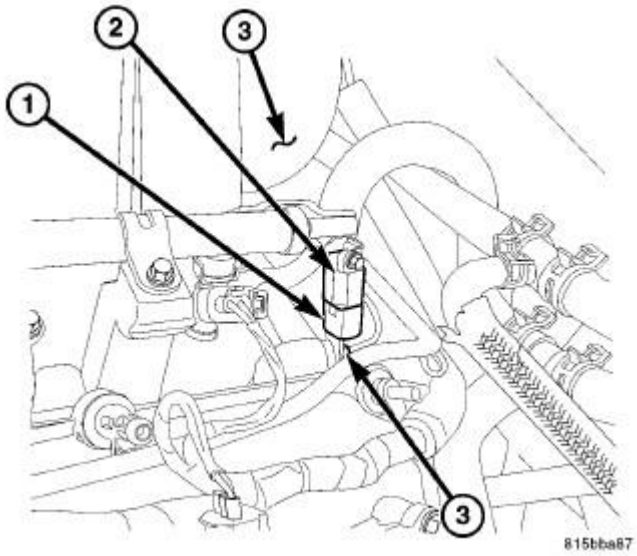


Fig. 6: Capacitor - 6.1L
Courtesy of CHRYSLER GROUP, LLC

1. Position the ignition capacitor (2) at the left rear corner of intake manifold (3).
2. Install the retaining bolt.
3. Install the electrical connector (1).
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

COIL, IGNITION

REMOVAL

3.6L

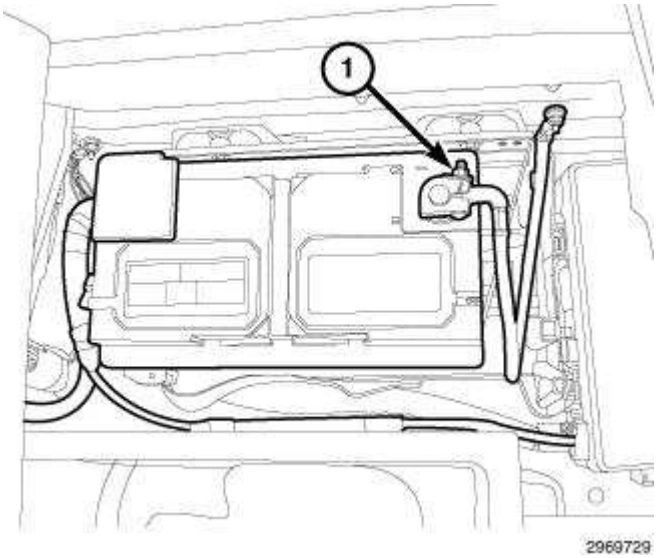


Fig. 7: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

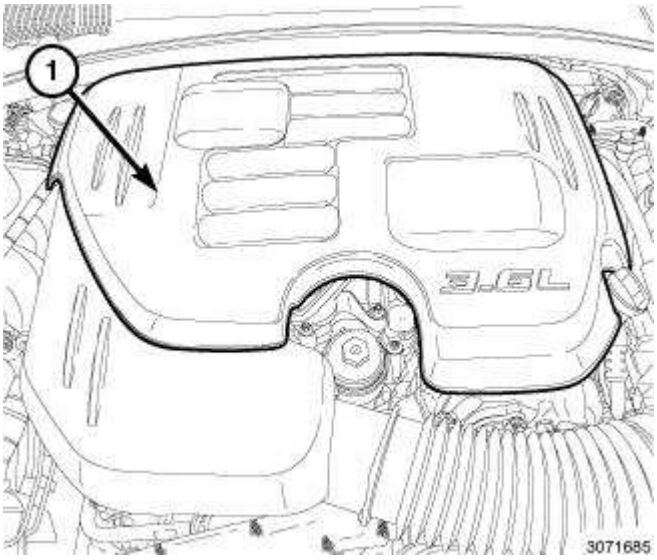


Fig. 8: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

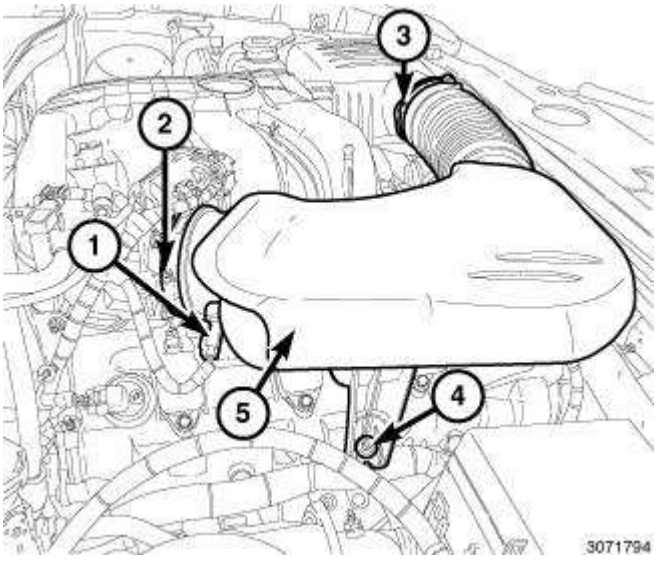


Fig. 9: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. If removing the ignition coils from cylinders 1, 3 or 5 on the right side of the engine, first remove the air inlet hose (5). Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER,**

REMOVAL or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

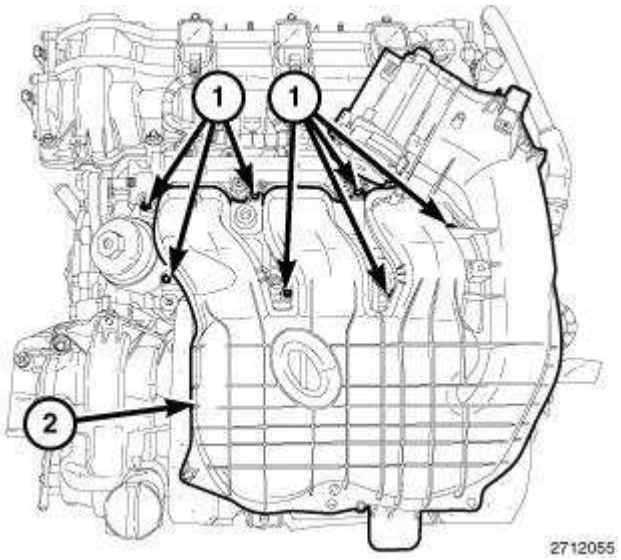


Fig. 10: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. If removing the ignition coils from cylinders 2, 4 or 6 on the left side of the engine, first remove the air inlet hose, upper intake manifold (2) and insulator. Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD, INTAKE, REMOVAL** .

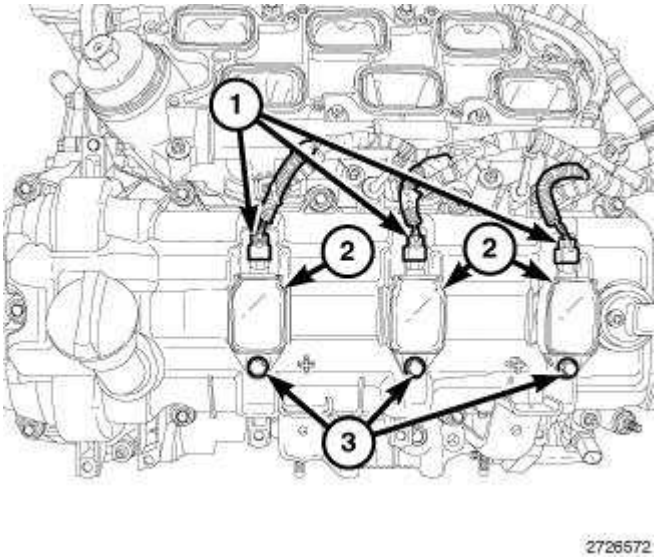


Fig. 11: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left side ignition coils are shown in illustration, the right side ignition coils are similar.

5. Unlock and disconnect the electrical connector (1) from the ignition coil.
6. Remove the ignition coil retaining bolt (3).
7. Pull the ignition coil (2) from cylinder head cover opening with a slight twisting action.

5.7L / 6.4L

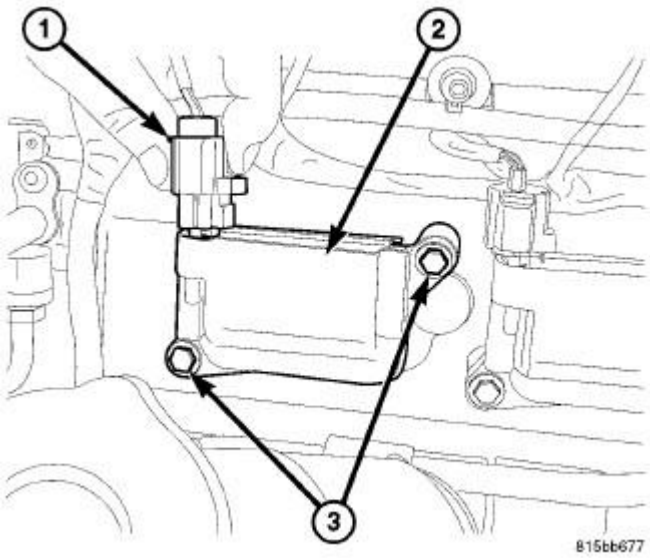


Fig. 12: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the electrical connector (1) from the coil.
3. Remove the two coil retaining bolts (3).

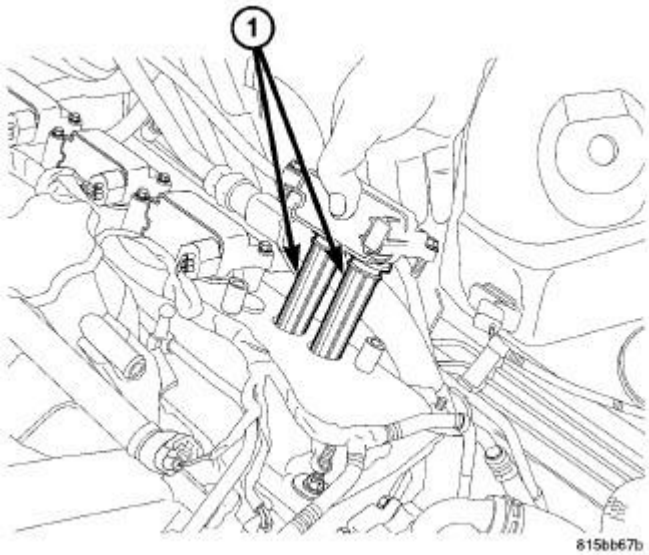


Fig. 13: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

4. Using a slight rocking motion, carefully lift coil (1) from the cylinder head opening.

INSTALLATION

3.6L

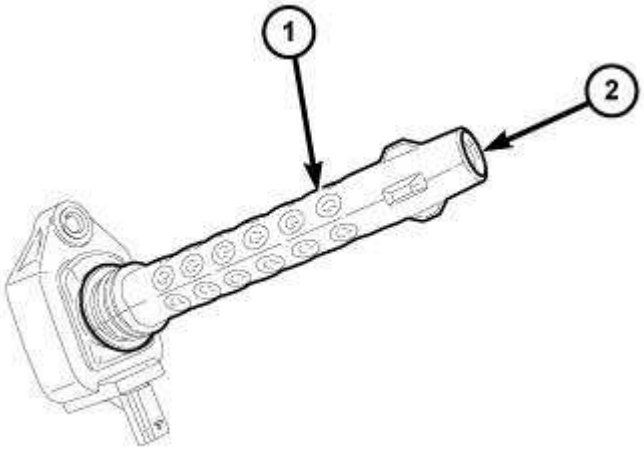


Fig. 14: Ignition Coil Rubber Boot & Opening Of The Boot
Courtesy of CHRYSLER GROUP, LLC

1. Using compressed air, blow out any dirt or contaminants from around the top of spark plug.
2. Check the condition of the ignition coil rubber boot (1). Inspect the opening of the boot (2) for any debris, tears or rips. Carefully remove any debris with a lint free cloth.

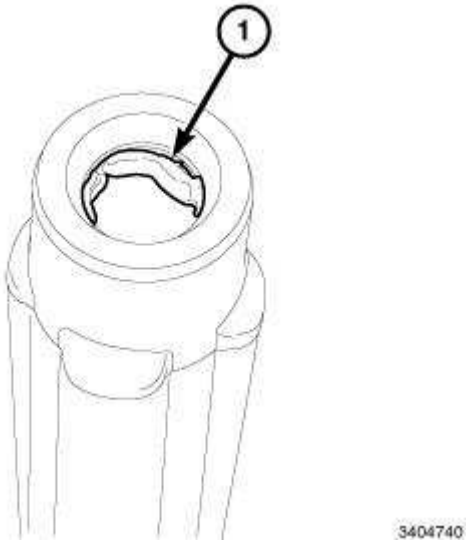


Fig. 15: Fluostar 2LF Lubricant
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not apply a silicone based grease such as Mopar® Dielectric Grease to the ignition coil rubber boot. The silicone based grease will absorb into the boot causing it to stick and tear.

3. Place a small, 360° bead of Fluostar 2LF lubricant (1) along the inside opening of the coil boot approximately 1 to 2 mm from the chamfer edge but not on the chamfered surface.

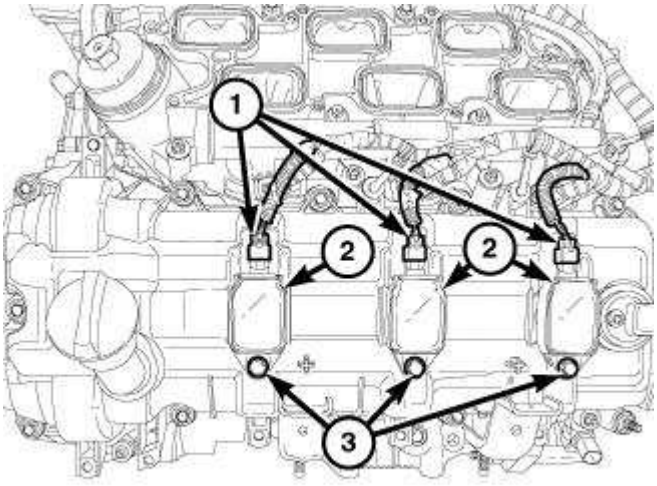


Fig. 16: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH ignition coils are shown in illustration, the RH ignition coils are similar.

4. Position the ignition coil (2) into the cylinder head cover opening. Using a twisting action, push the ignition coil onto the spark plug.
5. Install the ignition coil mounting bolt (3) and tighten to 8 N.m (71 in.lbs).
6. Connect and lock the electrical connector (1) to the ignition coil (2).

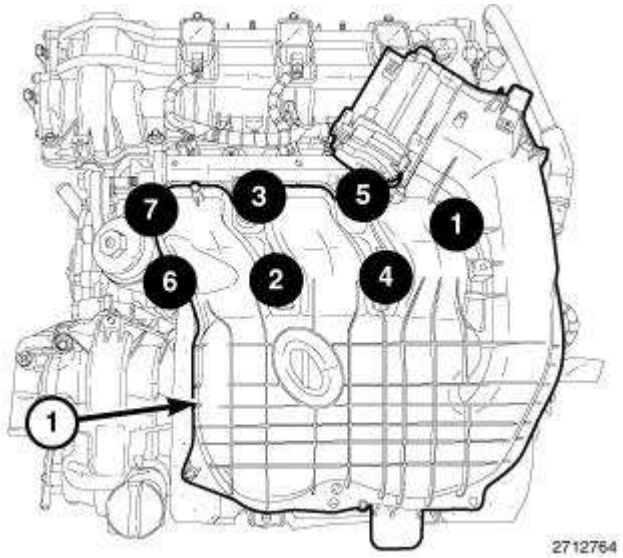


Fig. 17: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. If removed, install the insulator, upper intake manifold (1) and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .
8. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

5.7L / 6.4L

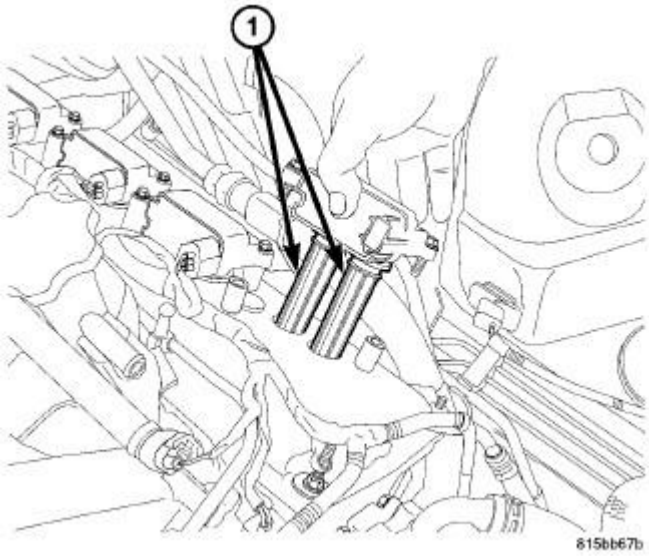


Fig. 18: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

1. Before installing coil(s), apply dielectric grease to the inside of spark plug boots (1).

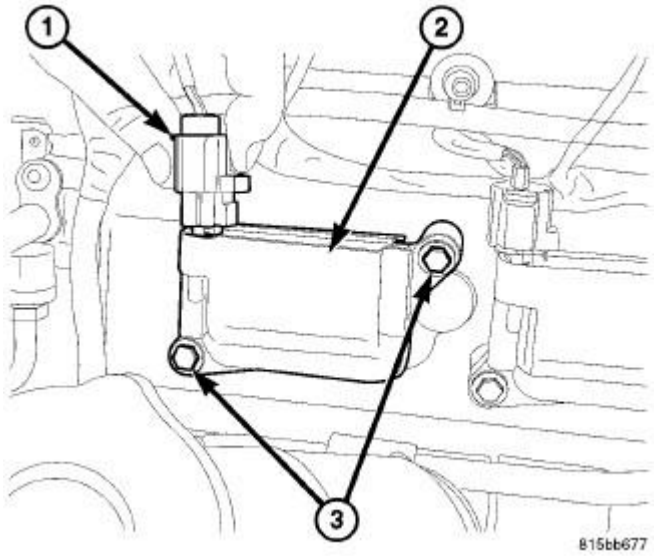


Fig. 19: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER GROUP, LLC

2. Position the ignition coil into cylinder head and push both spark plug boots onto each spark plug.
3. Install the two coil mounting bolts (3) and tighten to 12 N.m (106 in. lbs.).
4. Connect the electrical connector (1) to the coil and lock connector.
5. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

PLUG, GLOW, 3.0L DIESEL

DESCRIPTION

DESCRIPTION

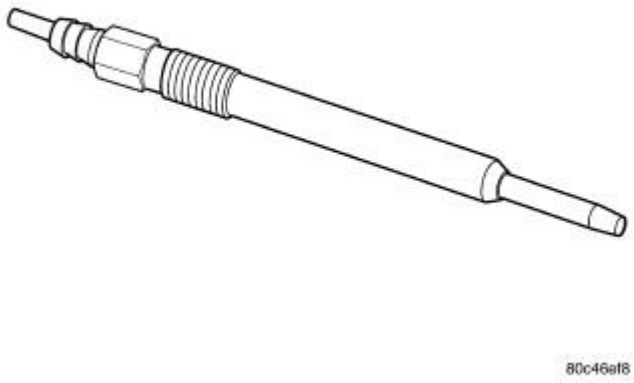


Fig. 20: Glow Plug

Courtesy of CHRYSLER GROUP, LLC

CAUTION: The glow plugs operate on a 5-volt system. The glow plugs DO NOT tolerate any over voltage. Full battery voltage will destroy the glow plug immediately. DO NOT test the glow plugs with a 12V source as damage will occur to the glow plug.

CAUTION:

- **Never bend, bump or knock the fast metallic glow plugs.**
- **Fast metallic glow plugs must not be handled loose in a container. Store, handle, and transport them only in original boxes.**
- **If there is any doubt about the proper condition of a glow plug, do not reuse it.**
- **Do not clean the glow plugs with abrasive or aggressive media.**
- **Avoid dipping the glow plug into fluids.**
- **Read Diagnostic Trouble Codes (DTCs). If a glow plug problem is indicated, do not start the engine.**

CAUTION: Disregarding these instructions may cause severe engine damage.

Glow plugs are used to help start a cold or cool engine. The glow plugs will heat up and glow to heat the combustion chamber of each cylinder. An individual glow plug is used for each cylinder. Each glow plug is threaded into the side of the cylinder head below the fuel rail.

OPERATION

OPERATION

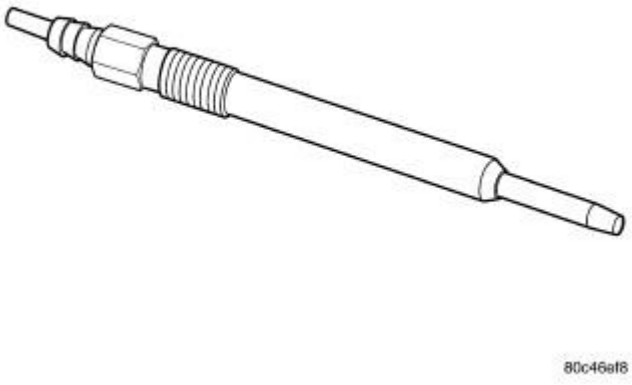


Fig. 21: Glow Plug
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The glow plugs operate on a 5-volt system. DO NOT test the glow plugs with a 12 V source as damage will occur to the glow plug(s).

The Powertrain Control Module (PCM) monitors various engine sensors. When the ignition key is turned to the ON position, the PCM sends a signal to the glow plug module (relay) to turn on, and cycle, the glow plugs for a predetermined amount of time, plus illuminate the glow plug light in the instrument panel. Once activated, the element inside of the core of the glow plug begins to glow. If there is a fault with the glow plug system, the PCM will store a fault code.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

CAUTION: DO NOT attempt to start the engine until the glow plug system tests correctly.

CAUTION: Do not apply 12 V battery voltage to the glow plug. Damage the glow plug, engine, or personal injury may result.

NOTE: To ensure a good contact of the measurement connections the contacts have to be free of oil, dirt or corrosion.

1. Measure the electrical resistance of each glow plug while it is still installed in the cylinder head. Resistance should be between 0.2 E 5? between the electrical connector point on the glow plug and the cylinder head. The ground contact on the DVOM must be as close as possible to the point where the glow plug contacts the cylinder head to avoid erratic resistance measurements.
2. If the resistance is out of tolerance, remove the glow plug from the cylinder head and check the resistance again.
3. Dismantled state: measure between connection side (connector/thread) and housing.
4. Engine mounted state: measure between connection side (connector/thread) and engine mass.
5. Resistance value:
   - Resistance > 5 ?: open circuit failure.
   - Resistance < 200 m?: short circuit failure.
   - 200 m? < Resistance < 5 ?: glow plug OK.
6. Use the actuator test function of the scan tool to test the glow plug module and glow plug lamp. The glow plug module's on-board diagnostic tests will automatically check the electrical condition of the entire glow plug system.
7. After the scan tool glow plug actuator test function is complete, if MIL is OFF and no glow plug DTCs are present, testing is complete and the engine can be started.
8. If MIL is still ON, check the harness connectors of glow plugs, repair any loose or damaged connections, and run the glow plug actuator test again.
9. If MIL is still ON, check the electrical connectors of glow plugs and power up the glow plugs

again.

REMOVAL

REMOVAL

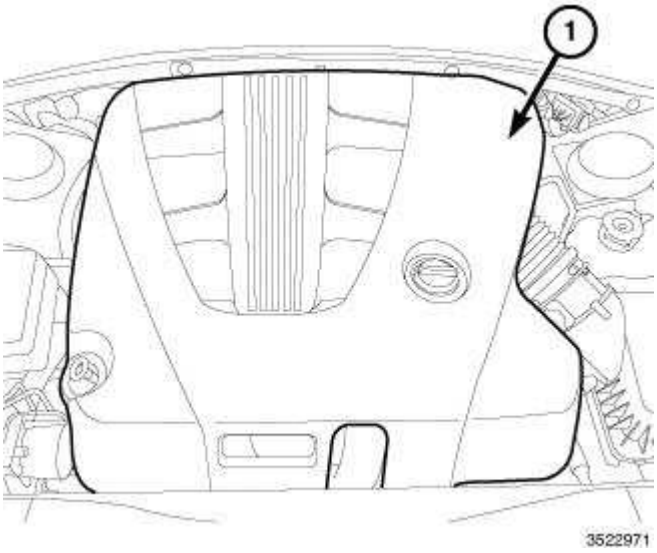


Fig. 22: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

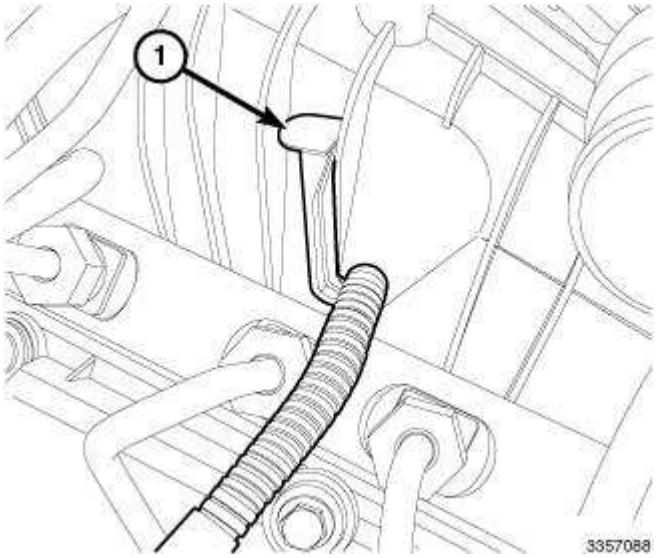


Fig. 23: Glow Plug Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the glow plug harness connector (1).

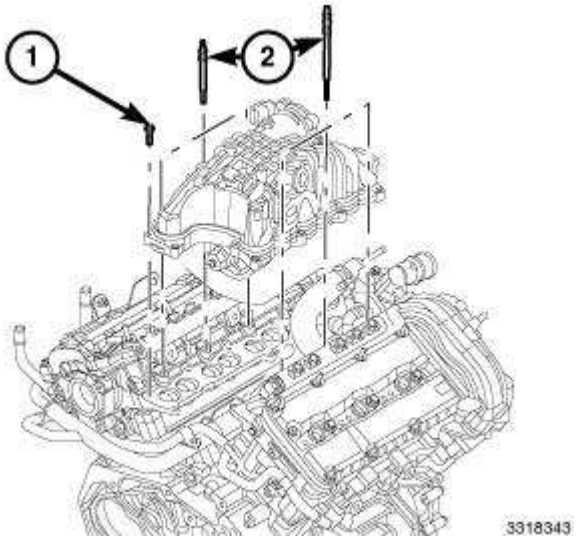


Fig. 24: Identifying Glow Plugs
Courtesy of CHRYSLER GROUP, LLC

4. Clean the glow plug bay area.
5. Remove the glow plugs (2).

INSTALLATION

INSTALLATION

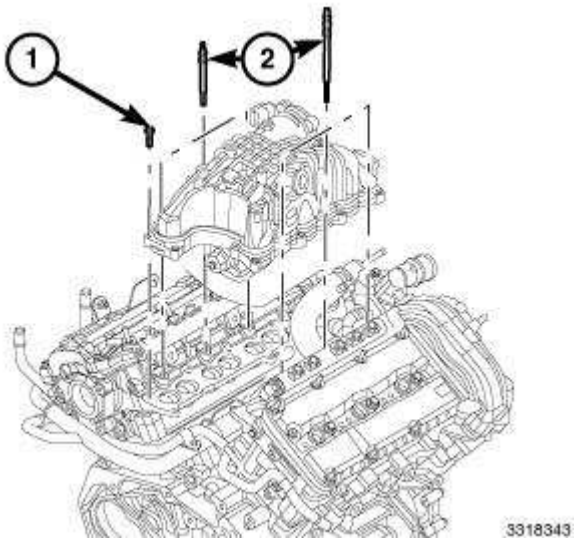


Fig. 25: Identifying Glow Plugs
Courtesy of CHRYSLER GROUP, LLC

1. Install the glow plug. Tighten glow plug to 11 N.m (97 in. lbs.).

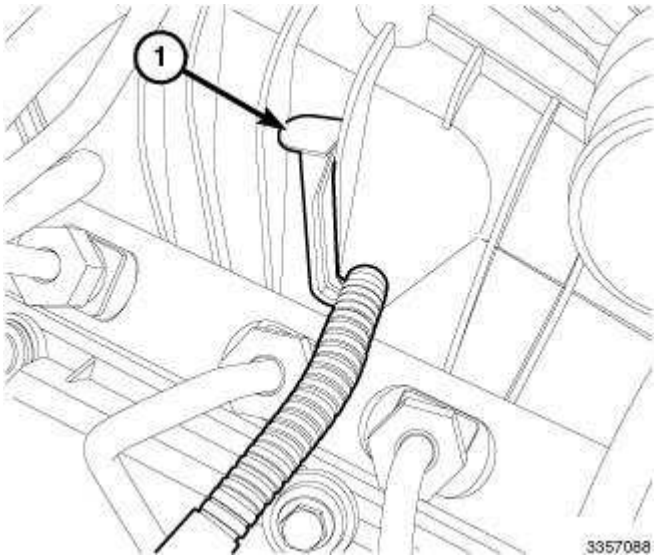


Fig. 26: Glow Plug Harness Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the glow plug harness connector (1).

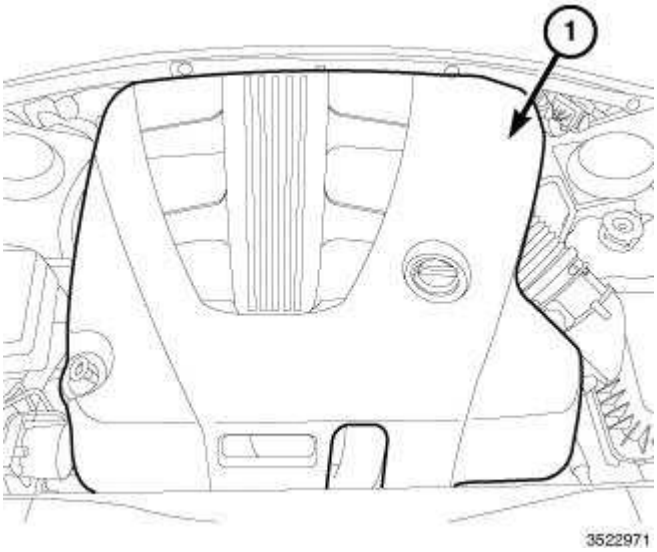


Fig. 27: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine cover (1).
4. Connect the negative battery cable.

SENSOR, CAMSHAFT POSITION

DESCRIPTION

DESCRIPTION

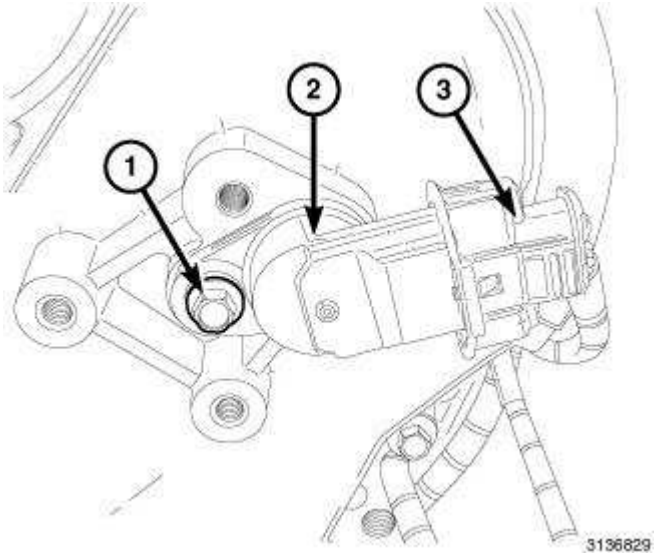


Fig. 28: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Camshaft Position (CMP) sensor is mounted on the left upper timing cover. The hall effect sensor supplies a signal to the Powertrain Control Module (PCM). The PCM uses the signals sent by the CMP and the Crankshaft Position (CKP) sensor to determine injection timing.

3.6L

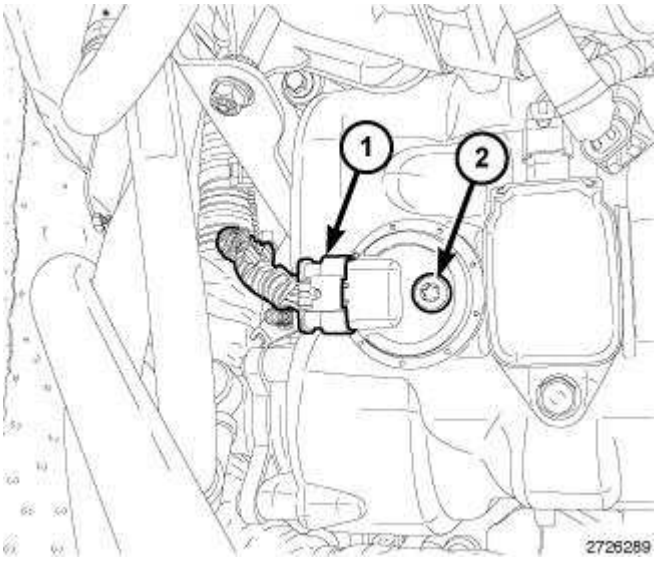


Fig. 29: CMP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

The two Camshaft Position (CMP) sensors are located at the rear of the cylinder head covers. The sensors are bolted to the cylinder head and utilize a radial lip seal where they protrude through the covers. The attaching bolt (2) has an O-ring seal and is captured in the sensor.

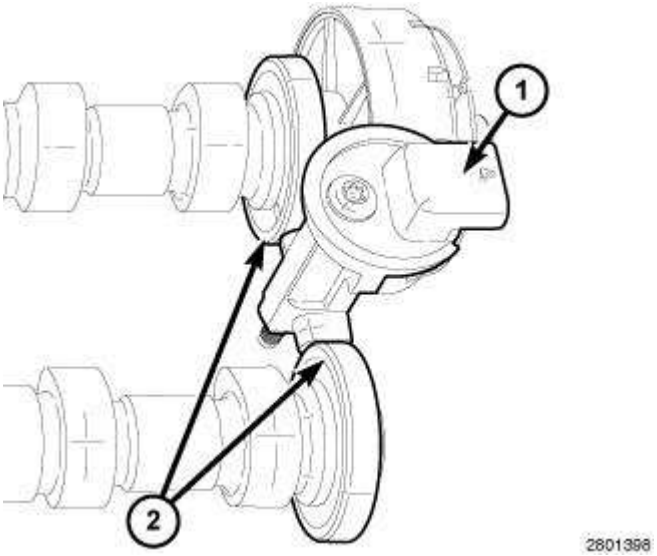


Fig. 30: Camshaft Position Sensors (CMP) Sensors & Encoded Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

The Camshaft Position Sensors (CMP) sensors (1) are dual read, single element hall effect sensors mounted between the magnetic encoded timing wheels (2). The magnetic timing wheels are used because of their small diameter allowing for a compact cylinder head design.

5.7L/6.4L

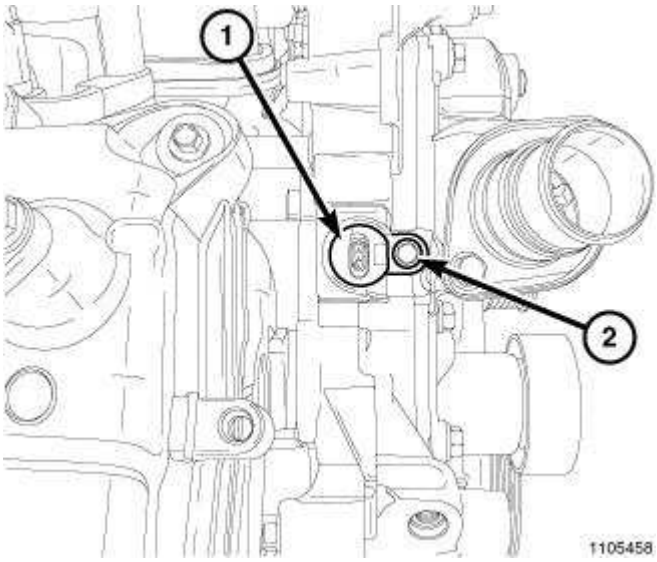


Fig. 31: Camshaft Position Sensor
Courtesy of CHRYSLER GROUP, LLC

The Camshaft Position Sensor (CMP) (1) is located in the timing cover near the thermostat housing.

OPERATION

OPERATION

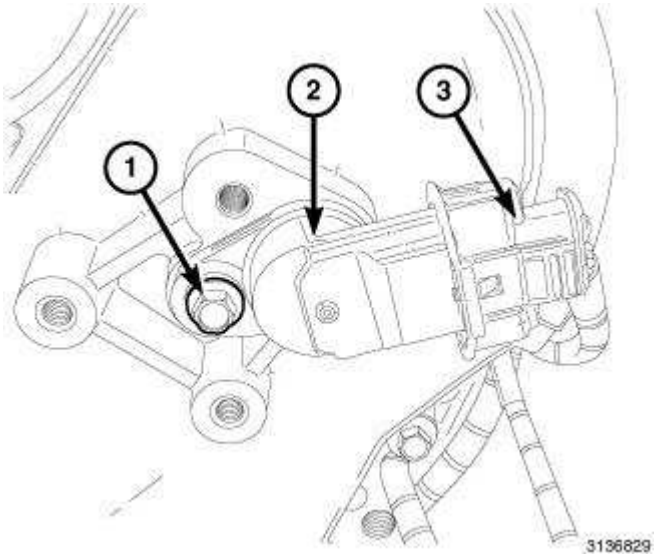


Fig. 32: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

The signal circuit of the camshaft sensor has a voltage of approximately 5V. The camshaft has a reluctor wheel bolted to the front of left exhaust camshaft, the camshaft signal is approximately 0V. This 0V to 5V signal is used by the Powertrain Control Module (PCM) for detecting ignition TDC of cylinder 1 as the engine rotates. If no signal is supplied by the camshaft position sensor, the vehicle will not start.

3.6L

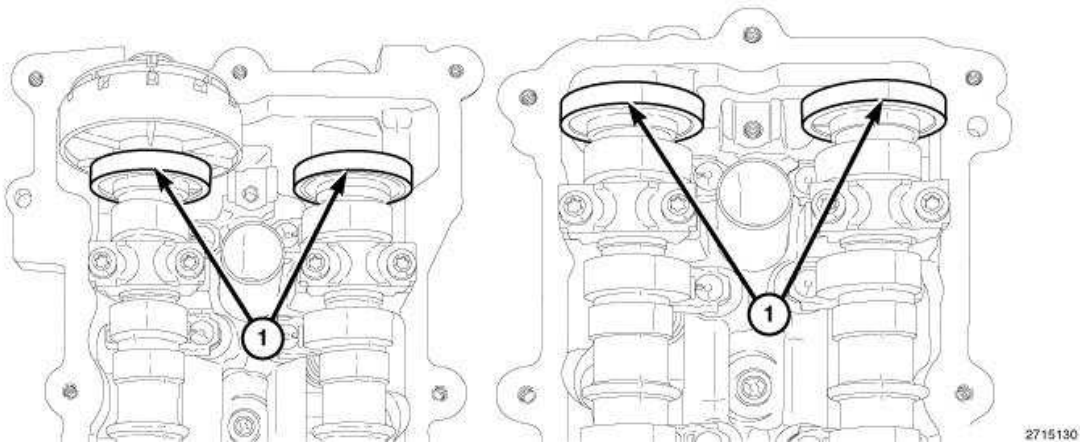


Fig. 33: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

The 3.6 liter engine uses a Dual Over Head Camshaft (DOHC) configuration. The camshafts are a nodular cast iron design and have two pressed on magnetic timing wheels (1) that are magnetically encoded.

The Camshaft Position Sensors (CMP) are mounted between the timing wheels (1).

5.7L/6.4L

The CMP sensor is used in conjunction with the crankshaft position sensor to differentiate between fuel injection and spark events. It is also used to synchronize the fuel injectors with their respective cylinders. The sensor generates electrical pulses. These pulses (signals) are sent to the Powertrain Control Module (PCM). The PCM will then determine crankshaft position from both the camshaft position sensor and crankshaft position sensor.

The tonewheel is located at the front of the camshaft. As the tonewheel rotates, notches pass through the sync signal generator.

When the cam gear is rotating, the sensor will detect the notches. Input voltage from the sensor to the PCM will then switch from a low (approximately 0.3 volts) to a high (approximately 5 volts). When the sensor detects a notch has passed, the input voltage switches back low to approximately 0.3 volts.

REMOVAL

REMOVAL

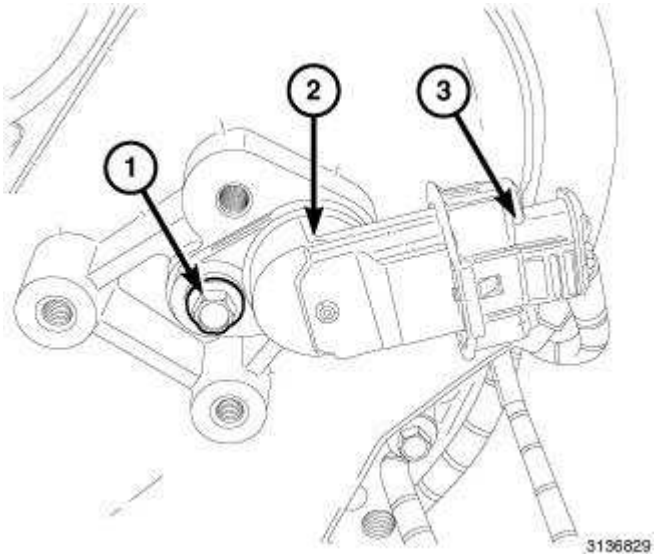


Fig. 34: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Disconnect Camshaft Position (CMP) sensor wire harness connector (3).
3. Remove bolt (1) and the CMP sensor (2).

3.6L

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

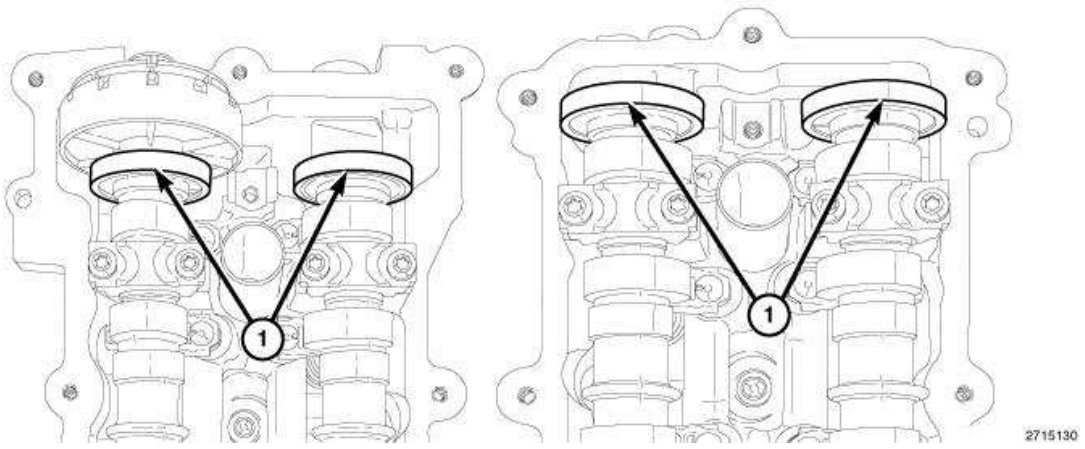


Fig. 35: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

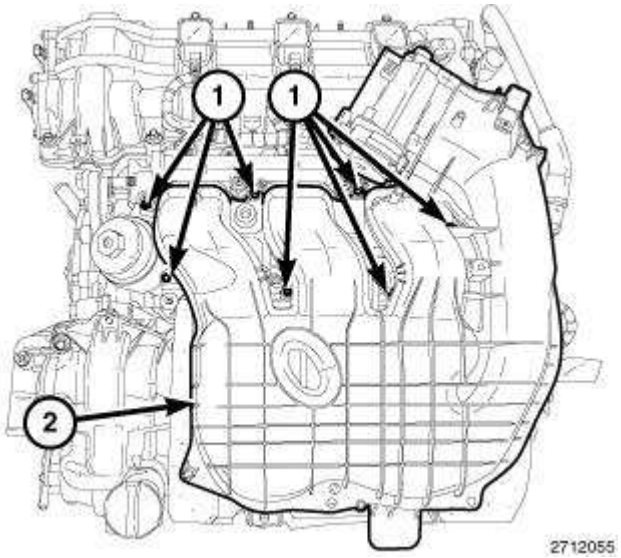


Fig. 36: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

The Camshaft Position (CMP) sensors are located at the rear of the cylinder head covers and are

bolted to the cylinder head.

1. Disconnect and isolate the negative battery cable.
2. If removing the left CMP sensor, first remove the air inlet hose and upper intake manifold (2). Refer to **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL** or **MANIFOLD, INTAKE, REMOVAL, 5.7L** or **MANIFOLD, INTAKE, REMOVAL** .

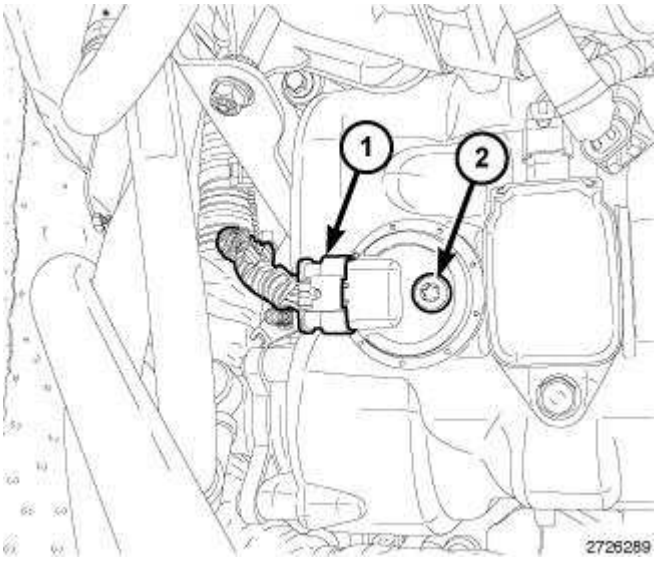


Fig. 37: CMP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right CMP sensor is shown in illustration, the left CMP sensor is similar. If removing both right and left CMP sensors, mark the sensors so they can be installed in their original locations.

3. Disconnect the electrical connector (1) from the CMP sensor.
4. Loosen the sensor mounting bolt (2).

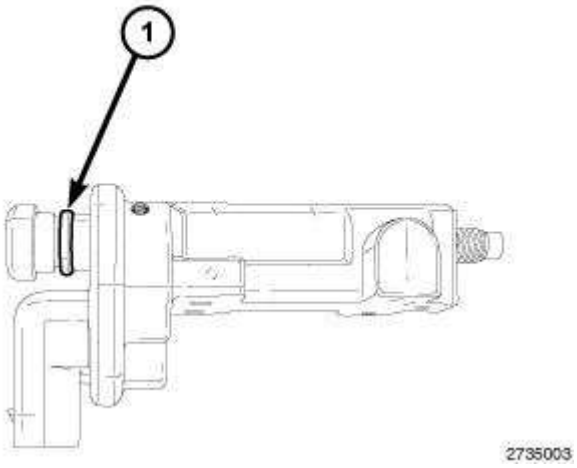


Fig. 38: O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

5. Pull the sensor and mounting bolt from the cylinder head cover.
6. The O-ring seal (1) can be reused if not damaged.

5.7L / 6.4L

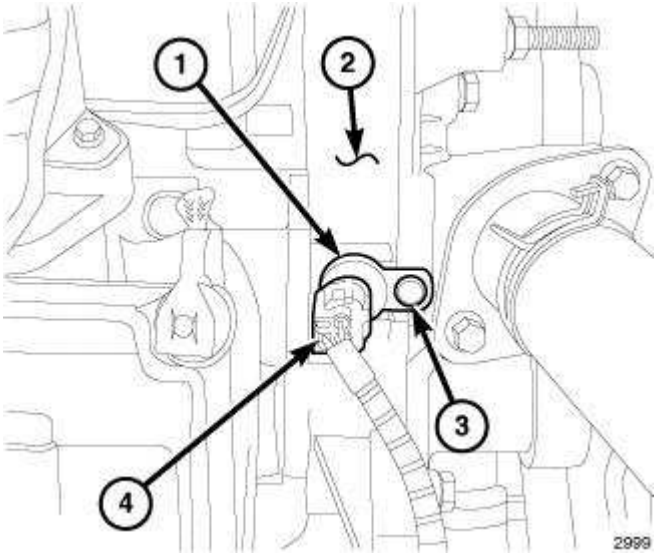


Fig. 39: Camshaft Position Sensor-5.7L
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the electrical connector (4) at the Camshaft Position (CMP) sensor (1).
3. Remove the CMP sensor mounting bolt (3).
4. Using a slight rotating motion, carefully remove the CMP sensor from the timing cover (2).

5. Check the condition of the sensor O-ring.

INSTALLATION

INSTALLATION

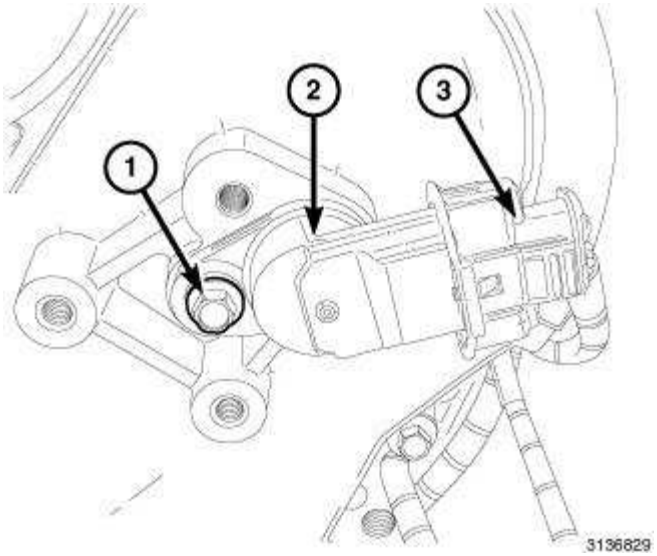


Fig. 40: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install Camshaft Position (CMP) sensor (2). Tighten bolt (1) to 8 N.m (71 in. lbs.).
2. Connect the CMP wire harness connector (3).
3. Connect the negative battery cable.

3.6L

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

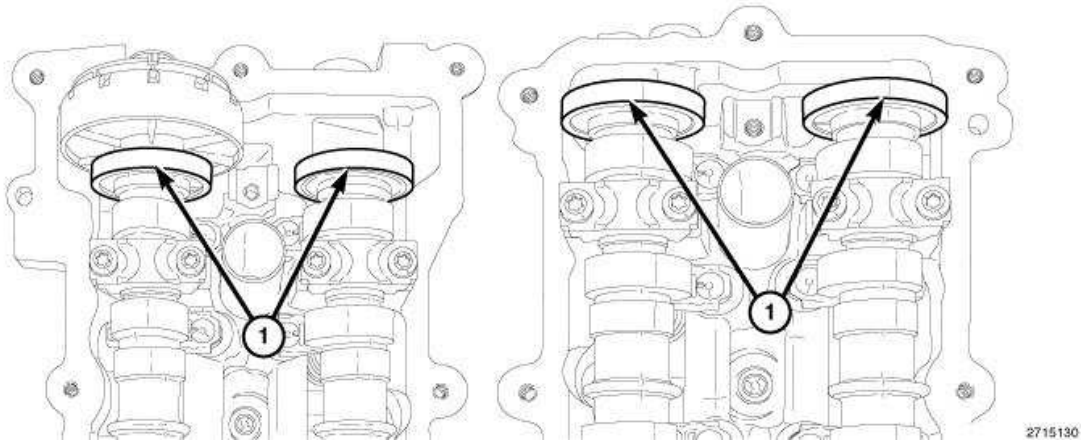


Fig. 41: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

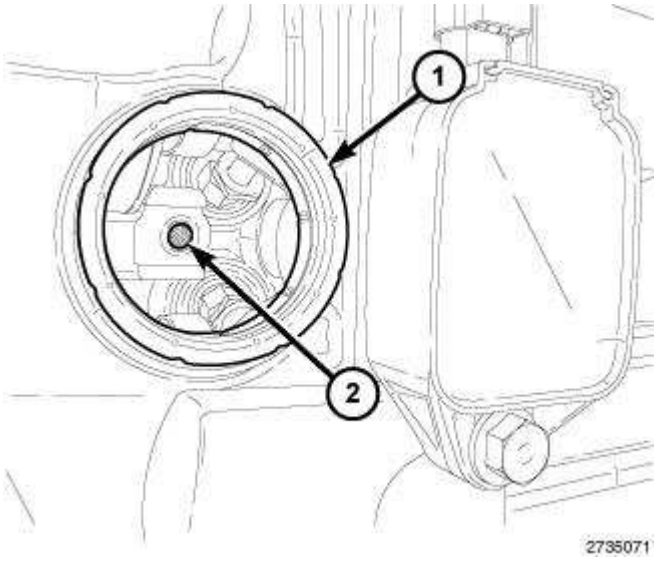


Fig. 42: CMP Sensor Seal & Mounting Bolt Hole
Courtesy of CHRYSLER GROUP, LLC

1. Clean out the camshaft position (CMP) sensor mounting bolt hole (2) in cylinder head.
2. The CMP sensor seal (1) can be reused if not damaged.

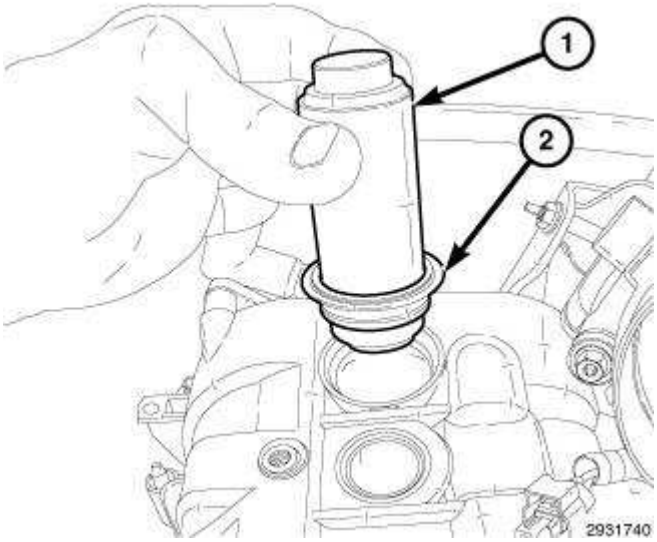


Fig. 43: Installing CMP Sensor Seal
Courtesy of CHRYSLER GROUP, LLC

3. If required, install a new CMP sensor seal (2) in the cylinder head cover:
   - Lubricate the CMP sensor seal inner and outer diameters with clean engine oil.
   - Place the CMP sensor seal (2) on the Cam Sensor/Spark Plug Tube Seal Installer (special tool #10256, Installer, Cam Installer, Cam Sensor/ Spark Plug Tube Seal) (1).
   - Push the seal into the cylinder head cover until the base of the seal is seated.
   - Remove the tool.

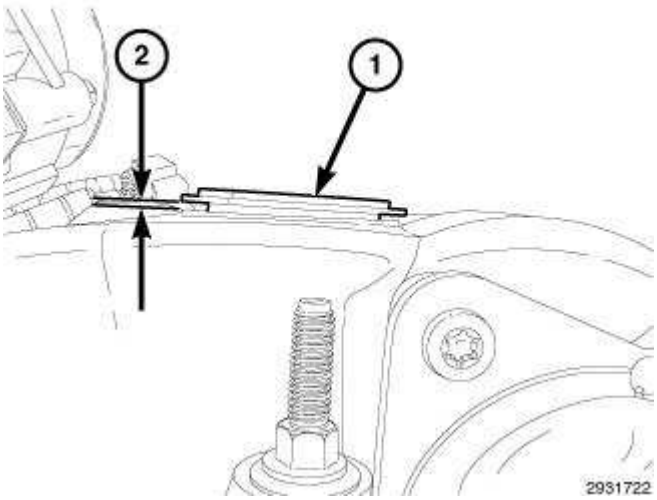


Fig. 44: Gap & CMP Sensor Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: A properly installed CMP sensor seal (1) will have a 1.5 - 2.0 mm (0.06 - 0.08 in.) gap (2) between the cylinder head cover and the seal upper flange.

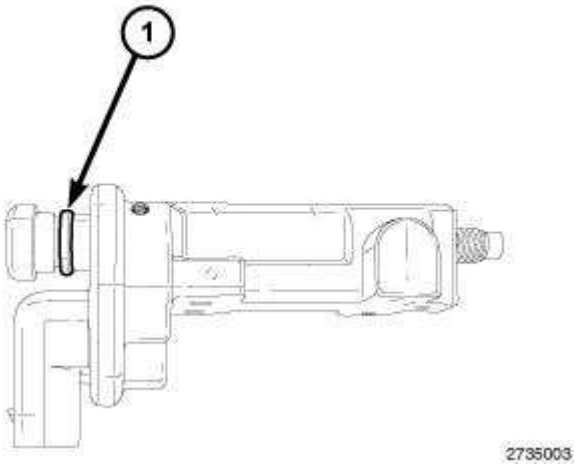


Fig. 45: O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

4. The sensor mounting bolt O-ring (1) can be reused if not damaged.
5. Apply a small amount of engine oil to the sensor mounting bolt O-ring (1).

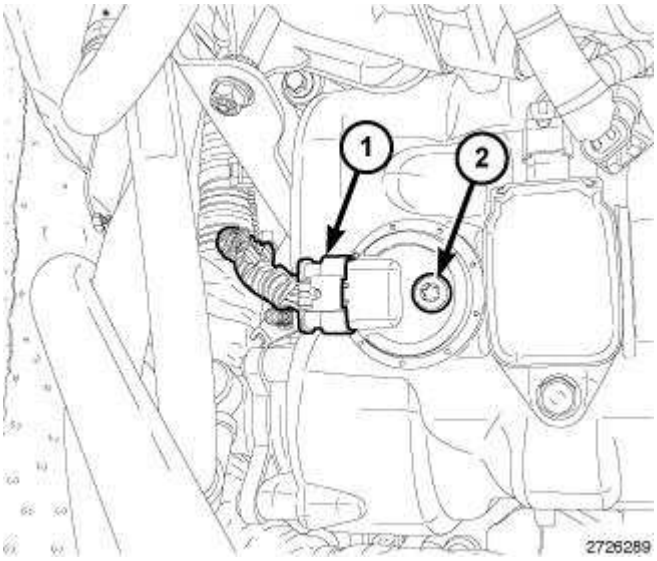


Fig. 46: CMP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right CMP sensor is shown in illustration, the left CMP sensor is similar. If both right and left CMP sensors where removed, install them into their original locations.

6. Install the CMP sensor to the cylinder head. Tighten the mounting bolt (2) to 9 N.m (80 in. lbs.).
7. Connect the electrical connector (1) to the sensor.

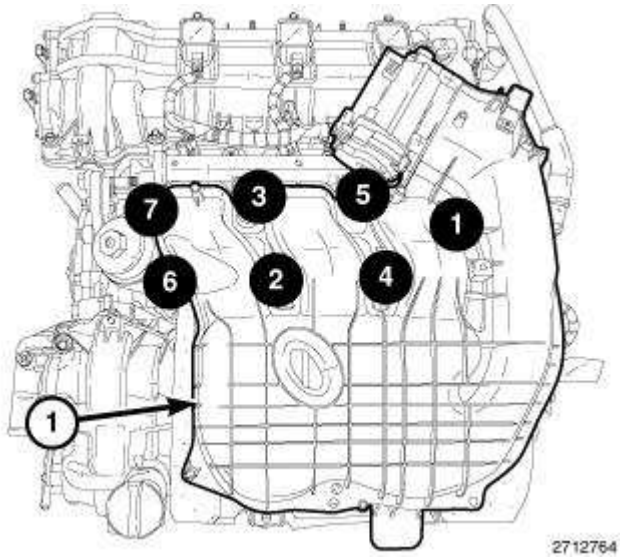


Fig. 47: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. If required, install the upper intake manifold (1) and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION** or **MANIFOLD, INTAKE, INSTALLATION, 5.7L** or **MANIFOLD, INTAKE, INSTALLATION** .
9. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

5.7L / 6.4L

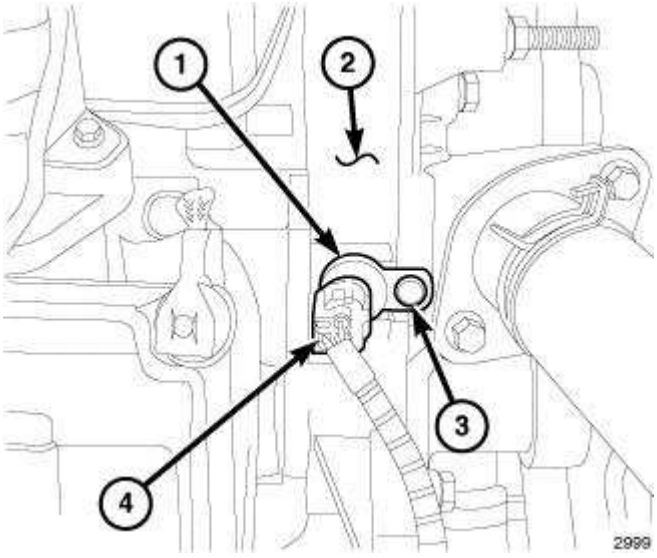


Fig. 48: Camshaft Position Sensor-5.7L

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Install the Camshaft Position (CMP) sensor using a slight rotating motion (side to side). Make sure the CMP sensor is fully seated. Do not drive the CMP sensor into the bore with the mounting screw. This may cause the CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

1. Using a slight rotating motion, carefully install the CMP sensor (1) into the timing cover (2).

CAUTION: Before tightening the sensor mounting bolt, be sure the sensor is completely flush to the timing cover. If the sensor is not flush, damage to the sensor mounting tang may result.

2. Install the CMP mounting bolt (3) and tighten to 12 N.m (9 ft. lbs.).
3. Connect the electrical connector (4) to the CMP sensor.
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

SENSOR, KNOCK

DESCRIPTION

3.6L

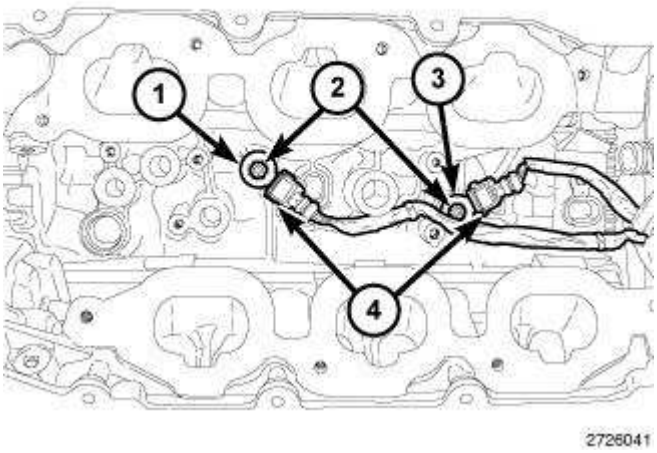


Fig. 49: Knock Sensor 1 & Knock Sensor 2
Courtesy of CHRYSLER GROUP, LLC

NOTE: The forward knock sensor (1) is known to the Powertrain Control Module (PCM) as Knock Sensor 1. The rear knock sensor (3) is known to the PCM as Knock Sensor 2.

The 3.6L engine uses two knock sensors (1, 3) and are bolted to the cylinder block under the intake manifold.

5.7L / 6.4L

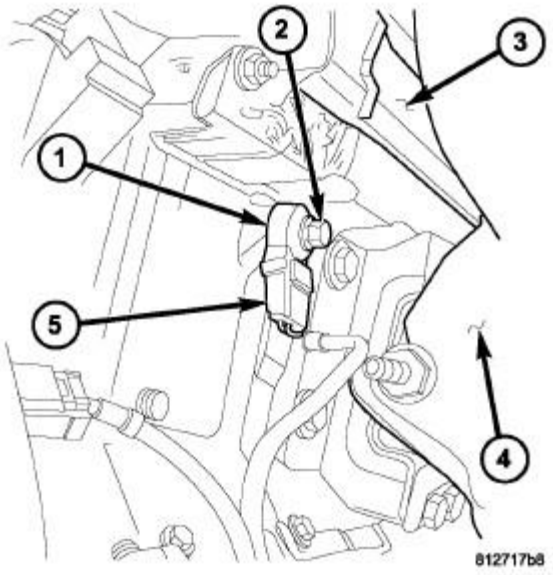


Fig. 50: Locating Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

The 5.7L and 6.4L engines use two knock sensors (1) and are bolted to each side of the cylinder block (outside) under each exhaust manifold (3).

OPERATION

OPERATION

When the knock sensor detects a knock in one of the cylinders on the corresponding bank, it sends an input signal to the Powertrain Control Module (PCM). In response, the PCM retards ignition timing for all cylinders by a scheduled amount.

Knock sensors contain a piezoelectric crystal which constantly vibrates and sends an input voltage (signal) to the PCM while the engine operates. As the intensity of the crystal's vibration increases, the knock sensor output voltage also increases.

The voltage signal produced by the knock sensor increases with the amplitude of vibration. The PCM receives the knock sensor voltage signal as an input. If the signal rises above a predetermined level, the PCM will store that value in memory and retard ignition timing to reduce engine knock. If the knock sensor voltage exceeds a preset value, the PCM retards ignition timing for all cylinders. It is not a selective cylinder retard.

The PCM ignores knock sensor input during engine idle conditions. Once the engine speed exceeds a specified value, knock retard is allowed.

Knock retard uses its own short term and long term memory program.

Long term memory stores previous detonation information in its battery-backed RAM. The maximum authority that long term memory has over timing retard can be calibrated.

Short term memory is allowed to retard timing up to a preset amount under all operating conditions (as long as RPM is above the minimum RPM) except at Wide Open Throttle (WOT). The PCM, using short term memory, can respond quickly to retard timing when engine knock is detected. Short term memory is lost any time the ignition key is turned off.

NOTE: Over or under tightening the sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control. Always use the specified torque when installing the knock sensors.

REMOVAL

3.6L

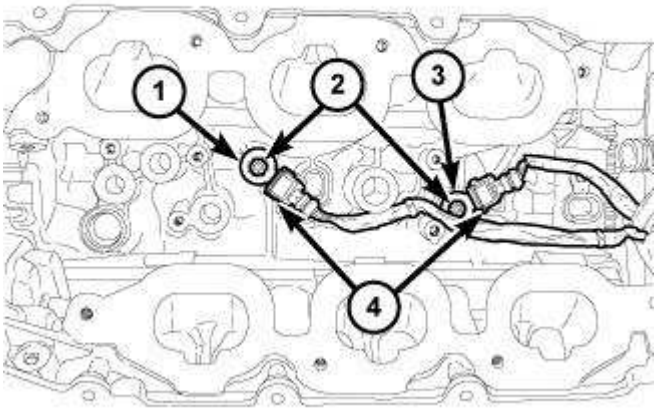


Fig. 51: Knock Sensor 1 & Knock Sensor 2
Courtesy of CHRYSLER GROUP, LLC

NOTE: The forward sensor (1) is known to the powertrain control module (PCM) as knock sensor 1. The rear sensor (3) is known to the PCM as knock sensor 2.

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM** .
2. Disconnect and isolate the negative battery cable.
3. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

4. Remove the air cleaner housing assembly, upper and lower intake manifolds and the oil filter housing. Refer to **HOUSING, OIL FILTER, REMOVAL** or **HOUSING, OIL FILTER, REMOVAL** .
5. Remove the knock sensor electrical connector (4).

NOTE: **There may be a foam strip on the bolt threads. This foam is used only to retain the bolts to the sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.**

6. Remove the retaining bolt (2) and knock sensor 1 (1) or knock sensor 2 (3).

5.7L / 6.4L

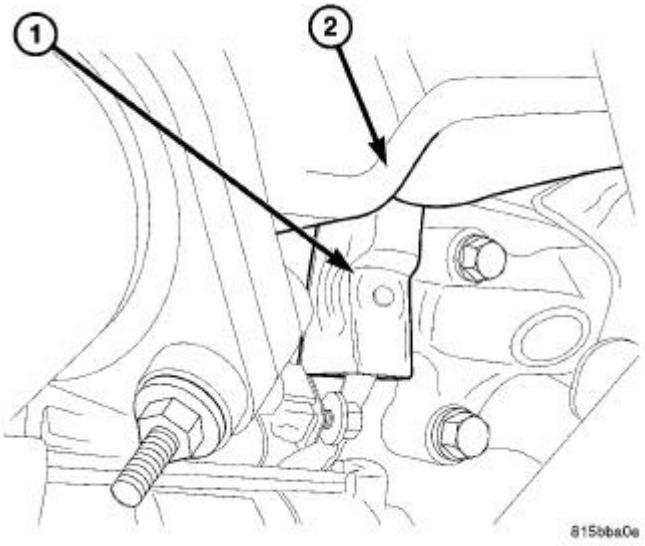


Fig. 52: Knock Sensor Heat Shield - 6.1L
Courtesy of CHRYSLER GROUP, LLC

Two knock sensors are used. Each sensor is bolted to the outside of cylinder block below the exhaust manifold.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove the heat shield (1) from knock sensor (shield snaps onto sensor).

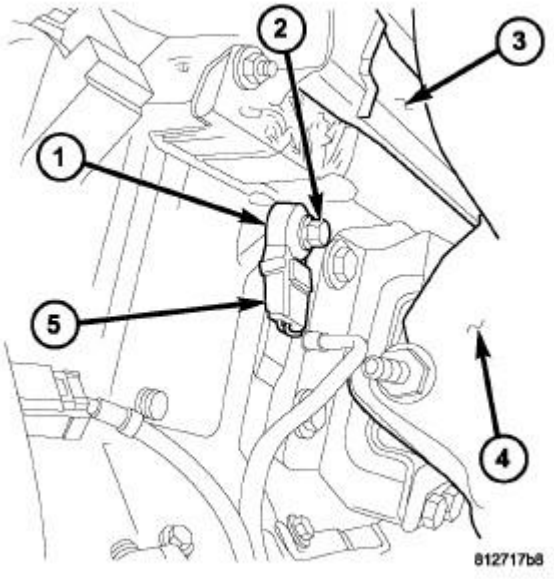


Fig. 53: Locating Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the knock sensor electrical connector (5).

NOTE: Note the foam strip on the knock sensor retaining bolt threads. This foam is only used to retain the bolts to the knock sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.

5. Remove the knock sensor retaining bolt (2).
6. Remove the knock sensor from the cylinder block.

INSTALLATION

3.6L

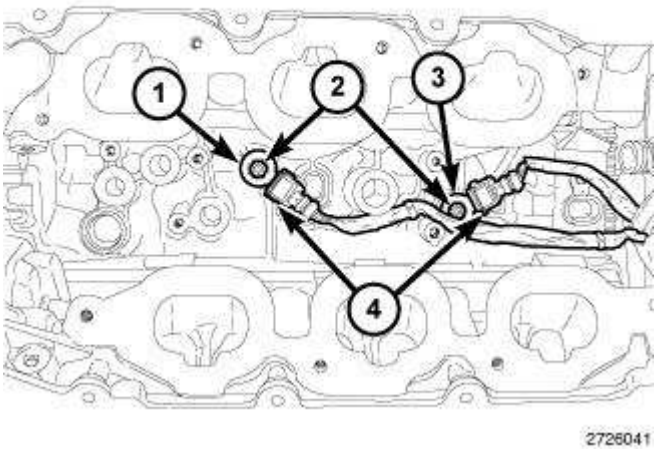


Fig. 54: Knock Sensor 1 & Knock Sensor 2
Courtesy of CHRYSLER GROUP, LLC

NOTE: The forward sensor (1) is known to the powertrain control module (PCM) as knock sensor 1. The rear sensor (3) is known to the PCM as knock sensor 2.

1. Thoroughly clean the knock sensor mounting holes.

   NOTE: Over or under tightening the sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control. Always use the specified torque when installing the knock sensors. The torque specification for the knock sensor bolt is less than the typical 8 mm bolt.

   NOTE: There may be a foam strip on the bolt threads. This foam is used only to retain the bolts to the sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.

2. Install knock sensor 1 (1) or knock sensor 2 (3) and retaining bolt (2). Tighten the retaining bolt to 22 N.m (16 ft. lbs.).
3. Connect the electrical connector (4).
4. Install the oil filter housing, upper and lower intake manifolds and air cleaner housing assembly. Refer to **HOUSING, OIL FILTER, INSTALLATION** or **HOUSING, OIL FILTER, INSTALLATION** .
5. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **LUBRICATION** or **LUBRICATION** or **LUBRICATION** or **LUBRICATION** .
6. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
7. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
8. Operate the engine until it reaches normal operating temperature. Check cooling system for

correct fluid level. Refer to **STANDARD PROCEDURE** .

5.7L / 6.4L

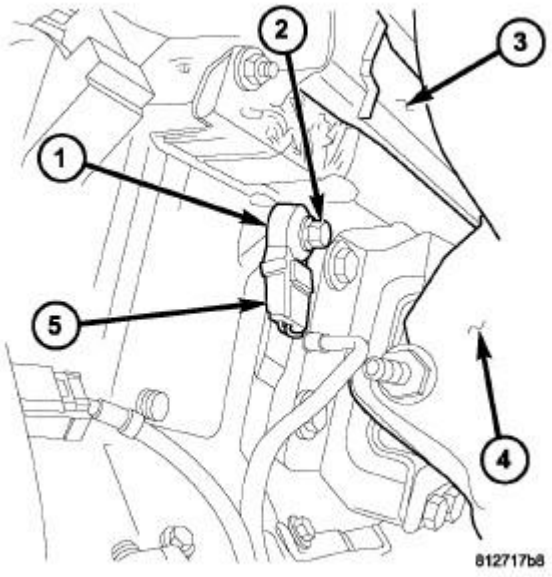


Fig. 55: Locating Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Over or under tightening the knock sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control.

1. Position the knock sensor (1) onto cylinder block.

NOTE: The foam strip used on bolt threads is used only to retain the bolts to the sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.

2. Install the retaining bolt and tighten (2) to 20 N.m (15 ft. lbs.).
3. Connect the electrical connector (5) to the knock sensor.

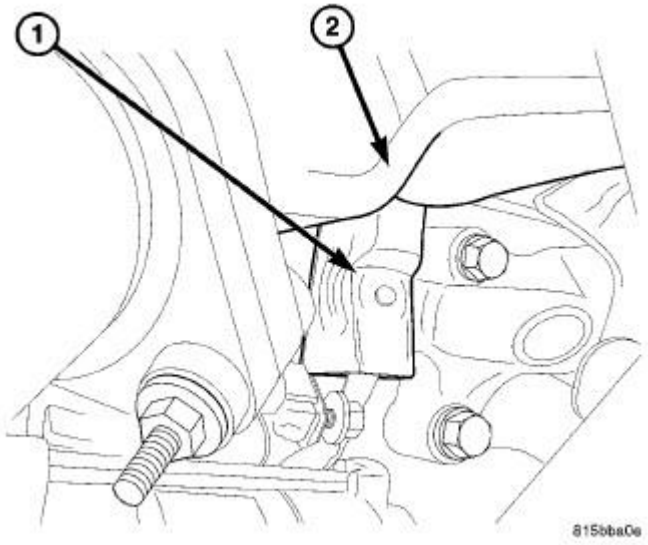


Fig. 56: Knock Sensor Heat Shield - 6.1L
Courtesy of CHRYSLER GROUP, LLC

4. Snap the heat shield (1) onto the knock sensor.
5. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

SOLENOID, VARIABLE VALVE TIMING

DESCRIPTION

DESCRIPTION

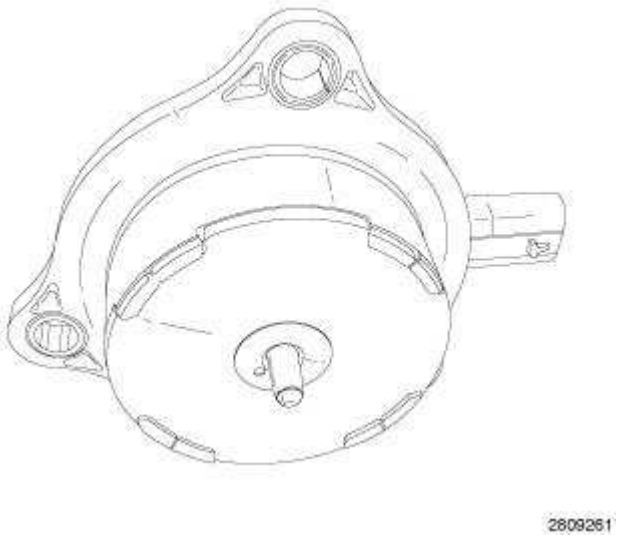


Fig. 57: Variable Valve Timing Solenoid
Courtesy of CHRYSLER GROUP, LLC

The 3.6L engine is equipped with Variable Valve Timing (VVT). This system adjusts the timing of all four camshafts independently using solenoids and oil control valves to direct oil pressure into the camshaft phaser assemblies. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The four VVT solenoids are located on the front of the cylinder head covers. The pintle should move freely within the solenoid body. Do not attempt to disassemble the solenoids, they are not serviceable. The solenoids are identical but should be installed in the same location as removed.

OPERATION

OPERATION

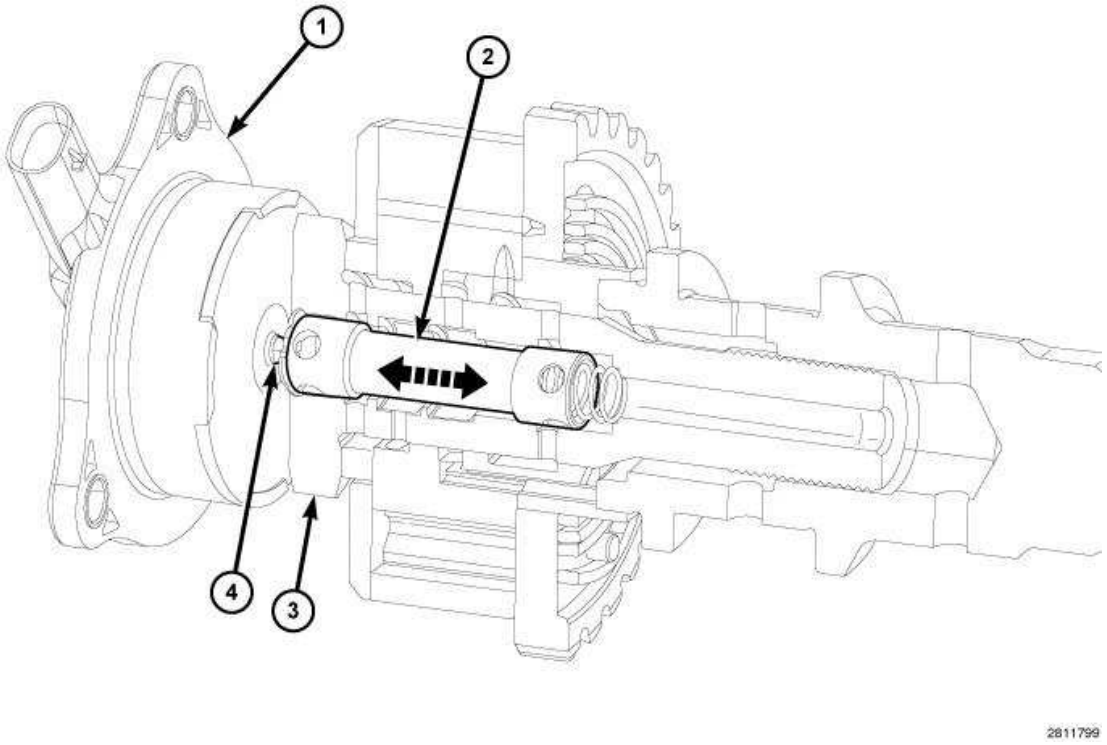


Fig. 58: Oil Control Valve (OCV), VVT Solenoid, Solenoid Pintle & Internal Spool Valve
Courtesy of CHRYSLER GROUP, LLC

Camshaft phaser position is adjusted using regulated oil pressure through an Oil Control Valve (OCV) (3). To begin Phaser movement, the Powertrain Control Module (PCM) applies a pulse-width modulated voltage signal to the VVT solenoid (1) to extend or retract the solenoid pintle (4). The pintle pushes against an internal spool valve (2) within the OCV moving the valve forwards and backwards to direct oil flow. The position of the spool inside the OCV determines which ports and chambers inside the phaser are being fed, either to advance the timing of the phaser sprocket relative to the camshaft, retard it, or hold a desired position. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, OPERATION** .

The Camshaft Position (CMP) sensor monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

REMOVAL

LEFT

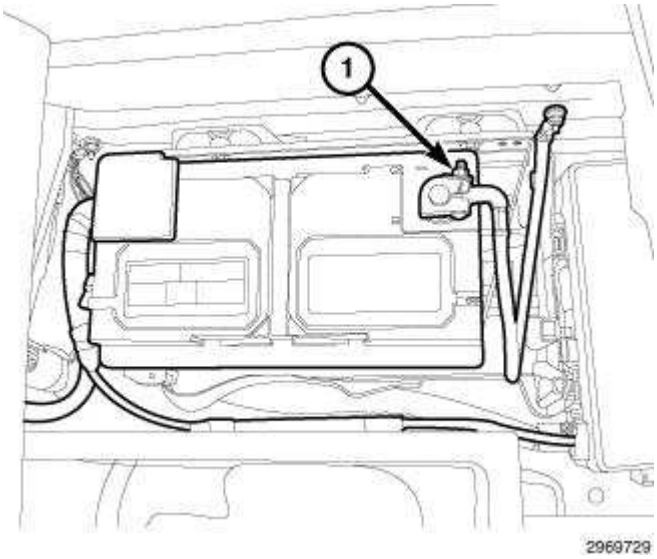


Fig. 59: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

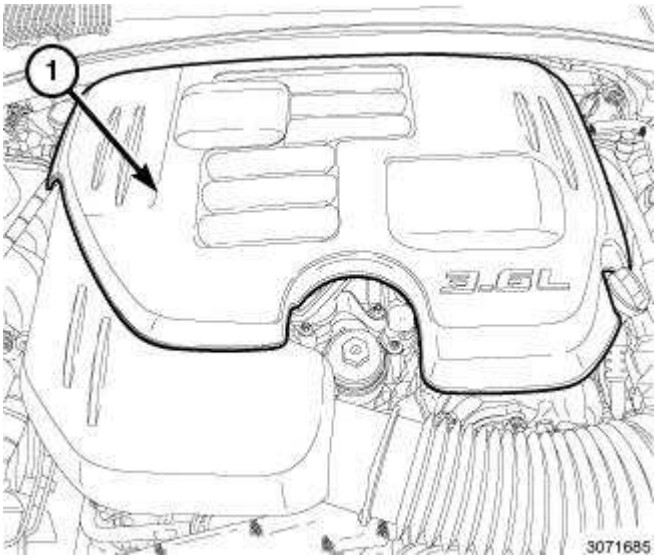


Fig. 60: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

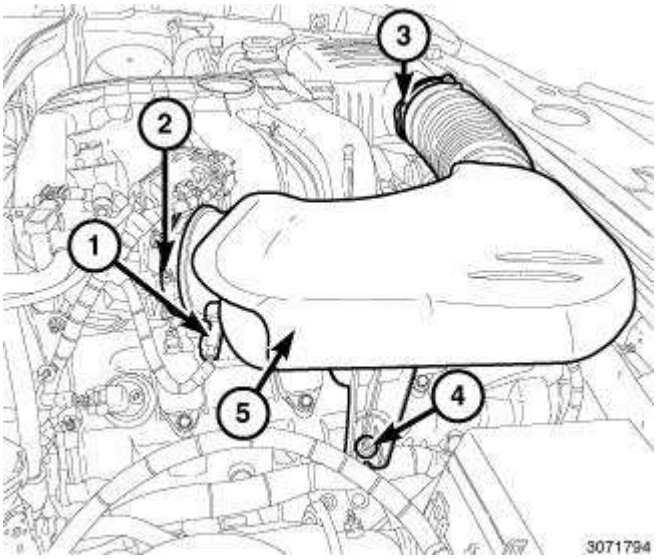


Fig. 61: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

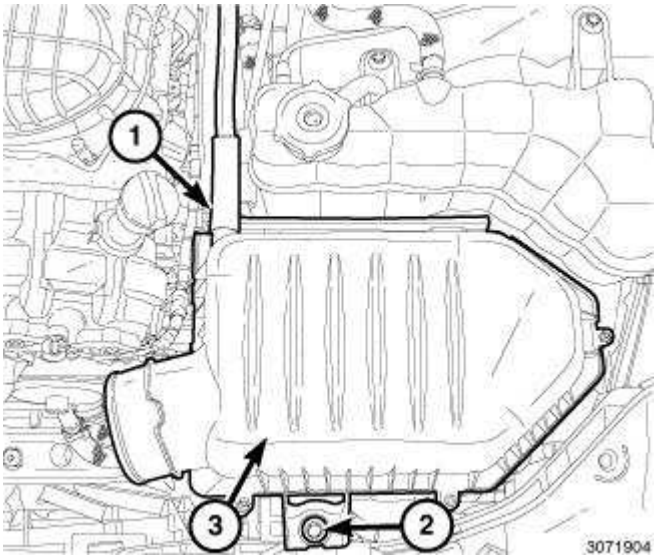


Fig. 62: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the fresh air makeup hose (1) from the air cleaner housing.
9. Remove the air cleaner housing retaining bolt (2).

10. Remove the air cleaner housing (3).

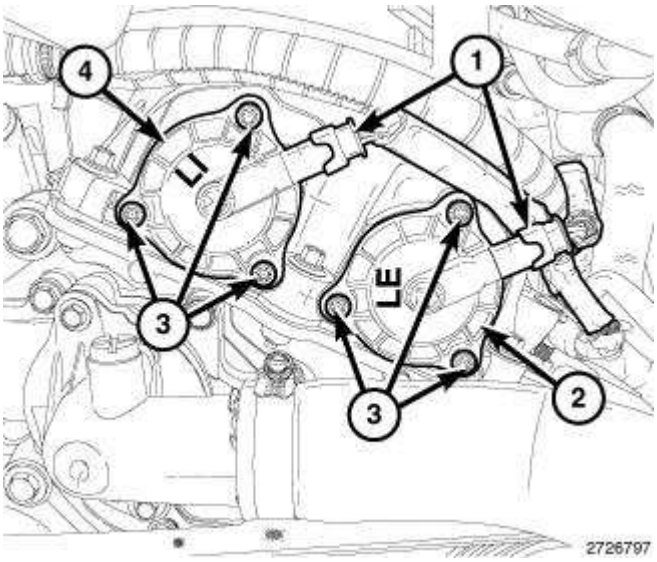


Fig. 63: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mark the variable valve timing solenoid connectors (1) with a paint pen or equivalent so that they may be reinstalled in their original locations.

11. Mark the intake variable valve timing solenoid (4) and the exhaust variable valve timing solenoid (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.
12. Disconnect the electrical connector (1) from the variable valve timing solenoid.
13. Remove the variable valve timing solenoid mounting bolts (3).

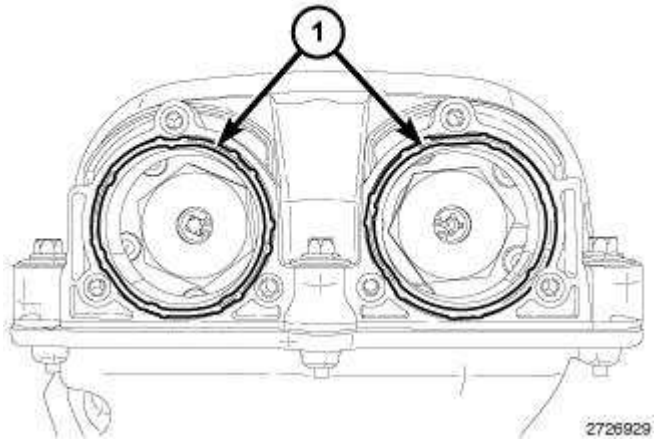


Fig. 64: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

14. Pull the variable valve timing solenoid from the cylinder head cover.
15. The seal (1) can be reused if not damaged.

RIGHT

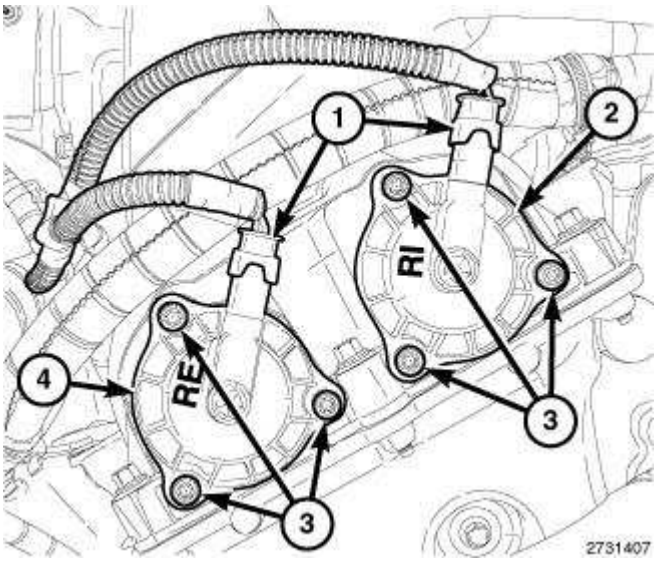


Fig. 65: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.

NOTE: Mark the variable valve timing solenoid connectors (1) with a paint pen or equivalent so that they may be reinstalled in their original locations.

2. Mark the intake variable valve timing solenoid (2) and the exhaust variable valve timing solenoid (4) with a paint pen or equivalent so that they may be reinstalled in their original locations.
3. Disconnect the electrical connector (1) from the variable valve timing solenoid.
4. Remove the variable valve timing solenoid mounting bolts (3).

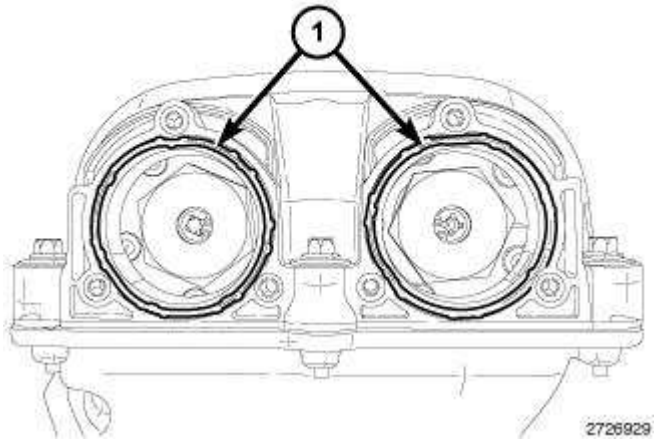


Fig. 66: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

5. Pull the variable valve timing solenoid from the cylinder head cover.
6. The seal (1) can be reused if not damaged.

INSTALLATION

LEFT

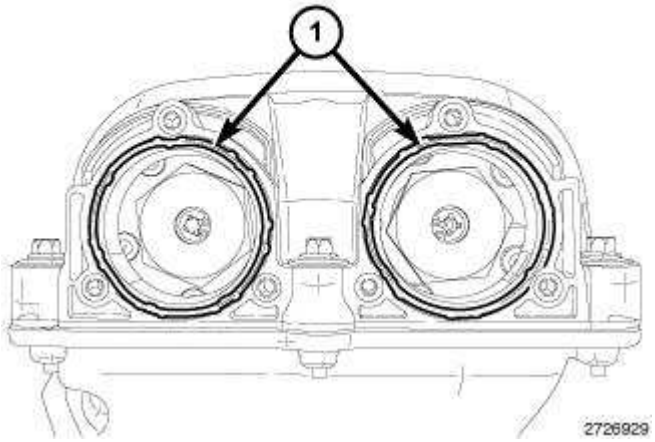


Fig. 67: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the variable valve timing solenoid seals (1). The seals can be reused if not damaged.

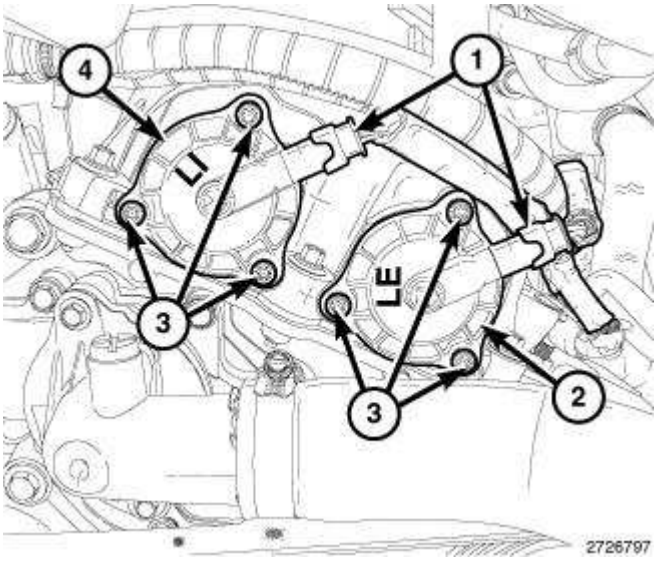


Fig. 68: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Refer to the markings made at disassembly and install the intake variable valve timing solenoid (4) and the exhaust variable valve timing solenoid (2) in their original locations.
3. Install the variable valve timing solenoid mounting bolts (3) and tighten to 4 N.m (35 in. lbs.).
4. Connect the electrical connector (1) to the variable valve timing solenoid.

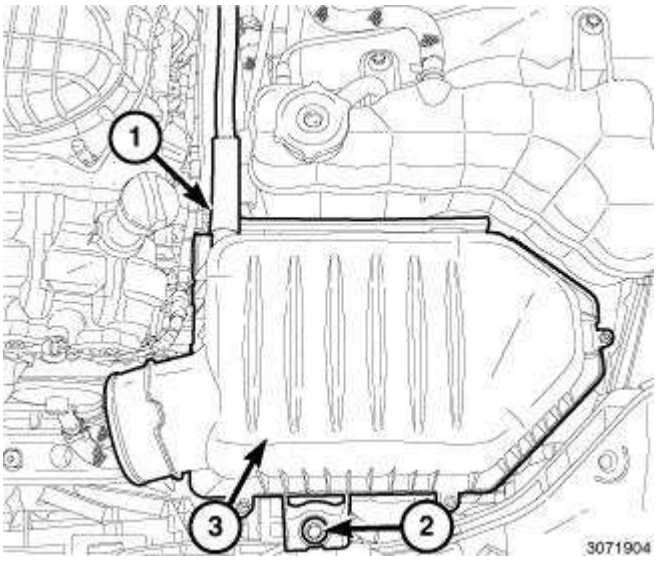


Fig. 69: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Position the air cleaner housing (3) into the vehicle.
6. Install the air cleaner housing retaining bolt (2) and tighten to 12 N.m (9 ft. lbs.).
7. Connect the fresh air makeup hose (1) to the air cleaner housing.

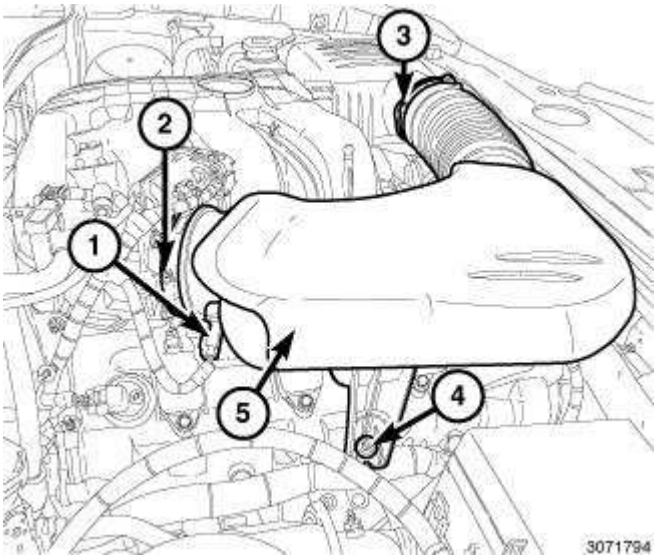


Fig. 70: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
9. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
10. Tighten the clamp at the air cleaner housing (3) to 5 N.m (44 in. lbs.).
11. Tighten the clamp (2) at the throttle body to 5 N.m (44 in. lbs.).
12. Connect the Inlet Air Temperature (IAT) sensor electrical connector (1).

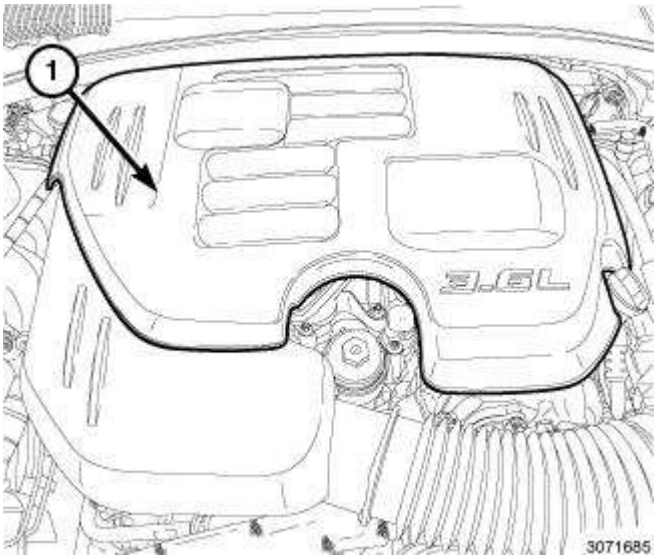


Fig. 71: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

13. Position the engine cover (1) and secure the retaining grommets onto the ball studs.

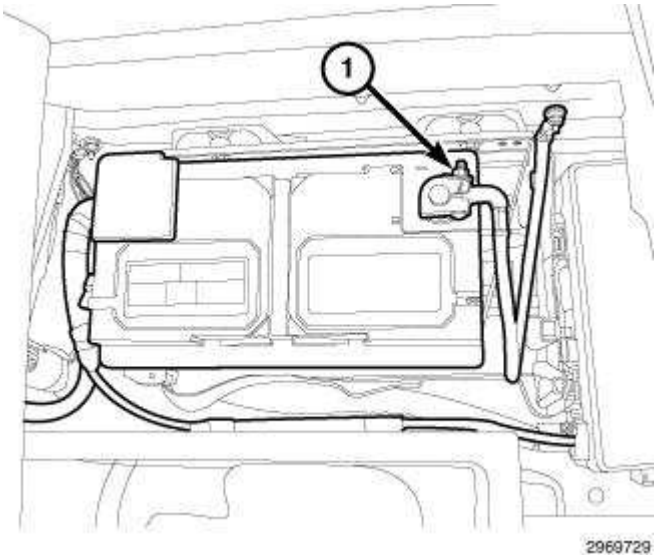


Fig. 72: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

14. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

RIGHT

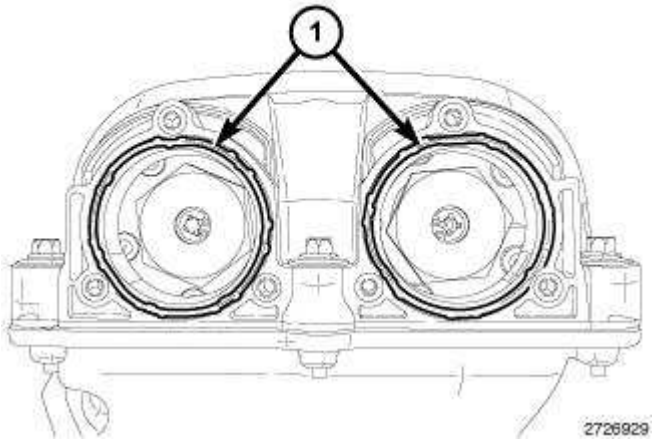


Fig. 73: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the variable valve timing solenoid seals (1). The seals can be reused if not damaged.

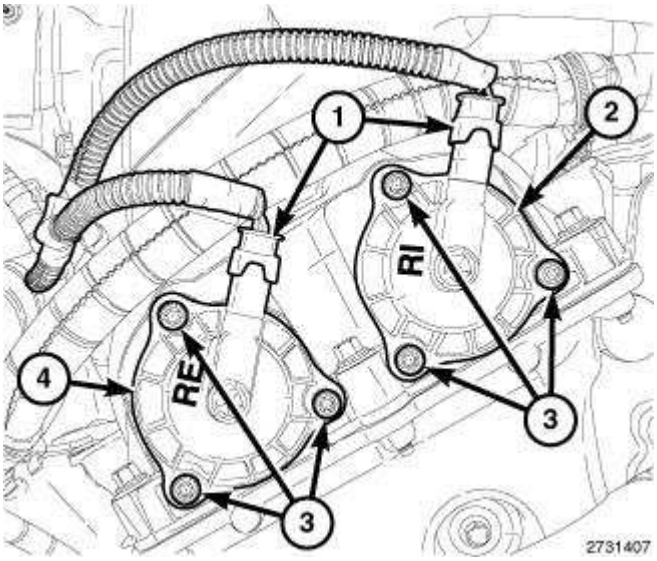


Fig. 74: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Refer to the markings made during disassembly and install the intake variable valve timing solenoid (2) and the exhaust variable valve timing solenoid (4) in their original locations.
3. Install the variable valve timing solenoid mounting bolts (3) and tighten to 4 N.m (35 in. lbs.).
4. Connect the electrical connector (1) to the variable valve timing solenoid.
5. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

SPARK PLUG

DESCRIPTION

DESCRIPTION

CAUTION: Cleaning platinum plugs may damage the platinum center electrode or the thin platinum pad.

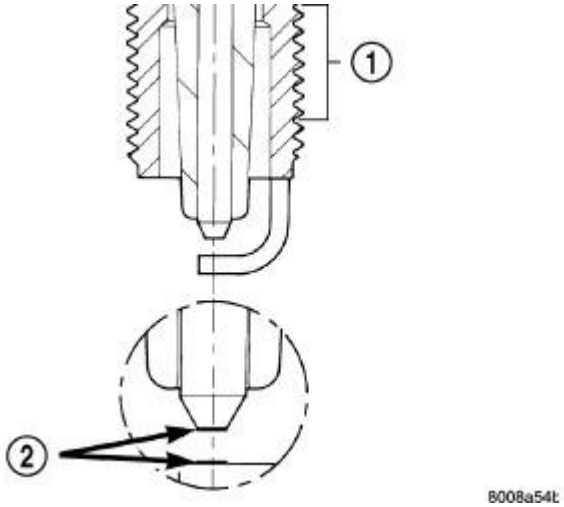


Fig. 75: Platinum Pads
Courtesy of CHRYSLER GROUP, LLC

1 - APPLY ANTI-SEIZE COMPOUND HERE ONLY
2 - PLATINUM SPARK SURFACE

The spark plugs are platinum resistor design. They have resistance values of 3, 500 to 20, 000 ohms when checked with at least a 1000 volt tester. For spark plug identification and specifications. Refer to **SPECIFICATIONS**.

Do not use an ohm meter to check the resistance of the spark plugs. This will give an inaccurate reading.

When the spark plugs use a single or double platinum tips, they have a recommended service life of 100, 000 miles for normal driving conditions per schedule A in this information. The spark plugs have a recommended service life of 75, 000 miles for severe driving conditions per schedule B in this information. A thin platinum pad (2) is welded to both or just the center electrode end(s). Extreme care must be used to prevent spark plug cross threading, incorrect gapping and ceramic insulator damage during plug removal and installation.

Mopar® Nickel-Graphite Anti-Seize compound is applied to the thread area (1) to prevent damage to the spark plug during removal and installation.

REMOVAL

3.6L

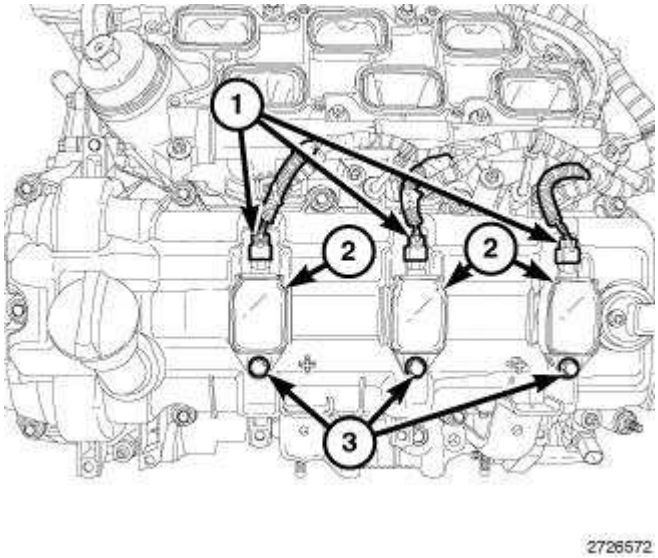


Fig. 76: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left side ignition coils are shown in illustration, the right side ignition coils are similar.

1. Remove the ignition coil (2). Refer to **COIL, IGNITION, REMOVAL**.

CAUTION: The spark plug tubes (1) are a thin wall design. Avoid damaging the spark plug tubes. Damage to the spark plug tube can result in oil leaks.

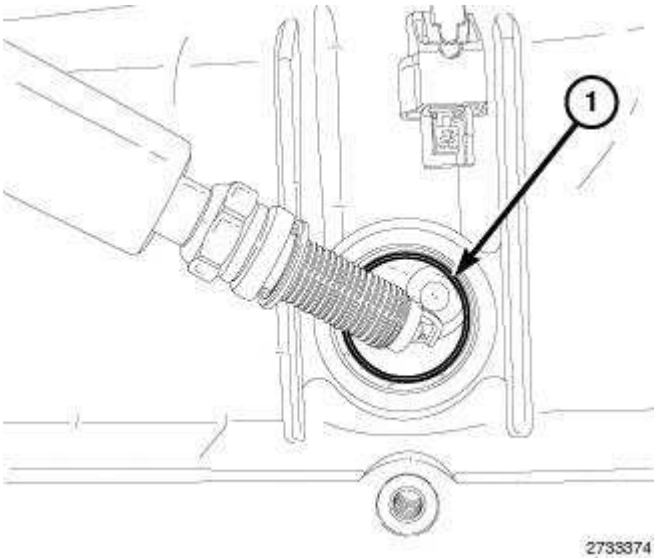


Fig. 77: Spark Plug Tubes
Courtesy of CHRYSLER GROUP, LLC

2. Prior to removing the spark plug, spray compressed air into the cylinder head opening. This will

help prevent foreign material from entering combustion chamber.

3. Remove the spark plug from the cylinder head using a quality thin wall socket with a rubber or foam insert.
4. Inspect the spark plug condition.

5.7L / 6.4L

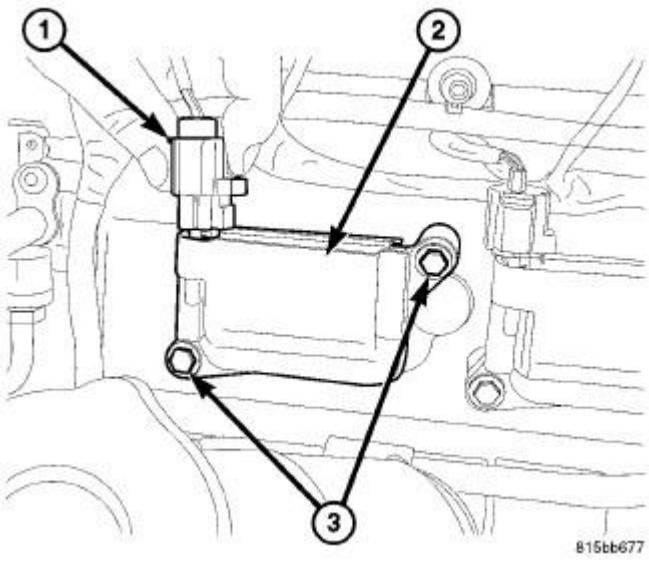


Fig. 78: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the coil electrical connector (1).
3. Remove the coil mounting bolts (3).

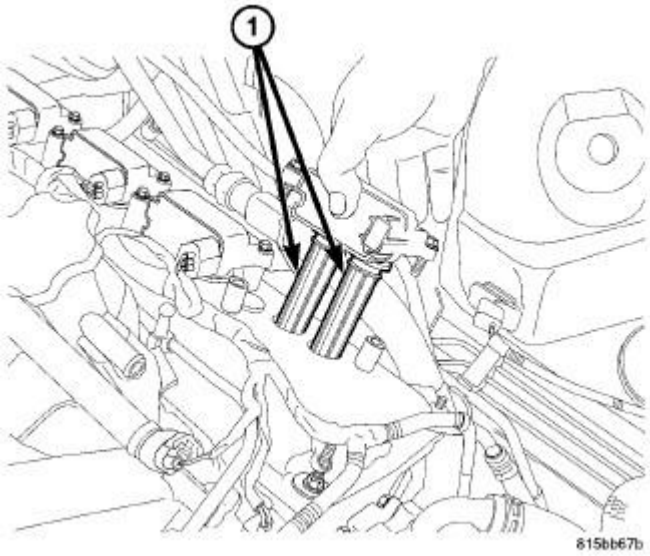


Fig. 79: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

4. Carefully lift coil from the cylinder head opening with a slight rocking motion.

CAUTION: Prior to removing the spark plugs, use compressed air to remove any accumulated dirt and debris. If dirt and debris enter the engine, this may cause internal engine damage.

5. Remove the spark plug(s) from the cylinder head using a quality deep well socket with a rubber or foam insert.

INSTALLATION

3.6L

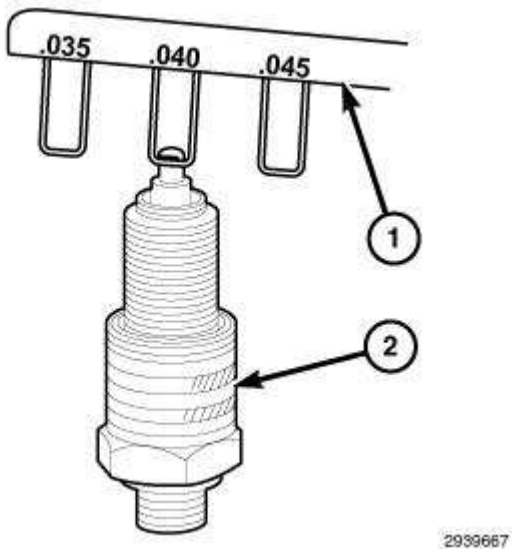


Fig. 80: Gap Gauging Tool
Courtesy of CHRYSLER GROUP, LLC

1. Check and adjust the spark plug gap with a gap gauging tool (1). Refer to **SPECIFICATIONS**.

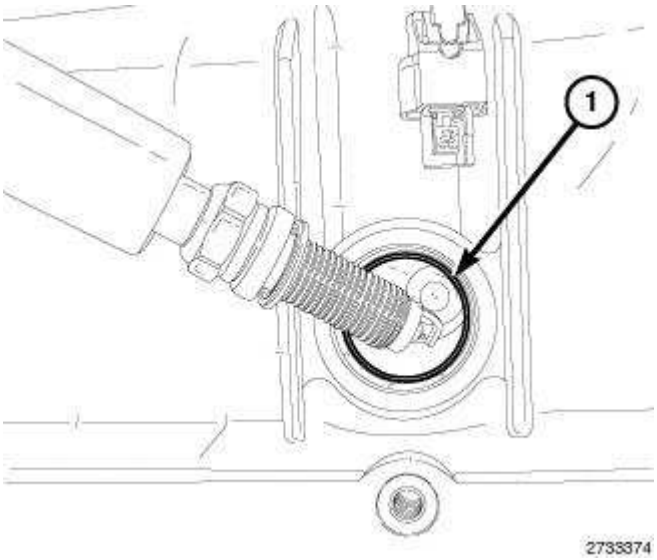


Fig. 81: Spark Plug Tubes
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Special care should be taken when installing spark plugs into the cylinder head spark plug wells. Be sure the plugs do not drop into the plug wells as electrodes can be damaged.

CAUTION: The spark plug tubes (1) are a thin wall design. Avoid damaging the spark plug tubes. Damage to the spark plug tube can result in oil leaks.

2. Start the spark plug into the cylinder head by hand to avoid cross threading.

CAUTION: Spark plug torque is critical and must not exceed the specified value. Overtightening stretches the spark plug shell reducing its heat transfer capability resulting in possible catastrophic engine failure.

3. Tighten the spark plugs to 17.5 N.m (13 ft. lbs.).

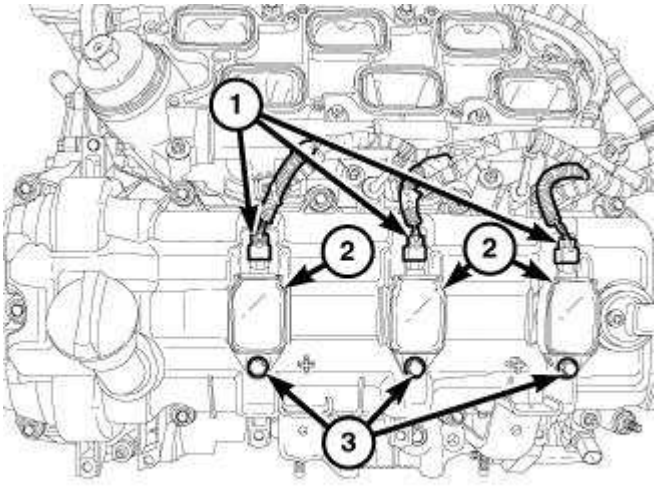


Fig. 82: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left side ignition coils are shown in illustration, the right side ignition coils are similar.

4. Install the ignition coil (2). Refer to **COIL, IGNITION, INSTALLATION**.

5.7L / 6.4L

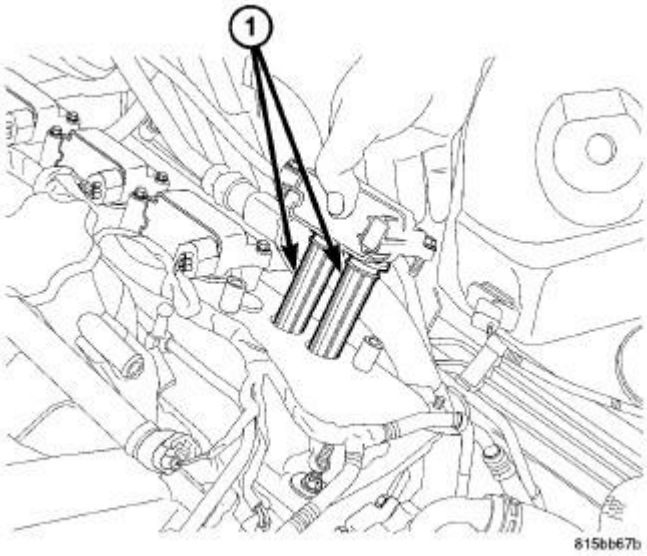


Fig. 83: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head.

Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

1. To avoid cross threading, start the spark plug(s) into the cylinder head by hand.
2. Tighten the spark plugs as follows:
   - 5.7L - 25 - 30 N.m (18.5 - 22 ft. lbs.)
   - 6.4L - 10 - 20 N.m (7.5 - 15 ft. lbs.)
3. Apply dielectric grease to the inside of spark plug boots (1).
4. Position the ignition coil into the cylinder head and push both spark plug boots onto each spark plug.

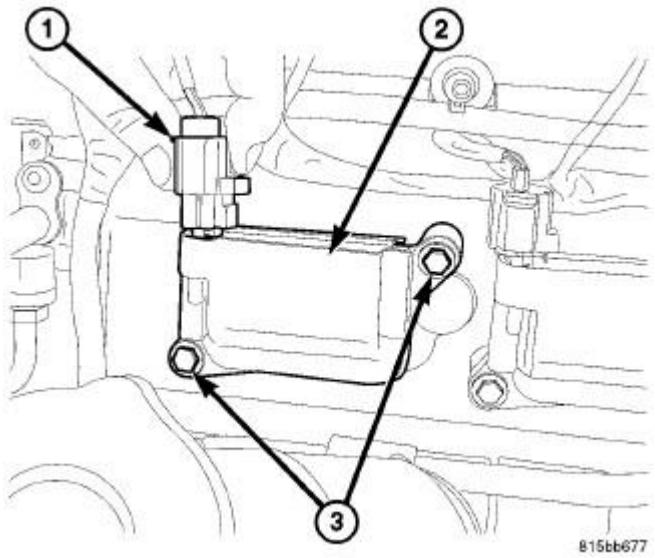


Fig. 84: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER GROUP, LLC

5. Install the ignition coil retaining bolts (3) and tighten to 12 N.m (9 ft. lbs.).
6. Connect the ignition coil electrical connector (1).
7. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

SWITCH, IGNITION

DESCRIPTION

DESCRIPTION

For more information on the ignition system. Refer to **RECEIVER, KEYLESS IGNITION NODE, DESCRIPTION** or **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

ACCESSORIES AND EQUIPMENT

Instrument Cluster - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

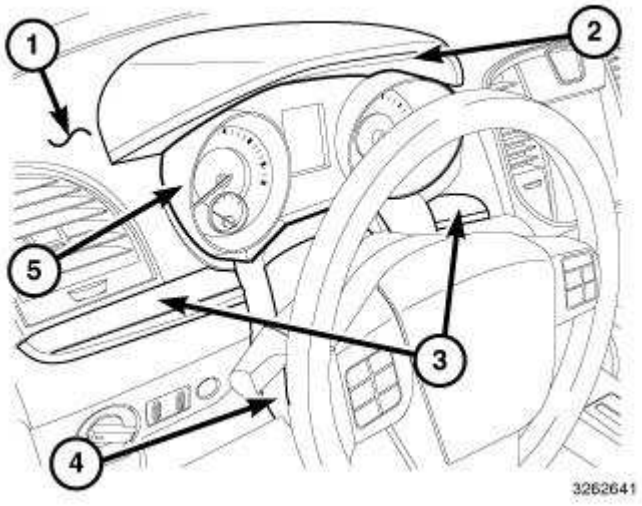


Fig. 1: Instrument Cluster (IC)
Courtesy of CHRYSLER GROUP, LLC

The instrument cluster (IC) (5) (also known as the Instrument Panel Cluster/IPC) for this vehicle is located directly in front of the driver, above the steering column opening. The mounts and the electrical connections, are concealed within the instrument panel behind various trim panels and the cluster itself. The IC contains various indicators, analog gauges, an electronic display unit and an integrated circuit board. The electronic display unit displays odometer information and several indicators, some of which are model dependent.

The optional Electronic Vehicle Information Center (EVIC) makes use of the IC electronic display unit. The EVIC feature provides display options of the outside ambient temperature, compass headings, average fuel economy, elapsed time, numerous textual warning messages, reminder indicators and certain diagnostic information.

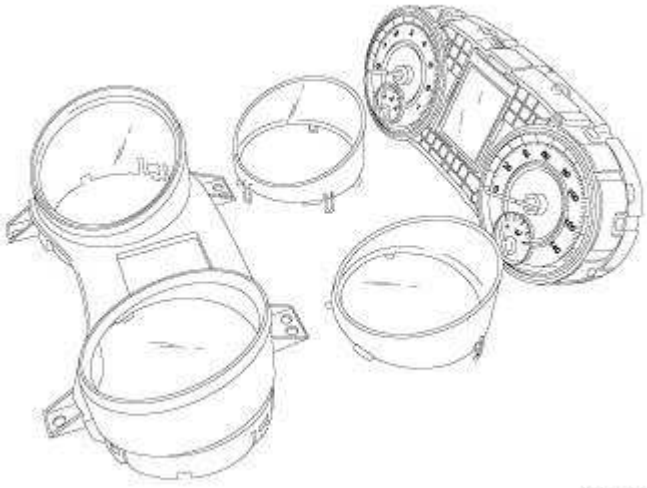


Fig. 2: Gauges, Indicators, Electronic Display Unit, Electronic Circuit Board And Housing
Courtesy of CHRYSLER GROUP, LLC

The IC has several serviced components. The gauges, indicators, electronic display unit, electronic circuit board and housing are only serviced as an assembly and cannot be adjusted or repaired. If a gauge, an LED unit, the electronic display unit, the electronic circuit board, the circuit board hardware, the cluster overlay or the cluster housing is damaged or ineffective, the entire IC unit must be replaced. The cluster lens, hood and mask are available for separate service replacement.

ELECTRONIC DISPLAY UNIT

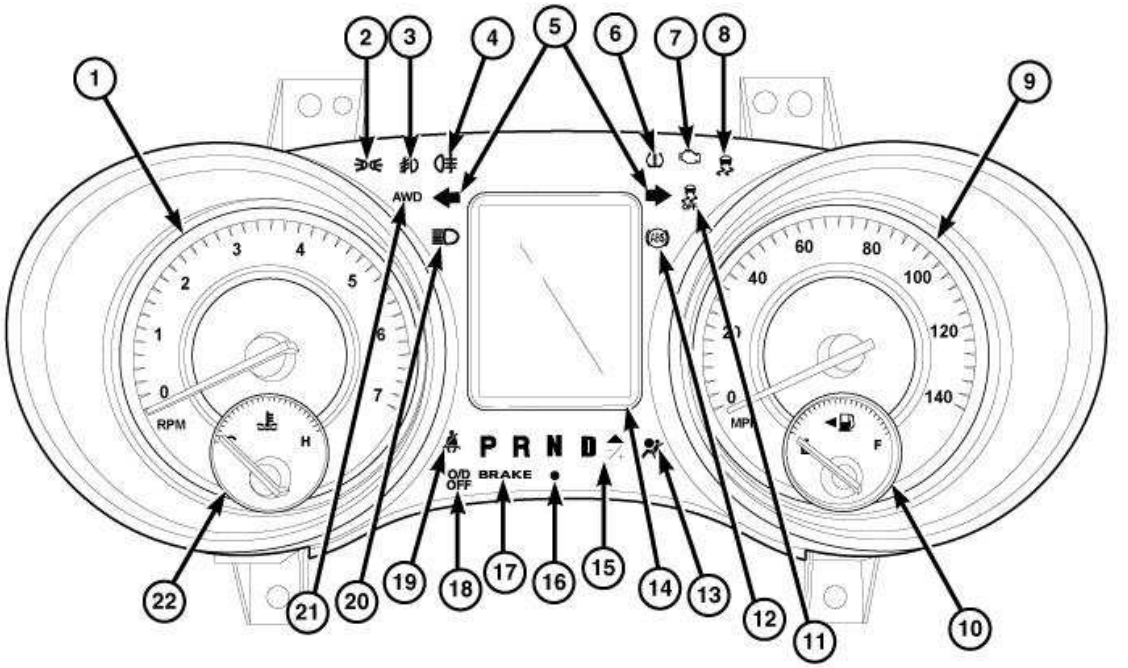


Fig. 3: Identifying Electronic Vehicle Information Center (EVIC) Components
Courtesy of CHRYSLER GROUP, LLC

The IC includes an electronic display unit (14). The electronic display unit is soldered to the electronic circuit board, and is visible through a window with a smoked lens between the tachometer on the left and speedometer on the right. The dark lens prevents it from being clearly visible when it is not illuminated.

The odometer information is displayed within the electronic display unit. The odometer information is stored in the IC memory. This information can be increased when the proper inputs are provided, but the information cannot be decreased. The odometer can display values up to 999, 999 kilometers (999, 999 miles). The odometer latches at these values, and will not roll over to zero.

The odometer display does not show leading zeroes, does not have a decimal point and will not show values less than a full unit (kilometer or mile). The unit of measure (**km** or **miles**) for the odometer display is shown in the electronic display in the same color and at the same lighting level as the odometer values. The unit of measure for the odometer can be selected using the customer programmable features function of the Integrated Center Stack (ICS) screen module. The odometer has a RENTAL CAR mode, which will illuminate the odometer information in the display whenever either front door is opened while the ignition switch status is OFF or ACCESSORY.

During daylight hours (exterior lamps are OFF) the electronic display unit is illuminated at full brightness for clear visibility. At night (exterior lamps are ON), the electronic display unit lighting level is adjusted with the other cluster general illumination lamps using the panel lamps dimmer function of the interior lighting dimmer control. However, a PARADE mode position of the dimmer control allows the display to be illuminated at full brightness if the exterior lamps are turned ON during daylight hours.

Dual trip odometer (Trip A and Trip B) capability is standard equipment on this vehicle. Both trip odometers appear within the electronic display unit. The trip odometer information is also stored in the IC memory. Each trip odometer can display values up to 16099.9 kilometers (9999.9 miles). Each trip odometer will roll over to zero independently when it accumulates these values. The trip odometer minimum value is **0.0** (miles or kilometers) and does have a decimal point to show values of tenths of a full unit (miles or kilometers).

The unit of measure (**km** or **miles**) for the trip odometer display is shown next to the **Trip A** or **Trip B** text in the display in the same color and at the same lighting level as the trip odometer values. The unit of measure for the trip odometer can also be selected using the customer programmable features function of the ICS screen module.

VEHICLE SYSTEMS SUPPORT

AUDIBLE WARNINGS

The IC electronic circuit board is equipped with a piezoelectric speaker and programming that allows it to provide various audible alerts to the vehicle operator. These alerts include single chime tones and continuous slow or fast tones. An IC can also produce audible clicks that are used to emulate the sound of a conventional turn signal or hazard warning flasher.

FUEL LEVEL DATA

The IC receives a message from the Body Control Module (BCM) over the Control Area Network (CAN) data bus. The IC uses this information to calculate the proper fuel gauge needle position and to control low fuel indicator operation.

VEHICLE WARNING MESSAGES

When the appropriate conditions exist, messages such as **DOOR** (door ajar), **LoCOOL** (low engine coolant), **LoWASH** (low washer fluid), **ESC OFF** (Electronic Stability Control/ESC in partial off mode), **NoBUS** (data bus communication fault), or **CHANGE OIL** displays in the electronic display unit.

CHANGE OIL MESSAGE

This vehicle is equipped with an engine oil change indicator system. The **CHANGE OIL** message flashes in place of the instrument cluster odometer for approximately 12 seconds after a single chime has sounded to indicate the next scheduled oil change interval has been attained. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon your personal driving style.

Unless reset, this message continues to display each time the ignition switch status transitions to ON. To turn off the message temporarily, press and release the trip odometer push button on the instrument cluster. To reset the oil change indicator system, (after performing the scheduled maintenance) perform the following procedure:

1. Set the ignition switch to the ON status. (Do not start the engine).
2. Fully press the accelerator pedal slowly three times within 10 seconds.
3. Set the ignition switch to the LOCK status.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure

ELECTRONIC VEHICLE INFORMATION CENTER DISPLAY

The optional Electronic Vehicle Information Center (EVIC) system conveniently allows the driver to select a variety of useful information by pressing the EVIC push button controls, which are located within the EVIC switch pod located on the front of the left horizontal steering wheel spoke. The EVIC display menu options include:

- **Compass display**
- **Outside temperature display**
- **System status display**
- **Trip computer functions**
- **Vehicle information warning message displays**
- **Economy mode (ECO) display**

OPERATION

OPERATION

The microprocessor-based IC hardware and software uses various inputs to control the gauges and indicators visible on the face of the cluster. The Vehicle Theft Alarm (VTA) lamp input is hard wired, the remaining are in the form of electronic messages that are transmitted by other electronic modules over the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, OPERATION** .

The IC may also produce audible warnings for other electronic modules in the vehicle based upon electronic tone request messages received over the CAN data bus. Each audible warning is intended to provide the vehicle operator with an audible alert to supplement a visual indication.

The IC circuitry operates on battery current received through a non-switched fused B(+) circuit and on battery current received through a fused ignition switch output (run-start) circuit. This arrangement allows the IC to provide some features regardless of the ignition switch position, while other features will operate only with the ignition switch in the On or Start positions. The circuitry is grounded through a ground circuit of the instrument panel wire harness.

The IC also has a self-diagnostic test capability that tests each of the CAN bus message-controlled functions of the cluster. This test illuminates the appropriate indicators, positions the gauge needles at several predetermined calibration points across the gauge faces, and illuminates all segments of the Electronic Vehicle Information Center (EVIC). The EVIC will display the hardware/software version, and the CAN Vehicle Maintenance Monitor (VMM) used in the IC. Refer to **DIAGNOSIS AND TESTING**.

LIQUID CRYSTAL DISPLAY

The LCD display unit is an integrated part, and soldered to the IC electronic circuit board. With the ignition switch in the Off or Accessory positions, the LCD display is activated when the driver door is opened (Rental Car mode), and deactivated when the driver door is closed. Otherwise, the display units are active when the ignition switch is in the ON or START positions, and inactive when the ignition switch is in the OFF or ACCESSORY positions.

The IC LCD display unit has several display capabilities. The LCD unit displays odometer, trip odometer, engine hours, gear selector indication (PRNDL) for models with an automatic transmission, several warning or reminder indications, and various diagnostics information when certain fault conditions exist. Steering wheel mounted switches are used to control some of the display modes of the LCD. for more information. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, OPERATION** .

CLUSTER ILLUMINATION

Instrument cluster illumination is supplied by several LED lamps controlled by the IC, and are illuminated at 100% intensity anytime the ignition switch is in the ON or RUN position. The illumination intensity of these lamps can be adjusted only when the vehicle park lamps are on by rotating the dimming control ring (down to dim, up to brighten). The IC monitors a CAN bus input from

the Body Control Module (BCM) to determine illumination intensity.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INSTRUMENT CLUSTER

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

If all of the Instrument Cluster (IC) gauges, and indicators are ineffective, be certain to check the IC fused B(+) fuse and the IC fused B(+) and ground circuits for shorts or opens. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

If an individual hard-wired gauge or indicator is ineffective, refer to the diagnosis and testing service information for that specific gauge or indicator. If an individual Controller Area Network (CAN) data bus message-controlled gauge or indicator is ineffective, perform the self-diagnostic Test.

CAUTION: Instrument clusters used in this vehicle automatically configure themselves for compatibility with the features and optional equipment in the vehicle in which they are initially installed. The instrument cluster is programmed to do this by embedding the Vehicle Identification Number (VIN) and other information critical to proper cluster operation into electronic memory. This embedded information is learned through electronic messages received from other electronic modules in the vehicle over the Controller Area Network (CAN) data bus and through certain hard-wired inputs received when the cluster is connected to the vehicle electrically. Once configured, the instrument cluster memory may be irreparably damaged and certain irreversible configuration errors may occur if the cluster is connected electrically to another vehicle; or, if an electronic module from another vehicle is connected that provides data to the instrument cluster (including odometer values) that conflicts with that which was previously learned and stored. Therefore, the practice of exchanging (swapping) instrument clusters and other electronic modules in this vehicle with those removed from another vehicle must always be avoided. Failure to observe this caution may result in instrument cluster damage, which is not reimbursable under the terms of the product warranty. Service replacement instrument clusters are provided with the correct VIN and the certified odometer values embedded into cluster memory, but will otherwise be automatically configured for compatibility

with the features and optional equipment in the vehicle in which they are initially installed.

NOTE: Certain indicators in this instrument cluster are automatically configured. This feature allows those indicators to be activated or deactivated for compatibility with certain optional equipment. If the problem being diagnosed involves improper illumination of the cruise indicator, the electronic throttle control indicator, the tow/haul indicator, the service four-wheel drive indicator, the four-wheel drive low indicator, the four-wheel drive lock indicator, the transmission over-temp indicator, the security indicator or the gear selector indicator, disconnect and isolate the battery negative cable. After about five minutes, reconnect the battery negative cable and turn the ignition switch to the ON position. The instrument cluster should automatically relearn the equipment in the vehicle and properly configure the configurable indicators accordingly.

SELF TEST

The diagnostic self test will put the IC into its self-diagnostic mode. In this mode the IC can perform a diagnostic test that will confirm that the circuitry, the gauges, and the indicators are capable of operating as designed. During the test the IC circuitry will position each of the gauge needles at various calibration points, illuminate each of the segments in the Liquid Crystal Display (LCD) unit, and turn all of the indicators ON and OFF again.

Successful completion of the self test will confirm that the IC is operational. However, there may still be a problem with the Controller Area Network (CAN) data bus or Local Interface Network (LIN) data bus, the Engine Control Module (ECM), the Body Control Module (BCM), the Controller Antilock Brake (CAB), the All-Wheel Drive Control Module (AWDCM), the Occupant Restraint Controller (ORC), the compass module, the Keyless Ignition Node (KIN), or the inputs to one of these electronic control modules. Use a diagnostic scan tool to diagnose these components. Refer to the appropriate diagnostic information.

1. Begin the test with the ignition switch in the OFF position.
2. Depress the Electronic Vehicle Information Center (EVIC) menu **Down Scrolling** switch button.
3. While still holding the scroll switch button depressed, turn the ignition switch to the ON position, but do not start the engine.
4. Release the switch button.
5. The instrument cluster will simultaneously begin to illuminate all of the operational segments in the LCD unit, and perform a bulb check of each operational LED indicator. The LCD segments and LED indicators remain illuminated as each gauge needle is swept to several calibration points and back. If a LCD segment or an LED indicator fails to illuminate, or if a gauge needle fails to sweep through the calibration points and back during this test, the instrument cluster must be replaced.
6. The self test is now complete. The instrument cluster will automatically exit the self-diagnostic mode and return to normal operation at the completion of the test. The self test will be aborted if the ignition switch is turned to the OFF position, or if an electronic **vehicle speed** message indicating that the vehicle is moving is received over the CAN data bus during the test.

7. Go back to repeat the test, if necessary. Refer to 1.

STANDARD PROCEDURE

STANDARD PROCEDURE - ENHANCED SEATBELT REMINDER PROGRAMMING

The seatbelt indicator also includes a programmable enhanced seatbelt reminder or "BeltAlert®" feature that is enabled when the vehicle is shipped from the factory. This BeltAlert® feature provides extended, and modified visual seatbelt indicator, and audible chime warning responses to an unbuckled driver, or front passenger seat belt. For front passenger seats equipped with the BeltAlert® feature, the warning system may be triggered when an animal or heavy object is on the front passenger seat, or when the seat is folded flat (if equipped). The beltminder feature may be disabled or enabled by the customer using the programming sequence that follows, or by the dealer using a diagnostic scan tool. The following sequence of events must occur within sixty (60) seconds of the ignition switch being placed in the On position in order for the programming to be completed successfully.

1. With the ignition switch in any position except On or Start, buckle the driver side front seat belt.
2. Turn the ignition switch to the On position and wait for the seatbelt indicator reminder function to conclude (about six seconds).
3. Unbuckle and buckle the driver side front seat belt three or more times, ending with the belt buckled.
4. Turn the ignition switch to any position except On or Start to toggle the BeltAlert® feature from its current setting (from active to inactive, or from inactive to active). A single chime tone will provide an audible confirmation that the programming sequence has been successfully completed.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: If replacing the cluster, take note of the mileage before disconnecting the battery, so the replacement cluster can be programmed with the correct mileage.

CLUSTER ASSEMBLY

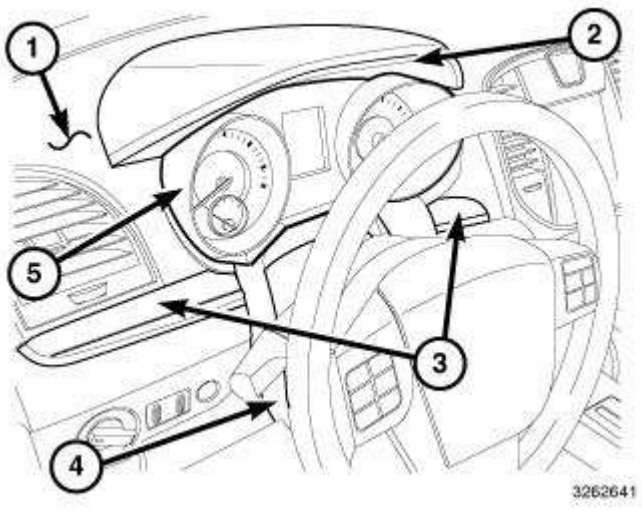


Fig. 4: Instrument Cluster (IC)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Pull the instrument panel upper hood (2) toward the driver seat to release the clips, and separate the hood from the instrument panel.
3. Using a trim stick, remove the two small trim panels (3) on both sides of the steering column opening.
4. Remove the steering column cover. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .
5. Release the clips, and position aside the steering column opening seal (4) to gain access to the instrument cluster fasteners.

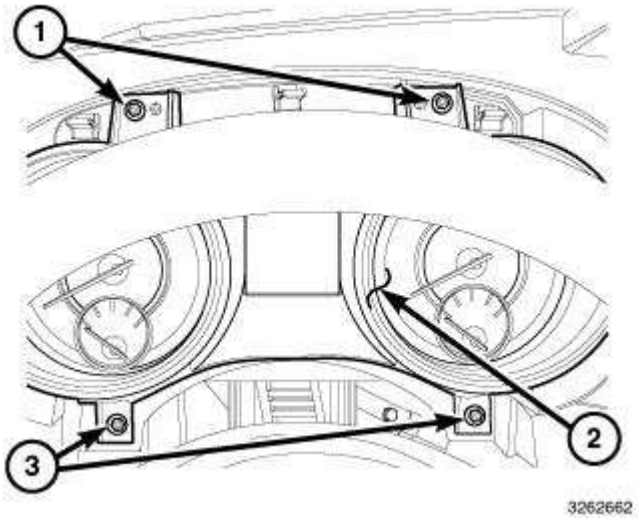


Fig. 5: Upper/Lower, Fasteners & Cluster
Courtesy of CHRYSLER GROUP, LLC

6. Remove the upper (1) and lower (3) fasteners securing the cluster (2) to the instrument panel.
7. Tilt the cluster forward, and disconnect the cluster electrical connector.
8. Remove cluster from instrument panel.

CLUSTER LENS, HOOD, AND MASK

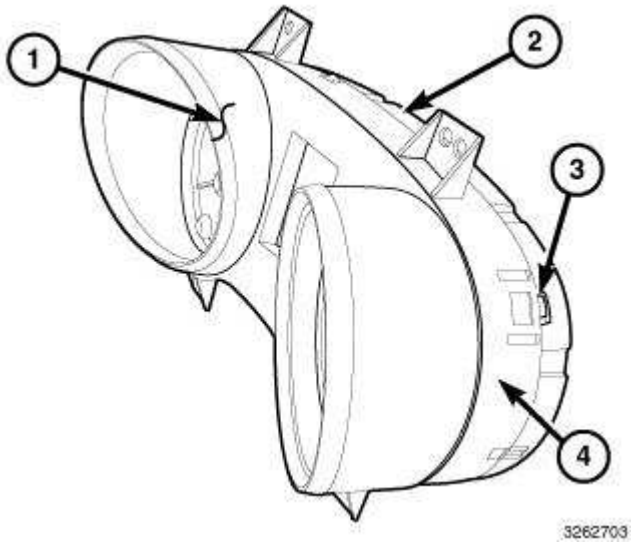


Fig. 6: Instrument Cluster Assembly, Latches, Mask Assembly & Instrument Cluster Body
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the instrument cluster assembly (1) from the instrument panel. Refer to 1.
3. Working around the perimeter disengage the latches (3), and remove the instrument cluster lens, hood, and mask assembly (4).
4. Remove the lens, hood, and mask assembly from the instrument cluster body (2).
5. Working around the perimeter of the left or right inner hood assemblies, disengage each of the latches that secure the panels to the cluster body.

INSTALLATION

INSTALLATION

WARNING: Wait two minutes for the airbag system reserve capacitor to discharge before beginning any airbag system or component service. Failure to do so may result in accidental airbag deployment, personal injury or death.

CLUSTER ASSEMBLY

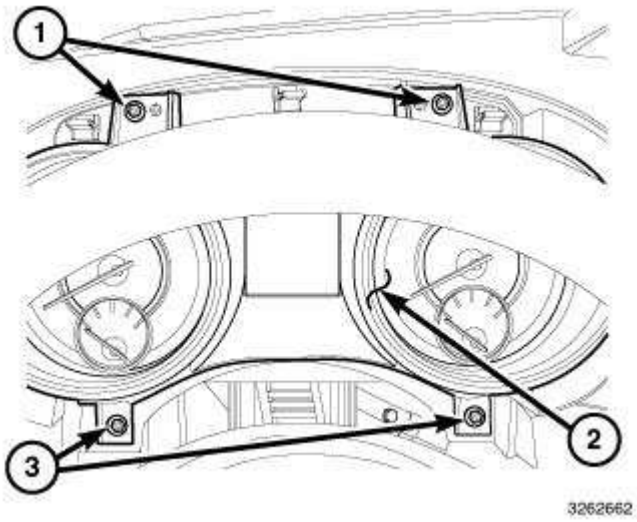


Fig. 7: Upper/Lower, Fasteners & Cluster
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the cluster has been replaced, the replacement cluster should be programmed with the correct mileage. Verify the correct mileage via WiTech/Scan Tool.

1. Position cluster into instrument panel opening.
2. Connect the cluster electrical connector.
3. Tilt the cluster forward, install and tighten the upper and lower fasteners (1 and 3).

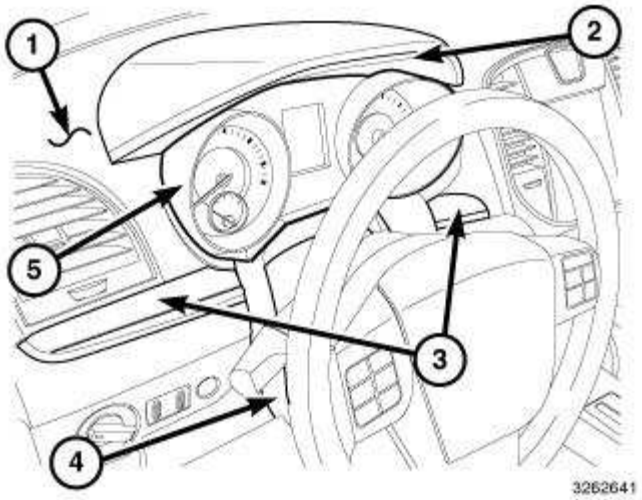


Fig. 8: Instrument Cluster (IC)
Courtesy of CHRYSLER GROUP, LLC

4. Position the steering column opening seal (4), and press into place.
5. Install the steering column cover. Refer to **COVER, STEERING COLUMN OPENING,**

INSTALLATION .

6. Install the two small instrument panel trim panels (3).
7. Position the upper hood (2) on the instrument panel, and press into place engaging the clips that secure the hood.
8. Connect the battery negative cable.

CLUSTER LENS, HOOD AND MASK

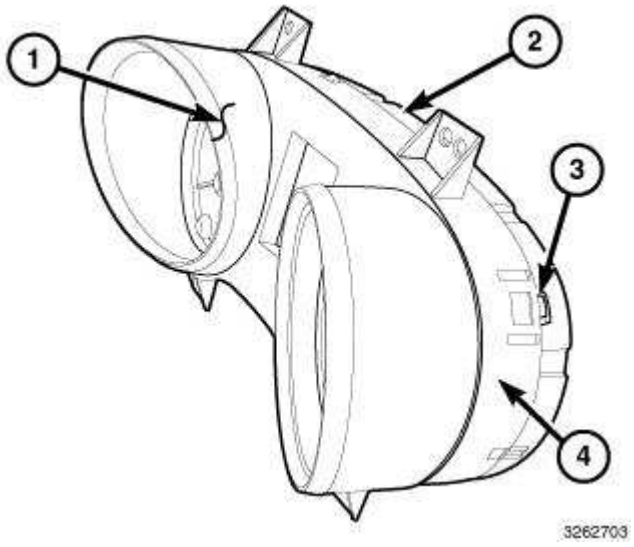


Fig. 9: Instrument Cluster Assembly, Latches, Mask Assembly & Instrument Cluster Body
Courtesy of CHRYSLER GROUP, LLC

1. Working around the perimeter of the left or right cluster lens, and hood assembly engage each of the latches that secure the unit to the cluster assembly.
2. Working around the perimeter of the lens, hood, and mask assembly engage each of the latches that secure the unit to the cluster assembly.
3. Install the cluster assembly into the instrument panel. Refer to 1.

GAUGE PACK, INSTRUMENT CLUSTER

DESCRIPTION

DESCRIPTION

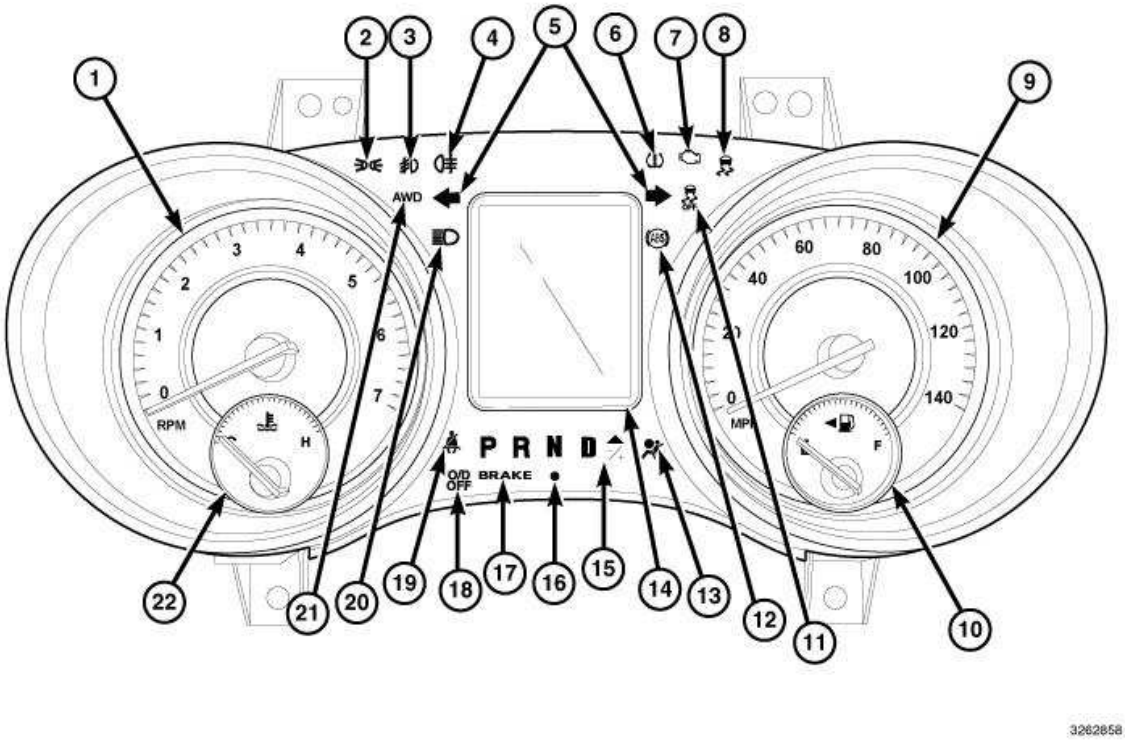


Fig. 10: Identifying Electronic Vehicle Information Center (EVIC) Components
Courtesy of CHRYSLER GROUP, LLC

The Instrument Cluster (IC) for this vehicle houses 4 analog gauges standard on all models, and has provisions for up to 29 International Control and Display Symbol icon indicators, that are all controlled by the IC electronic circuitry. Refer to **INDICATORS, INSTRUMENT CLUSTER, DESCRIPTION**. The gauge graphics are silver against a black field except for a single red graduation at the high end of the gauge scale, on both the engine temperature, and fuel level gauges; and several red graduations at the high end of the gauge scale on the tachometer; that designate the red line area. When illuminated by the cluster illumination lighting, the silver text and graphics as well as the red graphics still appear the same, the red gauge needles have internal optical illumination. Gauge illumination is provided by dimmer controlled Light Emitting Diode (LED) units soldered onto the IC circuit board. The Gauge set and indicators shown in illustration above are an integrated part of the cluster, therefore are only serviced as a unit. The instrument cluster lens and the hood and mask unit are the only components of the instrument cluster assembly that can be serviced separately.

The instrument cluster includes the following analog gauges:

- **Engine Temperature Gauge (22)**
- **Fuel Gauge (10)**
- **Speedometer (9)**
- **Tachometer (1)**

ENGINE TEMPERATURE

The standard equipment engine temperature gauge is located on the left side of the instrument cluster with in the tachometer. The gauge consists of a movable gauge needle or pointer controlled by the IC circuitry and a fixed 90 degree gauge scale on the IC overlay that reads from **C** (or Cold) to **H** . An International Control and Display Symbol icon for **Engine Coolant Temperature** is located on the gauge face, near the low end of the scale. For more information, refer to **INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS, DESCRIPTION** .

FUEL LEVEL

A fuel gauge is standard equipment on all instrument clusters. This gauge is located on the right side of the instrument cluster, within the speedometer. Similar to the engine temperature gauge, the fuel level gauge consists of a movable gauge needle or pointer controlled by the IC circuitry and a fixed 90 degree gauge scale on the cluster overlay that reads from **E** (or Empty) to **F** (or Full). The International Control and Display Symbol icon for **Fuel** is located on the gauge face, in the center of the scale. An arrowhead pointed to the left side of the vehicle is imprinted on the cluster overlay next to the **Fuel** icon on the gauge to provide the driver with a reminder as to the location of the fuel filler access. For more information, refer to **INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS, DESCRIPTION** .

SPEEDOMETER

Standard equipment on all instrument clusters, the speedometer is located to the left of center in the instrument cluster, next to the tachometer and engine temperature gauge. The speedometer consists of a movable gauge needle or pointer controlled by the instrument cluster circuitry and a fixed 185 degree primary scale on the gauge dial face that reads left-to-right either from **0** to **140** or **160** MPH, or from **0** to **230** km/h, depending upon the model.

Each version also has a secondary inner scale on the gauge dial face that provides the equivalent opposite units from the primary scale. Text appearing on the cluster overlay above the hub of the speedometer needle and below the primary scale abbreviates the unit of measure for the primary scale (either **MPH** or **km/h**), and text above the hub of the speedometer needle and below the secondary scale indicates the unit of measure for that scale.

TACHOMETER

The standard equipment tachometer is located to the right of center in the instrument cluster, next to the speedometer and fuel gauge. The tachometer consists of a movable gauge needle or pointer controlled by the instrument cluster circuitry and a fixed 185 degree scale on the gauge dial face that reads left-to-right either from **0** to **7** . The text **RPM X 1000** imprinted on the cluster overlay directly above the hub of the tachometer needle identifies that each number on the tachometer scale is to be multiplied by 1000 RPM.

OPERATION

OPERATION

GAUGES

All gauges receive battery current through the Instrument Cluster (IC) circuitry only when the ignition switch is in the ON or START positions. With the ignition switch in the OFF position battery current is not supplied to any gauges, and the IC circuitry is programmed to move all of the gauge needles back to the low end of their respective scales. Therefore, the gauges do not accurately indicate any vehicle condition unless the ignition switch is in the ON or START positions.

All of the IC gauges are driven by stepper motors. Two fixed electromagnetic coils are located within each gauge. These coils are wrapped at right angles to each other around a movable permanent magnet. The movable magnet is suspended within the coils on one end of a pivot shaft, while the gauge needle is attached to the other end of the shaft. One of the coils has a fixed current flowing through it to maintain a constant magnetic field strength. Current flow through the second coil changes, which causes changes in its magnetic field strength. The current flowing through the second coil is changed by the IC circuitry in response to messages received over the CAN data bus. The gauge needle moves as the movable permanent magnet aligns itself to the changing magnetic fields created around it by the electromagnets.

ENGINE COOLANT TEMPERATURE GAUGE

This gauge is controlled by the IC circuit board based upon programming and electronic messages received from the Powertrain Control Module (PCM) over the CAN data bus.

The engine coolant temperature gauge is a stepper motor design gauge that receives battery current on the instrument IC electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the ON or START positions. The IC is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The IC circuitry controls the gauge needle position and provides the following features:

- **Engine Temperature Message** - Each time the IC receives a message from the PCM indicating the engine coolant temperature is between the low end of normal [about 54° C (130° F)] and the high end of normal [about 127° C (260° F)], the gauge needle is moved to the actual relative temperature position on the gauge scale.
- **Engine Temperature Low Message** - Each time the IC receives a message from the PCM indicating the engine coolant temperature is below the low end of normal [about 54° C (130° F)], the gauge needle is held at the "C" increment at low end of the gauge scale. The gauge needle remains at the low end of the gauge scale until the IC receives a message from the PCM indicating that the engine temperature is above about 54° C (130° F), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Engine Temperature High Message** - Each time the IC receives a message from the PCM indicating the engine coolant temperature is above about 127° C (260° F), the gauge needle is moved into the red zone on the gauge scale, the engine temperature indicator is illuminated, and a single chime tone is sounded. The gauge needle remains in the red zone and the engine temperature indicator remains illuminated until the IC receives a message from the PCM indicating that the engine temperature is below about 127° C (260° F), or until the ignition switch is turned to the Off position, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the engine temperature indicator is cycled off and then on again by the appropriate engine temperature messages from the PCM.
- **Communication Error** - If the IC fails to receive an engine temperature message, it will hold

the gauge needle at the last indication for about five seconds or until the ignition switch is turned to the Off position, whichever occurs first. After five seconds, the IC will move the gauge needle to the low end of the gauge scale.

The PCM continually monitors the engine coolant temperature sensor to determine the engine operating temperature. The PCM then sends the proper engine coolant temperature messages to the IC. For further diagnosis of the engine coolant temperature gauge or the IC circuitry that controls the gauge. Refer to **DIAGNOSIS AND TESTING**. If the IC turns on the engine temperature indicator due to a high engine temperature gauge reading, it may indicate that the engine or the engine cooling system requires service. The engine coolant temperature gauge is serviced as a unit with the instrument cluster.

FUEL GAUGE

The fuel gauge gives an indication to the vehicle operator of the level of fuel in the fuel tank. This gauge is controlled by the IC circuit board based upon programming and a hard wired input received from the fuel level sending unit on the fuel pump module in the fuel tank.

The fuel gauge is a stepper motor design gauge that receives battery current on the IC electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions. The IC is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The IC circuitry controls the gauge needle position and provides the following features:

- **Fuel Level Sending Unit Input** - The IC provides a constant current source to the fuel level sending unit and monitors a return input on a fuel level sense circuit. The resistance through the fuel level sending unit increases as the fuel level falls and decreases as the fuel level rises causing changes in the sense input voltage. The IC programming applies an algorithm to calculate the proper fuel gauge needle position based upon the fuel level sense input, then moves the gauge needle to the proper relative position on the gauge scale. This algorithm is used to dampen gauge needle movement against the negative effect that fuel sloshing within the fuel tank can have on accurate inputs from the fuel tank sending unit to the IC.
- **Less Than Ten Percent Tank Full Input** The LX is equipped with two tank sizes : an 18 gallon and a 19 gallon. This is a saddle type tank with a sending unit on each side. The sending units are hard-wired to the IC. The IC will average the sending unit voltages and provide the proper gauge positioning. Each time the fuel level sense input to the IC indicates the fuel tank is about ten percent full or less for ten consecutive seconds and the vehicle speed is zero, or for sixty consecutive seconds and the vehicle speed is greater than zero, the gauge needle is moved to about the one-eighth graduation on the gauge scale, the low fuel indicator is illuminated, and a single chime tone is sounded. The low fuel indicator remains illuminated until the fuel level sense input indicates that the fuel tank is greater than about thirteen percent full for ten consecutive seconds and the vehicle speed is zero, or for sixty consecutive seconds and the vehicle speed is greater than zero, or until the ignition switch is turned to the Off position, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the low fuel indicator is cycled off and then on again by the appropriate inputs from the fuel level sending unit.
- **Less Than Empty Stop Input** - Each time the IC receives a fuel level sense input that indicates

the fuel level in the fuel tank is less than the Empty gauge needle stop position, the gauge needle is moved to the low end of the gauge scale and the low fuel indicator is illuminated immediately. This input would indicate that the fuel level sense input to the IC is a short circuit.

- **More Than Full Stop Input** - Each time the IC receives a fuel level sense input that indicates the fuel level in the fuel tank is more than the Full gauge needle stop position, the gauge needle is moved to the low end of the gauge scale and the low fuel indicator is illuminated immediately. This input would indicate that the fuel level sense input to the IC is an open circuit.

The IC continually monitors the fuel tank sending unit to determine the level of fuel in the fuel tank. The IC then sends the proper fuel level messages to other electronic modules in the vehicle over the CAN data bus. For further diagnosis of the fuel gauge or the IC circuitry that controls the gauge. Refer to **DIAGNOSIS AND TESTING**. The fuel gauge is serviced as a unit with the instrument cluster.

SPEEDOMETER

The speedometer gives an indication to the vehicle operator of the vehicle road speed. This gauge is controlled by the IC circuit board based upon programming and electronic messages received from the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM is provided the vehicle speed information across the CAN data bus by either the PCM, the ESP module or the ABS module.

The IC circuitry controls the gauge needle position and provides the following features:

- **Vehicle Speed Message** - Each time the IC receives a vehicle speed message from the BCM, it will calculate the correct vehicle speed reading and position the gauge needle at that relative speed position on the gauge scale. The IC will receive a new vehicle speed message and reposition the gauge pointer accordingly about every 50 milliseconds. The gauge needle will continually be positioned at the relative vehicle speed position on the gauge scale until the vehicle stops moving, or until the ignition switch is turned to the OFF position, whichever occurs first.
- **Communication Error** - If the IC fails to receive a speedometer message, it will hold the gauge needle at the last indication for about three seconds, or until the ignition switch is turned to the Off position, whichever occurs first. After three seconds, the gauge needle will return to the left end of the gauge scale.

The PCM continually monitors the vehicle speed sensor to determine the vehicle road speed. The PCM then sends the proper vehicle speed messages to the IC. For further diagnosis of the speedometer or the IC circuitry that controls the gauge. Refer to **DIAGNOSIS AND TESTING**. The speedometer is serviced as a unit with the instrument cluster.

TACHOMETER

The tachometer gives an indication to the vehicle operator of the engine speed. This gauge is controlled by the IC circuit board based upon programming and electronic messages received from the PCM over the CAN data bus.

The tachometer is a stepper motor design gauge that receives battery current on the IC electronic

circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the ON or START positions. The IC is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the OFF position. The IC circuitry controls the gauge needle position and provides the following features:

- **Engine Speed Message** - Each time the IC receives an engine speed message from the PCM it will calculate the correct engine speed reading and position the gauge needle at that relative speed position on the gauge scale. The IC will receive a new engine speed message and reposition the gauge pointer accordingly about every 88 milliseconds. The gauge needle will continually be repositioned at the relative engine speed position on the gauge scale until the engine stops running, or until the ignition switch is turned to the OFF position, whichever occurs first.
- **Communication Error** - If the IC fails to receive an engine speed message, it will hold the gauge needle at the last indication for about three seconds, or until the ignition switch is turned to the Off position, whichever occurs first. After three seconds, the gauge needle will return to the left end of the gauge scale.

The PCM continually monitors the crankshaft position sensor to determine the engine speed. The PCM then sends the proper engine speed messages to the IC. For further diagnosis of the tachometer or the IC circuitry that controls the gauge. Refer to **DIAGNOSIS AND TESTING**. The tachometer is serviced as a unit with the instrument cluster.

The gauges are diagnosed using the IC self-diagnostic test. Refer to **DIAGNOSIS AND TESTING**. Proper testing of the CAN data bus and the electronic data bus message inputs to the IC that control each gauge require the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

INDICATORS, INSTRUMENT CLUSTER

DESCRIPTION

DESCRIPTION

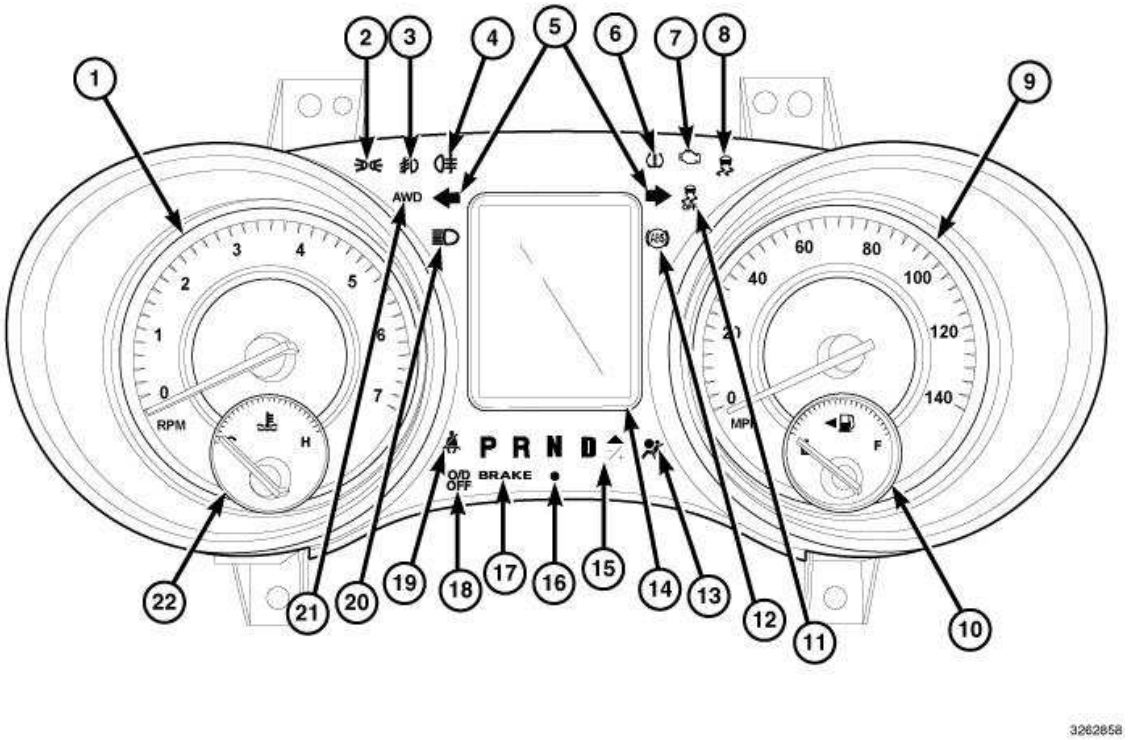


Fig. 11: Identifying Electronic Vehicle Information Center (EVIC) Components
Courtesy of CHRYSLER GROUP, LLC

The Instrument Cluster (IC) for this vehicle has provisions for up to 29 International Control and Display Symbol icon indicators and 4 analog gauges, that are all controlled by the IC electronic circuitry and standard on all models. Refer to **GAUGE PACK, INSTRUMENT CLUSTER, DESCRIPTION**. Some of the indicators are automatically configured when the IC is connected to the vehicle's electrical system for compatibility with certain optional equipment or equipment required for regulatory purposes in certain markets. While each IC may have provisions for indicators to support every available option, the configurable indicators will not function in vehicles that do not have the equipment that an indicator supports.

Each indicator in the IC, except those located within a VFD unit, is illuminated by a dedicated Light Emitting Diode (LED) that is soldered onto the electronic circuit board. IC illumination is accomplished by several dimmable LED units, which illuminate each of the gauge dial faces for visibility when the exterior lighting is turned ON. These LED units as well as the IC assembly are serviced only as a complete unit with the instrument cluster and, if damaged or ineffective, the entire instrument cluster assembly must be replaced. The IC lens and the hood and mask unit are the only components of the IC assembly that can be serviced separately.

The IC includes provisions for the following indicators:

- **Airbag Indicator (13)**
- **Ajar Indicators (14)** - in the EVIC display
- **Antilock Brake System (ABS) Indicator (12)**

- **All Wheel Drive (AWD) Indicator (21)**
- **Brake Indicator (18)** - text only for U.S. market, icon only for markets outside U.S.
- **Change Oil Indicator** - textual message in odometer / EVIC display
- **Charging Indicator (14)** - in the EVIC display
- **Cruise Indicator (14)** - in the EVIC display
- **Electronic Stability Control (ESC) System Activation Indicator (8)**
- **Electronic Throttle Control (ETC) Indicator (14)** - in the EVIC display
- **Engine Coolant Temperature Indicator (14)** - in the EVIC display
- **Front Fog Lamp Indicator (3)** - with optional front fog lamps only
- **Fuel Saver Indicator- ECOnomizer (ECO) (14)** - in the EVIC display
- **Gas Cap Indicator (14)** - in the EVIC display
- **Gear Selector Indicator (15)**
- **High Beam Indicator (20)**
- **Low Fuel Indicator (14)** - in the EVIC display
- **Low Oil Pressure Indicator (14)** - in the EVIC display
- **Malfunction Indicator Lamp (MIL) (7)** - only on domestic market vehicles
- **No Bus Indicator** - in the EVIC display
- **Seat Belt Indicator (19)**
- **Security Indicator (16)**
- **Tire Pressure Monitor (TPM) Indicator (6)**
- **Electronic Stability Control (ESC) OFF Indicator (11)**
- **Turn Signal (Right and Left) Indicators (5)**

The IC also includes the following Liquid Crystal Display (LCD) units :

- **Electronic Vehicle Information Center (EVIC) Display** . Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .

For more information on the International Control and Display Symbol icons. Refer to **INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS, DESCRIPTION** .

OPERATION

OPERATION

Indicators are located in various locations within the Instrument Cluster (IC) (also known as the Instrument Panel Cluster/IPC) and are all connected to the electronic circuit board. All of the indicators are completely controlled by the IC. The various indicators are controlled by different strategies; some receive fused ignition output from the IC circuitry and have a switched ground, while others are grounded through the IC circuitry and have a switched battery feed. However, most are controlled by (CAN) or Local Interface Network (LIN) data bus messages from other electronic modules in the vehicle while others are controlled by a combination of hard wired inputs, electronic

messaging and IC programming. If the IC loses CAN data bus communication, the IC circuitry will automatically turn ON the Malfunction Indicator Lamp (MIL) until CAN data bus communication is restored.

In addition, certain indicators in this IC are automatically or self-configured. This feature allows the configurable indicators to be enabled by the IC circuitry for compatibility with certain optional equipment. These indicators are enabled or disabled by an electronic **configuration** message sent to the IC by the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM defaults for the Antilock Brake System (ABS) and the airbag indicators is enabled. These configuration settings must be programmatically disabled in the BCM using a diagnostic scan tool for vehicles that do not have this equipment. The automatically or self-configured indicators remain latent in the IC at all times and will be active only when the IC receives the appropriate CAN or LIN bus message inputs for that optional system or equipment.

The hard wired indicator inputs may be diagnosed using conventional diagnostic tools and procedures. However, the IC circuitry and electronic CAN or LIN data bus message controlled indicators are diagnosed using the self-diagnostic IC **Self Test** . for more information, refer to **DIAGNOSIS AND TESTING**. Proper testing of the CAN or LIN data bus and the electronic data bus message inputs to the IC that control each indicator requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

Below are brief explanations of the indicators available on this vehicle. More detailed information may be available elsewhere in this service information covering the system or component that control or influence the illumination of that indicator.

AIRBAG INDICATOR

The airbag indicator gives an indication to the vehicle operator when the airbag system, or a circuit or component of the system is ineffective. The airbag indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the Occupant Restraint Controller (ORC) over the CAN data bus. The IC will illuminate the airbag indicator for about six seconds as a bulb test each time the ignition switch status transitions to ON.

The airbag indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the airbag indicator for the following reasons:

- **Airbag Indicator Lamp-On Message** - Each time the IC receives an electronic **airbag indicator lamp-ON** message from the ORC, the airbag indicator will be illuminated. The indicator remains illuminated for about 12 seconds or until the IC receives a lamp-OFF message from the ORC, whichever is longer. This indicator will also be extinguished when the ignition switch status transitions to OFF.
- **Communication Error** - If the IC receives no lamp-ON or lamp-OFF messages from the ORC for 10 consecutive message cycles, the airbag indicator is illuminated. The indicator remains illuminated until the IC receives a single lamp-OFF message from the ORC.

The ORC continually monitors the airbag system circuits and sensors to decide whether the system is in good operating condition. The ORC then sends the proper lamp-ON or lamp-OFF message to the IC. If the ORC sends a lamp-ON message after the bulb test, it indicates that the ORC has detected a system malfunction or that the airbags and seat belt tensioners may not deploy when required, or may deploy when not required. The ORC will store a DTC for any malfunction it detects. Each time the airbag indicator fails to illuminate due to an open or short in the IC airbag indicator circuit, the IC sends a message notifying the ORC of the condition, then the IC and the ORC will each store a DTC.

For proper diagnosis of the airbag system, the ORC, the IC, the CAN data bus or the electronic communication related to airbag indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

AJAR INDICATORS

The ajar indicators give an indication to the vehicle operator that one or more of the passenger compartment doors or the deck lid may be open or not completely latched. These indicators are controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the Body Control Module (BCM) over the CAN data bus. The BCM monitors hard-wired inputs from the door and deck lid ajar switches.

The ajar indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused B(+) circuit. Therefore, the ajar indications can occur regardless of the ignition switch position. The IC will turn ON an ajar indicator for the following reasons:

- **Ajar Indicator Lamp-On Message** - Each time the IC receives an electronic **door ajar indicator lamp-on** or **deck lid ajar indicator lamp-on** message from the BCM indicating that a door or the deck lid or a combination of these is open or not completely latched, the appropriate ajar textual message and icons will be illuminated. If the IC detects a vehicle speed input greater than zero (kilometers or miles-per-hour) while the ignition switch status is ON or START, the ajar indication will be accompanied by a single chime tone. When the ignition switch status is anything except ON or START, any and all ajar indications will time out after about five minutes.

The ajar switches on the door and deck lid latch mechanisms provide hard-wired ground inputs to the BCM circuitry through the ajar switch sense circuits whenever a door or the deck lid is open or not completely latched. The BCM continually monitors the door and deck lid ajar switches to determine the status of the doors and deck lid, then sends the proper electronic **ajar indicator lamp-on** or **lamp-off** message to the IC.

The hard wired ajar switch inputs to the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. For proper diagnosis of the BCM, the IC, the CAN data bus or the electronic communication related to ajar indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

ANTILOCK BRAKE SYSTEM INDICATOR

The Antilock Brake System (ABS) indicator gives an indication to the vehicle operator when the ABS

system, or a circuit or component of the system is ineffective. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the cluster from the CAB over the CAN data bus. The IC will illuminate the ABS indicator for about three seconds as a bulb test each time the ignition switch status transitions to ON.

The ABS indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the ABS indicator for the following reasons:

- **ABS Indicator Lamp-On Message** - Each time the IC receives an electronic **ABS indicator lamp-ON** message from the CAB, the ABS indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the CAB, or until the ignition switch status transitions to OFF, whichever occurs first.
- **Communication Error** - If the IC receives no lamp-ON or lamp-OFF messages from the CAB for five consecutive message cycles, the ABS indicator is illuminated. The indicator remains illuminated until the IC receives a valid message from the CAB, or until the ignition switch status transitions to OFF, whichever occurs first.
- **ABS Diagnostic Test** - The ABS indicator is blinked ON and OFF by lamp-ON and lamp-OFF messages from the CAB during the performance of the ABS diagnostic tests.

The CAB continually monitors the ABS circuits and sensors to decide whether the system is in good operating condition. The CAB then sends the proper lamp-ON or lamp-OFF message to the IC. If the CAB sends a lamp-ON message after the bulb test, it indicates that the CAB has detected a system malfunction or that the ABS system has become ineffective. The CAB will store a DTC for any malfunction it detects. Each time the ABS indicator fails to light due to an open or short in the IC ABS indicator circuit, the IC sends a message notifying the CAB of the condition, then the IC and the CAB will each store a DTC and the IC will flash the brake indicator ON and OFF as a backup to notify the vehicle operator.

For proper diagnosis of the anti-lock brake system, the CAB, the IC, the CAN data bus or the electronic communication related to ABS indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

BRAKE/PARK BRAKE INDICATOR

The brake indicator gives an indication to the vehicle operator when the parking brake is applied, when there are certain brake hydraulic system malfunctions as indicated by a low brake hydraulic fluid level condition or when the brake fluid level switch is disconnected. The brake indicator can also give an indication when certain faults are detected in the Antilock Brake System (ABS). This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the CAB or the Body Control Module (BCM) over the CAN data bus. The BCM monitors the hard wired input from the park brake switch. The IC will illuminate the brake indicator for about three seconds as a bulb test each time the ignition switch status transitions to ON.

The brake indicator LED is completely controlled by the IC logic circuit, and that logic will only allow

this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the brake indicator for the following reasons:

- **Brake Indicator Lamp-On Message** - Each time the IC receives an electronic **brake indicator lamp-ON** message from the CAB, the brake indicator will be illuminated. The CAB may also send lamp-ON messages as feedback during ABS diagnostic procedures. The indicator remains illuminated until the IC receives a lamp-OFF message from the CAB or until the ignition switch status transitions to OFF, whichever occurs first.
- **Low Brake Fluid Textual Warning Message** - When the CAB detects a low brake fluid level input from the brake fluid level switch, it will send an electronic **textual warning request** message requesting the IC display a textual warning message. Each time the IC receives this message from the CAB, a **LOW BRAKE FLUID LEVEL** textual message will appear within the IC electronic display to accompany brake indicator illumination. This message indicates that the CAB has detected a low brake fluid level condition in the brake master cylinder or that there is a problem in the brake fluid level switch or circuits.
- **Park Brake Switch Input** - Each time the IC receives an electronic **brake indicator lamp-FLASH** message from the BCM, the brake indicator will be flashed ON and OFF. While the ignition switch status is ON, the BCM monitors the park brake switch through the park brake switch sense circuit (park brake switch closed = park brake applied or not fully released). The indicator continues to flash until the park brake switch sense input to the BCM is an open circuit (park brake switch open = park brake fully released), or until the ignition switch status transitions to OFF, whichever occurs first.
- **Antilock Brake System (ABS) Indicator Backup** - If the IC detects a fault in the ABS indicator circuit it will send a message indicating the fault to the CAB, then flash the brake indicator ON and OFF. The IC will continue to flash the brake indicator until the ABS indicator circuit fault is resolved, or until the ignition switch status transitions to OFF, whichever occurs first.

The park brake switch on the park brake lever mechanism provides a hard-wired ground input to the BCM circuitry through the park brake switch sense circuit whenever the park brake is applied or not fully released. The CAB continually monitors the ABS system circuits and sensors, including the brake fluid level switch on the brake master cylinder reservoir, to decide whether the system is in good operating condition. The CAB then sends the proper lamp-ON, lamp-OFF or lamp-FLASH message to the IC. If the CAB sends a lamp-ON message after the bulb test, it indicates that the CAB has detected a brake hydraulic system malfunction or that the ABS system has become ineffective. The CAB will store a DTC for any malfunction it detects.

The hard wired park brake switch input to the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. For proper diagnosis of the brake fluid level switch, the ABS, the BCM, the CAB, the IC, the CAN data bus or the electronic communication related to brake indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

CHANGE OIL INDICATOR

The change oil indicator gives an indication to the vehicle operator when a duty-cycle algorithm

contained within the software of the PCM determines that a recommended oil change interval has been attained. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received over the CAN data bus from the PCM.

The change oil indicator function of the IC electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the change oil indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the change oil indicator for the following reasons:

- **Change Oil Indicator Lamp-On Message** - Each time the ignition switch status transitions to ON and the IC receives an electronic **change oil indicator lamp-ON** message from the PCM indicating that a duty-cycle based recommended oil change interval has been attained, the change oil indicator will be illuminated for about ten seconds, until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to OFF, whichever occurs first.
- **Change Oil Indicator Reset Procedure** - Once an engine oil change has been completed, the PCM duty cycle counters can be reset using the following procedure. Set the ignition switch status to ON, but DO NOT start the engine. Slowly depress and release the accelerator pedal fully three times within ten seconds. The IC will display a textual **OIL CHANGE RESET** message. Set the ignition switch status to OFF. If the change oil indicator illuminates the next time the engine is started, repeat this procedure.

The PCM continually monitors numerous sensor inputs to determine the duty-cycles to which the engine is being subjected. A pre-programmed algorithm within the PCM then determines when to send the proper lamp-ON or lamp-OFF message to the IC.

For proper diagnosis of the change oil indicator, the PCM, the IC, the CAN data bus or the electronic communication related to change oil indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

CHARGING INDICATOR

The charging indicator gives an indication to the vehicle operator when the electrical system voltage is too low or too high. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the PCM over the CAN data bus. The IC will illuminate the charge indicator for about three seconds as a bulb test each time the ignition switch status transitions to ON.

The charging indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the charging indicator for the following reasons:

- **Voltage Low Message** - Each time the IC receives an electronic **system voltage** message from the PCM indicating the voltage is low (less than about 11.5 volts is a charge fail condition),

the charging indicator will be illuminated. The indicator remains illuminated until the IC receives a message from the PCM indicating the voltage is normal (greater than about 12.0 volts, but less than 16.0 volts), or until the ignition switch status transitions to OFF, whichever occurs first.

- **Voltage High Message** - Each time the IC receives an electronic **system voltage** message from the PCM indicating the voltage is high (greater than about 16.0 volts), the charging indicator will be illuminated. The indicator remains illuminated until the IC receives a message from the PCM indicating the voltage is normal (less than about 15.5 volts, but greater than 11.5 volts), or until the ignition switch status transitions to OFF, whichever occurs first.

The PCM continually monitors the electrical system voltage to control the generator output. The PCM then sends the proper messages to the IC. If the IC turns ON the charging indicator due to a charge fail or voltage high condition, it may indicate that the charging system requires service.

For proper diagnosis of the charging system, the PCM, the IC, the CAN data bus or the electronic communication related to charging indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

CHECK GAUGES INDICATOR

The check gauges indicator gives an indication to the vehicle operator when the engine coolant temperature gauge indicates the coolant temperature is high or critical. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received over the CAN data bus from the PCM.

The check gauges indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the check gauges indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the check gauges indicator for the following reasons:

- **Engine Temperature High or Critical Message** - Each time the IC receives an electronic **engine coolant temperature** message from the PCM indicating the temperature is high or critical the engine coolant temperature gauge needle is moved to the appropriate position at the high end of the gauge scale, the check gauges textual warning is displayed, and a single chime tone is sounded. The check gauges textual warning remains illuminated until the IC receives a message from the PCM indicating that the temperature is below the high end of normal, until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to OFF, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the check gauges textual warning is cycled OFF and then ON again by the appropriate temperature messages from the PCM.

The PCM continually monitors the engine coolant temperature sensor to determine the engine operating temperature. The PCM then sends the proper messages to the IC. If the IC turns on the check gauges indicator due to a high or critical engine temperature gauge reading, it may indicate that the engine or the engine cooling system requires service.

For proper diagnosis of the engine coolant temperature sensor, the PCM, the IC, the CAN data bus or

the electronic communication related to check gauges indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

CRUISE INDICATOR

The cruise indicator gives the vehicle operator an indication when the speed control system is ON, regardless of whether the speed control is engaged. This indicator is controlled by the IC circuit board based upon programming and electronic messages received by the IC from the PCM over the CAN data bus.

The cruise indicator LED is completely controlled by the IC logic circuit, and that logic only allows this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED is always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the cruise indicator for the following reasons:

- **Cruise Indicator Lamp-On Message** - Each time the IC receives an electronic **cruise indicator lamp-on** message from the PCM indicating the speed control system is ON, the cruise indicator is illuminated. The indicator remains illuminated until the IC receives a lamp-off message from the PCM, or until the ignition switch status transitions to OFF, whichever occurs first.

The PCM continually monitors the speed control switches to determine the appropriate outputs to control the vehicle speed. The PCM then sends the proper lamp-on or lamp-off message to the IC.

For proper diagnosis of the speed control switches, the PCM, the IC, the CAN data bus or the electronic communication related to cruise indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

ELECTRONIC THROTTLE CONTROL INDICATOR

The Electronic Throttle Control (ETC) indicator gives an indication to the vehicle operator when the ETC system, or a circuit or component of the system is ineffective. The ETC indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the PCM over the CAN data bus. The IC will illuminate the ETC indicator for about fifteen seconds as a bulb test each time the ignition switch status transitions to ON.

The ETC indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the ETC indicator for the following reasons:

- **ETC Indicator Lamp-On Message** - Each time the IC receives an electronic **ETC indicator lamp-ON** message from the PCM, the ETC indicator will be illuminated. The indicator can be flashed ON and OFF, or illuminated solid, as dictated by the PCM message. The indicator remains illuminated solid or continues to flash for about 12 seconds or until the IC receives a lamp-OFF message from the PCM, whichever is longer. If the indicator is illuminated solid with

the engine running the vehicle will usually remain drivable. If the indicator is flashing with the engine running the vehicle may require towing. A flashing indicator means the ETC system requires immediate service. The indicator will be extinguished when the ignition switch status transitions to OFF.

The PCM continually monitors the ETC system circuits and sensors to decide whether the system is in good operating condition. The PCM then sends the proper lamp-ON or lamp-OFF message to the IC. If the PCM sends a lamp-ON message after the bulb test, it indicates that the PCM has detected an ETC system malfunction or that the ETC system is ineffective. The PCM will store a DTC for any malfunction it detects. Each time the ETC indicator fails to illuminate due to an open or short in the IC ETC indicator circuit, the IC sends a message notifying the PCM of the condition, then the IC and the PCM will each store a DTC.

For proper diagnosis of the ETC system, the PCM, the IC, the CAN data bus or the electronic communication related to ETC indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

ENGINE TEMPERATURE INDICATOR

The engine temperature indicator gives an indication to the vehicle operator when the engine temperature gauge reading reflects a condition requiring immediate attention. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received from the PCM over the CAN data bus. The IC will illuminate the engine temperature indicator for about three seconds as a bulb test each time the ignition switch status transitions to ON.

The engine temperature indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The engine temperature indicator will also be turned ON for the following reasons:

- **Engine Temperature High Message** - Each time the IC receives a message from the PCM indicating the engine coolant temperature is high, the engine temperature indicator will be illuminated and a single chime tone is sounded. The indicator remains illuminated until a message from the PCM indicating that the engine coolant temperature is below the high end of normal is received, or until the ignition switch status transitions to OFF, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the engine temperature indicator is cycled off and then on again by the appropriate engine temperature messages from the PCM.

The PCM continually monitors the engine coolant temperature sensor to determine the engine operating temperature. The PCM then sends the proper engine coolant temperature messages to the IC. If the IC turns on the engine temperature indicator due to a high engine temperature gauge reading, it may indicate that the engine or the engine cooling system requires service.

ELECTRONIC STABILITY CONTROL INDICATOR

The Electronic Stability Control (ESC) indicator gives an indication to the vehicle operator when the ESC has been activated. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the CAB and the Final Drive Control Module (FDCM) over the CAN data bus. The IC will illuminate the ESC/BAS indicator for about four seconds as a bulb test each time the ignition switch status transitions to ON.

The ESC indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the ESC/BAS indicator for the following reasons:

- **ESC Indicator Lamp-On Message** - Each time the IC receives an electronic **ESC/ indicator lamp-ON** message from the CAB indicating that the ESC system has been activated, the ESC indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the CAB, or until the ignition switch status transitions to OFF, whichever occurs first.
- **ESC Off Textual Message** - Each time the IC receives an electronic **ESC OFF indicator lamp-ON** message from the CAB indicating that the ESC system has been manually disabled, an **ESC OFF** textual message will appear within the IC electronic display unit. The **ESC OFF** textual message remains displayed until the IC receives a lamp-OFF message from the CAB, or until the ignition switch status transitions to OFF, whichever occurs first.
- **ESC Textual Warning Message** - When the CAB or FDCM detects certain monitored fault conditions, it will send electronic messages requesting the IC display a textual warning message. Each time the IC receives an electronic **ESC textual warning request** message from the CAB or FDCM, a **WARNING! LIMIT SPEED** textual message will appear within the IC electronic display unit to accompany an ESC indicator that is illuminated solid. This message indicates that the CAB or FDCM has detected a problem in one of the ESC system circuits or components.

The CAB and FDCM continually monitor the ESC circuits and sensors to decide whether the system is in good operating condition. The CAB or FDCM then sends the proper lamp-ON or lamp-OFF message to the IC.

For proper diagnosis of the ESC/BAS system, the CAB, the FDCM, the IC, the CAN data bus or the electronic communication related to the ESC/BAS indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

FRONT FOG LAMP INDICATOR

The front fog lamp indicator gives an indication to the vehicle operator whenever the front fog lamps are illuminated. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the BCM over the CAN data bus.

The front fog lamp indicator LED is completely controlled by the IC logic circuit, and that logic will allow this indicator to operate whenever the IC receives a battery current input on the fused B(+) circuit. Therefore, the LED can be illuminated regardless of the ignition switch status. The LED only

illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the front fog lamp indicator for the following reasons:

- **Front Fog Indicator Lamp-On Message** - Each time the IC receives an electronic **front fog indicator lamp-ON** message from the BCM indicating the front fog lamps are turned ON, the front fog lamp indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the BCM, or until the exterior lamp load shedding (battery saver) timed interval expires, whichever occurs first.

The BCM continually monitors a hard wired input from the exterior lighting switch to determine the appropriate outputs to the front fog lamps. The BCM activates or deactivates the front fog lamps then sends the proper lamp-ON or lamp-OFF message to the IC to control the front fog lamp indicator.

For proper diagnosis of the front fog lamp system, the BCM, the IC, the CAN data bus or the electronic communication related to front fog lamp indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

GAS CAP INDICATOR

The gas cap indicator gives an indication to the vehicle operator when there is a gross leak detected in the on-board fuel vapor recovery system. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received over the CAN data bus from the PCM.

The gas cap indicator function of the IC electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the gas cap indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the gas cap indicator for the following reasons:

- **Gas Cap Indicator Lamp-On Message** - Each time the IC receives an electronic **gas cap indicator lamp-ON** message from the PCM indicating there is a gross leak in the vapor recovery system, the gas cap indicator will be displayed. The indicator remains displayed until the IC receives a lamp-OFF message from the PCM, until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to OFF, whichever occurs first.

NOTE: **If the On-Board Diagnostic (OBD) system in the vehicle determines that the fuel filler cap is loose, improperly installed or damaged, a gas cap ICON will be displayed in the electronic display unit. In this instance, verify that the gas cap is properly installed and tightened before proceeding with any further diagnosis.**

The PCM continually monitors the on board vapor recovery system to determine whether there are air leaks in the system. The PCM then sends the proper lamp-ON or lamp-OFF message to the IC. If the IC turns ON the gas cap indicator due to a monitored gross leak in the vapor recovery system, it may indicate that the gas cap has been removed or is improperly installed.

For proper diagnosis of the on board vapor recovery system, the PCM, the IC, the CAN data bus or the electronic communication related to gas cap indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

HIGH BEAM INDICATOR

The high beam indicator gives an indication to the vehicle operator whenever the headlamp high beams are illuminated. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received from the BCM over the CAN data bus.

The high beam indicator LED is completely controlled by the IC logic circuit, and that logic will allow this indicator to operate whenever the IC receives a battery current input on the fused B(+) circuit. Therefore, the LED can be illuminated regardless of the ignition switch status. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the high beam indicator for the following reasons:

- **High Beam Indicator Lamp-On Message** - Each time the IC receives an electronic **high beam indicator lamp-ON** message from the BCM or the Automatic High Beam Module (AHBM) (also known as SmartBeam® on vehicles so equipped) the high beam indicator will be illuminated. The high beam indicator remains illuminated until the IC receives a lamp-OFF message from the BCM, or until the exterior lamp load shedding (battery saver) timed interval expires, whichever occurs first.

The BCM continually monitors electronic messages from the Steering Angle Sensor (SAS) based upon the status of the beam select switch and the AHBM to determine the proper headlamp beam control. The BCM activates or deactivates the headlamp high beams then sends the proper lamp-ON or lamp-OFF message back to the IC.

For proper diagnosis of the SAS, the AHBM, the BCM, the IC, the CAN data bus or the electronic communication related to high beam indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

LOW COOLANT INDICATOR

The low coolant indicator gives an indication to the vehicle operator when the diesel engine coolant level is low. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received over the CAN data bus from the PCM.

The low coolant indicator function of the IC electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the low coolant indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the low coolant indicator for the following reasons:

- **Low Coolant Indicator Lamp-On Message** - Each time the IC receives an electronic **low coolant indicator lamp-ON** message from the PCM indicating the engine coolant level is low, the low coolant textual warning and icon are illuminated and a single chime tone is sounded. The low coolant textual warning and icon remain illuminated until the IC receives a lamp-OFF

message from the PCM, or until the ignition switch status transitions to OFF, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the textual warning and icon are cycled OFF and then ON again by the appropriate messages from the PCM.

The PCM continually monitors the engine coolant level switch on the coolant bottle to determine the level of the engine coolant. The PCM then sends the proper lamp-ON or lamp-OFF message to the IC. If the IC turns ON the coolant low indicator and icon due to a low coolant level, it may indicate that the engine or the engine cooling system requires service.

For proper diagnosis of the engine coolant level switch, the PCM, the IC, the CAN data bus or the electronic communication related to low coolant indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

LOW FUEL INDICATOR

The low fuel indicator gives an indication to the vehicle operator when the level of fuel in the fuel tank becomes low. This indicator is controlled by a transistor on the IC circuit board based upon programming and a hard wired input received by the IC from the fuel level sending unit on the fuel pump module in the fuel tank. The IC will illuminate the low fuel indicator for about three seconds as a bulb test each time the ignition switch status transitions to ON.

The low fuel indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the low fuel indicator for the following reasons:

- **Less Than 11 Percent Tank Full Input** - The BCM provides a constant current source to the fuel level sending unit, and monitors a return input on a fuel level sense circuit. The resistance through the fuel level sending unit increases as the fuel level falls, and decreases as the fuel level rises causing changes in the sense input voltage. Each time the fuel level sense input to the BCM indicates the fuel tank is about 11 percent full or less for 10 consecutive seconds and the vehicle speed is zero, or for 60 consecutive seconds and the vehicle speed is greater than zero, the BCM sends an electronic message to the IC. Then the IC moves the gauge needle to the appropriate position on the gauge scale; the low fuel indicator is illuminated and a single chime tone is sounded. The low fuel indicator remains illuminated until the fuel level sense input indicates that the fuel tank is greater than about 14 percent full for 10 consecutive seconds and the vehicle speed is zero, or for 60 consecutive seconds and the vehicle speed is greater than zero, or until the ignition switch transitions to OFF, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the low fuel indicator is cycled OFF and then ON again by the appropriate inputs from the fuel level sending unit.
- **Less Than Empty Stop Input** - Each time the IC receives a fuel level message from the BCM that indicates the fuel level in the fuel tank is less than the **E** (or Empty) gauge needle stop position for five consecutive seconds, the gauge needle is moved to the low end of the gauge scale and the low fuel indicator is illuminated immediately. This input would indicate that the fuel level sense input to the BCM is a short circuit.
- **More Than Full Stop Input** - Each time the IC receives a fuel level message from the BCM that

indicates the fuel level in the fuel tank is more than the **F** (or Full) gauge needle stop position for five consecutive seconds, the gauge needle is moved to the low end of the gauge scale and the low fuel indicator is illuminated immediately. This input would indicate that the fuel level sense input to the BCM is an open circuit.

The BCM continually monitors the fuel tank sending unit to determine the level of fuel in the fuel tank. The BCM then sends the proper electronic **fuel level** message to IC and other electronic modules in the vehicle over the CAN data bus. The BCM will store a DTC for any fault detected in the fuel level sense circuit.

For proper diagnosis of the fuel tank sending unit, the BCM, the IC, and the CAN data bus or the electronic communication related to low fuel indicator operation or fuel level data processing, a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

LOW OIL PRESSURE INDICATOR

The low oil pressure indicator gives an indication to the vehicle operator when the engine oil pressure reading reflects a condition requiring immediate attention. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the PCM over the CAN data bus.

The low oil pressure indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the low oil pressure indicator for the following reasons:

- **Engine Oil Pressure Low Message** - Each time the IC receives an electronic **engine oil pressure** message from the PCM indicating the pressure is about 6.9 kPa (1 psi) or lower, the low oil pressure indicator will be illuminated. The indicator can be flashed ON and OFF, or illuminated solid, as dictated by the PCM message. The indicator remains illuminated solid or flashing until the IC receives a message from the PCM indicating that the pressure is above about 6.9 kPa (1 psi), or until the ignition switch status transitions to OFF, whichever occurs first. The IC will only turn the indicator ON in response to low engine oil pressure if the engine speed is greater than zero.

The PCM continually monitors the engine oil pressure sensor to determine the engine oil pressure. The PCM then sends the proper messages to the IC. If the IC turns ON the indicator after the bulb test, it may indicate that the engine or the engine oiling system requires service.

For proper diagnosis of the engine oil pressure sensor, the PCM, the IC, the CAN data bus or the electronic communication related to low oil pressure indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

LOW TIRE PRESSURE INDICATOR

The Tire Pressure Monitor (TPM) indicator gives an indication to the vehicle operator of the status of the TPM system. This indicator is controlled by a transistor on the IC circuit board based upon

programming and electronic messages received by the IC from the Tire Pressure Module (TPM) (also known as the CORAX module) over the CAN data bus. The IC will illuminate the TPM indicator for about three seconds as a bulb test each time the ignition switch status transitions to ON.

The TPM indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the TPM indicator for the following reasons:

- **TPM Indicator Lamp-On Message** - Each time the IC receives an electronic **TPM indicator lamp-ON** message from the TPM, the TPM indicator will be illuminated. The indicator can be flashed ON and OFF, or illuminated solid, as dictated by the TPM message. The indicator remains illuminated until the IC receives a lamp-OFF message from the TPM, or until the ignition switch status transitions to OFF position, whichever occurs first.
- **TPM Textual Warning Message** - When the TPM detects certain monitored fault conditions, it will send electronic messages requesting the IC display a textual warning message. Each time the IC receives an electronic **textual warning request** message from the TPM, a **SERVICE TIRE PRESS. SYSTEM** textual message will appear within the electronic display unit to accompany a flashing TPM indicator or to replace the TPM **TIRE LOW PRESSURE** textual message. This message indicates that the TPM has detected a problem in one of the TPM system components.
- **TPM Low Pressure Message** - On vehicles equipped with the optional premium version of the TPM system, each time the IC receives an electronic **low pressure** message from the TPM, a **LEFT FRONT** , **RIGHT FRONT** , **LEFT REAR** or **RIGHT REAR LOW PRESSURE** textual message will appear within the IC electronic display unit to accompany a solid TPM indicator. If the vehicle is equipped with a full-sized matching spare tire and wheel assembly, an electronic **spare low pressure** message from the TPM to the IC will cause a **SPARE LOW PRESSURE** textual message to appear in the electronic display unit, but the TPM indicator will not illuminate. This message indicates that the TPM has received a low tire pressure input from the tire pressure sensor in the identified location on the vehicle. The premium TPM system is not offered in markets where rear fog lamps are an available option.
- **Communication Error** - If the IC receives no TPM lamp-ON or lamp-OFF messages from the TPM for six consecutive seconds, the TPM indicator is illuminated by the IC. The indicator remains controlled and illuminated by the IC until a valid lamp-ON or lamp-OFF message is received from the TPM.

The TPM performs a self-test each time the ignition switch status transitions to ON to decide whether the TPM system is in good operating condition and whether the tire inflation pressures are too high or too low. The TPM then sends the proper lamp-ON or lamp-OFF message to the IC. If the IC turns ON the TPM indicator after the bulb test, it indicates that the inflation pressure of a tire is too low or that a malfunction has occurred and the TPM system is ineffective.

For proper diagnosis of the TPM system, the TPM, the IC, the CAN data bus or the electronic communication related to TPM indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

MALFUNCTION INDICATOR LAMP

The Malfunction Indicator Lamp (MIL) gives an indication to the vehicle operator when the PCM has recorded a DTC for an On-Board Diagnostics II (OBDII) emissions-related circuit or component malfunction. The MIL is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the PCM over the CAN data bus. The IC will illuminate the MIL indicator for about fifteen seconds as a bulb test each time the ignition switch status transitions to ON.

The MIL LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the MIL for the following reasons:

- **MIL Lamp-On Message** - Each time the IC receives an electronic **MIL lamp-ON** message from the PCM, the indicator will be illuminated. The indicator can be flashed ON and OFF, or illuminated solid, as dictated by the PCM message. For some DTCs, if a problem does not recur, the PCM will send a lamp-OFF message automatically. Other DTCs may require that a fault be repaired and the PCM be reset before a lamp-OFF message will be sent. For more information on the PCM, and the DTC set and reset parameters. Refer to **OPERATION** .
- **Communication Error** - If the IC receives no lamp-ON or lamp-OFF messages from the PCM for 10 consecutive message cycles, the MIL is illuminated by the IC to indicate a loss of bus communication. The indicator remains controlled and illuminated by the IC until a valid message is received from the PCM.

The PCM continually monitors the fuel and emissions system circuits and sensors to decide whether the system is in good operating condition. The PCM then sends the proper lamp-ON or lamp-OFF message to the IC. If the IC turns ON the MIL after the bulb test, it may indicate that a malfunction has occurred and that the fuel and emissions systems require service.

For proper diagnosis of the fuel and emissions systems, the PCM, the IC, the CAN data bus or the electronic communication related to MIL operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

NO BUS INDICATOR

The no bus indicator gives an indication to the vehicle operator when the IC detects a loss of electronic communication over the CAN data bus. This indicator is controlled by the IC logic circuit based upon programming and electronic messages not being received over the CAN data bus from the BCM.

The no bus indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the no bus indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the no bus indicator for the following reasons:

- **No Electronic Communication Messages** - Each time the ignition switch is turned to the ON position and the IC does not receive electronic communication messages over the CAN data bus, the no bus indicator is illuminated. The indicator remains illuminated until CAN bus communication is restored or until the ignition switch status transitions to OFF, whichever occurs first.

The IC continually monitors the CAN data bus to determine the status of many sensors and systems throughout the vehicle. If the IC detects the loss of CAN bus communication it illuminates the no bus indicator to alert the vehicle operator that it cannot provide accurate displays and outputs.

For proper diagnosis of the IC, the CAN data bus or the electronic communication related to no bus indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

POSITION LAMP INDICATOR

The position lamp indicator gives an indication to the vehicle operator whenever the position lamps are illuminated. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the BCM over the CAN data bus.

The position lamp indicator LED is completely controlled by the IC logic circuit, and that logic will allow this indicator to operate whenever the IC receives a battery current input on the fused B(+) circuit. Therefore, the LED can be illuminated regardless of the ignition switch status. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the position lamp indicator for the following reasons:

- **Position Lamp Indicator Lamp-On Message** - Each time the IC receives an electronic **position lamp indicator lamp-ON** message from the BCM indicating the position lamps are turned ON, the position lamp indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the BCM, or until the exterior lamp load shedding (battery saver) timed interval expires, whichever occurs first.

The BCM continually monitors a hard wired input from the exterior lighting switch to determine the appropriate outputs to the park lamps. The BCM activates or deactivates the park lamps then sends the proper lamp-ON or lamp-OFF message to the IC to control the position lamp indicator.

For proper diagnosis of the position lamp system, the BCM, the IC, the CAN data bus or the electronic communication related to position lamp indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

REAR FOG LAMP INDICATOR

The rear fog lamp indicator gives an indication to the vehicle operator whenever the rear fog lamps are illuminated. This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received by the IC from the BCM over the CAN data bus.

The rear fog lamp indicator LED is completely controlled by the IC logic circuit, and that logic will allow this indicator to operate whenever the IC receives a battery current input on the fused B(+)

circuit. Therefore, the LED can be illuminated regardless of the ignition switch status. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the rear fog lamp indicator for the following reasons:

- **Rear Fog Indicator Lamp-On Message** - Each time the IC receives an electronic **rear fog indicator lamp-ON** message from the BCM indicating that the rear fog lamps are turned ON, the rear fog lamp indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the BCM, or until the exterior lamp load shedding (battery saver) timed interval expires, whichever occurs first.

The BCM continually monitors a hard wired input from the exterior lighting switch to determine the appropriate outputs to the rear fog lamps. The BCM activates or deactivates the rear fog lamps then sends the proper lamp-ON or lamp-OFF message to the IC to control the rear fog lamp indicator.

For proper diagnosis of the rear fog lamp system, the BCM, the IC, the CAN data bus or the electronic communication related to rear fog lamp indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

REMOTE START INDICATOR

The remote start indicator gives an indication to the vehicle operator of the remote start system status. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received over the CAN data bus from the BCM and the Radio Frequency Hub (RF Hub).

The remote start indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will allow this indicator to operate whenever the IC receives a battery current input on the fused B(+) circuit. Therefore, the remote start indications can be illuminated regardless of the ignition switch status. The IC will turn ON the remote start indicator for the following reasons:

- **Remote Start Active Messages** - Each time the IC receives an electronic **remote start active** message from the BCM, the **REMOTE START ACTIVE - PUSH START BUTTON** textual message is displayed. The message is displayed while the current remote start event remains active (about 15 minutes), until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to ON, whichever occurs first.
- **Remote Start Abort Messages** - Each time the IC receives a combination of electronic **remote start abort** and **door ajar** , **hood ajar** , **liftgate ajar** or **low fuel** messages from the BCM the **REMOTE START ABORTED** and appropriate **DOOR AJAR** , **HOOD AJAR** , **LIFTGATE AJAR** or **FUEL LOW** textual messages are displayed. The messages are displayed while the current remote start event remains active (about 15 minutes), until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to ON, whichever occurs first.
- **Remote Start Disabled Messages** - Each time the IC receives an electronic **remote start disabled** message from the BCM the **REMOTE START DISABLED - START VEHICLE TO RESET** textual message is displayed. The message is displayed while the current remote start event remains active (about 15 minutes), until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to START, whichever

occurs first.

The BCM continually monitors the remote start system inputs and the RF Hub to determine the proper outputs to the remote start components. The BCM then sends the proper lamp-ON or lamp-OFF message to the IC.

For proper diagnosis of the remote start system, the RF hub, the BCM, the IC, the CAN data bus or the electronic communication related to remote start indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

SEAT BELT INDICATOR

The seat belt indicator gives an indication to the vehicle operator of the status of the driver side front seat belt (export market vehicles) or driver and passenger front seat belts (domestic market vehicles). This indicator is controlled by a transistor on the IC circuit board based upon programming and electronic messages received over the CAN data bus from the ORC.

The seat belt indicator also includes a programmable enhanced seat belt reminder or BELTMINDER feature that is enabled when the vehicle is shipped from the factory. This BELTMINDER feature can be disabled and enabled by the customer using a specific programming event sequence, or by the dealer using a diagnostic scan tool.

The seat belt indicator LED is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the LED will always be OFF when the ignition switch status is anything except ON or START. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the seat belt indicator for the following reasons:

- **Seat Belt Reminder Function** - Each time the IC receives a battery current input on the fused ignition switch (run-start) circuit, the indicator will be illuminated as a seat belt reminder for about six seconds, or until the ignition switch status transitions to OFF, whichever occurs first. This reminder function will occur regardless of the status of the seat belt switch input to the ORC.
- **Front Seat Belt Not Buckled - Beltminder Active** - Following the seat belt reminder function, each time the IC receives an electronic **seat belt indicator lamp-On** message from the ORC while the ignition switch status is START or ON, the indicator will be illuminated. In addition, if the front seat belt remains unbuckled about 18 to 25 seconds after the conclusion of the seat belt reminder function with the vehicle speed greater than about 8 kilometers-per-hour (5 miles-per-hour), the seat belt indicator will begin to cycle between flashing ON and OFF for 3 seconds, then lighting solid for 2 seconds. The seat belt indicator will continue to cycle between flashing and solid illumination for 13 complete cycles, until the seat belt switch sense inputs to the ORC are closed circuits (seat belt switch closed = seat belt buckled), or until the ignition switch status transitions to OFF, whichever occurs first.
- **Front Seat Belt Not Buckled - Beltminder Inactive** - Following the seat belt reminder function, each time the IC receives an electronic **seat belt indicator lamp-On** message from the ORC while the ignition switch status is START or ON, the indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the ORC or until the ignition

switch status transitions to OFF, whichever occurs first.

Each seat belt switch is connected in series between source current and a sense circuit from the ORC. The ORC continually monitors the seat belt switch circuits then sends the proper lamp-on or lamp-off messages to the IC. The seat belt switch inputs to the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. For proper diagnosis of the ORC, the IC, the CAN data bus or the electronic communication related to seat belt indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

SECURITY INDICATOR

The security indicator gives an indication to the vehicle operator when the Vehicle Theft Security System (VTSS) is arming or is armed. On vehicles equipped with the Sentry Key Immobilizer System (SKIS), the security indicator also gives an indication to the vehicle operator of the status of the SKIS. This indicator is controlled by a transistor on the IC circuit board based upon a hard wired input to the IC from the BCM and electronic messages received by the BCM from the RF hub over the CAN data bus. The BCM will illuminate the security indicator for about three seconds as a bulb test each time the ignition switch status transitions to ON.

The security indicator LED is completely controlled by the BCM logic circuit, and that logic will allow this indicator to operate whenever the BCM receives a battery current input on the fused B(+) circuit. Therefore, the LED can be illuminated regardless of the ignition switch status. The LED only illuminates when it is provided a path to ground by the BCM. Depending upon the programmed condition the indicator can be illuminated solid, flashed at a slow rate (0.5 Hertz, 12.5 percent duty cycle), or flashed at a fast rate (1 Hertz, 50 percent duty cycle). The IC will turn ON the security indicator for the following reasons:

- **VTSS Indication** - During the 16 second VTSS arming function, the BCM will flash the security indicator ON and OFF repeatedly at a steady, fast rate to indicate that the VTSS is in the process of arming. Following successful VTSS arming, the BCM flashes the security indicator ON and OFF continuously at a slower rate to indicate that the VTSS is armed. The security indicator continues flashing at the slower rate until the VTSS is disarmed or triggered. If the VTSS has alarmed and rearmed, the BCM will flash the security indicator at a steady, slow rate for about 30 seconds after the VTSS is disarmed.
- **SKIS Indicator Lamp-On Message** - Each time the BCM receives an electronic **SKIS indicator lamp-ON** message from the RF hub, the security indicator will be illuminated. The indicator can be flashed ON and OFF, or illuminated solid, as dictated by the RF hub message. The indicator remains illuminated solid or continues to flash until the BCM receives a lamp-OFF message from the RF hub, or until the ignition switch status transitions to OFF, whichever occurs first. For more information on the SKIS and the security indicator control parameters. Refer to **OPERATION** .
- **SKIS Textual Message** - When the RF hub detects certain monitored conditions or is placed in the programming mode it will send electronic messages requesting the IC display textual messages, and the appropriate textual message or combination of messages is illuminated in the electronic display unit. **PROGRAMMING ACTIVE** , **NEW KEY PROGRAMMED** , **REMOTE KEY BATTERY LOW** and **SERVICE SECURITY KEY** messages appear individually, while a **KEY NOT PROGRAMMED** message is followed by either a **DAMAGED KEY** , **INVALID KEY** or

EXCEEDED KEY PROGRAM LIMIT message and an **INVALID KEY** message is followed by a **TRY ALTERNATE KEY** message. The textual messages related to key programming are active only on vehicles sold in markets where customer programming is an available feature of the SKIS.

- **Communication Error** - If the BCM receives no lamp-ON or lamp-OFF messages from the RF hub for 10 consecutive message cycles, the security indicator is illuminated by the BCM. The indicator remains controlled and illuminated by the BCM until a valid lamp-ON or lamp-OFF message is received from the RF hub.

The BCM circuitry controls the security indicator whenever the ignition switch status is OFF and the VTSS is arming, armed, or alarming. Whenever the ignition switch status is ON or START, RF hub performs a self-test to decide whether the SKIS is in good operating condition and whether a valid key is present within the vehicle. The RF hub then sends the proper lamp-ON or lamp-OFF message to the BCM. If the BCM flashes the security indicator when the ignition switch transitions to ON, or turns ON the security indicator solid after the bulb test, it indicates that a SKIS malfunction has occurred or that the SKIS is ineffective.

For proper diagnosis of the VTSS, the SKIS, the BCM, the RF hub, the IC, the CAN data bus or the electronic communication related to security indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

SERVICE COLUMN LOCK INDICATOR

The service column lock indicator gives an indication to the vehicle operator when the RF hub has recorded a DTC for a steering column shaft lock module circuit or component malfunction. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received by the IC from the RF hub over the CAN data bus.

The service column lock indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the service column lock indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the service column lock indicator for the following reasons:

- **Service Column Lock Indicator Lamp-On Message** - Each time the IC receives an electronic **service column lock indicator lamp-ON** message from the RF hub, the service column lock indicator will be illuminated. The indicator remains illuminated for about five seconds, until the IC receives a lamp-OFF message from the RF hub, until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to OFF, whichever occurs first.

The RF hub continually monitors the steering column shaft lock module circuits and components to determine the condition of the system. The RF hub then sends the proper lamp-ON or lamp-OFF message to the IC.

For proper diagnosis of the shaft lock module, the RF hub, the IC, the CAN data bus or the electronic communication related to service column lock indicator operation a diagnostic scan tool is required.

Refer to the appropriate diagnostic information.

TRACTION CONTROL INDICATOR

The traction control indicator gives an indication to the vehicle operator when the Electronic Stability Control (ESC) / Traction Control System (TCS) has been activated. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received by the IC from the CAB over the CAN data bus. The IC will illuminate the traction control indicator for about four seconds as a bulb test each time the ignition switch status transitions to ON.

The traction control indicator is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the indicator will always be OFF when the ignition switch status is anything except ON or START. The indicator only illuminates when it is provided a path to ground by the IC circuitry. The IC will turn ON the traction control indicator for the following reasons:

- **Traction Control Indicator Lamp-On Message** - Each time the IC receives an electronic **traction control indicator lamp-ON** message from the CAB indicating that the ESC/TCS has been activated, the traction control indicator will be illuminated. The indicator can be flashed ON and OFF, or illuminated solid, as dictated by the CAB message. The indicator remains illuminated solid or continues to flash until the IC receives a lamp-OFF message from the CAB, or until the ignition switch status transitions to OFF, whichever occurs first.

The CAB continually monitors the traction control switch to determine the proper outputs to the components of the Antilock Brake System (ABS). The CAB then sends the proper lamp-ON or lamp-OFF message to the IC.

For proper diagnosis of the traction control switch, the ESC/TCS, the CAB, the IC, the CAN data bus or the electronic communication related to traction control indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

TRANSMISSION TEMPERATURE INDICATOR

The transmission over-temperature indicator gives an indication to the vehicle operator when the transmission fluid temperature is excessive, which may lead to accelerated transmission component wear or failure. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received over the CAN data bus from the TCM.

The transmission over-temperature indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the transmission over-temperature indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the transmission over-temperature indicator for the following reasons:

- **Trans Over-Temp Indicator Lamp-On Message** - Each time the IC receives an electronic **trans over-temp indicator lamp-ON** message from the TCM indicating that the fluid temperature is too high, the transmission over-temperature indicator will be illuminated and a

single chime tone is sounded. The indicator remains illuminated for about five seconds, until the IC receives a lamp-OFF message from the TCM, until the IC arbitrator logic determines that another display request has priority, or until the ignition switch status transitions to OFF, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the indicator is cycled OFF and then ON again by the appropriate lamp-ON and lamp-OFF messages from the TCM.

The TCM continually monitors the transmission temperature sensor to determine the transmission operating condition. The TCM then sends the proper lamp-ON or lamp-OFF message to the IC. If the IC illuminates the transmission over-temperature indicator due to a high transmission oil temperature condition, it may indicate that the transmission or the transmission cooling system are being overloaded or that they require service.

For proper diagnosis of the transmission temperature sensor, the TCM, the IC, the CAN data bus or the electronic communication related to transmission over-temperature indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

TURN SIGNAL INDICATORS

The turn signal indicators give an indication to the vehicle operator that the turn signal (left or right indicator flashing) or hazard warning (both left and right indicators flashing) have been selected and are operating. These indicators are controlled by transistors on the IC cluster electronic circuit board based upon cluster programming and electronic messages received from the BCM over the CAN data bus.

Each turn signal indicator Light Emitting Diode (LED) unit is completely controlled by the IC logic circuit, and that logic will allow this indicator to operate whenever the IC receives a battery current input on the fused B(+) circuit. Therefore, each LED can be illuminated regardless of the ignition switch status. The LED only illuminates when it is provided a path to ground by the IC transistor. The IC will turn ON the turn signal indicators for the following reasons:

- **Turn Signal Indicator Lamp-On Message** - Each time the IC receives an electronic **right** or **left turn signal indicator lamp-On** message from the BCM over the CAN data bus, the appropriate turn signal indicator will be flashed on and off. The BCM messages to the IC also control the flash rate of the turn signal indicators, as well as the click rate of an electromechanical relay soldered onto the IC electronic circuit board that emulates the sound emitted by a conventional turn signal flasher. The turn signal indicators continue to flash on and off until the IC receives a lamp-OFF message from the BCM, or until the ignition switch status transitions to OFF, whichever occurs first.
- **Hazard Warning Indicator Lamp-On Message** - Each time the IC receives an electronic **hazard warning indicator lamp-On** message from the BCM over the CAN data bus, both turn signal indicators will be flashed on and off. The BCM messages to the IC also control the flash rate of the turn signal indicators, as well as the click rate of an electromechanical relay soldered onto the IC electronic circuit board that emulates the sound emitted by a conventional hazard warning flasher. The turn signal indicators continue to flash on and off until the IC receives a lamp-OFF message from the BCM.
- **Turn Signal-On Textual Warning Message** - When the BCM detects that a turn signal has

been active continuously for 1.6 kilometers (1 mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per hour) a **TURN SIGNAL ON** textual message and flashing right or left turn signal icon will appear within the IC electronic display unit and a chime tone will be sounded.

- **Lamp Out Mode** - If the BCM detects an ineffective turn signal lamp or circuit, it increases the flash rate for the remaining operative turn signals and sends an electronic message to the IC. The IC then increases the flash rate of the turn signal indicators and the click rate of the electromechanical relay to provide an indication of the problem to the vehicle operator.

The IC continually monitors electronic messages from the BCM to determine the proper turn signal and hazard warning indicator operation.

For proper diagnosis of the turn signal and hazard warning system, the multi-function switch, the BCM, the IC, the CAN data bus or the electronic communication related to turn signal indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

WAIT-TO-START INDICATOR

The wait-to-start indicator gives an indication to the vehicle operator when the diesel engine is too cool for efficient and reliable engine starting, and the engine glow plugs are energized in their preheat operating mode. This indicator is controlled by the IC logic circuit board based upon programming and electronic messages received by the IC from the PCM over the CAN data bus.

The wait-to-start indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the indicator will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the wait-to-start indicator for the following reasons:

- **Wait-To-Start Indicator Lamp-On Message** - Each time the IC receives an electronic **wait-to-start indicator lamp-ON** message from the PCM indicating that the air temperature is too cool for efficient and reliable engine starting and the glow plugs are energized in their preheat mode, the wait-to-start indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the PCM, until the PCM detects that the engine is running, or until the ignition switch status transitions to OFF, whichever occurs first.

The PCM continually monitors the glow plug control circuits to determine when they are energized in their preheat operating mode. The PCM then sends the proper lamp-ON or lamp-OFF message to the IC. For proper diagnosis of the wait-to-start indicator, the PCM, the IC, the CAN data bus or the electronic communication related to wait-to-start indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

WASHER FLUID INDICATOR

The washer fluid indicator gives an indication to the vehicle operator that the fluid level in the washer reservoir is low. This indicator is controlled by the IC logic circuit based upon programming and electronic messages received from the BCM over the CAN data bus.

The washer fluid indicator function of the electronic display unit is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the washer fluid indication will always be OFF when the ignition switch status is anything except ON or START. The IC will turn ON the washer fluid indicator for the following reasons:

- **Washer Fluid Indicator Lamp-On Message** - Each time the IC receives an electronic **washer fluid indicator lamp-ON** message from the BCM indicating that a low washer fluid condition has been detected for 60 consecutive seconds, the washer fluid indicator is illuminated and a single chime tone is sounded. The indicator remains illuminated until the IC receives lamp-OFF messages for 60 consecutive seconds from the BCM, or until the ignition switch status transitions to OFF, whichever occurs first. The chime tone feature will only repeat during the same ignition cycle if the washer fluid indicator is cycled OFF and then ON again by the appropriate lamp-ON and lamp-OFF messages from the BCM.

The BCM continually monitors the washer fluid level switch in the washer reservoir to determine the level of the washer fluid. The BCM then sends the proper lamp-ON or lamp-OFF message to the IC.

For proper diagnosis of the washer fluid level switch, the BCM, the IC, the CAN data bus or the electronic communication related to washer fluid indicator operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

WATER-IN-FUEL INDICATOR

The water-in-fuel indicator gives an indication to the vehicle operator when there is excessive water in the fuel system. This indicator is controlled by the IC based upon programming and electronic messages received from the PCM over the Controller Area Network (CAN) data bus.

The water-in-fuel indicator is completely controlled by the IC logic circuit, and that logic will only allow this indicator to operate when the IC receives a battery current input on the fused ignition output (run-start) circuit. Therefore, the indicator will always be OFF when the ignition switch status is anything except ON or START. The icon only illuminates when it is provided a path to ground by the IC transistor. Each time the ignition switch status transitions to ON the water-in-fuel indicator is illuminated for about two seconds as a bulb test. The water-in-fuel indicator will be turned ON for the following reasons:

- **Water-In-Fuel Indicator Lamp-On Message** - Each time the IC receives an electronic **water-in-fuel lamp-ON** message from the PCM indicating that there is excessive water in the diesel fuel system, the water-in-fuel indicator will be illuminated. The indicator remains illuminated until the IC receives a lamp-OFF message from the PCM, or until the ignition switch status transitions to OFF, whichever occurs first.

The PCM continually monitors the water-in-fuel sensor to determine whether there is excessive water in the diesel fuel system. The PCM then sends the proper lamp-ON or lamp-OFF message to the IC. For proper diagnosis of the water-in-fuel operation a diagnostic scan tool is required. Refer to the appropriate diagnostic information.

POD, SWITCH BANK

DESCRIPTION

DESCRIPTION

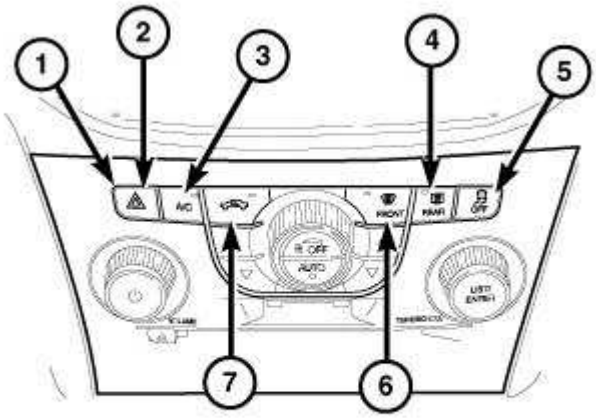


Fig. 12: Accessory Switch Bank Module (ASBM), Hazard Warning/A/C On/Off Switch, Stability Control
Courtesy of CHRYSLER GROUP, LLC

The Accessory Switch Bank Module (ASBM) (1) for this vehicle is located in the center stack area of the instrument panel. The accessory switch back, the a/c and heater controls, and the radio hard controls are a complete unit and only serviced as such. This switches vary from a single momentary push button switch, to momentary push button switches; depending on the equipment or systems they support. The unit includes the following switches:

- **Hazard Warning Switch (2)**
- **A/C On/Off switch (3)**
- **Rear Defroster On/Off switch (4)**
- **Electronic Stability Control Off (5)**
- **Windshield defroster On/Off switch (6)**

The switch housing and the push buttons are constructed of molded plastic. Each push button has a smooth finish and is clearly identified with the appropriate text and International Control and Display Symbol icons. Several of the push buttons feature Light Emitting Diode (LED) units to give the vehicle operator an indication when the function of that switch is currently active.

Panel lamps dimmer controlled illumination lamps integral to the circuit board within the switch provide back lighting for visibility at night, but these lamps are not serviceable. The individual switches in the switch bank cannot be repaired and are not serviced individually. If any component

within the switch bank is ineffective or damaged, the complete assembly must be replaced.

OPERATION

OPERATION

For information covering details of operation for the individual switches or indicator contained within the instrument panel switch bank, refer to the specific service information covering the system to which that switch or indicator belongs.

- **Air Conditioning control Switches** (all models) - Refer to **CONTROL, A/C AND HEATER, DESCRIPTION** .
- **Front and Rear Defroster Control switches** (all models) - Refer to **CONTROL, A/C AND HEATER, DESCRIPTION** .
- **Electronic Stability Control (ESC) On/Off** - Refer to **DESCRIPTION** .
- **Hazard Switch** (all models) - Refer to **SWITCH, HAZARD WARNING, DESCRIPTION** .

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

SWITCH-BANK AND BEZEL ASSEMBLY

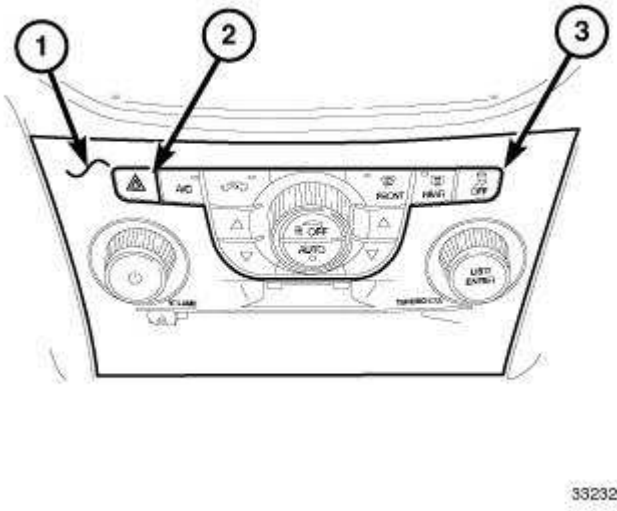


Fig. 13: Guide Pins & Switch-Bank Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.

CAUTION: Use care when removing or installing the cubby bin, not to damage or distort the guide pins (4) on either side.

2. Using a trim stick, pry the switch-bank panel (1) away from the IP, and release the clips that secure the switch-bank to the IP.

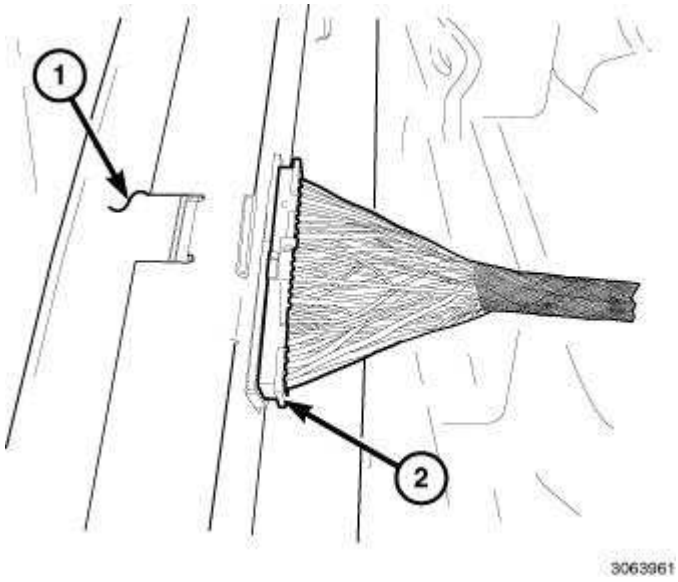


Fig. 14: Switch-Bank Panel & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (2) from the back of the switch-bank assembly (1). Refer to **MODULE, INTEGRATED CENTER STACK SCREEN, REMOVAL** .
4. Remove the switch-bank assembly from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

SWITCH-BANK AND BEZEL ASSEMBLY

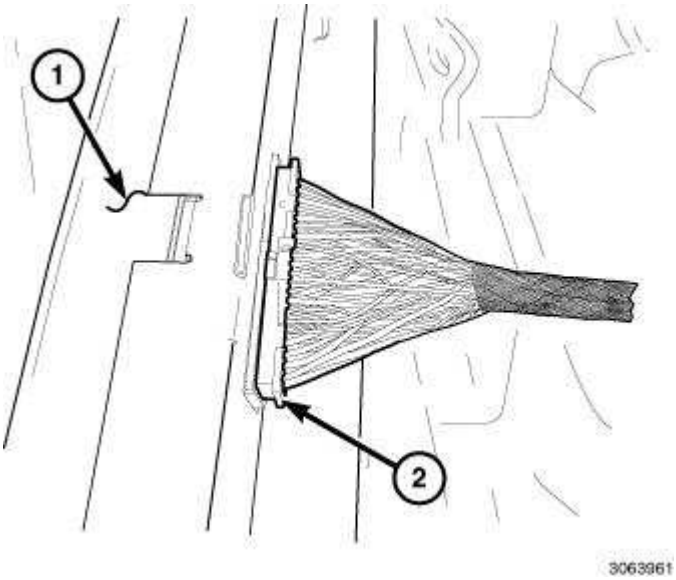


Fig. 15: Switch-Bank Panel & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the switch-bank assembly in place.
2. Connect the electrical connector (2) to the back of the switch-bank assembly (1).

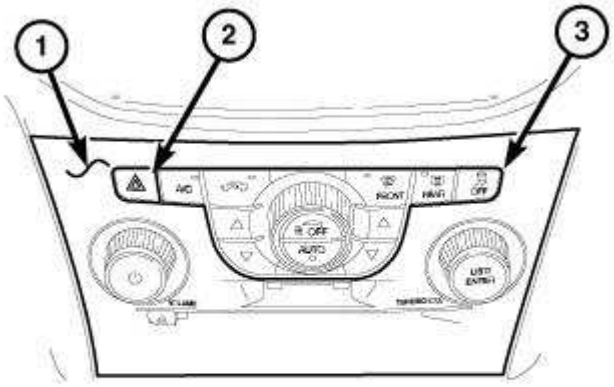


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Fig. 16: Guide Pins & Switch-Bank Panel
Courtesy of CHRYSLER GROUP, LLC

3. Position the switch-bank panel (1) in the IP and press firmly to engage the clips, securing the switch-bank to the IP.
4. Connect the negative battery cable.

ACCESSORIES AND EQUIPMENT

Lamps/Lighting - Interior - Service Information - Chrysler 300

WARNING

WARNING

WARNING: To avoid serious or fatal injury, eye protection should be used when servicing any glass components.

CAUTION: Do not use bulbs with higher candle power than indicated in the Bulb Application table. Refer to SPECIFICATIONS. In addition, do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owner's Manual. Damage to lamps, lenses, wiring and other related electrical components can result.

DESCRIPTION

DESCRIPTION

The interior lighting system for this vehicle includes both incandescent and Light Emitting Diode (LED) unit lighting on several separate circuits. The lamps in the interior lighting system include:

- **Center Floor Console Cup Holder Lamps** - The cup holders in the center floor console include a standard equipment light pipe around their inside perimeter illuminated by LED lamp units to assist visibility at night. These lamps are controlled by the panel lamps dimmer circuit and illuminate whenever the exterior lighting is turned ON.
- **Center Floor Console Forward Storage Bin Lamp** - The forward storage bin in the center floor console on some models is illuminated by an LED lamp unit located in the overhead console to assist visibility at night. This lamp is controlled by the exterior lighting circuit and illuminates whenever the exterior lighting is turned ON.
- **Center Floor Console Universal Serial Bus Connector Lamp** - The Universal Serial Bus (USB) connector in the center floor console on some models includes an LED lamp unit to assist visibility at night. This lamp is controlled by the courtesy lamp circuit and illuminates whenever the interior courtesy lamps are turned ON.
- **Door Entry And Exit Lamps** - Door entry and exit lamps (also known as puddle lamps) on some models include an incandescent lamp unit on the underside of each door trim panel that illuminate the ground outside the opened doors to assist visibility at night. These lamps are controlled by the courtesy lamps circuit and illuminate whenever the interior courtesy lamps are turned ON.
- **Door Inside Handle Lamps** - Door inside latch release handle pockets on models with the ambient lighting package include an LED lamp unit to assist visibility at night. These lamps are controlled by both the ambient lamps dimmer circuit and the courtesy lamps circuit. These lamps are illuminated whenever the ambient lighting or the courtesy lighting is turned ON, and

are dimmable only when the ambient lighting is turned ON while the exterior lighting is also turned ON.

- **Door Map Pocket Lamps** - Door trim panel map pockets on models with the ambient lighting package include an LED lamp unit to assist visibility at night. These lamps are controlled by both the ambient lamps dimmer circuit and the courtesy lamps circuit. These lamps are illuminated whenever the ambient lighting or the courtesy lighting is turned ON, and are dimmable only when the ambient lighting is turned ON while the exterior lighting is also turned ON.
- **Front Dome Lamps** - Front seat driver side and passenger side incandescent dome lamps are located behind a lens shared with the LED map/reading lamps in the overhead console. The dome lamps are controlled by the courtesy lamp circuit and by independent lens-actuated switches.
- **Front Map/Reading Lamps** - Front seat driver side and passenger side LED map/reading lamps are located behind a lens shared with the incandescent dome lamps in the overhead console. The map/reading lamps are controlled by the courtesy lamp circuit and by independent push button switches in the overhead console.
- **Glove Box Lamp** - A standard glove box lamp with an integral plunger-actuated switch is located at the upper outboard corner of the instrument panel lower glove box opening and illuminates whenever the glove box door is opened.
- **Instrument Panel Courtesy Lamps** - Vehicles equipped with the optional instrument panel courtesy lamps have two LED lamp units mounted to the closeout panel located under each side of the instrument panel. These lamps are controlled by the courtesy lamps circuit and illuminate whenever the interior courtesy lamps are turned ON.
- **Rear Map/Reading Lamps** - Optional rear seat incandescent map/reading lamps are located behind a lens integral to the grab handle unit located on each roof side rail above the rear door openings. The map/reading lamps are controlled by the courtesy lamp circuit and by independent lens-actuated switches.
- **Trunk Lamps** - Standard trunk lamps are located in the right and left trunk trim panels and are activated automatically whenever the deck lid is opened to illuminate the trunk of the vehicle.
- **Vanity Lamps** - Optional single-intensity vanity lamps are located on both sides of a covered mirror on both the right and left sun visors. These lamps are controlled by an integral vanity mirror cover-actuated switch.

Most controls on the instrument panel and elsewhere in the interior of the vehicle are illuminated by the panel lamps dimmer circuit for night visibility. All have miniature incandescent bulbs, Light-Emitting Diode (LED) units or a combination of the two lighting types that are soldered to internal circuit boards and are not serviceable.

Other components of the interior lighting system for this vehicle include:

- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located beneath the instrument panel on the passenger side of the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Deck Lid Ajar Switch** - A deck lid ajar switch is integral to the latch mechanism of the deck lid.
- **Dimmer Module** - A dimmer module is located on the left side of the instrument panel, below

and outboard of the steering column just inboard from the headlamp switch. The dimmer module features a vertical thumbwheel for selecting the panel lamps dimming level, a PARADE mode to illuminate all Vacuum Fluorescent Display (VFD) units at full brightness for visibility when driving in daylight with the exterior lighting turned ON. There are also detent positions to turn ON all interior courtesy lighting, and a DEFEAT position that overrides door ajar switch control of interior lighting. On vehicles equipped with the ambient lighting option the dimmer module includes a second thumbwheel dedicated to the ambient lighting, which allows the selection of the ambient lighting dimming level while the exterior lighting is turned ON and includes a detent position that turns the ambient lighting OFF.

- **Door Ajar Switches** - A door ajar switch is integral to the door latch mechanism of each front and rear door.
- **Door Module** - An electronic door control module (also known as the Driver Door Module/DDM or Passenger Door Module/PDM) is concealed behind the front door trim panel where it is secured through two integral mounting tabs to the inner door panel. Refer to **MODULE, DOOR, DESCRIPTION** .
- **Trunk Ajar Switch** - A trunk ajar switch is integral to the deck lid latch mechanism.

Hard wired circuitry connects the interior lighting system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the interior lighting components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

The lamps of the interior lighting system can be divided into general classifications based upon the circuit that controls their operation: The courtesy lamp circuit, the reading lamps circuit and the panel lamps dimmer circuit. In vehicles equipped with the optional ambient lighting package, the ambient lights are actually controlled by the courtesy lamp circuit as well as by dedicated ambient lighting outputs based upon an input from the ambient lighting thumbwheel of the dimmer module. Following are paragraphs that briefly describe the operation of the courtesy lamps, reading lamps and panel lamps dimmer interior lighting circuits.

The lamps and the hard wired circuits between components related to the interior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the interior lighting system or the electronic controls or communication between modules and other devices that

provide some features of the interior lighting system. The most reliable, efficient, and accurate means to diagnose the interior lighting system or the electronic controls and communication related to interior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

COURTESY LAMP CIRCUIT

Depending upon the selected vehicle options, the courtesy lamp circuit may include either the dome or map and reading lamps located in the overhead console near the windshield, the map and reading lamp integral to the grab handle above each rear door opening, the trunk lamp located in the left trunk trim panel, the glove box lamp in the top of the glove box opening in the instrument panel and the vanity lamps located in the sun visors.

The lamps in the courtesy lamp circuit are provided with a path to ground at all times. The Body Control Module (BCM) (also known as the Common Body Controller/CBC) controls the output of battery voltage for the courtesy lamps in this circuit based upon hard wired inputs from the dimmer module and electronic message inputs from the ignition switch (also known as the Keyless Ignition Node/KIN) and the Radio Frequency (RF) Hub.

After all of the ajar switch inputs to the BCM transition to open, the BCM will keep the courtesy lamps illuminated for about 30 seconds, then fade the lamps to OFF (theater dimming) over about 3 seconds. The BCM also provides courtesy lamp operation based upon a resistor multiplexed input from the interior lighting thumbwheel of the dimmer module, and provides an Illuminated Entry feature in response to certain electronic **ignition switch status** message inputs received from the KIN, the RF Hub and the Occupant Restraint Controller (ORC) over the CAN data bus. A courtesy lamp DEFEAT mode input based upon a resistor multiplexed input from the interior lighting thumbwheel of the dimmer module thumbwheel will cause the BCM to override normal courtesy lamp operation.

The BCM provides a battery saver (load shedding) feature for all courtesy lamps, which will automatically turn these lamps OFF if they are left ON for more than about 10 minutes after the electronic **ignition switch status** message transitions to OFF. If any courtesy lamp input is received subsequent to a 10 minute load shed and prior to a new ignition cycle, the courtesy lamps will turn OFF after 90 seconds.

AMBIENT LIGHTING

Vehicles equipped with the ambient lighting option have a second, dedicated ambient lighting thumbwheel located in the dimmer module. This thumbwheel controls the Light Emitting Diode (LED) units in the inside door latch release handle pockets and the door map pockets. The ambient lighting can be turned ON at full brightness or OFF using the ambient lighting thumbwheel. When the exterior lighting is turned ON, the ambient lighting can be dimmed using the ambient lighting thumbwheel. The ambient lighting is also controlled by the courtesy lamp circuit and will be turned ON at full brightness whenever the other courtesy lamps are turned ON, regardless of the ambient lighting thumbwheel setting.

The ambient lighting thumbwheel provides a resistor multiplexed input to the BCM. The BCM controls the front door ambient lighting using electronic messages sent to the door modules (also known as the Driver Door Module/DDM and Passenger Door Module/PDM) over the CAN data bus. The door

modules then regulate the voltage output to the front door ambient lighting LED units accordingly. The BCM provides direct hard wired outputs to control the rear door ambient lighting LED units.

READING LAMP CIRCUIT

For those lamps on the courtesy lamp circuit with independent switching such as the map and reading lamps, the optional vanity lamps and the glove box lamp, the BCM also provides a battery voltage output to those switches through a separate reading lamp circuit. The BCM provides a battery saver (load shedding) feature for the reading lamp circuit as well as the courtesy lamp circuit, which will automatically turn these lamps OFF if they are left ON for more than about 10 minutes after the electronic **ignition switch status** message transitions to OFF. If any reading lamp input is received subsequent to a 10 minute load shed and prior to a new ignition cycle, the courtesy lamps will turn OFF after 90 seconds.

PANEL LAMPS DIMMER CIRCUIT

The panel lamps dimmer circuit actually includes several circuits. These circuits control the back lighting illumination and dimming level of the headlamp switch, the dimmer module, the automatic transmission gear selector bezel lamp as well as the center floor console cup holder lamps. All lamps in the panel lamps dimmer circuits are provided a path to ground at all times through a hard wired ground circuit. These lamps are illuminated by a 12-volt Pulse Width Modulated (PWM) output of the BCM or the door control modules (also known as the Driver Door Module/DDM or Passenger Door Module/PDM) through several panel lamps dimmer circuits.

This shared PWM output synchronizes the selected illumination intensity level of all the lamps in the panel lamps dimmer circuits. The BCM uses hard wired resistor multiplexed inputs from the rotary exterior lighting control knob of the headlamp switch to determine when the exterior lighting is turned ON and from the thumbwheel of the dimmer module to determine the dimming level selection. Then the BCM provides the appropriate PWM outputs through the panel lamps dimmer circuits as well as electronic **dimming level** messages over the CAN data bus to other electronic modules in the vehicle.

The Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and the Integrated Center Stack (ICS) use the electronic **dimming level** messages to control the illumination intensity of their own back lighting, controls and display units. In addition, when the interior lighting thumbwheel of the dimmer module is moved to the PARADE (or funeral) mode detent position, all of the electronic display units are illuminated at their full intensity levels for increased visibility when the vehicle is driven during daylight hours with the exterior lighting turned ON. The PARADE mode has no effect on the illumination intensity of incandescent panel lamps.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTERIOR LIGHTING

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or

instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: When diagnosing the interior lighting circuits, remember that high generator output can burn out bulbs rapidly and repeatedly; and, that dim or flickering bulbs can be caused by low generator output or poor battery condition. If one of these symptoms is a problem on the vehicle, be certain to diagnose the battery and charging system, then repair as necessary.

NOTE: A good ground is necessary for proper lighting operation. If a lighting problem is being diagnosed that involves multiple symptoms, systems, or components, the problem can often be traced to a loose, corroded, or open ground.

The hard wired circuits between components related to the operation of the interior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the interior lighting system or the electronic controls or communication between modules and other devices that provide some features of the interior lighting system. The most reliable, efficient, and accurate means to diagnose the interior lighting system or the electronic controls and communication related to interior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ACRONYMS USED IN THE FOLLOWING SERVICE INFORMATION	
Body Control Module	BCM
Light-Emitting Diode	LED

COURTESY AND READING LAMP CIRCUITS

CONDITION	POSSIBLE CAUSES	CORRECTION
A SINGLE LAMP IN THE COURTESY LAMP CIRCUIT DOES NOT ILLUMINATE	1. Ineffective or missing bulb (except LED lamps).	1. Test and replace the courtesy lamp bulb if required.
	2. Ineffective lamp switch.	2. Test and replace a dome lamp switch, dome/reading lamp switch, glove box lamp switch or vanity lamp switch if required.
	3. Ineffective ground circuit.	3. Test and repair the open ground circuit if required.
	4. Ineffective feed circuit.	4. Test and repair the open feed

		circuit if required.
ALL LAMPS IN THE COURTESY LAMP CIRCUIT DO NOT ILLUMINATE	1. Courtesy DEFEAT feature turned ON.	1. Turn courtesy DEFEAT feature OFF.
	2. Ineffective ground circuit.	2. Test and repair the open ground circuit if required.
	3. Ineffective or missing fuse.	3. Test and replace the fuse if required.
	4. Ineffective courtesy lamp control circuit.	4. Test and repair the courtesy lamp control circuit if required.
	5. Ineffective dimmer module.	5. Test and replace the dimmer module if required.
	6. Ineffective BCM inputs or outputs.	6. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.
A SINGLE LAMP IN THE COURTESY LAMP CIRCUIT DOES NOT EXTINGUISH	1. Ineffective lamp switch.	1. Test and replace a dome/reading lamp switch, glove box lamp switch or vanity lamp switch if required.
ALL LAMPS IN THE COURTESY LAMP CIRCUIT DO NOT EXTINGUISH	1. Ineffective ajar switch.	1. Test and replace a door ajar or liftgate ajar switch if required.
	2. Ineffective ajar switch sense circuit.	2. Test and repair the shorted ajar switch sense circuit if required.
	3. Ineffective dimmer module.	3. Test and replace the dimmer module if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.

PANEL LAMPS DIMMER CIRCUIT

NOTE: **As part of the exterior lighting failsafe feature, upon ignition ON all of the panel lamps dimmer circuit lamps will illuminate at full intensity and the exterior park lamps and headlamp low beams will illuminate regardless of the multi-function switch control knob and stalk positions if the Steering Control Module (SCM) cannot detect an input from the multi-function switch, or if there is a loss of data bus communication.**

CONDITION	POSSIBLE CAUSES	CORRECTION
A SINGLE LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb or Light Emitting Diode (LED) unit.	1. Test and replace the lamp bulb or LED unit if required.
	2. Ineffective ground circuit.	2. Test and repair the open lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair the open lamp feed circuit if required.

A SINGLE LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair the shorted lamp feed circuit if required.
ALL LAMPS DO NOT ILLUMINATE	1. Ineffective ground circuit.	1. Test and repair the open lamp ground circuit if required.
	2. Ineffective feed circuit.	2. Test and repair the open lamp feed circuit if required.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.
ALL LAMPS ILLUMINATE AT FULL INTENSITY AT IGNITION ON	1. Ineffective dimmer module.	1. Test and replace the dimmer module if required.
	2. Ineffective IC inputs or outputs.	2. Use a diagnostic scan tool and the appropriate diagnostic information for further IC diagnosis.
	3. Loss of data bus communication.	3. Use a diagnostic scan tool to test the data bus. Refer to the appropriate diagnostic information.

SPECIFICATIONS

SPECIFICATIONS

BULB APPLICATION

BULB APPLICATION TABLE

LAMP	BULB
AMBIENT LIGHTING (DOOR INSIDE LATCH RELEASE HANDLE POCKETS AND MAP POCKETS)	LIGHT EMITTING DIODES (LED) SERVICED IN DOOR TRIM PANEL ASSEMBLY
DOOR ENTRY AND EXIT	567
FRONT DOME	MOPAR® 68090625AA
FRONT MAP/READING	LIGHT EMITTING DIODES (LED) SERVICED IN OVERHEAD CONSOLE ASSEMBLY
GLOVE BOX LAMP	194
REAR DOME/READING	MOPAR® 68090625AA
GEAR SELECTOR BEZEL	JKLE14140
TRUNK	567
UNDER INSTRUMENT PANEL COURTESY LAMPS	LIGHT EMITTING DIODES (LED) SERVICED IN INSTRUMENT PANEL CLOSE OUT PANEL ASSEMBLIES
VANITY LAMP	MOPAR® 06501966

PANEL LAMPS

NOTE: **All illuminated controls on the instrument panel and elsewhere in the interior of the vehicle have either miniature incandescent bulbs or Light-Emitting Diode (LED) units that are soldered to internal circuit boards and are not serviceable.**

LAMP, COURTESY, CUPHOLDER

REMOVAL

REMOVAL

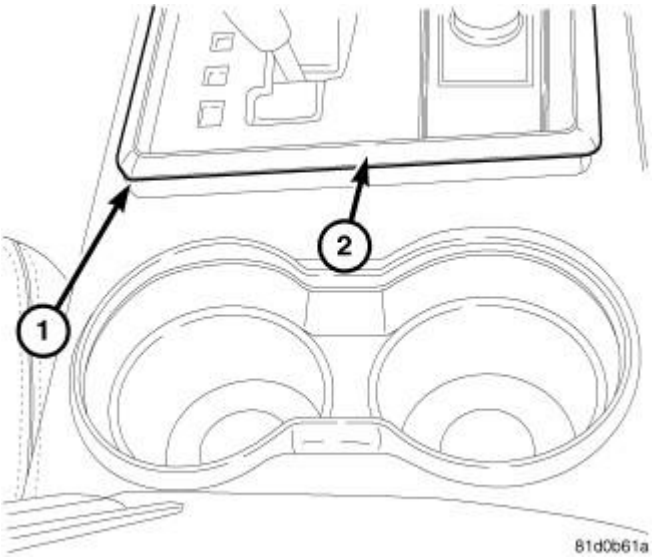

Fig. 1: Identifying Shifter Trim Ring
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the battery negative cable.
2. Place the shifter into the neutral position.
3. Insert a trim stick or equivalent at (1) and gently pry to remove the shifter trim ring (2).

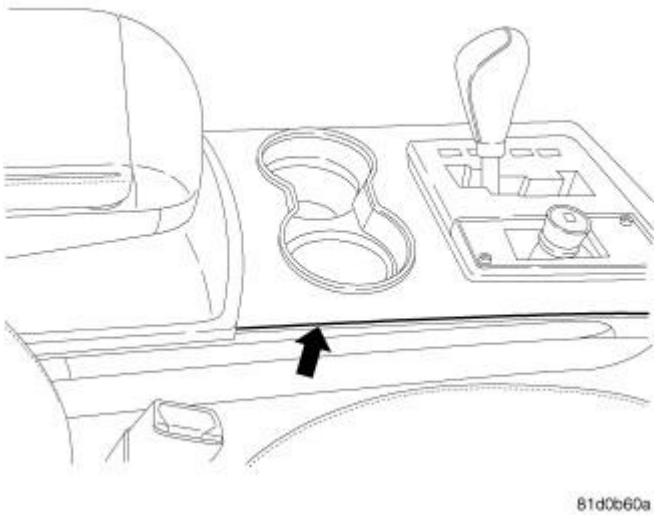

Fig. 2: Identifying Shifter Trim Ring
Courtesy of CHRYSLER GROUP, LLC

4. Insert a trim stick or equivalent at point (1) and gently pry to remove console trim from the center console.

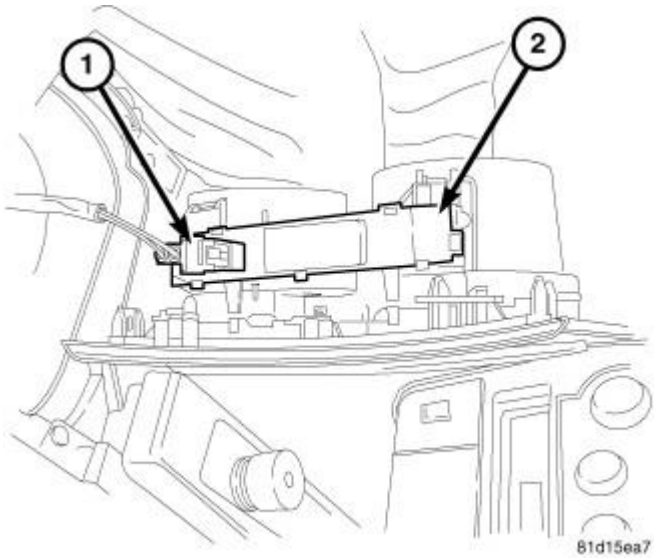

Fig. 3: Identifying Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the electrical connector (1) from the LED lamp unit (2).
6. Remove the LED lamp (2) from the center console by flexing the lock tabs on the unit.

INSTALLATION

INSTALLATION

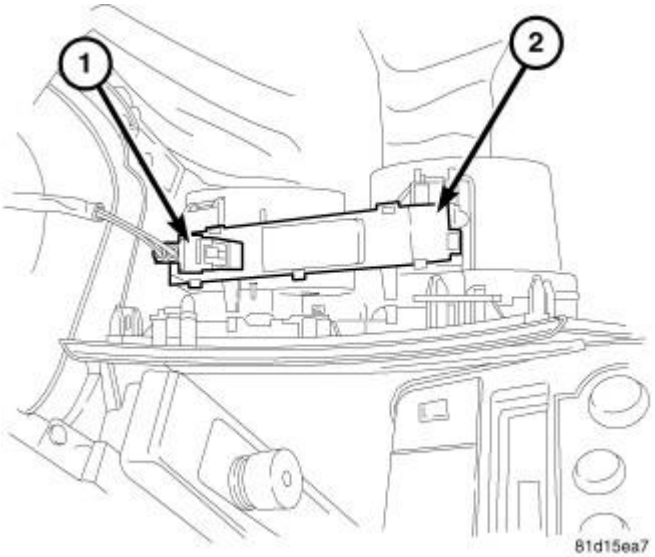

Fig. 4: Identifying Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

1. Install the LED lamp (2) into the center console trim by flexing the lock tabs.
2. Connect the electrical connector (1) to the lamp unit.

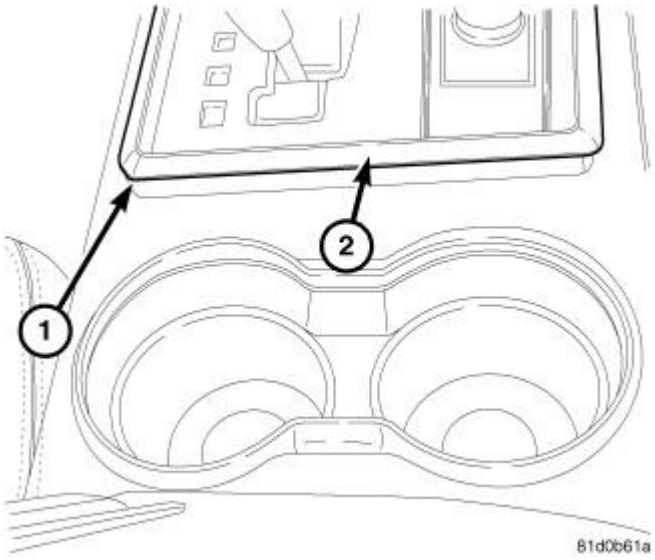

Fig. 5: Identifying Shifter Trim Ring
Courtesy of CHRYSLER GROUP, LLC

3. Install the console trim (1) to the center console.
4. Install the shifter trim ring (2) to the console
5. Connect the negative battery cable.

LAMP, DOME

REMOVAL

BULB - FRONT

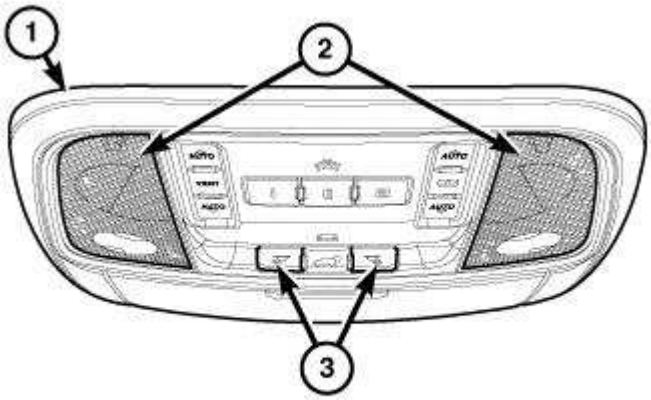

Fig. 6: Overhead Console, Lenses & Switches
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front dome and the front map/reading lamps are integral to the overhead console (1) in the headliner near the windshield. Both the incandescent dome lamps and the Light Emitting Diode (LED) map/reading lamps share the same two lenses (2) in the overhead console. Both the dome lamps and the map/reading lamps are turned ON and OFF by the door ajar switches or by the interior lighting thumbwheel of the headlamp switch. The front dome lamps can be turned ON independently by depressing the lamp lenses, while the front map/reading lamps are turned ON or OFF independently by the two map/reading lamp push button switches (3). The incandescent dome lamp bulbs are serviceable; however, the LED map/reading lamps as well as all of the switches, lamp housings, lenses and wiring are serviced only as a unit with the overhead console assembly.

1. Disconnect and isolate the battery negative cable.
2. Remove the overhead console from the headliner, but do not disconnect it. Refer to **CONSOLE, OVERHEAD, REMOVAL** .

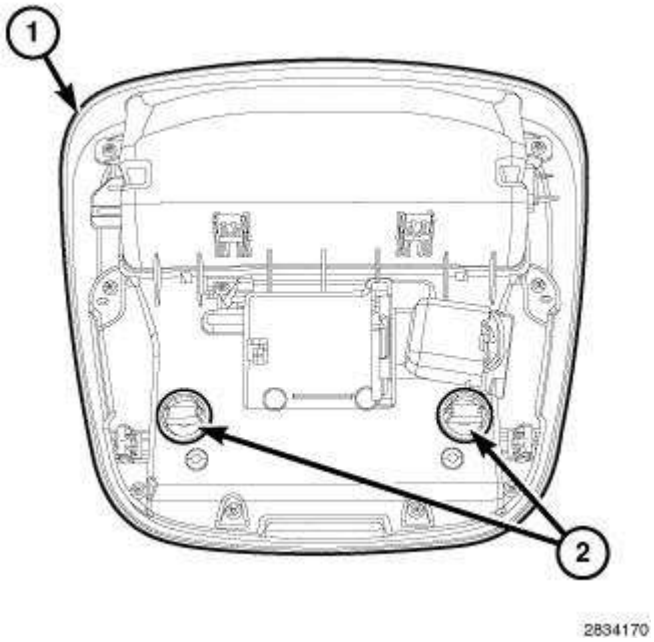

Fig. 7: Console & Bulb Holder Unit
Courtesy of CHRYSLER GROUP, LLC

3. Reach above the top of the over head console (1) to access and rotate the bulb and bulb holder unit (2) counterclockwise about 30 degrees to unlock it from the keyed opening in the lamp housing.
4. Pull the bulb holder and bulb straight out of the housing.

BULB - REAR

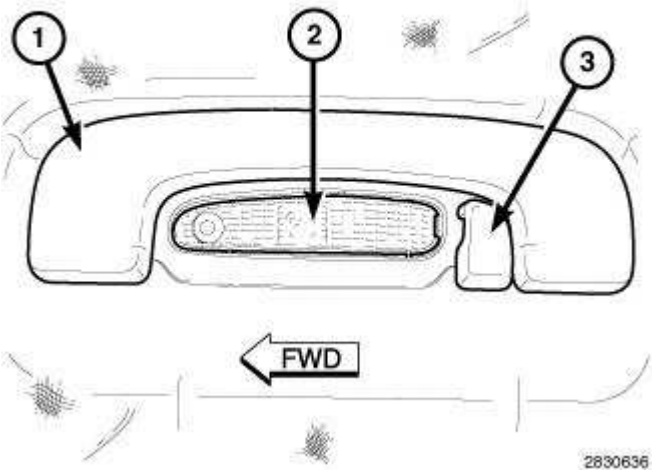

Fig. 8: Grab Handle & Reading Lamp Lens
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The rear dome/reading lamps are integral to the grab handle (1) in the headliner on the inner roof side rail over each outboard rear seating position. The lamp housing, switch and wiring are serviced only as a unit with the grab handle assembly.**

1. Disconnect and isolate the battery negative cable.
2. Using a small thin-bladed screwdriver, gently pry the forward end of the reading lamp lens (2) away from the grab handle far enough to unsnap it from the lamp housing.
3. Pull the front end of the lens outward far enough to disengage the larger rear lens tab from the lamp housing.

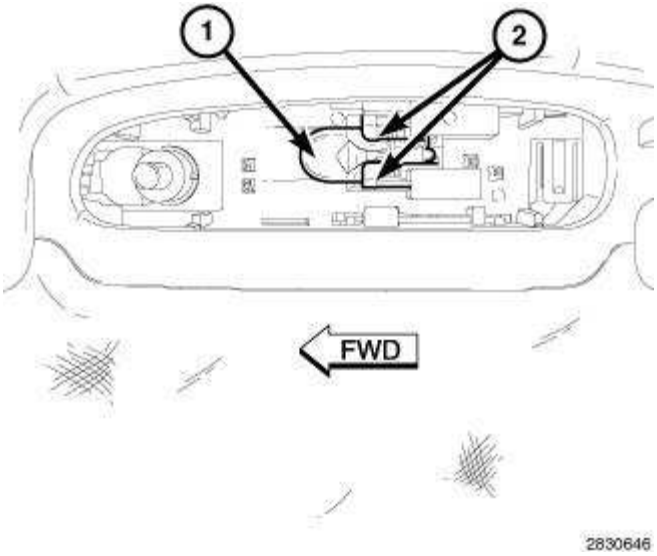

Fig. 9: Bulb & Bulb Holders
Courtesy of CHRYSLER GROUP, LLC

4. Pull the base of the bulb (1) straight forward out of the bulb holders (2) within the lamp housing.

INSTALLATION

BULB - FRONT

CAUTION: **Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.**

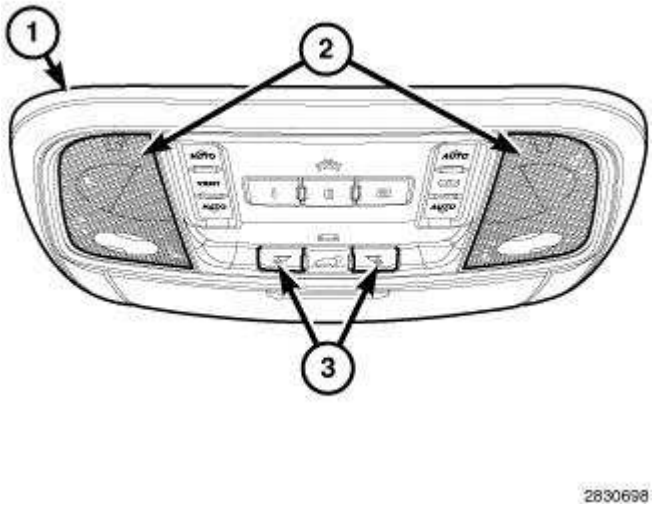

Fig. 10: Overhead Console, Lenses & Switches
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The front dome and the front map/reading lamps are integral to the overhead console (1) in the headliner near the windshield. Both the incandescent dome lamps and the Light Emitting Diode (LED) map/reading lamps share the same two lenses (2) in the overhead console. Both the dome lamps and the map/reading lamps are turned ON and OFF by the door ajar switches or by the interior lighting thumbwheel of the headlamp switch. The front dome lamps can be turned ON independently by depressing the lamp lenses, while the front map/reading lamps are turned ON or OFF independently by the two map/reading lamp push button switches (3). The incandescent dome lamp bulbs are serviceable; however, the LED map/reading lamps as well as all of the switches, lamp housings, lenses and wiring are serviced only as a unit with the overhead console assembly.**

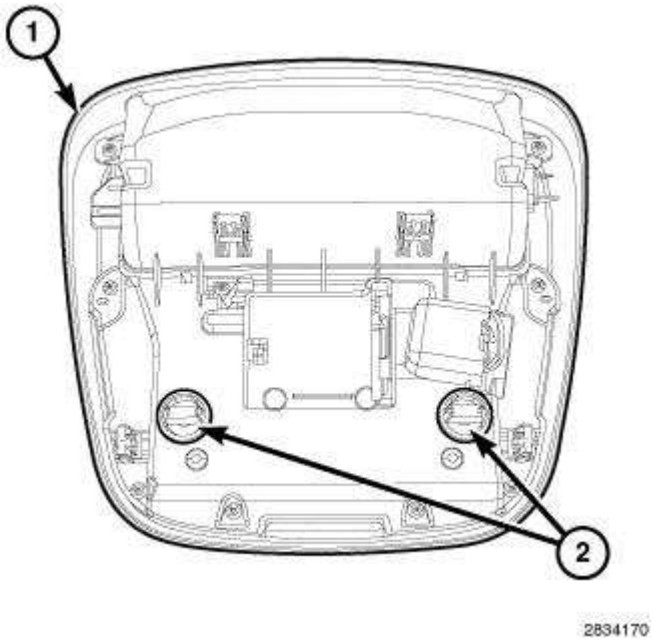

Fig. 11: Console & Bulb Holder Unit
Courtesy of CHRYSLER GROUP, LLC

1. Reach above the top of the overhead console (1) to align and insert the bulb and bulb holder unit (2) into the keyed opening of the overhead console lamp housing until the bulb holder is firmly seated.
2. Rotate the bulb and bulb holder unit clockwise about 30 degrees to lock it into place.
3. Reinstall the overhead console onto the headliner. Refer to **CONSOLE, OVERHEAD, INSTALLATION** .
4. Reconnect the battery negative cable.

BULB - REAR

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

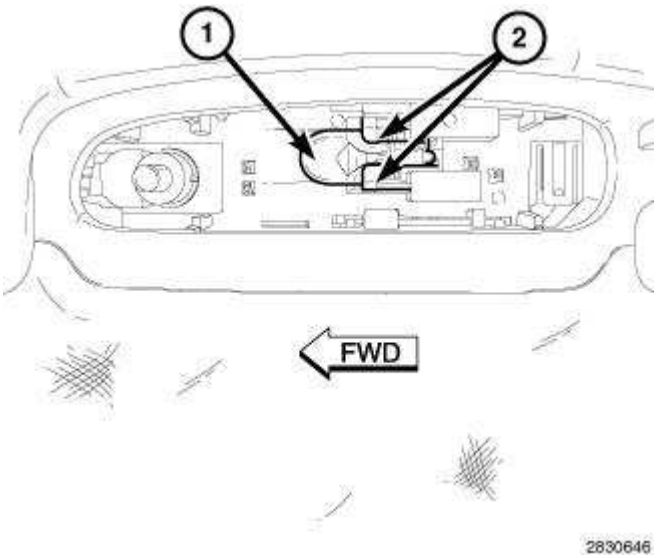

Fig. 12: Bulb & Bulb Holders
Courtesy of CHRYSLER GROUP, LLC

NOTE: The rear dome/reading lamps are integral to the grab handle in the headliner on the inner roof side rail over each outboard rear seating position. The lamp housing, switch and wiring are serviced only as a unit with the grab handle assembly.

1. Align the base of the bulb (1) with the bulb holders (2) within the rear reading lamp housing.
2. Push the bulb straight rearward into the bulb holders until the base is fully seated.

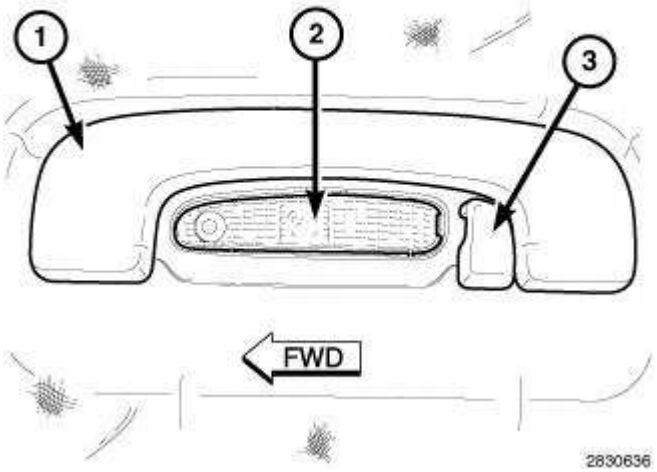

Fig. 13: Grab Handle & Reading Lamp Lens
Courtesy of CHRYSLER GROUP, LLC

3. Insert the large tab on the rearward end of the lamp lens (2) into the rear end of the lamp housing.

4. Using hand pressure, push the small tab at the front of the lens rearward and inward towards the lamp housing until it snaps into place.
5. Reconnect the battery negative cable.

LAMP, ENTRY AND EXIT

REMOVAL

BULB

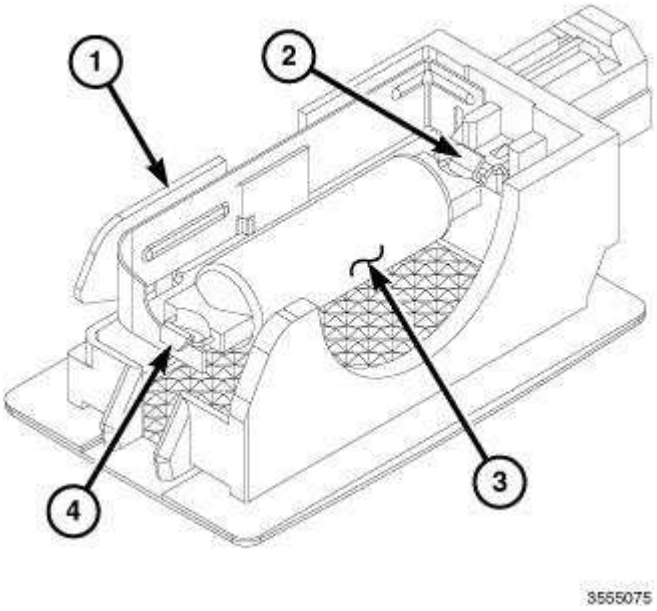

Fig. 14: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the entry and exit lamp unit (1) (also known as the puddle lamp) from the bottom of the front or rear door trim panel. Refer to **LAMP, ENTRY AND EXIT, REMOVAL**.
3. Gently press the movable bulb holder (4) and the bulb (3) towards the fixed bulb holder (2) far enough to disengage the wire loop terminal of the bulb from the hook of the fixed bulb holder.
4. Disengage the wire loop terminal of the bulb from the hook on the movable bulb holder.
5. Remove the bulb from the lamp.

LAMP

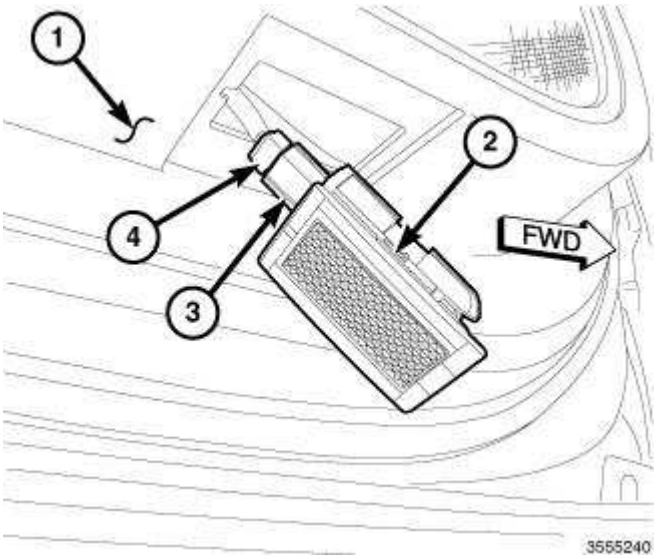

Fig. 15: Rear Door Trim Panel, Lens, Door Wire Harness Connector & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable flat wide-bladed tool, gently pry the forward (notched) edge of the entry and exit lamp (also known as the puddle lamp) lens (2) down from the mounting hole in the lower horizontal surface of the front or rear door trim panel (1).
3. Disconnect the door wire harness connector (4) from the connector receptacle (3) integral to the lamp housing.
4. Remove the lamp from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

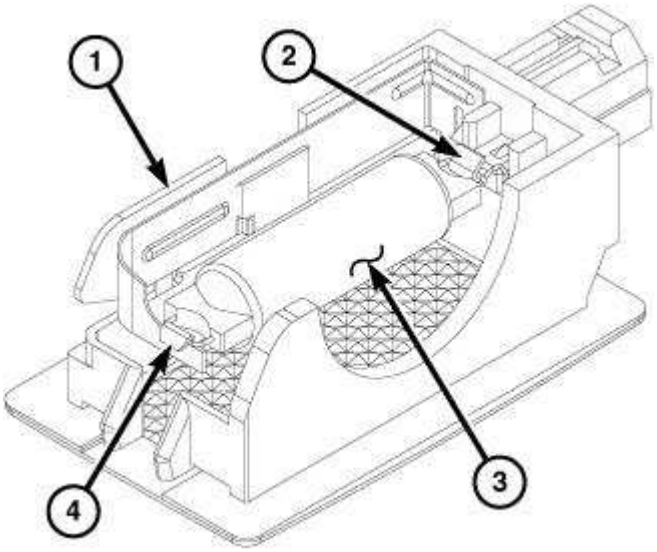

Fig. 16: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Engage the wire loop terminal on one end of the bulb (3) over the hook on the movable bulb holder (4).
2. Gently press the movable bulb holder and bulb towards the fixed bulb holder (2) far enough to engage the wire loop terminal over the hook on the fixed bulb holder, then release the movable bulb holder.
3. Reinstall the entry and exit lamp unit (1) (also known as the puddle lamp) into the bottom of the front or rear door trim panel. Refer to **LAMP, ENTRY AND EXIT, INSTALLATION**.
4. Reconnect the battery negative cable.

LAMP

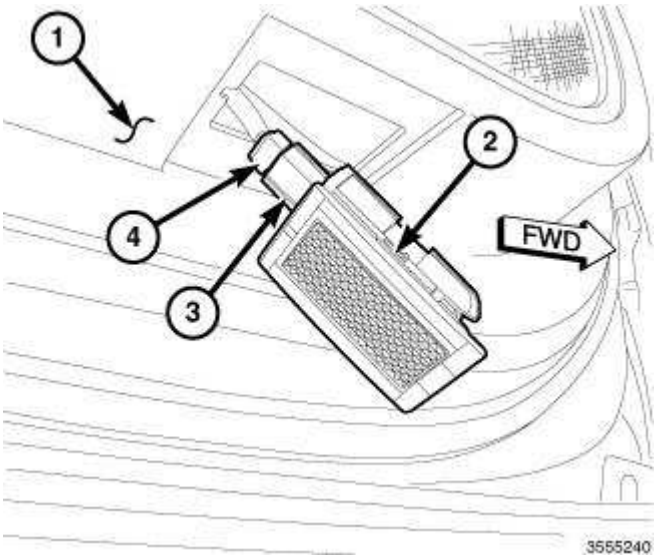

Fig. 17: Rear Door Trim Panel, Lens, Door Wire Harness Connector & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Position the entry and exit lamp (also known as the puddle lamp) to the mounting hole in the lower horizontal surface of the front or rear door trim panel (1).
2. Reconnect the door wire harness connector (4) to the connector receptacle (3) integral to the lamp housing.
3. Insert the connector end of the lamp into the rearward end of the mounting hole in the door trim panel far enough to engage the fixed retention tabs with the edge of the mounting hole.
4. Using hand pressure, press the front (notched) edge of the lamp lens (2) upward until the movable retention tabs snap into place and the lens is just proud of the trim panel.
5. Reconnect the battery negative cable.

LAMP, TRANSMISSION RANGE INDICATOR

REMOVAL

REMOVAL

1. Disconnect the battery negative cable.
2. Remove shift console trim ring and shift console trim panel. Refer to **CONSOLE, FLOOR, REMOVAL** .

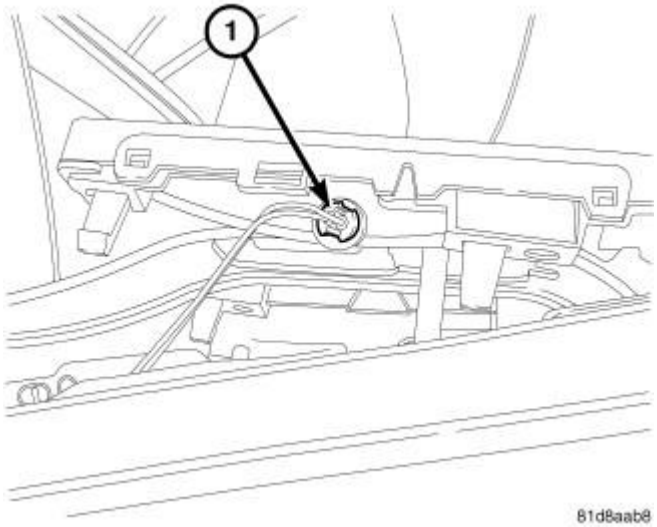

Fig. 18: Identifying Bulb Socket
Courtesy of CHRYSLER GROUP, LLC

3. Using a trim stick or equivalent, gently pry up the shifter bezel lock tabs.
4. Grasp the bulb socket (1) and turn counter clockwise to remove from the shifter assembly.
5. Pull the bulb from the bulb socket.

INSTALLATION

INSTALLATION

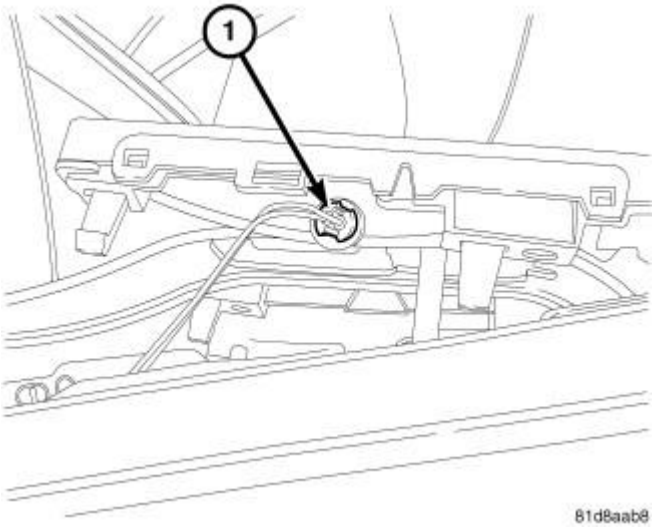

Fig. 19: Identifying Bulb Socket
Courtesy of CHRYSLER GROUP, LLC

1. Insert new bulb into bulb socket.
2. Install socket into shifter assembly.

3. Snap shifter assembly back into the center console.
4. Install shifter console trim panel and shift console trim ring. Refer to **CONSOLE, FLOOR, INSTALLATION** .
5. Connect battery negative cable.

LAMP, TRUNK

REMOVAL

BULB

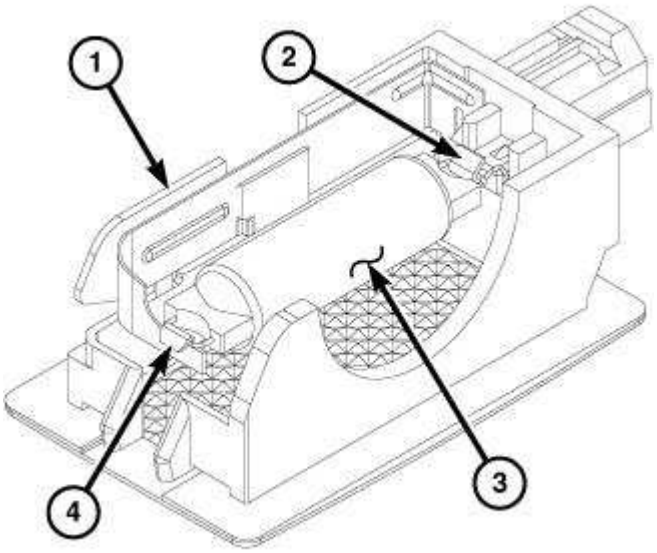

Fig. 20: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trunk lamp unit (1) from the right or left trunk trim panel. Refer to **LAMP, TRUNK, REMOVAL**.
3. Gently press the movable bulb holder (4) and the bulb (3) towards the fixed bulb holder (2) far enough to disengage the wire loop terminal of the bulb from the hook of the fixed bulb holder.
4. Disengage the wire loop terminal of the bulb from the hook on the movable bulb holder.
5. Remove the bulb from the lamp.

LAMP

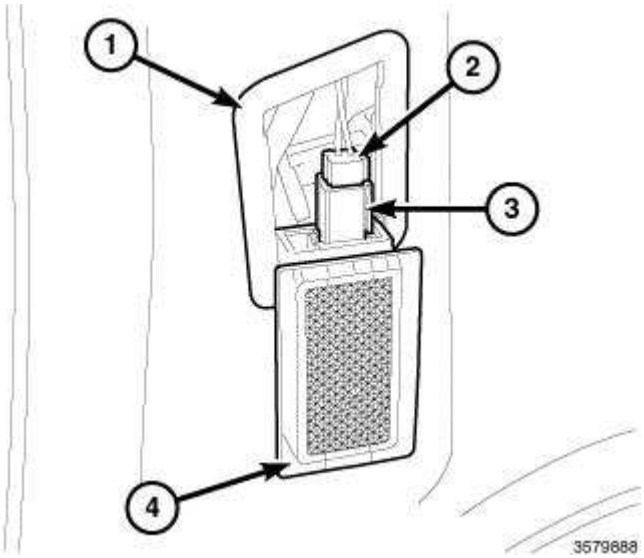

Fig. 21: Trunk Lamp Lens, Connector Receptacle & Mounting Hole
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable flat wide-bladed tool, gently pry the upper (notched) edge of the trunk lamp lens (4) out from the mounting hole (1) in the right or left trunk side trim panel.
3. Disconnect the body wire harness connector (2) from the connector receptacle (3) integral to the lamp housing.
4. Remove the lamp from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

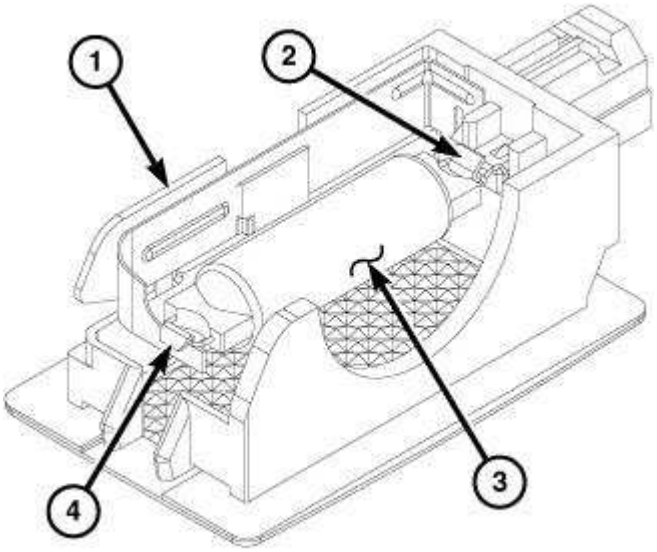

Fig. 22: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Engage the wire loop terminal on one end of the bulb (3) over the hook on the movable bulb holder (4).
2. Gently press the movable bulb holder and bulb towards the fixed bulb holder (2) far enough to engage the wire loop terminal over the hook on the fixed bulb holder, then release the movable bulb holder.
3. Reinstall the trunk lamp unit (1) into the right or left trunk trim panel. Refer to **LAMP, TRUNK, INSTALLATION**.
4. Reconnect the battery negative cable.

LAMP

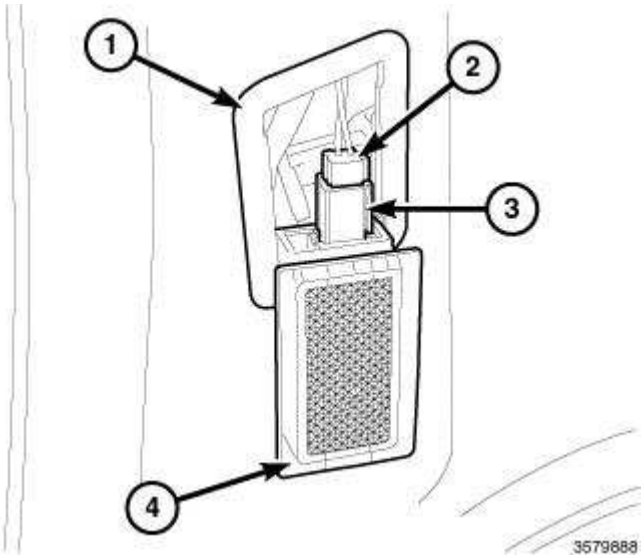

Fig. 23: Trunk Lamp Lens, Connector Receptacle & Mounting Hole
Courtesy of CHRYSLER GROUP, LLC

1. Position the trunk lamp to the mounting hole (1) in the right or left trunk side trim panel.
2. Reconnect the body wire harness connector (2) to the connector receptacle (3) integral to the lamp housing.
3. Insert the connector end of the lamp into the lower end of the mounting hole in the trunk side trim panel far enough to engage the fixed retention tabs with the edge of the mounting hole.
4. Using hand pressure, press the upper (notched) edge of the lamp lens (4) into the mounting hole until the movable retention tabs snap into place and the lens is just proud of the trim panel.
5. Reconnect the battery negative cable.

LAMP, VANITY

REMOVAL

REMOVAL

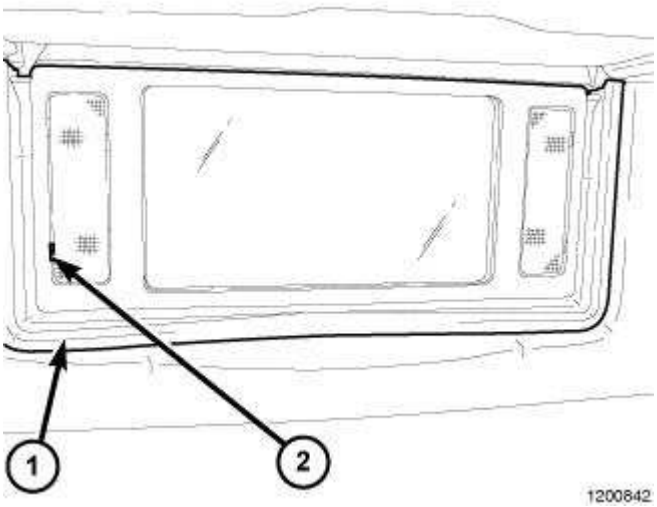

Fig. 24: Vanity Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: Vehicles equipped with optional vanity lamps have a single lamp at each side of the covered mirror that is integral to each sun visor. Each lamp is independently controlled by an integral switch that is automatically actuated by the mirror cover. The lamp housings, the switch, the mirror and the mirror cover are serviced only as a unit with the sun visor. The bulb types and service procedures are identical for each of these lamp bulbs.

1. Disconnect and isolate the battery negative cable.
2. Insert a small flat-bladed screwdriver on either side near the top or the bottom between the vanity lamp lens (2) and the lamp housing of the sun visor (1).
3. Carefully pry the lens outward until it unsnaps from the lamp housing.

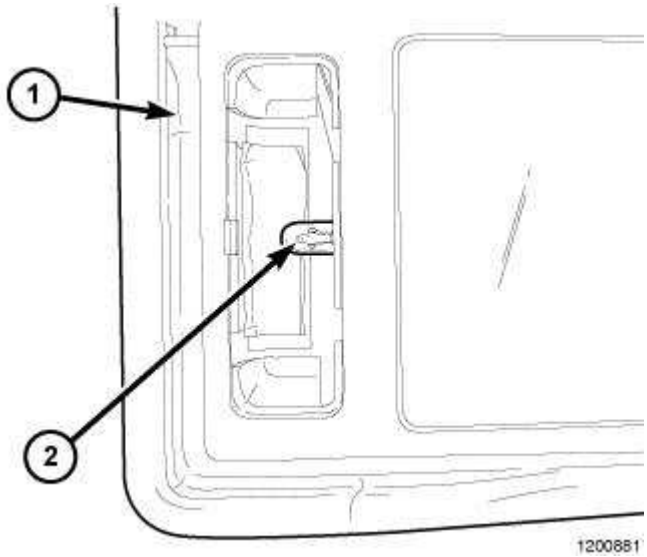

Fig. 25: Vanity Lamp Bulb
Courtesy of CHRYSLER GROUP, LLC

4. Using small needle-nose pliers, carefully grasp the bulb (2) and pull the base out of the lamp socket.

INSTALLATION

INSTALLATION

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

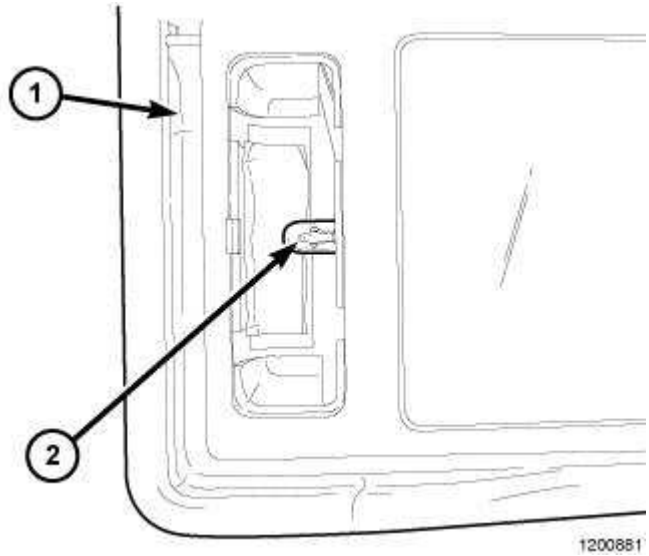

Fig. 26: Vanity Lamp Bulb
Courtesy of CHRYSLER GROUP, LLC

NOTE: Vehicles equipped with optional vanity lamps have a single lamp at each side of the covered mirror that is integral to each sun visor. Each lamp is independently controlled by an integral switch that is automatically actuated by the mirror cover. The lamp housings, the switch, the mirror and the mirror cover are serviced only as a unit with the sun visor. The bulb types and service procedures are identical for each of these lamp bulbs.

1. Using small needle-nose pliers, carefully grasp the vanity lamp bulb (2) and align the base of the bulb with the socket in the lamp housing of the sun visor (1).
2. Push the bulb straight into the socket until the base is fully seated.

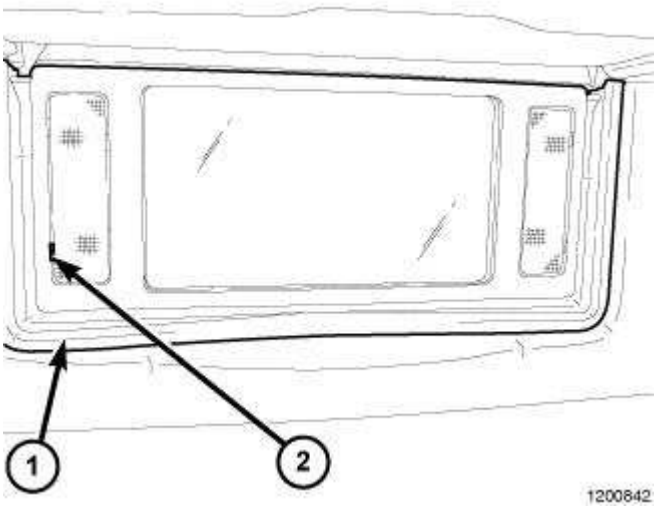

Fig. 27: Vanity Lamp
Courtesy of CHRYSLER GROUP, LLC

3. Insert one tab on the top or the bottom of the lens (2) into the appropriate slot at the top or bottom of the lamp housing.
4. Flex the lens far enough to engage the loose tab into its slot in the lamp housing.
5. Reconnect the battery negative cable.

SWITCH AND LAMP, GLOVE BOX

REMOVAL

BULB

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

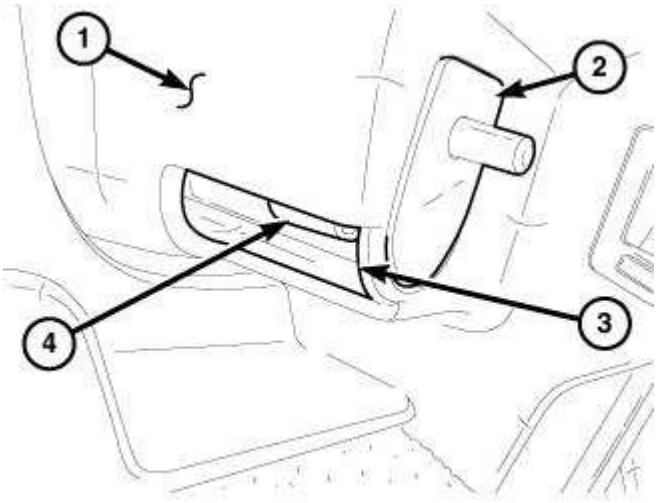

Fig. 28: Window, Instrument Panel Glove Box Housing, Access The Bulb & Switch Unit
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Open the glove box.
3. Reach through the window (3) in the instrument panel glove box housing (1) to access the bulb (4) on the lower side of the glove box lamp and switch unit (2).
4. Pull the base of the bulb straight out of the bulb holder and out through the window.

LAMP/SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

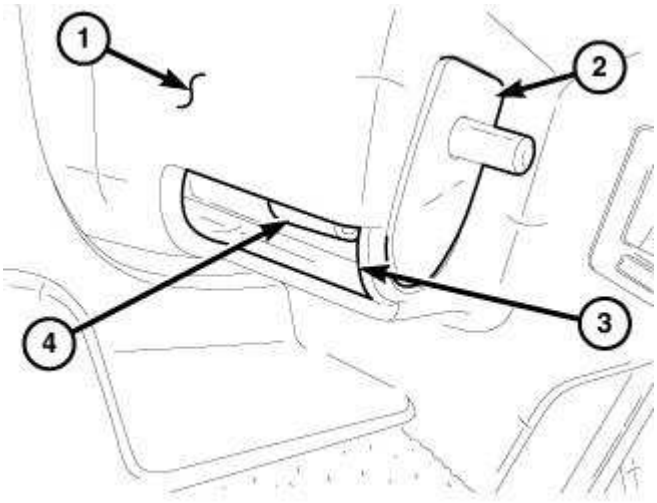

Fig. 29: Window, Instrument Panel Glove Box Housing, Access The Bulb & Switch Unit
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Open the glove box.
3. Reach through the window (3) in the instrument panel glove box housing (1) to access and depress the latch feature on either side of the glove box lamp and switch unit (2).
4. While holding the retaining latch depressed, push the glove box lamp and switch unit out through the mounting hole in the face of the instrument panel glove box housing.
5. Disconnect the wire harness connector from the glove box lamp and switch.
6. Remove the lamp and switch unit from the instrument panel.

INSTALLATION

BULB

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

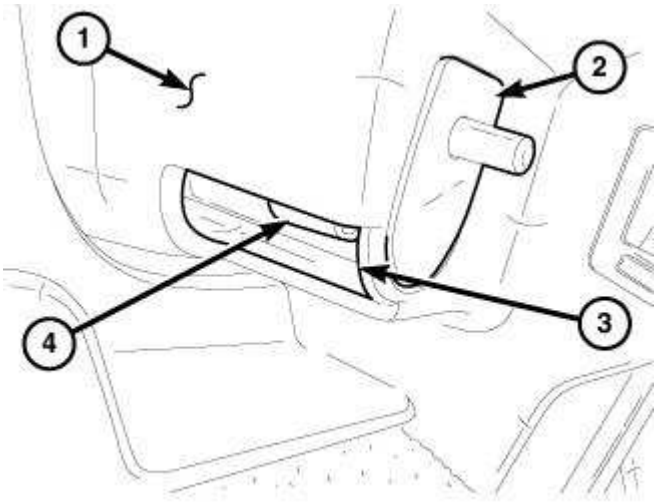

Fig. 30: Window, Instrument Panel Glove Box Housing, Access The Bulb & Switch Unit
Courtesy of CHRYSLER GROUP, LLC

1. Reach through the window (3) in the instrument panel glove box housing (1) to align the base of the bulb (4) with the bulb holder on the lower side of the glove box lamp and switch unit (2).
2. Push the bulb straight into the bulb holder until the base is firmly seated.
3. Close the glove box.
4. Reconnect the battery negative cable.

LAMP/SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

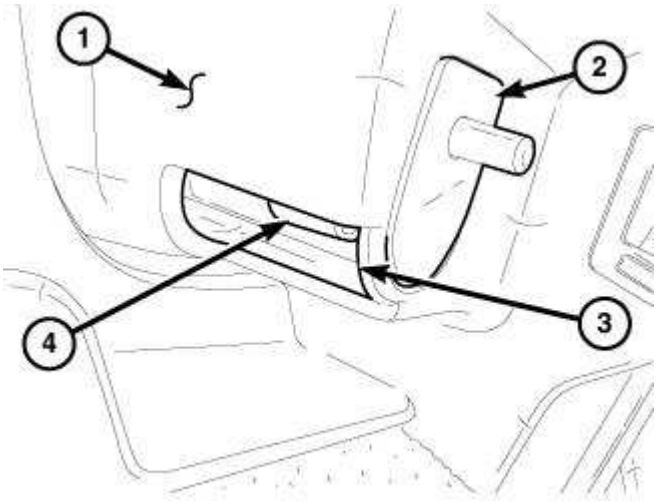

Fig. 31: Window, Instrument Panel Glove Box Housing, Access The Bulb & Switch Unit
Courtesy of CHRYSLER GROUP, LLC

1. Position the glove box lamp and switch unit (2) to the instrument panel glove box housing (1).
2. Reconnect the wire harness connector to the lamp and switch unit.
3. Feed the wire harness back through the switch mounting hole.
4. Align the lamp and switch unit with the mounting hole in the instrument panel glove box housing.
5. Using hand pressure, push the lamp and switch unit firmly and evenly into the mounting hole until it is fully seated.
6. Close the glove box.
7. Reconnect the battery negative cable.

SWITCH, DIMMER

DESCRIPTION

DESCRIPTION

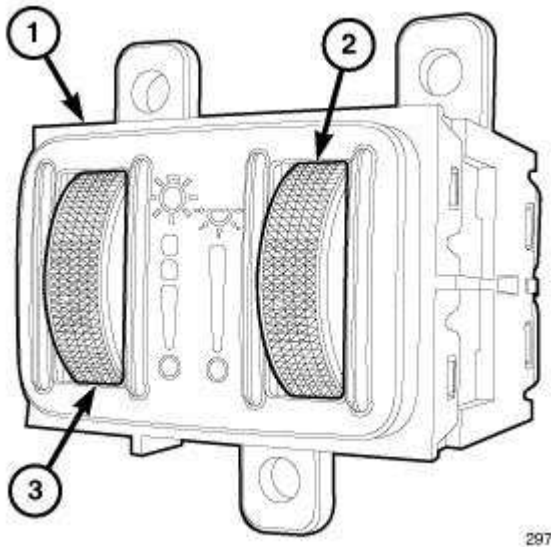

Fig. 32: Dimmer Module, Thumbwheel & Second Thumbwheel
Courtesy of CHRYSLER GROUP, LLC

This vehicle has a separate dimmer module (1) that is located on the instrument panel, in a mounting hole inboard of the headlamp switch mounting hole, outboard of the steering column. The standard dimmer module features a single thumbwheel (3) for panel lamps dimming and interior lighting control. There are also two optional switches with a second thumbwheel (2). The second thumbwheel is used for ambient (also known as halo) lighting control in vehicles with the ambient lighting option, or for headlamp leveling control in vehicles manufactured for certain markets where headlamp leveling is required.

The dimmer module is constructed of molded plastic. The thumbwheel is molded plastic and knurled around its circumference to ease operator control. The dimmer module face plate is labeled with graphics and International Control and Display Symbol icons to clearly identify the functions of the thumbwheel or optional thumbwheels.

The dimmer module housing is secured within the mounting hole of the instrument panel by three screws, two on the top and one on the bottom. The back of the dimmer module housing has an integral connector receptacle containing terminal pins that connect the module to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness. Panel dimmer controlled Light Emitting Diode (LED) units soldered to the circuit board within the module provide back lighting for visibility at night, but are not serviceable.

The dimmer module cannot be repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

The dimmer module uses a single resistor multiplexed output for each switch thumbwheel to control the many functions and features it provides. The switch receives a clean ground from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) on a multifunction switch

MUX return circuit. It then provides outputs to the BCM on a panel lamps dimmer signal circuit to control panel dimmer and interior lighting functions, or on a dimmer environmental lighting circuit to control ambient (halo) lighting functions.

On vehicles equipped with a remote manual headlamp leveling system, the dimming module also receives a battery voltage input on a park/tail/running lamps feed circuit whenever the exterior lighting is turned ON. It then provides outputs to the BCM on a headlamp leveling switch to module signal circuit to control the headlamp leveling function.

The dimmer module illumination circuit receives a path to ground at all times through an instrument panel ground circuit. The illumination level is controlled by a Pulse-Width Modulated (PWM) output received from the BCM on a panel lamps driver circuit. The BCM controls this output based upon the panel lamps dimmer signal circuit input from the dimmer module.

The dimmer module operates as follows:

- **Ambient (Halo) Lighting Control** - On vehicles so equipped, the right thumbwheel on the dimmer module is rotated to the ambient DEFEAT or one of the six ambient dimmer detent positions to control the ambient (halo) lighting level. The dimmer module provides the appropriate resistor multiplexed output to the BCM over the dimmer environmental lighting circuit. The BCM reads and responds to this input by providing the appropriate control outputs through internal HSDs over the liftgate courtesy feeds driver circuit.
- **Headlamp Leveling Control** - On vehicles so equipped, the right thumbwheel on the dimmer module is rotated to the 0, 1 or 2 detent positions to provide the appropriate resistor multiplexed output to the BCM over the headlamp leveling switch to module signal circuit. The BCM reads and responds to this input by providing the appropriate control outputs to the headlamp leveling motors.
- **Interior Lighting Control** - The left thumbwheel on the dimmer module is rotated to the dome DEFEAT, dome ON, PARADE mode, or one of the six panel dimmer detent positions to control the interior courtesy/dome and panel lamps. The dimmer module provides the appropriate resistor multiplexed output to the BCM over the panel lamps dimmer signal circuit. The BCM reads and responds to this input by providing the appropriate control outputs through internal HSDs over the courtesy lamps, panel lamps and reading lamps driver circuits, and by sending appropriate electronic **dimming level** messages to other electronic modules over the CAN data bus.

The dimmer module as well as the hard wired inputs and outputs of the module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - DIMMER SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate

the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

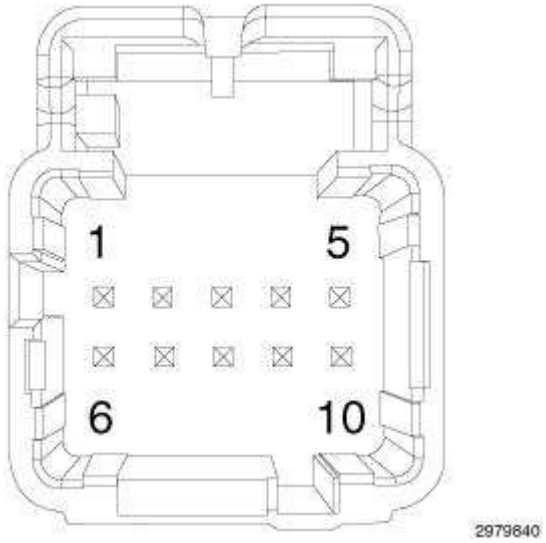

Fig. 33: Dimmer Switch
Courtesy of CHRYSLER GROUP, LLC

1. Remove the dimmer module from the instrument panel. Refer to **SWITCH, DIMMER, REMOVAL**.
2. Disconnect the instrument panel wire harness connector from the back of the dimmer module.
3. Using an ohmmeter, test the resistance between the terminals of the module as shown in the Dimmer Module Tests table.

DIMMER MODULE TESTS	
SWITCH POSITION (PINS)	**RESISTANCE RANGE (OHMS)**
DOME DEFEAT (1 and 4)	8645 - 9555
PANEL DIMMER 1 (1 and 4)	2565 - 2835
PANEL DIMMER 2 (1 and 4)	1140 - 1260
PANEL DIMMER 3 (1 and 4)	646 - 714
PANEL DIMMER 4 (1 and 4)	417.78 - 426.22
PANEL DIMMER 5 (1 and 4)	256.5 - 283.5
PANEL DIMMER 6 (1 and 4)	180.18 - 183.82

PARADE MODE (1 and 4)	135.63 - 138.37
DOME ON (1 and 4)	172.26 - 175.74
AMBIENT DOME DEFEAT (1 and 5)	8645 - 9555
AMBIENT DIMMER 1 (1 and 5)	2565 - 2835
AMBIENT DIMMER 2 (1 and 5)	1140 - 1260
AMBIENT DIMMER 3 (1 and 5)	646 - 714
AMBIENT DIMMER 4 (1 and 5)	417.78 - 426.22
AMBIENT DIMMER 5 (1 and 5)	256.5 - 283.5
AMBIENT DIMMER 6 (1 and 5)	494.01 - 503.99
HEADLAMP LEVELING 0 (7 and 8)	172.26 - 175.74
HEADLAMP LEVELING 1 (7 and 8)	198 - 202
HEADLAMP LEVELING 2 (7 and 8)	575.19 - 586.81
SWITCH ILLUMINATION (2 and 3)	LEDs - SET MULTIMETER TO DIODE MODE - CONNECT PIN 3 TO PLUS (+), CONNECT PIN 2 TO MINUS (-) - LEDs SHOULD BARELY GLOW

4. If the module fails any of the tests, replace the ineffective dimmer module as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

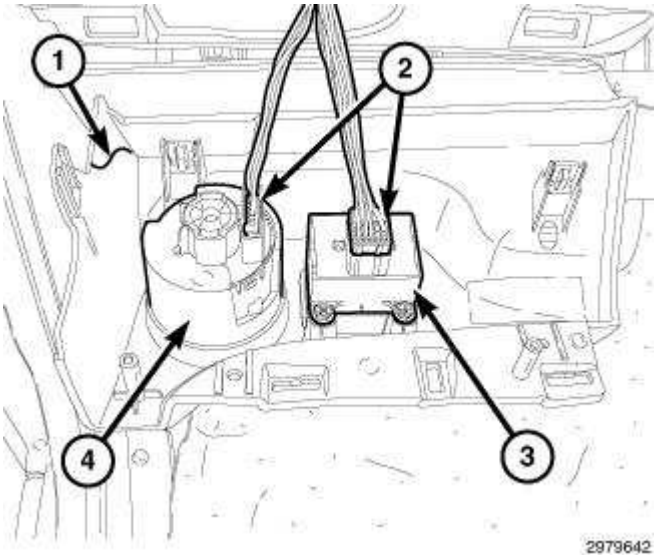

Fig. 34: Trim Molding, Wire Harness Connector & Dimmer Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable wide flat-bladed tool, gently and evenly pry around the perimeter of the instrument panel trim molding outboard of the steering column to unsnap the molding from the instrument panel.
3. Pull the trim molding (1) away from the instrument panel far enough to access and disconnect the instrument panel wire harness connector (2) from the dimmer module (3) connector receptacle.
4. Remove the three screws that secure the dimmer module to the back of the instrument panel trim molding.
5. Remove the dimmer module from the trim molding.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

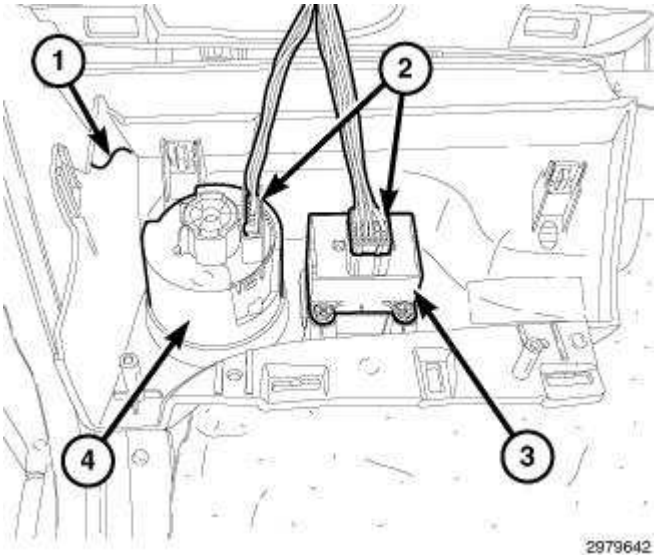

Fig. 35: Trim Molding, Wire Harness Connector & Dimmer Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the dimmer module (3) onto the back of the driver side outboard instrument panel trim molding (1).
2. Install and tighten the three screws that secure the dimmer module to the trim molding. Tighten the screws securely.
3. Reconnect the instrument panel wire harness connector (2) to the dimmer module connector receptacle.
4. Align the snap clips on the back of the trim molding with the receptacles in the instrument panel outboard of the steering column. Using hand pressure, press firmly and evenly on the bezel until the clips snap into place.
5. Reconnect the battery negative cable.

SWITCH, DOOR AJAR

DESCRIPTION

DOOR

This vehicle has four door ajar switches, one for each door. Each switch is concealed within and integral to its respective door latch unit. The switches are momentary leaf contact-type micro switch units that are actuated by the mechanisms internal to the door latch. An integral connector receptacle on each door latch connects the door ajar switch and the power lock motor to the vehicle electrical system through its respective door wire harness.

The door ajar switches cannot be adjusted or repaired and, if ineffective or damaged, the door latch unit must be replaced.

DECK LID

A deck lid ajar switch is standard equipment on this vehicle. The switch is concealed within and integral to the deck lid latch unit. The switch is a momentary leaf contact-type micro switch unit that is actuated by the deck lid latch mechanism. An integral connector receptacle on the deck lid latch connects the deck lid ajar switch to the vehicle electrical system through the body wire harness.

The deck lid ajar switch cannot be adjusted or repaired and, if ineffective or damaged, the deck lid latch unit must be replaced. Refer to **LATCH, REMOVAL** .

OPERATION

DOOR

The door ajar switches are actuated by the mechanisms internal to the door latch. When a door is closed and properly latched, its door ajar switch is an open circuit. When a door is open or only partially latched, the door ajar switch is a closed circuit. The door ajar switches are hard wired in series between a body ground and the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM reads the hard wired door ajar switch inputs through internal pull-ups, then uses these inputs to control many electronic functions and features of the vehicle. The BCM also sends electronic **door ajar switch status** messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The door ajar switches as well as the hard wired inputs and outputs of the switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

DECK LID

The deck lid ajar switch is actuated by the deck lid latch mechanism. When the deck lid is closed and properly latched, the deck lid ajar switch is an open circuit. When the deck lid is open or only partially latched, the deck lid ajar switch is a closed circuit. The deck lid ajar switch is hard wired in series between a body ground and the Body Control Module (BCM) (also known as the Common Body Controller). The BCM reads the hard wired liftgate ajar switch input through an internal pull-up, then uses this input to control many electronic functions and features of the vehicle. The BCM also sends electronic **deck lid ajar switch status** messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The deck lid ajar switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

ACCESSORIES AND EQUIPMENT

Lamps/Lighting - Exterior - Service Information - Chrysler 300

WARNING

WARNING

WARNING: To avoid serious or fatal injury, eye protection should be used when servicing any glass components.

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

CAUTION: Do not contaminate the glass of halogen bulbs with fingerprints or allow contact with other possibly oily surfaces. Reduced bulb life will result.

CAUTION: Do not use bulbs with higher candle power than indicated in the Bulb Application table. Refer to SPECIFICATIONS . In addition, do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owner's Manual. Damage to lamps, lenses, wiring and other related electrical components can result.

DESCRIPTION

DESCRIPTION

The exterior lighting system for this model includes the following exterior lamp units:

- **Center High Mounted Stop Lamp** - A Center High Mounted Stop Lamp (CHMSL) is centered

near the top of the vertical surface of the deck lid at the rear of the vehicle.

- **Front Fog Lamps** - Vehicles equipped with this option have a front fog lamp unit mounted near each outboard end of the front fascia, below the front lamp units.
- **Front Lamp Units** - Standard equipment includes a bi-functional, single filament halogen front lamp unit. A bi-functional High Intensity Discharge (HID) front lamp unit is optional. The Adaptive Front Lighting System (AFLS) is included when the vehicle is equipped with the optional HID front lamp unit. The front lamp units are mounted at the front of each front fender panel at the outboard side of the grille opening.
- **License Plate Lamp** - Two standard rear license plate lamp units are mounted to the rear fascia, just above the license plate tub formation.
- **Outside Mirror Lamps** - The outside rear view mirrors are available with signal lamps and approach lamps. The signal lamps incorporate three amber Light Emitting Diode (LED) units behind a clear lens located on the lower, forward-facing outer cap of each mirror head. The outside mirror signal lamps also function as repeater lamps in vehicles manufactured for sale in certain export markets where they are required. The signal lamps are serviced only as a unit with the outside rear view mirror assembly. The approach lamps are used on vehicles equipped with the Passive Entry (PE) system and incorporate an LED unit located behind the outer edge of each outside rear view mirror glass and are serviced only as a unit with the mirror glass and case assembly.
- **Rear Lamp Units** - A rear lamp unit is mounted to the rear of each quarter panel on either side of the deck lid opening.
- **Rear Fog Lamps** - In certain export markets where they are required, two rear fog lamps are integral to the rear lamp units.

These exterior lighting lamps and their controls are combined to provide the following exterior lighting features:

- **Automatic Headlamps** - Automatic headlamps are standard equipment on this vehicle. The headlamp switch includes an **A** (Automatic) position and an automatic headlamp sensor senses ambient light levels. The automatic headlamp sensor is integral to the sun load sensor located on the top of the instrument panel. When the **A** position of the headlamp switch is selected, the headlamps are turned ON and OFF automatically as ambient light levels dictate.
- **Adaptive Front Lighting System** - Vehicles equipped with the High Intensity Discharge (HID) front lamp units include the Adaptive Front Lighting System (AFLS). AFLS includes an electronic AFLS module mounted to the right of the Power Distribution Center (PDC) in the engine compartment. The AFLS module monitors vehicle braking, steering and suspension system inputs then automatically adjusts the aim of the headlamp beams up and down or right and left as appropriate using leveling and swiveling stepper motors integral to both front lamp units for improved visibility when driving at night.
- **Backup Lamps** - The backup (or reverse) lamps include a clear bulb, reflector and clear lens that are integral to each rear lamp unit.
- **Brake Lamps** - The brake (or stop) lamps include multiple Light-Emitting Diode (LED) units, a reflector and a red lens that are integral to each rear lamp unit, and the red lens and multiple LED units of the CHMSL.
- **Daytime Running Lamps** - Multiple Light-Emitting Diode (LED) units in a light strip integral to

each front lamp unit are illuminated when appropriate to serve as the Daytime Running Lamps (DRL).

- **Exterior Lamp Fail-Safe Operation** - The Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and the Body Control Module (BCM) (also known as the Common Body Controller/CBC) provide a fail-safe feature which will automatically turn ON the low beam headlamps and all park lamps when the ignition switch is in the ON position and there is no detected input from either the headlamp switch or the multi-function switch, no communication from the Steering Control Module (SCM) or Steering Angle Sensor (SAS) or when the Controller Area Network (CAN) data bus is inoperative.
- **Exterior Lamp Load Shedding** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) provides a battery saver feature which will automatically turn OFF all exterior lamps that remain ON with the ignition switch in the LOCK position after a timed interval of about eight minutes.
- **Front Fog Lamps** - The optional front fog lamps include the bulb, reflector and projector lens of each adjustable front fog lamp unit.
- **Hazard Warning Lamps** - The hazard warning lamps include the bulbs, Light Emitting Diode (LED) units and lenses of each lamp in the right and left, front and rear turn signal circuits.
- **Headlamp Delay** - When this feature is enabled the low or high beam headlamps remain illuminated for a programmable delay interval of 0 (disabled), 30, 60 or 90 seconds after the ignition switch has been turned to the OFF position. This feature is customer programmable using the Electronic Vehicle Information Center (EVIC) switches and the U-Connect Touch™ screen module in the Integrated Center Stack (ICS).
- **Headlamps** - Two headlamp systems are available on this vehicle for domestic markets. The standard halogen headlamp system includes a bi-functional single filament halogen bulb in each front lamp unit for low or high beam headlamps. The optional HID headlamp system includes a bi-functional single HID lighting element/igniter unit for low or high beam headlamps. In either halogen or HID form, an electric solenoid motor and mechanism internal to the front lamp unit closes a shutter for low beams and opens the shutter for high beams. HID headlamps are standard equipment for all vehicles manufactured for export markets. The HID front lamp units each include an electronic ballast module. Both headlamp systems also include an adjustable reflector and clear lens integral to each front lamp unit.
- **Headlamps With Wipers** - When this feature is enabled and the **AUTO** position of the headlamp switch is selected, the headlamps are turned ON automatically whenever the windshield wipers are turned ON; and, if the headlamps were turned ON automatically when the wipers were turned ON and the appropriate ambient light conditions exist, they will also turn OFF automatically when the wipers are turned OFF. This feature is customer programmable using the Electronic Vehicle Information Center (EVIC) switches and the U-Connect Touch™ screen module in the Integrated Center Stack (ICS).
- **Optical Horn** - Also known as flash-to-pass, the beam selection function of the multi-function switch control stalk has a momentary intermediate position that allows the headlamp high beams to be flashed momentarily, without changing the headlamp beam selection.
- **Park Lamps** - The front park lamps include the amber bulbs, the reflectors and the clear lenses of each park lamp and the multiple Light Emitting Diode (LED) units and amber lens of each front side marker lamp integral to each front lamp unit. The rear tail lamps include the multiple LED units, a reflector and a red lens integral to both the rear lamp units, the multiple LED units

and red lens of each rear side marker lamp integral to each rear lamp unit as well as the bulbs and clear lenses of each license plate lamp unit.

- **Rear Fog Lamps** - Rear fog lamps are available only in certain export markets where they are required equipment. The rear fog lamps include the multiple Light Emitting Diode (LED) units a red lens and a reflector that are integral to each rear lamp unit.
- **SmartBeam® Automatic Headlamps** - Vehicles equipped with the optional SmartBeam® automatic (auto high) headlamp option include a unique digital light-sensing imager camera integral to the electrochromic inside rear view mirror and programming that allows it to detect light levels, their color and their source within the path ahead of the vehicle. When SmartBeam® is enabled, the **A** (Automatic) position of the headlamp switch is selected, the high beam position of the headlamp dimmer switch is selected and the ambient light conditions are appropriate, the headlamp high beams are turned ON and OFF automatically as needed.
- **Turn Signal Lamps** - The front turn signal lamps include an amber bulb, a reflector, and a clear lens that are integral to each front lamp unit. On vehicles equipped with the optional outside mirror signal lamps, there are several amber Light-Emitting Diode (LED) units and a clear lens integral to each mirror signal lamp that are also activated by the turn signal circuits for the same side of the vehicle. For domestic markets the rear turn signal lamps include the multiple LED units, a reflector and a red lens integral to each rear lamp unit. For export markets the rear turn signal lamps include an amber bulb, a reflector and a clear lens integral to each rear lamp unit.

Other components of the exterior lighting system for this vehicle include:

- **Adaptive Front Lighting System Module** - An Adaptive Front Lighting System (AFLS) module is located on the right side of the Power Distribution Center (PDC) in the engine compartment. Refer to **MODULE, ADAPTIVE FRONT LIGHTING SYSTEM, DESCRIPTION** .
- **Axle Sensors** - Vehicles equipped with HID headlamps have an axle sensor for both the front and the rear axles, which monitor the suspension height of the vehicle.
- **Backup Lamp Switch** - A Transmission Range Sensor (TRS) integral to the solenoid pack on the valve body of the electronic automatic transmission performs the backup lamp switch function for this vehicle.
- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located beneath the instrument panel on the passenger side of the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Brake Lamp Switch** - A lever-actuated brake pedal position sensor serves as the brake lamp switch in this vehicle. The brake pedal position sensor is located on the brake pedal support bracket under the instrument panel and is actuated by a pin on the brake pedal arm when the brake pedal is depressed.
- **Controller Antilock Brake** - A Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM or the Antilock Brake System/ABS module) is located in the engine compartment below the brake master cylinder. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .
- **Electronic Ballast Module** - Vehicles equipped with the HID headlamps have an electronic ballast module secured to the underside of each front lamp unit. Each module controls the HID lighting element/igniter within the front lamp unit to which it is mounted.
- **Hazard Switch** - A latching push button-actuated hazard switch is integral to the instrument

panel switch bank in the lower vehicle feature controls module (also known as the Integrated Center Stack/ICS) located in the center stack area of the instrument panel.

- **Headlamp Leveling And Swiveling Motors** - A headlamp leveling stepper motor and a headlamp swiveling stepper motor is located within each front lamp unit housing of vehicles manufactured with HID headlamps.
- **Headlamp Switch** - A rotary knob-actuated headlamp switch is located in the headlamp switch bezel of the instrument panel. The headlamp switch is used to select the park lamps, headlamps or fog lamps.
- **Instrument Cluster** - The Instrument Cluster (IC) is also known as the Common Instrument Cluster (CIC) in this vehicle. The IC is located in the instrument panel above the steering column opening, directly in front of the driver. Refer to **DESCRIPTION** .
- **Instrument Panel Switch Bank** - The instrument panel switch bank contains the hazard switch. The switch bank is located in the lower vehicle feature controls module (also known as the Integrated Center Stack/ICS) located in the center stack area of the instrument panel. Refer to **POD, SWITCH BANK, DESCRIPTION** .
- **Multi-Function Switch** - The multi-function switch is located on the steering column, just below the steering wheel. A control stalk that extends from the left side of the switch is used to select the turn signal lamps (right or left) and to select the headlamp beam (low, high or optical horn).
- **Park Brake Switch** - A park brake switch is located on the park brake mechanism located on the driver side cowl side inner panel below the instrument panel.
- **SmartBeam® Module** - The SmartBeam® automatic high beam digital imaging camera and system logic circuitry is integral to the electrochromic inside rear view mirror on the inside of the windshield.
- **Steering Control Module** - The Steering Control Module (SCM) is located within the Steering Column Control Module (SCCM) on the top of the steering column, just below the steering wheel. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** .
- **Turn Signal Cancel Cam** - The turn signal cancel cam is integral to the clockspring. The turn signal cancel cam provides automatic turn signal cancellation as the steering wheel is rotated back to its centered position following a vehicle turning maneuver.

Hard wired circuitry connects the exterior lighting system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the exterior lighting components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

Following are paragraphs that briefly describe the operation of each of the major exterior lighting

systems. The lamps and the hard wired circuits between components related to the exterior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the exterior lighting system or the electronic controls or communication between modules and other devices that provide some features of the exterior lighting system. The most reliable, efficient and accurate means to diagnose the exterior lighting system or the electronic controls and communication related to exterior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ADAPTIVE FRONT LIGHTING SYSTEM

The Adaptive Front Lighting System (AFLS) module monitors hard wired inputs from the front and rear axle (leveling) sensors. The AFLS module also monitors electronic message inputs from the Body Control Module (BCM) (also known as the Common Body Controller/CBC), the Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM, Antilock Brake System/ABS module or the Electronic Stability Control/ESC module) the Powertrain Control Module (PCM), the Steering Angle Sensor (SAS) and the Steering Control Module (SCM) received over the Controller Area Network (CAN) data bus.

The AFLS module is programmed to use these inputs and, as a Local Interface Network (LIN) master node, respond by providing electronic message outputs over a Local Interface Network (LIN) data bus connection to the leveling and swiveling stepper motors within each High Intensity Discharge (HID) front lamp unit. The four stepper motors, which are each a LIN slave node, respond by adjusting the aim of the headlamp beams up, down, right or left as commanded. The stepper motors then provide a confirmation reply over the LIN bus to the AFLS module indicating the current beam position.

AUTOMATIC HEADLAMPS

The automatic headlamp system includes the headlamp switch, the Body Control Module (BCM) (also known as the Common Body Controller/CBC), the air conditioner - heater control unit and the sun load sensor on the top of the instrument panel.

The sun load sensor provides an ambient light level input to the A/C - heater control whenever the ignition switch is in the ON position. The A/C - heater control responds to this input by sending the appropriate electronic **light level** messages to the BCM over the Controller Area Network (CAN) data bus. When the **AUTO** (Automatic) position is selected with the headlamp switch, the BCM receives a hard wired multiplex input from the headlamp switch. The BCM also receives electronic messages over the CAN data bus from the PCM indicating the engine is running.

The BCM responds to these input conditions by automatically controlling a Pulse-Width Modulated (PWM) voltage output to the selected headlamp bulbs or lighting elements through the right and left low or high beam driver circuits to illuminate the headlamps. The BCM also remembers which beams (low or high) were selected when the headlamps were last turned OFF, and energizes those beams and lamps again the next time it turns the headlamps ON.

BACKUP LAMPS

The backup (or reverse) lamps have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured to the body sheet metal within the passenger compartment. The Powertrain Control Module (PCM) continually monitors a hard wired multiplex input from the Transmission Range Sensor (TRS), then sends the appropriate electronic **transmission gear selector status** messages to other electronic modules over the CAN data bus. Whenever the ignition switch is in the ON position and the Body Control Module (BCM) (also known as the Common Body Controller/CBC) receives an electronic message indicating the status of the transmission gear selector is REVERSE, it provides a battery voltage output to the backup lamps on the backup lamp control output circuit.

BRAKE LAMPS

The brake (or stop) lamps and the Center High Mounted Stop Lamp (CHMSL) each have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal within the passenger compartment. The Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM, the Antilock Brake System/ABS module or the Electronic Stability Control/ESC module) monitors a hard wired input from the brake pedal position sensor, which is actuated by movement of the brake pedal arm. When the CAB receives an input from the brake pedal position sensor indicating movement of the brake pedal arm, it responds by sending the appropriate electronic **brake lamp switch** status message to the BCM over the CAN data bus. The BCM then controls brake lamp and CHMSL illumination through High Side Drivers (HSD) on the left and right stop lamp control circuits. The brake lamp function of the trailer tow wiring is also controlled by an output from the BCM based upon the electronic **brake lamp switch** status messages received from the CAB.

DAYTIME RUNNING LAMPS

Vehicles equipped with this option or manufactured for sale in Canada illuminate multiple Light-Emitting Diode (LED) units in both front lamp units when the engine is running, the parking brake is released and the exterior lamps are turned OFF. The BCM must be programmed appropriately for this feature to be enabled. Once enabled, anytime the BCM receives electronic messages over the CAN data bus from the PCM indicating the engine is running, a hard wired multiplex input from the headlamp switch indicating the status of the headlamp switch is OFF and a hard wired input from the park brake switch indicating that the parking brake is released, the BCM provides an output to the appropriate LED units to produce illumination. If a turn signal is activated while the DRL units are active, the DRL for the same side of the vehicle as the indicated turn is extinguished until the turn signal is cancelled to permit clear signal visibility.

FRONT FOG LAMPS

Vehicles equipped with optional front fog lamps include a front fog lamp switch integral to the headlamp switch on the instrument panel. The front fog lamps have a path to ground at all times through their connection to the headlamp and dash wire harness and a takeout with an eyelet terminal that is secured to the body sheet metal. The BCM monitors a hard wired multiplex input from the headlamp switch to determine whether the fog lamps are selected.

When the BCM input from the headlamp switch indicates the fog lamps are selected, it controls front fog lamp operation by providing a battery voltage output to the fog lamps through the right and left front fog lamp control circuits. The BCM also sends the appropriate electronic messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to illuminate or extinguish the front fog lamp indicator. The BCM will automatically de-energize the front fog lamps any time the headlamp high beams are selected, except on vehicles manufactured for certain export markets.

The BCM also provides a battery saver (load shedding) feature for the front fog lamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position, if there is a charging system failure, or if the electrical system voltage falls below about 11.75 volts for more than about 30 seconds.

Each front fog lamp includes an integral adjustment screw to be used for static aiming of the fog lamp beams.

HAZARD WARNING LAMPS

The hazard warning system includes the IC, the BCM and the hazard switch in the instrument panel switch bank of the Integrated Center Stack (ICS) module located in the center stack area of the instrument panel. The hazard switch provides a hard wired input to the BCM. When the BCM receives an input from the hazard switch, it controls hazard warning system operation and flash rate by controlling battery voltage outputs through high side drivers on the front and rear, right and left turn signal control circuits.

The BCM also sends the appropriate electronic messages to the IC over the CAN data bus to control the illumination and flash rate of the right and left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the IC electronic circuit board that emulates the sound emitted by a conventional electromechanical hazard warning flasher.

HEADLAMPS

The headlamp system includes the IC, the BCM, the headlamp switch on the instrument panel, the Steering Column Module (SCM) and the multi-function switch on the steering column. The headlamp bulbs have a path to ground at all times through their connection to the headlamp and dash wire harness. The headlamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The BCM will store a Diagnostic Trouble Code (DTC) for any shorts or opens in the headlamp circuits.

The BCM monitors a hard wired multiplex input to determine the status of the headlamp switch on the instrument panel, while the SCM monitors a hard wired multiplex input from the multi-function switch to determine whether the headlamp high or low beams are selected. The SCM sends the appropriate **headlamp beam select switch status** messages to the BCM over the CAN data bus. The BCM responds to these input conditions by controlling an output to the headlamp shutter solenoid to activate the appropriate headlamp beam output level. The BCM also sends the appropriate electronic messages to the IC to control the illumination of the high beam indicator.

When the optical horn feature is selected, the low beams will shut OFF about 200 milliseconds after

the high beams are activated. The BCM also remembers which beams (LOW or HIGH) were selected when the headlamps were last turned OFF, and energizes those beams again the next time the headlamps are turned ON. The BCM provides a battery saver (load shedding) feature for the headlamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position.

The SCM provides a fail-safe feature for the headlamps, which will cause the BCM to turn the low beam headlamps ON automatically if there is no input available from the multi-function switch. The BCM provides a fail-safe feature for the headlamps, which will turn the low beam headlamps ON automatically if there is no input available from the headlamp switch. The BCM also provides a fail-safe feature for the headlamps that will turn the headlamps ON automatically whenever a loss of CAN bus communication is detected with the ignition switch in the ON position.

Each headlamp includes integral adjustment screws to be used for static aiming of the headlamps.

HEADLAMP TIME DELAY

The headlamp time delay feature includes the headlamp switch and the BCM. This feature is customer programmable using the Electronic Vehicle Information Center (EVIC) switches and the U-Connect Touch™ screen module in the Integrated Center Stack (ICS). If the headlamp switch is in the **AUTO** (Automatic) position when the ignition switch is moved from the ON position to any position except ON, then the headlamps will remain illuminated until after the selected delay interval has elapsed. The park lamps will not stay ON during the headlamp time delay interval. The default delay interval is 90 seconds, but can be reprogrammed by the customer using the EVIC switches.

MIRROR APPROACH LAMPS

The approach lamps integral to the outside rear view mirrors on vehicles equipped with the Passive Entry (PE) system are controlled by the interior courtesy lamp circuit. Refer to **OPERATION** .

MIRROR SIGNAL LAMPS

The signal lamps integral to the outside rear view mirrors on vehicles so equipped are controlled by the turn signal circuits.

PARK LAMPS

The park lamps system includes the headlamp switch on the instrument panel and the BCM. The front park lamp bulbs and LED unit marker lamps each have a path to ground at all times through their connection to the headlamp and dash wire harness. The headlamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The rear park/tail lamp and side marker LED units and the license plate lamp bulbs each have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal.

The BCM monitors a hard wired multiplex input from the headlamp switch. The BCM responds to this input by controlling a battery voltage output to the appropriate lamps and bulbs through high side drivers on the front and rear, right and left lamp driver and control circuits.

The BCM provides a battery saver (load shedding) feature for the park lamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position. The BCM also provides a fail-safe feature for the park lamps, which will turn the park lamps and low beam headlamps ON automatically if there is no input available from the headlamp switch. The BCM also provides a fail-safe feature for the park lamps that will turn the park lamps and low beam headlamps ON automatically whenever a loss of CAN bus communication is detected with the ignition switch in the ON position.

SMARTBEAM® SYSTEM

The optional SmartBeam® (auto high beam) system includes the SmartBeam® module with digital imager camera and electronic circuitry integral to the electrochromic inside rear view mirror, the SCM, the BCM, the IC, the headlamp switch and the multi-function switch. First, the **Auto High Beams** option must be enabled using the customer programmable features function of the EVIC. Then the **AUTO** (Automatic) position must be selected using the rotary knob of the headlamp switch, the headlamp beam selector switch must be in the high beam position and the appropriate ambient light conditions must be present. Finally, the vehicle speed must be greater than 32 kilometers-per-hour (20 miles-per-hour).

Once all of these prerequisites have been met, the SmartBeam® camera and its circuitry within the electrochromic mirror automatically sends the appropriate electronic **headlamp beam select switch status** messages to the BCM over the Local Interface Network (LIN) data bus. The BCM then responds to these messages by providing an output to the headlamp bulbs or the lighting elements through the right and left low and high beam feed circuits to illuminate the headlamps. The BCM also sends the appropriate electronic messages back to the IC to control the illumination of the high beam indicator.

The SCM continues to monitor the multi-function switch, and will send the appropriate electronic messages to the BCM, which relays these messages to the SmartBeam® circuitry in the inside rear view mirror to manually invoke the beam select switch momentary optical horn (flash-to-pass) feature or, when a detent switch position is selected to override SmartBeam® operation.

TURN SIGNAL LAMPS

The turn signal lamps system includes the multi-function switch on the steering column, the SCM, the IC and the BCM. The front turn signal lamp bulbs each have a path to ground at all times through their connection to the headlamp and dash wire harness. The headlamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The rear turn signal LED units have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal.

The SCM monitors a hard wired multiplex input from the multi-function switch to determine the status of the turn signal switch, then sends the appropriate electronic **turn signal switch status** messages to the BCM over the CAN data bus. The BCM responds to these messages by controlling a battery voltage output and the flash rate for either the right or left turn signal lamps through high side drivers on the appropriate front and rear, right or left turn signal control circuits. The BCM also sends the appropriate electronic messages to the IC to control the illumination and flash rate of the right or left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto

the IC electronic circuit board that emulates the sound emitted by a conventional electromechanical turn signal flasher.

The BCM also provides a Turn Signal ON warning that will send a **turn signal ON warning** request message to the IC over the CAN bus that causes the IC to generate repetitive chimes to indicate that a turn signal has been active continuously for 1.6 kilometers (1 mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per-hour). The chime will continue until the turn signal input becomes inactive or until the vehicle speed message indicates that the speed is less than 22 kilometers-per-hour (15 miles-per-hour), whichever occurs first.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - EXTERIOR LIGHTING

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

NOTE: When diagnosing the exterior lighting circuits, remember that high generator output can burn out bulbs rapidly and repeatedly; and, that dim or flickering bulbs can be caused by low generator output or poor battery condition. If one of these symptoms is a problem on the vehicle, be certain to diagnose the battery and charging system, then repair as necessary.

NOTE: **A good ground is necessary for proper lighting operation. If a lighting problem is being diagnosed that involves multiple symptoms, systems, or components, the problem can often be traced to a loose, corroded, or open ground.**

The lamps and the hard wired circuits between components related to the exterior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between modules and other devices that provide some features of the exterior lighting system. The most reliable, efficient, and accurate means to diagnose the exterior lighting system or the electronic controls and communication related to exterior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ACRONYMS USED IN THE FOLLOWING SERVICE INFORMATION	
Adaptive Front Lighting System	AFLS
Adaptive Front Lighting System Module	AFLSM
Automatic High Beam Module	AHBM
Body Control Module	BCM
Center High-Mounted Stop Lamp	CHMSL
Controller Antilock Brake	CAB
Controller Area Network	CAN
Daytime Running Lamps	DRL
Diagnostic Trouble Code	DTC
Instrument Cluster	IC
Integrated Center Stack	ICS
Light-Emitting Diode	LED
Local Interface Network	LIN
Steering Angle Sensor	SAS
Steering Column Control Module	SCCM
Steering Control Module	SCM
Transmission Range Sensor	TRS

BACKUP LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
BACKUP LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace backup lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open backup lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open backup lamp

		feed circuit if required.
	4. Ineffective switch.	4. Test and replace backup lamp switch (manual transmission) or TRS (automatic transmission) if required.
	5. Ineffective BCM inputs or outputs.	5. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
BACKUP LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted backup lamp feed circuit if required.
	2. Ineffective switch.	2. Test and replace backup lamp switch (manual transmission) or TRS (automatic transmission) if required.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

BRAKE LAMPS

NOTE: **The rear lamp units and the CHMSL are illuminated by several LED units that are soldered to the electronic circuit boards within the lamp housings. The brake lamps are powered by high side drivers within the BCM based upon an input to the CAB from the brake pedal position sensor. If all of the LED units within the CHMSL fail to operate, diagnose and repair the brake lamps before attempting to repair the CHMSL. If the brake lamp LED units in the rear lamps operate but none of the CHMSL LED units illuminate, test and repair the CHMSL ground or feed circuit if required. If some of the rear lamp or CHMSL LED units operate and others do not, the outer rear lamp or CHMSL assembly must be replaced with a new unit.**

CONDITION	POSSIBLE CAUSES	CORRECTION
BRAKE LAMP DOES NOT ILLUMINATE	1. Ineffective ground circuit.	1. Test and repair open brake lamp ground circuit if required.
	2. Ineffective fuse.	2. Test and replace the fuse if required.
	3. Ineffective feed circuit.	3. Test and repair open stop lamp output circuit if required.
	4. Ineffective brake pedal position sensor.	4. Test and replace brake pedal position sensor if required.
	5. Ineffective CAB inputs or outputs.	5. Use a diagnostic scan tool to test the CAB inputs and outputs. Refer to the appropriate diagnostic information.
	6. Ineffective BCM inputs or	6. Use a diagnostic scan tool to test

	outputs.	the BCM inputs and outputs. Refer to the appropriate diagnostic information.
BRAKE LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted stop lamp output circuit if required.
	2. Ineffective brake pedal position sensor.	2. Test and replace brake pedal position sensor if required.
	3. Ineffective CAB inputs or outputs.	3. Use a diagnostic scan tool to test the CAB inputs and outputs. Refer to the appropriate diagnostic information.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

DAYTIME RUNNING LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
DAYTIME RUNNING LAMPS WILL NOT ILLUMINATE	1. Incorrect BCM configuration.	1. Use a diagnostic scan tool to check and configure BCM if required.
	2. Automatic transmission in PARK position.	2. Place the transmission gear selector lever in any position except PARK.
	3. Parking brake applied.	3. Release the parking brake.
	4. Engine not running.	4. Start the engine.
	5. Ineffective BCM inputs or outputs.	5. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
	6. Ineffective LED units.	6. Replace the front lamp unit if required.

FRONT FOG LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
FRONT FOG LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace front fog lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open front fog lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open front fog lamp feed circuit if required.
	4. Ineffective switch.	4. Test and replace headlamp switch if required.
	5. Ineffective BCM inputs or	5. Use a diagnostic scan tool to test

	outputs.	the BCM inputs and outputs. Refer to the appropriate diagnostic information.
FRONT FOG LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted front fog lamp feed circuit if required.
	2. Ineffective switch.	2. Test and replace the headlamp switch if required.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

HAZARD WARNING LAMPS

NOTE: The hazard switch is integral to the instrument panel switch bank, which provides a hard wired output to the BCM. Before performing any of the following tests, confirm whether the left and right turn signals operate satisfactorily. Then determine whether the other functions of the instrument panel switch bank are operational. If the turn signals are ineffective or operate improperly, or if the other instrument panel switch bank functions are ineffective, diagnose and repair those problems before attempting to repair the hazard warning lamps system.

CONDITION	POSSIBLE CAUSES	CORRECTION
HAZARD WARNING LAMPS DO NOT FLASH	1. Ineffective instrument panel switch bank (lower ICS module). 2. Ineffective BCM inputs or outputs.	1. Test and replace instrument panel switch bank (lower ICS module) if required. 2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HAZARD WARNING LAMPS DO NOT STOP FLASHING	1. Ineffective instrument panel switch bank (lower ICS module). 2. Ineffective BCM inputs or outputs.	1. Test and replace instrument panel switch bank (lower ICS module) if required. 2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

HEADLAMPS

NOTE: As part of the exterior lighting failsafe feature, upon ignition ON all exterior park lamps and the headlamp low beams will illuminate regardless of the headlamp switch control knob position if the IC cannot detect an input from the headlamp switch, or if there is a loss of communication between the multi-function

switch/SCM and the BCM. Diagnose and repair those problems before attempting to repair the headlamps. In addition, the BCM will store a DTC for an open or shorted headlamp circuit.

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace headlamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open headlamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open headlamp low beam or high beam feed circuit if required.
	4. Ineffective switch.	4. Test and replace the headlamp switch if required.
	5. Ineffective BCM inputs or outputs.	5. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HEADLAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted headlamp low beam or high beam feed circuit if required.
	2. Ineffective switch.	2. Test and replace headlamp switch if required.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HEADLAMPS ILLUMINATE WITH IGNITION ON AND HEADLAMP SWITCH OFF (FAIL-SAFE OPERATION)	1. Loss of LIN or CAN data bus communication.	1. Test and repair the LIN or CAN data bus if required. Refer to the appropriate diagnostic information.
HEADLAMPS WILL NOT SWITCH FROM HIGH TO LOW BEAMS, OR FROM LOW TO HIGH BEAMS	1. Ineffective SCM inputs or outputs.	1. Use a diagnostic scan tool and the appropriate diagnostic information for further SCM diagnosis.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

PARK LAMPS

NOTE: **As part of the exterior lighting failsafe feature, upon ignition ON all exterior park lamps and the headlamp low beams will illuminate regardless of the headlamp switch control knob position if the IC cannot detect an input from the headlamp switch, or if there is a loss of communication between the multi-function**

switch/SCM and the BCM. Diagnose and repair those problems before attempting to repair the Park Lamps. In addition, the BCM will store a DTC for an open or shorted park lamps circuit.

CONDITION	POSSIBLE CAUSES	CORRECTION
PARK LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace park lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open park lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open park lamp feed circuit if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
PARK LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted park lamp feed circuit if required.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

SMARTBEAM®

NOTE: For SmartBeam® to operate, the Auto High Beam option must be enabled using the customer programmable features function of the Electronic Vehicle Information Center (EVIC). Also, the BCM must be properly configured for the automatic headlamps option using a diagnostic scan tool. Refer to the appropriate diagnostic information.

CONDITION	POSSIBLE CAUSES	CORRECTION
SMARTBEAM® INEFFECTIVE AND RED LED ON INSIDE REAR VIEW MIRROR NOT ON	1. Feature not enabled.	1. Enable **Auto Dim High Beams** using the customer programmable features function of the Electronic Vehicle Information Center (EVIC).
	2. Automatic headlamps are not turned ON.	2. Turn automatic headlamps ON using the control knob of the headlamp switch.
	3. Headlamp high beams are not selected.	3. Turn high beam headlamps ON using the beam selector function of the multi-function switch control stalk.
	4. Vehicle speed is below 34 kilometers-per-hour (18 miles-per-hour).	4. Increase vehicle speed. SmartBeam® is not designed to operate at speeds below 34 kilometers-per-hour (18 miles-per-

		hour).
	5. Ineffective ElectroChromic (EC) mirror inputs or outputs.	5. Use a diagnostic scan tool and the appropriate diagnostic information for further EC mirror diagnosis.
	6. Incorrect Body Control Module (BCM) configuration.	6. Use a diagnostic scan tool to check and correct the BCM configuration settings if required. Refer to the appropriate diagnostic information.
	7. SmartBeam® imager lens dirty or obstructed.	7. Clean imager lens and windshield or remove obstructions from the windshield glass if required.
	8. Ineffective ground circuit.	8. Test and repair open ground circuit to inside rear view mirror as required.
	9. Ineffective feed circuit.	9. Test and repair open fused run relay output circuit to inside rear view mirror if required.
	10. Loss of CAN data bus or LIN data bus communication.	10. Use a diagnostic scan tool and the appropriate diagnostic information for further CAN data bus or LIN data bus diagnosis.
	11. Internal faults in imager camera or EC mirror circuitry.	11. Use a diagnostic scan tool and the appropriate diagnostic information for further imager camera and EC mirror (AHBM) diagnosis.
SMARTBEAM® INEFFECTIVE AND RED LED ON INSIDE REAR VIEW MIRROR FLASHING CONTINUALLY	1. SmartBeam® calibration required (slow flash - once-per-second).	1. Perform the SmartBeam® Calibration procedure.
SMARTBEAM® INEFFECTIVE AND RED LED ON INSIDE REAR VIEW MIRROR ON CONTINUOUSLY	1. SmartBeam® failed calibration procedure due to improper set up. 2. SmartBeam® failed calibration procedure due to a mechanical misalignment.	1. Perform the SmartBeam® Calibration procedure properly. 2. Use a diagnostic scan tool to retrieve the Diagnostic Trouble Code (DTC). Refer to the appropriate diagnostic information.

TURN SIGNAL LAMPS

NOTE: The turn signal switch is integral to the multi-function switch/SCM, which communicates with the BCM over the CAN data bus. Before performing any of the following tests, determine whether the other functions of the multi-function switch/SCM are operational. If the other multi-function switch/SCM functions are ineffective, diagnose and repair that problem before attempting to repair the Turn Signal Lamps.

CONDITION	POSSIBLE CAUSES	CORRECTION
ONE TURN SIGNAL LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace turn signal bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open right or left turn signal feed circuit if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
ALL RIGHT SIDE OR ALL LEFT SIDE TURN SIGNAL LAMPS (OR BOTH SIDES) DO NOT FLASH	1. Ineffective feed circuit.	1. Test and repair open right or left turn signal feed circuit if required.
	2. Ineffective SCM inputs or outputs.	2. Use a diagnostic scan tool and the appropriate diagnostic information for further SCM diagnosis.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
ALL RIGHT SIDE OR ALL LEFT SIDE TURN SIGNALS FLASH TOO RAPIDLY (MORE THAN 100 FLASHES PER MINUTE)	1. Ineffective or missing bulb.	1. Test and replace turn signal bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open bulb ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open right or left turn signal feed circuit if required.
TURN SIGNALS DO NOT AUTOMATICALLY CANCEL	1. Ineffective cancel cam.	1. Inspect and replace the turn signal cancel cam (SCCM) if required.
	2. Ineffective cancel actuator.	2. Inspect and replace the turn signal cancel actuator (SCCM) if required.

STANDARD PROCEDURE

STANDARD PROCEDURE - FRONT LAMP AIMING

VEHICLE PREPARATION FOR LAMP ALIGNMENT

1. Check for and correct any burnt out bulbs.
2. Repair or replace any faulty, worn or damaged body or suspension components that could hinder proper lamp alignment.
3. Verify proper tire inflation pressures.
4. Remove any accumulations of mud, snow or ice from the vehicle underbody and clean the front lamp lenses.
5. Verify that there is no load in the vehicle (cargo or passengers), except for the driver.

6. The fuel tank should be Full. Add 2.94 kilograms (6.5 pounds) of weight over the fuel tank for each estimated gallon of missing fuel.
7. Verify correct vehicle suspension height.

LAMP ALIGNMENT SCREEN PREPARATION

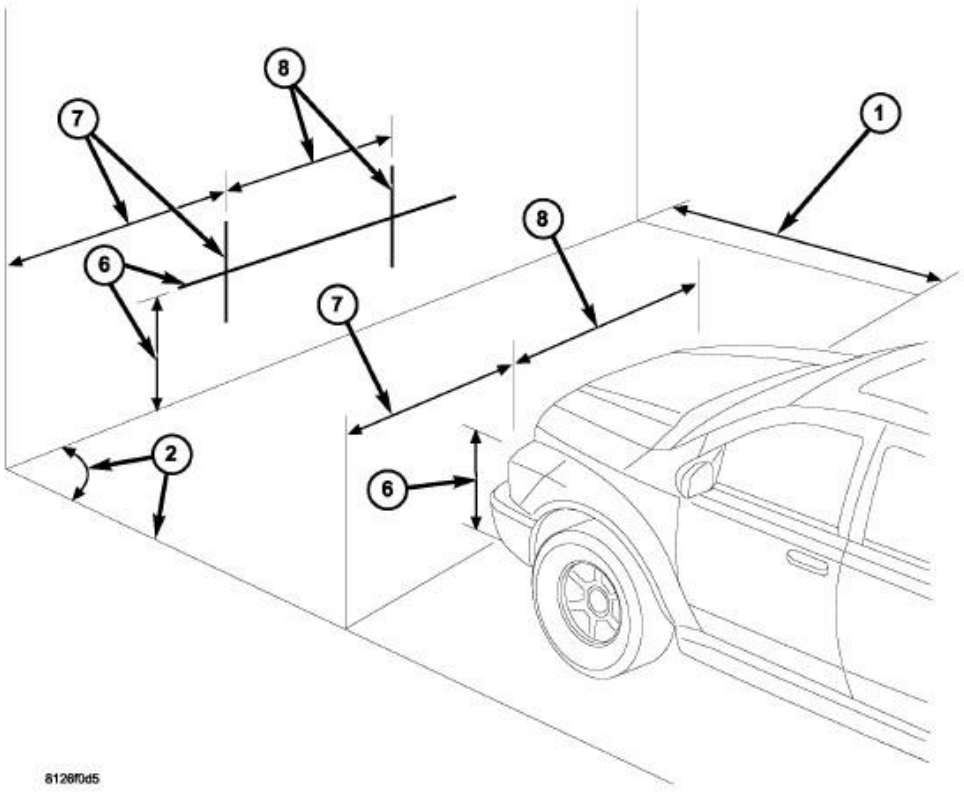

Fig. 1: Lamp Alignment Screen Preparation
Courtesy of CHRYSLER GROUP, LLC

The procedure that follows will prepare a suitable front lamp alignment screen.

1. Tape a line on a level floor 7.62 meters (25 feet) away from and parallel to the flat wall that will be used as the lamp alignment screen. The level floor will be used as the horizontal zero reference.
2. An adjacent wall or floor member that is perpendicular to the alignment screen can be used as the vertical zero reference. If there is no adjacent wall or floor member that is perpendicular to the screen, tape a second line on the floor perpendicular to both the alignment screen and the first line, and outboard of either side of where the vehicle will be positioned. This will be used as the vertical zero reference.
3. Position the vehicle so that the side of the vehicle is parallel to the vertical zero reference, and

so that the front of the lamp lenses are in the vertical plane of the parallel line taped on the floor 7.62 meters (25 feet) away from the screen.

4. Rock the vehicle side-to-side three times to allow the suspension to stabilize.
5. Jounce the front suspension three times by pushing downward on the front bumper and releasing.
6. There is a small circle mark on the lamp lens indicating the optical center. Measure the distance between the optical center of one of the lamps being aimed (head or fog) and the floor (horizontal zero reference). Transfer this measurement to the alignment screen with a piece of tape placed horizontally to the floor. This line will be used as the lamp horizontal reference.
7. Measure the distance between the vertical zero reference and the optical center of the nearest lamp being aimed (head or fog). Transfer this measurement to the alignment screen with a piece of tape placed vertically across the appropriate (head or fog) lamp horizontal reference. This is the centerline reference for the first lamp.
8. Measure the distance on center between the first and the second lamp being aimed. Transfer this measurement to the alignment screen with a second piece of tape placed vertically across the appropriate (head or fog) lamp horizontal reference. This is the centerline reference for the second lamp.

HEADLAMP ALIGNMENT

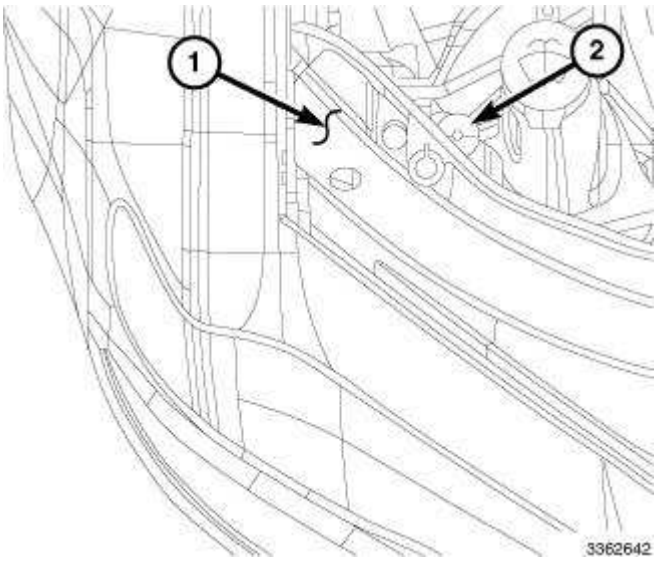

Fig. 2: Domestic
Courtesy of CHRYSLER GROUP, LLC

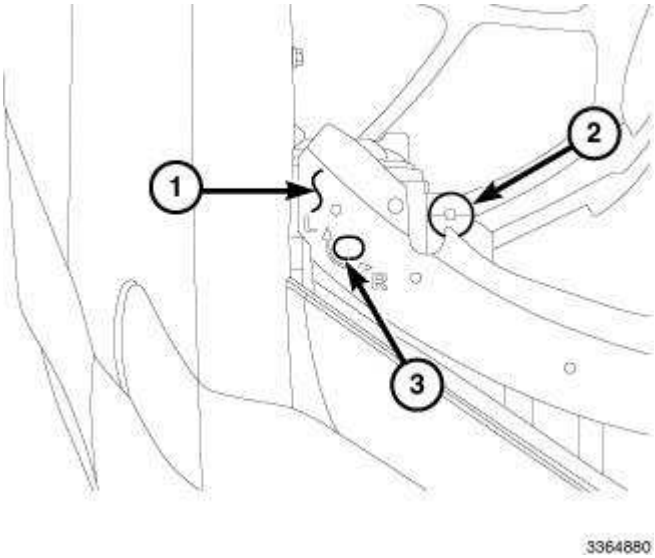

Fig. 3: Export
Courtesy of CHRYSLER GROUP, LLC

The headlamp vertical adjustment screws are accessed through funnel-like formations (2) integral to the back of each front lamp unit housing, located just rearward of the upper member of the headlamp mounting cross member (1). Export market vehicles have a second horizontal (right/left) adjustment screw (3) provided. The high beam pattern will be correct when the low beams are properly aimed.

HALOGEN HEADLAMPS

1. Turn the headlamps ON and select the LOW beams.
2. Block the light of the right headlamp.
3. Rotate the left headlamp vertical adjustment screw to adjust the right side of the beam pattern to the lamp horizontal reference height as required.
4. Block the light of the left headlamp.
5. Rotate the right headlamp vertical adjustment screw to adjust the right side of the beam pattern to the lamp horizontal reference height as required.

HIGH INTENSITY DISCHARGE HEADLAMPS

NOTE: Vehicles equipped with the High Intensity Discharge (HID) headlamps are also equipped with the Adaptive Front Lighting System (AFLS). If the AFLS module or either front or rear axle (also known as leveling) sensor has been replaced, the AFLS module must store the leveling sensor at the 0 (zero) position first, before the headlamps can be correctly and successfully aimed.

1. Create a second lamp horizontal reference line 5.3 centimeters (2.1 inches) below the initial line created in Step 6 of the Lamp Alignment Screen Preparation procedure. This line will be the High Intensity Discharge (HID) horizontal reference height.
2. Turn the headlamps ON and select the LOW beams.

3. Block the light of the right headlamp.
4. Rotate the left headlamp vertical adjustment screw to adjust the left side of the beam pattern to the HID horizontal reference height as required.
5. Block the light of the left headlamp.
6. Rotate the right headlamp vertical adjustment screw to adjust the left side of the beam pattern to the HID horizontal reference height as required.
7. For export markets only, use a screwdriver to rotate the headlamp horizontal adjustment screw on the back of each front lamp unit housing to adjust the beam horizontally to the right or left as required.

FOG LAMP ALIGNMENT

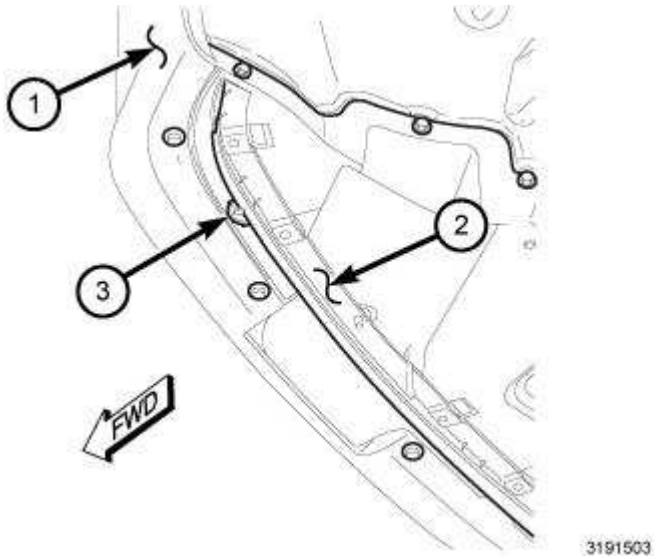

Fig. 4: Clearance Holes, Belly Pan & Fascia
Courtesy of CHRYSLER GROUP, LLC

The fog lamp adjustment screw is accessed through clearance holes (3) near the right and left outboard ends of the belly pan (2) below the front fascia (1). A properly aimed front fog lamp will project a pattern on the alignment screen 100 millimeters (4 inches) below the fog lamp centerline and straight ahead of the lamp.

1. Turn the fog lamps ON.
2. Rotate the fog lamp vertical adjustment screw on each lamp to adjust the beam height as required.

SPECIFICATIONS

SPECIFICATIONS

BULB APPLICATION TABLE

LAMP	BULB

BACKUP - DOMESTIC (REAR LAMP UNIT)	T-20 HT-W21W (7440)921
BACKUP - EXPORT (REAR LAMP UNIT)	921 - W16W
BRAKE (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
CENTER HIGH MOUNTED STOP	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
DAYTIME RUNNING LAMPS (DRL) (FRONT LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
FRONT FOG	H11LL/55W
FRONT PARK (FRONT LAMP UNIT)	PSY24W SV+
FRONT SIDE MARKER (FRONT LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
FRONT TURN SIGNAL (FRONT LAMP UNIT)	PSY24W SV+
HALOGEN HEADLAMP	HIR2LL
HIGH INTENSITY DISCHARGE HEADLAMP	D3S
LICENSE PLATE	168
OUTSIDE MIRROR APPROACH	LIGHT-EMITTING DIODES SERVICED IN MIRROR GLASS AND CASE ASSEMBLY
OUTSIDE MIRROR REPEATER	LIGHT-EMITTING DIODES SERVICED IN MIRROR HEAD ASSEMBLY
OUTSIDE MIRROR TURN SIGNAL	LIGHT-EMITTING DIODES SERVICED IN MIRROR HEAD ASSEMBLY
REAR SIDE MARKER (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
REAR STOP (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
REAR TAIL (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
REAR TURN SIGNAL - DOMESTIC (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
REAR TURN SIGNAL - EXPORT (REAR LAMP UNIT)	T-20 HT-WY21W

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Front Axle Sensor Mounting Nut	6.7	-	60
Rear Axle Sensor Mounting Screw	6	-	53

BALLAST, HIGH INTENSITY DISCHARGE (HID)

DESCRIPTION

DESCRIPTION

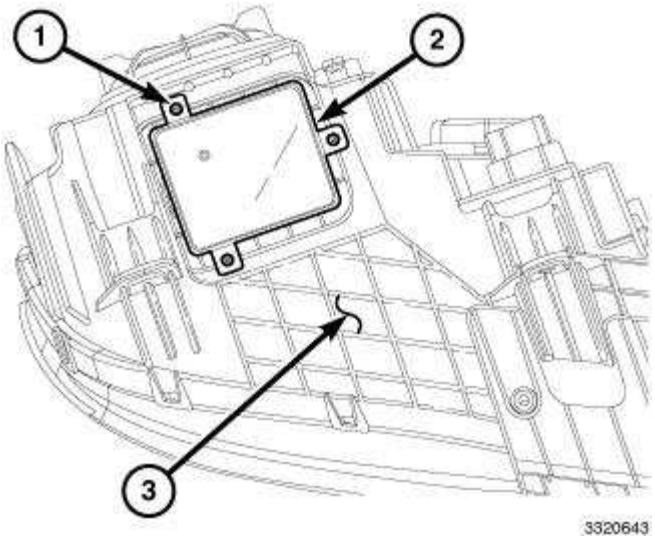

Fig. 5: Ballast Module, Front Lamp Unit & Screws
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional High Intensity Discharge (HID) headlamps have an electronic ballast module (2) mounted to the bottom of each front lamp unit (3). The electronic circuitry of the module is contained within a die cast aluminum module housing, which is secured by three screws (1) through integral mounting tabs to the molded plastic front lamp unit housing.

The sealed connector receptacle of the module is integral to the side of the housing that mates to the front lamp unit. The connector receptacle contains terminal pins that connect the module to the vehicle electrical system, to the high tension HID cable and to the front lamp unit through dedicated take outs and connectors of the front lamp unit wire harness.

The electronic ballast module cannot be adjusted or repaired and, if damaged or ineffective, it must be replaced.

OPERATION

OPERATION

The electronic ballast module operates on battery current and ground received directly from the Body Control Module (BCM) (also known as the Common Body Controller/CBC). Each module controls operation of the High Intensity Discharge (HID) igniter and lighting element for the front lamp unit on which it is installed. The BCM monitors a hard wired input from the headlamp switch to determine the proper control outputs to the electronic ballast module, which then provides a controlled voltage to operate the HID lamp igniter as appropriate.

The BCM also monitors electronic message inputs received from the Steering Control Module (SCM) over the Controller Area Network (CAN) Interior High Speed (IHS) data bus based upon multi-function switch inputs and, if the vehicle is so equipped, from the SmartBeam® (also known as the Automatic

High Beam Module/AHBM) and the Light/Rain Sensor Module (LRSM) (also known as the Rain Sensor Module/RSM or Rain/Light Sensor Module/RLSM) to determine the proper lighting outputs to provide to the ballast module.

When a proper 12 volt Direct Current (DC) control output is received from the BCM, the HID electronic ballast module activates the HID igniter integral to the lighting element through a high-tension cable to provide a high voltage (up to about 800 volts Alternating Current/AC) surge. The igniter further steps up this AC voltage to up to about 25, 000 volts, which creates a light arc between the lighting element electrodes. Once the igniter and electronic ballast module detect a suitably stable light arc, they switch over to a power-limiting mode to sustain the light arc, which requires only about 85 volts to sustain proper lighting element output.

The hard wired electronic ballast module circuits may be diagnosed using conventional diagnostic tools and procedures. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic ballast module or the electronic controls and communication that provide some features of the HID lamp system. Proper diagnosis of the electronic ballast module, the BCM, the SCM, the SmartBeam®, the LRSM, the CAN data bus and the electronic communication related to electronic ballast module operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

NOTE: Before replacing a High Intensity Discharge (HID) ballast due to an inoperative HID lamp, be certain that the HID lamp is receiving power from the Body Control Module (BCM). See the appropriate wiring information.

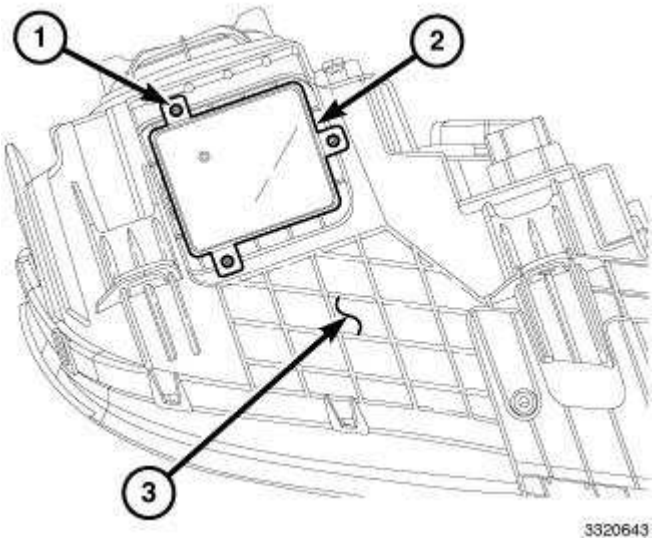

Fig. 6: Ballast Module, Front Lamp Unit & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the front lamp unit (3) from the vehicle. Refer to **UNIT, FRONT LAMP, REMOVAL**.
3. Remove the three screws (1) that secure the electronic ballast module (2) to the bottom of the front lamp unit housing.
4. Pull the ballast module away from the front lamp unit far enough to access and disconnect the wire harness connections within the front lamp unit.
5. Remove the electronic ballast module from the lamp.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials

and ensure sufficient ventilation in the working area.

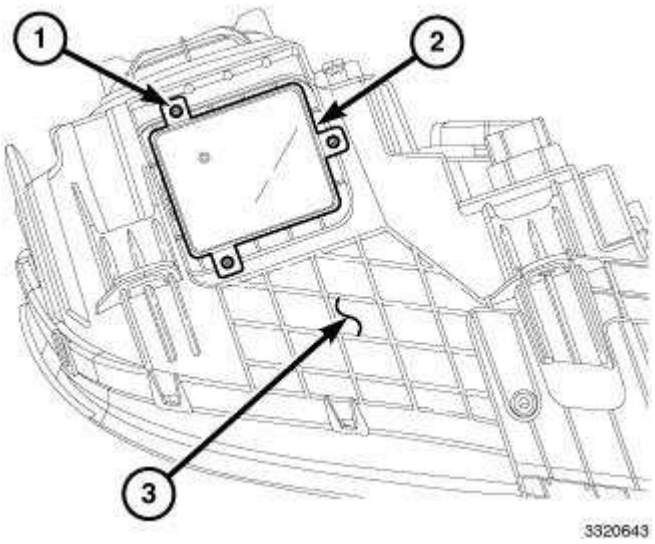

Fig. 7: Ballast Module, Front Lamp Unit & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the electronic ballast module (2) to the bottom of the front lamp unit housing (3).
2. Reconnect the wire harness connections within the front lamp unit to the module connector receptacles.
3. Install and tighten the three screws (1) that secure the module to the housing. Tighten the screws securely.
4. Reinstall the front lamp unit into the vehicle. Refer to **UNIT, FRONT LAMP, INSTALLATION**.
5. Reconnect the battery negative cable.

CAM, TURN SIGNAL CANCEL

DESCRIPTION

DESCRIPTION

The turn signal cancel cam is concealed within the clockspring integral to the Steering Column Control Module (SCCM) on the steering column. The turn signal cancel cam consists of integral eccentrics on the outer circumference of the molded plastic clockspring rotor. The clockspring mechanism provides turn signal cancellation as well as a constant electrical connection between the rotating electrical components on the steering wheel and the instrument panel wire harness on the steering column. The SCCM and the housing of the clockspring are secured to the steering column and remain stationary. The rotor of the clockspring, including the turn signal cancel cam lobes, rotates with the steering wheel.

The turn signal cancel cam is serviced as a unit with the SCCM and cannot be repaired. If ineffective or damaged, the entire SCCM must be replaced. Refer to **MODULE, STEERING COLUMN,**

REMOVAL .

OPERATION

OPERATION

When the multi-function switch control stalk is moved to a latched turn signal ON position, a turn signal cancel actuator is extended from the inside surface of the switch housing through a small opening on the left side of the clockspring case toward the turn signal cancel cam. As the steering wheel is rotated to complete the turn, one of the cam eccentrics will contact the actuator, automatically cancelling the turn signal event and releasing the latched multi-function switch control stalk to the neutral or OFF position.

LAMP, CENTER HIGH MOUNTED STOP

REMOVAL

REMOVAL

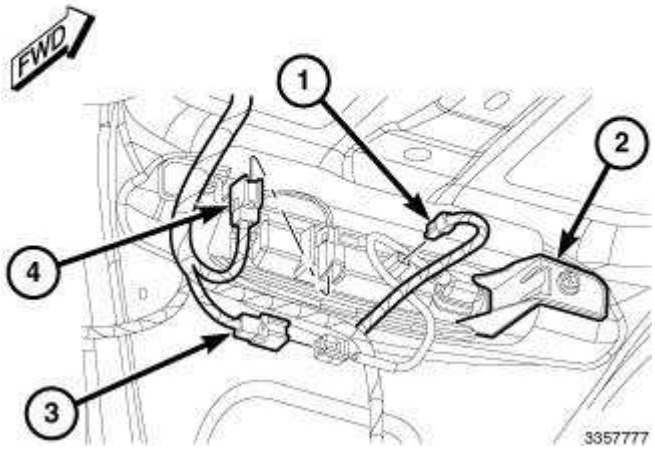

Fig. 8: Wire Harness Connector, Center High Mounted Stop Lamp (CHMSL) & Housing Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trim cover from the inside of the deck lid.
3. From the inside of the deck lid, disconnect the body wire harness connector (1) from the connector receptacle integral to the back of the Center High Mounted Stop Lamp (CHMSL) housing (2).
4. If the vehicle is so equipped, disconnect the body wire harness connector (3) from the Passive Entry (PE) deck lid release switch pigtail wire connector on the back of the CHMSL housing.
5. If the vehicle is so equipped, disconnect the body wire harness connector (4) from the rear view

camera connector receptacle on the back of the CHMSL housing.

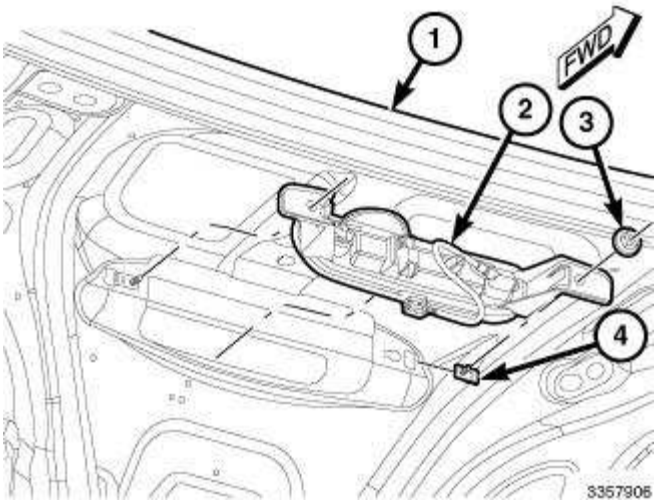

Fig. 9: Two Nuts, CHMSL, Retainer Units & Deck Lid
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two nuts (3) that secure the CHMSL (2) mounts to the two screw and retainer units (4) installed in the deck lid (1) inner reinforcement.
7. Push the integral latch tabs on both CHMSL mounts inboard far enough to enable pulling the CHMSL free from the deck lid inner reinforcement mounting hole.
8. Remove the CHMSL from the vehicle.

INSTALLATION

INSTALLATION

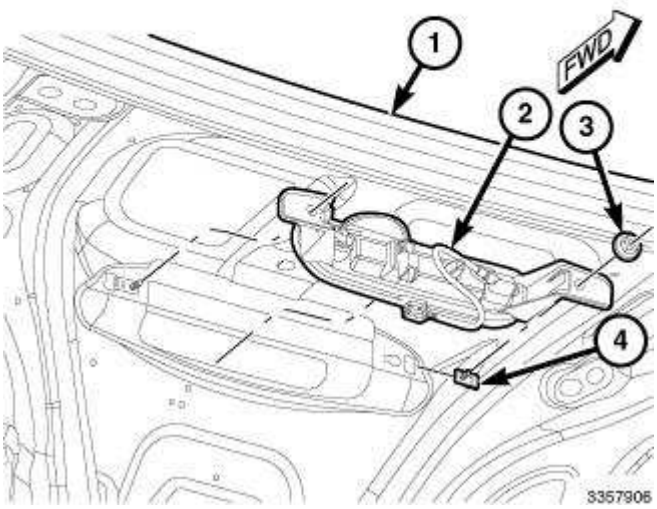

Fig. 10: Two Nuts, CHMSL, Retainer Units & Deck Lid
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain that the two screw and retainer units (4) are properly installed and in good condition in the deck lid (1) inner reinforcement.
2. Position the Center High Mounted Stop Lamp (CHMSL) (2) to the mounting hole on the inside of the deck lid inner reinforcement.
3. Push the CHMSL into the mounting hole until the two integral latch tabs snap into place and the two screws extend from the two CHMSL mounts.
4. Install and tighten the two nuts (3) that secure the CHMSL to the two screw and retainer units in the inner deck lid reinforcement. Tighten the nuts securely.

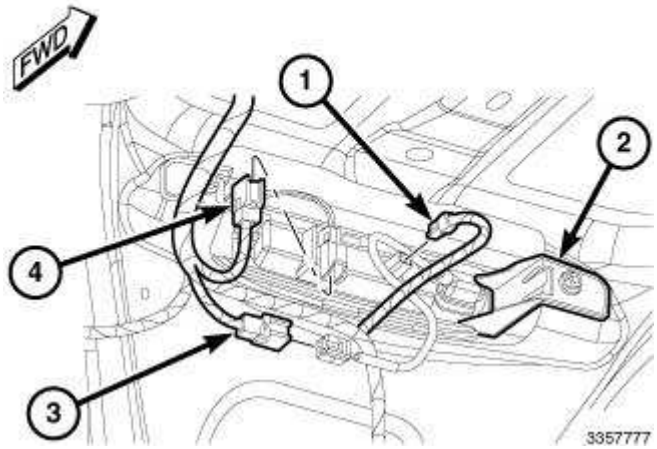

Fig. 11: Wire Harness Connector, Center High Mounted Stop Lamp (CHMSL) & Housing

Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Reconnect the body wire harness connector (1) to the connector receptacle integral to the back of the CHMSL housing (2).
6. If the vehicle is so equipped, reconnect the body wire harness connector (3) to the Passive Entry (PE) deck lid release switch pigtail wire connector on the back of the CHMSL housing.
7. If the vehicle is so equipped, reconnect the body wire harness connector (4) to the rear view camera connector receptacle on the back of the CHMSL housing.
8. Reinstall the trim cover onto the inside of the deck lid.
9. Reconnect the battery negative cable.

LAMP, FOG

REMOVAL

BULB

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

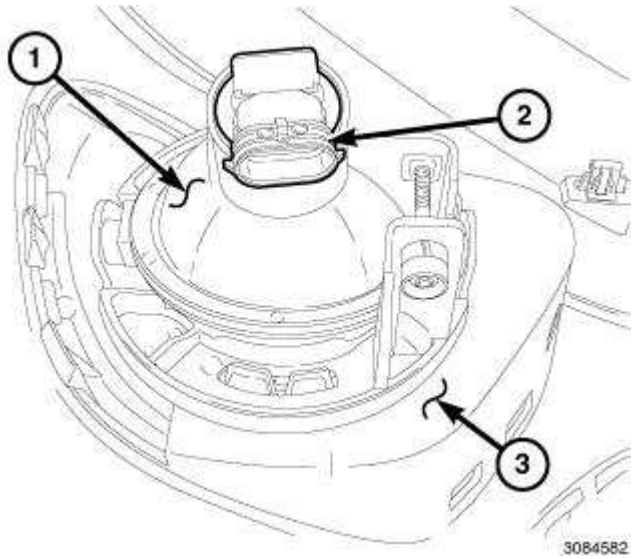

Fig. 12: Fascia Fog Lamp Seat, Connector Receptacle & Front Fog Lamp Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Loosen the front belly pan from the underbody far enough to access the back of the fog lamp on the back of the fascia fog lamp seat (3). Refer to **BELLY PAN, REMOVAL** .
4. Reach behind the front fascia to access and disconnect the headlamp and dash wire harness

connector from the front fog lamp bulb connector receptacle (2).

5. Firmly grasp the bulb on the back of the front fog lamp housing (1) and rotate it counterclockwise about 30 degrees to unlock it.
6. Pull the bulb straight out from the keyed opening in the housing.

LAMP

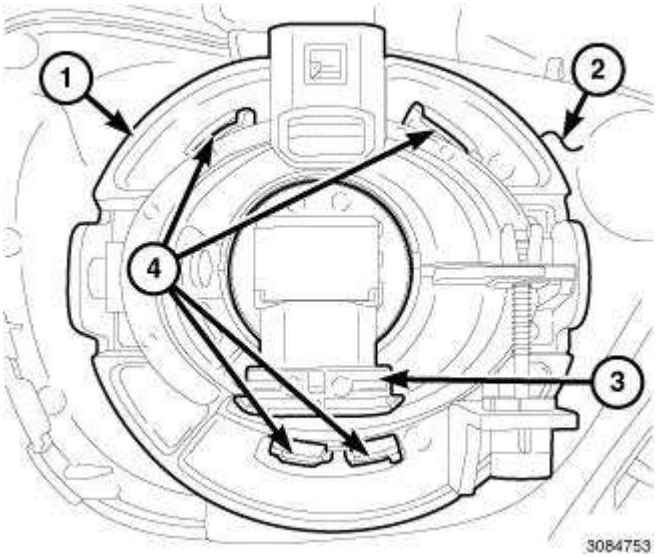

Fig. 13: Fascia, Connector Receptacle, Four Latch Features & Front Fog Lamp Mounting Ring
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Remove the front belly pan from the underbody. Refer to **BELLY PAN, REMOVAL** .
4. Reach behind the front fascia (2) to access and disconnect the headlamp and dash wire harness connector from the front fog lamp bulb connector receptacle (3).
5. Using a trim stick or another suitable wide flat-bladed tool, carefully pry between the front fog lamp mounting ring (1) and the back of the front fascia as necessary to disengage the four latch features (4) integral to the back of the fog lamp seat in the fascia from the slots in the mounting ring.
6. Remove the front fog lamp unit from the back of the fascia.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by

allowing it to contact other oily surfaces. Shortened bulb life will result.

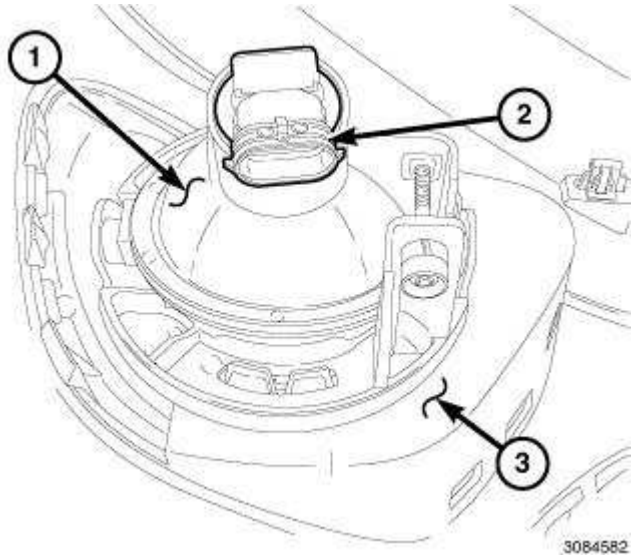

Fig. 14: Fascia Fog Lamp Seat, Connector Receptacle & Front Fog Lamp Housing
Courtesy of CHRYSLER GROUP, LLC

1. From behind the front fascia fog lamp seat (3), align the front fog lamp bulb with the keyed opening on the back of the front fog lamp housing (1).
2. Insert the bulb into the housing until the base is firmly seated.
3. Rotate the bulb clockwise about 30 degrees to lock it into place. The bulb connector receptacle (2) should be pointed straight downward.
4. Reconnect the headlamp and dash wire harness connector to the bulb connector receptacle.
5. Reinstall the front belly pan to the underbody. Refer to **BELLY PAN, INSTALLATION** .
6. Lower the vehicle.
7. Reconnect the battery negative cable.

LAMP

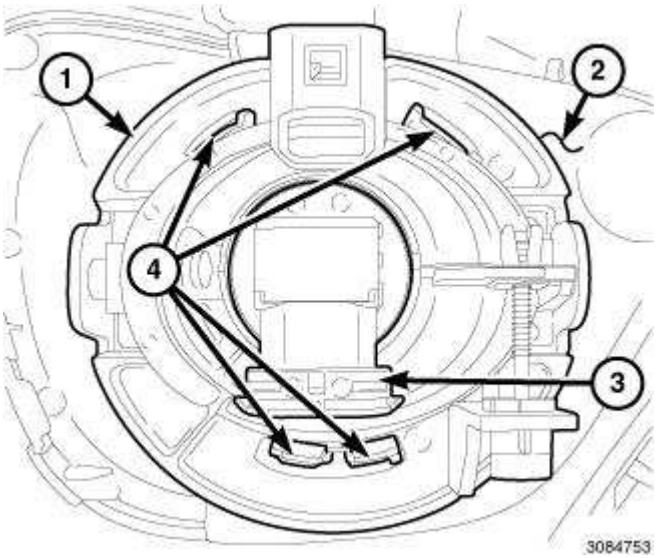

Fig. 15: Fascia, Connector Receptacle, Four Latch Features & Front Fog Lamp Mounting Ring
Courtesy of CHRYSLER GROUP, LLC

1. Reach behind the front fascia to position the front fog lamp and mounting ring unit (1) to the back of the fog lamp seat in the front fascia (2).
2. Align the four slots in the front fog lamp mounting ring with the four latch features (4) integral to the back of the fog lamp seat.
3. Press firmly and evenly on the fog lamp mounting ring until the four latch features snap into place through the mounting ring slots.
4. Reconnect the headlamp and dash wire harness connector to the front fog lamp bulb connector receptacle (3).
5. Reinstall the front belly pan to the underbody. Refer to **BELLY PAN, INSTALLATION** .
6. Lower the vehicle.
7. Reconnect the battery negative cable.
8. Confirm proper front fog lamp alignment. Refer to **STANDARD PROCEDURE**.

LAMP, LICENSE PLATE

REMOVAL

BULB

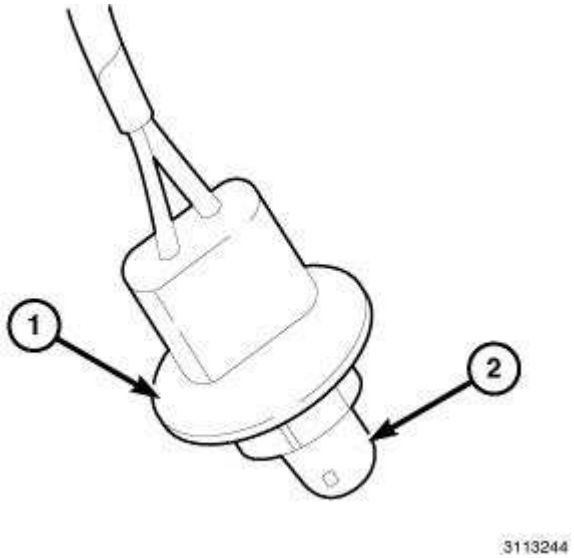

Fig. 16: Bulb & Socket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the license plate lamp from the rear fascia. Refer to **LAMP, LICENSE PLATE, REMOVAL**.
3. Pull the base of the bulb (2) straight out of the socket (1).

LAMP

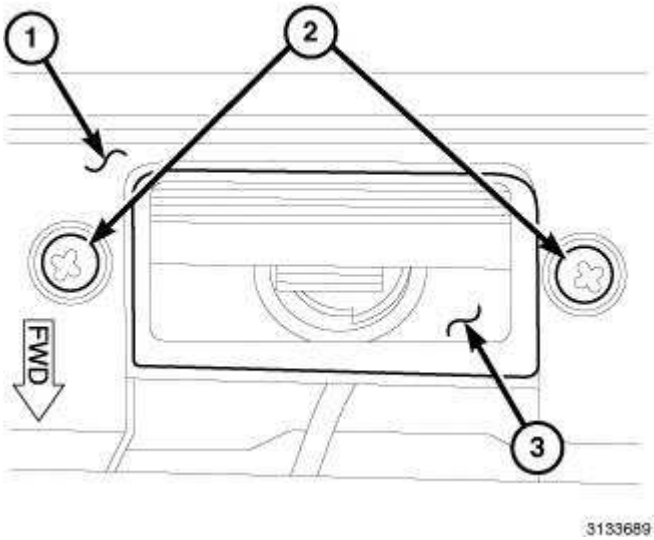

Fig. 17: Two Screws, License Plate Lamp & Rear Fascia
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the two screws (2) that secure the license plate lamp (3) to the rear fascia (1).

3. Slide the license plate lamp to one side of the fascia opening far enough to lower one end of the lamp through the opening, then lower the opposite end through the opening.

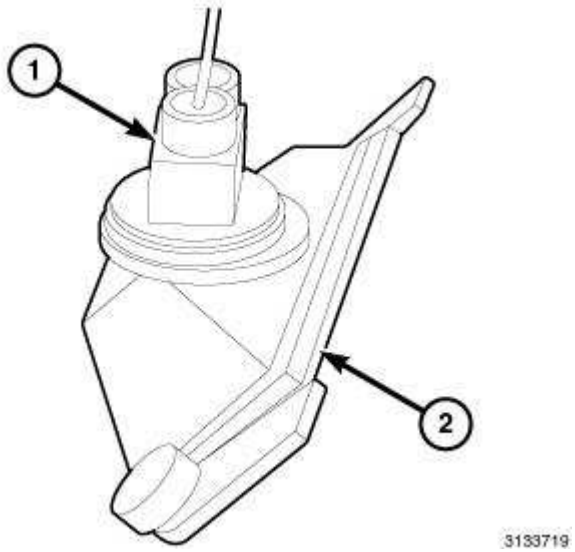

Fig. 18: Bulb Socket & Lamp Housing
Courtesy of CHRYSLER GROUP, LLC

4. Firmly grasp the bulb socket (1) on the top of the lamp housing (2) and rotate it counterclockwise about 30 degrees to unlock it.
5. Pull the socket and bulb straight out of the lamp housing.
6. Remove the lamp lens and housing from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

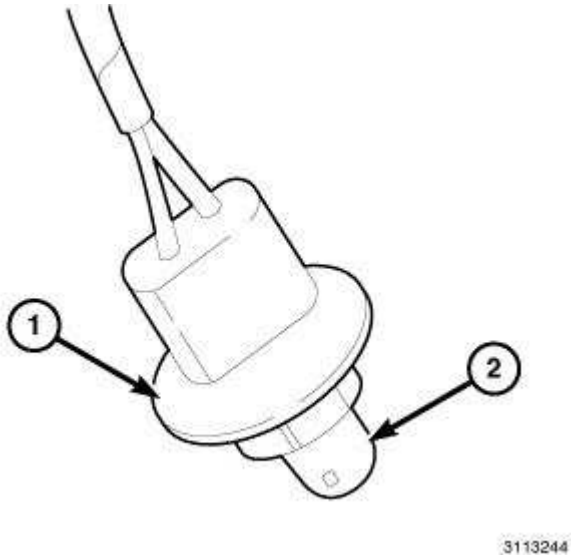

Fig. 19: Bulb & Socket
Courtesy of CHRYSLER GROUP, LLC

1. Align the base of the license plate lamp bulb (2) with the socket (1).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Reinstall the license plate lamp into the rear fascia. Refer to **LAMP, LICENSE PLATE, INSTALLATION**.
4. Reconnect the battery negative cable.

LAMP

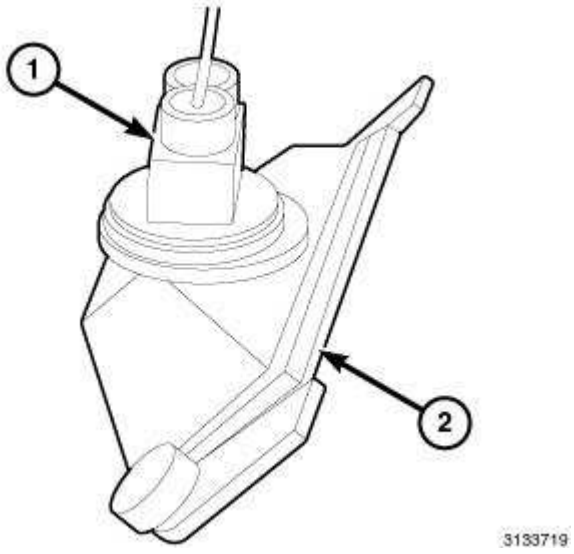

Fig. 20: Bulb Socket & Lamp Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the license plate lamp lens and housing (2) close enough to the rear fascia mounting hole to align the socket (1) and bulb with the keyed opening on the top of the housing.

2. Insert the socket and bulb into the housing until the socket is firmly seated.
3. Rotate the socket clockwise about 30 degrees to lock it into place.

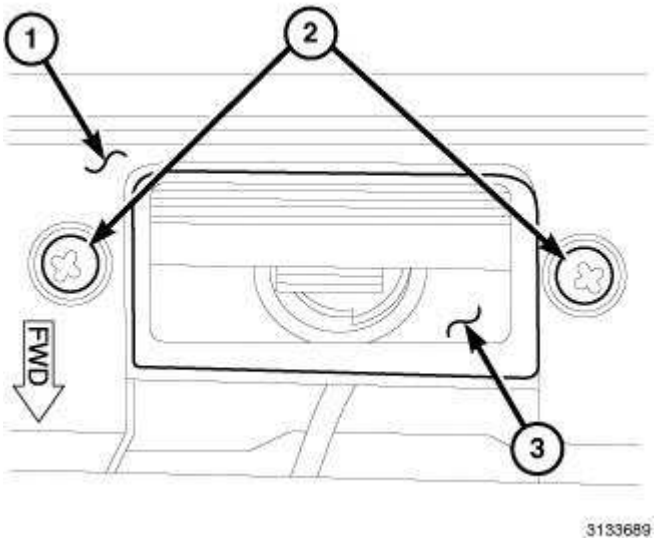

Fig. 21: Two Screws, License Plate Lamp & Rear Fascia
Courtesy of CHRYSLER GROUP, LLC

4. Insert one end of the license plate lamp (3) into one side of the rear fascia (1) mounting hole and slide it to that side far enough to insert the opposite end through the opening.
5. Center the lamp in the opening.
6. Install and tighten the two screws (2) that secure the lamp to the rear fascia. Tighten the screws securely.
7. Reconnect the battery negative cable.

LAMP, MIRROR

REMOVAL

REMOVAL

APPROACH LAMP

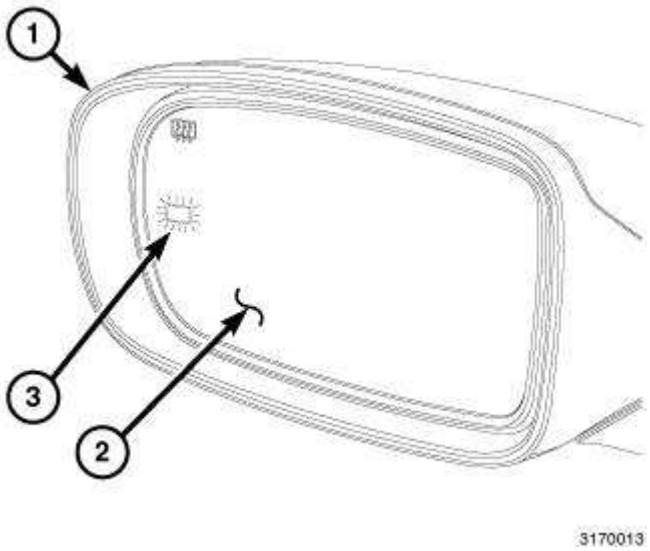

Fig. 22: Lamps, Rear View Mirrors, Mirror Glass And Case
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the Passive Entry (PE) system have approach lamps (3) located in the outside rear view mirrors (1). This lamp consists of a clear Light Emitting Diode (LED) unit integral to the mirror glass and case (2) that illuminates through the mirror glass whenever the interior courtesy lamps are active, such as when a door is ajar or with the illuminated entry feature. This lamp is serviced only as a unit with the mirror glass and case. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** .

SIGNAL LAMP

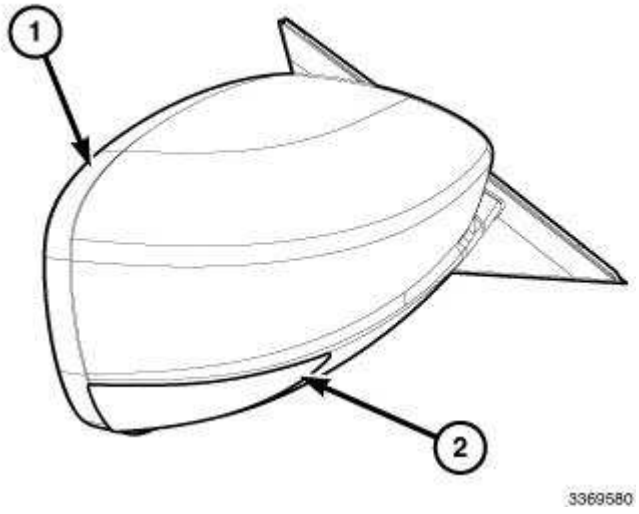

Fig. 23: Lamps & Rear View Mirrors
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional signal lamps (2) located in the outside rear view mirrors (1) have three amber Light Emitting Diode (LED) units that illuminate through a clear lens on the lower,

forward facing surface of the mirror shell cap. Illumination of these lamps is coordinated with the illumination of the turn signals for the same side of the vehicle.

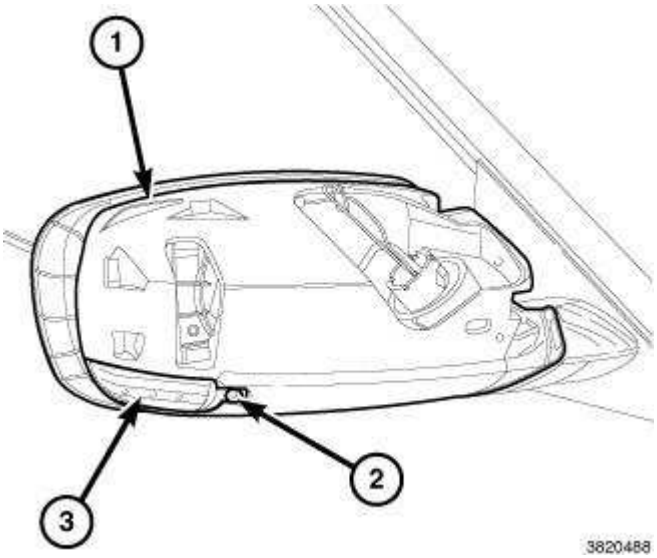

Fig. 24: Rear View Mirror, Screw & Signal Lamp
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the cap from the shell of the outside rear view mirror (1). Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** .
3. Remove the screw (2) that secures the inboard end of the signal lamp (3) to the mirror shell.
4. Pull the inboard end of the signal lamp away from the mirror shell far enough to disengage the stepped tab on the outboard end of the lamp from the shell.
5. Carefully pull the signal lamp away from the mirror shell far enough to access and disconnect the lamp pigtail wire connector from the mirror wire harness connector.
6. Remove the signal lamp from the mirror.

INSTALLATION

INSTALLATION

APPROACH LAMP

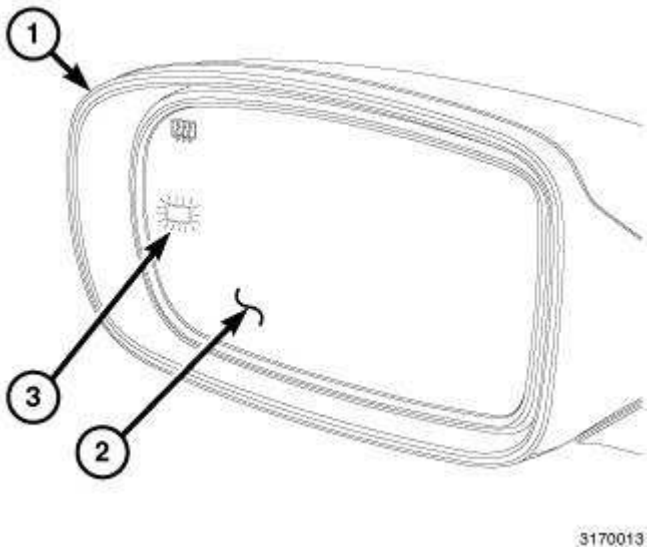

Fig. 25: Lamps, Rear View Mirrors, Mirror Glass And Case
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the Passive Entry (PE) system have approach lamps (3) located in the outside rear view mirrors (1). This lamp consists of a clear Light Emitting Diode (LED) unit integral to the mirror glass and case (2) that illuminates through the mirror glass whenever the interior courtesy lamps are active, such as when a door is ajar or with the illuminated entry feature. This lamp is serviced only as a unit with the mirror glass and case. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** or **MIRROR, OUTSIDE REARVIEW, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** .

SIGNAL LAMP

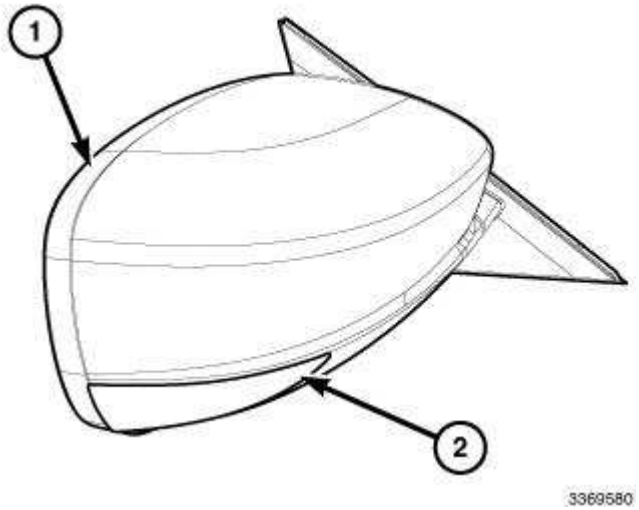

Fig. 26: Lamps & Rear View Mirrors
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional signal lamps (2) located in the outside rear view mirrors (1) have

three amber Light Emitting Diode (LED) units that illuminate through a clear lens on the lower, forward facing surface of the mirror shell cap. Illumination of these lamps is coordinated with the illumination of the turn signals for the same side of the vehicle.

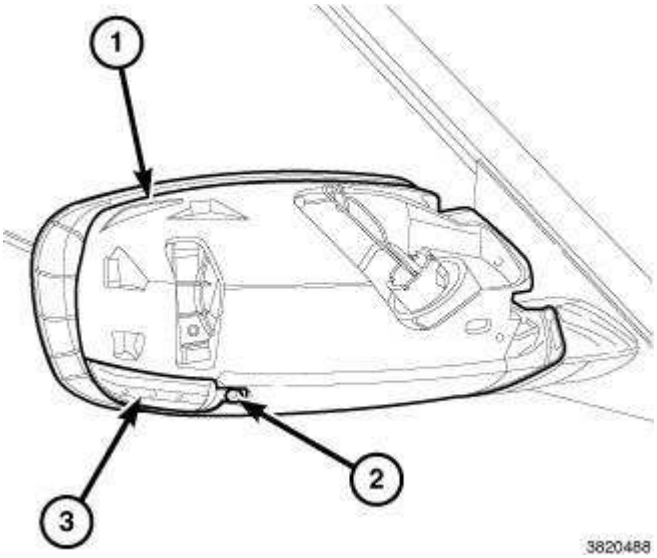

Fig. 27: Rear View Mirror, Screw & Signal Lamp
Courtesy of CHRYSLER GROUP, LLC

1. Position the signal lamp (3) close enough to the outside rear view mirror shell (1) to access and reconnect the lamp pigtail wire connector to the mirror wire harness connector.
2. Engage the stepped tab on the outboard end of the signal lamp into the opening on the outboard edge of the mirror shell.
3. Position the mounting tab on the inboard end of the signal lamp against the mirror shell.
4. Install and tighten the screw (2) that secures the signal lamp mounting tab to the mirror shell. Tighten the screw securely.
5. Reinstall the cap onto the mirror shell. Refer to **MIRROR, OUTSIDE REARVIEW, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** .
6. Reconnect the battery negative cable.

LAMP, TAIL STOP TURN

REMOVAL

BULB

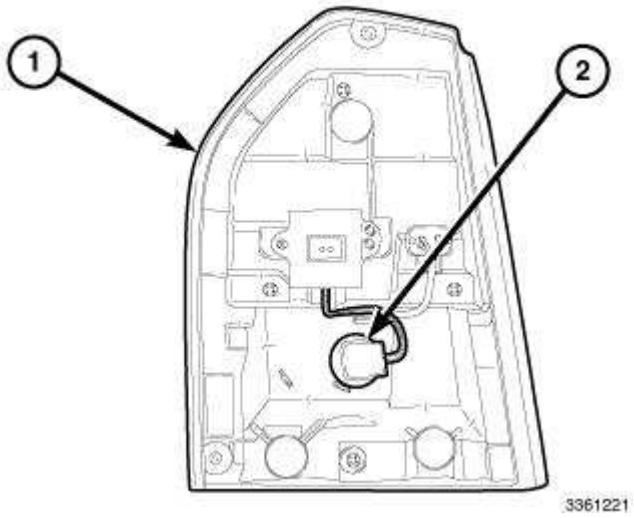

Fig. 28: Domestic Market
Courtesy of CHRYSLER GROUP, LLC

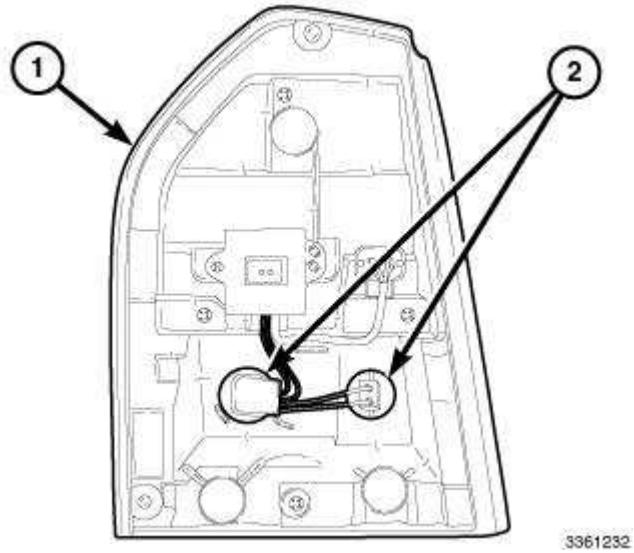

Fig. 29: Export Market
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The rear lamp unit for this vehicle includes multiple Light-Emitting Diode (LED) units for the park (or tail) lamps, the brake (or stop) lamps, the turn signal lamps (domestic market vehicles only) and the rear fog lamps (export market or if equipped only). All rear lamp units have one clear incandescent bulb for the backup (or reverse) lamps. Export market vehicles also have an amber incandescent bulb in each rear lamp for turn signals. The LED units are service only as a unit with their respective rear lamp unit. The backup lamp bulbs and amber turn signal bulbs (export only) are serviced individually. The service procedures for each bulb are the same only the bulb sizes and types are different.**

1. Disconnect and isolate the battery negative cable.
2. Remove the rear lamp unit (1) from the vehicle. Refer to **LAMP, TAIL STOP TURN, REMOVAL**.
3. Firmly grasp the appropriate bulb socket (2) on the back of the lamp housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the socket and bulb straight out of the lamp.
5. Pull the base of the bulb straight out of the socket.

LAMP

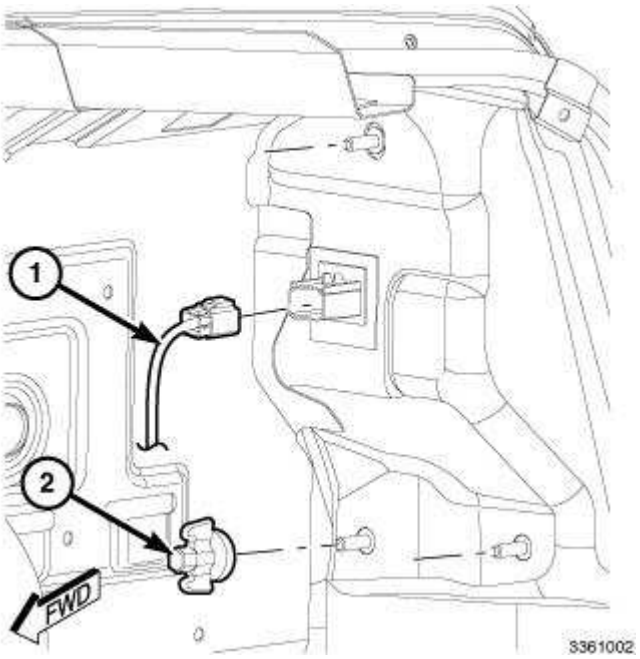

Fig. 30: Wire Harness Connector & Plastic Wing Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. From inside the trunk, peel back the trunk trim from over the lamp seat.
3. Disconnect the body wire harness connector (1) from the rear lamp unit connector receptacle.
4. Remove the three plastic wing nuts (2) that secure the lamp studs on the inside of the lamp seat.

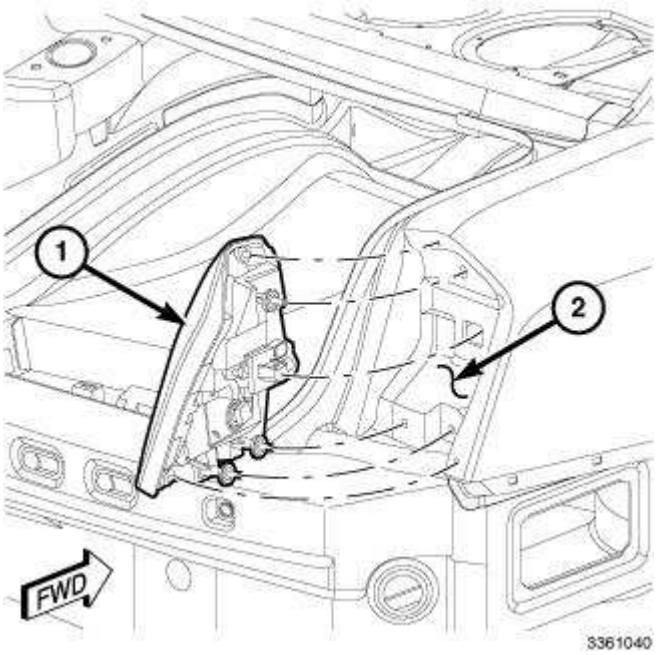

Fig. 31: Rear Lamp Unit & Lamp Seat
Courtesy of CHRYSLER GROUP, LLC

5. From the outside of the vehicle, pull the rear lamp unit (1) straight out of the lamp seat (2) in the end of the quarter panel.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

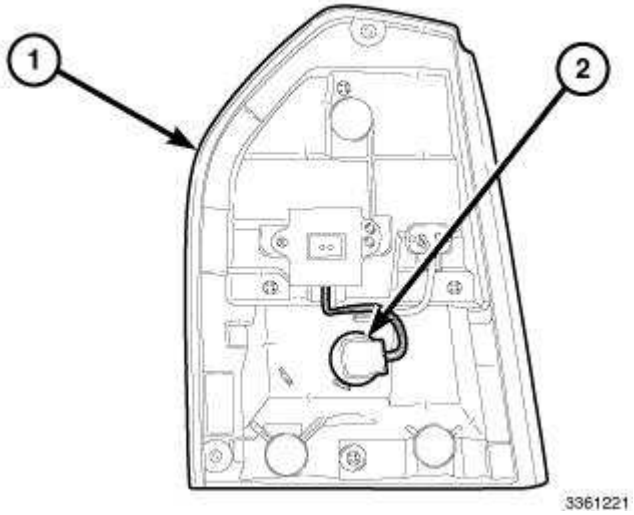

Fig. 32: Domestic Market
Courtesy of CHRYSLER GROUP, LLC

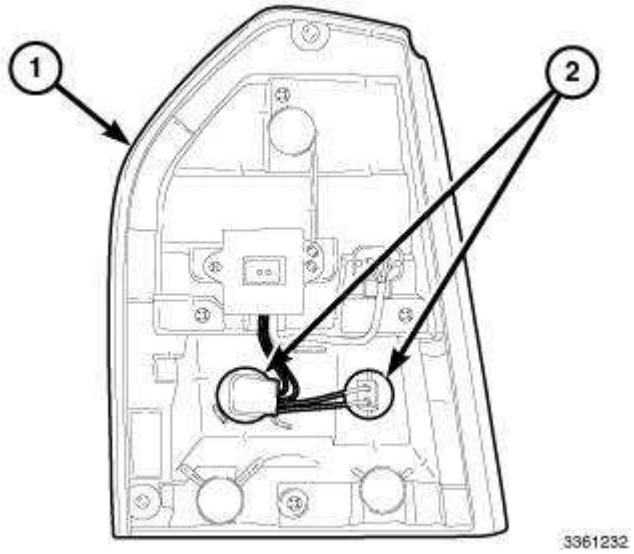

Fig. 33: Export Market
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The rear lamp unit for this vehicle includes multiple Light-Emitting Diode (LED) units for the park (or tail) lamps, the brake (or stop) lamps, the turn signal lamps (domestic market vehicles only) and the rear fog lamps (export market or if equipped only). All rear lamp units have one clear incandescent bulb for the backup (or reverse) lamps. Export market vehicles also have an amber incandescent bulb in each rear lamp for turn signals. The LED units are service only as a unit with their respective rear lamp unit. The backup lamp bulbs and amber turn signal bulbs (export only) are serviced individually. The service procedures for each bulb are the same only the bulb sizes and types are different.**

1. Align the base of the bulb with the appropriate bulb socket (2).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Align the socket and bulb with the keyed opening on the back of the rear lamp unit (1) housing.
4. Insert the socket and bulb into the housing until the socket is firmly seated.
5. Rotate the socket clockwise about 30 degrees to lock it into place.
6. Reinstall the rear lamp unit onto the vehicle. Refer to **LAMP, TAIL STOP TURN, INSTALLATION**.
7. Reconnect the battery negative cable.

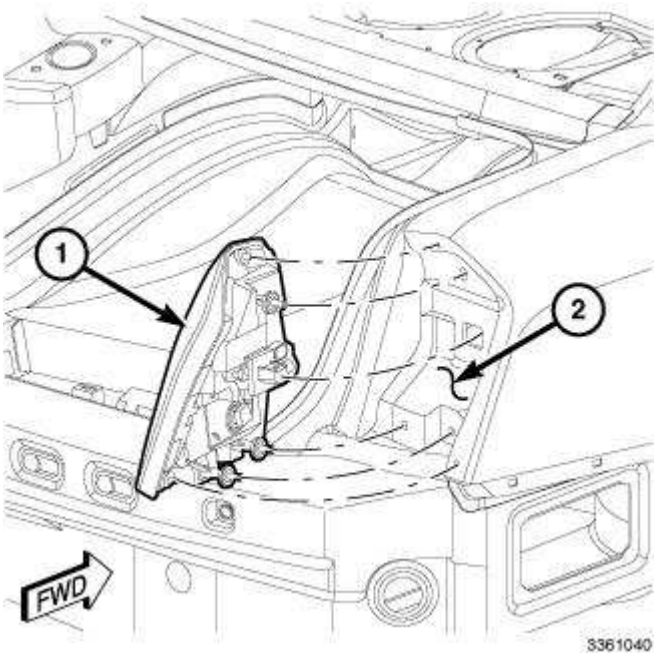

Fig. 34: Rear Lamp Unit & Lamp Seat
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear lamp unit (1) into the lamp seat (2) in the end of the quarter panel.

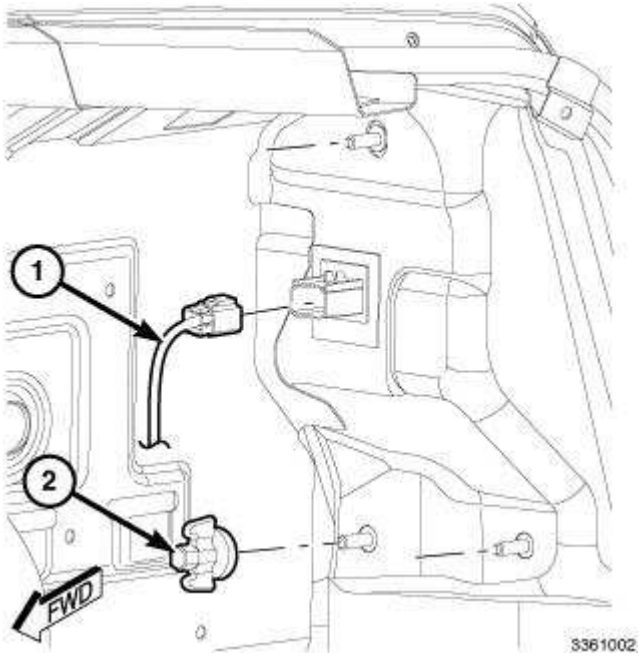

Fig. 35: Wire Harness Connector & Plastic Wing Nuts
Courtesy of CHRYSLER GROUP, LLC

2. From inside the trunk, install and tighten the three plastic wing nuts (2) that secure the rear lamp unit studs on the inside of the lamp seat. Tighten the nuts securely.
3. Reconnect the body wire harness connector (1) to the lamp connector receptacle.

4. Restore the trunk trim over the inside of the lamp seat.
5. Reconnect the battery negative cable.

MOTOR, HEADLAMP LEVELING

DESCRIPTION

DESCRIPTION

Two intelligent stepper motors are located within each front lamp unit on vehicles equipped with Adaptive Forward Lighting System (AFLS), which is standard equipment when this vehicle is equipped with High Intensity Discharge (HID) headlamps. The stepper motor that adjusts the headlamp beams up or down is referred to as a leveling motor. The stepper motor that adjusts the headlamp beams right or left is referred to as the swiveling motor.

The motors are enclosed within the front lamp unit housing for protection and are connected to the vehicle electrical system through the front lamp unit wire harness. Within each motor housing is a 12-volt Direct Current (DC) servo motor, an electronic controller board that includes the motor logic circuits, and an integral screw-drive transmission.

The headlamp leveling and swiveling motors are serviced as a unit with the front lamp unit. These motors cannot be repaired and, if ineffective or damaged, the entire front lamp unit must be replaced.

OPERATION

OPERATION

The controller board and logic circuitry of the headlamp leveling and swiveling motors control motor operation based upon electronic message inputs received from the Adaptive Front Lighting System (AFLS) module over the Local Interface Network (LIN) data bus. The AFLS module is a LIN master node, while each of the leveling and swiveling motors is a LIN slave node. The AFLS module sends commands to the stepper motors based upon many external hard wired and electronic message inputs. The microprocessor in each stepper motor drives the motor and monitors the positioning of the lamp.

The headlamp leveling and swiveling motors have a path to ground at all times. The AFLS module and the stepper motors operate on battery voltage received through a fused ignition (run) circuit; however, the system will only operate when the headlamps are turned ON. The AFLS module monitors the condition and positioning of the leveling and swiveling stepper motors and circuits, and will store a Diagnostic Trouble Code (DTC) for any motor fault that is detected. Any DTC related to the AFLS can be retrieved from the AFLS module over the Controller Area Network (CAN) data bus.

The hard wired circuits for the headlamp leveling and swiveling motors may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the active electronic elements within the headlamp leveling and swiveling motors or the electronic controls and communication between other modules and devices that provide some features of the AFLS. The

most reliable, efficient, and accurate means to diagnose the headlamp leveling and swiveling motors or the electronic controls and communication related to AFLS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SENSOR, AXLE

DESCRIPTION

DESCRIPTION

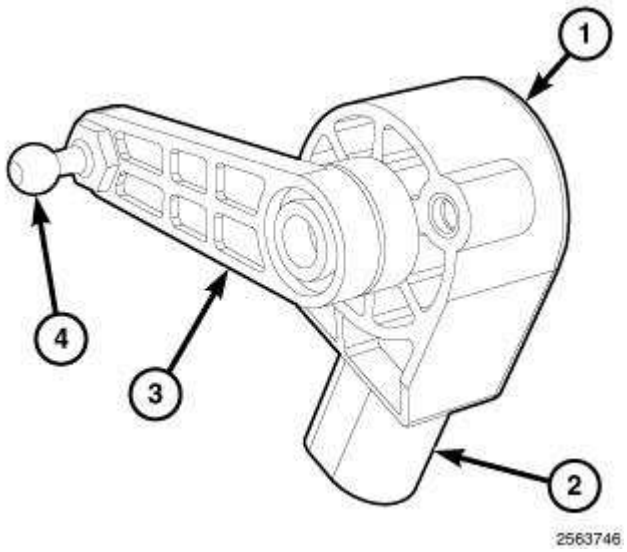

Fig. 36: Axle Sensors
Courtesy of CHRYSLER GROUP, LLC

Two axle sensors (1) are used on vehicles equipped with the optional High Intensity Discharge (HID) headlamps. One sensor is used to monitor the front suspension and another to monitor the rear suspension of the vehicle. The sensors are located at the right front and right rear.

In all applications the front and rear sensors are identical, but are secured by screws to unique fixed brackets that are mounted to a frame member above the front or rear suspension control arm. Each sensor has a mechanical lever arm (3) that rotates a sensor input shaft. The opposite end of the lever arm is secured by a ball stud (4) to a unique linkage that is connected to another ball stud on the nearest suspension member and is articulated by the changing positions of the front or rear suspension in relationship to the body of the vehicle.

The axle sensor housing has an integral connector receptacle (2) and integral mounting hole. A cavity in the center of the molded plastic axle sensor housing contains the electronic circuitry of the sensor. The sensor housing is sealed to enclose and protect the internal electronic circuitry and components. The axle sensors are each connected to the vehicle electrical system through a dedicated take out and connector of the vehicle underbody wire harnesses.

The axle sensor, the unique mounting brackets and the linkage are serviced only as a complete unit. The sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

The ball stud mounted on the front or rear suspension control arm is available for separate service replacement.

OPERATION

OPERATION

The front and rear axle sensors monitor changes in the relative distance between the vehicle body and the front or rear suspension members. The sensor circuitry is energized by the Adaptive Front Lighting System (AFLS) module and both sensors provide hard wired analog (potentiometer) inputs back to the AFLS module. The AFLS module uses these sensor inputs as logic for calculating when and how much to adjust the headlamp beams as part of the automatic headlamp leveling feature.

The body of each sensor is mounted in a fixed position, while the sensor lever arm is attached to a linkage arranged between the vehicle chassis and the front or rear suspension members. Each sensor is capable of either analog or digital outputs. The output type is determined by the wiring connections to the pins in the sensor connector receptacle. The sensor circuitry is energized by the AFLS module. As the sensor lever arm is moved, it rotates an input shaft. The input shaft rotation is monitored by the sensor circuitry, which causes changes in the output signal of the sensor. The AFLS module evaluates the output signals from the sensors to determine what changes are occurring in the front and rear suspension height of the vehicle.

The hard wired circuits for the axle sensors may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the axle sensors or the electronic controls and communication that provide the features of the AFLS system. The most reliable, efficient, and accurate means to diagnose the axle sensors or the electronic controls and communication related to AFLS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

FRONT

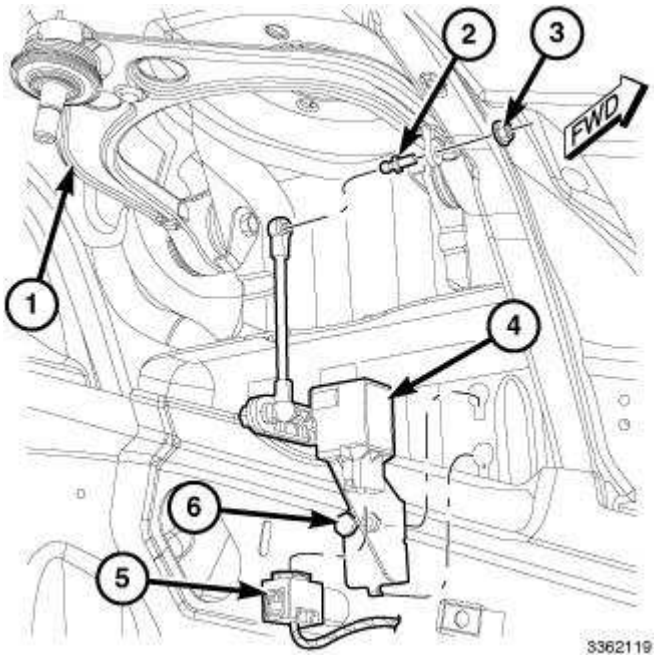

Fig. 37: Front Axle Sensor, Wire Harness Connector & Ball Stud
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Locate the front axle sensor (4) within the right front fender wheel house.
4. Disconnect the underbody wire harness connector (5) from the sensor connector receptacle.
5. Carefully unsnap the upper end of the front axle sensor link from the ball stud (2) on the forward-facing side of the front suspension upper control arm (1).
6. Loosen the two nut (6) that secures the sensor mounting bracket to the keyed hole in the inner wheel house sheet metal.
7. Lift the sensor and bracket upward far enough to disengage the head of the fastener from the keyed hole.
8. Remove the front axle sensor, bracket and link from the vehicle as a unit.

REAR

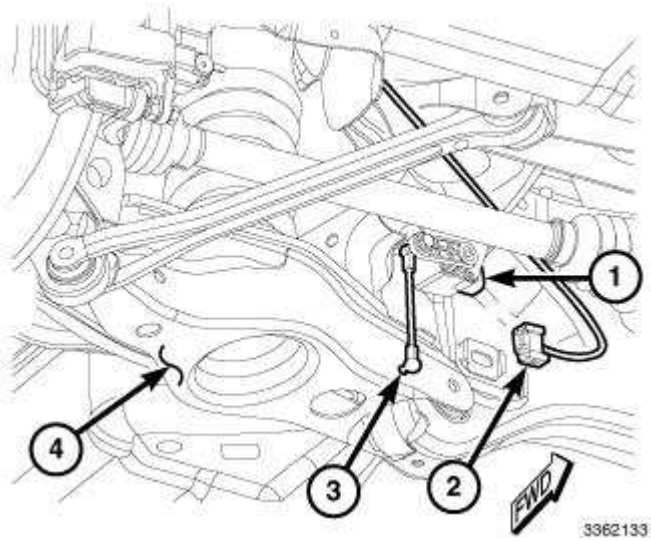

Fig. 38: Rear Axle Sensor, Wire Harness Connector & Ball Stud
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Locate the rear axle sensor (1) on a bracket between the rear suspension cradle and the rear suspension lower control arm (4).
4. Disconnect the underbody wire harness connector (2) from the rear axle sensor connector receptacle.
5. Carefully unsnap the lower end of the rear axle sensor link from the ball stud (3) on the forward-facing side of the rear suspension lower control arm.
6. Remove the screw that secures the sensor to the bracket on the rear suspension cradle.
7. Remove the rear axle sensor, bracket and link from the vehicle as a unit.

INSTALLATION

FRONT

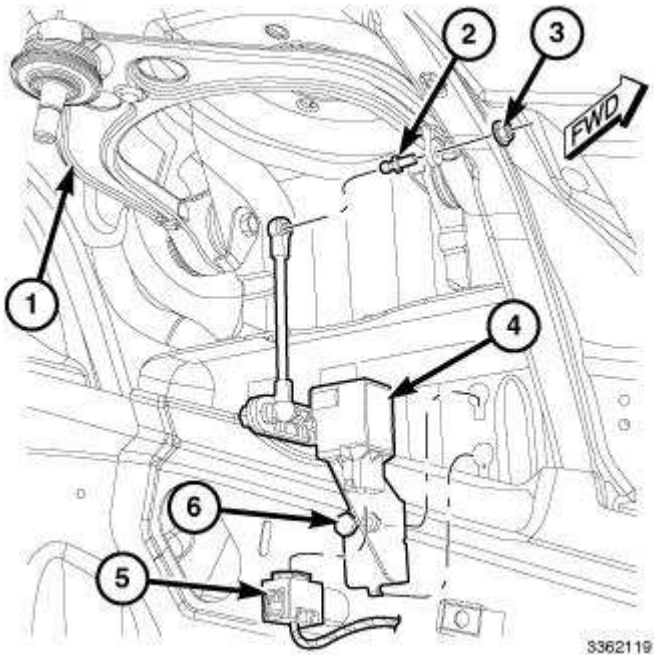

Fig. 39: Front Axle Sensor, Wire Harness Connector & Ball Stud
Courtesy of CHRYSLER GROUP, LLC

1. Position the front axle sensor, bracket and link unit (4) to the keyed holes in the inner wheel house sheet metal as a unit.
2. Engage the head of the sensor bracket fastener into the upper keyed hole and the anti-rotation tab into the lower keyed hole.
3. Tighten the nut (6) that secures the mounting bracket to the inner wheel house. Tighten the nut to 6.7 N.m (60 in. lbs.).
4. Align the socket formation on the upper end of the front axle sensor link with the ball stud (2) on the forward-facing side of the front suspension upper control arm (1). Press the link socket formation firmly and evenly over the ball stud until it snaps into place.
5. Reconnect the underbody wire harness connector (5) to the sensor connector receptacle.
6. Lower the vehicle.
7. Reconnect the battery negative cable.

NOTE: **Whenever the front or rear axle (leveling) sensor is removed and reinstalled or replaced with a new unit, it is necessary for the AFLSM to learn the sensor using a calibration procedure. Follow the programming steps outlined in the diagnostic scan tool for the "AFLS Module Calibrate" routine under "Miscellaneous Functions" for the "AFLS Module" menu item as appropriate.**

REAR

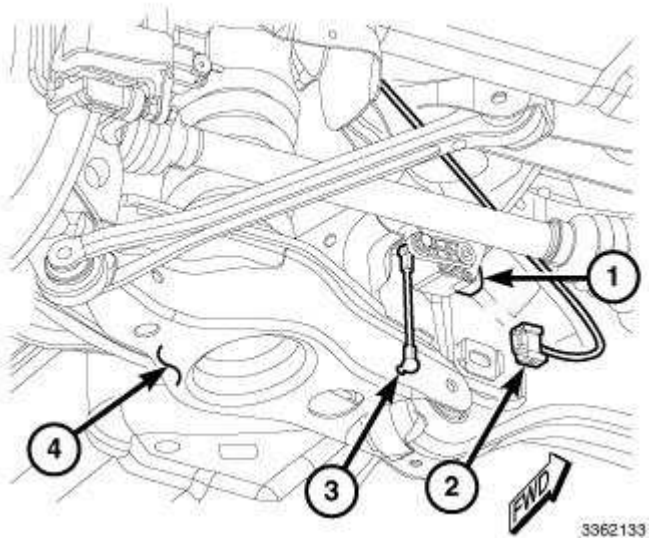

Fig. 40: Rear Axle Sensor, Wire Harness Connector & Ball Stud
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear axle sensor, bracket and link (1) to the rear suspension cradle.
2. Move the sensor lever arm as needed to access, install and tighten the screw that secures the sensor to the mounting bracket. Tighten the screw to 6 N.m (53 in. lbs.).
3. Move the sensor lever arm so that it is pointed toward the outboard side of the vehicle before positioning the sensor link to the ball stud (3) on the rear lower control arm (4).
4. Align the socket formation on the lower end of the rear axle sensor link with the ball stud on the forward-facing side of the rear suspension lower control arm. Press the link socket formation firmly and evenly over the ball stud until it snaps into place.
5. Reconnect the underbody wire harness connector (2) to the sensor connector receptacle.
6. Lower the vehicle.
7. Reconnect the battery negative cable.

NOTE: Whenever the front or rear axle (leveling) sensor is removed and reinstalled or replaced with a new unit, it is necessary for the AFLSM to learn the sensor using a calibration procedure. Follow the programming steps outlined in the diagnostic scan tool for the "AFLS Module Calibrate" routine under "Miscellaneous Functions" for the "AFLS Module" menu item as appropriate.

SMART BEAM

DESCRIPTION

DESCRIPTION

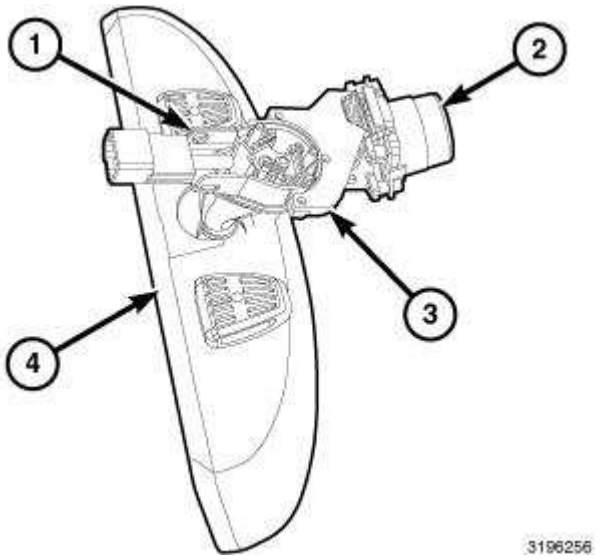

Fig. 41: Rear View Mirror, Camera Pod, Bracket
Courtesy of CHRYSLER GROUP, LLC

SmartBeam® automatic high beam headlamp control is an available option on this vehicle when it is also equipped with the automatic headlamps, automatic wipers and the electrochromic inside rear view mirror (4) options. SmartBeam® enhances the headlamp system of the vehicle by assisting the driver with the task of turning the headlamp high beams ON and OFF according to surrounding traffic conditions. The only visible component of SmartBeam® is the camera pod (2) and the rectangular forward-facing clear lens. Because the SmartBeam® camera looks through the windshield, the system may not function properly if this area of the glass is covered with ice, dirt, haze or any other obstruction.

The camera pod is secured to a bracket (3) that extends from the integral mounting bracket (1) of the electrochromic inside rear view mirror. Within the camera pod is the circuit board and circuitry of the camera. The camera pod and bracket as well as the Light Rain Sensor Module (LRSM) (also known as the Rain Sensor Module/RSM or Light Sensor Module/LSM) are located just below the rear view mirror mounting button on the inside of the windshield glass, where they are both concealed from view within the vehicle interior behind a two piece clamshell-like mirror bracket trim cover.

The digital imager camera is aimed so as to view a predetermined area in the path directly ahead of the vehicle. If the camera is not properly aimed the system performance may be diminished or altered. For optimal system performance, the SmartBeam® camera must be calibrated (aimed) by the dealer to insure that the camera aim is properly centered on the road ahead of the vehicle whenever the inside rear view mirror, the SmartBeam® camera, the windshield glass or the mirror mounting button are replaced or reinstalled.

The microprocessor-based electronics of SmartBeam® (also known as the Auto High Beam Module/AHBM) are integral to the circuit board contained within the electrochromic mirror. A short pigtail wire connects the camera circuit board directly to the electrochromic mirror circuit board, and a connector receptacle secured to the mount of the electrochromic mirror connects the mirror to the vehicle electrical system through a dedicated take out and connector of the overhead wire harness.

The SmartBeam® is serviced as a unit with the electrochromic inside rear view mirror. If the SmartBeam® camera, lens, circuitry or bracket is damaged or ineffective, the entire electrochromic inside rear view mirror must be replaced.

OPERATION

OPERATION

The SmartBeam® automatic high beam control system uses digital light-sensing technology to monitor the lighting and traffic conditions in front of the vehicle. It helps improve forward visibility during nighttime driving by initiating high beam usage as ambient lighting and traffic conditions warrant. SmartBeam® is also a Local Interface Network (LIN) slave node and communicates over a LIN data bus with the Body Control Module (BCM) (also known as the Common Body Controller/CBC), which is a LIN master node. The BCM is also a gateway to the Controller Area Network (CAN) data bus, which allows bus communication with other electronic modules in the vehicle and the diagnostic scan tool.

SmartBeam® may be enabled or disabled by using the customer programmable features function of the EVIC and selecting or deselecting the **AUTO DIM HIGH BEAMS** feature. Then the headlamp switch control knob, located on the instrument panel, must be in the **AUTO** (Automatic) position and the high beams must be selected using the beam selector function of the multi-function switch control stalk for SmartBeam® to be operational. An **AUTO HIGHBEAM ON** or **AUTO HIGHBEAM OFF** textual message will temporarily appear in the Integrated Center Stack (ICS) display to confirm the current system status.

When the SmartBeam® system is enabled, ambient light levels are low enough to require the use of high beams, the vehicle is moving over 34 kilometers-per-hour (21 miles-per-hour) and no other traffic is present; SmartBeam® will automatically turn the high beams ON. When the system detects the headlamps of an approaching vehicle or the tail lamps of a preceding vehicle, the high beams will automatically turn OFF. If the high beams are ON while decelerating and approaching a full stop, the system will turn them OFF automatically at below approximately 30 kilometers-per-hour (18 miles-per-hour).

SmartBeam® will switch the high beams ON or OFF instantaneously. The high beam indicator in the instrument cluster will illuminate as soon as the high beams come ON, and will remain illuminated until the high beams are OFF. SmartBeam® will instantaneously turn the high beams OFF if the system detects the sudden presence of vehicle lights ahead. The vehicle operator can also override the SmartBeam® selection at any time manually using the beam selection function of the multi-function switch control stalk to select the low beams, and the flash-to-pass (optical horn) feature is still functional with SmartBeam®.

SmartBeam® senses lighting conditions directly ahead of the vehicle. In certain situations, such as hills or winding roads, it may be more comfortable manually overriding the system because the vehicles in front may not be in the SmartBeam® imaging camera field of view. However, it is not likely that your high beams will cause discomforting glare to other drivers in this situation.

SmartBeam® may not function properly if its field of view is obscured. Because it looks through the windshield, the system may not function properly if this area is covered with ice, dirt, haze or any

other obstruction. For optimal system performance, the lens of the imager camera must be cleaned periodically, as it may haze over due to the air quality in the vehicle passenger compartment. Spray a small amount of glass cleaner onto a soft cloth and gently clean the lens. Do not spray the glass cleaner directly onto the lens.

SmartBeam® uses a red Light Emitting Diode (LED) unit to indicate certain faults it detects in the imager camera and circuitry. A slow (once-per-second) continual flashing of this LED indicates the SmartBeam® camera requires aiming. A constantly (solid) illuminated LED indicates the camera has failed factory aim. The LED is located to the right of the rearward facing ElectroChromic (EC) inside rear view mirror photo sensor, behind the top center of the mirror glass. This LED is only clearly visible when it is illuminated.

The BCM will store a DTC for any SmartBeam® fault that is detected. The hard wired inputs and outputs of the EC mirror may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SmartBeam® unit, the EC mirror or the electronic controls or communication between modules and other devices that provide some features of the automatic high beam system. The most reliable, efficient, and accurate means to diagnose the SmartBeam®, the EC mirror or the electronic controls and communication related to automatic high beam system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

STANDARD PROCEDURE

STANDARD PROCEDURE - SMART BEAM CALIBRATION

SmartBeam® calibration must be performed after the inside rear view mirror is replaced with a new unit, and may also be required following any rear view mirror mounting button or windshield replacement procedure. The calibration procedure ensures that the field of vision for the SmartBeam® imager is aimed at the proper path directly ahead of the vehicle. New and unused replacement SmartBeam® units are shipped in calibration mode, which will be indicated by a slow (once-per-second) continuously flashing electrochromic mirror Light Emitting Diode (LED) while the ignition switch is in the ON position. Complaints of poor or improper system performance following mirror mounting button or windshield replacement indicate the need for SmartBeam® calibration.

VEHICLE PREPARATION FOR SMARTBEAM® CALIBRATION

1. Be certain that the imager lens and the windshield glass in front of the imager lens are clean and free from obstructions.
2. Be certain that the inside rear view mirror mounting is properly tightened and secure.
3. Repair or replace any ineffective, worn or damaged suspension components that could hinder proper SmartBeam® calibration.
4. Verify proper tire inflation pressures.
5. Remove any accumulations of mud, snow or ice from the vehicle underbody.
6. Verify that there is no load in the vehicle (cargo or passengers), except for the driver.

7. The fuel tank should be FULL. Add 2.94 kilograms (6.5 pounds) of weight over the fuel tank for each estimated gallon of missing fuel.
8. Verify correct vehicle suspension height.
9. Verify that the vehicle has at least 16 kilometers (10 miles) showing on the odometer.

MARK IMAGER CENTERLINE ON WINDSHIELD

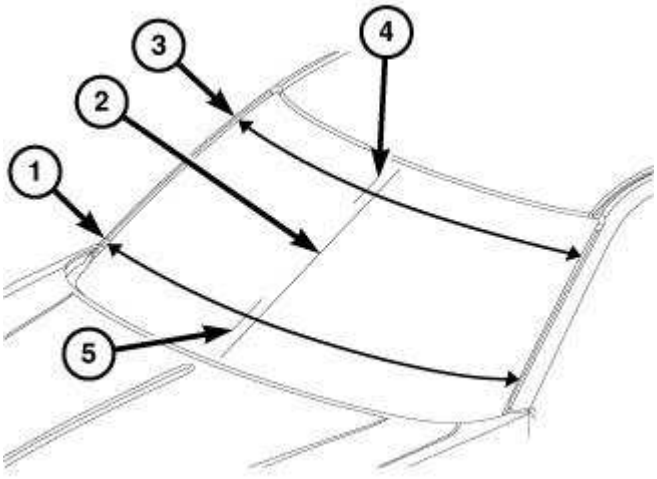

Fig. 42: Measurement, Glass, Measurement & Glass
Courtesy of CHRYSLER GROUP, LLC

1. Take a measurement (3) across the top of the windshield using the lower edge of the tint band on each side of the glass as the reference points.
2. Divide the upper measurement in half and mark that dimension near the lower edge of the tint band on the glass (4) using a grease pencil. This is the upper centerline of the glass.
3. Take a measurement (1) across the base of the windshield using the inside corner where the side blackout area intersects the lower blackout area on each side of the glass as the reference points.
4. Divide the lower measurement in half and mark that dimension near the upper edge of the lower blackout area on the glass (5) using a grease pencil. This is the lower centerline of the glass.
5. Measure and mark 27.5 millimeters (1.084 inches) toward the driver side of the windshield from the upper and lower glass centerline marks and draw a line (2) between these marks. This is the centerline of the SmartBeam® imager.

NOTE: Be certain to clean the centerline marks from the area of the glass in front of the imager lens before attempting to calibrate the SmartBeam® unit.

MARK IMAGER CENTERLINE ON BACK GLASS

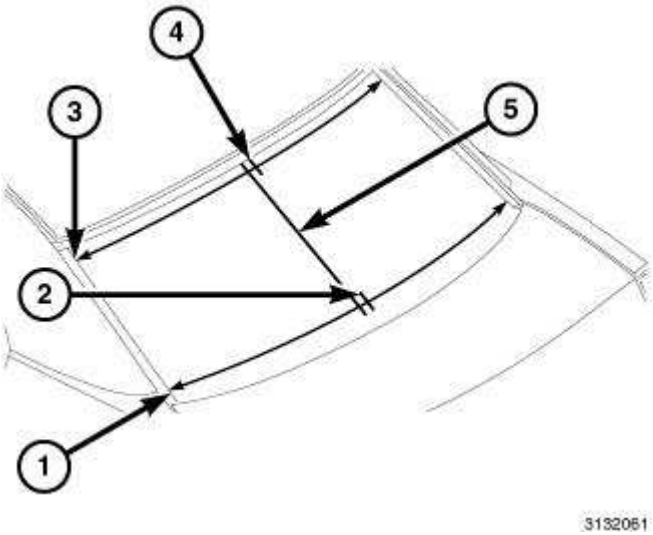

Fig. 43: Measurement, Glass, Measurement, Glass
Courtesy of CHRYSLER GROUP, LLC

1. Take a measurement (3) across the upper edge of the back glass using the vertical edges of the body back glass opening as the reference points.
2. Divide the upper measurement in half and mark that dimension on the glass (4) using a grease pencil. This is the upper centerline of the back glass.
3. Take a measurement (1) across the lower edge of the back glass using the vertical edges of the body back glass opening as the reference points.
4. Divide the lower measurement in half and mark that dimension on the glass (2) using a grease pencil. This is the lower centerline of the back glass.
5. Measure and mark 27.5 millimeters (1.084 inches) toward the driver side of the back glass from the upper and lower glass centerline marks and draw a line (5) between these marks. This is the centerline of the imager.

SET UP AIM BOARD AND TRIPOD

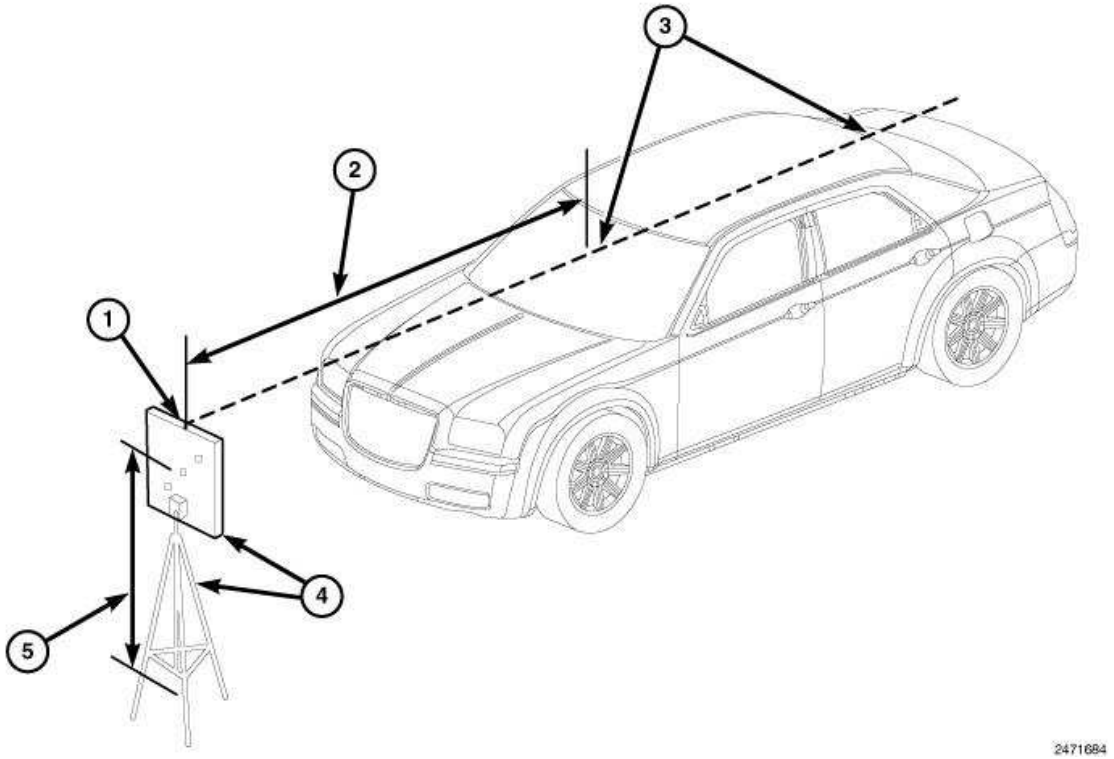

Fig. 44: Positioning Aim Board And Tripod
Courtesy of CHRYSLER GROUP, LLC

1. Position the vehicle on a level surface in a dimly lit area.
2. Place the aim board and tripod (4) (Special Tool (special tool #9649, Alignment Device, Smart Beam)) 304 centimeters (10 feet) ahead (2) of the imager camera lens.
3. Sight through the V-notch (1) in the upper edge of the aim board to align and center the board to the imager centerline marks on both the windshield and the back glass (3).
4. Adjust the tripod so that the center Light Emitting Diode (LED) on the aim board is 131 centimeters (51.5 inches) from the level floor (5).

CALIBRATION PROCEDURE

1. Connect a diagnostic scan tool to the Data Link Connector (DLC) below the driver side end of the instrument panel.
2. Turn the ignition switch to the ON position.
3. Use the diagnostic scan tool to enter the SmartBeam unit into calibration mode. Look in the diagnostic scan tool under the **SmartBeam®** or **AUTOMATIC HIGH BEAM MODULE/AHBM** menu item as appropriate. When the SmartBeam® unit has entered calibration mode, it will be indicated by a continual flashing of the ElectroChromic (EC) mirror red LED at a slow rate of once-per-second.
4. Connect the aim board transformer to illuminate the aim board LED units. The EC mirror red LED will continue to flash for five to ten seconds, then will stop flashing to indicate that it has completed calibration. If the LED illuminates continually (solid), it indicates that the calibration has failed and a Diagnostic Trouble Code (DTC) has been recorded. Use the diagnostic scan

tool to retrieve the DTC, then refer to the appropriate diagnostic information.

SWITCH, BACKUP LAMP

DESCRIPTION

DESCRIPTION

Vehicles with an electronic automatic transmission have a Transmission Range Sensor (TRS) that is used to perform several functions, including that of the backup lamp switch. The TRS may be a separate component, or it may be an integral part of an electronic automatic transmission solenoid pack or of a transmission gear selector module. The specific TRS details vary by the model of the transmission installed in the vehicle. The TRS is described in further detail elsewhere in this service information. Refer to the service and diagnostic information for the automatic transmission type installed in the vehicle.

SWITCH, HAZARD WARNING

DESCRIPTION

DESCRIPTION

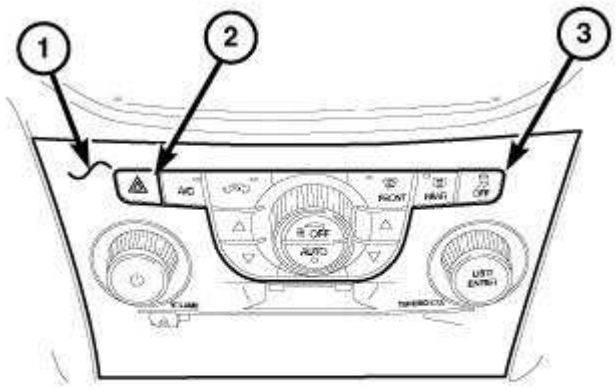

Fig. 45: Guide Pins & Switch-Bank Panel
Courtesy of CHRYSLER GROUP, LLC

The hazard switch (2) is integral to the instrument panel switch bank (3) in the vehicle feature controls module (1) (also known as the Integrated Center Stack/ICS), which is secured to the lower instrument panel center stack just below the U-Connect Touch™ screen module. A red, stencil-like International Control and Display Symbol icon for **Hazard Warning** identifies the hazard switch button. The remainder of the hazard switch circuitry is concealed within the instrument panel switch bank.

The hazard switch button has panel lamps dimmer controlled illumination for night visibility. The switch button latches to a slightly lowered position when the hazard warning system is activated and unlatches to a position flush with the other push buttons in the switch bank when the hazard warning is deactivated.

All of the circuitry and components of the hazard switch are contained within the molded plastic vehicle feature controls module. A single connector receptacle is integral to the back of the module. The switch is connected to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The hazard switch cannot be adjusted or repaired and, if ineffective or damaged, the entire instrument panel switch bank and vehicle features control module unit must be replaced. Refer to **POD, SWITCH BANK, REMOVAL** .

OPERATION

OPERATION

The status of the hazard switch is continually monitored by the circuitry within the instrument panel switch bank in the vehicle features control module (also known as the Integrated Center Stack/ICS). The switch receives battery voltage at all times through a fused battery feed circuit, and a path to ground at all times through the instrument panel wire harness.

Whenever the hazard switch is in its latched and lowered position, the hazard warning system is selected and the switch bank circuitry provides a hard wired output to the Body Control Module (BCM) (also known as the Common Body Controller/CBC). When the BCM receives a hazard switch input, it then controls hazard warning system operation and flash rate by controlling battery voltage outputs through high side drivers on the right and left, front and rear turn signal feed circuits.

The BCM also sends the appropriate electronic messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) over the Controller Area Network (CAN) data bus to control the illumination and flash rate of the right and left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the IC electronic circuit board that emulates the sound emitted by a conventional hazard warning flasher.

The hard wired circuits for the instrument panel switch bank may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the hazard warning switch or the electronic controls and communication between other modules and devices that provide some features of the hazard warning system. The most reliable, efficient, and accurate means to diagnose the hazard switch or the electronic controls and communication related to hazard warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, HEADLAMP

DESCRIPTION

DESCRIPTION

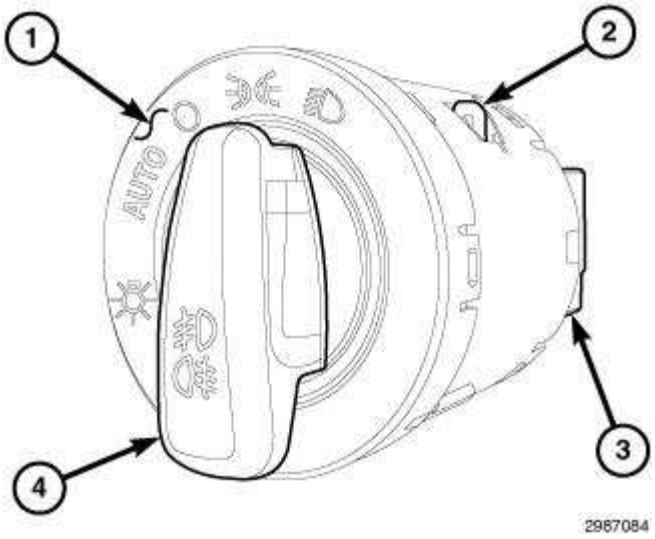

Fig. 46: Headlamp Switch, Retainers & Receptacle
Courtesy of CHRYSLER GROUP, LLC

The headlamp switch (1) is located on the instrument panel, in a cylinder-like mounting hole molded into the steering column opening cover to the left of the steering column. Several different switches are used, depending upon equipment and market requirements. The standard switch features a three-position rotary knob (4) for exterior lighting control. An optional switch has a fourth position added to the rotary knob for automatic headlamps and a momentary PUSH function added to the rotary knob for front fog lamp control.

Each of these switches is constructed of molded plastic. On vehicles with optional fog lamps the rotary knob also has the International Control and Display Symbol icon for **Front Fog Light** applied to it. The switch face plate is also labeled with graphics and icons to clearly identify the many functions of the rotary knob.

The switch housing is secured within the mounting hole of the instrument panel bezel by two spring loaded, pivoting pawl-like retainers (2), one near the bottom and another near the top. These pawls can be retracted for removal of the switch from the face of the instrument panel using a specific rotary knob actuation sequence. Refer to **SWITCH, HEADLAMP, REMOVAL**.

The back of the switch housing has an integral connector receptacle (3) containing terminal pins that connect the switch to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness. A panel dimmer controlled Light Emitting Diode (LED) unit soldered to the circuit board within the switch provides back lighting for visibility at night, but is not serviceable.

The headlamp switch cannot be repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

The headlamp switch uses a single resistor multiplexed output to control the many functions and features it provides. The switch receives a clean ground from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) on a headlamp switch MUX return circuit. The BCM then reads the switch outputs using an internal pull up on the headlamp/fog lamp switch signal circuit to control the exterior lighting functions.

The switch illumination circuit receives a path to ground at all times through an instrument panel ground circuit. The illumination level is controlled by a Pulse-Width Modulated (PWM) output received from the BCM on a panel lamps driver circuit. The BCM controls this output based upon the panel lamps dimmer signal circuit input from the interior lighting thumbwheel switch in the dimmer module. Refer to **SWITCH, DIMMER, OPERATION** .

The headlamp switch operates as follows:

- **Front Fog Lamps Control** - For vehicles so equipped, the rotary knob on the headlamp switch is depressed to activate or deactivate the optional front fog lamps. The headlamp switch provides the appropriate resistor multiplexed output to the BCM over the headlamp/fog lamp switch signal circuit, and the BCM reads and responds to this input by energizing or de-energizing the right and left front and rear fog lamp control circuits through internal High Side Drivers (HSD) and by sending an electronic confirmation message to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) over the Controller Area Network (CAN) data bus, which controls the front and rear fog lamp indicators as appropriate.
- **Exterior Lighting Control** - The rotary knob on the headlamp switch is rotated to a detent position to activate or deactivate the exterior lighting. The headlamp switch provides the appropriate resistor multiplexed output to the BCM over the headlamp/fog lamp switch signal circuit, and the BCM responds by energizing or de-energizing the right and left park lamp feed circuits and the right and left high or low beam driver circuits through internal HSDs and by sending an electronic confirmation message to the IC over the CAN data bus, which controls the high beam indicator as appropriate. The BCM also remembers which headlamp beams were last selected with the multi-function switch, and energizes those beams by default the next time the headlamps are turned ON. If the vehicle is equipped with optional automatic headlamps and the **AUTO** (Automatic) position is selected, the BCM also monitors an electronic **ambient light level** message received over the CAN data bus from the air conditioner - heater control module based upon a hard wired input from the sun sensor to turn the exterior lighting ON and OFF automatically while the ignition switch is in the ON position.

The headlamp switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HEADLAMP SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate

the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

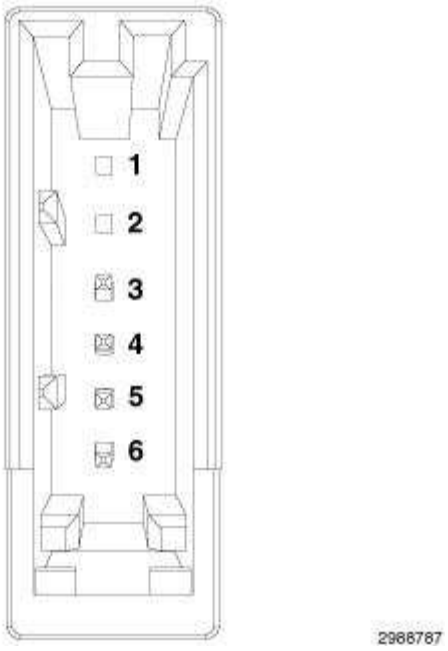

Fig. 47: Terminals Of The Switch
Courtesy of CHRYSLER GROUP, LLC

1. Remove the headlamp switch from the instrument panel. Refer to **SWITCH, HEADLAMP, REMOVAL**.
2. Disconnect the instrument panel wire harness connector from the back of the headlamp switch.
3. Using an ohmmeter, test the resistance between the terminals of the switch as shown in the Headlamp Switch Tests table.

HEADLAMP SWITCH TESTS	
SWITCH POSITION (PINS)	***RESISTANCE RANGE (OHMS)**
AUTO (3 and 6)	4028.0 - 4452.0
OFF (3 and 6)	1938.0 - 2142.0
PARK (3 and 6)	1073.5 - 1186.5
HEADLAMP (3 and 6)	627.0 - 693.0
FOG LAMP - AUTO (3 and 6)	347.2 - 383.8
FOG LAMP - OFF (3 and 6)	317.7 - 351.1
FOG LAMP - PARK (3 and 6)	280.6 - 310.1
FOG LAMP - HEADLAMP	

(3 and 6)	236.6 - 261.5
SWITCH ILLUMINATION (4 and 5)	LEDs - SET MULTIMETER TO DIODE MODE - CONNECT PIN 4 TO PLUS (+), CONNECT PIN 5 TO MINUS (-) - LEDs SHOULD BARELY GLOW
*All resistance values are plus or minus 5%.	

4. If the switch fails any of the tests, replace the ineffective headlamp switch as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

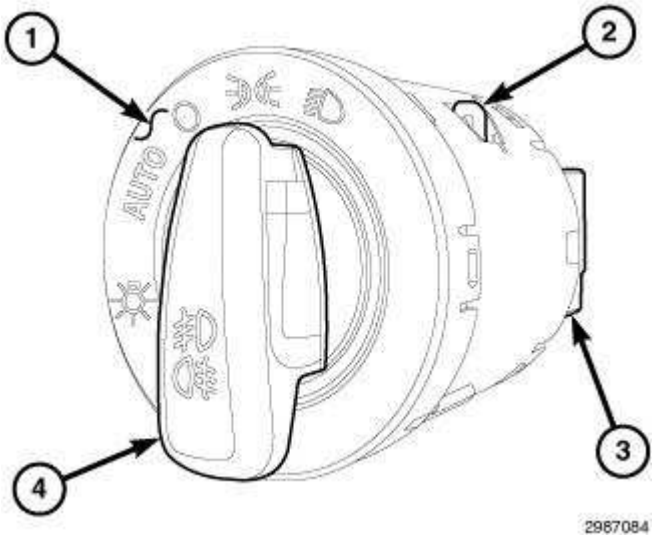

Fig. 48: Headlamp Switch, Retainers & Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Place the headlamp switch (1) rotary knob (4) in the OFF (**O**) position.
3. Push in on the rotary knob to engage the switch retainer (2) retractor mechanism.

4. Still holding the switch rotary knob depressed, rotate the knob clockwise toward the park lamps ON position to retract the two switch retainers. The retainers will be fully retracted before the rotary knob actually reaches the park lamps ON position.
5. With the switch rotary knob still in the retainer retractor position, pull the switch out of the cylinder-like mounting hole far enough to access and disconnect the instrument panel wire harness connector from the connector receptacle (3) on the back of the switch housing.
6. Remove the headlamp switch from the instrument panel steering column opening cover.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

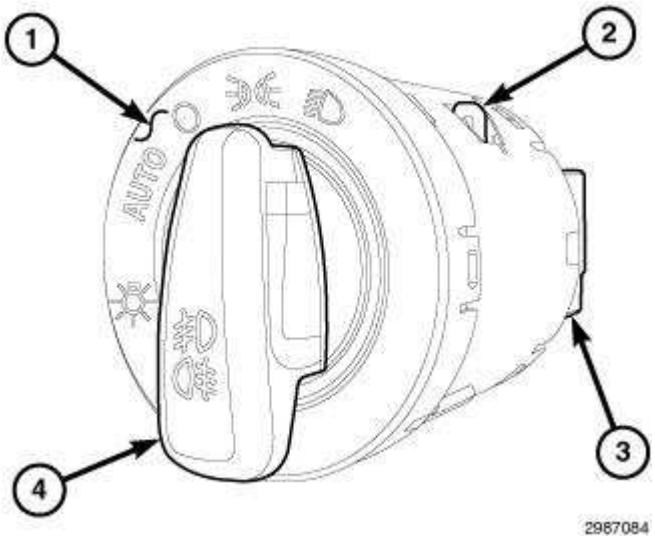

Fig. 49: Headlamp Switch, Retainers & Receptacle
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before attempting to install the headlamp switch (1), be certain that both pawl-like retainers (2) are extended outward from the body of the switch. If the retainers are in the retracted position, rotating the headlamp switch rotary knob (4) to the OFF (O) position should disengage the retainer retractor mechanism causing the retainers to spring outward from the switch body.

1. Position the headlamp switch (1) close enough to the cylinder-like switch mounting hole in the

instrument panel steering column opening cover to reconnect the instrument panel wire harness connector to the connector receptacle (3) on the back of the switch housing.

2. Position and align the switch in the center of the switch mounting hole of the steering column opening cover on the instrument panel.
3. Using hand pressure, press the switch firmly and evenly into the mounting hole until it is fully seated. An indication that the switch is fully seated will be a light audible click as each of the two pawl-like retainers (2) snap into place within the mounting hole.
4. Reconnect the battery negative cable.

SWITCH, MULTIFUNCTION

DESCRIPTION

DESCRIPTION

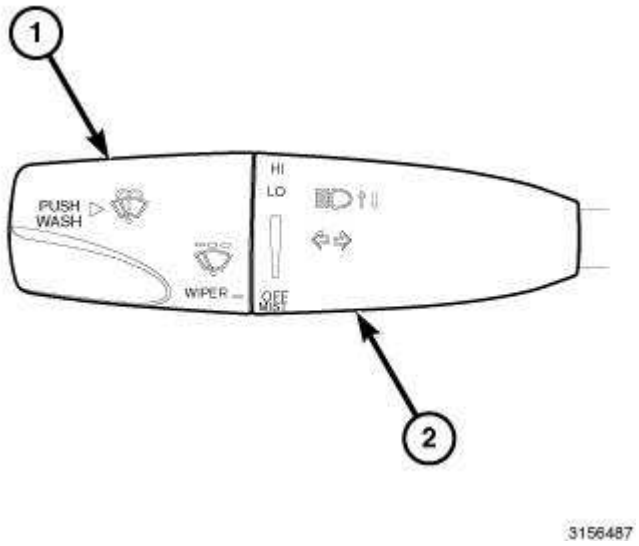

Fig. 50: Control Knob & Control Stalk
Courtesy of CHRYSLER GROUP, LLC

The multi-function switch is located on the left side of the steering column, just below the steering wheel. This switch is the primary control for the front wiper and washer systems, the turn signals and headlamp beam selection. The only visible components of the switch are the control stalk (2) and control knob (1) that extend through the steering column shrouds on the left side of the column. The remainder of the switch including its mounting provisions, its electrical connections and the turn signal cancel actuator are concealed beneath the shrouds.

The switch housing and controls are constructed of molded black plastic. Each of the switch controls has white International Control and Display Symbol graphics applied to it, which clearly identify its many functions. The multi-function switch for this vehicle is integral to the Steering Column Control Module (SCCM).

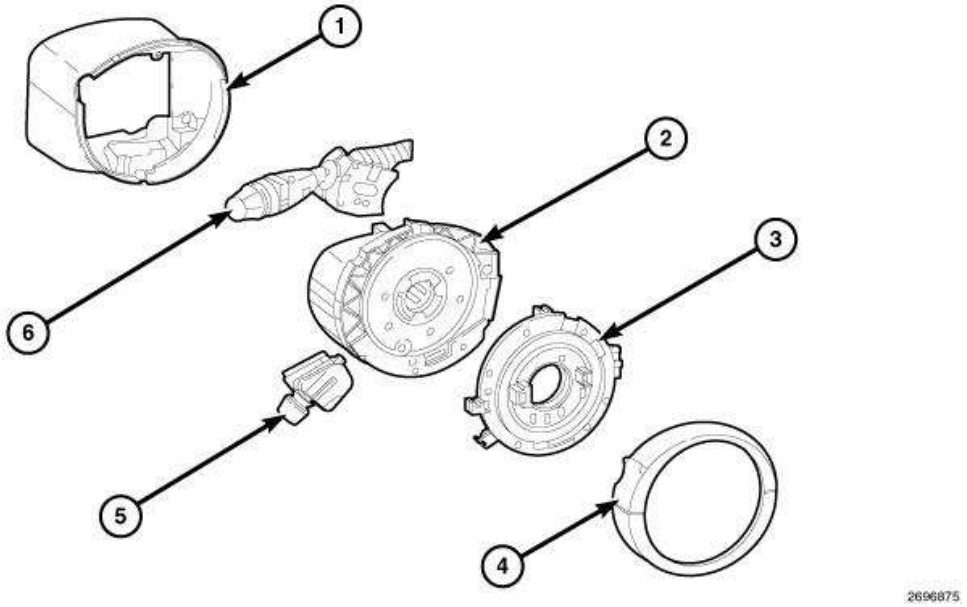

Fig. 51: Steering Column Shroud, Steering Angle Sensor (SAS), Clockspring, Telescope Switch & Trim Cover
Courtesy of CHRYSLER GROUP, LLC

The SCCM is located near the top of the steering column below the steering wheel. The SCCM includes the steering column shroud (1), the Steering Angle Sensor (SAS) (2), the clockspring (3), the multi-function switch (6), a steering column power tilt and telescope switch (5) for vehicles so equipped, a trim cover (4) and the Steering Control Module (SCM). The SCCM includes an integral connector receptacle that faces toward the instrument panel and is connected to the vehicle electrical system through a single take out and connector of the instrument panel wire harness.

The multi-function switch provides the vehicle operator with a control interface for the following functions:

- **Front Washer Control** - The multi-function switch control knob provides a momentary WASH position for washer system operation.
- **Front Wiper Control** - The multi-function switch control knob provides detent switching for two continuous wipe switch positions, LO speed or HI speed, and an intermittent wipe mode with four delay interval positions. The four delay positions become four sensitivity positions for vehicles equipped with the optional automatic wiper system. The control knob also has a momentary MIST or pulse wipe feature switch position.
- **Headlamp Beam Selection** - The multi-function switch control stalk provides detent switching for selection of the headlamp HIGH or LOW beams.
- **Headlamp Optical Horn** - The multi-function switch control stalk includes momentary switching of the headlamp high beam circuits to provide an optical horn feature (sometimes referred to as flash-to-pass), which allows the vehicle operator to momentarily flash the headlamp high beams as an optical signalling device.
- **Turn Signal Control** - The multi-function switch control stalk provides both momentary non-detent (lane change) switching or detent switching with automatic cancellation for both the left

and right turn signals.

The multi-function switch cannot be adjusted or repaired. If any function of the switch is ineffective, or if the switch is damaged, the entire SCCM unit must be replaced. Refer to **MODULE, STEERING COLUMN, REMOVAL** .

OPERATION

OPERATION

The multi-function switch uses resistor multiplexing to control the many functions and features it provides using a minimal number of hard wired circuits. The switch receives clean grounds from the Steering Control Module (SCM) internal to the Steering Column Control Module (SCCM), then provides resistor multiplexed return outputs to the SCM to indicate the selected switch positions. The SCM then sends electronic **switch status** messages over the Controller Area Network (CAN) data bus to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) and to other electronic modules in the vehicle.

If the SCM detects no inputs from the multi-function switch, it transmits an electronic **Signal Not Available (SNA)** status message over the CAN data bus. The SNA status signals other electronic modules to implement a fail-safe or default mode of operation. For the exterior lighting system, the multi-function switch fail-safe mode automatically selects LOW beams when the headlamps are turned ON. For the wiper system, the multi-function switch fail-safe mode will maintain the last selected wiper system operation for the remainder of the current ignition cycle, after which the wiper system will default to OFF.

Some of the hard wired inputs and outputs of the SCCM, SCM and multi-function switch unit may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, the most reliable, efficient and accurate means to diagnose the SCCM, the SCM and the multi-function switch requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

Following are descriptions of how the multi-function switch is operated to control the functions and features it provides:

- **Front Washer Control** - The control knob on the end of the multi-function switch control stalk is depressed toward the steering column to the momentary WASH detent position to activate the washer pump/motor in the FRONT WASH mode. The washer pump/motor will continue to operate for as long as the control knob is held in this position. The SCM reads the resistor multiplexed input from the multi-function switch and sends an electronic **front washer switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Front Wiper Control** - The control knob on the end of the multi-function switch control stalk is rotated to one of the two continuous wiper detents (LO or HI), to one of four intermittent delay or sensitivity wiper detents, or to the OFF position to select the FRONT WIPER mode. The SCM reads the resistor multiplexed input from the multi-function switch and sends electronic **front wiper switch status** messages over the CAN data bus to the BCM and to other electronic

modules in the vehicle.

- **Front Wiper Mist Mode** - The control knob on the end of the multi-function switch control stalk is rotated to the momentary MIST position to activate the wiper MIST mode. The wiper motor will continue to operate, one complete cycle at a time, for as long as the control knob is held in this position. The SCM reads the resistor multiplexed input from the multi-function switch and sends an electronic **front wiper switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Headlamp Beam Selection** - The headlamp high beams are selected when the multi-function switch control stalk is pushed forward to the high beam selection detent position. The low beams are selected when the control stalk is pulled rearward to the low beam selection detent position. The SCM reads the resistor multiplexed input from the multi-function switch and sends an electronic **beam select switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Headlamp Optical Horn** - The headlamp optical horn is selected each time the multi-function switch control stalk is pulled fully rearward to a momentary position. The headlamp HIGH beams will remain illuminated for as long as the control stalk is held in this momentary position and the LOW beams will be restored when the control stalk is released. The SCM reads the resistor multiplexed input from the multi-function switch and sends an electronic **beam select switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Turn Signal Control** - The turn signals are requested when the multi-function switch control stalk is moved downward (LEFT signal) or upward (RIGHT signal). The control stalk has a detent position in each direction that provides turn signals with automatic cancellation, and an intermediate, momentary position in each direction that automatically provides three turn signal blinks as a LANE CHANGE feature when the control stalk is tapped or will energize the turn signals for as long as the control stalk is held in the momentary position. When the control stalk is moved to a detent turn signal switch position, a cancel actuator extends from the multi-function switch housing through an opening in the side of the clockspring case toward the center of the steering column. A turn signal cancel cam that is integral to the clockspring rotor rotates with the steering wheel and the cam lobes contact the cancel actuator when it is extended from the multi-function switch. When the steering wheel is rotated during a turning maneuver, one of the turn signal cancel cam lobes will contact the turn signal cancel actuator. The cancel actuator latches against the cancel cam rotation in the direction opposite that which is signaled. If the LEFT turn signal detent is selected, the lobes of the cancel cam will ratchet past the cancel actuator when the steering wheel is rotated to the left, but will unlatch the cancel actuator as the steering wheel rotates to the right and returns to center, which will cancel the turn signal event and release the control stalk from the detent so it returns to the neutral OFF position. The SCM reads the resistor multiplexed input from the multi-function switch and sends an electronic **turn signal switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.

REMOVAL

REMOVAL

NOTE: The multi-function switch for this vehicle is integral to the Steering Column

Control Module (SCCM). If any function of the switch is ineffective, or if the switch is damaged, the entire SCCM unit must be replaced. Refer to MODULE, STEERING COLUMN, REMOVAL .

INSTALLATION

INSTALLATION

NOTE: The multi-function switch for this vehicle is integral to the Steering Column Control Module (SCCM). If any function of the switch is ineffective, or if the switch is damaged, the entire SCCM unit must be replaced. Refer to MODULE, STEERING COLUMN, INSTALLATION .

SWITCH, PARKING BRAKE

DESCRIPTION

DESCRIPTION

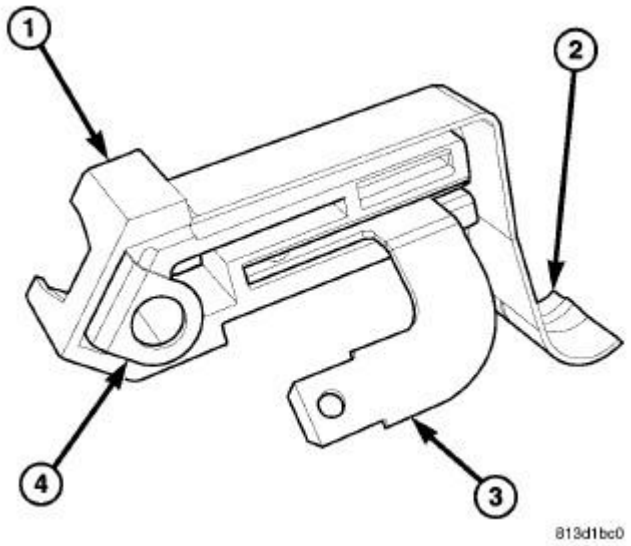

Fig. 52: Identifying Park Brake Switch
Courtesy of CHRYSLER GROUP, LLC

The park brake switch (1) is located on the park brake lever mechanism on the left cowl side inner panel below the instrument panel, outboard of the steering column. This switch includes a spade-type output terminal (3) that connects the switch to the vehicle electrical system through a dedicated take out and connector of the body wire harness. The output terminal is integral to the stationary contact within a molded plastic insulator.

A locating tab on the insulator engages a slot in the park brake lever mechanism for positive switch location. External to the insulator is a movable leaf contact with an integral grounding lug (4) on one

end and an integral actuating lever and follower (2) on the opposite end. The switch is secured to and grounded by a single screw to the park brake lever mechanism.

The park brake switch cannot be adjusted or repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

The park brake switch is a normally closed, mechanically actuated leaf contact switch that is operated by the park brake lever mechanism. The switch is grounded through its mounting to the park brake lever mechanism and provides a ground input to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) on a park brake switch sense circuit whenever the park brake is applied, and opens this circuit whenever the park brake is released. The park brake switch sense input to the IC is used as an additional logic input by the IC for control of the brake indicator and may also be used as a logic input for other electronic features in the vehicle.

The park brake switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and devices that rely upon inputs from the park brake switch. The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to park brake switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: If the brake indicator stays ON with the ignition switch in the ON position and the park brake released, or comes ON while driving, the brake system must be diagnosed and repaired prior to performing the following tests. If no brake system problem is found, the following procedures will help to locate a shorted or open park brake switch sense circuit, or an ineffective park brake switch.

PARKING BRAKE SWITCH

INDICATOR ILLUMINATES DURING BULB TEST, BUT DOES NOT WHEN PARK BRAKE APPLIED

1. Disconnect and isolate the battery negative cable. Disconnect the body wire harness connector for the park brake switch from the switch terminal. Apply the parking brake. Check for continuity between the park brake switch terminal and a good ground. There should be continuity. If OK, go to 2. If not OK, replace the ineffective park brake switch.
2. Disconnect the instrument panel wire harness connector for the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) from the cluster connector receptacle. Check for continuity between the park brake switch sense circuit cavities of the body wire harness connector for the park brake switch and the instrument panel wire harness connector for the IC. There should be continuity. If not OK, repair the open park brake switch sense circuit between the park brake switch and the IC as required.

INDICATOR REMAINS ILLUMINATED - BRAKE SYSTEM CHECKS OKAY

1. Disconnect and isolate the battery negative cable. Disconnect the body wire harness connector for the park brake switch from the switch terminal. Check for continuity between the terminal of the park brake switch and a good ground. There should be no continuity with the park brake released, and continuity with the park brake applied. If OK, go to 2. If not OK, replace the ineffective park brake switch.
2. Disconnect the instrument panel wire harness connector for the IC from the cluster connector receptacle. Check for continuity between the park brake switch sense circuit cavity of the body wire harness connector for the park brake switch and a good ground. There should be no continuity. If not OK, repair the shorted park brake switch sense circuit between the park brake switch and the IC as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

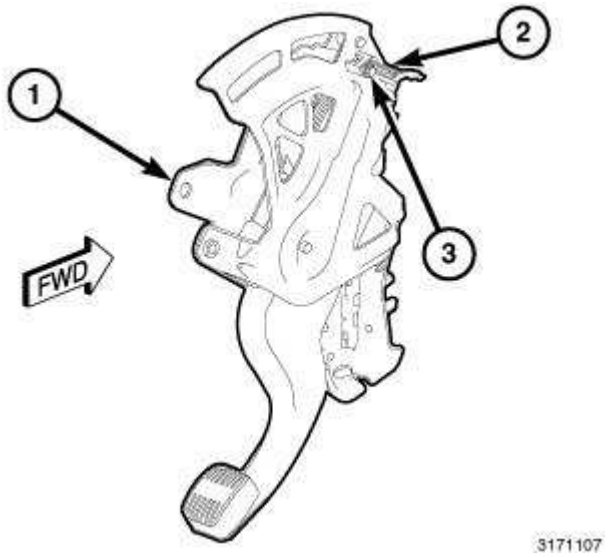

Fig. 53: Park Brake Switch, Park Brake Lever Mechanism & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Apply the parking brake.
3. Reach under the left end of the instrument panel to access and disconnect the body wire harness connector from the terminal of the park brake switch (2) located on the park brake lever mechanism (1) on the left cowl side inner panel.
4. Remove the screw (3) that secures the park brake switch to the park brake lever mechanism.
5. Remove the switch from the park brake lever mechanism.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

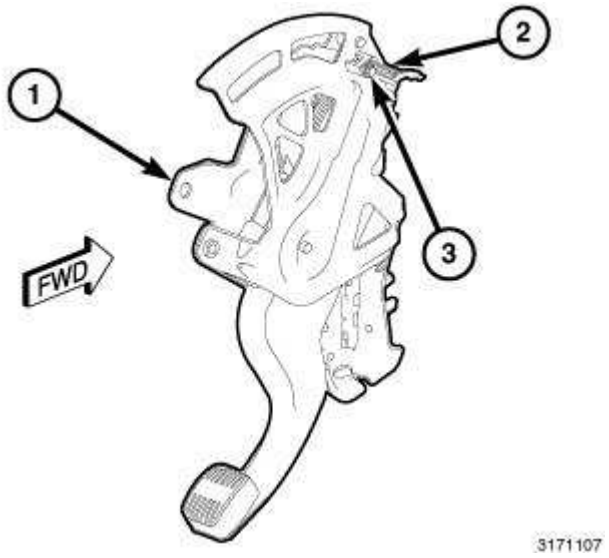

Fig. 54: Park Brake Switch, Park Brake Lever Mechanism & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Reach under the left end of the instrument panel to position the park brake switch (2) onto the park brake lever mechanism (1) on the left cowl side inner panel. Be certain to engage the locating pin on the back of the switch insulator into the locating slot in the lever mechanism bracket.
2. Install and tighten the screw (3) that secures the park brake switch to the park brake lever mechanism. Tighten the screw securely.
3. Reconnect the body wire harness connector to the terminal of the park brake switch.
4. Reconnect the battery negative cable.
5. Turn the ignition switch to the ON position and check for proper brake indicator operation with the parking brake applied, then release the parking brake and check that the brake indicator extinguishes.

SWITCH, STOP LAMP

DESCRIPTION

DESCRIPTION

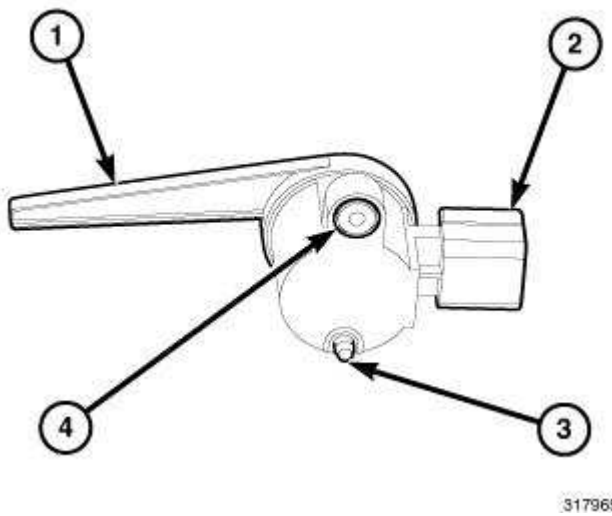

Fig. 55: Spring-Loaded Mechanical Lever Arm, Pin, Mounting Tab & Receptacle
Courtesy of CHRYSLER GROUP, LLC

A brake pedal position sensor is used in place of the brake (or stop) lamp switch in this vehicle. This sensor has a spring-loaded mechanical lever arm (1) that is actuated by a pin integral to the brake pedal arm. The sensor is secured by an integral locating pin (3) and a single screw through a metal insert in an integral mounting tab (4) to the brake pedal support bracket under the instrument panel on the driver side of the vehicle.

The molded plastic sensor housing has an integral connector receptacle (2) containing three terminal pins. The switch is connected to the vehicle electrical system through a dedicated take out of the body wire harness. A cavity in the center of the molded plastic sensor housing contains the electronic circuitry of the sensor. The sensor housing is sealed to enclose and protect the internal electronic circuitry and components.

The brake pedal position sensor cannot be repaired. If the sensor is damaged or ineffective it must be replaced with a new unit.

OPERATION

OPERATION

The brake pedal position sensor monitors changes in the brake pedal position relative to the brake pedal mounting bracket. The sensor circuitry is energized by the Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM or Antilock Brake System/ABS module) and provides hard wired analog (potentiometer) inputs back to the CAB. The CAB uses the sensor inputs directly as additional logic for many of the Antilock Brake System (ABS), Electronic Stability Control (ESC) and Brake Assist System (BAS) features.

The CAB also sends electronic **brake lamp switch status** messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Other electronic modules use this information as an additional logic input for controlling many other vehicle functions and features,

including the Body Control Module (BCM) (also known as the Common Body Controller/CBC) for control of the brake (or stop) lamps.

The hard wired circuits between the brake pedal position sensor and the CAB may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the brake pedal position sensor or the electronic controls and communication that provide some features related to brake pedal position sensor operation. The most reliable, efficient and accurate means to diagnose the brake pedal position sensor or the electronic controls and communication related to sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

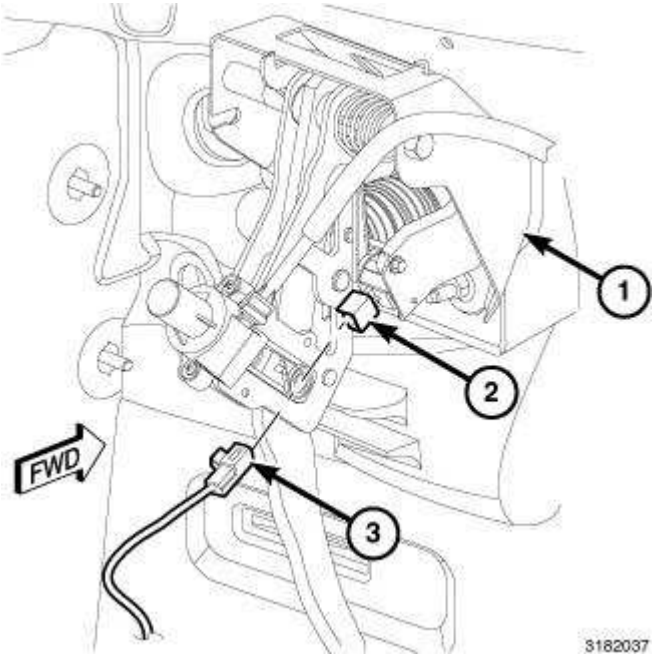

Fig. 56: Brake Pedal Position Sensor, Brake Pedal Support Bracket & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.

2. If equipped, remove the silencer pad from below the steering column. Refer to **PANEL, SILENCER, REMOVAL** .
3. Locate the brake pedal position sensor (2) on the brake pedal support bracket (1) under the instrument panel.
4. Disconnect the body wire harness connector (3) from the sensor.

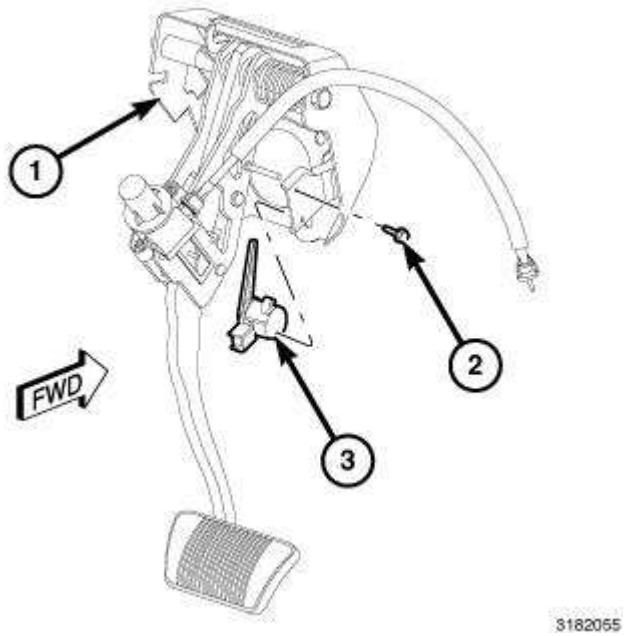

Fig. 57: Screw, Brake Pedal Position Sensor & Brake Pedal Support Bracket
Courtesy of CHRYSLER GROUP, LLC

5. Depress and hold the brake pedal in the depressed position.
6. Remove the screw (2) that secures the brake pedal position sensor (3) to the sensor bracket on the brake pedal support bracket (1).
7. Disengage the sensor locating pin from the locating hole in the sensor bracket.
8. Pull the sensor straight rearward from the pedal support bracket to remove it from the sensor bracket.
9. Release the brake pedal.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service.

This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

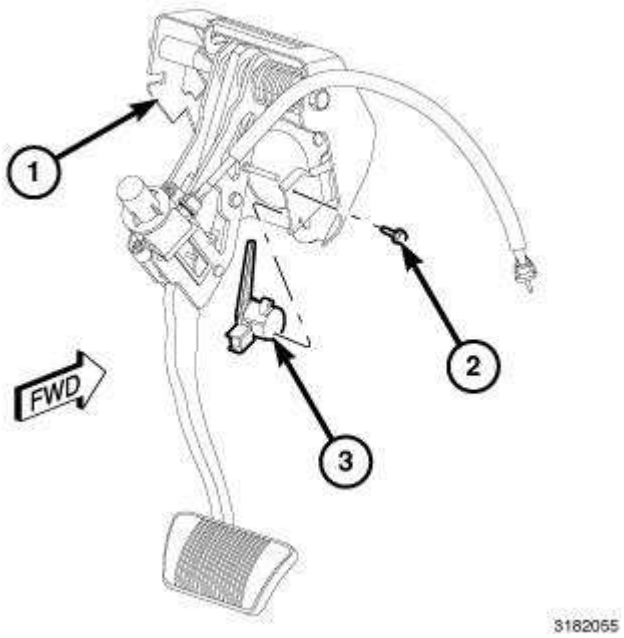

Fig. 58: Screw, Brake Pedal Position Sensor & Brake Pedal Support Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Depress and hold the brake pedal in the depressed position.
2. Position the brake pedal position sensor (3) to the sensor bracket on the brake pedal support bracket (1).
3. Engage the sensor locating pin into the locating hole in the sensor bracket.
4. Install and tighten the screw (2) that secures the sensor to the sensor bracket. Tighten the screw securely.

CAUTION: Brake booster damage may occur if the brake pedal pull exceeds about 9 kilograms (20 pounds).

5. Release the brake pedal. Then pull the pedal lightly upward to be certain the pedal is in its normal at-rest position.

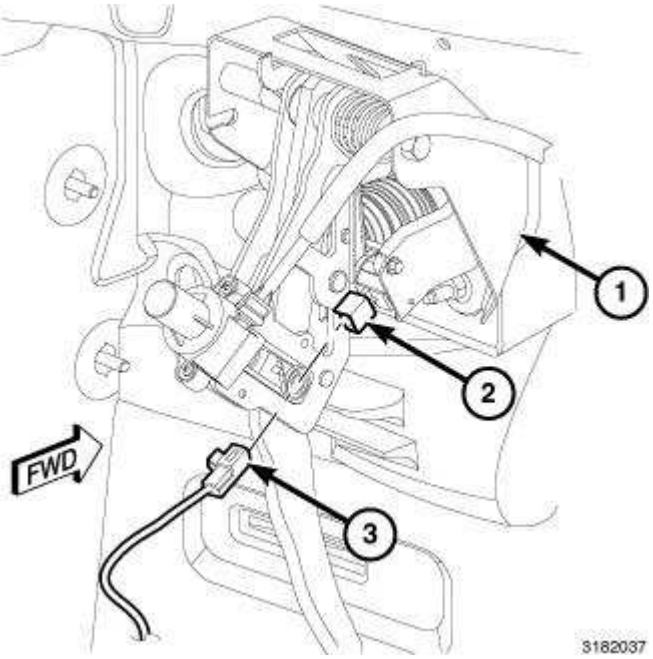

Fig. 59: Brake Pedal Position Sensor, Brake Pedal Support Bracket & Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Be certain the brake pedal position sensor is fully seated in the sensor bracket before completing the electrical connection.

6. Reconnect the body wire harness connector (3) to the connector receptacle on the sensor (2).
7. If equipped, reinstall the silencer pad below the steering column. Refer to **PANEL, SILENCER, INSTALLATION** .
8. Reconnect the battery negative cable.

NOTE: Whenever the brake pedal position sensor is removed and reinstalled or replaced with a new unit, it is necessary for the Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM or Antilock Brake System/ABS module) to calibrate the reinstalled or the new sensor. Follow the programming steps outlined in the diagnostic scan tool for the "ABS Initialize" routine under "Miscellaneous Functions" for the "ABS Module" menu item as appropriate.

UNIT, FRONT LAMP

STANDARD PROCEDURE

STANDARD PROCEDURE - LAMP LENS DEFOGGING

Some occasional moisture accumulation inside a vented front lamp unit is normal and appears as a fogging on the inside of the lamp lens, similar to the fog that sometimes appears on the inside of a windshield. This condition is caused by rapidly changing temperature and humidity levels between the air internal and external to the lamp, and will usually dissipate once the temperature and humidity

conditions have been allowed to stabilize. Accelerated removal of such moisture may be accomplished by activating the headlamps on HIGH beam for about 15 minutes.

However, water droplets larger than 1 millimeter (0.039 inch) in size accumulated on the inside of the lamp lens, water droplets visible on most internal lamp surfaces or large quantities of water within the lamp indicates a problem with the lamp sealing that has allowed excessive amounts of water to enter the lamp. Once such excessive moisture has entered the lamp, it will always be present and will never disappear. A lamp with permanent internal moisture should be replaced.

REMOVAL

BULB - FRONT PARK AND TURN SIGNAL

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

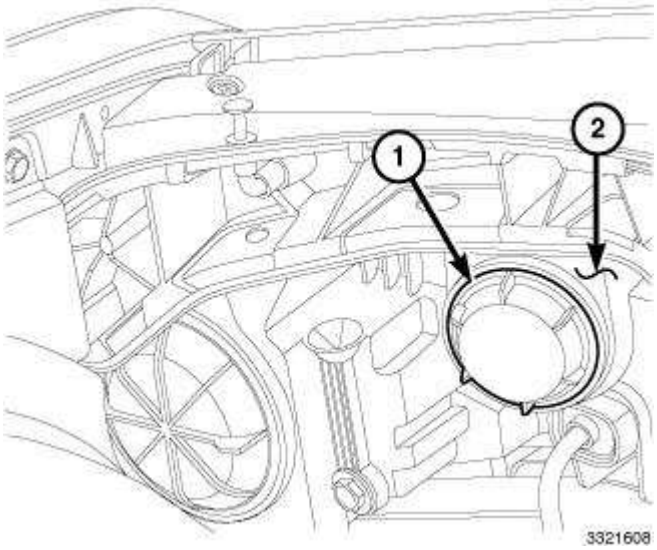

Fig. 60: Front Lamp Unit Housing & Signal Bulb Access Cover

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. For the left hand side only, remove the fastener that secures the engine air cleaner assembly to the Front End Module (FEM) structural support and move the air cleaner assembly far enough to access the bulbs on the back of the front lamp unit housing (2).
3. Firmly grasp the park and turn signal bulb access cover (1) on the inboard back of the front lamp unit housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Remove the access cover from the lamp housing.

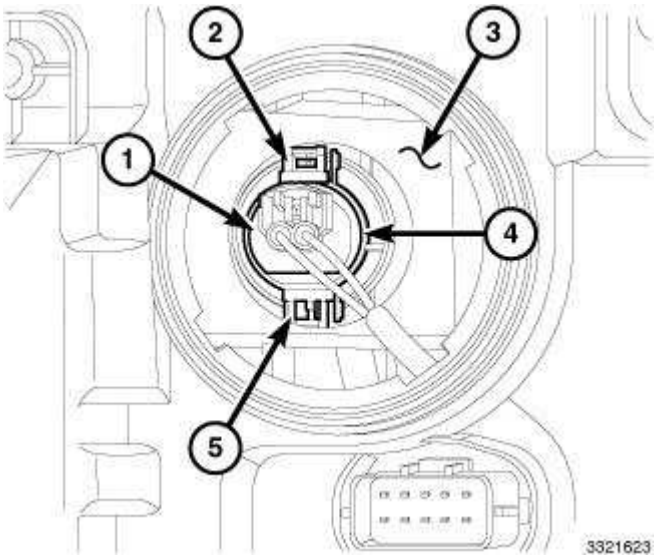

Fig. 61: Wire Harness Connector, Bulb Connector Receptacle & Two Latch Features
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the front lamp unit wire harness connector (1) from the bulb connector receptacle (4).
6. Firmly grasp the bulb by the two latch features (2 and 5) and squeeze them together to unlock the bulb from the back of the front lamp unit reflector (3).
7. Pull the bulb straight out from the keyed opening in the reflector.

BULB - HEADLAMP

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

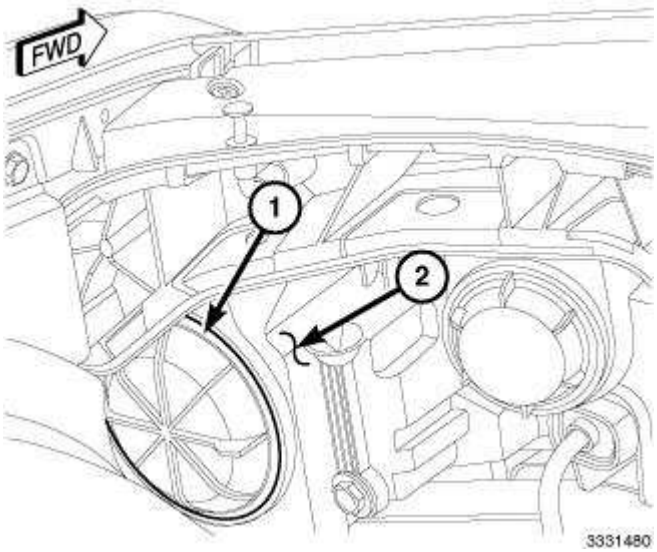

Fig. 62: Front Lamp Unit Housing & Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. For the left hand side only, remove the fastener that secures the engine air cleaner assembly to the Front End Module (FEM) structural support and move the air cleaner assembly far enough to access the back of the front lamp unit housing (2).
3. Firmly grasp the headlamp bulb access cover (1) on the outboard back of the front lamp unit housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Remove the access cover from the lamp housing.

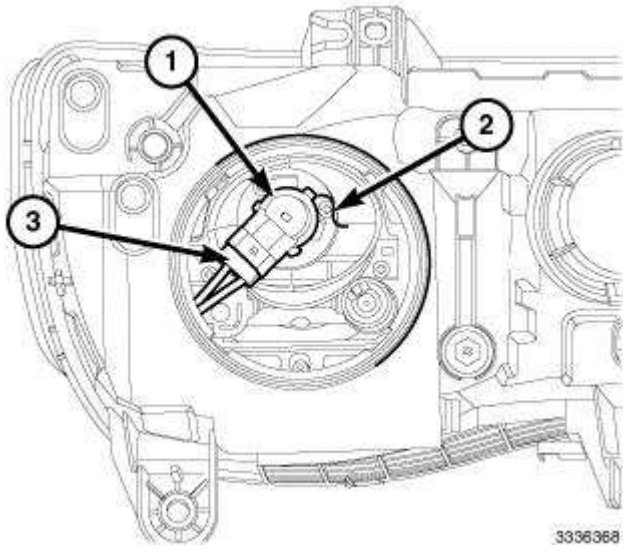

Fig. 63: Bulb Base & Reflector
Courtesy of CHRYSLER GROUP, LLC

5. Firmly grasp the bulb base (1) on the back of the reflector (2) within the front lamp unit housing and rotate it counterclockwise about 30 degrees to unlock it.

6. Pull the bulb and base straight out from the keyed opening in the reflector.

NOTE: Take care to prevent the wire harness and connector from falling back into the headlamp housing after disconnecting it from the headlamp bulb.

7. Disconnect the front lamp unit wire harness connector (3) from the bulb connector receptacle.
8. Remove the bulb from the back of the front lamp unit.

LAMP

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

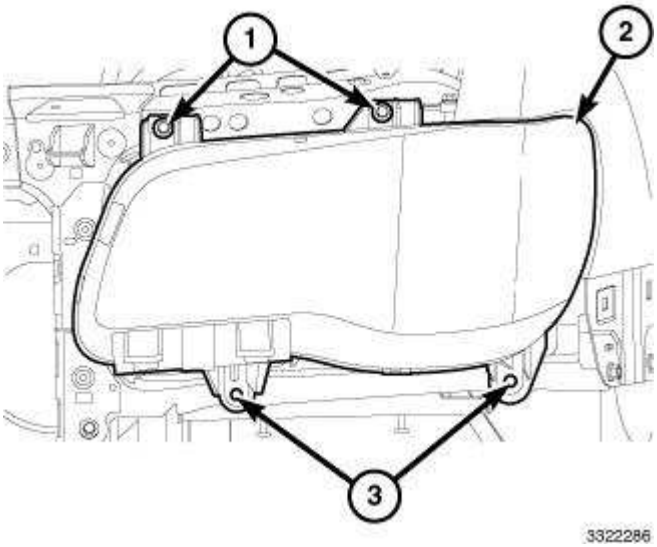

Fig. 64: Four Screws & Two Upper Front Lamp Unit
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the front fascia from the Front End Module (FEM). Refer to **FASCIA, FRONT, REMOVAL** .
3. Remove the four screws (1 and 3) that secure the two lower and two upper front lamp unit (2) mounting brackets to the FEM support structure.

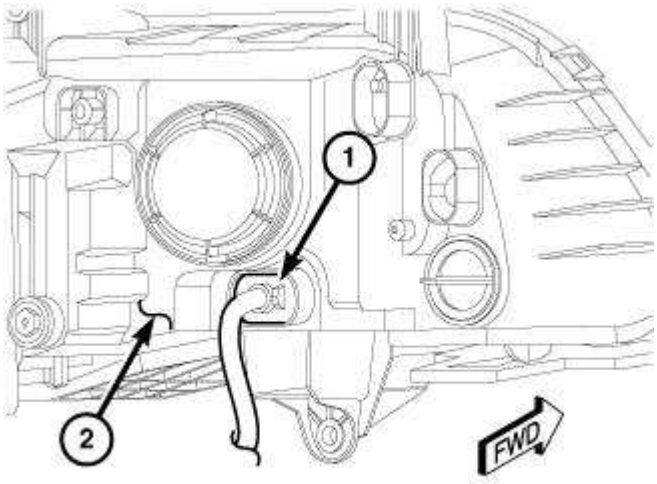

Fig. 65: Lamp & FEM Wire Harness Connection
Courtesy of CHRYSLER GROUP, LLC

4. Pull the lamp (2) away from the front of the vehicle far enough to access and disconnect the FEM wire harness connection (1) on the back of the lamp housing.
5. Remove the front lamp unit from the vehicle.

LIGHTING ELEMENT - HIGH INTENSITY DISCHARGE

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials

and ensure sufficient ventilation in the working area.

CAUTION: Do not contaminate the lighting element glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened lighting element life will result.

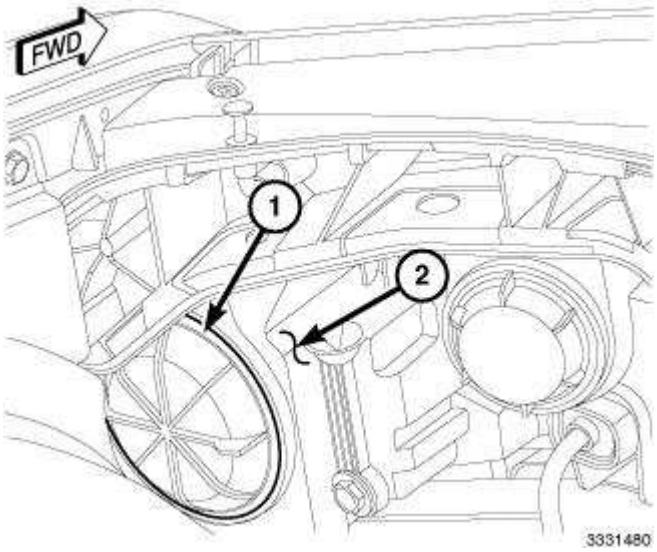

Fig. 66: Front Lamp Unit Housing & Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative battery cable.
2. For the left hand side only, remove the fastener that secures the engine air cleaner assembly to the Front End Module (FEM) structural support and move the air cleaner assembly far enough to access the bulbs on the back of the front lamp unit housing (2).
3. Firmly grasp the High Intensity Discharge (HID) igniter and lighting element access cover (1) on the outboard back of the front lamp unit housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Remove the access cover from the lamp housing.

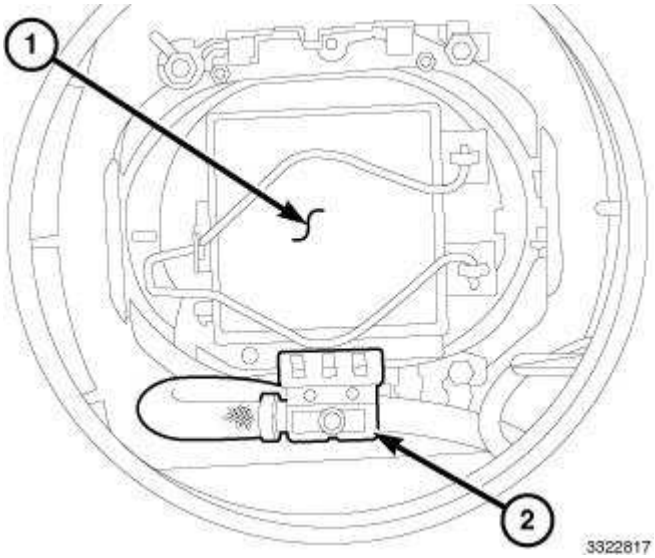

Fig. 67: High Tension Cable Wire Harness Connector & HID Igniter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Take care to prevent the high tension cable from falling back into the lamp housing after disconnecting it from the HID igniter.

5. Disconnect the high tension cable wire harness connector (2) from the HID igniter (1) connector receptacle.

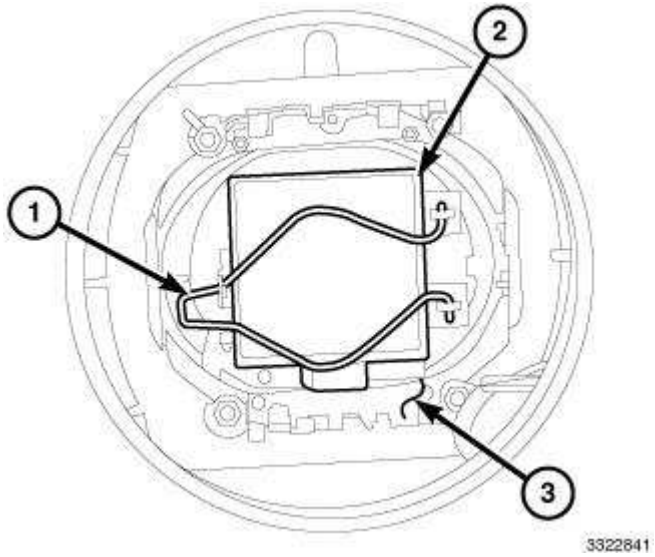

Fig. 68: Wire Retainer Clip, HID Igniter & Front Lamp Unit Reflector
Courtesy of CHRYSLER GROUP, LLC

6. Disengage the wire retainer clip (1) that secures the HID igniter (2) to the back of the front lamp unit reflector (3).
7. Pull the HID igniter and lighting element straight out from the keyed opening in the reflector.
8. Remove the igniter and lighting element from the back of the front lamp unit.

INSTALLATION

BULB - FRONT PARK AND TURN SIGNAL

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

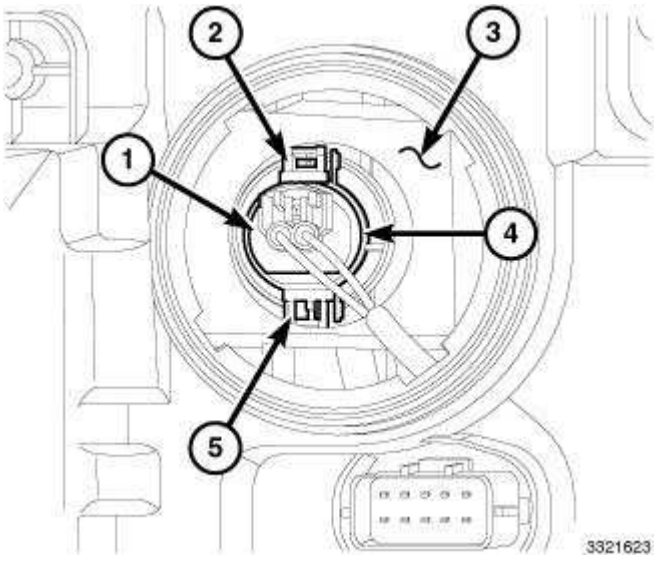

Fig. 69: Wire Harness Connector, Bulb Connector Receptacle & Two Latch Features
Courtesy of CHRYSLER GROUP, LLC

1. Align the index tabs of the front fog lamp bulb with the slots in the collar of the bulb opening on the back of the front lamp unit reflector (3).

2. Insert the bulb into the housing until the index tabs are engaged in the slots of the collar.
3. Firmly and evenly push the bulb straight into the lamp reflector until both bulb latch features (2 and 5) snap into place and are fully engaged.
4. Reconnect the front lamp unit wire harness connector (1) to the bulb connector receptacle (4).

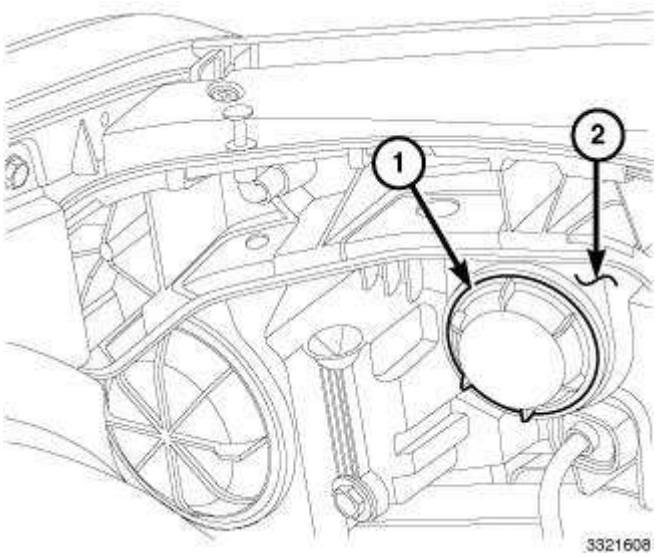

Fig. 70: Front Lamp Unit Housing & Signal Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

5. Position the bulb access cover (1) onto the inboard back of the front lamp unit housing (2) and rotate it clockwise about 30 degrees to lock it into place.
6. For the left hand side only, position the engine air cleaner assembly to the Front End Module (FEM) structural support and reinstall the fastener that secures the air cleaner assembly.
7. Reconnect the battery negative cable.

BULB - HEADLAMP

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

NOTE: Left side shown in illustration. Right side similar.

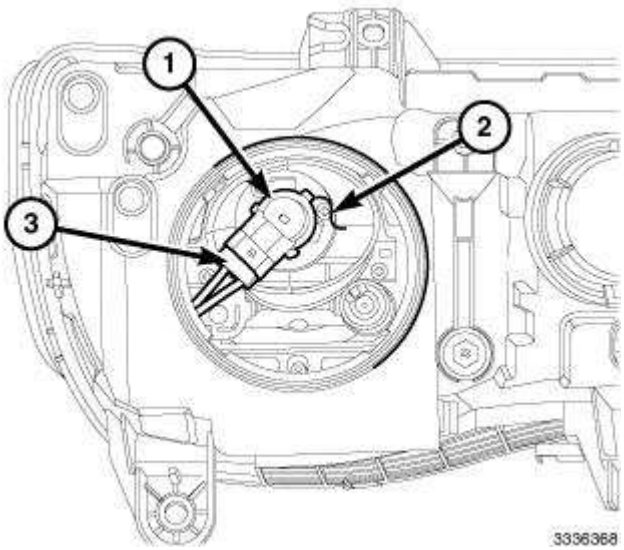

Fig. 71: Bulb Base & Reflector
Courtesy of CHRYSLER GROUP, LLC

1. Position the headlamp bulb (1) close enough to the back of the front lamp unit housing to access and reconnect the lamp wire harness connector (3) to the bulb connector receptacle.
2. Align the bulb with the keyed opening on the back of the front lamp unit reflector (2).
3. Insert the bulb into the reflector opening until the base is firmly seated.
4. Rotate the base clockwise about 30 degrees to lock it into place.

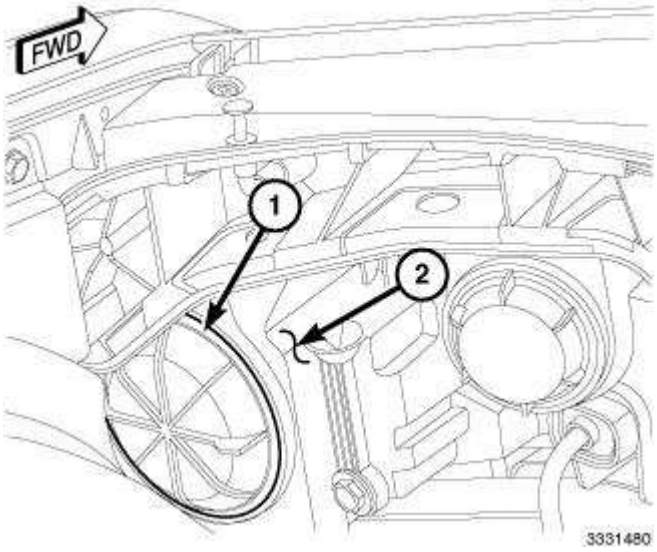

Fig. 72: Front Lamp Unit Housing & Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

5. Position the headlamp bulb access cover (1) onto the outboard back of the front lamp unit housing and rotate it clockwise about 30 degrees to lock it into place.
6. For the left hand side only, position the engine air cleaner assembly to the Front End Module

(FEM) structural support and reinstall the fastener that secures the air cleaner assembly.

7. Reconnect the battery negative cable.

LAMP

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

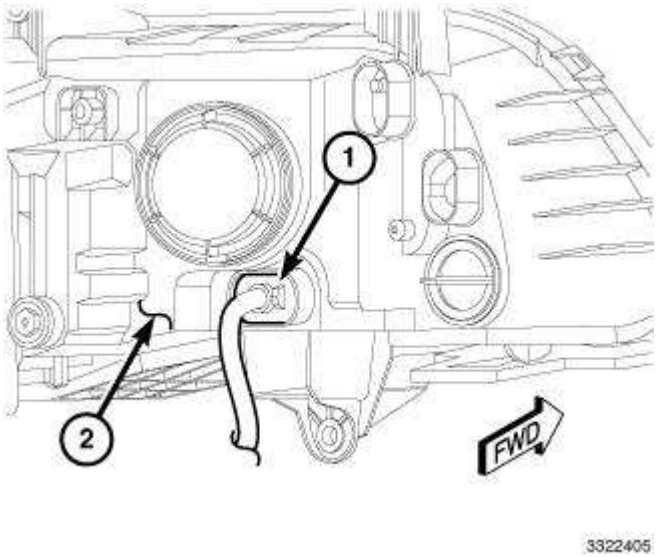

Fig. 73: Lamp & FEM Wire Harness Connection
Courtesy of CHRYSLER GROUP, LLC

1. Position the front lamp unit (2) close enough to the front of the vehicle to reconnect the Front End Module (FEM) wire harness connections (1) to the back of the lamp housing.

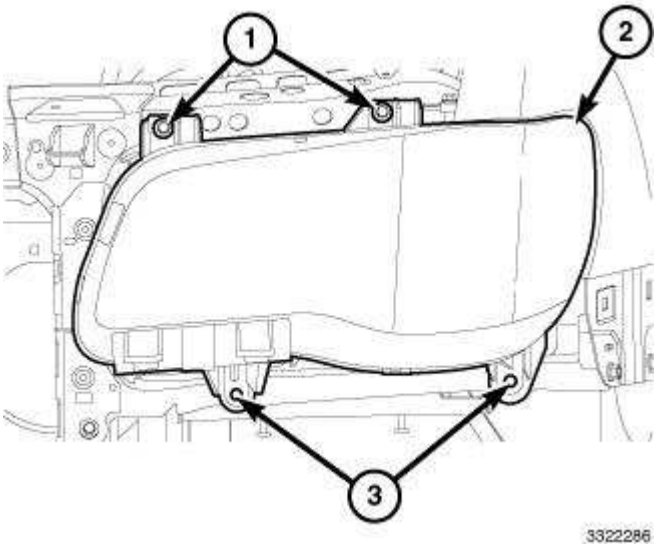

Fig. 74: Four Screws & Two Upper Front Lamp Unit
Courtesy of CHRYSLER GROUP, LLC

2. Position the lamp (2) to the FEM support structure on the front of the vehicle.
3. Install and tighten the four screws (1 and 3) that secure the two lower and the two upper mounting brackets integral to the lamp housing to the FEM. Tighten the screws securely.
4. Reinstall the fascia onto the FEM. Refer to **FASCIA, FRONT, INSTALLATION** .
5. Reconnect the battery negative cable.
6. Confirm proper headlamp alignment. Refer to **STANDARD PROCEDURE**.

LIGHTING ELEMENT - HIGH INTENSITY DISCHARGE

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

CAUTION: Always use the correct lighting element size and type for replacement. An incorrect size or type may overheat and cause damage to the lamp or the lamp wiring.

CAUTION: Do not contaminate the lighting element glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened lighting element life will result.

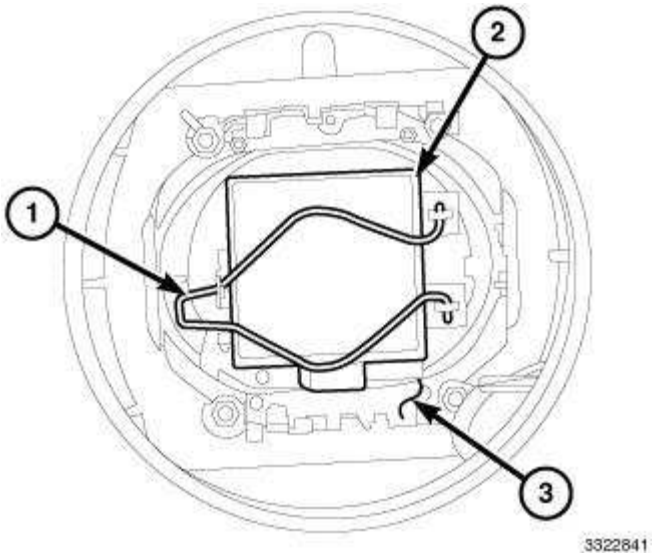

Fig. 75: Wire Retainer Clip, HID Igniter & Front Lamp Unit Reflector
Courtesy of CHRYSLER GROUP, LLC

1. Align and insert the High Intensity Discharge (HID) igniter (2) and lighting element unit straight into the opening in the front lamp unit reflector (3) as a unit.
2. Press the igniter firmly and evenly toward the reflector until the base is firmly seated.
3. Insert the HID igniter into the headlamp reflector. Be sure the igniter is fully seated in the reflector.
4. Pivot the wire retainer clip (1) back over the igniter and engage it under the hook on the back of the reflector.

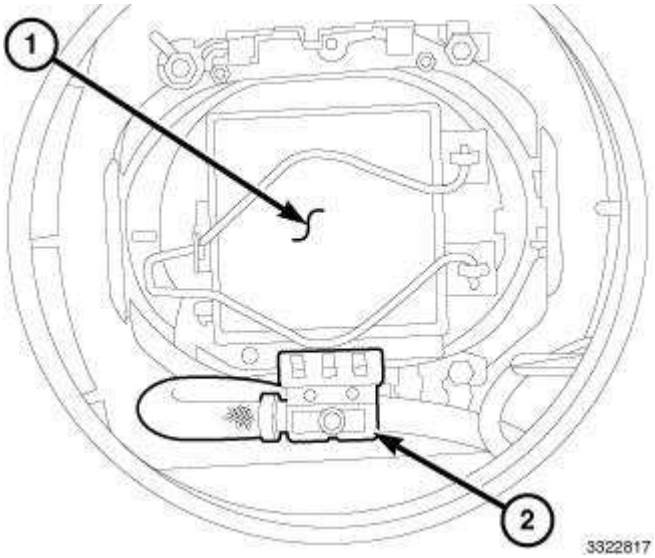

Fig. 76: High Tension Cable Wire Harness Connector & HID Igniter
Courtesy of CHRYSLER GROUP, LLC

5. Reconnect the high tension cable connector (2) to the connector receptacle integral to the lower edge of the igniter (1) housing.

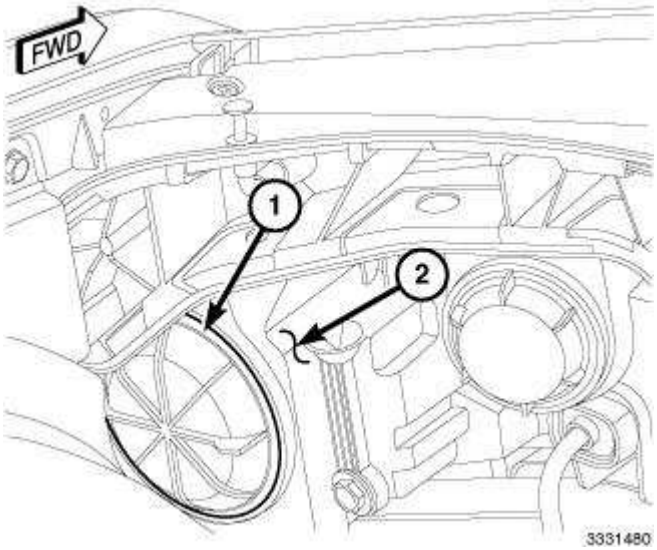

Fig. 77: Front Lamp Unit Housing & Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

6. Position the access cover (1) onto the outboard back of the front lamp unit housing (2) and rotate it clockwise about 30 degrees to lock it into place.
7. For the left hand side only, position the engine air cleaner assembly to the Front End Module (FEM) structural support and reinstall the fastener that secures the air cleaner assembly.
8. Reconnect the battery negative cable.

REMINDER INDICATOR RESET PROCEDURES

Chrysler / Dodge / Plymouth / RAM - 1978-14

ASSYST MAINTENANCE COMPUTER

NOTE: **To determine the appropriate reset procedure, refer to ASSYST MAINTENANCE COMPUTER RESET INDEX. Only vehicles listed in this index have an ASSYST Maintenance Computer reset.**

ASSYST MAINTENANCE COMPUTER RESET INDEX

Model & Year	Reset Procedure
Sprinter	
2003-09	Assyst Maintenance Computer Reset - Procedure 1

ASSYST MAINTENANCE COMPUTER RESET - PROCEDURE 1

When a service as been performed, the ASSYST maintenance computer can be reset as follow:

1. Turn the key to position 2 in the ignition lock and immediately press the "mi" ("km") button twice and hold. Keep the "mi" ("km") button pressed.
2. Within 10 seconds, return the key to position 0 in the ignition lock.
3. Continue to press and hold the "mi" ("km") button. Turn the key to position 2 in the ignition lock. Keep the "mi" ("km") button pressed.
4. The maintenance indicator with the current remaining time/distance is shown.
5. After about 10 seconds, an acoustic signal will sound and the maintenance indicator is displayed with the new remaining time/distance.
6. Release the "mi" ("km") button.

EGR/MAINTENANCE REQUIRED WARNING LIGHT

NOTE: **To determine the appropriate reset procedure, refer to EGR/MAINTENANCE REQUIRED WARNING LIGHT RESET INDEX. Only vehicles listed in this index have an EGR/Maintenance Required Warning Light reset.**

EGR/MAINTENANCE REQUIRED WARNING LIGHT RESET INDEX

Model & Year	Reset Procedure
Colt & Colt Vista	
1978-94	EGR/Maintenance Required Warning Light Reset - Procedure 1
Ram-50	
1985-93	EGR/Maintenance Required Warning Light Reset - Procedure 1

EGR/MAINTENANCE REQUIRED WARNING LIGHT RESET - PROCEDURE 1

1. On some models, an EGR or MAINTENANCE REQUIRED warning light in dash will come on as a reminder to have EGR system serviced (each 50,000 miles), oxygen sensor replaced (each 80,000 miles), or evaporative carbon canister replaced (100,000 miles).
2. After servicing or replacing components, reset mileage counter. Reset switch is located on back of instrument cluster. See **Fig. 1**, **Fig. 2** and **Fig. 3** . Slide switch to opposite side to reset indicator light.
3. Remove light bulb after 120,000 mile service on Ram-50.

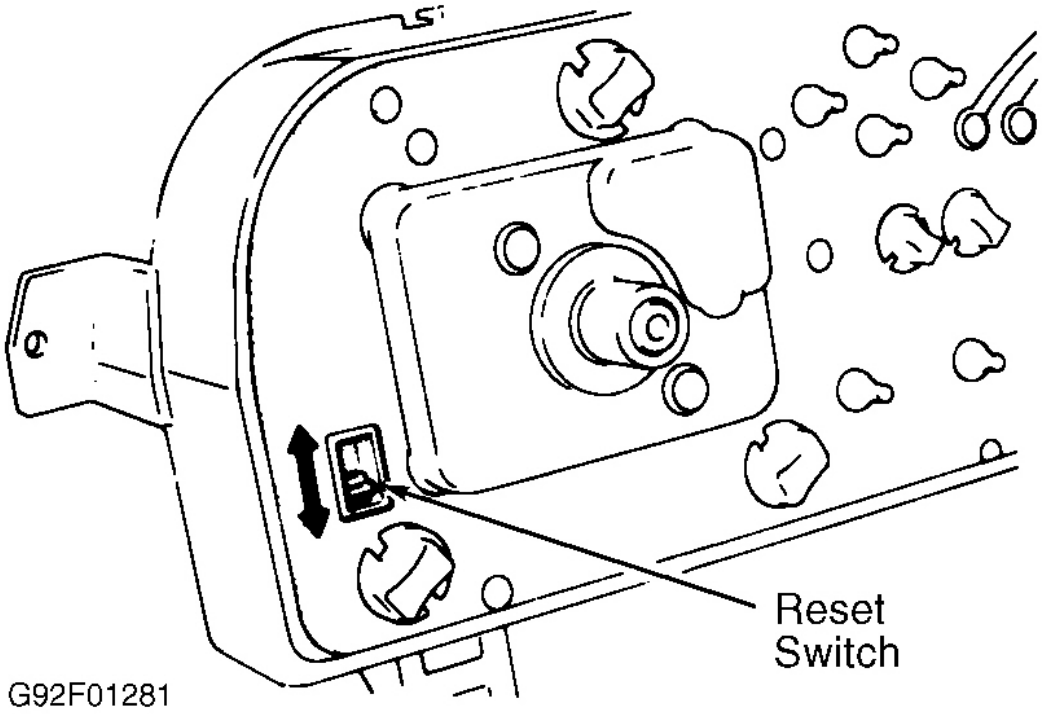

Fig. 1: Locating Warning Light Reset Switch (Colt Vista Shown; Colt Wagon Is Similar)
Courtesy of CHRYSLER CORP.

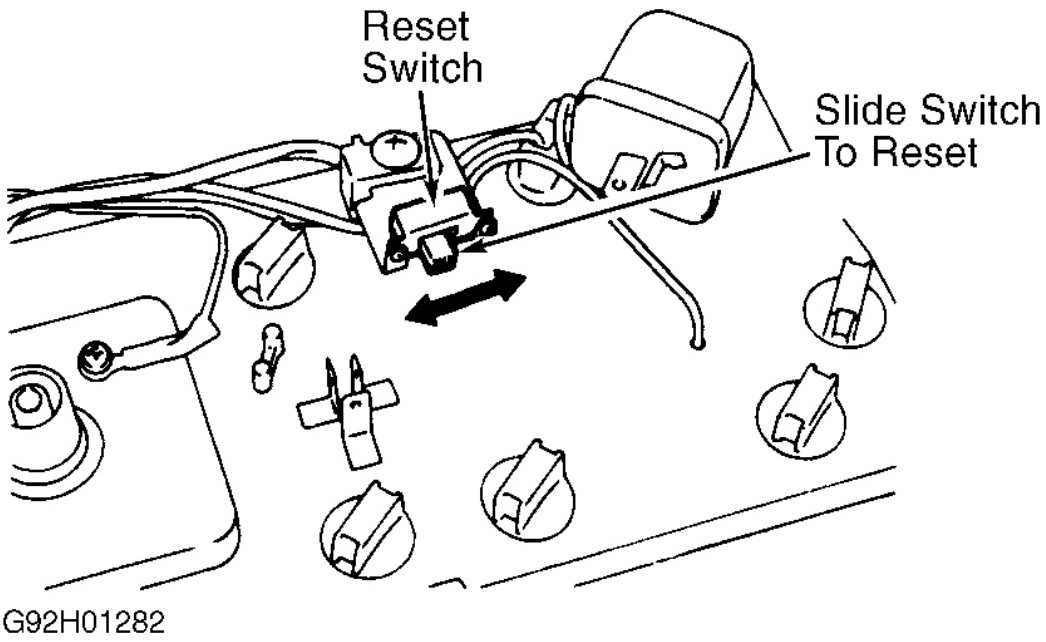

Fig. 2: Locating Warning Light Reset Switch (1985-86 Ram-50)
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

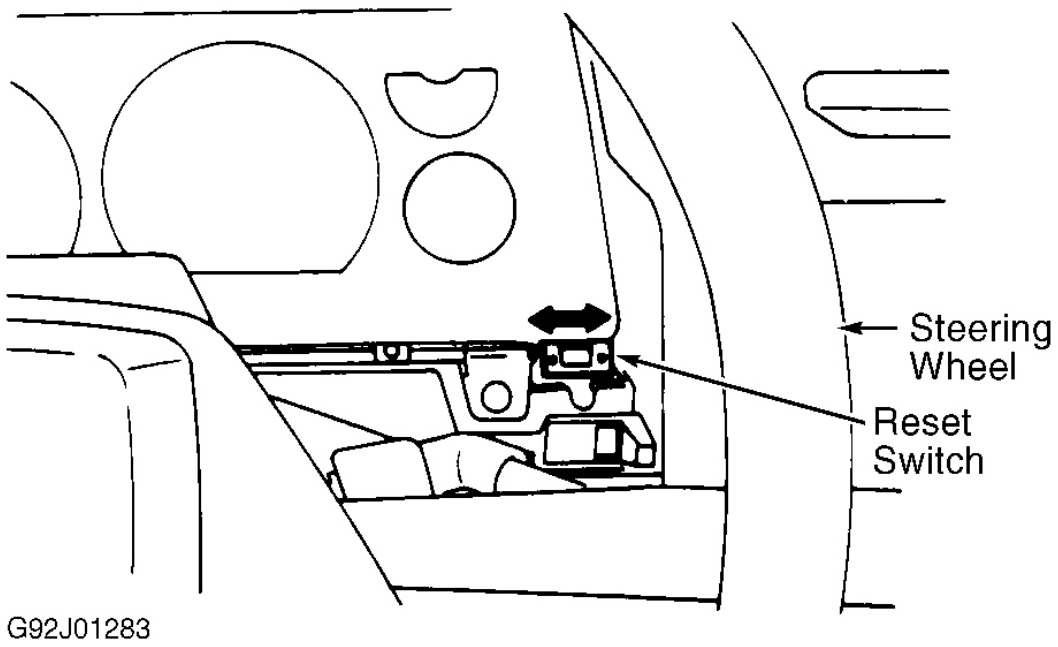

Fig. 3: Locating Warning Light Reset Switch (1987-93 Ram-50)
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

EMR MILEAGE RESET

NOTE: To determine the appropriate reset procedure, refer to EMR MILEAGE RESET INDEX. Only vehicles listed in this index have a EMR mileage reset.

EMR MILEAGE RESET INDEX

Model & Year	Reset Procedure
Light Duty Trucks & Vans	
1989-92	EMR Mileage Reset - Procedure 1

EMR MILEAGE RESET - PROCEDURE 1

1. Using DRB-II tester, select EMR MEMORY CHECK. DRB-II display will read, EMR MEMORY CHECK ARE YOU SURE? Press YES key.
2. Display will read, WRITE TEST. Display will read, IS INSTRUMENT PANEL MILEAGE BETWEEN XXXXXX AND XXXXXX? If odometer mileage on vehicle is within specification, press YES key. DRB-II will display EMR MEMORY CHECK TEST COMPLETE.

NOTE: DRB-II may display EMR MEMORY WRITE FAILURE or EMR MEMORY CHECK WRITE REFUSED if there is a problem with SMEC/SBEC.

3. If odometer mileage on vehicle is not within specification shown on DRB-II, press NO key. DRB-II will read DO YOU WANT TO CORRECT EMR MILEAGE? Press YES key on DRB-II. DRB-II will display ENTER MILEAGE SHOWN ON INSTRUMENT PANEL.
4. Enter mileage shown on instrument panel. DO NOT enter tenths. Press ENTER key on DRB-II. DRB-II will ask for verification of entry. If mileage entry was correct, DRB-II will display SETTING ENGINE DATA and EMR MEMORY CHECK TEST COMPLETE. Vehicle must be driven for at least 8 miles for mileage reset to be accepted.

MAINT REQD OR CHECK EGR INDICATOR LIGHT

CAUTION: There is no test procedure for this system. Any attempt to test this system will damage system components.

NOTE: To determine the appropriate reset procedure, refer to MAINT REQD OR CHECK EGR INDICATOR LIGHT RESET INDEX. Only vehicles listed in this index have a MAINT REQD OR CHECK EGR INDICATOR LIGHT reset.

MAINT REQD OR CHECK EGR INDICATOR LIGHT RESET INDEX

Model & Year	Reset Procedure
FWD Vans	
1987-88	Maint REQD Or Check EGR Indicator Light Reset - Procedure 1
Light Duty Trucks	
1988	Maint REQD Or Check EGR Indicator Light Reset - Procedure 1
1989-92	Maint REQD Or Check EGR Indicator Light Reset - Procedure 2
RWD Vans	
1988	Maint REQD Or Check EGR Indicator Light Reset - Procedure 1
1989-92	Maint REQD Or Check EGR Indicator Light Reset - Procedure 2

MAINT REQD OR CHECK EGR INDICATOR LIGHT RESET - PROCEDURE 1

The Service Reminder Indicator (SRI) module is not an emissions warning system. It is only a reminder to perform emissions servicing. Components to be serviced include the EGR system, PCV valve, oxygen sensor, delay valves, and bi-level purge valve.

The SRI module will illuminate the MAINT REQD or CHECK EGR light after a predetermined time. The light will remain on until the SRI module is reset by inserting a small screwdriver into the hole in the module (RWD only) and/or depressing the reset switch (FWD and RWD). Replace 9-volt battery (if equipped).

The SRI module is located on steering column, behind instrument panel on RWD vans and in instrument cluster, under fuel gauge, on FWD vans. See **Fig. 4** or **Fig. 5** . On light trucks except Dakota, SRI module is located behind the far right side of dash panel next to glove box. See **Fig. 6**. On Dakota models, module is located on bracket below headlight switch, on rear of instrument panel. See **Fig. 7**.

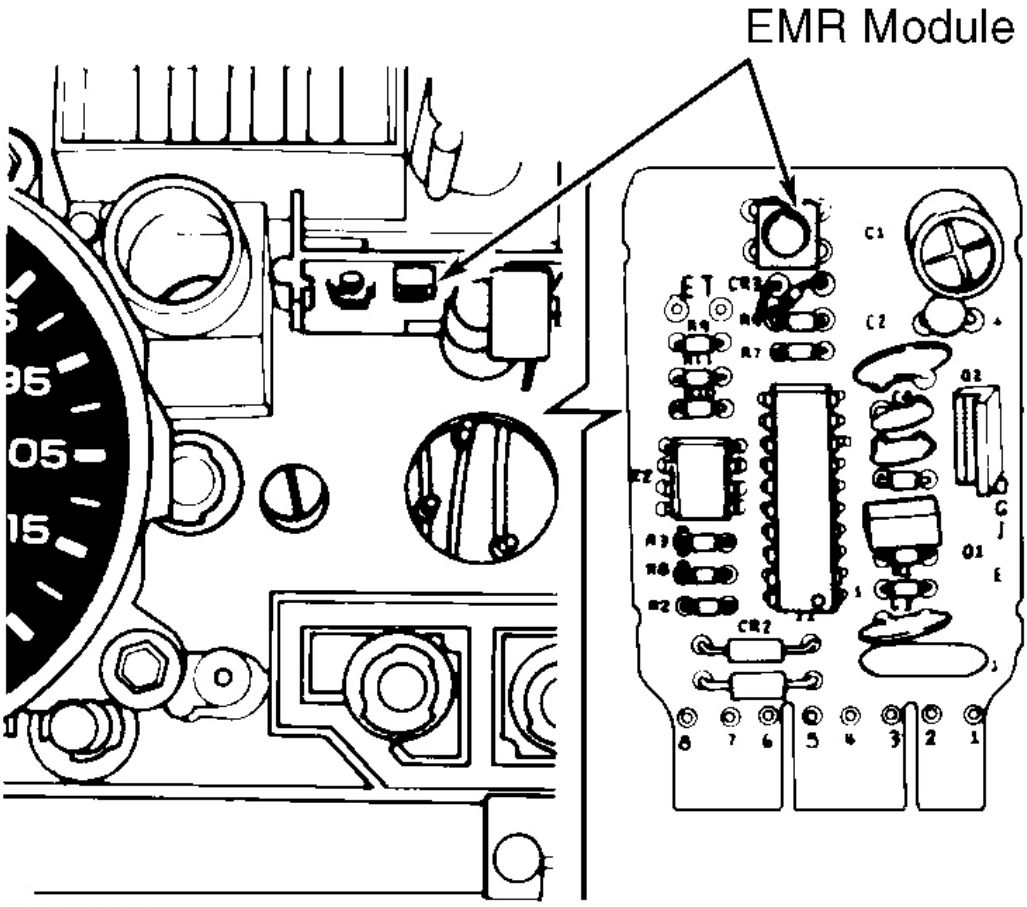

Fig. 4: Locating SRI Module (1987-88 FWD Vans)
Courtesy of CHRYSLER CORP.

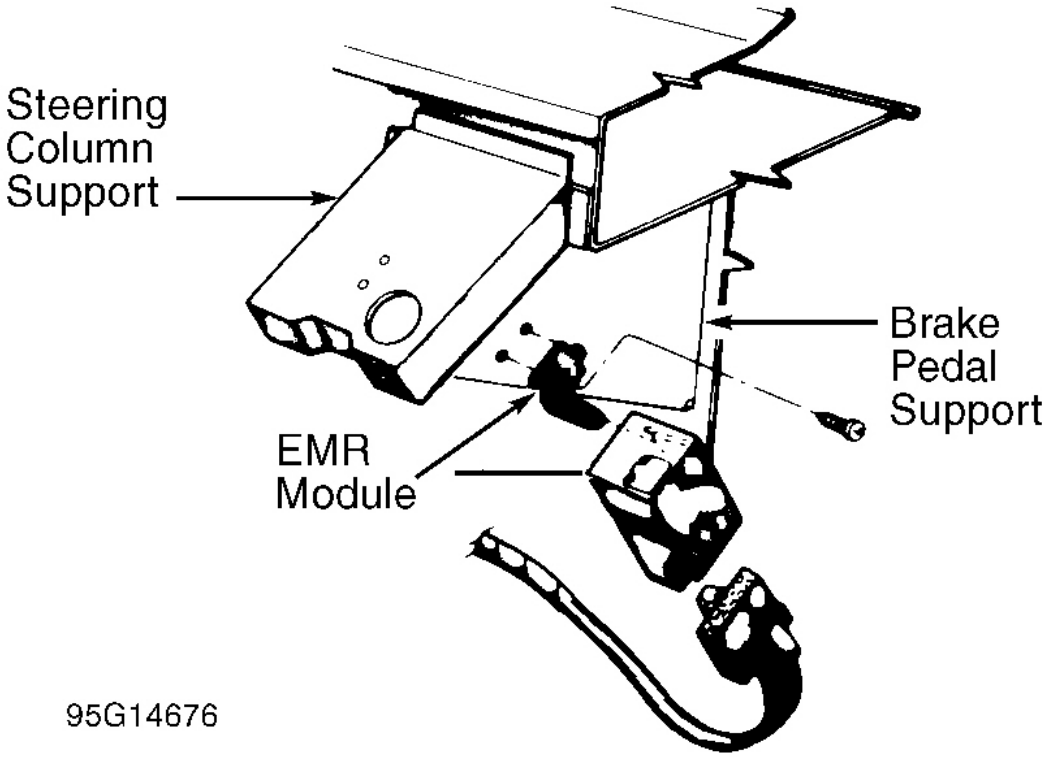

Fig. 5: Locating SRI Module (1988 RWD Vans)
Courtesy of CHRYSLER CORP.

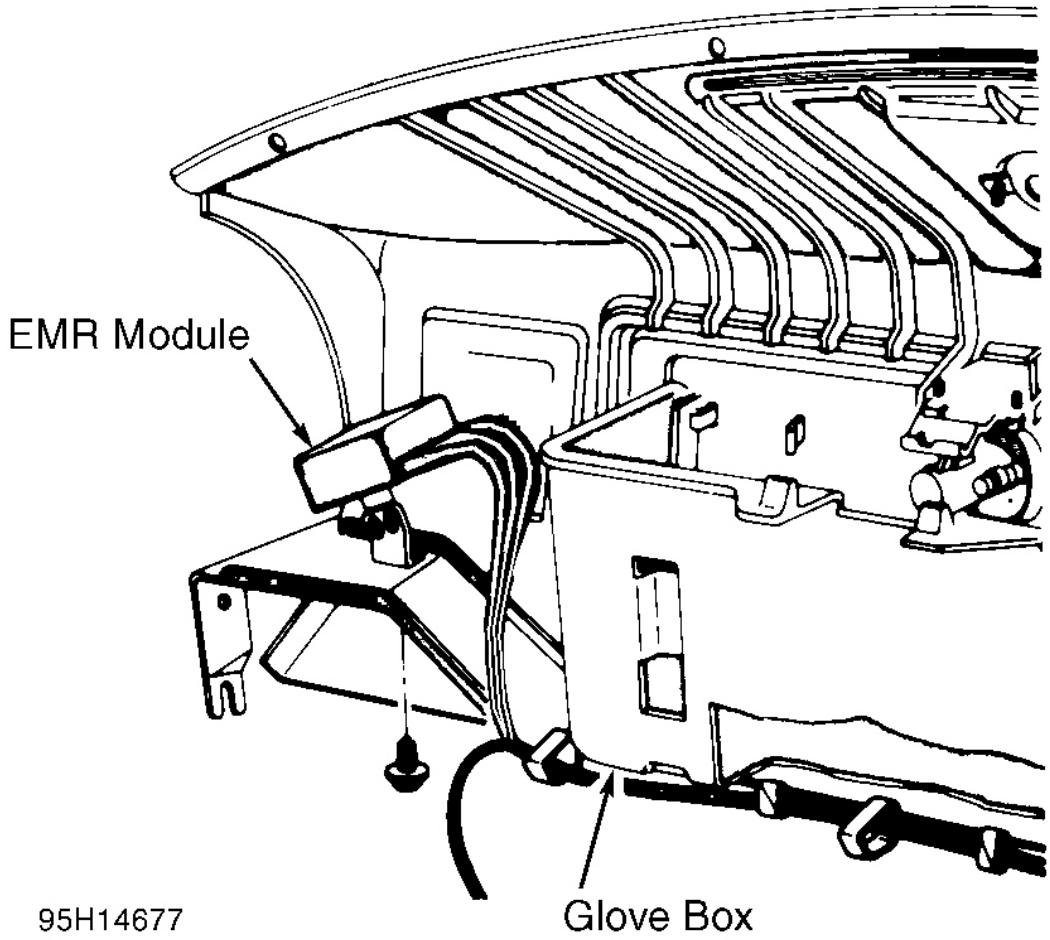

Fig. 6: Locating SRI Module (1988 Light Trucks Except Dakota)
Courtesy of CHRYSLER CORP.

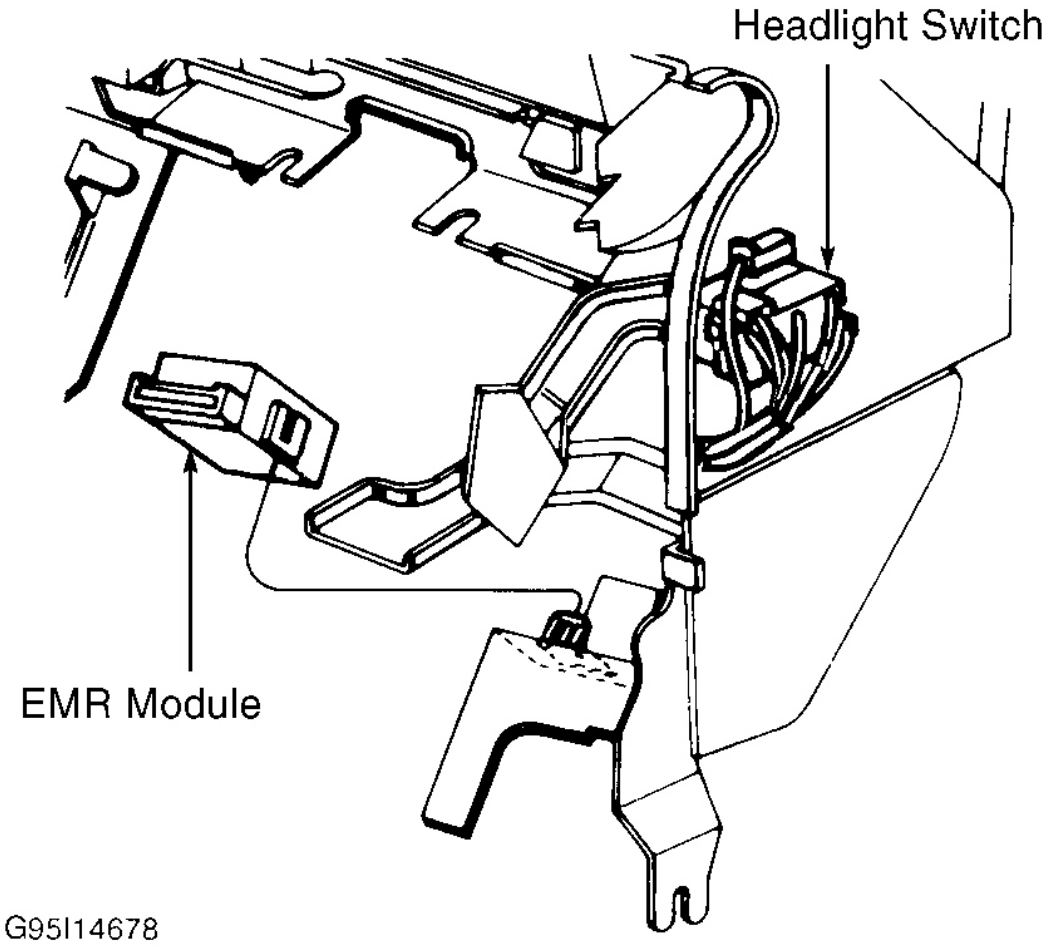

Fig. 7: Locating SRI Module (1988 Dakota)
Courtesy of CHRYSLER CORP.

MAINT REQD OR CHECK EGR INDICATOR LIGHT RESET - PROCEDURE 2

NOTE: If any other scan tool is used, use scan tool manufacturer's instructions.

Attach DRB-II tester to diagnostic connector. Turn ignition on but do not start engine. Access SELECT SYSTEMS function of DRB-II tester. Select appropriate engine. Select with or without A/C. Select FUEL & IGNITION. Select ADJUSTMENTS. Select RESET EMR LIGHT. Reset EMR light. When DRB-II is finished resetting light, DRB-II display will read EMR LIGHT IS RESET.

NOTE: If Single Module Engine Controller (SMEC) or Single Board Engine Controller (SBEC) is replaced, vehicle mileage must be programmed back into the SMEC/SBEC. DRB-II tester MUST be used for this procedure. If the following procedure is not performed, EMR light will not turn on at the proper mileage

intervals.

MAINT REQD OR SERVICE REMINDER INDICATOR (SRI) LIGHT

The components to be serviced include the EGR system, PCV valve, oxygen sensor and some vacuum-operated components. SRI will illuminate after a predetermined mileage. To reset SRI, a Chrysler Diagnostic Readout Box (DRB) Tester or suitable scan tool is required.

NOTE: To determine the appropriate reset procedure, refer to MAINT REQD OR SRI LIGHT RESET INDEX. Only vehicles listed in this index have a MAINT REQD OR SRI LIGHT reset.

MAINT REQD OR SRI LIGHT RESET INDEX

Model & Year	Reset Procedure
Light Duty Trucks & Vans	
1993	Maint REQD Or SRI Light Reset - Procedure 1
Ram Pickup 2500/3500	
1994-02	Maint REQD Or SRI Light Reset - Procedure 2

MAINT REQD OR SRI LIGHT RESET - PROCEDURE 1

1. Attach DRB tester to diagnostic connector. Turn ignition on, but do not start engine. Using DRB, perform Service Reminder Indicator (SRI) memory test. If DRB displays WRITE FAILURE, replace Powertrain Control Module (PCM).
2. If DRB displays WRITE REFUSED, go to step 4. If DRB displays SRI MILEAGE INVALID, update mileage and retest SRI memory. If DRB does not display SRI MILEAGE INVALID, compare SRI mileage stored with instrument panel odometer.
3. If mileage is same, retest SRI memory. If mileage is not same, update mileage and retest SRI memory.
4. PCM was busy. Using DRB, perform SRI memory test. Retest SRI memory 2 or more times, if necessary. If WRITE REFUSED trouble code returns, replace PCM. If WRITE REFUSED does not return, procedure is complete.

MAINT REQD OR SRI LIGHT RESET - PROCEDURE 2

The components to be serviced include the EGR system, PCV valve, and oxygen sensor. The SRI or Maintenance Required will illuminate after a predetermined mileage. To reset the light, a Chrysler Diagnostic Readout Box (DRB) Tester or suitable scan tool is required. Follow scan tool manufacturer's information to reset SRI.

OIL CHANGE REQUIRED MESSAGE

NOTE: To determine the appropriate reset procedure, refer to OIL CHANGE REQUIRED MESSAGE RESET INDEX. Only vehicles listed in this index have an Oil Change

Required Message reset.

OIL CHANGE REQUIRED MESSAGE RESET INDEX

Model & Year	Reset Procedure
200	
2011-15	**Oil Change Required Message Reset - Procedure 1**
300	
2008-15	**Oil Change Required Message Reset - Procedure 1**
Aspen	
2008-09	**Oil Change Required Message Reset - Procedure 1**
Avenger	
2008-15	**Oil Change Required Message Reset - Procedure 1**
Caliber	
2008-12	**Oil Change Required Message Reset - Procedure 1**
Challenger	
2008-15	**Oil Change Required Message Reset - Procedure 1**
Charger	
2008-15	**Oil Change Required Message Reset - Procedure 1**
Dakota	
2008-11	**Oil Change Required Message Reset - Procedure 1**
Dart	
2013-15	**Oil Change Required Message Reset - Procedure 1**
Dodge Pickup	
2008-10	**Oil Change Required Message Reset - Procedure 1**
Durango	
2008-15	**Oil Change Required Message Reset - Procedure 1**
Grand Caravan	
2007-14	**Oil Change Required Message Reset - Procedure 1**
Jouney	
2010-15	**Oil Change Required Message Reset - Procedure 1**
Magnum	
2008	**Oil Change Required Message Reset - Procedure 1**
Nitro	
2008-11	**Oil Change Required Message Reset - Procedure 1**
Pacifica	
2008	**Oil Change Required Message Reset - Procedure 1**
RAM C/V Tradesman	
2012-15	**Oil Change Required Message Reset - Procedure 1**
RAM Pickup (1500/ 2500/ 3500)	
2011-15	**Oil Change Required Message Reset - Procedure 1**
RAM ProMaster (1500/ 2500/ 3500)	

2011-15	**Oil Change Required Message Reset - Procedure 1**
Sebring	
2008-10	**Oil Change Required Message Reset - Procedure 1**
Town & Country	
2008-15	**Oil Change Required Message Reset - Procedure 1**

OIL CHANGE REQUIRED MESSAGE RESET - PROCEDURE 1

NOTE: The message can be temporarily turned off by pressing and releasing the Trip Odometer button in instrument cluster.

To reset oil change indicator after performing scheduled maintenance:

1. Turn ignition on, with engine off.

   NOTE: On vehicles with keyless START, without pressing the brake pedal, push the ENGINE START/STOP button and cycle the ignition to the ON/RUN position (Do not start the engine).

2. Fully depress accelerator pedal slowly 3 times within 10 seconds.
3. Turn ignition off.

   NOTE: On vehicles with keyless START, without pressing the brake pedal, push the ENGINE START/STOP button once to return the ignition to the OFF/LOCK position.

4. Start engine. If indicator message illuminates when engine is started, repeat reset procedure.

PERFORM SERVICE MESSAGE

NOTE: To determine the appropriate reset procedure, refer to PERFORM SERVICE MESSAGE RESET INDEX. Only vehicles listed in this index have a perform service message reset.

PERFORM SERVICE MESSAGE RESET INDEX

Model & Year	Reset Procedure
300M	
2001-04	**Perform Service Message Reset - Procedure 1**
Caravan & Grand Caravan	
2003-07	**Perform Service Message Reset - Procedure 2**
Concorde	
2001-04	**Perform Service Message Reset - Procedure 1**
Intrepid	

2001-04	**Perform Service Message Reset - Procedure 1**
LHS	
2001	**Perform Service Message Reset - Procedure 1**
Dodge Pickup 1500	
2002	**Perform Service Message Reset - Procedure 3**
Town & Country	
2003-07	**Perform Service Message Reset - Procedure 4**

PERFORM SERVICE MESSAGE RESET - PROCEDURE 1

The PERFORM SERVICE message is a warning message delivered from the Electronic Vehicle Information Center (EVIC). This indicates that regular maintenance is due. After regular required maintenance is performed, the counter is reset by pressing and holding the reset button for 3 seconds.

PERFORM SERVICE MESSAGE RESET - PROCEDURE 2

1. The Electronic Vehicle Information Center (EVIC) displays a PERFORM SERVICE message when distance to service interval has been reached, indicating that regular service and maintenance is due. After performing necessary services, reset service distance by selecting a distance to service interval.
2. To program EVIC, turn ignition switch to ON position. Depress and release MENU push button until SERVICE INTV. = is displayed. Press and release STEP button to step through available options. The last selected distance option displayed becomes the service interval at which the PERFORM SERVICE message will be displayed.
3. If a new distance interval is selected, RESET SERVICE DISTANCE? with a yes or no option. When YES is selected, the accumulated distance since the last previous PERFORM SERVICE message will be reset to zero because the service interval has been changed. When NO is selected, the distance until the next PERFORM SERVICE message is reduced by the accumulated distance since the last pervious message.
4. EVIC exits programming mode and returns to its normal operation mode when the C/T button is depressed or when the end of the programmable feature menu list is reached, whichever occurs first.

PERFORM SERVICE MESSAGE RESET - PROCEDURE 3

The Vehicle Information Center (VIC) displays a PERFORM SERVICE message. PERFORM SERVICE message is displayed when "miles/kms" to service is zero, indicating that regular service and maintenance is due. After performing necessary services, reset service distance by pressing the STEP button when in this display will select "Yes" or "No".

PERFORM SERVICE MESSAGE RESET - PROCEDURE 4

1. The Electronic Vehicle Information Center (EVIC) displays a PERFORM SERVICE message when distance to service interval has been reached, indicating that regular service and

maintenance is due. After performing necessary services, reset service distance by selecting a distance to service interval.

2. To program EVIC, turn ignition switch to ON position. Depress and release MENU push button until SERVICE INTV. = is displayed. Press and release STEP button to step through available options. The last selected distance option displayed becomes the service interval at which the PERFORM SERVICE message will be displayed.
3. If a new distance interval is selected, RESET SERVICE DISTANCE? with a yes or no option. When YES is selected, the accumulated distance since the last previous PERFORM SERVICE message will be reset to zero because the service interval has been changed. When NO is selected, the distance until the next PERFORM SERVICE message is reduced by the accumulated distance since the last pervious message.
4. EVIC exits programming mode and returns to its normal operation mode when the C/T button is depressed or when the end of the programmable feature menu list is reached, whichever occurs first.

SERVICE REMINDER INDICATOR LIGHT

NOTE: To determine the appropriate reset procedure, refer to SERVICE REMINDER INDICATOR LIGHT RESET INDEX. Only vehicles listed in this index have a service reminder indicator light reset.

SERVICE REMINDER INDICATOR LIGHT RESET INDEX

Model & Year	Reset Procedure
Models With Electronic Type Counter	
1980	Service Reminder Indicator Light Reset - Procedure 1
Monaco	
1990-92	Service Reminder Indicator Light Reset - Procedure 2

SERVICE REMINDER INDICATOR LIGHT RESET - PROCEDURE 1

A mileage counter activates the service reminder indicator between 12,000 and 30,000 mile intervals, depending on whether mechanical or electronic type is used. On 1987 Dakota models, mileage counter in the odometer will illuminate reminder light at 52,500, 82,500 and 105,000 miles.

The electronic type uses a 9-volt battery which supplies power to the electronic counter, preventing memory loss when vehicle battery is disconnected.

NOTE: Vehicle battery must be connected during resetting procedure to prevent power loss to memory.

To reset electronic type, locate Green, Red, White or Tan plastic case behind instrument panel in lower left cluster area. Slide case from bracket and open cover. Remove 9-volt battery, and insert a small rod or screwdriver into hole in switch, closing contacts. Replace battery with a new 9-volt alkaline type. Close case. Slide case back into bracket. See **Fig. 8**.

NOTE: **Some models use a non-resettable mileage counter. Replace it with a resettable type.**

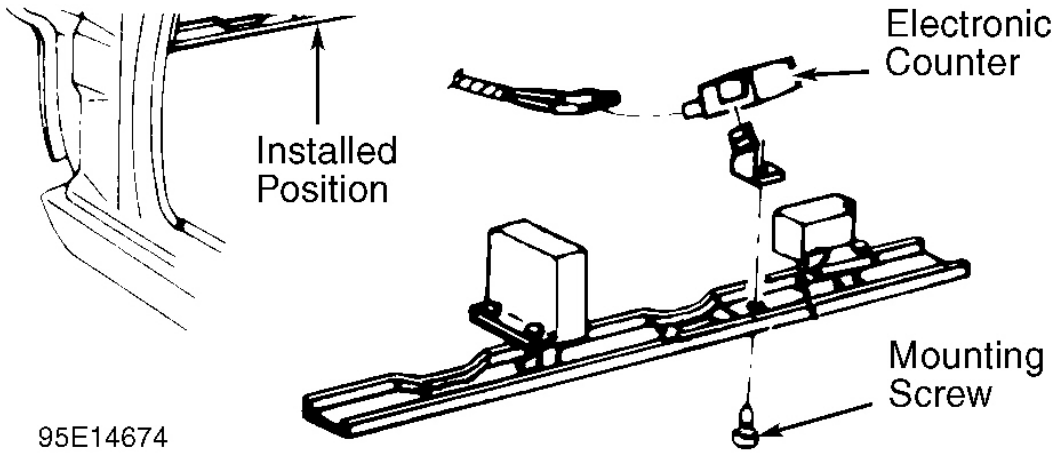

Fig. 8: Chrysler Electronic Type Reset Switch
Courtesy of CHRYSLER CORP.

SERVICE REMINDER INDICATOR LIGHT RESET - PROCEDURE 2

Every 7500 miles, a Vehicle Maintenance Monitor (VMM) will illuminate a SERVICE interval reminder indicator light. This indicates regular maintenance is due. After required service is performed, press RESET button on dash below VMM display. Hold button until a beep is heard. VMM display will now be clear.

SERVICE REMINDER MESSAGE

NOTE: **To determine the appropriate reset procedure, refer to SERVICE REMINDER MESSAGE RESET INDEX. Only vehicles listed in this index have a Service Reminder Message reset.**

SERVICE REMINDER MESSAGE RESET INDEX

Model & Year	Reset Procedure
Imperial	
1990	Service Reminder Message Reset - Procedure 2
Lebaron	
1990	Service Reminder Message Reset - Procedure 2
New Yorker	
1988-89	Service Reminder Message Reset - Procedure 1
1990	Service Reminder Message Reset - Procedure 2

SERVICE REMINDER MESSAGE RESET - PROCEDURE 1

Every 7500 miles or 12 months which ever comes first, a service reminder message on Electronic Vehicle Information Center (EVIC) display will illuminate, indicating an oil change is due. The EVIC is an optional accessory located in the overhead console.

Pressing INFO button with the ignition on will activate a MONITORED SYSTEMS OK message on the display if all systems are operating properly. If service is required, SERVICE REMINDER message will be displayed. Pressing the RESET button after message has been displayed will clear the message.

SERVICE REMINDER MESSAGE RESET - PROCEDURE 2

Every 7500 miles or 12 months which ever comes first, a service reminder message on Electronic Vehicle Information Center (EVIC) display will illuminate, indicating an oil change is due. The EVIC is an optional accessory located in the overhead console.

Pressing INFO button with the ignition on will activate a MONITORED SYSTEMS OK message on the display if all systems are operating properly. If service is required, SERVICE REMINDER message will be displayed. To clear message, press INFO button and within 5 seconds, press SET button.

TIRE PRESSURE MONITOR SYSTEM (TPMS)

NOTE: To determine the appropriate reset procedure, refer to TPMS RESET INDEX. Only vehicles listed in this index have a TPMS reset.

TPMS RESET INDEX

Model & Year	Reset Procedure
200	
2011-15	TPMS Reset - Procedure 1
300	
2005-14	TPMS Reset - Procedure 1
300M	
2002-04	TPMS Reset - Procedure 1
Aspen	
2007-09	TPMS Reset - Procedure 1
Avenger	
2008-14	TPMS Reset - Procedure 1
Caliber	
2007-12	TPMS Reset - Procedure 1
Caravan & Grand Caravan	
2005-14	TPMS Reset - Procedure 1
Challenger	
2008-14	TPMS Reset - Procedure 1

Charger	
2006-14	**TPMS Reset - Procedure 1**
Crossfire	
2005-08	**TPMS Reset - Procedure 2**
Concorde	
2002-04	**TPMS Reset - Procedure 1**
Dakota	
2008-11	**TPMS Reset - Procedure 4**
Dart	
2013-14	**TPMS Reset - Procedure 1**
Dodge Pickup (1500/ 2500/ 3500) (1)	
2008-10	**TPMS Reset - Procedure 1**
Durango	
2007-14	**TPMS Reset - Procedure 1**
Journey	
2009-10	**TPMS Reset - Procedure 4**
2011-15	**TPMS Reset - Procedure 1**
Nitro	
2007-11	**TPMS Reset - Procedure 1**
Magnum	
2006-08	**TPMS Reset - Procedure 1**
Pacifica	
2004-08	**TPMS Reset - Procedure 1**
Prowler	
2002	**TPMS Reset - Procedure 3**
PT Cruiser	
2008-10	**TPMS Reset - Procedure 1**
RAM C/V Tradesman	
2012-15	**TPMS Reset - Procedure 5**
RAM Pickup (1500/ 2500/ 3500) (1)	
2011-14	**TPMS Reset - Procedure 5**
RAM ProMaster (1500/ 2500/ 3500)	
2014	**TPMS Reset - Procedure 1**
Sebring	
2007-10	**TPMS Reset - Procedure 1**
Sprinter	
2007-09	**TPMS Reset - Procedure 1**
Town & Country	
2002-15	**TPMS Reset - Procedure 1**
Viper	
2005-10	

	TPMS Reset - Procedure 6
2013-14	**TPMS Reset - Procedure 1**
(1) Some early Dodge/RAM Pickup 3500 and Cab & Chassis models may not be equipped with TPMS.	

TPMS RESET - PROCEDURE 1

NOTE: In a low tire pressure siuation, the TPMS indicator light (and message) will turn OFF only after the tires are inflated to the vehicles recommended cold placard pressure value. The vehicle may need to be driven for up to 20 minutes above 20 mph (32 km/h) in order for the TPMS to determine that the inflation pressures are correct.

Once a sensor has been replaced and vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 20 minutes while maintaining a continuous speed above 20 mph (32 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

NOTE: The sensor IDs can also be programmed using the TPM-RKE Analyzer Tool. Scan each TPM sensor at each road wheel, and store each Sensor ID in the correct location (Left Front, Left Rear, Right Front, and Right Rear). Connect the TPM-RKE Analyzer Tool to the Scan Tool. Then follow the programming steps outlined in the diagnostic Scan Tool for "Program Tire Pressure Sensor ID w/ TPM Tool".

TPMS RESET - PROCEDURE 2

TPMS Indicator Reset

Once a sensor has been replaced and vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 10 minutes while maintaining a continuous speed above 20 mph (32 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

Tire Sensors Programming

WARNING: In the following procedure, Relearn Magnet (8821) is used. Death or serious injury can occur if magnetically sensitive devices are exposed to the retraining magnet used in the TPM system. Magnets can affect pacemakers.

NOTE: If a tire is changed (tire rotation), one or more tire pressure sensors fail, or if TPM module is replaced, the TPM system needs to relearn tire pressure sensor IDs. To perform this procedure, a Chrysler DRB-III® scan tool and a Relearn Magnet (8821) must be used.

NOTE: **The vehicle's tires must not have been rotated above 5 mph (8 km/h) in the last 2 minutes prior to programming.**

1. Connect Chrysler DRB-III® scan tool to vehicle's Data Link Connector (DLC), which is located beneath instrument panel, near steering column.
2. Using scan tool, access "CHASSIS SYSTEM".
3. Once in "CHASSIS SYSTEM", select "MISCELLANEOUS FUNCTIONS".
4. Select "TRAIN ALL MODE" from the menu selections. Select "YES" to continue.
5. Place Relearn Magnet (8821) over the valve stem for the left front wheel.
6. Each sensor/transmitter will automatically sense the presence of the magnet and begin transmitting. When the tire pressure sensor on each wheel has been programmed, the DRB-III® will automatically beep and direct you to the next wheel to be programmed. Move the magnet to each of the remaining wheels as directed by scan tool.
7. Remove magnet from last tire to be programmed (left rear wheel).
8. Once "TRAINING COMPLETED" is displayed, exit the program function screen and use the following to verify TPM functionality:
    - Verify TPM module programming is complete by viewing the "INPUT/OUTPUT DISPLAY" selection of the DRB-III® and confirming the tire pressure sensors are trained.
    - Verify TPM module programming is complete by viewing the "SENSOR DISPLAY" selection of the DRB-III® and confirming the tire pressure sensor pressure readings are accurate.

TPMS RESET - PROCEDURE 3

NOTE: **If a tire is changed (tire rotation), one or more tire pressure sensors fail, or if TPM module is replaced, the TPM system needs to relearn tire pressure sensor IDs. The procedure is similar to Tire Sensors Programming in TPMS RESET - PROCEDURE 2.**

When tire pressure is low, the "Low Tire" Pressure Indicator Lamp signal circuit will be pulsed to ground by the TPM module for two seconds on and then two seconds off, over and over. The BCM will then illuminate the "Low Tire" Pressure Indicator Lamp at the same rate and sound the audible chime as one single long tone.

When tire pressure is critical, the low tire pressure warning lamp signal circuit will be pulsed to ground by the low tire pressure warning module for one second on and then one second off, over and over. The BCM will then illuminate the "Low Tire" Pressure Indicator Lamp and sound the audible chime at the rate of one second on and one second off.

In either case, the TPM module will continue to pulse to ground the "Low Tire" Pressure Indicator Lamp signal circuit until the sensor/transmitter(s) transmits a pressure above the calibrated thresholds (and car is then driven above 20 mph (32 km/h)) or the ignition is turned off. If the conditions has not been corrected when the ignition is turned off, the indicator lamp will remain off when the ignition is turned on again until the vehicle reaches a speed of approximately 20 mph (32

km/h).

NOTE: In the event a diagnostic trouble code (DTC) is set, the "Low Tire" Pressure Indicator Lamp will illuminate continuously until the ignition is turned off. A low tire pressure condition cannot set a diagnostic trouble code (DTC).

TPMS RESET - PROCEDURE 4

The TPMS will not turn off the indicator lamp until the tire pressure is at or above the Low Pressure (lamp) OFF threshold. The system will automatically update and the TPM indicator lamp will extinguish once the updated tire pressures have been received.

NOTE: If a tire pressure sensor has been replaced, the TPM system needs to relearn tire pressure sensor IDs.

Wireless Control Module (WCM): The WCM automatically learns and stores new sensor IDs while driving "within 10-20 minutes continuously above 15 mph (24 km/h)" after a sensor has been replaced. The learning sequence will initiate when the vehicle has been stopped for more then 20 minutes.

A new sensor ID can also be programmed directly into the WCM by using an RKE-TPM Analyzer in conjunction with a Scan Tool. Scan each TPM sensor at each road wheel, and store each Sensor ID in the correct location. (Left Front, Left Rear, Right Front, and Right Rear) Connect the TPM-RKE Analyzer Tool to the Scan Tool. Then follow the programming steps outlined in the diagnostic Scan Tool for "Program Tire Pressure Sensor ID w/ TPM Tool"

For further information, refer to the Owners Manual or the Appropriate Diagnostic Information.

TPMS RESET - PROCEDURE 5

There are two tire pressure monitoring systems available, a base system and a premium system. The base system does not specify how many tires are low or where they are located. The premium system does indicate which tire is low. Sensor types are the Tire Pressure Monitoring (TPM) module for the 2500/3500 series, or the Wireless Ignition Node (WIN) for the 1500 series.

Base Tire Pressure Monitoring System:

The TPMS will not turn off the indicator lamp until the tire pressure is at or above specified tire pressure. The system will automatically update and the TPM indicator lamp will extinguish once the updated tire pressures have been received.

Premium Tire Pressure Monitoring System:

If the TPMS detects that the tire pressure in any road tire is going low, a chime will sound and the indicator lamp will turn on. In addition to the chime and lamp, a graphic display of the pressure value (s) and position of the low tire(s) will flash in the Electronic Vehicle Information Center (EVIC). Once pressure in the suspect tire(s) raises above the specified tire pressure, and the TPM module receives

a valid transmission from the sensor the lamp will go out. If a system fault is detected due to a missing sensor signal, in addition to a chime and a indicator lamp flashing, a "Check TPM System" text message will be displayed in the instrument cluster, and the tire pressure graphic display will display "- -" in place of the pressure value. After the flash sequence the TPM indicator lamp will remain illuminated. The system will return to normal once the TPM module receives a valid transmission from that sensor location. If a system fault is detected, the indicator lamp will flash on/off for 75 seconds and then remain on solid.

Base and Premium Systems:

NOTE: If a tire pressure sensor has been replaced, the TPM system needs to relearn tire pressure sensor IDs.

The WIN or TPM automatically learns and stores the sensor IDs while driving "within 10-20 minutes continuously above 15 mph (24 km/h)" after a sensor has been replaced. The learning sequence will initiate after the vehicle has been stopped for more than 20 minutes.

A new sensor ID can also be programmed directly into the WIN or TPM module by using a RKE-TPM Analyzer in conjunction with a Scan Tool. Once the new sensor ID has been programmed, the vehicle will need to be driven above 15 mph until the fault is no longer active (lamp extinguishes) and display is updated (for up to 20 minutes).

NOTE: The matching full size spare wheel and tire assembly (if equipped) has a TPM sensor. The spare can be used in place of any of the four road tires. The TPMS will only monitor the pressure in the full size spare when it is used in place of a road tire. Otherwise, a spare with pressure below the low-pressure limit will not cause the TPMS indicator light to illuminate or the chime to sound.

TPMS RESET - PROCEDURE 6

NOTE: If tires have been rotated or a tire pressure sensor has been replaced, the tire pressure sensors must be retrained. Refer to the following procedure to program the module for identification of one new or all tire pressure sensor/transmitters.

NOTE: The vehicle's tires must not have been rotated above 5 mph (8 km/h) in the last two minutes prior to programming.

1. Connect a DRBIII® scan tool to the vehicle's diagnostic connector beneath the instrument panel, to the right of the steering column.
2. Access the Chassis System using the DRBIII.
3. Once in the Chassis System, select Tire Pressure Monitor, followed by Miscellaneous.
4. Select the appropriate function from the next screen displaying the following options:
    - Program LF Pressure Sensor
    - Program RF Pressure Sensor

- Program RR Pressure Sensor
- Program LR Pressure Sensor
- Program Module (4 Sensors)
- Monitor

5. Place a magnet (or special tool 8821), at the valve stem for that wheel as directed by the DRBIII. If the Program Module function has been chosen, the DRBIII will direct you to the left front wheel pressure sensor/transmitter first.

NOTE: **When programming the module (all four sensor/transmitters), the magnet should be moved from wheel to wheel in a clockwise direction starting at the left front wheel.**

6. When that wheels pressure sensor/transmitter has been programmed, the DRBIII will display Program Transmitter Complete or will automatically direct you to the next wheel sensor/transmitter to be programmed.
7. Remove the magnet and if programming the entire module, move the magnet to each of the remaining wheels as directed by the DRBIII. Each sensor/transmitter will automatically sense the presence of the magnet and begin programming.
8. Once Program Transmitter Complete is displayed, exit the program function screen.
9. Verify that the module programming is complete by looking at the tire pressure sensor/transmitter ID's in the Sensor Display using the DRBIII.

ACCESSORIES AND EQUIPMENT

Message Center - Service Information - Chrysler 300

CENTER, ELECTRONIC VEHICLE INFORMATION

DESCRIPTION

DESCRIPTION

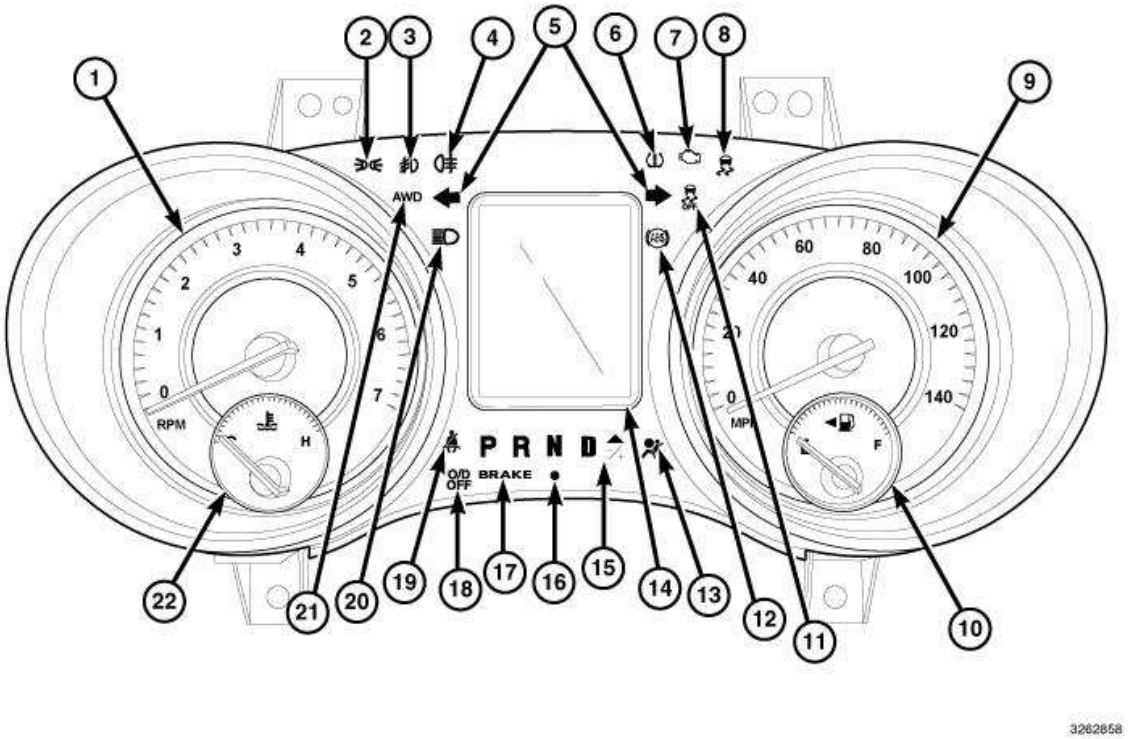

Fig. 1: Identifying Electronic Vehicle Information Center (EVIC) Components
Courtesy of CHRYSLER GROUP, LLC

The Electronic Vehicle Information Center (EVIC) features a driver-interactive display (14). The display is a Liquid Crystal Display (LCD), and is located directly in the center of the Instrument Cluster (IC) between the two gauge pods.

The EVIC displays many textual messages for vehicle systems support as well as your more common vehicle features, and options. These features and options include: Odometer (ODO), Trip A and Trip B odometer readouts, PRNDL, and compass heading, and ambient temperature readouts. The EVIC function buttons; located on the left spoke of the steering wheel can be used to scroll through the different features.

The EVIC system is comprised of several different components. Those components are:

- Instrument Cluster (IC)

- Ambient Temperature Sensor
- Remote Compass Module (RCM)
- Body Control Module (BCM)
- Controller Area Network (CAN) Data Bus
- Local Interface Network (LIN) Data Bus

The EVIC display is part of the Instrument Cluster assembly and is not serviced as a separate component. If the display is inoperative the complete Instrument Cluster assembly must be replaced. Refer to **REMOVAL** .

OPERATION

OPERATION

The Electronic Vehicle Information Center (EVIC) uses both non-switched and ignition switched sources of battery current so that some of its features remain operational at any time, while others may only operate with the ignition switch in the "ON" position. When the ignition switch is turned to the "ON" position, the EVIC display will return to the last function being displayed before the ignition was turned to the "OFF" position.

The EVIC system is comprised of several different components that communicate over the Controller Area Network (CAN) and Local Interface Network (LIN) Data Buses. **If the system is inoperative a scan tool and the appropriate diagnostic information must be used to diagnose the system.**

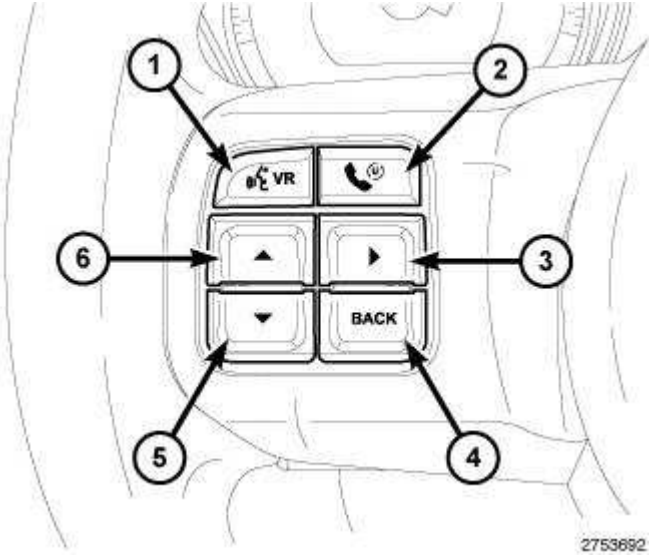

Fig. 2: EVIC SWITCHES
Courtesy of CHRYSLER GROUP, LLC

The EVIC function buttons are used to operate the different functions of the EVIC system. Pressing and releasing the **MENU** buttons (5 & 6) allows the driver to scroll though and select the Compass/Temperature, Trip Computer, Personal Settings or System Status functions. The **STEP** button (3) allows the selection of setting or resetting of the function currently displayed at that time.

Pressing and releasing the **BACK** button (4) will cause the EVIC to return to the main menu.

EVIC DISPLAY MODES

SYSTEM STATUS MODE

Displays warnings and user interaction messages. Initial warnings will be displayed accompanied by a series of audible beeps. Critical text warnings will be displayed until the failure is corrected. Non-critical text warnings will be displayed for 60 seconds. The driver can scroll to view multiple messages by using the menu buttons.

When the appropriate conditions exist, the EVIC displays the following messages:

- Turn Signal On (with a continuous warning chime if the vehicle is driven more than 1 mile [1.6 km] with either turn signal on)
- Left Front Turn Signal Lamp Out (with a single chime)
- Left Rear Turn Signal Lamp Out (with a single chime)
- Right Front Turn Signal Lamp Out (with a single chime)
- Right Rear Turn Signal Lamp Out (with a single chime)
- Remote Keyless Entry (RKE) Battery Low (with a single chime)
- Low Fuel
- Cal (if equipped with a compass module)
- Oil Change Required (with a single chime)
- Low Washer Fluid
- Coolant Low
- Key in Ignition
- Lights On
- Exhaust Service Required - See Dealer Now (diesel models only)
- Exhaust System - Regeneration Required Now (diesel models only)

COMPASS/TEMPERATURE/TRIP COMPUTER

Compass heading and outside temperature are displayed on the Instrument Cluster (IC) Liquid Crystal Display (LCD) display. One of eight compass headings to indicate the direction the vehicle is facing (N, S, E, W, NE, NW, SE, SW) and one of 15 compass variance settings can be programmed. Outside temperature is displayed in °C (degrees Celsius) or °F (degrees Fahrenheit).

Press and release the **MENU** button until one of the following Trip Functions displays in the EVIC:

- Fuel Economy
- Trip Info
- Vehicle Speed

Press the **STEP** button to cycle through all the Trip Computer functions.

The Trip Functions mode displays the following information:

- **Average Fuel Economy** Displays the average fuel economy since the last reset. When the fuel economy is reset, the display will read "RESET" or show dashes for two seconds. Then, the history information will be erased, and the averaging will continue from the last fuel average reading before the reset.
- **Distance To Empty (DTE)** Displays the estimated distance that can be traveled with the fuel remaining in the tank. This estimated distance is determined by a weighted average of the instantaneous and average fuel economy, according to the current fuel tank level. DTE cannot be reset through the **RESET** button. When the DTE value is less than 30 miles (48 km) estimated driving distance, the DTE display will change to a text display of "LOW FUEL." This display will continue until the vehicle runs out of fuel. Adding a significant amount of fuel to the vehicle will turn off the "LOW FUEL" text and a new DTE value will display.
- **Elapsed Time** Displays the total elapsed time of travel since the last reset when the ignition switch is in the ACC position. Elapsed time will increment when the ignition switch is in the ON or START position.
- **Trip-A or Trip-B** Displays trip mileage accumulated since the last reset when the ignition switch is in the ON or ACC position.
- **Display Units of Measure in:** To make your selection, press and release the **RESET** button until "MPH" or "km/h" appears.

To Reset The Display Reset will only occur while a resettable function is being displayed. Press and release the **RESET** button once to clear the resettable function being displayed. To reset all resettable functions, press and release the **RESET** button a second time within 3 seconds of resetting the currently displayed function (>Reset ALL will display during this 3 second window).

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ELECTRONIC VEHICLE INFORMATION CENTER

The Electronic Vehicle Information Center (EVIC) data is obtained from several components on the Controller Area Network (CAN) Data Bus circuit. The EVIC will not function properly if the bus messages from any of these components is not received. If no EVIC data is displayed, check the CAN Data Bus circuit communications, the Instrument Cluster functions and the Body Control Module (BCM).

The use of a scan tool and the proper diagnostic procedures information are recommended for further testing of the EVIC and the CAN Data Bus circuit. Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

MODULE, COMPASS

DESCRIPTION

DESCRIPTION

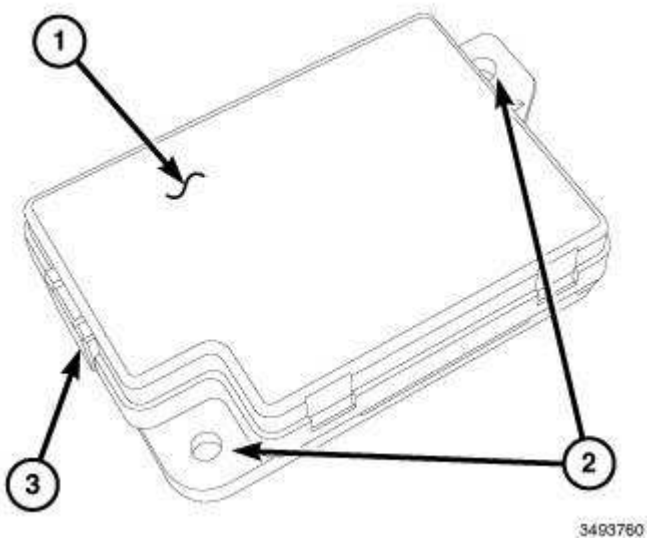

Fig. 3: Remote Compass Module (RCM), Mounting Tabs, And Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

The Remote Compass Module (RCM) (1) is secured through two integral mounting tabs (2) to a mounting bracket that is secured to the upper center of the instrument panel support structure, behind the Integrated Center Stack (ICS) display module. A connector receptacle (3) integral to one side of the molded black plastic RCM housing is connected to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The RCM cannot be repaired. If the module is ineffective or damaged, the entire unit must be replaced.

OPERATION

OPERATION

The Compass Temperature Display system uses both non-switched and ignition switched sources of battery current so that some of its features remain operational at any time, while others may only operate with the ignition switch in the ON position. When the ignition switch is turned to the ON position, the display will return to the last function being displayed before the ignition was turned to the OFF position.

The Compass Temperature Display system is comprised of several different components that communicate over the Controller Area Network (CAN) and Local Interface Network (LIN) Data Bus circuits. If the system is inoperative a scan tool and the appropriate diagnostic information must be used to diagnose the system and related data buses.

STANDARD PROCEDURE

COMPASS VARIANCE ADJUSTMENT

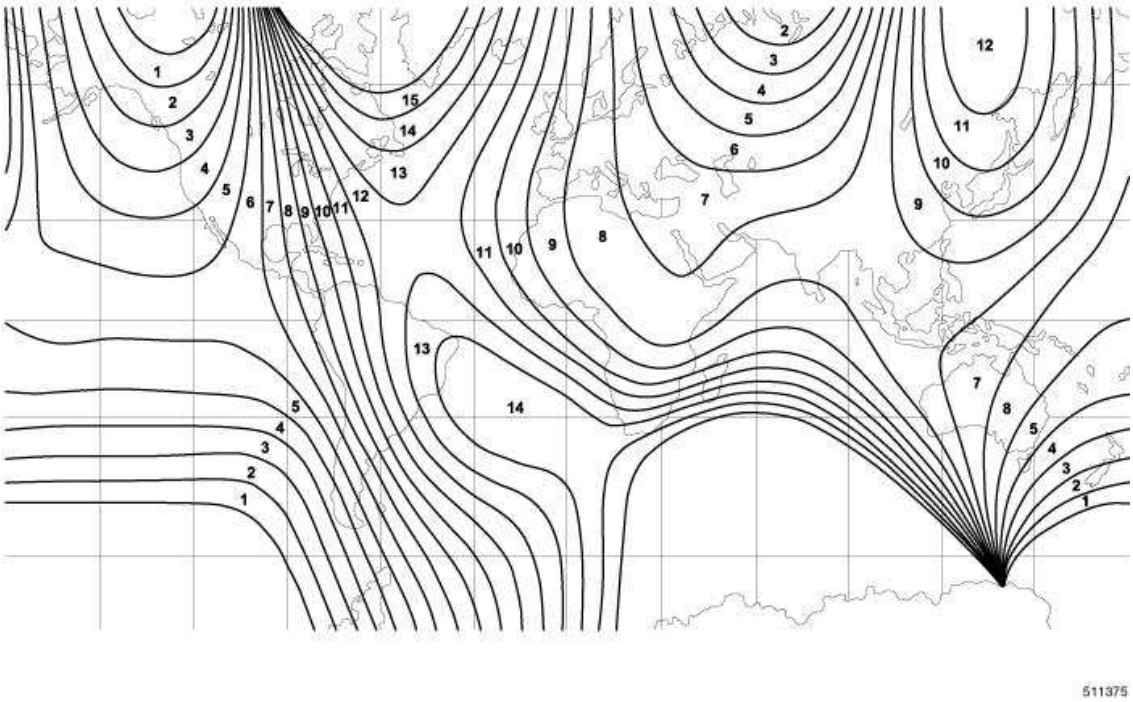

Fig. 4: Magnetic And Geographic North MAP
Courtesy of CHRYSLER GROUP, LLC

Compass variance, also known as magnetic declination, is the difference in angle between magnetic north and true geographic north. In some geographic locations, the difference between magnetic and geographic north is great enough to cause the compass to give false readings. If this problem occurs, the compass variance must be set.

NOTE: **If the vehicle is taken on long trips into a new variance zone the compass function may be effected. Compass variance will need to be updated to the new zone number to function properly.**

NOTE: **The default for the compass variance from the factory is 8.**

SET THE COMPASS VARIANCE MANUALLY AS FOLLOWS:

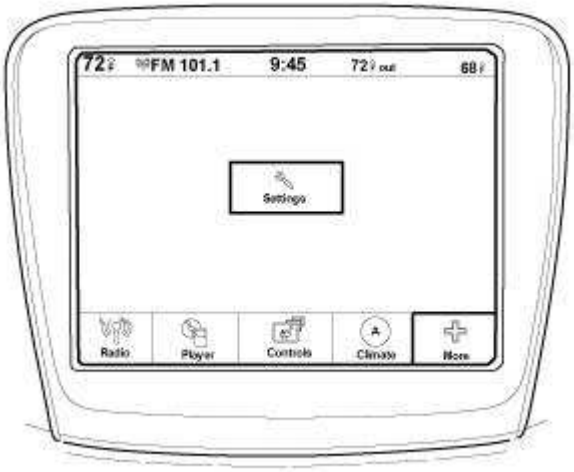

Fig. 5: U-Connect Touch Display (Settings)
Courtesy of CHRYSLER GROUP, LLC

1. Using the Variance Settings Map, find your geographic location and note the zone number.
2. Turn the ignition switch to the ON/RUN position.
3. Using the U-Connect Touch ™ screen, select **SETTINGS** either from the hard controls on the side of the screen, or from the menu selections at the bottom of the screen, depending on model.
4. Scroll through the menu, and select **COMPASS VARIANCE** .
5. Once selected, toggle through the zone numbers (1-15), until the zone number for your geographic location appears in the display. The zone number will set automatically.

NOTE: The default for the compass variance from the factory is 8. During programming, the Zone value will wrap around from Zone 15 to Zone 1.

6. Press the **BACK** button to return to the main menu.
7. Confirm that the correct direction is now indicated by the compass.

MANUAL COMPASS CALIBRATION

CAUTION: Do not place any external magnets, such as magnetic roof mount antennas, in the vicinity of the Remote Compass Module (RCM) located under the instrument panel center stack hood. Do not place any electronic devices (cell phones, laptop computers, PDAs, portable DVD players, etc), on or near the instrument panel as the RCM performance may be effected. Do not use magnetic tools when servicing the RCM.

NOTE: Confirmation that the proper variance zone is programmed, is recommended whenever manual compass calibration is performed, for the appropriate

procedure. Refer to MODULE, COMPASS, STANDARD PROCEDURE.

The electronic compass unit features a self-calibrating design, which simplifies the calibration procedure. This feature automatically updates the compass calibration while the vehicle is being driven. This allows the compass unit to compensate for small changes in the residual magnetism that the vehicle may acquire during normal use. If the compass readings appear to be erratic or the Electronic Vehicle Information Center (EVIC) displays "CAL", perform the following manual calibration procedure. Also, any time EVIC service replacement components are installed, they must be calibrated using this procedure. Do not attempt to calibrate the compass near large metal objects such as other vehicles, large buildings, or bridges; or, near overhead or underground power lines.

NOTE: Do not attempt to calibrate the compass near large metal objects such as other vehicles, large buildings, or bridges; or, near overhead or underground power lines.

CALIBRATE THE COMPASS MANUALLY AS FOLLOWS:

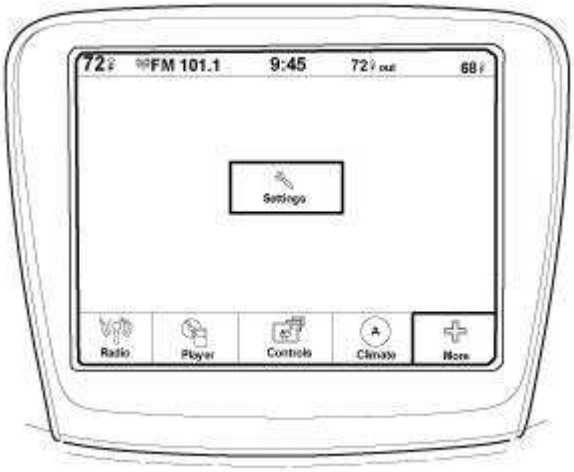

Fig. 6: U-Connect Touch Display (Settings)
Courtesy of CHRYSLER GROUP, LLC

1. Start the engine but leave the vehicle in "PARK".
2. Using the U-Connect Touch ™ screen, select **SETTINGS** either from the hard controls on the sides of the screen, or from the menu selections at the bottom of the screen, depending on model.
3. Scroll through the menu, and select **CALIBRATE COMPASS** .
4. Select **ON** , the "CAL" symbol will come on solid in the EVIC display next to the compass direction that is displayed.
5. Slowly drive the vehicle on a level surface, away from large metal objects and power lines, through one or two **complete** circles not exceeding 8 km/h (5 mph). The "CAL" message will disappear from the display to indicate successful compass calibration.

6. Confirm that the correct direction is now indicated by the compass.
7. Press the **BACK** button to return to the main menu.

NOTE: **If the compass display indicates an inaccurate compass heading or the display is locked up, the RCM (if equipped) may be inoperative and require replacement.**

NOTE: **If the "CAL" message remains in the display, either there is excessive magnetism near the compass, or the EVIC is inoperative. Attempt the calibration procedure at least one more time before performing EVIC diagnosis.**

NOTE: **If the wrong direction is still indicated in the compass display, the area selected for calibration may be too close to a strong magnetic field. Repeat the manual calibration procedure in another location.**

REMOVAL

REMOVAL

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

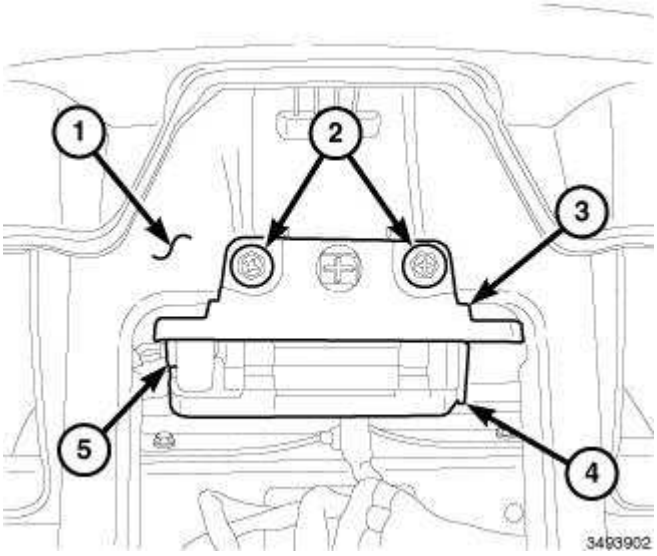

Fig. 7: Instrument Panel Structural Support, Screws, And Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the center bezel from the instrument panel. Refer to **BEZEL, INSTRUMENT PANEL, CENTER, REMOVAL** .
3. Remove the two screws (2) that secure the Remote Compass Module (RCM) mounting bracket (3) near the top of the instrument panel structural support (1).
4. Pull the RCM (4) and mounting bracket out from the instrument panel structural support far enough to access and disconnect the instrument panel wire harness connector (5) from the RCM connector receptacle.
5. Remove the RCM and mounting bracket unit from the vehicle.

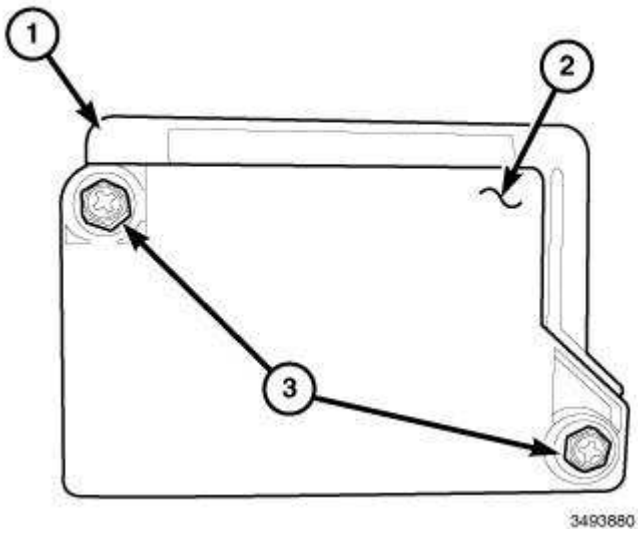

Fig. 8: RCM, Screws, And Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two screws (3) that secure the RCM (2) to the mounting bracket (1).
7. Remove the RCM from the mounting bracket.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

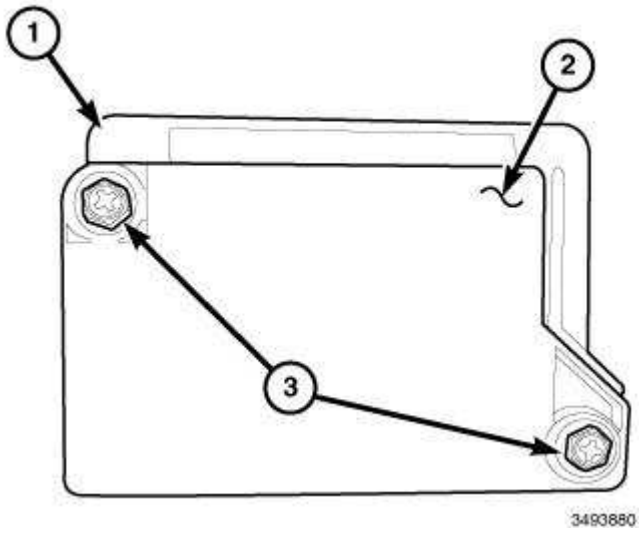

Fig. 9: RCM, Screws, And Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Position the Remote Compass Module (RCM) (2) to the mounting bracket (1).
2. Install and tighten the two screws (3) that secure the RCM to the mounting bracket. Tighten the screws securely.

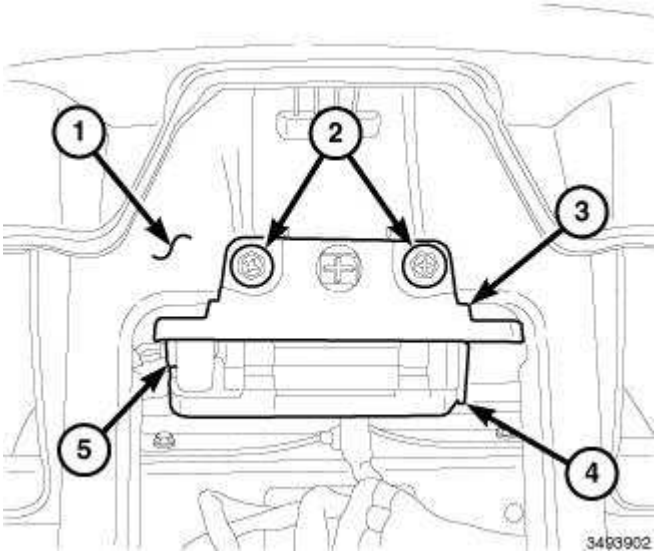

Fig. 10: Instrument Panel Structural Support, Screws, And Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

3. Position the RCM (4) and mounting bracket (3) as a unit close enough to the top of the instrument panel structural support (1) to reconnect the instrument panel wire harness connector (5) to the RCM connector receptacle.
4. Position the RCM and mounting bracket unit to the structural support.
5. Install and tighten the two screws (2) that secure the RCM mounting bracket to the structural support. Tighten the screws securely.

6. Reinstall the center bezel onto the instrument panel. Refer to **BEZEL, INSTRUMENT PANEL, CENTER, INSTALLATION** .
7. Reconnect the battery negative cable.
8. Perform both the Manual Compass Calibration and the Compass Variance Adjustment standard procedures. Refer to **MODULE, COMPASS, STANDARD PROCEDURE**.
9. Verify proper compass operation.

SENSOR, AMBIENT TEMPERATURE

DESCRIPTION

DESCRIPTION

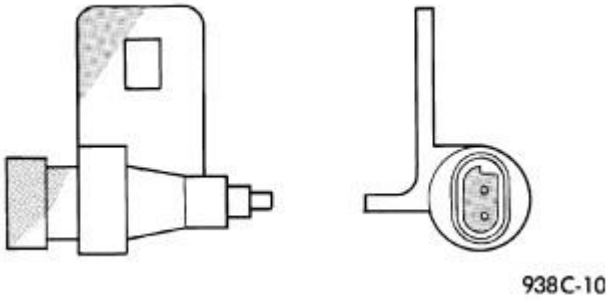

Fig. 11: Ambient Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

The ambient temperature sensor is a variable resistor type sensor. it is mounted to the front bumper beam behind the radiator grille and in front of the engine compartment.

The ambient temperature sensor cannot be adjusted or repaired and, if inoperative or damaged, it must be replaced.

OPERATION

OPERATION

The ambient temperature sensor is a variable resistor that operates on a five-volt reference signal sent by the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The resistance in the sensor changes as temperature changes, changing the temperature sensor signal circuit voltage to the BCM. Based upon the resistance in the sensor, the BCM senses a specific voltage on the temperature sensor signal circuit. The BCM then translates the voltage into a temperature reading that it sent over the Controller Area Network (CAN) data bus to other modules utilizing temperature information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AMBIENT TEMPERATURE SENSOR

The temperature function is supported by the ambient temperature sensor, a wiring circuit and the Body Control Module (BCM) (also known as the Common Body Controller/CBC). If any portion of the ambient temperature sensor circuit fails or if the Controller Area Network (CAN) data bus information is missing, a (- -) will appear in the Electronic Vehicle Information Center (EVIC) display in place of the temperature. When the sensor is exposed to temperatures above 55° C (130° F), or if the sensor circuit is shorted, 55° C (130° F) will appear in the EVIC display in place of the temperature. When the sensor is exposed to temperatures below - 40° C (- 40° F) or if the sensor circuit is open, - 40° C (- 40° F) will appear in the EVIC display.

NOTE: **The system displays the last known temperature when starting the vehicle and may take a minimum time or mileage to update to an accurate current reading, up to 5 minutes at a maintained speed above 40 mph (64.3 kph). Customers with very short commutes may not get an updated reading before their destination is reached, or if the ignition does not remain in the OFF status for more than 255 minutes (4hrs., 15min.). This strategy was intended to eliminate wildly fluctuating readings and may cause some customer confusion leading to unnecessary diagnosis and parts replacements.**

SENSOR TEST

1. Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Disconnect the ambient temperature sensor harness connector.
2. Measure the resistance of the ambient temperature sensor. At - 40° C (- 40° F), the sensor resistance is 336 kilohms. At 55° C (130° F), the sensor resistance is 2.488 kilohms. The sensor resistance should read between these two values. If OK, refer to **SENSOR CIRCUIT TEST**. If not OK, replace the inoperative ambient temperature sensor.

SENSOR CIRCUIT TEST

Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

1. Transition the ignition switch to the OFF status. Disconnect and isolate the battery negative cable. Disconnect the wire harness connectors from the ambient temperature sensor and the BCM.
2. Connect a jumper wire between the two terminals in the body half of the ambient temperature sensor harness connector.
3. Check for continuity between the sensor return circuit and the ambient temperature sensor signal circuit cavities of the BCM harness connector. There should be continuity. If OK, go to 4. If not OK, repair the open sensor return circuit or ambient temperature sensor signal circuit to the ambient temperature sensor as required.
4. Check for continuity between the ambient temperature sensor signal circuit cavity of the BCM harness connector and a good ground. There should be no continuity. If OK, test the EVIC operation. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, OPERATION**. If not OK, repair the shorted ambient temperature sensor signal circuit as required.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** .

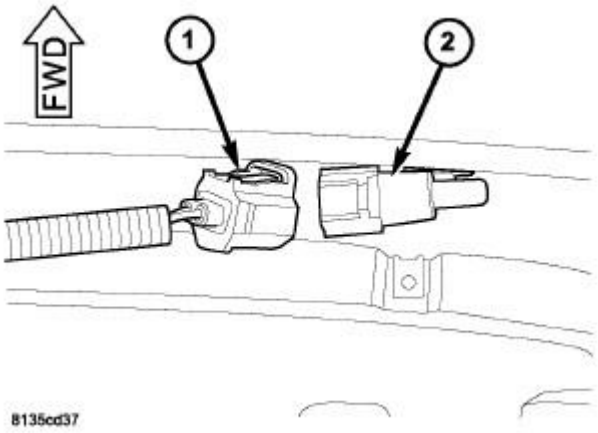

Fig. 12: Ambient Temperature Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the wire harness connector (1) from the ambient temperature sensor (2).

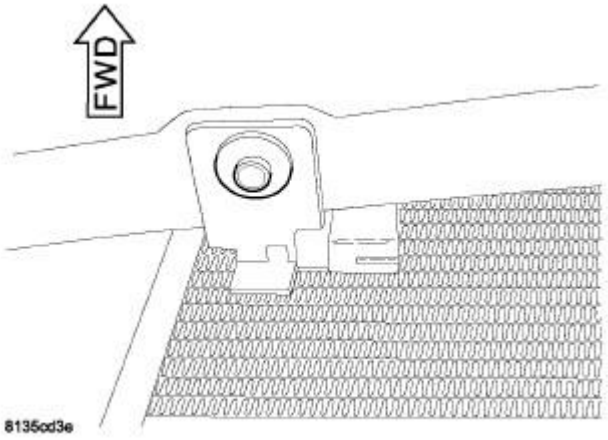

Fig. 13: Ambient Temperature Sensor Fastener
Courtesy of CHRYSLER GROUP, LLC

4. Remove the fastener that secures the ambient temperature sensor bracket to the front bumper beam.
5. Remove the ambient temperature sensor from the vehicle.

INSTALLATION

INSTALLATION

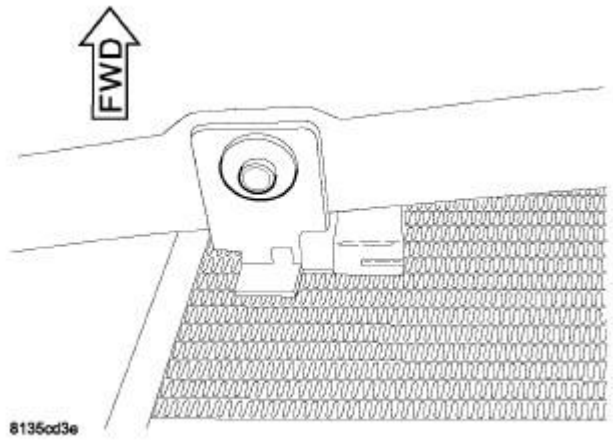

Fig. 14: Ambient Temperature Sensor Fastener
Courtesy of CHRYSLER GROUP, LLC

1. Position the ambient temperature sensor in the vehicle.
2. Install the fastener that secures the ambient temperature sensor to the front bumper beam.

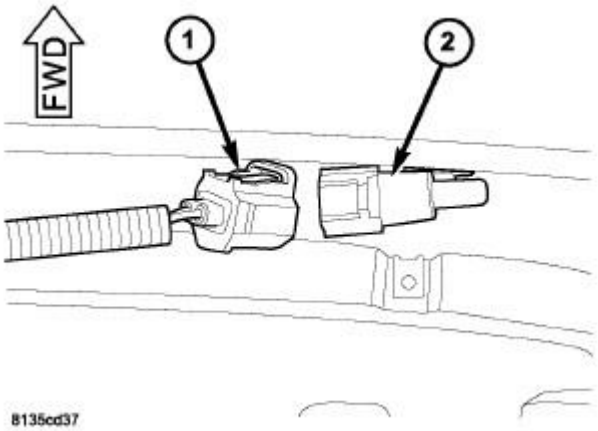

Fig. 15: Ambient Temperature Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect the wire harness connector (1) to the ambient temperature sensor (2).
4. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .
5. Connect the battery negative cable.

SWITCH, EVIC CONTROL

DESCRIPTION

DESCRIPTION

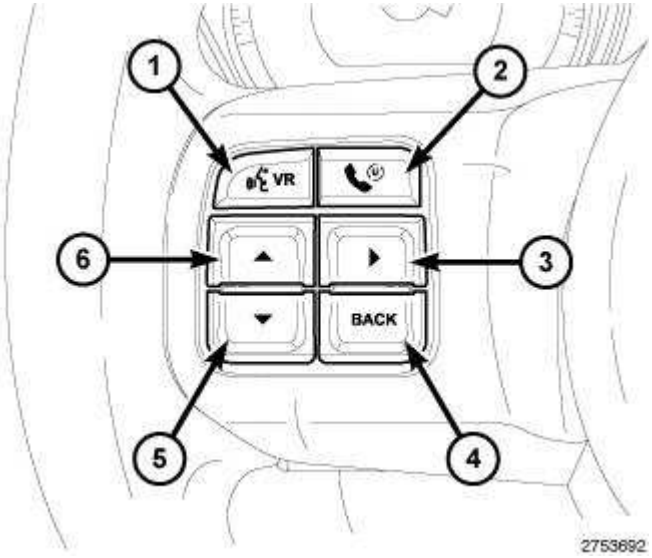

Fig. 16: EVIC Switches
Courtesy of CHRYSLER GROUP, LLC

The Electronic Vehicle Information Center (EVIC) control switch pod is located in the left spoke of the steering wheel spoke bezel. This switch has up to six push buttons. Four of the push buttons (3 through 6) are used on all vehicles equipped with the EVIC. Two additional push buttons (1 and 2) are found on vehicles equipped with the optional Uconnect™ Hands-Free Communication System. The only visible components of the switch pod are the switch push buttons and a decorative bezel around the push buttons, which stands slightly proud of the steering wheel spoke bezel. The remainder of the switch pod including its mounting provisions and its electrical connection are concealed beneath the spoke bezel.

The switch pod housing and push buttons are constructed of molded plastic. Each of the push buttons has white International Control and Display Symbol graphics or text applied to it, which clearly identify the function of each push button. The switch pod is secured through three integral mounting tabs to mounting bosses on the back of the spoke bezel by three screws. A connector receptacle integral to the inboard end of the switch pod housing connects the EVIC control switch pod to the vehicle electrical system through a dedicated take out and connector of the steering wheel wire harness.

The EVIC control switch pod cannot be adjusted or repaired. If any function of the switch is ineffective or damaged, the entire switch pod unit must be replaced.

OPERATION

OPERATION

The Electronic Vehicle Information Center (EVIC) control switch pod is a resistor multiplexed unit that

receives source current from and provides hard wired inputs to the Local Interface Network (LIN) slave node integral to the speed control switch pod in the right spoke of the steering wheel spoke bezel. The LIN slave node communicates the switch states of the EVIC control switch pod, the remote radio switches, the paddle shifter switches (if equipped), the horn switch and the heated steering wheel sensor (if equipped) over the LIN data bus to the Steering Control Module (SCM), which is the LIN master node.

The EVIC control switch pod contains four switch push buttons whose functions are:

- **Back** - Pressing and releasing the Back push button returns you to the previous sub menu or main menu.
- **Down Arrow** - Pressing and releasing the Down Arrow push button allows the operator to scroll downward through the various EVIC main menus and sub menus.
- **Right Arrow** - Pressing and releasing the Right Arrow (Select) push button allows the operator to navigate, select and reset items or settings in the currently displayed EVIC main menu or sub menu. Pressing and holding the Right Arrow (Select) push button for two seconds provides a global reset of all of those EVIC features that can be reset, whether currently displayed or not.
- **Up Arrow** - Pressing and releasing the Up Arrow push button allows the operator to scroll upward through the various EVIC main menus and sub menus.

For vehicles equipped with the Uconnect™ Hands-Free Communication System, the EVIC control switch pod contains two additional switch push buttons whose functions are:

- **VR (Voice Recognition)** - This switch button activates the Uconnect™ Voice Command system.
- **Phone** - This switch push button activates the Uconnect™ Hands-Free Phone system.

The SCM LIN master node provides a clean ground and fused B(+) current for all of the switches and sensors on the rotating steering wheel through the LIN slave node circuitry of the speed control switch pod as well as for the Light Emitting Diode (LED) back lighting of both the speed control and the EVIC switch pods. The SCM continually monitors the LIN bus data and will store a Signal Not Available (SNA) code for any LIN bus input errors. The SCM also communicates with other electronic modules over the Controller Area Network (CAN) data bus. Therefore, any SCM DTC information can be retrieved using a diagnostic scan tool connected to the Data Link Connector (DLC).

The analog resistor multiplexed circuits of the EVIC control switch pod as well as the hard wired circuits between the switch pod and the LIN slave node within the speed control switch pod may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the LIN slave or master nodes, the SCM or the electronic controls and communication between modules and other devices that provide some features of the EVIC system. The most reliable, efficient, and accurate means to diagnose the EVIC control switch pod, the LIN slave or master nodes, the SCM or the

electronic controls and communication related to EVIC system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

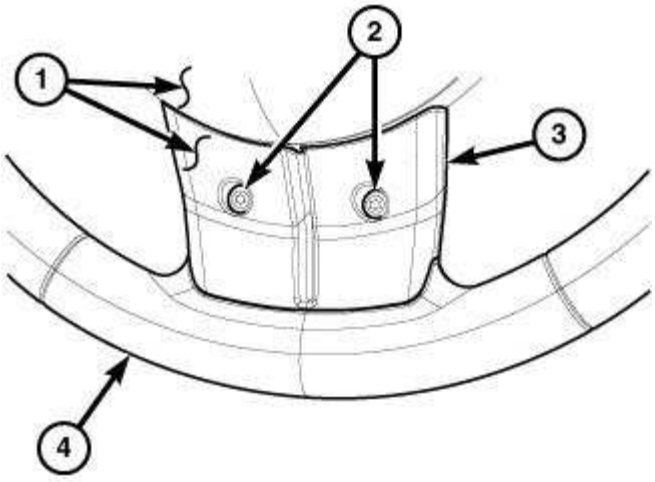

Fig. 17: Rear Cover, Two Screws, Steering Wheel Spoke Front Bezel & Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the driver airbag assembly from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
3. From the back of the steering wheel (4), remove the screws (2) that secure the front bezel to the rear cover (1) of the steering wheel.

NOTE: Depending on model, there may be additional screws securing the bezel to the steering wheel.

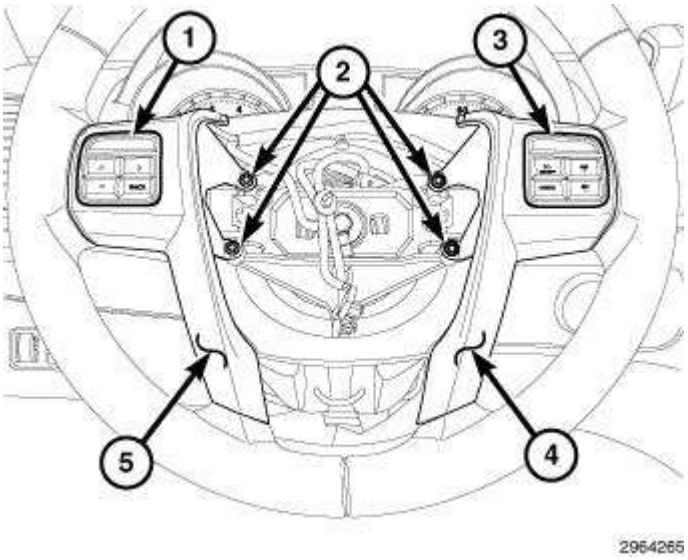

Fig. 18: Electronic Vehicle Information Center (EVIC) Switch Pod, Spoke Bezel And Screws
Courtesy of CHRYSLER GROUP, LLC

4. From the face of the steering wheel, remove the screws (2) as needed, that secure the front spoke bezel (5) to the steering wheel armature within the steering wheel hub cavity.
5. Using a trim stick (special tool # (special tool #C-4755, Trim Stick)) or equivalent, carefully pry at the parting line between the front spoke bezel and the steering wheel rear cover enough to unsnap the two horizontal members of the bezel from those of the rear cover.
6. Pull the front spoke bezel away from the steering wheel far enough to access and disconnect the steering wheel wire harness connections from the Electronic Vehicle Information Center (EVIC) switch pod (1).

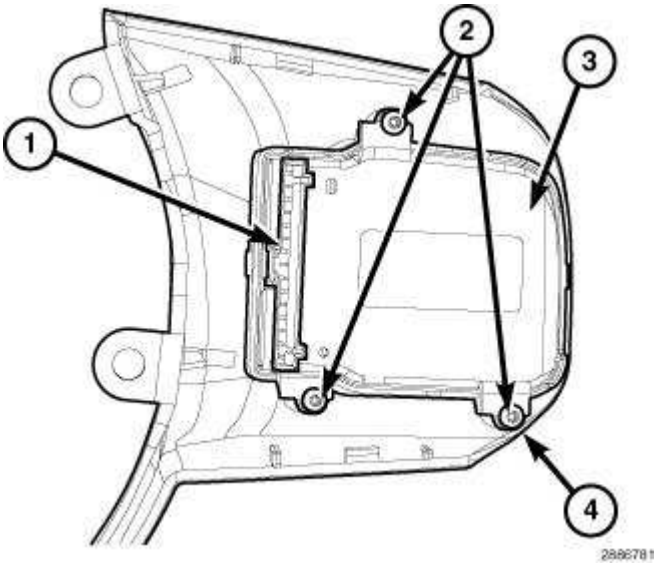

Fig. 19: Steering Wheel Spoke Front Bezel, Screws, EVIC Switch Pod And Mounting Tabs
Courtesy of CHRYSLER GROUP, LLC

7. From the back of the steering wheel spoke front bezel (4), remove the three screws (2) that secure the EVIC switch pod (3) mounting tabs to the bezel.
8. Remove the switch from the bezel.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

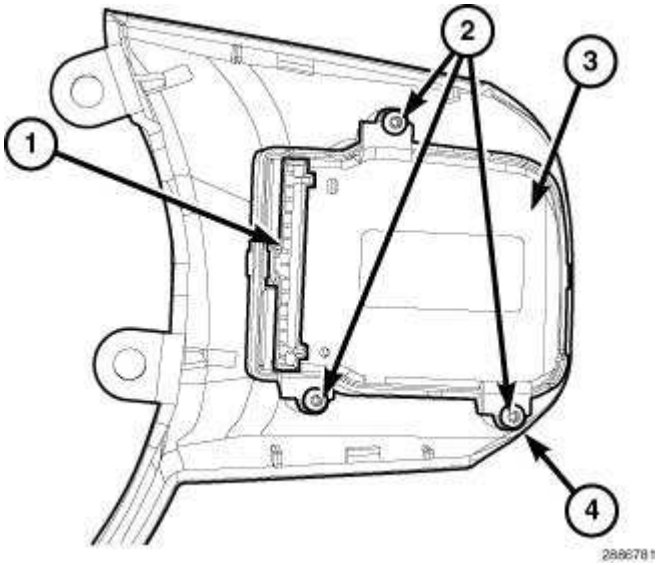

Fig. 20: Steering Wheel Spoke Front Bezel, Screws, EVIC Switch Pod And Mounting Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Position the Electronic Vehicle Information center (EVIC) switch pod (3) to the back of the steering wheel spoke front bezel (4).
2. Install and tighten the three screws (2) that secure the switch mounting tabs to the bezel. Tighten the screws securely.
3. Position the front spoke bezel close enough to the steering wheel to reconnect the steering wheel wire harness connections to the Electronic Vehicle Information Center (EVIC) switch pod and the speed control switch pod connector receptacles (3).

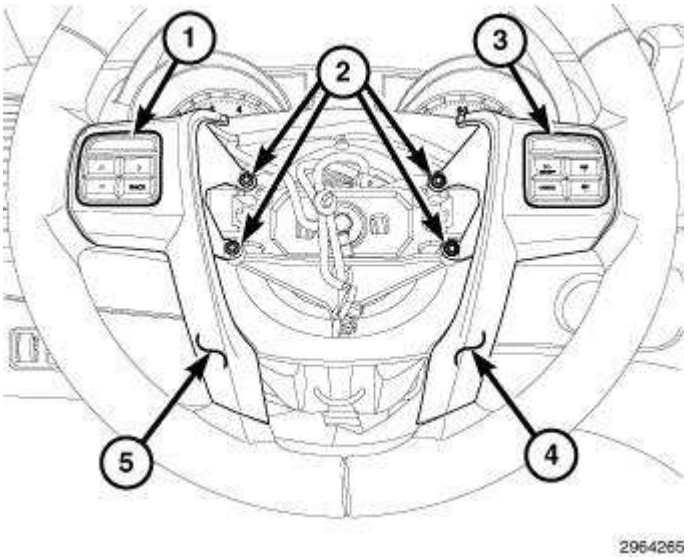

Fig. 21: Electronic Vehicle Information Center (EVIC) Switch Pod, Spoke Bezel And Screws
Courtesy of CHRYSLER GROUP, LLC

4. Position the front spoke bezel (5), EVIC switch pod (1) to the steering wheel. Be certain that the steering wheel wire harness is routed between the upper bezel stanchions and the inside circumference of the steering wheel hub cavity so that the wiring will not be pinched when the driver airbag is reinstalled.
5. Use hand pressure to squeeze the horizontal spokes of both the front spoke bezel and the steering wheel rear cover together until all of the snap features are fully engaged.
6. Install and tighten the screws as needed that secure the stanchions of the front spoke bezel to the steering wheel armature within the steering wheel hub cavity. Tighten the screws securely.

NOTE: Depending on model, there may be additional screws securing the bezel to the steering wheel.

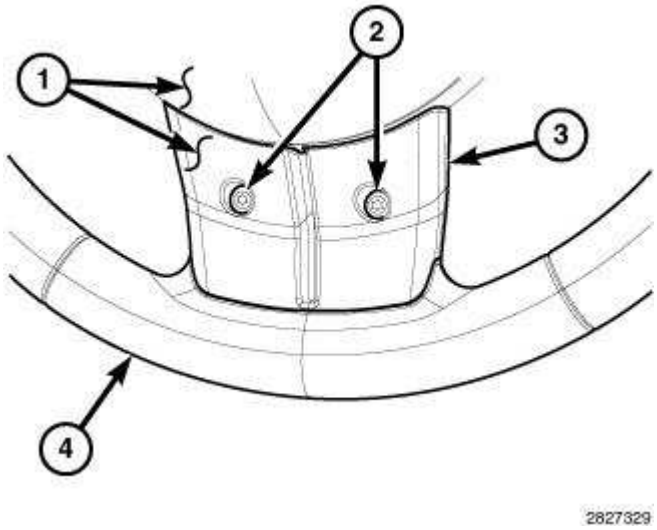

Fig. 22: Rear Cover, Two Screws, Steering Wheel Spoke Front Bezel & Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

7. From the back of the steering wheel (4), install and tighten the lower screws (2) as needed that secure the spoke of the rear cover (1) to the lower spoke of the steering wheel front bezel (3). Tighten the screws securely.
8. Install the driver airbag assembly (2). Refer to **AIR BAG, DRIVER, INSTALLATION** .
9. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) verification test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE** .
10. Connect the negative battery cable.

SPECIAL TOOLS

SPECIAL TOOLS

	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)

AUDIO AND ELECTRONICS

INSTRUCTION SHEET

WIFI ROUTER

300/CHARGER/CHALLENGER

PROCEDURE STEPS

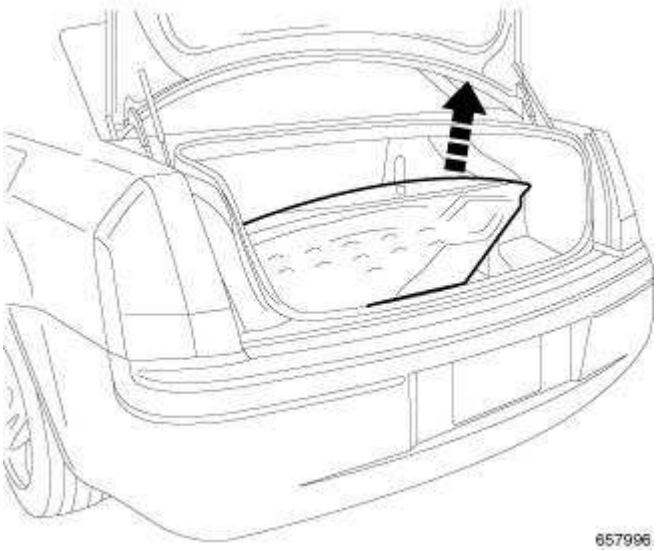

Fig. 1: Spare Tire Cover
Courtesy of CHRYSLER GROUP, LLC

1. Remove the spare tire cover.

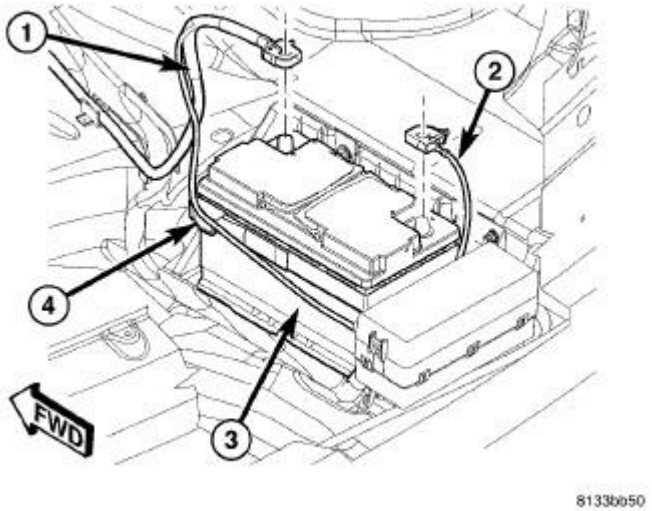

Fig. 2: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the negative battery cable. (2)

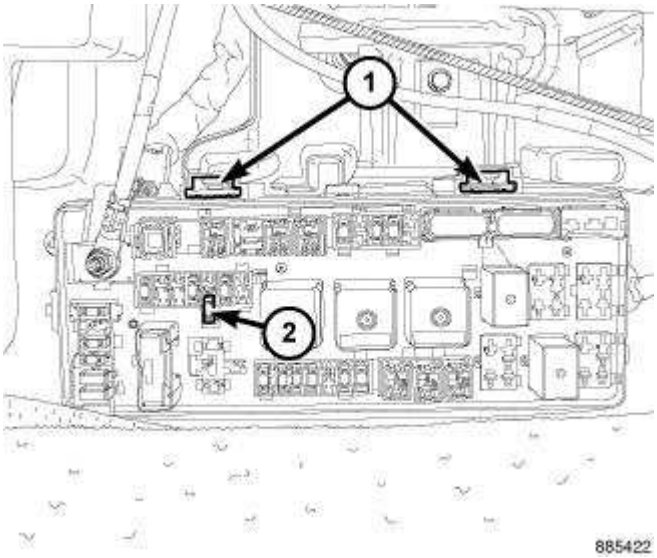

Fig. 3: Removing/Installing Power Distribution Center (PDC)
Courtesy of CHRYSLER GROUP, LLC

3. Remove the Power Distribution Center (PDC) by pressing the releasing tabs (1) and pulling the PDC straight up.

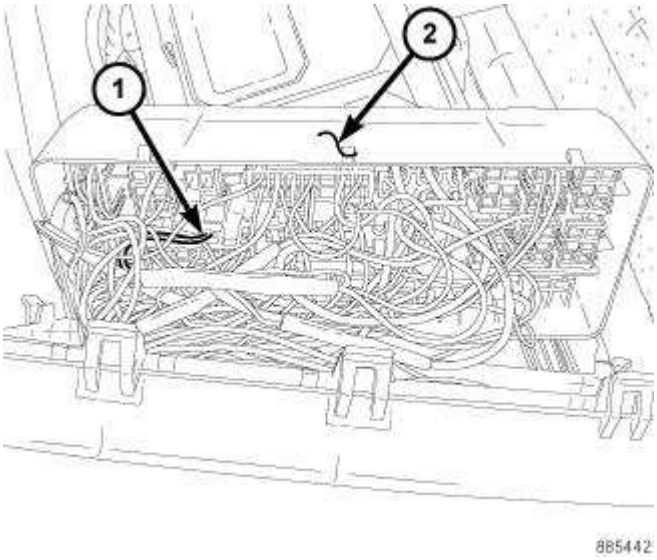

Fig. 4: Locating Circuit
Courtesy of CHRYSLER GROUP, LLC

4. Remove the back cover of the PDC (2).

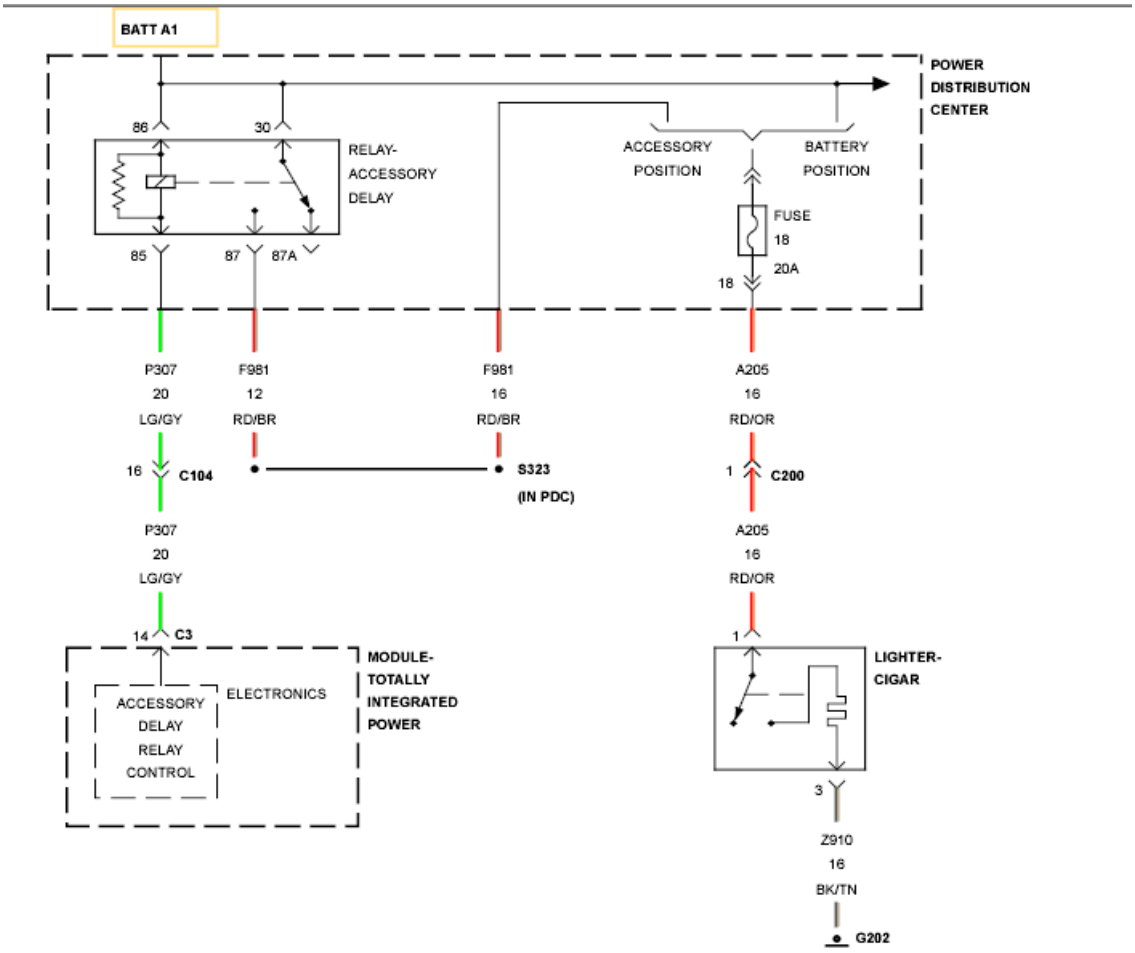

Fig. 5: Wire Schematic
Courtesy of CHRYSLER GROUP, LLC

5. Locate the F981 (RD/BR) circuit (1) going to fuse 18. Refer to the wire schematic above.
6. Measure the appropriate length of wire so that the wire harness will reach the router from the PDC.

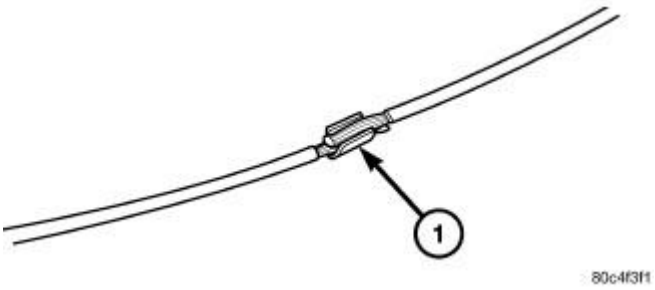

Fig. 6: Splice Band
Courtesy of CHRYSLER GROUP, LLC

1 - SPLICE BAND

7. Remove one-half (1/2) inch of insulation from each wire that needs to be spliced.
8. Place a piece of adhesive lined heat shrink tubing on one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.
9. Place the strands of wire overlapping each other inside of the splice clip (1).

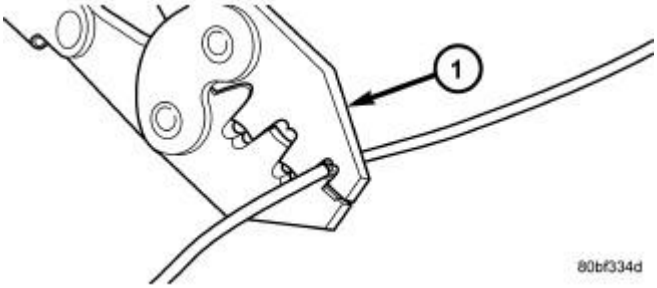

Fig. 7: Crimping Tool
Courtesy of CHRYSLER GROUP, LLC

1 - CRIMPING TOOL

10. Using crimping tool (1), Mopar p/n 05019912AA, crimp the splice clip and wires together.

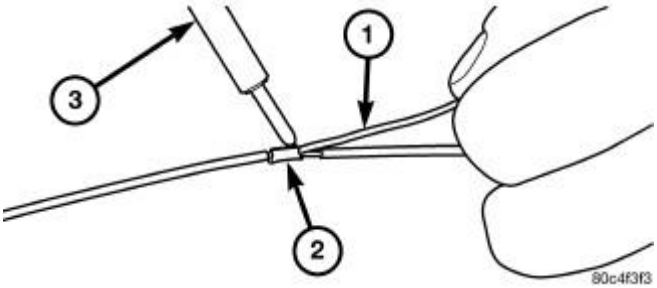

Fig. 8: Solder Splice
Courtesy of CHRYSLER GROUP, LLC

1 - SOLDER
2 - SPLICE BAND
3 - SOLDERING IRON

11. Solder (3) the connection (2) together using rosin core type solder (1) only.

CAUTION: Do not use acid core solder.

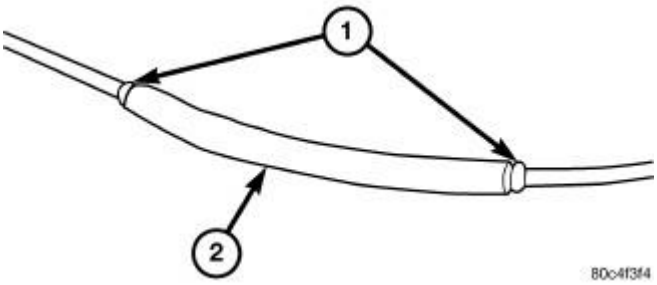

Fig. 9: Heat Shrink Tube
Courtesy of CHRYSLER GROUP, LLC

1 - SEALANT
2 - HEAT SHRINK TUBE

12. Center the heat shrink tubing (2) over the joint and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant (1) comes out of both ends of the tubing.
13. Attach the black wire to the negative battery terminal stud.
14. Install the PDC back cover, being careful not to pinch any wires between the PDC and the PDC cover.
15. Install the PDC.
16. Connect the negative battery cable.
17. Install the spare tire cover.

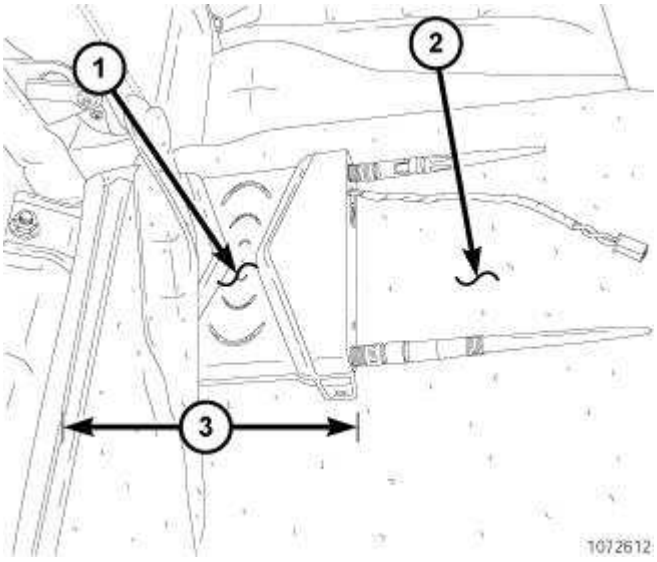

Fig. 10: Securing Wi-Fi Router
Courtesy of CHRYSLER GROUP, LLC

18. Secure the Wi-Fi Router (1) with the supplied fasteners on the back of the passenger rear seat (2). Measure 230 mm (9.1 in.) from the bottom of the seat back (3) to the top of the Wi-Fi Router.

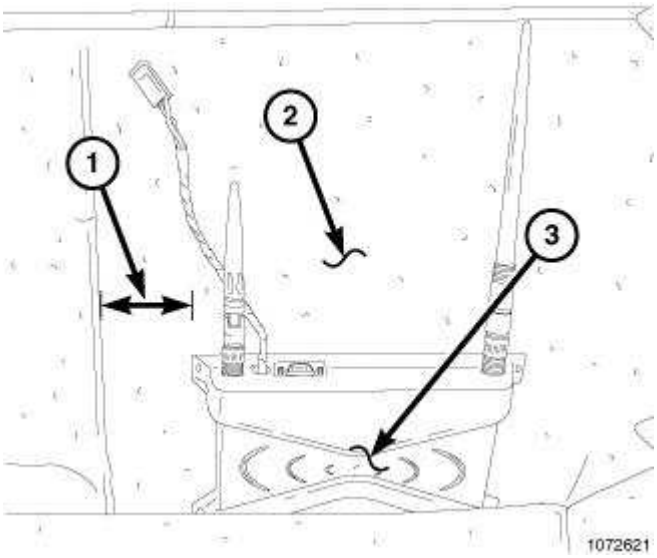

Fig. 11: Wi-Fi Router Position
Courtesy of CHRYSLER GROUP, LLC

19. The Wi-Fi Router (3) should be 50 mm (2 in.) from the left edge (1) of the seat back (2).
20. Route and secure the twisted pair wire harness from the PDC to the Wi-Fi Router along the passenger side trunk.
21. Connect the twisted pair wire harness to the router.
22. Verify system operation.

SDARS ANTENNA

CHRYSLER 300, DODGE CHARGER

PROCEDURE STEPS

NOTE: Verify that the radio is satellite compatible. Look for the SIRIUS® logo on the radio.

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in possible serious or fatal injury.

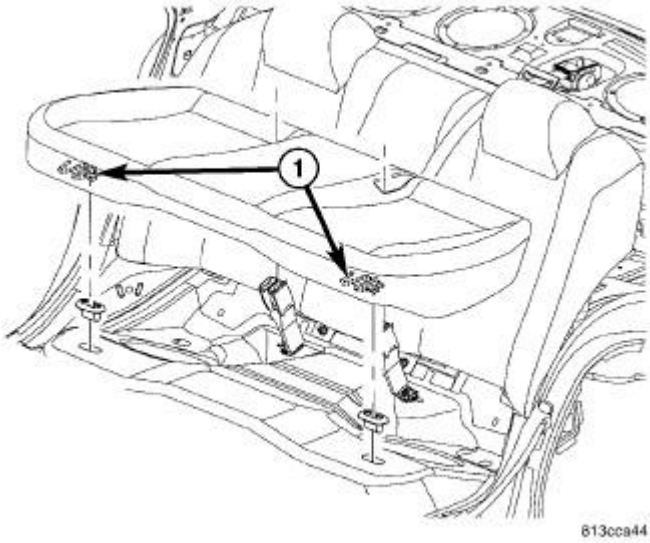

Fig. 12: Rear Seat Cushion
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the rear seat cushion (1).
3. Remove the rear seat back.

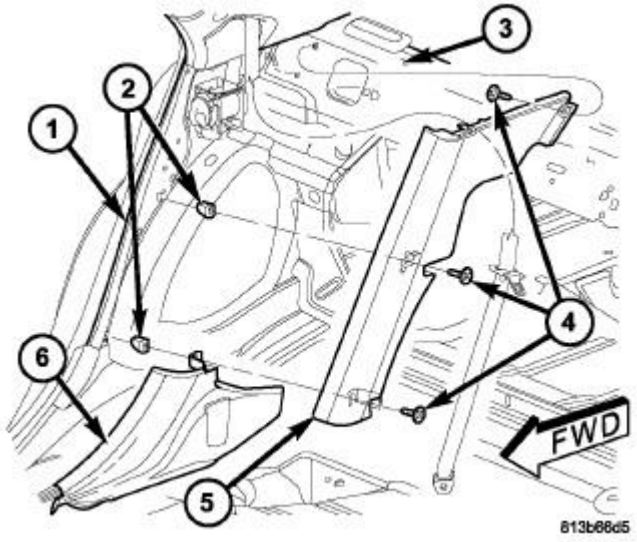

Fig. 13: Upper/Lower Pillar Trim Panels
Courtesy of CHRYSLER GROUP, LLC

4. Remove both upper C-pillar trim panels.
5. Remove the left lower C-pillar trim.
6. Remove both door opening scuff plates on the left side of the vehicle.

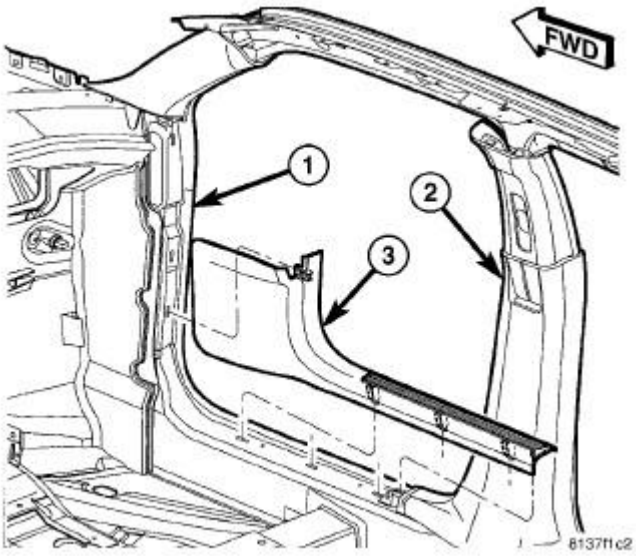

Fig. 14: Lower Cowl Trim
Courtesy of CHRYSLER GROUP, LLC

7. Remove the left upper cowl trim panel.
8. Remove the left lower cowl trim panel (3).
9. Remove the vehicle left side carpet retainers.

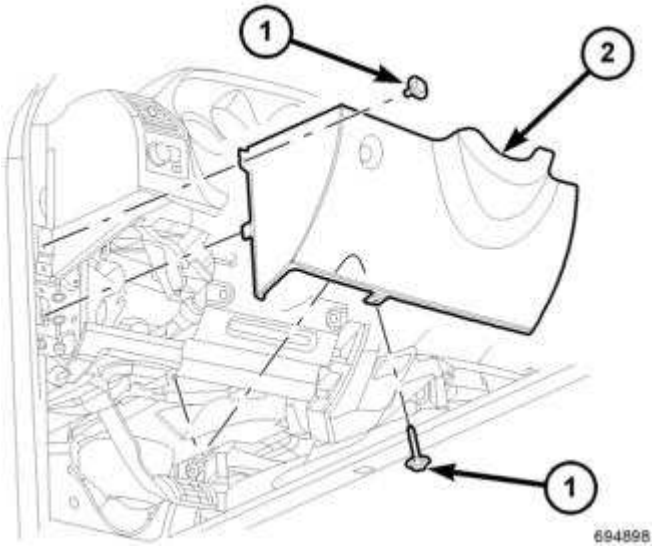

Fig. 15: Steering Column Cover
Courtesy of CHRYSLER GROUP, LLC

10. Remove the steering column cover (1) and disconnect the electrical switch.
11. Remove the sound insulator.

CAUTION: Pulling the antenna cable straight out of the radio without pulling on

the locking antenna connector could damage the cable or radio.

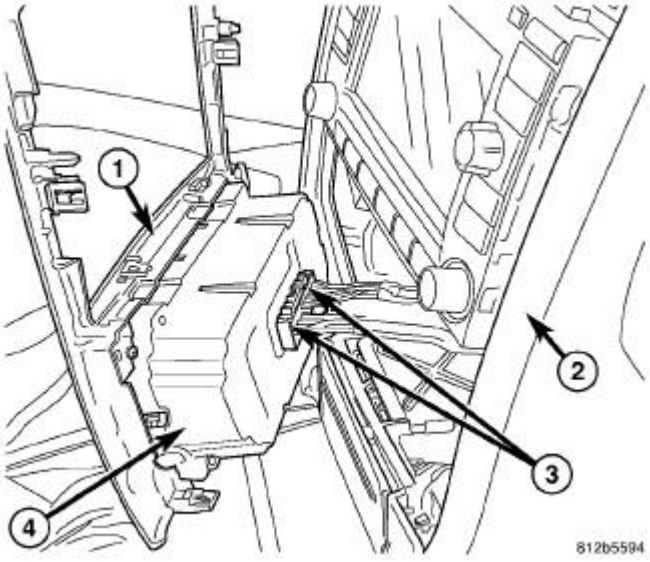

Fig. 16: Removing/Installing A/C Heater Control Center Bezel
Courtesy of CHRYSLER GROUP, LLC

12. Remove the instrument panel center bezel (1) and disconnect electrical connectors (3).
13. Remove and disconnect the radio.

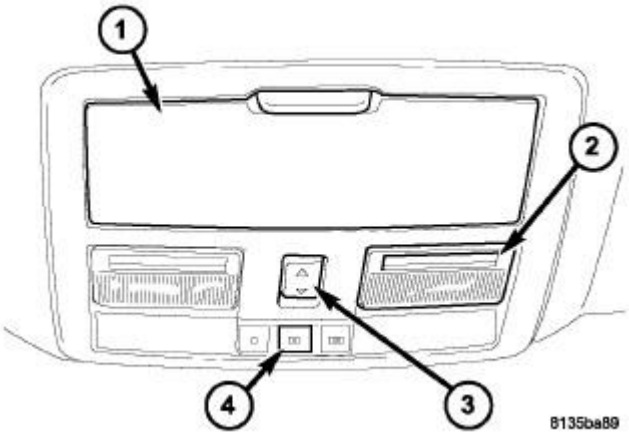

Fig. 17: Identifying Overhead Console Components
Courtesy of CHRYSLER GROUP, LLC

14. Remove the overhead console assembly and disconnect the electrical connectors.
15. Remove the sun visor assemblies and disconnect the electrical connectors.
16. Remove the assist handle assembly.

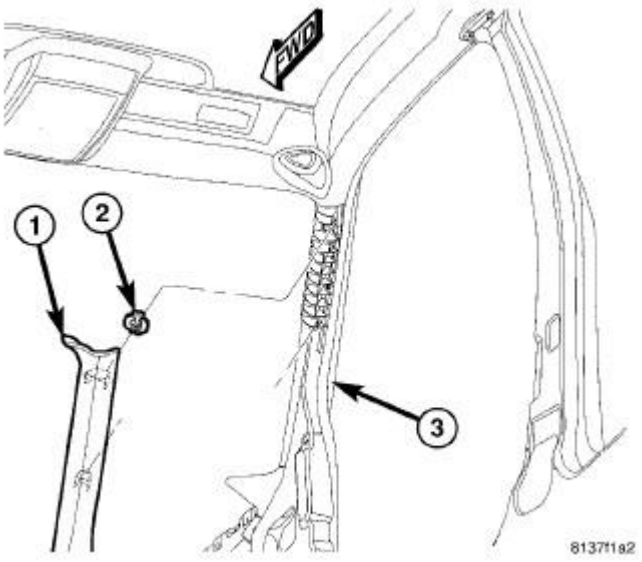

Fig. 18: A-Pillar Trim
Courtesy of CHRYSLER GROUP, LLC

17. Remove the upper A-pillar trim panels (2).
18. Remove the lower B-pillar trim panels.
19. Remove the upper B-pillar trim panels.
20. Release clips and lower the headliner.

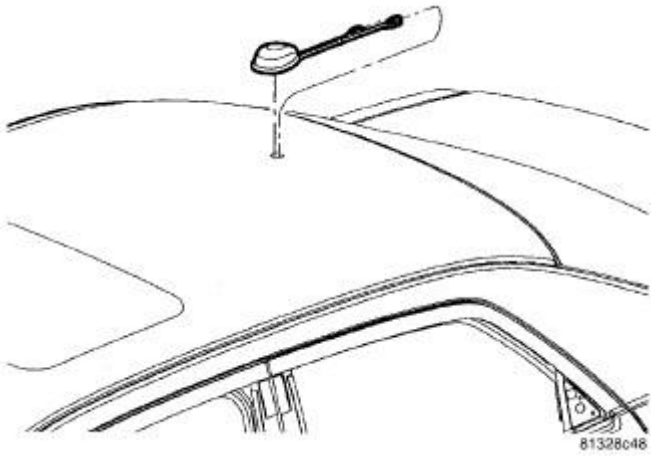

Fig. 19: Satellite Radio Antenna
Courtesy of CHRYSLER GROUP, LLC

21. Locate center line of roof, cut out template as indicated, center template and tape in place.
22. Carefully center punch at the two locations for the antenna mounting holes. Remove and discard template.

CAUTION: Do not drill more than a 6 mm (1/4 in.). Failure to do so results in damage to the vehicles headliner.

23. Drill a 3mm (1/8 in.) pilot hole at the marked locations.
24. Drill a 5mm (13/64 in.) diameter hole at the mark closest to the vehicles rear glass.
25. Using a hole saw, drill a 19mm (3/4 in.) hole at the mark forward of the previous hole drilled at the second mark.
26. Deburr holes and remove rough edges.
27. Apply Mopar® Corrosion Inhibitor, p/n 82300508, to the bare metal surface of the drilled holes.
28. Clean and prepare bare metal surfaces.
29. Apply primer to bare metal surfaces.
30. Route harness and set antenna in place.
31. Install fastener and tighten to spec.
    - Tighten to 9Nm (80in.lbs.)
32. Connect hard-shell connector.

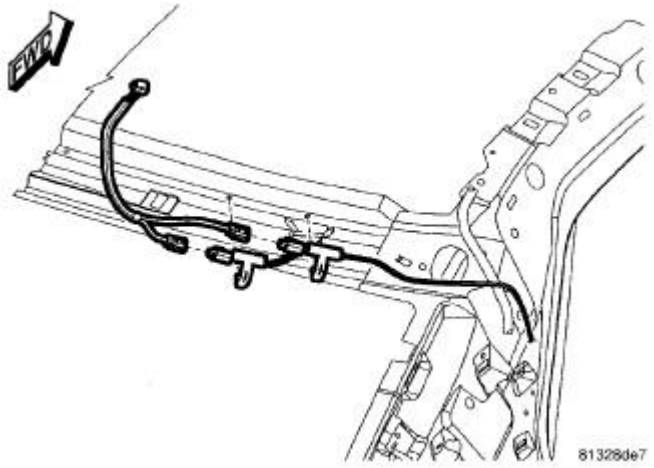

Fig. 20: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

33. Route the antenna cable down the left C-pillar, along the left inner apron along the lower instrument panel brace and up to the radio opening. Secure to the vehicles body electrical harness and lower instrument panel brace.
34. Raise headliner and secure clips.
35. Connect and install both sun visor assemblies.
36. Install the assist handle assembly.

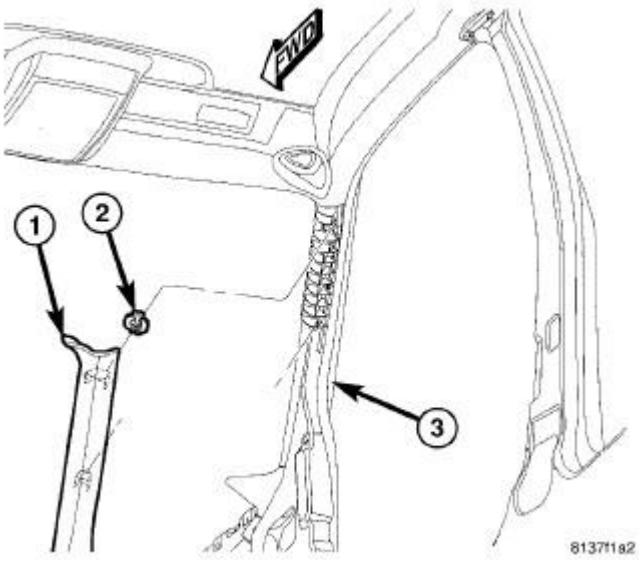

Fig. 21: A-Pillar Trim
Courtesy of CHRYSLER GROUP, LLC

37. Install the upper A-pillar trim panels.
38. Connect electrical and install the overhead console.

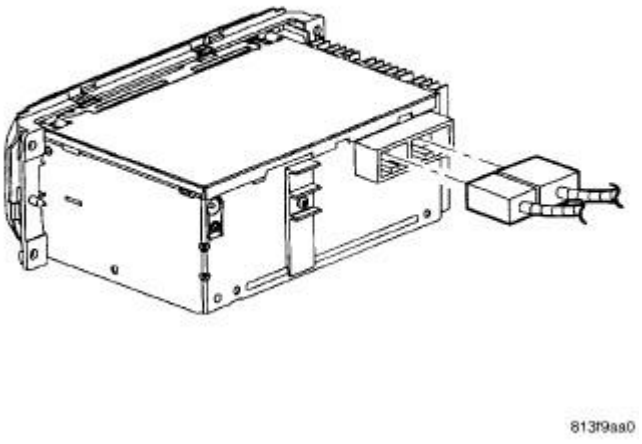

Fig. 22: Removing/Installing Radio Harness Connector
Courtesy of CHRYSLER GROUP, LLC

39. Connect the antenna cable into the open antenna port on the radio.

NOTE: The antenna ports are keyed and color coded for there specific antenna connection.

NOTE: All SDARS antenna connections are Yellow.

40. Connect electrical and install the radio.
41. Connect electrical and install the center bezel assembly.

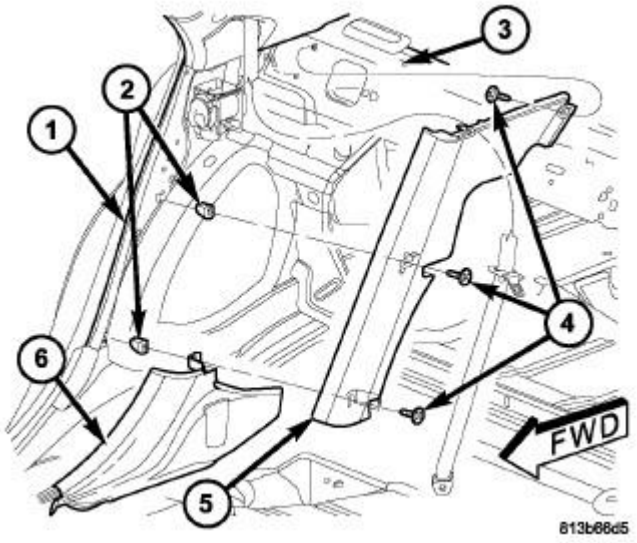

Fig. 23: Upper/Lower Pillar Trim Panels
Courtesy of CHRYSLER GROUP, LLC

42. Install the lower C-pillar trim panel.
43. Install the upper C-pillar trim panels.
44. Install the upper B-pillar trim panels.
45. Install the lower B-pillar trim panels.

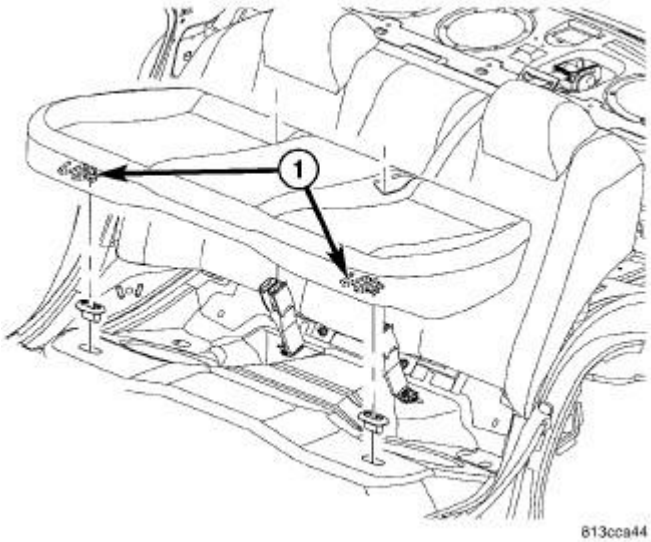

Fig. 24: Rear Seat Cushion
Courtesy of CHRYSLER GROUP, LLC

46. Install the rear seat back.
47. Install rear seat cushion.

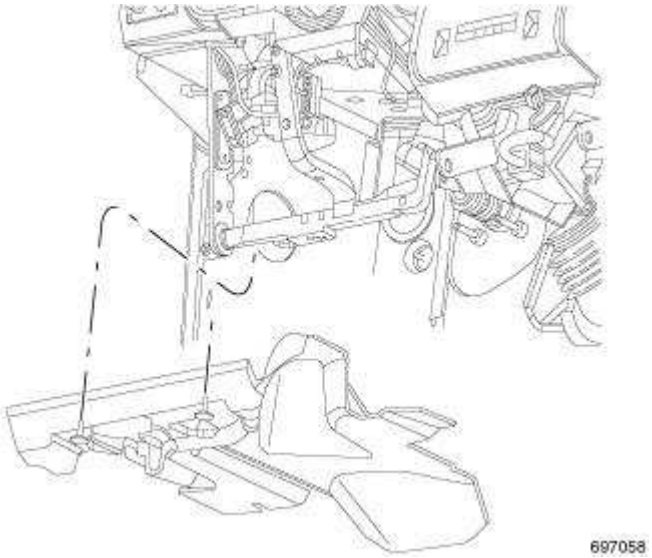

Fig. 25: Sound Insulator
Courtesy of CHRYSLER GROUP, LLC

48. Install the sound insulator.
49. Connect electrical and install the steering column cover.

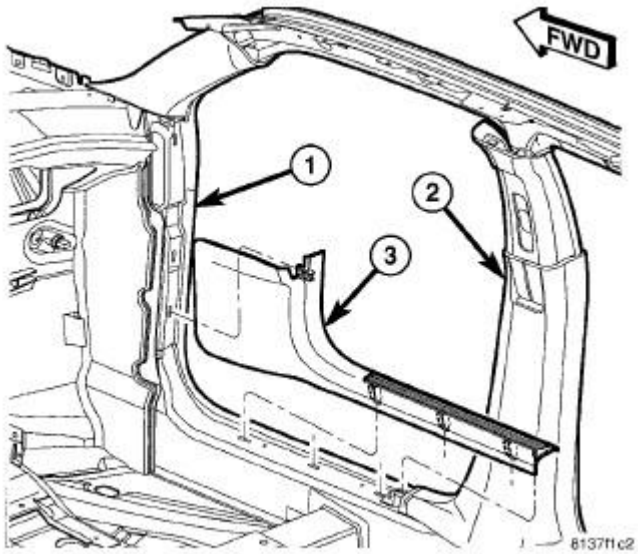

Fig. 26: Lower Cowl Trim
Courtesy of CHRYSLER GROUP, LLC

50. Install the vehicle left side carpet retainers.
51. Install the lower cowl trim panel.
52. Install the upper cowl trim panel
53. Install the door opening scuff plates.
54. Connect the negative battery cable.

SDARS VEHICLE CONFIGURATION

Vehicle VIN must be updated with the sales code of the added accessory in order to enable system functionality.

Using the DealerCONNECT website and a scantool, complete the procedure below.

- Log on to Http://dealerconnect.chrysler.com.
- In the "Vehicle Options" screen under the "Global Claims System" category in the "Service tab, enter the vehicle VIN and add the sales code **RSC (SIRIUS SATELLITE RADIO)** as a "Dealer Installed option".
- Confirm the new sales code has been successfully added to the VIN.

With the ScanTool connected to both the internet (via Ethernet port or wireless connection) and the vehicle, follow the steps below:

- In the "Initial Start Up" screen select **VEHICLE PREPARATION**
- Toggle down and highlight **RESTORE VEHICLE CONFIGURATION**
- Press **START**
- Press **NEXT**
- If necessary, select proper vehicle line and model year and press **NEXT**
- Confirm correct selection and press **NEXT**
- Enter vehicle VIN using the on screen keyboard or confirm that the Auto Filled VIN plate is correct and press **NEXT**
- Press **OK**
- Enter the user ID, password and dealer code using the one screen keyboard and press **OK**

NOTE: At this point the ScanTool is downloading the vehicle configuration from the network.

- Confirm that the new vehicle configuration has been successfully programmed, follow the on screen instructions and press **FINISH**

VALIDATION PROCESS

from the "Initial Start up" screen on the ScanTool follow the steps below:

- Using a ScanTool follow the menu to **ECU VIEW** , select either **TPIMCGW CENTRAL GATEWAY** or **FCMCGW CENTRAL GATEWAY** depending on the vehicle.
- Select **MORE OPTIONS, ECU DETAILS,** and then **CONFIG INFO** .
- Verify **SDARV - - - - SET** is present.
- Drive the vehicle outside for a clear satellite signal to the antenna and verify system operation.

REMOTE START

CHRYSLER 300C / DODGE CHARGER

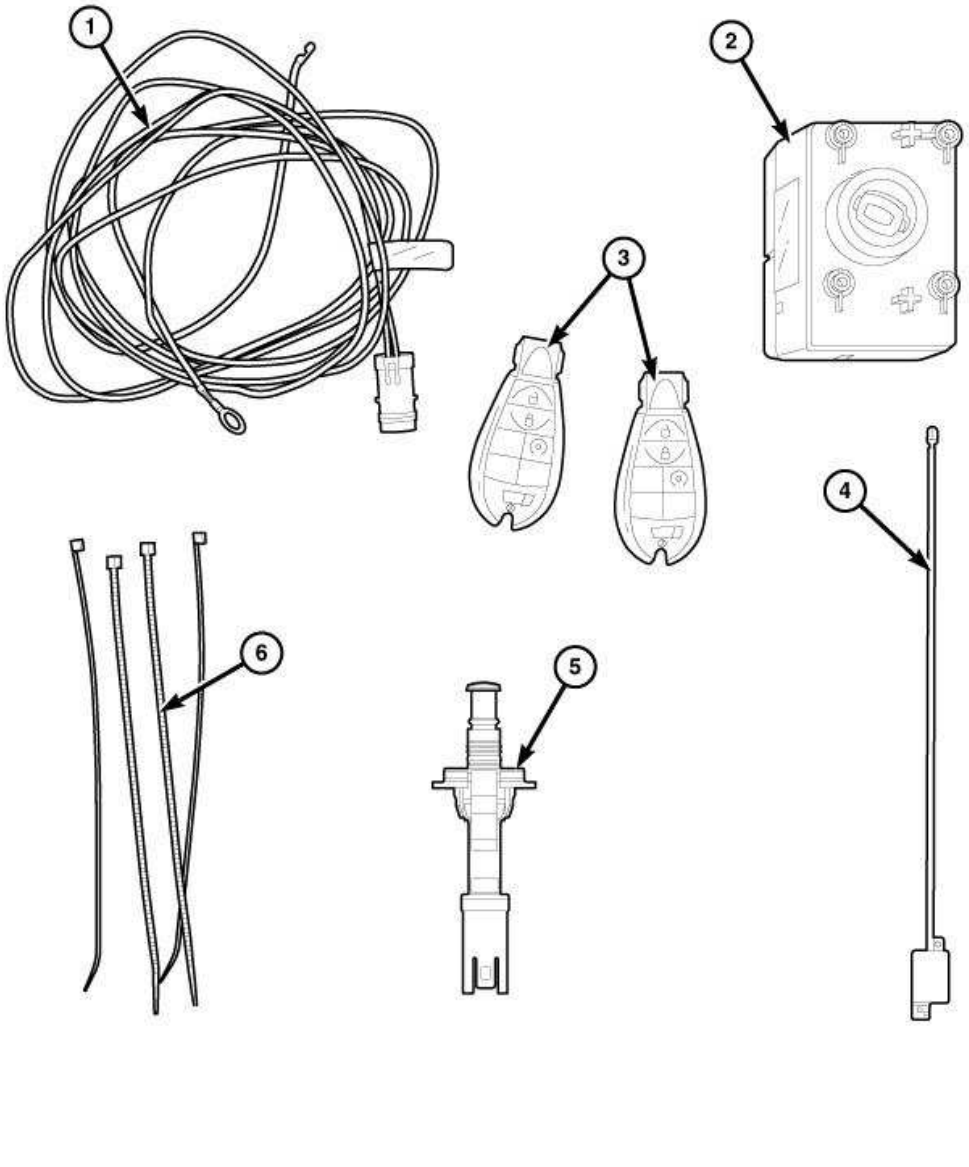

Fig. 27: Remote Start Components
Courtesy of CHRYSLER GROUP, LLC

CALL OUT	DESCRIPTION	QUANTITY
1	Hood Switch Harness	1
2	Wireless Ignition Module (WIN)	1
3	FOBIK	2
4	WIN Antenna	1
5	Hood Ajar Switch	1
6	Zip Ties	10

CAUTION: XBM remote start can ONLY be installed on vehicles that have the following factory options: Automatic Transmission, Remote Keyless Entry and Immobilizer.

WinFobik based vehicles, the sales code must be added to the database and the Restore Vehicle Configuration (using a diagnostic scan tool) must be performed prior to installing the new WIN module. Failure to do so will render the WIN module's remote start function inoperative.

The technician should wait 1/2 hour between adding XBM sales code in DealerConnect before installing the WIN module & restoring vehicle configuration. In the interim, the technician can install all other components except the WIN module.

NOTE: Prior to installation, obtain the four digit PIN from the dealership's parts department.

RESTORE VEHICLE CONFIGURATION

NOTE: The wiTECH software level must be at the latest release to perform this procedure.

1. VIN must be updated with the sales code of the added accessory in order to enable system functionality. Using the DealerCONNECT website and the wiTECH diagnostic application, complete the vehicle configuration.
2. Log on to https://dealerconnect.chrysler.com.
3. In the "Vehicle Option" screen under the "Global Claims System" category in the "Service" tab, enter the vehicle VIN, four digit pin number obtained from the dealership parts department and add sales code(s) noted below as a "Dealer Installed Option".

XBM (REMOTE START)

1. Confirm that the new sales code has been successfully added to the VIN.
2. With the wiTECH diagnostic application, perform the following steps form the Initial Start Up Screen:

- Select the "DIAGNOSTIC PROCEDURES" tab
- Highlight "RESTORE VEHICLE CONFIGURATION"
- Select the "Run Diagnostic" button
- Select "CONTINUE"
- Verify that the vehicle VIN number is correct
- Once verified, select the "Correct VIN" button
- Note On-Screen instructions and select the "Close" button

PROCEDURE STEPS

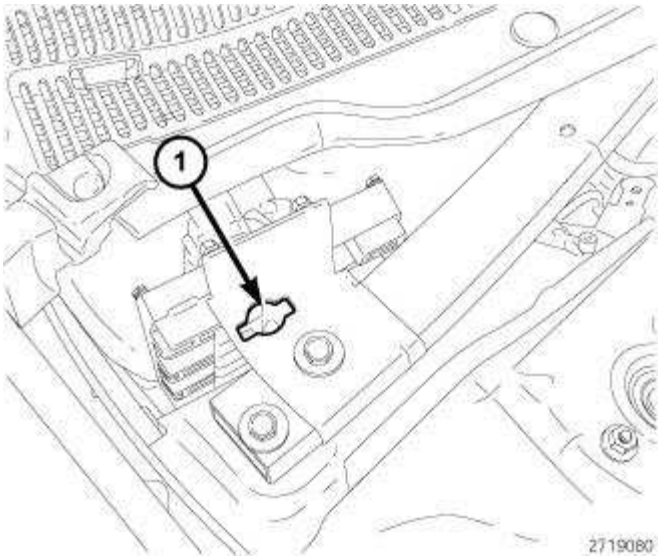

Fig. 28: Opening For Hood Ajar Switch
Courtesy of CHRYSLER GROUP, LLC

1. **Disconnect and isolate the negative battery cable.**
2. Open the hood.
3. Locate the opening (1) designated for the hood ajar switch on the brace near the rear passenger side of the engine compartment.

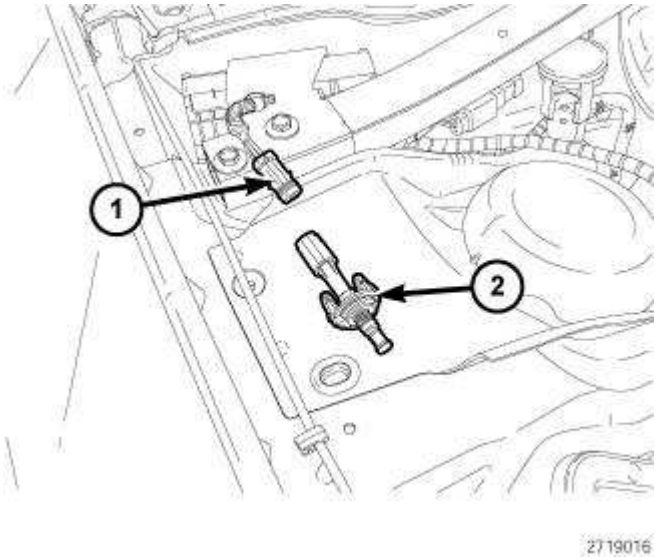

Fig. 29: Identifying Hood Switch And Hood Switch Harness
Courtesy of CHRYSLER GROUP, LLC

4. Route the hood switch harness (1) underneath the brace and through the opening designated for the hood switch.
5. Connect the hood switch (2) to the hood switch harness (1).
6. Once connected, insert the hood switch (2) into the opening, turn the hood switch (2) until properly seated.

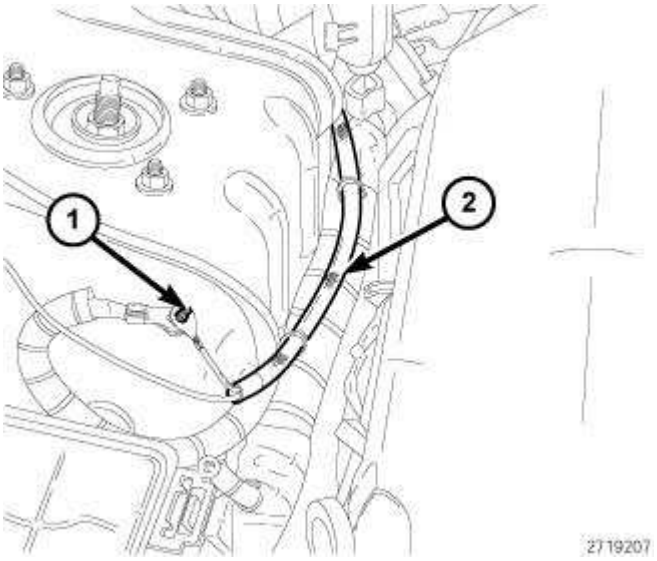

Fig. 30: Identifying Factory Ground Lug And Hood Switch Harness
Courtesy of CHRYSLER GROUP, LLC

7. Route the hood switch harness (2) into the engine compartment.
8. Locate the factory ground lug (1) on the passenger wheel well/shock tower. Remove the nut.
9. Install the hood switch ground terminal onto the factory ground lug and reinstall the nut.

10. Secure the hood switch harness (2) to the vehicle harness using the tie straps supplied in the kit.

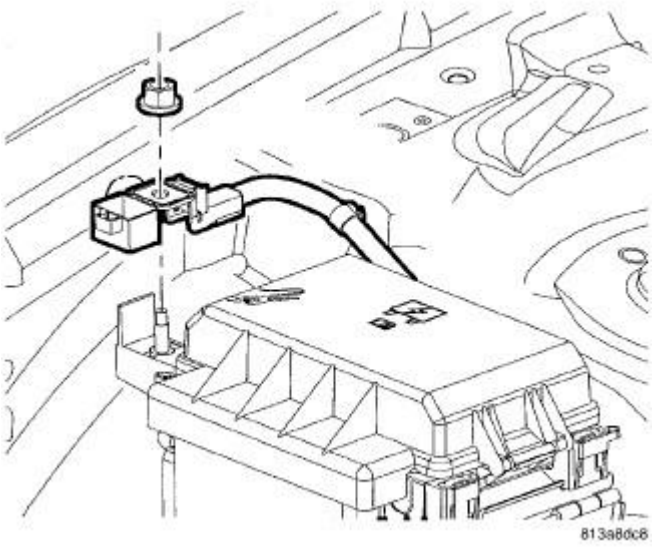

Fig. 31: Disconnecting/Connecting Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

11. Open the positive battery cable nut cover on the TIPM to expose nut.
12. Remove the battery cable nut and the battery cable from the Totally Integrated Power Module (TIPM).

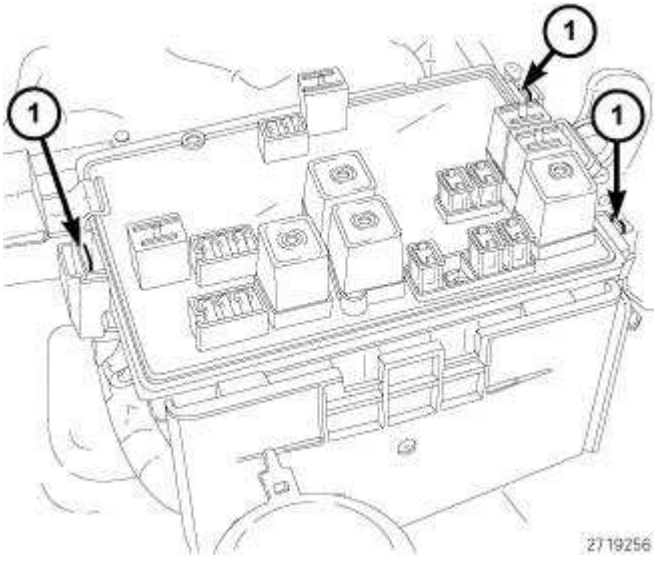

Fig. 32: Locating TIPM Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

13. Remove the TIPM cover.

14. Disengage the three retaining tabs (1) to remove the TIPM from it's mounting bracket.

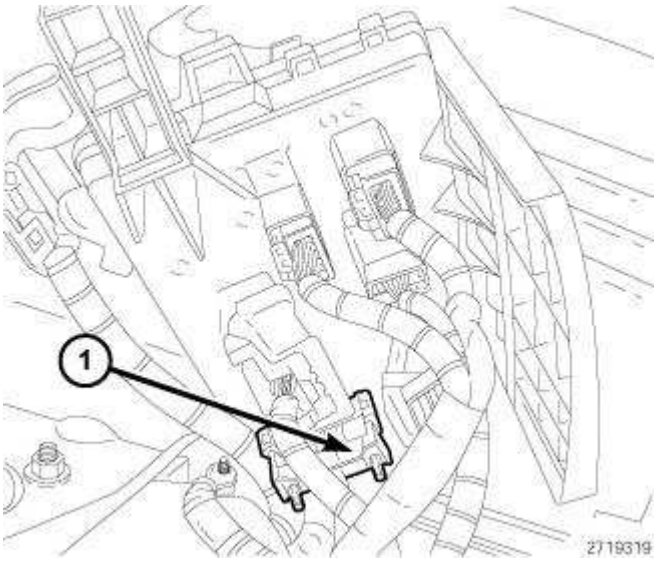

Fig. 33: Locating Connector Labeled B
Courtesy of CHRYSLER GROUP, LLC

15. Lift the TIPM to gain access to the connectors.
16. Locate the connector labeled B (1).
17. Disconnect the connector labeled B (1) from the TIPM.

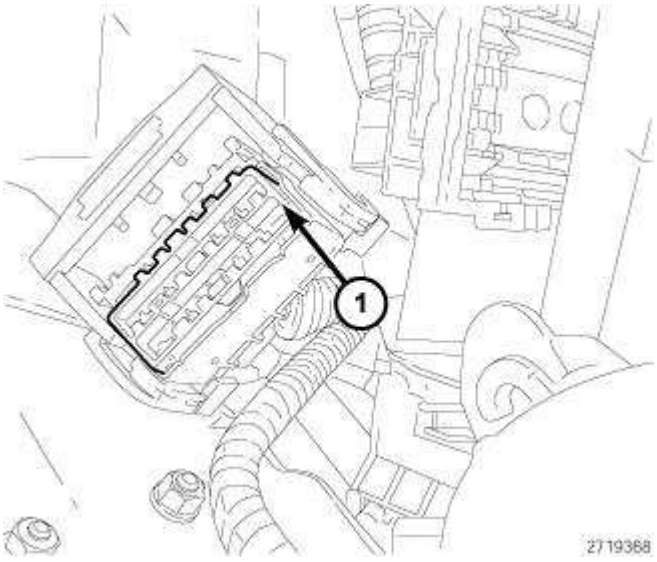

Fig. 34: Identifying Secondary Lock To Front Of Connector
Courtesy of CHRYSLER GROUP, LLC

18. Remove the secondary lock from the front of the connector (1).

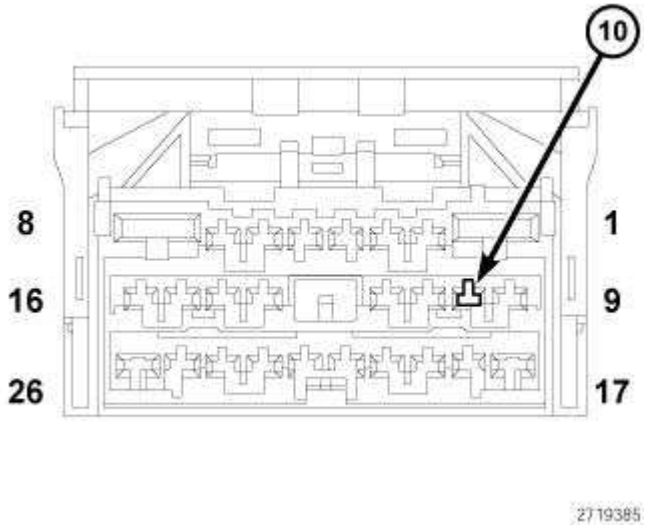

Fig. 35: Locating Pin Cavity 10
Courtesy of CHRYSLER GROUP, LLC

19. Locate pin cavity 10 (10) on the connector's mating side.

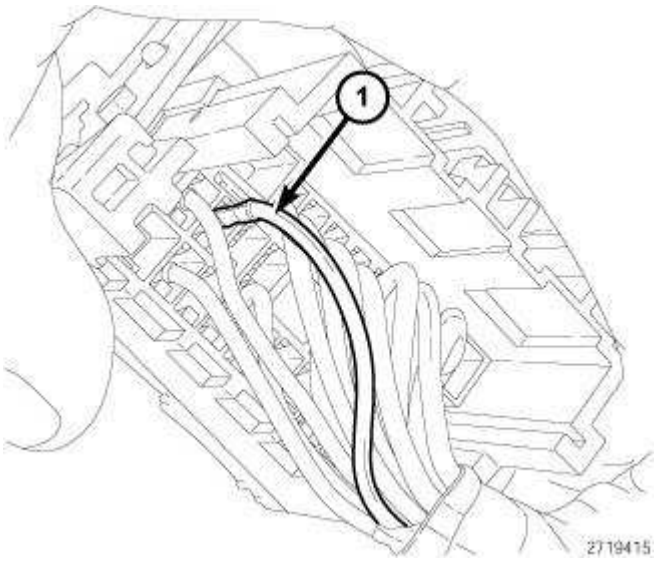

Fig. 36: Identifying Violet/Light Blue Wire
Courtesy of CHRYSLER GROUP, LLC

20. Looking into the connector's rear/wire side view, insert the violet/light blue wire (1) from the hood switch harness into the pin 10 cavity.

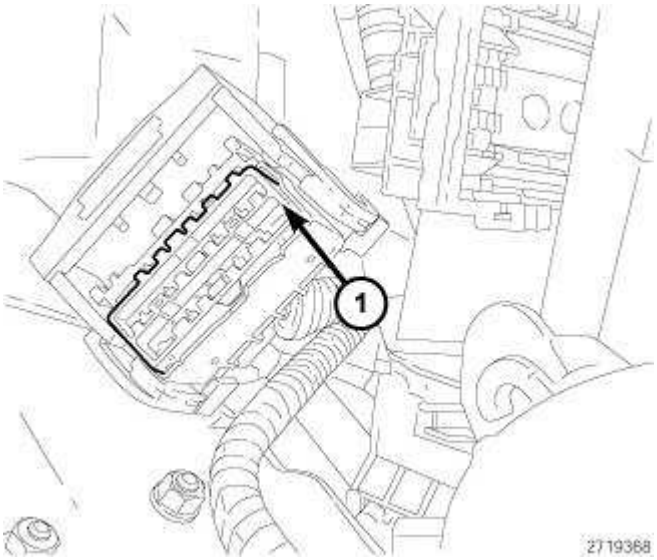

Fig. 37: Identifying Secondary Lock To Front Of Connector
Courtesy of CHRYSLER GROUP, LLC

21. Install the secondary lock to the front of the connector (1).

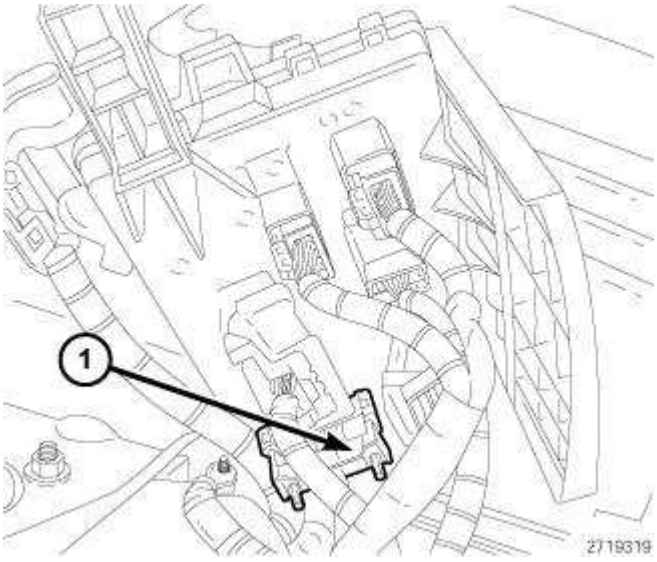

Fig. 38: Locating Connector Labeled B
Courtesy of CHRYSLER GROUP, LLC

22. Connect the connector labeled B (1) to the TIPM.

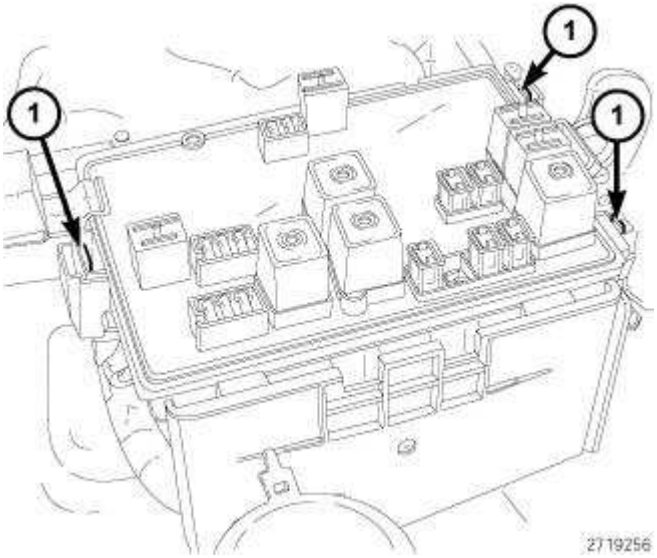

Fig. 39: Locating TIPM Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

23. Position the TIPM over the mounting bracket.
24. Engage the three retaining tabs (1) by pushing down on the TIPM. Make sure the three retaining tabs (1) snap into place.
25. Install the cover to the TIPM.

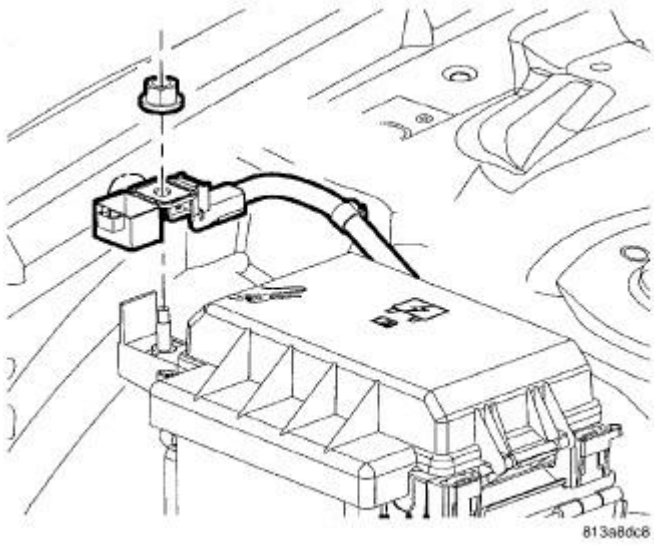

Fig. 40: Disconnecting/Connecting Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

26. Install the battery cable nut and the battery cable to the Totally Integrated Power Module (TIPM).
27. Close the positive battery cable nut cover on the TIPM.

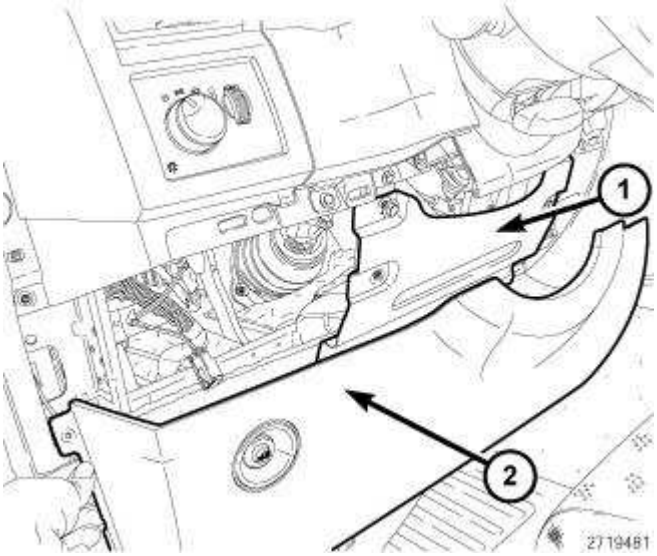

Fig. 41: Identifying Steering Column Cover Reinforcement And Lower Instrument Panel Cover
Courtesy of CHRYSLER GROUP, LLC

28. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, remove the center trim/radio bezel.
29. Using trim stick (special tool #C-4755, Trim Stick) or equivalent, remove the trim panel located on the left side door opening.
30. Remove the screw securing the lower instrument panel cover to the left side door opening.
31. Remove the screw securing the lower instrument panel cover near the hood latch switch.
32. Remove the lower instrument panel cover (2) and disconnect the trunk release switch.
33. Remove the bolts that secure the instrument panel steering column cover reinforcement (1) to the bracket and remove the reinforcement (1) from the vehicle.

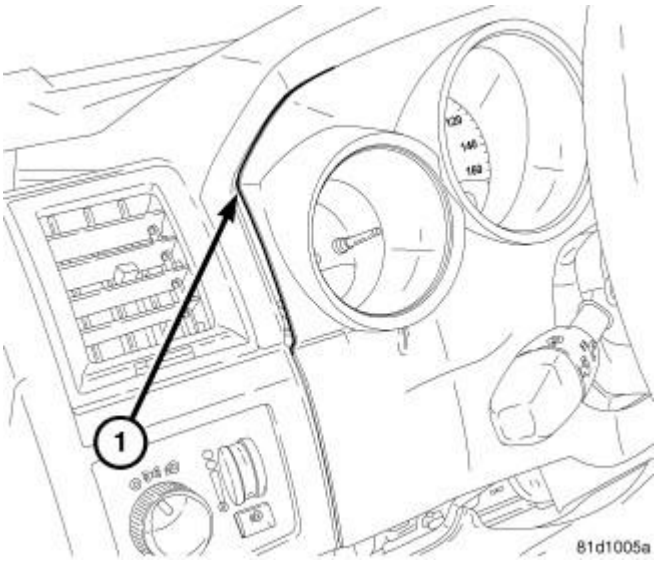

Fig. 42: Edge Of The Trim

Courtesy of CHRYSLER GROUP, LLC

34. Using a trim stick or equivalent, gently pry along the edge of the trim (1) to remove the instrument cluster trim.

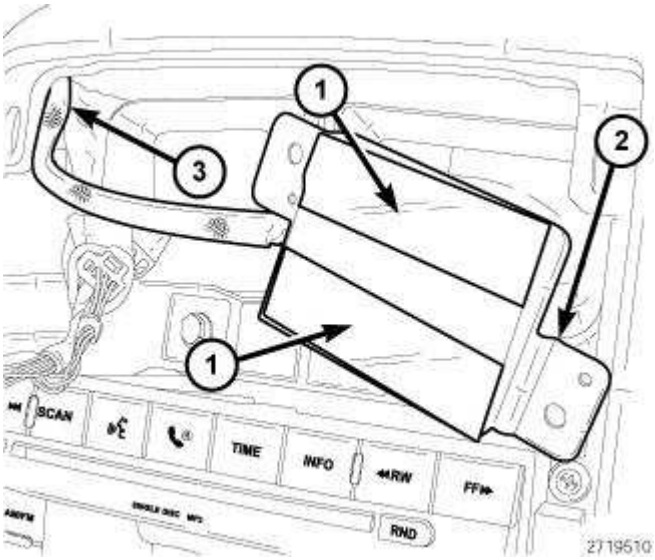

Fig. 43: Identifying Two Sided Tape, Remote Start Antenna, And Antenna Harness
Courtesy of CHRYSLER GROUP, LLC

35. Remove adhesive backing on one side and apply the two sided tape (1) to the bottom of the remote start antenna (2).
36. Press the tape (1) firmly for 30 seconds.
37. Using a fish tape or equivalent, route the antenna harness (3) down through the opening near the air conditioner ducts.

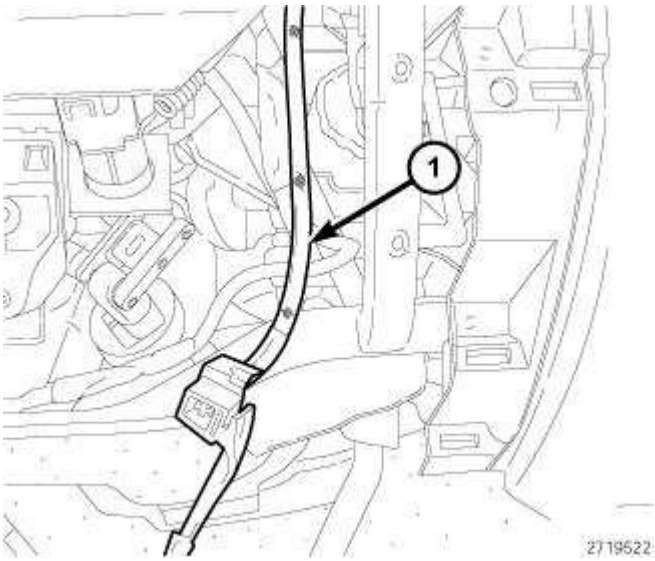

Fig. 44: Routing The Remote Start Antenna Harness
Courtesy of CHRYSLER GROUP, LLC

38. Finish routing the remote start antenna harness to the dash area near the ignition WIN module.

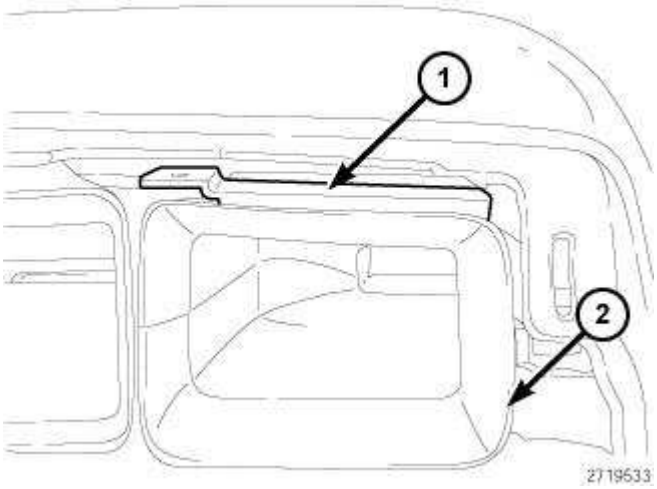

Fig. 45: Identifying Remote Start Antenna And A/C Heating Duct
Courtesy of CHRYSLER GROUP, LLC

39. Remove the remaining adhesive backing from the two sided tape and place the remote start antenna to the top of the air conditioner/heating duct. Press firmly for 30 seconds.

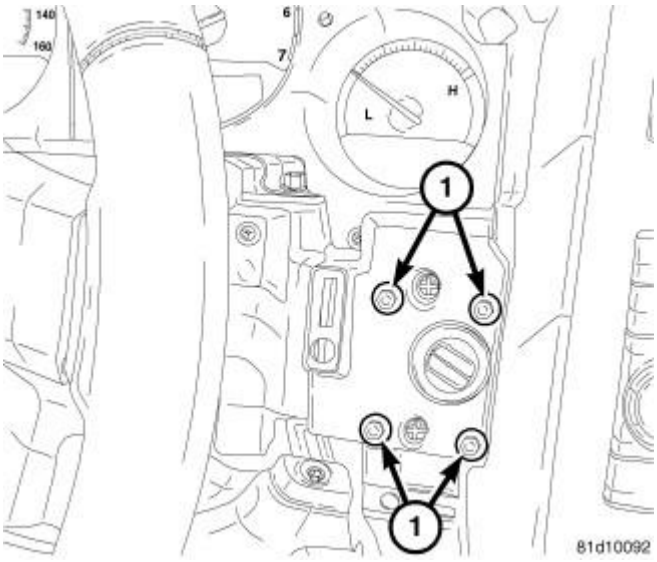

Fig. 46: Wireless Ignition Node Screws
Courtesy of CHRYSLER GROUP, LLC

40. Remove the 4 screws from the WIN (1).

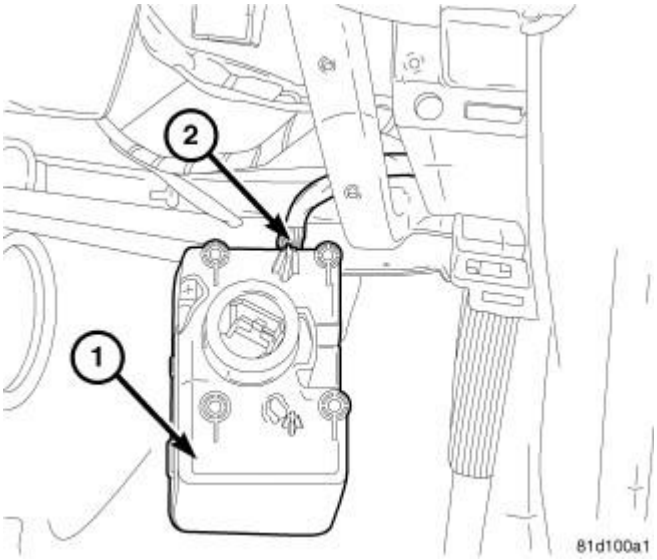

Fig. 47: Wireless Ignition Node
Courtesy of CHRYSLER GROUP, LLC

41. Remove the WIN (1) from the rear of the instrument panel bringing it through the opening below the steering column and disconnect the electrical connector (2) from the WIN. Discard the factory WIN module (1).

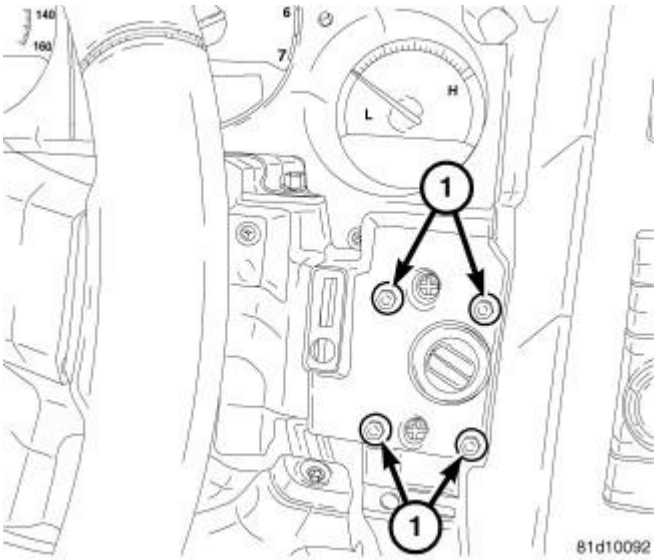

Fig. 48: Wireless Ignition Node Screws
Courtesy of CHRYSLER GROUP, LLC

42. Connect the electrical connector and remote start antenna harness connector to the WIN supplied in the kit.
43. Install the WIN into the instrument panel.
44. Install the four screws (1) securing the WIN to the instrument panel.

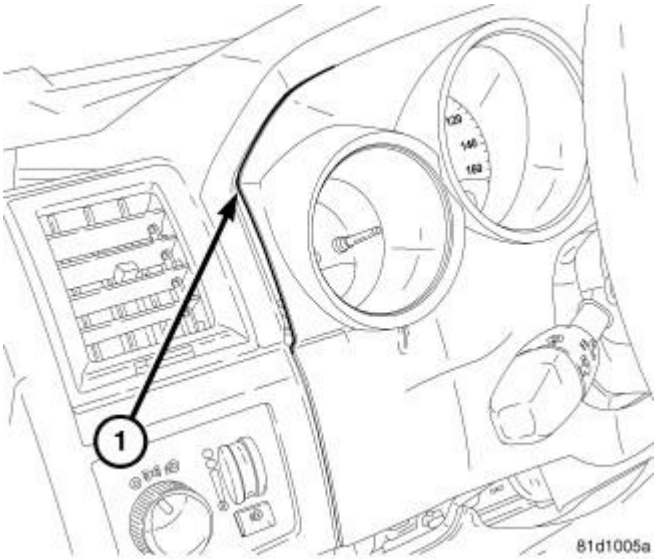

Fig. 49: Edge Of The Trim
Courtesy of CHRYSLER GROUP, LLC

45. Reinstall the center trim/radio bezel.
46. Reinstall the instrument cluster trim.

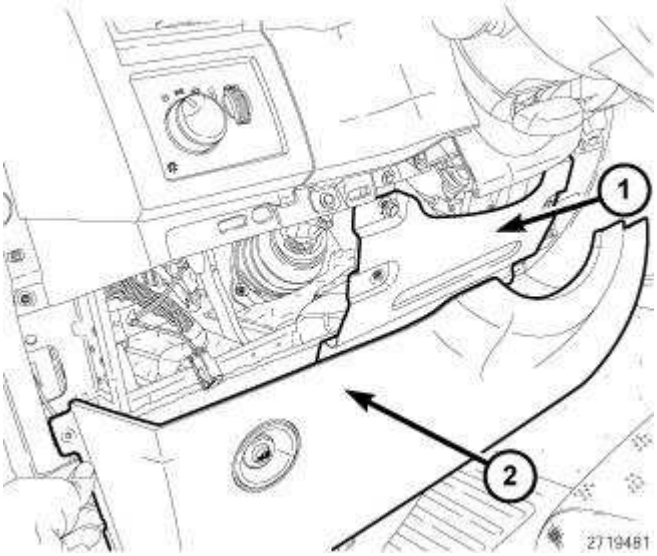

Fig. 50: Identifying Steering Column Cover Reinforcement And Lower Instrument Panel Cover
Courtesy of CHRYSLER GROUP, LLC

47. Install the screws that secure the instrument panel steering column cover reinforcement (1) to the bracket. Tighten the screws securely.
48. Connect the trunk release switch and install the lower instrument panel cover (2).
49. Install and tighten the screw securing the lower instrument panel cover near the hood latch switch.

50. Install and tighten the screw securing the lower instrument panel cover to the left side door opening.
51. Install the trim panel located on the left side door opening.

PROGRAMMING THE WIN

CAUTION: Read all notes and cautions for programming procedures.

NOTE: Have the vehicle PIN readily available before running the routine

CAUTION: If the PCM and WIN are replaced at the same time, the PCM MUST be programmed before the WIN.

1. Connect a battery charger to the vehicle.
2. With the wiTECH diagnostic application, perform the following steps:
   - Select "WIRELESS CONTROL MODULE (WCM)"
   - Select the "MISCELLANEOUS FUNCTIONS" tab
   - Highlight "WIN REPLACED"
   - Select the "Start Misc Function" button
   - Select "NEXT"
   - Enter the PIN when prompted.
   - Select "NEXT"
   - Verify that the PIN number is correct
   - Once verified select "NEXT"
   - Select "NEXT"
   - Note On-Screen instructions and select the "FINISH" button
   - Cycle ignition key after the successful routine completion.

PROGRAMMING IGNITION KEYS TO THE WIN

CAUTION: Read all notes and cautions for programming procedures.

NOTE: Have the vehicle PIN readily available before running the routine

1. Connect a battery charger to the vehicle.
2. With the wiTECH diagnostic application, perform the following steps:
   - Select "WIRELESS CONTROL MODULE (WCM)"
   - Select the "MISCELLANEOUS FUNCTIONS" tab

- Highlight "PROGRAMMING IGNITION KEYS OR KEY FOBS"
- Select "NEXT"
- Enter the PIN when prompted.
- Select "NEXT"
- Verify that the PIN number is correct
- Once verified select "NEXT"
- Note On-Screen instructions and select the "FINISH" button
- Cycle ignition key after the successful routine completion.

NOTE: If the original keys do not successfully program to the new WIN after the proper procedures are followed correctly, programming new keys will be necessary.

NOTE: A maximum of eight keys can be learned by the WIN. Once a key is learned by a WIN, that key has acquired the Secret Key for that WIN and cannot be transferred to any other vehicle.

ECU RESET

NOTE: The wiTECH software level must be at the latest release to perform this procedure.

CAUTION: Read all notes and cautions for programming procedures.

1. Connect a battery charger to the vehicle.
2. With the wiTECH diagnostic application, perform the following steps:
   - Select "WIRELESS CONTROL MODULE (WCM)"
   - Select the "MISCELLANEOUS FUNCTIONS" tab
   - Highlight "RESET ECU"
   - Note On-Screen instructions and select the "NEXT" button
   - Select "FINISH"

WINDOW CALIBRATION

NOTE: Vehicles equipped with the auto up feature must have the windows calibrated after a battery disconnect.

NOTE: The door must be completely closed when starting this step.

1. Sit in the driver seat and close the door.

2. Lower the window part of the way down.
3. Run the window to the full up position and continue to hold the switch for an additional two seconds.
4. Run the window to the full down position and continue to hold the switch for an additional two seconds.
5. Raise the window to the full up position.
6. Repeat the steps for the remaining windows.

UPDATE PRESSURE THRESHOLDS

NOTE: The wiTECH software level must be at the latest release to perform this procedure.

NOTE: The vehicle must be driven before the TPMS light will turn off.

CAUTION: Read all notes and cautions for programming procedures.

NOTE: Have the vehicle PIN readily available before running the routine

1. Connect a battery charger to the vehicle.
2. With the wiTECH diagnostic application, perform the following steps:
    - Select the "TIPMCGW"
    - Select the "MISCELLANEOUS FUNCTIONS" tab
    - Highlight and select "UPDATE PRESSURE THRESHOLDS"
    - Note On-Screen instructions and select the "NEXT" button
    - Verify current settings, select the "NEXT" button to change settings
    - Select "NEXT"
    - Enter the PIN when prompted.
    - Select "NEXT"
    - Verify that the PIN number is correct
    - Once verified, select "NEXT"
    - Select "NEXT"
    - Wait for the WCM/WIN to update it's configuration
    - Once the WCM/WIN configuration is complete, select "NEXT"
    - Note On-Screen instructions and select the "FINISH" button

TEMPORARY REMOTE START DISABLE

NOTE: The wiTECH software level must be at the latest release to perform this

procedure.

CAUTION: Read all notes and cautions for programming procedures.

1. Connect a battery charger to the vehicle.
2. With the wiTECH diagnostic application, perform the following steps:
   - Select the "TIPMCGW"
   - Select the "MISCELLANEOUS FUNCTIONS" tab
   - Highlight and select "TEMPORARY REMOTE START DISABLE"
   - Note On-Screen instructions and select the "NEXT" button
   - Select the "DISABLE" button to activate the remote start function
   - Select "YES" to reset the module and exit the routine, select "NO" to toggle the value back
   - Select "FINISH"

CLEAR ALL DTC'S

NOTE: The wiTECH diagnostic application is the preferred method for clearing all DTC's.

NOTE: The wiTECH software level must be at the latest release to perform this procedure.

ACTIVATE THE REMOTE START

To activate the remote start the vehicle must have been driven at least 35 MPH.

With the vehicle off, and the doors closed and locked, verify the remote start is functioning properly.

CARRIERS AND CARGO HAULING

INSTRUCTION SHEET

TRAILER TOW HARNESS

CHRYSLER 300

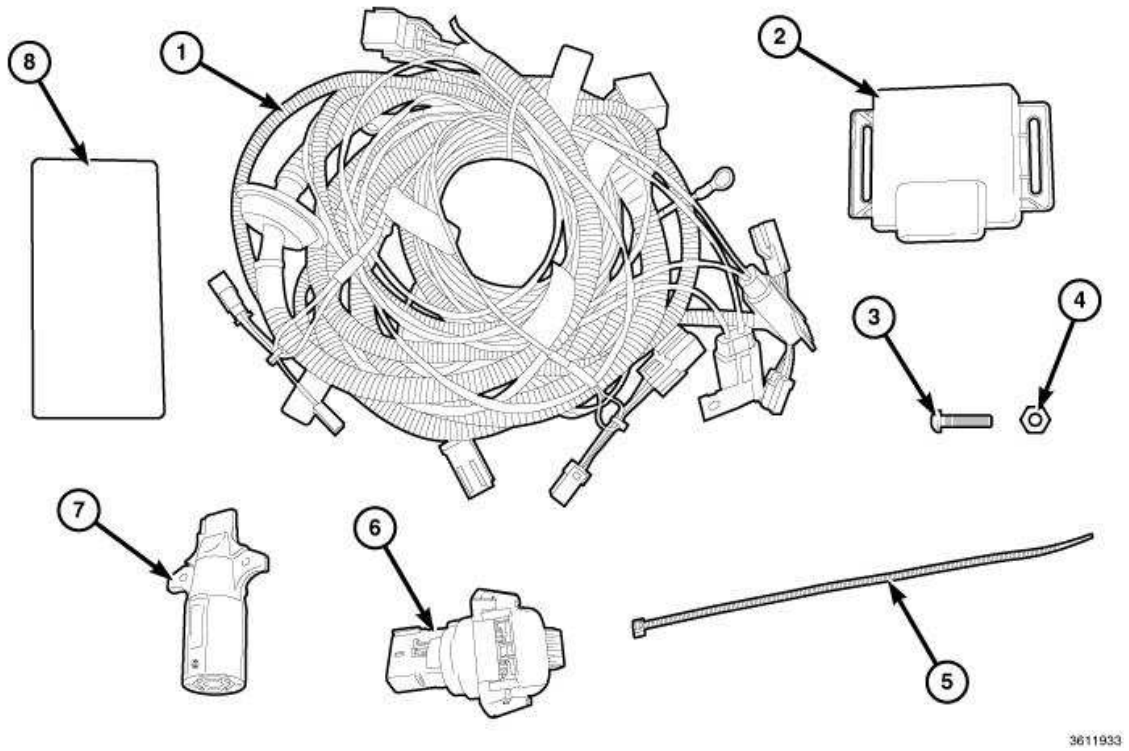

Fig. 51: Trailer Tow Wiring Harness & Other Items
Courtesy of CHRYSLER GROUP, LLC

CALL OUT	DESCRIPTION	QUANTITY
1	Trailer tow wiring harness	1
2	Control Module	1
3	Ten way adapter retaining screw	4
4	Ten way adapter retaining nut	4
5	Tie straps	31
6	Ten way adapter	1
7	7-pin to 4-pin harness adapter	1
8	Foam tape	3

Tools Required			
		41mm (1 5/8	

7mm, 10 mm Socket and Ratchet	Drill	in.) hole saw	RTV silicone
7 mm (9/32 in.) Drill Bit	Small Flat Blade Screwdriver	T20 Torx® Driver	Trim Panel Tool

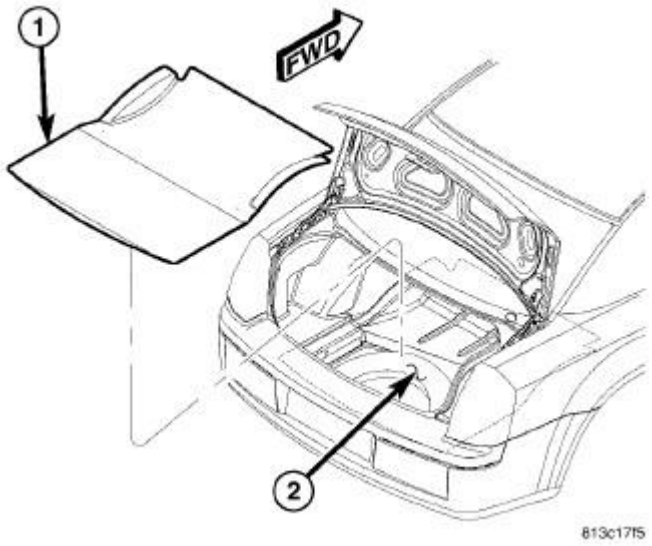

Fig. 52: Spare Tire Cover/Trunk Floor Carpet
Courtesy of CHRYSLER GROUP, LLC

1. Open the vehicle trunk.
2. Remove the spare tire cover/trunk floor carpet (1) from the spare tire well (2).

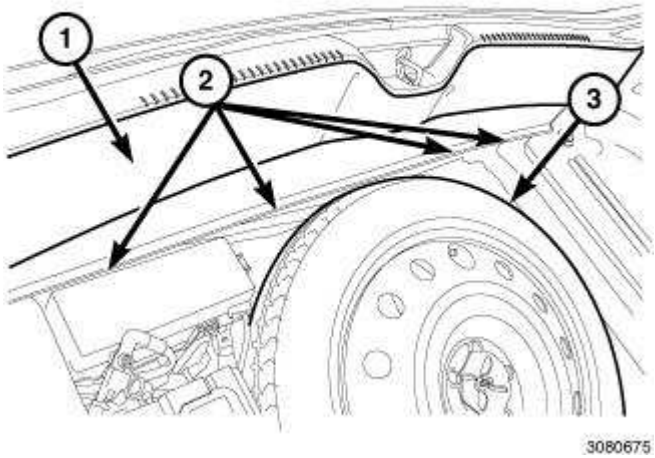

Fig. 53: Spare Tire, Trunk Rear Trim Panel, Four Lower Fasteners & Panel

Courtesy of CHRYSLER GROUP, LLC

3. Remove the spare tire (3).
4. Remove the trunk rear trim panel (1) as follows:
    1. Firmly grasp the bottom of the panel (1) on both sides and pull inward to disconnect the four lower fasteners (2, under panel).
    2. With the bottom fasteners disconnected pull up on the panel (1) to disconnect the upper fasteners and remove the panel from the vehicle.

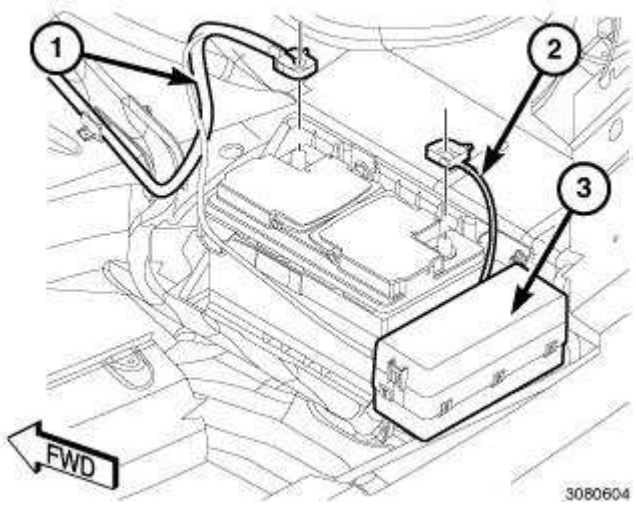

Fig. 54: Battery Negative & Positive
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect both the battery negative (2) and positive (1) cables.

DECKLID COVER REMOVAL

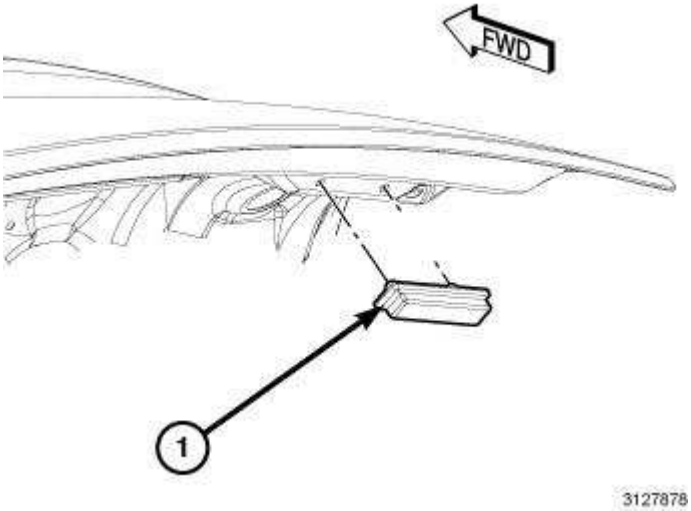

Fig. 55: Trunk Lid Handle
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two screws from the trunk lid handle (1) and remove the handle from the decklid.

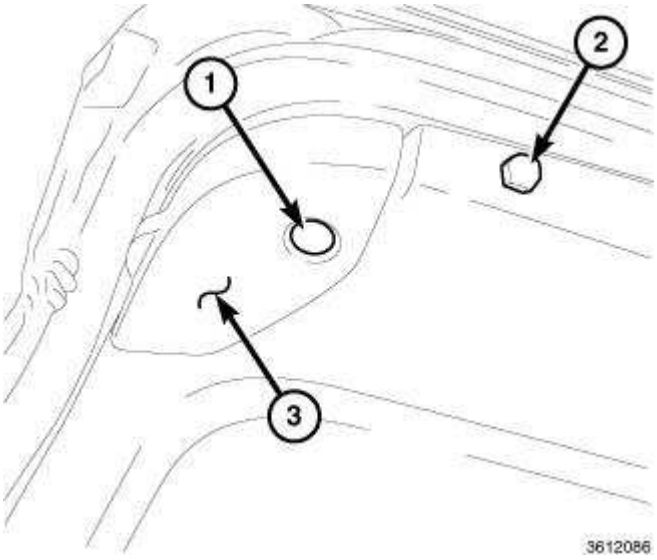

Fig. 56: Pushpin, Decklid Corner Trim Piece & Decklid Corner Trim Piece
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform 7 and8 on both sides of the decklid.

7. Remove the pushpin (1) and remove the decklid corner trim piece (2).
8. Unscrew the decklid bumper (2) and remove from the vehicle.

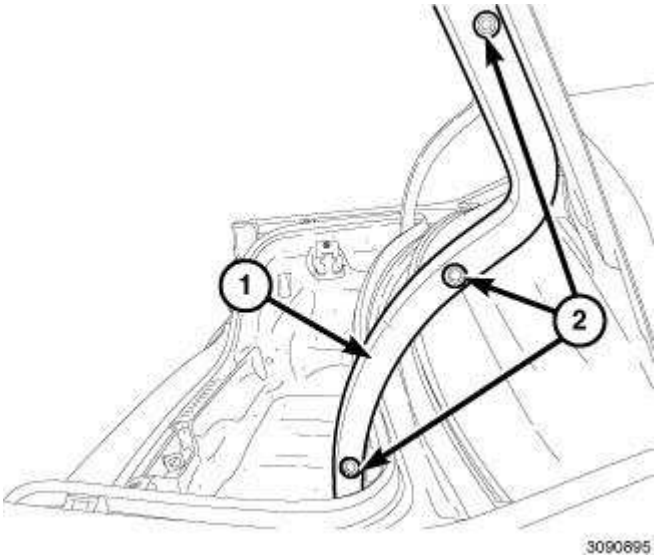

Fig. 57: RH Hinge Trim Push-In Fasteners & Hinge Trim
Courtesy of CHRYSLER GROUP, LLC

9. Remove the hinge trim push-in fasteners (2) and remove the hinge trim (1) on the right hand side of the trunk.

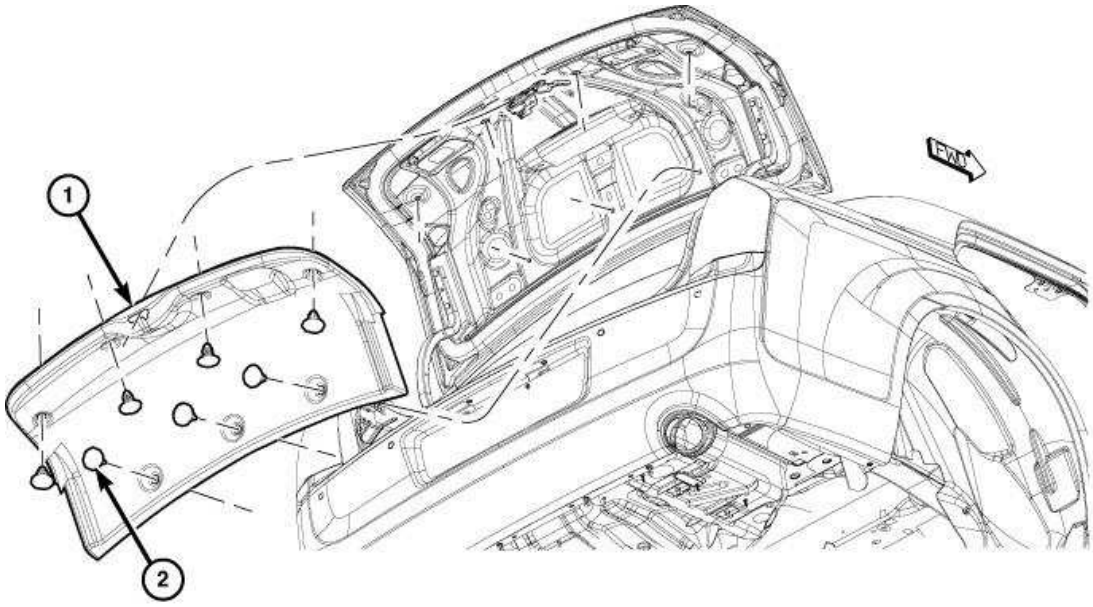

Fig. 58: Push-In Retainers & Decklid Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle must be routed through the decklid cover.

10. Remove the push-in retainers (2) securing the decklid cover (1) to the decklid.

INNER TRUNK PANELS: RIGHT REMOVED AND LEFT LOOSENED

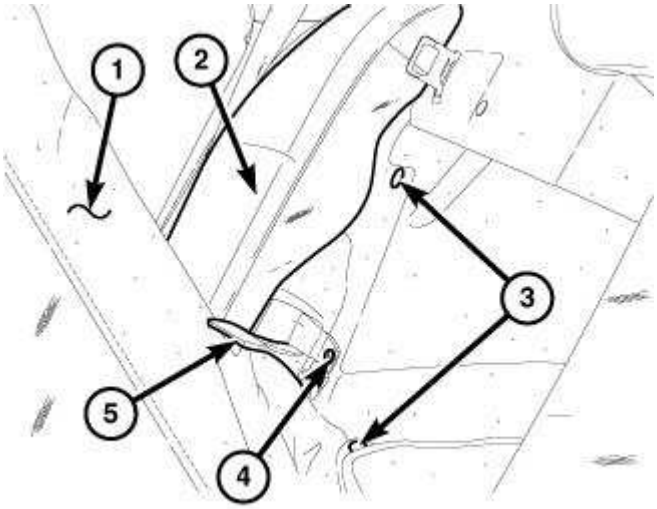

Fig. 59: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Pull the right hand rear seat back (1) forward, exposing the luggage compartment.
12. Behind the right hand rear seat, pull the carpet tab (5) up, exposing the rear seat back side bolster bracket retaining bolt (4).
13. Remove the right hand rear seat back side bolster bracket bolt (4).
14. Remove the push-in fasteners (3) that secure the trunk side trim.

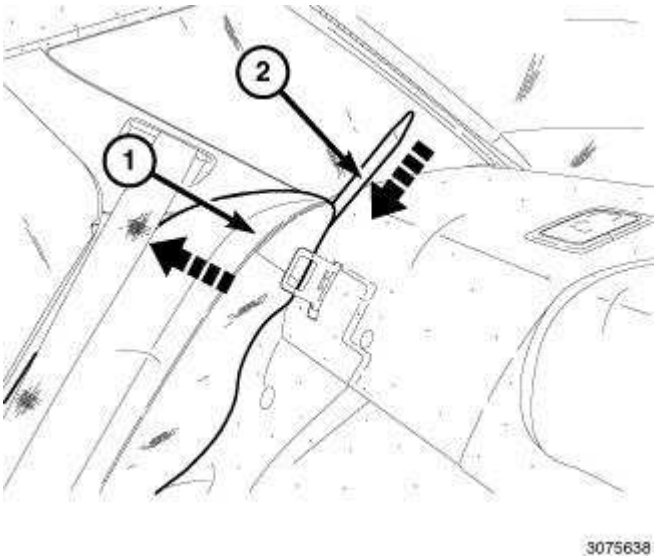

Fig. 60: Trim Stick & Seat Back Bolster
Courtesy of CHRYSLER GROUP, LLC

15. Using (special tool #C-4755, Trim Stick) (2), push down between the rear shelf and the right hand rear seat back bolster (1) to release the retaining clip, and pull out on the seat back bolster (1) to remove.

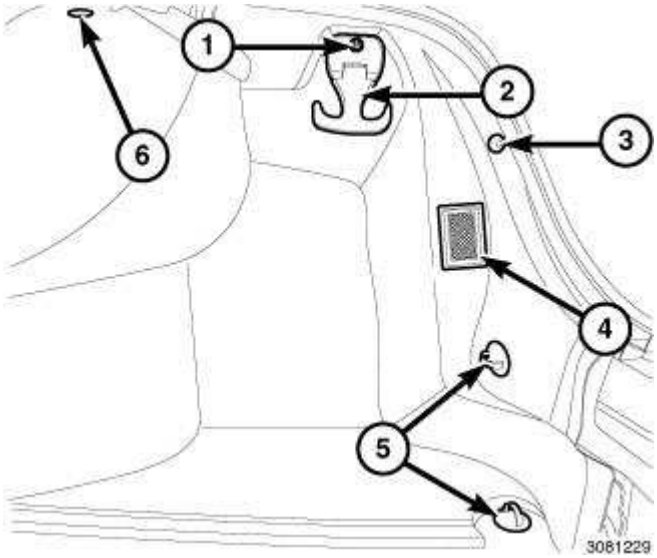

Fig. 61: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

16. Remove the cargo net hook screw (1) and upper cargo hook (2) on both sides.
17. Remove the push-in retainers (3) for the wheel well cover on both sides.
18. On the right hand side only, remove the forward push-in retainer (6) for the wheel well cover.
19. Remove the cargo net lower hooks (5) on both sides.
20. Carefully pull back the wheel well cover enough to disconnect the trunk lamp (4) harness connector and expose the tail light connectors on both sides.
21. On the right hand side, remove the wheel well cover.

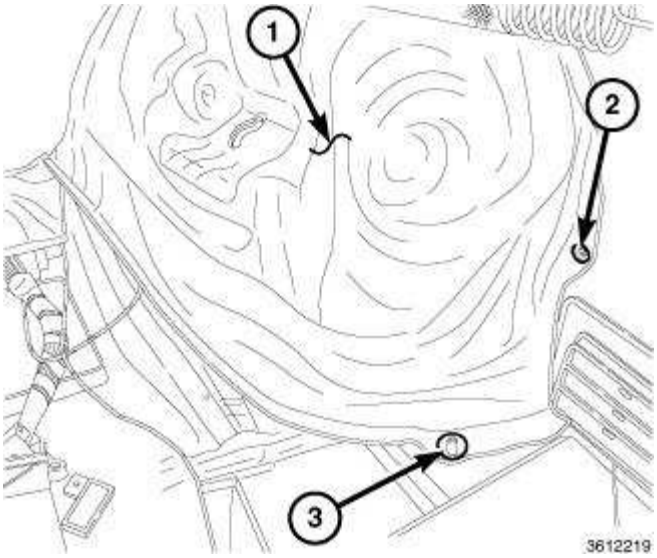

Fig. 62: Push-In Retainer, Inner Trunk Insulator & Plastic Retainer
Courtesy of CHRYSLER GROUP, LLC

22. Remove the push-in retainer (2) securing the inner trunk insulator (1) to the body.

23. Unscrew the plastic retainer (3) from the floor of the trunk.
24. Remove the inner trunk panel (1) from the vehicle.

DRILLING THE PASS THROUGH HOLE

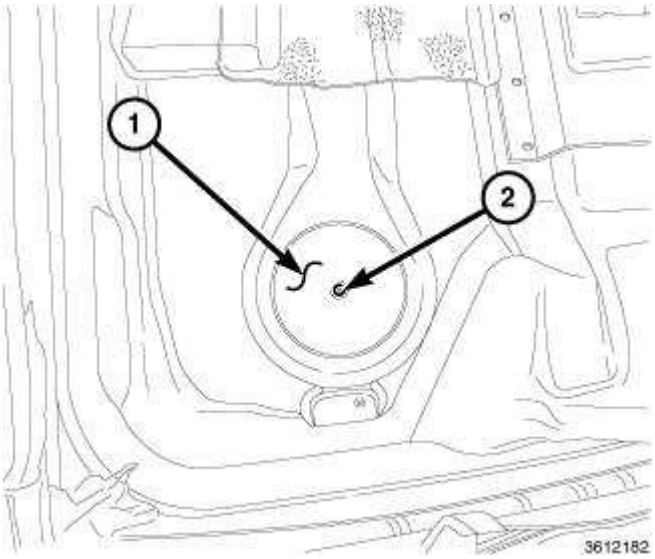

Fig. 63: Center Of The Plug & Identify The Plug
Courtesy of CHRYSLER GROUP, LLC

NOTE: The center of the plug (2) will be used in to center the hole saw to drill the required hole. Refer to 26.

25. Identify the plug (1) in the left hand rear corner of the trunk.

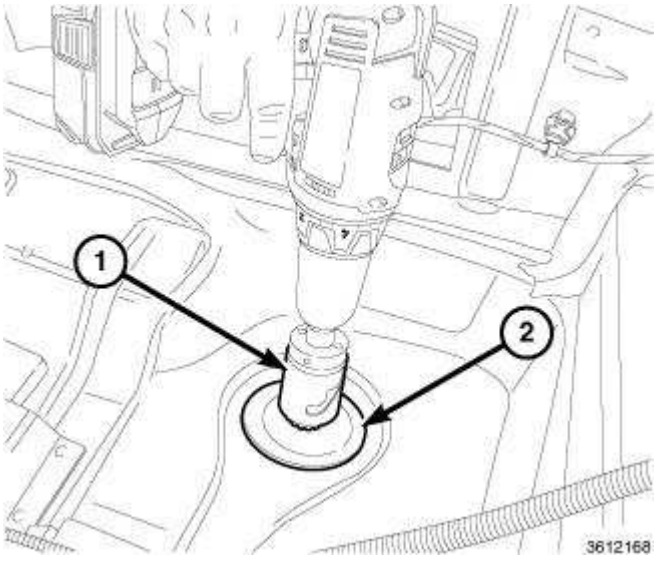

Fig. 64: Hole Saw & Plug
Courtesy of CHRYSLER GROUP, LLC

26. Using a 41mm (1 5/8 in.) hole saw (1), drill a hole in the plug (2) in the rear left hand corner of the trunk.
27. De-burr the hole.

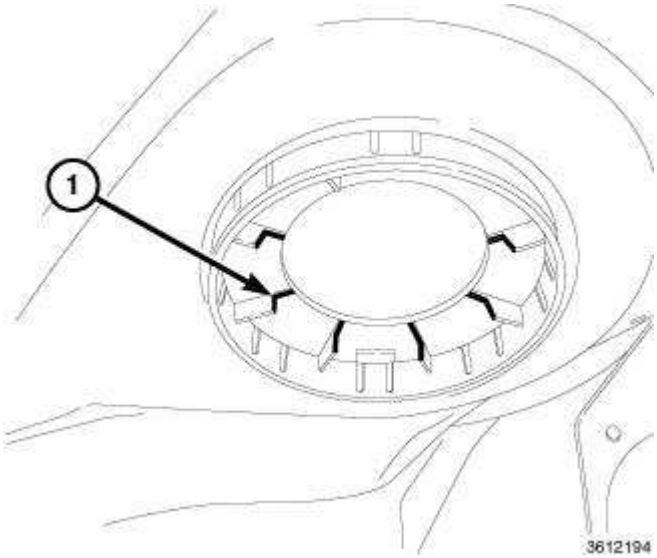

Fig. 65: Tabs
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the tabs (1) are not trimmed and made flush with the bottom of the plug, the wiring harness grommet will not seal and water may get into the trunk.

28. Raise and support the vehicle.
29. On the underside of the plug, cut each tab (1) back 8 mm (3/16 inch) and make flush with the bottom side of the plug.
30. Lower the vehicle.

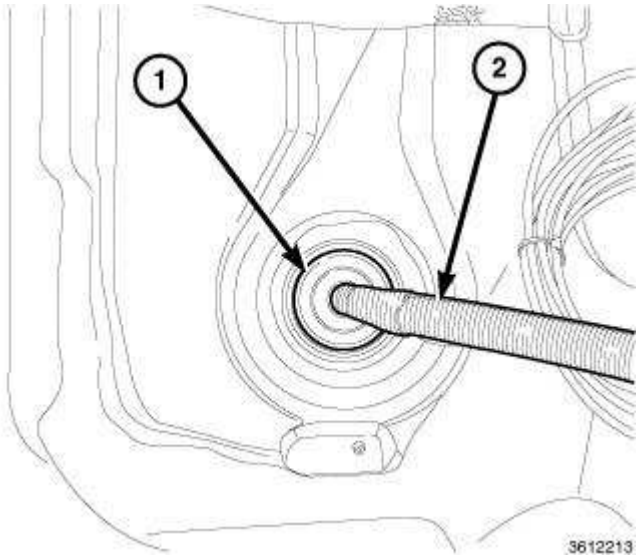

Fig. 66: Grommet, Connector And Harness
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply RTV silicone to sealing area of grommet just before seating.

31. From inside the trunk, feed the connector and harness (2) through the drilled hole and seat the grommet (1).

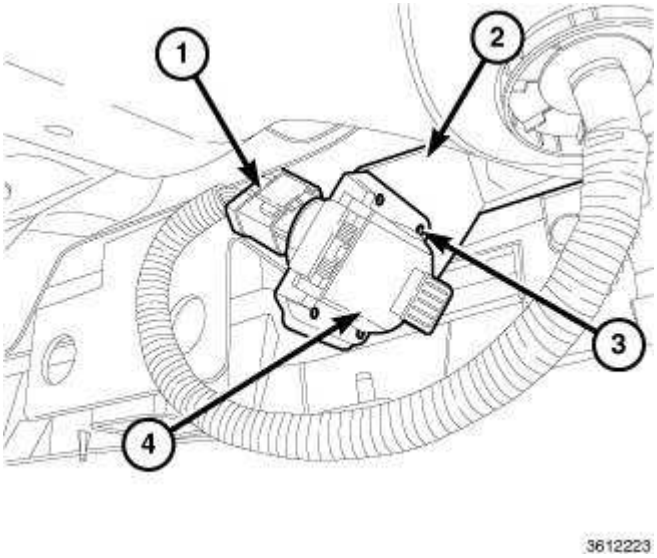

Fig. 67: Ten Way Adapter, Hitch Bracket & Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

32. Raise and support the vehicle.
33. Position and secure the ten way adapter (4) to the trailer hitch bracket (2) with the four adapter retaining screws (3) and nuts (not shown).
34. Install the wiring harness connector (1) to the ten way adapter (4).

MODULE MOUNTING

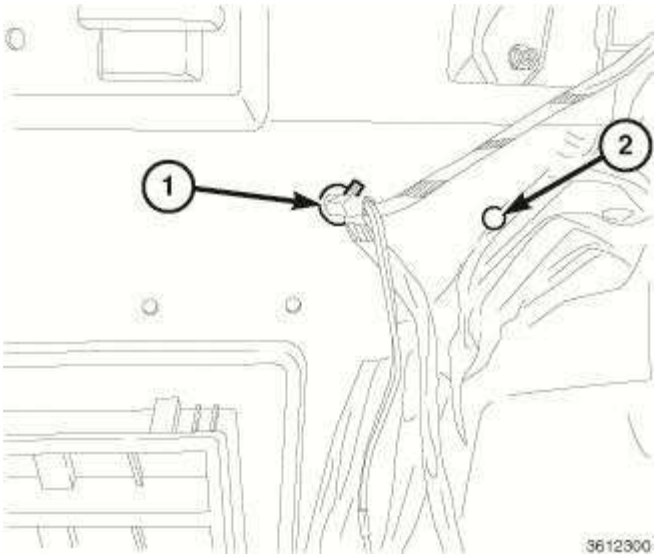

Fig. 68: Clip & Hole
Courtesy of CHRYSLER GROUP, LLC

35. On the right side of the trunk, remove the clip (1) from the body using an appropriate tool.
36. Drill a 7 mm (9/32 in.) hole in the location shown in illustration (2).

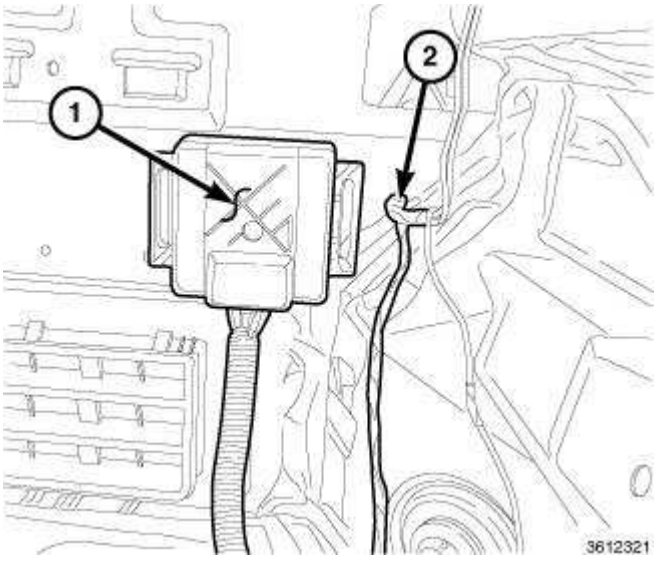

Fig. 69: Wiring Clip & Control Module
Courtesy of CHRYSLER GROUP, LLC

37. Route the trailer tow wiring harness along the back of the spare tire tub and secure with tie straps to the existing wiring harness.
38. Install the wiring clip (2) in the hole that was drilled in the previous step.
39. Remove the adhesive backing from the control module (1) and install in the location shown in illustration.

40. Press firmly on the control module to make sure it is secured to the right trunk wall.

HARNESS ROUTING AND CONNECTIONS

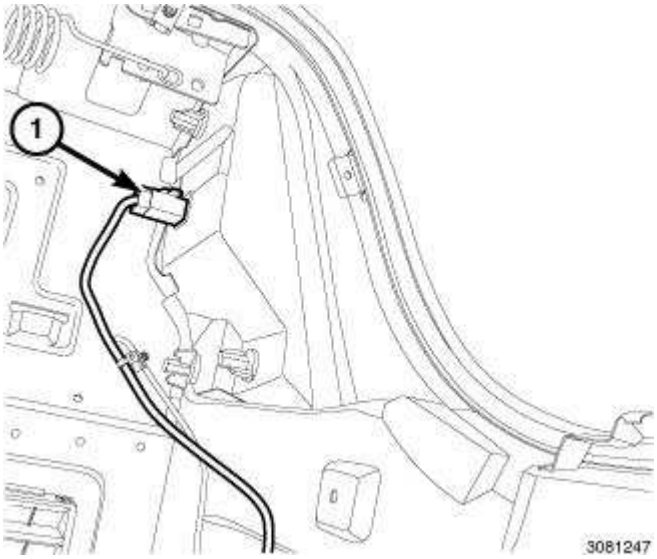

Fig. 70: Tail Lamp Connector
Courtesy of CHRYSLER GROUP, LLC

41. Disconnect the tail lamp connector (1) on both sides.

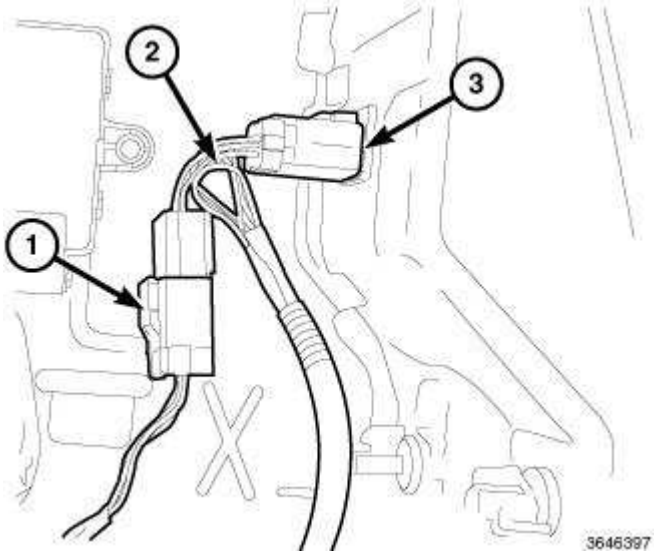

Fig. 71: Trailer Tow Harness, Tail Lamp Connector & Factory Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform 42 through45on both sides of the vehicle.

42. Route the trailer tow harness (2) to the tail lamp.

43. Connect the factory harness connector (1) to the trailer tow wiring harness.
44. Install the trailer tow harness connector to the tail lamp connector (3).
45. After making the connections, place a piece of foam tape over the connection of the factory wiring to the trailer tow harness. This will prevent any noise or chafing issues.

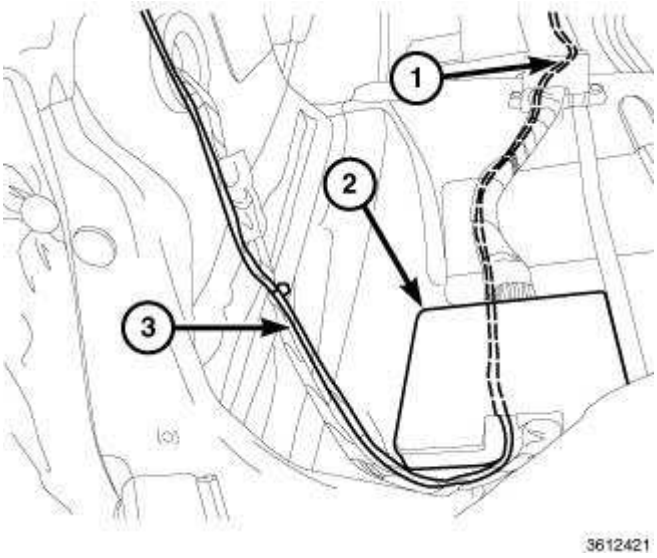

Fig. 72: Lids & Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

46. Remove the lids (1, 2) from the junction boxes on the trunk floor.
47. Route the trailer tow wiring harness (3) around the battery and through the junction boxes.
48. Continue to route the trailer tow harness along the existing harness and secure with tie straps.
49. Replace the lids of the junction boxes and snap into place.

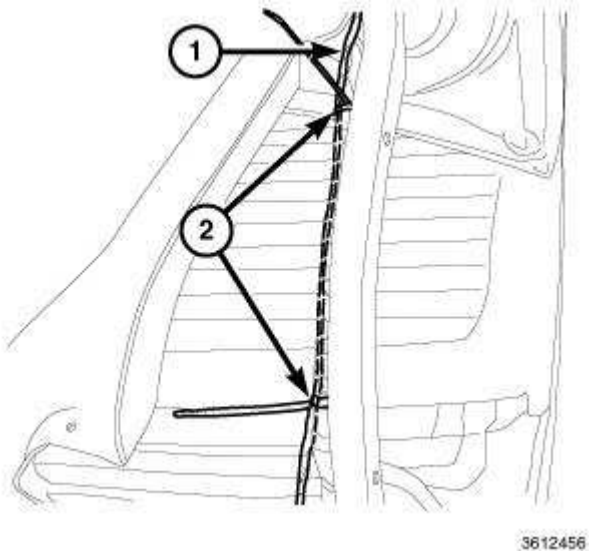

Fig. 73: Trailer Tow Harness & Tie Straps
Courtesy of CHRYSLER GROUP, LLC

50. Route the trailer tow harness (1) up the trunk support beam and secure with tie straps (2). Do not fully tighten the tie straps until the wiring harness has been fully routed in case the location needs to be adjusted.

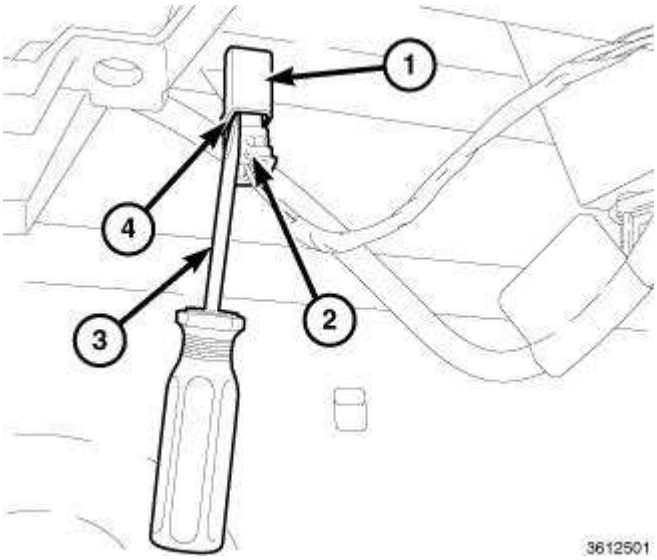

Fig. 74: Flat Screwdriver & Tab
Courtesy of CHRYSLER GROUP, LLC

51. Disconnect the center high mount stop lamp (CHMSL) connector (2) from the lamp (1). It may be necessary to use a small, flat screwdriver (3) between the tab (4) and connector to separate the connector from the lamp.

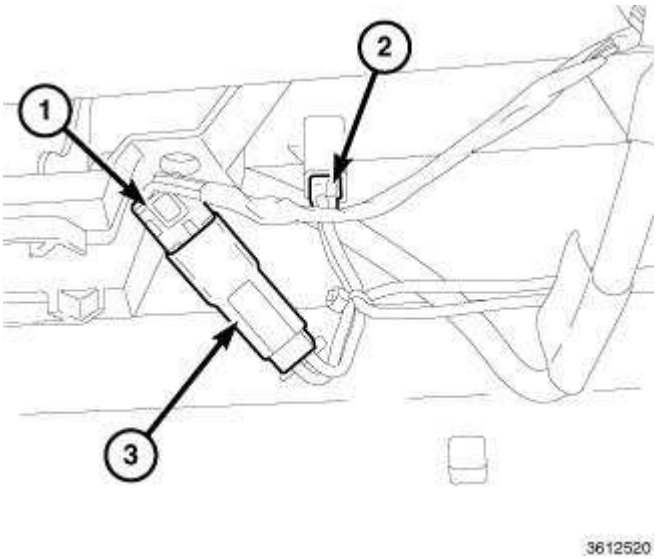

Fig. 75: Stop Lamp (CHMSL) Connector & Lamp
Courtesy of CHRYSLER GROUP, LLC

52. Connect the CHMSL factory wiring (1) to the trailer tow wiring harness (3).
53. Install the trailer tow connector (2) to the CHMSL.

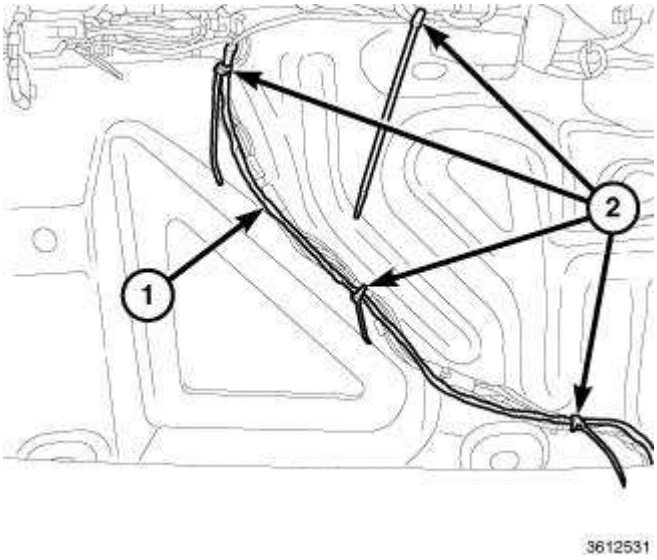

Fig. 76: Trailer Tow Harness & Tie Straps
Courtesy of CHRYSLER GROUP, LLC

54. Secure the trailer tow harness (1) to the existing harness with tie straps (2). After final wire routing, trim tie straps.

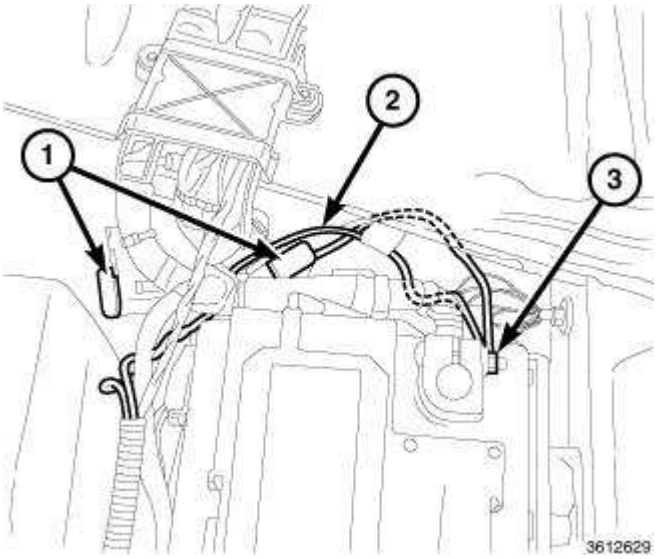

Fig. 77: Power Wires, Nut & Fuse Holders
Courtesy of CHRYSLER GROUP, LLC

55. Route the power wires (2) to the battery and secure the wires to the positive terminal with the nut (3).
56. Route the fuse holders (1) and secure to the existing harness with tie straps.

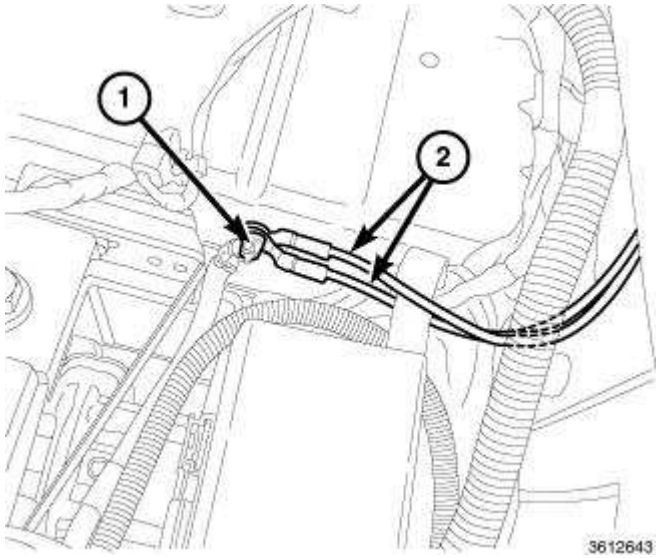

Fig. 78: Ground Wires & Existing Nut
Courtesy of CHRYSLER GROUP, LLC

57. Route the ground wires (2) from the trailer tow harness to the ground stud near the battery.
58. Secure the ground wires to the stud with the existing nut (1).

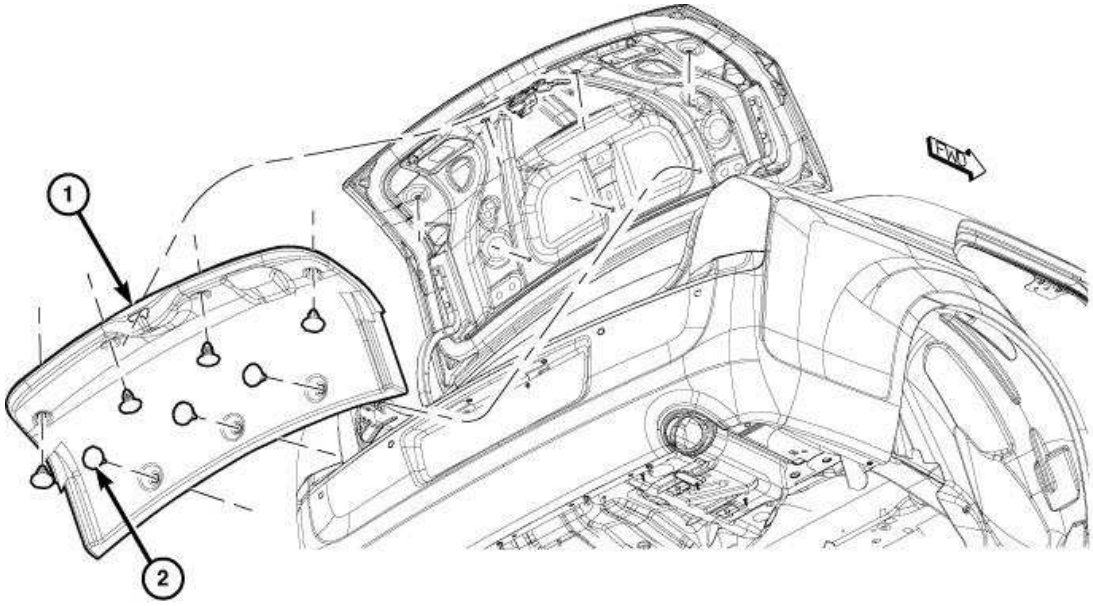

Fig. 79: Push-In Retainers & Decklid Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The manual trunk release handle must be routed through the decklid cover.

59. Position the decklid cover (1).
60. Install the push-in retainers (2) securing the decklid cover (1) to the decklid.

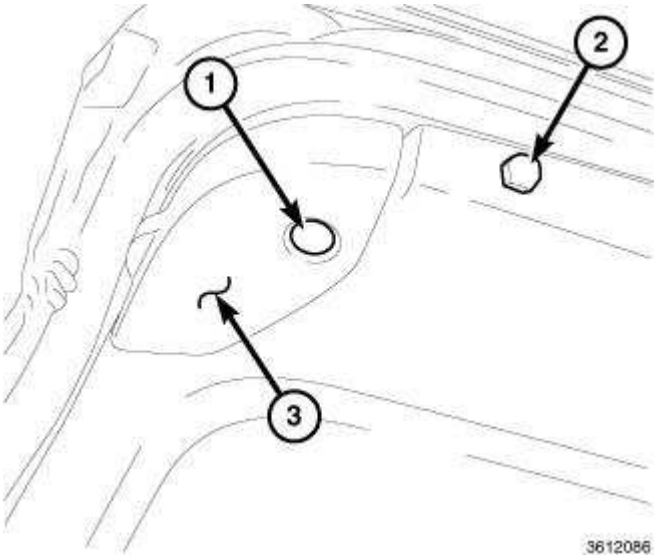

Fig. 80: Pushpin, Decklid Corner Trim Piece & Decklid Corner Trim Piece
Courtesy of CHRYSLER GROUP, LLC

61. Install decklid corner trim piece (3) and secure with the push pin (1).
62. Screw on the decklid bumper (2).

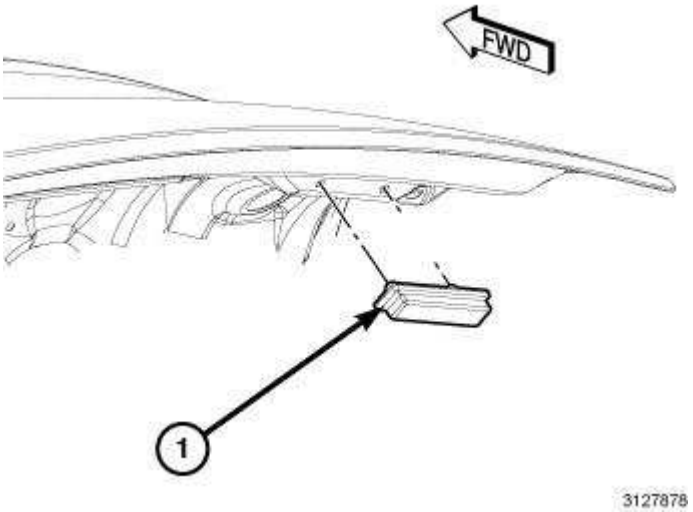

Fig. 81: Trunk Lid Handle
Courtesy of CHRYSLER GROUP, LLC

63. Install the decklid handle (1) and install the two retaining screws.

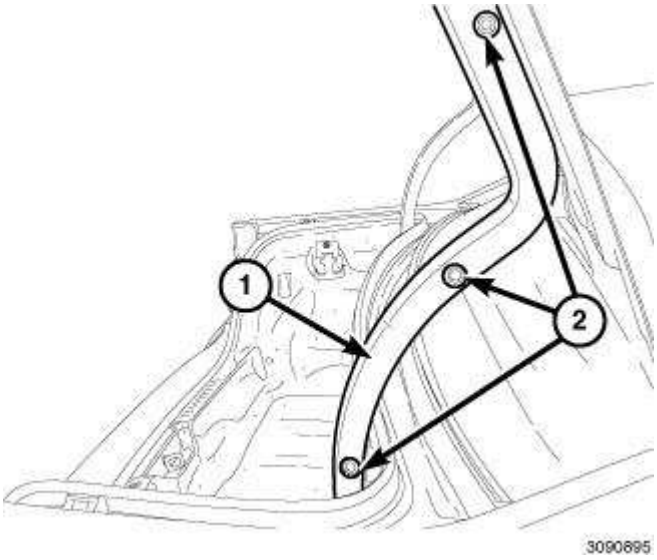

Fig. 82: RH Hinge Trim Push-In Fasteners & Hinge Trim
Courtesy of CHRYSLER GROUP, LLC

64. Install the decklid hinge trim piece (1) and secure with push pin fasteners (2).

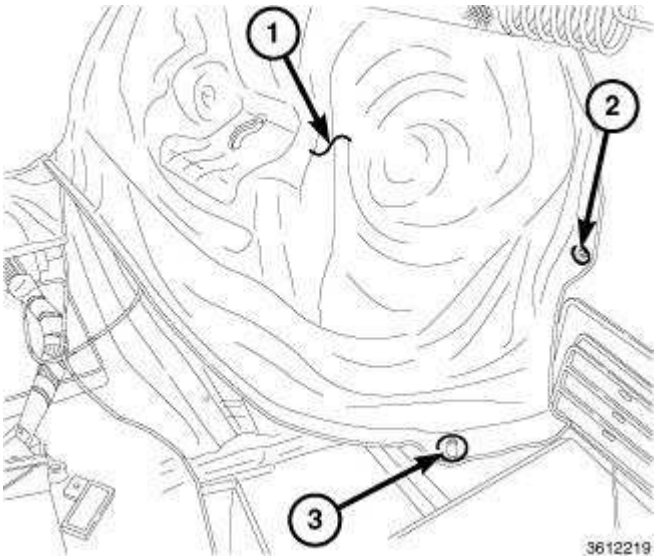

Fig. 83: Push-In Retainer, Inner Trunk Insulator & Plastic Retainer
Courtesy of CHRYSLER GROUP, LLC

65. Install the inner trunk panel (1) into the vehicle.
66. Install the push-in retainer (2) securing the inner trunk insulator (1) to the body.
67. Tighten the plastic retainer (3) to the stud on the floor of the trunk.

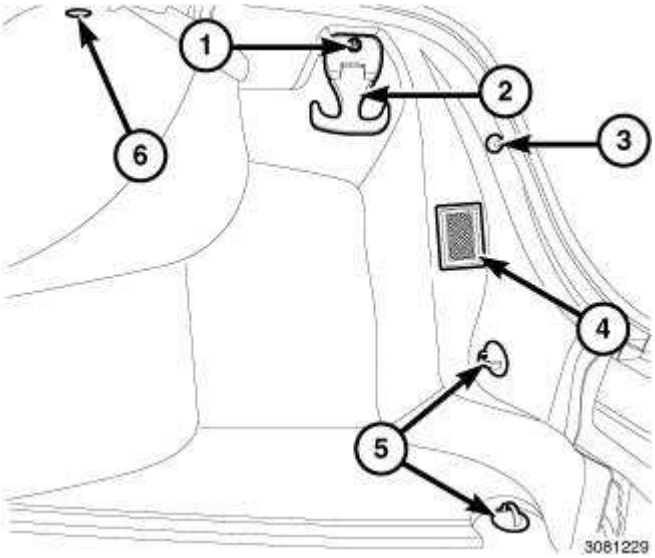

Fig. 84: Hook Screw, Upper Cargo Hook & Push-In Retainer, Hooks & Trunk Lamp
Courtesy of CHRYSLER GROUP, LLC

68. Carefully position the wheel well cover on both sides and connect the trunk lamp (4) connectors.
69. Install the cargo net lower hooks (3) on both sides.
70. Install the cargo net hook screw (1) and upper cargo hook (2) on both sides.
71. Install the push-in retainers (3) for the wheel well cover on both sides.

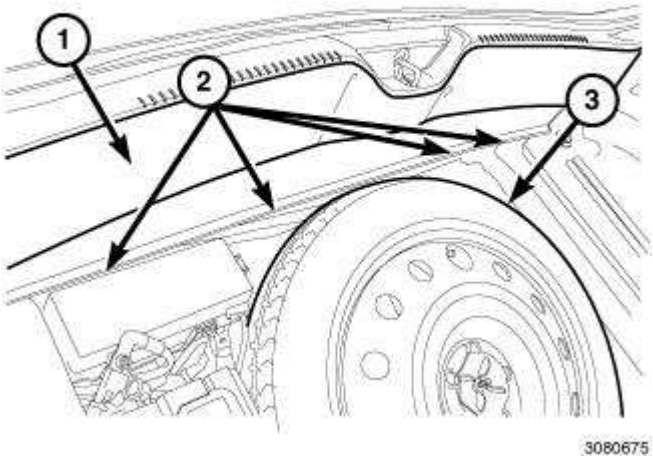

Fig. 85: Spare Tire, Trunk Rear Trim Panel, Four Lower Fasteners & Panel
Courtesy of CHRYSLER GROUP, LLC

72. Install the rear trunk trim panel (1) as follows:
    1. Position the rear trunk trim panel (1) and push down to engage the upper fasteners (not shown).
    2. With the four lower fasteners (2, under panel) aligned, firmly push on each to properly

seat.

73. Install the spare tire (3).

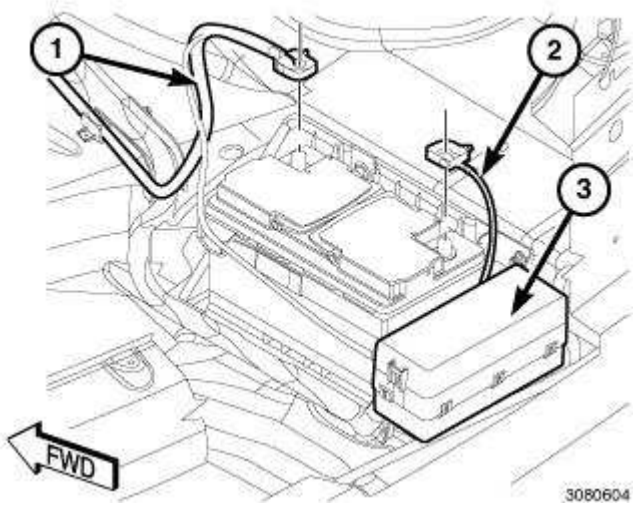

Fig. 86: Battery Negative & Positive
Courtesy of CHRYSLER GROUP, LLC

74. Connect both the battery negative (2) and positive (1) cables.

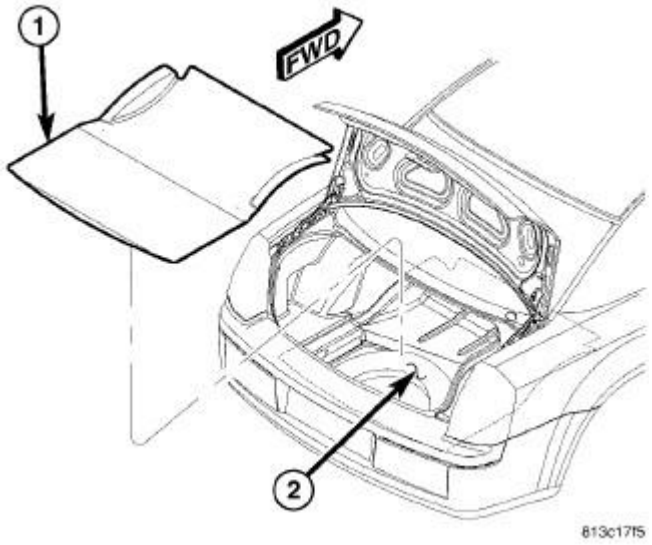

Fig. 87: Spare Tire Cover/Trunk Floor Carpet
Courtesy of CHRYSLER GROUP, LLC

75. Install the spare tire cover/trunk floor carpet (1) into the spare tire well (2).

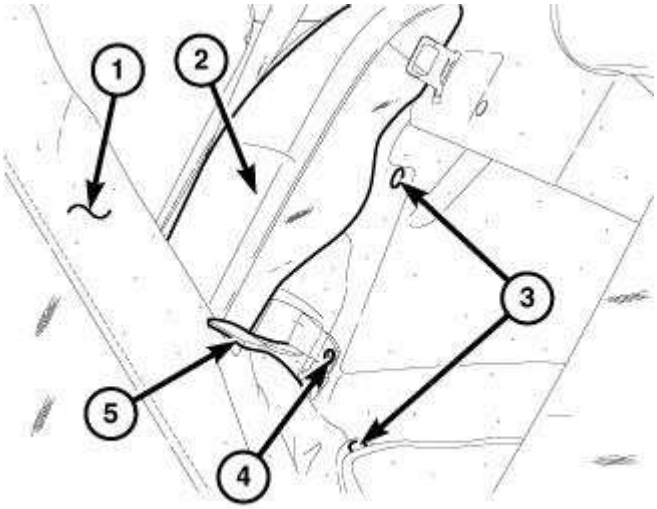

Fig. 88: RH Rear Seat Back, Carpet Tab, Bolt & Fasteners
Courtesy of CHRYSLER GROUP, LLC

76. Position the rear seat bolster (2), push rearward to engage the retaining clip between the rear shelf and the bolster.
77. Install the push-in fasteners (3) that secure the trunk side trim.
78. Install the right hand rear seat back side bolster bracket bolt (4).
79. Verify the system operates correctly.

DRIVING CONVENIENCE

INSTRUCTION SHEET

3.6L ENGINE BLOCK HEATER

CHRYSLER 300C / DODGE CHARGER

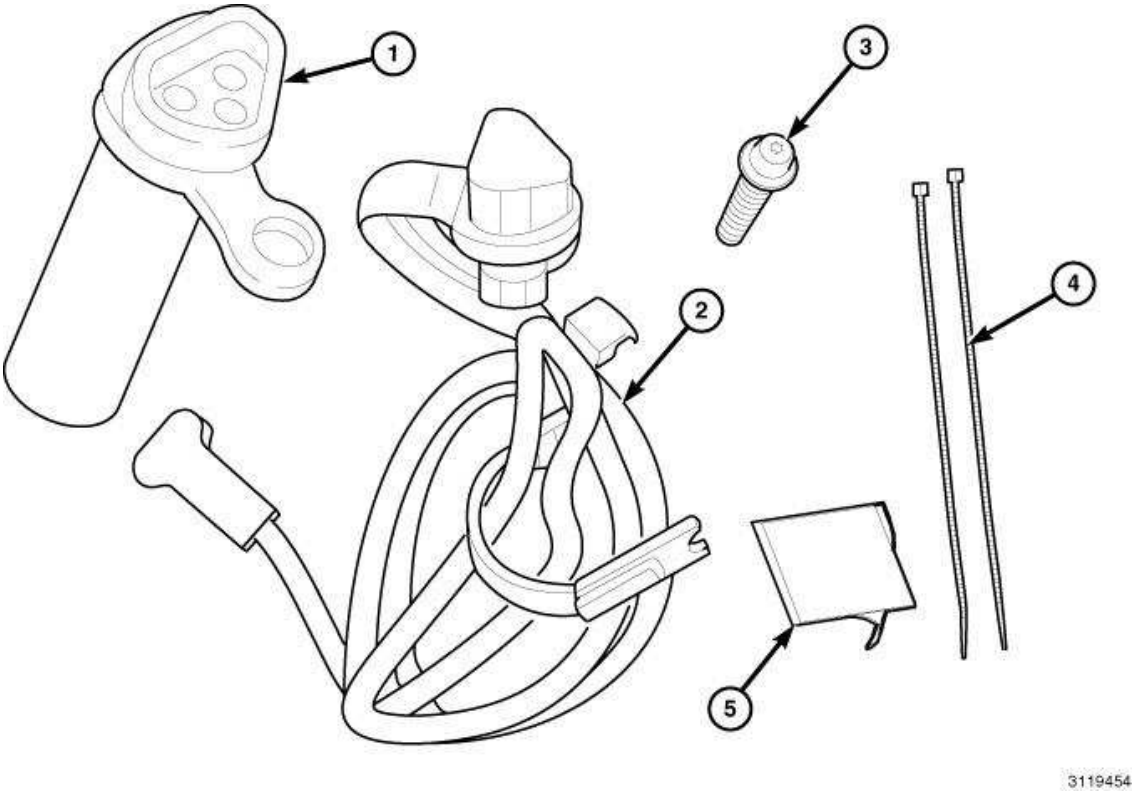

Fig. 89: Engine Block Heater, Cord, Bolt, Tie Straps & Tape Patch
Courtesy of CHRYSLER GROUP, LLC

CALL OUT	DESCRIPTION	QUANTITY
1	Engine Block Heater	1
2	Cord	1
3	Bolt	1
4	Tie Straps	2
5	Tape Patch	2

TOOLS REQUIRED		
Front End Cutters	T-30, 8mm, 13mm, 17mm Socket/Rachet/Wrench	Hoist
Flat Bladed, Phillips Screwdrivers	Trim Pad Pry Tool	Small Pick Tool

NOTE: It is recommended the installer/technician read the instructions thoroughly prior to installation of this product.

PROCEDURE STEPS

The heater block is located on the driver side towards the front of the engine.

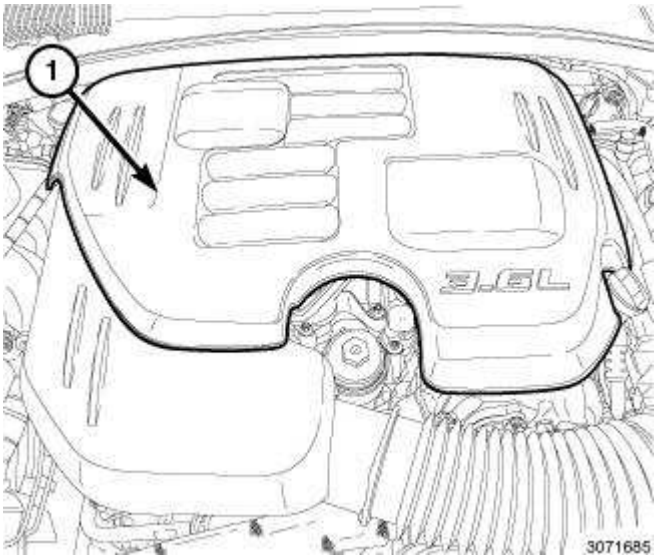

Fig. 90: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable located in the trunk near the spare tire.
2. Open the hood.
3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

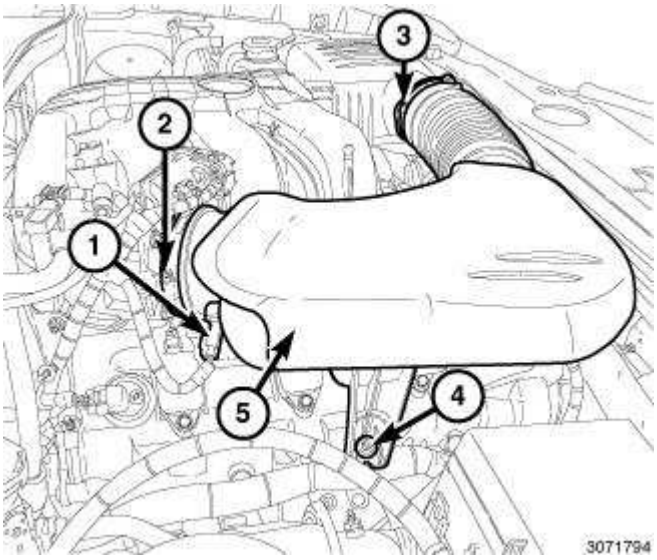

Fig. 91: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) Sensor.
5. Using a screwdriver, loosen the clamp (2) at the throttle body.
6. Using a screwdriver, loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).

8. Remove the air inlet hose assembly (5).

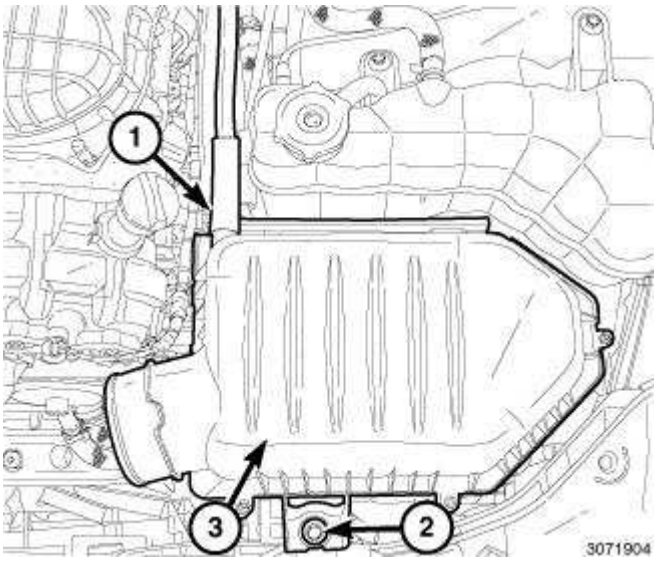

Fig. 92: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the hose (1) from the air cleaner housing.
10. Using a 8mm socket/ratchet, remove the air cleaner housing retaining bolt (2).
11. Remove the air cleaner housing (3).

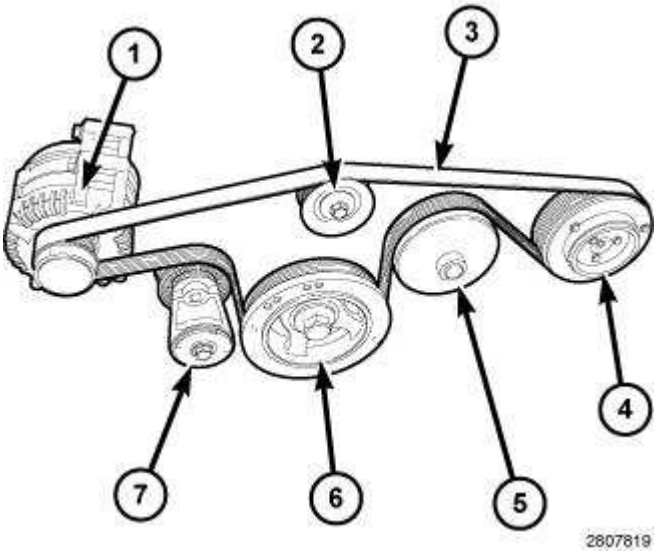

Fig. 93: New Belt, Idler Pulley, Tensioner Arm, Belt, Idler & Tensioner
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, severe damage may occur to the tensioner.

12. Rotate the belt tensioner (7) until it contacts its stop. Remove the belt (3) from the A/C compressor pulley (4), then slowly rotate the tensioner (7) into the freearm position.

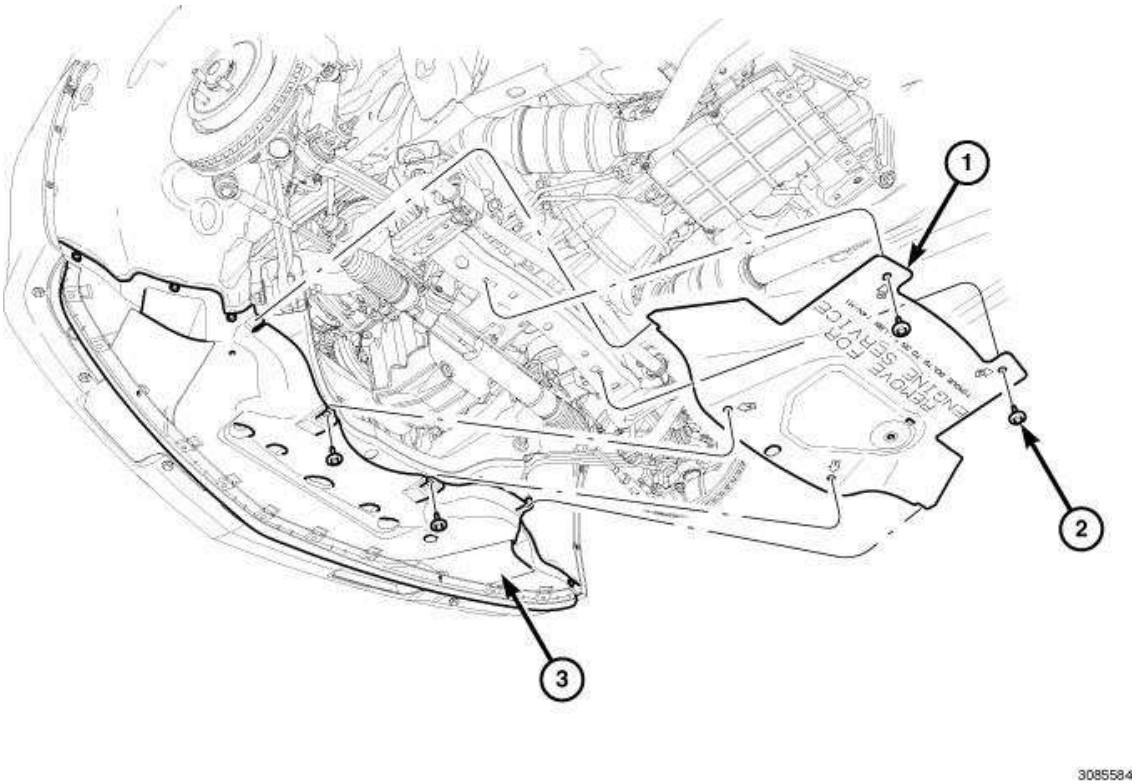

Fig. 94: Four Fasteners, Rear Belly Pan & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

13. Raise and support the vehicle.
14. Using a 17mm socket/ratchet, remove the four fasteners (1) that secure the rear belly pan (1) to the underside of the vehicle.
15. Pull the rear belly pan (1) rearward out of the from the front belly pan (3) to remove from the vehicle.

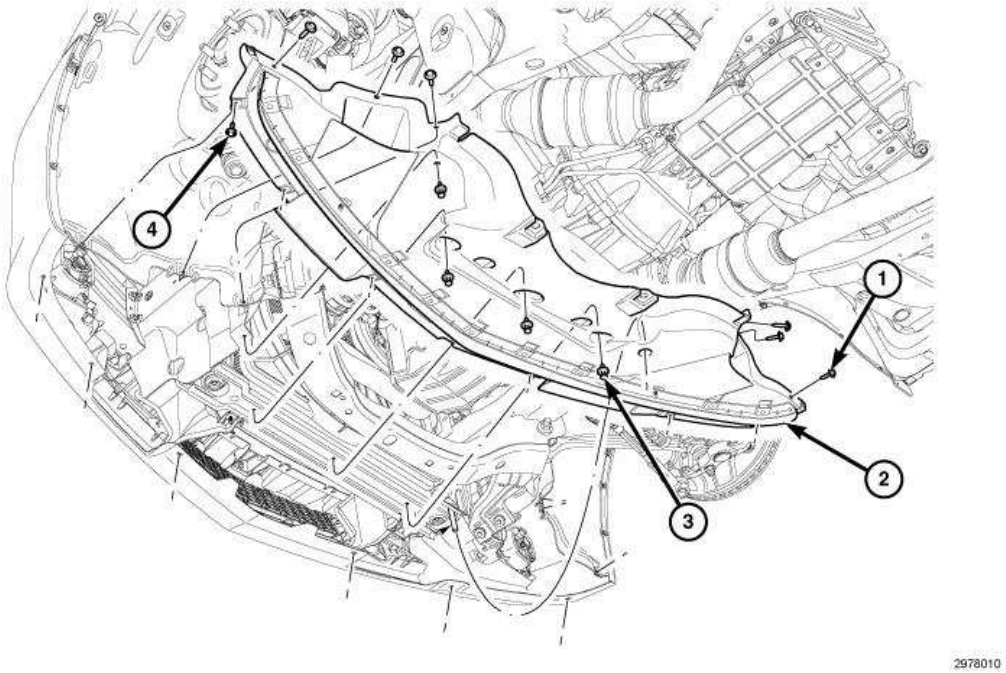

Fig. 95: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

16. Using a phillips screwdriver, remove the six screws (4) that secure the front belly pan (2) to the underside of the vehicle's front fascia.
17. Using a phillips screwdriver, remove the three screws (1) that secure the front belly pan (2) to the lower edge of the vehicle's wheelhouse/wheelwell splash shield. Repeat for the other side.
18. Using a small pick tool and pry tool, remove the four push pin fasteners (3) that secure the front belly pan (2) to the underside of the vehicle's lower crossmember. Repeat for the other side.
19. Remove the front belly pan (2) from the underside of the vehicle.

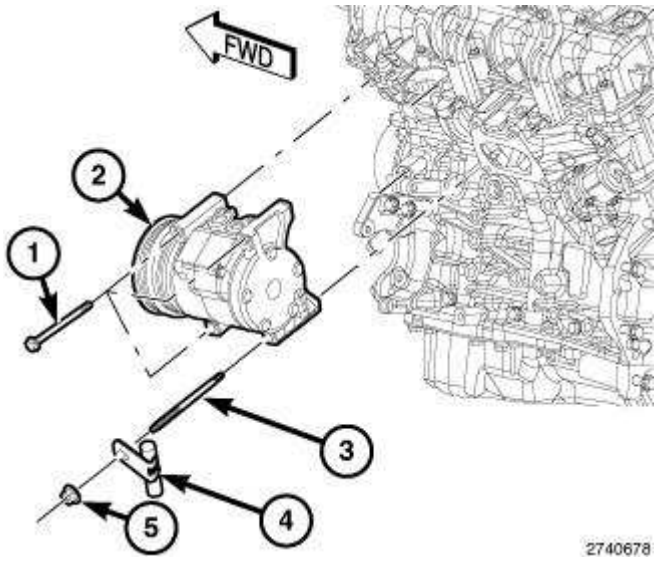

Fig. 96: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

20. Disconnect the engine wire harness from the A/C compressor (2).
21. Using a 13mm socket/ratchet/wrench, remove the nut (5) and position the heater tube bracket (4) out of the way.
22. Support the A/C compressor, remove the stud (3) and the three bolts (1) using a 13mm socket/ratchet/wrench.
23. Reposition the A/C compressor (2) away from the engine.

NOTE: The A/C compressor may be repositioned without disconnecting the refrigerant lines or discharging the refrigerant system.

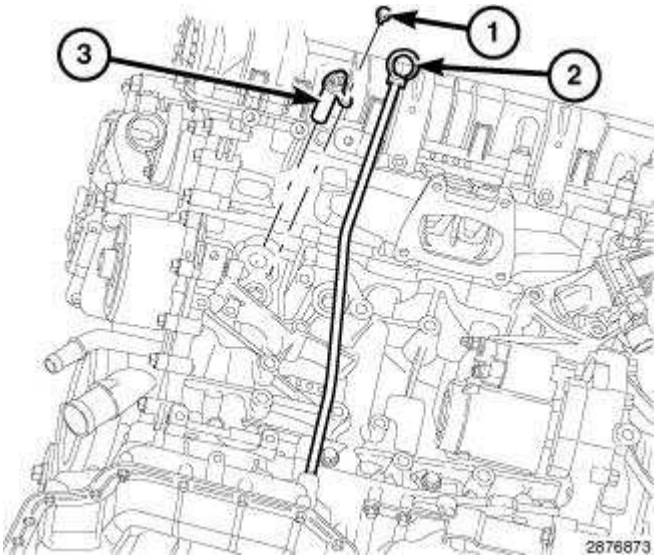

Fig. 97: Engine Block Heater Element, Bolt & Fluid Level Indicator/Dipstick
Courtesy of CHRYSLER GROUP, LLC

24. Position and install the engine block heater element (3) and bolt (1) into the opening under the rear of the exhaust manifold forward of the fluid level indicator/dipstick (2).
25. Using a T-30 socket/driver/ratchet, tighten the bolt (1) to 9 N-m (80 in-lbs).

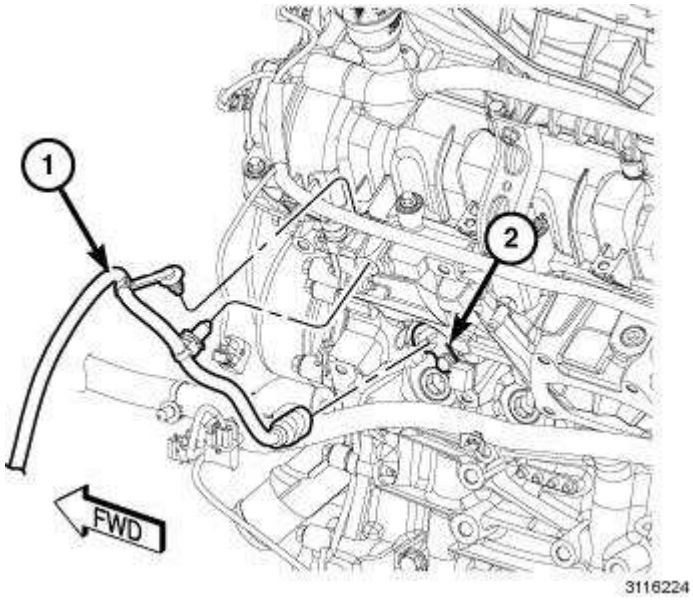

Fig. 98: Engine Block Heater Cord & Element
Courtesy of CHRYSLER GROUP, LLC

26. Plug in the engine block heater cord (1) to the element (2).
27. Lower the vehicle enough to access the top of the engine.
28. Begin routing the cord (1) upward towards the front of the engine and install the harness retainers into the driver valve cover holes.

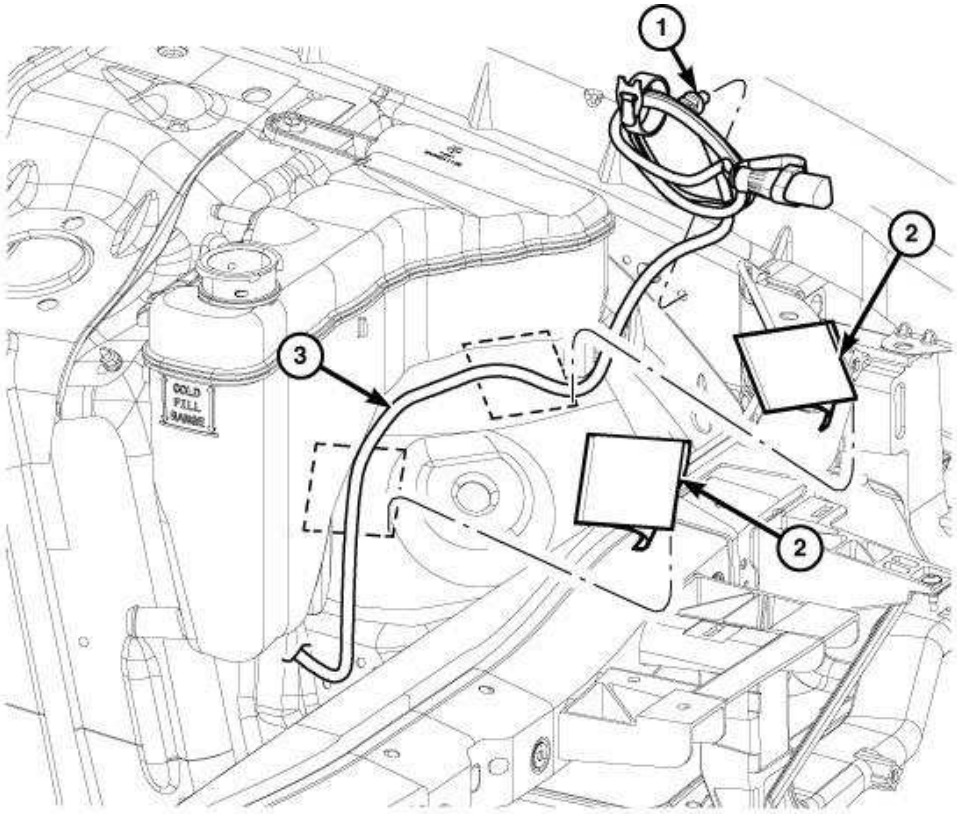

Fig. 99: Cord, Retainer & Tape Patches
Courtesy of CHRYSLER GROUP, LLC

29. Route the cord (3) under the coolant recovery bottle towards to the front of the driver side inner fender.
30. Install the retainer (1) into the hole on the inner front fender.
31. Using the kit supplied tape patches (2), remove the adhesive backing and secure the cord (3) to the fender panel.

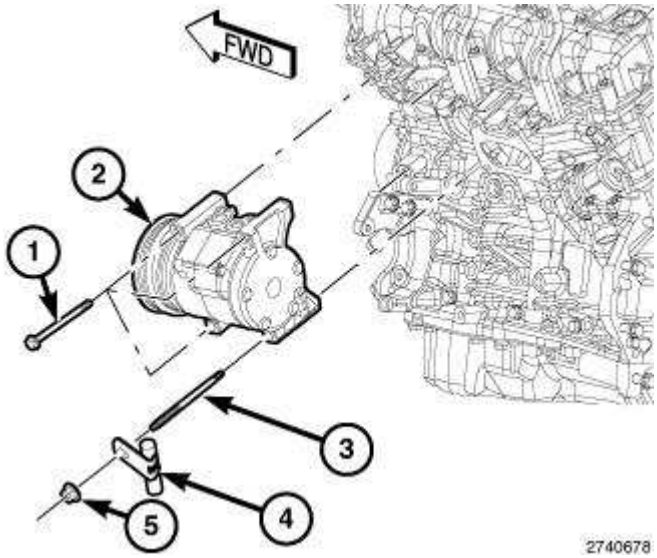

Fig. 100: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

32. Raise the vehicle as necessary.
33. Reposition the A/C compressor (2) to the engine.
34. Using a 13mm socket/ratchet/wrench, install the stud (3) and the three bolts (1) that secure the A/C compressor (2) to the engine. Tighten the bolts to 28 N.m (21 ft. lbs.).
35. Reposition the bracket (4) onto the stud and install the retaining nut (5). Tighten the nut to 40 N.m (30 ft. lbs.).
36. Connect the engine wire harness to the A/C compressor (2).

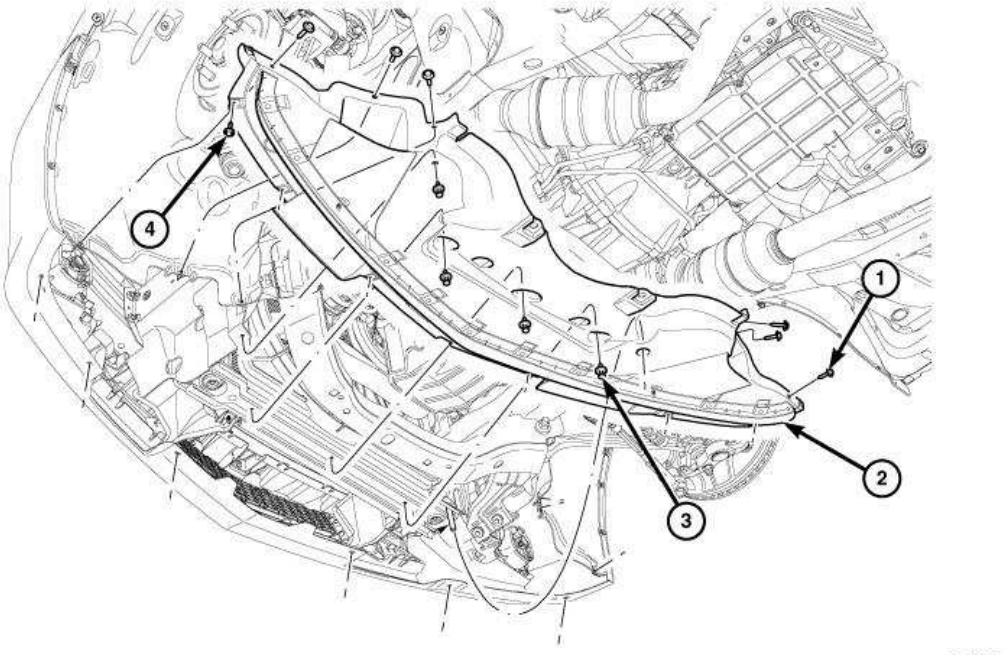

Fig. 101: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

37. Position the front belly pan (2) to the underside of the vehicle.
38. Install the four push pin fasteners (3) that secure the front belly pan (2) to the underside of the vehicle's lower crossmember.
39. Using a phillips screwdriver, install the six screws (4) that secure the front belly pan (2) to the underside of the vehicle's front fascia.
40. Using a phillips screwdriver, install the three screws (1) that secure the front belly pan (2) to the underside of the vehicle's wheelhouse/wheelwell splash shield. Tighten the screws securely. Repeat for the other side.

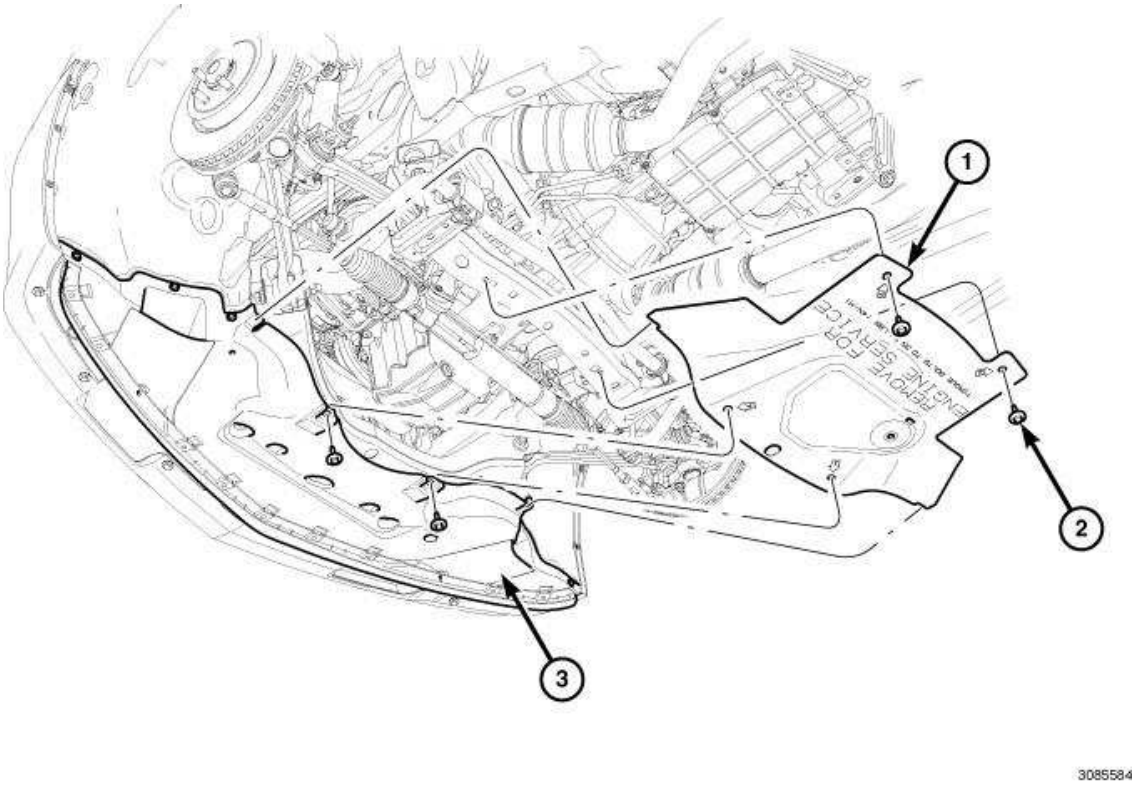

Fig. 102: Four Fasteners, Rear Belly Pan & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: During installation, ensure rear belly pan is shingled underneath the front belly pan. Failure to do so may result in damage to belly pan.

41. Position the rear belly pan (1) to the underside of the vehicle and to the front fascia (3).
42. Using a 17mm socket/ratchet, install the fasteners (2) that secure the rear belly pan (1) to the underside of the vehicle. Tighten the fasteners securely.
43. Lower the vehicle.

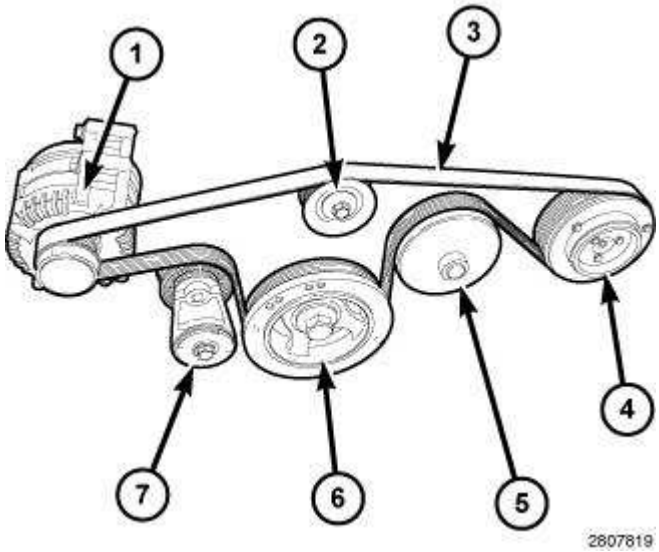

Fig. 103: New Belt, Idler Pulley, Tensioner Arm, Belt, Idler & Tensioner
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not let the tensioner arm snap back to the freearm position, severe damage may occur to the tensioner.

44. Rotate the belt tensioner (7) until it contacts its stop. Install the belt (3) to the A/C compressor pulley (4), then slowly rotate the tensioner (7) into the freearm position.
45. Secure the engine block heater cord (1) to an existing vehicle harness with the kit supplied tie straps.

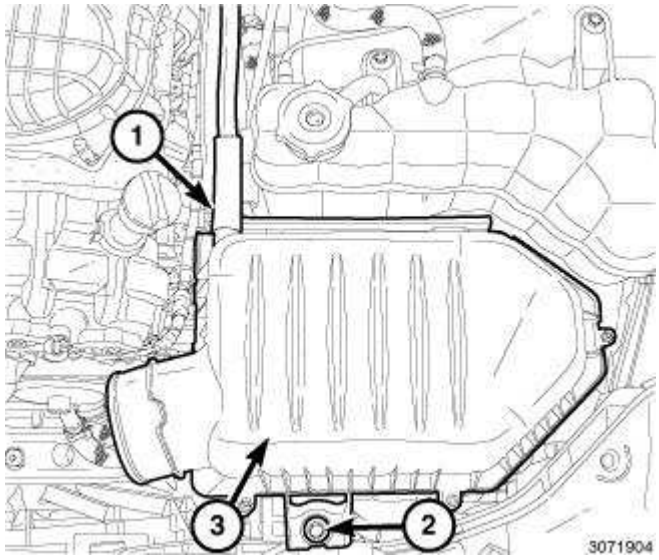

Fig. 104: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

46. Position the air cleaner housing (3) into the engine compartment of the vehicle.

47. Using a 8mm socket/ratchet, install the air cleaner housing retaining bolt (2) and tighten to 4 N.m (35 in. lbs.).
48. Connect the hose (1) onto the air cleaner housing.

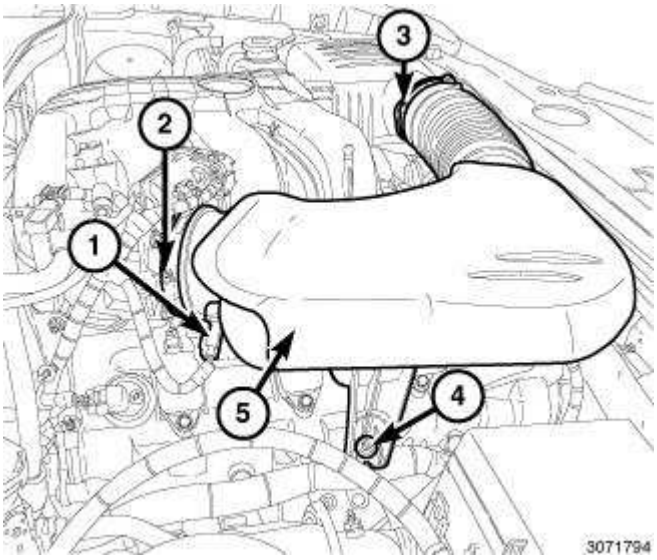

Fig. 105: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

49. Position the air inlet hose assembly (5), connect the air inlet hose to the throttle body and the air cleaner housing.
50. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
51. Using a screwdriver, tighten the clamp (3) at the air cleaner housing to 4 N.m (35 in. lbs.).
52. Using a screwdriver, tighten the clamp (2) at the throttle body to 4 N.m (35 in. lbs.).
53. Connect the electrical connector (1) to the Inlet Air Temperature (IAT) Sensor.

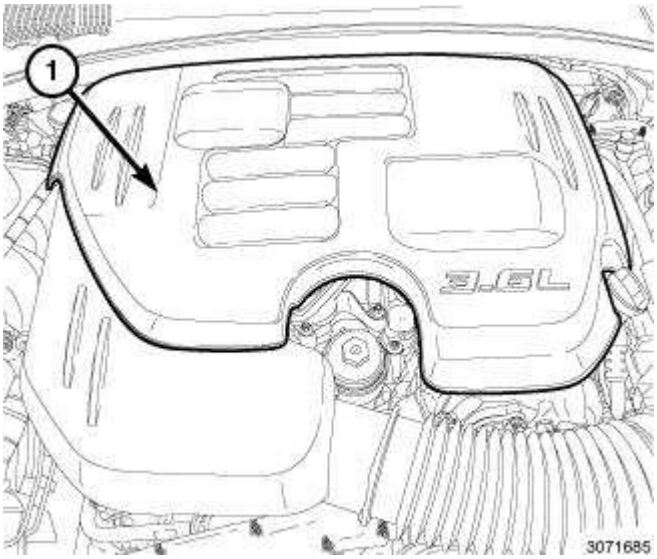

Fig. 106: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

54. Position the engine cover (1) and push down to secure the retaining grommets to the ball studs.
55. Close the hood.
56. Connect the negative cable to the battery located in the trunk near the spare tire.

5.7L ENGINE BLOCK HEATER

CHRYSLER 300C / DODGE CHARGER

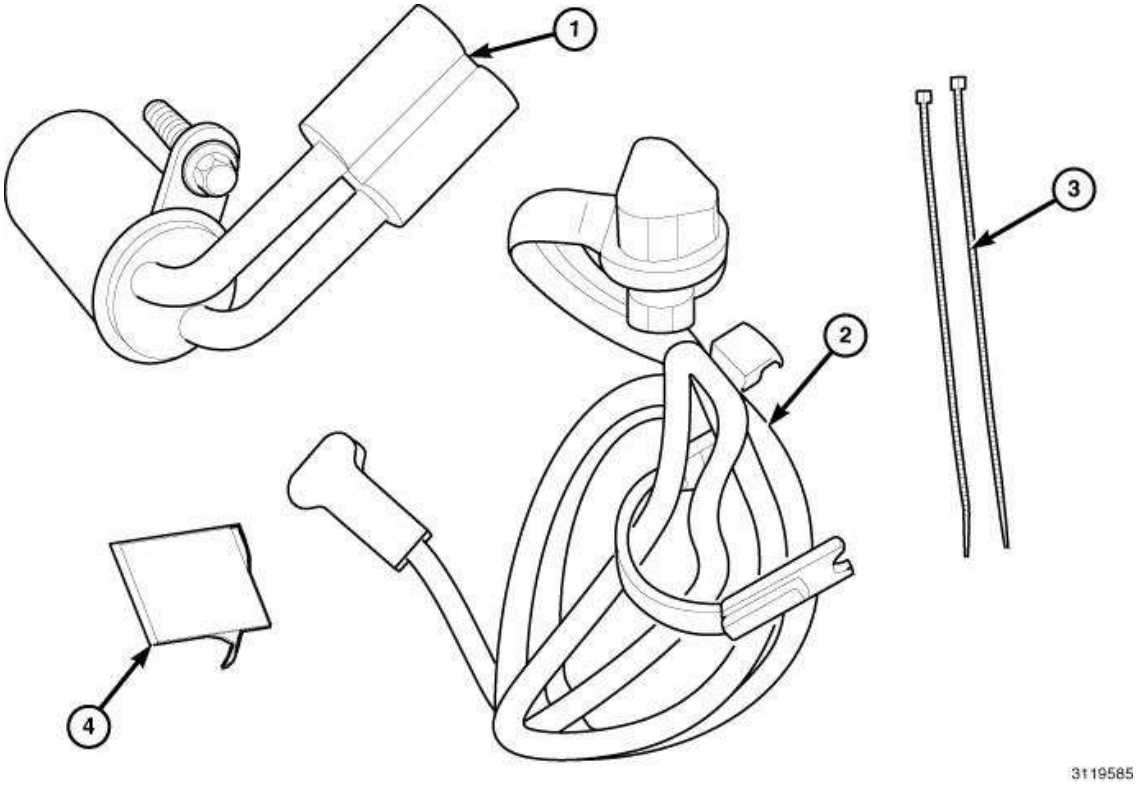

Fig. 107: Engine Block Heater (with PIA Bolt), Cord, Tie Straps & Tape Patch
Courtesy of CHRYSLER GROUP, LLC

CALL OUT	DESCRIPTION	QUANTITY
1	Engine Block Heater (with PIA Bolt)	1
2	Cord	1
3	Tie Straps	2
4	Tape Patch	2

TOOLS REQUIRED		

Front End Cutters	8mm, 10mm, 16mm, 17mm Socket/Ratchet/Wrench	Hoist
Flat Bladed, Phillips Screwdrivers	Heat Valve Lubricant	Pick Tool / Trim Pad Pry Tool

NOTE: It is recommended the installer/technician read the instructions thoroughly prior to installation of this product.

PROCEDURE STEPS

The engine block heater element will locate on the driver side towards the rear of the engine just under the exhaust manifold.

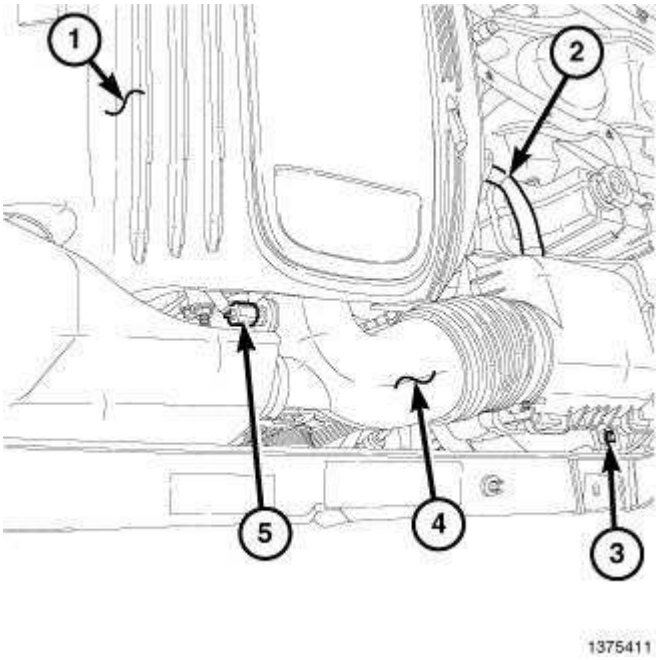

Fig. 108: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Remove the negative battery cable located in the trunk near the spare tire.
2. Open the hood and remove the oil fill cap.
3. Remove the engine cover (1).
4. Disconnect the Intake Air Temperature (IAT) Sensor (5) connector.
5. Using a screwdriver, loosen the clamps at the throttle body and the air filter assembly and remove the air tube (4).
6. Disconnect the hose (2) at the air filter assembly.
7. Using a 8mm socket/ratchet, remove the air filter assembly retaining bolt (3).
8. Remove the air filter assembly from the vehicle.

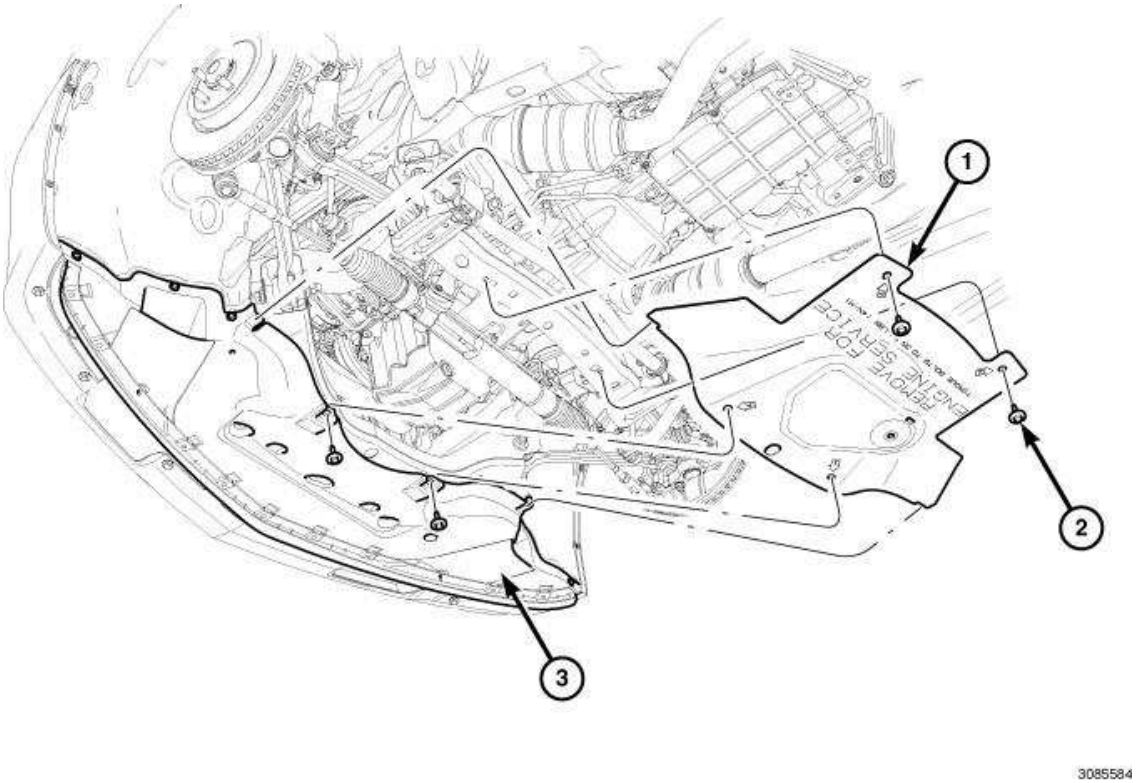

Fig. 109: Four Fasteners, Rear Belly Pan & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

9. Raise and support the vehicle.
10. Using a 17mm socket/ratchet, remove the four fasteners (1) that secure the rear belly pan (1) to the underside of the vehicle.
11. Pull the rear belly pan (1) rearward out of the from the front belly pan (3) to remove from the vehicle.

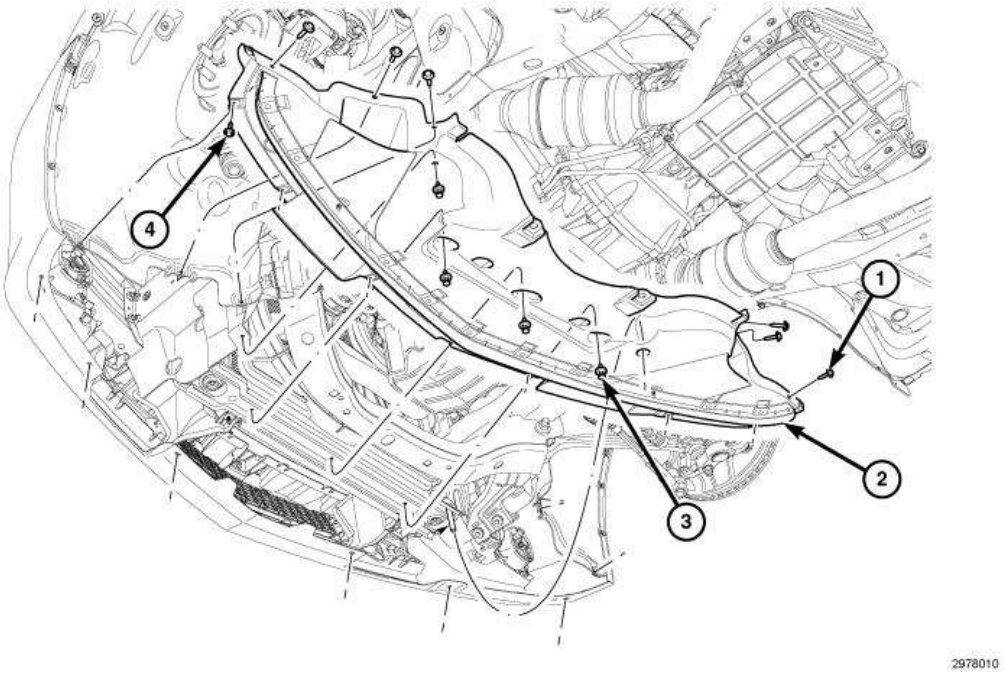

Fig. 110: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

12. Using a phillips screwdriver, remove the six screws (4) that secure the front belly pan (2) to the underside of the vehicle's front fascia.
13. Using a phillips screwdriver, remove the three screws (1) that secure the front belly pan (2) to the underside of the vehicle's wheelhouse/wheelwell splash shield. Repeat for the other side.
14. Using a small pick tool and trim pad pry tool, remove the four push pin fasteners (3) that secure the front belly pan (2) to the underside of the vehicle's lower crossmember. Repeat for the other side.
15. Remove the front belly pan (2) from the underside of the vehicle.

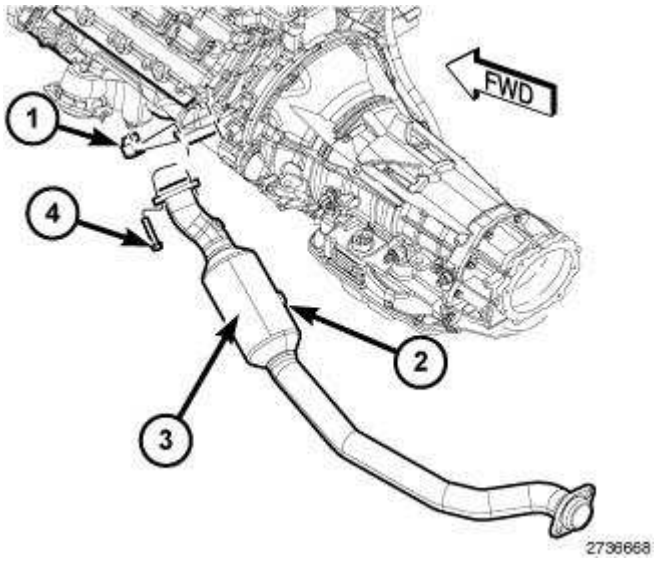

Fig. 111: Exhaust Pipe/Catalytic Converter Assembly, Bolts And Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to reposition the catalytic converter at the exhaust manifold to install this accessory. LET THE VEHICLE COOL DOWN COMPLETELY BEFORE INSTALLATION OF THIS PRODUCT.

16. If necessary, saturate the bolts (4) and nuts (1) with heat valve lubricant. Allow 5 minutes for penetration.
17. If necessary, remove the bolts (4) and flanged nuts (1) at the exhaust manifold using a 16mm socket/ratchet/wrench.
18. If necessary, reposition the front exhaust pipe/catalytic converter assembly (3) away from the exhaust manifold.

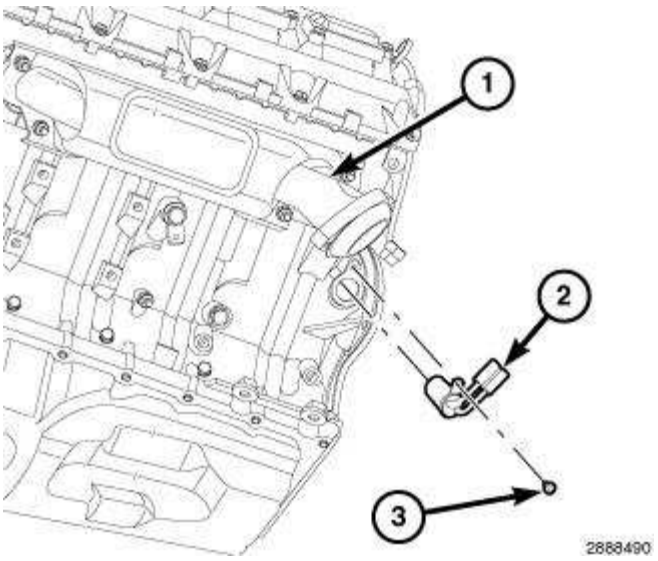

Fig. 112: PIA Bolt, Engine Block Heater Element & PIA Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: PIA Bolt (3) shown in illustration exploded for clarity.

19. Position and install the engine block heater element (2) and PIA bolt (3) into the opening under the rear of the exhaust manifold (1).
20. Using a 10mm socket/driver/ratchet, tighten the PIA bolt (3) to 9 N-m (80 in-lbs).

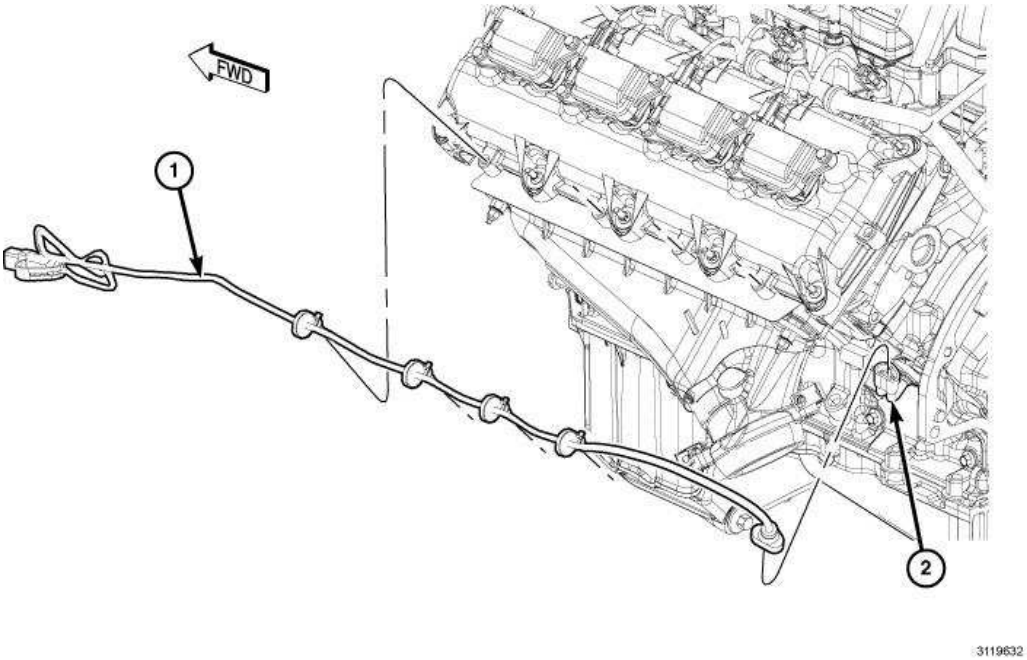

Fig. 113: Engine Block Heater Cord & Element
Courtesy of CHRYSLER GROUP, LLC

21. Plug in the engine block heater cord (1) into the element (2).
22. Lower the vehicle enough to access the top of the engine.
23. Begin routing the cord (1) upward and secure by engaging/installing the cord's retaining clips into the holes located in the valve cover.

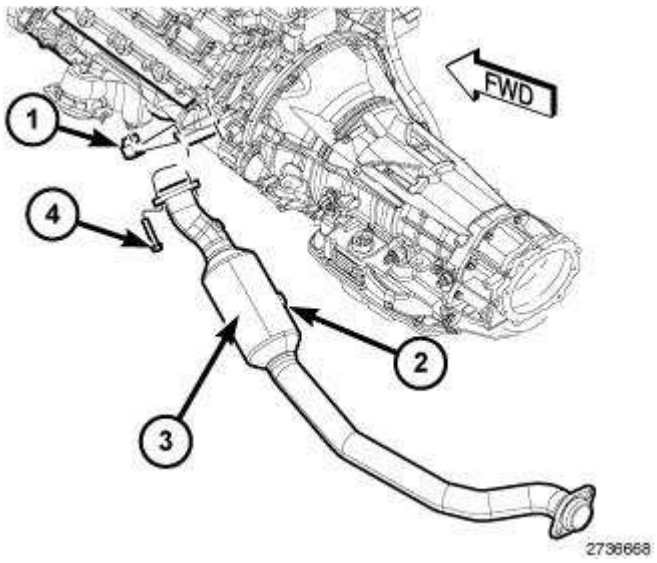

Fig. 114: Exhaust Pipe/Catalytic Converter Assembly, Bolts And Nuts
Courtesy of CHRYSLER GROUP, LLC

24. If necessary, raise the vehicle and position the front exhaust pipe/catalytic converter assembly (3) to the exhaust manifold.

25. Install the bolts (2) at the front exhaust pipe/catalytic converter assembly (4) to exhaust manifold flange.
26. Install the nuts (1) at the front exhaust pipe/catalytic converter assembly to muffler flange at the exhaust manifold using a 16mm socket/ratchet/wrench. Tighten to 47 N.m (35 ft. lbs.) torque.

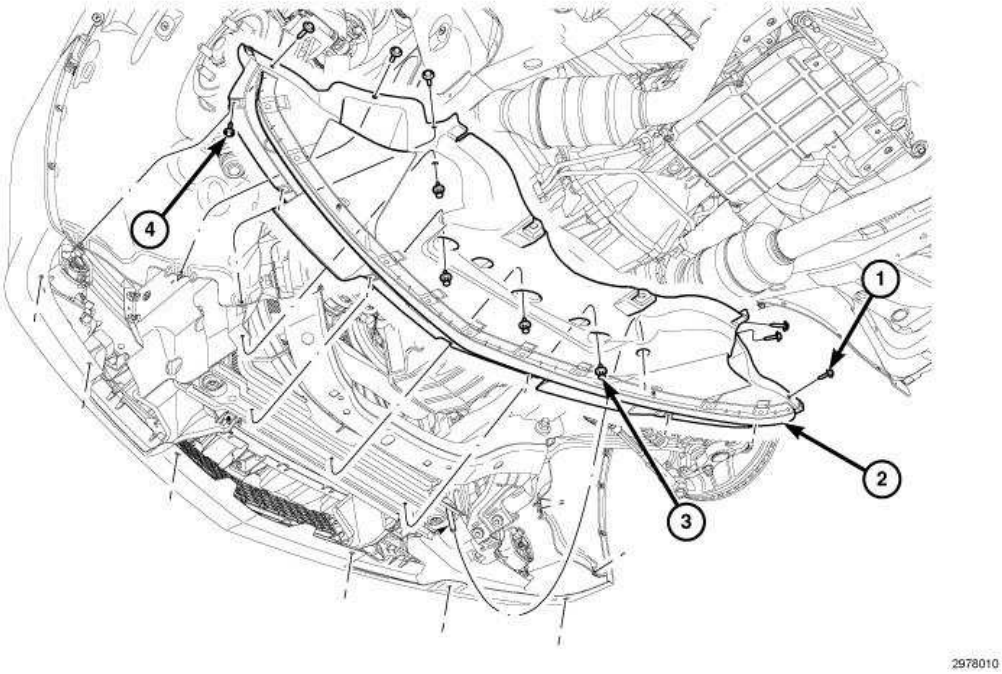

Fig. 115: Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

27. Position the front belly pan (2) to the underside of the vehicle.
28. Install the four push pin fasteners (3) that secure the front belly pan (2) to the underside of the vehicle's lower crossmember.
29. Using a phillips screwdriver, install the six screws (4) that secure the front belly pan (2) to the underside of the vehicle's front fascia.
30. Using a phillips screwdriver, install the three screws (1) that secure the front belly pan (2) to the underside of the vehicle's wheelhouse/wheelwell splash shield. Tighten the screws securely. Repeat for the other side.

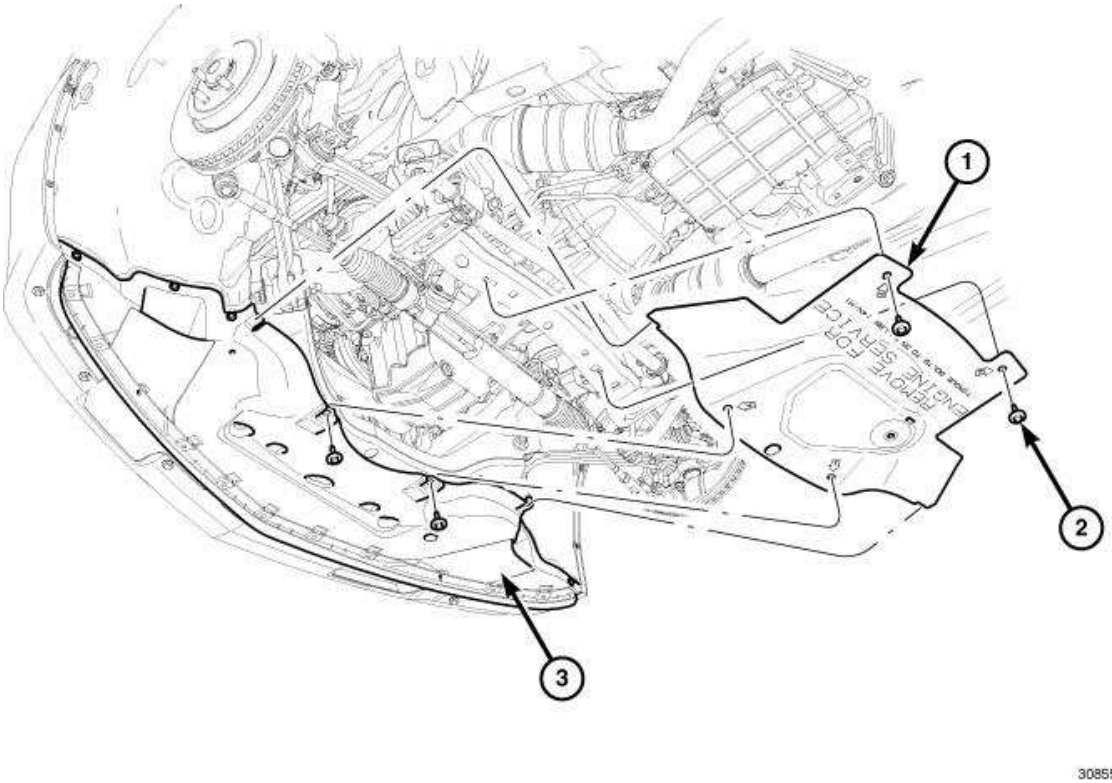

Fig. 116: Four Fasteners, Rear Belly Pan & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: During installation, ensure rear belly pan is shingled underneath front belly pan. Failure to do so may result in damage to belly pan.

31. Position the rear belly pan (1) to the underside of the vehicle and to the front fascia (3).
32. Using a 17mm socket/ratchet, install the fasteners (2) that secure the rear belly pan (1) to the underside of the vehicle. Tighten the fasteners securely.
33. Lower the vehicle.

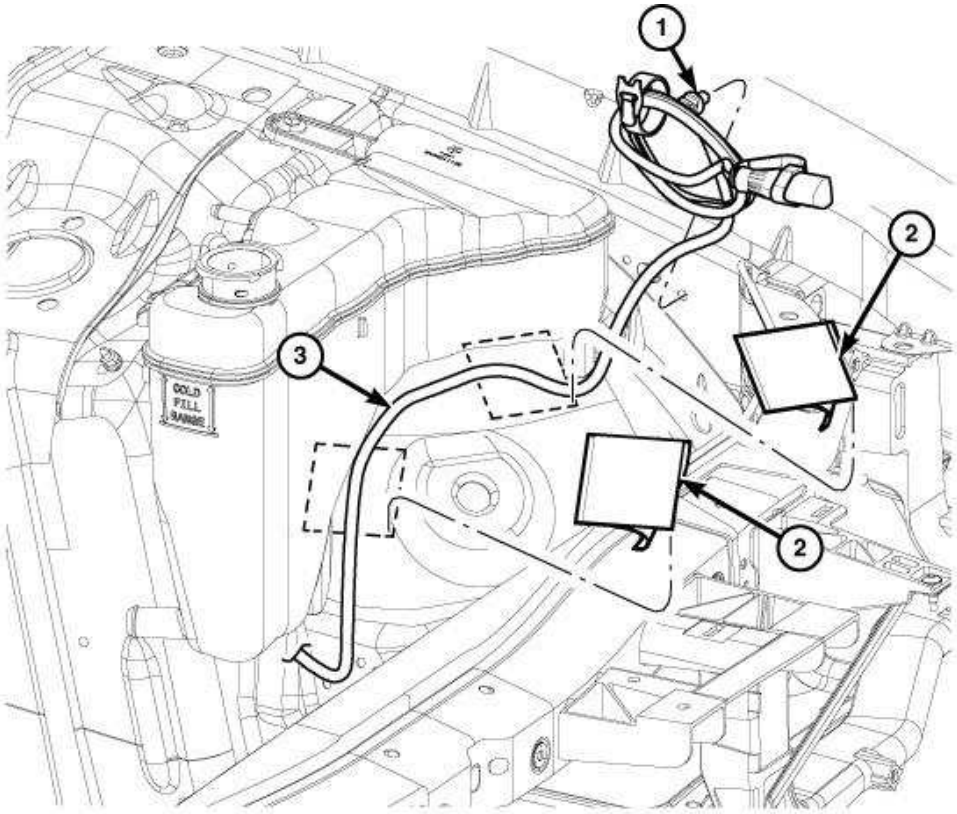

Fig. 117: Cord, Retainer & Tape Patches
Courtesy of CHRYSLER GROUP, LLC

34. Route the cord (3) under the coolant recovery bottle towards to the front of the driver side inner fender.
35. Install the retainer (1) into the hole on the inner front fender.
36. Using the kit supplied tape patches (2), remove the adhesive backing and secure the cord (3) to the fender panel.

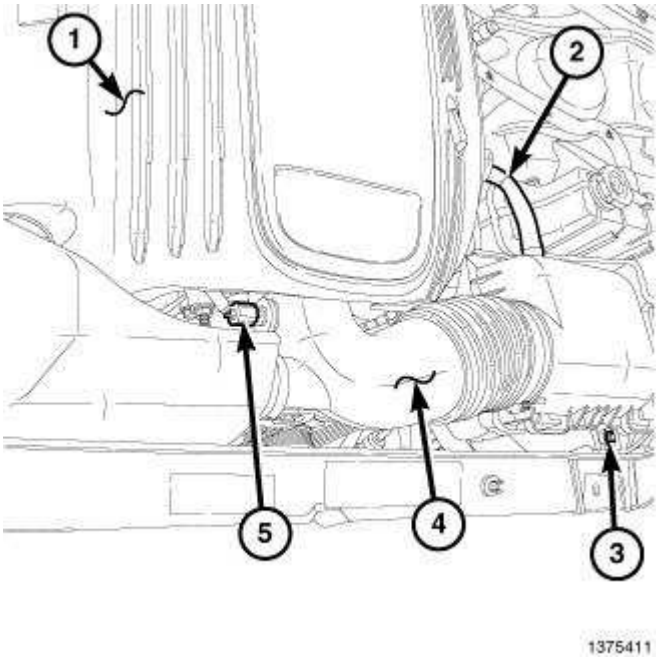

Fig. 118: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

37. Secure the engine block heater cord (1) to an existing vehicle harness with the kit supplied tie straps.
38. Position the air filter assembly into the engine compartment.
39. Using a 8mm socket/ratchet, install the air filter assembly retaining bolt (3) and tighten securely.
40. Connect the clean air tube to the throttle body and the air filter assembly and tighten clamps.
41. Connect the hose (2) to the air filter assembly.
42. Connect the Intake Air Temperature (IAT) Sensor (5) connector.
43. Install the engine cover (1) by aligning the cover's retaining grommets with the ball studs located on the top of the engine. Once aligned, push down to engage/install.
44. Install the oil fill cap and close the hood.
45. Connect the negative battery cable located in the trunk near the spare tire.

ACCESSORIES AND EQUIPMENT

Navigation - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

The navigation system offers several new customer features for expanded usability and convenience with hands-free voice-activated operation in addition to the touch screen buttons. The navigation system uses the Bluetooth microphone in the rear view mirror. Navigation routes can be based on a variety of formats including some of the following:

- Destination entry by street intersection, city, zip code, street name, street address and number, state/province/country and phone number
- Stop/change route
- Save current position
- Personal menu, including Guide Me Home (Go Home), Trip Itinerary, List of Saved Locations, Favorite Points of Interest (from a data base), Manage Personal User and Choose User
- Personal Interests including recent routes, address book, Where Am I Now, Emergency (police stations, Dodge dealerships, fire stations, hospitals and emergency care centers), Trail and geo- coordinates
- Route options include shortest, quickest, maximize freeways, minimize freeways, avoid toll roads and avoid ferries
- Navigation can be put into DEMO mode to enhance trip planning

This navigation system will support Traffic Messaging. Traffic Messaging displays voice and pop up warning messages for medium and high priority situations on the route such as road closures due to accidents/hazardous situations and it can even generate a traffic detour for a traffic event located on the route.

OPERATION

OPERATION

The navigation system collects data from GPS satellites in orbit around the Earth. This information is sent to the radio to be processed and provides the user with present location and is used to provide the route planing and guidance as the vehicle is driven.

ANTENNA, NAVIGATION

DESCRIPTION

DESCRIPTION

The navigation antenna has been integrated into the satellite antenna on the roof of the vehicle. Refer to **ANTENNA, SATELLITE, AUDIO, DESCRIPTION** .

ACCESSORIES AND EQUIPMENT

Park Assist Module (PAM) - Electrical Diagnostics - Chrysler 300

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B128E-11	PTS SENSOR 1 - CIRCUIT SHORT TO GROUND
B128E-12	PTS SENSOR 1 - CIRCUIT SHORT TO BATTERY
B128E-25	PTS SENSOR 1 - SIGNAL SHAPE / WAVEFORM FAILURE
B128E-92	PTS SENSOR 1 - PERFORMANCE OR INCORRECT OPERATION
B128F-11	PTS SENSOR 2 - CIRCUIT SHORT TO GROUND
B128F-12	PTS SENSOR 2 - CIRCUIT SHORT TO BATTERY
B128F-25	PTS SENSOR 2- SIGNAL SHAPE / WAVEFORM FAILURE
B128F-92	PTS SENSOR 2 - PERFORMANCE OR INCORRECT OPERATION
B1290-11	PTS SENSOR 3 - CIRCUIT SHORT TO GROUND
B1290-12	PTS SENSOR 3 - CIRCUIT SHORT TO BATTERY
B1290-25	PTS SENSOR 3 - SIGNAL SHAPE / WAVEFORM FAILURE
B1290-92	PTS SENSOR 3 - PERFORMANCE OR INCORRECT OPERATION
B1291-11	PTS SENSOR 4- CIRCUIT SHORT TO GROUND
B1291-12	PTS SENSOR 4 - CIRCUIT SHORT TO BATTERY
B1291-25	PTS SENSOR 4 - SIGNAL SHAPE / WAVEFORM FAILURE
B1291-92	PTS SENSOR 4 - PERFORMANCE OR INCORRECT OPERATION
B1292-11	PTS SENSOR 5 - CIRCUIT SHORT TO GROUND
B1292-12	PTS SENSOR 5 - CIRCUIT SHORT TO BATTERY
B1292-25	PTS SENSOR 5 - SIGNAL SHAPE / WAVEFORM FAILURE
B1292-92	PTS SENSOR 5 - PERFORMANCE OR INCORRECT OPERATION
B1293-11	PTS SENSOR 6 - CIRCUIT SHORT TO GROUND
B1293-12	PTS SENSOR 6 - CIRCUIT SHORT TO BATTERY
B1293-25	PTS SENSOR 6 - SIGNAL SHAPE / WAVEFORM FAILURE
B1293-92	PTS SENSOR 6 - PERFORMANCE OR INCORRECT OPERATION
B1295-11	PTS SENSOR 8 - CIRCUIT SHORT TO GROUND
B1295-12	PTS SENSOR 8 - CIRCUIT SHORT TO BATTERY
B1295-25	PTS SENSOR 8 - SIGNAL SHAPE / WAVEFORM FAILURE
B1295-92	PTS SENSOR 8 - PERFORMANCE OR INCORRECT OPERATION
B1296-11	PTS SENSOR 9 - CIRCUIT SHORT TO GROUND
B1296-12	PTS SENSOR 9 - CIRCUIT SHORT TO BATTERY
B1296-25	PTS SENSOR 9 - SIGNAL SHAPE / WAVEFORM FAILURE
B1296-92	PTS SENSOR 9 - PERFORMANCE OR INCORRECT OPERATION
B1297-11	PTS SENSOR 10 - CIRCUIT SHORT TO GROUND

B1297-12	PTS SENSOR 10 - CIRCUIT SHORT TO BATTERY
B1297-25	PTS SENSOR 10 - SIGNAL SHAPE / WAVEFORM FAILURE
B1297-92	PTS SENSOR 10 - PERFORMANCE OR INCORRECT OPERATION
B1298-11	PTS SENSOR 11 - CIRCUIT SHORT TO GROUND
B1298-12	PTS SENSOR 11 - CIRCUIT SHORT TO BATTERY
B1298-25	PTS SENSOR 11 - SIGNAL SHAPE / WAVEFORM FAILURE
B1298-92	PTS SENSOR 11 - PERFORMANCE OR INCORRECT OPERATION
B210C-16	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B2128-16	SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2128-17	SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B21DD-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B222A-00	VEHICLE LINE MISMATCH
B2232-00	(PTS) PARKTRONICS INTERNAL
U0001-00	CAN C BUS
U0100-00	LOST COMMUNICATION WITH PCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0418-00	IMPLAUSIBLE DATA RECEIVED FROM BRAKE SYSTEM CONTROL MODULE
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

DIAGNOSIS AND TESTING

B128E-11-PTS SENSOR 1 - CIRCUIT SHORT TO GROUND

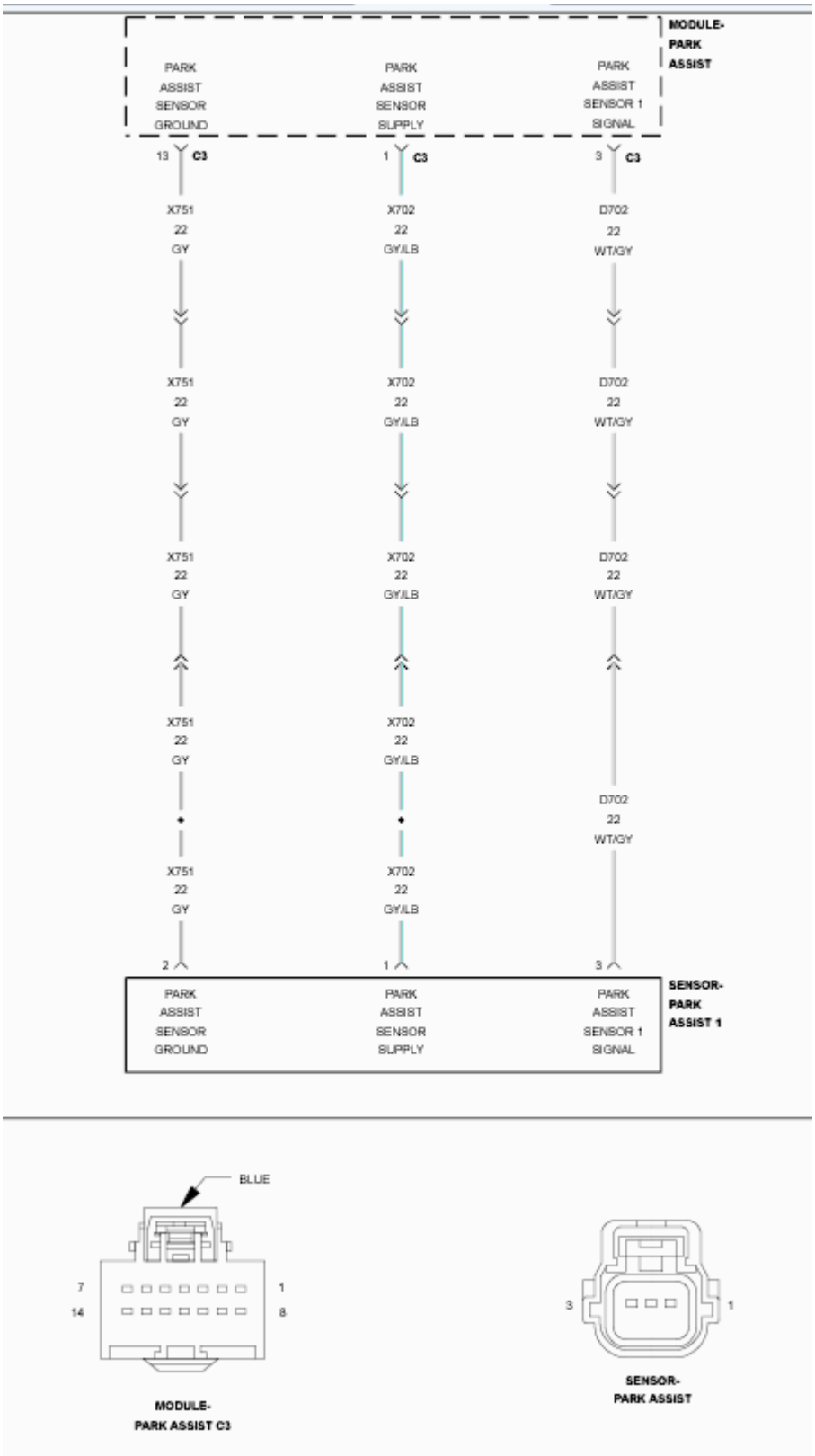

Fig. 1: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR AN OPEN
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

   1. Turn the ignition on.

2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

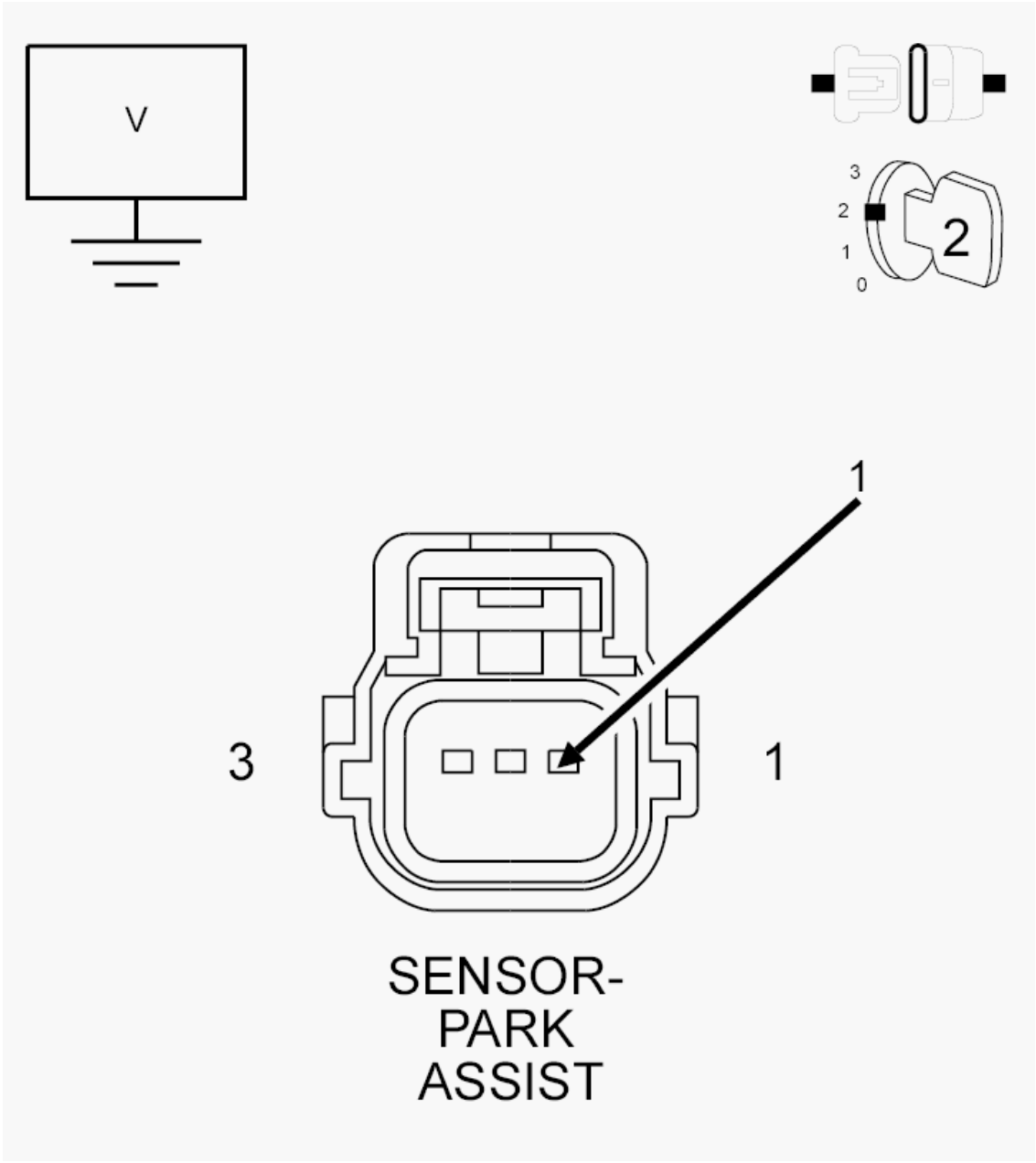

Fig. 2: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X702) Front Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

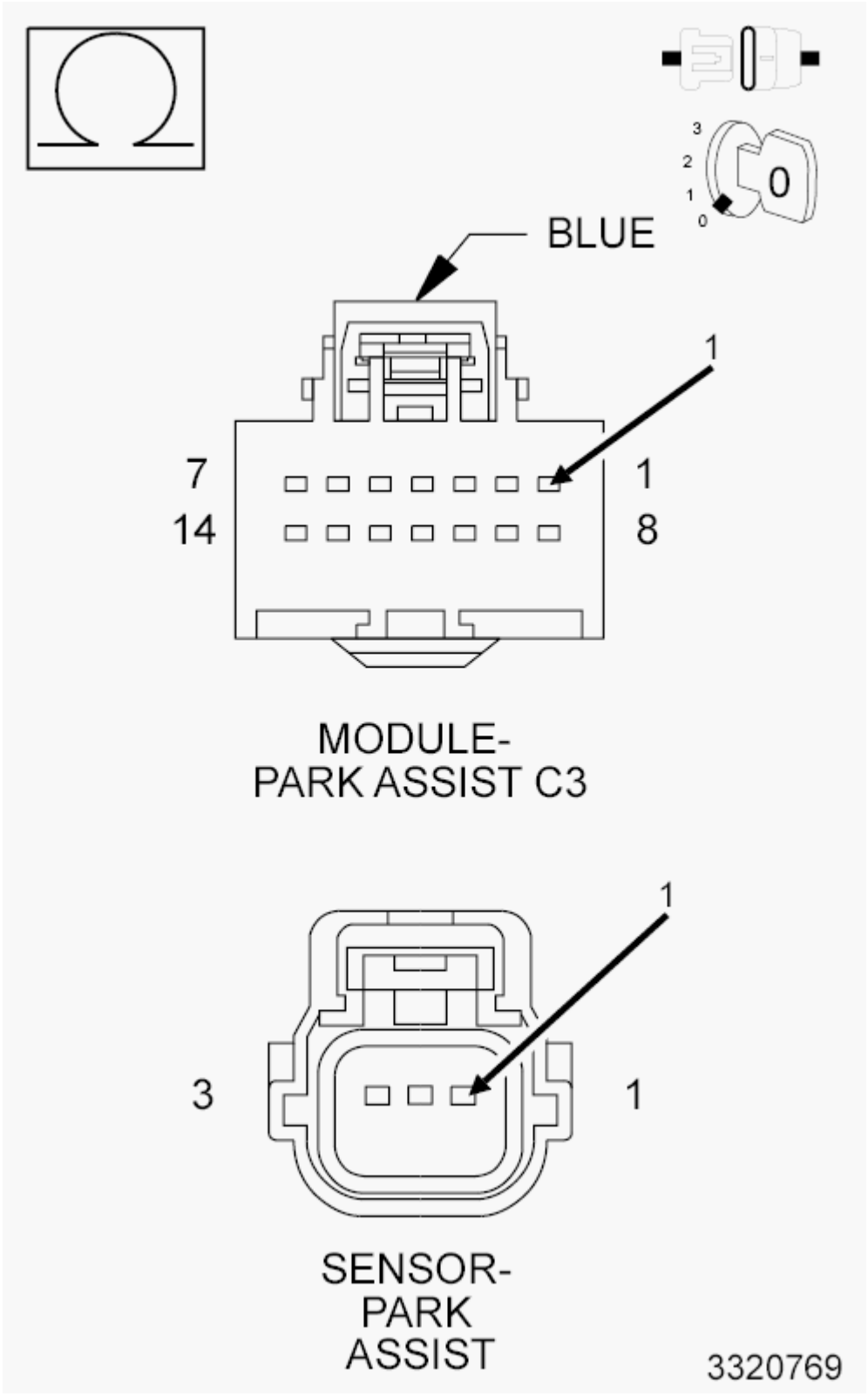

Fig. 3: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance of the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

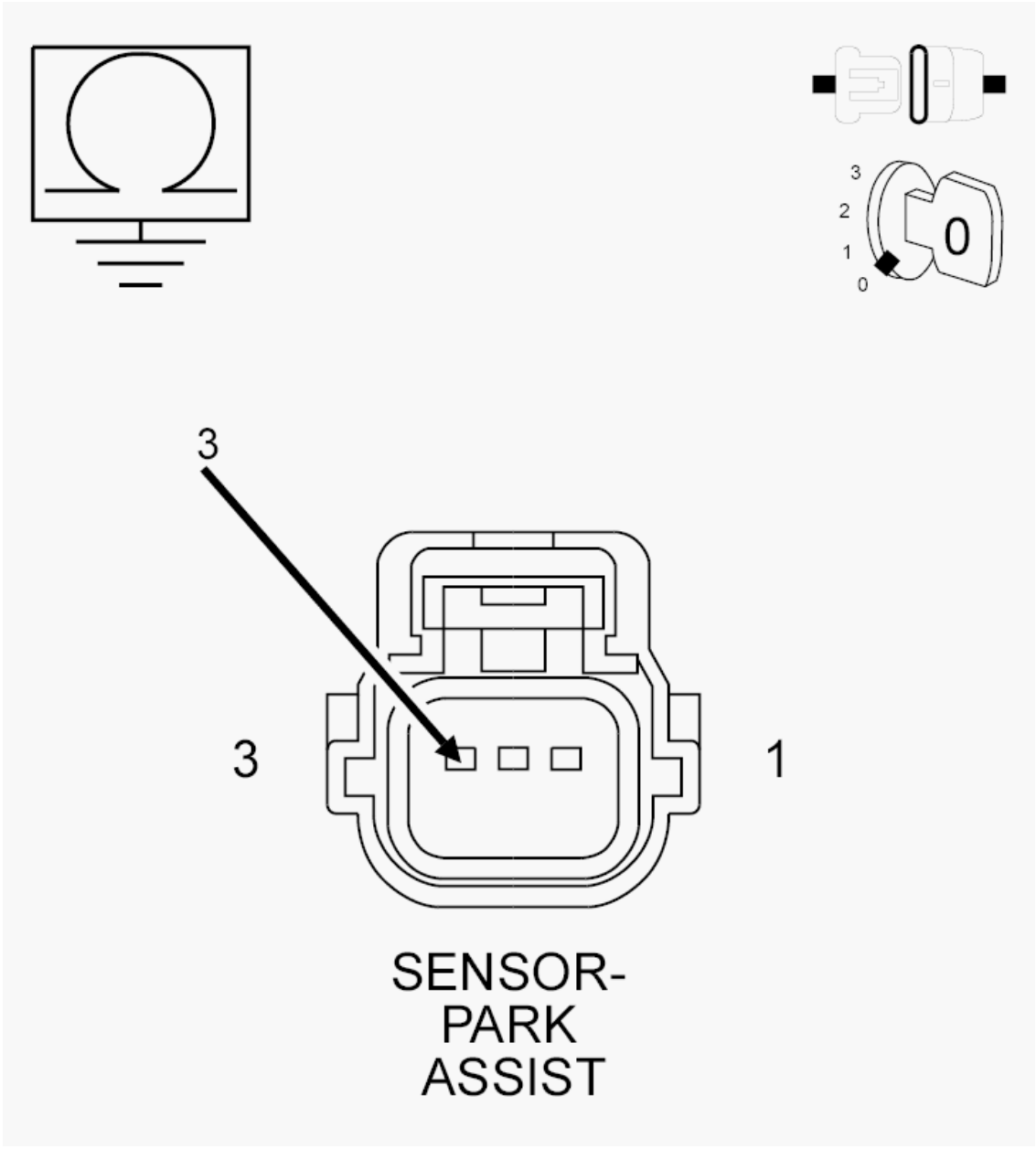

Fig. 4: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module harness connected.

1. Measure the resistance between ground and the (D702) Park Assist Sensor Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Go To 5.

No

- Go To 7.

5. **CHECK THE (D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**

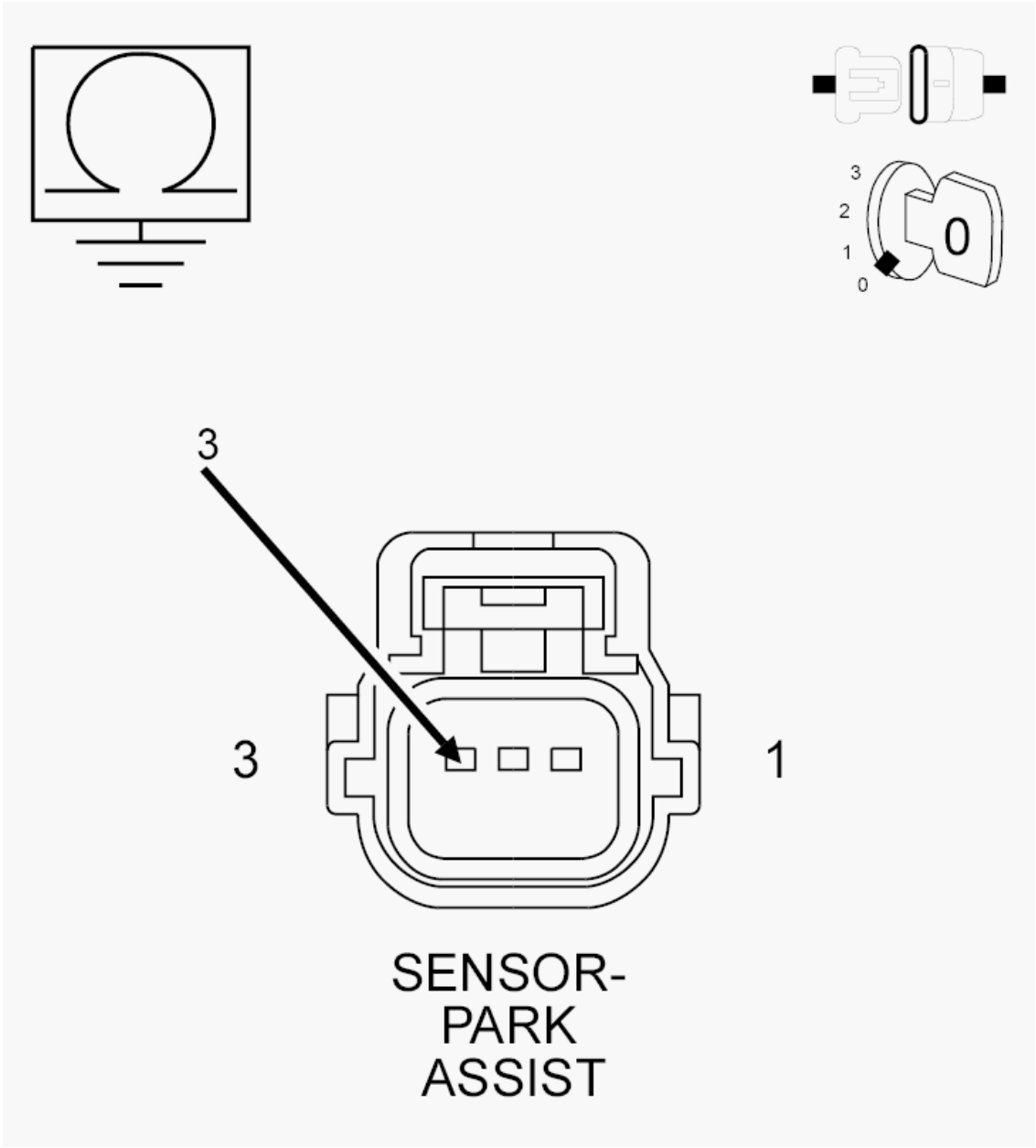

Fig. 5: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (D702) Park Assist Sensor Signal circuit.

Is the resistance below 10K Ohms?

Yes

- Repair the short to ground in the (D702) Park Assist Sensor Signal circuit.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Go To 6.

6. **CHECK THE (D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT**

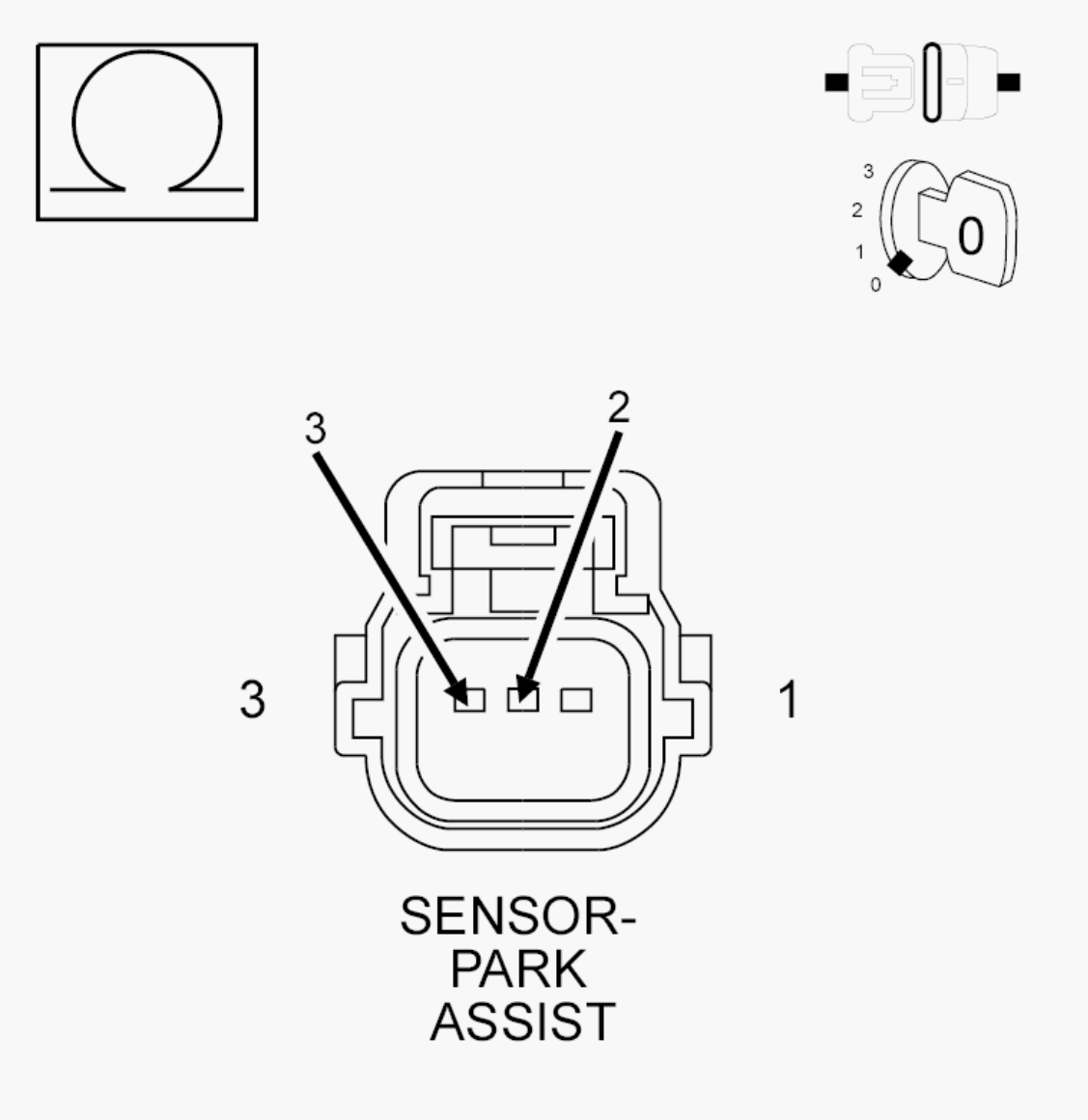

Fig. 6: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist

Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D702) Park Assist Sensor Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D702) Park Assist Sensor Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR AN OPEN**

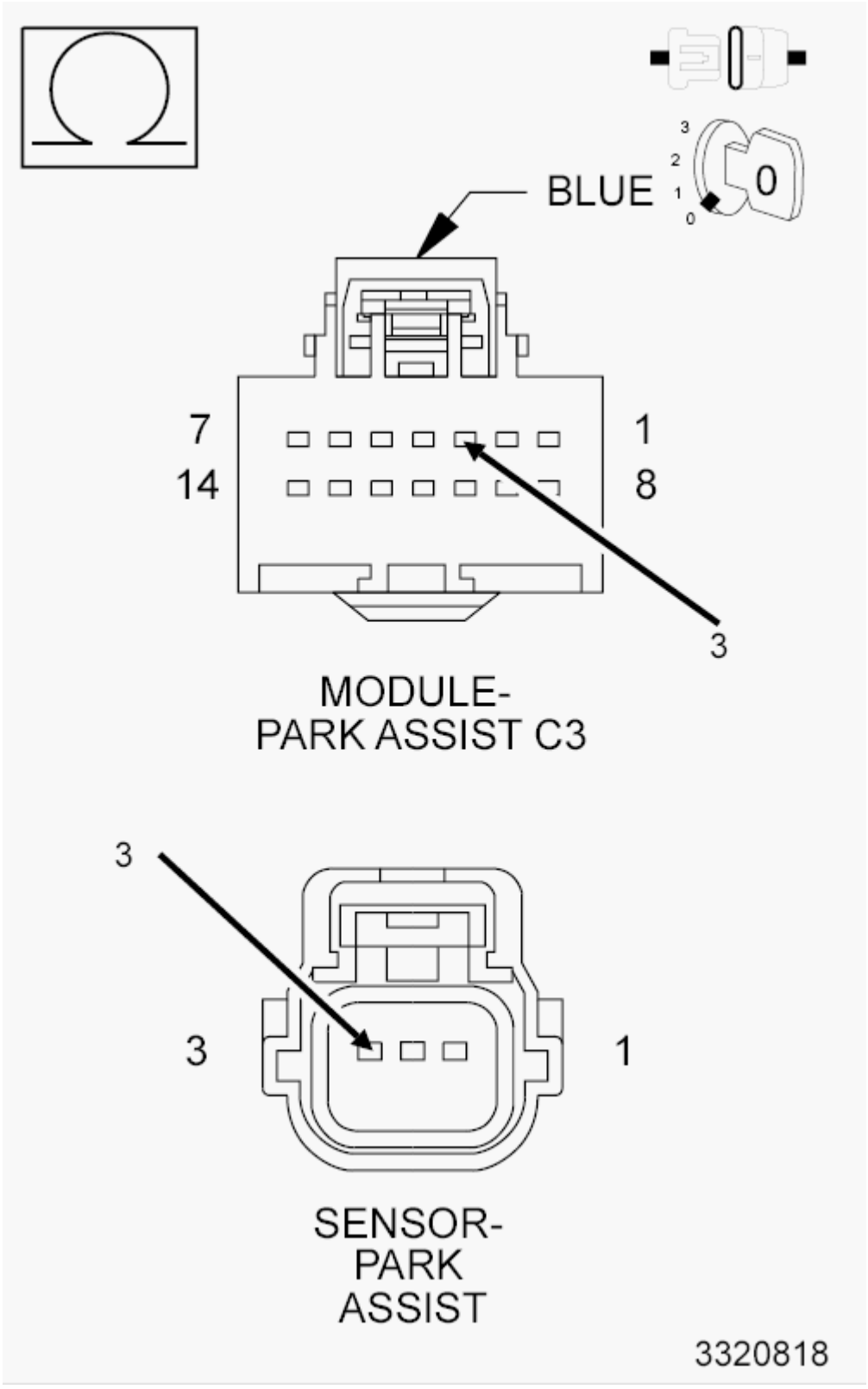

Fig. 7: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (D702) Park Assist Sensor Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D702) Park Assist Sensor Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

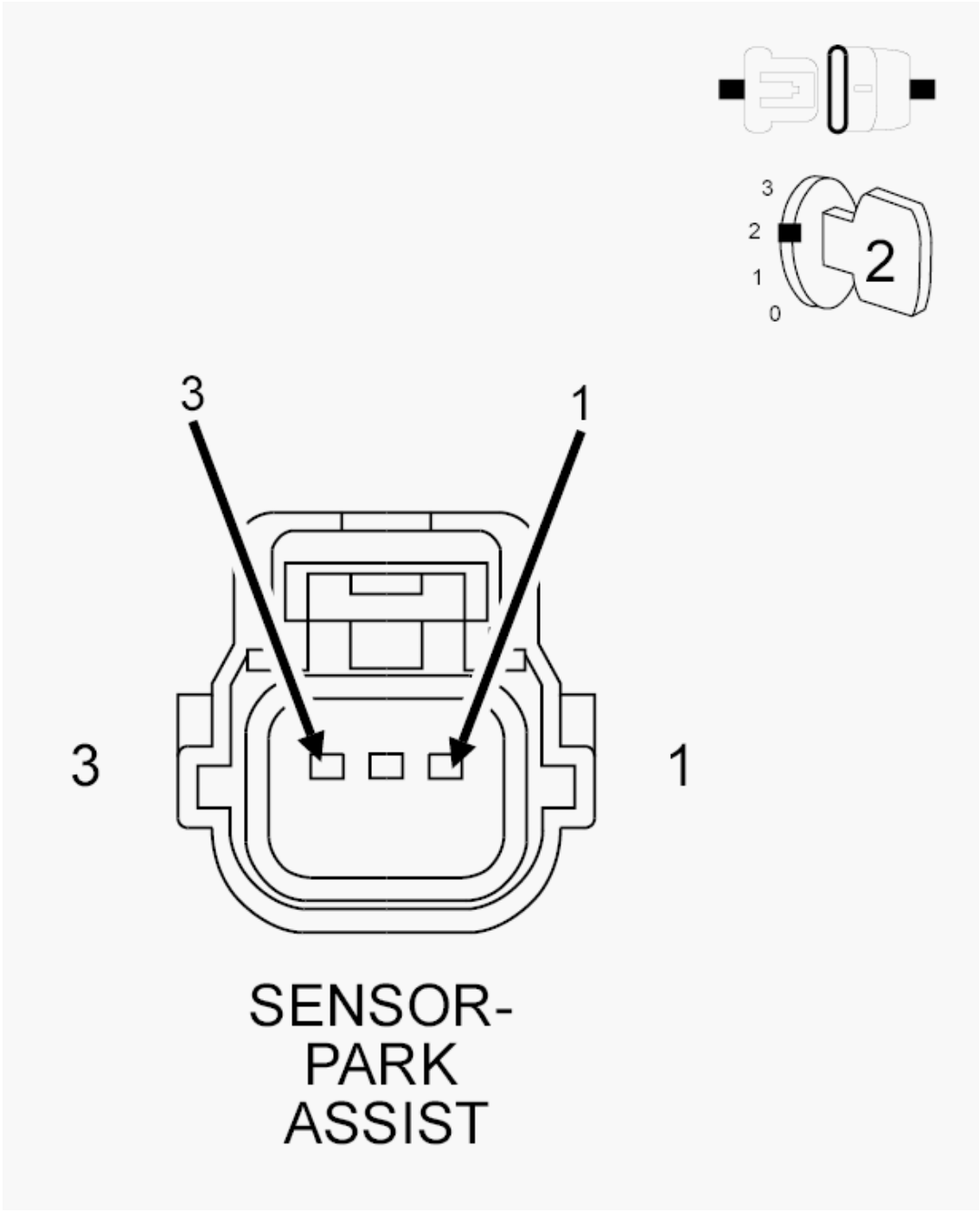

Fig. 8: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C3 harness connector.
3. Connect a jumper wire across the (X702) Front Park Assist Sensor Supply and (D702) Park Assist Sensor Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B128E-12-PTS SENSOR 1 - CIRCUIT SHORT TO BATTERY as active?

   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B128E-12-PTS SENSOR 1 - CIRCUIT SHORT TO BATTERY

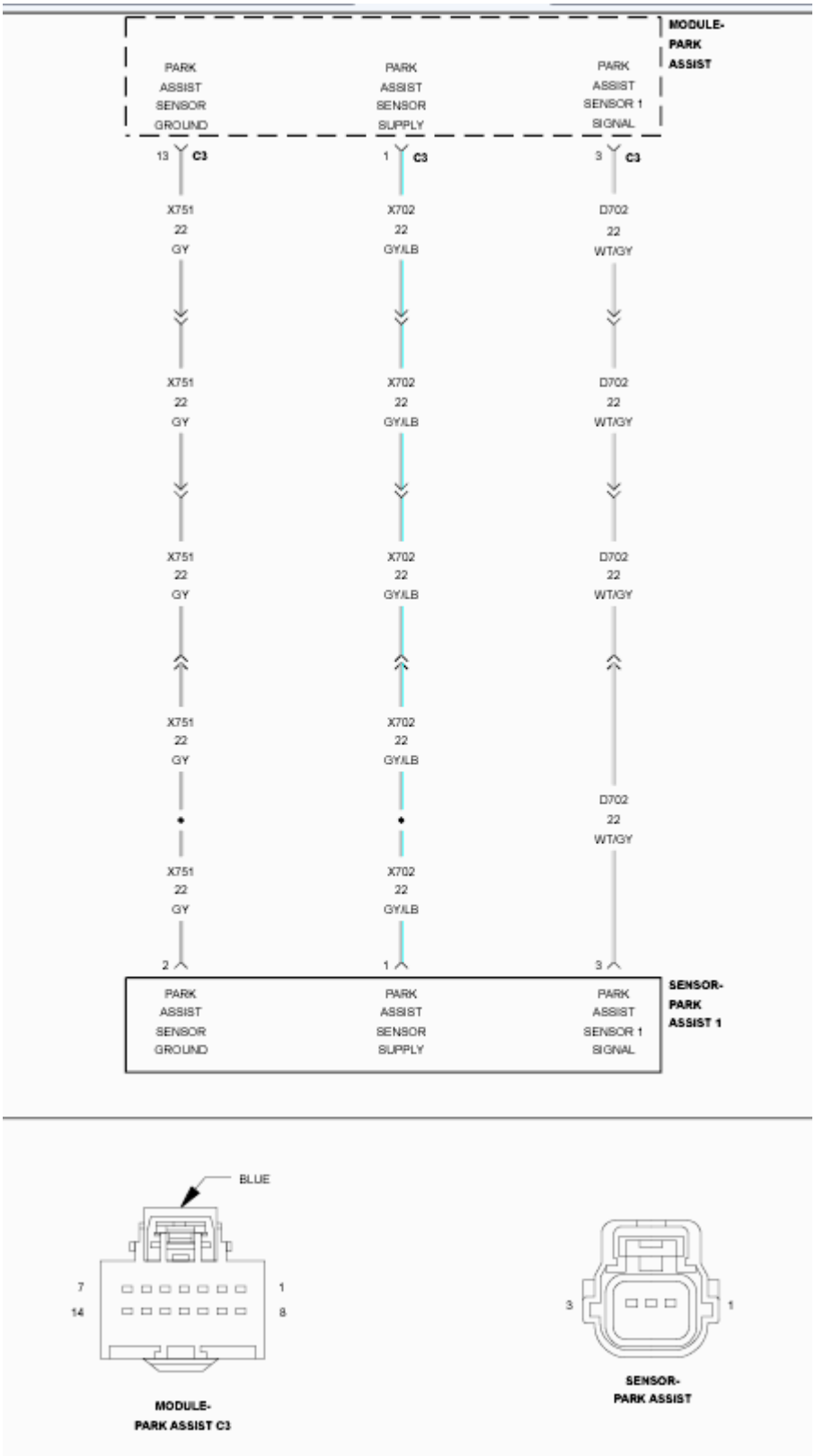

Fig. 9: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

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NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT
(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

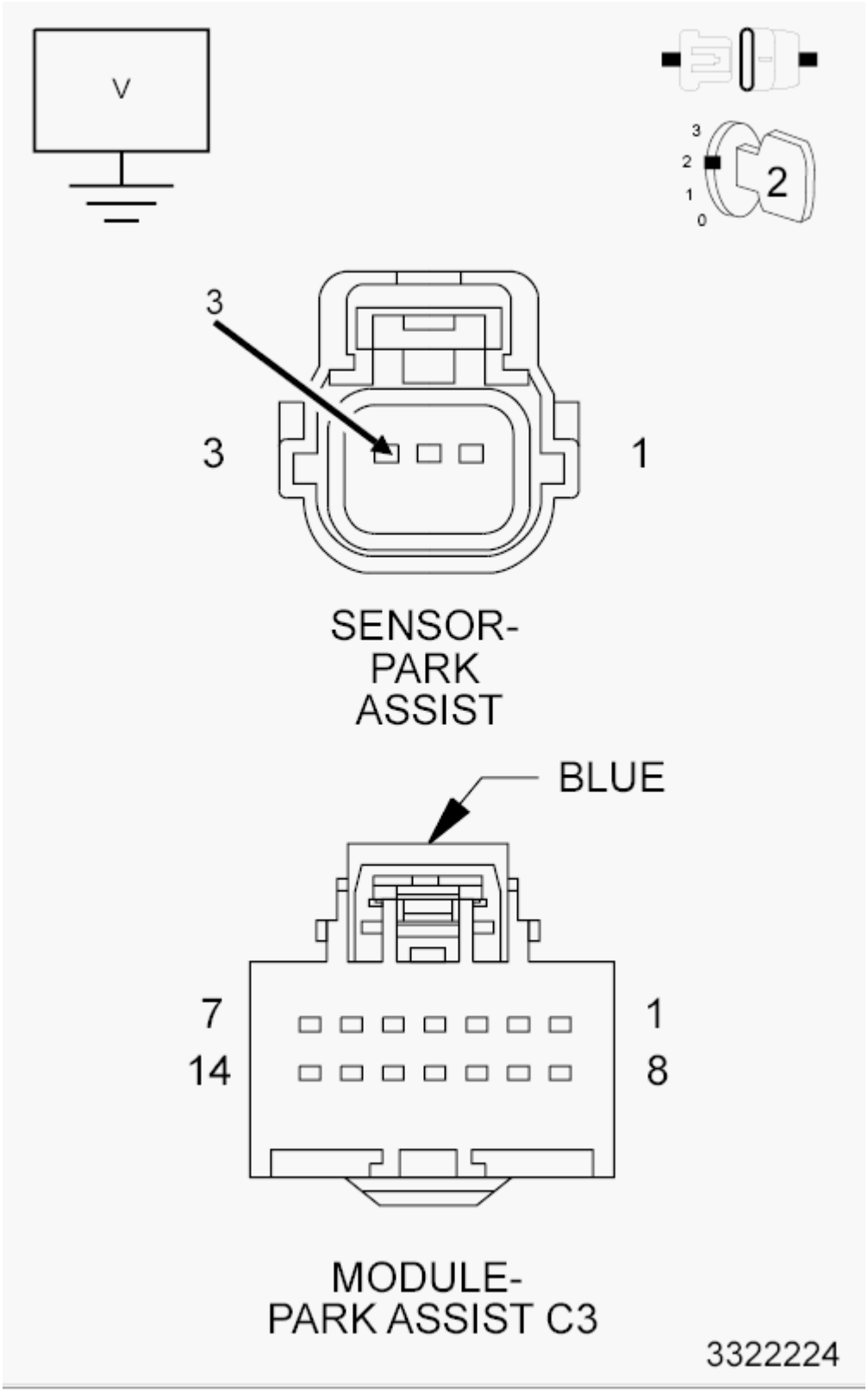


Fig. 10: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D702) Park Assist Sensor Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Repair the (D702) Park Assist Sensor Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

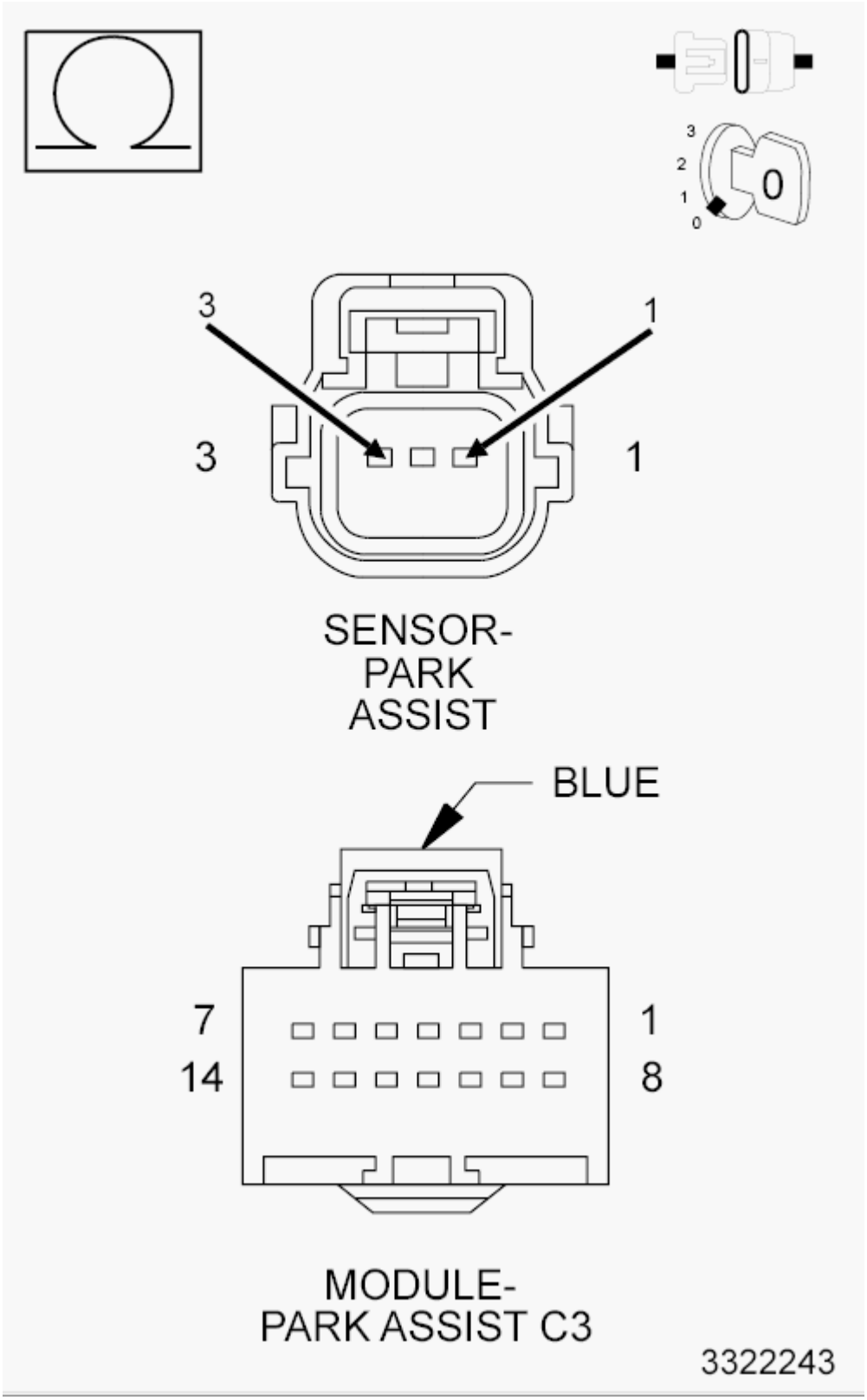


Fig. 11: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D702) Park Assist Sensor Signal circuit and the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D702) Park Assist Sensor Signal circuit for a short to the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

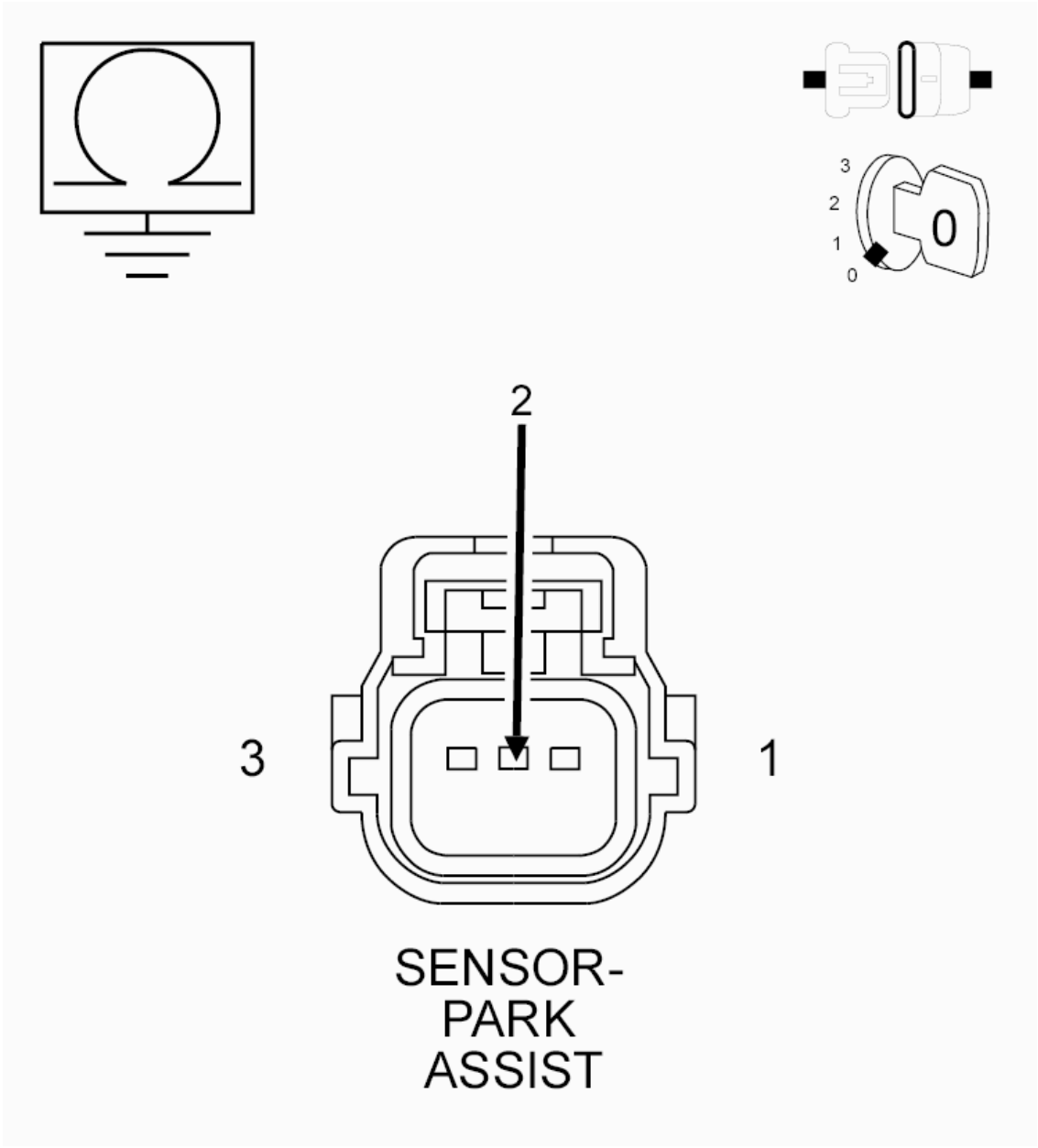


Fig. 12: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

   Yes

   - Go To 5.

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**

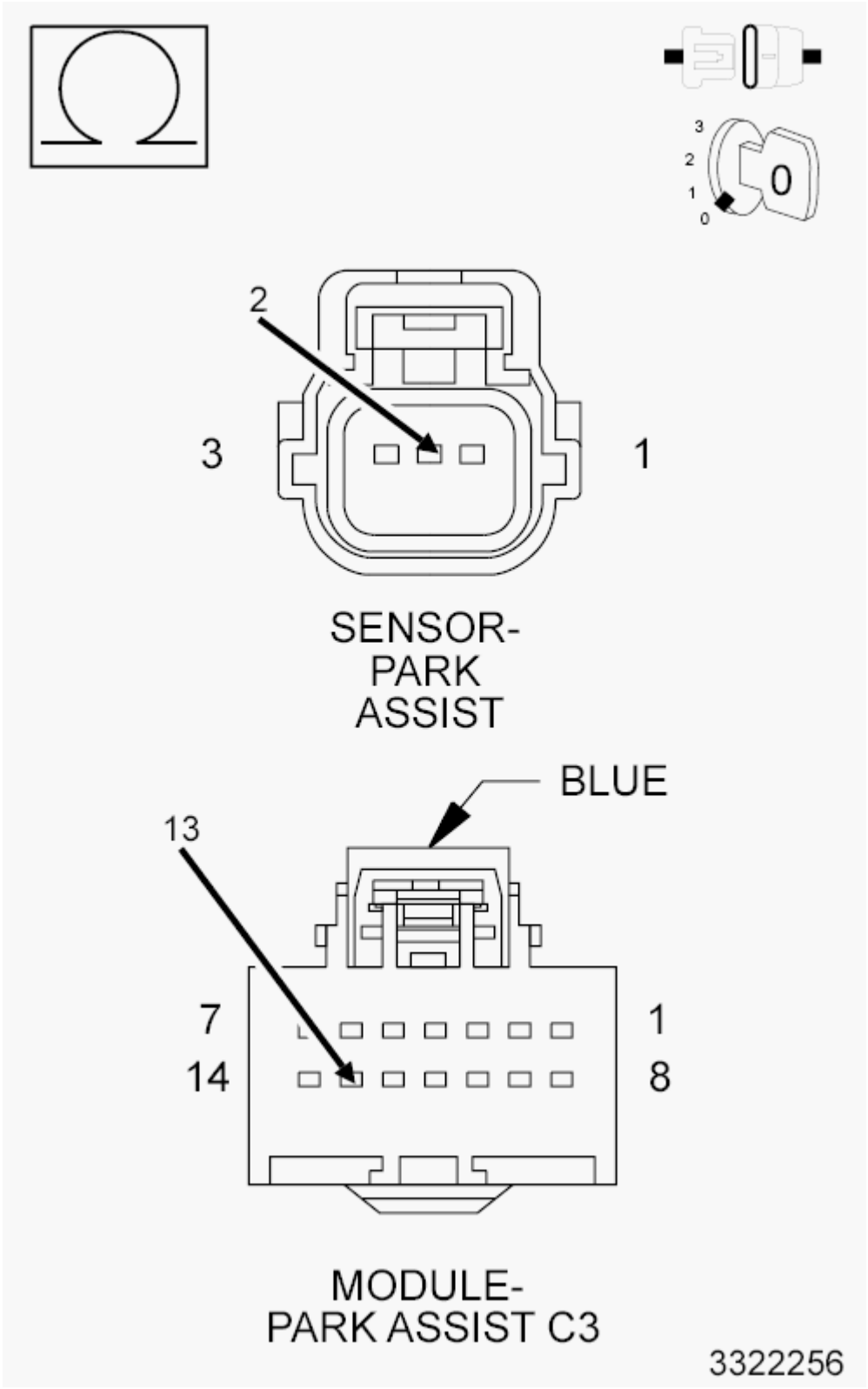


Fig. 13: Checking Front Park Assist Sensor Ground Circuit For An Open Between Park Assist Module & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B128E-25-PTS SENSOR 1 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

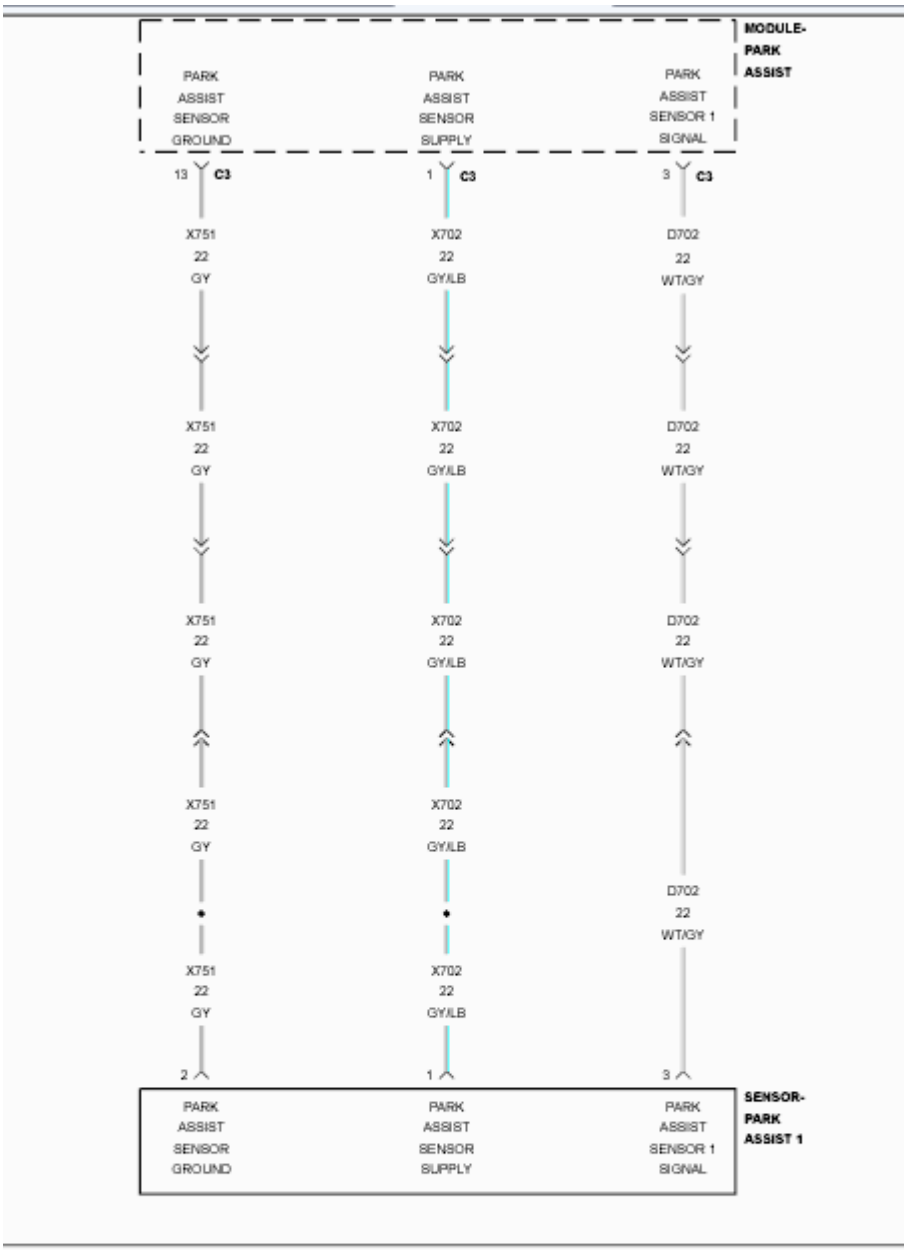
2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

      - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B128E-92-PTS SENSOR 1 - PERFORMANCE OR INCORRECT OPERATION



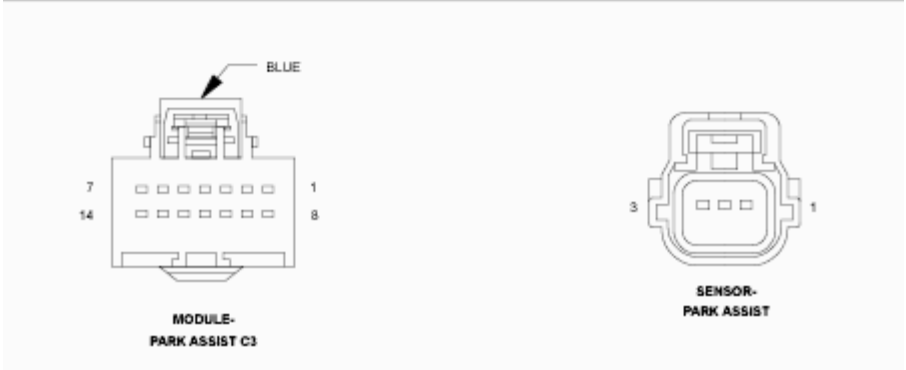


Fig. 14: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE PARK ASSIST SENSOR FOR AN INTERNAL SHORT**
    1. Disconnect the Park Assist Sensor harness connector.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

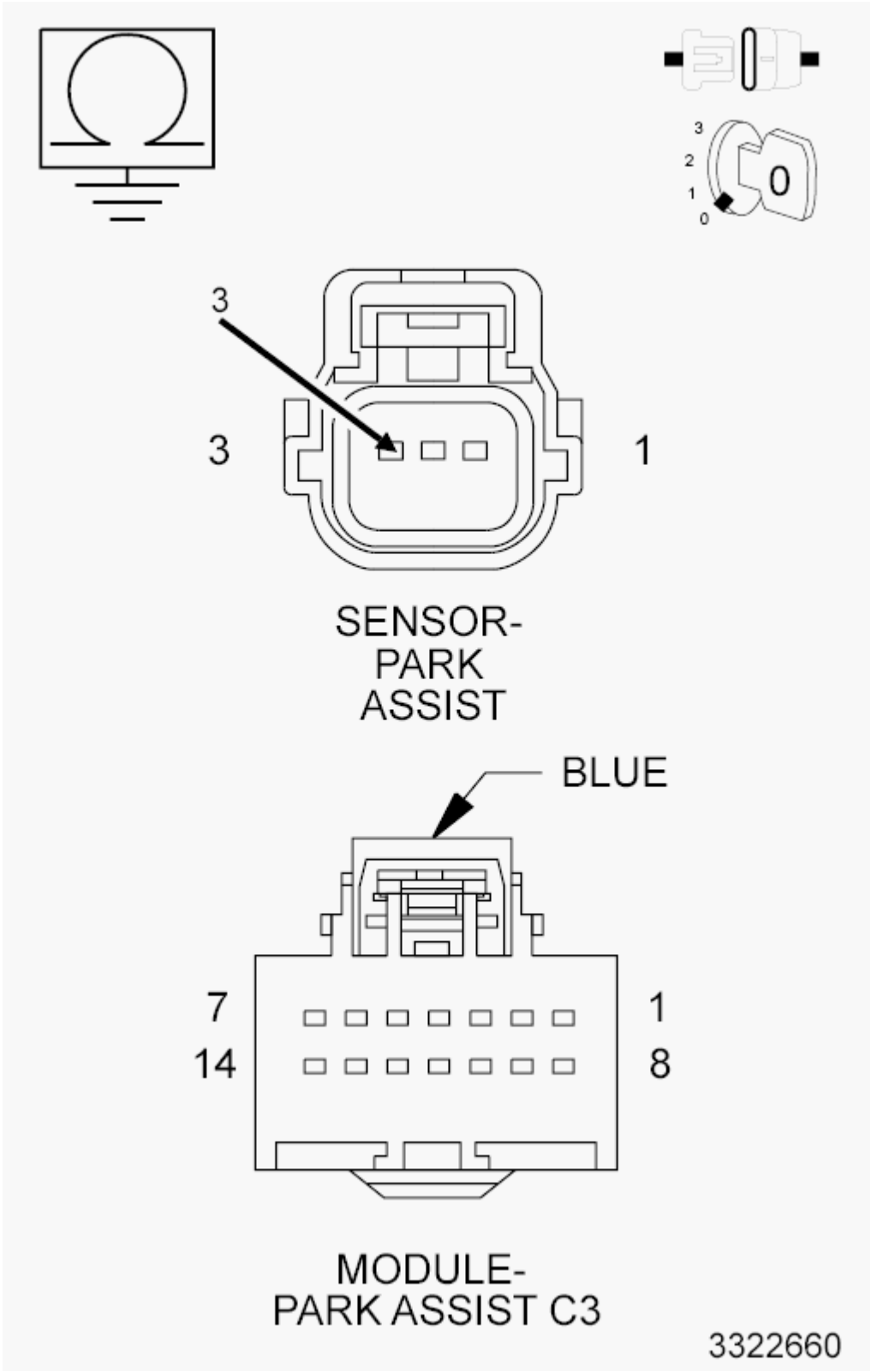


Fig. 15: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance between ground and the (D702) Park Assist Sensor Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D702) Park Assist Sensor Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

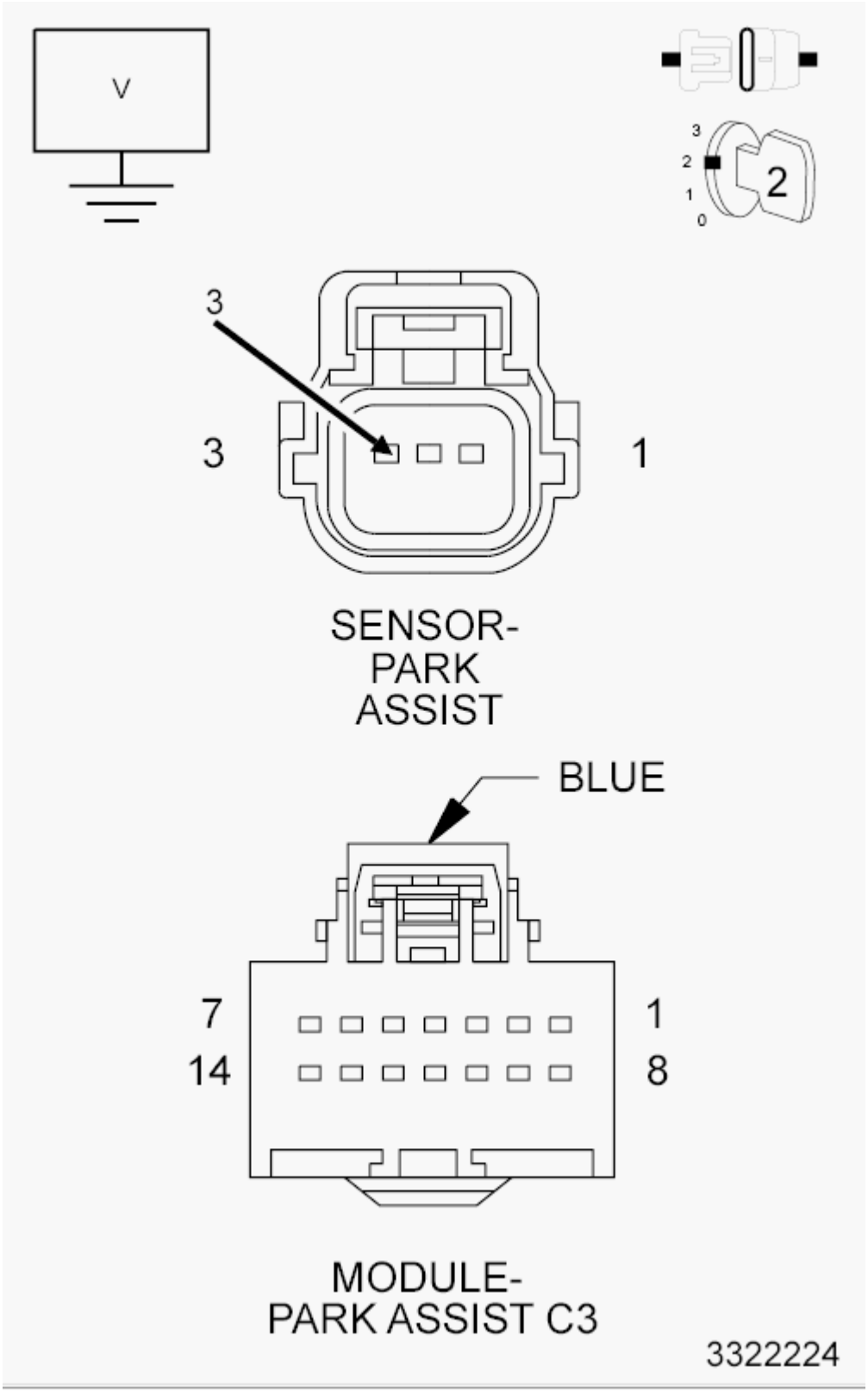


Fig. 16: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Measure the voltage of the (D702) Park Assist Sensor Signal circuit.

   Is voltage present?

   Yes

   - Repair the (D702) Park Assist Sensor Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D702) PARK ASSIST SENSOR 1 SIGNAL CIRCUIT FOR AN OPEN**

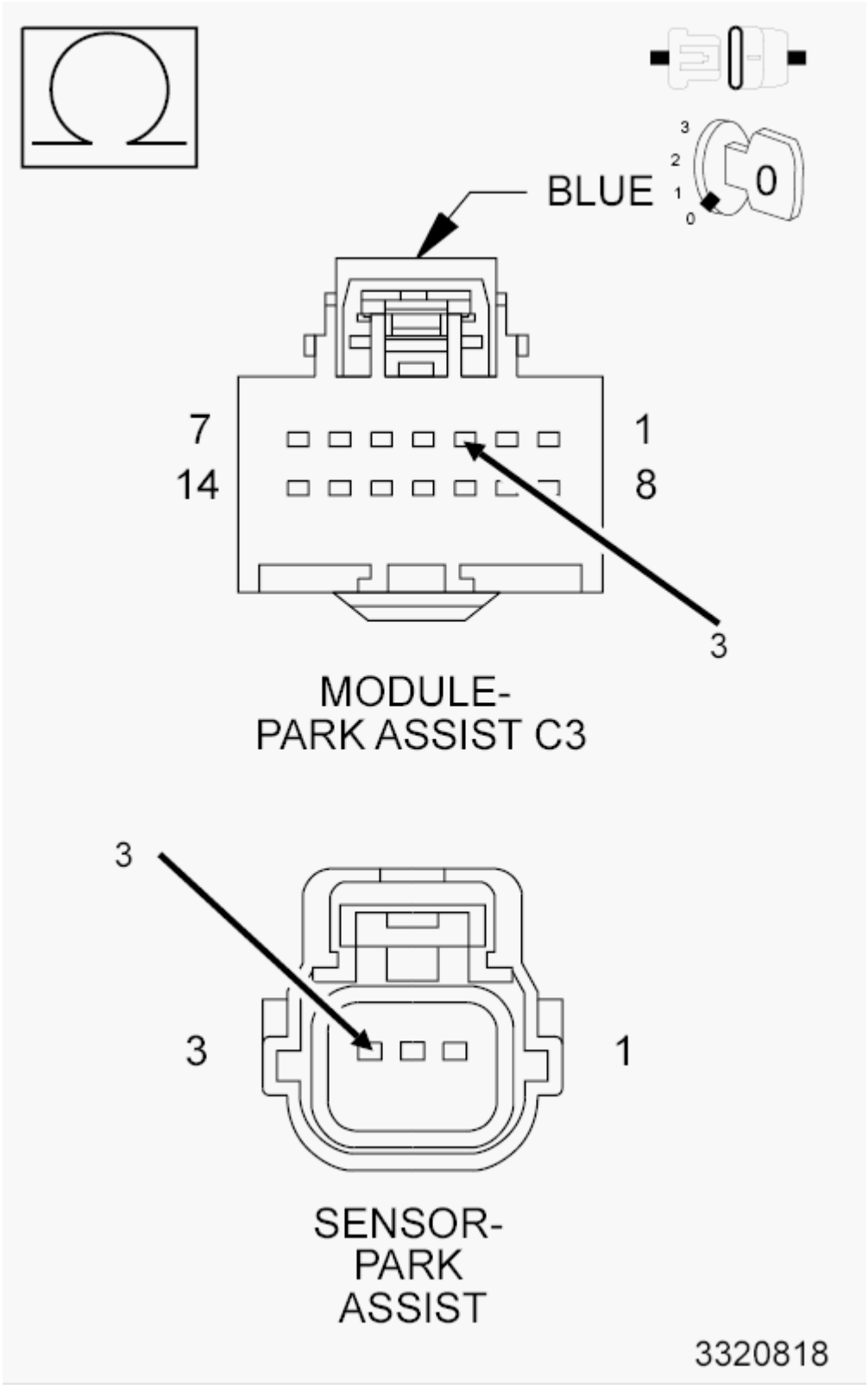


Fig. 17: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D702) Park Assist Sensor Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (D702) Park Assist Sensor Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B128F-11-PTS SENSOR 2 - CIRCUIT SHORT TO GROUND

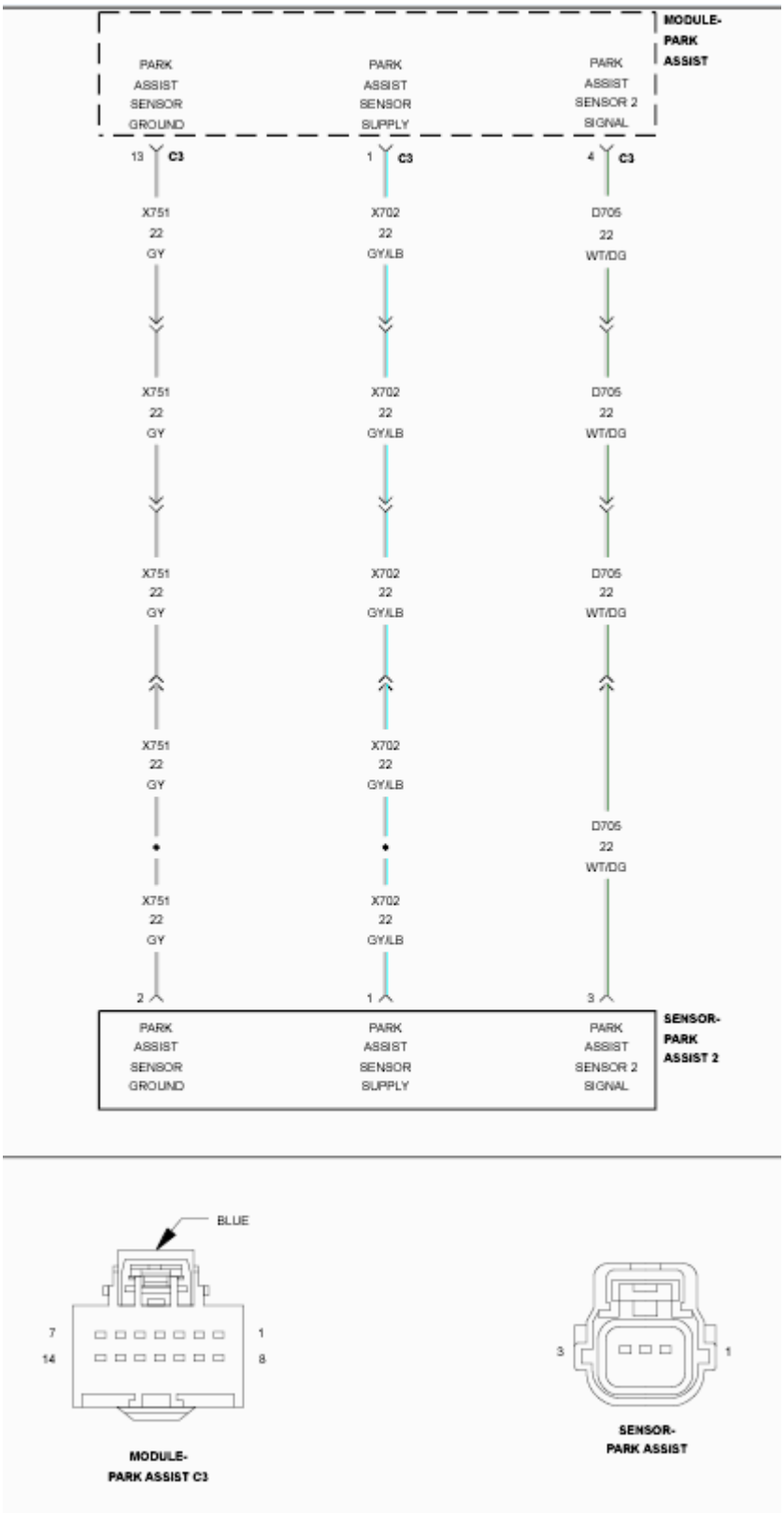


Fig. 18: Park Assist Sensor 2 Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR AN OPEN
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

   1. Turn the ignition on.

2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

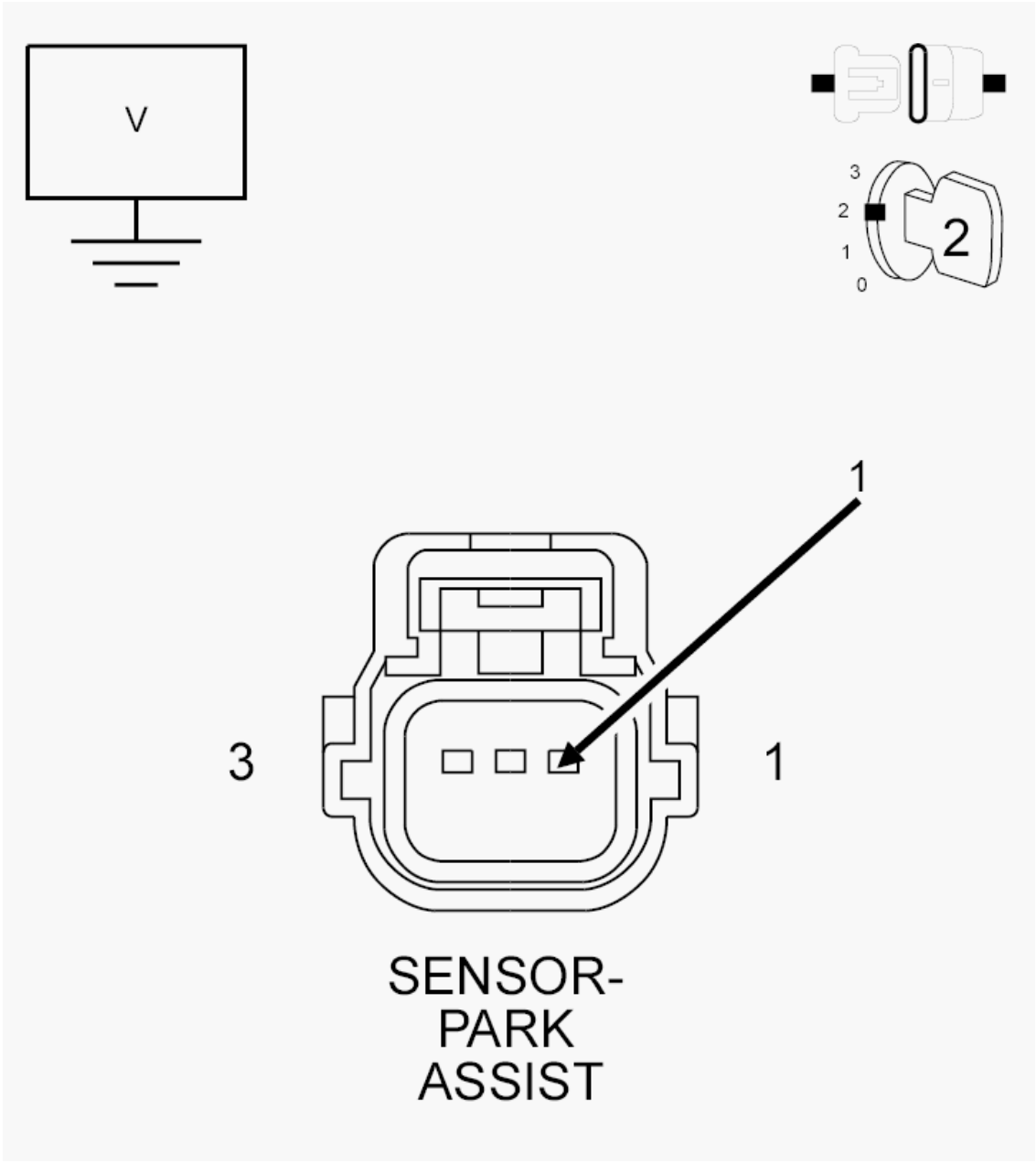


Fig. 19: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X702) Front Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

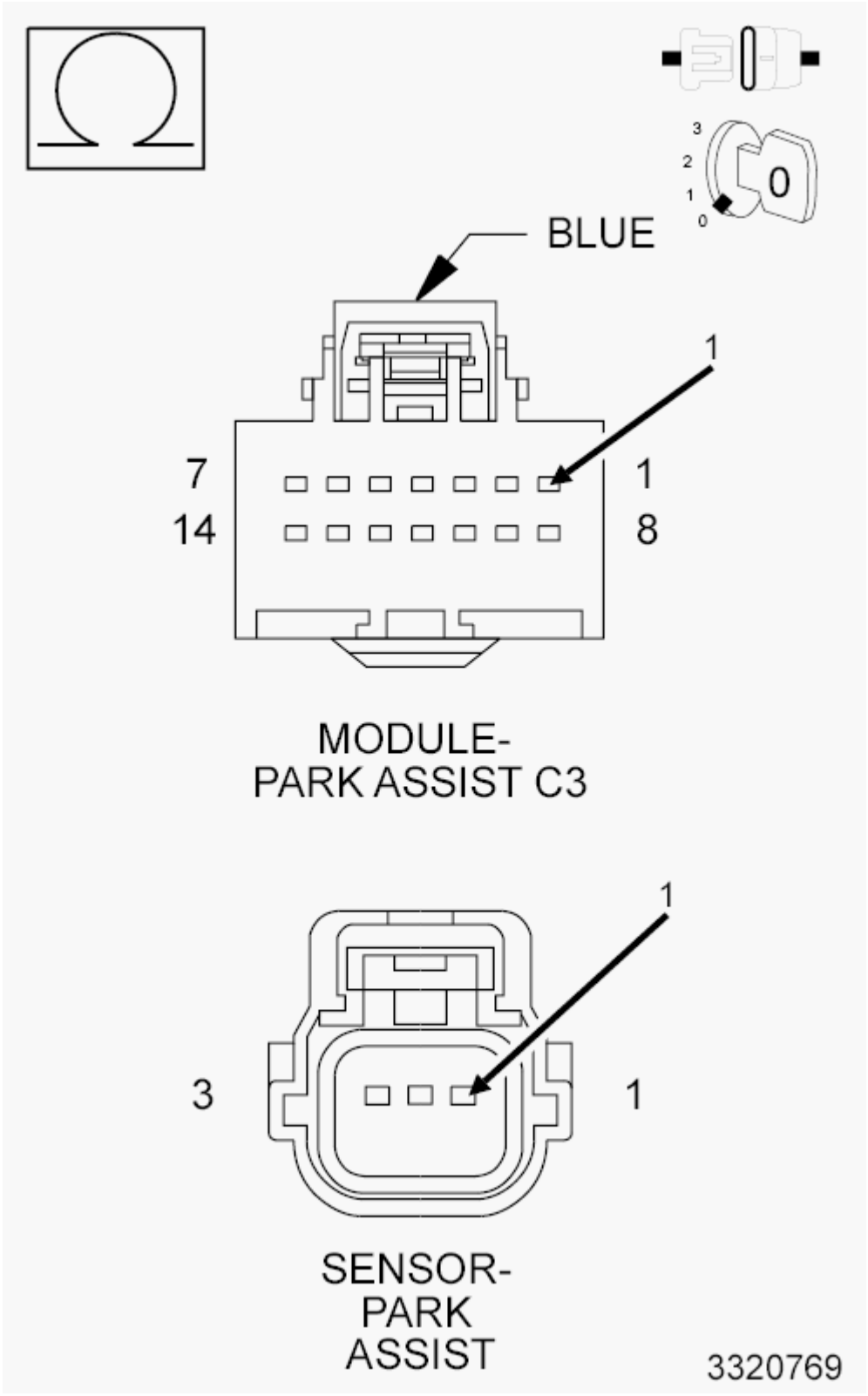


Fig. 20: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance of the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

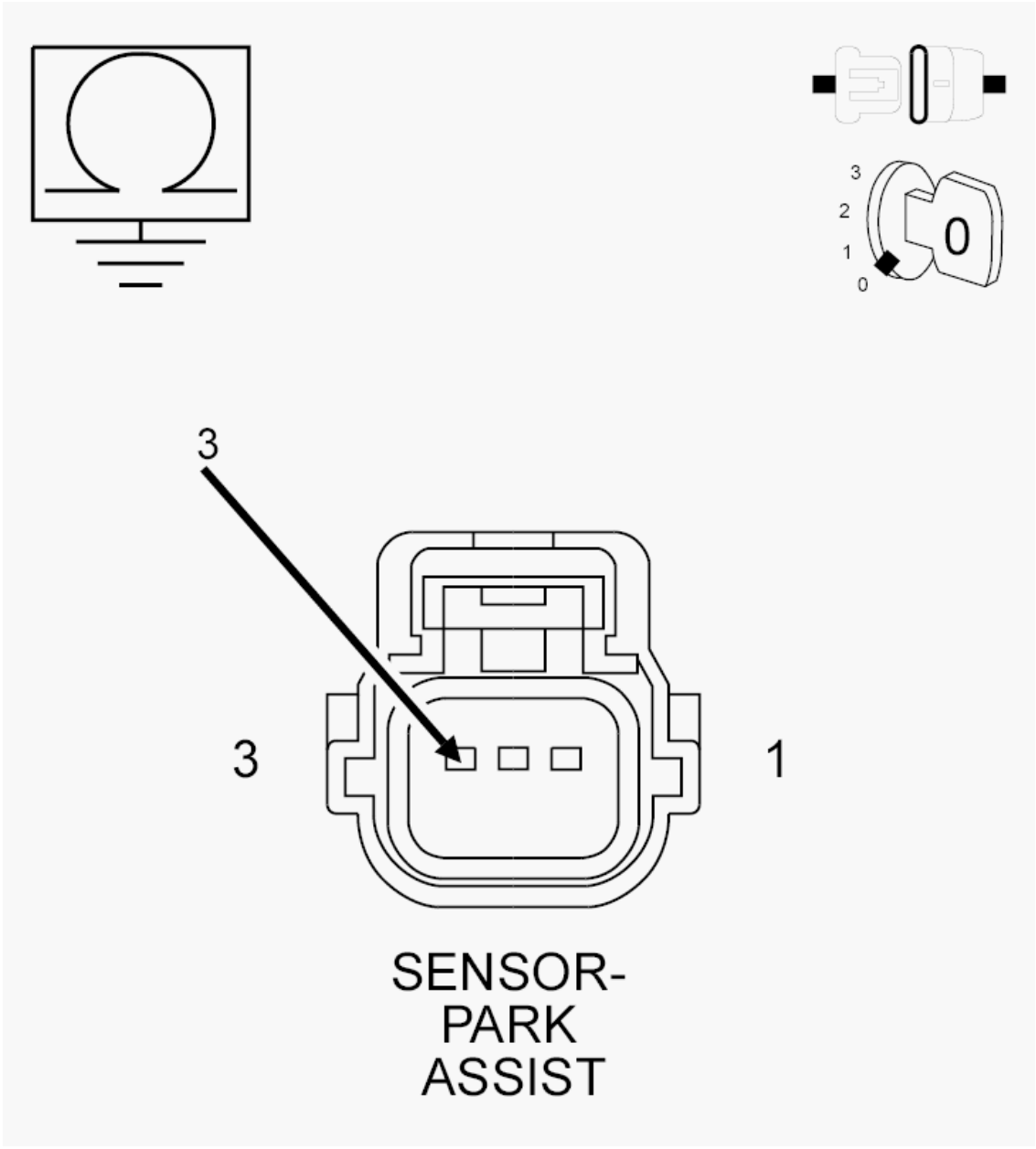


Fig. 21: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D705) Park Assist Sensor 2 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

- Go To 5.

No

- Go To 7.

5. **CHECK THE (D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**

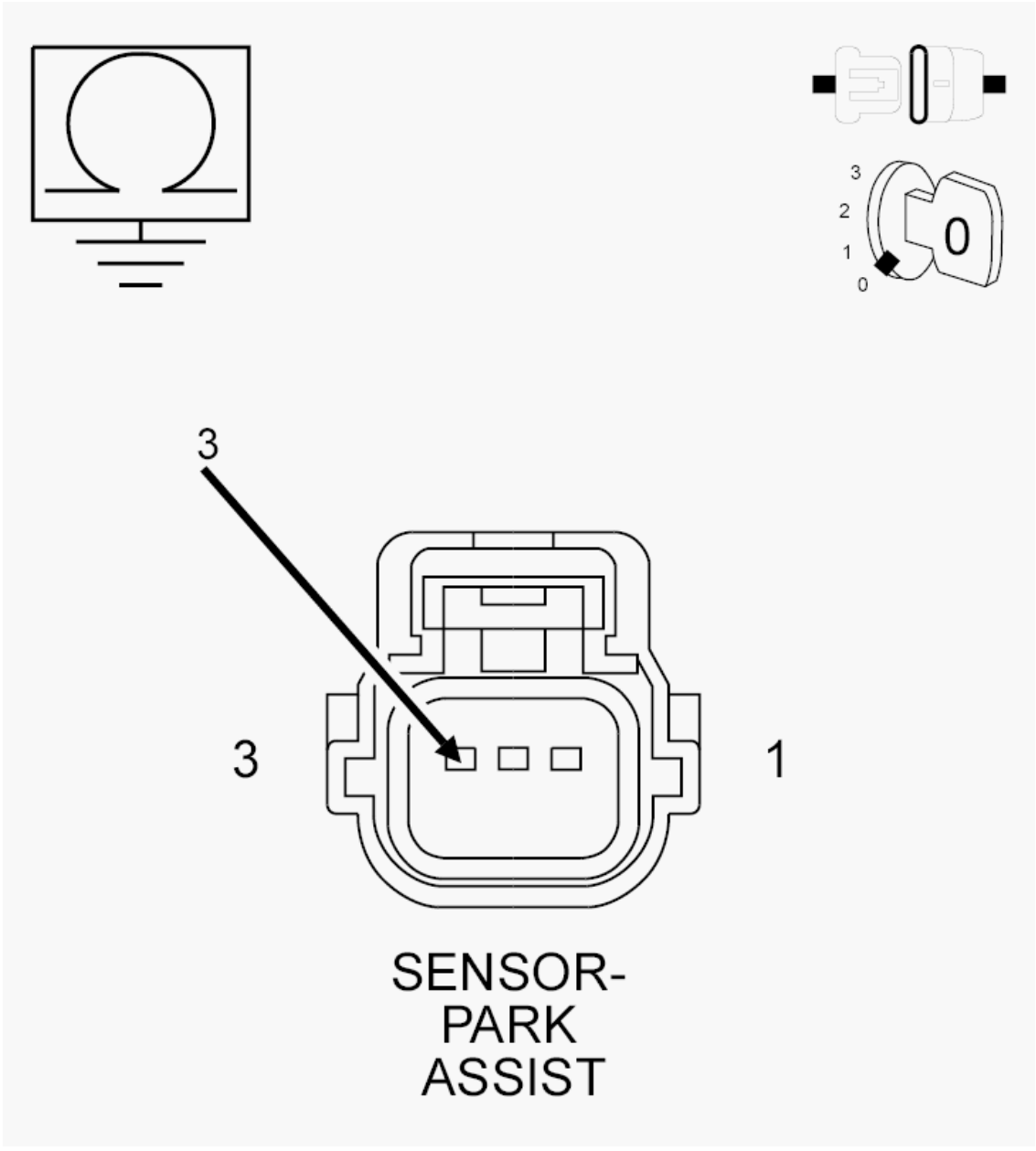


Fig. 22: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.

2. Measure the resistance between ground and the (D705) Park Assist Sensor 2 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D705) Park Assist Sensor 2 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT**

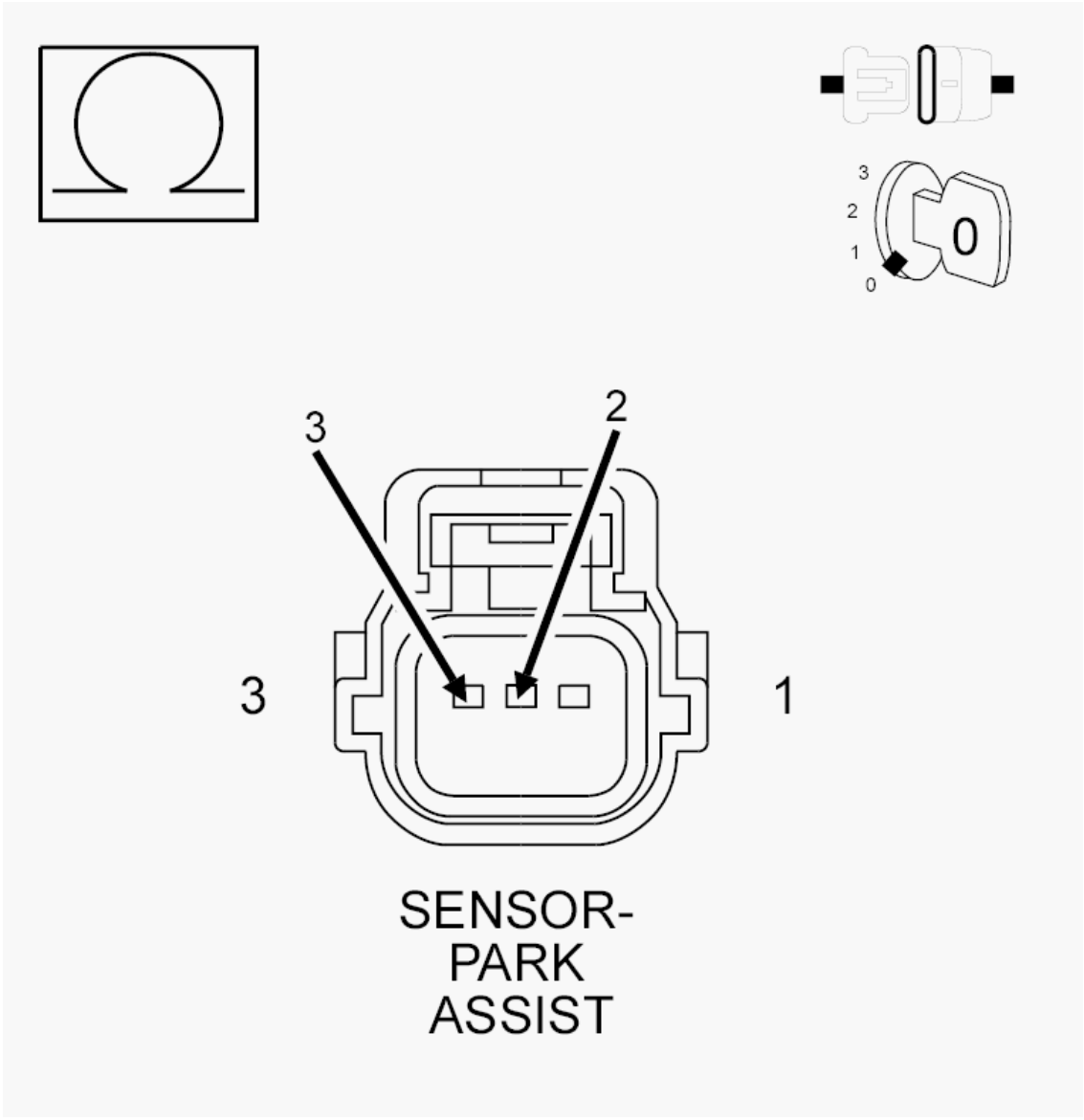


Fig. 23: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D705) Park Assist Sensor 2 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D705) Park Assist Sensor 2 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR AN OPEN**

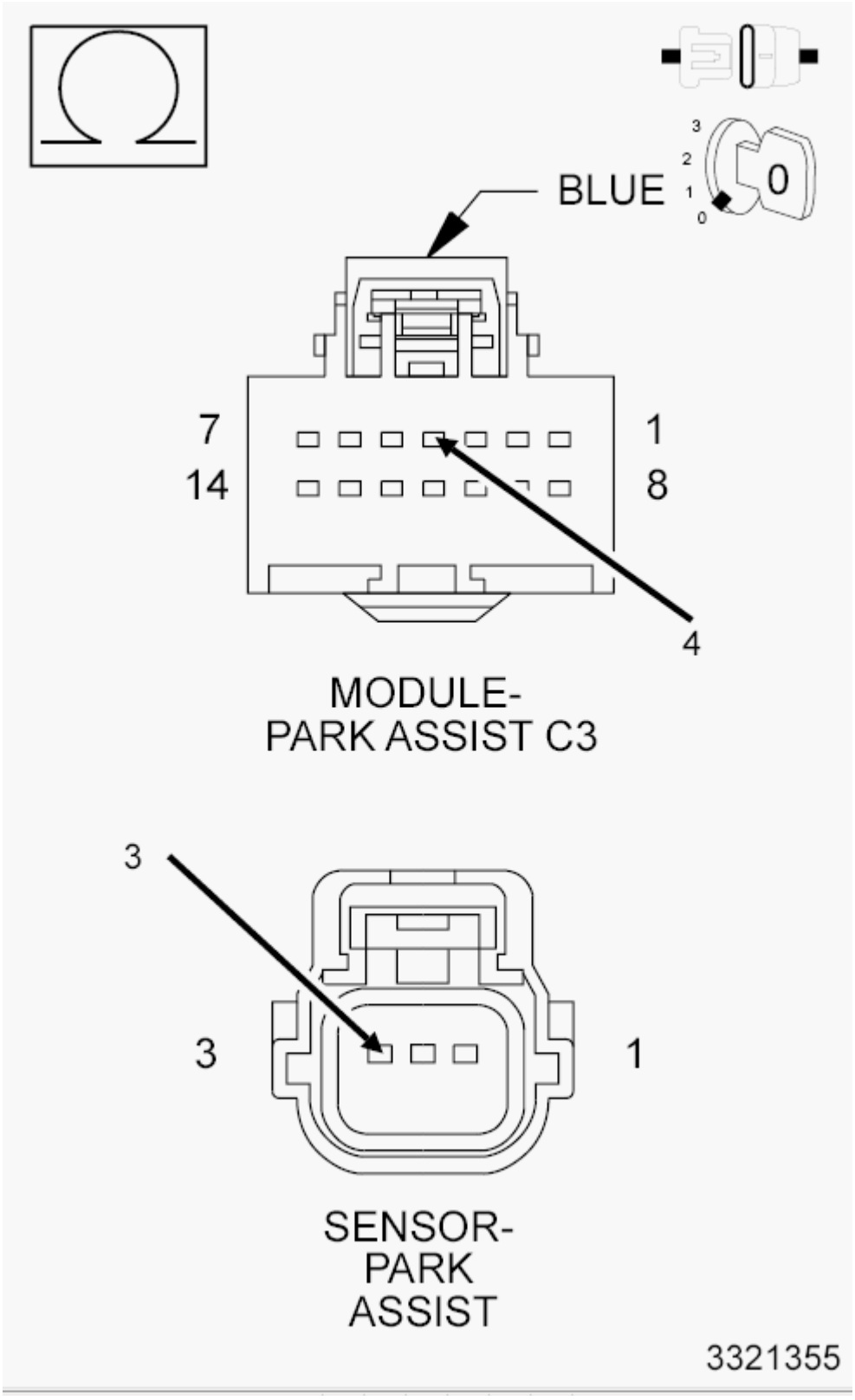


Fig. 24: Checking Park Assist Sensor 2 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (D705) Park Assist Sensor 2 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D705) Park Assist Sensor 2 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

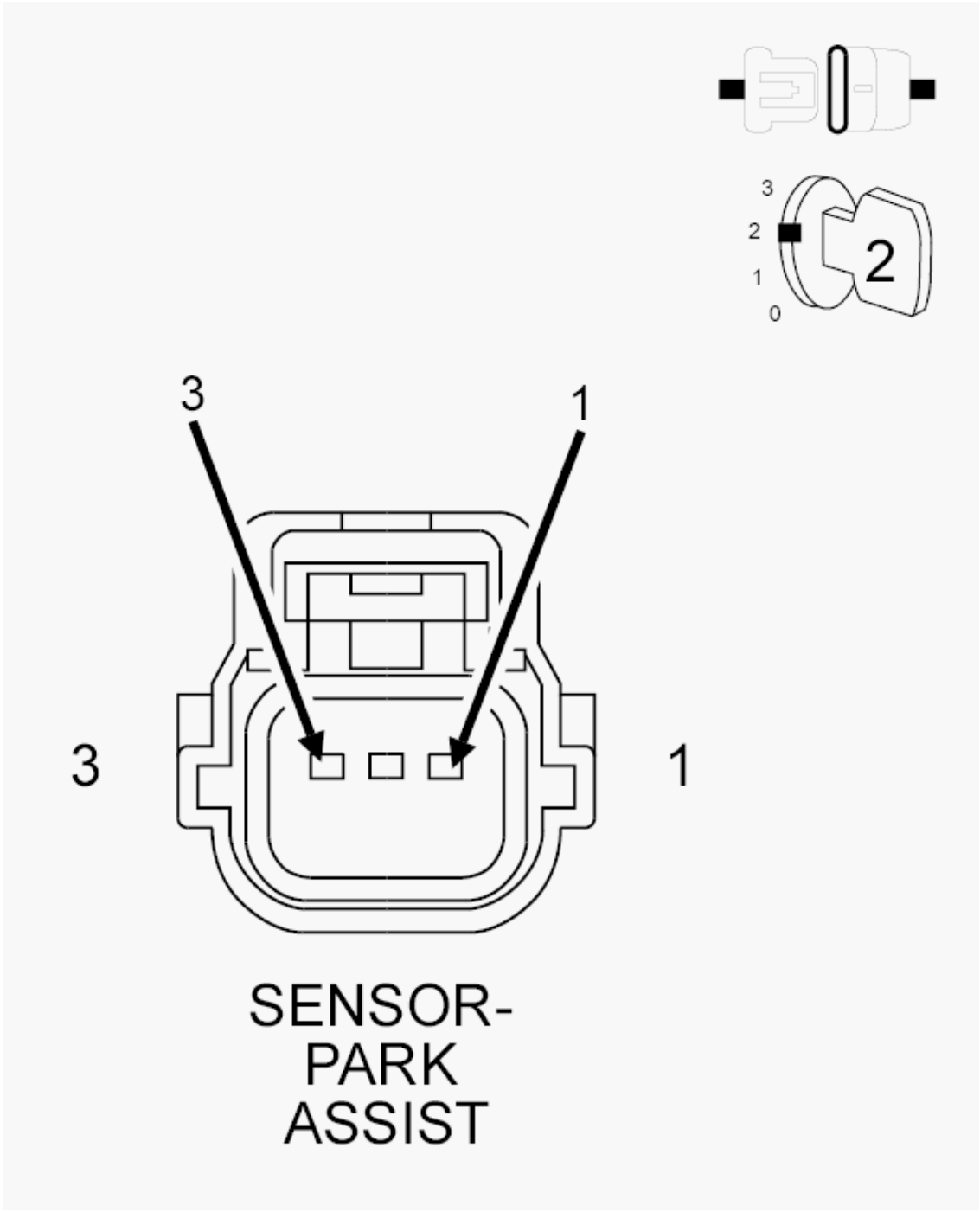


Fig. 25: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C3 harness connector.
3. Connect a jumper wire across the (X702) Front Park Assist Sensor Supply and (D705) Park Assist Sensor 2 Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B128F-12-PTS SENSOR 2 - CIRCUIT SHORT TO BATTERY as active?

   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B128F-12-PTS SENSOR 2 - CIRCUIT SHORT TO BATTERY

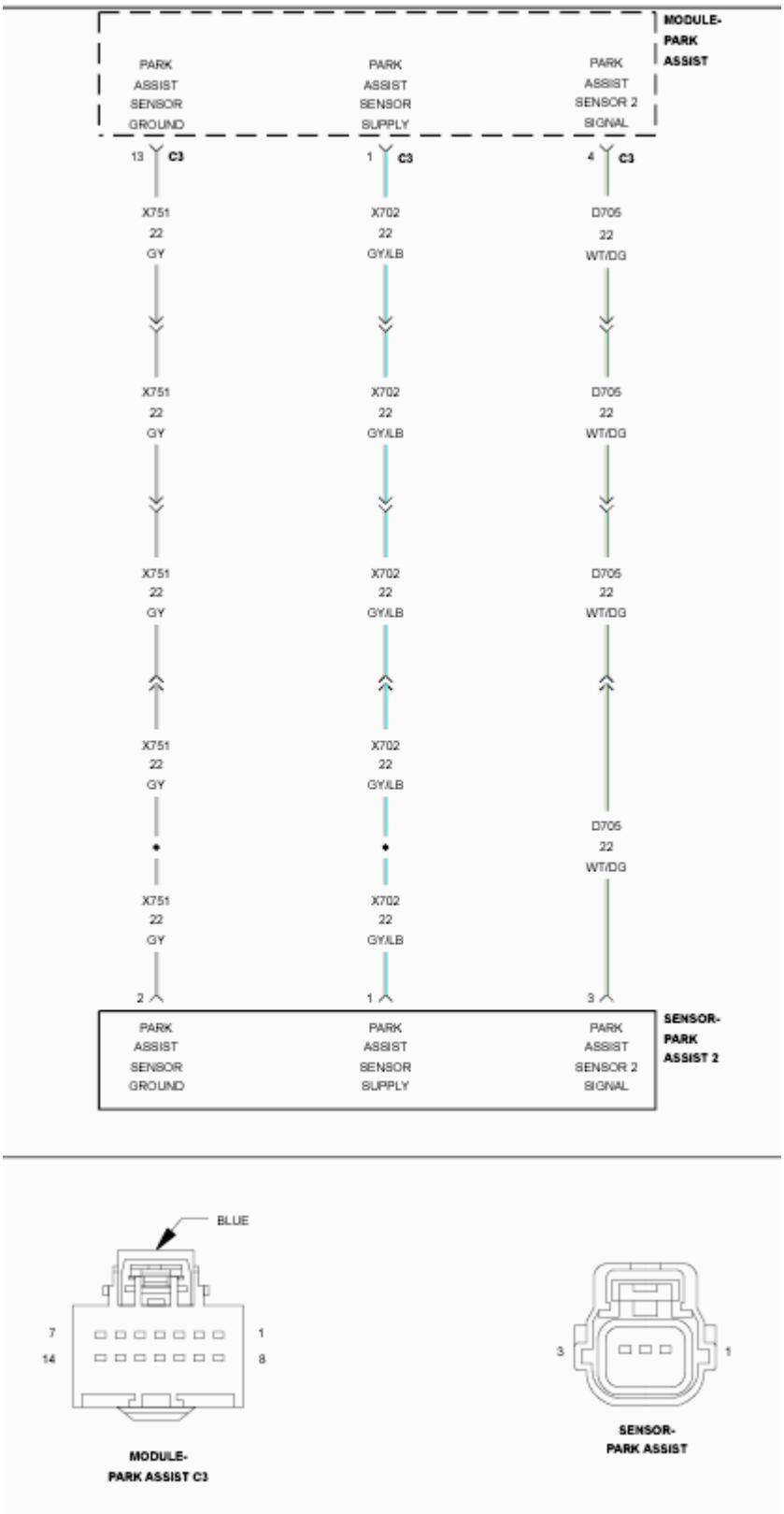


Fig. 26: Park Assist Sensor 2 Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT
(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

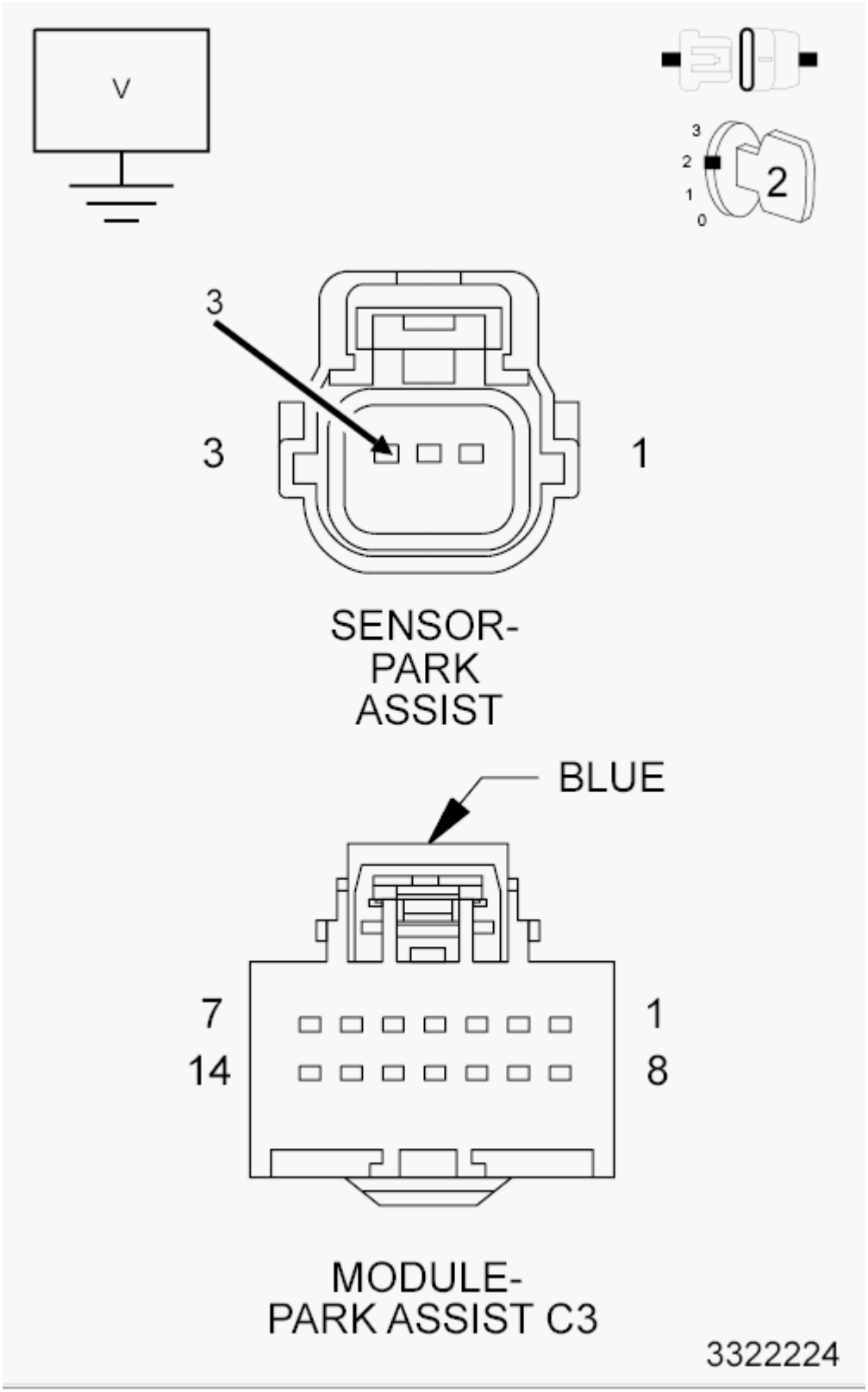


Fig. 27: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D705) Park Assist Sensor 2 Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Repair the (D705) Park Assist Sensor 2 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

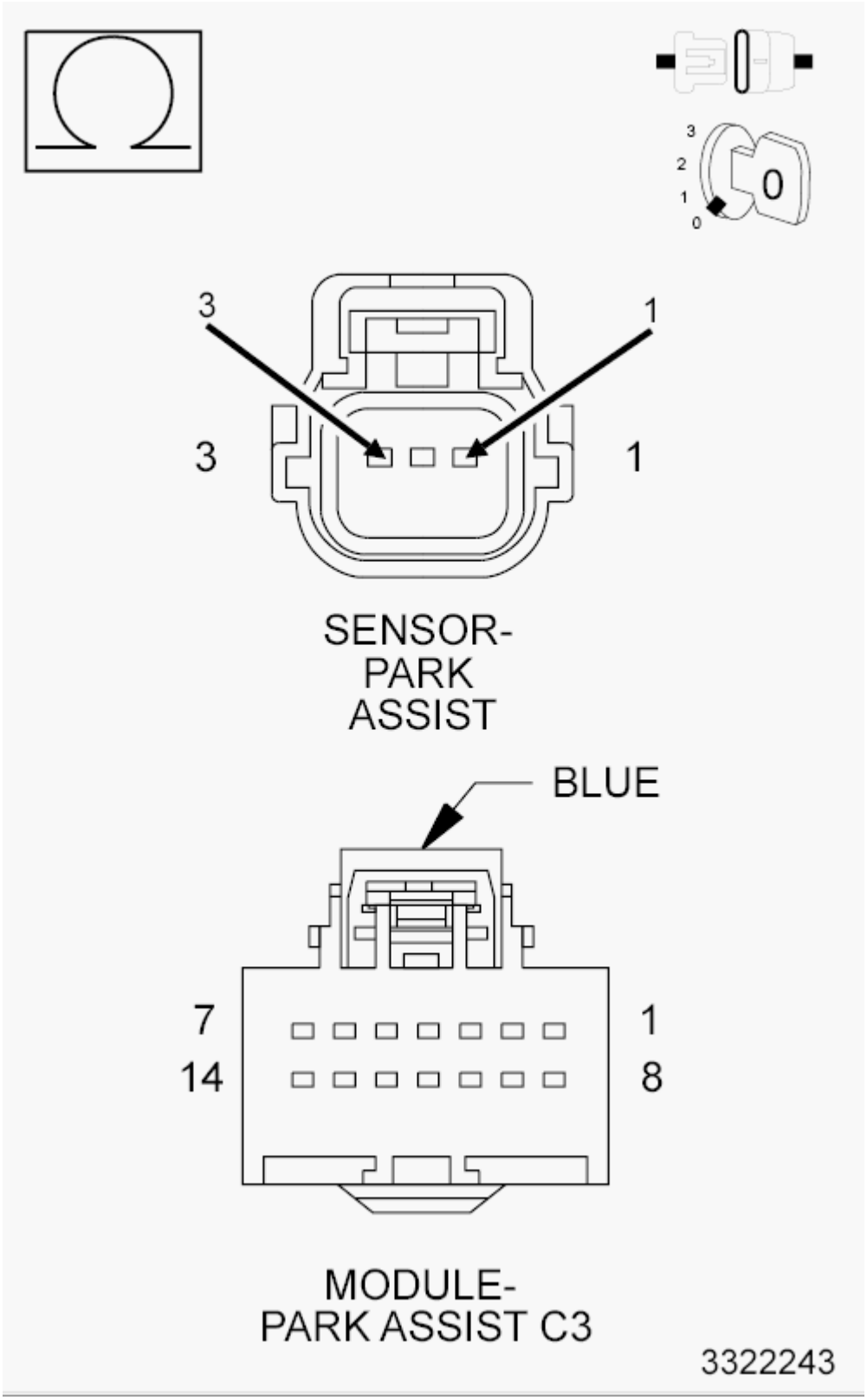


Fig. 28: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Supply Circuit

Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D705) Park Assist Sensor 2 Signal circuit and the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D705) Park Assist Sensor 2 Signal circuit for a short to the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

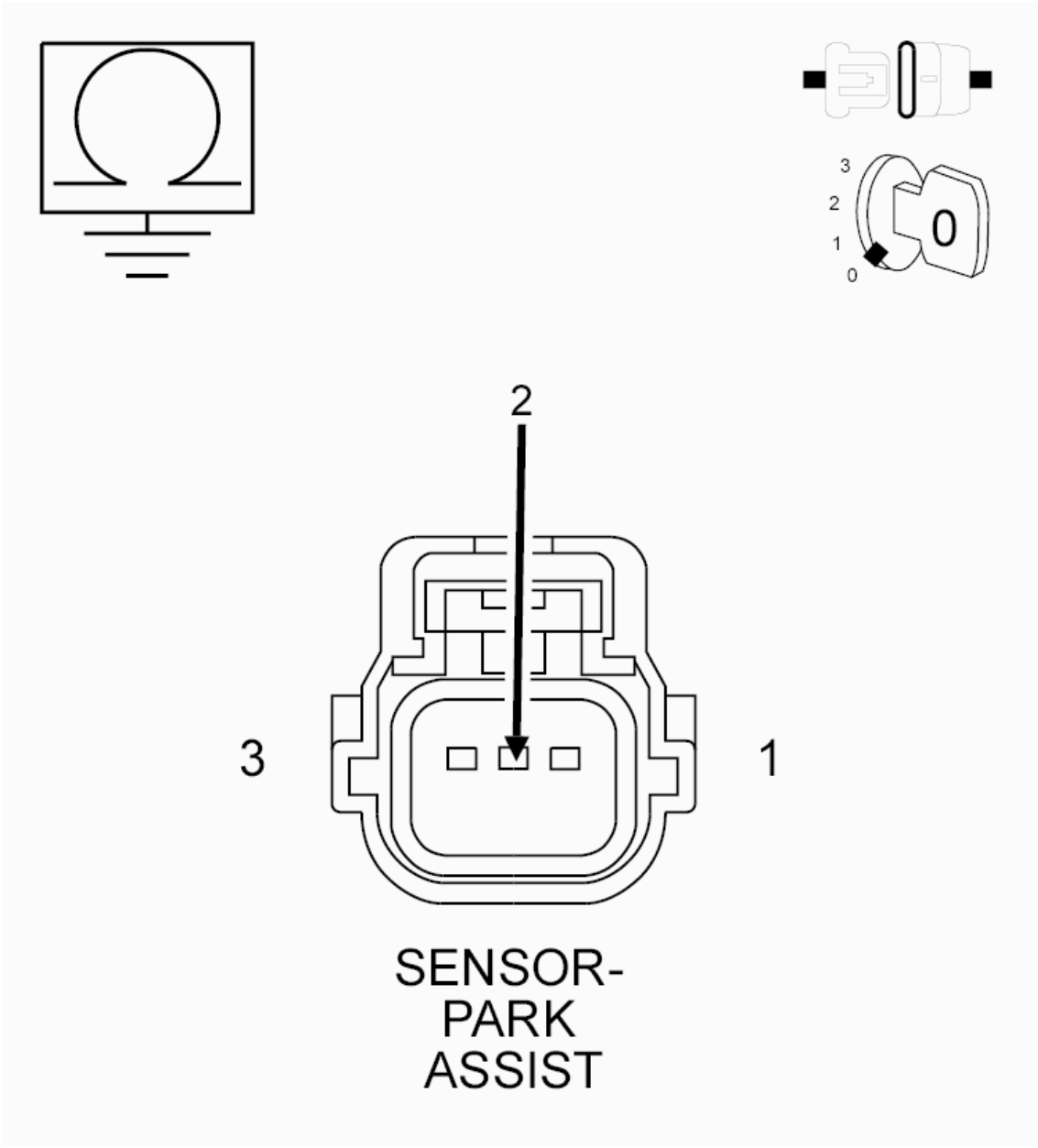


Fig. 29: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

   Yes

   - Go To 5.

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**

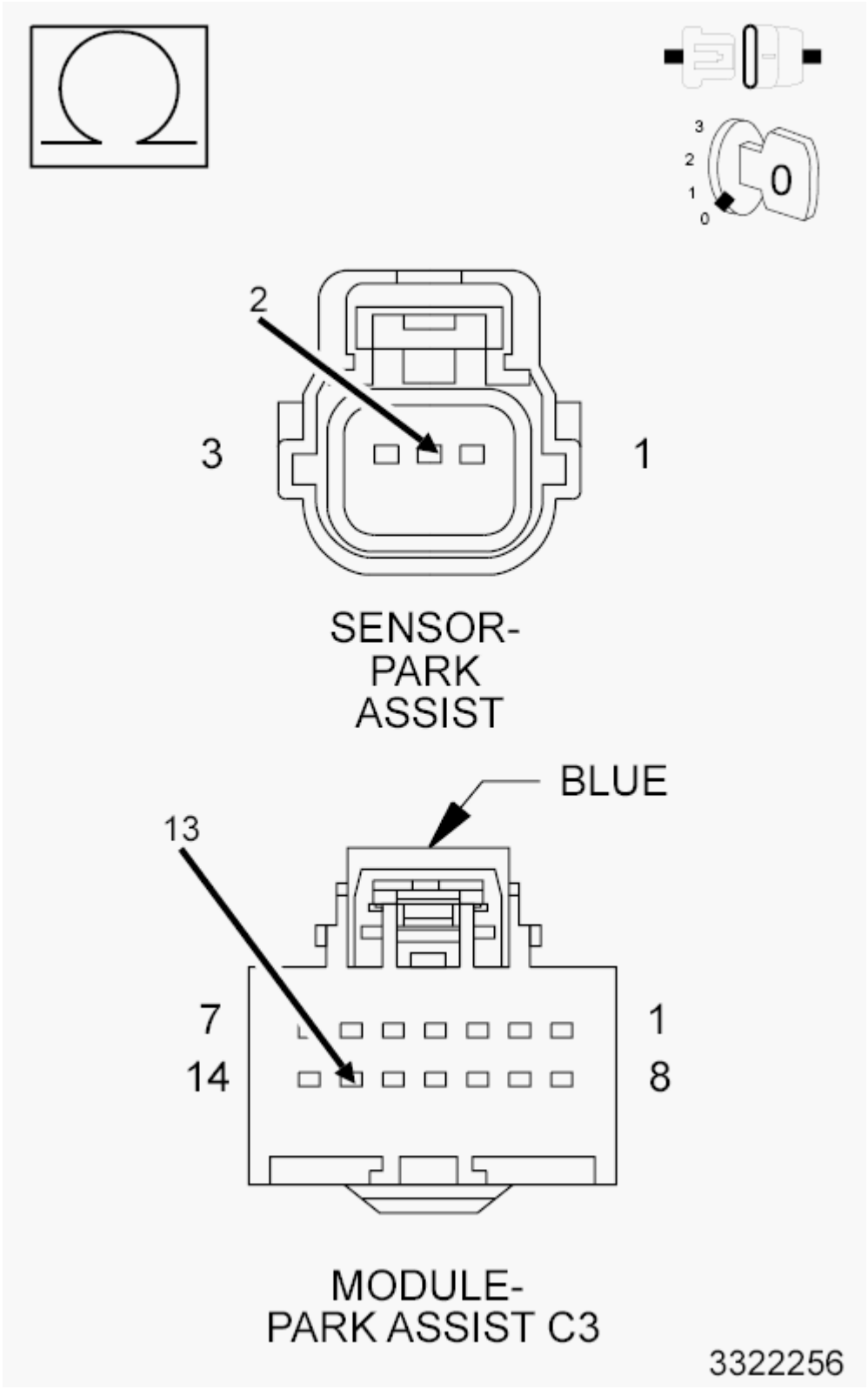


Fig. 30: Checking Front Park Assist Sensor Ground Circuit For An Open Between Park Assist Module & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B128F-25-PTS SENSOR 2- SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

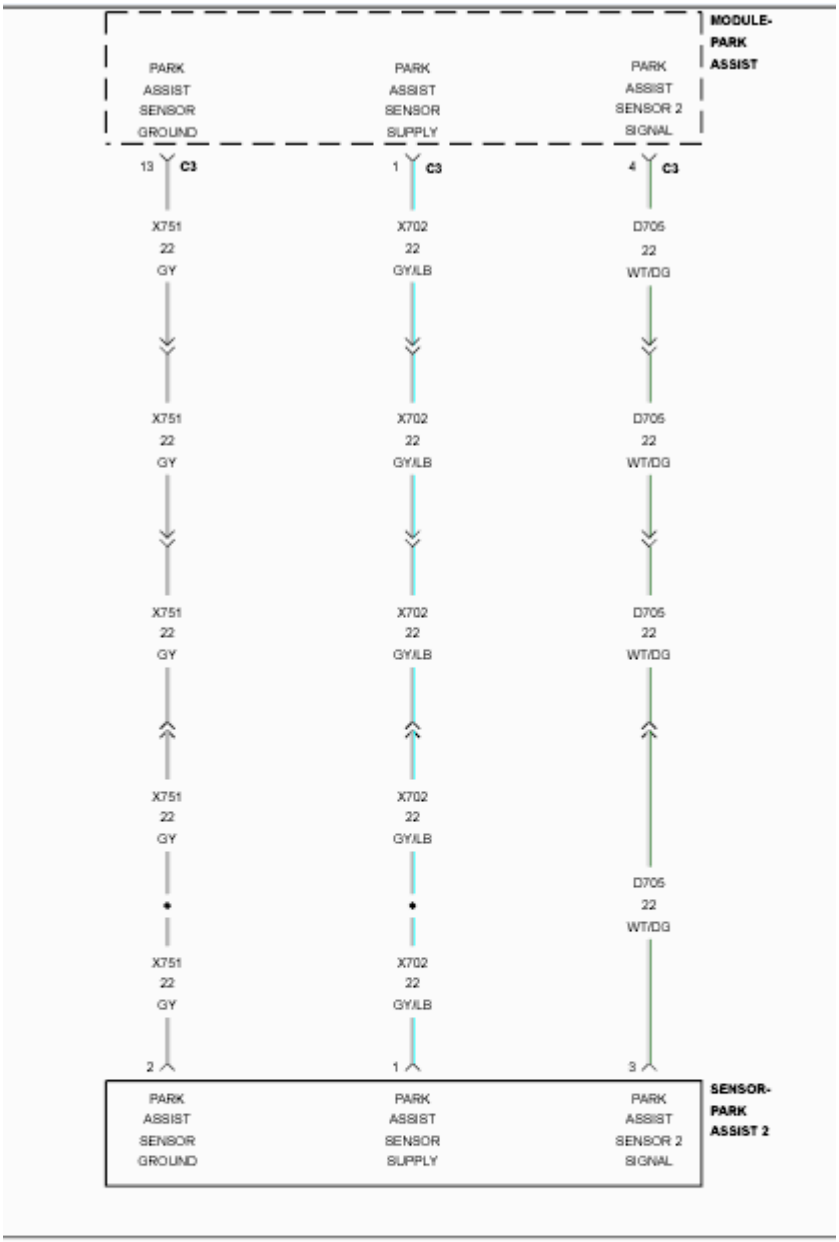
2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

      - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B128F-92-PTS SENSOR 2 - PERFORMANCE OR INCORRECT OPERATION



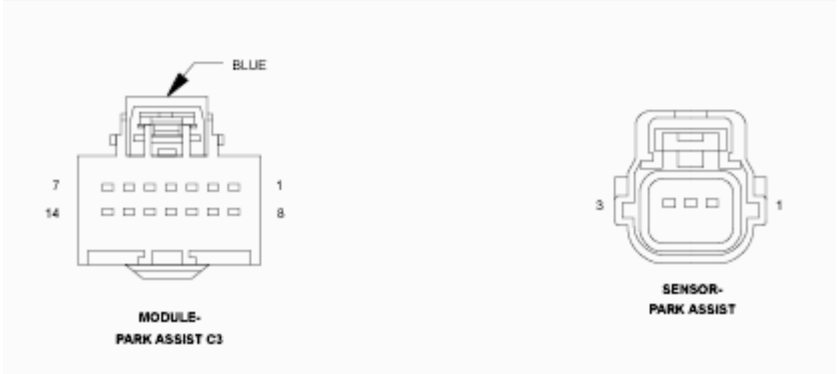


Fig. 31: Park Assist Sensor 2 Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE PARK ASSIST SENSOR FOR AN INTERNAL SHORT**
    1. Disconnect the Park Assist Sensor harness connector.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor 2 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

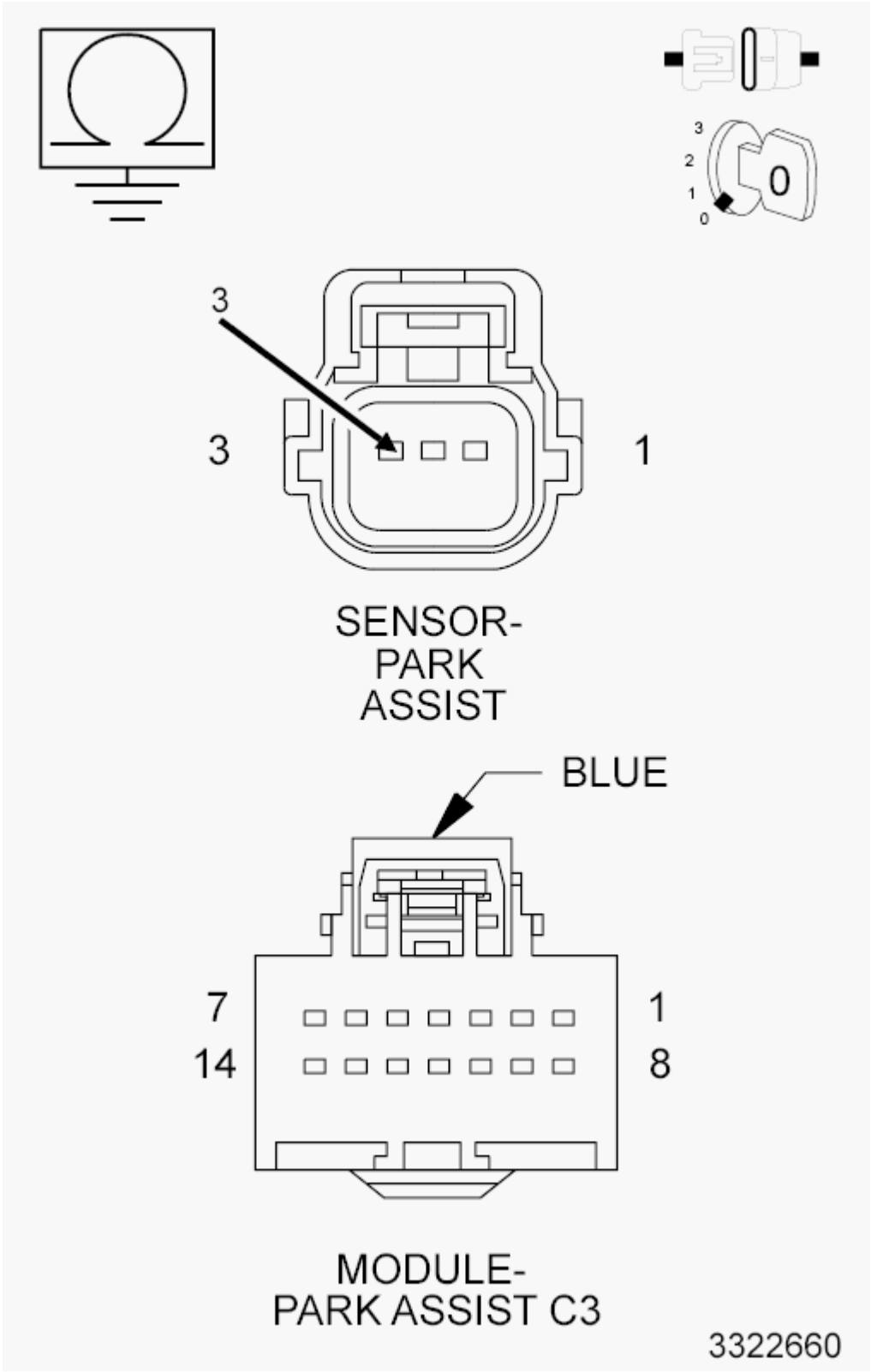


Fig. 32: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance between ground and the (D705) Park Assist Sensor 2 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D705) Park Assist Sensor 2 Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

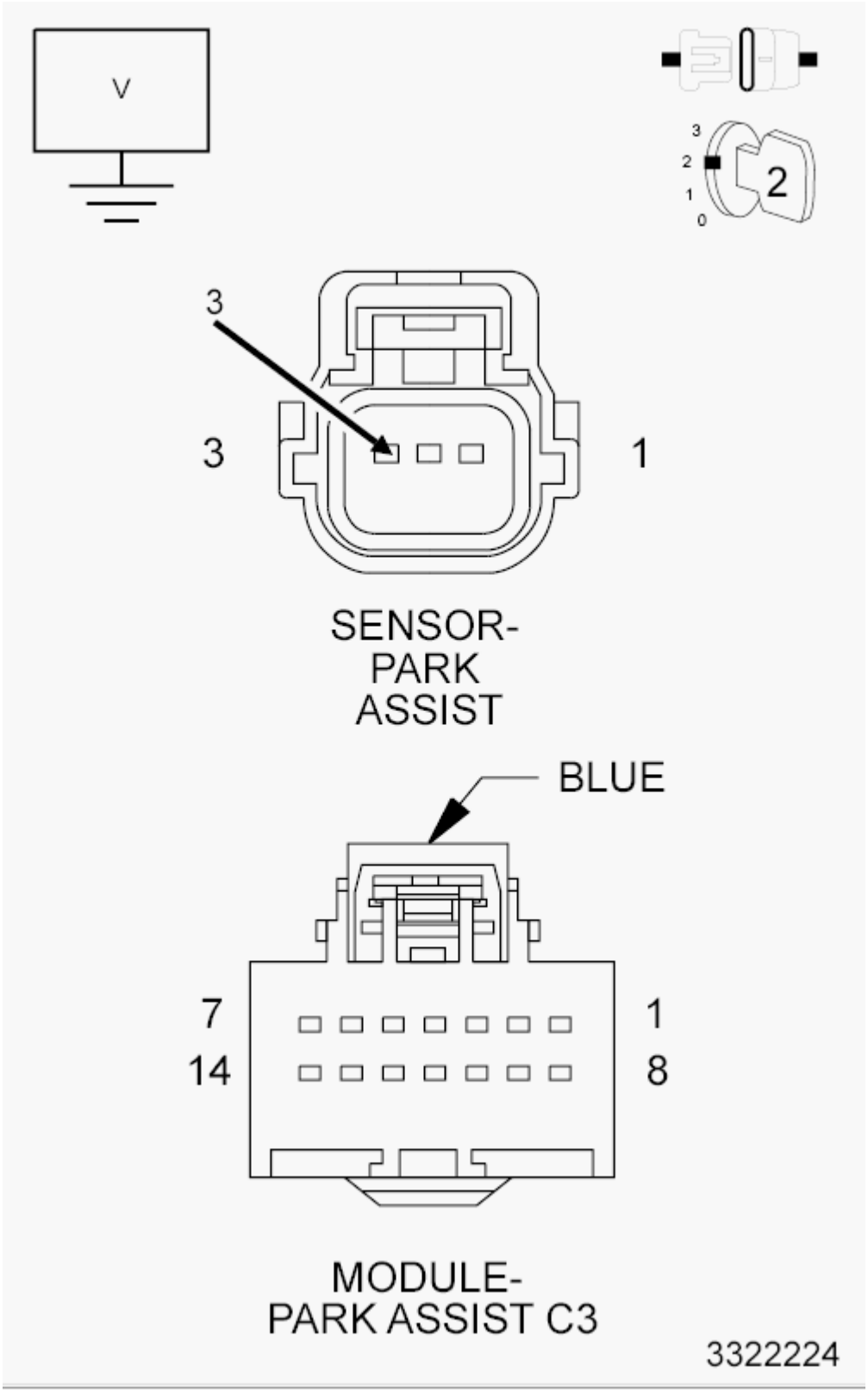


Fig. 33: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Measure the voltage of the (D705) Park Assist Sensor 2 Signal circuit.

   Is voltage present?

   Yes

   - Repair the (D705) Park Assist Sensor 2 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D705) PARK ASSIST SENSOR 2 SIGNAL CIRCUIT FOR AN OPEN**

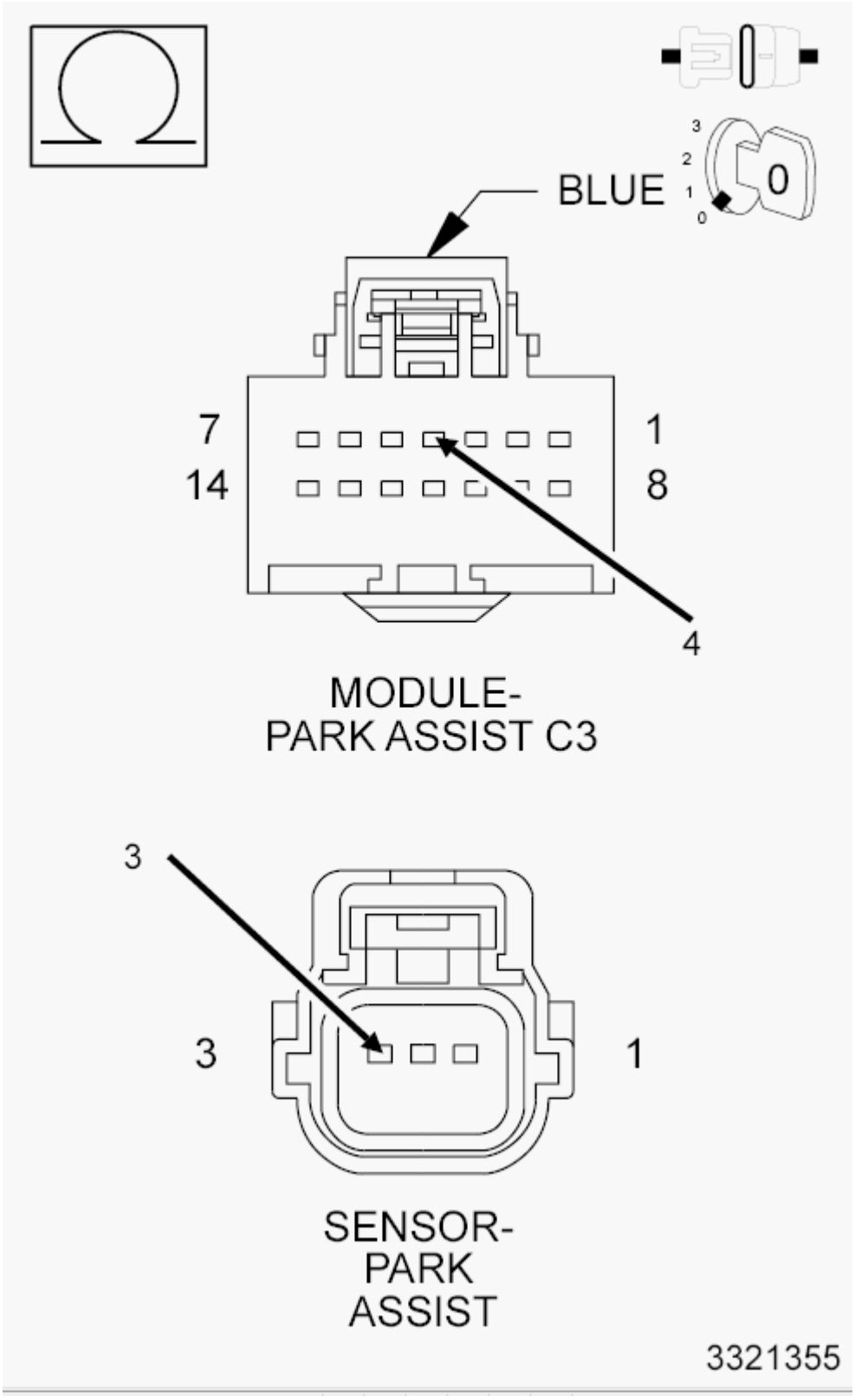


Fig. 34: Checking Park Assist Sensor 2 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D705) Park Assist Sensor 2 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (D705) Park Assist Sensor 2 Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1290-11-PTS SENSOR 3 - CIRCUIT SHORT TO GROUND

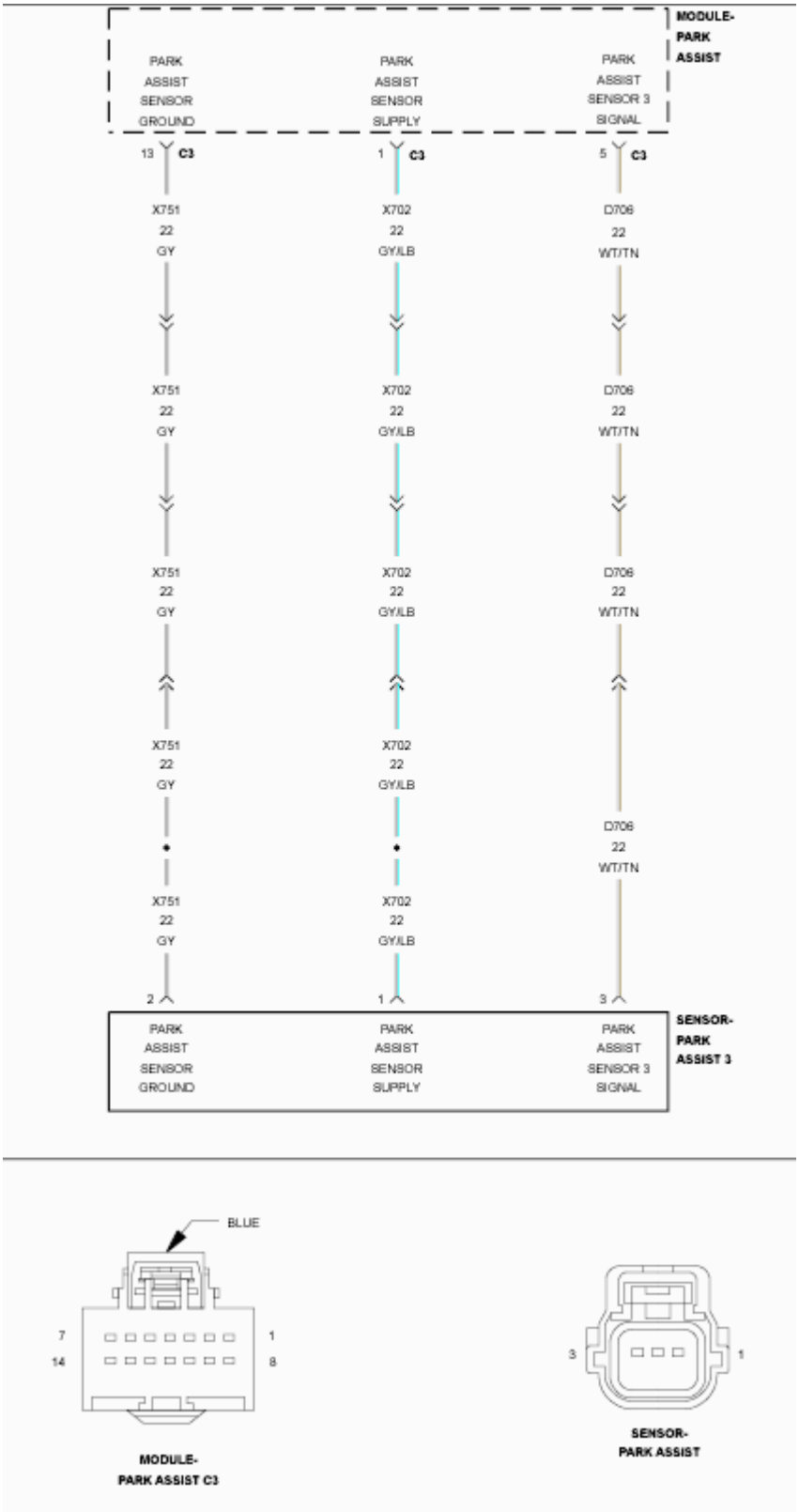


Fig. 35: Park Assist Sensor Circuit Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR AN OPEN
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

   1. Turn the ignition on.

2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

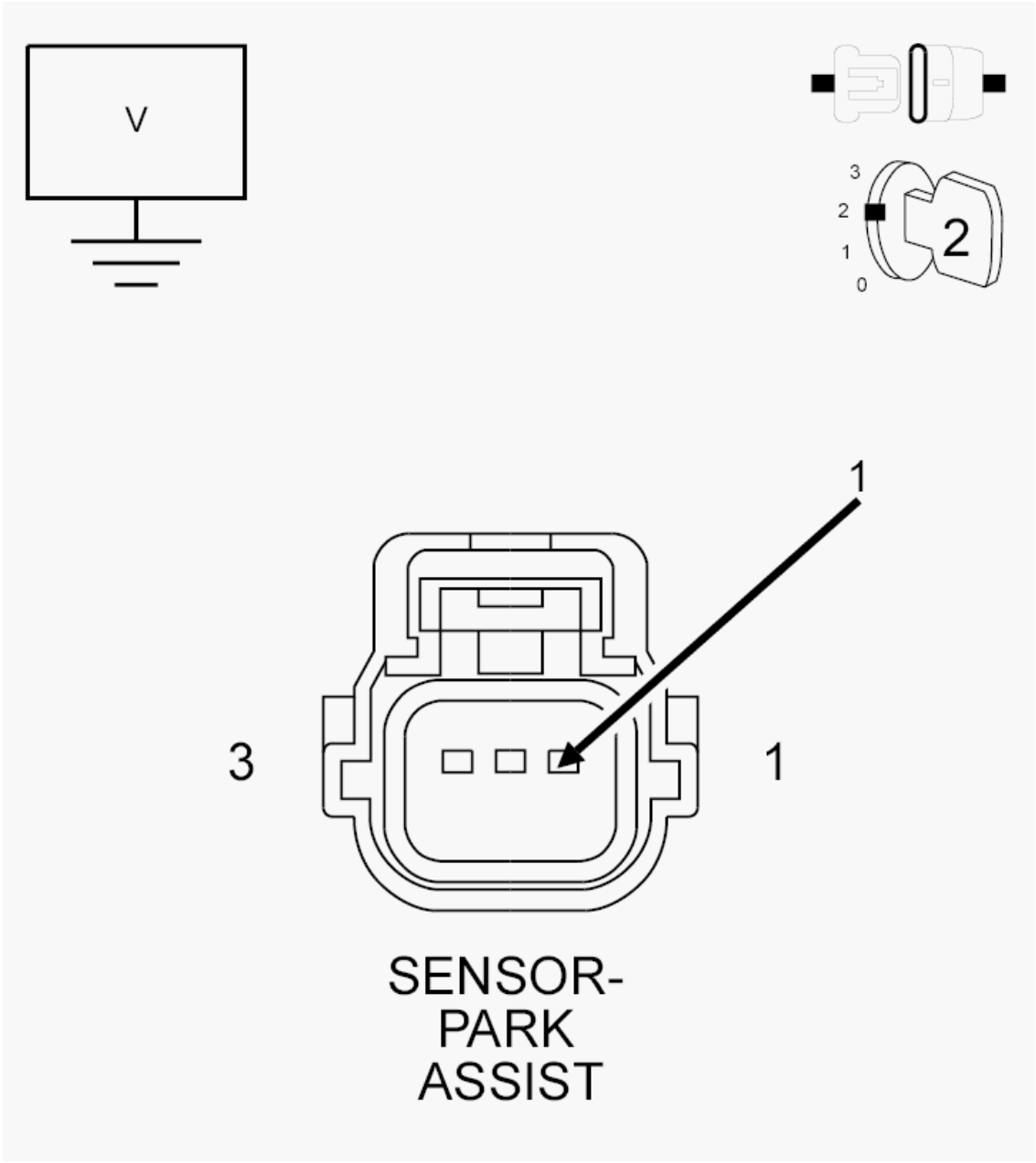


Fig. 36: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X702) Front Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

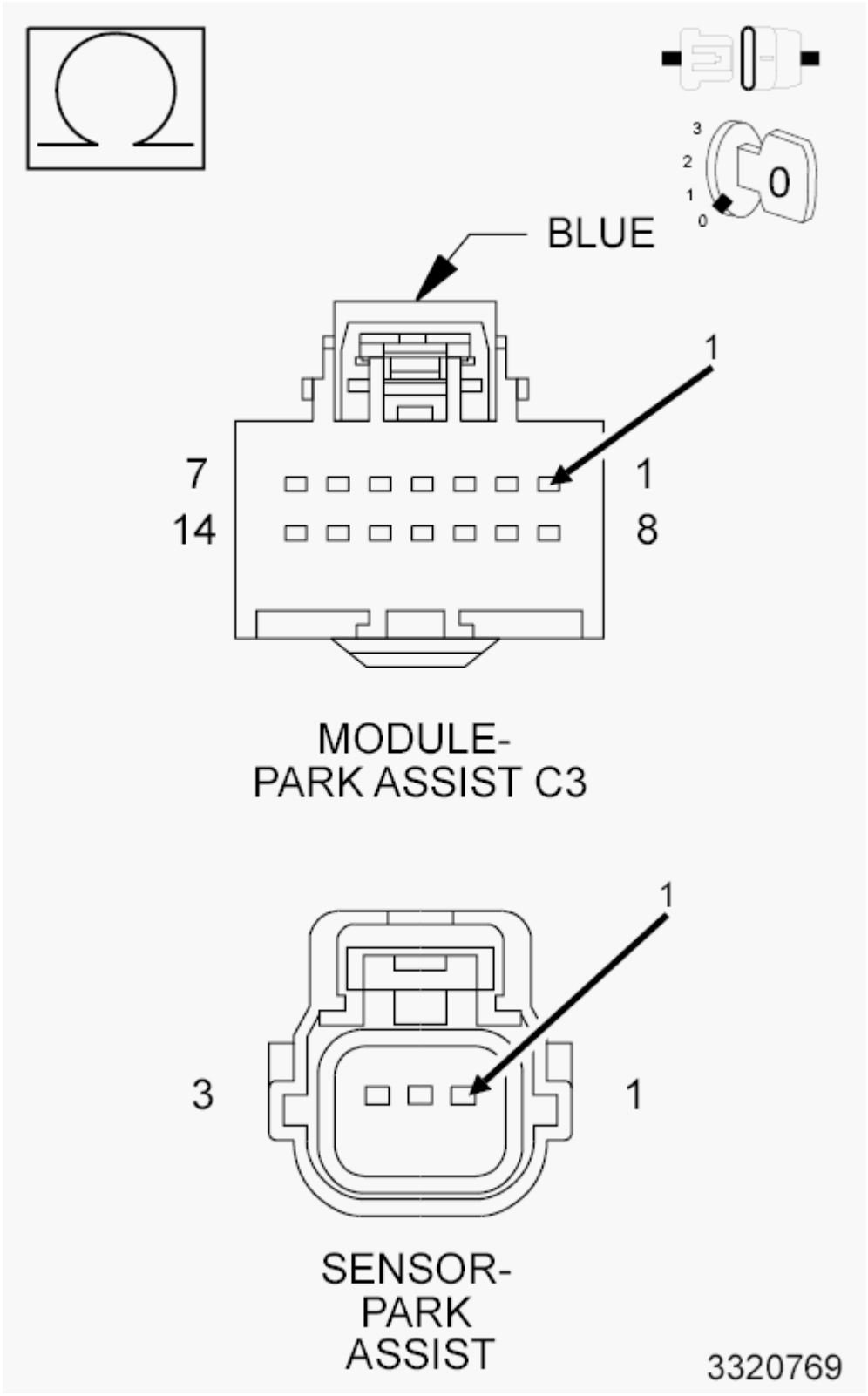


Fig. 37: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance of the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

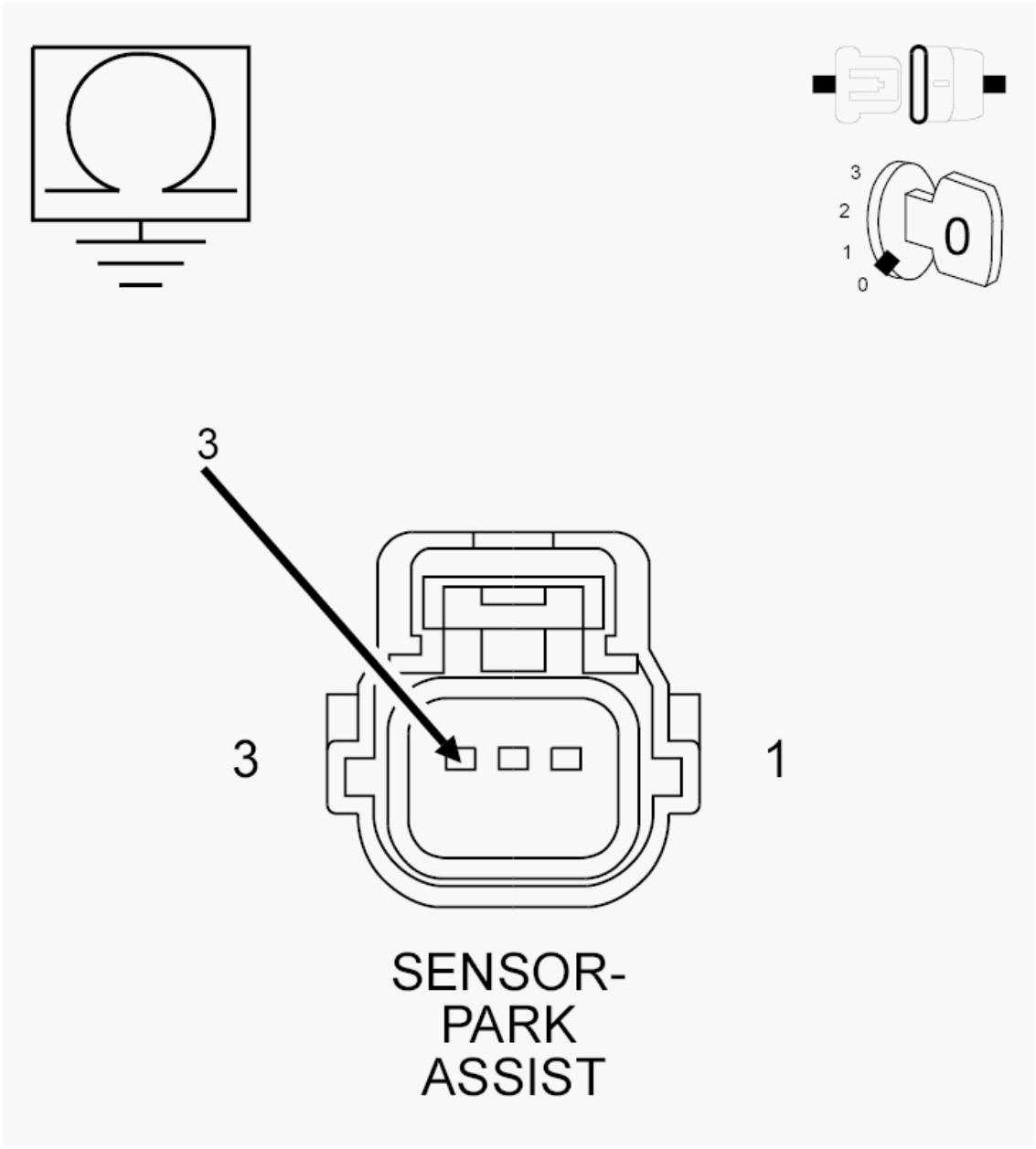


Fig. 38: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D706) Park Assist Sensor 3 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

- Go To 5.

No

- Go To 7.

5. **CHECK THE (D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**

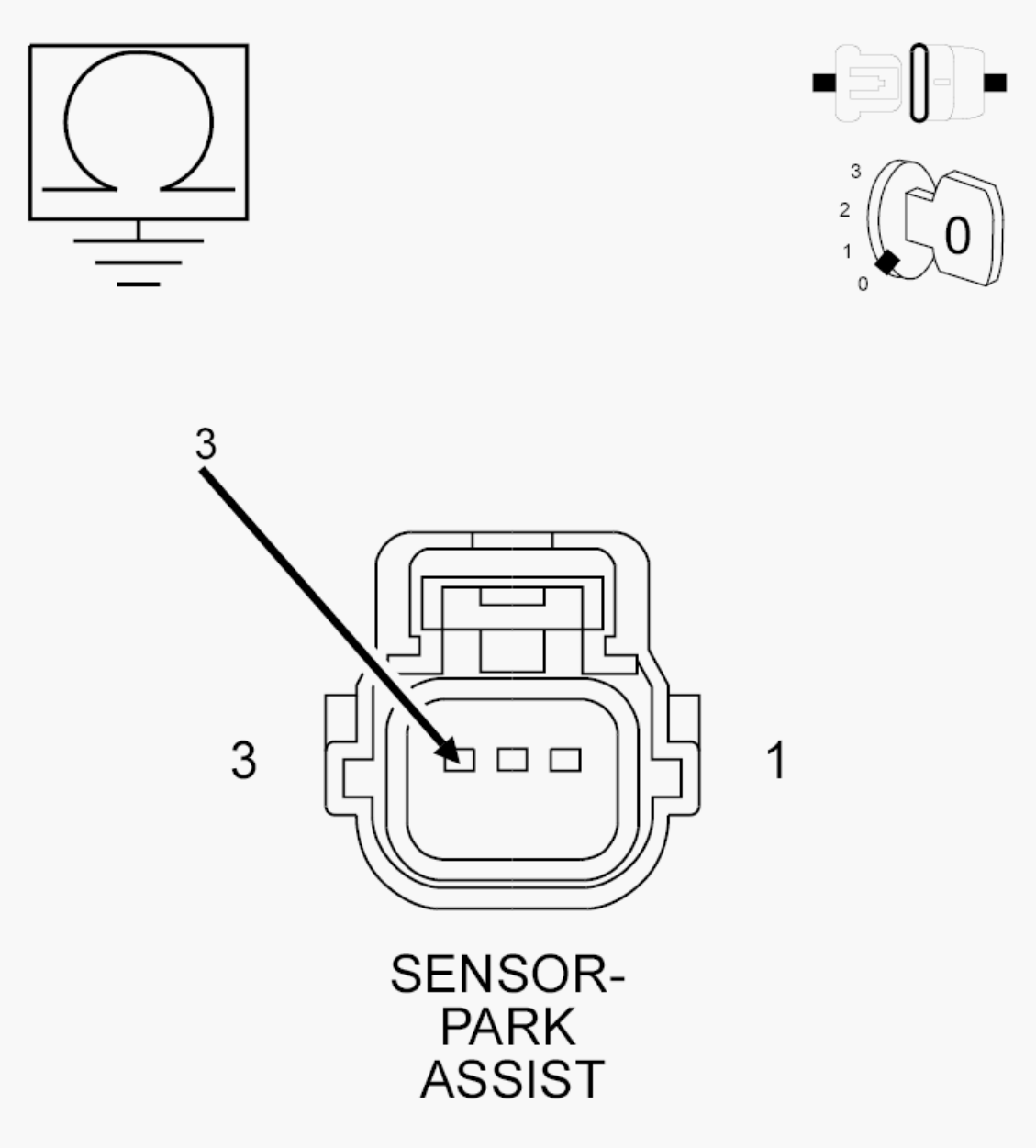


Fig. 39: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.

2. Measure the resistance between ground and the (D706) Park Assist Sensor 3 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D706) Park Assist Sensor 3 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT**

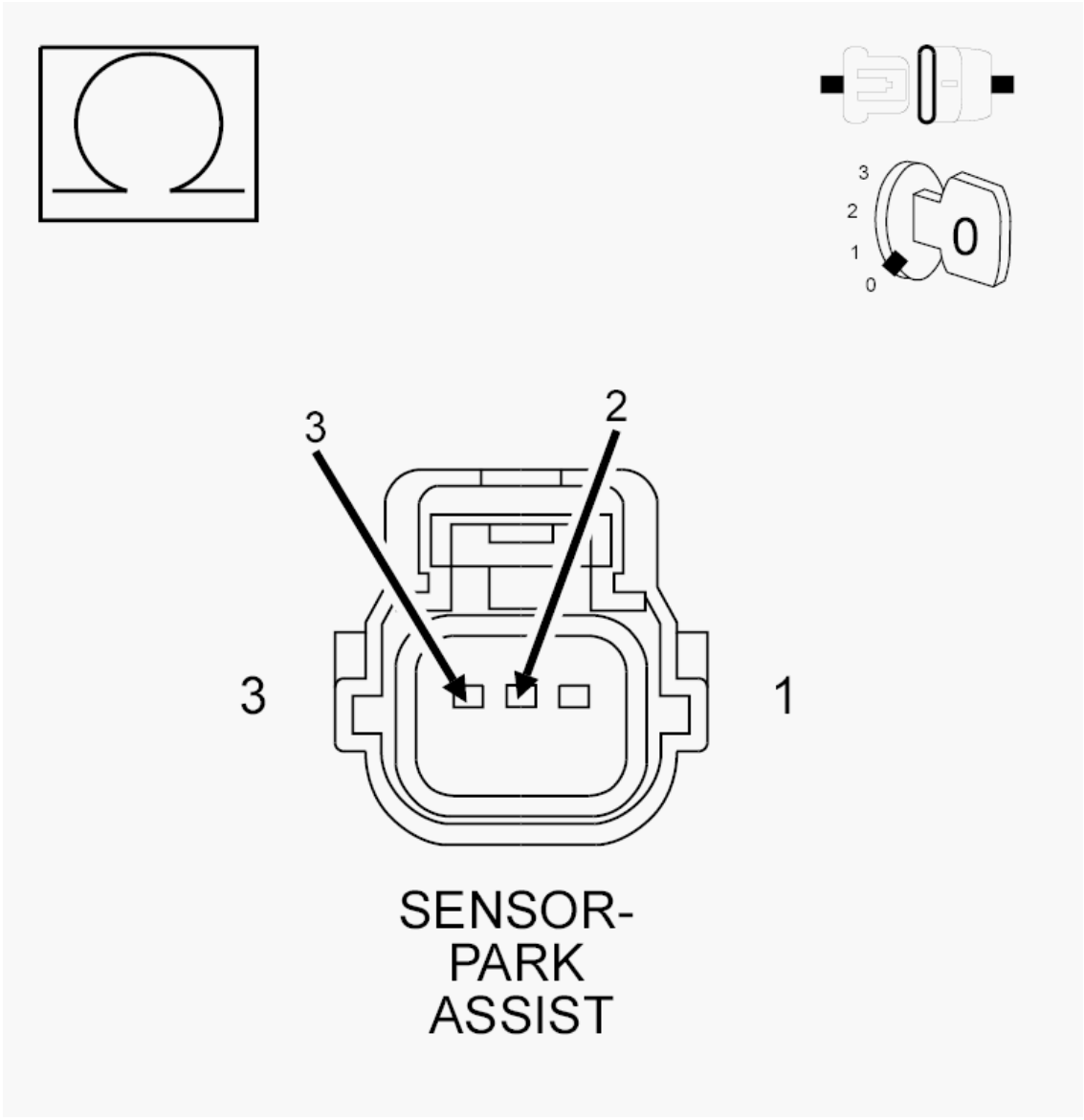


Fig. 40: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D706) Park Assist Sensor 3 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D706) Park Assist Sensor 3 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR AN OPEN**

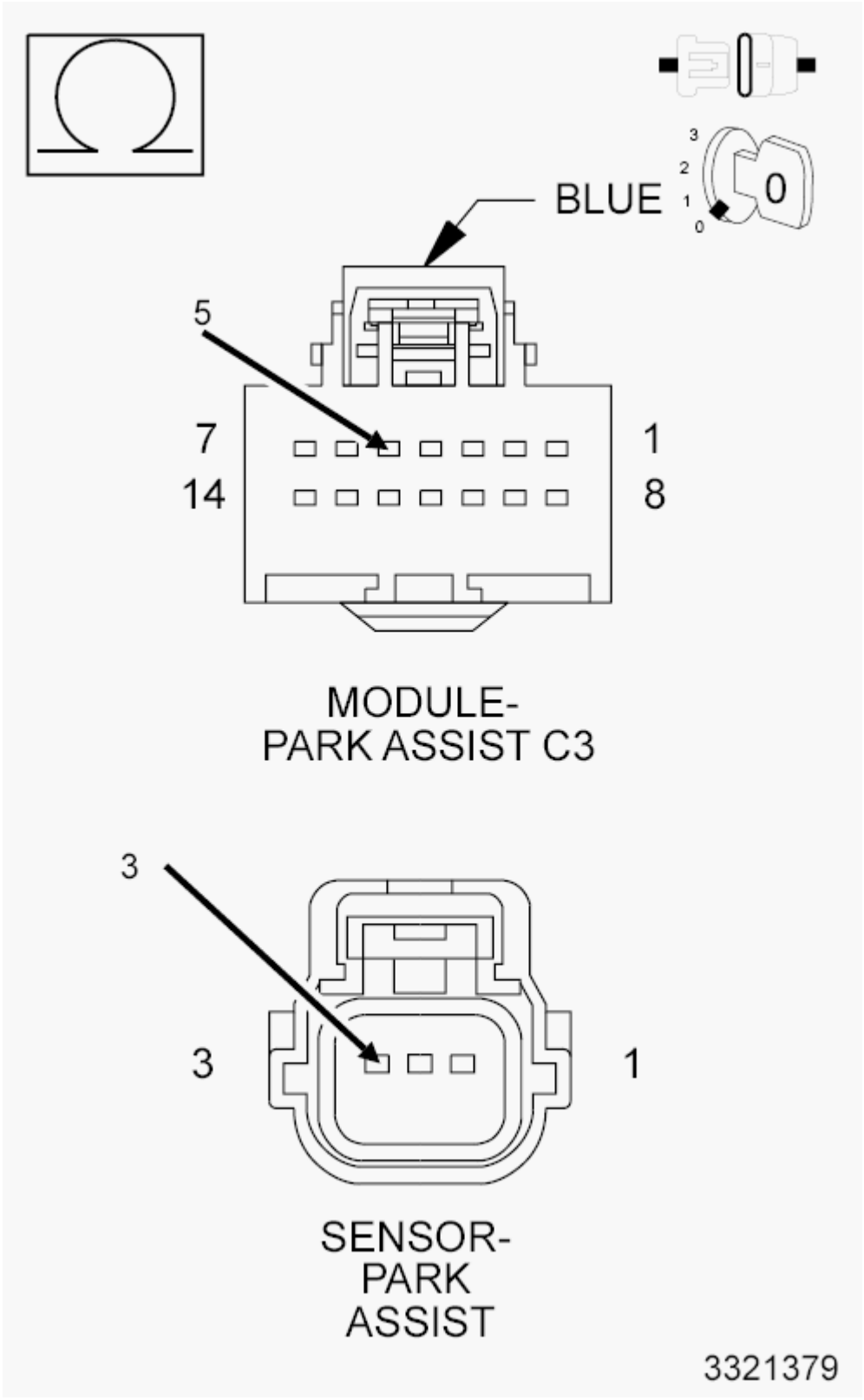


Fig. 41: Checking Park Assist Sensor 3 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (D706) Park Assist Sensor 3 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D706) Park Assist Sensor 3 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

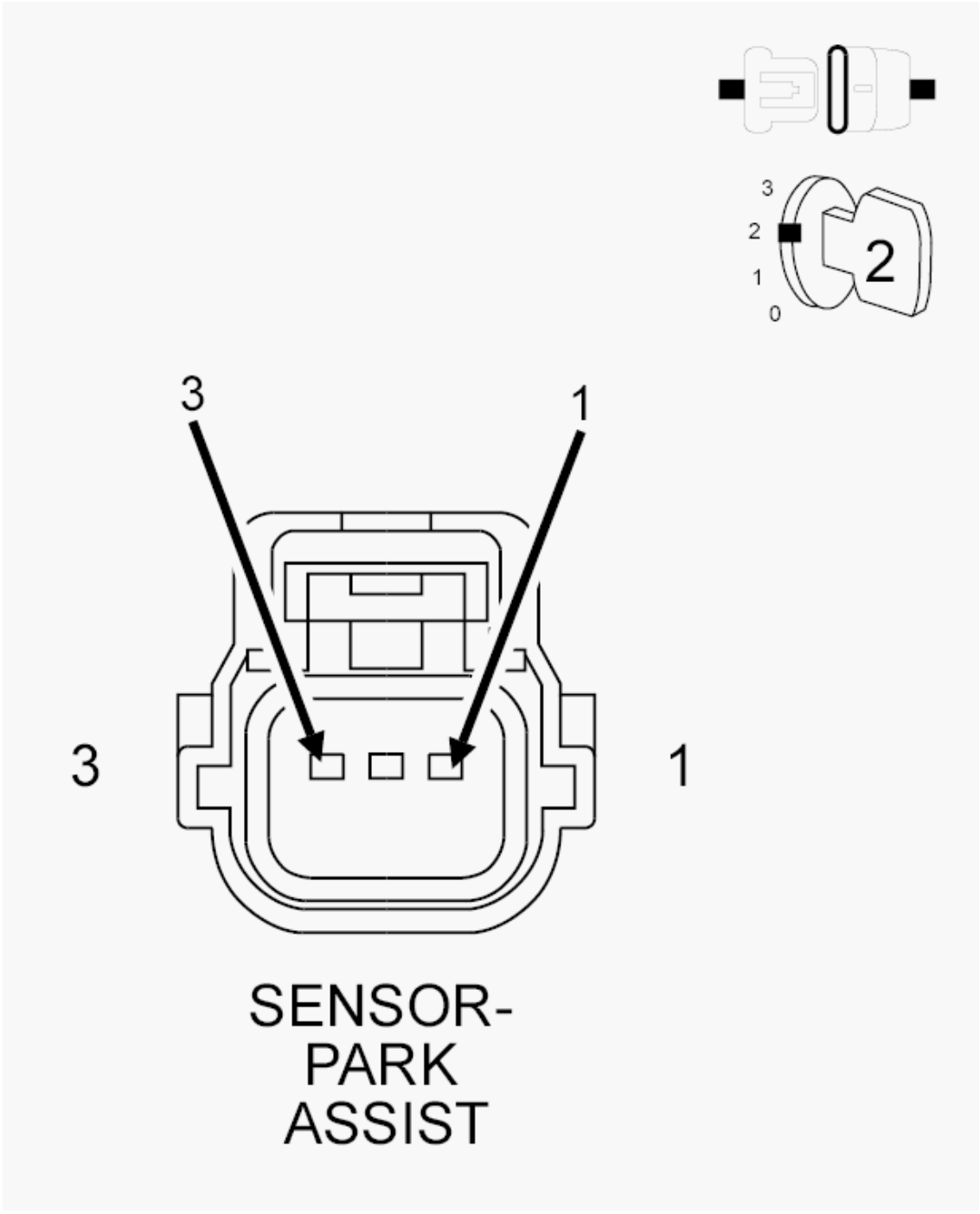


Fig. 42: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C3 harness connector.
3. Connect a jumper wire across the (X702) Front Park Assist Sensor Supply and (D706) Park Assist Sensor 3 Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1290-12-PTS SENSOR 3 - CIRCUIT SHORT TO BATTERY as active?

   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1290-12-PTS SENSOR 3 - CIRCUIT SHORT TO BATTERY

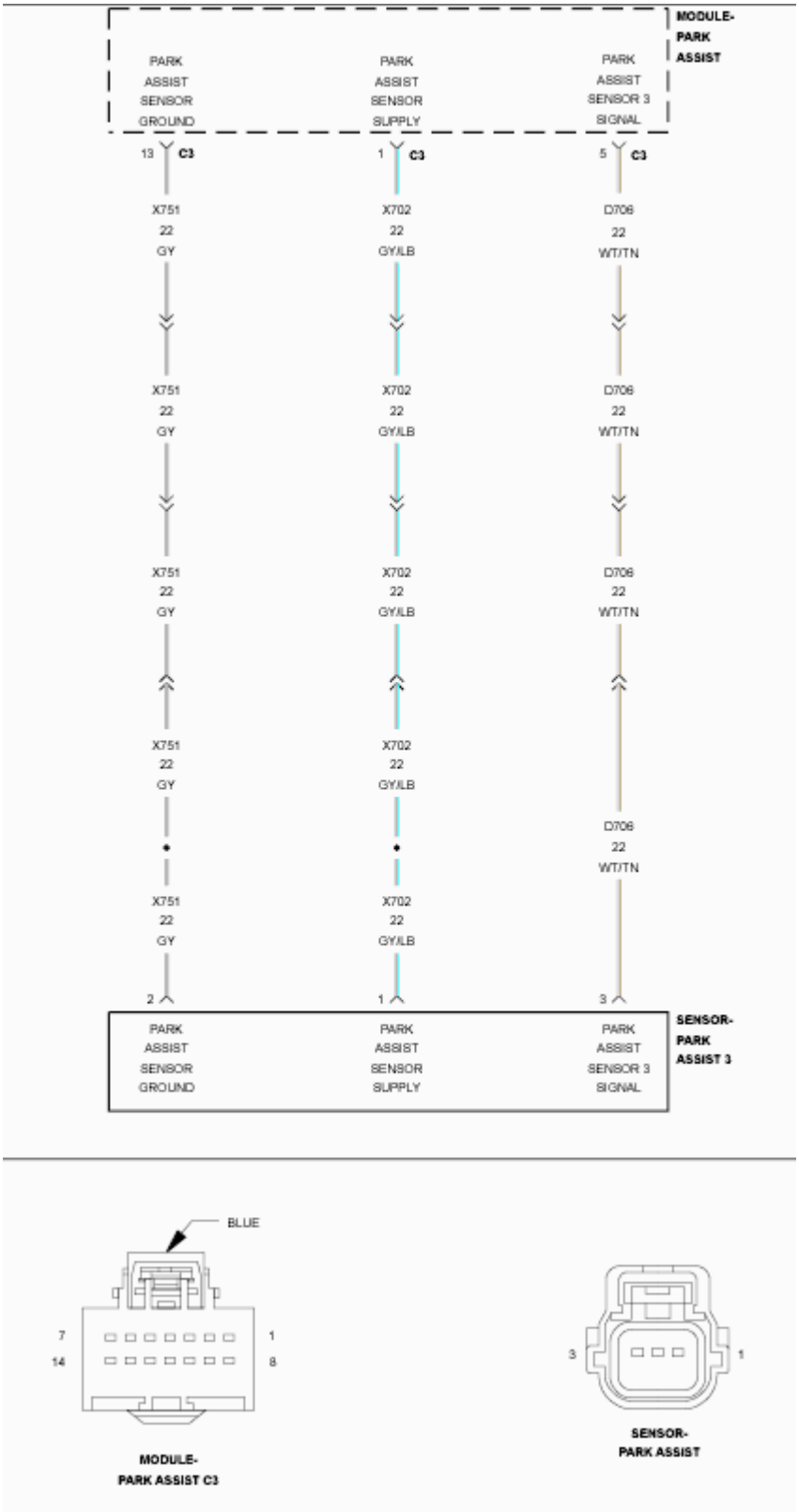


Fig. 43: Park Assist Sensor Circuit Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT
(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

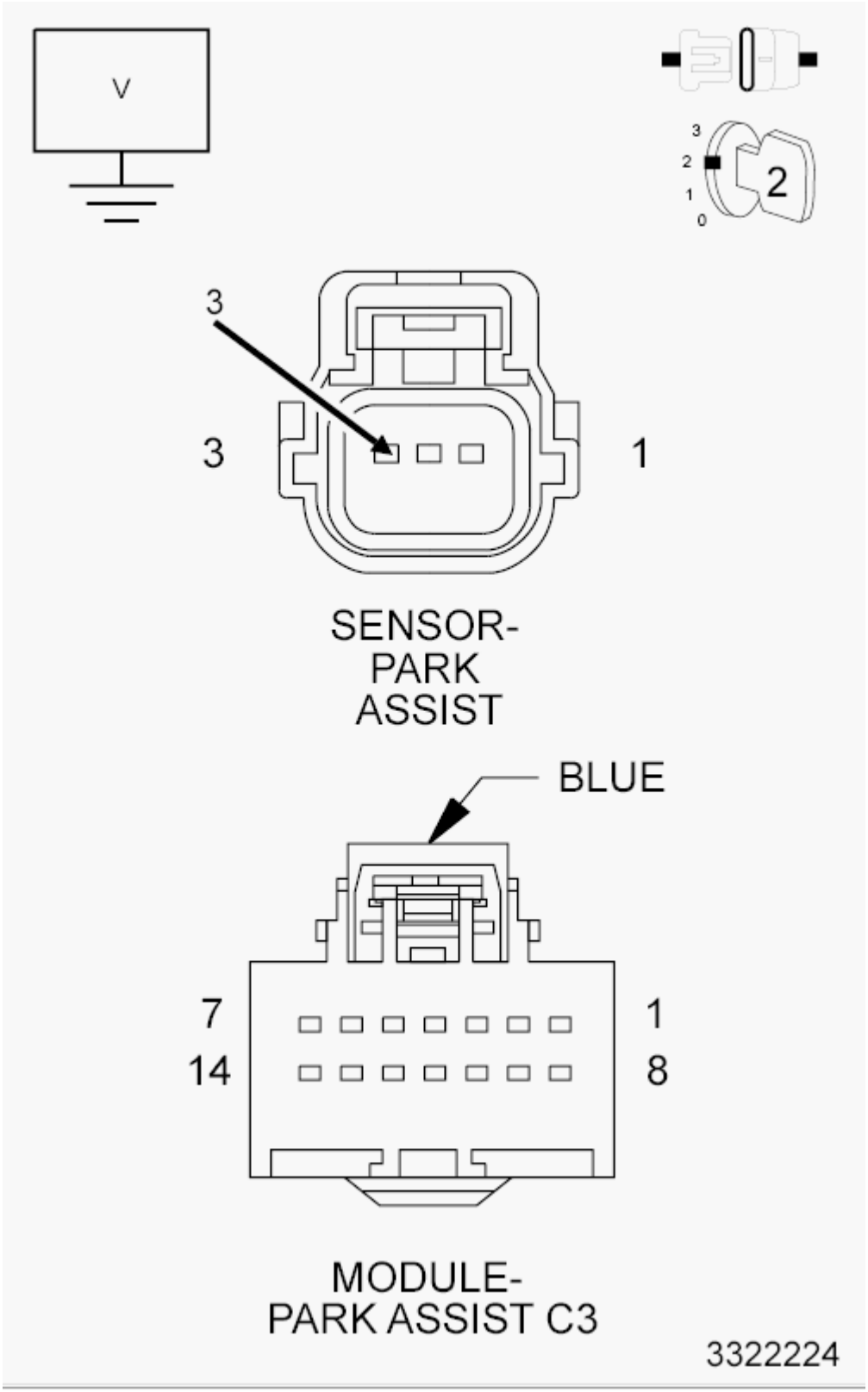


Fig. 44: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D706) Park Assist Sensor 3 Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Repair the (D706) Park Assist Sensor 3 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

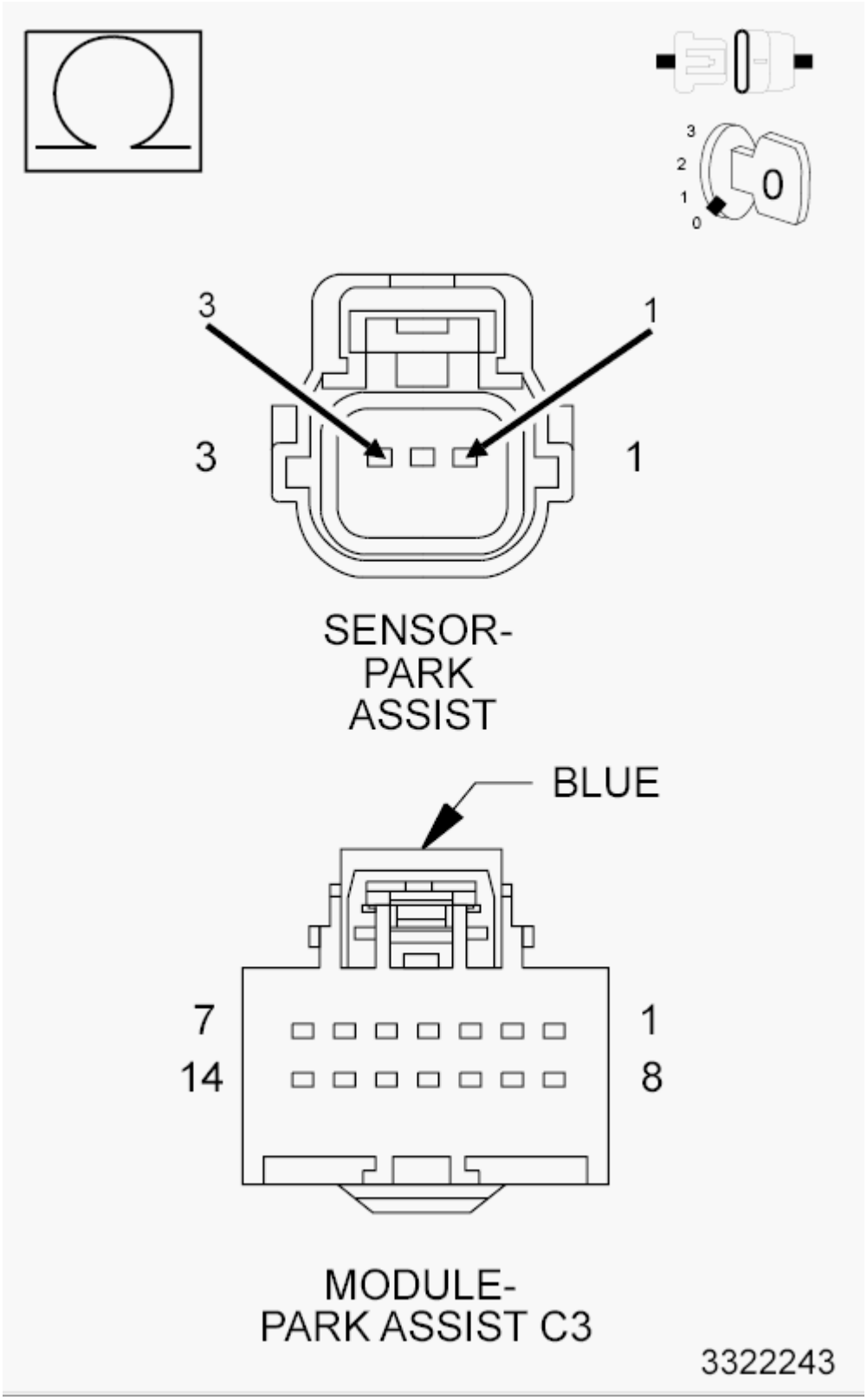


Fig. 45: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Supply Circuit

Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D706) Park Assist Sensor 3 Signal circuit and the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D706) Park Assist Sensor 3 Signal circuit for a short to the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

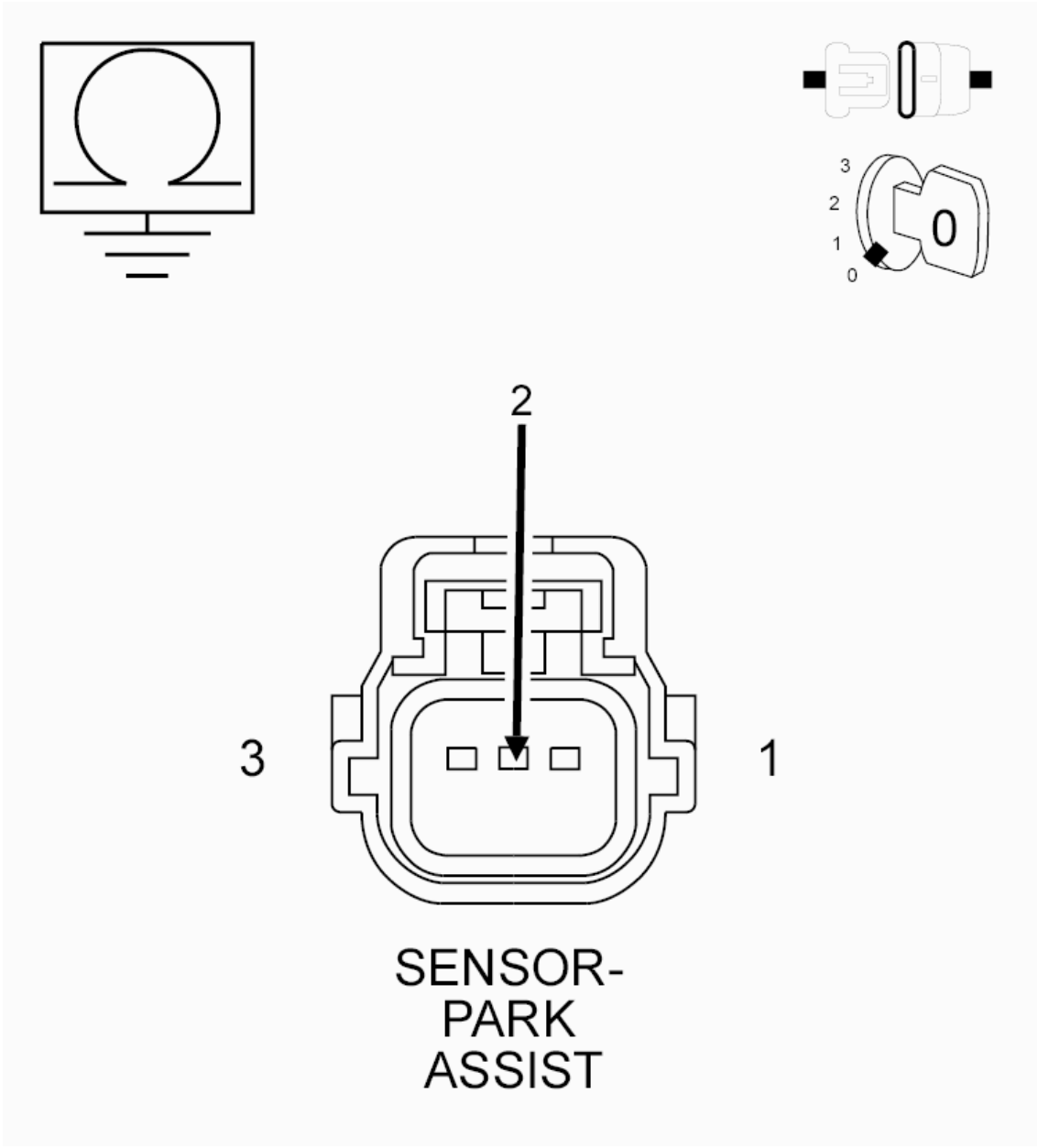


Fig. 46: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

   Yes

   - Go To 5.

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**

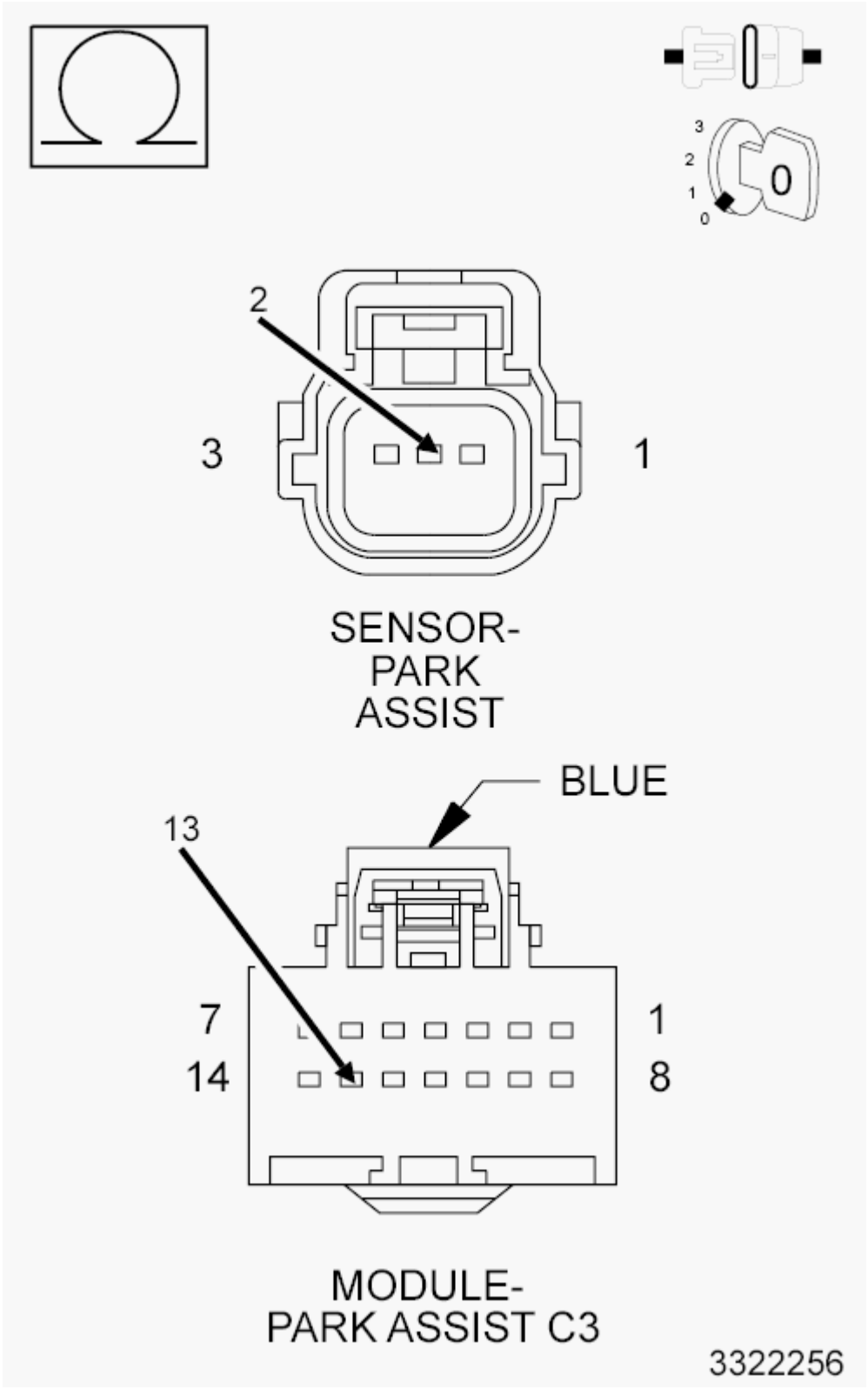


Fig. 47: Checking Front Park Assist Sensor Ground Circuit For An Open Between Park Assist Module & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1290-25-PTS SENSOR 3 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

      - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1290-92-PTS SENSOR 3 - PERFORMANCE OR INCORRECT OPERATION

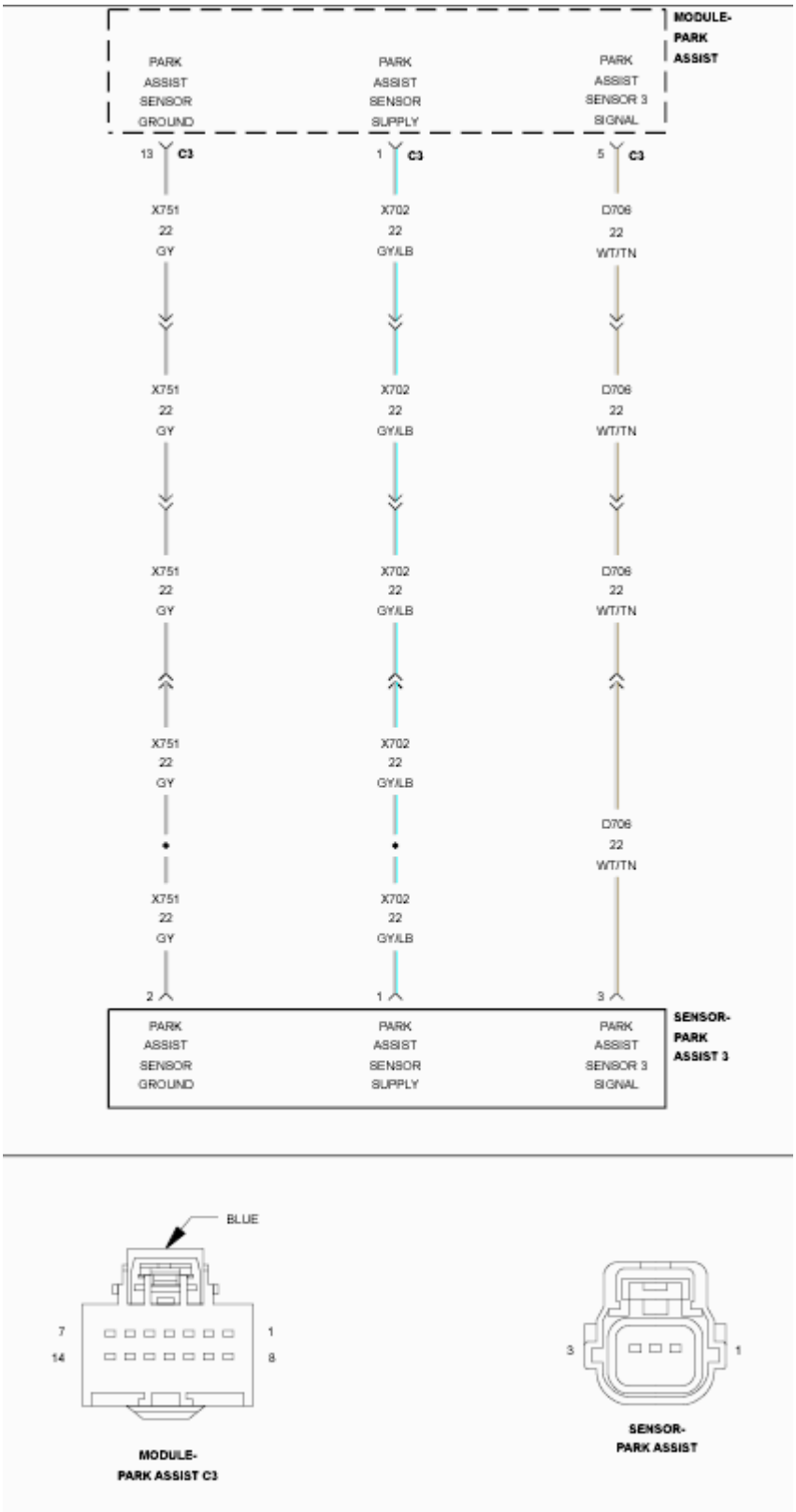


Fig. 48: Park Assist Sensor Circuit Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE PARK ASSIST SENSOR FOR AN INTERNAL SHORT**
    1. Disconnect the Park Assist Sensor harness connector.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor 3 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

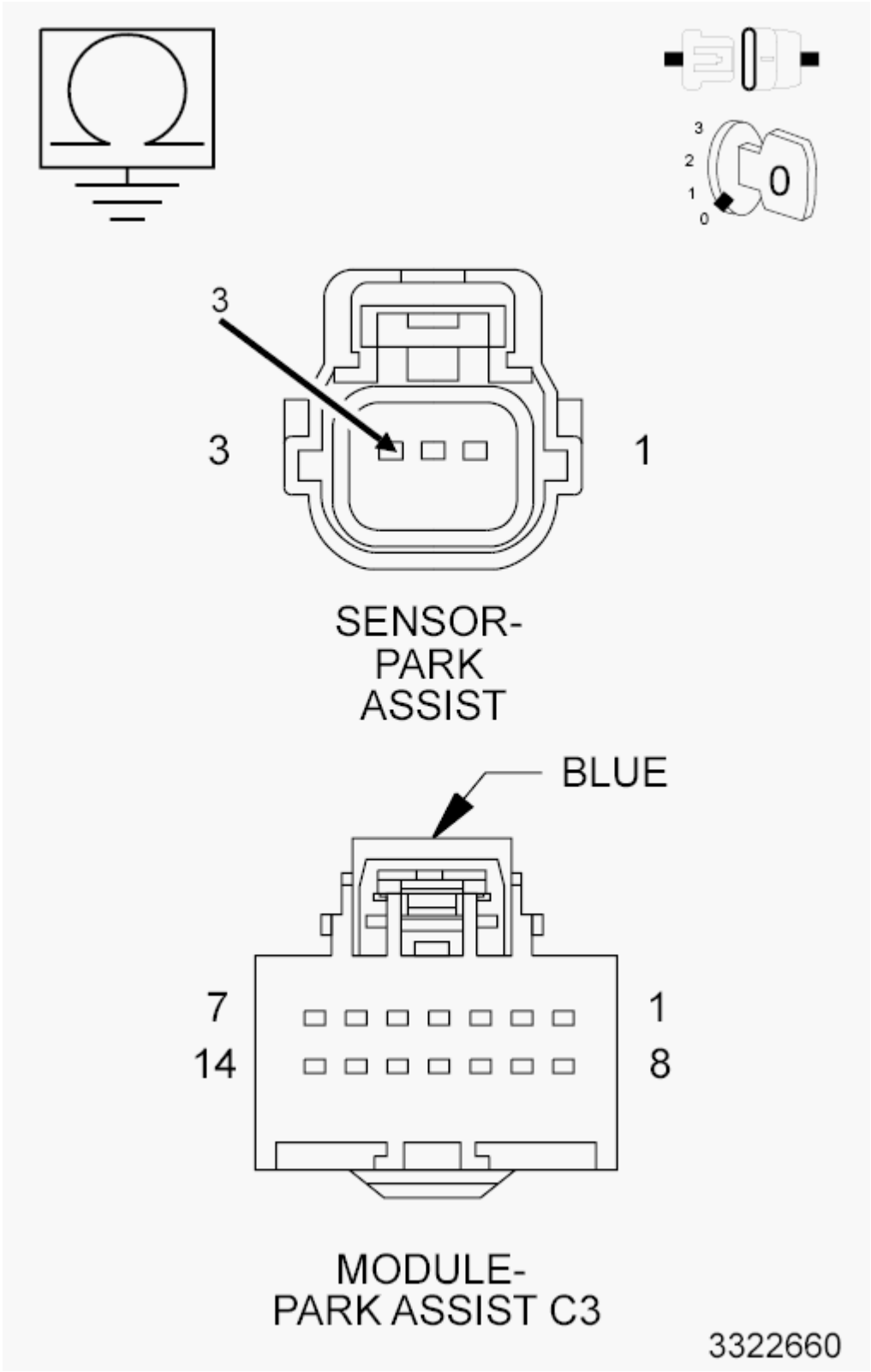


Fig. 49: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance between ground and the (D706) Park Assist Sensor 3 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D706) Park Assist Sensor 3 Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

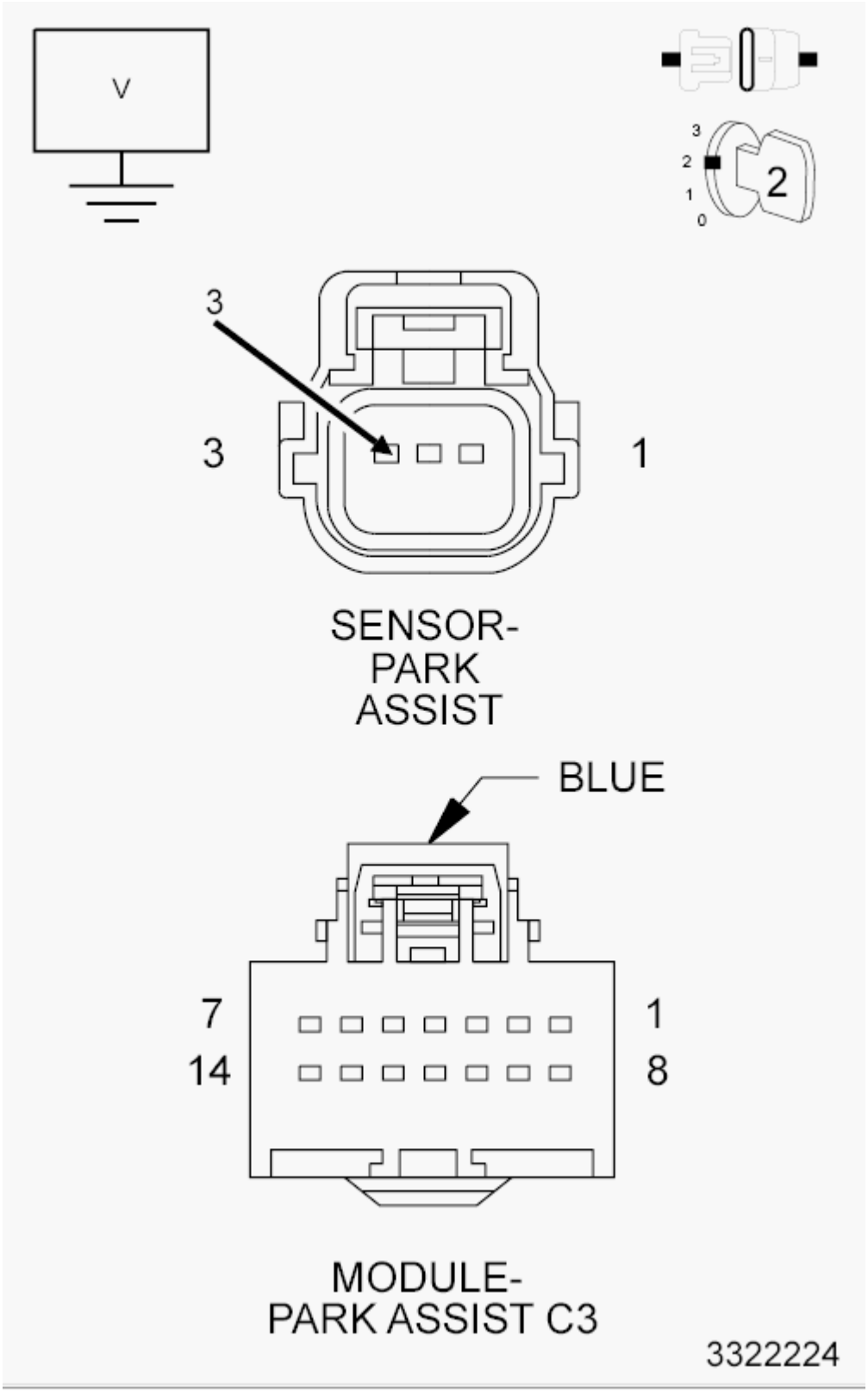


Fig. 50: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Measure the voltage of the (D706) Park Assist Sensor 3 Signal circuit.

   Is voltage present?

   Yes

   - Repair the (D706) Park Assist Sensor 3 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D706) PARK ASSIST SENSOR 3 SIGNAL CIRCUIT FOR AN OPEN**

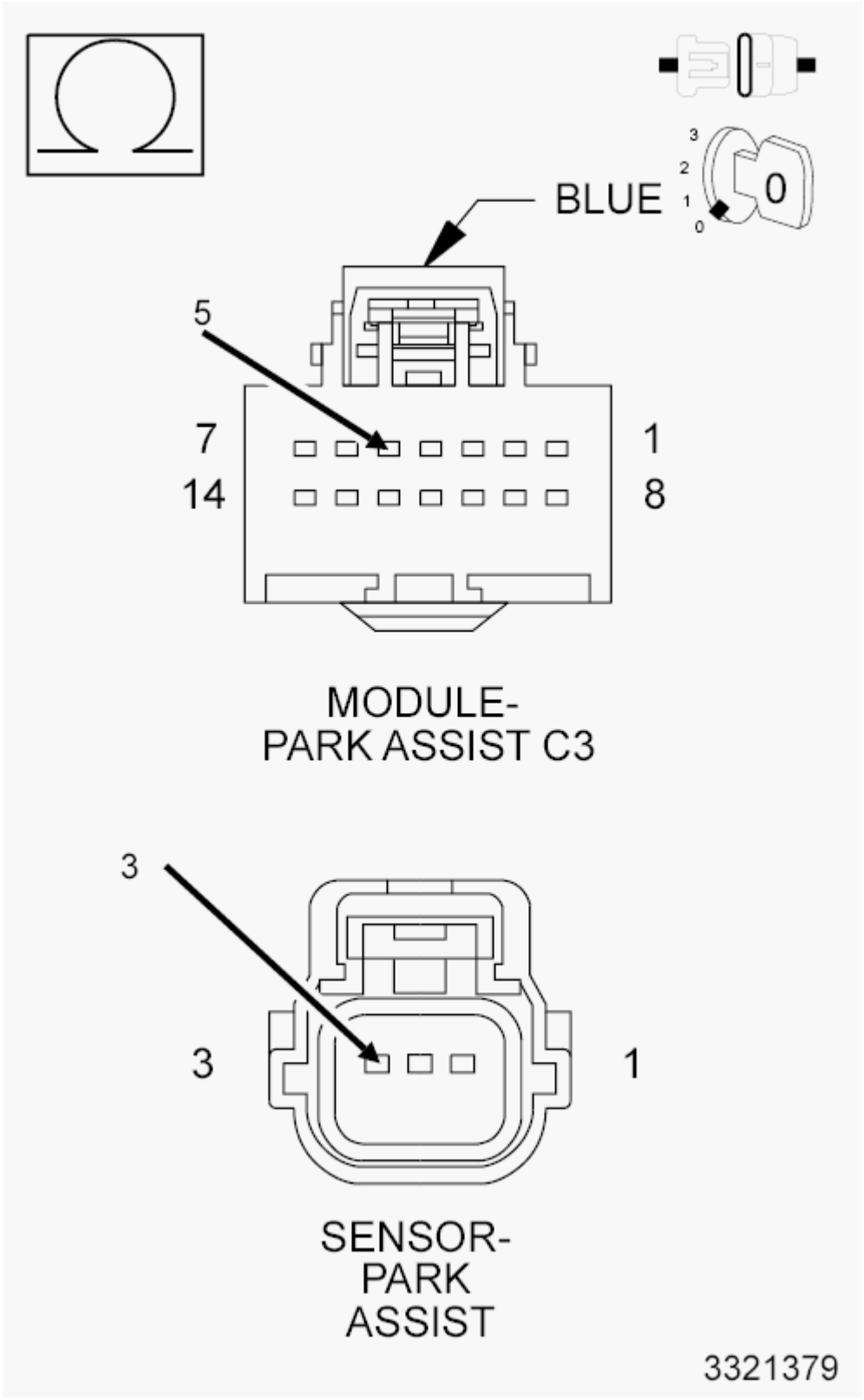


Fig. 51: Checking Park Assist Sensor 3 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D706) Park Assist Sensor 3 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (D706) Park Assist Sensor 3 Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1291-11-PTS SENSOR 4- CIRCUIT SHORT TO GROUND

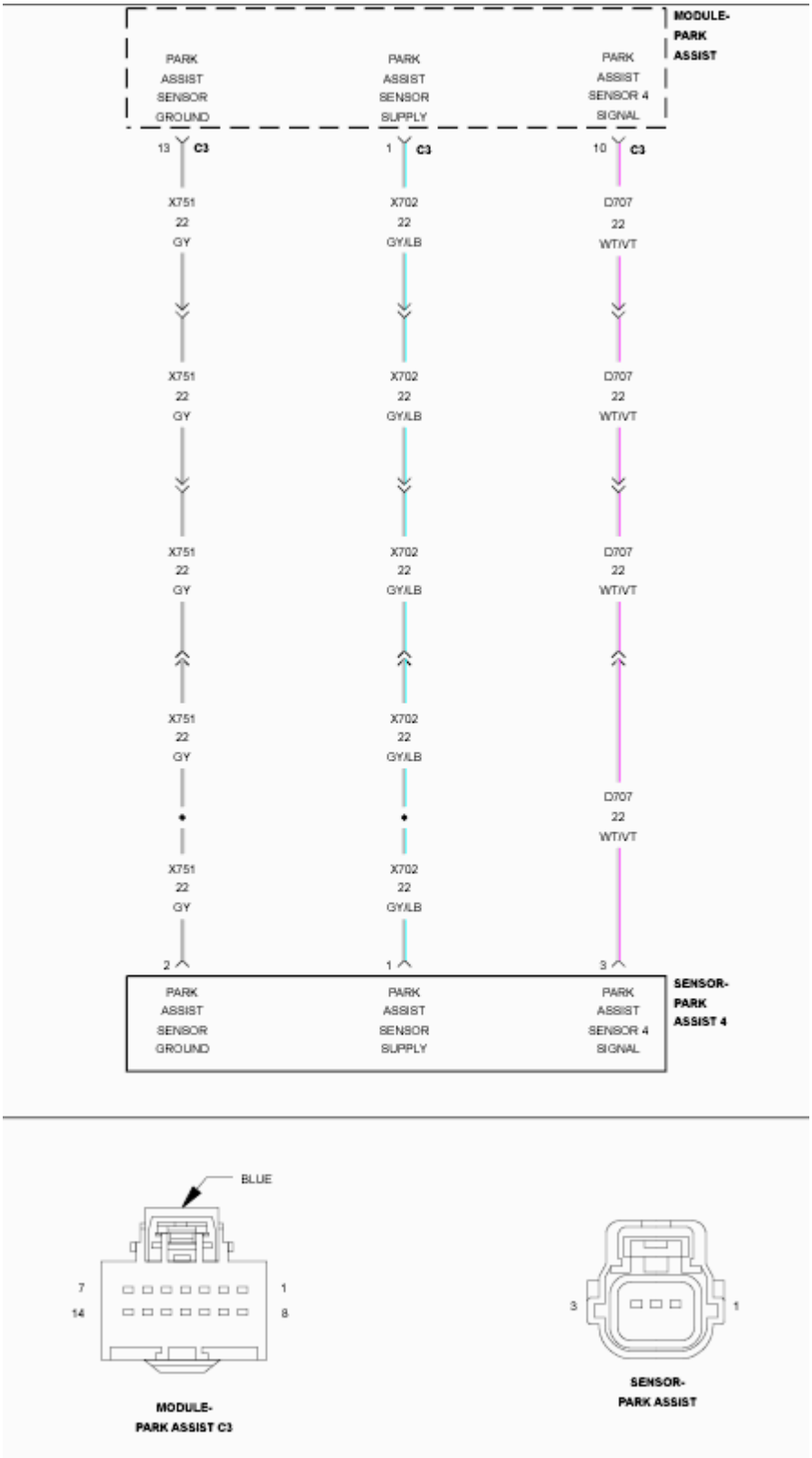


Fig. 52: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR AN OPEN
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

   1. Turn the ignition on.

2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

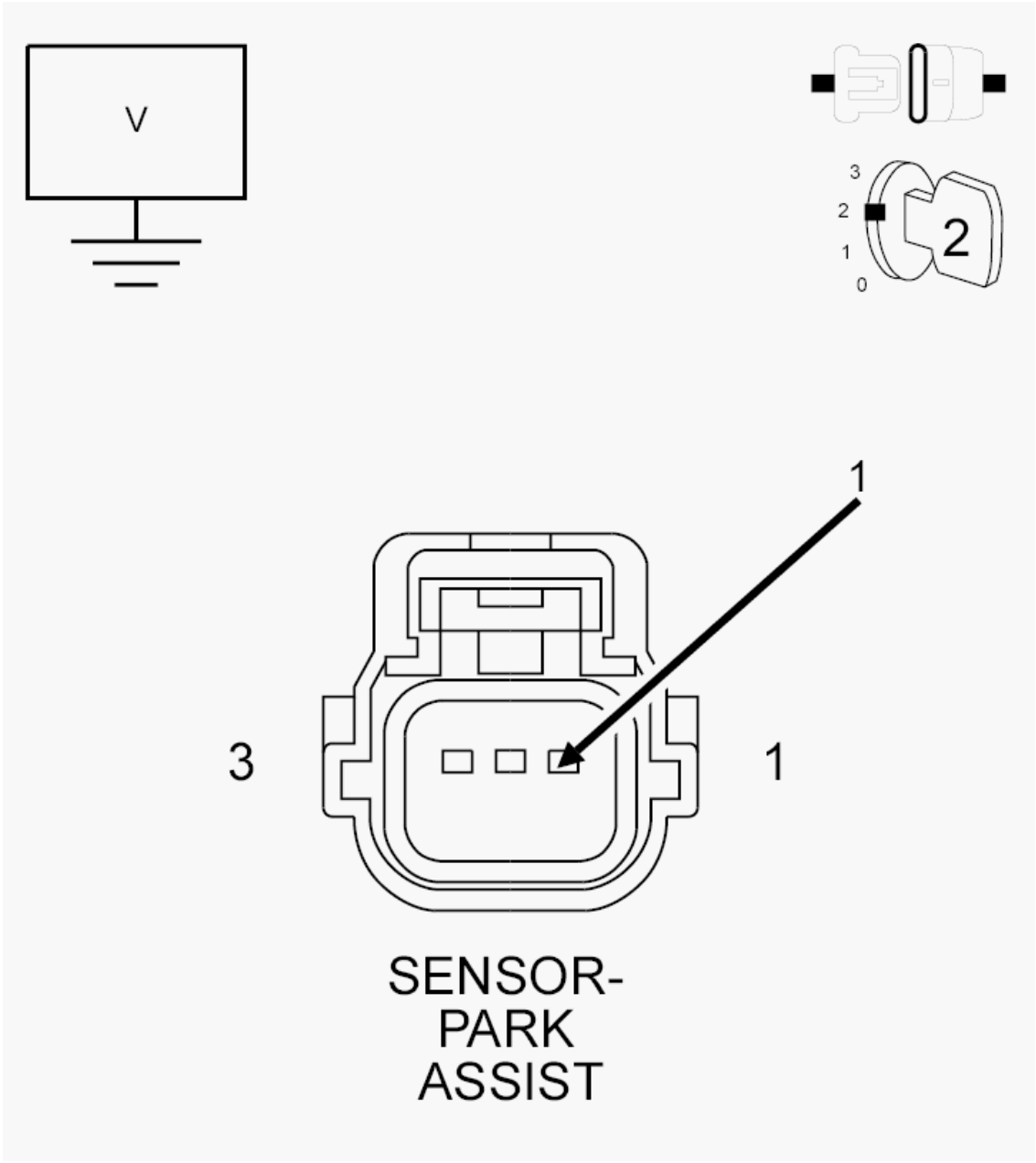


Fig. 53: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X702) Front Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

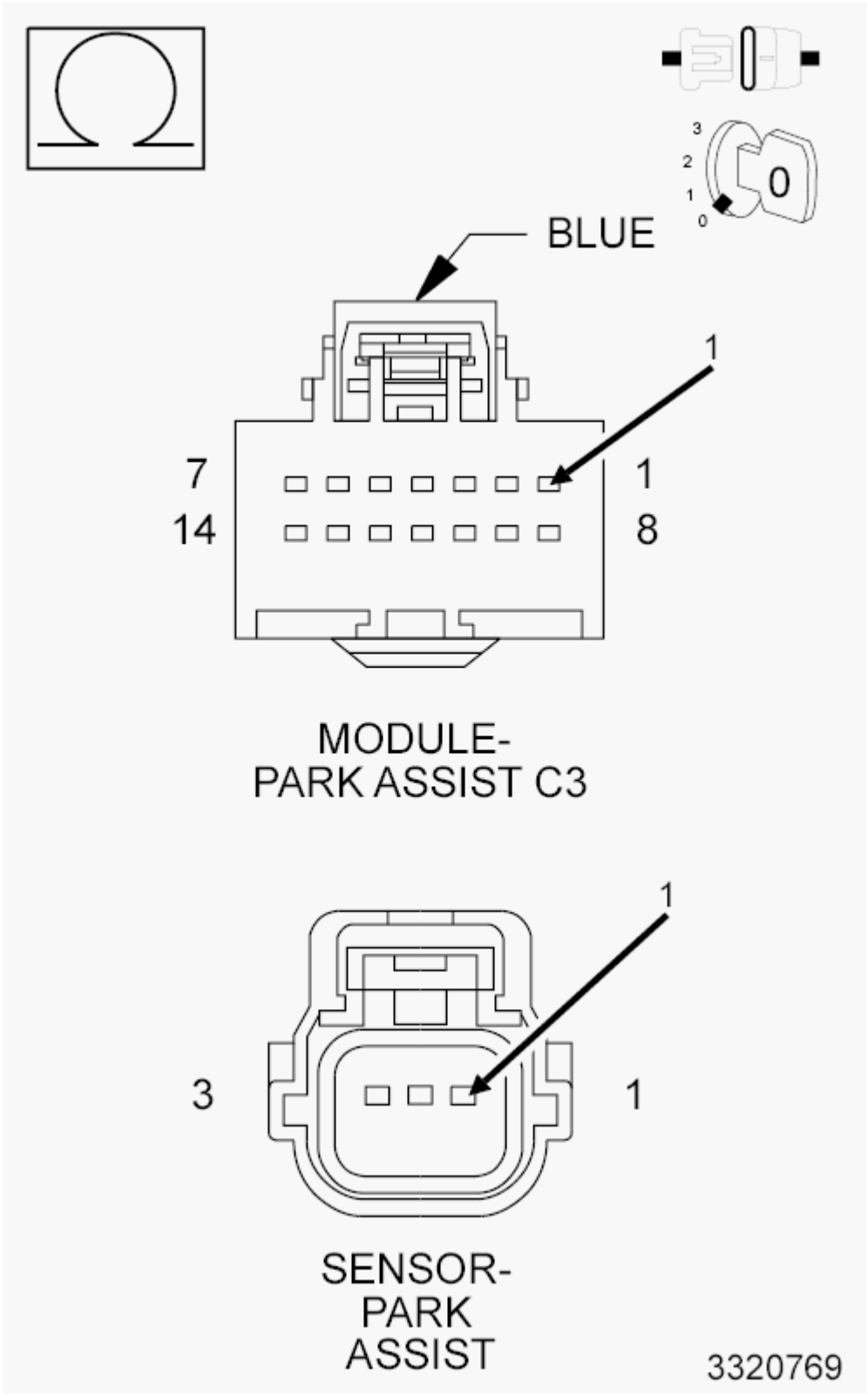


Fig. 54: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance of the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

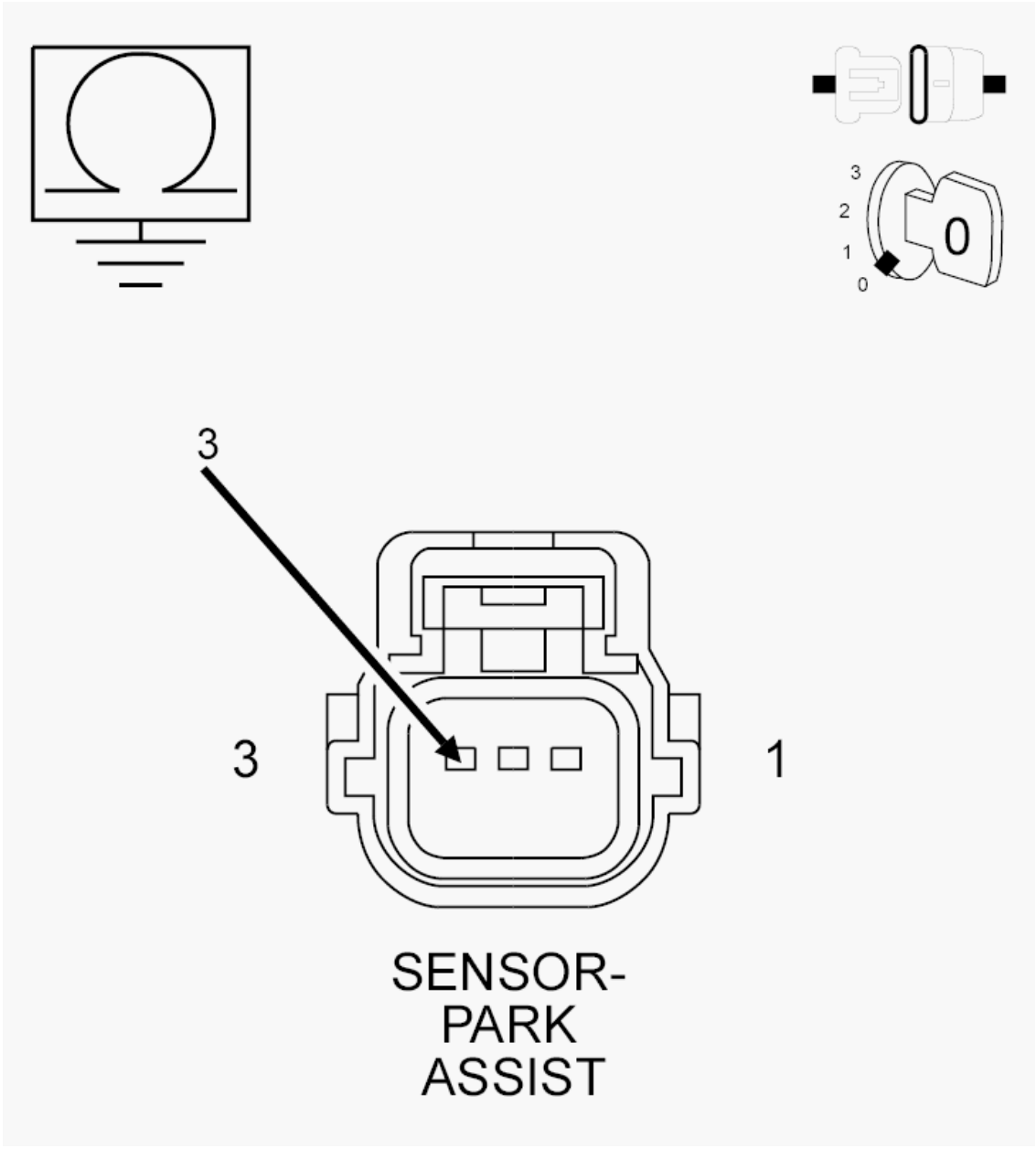


Fig. 55: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D707) Park Assist Sensor 4 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

- Go To 5.

No

- Go To 7.

5. **CHECK THE (D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**

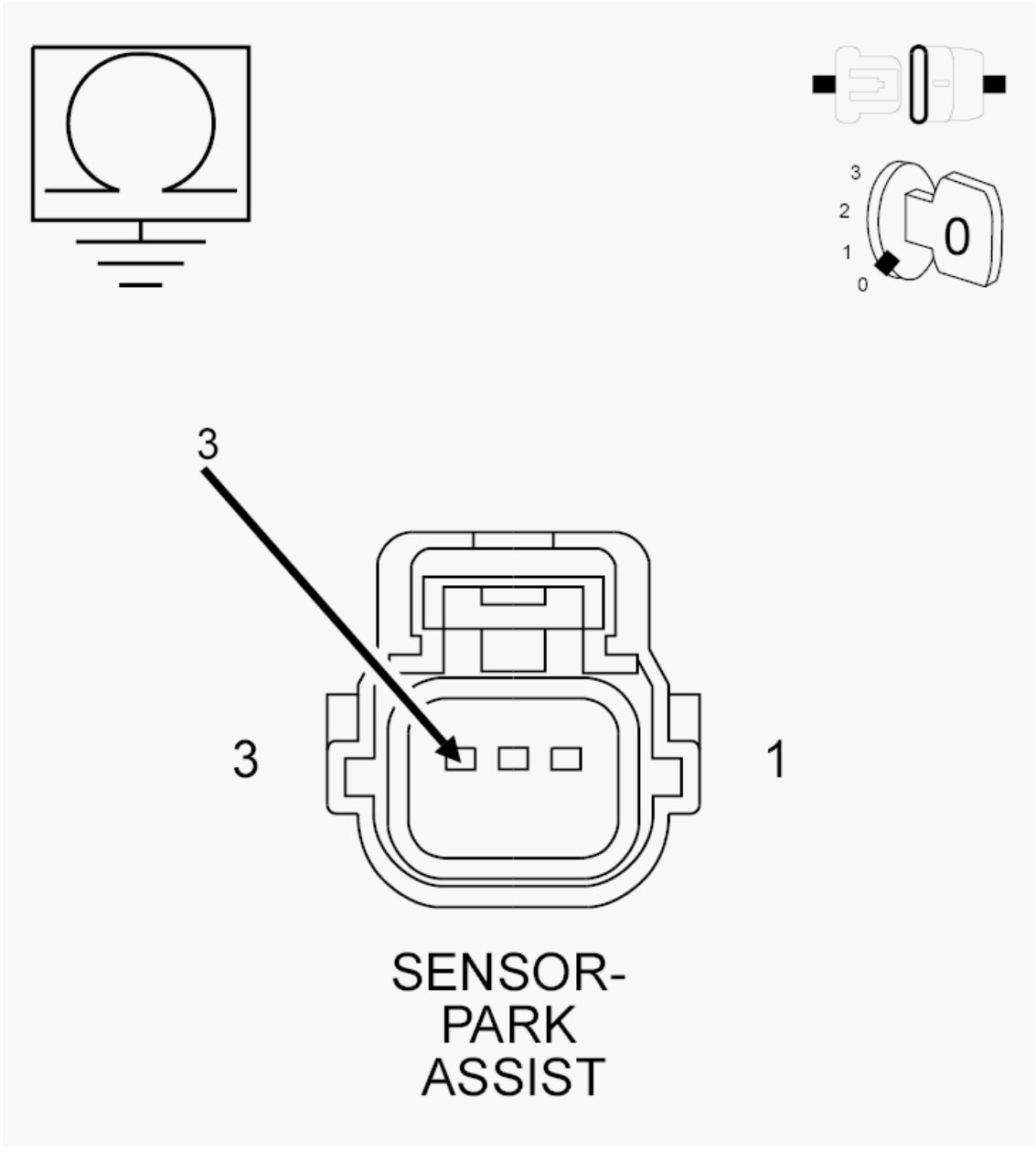


Fig. 56: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.

2. Measure the resistance between ground and the (D707) Park Assist Sensor 4 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D707) Park Assist Sensor 4 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT**

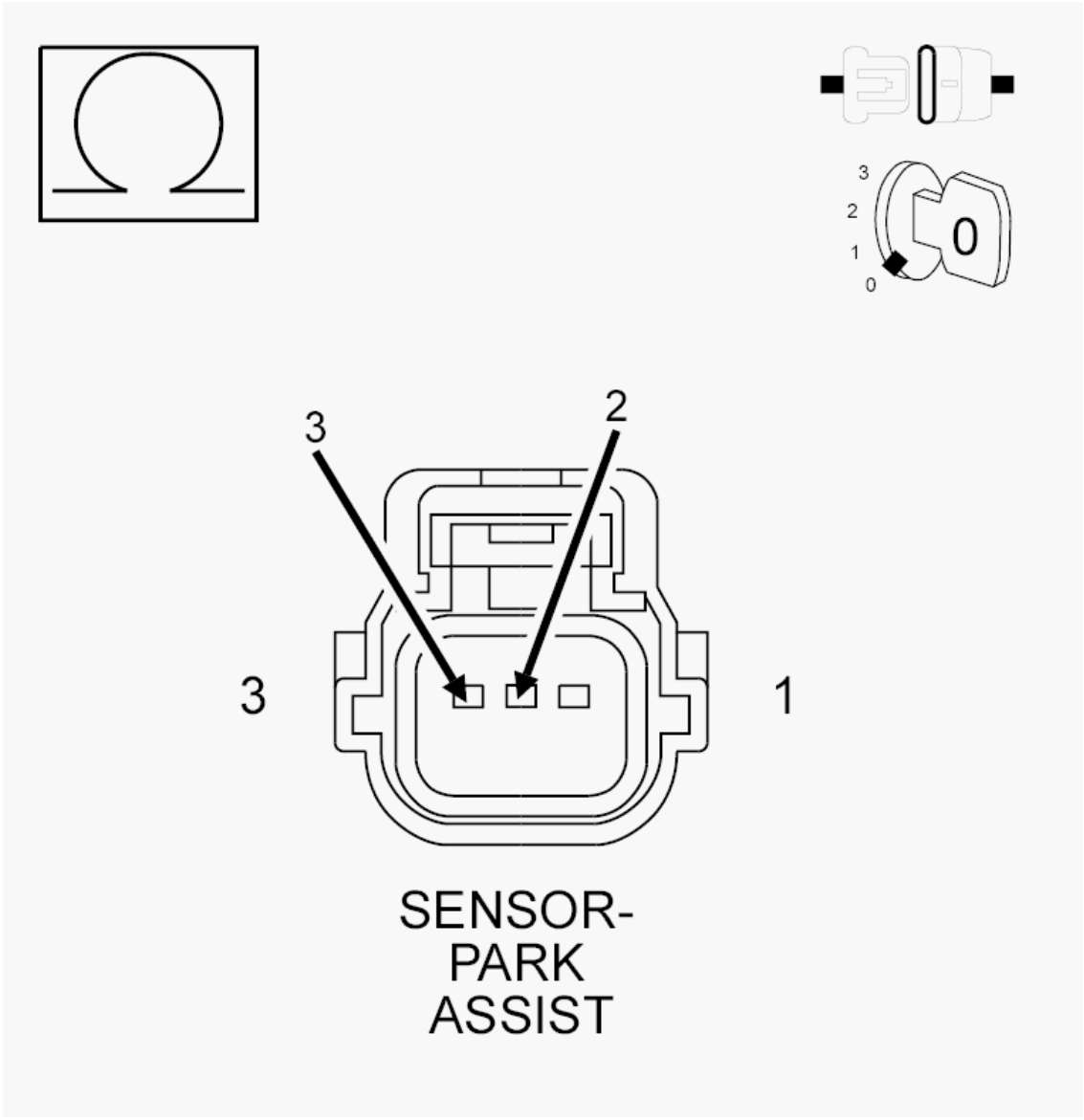


Fig. 57: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D707) Park Assist Sensor 4 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D707) Park Assist Sensor 4 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR AN OPEN**

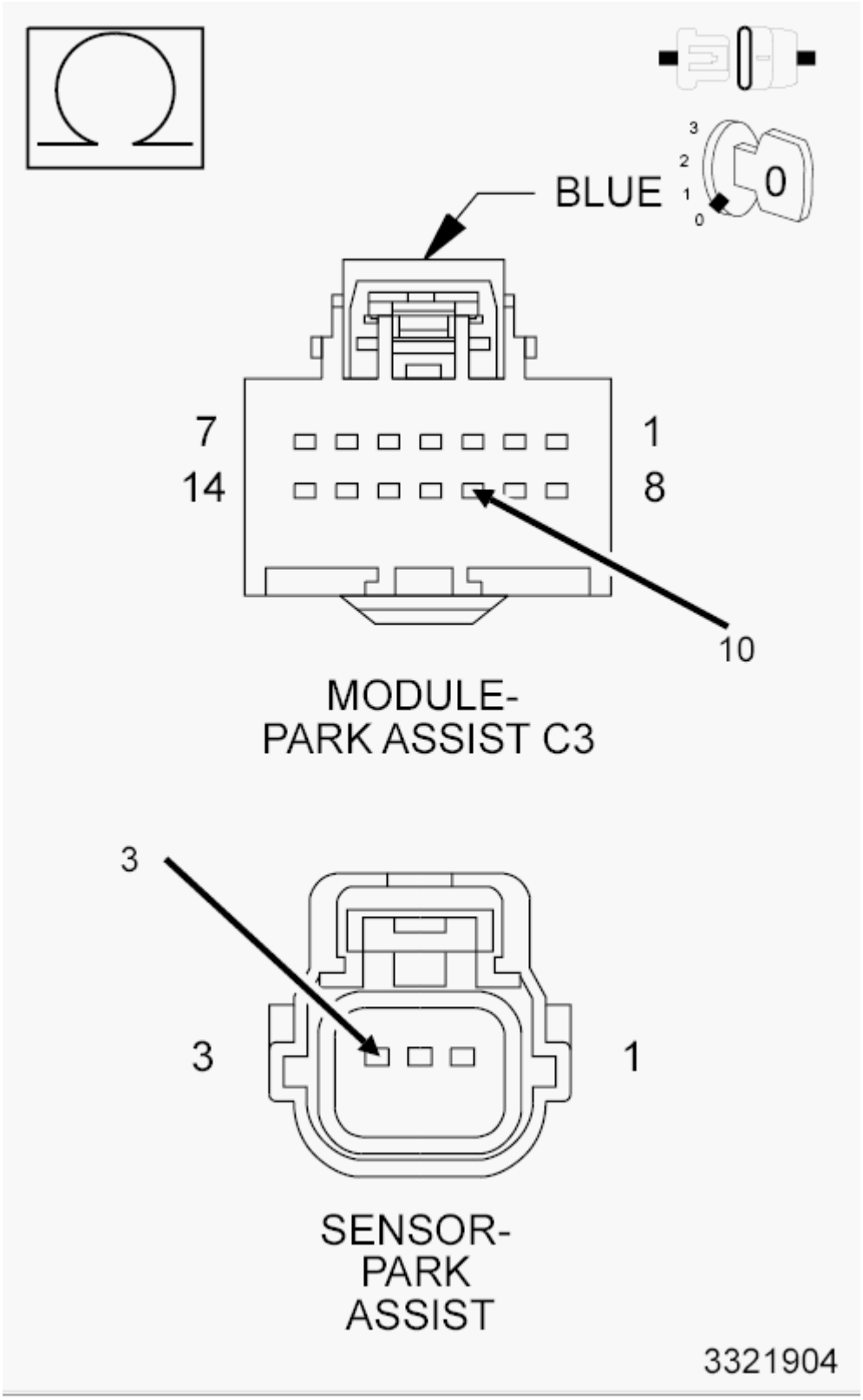


Fig. 58: Checking Park Assist Sensor 4 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (D707) Park Assist Sensor 4 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D707) Park Assist Sensor 4 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

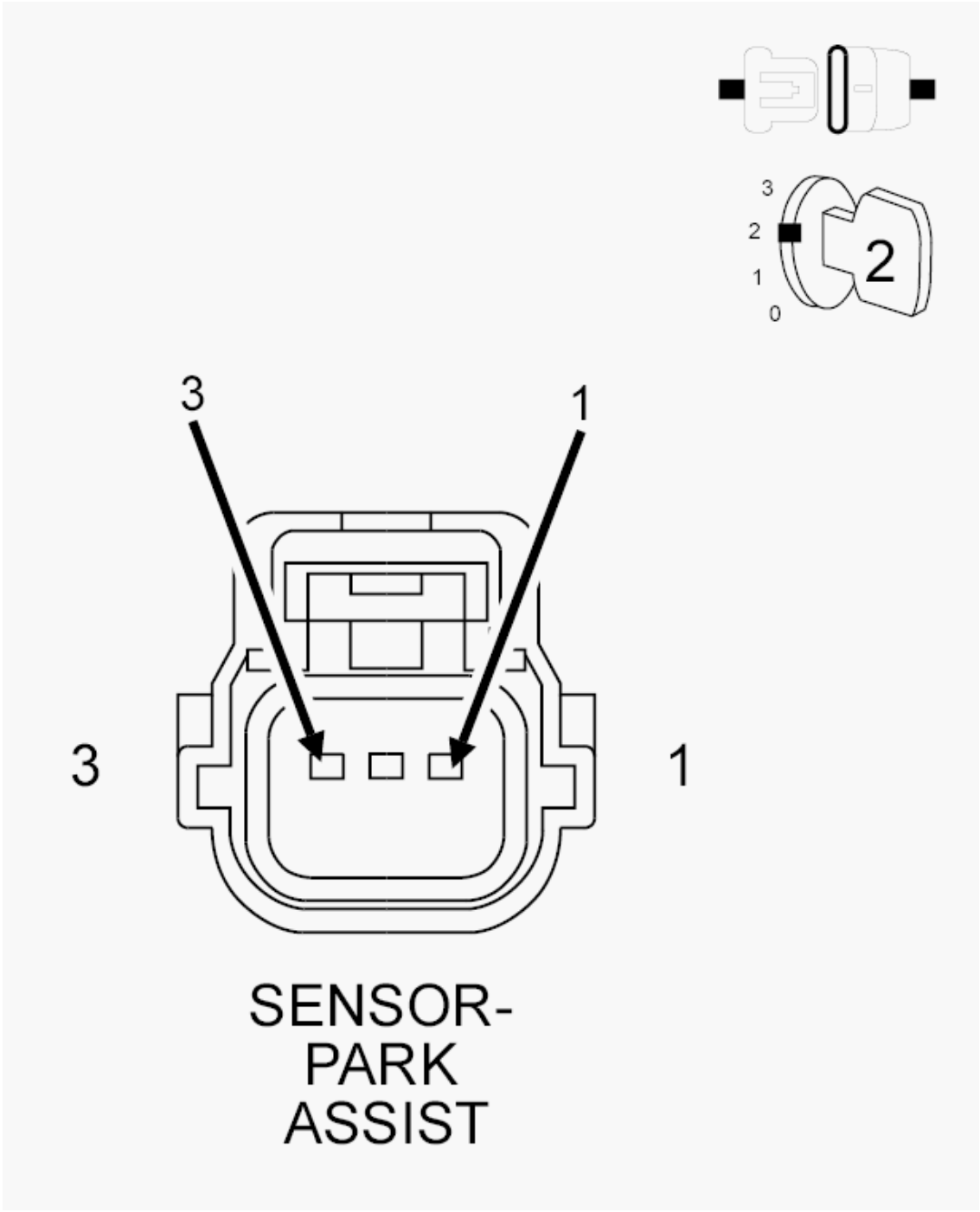


Fig. 59: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C3 harness connector.
3. Connect a jumper wire across the (X702) Front Park Assist Sensor Supply and (D707) Park Assist Sensor 4 Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1291-12-PTS SENSOR 4 - CIRCUIT SHORT TO BATTERY as active?

   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1291-12-PTS SENSOR 4 - CIRCUIT SHORT TO BATTERY

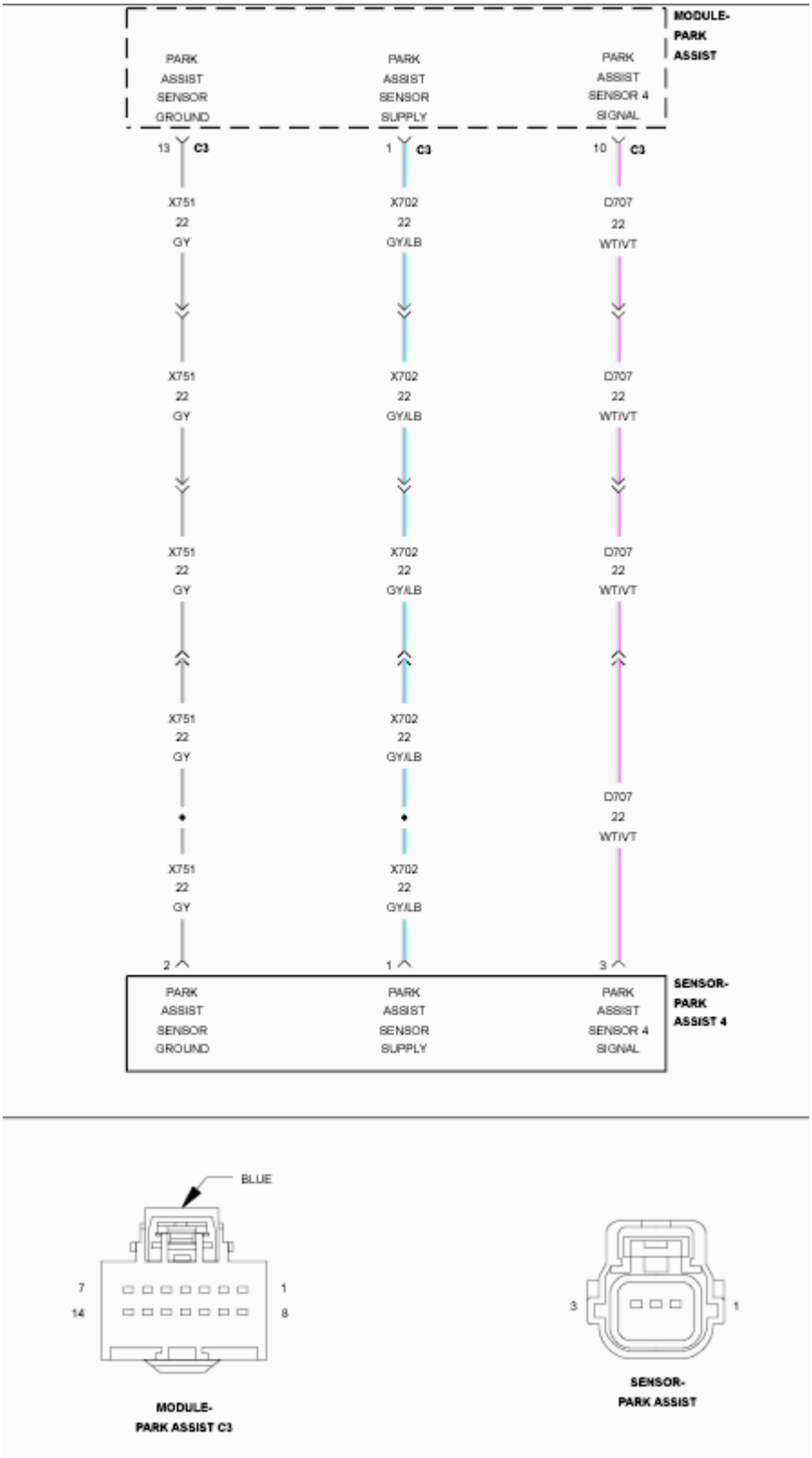


Fig. 60: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT
(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

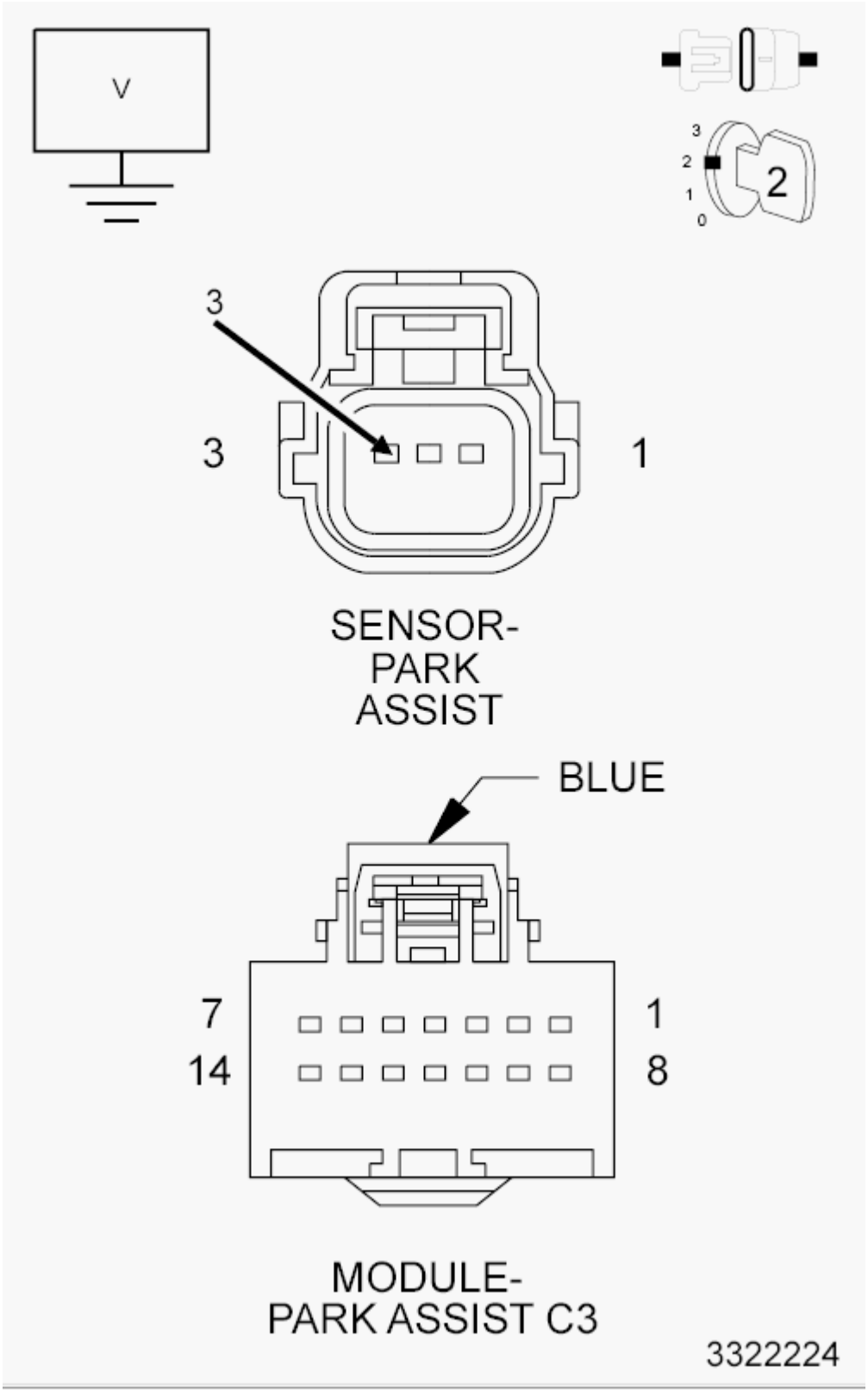


Fig. 61: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D707) Park Assist Sensor 4 Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Repair the (D707) Park Assist Sensor 4 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

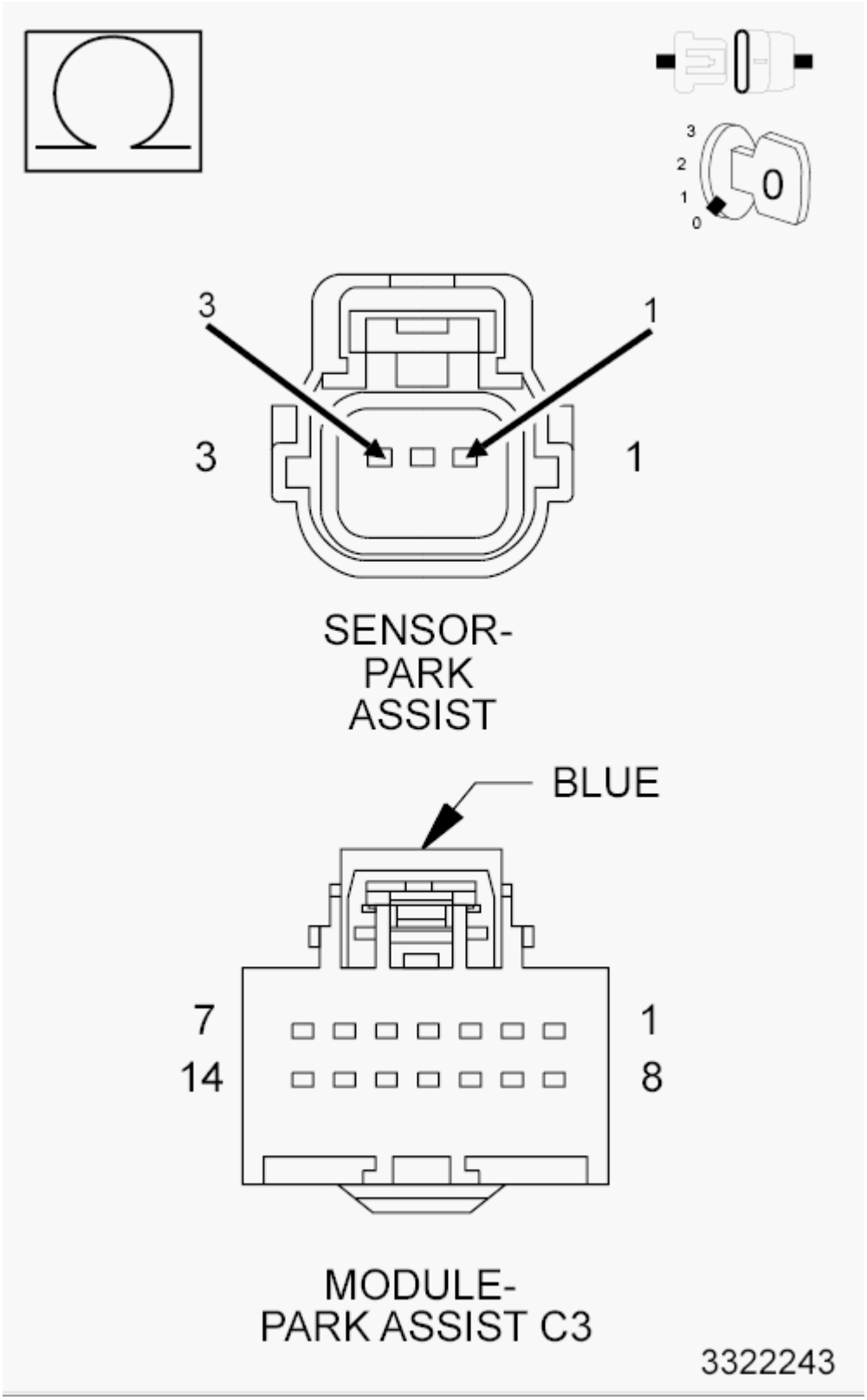


Fig. 62: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D707) Park Assist Sensor 4 Signal circuit and the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D707) Park Assist Sensor 4 Signal circuit for a short to the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

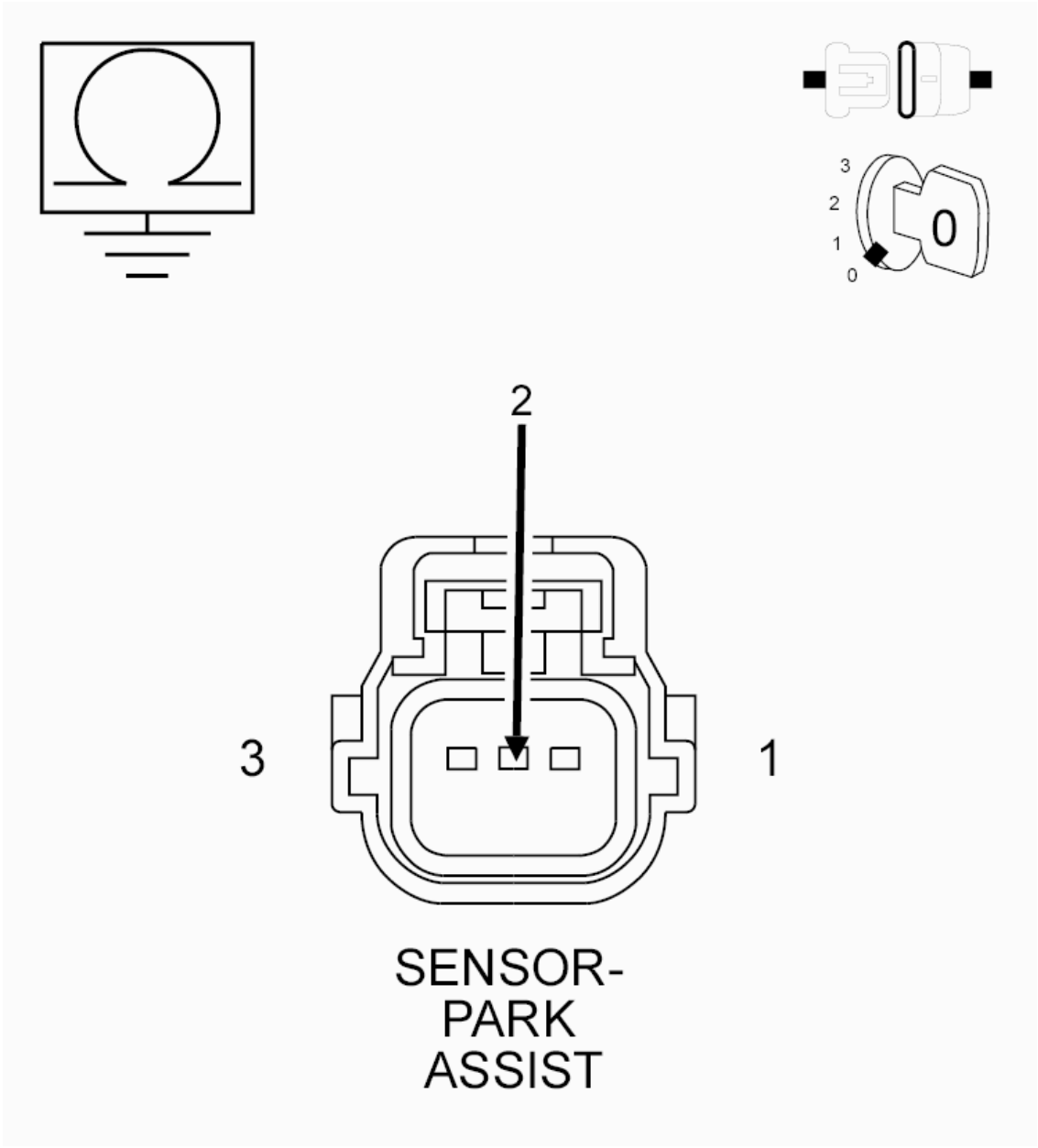


Fig. 63: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

   Yes

   - Go To 5.

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**

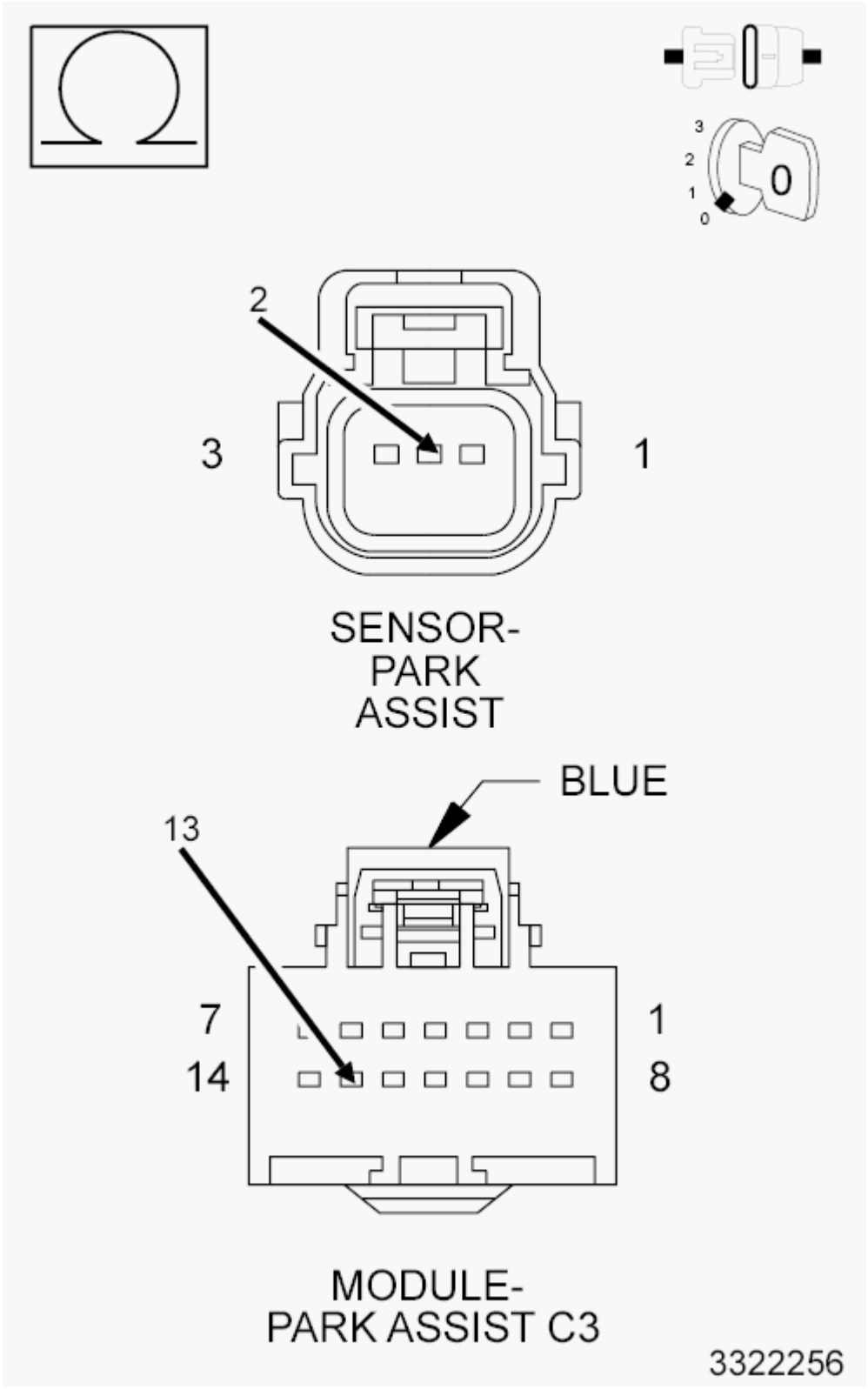


Fig. 64: Checking Front Park Assist Sensor Ground Circuit For An Open Between Park Assist Module & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1291-25-PTS SENSOR 4 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

      - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1291-92-PTS SENSOR 4 - PERFORMANCE OR INCORRECT OPERATION

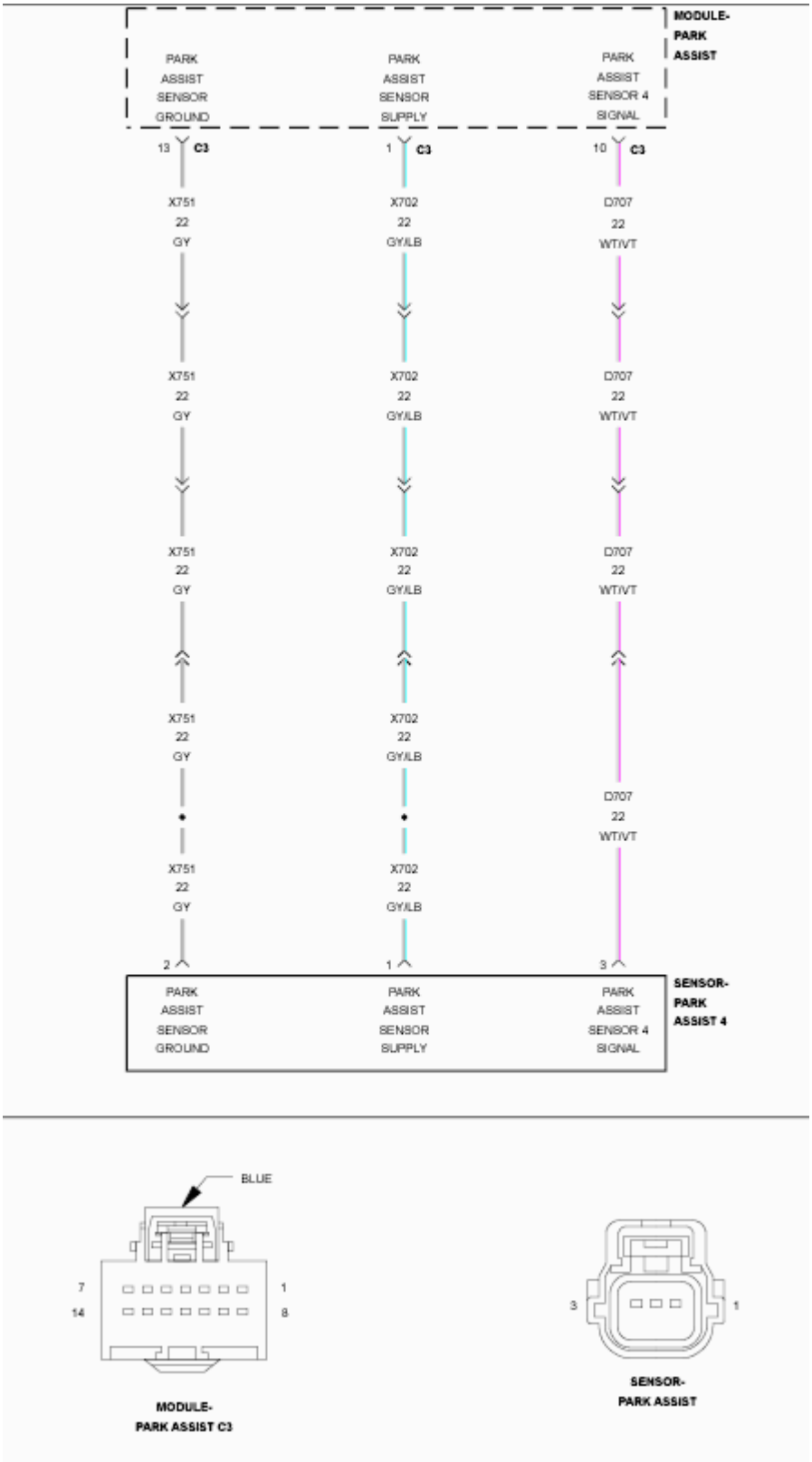


Fig. 65: Park Assist Sensor Wiring Diagram

Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE PARK ASSIST SENSOR FOR AN INTERNAL SHORT**
    1. Disconnect the Park Assist Sensor harness connector.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor 4 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

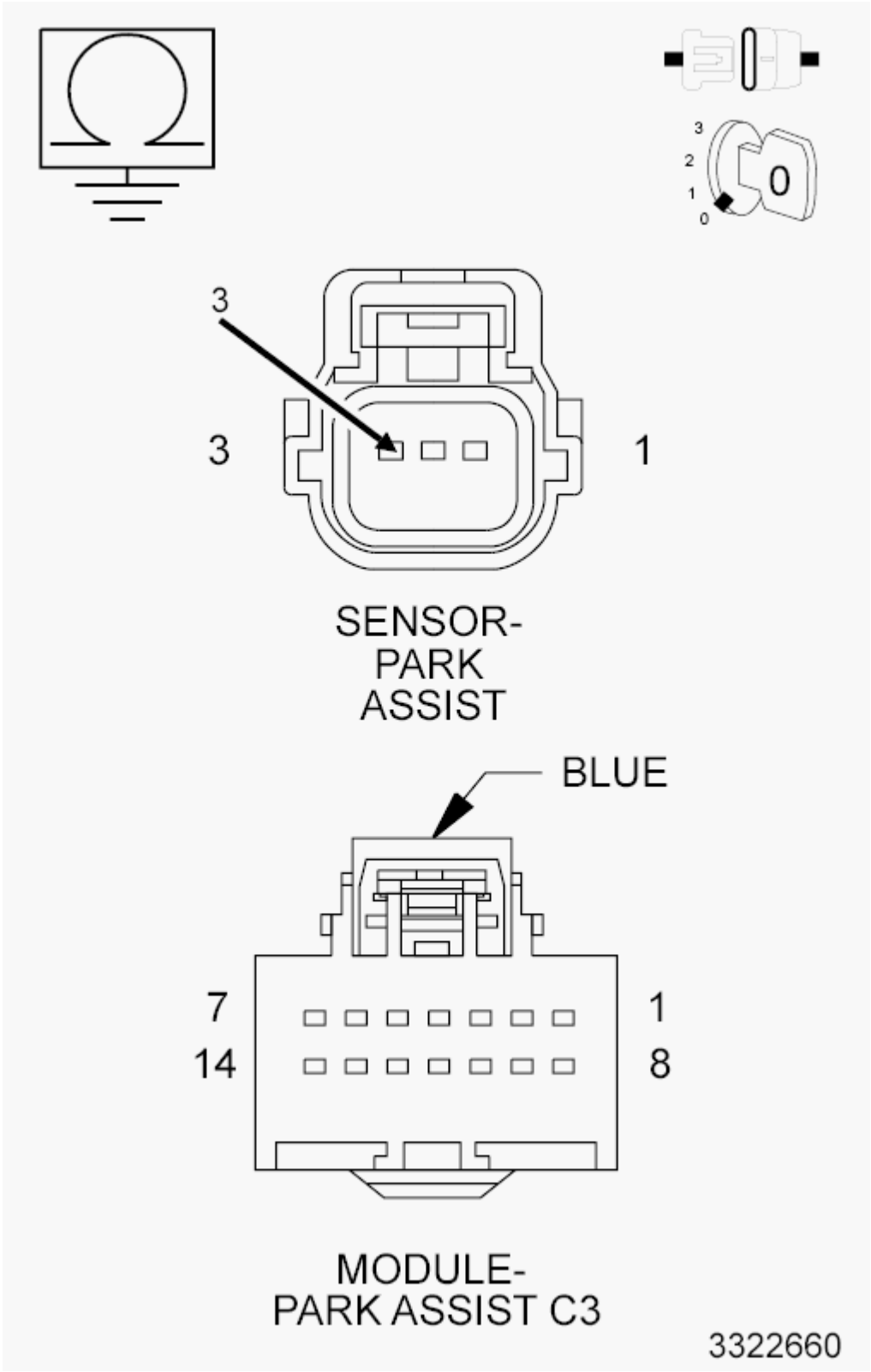


Fig. 66: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance between ground and the (D707) Park Assist Sensor 4 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D707) Park Assist Sensor 4 Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

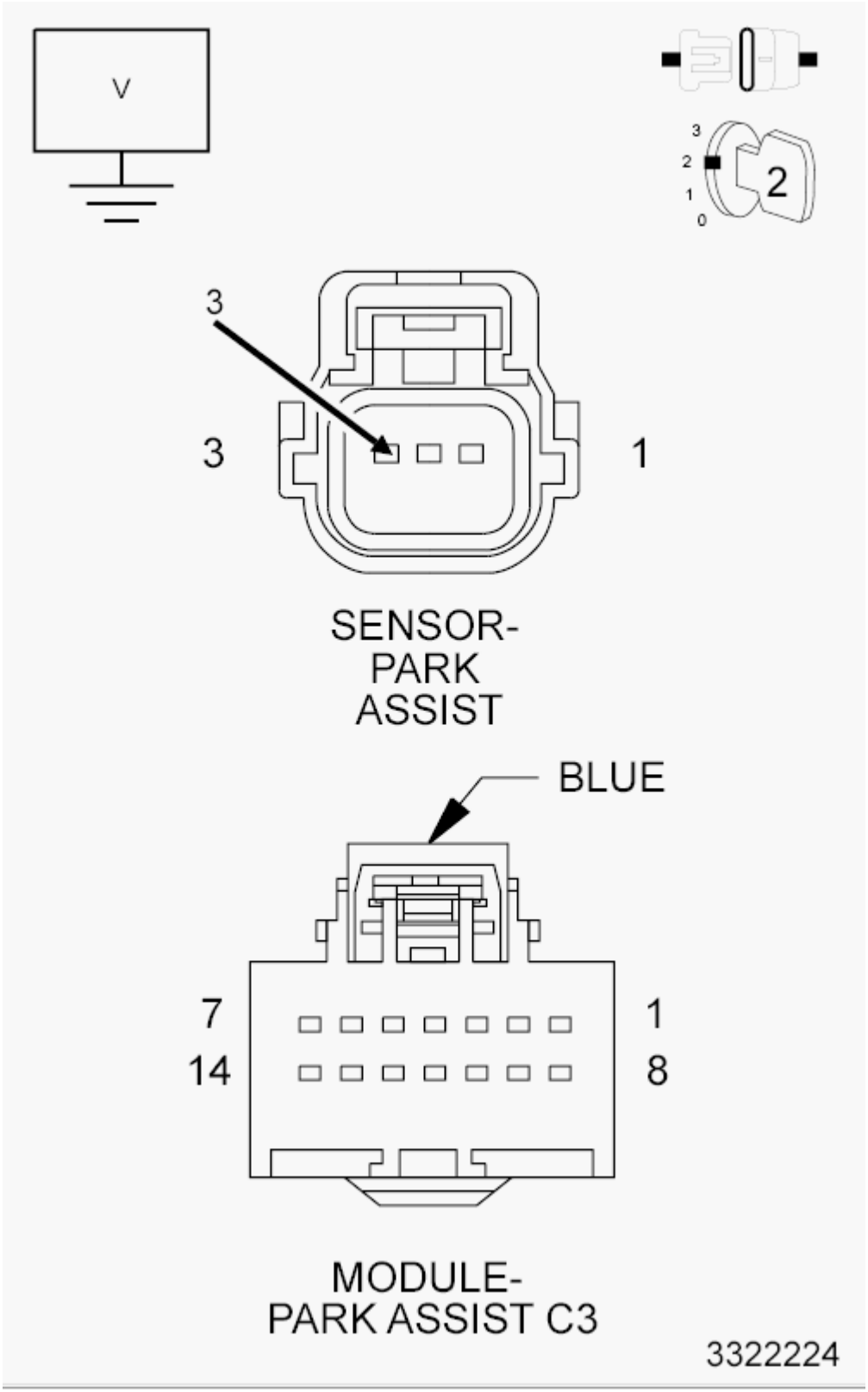


Fig. 67: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Measure the voltage of the (D707) Park Assist Sensor 4 Signal circuit.

   Is voltage present?

   Yes

   - Repair the (D707) Park Assist Sensor 4 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D707) PARK ASSIST SENSOR 4 SIGNAL CIRCUIT FOR AN OPEN**

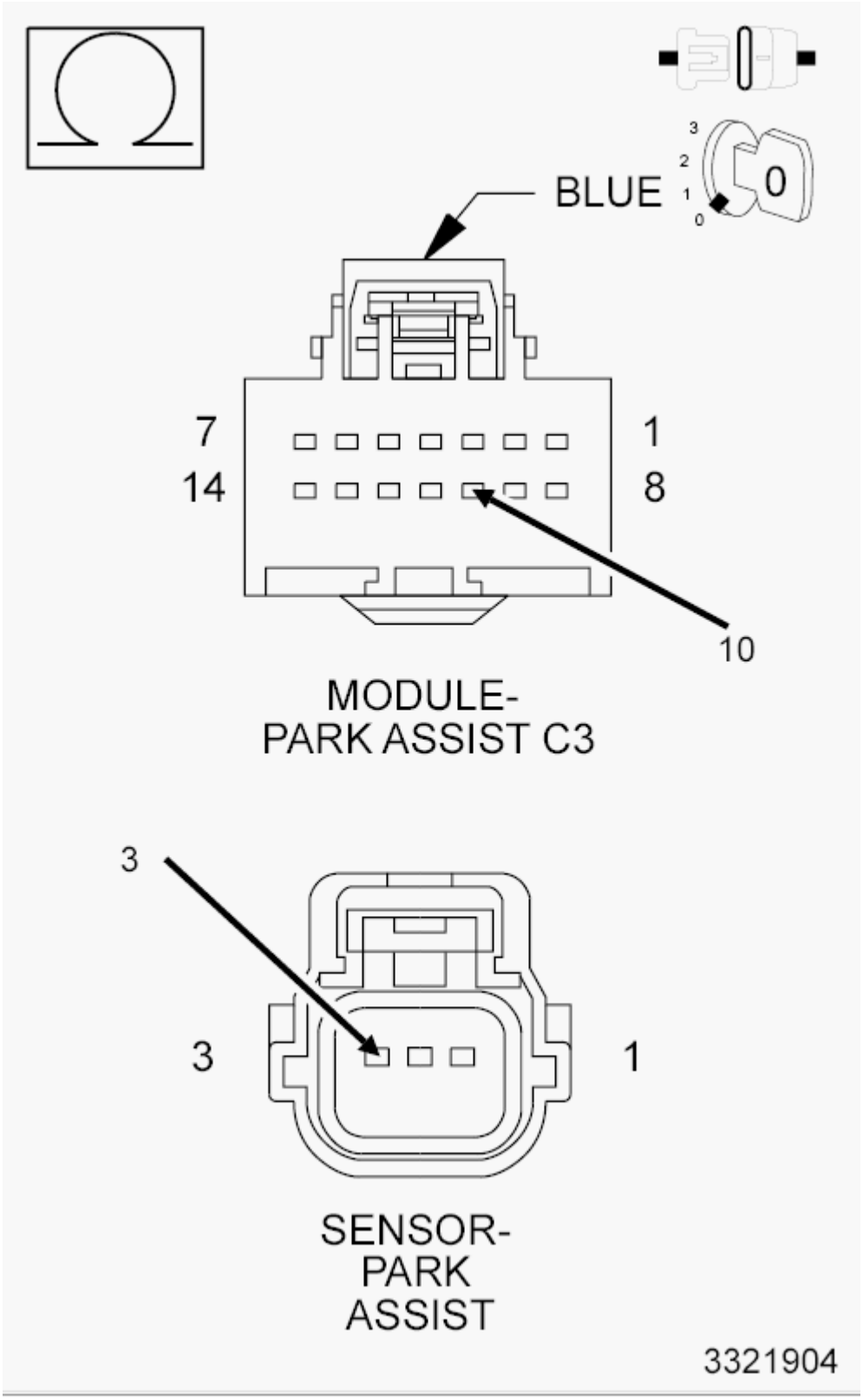


Fig. 68: Checking Park Assist Sensor 4 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D707) Park Assist Sensor 4 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (D707) Park Assist Sensor 4 Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1292-11-PTS SENSOR 5 - CIRCUIT SHORT TO GROUND

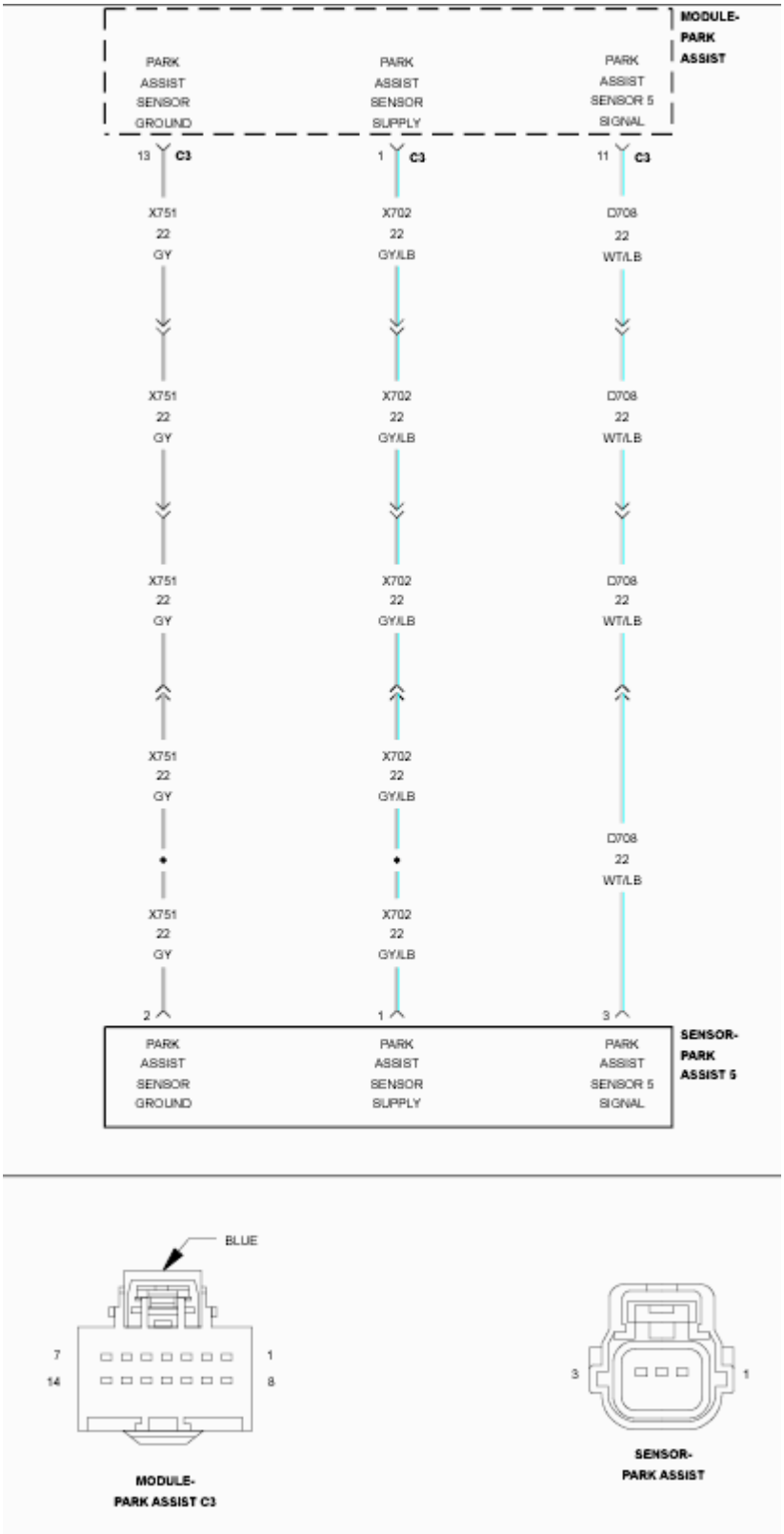


Fig. 69: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR AN OPEN
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

1. Turn the ignition on.

2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

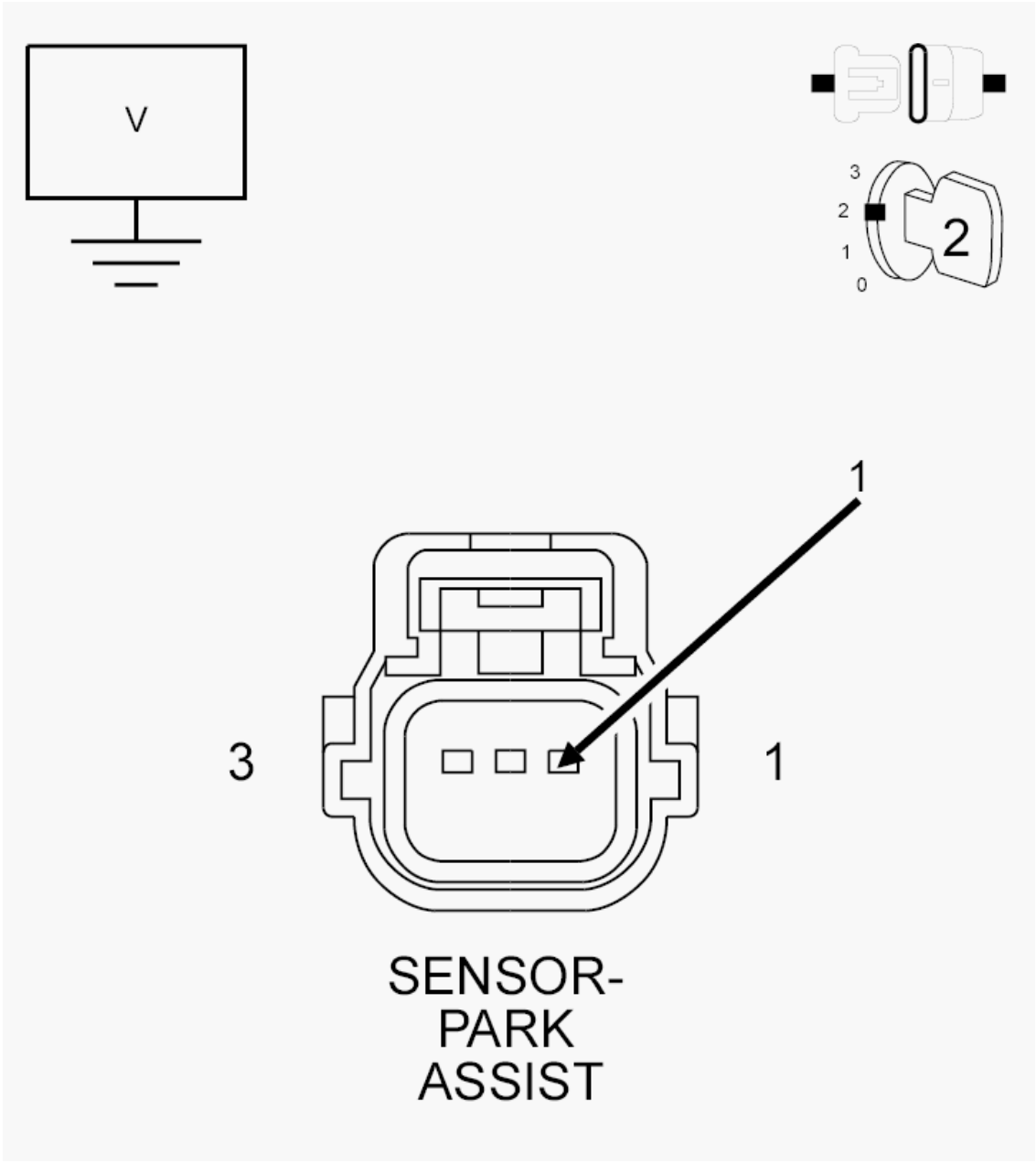


Fig. 70: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X702) Front Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

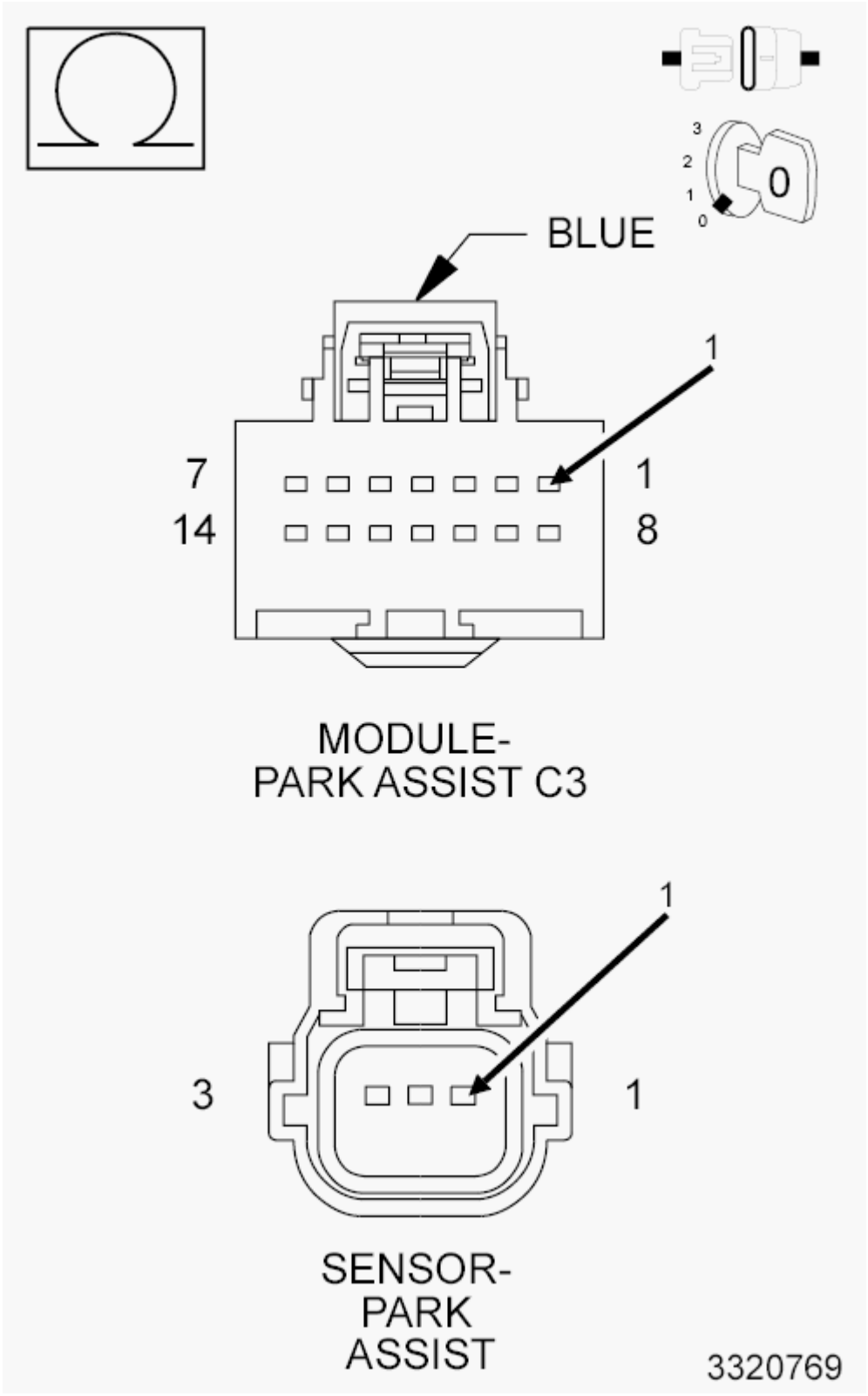


Fig. 71: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance of the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

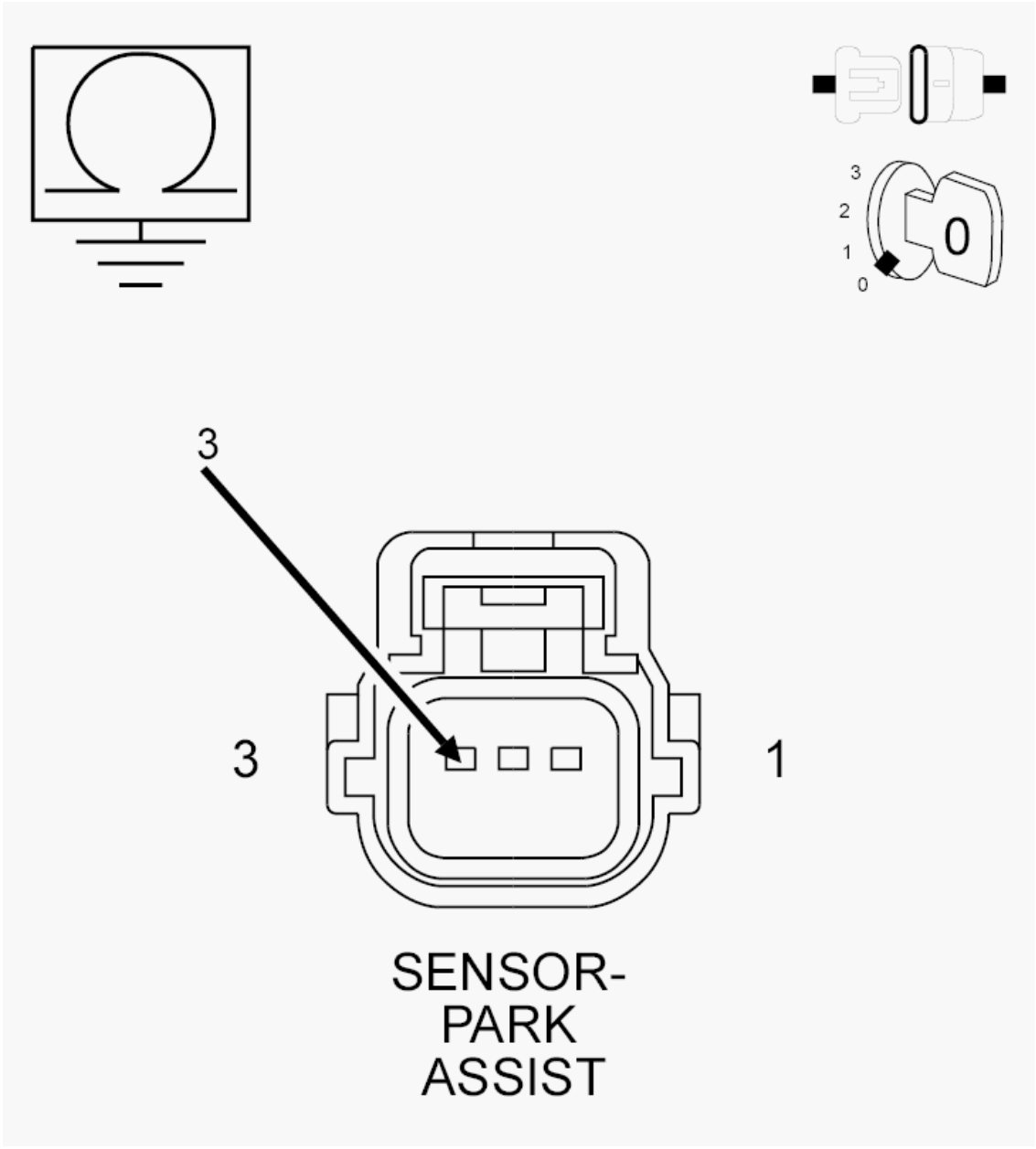


Fig. 72: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D708) Park Assist Sensor 5 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

- Go To 5.

No

- Go To 7.

5. **CHECK THE (D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**

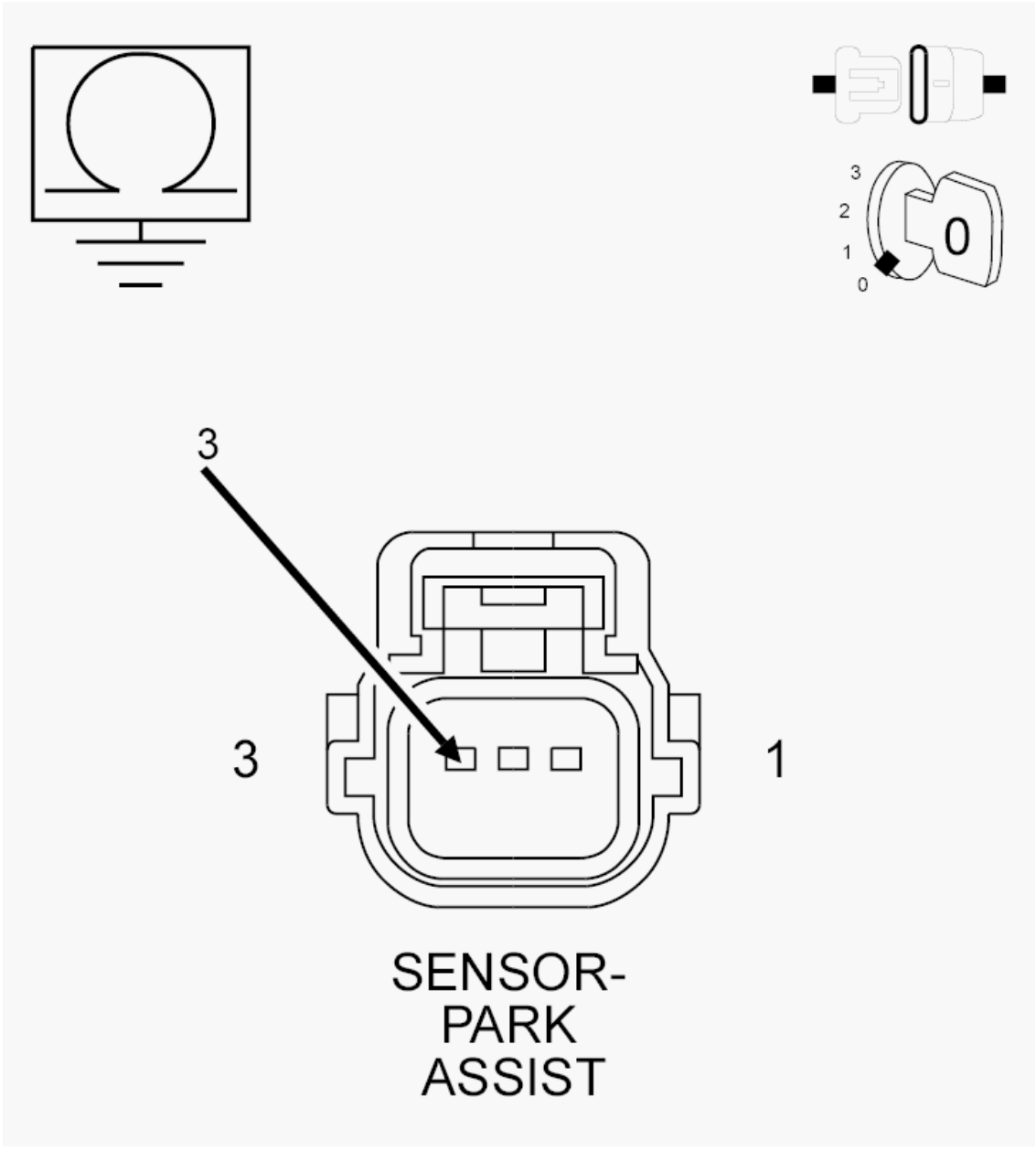


Fig. 73: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.

2. Measure the resistance between ground and the (D708) Park Assist Sensor 5 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D708) Park Assist Sensor 5 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT**

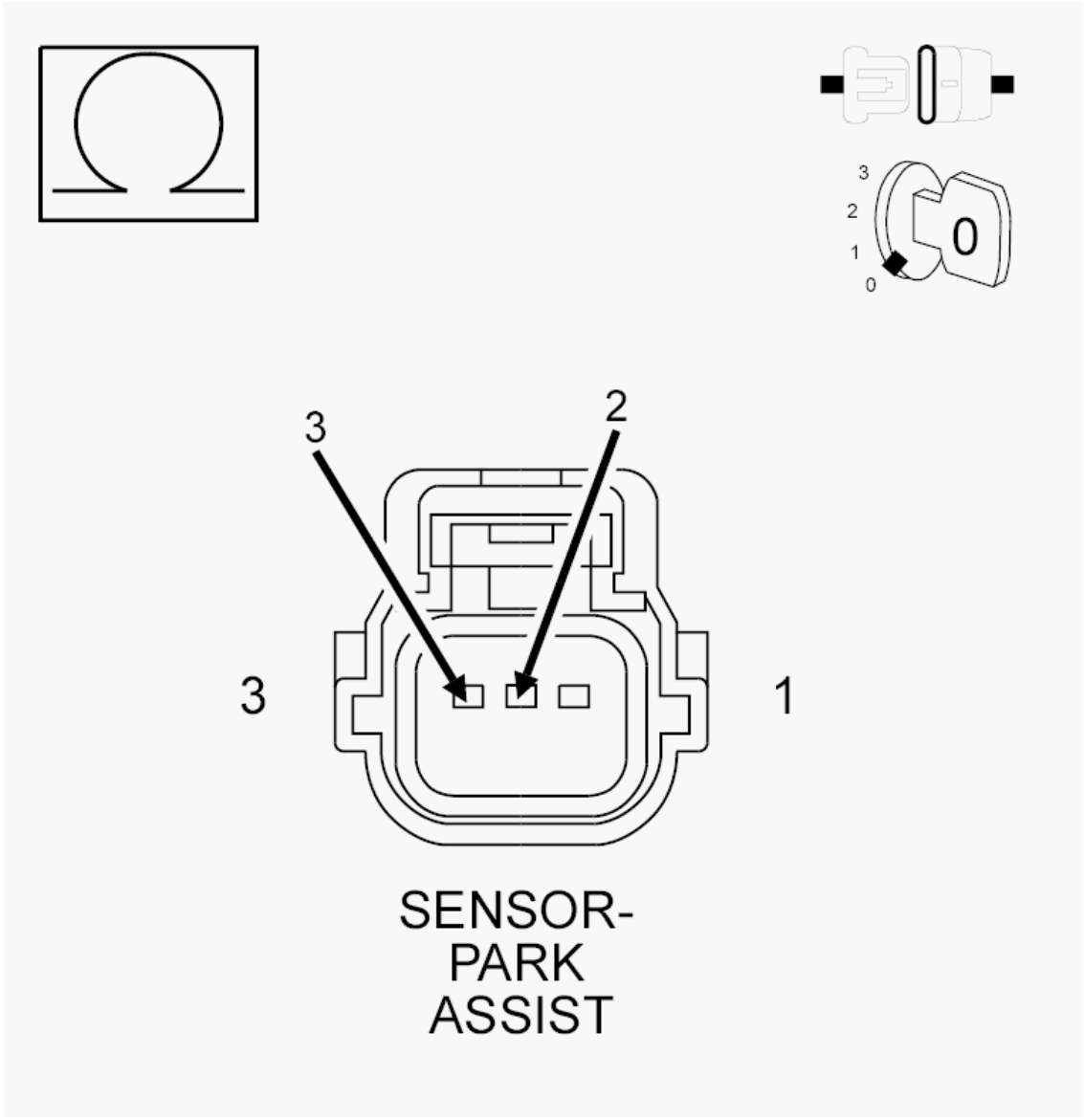


Fig. 74: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D708) Park Assist Sensor 5 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D708) Park Assist Sensor 5 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR AN OPEN**

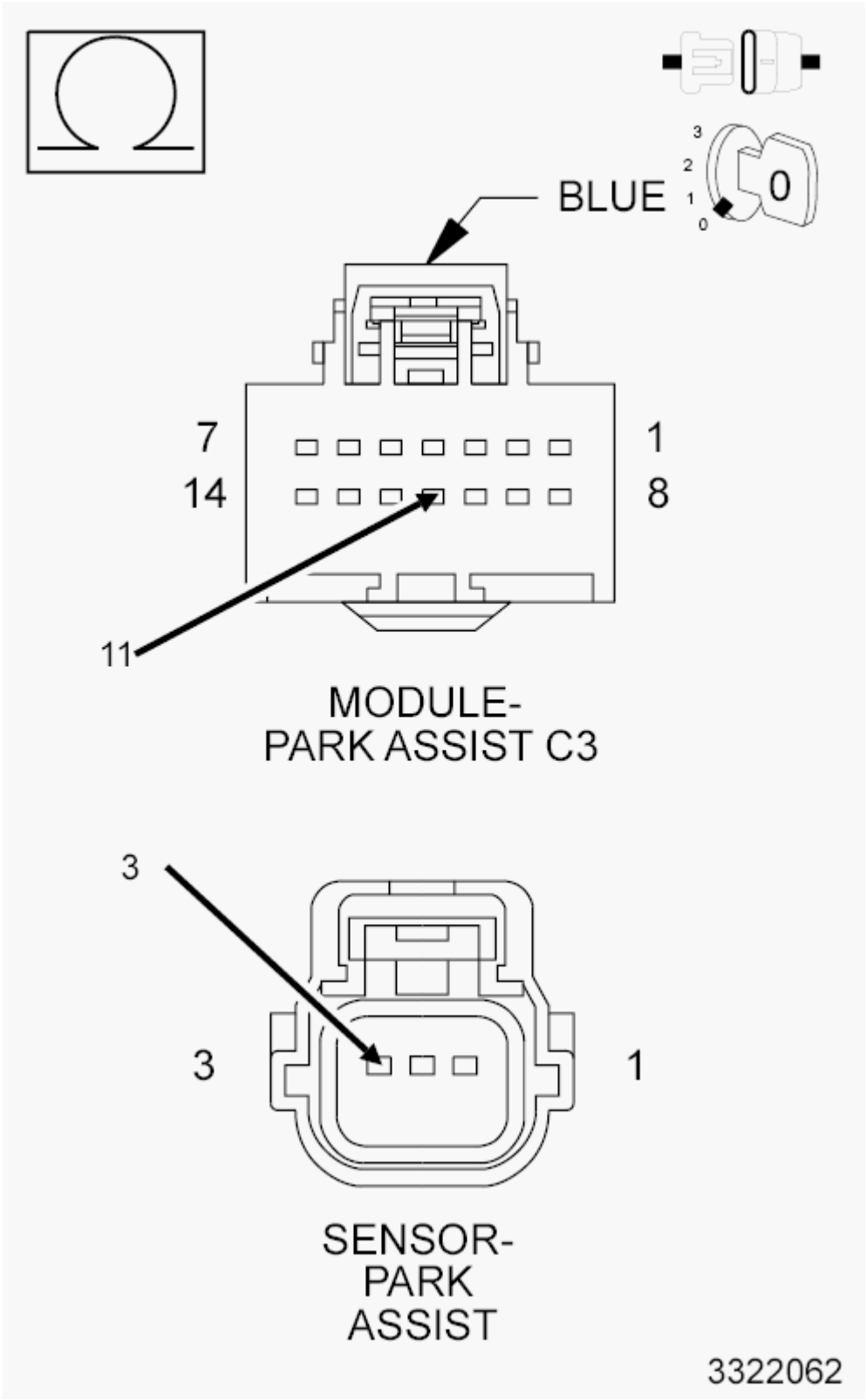


Fig. 75: Checking Park Assist Sensor 5 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (D708) Park Assist Sensor 5 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D708) Park Assist Sensor 5 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

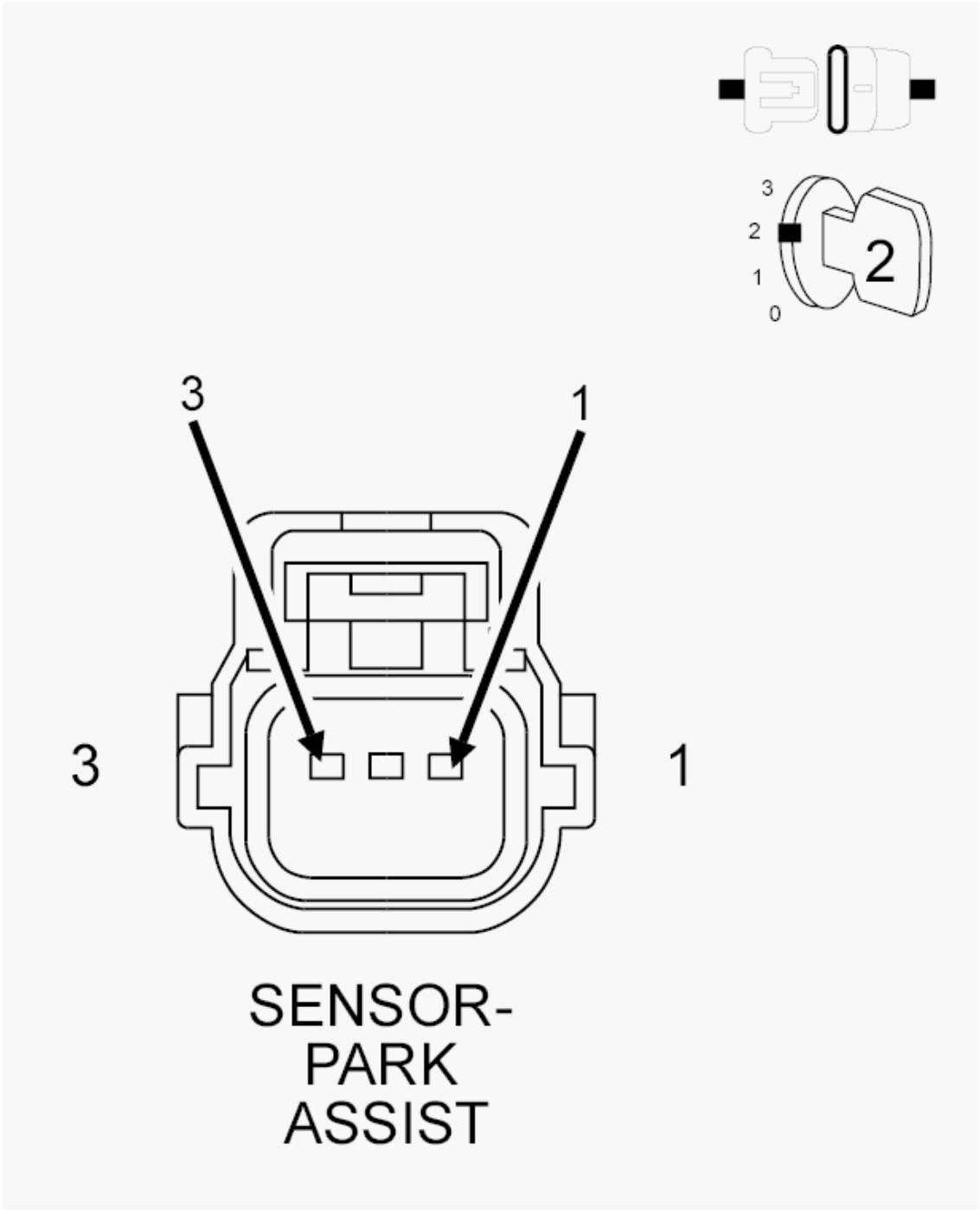


Fig. 76: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C3 harness connector.
3. Connect a jumper wire across the (X702) Front Park Assist Sensor Supply and (D708) Park Assist Sensor 5 Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1292-12-PTS SENSOR 5 - CIRCUIT SHORT TO BATTERY as active?

   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1292-12-PTS SENSOR 5 - CIRCUIT SHORT TO BATTERY

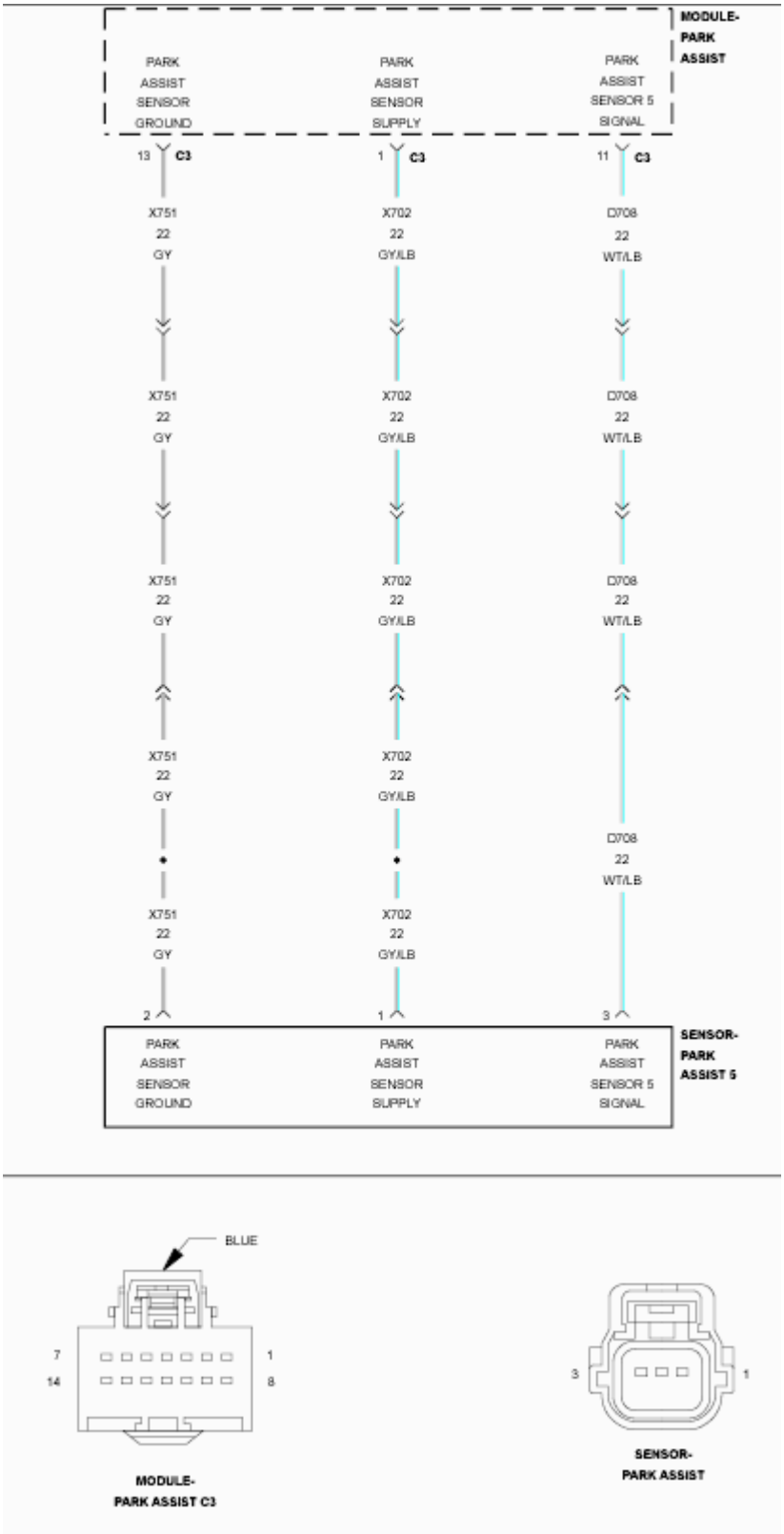


Fig. 77: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT
(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

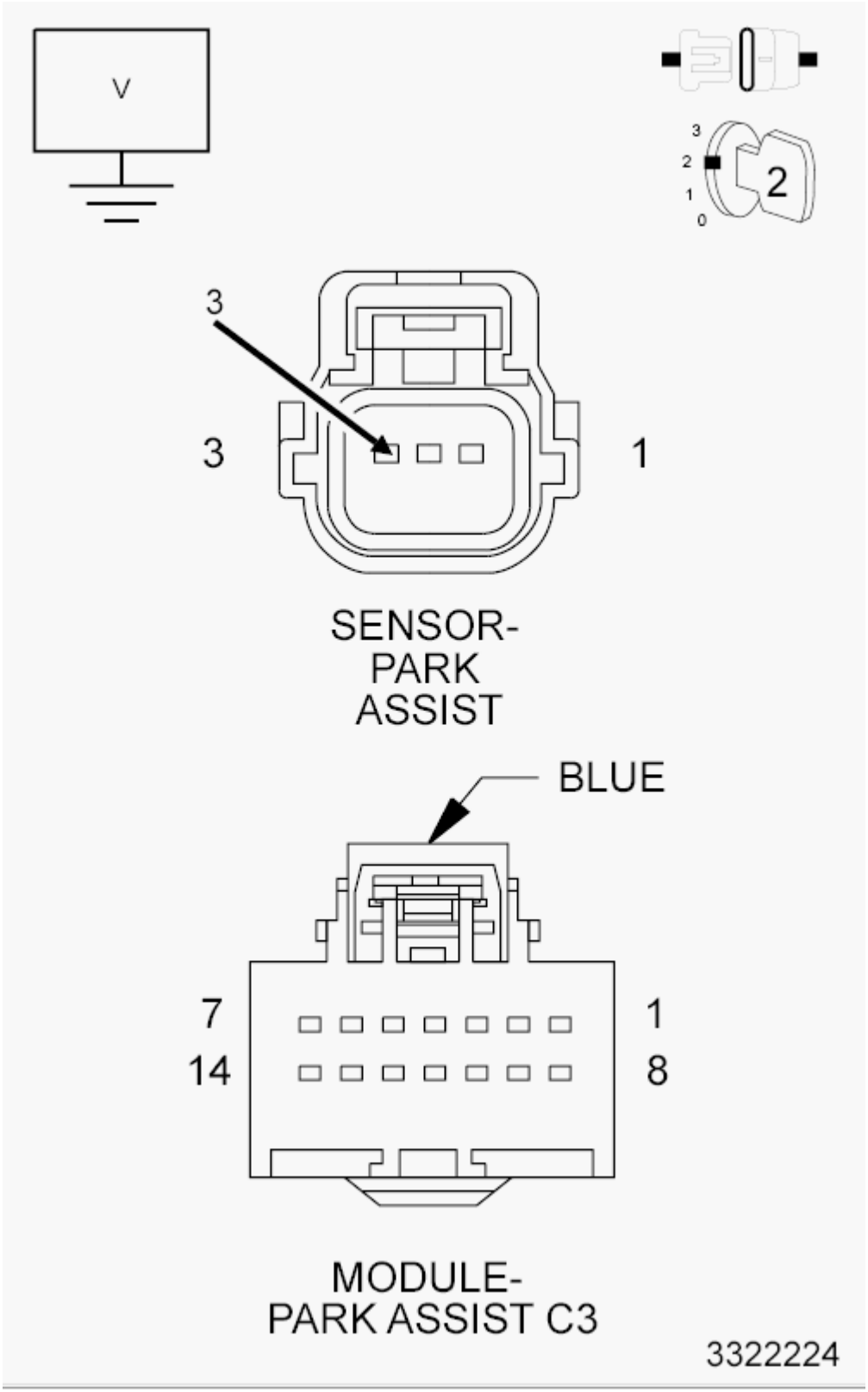


Fig. 78: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D708) Park Assist Sensor 5 Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Repair the (D708) Park Assist Sensor 5 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

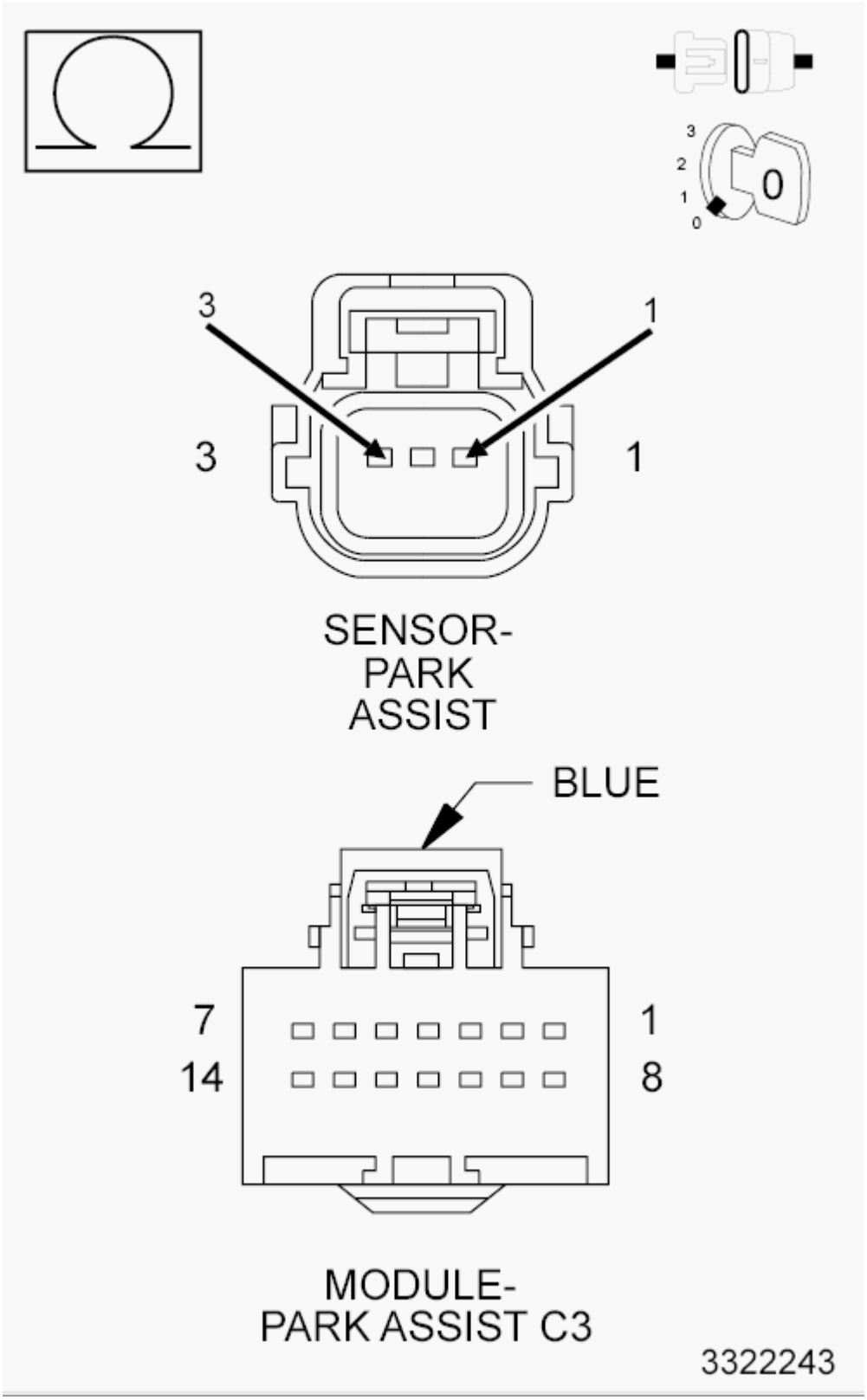


Fig. 79: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D708) Park Assist Sensor 5 Signal circuit and the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D708) Park Assist Sensor 5 Signal circuit for a short to the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

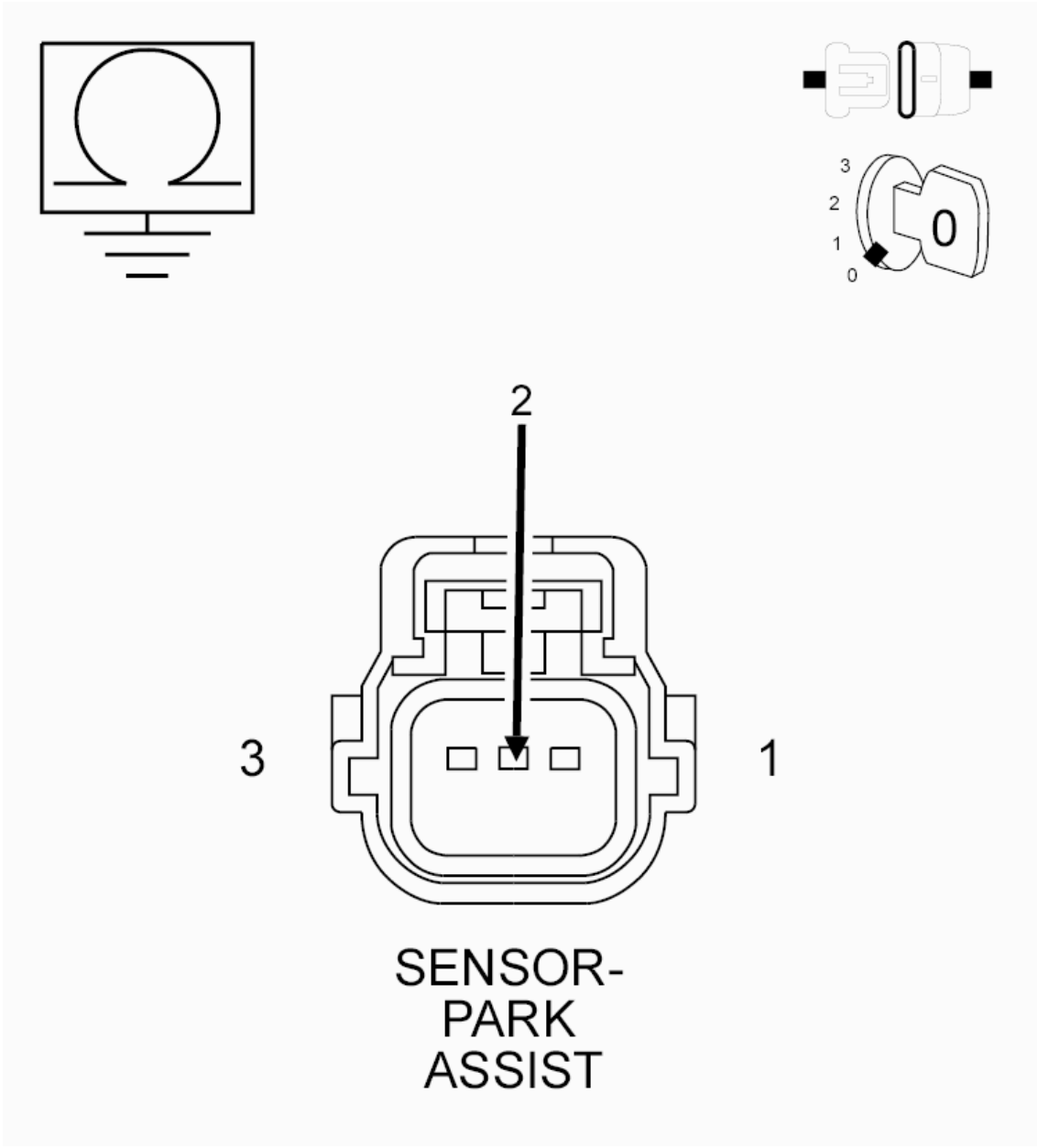


Fig. 80: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

   Yes

   - Go To 5.

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**

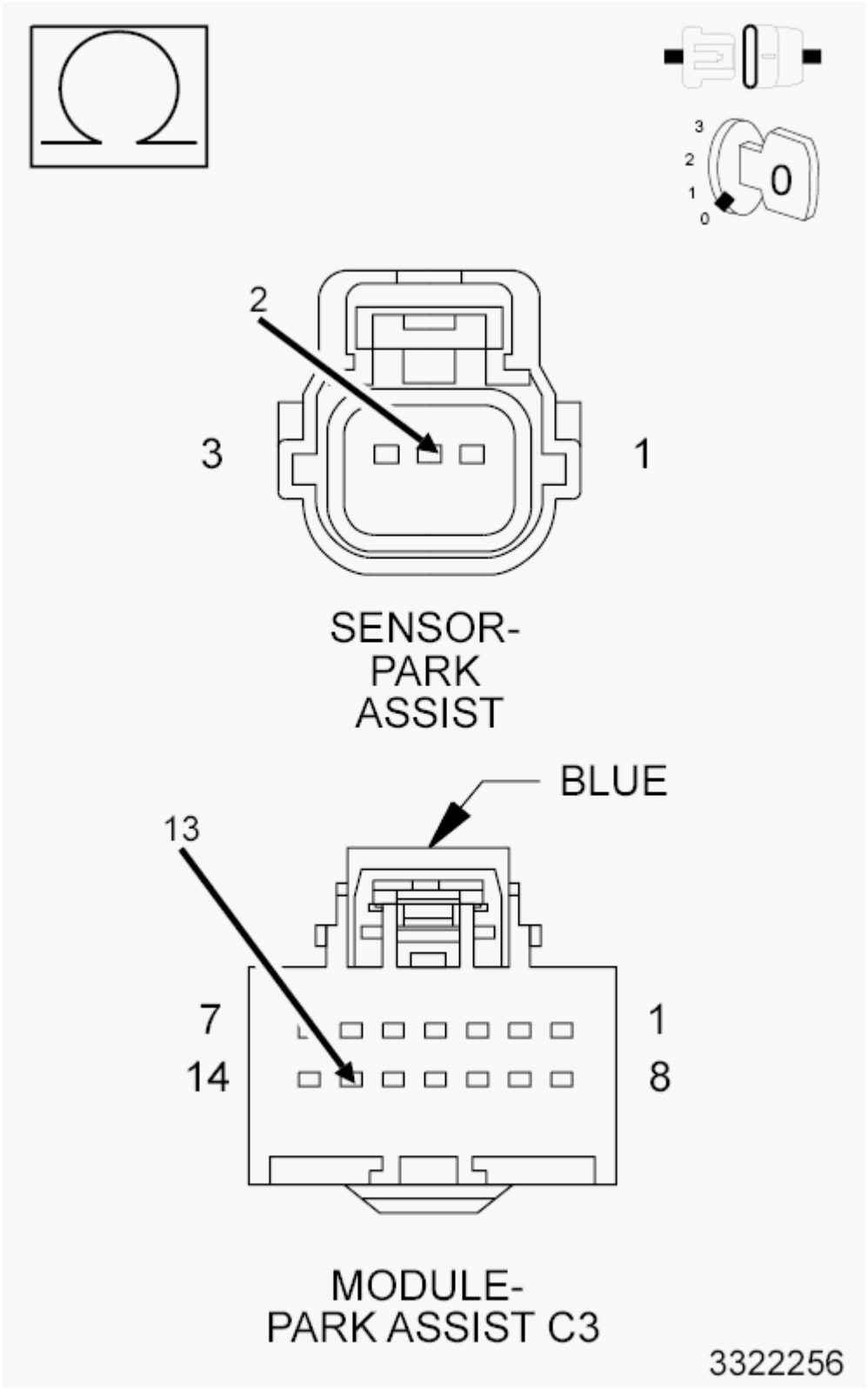


Fig. 81: Checking Front Park Assist Sensor Ground Circuit For An Open Between Park Assist Module & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1292-25-PTS SENSOR 5 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

      - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1292-92-PTS SENSOR 5 - PERFORMANCE OR INCORRECT OPERATION

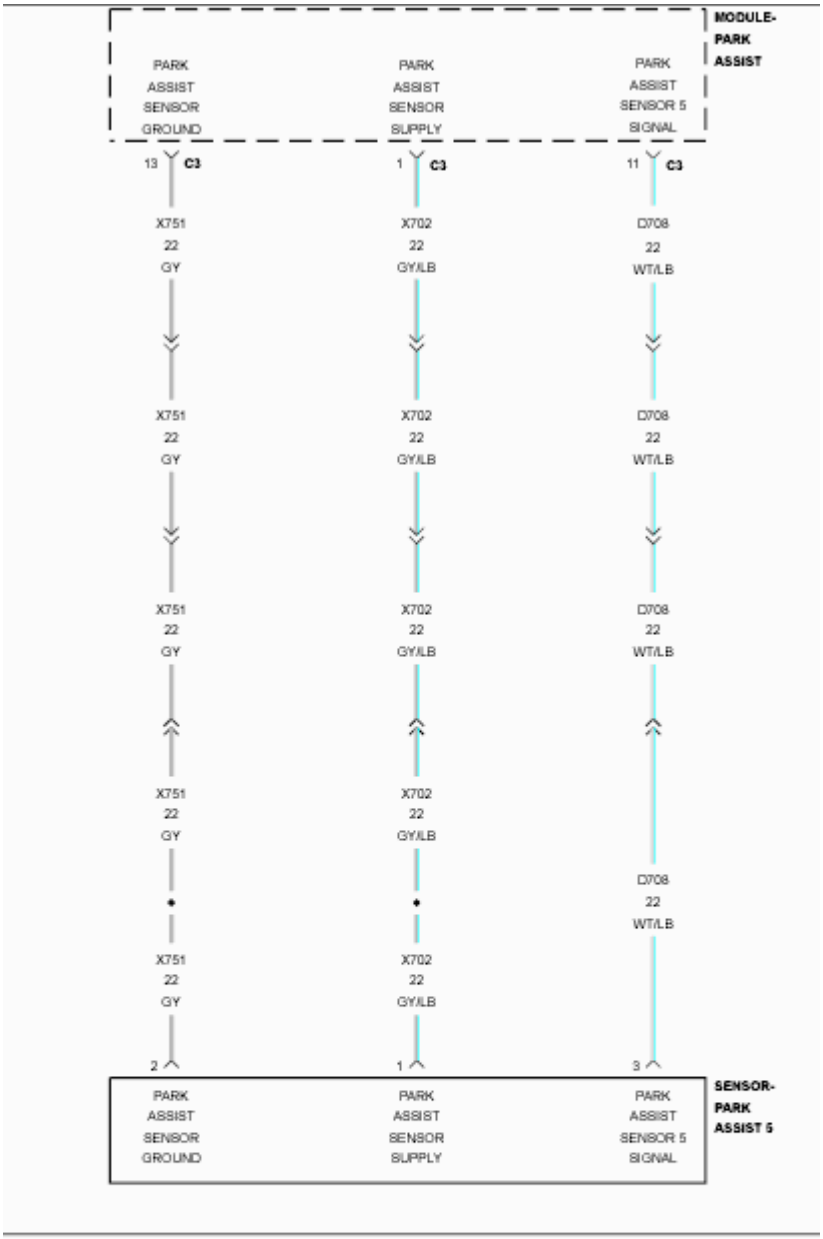


Fig. 82: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE PARK ASSIST SENSOR FOR AN INTERNAL SHORT**
    1. Disconnect the Park Assist Sensor harness connector.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor 5 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

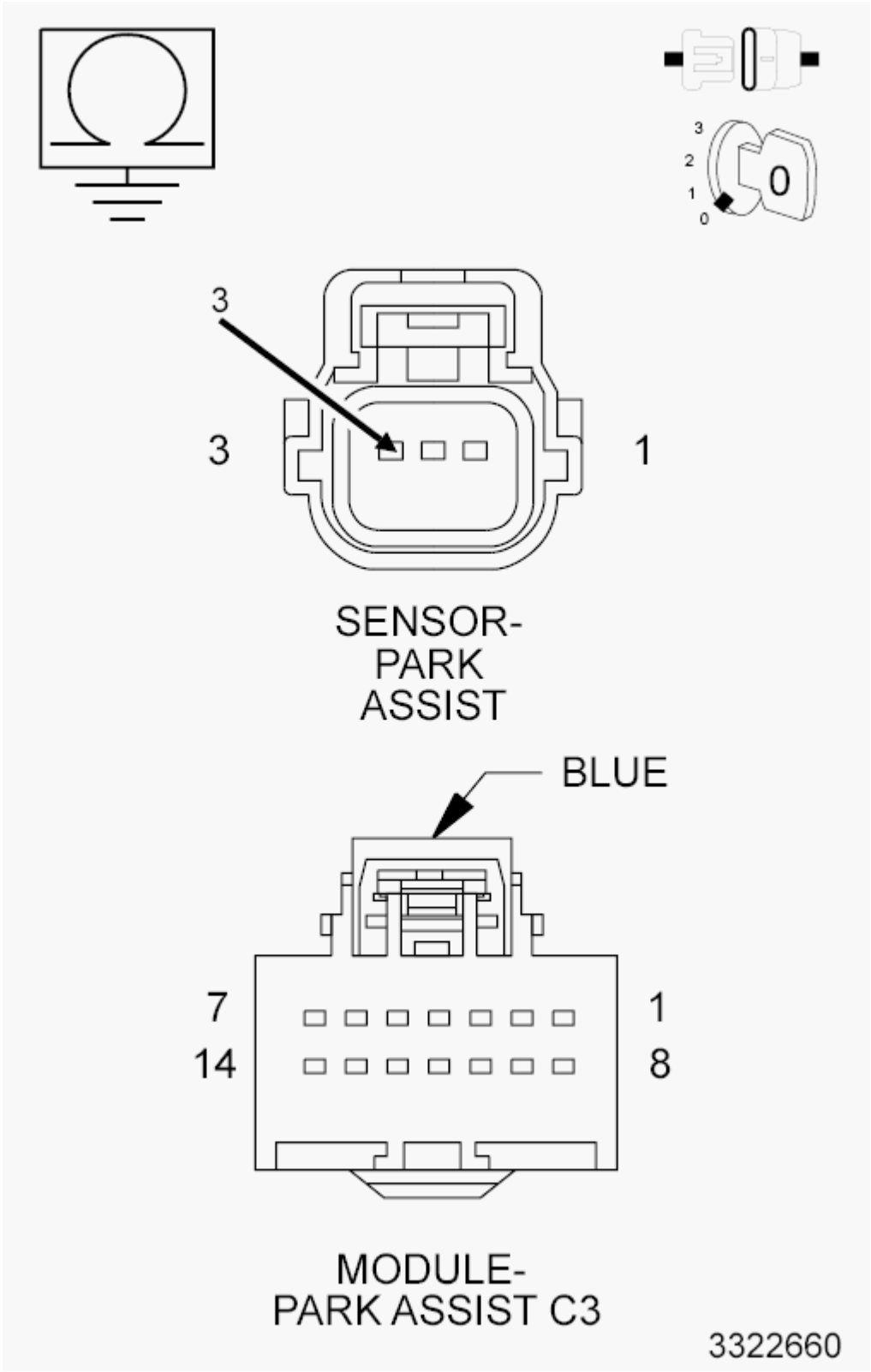


Fig. 83: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance between ground and the (D708) Park Assist Sensor 5 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D708) Park Assist Sensor 5 Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

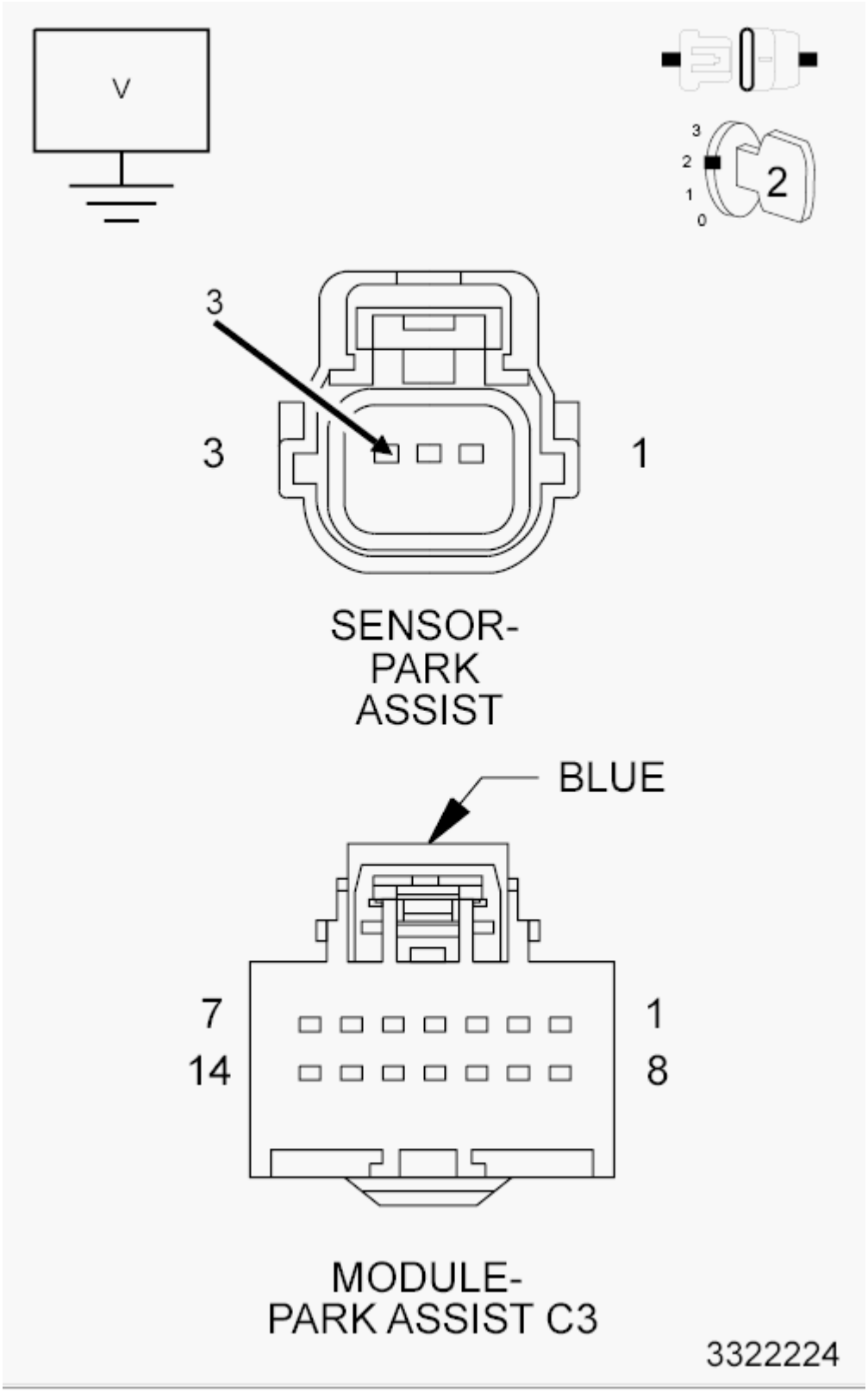


Fig. 84: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Measure the voltage of the (D708) Park Assist Sensor 5 Signal circuit.

   Is voltage present?

   Yes

   - Repair the (D708) Park Assist Sensor 5 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D708) PARK ASSIST SENSOR 5 SIGNAL CIRCUIT FOR AN OPEN**

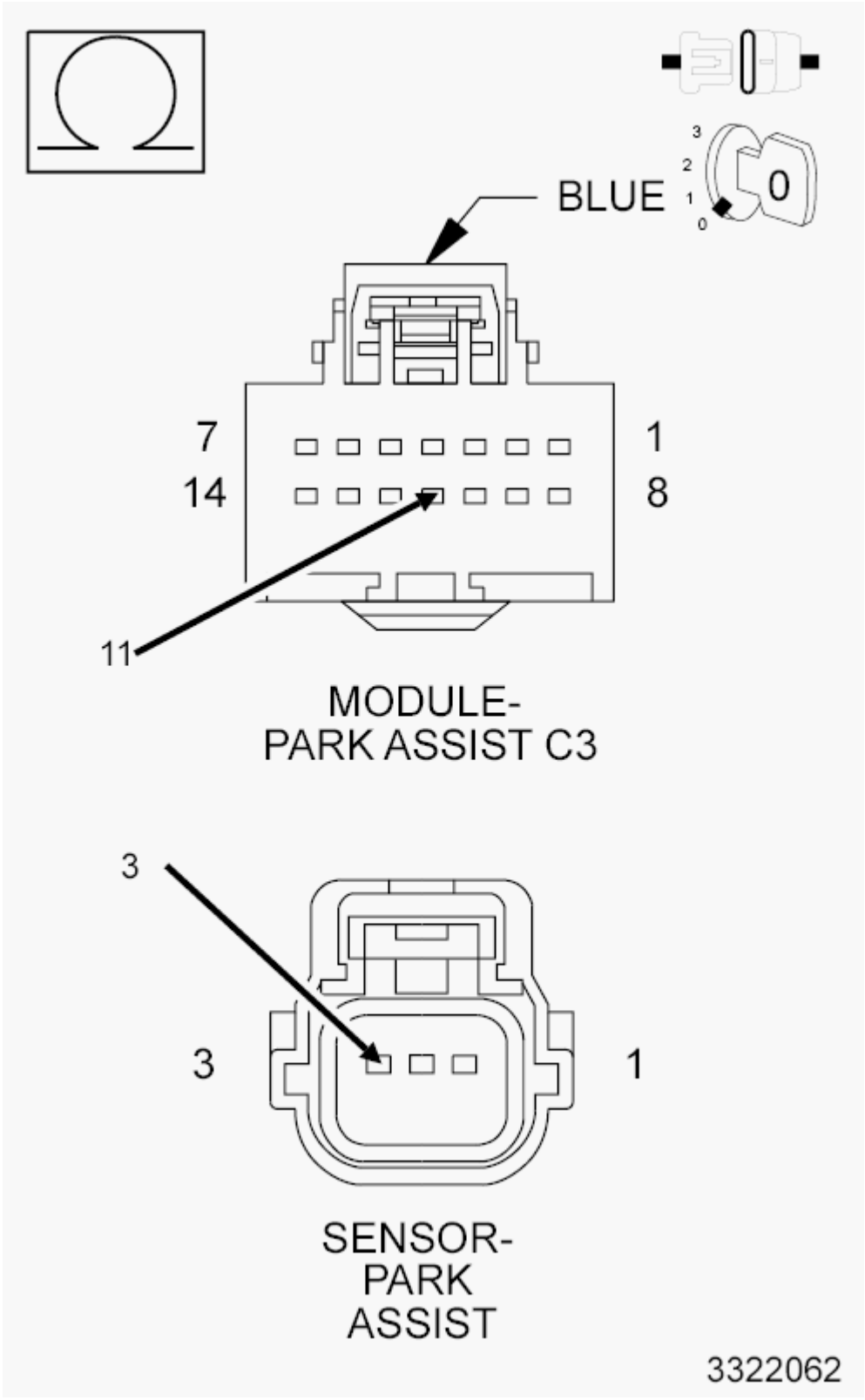


Fig. 85: Checking Park Assist Sensor 5 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D708) Park Assist Sensor 5 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (D708) Park Assist Sensor 5 Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1293-11-PTS SENSOR 6 - CIRCUIT SHORT TO GROUND

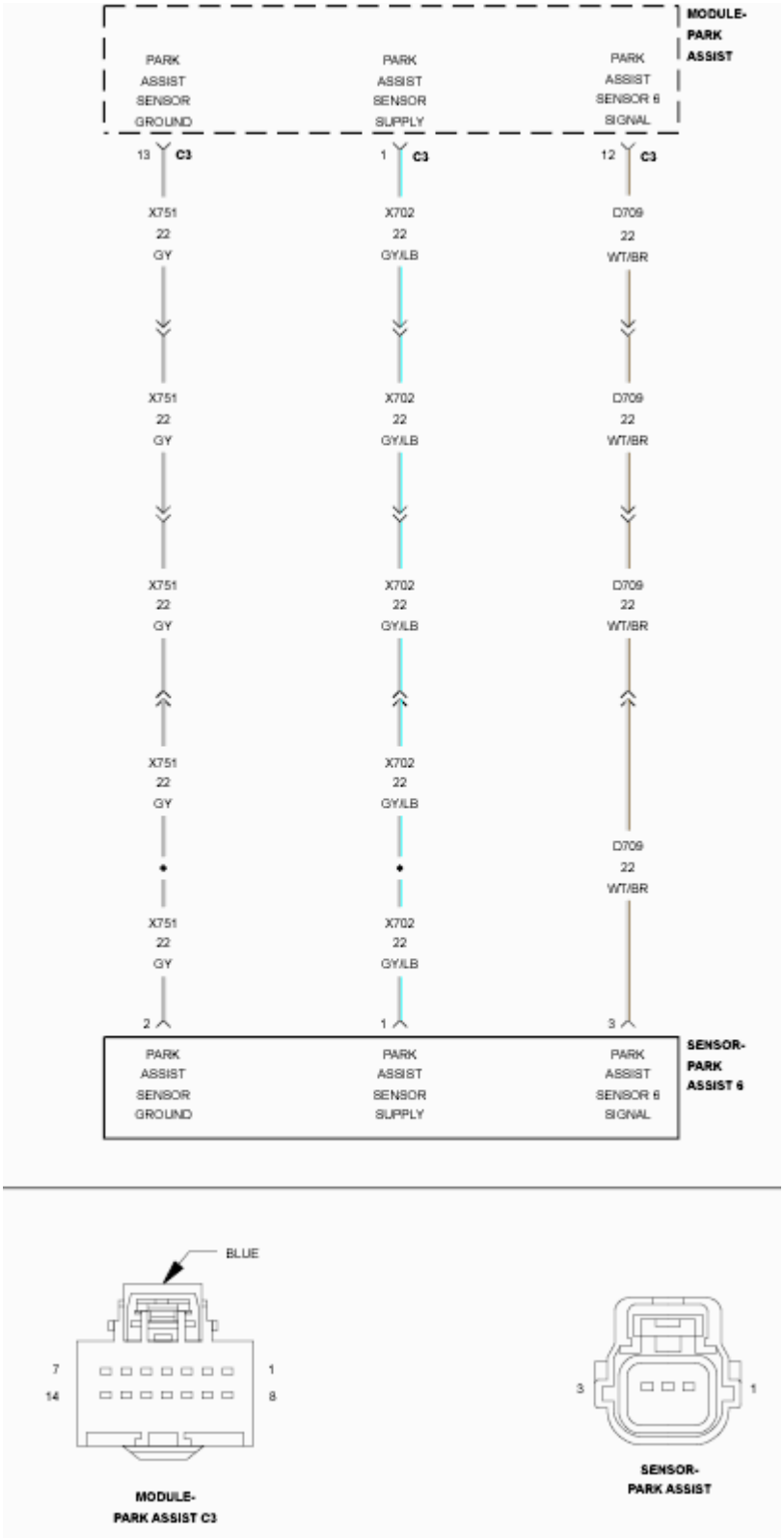


Fig. 86: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR AN OPEN
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

   1. Turn the ignition on.

2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

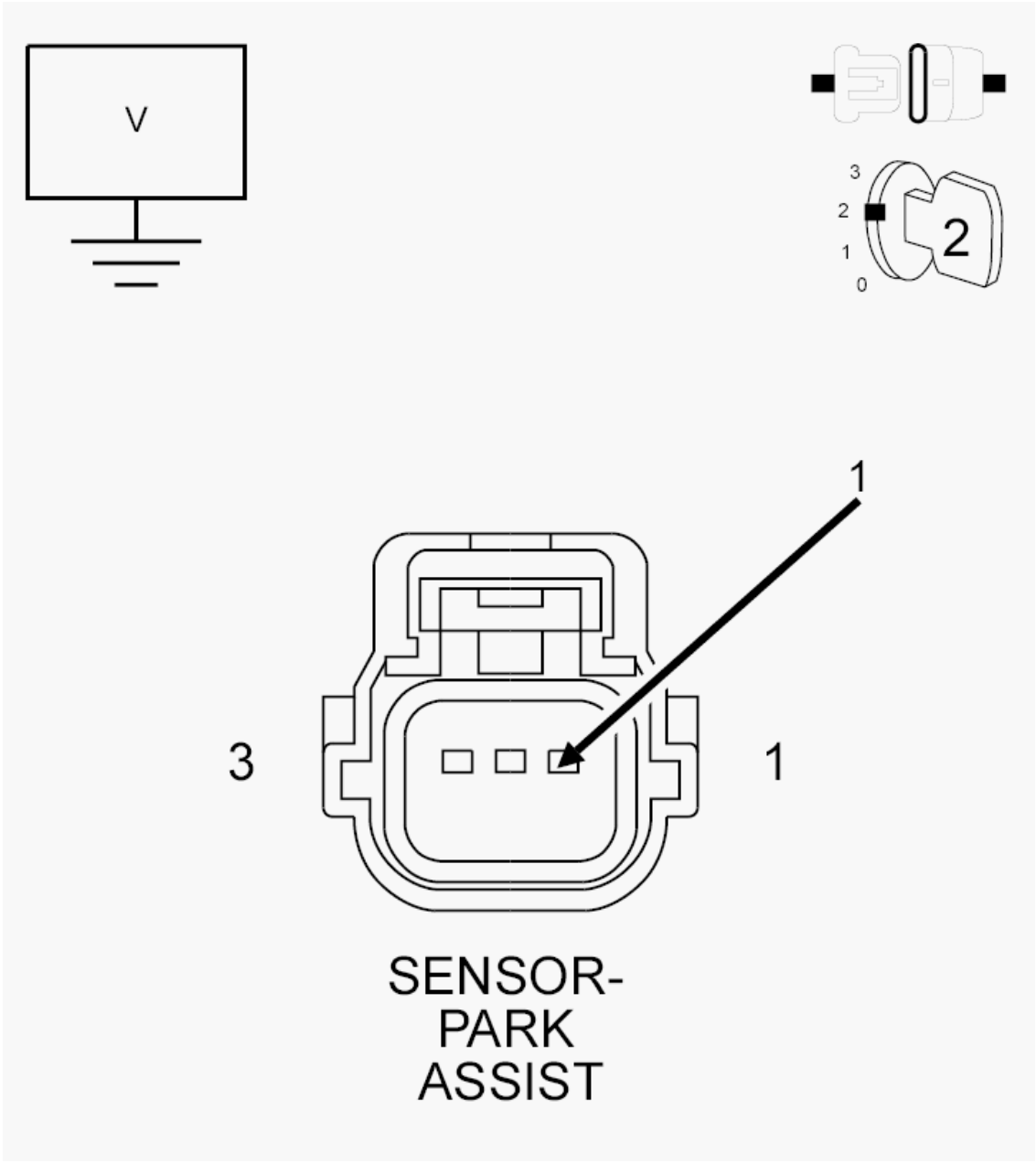


Fig. 87: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X702) Front Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

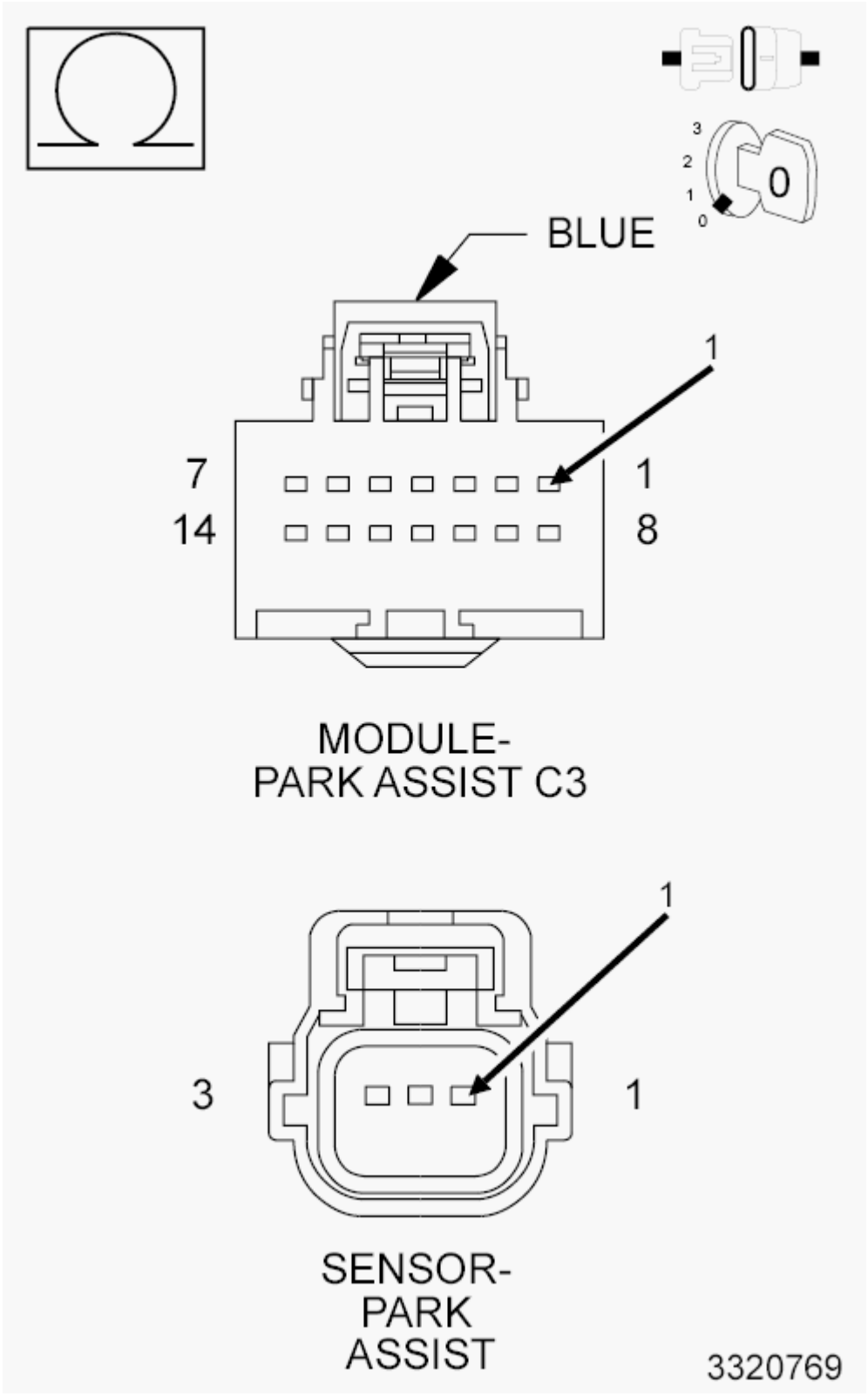


Fig. 88: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance of the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

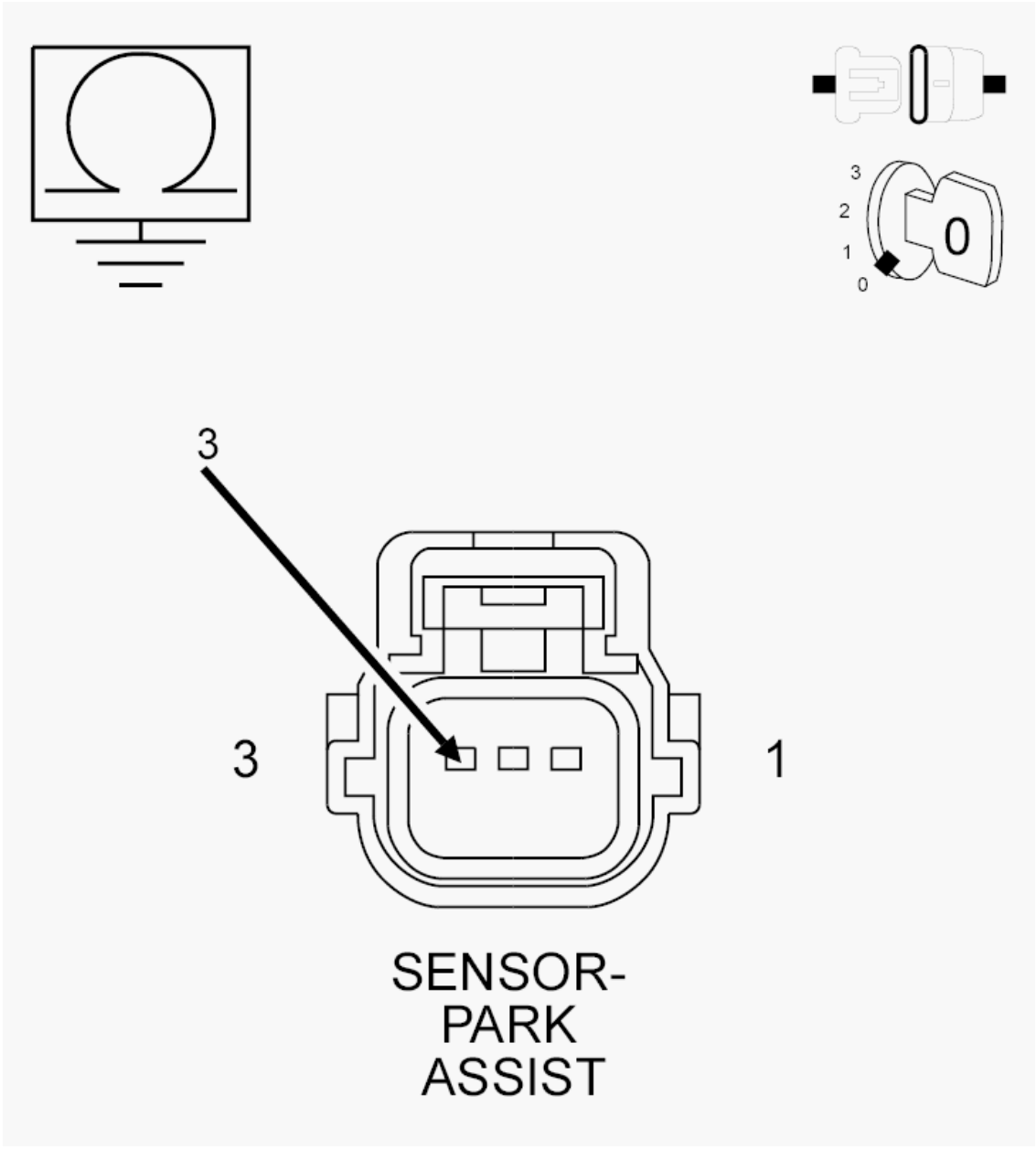


Fig. 89: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D709) Park Assist Sensor 6 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

- Go To 5.

No

- Go To 7.

5. **CHECK THE (D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**

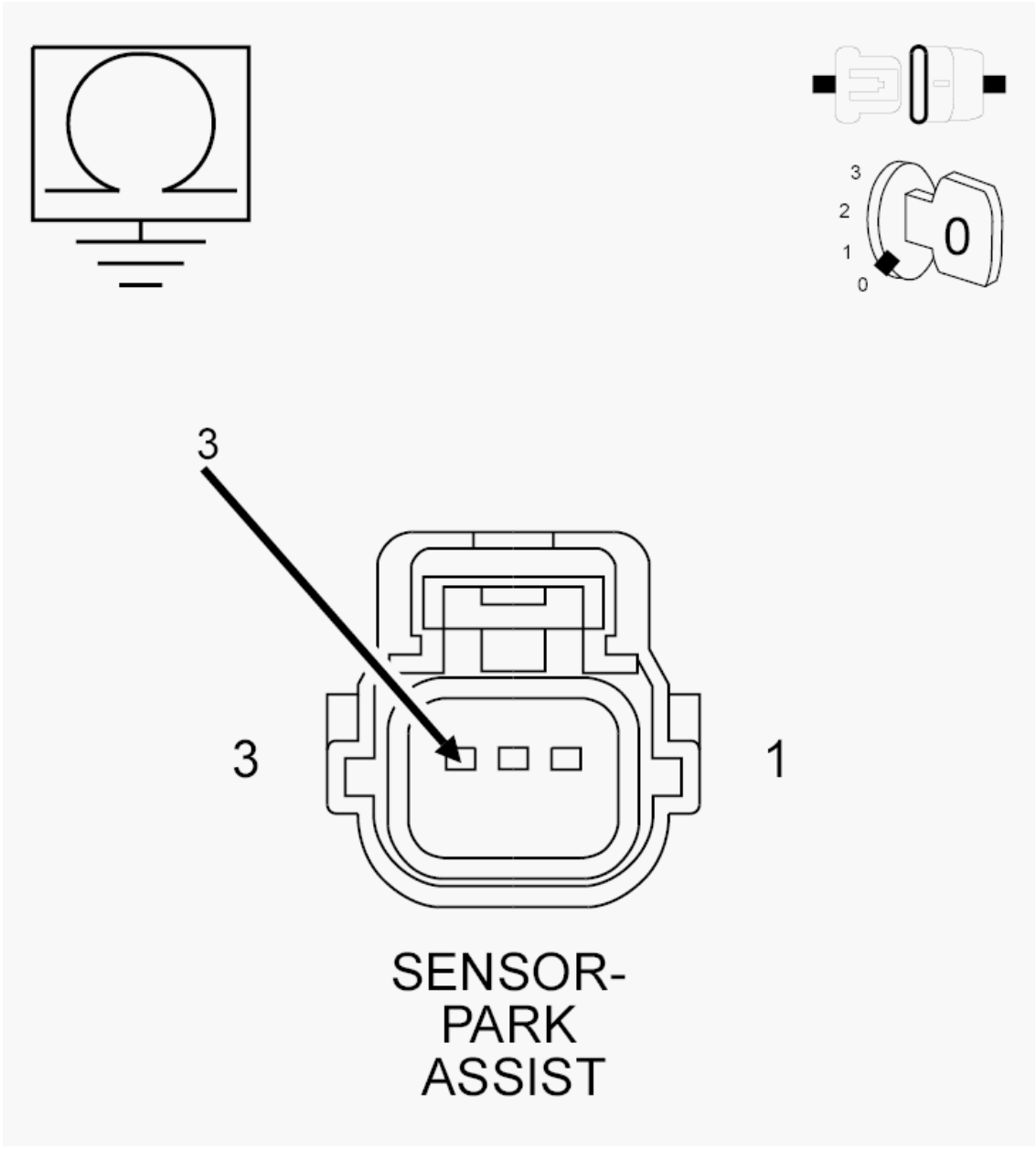


Fig. 90: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.

2. Measure the resistance between ground and the (D709) Park Assist Sensor 6 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D709) Park Assist Sensor 6 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO THE (X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT**

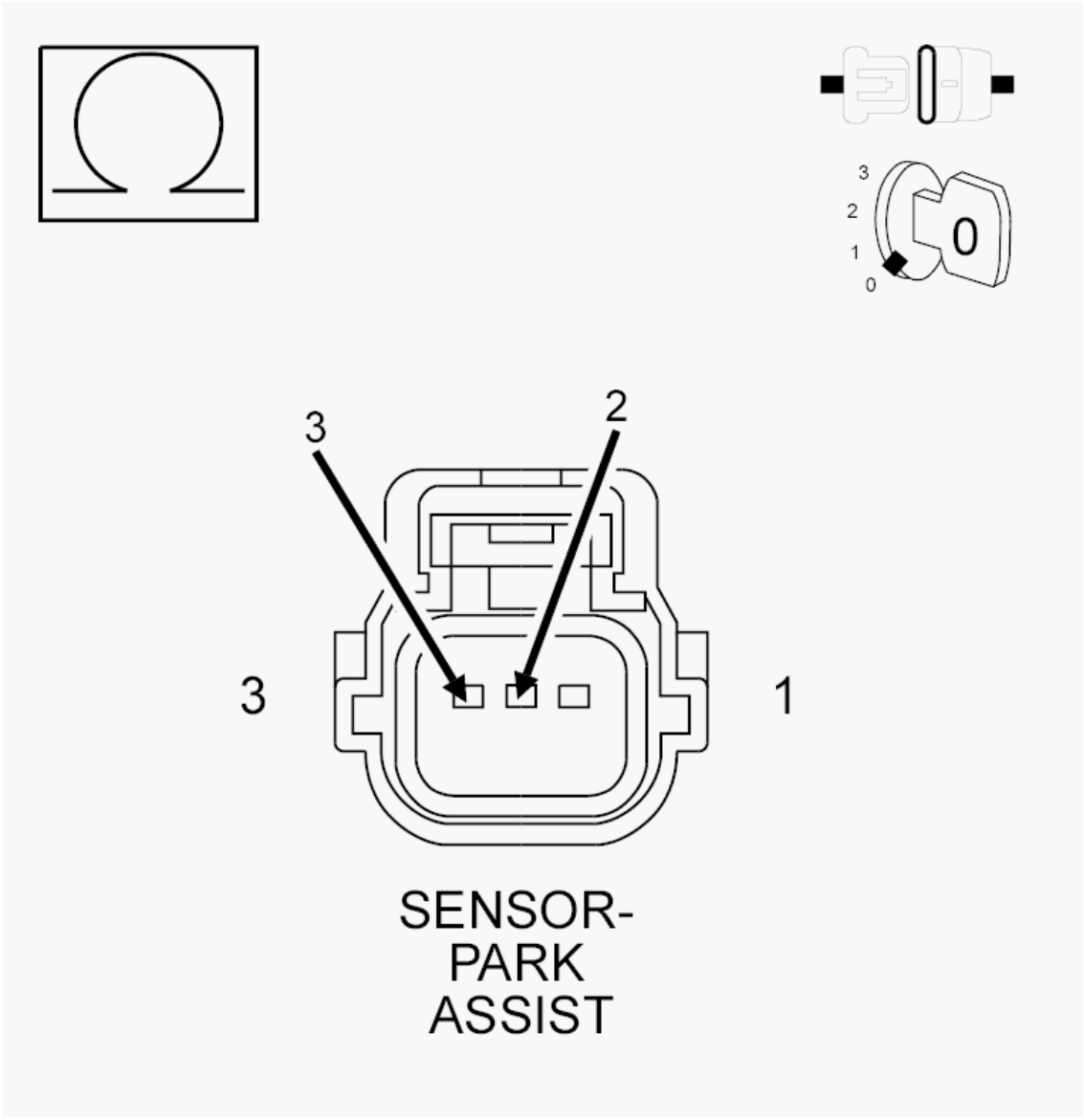


Fig. 91: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D709) Park Assist Sensor 6 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D709) Park Assist Sensor 6 Signal circuit and the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR AN OPEN**

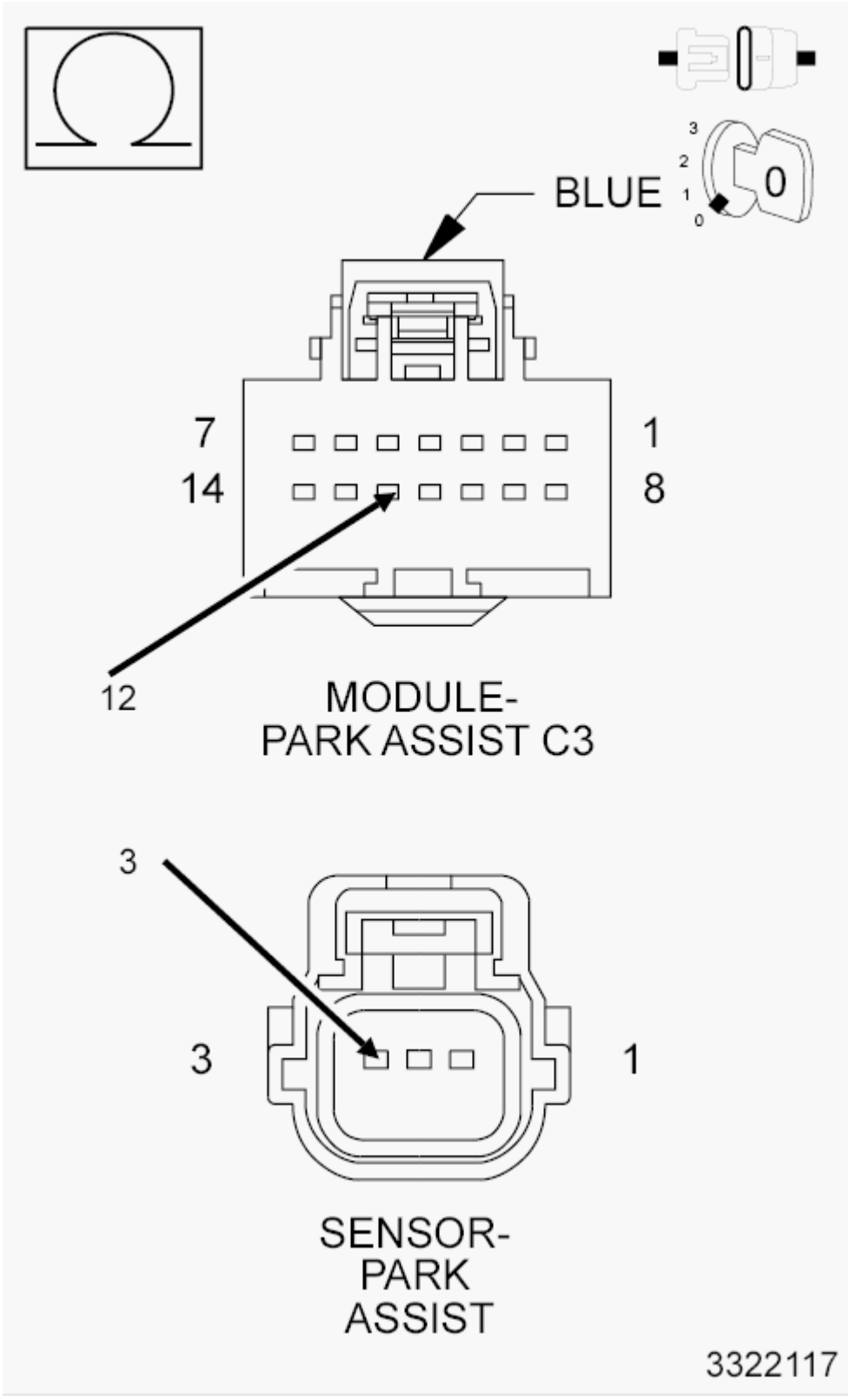


Fig. 92: Checking Park Assist Sensor 6 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (D709) Park Assist Sensor 6 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D709) Park Assist Sensor 6 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

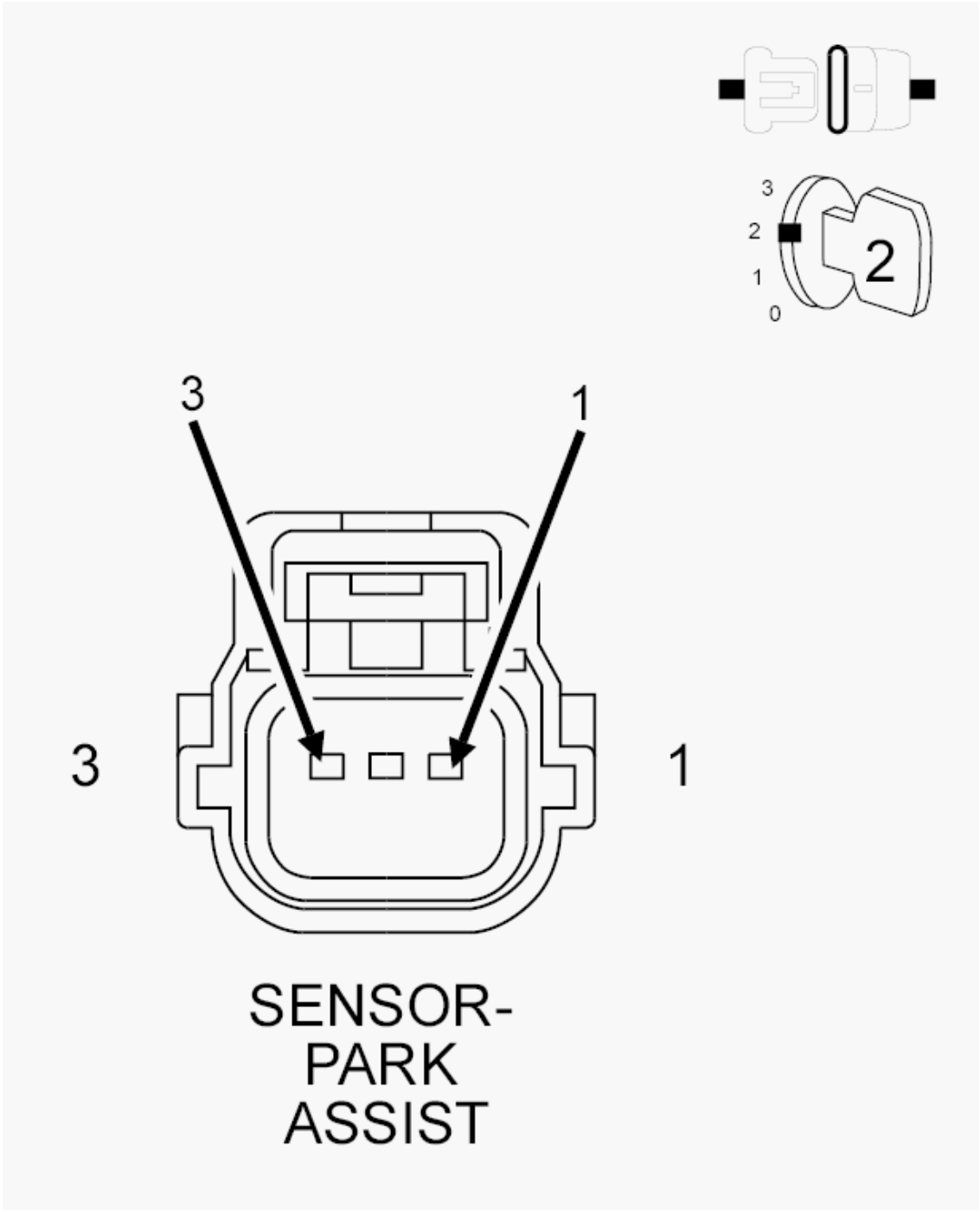


Fig. 93: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C3 harness connector.
3. Connect a jumper wire across the (X702) Front Park Assist Sensor Supply and (D709) Park Assist Sensor 6 Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1291-12-PTS SENSOR 6 - CIRCUIT SHORT TO BATTERY as active?

   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1293-12-PTS SENSOR 6 - CIRCUIT SHORT TO BATTERY

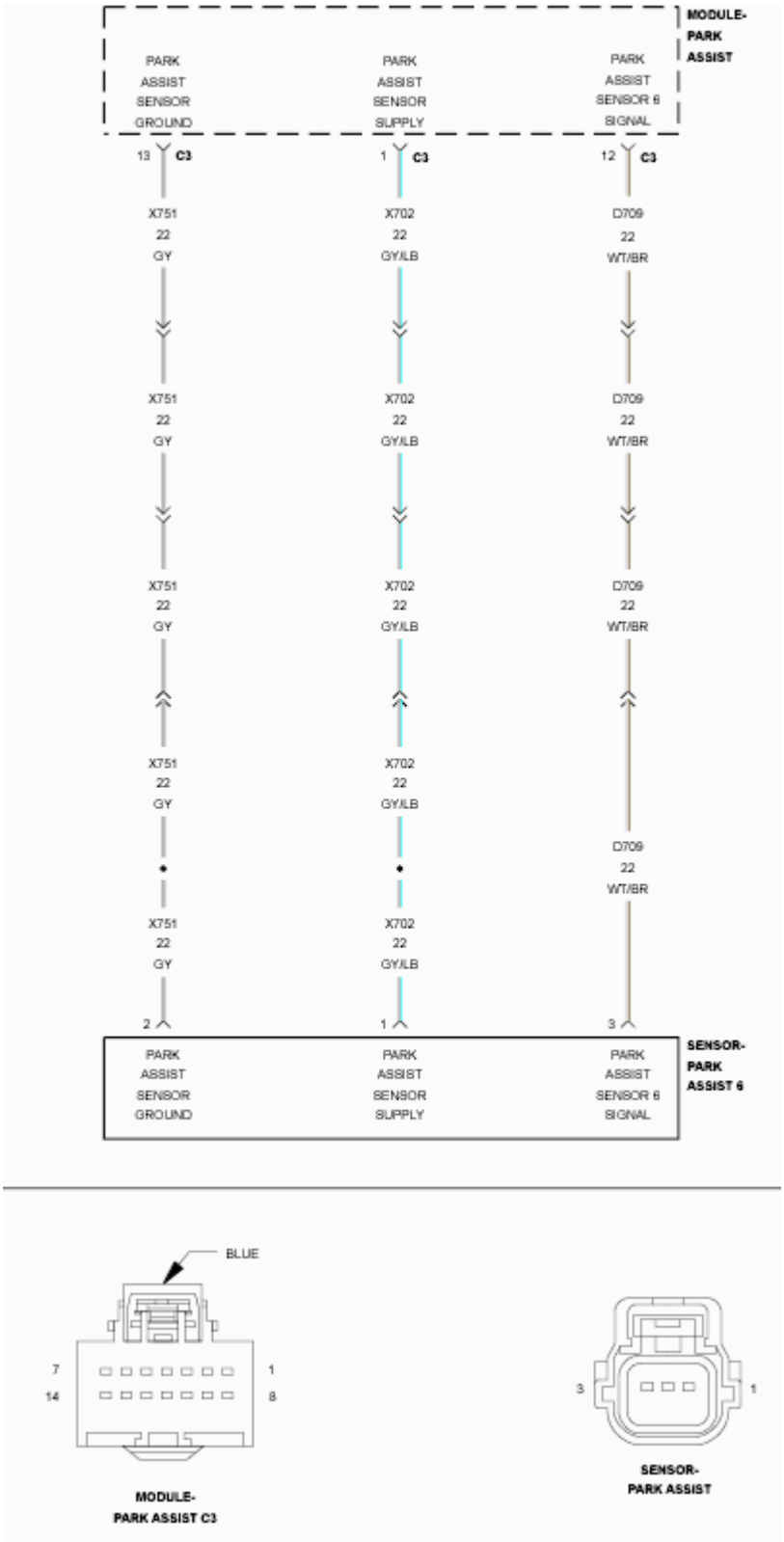


Fig. 94: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT
(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

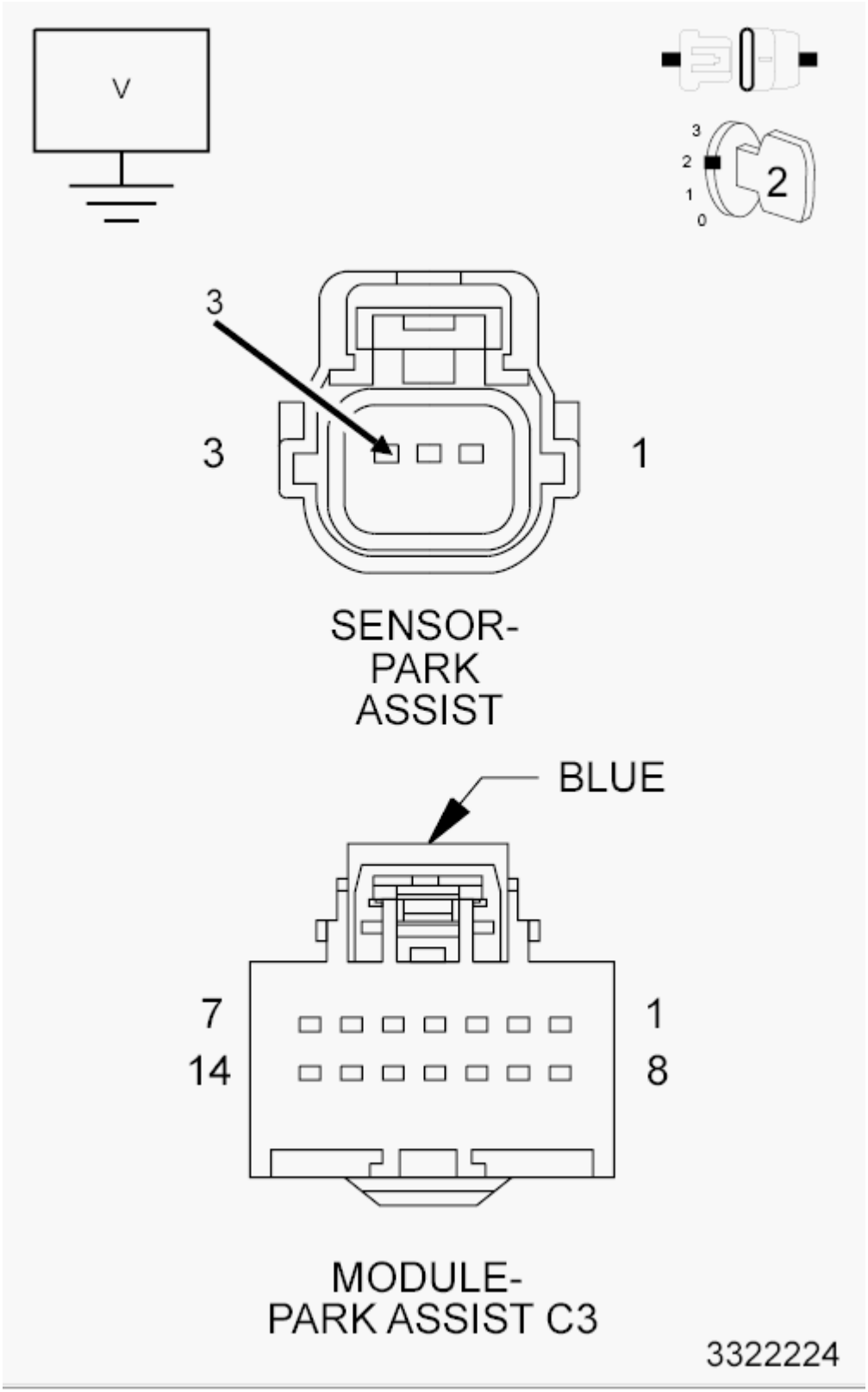


Fig. 95: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D709) Park Assist Sensor 6 Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Repair the (D709) Park Assist Sensor 6 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT**

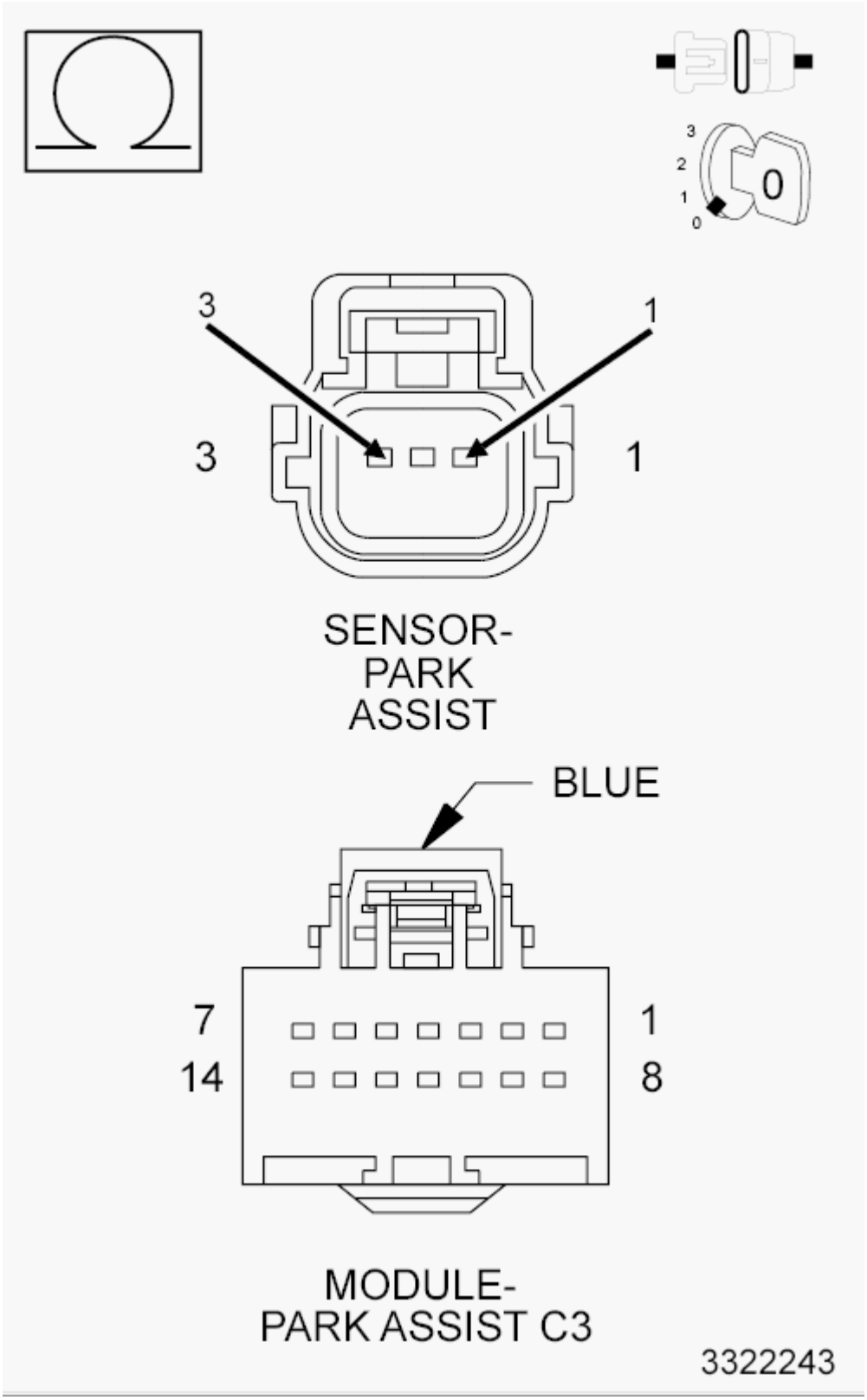


Fig. 96: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D709) Park Assist Sensor 6 Signal circuit and the (X702) Front Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D709) Park Assist Sensor 6 Signal circuit for a short to the (X702) Front Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

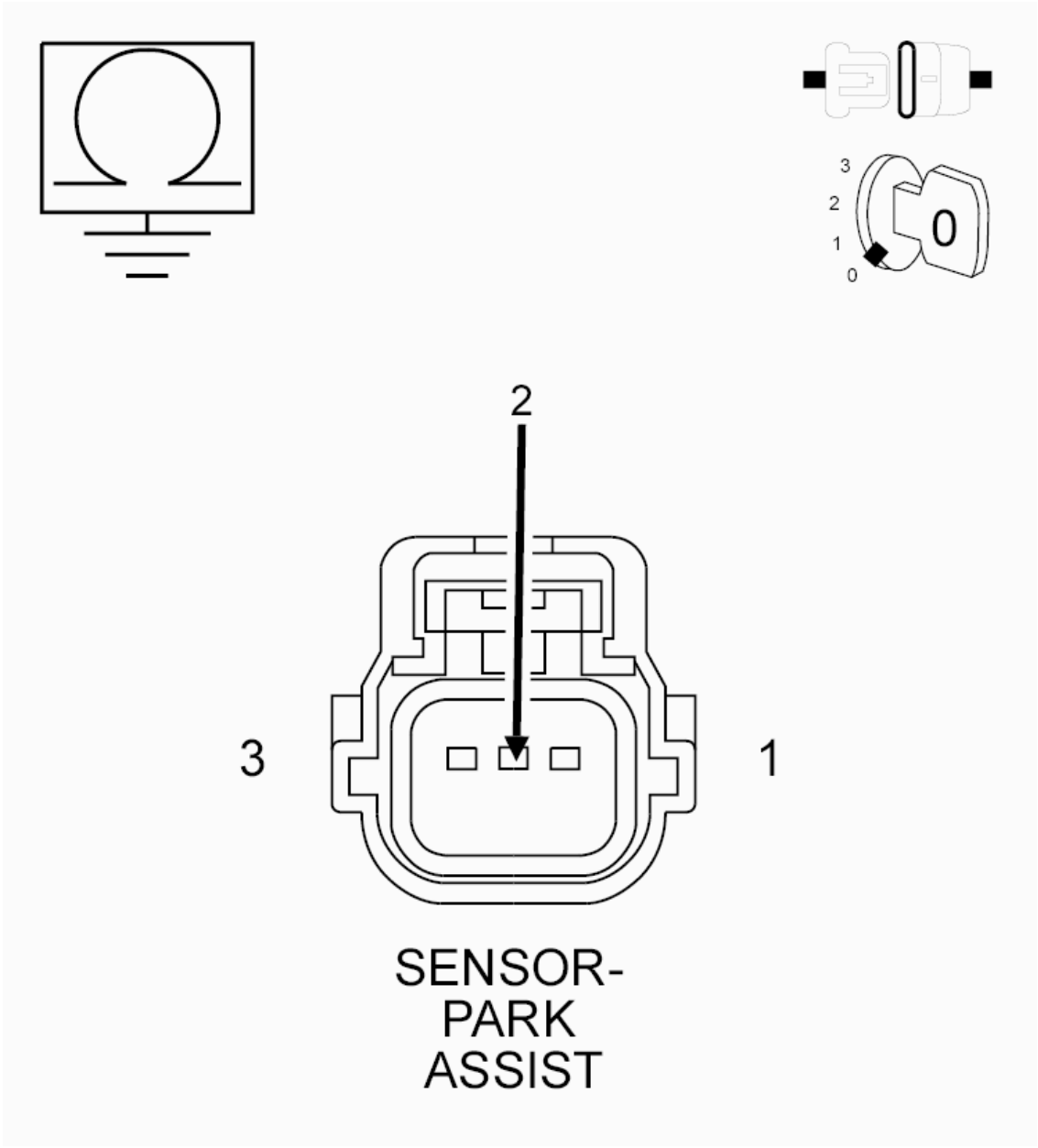


Fig. 97: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

   Yes

   - Go To 5.

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X751) FRONT PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**

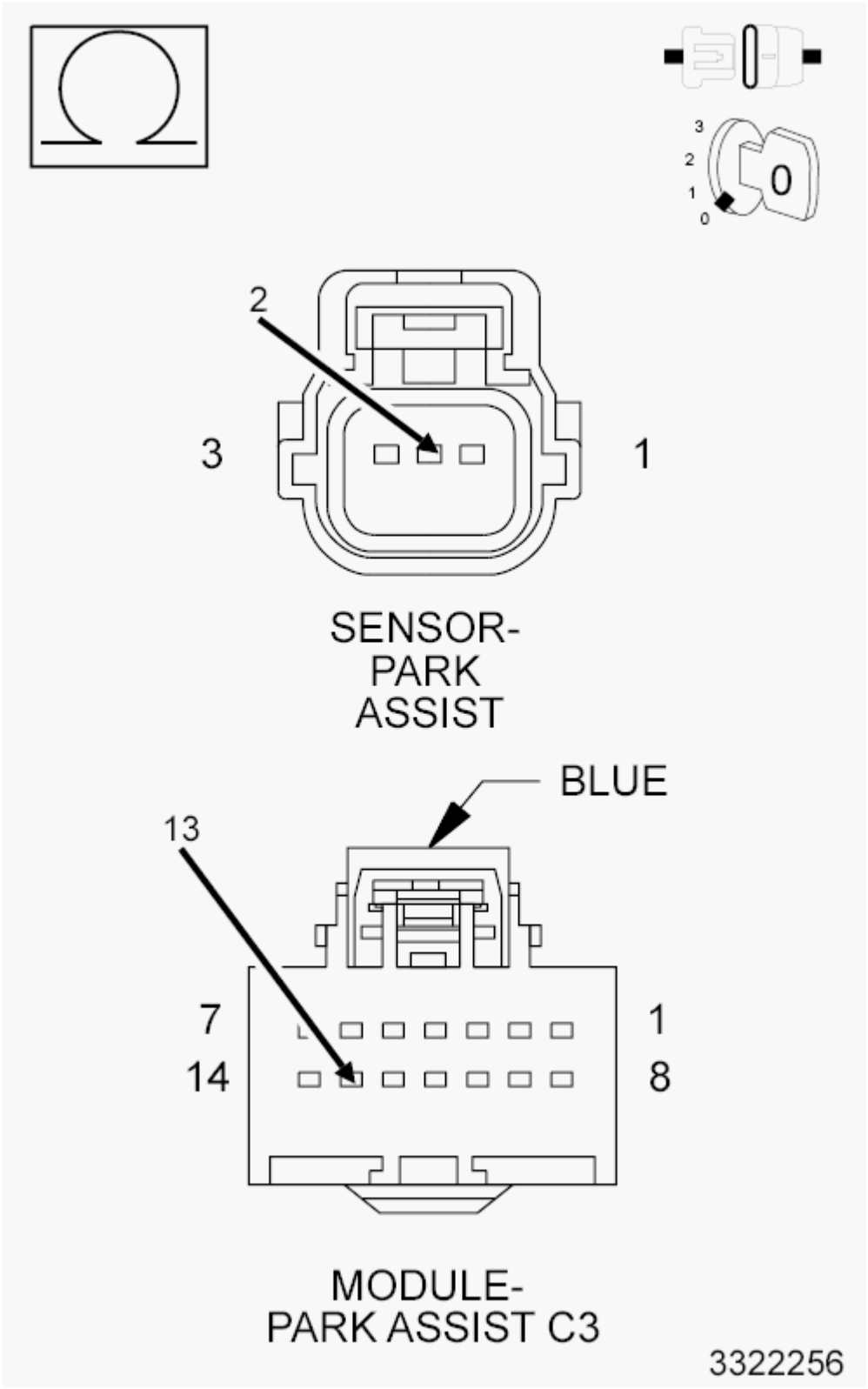


Fig. 98: Checking Front Park Assist Sensor Ground Circuit For An Open Between Park Assist Module & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance of the (X751) Front Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X751) Front Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1293-25-PTS SENSOR 6 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

      - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1293-92-PTS SENSOR 6 - PERFORMANCE OR INCORRECT OPERATION

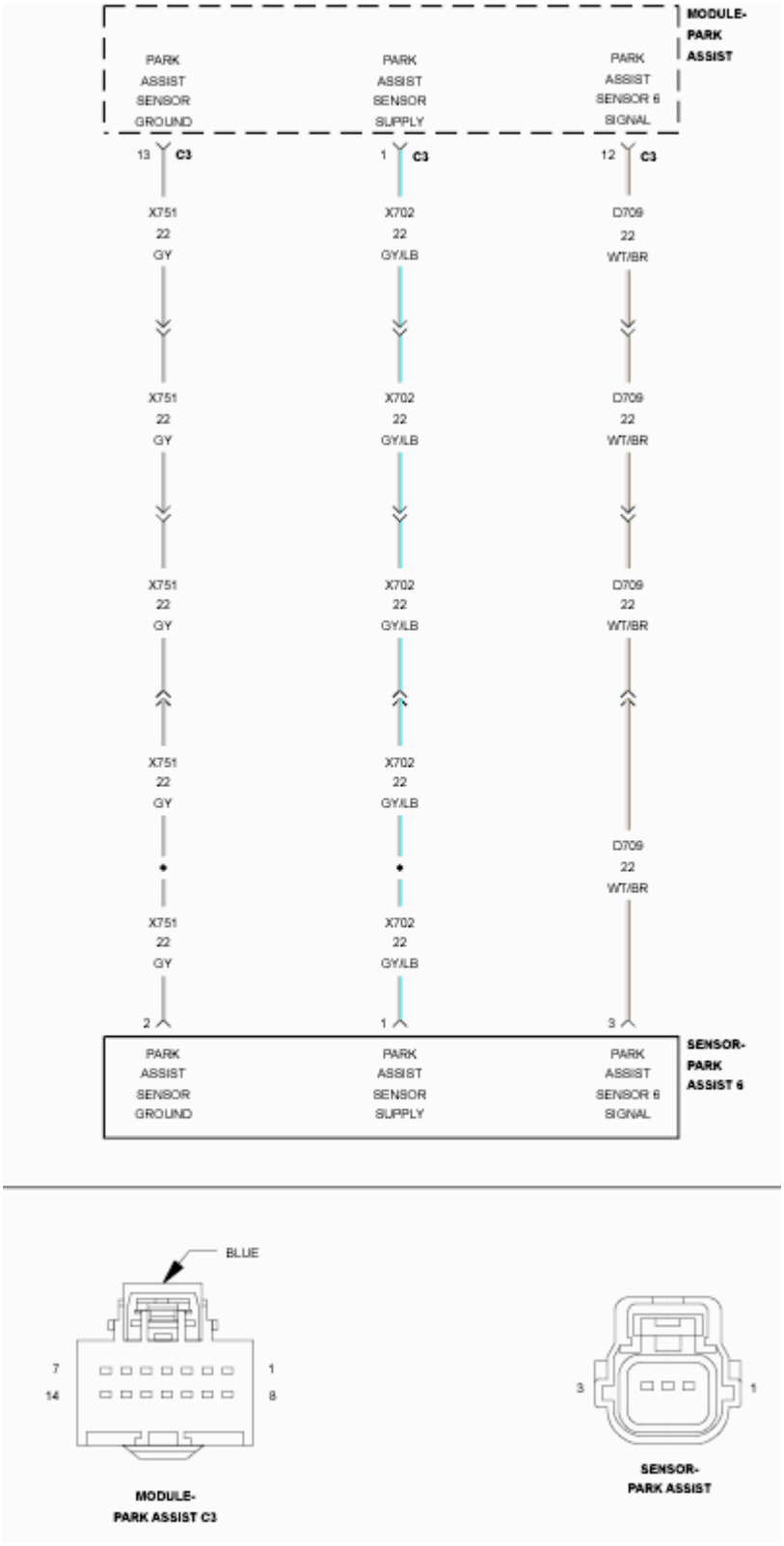


Fig. 99: Park Assist Sensor Wiring Diagram

Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE PARK ASSIST SENSOR FOR AN INTERNAL SHORT**
    1. Disconnect the Park Assist Sensor harness connector.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor 6 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

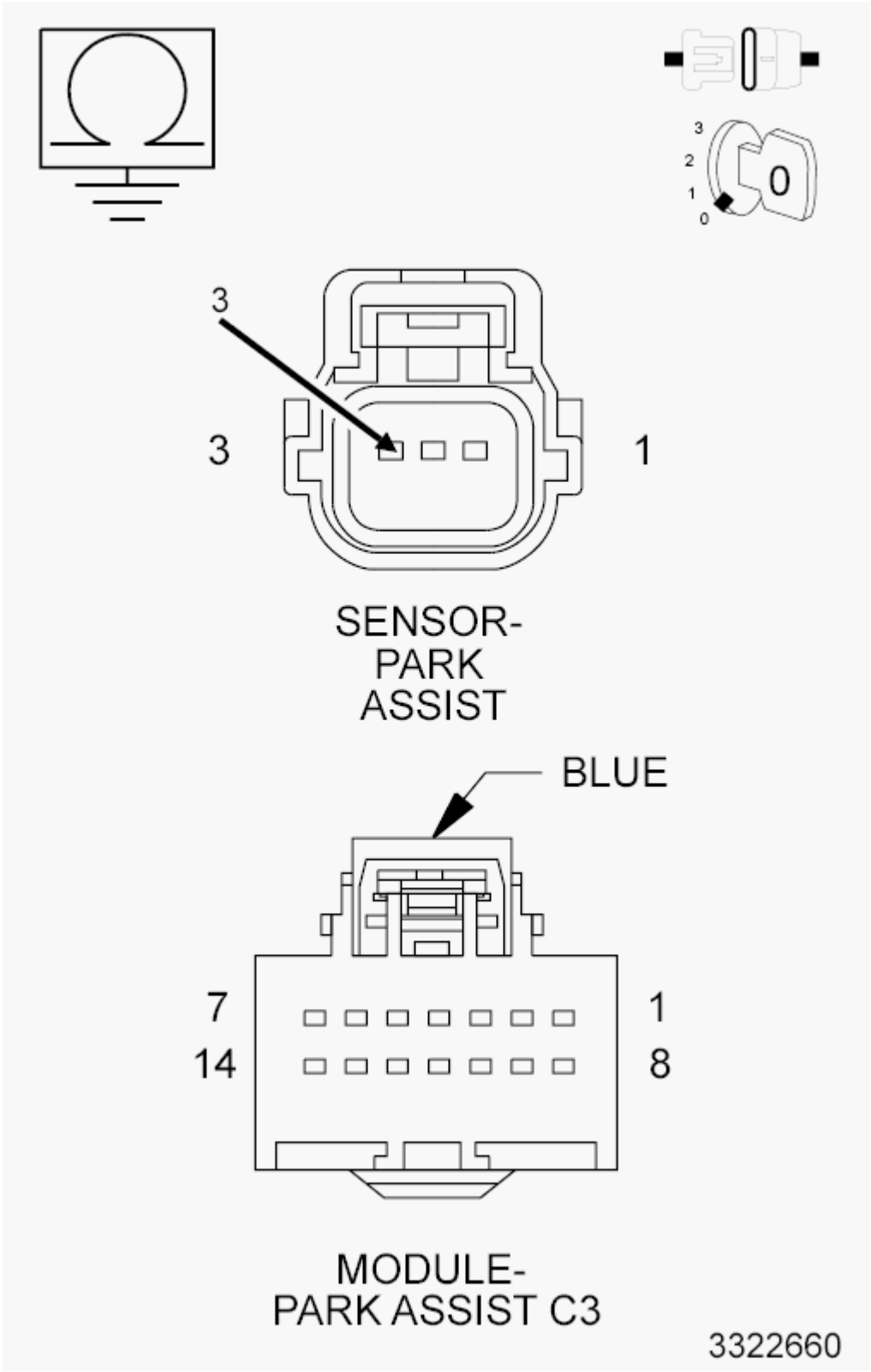


Fig. 100: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Measure the resistance between ground and the (D709) Park Assist Sensor 6 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D709) Park Assist Sensor 6 Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

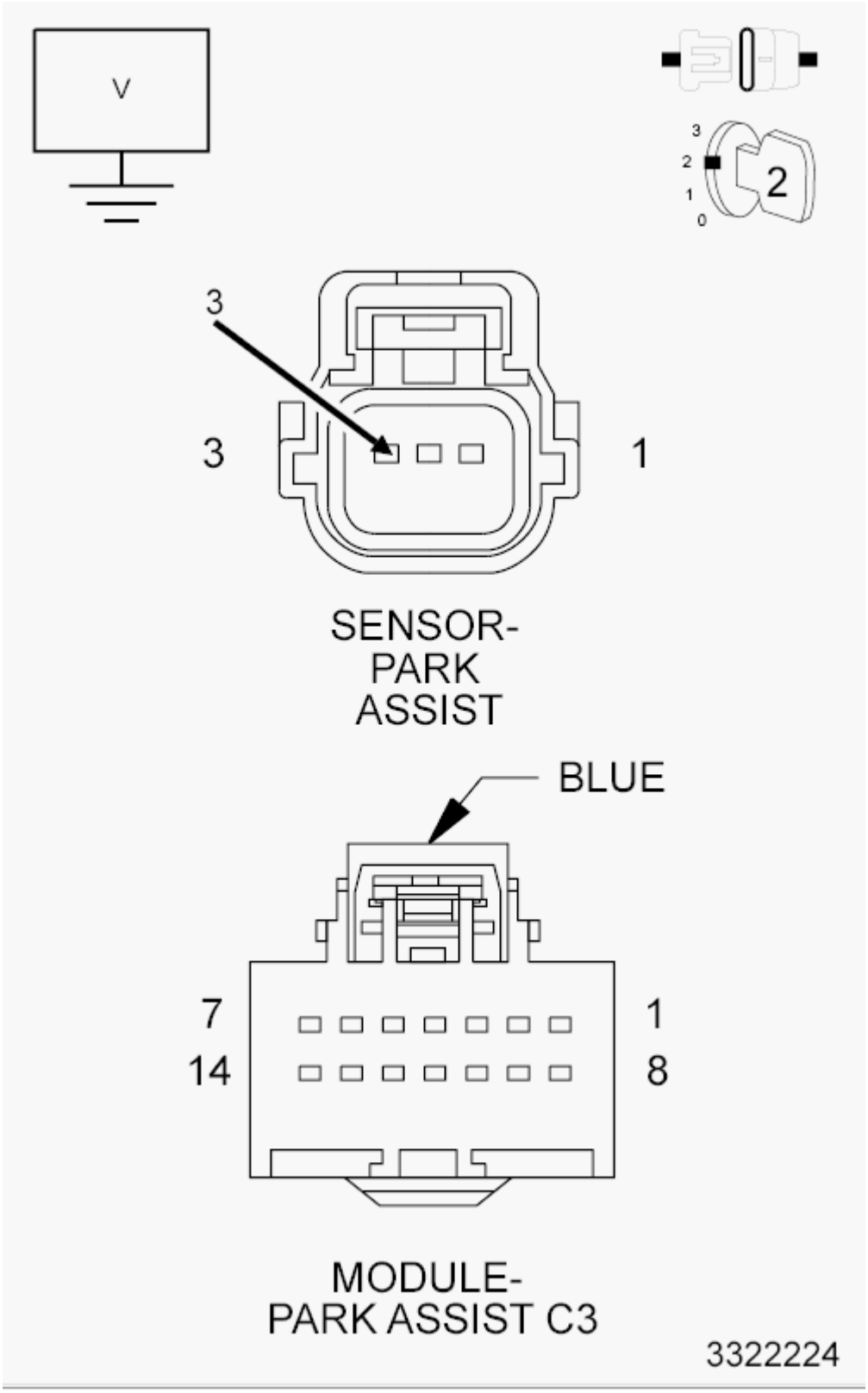


Fig. 101: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Measure the voltage of the (D709) Park Assist Sensor 6 Signal circuit.

   Is voltage present?

   Yes

   - Repair the (D709) Park Assist Sensor 6 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D709) PARK ASSIST SENSOR 6 SIGNAL CIRCUIT FOR AN OPEN**

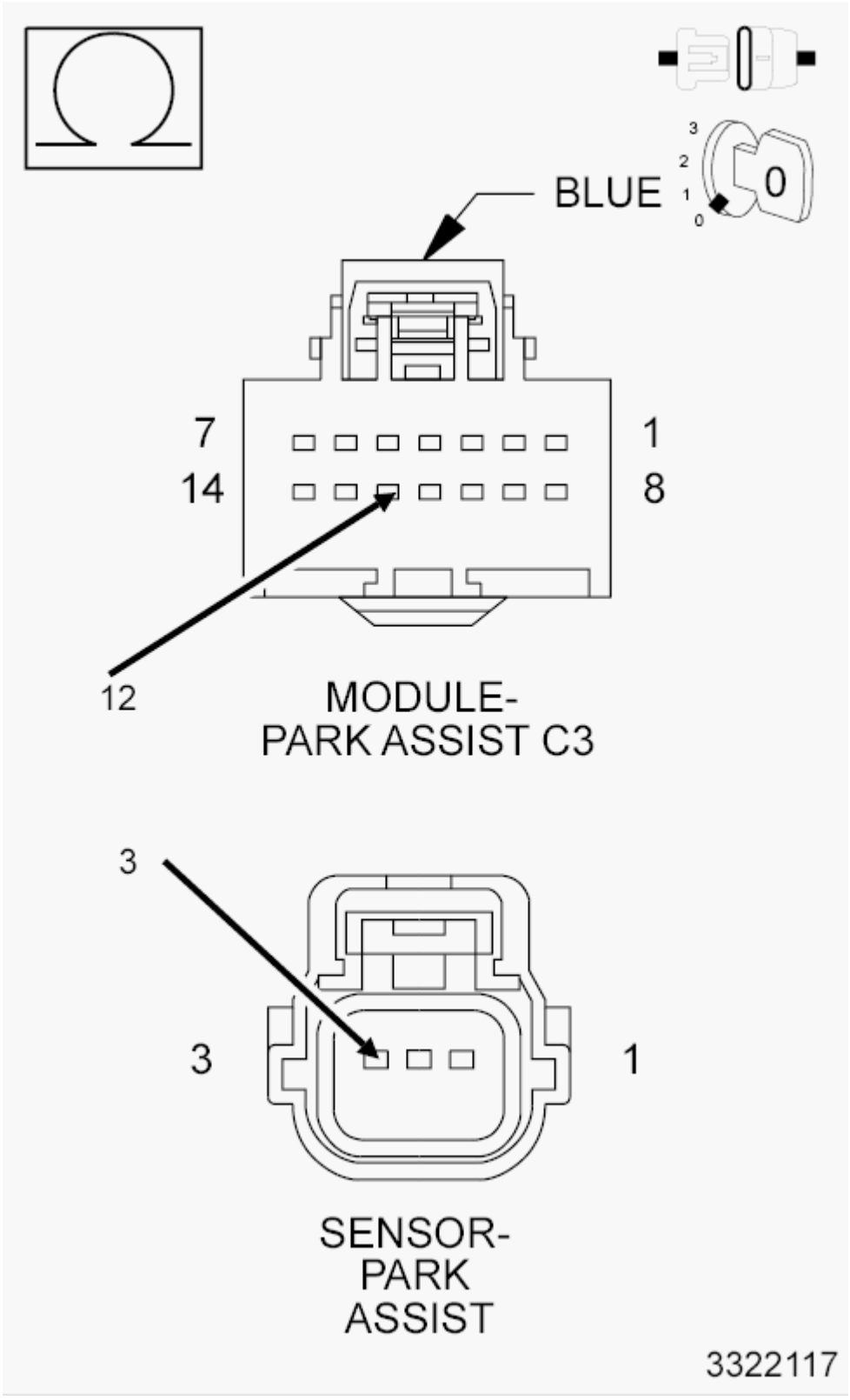


Fig. 102: Checking Park Assist Sensor 6 Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D709) Park Assist Sensor 6 Signal circuit.

   Is the resistance above 5.0 Ohms?

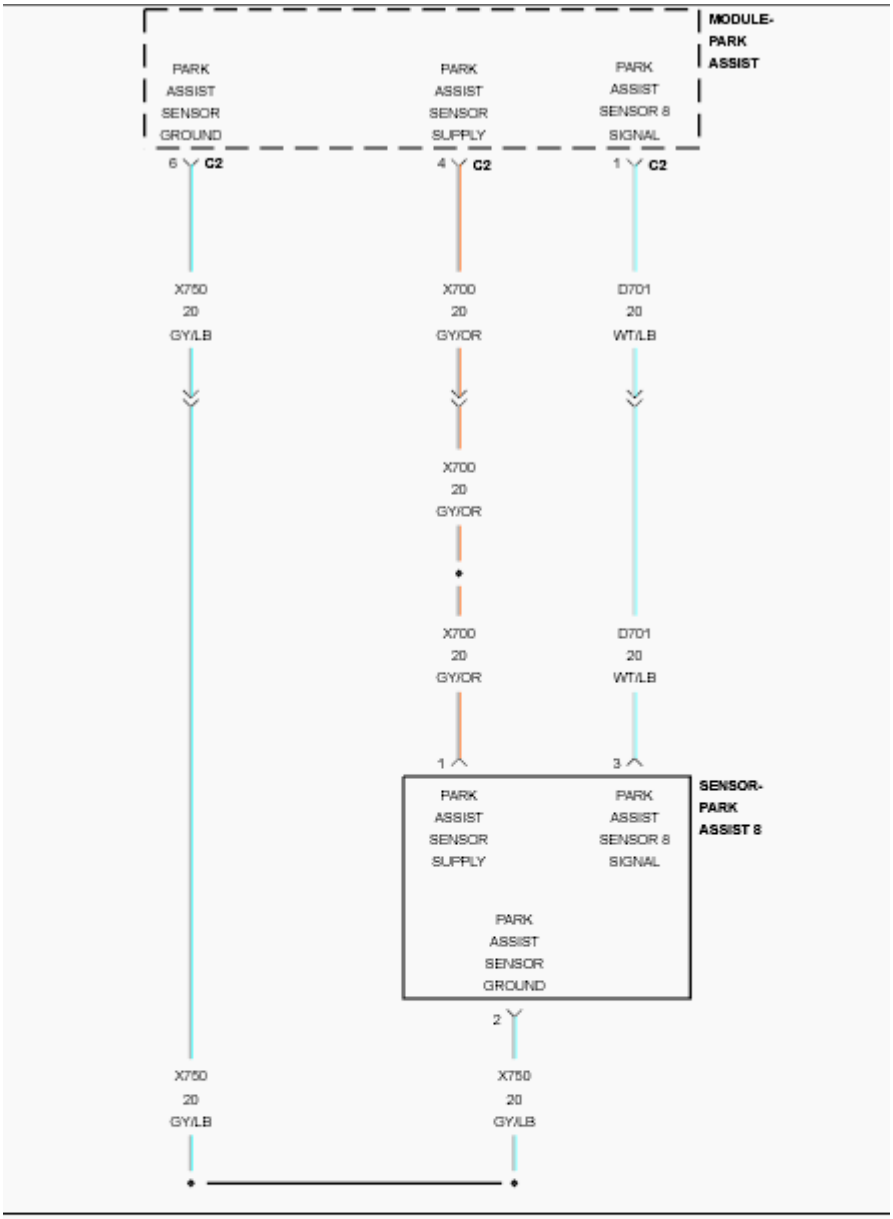
   Yes

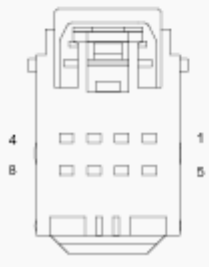
   - Repair the (D709) Park Assist Sensor 6 Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1295-11-PTS SENSOR 8 - CIRCUIT SHORT TO GROUND





MODULE-
PARK ASSIST C2

SENSOR-
PARK ASSIST 8

Fig. 103: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR AN OPEN
(X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is

connected before proceeding with this diagnostic procedure.

1. Turn the ignition on.
2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

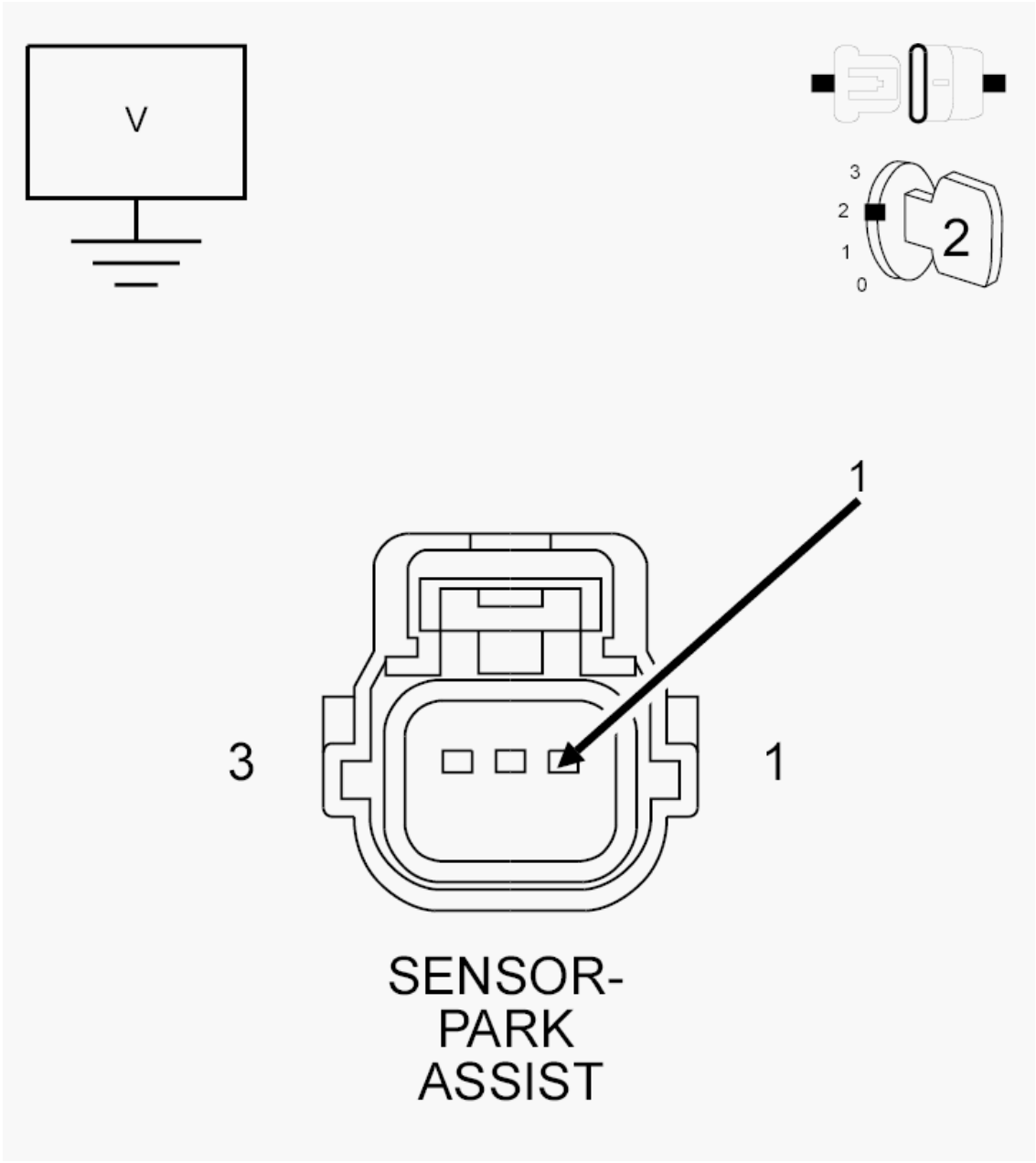


Fig. 104: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X700) Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

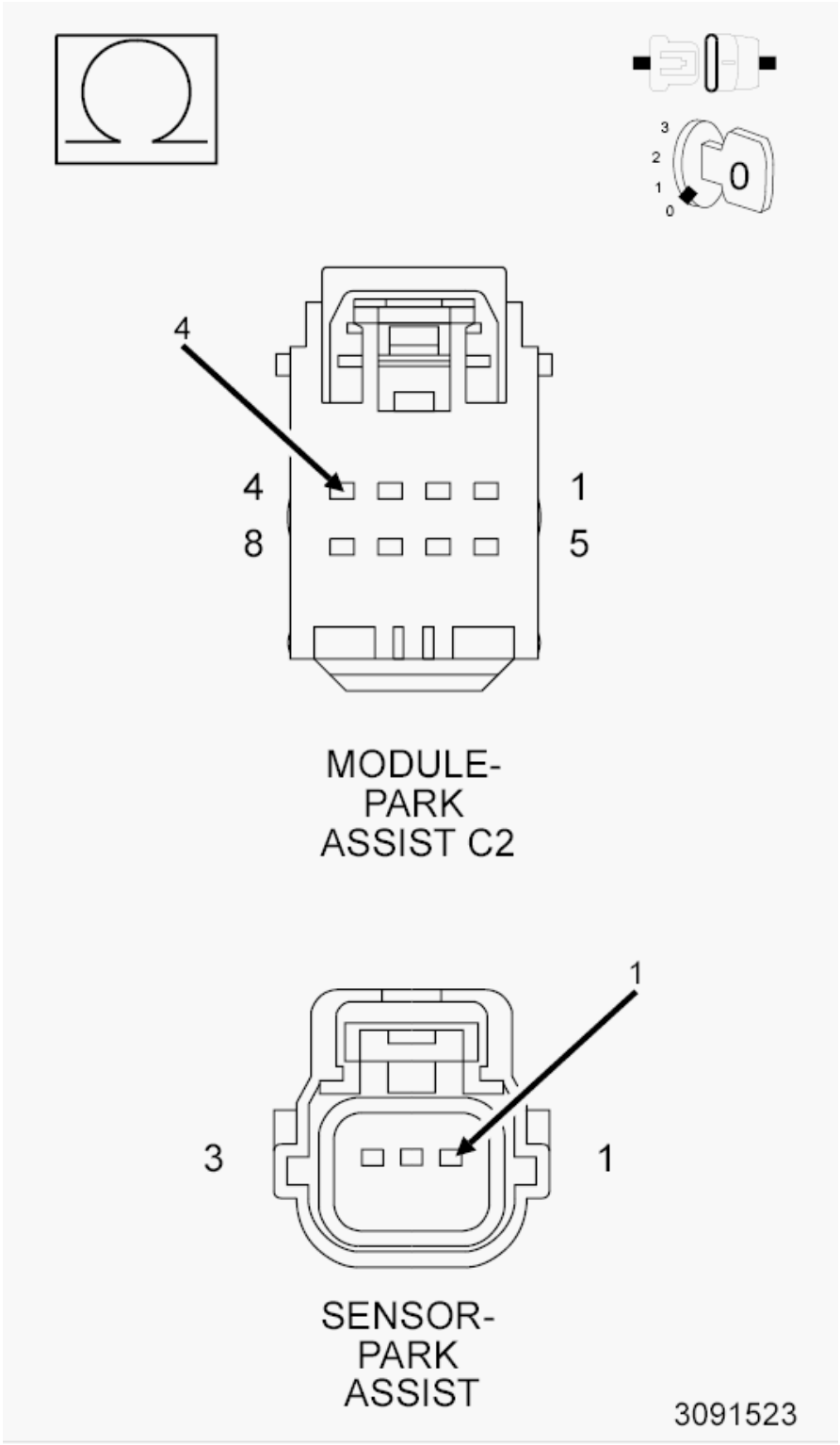


Fig. 105: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.

3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

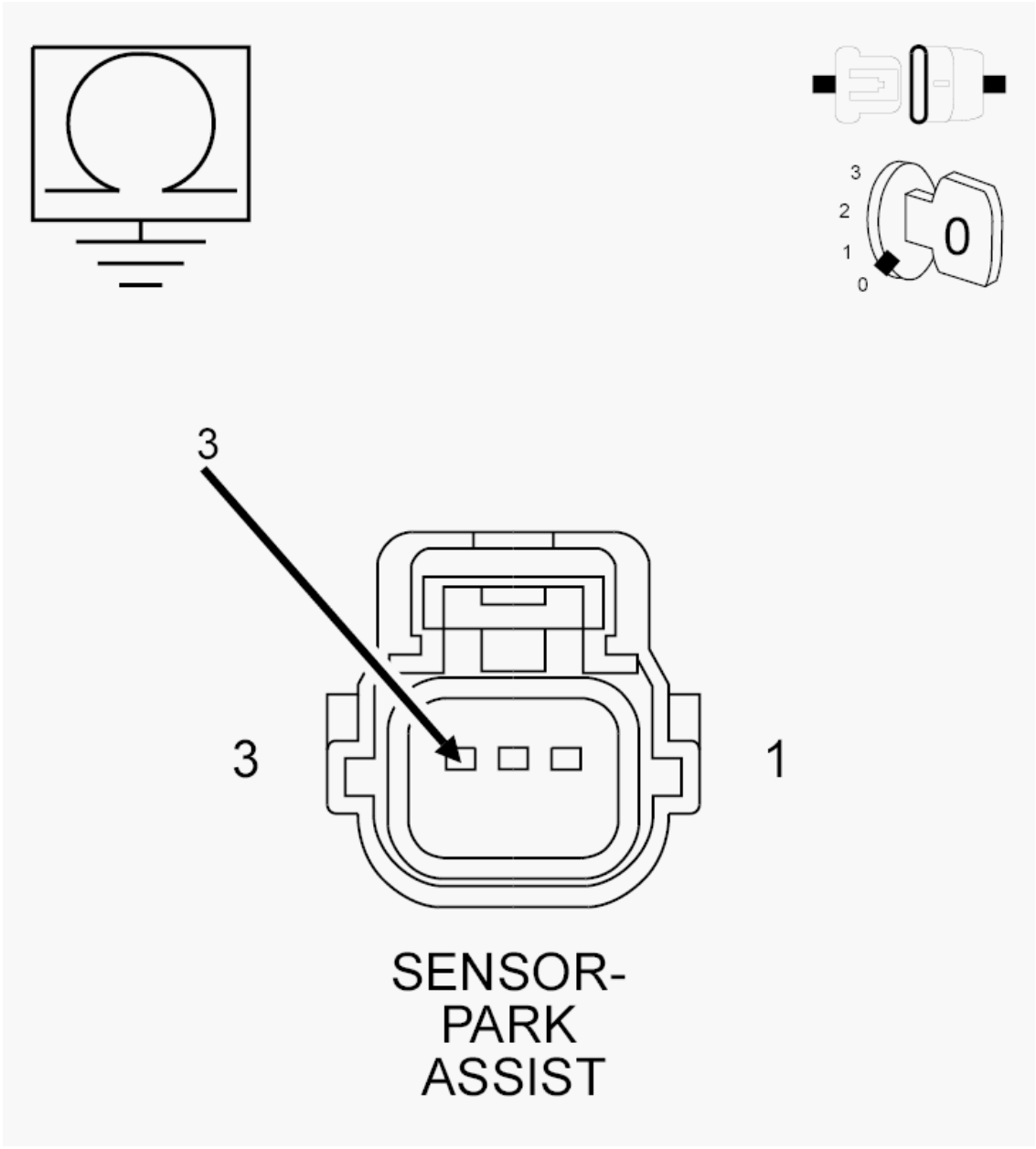


Fig. 106: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D701) Park Assist Sensor Signal circuit.

   Is the resistance below 10K Ohms?

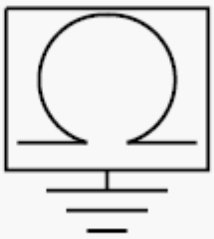
   Yes

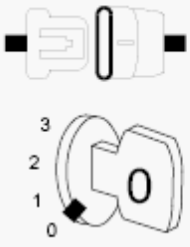
   - Go To 5.

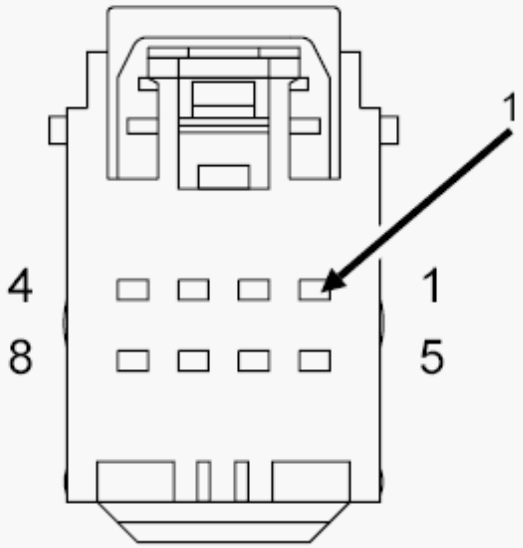
No

- Go To 7.

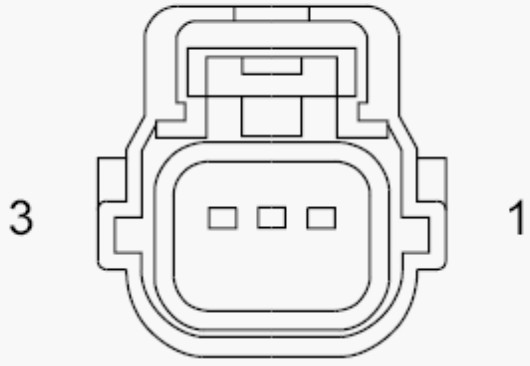
5. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**







MODULE-
PARK
ASSIST C2



SENSOR-
PARK

Fig. 107: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (D701) Park Assist Sensor Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D701) Park Assist Sensor Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**

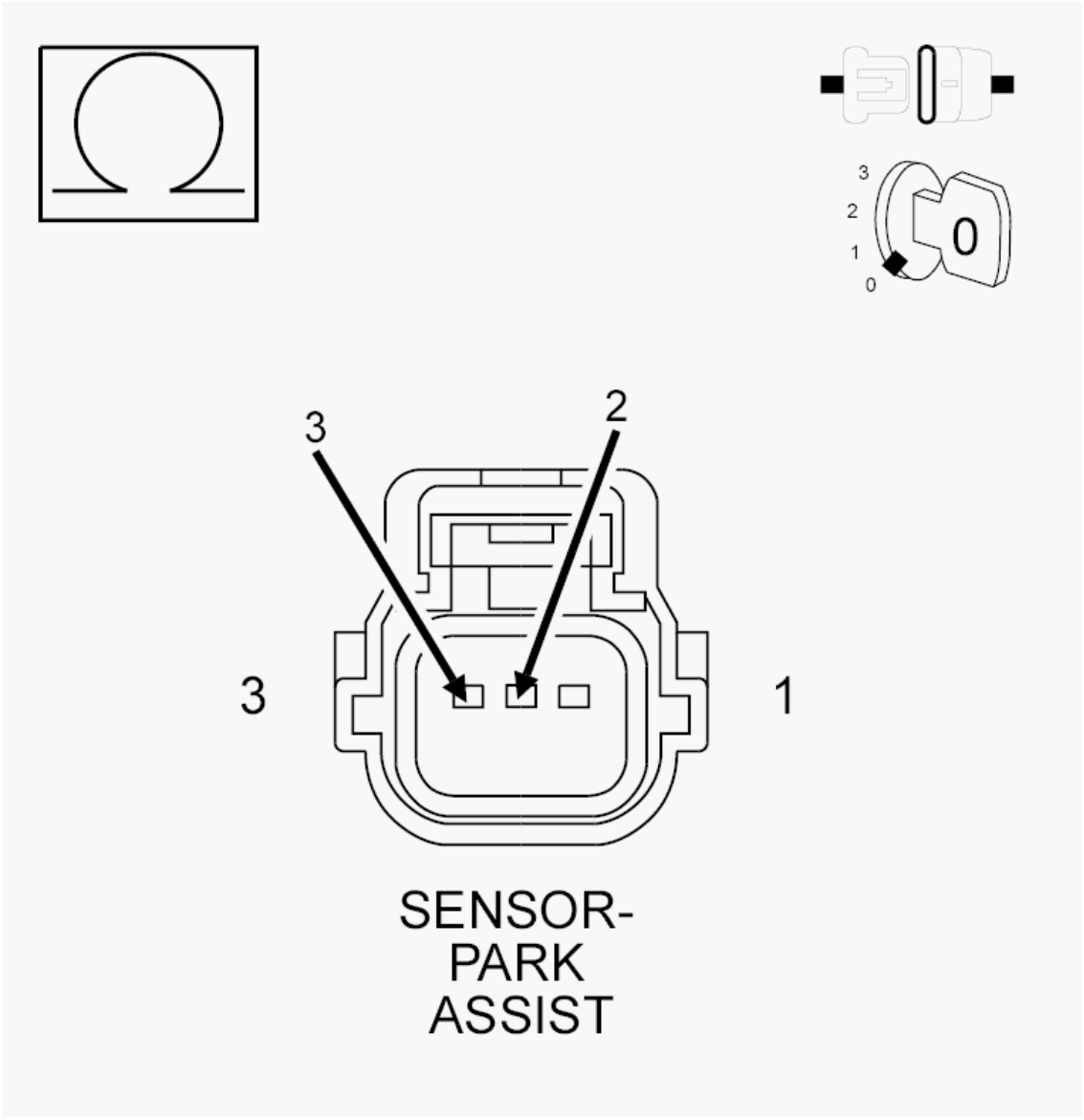


Fig. 108: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D701) Park Assist Sensor Signal circuit and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D701) Park Assist Sensor Signal circuit and the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR AN OPEN**

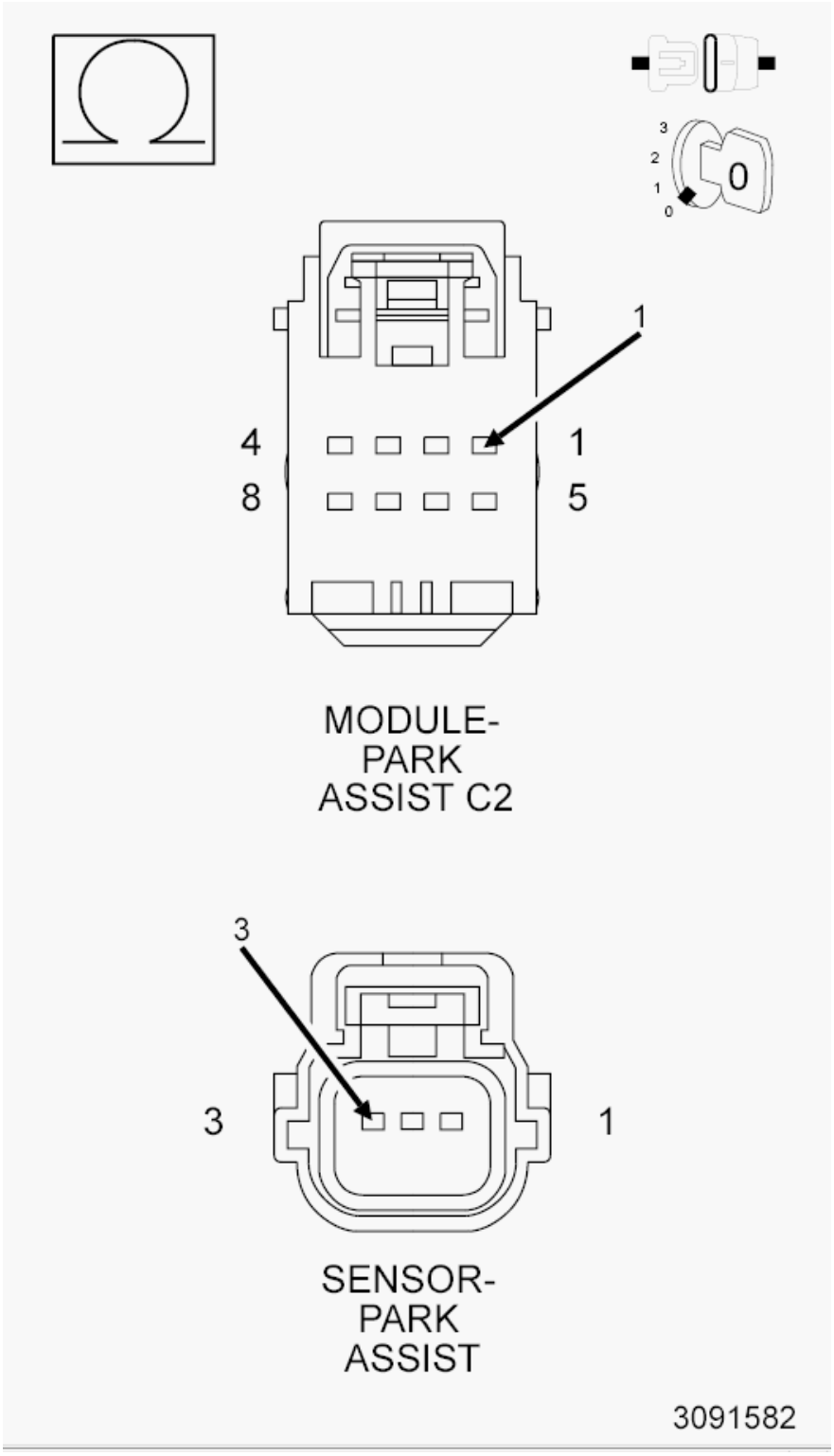


Fig. 109: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.

2. Measure the resistance of the (D701) Park Assist Sensor Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D701) Park Assist Sensor Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

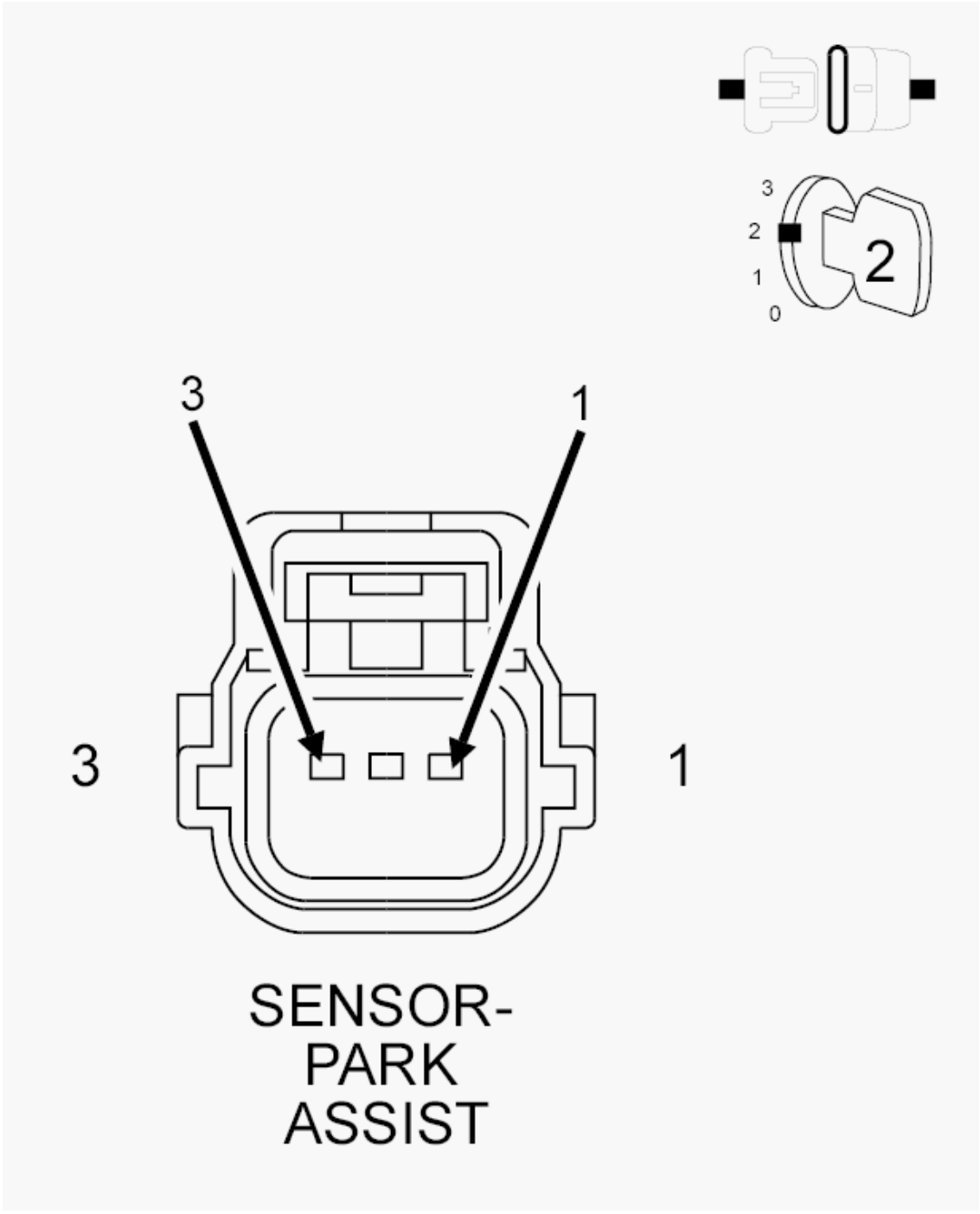


Fig. 110: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C2 harness connector.
3. Connect a jumper wire across the (X700) Park Assist Sensor Supply and (D701) Park Assist Sensor Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1295-12-PTS SENSOR 8 - CIRCUIT SHORT TO BATTERY as active?

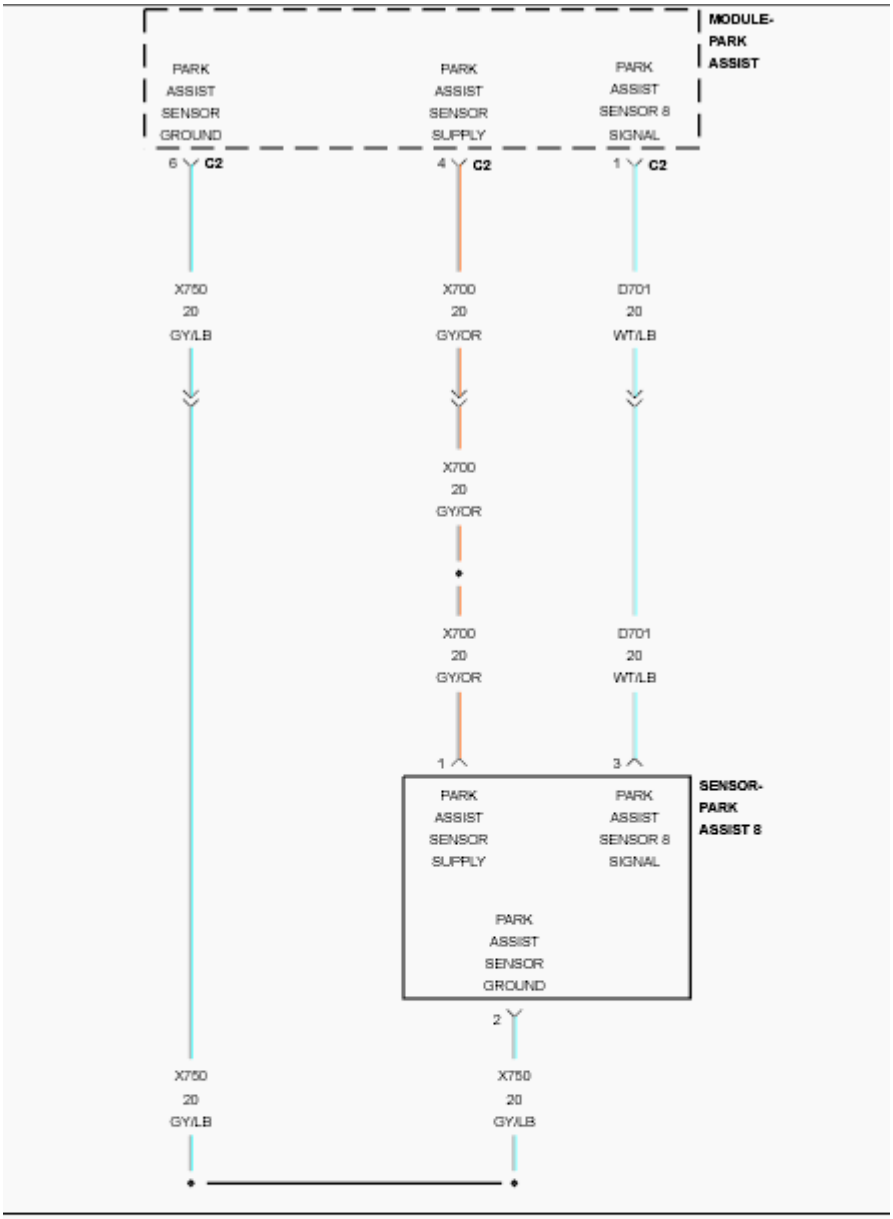
   Yes

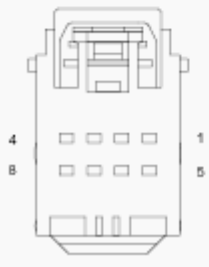
   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1295-12-PTS SENSOR 8 - CIRCUIT SHORT TO BATTERY





MODULE-
PARK ASSIST C2

SENSOR-
PARK ASSIST 8

Fig. 111: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT
(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

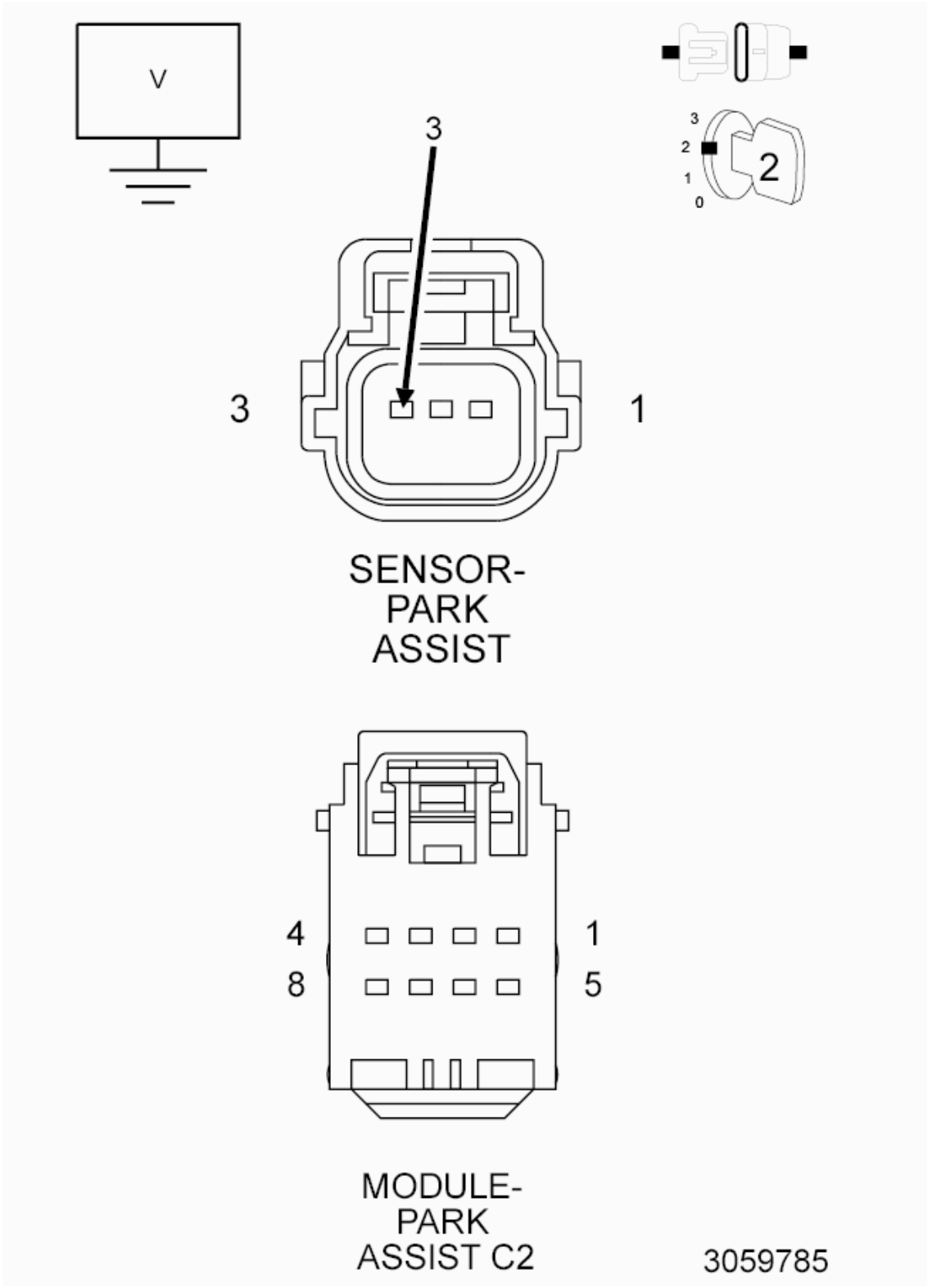


Fig. 112: Measuring Voltage Of Park Assist Sensor Signal Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.

2. Disconnect the Park Assist Module C2 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D701) Park Assist Sensor Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

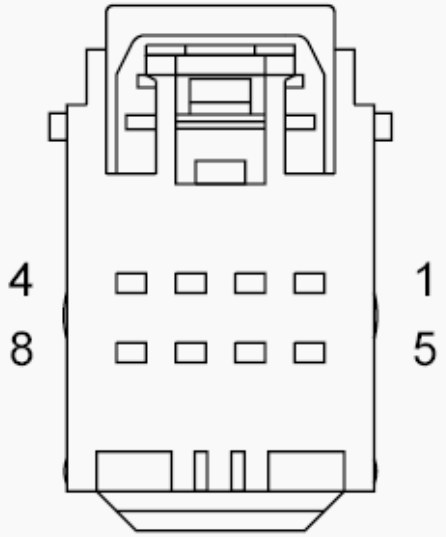
   - Repair the (D701) Park Assist Sensor Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060400

Fig. 113: Checking Park Assist Sensor Signal Circuit For A Short To The Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D701) Park Assist Sensor Signal circuit and the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D701) Park Assist Sensor Signal circuit for a short to the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

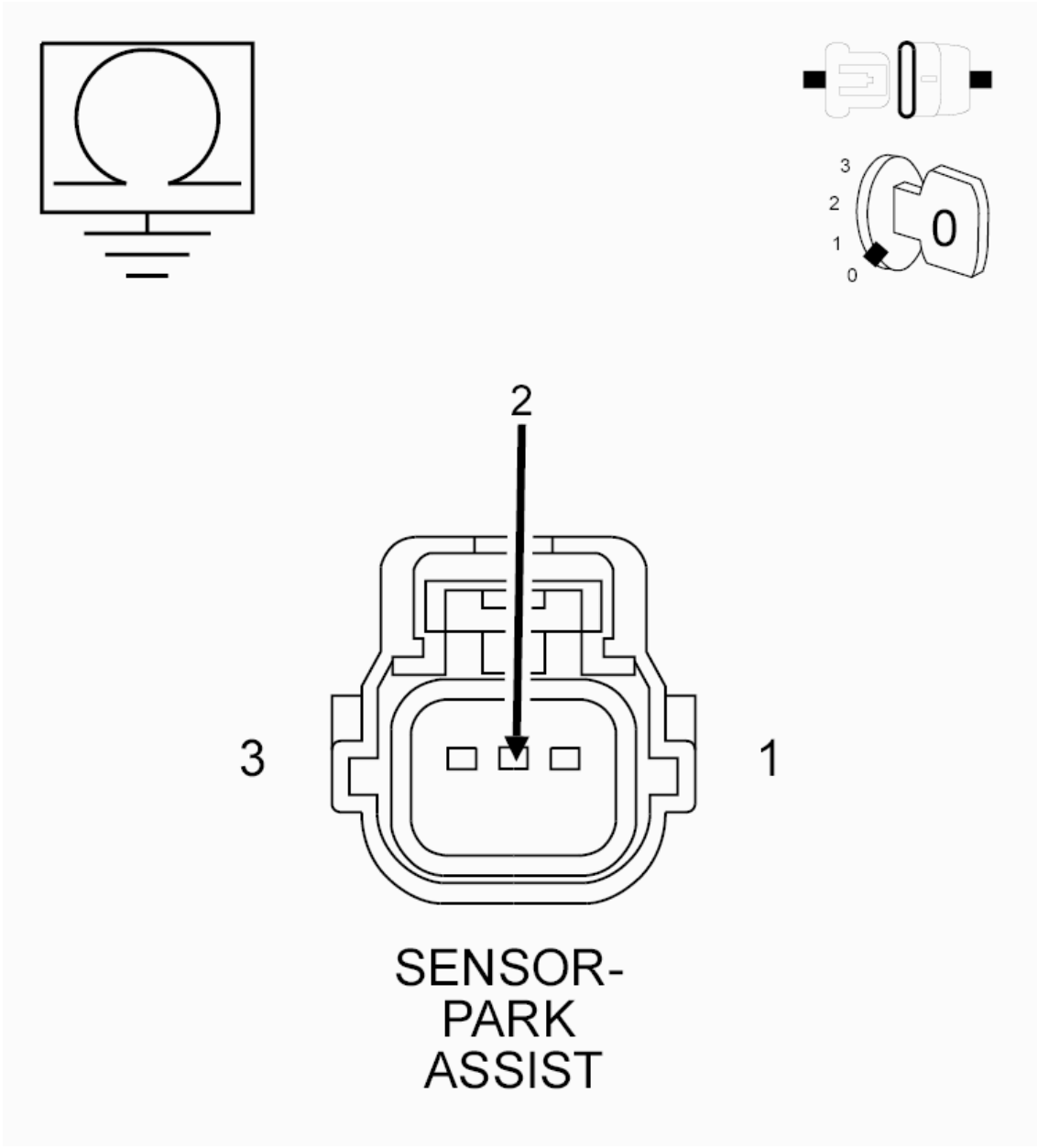


Fig. 114: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

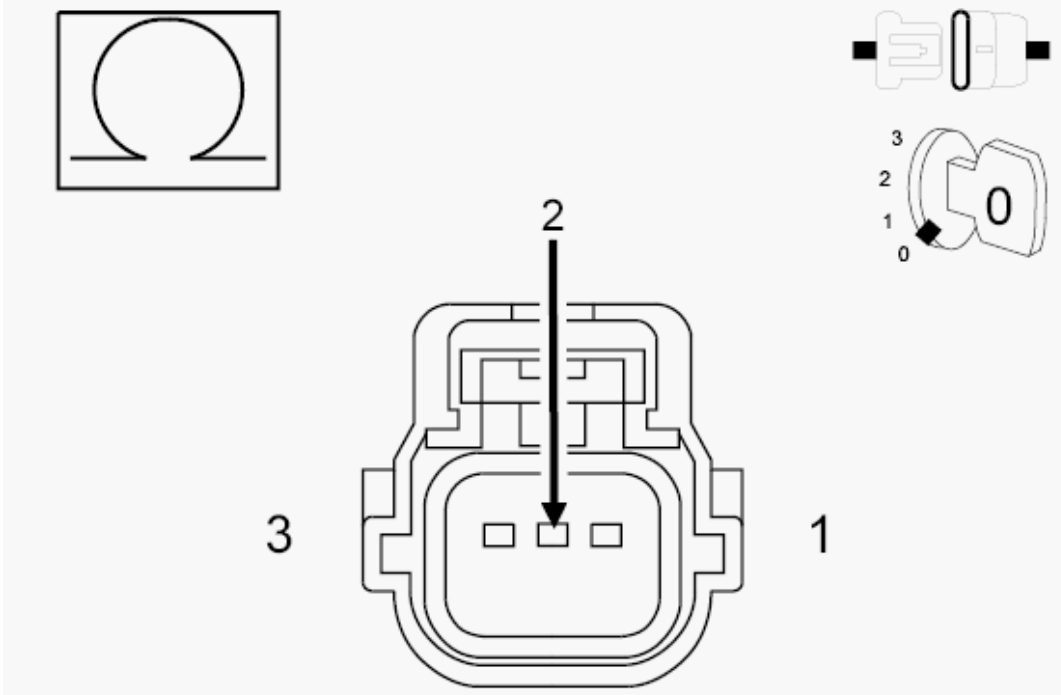
   Yes

   - Go To 5.

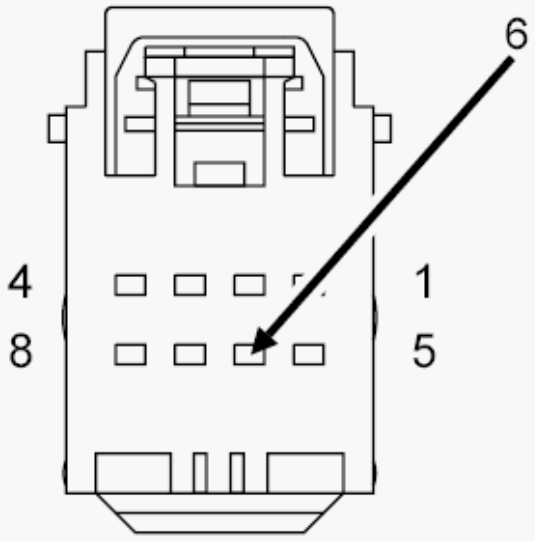
No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**



SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060659

Fig. 115: Checking Park Assist Sensor Ground Circuit For An Open Between Park Assist Module And Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1295-25-PTS SENSOR 8 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

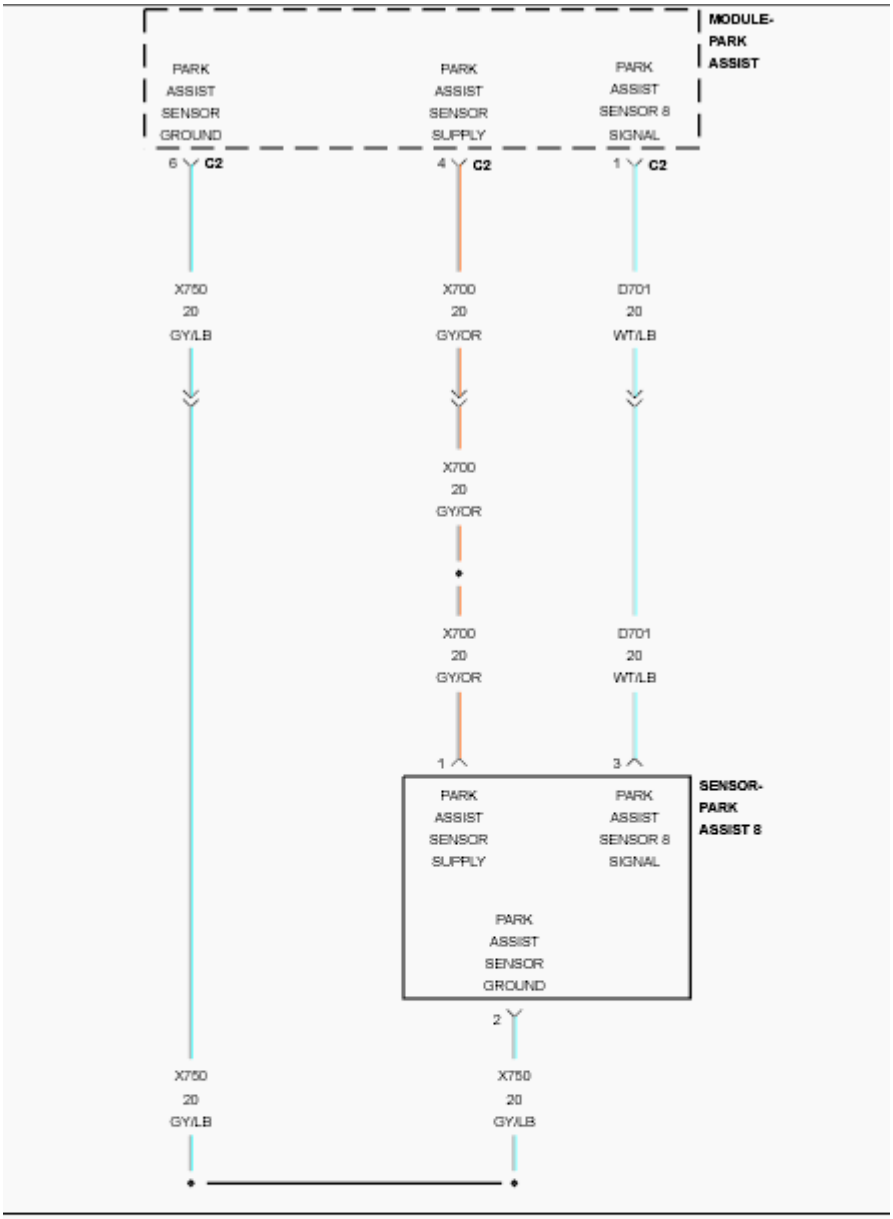
2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

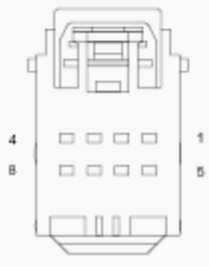
      If none of the possible causes mentioned above are present, view repair.

      Repair

- Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1295-92-PTS SENSOR 8 - PERFORMANCE OR INCORRECT OPERATION





MODULE-
PARK ASSIST C2

SENSOR-
PARK ASSIST 8

Fig. 116: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR 8
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK PARK ASSIST SENSOR 8 FOR INTERNAL SHORT**
    1. Disconnect Park Assist Sensor.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

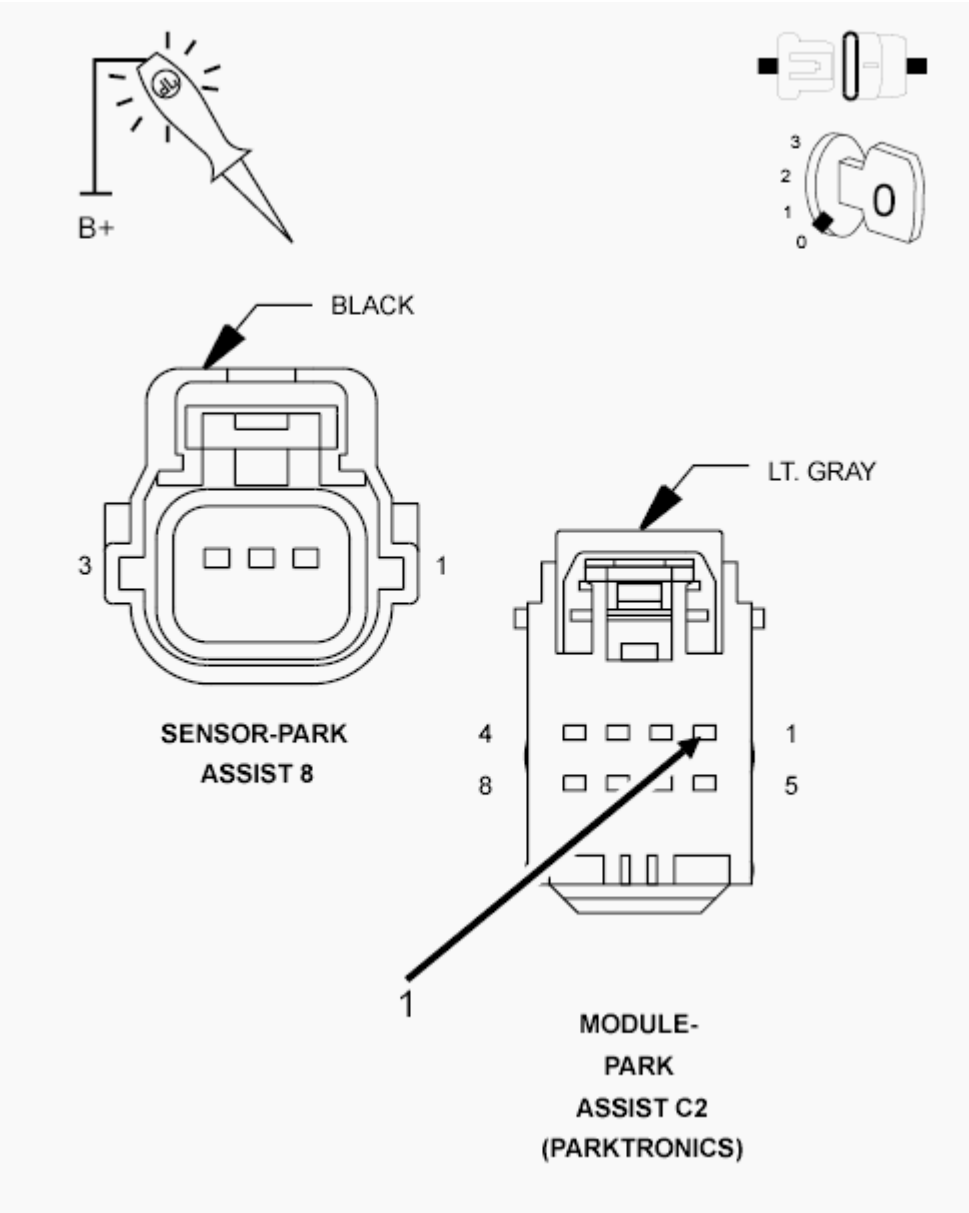


Fig. 117: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.
3. Using a 12-volt test light connected to 12-volts check the (D701) Park Assist Sensor Signal circuit at the Park Assist Module C2 harness connector.

   Does the test light illuminate brightly?

   Yes

   - Repair the (D701) Park Assist Sensor Signal circuit for a short to ground.

- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Go To 4.

4. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

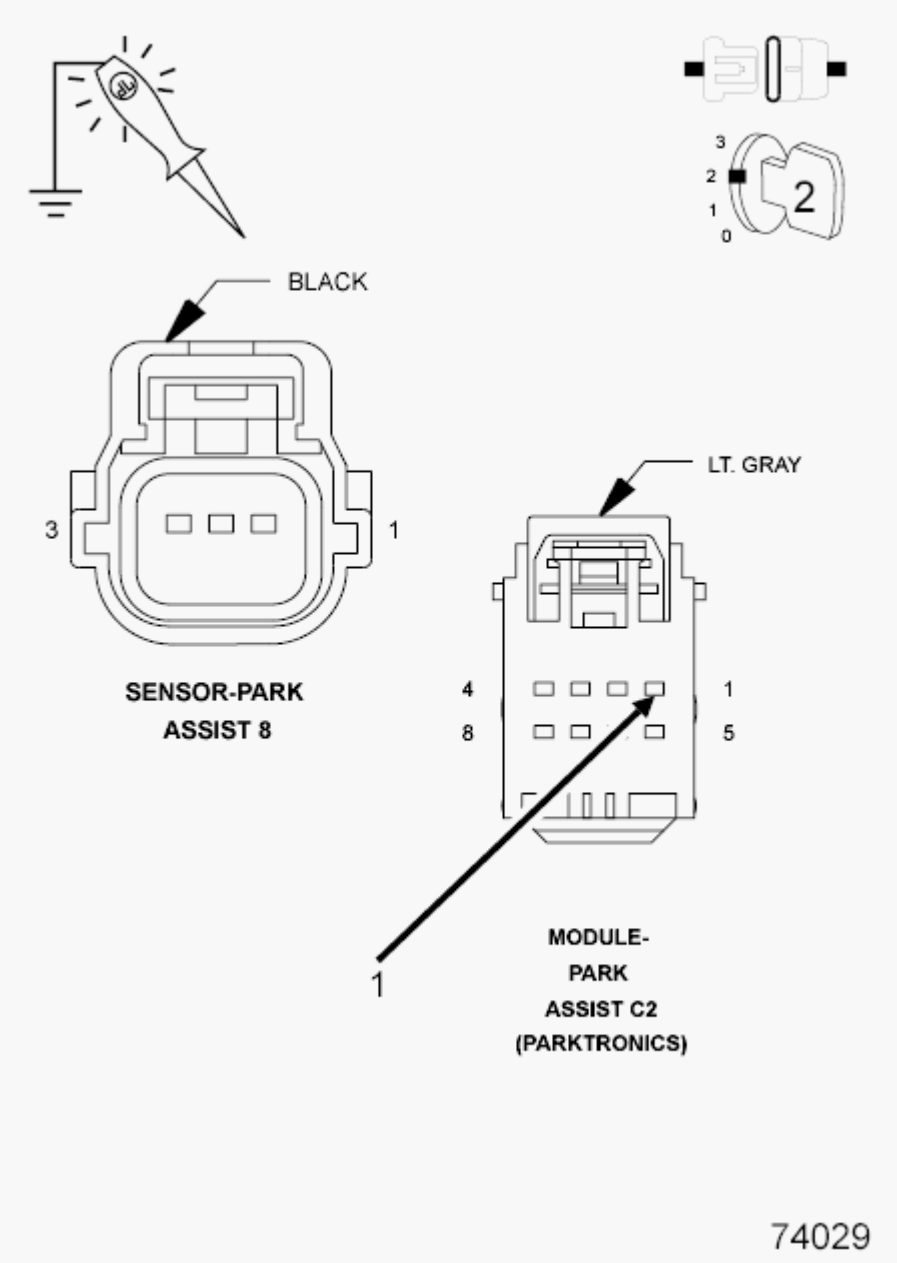


Fig. 118: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.

2. Using a 12-volt test light connected to ground check the (D701) Park Assist Sensor Signal circuit at the Park Assist Module C2 harness connector for a short to battery.

   Does the test light illuminate brightly?

   Yes

   - Repair the (D701) Park Assist Sensor Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR AN OPEN**

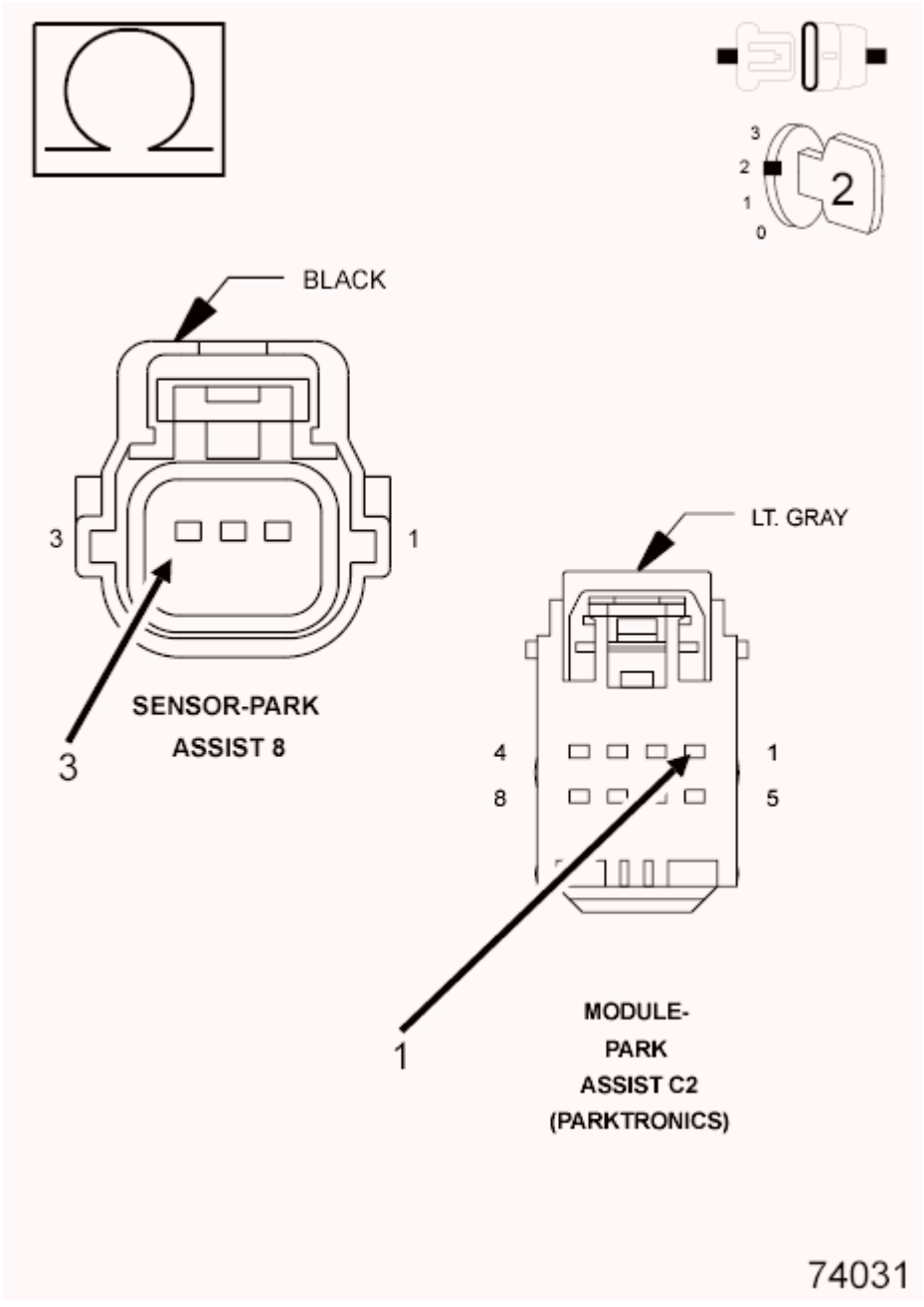


Fig. 119: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D701) Park Assist Sensor Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   No

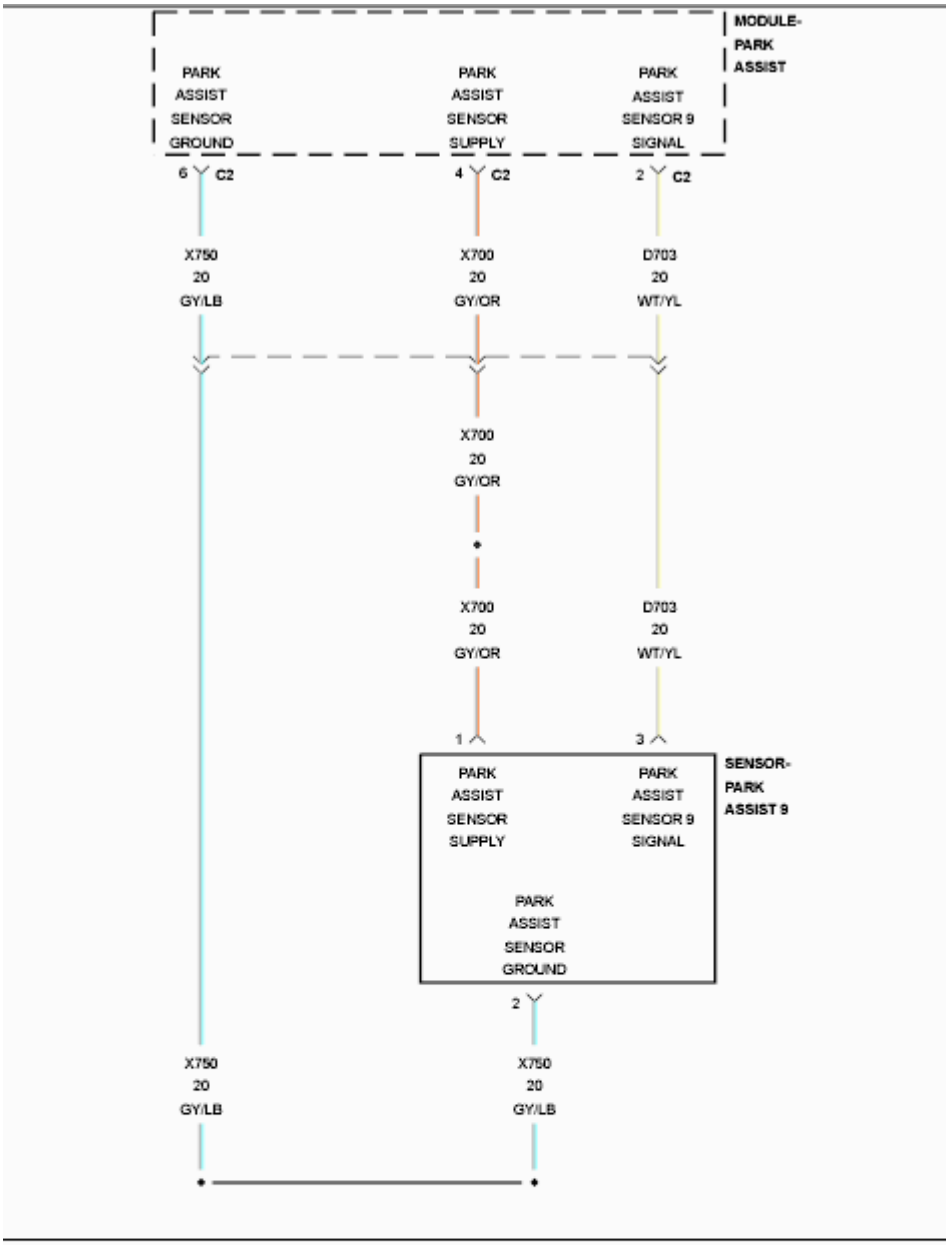
   - Repair the (D701) Park Assist Sensor Signal circuit for an open.

- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

Yes

- Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1296-11-PTS SENSOR 9 - CIRCUIT SHORT TO GROUND


MODULE-
PARK
ASSIST
PARK
ASSIST
SENSOR
GROUND
PARK
ASSIST
SENSOR
SUPPLY
PARK
ASSIST
SENSOR 9
SIGNAL
6
C2
4
C2
2
C2
X750
20
GY/LB
X700
20
GY/OR
D703
20
WT/YL
X700
20
GY/OR
X700
20
GY/OR
D703
20
WT/YL
1
3
SENSOR-
PARK
ASSIST 9
PARK
ASSIST
SENSOR
SUPPLY
PARK
ASSIST
SENSOR 9
SIGNAL
PARK
ASSIST
SENSOR
GROUND
2
X750
20
GY/LB
X750
20
GY/LB

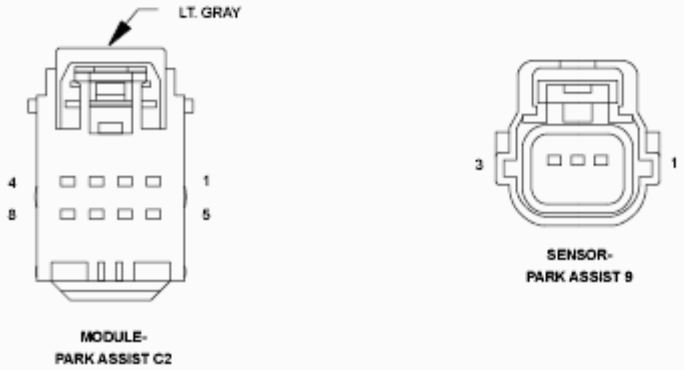

LT. GRAY
4
1
8
5
MODULE-
PARK ASSIST C2
3
1
SENSOR-
PARK ASSIST 9

Fig. 120: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR AN OPEN
(X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is

connected before proceeding with this diagnostic procedure.

1. Turn the ignition on.
2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

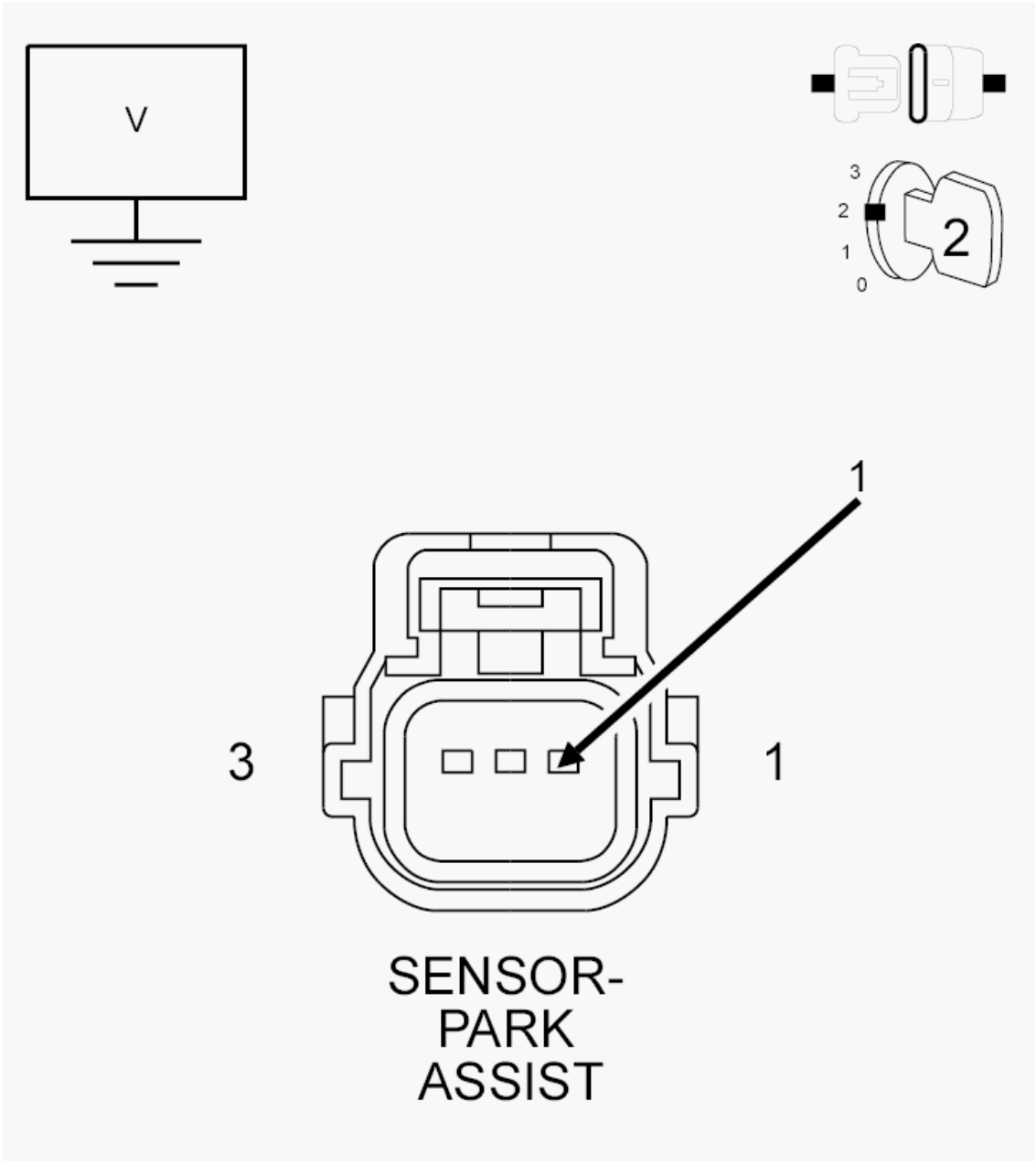


Fig. 121: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor.
3. Turn the ignition on.
4. Measure the voltage of the (X700) Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

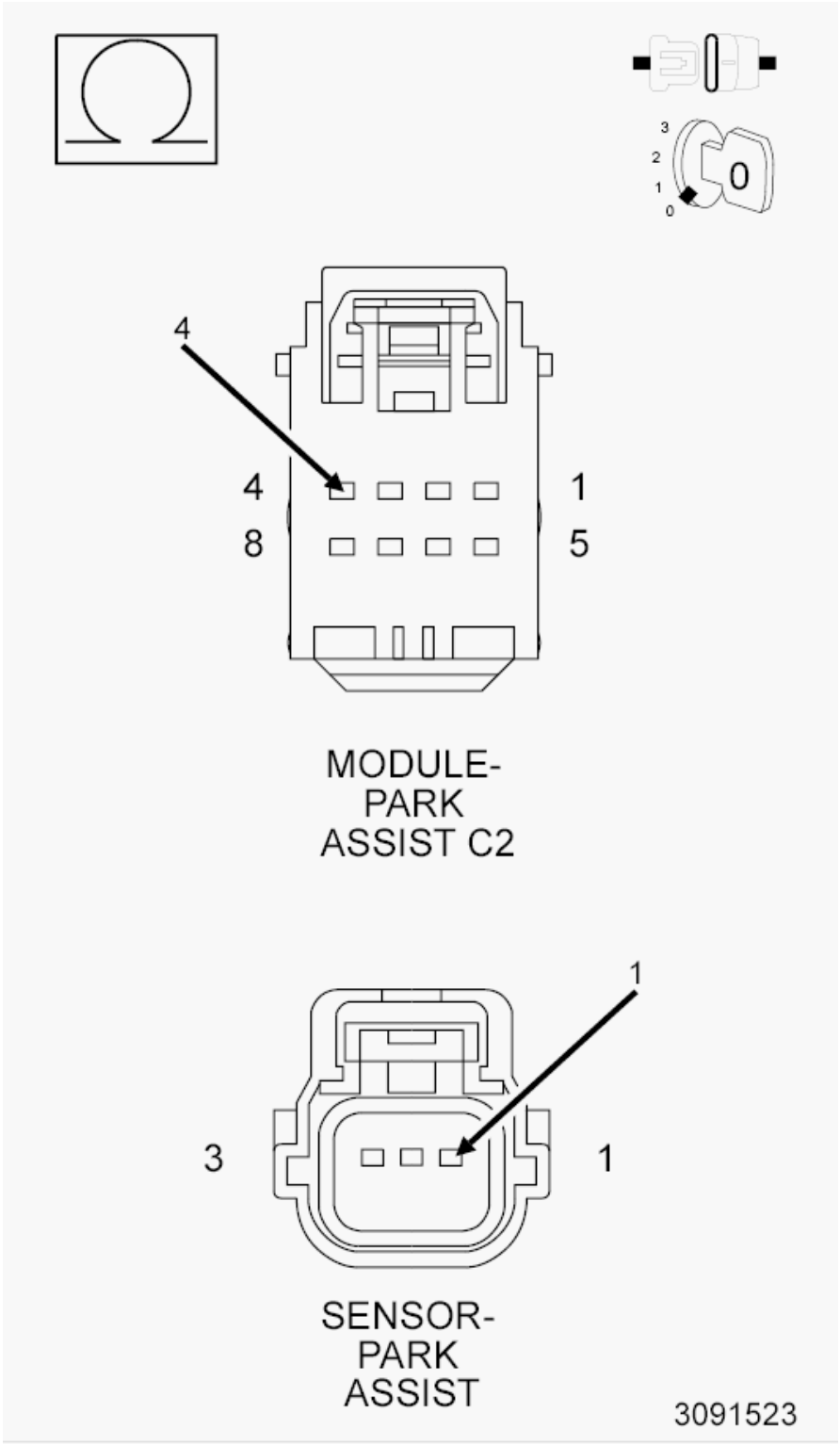


Fig. 122: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.

3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

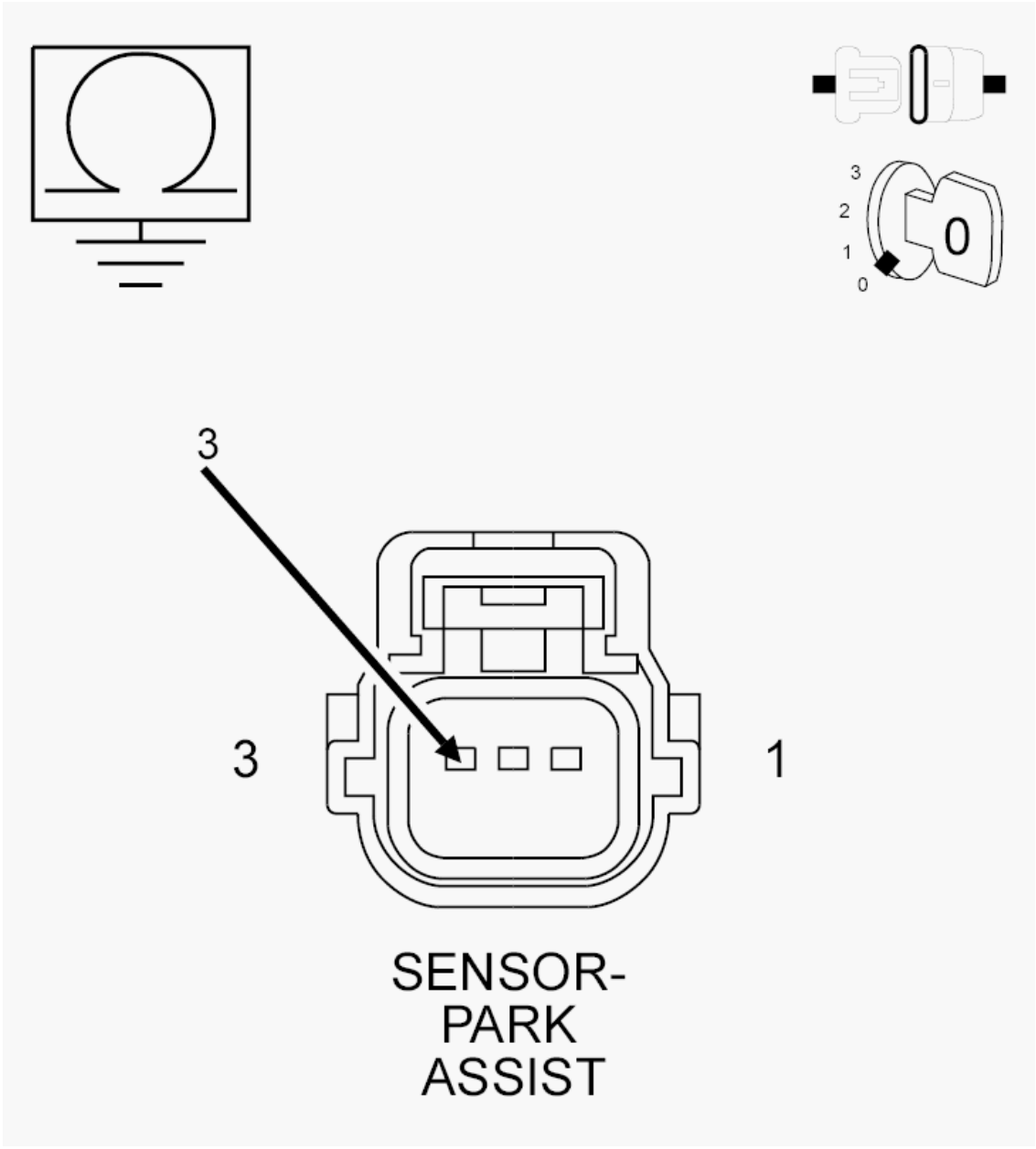


Fig. 123: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D703) Park Assist Sensor 9 Signal circuit.

   Is the resistance below 10K Ohms?

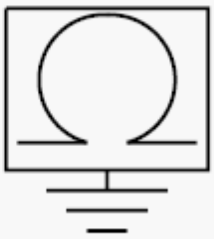
   Yes

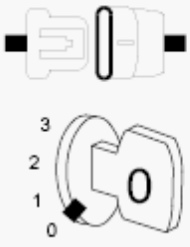
- Go To 5.

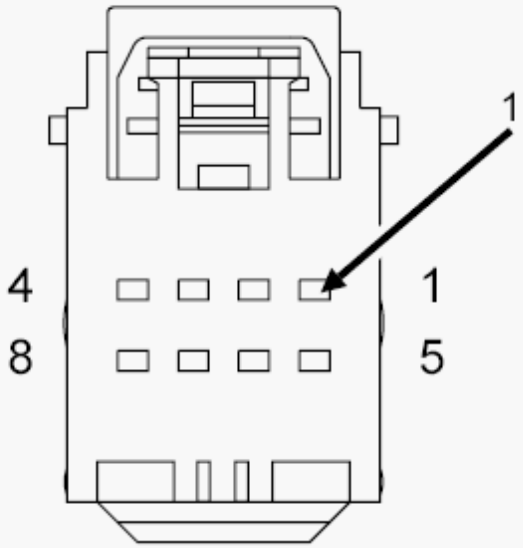
No

- Go To 7.

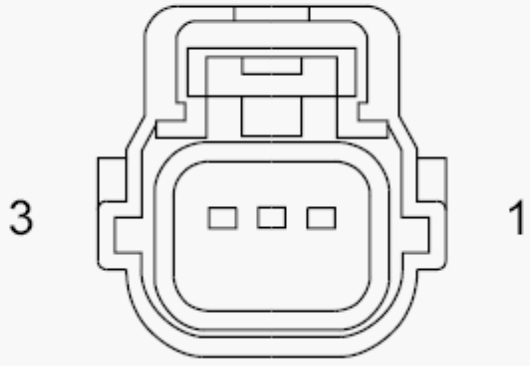
5. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**







MODULE-
PARK
ASSIST C2



SENSOR-
PARK

Fig. 124: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (D703) Park Assist Sensor 9 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D703) Park Assist Sensor 9 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**

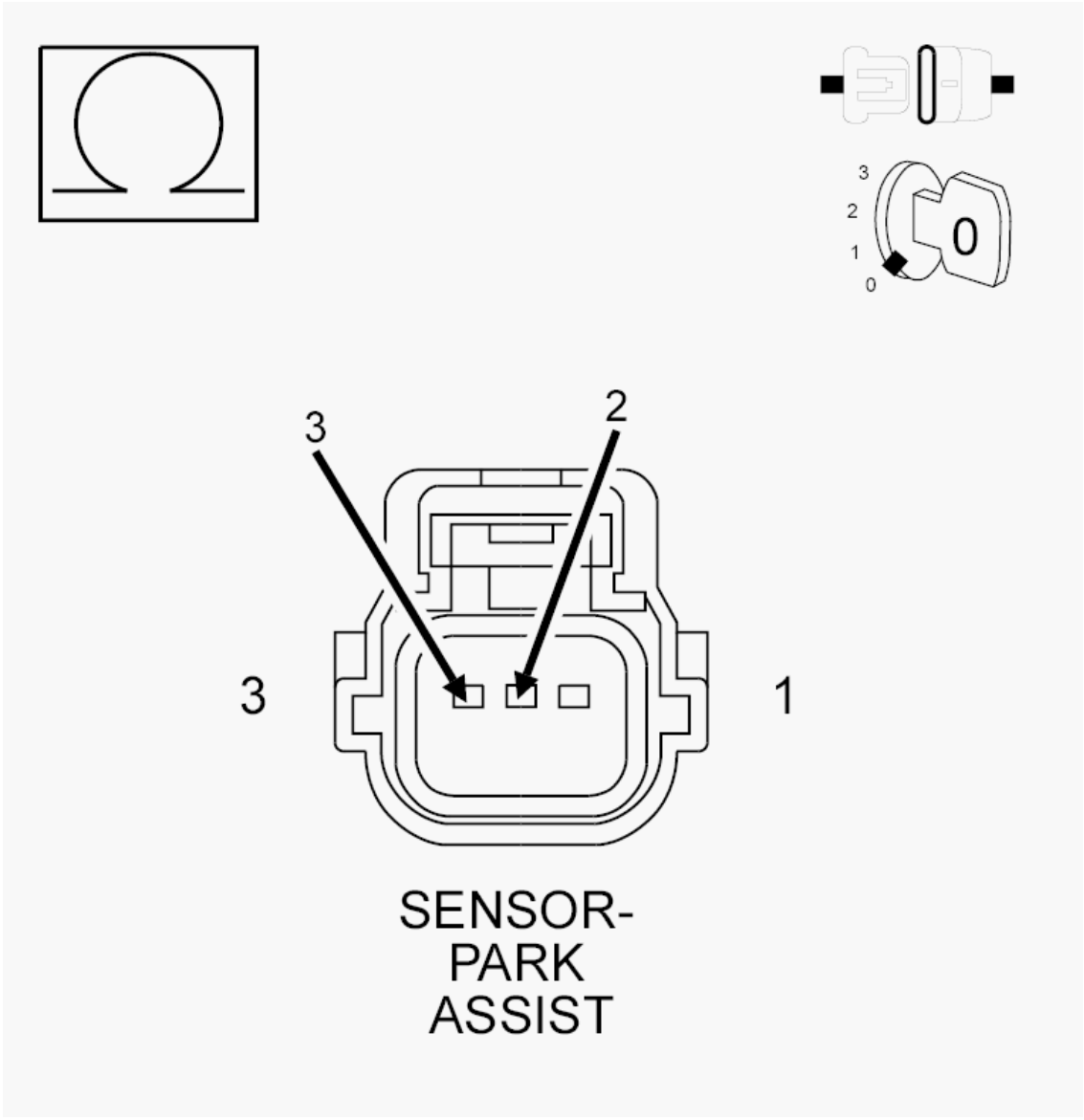


Fig. 125: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D703) Park Assist Sensor 9 Signal circuit and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D703) Park Assist Sensor 9 Signal circuit and the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR AN OPEN**

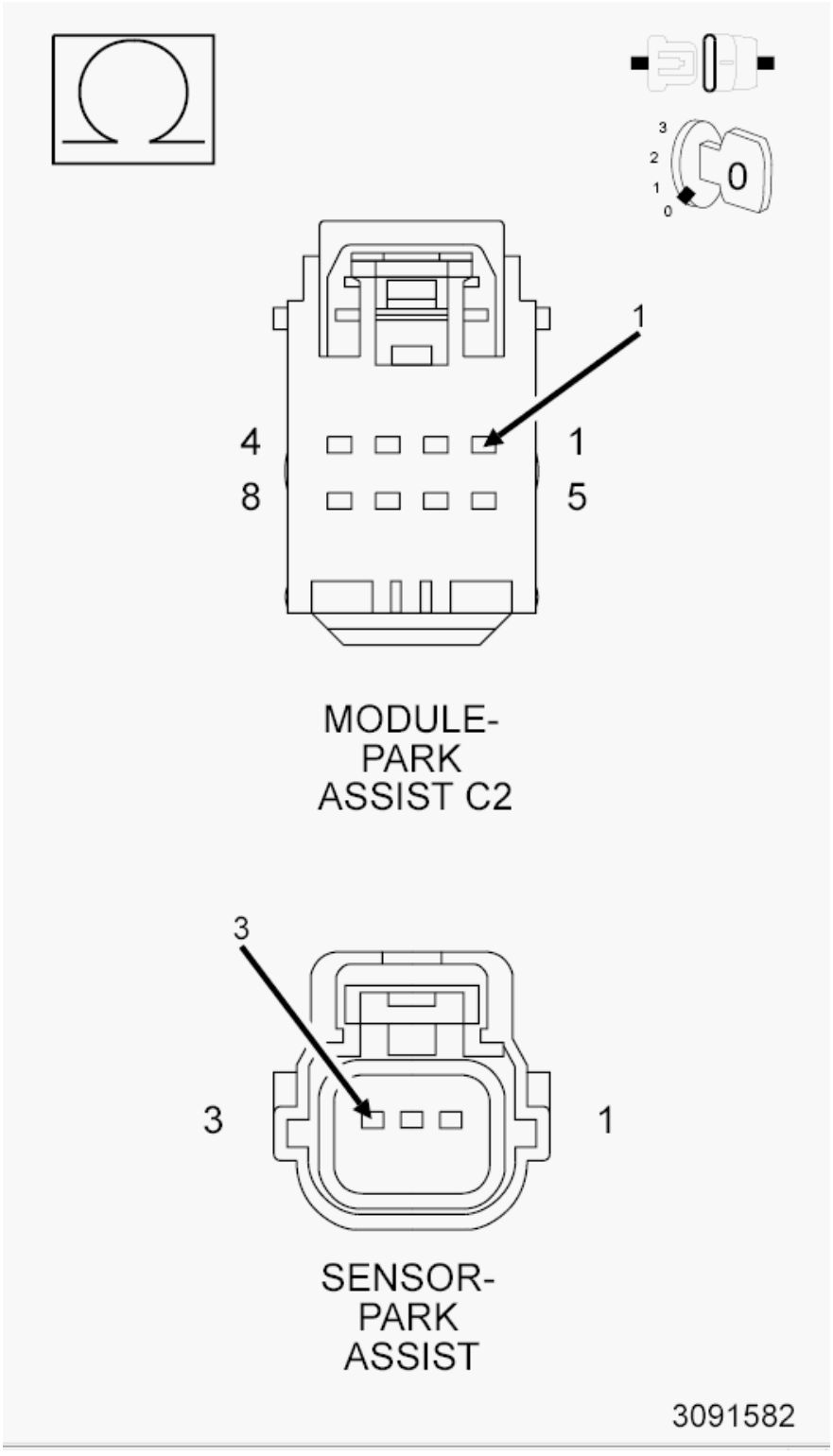


Fig. 126: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.

2. Measure the resistance of the (D703) Park Assist Sensor 9 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D703) Park Assist Sensor 9 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

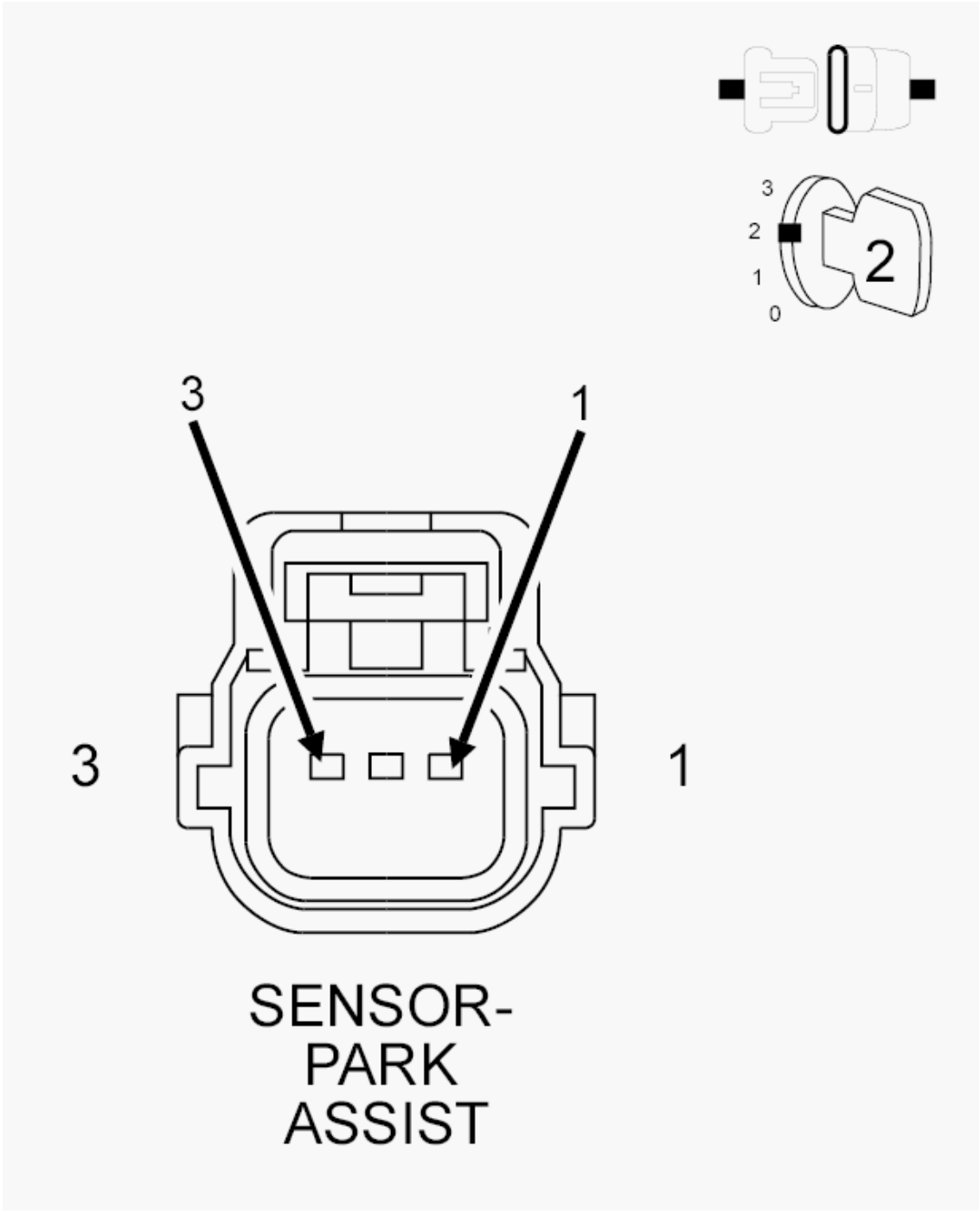


Fig. 127: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C2 harness connector.
3. Connect a jumper wire across the (X700) Park Assist Sensor Supply and (D703) Park Assist Sensor 9 Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1296-12-PTS SENSOR 9-CIRCUIT SHORT TO BATTERY as active?

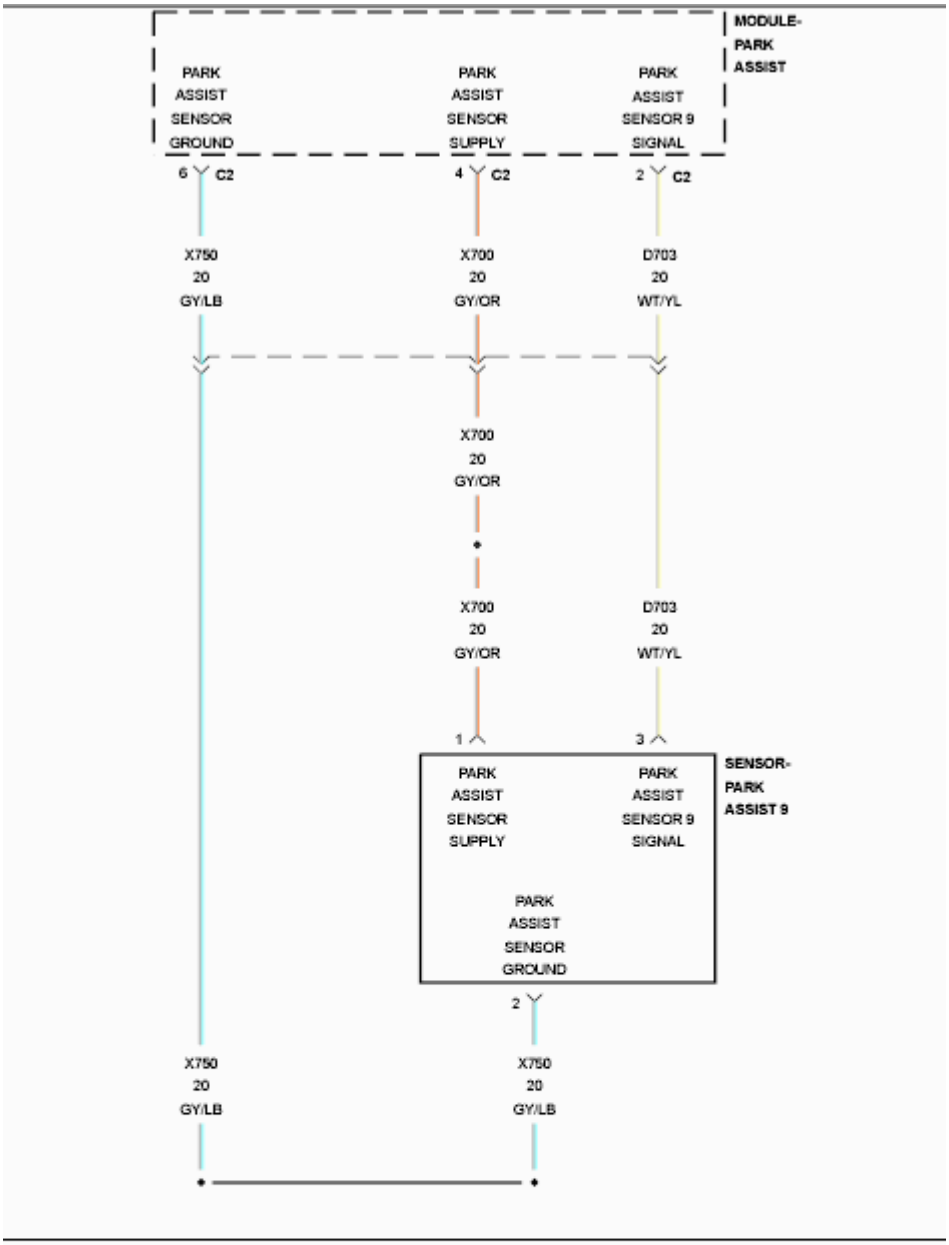
   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1296-12-PTS SENSOR 9 - CIRCUIT SHORT TO BATTERY


MODULE-
PARK
ASSIST
PARK
ASSIST
SENSOR
GROUND
PARK
ASSIST
SENSOR
SUPPLY
PARK
ASSIST
SENSOR 9
SIGNAL
6
C2
4
C2
2
C2
X750
20
GY/LB
X700
20
GY/OR
D703
20
WT/YL
X700
20
GY/OR
X700
20
GY/OR
D703
20
WT/YL
1
3
SENSOR-
PARK
ASSIST 9
PARK
ASSIST
SENSOR
SUPPLY
PARK
ASSIST
SENSOR 9
SIGNAL
PARK
ASSIST
SENSOR
GROUND
2
X750
20
GY/LB
X750
20
GY/LB

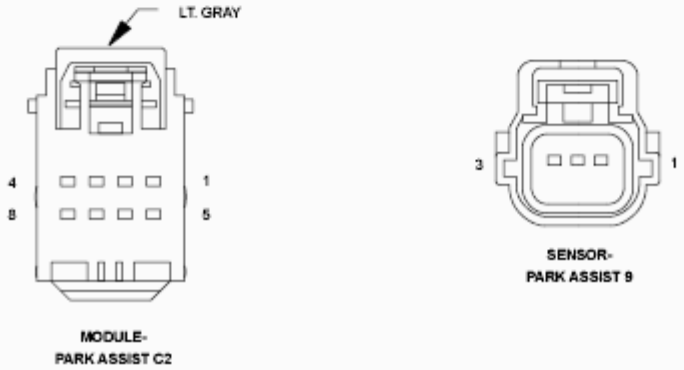

LT. GRAY
4
1
8
5
MODULE-
PARK ASSIST C2
3
1
SENSOR-
PARK ASSIST 9

Fig. 128: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT
(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

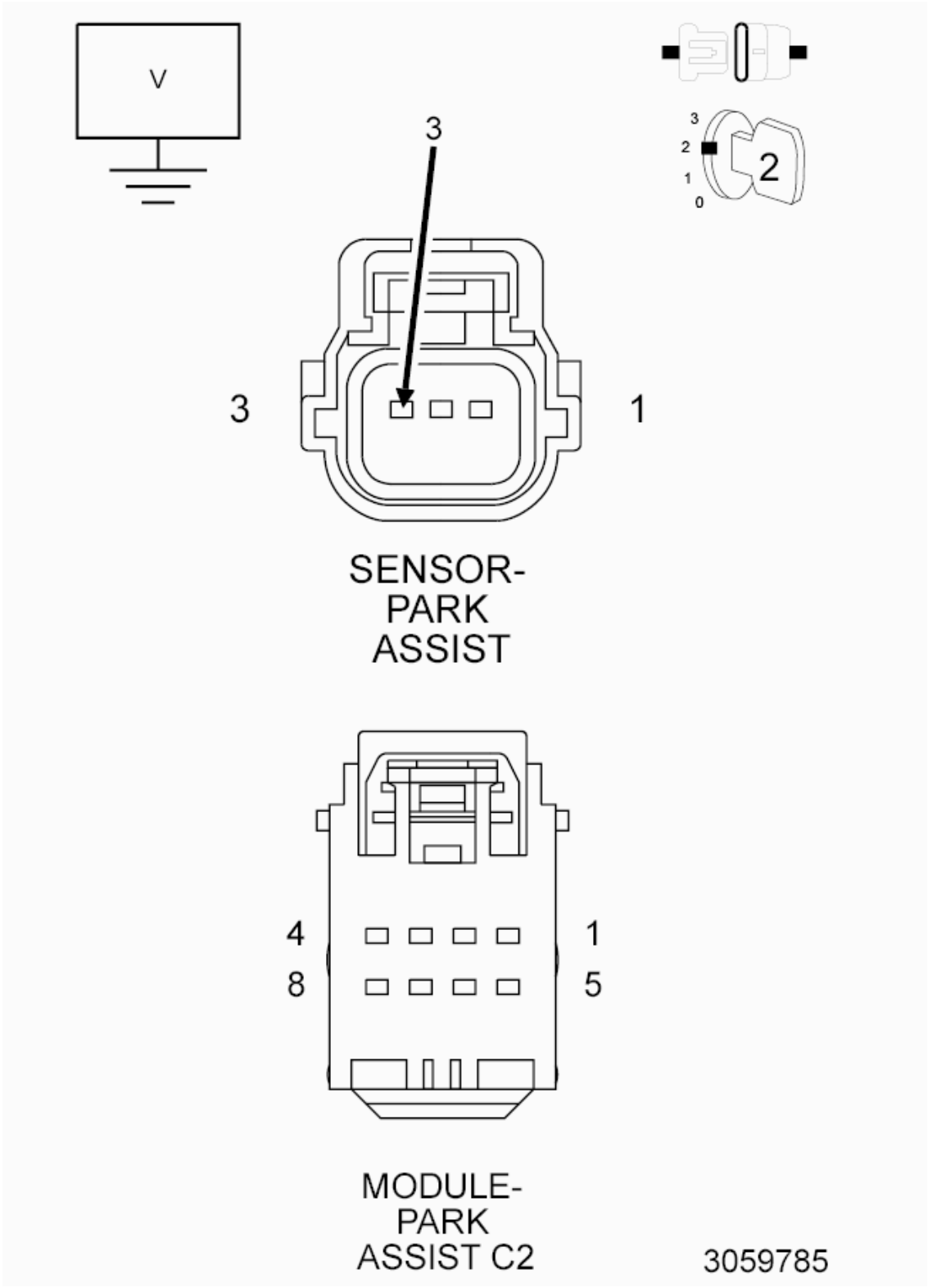


Fig. 129: Measuring Voltage Of Park Assist Sensor Signal Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.

2. Disconnect the Park Assist Module C2 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D703) Park Assist Sensor 9 Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

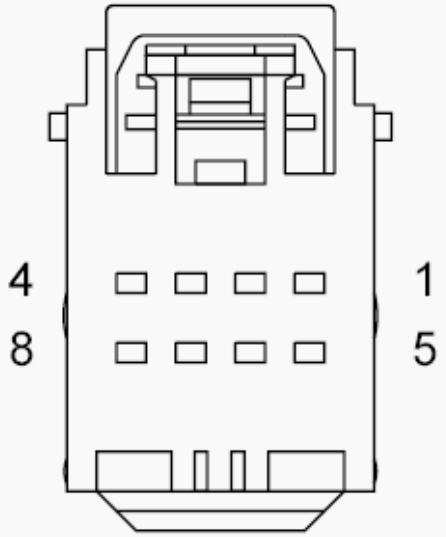
   - Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060400

Fig. 130: Checking Park Assist Sensor Signal Circuit For A Short To The Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D703) Park Assist Sensor 9 Signal circuit and the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

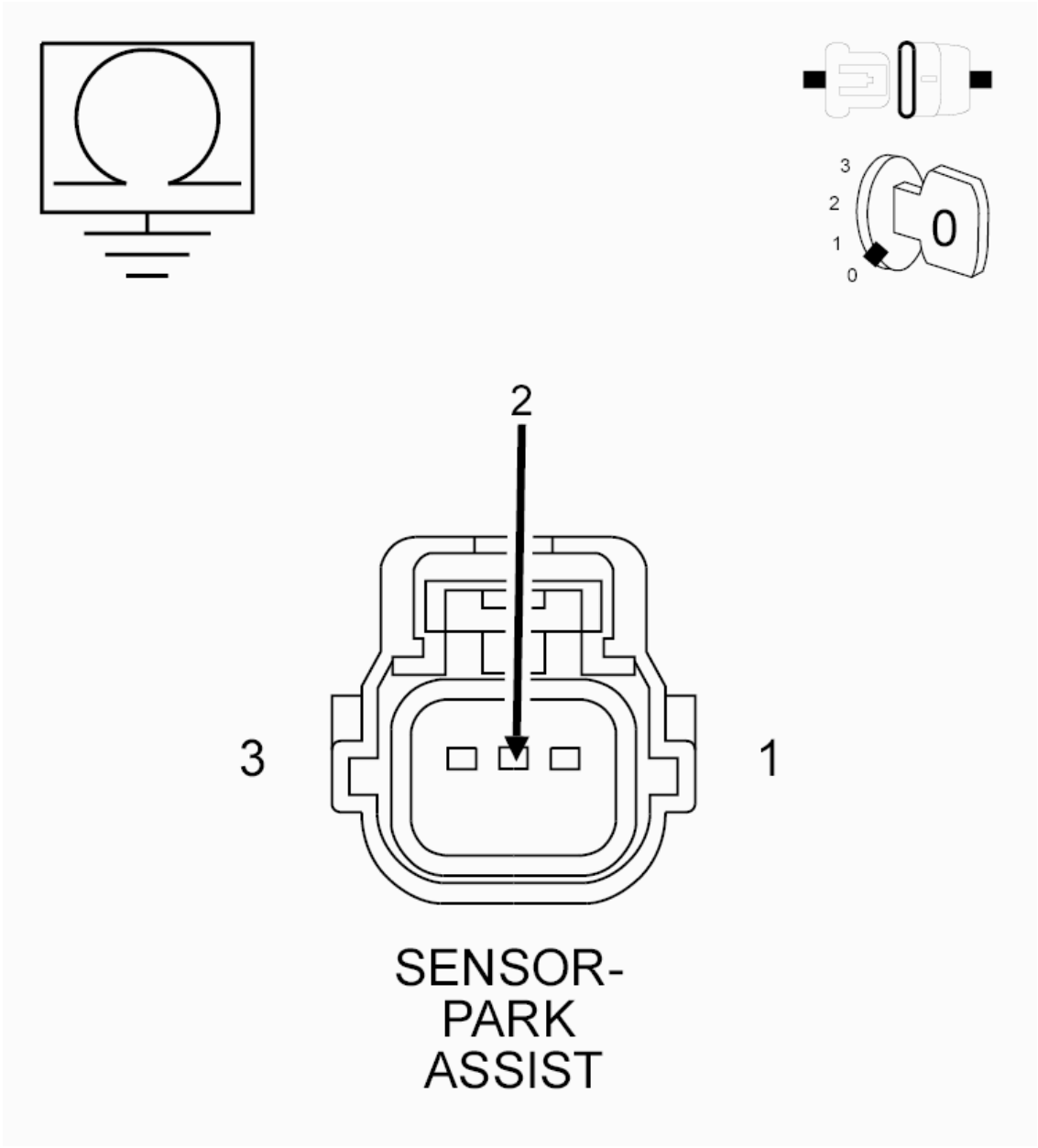


Fig. 131: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

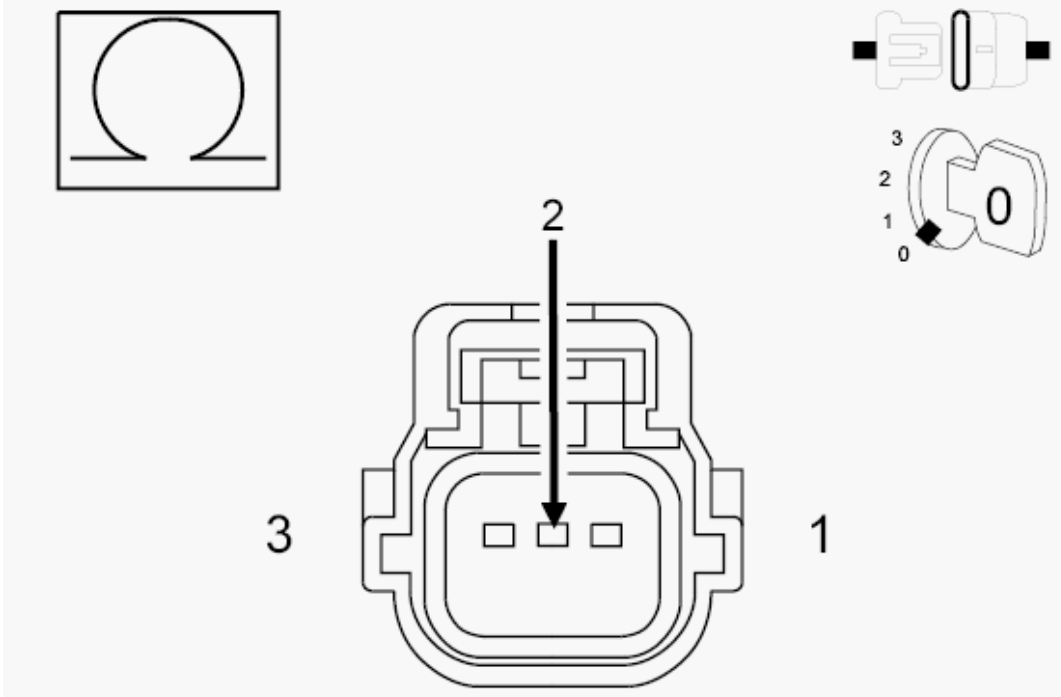
   Yes

   - Go To 5.

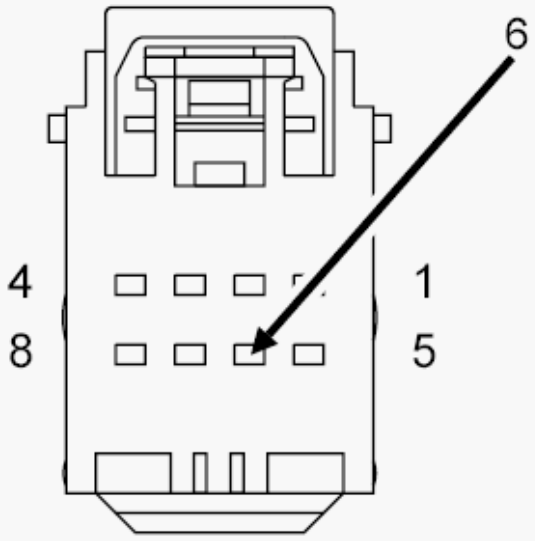
No

- Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**



SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060659

Fig. 132: Checking Park Assist Sensor Ground Circuit For An Open Between Park Assist Module And Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1296-25-PTS SENSOR 9 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

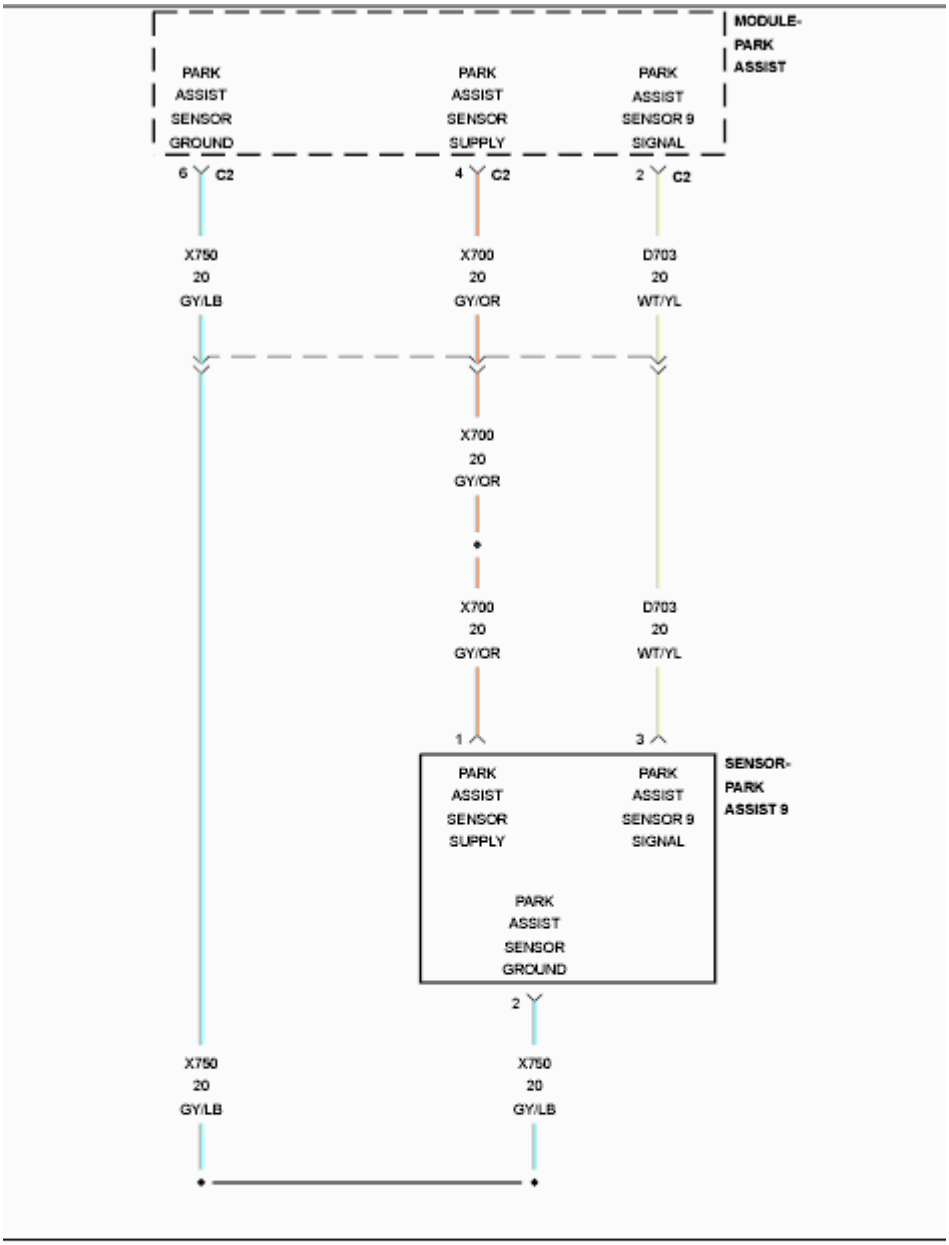
2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

- Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1296-92-PTS SENSOR 9 - PERFORMANCE OR INCORRECT OPERATION


MODULE-
PARK
ASSIST
PARK
ASSIST
SENSOR
GROUND
PARK
ASSIST
SENSOR
SUPPLY
PARK
ASSIST
SENSOR 9
SIGNAL
6
C2
4
C2
2
C2
X750
20
GY/LB
X700
20
GY/OR
D703
20
WT/YL
X700
20
GY/OR
X700
20
GY/OR
D703
20
WT/YL
1
3
SENSOR-
PARK
ASSIST 9
PARK
ASSIST
SENSOR
SUPPLY
PARK
ASSIST
SENSOR 9
SIGNAL
PARK
ASSIST
SENSOR
GROUND
2
X750
20
GY/LB
X750
20
GY/LB

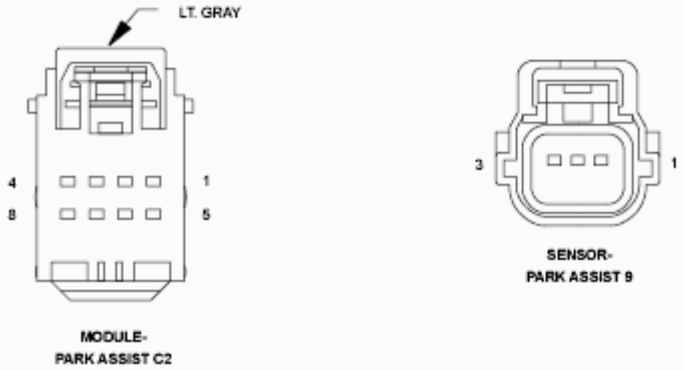

LT. GRAY
4
1
8
5
MODULE-
PARK ASSIST C2
3
1
SENSOR-
PARK ASSIST 9

Fig. 133: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR 9
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK PARK ASSIST SENSOR 9 FOR INTERNAL SHORT**
    1. Disconnect Park Assist Sensor 9.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor 9 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

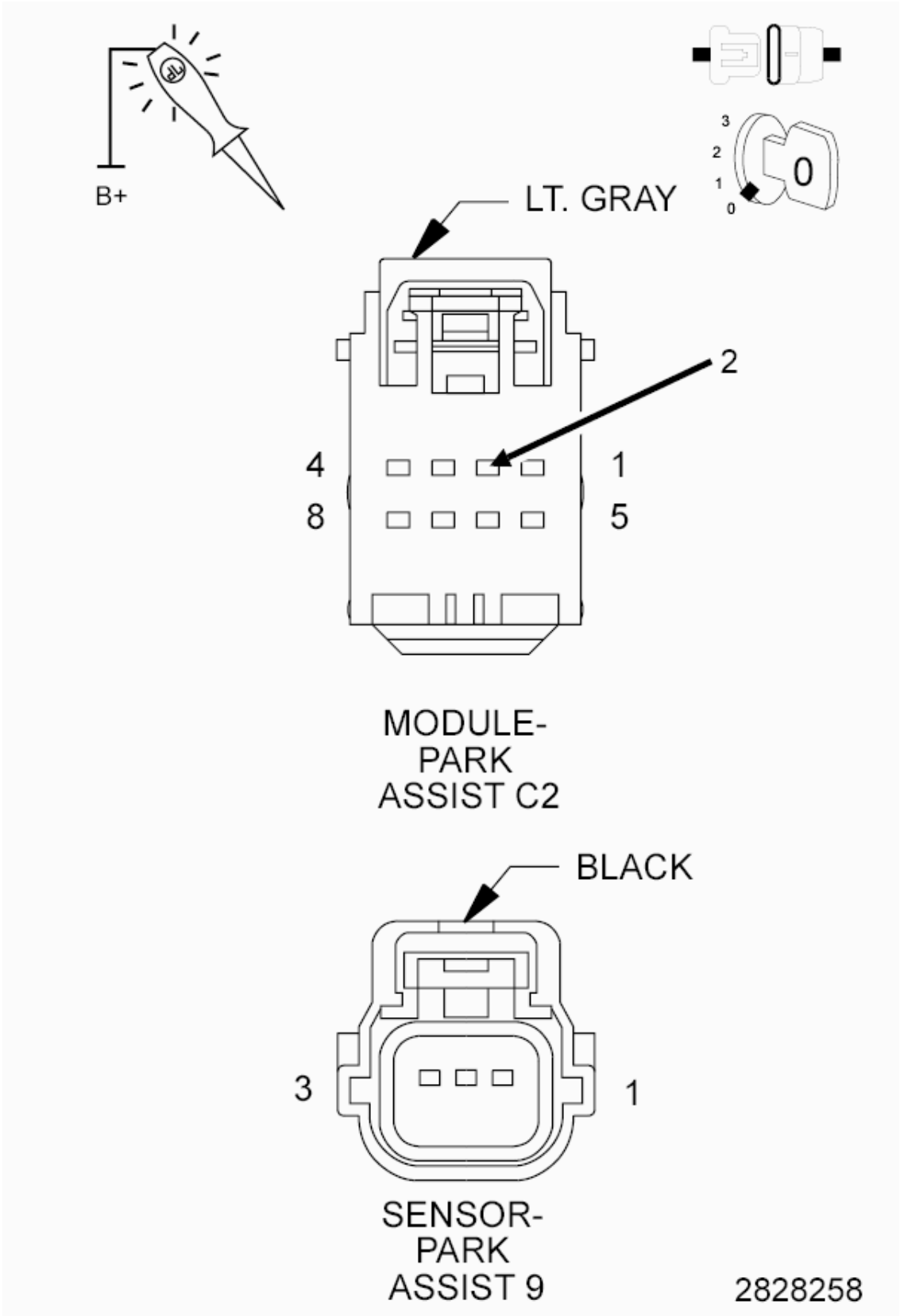


Fig. 134: Checking Park Assist Sensor 9 Signal Circuit For A Short To Ground

Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.
3. Using a 12-volt test light connected to 12-volts check the (D703) Park Assist Sensor 9 Signal circuit for a short to ground at the Park Assist Module C2 harness connector.

   Does the test light illuminate brightly?

   Yes

   - Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

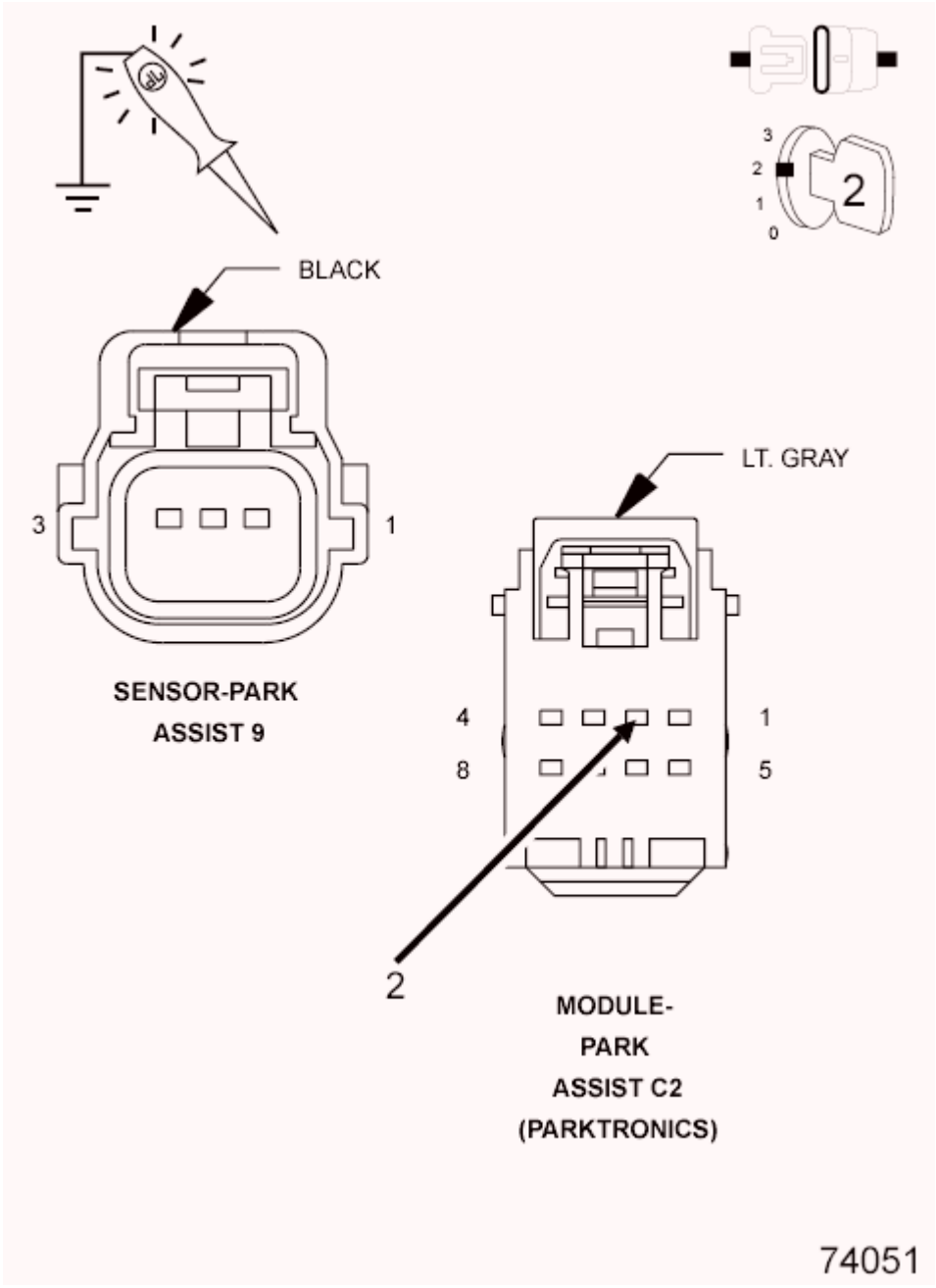


Fig. 135: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Using a 12-volt test light connected to ground check the (D703) Park Assist Sensor 9 Signal circuit at the Park Assist Module C2 harness connector for a short to battery.

   Does the test light illuminate brightly?

   Yes

- Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to battery.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Go To 5.

5. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR AN OPEN**

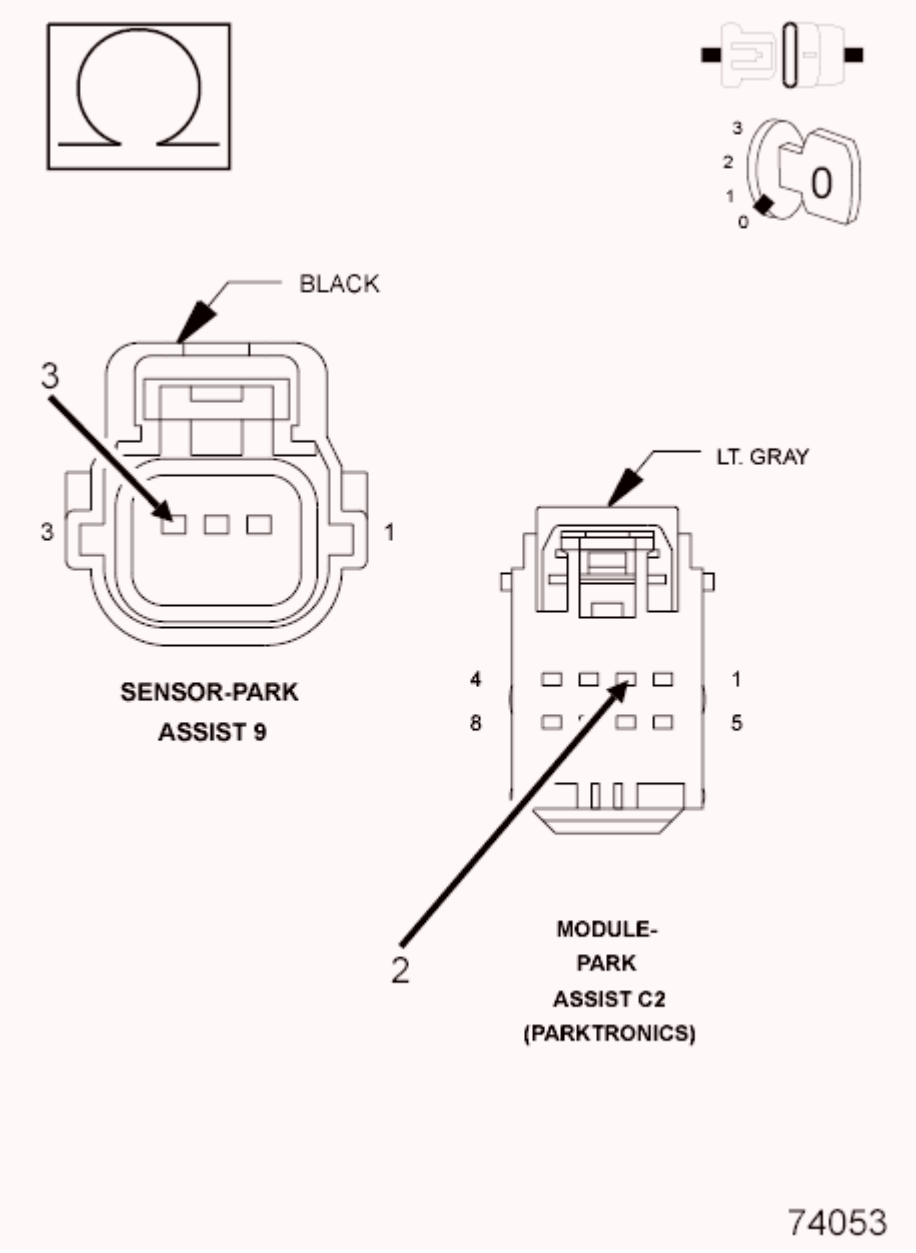


Fig. 136: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D703) Park Assist Sensor 9 Signal circuit between the

Park Assist Module C2 harness connector and the Park Assist Sensor 9 harness connector.

Is the resistance below 5.0 Ohms?

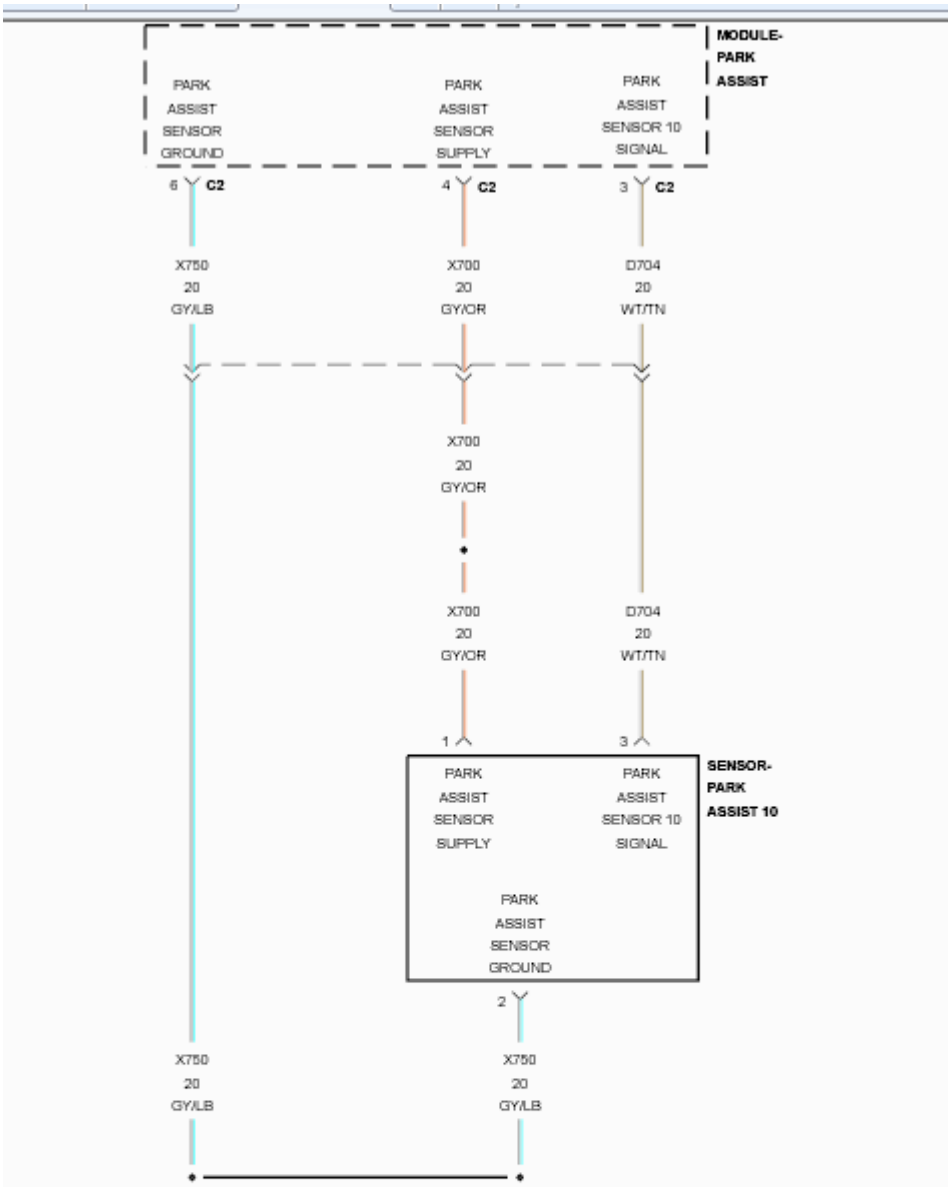
No

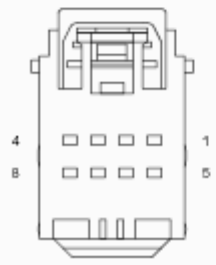
- Repair the (D703) Park Assist Sensor 9 Signal circuit for an open.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

Yes

- Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1297-11-PTS SENSOR 10 - CIRCUIT SHORT TO GROUND





MODULE-
PARK ASSIST C2

SENSOR-
PARK ASSIST 10

Fig. 137: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR AN OPEN
(X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is

connected before proceeding with this diagnostic procedure.

1. Turn the ignition on.
2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

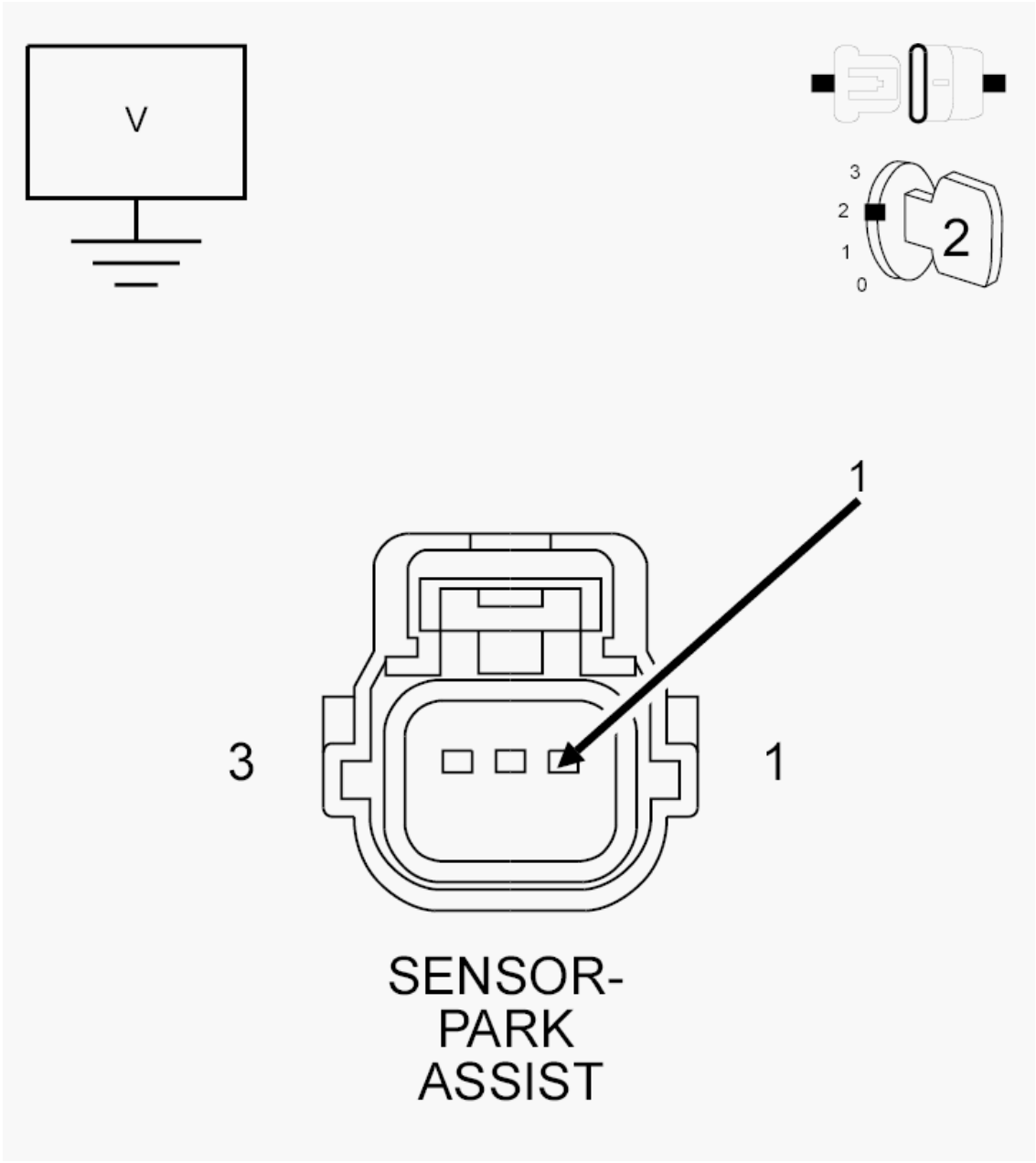


Fig. 138: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X700) Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

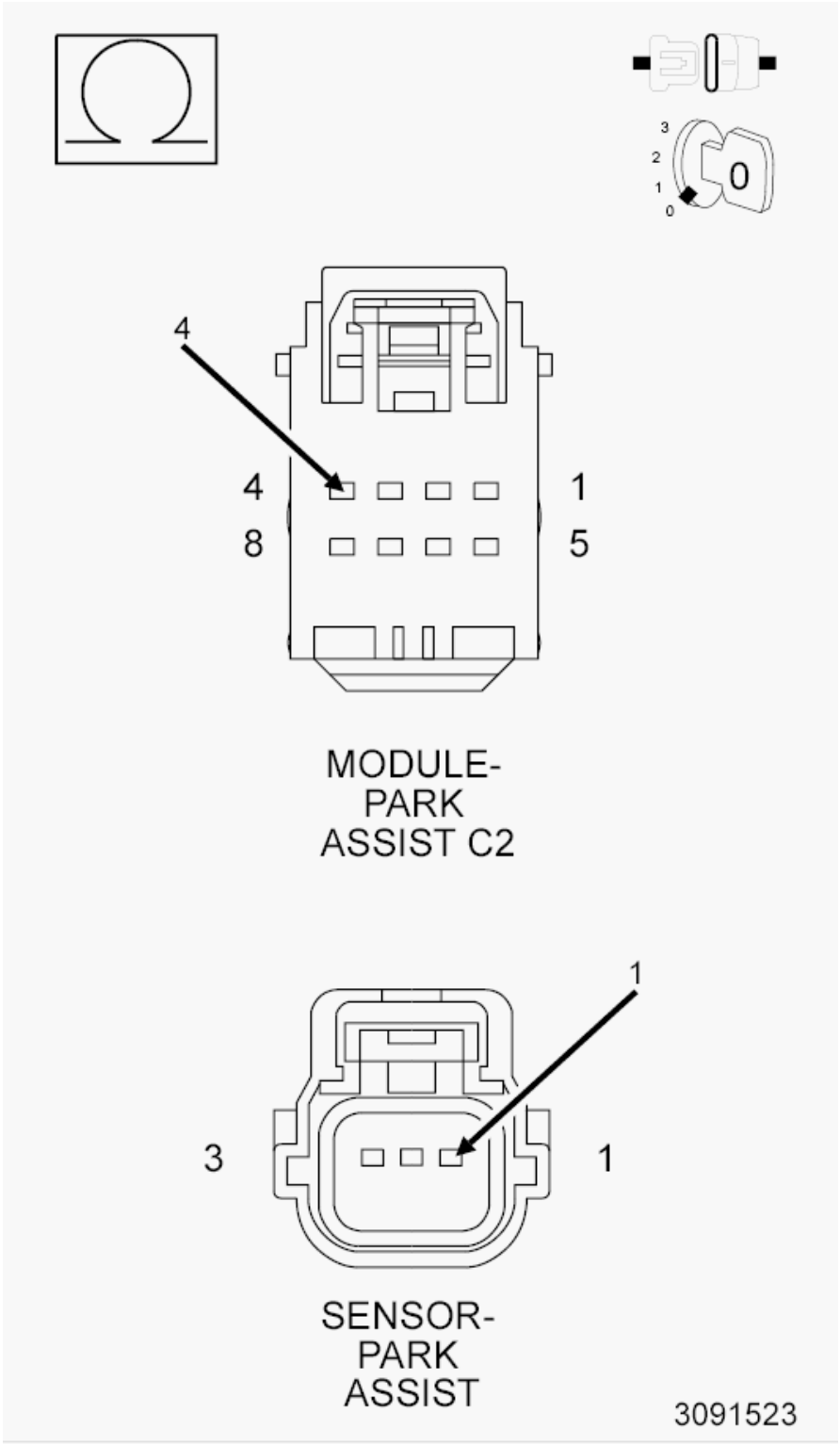


Fig. 139: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.

3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

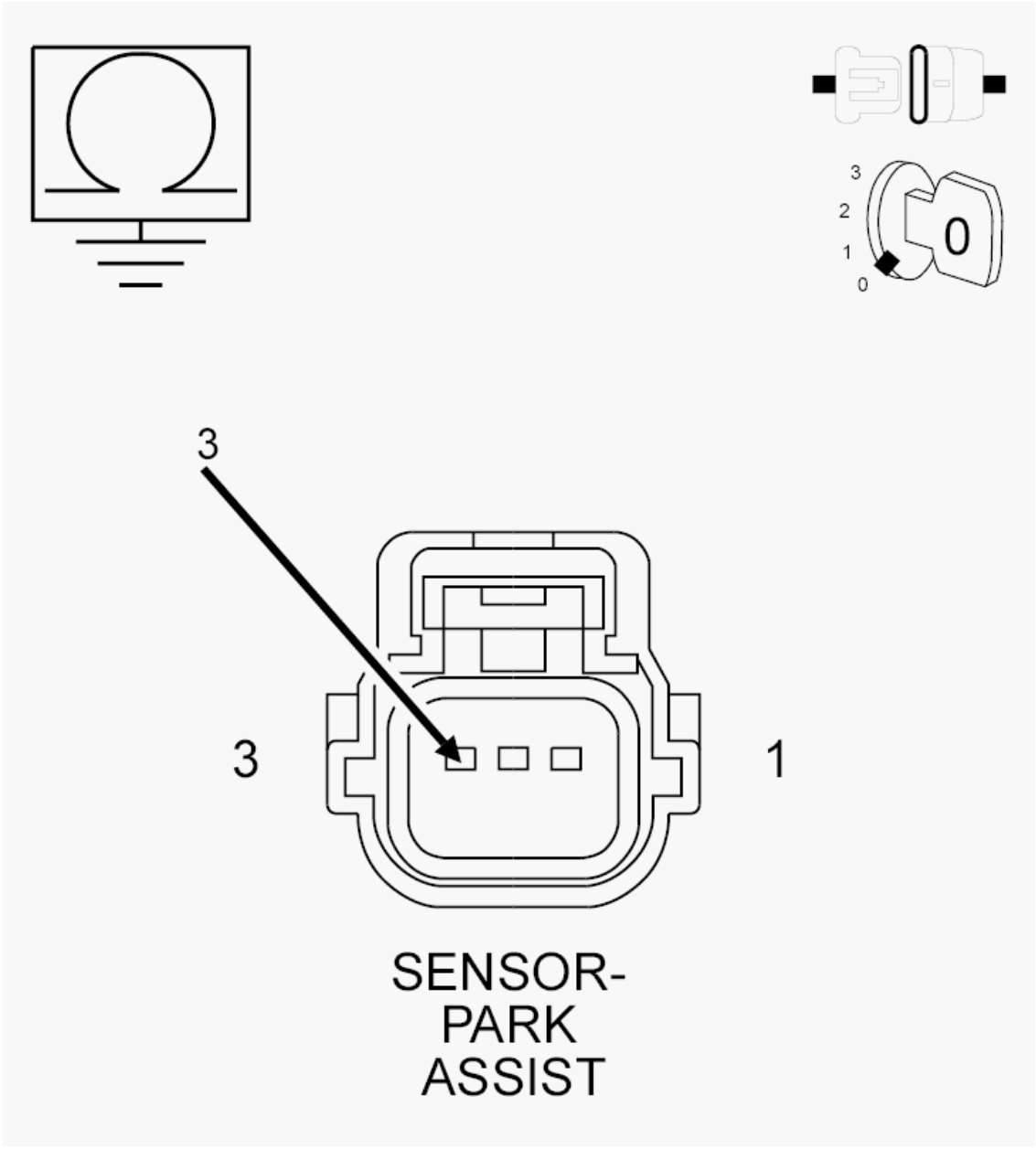


Fig. 140: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D704) Park Assist Sensor Signal circuit.

   Is the resistance below 10K Ohms?

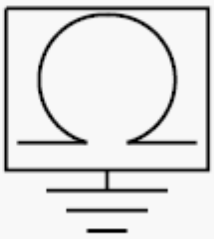
   Yes

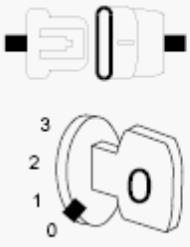
   - Go To 5.

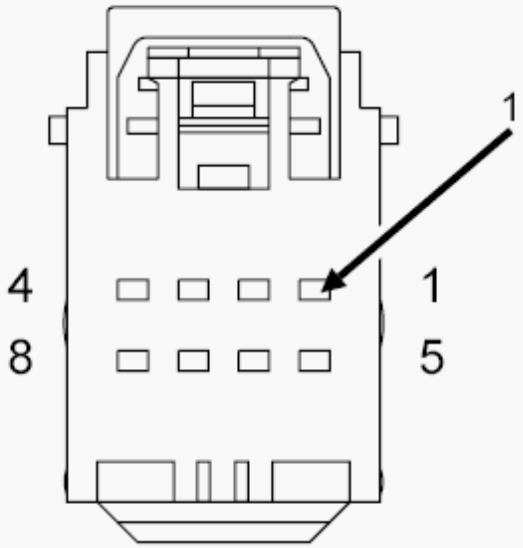
No

- Go To 7.

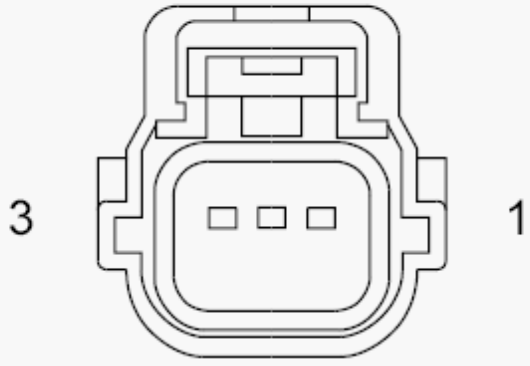
5. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**







MODULE-
PARK
ASSIST C2



SENSOR-
PARK

Fig. 141: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (D704) Park Assist Sensor Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D704) Park Assist Sensor Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**

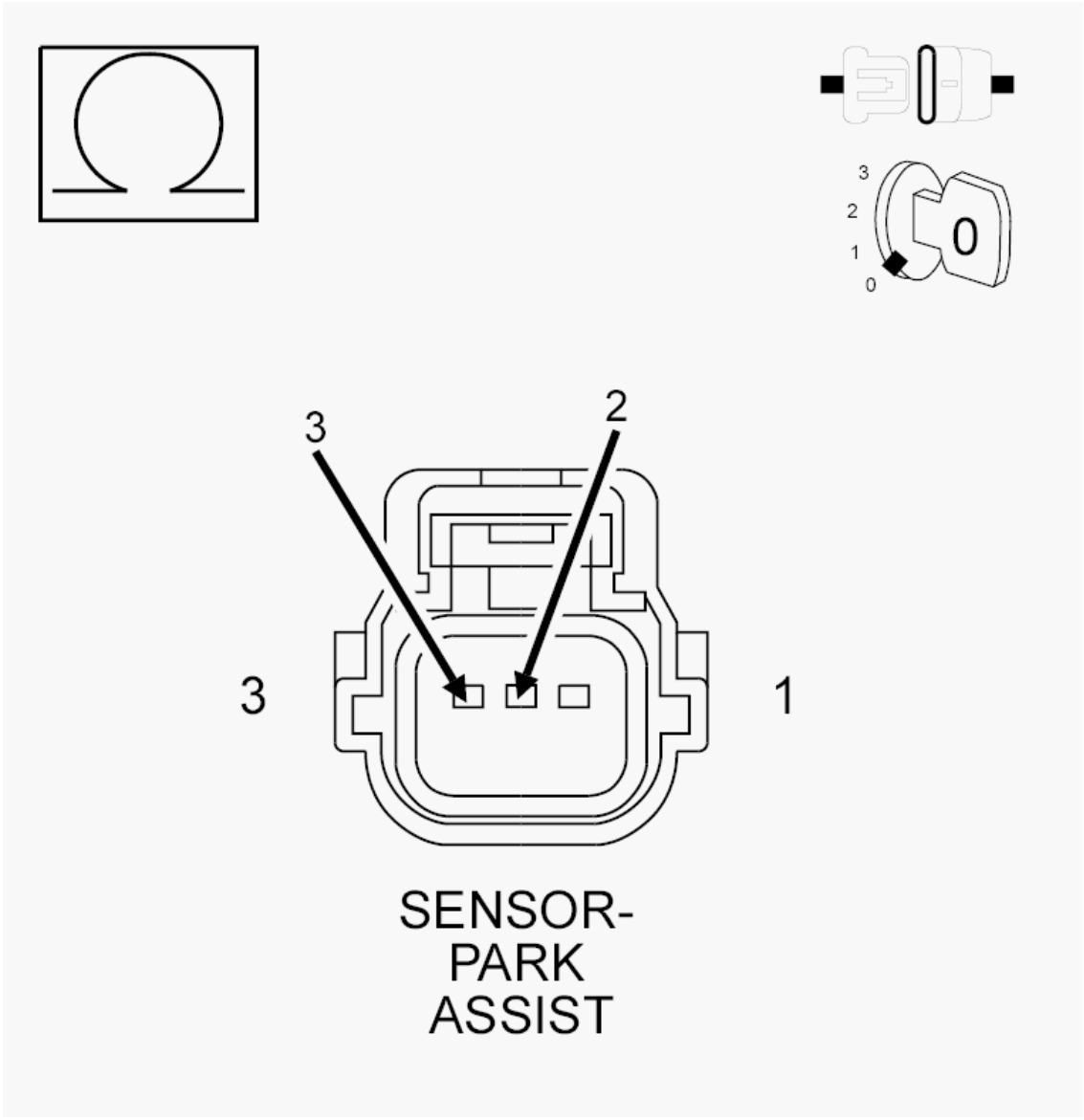


Fig. 142: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D704) Park Assist Sensor Signal circuit and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D704) Park Assist Sensor Signal circuit and the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR AN OPEN**

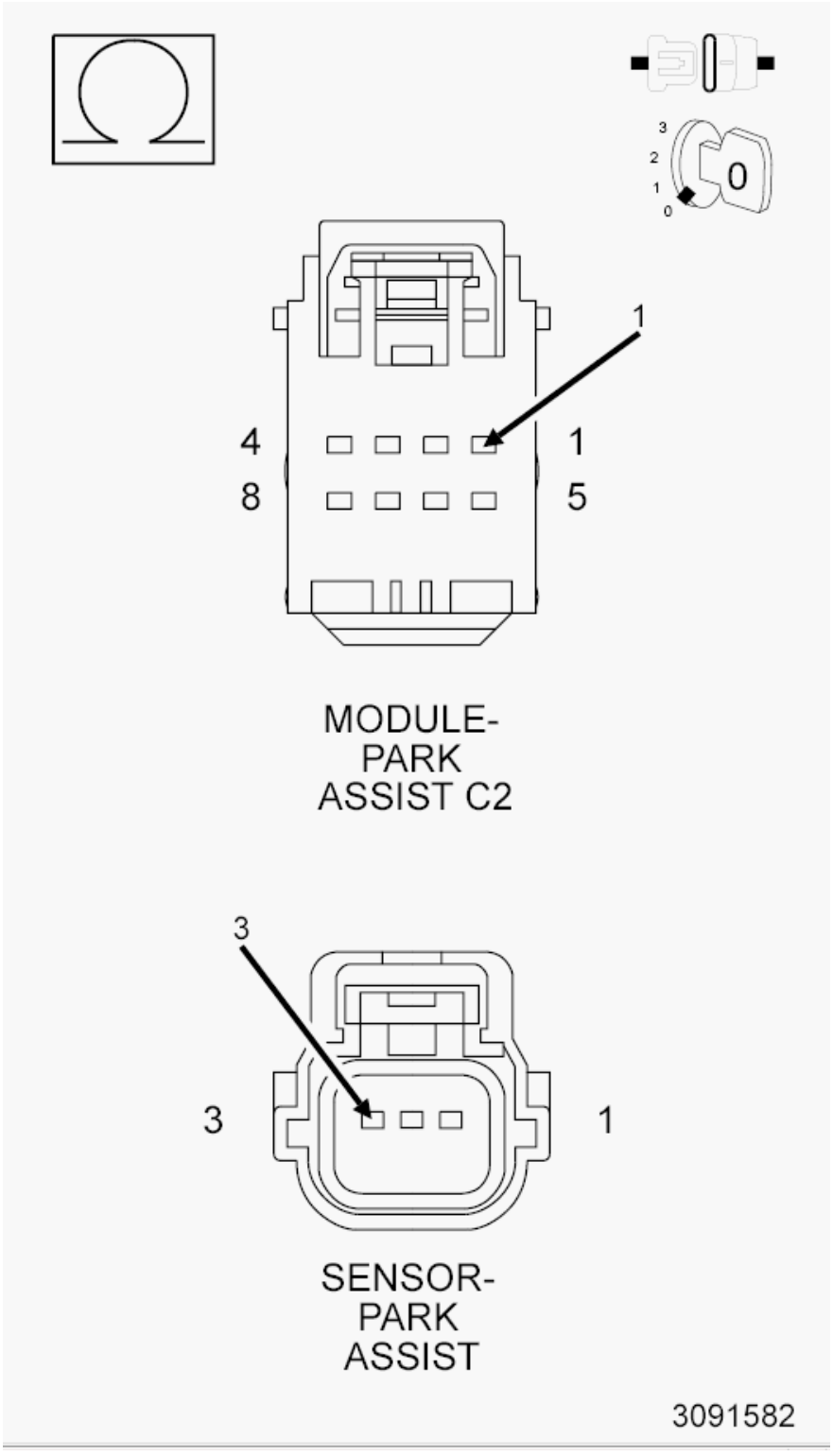


Fig. 143: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.

2. Measure the resistance of the (D704) Park Assist Sensor Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D704) Park Assist Sensor Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

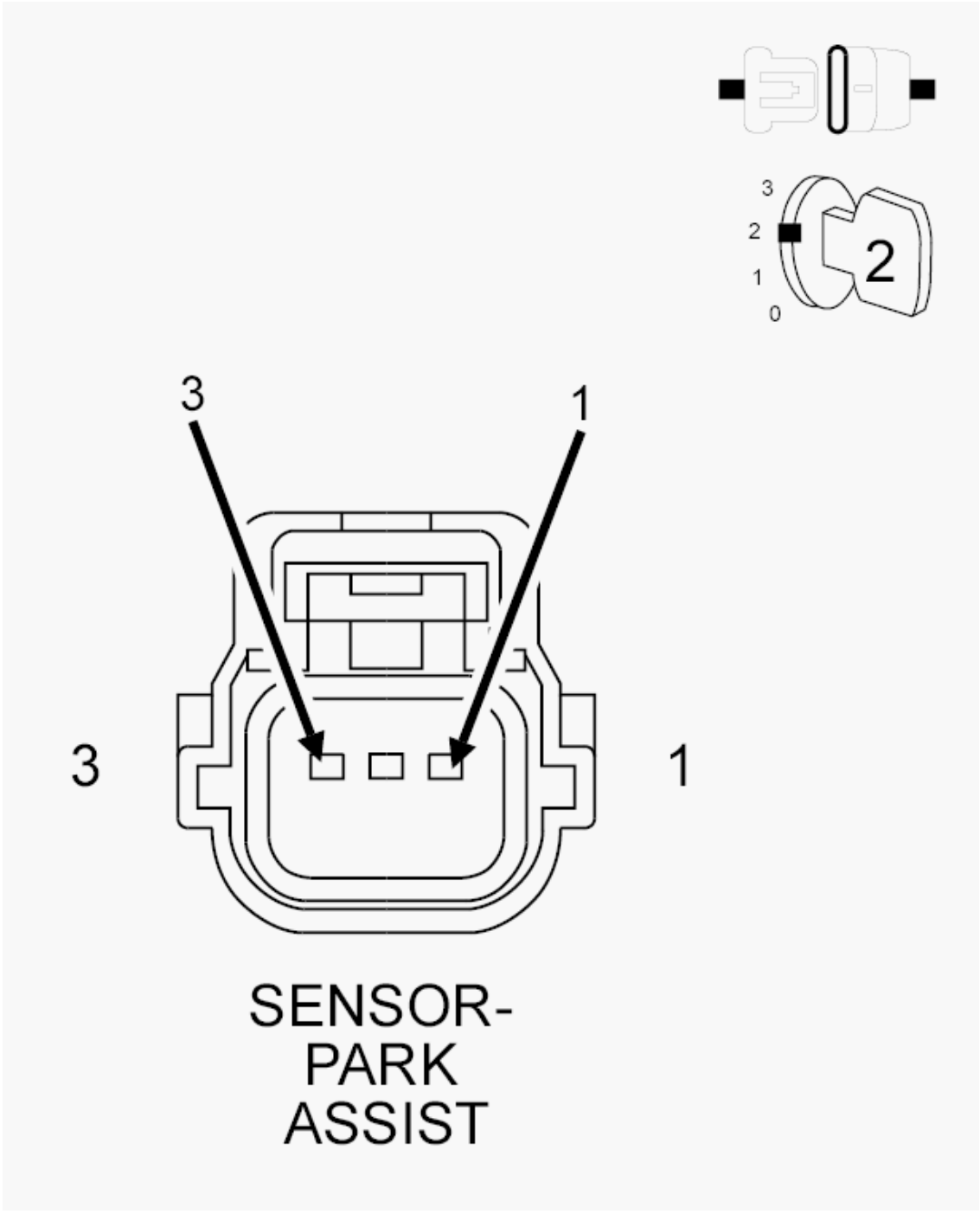


Fig. 144: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C2 harness connector.
3. Connect a jumper wire across the (X700) Park Assist Sensor Supply and (D704) Park Assist Sensor Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1297-12-PTS SENSOR 10 - CIRCUIT SHORT TO BATTERY as active?

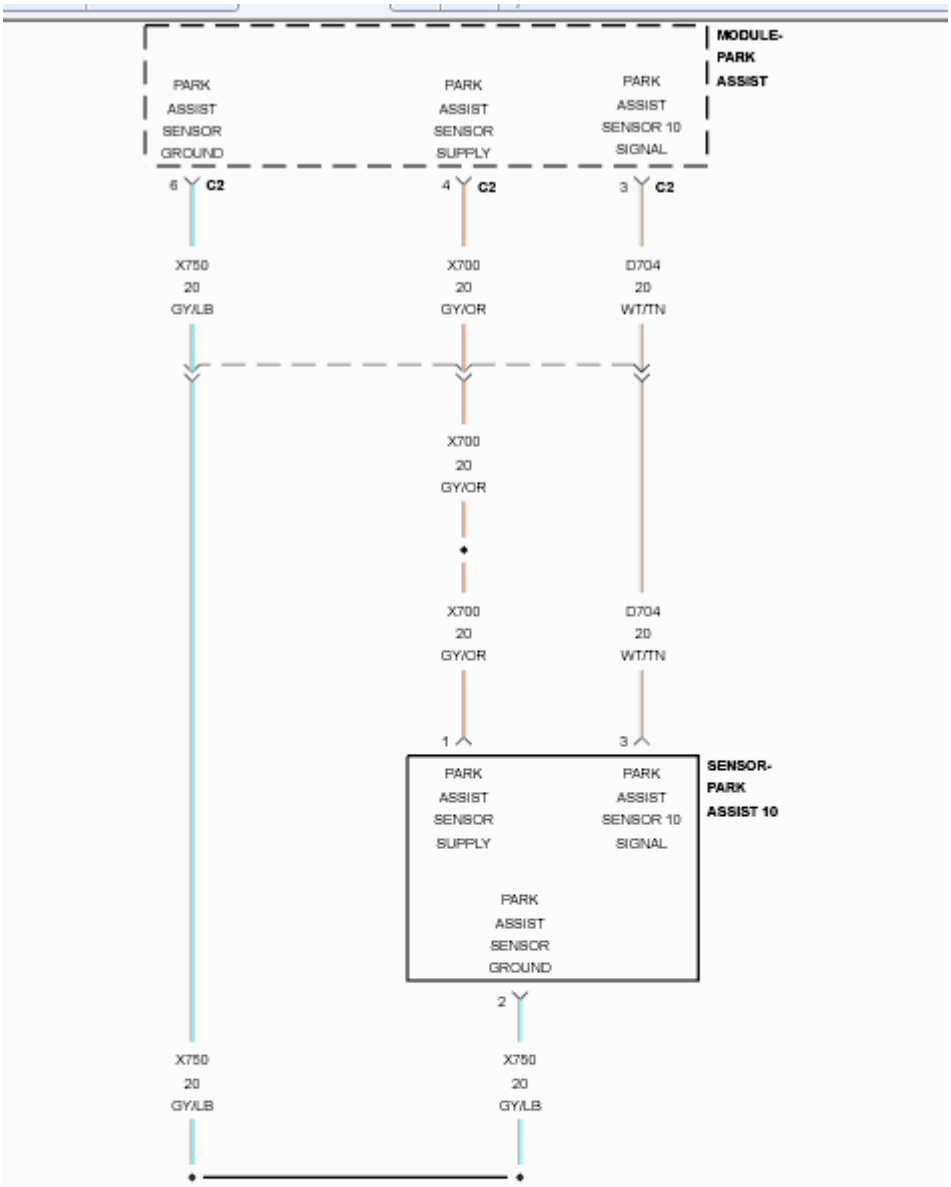
   Yes

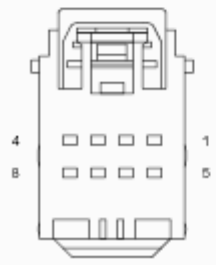
   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1297-12-PTS SENSOR 10 - CIRCUIT SHORT TO BATTERY





MODULE-
PARK ASSIST C2

SENSOR-
PARK ASSIST 10

Fig. 145: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT
(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

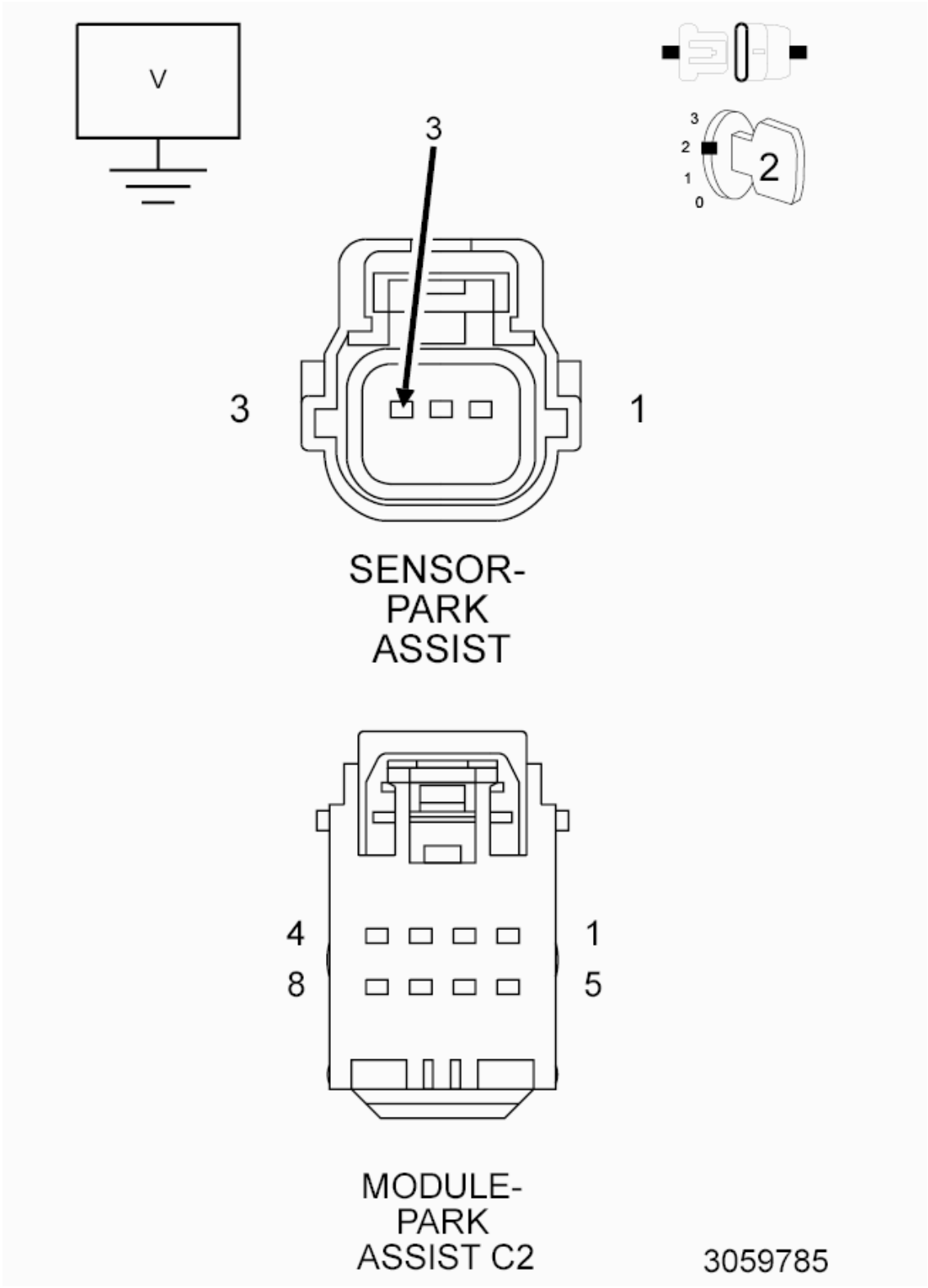


Fig. 146: Measuring Voltage Of Park Assist Sensor Signal Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.

2. Disconnect the Park Assist Module C2 harness connector.
3. Disconnect the Park Assist Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D704) Park Assist Sensor Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

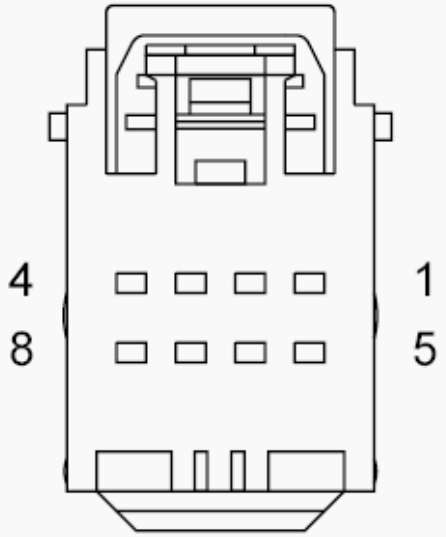
   - Repair the (D704) Park Assist Sensor Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060400

Fig. 147: Checking Park Assist Sensor Signal Circuit For A Short To The Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D704) Park Assist Sensor Signal circuit and the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D704) Park Assist Sensor Signal circuit for a short to the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

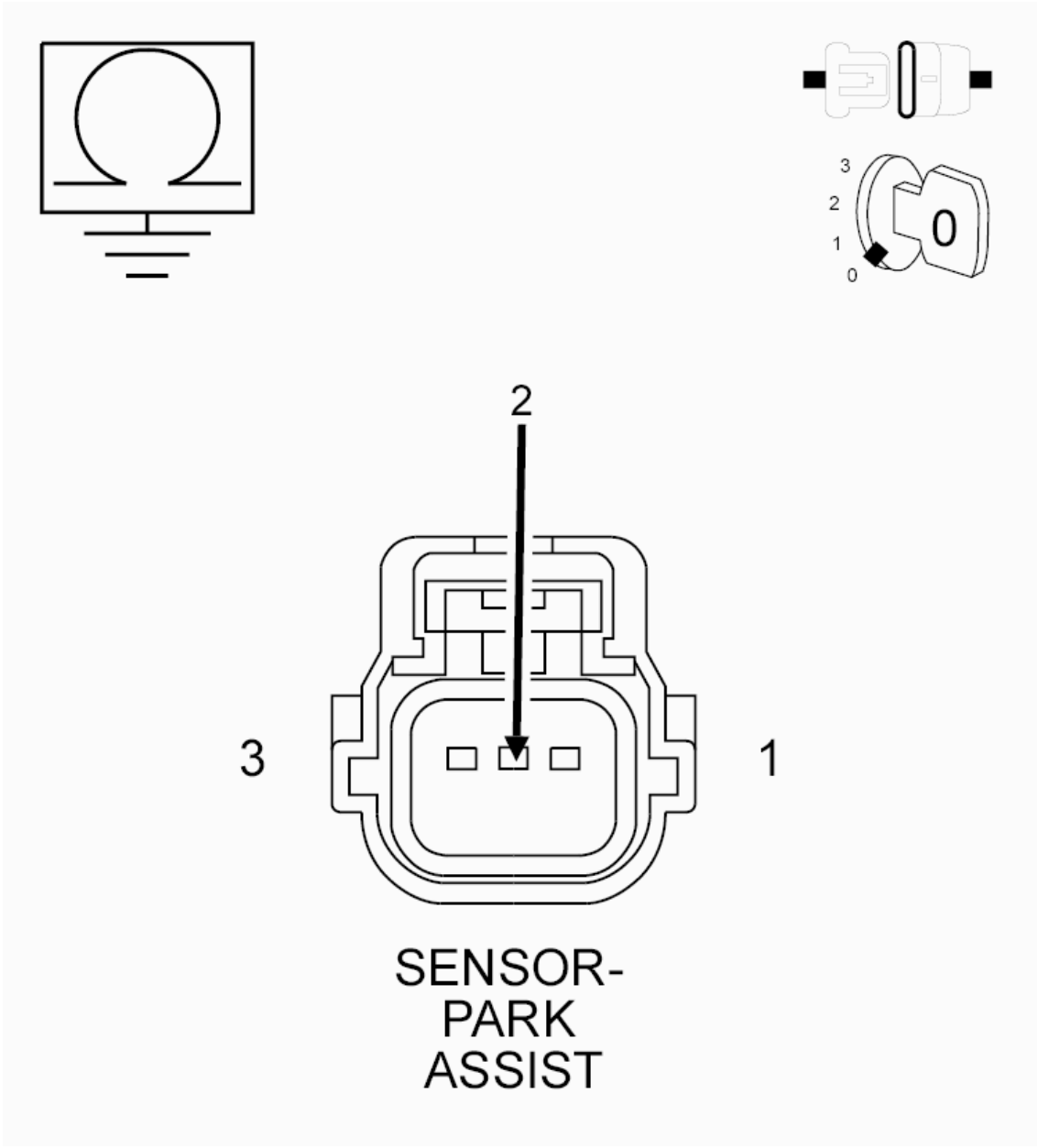


Fig. 148: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

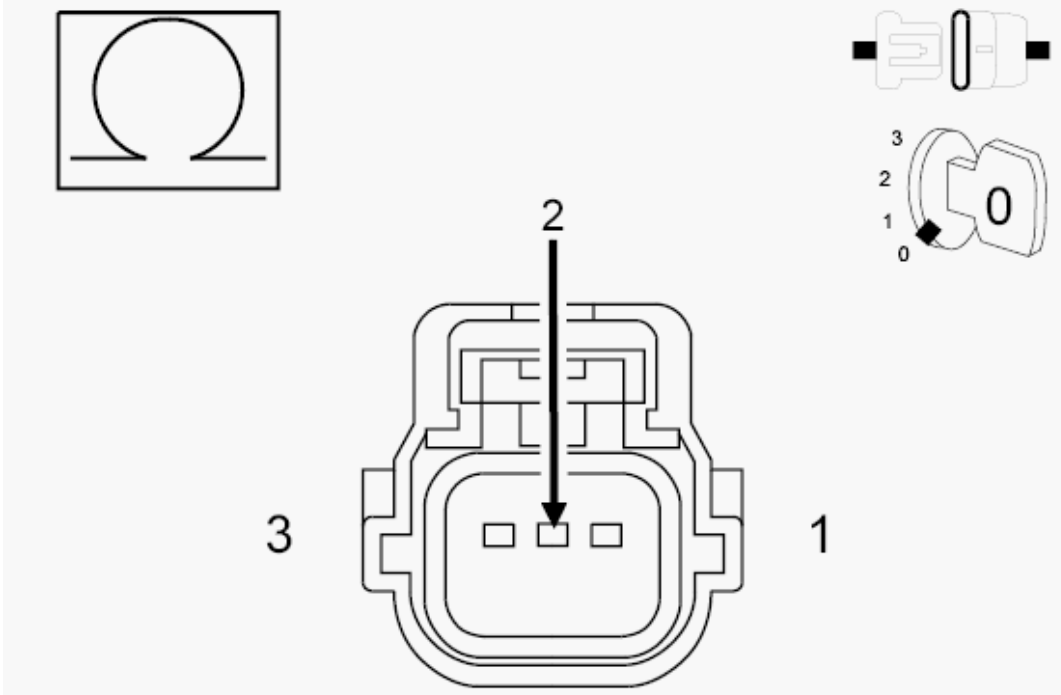
   Yes

   - Go To 5.

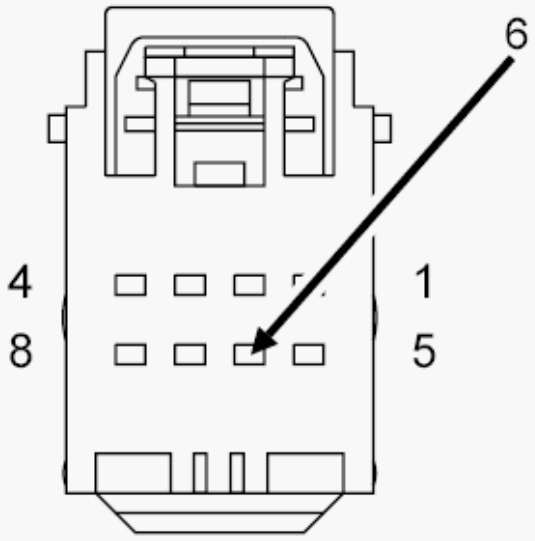
No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**



SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060659

Fig. 149: Checking Park Assist Sensor Ground Circuit For An Open Between Park Assist Module And Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1297-25-PTS SENSOR 10 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

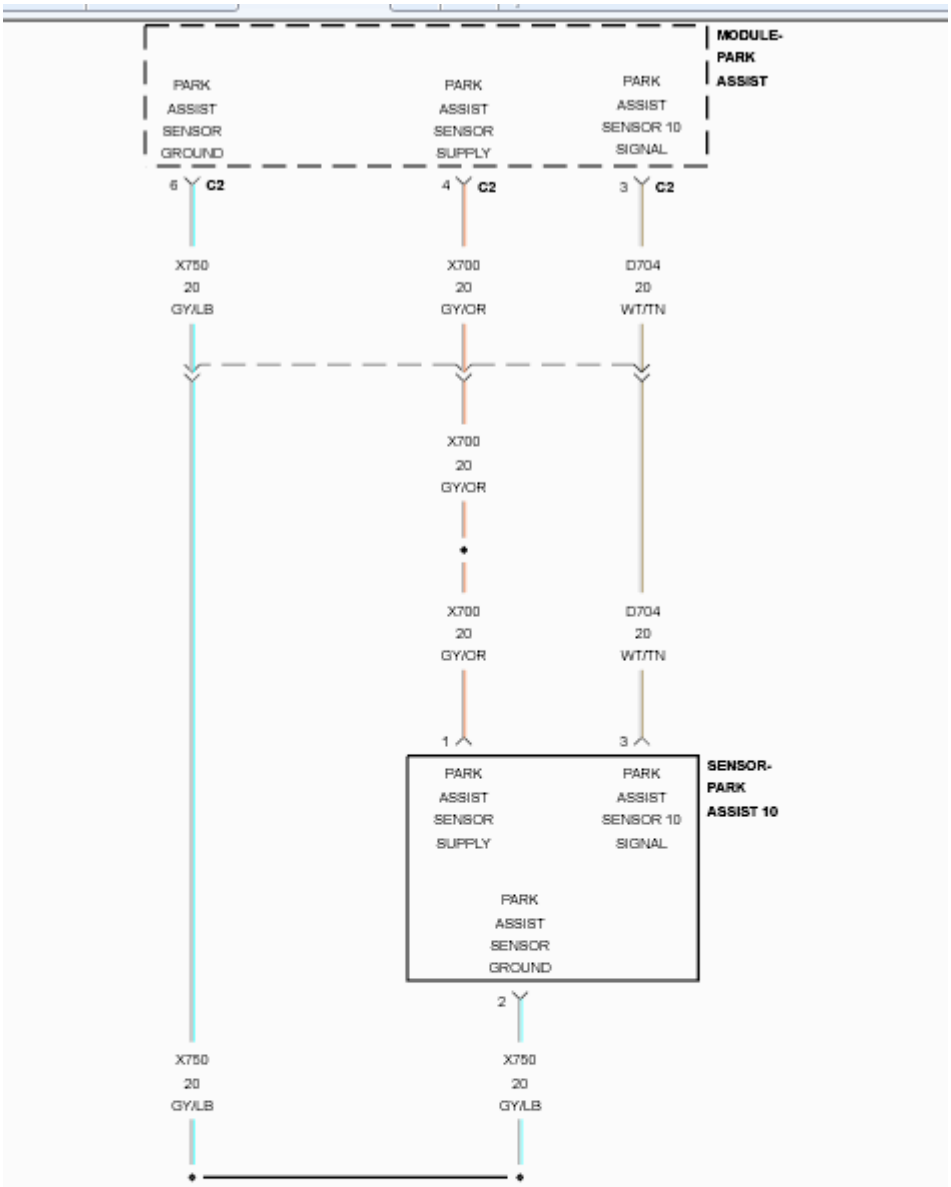
2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

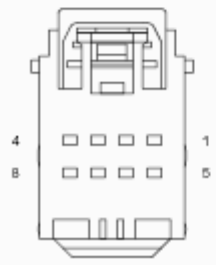
      If none of the possible causes mentioned above are present, view repair.

      Repair

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1297-92-PTS SENSOR 10 - PERFORMANCE OR INCORRECT OPERATION





MODULE-
PARK ASSIST C2

SENSOR-
PARK ASSIST 10

Fig. 150: Park Assist Sensor Wiring Diagram
Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR 10
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK PARK ASSIST SENSOR 10 FOR INTERNAL SHORT**
    1. Disconnect Park Assist Sensor0.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

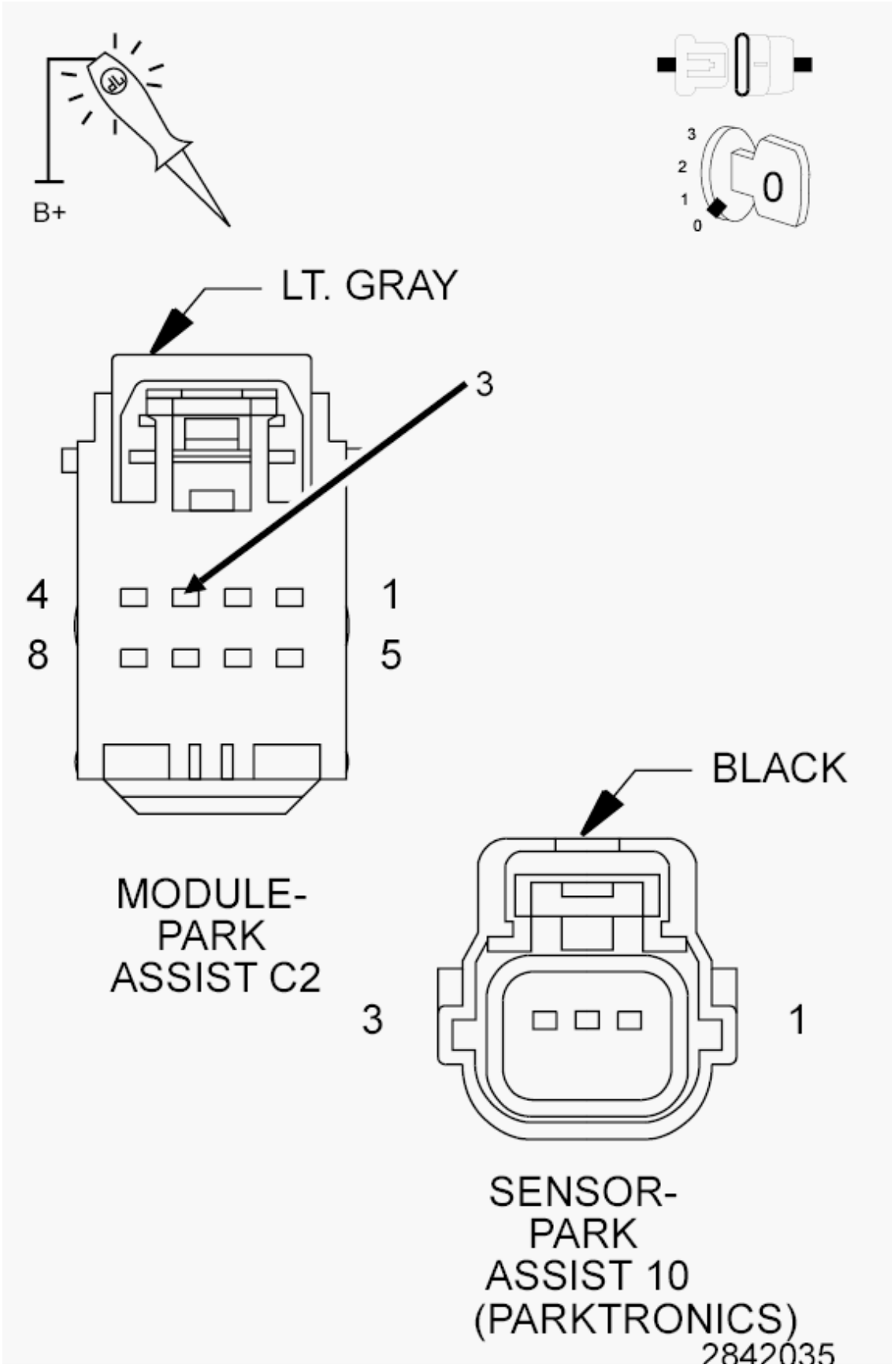

B+
3
2
1
0
0
LT. GRAY
3
4
1
8
5
MODULE-
PARK
ASSIST C2
BLACK
3
1
SENSOR-
PARK
ASSIST 10
(PARKTRONICS)
2842035

Fig. 151: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.
3. Using a 12-volt test light connected to 12-volts check the (D704) Park Assist Sensor Signal circuit at the Park Assist Module C2 harness connector.

   Does the test light illuminate brightly?

   Yes

   - Repair the (D704) Park Assist Sensor Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

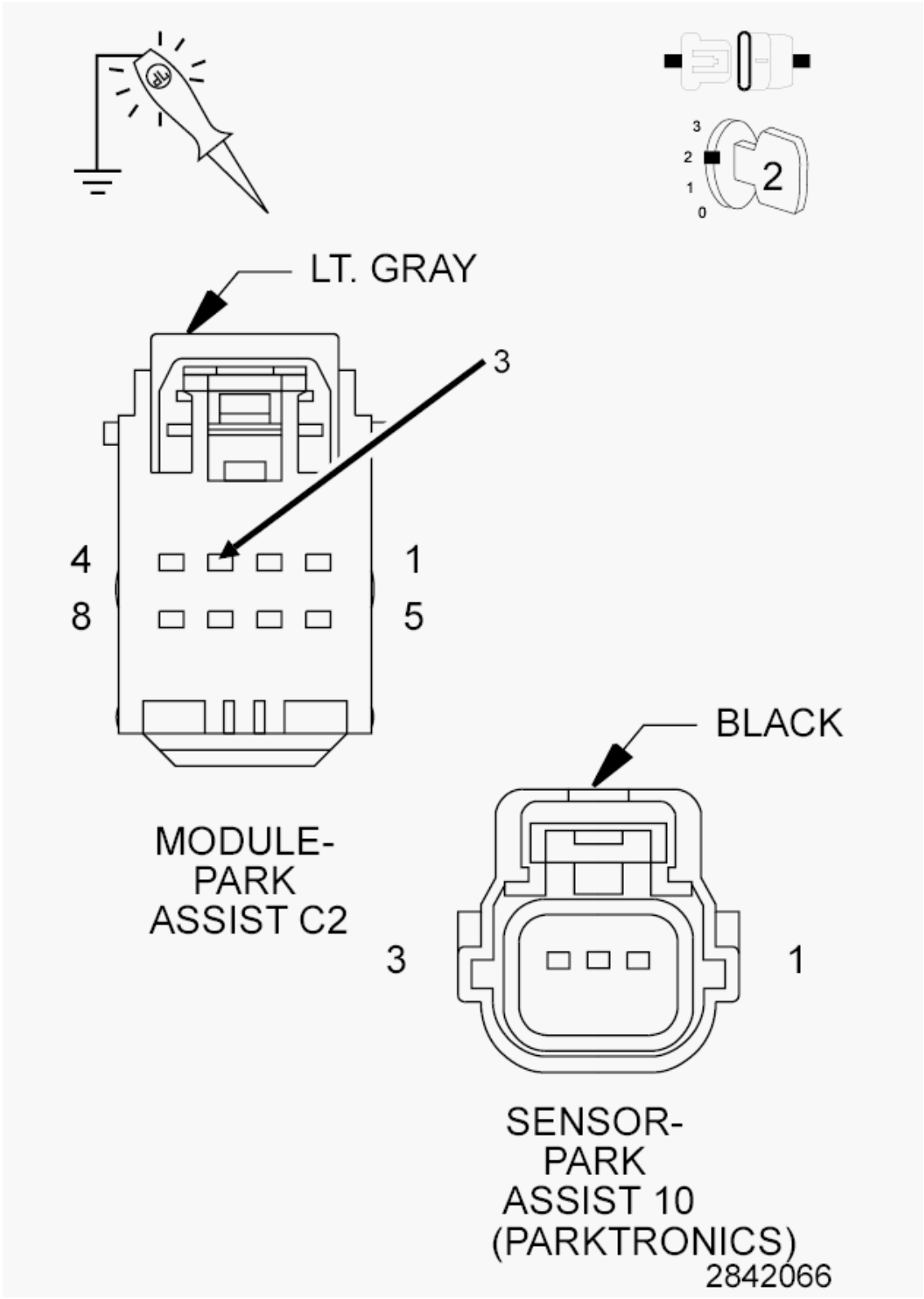


Fig. 152: Checking Park Assist Sensor Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Using a 12-volt test light connected to ground check the (D704) Park Assist Sensor Signal circuit at the Park Assist Module C2 harness connector for a short to battery.

   Does the test light illuminate brightly?

   Yes

   - Repair the (D704) Park Assist Sensor Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR AN OPEN**

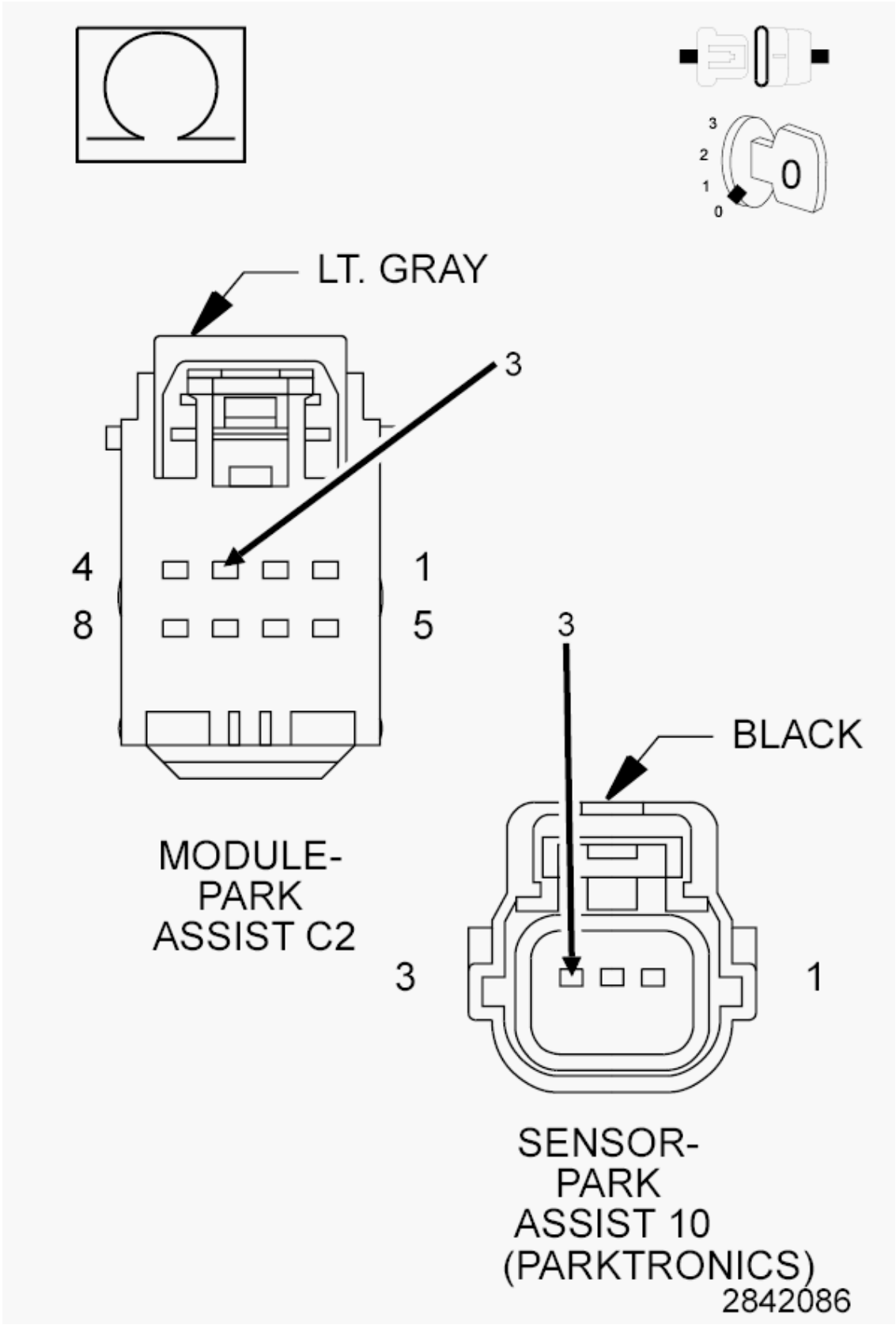


Fig. 153: Checking Park Assist Sensor Signal Circuit For An Open

Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance of the (D704) Park Assist Sensor Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   No

   - Repair the (D704) Park Assist Sensor Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   Yes

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1298-11-PTS SENSOR 11 - CIRCUIT SHORT TO GROUND

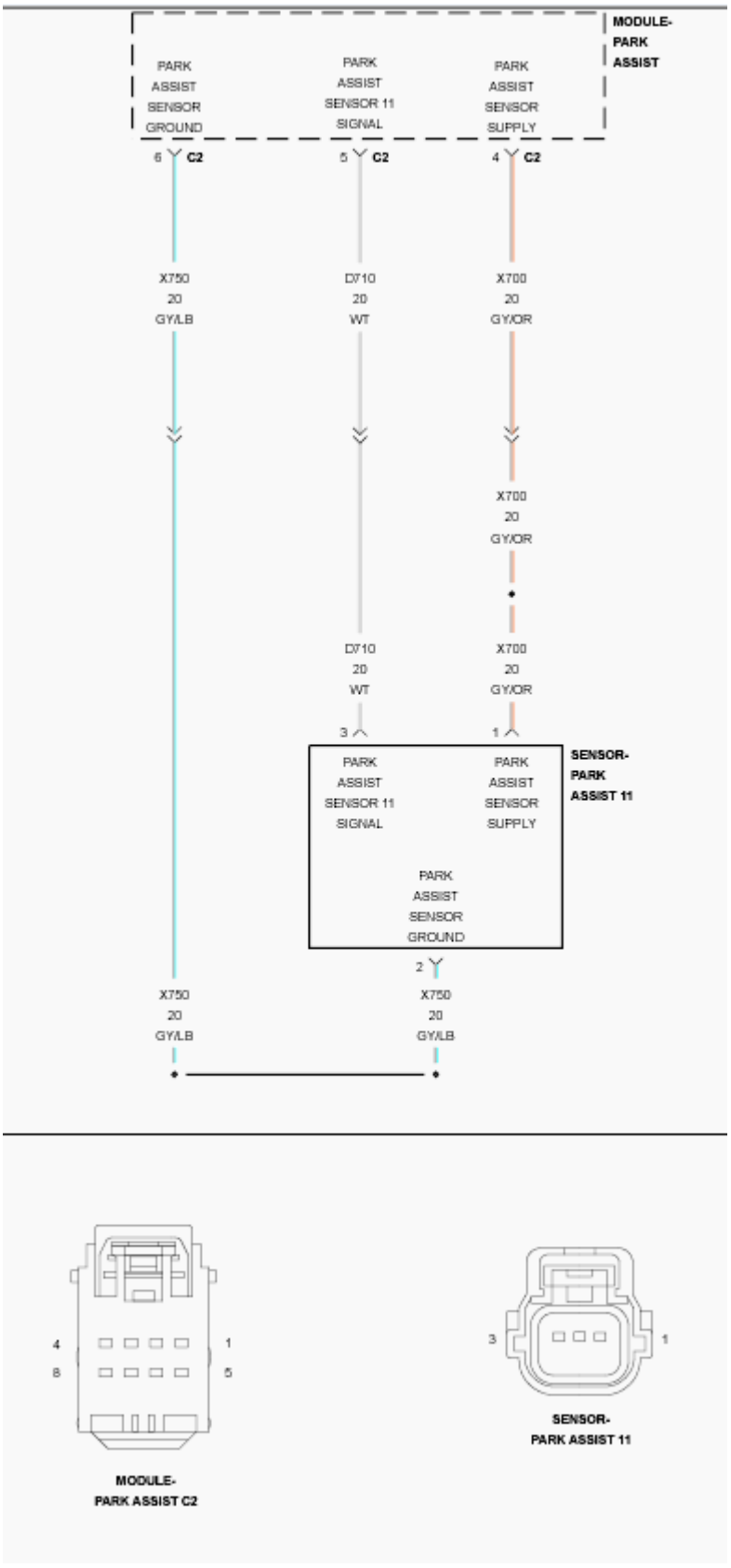


Fig. 154: Park Assist Sensor Wiring Diagram

Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR AN OPEN
(X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: A disconnected sensor will set this DTC. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

1. Turn the ignition on.
2. With the scan tool, read DTCs.

   Does the scan tool display this DTC as active?

   Yes

   - Go To 2.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

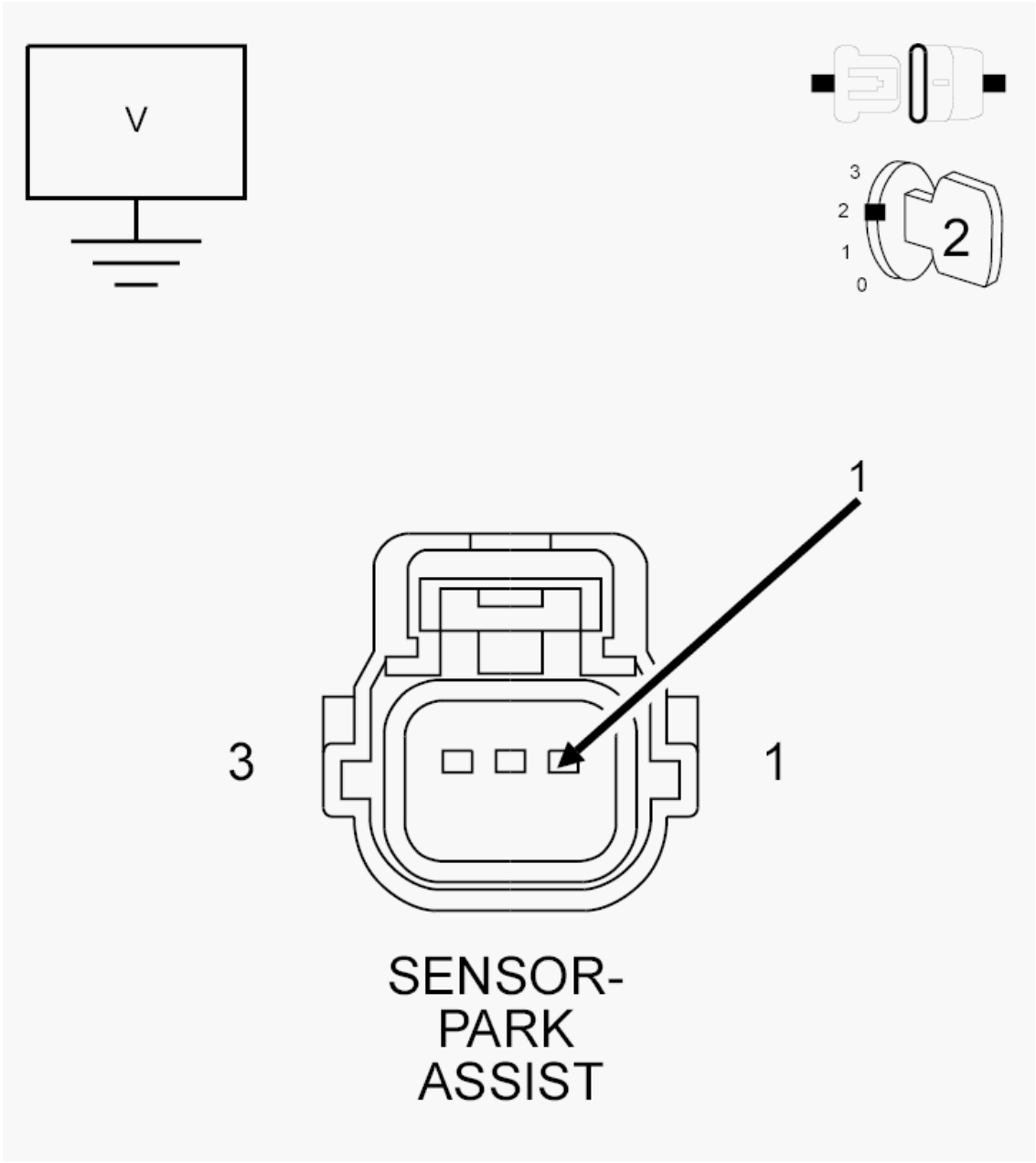


Fig. 155: Measuring Voltage Of Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Sensor1 harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (X700) Park Assist Sensor Supply circuit.

   Is the voltage above 8.0 volts?

   Yes

- Go To 4.

No

- Go To 3.

3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

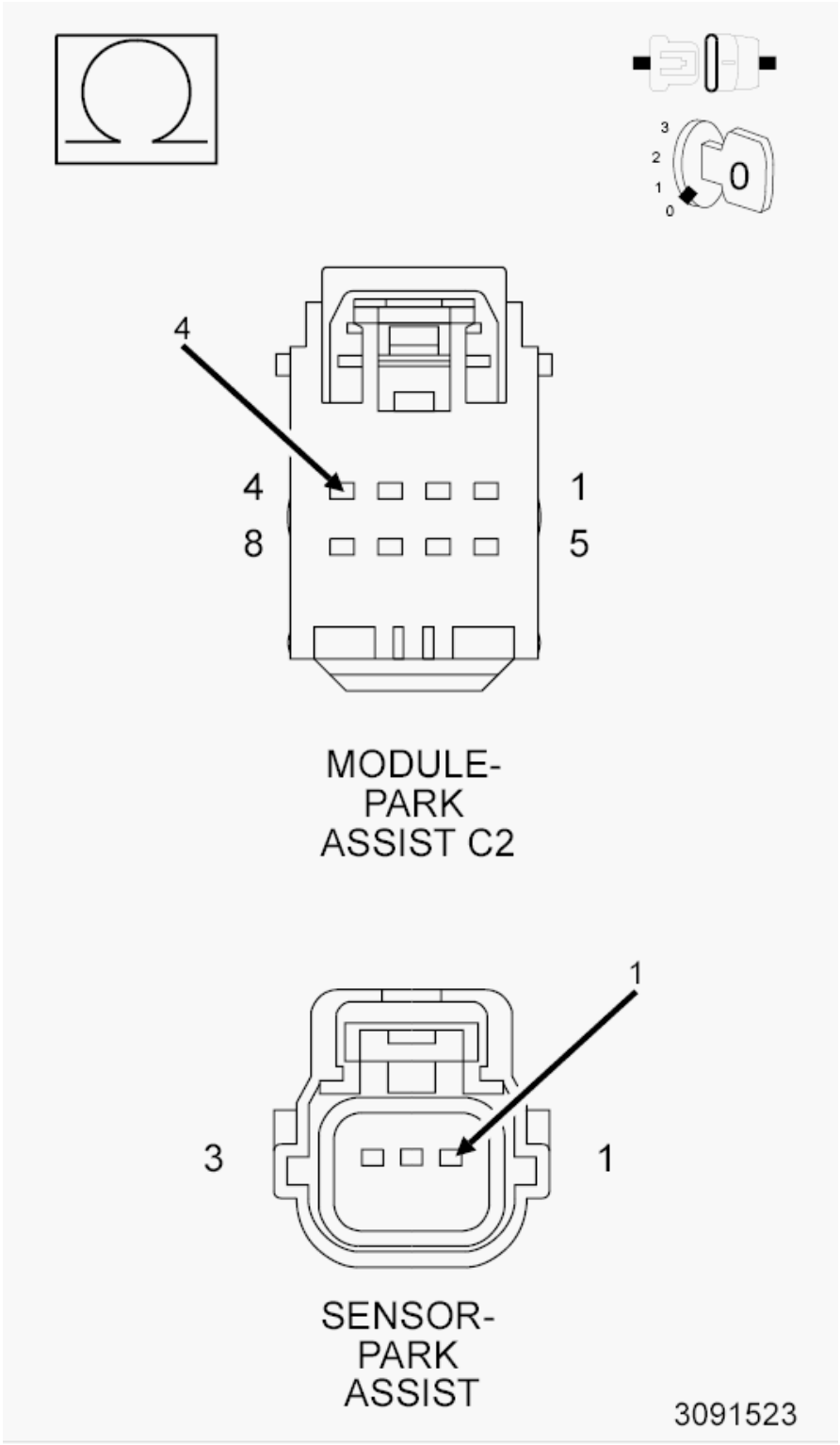


Fig. 156: Checking Park Assist Sensor Supply Circuit For An Open Or High Resistance
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.

3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Repair the open or high resistance in the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

4. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

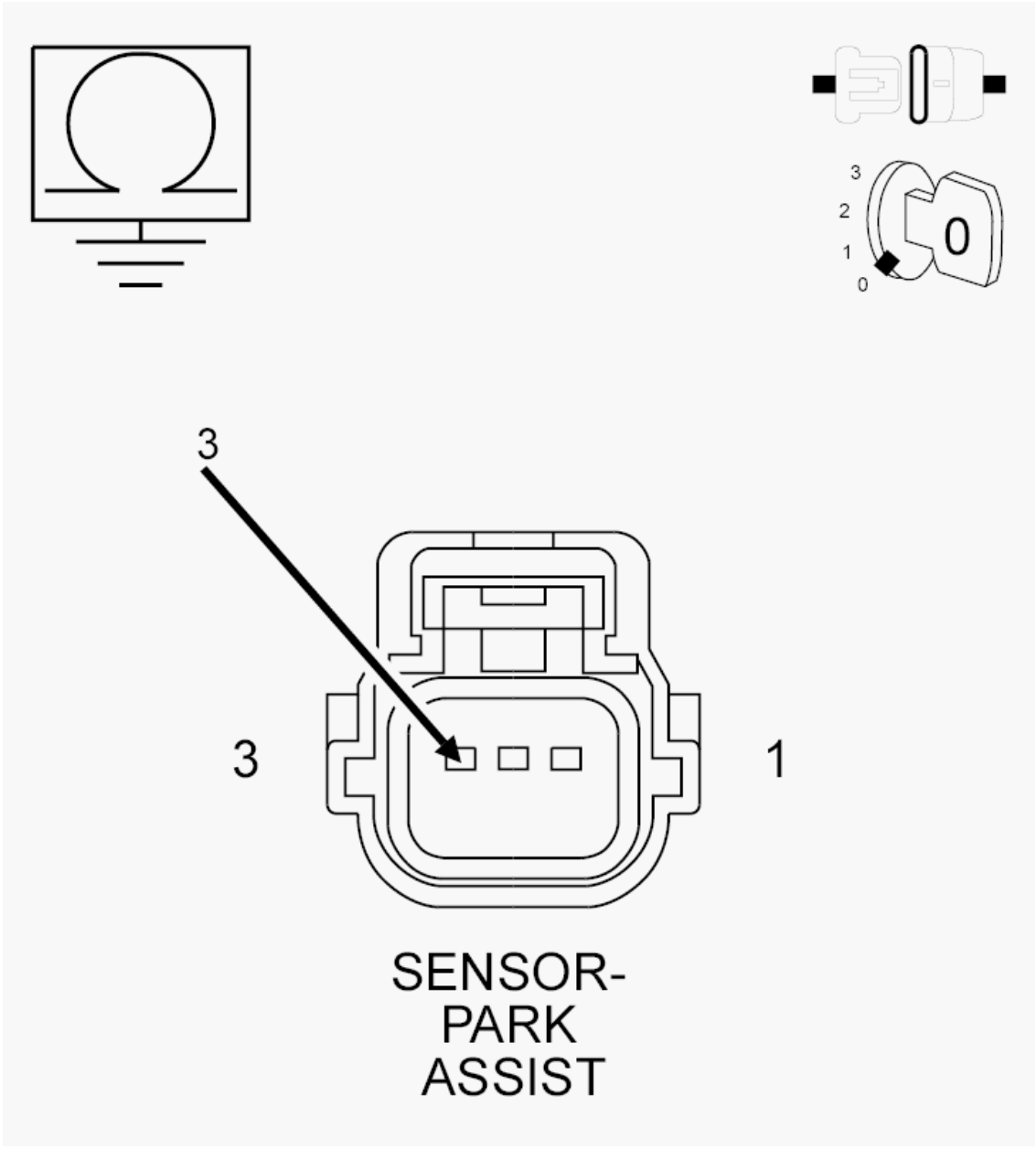


Fig. 157: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this step with the Park Assist Module connected.

1. Measure the resistance between ground and the (D710) Park Assist Sensor1 Signal circuit.

   Is the resistance below 10K Ohms?

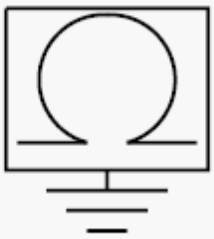
   Yes

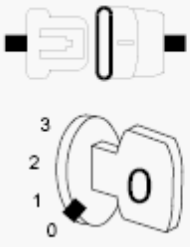
- Go To 5.

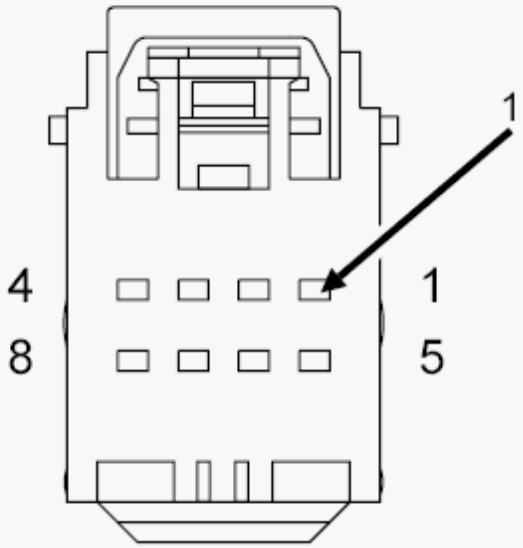
No

- Go To 7.

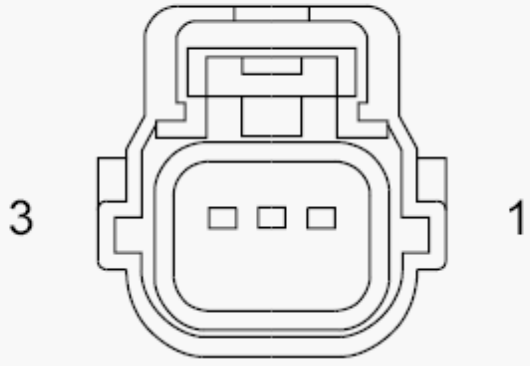
5. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**







MODULE-
PARK
ASSIST C2



SENSOR-
PARK

Fig. 158: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (D710) Park Assist Sensor1 Signal circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short to ground in the (D710) Park Assist Sensor1 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 6.

6. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**

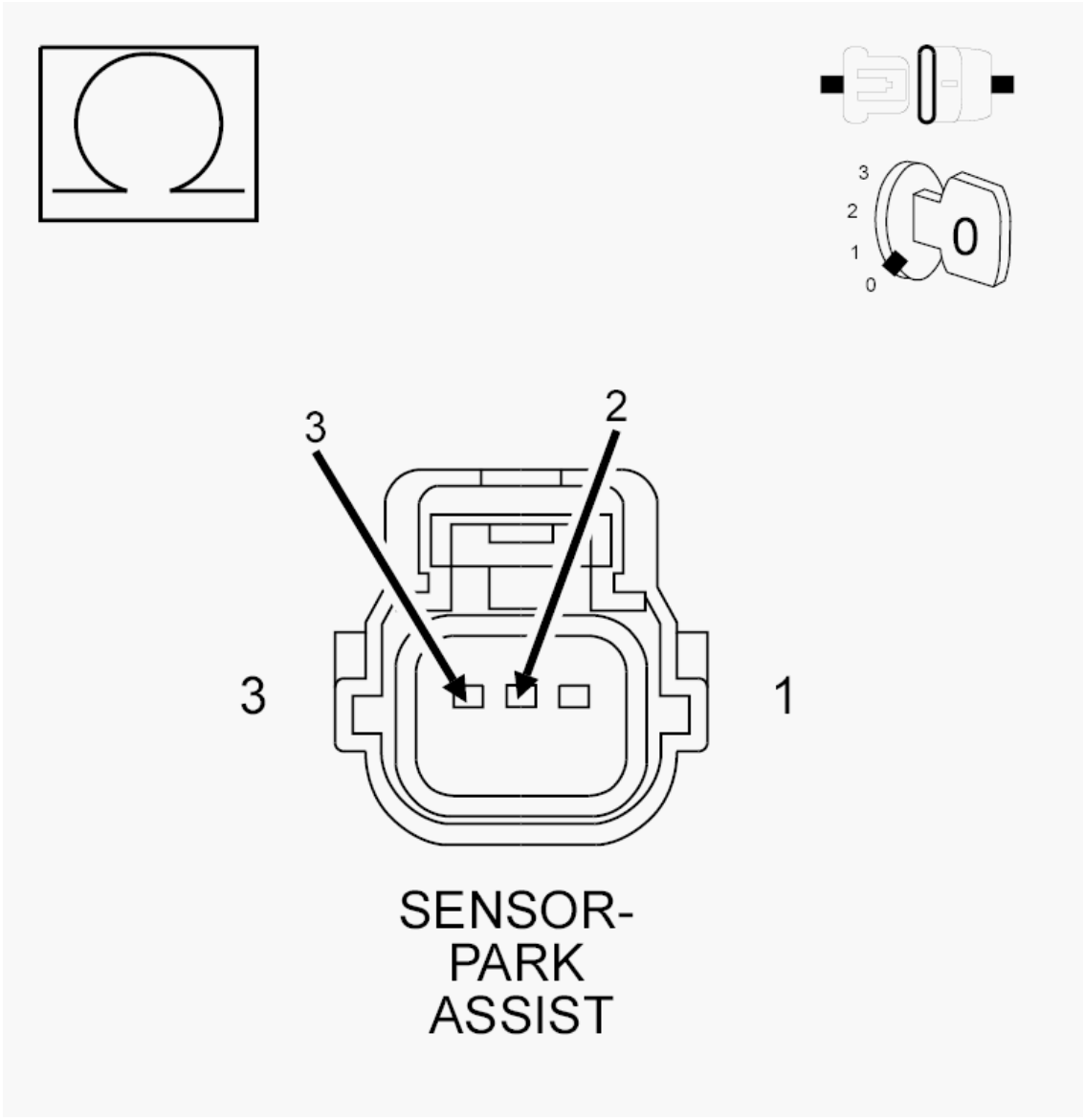


Fig. 159: Checking Park Assist Sensor Signal Circuit For A Short To The Front Park Assist Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance between the (D710) Park Assist Sensor1 Signal circuit and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the short between the (D710) Park Assist Sensor1 Signal circuit and the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

7. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR AN OPEN**

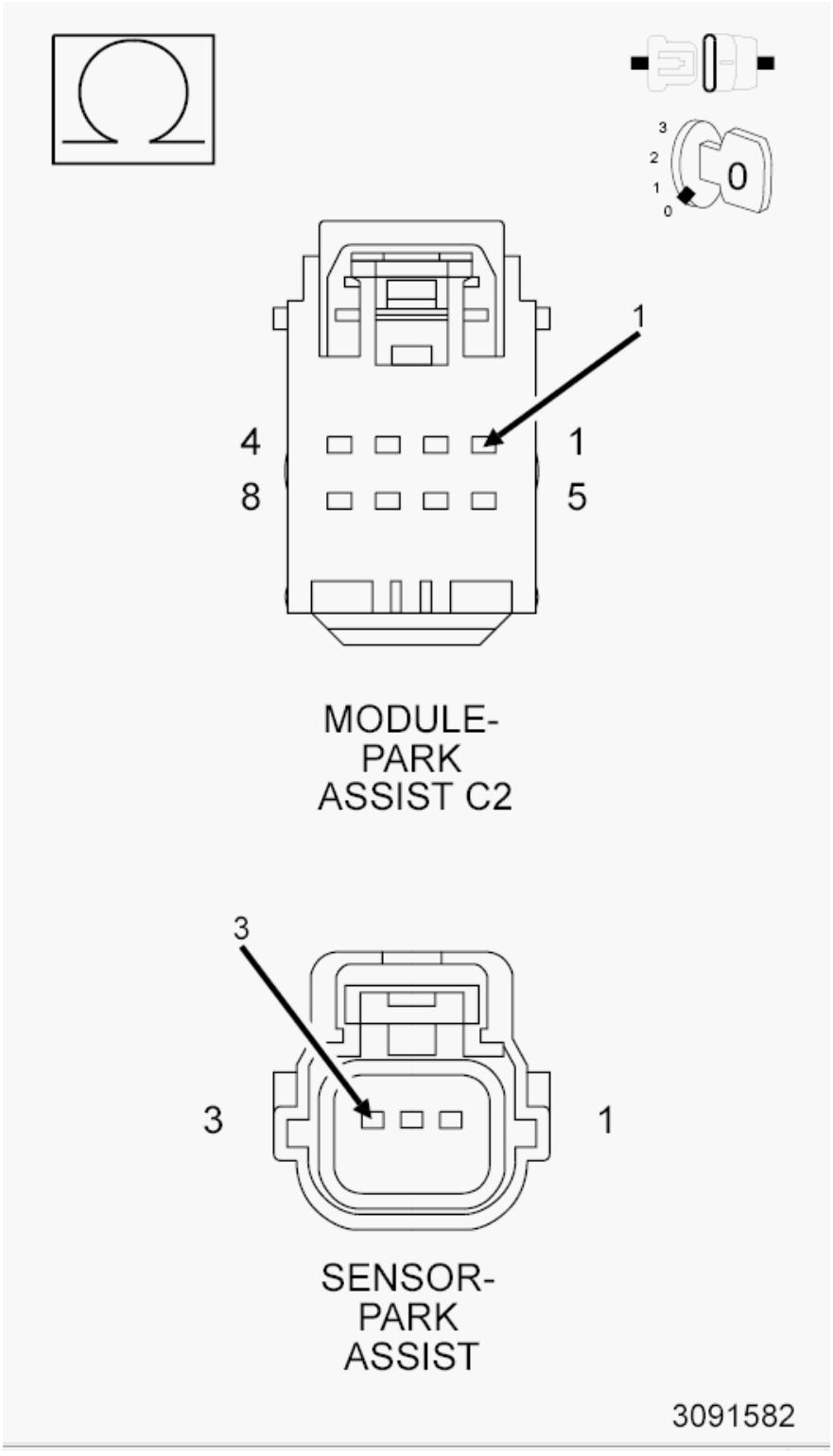


Fig. 160: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.

2. Measure the resistance of the (D710) Park Assist Sensor1 Signal circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (D710) Park Assist Sensor1 Signal circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 8.

8. **PARK ASSIST SENSOR**

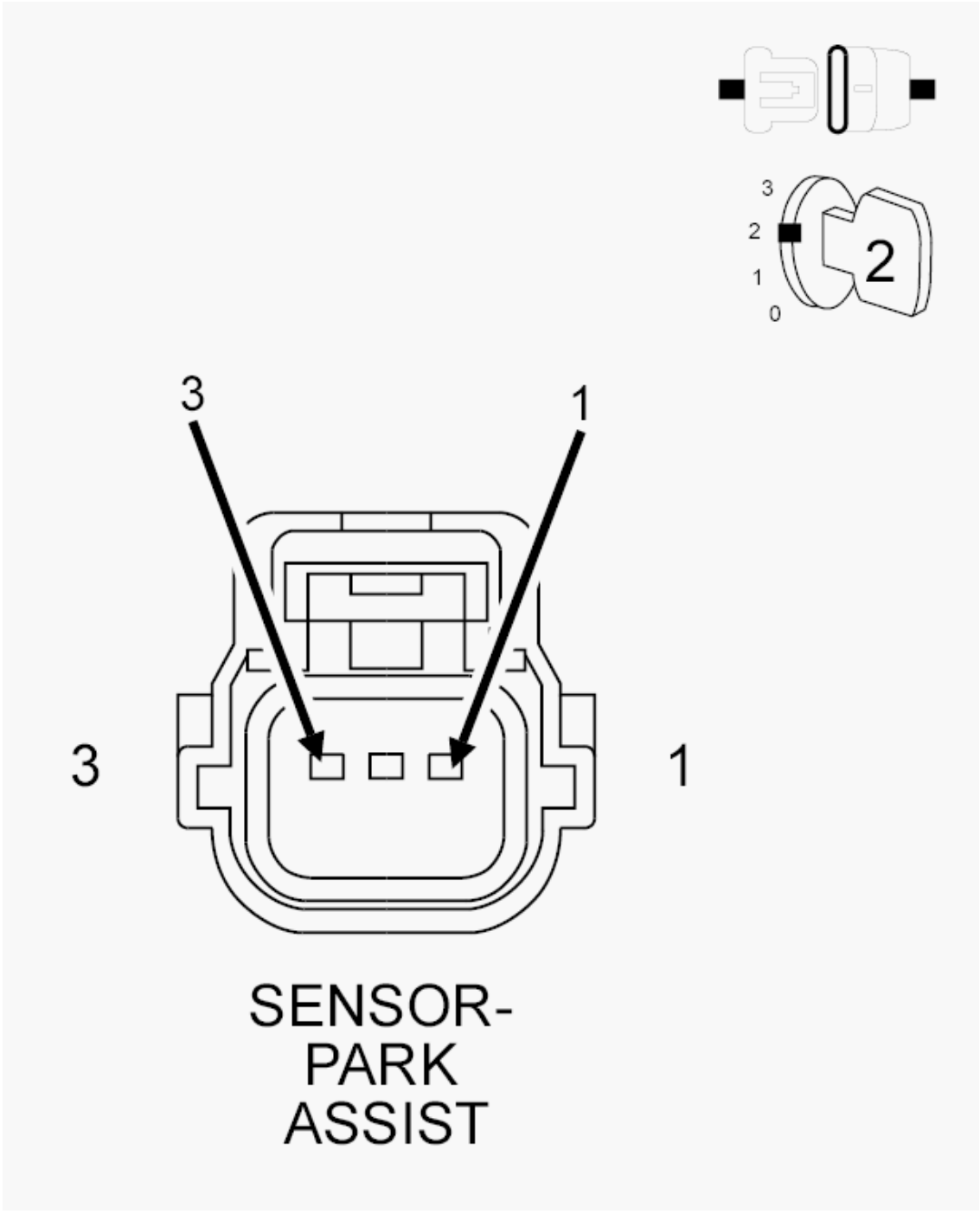


Fig. 161: Park Assist Sensor Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Reconnect the Park Assist Module C2 harness connector.
3. Connect a jumper wire across the (X700) Park Assist Sensor Supply and (D710) Park Assist Sensor1 Signal circuits.
4. Turn the ignition on.

5. With the scan tool, read DTCs.

   Does the scan tool display DTC: B1298-12-PTS SENSOR 11 - CIRCUIT SHORT TO BATTERY as active?

   Yes

   - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1298-12-PTS SENSOR 11 - CIRCUIT SHORT TO BATTERY

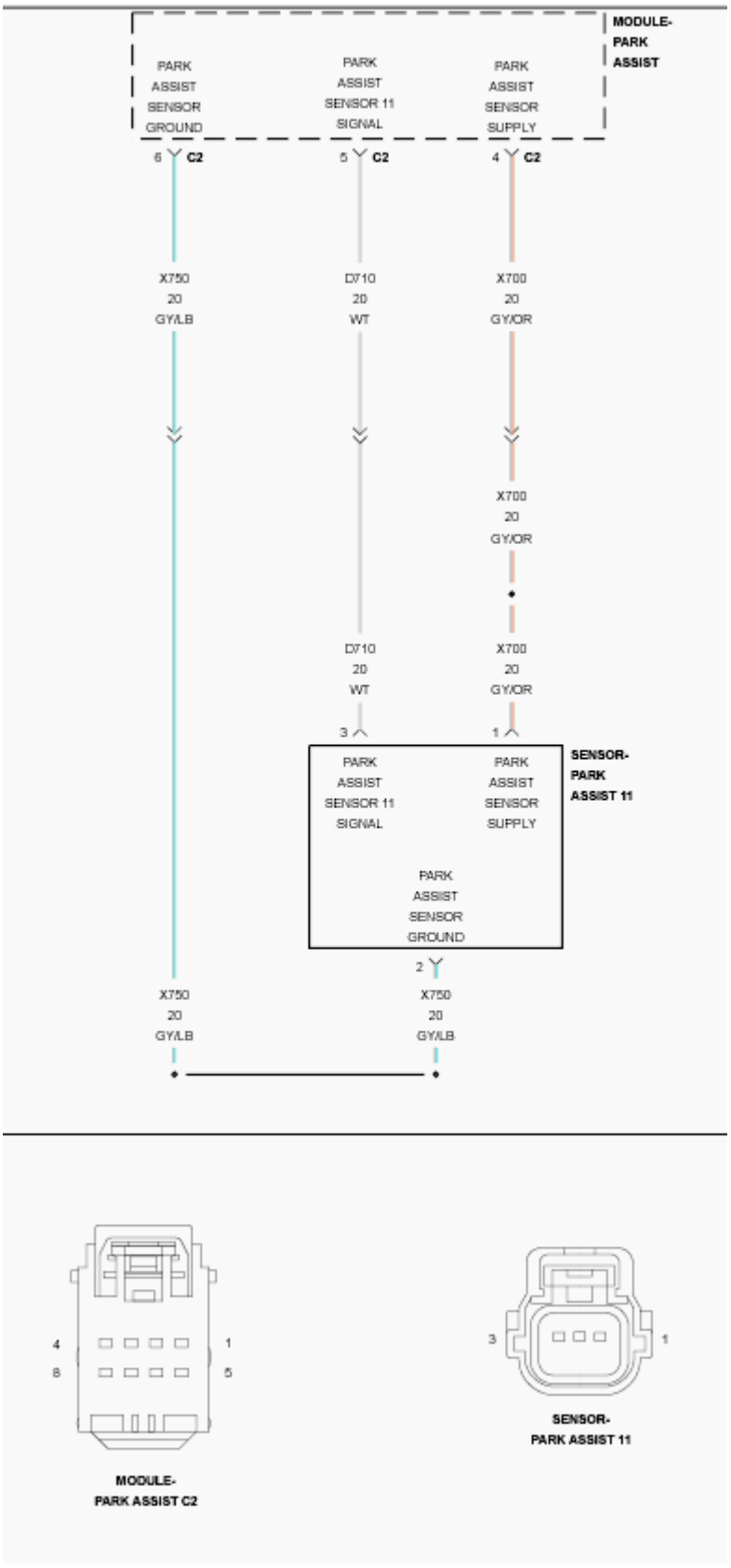


Fig. 162: Park Assist Sensor Wiring Diagram

Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

POSSIBLE CAUSES

Possible Causes
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT
(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

    Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

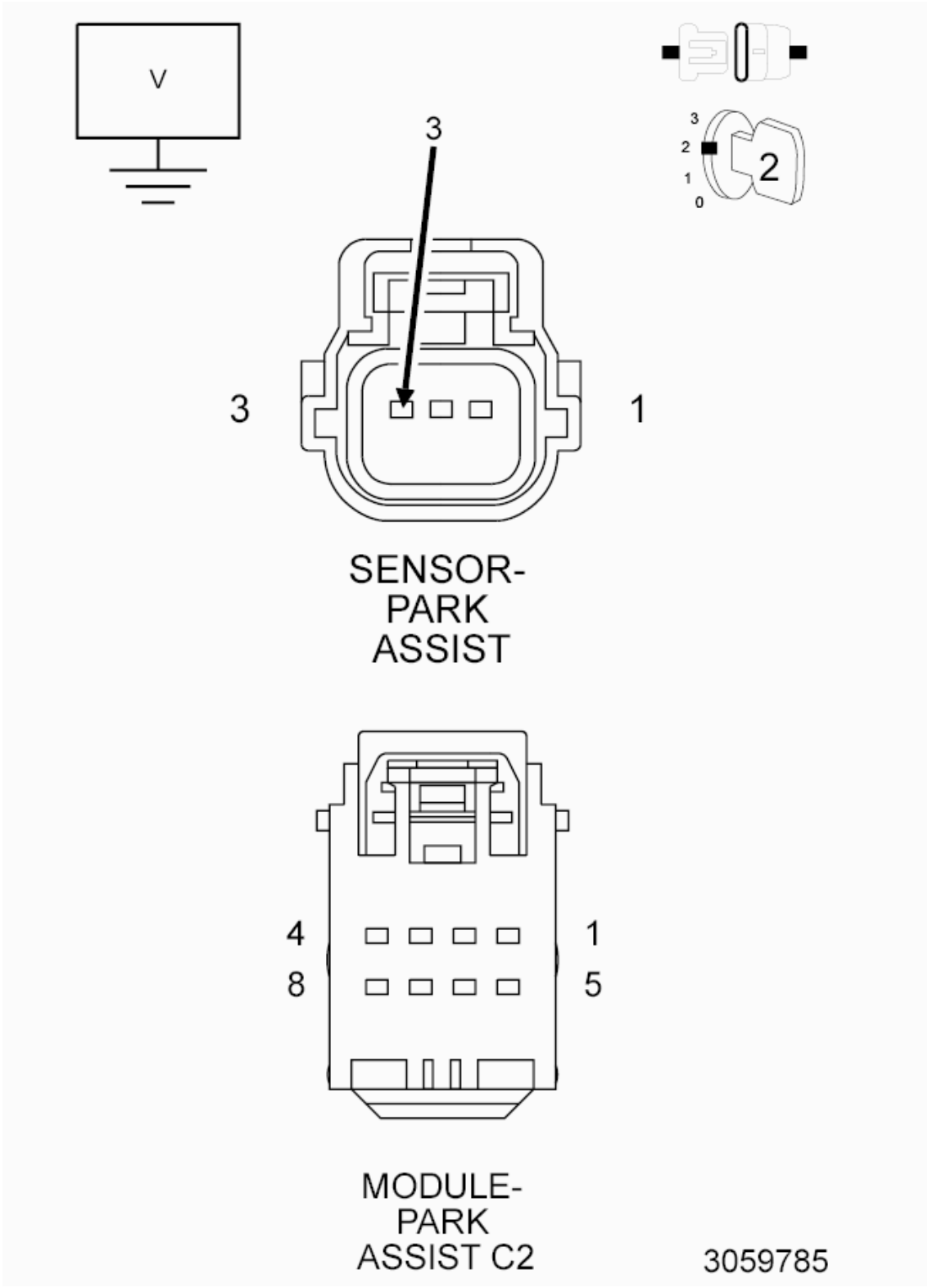


Fig. 163: Measuring Voltage Of Park Assist Sensor Signal Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.

2. Disconnect the Park Assist Module C2 harness connector.
3. Disconnect the Park Assist Sensor1 harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D710) Park Assist Sensor1 Signal circuit.

   Is the voltage above 10.0 volts?

   Yes

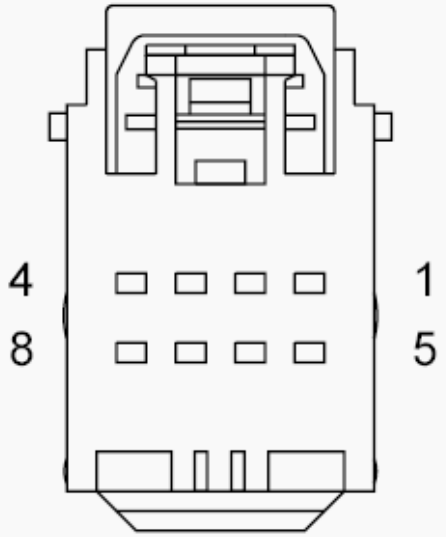
   - Repair the (D710) Park Assist Sensor1 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 3.

3. **(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**

SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060400

Fig. 164: Checking Park Assist Sensor Signal Circuit For A Short To The Park Assist Sensor Supply Circuit
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Measure the resistance between the (D710) Park Assist Sensor1 Signal circuit and the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (D710) Park Assist Sensor1 Signal circuit for a short to the (X700) Park Assist Sensor Supply circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 4.

4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN**

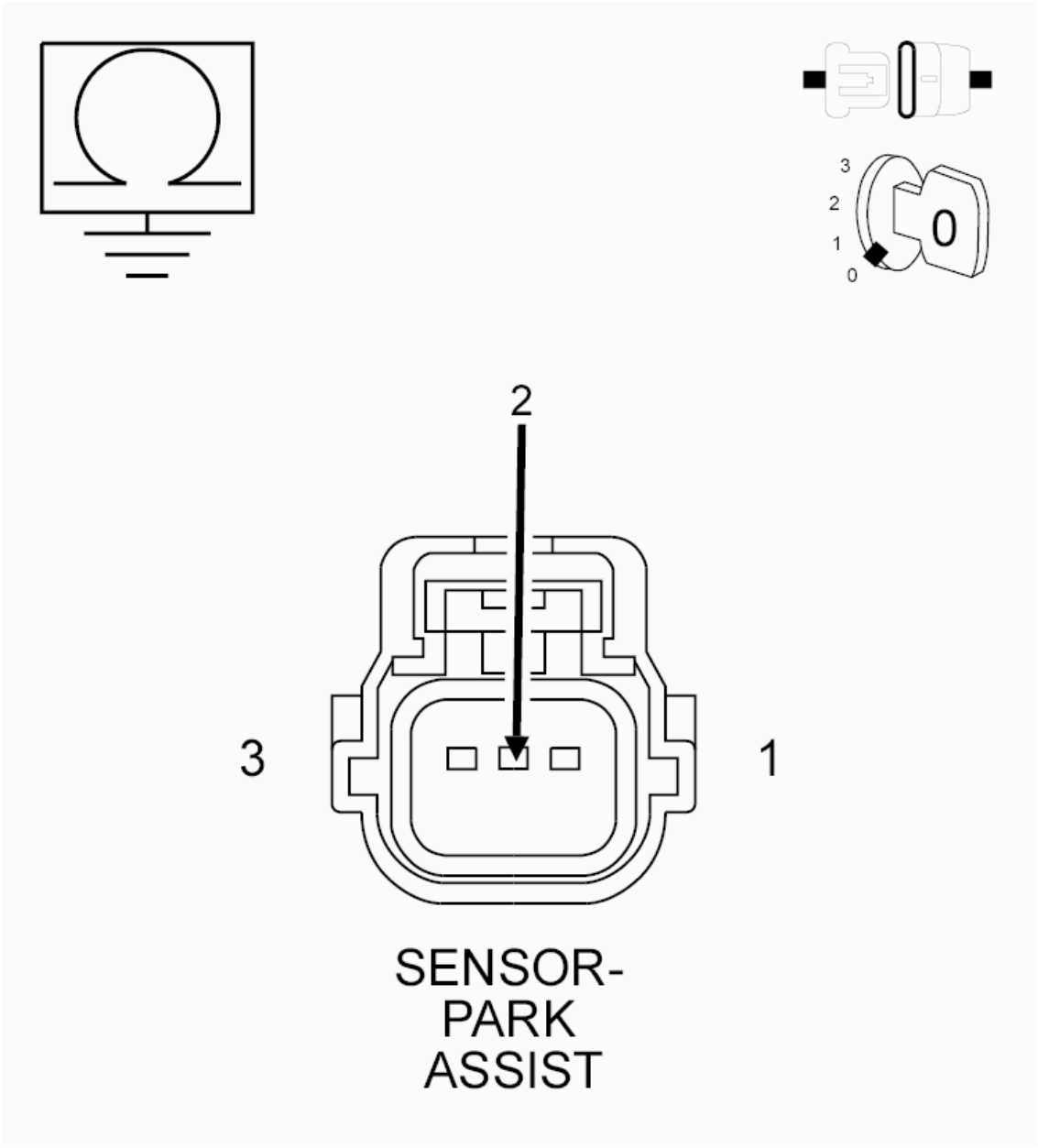


Fig. 165: Checking Front Park Assist Sensor Ground Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Reconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 20.0 Ohms?

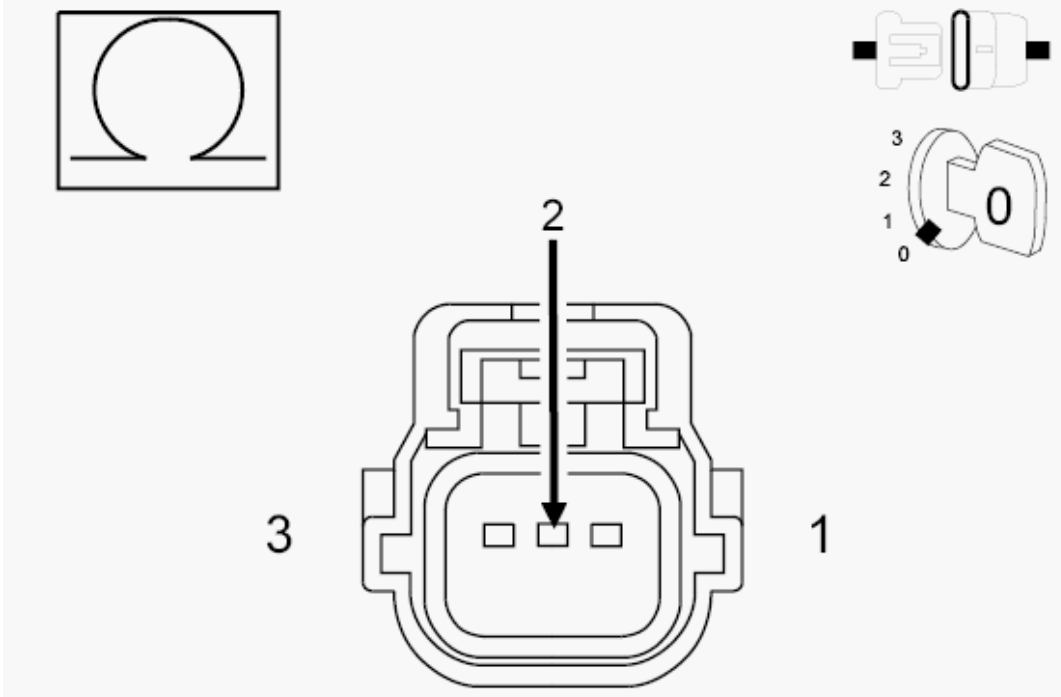
   Yes

   - Go To 5.

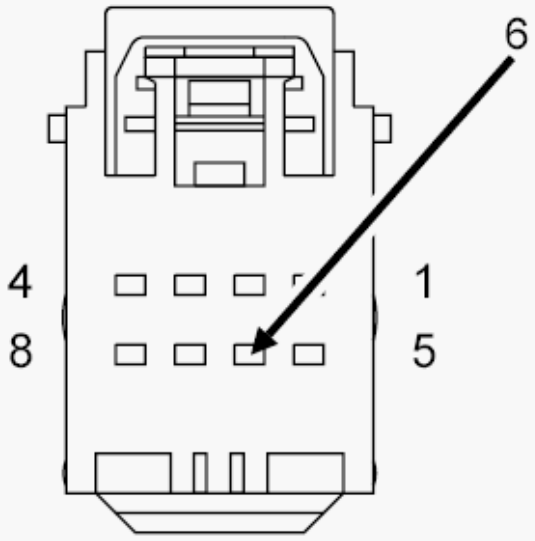
No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT FOR AN OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**



SENSOR-
PARK
ASSIST



MODULE-
PARK
ASSIST C2

3060659

Fig. 166: Checking Park Assist Sensor Ground Circuit For An Open Between Park Assist Module And Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the open in the (X750) Park Assist Sensor Ground circuit.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1298-25-PTS SENSOR 11 - SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse.

During the self-test while vehicle is in drive between 11 mph (18 km/h) and 25 mph (40 km/h).

SET CONDITION:

The Park Assist Module detects an internal Sensor error.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**

   NOTE: Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Does the scan tool display this DTC as active?

      Yes

      - Go To 2.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
      - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

      If none of the possible causes mentioned above are present, view repair.

      Repair

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B1298-92-PTS SENSOR 11 - PERFORMANCE OR INCORRECT OPERATION

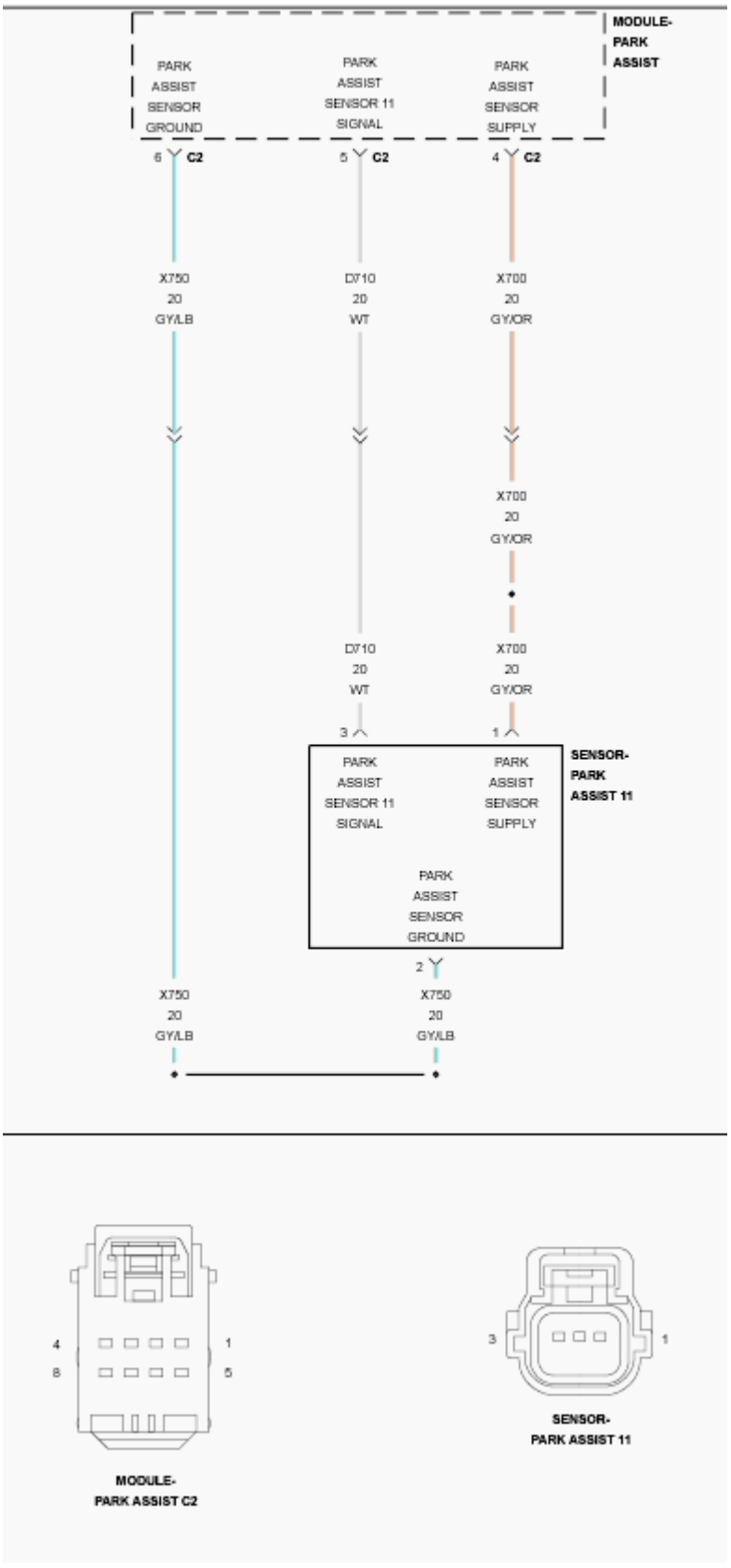


Fig. 167: Park Assist Sensor Wiring Diagram

Courtesy of CHRYSLER GROUP, LLC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.**

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

POSSIBLE CAUSES

Possible Causes
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO GROUND
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO BATTERY
(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR AN OPEN
PARK ASSIST SENSOR 11
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

       Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **CHECK PARK ASSIST SENSOR 11 FOR INTERNAL SHORT**
    1. Disconnect Park Assist Sensor1 harness connector.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 3.

    No

    - Replace Park Assist Sensor1 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO GROUND**

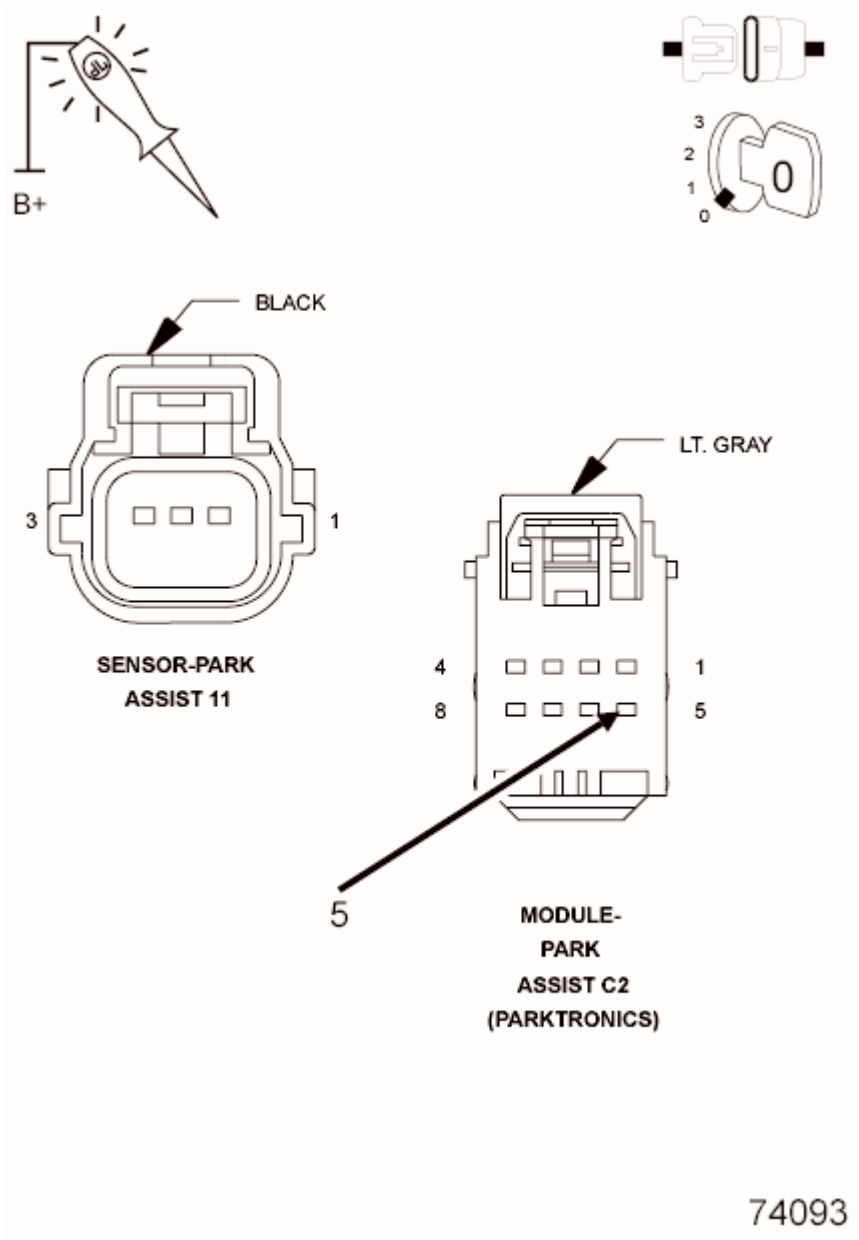


Fig. 168: Checking Park Assist Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.
3. Using a 12-volt test light connected to 12-volts check the (D710) Park Assist Sensor1 Signal circuit at the Park Assist Module C2 harness connector.

   Does the test light illuminate brightly?

   Yes

- Repair the (D710) Park Assist Sensor1 Signal circuit for a short to ground.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Go To 4.

4. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO BATTERY**

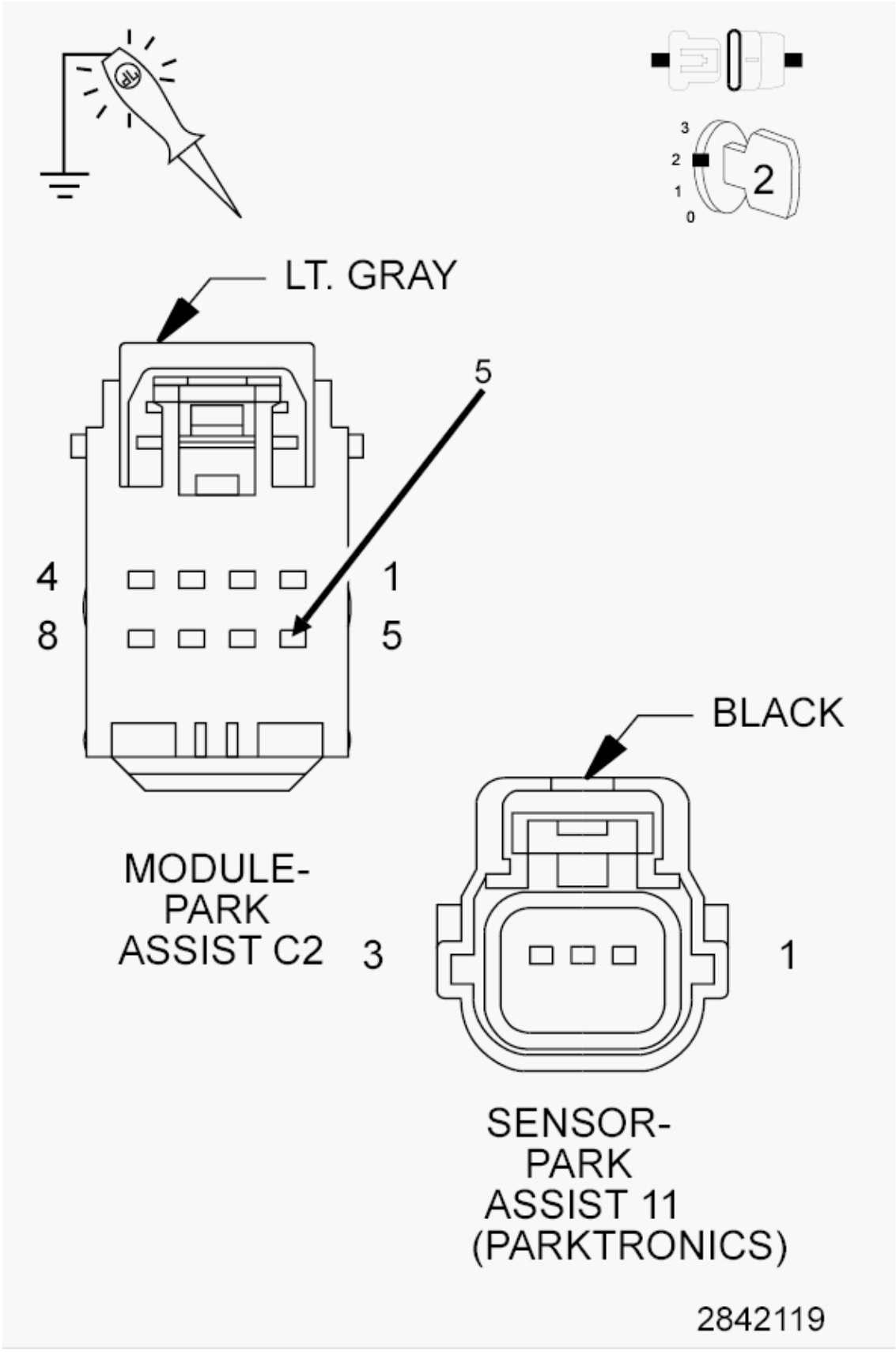

LT. GRAY
5
4
1
8
5
MODULE-
PARK
ASSIST C2
BLACK
3
1
SENSOR-
PARK
ASSIST 11
(PARKTRONICS)
2842119

Fig. 169: Checking Park Assist Sensor1 Signal Circuit For A Short To Battery
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition on.
2. Using a 12-volt test light connected to ground check the (D710) Park Assist Sensor1 Signal circuit at the Park Assist Module C2 harness connector for a short to battery.

   Does the test light illuminate brightly?

   Yes

   - Repair the (D710) Park Assist Sensor1 Signal circuit for a short to battery.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Go To 5.

5. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR AN OPEN**

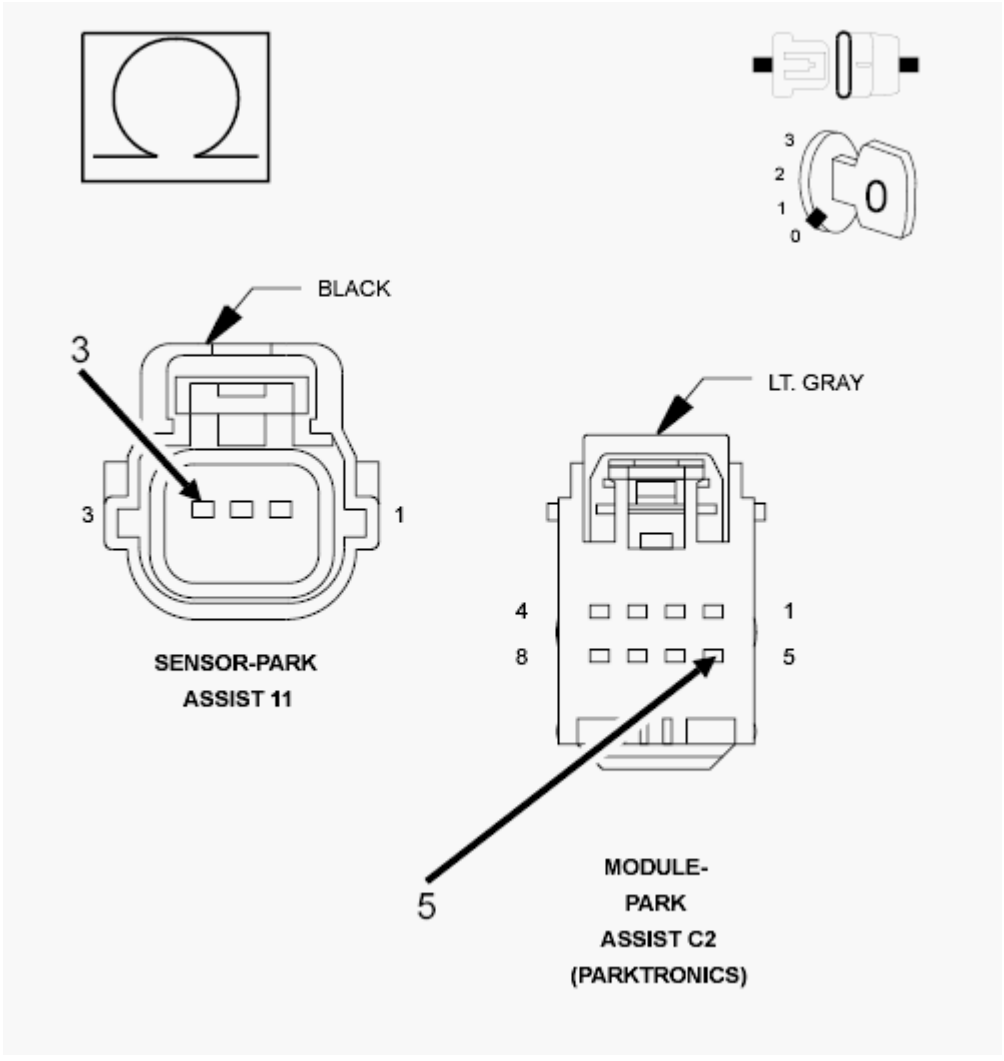


Fig. 170: Checking Park Assist Sensor Signal Circuit For An Open
Courtesy of CHRYSLER GROUP, LLC

1. Measure the resistance of the (D710) Park Assist Sensor1 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor1 harness connector.

   Is the resistance below 5.0 Ohms?

   No

   - Repair the (D710) Park Assist Sensor1 Signal circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   Yes

   - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .

- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B210C-16-BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

Park Assist Module supply voltage less than 6.5 volts.

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

       Does the scan tool display this DTC as active?

       Yes

       - Go To 2.

       No

       - The condition that caused this code to set is not present at this time. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also inspect the related connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

   NOTE: Troubleshoot any PCM charging/cranking DTCs before proceeding.

   NOTE: Make sure the battery is fully charged.

Are any charging system DTCs present?

Yes

- Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B210C-17-BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

Park Assist Module supply voltage greater than 16.0 volts.

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 2.

    No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

   NOTE: Troubleshoot any PCM charging/cranking DTCs before proceeding.

   NOTE: Make sure the battery is fully charged.

   Are any charging system DTCs present?

   Yes

   - Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B2128-16-SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

Park Assist Sensor supply voltage less than 7.2 volts.

POSSIBLE CAUSES

Possible Causes
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO GROUND (IF EQUIPPED)
(X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO GROUND
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

       Does the scan tool display this DTC as active?

       Yes

       - Go To 2.

       No

       - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
2. **CHECK EACH PARK ASSIST SENSOR FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect one Park Assist Sensor.
    3. Turn the ignition on.
    4. With the scan tool, read Park Assist Module DTCs. If this DTC is still active, repeat this procedure by disconnecting another Park Assist Sensor. However, if this DTC changes from active to stored, or if all sensors have been disconnected, proceed as follows:

       Does the scan tool still display this DTC as active?

Yes

- Go To 3.

No

- Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

3. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO GROUND (IF EQUIPPED)**

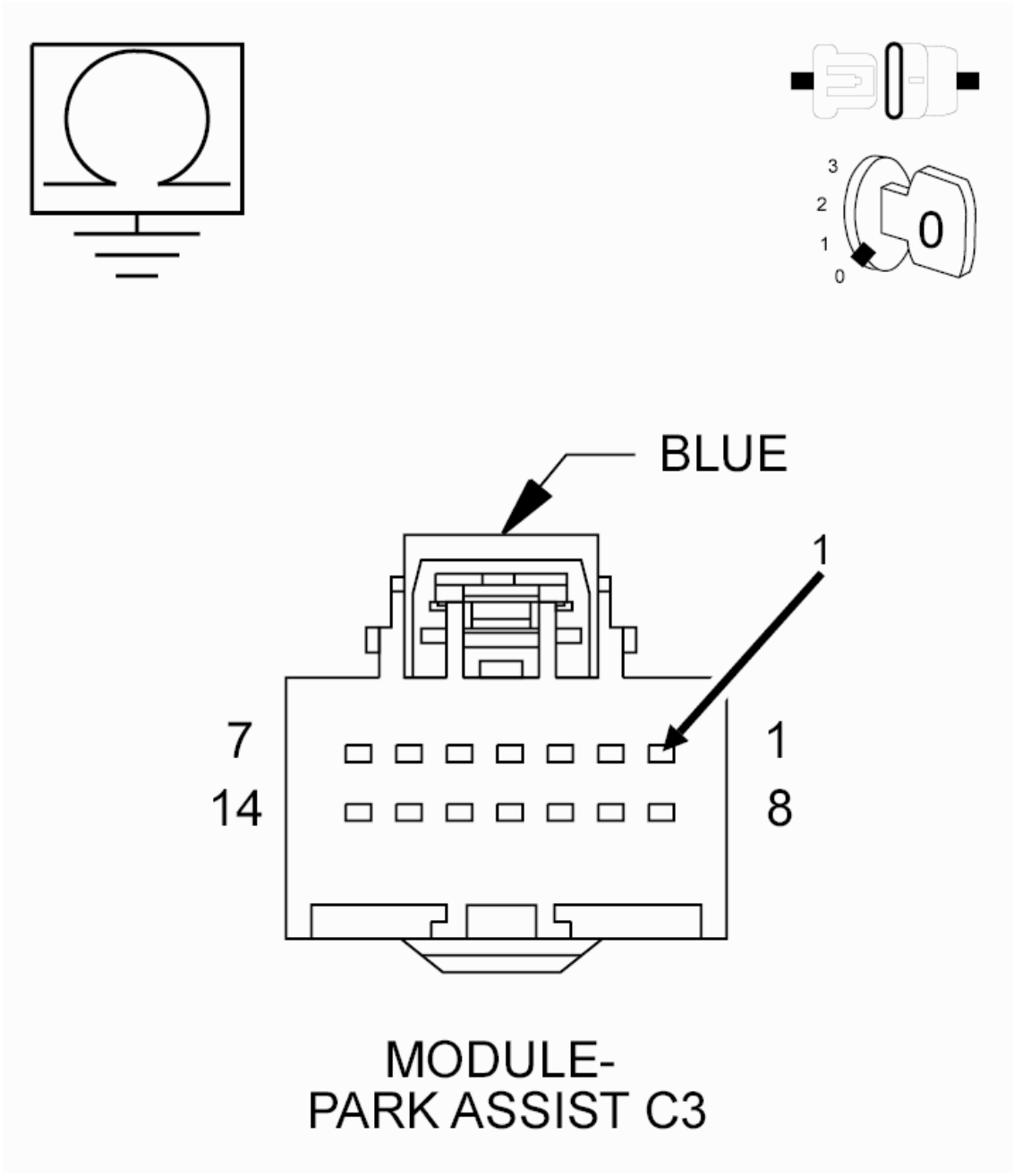


Fig. 171: Checking Front Park Assist Sensor Supply Circuit For A Short To Ground (If Equipped)
Courtesy of CHRYSLER GROUP, LLC

NOTE: If vehicle is not equipped with Front Park Assist, proceed to next test step.

NOTE: Perform this test with all Front Park Assist Sensors disconnected.

1. Disconnect the Park Assist Module C3 harness connector.
2. Measure the resistance between ground and the (X702) Front Park Assist Sensor Supply

circuit.

Is the resistance below 10K Ohms?

Yes

- Repair the short to ground in the (X702) Front Park Assist Sensor Supply circuit.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Go To 4.

4. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO GROUND**

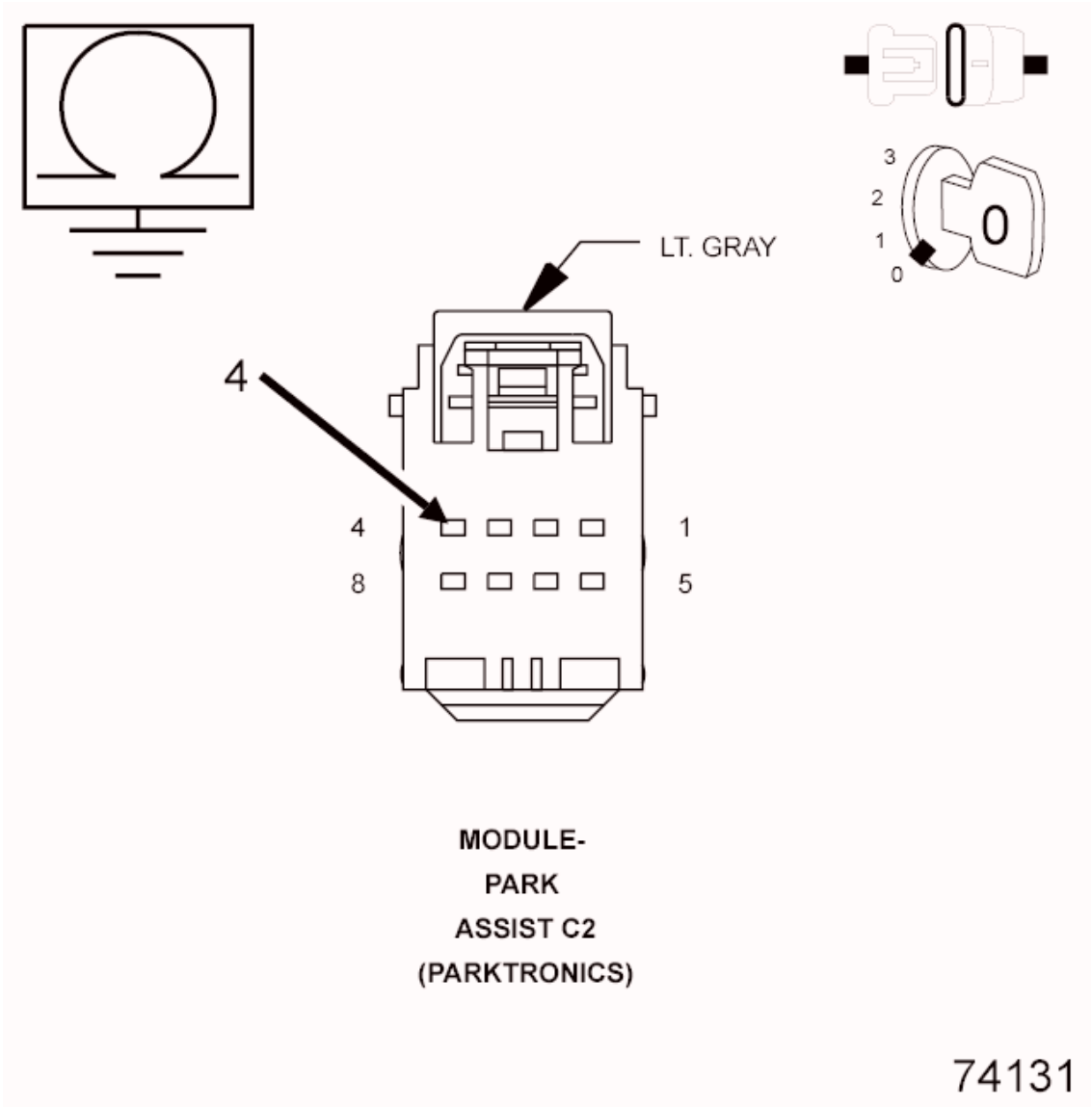


Fig. 172: Checking Park Assist Sensor Supply Circuit For A Short To Ground
Courtesy of CHRYSLER GROUP, LLC

NOTE: Perform this test with all Rear Park Assist Sensors disconnected.

1. Disconnect the Park Assist Module C2 harness connector.
2. Measure the resistance between ground and the (X700) Park Assist Sensor Supply circuit.

   Is the resistance below 10K Ohms?

   Yes

   - Repair the (X700) Park Assist Sensor Supply circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B2128-17-SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since Chrysler Group vehicles use only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

Park Assist Sensor supply voltage greater than 9.2 volts.

POSSIBLE CAUSES

Possible Causes
(X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE (IF EQUIPPED)
(X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 2.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
2. **CHECK THE (X702) FRONT PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE (IF EQUIPPED)**

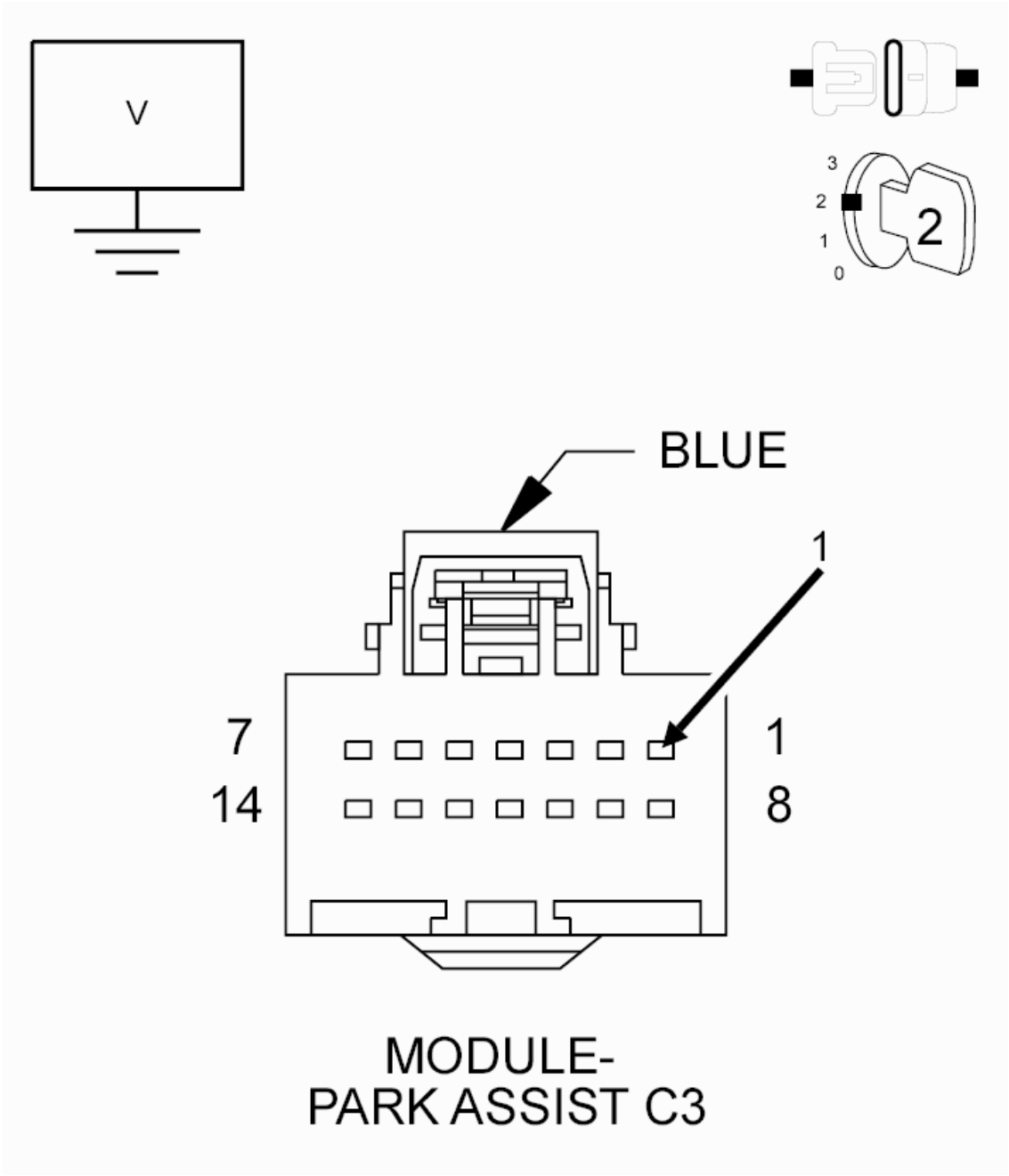


Fig. 173: Checking Front Park Assist Sensor Supply Circuit For A Short To Voltage (If Equipped)
Courtesy of CHRYSLER GROUP, LLC

NOTE: If vehicle is not equipped with Front Park Assist, proceed to next test step.

1. Turn the ignition off.
2. Disconnect the Park Assist Module C3 harness connector.
3. Turn the ignition on.
4. Measure the voltage on the (X702) Front Park Assist Sensor Supply circuit.

Is the voltage above 9.2 volts?

Yes

- Repair the (X702) Front Park Assist Sensor Supply circuit for a short to voltage.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Go To 3.

3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE**

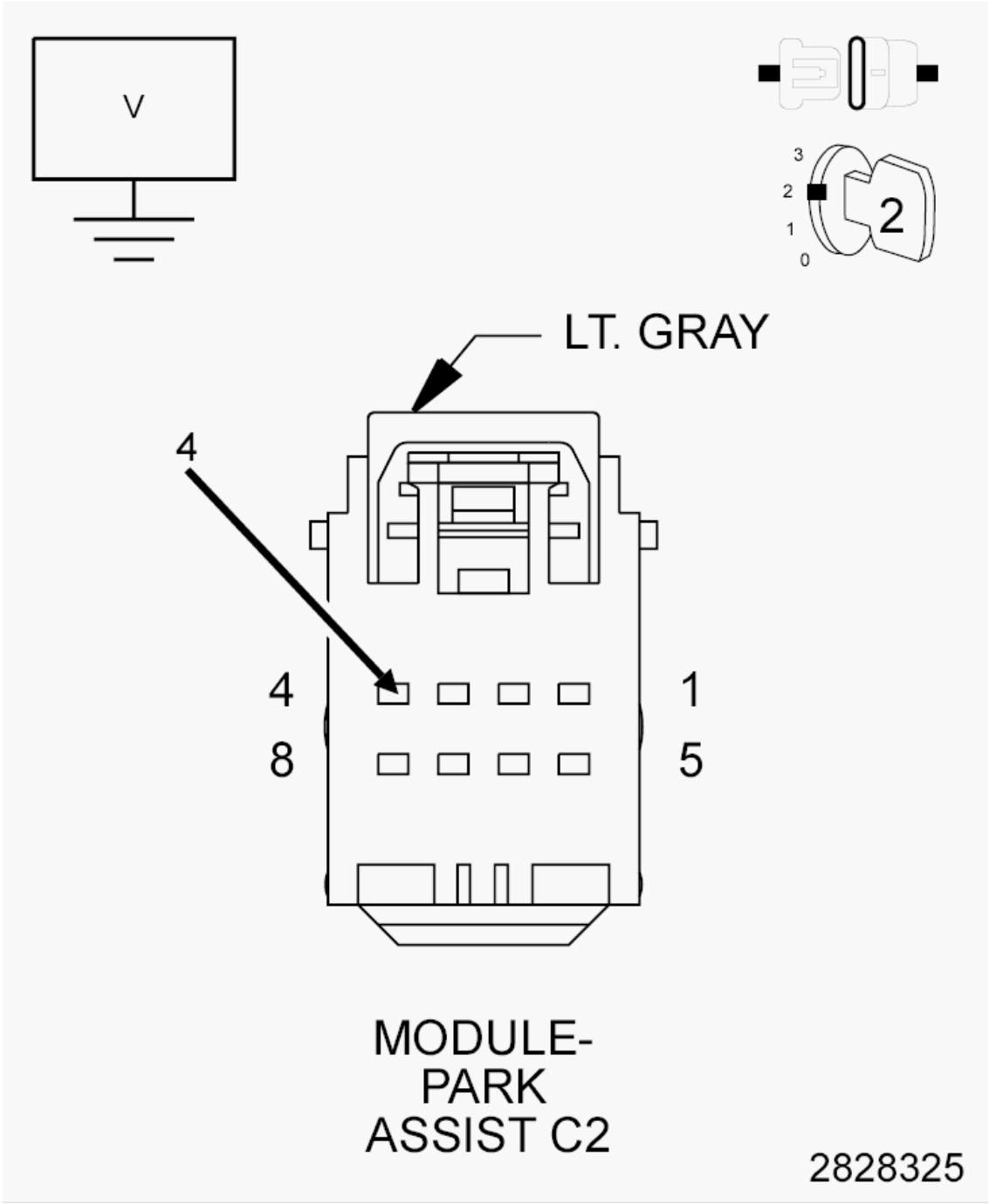


Fig. 174: Checking Park Assist Sensor Supply Circuit For A Short To Voltage
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the Park Assist Module C2 harness connector.
3. Turn the ignition on.
4. Measure the voltage on the (X700) Park Assist Sensor Supply circuit.

Is the voltage above 9.2 volts?

Yes

- Repair the (X700) Park Assist Sensor Supply circuit for a short to voltage.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B21DD-16-SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

Vehicle System voltage less than 6.5 volts.

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 2.

    No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

   NOTE: Troubleshoot any PCM charging/cranking DTCs before proceeding.

   NOTE: Make sure the battery is fully charged.

   Are any charging system DTCs present?

   Yes

   - Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B21DD-17-SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Vehicle in reverse and during the self-test while vehicle is in drive between 18 km/h (11 mph) and 40 km/h (25 mph).

SET CONDITION:

Vehicle System voltage greater than 16.0 volts.

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

       Does the scan tool display this DTC as active?

       Yes

       - Go To 2.

       No

       - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

   NOTE: Troubleshoot any PCM charging/cranking DTCs before proceeding.

   NOTE: Make sure the battery is fully charged.

   Are any charging system DTCs present?

   Yes

   - Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B222A-00-VEHICLE LINE MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

With the ignition on.

SET CONDITION:

If the Vehicle Line data transmitted on the CAN C Interior bus doesn't correspond with the data stored in the Park Assist Module.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK VEHICLE LINE IN THE BCM**
    1. With the scan tool, compare the vehicle line that is programmed in to the BCM to the vehicle line of the vehicle.

       Does the vehicle line programmed into the BCM match the vehicle?

       Yes

       - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

       No

       - Use the scan tool to read DTCs in all other modules. If any communication DTCs are present, perform the appropriate diagnostic procedure. Perform any Technical Service Bulletins that apply. If no problems are found, test is complete.
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

B2232-00-(PTS) PARKTRONICS INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

WHEN MONITORED:

With the ignition on.

SET CONDITION:

The Park Assist Module detects an internal failure.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **REPLACE THE PARK ASSIST MODULE**

   View Repair

   Repair

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

U0001-00-CAN C BUS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

Battery voltage between 10 and 16 volts.

SET CONDITION:

The controller detects an open, short to ground or a short to voltage on the CAN C Bus circuit.

POSSIBLE CAUSES

Possible Causes
CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE (BCM) POWER AND GROUND
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

NOTE: **Make sure the battery voltage is between 10 and 16 volts before proceeding.**

1. Turn the ignition on.
2. With the scan tool, read the active DTCs.

   Does the scan tool display: U0001-00-CAN C BUS?

   Yes

   NOTE: **For the DTC U0001-00 Can C Bus, use the U0002-00 Can C Bus Off Performance diagnostic procedure.**

   -
   - **Refer to U0002-00-CAN C BUS OFF PERFORMANCE** and perform the U0002-CAN C Bus Off Performance diagnostic procedure.

   No

   - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0100-00-LOST COMMUNICATION WITH PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

The battery voltage between 10 and 16 Volts.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Powertrain Control Module (PCM) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
POWERTRAIN CONTROL MODULES POWER AND GROUND

BCM NOT CONFIGURED CORRECTLY
POWERTRAIN CONTROL MODULE (PCM)
ANY MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the battery is fully charged before proceeding.

   1. Turn the ignition on.
   2. Using the scan tool, read the active DTCs.

      Does the scan tool display: U0100-00-LOST COMMUNICATION WITH PCM?

      Yes

      - **Refer to U0100-00-LOST COMMUNICATION WITH ECM/PCM** and perform the U0100-Lost Communication with PCM diagnostic procedure.

      No

      - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0121-00-LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

The battery voltage between 10 and 16 volts.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Anti-lock Brake System (ABS) Module for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes

CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
ANTI LOCK BRAKE MODULE (ABS) POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
ANTI LOCK BRAKE MODULE (ABS)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: Make sure the battery is fully charged before proceeding.

   1. Turn the ignition on.
   2. With the scan tool, read the active DTCs.

      Does the scan tool display: U0121-00-LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE?

      Yes

      - **Refer to U0121-00-LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE** and perform the U0121-00-Lost Communication with Anti-lock Brake System (ABS) Control Module diagnostic procedure.

      No

      - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

The battery voltage between 10.0 and 16.0 Volts.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Body Control Module (BCM) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, read the active DTCs.

       Does the scan tool display; U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE as active?

       Yes

       - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the NO RESPONSE FROM BCM (BODY CONTROL MODULE) diagnostic procedure.

       No

       - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0155-00-LOST COMMUNICATION WITH CLUSTER/CCN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Continuously when the ignition is on.

Battery voltage between 10 and 16 volts.

Body Control Module (BCM) is configured correctly.

SET CONDITION:

Bus messages not received from the Instrument Cluster (IC) for approximately two to five seconds.

POSSIBLE CAUSES

Possible Causes
CAN C BUS (+) CIRCUIT FOR A SHORT TO VOLTAGE
CAN C BUS (-) CIRCUIT FOR A SHORT TO GROUND
INSTRUMENT CLUSTER (IC) POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
INSTRUMENT CLUSTER (IC)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: Make sure the battery is fully charged before proceeding.

   1. Turn the ignition on.
   2. With the scan tool, read the active DTCs.

      Does the scan tool display: U0155-00-LOST COMMUNICATION WITH CLUSTER/CCN?

      Yes

      - **Refer to U0155-00-LOST COMMUNICATION WITH CLUSTER/CCN** and perform the U0155-Lost Communication with Cluster/CCN diagnostic procedure.

      No

      - **Refer to COMMUNICATION - DIAGNOSIS AND TESTING** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0401-00-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Park Assist Module supply voltage between 9-16 volts. Ignition in Run/Start.

SET CONDITION:

Incorrect data received from Powertrain Control Module (PCM).

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH POWERTRAIN CONTROL MODULE (PCM)

DTCS STORED OR ACTIVE IN THE PCM
ACTIVE COMMUNICATION DTCS IN THE BCM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 2.

    No

    - The condition that caused this code to set is not present at this time. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also inspect the related connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
2. **VERIFY PCM IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the PCM is active on the bus.

    Is the PCM active on the bus?

    Yes

    - Go To 3.

    No

    - Refer to **COMMUNICATION - DIAGNOSIS AND TESTING** and perform the No Response from PCM diagnostic procedure.
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **DTCS STORED OR ACTIVE IN THE PCM**
    1. With the scan tool, read PCM DTCs.

    Are any DTCs active or stored in the PCM?

    Yes

- Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** or **3.6L - DIAGNOSTIC CODE INDEX** or **5.7L - DIAGNOSTIC CODE INDEX** or **6.4L - DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

No

- Go To 4.

4. **ACTIVE COMMUNICATION DTCS IN THE BCM**
    1. With the scan tool, select ECU View and select BCM.
    2. With the scan tool, read active DTCs.

    Are any Communication DTCs active in the BCM?

    Yes

    - Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

    No

    - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

U0418-00-IMPLAUSIBLE DATA RECEIVED FROM BRAKE SYSTEM CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Park Assist Module supply voltage between 9-16 volts. Ignition in Run/Start.

SET CONDITION:

Incorrect data received from Antilock Brake Module (ABS).

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH ANTILOCK BRAKE MODULE (ABS)
DTCS STORED OR ACTIVE IN THE ANTILOCK BRAKE MODULE (ABS)
ACTIVE COMMUNICATION DTCS IN THE BCM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

       Does the scan tool display this DTC as active?

       Yes

       - Go To 2.

       No

       - The condition that caused this code to set is not present at this time. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also inspect the related connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
2. **VERIFY ABS IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the ABS is active on the bus.

       Is the ABS active on the bus?

       Yes

       - Go To 3.

       No

       - Refer to **COMMUNICATION - DIAGNOSIS AND TESTING** and perform the No Response from ABS diagnostic procedure.
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **DTCS STORED OR ACTIVE IN THE ANTILOCK BRAKE MODULE (ABS)**
    1. With the scan tool, read ABS DTCs.

       Are any DTCs active or stored in the ABS?

       Yes

       - Refer to **ABS - DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

       No

- Go To 4.

4. **ACTIVE COMMUNICATION DTCS IN THE BCM**
    1. With the scan tool, select ECU View and select BCM.
    2. With the scan tool, read active DTCs.

       Are any Communication DTCs active in the BCM?

       Yes

       - Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

       No

       - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

U0422-00-IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Park Assist Module supply voltage between 9-16 volts. Ignition in Run/Start.

SET CONDITION:

Incorrect data received from the Body Control Module (BCM).

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH THE BODY CONTROL MODULE (BCM)
DTCS STORED OR ACTIVE IN THE BCM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

       Does the scan tool display this DTC as active?

Yes

- Go To 2.

No

- The condition that caused this code to set is not present at this time. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also inspect the related connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

2. **VERIFY THE BCM IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the BCM is active on the bus.

    Is the BCM active on the bus?

    Yes

    - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

    No

    - Refer to **COMMUNICATION - DIAGNOSIS AND TESTING** and perform the No Response from BCM diagnostic procedure.
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

U0423-00-IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED:

Park Assist Module supply voltage between 9-16 volts. Ignition in Run/Start.

SET CONDITION:

Incorrect ignition status received from the Cluster

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH CLUSTER

DTCS STORED OR ACTIVE IN THE CLUSTER
ACTIVE COMMUNICATION DTCS IN THE BODY CONTROL MODULE (BCM)
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DIAGNOSTIC TROUBLE CODE (DTC)**
    1. Turn the ignition on.
    2. With the scan tool, read Park Assist Module DTCs.

    Does the scan tool display this DTC as active?

    Yes

    - Go To 2.

    No

    - The condition that caused this code to set is not present at this time. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also inspect the related connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
2. **VERIFY CLUSTER IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the Cluster is active on the bus.

    Is the Cluster active on the bus?

    Yes

    - Go To 3.

    No

    - Refer to **COMMUNICATION - DIAGNOSIS AND TESTING** and perform the No Response from Cluster/CCN diagnostic procedure.
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .
3. **DTCS STORED OR ACTIVE IN THE CLUSTER**
    1. Check for active DTCs in the Cluster.

    Are any DTCs active or stored in the Cluster?

    Yes

- Refer to **CCN - DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

No

- Go To 4.

4. **ACTIVE COMMUNICATION DTCS IN THE BCM**
    1. With the scan tool, select ECU View and select BCM.
    2. With the scan tool, read active DTCs.

    Are any Communication DTCs active in the BCM?

    Yes

    - Refer to **BCM, DTC'S B10B3 - B1ED2-11 - DIAGNOSIS AND TESTING** or **BCM, DTC'S B1ED2-2A - U1433 - DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

    No

    - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

ELECTRICAL

Power Distribution - Chrysler 300

DESCRIPTION

DESCRIPTION

The power distribution system for this vehicle consists of the following components:

- Front Power Distribution Center (PDC) - located in the engine compartment
- Rear Power Distribution Center (PDC) - located in trunk
- Power Outlets

Refer to Wiring Diagrams for complete circuit schematics.

The power distribution system also incorporates various types of circuit control and protection features, including:

- Automatic resetting circuit breakers
- Blade-type fuses
- Cartridge fuses
- Relays
- Mini fuses

CENTER, POWER DISTRIBUTION (PDC)

DESCRIPTION

DESCRIPTION

The majority of electrical system fuses and relays are housed in the two Power Distribution Centers (PDC). One is located in the engine compartment, the Front Power Distribution Centers (PDC). The PDC is located next to the battery in the rear of the vehicle. Both of the PDC are replaced only as part of the body wiring harness.

For fuse description and layout. Refer to **FUSE LOCATIONS AND TYPES, SPECIFICATIONS** .

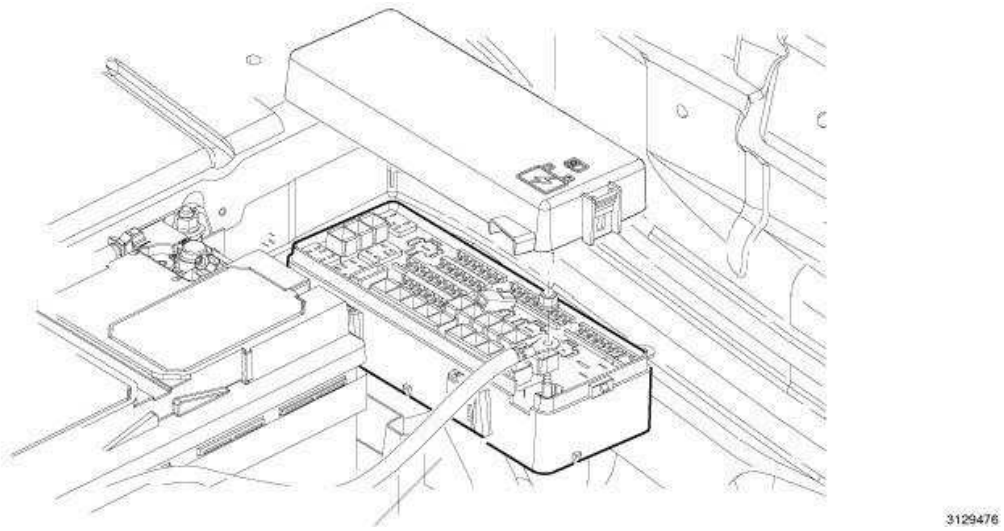


Fig. 1: Identifying Rear PDC
Courtesy of CHRYSLER GROUP, LLC

Rear PDC located in the truck next to the battery.

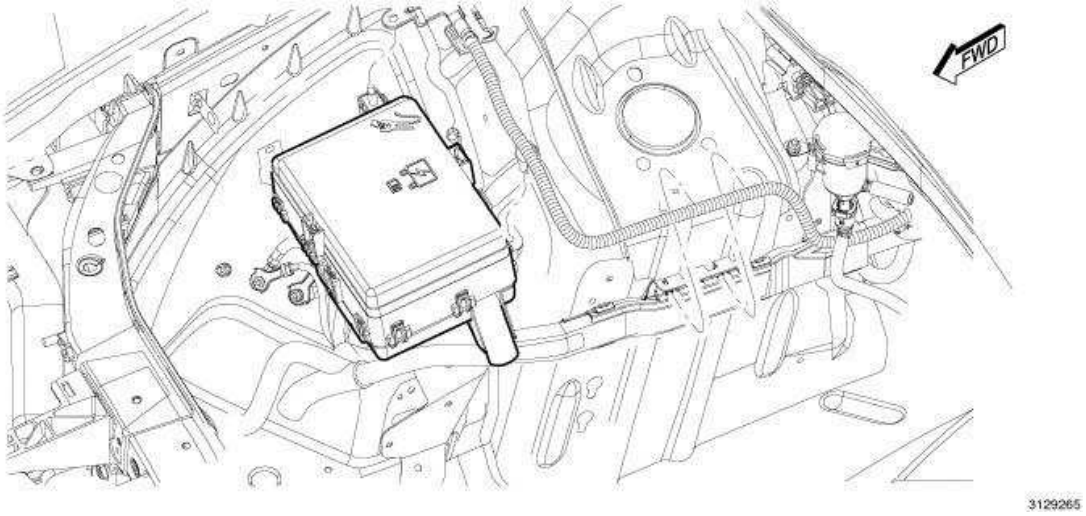


Fig. 2: Identifying Front PDC
Courtesy of CHRYSLER GROUP, LLC

Front PDC located in the engine compartment on the passenger side fender.

OUTLET, POWER, 12 V

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.

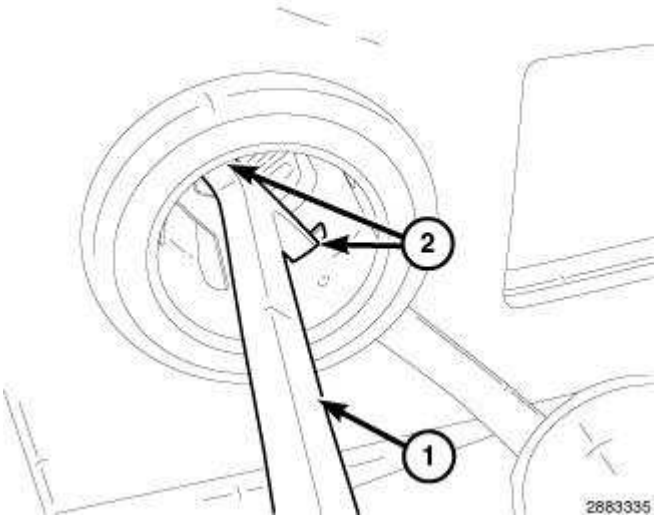


Fig. 3: Inserting Power Outlet Remover
Courtesy of CHRYSLER GROUP, LLC

2. Look inside and note position of the retaining bosses (2).
3. Insert Remover, Power Outlet (special tool #10246, Remover, Power Outlet) (1) into the retaining bosses (2) of the power outlet.
4. Pull out the base through the mounting ring by gently rocking the tool.

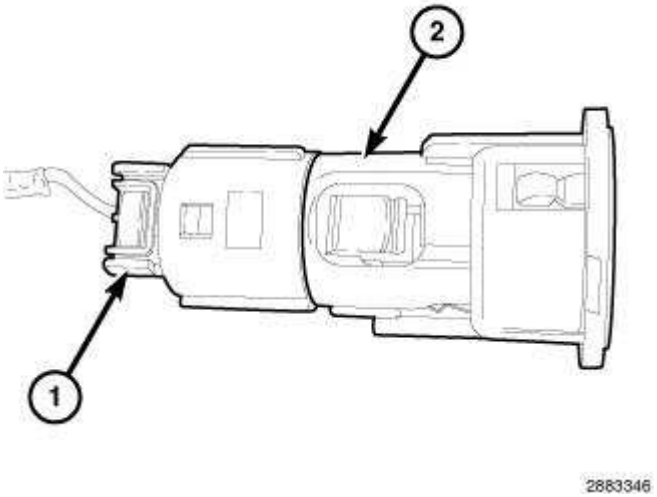


Fig. 4: Power Outlet & Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the harness (1) from the power outlet (2).
6. Set the base aside and remove the base mount ring.

INSTALLATION

INSTALLATION

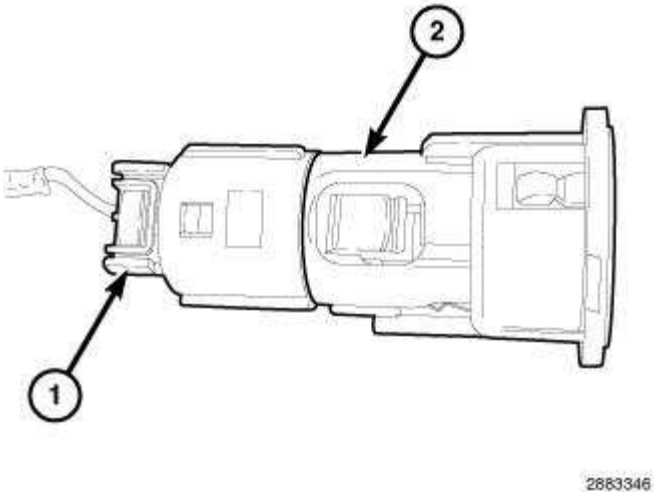


Fig. 5: Power Outlet & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Connect the wire connector (1) to the power outlet receptacle (2).
2. Install the power outlet mount into the panel.
3. Align the splines on the outside of the power outlet receptacle base connector receptacle with the grooves on the inside of the mount.
4. Press firmly on the power outlet receptacle base until the retaining bosses of the mount are fully engaged in their receptacles.
5. Connect the battery negative cable.

ACCESSORIES AND EQUIPMENT

Power Locks - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

A power operated door and liftgate lock system is standard factory-installed equipment on this vehicle. The power lock system allows all of the doors and the liftgate to be locked or unlocked electrically. Locking or unlocking the vehicle using the power lock system can be accomplished by up to three different methods:

- **Power Lock System** - Operating a power lock system switch on either front door inside trim panel will lock or unlock the latches of all four doors. Operating a trunk release switch on the instrument panel will unlatch the deck lid.
- **Remote Keyless Entry System** - Depressing the **Lock** or **Unlock** button of the standard equipment Remote Keyless Entry (RKE) system transmitter (also known as the FOB with Integrated Key/FOBIK) can also be used to lock or unlock the latches of the doors. Depressing the **Trunk Release** button of the RKE transmitter will unlatch the deck lid. The specific locks operated and the number of FOBIK button presses required varies depending upon the Customer Programmable settings chosen by the vehicle operator.
- **Passive Entry System** - Contacting the capacitive **Unlock** switch on the inside of either exterior front door Smart handle pull or depressing the tactile **Lock** button of either front door Smart handle while a valid FOBIK is identified in that same zone can be used to lock or unlock the doors. Also depressing the tactile **Unlock** button on the lens of the deck lid Center High Mounted Stop Lamp (CHMSL) while a valid FOBIK is identified in that same zone can be used to unlatch the deck lid. The specific locks operated varies depending upon the Customer Programmable settings chosen by the vehicle operator.

Additional details of each of these subsystems and their components can be found in the subheadings and paragraphs that follow.

POWER LOCK SYSTEM

The power lock system includes the following major components, which are described in further detail elsewhere in this service information:

- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located beneath the instrument panel on the passenger side of the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Deck Lid Release Switch** - A switch on the instrument panel to the left of the steering column will unlatch the deck lid only when the automatic transmission gear selector is in the PARK position, or when the manual transmission vehicle speed is below 8 kilometers-per-hour (5 miles-per-hour).
- **Door Modules** - The Driver Door Module (DDM) and Passenger Door Module (PDM) are

located on their respective driver and passenger front door hardware module carriers and are concealed behind the front door inside trim panels. Refer to **MODULE, DOOR, DESCRIPTION** .

- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) includes the EVIC switches and the U-Connect Touch™ screen module in the Integrated Center Stack (ICS) located in the center stack area of the instrument panel. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .
- **Power Lock Motors** - A reversible electric power lock motor is integral to the latch of each front and rear door and the deck lid.
- **Power Lock Switches** - A power lock switch is integral to the switch module located on the forward end of the arm rest of each front door inside trim panel.

These components and their controls are combined to provide the following power lock system central locking and unlocking features:

- **Automatic Door Locking** - Automatic door locking (also known as rolling door locks) automatically locks any unlocked door when the vehicle speed exceeds about 25.7 kilometers per hour (15 miles per hour). This is a Customer Programmable feature.
- **Automatic Door Unlocking** - Automatic door unlocking (also known as automatic unlock doors on exit) automatically unlocks the doors after they were automatically locked when the vehicle speed exceeded about 25.7 kilometers per hour (15 miles per hour), the vehicle speed has returned to zero, the transmission shift lever is in the **Neutral** or **Park** positions and the driver side front door is opened. This is a Customer Programmable feature.
- **Customer Programmable Features** - The vehicle operator interfaces with the BCM, which is the power lock system controller, using the EVIC. EVIC switches allow the vehicle operator to set or change the power lock system Customer Programmable Features through the U-Connect Touch™ screen module EVIC display.
- **Door Lock Inhibit** - Prevents locking the doors using a power door lock switch or the **Lock** button of the Remote Keyless Entry (RKE) system transmitter (also known as the FOB with Integrated Key/FOBIK) if the key is in the ignition and the driver side front door is open.
- **Enhanced Accident Response System** - In the event of a vehicle impact that causes airbag deployment but leaves vehicle electrical power intact, the Enhanced Accident Response System (EARS) automatically turns OFF the supply of fuel to the engine, turns ON the interior courtesy lamps, turns ON the hazard warning flashers and unlocks the doors after the vehicle speed has returned to zero. This helps emergency responders in their efforts to render the appropriate assistance. The courtesy lamps and hazard flashers remain ON as long as the battery has power or until the key is removed from the ignition.
- **Illuminated Entry** - Automatic illumination of the interior courtesy lamps when the vehicle is unlocked using the power lock system.

Hard wired circuitry connects the power lock system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the power lock system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information

includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

REMOTE KEYLESS ENTRY SYSTEM

The Remote Keyless Entry (RKE) system is standard factory-installed equipment on this vehicle. The RKE system includes the following major components, which are described in further detail elsewhere in this service information:

- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) is a digital display integral to the Integrated Center Stack (ICS). The EVIC includes the EVIC switches and the U-Connect Touch™ screen module located in the center stack area of the instrument panel. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .
- **Radio Frequency Hub** - The Radio Frequency Hub (also known as the RF Hub) is the RKE system control module and RF receiver located on the shelf support behind the rear seat and is concealed beneath the package tray interior trim. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .
- **Remote Keyless Entry System Transmitter** - The RKE system transmitter (also known as the FOB with Integrated Key/FOBIK) is the battery powered, wireless and portable Radio Frequency (RF) user controller for all of the features of the RKE system.

These components and their controls are combined to provide the following RKE system features:

- **Customer Programmable Features** - The vehicle operator interfaces with the RF Hub, which is the RKE system controller, using the EVIC. EVIC switches allow the vehicle operator to set or change the RKE system Customer Programmable Features through the U-Connect Touch™ screen module EVIC display.
- **Flash Lights With Lock And Unlock?** - This is a Customer Programmable feature of the RKE system. The first option has the park lamps flash as an optical verification that the RKE system has received a valid **Lock** or **Unlock** request from the FOBIK. The second option disables the optical verification feature.
- **Panic Feature** - In certain markets the FOBIK may also be equipped with a red **Panic** button. Depressing the **Panic** button of the FOBIK while within transmitter range will sound the vehicle signal horn and flash the exterior lighting of the vehicle for about three minutes or until the **Panic** button is depressed a second time, whichever occurs first. Attaining a vehicle speed of about 25.7 kilometers per hour (15 miles per hour) will also cancel the panic event.
- **Programming Additional Transmitters** - Two RKE transmitters are shipped with the vehicle from the factory, but the RKE system can retain the vehicle access codes of up to a total of eight transmitters. The transmitter codes are retained in the RKE system controller memory, even if the battery is disconnected. If a FOBIK is ineffective, lost or an additional FOBIK is desired, new transmitter vehicle access codes can be programmed into the system using a diagnostic scan tool.
- **Remote Deck Lid Unlatching** - Depressing the **Trunk Release** button of the FOBIK twice within 5 seconds while within transmitter range will unlatch the deck lid of the vehicle.

- **Remote Engine Start** - On vehicles equipped with the optional Remote Starting System, depressing the **Remote Start** button of the FOBIK twice while within transmitter range will start the engine of the vehicle.
- **Remote Locking** - Depressing the **Lock** button of the FOBIK while within transmitter range will lock all of the vehicle doors.
- **Remote Unlocking** - Depressing the **Unlock** button of the FOBIK while within transmitter range will unlock the vehicle and activate the Illuminated Entry System. The specific locks operated and the number of FOBIK button presses required varies depending upon the Customer Programmable settings chosen by the vehicle operator.
- **Remote Unlock Sequence** - This is a Customer Programmable feature of the RKE system. There are two options available. The first option allows only the driver side front door to unlock when the FOBIK **Unlock** button is depressed one time, and the remaining doors unlock when the button is depressed a second time within 5 seconds of the first press. The second option allows all doors to unlock upon a single press of the FOBIK **Unlock** button.
- **Sound Horn On Lock?** - This is a Customer Programmable feature of the RKE system. There are two options available. The first option has the signal horn of the vehicle sound a short chirp as an audible verification that the RKE system received a valid **Lock** request from the FOBIK. The second option disables the audible verification feature.
- **Vehicle Theft Security System Arming** - If the vehicle is equipped with the optional Vehicle Theft Security System (VTSS), depressing the **Lock** button of the FOBIK while within transmitter range will arm the VTSS in addition to activating the remote locking feature.
- **Vehicle Theft Security System Disarming** - If the vehicle is equipped with the optional Vehicle Theft Security System (VTSS), depressing the **Unlock** button of the FOBIK while within transmitter range will disarm the VTSS in addition to activating the remote unlocking feature.

Hard wired circuitry connects many of the RKE system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the RKE system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

PASSIVE ENTRY SYSTEM

An optional Passive Entry (PE) system is available factory-installed equipment for this vehicle. The PE system allows the vehicle to be unlocked without the use of a key, as long as an authorized FOB with Integrated Key (FOBIK) is in the possession of, or in close proximity to the individual and the aperture of the vehicle that is to be unlocked. All other features and Customer Programmable feature settings of the power lock system and the Remote Keyless Entry (RKE) system function the same as they would on vehicles without the PE system option.

The PE system includes the following major components, which are described in further detail elsewhere in this service information:

- **Deck Lid Latch Release Switch** - A tactile deck lid latch release switch is located on the right side of the lens of the Center High Mounted Stop Lamp (CHMSL) in the center of the vertical rear deck lid surface. Only the resilient black switch push button membrane is visible on the outside of the CHMSL lens.
- **Door Handle Switches** - Each PE door outside handle (also known as a Smart handle) is equipped with three switches and an Integrated Circuit (IC). A tactile Lock switch is located on the outer horizontal surface of each door handle pull, a capacitive Unlock switch membrane is located on the inner vertical surface of the handle pull, while a Hall effect switch and an IC are concealed within the handle pull unit.
- **Low Frequency Antennas** - The PE system includes five Low Frequency (LF) antennas, one mounted on the underside of the center floor console, one on each rear door hardware module carrier concealed behind the inside trim panel, one at the forward edge of the spare tire well within the trunk compartment and one on the rear fascia bracket above the license plate tub and to the right of the license plate lamp concealed behind the rear fascia at the rear of the vehicle.
- **Radio Frequency Hub** - The Radio Frequency Hub (also known as the RF Hub) is the Passive Entry Keyless Go (PEKG) system control module and RF receiver located on the shelf support behind the rear seat and is concealed beneath the package tray interior trim. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

Hard wired circuitry connects many of the PE system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the PE system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

POWER LOCK SYSTEM

The power lock system uses non-switched battery current received through a fused B(+) fuse in the Body Control Module (BCM) (also known as the Common Body Controller/CBC) so that the system remains operational regardless of the ignition switch position. The BCM is the primary power lock system controller. The power lock switches are hard wired to their respective Driver Door Module (DDM) or Passenger Door Module (PDM). The BCM, the DDM and the PDM all communicate with each other and with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

When a door module receives an input from a power lock switch, it sends the appropriate electronic **Lock Request** or **Unlock Request** message to the BCM over the CAN data bus. The BCM responds to these request messages by providing the appropriate outputs to each of the power lock motors to

lock or unlock each of the door latches. The BCM also monitors a hard wired input from the deck lid release switch and electronic message inputs indicating automatic transmission gear selector position and vehicle speed. The BCM uses all of these inputs and internal programming to determine whether or not to provide the output necessary to operate the deck lid latch release motor.

The BCM also stores the power lock system Customer Programmable feature settings received over the CAN data bus from the Electronic Vehicle Information Center (EVIC). The BCM uses these settings and internal programming along with hard wired and electronic message inputs to determine the proper outputs needed to produce each of the appropriate power lock system features.

The power lock system circuits are continually monitored and controlled by the microprocessor and software contained within the BCM, the DDM and the PDM. When one of these modules monitors a problem in any of the power lock system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit. The hard wired circuits between components related to the power lock system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the power lock system or the electronic controls or communication between other modules and devices that provide features of the power lock system. The most reliable, efficient, and accurate means to diagnose the power lock system or the electronic controls and communication related to power lock system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOTE KEYLESS ENTRY SYSTEM

The Remote Keyless Entry (RKE) system uses non-switched battery current received through a fused B(+) fuse in the Body Control Module (BCM) (also known as the Common Body Controller/CBC) so that the system remains operational regardless of the ignition switch position. The Radio Frequency Hub (also known as the RF Hub) is the primary RKE system controller as well as the Radio Frequency (RF) RKE receiver. The RF Hub validates the vehicle access code of each RKE transmitter (also known as FOB with Integrated Key/FOBIK) from which it receives RF signal inputs. It ignores requests from any transmitter for which it has no stored vehicle access code.

The RF Hub communicates and shares resources with the BCM and many other electronic modules in the vehicle over the CAN data bus. The RF Hub also stores the RKE system Customer Programmable feature settings received over the CAN data bus from the Electronic Vehicle Information Center (EVIC). When the RF Hub receives an input from a valid transmitter source, it uses these settings and internal programming to send the appropriate electronic request messages to the BCM and other electronic modules over the CAN data bus to invoke the proper RKE system features and responses.

The RKE system circuits and transmitter inputs are continually monitored by the microprocessor and software contained within the RF Hub. When the RF Hub monitors a problem in any of the RKE system circuits or transmitters, it stores a Diagnostic Trouble Code (DTC) in its memory circuit. The hard wired circuits between components related to the RKE system may be diagnosed using

conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RKE system or the electronic controls or communication between other modules and devices that provide features of the RKE system. The most reliable, efficient, and accurate means to diagnose the RKE system or the electronic controls and communication related to RKE system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PASSIVE ENTRY SYSTEM

In the Passive Entry (PE) system the doors are unlocked passively; however, they must still be locked actively after exiting the vehicle using the tactile **Lock** button on either front door handle. When the system senses a hand approaching the capacitive switch in the door handle pull or detects a button press of the deck lid release switch, it sends out challenge messages through the Low Frequency (LF) antennas to authenticate the presence and location of a valid FOB with Integrated Key (FOBIK).

The FOBIK responds by sending a Very High Frequency (VHF) message back to the receiver within the Radio Frequency Hub (also known as the RF Hub). If the RF Hub determines the FOBIK is valid and that it is located outside the vehicle in the same zone or vicinity as the door handle or deck lid switch being activated, it sends an electronic **Unlock Request** message over the Controller Area Network (CAN) data bus to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) to automatically unlock and allow entry to that aperture.

The PE system circuits and FOBIK inputs are continually monitored by the microprocessor and software contained within the RF Hub. When the RF Hub monitors a problem in any of the PE system circuits or FOBIK inputs, it stores a Diagnostic Trouble Code (DTC) in its memory circuit. The hard wired circuits between components related to the PE system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PE system or the electronic controls or communication between other modules and devices that provide features of the PE system. The most reliable, efficient, and accurate means to diagnose the PE system or the electronic controls and communication related to PE system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER LOCKS AND REMOTE KEYLESS ENTRY SYSTEM

POWER LOCK SYSTEM

Following are tests that may help to diagnose the hard wired components and circuits of the power lock system. However, these tests may not prove conclusive in the diagnosis of this system. In order to obtain conclusive testing of the power lock system, the Controller Area Network (CAN) data bus and all of the electronic modules that provide inputs to, or receive outputs from the power lock system components must also be tested.

The most reliable, efficient, and accurate means to diagnose the power lock system requires the use of a diagnostic scan tool and the appropriate diagnostic information. The diagnostic scan tool can provide confirmation that the CAN data bus is functional, that all of the proper electronic modules are sending and receiving the proper electronic messages over the CAN data bus, and that the power lock motors are receiving the proper hard wired outputs from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) for them to perform their power lock system functions.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

PRELIMINARY DIAGNOSIS

As a preliminary diagnosis for the power lock system, note the system operation while you actuate both the Lock and Unlock functions with the power lock switches and with the Remote Keyless Entry (RKE) transmitter (also known as the FOB with Integrated Key/FOBIK). Then, proceed as follows:

1. If the entire power lock system fails to function with either the power lock switches or the FOBIK, check the fused B(+) fuse for the power lock system.
2. If the power lock system functions with both power lock switches, but not with the FOBIK, proceed to **RKE TRANSMITTER** .
3. If the power lock system functions with the FOBIK, but not with one or both power lock switches, proceed to **DIAGNOSIS AND TESTING** of the door lock switches.
4. If only one power lock motor fails to operate with both power lock switches and the RKE transmitter, proceed to **DIAGNOSIS AND TESTING - POWER LOCK MOTOR** .

REMOTE KEYLESS ENTRY SYSTEM

Following are tests that may help to diagnose the Remote Keyless Entry (RKE) system. However, these tests may not prove conclusive in the diagnosis of this system. In order to obtain conclusive testing of the RKE system, the Controller Area Network (CAN) data bus network and all of the electronic modules that provide inputs to, or receive outputs from the RKE system components must also be tested.

The most reliable, efficient, and accurate means to diagnose the RKE system requires the use of a diagnostic scan tool and the appropriate diagnostic information. The diagnostic scan tool can provide confirmation that the CAN data bus is functional, that all of the proper electronic modules are sending and receiving the proper electronic messages over the CAN data bus, and that the Radio Frequency Hub (also known as the RF Hub) is being sent the proper Radio Frequency (RF) signals by the RKE

transmitters (also known as FOB with Integrated Key/FOBIK) to perform its RKE system functions.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

PRELIMINARY DIAGNOSIS

As a preliminary diagnosis for the RKE system, first confirm that the power lock system operates satisfactorily. If the power lock system fails to operate correctly, repair that problem before attempting to diagnose the RKE system. If the problem being diagnosed involves only one or more Customer Programmable features, check using the Electronic Vehicle Information Center (EVIC) or with a diagnostic scan tool to be certain that these programmable features are enabled. If the features are enabled and still fail to operate, the RF Hub and the CAN data bus must be tested. Next, note the RKE system operation while you perform both the Lock and Unlock functions with the FOBIK. Then, proceed as follows:

1. If the power lock system functions with both power lock switches, but not with the FOBIK, proceed to **DIAGNOSIS AND TESTING** .
2. If the FOBIK checks okay, proceed to **DIAGNOSIS AND TESTING** of the RF Hub or the CAN data bus. The use of a diagnostic scan tool and the appropriate diagnostic information are required.

PASSIVE ENTRY SYSTEM

As a preliminary diagnosis for the Passive Entry (PE) system, first check using the Electronic Vehicle Information Center (EVIC) or with a diagnostic scan tool to be certain that this Customer Programmable feature is enabled. Next, confirm that the power lock system and the RKE system operate satisfactorily. If the power lock system or the RKE system fails to operate correctly, repair that problem before attempting to diagnose the PE system.

The most reliable, efficient, and accurate means to diagnose the PE system requires the use of a diagnostic scan tool and the appropriate diagnostic information. The diagnostic scan tool can provide confirmation that the CAN data bus is functional, that all of the proper electronic modules are sending and receiving the proper electronic messages over the CAN data bus, and that the Radio Frequency Hub (also known as the RF Hub) is sending the proper Radio Frequency (RF) signals to and receiving the proper RF signals from the RKE transmitters (also known as FOB with Integrated Key/FOBIK) to perform its PE system functions.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

ACTUATOR, FUEL DOOR

DESCRIPTION

DESCRIPTION

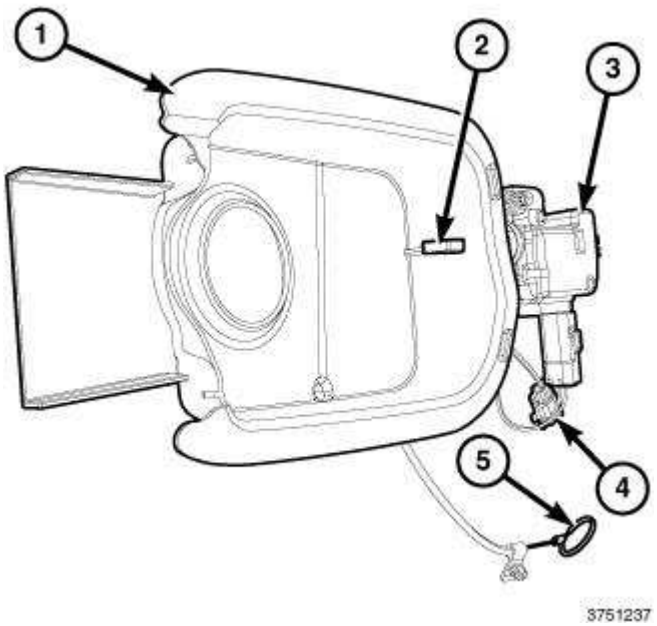


Fig. 1: Fuel Filler Housing, Latch, Electrical Solenoid & Wire Harness
Courtesy of CHRYSLER GROUP, LLC

An electrically actuated fuel door release mechanism is standard equipment in this vehicle. A striker on the fuel door is engaged by a latch (2) and actuator mechanism integral to the fuel filler housing (1) located behind the fuel door opening of the left quarter outer panel. The actuator mechanism is operated by an electrical solenoid (3) that is also integral to the fuel filler housing. A short wire harness (4) connected to the solenoid passes through a rubber grommet and a hole in the body sheet metal into the trunk compartment along with a mechanical emergency release cable (5). The solenoid is connected to the vehicle electrical system through a dedicated take out and connector of the body wire harness located on the left side of the trunk.

The fuel door release actuator mechanism cannot be adjusted or repaired. If damaged or ineffective, the entire fuel filler housing unit must be replaced. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .

OPERATION

OPERATION

The fuel filler door actuator solenoid is energized by fused battery feed received from the fuel filler door switch located within the map pocket of the driver side front door inside trim panel whenever the momentary switch button is depressed. The solenoid is connected to a path to ground at all times through a take out of the body wire harness that is secured to the body sheet metal. These connections allow the solenoid to operate regardless of the ignition switch status.

If the vehicle electrical system, the fuel filler release solenoid, the switch or the release solenoid

electrical circuits are damaged or ineffective, pulling the mechanical emergency release cable located on the left side within the trunk compartment will manually release the fuel filler door.

ANTENNA, PASSIVE ENTRY

DESCRIPTION

DESCRIPTION

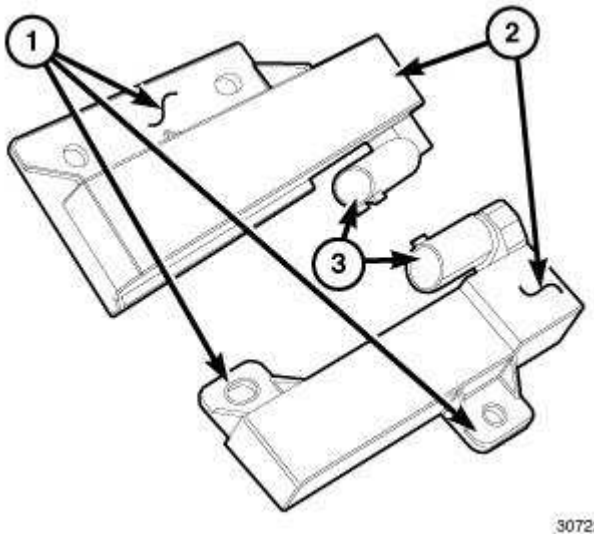


Fig. 2: Integral Connector Receptacle, Ferrite Antenna Units & Flanges
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the Passive Entry (PE) and Keyless Go (KG) systems have several Low Frequency (LF), ferrite antenna units (2) located within the vehicle. Each ferrite PE antenna unit is contained within a molded black plastic housing with an integral connector receptacle (3) molded into one end. The connector receptacle contains terminal pins that connect the antenna to the vehicle electrical system through a twisted pair of conductors and a connector that are part of the adjacent wire harness.

Each antenna housing also includes two integral mounting flange or flanges (1) which can be used to mount the unit with screws. However, in some applications the antenna mounting flanges are snapped into a spring steel adapter or retainer, which allows the antenna unit to be securely clipped in place over a body flange rather than being secured with screws. This vehicle platform uses five PE antenna units. One is secured to the underside of the center floor console, one is secured to each rear door hardware module carrier concealed behind the inside door trim panels, one is secured to the forward flange of the spare tire well within the trunk area and one is concealed behind the rear fascia to the right of the license plate lamp.

The antennas are each connected to the Radio Frequency Hub (also known as the RF Hub) on dedicated and sequentially numbered circuits. The left rear door antenna is connected through the antenna 1 circuits, the right rear door antenna is connected through the antenna 2 circuits, the trunk antenna is connected through the antenna 3 circuits, the center floor console is connected through

the antenna 4 circuits and the rear fascia bracket antenna is connected through the antenna 5 circuits.

LD LOW FREQUENCY ANTENNA AND CIRCUIT NUMBERING	
Location	**Antenna And Circuit Number**
Left Rear Door	1
Right Rear Door	2
Trunk	3
Center Floor Console	4
Rear Fascia Bracket	5

An LF antenna unit cannot be adjusted or repaired. If ineffective or damaged, it must be replaced with a new unit. For applications where it is used, the antenna unit adapter or retainer may be serviced only as a unit with the LF antenna.

OPERATION

OPERATION

The Passive Entry (PE) antenna units allow the transmitter within the Radio Frequency Hub (also known as the RF Hub) to communicate via Low Frequency (LF) radio transmission with a FOB with Integrated Key (FOBIK) that is located inside the vehicle or, at most, about 2 meters (6.5 feet) horizontally in all directions around the outside of the vehicle. The RF Hub uses communication through the antenna units to wake up and challenge a FOBIK that is within range in order to authenticate whether that FOBIK is valid (programmed) to the vehicle. The RF Hub communication with the FOBIK is on 20 kilohertz using Frequency-Shift Keying (FSK) modulation.

Each antenna unit has two dedicated connections to the RF Hub. One connection is the LF antenna output circuit, while the other connection Is the LF antenna return circuit. These circuits to each antenna unit are a twisted pair to help reduce the potential for induced electrical interference. The RF Hub microprocessor continuously monitors all of the antenna units and will store a Diagnostic Trouble Code (DTC) for any fault that it detects.

The hard wired inputs and outputs of the antenna units may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, the most reliable, efficient, and accurate means to diagnose the antenna units requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

CENTER FLOOR CONSOLE

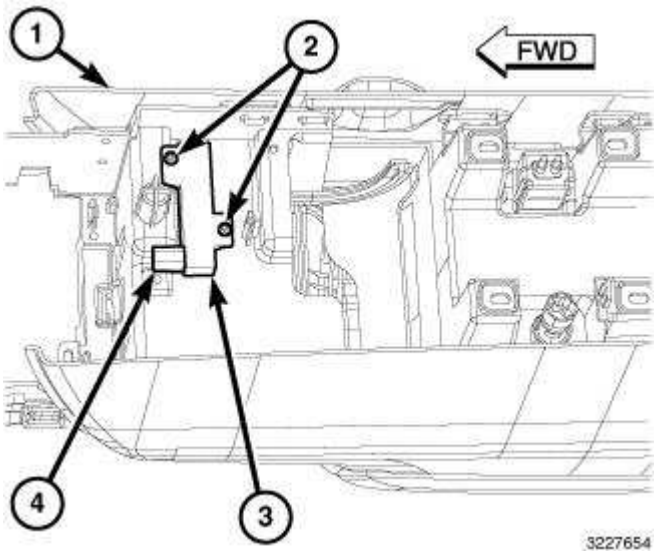


Fig. 3: Center Floor Console, Connector Receptacle & Low Frequency Antenna
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the center floor console (1) from the vehicle. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Disconnect the wire harness connector from the connector receptacle (4) for the Low Frequency (LF) antenna (3) on the underside of the console.
4. Remove the two screws (2) that secure the antenna to the underside of the console.
5. Remove the antenna from the console.

REAR DOOR

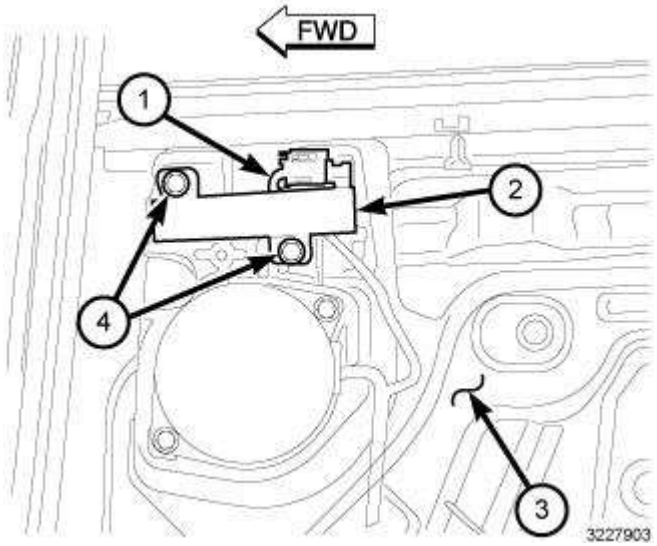


Fig. 4: Wire Harness Connector, Low Frequency (LF) Antenna, Screws & Rear Door Hardware Module Carrier
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trim panel from the inside of the rear door. Refer to **PANEL, REAR DOOR TRIM, REMOVAL** .
3. Disconnect the door wire harness connector (1) from the Low Frequency (LF) antenna (2) connector receptacle.
4. Remove the two screws (4) that secure the antenna to the inside of the rear door hardware module carrier (3).
5. Remove the antenna from the carrier.

REAR FASCIA BRACKET

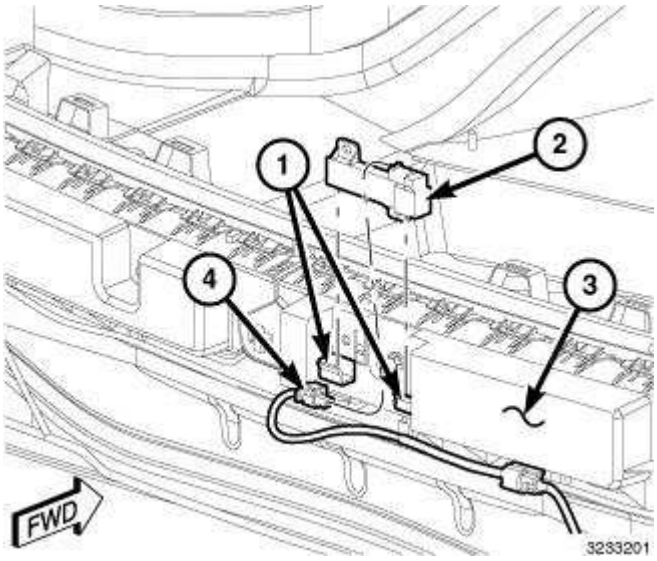


Fig. 5: Wire Harness Connector, Antenna & Rear Fascia Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the rear fascia from the vehicle. Refer to **FASCIA, REAR, REMOVAL** .
3. Disconnect the wire harness connector (4) from the connector receptacle for the Low Frequency (LF) antenna (2) located in a pocket near the center of the rear fascia bracket (3).
4. Unsnap the antenna from the retainers (1) integral to the rear fascia bracket.
5. Remove the LF antenna from the vehicle.

TRUNK

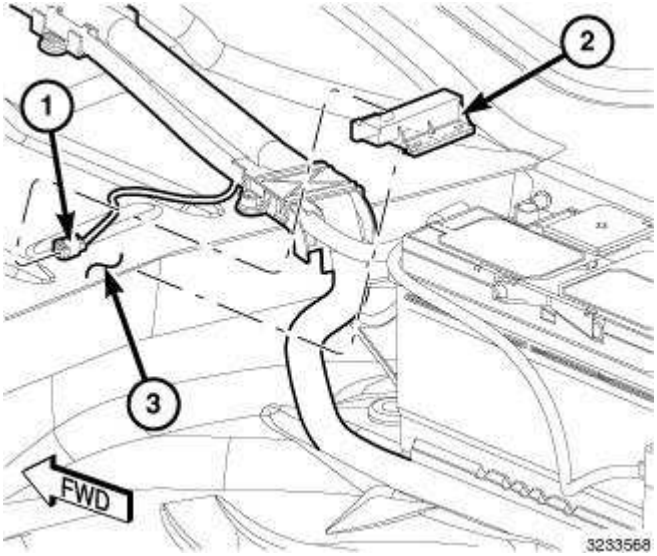


Fig. 6: Wire Harness Connector, Antenna & Trunk Floor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Fold up and move the spare tire cover and trunk carpet aside far enough to access the trunk floor (3) where it meets the forward edge of the spare tire well. Refer to **CARPET, REMOVAL** .
3. Disconnect the body wire harness connector (1) from the Low Frequency (LF) antenna (2) connector receptacle.
4. Pull the antenna and retainer unit rearward off of the flange at the front of the spare tire well.
5. Remove the antenna and retainer from the trunk as a unit.

INSTALLATION

CENTER FLOOR CONSOLE

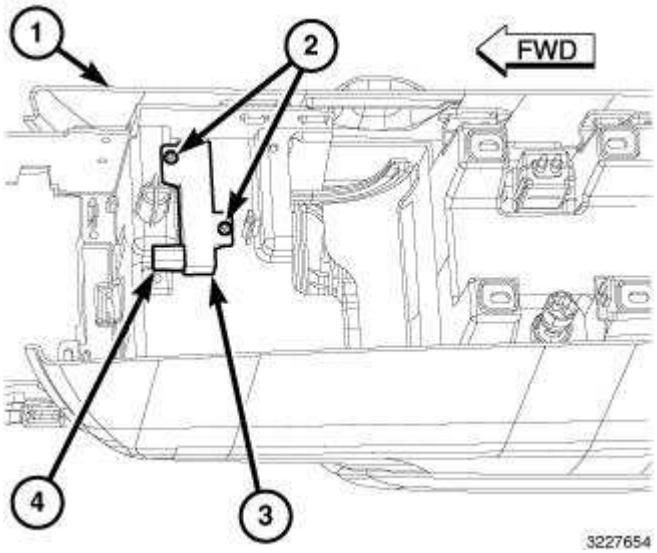


Fig. 7: Center Floor Console, Connector Receptacle & Low Frequency Antenna
Courtesy of CHRYSLER GROUP, LLC

1. Position the Low Frequency (LF) antenna (3) to the underside of the center floor console (1).
2. Install and tighten the two screws (2) that secure the antenna to the console. Tighten the screws securely.
3. Reconnect the wire harness connector to the antenna connector receptacle (4).
4. Reinstall the console into the vehicle. Refer to **CONSOLE, FLOOR, INSTALLATION** .
5. Reconnect the battery negative cable.

REAR DOOR

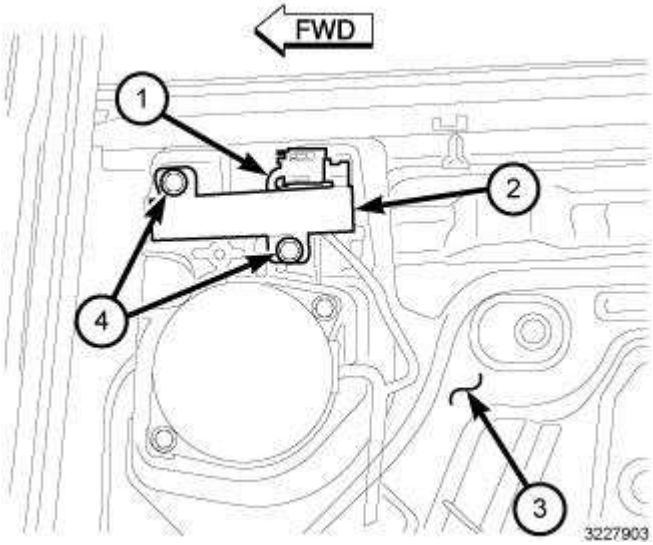


Fig. 8: Wire Harness Connector, Low Frequency (LF) Antenna, Screws & Rear Door Hardware Module Carrier
Courtesy of CHRYSLER GROUP, LLC

1. Position the Low Frequency (LF) antenna (2) to the rear door hardware module carrier (3). Be certain the door wire harness take out for the antenna is routed behind the antenna, but not pinched.
2. Install and tighten the two screws (4) that secure the antenna to the carrier. Tighten the screws securely.
3. Reconnect the door wire harness connector (1) to the antenna connector receptacle.
4. Reinstall the trim panel onto the inside of the rear door. Refer to **PANEL, REAR DOOR TRIM, INSTALLATION** .
5. Reconnect the battery negative cable.

REAR FASCIA BRACKET

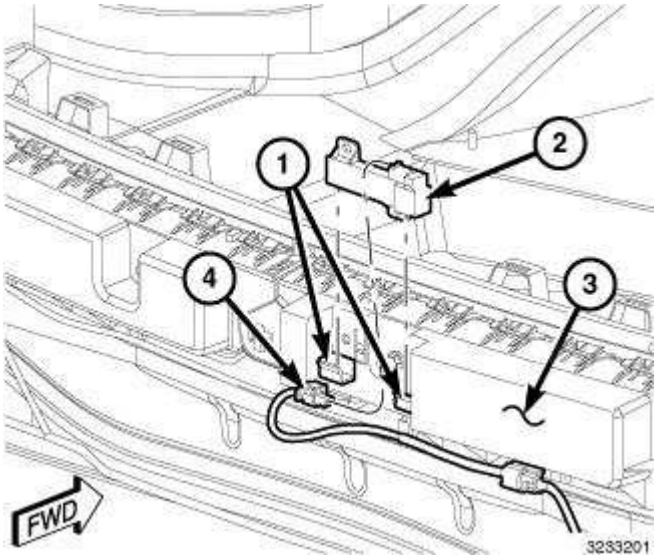


Fig. 9: Wire Harness Connector, Antenna & Rear Fascia Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Position the Low Frequency (LF) antenna (2) to the pocket near the center of the rear fascia bracket (3).
2. Reconnect the wire harness connector (4) to the connector receptacle for the antenna.
3. Align the antenna with the retainers (1) integral to the rear fascia bracket, then slide it downward until it snaps into place.
4. Reinstall the rear fascia onto the vehicle. Refer to **FASCIA, REAR, INSTALLATION** .
5. Reconnect the battery negative cable.

TRUNK

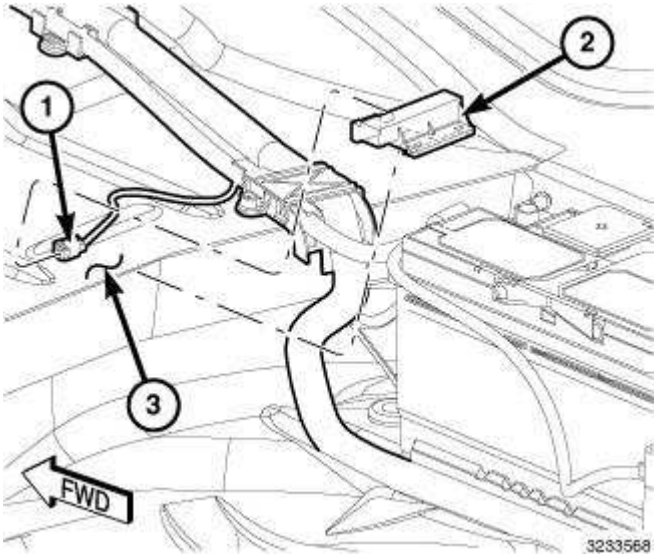


Fig. 10: Wire Harness Connector, Antenna & Trunk Floor
Courtesy of CHRYSLER GROUP, LLC

1. Position the Low Frequency (LF) antenna and receiver (2) into the trunk as a unit.
2. Align the clip on the underside of the antenna retainer with the flange where the trunk floor (3) meets the forward edge of the spare tire well.
3. Push the antenna and retainer unit forward until the clip is fully seated on the flange.
4. Reconnect the body wire harness connector (1) to the antenna connector receptacle.
5. Reinstall the spare tire cover and trunk carpet over the trunk floor and the spare tire well. Refer to **CARPET, INSTALLATION** .
6. Reconnect the battery negative cable.

MOTOR, DOOR LOCK

DESCRIPTION

DESCRIPTION

Power operated door locking and deck lid latching mechanisms are standard equipment in this vehicle. The lock mechanisms of each door and the deck lid latch are actuated by a reversible electric motor integral to each latch unit. A connector receptacle integral to each latch connects the power lock motor and the integral door or deck lid ajar micro switch to the vehicle electrical system through a dedicated take out and connector of the door or body wire harness.

The power lock motors cannot be adjusted or repaired and, if ineffective or damaged, the entire door or deck lid latch unit must be replaced.

OPERATION

OPERATION

The power lock motors are controlled by outputs received from the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM acts upon programming, hard wired inputs from the driver or passenger door lock switches as well as electronic **lock** or **unlock** command message inputs received over the Controller Area Network (CAN) data bus from the Radio Frequency Hub Module (RFHM) (also known as the RF Hub) based upon inputs from the FOB with Integrated Key (FOBIK) transmitters.

A positive and negative battery connection to the two lock motor terminals will cause the motor to move in one direction, locking or unlocking the latch. Reversing the current will cause the motor to move in the opposite direction.

The power lock motors and the hard wired circuits between the motors and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the power lock system or the electronic controls or communication between other modules and devices that provide some features of the power lock system. The most reliable, efficient, and accurate means to diagnose the power lock motors or the electronic controls and communication related to power lock motor operation requires the use of a diagnostic scan tool. Refer to the

appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER LOCK MOTOR

Remember, the Body Control Module (BCM) (also known as the Common Body Controller/CBC) circuitry controls the outputs to the power lock motors. If both the power lock motors and the circuits between the motors and the BCM test okay, the use of a diagnostic scan tool is required for further power lock system diagnosis. Refer to the appropriate diagnostic information.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

1. Check the power lock motor for correct operation while moving a power lock switch to both the **Lock** and **Unlock** positions.
2. Disconnect the door or body wire harness connector from the inoperative power lock motor.
3. Apply 12 volts to the lock and unlock driver circuit cavities of the power lock motor connector to check its operation in one direction.
4. Reverse the connection polarity to check the motor operation in the opposite direction.
5. If motor operation is okay in both directions, check both the lock and unlock circuits between the lock motor and the BCM and repair if required. If motor operation is not okay in both directions, replace the latch unit containing the ineffective power lock motor.

SWITCH, DECK LID RELEASE

DESCRIPTION

DECK LID

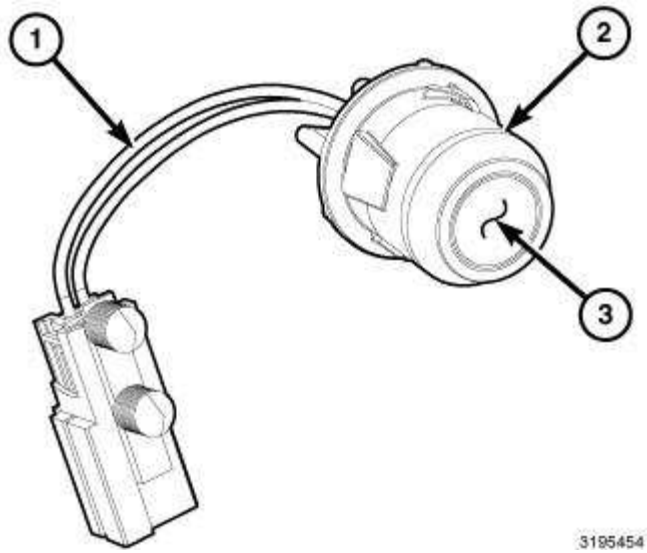


Fig. 11: Wire And Connector, Release Switch & Switch Button
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the Passive Entry (PE) system have a PE deck lid release switch (2) integral to the Center High Mounted Stop Lamp (CHMSL). This tactile switch is secured to the back of the right side of the CHMSL housing with a wedge type base connection. The switch button (3) extends through clearance holes in the lamp housing and lens so that it can be accessed on the right end of the CHMSL lens, which is visible on the upper rear vertical face of the deck lid.

The switch has a pigtail wire and connector (1) secured to the back of the CHMSL housing that connects the switch to the vehicle electrical system through a dedicated take out and connector of the body wire harness. An integral 3.0 kilohm diagnostic resistor is connected in series with the output side of the switch.

The PE deck lid release switch cannot be adjusted or repaired. If the switch is damaged or ineffective, the entire switch unit must be replaced.

INSTRUMENT PANEL

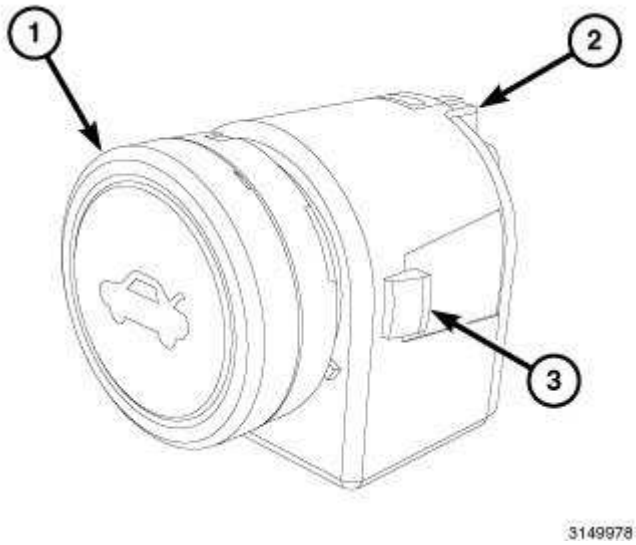


Fig. 12: Release Switch, Receptacle & Single Integral Latch
Courtesy of CHRYSLER GROUP, LLC

The instrument panel deck lid release switch (1) is mounted in the steering column opening cover to the left of the steering column on the instrument panel. Only the switch button is visible on the outer surface of the instrument panel. The black plastic switch button has a white International Control and Display Symbol icon applied to it, which clearly identifies its function.

The black, molded plastic switch housing encloses the switch button mechanism and the switch circuitry including the switch contacts. A connector receptacle (2) is integral to the back of the switch housing, while a single integral latch feature (3) on each side of the housing are used secure the switch by a yoke type retainer and two screws on the back side of the steering column opening cover. The deck lid release switch is connected to the vehicle electrical system through a dedicated take out

and connector of the instrument panel wire harness.

The instrument panel deck lid release switch cannot be adjusted or repaired and, if ineffective or damaged, the unit must be replaced.

OPERATION

DECK LID

The Passive Entry (PE) deck lid release switch is a normally open switch that is connected to ground at all times. When the switch button is depressed, it provides a ground signal to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) through a deck lid release switch sense circuit. In response to that input, the BCM sends an electronic **unlock request** message to the Radio Frequency (RF) Hub over the Controller Area Network (CAN) data bus. The RF Hub determines the PE system response based upon the inputs it receives through the authentication process with each detected FOB with Integrated Key (FOBIK).

The diagnostic resistor integral to the output side of the switch enables the BCM to monitor the condition of the deck lid release switch and switch sense circuit. The BCM will store a Diagnostic Trouble Code (DTC) for any fault that is detected in this circuit.

The hard wired circuits between the PE deck lid release switch and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the switch or the electronic controls and communication between other modules and devices that provide some features of the PE system. The most reliable, efficient, and accurate means to diagnose the PE system or the electronic controls and communication related to deck lid release switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

INSTRUMENT PANEL

The instrument panel deck lid release switch is a normally open switch that is connected to ground at all times. When the switch button is depressed, it provides a ground signal to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) through a deck lid release switch sense circuit.

The BCM uses internal programming and inputs from other sources to determine the appropriate response to an instrument panel deck lid release switch input. If the vehicle has an automatic transmission, the BCM must confirm that the transmission gear selector lever is in the PARK position before activating the deck lid latch motor. If the vehicle is equipped with a manual transmission, the BCM must confirm that the vehicle speed input is less than 8 kilometers-per-hour (5 miles-per-hour) before activating the deck lid latch motor.

The hard wired circuits between the instrument panel deck lid release switch and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the switch or the electronic controls and communication between other modules and devices that provide the deck lid release feature. The most reliable, efficient, and accurate means to diagnose the

deck lid release feature or the electronic controls and communication related to instrument panel deck lid release switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

DECK LID

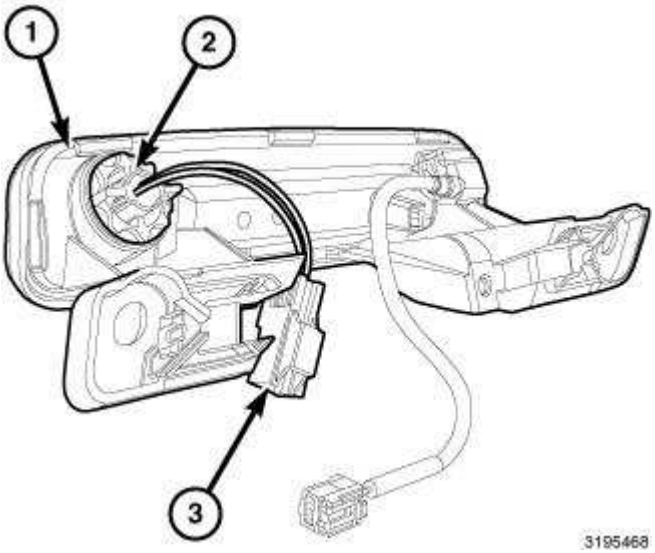


Fig. 13: Center High Mounted Stop Lamp (CHMSL) Unit, Switch Connector & Mounting Flange
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the Center High Mounted Stop Lamp (CHMSL) unit (1) from the deck lid. Refer to **LAMP, CENTER HIGH MOUNTED STOP, REMOVAL** .
3. Disengage the deck lid release switch connector (3) and pigtail wire harness from the retention features on the back of the CHMSL housing.
4. Firmly grasp the tabs of the deck lid release switch mounting flange (2) on the back of the CHMSL housing and rotate it counterclockwise about 30 degrees to unlock it.
5. Pull the switch straight out from the clearance hole through the back of the CHMSL housing.

INSTRUMENT PANEL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

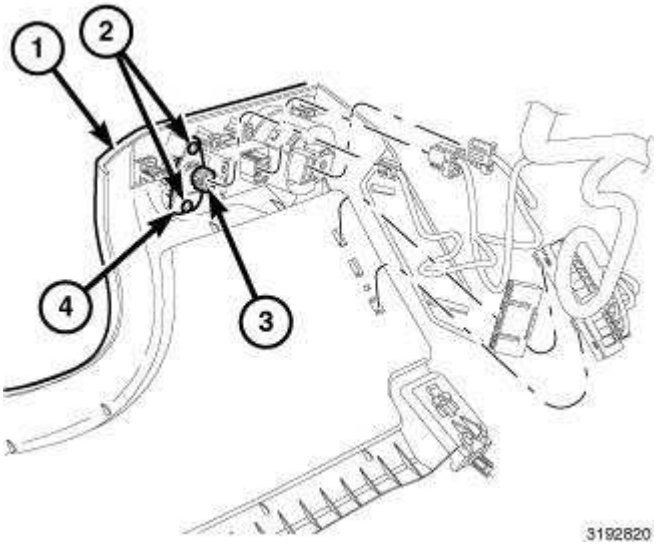


Fig. 14: Steering Column Opening Cover, Release Switch & Retainer Yoke
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the steering column opening cover (1) from the instrument panel. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .
3. Working from the back of the steering column opening cover, remove the two screws that secure the deck lid release switch (3) retainer yoke (4) to the back of the cover.
4. Remove the switch and retainer from the back of the cover.
5. Remove the switch from the retainer.

INSTALLATION

DECK LID

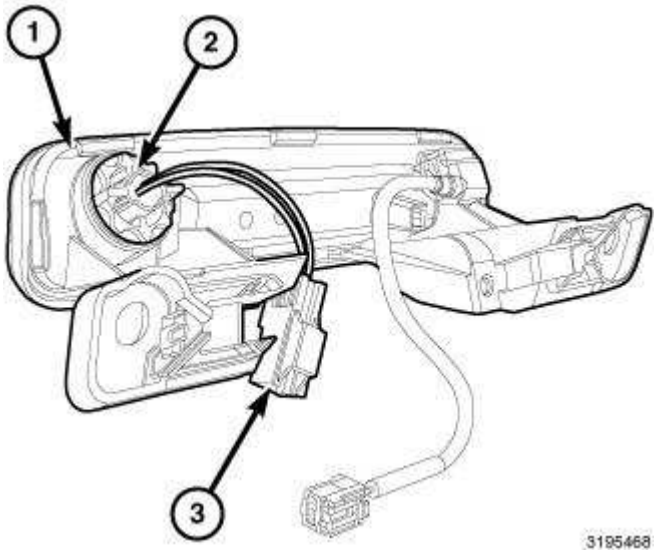


Fig. 15: Center High Mounted Stop Lamp (CHMSL) Unit, Switch Connector & Mounting Flange
Courtesy of CHRYSLER GROUP, LLC

1. Align the deck lid release switch with the clearance hole in the back of the Center High Mounted Stop Lamp (CHMSL) unit housing (1).
2. Insert the switch straight into the clearance hole through the back of the CHMSL housing until the switch mounting flange (2) is firmly seated against the CHMSL housing.
3. Rotate the switch clockwise about 30 degrees to lock it into place.
4. Engage the deck lid release switch connector (3) and pigtail wire harness with the retention features on the back of the CHMSL housing.
5. Reinstall the CHMSL unit into the deck lid. Refer to **LAMP, CENTER HIGH MOUNTED STOP, INSTALLATION** .
6. Reconnect the battery negative cable.

INSTRUMENT PANEL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

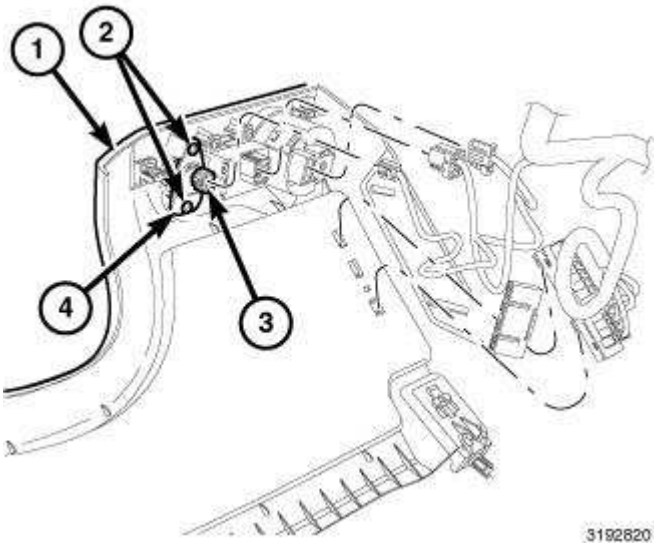


Fig. 16: Steering Column Opening Cover, Release Switch & Retainer Yoke
Courtesy of CHRYSLER GROUP, LLC

1. Position the back of the deck lid release switch (3) through the hole in the retainer yoke (4).
2. Position the switch and retainer to the back of the steering column opening cover (1).

3. Install and tighten the two screws (2) that secure the switch and retainer to the back of the cover. Tighten the screws securely.
4. Reinstall the steering column opening cover onto the instrument panel. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
5. Reconnect the battery negative cable.

SWITCH, DOOR HANDLE

DESCRIPTION

DESCRIPTION

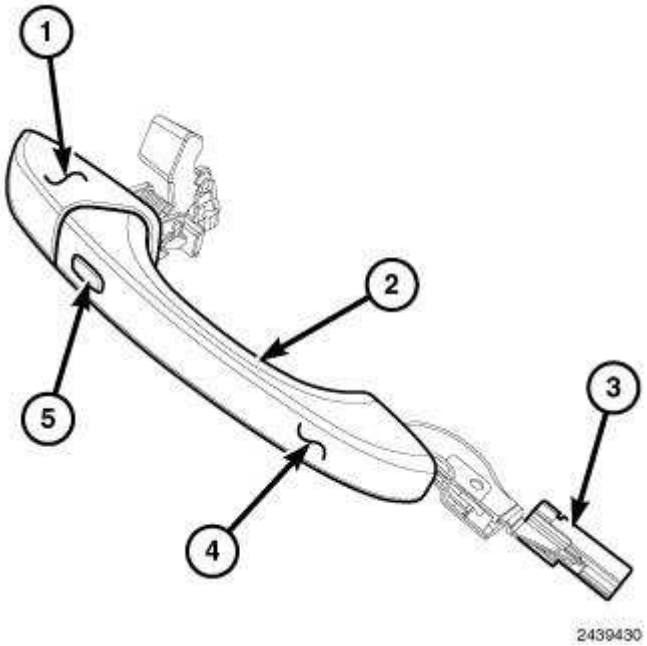


Fig. 17: SWITCH, Door Handle, Front
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional Passive Entry (PE) system have unique outside front door handles that incorporate three switches and a logic circuit. These unique PE door handles are sometimes referred to as smart handles. The handle itself is very similar in appearance to those used in conventional non-PE applications, consisting primarily of a grip (4) and a base (1).

The PE door handles can be readily identified by a tactile, resistive membrane lock switch (5) located on the outward facing vertical surface at the rearward end of the handle grip, and by a capacitive sensor or switch membrane patch on the inside surface (2) of the grip. A third, Hall-effect type switch as well as an Integrated Circuit (IC) chip are concealed within the grip near the handle base.

The mechanical functions and mounting provisions of the PE handle are identical to those of a conventional outside door handle. However, an integral connector receptacle (3) is located at the forward end of the handle grip where it is concealed within the door interior. The PE handle is

connected to the vehicle electrical system through a dedicated take out and connector of the PE door jumper wire harness.

The individual switches of the PE outside front door handles cannot be adjusted or repaired. If any one of the switches, the IC or any of the mechanical handle components is damaged or ineffective, the entire handle unit must be replaced. Refer to **HANDLE, EXTERIOR, REMOVAL** .

OPERATION

OPERATION

The three switches of each Passive Entry (PE) outside front door handle are powered by and provide a direct input to the Integrated Circuit (IC) of that door handle. The IC of each PE outside front door handle receives power from the Passive Entry Module (PEM) on a signal circuit, and a clean ground from the PEM on a return circuit. The PE handle IC and the PEM communicate with each other by modulating the current in the signal circuit.

Each PE outside front door handle has three switches. The inputs from those three switches and the handle logic circuit allow each handle to send the PEM up to four different signals: Unlock Request, Hall, Lock Request and Error. The PEM determines the system response based upon the inputs it receives from each handle as well as the inputs it receives through the authentication process with each detected FOB with Integrated Key (FOBIK).

The tactile, mechanical, resistive membrane lock switch allows the user to actively lock the vehicle. The capacitive switch senses a hand approaching the handle grip to passively unlock the vehicle. The Hall-effect switch senses handle grip movement. An adaptation algorithm in the logic circuit of each handle can modify the sensitivity of the capacitive switches as well as system responses to the Hall-effect switch inputs to compensate for sensed repeated or continuous actuations such as might be caused by the switch membrane being wetted, but restores normal sensitivity about one minute after the repeated or continuous actuation input ceases.

The hard wired inputs and outputs of the PE outside front door handle may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, the most reliable, efficient and accurate means to diagnose this component requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, FUEL DOOR

DESCRIPTION

DESCRIPTION

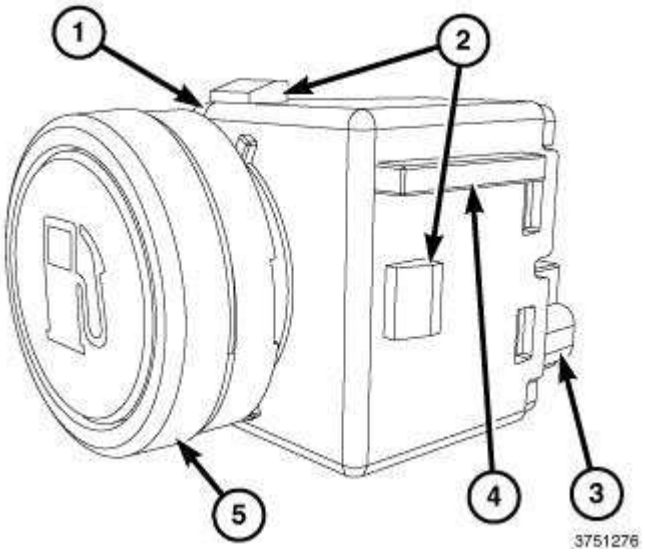


Fig. 18: Switch, Latch Features, Receptacle & Alignment Spline
Courtesy of CHRYSLER GROUP, LLC

The fuel door release switch (1) is mounted in the map pocket of the driver side front door inside trim panel. Only the switch button is visible on the outer surface of the trim panel. The black plastic switch button has a white International Control and Display Symbol icon applied to it, which clearly identifies its function. A Light Emitting Diode (LED) unit within the switch illuminates the icon on the switch button for improved visibility.

The black, molded plastic switch housing encloses the switch button mechanism and the switch circuitry including the switch contacts. A connector receptacle (3) is integral to the back of the switch housing, while integral latch features (2) and an alignment spline (4) on the sides of the housing are used to secure and locate the switch within a mounting receptacle integral to a reinforcement on the back side of the door trim panel. The fuel door release switch is connected to the vehicle electrical system through a dedicated take out and connector of the door wire harness.

The fuel door release switch cannot be adjusted or repaired and, if ineffective or damaged, the unit must be replaced.

OPERATION

OPERATION

The fuel door release switch is a normally open, momentary switch that is connected to fused battery feed at all times. When the switch button is depressed, it provides a battery feed signal to the fuel door release actuator solenoid on the fuel filler housing through a fuel door control circuit.

The hard wired circuit between the fuel door release switch and the fuel door release actuator solenoid may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

REMOVAL

REMOVAL

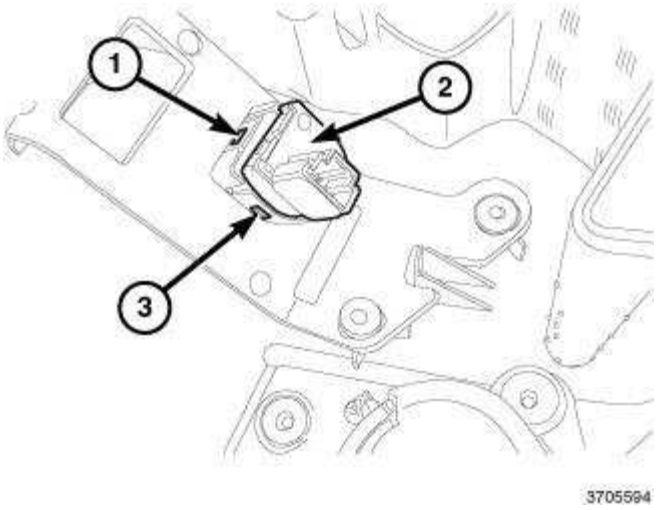


Fig. 19: Latch Tabs & Release Switch
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trim panel from the inside of the driver side front door. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Working from the back side of the door trim panel, disengage the latch tabs (1 and 3) that secure the fuel door release switch (2) to the receptacle integral to the trim panel reinforcement.
4. Remove the switch from the door trim panel.

INSTALLATION

INSTALLATION

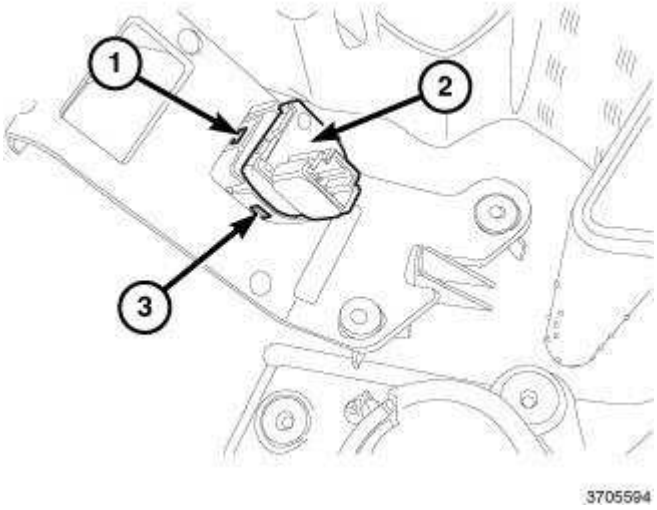


Fig. 20: Latch Tabs & Release Switch
Courtesy of CHRYSLER GROUP, LLC

1. Align the fuel door release switch (2) with the receptacle integral to the reinforcement on the back side of the driver side front door trim panel.
2. Using hand pressure, push the switch into the receptacle until each of the switch latch tabs (1 and 3) are fully engaged.
3. Reinstall the trim panel onto the inside of the driver side front door. Refer to **PANEL, DOOR TRIM, INSTALLATION** .
4. Reconnect the battery negative cable.

SWITCH, LOCK

DESCRIPTION

DESCRIPTION

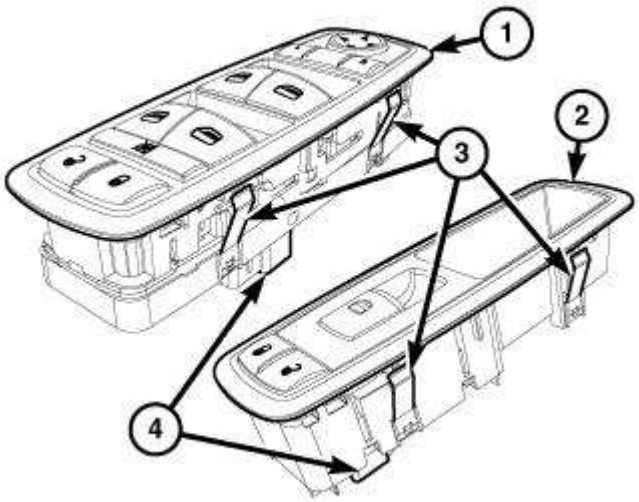


Fig. 21: Driver Side Module, Passenger Side Module, Four Spring Clip Retainers & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

A front door power switch module and bezel unit is located near the forward end of the arm rest of each front door trim panel. Two different modules are used: a driver side module (1), and a passenger side module (2). Each switch button in both modules is identified with either an International Control and Display Symbol icon or text that clearly identifies the switch function, and each switch button has a Light Emitting Diode (LED) unit soldered to the switch circuit board that provides back lighting of the icon or text for night visibility.

Each switch module housing is secured within the trim panel armrest by four spring clip retainers (3), two on each side of the switch module housing. The passenger side switch module includes a small cubby bin. A connector receptacle (4) integral to each switch module housing connects the switches to the vehicle electrical system through dedicated take outs and connectors of the door wire harnesses.

The front door power switch modules include the following switches:

- **Power Lock Switch** - A momentary switch button to control the **Lock** function of the power lock system.
- **Power Unlock Switch** - A momentary switch button to control the **Unlock** function of the power lock system.
- **Power Mirror Selector Switch (Driver Side Switch Only)** - Three mirror selector switch buttons choose the power mirror to be adjusted, **R** (right), **L** (left) or a power fold position (both mirrors).
- **Power Mirror Direction Control Switch (Driver Side Switch Only)** - After a power mirror is selected, pressing down on one of the arrows on the momentary mirror direction switch will move the selected mirror in that direction for as long as it is held down until the limit of the mirror travel is reached.
- **Power Window Lockout Switch (Driver Side Switch Only)** - A latching push-button power window lockout switch allows the vehicle operator to lock out the power window switches on each front and rear passenger door so that those windows may be operated only from the driver side front door master switches. When the lockout switch is engaged, the LED back lighting for each front and rear passenger door power window switch is extinguished.
- **Power Window Switches** - A single two-way, momentary power window switch with a push-to-open and a lift-to-close tab is provide for each passenger door window while the driver side switch module contains four of these power window switches, one switch dedicated to each door window. The switch tab for the driver side front door power window has a second detent in the down direction which is used to activate the **Auto-Down** (also known as express down or one-touch down) feature. A second detent in the up direction on both front door power window switches activates the **Express-Up** feature.

The front door power switch modules cannot be adjusted or repaired. If damaged or ineffective, the entire driver side or passenger side front door switch module must be replaced as a unit.

OPERATION

OPERATION

The driver side front door power switch module combines a power lock switch, a power window switch for each of the four door windows including auto-down (also known as one-touch down or express down) and express up features for both front door windows, a power window lockout switch, a power mirror selector switch, and a power mirror adjustment switch in a single unit. The passenger side power door switch module combines a power lock switch and a passenger side front door power window switch with the auto-down and express up features.

The driver side front door power switch module provides resistor multiplexed outputs to the driver door module indicating the power lock switch selection, hard wired analog outputs indicating the power mirror selector switch and adjustment switch selections, and electronic message outputs over a Local Interface Network (LIN) data bus connection indicating the power window switch selections. The passenger side front door power switch module provides resistor multiplexed outputs to the passenger door module indicating both the power lock and power window switch selections.

The hard wired circuits between the driver side front door power switch module and the driver side door module or the rear door power window switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between the switch module and the door module or in the diagnosis of the electronic controls and communication between other modules and the door module that provide some features of the power lock, power mirror or power window systems. The most reliable, efficient, and accurate means to diagnose the driver side power switch module or the electronic controls and communication related to power lock, power mirror or power window system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

The hard wired circuits between the passenger side front door power switch module and the passenger side door module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and the door module that provide some features of the power lock or power window systems. The most reliable, efficient, and accurate means to diagnose the power switch module or the electronic controls and communication related to power lock or power window system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - LOCK SWITCH

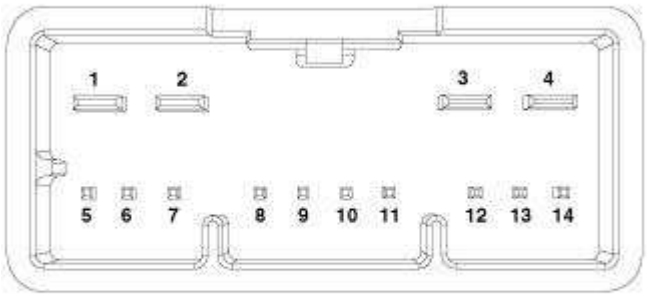


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Fig. 22: Driver Front Door Switch Module Connector Receptacle

Courtesy of CHRYSLER GROUP, LLC

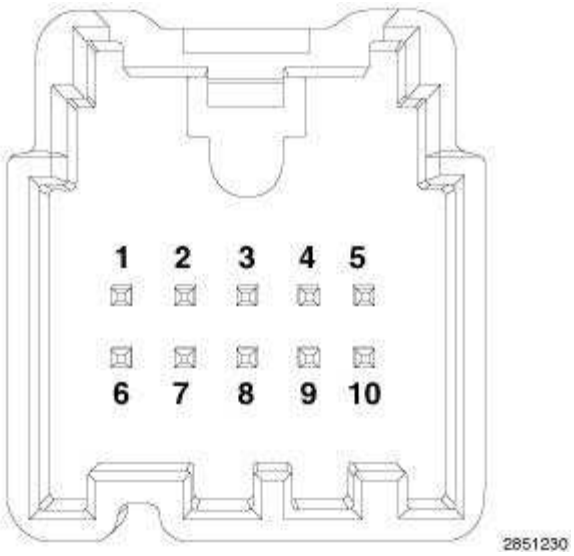

Fig. 23: Passenger Front Door Switch Module Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Remove the power switch module and bezel unit from the front door trim panel. Refer to **SWITCH, LOCK, REMOVAL**.
2. Disconnect the door wire harness connector from the power switch module.
3. Using an ohmmeter, test the resistance between the terminals of the front door power lock or power window switch as shown in the Power Lock or Power Window Switch Tests table.

NOTE: **The switches in the driver front door switch module not listed in the Switch Test Tables provide inputs to the Driver Door Module (DDM) over a Local Interface Network (LIN) data bus and cannot be resistance tested. The use of a diagnostic scan tool and the appropriate diagnostic information is required for further testing of those switches.**

POWER LOCK SWITCH TESTS - PASSENGER DOOR	
SWITCH POSITION (PINS)	**RESISTANCE RANGE (OHMS)**
LOCK (4 and 8)	326 - 341
UNLOCK (4 and 8)	99 - 103
NEUTRAL (4 and 8)	>1 megohm
POWER WINDOW	

SWITCH TESTS - DRIVER DOOR	
SWITCH POSITION (PINS)	**RESISTANCE (OHMS)**
MASTER LEFT REAR WINDOW UP SWITCH - NEUTRAL (2 and 5)	>1 megohm
UP SWITCH - UP (2 and 5)	<2
DOWN SWITCH - NEUTRAL (2 and 7)	>1 megohm
DOWN SWITCH - DOWN (2 and 7)	<2
MASTER RIGHT REAR WINDOW UP SWITCH - NEUTRAL (2 and 12)	>1 megohm
UP SWITCH - UP (2 and 12)	<2
DOWN SWITCH - NEUTRAL (2 and 14)	>1 megohm
DOWN SWITCH - DOWN (2 and 14)	<2
POWER WINDOW	

SWITCH TESTS - PASSENGER DOOR	
SWITCH POSITION (PINS)	**RESISTANCE RANGE (OHMS)**
UP (4 and 9)	990 - 1022
AUTO UP (4 and 9)	329 - 349
DOWN (4 and 9)	2970 - 3042
AUTO DOWN (4 and 9)	0 - 12
NEUTRAL (4 and 9)	>1 megohm

4. If a switch fails any of the tests, replace the ineffective front door power switch module and bezel unit as required.

REMOVAL

REMOVAL

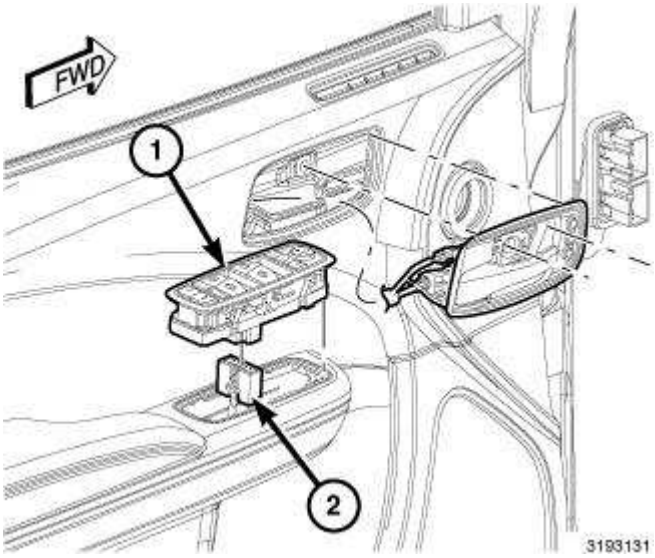

Fig. 24: Front Door Switch Module & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable wide flat-bladed tool, pry the bezel of the front door switch module (1) up and away from the front door trim panel arm rest far enough to disengage the four spring steel retainers of the switch from the arm rest opening.

3. Pull the switch module away from the mounting hole of the arm rest far enough to access and disconnect the door wire harness connector (2) from the switch connector receptacle.
4. Remove the switch module from the vehicle.

INSTALLATION

INSTALLATION

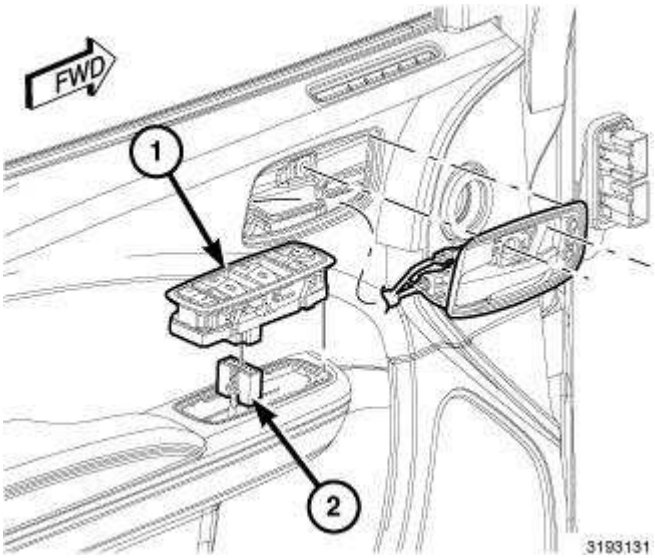

Fig. 25: Front Door Switch Module & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the front door switch module (1) close enough to the mounting hole in the arm rest of the front door trim panel to access and reconnect the front door wire harness connector (2) to the switch connector receptacle.
2. Align the switch module to the arm rest mounting hole.
3. Using hand pressure, press the switch module firmly and evenly into the mounting hole until the four spring steel retainers of the switch are fully engaged and the switch bezel is fully seated against the arm rest.
4. Reconnect the battery negative cable.

TRANSMITTER, INTEGRATED KEY FOB

DESCRIPTION

DESCRIPTION

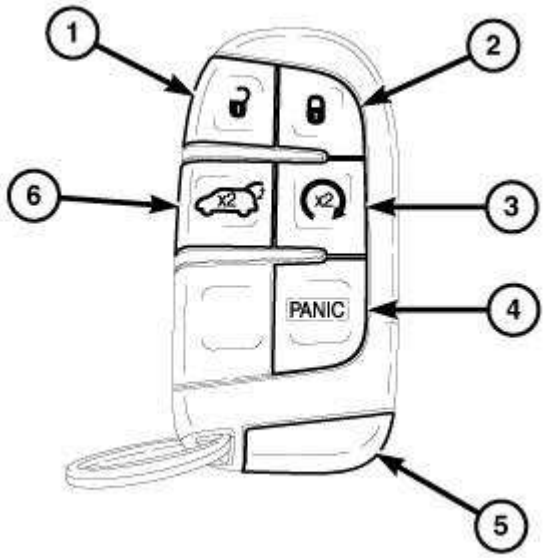

Fig. 26: FOB with Integrated Key (FOBIK) Remote Keyless Entry (RKE) Transmitters
Courtesy of CHRYSLER GROUP, LLC

Vehicles are shipped from the factory with two FOB with Integrated Key (FOBIK) Remote Keyless Entry (RKE) transmitters programmed to the vehicle as standard equipment. The FOBIK circuitry is contained and protected within a molded black plastic case with a black soft rubber touch pad on the face divided into six sections. The rearward end of the FOBIK case houses a mechanical, metal, coded emergency key (5) that is released by sliding a latch button on the back of the FOBIK case.

Depending upon vehicle equipment, each FOBIK has at least three and no more than five functional resistive membrane switches located beneath the six touch pad sections. Each functional touch pad section is clearly identified by white icons or white text and icons identifying the specific function obtained by pushing that button. Domestic market vehicles also include a touch pad section on the FOBIK with the red text **PANIC** applied to it. Not counting the **PANIC** touch pad (4), the available switches include:

- **Unlock (1)**

  - Standard equipment.

- **Lock (2)** - Standard equipment.
- **Remote Start (3)** - Only for vehicles equipped with the factory-installed remote start system.
- **Trunk (6)** - Standard equipment.

The FOBIK RKE transmitter is the primary customer active interface for remotely operating the power lock system, the RKE system and the remote start system components and features. However, the FOBIK also has an important passive role in each of the following vehicle systems:

- **Keyless Go System** - Refer to **STARTING - SERVICE INFORMATION** .

- **Passive Entry System** - Refer to **DESCRIPTION**.
- **Sentry Key® Theft Deterrent System** - Refer to **VEHICLE THEFT SECURITY - SERVICE INFORMATION** .
- **Vehicle Theft Security System (VTSS)** - Refer to **VEHICLE THEFT SECURITY - SERVICE INFORMATION** .

Other than battery replacement, the FOBIK cannot be adjusted or repaired. Once a FOBIK has been programmed to a vehicle, it cannot be reprogrammed for use on any other vehicle. If damaged or ineffective, the FOBIK must be replaced with a new unit. A new and unused FOBIK unit must be properly programmed in order to function properly with the systems of the vehicle. The mechanical emergency key of the new FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

OPERATION

OPERATION

The FOB with Integrated Key (FOBIK) incorporates many useful functions into a single, compact unit. The transducer on the internal circuit board of the FOBIK uses low frequency Radio Frequency (RF) communication to ensure vehicle security through an electronic validation or handshake process that is performed with the RF Hub each time the engine is started.

When any one of the Remote Keyless Entry (RKE), liftgate or remote start buttons of the FOBIK is depressed, the on-board transmitter of the FOBIK generates a high frequency RF request signal that is received and validated by the RF Hub. If the RF Hub determines the RF signal was generated by a FOBIK that is valid for the vehicle, the RF Hub relays electronic request messages to the appropriate electronic modules in the vehicle over the Controller Area Network (CAN) data bus to invoke the functions or features associated with the request.

The integrated mechanical emergency key of the FOBIK provides emergency access to the vehicle in case the battery in the vehicle or the transmitter becomes discharged. The emergency key can also be retained to keep any locked on-board vehicle storage compartments such as the glove box secured, for example: While the vehicle is being attended to by a parking valet.

Each vehicle owner is provided with a four-digit Personal Identification Number (PIN) by the dealer at the time of vehicle purchase. This number is required along with a diagnostic scan tool for the dealer to program an additional or replacement FOBIK into the electronics of the vehicle. The emergency key included with a new additional or replacement blank FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

Diagnosis of a FOBIK transmitter requires the use of a Radio Frequency Detector such as special tool #(special tool #9001, RF Detector). Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

RKE TRANSMITTER

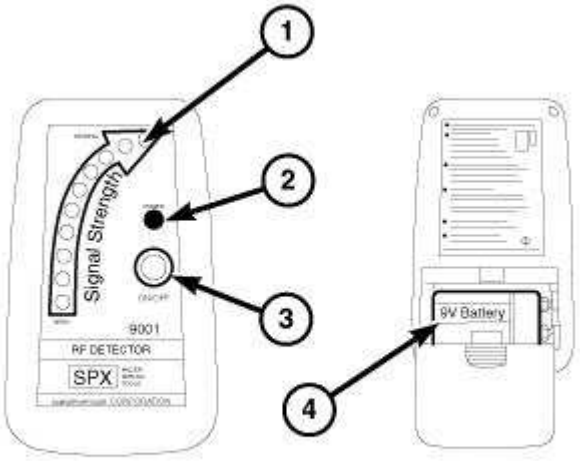

Fig. 27: Radio Frequency Detector
Courtesy of CHRYSLER GROUP, LLC

Use a Radio Frequency Detector such as special tool (special tool #9001, RF Detector) to confirm that the Remote Keyless Entry (RKE) transmitter is functioning. Typical testing distance is 2.5 centimeters (1 inch) for the transmitters of vehicles manufactured for Asian markets, and 30.5 centimeters (12 inches) for all others.

1. Position the transmitter the appropriate distance from the special tool.
2. Depress any transmitter button, then test each button individually. The special tool will issue an audible beep tone if a satisfactory radio signal strength that lights five or more LED units is detected.
3. Repeat Step 2 three times. If the transmitter fails any of the signal strength tests, use a diagnostic scan tool and the appropriate diagnostic information to complete further diagnosis.

STANDARD PROCEDURE

BATTERY REPLACEMENT

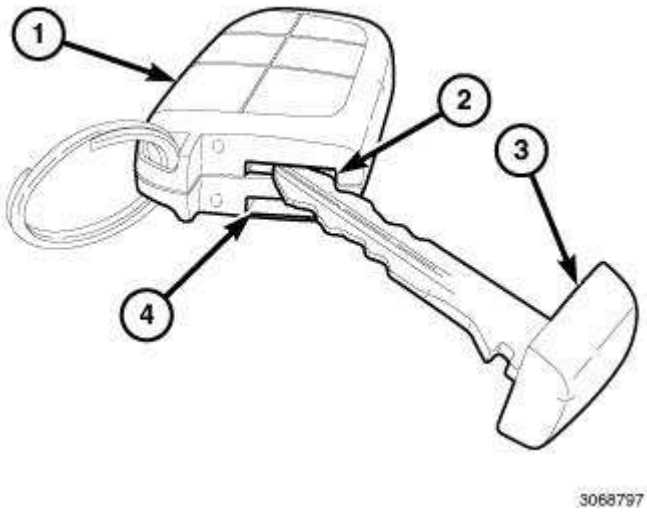

Fig. 28: Emergency Key, Storage Slot & Integrated Key (FOBIK) Case
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not touch or disturb the metal contacts for the battery. Avoid touching the new battery. Battery contamination from oils on your skin may result in shortened battery life. If the battery or contacts are contaminated, clean them thoroughly with rubbing alcohol.

1. Unlatch and remove the emergency key (3) from the storage slot (4) of the FOB with Integrated Key (FOBIK) case (1).
2. With the front of the FOBIK case facing upward, insert the tip of the emergency key into the notch (2) between the case halves and twist the key to unsnap and separate the front case half from the back case half.

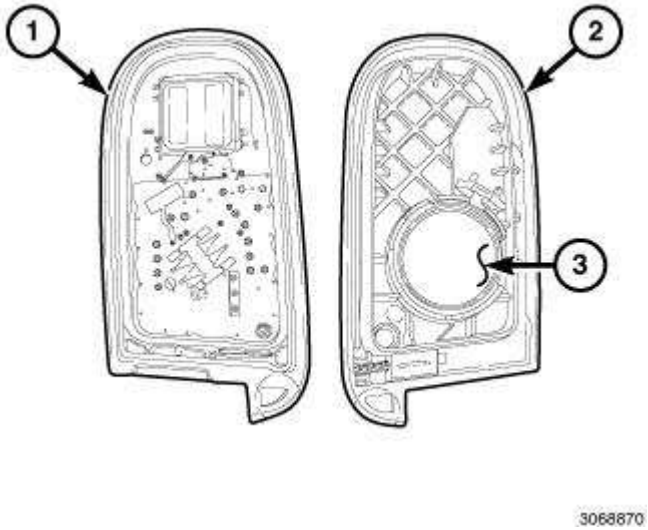

Fig. 29: FOBIK Case & Battery
Courtesy of CHRYSLER GROUP, LLC

3. Lift the battery (3) out of the receptacle in the back half of the FOBIK case (2).
4. Replace the battery with a recommended replacement battery. Refer to **TRANSMITTER, INTEGRATED KEY FOB, SPECIFICATIONS**.
5. Install the new battery into the receptacle in the back half of the FOBIK case with the negative terminal facing upward.
6. Align the front half of the FOBIK case (1) with the back half.
7. Using hand pressure, squeeze the two FOBIK case halves around their perimeters until they snap back together.
8. Reinsert the emergency key into the storage slot of the FOBIK case.
9. Test the FOBIK operation.

FOBIK PROGRAMMING

FOB with Integrated Key (FOBIK) programming may require the use of the Personal Identification Number PIN) for the vehicle, a diagnostic scan tool and the appropriate diagnostic information. Also be certain that the FOBIK and any replaced electronic modules are programmed in the proper sequence. Refer to **STANDARD PROCEDURE** .

SPECIFICATIONS

SPECIFICATIONS

BATTERY

The FOB with Integrated Key (FOBIK) transmitter is powered by a single 3-volt lithium and manganese dioxide button cell battery, which can be removed and replaced without special tools. Refer to **TRANSMITTER, INTEGRATED KEY FOB, STANDARD PROCEDURE**. The international standard battery type designation is: **CR2032** . This battery type is available at many local retail stores. Typical battery life is approximately three years.

CAUTION: Do not handle the batteries any more than necessary. Hands must be clean and dry.

RANGE

Normal Remote Keyless Entry (RKE) transmitter operation range for vehicles manufactured for domestic markets is up to 20 meters (66 feet) away from the vehicle. On vehicles manufactured for export markets, normal RKE transmitter range is up to 10 meters (33 feet) away from the vehicle. If a domestic market vehicle is equipped with the optional factory-installed Remote Start System, the normal transmitter range is increased to up to 91 meters (300 feet). Please note that the actual RKE transmitter range values may be better or worse than specified above, depending upon many possible variables in the environment at the specific time and location that any RKE transmission is attempted.

ACCESSORIES AND EQUIPMENT

Power Mirrors - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

Driver and passenger power operated outside rear view mirrors are standard factory-installed equipment. In addition, automatic dimming rear view mirrors, both inside and a driver side outside are available as optional equipment. The power mirror system for this vehicle includes the following major components, which are described in further detail elsewhere in this service information:

- **Automatic Dimming Rear View Mirrors** - The optional automatic dimming inside rear view mirror is secured to a mounting button on the inside of the windshield glass near the upper windshield opening header. This is the same mounting button that is used for mounting the standard prismatic inside rear view mirror. The optional automatic dimming outside rear view mirror is only available for the driver side door. The automatic dimming outside rear view mirror is secured to the same mounting flag on the front door panel and in the same manner that is used to mount the standard equipment outside rear view mirrors.
- **Front Door Control Modules** - Vehicles that use the low current front door power switch configuration also have a front door control module for each front door. The front door control modules are concealed behind the door trim panels on the front door hardware module carrier. Refer to **MODULE, DOOR, DESCRIPTION** .
- **Front Door Power Switch Modules** - Front door power switch modules are used in both primary system configurations: high current and low current. The outputs of the switches will identify the configuration type being used. In the high current configuration the switch outputs are hard wired directly to the power mirror, power window and power lock motors. In the low current configuration the switch outputs are hard wired to the driver or passenger front door control modules, which then control the high current outputs to the power mirror, power window and power lock motors. Refer to **SWITCH, POWER WINDOW, DESCRIPTION** .
- **Power Folding Mirror Switch** - The power folding mirror switch is used only on vehicles manufactured for certain export markets where power foldaway mirrors are required equipment. The power folding mirror switch is integral to the driver front door power switch module located on the driver side front door trim panel and is only serviced as a unit with the switch module.
- **Power Mirror Switches** - The power mirror system includes two selector switches and an adjuster switch that are located on the driver front door trim panel and are only serviced as an integral part of their respective driver front door power switch module. Refer to **SWITCH, POWER WINDOW, DESCRIPTION** .
- **Power Outside Rear View Mirrors** - Power outside rear view mirror units are mounted to the mirror flag at the front belt line of each front door window opening. Many variations of both the driver and passenger mirror are available, depending upon both trim and other optional equipment in the vehicle.

In the low current switch configuration, the front door power switch modules and the front door control modules each contain a microprocessor and programming that allow them to communicate with each

other using a Local Interface Network (LIN) data bus. The front door control modules and the automatic dimming inside rear view mirror each contain a microprocessor and programming that allow them to communicate with each other, with other electronic modules in the vehicle and with a diagnostic scan tool connected to the 16-way Data Link Connector (DLC) using the Controller Area Network (CAN) Interior High Speed (IHS) data bus. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the power mirror system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the power mirror system components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

POWER OPERATED OUTSIDE REAR VIEW MIRRORS

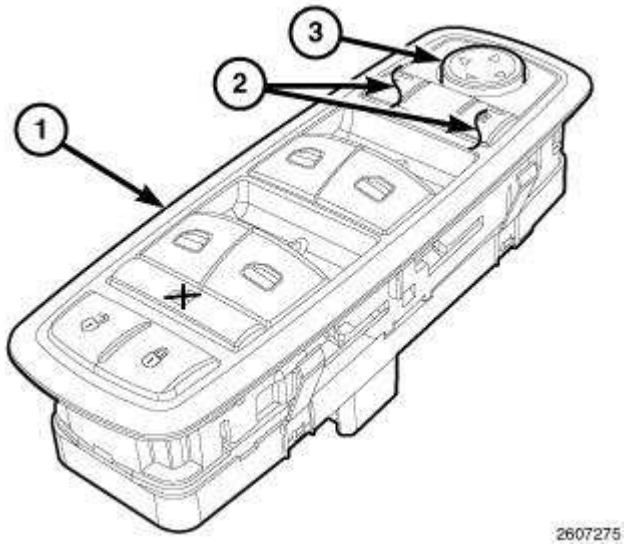

Fig. 1: Driver Front Door Power Switch Module
Courtesy of CHRYSLER GROUP, LLC

The power operated outside rear view mirrors are connected to battery current at all times. Each mirror head contains two electric motors, two drive mechanisms, an electric heating element and the mirror glass. First, a mirror selector switch button (2) is depressed in the driver door power switch module (1) to determine whether the mirror adjuster switch (3) will have control over the right or left mirror. If the vehicle is equipped with the high current door power switch module configuration, hard wired ground and battery current outputs to each power mirror motor determine whether the horizontal or the vertical motor will be operated and the polarity of those outputs control the direction

in which the motor will move the drive unit and mirror glass.

Power mirror and mirror switch functionality is the same with the low current configuration; however, the driver door power switch module sends power mirror switch status messages over the Local Interface Network (LIN) data bus to the driver front door control module. The driver front door control module then controls the high current outputs to the driver door mirror motors or sends electronic request messages over the Controller Area Network (CAN) Interior High Speed (IHS) data bus to the passenger front door control module to control high current outputs to the passenger door mirror motors.

The power mirror switch is diagnosed using a scan tool, for the appropriate information. Refer to **DIAGNOSIS AND TESTING** .

AUTOMATIC DIMMING REAR VIEW MIRRORS

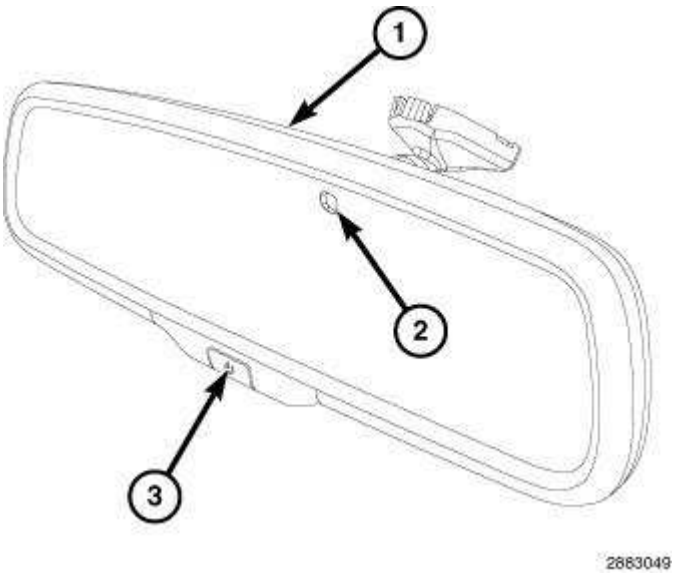

Fig. 2: Automatic Dimming Inside Rear View Mirror
Courtesy of CHRYSLER GROUP, LLC

An automatic dimming inside rear view mirror (1) is an available option. The automatic lighted dimming mirror switch (3) allows the driver a manual control of whether the automatic dimming feature is operational. This switch is a momentary push button switch located on the lower rearward-facing surface of the mirror housing. When ON is selected, the switch illuminates to indicate that the automatic dimming mirror is turned ON. When OFF is selected, the LED is extinguished. If the vehicle is equipped with an optional driver side automatic dimming outside rear view mirror, the operation of that mirror is controlled by the same switch and inputs as the inside rear view mirror.

The automatic dimming mirrors are able to automatically change their reflectance level. A thin layer of electrochromic material between two pieces of conductive glass make up the face of the mirror. Two photocell sensors are used to monitor light levels and adjust the reflectance of both the inside and driver side outside mirrors. This change in reflectance helps to reduce the glare of headlamps approaching the vehicle from the rear.

The ambient photocell light sensor faces forward, to detect the outside light levels. The headlamp photocell light sensor (2) is located on the mirror face to one side of the switch and facing rearward, to detect the light level received at the rear window side of the mirror. When the difference between the two light levels becomes too great (the light level received at the rear of the mirror is much higher than that at the front of the mirror), the mirror begins to darken. The mirror also monitors the backup lamp circuit, and will automatically disable its self-dimming feature whenever the transmission gear selector is in the REVERSE position.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER MIRRORS

Any diagnosis of the Power Mirror system should begin with the use of scan tool. For information on the use of the scan tool, refer to DIAGNOSIS AND TESTING.

For complete circuit diagrams, refer to the appropriate wiring information.

1. Check the fuses in the Power Distribution Center (PDC) and the TIPM. If OK, go to 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse(s).
2. Check for battery voltage at the fuse in the TIPM. If OK, go to3. If not OK, repair the open circuit to the PDC as required.
3. Disconnect and isolate the battery negative cable. Remove the driver side power window switch and bezel assembly and unplug the wire harness connector from the power mirror switch. Connect the battery negative cable. Check for battery voltage at the fused B(+) circuit cavity in the door wire harness half of the power mirror switch wire harness connector. If OK, go to4. If not OK, repair the open circuit to the TIPM as required.
4. Disconnect and isolate the battery negative cable. Check for continuity between the ground circuit cavity in the door wire harness half of the power mirror switch wire harness connector and a good ground. There should be continuity. If not OK, repair open in the ground circuit.

MIRROR, AUTOMATIC DAY AND NIGHT

DESCRIPTION

DESCRIPTION

An automatic dimming (day and night) inside rear view mirror is an available factory-installed option for this vehicle. Vehicles equipped with the automatic dimming inside rear view mirror are also available with an optional factory-installed automatic dimming outside rear view mirror for the driver side of the vehicle. In vehicles so equipped, this system will automatically change the reflectance of the inside and driver side outside rear view mirrors to protect the driver from the unwanted headlight glare of trailing vehicles while driving at night. Following are general descriptions of this optional equipment.

INSIDE

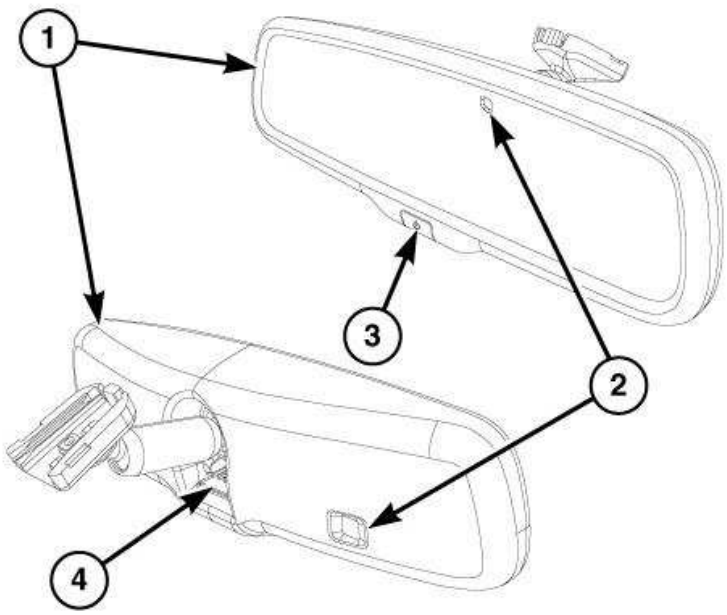

Fig. 3: Inside Rear View Mirror, Two Photocell Light Sensors, Lighted Mirror Switch & Mirror Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

The automatic dimming inside rear view mirror (1) is able to automatically change its reflectance. The automatic dimming inside rear view mirror system is a completely self-contained unit that replaces the standard equipment manual prismatic inside rear view mirror. The two layers of conductive mirror glass with a thin layer of electrochromic material between them, the lighted mirror switch (3), two photocell light sensors (2), the mirror connector receptacle (4) and the electronic mirror control circuitry are all self-contained within the inside rear view mirror housing.

The automatic dimming mirror is secured to the same mounting button on the inside of the windshield glass and in the same manner that is used to mount the standard equipment manual prismatic mirrors. The mirror is connected to the vehicle electrical system through a dedicated take out and connector of the overhead wire harness. The automatic dimming inside rear view mirror receives battery current through a fused ignition switch output (run-start) circuit and a fuse in the Totally Integrated Power Module (TIPM), and will only operate when the ignition switch is in the ON or START positions.

The automatic dimming inside rear view mirror sensitivity cannot be repaired or adjusted. If any component of this unit is ineffective or damaged, the entire inside rear view mirror unit must be replaced. For service procedures, refer to **MIRROR, REARVIEW, REMOVAL** and **MIRROR, REARVIEW, INSTALLATION** .

OUTSIDE

The automatic dimming driver side outside rear view mirror is able to automatically change its reflectance. The automatic dimming outside rear view mirror replaces the standard equipment outside rear view mirror. The two layers of conductive mirror glass with a thin layer of electrochromic material between them is contained within the outside rear view mirror glass case. However, this mirror relies upon the photocells and mirror control circuitry of the automatic dimming inside rear view mirror to control its reflectance.

The automatic dimming outside rear view mirror is secured to the same mounting flag on the front door panel and in the same manner that is used to mount the standard equipment outside rear view mirrors. The mirror is connected to the vehicle electrical system through a dedicated take out and connector of the front door wire harness. The automatic dimming circuitry of the outside rear view mirror receives current through auto day/night mirror feed (+) and return (-) circuits from the inside rear view mirror, and will only operate when the ignition switch is in the ON or START positions.

The automatic dimming outside rear view mirror sensitivity cannot be repaired or adjusted. If any component of this unit is ineffective or damaged, the entire outside rear view mirror unit must be replaced. For service procedures, refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** .

OPERATION

OPERATION

Both the inside and outside automatic dimming mirrors receive battery current through a fused ignition switch output (run/start) circuit and fuse in the Totally Integrated Power Module (TIPM), and will only operate when the ignition switch is in the ON or START positions.

INSIDE

The lighted switch on the automatic dimming inside rear view mirror provides the vehicle operator with a manual control of whether the automatic dimming feature is operational. When AUTO is selected, the mirror switch is illuminated. However, if the mirror is turned OFF manually, the mirror switch illumination is extinguished. However, the mirror will always turn back ON by default at the onset of a new ignition ON cycle. The automatic dimming mirror circuitry also senses the backup lamp circuit, and will automatically disable its self-dimming feature whenever the transmission gear selector is in the REVERSE position.

The ambient photocell sensor of the mirror faces forward, to detect the outside light levels through the windshield glass. A second headlamp photocell sensor is located in the upper right quadrant of the mirror face, to detect the light level received at the rear window side of the mirror. When the mirror control circuitry detects that the difference between the two sensed light levels has become too great (the light level received at the rear of the mirror is much higher than that at the front of the mirror) the mirror begins to darken. A thin layer of electrochromic material between two pieces of conductive glass make up the face of the mirror.

On vehicles equipped with an optional driver side automatic dimming outside rear view mirror, the signal to control the dimming of that mirror is generated by the automatic dimming inside rear view

mirror circuitry. That signal is then delivered to the driver side outside rear view mirror on two hard wired circuits.

OUTSIDE

The driver side automatic dimming outside mirror is operated by the same controls and circuitry as the automatic inside rear view mirror. When the automatic inside rear view mirror is switched ON or OFF, the automatic dimming outside mirror is likewise switched ON or OFF. Just as in the automatic inside rear view mirror, a thin layer of electrochromic material between two pieces of conductive glass make up the face of the automatic dimming outside mirror. However, the signal to control the dimming of the outside mirror is generated by the automatic dimming inside rear view mirror control circuitry based upon the inputs from the two photocell sensors integral to the inside mirror. That signal is then delivered to the driver side outside rear view mirror on two hard wired circuits.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AUTOMATIC DIMMING MIRRORS

For complete circuit diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

1. Check the fused ignition switch output (run/start) fuse in the Totally Integrated Power Module (TIPM). If OK, go to2. If not OK, repair the shorted circuit or component as required and replace the ineffective fuse.
2. Turn the ignition switch to the ON position. Check for battery voltage at the fused ignition switch output (run/start) fuse in the TIPM. If OK, go to 3. If not OK, repair the open fused ignition switch output (run/start) circuit to the run-start relay in the TIPM as required.
3. Disconnect the overhead wire harness connector from the automatic dimming inside rear view mirror. Check for battery voltage at the fused ignition switch output (run-start) circuit cavity of the overhead wire harness connector for the mirror. If OK, go to 4. If not OK, repair the open fused ignition switch output (run/start) circuit to the fuse in the TIPM as required.
4. Turn the ignition switch to the OFF position. Check for continuity between the ground circuit cavity of the overhead wire harness connector for the automatic dimming inside rear view mirror and a good ground. There should be continuity. If OK, go to 5. If not OK, repair the open circuit to ground as required.
5. Turn the ignition switch to the ON position. Set the parking brake. Place the transmission gear selector lever in the REVERSE position. Check for battery voltage at the backup lamp switch output circuit cavity of the overhead wire harness connector for the automatic dimming inside rear view mirror. If OK, reconnect the overhead wire harness connector to the mirror and go to 6. If not OK, repair the open backup lamp switch output circuit as required.
6. Place the transmission gear selector lever in the NEUTRAL position. Place the automatic dimming inside rear view mirror switch in the ON (green LED indicator illuminated) position. Cover the forward facing ambient photocell light sensor to keep out any ambient light.

NOTE: **The ambient photocell sensor must be covered completely, so that no light reaches the sensor. Use a finger pressed tightly against the sensor, or cover the sensor completely with electrical tape.**

7. Shine a light into the rearward facing headlamp photocell light sensor. The automatic dimming mirror glass should darken within 2 minutes if testing for the first time. For an immediate response, turn the mirror switch to the OFF position and back to the ON position with the forward-facing ambient light sensor still covered. This defeats the daylight detection logic of the mirror. If OK, go to 8. If not OK, replace the ineffective mirror unit.
8. With the mirror darkened, place the transmission gear selector lever in the REVERSE position. The automatic dimming mirror glass should return to its normal reflectance. If not OK, replace the ineffective mirror unit.

BENCH TESTING

Bench testing of both the inside and the driver side outside mirrors can be done if proper care is exercised. Connect the inside mirror ground terminal pin to ground and the fused ignition switch output (run-start) terminal pin to 12 volts. The inside mirror can now be tested by completely blocking the ambient photocell (forward-facing) light sensor and shining a light into the headlight photocell (rearward-facing) light sensor.

CAUTION: **In the following test, 1.2 volts is applied to the outside mirror dimming circuits. DO NOT apply 12 volts to these circuits or the mirror dimming circuitry will be damaged and require replacement.**

For an outside mirror, there are two pigtail wire circuits (auto day/night mirror plus and auto day/night mirror minus) that are normally controlled by the outputs from the inside mirror circuitry. Applying **1.2 volts** to these two circuits should cause the outside mirror glass to darken. If the mirror glass does not darken, the entire mirror glass and case assembly can be replaced just as it is when the glass has been broken. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** or **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** .

MIRROR, OUTSIDE REARVIEW

DESCRIPTION

DESCRIPTION

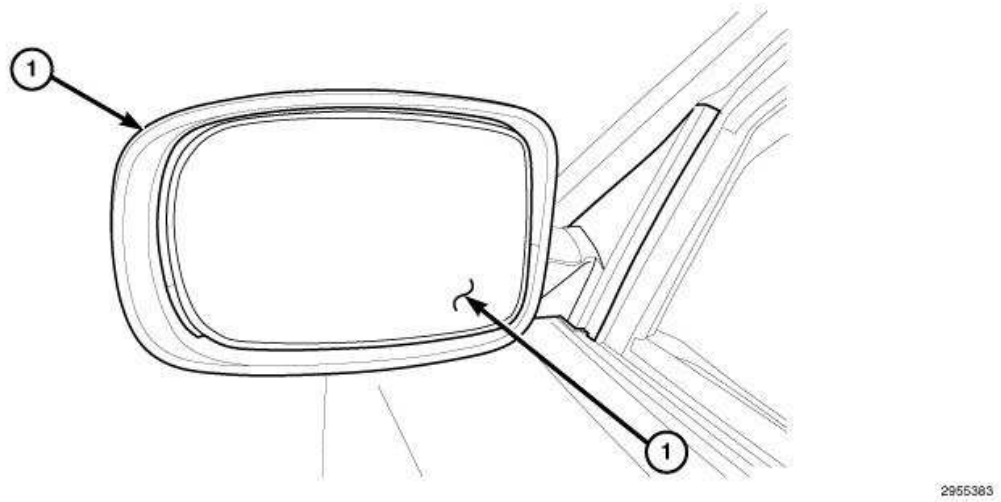

Fig. 4: Power Operated Outside Rear View Mirrors
Courtesy of CHRYSLER GROUP, LLC

The power operated outside rear view mirrors (1) allow the driver to adjust both mirrors electrically from the driver seat position by operating switches integral to the power switch module on the driver side front door trim panel. The power outside mirrors operate on non-switched battery current received through a fuse in the Power Distribution Center (PDC) so that the mirrors remain operational, regardless of the ignition switch position.

Each power mirror housing contains two electric motors, two drive mechanisms, the mirror glass case and the mirror glass (2). One motor and drive controls mirror up-and-down (vertical) movement, and the other controls right-and-left (horizontal) movement. Vehicles manufactured for certain export markets also have a power folding mirror option. These mirrors include a third motor and drive mechanism that allow the mirror to be folded inward and outward from the driver seat position for additional clearance through narrow passages or in tight parking spaces.

A memory system that automatically positions the driver power mirror for two different drivers is an available option. With the memory system, the driver side mirror head also contains two position potentiometers. One position potentiometer monitors the vertical mirror motor, and the other monitors the horizontal mirror motor. Refer to **DESCRIPTION** .

The standard equipment mechanically folding or the optional power folding, power operated outside rear view mirrors are also electrically heated. The mirror heater only operates when the ignition switch is in the ON position and the rear window defogger switch is turned ON. When the rear window defogger switch is in the ON position, electric heater grids on the rear window glass and behind both outside rear view mirror glasses are energized. These electric heater grids produce heat to help clear the rear window glass and outside rear view mirrors of ice, snow, or fog. Refer to **DESCRIPTION** .

On vehicles equipped with the optional automatic dimming inside rear view mirror, an optional driver side automatic dimming outside rear view mirror that darkens the mirror to reduce the glare of bright lights approaching the vehicle from behind is available. This mirror is controlled an output of the automatic dimming inside rear view mirror. Like the automatic dimming inside rear view mirror, a thin layer of electrochromic material between two pieces of conductive glass make up the face of the

mirror glass. Refer to **MIRROR, AUTOMATIC DAY AND NIGHT, DESCRIPTION**.

An optional integrated turn signal mirror is also available that includes a Light Emitting Diode (LED) turn signal module integrated into the lower forward facing surface of each outside rear view mirror. Refer to **DESCRIPTION** .

On vehicles equipped with the optional Blind Spot Monitor (BSM) system, a Light Emitting Diode (LED) display unit is concealed behind the outside rear view mirror glass. This unit illuminates an amber triangle icon through the lower edge of the mirror glass to give the vehicle operator an indication that an object has been detected by the BSM system. Refer to **DESCRIPTION** .

The power outside rear view mirror unit cannot be repaired. Only the LED turn signal modules and the mirror glass and glass case are serviced separately. If any other component of the power mirror unit is ineffective or damaged, the entire power mirror unit must be replaced. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** or **MIRROR, OUTSIDE REARVIEW, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** for the appropriate service information.

OPERATION

OPERATION

The power operated outside rear view mirrors are connected to battery current at all times. Each mirror head contains two electric motors, two drive mechanisms, an electric heating element and the mirror glass. If the vehicle is equipped with the high current door power switch module configuration, hard-wired ground and battery current outputs to each power mirror motor determine whether the horizontal or the vertical motor will be operated and the polarity of those outputs control the direction in which the motor will move the drive unit and mirror glass.

Power mirror and mirror switch functionality is the same with the low current configuration; however, the driver door power switch module sends power mirror switch status messages over the Local Interface Network (LIN) data bus to the driver front door control module. The driver front door control module then controls the high current outputs to the driver door mirror motors or sends electronic request messages over the Controller Area Network (CAN) Interior High Speed (IHS) data bus to the passenger front door control module to control high current outputs to the passenger door mirror motors.

The standard equipment power outside rear view mirrors are electrically heated. In the high current door power switch module configuration, the heater grid behind each mirror glass is energized whenever the rear window defogger relay is energized by the Totally Integrated Power Module (TIPM) in response to electronic defogger switch status messages received over the CAN data bus from the A/C-heater control. In the low current door power switch configuration each front door control module responds to the electronic defogger switch status messages received over the CAN data bus from the A/C-heater control to control the high current output to the heater grid of the mirror on the same door as appropriate.

On vehicles equipped with the optional driver side automatic dimming outside rear view mirror, the mirror reflectance is controlled by the driver front door control module based upon hard-wired inputs received from the automatic dimming inside rear view mirror. On vehicles equipped with the optional signal mirrors, the turn signal Light Emitting Diode (LED) module in each mirror is controlled by the front door control module on the same door based upon electronic request messages received over the CAN data bus from the TIPM.

Vehicles manufactured for certain export markets are equipped with a power folding mirror option that includes another motor and drive unit in each outside mirror and a power folding mirror switch button located between the right and left power mirror selector buttons in the driver door power switch module. Each time the momentary power folding mirror switch button is depressed, both outside rear view mirrors are cycled from folded to unfolded, or from unfolded to folded. If the vehicle is equipped with the optional memory system, the driver side mirror head also contains both a horizontal and a vertical motor position sensor. When the memory set procedure is carried out, the memory module learns the outputs of the mirror position sensors so that those positions can be recalled later.

If the vehicle is equipped with the optional Blind Spot Monitor (BSM) system, an LED display unit behind the lower edge of each mirror glass illuminates an amber triangle to indicate to the vehicle operator that an object has been detected by the BSM system. The BSM LED display is controlled by the front door control modules based upon electronic messages received from the BSM control module over the CAN data bus.

SWITCH, MIRROR

DESCRIPTION

DESCRIPTION

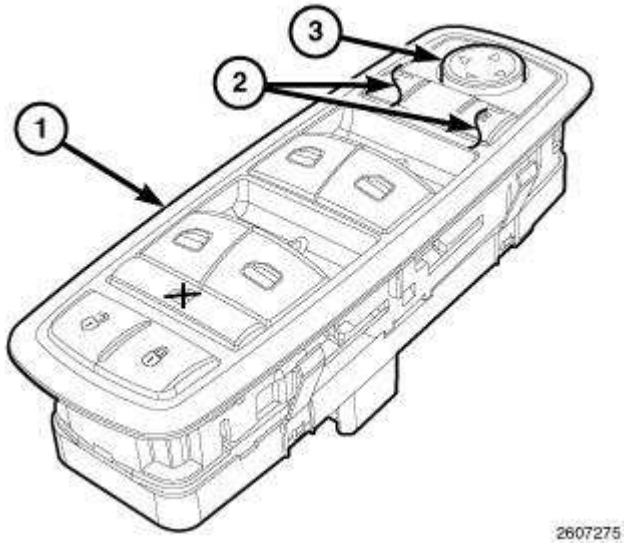

Fig. 5: Driver Front Door Power Switch Module
Courtesy of CHRYSLER GROUP, LLC

The power mirror system includes two selector switches (2) and an adjuster switch (3) that are

located on the driver front door trim panel and are only serviced as an integral part of the driver front door power switch module (1). Refer to **SWITCH, POWER WINDOW, REMOVAL** and **SWITCH, POWER WINDOW, INSTALLATION** for the appropriate service information.

OPERATION

OPERATION

The power operated outside rear view mirrors are connected to battery current at all times. Each mirror head contains two electric motors, two drive mechanisms, an electric heating element and the mirror glass. A mirror selector switch button is depressed in the driver door power switch module to determine whether the mirror adjuster switch will have control over the right or left mirror.

The driver door power switch module sends power mirror switch status messages over the Local Interface Network (LIN) data bus to the driver front door control module. The driver front door control module then controls the high current outputs to the driver door mirror motors or sends electronic request messages over the Controller Area Network (CAN) Interior High Speed (IHS) data bus to the passenger front door control module to control high current outputs to the passenger door mirror motors.

SWITCH, POWER FOLDAWAY MIRROR

DESCRIPTION

DESCRIPTION

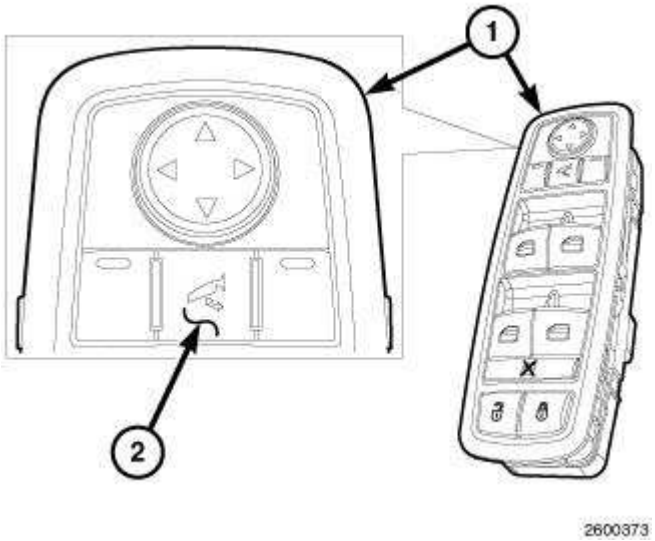

Fig. 6: Driver Door Power Switch Module
Courtesy of CHRYSLER GROUP, LLC

Vehicles manufactured for certain export markets where it is required, are equipped with power foldaway outside rear view mirrors. Vehicles equipped with these power foldaway mirrors have a dedicated power folding mirror switch and switch button (2) identified by an International Standards

Organization (ISO) icon. This switch button is located between the power mirror switch selector buttons just below the power mirror adjusting switch button. The power folding mirror switch is integral to the driver door power switch module (1) as are the other power mirror, window and lock switches.

The power folding mirror switch cannot be repaired and, if ineffective or damaged, it must be replaced as a unit with the driver door power switch module. Refer to **SWITCH, POWER WINDOW, REMOVAL** and **SWITCH, POWER WINDOW, INSTALLATION** for the appropriate service information.

ACCESSORIES AND EQUIPMENT

Power Seats - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

NOTE: Driver seat shown in illustrations. Front passenger seat similar.

POWER SEAT SYSTEM

The power seat system allows the driver and front seat passenger (when equipped) to electrically adjust their seating positions using the power seat switches located on the outboard seat cushion side shield.

The standard driver side six-way power seat includes a six-way adjustable seat cushion track and a manual recline and fold flat feature. The seat can be electrically adjusted forward, rearward, up, down and seat front only, up and down.

The available driver and passenger side twelve-way power seats include a six-way adjustable seat cushion track and two-way power seat back, along with a four-way power lumbar support. The seats can be electrically adjusted forward, rearward, up, down, seat front only up and down, recliner forward and rearward, and lumbar support in, out, up and down. A memory driver seat option is available that automatically positions the twelve-way driver power seat for two different operators.

The power seat contains reversible motors that are connected to worm-drive gearboxes that move the seat through a combination of screw-type drive units. On vehicles equipped with non-memory power seats, each motor contains a self-resetting circuit breaker to protect it from overload. On vehicles equipped with memory seat, the motor overload protection is a function of the Memory Seat Module (MSM). Consecutive or frequent resetting of the circuit breakers may damaged the motors.

The power seating system is also available with heated seat options. Refer to **DESCRIPTION** .

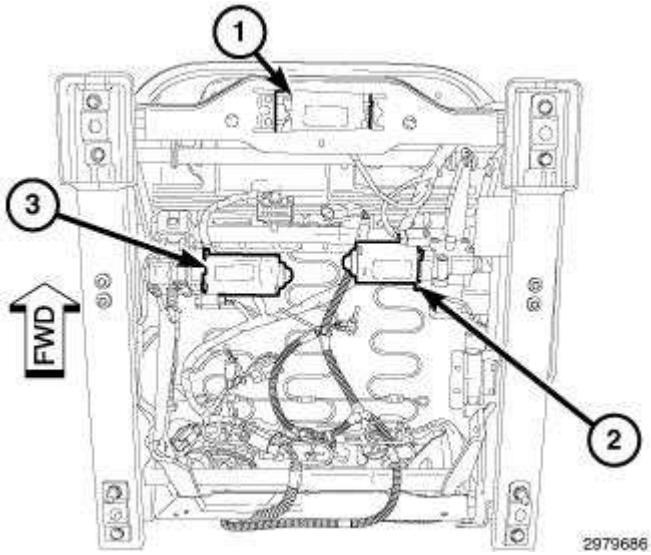

Fig. 1: Fore/Aft Motor, Front Tilt Motor & Rear Tilt Motor
Courtesy of CHRYSLER GROUP, LLC

The power seat track for this vehicle includes the following:

- **Fore/Aft Motor** (1) - located at the front of the seat track.
- **Front Tilt Motor** (2) - located on the left side of the seat track.
- **Rear Tilt Motor** (3) - located on the right side of the seat track.

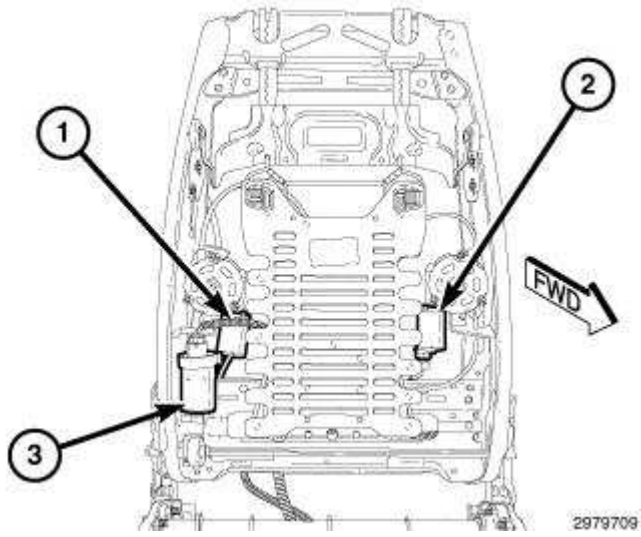

Fig. 2: Lumbar Motors & Recliner Motor
Courtesy of CHRYSLER GROUP, LLC

The power seat back for this vehicle includes the following:

- **Lumbar Motors** (1 and 2) - two motors located on the power lumbar mechanism, in seat back frame.

- **Recliner Motor** (3) - located on the power recline mechanism, on the right side of the seat back frame.

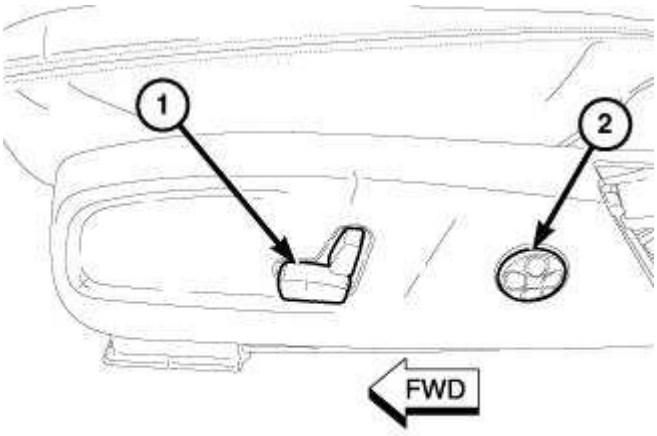

Fig. 3: Seat Position Switch & Lumbar Switch
Courtesy of CHRYSLER GROUP, LLC

The power seat for this vehicle can include the following switches:

- **Seat Position Switch** (1) - located at the center of the outboard seat cushion trim panel. Vehicles may be equipped with driver only, or driver and passenger power seats. One seat switch is used for each front seat. The power seat switches are paddle-type levers. Movement of the seat cushions and backs mimics the action of the switch paddles. The driver power seat switch type (memory or non-memory) can be identified by the color of the switch electrical connector receptacle. Memory switches have a light gray connector receptacle and non-memory have a black receptacle.
- **Lumbar Switch** (2) - located at the rear of the outboard seat cushion trim panel. The power lumbar switch is a four-way rocker type switch. Lumbar support can be increased and decreased, and the support area can be lowered or raised for added driver comfort.

MEMORY SEAT SYSTEM

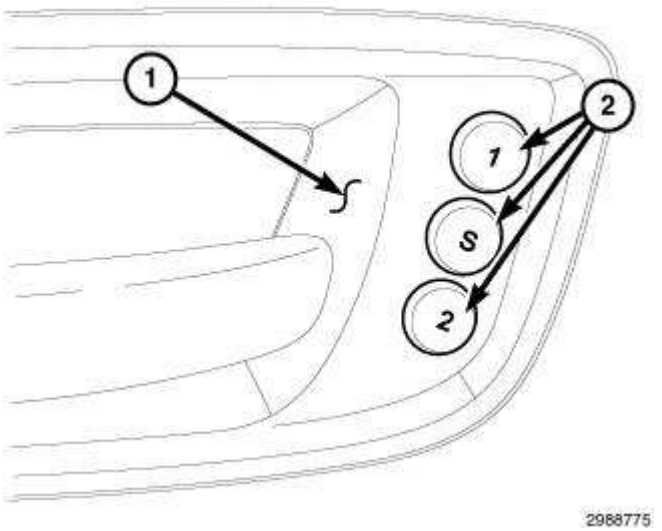

Fig. 4: Memory Switch & Driver Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

An electronic memory seat system is available on certain models. The memory seat system is able to store and recall all driver side power seat positions, driver side power rear view mirror position and power steering column position, when equipped. The system can be set for two different drivers. The memory system is also able to store and recall up to twenty radio station presets for two drivers (ten AM and ten FM). The memory system also will store and recall the last station listened to for each driver, even if it is not one of the twenty preset stations.

The memory system will automatically recall all of these settings when a button of the memory switch (2) located on the driver door trim panel (1) is pressed, or when the doors are unlocked using a FOBIK transmitter (if enabled).

The memory system also has a customer programmable easy exit feature. When the ignition switch is turned off, the driver seat will move rearward 55 millimeters (2.2 inches) or to the end of its travel, whichever occurs first.

The memory system includes the following components:

- **Body Control Module (BCM)** - located behind the passenger side of the instrument panel.
- **FOBIC Transmitter** - located in each key fob.
- **Hall Effect Sensors - Power Drivers Mirror** - located in the two drivers side view mirror motors. Used to provide a reference signal to the memory seat module, letting the module know the exact position of the mirror.
- **Hall Effect Sensors - Power Seat** - located in each of the power seat track and recliner motor. Used to provide a reference signal to the memory seat module, letting the module know the exact position of the seat and recliner.
- **Hall Effect Sensors - Power Adjustable Steering Column** - located in the two steering column motors. They are used to provide a reference signal to the memory seat module, letting the module know the exact position of the column.

- **Memory Seat Module (MSM)** - located underneath the driver seat.
- **Memory Seat Switch** - located in the driver door trim panel.
- **Telematics Gateway (TGW)** - located in the center of the instrument panel.
- **Wireless Ignition Node (WIN)** - located in the instrument panel.

Certain functions and features of the memory system rely upon resources shared with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. The CAN bus allows the sharing of sensor information. This helps to reduce wire harness complexity, internal controller hardware and component sensor current loads. At the same time, this system provides increased reliability, enhanced diagnostics and allows the addition of many new feature capabilities. A scan tool is required for diagnosis of the electronic modules and the CAN bus (Refer to appropriate diagnostic information).

OPERATION

OPERATION

POWER SEAT SYSTEM

When a power seat switch is actuated, a battery feed and a ground path are applied through the power seat switch contacts to the appropriate motor or motors. The motor and drive unit operate to move the seat adjuster, seat back or lumbar support (when equipped) in the selected direction until the switch is released, or until the travel limit of the drive unit is reached. When the switch is moved in the opposite direction, the battery feed and ground path to the motor is reversed through the switch contacts. This causes the motor to run in the opposite direction. Power seats remain operational, regardless of the ignition switch position.

NOTE: **When equipped with memory seat system, anytime a driver power seat motor or seat track is replaced, the Memory Seat Module (MSM) must be cleared of all learned parameters using a scan tool and the Power Seat System Verification test must be performed.**

The motors, gearboxes and linkage for the power seat adjuster, power reclining seat back and power lumbar support cannot be adjusted or serviced separately. If a motor, gearbox or linkage for the power seat adjuster, power recliner or power lumbar becomes inoperative or damaged, the entire power seat adjuster and pan assembly, or the seat back frame assembly must be replaced. Refer to **ADJUSTER, SEAT, FRONT, REMOVAL** or **COVER, SEAT BACK, FRONT, REMOVAL** .

MEMORY SEAT SYSTEM

When one of the two driver memory seat switches is pressed, a resistance signal is sent to the Memory Seat Module (MSM) over the Controller Area Network (CAN) data bus. The MSM is responsible for the 12 volt Direct Current (DC) feed and ground path to the power seat motors. The motors move the power seat through their drive units until the correct preset location is achieved.

NOTE: **When equipped with memory seat system, anytime a Memory Seat Module**

(MSM) is replaced, the MSM must be cleared of all learned parameters using a scan tool and the Power Seat System Verification test must be performed.

The MSM receives the memory seat switch set and selection inputs through the CAN bus circuit, along with input signals from the hall effect sensors in the driver side mirror and power adjustable steering column (when equipped), and hardwired input signals from the hall effect sensors mounted in each of the driver power seat motors. The programmed software in the module allow it to know where the driver seat, driver side mirror and power adjustable steering column (when equipped) are located in their designed travel, by the pulse count generated from each hall effect sensor. This way, when a memory switch is pressed, the MSM powers the driver seat, driver side mirror and power adjustable steering column (when equipped), until each correct preset location is achieved. The MSM will prevent seat memory recall function from being initiated if the transmission gear selector lever is not in the Park position or if the driver seat belt is latched. These inputs are monitored by the MSM over the CAN bus.

- A memory setting is saved by pressing the "set" button, then pressing either the memory "1" or "2" button within five seconds of pressing the "set" button.
- A memory setting is recalled by pressing either the memory "1" or "2" button, or by pressing the unlock button on a "linked" Remote Keyless Entry (RKE) transmitter.

DIAGNOSIS AND TESTING

MEMORY SEAT SYSTEM

In order to obtain conclusive testing of the power seats with and without the memory system option, the Controller Area Network (CAN) data bus, and all of the electronic modules that provide inputs to, or receive outputs from the memory system components must be checked. Use a scan tool and the proper diagnostic information to accurately diagnose the power seat and memory seat systems.

NOTE: Vehicles equipped with the memory/heated seat option utilize a low voltage cut-off feature. This feature turns off battery power to the power seat system anytime vehicle voltage is below 11 volts. Be certain to check the vehicle electrical system for proper voltage anytime the power seat system appears inoperative.

Before any testing of the power seat system is attempted, the battery should be fully-charged. Refer to **BATTERY, STANDARD PROCEDURE** .

POWER SEAT SYSTEM

NOTE: For complete circuit diagrams, see Wiring Information. Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.

Operate the power seat switches and power lumbar support switch. Move the seat, seat back and

power lumbar support in all directions. The seat and lumbar support should move in each of the selected directions. If any of the power seat and/or lumbar support motors fail to operate in more than one direction, proceed as follows:

1. Inspect the power seat and power lumbar motors to ensure the electrical connectors are fully connected to the motors. If OK, go to Step 2. If not OK, reconnect the electrical connector(s).
2. Check the power seat fuse in the Power Distribution Center (PDC). If OK, go to Step 3. If not OK, replace the fuse.
3. Remove the power seat switch and/or power lumbar switch from the seat cushion side panel. Check for battery voltage at the fused B(+) circuit cavity of the switch wire harness connector. If OK, go to Step 4. If not OK, repair the open circuit as required.
4. Check for continuity between the ground circuit cavity of the power seat switch and/or power lumbar switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 5. If not OK, repair the open circuit to ground as required.
5. Test the power seat switch and/or power lumbar switch. Refer to **SWITCH, SEAT, DIAGNOSIS AND TESTING** and **SWITCH, LUMBAR CONTROL, DIAGNOSIS AND TESTING**. If the switch tests OK, check the wire harness between the switch and the motor(s) (See Wiring information). If the circuits check OK, replace the inoperative power seat track and pan assembly or the seat back assembly (Refer to **SEATS**). If the circuits are not OK, repair the wire harness as required.

STANDARD PROCEDURE

STANDARD PROCEDURE - MEMORY SYSTEM PROGRAMMING

The Memory Seat Module (MSM) interfaces with the Remote Keyless Entry (RKE) system via the Controller Area Network (CAN) bus. The proper procedure of setting and recalling a memory position using the RKE is as follows:

1. Press and release memory switch 1 or 2 to recall memory position 1 or 2.
2. Adjust the seat, recliner, adjustable pedal position, set radio station presets, set HVAC temperature preset, and the side view mirrors to the desired position.
3. Press momentarily and release memory switch S.
4. Within five seconds, press momentarily and release memory switch 1 or 2.
5. To link the RKE transmitter: within ten seconds, press and release the "LOCK" button on one of the RKE transmitters

To program the second driver's position, repeat the above procedure using memory switch 2. The second RKE transmitter can be programmed in the same fashion as indicated. Refer to 5.

NOTE: **The module will abort a recall if the transmission is moved out of park or if any seat movement is activated whether manually or by memory recall. The module will also abort a recall if any movement of the adjustable pedals is detected.**

To recall either of the programmed positions momentarily press and release either memory selector

switch 1 or 2. If using RKE, just press and release the "UNLOCK" button on the proper transmitter for either position 1 or 2.

A recall is possible any time the vehicle transmission is in PARK and the seatbelt is unbuckled. This condition is monitored by the MSM.

SWITCH, LUMBAR CONTROL

DESCRIPTION

DESCRIPTION

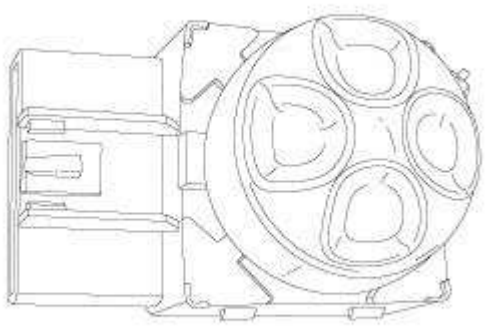

Fig. 5: Power Lumbar Switch
Courtesy of CHRYSLER GROUP, LLC

The driver power lumbar can be adjusted in four different ways using the power lumbar switch, located on the outboard seat cushion side shield, on models so equipped. The power lumbar support can be adjusted inward, outward, upward and downward for added driver comfort.

OPERATION

OPERATION

When a power lumbar support switch is actuated, a battery feed and a ground path are applied through the switch contacts to the power lumbar support adjuster. The selected lumbar support adjuster motor operates the lumbar support adjuster mechanism through its drive unit in the selected direction until the switch is released, or until the travel limit of the adjuster is reached. When the switch is moved in the opposite direction, the battery feed and ground path to the motor are reversed through the switch contacts. This causes the selected power lumbar support adjuster motor to run in the opposite direction.

On vehicles equipped with the memory seat system, the driver memory seat switch provides a

resistive signal/input to the Memory Seat Module (MSM). The MSM is responsible for the 12 volt battery feed and ground path to the power lumbar support adjuster motor.

No power lumbar support switch should be held applied in any direction after the adjuster has reached its travel limit. The power lumbar support adjuster motors each contain a self-resetting circuit breaker to protect them from overload. However, consecutive or frequent resetting of the circuit breaker may result in motor damage.

The power lumbar switch cannot be adjusted or repaired and must be replaced if damaged or inoperative.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

NOTE: For complete circuit diagrams, see Wiring Information. Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.

POWER LUMBAR SWITCH

DRIVER SEAT

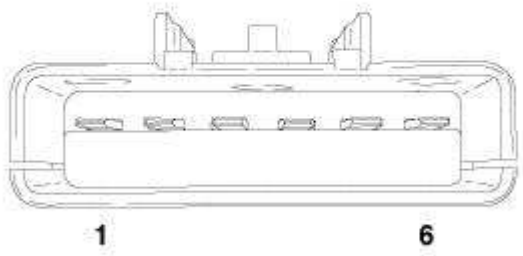

Fig. 6: Power Lumbar Switch Connector Terminals
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the power lumbar support switch from the seat. Refer to **SWITCH, LUMBAR CONTROL, REMOVAL**.
3. Use an ohmmeter to test the continuity of the power lumbar support switch using the following

table. If not OK, replace the inoperative power lumbar support switch. If switch tests OK, check for an open or short in the power lumbar support circuit wiring. If no open or short is found, replace the power lumbar support adjuster motor(s) as required.

DRIVER SEAT LUMBAR SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	1-2, 1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-4, 3-5, 4-5
UP	1-2, 1-3, 1-4, 2-3, 2-4, 3-4, 5-6
DOWN	1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-4, 3-5, 4-5
IN	1-2, 1-4, 1-5, 2-6, 3-4, 3-5, 4-5
OUT	2-4, 2-5, 3-6, 4-5

PASSENGER SEAT

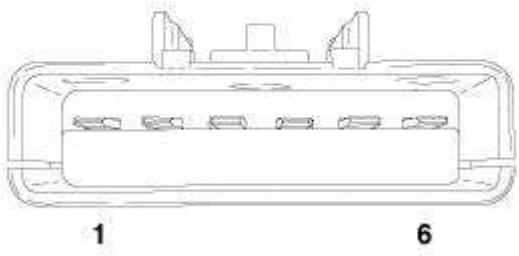

Fig. 7: Power Lumbar Switch Connector Terminals
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the power lumbar support switch from the seat. Refer to **SWITCH, LUMBAR CONTROL, REMOVAL**.

3. Use an ohmmeter to test the continuity of the power lumbar support switch using the following table. If not OK, replace the inoperative power lumbar support switch. If switch tests OK, check for an open or short in the power lumbar support circuit wiring. If no open or short is found, replace the power lumbar support adjuster motor(s) as required.

PASSENGER SEAT LUMBAR SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	1-2, 1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-4, 3-5, 4-5
UP	1-2, 1-3, 1-4, 2-3, 2-4, 3-4, 5-6
DOWN	1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-4, 3-5, 4-5
IN	2-4, 2-5, 3-6, 4-5
OUT	1-2, 1-4, 1-5, 2-6, 3-4, 3-5, 4-5

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Driver seat shown in illustration. Passenger seat similar.

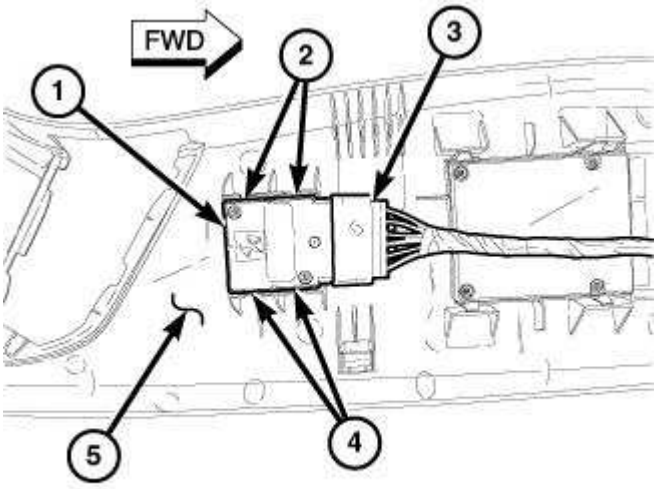

Fig. 8: Electrical Connector, Power Lumbar Control Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat being serviced all the way forward.
2. Disconnect and isolate the negative battery cable.

NOTE: It is not necessary to remove the seat belt anchor from the seat when servicing the power lumbar control switch.

3. Remove the outboard seat cushion side trim panel (5) from the seat (Refer to **SEATS**).
4. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, carefully disengage the four tabs (2 and 4) that secure the lumbar control switch (1) to the seat cushion side trim panel.
5. Disconnect the electric connector (3) from the lumbar control switch and remove the switch.

INSTALLATION

INSTALLATION

NOTE: Driver seat shown in illustration. Passenger seat similar.

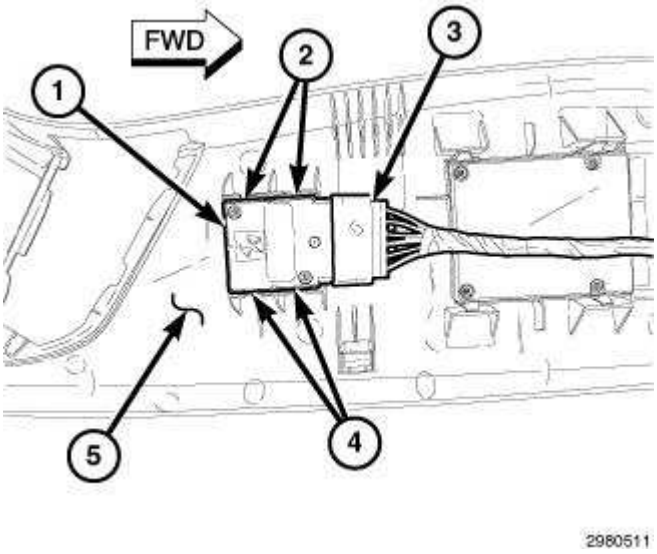

Fig. 9: Electrical Connector, Power Lumbar Control Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Connect the electrical connector (3) to the power lumbar control switch (1). Make sure the connector is fully engaged to the switch.
2. Position the lumbar control switch to the seat cushion side trim panel (5) and engage the four retaining tabs (2 and 4) that secure the switch to the trim panel. Make sure the retaining tabs are fully engaged.
3. Install the outboard seat cushion side trim panel (Refer to **SEATS**).
4. Connect the negative battery cable.
5. Verify proper power lumbar support operation.

SWITCH, MEMORY

DESCRIPTION

DESCRIPTION

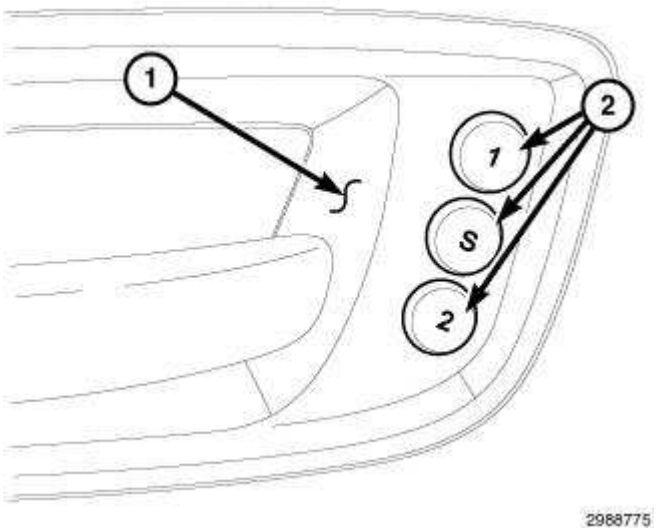

Fig. 10: Memory Switch & Driver Door Trim Panel
Courtesy of CHRYSLER GROUP, LLC

When equipped, the memory seat switch (2) is located on the driver door trim panel (1). The driver seating position can be automatically adjusted for two different driver preference settings using the memory seat switch. The memory seat system is able to store and recall all driver power seat positions (fore/aft, up/down, tilt and recline), driver side power rear view mirror position and the power adjustable steering column position, when equipped. The memory system is also able to store and recall up to twenty radio station presets for two drivers (ten AM and ten FM). The memory system also will store and recall the last station listened to for each driver, even if it is not one of the twenty preset stations.

OPERATION

OPERATION

When one of the two driver memory seat switches is pressed, a resistance signal is sent to the Memory Seat Module (MSM) over the Controller Area Network (CAN) data bus. The MSM is responsible for the 12 volt Direct Current (DC) feed and ground path to the power seat motors.

The MSM receives the memory seat switch set and selection inputs through the CAN bus circuit, along with input signals from the hall effect sensors in the driver side mirror and power adjustable steering column (when equipped), and hardwired input signals from the hall effect sensors mounted in each of the driver power seat motors. The programmed software in the module allow it to know where the driver seat, driver side mirror and power adjustable steering column (when equipped) are located in their designed travel, by the pulse count generated from each hall effect sensor. This way, when a memory switch is pressed, the MSM powers the driver seat, driver side mirror and power adjustable steering column (when equipped), until each correct preset location is achieved. The MSM will prevent seat memory recall function from being initiated if the transmission gear selector lever is not in the Park position or if the driver seat belt is latched. These inputs are monitored by the MSM over the CAN bus.

- A memory setting is saved by pressing the "set" button, then pressing either the memory "1" or "2" button within five seconds of pressing the "set" button.
- A memory setting is recalled by pressing either the memory "1" or "2" button, or by pressing the unlock button on a "linked" Remote Keyless Entry (RKE) transmitter.

The memory seat switch is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The memory seat switch cannot be adjusted or repaired and must be replaced if damaged or inoperative.

REMOVAL

REMOVAL

NOTE: Take the proper precautions to protect the door handle and bezel from cosmetic damage while performing this procedure.

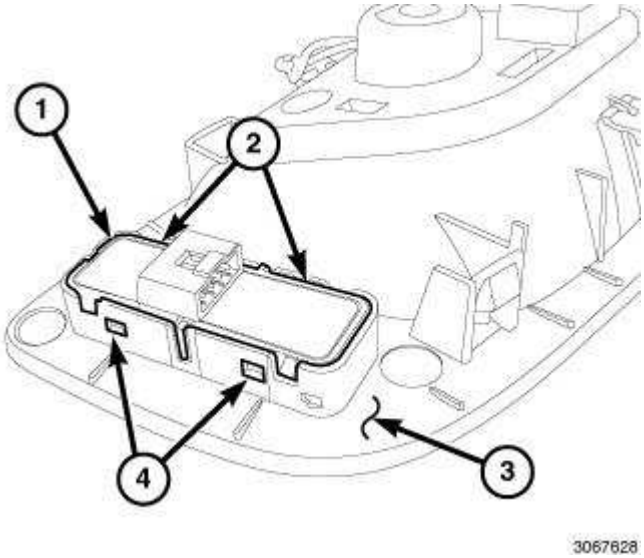

Fig. 11: Memory Seat Switch & Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the driver door handle and place it on a workbench. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Using an appropriate flat bladed tool, gently disengage the four retaining tabs (2 and 4) that secure the memory seat switch (1) to the back of the driver door handle bezel (3).
4. Remove the memory seat switch from the driver door handle bezel.

INSTALLATION

INSTALLATION

NOTE: **Take the proper precautions to protect the door handle and bezel from cosmetic damage while performing this procedure.**

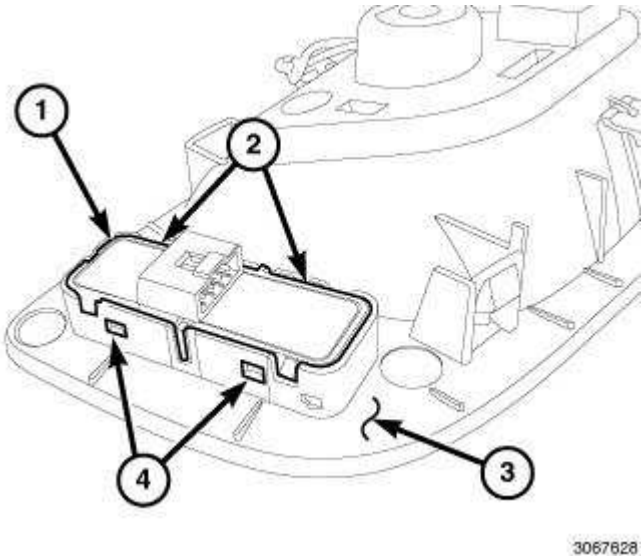

Fig. 12: Memory Seat Switch & Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Install the memory seat switch (1) into the driver door handle bezel (3). Push the switch firmly into the bezel until the retaining tabs (2 and 4) are fully engaged.
2. Install the driver door handle and bezel. Refer to **PANEL, DOOR TRIM, INSTALLATION** .
3. Reconnect the negative battery cable.
4. Using a scan tool, perform the Power Seat System Verification test. Refer to **STANDARD PROCEDURE** .
5. Verify proper memory seat system operation.

SWITCH, SEAT

DESCRIPTION

DESCRIPTION

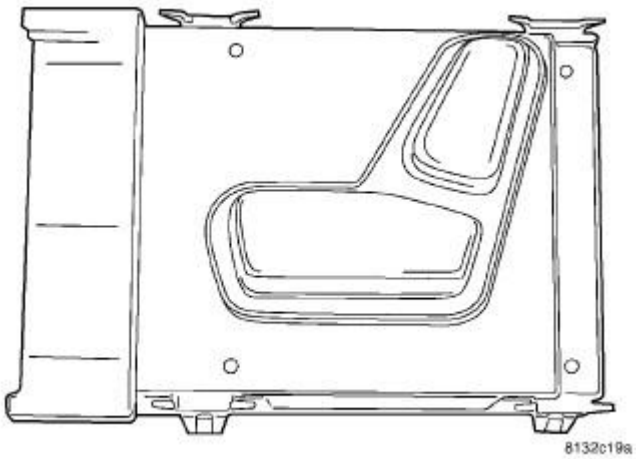

Fig. 13: Power Seat Switches
Courtesy of CHRYSLER GROUP, LLC

NOTE: Driver power seat switch shown in illustration.

The standard driver power seat and available power front passenger seats can be adjusted using the power seat switch located on the outboard seat cushion side shield.

OPERATION

OPERATION

When a power seat switch is actuated, a battery feed and a ground path are applied through the switch contacts to the power seat adjuster or recliner adjuster motor. The selected seat adjuster motor operates to move the seat or recliner through its drive unit in the selected direction until the switch is released, or until the travel limit of the adjuster is reached. When the switch is moved in the opposite direction, the battery feed and ground path to the motor are reversed through the switch contacts. This causes the seat adjuster motor to run in the opposite direction.

On vehicles equipped with the memory seat system, the driver memory seat switch provides a resistive signal/input to the Memory Seat Module (MSM). The MSM is responsible for the 12v battery feed and ground path to the power seat adjuster motor. The adjuster motor operates to move the seat adjuster mechanism through its drive unit in the selected direction until the switch is released, or until the travel limit of the adjuster is reached.

No power seat switch should be held applied in any direction after the adjuster has reached its travel limit. The power seat adjuster motors each contain a self-resetting circuit breaker to protect them from overload. However, consecutive or frequent resetting of the circuit breaker may result in motor damage.

The individual switches in the power seat switch cannot be adjusted or repaired. If one switch is damaged or inoperative, the entire power seat switch must be replaced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER SEAT SWITCH

6-WAY DRIVER SEAT

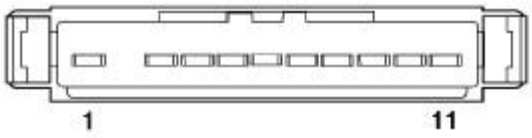

Fig. 14: Power Seat Switch Terminals
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the power seat switch from the seat. Refer to **SWITCH, SEAT, REMOVAL**.
3. Use an ohmmeter to test the continuity of the power seat switch using the following table. If not OK, replace the inoperative power seat switch. If switch tests OK, check for an open or short in the power seat circuit wiring. If no open or short is found, replace the power seat track and pan assembly. Refer to **ADJUSTER, SEAT, FRONT, REMOVAL** .

6-WAY DRIVER SEAT SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
HORIZONTAL FORWARD	6-8, 7-1, 7-3, 7-4, 7-5, 7-9, 7-10, 7-11
HORIZONTAL REARWARD	6-4, 7-1, 7-3, 7-5, 7-8, 7-9, 7-10, 7-11
FRONT TILT DOWN	6-5, 7-1, 7-3, 7-4, 7-8, 7-9, 7-10, 7-11
FRONT TILT UP	6-9, 7-1, 7-3, 7-4, 7-5, 7-8, 7-10, 7-11
REAR TILT DOWN	6-10, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-11
REAR TILT UP	6-11, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10

8-WAY DRIVER SEAT WITHOUT MEMORY

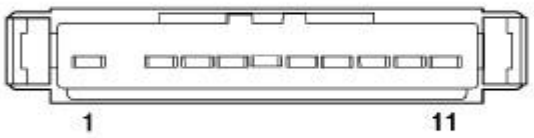

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Fig. 15: Power Seat Switch Terminals
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the power seat switch from the seat. Refer to **SWITCH, SEAT, REMOVAL**.
3. Use an ohmmeter to test the continuity of the power seat switch using the following table. If not OK, replace the inoperative power seat switch. If switch tests OK, check for an open or short in the power seat circuit wiring. If no open or short is found, replace the power seat track and pan assembly or seat back frame, as required (Refer to **SEATS**).

8-WAY DRIVER SEAT SWITCH CONTINUITY - WITHOUT MEMORY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
RECLINER UP	6-3, 7-1, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
RECLINER DOWN	6-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
HORIZONTAL FORWARD	6-8, 7-1, 7-3, 7-4, 7-5, 7-9, 7-10, 7-11
HORIZONTAL REARWARD	6-4, 7-1, 7-3, 7-5, 7-8, 7-9, 7-10, 7-11
FRONT TILT DOWN	6-5, 7-1, 7-3, 7-4, 7-8, 7-9, 7-10, 7-11
FRONT TILT UP	6-9, 7-1, 7-3, 7-4, 7-5, 7-8, 7-10, 7-11
REAR TILT DOWN	6-10, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-11
REAR TILT UP	6-11, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10

8-WAY DRIVER SEAT WITH MEMORY

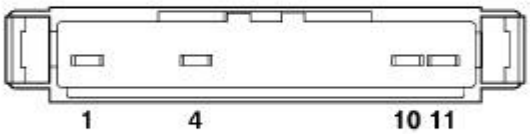

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Fig. 16: Power Seat Switch Terminals
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the power seat switch from the seat. Refer to **SWITCH, SEAT, REMOVAL**.
3. Use an ohmmeter to test the continuity of the power seat switch using the following table. If not OK, replace the inoperative power seat switch. If switch tests OK, check for an open or short in the power seat circuit wiring. If no open or short is found, replace the power seat track and pan assembly or seat back frame, as required (Refer to **SEATS**).

8-WAY DRIVER SEAT SWITCH CONTINUITY - WITH MEMORY

SWITCH POSITION	CONTINUITY BETWEEN	RESISTANCE VALUE
OFF	10-4	OPEN
OFF	10-11	OPEN
OFF	1-4	47 OHMS
OFF	1-11	47 OHMS
REAR TILT UP	10-11	169 OHMS
REAR TILT DOWN	10-11	76 OHMS
HORIZONTAL FORWARD	10-11	43 OHMS
HORIZONTAL REARWARD	10-11	10 OHMS
RECLINER UP	10-4	43 OHMS
RECLINER DOWN	10-4	10 OHMS
FRONT TILT UP	10-4	169 OHMS
FRONT TILT DOWN	10-4	76 OHMS
ALL RESISTANCE VALUES ARE ± FIVE PERCENT		

8-WAY PASSENGER SEAT

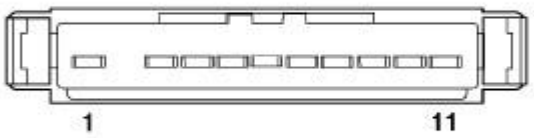

Fig. 17: Power Seat Switch Terminals
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the power seat switch from the seat. Refer to **SWITCH, SEAT, REMOVAL**.
3. Use an ohmmeter to test the continuity of the power seat switch using the following table. If not OK, replace the inoperative power seat switch. If switch tests OK, check for an open or short in the power seat circuit wiring. If no open or short is found, replace the power seat track and pan assembly or seat back frame, as required (Refer to **SEATS**).

8-WAY PASSENGER SEAT SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
RECLINER UP	6-3, 7-1, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
RECLINER DOWN	6-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
HORIZONTAL FORWARD	6-8, 7-1, 7-3, 7-4, 7-5, 7-9, 7-10, 7-11
HORIZONTAL REARWARD	6-4, 7-1, 7-3, 7-5, 7-8, 7-9, 7-10, 7-11
FRONT TILT DOWN	6-5, 7-1, 7-3, 7-4, 7-8, 7-9, 7-10, 7-11
FRONT TILT UP	6-9, 7-1, 7-3, 7-4, 7-5, 7-8, 7-10, 7-11
REAR TILT DOWN	6-10, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-11
REAR TILT UP	6-11, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result

in accidental airbag deployment and possible serious or fatal injury.

NOTE: Driver seat shown in illustration. Passenger seat similar.

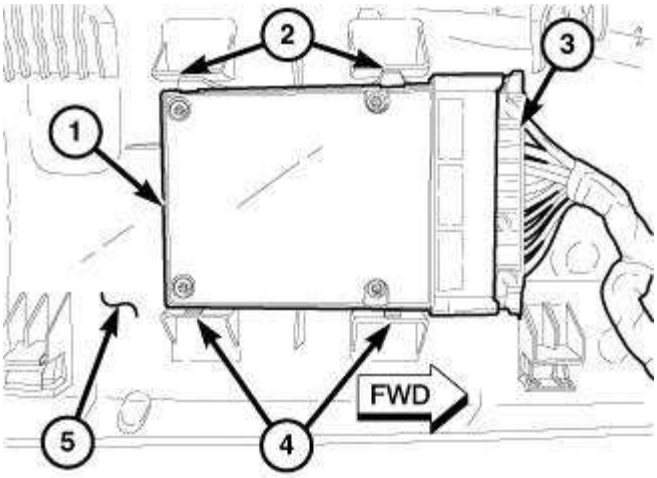

Fig. 18: Electrical Connector, Power Seat Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat being serviced all the way forward.
2. Disconnect and isolate the negative battery cable.

NOTE: It is not necessary to remove the seat belt anchor from the seat when servicing the power seat switch.

3. Remove the outboard seat cushion side trim panel (5) from the seat (Refer to **SEATS**).
4. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, carefully disengage the four tabs (2 and 4) that secure the power seat switch (1) to the seat cushion side trim panel.
5. Disconnect the electric connector (3) from the power seat switch and remove the switch.

INSTALLATION

INSTALLATION

NOTE: Driver seat shown in illustration. Passenger seat similar.

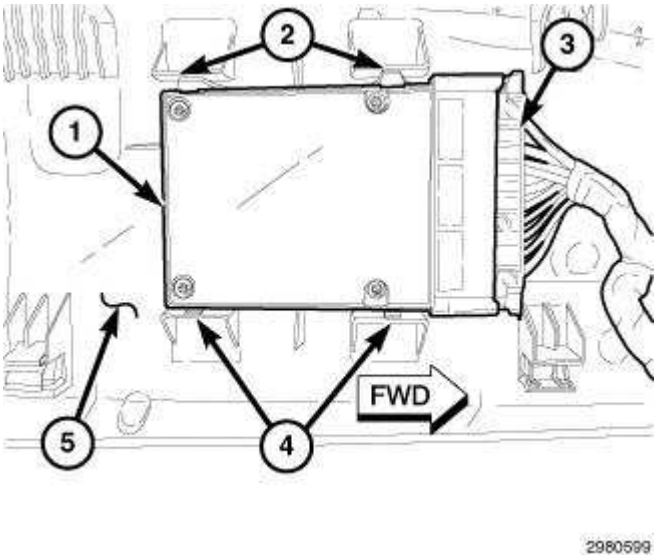

Fig. 19: Electrical Connector, Power Seat Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Connect the electrical connector (3) to the power seat switch (1). Make sure the connector is fully engaged to the switch.
2. Position the power seat switch to the seat cushion side trim panel (5) and engage the four retaining tabs (2 and 4) that secure the switch to the trim panel. Make sure the retaining tabs are fully engaged.
3. Install the outboard seat cushion side trim panel (Refer to **SEATS**).
4. Connect the negative battery cable.
5. Verify proper power seat operation.

ACCESSORIES AND EQUIPMENT

Power Sunshade, Rear Window - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

The rear window power sunshade system allows each of the rear sunshade to be raised and lowered electrically by actuating an electronic switch within the Integrated Center Stack (ICS) Screen (also known as the U-Connect Touch ™ screen module), or a switch on the rear center trim panel of center floor console. The system consist of the following components:

- **Body Control Module (BCM)** - Located on the right lower "A" pillar behind the instrument panel.
- **Integrated Center Stack (ICS)** - Located in the center stack area of the instrument panel.
- **SunShade Module (SSM)** - located under the rear package tray trim panel, near the sunshade assembly.
- **Sunshade Switch** - Located in the center of the floor console rear center trim panel.
- **Sunshade Motor** - Located on the sunshade assembly drive mechanism.
- **Sunshade assembly** - Located at the rear of the package tray beneath sunshade assembly trim panel.

OPERATION

OPERATION

The front sunshade switch is a soft switch in the Integrated Center Stack (ICS) Screen. The ICS sends the sunshade message to the Body Control Module (BCM) through the Telematics GateWay (TGW). The BCM sends a signal to the SunShade Module (SSM) from its flipper glass output. The SSM will extend or retract the sunshade depending on current position. SSM will stop the sunshade when it reaches the extended or retracted position. If an object is detected in the path of the sunshade, the SSM will stop the sunshade in the current position. If the SSM receives the reverse signal from the BCM, the SSM will wait one second and then drive the sunshade to the down position if it is still receiving the reverse signal. The SSM will determine if the sunshade had been lowered in reverse and return the sunshade to the up position after the reverse signal stops. If either sunshade buttons are pressed in reverse mode, the sunshade will begin to operate as normal operation and ignore the reverse input. It will continue to ignore the reverse input until it detects the reverse signal is gone.

The rear sunshade switch receives a RUN / ACC delay power feed, the same as the sunshade module. A signal from the rear switch will be fed into the BCM flipper switch input. BCM will lockout the rear switch only when the window lockout message is received from the Drivers Door Module (DDM). The cluster will control the illumination circuit and will not indicate if the switch is enabled or disabled.

MODULE, SUNSHADE

REMOVAL

REMOVAL

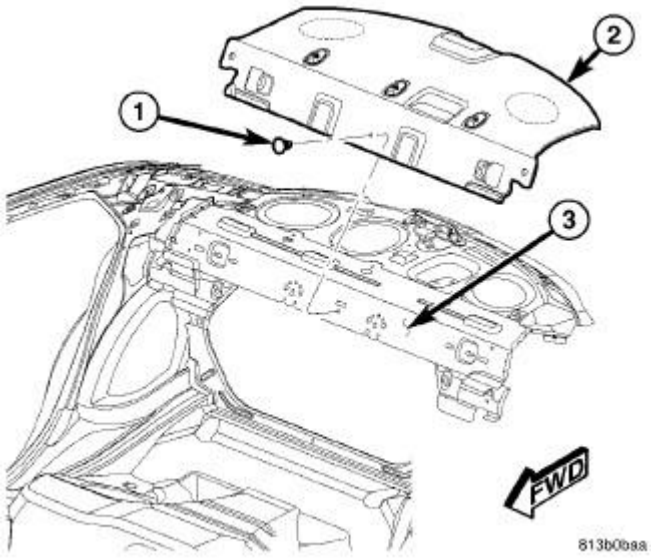

Fig. 1: Rear Shelf Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the package tray trim panel. Refer to **PANEL, REAR SHELF, REMOVAL** .
3. Disconnect the electrical connector at the SunShade Module (SSM).
4. Release the clip and remove the module.

INSTALLATION

INSTALLATION

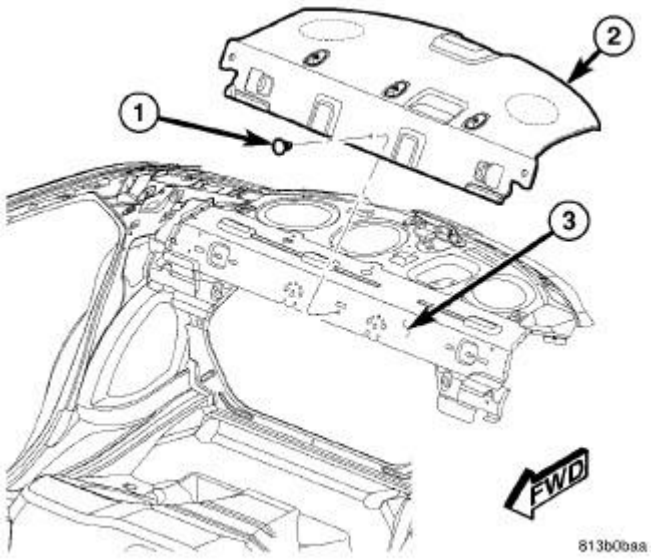

Fig. 2: Rear Shelf Trim Panel
Courtesy of CHRYSLER GROUP, LLC

Position the SunShade Module (SSM) at the rear sunshade assembly.

1. Slide the module onto the mounting bracket and engage the retaining clip.
2. Connect the electrical connector.
3. Install the package tray trim panel. Refer to **PANEL, REAR SHELF, INSTALLATION** .
4. Connect the negative battery cable.

MOTOR, SUNSHADE

DESCRIPTION

DESCRIPTION

The Rear sunshade motor for this vehicle is only serviced as an assembly with the sunshade, for more information. Refer to **SUNSHADE, REAR WINDOW, REMOVAL** .

SWITCH, SUNSHADE

DESCRIPTION

FRONT

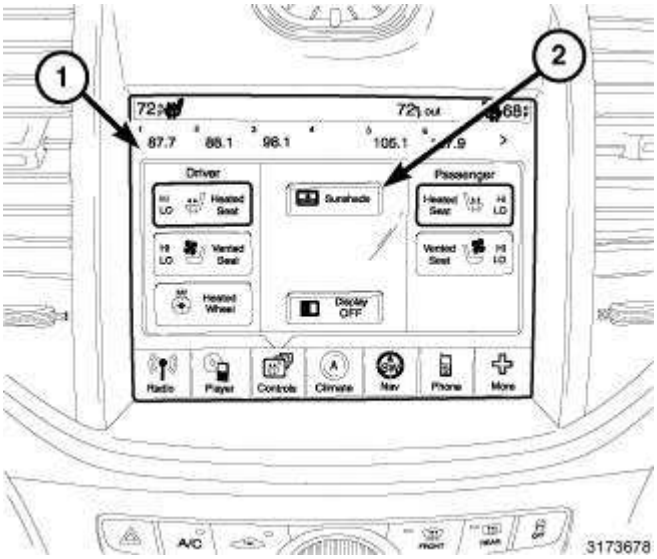

Fig. 3: View Of U-Connect Touch Screen Module And Front Switch
Courtesy of CHRYSLER GROUP, LLC

The front switch (2) for the optional rear window sunshade is located in the Integrated Center Stack (ICS) screen module (also known as the U-Connect Touch ™ screen module) (1), at the center of the instrument panel. The power rear window sunshade system allows the driver, and front seat passenger to raise and lower the rear sunshade for improved passenger comfort. Pressing a sunshade switch once will either raise or lower the shade, depending on position. Pressing the switch a second time will reverse the sunshade motor and return the shade to its original position.

REAR

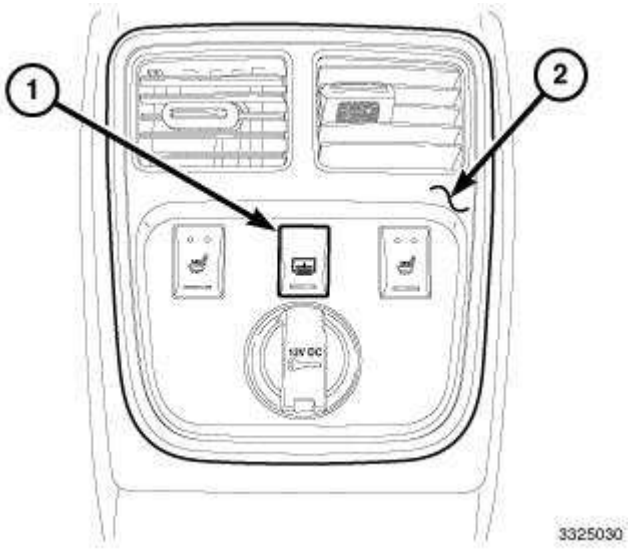

Fig. 4: Floor Console Sunshade Switch
Courtesy of CHRYSLER GROUP, LLC

The rear sunshade switch (1) is a momentary contact push button type switch that is mounted at the rear of the center floor console. This switch allows the rear seat passengers to raise or lower the rear

window sunshade for improved passenger comfort. Pressing a sunshade switch once will either raise or lower the shade, depending on position. Pressing the switch a second time will reverse the sunshade motor and return the shade to its original position.

OPERATION

FRONT

When the front switch for the power rear sunshade, located in the U-Connect Touch ™ screen module is pressed with the ignition on, a signal is sent to the Body Control Module (BCM) over the Controller Area Network (CAN) data bus, signaling the module to raise or lower the rear sunshade. The BCM provide a hard-wired resistance signal to the sunshade control module to raise or lower the sunshade. Pressing the power sunshade switch once will either raise or lower the sunshade, depending on its currant position. Pressing the same switch a second time will reverse the motor, and return the sunshade to its original position before the switch was pressed.

The front switch for the power rear sunshade located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If the switch is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced (Refer to appropriate service information).

REAR

The rear power sunshade switch is a momentary, push button-type switch, that provide a hard-wired resistance signal to the Body Control Module (BCM), the BCM transfers this signal to the sunshade control module to raise or lower the sunshade. In addition to signaling the module, the BCM sends a message to the Integrated Center Stack (ICS) Screen (also known as the U-Connect Touch ™ screen module) over the Controller Area Network (CAN) data bus.

The rear sunshade switch is diagnosed using a scan tool, for more information. Refer to **DIAGNOSIS AND TESTING** .

The rear heated seat switches cannot be adjusted or repaired and if it becomes damaged or inoperative, the entire switch must be replaced.

REMOVAL

REMOVAL

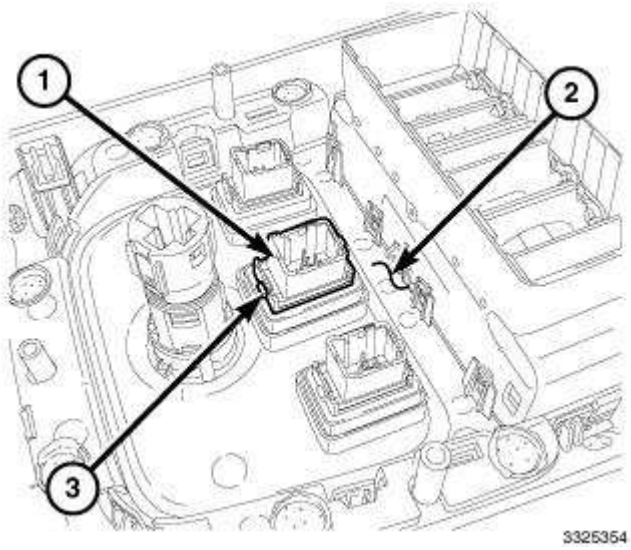

Fig. 5: Sunshade Switch, Trim Panel And Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the trim panel (2) from the back of the floor console using Trim Stick (special tool #C-4755, Trim Stick) or equivalent.
3. Disconnect the electrical connectors and place the trim panel on a workbench.
4. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, gently disengage the two retaining tabs (3) that secure sunshade switch (1) to the rear trim panel.
5. Remove the sunshade switch from the floor console rear trim panel.

INSTALLATION

INSTALLATION

NOTE: Take the proper precautions to protect the face of the floor console panel from cosmetic damage while performing this procedure.

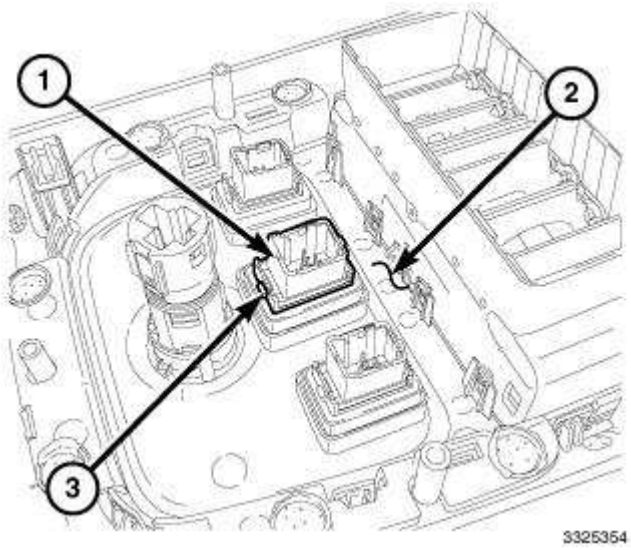

Fig. 6: Sunshade Switch, Trim Panel And Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Align the tabs on each sunshade seat switch (1) with the openings in the floor console rear trim panel (2) and install the switch, as necessary. Push the switches firmly into the trim panel until the two retaining tabs (3) are fully engaged.
2. Install the trim panel onto the back of the center floor console. Be sure to connect any necessary electrical connectors and properly align the console ducts.
3. Connect the negative battery cable.

DRIVELINE/AXLES

Propeller Shaft - Chrysler 300

DESCRIPTION

DESCRIPTION

REAR

WARNING: Due to propeller shaft imbalance concerns, rear propeller shaft service is limited to center support bearing and coupler replacement only. The rear segment single-cardan universal joint is not serviceable.

Both RWD and AWD models utilize a "two-piece" rear propeller shaft design to transmit torque to the rear axle assembly. This two-piece design consists of:

- Front and rear shaft segments
- Center support bearing/bracket assembly
- Single-Cardan u-joint at rear segment/bearing interface
- Rubber couplers at transmission and rear axle flanges
- Fore-mounted vibration damper (V6 Models)

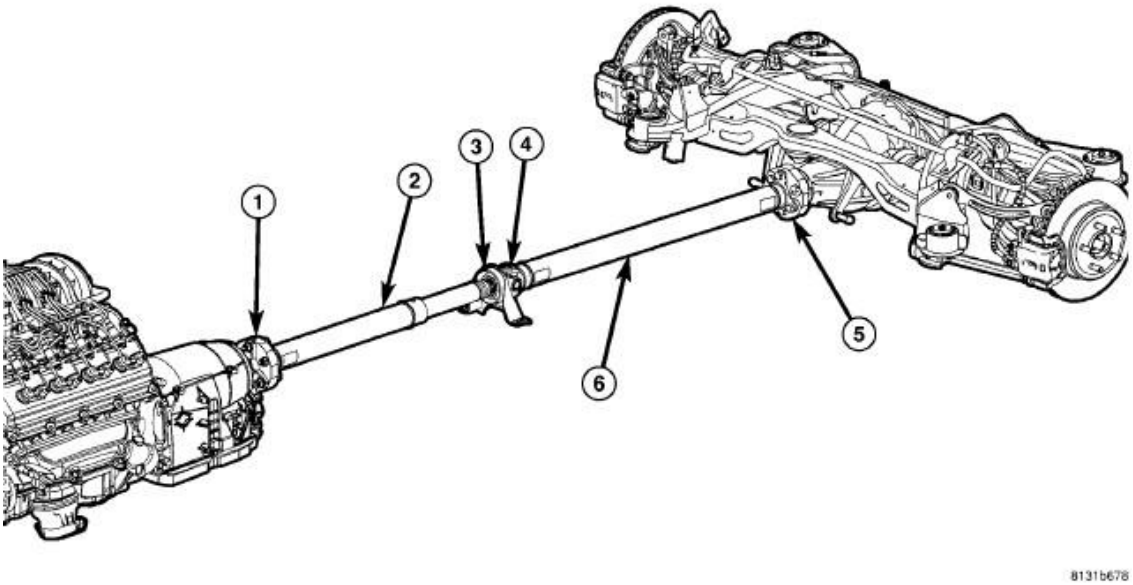

Fig. 1: Rear Propeller Shaft Assembly (V8 System Shown)
Courtesy of CHRYSLER GROUP, LLC

1 - FRONT COUPLER
2 - FRONT SEGMENT

3 - BEARING/BRACKET ASSEMBLY
4 - SINGLE-CARDAN U-JOINT
5 - REAR COUPLER
6 - REAR SEGMENT

The front shaft segment is designed with a collapsing feature, consisting of two concentric tubes secured by shear pins. This feature allows the tubes to telescope up to 200 mm (8 in.) during certain impacts.

The flexible rubber couplers at the transmission and axle flanges absorb vibration. The low-travel Single-Cardan universal joint permits the minimal axial and angular variations that occur with independent rear suspension.

Additionally, models equipped with the V6 engine utilize a vibration damper which is designed to absorb and isolate driveline vibrations and harmonics. This damper is mounted to the front segment, sandwiched between the coupler and propeller shaft.

FRONT

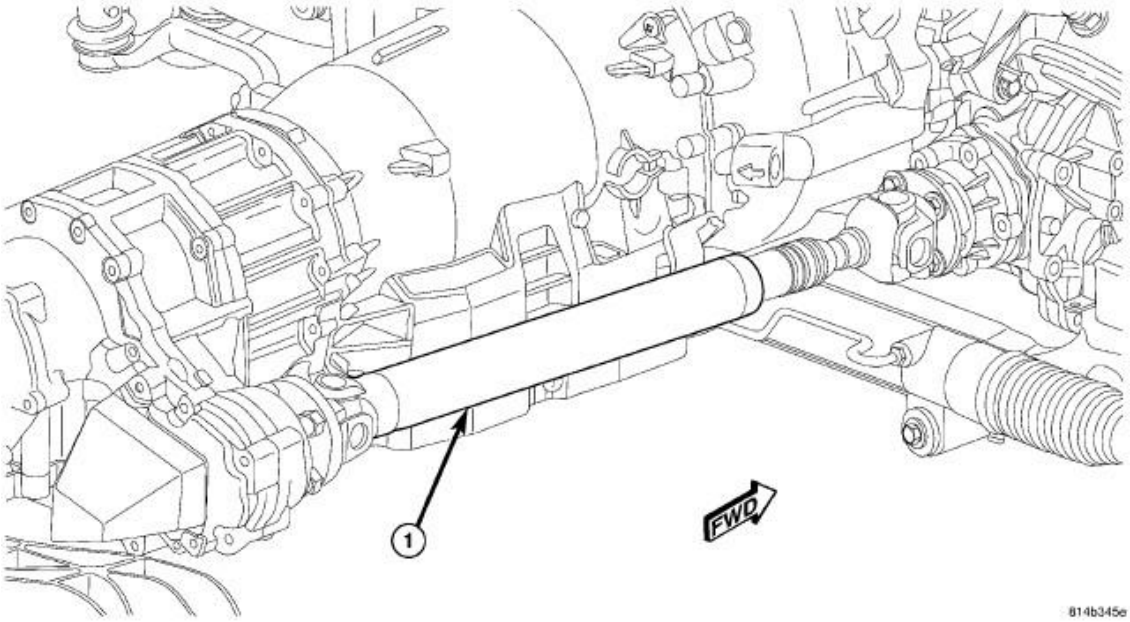

Fig. 2: Front Propeller Shaft Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - FRONT PROPELLER SHAFT ASSEMBLY

WARNING: Due to propeller shaft imbalance concerns, front propeller shaft service is limited to rubber coupler and entire shaft replacement. The single-cardan universal joints are not serviceable.

AWD models utilize a "two-piece" front propeller shaft design to transmit torque to the front axle assembly. This two-piece design consists of:

- Front and rear shaft segments
- Single-Cardan u-joints at end flanges
- Rubber boot at front/rear segment interface

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolt/Nut, Shaft Coupler to Transmission	98	72	-
Bolt/Nut, Shaft Coupler to Transmission **(SRT8)**	156	115	-
Bolt/Nut, Shaft Coupler to Rear Axle Assembly	98	72	-
Bolt/Nut, Shaft Coupler to Rear Axle Assembly **(SRT8)**	156	115	-
Bolt/Nut, Coupler to Propeller Shaft	58	43	-
Bolt, Center Bearing to Body	27	20	-
Bolt, Front Propeller Shaft to Axle/Transfer Case Flange	64	48	-

REMOVAL

FRONT

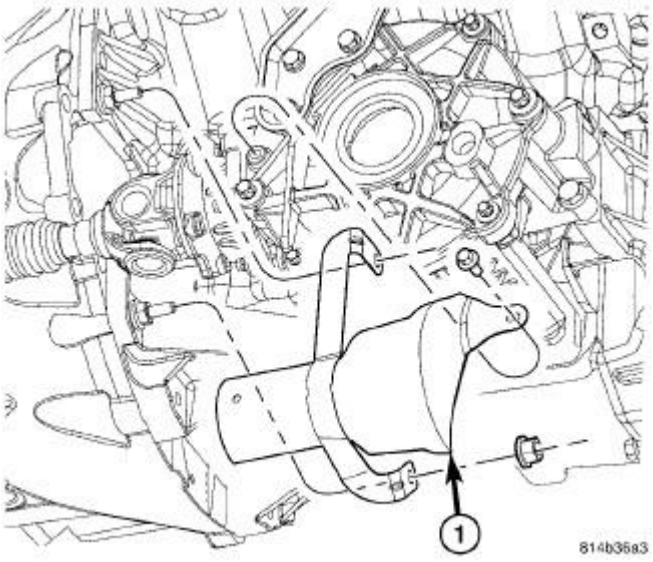

Fig. 3: Removing/Installing Heat Shield
Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD

1. Place gearshift lever in NEUTRAL and raise vehicle on hoist.
2. Remove propeller shaft heat shield.

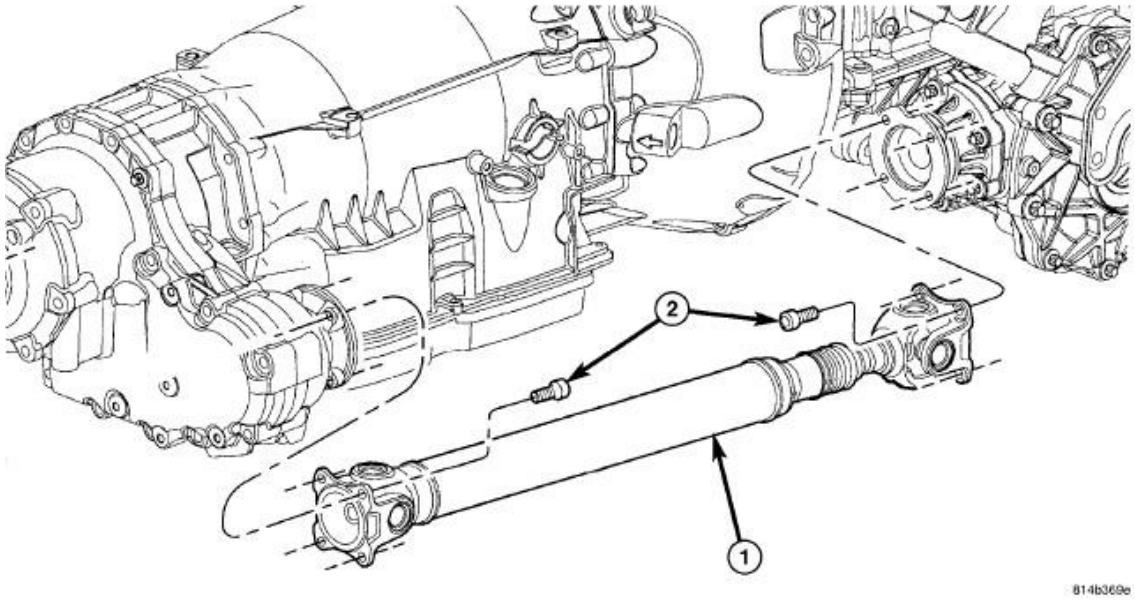

Fig. 4: Front Propeller Shaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1 - PROPELLER SHAFT ASSEMBLY

2 - BOLTS

3. Apply alignment index marks on the propeller shaft and front axle flanges.
4. Remove and discard four front propeller shaft-to-axle flange bolts (2).
5. Apply alignment index marks on the propeller shaft and transfer case flanges.
6. Remove and discard four front propeller shaft-to-transfer case flange bolts (2).
7. Remove propeller shaft assembly (1).

REAR

CAUTION: Propeller shaft removal is a two-man operation. Never allow propeller shaft to hang from the center bearing, or while only connected to the transmission or rear axle flanges. A helper is required. If a propeller shaft section is hung unsupported, damage may occur to the shaft, coupler, and/or center bearing from over-angulation. This may result in driveline vibrations and/or component failure.

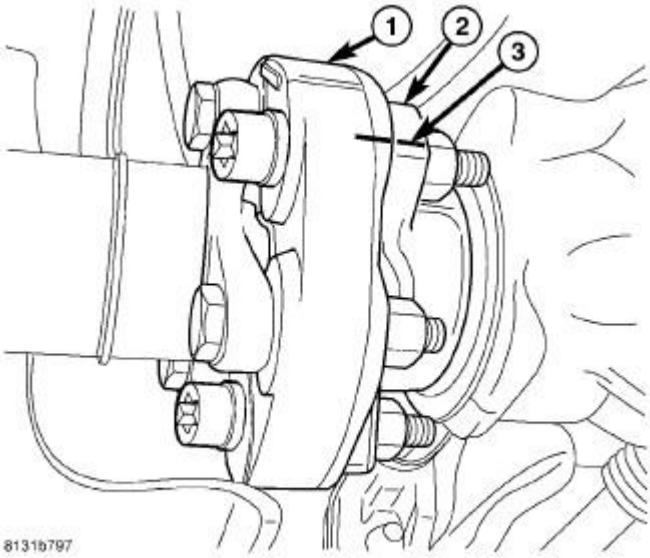

Fig. 5: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

1. With vehicle in neutral, position on hoist.
2. Apply alignment index marks (3) on the transmission and axle flanges (2) and rubber couplers (1).

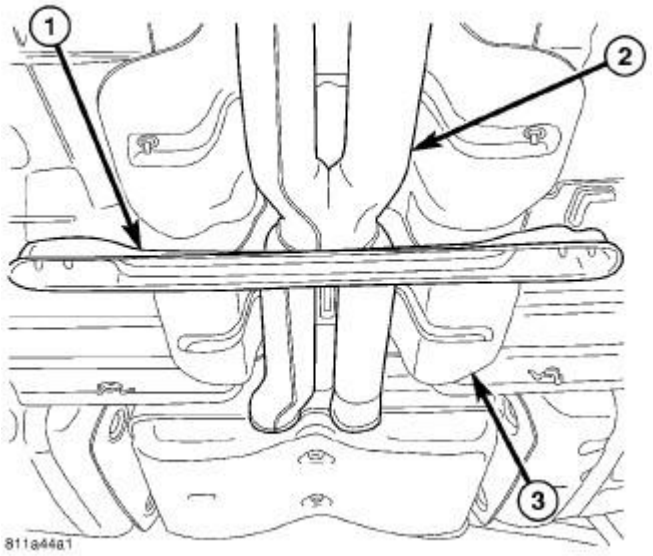

Fig. 6: Crossmember
Courtesy of CHRYSLER GROUP, LLC

3. Remove crossmember (1).

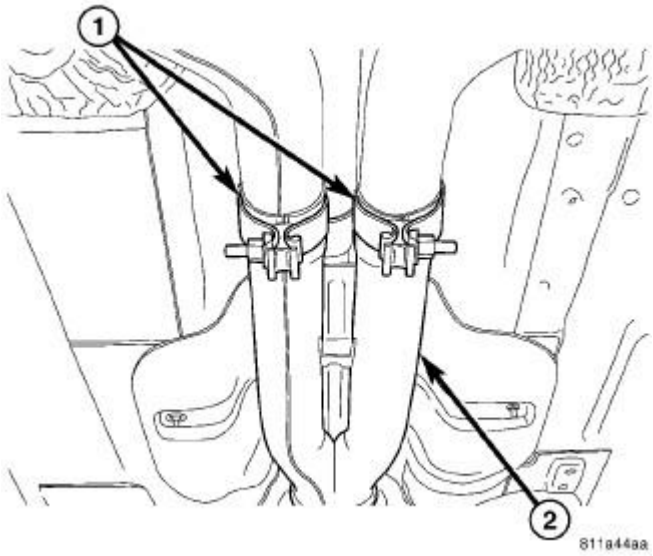

Fig. 7: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

4. Remove rear exhaust system (2).

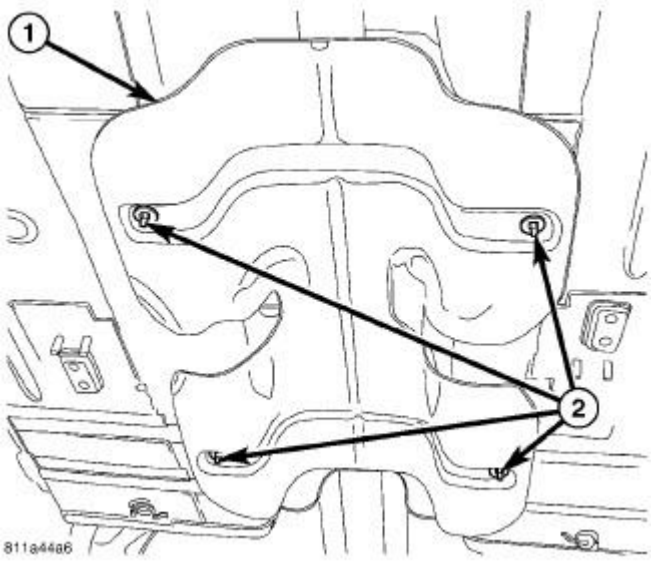

Fig. 8: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

5. Remove heat shield (1).

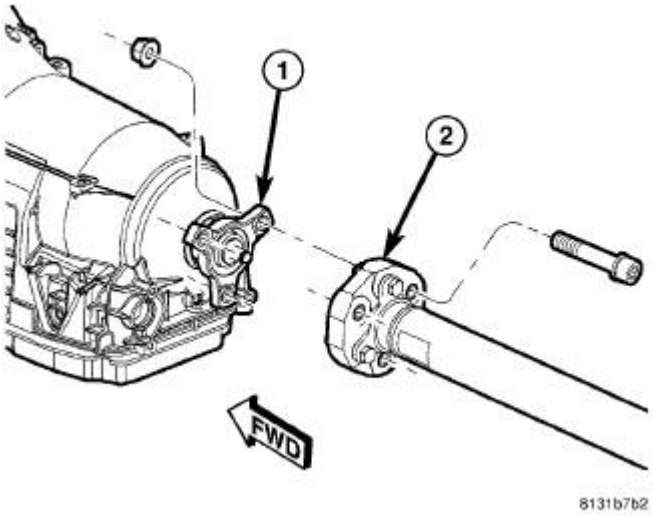

Fig. 9: Propeller Shaft AT Transmission
Courtesy of CHRYSLER GROUP, LLC

1 - TRANSMISSION REAR FLANGE
2 - FRONT COUPLER

6. Remove propeller shaft front coupler-to-flange bolts.

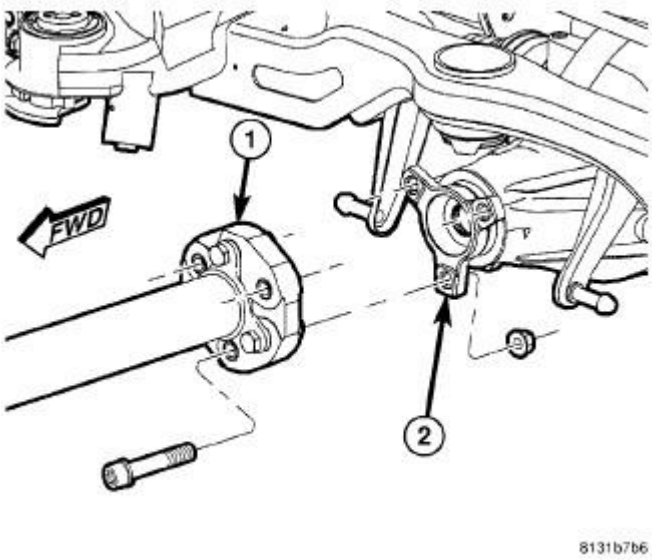

Fig. 10: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

7. Remove propeller shaft rear coupler-to-flange bolts.

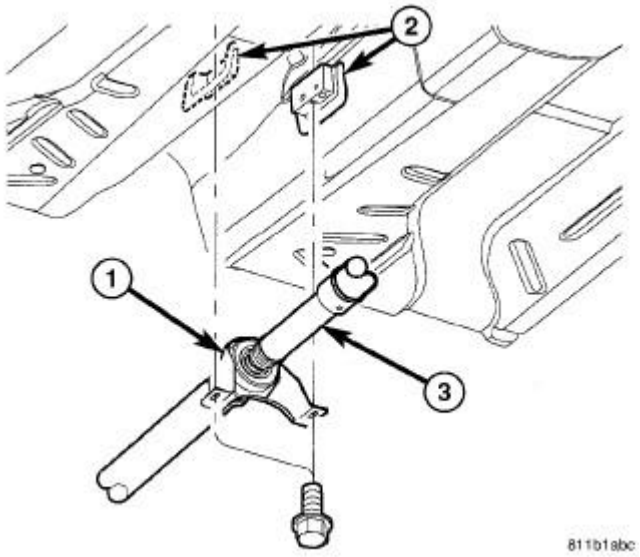

Fig. 11: Center Bearing-To-Body
Courtesy of CHRYSLER GROUP, LLC

1 - CENTER BEARING
2 - CENTER BEARING MOUNT
3 - PROPELLER SHAFT

8. Remove center bearing (1) mounting bolts.

9. With the aid of a helper, remove propeller shaft assembly.

COUPLER/DAMPER SERVICE

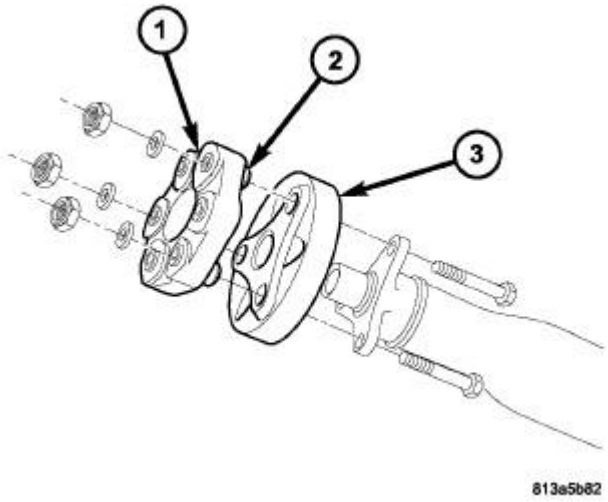

Fig. 12: Removing/Installing Damper
Courtesy of CHRYSLER GROUP, LLC

1. Remove three coupler-to-propeller shaft bolt/nuts.
2. Separate coupler (1) and damper (3) (if equipped) from propeller shaft. Note orientation and direction of components. It is imperative that they are properly reinstalled.

INSTALLATION

FRONT

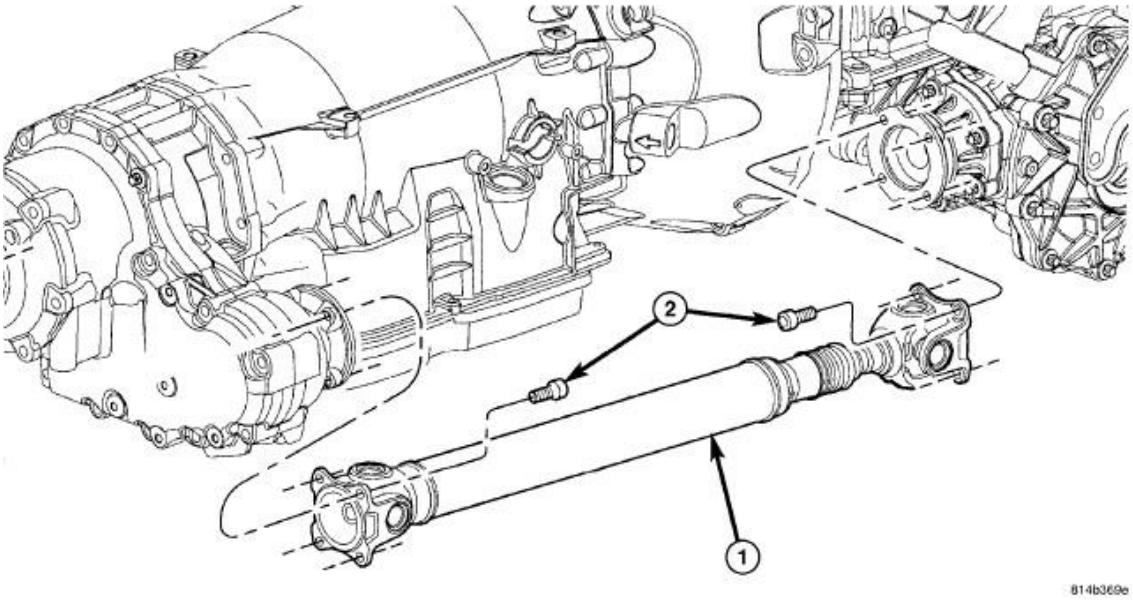

Fig. 13: Front Propeller Shaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1 - PROPELLER SHAFT ASSEMBLY
2 - BOLTS

1. Install propeller shaft (1) into position.
2. Starting at transfer case end, align index marks placed upon removal and loose-install **new** propeller shaft-to-transfer case flange bolts.
3. Align index marks at front axle end of shaft, and loose-install **new** propeller shaft-to-front axle flange bolts.
4. Torque propeller shaft-to-transfer case and axle flange bolts (2) to 64 N.m (48 ft. lbs.).

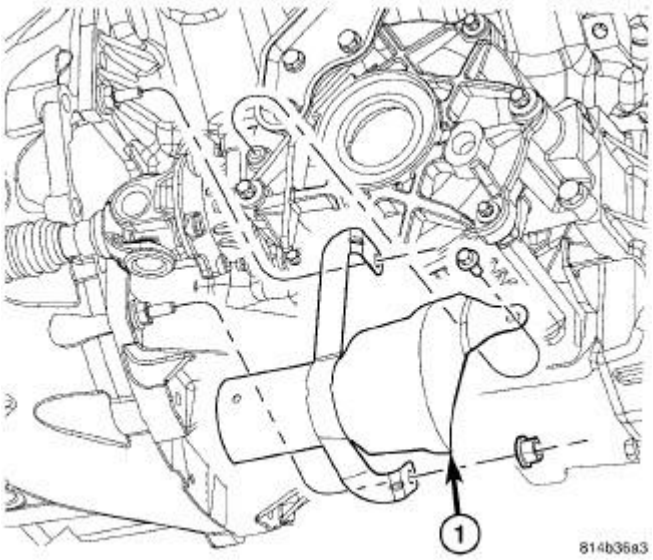

Fig. 14: Removing/Installing Heat Shield
Courtesy of CHRYSLER GROUP, LLC

1 - HEAT SHIELD

5. Install propeller shaft heat shield.
6. Lower vehicle.

REAR

CAUTION: Propeller shaft installation is a two-man operation. Never allow propeller shaft to hang from the center bearing, or while only connected to the transmission or rear axle flanges. A helper is required. If a propeller shaft section is hung unsupported, damage may occur to the shaft, coupler, and/or center bearing from over-angulation. This may result in driveline vibrations and/or component failure.

COUPLER/DAMPER SERVICE

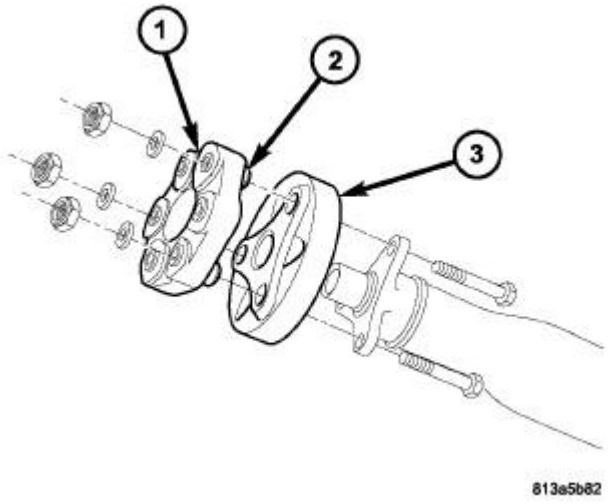

Fig. 15: Removing/Installing Damper
Courtesy of CHRYSLER GROUP, LLC

1. If coupler and/or damper were removed, align index marks and reinstall. **Make sure protruding sleeve (2) is properly seated into propshaft or damper counterbores.**
2. Install three bolts with washers and nuts and torque to 58 N.m (43 ft. lbs.) torque.

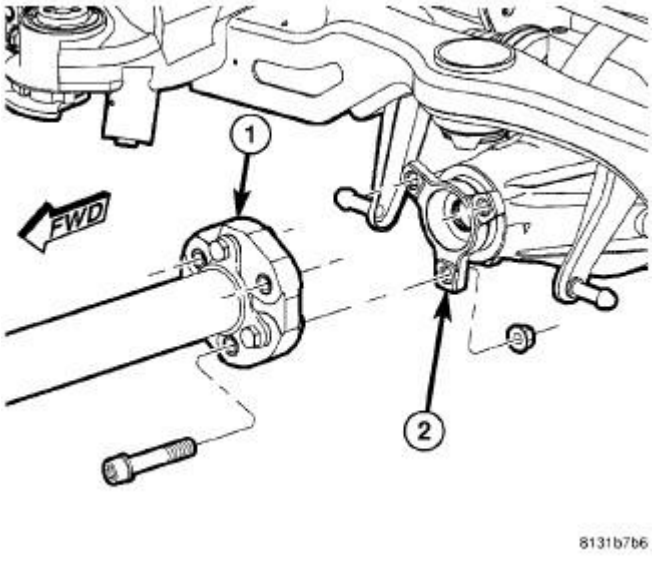

Fig. 16: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

1. Obtain helper and install propeller shaft into position at axle. Align index marks placed upon removal. Install propeller shaft rear coupler-to-axle flange bolt/nuts by hand. Do not torque at this time.

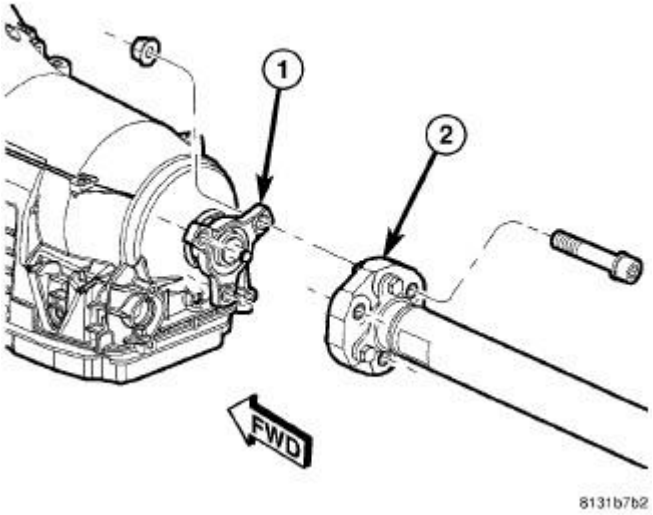

Fig. 17: Propeller Shaft AT Transmission
Courtesy of CHRYSLER GROUP, LLC

1 - TRANSMISSION REAR FLANGE
2 - FRONT COUPLER

2. Install propeller shaft into position at transmission flange. Align index marks placed upon removal. Install propeller shaft front coupler-to-transmission flange bolt/nuts by hand. Do not torque at this time.

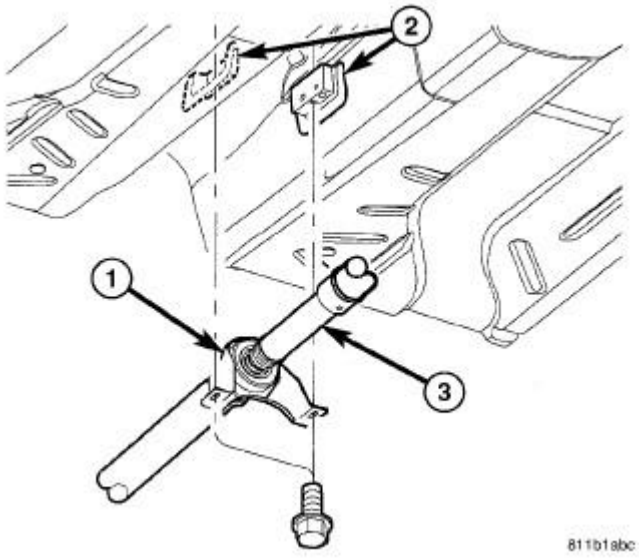

Fig. 18: Center Bearing-To-Body
Courtesy of CHRYSLER GROUP, LLC

1 - CENTER BEARING
2 - CENTER BEARING MOUNT
3 - PROPELLER SHAFT

3. Loosely install center bearing-to-body bolts. Do not torque at this time.

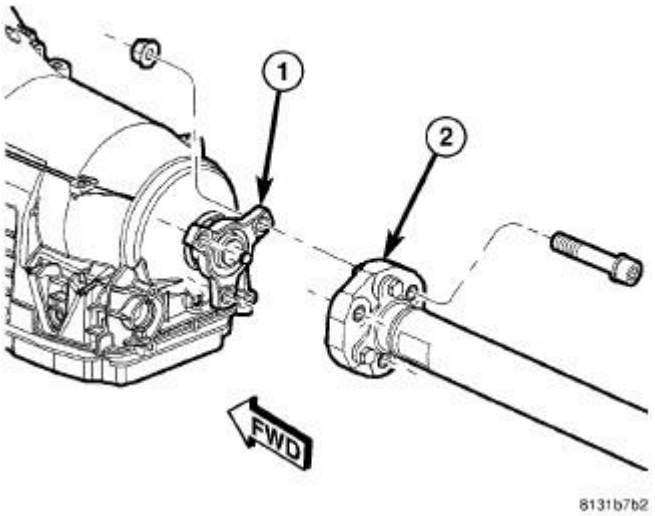

Fig. 19: Propeller Shaft AT Transmission
Courtesy of CHRYSLER GROUP, LLC

1 - TRANSMISSION REAR FLANGE
2 - FRONT COUPLER

4. Tighten the bolts to 98 N.m (72 ft. lbs.) for **non SRT8 applications** .
5. Tighten the bolts to 156 N.m (115 ft. lbs.) for **SRT8 applications** .

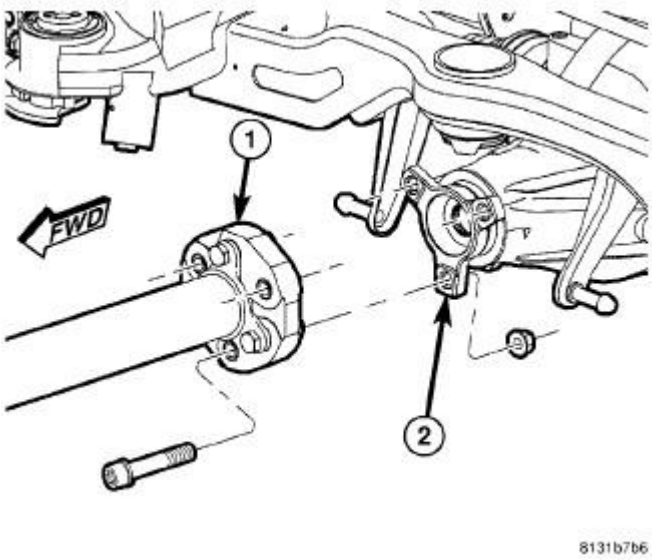

Fig. 20: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the bolts to 98 N.m (72 ft. lbs.) for **non SRT8 applications** .
7. Tighten the bolts to 156 N.m (115 ft. lbs.) for **SRT8 applications** .

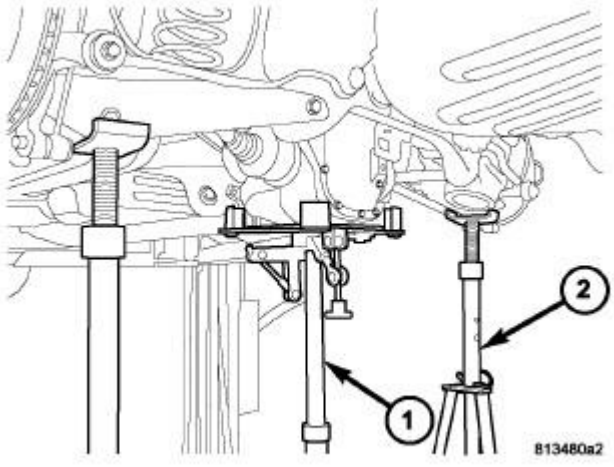

Fig. 21: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Note: It is necessary to compress rear suspension to ride height before securing center bearing to body. Failure to compress suspension may result in objectionable noise and premature bearing wear.**

8. Compress rear suspension with suitable jack stands (2).

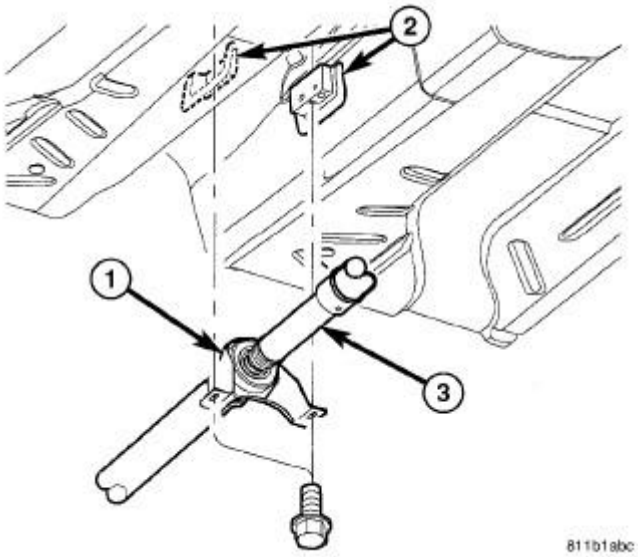

Fig. 22: Center Bearing-To-Body
Courtesy of CHRYSLER GROUP, LLC

1 - CENTER BEARING
2 - CENTER BEARING MOUNT
3 - PROPELLER SHAFT

9. Torque center bearing-to-body bolts to 27 N.m (20 ft. lbs.).

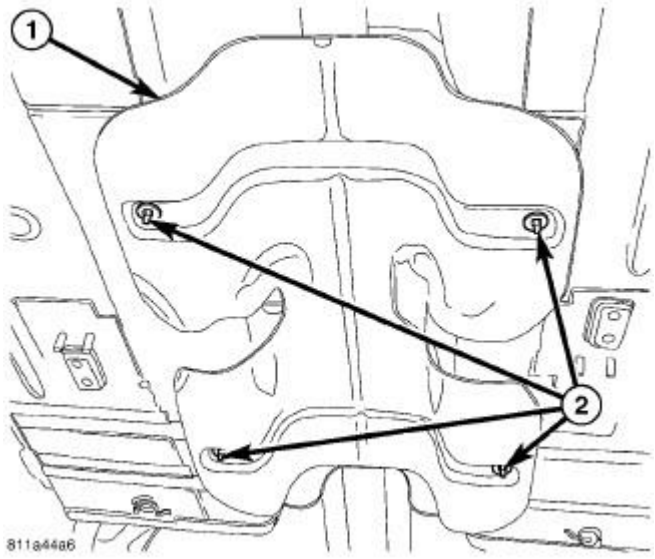

Fig. 23: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

10. Install heat shield (1).

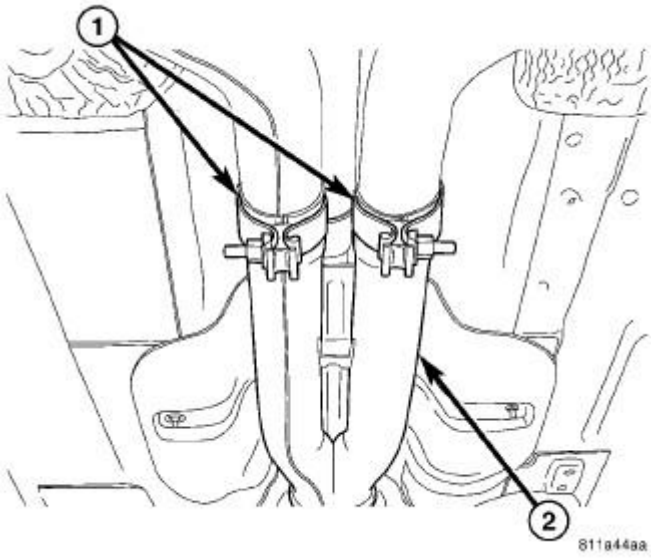

Fig. 24: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

11. Install rear exhaust system (2)

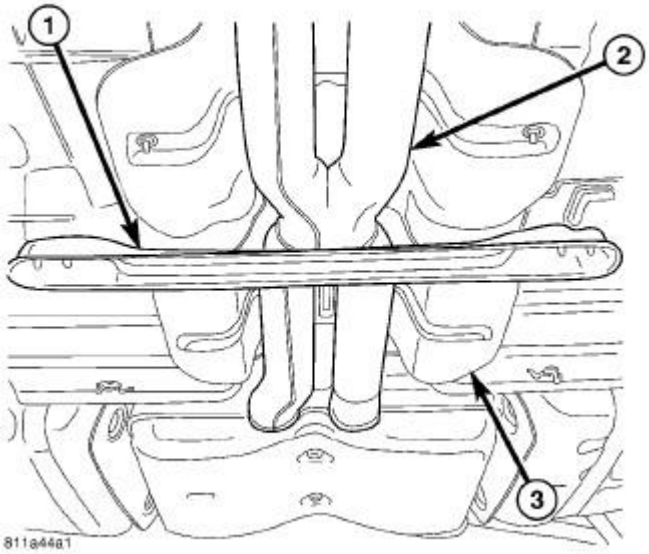

Fig. 25: Crossmember
Courtesy of CHRYSLER GROUP, LLC

12. Install crossmember (1).

SPECIAL TOOLS

SPECIAL TOOLS

	1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.) C-4735 - Handle, Driver (Originally Shipped In Kit Number(s) 9299.)

BEARING, DRIVE SHAFT CENTER

REMOVAL

REMOVAL

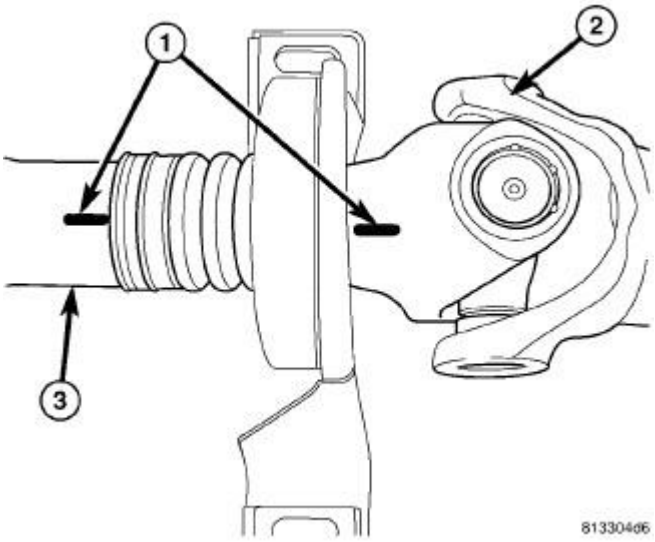

Fig. 26: Propeller Shaft Index Markings
Courtesy of CHRYSLER GROUP, LLC

1. Remove propeller shaft from vehicle.

NOTE: To address propeller shaft imbalance concerns, the propeller shaft spline interface has a "skip-tooth" design allowing only one possible assembly orientation. Install reference marks only to aid in assembly.

2. Mark front and rear shaft segments (2, 3) with installation reference marks (1).

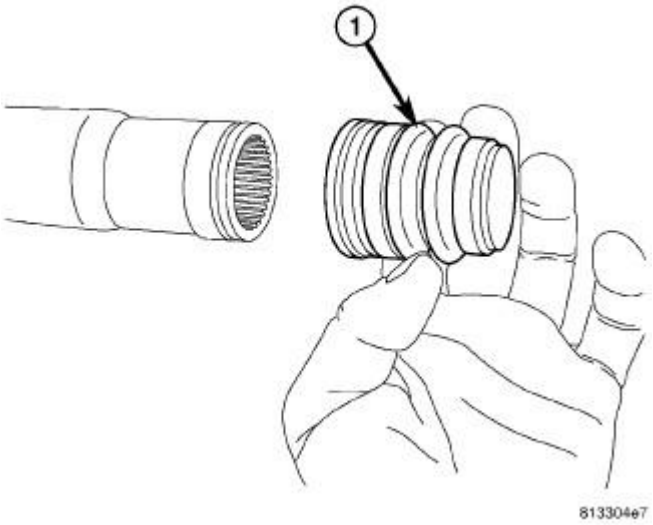

Fig. 27: Removing Plunging Boot
Courtesy of CHRYSLER GROUP, LLC

3. Separate propeller shaft front and rear segments at bearing and remove boot (1)

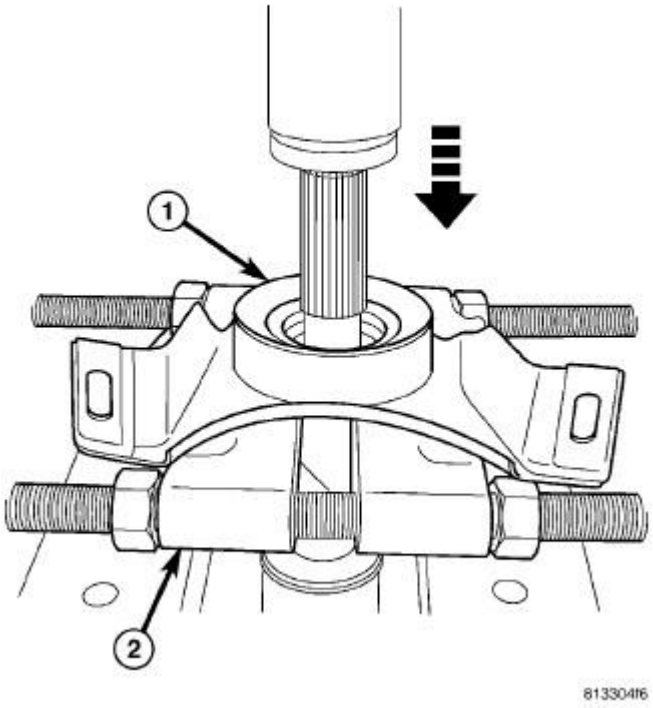

Fig. 28: Center Bearing Removal
Courtesy of CHRYSLER GROUP, LLC

4. Press center bearing (1) off of rear shaft segment using arbor press and Bearing Splitter (special tool #1130, Splitter, Bearing/Gear) (2).

INSTALLATION

INSTALLATION

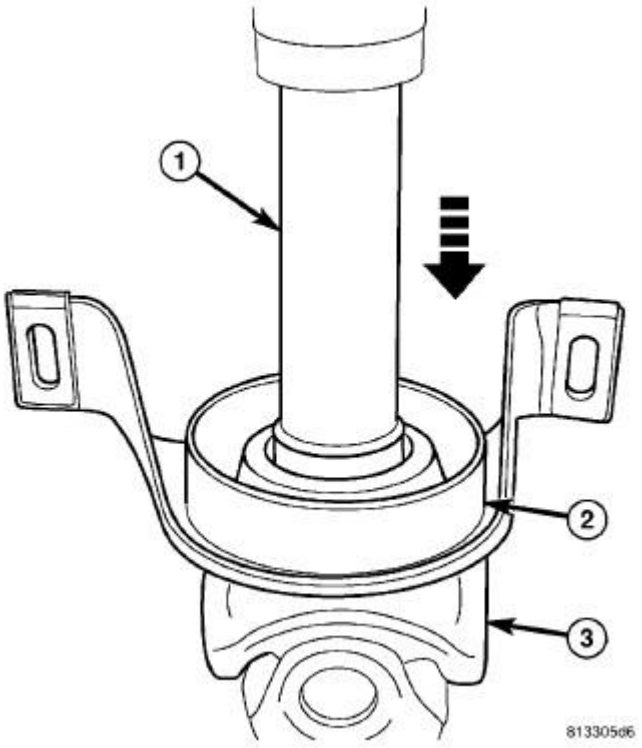

Fig. 29: Installing Center Bearing
Courtesy of CHRYSLER GROUP, LLC

1. Install propeller shaft rear segment into press, supported on joint yoke (3).
2. Install bearing assembly as shown in illustration (2).
3. Using installer (special tool #C-4735, Handle, Driver) (1), press bearing assembly (2) onto shaft.

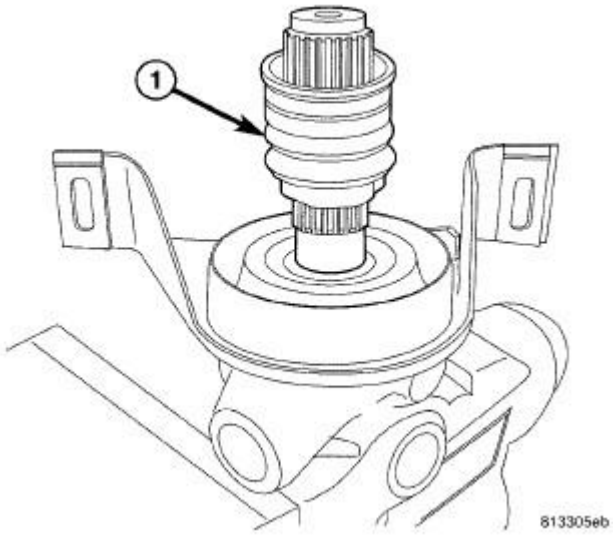

Fig. 30: Installing Plunging Boot
Courtesy of CHRYSLER GROUP, LLC

4. Remove propeller shaft from press.
5. Install boot (1) to rear shaft segment.

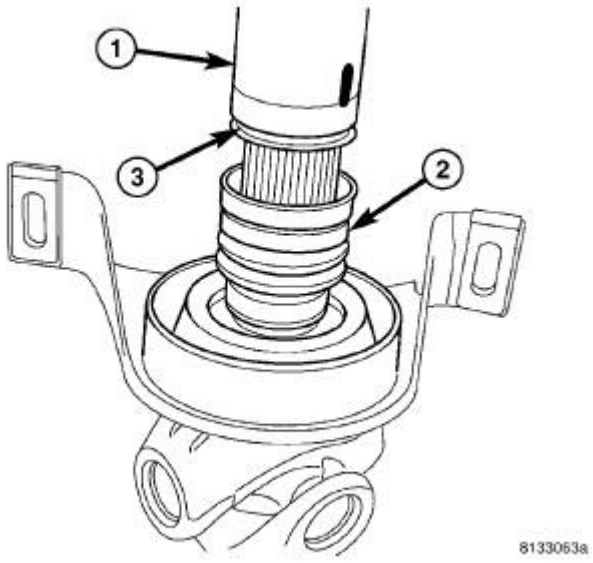

Fig. 31: Front Segment Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: To address propeller shaft imbalance concerns, the propeller shaft spline interface has a "skip-tooth" design allowing only one possible assembly orientation.

6. Align index marks placed upon disassembly and install front segment (1) to rear segment.
7. Install boot (2) to front segment, seating boot into groove (3).
8. Install propeller shaft into vehicle.

DRIVELINE/AXLES

Rear Axle - 200MM - Chrysler 300

DESCRIPTION

DESCRIPTION

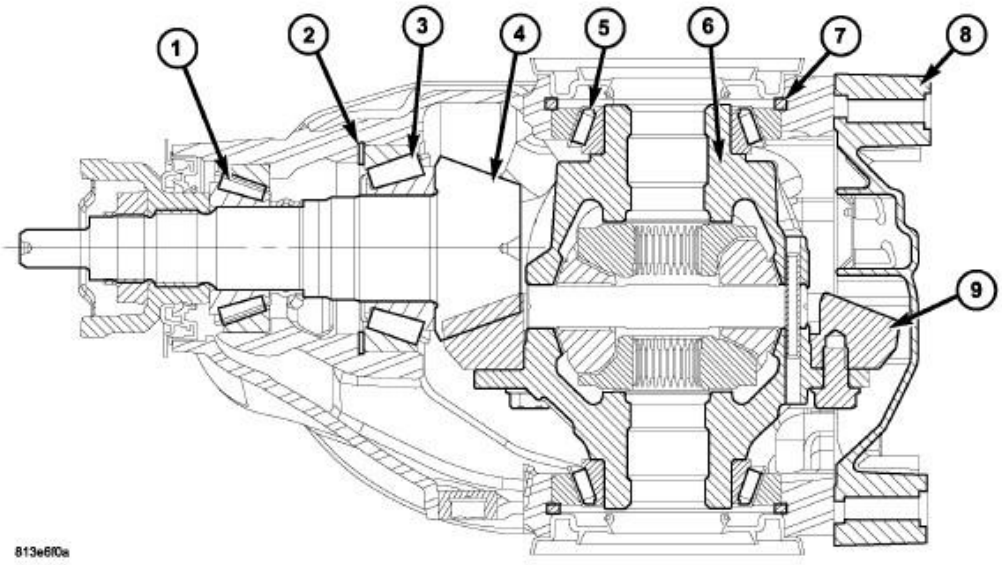

Fig. 1: Axle Section View
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING, PINION TAIL	6 - DIFFERENTIAL
2 - SHIM, PINION DEPTH	7 - RING, SNAP
3 - BEARING, PINION HEAD	8 - COVER, AXLE
4 - GEAR/SHAFT, PINION	9 - GEAR, RING
5 - BEARING, DIFFERENTIAL SIDE	

The 200 MM RII (Rear-Independent-Iron) axle is an independent assembly with a cast iron housing and differential. The 200 MM RII uses an open differential which is supported by two tapered roller bearings located on either side of the case. Differential bearing preload and ring gear backlash are controlled with select snap-rings located on the outside of the differential bearing cups. Pinion height is set with a select shim located under the rear pinion bearing cup.

The 200 axle is available only in all-wheel-drive (AWD) models, and in V-6 engine-equipped rear-wheel-drive (RWD) models, and is available in a 3.07 gear ratio.

AXLE IDENTIFICATION

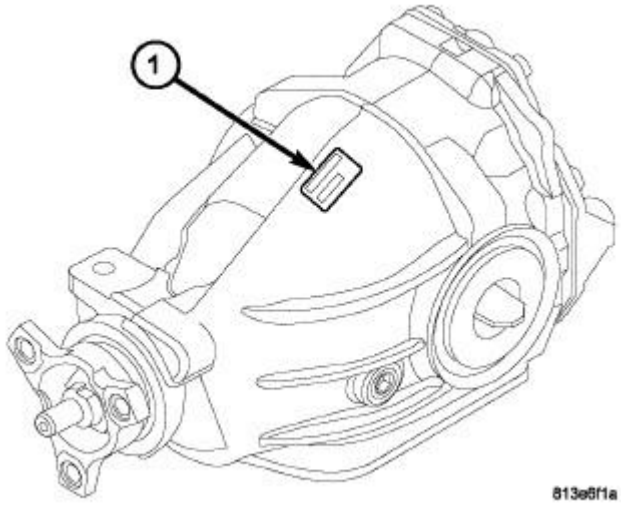

Fig. 2: Axle Identification Tag
Courtesy of CHRYSLER GROUP, LLC

The 200 MM axle utilizes a barcoded label (1) which is adhered to the top of the axle housing as shown in illustration. The following information is found on the identification label:

- Traceability Code (Plant Use)
- Axle Part Number
- Axle Gear Ratio

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AXLE

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly:

- Check for insufficient lubricant.
- Incorrect ring gear backlash.

- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehicle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The differential and pinion bearings can produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Worn or damaged differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Wheel hub bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by a worn U-joint or by worn side-gear thrust washers. A worn pinion shaft bore will also cause low speed knock.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged propeller shaft.
- Missing propeller shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joints or CV joints.
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.
- Bent halfshaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear, can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints or CV joints.
- Worn or broken axle mount isolators.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
WHEEL NOISE	1. Wheel loose.	1. Tighten loose nuts.
	2. Faulty, brinelled wheel bearing.	2. Replace bearing.
DIFFERENTIAL CRACKED	1. Improper differential side bearing preload.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing preload properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
DIFFERENTIAL GEARS SCORED	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill

		differential with the proper fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
LOSS OF LUBRICANT	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked axle housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored pinion flange journal.	5. Replace pinion flange and seal.
	6. Axle cover not properly sealed.	6. Remove, clean, and re-seal cover.
AXLE OVERHEATING	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing preload too high.	3. Readjust bearing pre-load.
	4. Insufficient ring gear backlash.	4. Re-adjust ring gear backlash.
GEAR TEETH BROKEN	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Ice-spotted pavement.	2. Replace gears and examine remaining parts for damage.
	3. Improper adjustments.	3. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.
AXLE NOISE	1. Insufficient lubricant.	1. Fill axle with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and/or pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing preload.

	7. Misaligned or sprung ring gear.	7. Measure ring gear run-out. Replace components as necessary.
	8. Housing not machined properly.	8. Replace housing.

STANDARD PROCEDURE

STANDARD PROCEDURE - FLUID DRAIN AND FILL

NOTE: Note: The fluid required for use in this axle is Mopar® Synthetic Gear and Axle Lubricant 75W-140.

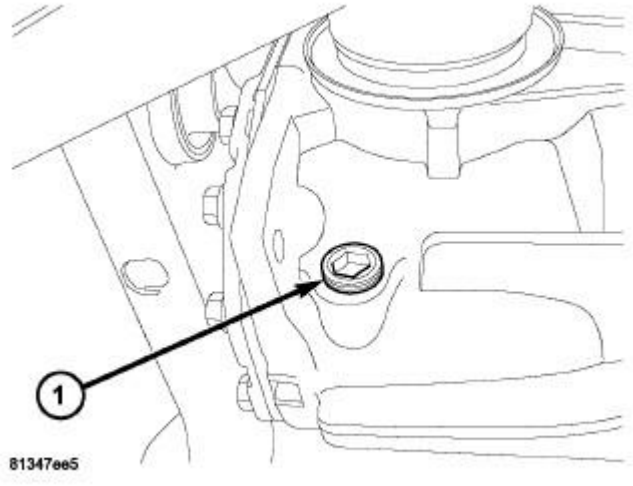

Fig. 3: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. Drive the vehicle until the differential lubricant is at the normal operating temperature.
2. With vehicle in neutral, position and raise vehicle on hoist.
3. Remove rear axle drain plug and drain lubricant completely from the axle.
4. Install drain plug and tighten to 60 N.m (44 ft lbs).

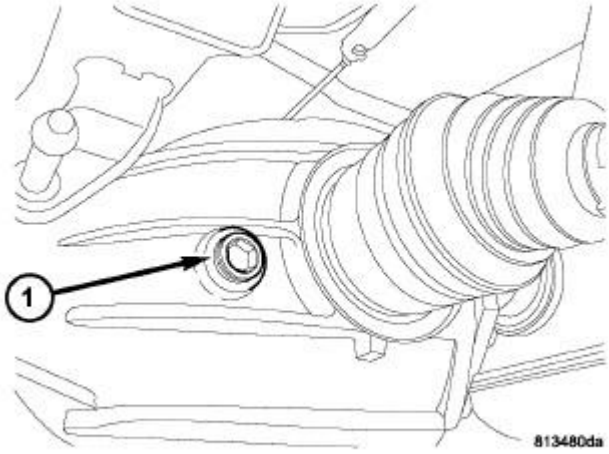

Fig. 4: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

5. Remove fill plug (1) and fill rear axle with 1.4 L (1.5 qts.) Mopar® Synthetic Gear AND Axle Lubricant 75W-140 and insure axle is filled to the bottom of the fill hole.
6. Install fill plug and tighten to 60 N.m (44 ft lbs).

ADJUSTMENTS

PINION DEPTH

PINION DEPTH VARIANCE

Ring gear and pinion are supplied as matched sets.

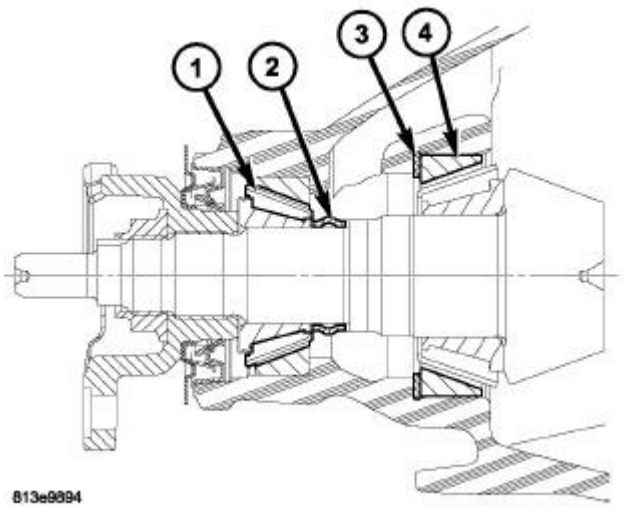

Fig. 5: Pinion Depth Variance
Courtesy of CHRYSLER GROUP, LLC

Compensation for pinion depth variance is achieved with select shims (3). The shims are sandwiched between the pinion head bearing cup (4) and axle housing.

If installing a new gear, note the depth variance number of the original and replacement pinion. Add or subtract this number from the original depth shim to compensate for the difference in the depth variances. The numbers represent deviation from the standard in thousandths of an inch. If the number is negative, add that value to the required thickness of the depth shims. If the number is positive, subtract that value from the thickness of the depth shim.

PINION DEPTH MEASUREMENT

Pinion depth measurement is taken with the pinion head and tail bearing cups pressed into the axle housing without the shim.

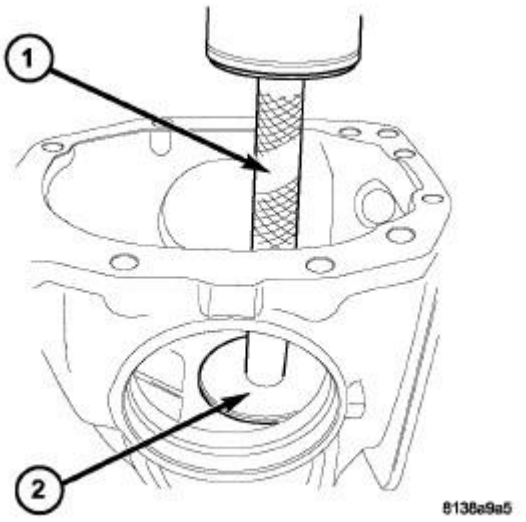

Fig. 6: Pinion Head Bearing Cup Installation
Courtesy of CHRYSLER GROUP, LLC

1. Press pinion head bearing cup into housing using Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #C-4310, Installer, Bearing) (2).

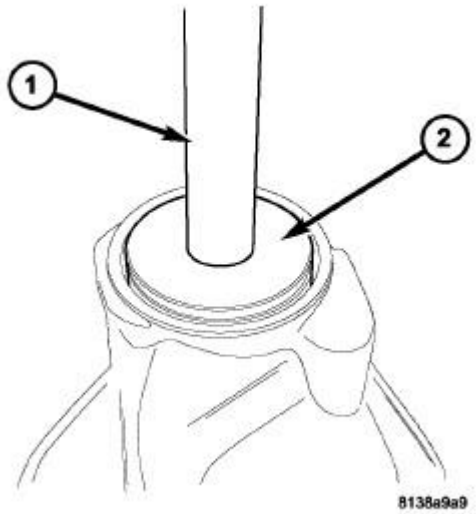

Fig. 7: Installing Pinion Tail Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

2. Press pinion tail bearing cup into housing using Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #D-146, Installer, Bearing Cup) (2).

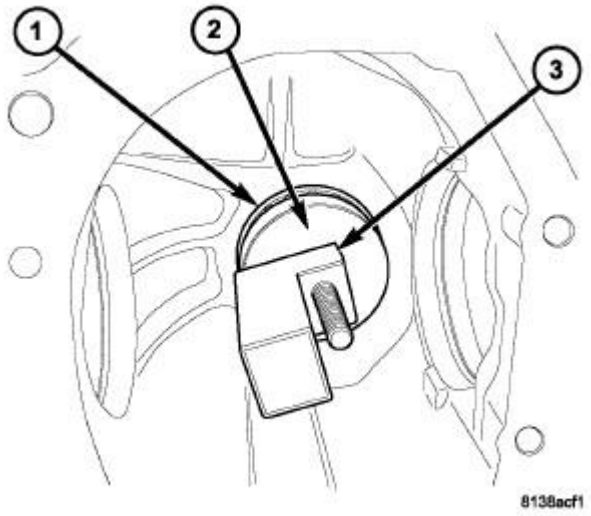

Fig. 8: L-Block, Gage Block & Bearing
Courtesy of CHRYSLER GROUP, LLC

3. Assemble Pinion Height Block (special tool #6739, Block, Height) (3), Pinion Head Bearing Cone (1), Screw (special tool #6741, Screw) (all these can be found in a Pinion Gauge Set such as (special tool #6774, Kit, Jeep Pinion Depth)), and Pinion Height Gage Block (special tool #9227, Gauge, Pinion Height) (2). Install assembly into axle housing and through bearing cups.

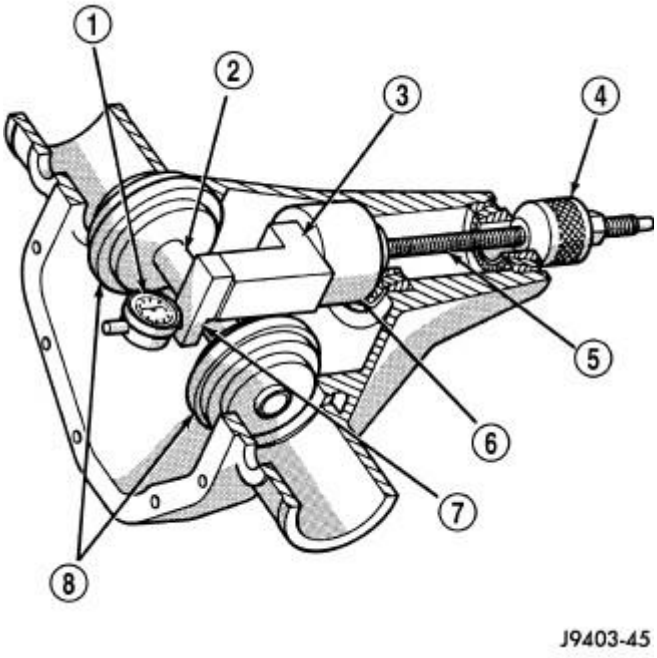

Fig. 9: Pinion Depth Gauge Tools - Typical
Courtesy of CHRYSLER GROUP, LLC

4. Install pinion tail bearing and Cone (special tool #6740, Cone) (4). Tighten Cone (special tool #6740, Cone) by hand until 3.4 N.m (30 in. lbs.) of rotating torque is measured at Screw (special tool #6741, Screw) (5).

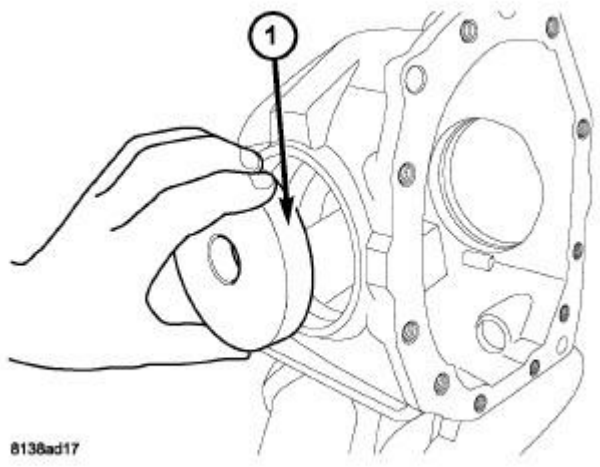

Fig. 10: Removing/Installing Arbor Discs
Courtesy of CHRYSLER GROUP, LLC

5. Install Arbor Discs (special tool #9228, Set, Arbor Disc) (1).

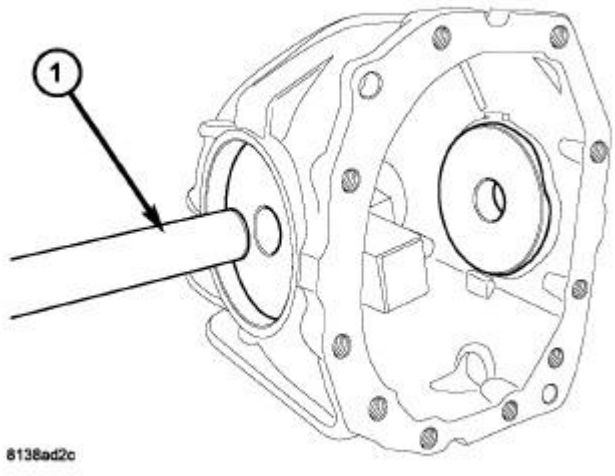

Fig. 11: Remove/Install Arbor Bar
Courtesy of CHRYSLER GROUP, LLC

6. Install Arbor Bar (special tool #D-115-3, Arbor) (1) from a Pinion Gauge Set such as (special

tool #6774, Kit, Jeep Pinion Depth).

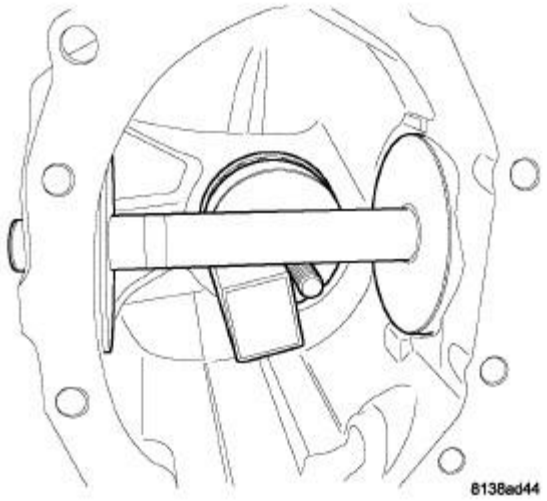

Fig. 12: Pinion Gage Setup
Courtesy of CHRYSLER GROUP, LLC

7. Verify pinion depth setup is as shown in illustration.

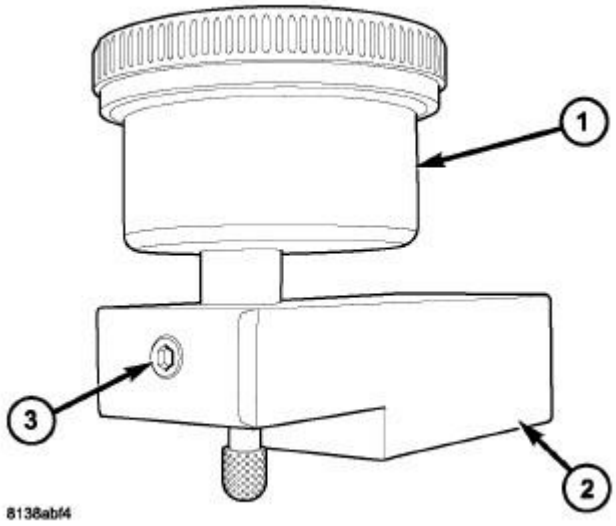

Fig. 13: Indicator/Scooter Block Setup
Courtesy of CHRYSLER GROUP, LLC

8. Install Dial Indicator (special tool #9524, Indicator, Dial) (1) to Scooter Block (special tool #D-115-2A, Block, Scooter) (2) (from a Pinion Gauge Set such as (special tool #6774, Kit, Jeep Pinion Depth)). Secure with set-screw (3).

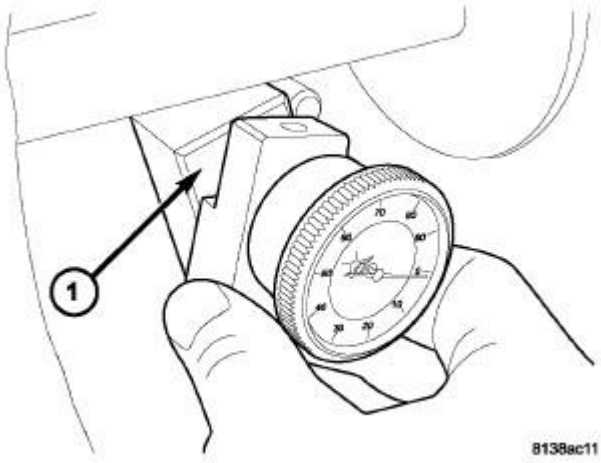

Fig. 14: Zero Dial Indicator On L-Block
Courtesy of CHRYSLER GROUP, LLC

9. Install Indicator/Block assembly to top of Pinion Height Block (special tool #6739, Block, Height) (1). Zero indicator on top surface.

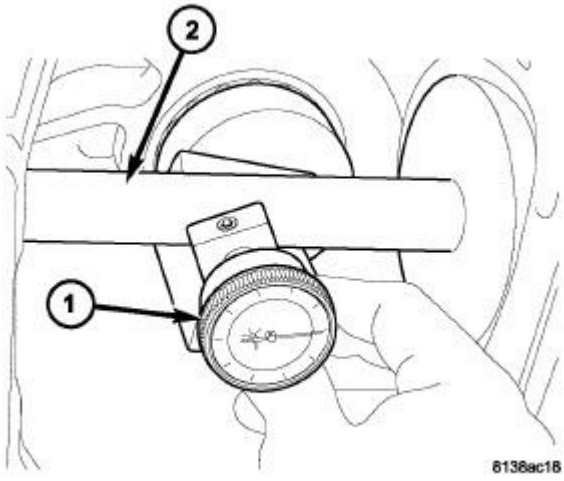

Fig. 15: Measure And Record Required Shim
Courtesy of CHRYSLER GROUP, LLC

10. Slide indicator probe off of height block and onto Arbor Bar (special tool #D-115-3, Arbor) (2). As indicator contacts Arbor Bar (2), indicator needle will rotate clockwise. Continue moving indicator probe to the crest of the arbor bar and record the highest reading.
11. Select a shim equal to the dial indicator reading minus 2.5 mm (0.09 in.). After shim installation, check the amount of pinion bearing preload, and adjust as required to achieve the correct

turning torque.

ADJUSTMENT - SIDE BEARING PRELOAD AND RING GEAR BACKLASH

DIFFERENTIAL SIDE BEARING PRELOAD MEASUREMENT/CORRECTION

Differential side bearing preload should be measured and adjusted after the following scenarios:

- Differential case replacement
- Differential side bearing replacement
- Axle housing replacement
- Loss or replacement of side bearing snap rings

If none of these situations apply, refer to **RING GEAR BACKLASH MEASUREMENT/CORRECTION** .

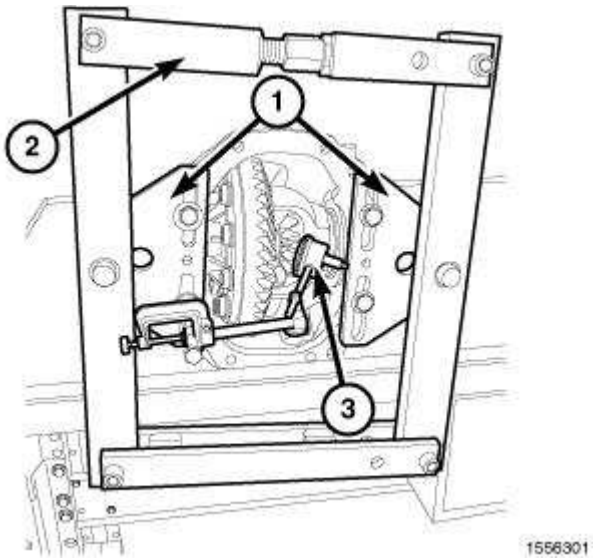

Fig. 16: Universal Spreader Adapter Plates & Spreader
Courtesy of CHRYSLER GROUP, LLC

1. Install Universal Spreader Adapter Plates (special tool #10113, Adapters, Spreader) (1), and Spreader (special tool #W-129-B, Spreader, Differential) (2). Install a stud into the case in the location shown in illustration. Mount Clamp (special tool #SP-5426, Clamp (Less Post)) to the stud, and install Post (special tool #SP-5425-B, Special Post) from Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) into the Clamp (special tool #SP-5426, Clamp (Less Post)). Zero Metric Dial Indicator (special tool #9524, Indicator, Dial) (3) in the location shown in illustration to measure axle housing spread.

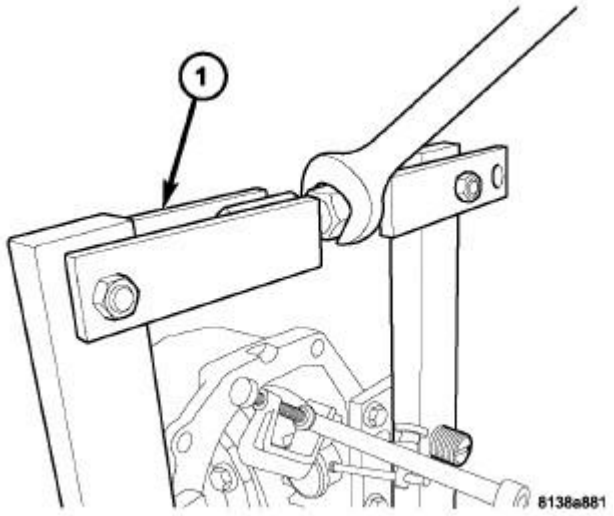

Fig. 17: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

2. If differential side bearing cups and snap rings are removed at this point, skip to Step 6. Otherwise, expand spreader to spread axle housing no more than 0.30 mm (0.012 in.).

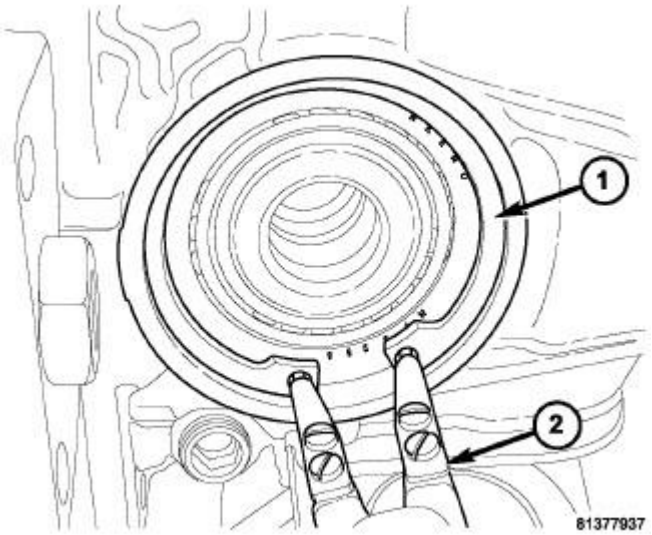

Fig. 18: Snap Ring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

3. Remove both differential side bearing snap rings (1). Tag snap ring to ensure installation in original position.

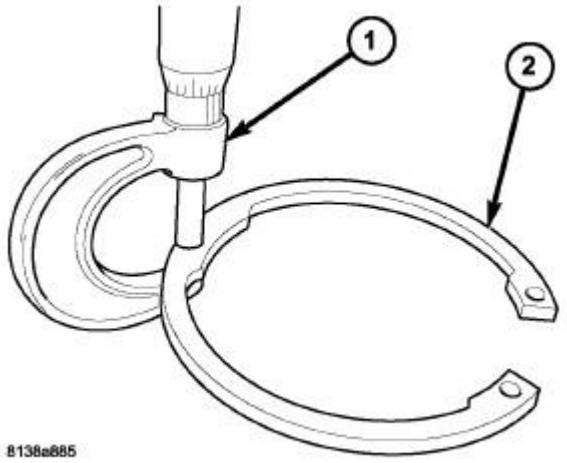

Fig. 19: Measuring Side Bearing Snap Ring
Courtesy of CHRYSLER GROUP, LLC

4. Measure and record snap ring (2) thickness for later use.

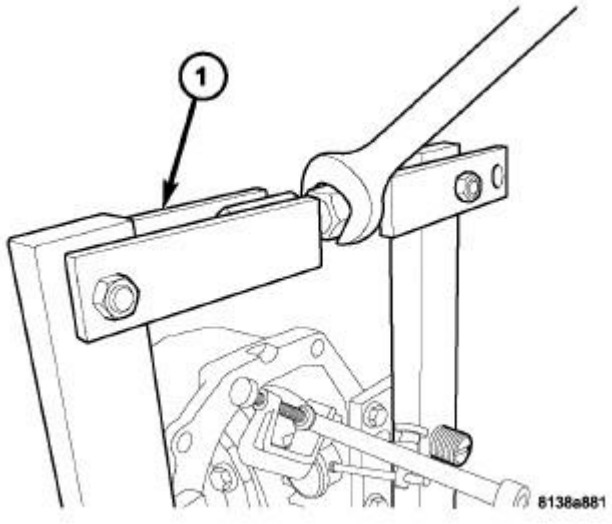

Fig. 20: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

5. Relax spreader (1) to relieve tension on axle housing.

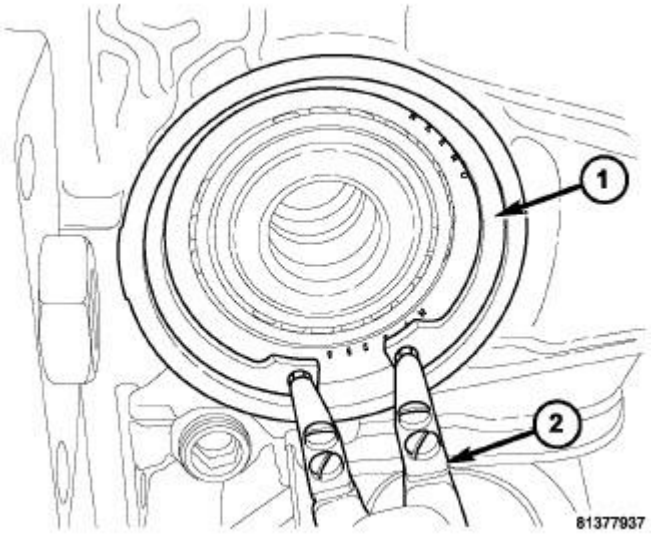

Fig. 21: Snap Ring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

6. Install right (pinion) side bearing cup and snap ring (1).

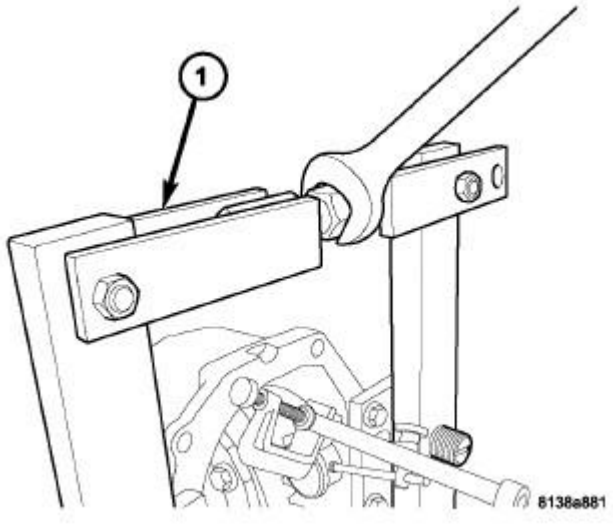

Fig. 22: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

7. Zero dial indicator.
8. Expand spreader (1) to spread axle housing no more than 0.30 mm (0.012 in.).

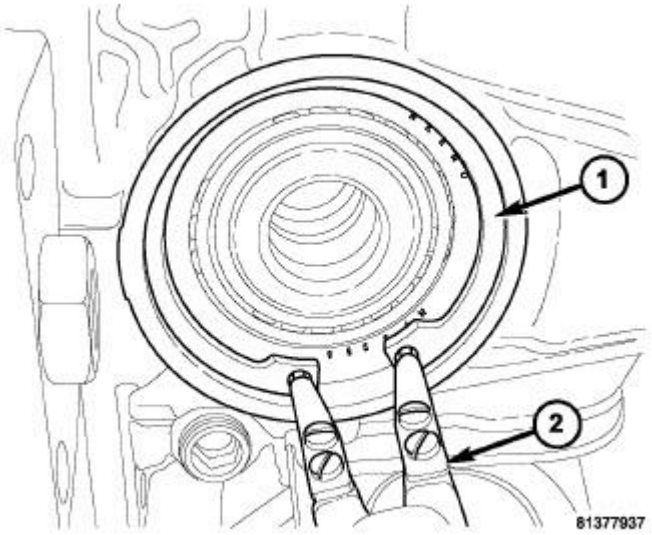

Fig. 23: Snap Ring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

9. Install left (ring gear) side bearing cup and snap ring (1).

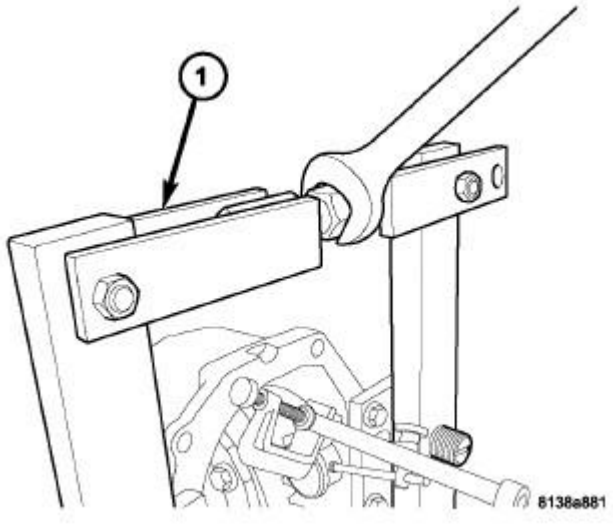

Fig. 24: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

10. Relax spreader (1) to relieve tension on axle housing.
11. Measurement showing on indicator is the axle housing retained spread. Proper differential side bearing preload is achieved with an axle housing retained spread of 0.18-0.23 mm (0.007-0.009 in.).
12. If retained spread is less than 0.18 mm (0.007 in.), increase snap ring thickness at each side in

equal increments.

13. If retained spread is greater than 0.23 mm (0.009 in.), decrease snap ring thickness at each side in equal increments.

RING GEAR BACKLASH MEASUREMENT/CORRECTION

Differential Ring Gear Backlash should be measured and adjusted after the following scenarios:

1. Ring and pinion gear replacement
2. Pinion head bearing replacement
3. Pinion depth (shim) adjustment
4. Differential case replacement
5. Differential side bearing replacement
6. Axle housing replacement

NOTE: If Spreader (special tool #W-129-B, Spreader, Differential) is installed, make sure tension on axle housing is relieved.

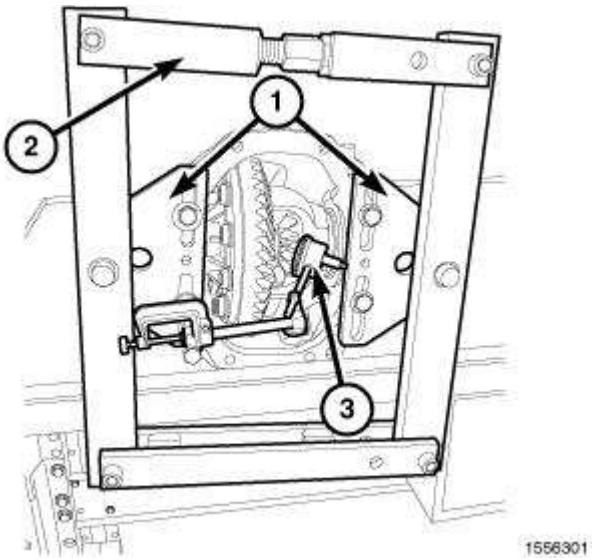

Fig. 25: Universal Spreader Adapter Plates & Spreader
Courtesy of CHRYSLER GROUP, LLC

7. Install Universal Spreader Adapter Plates (special tool #10113, Adapters, Spreader) (1), and Spreader (special tool #W-129-B, Spreader, Differential) (2). Install a stud into the case in the location shown in illustration. Mount Clamp (special tool #SP-5426, Clamp (Less Post)) to the stud, and install Post (special tool #SP-5425-B, Special Post) from Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) into the Clamp (special tool #SP-5426, Clamp (Less Post)). Zero Metric Dial Indicator (special tool #9524, Indicator, Dial) (3) in the location shown in illustration to measure axle housing spread.
8. Rotate ring gear one direction to take up clearance to pinion. Verify indicator tip is in contact with ring gear and zero indicator. Rotate ring gear back and forth and record measurement.

Ring gear backlash should be 0.13-0.18 mm (0.005-0.007 in.). Verify back lash measurement in four positions.

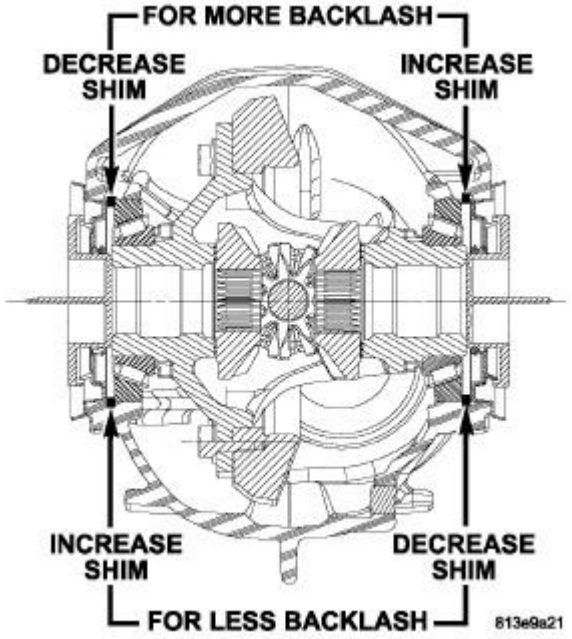

Fig. 26: Backlash Shim Correction
Courtesy of CHRYSLER GROUP, LLC

9. If backlash measurement is less than 0.13 mm (0.005 in.), it is necessary to decrease the snap ring thickness on the ring gear (left) side, and increase the thickness on the pinion (right) side.
10. If backlash measurement is greater than 0.18 mm (0.007 in.), it is necessary to increase the snap ring thickness on the ring gear (right) side, and decrease the thickness on the pinion (left) side.

GEAR CONTACT PATTERN

The ring gear and pinion teeth contact patterns will show if the pinion depth is correct in the housing. It will also show if the ring gear backlash has been adjusted correctly. The backlash can be adjusted within specifications to achieve desired tooth contact patterns.

1. Apply a thin coat of hydrated ferric oxide or equivalent to the drive and coast side of the ring gear teeth.
2. Wrap, twist, and hold a shop towel around the pinion yoke to increase the turning resistance of the pinion. This will provide a more distinct contact pattern.
3. With a boxed end wrench on a ring gear bolt, rotate the differential case one complete revolution in both directions while a load is being applied from shop towel.

The areas on the ring gear teeth with the greatest degree of contact against the pinion teeth will squeegee the compound to the areas with the least amount of contact. Note and compare patterns on

the ring gear teeth to Gear Tooth Contact Patterns chart and adjust pinion depth and gear backlash as necessary. Refer to **Fig. 27**.

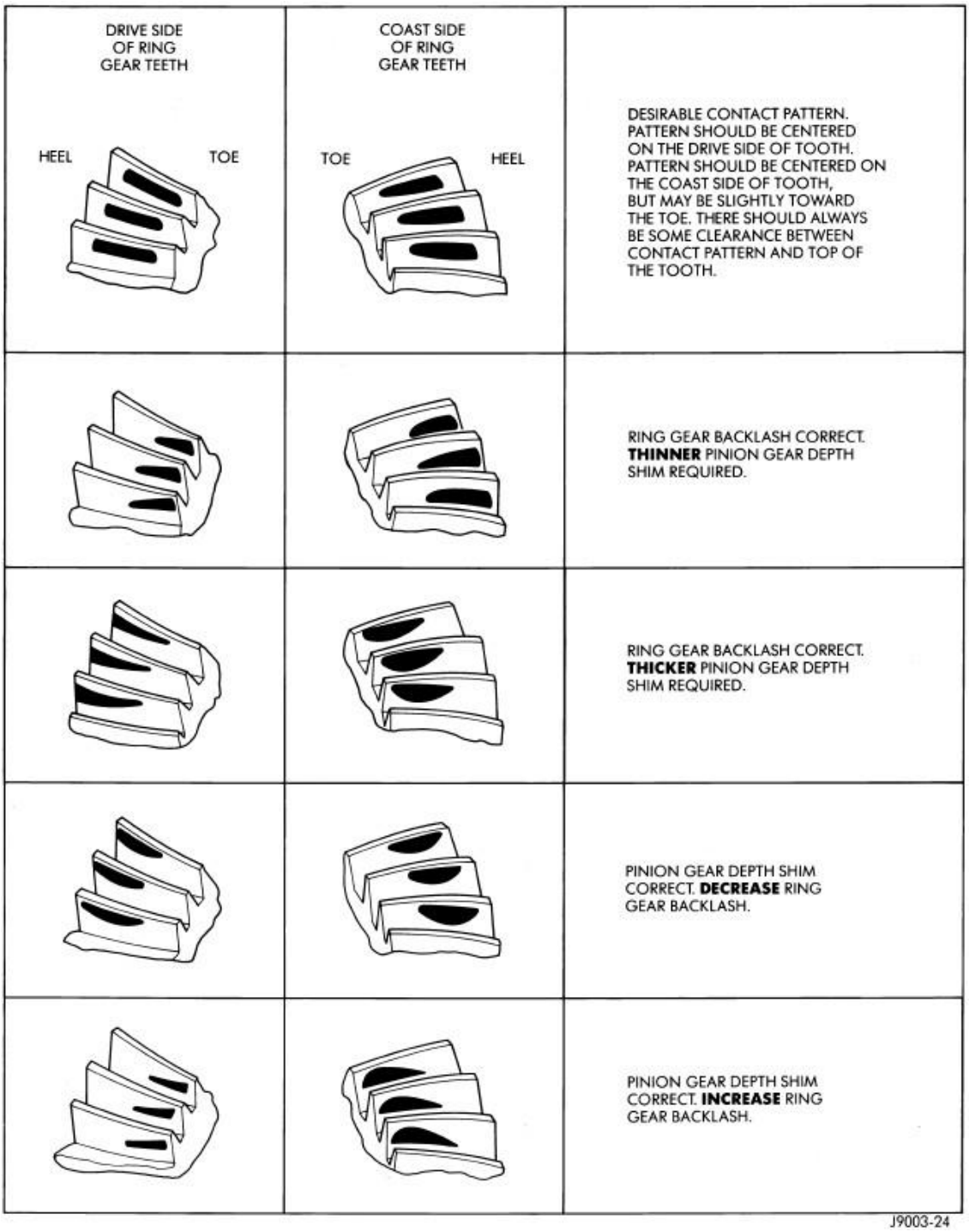

Fig. 27: Gear Tooth Contact Patterns
Courtesy of CHRYSLER GROUP, LLC

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Ring Gear Diameter	200 mm (7.87 in.)
Ring Gear Backlash	0.13-0.18 mm (0.005-0.007 in.)
Axle Housing Retained Spread	0.18 mm to 0.23 mm (0.007 in. to 0.009 in.)
Select Snap Ring Size	3.60-4.68 mm (0.14-0.18 in.) In 0.02mm (0.0007 in.) increments
Select Pinion Shim Size	1.40-2.50mm (0.05-0.10 in.) In 0.01mm (0.0004 in.) increments
Pinion Torque To Rotate	2.25N.m (20 in. lbs.)
Total Torque To Rotate (Approx.)	3.38N.m (30 in. lbs.)

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Plug, Rear Axle Drain/Fill	60	44	-
Bolt, Differential Cover	30 +45°	22 + 45°	-
Bolt, Ring Gear-to-Differential Case	85	64	-
Bolt, Axle Housing-to-Crossmember	220	162	-
Bolt/Nut, Axle Front Mount Isolator	65	48	-
Bolt/Nut, Propeller Shaft Coupler-to-Axle Flange	58	43	-

REMOVAL

REMOVAL

NOTE: This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.

CAUTION: Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.

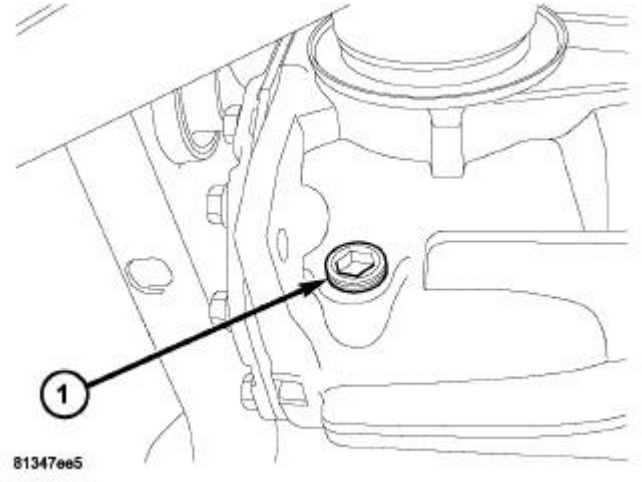

Fig. 28: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. With vehicle in neutral, position and raise vehicle on hoist.
2. Using 14mm hex, remove axle drain plug (1) and drain rear axle fluid into container suitable for fluid reuse.
3. Install drain plug (1) and torque to 60 N.m (44 ft. lbs.) torque.

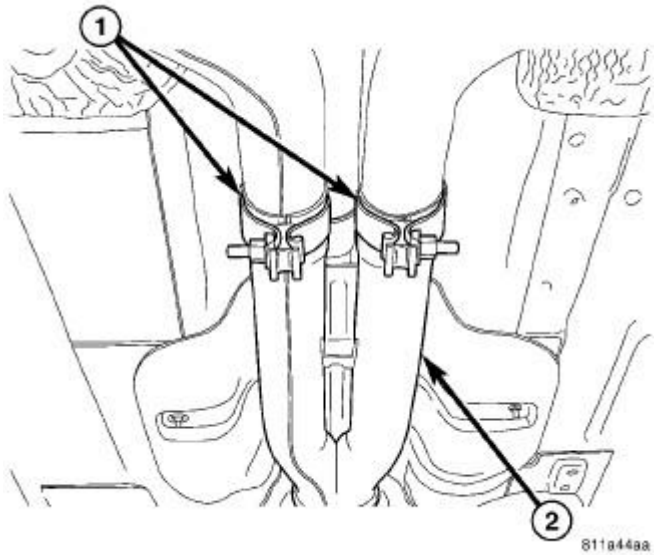

Fig. 29: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

4. Remove rear exhaust system (2) on dual-outlet exhaust models, otherwise, lower exhaust system at rear hanger(s) to provide adequate clearance.

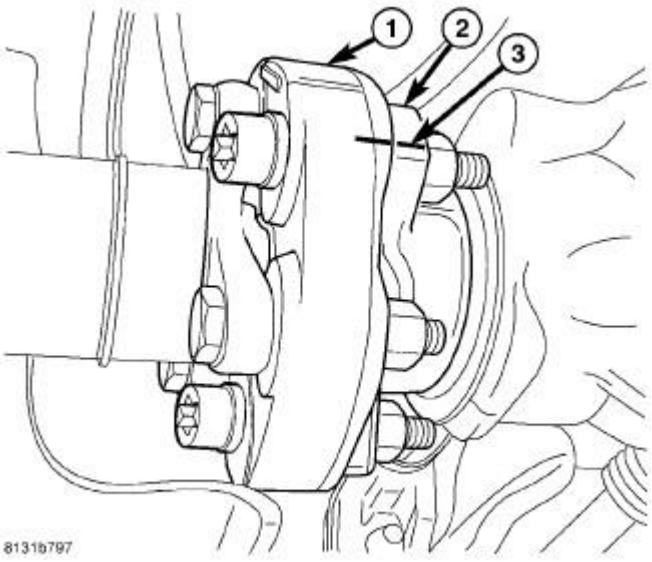

Fig. 30: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

5. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).

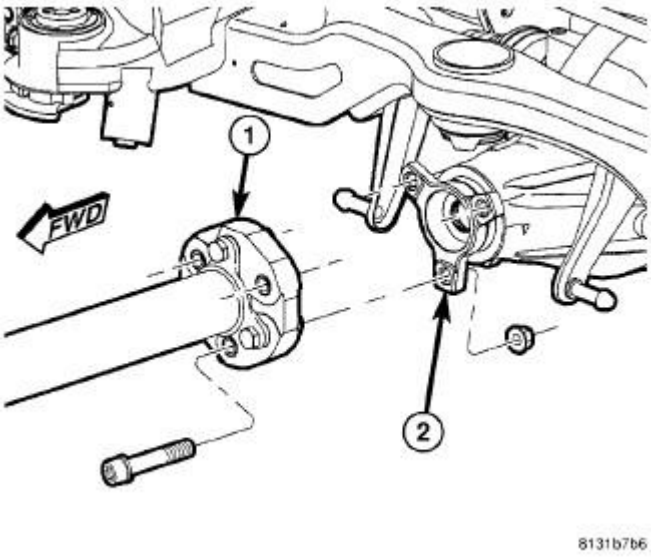

Fig. 31: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove three propeller shaft coupler-to-axle flange bolt/nuts.

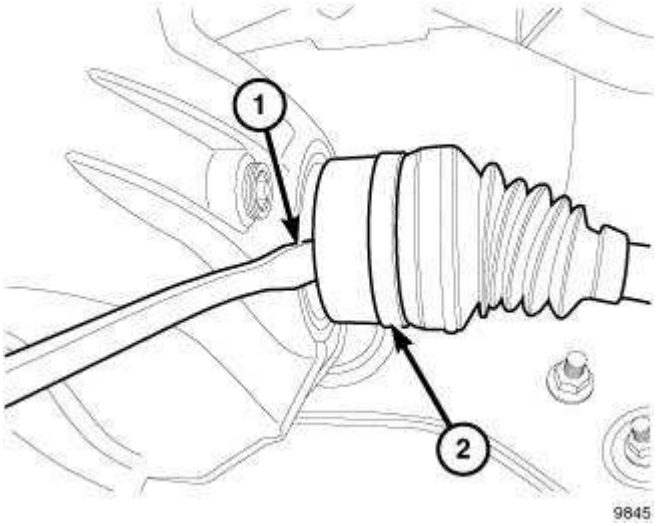

Fig. 32: Halfshaft Removal (V6 Models)
Courtesy of CHRYSLER GROUP, LLC

7. Using suitable screwdriver (1), partially disengage halfshaft(s) (2) from axle assembly.

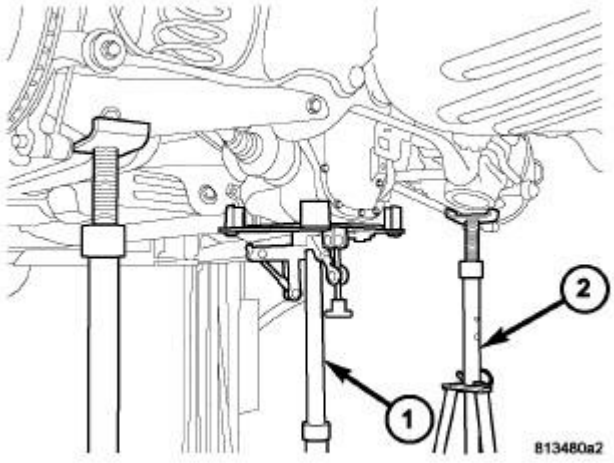

Fig. 33: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

8. If a drive-on hoist is used, position transmission jack (1) to rear axle assembly. If a drive-on hoist is not used, compress rear suspension using screw-style under-hoist jack stands (2), then position transmission jack to rear axle assembly.

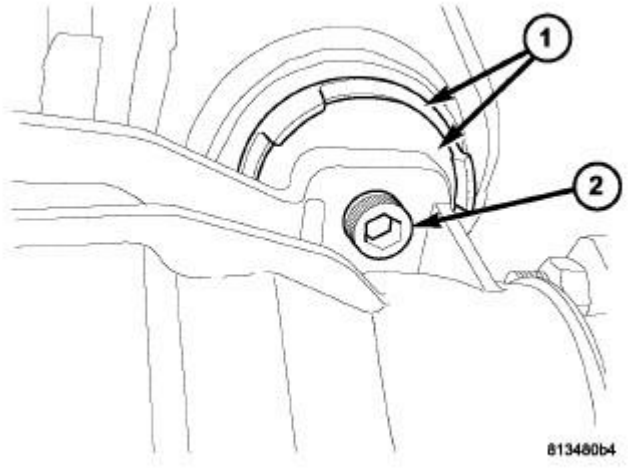

Fig. 34: Rear Axle Forward Mount Isolator & Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

9. Remove rear axle forward mount isolator (1) bolt/nut (2).
10. Remove two rear axle-to-crossmember bolts (1).

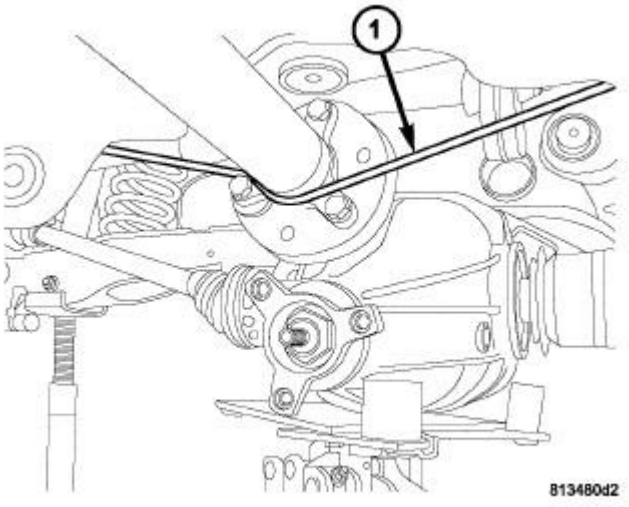

Fig. 35: Propeller Shaft Supported
Courtesy of CHRYSLER GROUP, LLC

11. Carefully lower rear axle. While lowering axle, separate propeller shaft from axle and support with suitable rope or wire (1).

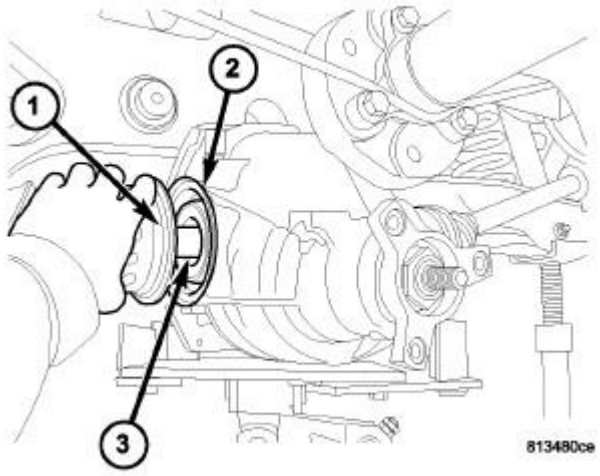

Fig. 36: Halfshaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

12. Lower axle just enough to remove both halfshafts one at a time. Shift axle assembly in one direction, compressing one halfshaft while removing the other (1). Use caution to protect axle seal and journal.
13. Remove axle assembly from vehicle and transfer to bench.

INSTALLATION

INSTALLATION

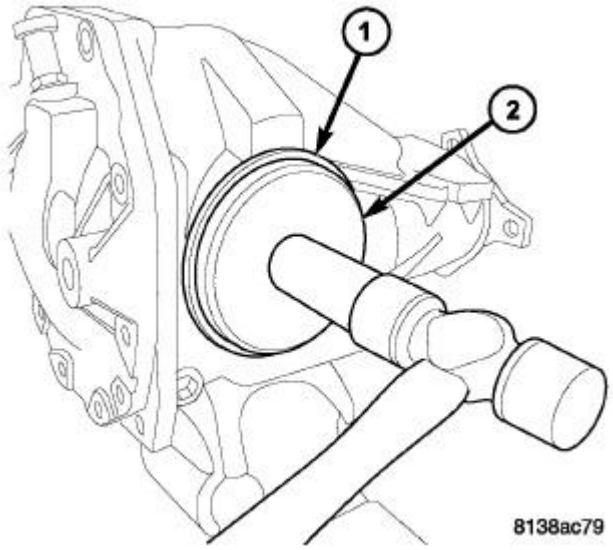

Fig. 37: Axle Seal Installation

Courtesy of CHRYSLER GROUP, LLC

1. Install new axle seal(s) (1) using (special tool #9223A, Drift) (2) if a new seal is required.

NOTE: Always use (special tool #9099, Seal Protector, Differential Output) when installing half shaft into the transaxle. If the Seal Protector is new please split at seam before using.

NOTE: Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.

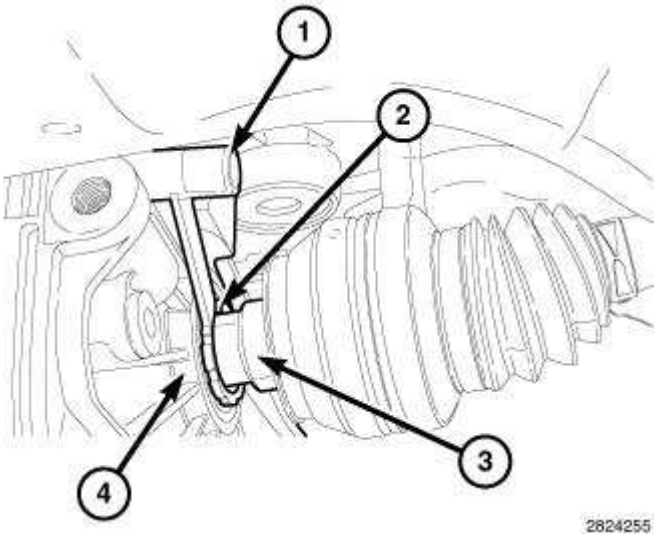

Fig. 38: Identifying Rear Axle, Rear Driveshaft, Rear Axle Flange, and Halfshafts
Courtesy of CHRYSLER GROUP, LLC

NOTE: While raising rear axle reposition rear drive shaft to rear axle flange.

2. Install new circlip(s), on halfshafts (3).
3. Raise axle just enough to install both halfshafts one at a time. Be careful not to damage axle seals using (special tool #9099, Seal Protector, Differential Output) (1). Shift axle assembly in one direction, compressing one halfshaft while installing the other.

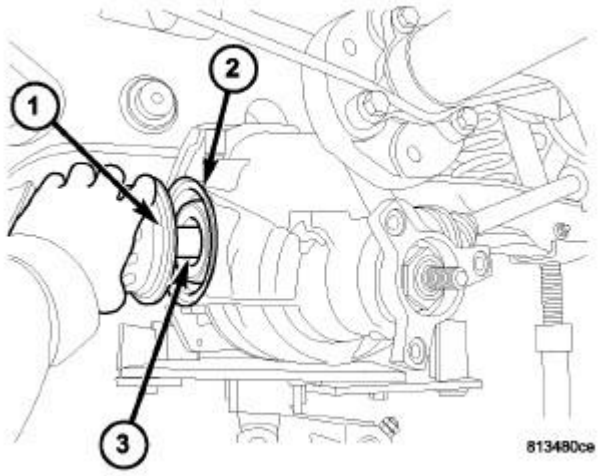

Fig. 39: Halfshaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

4. Verify proper installation by pulling outward on joint by hand.

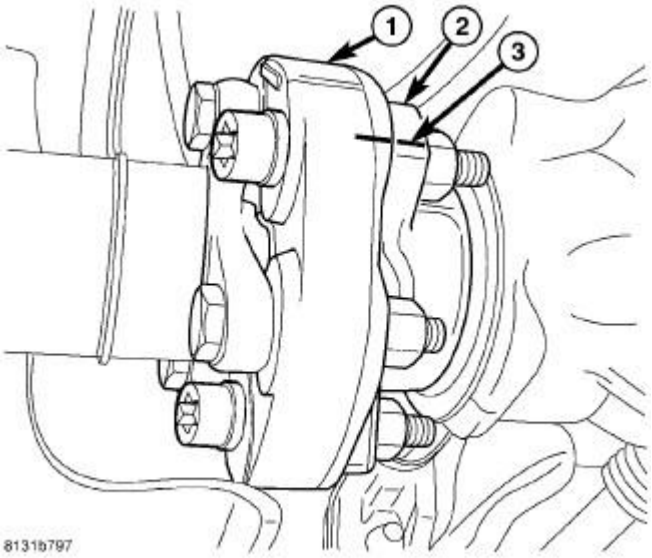

Fig. 40: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

5. Raise rear axle assembly into position. Align propeller shaft index marks (3) and start propeller shaft coupler-to-axle bolt/nuts by hand.

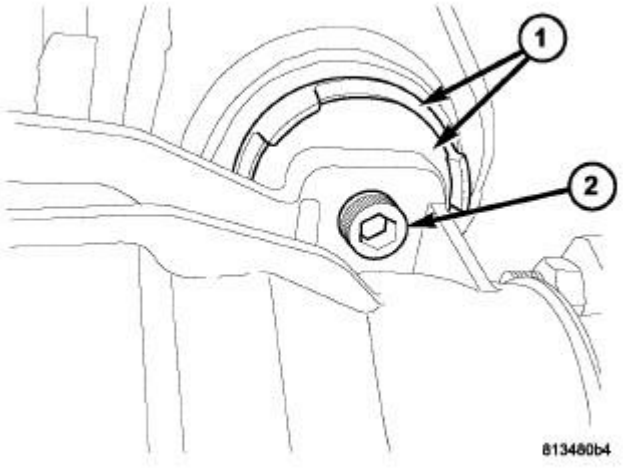

Fig. 41: Rear Axle Forward Mount Isolator & Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

6. Install two rear axle-to-crossmember bolts (1) and torque to 220 N.m (162 ft. lbs.).
7. Install rear axle front mount isolator (1) as shown in illustration and torque bolt/nut to 65 N.m (48 ft. lbs.).

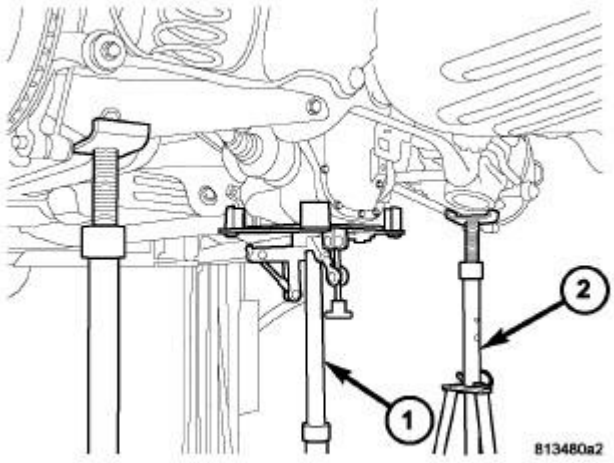

Fig. 42: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

8. Again verify halfshaft inner joints are fully engaged to axle assembly.
9. Remove transmission jack (1).
10. If used, remove screw-type under-hoist jack stands (2).

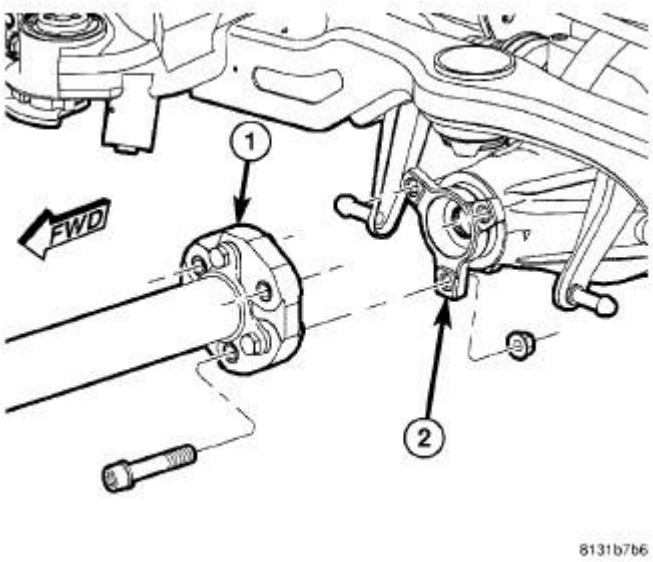

Fig. 43: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

11. Tighten the propeller shaft coupler-to-axle flange bolt/nuts. Refer to **SPECIFICATIONS** .

SPECIAL TOOLS

SPECIAL TOOLS

10113 - Adapters, Spreader (Originally Shipped In Kit Number(s) 9566-SUP2.)
1026 - Puller (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC.)
6448A - Installer, Bearing/Gear (Originally Shipped In Kit Number(s) 6947, 8667, 8837, 8867.)
6739 - Block, Height (Originally Shipped In Kit Number(s) 6730, 9516A-CAN, 9540, 9541.)
6740 - Cone (Originally Shipped In Kit Number(s) 6730, 6731, 9516A-CAN, 9540, 9541.)
6741 - Screw (Originally Shipped In Kit Number(s) 6730, 6731, 9516A-CAN, 9540, 9541.)
6774 - Kit, Jeep Pinion Depth (Originally Shipped In Kit Number(s) 6774.)
8255 - Installer (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
9084 - Remover, Pinion Bearing Cup (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541, 9694.)
9099 - Seal Protector, Differential Output

(Originally Shipped In Kit Number(s) 9324, 9324CC.)

9223A - Drift
(Originally Shipped In Kit Number(s) 9202, 9202CC, 9329-SUP, 9516-SUP, 9518-SUP, 9519-SUP, 9540-SUP.)

9226 - Adapters, Spreader
(Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

9227 - Gauge, Pinion Height
(Originally Shipped In Kit Number(s) 9329-SUP, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

9228 - Set, Arbor Disc
(Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

9231A - Installer, Pinion Oil Seal
(Originally Shipped In Kit Number(s) 9202, 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541, 9580, 9599.)

9522 - Remover/Installer, Bearing Cup
(Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

9523A - Installer, Bearing
(Originally Shipped In Kit Number(s) 10175, 10175, 9541.)

9524 - Indicator, Dial
(Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP2, 9516, 9516-SUP, 9517-SUP2, 9518, 9518-SUP, 9519, 9540-SUP, 9541-SUP, 9694.)

9630 - Fixture, Diff. Case Holding
(Originally Shipped In Kit Number(s) 9329-SUP, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

9631 - Fixture, Holding
(Originally Shipped In Kit Number(s) 9329-SUP, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

C-293-37 - Block Set, Puller
(Originally Shipped In Kit Number(s) 8418, 8562, C-293-M, DD-914-CLT-L.)

C-293-PA - Puller, Press
(Originally Shipped In Kit Number(s) 8418, 8837, C-293-M.)

C-3095-A - Installer, Bearing

C-3281 - Holder, Flange
(Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)

C-3339A - Set, Dial Indicator
(Originally Shipped In Kit Number(s) 9202.)

C-4171 - Driver Handle, Universal
(Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)

C-4310 - Installer, Bearing
(Originally Shipped In Kit Number(s) C-4306.)

D-115-2A - Block, Scooter

(Originally Shipped In Kit Number(s) 9329-SUP, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP, 9694, 9926.) D-115-3 - Arbor (Originally Shipped In Kit Number(s) 8667, 9516A-CAN.) D-146 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 8667.) D-149 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 8207, 8418, C-4306.) SP-3289 - Extension, Puller (Originally Shipped In Kit Number(s) 9599.) SP-5425-B - Special Post SP-5426 - Clamp (Less Post) W-129-B - Spreader, Differential (Originally Shipped In Kit Number(s) 9975.)

BEARING, DIFFERENTIAL SIDE

REMOVAL

REMOVAL

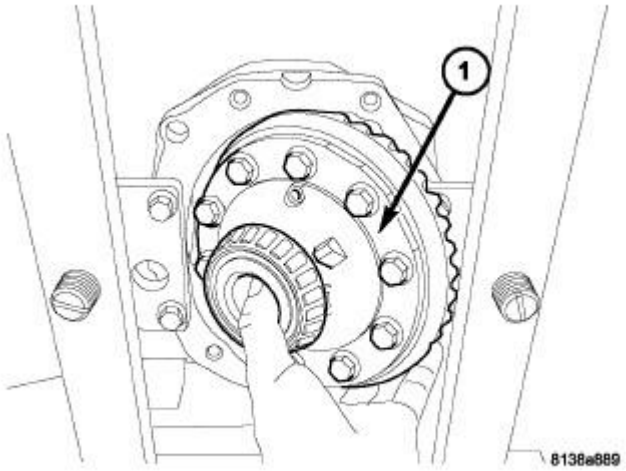

Fig. 44: Removing/Installing Differential
Courtesy of CHRYSLER GROUP, LLC

1. Remove differential assembly from axle. Refer to **CASE ASSEMBLY, DIFFERENTIAL, REMOVAL**.

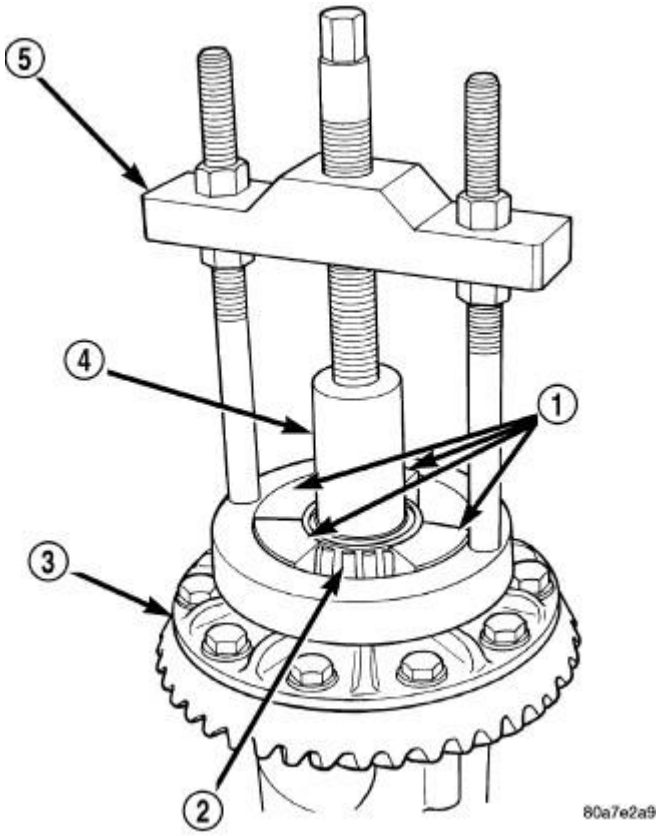

Fig. 45: Bearing Removal
Courtesy of CHRYSLER GROUP, LLC

2. Remove bearings (2) from the differential case (3) with Puller/Press (special tool #C-293-PA, Puller, Press) (5), Adapters (special tool #C-293-37, Block Set, Puller) (1) and Puller Extension (special tool #SP-3289, Extension, Puller) (4).

INSTALLATION

INSTALLATION

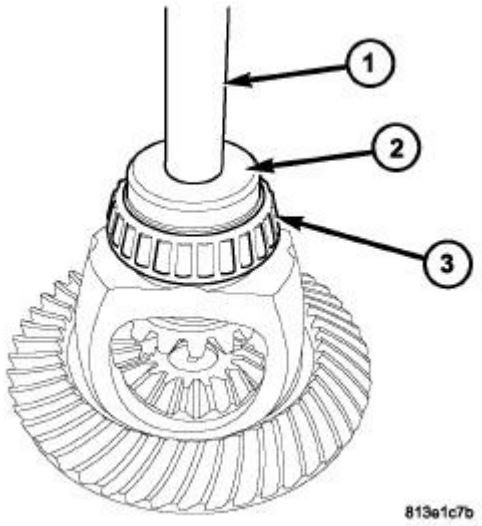

Fig. 46: Installing Differential Side Bearing
Courtesy of CHRYSLER GROUP, LLC

1. Using Installer (special tool #9523A, Installer, Bearing) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (1), press differential side bearings (3) onto differential case.

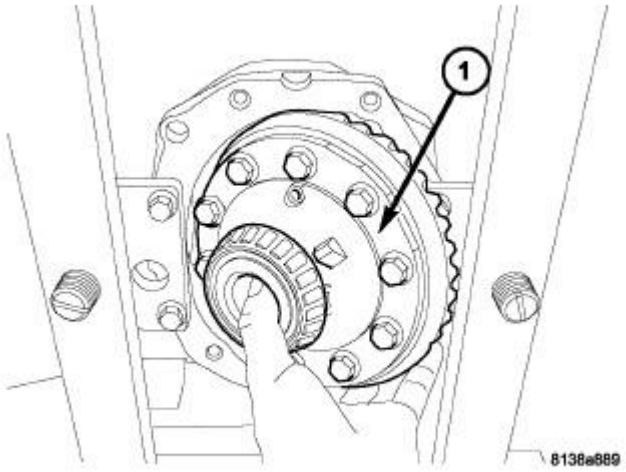

Fig. 47: Removing/Installing Differential
Courtesy of CHRYSLER GROUP, LLC

2. Install differential (1) and reassemble axle assembly.
3. Install the axle assembly. Refer to **INSTALLATION**.

CASE ASSEMBLY, DIFFERENTIAL

REMOVAL

REMOVAL

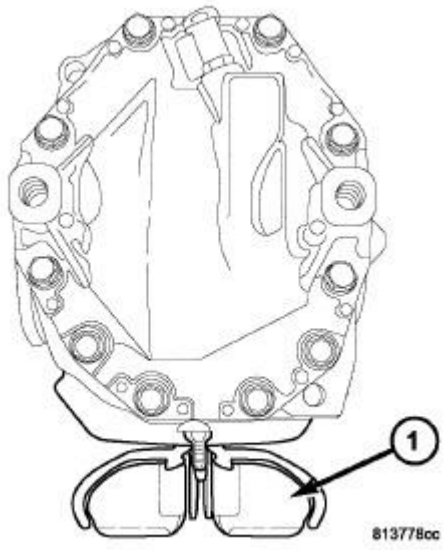

Fig. 48: Axle Clamped In Vise
Courtesy of CHRYSLER GROUP, LLC

1. Remove rear axle from vehicle. Refer to **REMOVAL**.
2. Clamp rear axle assembly into bench vise (1).

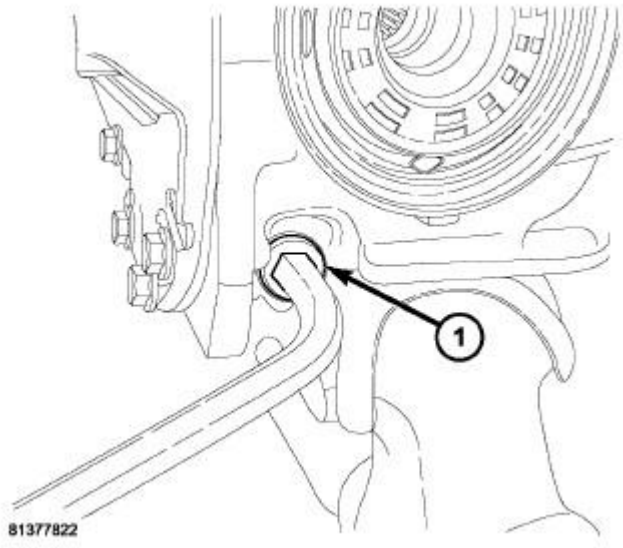

Fig. 49: Removing/Installing Drain Plug
Courtesy of CHRYSLER GROUP, LLC

3. Remove drain plug (1) and drain fluid into container suitable for reuse.

4. Install drain plug and torque to 60 N.m (44 ft. lbs.).

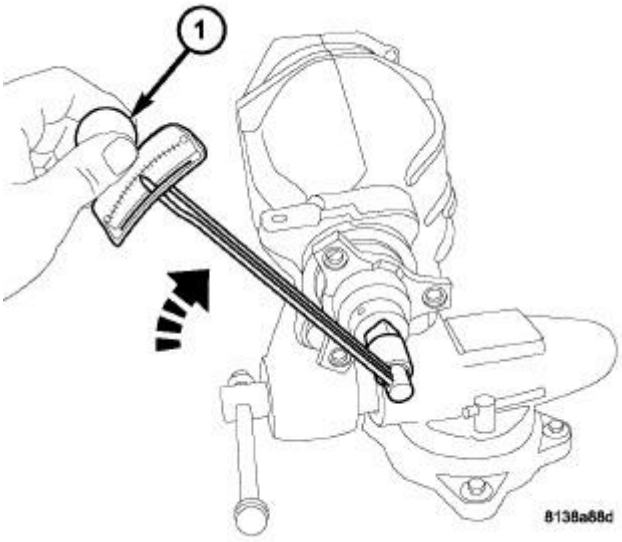

Fig. 50: Measuring Turning Torque
Courtesy of CHRYSLER GROUP, LLC

5. Using suitable torque wrench (1), measure and record rear axle assembly total turning torque.

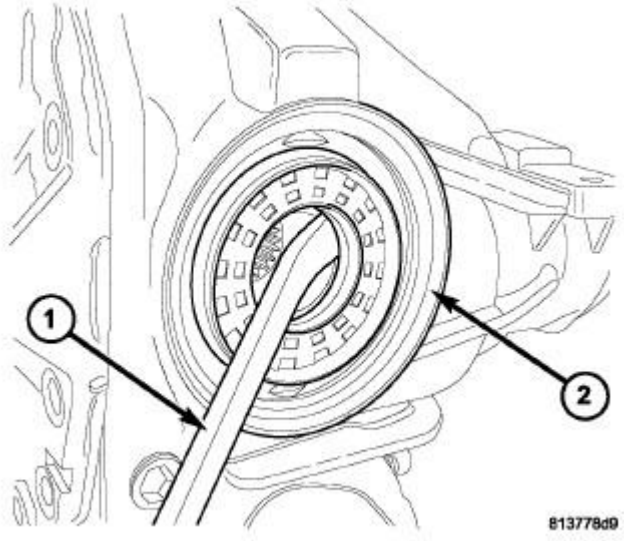

Fig. 51: Axle Seal Removal
Courtesy of CHRYSLER GROUP, LLC

6. Using suitable screwdriver (1), remove both axle seals (2).

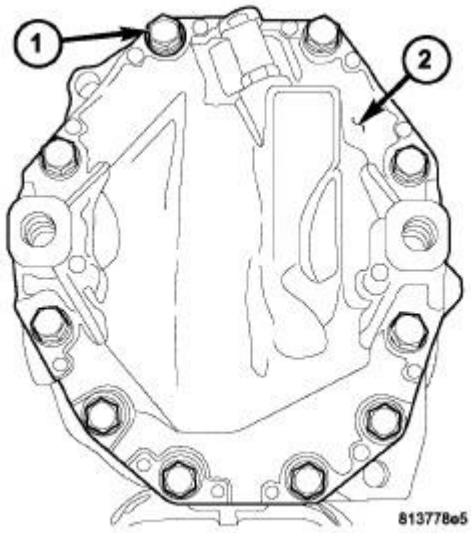

Fig. 52: Axle Housing Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove twelve axle cover-to-housing bolts (1) and remove cover (2).

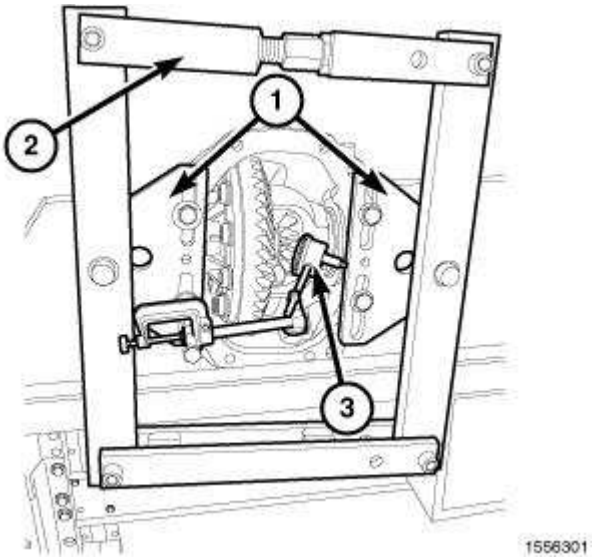

Fig. 53: Universal Spreader Adapter Plates & Spreader
Courtesy of CHRYSLER GROUP, LLC

8. Install Universal Spreader Adapter Plates (special tool #10113, Adapters, Spreader) (1), and Spreader (special tool #W-129-B, Spreader, Differential) (2). Install a stud in the location shown in illustration. Mount Clamp (special tool #SP-5426, Clamp (Less Post)) to the stud, and install Post (special tool #SP-5425-B, Special Post) from dial indicator set (special tool #C-3339A, Set, Dial Indicator) into Clamp (special tool #SP-5426, Clamp (Less Post)). Zero Metric Dial Indicator (special tool #9524, Indicator, Dial) (3) in the location shown in illustration to measure axle housing spread.

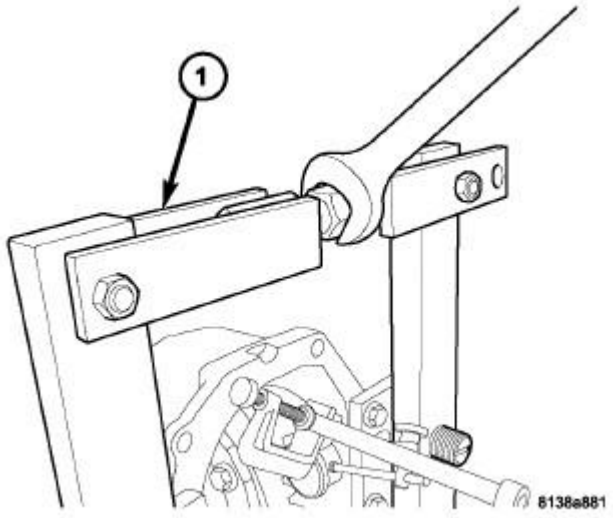

Fig. 54: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

9. Spread axle housing no more than 0.30 mm (0.012 in.).

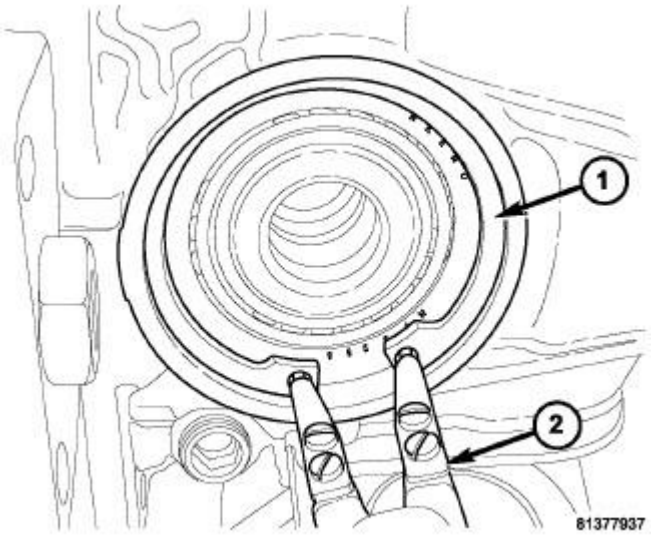

Fig. 55: Snap Ring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: The differential side bearing snap rings are select-fit, and control ring gear backlash and differential side bearing preload. It is important to return original snap rings to their original position.

10. Using suitable snap ring pliers (2), compress and remove differential side bearing snap rings

(1). Identify and tag for proper reuse.

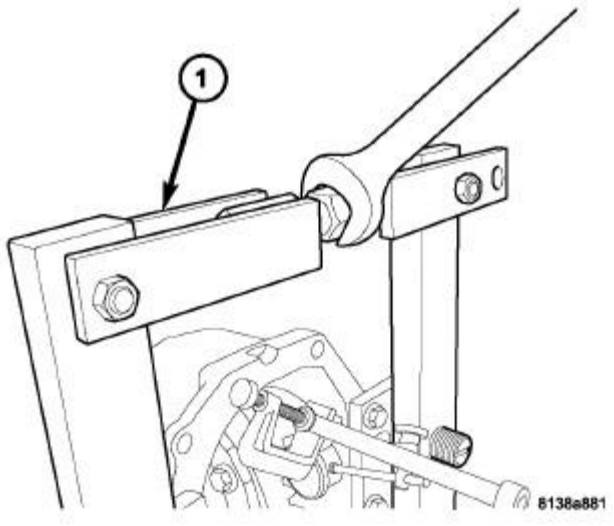

Fig. 56: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

11. Back off Spreader (special tool #W-129-B, Spreader, Differential) (1) to relax tension on housing.

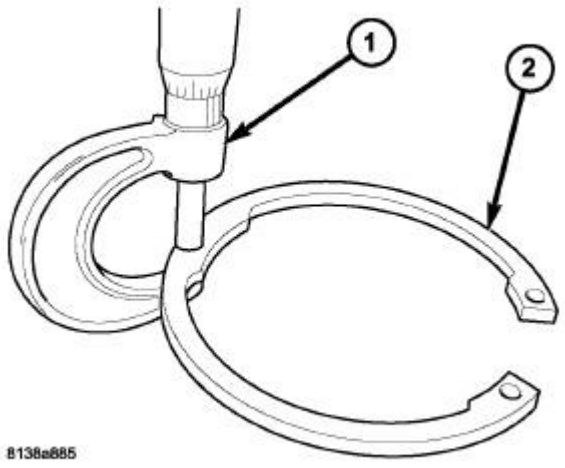

Fig. 57: Measuring Side Bearing Snap Ring
Courtesy of CHRYSLER GROUP, LLC

12. Measure snap ring thickness and record for future use.

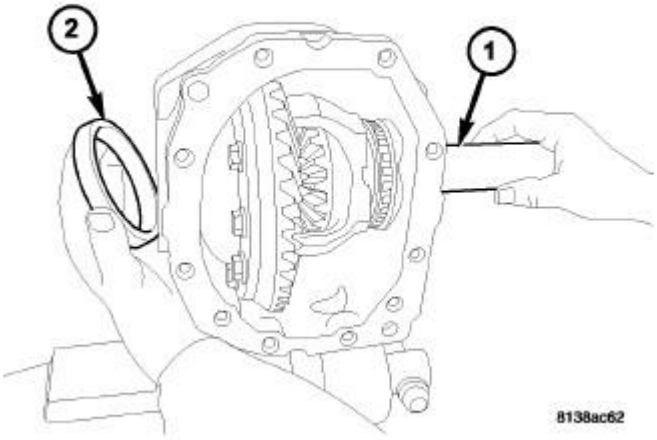

Fig. 58: Removing/Installing Side Bearing Cups
Courtesy of CHRYSLER GROUP, LLC

13. Install Removal/Installation Arbor (special tool #9522, Remover/Installer, Bearing Cup) (1) into one side of housing and push inward to release differential side bearing cup (2) from opposite side. Repeat for other bearing.

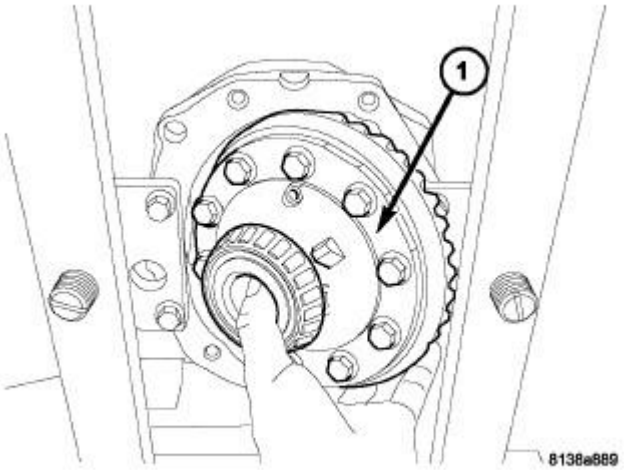

Fig. 59: Removing/Installing Differential
Courtesy of CHRYSLER GROUP, LLC

14. Remove differential assembly from axle housing.

NOTE: Note: If difficulty removing differential is encountered due to interference

with Spreader (special tool #W-129-B, Spreader, Differential) and Spreader Adapter Plates (special tool #9226, Adapters, Spreader), remove spreader and adapter plates to facilitate removal.

DISASSEMBLY

DISASSEMBLY

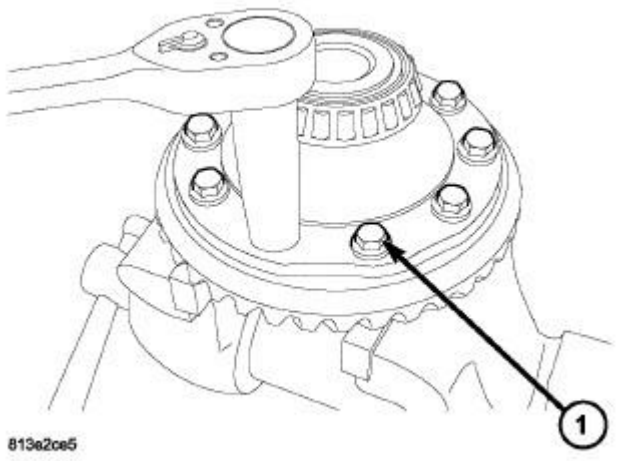

Fig. 60: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove differential ring gear-to-case bolts (1).

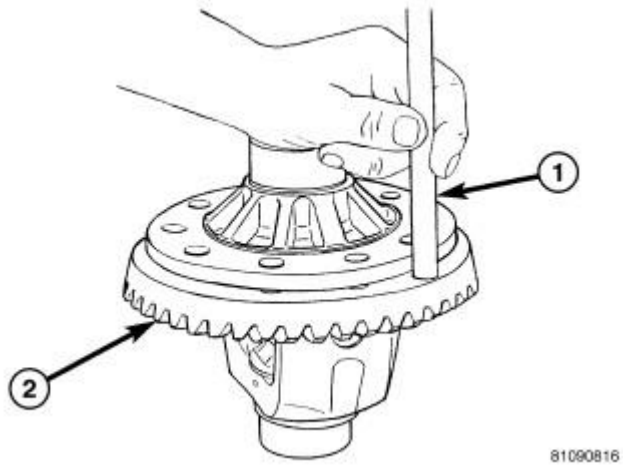

Fig. 61: Removing Ring Gear
Courtesy of CHRYSLER GROUP, LLC

2. Using brass drift (1), remove ring gear (2).

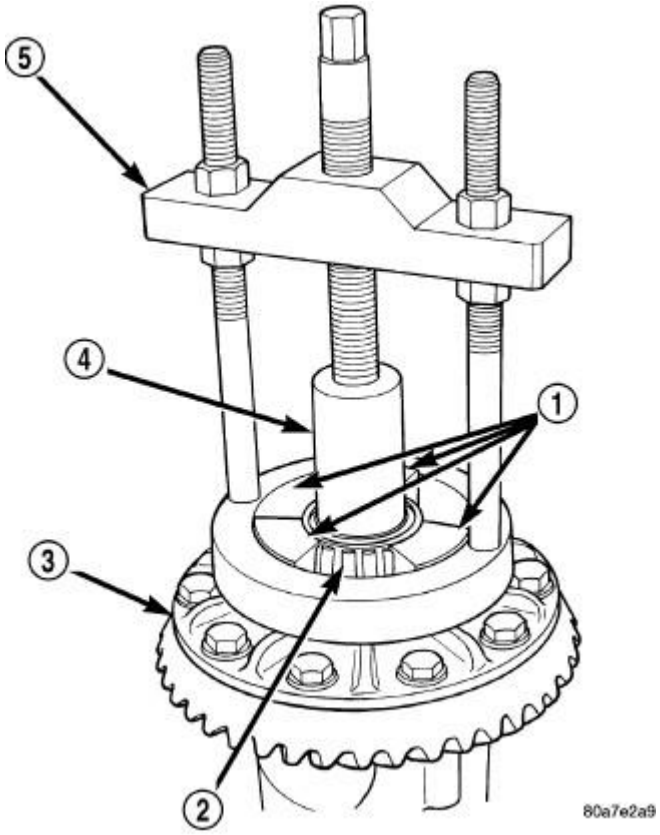

Fig. 62: Bearing Removal
Courtesy of CHRYSLER GROUP, LLC

3. Remove bearings (2) from the differential case (3) with Puller/Press (special tool #C-293-PA, Puller, Press) (5), Adapters (special tool #C-293-37, Block Set, Puller) (1) and Puller Extension (special tool #SP-3289, Extension, Puller) (4).

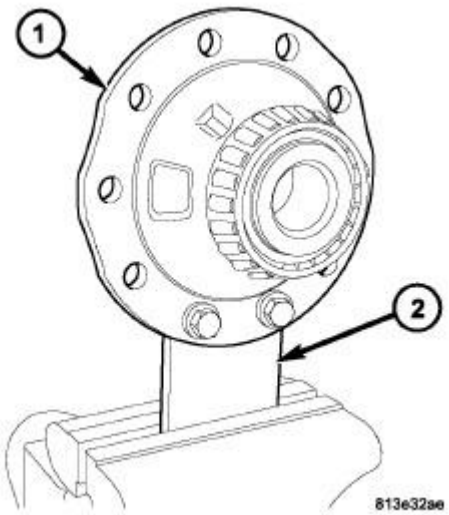

Fig. 63: Differential Mounted
Courtesy of CHRYSLER GROUP, LLC

4. Install the differential to Mounting Plate (special tool #9630, Fixture, Diff. Case Holding) (2) to the differential (1) and then install the assembly into a bench vise.

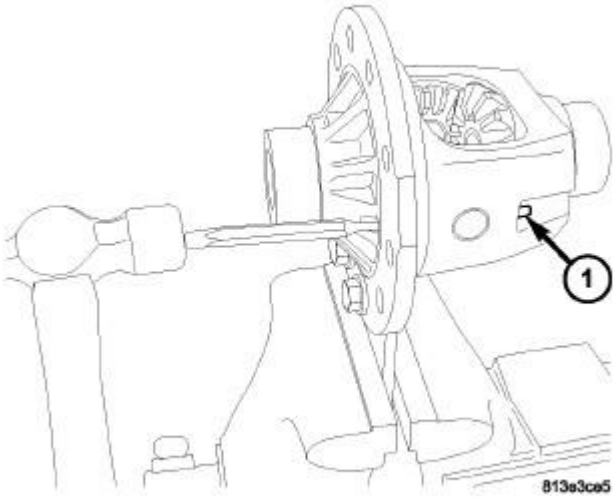

Fig. 64: Roll Pin Removal
Courtesy of CHRYSLER GROUP, LLC

5. Drive out pinion shaft-to-case roll pin using hammer and suitable punch.

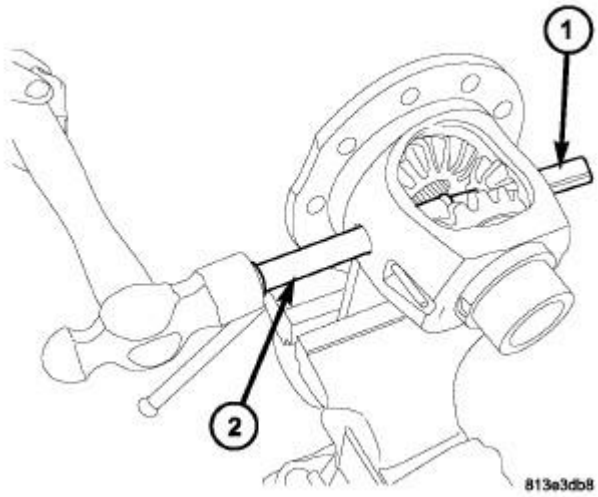

Fig. 65: Removing Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

6. Using brass drift (2), drive out pinion shaft (1).

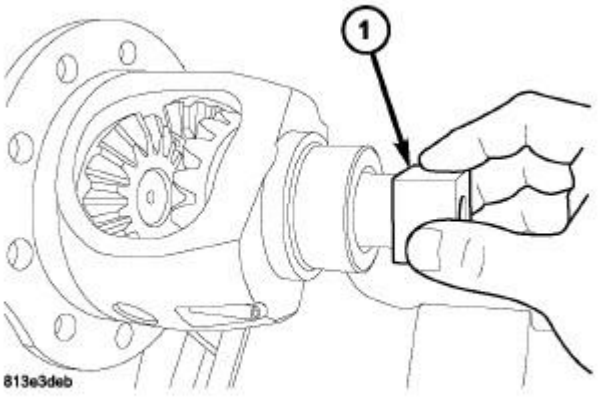

Fig. 66: Installing Fixture
Courtesy of CHRYSLER GROUP, LLC

7. Install Fixture (special tool #9631, Fixture, Holding) (1) into differential side gear.

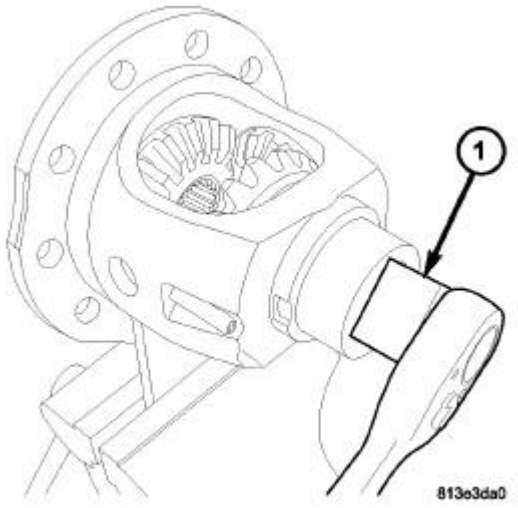

Fig. 67: Rotate Differential Gears
Courtesy of CHRYSLER GROUP, LLC

8. Rotate Fixture (special tool #9631, Fixture, Holding) (1) to gain access to and remove pinion gears and thrust washers.

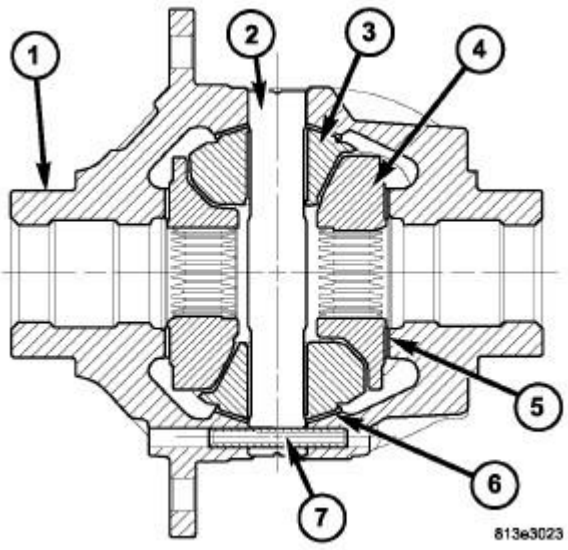

Fig. 68: Side Gears & Thrust Washers
Courtesy of CHRYSLER GROUP, LLC

9. Remove differential side gears (4) and thrust washers (5).

ASSEMBLY

ASSEMBLY

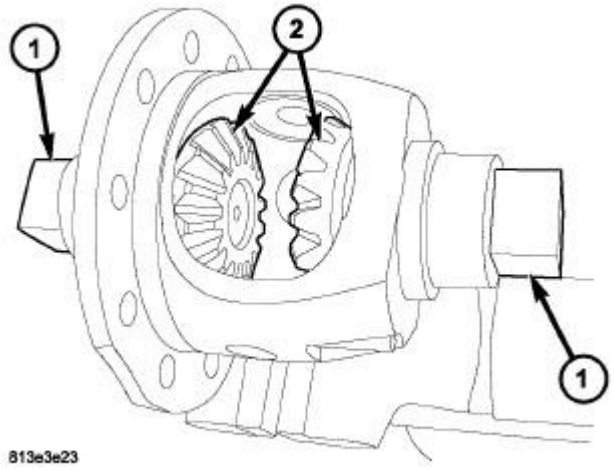

Fig. 69: Installing Side Gears
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate all differential components with hypoid gear lubricant.
2. Install differential side gears (2) and thrust washers to Fixtures (special tool #9631, Fixture, Holding) (1) as shown in illustration.

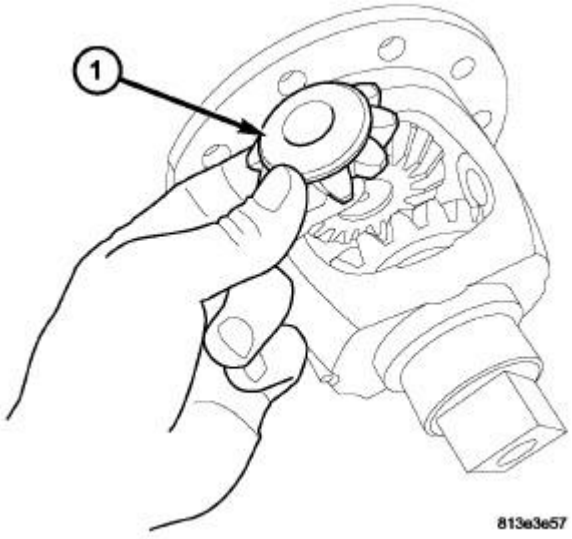

Fig. 70: Removing/Installing Pinion Gear & Washer
Courtesy of CHRYSLER GROUP, LLC

3. Install differential pinion gears (1) and thrust washers into position across from each other.

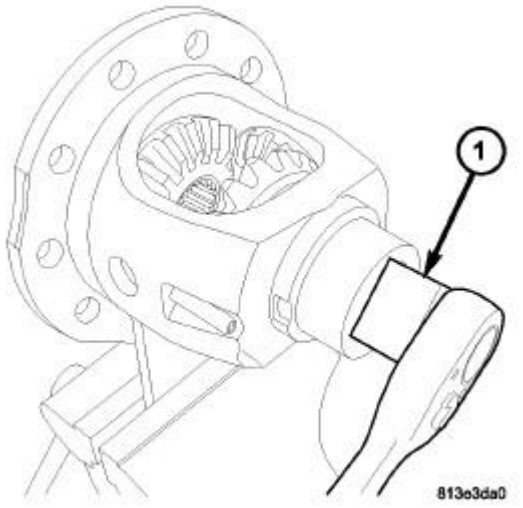

Fig. 71: Rotate Differential Gears
Courtesy of CHRYSLER GROUP, LLC

4. Rotate pinion gears into place using Fixture (special tool #9631, Fixture, Holding) and line up gear centers with pinion shaft bore.

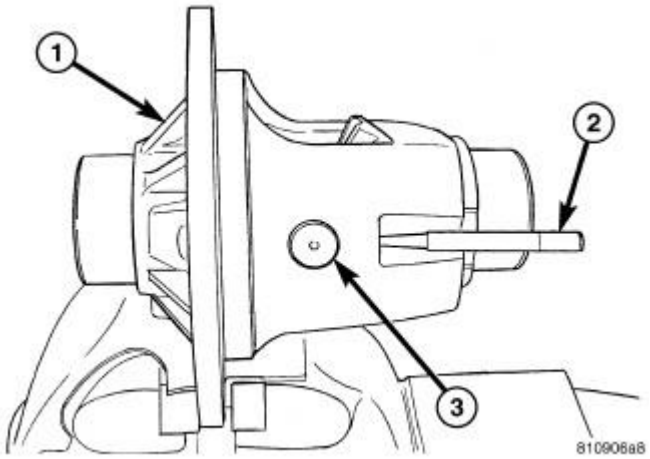

Fig. 72: Roll Pin Installation
Courtesy of CHRYSLER GROUP, LLC

5. Using a brass hammer, drive pinion shaft (3) into differential case (1), making sure to line up roll pin bores.
6. Using suitable punch (2), drive new roll pin into position.

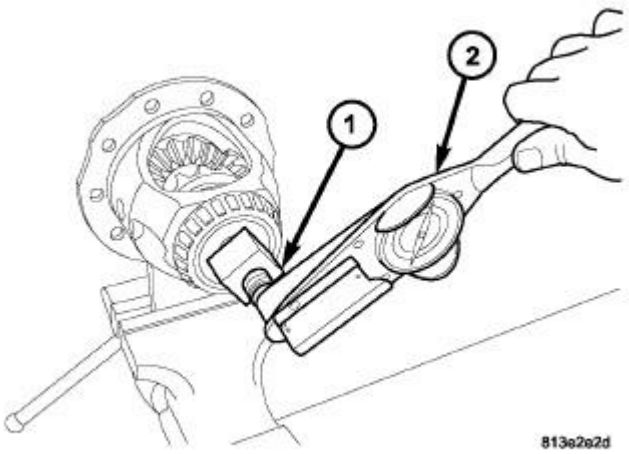

Fig. 73: Measure Rotating Torque
Courtesy of CHRYSLER GROUP, LLC

7. Measure differential gear rotating torque as shown in illustration. Differential gear rotating torque should be 5-30 N.m (44-266 in. lbs.) Rotating torque is adjusted using select side gear thrust washers. Refer to the following chart.

Available Side Gear Thrust Washer Thicknesses
1.25 mm (0.049 in.)
1.30 mm (0.051 in.)
1.35 mm (0.053 in.)
1.40 mm (0.055 in.)
1.45 mm (0.057 in.)
1.50 mm (0.059 in.)
1.55 mm (0.061 in.)
1.60 mm (0.063 in.)
1.65 mm (0.065 in.)

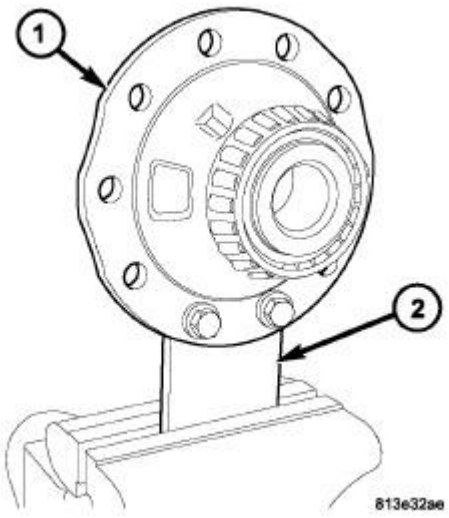

Fig. 74: Differential Mounted
Courtesy of CHRYSLER GROUP, LLC

8. Remove differential case from Mounting Plate (special tool #9630, Fixture, Diff. Case Holding) (2).

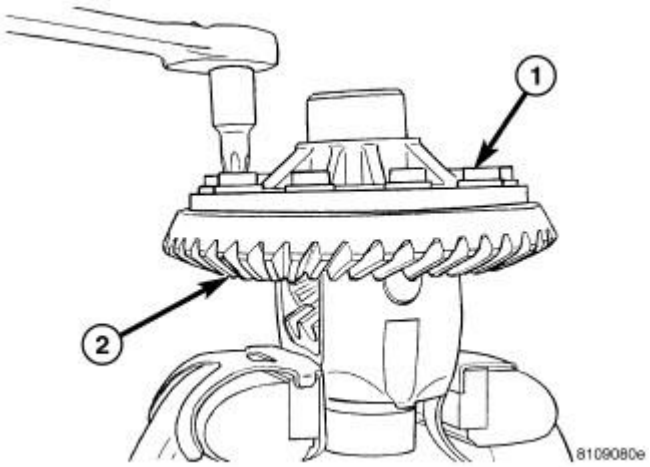

Fig. 75: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install ring gear to case. Lightly tap ring gear into position to facilitate starting of bolts.
10. Install **new** ring gear-to-case bolts and torque to 85 N.m (63 ft. lbs.).

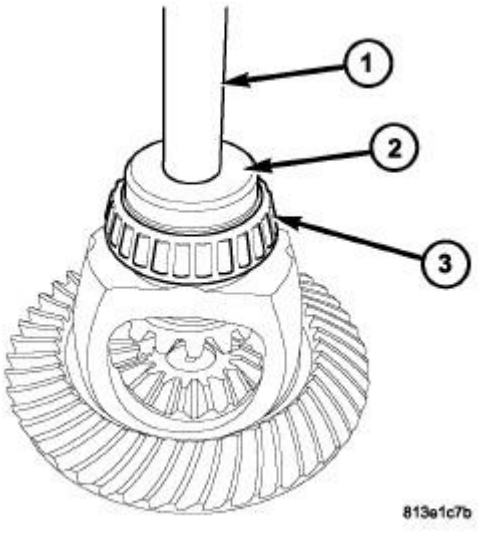

Fig. 76: Installing Differential Side Bearing
Courtesy of CHRYSLER GROUP, LLC

11. Using Installer (special tool #9523A, Installer, Bearing) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (1), press **new** differential side bearings (3) onto differential case.

INSTALLATION

INSTALLATION

NOTE: If replacement differential side bearings or differential case are being installed, it is necessary to measure and adjust Differential Side Bearing Preload and Gear Backlash. to determine proper snap ring selection. Refer to ADJUSTMENTS.

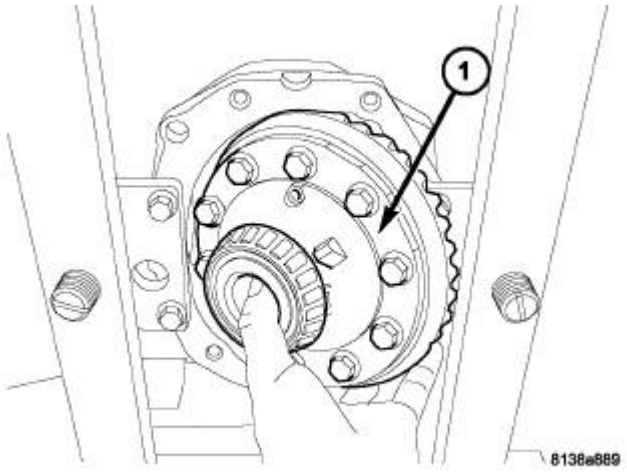

Fig. 77: Removing/Installing Differential
Courtesy of CHRYSLER GROUP, LLC

1. Install differential assembly (1) into axle housing.

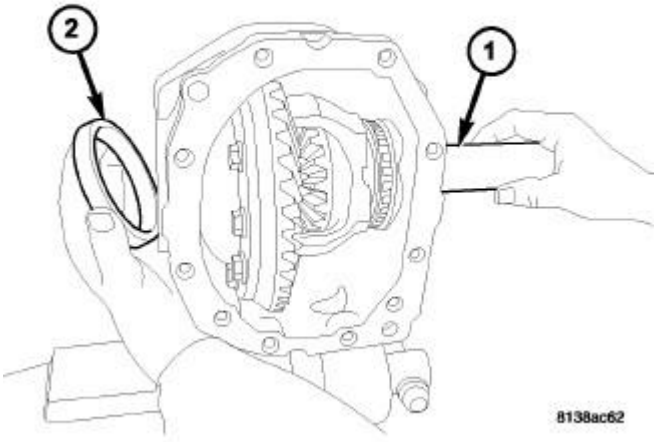

Fig. 78: Removing/Installing Side Bearing Cups
Courtesy of CHRYSLER GROUP, LLC

2. Install differential side bearing cups (2).

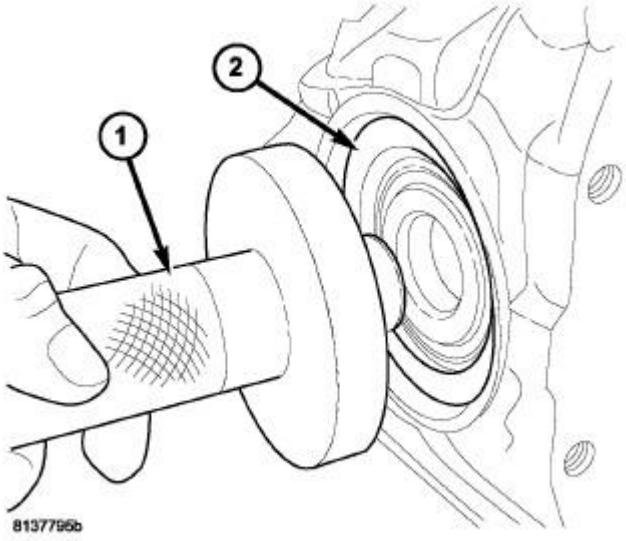

Fig. 79: Arbor & Bearing Cups
Courtesy of CHRYSLER GROUP, LLC

3. Use Removal/Installation Arbor (special tool #9522, Remover/Installer, Bearing Cup) (1) to aid in seating side bearing cups (2).

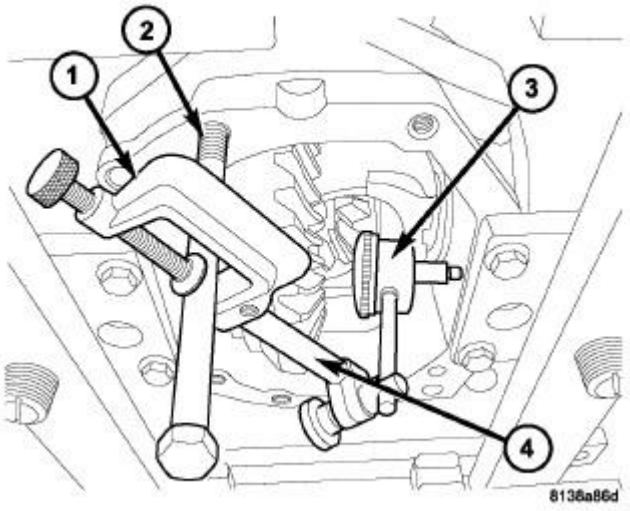

Fig. 80: Measuring Rotating Torque
Courtesy of CHRYSLER GROUP, LLC

4. Set up Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) to measure housing spread as shown in illustration:
    1. Clamp (special tool #SP-5426, Clamp (Less Post)) (1)
    2. Post (special tool #SP-5425-B, Special Post) (2)

3. Metric Dial Indicator (special tool #9524, Indicator, Dial) (3)

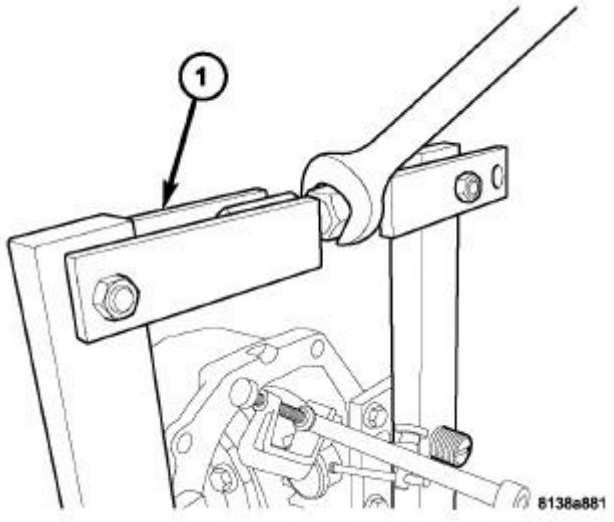

Fig. 81: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

5. Expand Spreader (special tool #W-129-B, Spreader, Differential) (1) to spread axle housing no more than 0.30 mm (0.012 in.).

NOTE: The differential side bearing snap rings are select-fit, and control ring gear backlash and differential side bearing preload. It is necessary to return snap rings to their original position. If replacement differential side bearings or differential case are being installed. to determine proper snap ring selection. Refer to ADJUSTMENTS.

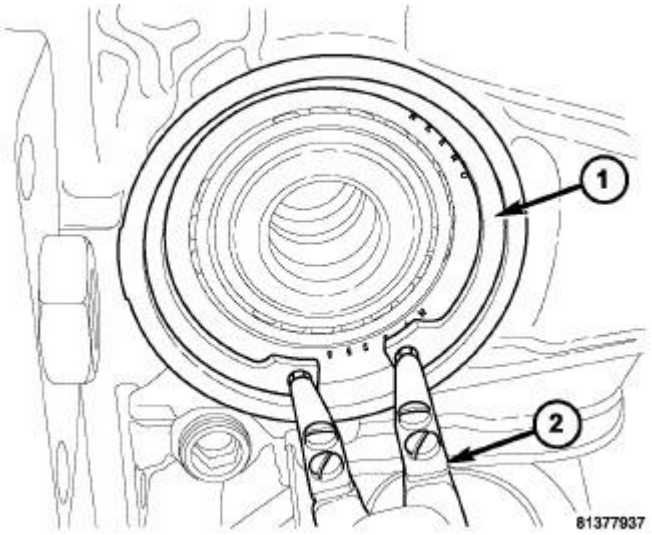

Fig. 82: Snap Ring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

6. Using suitable snap ring pliers (2), install differential side bearing snap rings (1).

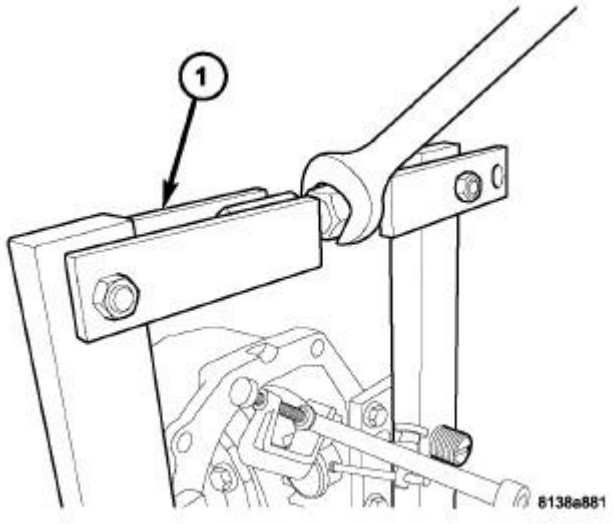

Fig. 83: Expanding/Contracting Spreader
Courtesy of CHRYSLER GROUP, LLC

7. Back off Spreader (special tool #W-129-B, Spreader, Differential) (1) to relax tension on housing.

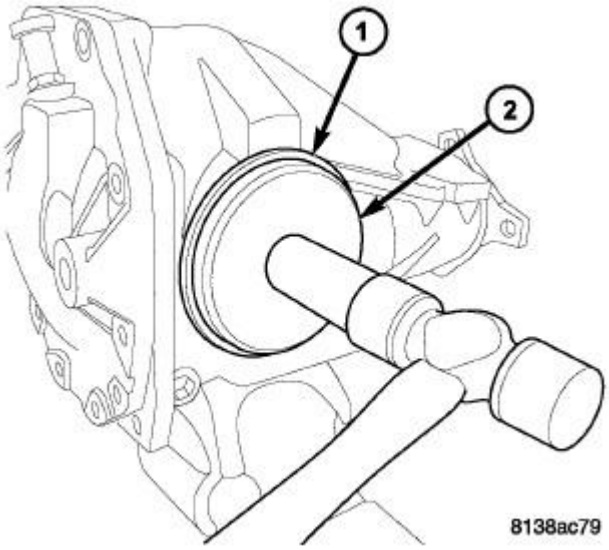

Fig. 84: Axle Seal Installation
Courtesy of CHRYSLER GROUP, LLC

8. Install axle seals (1) using Installer (special tool #9223A, Drift) (2).

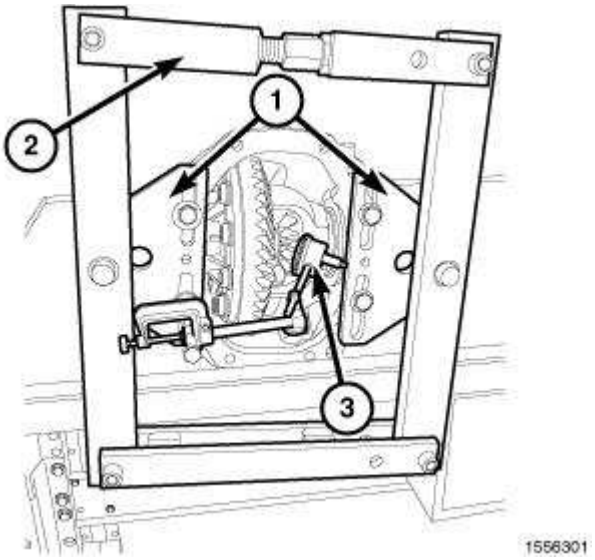

Fig. 85: Universal Spreader Adapter Plates & Spreader
Courtesy of CHRYSLER GROUP, LLC

9. Remove Dial Indicator Kit, Stud, Spreader (special tool #W-129-B, Spreader, Differential) (2) and Universal Spreader Adapter Plates (special tool #10113, Adapters, Spreader) (1).

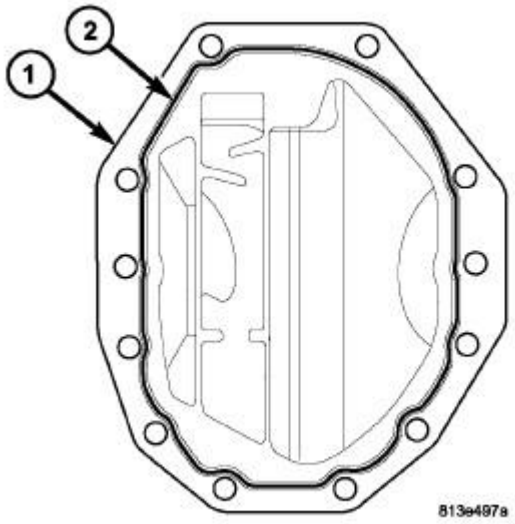

Fig. 86: Sealant Application
Courtesy of CHRYSLER GROUP, LLC

10. Apply 4mm (0.157 in.) bead (2) of Mopar® Axle RTV to axle housing cover (1) as shown in illustration.

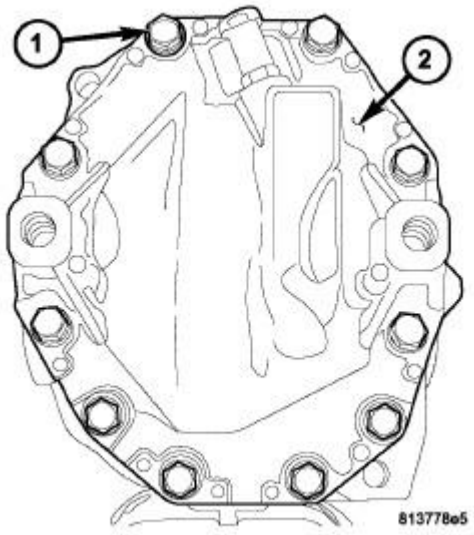

Fig. 87: Axle Housing Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install cover to axle housing. Install and torque cover-to-housing bolts to 30 N.m (22 ft. lbs.) + 45°.
12. Install the rear axle. Refer to **INSTALLATION**.

COVER, DIFFERENTIAL

REMOVAL

REMOVAL

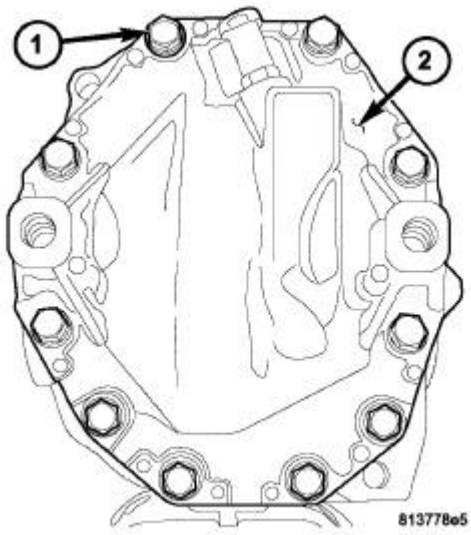

Fig. 88: Axle Housing Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove axle assembly from vehicle. Refer to **REMOVAL**.
2. Remove axle housing cover bolts (1).
3. Using suitable screwdriver, remove axle housing cover (2).

INSTALLATION

INSTALLATION

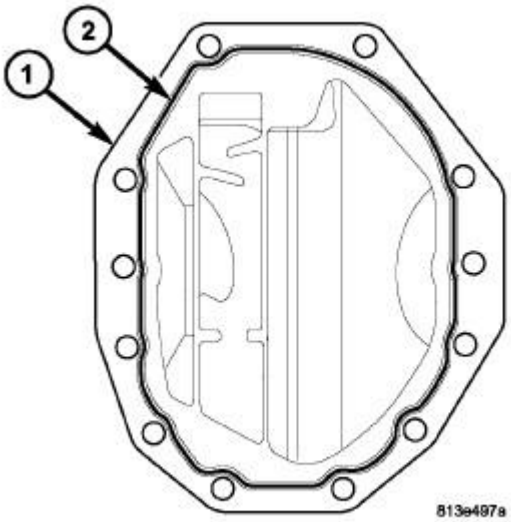

Fig. 89: Sealant Application
Courtesy of CHRYSLER GROUP, LLC

1. After thoroughly cleaning axle housing cover (1), apply a 4 mm (0.157 in.) bead (2) of Mopar® Axle RTV as shown in illustration.

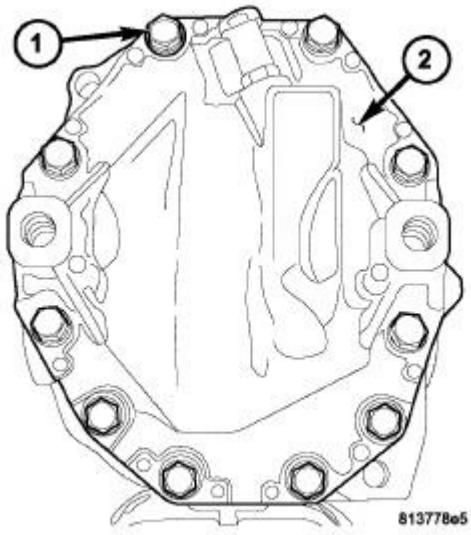

Fig. 90: Axle Housing Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Immediately install cover (2) to axle housing. Install and torque axle housing cover bolts (1) to 30 N.m (22 ft. lbs.) + 45°.
3. Install axle assembly to vehicle. Refer to **INSTALLATION**.

GEAR, RING AND PINION

REMOVAL

REMOVAL

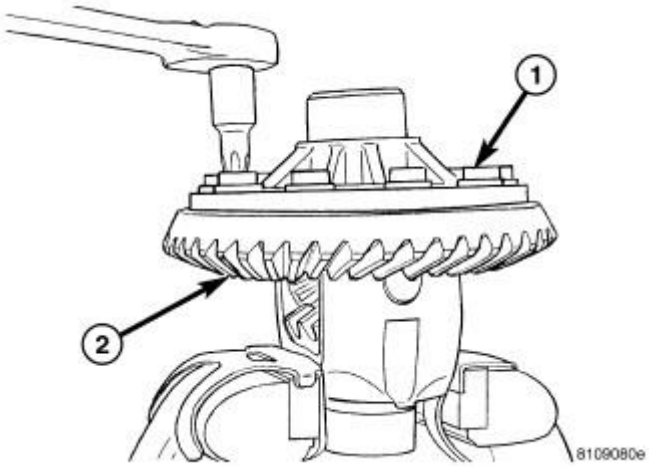

Fig. 91: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove differential assembly. Refer to **CASE ASSEMBLY, DIFFERENTIAL, REMOVAL**.
2. Place differential case in a soft-jawed vise and remove ring gear-to-case bolts.

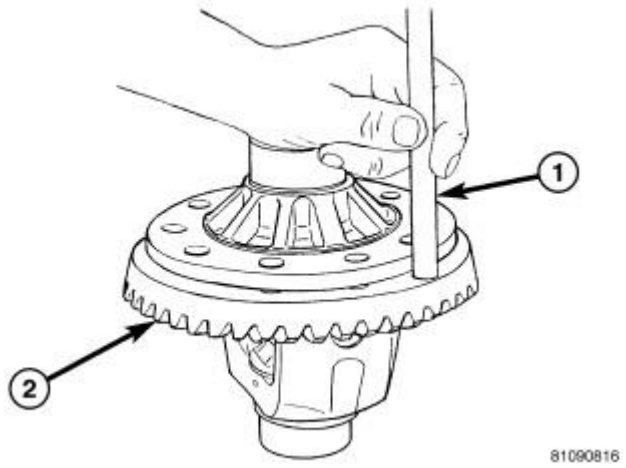

Fig. 92: Removing Ring Gear
Courtesy of CHRYSLER GROUP, LLC

3. Remove ring gear from differential case with a brass drift and hammer.

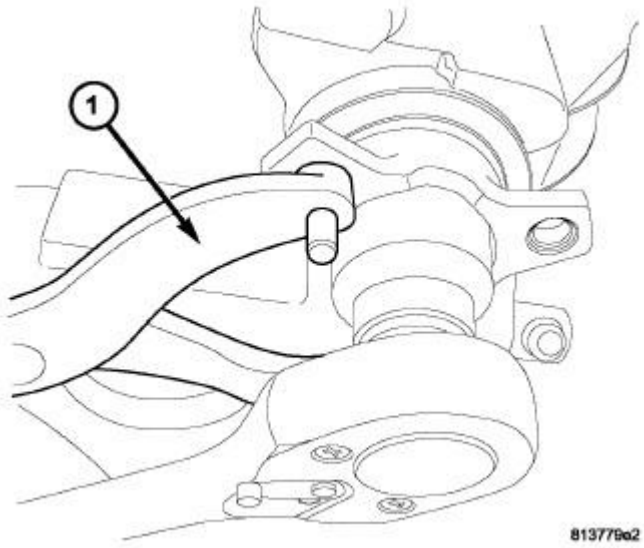

Fig. 93: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

4. Using 41mm socket and Flange Wrench (special tool #C-3281, Holder, Flange) (1), remove pinion nut and discard.

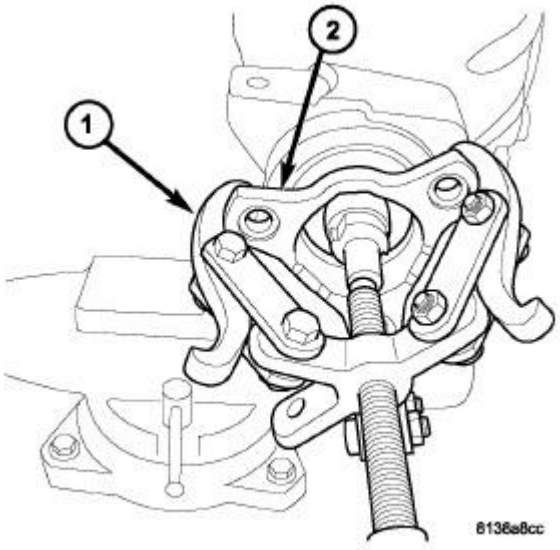

Fig. 94: Removing Pinion Flange With Puller
Courtesy of CHRYSLER GROUP, LLC

5. Using Puller (special tool #1026, Puller) (1), remove pinion flange (2).

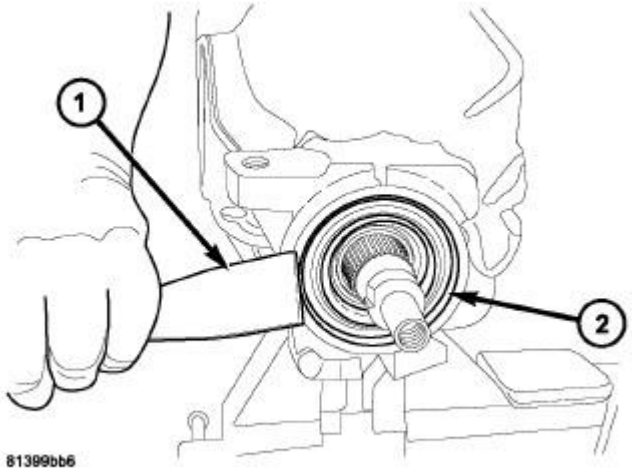

Fig. 95: Pinion Seal Removal
Courtesy of CHRYSLER GROUP, LLC

6. Using a suitable screwdriver, remove and discard the pinion seal.
7. Remove pinion tail bearing cone.

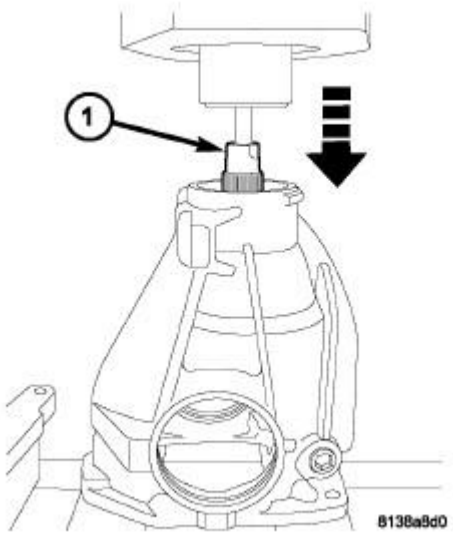

Fig. 96: Pressing Pinion Shaft Out Of Carrier
Courtesy of CHRYSLER GROUP, LLC

8. Move axle housing to press and press out pinion shaft (1) as shown in illustration.

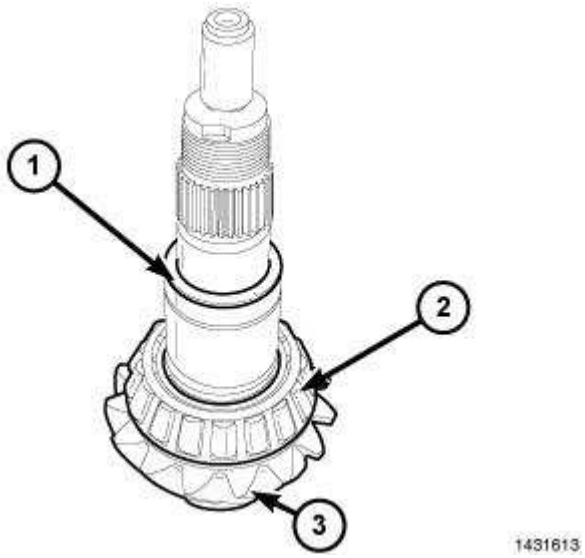

Fig. 97: Washer On Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

9. Remove the washer (1).

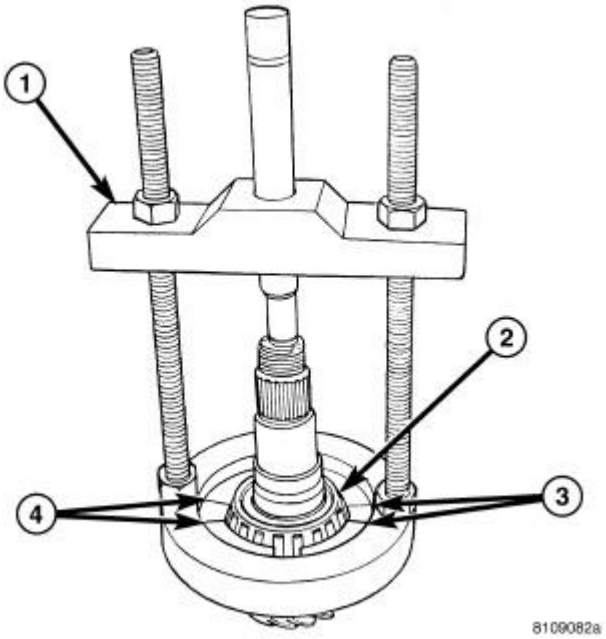

Fig. 98: Removing Pinion Head Bearing
Courtesy of CHRYSLER GROUP, LLC

10. Remove pinion head bearing (2) with Puller/Press (special tool #C-293-PA, Puller, Press) (1) and Adapters (special tool #C-293-37, Block Set, Puller) (3, 4).

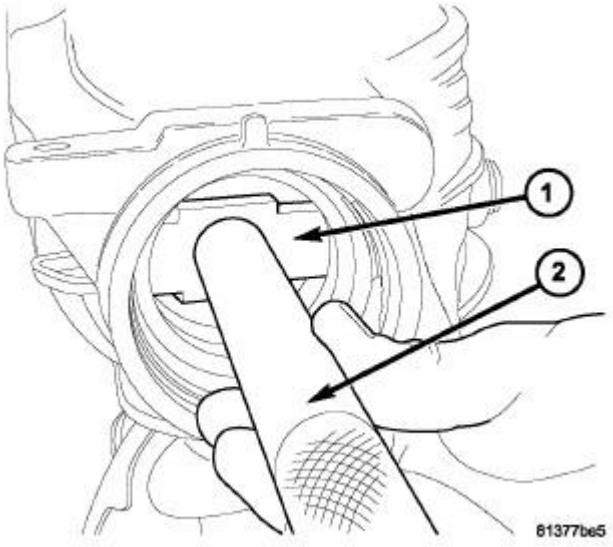

Fig. 99: Removing Pinion Head Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

11. Using Handle (special tool #C-4171, Driver Handle, Universal) (2) and Remover (special tool #9084, Remover, Pinion Bearing Cup) (1), drive out pinion head bearing cup.

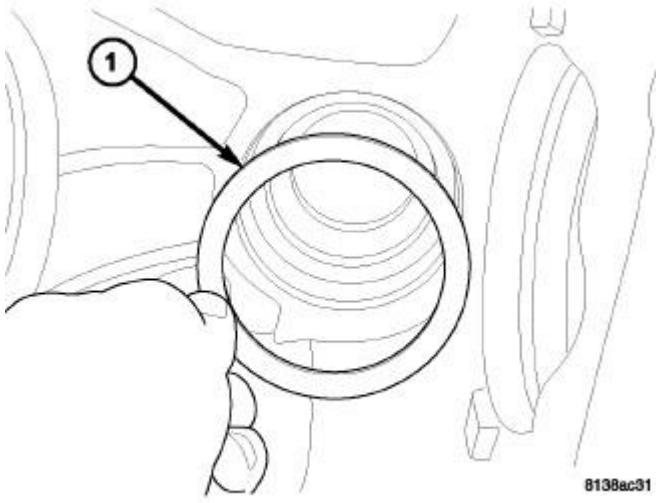

Fig. 100: Removing/Installing Shim
Courtesy of CHRYSLER GROUP, LLC

12. Remove pinion head shim. Measure and record shim thickness.

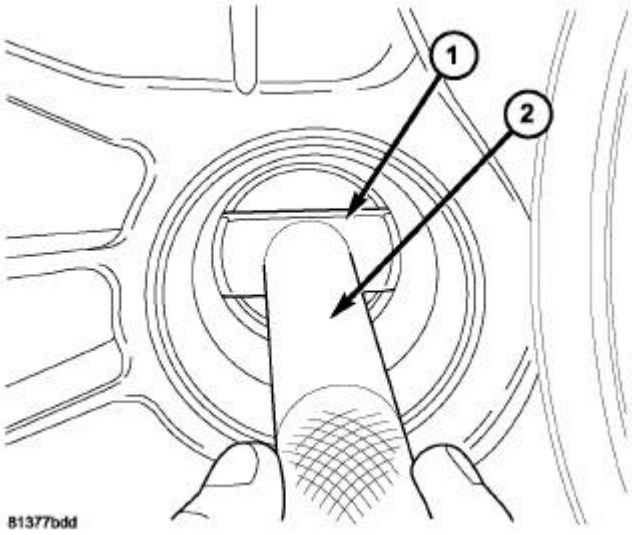

Fig. 101: Removing Pinion Tail Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

13. Using Handle (special tool #C-4171, Driver Handle, Universal) (2) and Remover (special tool #D-149, Remover, Bearing Cup) (1), drive out pinion tail bearing cup.

INSTALLATION

INSTALLATION

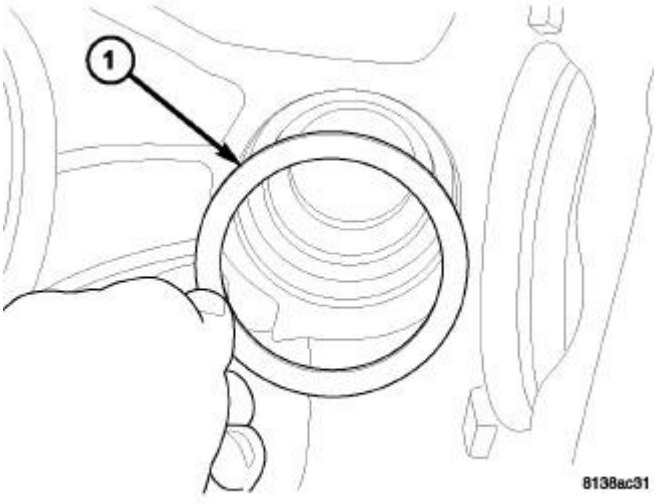

Fig. 102: Removing/Installing Shim
Courtesy of CHRYSLER GROUP, LLC

1. Install selected pinion depth shim (1) into housing.

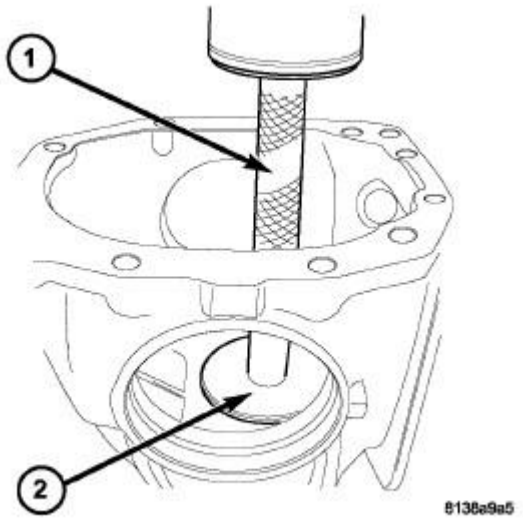

Fig. 103: Pinion Head Bearing Cup Installation
Courtesy of CHRYSLER GROUP, LLC

2. Press pinion head bearing cup into housing using Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #C-4310, Installer, Bearing) (2).

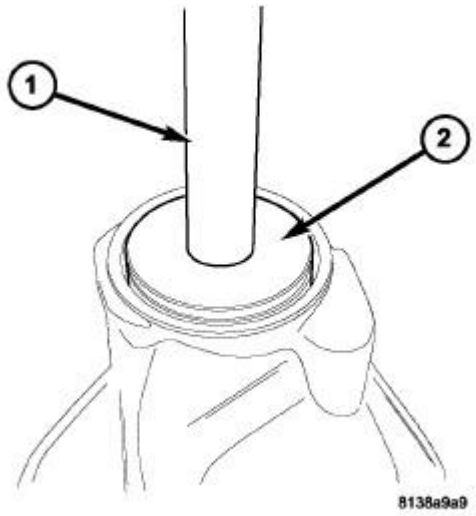

Fig. 104: Installing Pinion Tail Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

3. Press pinion tail bearing cup into housing using Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #D-146, Installer, Bearing Cup) (2).

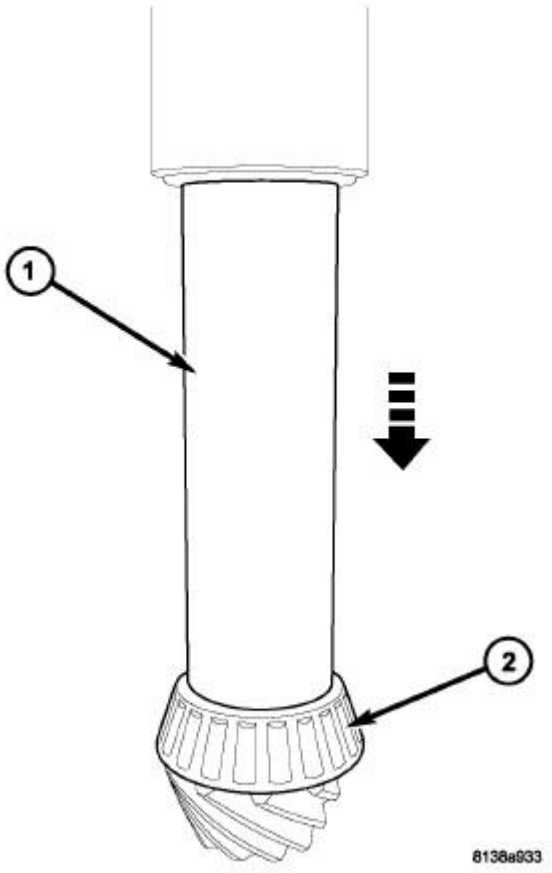

Fig. 105: Installing Pinion Head Bearing
Courtesy of CHRYSLER GROUP, LLC

4. Press **new** pinion head bearing (2) onto pinion shaft using Installer (special tool #C-3095-A, Installer, Bearing) (1).

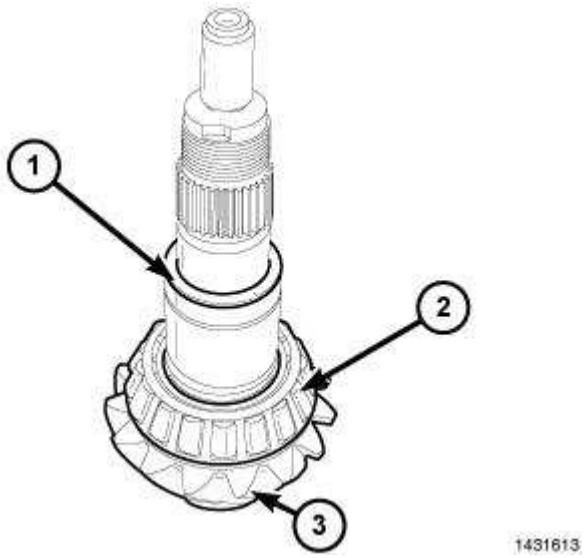

Fig. 106: Washer On Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

5. Install the washer (1).

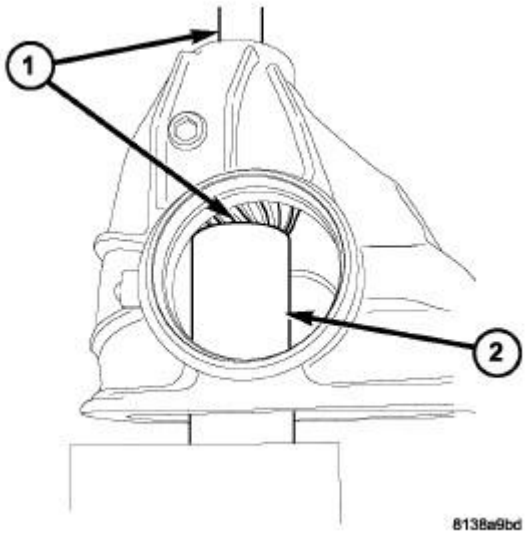

Fig. 107: Support Pinion Head & Carrier
Courtesy of CHRYSLER GROUP, LLC

6. Install pinion shaft (1) into housing and support on press table atop Installer (special tool #8255, Installer) (2). **Ensure pinion gear face is centered atop Installer (special tool #8255, Installer).**

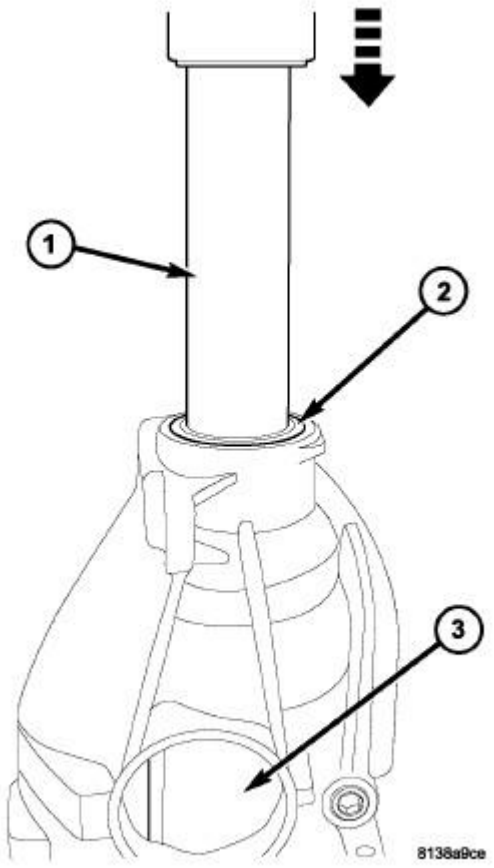

Fig. 108: Pinion Tail Bearing Installation
Courtesy of CHRYSLER GROUP, LLC

7. Using Installer (special tool #C-3095-A, Installer, Bearing) (1), press on **new** pinion tail bearing (2).

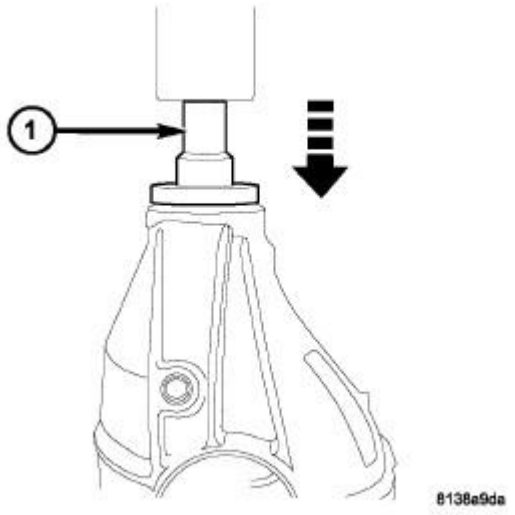

Fig. 109: Installing Pinion Seal
Courtesy of CHRYSLER GROUP, LLC

8. Install new pinion seal into position.
9. Press pinion seal into housing using Installer (special tool #9231A, Installer, Pinion Oil Seal) (1).

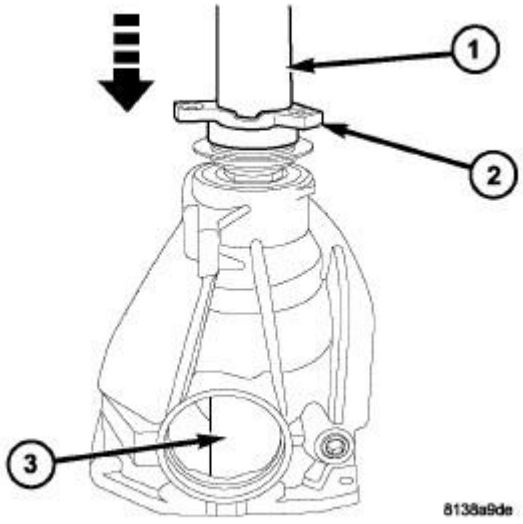

Fig. 110: Installing Pinion Seal
Courtesy of CHRYSLER GROUP, LLC

10. Lightly lubricate pinion flange seal with axle lubricant for flange installation.
11. Align index marks and press pinion flange (2) on using Installer (special tool #C-3095-A, Installer, Bearing) (1).

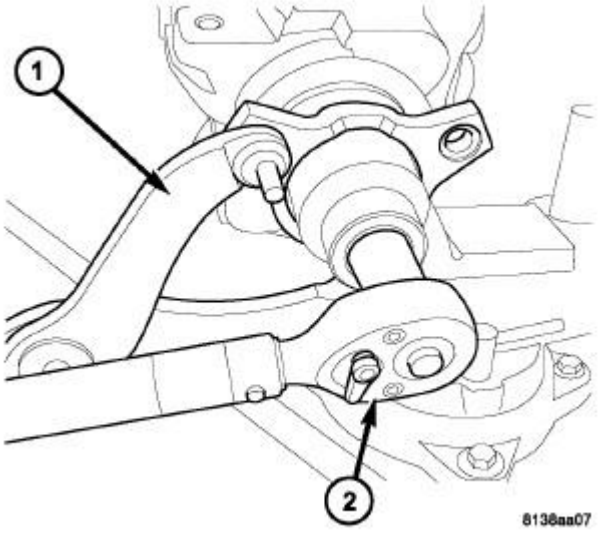

Fig. 111: Torquing Pinion Flange Nut
Courtesy of CHRYSLER GROUP, LLC

12. Install new pinion flange nut by hand.
13. Hold pinion flange with Flange Wrench (special tool #C-3281, Holder, Flange) (1). Using a deep 41 mm socket, tighten pinion flange nut to an initial torque of 203 N.m (150 ft. lbs.).

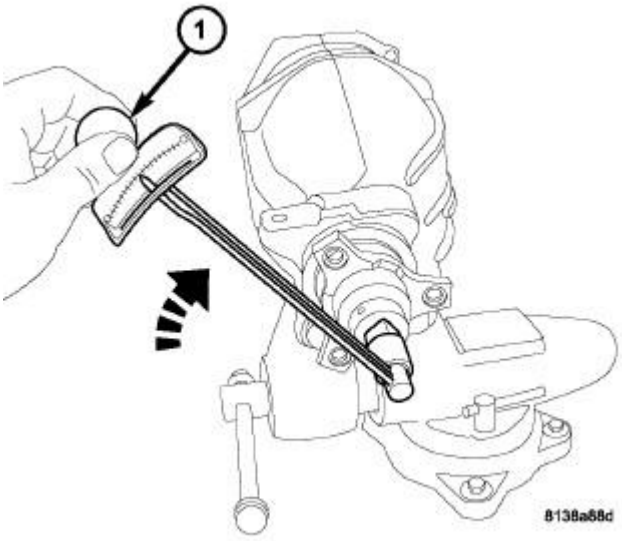

Fig. 112: Measuring Turning Torque
Courtesy of CHRYSLER GROUP, LLC

14. Rotate pinion flange to ensure bearing is properly seated.
15. Measure pinion rotating torque using suitable torque wrench (1). **Pinion rotating torque should be 215-245 N. cm (19-22 in. lbs.).**

16. If pinion rotating torque exceeds the specified range, the pinion shaft must be removed and the crush sleeve replaced.

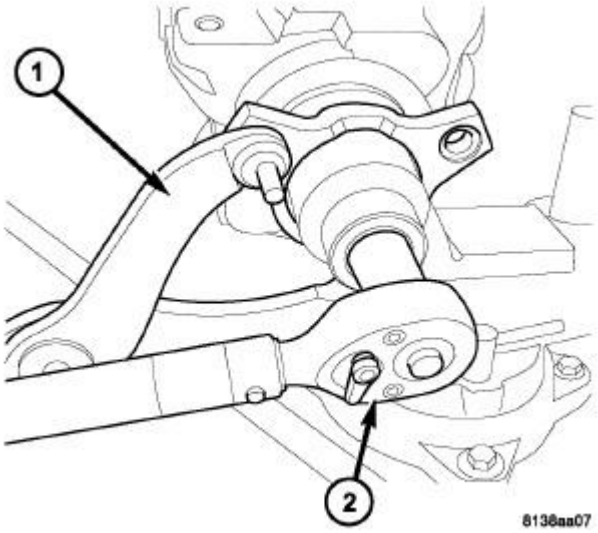

Fig. 113: Torquing Pinion Flange Nut
Courtesy of CHRYSLER GROUP, LLC

17. If pinion rotating torque is below the specified range, increase nut torque by 7 N.m (5 ft. lbs.) increments and recheck turning torque until rotating torque is within range.

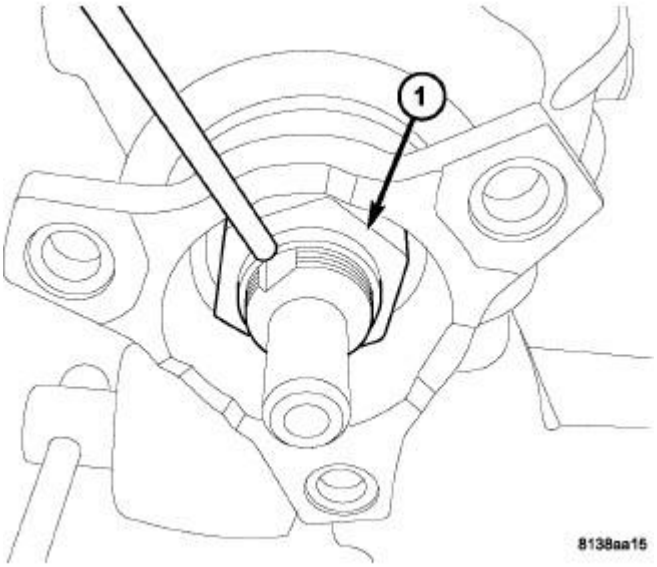

Fig. 114: Staking Pinion Flange Nut
Courtesy of CHRYSLER GROUP, LLC

18. Stake pinion flange nut (1) using hammer and suitable punch.

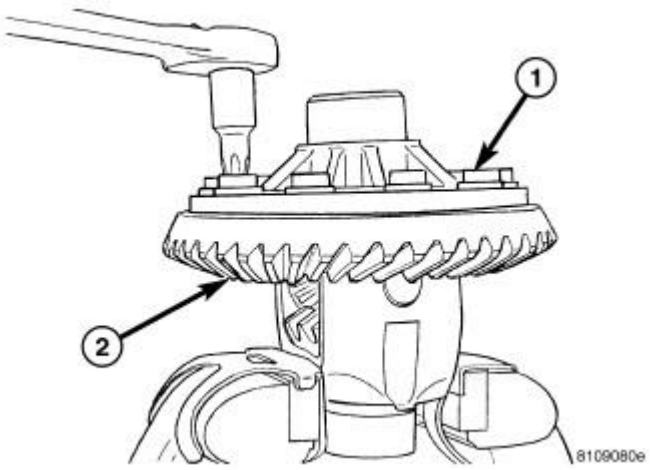

Fig. 115: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Install ring gear to differential case. Loosely install **new** ring-gear-to-differential case bolts.
20. Torque all ring gear-to-case bolts to 85 N.m (64 ft. lbs.)

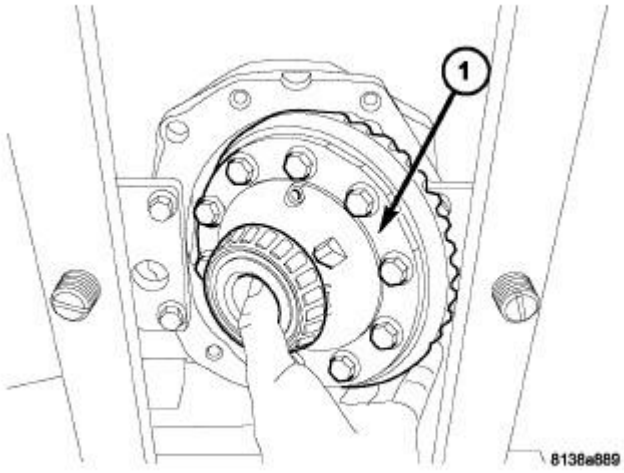

Fig. 116: Removing/Installing Differential
Courtesy of CHRYSLER GROUP, LLC

21. Install differential and reassemble axle assembly. Refer to **CASE ASSEMBLY, DIFFERENTIAL, INSTALLATION**.

SEAL, AXLE DRIVE SHAFT

REMOVAL

REMOVAL

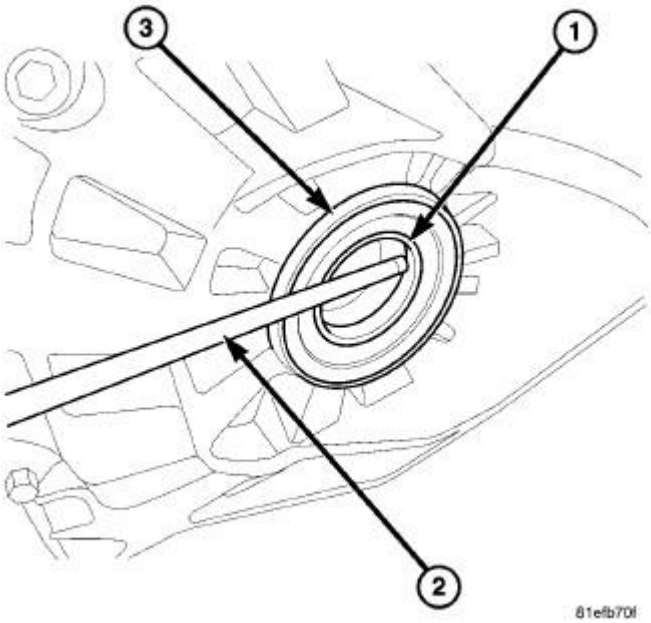

Fig. 117: Remove Lside Seal
Courtesy of CHRYSLER GROUP, LLC

1. Remove halfshaft(s). Refer to **REMOVAL** and **REMOVAL** .
2. Using suitable screwdriver (1), remove axle shaft seal (2).
3. Visually inspect halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc.). Replace halfshaft if necessary.

INSTALLATION

INSTALLATION

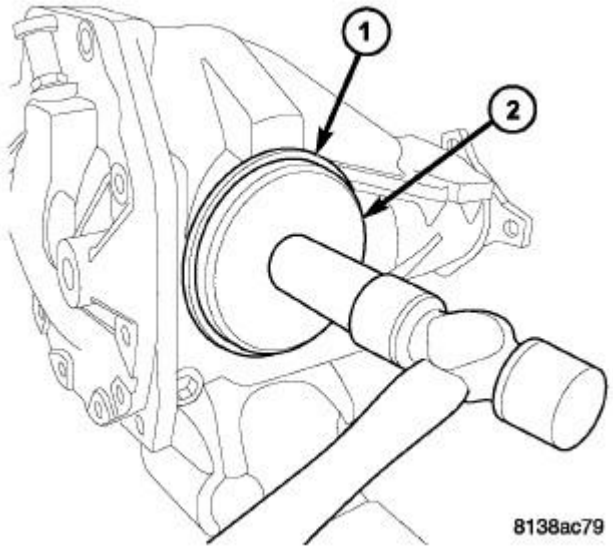

Fig. 118: Axle Seal Installation
Courtesy of CHRYSLER GROUP, LLC

1. Using Installer (special tool #9223A, Drift) (2), install **NEW** axle shaft seal (1). Lubricate the inside diameter with Mopar® Gear and Axle Lubricant 75W-140 to protect seal during halfshaft installation.
2. Install halfshaft(s). Refer to **INSTALLATION** and **INSTALLATION** .

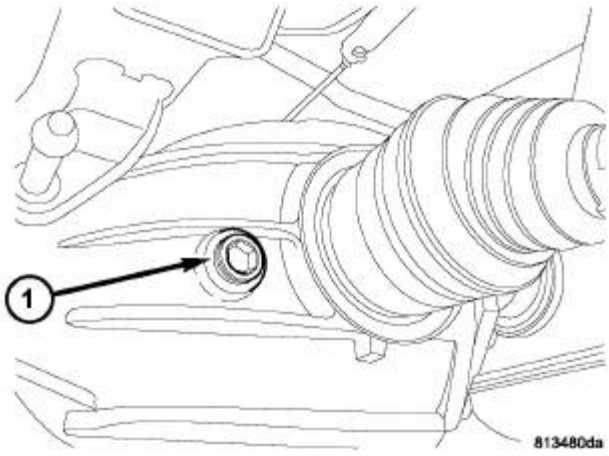

Fig. 119: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

3. Remove fill plug (1) to check and adjust rear axle fluid level. Top off axle with Mopar® Gear and Axle Lubricant 75W-140. Reinstall fill plug torque to 60 N.m (44 ft. lbs.) torque.

SEAL, DRIVE PINION

REMOVAL

REMOVAL

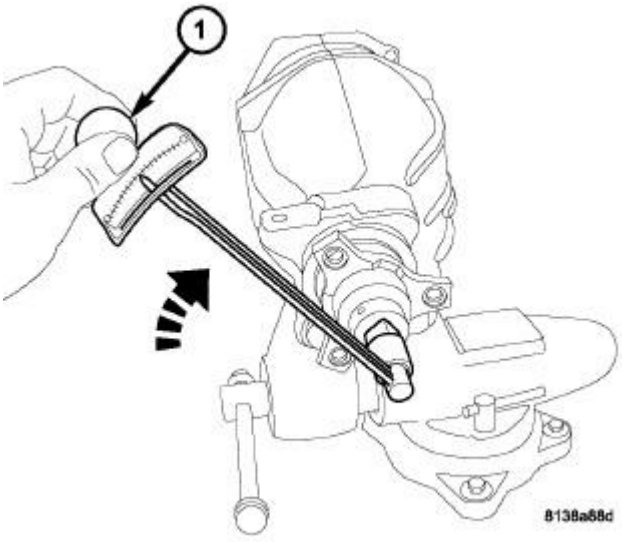

Fig. 120: Measuring Turning Torque
Courtesy of CHRYSLER GROUP, LLC

1. Remove rear axle assembly from vehicle. Refer to **REMOVAL**.
2. Measure axle assembly rotating torque and record measurement for reuse on assembly.

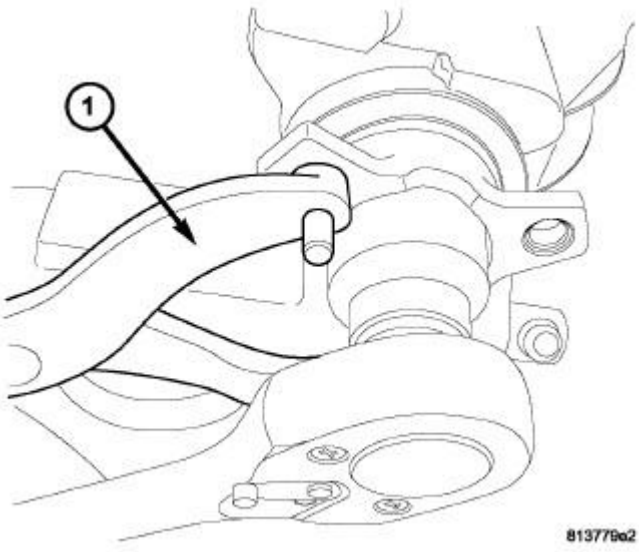

Fig. 121: Pinion Flange Nut Removal/Installation

Courtesy of CHRYSLER GROUP, LLC

3. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and 41mm socket, remove pinion flange nut and discard.

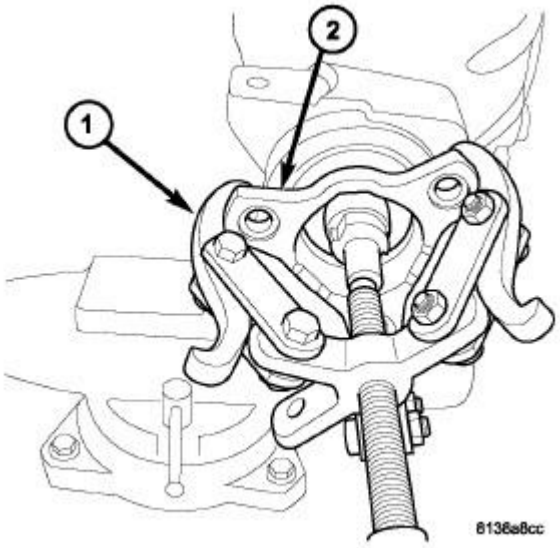

Fig. 122: Removing Pinion Flange With Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to axle imbalance concerns, it is necessary to make sure pinion flange-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion flange.

4. Using Puller (special tool #1026, Puller) (1), remove pinion flange (2) from pinion shaft.

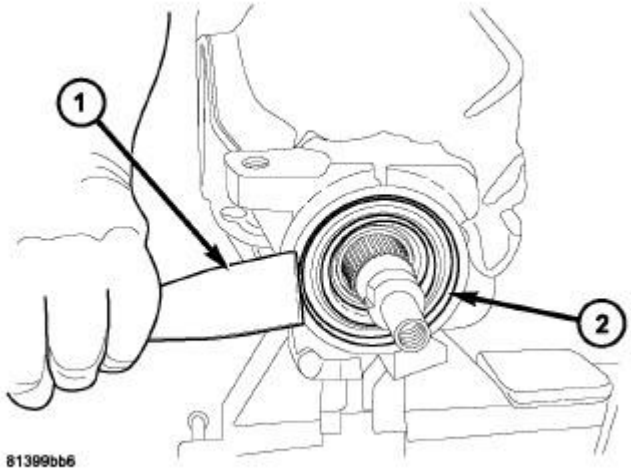

Fig. 123: Pinion Seal Removal
Courtesy of CHRYSLER GROUP, LLC

5. Using suitable tool (1), remove pinion seal (2) and discard.

INSTALLATION

INSTALLATION

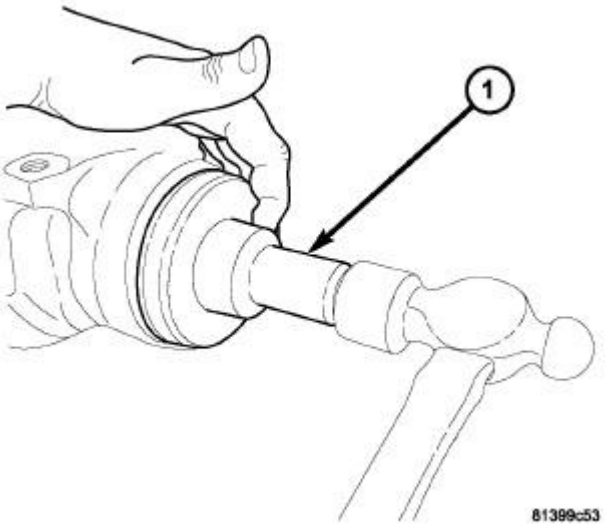

Fig. 124: Installing Pinion Seal
Courtesy of CHRYSLER GROUP, LLC

1. Apply light coating of gear lubricant to the lip of the pinion seal.
2. Using Installer (special tool #9231A, Installer, Pinion Oil Seal) (1), install pinion seal until tool bottoms on carrier.

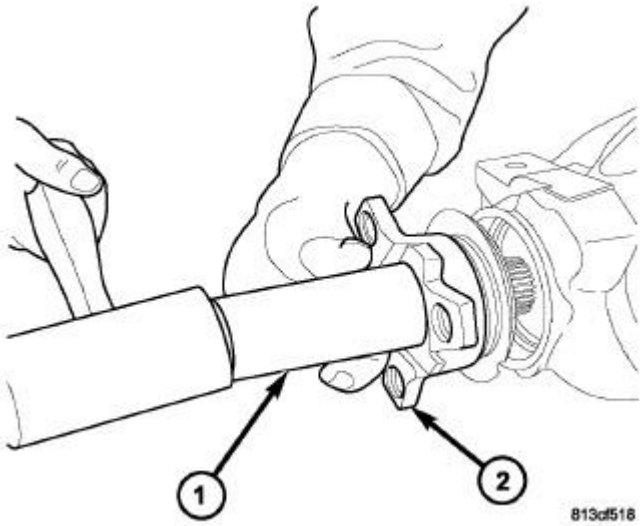

Fig. 125: Installing Pinion Flange
Courtesy of CHRYSLER GROUP, LLC

3. Install pinion flange into position. Align index marks to maintain assembly balance.
4. Using Installer (special tool #6448A, Installer, Bearing/Gear) (1), lightly tap on pinion flange (2) until adequate pinion shaft threads are exposed.

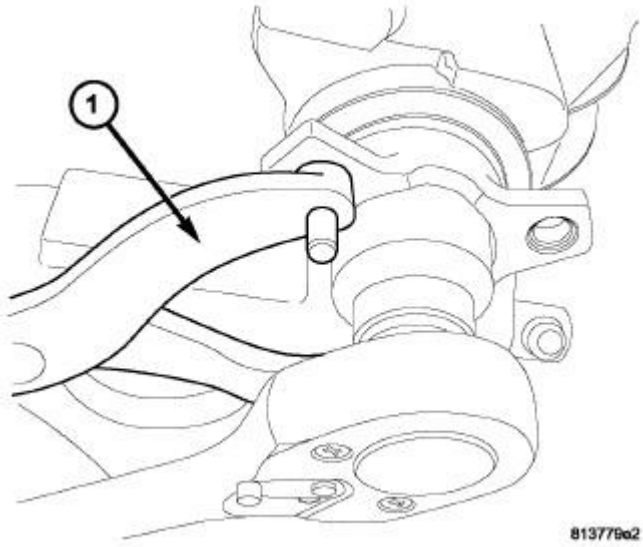

Fig. 126: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

5. Install **new** pinion flange nut. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and 41mm socket, torque nut to 136 N.m (100 ft. lbs.).

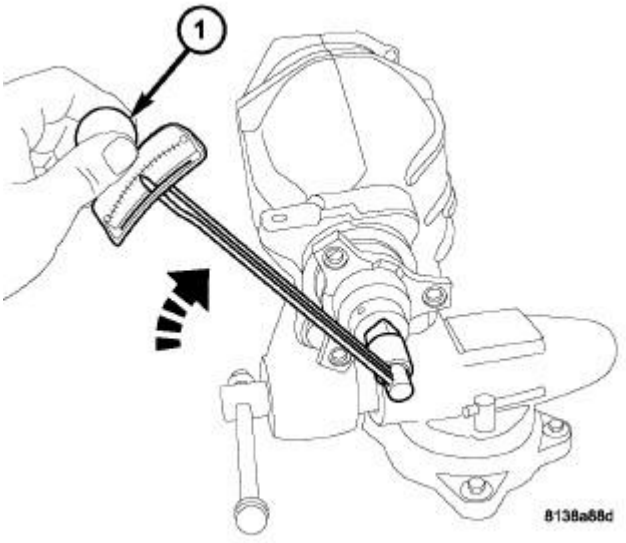

Fig. 127: Measuring Turning Torque
Courtesy of CHRYSLER GROUP, LLC

6. Measure assembly turning torque. Axle assembly rotating torque should be equal to the reading recorded upon seal/flange removal.

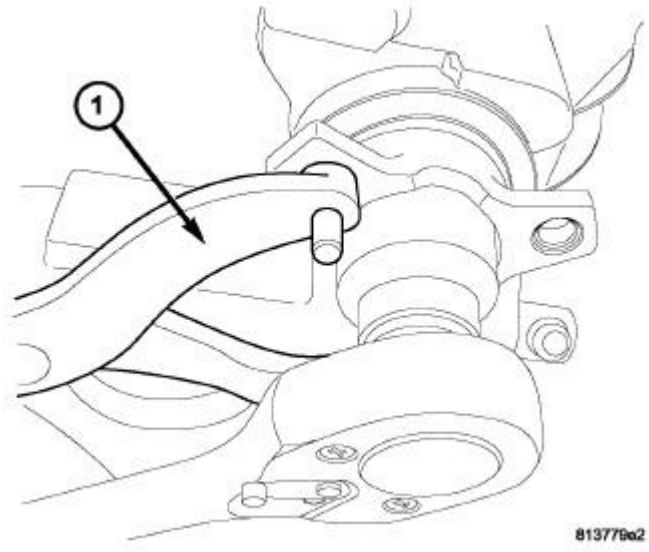

Fig. 128: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

7. If rotating torque is low, increase pinion flange nut torque in 7 N.m (5 ft. lbs.) increments. Repeat until proper rotating torque is received.

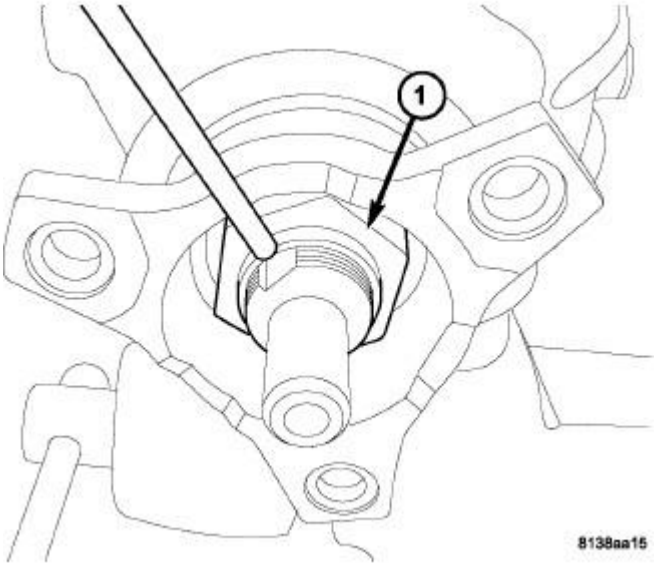

Fig. 129: Staking Pinion Flange Nut
Courtesy of CHRYSLER GROUP, LLC

8. Stake pinion flange nut (1) as shown in illustration.
9. Install rear axle assembly. Refer to **INSTALLATION**.

DRIVELINE/AXLES

Rear Axle - 215RII - Chrysler 300

DESCRIPTION

DESCRIPTION

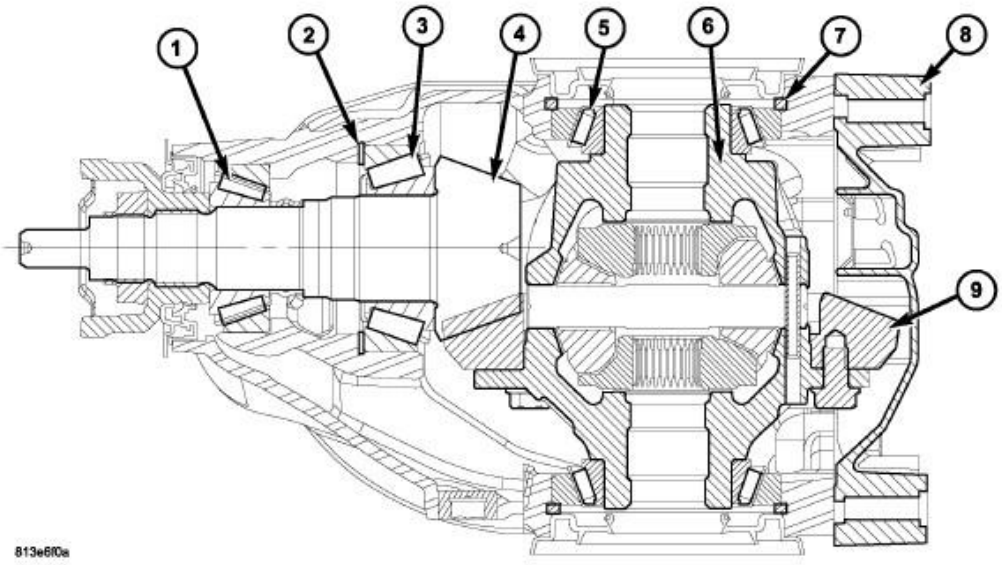

Fig. 1: 198/210 Mm Rii Axle Section View
Courtesy of CHRYSLER GROUP, LLC

1 - BEARING, PINION TAIL	6 - DIFFERENTIAL
2 - SHIM, PINION DEPTH	7 - RING, SNAP
3 - BEARING, PINION HEAD	8 - COVER, AXLE
4 - GEAR/SHAFT, PINION	9 - GEAR, RING
5 - BEARING, DIFFERENTIAL SIDE	

The 215 MM RII (Rear-Independent-Iron) axle is an independent assembly with a cast iron housing and differential. The 215 MM RII uses an open differential which is supported by two tapered roller bearings located on either side of the case. Differential bearing preload and ring gear backlash are controlled with select snap-rings located on the outside of the differential bearing cups. Pinion height is set with a select shim located under the rear pinion bearing cup.

AXLE IDENTIFICATION

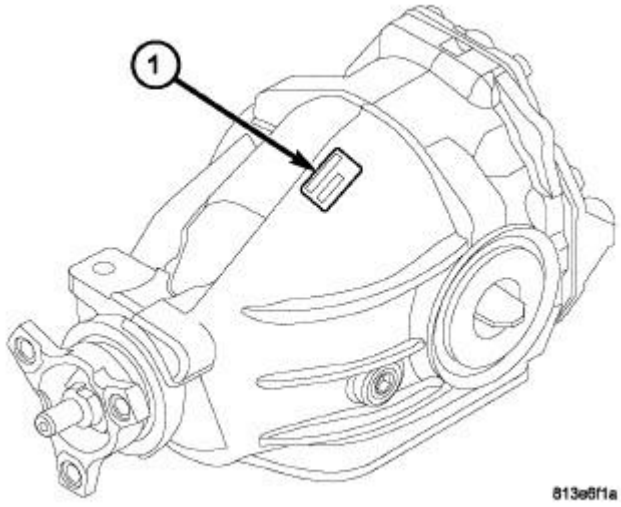

Fig. 2: Axle Identification Tag
Courtesy of CHRYSLER GROUP, LLC

The 215 MM axle utilizes a barcoded label which is adhered to the top of the axle housing as shown. The following information is found on the identification label:

- Traceability Code (Plant Use)
- Axle Part Number
- Axle Gear Ratio

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AXLE

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly:

- Check for insufficient lubricant.
- Incorrect ring gear backlash.

- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehicle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The differential and pinion bearings can produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Worn or damaged differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Wheel hub bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by a worn U-joint or by worn side-gear thrust washers. A worn pinion shaft bore will also cause low speed knock.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged propeller shaft.
- Missing propeller shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joints or CV joints.
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.
- Bent halfshaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear, can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints or CV joints.
- Worn or broken axle mount isolators.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
WHEEL NOISE	1. Wheel loose.	1. Tighten loose nuts.
	2. Faulty, brinelled wheel bearing.	2. Replace bearing.
DIFFERENTIAL CRACKED	1. Improper differential side bearing preload.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing preload properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
DIFFERENTIAL GEARS SCORED	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill

		differential with the proper fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
LOSS OF LUBRICANT	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked axle housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored pinion flange journal.	5. Replace pinion flange and seal.
	6. Axle cover not properly sealed.	6. Remove, clean, and re-seal cover.
AXLE OVERHEATING	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing preload too high.	3. Readjust bearing pre-load.
	4. Insufficient ring gear backlash.	4. Re-adjust ring gear backlash.
GEAR TEETH BROKE	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Ice-spotted pavement.	2. Replace gears and examine remaining parts for damage.
	3. Improper adjustments.	3. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.
AXLE NOISE	1. Insufficient lubricant.	1. Fill axle with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and/or pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing preload.

	7. Misaligned or sprung ring gear.	7. Measure ring gear run-out. Replace components as necessary.
	8. Housing not machined properly.	8. Replace housing.

STANDARD PROCEDURE

STANDARD PROCEDURE - FLUID DRAIN AND FILL

NOTE: The fluid required for use in this axle is Mopar® Synthetic Gear and Axle Lubricant 75W-140.

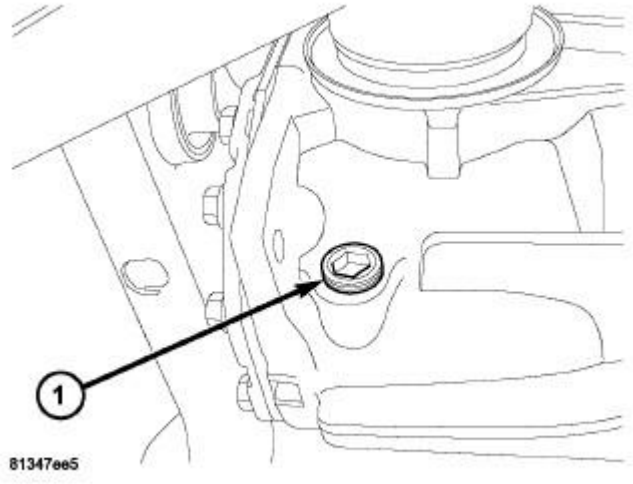

Fig. 3: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. Drive the vehicle until the differential lubricant is at the normal operating temperature.
2. With vehicle in neutral, position and raise vehicle on hoist.
3. Remove rear axle drain plug (1) and drain lubricant completely from the axle.
4. Install drain plug and tighten to 50 N.m (37 ft lbs).

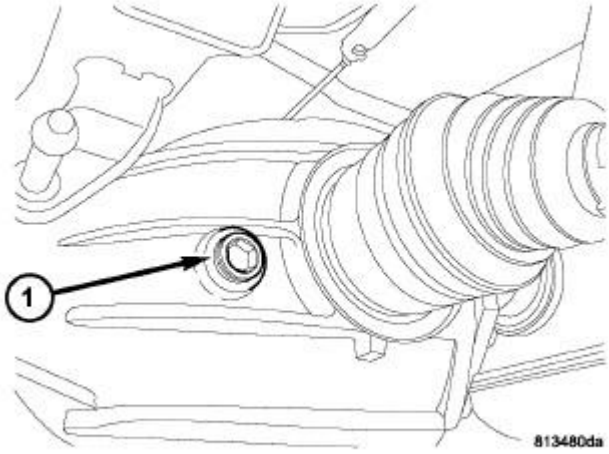

Fig. 4: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

5. Remove fill plug (1) and fill rear axle with 1.2 L (1.3 qts.) Mopar® Synthetic Gear AND Axle Lubricant 75W-140 and insure axle is filled to the bottom of the fill hole.
6. Install fill plug and tighten to 50 N.m (37 ft lbs).

REMOVAL

REMOVAL

NOTE: This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.

CAUTION: Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.

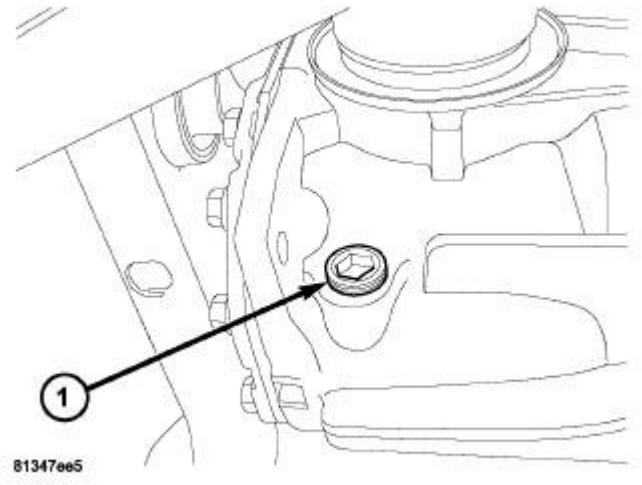

Fig. 5: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. With vehicle in neutral, position and raise vehicle on hoist.
2. Using 14mm hex, remove axle drain plug (1) and drain rear axle fluid into container suitable for fluid reuse.
3. Install drain plug (1) and torque to 50 N.m (37 ft. lbs.) torque.

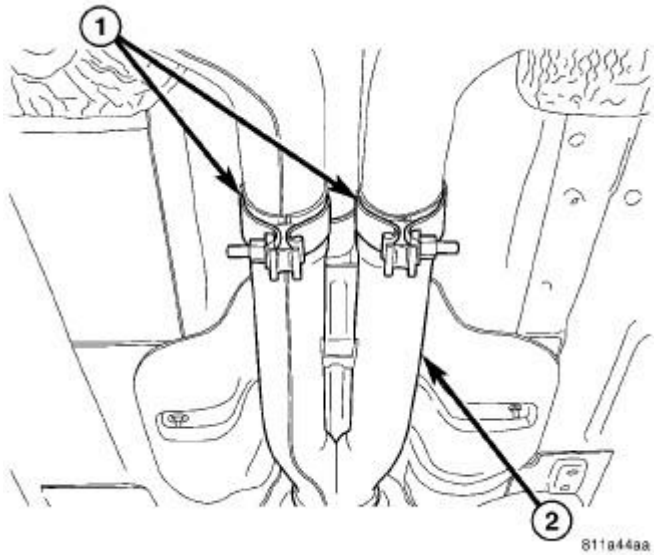

Fig. 6: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

4. Remove rear exhaust system (2) on dual-outlet exhaust models, otherwise, lower exhaust system at rear hanger(s).

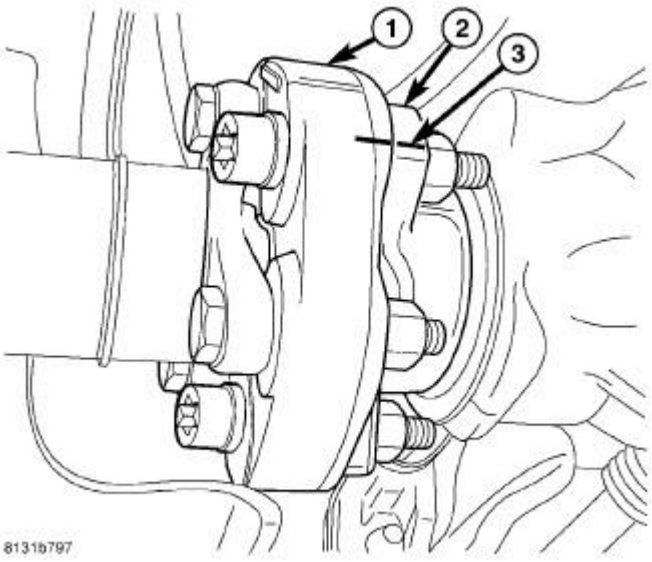

Fig. 7: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

5. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).

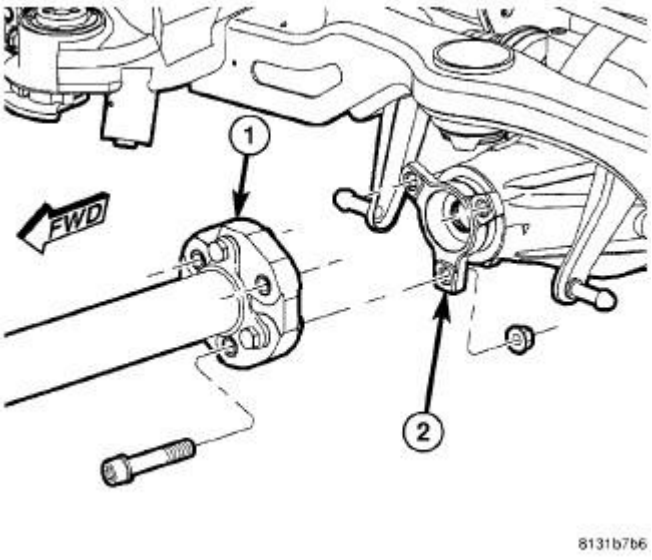

Fig. 8: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove three propeller shaft coupler (1)-to-axle flange (2) bolt/nuts.

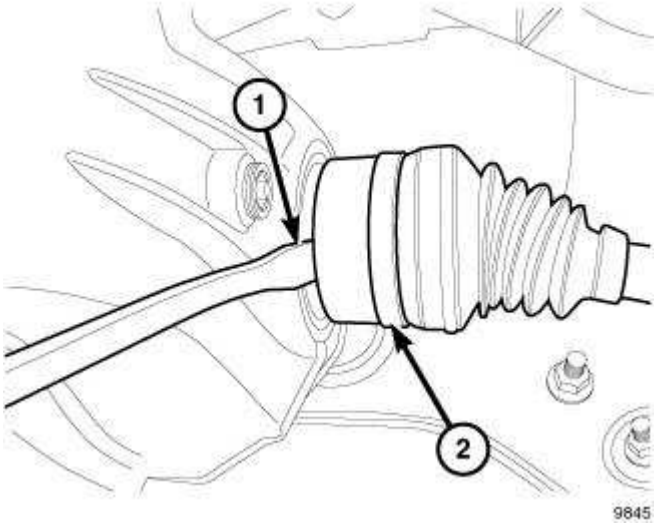

Fig. 9: Halfshaft Removal (V6 Models)
Courtesy of CHRYSLER GROUP, LLC

7. Using suitable screwdriver (1), partially disengage halfshaft(s) (2) from axle assembly.

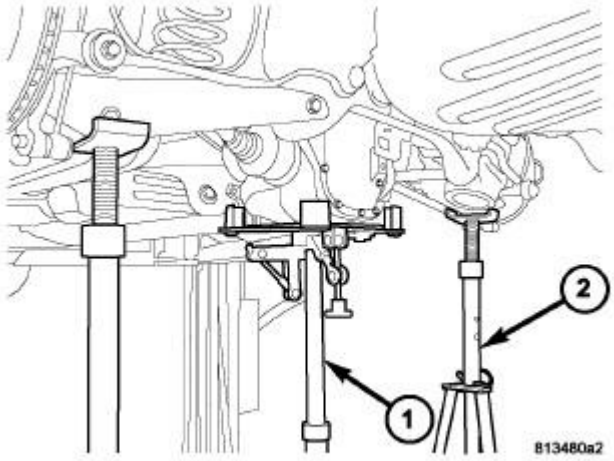

Fig. 10: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

8. If a drive-on hoist is used, position transmission jack (1) to rear axle assembly. If a drive-on hoist is not used, compress rear suspension using screw-style under-hoist jack stands (2), then position transmission jack to rear axle assembly.

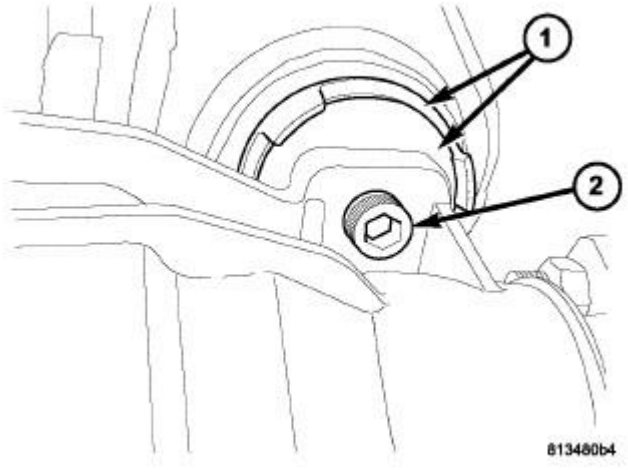

Fig. 11: Rear Axle Forward Mount Isolator & Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

9. Remove rear axle forward mount isolator (1) bolt/nut (2).
10. Remove two rear axle-to-crossmember bolts (1).

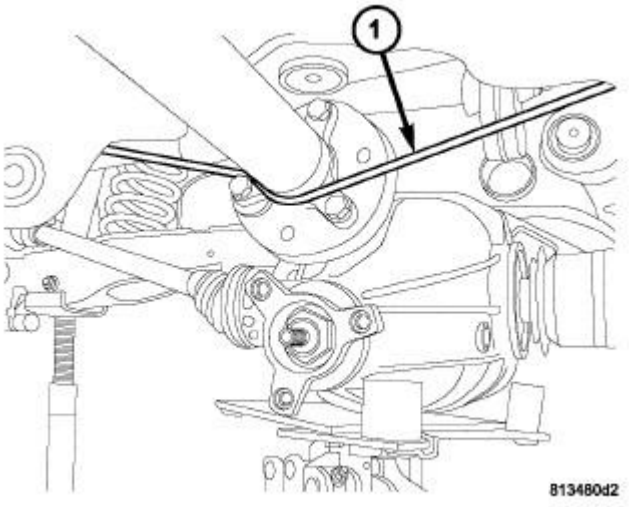

Fig. 12: Propeller Shaft Supported
Courtesy of CHRYSLER GROUP, LLC

11. Carefully lower rear axle. While lowering axle, separate propeller shaft from axle and support with suitable rope or wire (1).

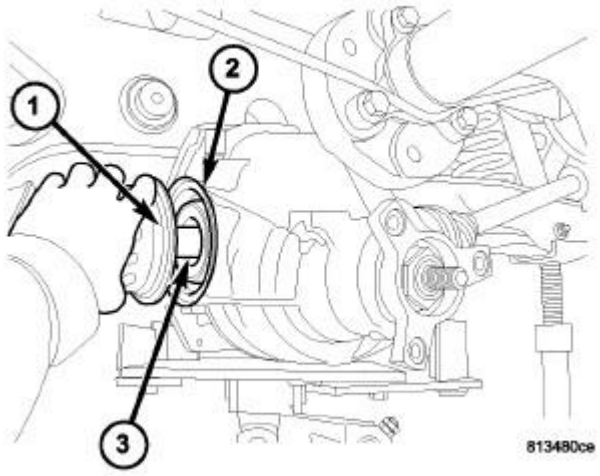

Fig. 13: Halfshaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

12. Lower axle just enough to remove both halfshafts one at a time. Shift axle assembly in one direction, compressing one halfshaft while removing the other (1). Use caution to protect axle seal and journal.
13. Remove axle assembly from vehicle and transfer to bench.

INSTALLATION

INSTALLATION

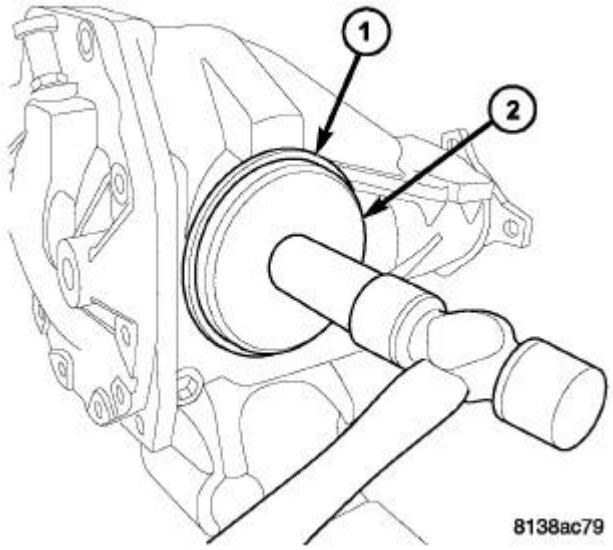

Fig. 14: Axle Seal Installation

Courtesy of CHRYSLER GROUP, LLC

1. Install new axle seal(s) (1) using (special tool #9755, Installer, Seal) (2).

NOTE: Always use (special tool #9099, Seal Protector, Differential Output) when installing half shaft into the transaxle. If the Seal Protector is new please split at seam before using.

NOTE: Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.

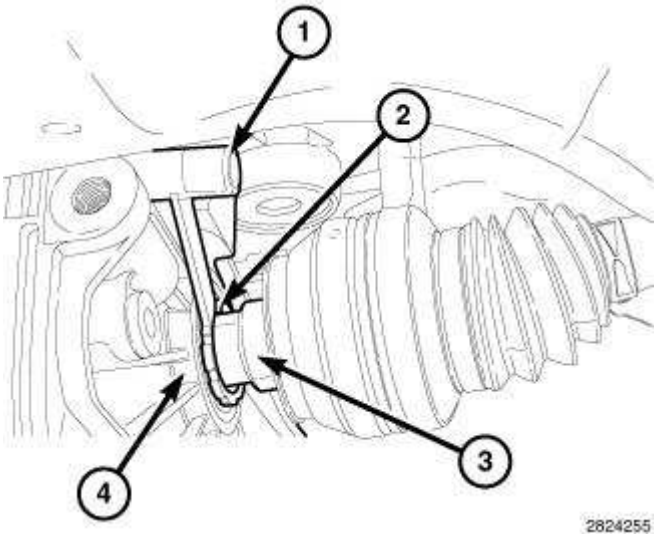

Fig. 15: Identifying Rear Axle, Rear Driveshaft, Rear Axle Flange, and Halfshafts
Courtesy of CHRYSLER GROUP, LLC

NOTE: While raising rear axle reposition rear drive shaft to rear axle flange.

2. Install new circlip(s), on halfshafts (3).
3. Raise axle just enough to install both halfshafts one at a time. Be careful not to damage axle seals using (special tool #9099, Seal Protector, Differential Output) (1). Shift axle assembly in one direction, compressing one halfshaft while installing the other.

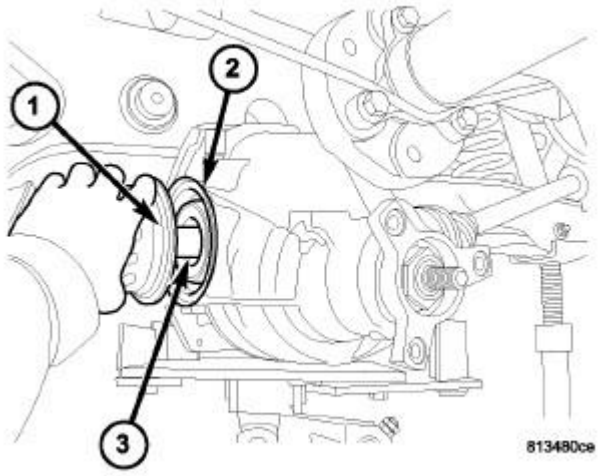

Fig. 16: Halfshaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.

4. Using new circlip(s), install halfshaft (1) to rear axle assembly. Use care not to damage axle seals (2). Verify proper installation by pulling outward on joint by hand.

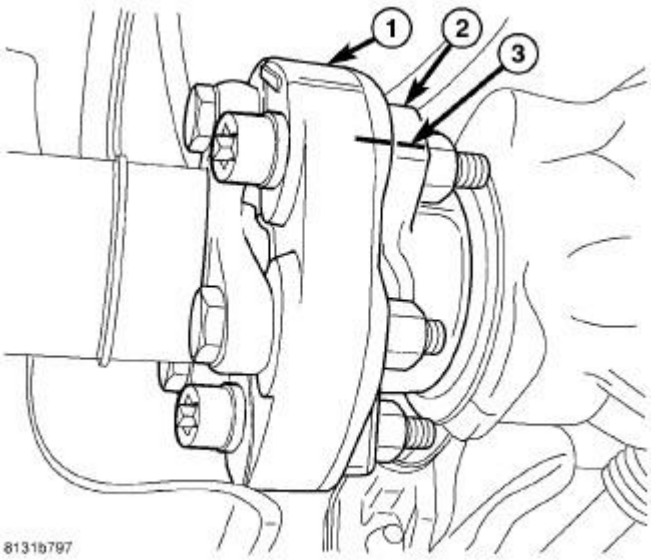

Fig. 17: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

5. Raise rear axle assembly into position. Align propeller shaft index marks (3) and start propeller shaft coupler-to-axle bolt/nuts by hand.

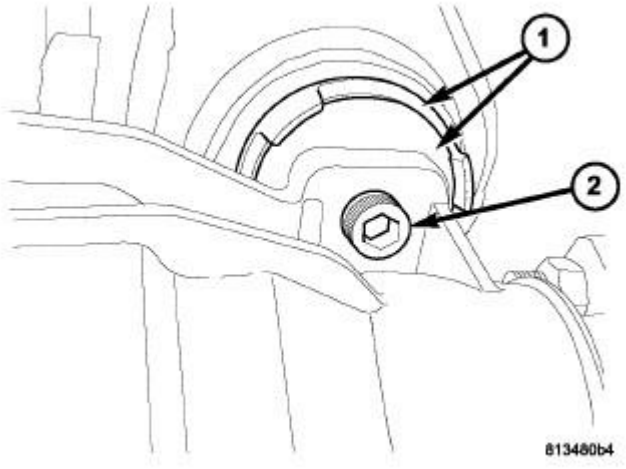

Fig. 18: Rear Axle Forward Mount Isolator & Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

6. Install two rear axle-to-crossmember bolts (1) and torque to 220 N.m (162 ft. lbs.).
7. Install rear axle front mount isolator (1) as shown and torque bolt/nut to 65 N.m (48 ft. lbs.).

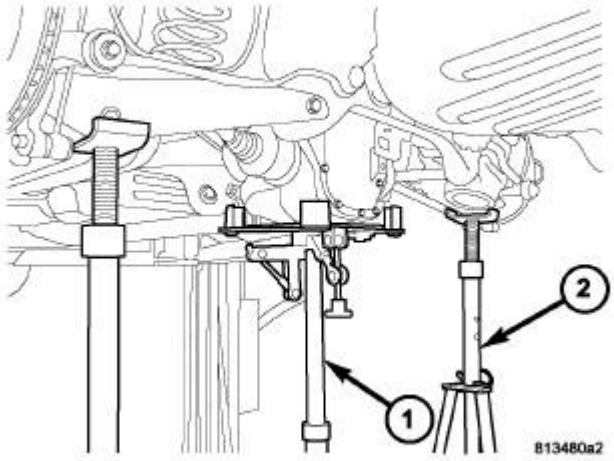

Fig. 19: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

8. Again verify halfshaft inner joints are fully engaged to axle assembly.

9. Remove transmission jack (1).
10. If used, remove screw-type under-hoist jack stands (2).

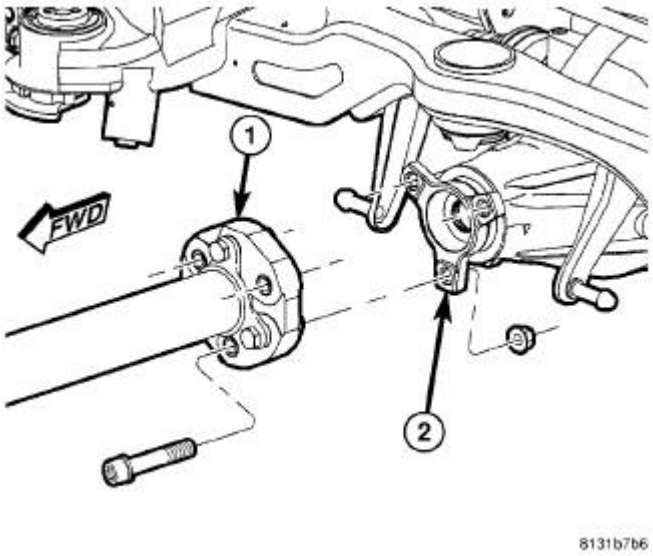

Fig. 20: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

11. Torque propeller shaft coupler-to-axle flange bolt/nuts to 58 N.m (43 ft. lbs.).

SPECIAL TOOLS

SPECIAL TOOLS

	1026 - Puller (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC.) 6448A - Installer, Bearing/Gear (Originally Shipped In Kit Number(s) 6947, 8667, 8837, 8867.) 9099 - Seal Protector, Differential Output (Originally Shipped In Kit Number(s) 9324, 9324CC.) 9754 - Installer, Seal (Originally Shipped In Kit Number(s) 9750.) 9755 - Installer, Seal (Originally Shipped In Kit Number(s) 9750.) C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)

SEAL, AXLE DRIVE SHAFT

REMOVAL

REMOVAL

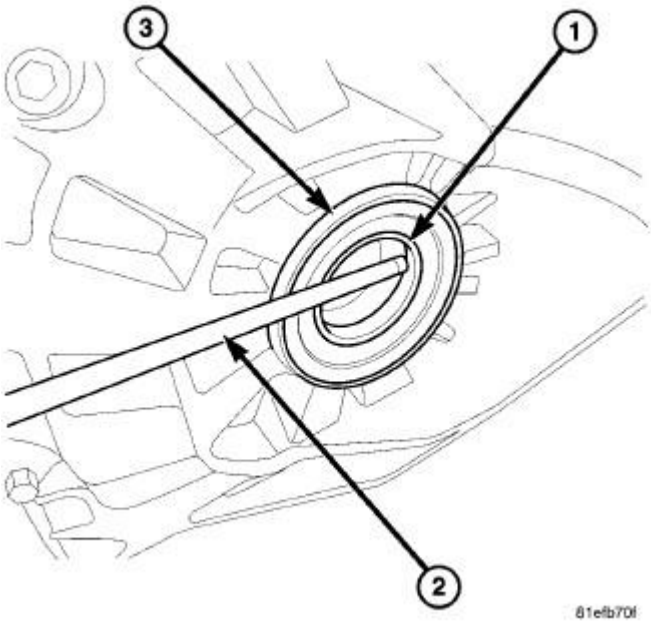

Fig. 21: Remove Lside Seal
Courtesy of CHRYSLER GROUP, LLC

1. Remove halfshaft(s). Refer to **REMOVAL** and **REMOVAL** .
2. Using suitable screwdriver (1), remove axle shaft seal (2).
3. Visually inspect halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc.). Replace halfshaft if necessary.

INSTALLATION

INSTALLATION

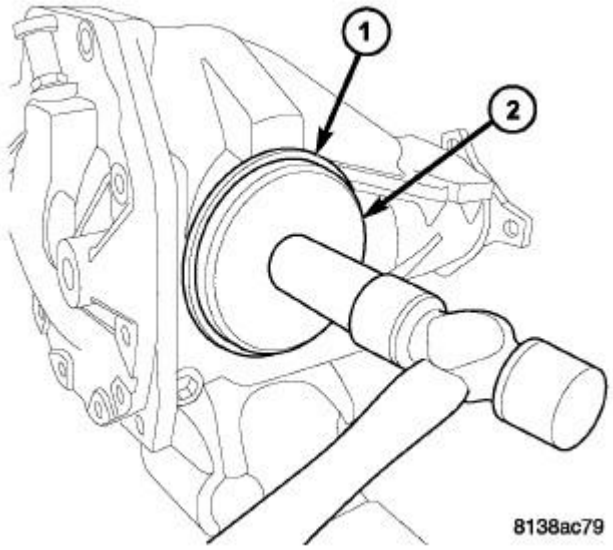

Fig. 22: Axle Seal Installation
Courtesy of CHRYSLER GROUP, LLC

1. Using Installer (special tool #9755, Installer, Seal) (2), install **NEW** axle shaft seal (1). Lubricate the inside diameter with Mopar® Gear and Axle Lubricant 75W-140 to protect seal during halfshaft installation.
2. Install halfshaft(s). Refer to **INSTALLATION** and **INSTALLATION** .

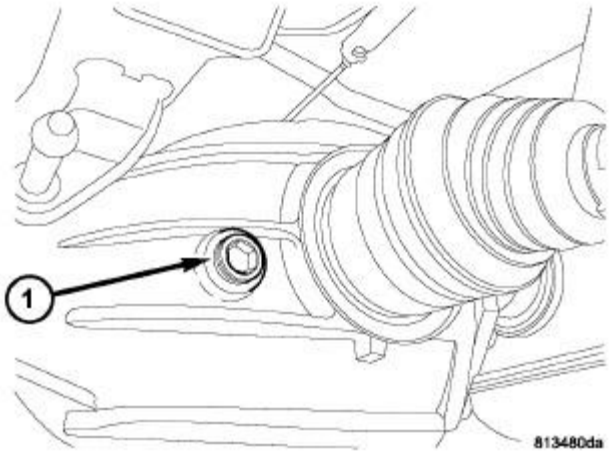

Fig. 23: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

3. Remove fill plug (1) to check and adjust rear axle fluid level. Top off axle with Mopar® Gear and Axle Lubricant 75W-140. Reinstall fill plug and torque to 50 N.m (37 ft. lbs.) torque.

SEAL, DRIVE PINION

REMOVAL

REMOVAL

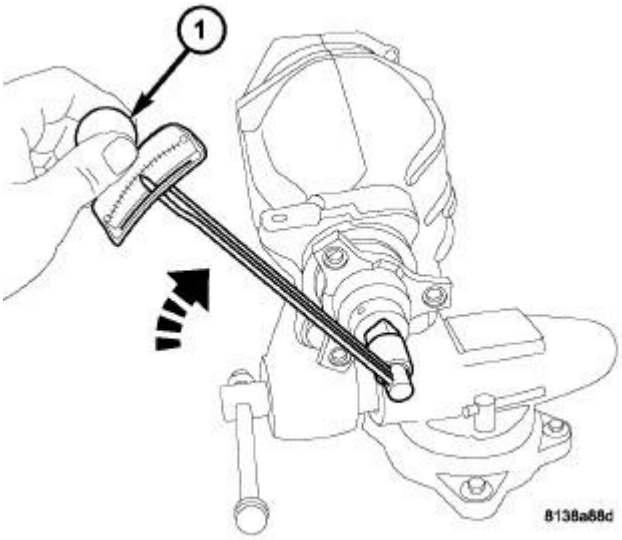

Fig. 24: Measuring Turning Torque
Courtesy of CHRYSLER GROUP, LLC

1. Remove rear axle assembly from vehicle. Refer to Rear Axle Removal.
2. Measure axle assembly rotating torque and record measurement for reuse on assembly.

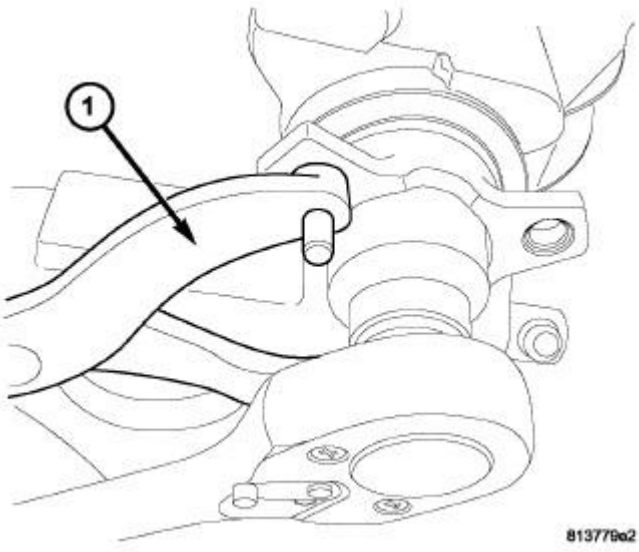

Fig. 25: Pinion Flange Nut Removal/Installation

Courtesy of CHRYSLER GROUP, LLC

3. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and 41mm socket, remove pinion flange nut and discard.

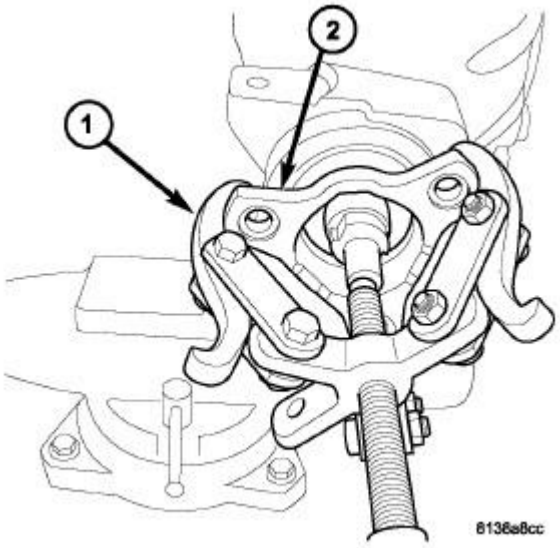

Fig. 26: Removing Pinion Flange With Puller 1026
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to axle imbalance concerns, it is necessary to make sure pinion flange-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion flange.

4. Using Puller (special tool #1026, Puller) (1), remove pinion flange (2) from pinion shaft.

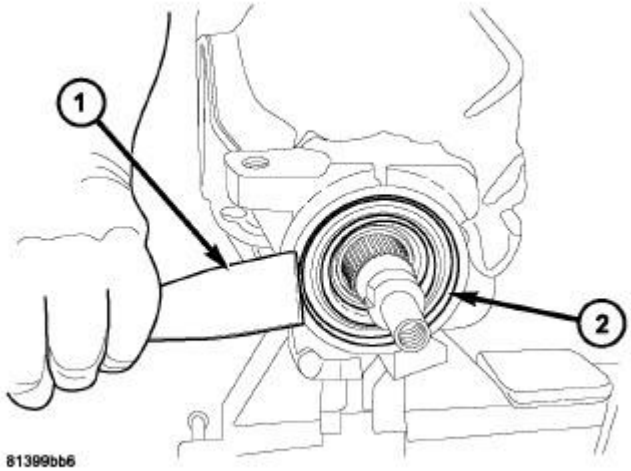

Fig. 27: Pinion Seal Removal
Courtesy of CHRYSLER GROUP, LLC

5. Using suitable tool (1), remove pinion seal (2) and discard.

INSTALLATION

INSTALLATION

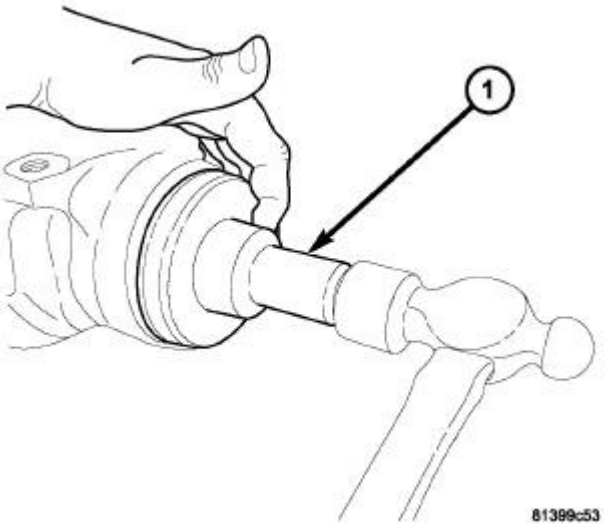

Fig. 28: Installing Pinion Seal
Courtesy of CHRYSLER GROUP, LLC

1. Apply light coating of gear lubricant to the lip of the pinion seal.
2. Using Installer (special tool #9754, Installer, Seal) (1), install pinion seal until tool bottoms on carrier.

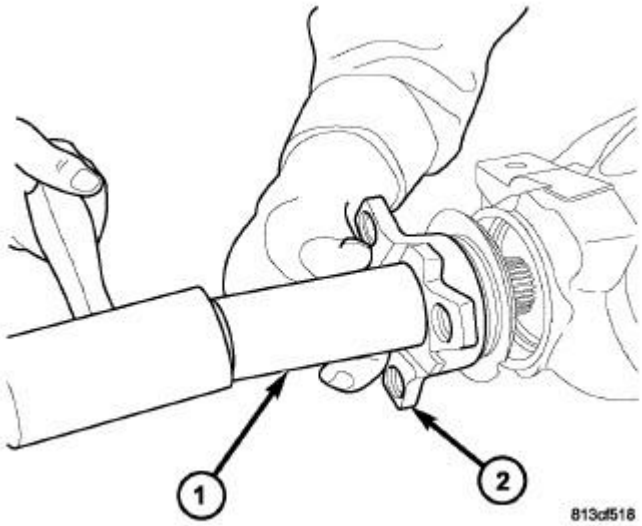

Fig. 29: Pinion Flange Installation
Courtesy of CHRYSLER GROUP, LLC

3. Install pinion flange into position. Align index marks to maintain assembly balance.
4. Using Installer (special tool #6448A, Installer, Bearing/Gear) (1), lightly tap on pinion flange (2) until adequate pinion shaft threads are exposed.

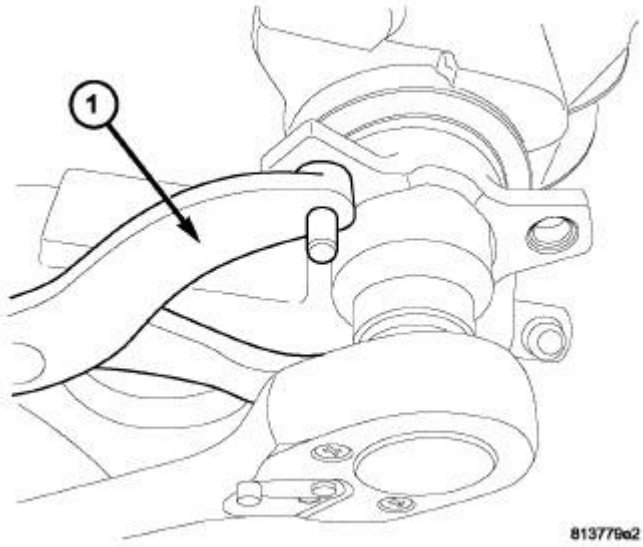

Fig. 30: Pinion Flange Nut Removal
Courtesy of CHRYSLER GROUP, LLC

5. Install **new** pinion flange nut. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and 41mm socket, torque nut to 136 N.m (100 ft. lbs.).

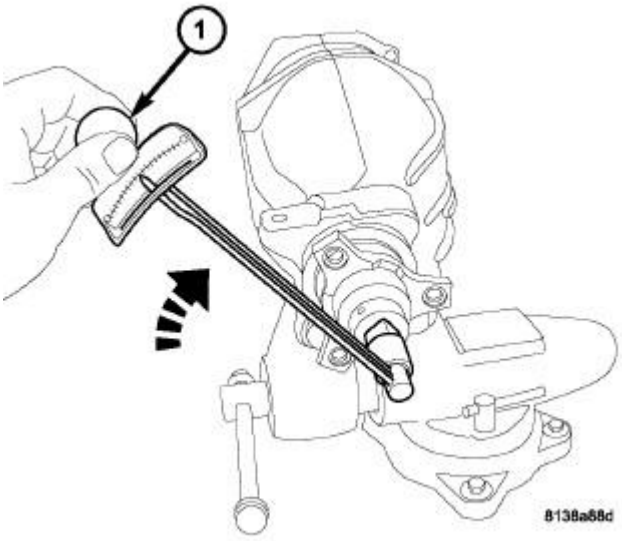

Fig. 31: Measuring Rotating Torque
Courtesy of CHRYSLER GROUP, LLC

6. Measure assembly turning torque. Axle assembly rotating torque must be should be equal to the reading recorded upon seal/flange removal.

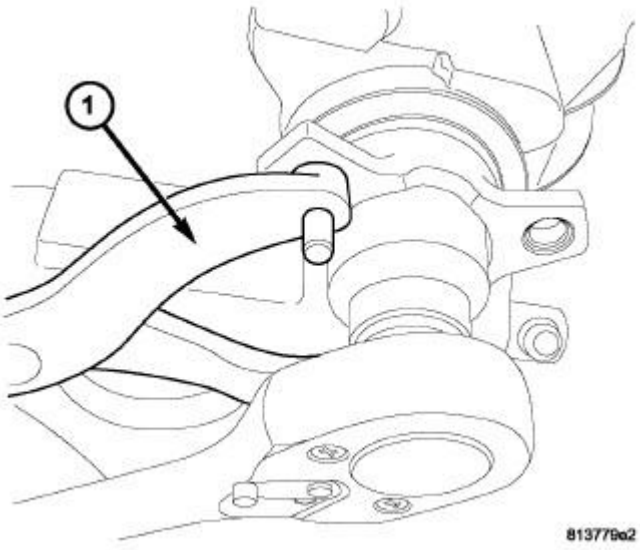

Fig. 32: Pinion Flange Nut Removal
Courtesy of CHRYSLER GROUP, LLC

7. If rotating torque is low, increase pinion flange nut torque in 7 N.m (5 ft. lbs.) increments. Repeat until proper rotating torque is received.

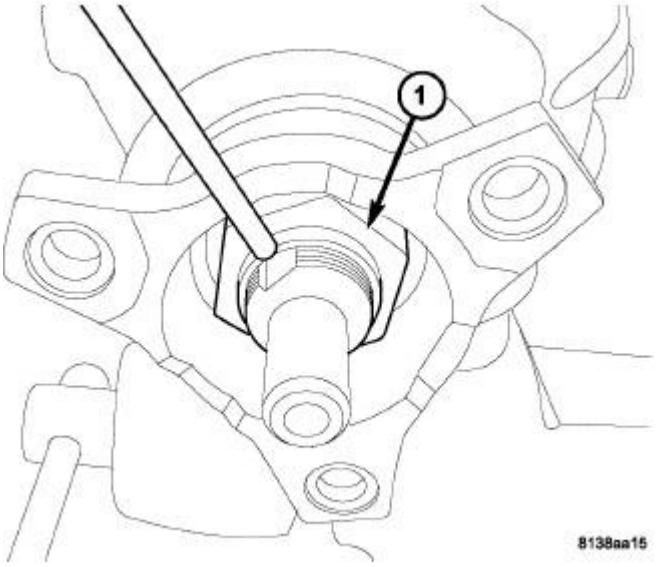

Fig. 33: Staking Pinion Flange Nut
Courtesy of CHRYSLER GROUP, LLC

8. Stake pinion flange nut (1) as shown.
9. Install rear axle assembly. Refer to Rear Axle Installation.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - NOISE

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly:

- Axle mounts damaged, worn, or bottoming out.
- Check for insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehicle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The differential and pinion bearings can produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Worn or damaged differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Wheel hub bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and

to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by a worn U-joint or by worn side-gear thrust washers. A worn pinion shaft bore will also cause low speed knock.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged propeller shaft.
- Missing propeller shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joints, or CV joints.
- Worn rubber coupler between the propeller shaft and the pinion yoke.
- Washers missing from the fasteners that attach the rubber coupler to the pinion yoke.
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.
- Bent halfshaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear, can be caused by:

- Cradle-to-body isolator worn or damaged.
- Worn or damaged rubber washer between axle hub nut and axle hub.
- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints, or CV joints.
- Worn rubber coupler between the propeller shaft and the pinion yoke.
- Worn or broken axle mount isolators.

- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
WHEEL NOISE	1. Wheel loose.	1. Tighten loose nuts.
	2. Faulty, brinelled wheel bearing.	2. Replace bearing.
DIFFERENTIAL CRACKED	1. Improper differential side bearing preload.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing preload properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
DIFFERENTIAL GEARS SCORED	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the proper fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
LOSS OF LUBRICANT	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked axle housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored pinion flange journal.	5. Replace pinion flange and seal.
	6. Axle cover not properly sealed.	6. Remove, clean, and re-seal cover.

AXLE OVERHEATING	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing preload too high.	3. Re-adjust bearing pre-load.
	4. Insufficient ring gear backlash.	4. Re-adjust ring gear backlash.
GEAR TEETH BROKE	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Ice-spotted pavement.	2. Replace gears and examine remaining parts for damage.
	3. Improper adjustments.	3. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.
AXLE NOISE	1. Insufficient lubricant.	1. Fill axle with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and/or pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing preload.
	7. Misaligned or sprung ring gear.	7. Measure ring gear run-out. Replace components as necessary.
	8. Housing not machined properly.	8. Replace housing.

ADJUSTMENTS

PINION DEPTH

NOTE: Pinion depth measurement is taken with the pinion head and tail bearing cups pressed into the axle housing without the shim.

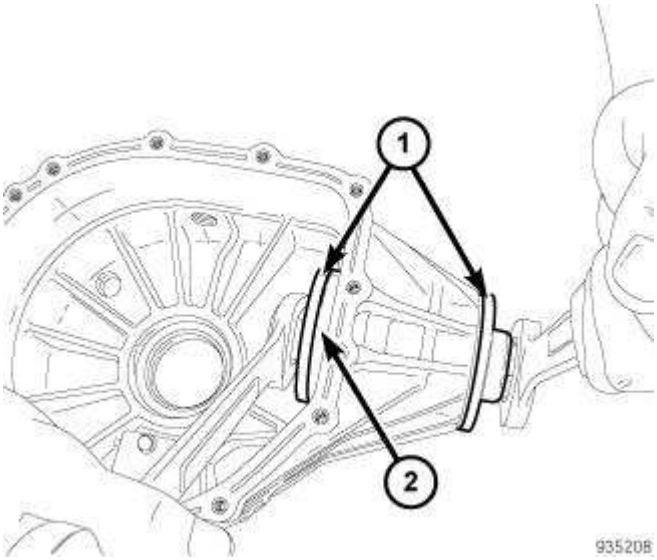

Fig. 1: Pinion Bearing Cup Installer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not attempt to install the inner and outer pinion bearing cups at the same time.

1. If necessary, install the pinion head bearing cup into housing with Pinion Bearing Cup Installer (special tool #10148, Installer, Pinion Head Bearing Cup) (1).
2. If necessary, press pinion tail bearing cup into housing with Pinion Bearing Cup Installer (special tool #10148, Installer, Pinion Head Bearing Cup) (1).

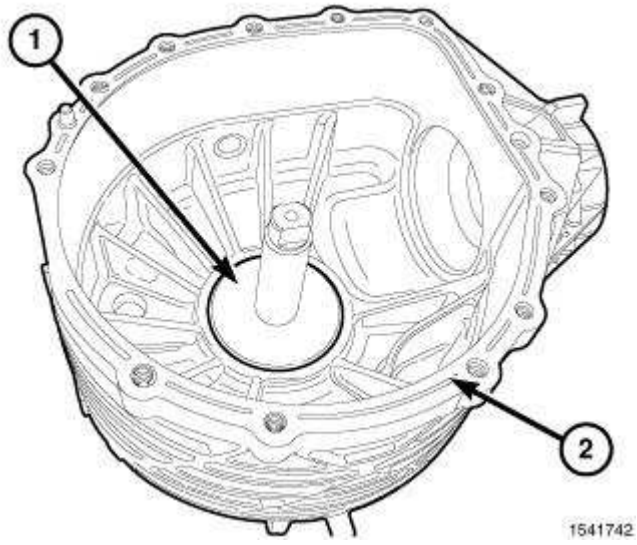

Fig. 2: Arbor Bar
Courtesy of CHRYSLER GROUP, LLC

3. Install Arbor Bar (special tool #10149-2, Arbor) (1) into the case side bearing bore, then secure Arbor (special tool #10149-2, Arbor) in place with Plate (special tool #10149-5, Washer) and

fastener.

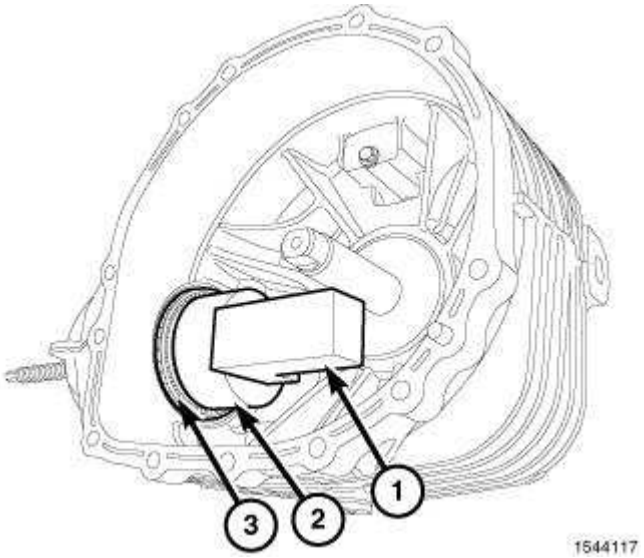

Fig. 3: Pinion Head Bearing
Courtesy of CHRYSLER GROUP, LLC

4. Install the pinion head bearing, tail bearing (3), L-block (special tool #6739, Block, Height) (1), and the Pinion Height Block (special tool #10149-1, Block, Pinion) (2).
5. Verify pinion depth measurement tools are set up as shown in illustration.

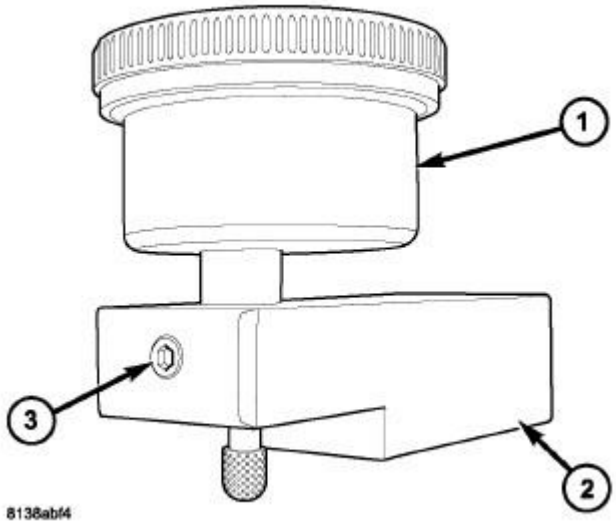

Fig. 4: Indicator/Scooter Block Setup
Courtesy of CHRYSLER GROUP, LLC

6. Install Dial Indicator (special tool #9524, Indicator, Dial) (1) to Scooter Block (special tool #D-115-2A, Block, Scooter) (2). Secure with set-screw (3).

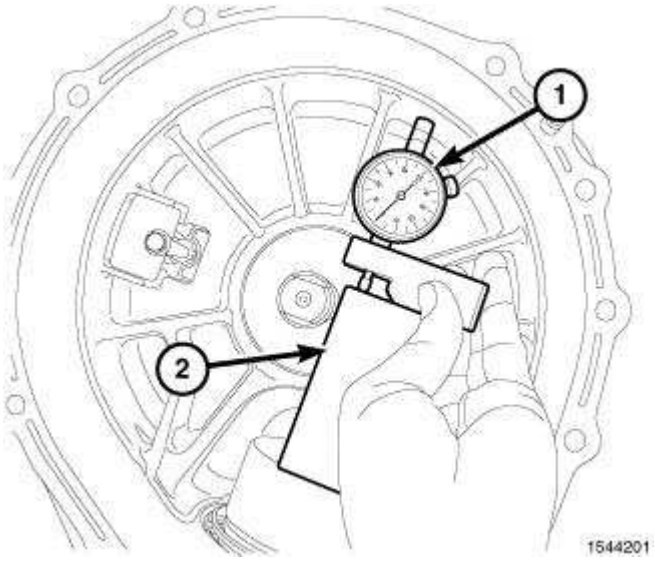

Fig. 5: Zeroing In Dial Indicator On L-Block
Courtesy of CHRYSLER GROUP, LLC

7. Zero Dial Indicator (special tool #9524, Indicator, Dial) (1) on L-block (special tool #6739, Block, Height) (2).

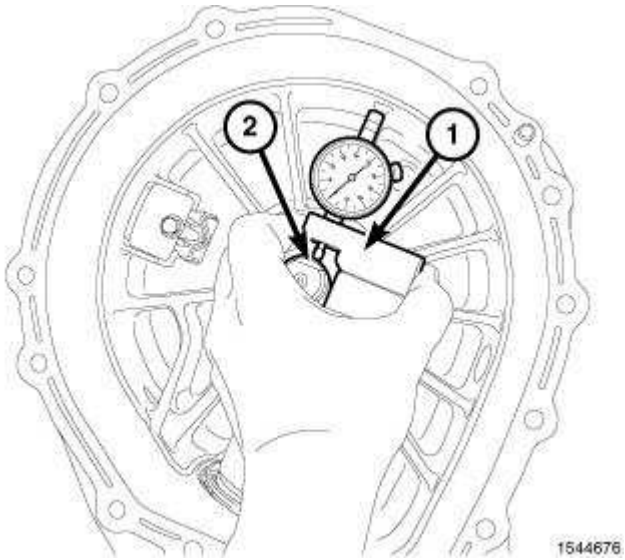

Fig. 6: Slide Indicator Probe Off Of Height Block And Onto Arbor Bar
Courtesy of CHRYSLER GROUP, LLC

8. Slide indicator probe (1) off of height block and onto Arbor Bar (special tool #10149-2, Arbor) (2). As indicator contacts Arbor Bar (special tool #10149-2, Arbor) (2), indicator needle will rotate clockwise. Continue moving indicator probe to the crest of Arbor Bar (special tool #10149-2, Arbor) and record the highest reading.
9. Rotate Arbor Bar (special tool #10149-2, Arbor) (2) 90°.
10. Repeat steps 7 through 9 and record each measurement until the Arbor Bar (special tool #10149-2, Arbor) has been rotated back to the original location.

11. Average the four measurements taken in steps 7 through 10.
12. Select a shim equal to the average of the measurements, plus 1.5 mm (0.059 in.).

SIDE BEARING PRELOAD ADJUSTMENT

NOTE: Select the pinion shim before performing this procedure.

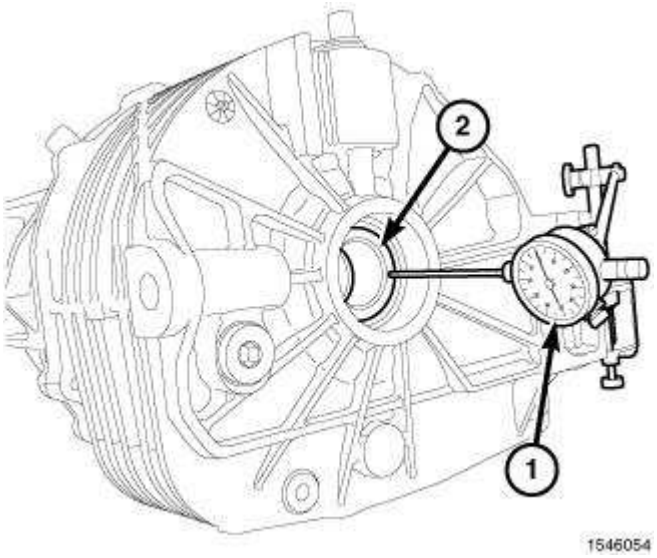

Fig. 7: Side Bearing Preload Adjustment
Courtesy of CHRYSLER GROUP, LLC

1. Clean the differential bearing cup bore in the axle housing.
2. Install Dummy Bearing (special tool #10149-3, Dummy Housing Bearing) in the axle housing.
3. Clean the differential bearing cup bore in the axle housing cover.
4. Install Dummy Bearing (special tool #10149-4, Dummy Cover Bearing) in the axle housing cover.
5. Install the differential into the axle housing.
6. Install the axle housing cover and tighten the bolts to 10 Nm (7 ft. lbs.).
7. Set up the dial indicator (1) to measure endplay on the housing side of the differential (2).
8. From the housing side of the differential, press the differential toward the case cover, then zero the dial indicator (1).
9. From the case cover side, press the differential toward the housing side, and record the measurement.
10. Add 1.33 mm (0.052 in.) to the empty case measurement taken in the previous step and record the results. This is the total dimension of both differential shims when installed.
11. Remove the dial indicator.
12. Remove the axle housing cover.
13. Fully install the pinion.

14. Install the Dummy Bearing (special tool #10149-3, Dummy Housing Bearing) in the axle housing, then install the differential carrier into the axle housing.
15. Install Dummy Bearing (special tool #10149-4, Dummy Cover Bearing) in the axle housing cover, and install the axle housing cover. Tighten the bolts to 10 Nm (7 ft. lbs.).
16. Set up the dial indicator (1) as before.
17. From the housing side of the differential, press the differential toward the case cover, then zero the dial indicator (1).
18. From the case cover side, press the differential toward the housing side, and record the measurement.
19. Subtract 0.27 mm (0.01 in.) from the measurement found in the previous step 10. This is the size of the shim that should be installed in the housing cover.
20. Subtract the size of the selected housing cover shim from the measurement found in. This is the size of the shim that should be installed in the housing.
21. Check ring gear backlash. Final ring gear backlash should be 0.21 mm +/- 0.13 mm (0.008 in. +/- 0.005 in.).

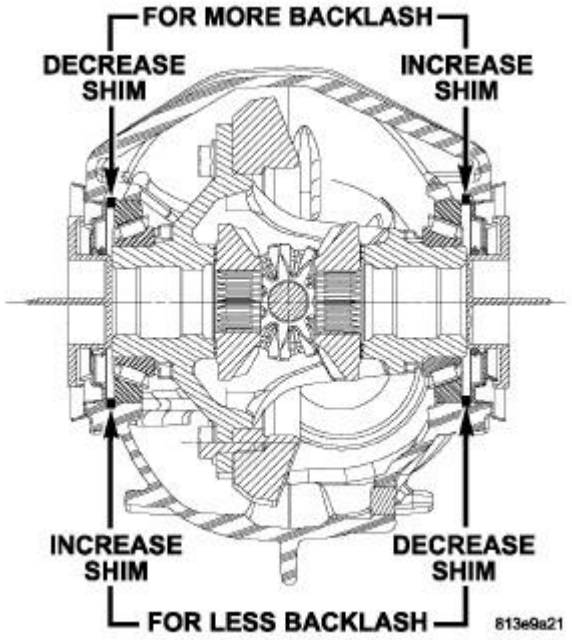

Fig. 8: Backlash Shim Correction
Courtesy of CHRYSLER GROUP, LLC

22. If backlash measurement is less than 0.08 mm (0.003 in.), it is necessary to decrease the shim thickness on the ring gear (left) side, and increase the thickness on the pinion (right) side.
23. If backlash measurement is greater than 0.34 mm (0.013 in.), it is necessary to increase the shim thickness on the ring gear (right) side, and decrease the thickness on the pinion (left) side.
24. Check the gear contact pattern, and adjust as necessary. Refer to **GEAR CONTACT PATTERN**.

GEAR CONTACT PATTERN

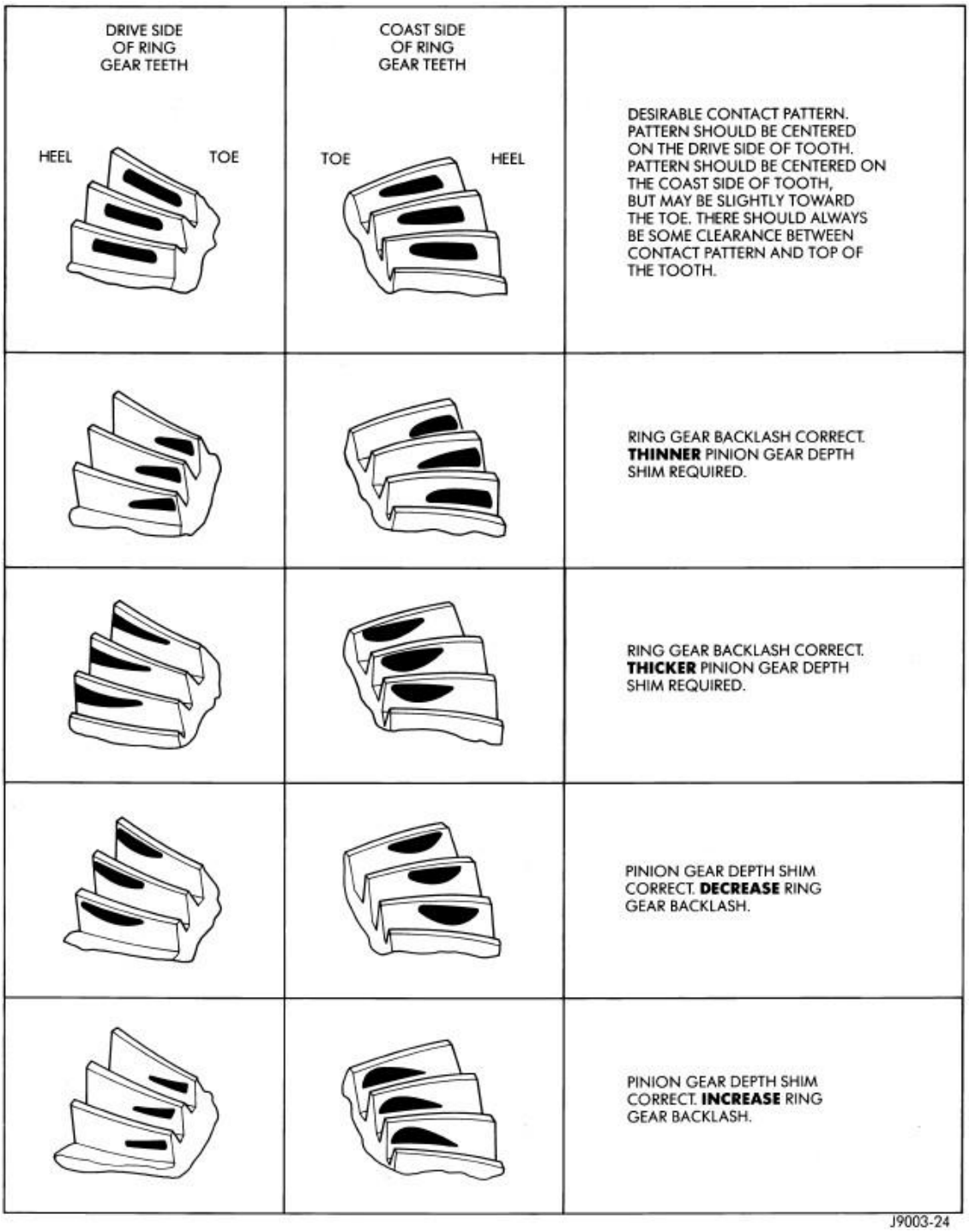

Fig. 9: Gear Tooth Contact Patterns
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The ring gear and pinion teeth contact patterns will show if the pinion depth is correct in the housing. It will also show if the ring gear backlash has been**

adjusted correctly. The backlash can be adjusted within specifications to achieve desired tooth contact patterns.

1. Install the differential side bearings and pinion bearings.
2. Install the selected differential bearing and pinion shims in the differential housing and cover, and install the bearing cups.
3. Install the differential carrier and pinion in the differential housing.
4. Apply a thin coat of hydrated ferric oxide or equivalent to the drive and coast side of the ring gear teeth.
5. Install the differential housing cover. Tighten the bolts to 28 Nm (20 ft. lbs.).
6. Make a witness mark on the differential carrier.
7. Hold the differential case from freely rotating. This will provide a more distinct contact pattern.
8. Rotate the pinion until the witness mark on the differential case has made one complete revolution in both directions.
9. Note and compare patterns on the ring gear teeth to Gear Tooth Contact Patterns chart and adjust pinion depth and gear backlash as necessary. The areas on the ring gear teeth with the greatest degree of contact against the pinion teeth will push the compound to the areas with the least amount of contact.

SPECIFICATIONS

SPECIFICATIONS

AXLE

ITEM	DESCRIPTION
Fluid	Mopar® Gear and Axle Lubricant 75W-90
Friction Modifier	MOPAR® Limited Slip Additive Friction Modifier

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Fill Hole Plug	35	25	-
Drain Hole Plug	35	25	-
Rear Axle Front Mount	65	48	-
Axle-to-Crossmember Bolts	220	162	-
Pinion Nut	245	180	-
Case Cover Bolts	28	20	-
Ring Gear Bolt Torques	185	136	-
Total Torque to Rotate (new bearings)	2.5 - 6.0	22 - 53	-

REMOVAL

REMOVAL

NOTE: This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.

CAUTION: Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.

1. With vehicle in neutral, position and raise vehicle on hoist.

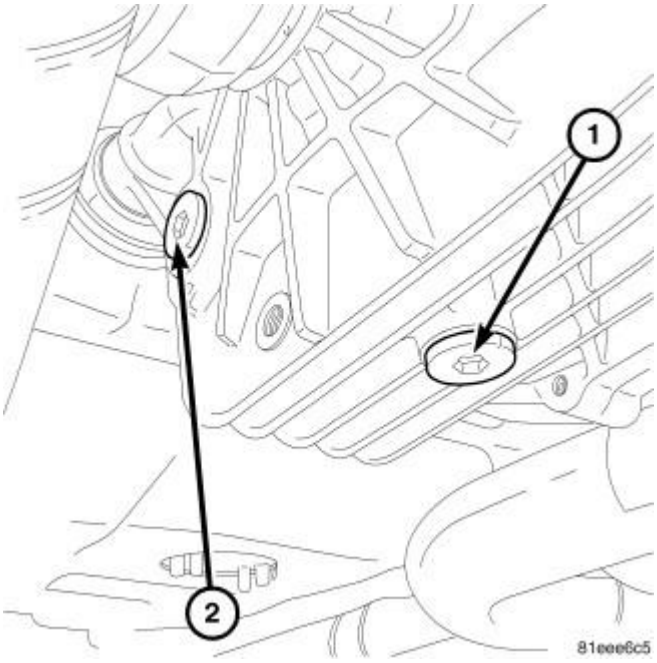

Fig. 10: Drain And Fill Plug
Courtesy of CHRYSLER GROUP, LLC

2. Remove axle drain plug (1) and drain rear axle fluid into suitable container.
3. Install drain plug (1). Do not tighten at this time.
4. Remove the muffler. Refer to **MUFFLER, EXHAUST, REMOVAL** .

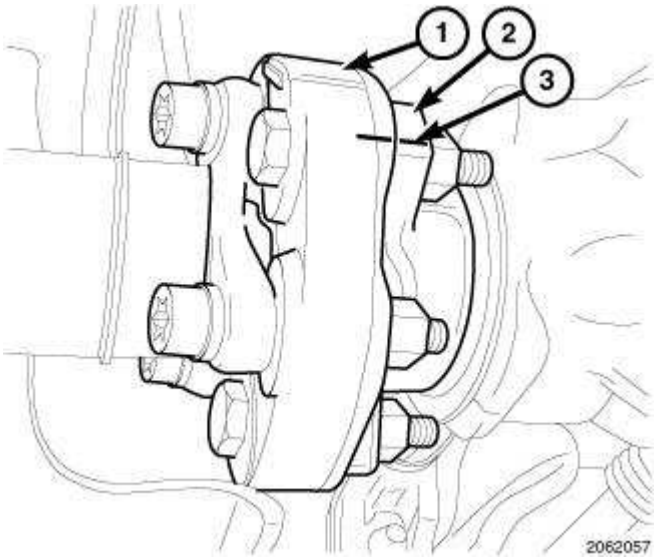

Fig. 11: Marks On Propeller Shaft Rubber Coupler
Courtesy of CHRYSLER GROUP, LLC

5. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).

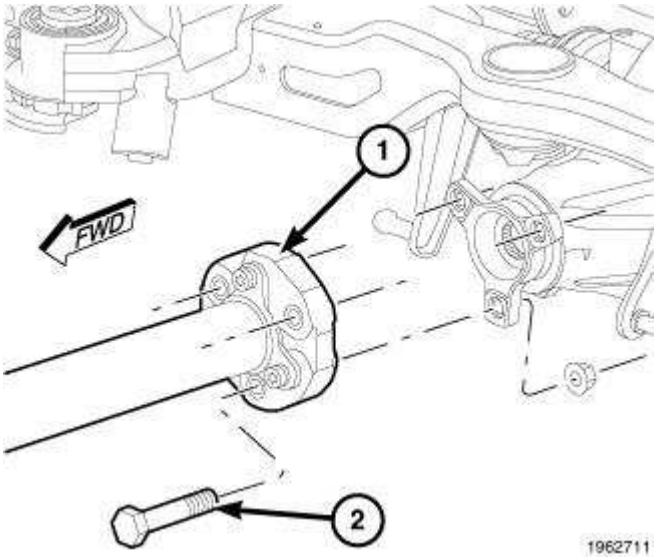

Fig. 12: Propeller Shaft Rear Coupler To Axle Flange
Courtesy of CHRYSLER GROUP, LLC

NOTE: If re-using the propeller shaft coupler-to-axle flange fasteners, save the washers.

6. Remove three propeller shaft coupler (2) -to-axle flange (1) fasteners.

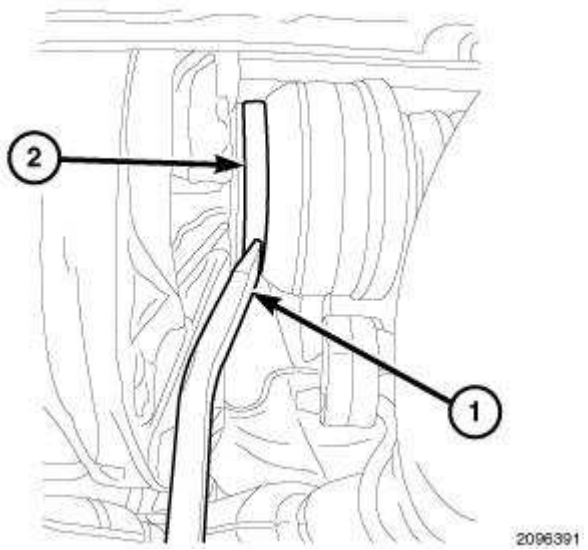

Fig. 13: Using Suitable Pry Bar Partially Disengage Halfshaft From Axle Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not pry on the slinger (2).

7. Using suitable pry bar (1) in the location shown in illustration, partially disengage halfshaft(s) from axle assembly.

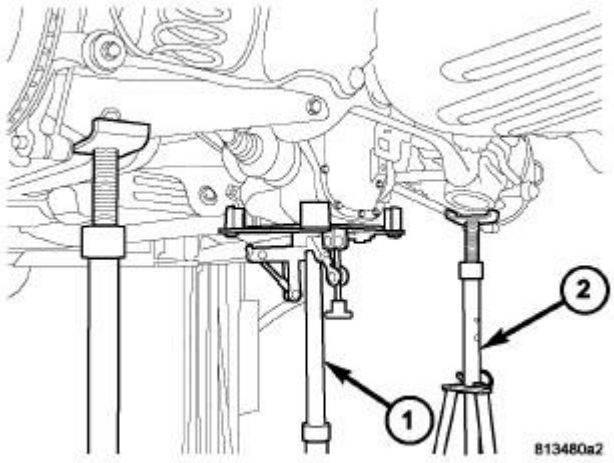

Fig. 14: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

8. If a drive-on hoist is used, position transmission jack (1) to rear axle assembly. If a drive-on hoist is not used, compress rear suspension using screw-style under-hoist jack stands (2), then position transmission jack to rear axle assembly.

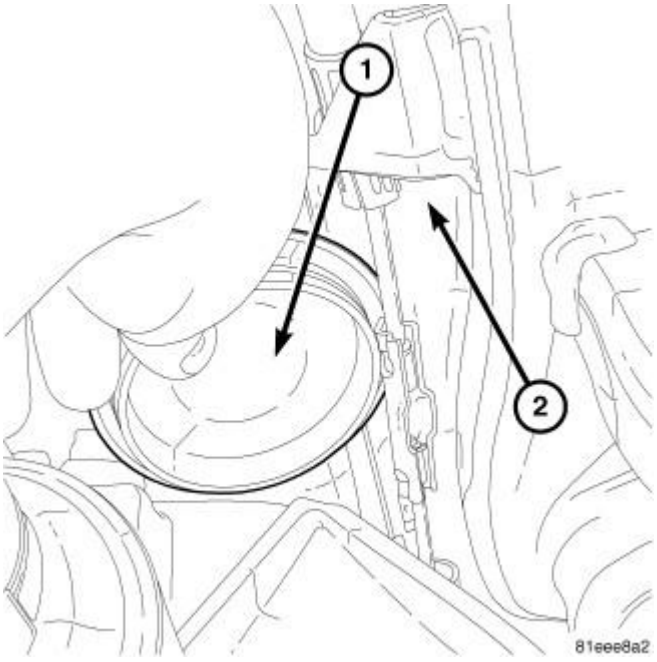

Fig. 15: Front Mount Bolt Cover
Courtesy of CHRYSLER GROUP, LLC

9. Remove the front mount bolt cover (1) located at the top of the axle carrier (2).

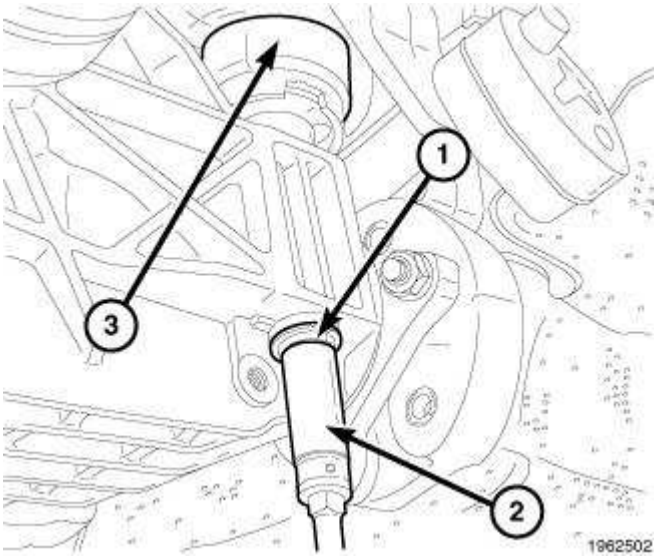

Fig. 16: Rear Axle Front Mount
Courtesy of CHRYSLER GROUP, LLC

NOTE: The nut will turn free at the at the top of the axle carrier, it will need to be held with a deep socket during removal.

10. Remove rear axle front mount bolt (1) and nut (3).

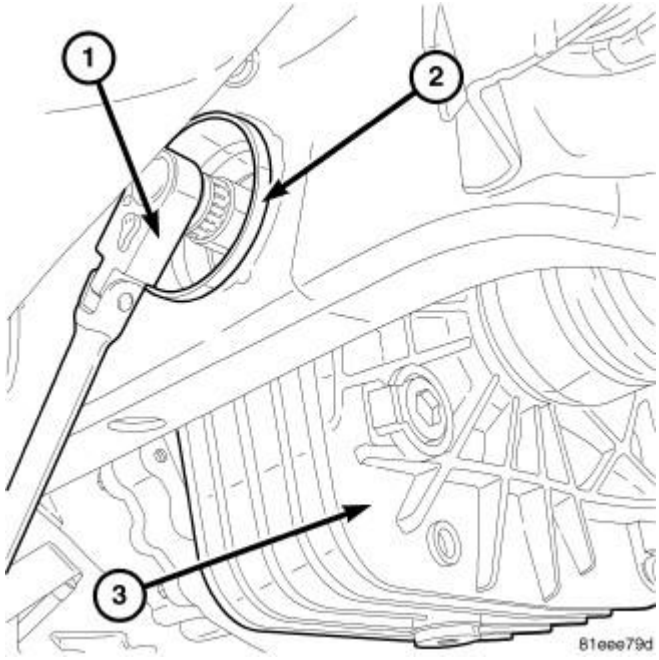

Fig. 17: Right Rear Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Remove right rear axle-to-crossmember bolts (1).

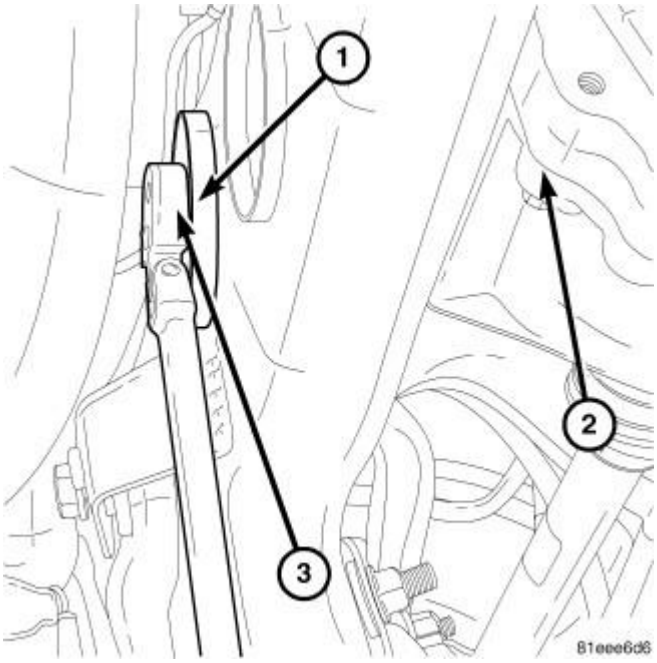

Fig. 18: Left Rear Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Remove the left rear bolt.

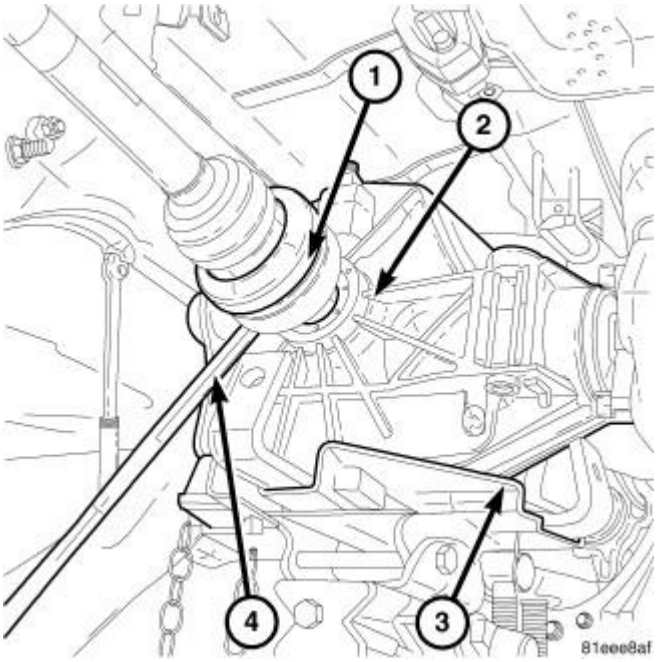

Fig. 19: Lower Rear End
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not pry on the axle halfshaft slinger.

13. Carefully lower rear axle. While lowering axle, separate right halfshaft (1) from axle and support with suitable rope or wire.

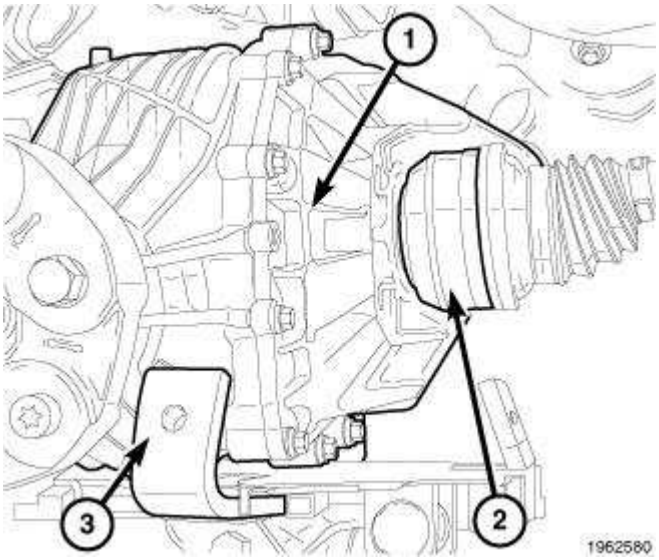

Fig. 20: Left Halfshaft
Courtesy of CHRYSLER GROUP, LLC

14. Remove left halfshaft (2).
15. Remove axle assembly from vehicle and transfer to bench.

INSTALLATION

INSTALLATION

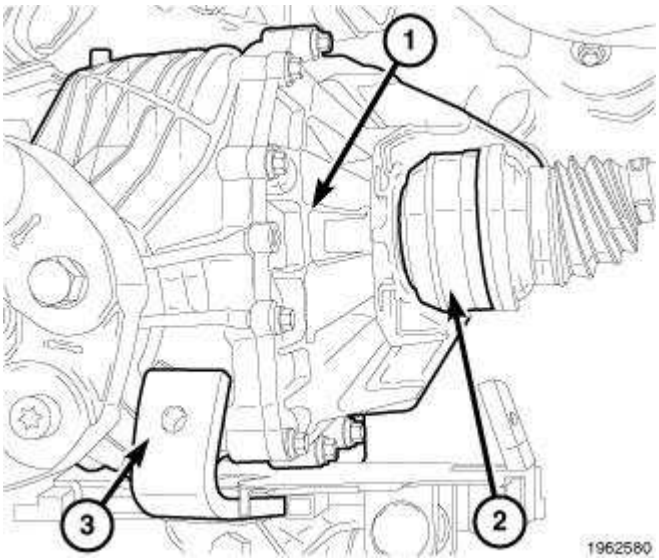

Fig. 21: Left Halfshaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.

1. Using new circlip(s), install left halfshaft (2) to rear axle assembly. Do not damage axle seals. Verify proper installation by pulling outward on joint by hand.

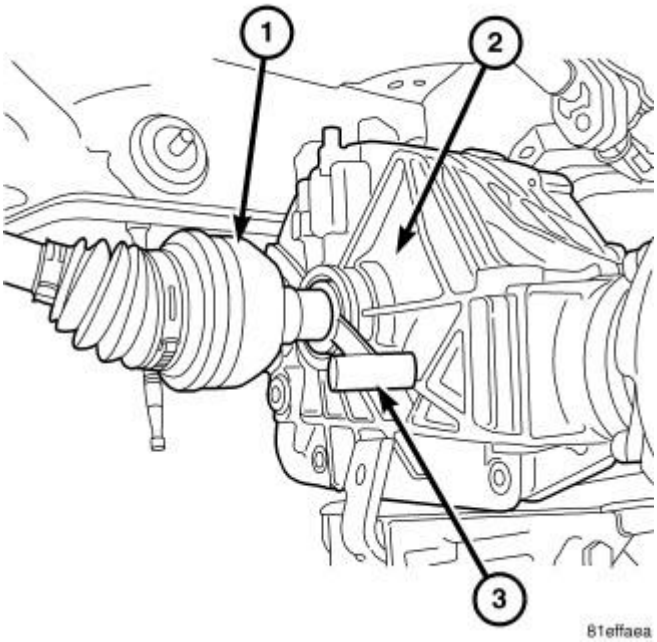

Fig. 22: Seal Protector
Courtesy of CHRYSLER GROUP, LLC

2. Using (special tool #9099, Seal Protector, Differential Output) (3) install the right halfshaft (1) into axle (2).

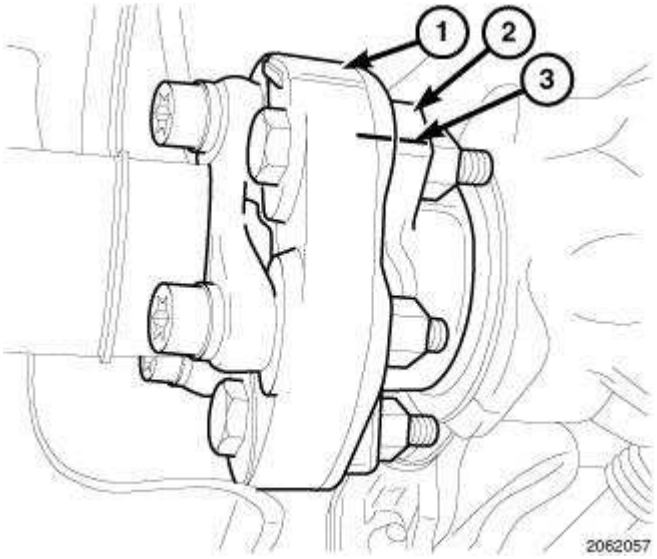

Fig. 23: Marks On Propeller Shaft Rubber Coupler
Courtesy of CHRYSLER GROUP, LLC

NOTE: To prevent damage or imbalance, washers must be placed on fasteners that attach rubber coupler to the pinion yoke.

NOTE: To prevent damage or imbalance, washers must be installed between fastener heads and the rubber coupler.

3. Raise rear axle assembly into position. Align propeller shaft index marks (3) and start propeller shaft coupler-to-axle bolt/nuts by hand.

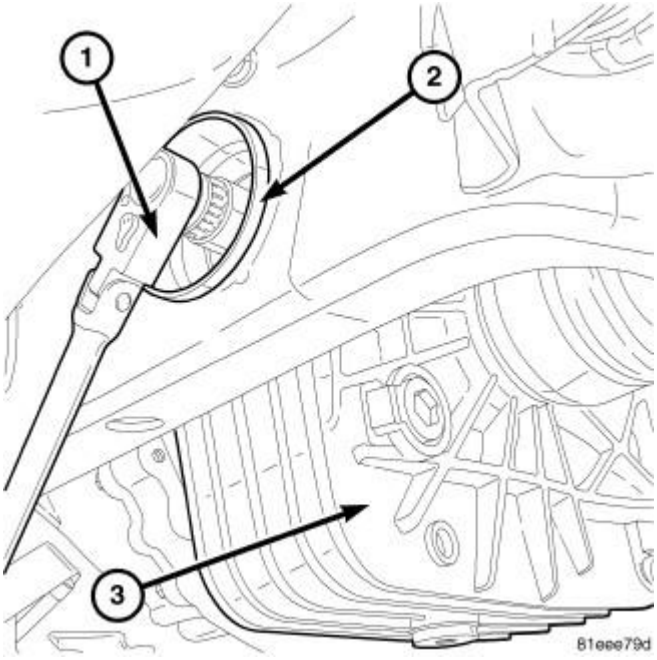

Fig. 24: Right Rear Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Clean the rear axle-to-crossmember bolts and apply a patch of blue MOPAR® Lock & Seal medium strength thread locker to the rear axle-to-crossmember bolts.

4. Install right rear axle-to-crossmember bolt (1) and tighten to 220 N.m (162 ft. lbs.).

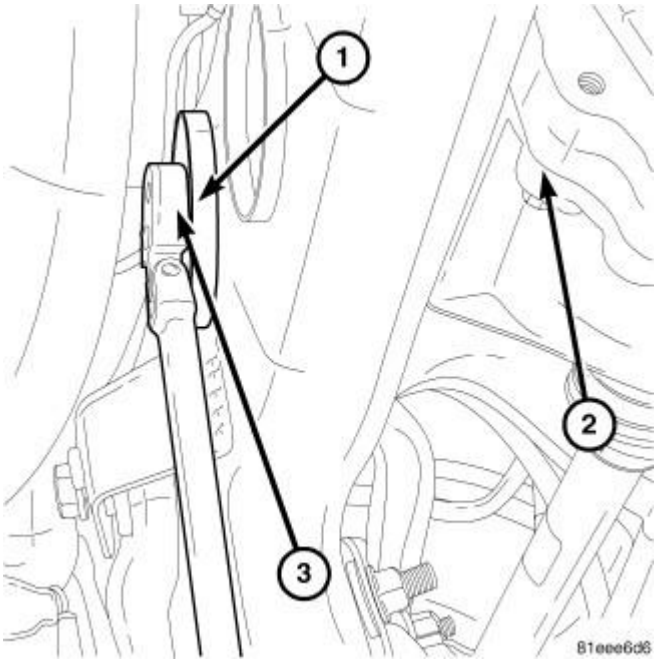

Fig. 25: Left Rear Bolt

Courtesy of CHRYSLER GROUP, LLC

NOTE: Clean the rear axle-to-crossmember bolts and apply a patch of blue MOPAR® Lock & Seal medium strength thread locker to the rear axle-to-crossmember bolts.

5. Install left rear axle-to-crossmember bolt (1) and tighten to 220 N.m (162 ft. lbs.).

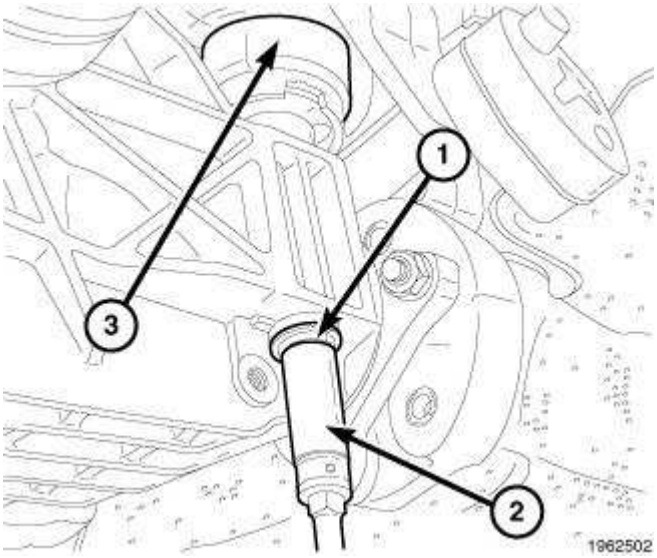

Fig. 26: Rear Axle Front Mount
Courtesy of CHRYSLER GROUP, LLC

NOTE: The rubber part of the axle isolator must face toward the cradle.

6. Install rear axle front mount isolator (3) as shown in illustration and torque fastener to 65 N.m (48 ft. lbs.).

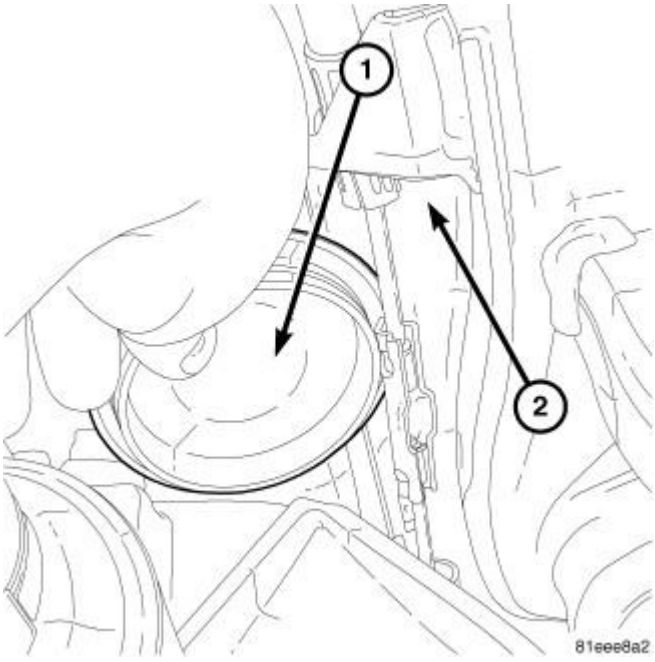

Fig. 27: Front Mount Bolt Cover
Courtesy of CHRYSLER GROUP, LLC

7. Install the front mount bolt cover (1).

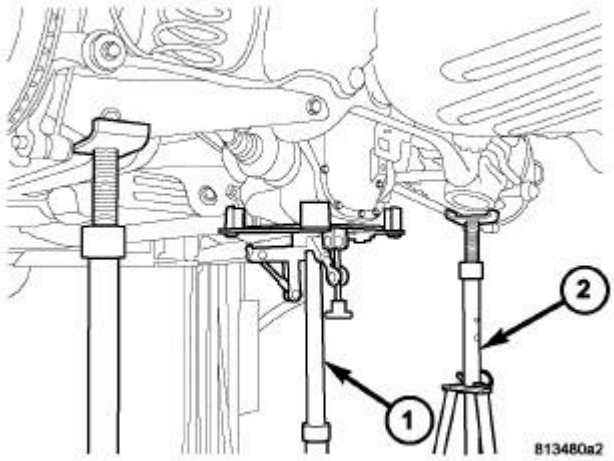

Fig. 28: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

8. Again verify halfshaft inner joints are fully engaged to axle assembly.
9. Remove transmission jack (1).
10. If used, remove screw-type under-hoist jack stands (2).

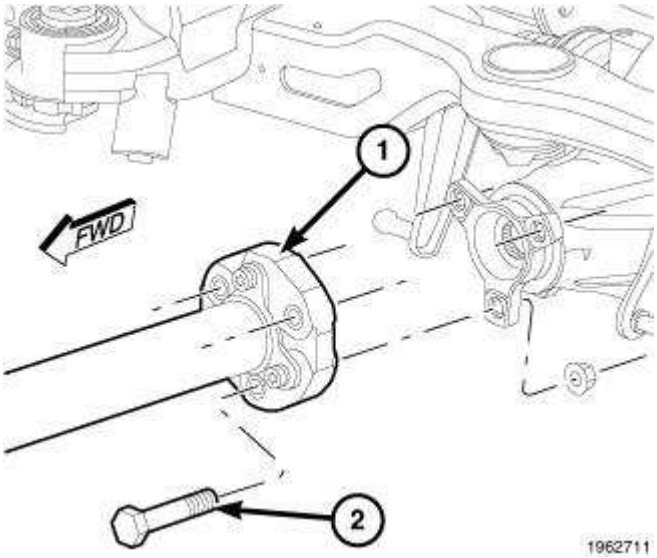

Fig. 29: Propeller Shaft Rear Coupler To Axle Flange
Courtesy of CHRYSLER GROUP, LLC

NOTE: If re-using original fasteners, apply a patch of blue MOPAR® Lock & Seal medium strength thread locker to the propeller shaft coupler-to-axle flange fasteners. New fasteners have a thread lock patch, and do not require application of blue MOPAR® Lock & Seal medium strength thread locker.

11. Install the propeller shaft coupler-to-axle flange fasteners. Tighten the propeller shaft coupler-to-axle flange fasteners (2) to 122 N.m (89 ft. lbs.).

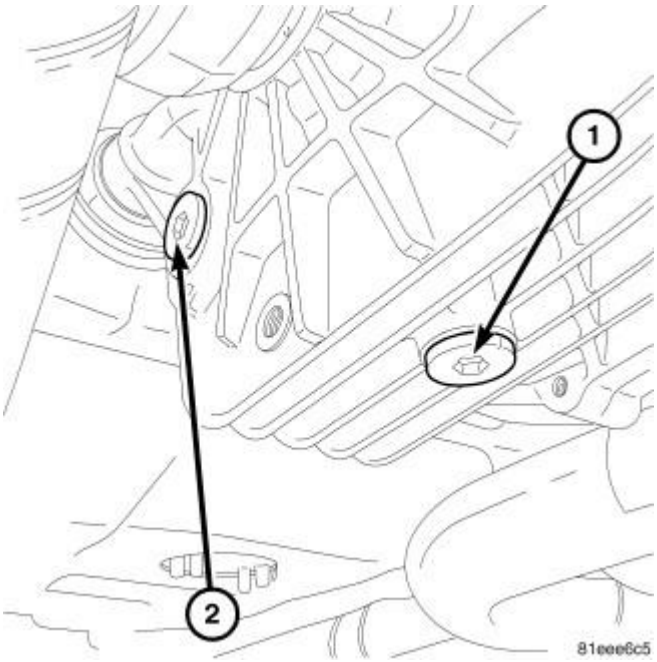

Fig. 30: Drain And Fill Plug
Courtesy of CHRYSLER GROUP, LLC

12. Remove rear axle fill plug (2). Fill axle with 1.2L (1.2 qts.) of Mopar® 75W-90 Synthetic Gear and Axle Lubricant and add one 0.03 L (4 oz.) bottle of MOPAR® Limited Slip Additive Friction Modifier. Install fill plug and torque to 35 N.m (25 ft. lbs.).

SPECIAL TOOLS

SPECIAL TOOLS

	10146 - Installer, Oil Seal (Originally Shipped In Kit Number(s) 10145, 10146.)
	10147 - Installer, Differential Bearing Cup (Originally Shipped In Kit Number(s) 10145.)
	10148 - Installer, Pinion Head Bearing Cup (Originally Shipped In Kit Number(s) 10145.)
	10149-1 - Block, Pinion (Originally Shipped In Kit Number(s) 10145.)
	10149-2 - Arbor (Originally Shipped In Kit Number(s) 10145.)
	10149-3 - Dummy Housing Bearing (Originally Shipped In Kit Number(s) 10145.)
	10149-4 - Dummy Cover Bearing (Originally Shipped In Kit Number(s) 10145.)
	10149-5 - Washer (Originally Shipped In Kit Number(s) 10145.)
	1026 - Puller (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC.)
	1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.)
	6446 - Installer, Bearing (Originally Shipped In Kit Number(s) 6440.)
	6448A - Installer, Bearing/Gear (Originally Shipped In Kit Number(s) 6947, 8667, 8837, 8867.)
	6739 - Block, Height (Originally Shipped In Kit Number(s) 6730, 9516A-CAN, 9540, 9541.)
	7794-A - Remover, Seal (Originally Shipped In Kit Number(s) 6645.)
	8915 - Brace (Originally Shipped In Kit Number(s) 8998, 8998CC, 9763.)
	9099 - Seal Protector, Differential Output (Originally Shipped In Kit Number(s) 9324, 9324CC.)
	9524 - Indicator, Dial (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP2, 9516, 9516-SUP, 9517-SUP2, 9518, 9518-SUP, 9519, 9540-SUP, 9541-SUP, 9694.)
	9593 - Remover, Bearing Cup

	(Originally Shipped In Kit Number(s) 9692.) 9919 - Installer, Bearing (Originally Shipped In Kit Number(s) 9870, 9971.) C-293-3 - Adapter, Bearing/Gear (Originally Shipped In Kit Number(s) 8418, 8837, C-293-M, C-4246-AL, DD-914-CLT-L.) C-293-37 - Block Set, Puller (Originally Shipped In Kit Number(s) 8418, 8562, C-293-M, DD-914-CLT-L.) C-293-PA - Puller, Press (Originally Shipped In Kit Number(s) 8418, 8837, C-293-M.) C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.) C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.) C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.) D-115-2A - Block, Scooter (Originally Shipped In Kit Number(s) 9329-SUP, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP, 9694, 9926.)

BEARING, DIFFERENTIAL SIDE

REMOVAL

REMOVAL

1. Remove the differential case assembly. Refer to **CASE ASSEMBLY, DIFFERENTIAL, REMOVAL**.

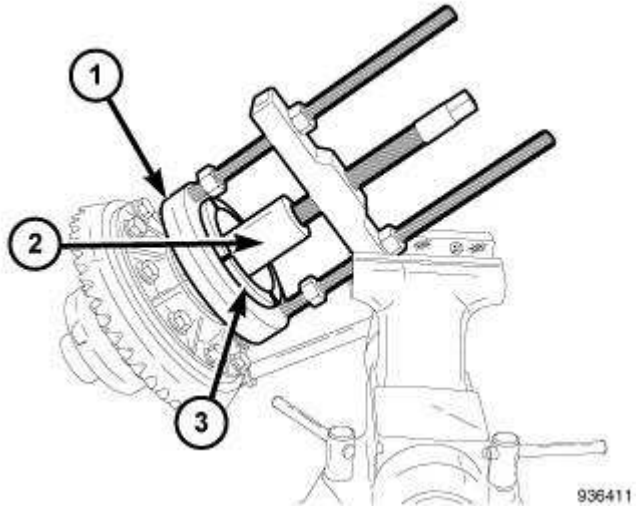

Fig. 31: Removing Differential Bearings From Case

Courtesy of CHRYSLER GROUP, LLC

2. Remove the Differential Bearings from the case with Puller Press (special tool #C-293-PA, Puller, Press) (1), Bearing/Gear Adapter (special tool #C-293-3, Adapter, Bearing/Gear) (2) and Adapter Blocks (special tool #C-293-37, Block Set, Puller) (3).

INSTALLATION

INSTALLATION

WARNING: Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: Use only a bearing heater/hot plate and follow manufacturer's instructions. Heat components to 100 - 177 Celsius (212° Min. - 350° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

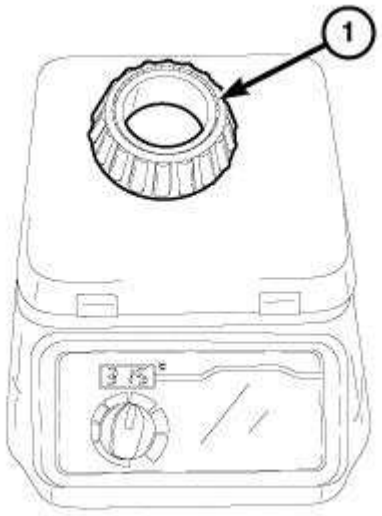

Fig. 32: Heating Differential Bearings With A Bearing Heater
Courtesy of CHRYSLER GROUP, LLC

1. Heat the Differential Bearings with a bearing heater.
2. Immediately after heating, install the Differential Bearings.

CASE ASSEMBLY, DIFFERENTIAL

REMOVAL

REMOVAL

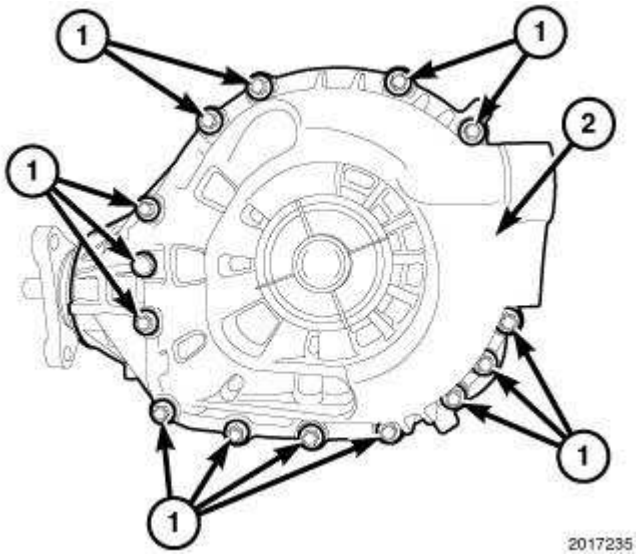

Fig. 33: Removing Case Half Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the Rear Axle Assembly. Refer to **REMOVAL**.
2. Remove the Case Half Bolts (1) and remove the Case Half (2).

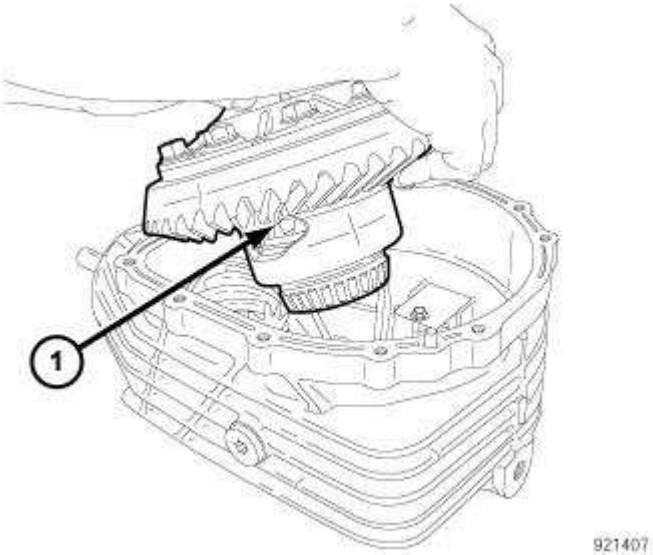

Fig. 34: Remove/Install Differential Case
Courtesy of CHRYSLER GROUP, LLC

3. Remove the Differential Case (1).

DISASSEMBLY

DISASSEMBLY

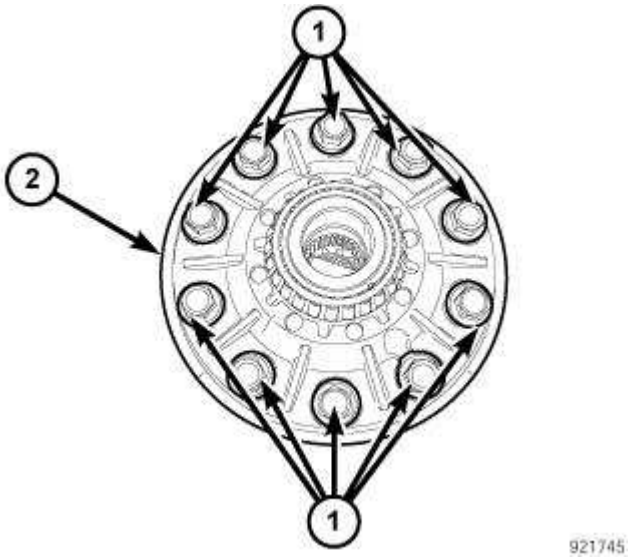

Fig. 35: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the ring gear bolts (1) and tap ring gear (2) off of the differential case with a soft faced hammer.
2. Remove the differential side bearings. Refer to **BEARING, DIFFERENTIAL SIDE, REMOVAL**.

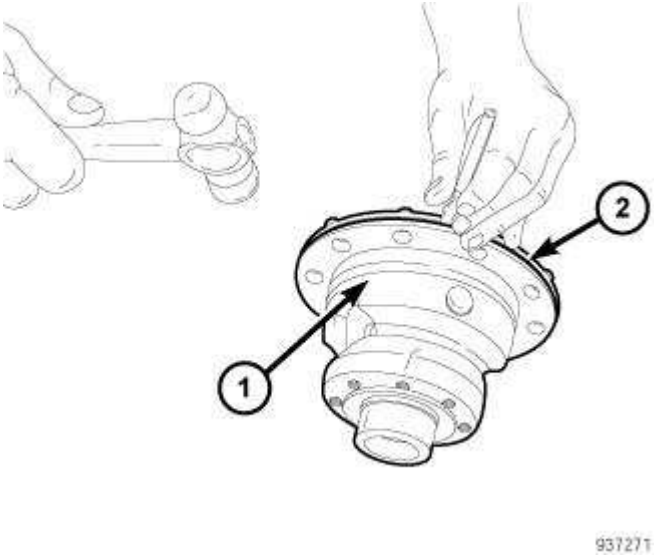

Fig. 36: Splitting Primary And Secondary Differential Case Halves
Courtesy of CHRYSLER GROUP, LLC

3. Split the primary (1) and secondary (2) differential case halves.

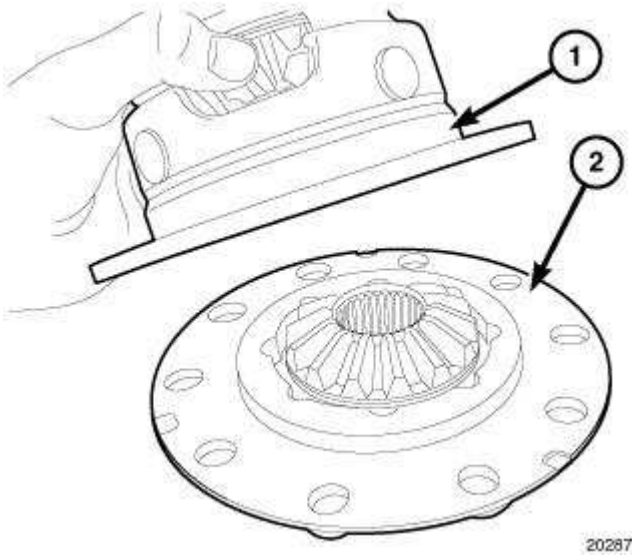

Fig. 37: Separating Primary And Secondary Differential Case Halves
Courtesy of CHRYSLER GROUP, LLC

4. Separate the primary (1) and secondary (2) differential case halves.

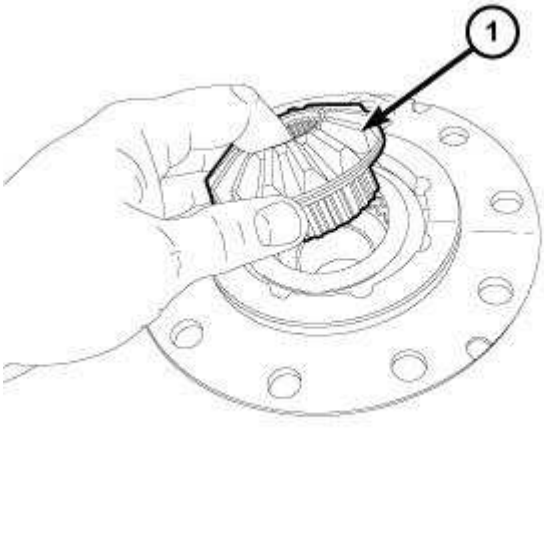

Fig. 38: Remove/Install Differential Side Gear
Courtesy of CHRYSLER GROUP, LLC

5. Remove the differential side gear (1).

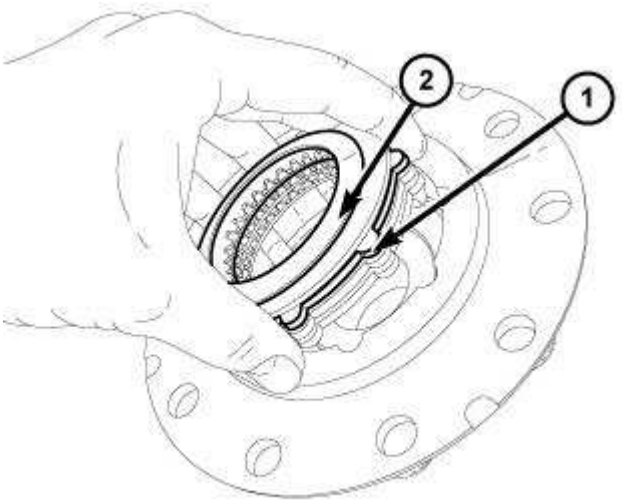

Fig. 39: Remove/Install Clutch Pack & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove the clutch pack (1) and the Belleville spring (2).

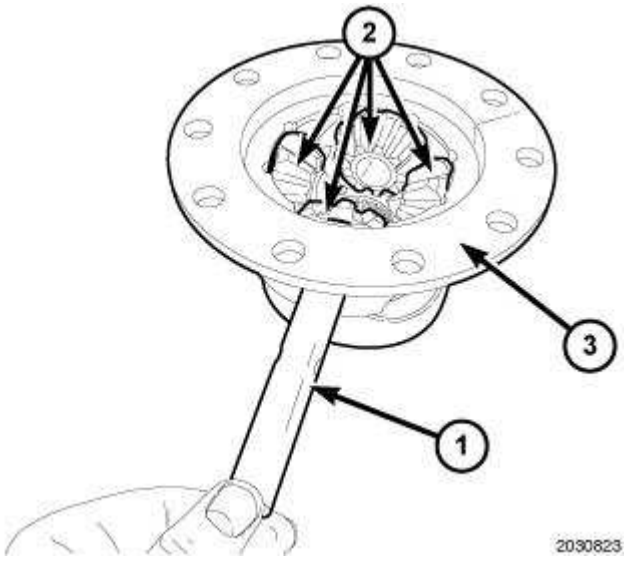

Fig. 40: Remove/Install Primary Differential Pinion Gear Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary use the differential side gear to press downward on the four pinions (2) for primary differential pinion gear shaft (1) removal.

7. Remove the primary differential pinion gear shaft (1).

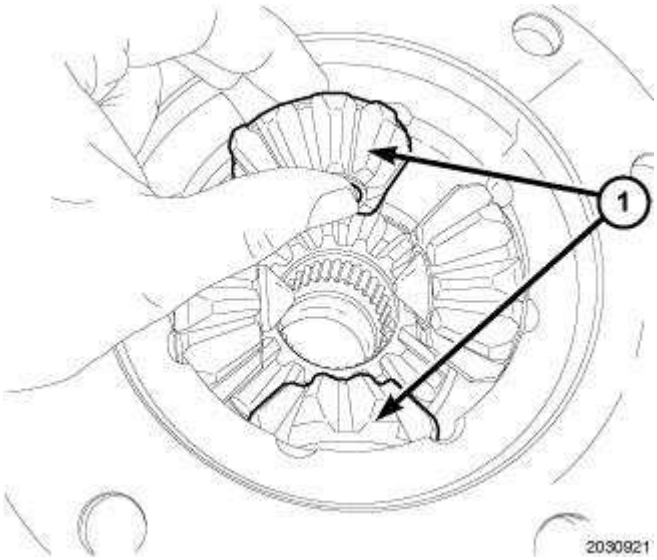

Fig. 41: Remove/Install Primary Differential Pinion Gears
Courtesy of CHRYSLER GROUP, LLC

8. Remove the primary differential pinion gears (1).

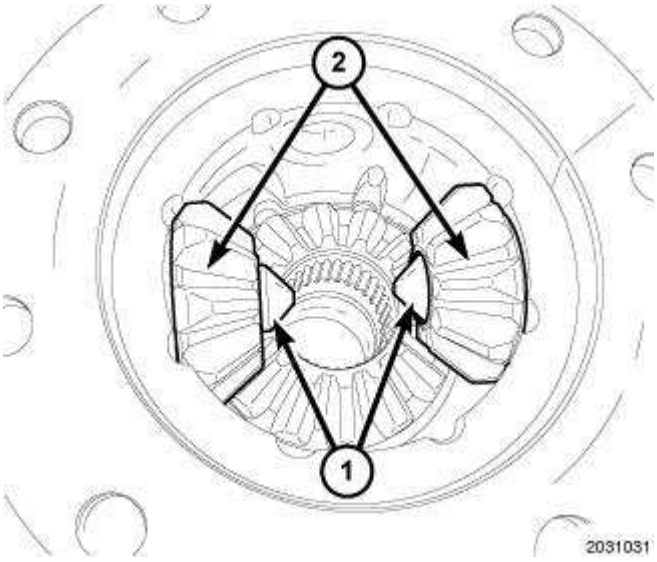

Fig. 42: Secondary Differential Side Gears
Courtesy of CHRYSLER GROUP, LLC

9. Use a brass drift to tap the secondary (split) pinion shafts (1) out of the differential case, then remove the secondary differential side gears (2).

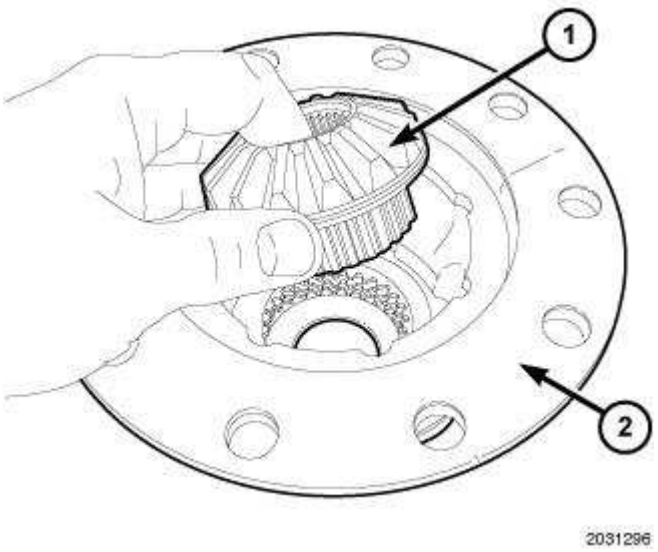

Fig. 43: Remove/Install Differential Side Gear
Courtesy of CHRYSLER GROUP, LLC

10. Remove the differential side gear (1) from the primary differential case half (2).

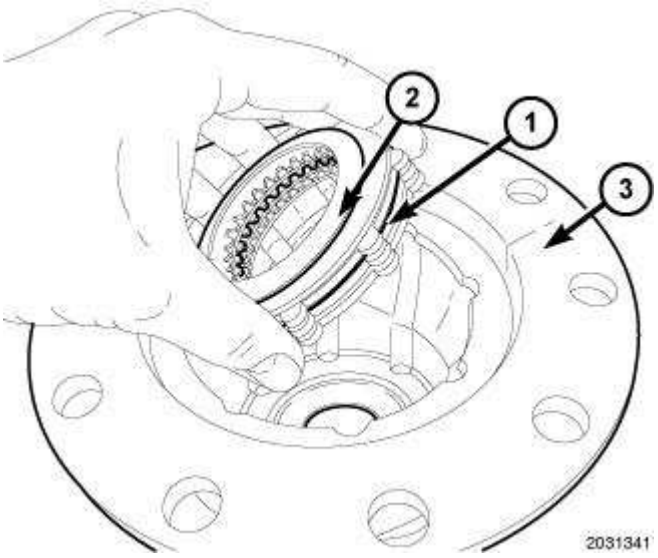

Fig. 44: Identifying Clutch Pack, Belleville Spring & Primary Differential Case Half
Courtesy of CHRYSLER GROUP, LLC

11. Remove the clutch pack (1) and the Belleville spring (2) from the primary differential case half (3).

ASSEMBLY

ASSEMBLY

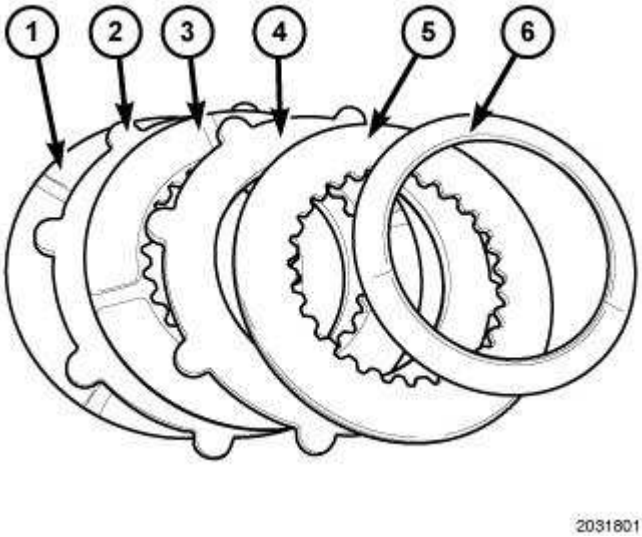

Fig. 45: Clutch Pack
Courtesy of CHRYSLER GROUP, LLC

1. Assemble the clutch pack as follows: Friction disc (1), tabbed plate (2), friction disc (3), tabbed plate (4), large friction disc (5), and Belleville spring (6). Verify the friction surface on the large friction disc (5) is facing the tabbed plate (4).

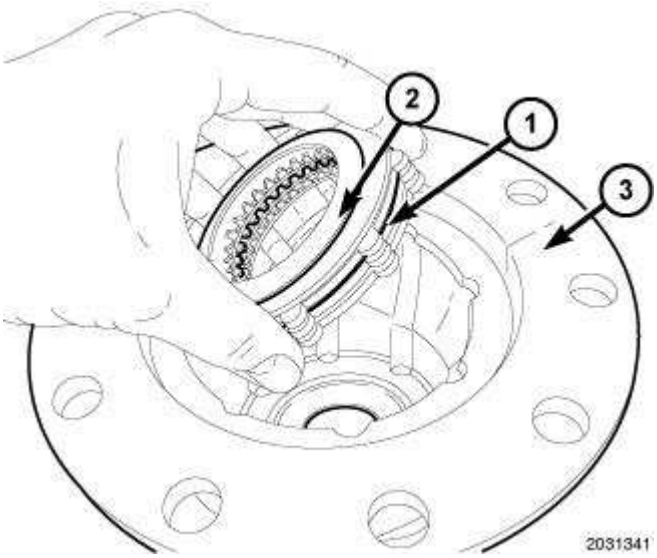

Fig. 46: Identifying Clutch Pack, Belleville Spring & Primary Differential Case Half
Courtesy of CHRYSLER GROUP, LLC

NOTE: Verify the raised edge of the Belleville spring (2) is facing up, or away from the clutch pack (1).

2. Install the clutch pack (1) and the Belleville spring (2) into the primary differential case half (3).

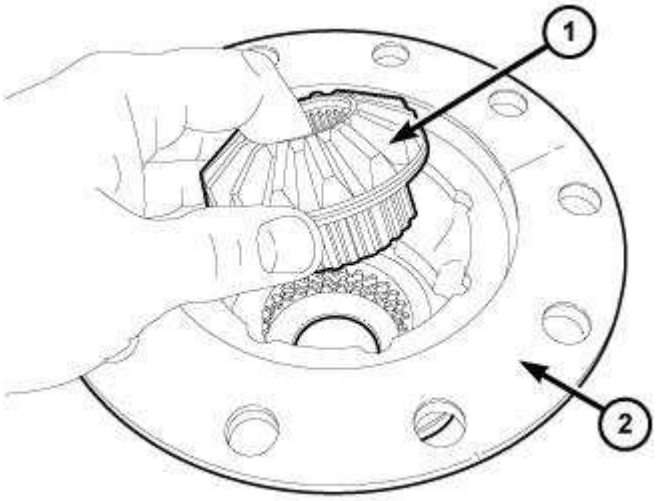

Fig. 47: Remove/Install Differential Side Gear
Courtesy of CHRYSLER GROUP, LLC

3. Install the differential side gear (1) into the primary differential case half (2).

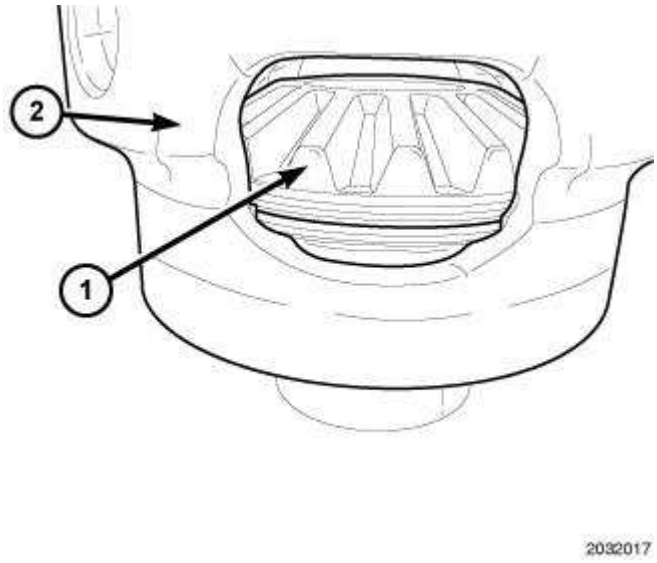

Fig. 48: Splines On Differential Side Gear
Courtesy of CHRYSLER GROUP, LLC

4. Verify the differential side gear (1) is fully seated in the primary case half (2). Rotate the side gear as necessary to align the splines on all the friction plates with the splines on the differential side gear (1).

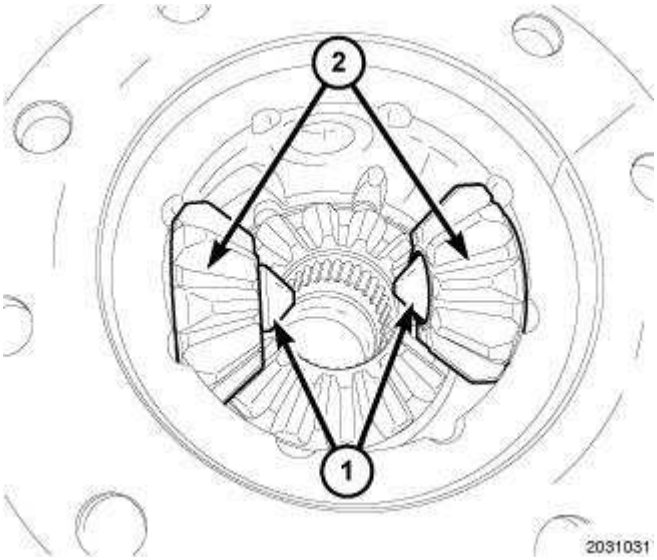

Fig. 49: Secondary Differential Side Gears
Courtesy of CHRYSLER GROUP, LLC

5. Install the secondary differential side gears (2), then slightly compress the Belleville spring by pressing down on the differential side gear, and install the secondary (split) pinion shafts (1).

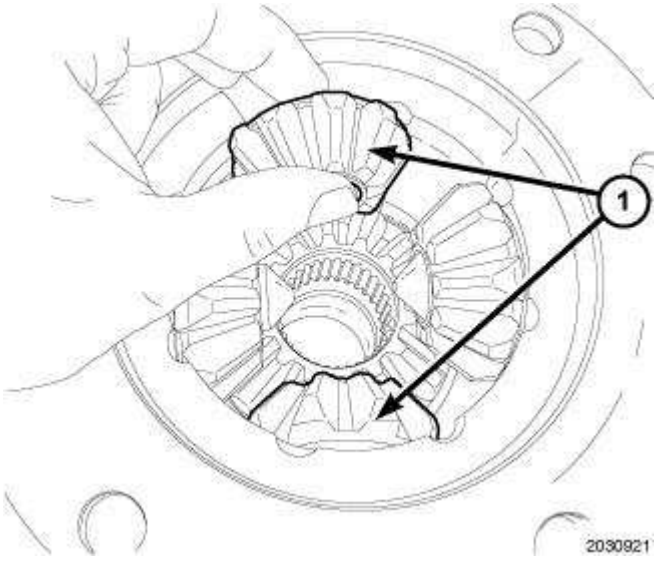

Fig. 50: Remove/Install Primary Differential Pinion Gears
Courtesy of CHRYSLER GROUP, LLC

6. Install the primary differential pinion gears (1).

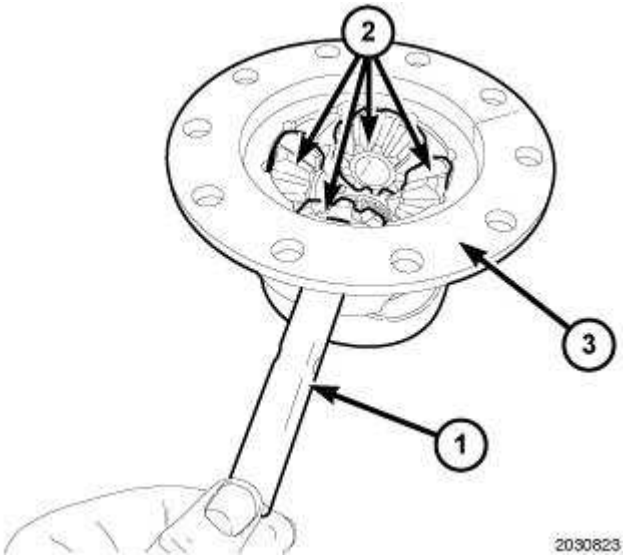

Fig. 51: Remove/Install Primary Differential Pinion Gear Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary use the differential side gear to press downward on the four pinions (2) for primary differential pinion gear shaft (1) removal.

7. Install the primary differential pinion gear shaft (1).

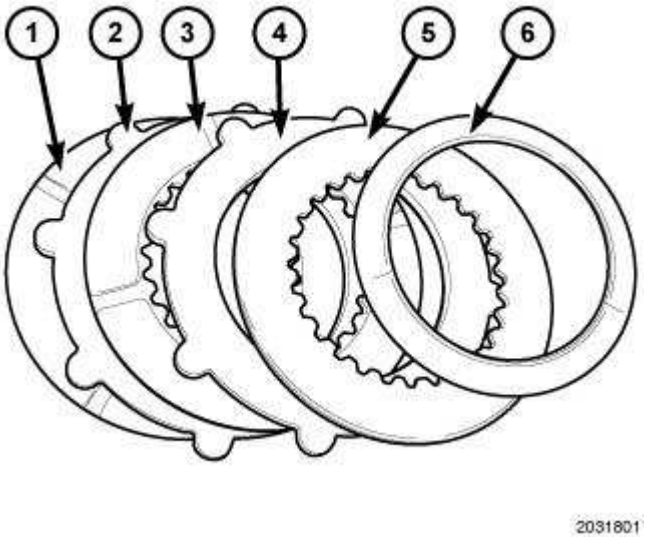

Fig. 52: Clutch Pack
Courtesy of CHRYSLER GROUP, LLC

8. Assemble the clutch pack as follows: Friction disc (1), tabbed plate (2), friction disc (3), tabbed plate (4), large friction disc (5), and Belleville spring (6). Verify the friction surface on the large friction disc (5) is facing the tabbed plate (4).

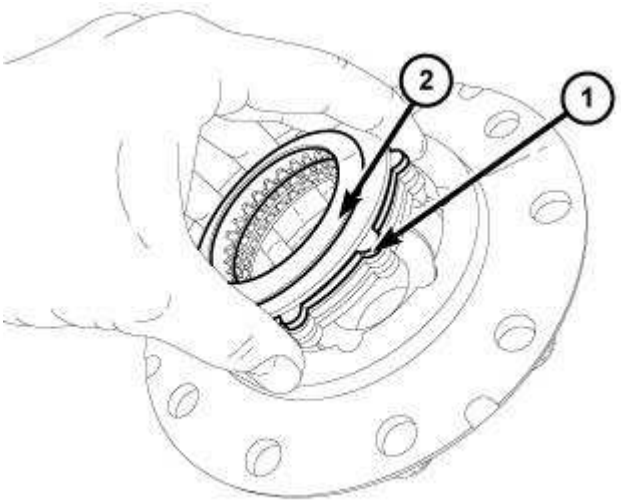

Fig. 53: Remove/Install Clutch Pack & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

NOTE: Verify the raised edge of the Belleville spring (2) is facing up, or away from the clutch pack (1).

9. Install the clutch pack (1) and the Belleville spring (2).

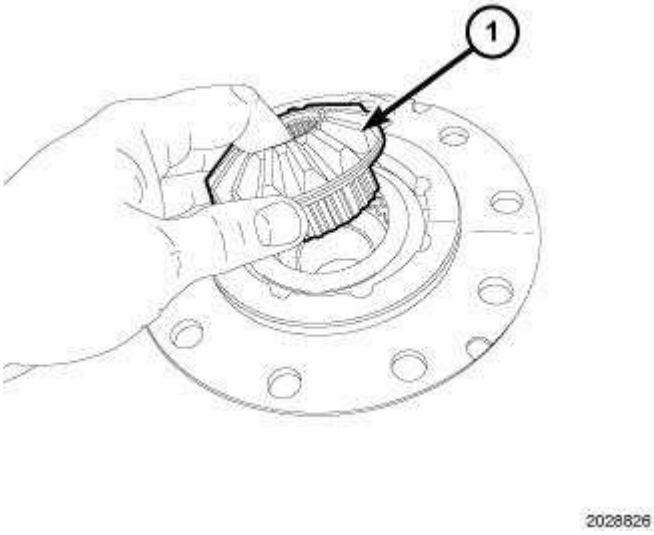

Fig. 54: Remove/Install Differential Side Gear
Courtesy of CHRYSLER GROUP, LLC

10. Install the differential side gear (1).

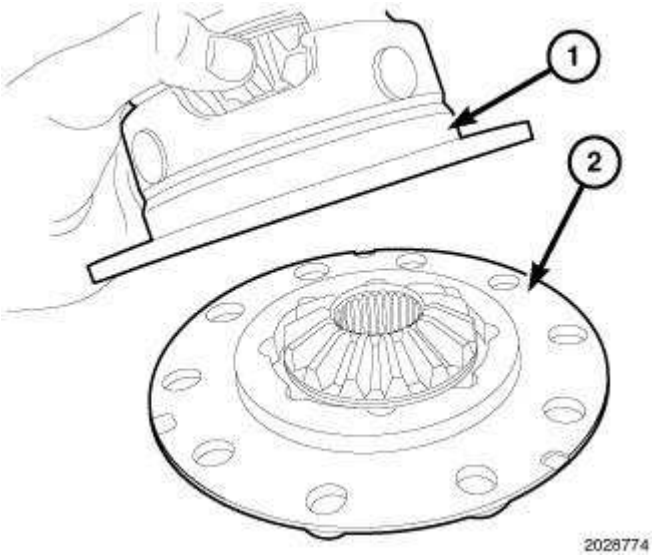

Fig. 55: Separating Primary And Secondary Differential Case Halves
Courtesy of CHRYSLER GROUP, LLC

11. Assemble the primary (1) and secondary (2) differential case halves.

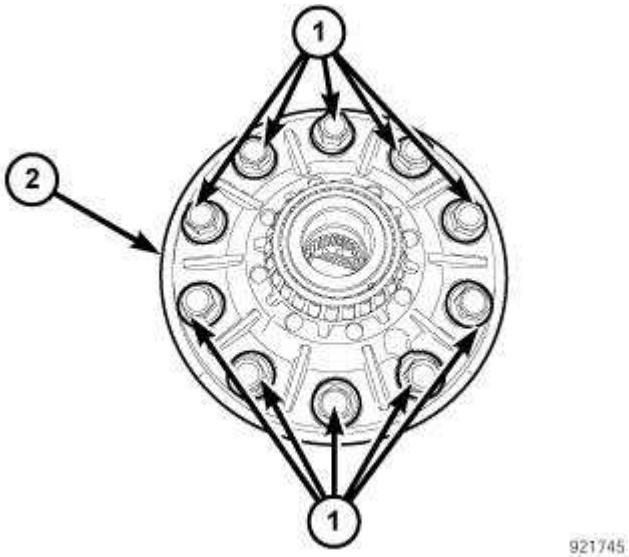

Fig. 56: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the Ring Gear (2), and the Ring Gear Bolts (1). Tighten the ring gear bolts to 185 Nm (136 ft. lbs.).

INSTALLATION

INSTALLATION

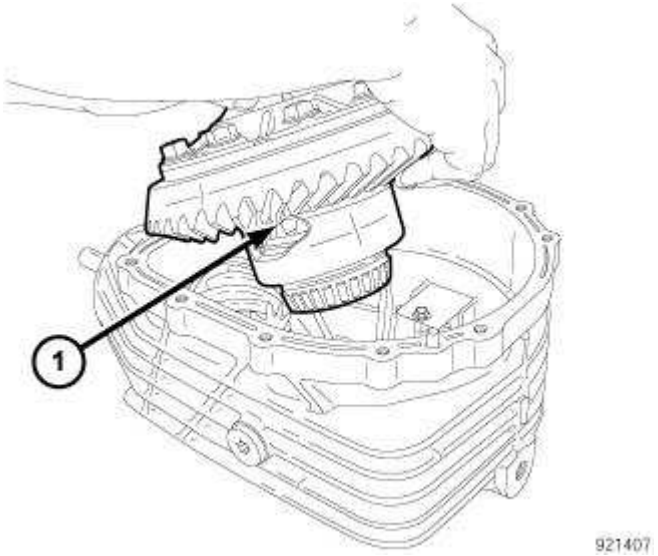

Fig. 57: Remove/Install Differential Case
Courtesy of CHRYSLER GROUP, LLC

1. Apply a light coat of gear lubricant to differential bearings and bearing cups.
2. Install the Differential Case (1).

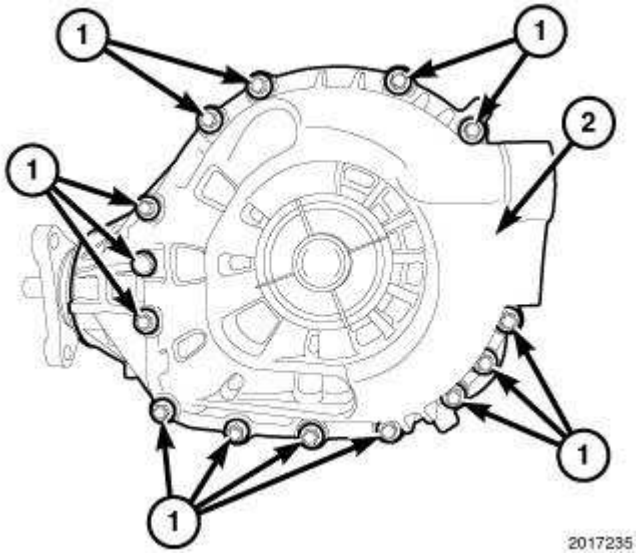

Fig. 58: Removing Case Half Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the Case Half (2) and the Case Half Bolts (1).
4. Verify the turning torque and differential bearing preload are within acceptable limits. If the turning torque and differential bearing preload measurements are not within specifications, or if a new ring and pinion gear have been installed, perform the pinion depth adjustment and differential side bearing preload and backlash adjustment procedures. Refer to **ADJUSTMENTS**.
5. Install the Rear Axle Assembly. Refer to **INSTALLATION**.

GEAR, RING AND PINION

REMOVAL

REMOVAL

1. Remove the Rear Axle Assembly. Refer to **REMOVAL**.

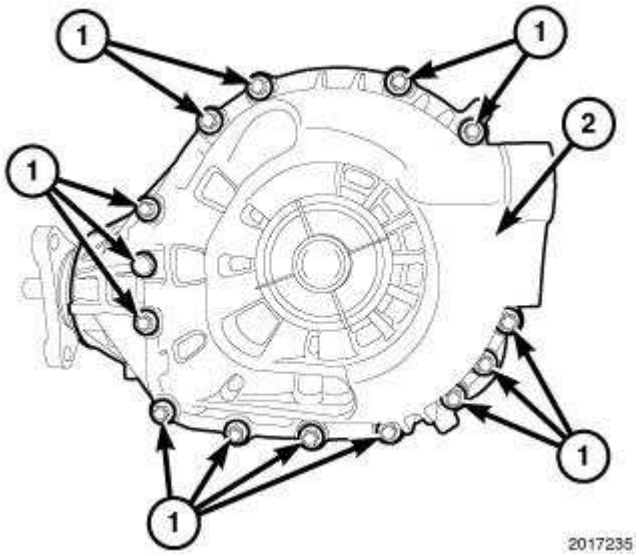

Fig. 59: Removing Case Half Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove the Case Half Bolts (1) and remove the Case Half (2).

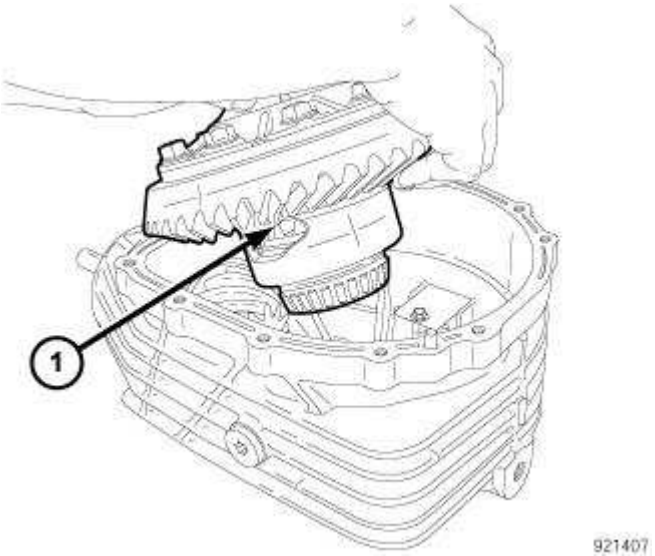

Fig. 60: Remove/Install Differential Case
Courtesy of CHRYSLER GROUP, LLC

3. Remove the Differential Case (1).

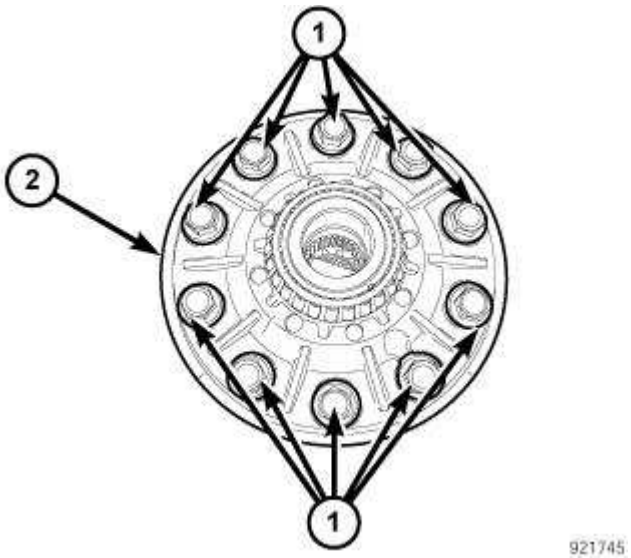

Fig. 61: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the Ring Gear Bolts (1) and tap Ring Gear (2) off of the Differential Case with a dead-blow hammer.

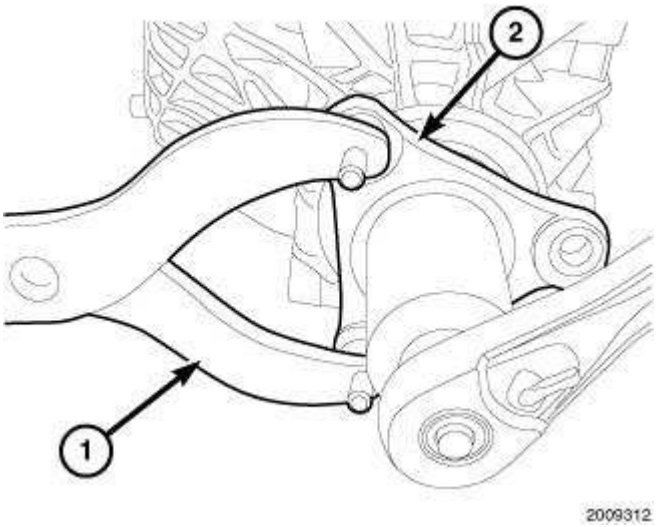

Fig. 62: Remove/Install Pinion Flange
Courtesy of CHRYSLER GROUP, LLC

5. Hold Pinion Flange (2) with Flange Holder (special tool #C-3281, Holder, Flange) (1) and remove the Pinion Nut.

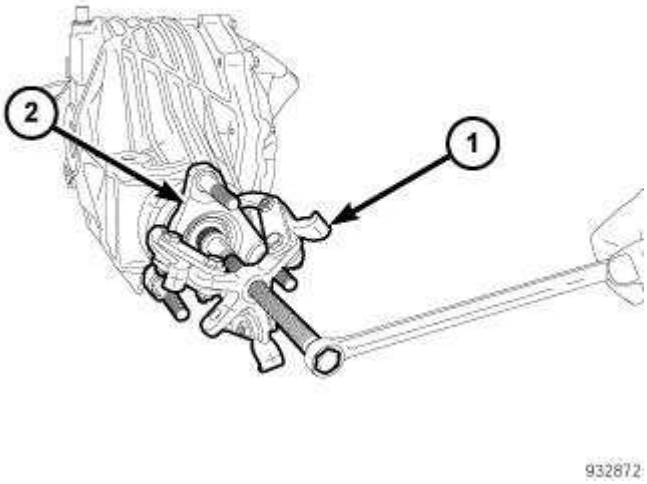

Fig. 63: Removing Pinion Flange From Pinion Shaft Using Puller
Courtesy of CHRYSLER GROUP, LLC

6. Use Puller (special tool #1026, Puller) (1) to remove the Pinion Flange (2) from the Pinion Shaft.

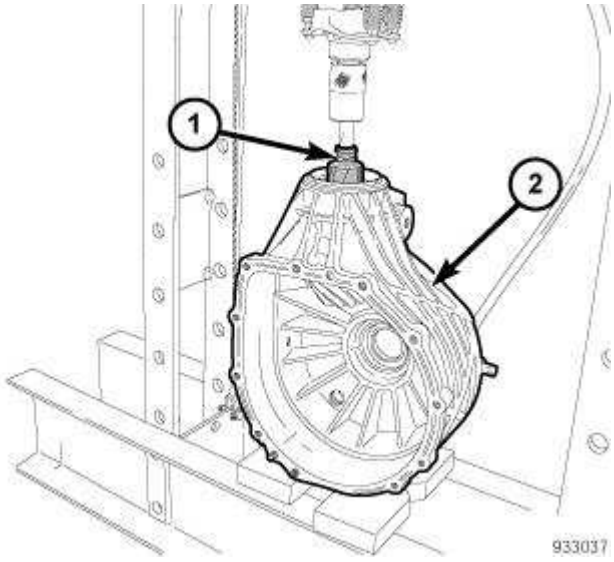

Fig. 64: Pressing Pinion Out Of Case With Arbor Press
Courtesy of CHRYSLER GROUP, LLC

7. Press the Pinion (1) out of the Case (2) with an arbor press.

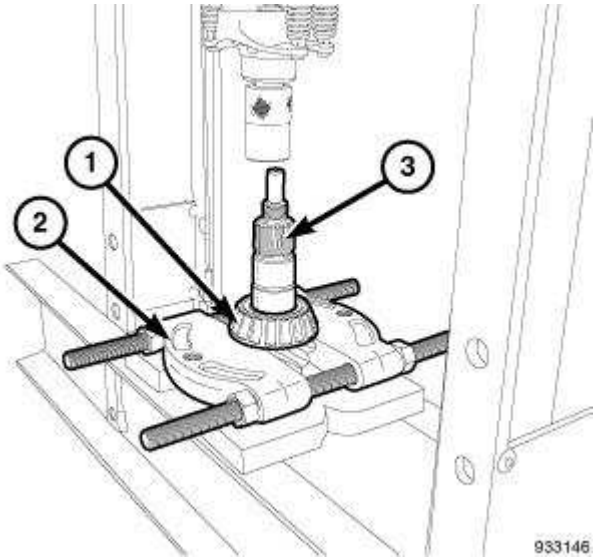

Fig. 65: Using Arbor Press And Bearing Splitter To Press Bearing Off Of Pinion
Courtesy of CHRYSLER GROUP, LLC

NOTE: Tighten Bearing Splitter (special tool #1130, Splitter, Bearing/Gear) enough so that it does not slip off the bearing during removal

8. Use an arbor press and Bearing Splitter (special tool #1130, Splitter, Bearing/Gear) (2) to press the Bearing (1) off of the Pinion (3).

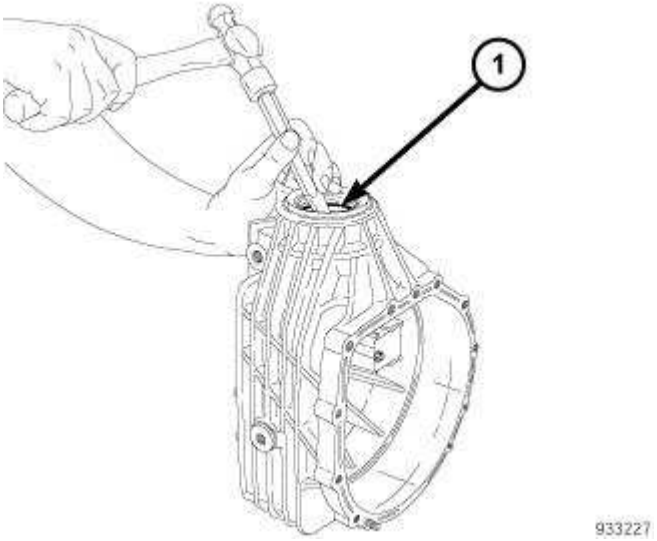

Fig. 66: Removing Pinion Bearing Cup By Tapping It Out Through Pinion Shaft Bore
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use a brass drift only. Otherwise, damage can occur.

9. Remove the Pinion Bearing Cup by tapping it out through the Pinion Shaft Bore (1).

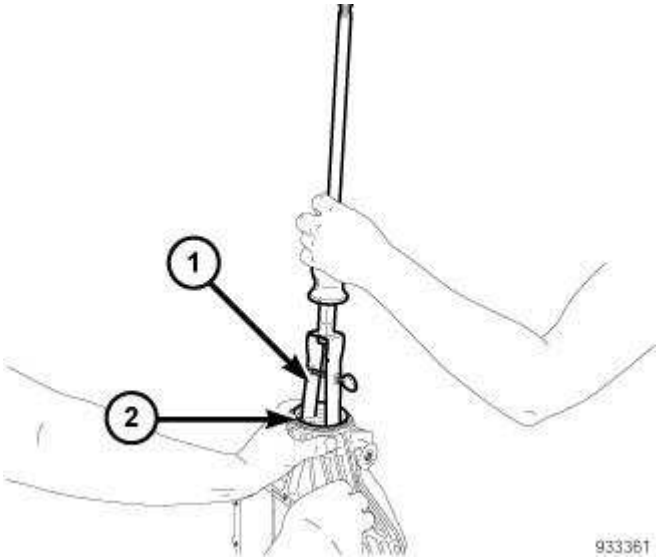

Fig. 67: Removing Pinion Bearing Seal With Slide Hammer And Collet
Courtesy of CHRYSLER GROUP, LLC

10. Remove the Pinion Bearing Seal with Slide Hammer (special tool #C-637, Slide Hammer, Universal) and Collet (special tool #7794-A, Remover, Seal).
11. Remove the Outer Pinion Bearing.

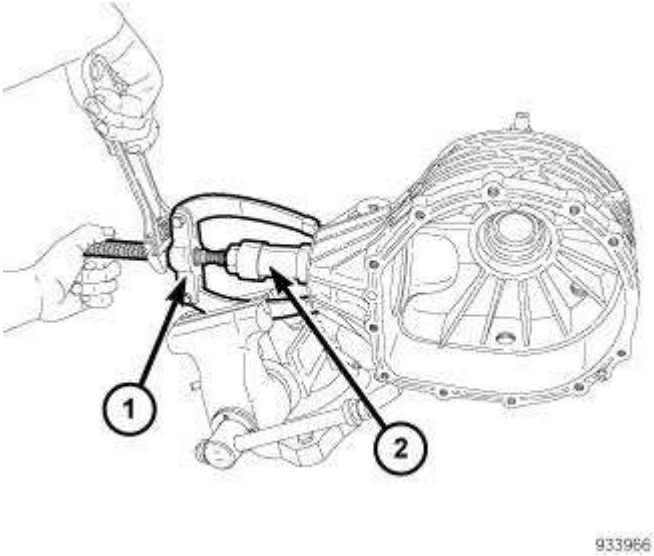

Fig. 68: Using Brace And Bearing Remover To Remove Outer Pinion Cup
Courtesy of CHRYSLER GROUP, LLC

12. Use Brace (special tool #8915, Brace) and Bearing Remover (special tool #9593, Remover, Bearing Cup) to remove the Outer Pinion Cup.

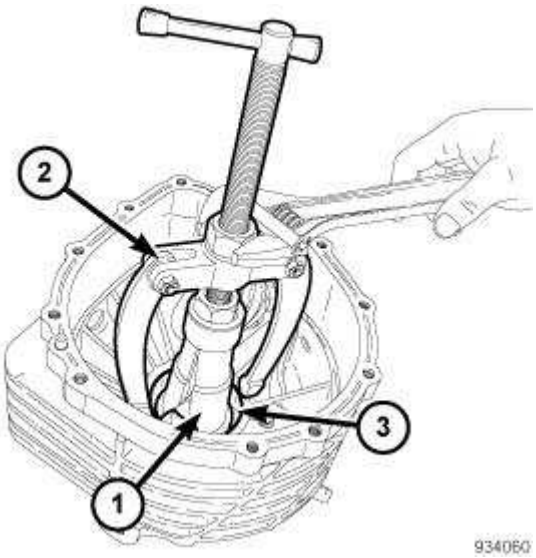

Fig. 69: Using Bearing Cup Remover And Brace To Remove Differential Bearing Cone From Case
Courtesy of CHRYSLER GROUP, LLC

13. Use Bearing Cup Remover (special tool #9593, Remover, Bearing Cup) (1) and Brace (special tool #8915, Brace) (2) to remove the Differential Bearing Cone (3) from the Case.

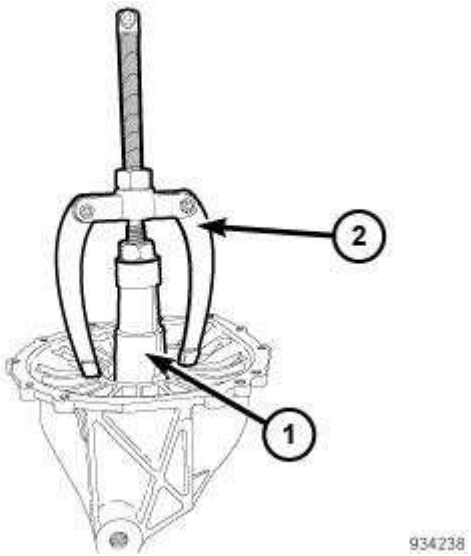

Fig. 70: Removing Differential Bearing Cone From Cover
Courtesy of CHRYSLER GROUP, LLC

14. Use Bearing Cup Remover (special tool #9593, Remover, Bearing Cup) (1) and Brace (special tool #8915, Brace) (2) to remove the Differential Bearing Cone (3) from the Cover.

INSTALLATION

INSTALLATION

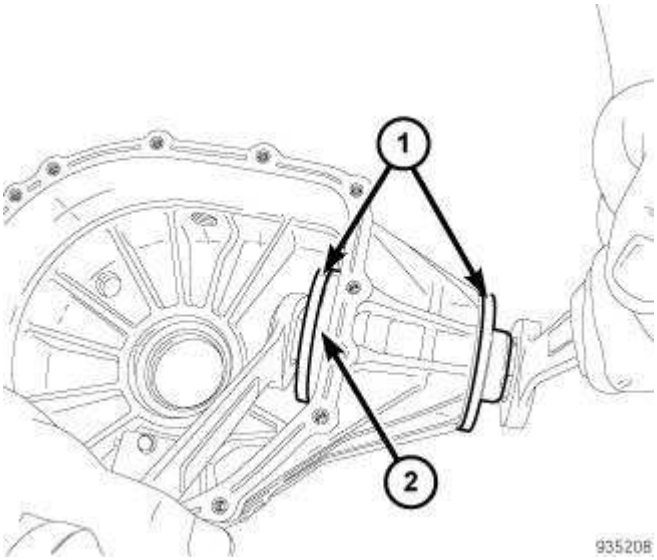

Fig. 71: Pinion Bearing Cup Installer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not attempt to install the inner and outer pinion bearing cups at the same time.

1. Use Pinion Bearing Cup Installer (special tool #10148, Installer, Pinion Head Bearing Cup) (1) to install the pinion head bearing cup (2).
2. Install the pinion tail bearing cup with pinion bearing cup Installer (special tool #10148, Installer, Pinion Head Bearing Cup) (1).

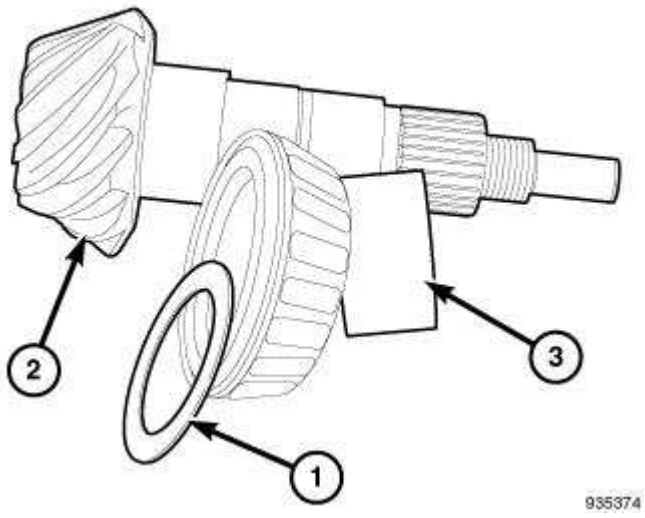

Fig. 72: Pinion Depth Shim Onto Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

3. Determine the correct pinion depth and differential bearing preload. Refer to **ADJUSTMENTS**.

4. Install the pinion depth shim (1) onto the pinion shaft (2).

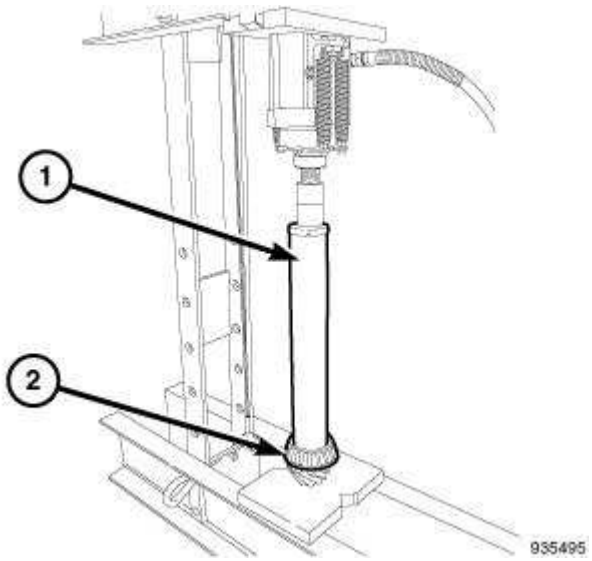

Fig. 73: Pinion Head Bearing
Courtesy of CHRYSLER GROUP, LLC

5. Use an arbor press and Installer (special tool #6446, Installer, Bearing) (1) to install the pinion head bearing (2).

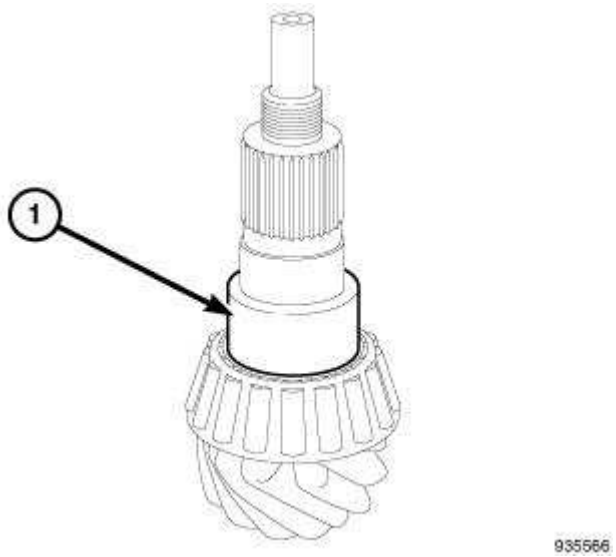

Fig. 74: Spacer On Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

6. Install the spacer (1) onto the pinion shaft.
7. Install the pinion into the case.

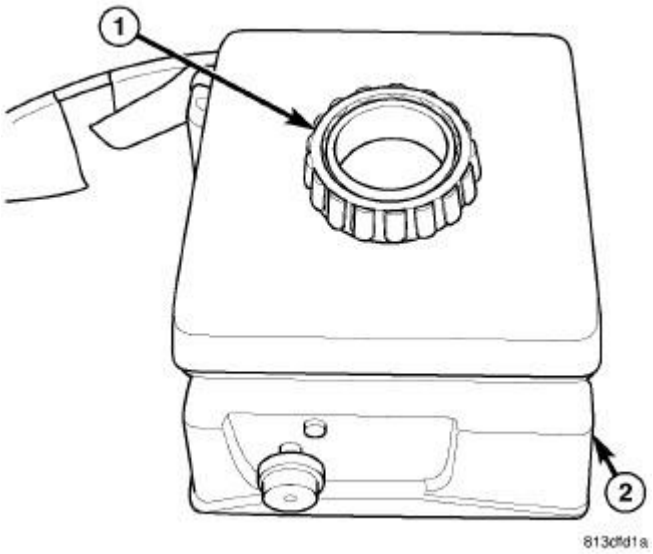

Fig. 75: Bearing Heater
Courtesy of CHRYSLER GROUP, LLC

WARNING: Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacturer's instructions. Heat components to 100 - 149 Celsius (212° Min. - 300° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

8. Heat pinion tail bearing (1) to 100 - 149 Celsius (212° Min. - 300° Max Fahrenheit) and install on pinion with tongs or welding gloves.

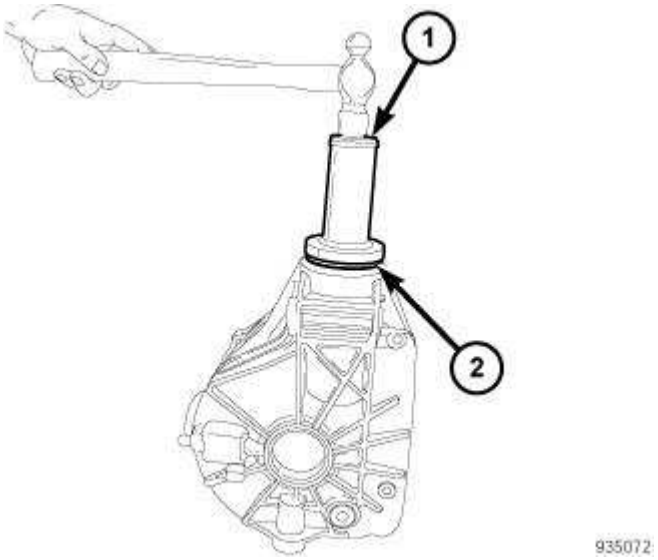

Fig. 76: Using Pinion Oil Seal Installer To Install Pinion Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply a light coating of gear lube to pinion seal.

NOTE: Allow the pinion tail bearing to cool off to room temperature before installing the pinion seal.

9. Use pinion oil seal installer (special tool #10146, Installer, Oil Seal) (1) to install the pinion seal (2).

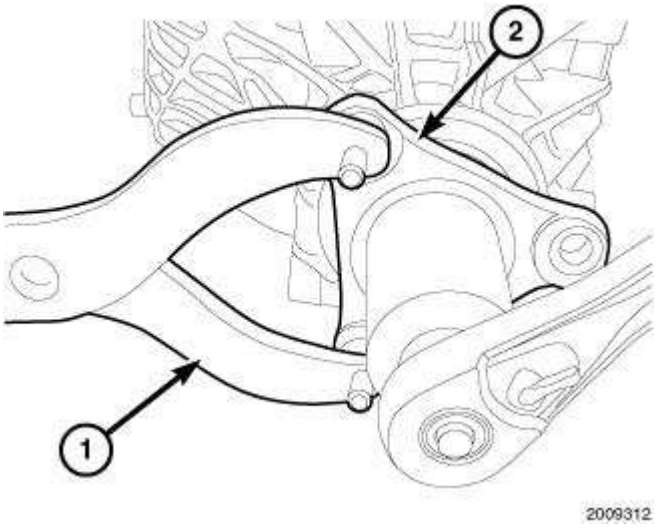

Fig. 77: Remove/Install Pinion Flange
Courtesy of CHRYSLER GROUP, LLC

10. Install the pinion flange (2).

11. Install the original pinion nut. Hold the pinion flange with flange holder (special tool #C-3281, Holder, Flange) (1) and tighten the pinion nut.
12. Remove and discard the original Pinion Nut.
13. Remove the Pinion Flange.
14. Install the pinion flange (2) and a new pinion flange nut. Tighten the pinion flange nut to 245 Nm (180 ft. lbs.).
15. Use an inch pound torque wrench to measure the turning torque of the pinion.
16. If the turning torque is too high, remove the selected shim, and install a larger shim on the pinion shaft, then verify the turning torque is correct. If the turning torque is too low, remove the selected shim, and install a smaller shim on the pinion, then verify the turning torque is correct.

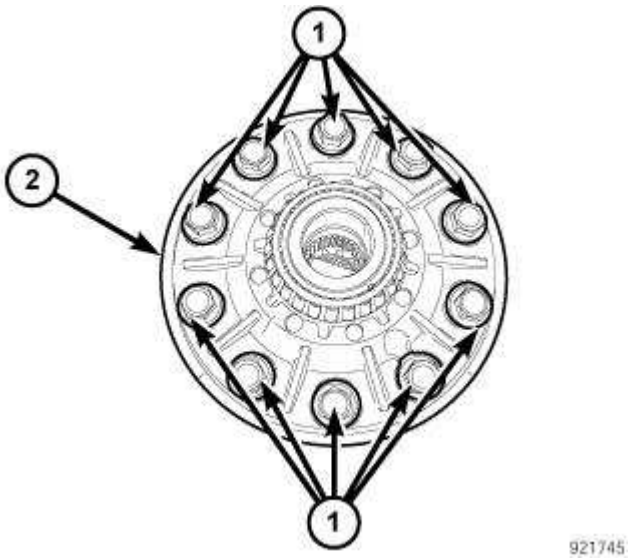

Fig. 78: Ring Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Install the Ring Gear (2), and new Ring Gear Bolts (1). Tighten the bolts to 185 Nm (136 ft. lb.).

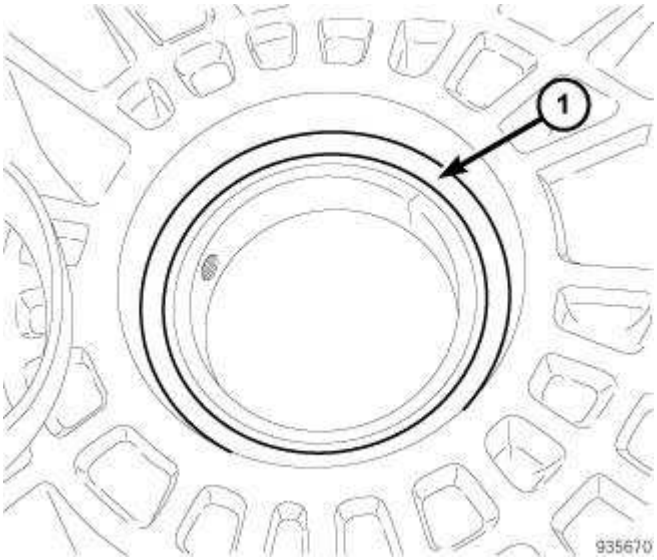

Fig. 79: Shim In Cover
Courtesy of CHRYSLER GROUP, LLC

18. Measure end play of the differential, and determine the size of the required differential shims to get the correct differential side bearing preload and ring gear backlash. Refer to **ADJUSTMENTS**.
19. Install shim (1) in the cover.

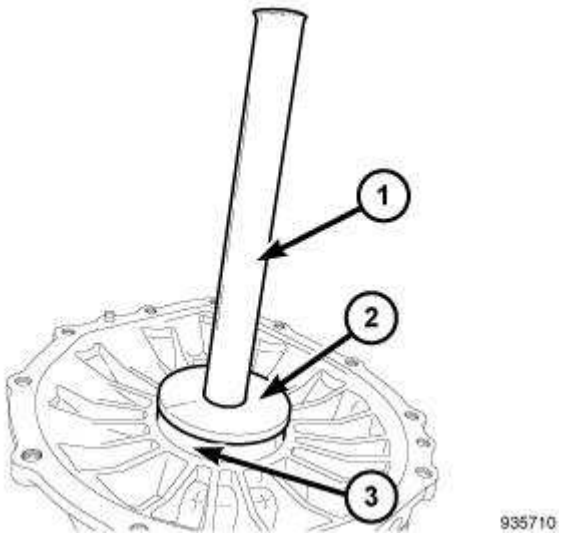

Fig. 80: Installing Differential Side Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

20. Use Differential Bearing Cup Installer (special tool #10147, Installer, Differential Bearing Cup) (2) and Universal Installer Handle (special tool #C-4171, Driver Handle, Universal) (1) to install the differential side bearing cup (3) into the cover (3).

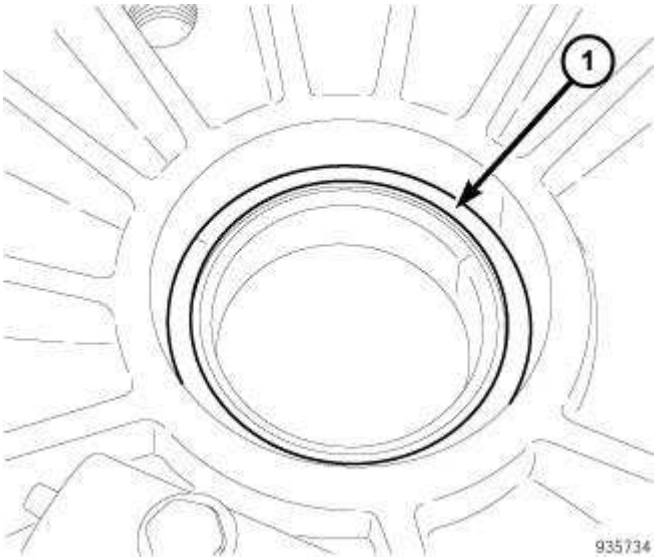

Fig. 81: Shim In Case
Courtesy of CHRYSLER GROUP, LLC

21. Install shim (1) in the case.

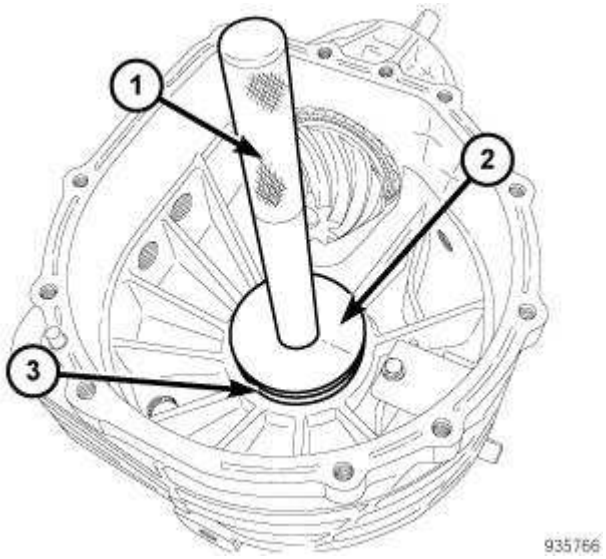

Fig. 82: Installing Differential Side Bearing Cup In Case
Courtesy of CHRYSLER GROUP, LLC

22. Use Differential Bearing Cup Installer (special tool #10147, Installer, Differential Bearing Cup) and Universal Installer Handle (special tool #C-4171, Driver Handle, Universal) to install the Differential Side Bearing Cup into the Case.
23. Install the Differential in the housing.

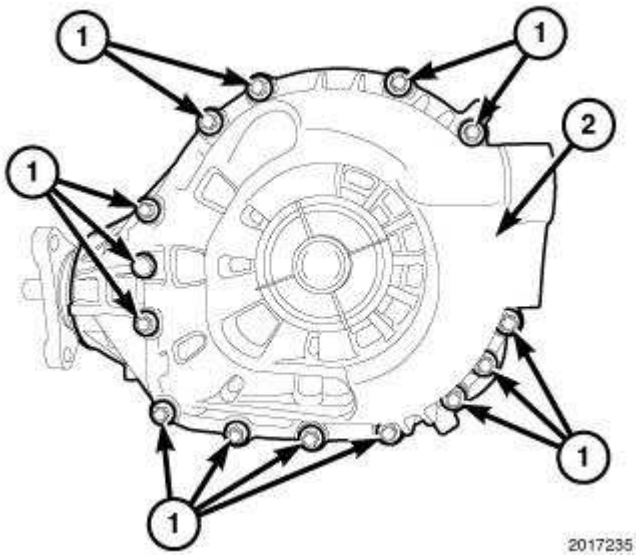

Fig. 83: Removing Case Half Bolts
Courtesy of CHRYSLER GROUP, LLC

24. Temporarily install the cover (2), and the cover bolts (1).
25. Verify the ring and pinion gear contact pattern is within acceptable limits.
26. Tighten the cover bolts to 28 Nm (20 ft. lbs.).
27. Verify the total turning torque of the differential is within 2.5 to 6.0 Nm (22 - 53 in. lbs.). If necessary, adjust the size of the differential shims to bring the turning torque within specifications.
28. Install the rear axle assembly. Refer to **INSTALLATION**.

SEAL, AXLE DRIVE SHAFT

REMOVAL

REMOVAL

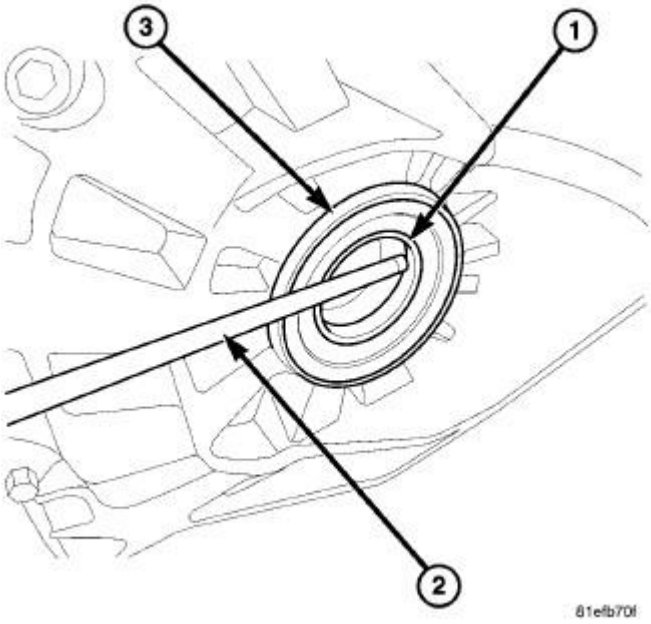

Fig. 84: Remove L Side Seal
Courtesy of CHRYSLER GROUP, LLC

1. Remove halfshaft(s). Refer to **REMOVAL** and **REMOVAL** .
2. Using suitable screwdriver (1), remove axle shaft seal (2).
3. Visually inspect halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc.). Replace halfshaft if necessary.

INSTALLATION

INSTALLATION

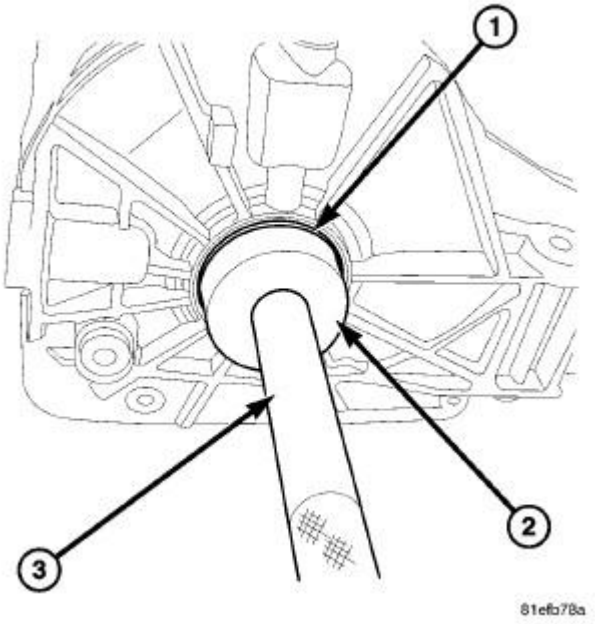

Fig. 85: Install R Side Seal
Courtesy of CHRYSLER GROUP, LLC

1. Using Installer (special tool #9919, Installer, Bearing) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (3), install **NEW** axle shaft seal (1). Lubricate the inside diameter with Mopar® Gear and Axle Lubricant 75W-90 to protect seal during halfshaft installation.
2. Install halfshaft(s). Refer to **INSTALLATION** and **INSTALLATION** .

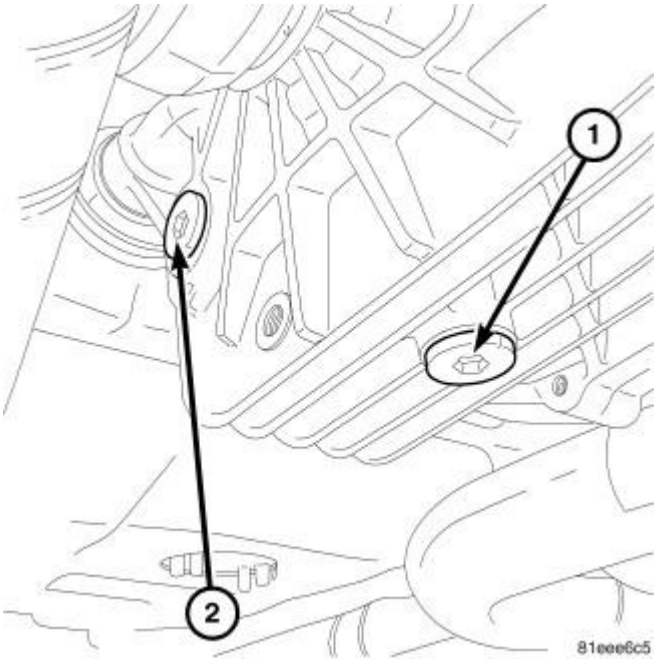

Fig. 86: Drain And Fill Plug

Courtesy of CHRYSLER GROUP, LLC

3. Remove fill plug (2) to check and adjust rear axle fluid level. Top off axle with Mopar® Gear and Axle Lubricant 75W-90. Reinstall fill plug and torque to 35 N.m (25 ft. lbs.) torque.

SEAL, DRIVE PINION

REMOVAL

REMOVAL

1. Remove rear axle assembly from vehicle. Refer to Rear Axle **REMOVAL** .

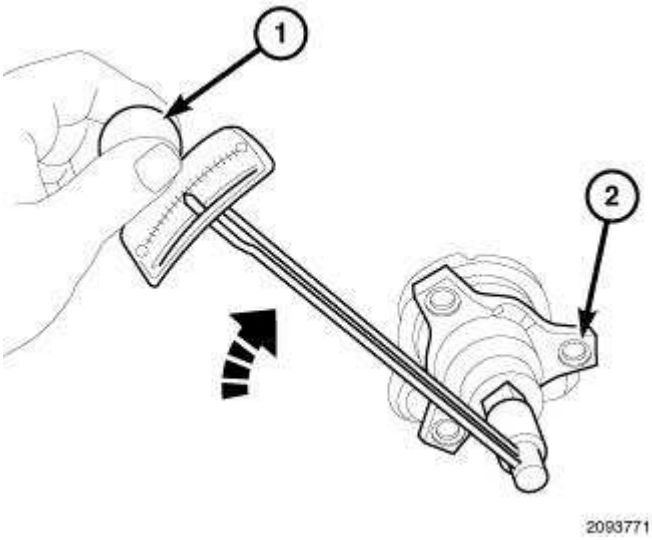

Fig. 87: Using A Torque Wrench Calibrated To Measure Low Torque Values
Courtesy of CHRYSLER GROUP, LLC

2. Use a torque wrench calibrated to measure low torque values (1) to measure rotating torque at the pinion flange (2). Record measurement for reuse on assembly.

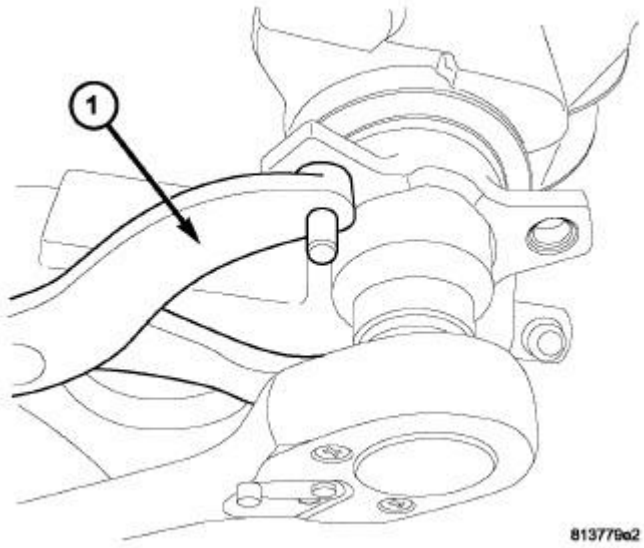

Fig. 88: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

3. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and 41mm socket, remove pinion flange nut and discard.

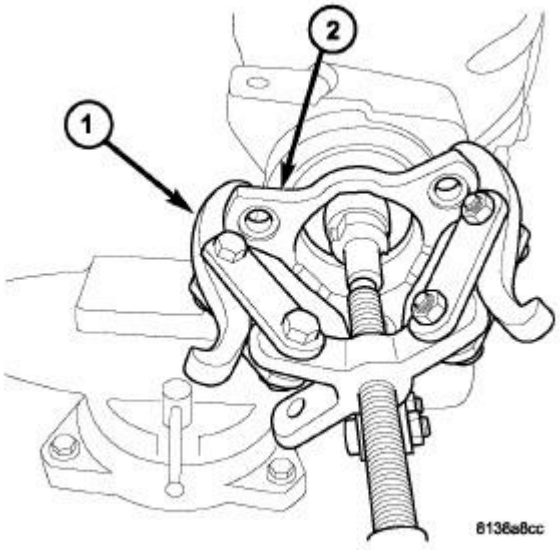

Fig. 89: Removing Pinion Flange With Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to axle imbalance concerns, it is necessary to make sure pinion flange-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion flange.

4. Using Puller (special tool #1026, Puller) (1), remove pinion flange (2) from pinion shaft.

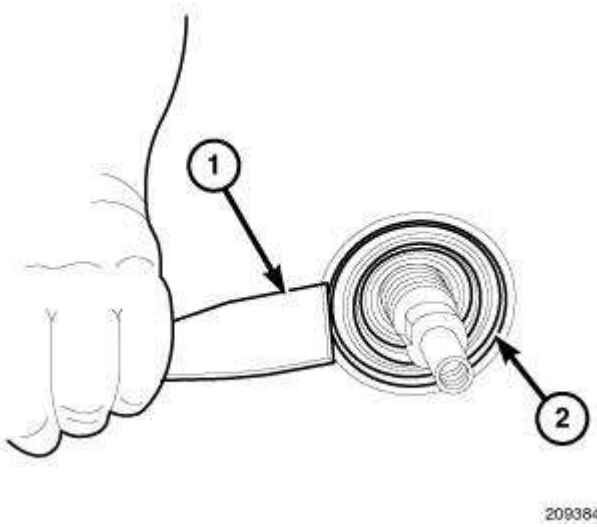

Fig. 90: Removing Pinion Seal Using A Suitable Seal Removal Tool
Courtesy of CHRYSLER GROUP, LLC

5. Using a suitable seal removal tool (1), remove pinion seal (2) and discard.

INSTALLATION

INSTALLATION

1. Apply light coating of gear lubricant to the lip of the pinion seal.

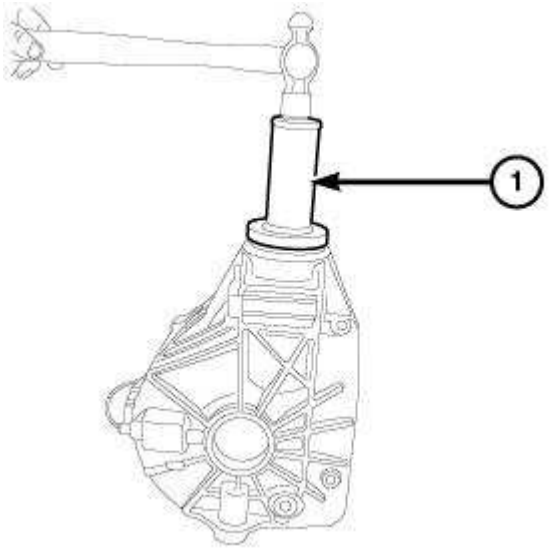

Fig. 91: Installing Pinion Seal Until Tool Bottoms On Carrier Using Installer
Courtesy of CHRYSLER GROUP, LLC

2. Using Installer (special tool #10146, Installer, Oil Seal) (1), install pinion seal until tool bottoms on carrier.

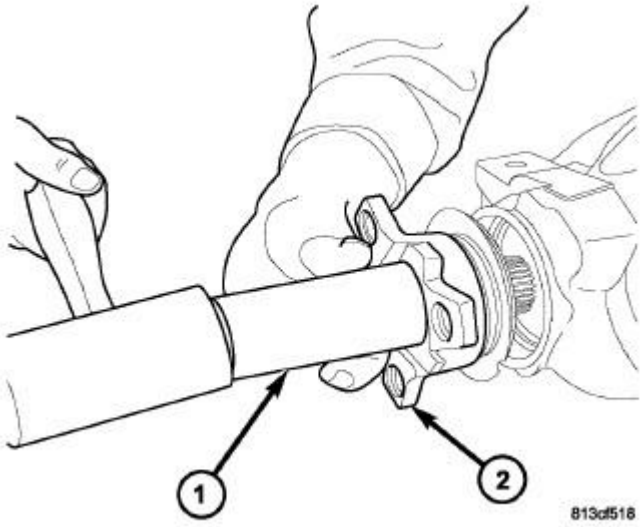

Fig. 92: Pinion Flange Installation
Courtesy of CHRYSLER GROUP, LLC

3. Install pinion flange into position. Align index marks made during disassembly to maintain assembly balance.
4. Using Installer (special tool #6448A, Installer, Bearing/Gear) (1), lightly tap on pinion flange (2) until enough pinion shaft threads are exposed to install the pinion flange, and start the pinion nut.

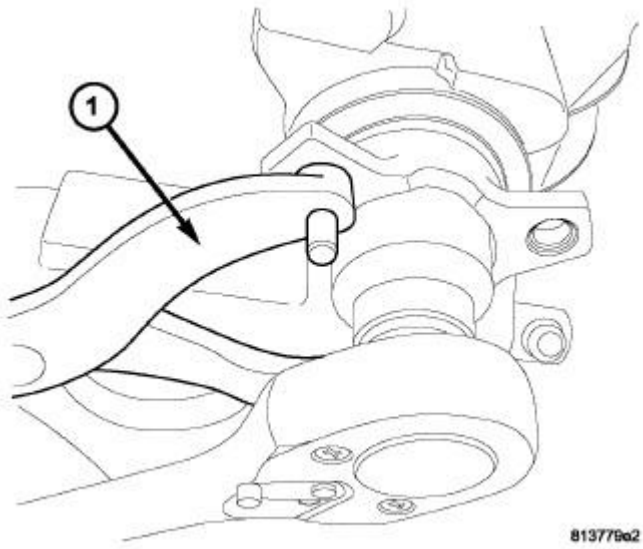

Fig. 93: Pinion Flange Nut Removal/Installation

Courtesy of CHRYSLER GROUP, LLC

5. Install a **new** pinion flange nut. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and 41mm socket, torque nut to 245 N.m (181 ft. lbs.).

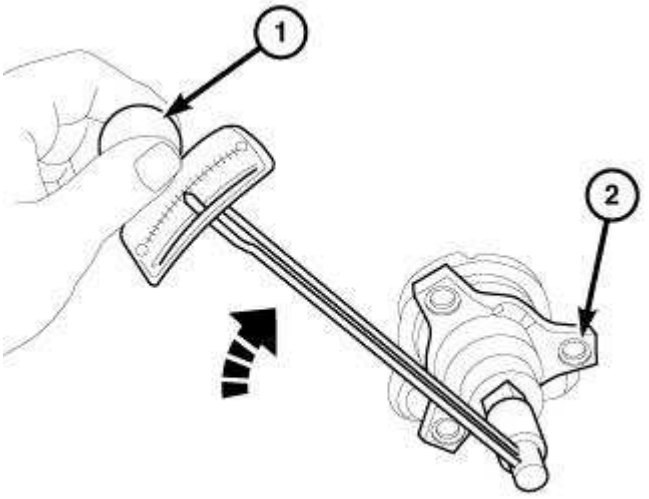

Fig. 94: Using A Torque Wrench Calibrated To Measure Low Torque Values
Courtesy of CHRYSLER GROUP, LLC

6. Use a torque wrench calibrated to measure low torque values (1) to measure rotating torque at the pinion flange (2). Verify the turning torque matches the rotating torque as measured before removal of the original seal.

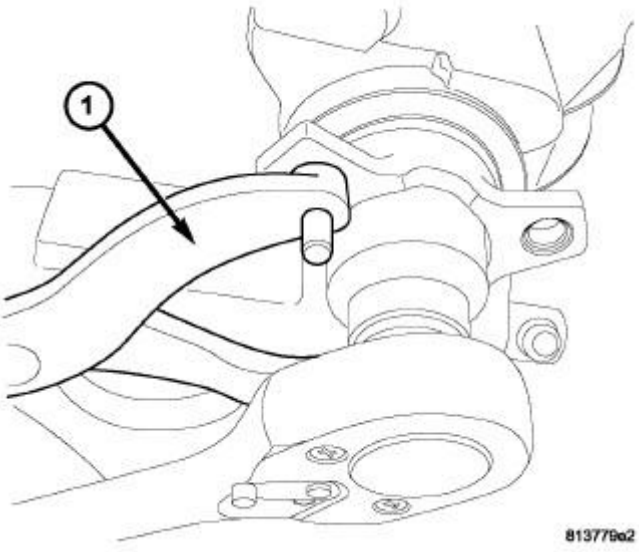

Fig. 95: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

7. Install rear axle assembly. Refer to Rear Axle **INSTALLATION** .

Rear Half Shaft - Chrysler 300

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HALF SHAFT

VEHICLE INSPECTION

1. Check for grease in the vicinity of both the inboard and outboard joints. This is a sign of inner or outer joint seal boot or seal boot clamp damage.

NOISE AND/OR VIBRATION IN TURNS

A clicking noise and/or a vibration in turns could be caused by one of the following conditions:

- Damaged outer CV or inner cross-groove joint seal boot or seal boot clamps. This will result in the loss and/or contamination of the joint grease, resulting in inadequate lubrication of the joint.
- Noise may also be caused by another component of the vehicle coming in contact with the half shafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a result of one of the following conditions:

- A torn seal boot on the inner or outer joint of the half shaft assembly.
- A loose or missing clamp on the inner or outer joint of the half shaft assembly.
- A damaged or worn half shaft CV joint.
- A worn intermediate shaft bearing (AWD Models).

SHUDDER OR VIBRATION DURING ACCELERATION

This problem could be a result of:

- A worn or damaged half shaft inner cross-groove joint.
- A worn intermediate shaft bearing (AWD Models).
- Improper wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

VIBRATION AT HIGHWAY SPEEDS

This problem could be a result of:

- Foreign material (mud, etc.) packed on the backside of the wheel(s).
- Out of balance tires or wheels. Refer to **STANDARD PROCEDURE** .

- A worn intermediate shaft bearing (AWD Models).
- Improper tire and/or wheel runout. Refer to **DIAGNOSIS AND TESTING** .

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolt, Axle Housing-to-Crossmember	220	162	-
Bolt/Nut, Axle Front Isolator	65	48	-
Clamp, Exhaust System Band	61	45	-
Nut, Axle Hub	213	157	-
Nut/Bolt, Propeller Shaft Coupler-to-Axle Flange (NON-SRT)	68	50	-
Nut/Bolt, Propeller Shaft Coupler-to-Axle Flange (SRT)	156	115	-
Nuts, Wheels	150	110	-

REMOVAL

REMOVAL

NOTE: This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.

NOTE: Halfshaft inner and outer boots are not serviceable separately. Boot replacement requires entire shaft assembly replacement.

CAUTION: Unequal-length halfshafts are used. The left halfshaft is shorter than the right, and it is necessary to identify and tag halfshafts upon removal to ensure proper installation.

CAUTION: Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.

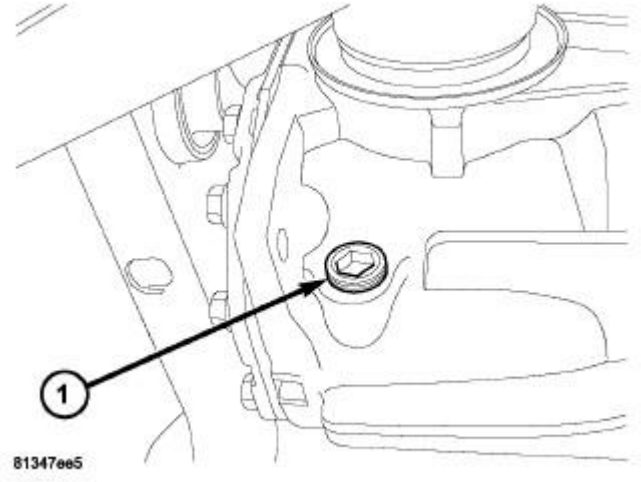

Fig. 1: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. With vehicle in neutral, position and raise vehicle on hoist.
2. Using 14mm hex, remove axle drain plug (1) and drain rear axle fluid into container suitable for fluid reuse.
3. Install drain plug (1) and torque to:
    - 198 Axle: 60 N.m (44 ft. lbs.)
    - 210 Axle: 50 N.m (37 ft. lbs.)

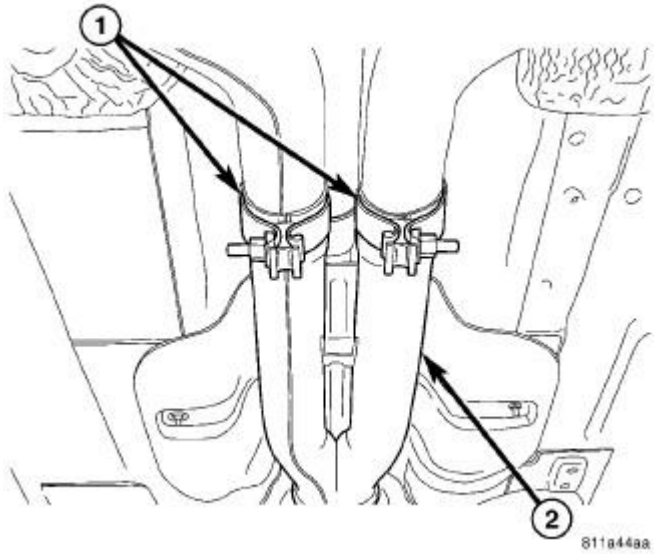

Fig. 2: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

4. Remove rear exhaust system (2) on V8-equipped models.

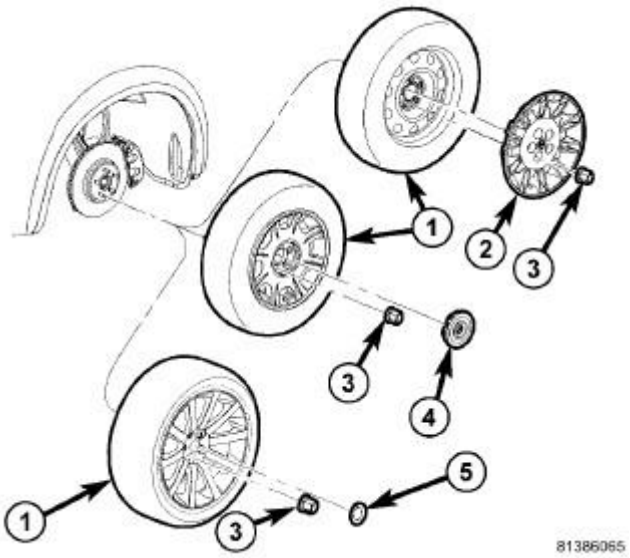

Fig. 3: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Remove wheel/tire assembly (1) from sides that shaft is to be removed.

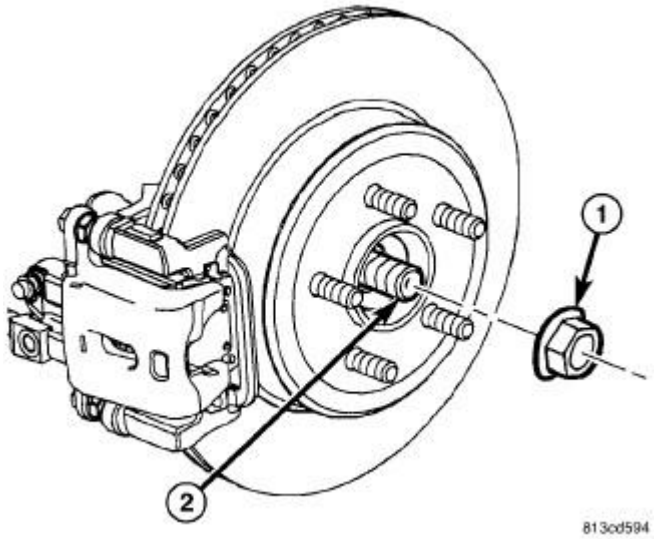

Fig. 4: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

6. Remove wheel hub nut (1) and discard.

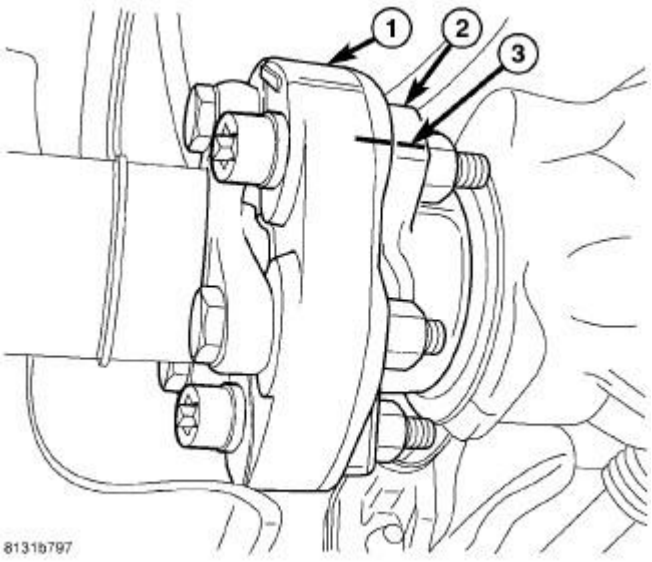

Fig. 5: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

7. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).

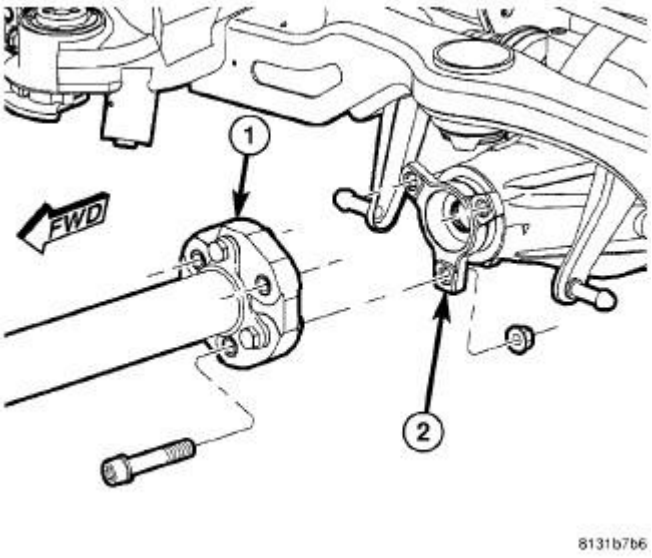

Fig. 6: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

8. Remove three propeller shaft coupler-to-axle flange bolt/nuts.

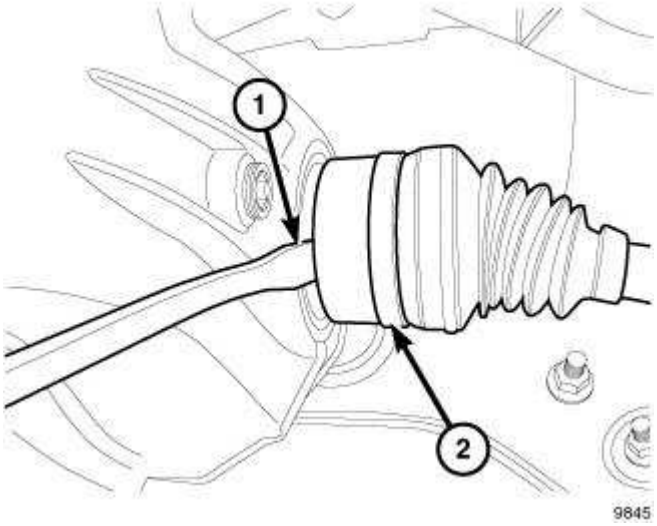

Fig. 7: Halfshaft Removal (V6 Models)
Courtesy of CHRYSLER GROUP, LLC

9. Using suitable screwdriver (1), partially disengage halfshaft(s) (2) from axle assembly.

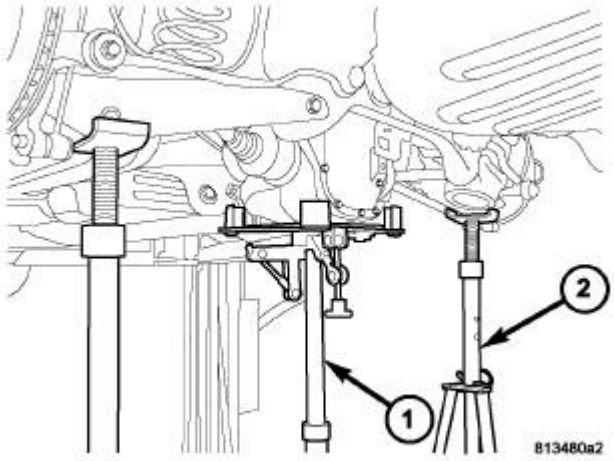

Fig. 8: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

10. If a drive-on hoist is used, position transmission jack (1) to rear axle assembly. If a drive-on hoist is not used, compress rear suspension using screw-style under-hoist jack stands (2), then position transmission jack to rear axle assembly.

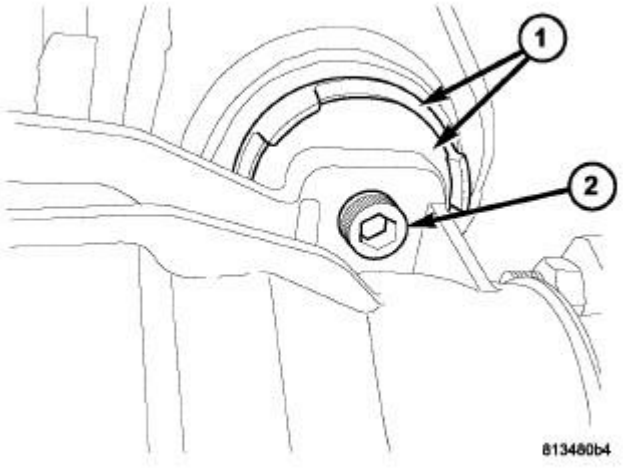

Fig. 9: Rear Axle Forward Mount Isolator & Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

11. Remove rear axle forward mount isolator (1) bolt/nut (2).

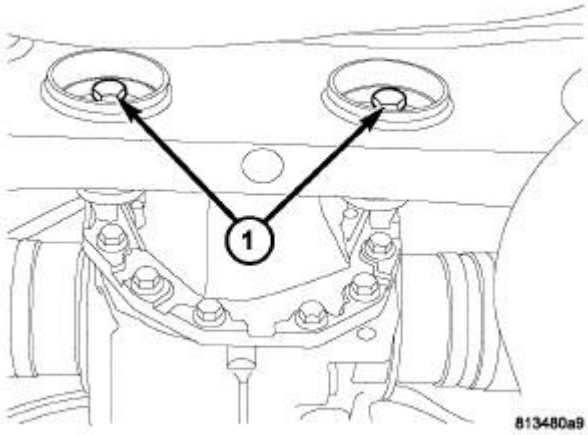

Fig. 10: Rear Axle-To-Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Access to rear axle-to-crossmember bolts is best achieved by use of short socket and a flexible-head ratchet.

12. Remove two rear axle-to-crossmember bolts (1).

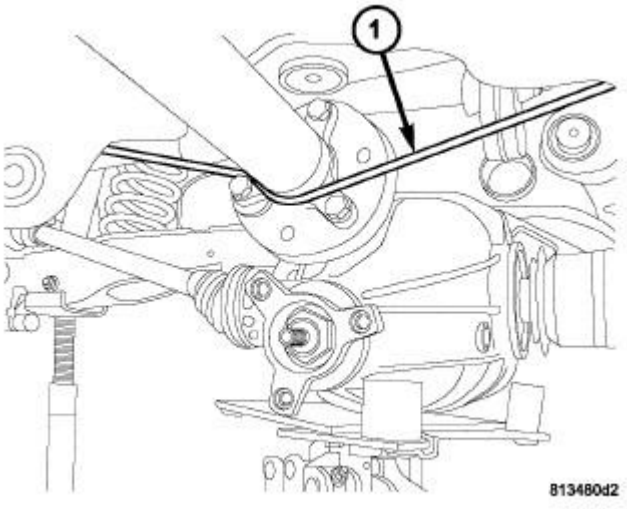

Fig. 11: Propeller Shaft Supported
Courtesy of CHRYSLER GROUP, LLC

13. Carefully lower rear axle. While lowering axle, separate propeller shaft from axle and support with suitable rope or wire (1).

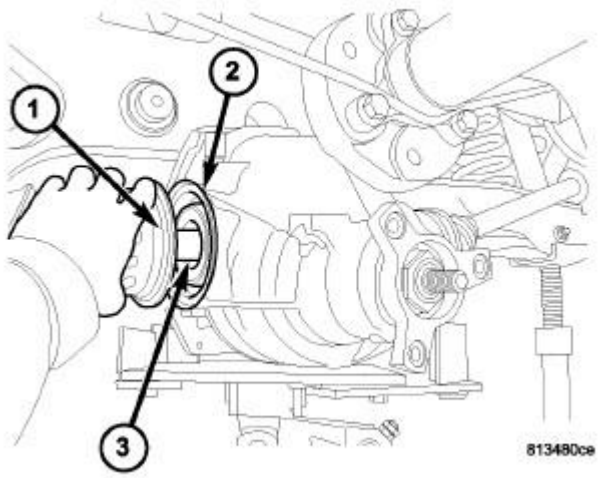

Fig. 12: Halfshaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Unequal-length halfshafts are used. The left halfshaft is shorter than the right, and it is necessary to identify and tag halfshafts upon removal to ensure proper installation.

14. Lower axle just enough to remove halfshafts one at a time. Shift axle assembly in one direction, compressing one halfshaft while removing the other (1). Use caution to protect axle seal and journal.

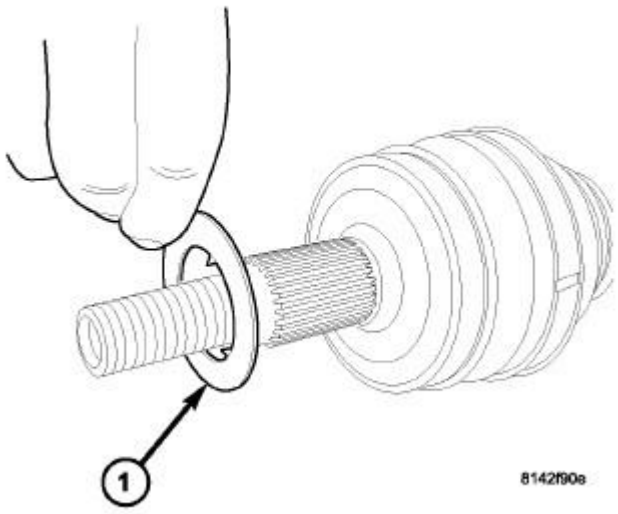

Fig. 13: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.

CAUTION: Use care while handling/storing halfshaft assembly. Damage to the slinger can result from improper handling. If slinger gets bent or damaged, straighten slinger to avoid contact with axle seal assembly.

15. Remove halfshaft from hub. Remove and inspect rubber isolation washer (1). Discard washer if rubber surfaces are worn away. Repeat on other side if necessary.

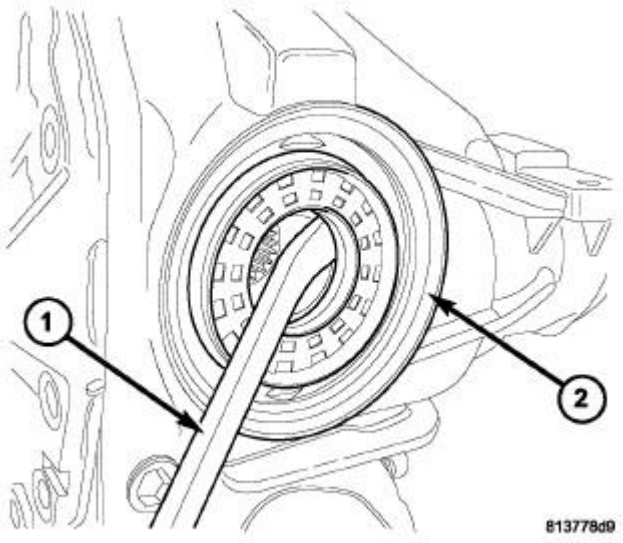

Fig. 14: Axle Seal Removal
Courtesy of CHRYSLER GROUP, LLC

16. Remove axle seals (2) using suitable screwdriver.

INSTALLATION

INSTALLATION

NOTE: Halfshaft inner and outer boots are not serviceable separately. Boot replacement requires entire shaft assembly replacement.

CAUTION: Unequal-length halfshafts are used. The left halfshaft is shorter than the right, and it is necessary to identify and tag halfshafts upon removal to ensure proper installation.

CAUTION: Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.

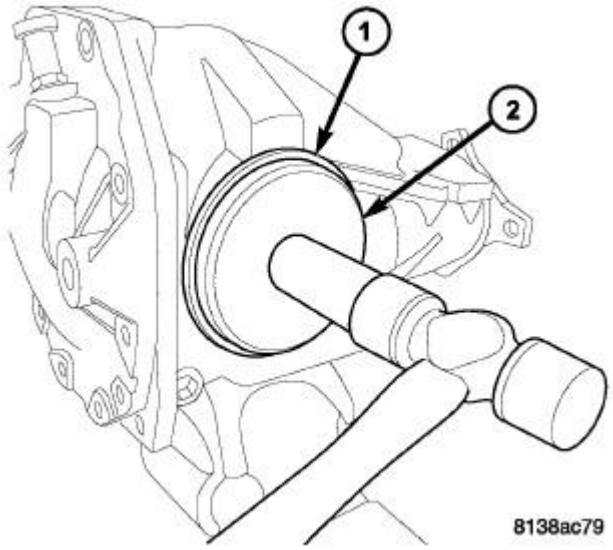

Fig. 15: Axle Seal Installation
Courtesy of CHRYSLER GROUP, LLC

1. Install new axle seal(s) (1) using (special tool #9223A, Drift) (2).

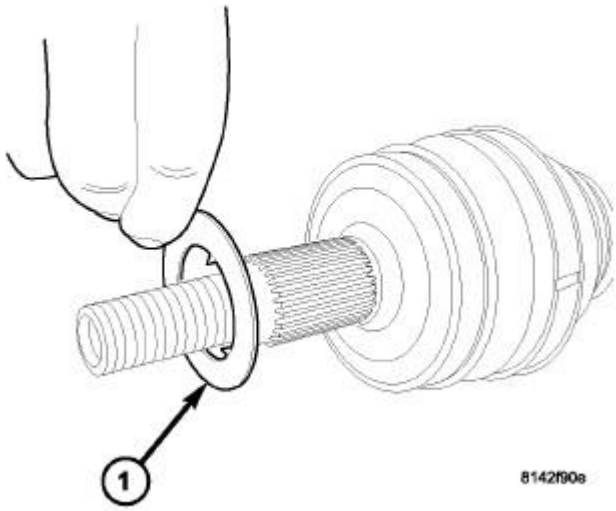

Fig. 16: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

2. Install halfshaft isolation washer (1).

NOTE: Always use (special tool #9099, Seal Protector, Differential Output) when

installing half shaft into the transaxle. If the Seal Protector is new please split at seam before using.

NOTE: Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.

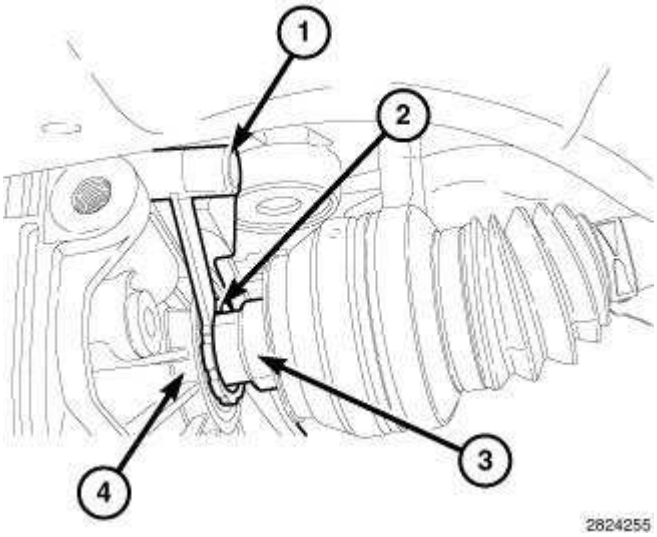

Fig. 17: Identifying Rear Axle, Rear Driveshaft, Rear Axle Flange, and Halfshafts
Courtesy of CHRYSLER GROUP, LLC

NOTE: While raising rear axle reposition rear drive shaft to rear axle flange.

3. Install new circlip(s), on halfshafts (3).
4. Raise axle just enough to install both halfshafts one at a time. Be careful not to damage axle seals using (special tool #9099, Seal Protector, Differential Output) (1). Shift axle assembly in one direction, compressing one halfshaft while installing the other.

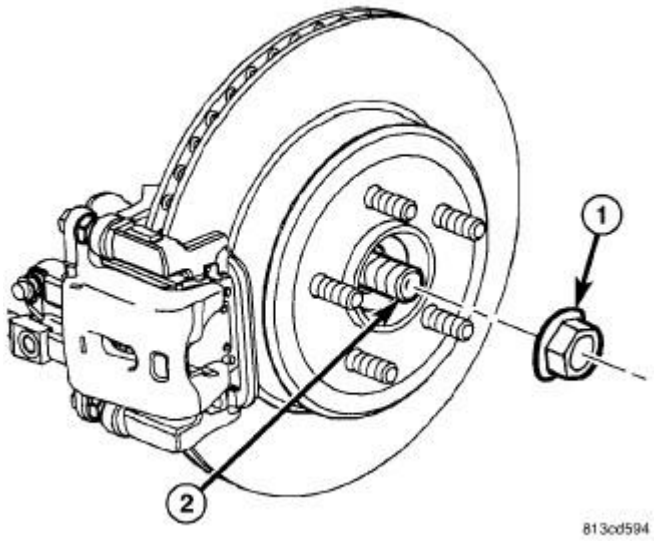

Fig. 18: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

5. Install **new** hub nut (1) by hand.

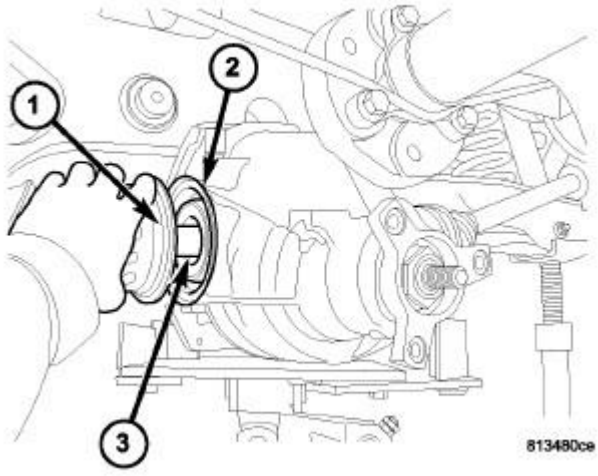

Fig. 19: Halfshaft Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect slinger(s) for handling damage. Straighten as necessary to avoid contact with axle seal.

NOTE: **Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.**

6. Lubricate halfshaft inner joint bearing journal (3) with Mopar® Gear and Axle Lubricant (75W-140). Using new circlip(s), install halfshaft (1) to rear axle assembly. Use care not to damage axle seals (2). Verify proper installation by pulling outward on joint by hand.

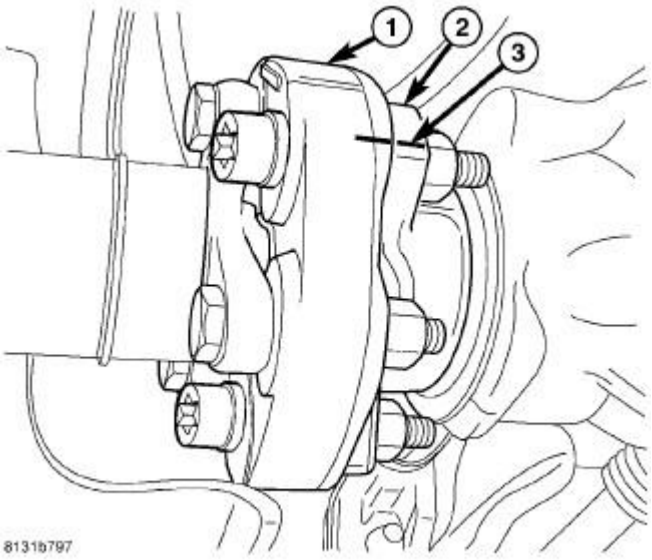

Fig. 20: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

7. Raise rear axle assembly into position. Align propeller shaft index marks (3) and start propeller shaft coupler-to-axle bolt/nuts by hand.

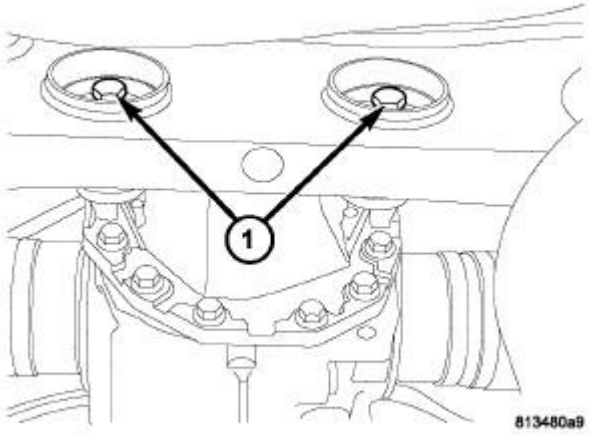

Fig. 21: Rear Axle-To-Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install two rear axle-to-crossmember bolts (1) and torque to 220 N.m (162 ft. lbs.).

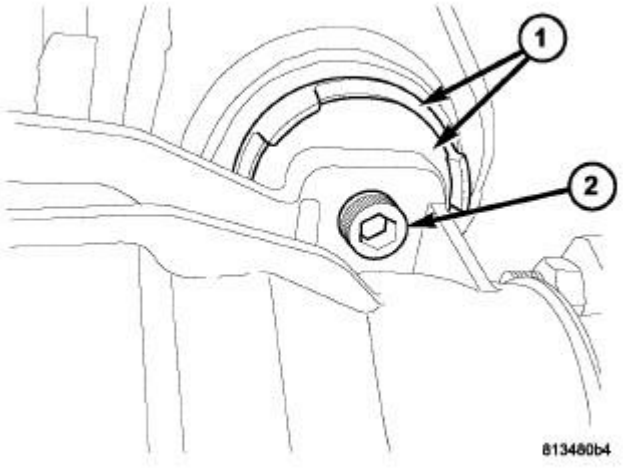

Fig. 22: Rear Axle Forward Mount Isolator & Bolt/Nut
Courtesy of CHRYSLER GROUP, LLC

9. Install rear axle front mount isolator (1) as shown in illustration and torque bolt/nut to 65 N.m (48 ft. lbs.).

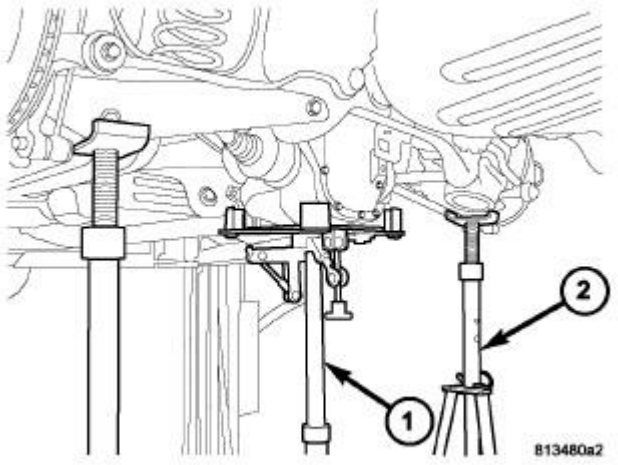

Fig. 23: Supporting Rear Axle With Jack Stands Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

10. Again verify halfshaft inner joints are fully engaged to axle assembly.
11. Remove transmission jack (1).
12. If used, remove screw-type under-hoist jack stands (2).

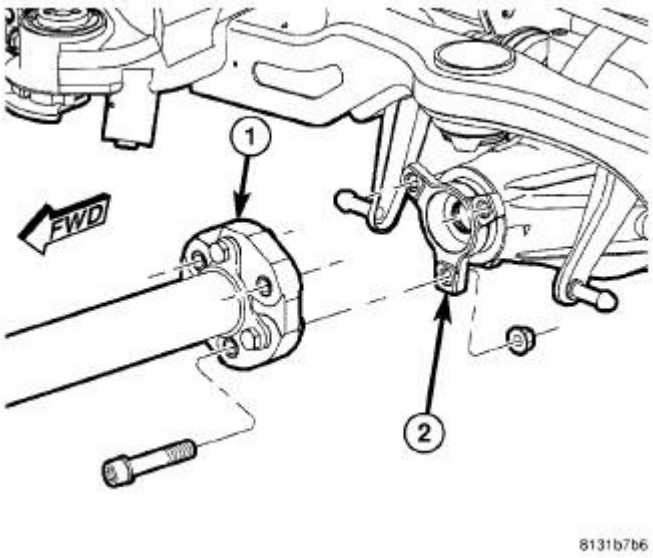

Fig. 24: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

13. Torque propeller shaft coupler-to-axle flange bolt/nuts to 58 N.m (43 ft. lbs.).

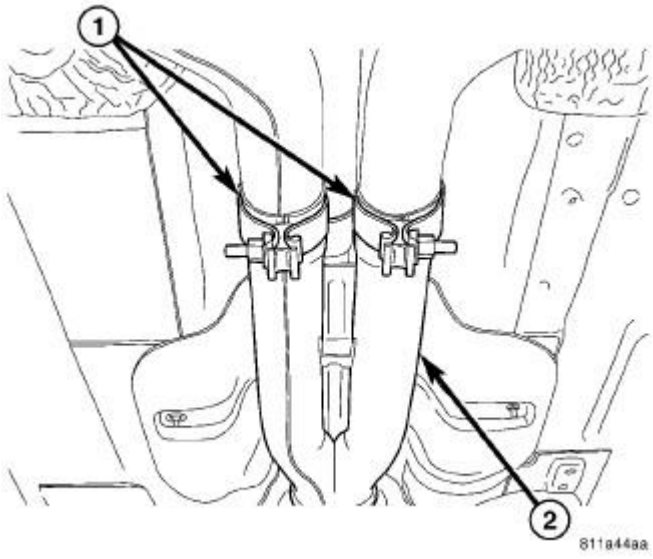

Fig. 25: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

14. V8 Models: Install exhaust system. Tighten band clamps (1) to 61 N.m (45 ft. lbs.).

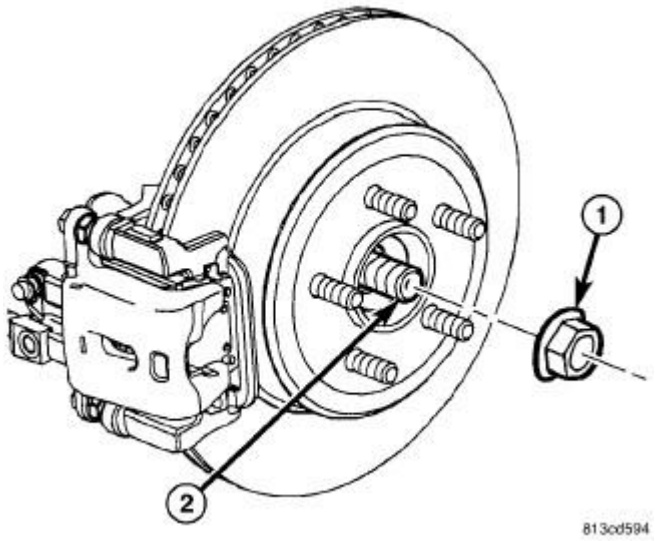

Fig. 26: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

15. Lower vehicle. Torque halfshaft hub nut (1) to 213 N.m (157 ft. lbs.). Install wheel center cap.
16. Install wheel/tire assembly (1) and torque lug nuts to 150 N.m (110 ft. lbs.).

SPECIAL TOOLS

SPECIAL TOOLS

	9099 - Seal Protector, Differential Output (Originally Shipped In Kit Number(s) 9324, 9324CC.) 9223A - Drift (Originally Shipped In Kit Number(s) 9202, 9202CC, 9329-SUP, 9516-SUP, 9518-SUP, 9519-SUP, 9540-SUP.)

SUSPENSION

Rear Suspension - Chrysler 300

DESCRIPTION

NON SRT

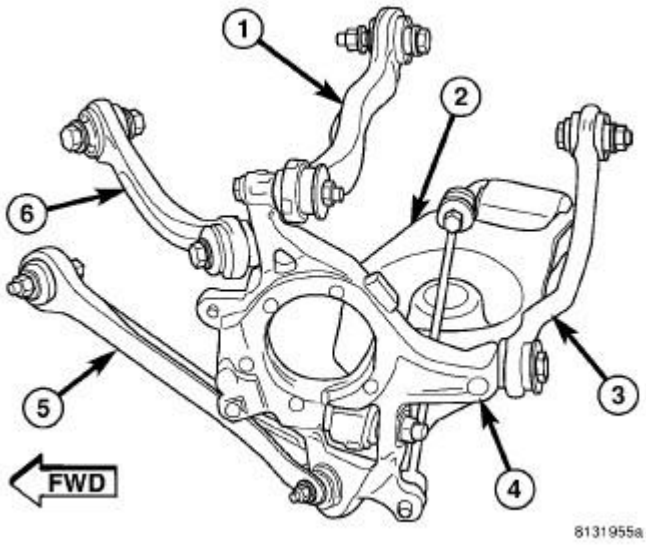

Fig. 1: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

This vehicle utilizes a five-link rear suspension including the following major components:

- Camber Link (1)
- Compression Link (5)
- Spring Link (2)
- Tension Link (6)
- Toe Link (3)
- Coil Spring
- Crossmember
- Hub And Bearing
- Knuckle (4)
- Shock Absorber
- Stabilizer Bar

Service Procedures for the crossmember can be found in Frame And Bumpers. Refer to **CROSSMEMBER, REAR, REMOVAL** .

SRT

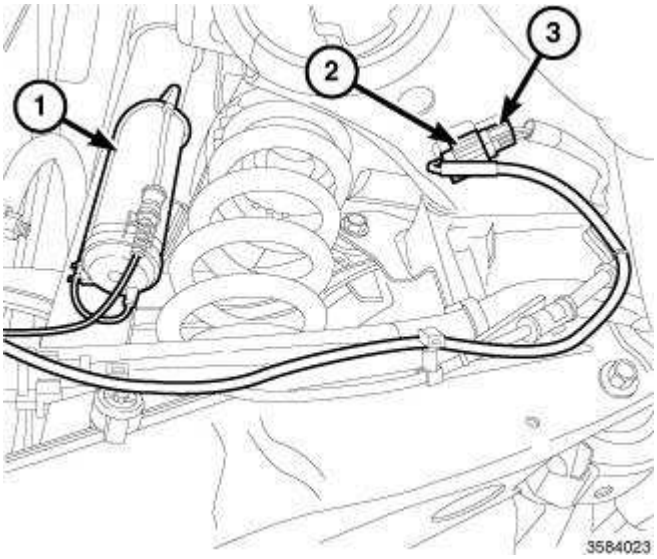

Fig. 2: Shock Solenoid Assembly & ADS Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

The SRT rear suspension is part of an Active Damping System (ADS). The ADS includes unique shock absorbers, an Active Damping Control Module (ADCM), and three accelerometers that work together to modify the ride of the suspension over varying road conditions.

The Active Damping System (ADS) rear shock is similar to a conventional shock with the addition of a shock solenoid assembly (1) mounted on the side of its body with a three wire harness connector attached to it. The ADS shock assembly is serviced the same as a conventional shock absorber, with the addition of disconnecting the ADS harness connector (2) on the crossmember.

Service of all other rear suspension components remain the same as the standard components. When components differ, be sure to use only SRT components on SRT vehicles.

The rear knuckle for the SRT is different from the standard knuckle. Although similar in appearance and in service, the mounting bosses for the disc brake caliper have been moved downward to allow mounting of the Brembo four-piston brake caliper. Due to this change, an updated special tool is needed to remove the sleeve that retains the lower control arm ball joint to the knuckle.

The rear stabilizer bar diameter has been increased for the SRT but it is serviced in the same manner as the standard bar.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Brake Caliper Adapter Knuckle Bolts	115	85	-
Camber Link Crossmember Bolt	85	63	-
Camber Link Knuckle Bolt	98	72	-
Compression Link Crossmember Bolt	85	63	-
Compression Link Knuckle Bolt	81	60	-
Crossmember Mounting Bolts	180	133	-
Hub And Bearing Mounting Bolts	68	50	-
Hub Nut	213	157	-
Parking Brake Cable Knuckle Screw	8	-	71
Shock Absorber Mounting Bolts - Upper	52	38	-
Shock Absorber Mounting Bolt Nut - Lower	72	53	-
Spring Link Crossmember Bolt	108	80	-
Spring Link Knuckle Nut	138	102	-
Stabilizer Bar Isolator Retainer Bolts	61	45	-
Stabilizer Link Nuts	61	45	-
Tension Link Crossmember Bolt	85	63	-
Tension Link Knuckle Bolt	98	72	-
Toe Link Crossmember Nut	108	80	-
Toe Link Knuckle Bolt	95	70	-

SPECIAL TOOLS

SPECIAL TOOLS

- 9361-1 - Tap, Plug M16 X 2.0
- 9361-10 - Cup, Remover, Right Side
- 9361-11 - Guide, Tap
- 9361-12 - Installer, Bushing
- 9361-2 - Tap Guide
- 9361-3 - Screw, Forcing
- 9361-4 - Cup, Bushing
- 9361-5 - Cup, Double Angle
- 9361-6 - Cup, Double Angle
- 9361-7 - Screw, Installation
- 9361-9 - Cup, Remover, Left Side
- 9361A - Rear Knuckle Sleeve Remover/Installer Kit (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

HUB AND BEARING

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HUB AND BEARING

NOTE: The hub and bearing is designed for the life of the vehicle and should require no maintenance.

With wheel and brake rotor removed, rotate flanged outer ring of hub. Excessive roughness, lateral play or resistance to rotation may indicate dirt intrusion or bearing failure. If the rear wheel bearings exhibit these conditions during inspection, the hub and bearing assembly should be replaced.

Damaged bearing seals and resulting excessive grease loss may also require bearing replacement. Moderate grease loss from bearing is considered normal and should not require replacement of the hub and bearing assembly.

To diagnose a bent hub, measure hub runout. Refer to **ROTOR, BRAKE, DIAGNOSIS AND TESTING** .

REMOVAL

NON SRT

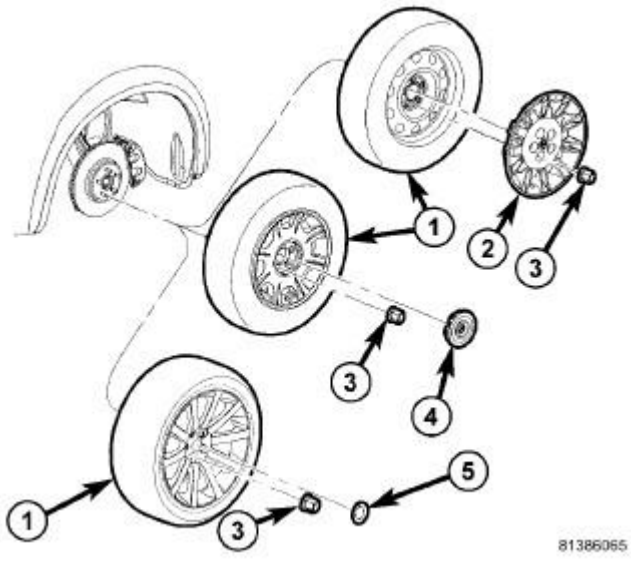

Fig. 3: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

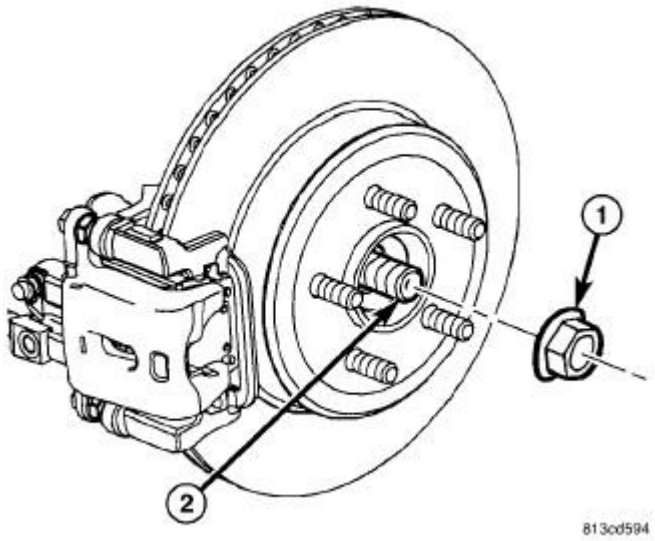

Fig. 4: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

3. While a helper applies brakes to keep hub from rotating, remove hub nut (1) from the half shaft (2).

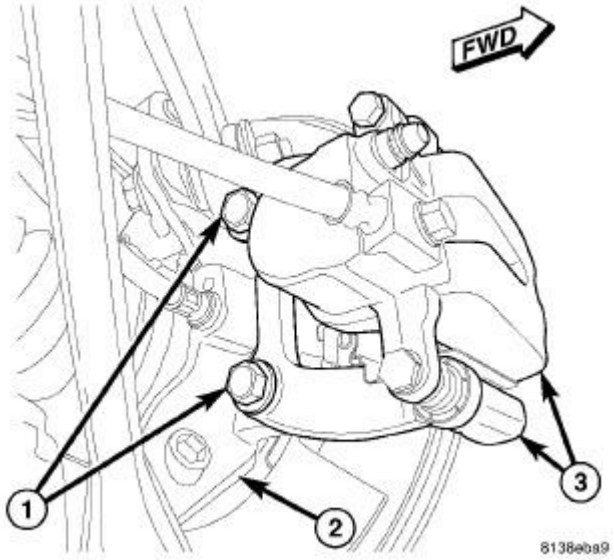

Fig. 5: Rear Caliper & Adapter Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be accomplished before guide pin bolts are removed, by grasping rear of

caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.

4. Remove two bolts (1) securing disc brake caliper adapter (3) to knuckle (2).
5. Remove disc brake caliper and adapter (3) from knuckle as an assembly. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

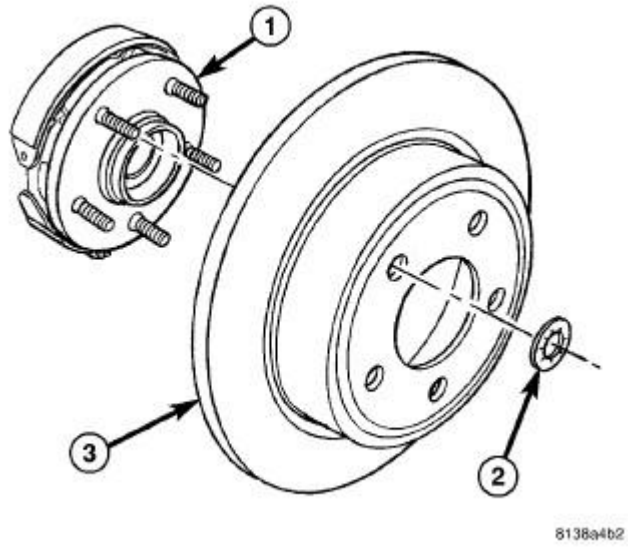

Fig. 6: Solid Brake Rotor Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Remove any clips (2) retaining brake rotor (3) to wheel mounting studs.
7. Slide brake rotor (3) off hub and bearing (1).

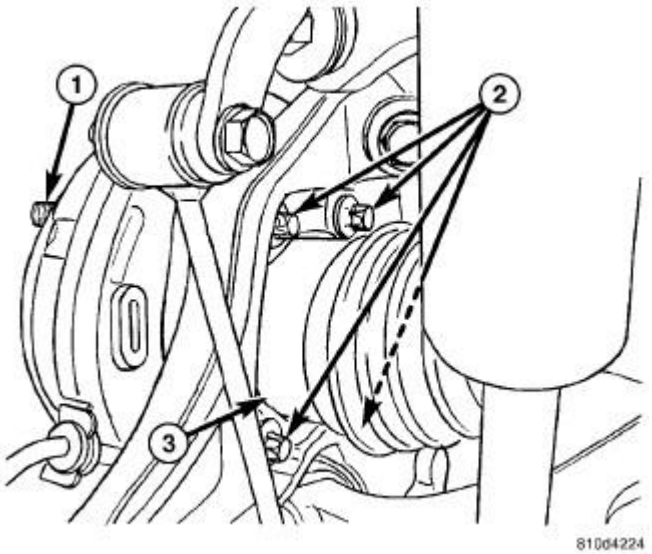

Fig. 7: Hub & Bearing Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - HUB AND BEARING
2 - MOUNTING BOLTS
3 - HALF SHAFT (IF EQUIPPED)

8. Loosen each hub and bearing mounting bolt (2) a turn or two at a time while pulling outward on hub and bearing to avoid bolt contact with half shaft outer joint. Once removed from threads in hub and bearing (but not knuckle), allow bolts to stay in and protrude through knuckle and brake support plate to keep brake support plate in place when hub and bearing is removed.
9. Slide hub and bearing off knuckle and half shaft.

SRT

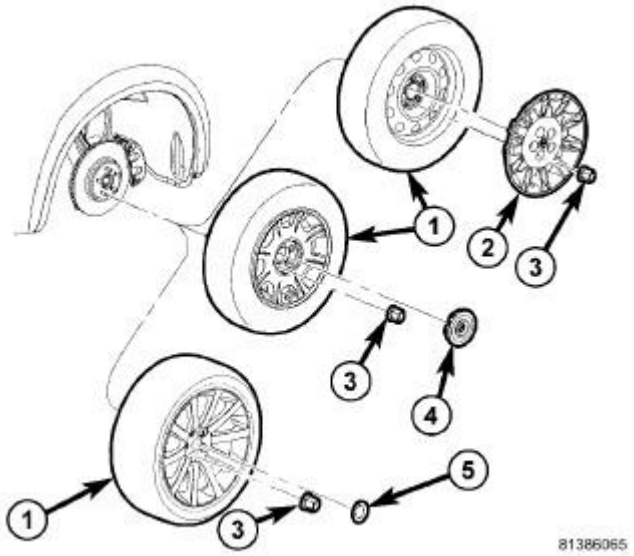

Fig. 8: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

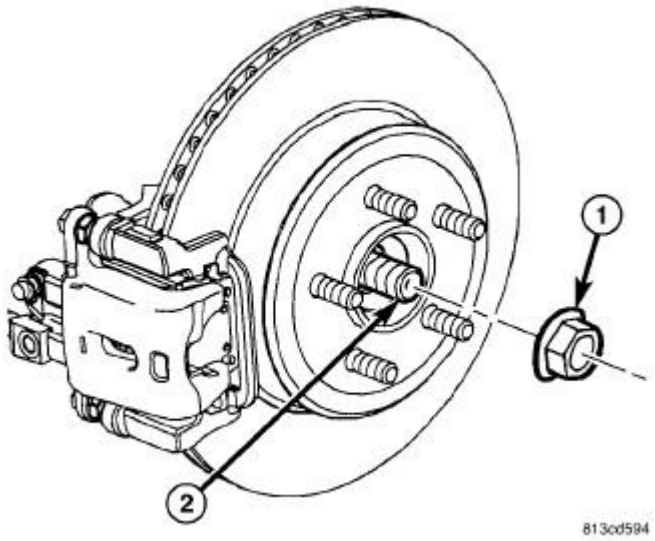

Fig. 9: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

3. While a helper applies brakes to keep hub from rotating, remove hub nut (1) from the half shaft (2).

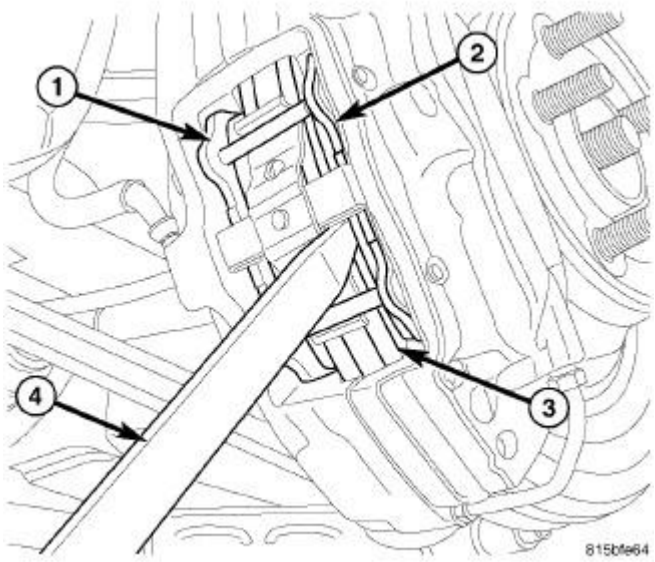

Fig. 10: Pushing Back Pistons In Bore
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown in illustration or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

4. Place trim stick (4) between brake pad (2) and outer edge of rotor (3).
5. Using trim stick, slowly apply pressure against brake pad (2) until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad (1) and pistons as necessary.

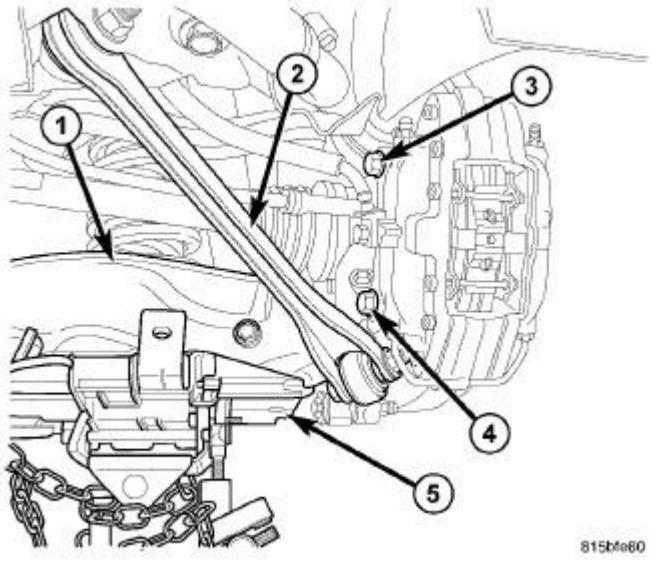

Fig. 11: Accessing Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Support spring link (1) using a transmission jack (5) or other appropriate jack. Raise spring link just enough to access brake caliper lower mounting bolt (4) from above compression link (2).

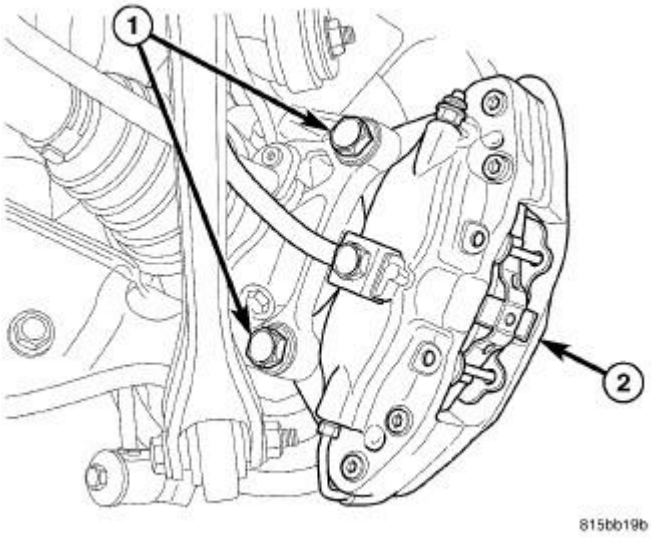

Fig. 12: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the lower and upper caliper mounting bolts (1).
8. Remove brake caliper (2) with pads from knuckle and brake rotor. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

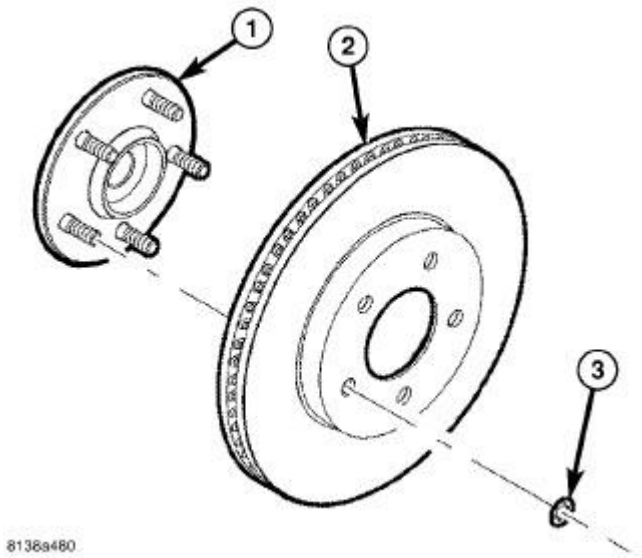

Fig. 13: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

9. Remove any clips (3) retaining brake rotor (2) to wheel mounting studs.
10. Slide brake rotor (2) off hub and bearing (1).

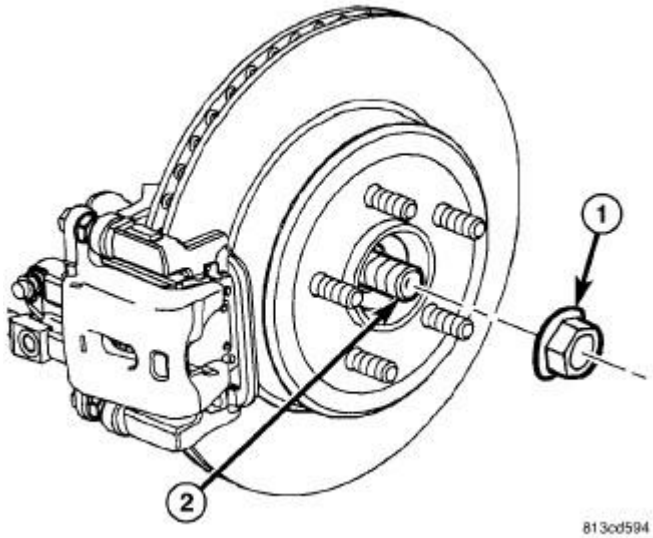

Fig. 14: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

11. Push inward on end of half shaft (2) until C/V joints bottom. This is necessary to give as much access to hub and bearing mounting bolts as possible.

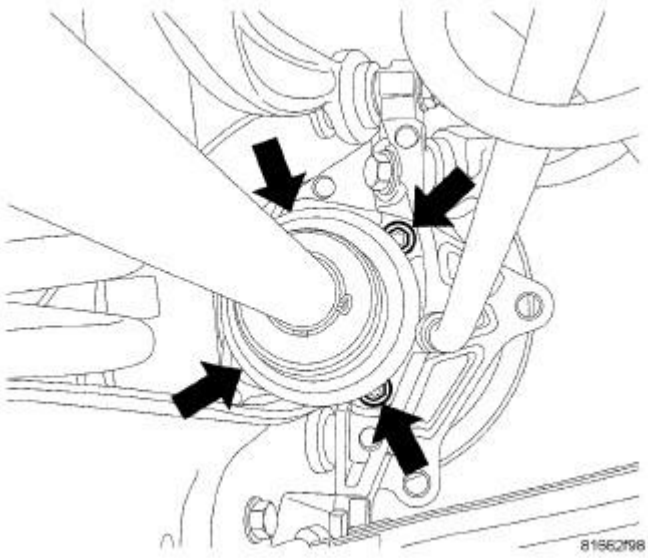

Fig. 15: Hub And Bearing Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is important to keep suspension jacked up as requested in to ease access to lower hub and bearing mounting bolts. Refer to 6.

NOTE: Use a 3/8 inch drive wobble extension along with a Torx® socket to access and remove two top and lower front mounting bolt. Use a standard 3/8 inch drive universal joint along with a Torx® socket to access and remove lower rear mounting bolt.

12. Loosen each (of the four) hub and bearing mounting bolt a turn or two at a time while pulling outward on hub and bearing to avoid bolt contact with half shaft outer joint. Once removed from threads in hub and bearing (but not knuckle), allow bolts to stay in and protrude through knuckle and parking brake adapter to keep brake adapter in place while hub and bearing is off vehicle.
13. Slide hub and bearing out of knuckle and off half shaft.

INSTALLATION

NON SRT

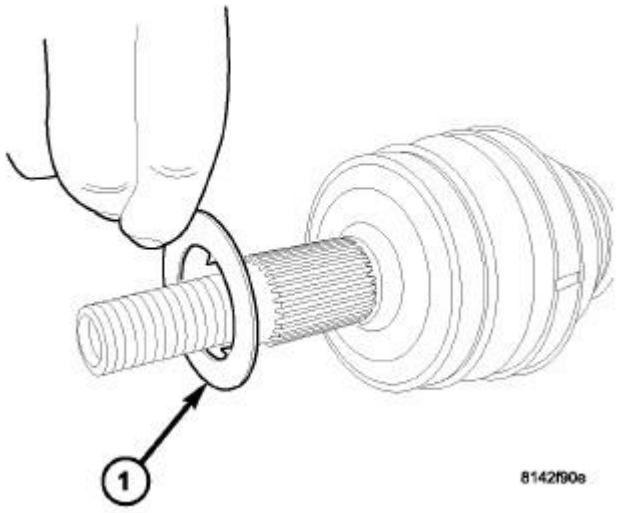

Fig. 16: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before installing hub and bearing on end of axle half shaft, ensure isolation washer is present on end of half shaft. Inspect washer making sure it is not worn or damaged. Washer can be installed in either direction on shaft.

1. Position hub and bearing bolts though rear of knuckle and parking brake support just enough to hold support in place as hub and bearing is installed.
2. Slide hub and bearing onto half shaft. Place hub and bearing through brake support, onto knuckle, lining up mounting bolt holes with bolts.

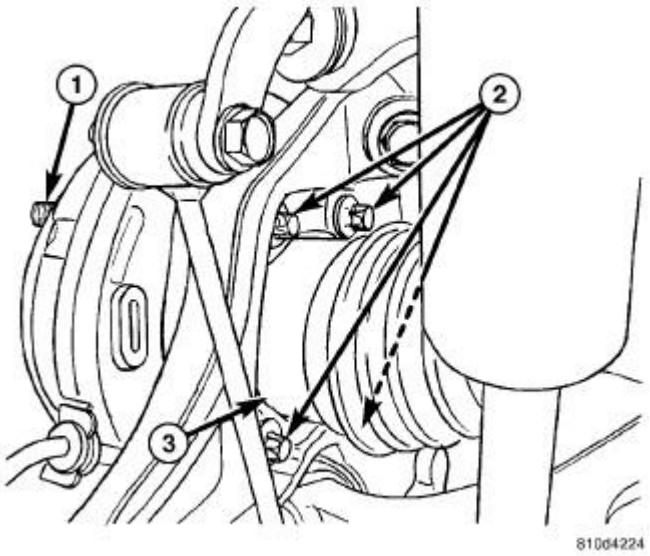

Fig. 17: Hub & Bearing Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1 - HUB AND BEARING
2 - MOUNTING BOLTS
3 - HALF SHAFT (IF EQUIPPED)

3. Install four bolts (2) fastening hub and bearing in place. Tighten mounting bolts to 68 N.m (50 ft. lbs.).

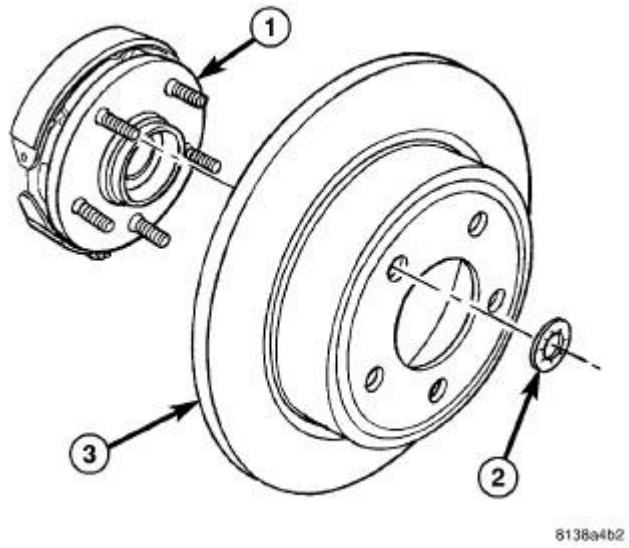

Fig. 18: Solid Brake Rotor Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect disc brake pads and parking brake shoes before brake rotor installation. Refer to HYDRAULIC/MECHANICAL .**

4. Install brake rotor (3) over wheel mounting studs and onto hub (1).

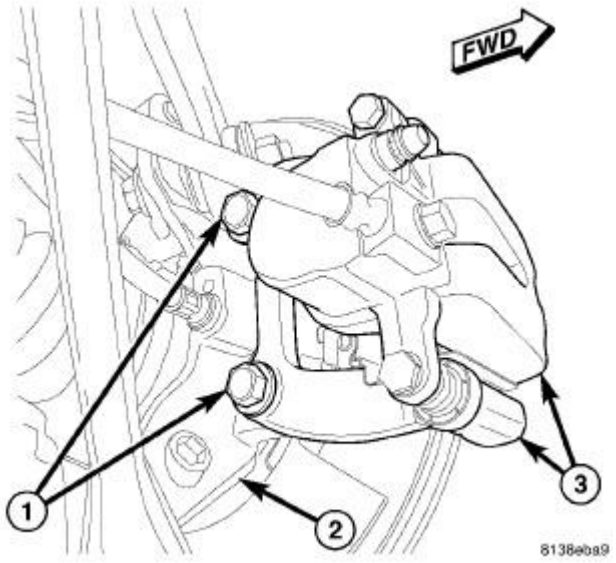

Fig. 19: Rear Caliper & Adapter Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Install disc brake caliper and adapter assembly (3) over brake rotor.
6. Install mounting bolts (1) securing caliper adapter (3) to knuckle (2). Tighten bolts to 115 N.m (85 ft. lbs.).

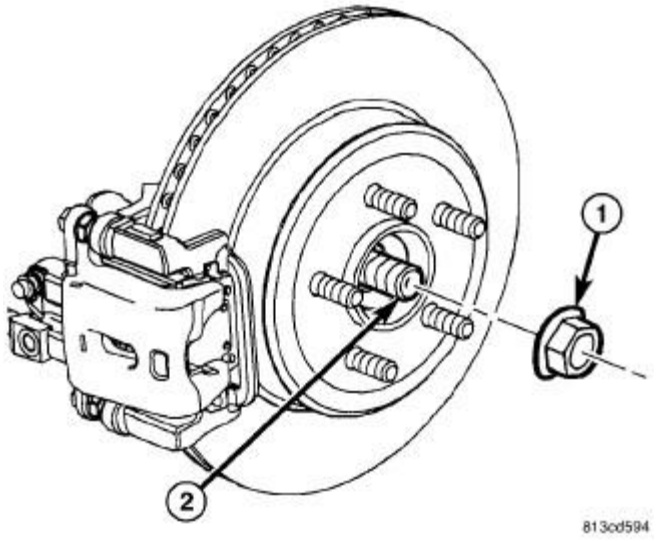

Fig. 20: Identifying Hub Nut

Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

7. Install hub nut (1) on end of half shaft (2). While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.).
8. Verify proper adjustment of the parking brake shoes and adjust as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .

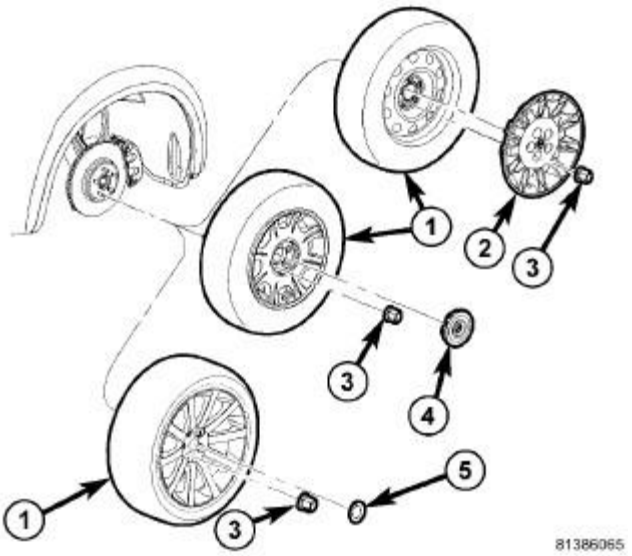

Fig. 21: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
10. Lower vehicle.
11. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.

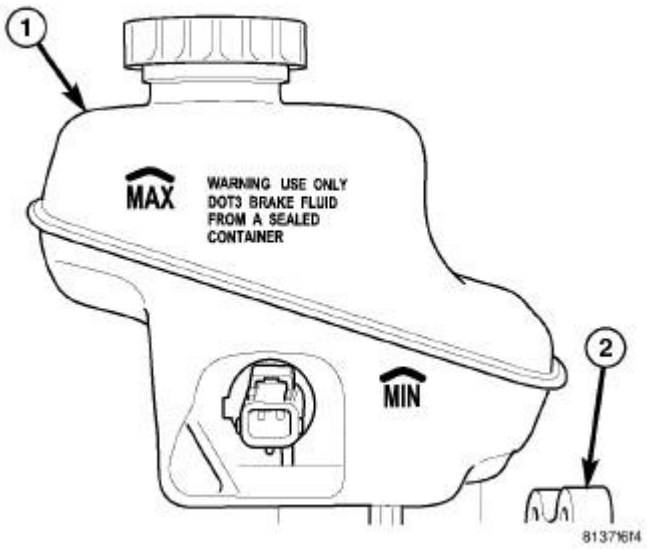

Fig. 22: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

12. Check and adjust brake fluid level in reservoir (1) as necessary.
13. Road test vehicle and make several stops to wear off any foreign material on brakes and to seat brake pads.

SRT

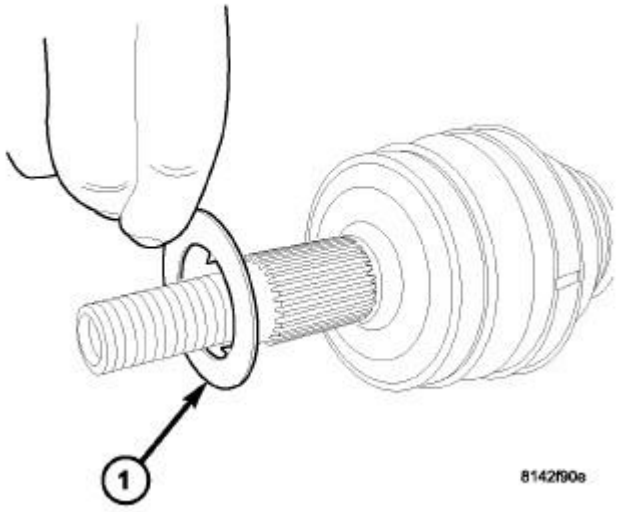

Fig. 23: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before installing hub and bearing on end of axle half shaft, ensure isolation washer (1) is present on end of half shaft. Inspect washer making sure it is not worn or damaged. Washer can be installed in either direction on shaft.**

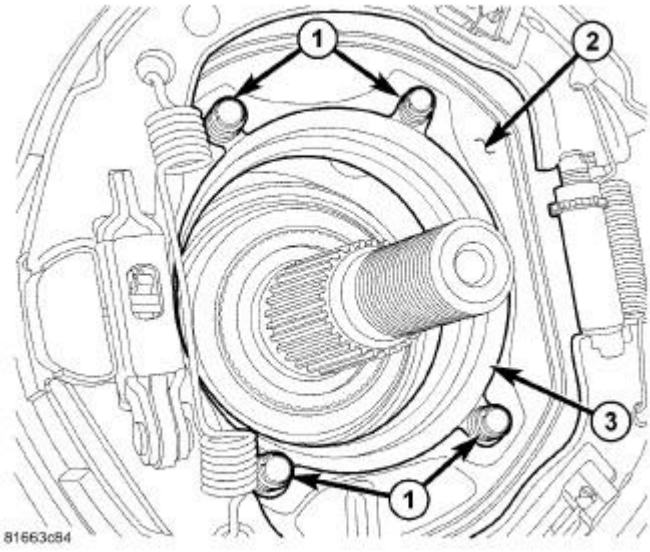

Fig. 24: Mounting Bolts Through Knuckle & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To help upon installation, make sure that hub and bearing mounting bolts (1) extend through knuckle (3) and parking brake adapter (2) to hold adapter in place during hub and bearing installation.**

1. Position hub and bearing mounting bolts (1) though rear of knuckle (3) and parking brake adapter (2) just enough to hold adapter in place.

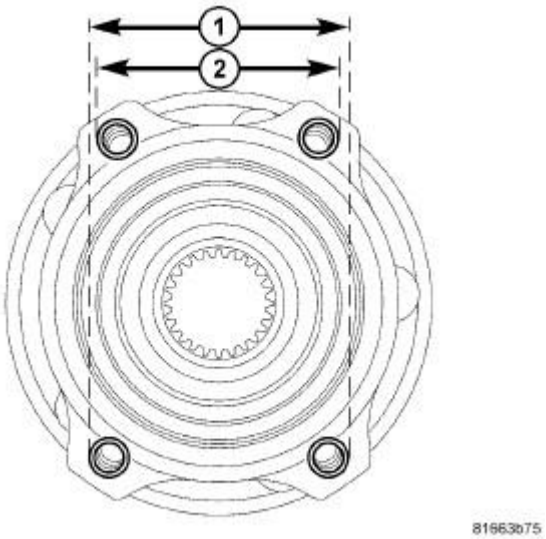

Fig. 25: Hub And Bearing Bolt Hole Pattern
Courtesy of CHRYSLER GROUP, LLC

NOTE: Hub and bearing mounting bolt holes are not evenly spaced. Upper mounting holes (2) are not as far apart as lower mounting holes (1). Make note of this before installing hub and bearing.

2. Slide hub and bearing onto half shaft. Insert hub and bearing through parking brake adapter and knuckle, lining up mounting bolt holes with bolts.

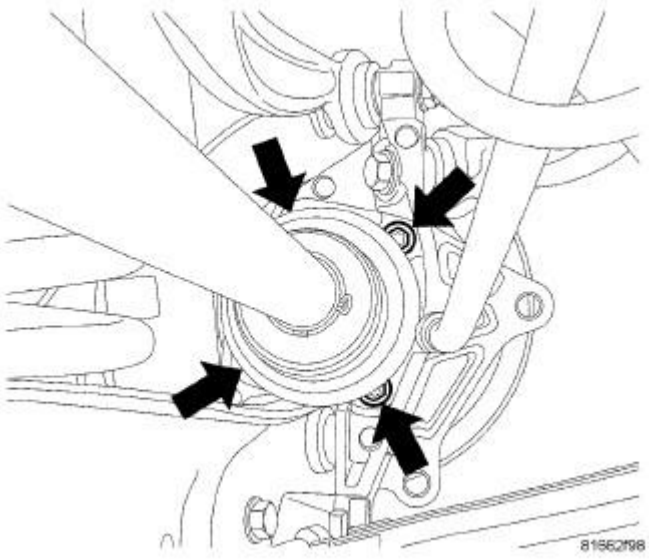

Fig. 26: Hub And Bearing Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Make sure suspension is jacked up as requested during removal to ease access to lower hub and bearing mounting bolts.**

NOTE: **Use a 3/8 inch drive wobble extension along with a Torx® socket to slip past half shaft outer C/V joint and install two top and lower front mounting bolts. Use a standard 3/8 inch drive universal joint along with a Torx® socket to install lower rear mounting bolt.**

3. Carefully start all four mounting bolts into hub and bearing. Using a cross pattern, tighten each hub and bearing mounting bolt a turn or two at a time, slowly drawing hub and bearing into mounted position. Periodically, push in on end of half shaft to give as much room as possible for tools on mounting bolts. Tighten mounting bolts to 68 N.m (50 ft. lbs.).

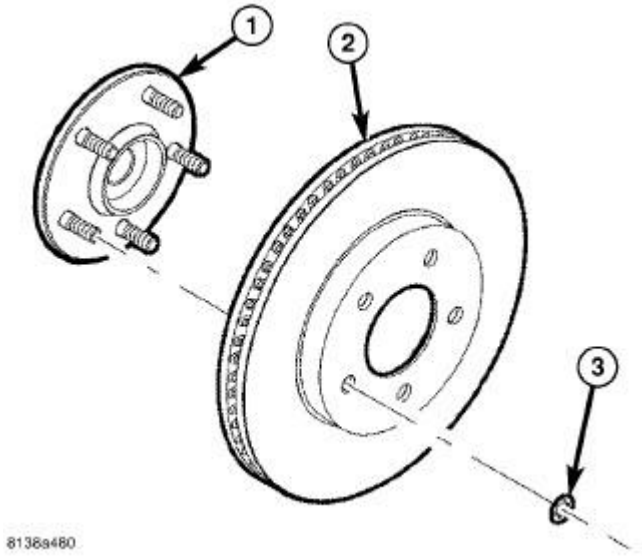

Fig. 27: Locating Clips Retaining Brake Rotor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect disc brake pads and parking brake shoes before brake rotor installation. Refer to HYDRAULIC/MECHANICAL .**

4. Clean hub face (1) to remove any dirt or corrosion where rotor mounts.
5. Install brake rotor (2) over studs on hub and bearing (1).

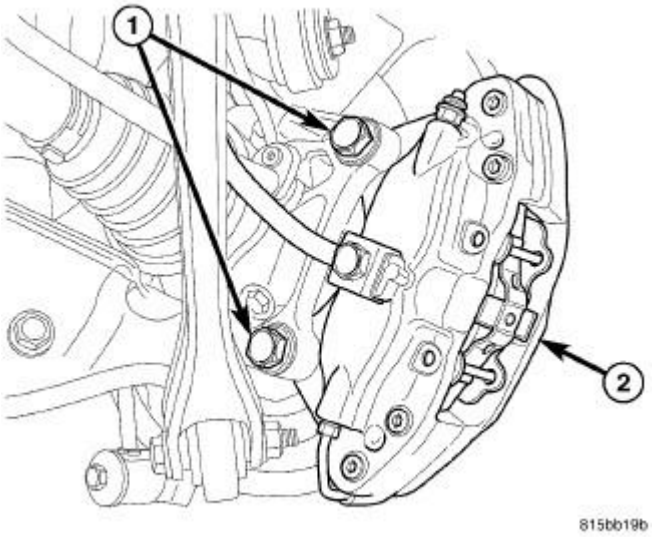

Fig. 28: Rear Caliper Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Slide caliper with pads (2) over brake rotor and align with knuckle.
7. Install caliper mounting bolts (1). Tighten bolts to 130 N.m (96 ft. lbs.).
8. Remove jack from under spring link.

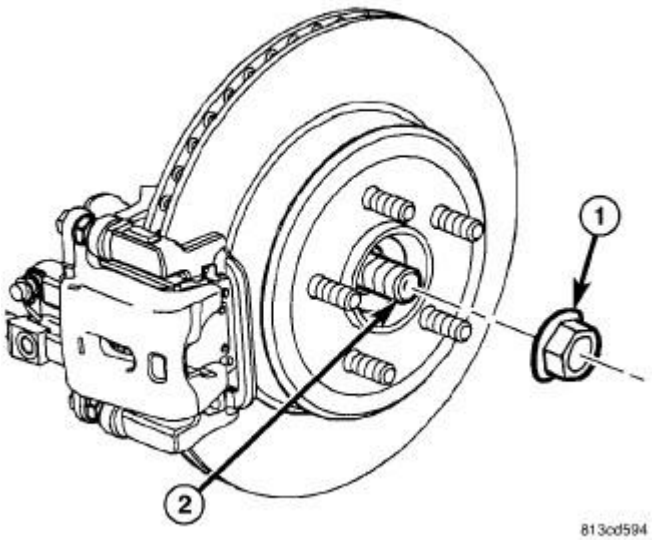

Fig. 29: Identifying Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

9. Install hub nut (1) on end of half shaft (2). While a helper applies brakes to keep hub from turning, tighten hub nut to 213 N.m (157 ft. lbs.).
10. Verify proper adjustment of the parking brake shoes and adjust as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .

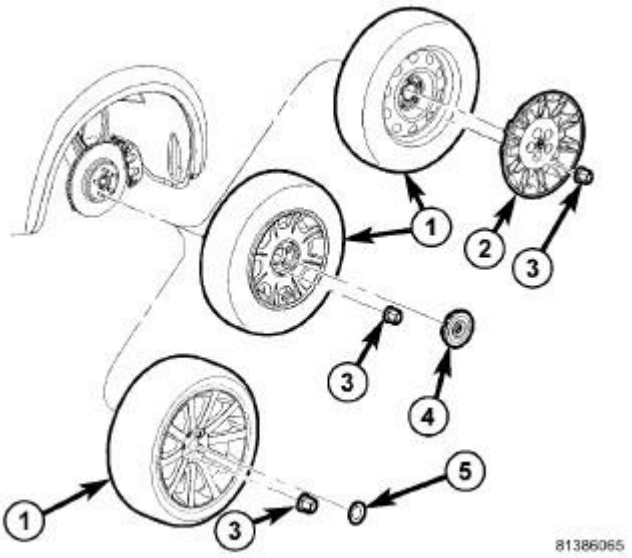

Fig. 30: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

11. Install tire and wheel assembly (1). Refer to **INSTALLATION** . Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.).
12. Lower vehicle.
13. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.

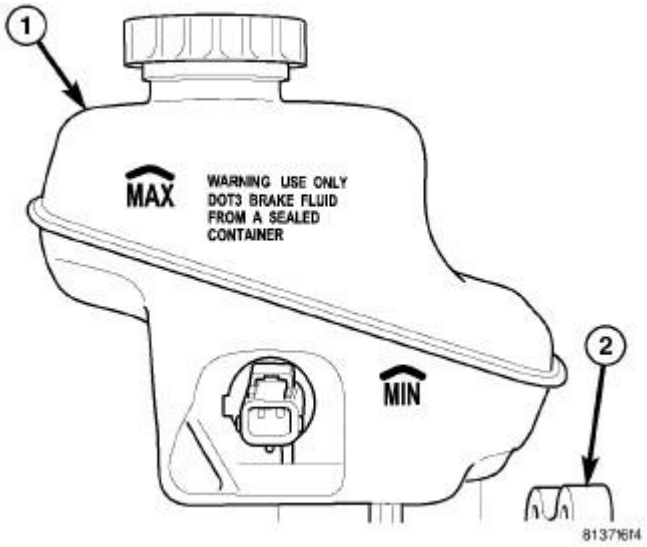

Fig. 31: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

14. Check and adjust brake fluid level in reservoir (1) as necessary.
15. Road test vehicle and make several stops to wear off any foreign material on brakes and to seat brake pads.

KNUCKLE, REAR

REMOVAL

NON SRT

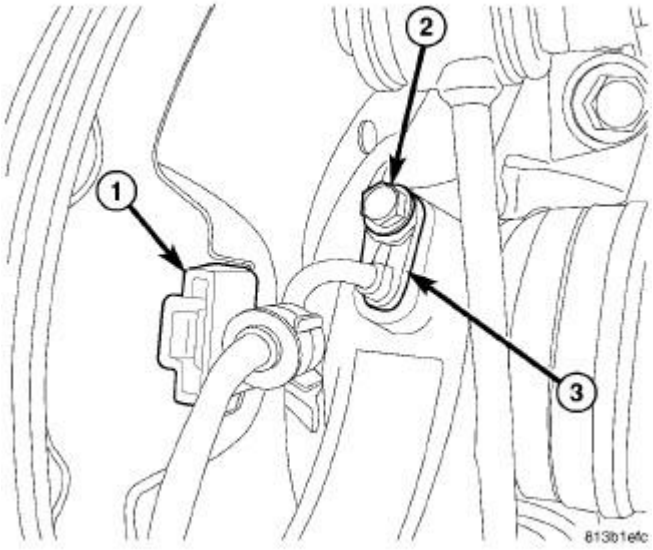

Fig. 32: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Unclip wheel speed sensor cable at rear brake rotor shield (1).
3. Remove screw (2) fastening sensor head (3) to rear knuckle.
4. Remove wheel speed sensor head from knuckle.
5. Access and remove rear hub and bearing. Refer to **HUB AND BEARING, REMOVAL**.
6. Remove parking brake shoes. Refer to **SHOES, PARKING BRAKE, REMOVAL** .

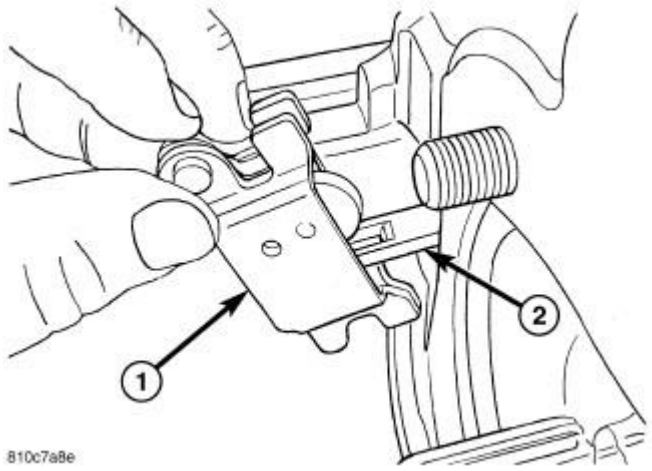

Fig. 33: Removing/Installing Actuator
Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR
2 - CABLE END

7. If not removed, remove parking brake shoe actuator lever (1) from end of cable (2).
8. Remove shoe support from knuckle.

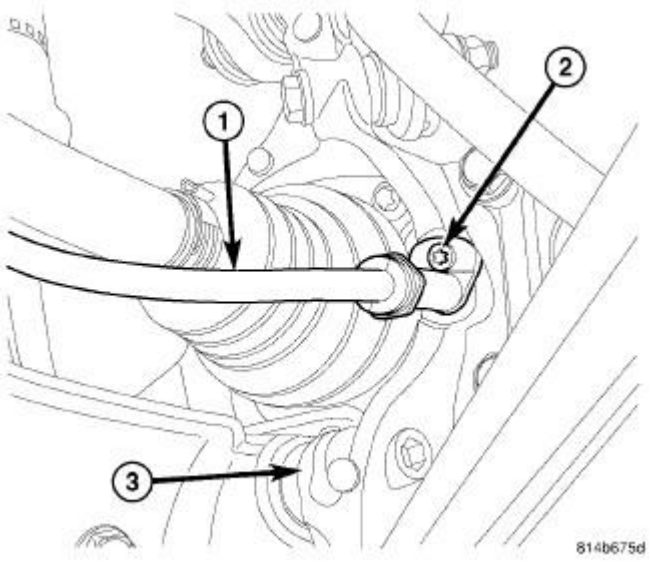

Fig. 34: Parking Brake Cable AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

9. Remove parking brake cable screw (2) at knuckle (3) and pull cable (1) out of knuckle.
10. Position under-hoist utility jack or jack stand under spring link. Raise jack head to contact spring link at shock mount secure in place.

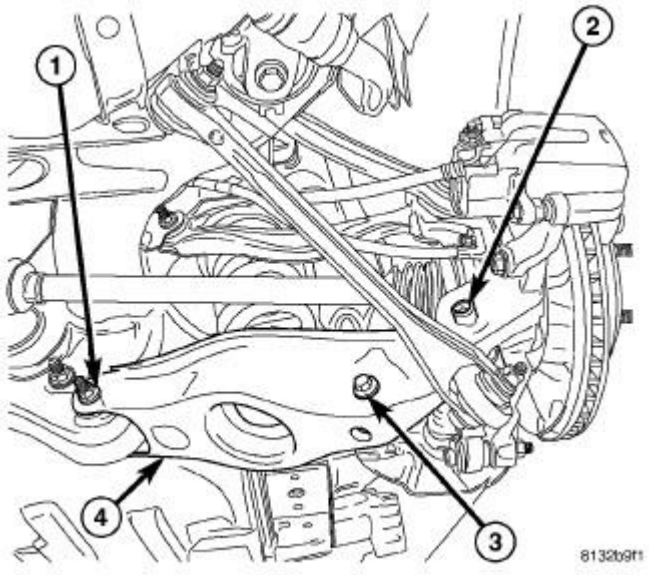

Fig. 35: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

11. Remove spring link-to-knuckle nut and bolt (2).

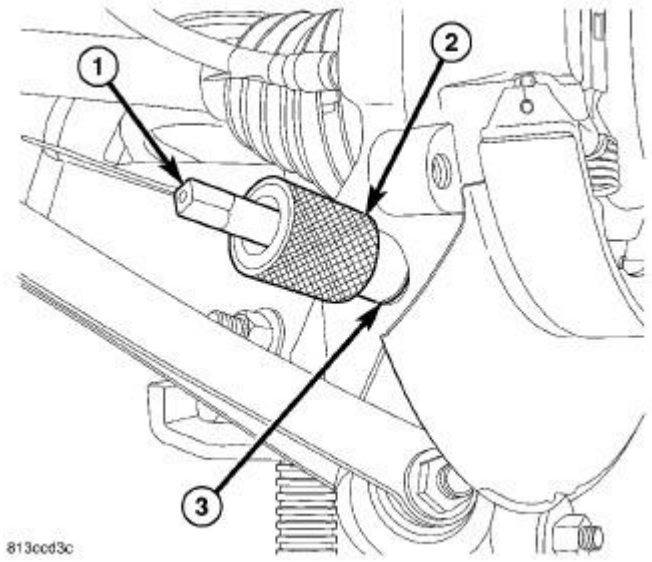

Fig. 36: Using Tap & Guide
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It important to use (special tool #9361-2, Tap Guide) (2), when tapping sleeve in knuckle to help keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1), straight during use or damage to Tap may occur.

12. Place (special tool #9361-2, Tap Guide) (2) against sleeve (3) in knuckle to keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1) straight. Using Tap with an appropriate handle, cut threads approximately halfway through bushing (or about six complete threads). **It is important to back tap out, clean out burrs and lubricate Tap often during process.**

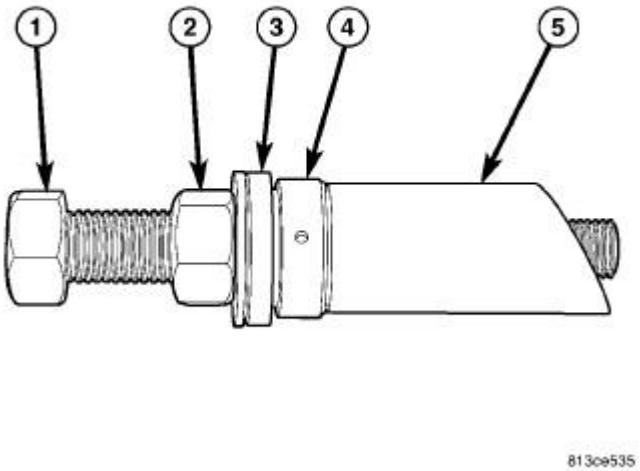

Fig. 37: Lubricate Bolt & Rear Knuckle Sleeve Remover/Installer Kit

Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate Bolt (1) threads to provide ease of use and promote tool longevity.

13. Assemble (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit) as shown in illustration.
    - (1) (special tool #9361-3, Screw, Forcing)
    - (2) Nut
    - (3) Spherical Washer
    - (4) Thrust Bearing
    - (5) (special tool #9361-4, Cup, Bushing) (RWD)
    - (5) (special tool #9361-5, Cup, Double Angle) (AWD - Left Side)
    - (5) (special tool #9361-6, Cup, Double Angle) (AWD - Right Side)

NOTE: When installing thrust bearing on Remover, be sure to place hardened side against nut. Place bearing outer cage against stationary component.

NOTE: It is important to use appropriate Sleeve on Remover to provide proper Tool-to-Knuckle contact. RWD sleeve can be used on either side while AWD knuckles require specific left or right side Sleeves.

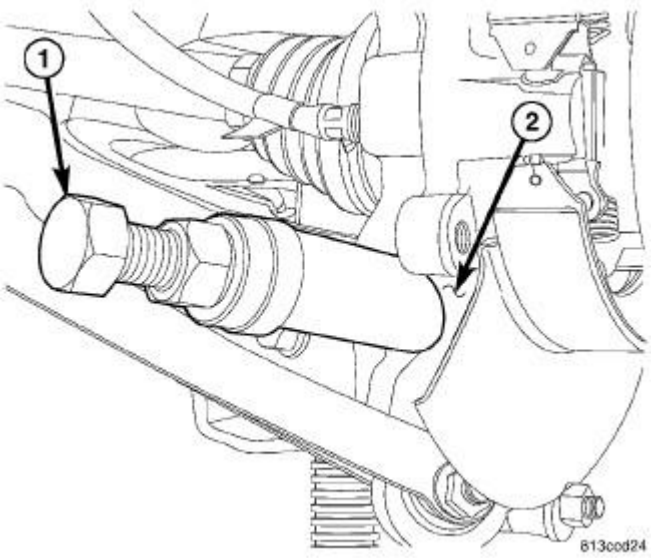

Fig. 38: Sleeve Removal Using
Courtesy of CHRYSLER GROUP, LLC

14. Thread (special tool #9361-3, Screw, Forcing) (1) into tapped knuckle sleeve.

15. Rotate Nut down, matching Sleeve angled end with angled face of knuckle.
16. Continue to rotate Nut until knuckle sleeve is removed from knuckle. **Discard knuckle sleeve; replace it with new upon installation.**

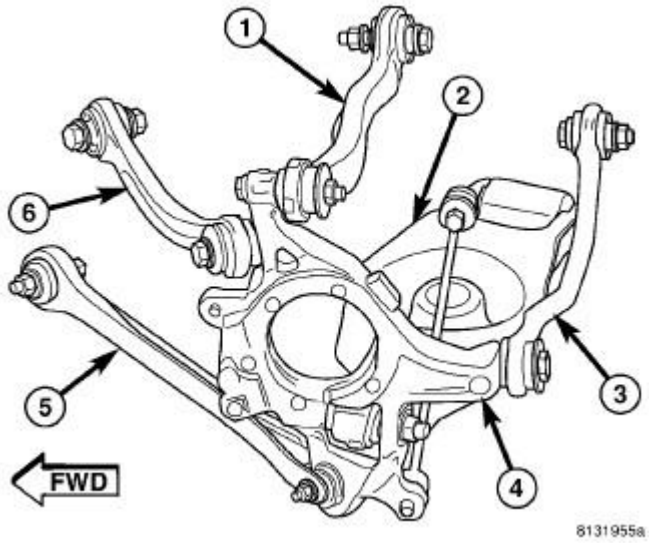

Fig. 39: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

17. Remove bolt and nut fastening compression link (5) to knuckle (4).
18. Remove bolt fastening toe link (3) to knuckle (4).
19. Remove nut and bolt fastening stabilizer link to knuckle (4).
20. Remove nut and bolt fastening tension link (6) to knuckle (4).
21. Remove nut and bolt fastening camber link (1) to knuckle (4).
22. Remove knuckle (4).
23. Remove hub mounting bolts from knuckle.

SRT

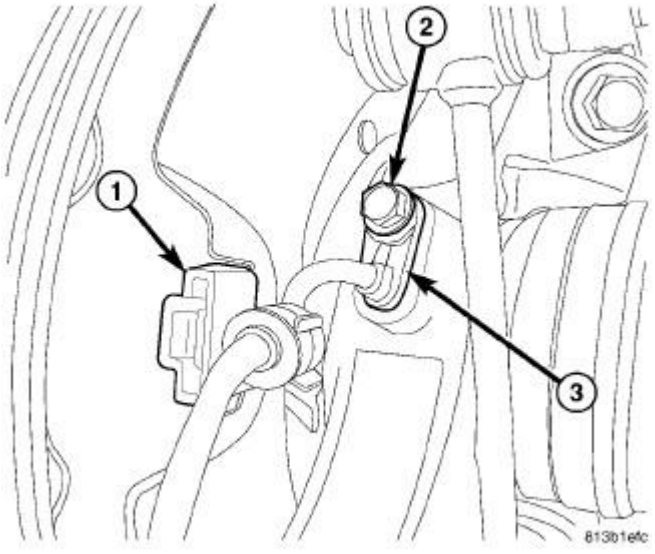

Fig. 40: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Unclip wheel speed sensor cable at rear brake rotor shield (1).
3. Remove screw (2) fastening sensor head (3) to rear knuckle.
4. Remove wheel speed sensor head from knuckle.
5. Access and remove rear hub and bearing. Refer to **HUB AND BEARING, REMOVAL**.
6. Remove parking brake shoes. Refer to **SHOES, PARKING BRAKE, REMOVAL** .

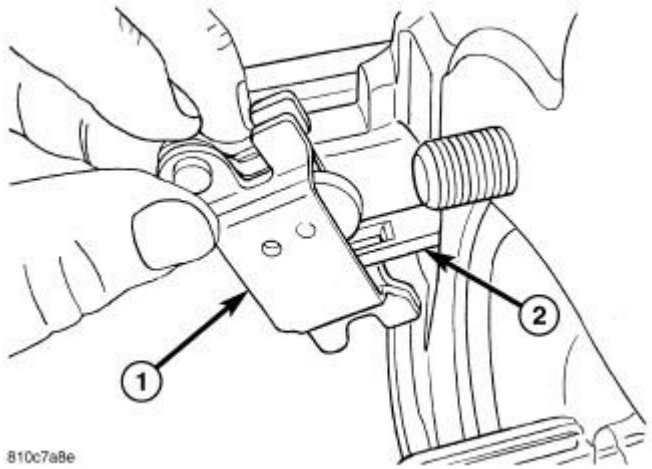

Fig. 41: Removing/Installing Actuator
Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR

2 - CABLE END

7. If not removed, remove parking brake shoe actuator lever (1) from end of cable (2).
8. Remove shoe support from knuckle.

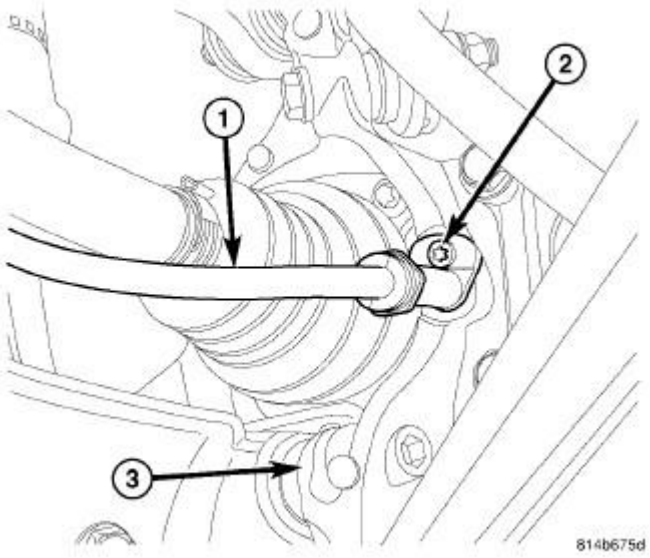

Fig. 42: Parking Brake Cable AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

9. Remove parking brake cable screw (2) at knuckle (3) and pull cable (1) out of knuckle.
10. Position under-hoist utility jack or jack stand under spring link. Raise jack head to contact spring link at shock mount secure in place.

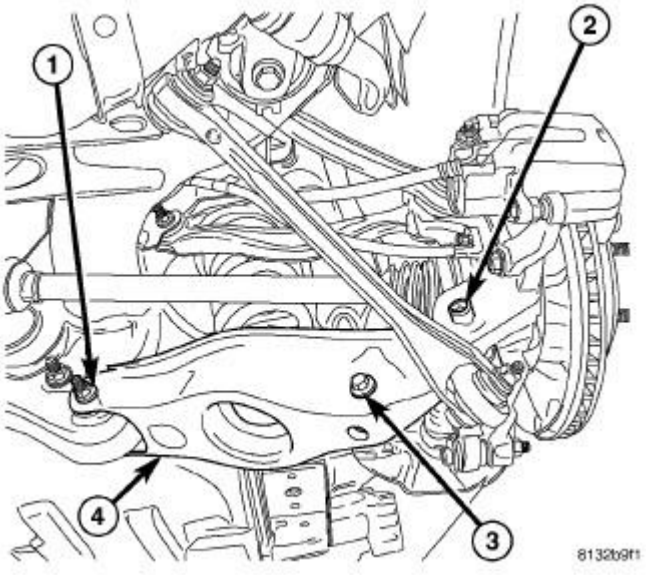

Fig. 43: Spring Link Mounting

Courtesy of CHRYSLER GROUP, LLC

11. Remove spring link-to-knuckle nut and bolt (2).

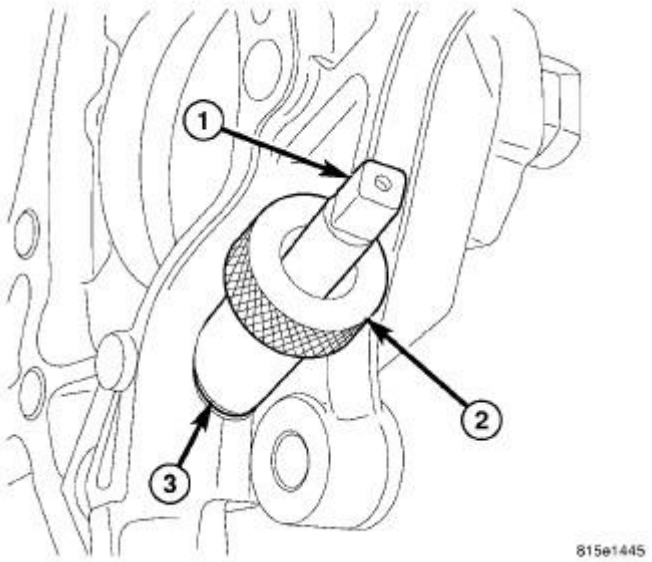

Fig. 44: Using Tap & Guide
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It important to use (special tool #9361-11, Guide, Tap) (2), when tapping sleeve in knuckle to help keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1), straight during use or damage to Tap may occur.

12. Place (special tool #9361-11, Guide, Tap) (2) against sleeve (3) in knuckle to keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1) straight. Using Tap with an appropriate handle, cut threads approximately halfway through bushing (or about six complete threads). **It is important to back tap out, clean out burrs and lubricate Tap often during process.**

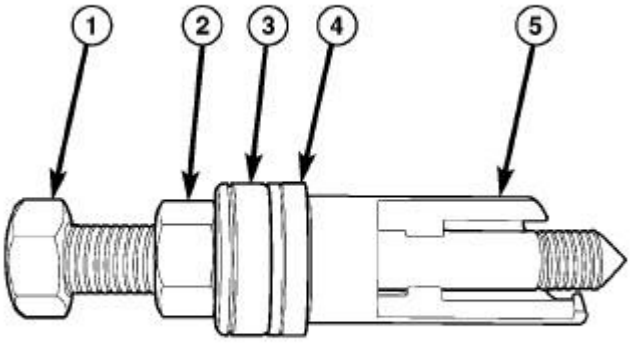

Fig. 45: Rear Knuckle Sleeve Remover/Installer Kit
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate Bolt (1) threads to provide ease of use and promote tool longevity.

13. Assemble (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), as shown in illustration.
    - (1) Bolt (special tool #9361-3, Screw, Forcing)
    - (2) Nut
    - (3) Thrust Bearing
    - (4) Spherical Washer
    - (5) (special tool #9361-9, Cup, Remover, Left Side) (Left Side - Shown in figure)
    - (5) (special tool #9361-10, Cup, Remover, Right Side) (Right Side)

NOTE: When installing thrust bearing (3) on Remover, be sure to place hardened side against nut (2). Place bearing outer cage against stationary component.

NOTE: It is important to use appropriate Sleeve ((special tool #9361-9, Cup, Remover, Left Side) or (special tool #9361-10, Cup, Remover, Right Side)) on Remover to provide proper Tool-to-Knuckle contact.

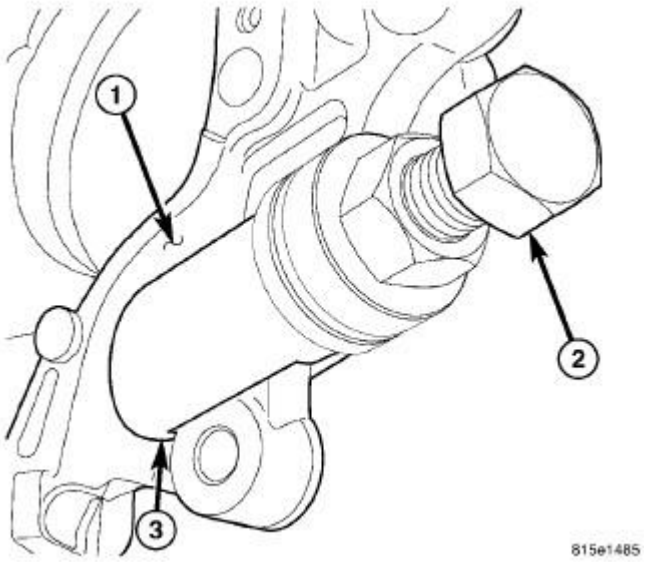

Fig. 46: Thread, knuckle & Sleeve
Courtesy of CHRYSLER GROUP, LLC

14. Thread (special tool #9361-3, Screw, Forcing) (2) into tapped knuckle sleeve.
15. Rotate Nut down, matching Sleeve ((special tool #9361-9, Cup, Remover, Left Side) or (special tool #9361-10, Cup, Remover, Right Side)) angled end with angled face of knuckle (1). **Make sure foot on Sleeve (3) is inserted behind machined brake caliper mounting boss.**
16. Continue to rotate Nut until knuckle sleeve is removed from knuckle. **Discard knuckle sleeve; replace it with new upon installation.**

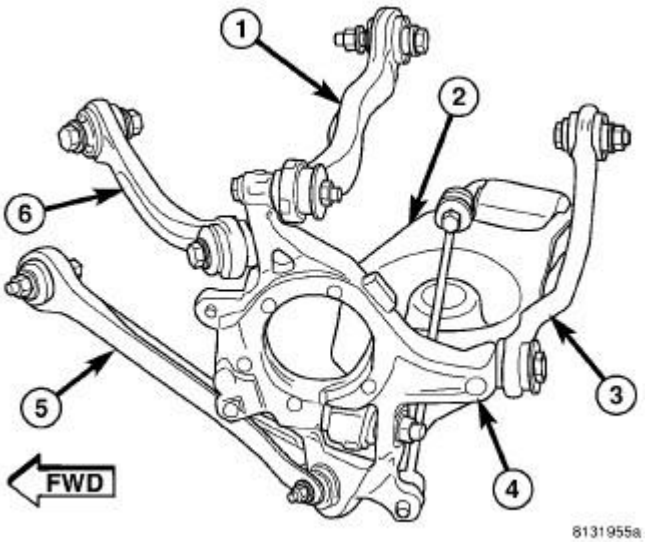

Fig. 47: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

17. Remove bolt and nut fastening compression link (5) to knuckle (4).
18. Remove bolt fastening toe link (3) to knuckle (4).
19. Remove nut and bolt fastening stabilizer link to knuckle (4).
20. Remove nut and bolt fastening tension link (6) to knuckle (4).
21. Remove nut and bolt fastening camber link (1) to knuckle (4).
22. Remove knuckle (4).
23. Remove hub mounting bolts from knuckle.

INSTALLATION

NON SRT

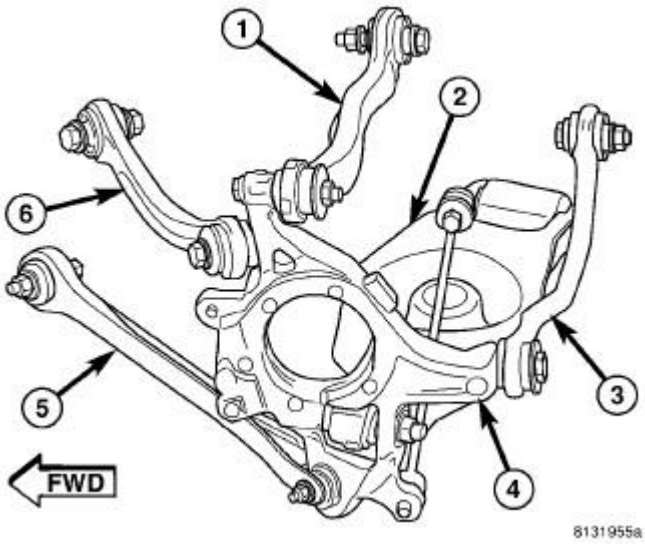

Fig. 48: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

1. Install four hub mounting bolts through knuckle from inboard side allowing ends to protrude from opposite side.
2. Position knuckle on vehicle and install bolt and nut fastening camber link (1) to knuckle (4) as shown in illustration. **Do not tighten bolt at this time.**
3. Install bolt and nut fastening tension link (6) to knuckle (4) as shown in illustration. **Do not tighten bolt at this time.**
4. Install bolt and nut fastening stabilizer link to knuckle (4). **Do not tighten bolt at this time.**
5. Install bolt fastening toe link (3) to knuckle (4). **Do not tighten bolt at this time.**
6. Install bolt and nut fastening compression link (5) to knuckle (4). **Do not tighten bolt at this time.**

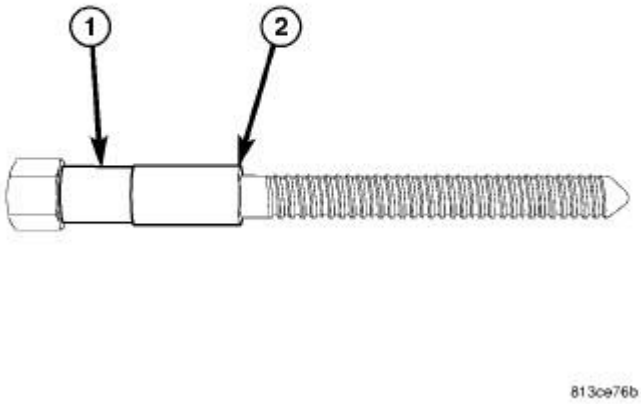

Fig. 49: Bolt & Knuckle Sleeve
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If a new knuckle sleeve is not installed in knuckle, perform 7through11.**

NOTE: **Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate bolt (1) threads to provide ease of use and promote tool longevity.**

7. Place NEW knuckle sleeve (2) onto (special tool #9361-7, Screw, Installation) (1), and slide it up to Bolt head.

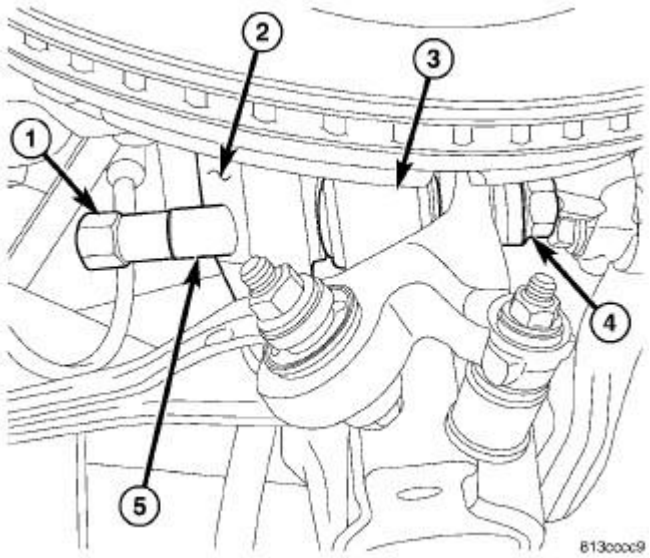

Fig. 50: Slide, Sleeve, Knuckle, Bearing And Nut

Courtesy of CHRYSLER GROUP, LLC

8. Starting from knuckle forward end, slide (special tool #9361-7, Screw, Installation) (1) with sleeve (5) through knuckle (2) and spring link ball joint (3).
9. Install thrust bearing and nut (4) on end of Bolt. **When installing thrust bearing on Installer, be sure to place hardened side against nut. Place bearing outer cage against stationary component.**
10. While holding Bolt head (1) stationary, rotate Nut (4) (using hand tools) installing sleeve in knuckle. Install sleeve until Nut stops turning. **Do not overtighten Nut.**
11. Remove special tool.

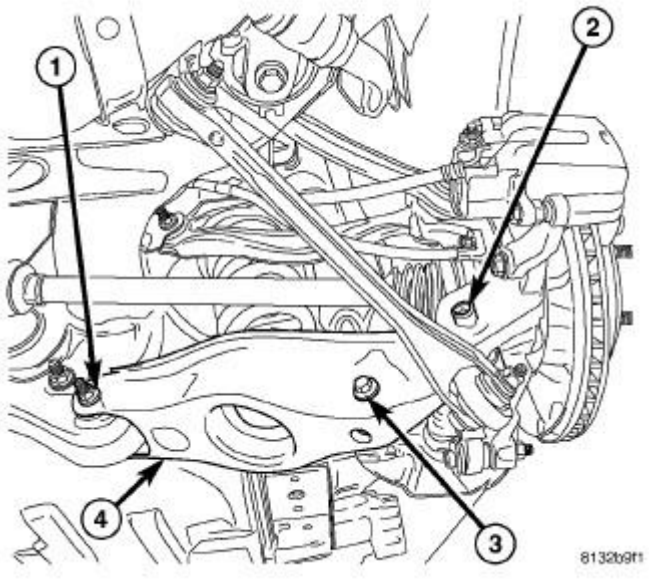

Fig. 51: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

12. Install spring link-to-knuckle bolt (2) front-to-rear through knuckle and link, then install nut. While holding bolt head stationary, tighten nut to 138 N.m (102 ft. lbs.).
13. Remove under-hoist utility jack or jack stand from under spring link.

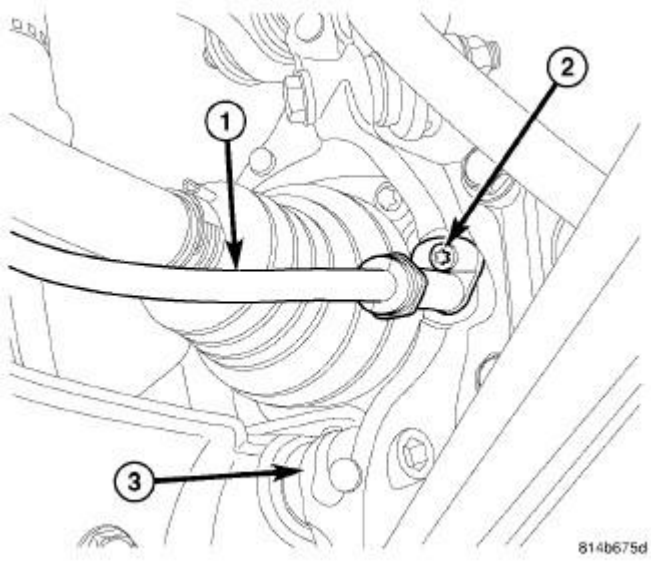

Fig. 52: Parking Brake Cable AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

14. Insert end of cable (1) through rear knuckle (3) and install mounting screw (2). Tighten screw to 8 N.m (71 in. lbs.).
15. Install parking brake shoe support over hub and bearing mounting screws and onto face of knuckle.

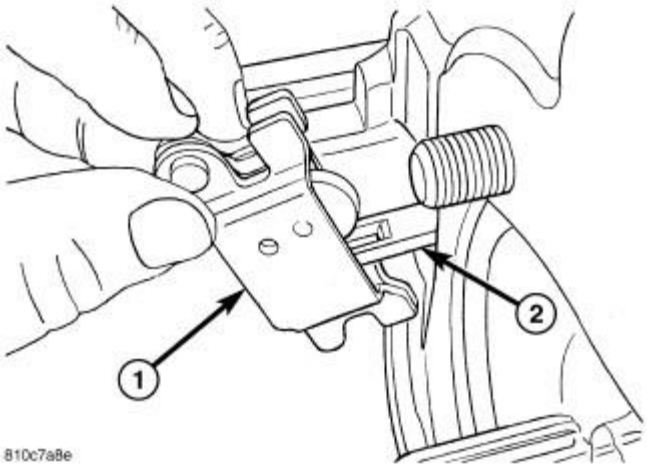

Fig. 53: Removing/Installing Actuator
Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR
2 - CABLE END

16. Install shoe actuator lever (1) on end of parking brake cable (2). Make sure actuator lever is positioned with word "UP" facing outward.

17. Install parking brake shoes as well as all components necessary to access them. Refer to **SHOES, PARKING BRAKE, INSTALLATION** .

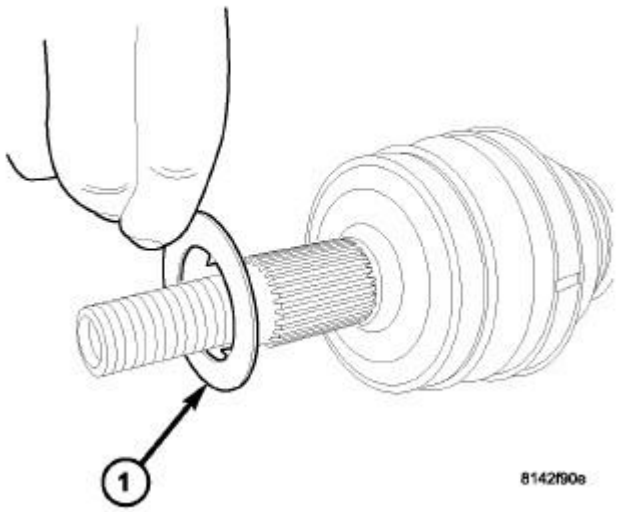

Fig. 54: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before installing hub and bearing on end of axle half shaft, ensure isolation washer is present on end of half shaft. Inspect washer making sure it is not worn or damaged. Washer can be installed in either direction on shaft.

18. Install hub and bearing as well as all components necessary to access it. Refer to **HUB AND BEARING, INSTALLATION**.

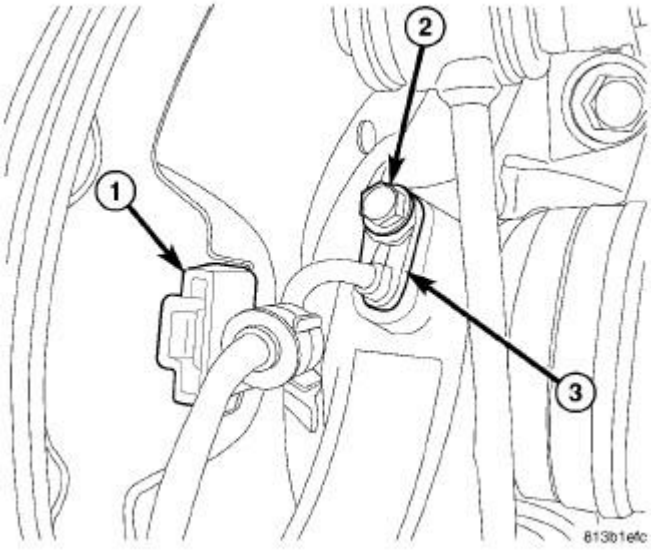

Fig. 55: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

19. Insert wheel speed sensor head (3) into mounting hole in rear of knuckle.
20. Install screw (2) fastening sensor head (3) to rear knuckle. Tighten Screw to 11 N.m (97 in. lbs.).
21. Install sensor cable at rear brake rotor shield (1).
22. Lower vehicle.
23. Adjust parking brake shoes as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .
24. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access mounting bolts.

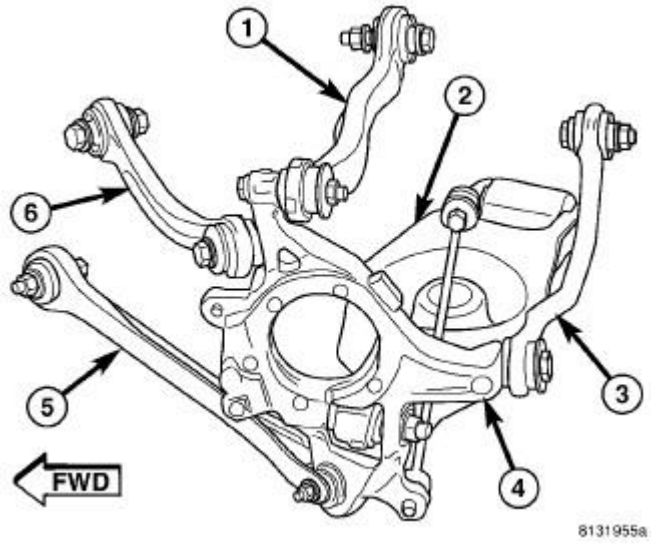

Fig. 56: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

25. Tighten fasteners at knuckle (vehicle at curb height) as follows:
    - Camber Link (1) - 98 N.m (72 ft. lbs.).
    - Compression Link (5) - 81 N.m (60 ft. lbs.).
    - Stabilizer Link - 61 N.m (45 ft. lbs.).
    - Tension Link (6) - 98 N.m (72 ft. lbs.).
    - Toe Link (3) - 95 N.m (70 ft. lbs.).
26. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

SRT

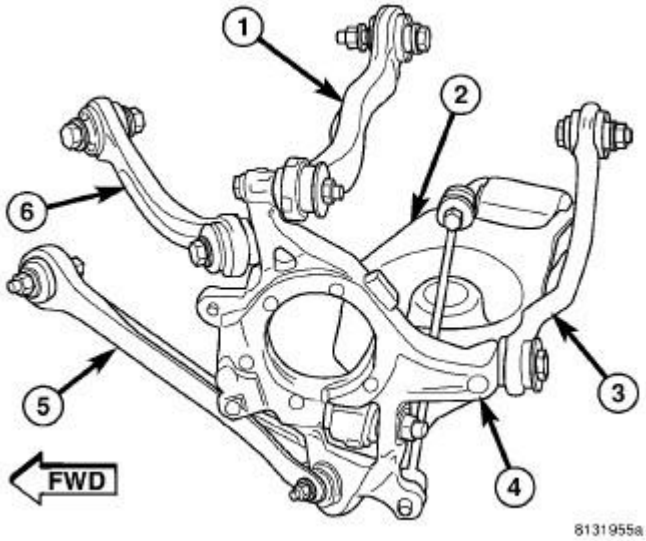

Fig. 57: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

1. Install four hub mounting bolts through knuckle from inboard side allowing ends to protrude from opposite side.
2. Position knuckle on vehicle and install bolt and nut fastening camber link (1) to knuckle (4) as shown in illustration. **Do not tighten bolt at this time.**
3. Install bolt and nut fastening tension link (6) to knuckle (4) as shown in illustration. **Do not tighten bolt at this time.**
4. Install bolt and nut fastening stabilizer link to knuckle (4). **Do not tighten bolt at this time.**
5. Install bolt fastening toe link (3) to knuckle (4). **Do not tighten bolt at this time.**
6. Install bolt and nut fastening compression link (5) to knuckle (4). **Do not tighten bolt at this time.**

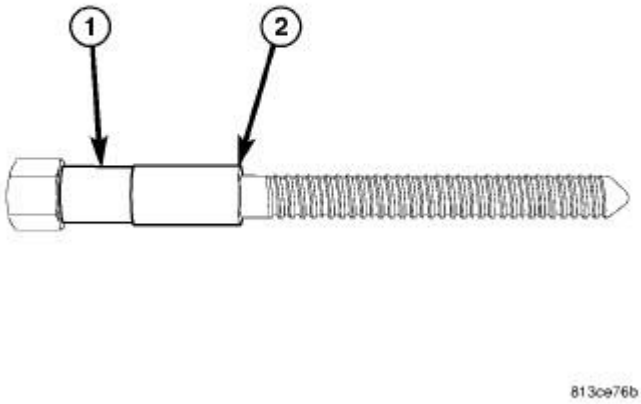

Fig. 58: Bolt & Knuckle Sleeve
Courtesy of CHRYSLER GROUP, LLC

NOTE: If a new knuckle sleeve is not installed in knuckle, perform 7through 11.

NOTE: Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate bolt (1) threads to provide ease of use and promote tool longevity.

7. Place NEW knuckle sleeve (2) onto (special tool #9361-12, Installer, Bushing) (1), and slide it up to the bolt head.

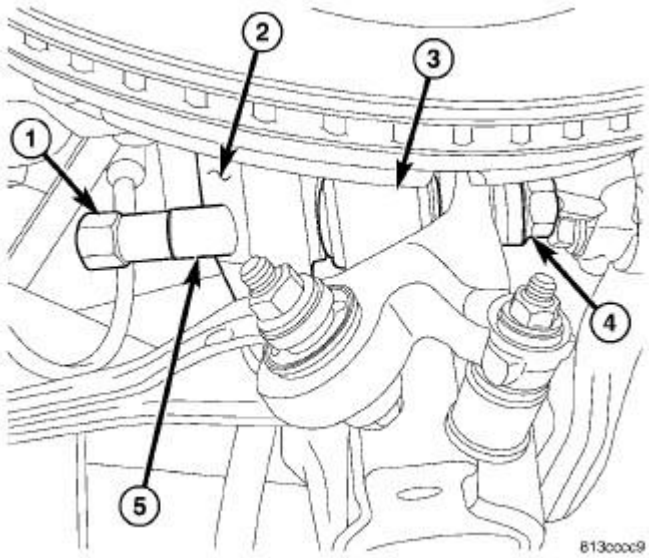

Fig. 59: Slide, Sleeve, Knuckle, Bearing And Nut

Courtesy of CHRYSLER GROUP, LLC

8. Starting from knuckle forward end, slide (special tool #9361-12, Installer, Bushing) (1) with sleeve (5) through knuckle (2) and spring link ball joint (3).
9. Install Installation Thrust Bearing (around 3/8 inch thick) and special flange nut (4) on end of Bolt. **When installing thrust bearing on Installer, be sure to place hardened side against nut. Place bearing outer cage against stationary component.**
10. While holding Bolt head (1) stationary, rotate Nut (4) (using hand tools) installing sleeve in knuckle. Install sleeve until Nut stops turning. **Do not overtighten Nut.**
11. Remove special tool.

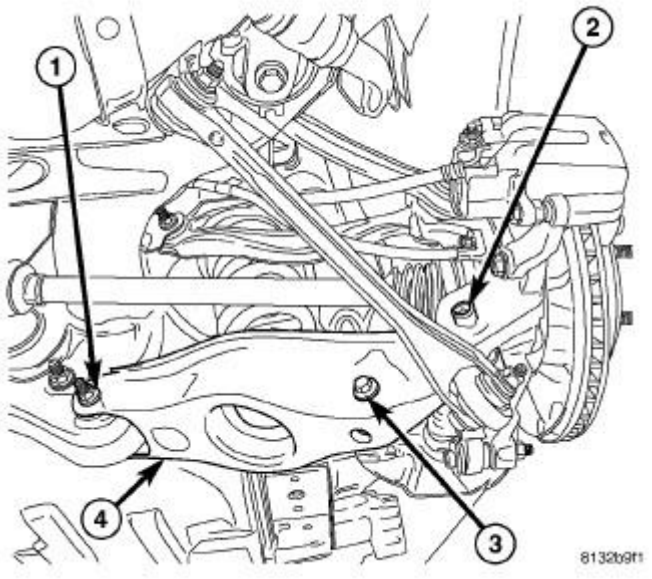

Fig. 60: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

12. Install spring link-to-knuckle bolt (2) front-to-rear through knuckle and link, then install nut. While holding bolt head stationary, tighten nut to 138 N.m (102 ft. lbs.).
13. Remove under-hoist utility jack or jack stand from under spring link.

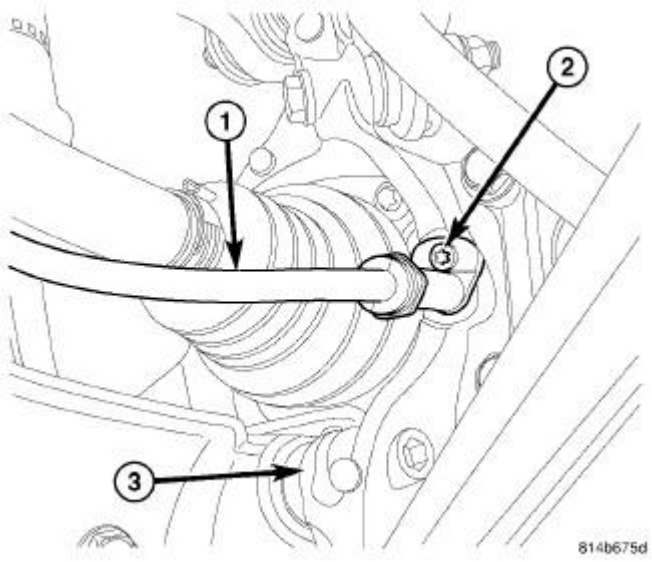

Fig. 61: Parking Brake Cable AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

14. Insert end of cable (1) through rear knuckle (3) and install mounting screw (2). Tighten screw to 8 N.m (71 in. lbs.).
15. Install parking brake shoe support over hub and bearing mounting screws and onto face of knuckle.

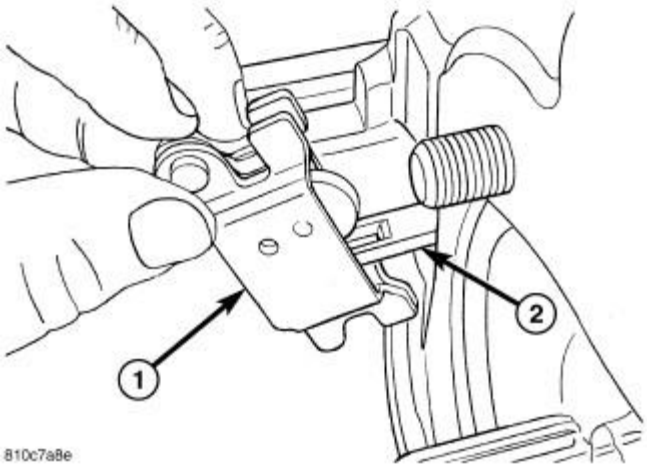

Fig. 62: Removing/Installing Actuator
Courtesy of CHRYSLER GROUP, LLC

1 - PARKING BRAKE SHOE ACTUATOR
2 - CABLE END

16. Install shoe actuator lever (1) on end of parking brake cable (2). Make sure actuator lever is positioned with word "UP" facing outward.

17. Install parking brake shoes as well as all components necessary to access them. Refer to **SHOES, PARKING BRAKE, INSTALLATION** .

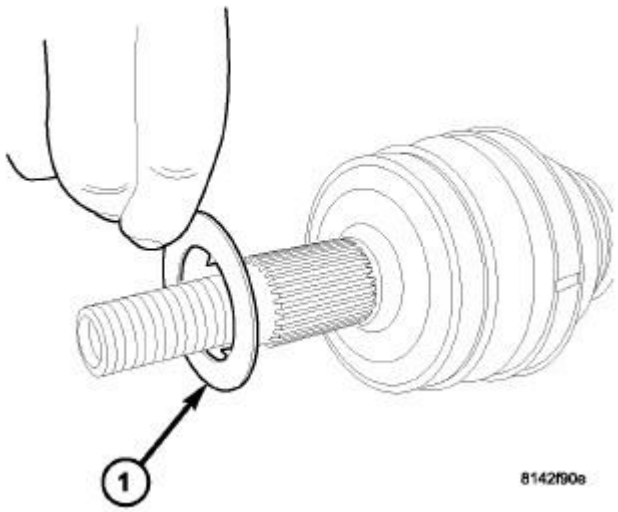

Fig. 63: Halfshaft Isolation Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before installing hub and bearing on end of axle half shaft, ensure isolation washer is present on end of half shaft. Inspect washer making sure it is not worn or damaged. Washer can be installed in either direction on shaft.

18. Install hub and bearing as well as all components necessary to access it. Refer to **HUB AND BEARING, INSTALLATION**.

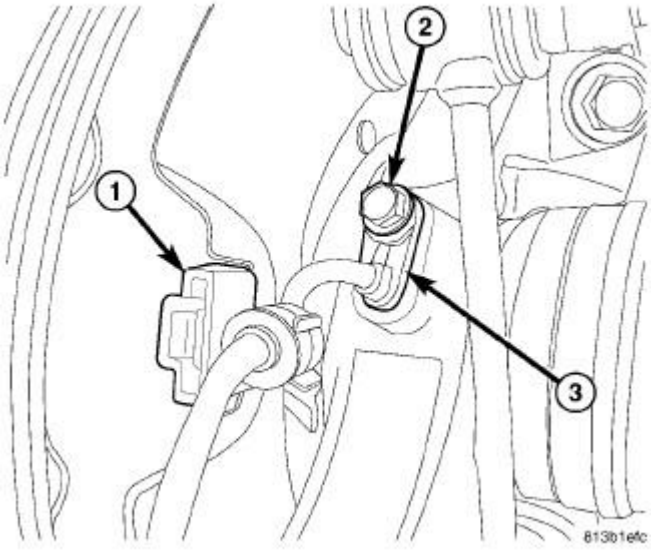

Fig. 64: Wheel Speed Sensor AT Rear Knuckle
Courtesy of CHRYSLER GROUP, LLC

19. Insert wheel speed sensor head (3) into mounting hole in rear of knuckle.
20. Install screw (2) fastening sensor head (3) to rear knuckle. Tighten Screw to 11 N.m (97 in. lbs.).
21. Install sensor cable at rear brake rotor shield (1).
22. Lower vehicle.
23. Adjust parking brake shoes as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .
24. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access mounting bolts.

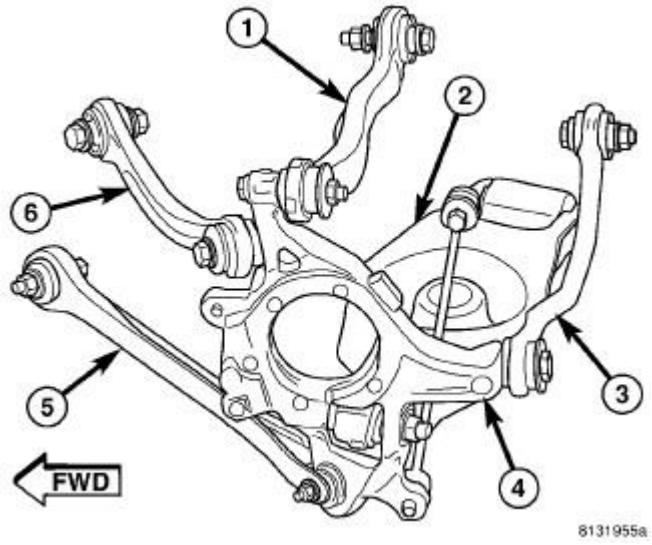

Fig. 65: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

25. Tighten fasteners at knuckle (vehicle at curb height) as follows:
    - Camber Link (1) - 98 N.m (72 ft. lbs.)
    - Compression Link (5) - 81 N.m (60 ft. lbs.)
    - Stabilizer Link - 61 N.m (45 ft. lbs.)
    - Tension Link (6) - 98 N.m (72 ft. lbs.)
    - Toe Link (3) - 95 N.m (70 ft. lbs.)
26. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, CAMBER

REMOVAL

REMOVAL

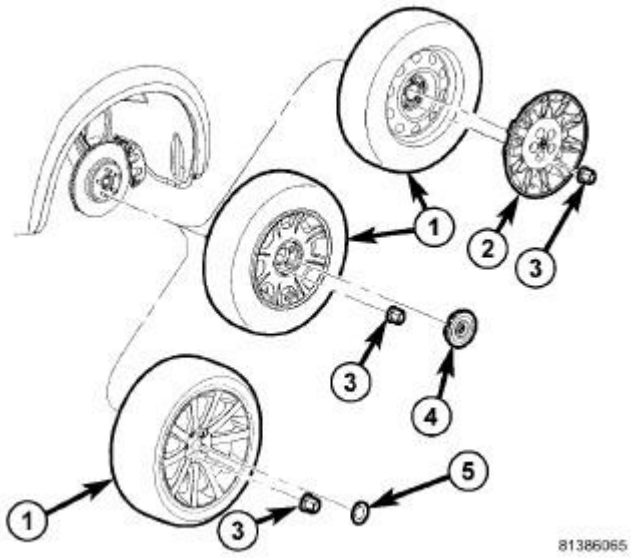

Fig. 66: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. On both sides of vehicle, remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

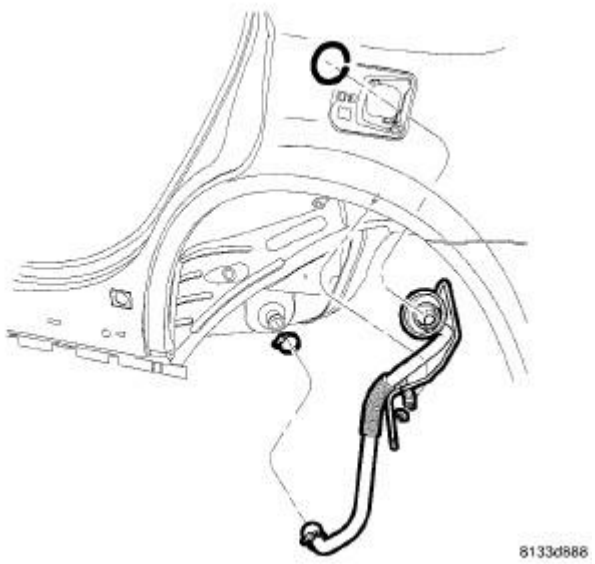

Fig. 67: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

3. If servicing left side, remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .
4. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.
5. Perform following if vehicle is equipped with dual-exhaust or are servicing right side on vehicle with single exhaust.
    1. Position under-hoist utility jack or stand several inches below exhaust at muffler.
    2. Disconnect exhaust isolators at muffler and resonators hangers.
    3. Lower exhaust down to rest upon top of jack or stand placed below muffler.

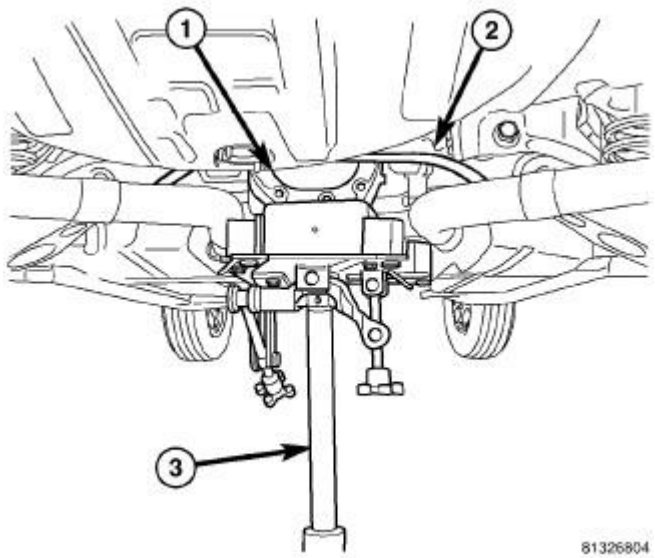

Fig. 68: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

6. Position under-hoist utility jack or transmission jack (3) under center of rear axle differential (1). Raise jack head to contact differential and secure in place. **When securing crossmember to jack, be sure not to secure stabilizer bar.**

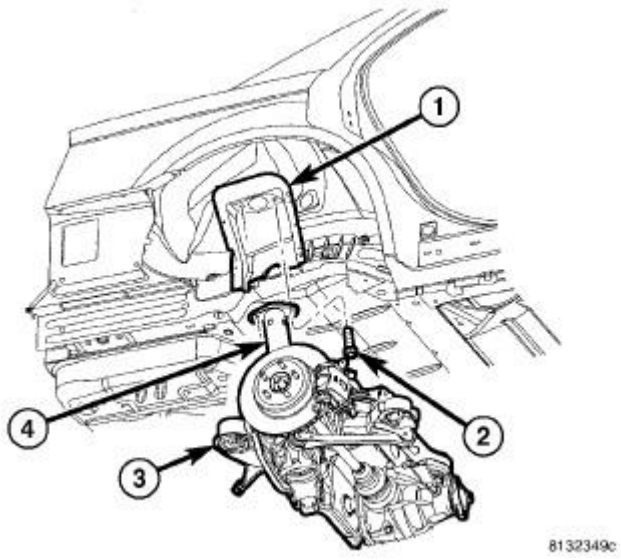

Fig. 69: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

7. Remove shock absorber (1) upper mounting screws (2).

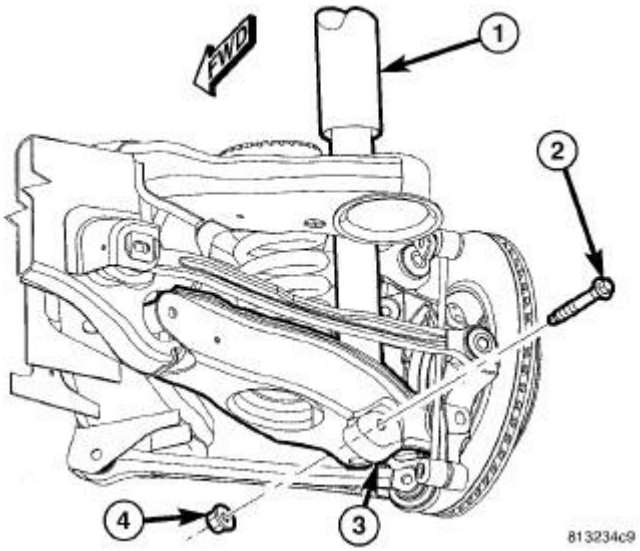

Fig. 70: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

8. Remove shock absorber (1) lower mounting bolt (2) and nut (4).

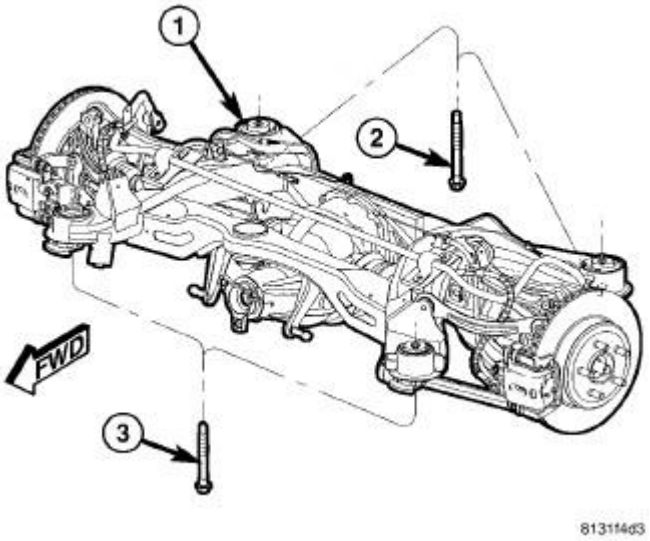

Fig. 71: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing crossmember mounting bolts (2 and 3) it is important NOT to loosen or remove crossmember mounting bolts on opposite side of vehicle. Doing so will require rear wheel alignment following reinstallation to ensure proper thrust angle.

9. Remove both front and rear crossmember mounting bolts (2 and 3) on repair-side of vehicle.

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember (1) any further than necessary to remove shock absorber.

10. **Slowly** lower jack allowing repair-side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow top of shock absorber to clear body flange.

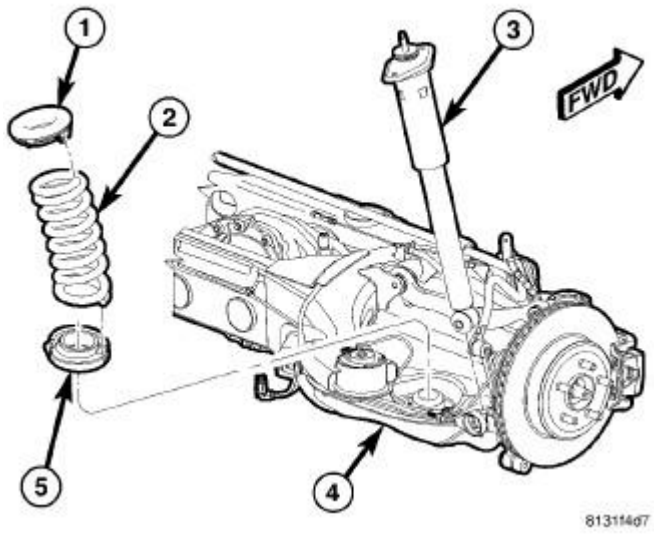

Fig. 72: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

11. Remove shock absorber (3) by tipping top outward and lifting lower end out of pocket in spring link (4).

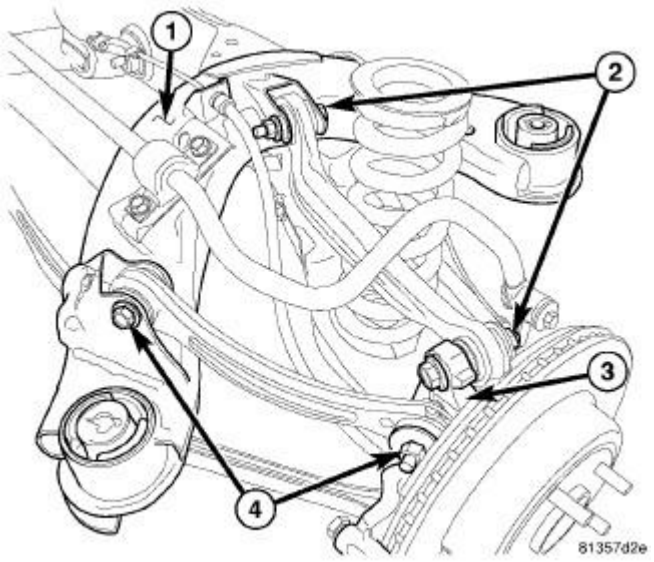

Fig. 73: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not lower repair-side of crossmember any further than necessary to gain access to link mounting bolts at crossmember.

12. Remove nut and bolt (2) mounting link to knuckle (3).
13. Remove nut and bolt (2) mounting link to crossmember (1).
14. Remove link.

INSTALLATION

INSTALLATION

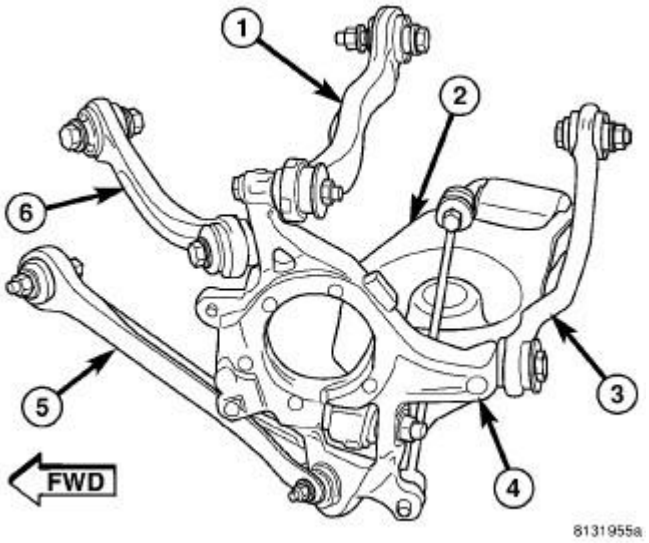

Fig. 74: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing link (1), ensure following to avoid mis-installation:

- **Heavier, thicker end goes toward crossmember.**
- **Fore-or-aft bow faces forward (curves around coil spring).**
- **Up-or-down bow faces downward.**

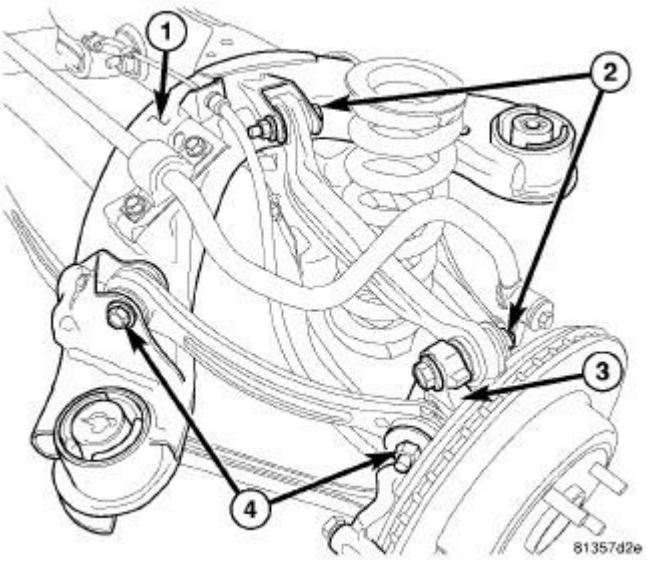

Fig. 75: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

1. Place link in bracket on crossmember (1). Install bolt and nut (2) at crossmember (1) as shown

in illustration. **Do not tighten bolt at this time.**

2. Install bolt and nut (2) mounting link to knuckle (3) as shown in illustration. **Do not tighten bolt at this time.**

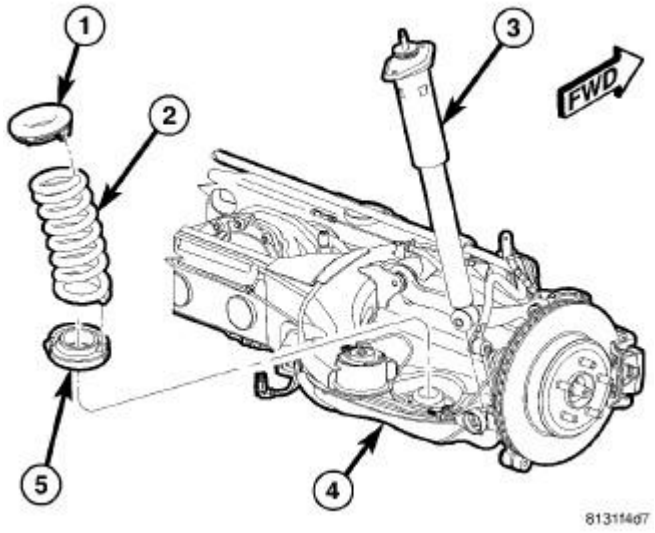

Fig. 76: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

3. Install shock absorber (3) by setting lower end into pocket in spring link (4), then tipping top inward until aligned with upper mounting holes.

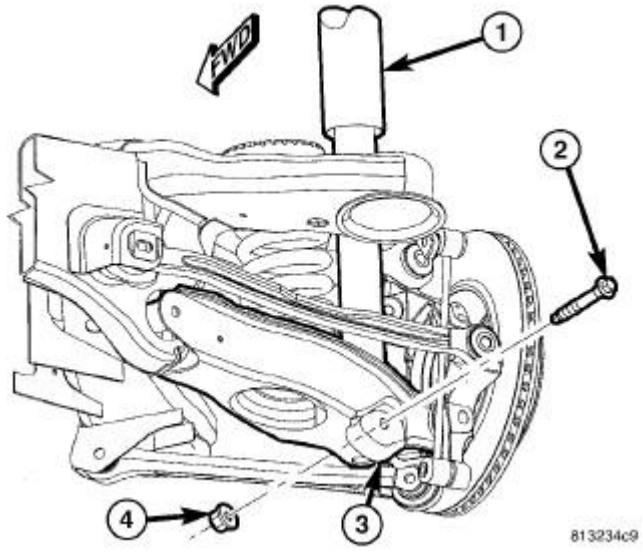

Fig. 77: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

4. Install lower shock mounting bolt and nut. **Do not tighten at this time.**

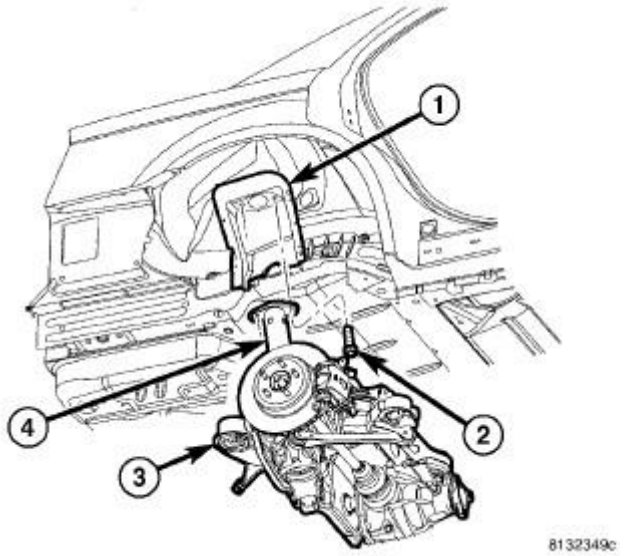

Fig. 78: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

5. Carefully raise jack, guiding coil spring and upper end of shock absorber (4) into mounted positions.
6. Install shock absorber upper mounting screws (2). Tighten upper mounting screws to 52 N.m (38 ft. lbs.).

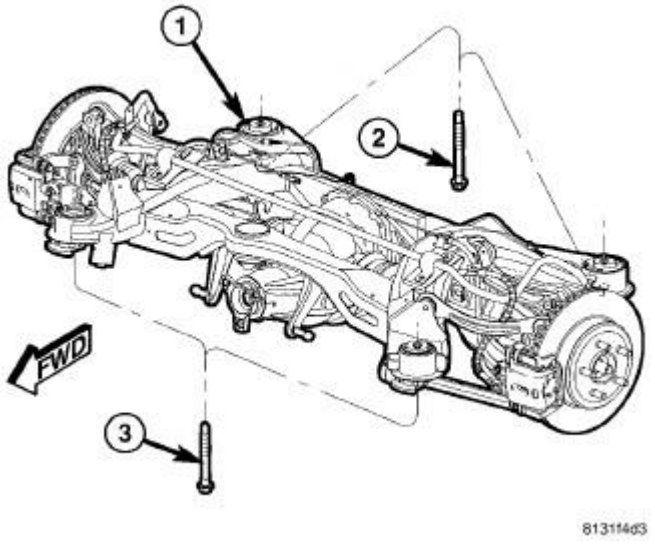

Fig. 79: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Rear crossmember mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.**

7. Install crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

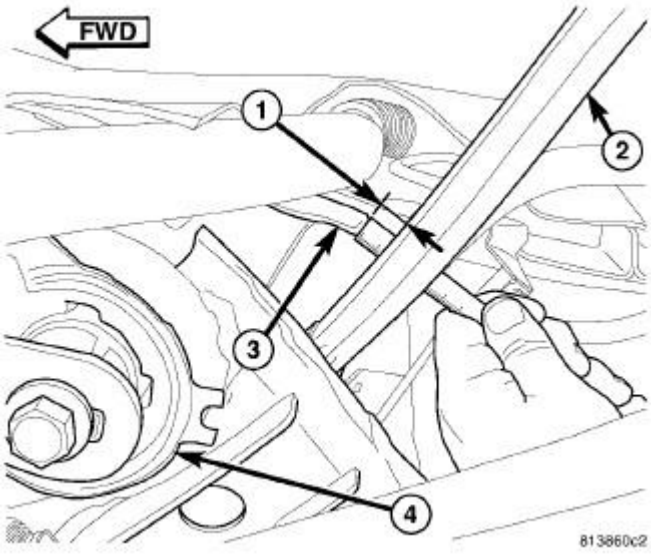

Fig. 80: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

8. Measure distance (1) between from tension link (2) to body weld flange (3) directly in front of it, just outboard of front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Measure opposite side to be sure it also maintains minimum 12 mm distance.

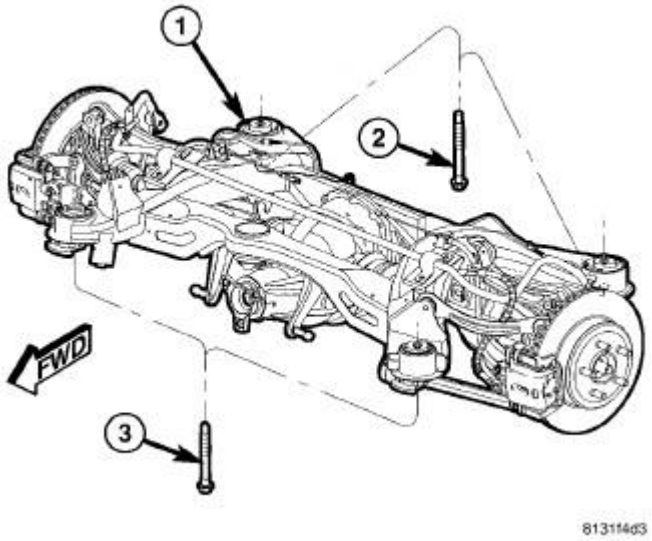

Fig. 81: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Tighten all crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

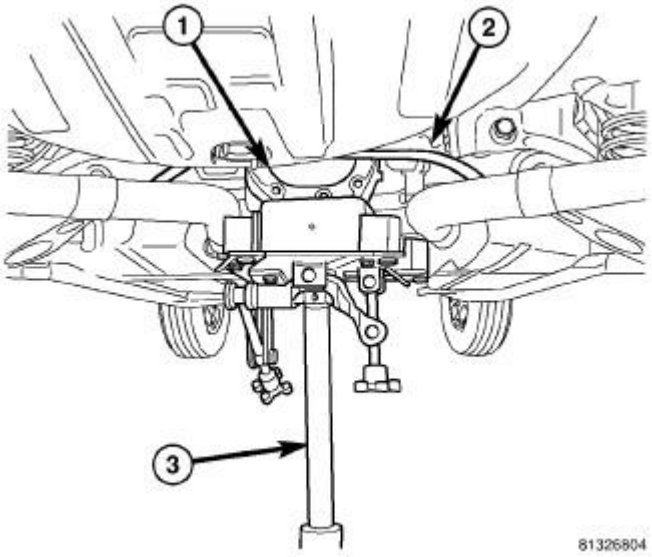

Fig. 82: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

10. Remove jack (3) from under rear axle differential.
11. If previously lowered, raise rear exhaust back to mounted position and connect exhaust isolators at muffler and resonators hangers. Remove jack or stand below exhaust muffler.

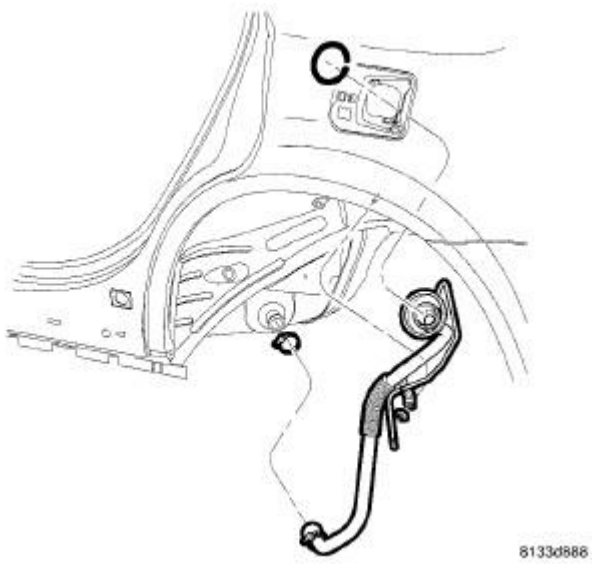

Fig. 83: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

12. If removed, install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

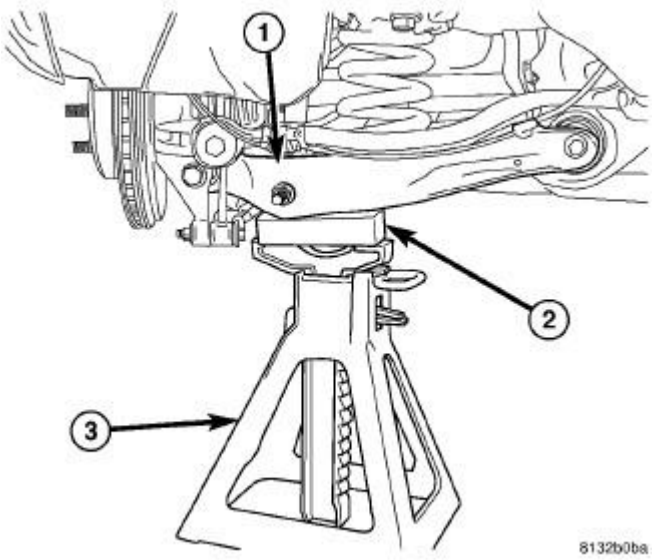

Fig. 84: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

13. Lower vehicle until front tires contact floor but rear is still suspended. Place jack stands under each rear suspension spring link. Place an appropriate wooden block between stand and link to avoid damaging spring link, then lower vehicle until full vehicle weight is supported by suspension.

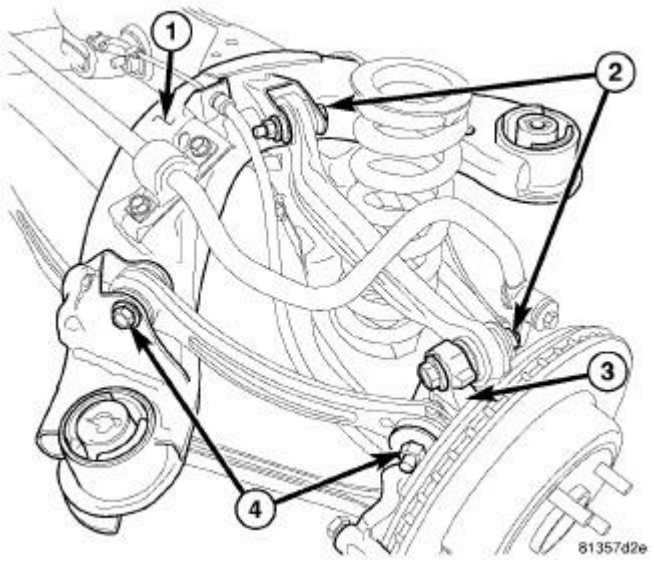

Fig. 85: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

14. Tighten camber link fasteners (2) to:
    - Bolt at crossmember - 85 N.m (63 ft. lbs.).
    - Bolt nut at knuckle - 98 N.m (72 ft. lbs.).

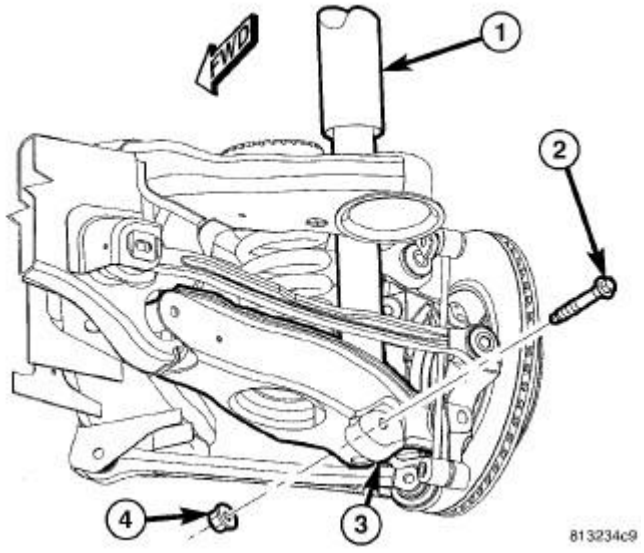

Fig. 86: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

15. Tighten shock absorber lower mounting bolt nut (4) to 72 N.m (53 ft. lbs.).

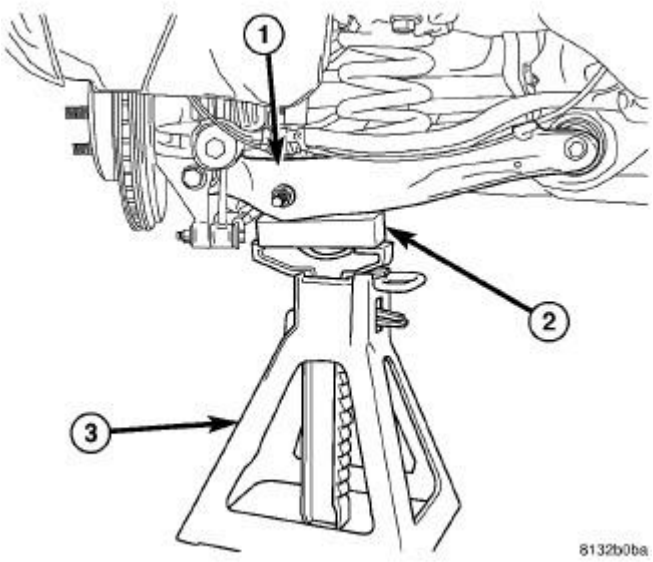

Fig. 87: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

16. Raise vehicle and remove jack stands (3).

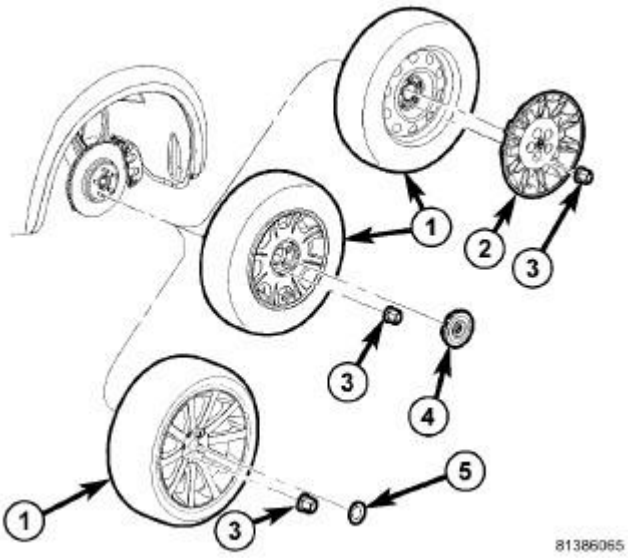

Fig. 88: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

17. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .
18. Lower vehicle.
19. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, COMPRESSION

REMOVAL

REMOVAL

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

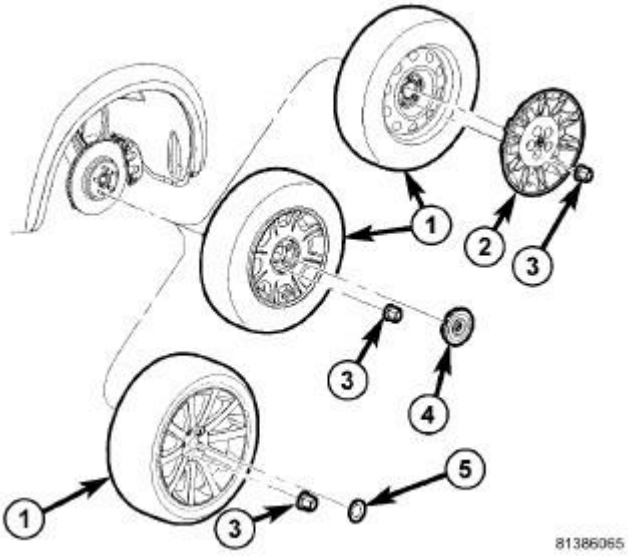

Fig. 89: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

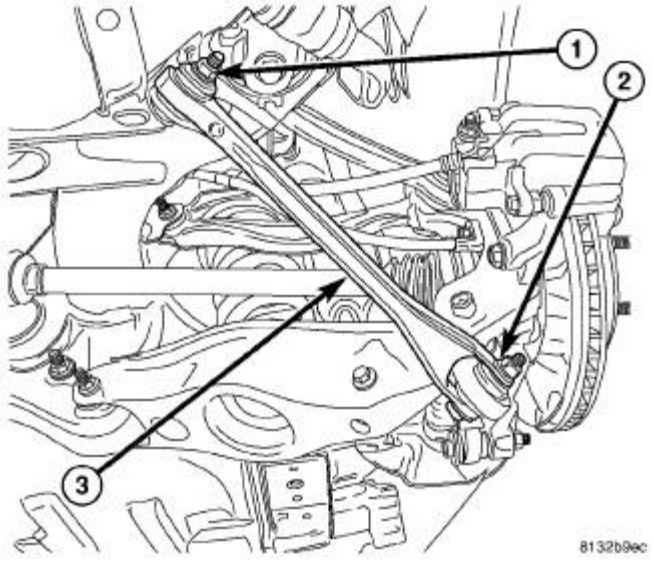

Fig. 90: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolt and nut (2) mounting link (3) at knuckle.
4. Remove bolt and nut (1) mounting link (3) at crossmember.
5. Remove link (3).

INSTALLATION

INSTALLATION

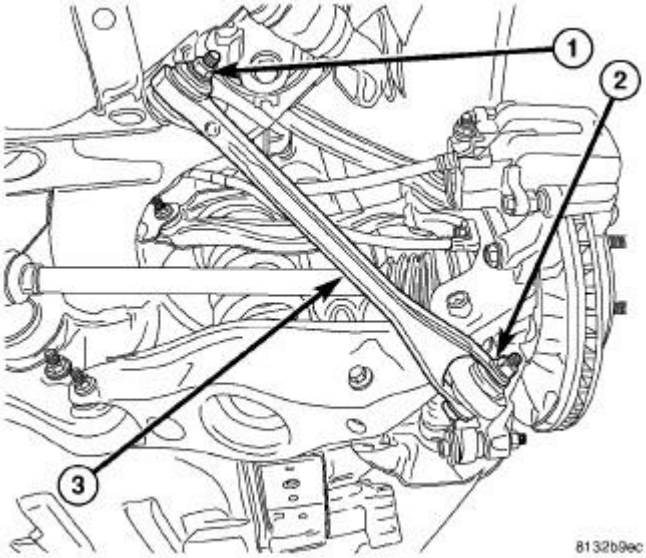

Fig. 91: Compression Link Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: Although the compression link is different end-to-end, there is no top and bottom.

1. Position link and install bolt and nut (1) mounting link (3) at crossmember. **Do not tighten bolt at this time.**
2. Install bolt and nut (2) mounting link (3) at knuckle. **Do not tighten bolt at this time.**

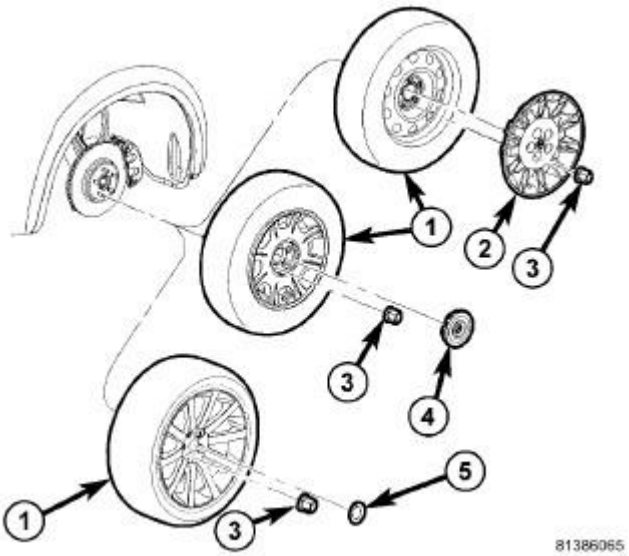

Fig. 92: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

3. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
4. Lower vehicle.
5. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access link fasteners.
6. Tighten compression link fasteners to:
   - Bolt at crossmember - 85 N.m (63 ft. lbs.).
   - Bolt at knuckle - 81 N.m (60 ft. lbs.).
7. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, SPRING

REMOVAL

NON SRT

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Access and remove rear spring. Refer to **SPRING(S), REMOVAL**.

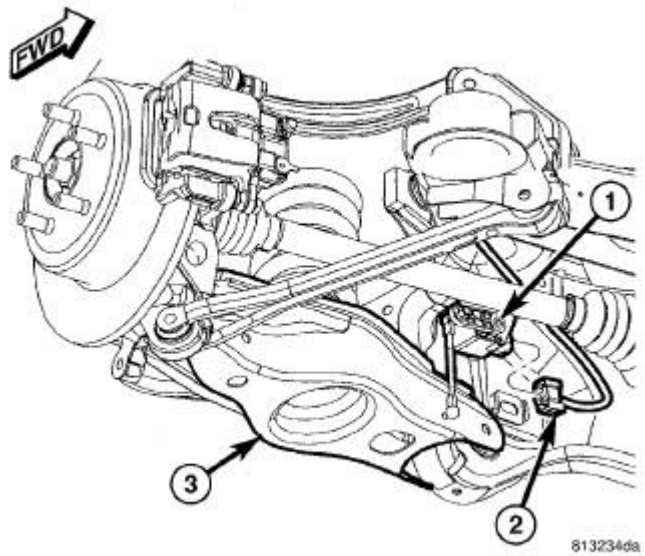

Fig. 93: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Export Only - If servicing right spring link, disconnect headlamp leveling sensor (1) link at spring link (3).

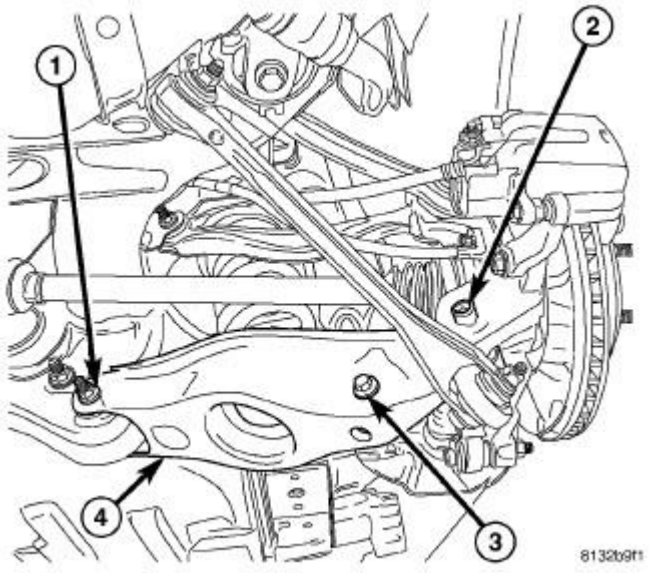

Fig. 94: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove spring link-to-knuckle nut and bolt (2).

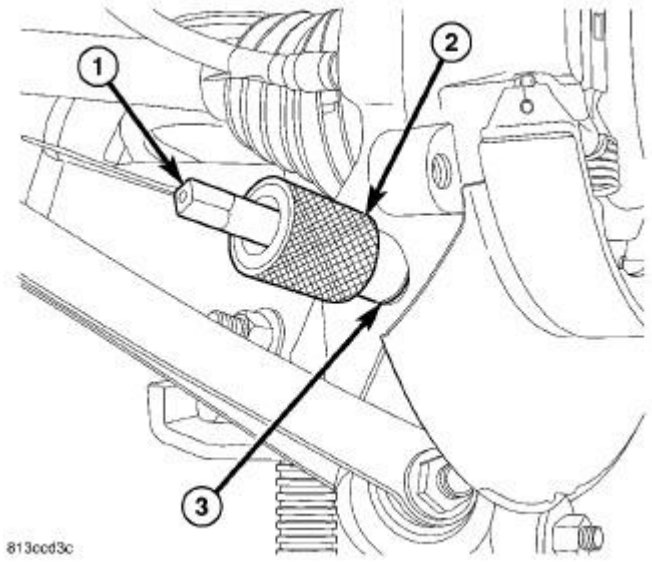

Fig. 95: Using Tap & Guide
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It important to use (special tool #9361-2, Tap Guide) (2) when tapping sleeve in knuckle to help keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1) straight during use or damage to Tap may occur.

5. Place (special tool #9361-2, Tap Guide) (2) against sleeve (3) in knuckle to keep(special tool #9361-1, Tap, Plug M16 X 2.0) (1) straight. Using Tap with an appropriate handle, cut threads approximately halfway through bushing (or about six complete threads). **It is important to back tap out, clean out burrs and lubricate Tap often during process.**

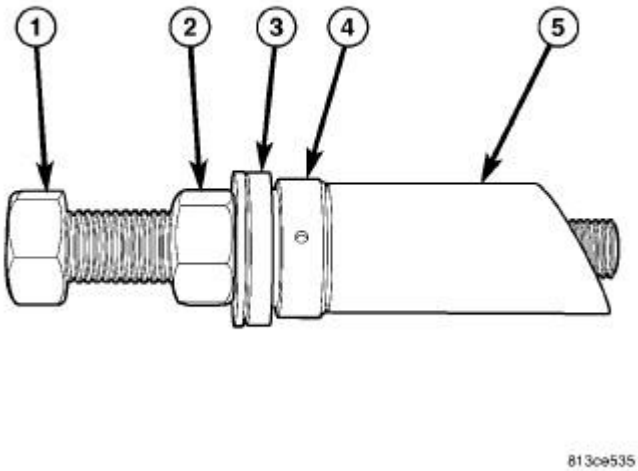

Fig. 96: Lubricate Bolt & Rear Knuckle Sleeve Remover/Installer Kit

Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate Bolt (1) threads to provide ease of use and promote tool longevity.

6. Assemble (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit) as shown in illustration.
   - (1) (special tool #9361-3, Screw, Forcing)
   - (2) Nut
   - (3) Spherical Washer
   - (4) Thrust Bearing
   - (5) (special tool #9361-4, Cup, Bushing) (RWD)
   - (5) (special tool #9361-5, Cup, Double Angle) (AWD - Left Side)
   - (5) (special tool #9361-6, Cup, Double Angle) (AWD - Right Side)

NOTE: When installing thrust bearing on Remover, be sure to place hardened side against nut. Place bearing outer cage against stationary component.

NOTE: It is important to use appropriate Sleeve on Remover to provide proper Tool-to-Knuckle contact. RWD sleeve can be used on either side while AWD knuckles require specific left or right side Sleeves.

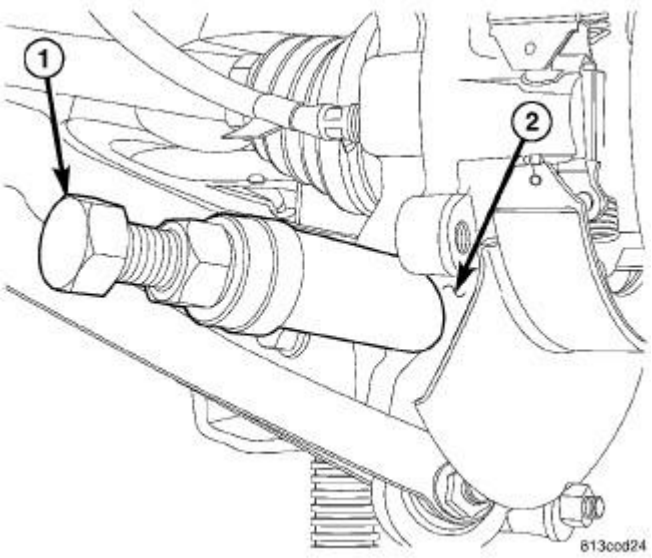

Fig. 97: Sleeve Removal Using
Courtesy of CHRYSLER GROUP, LLC

7. Thread (special tool #9361-3, Screw, Forcing) (1) into tapped knuckle sleeve.

8. Rotate Nut down, matching Sleeve angled end with angled face of knuckle.
9. Continue to rotate Nut until knuckle sleeve is removed from knuckle. **Discard knuckle sleeve; replace it with new upon installation.**

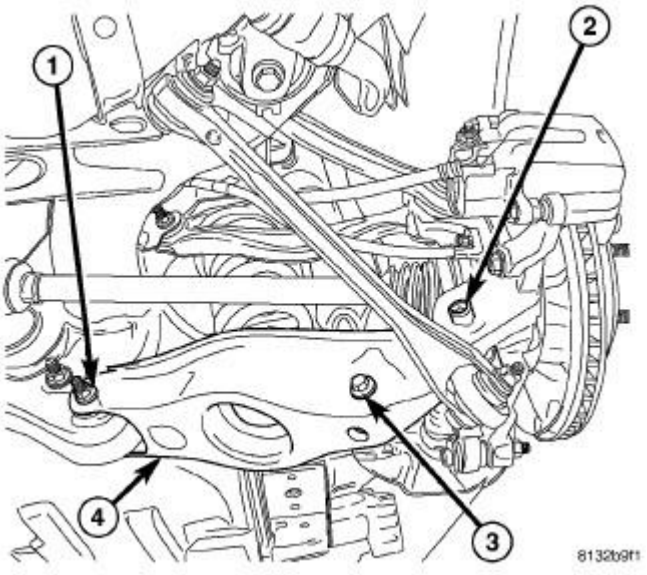

Fig. 98: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Remove bolt and nut (1) fastening spring link (4) to crossmember.
11. Remove spring link (4).

SRT

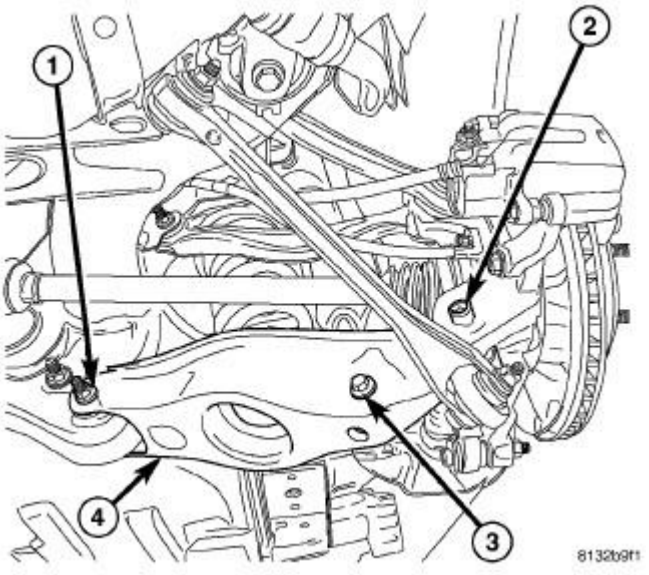

Fig. 99: Spring Link Mounting

Courtesy of CHRYSLER GROUP, LLC

1. Access and remove rear brake rotor on side of repair. Refer to **ROTOR, BRAKE, REMOVAL** .
2. Access and remove rear spring on side of repair. Refer to **SPRING(S), REMOVAL**.
3. Remove spring link-to-knuckle nut and bolt (2).

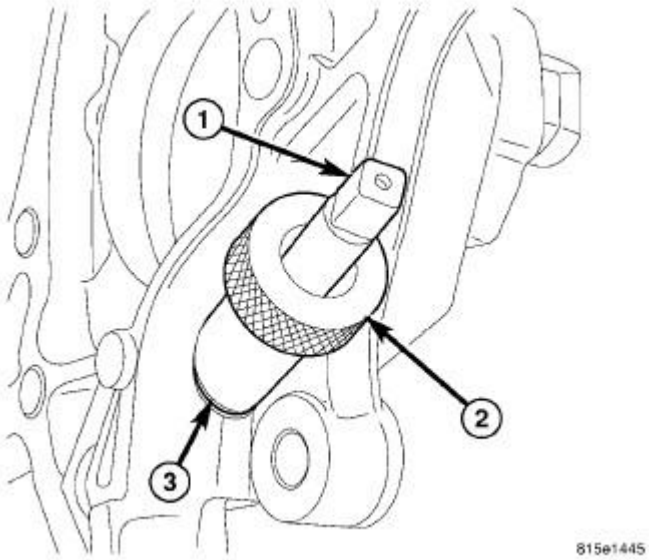

Fig. 100: Using Tap & Guide
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It important to use (special tool #9361-11, Guide, Tap) (2), when tapping sleeve in knuckle to help keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1), straight during use or damage to Tap may occur.

4. Place Guide (special tool #9361-11, Guide, Tap) (2) against sleeve (3) in knuckle to keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1) straight. Using Tap with an appropriate handle, cut threads approximately halfway through bushing (or about six complete threads). **It is important to back tap out, clean out burrs and lubricate Tap often during process.**

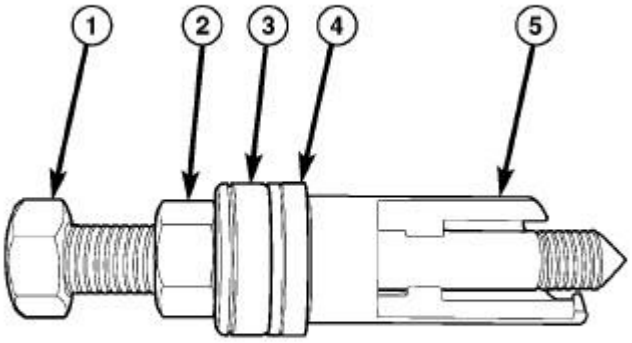

Fig. 101: Rear Knuckle Sleeve Remover/Installer Kit
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate Bolt (1) threads to provide ease of use and promote tool longevity.

5. Assemble Remover, (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), as shown in illustration.
   - (1) (special tool #9361-3, Screw, Forcing)
   - (2) Nut
   - (3) Thrust Bearing
   - (4) Spherical Washer
   - (5) (special tool #9361-9, Cup, Remover, Left Side) (Left Side - Shown in figure)
   - (5) (special tool #9361-10, Cup, Remover, Right Side) (Right Side)

NOTE: When installing thrust bearing (3) on Remover, be sure to place hardened side against nut (2). Place bearing outer cage against stationary component.

NOTE: It is important to use appropriate Sleeve ((special tool #9361-9, Cup, Remover, Left Side) or (special tool #9361-10, Cup, Remover, Right Side)) on Remover to provide proper Tool-to-Knuckle contact.

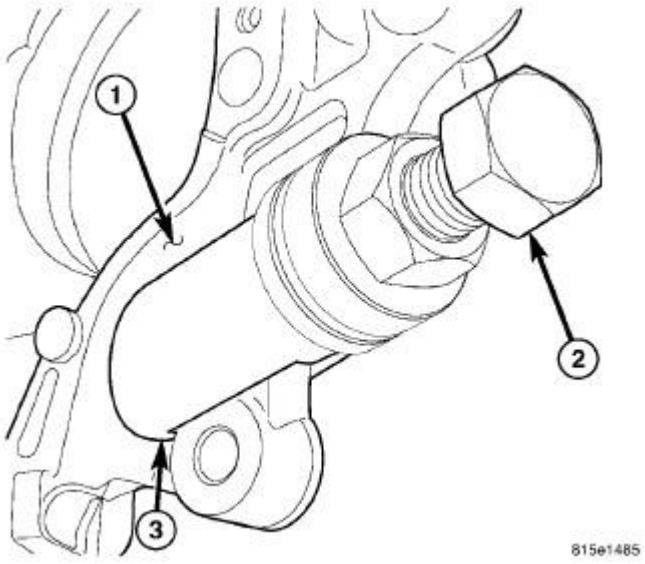

Fig. 102: Thread, knuckle & Sleeve
Courtesy of CHRYSLER GROUP, LLC

6. Thread (special tool #9361-3, Screw, Forcing) (2) into tapped knuckle sleeve.
7. Rotate Nut down, matching Sleeve ((special tool #9361-9, Cup, Remover, Left Side) or (special tool #9361-10, Cup, Remover, Right Side)) angled end with angled face of knuckle (1). **Make sure foot on Sleeve (3) is inserted behind machined brake caliper mounting boss.**
8. Continue to rotate Nut until knuckle sleeve is removed from knuckle. **Discard knuckle sleeve; replace it with new upon installation.**

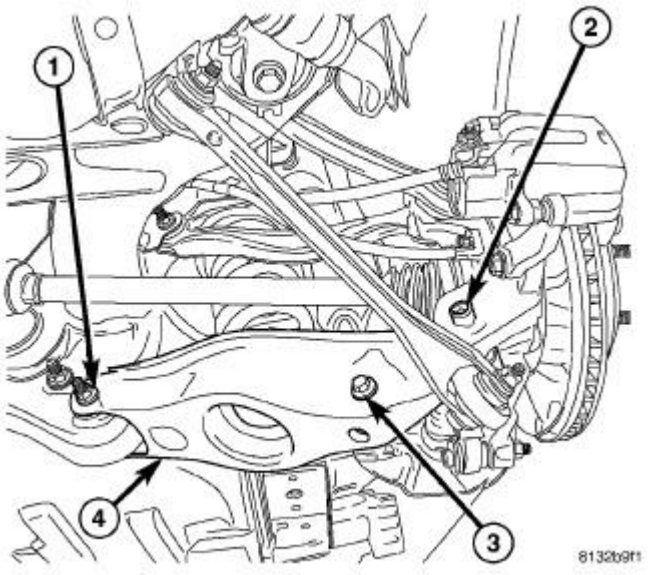

Fig. 103: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolt and nut (1) fastening spring link (4) to crossmember.
10. Remove spring link (4).

INSTALLATION

NON SRT

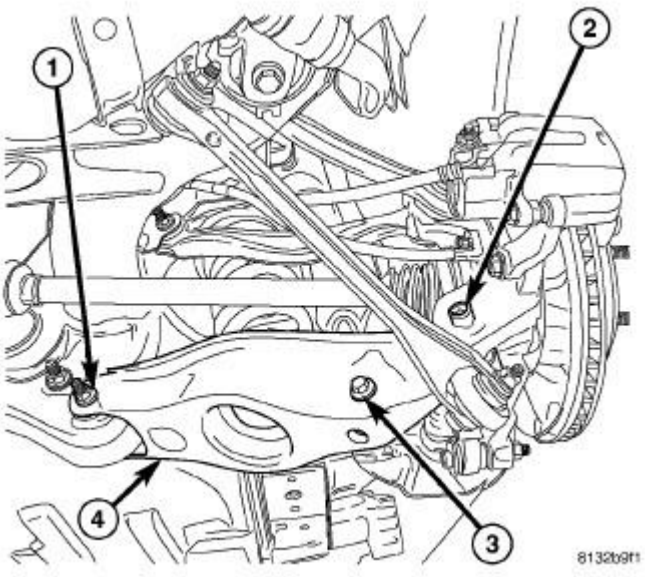

Fig. 104: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Guide ball joint end of spring link (4) into mounting pocket of knuckle, then swing opposite end up to bushing in crossmember and install bolt and nut (1) fastening spring link (4) to crossmember. **Do not tighten bolt at this time.**

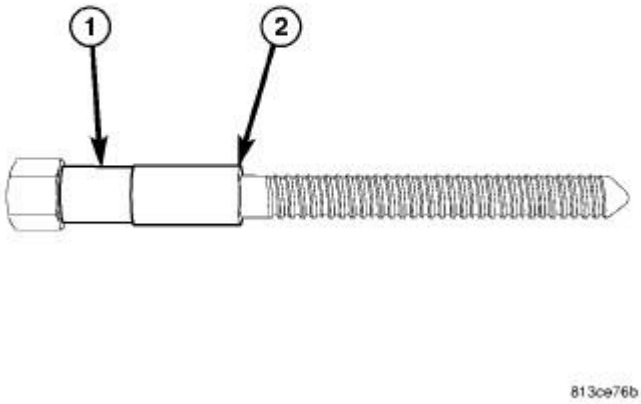

Fig. 105: Bolt & Knuckle Sleeve
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate bolt (1) threads to provide ease of use and promote tool longevity.

2. Place NEW knuckle sleeve (2) onto (special tool #9361-7, Screw, Installation) (1), and slide it up to Bolt's head.

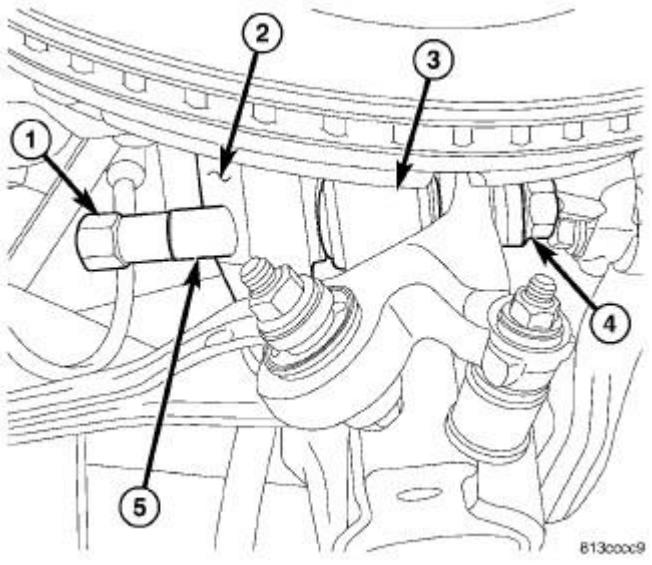

Fig. 106: Slide, Sleeve, Knuckle, Bearing And Nut
Courtesy of CHRYSLER GROUP, LLC

3. Starting from knuckle forward end, slide Bolt (special tool #9361-7, Screw, Installation) (1) with sleeve (5) through knuckle (2) and spring link ball joint (3).
4. Install thrust bearing and nut (4) on end of Bolt. **When installing thrust bearing on Installer, be sure to place hardened side against nut. Place bearing outer cage against stationary component.**
5. While holding Bolt head (1) stationary, rotate Nut (4) (using hand tools) installing sleeve in knuckle. Install sleeve until Nut stops turning. **Do not overtighten Nut.**
6. Remove special tool.

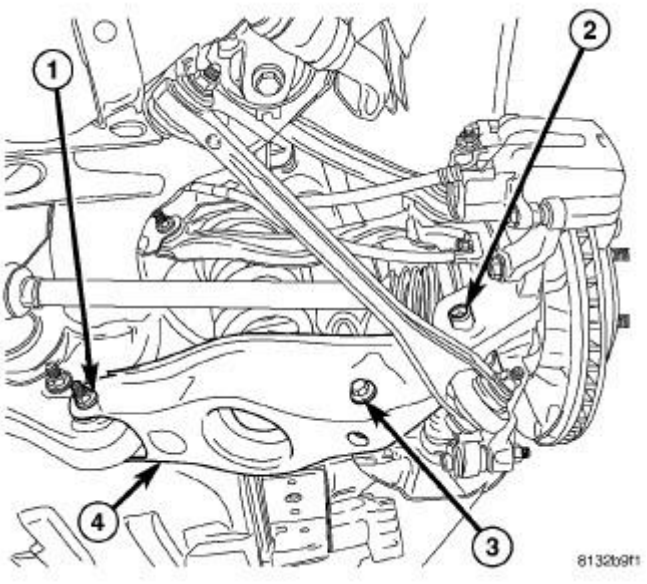

Fig. 107: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Install spring link-to-knuckle bolt (2) front-to-rear through knuckle and link, then install nut. While holding bolt head stationary, tighten nut to 138 N.m (102 ft. lbs.).

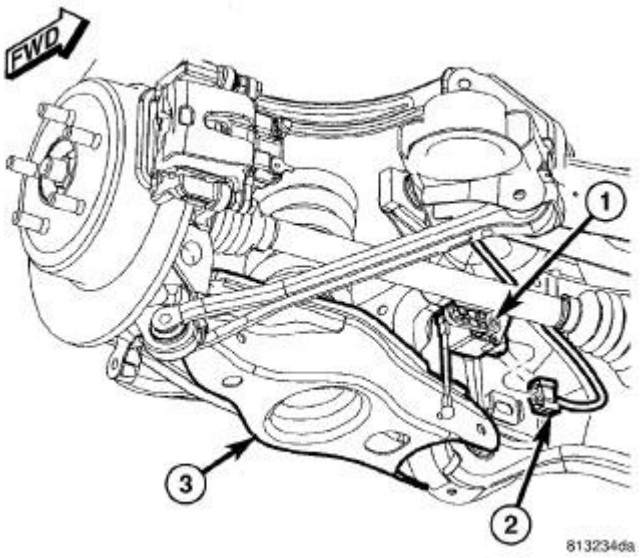

Fig. 108: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

8. Export Only - If servicing right spring link, connect headlamp leveling sensor (1) link at spring link (3).
9. Install rear spring as well as all components necessary to access it. Refer to **SPRING(S), INSTALLATION**.
10. Lower vehicle.
11. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolt.
12. Tighten spring link bolt at crossmember to 108 N.m (80 ft. lbs.).
13. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

SRT

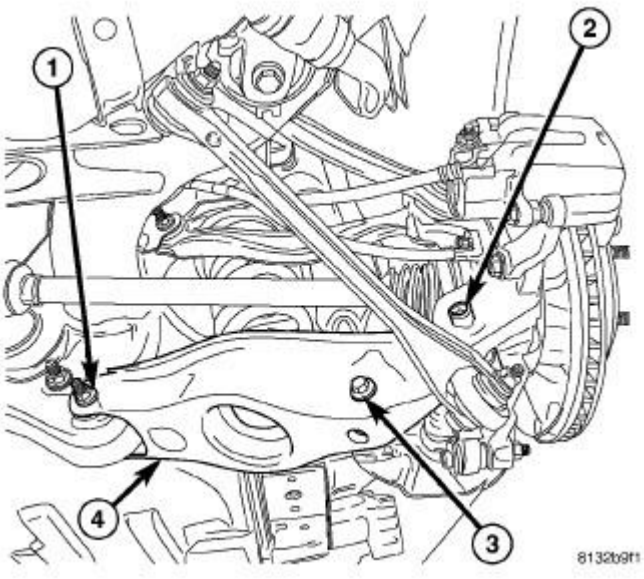

Fig. 109: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Guide ball joint end of spring link (4) into mounting pocket of knuckle, then swing opposite end up to bushing in crossmember and install bolt and nut (1) fastening spring link (4) to crossmember. **Do not tighten bolt at this time.**

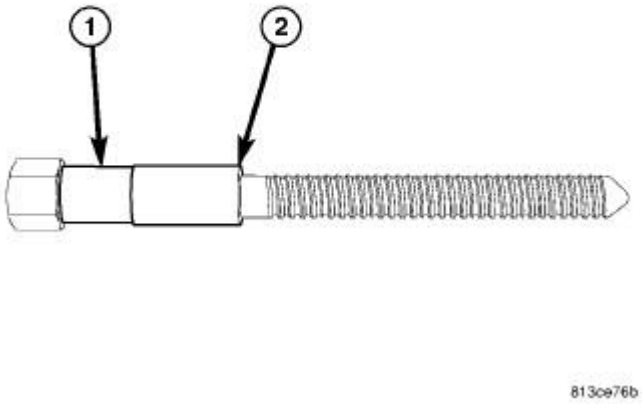

Fig. 110: Bolt & Knuckle Sleeve
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate bolt (1) threads to provide ease of use and promote tool longevity.

2. Place NEW knuckle sleeve (2) onto (special tool #9361-12, Installer, Bushing) (1), and slide it up to Bolt's head.

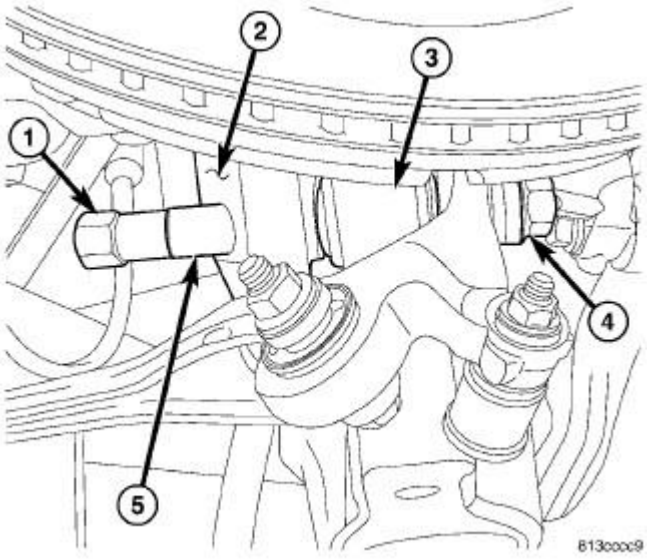

Fig. 111: Slide, Sleeve, Knuckle, Bearing And Nut
Courtesy of CHRYSLER GROUP, LLC

3. Starting from knuckle forward end, slide (special tool #9361-12, Installer, Bushing) (1) with sleeve (5) through knuckle (2) and spring link ball joint (3).
4. Install Installation Thrust Bearing (around 3/8 inch thick) and special flange nut (4) on end of Bolt. **When installing thrust bearing on Installer, be sure to place hardened side against nut. Place bearing outer cage against stationary component.**
5. While holding Bolt head (1) stationary, rotate Nut (4) (using hand tools) installing sleeve in knuckle. Install sleeve until Nut stops turning. **Do not overtighten Nut.**
6. Remove special tool.

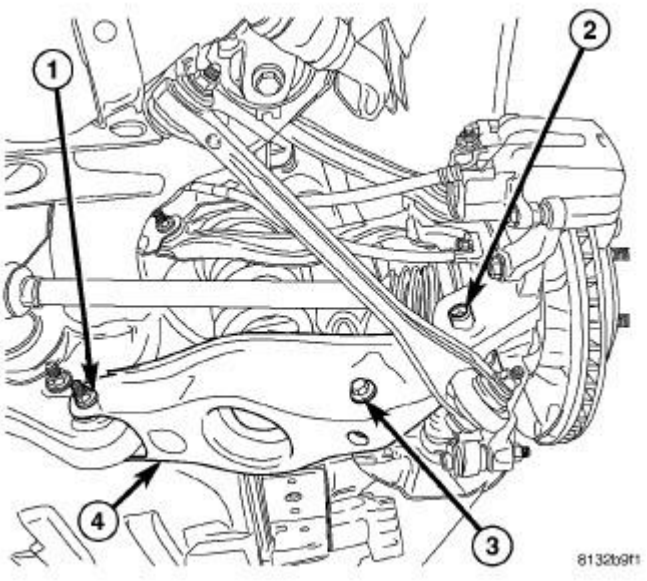

Fig. 112: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

7. Install spring link-to-knuckle bolt (2) front-to-rear through knuckle and link, then install nut. While holding bolt head stationary, tighten nut to 138 N.m (102 ft. lbs.).
8. Install rear spring and all components necessary to access it, except rear tire and wheel assembly on side of repair. Refer to **SPRING(S), INSTALLATION**.
9. Install rear brake rotor and components necessary to access it. Refer to **ROTOR, BRAKE, INSTALLATION** .
10. Lower vehicle.
11. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
12. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolt.
13. Tighten spring link bolt at crossmember to 108 N.m (80 ft. lbs.).
14. Tighten shock absorber lower mounting bolt nut to 72 N.m (53 ft. lbs.).
15. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, TENSION

REMOVAL

REMOVAL

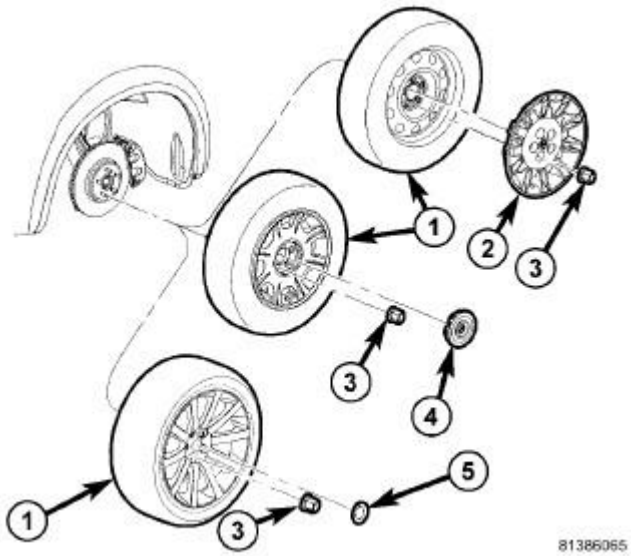

Fig. 113: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. On both sides of vehicle, remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

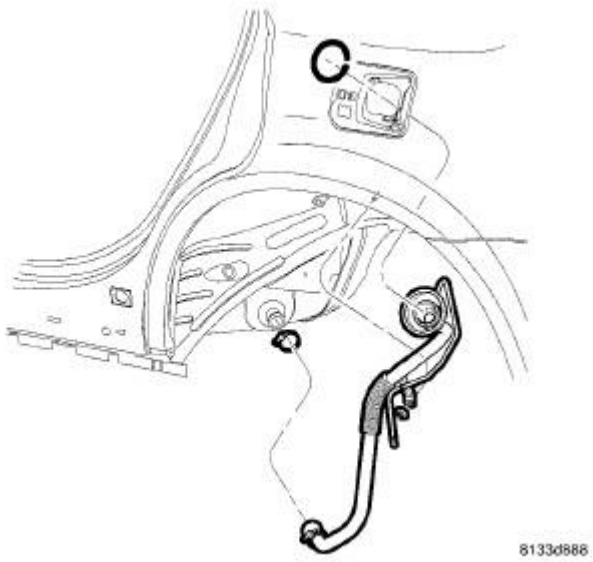

Fig. 114: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

3. If servicing left side, remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .
4. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.
5. Perform following if vehicle is equipped with dual-exhaust or are servicing right side on vehicle with single exhaust.
    1. Position under-hoist utility jack or stand several inches below exhaust at muffler.
    2. Disconnect exhaust isolators at muffler and resonators hangers.
    3. Lower exhaust down to rest upon top of jack or stand placed below muffler.

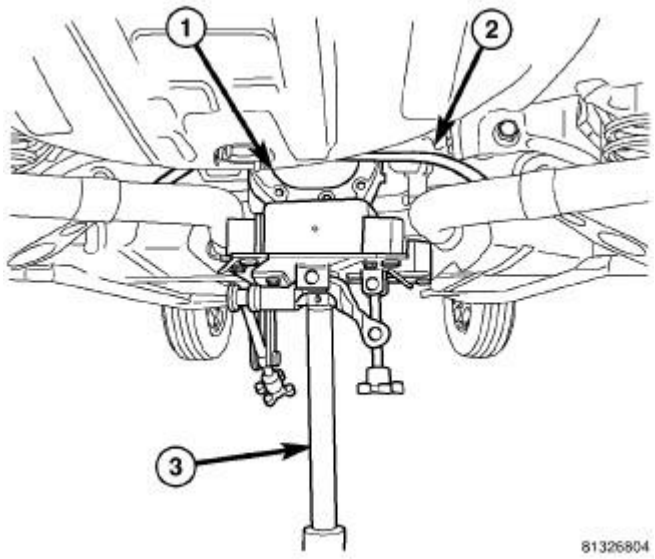

Fig. 115: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

6. Position under-hoist utility jack or transmission jack (3) under center of rear axle differential (1). Raise jack head to contact differential and secure in place. **When securing crossmember to jack, be sure not to secure stabilizer bar.**

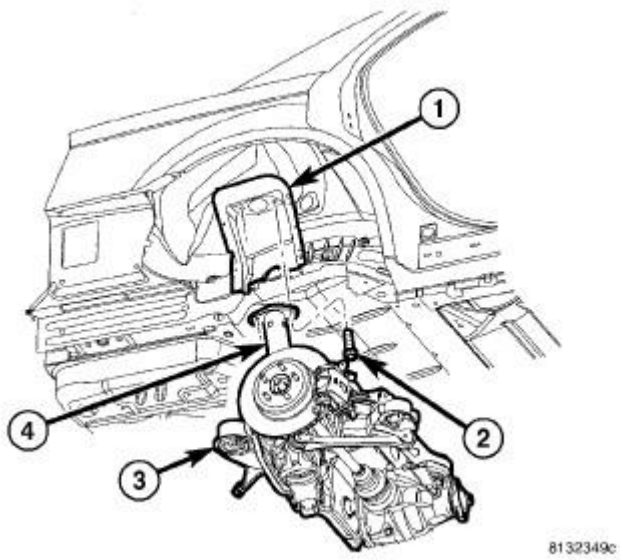

Fig. 116: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

7. Remove shock absorber (1) upper mounting screws (2).

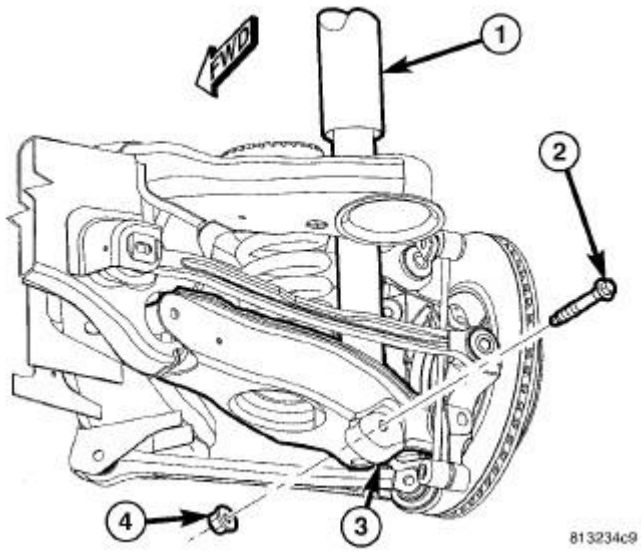

Fig. 117: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

8. Remove shock absorber (1) lower mounting bolt (2) and nut (4).

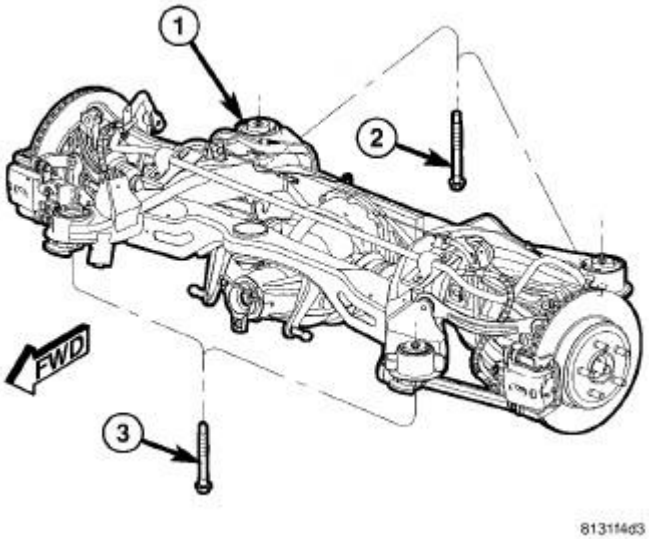

Fig. 118: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing crossmember mounting bolts (2 and 3) it is important NOT to loosen or remove crossmember mounting bolts on opposite side of vehicle. Doing so will require rear wheel alignment following reinstallation to ensure proper thrust angle.

9. Remove both front and rear crossmember mounting bolts (2 and 3) on repair-side of vehicle.

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember (1) any further than necessary to remove shock absorber.

10. **Slowly** lower jack allowing repair-side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow top of shock absorber to clear body flange.

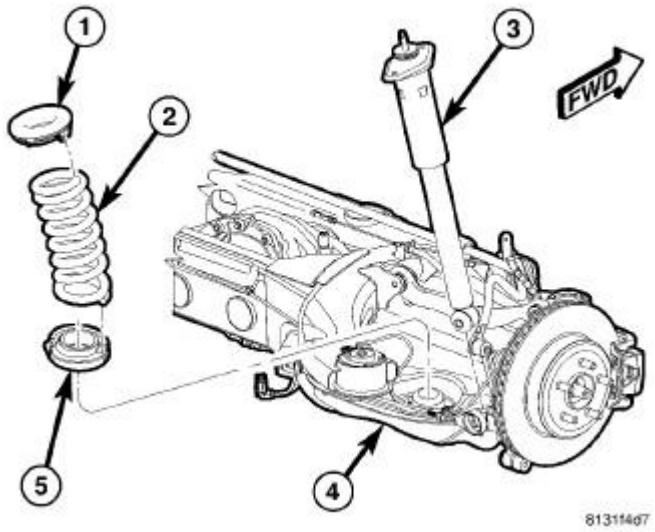

Fig. 119: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

11. Remove shock absorber (3) by tipping top outward and lifting lower end out of pocket in spring link (4).

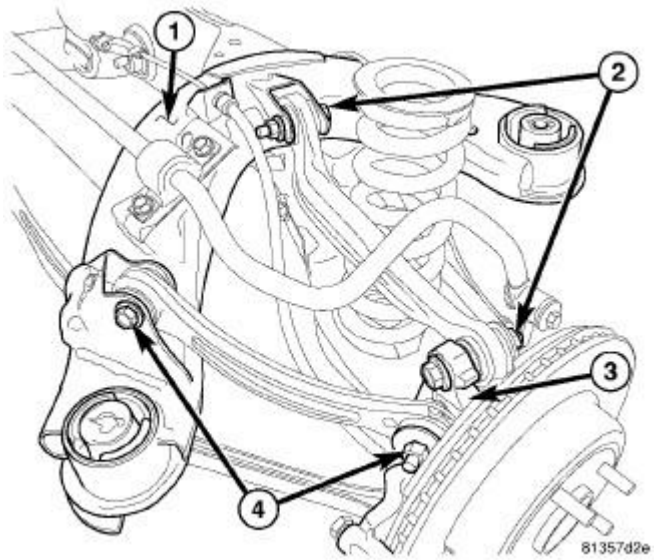

Fig. 120: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not lower repair-side of crossmember any further than necessary to gain access to link mounting bolts at crossmember.

12. Remove nut and bolt (4) mounting link to knuckle (3).

13. Remove nut and bolt (4) mounting link to crossmember (1).
14. Remove link.

INSTALLATION

INSTALLATION

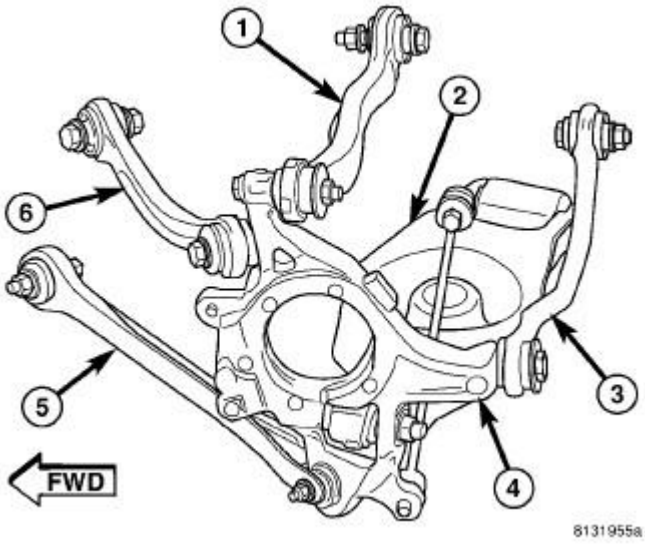

Fig. 121: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing tension link, although link (6) is same end-to-end, make sure that center bow is facing downward.

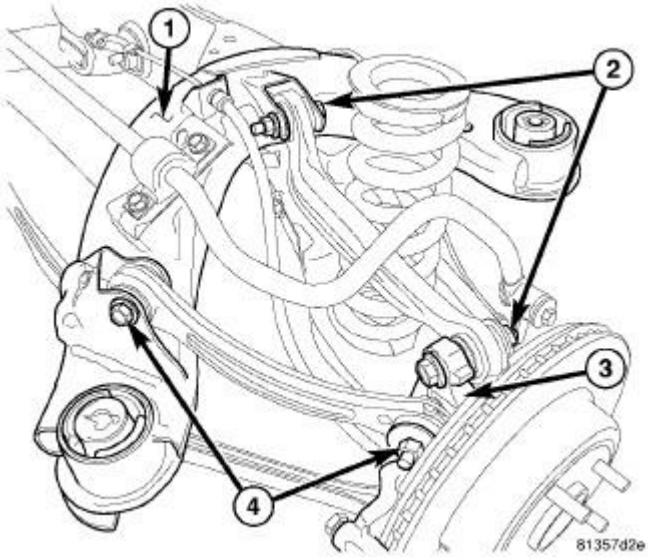

Fig. 122: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

1. Place link in bracket on crossmember (1). Install bolt and nut (4) at crossmember (1) as shown in illustration. **Do not tighten bolt at this time.**
2. Install bolt and nut (4) mounting link to knuckle (3) as shown in illustration. **Do not tighten bolt at this time.**

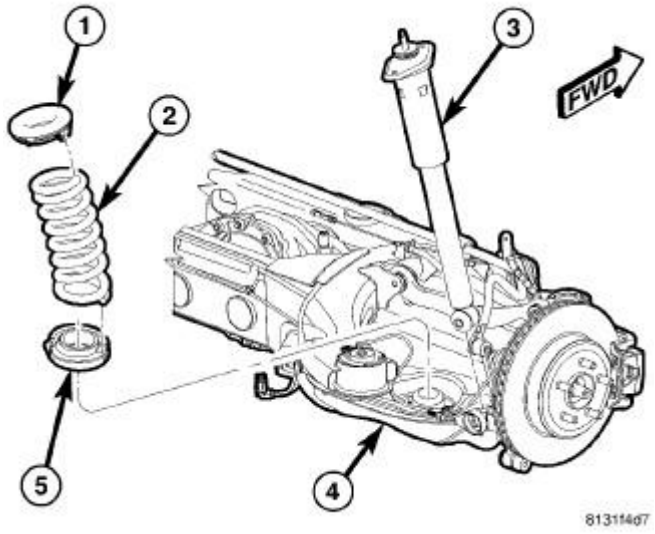

Fig. 123: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

3. Install shock absorber (3) by setting lower end into pocket in spring link (4), then tipping top inward until aligned with upper mounting holes.

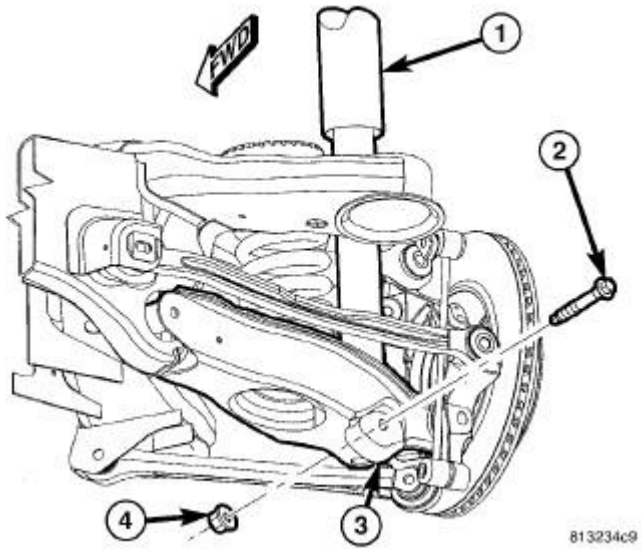

Fig. 124: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

4. Install lower shock mounting bolt and nut. **Do not tighten at this time.**

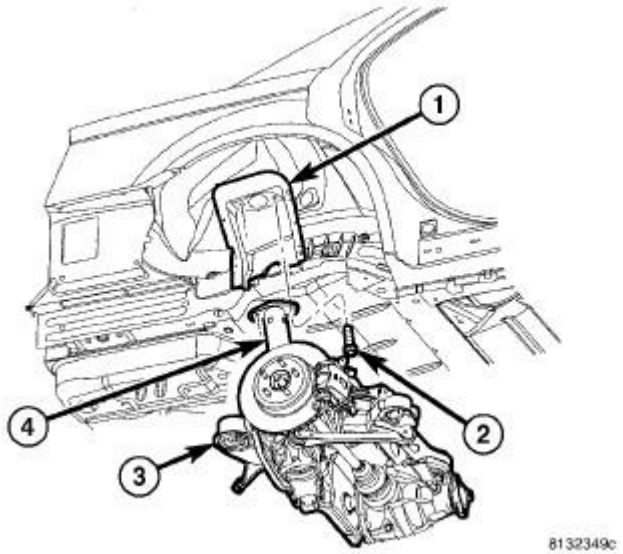

Fig. 125: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

5. Carefully raise jack, guiding coil spring and upper end of shock absorber (4) into mounted positions.
6. Install shock absorber upper mounting screws (2). Tighten upper mounting screws to 52 N.m (38 ft. lbs.).

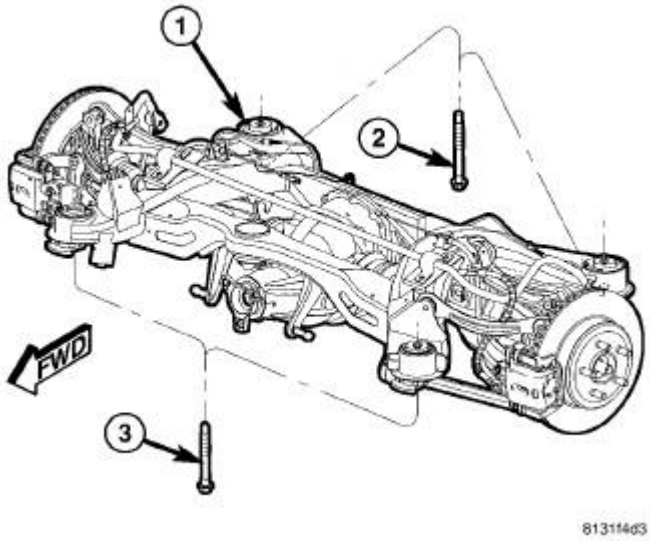

Fig. 126: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Rear crossmember mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

7. Install crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

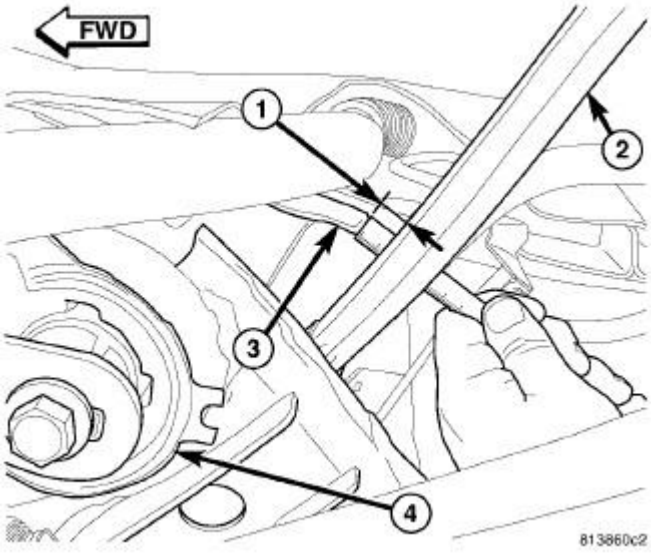

Fig. 127: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

8. Measure distance (1) between from tension link (2) to body weld flange (3) directly in front of it, just outboard of front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Measure opposite side to be sure it also maintains minimum 12 mm distance.

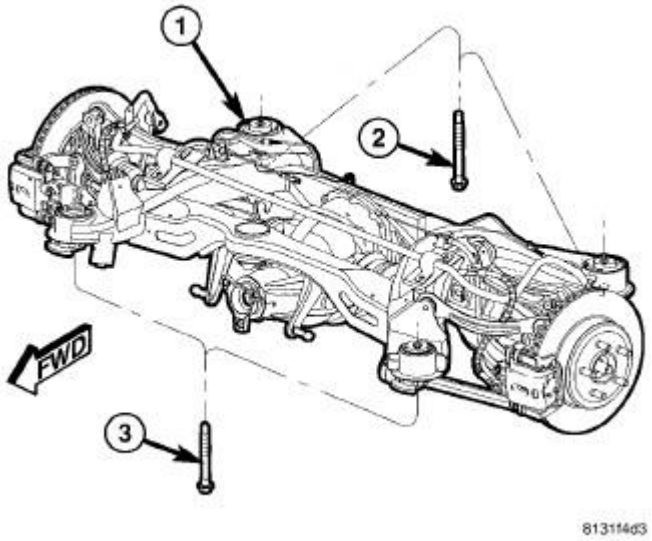

Fig. 128: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Tighten all crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

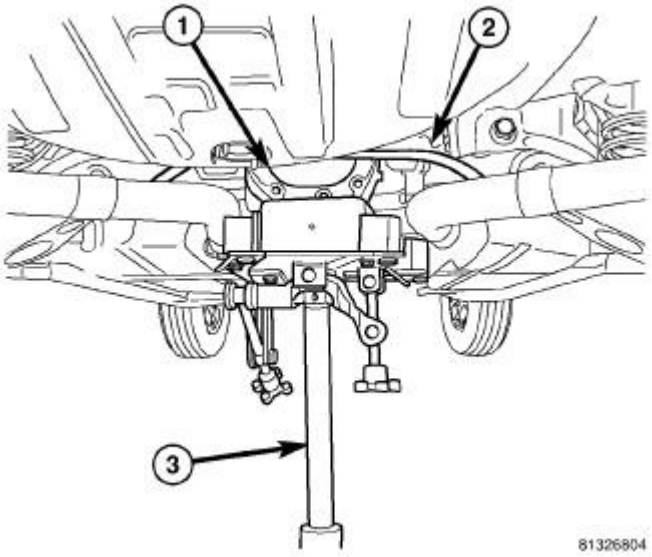

Fig. 129: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

10. Remove jack (3) from under rear axle differential.
11. If previously lowered, raise rear exhaust back to mounted position and connect exhaust isolators at muffler and resonators hangers. Remove jack or stand below exhaust muffler.

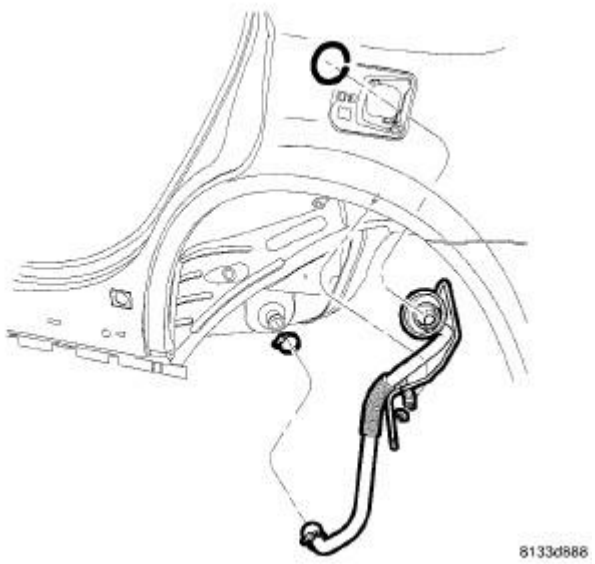

Fig. 130: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

12. If removed, install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

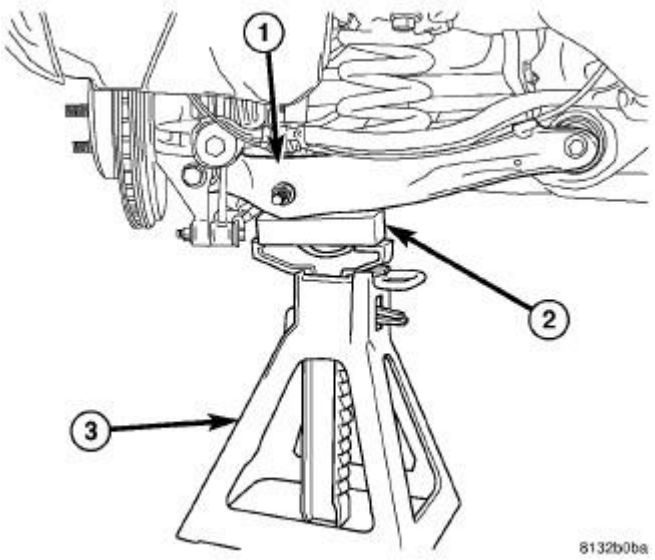

Fig. 131: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

13. Lower vehicle until front tires contact floor but rear is still suspended. Place jack stands under each rear suspension spring link. Place an appropriate wooden block between stand and link to avoid damaging spring link, then lower vehicle until full vehicle weight is supported by suspension.

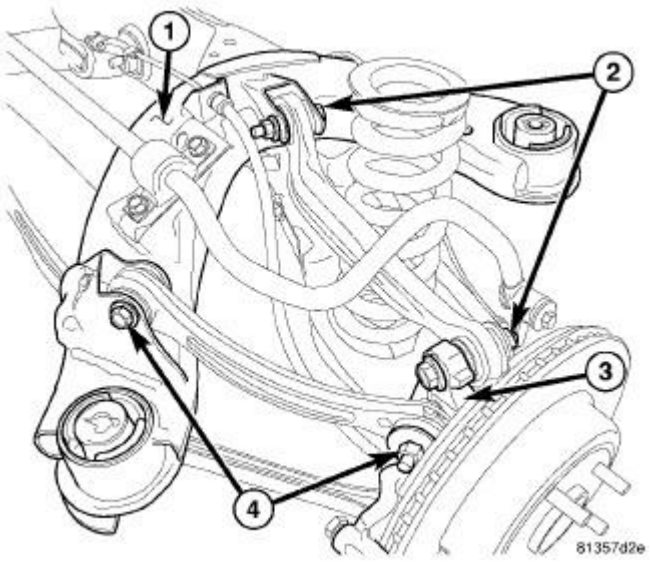

Fig. 132: Camber And Tension Links
Courtesy of CHRYSLER GROUP, LLC

14. Tighten tension link fasteners (4) to:
    - Bolt nut at crossmember - 85 N.m (63 ft. lbs.).
    - Bolt at knuckle - 98 N.m (72 ft. lbs.).

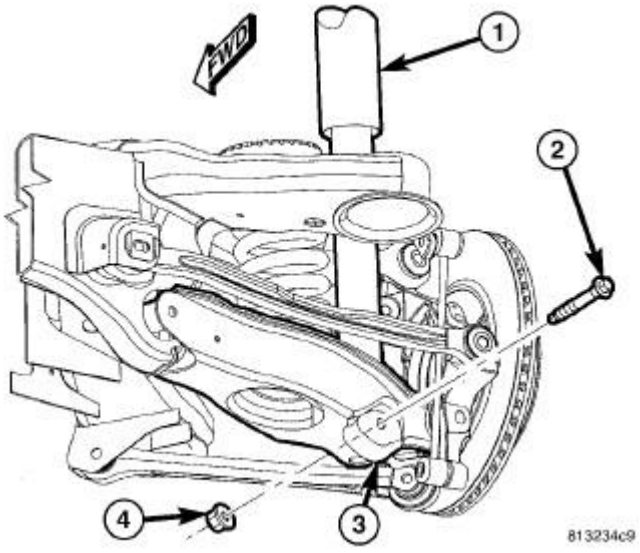

Fig. 133: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

15. Tighten shock absorber lower mounting bolt nut (4) to 72 N.m (53 ft. lbs.).

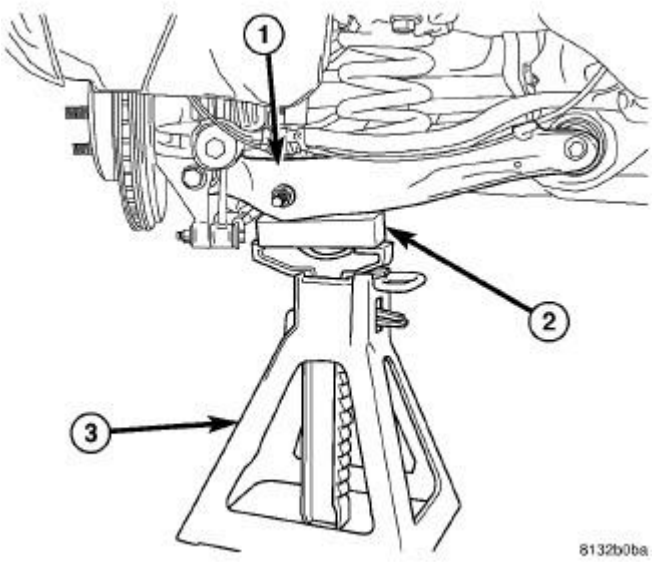

Fig. 134: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

16. Raise vehicle and remove jack stands (3).

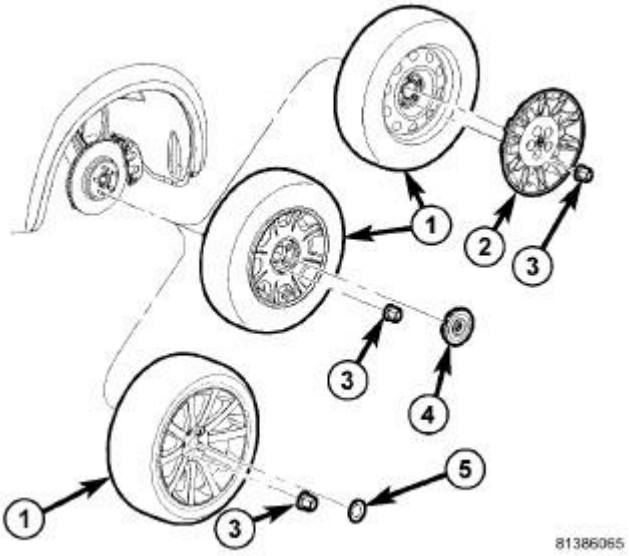

Fig. 135: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

17. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .
18. Lower vehicle.
19. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, TOE

REMOVAL

LEFT LINK

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

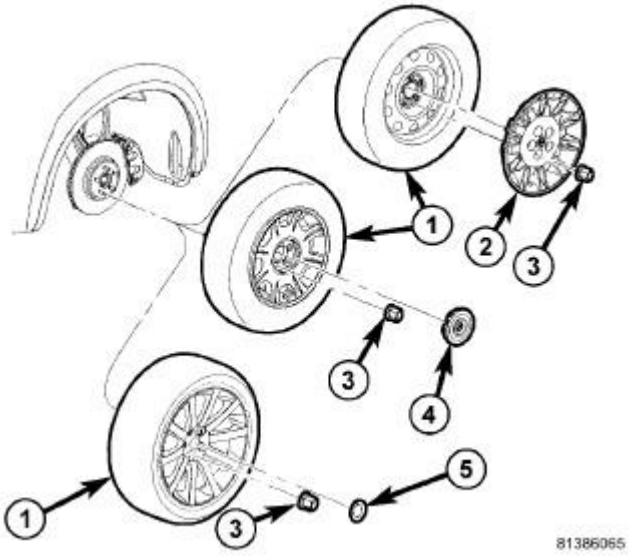

Fig. 136: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. On both sides of vehicle, remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

Fig. 137: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

3. Remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .
4. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.
5. Perform following if vehicle is equipped with dual-exhaust.
    1. Position under-hoist utility jack or stand several inches below exhaust at muffler.
    2. Disconnect exhaust isolators at muffler and resonators hangers.
    3. Lower exhaust down to rest upon top of jack or stand placed below muffler.

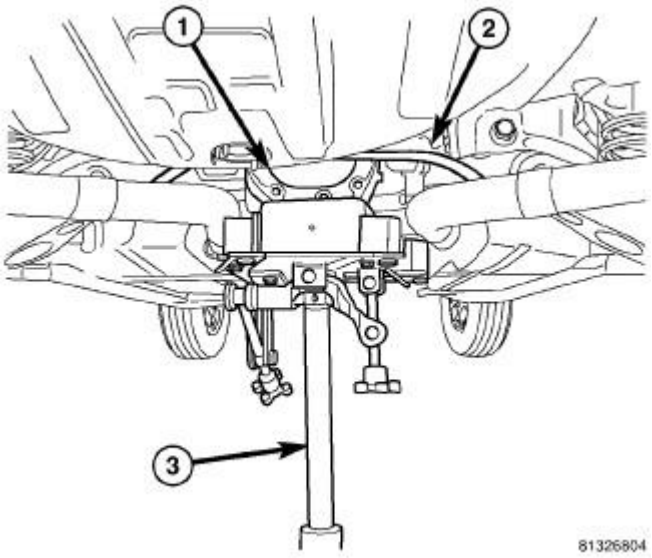

Fig. 138: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

6. Position under-hoist utility jack or transmission jack (3) under center of rear axle differential (1). Raise jack head to contact differential and secure in place.

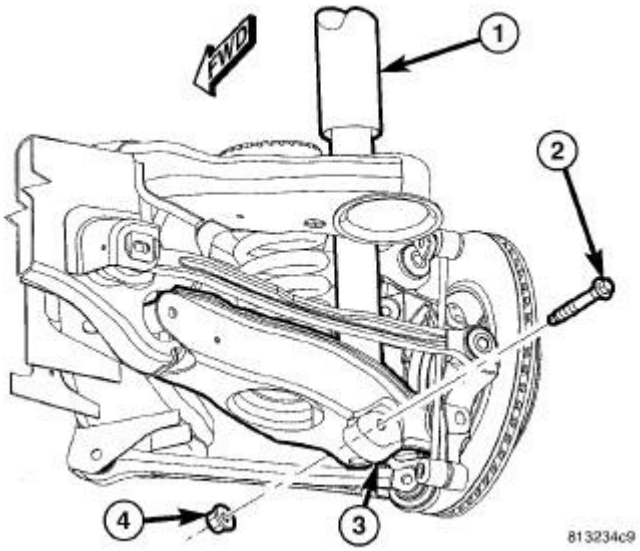

Fig. 139: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

7. Remove shock absorber (1) lower mounting bolt (2) and nut (4).

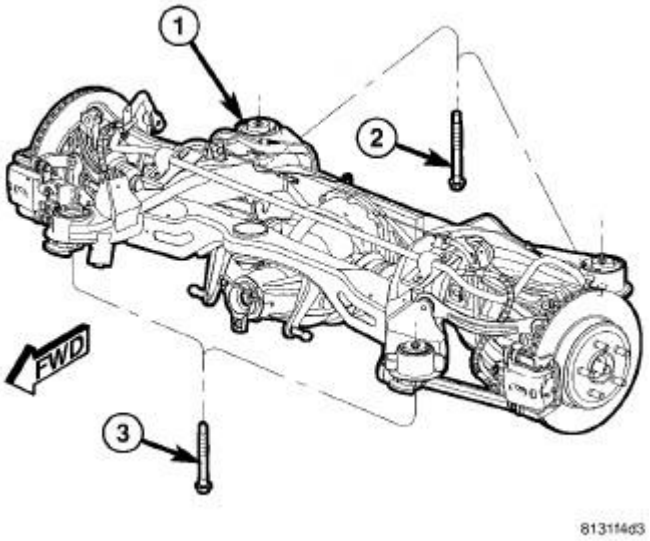

Fig. 140: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing crossmember mounting bolts (2 and 3) it is important NOT to loosen or remove crossmember mounting bolts on opposite side of vehicle. Doing so will require rear wheel alignment following reinstallation to ensure proper thrust angle.

8. Remove both front and rear crossmember mounting bolts (2 and 3) on repair-side of vehicle. **If equipped with AWD, be sure to not to misplace spacers between crossmember mounts and body.**

   CAUTION: To avoid damaging other components of vehicle, do not lower crossmember (1) any further than necessary to remove shock absorber.

9. **Slowly** lower jack allowing repair-side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow toe link mounting bolt at crossmember.

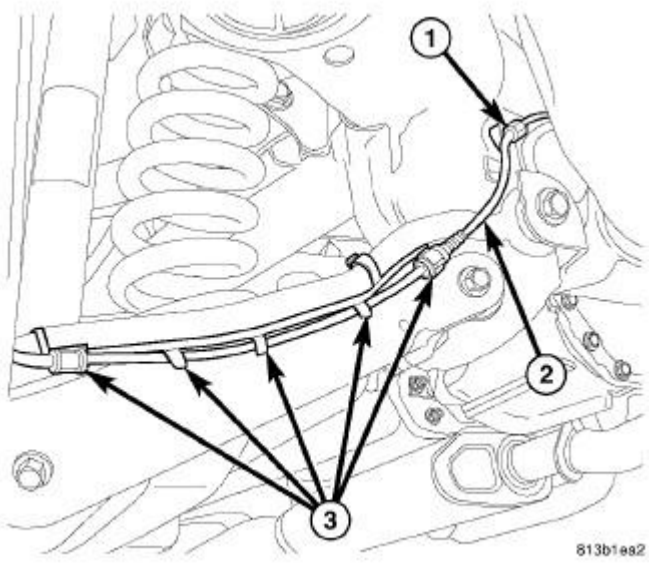

Fig. 141: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

10. If equipped, remove wheel speed sensor cable (2) from toe link.

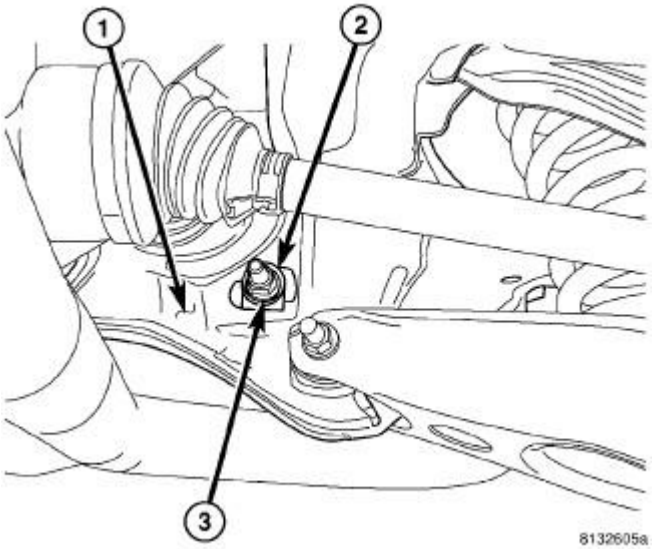

Fig. 142: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

11. While holding toe adjustment cam bolt from rotating, remove nut (3) securing toe link at crossmember (1).

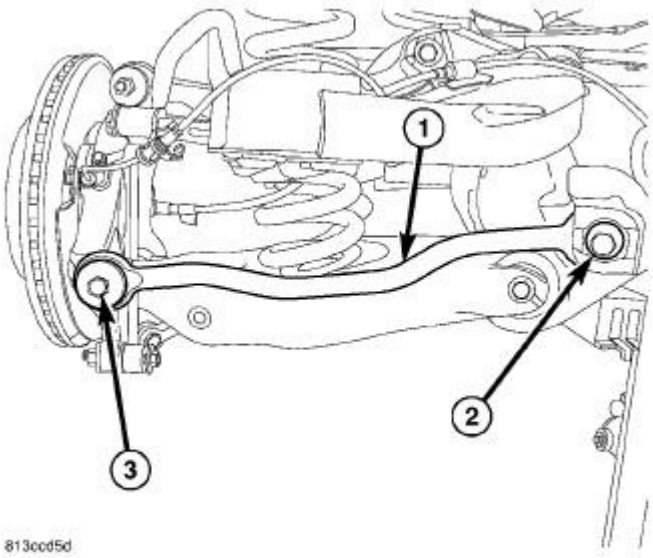

Fig. 143: Toe Link Mounting
Courtesy of CHRYSLER GROUP, LLC

12. Slide cam bolt (2) rearward out of crossmember and link (1).
13. Remove mounting bolt (3) and nut at knuckle.
14. Remove toe link (1).

RIGHT LINK

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

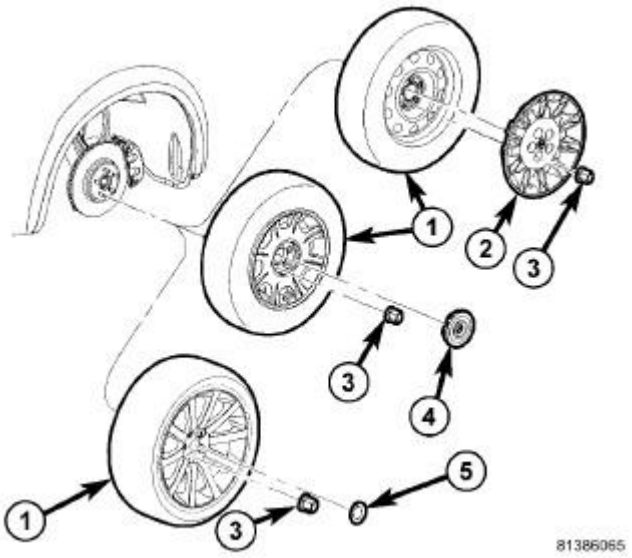

Fig. 144: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

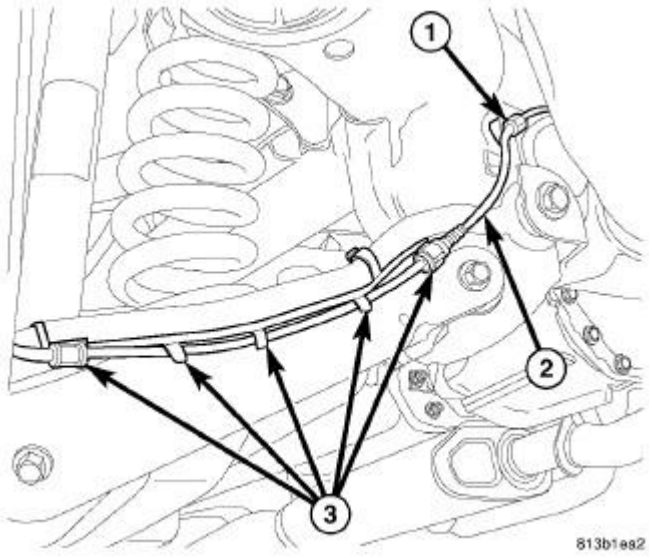

Fig. 145: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

3. If equipped, remove wheel speed sensor cable (2) from toe link.

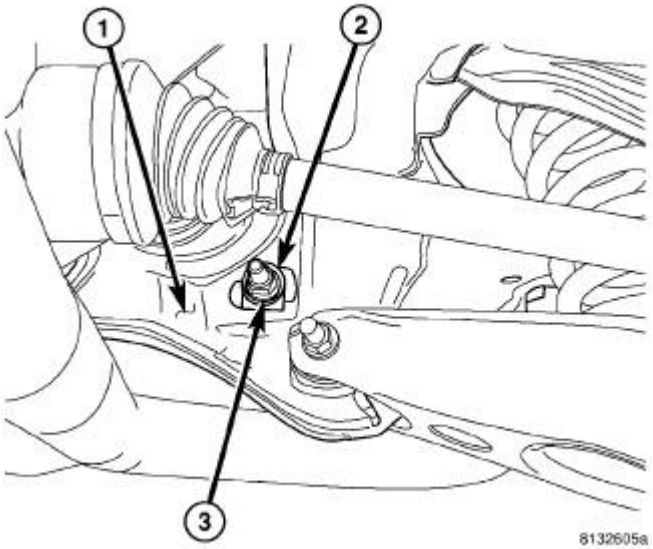

Fig. 146: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

4. While holding toe adjustment cam bolt from rotating, remove nut (3) securing toe link at crossmember (1).

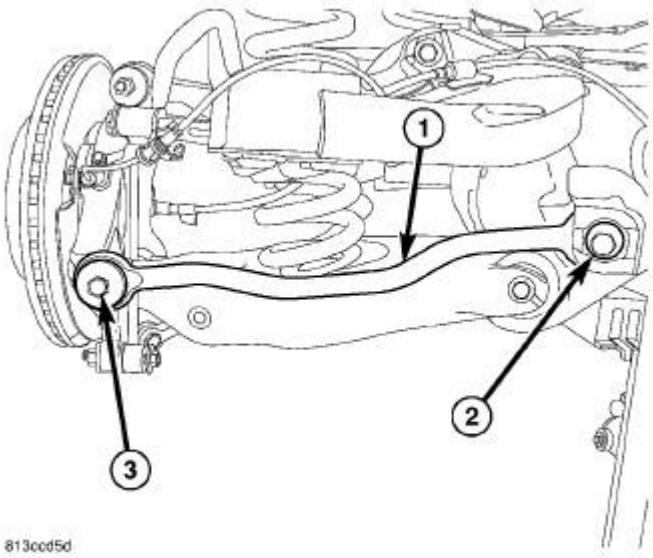

Fig. 147: Toe Link Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Slide cam bolt (2) rearward out of crossmember and link (1).
6. Remove mounting bolt (3) and nut at knuckle.
7. Remove toe link (1).

INSTALLATION

LEFT LINK

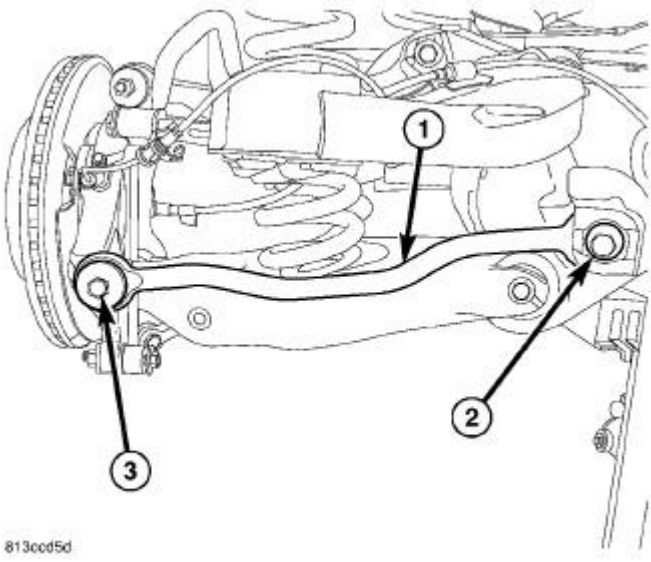

Fig. 148: Toe Link Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Slide crossmember end of toe link (1) into box bracket on crossmember. Slide cam bolt (2) through bracket and link from rear.
2. Install bolt (3) and nut securing link to knuckle. **Do not tighten bolt at this time.**

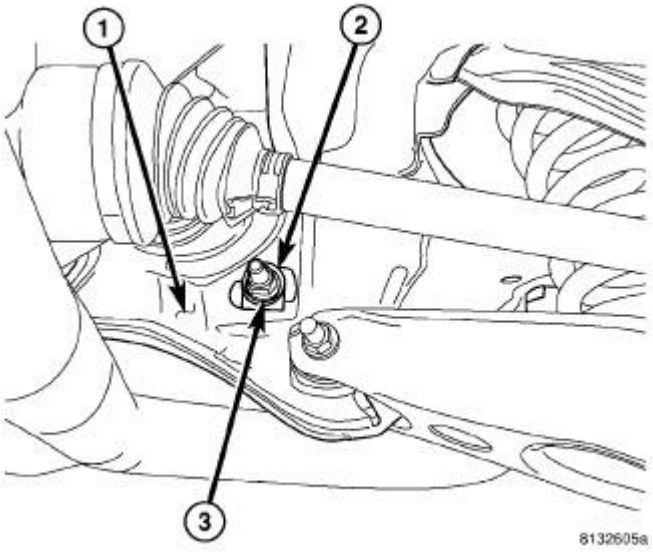

Fig. 149: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

3. While holding toe adjustment cam bolt from rotating (cam facing upward), Install cam washer (2) and nut (3) securing toe link at crossmember (1). **Do not tighten nut at this time.**

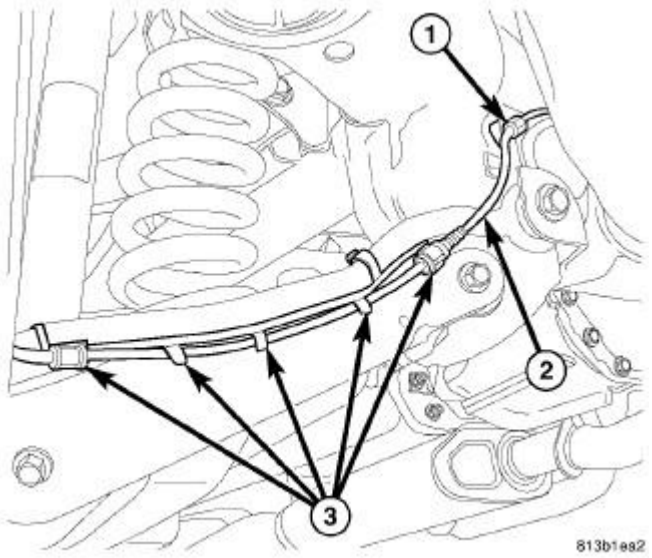

Fig. 150: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

4. If equipped, Attach wheel speed sensor cable (2) to toe link.

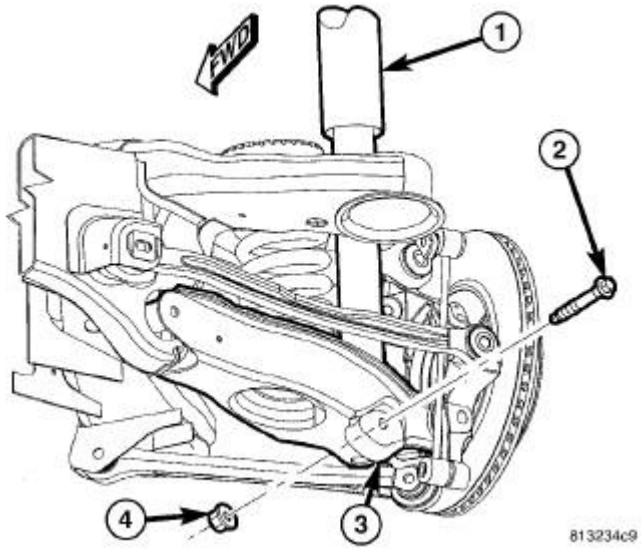

Fig. 151: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

5. Carefully raise jack, guiding coil spring and lower end of shock absorber (4) into mounted positions.

6. When lower shock mounting bolt holes line up install bolt (2) and nut (4). **Do not tighten at this time.**

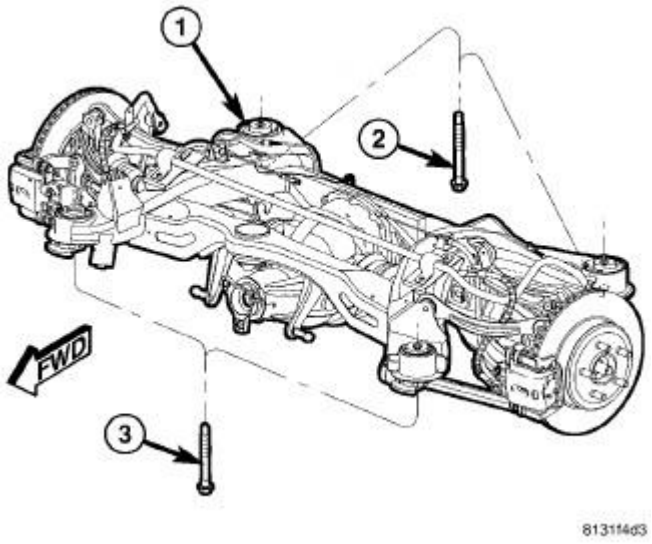

Fig. 152: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Rear crossmember mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

7. Continue to raise crossmember in not already in mounted position, then install crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

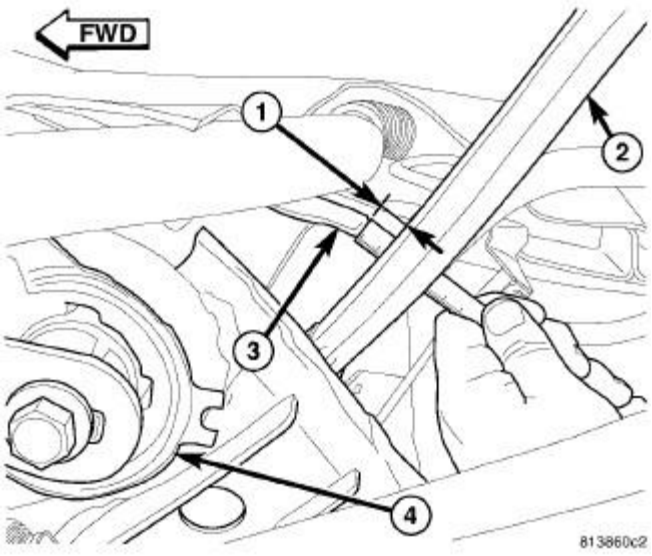

Fig. 153: Measuring Tension Link Clearance

Courtesy of CHRYSLER GROUP, LLC

8. Measure distance (1) between from tension link (2) to body weld flange (3) directly in front of it, just outboard of front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Measure opposite side to be sure it also maintains minimum 12 mm distance.

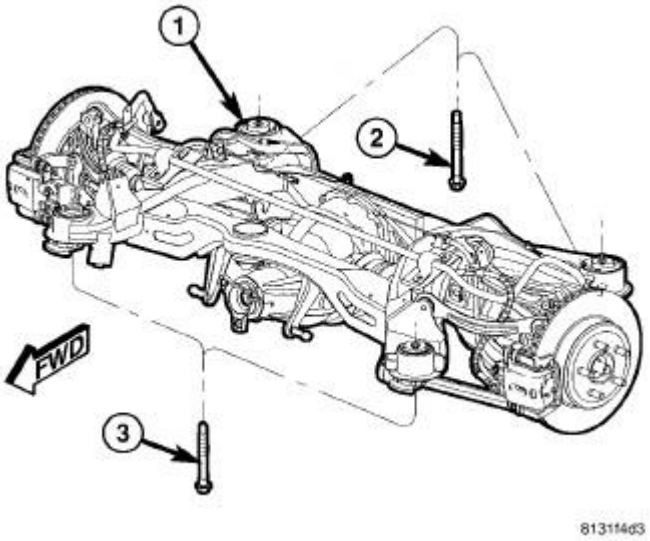

Fig. 154: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Tighten all crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

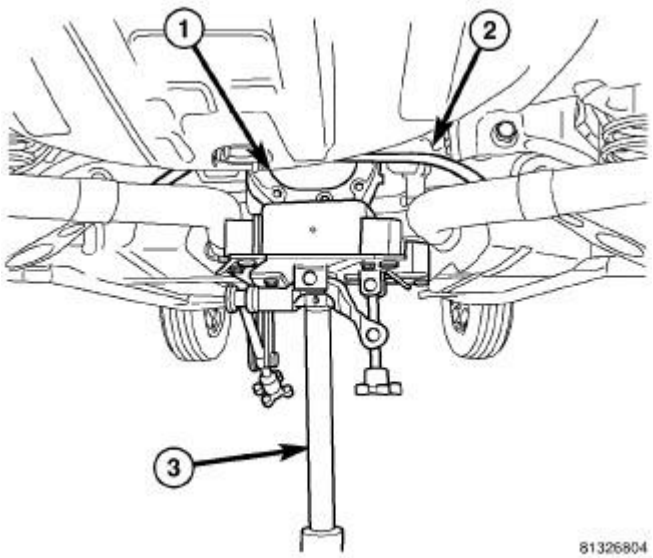

Fig. 155: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

10. Remove jack (3) from under rear axle differential.
11. If previously lowered, raise rear exhaust back to mounted position and connect exhaust isolators at muffler and resonators hangers. Remove jack or stand below exhaust muffler.

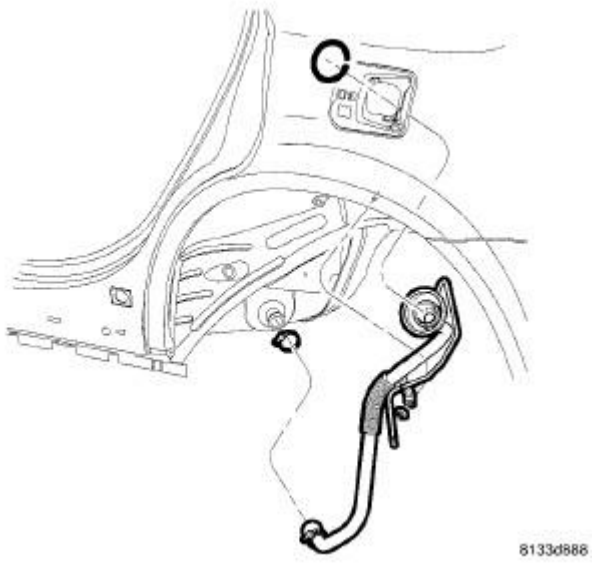

Fig. 156: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

12. Install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

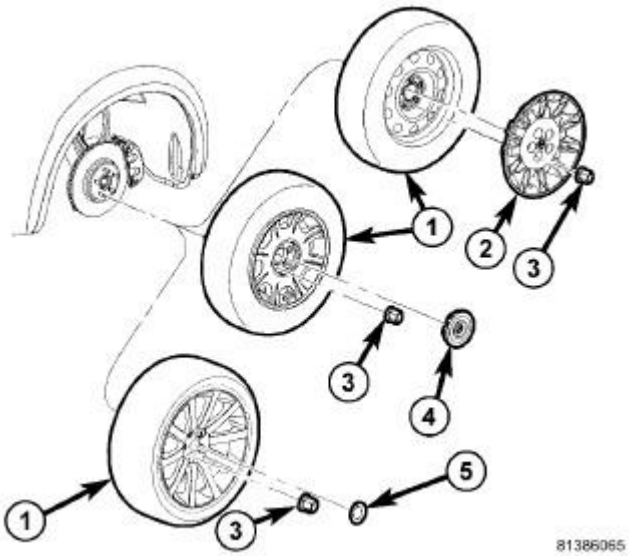

Fig. 157: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

13. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .
14. Lower vehicle.
15. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolts.

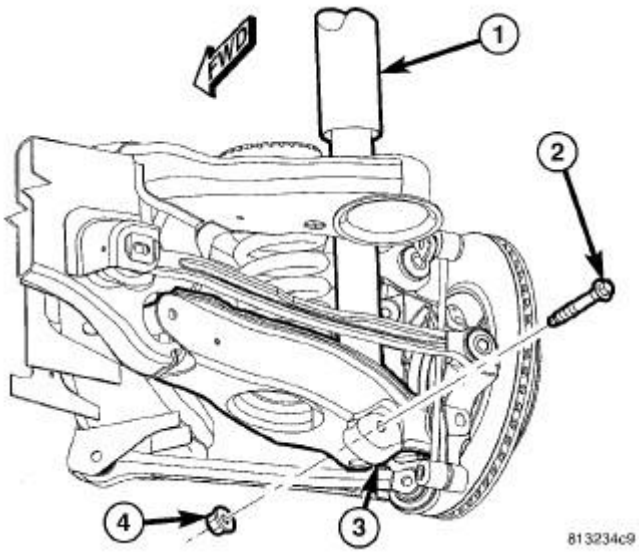

Fig. 158: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

16. Tighten shock absorber lower mounting bolt nut (4) to 72 N.m (53 ft. lbs.).

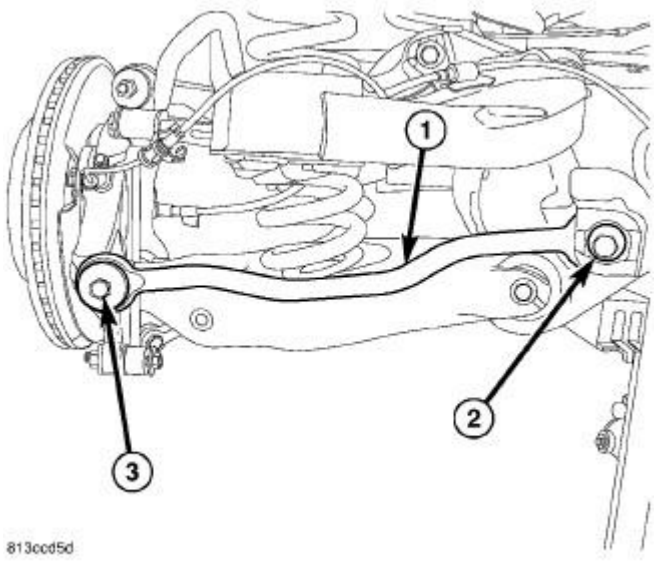

Fig. 159: Toe Link Mounting
Courtesy of CHRYSLER GROUP, LLC

17. Tighten toe link (1) fasteners to:
    - Nut at crossmember - 108 N.m (80 ft. lbs.) (This nut may be tightened after rear wheel alignment toe is set. Do not tighten from bolt head end.).
    - Bolt at knuckle - 95 N.m (70 ft. lbs.).
18. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

RIGHT LINK

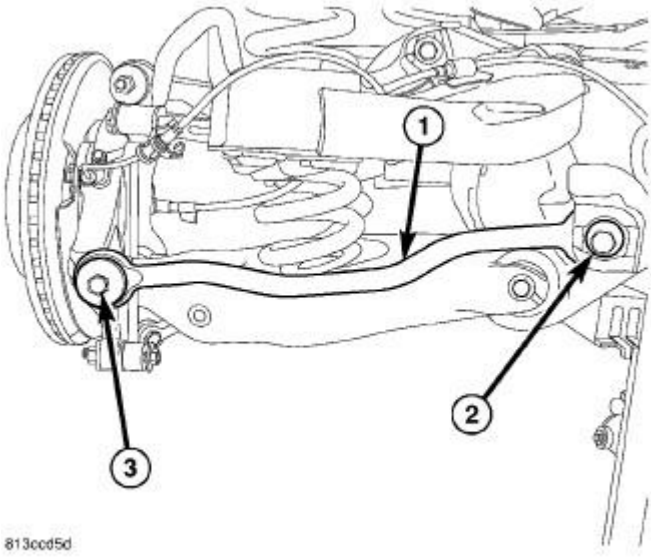

Fig. 160: Toe Link Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Slide crossmember end of toe link (1) into box bracket on crossmember. Slide cam bolt (2) through bracket and link from rear of vehicle.
2. Install bolt (3) and nut securing link to knuckle. **Do not tighten bolt at this time.**

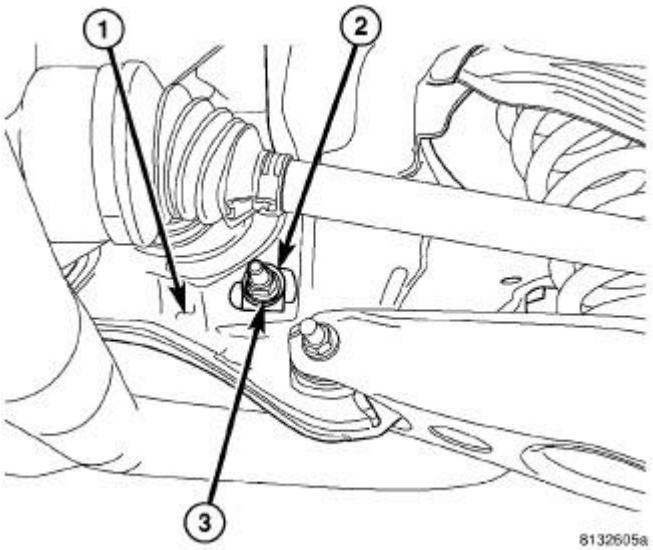

Fig. 161: Rear Toe Adjustment Bolt Nut
Courtesy of CHRYSLER GROUP, LLC

3. While holding toe adjustment cam bolt from rotating (cam facing upward), Install cam washer (2) and nut (3) securing toe link at crossmember (1). **Do not tighten nut at this time.**

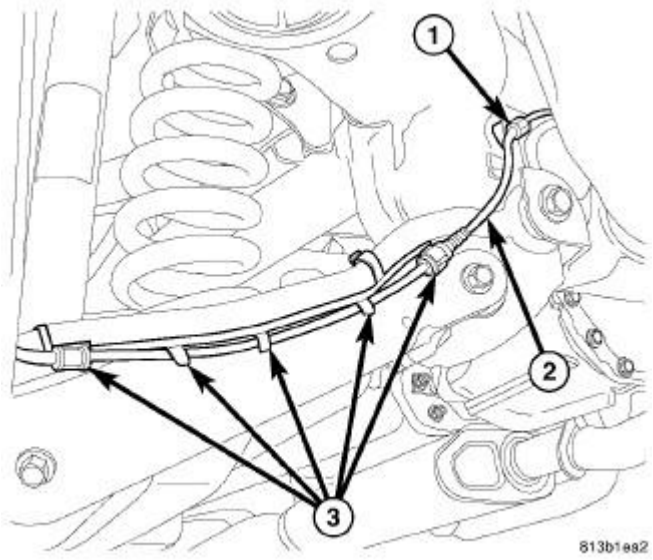

Fig. 162: WSS Routing Along Left Toe Link
Courtesy of CHRYSLER GROUP, LLC

4. If equipped, Attach wheel speed sensor cable (2) to toe link.
5. Raise rear exhaust back to mounted position and connect exhaust isolators at muffler and resonators hangers. Remove jack or stand below exhaust muffler.

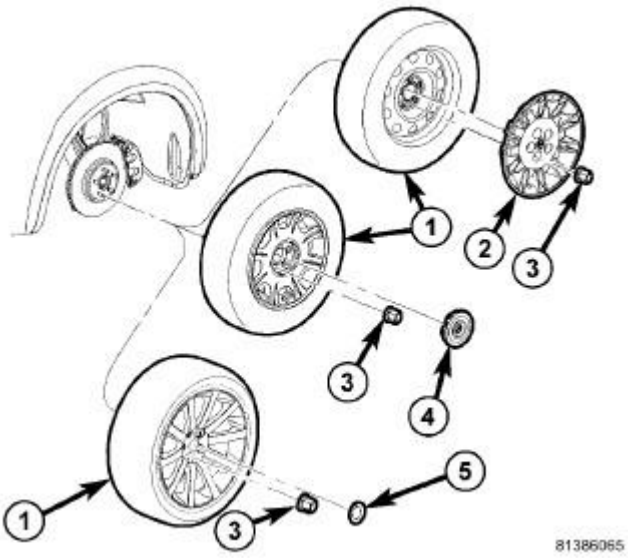

Fig. 163: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

6. Install tire and wheel assembly (1). Refer to **INSTALLATION** .
7. Lower vehicle.
8. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolts.

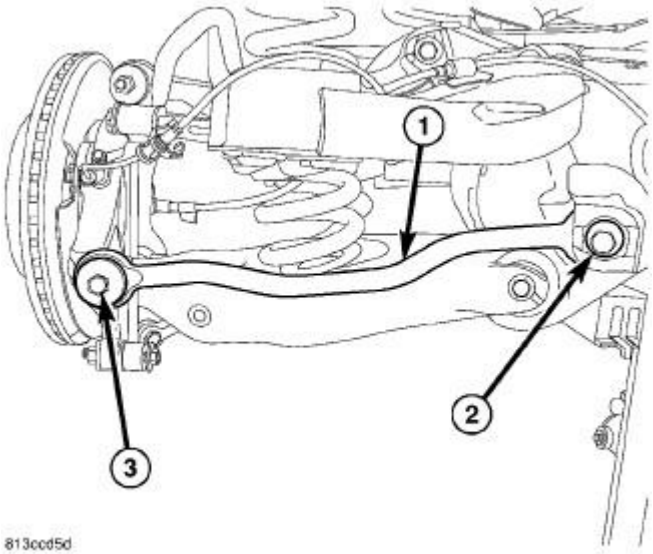

Fig. 164: Toe Link Mounting

Courtesy of CHRYSLER GROUP, LLC

9. Tighten toe link (1) fasteners to:
   - Nut at crossmember - 108 N.m (80 ft. lbs.) (This nut may be tightened after rear wheel alignment toe is set. Do not tighten from bolt head end.).
   - Bolt at knuckle - 95 N.m (70 ft. lbs.).
10. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

SHOCK ABSORBER, SUSPENSION

DESCRIPTION

NON SRT

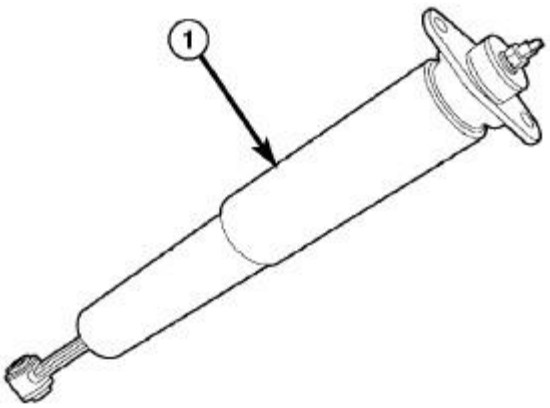

Fig. 165: Nivomat Load-Leveling Shock Absorber
Courtesy of CHRYSLER GROUP, LLC

Non SRT vehicles have standard gas-charged shock absorbers for the rear suspension.

SRT

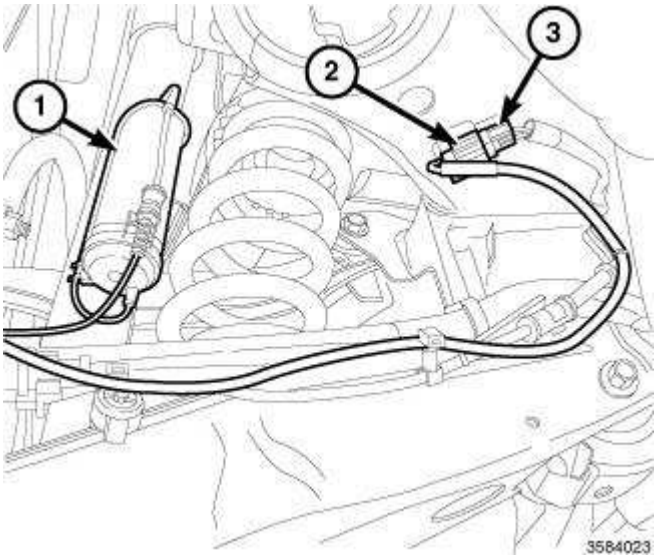

Fig. 166: Shock Solenoid Assembly & ADS Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

This vehicle has Active Damping System (ADS) shock absorbers for the rear suspension. The ADS shock absorbers are serviced the same as conventional shocks, except the ADS connector (2) must be removed from the harness connector (3). It is important to pay close attention to which direction the shock solenoid assembly (1) is pointing when removing and installing ADS shocks.

REMOVAL

NON SRT

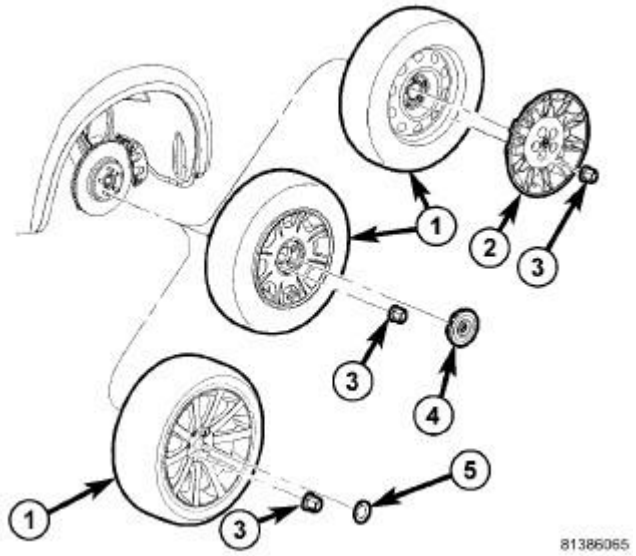

Fig. 167: Tire And Wheel Mounting

Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).
3. Position under-hoist utility jack or jack stand under outer spring link adding just enough support to keep suspension from going into full-rebound when shock absorber mounting bolts are removed.

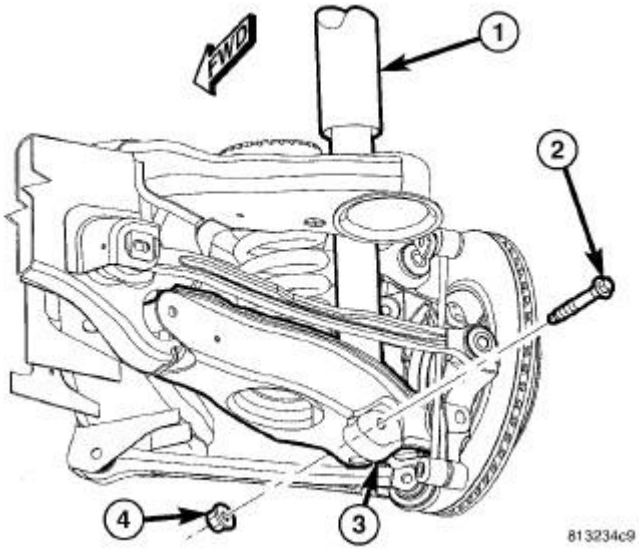

Fig. 168: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

4. Remove shock absorber (1) lower mounting bolt (2) and nut (4).

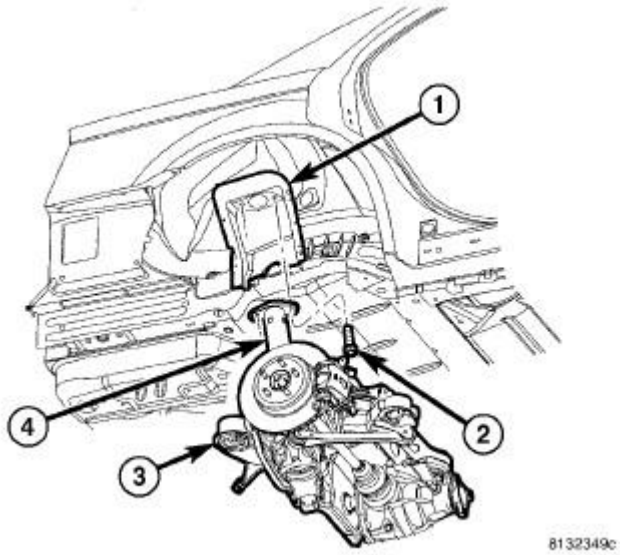

Fig. 169: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

5. Remove shock absorber (1) upper mounting bolts (2).
6. Remove shock absorber (4).

SRT

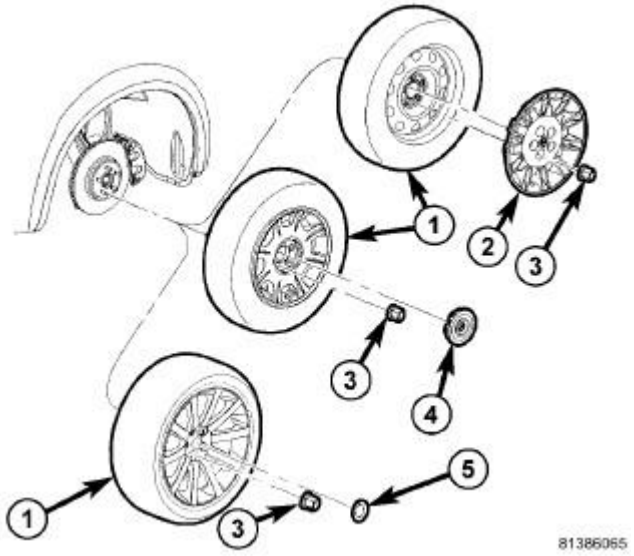

Fig. 170: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).
3. Position under-hoist utility jack or jack stand under outer spring link adding just enough support to keep suspension from going into full-rebound when shock absorber mounting bolts are removed.

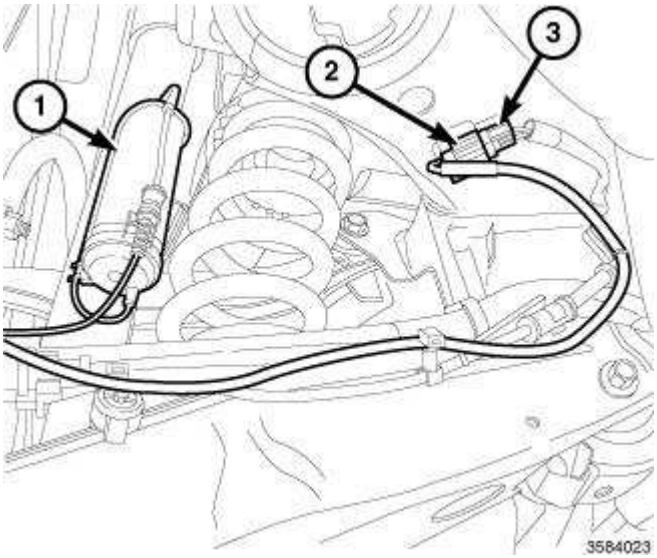

Fig. 171: Shock Solenoid Assembly & ADS Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

4. Disconnect the Active Damping System (ADS) shock connector (2) from the harness connector (3).

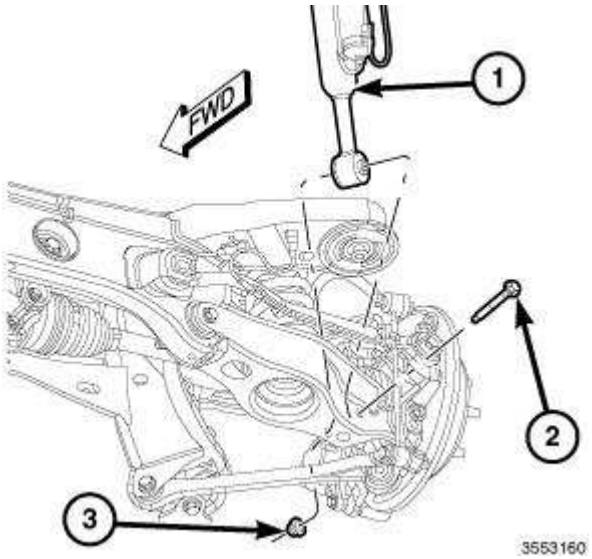

Fig. 172: Lower Mounting Bolt, Nut & Shock Absorber
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in illustration, left side similar.

5. Remove lower mounting bolt (2) and nut (3) securing shock absorber (1) to knuckle.

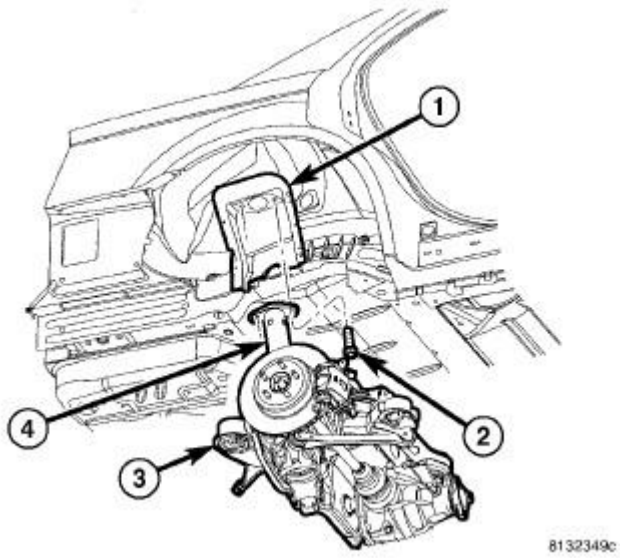

Fig. 173: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

6. Remove shock absorber upper mounting bolts (2).
7. Remove shock absorber (4).

INSTALLATION

NON SRT

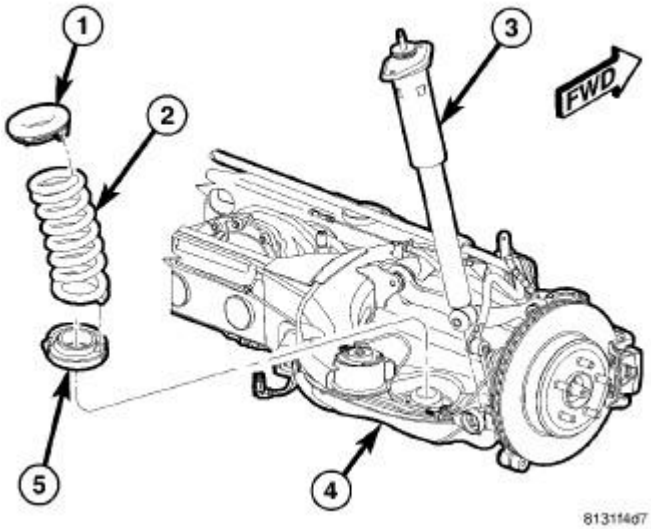

Fig. 174: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

1. Insert lower end of shock absorber (3) into well of spring link (4).

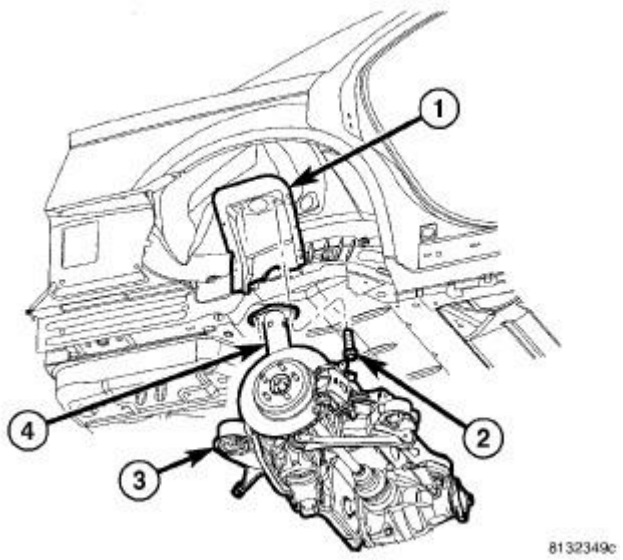

Fig. 175: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

2. Raise upper end of shock absorber (4) up into mounted position on body (1) and install upper mounting screws (2). Tighten upper mounting screws to 52 N.m (38 ft. lbs.).

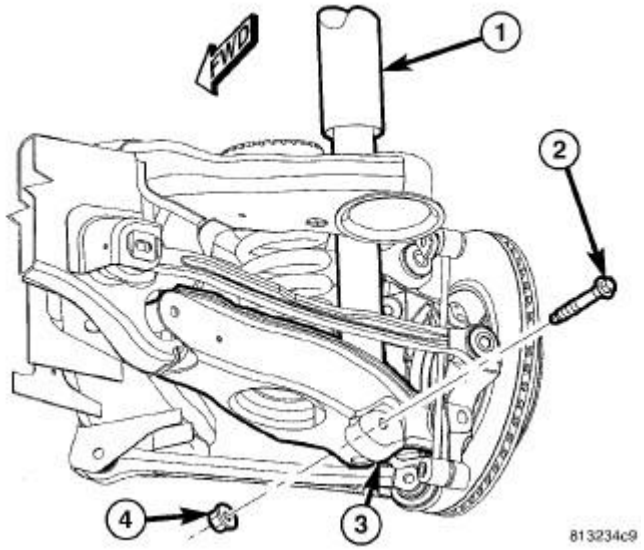

Fig. 176: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

3. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**
4. Remove under-hoist utility jack or jack stand from under spring link.

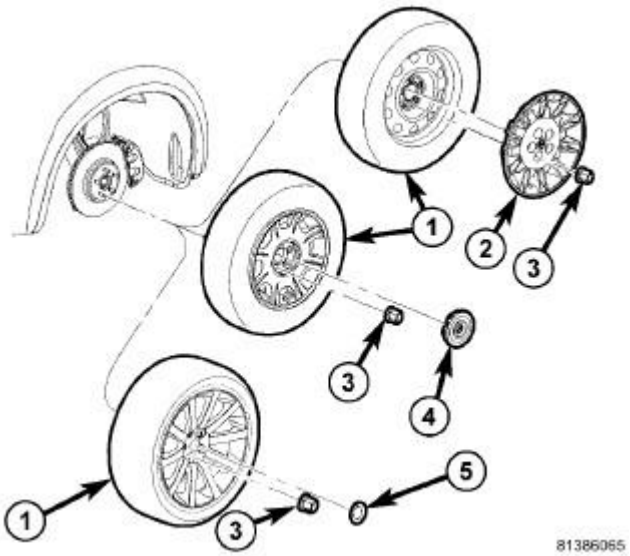

Fig. 177: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.). Refer to **INSTALLATION** .
6. Lower vehicle.
7. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access lower mounting bolt.

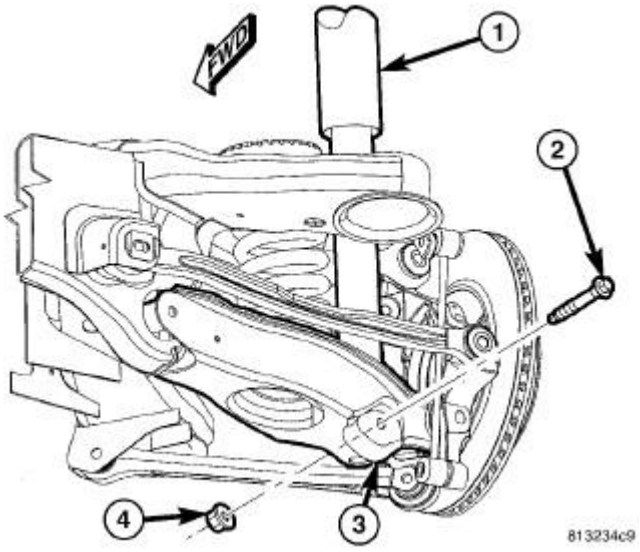

Fig. 178: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

8. Tighten shock absorber lower mounting bolt nut (4) to 72 N.m (53 ft. lbs.).

SRT

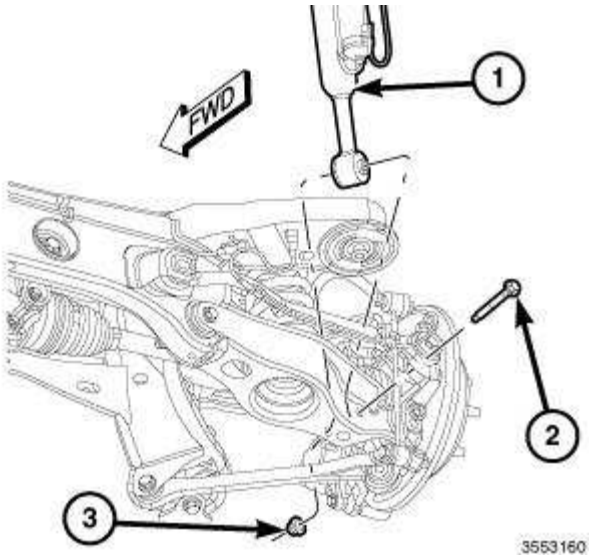

Fig. 179: Lower Mounting Bolt, Nut & Shock Absorber
Courtesy of CHRYSLER GROUP, LLC

1. Insert lower end of shock absorber (1) into well of spring link.

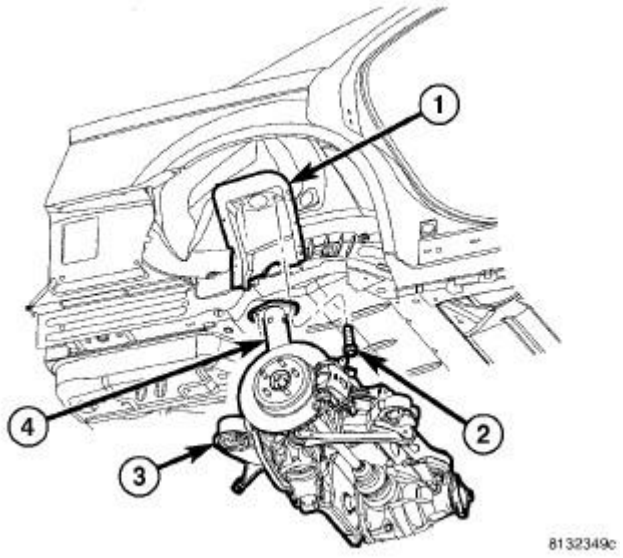

Fig. 180: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

2. Raise upper end of shock absorber (4) up into mounted position on body (1) and install upper mounting screws (2). Tighten upper mounting screws to 52 N.m (38 ft. lbs.).

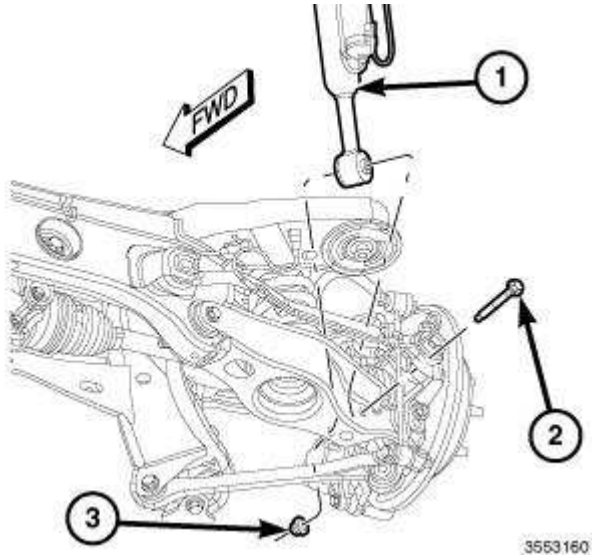

Fig. 181: Lower Mounting Bolt, Nut & Shock Absorber
Courtesy of CHRYSLER GROUP, LLC

3. Install lower shock mounting bolt (2) and nut (3). **Do not tighten at this time.**
4. Remove under-hoist utility jack or jack stand from under spring link.

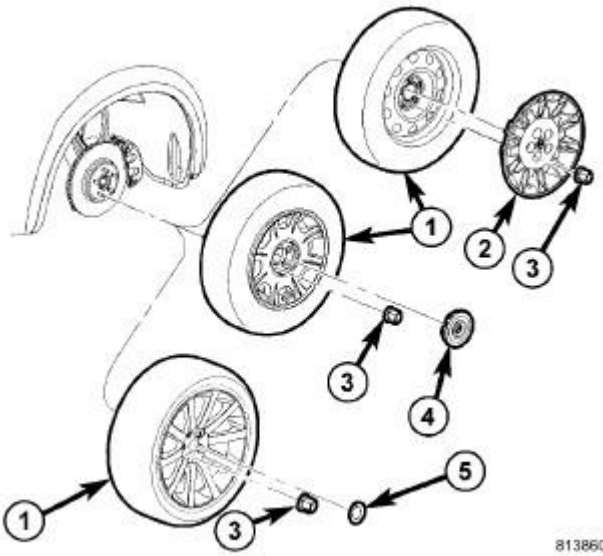

Fig. 182: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Install tire and wheel assembly (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.). Refer to **INSTALLATION** .
6. Lower vehicle.
7. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access lower mounting bolt.

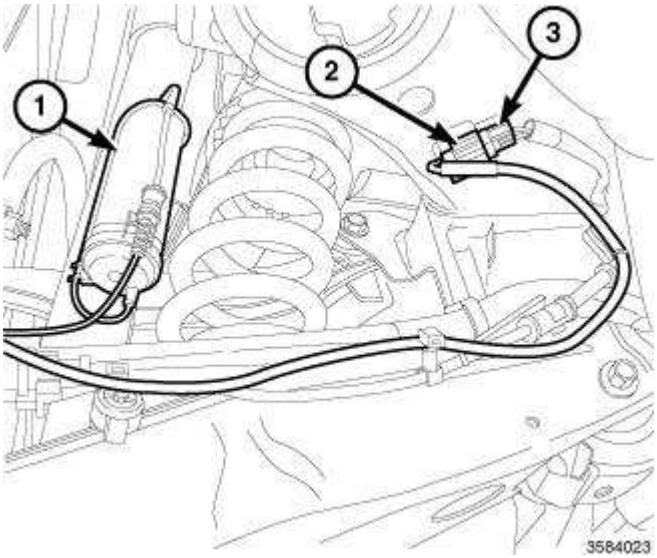

Fig. 183: Shock Solenoid Assembly & ADS Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Connect the Active Damping System (ADS) connector (2) from the ADS shock (1) to the harness connector (3).

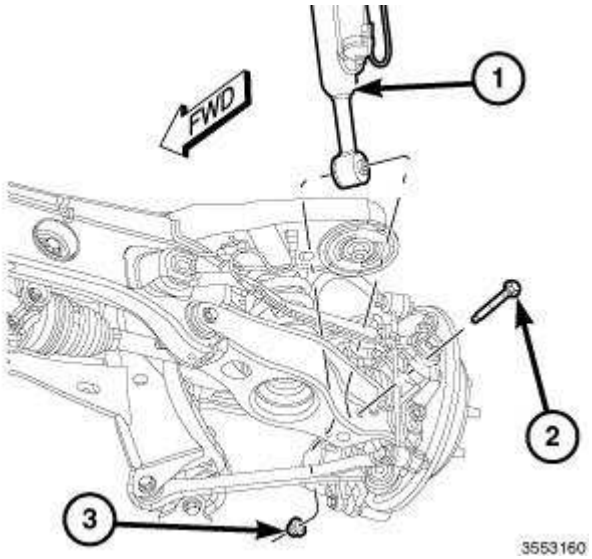

Fig. 184: Lower Mounting Bolt, Nut & Shock Absorber
Courtesy of CHRYSLER GROUP, LLC

9. Tighten shock absorber lower mounting nut (3) to 72 N.m (53 ft. lbs.).

SPRING(S)

REMOVAL

REMOVAL

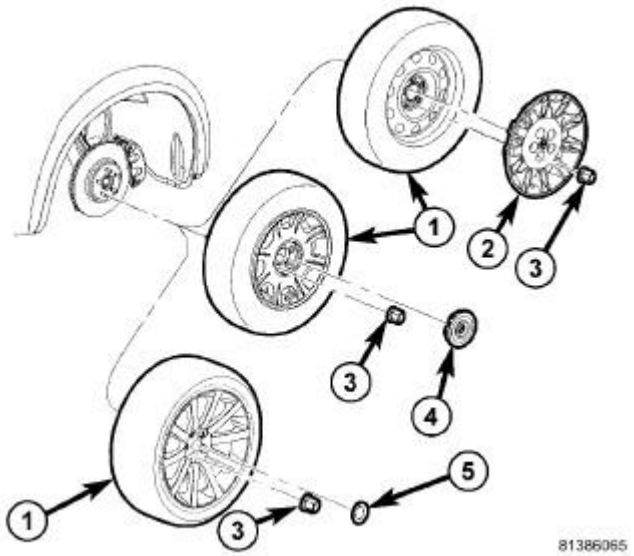

Fig. 185: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. On both sides of vehicle, remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

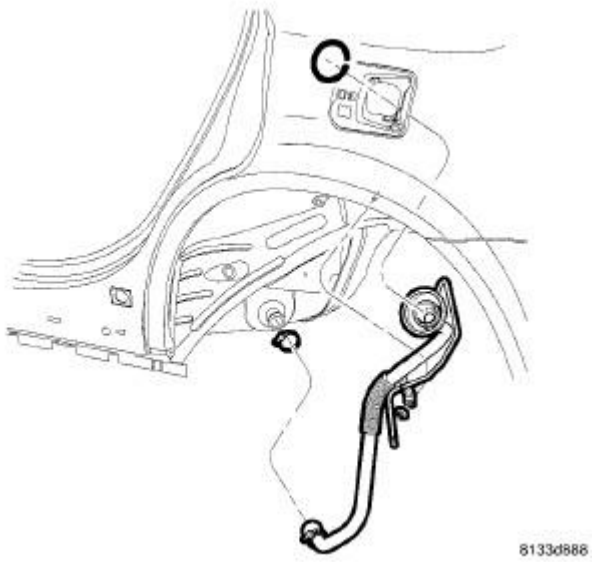

Fig. 186: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

3. If servicing left side shock absorber, remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .
4. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.
5. Perform following if vehicle is equipped with dual-exhaust or are servicing right side on vehicle with single exhaust.
    1. Position under-hoist utility jack or stand several inches below exhaust at muffler.
    2. Disconnect exhaust isolators at muffler and resonators hangers.
    3. Lower exhaust down to rest upon top of jack or stand placed below muffler.

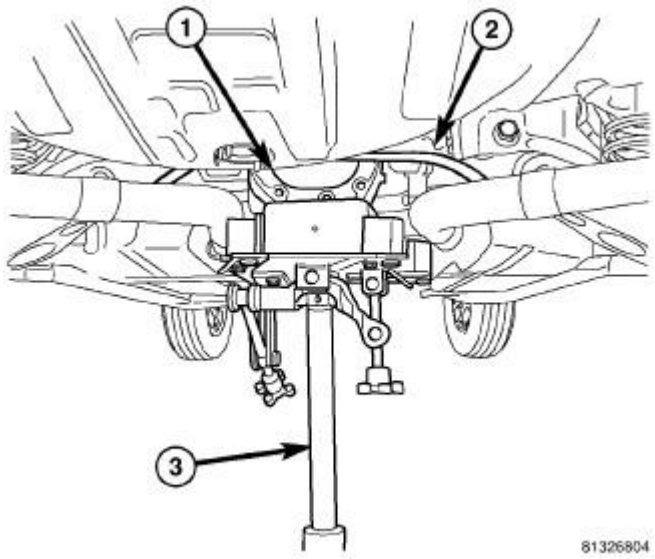

Fig. 187: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

6. Position under-hoist utility jack or transmission jack (3) under center of rear axle differential (1). Raise jack head to contact differential and secure in place. **When securing crossmember to jack, be sure not to secure stabilizer bar.**

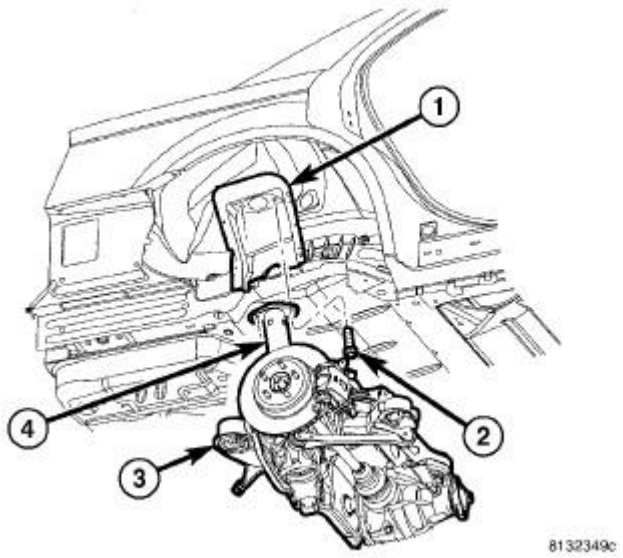

Fig. 188: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

7. Remove shock absorber (1) upper mounting screws (2).

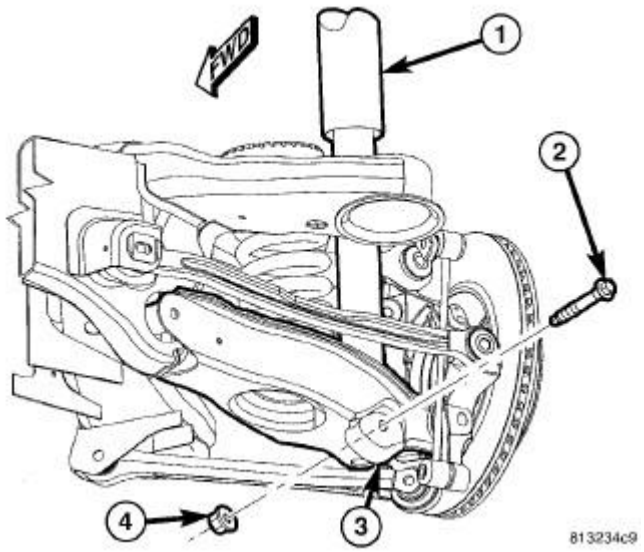

Fig. 189: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

8. Remove shock absorber (1) lower mounting bolt (2) and nut (4).

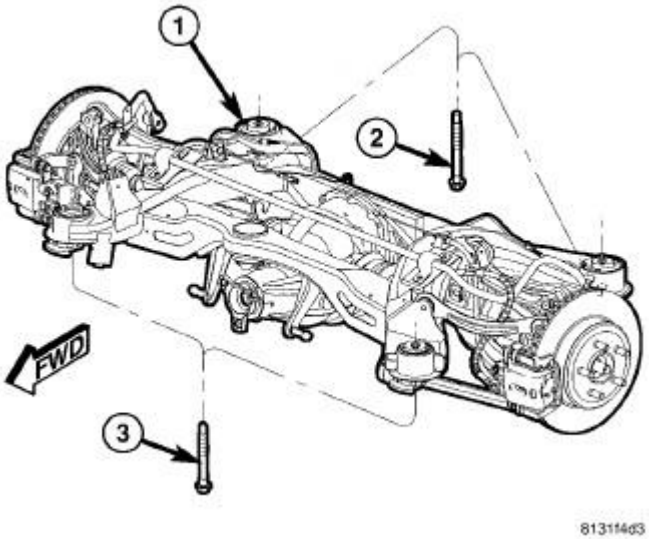

Fig. 190: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing crossmember mounting bolts (2 and 3) it is important NOT to loosen or remove crossmember mounting bolts on opposite side of vehicle. Doing so will require rear wheel alignment following reinstallation to ensure proper thrust angle.

9. Remove both front and rear crossmember mounting bolts (2 and 3) on repair-side of vehicle.

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember (1) any further than necessary to remove shock absorber.

10. **Slowly** lower jack allowing repair-side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow top of shock absorber to clear body flange.

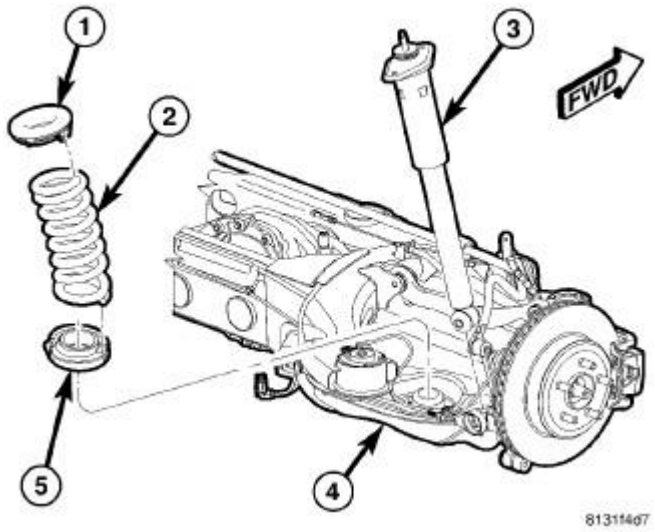

Fig. 191: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

NOTE: Standard suspension shown in illustration, Active Damping System (ADS) similar.

NOTE: If equipped with ADS, disconnect the ADS connector before removing the shock assembly from the vehicle.

11. Remove shock absorber (3) by tipping top outward and lifting lower end out of pocket in spring link (4).
12. Disconnect brake hose at bracket mounted to body to allow to avoid overextending hose, damaging it, during following step.
13. Slowly lower jack until crossmember is low enough to remove coil spring. **Do not lower jack any further than necessary to remove spring.**
14. Remove coil spring and isolators (1, 2 and 5).

INSTALLATION

INSTALLATION

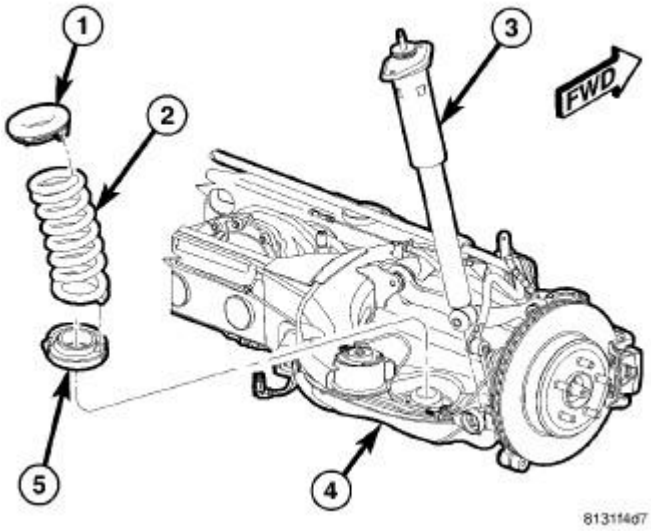

Fig. 192: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

NOTE: Standard suspension shown in illustration, Active Damping Suspension (ADS) similar.

NOTE: Rear coil springs are interchangeable.

1. Install upper (1) and lower (5) isolators on coil spring (2).

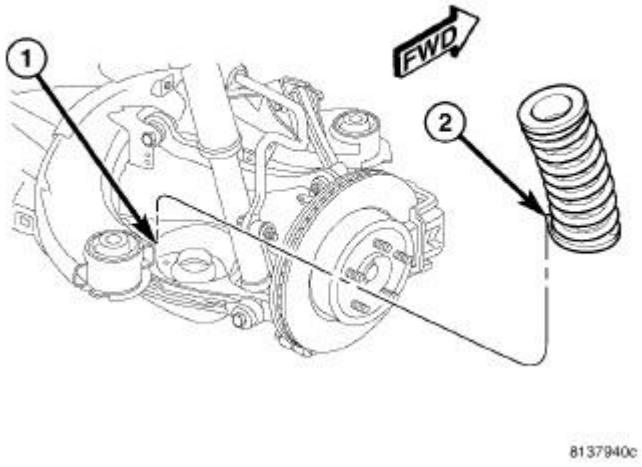

Fig. 193: Matching Spring Isolator To Spring Link
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.**

2. Install coil spring with isolators into spring pocket of spring link (1) fitting lower isolator (2) to shape of pocket, then align top of spring with body mount.

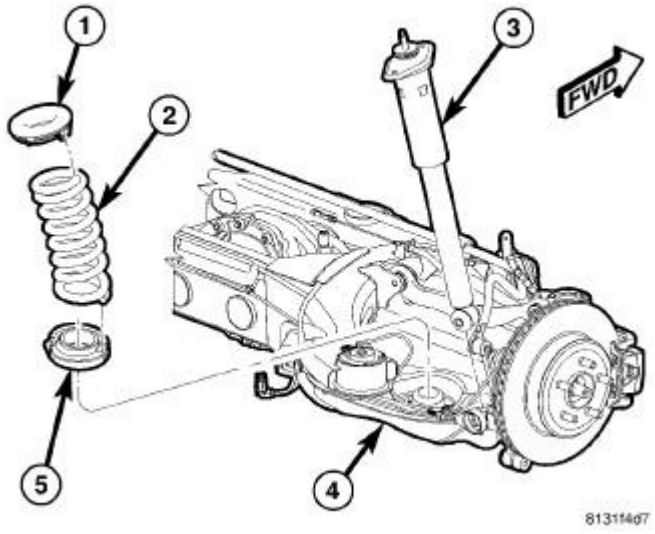

Fig. 194: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Standard suspension shown in illustration, Active Damping Suspension (ADS) similar.**

NOTE: **If equipped with ADS, connect the ADS connector to the shock after installing it in the vehicle.**

3. Install shock absorber (3) by setting lower end into pocket in spring link (4), then tipping top inward until aligned with upper mounting holes.

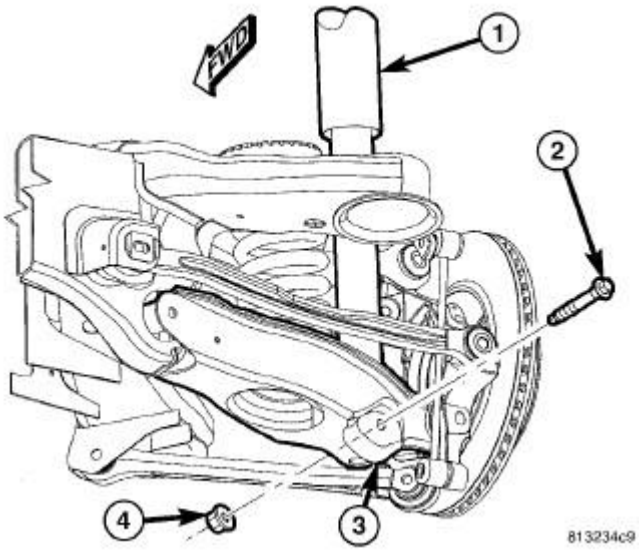

Fig. 195: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

4. Install lower shock mounting bolt and nut. **Do not tighten at this time.**

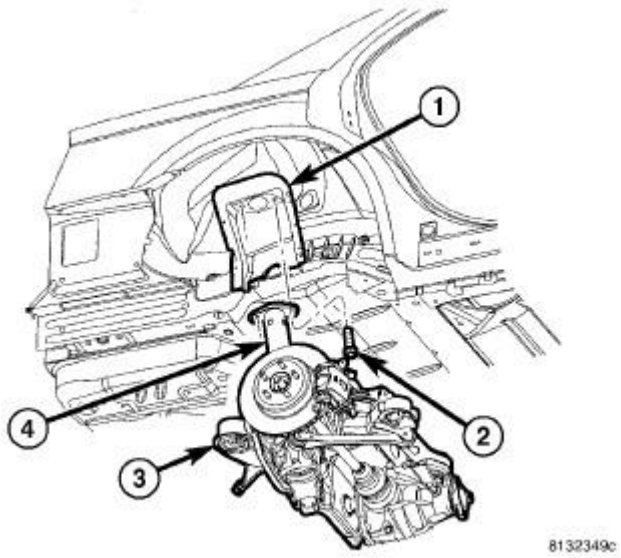

Fig. 196: Shock And Frame Mounting - Upper
Courtesy of CHRYSLER GROUP, LLC

5. Carefully raise jack, guiding coil spring and upper end of shock absorber (4) into mounted positions.
6. Install shock absorber upper mounting screws (2). Tighten upper mounting screws to 52 N.m (38 ft. lbs.).

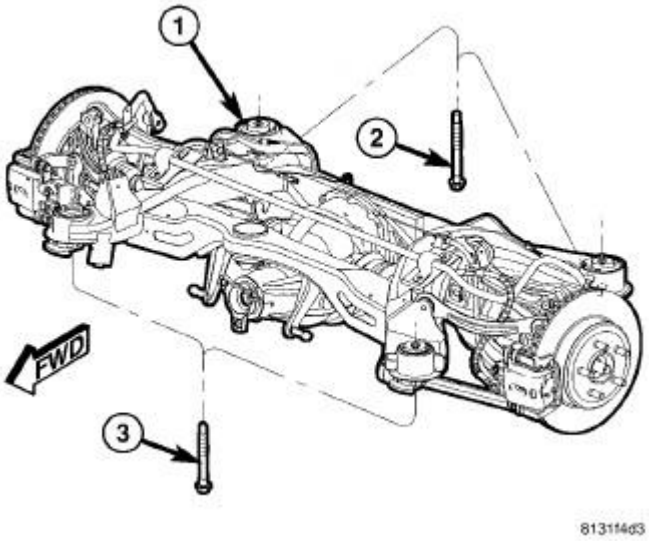

Fig. 197: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Rear crossmember mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

7. Install crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

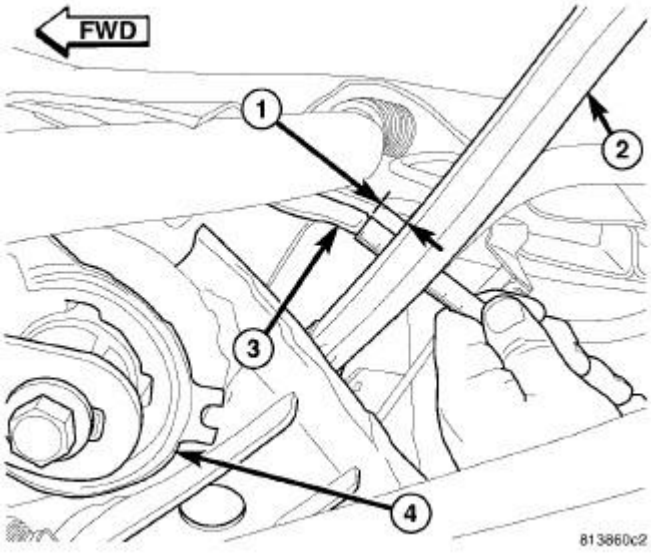

Fig. 198: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

8. Measure distance (1) between from tension link (2) to body weld flange (3) directly in front of it,

just outboard of front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Measure opposite side to be sure it also maintains minimum 12 mm distance.

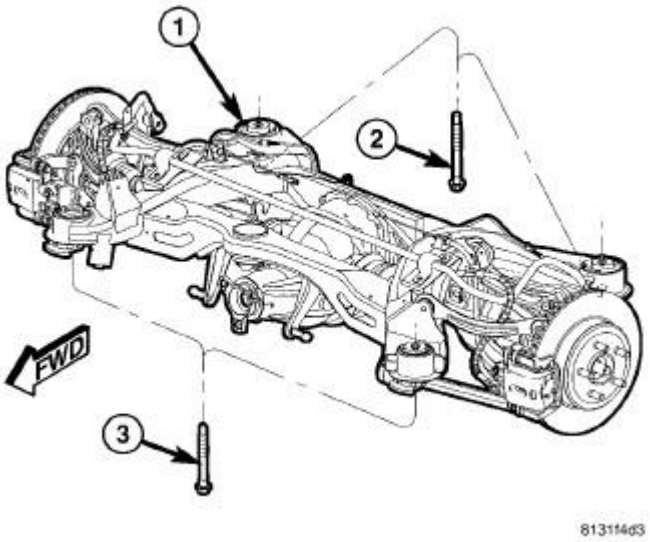

Fig. 199: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Tighten all crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

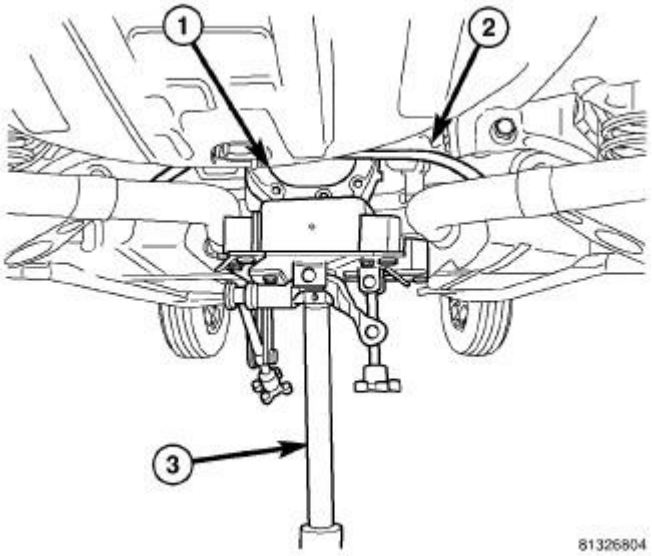

Fig. 200: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

10. Remove jack (3) from under rear axle differential.
11. If previously lowered, raise rear exhaust back to mounted position and connect exhaust isolators at muffler and resonators hangers. Remove jack or stand below exhaust muffler.

Fig. 201: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

12. Install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

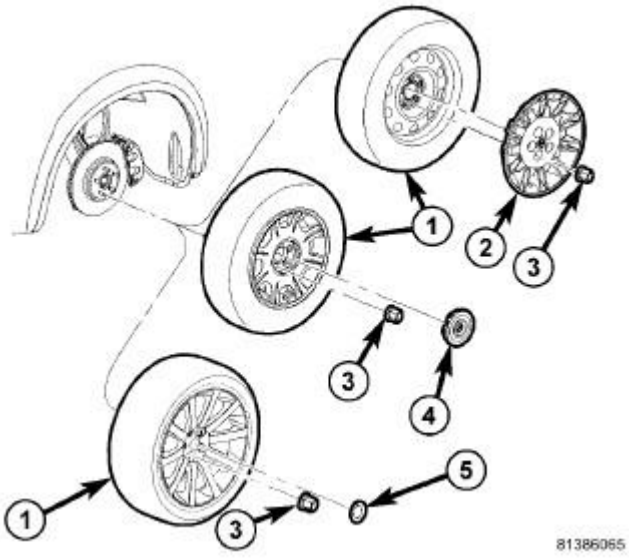

Fig. 202: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

13. Install tire and wheel assemblies (1). Tighten wheel mounting nuts (3) to 150 N.m (110 ft. lbs.) (Police - 190 N.m (140 ft. lbs.)). Refer to **INSTALLATION** .
14. Lower vehicle.
15. Position vehicle on alignment rack/drive-on lift. Raise lift as necessary to access lower mounting bolt.

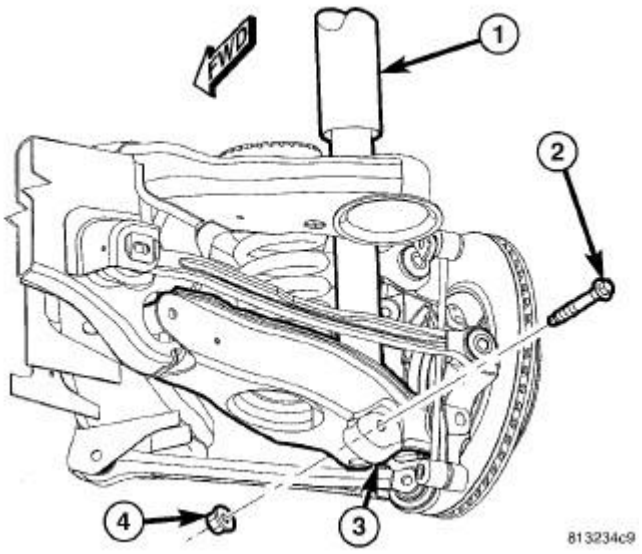

Fig. 203: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

16. Tighten shock absorber lower mounting bolt nut (4) to 72 N.m (53 ft. lbs.).

STABILIZER BAR, REAR SUSPENSION

REMOVAL

REMOVAL

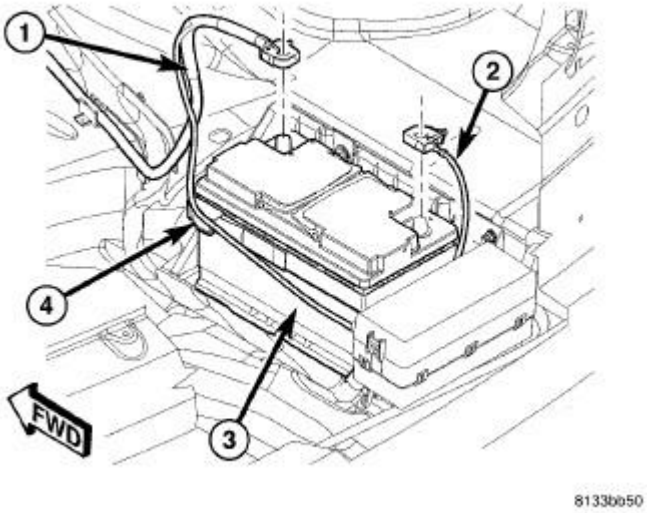

Fig. 204: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.

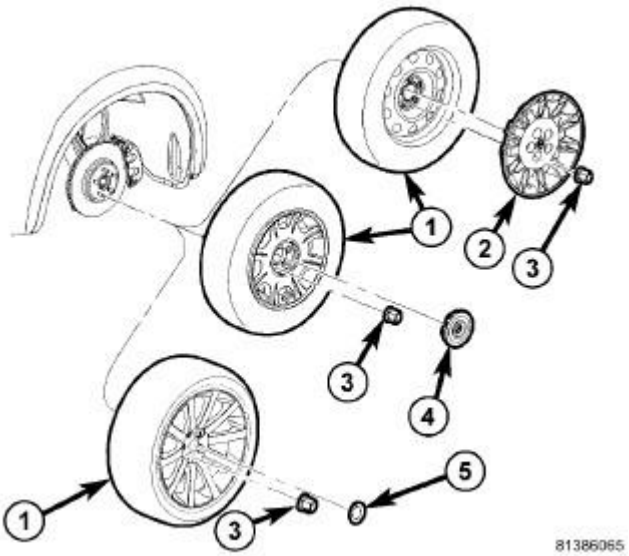

Fig. 205: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. On each side of vehicle rear, remove wheel mounting nuts (3), then tire and wheel assembly (1).

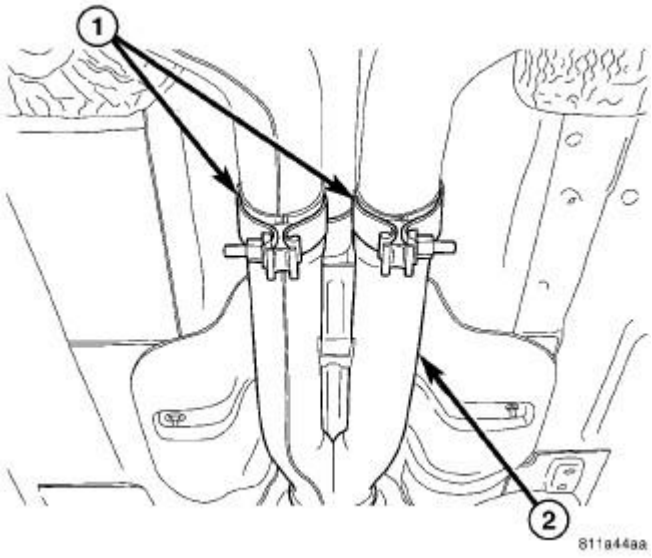

Fig. 206: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

4. Remove rear exhaust system (2) (dual-outlet exhaust shown in figure). Refer to **MUFFLER, EXHAUST, REMOVAL** .

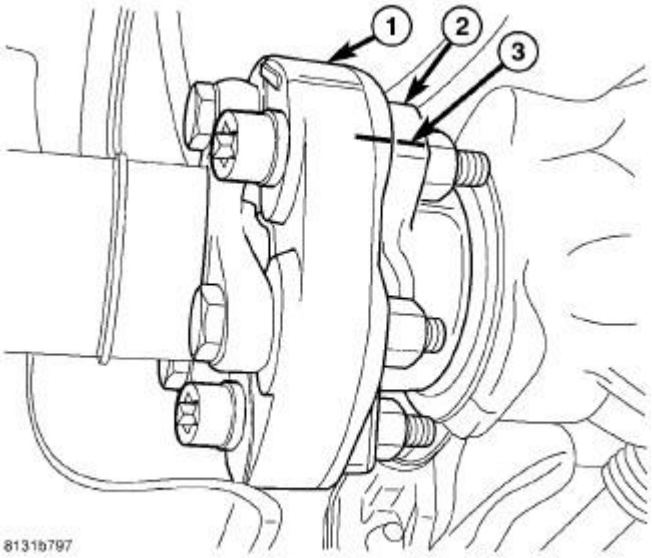

Fig. 207: Alignment Marks AT Shaft And Flange
Courtesy of CHRYSLER GROUP, LLC

5. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).

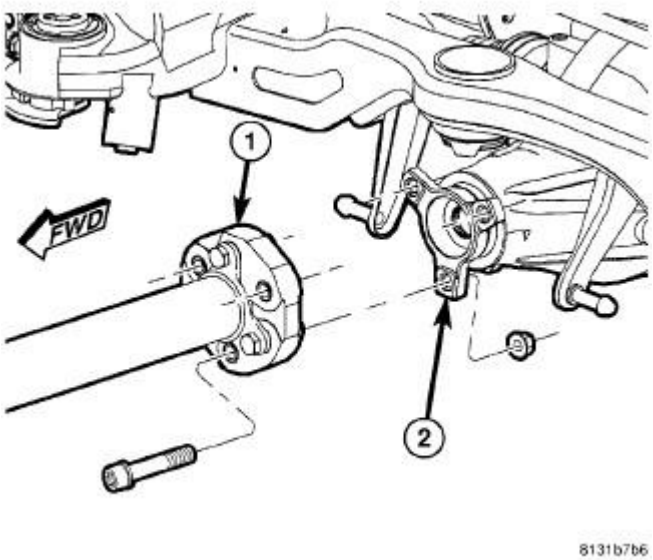

Fig. 208: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove three (four if equipped with 215 MM axle) propeller shaft coupler-to-axle flange bolts and nuts.

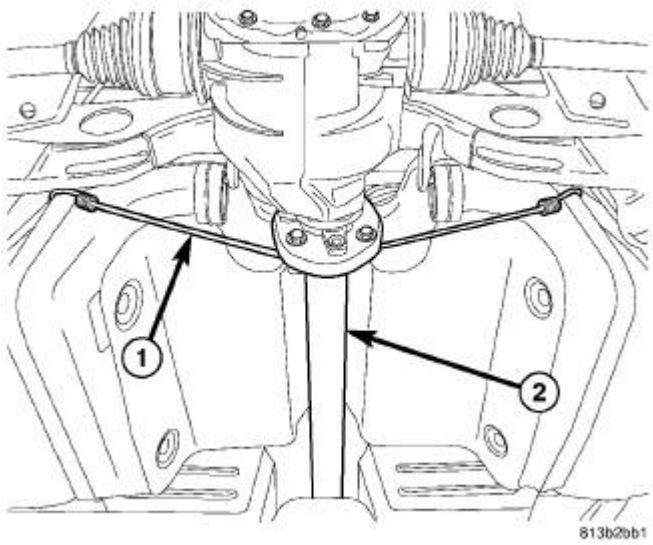

Fig. 209: Prop Shaft Support By Bungee Cord
Courtesy of CHRYSLER GROUP, LLC

7. Support propeller shaft (2) using a bungee cord (1). Attach ends of cord to fuel tank straps as shown in illustration.

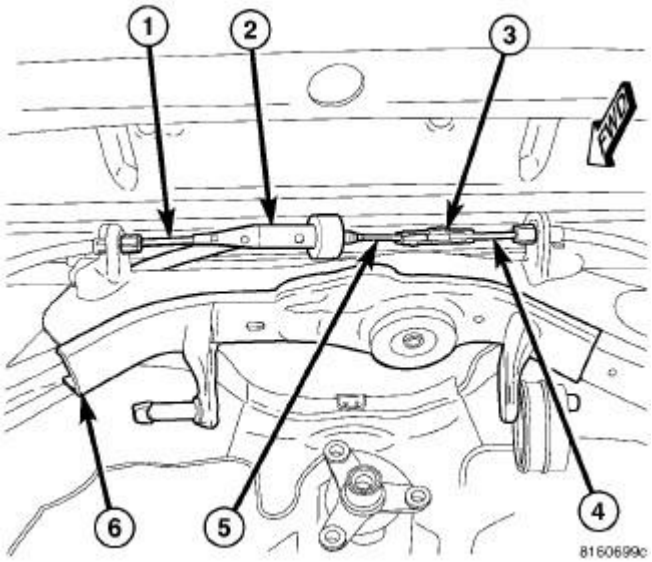

Fig. 210: Cables AT Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

8. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable (4).

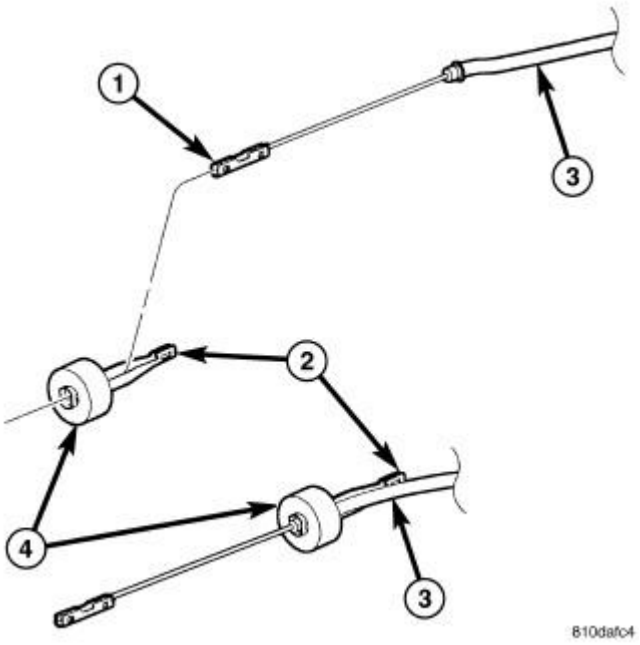

Fig. 211: Front Cable Installation Into Equalizer
Courtesy of CHRYSLER GROUP, LLC

9. Remove front parking brake cable (3) from equalizer (2).

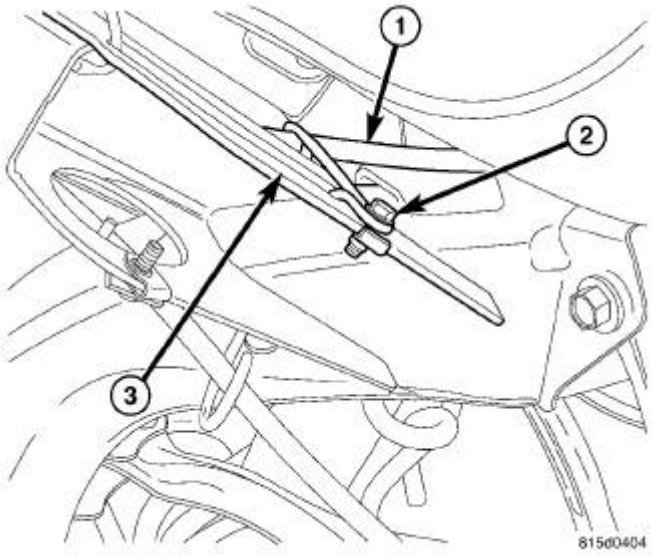

Fig. 212: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

10. Remove screw (2) fastening front parking brake cable (1) routing bracket to rear crossmember front flange (3).

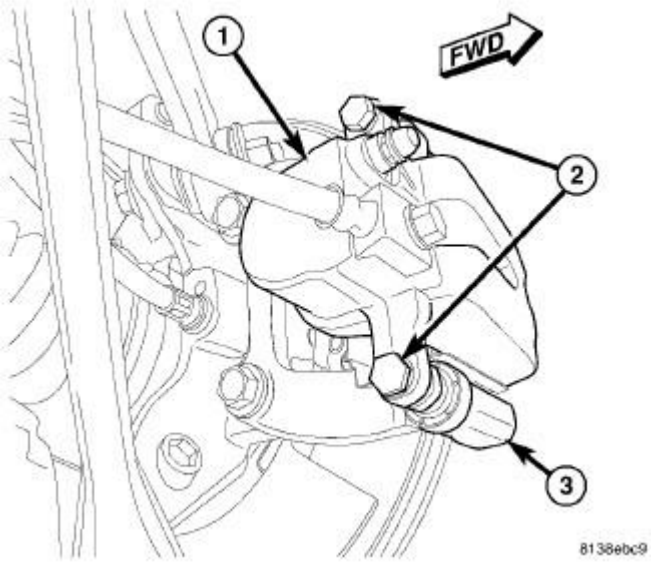

Fig. 213: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

11. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. While holding guide pins from turning, remove disc brake caliper guide pin bolts (2).

2. Remove brake caliper (1) from brake adapter (3) and pads.
3. Guide brake caliper up through suspension, following brake hose path. Support caliper above rear suspension using with bungee cord or wire to keep caliper from overextending brake hose when crossmember is lowered.

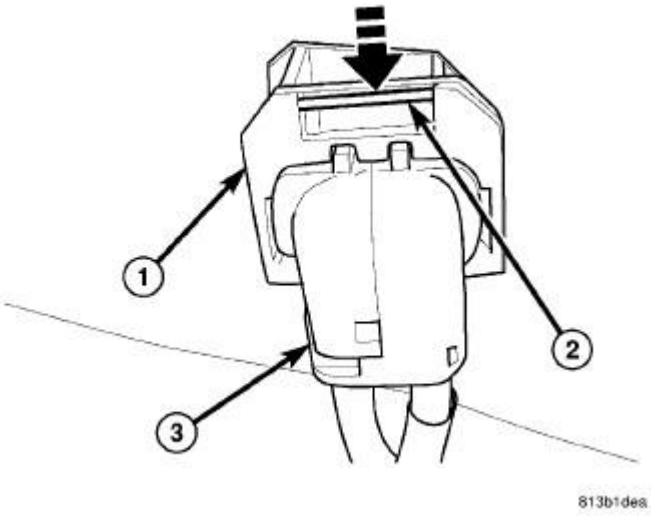

Fig. 214: Releasing Wheel Speed Sensor Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove wheel speed sensor connector from body wiring harness connector, move retaining clip (2) and pull sensor connector outward.

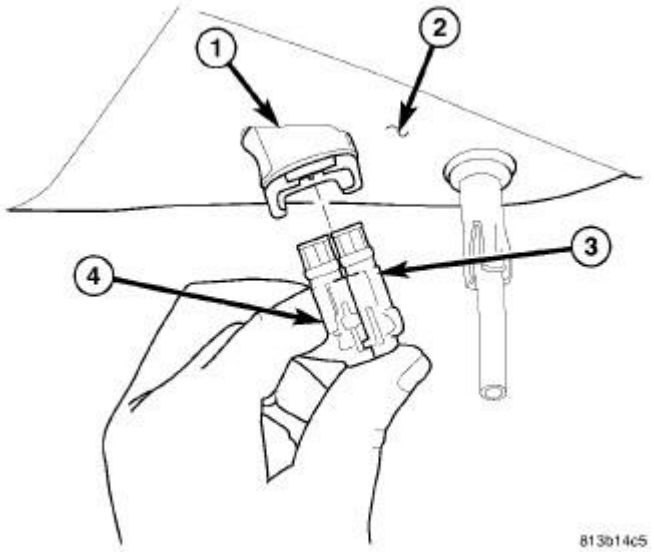

Fig. 215: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

12. Remove wheel speed sensor connectors (3 and 4) from body wiring harness connector (1) located in luggage compartment floor pan (2).

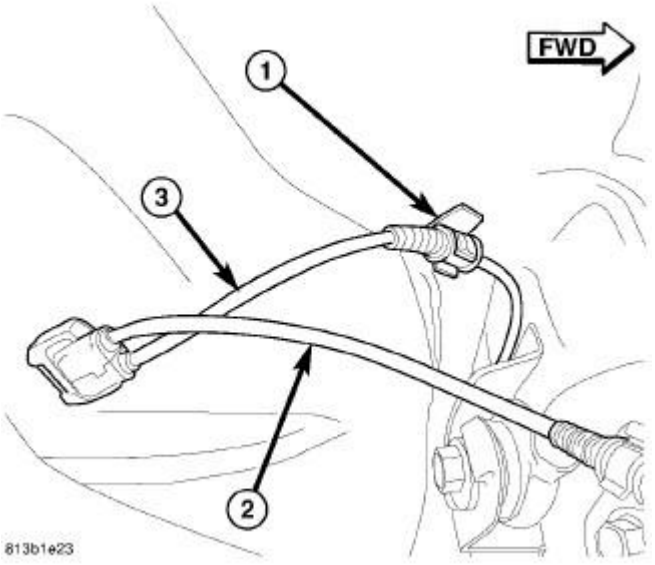

Fig. 216: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

13. Unclip left wheel speed sensor cable (3) from routing clip (1) near body connector.

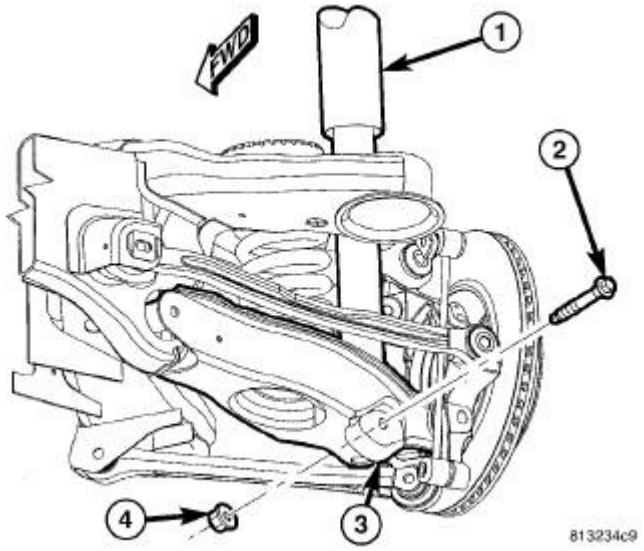

Fig. 217: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

14. On each side of vehicle, remove shock absorber (1) lower mounting bolt (2) and nut (4).

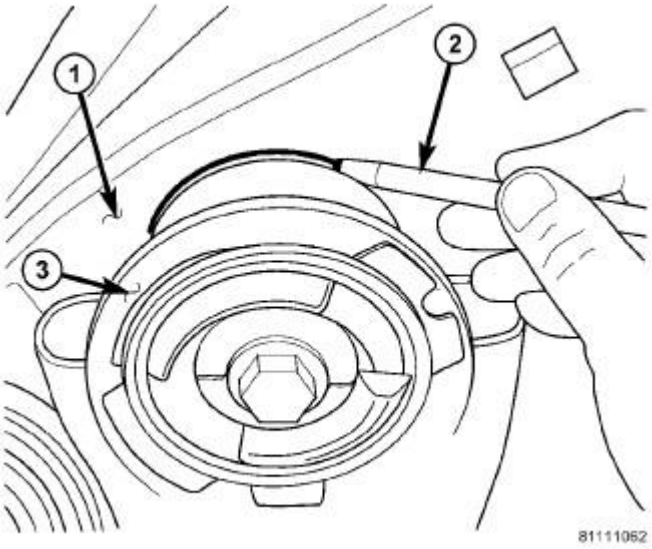

Fig. 218: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

15. Carefully mark location of rear crossmember on body at all four mount (bushing) locations using a marker or crayon. **Do not use a scratch awl to mark location.**
16. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.

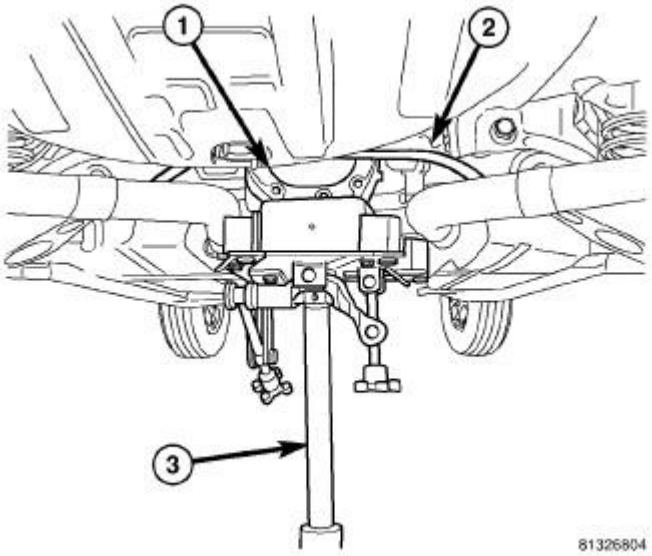

Fig. 219: Support Rear Suspension Using Jack

Courtesy of CHRYSLER GROUP, LLC

17. Position under-hoist utility jack or transmission jack (3) under center of rear axle differential (1). Raise jack head to contact differential and secure in place. **When securing crossmember to jack, be sure not to secure stabilizer bar.**

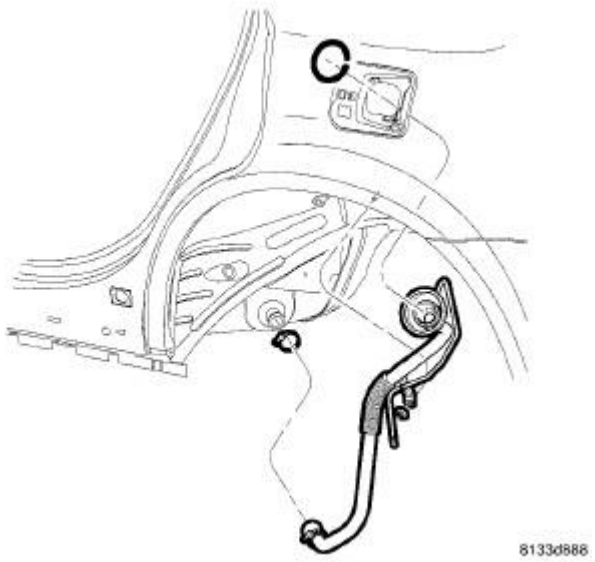

Fig. 220: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before opening fuel system, review all Warnings and Cautions.

18. Remove fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** or **TUBE, FUEL TANK FILLER, REMOVAL** .

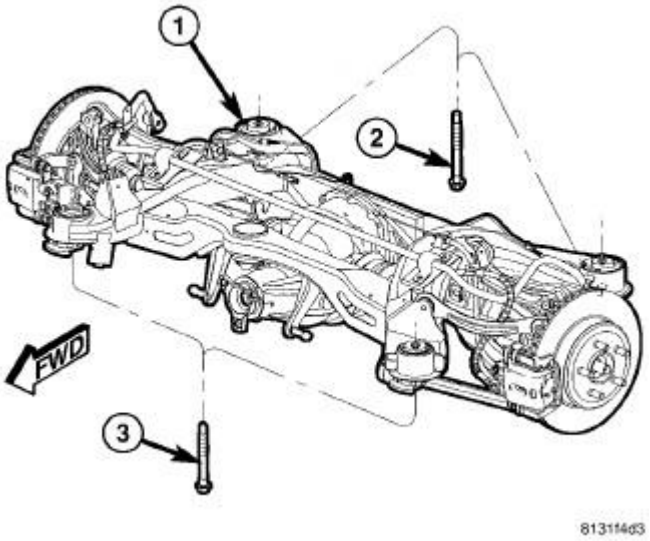

Fig. 221: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Remove both front (3) and both rear (2) mounting bolts fastening crossmember (1) in place.
20. **Slowly** lower crossmember using jack. **Do not lower jack at a fast rate.** Lower just enough to allow propeller shaft removal from rear axle differential. **Do not lower jack any further than necessary.** Slide propeller shaft out of rear axle differential and allow bungee cord previously installed to support.
21. Continue to lower jack until crossmember is at a comfortable working level to access stabilizer bar fasteners.

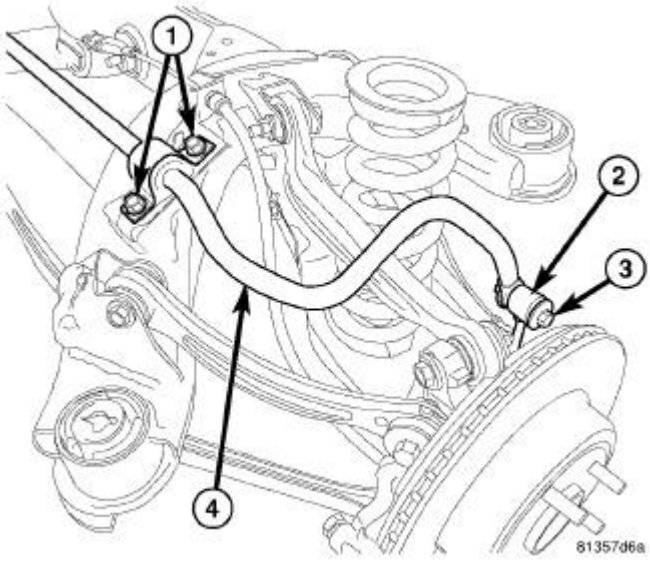

Fig. 222: Rear Stabilizer Bar Mounting
Courtesy of CHRYSLER GROUP, LLC

22. On each end, remove bolt (3) and nut fastening stabilizer bar (4) to stabilizer link (2).
23. Remove bolts (1) fastening each stabilizer bar isolator retainer to crossmember.
24. Remove stabilizer bar (4) with isolators and retainers.
25. Remove retainers from isolators.
26. Remove isolators from stabilizer bar utilizing slits in bushings.

INSTALLATION

INSTALLATION

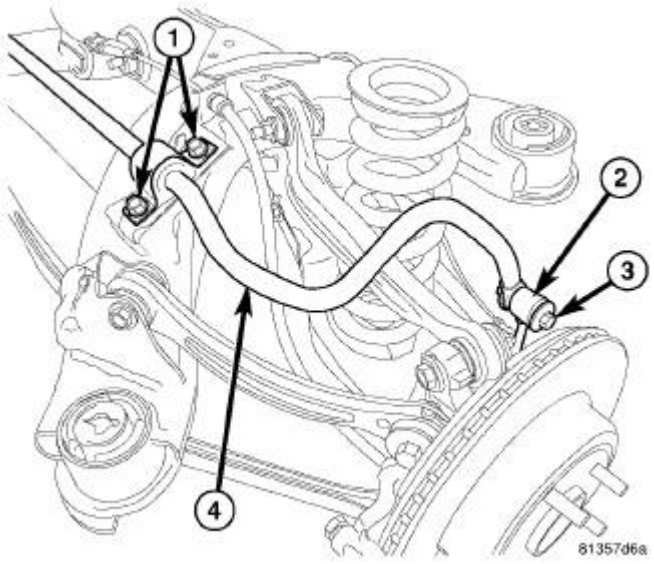

Fig. 223: Rear Stabilizer Bar Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Install isolators on stabilizer bar utilizing slits in bushings. Install each isolator so its slit faces forward and flat side is positioned toward crossmember once installed.
2. Install retainers on isolators.
3. Install stabilizer bar (4) with isolators and retainers on crossmember.
4. Install isolator retainer mounting bolts (1). **Do not tighten at this time.**
5. Install bolt (3) and nut fastening stabilizer bar ends to each stabilizer links (2). **Do not tighten at this time.**
6. Tighten isolator retainer mounting bolts (1) to 61 N.m (45 ft. lbs.).

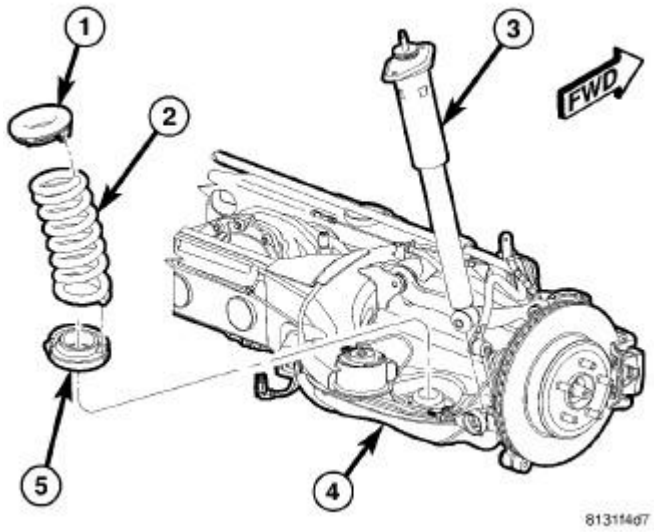

Fig. 224: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

7. Remove coil springs (2) with isolators (1 and 5) from spring links (4).
8. Raise crossmember to body mounting points. As crossmember is raised, slide propeller shaft onto rear axle differential flange and align shocks with pockets in spring links.

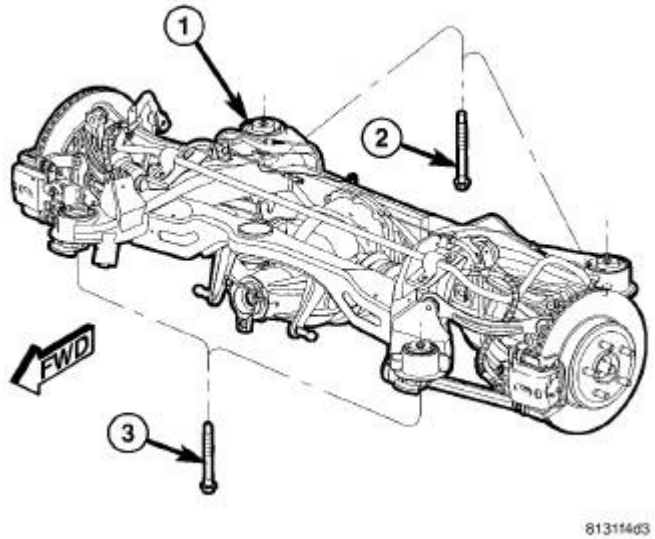

Fig. 225: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

9. Continue to raise crossmember (1) with jack until crossmember mounting bolts (2 and 3) can be installed. Install left side crossmember mounting bolts, but not the right side bolts. It is not necessary to tighten bolts at this point.

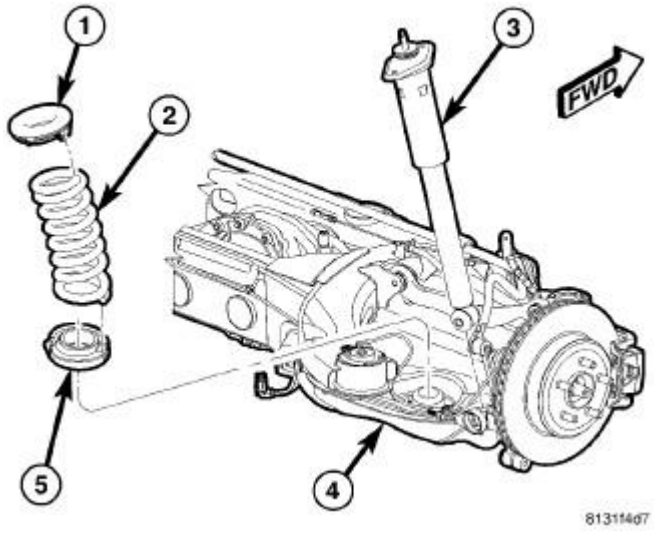

Fig. 226: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

10. **Slowly** lower jack allowing right side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

11. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

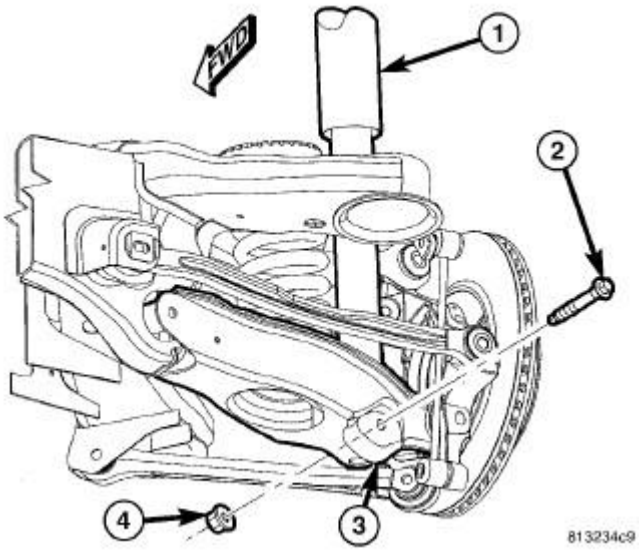

Fig. 227: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

12. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
13. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

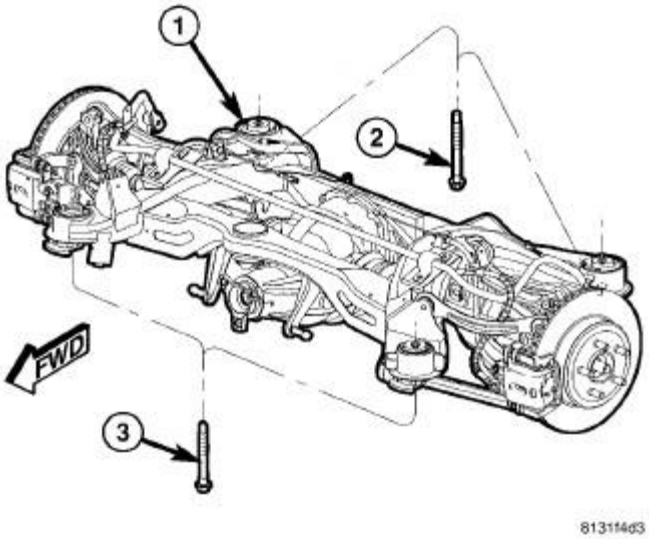

Fig. 228: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

14. Raise right side of crossmember (1) into mounted position. Install right side crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**
15. Remove both front and rear crossmember mounting bolts (2 and 3) on **left** side of vehicle.

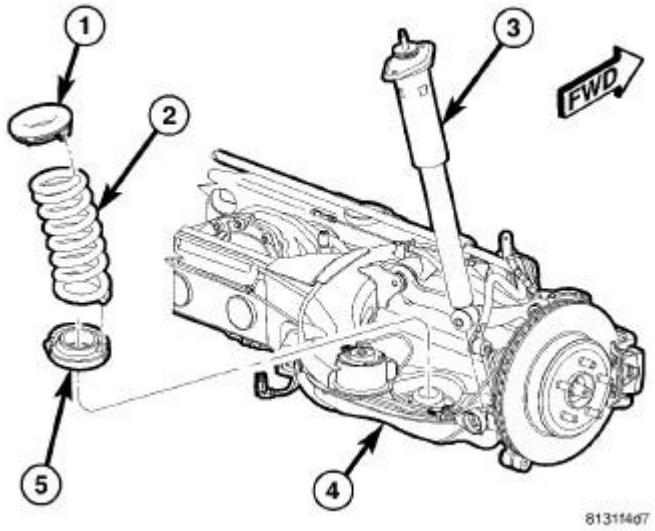

Fig. 229: Coil Spring And Shock Assy.
Courtesy of CHRYSLER GROUP, LLC

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember any further than necessary to install coil spring (2).

16. **Slowly** lower jack allowing left side of crossmember to drop. **Do not lower jack at a fast rate.** Lower jack just enough to allow spring (2) Installation. **Do not lower jack any further than necessary.**

NOTE: Before installing coil spring, make sure isolators (1 and 5) are completely installed on ends of spring.

17. Install coil spring (2) with isolators into spring pocket of spring link fitting the lower isolator to the shape of the pocket, then align top of spring with body mount.

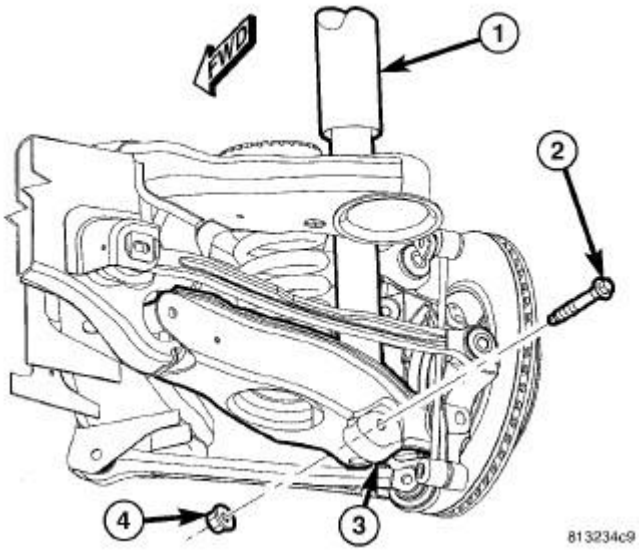

Fig. 230: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

18. Carefully raise jack, guiding coil spring and lower end of shock absorber (1) into mounted positions. Once shock absorber (1) lower mounting hole lines up with hole in spring link (3), stop jacking.
19. Install lower shock mounting bolt (2) and nut (4). **Do not tighten at this time.**

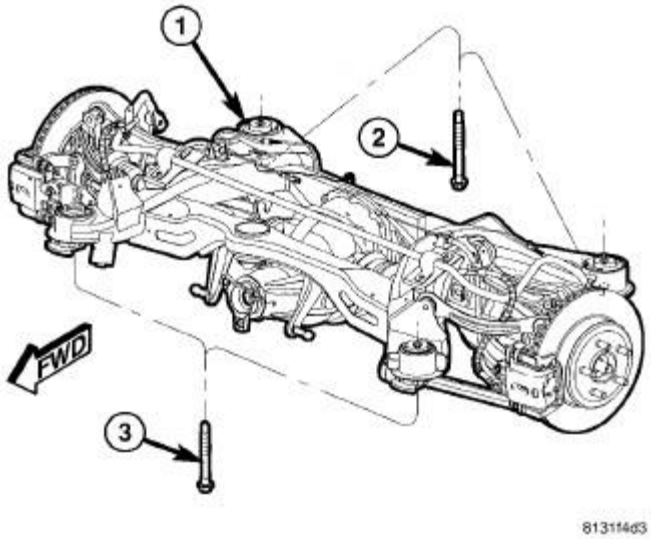

Fig. 231: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: There are four crossmember mounting bolts. Rear mounting bolts (2) are longer than front mounting bolts (3). Do not interchange mounting bolts.

20. Raise left side of crossmember (1) into mounted position. Install left side crossmember mounting bolts (2 and 3). **Snug, but do not fully tighten bolts at this time.**

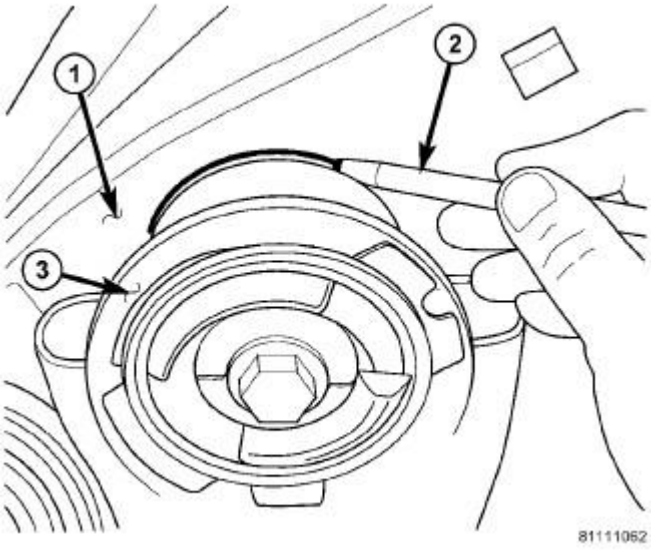

Fig. 232: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

1 - BODY
2 - MARKER (OR CRAYON)
3 - CROSSMEMBER BUSHING FLANGE

21. Shift crossmember as necessary to line up mounts (3) with location marks drawn on body (1) before removal.

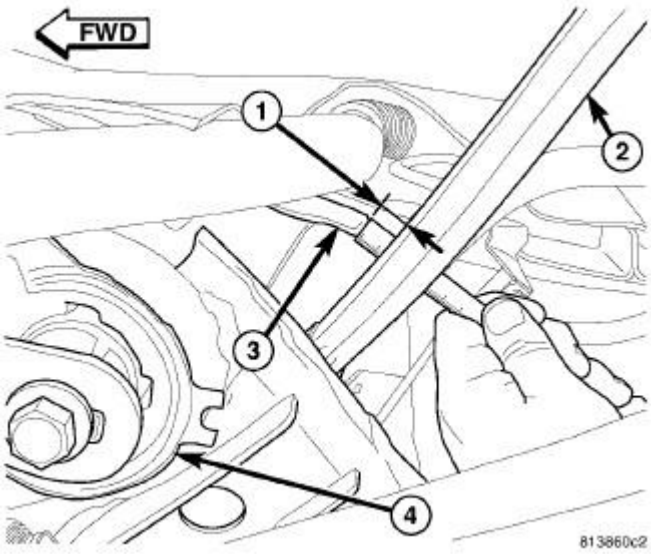

Fig. 233: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

22. Once mounts are lined up with location marks, on both sides of vehicle, measure distance (1) between the tension link (2) and weld flange (3) on body directly in front of it, just outboard of the front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm on either side of vehicle, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Remeasure opposite side to be sure it still maintains minimum 12 mm distance.

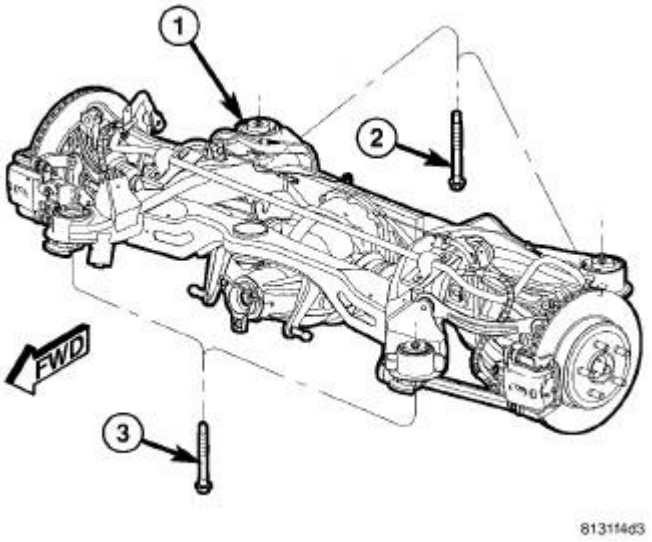

Fig. 234: Rear Crossmember Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

23. Tighten all four crossmember mounting bolts (2 and 3) to 180 N.m (133 ft. lbs.).

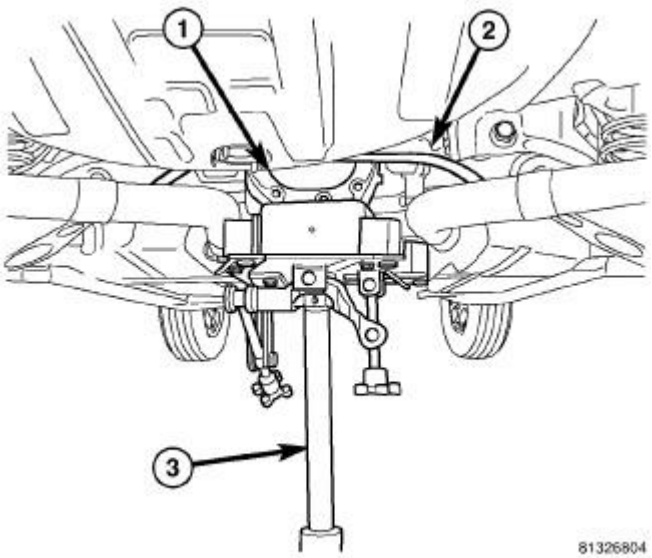

Fig. 235: Support Rear Suspension Using Jack
Courtesy of CHRYSLER GROUP, LLC

24. Remove jack (3) from under rear axle differential.

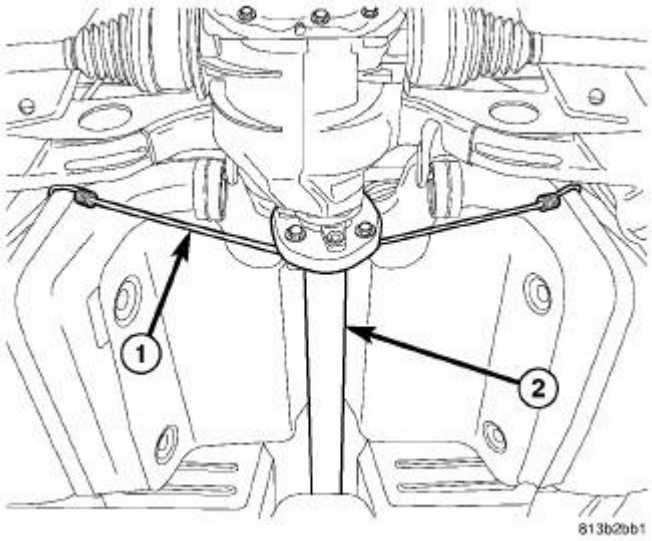

Fig. 236: Prop Shaft Support By Bungee Cord
Courtesy of CHRYSLER GROUP, LLC

25. Remove bungee cord (1) supporting propeller shaft (2).

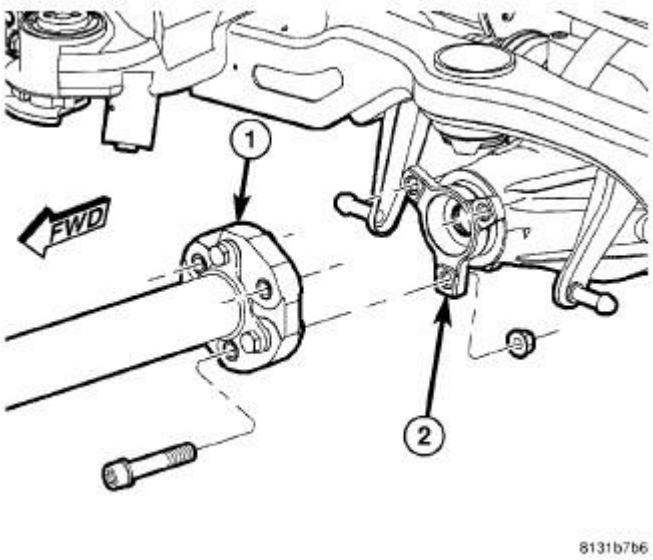

Fig. 237: Propeller Shaft AT Rear Axle Flange
Courtesy of CHRYSLER GROUP, LLC

26. Align propeller shaft index marks placed upon removal. Install propeller shaft rear coupler-to-axle flange bolts and nuts by hand. Tighten propeller shaft rear coupler-to-axle flange bolts to 81 N.m (60 ft. lbs.).

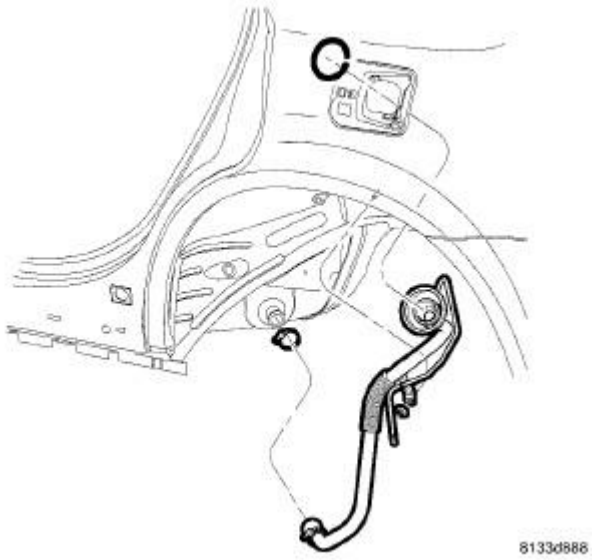

Fig. 238: Filler Tube Assembly
Courtesy of CHRYSLER GROUP, LLC

27. Install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** or **TUBE, FUEL TANK FILLER, INSTALLATION** .

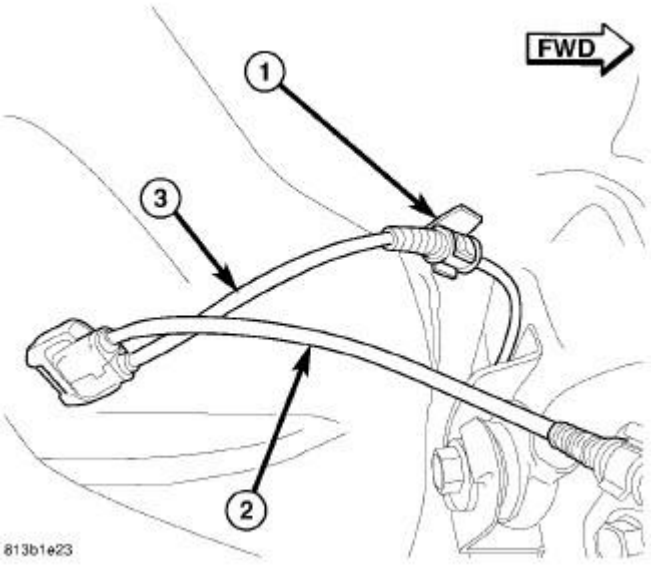

Fig. 239: Left/Right Rear Wheel Speed Sensor Routing
Courtesy of CHRYSLER GROUP, LLC

28. Clip left rear wheel speed sensor cable (3) to routing clip (1) near body connector.

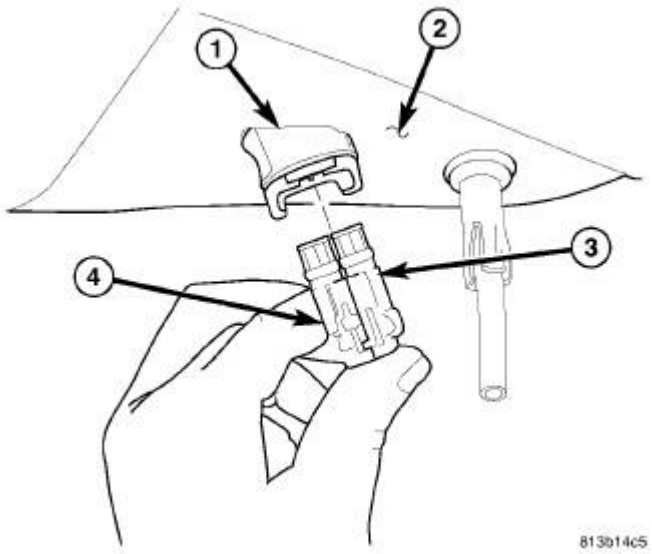

Fig. 240: Sensor Connection To Body Connector
Courtesy of CHRYSLER GROUP, LLC

29. Match left rear wheel speed sensor connector (4) to right sensor connector (3) to make one connector.
30. Insert speed sensor connectors (3 and 4) into body wiring harness connector (1) located in luggage compartment floor pan (2). When installing connector, make sure retaining clip on body connector is properly in place and sensor connector cannot be pulled out.

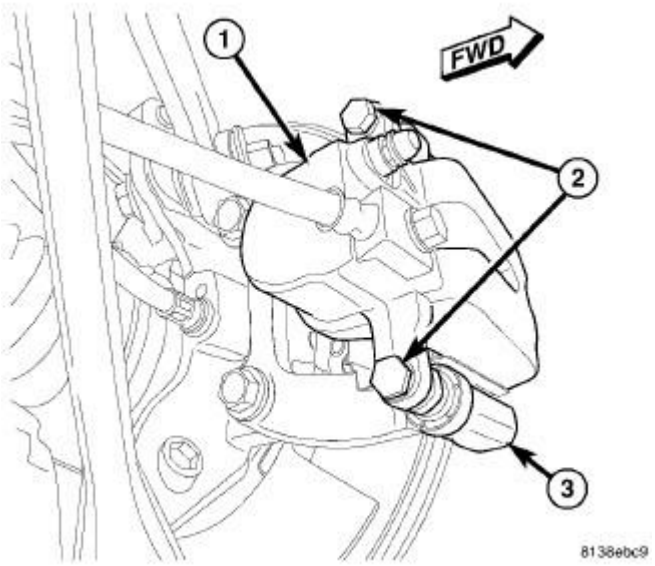

Fig. 241: Rear Caliper Mounting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Extreme caution should be taken not to cross-thread caliper guide pin bolts (2) when they are installed.

NOTE: Before installing caliper guide pin bolts, clean guide pin bolt threads and apply Mopar® Lock AND Seal Adhesive or equivalent.

31. If equipped with standard or premium disc brakes, on each rear disc brake:
    1. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.
    2. Guide caliper and brake hose down through rear suspension, then slide caliper over brake pads and onto caliper adapter (3).
    3. Align caliper mounting holes with guide pins, then install guide pin bolts (2). While holding guide pins from turning, tighten bolts to 31 N.m (23 ft. lbs.).
    4. Make sure brake hose is properly routed and will not come in contact with suspension components.

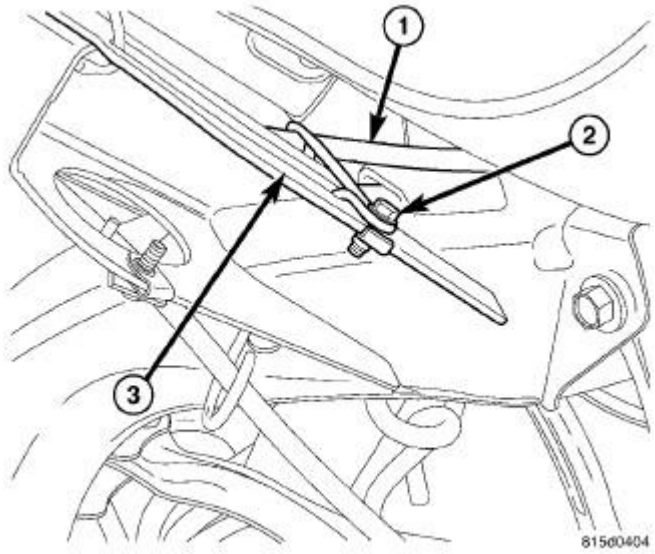

Fig. 242: Front Cable AT Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

32. Insert routing front parking brake cable bracket locating pin in front flange of crossmember (3), then install screw (2) fastening cable (1) routing bracket to rear crossmember.

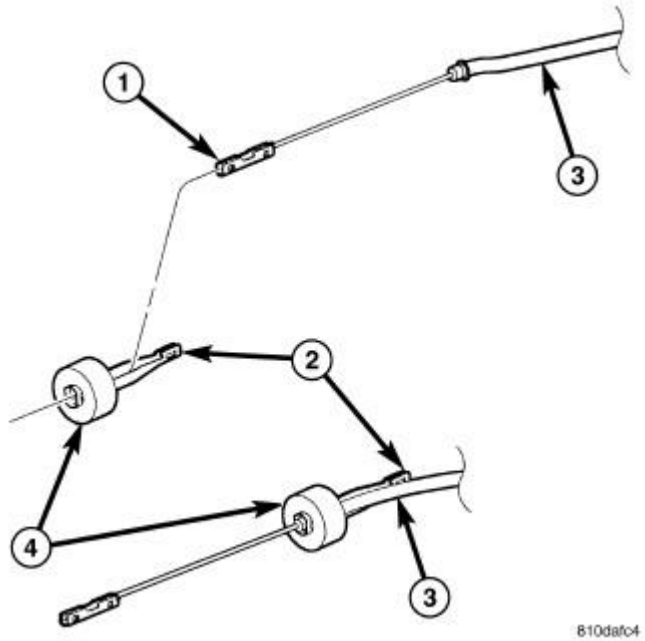

Fig. 243: Front Cable Installation Into Equalizer
Courtesy of CHRYSLER GROUP, LLC

33. Route parking brake cable above rear crossmember, then slide cable (1, 3) through equalizer (2) above rear axle differential.

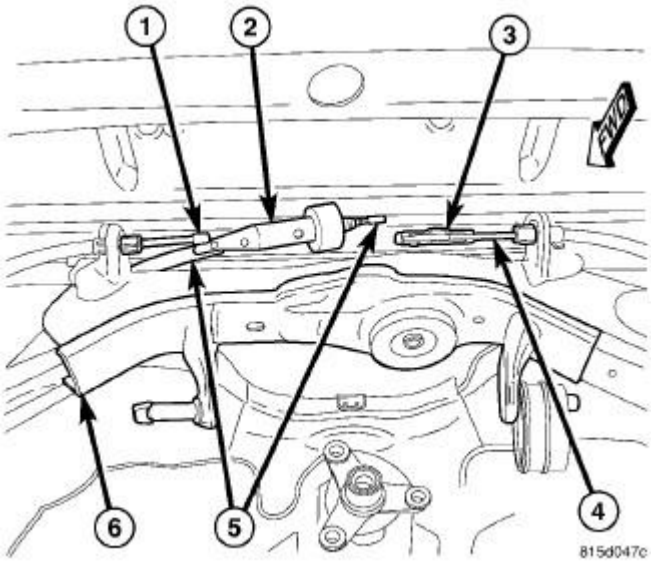

Fig. 244: Parking Brake Cables AT Rear Crossmember
Courtesy of CHRYSLER GROUP, LLC

NOTE: Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.

34. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4).

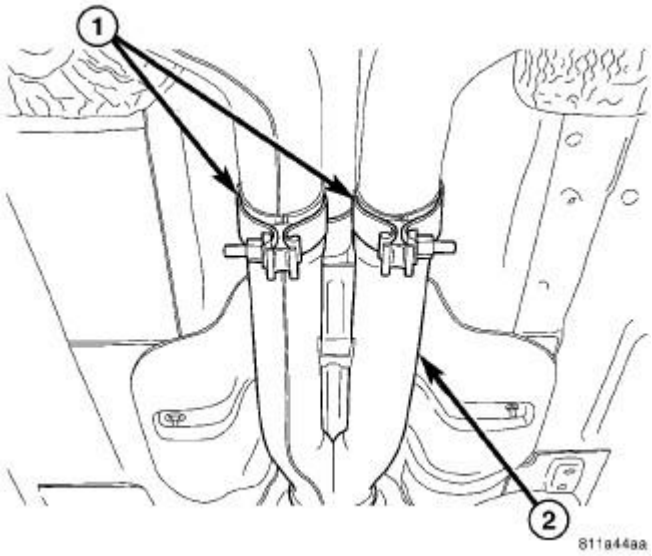

Fig. 245: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

35. Install rear exhaust system (2) (dual-outlet exhaust shown in figure). Refer to **MUFFLER, EXHAUST, INSTALLATION** .

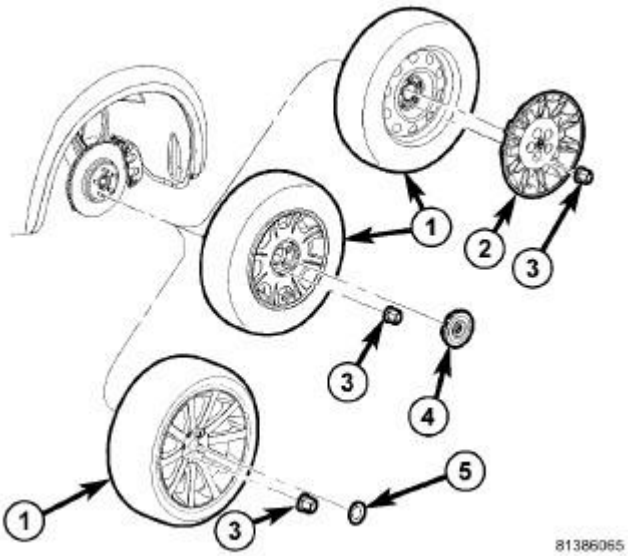

Fig. 246: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

36. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .
37. Lower vehicle until rear wheels are just above floor level.
38. Apply parking brake lever. Release lever, then reapply.
39. Check to make sure rear wheels will not rotate with lever applied.
40. Lower vehicle.

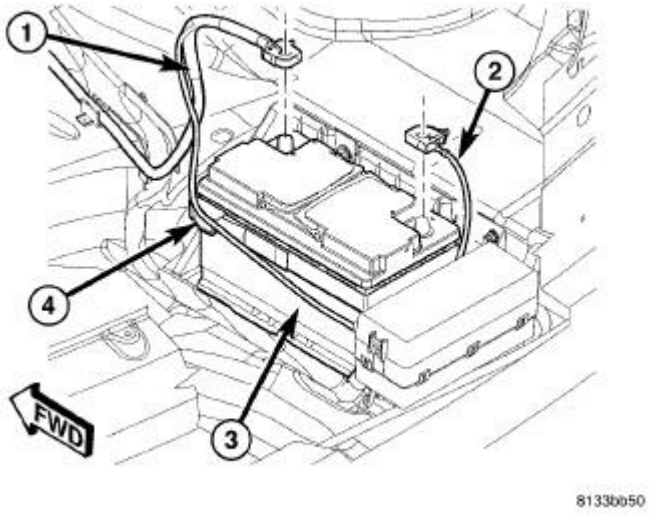

Fig. 247: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

41. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

42. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
43. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access mounting bolts.

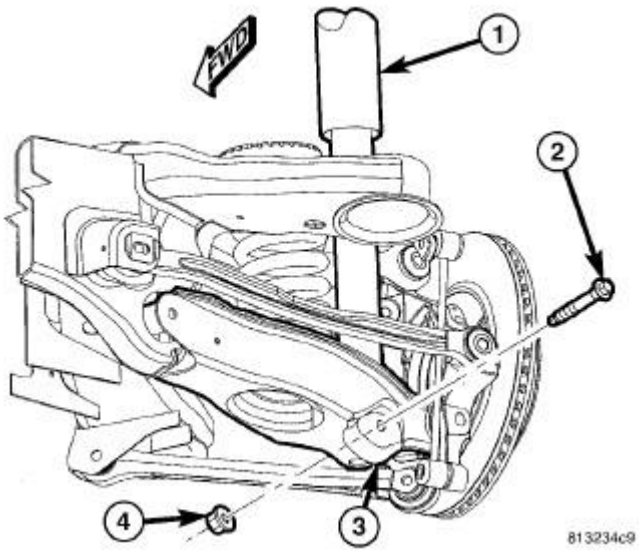

Fig. 248: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

44. Tighten shock absorber lower mounting bolt nuts (4) to 72 N.m (53 ft. lbs.).

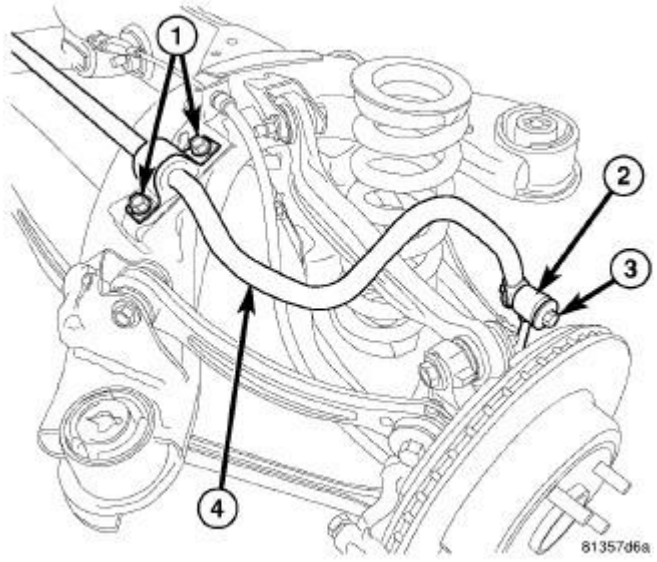

Fig. 249: Rear Stabilizer Bar Mounting
Courtesy of CHRYSLER GROUP, LLC

45. Tighten stabilizer link fasteners (3) to 61 N.m (45 ft. lbs.).
46. Perform wheel alignment, paying special attention to thrust angle. If rear crossmember needs to be shifted to align thrust angle, try to avoid compromising tension link clearance (). Refer to 22 and **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

RESTRAINTS

Service Information - Chrysler 300

WARNING

WARNING

WARNING: To avoid serious or fatal injury on vehicles equipped with the Supplemental Restraint System (SRS), never attempt to repair the electrically conductive circuits or wiring components related to the SRS for which there is no MOPAR wiring repair kit. It is important to use ONLY the recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR® Connector Web Site at the following address on the internet: (http://dto.vftis.com/mopar/disclaimer.asp). Inappropriate repairs can compromise the conductivity and current carrying capacity of those critical electrical circuits, which may cause SRS components not to deploy when required, or to deploy when not required. Only minor cuts or abrasions of wire and terminal insulation where the conductive material has not been damaged, or connector insulators where the integrity of the latching and locking mechanisms have not been compromised may be repaired using appropriate methods.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain or seat (pelvic and thorax) airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side curtains or seat airbags in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side curtain and seat airbags

will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid potential physical injury or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the Occupant Restraint Controller (ORC) capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 12 inches (30 centimeters) of an electronic module or wiring harness, then that module or harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens.

WARNING: To avoid serious or fatal injury, do not attempt to dismantle an airbag unit or tamper with its inflator. Do not puncture, incinerate or bring into contact with electricity. Do not store at temperatures exceeding 93° C (200° F). An airbag inflator unit may contain sodium azide and potassium nitrate. These materials are poisonous and extremely flammable. Contact with acid, water, or heavy metals may produce harmful and irritating gases (sodium hydroxide is formed in the presence of moisture) or combustible compounds. An airbag inflator unit may also contain a gas canister pressurized to over 17.24 kPa (2500 psi). Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury when handling a seat belt tensioner retractor or buckle, proper care should be exercised to keep fingers out from under the retractor or buckle cover and away from the seat belt webbing or cable where it exits from the retractor or buckle cover.

WARNING: To avoid serious or fatal injury, replace all Supplemental Restraint System

(SRS) components only with parts specified in the Chrysler Mopar® Parts Catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection.

WARNING: To avoid serious or fatal injury, the fasteners, screws, and bolts originally used for the Supplemental Restraint System (SRS) components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the SRS. Anytime a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler Mopar® Parts Catalog.

WARNING: To avoid serious or fatal injury when a steering column has an airbag unit attached, never place the column on the floor or any other surface with the steering wheel or airbag unit face down. Failure to follow these instructions may result in possible serious or fatal injury.

DESCRIPTION

OCCUPANT RESTRAINT SYSTEM

An occupant restraint system is standard factory-installed safety equipment on this vehicle. Available occupant restraints for this vehicle include both active and passive types. Active restraints are those which require the vehicle occupants to take some action to employ, such as fastening and adjusting a seat belt; while passive restraints require no action by the vehicle occupants to be employed.

ACTIVE RESTRAINTS

The active restraints for this vehicle include:

- **Child Restraint Anchors** - All vehicles are equipped with three, fixed-position, child seat upper tether anchors for the rear seating. These upper anchors are integral to the rear shelf panel. Two lower anchors are also provided for each outboard rear seating position. The lower anchors are integral to an isofix cross member welded to the center floor panel beneath the rear seat. These lower anchors are accessed from the front of the rear seat where the seat back meets the seat cushion.
- **Front Seat Belts** - Both front seating positions are equipped with three-point seat belt systems employing lower B-pillar mounted inertia latch-type emergency locking retractors, height-adjustable upper B-pillar mounted turning loops, a traveling lower seat belt anchor secured to the outboard side of the seat frame, and a traveling end-release seat belt buckle secured to the inboard side of the seat frame. The passenger side front seat belt retractor is switchable to an automatic locking retractor for compatibility with child seats. The driver and passenger side front seat belt buckles each include an integral seat belt switch that detects whether the front seat belts have been fastened.
- **Rear Seat Belts** - All three rear seating positions are equipped with three-point seat belt systems. The outboard seating position belts employ C-pillar mounted inertia latch-type emergency locking retractors, fixed position upper C-pillar mounted turning loops and fixed

lower seat belt anchors secured to the lower C-pillar. The center position retractor is secured to the rear shelf panel and the fixed lower center seat belt anchor is secured to the floor panel. All three rear seat belts have fixed end-release seat belt buckles secured to the floor panel, a double buckle unit on the right side and a single buckle unit on the left side. Both outboard second row seat belt retractors are switchable to an automatic locking retractor for compatibility with child seats.

PASSIVE RESTRAINTS

Fig. 1: SRS Logo
Courtesy of CHRYSLER GROUP, LLC

The passive restraints available for this vehicle include the following:

- **Active Head Restraints** - Inertia-based Active Head Restraints (AHR) are standard equipment for both front seating positions in this vehicle.
- **Dual Front Airbags** - Multistage driver and front passenger airbags are standard in this model. This airbag system consists of passive, inflatable, Supplemental Restraint System (SRS) components and vehicles with this equipment can be readily identified by the **SRS - AIRBAG** logo molded into the driver airbag trim cover in the center of the steering wheel and also into the passenger airbag door on the top of the instrument panel above the glove box. Vehicles with the airbag system can also be identified by the airbag indicator, which will illuminate in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) from four to six seconds as a bulb test each time the ignition switch is turned to the ON position. Pyrotechnic-type seat belt tensioners are also integral for the driver and passenger front seat belts of all airbag equipped vehicles to work in conjunction with the dual front and side curtain airbags.
- **Knee Blocker Airbag** - The front airbag system also includes a knee blocker airbag (also known as a Knee AirBag/KAB or an Inflatable Knee Blocker/IKB) that is located just below the steering column, behind the instrument panel steering column opening cover. This airbag is also a passive, inflatable, SRS component and vehicles with this equipment can be readily identified by the **SRS - AIRBAG** logo molded into the steering column opening cover on the instrument panel just beneath the steering column.
- **Seat Airbags** - Front seat integrated pelvic and thorax airbags are standard equipment in all

markets. This airbag system consists of passive, inflatable, SRS components and vehicles with this equipment can be readily identified by a sewn tag with the **SRS - AIRBAG** logo located on the outboard side of the front seat back trim cover.

- **Side Curtain Airbags** - Side curtain airbags are standard equipment for this vehicle when it is also equipped with dual front airbags. This airbag system consists of passive, inflatable, SRS components and vehicles with this equipment can be readily identified by a molded identification trim button with the **SRS - AIRBAG** logo located on the top of each B-pillar upper trim panel near the headliner.

The SRS includes the following major components, which are described in further detail elsewhere in this service information:

- **Active Head Restraints** - On vehicles with this equipment, one Active Head Restraint (AHR) is located atop each front seat back unit.
- **Airbag Indicator** - The airbag indicator is integral to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC), which is located on the instrument panel in front of the driver.
- **Clockspring** - The clockspring is located near the top of the steering column, directly beneath the steering wheel.
- **Driver Airbag** - The driver airbag is located in the center of the steering wheel, beneath the driver airbag trim cover.
- **Driver Knee Blocker** - The driver knee blocker is a structural unit secured to the back side of and integral to the instrument panel steering column opening cover.
- **Front Impact Sensor** - Two front impact sensors are used on vehicles equipped with dual front airbags, one left side and one right side. One sensor is located on the back side of each vertical member of the headlamp mounting cross member structural support.
- **Knee Blocker Airbag** - This vehicle is equipped with a knee blocker airbag (also known as the Knee AirBag/KAB or Inflatable Knee Blocker/IKB) feature. The knee blocker airbag is mounted behind the instrument panel steering column opening cover in addition to the static driver knee blocker.
- **Occupant Detection Sensor** - An Occupant Detection Sensor (ODS) is located on the top of the seat cushion of the passenger side front seat in domestic market vehicles.
- **Occupant Restraint Controller** - The Occupant Restraint Controller (ORC) is located on a mount on the floor panel transmission tunnel forward of the transmission gear selector, and is concealed below the instrument panel.
- **Passenger Airbag** - The passenger airbag is located in the instrument panel, beneath the passenger airbag door on the top of the instrument panel above the glove box on the passenger side of the vehicle.
- **Passenger Knee Blocker** - The passenger knee blocker is a structural reinforcement that is integral to and concealed within the glove box door.
- **Seat Airbag** - A seat (also known as pelvic and thorax) airbag unit is secured to each outboard front seat back frame, where it is concealed beneath the seat back trim cover and foam.
- **Seat Belt Tensioner** - A seat belt tensioner is integral to both front seat belt retractor and both front seat buckle units on vehicles equipped with dual front airbags. The seat belt retractor and

tensioner units are secured to each lower inner B-pillar and are concealed behind the lower B-pillar trim. The seat belt buckle tensioner units are located on the inboard rear corner of each front seat cushion frame.

- **Seat Track Position Sensor** - Certain vehicles may include a seat track position sensor that may be located on the inboard side of one of the seat adjuster tracks on both the driver and the passenger front seats.
- **Side Curtain Airbag** - A standard equipment side curtain airbag is secured to each inside roof side rail above the headliner, and extends from the A-pillar to just beyond the C-pillar.
- **Side Impact Sensor** - Six side impact sensors are standard equipment on vehicles equipped with side curtain airbags, three on each side of the vehicle. One pressure-type sensor is located on each right and left side front door hardware module carrier, while one acceleration-type sensor is located on each B-pillar and C-pillar. These sensors are each concealed behind the adjacent interior trim components.

The ORC and the IC each contain a microprocessor and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ORC for control of the airbag indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the SRS components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the SRS components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

PEDESTRIAN PROTECTION SYSTEM

An Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) is factory-installed safety equipment, which is available only in vehicles manufactured for certain export markets. The EPP system includes the following major components, which are described in further detail elsewhere in this service information:

- **Active Hood Hinge Actuators** - The two pyrotechnic EPP active hood hinge actuators are each secured by a screw within a mounting plate located on each of the two active hood hinges, which are located near each rear corner of the hood panel.
- **Active Hood Hinges** - The active hood hinges have several features and components not found on a conventional hood hinge. In addition to a mounting plate for a pyrotechnic actuator and a reset spring, each active hood hinge includes a mid-strap joined to the hood bracket by a pivot pin at the forward end and a shear rivet at the rearward end. An up-stop pin near the center of the hood bracket fits within a slotted hole near the center of the mid-strap. Refer to **HINGE, HOOD** for hood hinge removal and installation procedures.
- **Front Energy Absorber Foam Material** - The front energy absorber foam material is

sandwiched between the front bumper area of the front fascia and the front bumper support beam. Refer to **FASCIA, FRONT** for front fascia removal and installation procedures.

- **Impact Sensors** - The EPP system includes three dedicated acceleration-type impact sensors to support the EPP feature. The impact sensors are each mounted by a screw to a receptacle with a U-nut located on the back of the front fascia. One sensor and bracket is located near each end just above the bumper support beam, and one is located near the center just below the bumper support beam. The impact sensors and the sensor mounting provisions are concealed behind the front fascia.
- **Occupant Restraint Controller** - The Occupant Restraint Controller (ORC) also serves as the Electronic Pedestrian Protection Module (EPPM) in this vehicle. The ORC is located on a mount on the floor panel transmission tunnel near the dash panel just forward of the center instrument panel support.
- **Pedestrian Bar** - A static, tubular metal pedestrian bar (also known as a leg catcher) is concealed just behind the lower end of the front fascia. The pedestrian bar is suspended at each side from the lower end of a stamped metal bracket that is secured at the top near the same brackets that support each end of the front bumper support beam. Refer to **FRAME AND BUMPERS** for the pedestrian bar removal and installation procedures.

The ORC and the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) each contain a microcontroller and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ORC for control of the airbag indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the EPP electronic components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the EPP components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OCCUPANT RESTRAINT SYSTEM

ACTIVE RESTRAINTS

The primary passenger restraints in this or any other vehicle are the standard equipment factory-installed seat belts and child restraint anchors. Seat belts and child restraint anchors are referred to as an active restraint because the vehicle occupants are required to physically fasten and properly adjust these restraints in order to benefit from them.

PASSIVE RESTRAINTS

The passive restraints are referred to as Supplemental Restraint System (SRS) components because

they were designed and are intended to enhance the protection for the occupants of the vehicle **only** when used in conjunction with the seat belts. They are referred to as passive restraints because the vehicle occupants are not required to do anything to make them operate; however, the vehicle occupants must be wearing their seat belts in order to obtain the maximum safety benefit from the factory-installed SRS components. In addition, each front seat occupant must have their Active Head Restraint (AHR) unit properly adjusted in order to obtain its maximum safety benefit.

The SRS electrical circuits are continuously monitored and controlled by a microprocessor and software contained within the Occupant Restraint Controller (ORC). An airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) illuminates from four to six seconds as a bulb test each time the ignition switch is turned to the ON or START positions. Following the bulb test, the airbag indicator is turned ON or OFF by the ORC to indicate the status of the SRS. If the airbag indicator comes ON at any time other than during the bulb test, it indicates that there is a problem in the SRS electrical circuits. Such a problem may cause airbags not to deploy when required, or to deploy when not required.

Deployment of the SRS components depends upon the angle and severity of an impact. Deployment is not based upon vehicle speed; rather, deployment is based upon the rate of deceleration as measured by the forces of gravity (G force) upon the acceleration-type impact sensors, or by a pressure wave within a front door as measured by the pressure-type impact sensor. When an impact is severe enough, the microprocessor in the ORC signals the inflator of the appropriate airbag units to deploy their airbag cushions.

The front seat belt retractor and buckle tensioners, the knee blocker airbag (also known as the Knee AirBag/KAB or Inflatable Knee Blocker/IKB) are provided with a deployment signal by the ORC in conjunction with the front airbags. The side curtain airbags and the seat airbags (also known as pelvic and thorax airbags) are provided with a deployment signal individually by the ORC based upon a side impact sensor input for the same side of the vehicle. The ORC also contains a rollover sensor. Should the vehicle roll over and not cause any acceleration-type or pressure-type impact sensor to signal the need for a deployment, the rollover sensor in the ORC will deploy the side curtain air bags, the seat air bags and, under certain conditions, will also actuate the seat belt buckle and retractor tensioners.

During a frontal vehicle impact, the static knee blockers work in concert with properly fastened and adjusted seat belts to restrain both the driver and the front seat passenger in the proper position for an airbag deployment. The static knee blockers also absorb and distribute the crash energy from the driver and the front seat passenger to the structure of the instrument panel. The seat belt tensioners remove the slack from the front seat belts to provide further assurance that the driver and front seat passenger are properly positioned and restrained for an airbag deployment.

Typically, the vehicle occupants recall more about the events preceding and following a collision than they do of an airbag deployment itself. This is because the airbag deployment and deflation occur very rapidly. In a typical 48 kilometer-per-hour (30 mile-per-hour) barrier impact, from the moment of impact until the airbags are fully inflated takes about 40 milliseconds. Within one to two seconds from the moment of impact, the airbags are almost entirely deflated. The times cited for these events are approximations, which apply only to a barrier impact at the given speed. Actual times will vary somewhat, depending upon the vehicle speed, impact angle, severity of the impact, and the type of collision.

When the ORC monitors a problem in any of the SRS circuits or components, including the seat belt tensioners, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit and sends an electronic message to the IC to turn ON the airbag indicator. The hard wired circuits between components related to the SRS may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SRS or the electronic controls or communication between other modules and devices that provide features of the SRS. The most reliable, efficient, and accurate means to diagnose the SRS or the electronic controls and communication related to SRS operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

PEDESTRIAN PROTECTION SYSTEM

In the event of a frontal vehicle impact, the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) components are designed and intended to enhance the protection for pedestrians from the hard components found just beneath the hood of the vehicle within the engine compartment. The EPP system has three acceleration-type impact sensors located in the front bumper area of the vehicle, a microcontroller-based Occupant Restraint Controller (ORC) located within the passenger compartment of the vehicle that also serves as the EPP system controller and an active hood hinge with a pyrotechnic-type actuator at each rear corner of the hood panel.

The impact sensors continually transmit sensor data to the ORC that give an indication of the forces of gravity (G force) upon the sensors. The ORC also receives electronic message inputs over the Controller Area Network (CAN) data bus indicating the ignition status, vehicle speed and ambient temperature. If the vehicle has a collision, the ORC uses algorithms to analyze all of the input data to determine whether to deploy the hood. If the algorithm makes a deployment decision and that the vehicle speed is between 22 kilometers-per-hour (14 miles-per-hour) and 52 kilometers-per-hour (32 miles-per-hour), then the ORC will send electrical signals to deploy the actuators on the active hood hinges.

When the micro gas generator in each actuator is energized, it produces a large quantity of expanding gas. The expanding gas moves a piston within the actuator that pushes upward against the hood bracket of the active hood hinge. The force of the actuator on the hinge bracket creates a lever action that shears a rivet between the hood bracket and the mid-strap of both hood hinges, allowing the actuators to lift the rear of the hood at the hinges. Lifting the rear of the hood in this manner provides additional clearance between the hood and the hard components found within the engine compartment.

Each active hood hinge functions normally during routine opening and closing of the hood. However, upon active hood hinge deployment the rear of the hood is lifted to a predetermined height, which is controlled by an up-stop pin on the hinge bracket that is engaged within a slotted hole in the mid-strap

of each hinge.

During a frontal pedestrian impact, the purpose of the pedestrian bar (also known as the leg catcher) that supports the lower front fascia is to reduce the severity of leg injuries and to position the pedestrian onto the hood of the vehicle rather than onto the pavement. These goals are both intended to reduce the severity and debilitating nature of potential pedestrian injuries. It should be noted that the pedestrian bar **must** be inspected and replaced if visually damaged following **any** frontal vehicle impact, regardless of whether or how the active hood is deployed.

The EPP system electrical circuits are continuously monitored and controlled by the ORC microcontroller. If the ORC detects a problem it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit and sends an electronic request message to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to illuminate the airbag indicator. The airbag indicator may be turned ON or OFF by the ORC to indicate a problem in either the Supplemental Restraint System (SRS) or the EPP system electrical circuits.

The hard wired circuits between components related to the EPP system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the EPP system or the electronic controls or communication between other modules and devices that provide inputs to the ORC. The most reliable, efficient, and accurate means to diagnose the ORC or the electronic controls and communication related to EPP system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUPPLEMENTAL RESTRAINT SYSTEM

The hard wired circuits between modules and components related to the Supplemental Restraint System (SRS) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SRS or the electronic controls or communication between other modules and devices that provide features of the SRS. The most reliable, efficient, and accurate means to diagnose the SRS or the electronic controls and communication related to SRS operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

In addition to a diagnostic scan tool that contains the latest version of the proper diagnostic software, certain diagnostic procedures for the SRS may require the use of the SRS Load Tool special tool

along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

PEDESTRIAN PROTECTION SYSTEM

The hard wired circuits between modules and components related to the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the EPP system or the electronic controls or communication between other modules and devices that provide features of the EPP system. The most reliable, efficient, and accurate means to diagnose the EPP system or the electronic controls and communication related to EPP system operation, as well as the retrieval or erasure of a Diagnostic Trouble Code (DTC) requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

In addition to a diagnostic scan tool that contains the latest version of the proper diagnostic software, certain diagnostic procedures for the EPP system may require the use of the Supplemental Restraint System (SRS) Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

STANDARD PROCEDURE

HANDLING NON-DEPLOYED SUPPLEMENTAL RESTRAINTS

At no time should any source of electricity be permitted near the inflator on the back of a non-

deployed airbag or seat belt tensioner. When carrying a non-deployed airbag, the trim cover or airbag cushion side of the unit should be pointed away from the body to minimize injury in the event of an accidental deployment. If the airbag unit is placed on a bench or any other surface, the trim cover or airbag cushion side of the unit should be face up to minimize movement in the event of an accidental deployment.

When handling a non-deployed seat belt tensioner, take proper care to keep fingers out from under the retractor or buckle cover and away from the seat belt webbing or cable where it exits from the retractor or buckle cover. In addition, the Supplemental Restraint System (SRS) should be disarmed whenever any steering wheel, steering column, seat belt tensioner, airbag, impact sensor, or instrument panel components require diagnosis or service. Failure to observe this warning could result in accidental airbag deployment and possible personal injury.

All damaged, ineffective or non-deployed airbags and seat belt tensioners which are replaced on vehicles are to be handled and disposed of properly. If an airbag or seat belt tensioner unit is ineffective or damaged and non-deployed, refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

SUPPLEMENTAL RESTRAINT STORAGE

Airbags and seat belt tensioners must be stored in their original, special container until they are used for service. Also, they must be stored in a clean, dry environment; away from sources of extreme heat, sparks and high electrical energy. Always place or store any airbag on a surface with its trim cover or airbag cushion side facing up, to minimize movement in case of an accidental deployment.

SERVICE AFTER A PEDESTRIAN PROTECTION DEPLOYMENT

COMPONENT REPLACEMENT AND INSPECTION REQUIREMENTS

There are two types of Electronic Pedestrian Protection (EPP) system deployments that may occur: pedestrian and non-pedestrian. Following either type of deployment, the Electronic Vehicle Information Center (EVIC) within the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) will display a **SERVICE ACTIVE HOOD** message and the airbag indicator will be illuminated. To make sure continued system integrity, certain components must be replaced or inspected following a deployment based upon the deployment type.

PEDESTRIAN DEPLOYMENT

The following components **must** be replaced following a pedestrian deployment:

- Right and left EPP hood hinge actuators
- Right and left active hood hinges
- Hood panel

The following components **must** be closely inspected, then replaced if any damage is visually evident

following a pedestrian deployment:

- EPP impact sensors
- EPP impact sensor wiring
- Front bumper energy absorber foam material (inspect for compression, cracks and any other signs of deformation or deterioration)
- Front bumper support beam (reinforcement)
- Front fascia
- Front fascia brackets
- Hood latch/secondary catch unit
- Hood latch striker
- Pedestrian bar (see **NOTE**)

NOTE: **The pedestrian bar MUST be inspected and replaced if visually damaged following ANY frontal vehicle impact, regardless of whether the active hood is deployed or how the impact occurred.**

NON-PEDESTRIAN DEPLOYMENT

The following components **must** be replaced following a non-pedestrian deployment:

- Right and left EPP hood hinge actuators
- Right and left active hood hinges

The following components **must** be closely inspected, then replaced if any damage is visually evident following a non-pedestrian deployment:

- EPP impact sensors
- EPP impact sensor wiring
- Front bumper energy absorber foam material (inspect for compression, cracks and any other signs of deformation or deterioration)
- Front bumper support beam (reinforcement)
- Front fascia
- Front fascia brackets
- Hood latch/secondary catch unit
- Hood latch striker
- Hood panel
- Pedestrian bar (see **NOTE 2**)

NOTE:

1. **In order to guarantee continued Electronic Pedestrian Protection (EPP) system integrity, the hood panel MUST be replaced following three EPP deployments, regardless of how the active hood is deployed or the results**

of any visual inspection.

2. **The pedestrian bar MUST be inspected and replaced if visually damaged following ANY frontal vehicle impact, regardless of whether the active hood is deployed or how the impact occurred.**

ACTIVE HOOD HINGE RESET PROCEDURE

If the vehicle remains otherwise safely operable following an EPP deployment, a customer reset position for the active hood hinges is provided to restore adequate forward visibility to drive the vehicle to the nearest dealer for service. Proceed as follows to engage the deployed active hood hinges in the reset position:

1. Push downward on one rear corner of the hood panel.

   NOTE: The initial 15 millimeters (0.60 inch) of travel will require significant effort, up to 300 Newtons (68 pounds) of force. After the initial travel, the deployed EPP actuators will vent and the required force to push the hood downward will be reduced.

2. Continue pushing the hood downward until the active hinge reset mechanism engages. The **C** shaped reset spring on the hinge mid-strap will come into contact with the hood bracket and the resistance will increase. Provide an additional downward force (a soft bump downward) on the hood to cause the reset spring to compress, then snap into the detent notch in the hood bracket. The rear edge of the hood will be raised about 5 millimeters (0.20 inch) higher than the fender when the active hood hinge is in the reset position.
3. Repeat Steps 1 and 2 on the opposite rear corner of the hood panel.

SERVICE AFTER A SUPPLEMENTAL RESTRAINT DEPLOYMENT

Any vehicle which is to be returned to use following a Supplemental Restraint System (SRS) component deployment must have the deployed restraints replaced. In addition, the following guidelines MUST be observed.

- **Following ANY major vehicle impact damage in the vicinity of an impact sensor or the ORC** - It is critical that the mounting surfaces and mounting brackets for the Occupant Restraint Controller (ORC), front impact sensors and side impact sensors located within the proximity of the impact damage be closely inspected and restored to their original conditions. Because the ORC and each impact sensor are used by the SRS to monitor or confirm the direction and severity of a vehicle impact, improper orientation or insecure fastening of these components may cause airbags not to deploy when required, or to deploy when not required.
- **If an active head restraint is deployed** - An inertia-based Active Head Restraint (AHR) unit that is undamaged following a deployment automatically resets itself. These units are designed with the intention of reuse.
- **If the driver airbag is deployed** - If the driver airbag has been deployed, the steering wheel, the clockspring and the complete steering column with lower steering column coupler must also be replaced.

- **If the knee blocker airbag is deployed** - If the knee blocker airbag (also known as the Knee AirBag/KAB or Inflatable Knee Blocker/IKB) has been deployed, the instrument panel steering column opening cover must also be replaced.
- **If the passenger airbag is deployed** - If the passenger airbag has been deployed, the instrument panel top pad must also be replaced.
- **If a seat airbag is deployed** - If a seat (pelvic and thorax) airbag has been deployed, the seat back frame, the seat back foam and the seat back trim cover on the same side of the vehicle as the deployed airbag must also be replaced.
- **If a seat belt tensioner is deployed** - The seat belt tensioners are deployed in conjunction with the front airbags, but can also be deployed with seat (pelvic and thorax) or side curtain airbags. The seat belt tensioners must be replaced if either front airbag has been deployed, and must be inspected if either seat or side curtain airbag has been deployed.
- **If a side curtain airbag is deployed** - If a side curtain airbag has been deployed, the headliner as well as the upper A, B and the C-pillar trim on the same side of the vehicle as the deployed airbag must also be replaced. On vehicles with an optional sunroof, the sunroof drain tubes and hoses must be closely inspected following a side curtain airbag deployment.

The components identified with the deployed SRS components in the preceding list are not intended for reuse and will be damaged or weakened as a result of an airbag deployment, which may or may not be obvious during a visual inspection. All other vehicle components should be closely inspected following any SRS component deployment, but are to be replaced only as required by the extent of the visible damage incurred.

SQUIB CIRCUIT WIRING REPAIRS

In addition to the preceding guidelines, be aware that the heat created by the initiator during an airbag or tensioner deployment will cause collateral damage to the connected wiring (squib circuits) and connector insulators. There are two methods by which an airbag or seat belt tensioner may be connected to the vehicle electrical system. The first method involves a short pigtail harness and connector insulator that are integral to the airbag or tensioner unit and are replaced as a unit with the service replacement airbag or seat belt tensioner. This connection method typically requires no additional wiring repair following a deployment.

However, the second connection method involves a wire harness takeout and connector insulator that are connected directly to the airbag or tensioner initiator or squib. These direct-connect type take outs and connector insulators **MUST** be repaired following an airbag or seat belt tensioner deployment using the approved Supplemental Restraint System Wiring Repairs procedure. Refer to **STANDARD PROCEDURE**.

AIRBAG SQUIB STATUS

Multistage airbags with multiple initiators (squibs) must be checked to determine that all squibs were used during the deployment event. The driver and passenger airbags in this vehicle are deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the driver or passenger squib 1 and squib 2 circuits to the two initiators in the airbag inflators. Typically, both initiators are used and all potentially hazardous chemicals are burned during an airbag deployment

event. However, it is possible for only one initiator to be used; therefore, it is always necessary to confirm that both initiators have been used in order to avoid the improper handling or disposal of potentially live pyrotechnic or hazardous materials. The following procedure should be performed using a diagnostic scan tool to verify the status of both airbag squibs before either deployed airbag is removed from the vehicle for disposal.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

1. Be certain that the diagnostic scan tool contains the latest version of the proper diagnostic software. Connect the scan tool to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, outboard of the steering column.
2. Turn the ignition switch to the ON position.
3. Using the scan tool, read and record the active (current) Diagnostic Trouble Code (DTC) data.

Using the active DTC information, refer to the **Airbag Squib Status** table to determine the status of both driver and passenger airbag squibs.

AIRBAG SQUIB STATUS		
IF THE ACTIVE DTC IS:	**CONDITIONS**	**SQUIB STATUS**
Driver or Passenger Squib 1 open	**AND** the stored DTC minutes for both Driver or Passenger squibs are within 15 minutes of each other	Both Squib 1 and 2 were used.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	**AND** the stored DTC minutes for Driver or Passenger Squib 2 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 1 by 15 minutes or more	Squib 1 was used; Squib 2 is live.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	**AND** the stored DTC minutes for Driver or Passenger Squib 1 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 2 by 15 minutes or more	Squib 1 is live; Squib 2 was used.
Driver or Passenger Squib 2 open		
Driver or Passenger Squib 1 open	**AND** Driver or Passenger Squib 2 open is NOT an active code	Squib 1 was used; Squib 2 is live.
Driver or Passenger Squib 2 open	**AND** Driver or Passenger Squib 1 open is NOT an active code	Squib 1 is live; Squib 2 was used.

NOTE: **If none of the Driver or Passenger Squib 1 or 2 open are active codes, the status of the airbag squibs is unknown. In this case the airbag should be handled and disposed of as if the squibs were both live.**

CLEANUP PROCEDURE

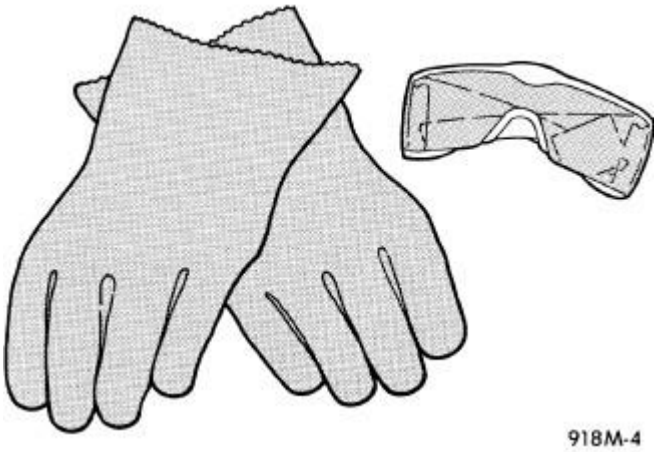

Fig. 2: Safety Glasses & Rubber Gloves
Courtesy of CHRYSLER GROUP, LLC

Following a Supplemental Restraint System (SRS) component deployment, the vehicle interior will contain a powdery residue. This residue consists primarily of harmless particulate by-products of the small pyrotechnic charge that initiates the propellant used to deploy a SRS component. However, this residue may also contain traces of sodium hydroxide powder, a chemical by-product of the propellant material that is used to generate the inert gas that inflates the airbag. Since sodium hydroxide powder can irritate the skin, eyes, nose, or throat, be certain to wear safety glasses, rubber gloves, and a long-sleeved shirt during cleanup.

WARNING: **To avoid serious or fatal injury, if you experience skin irritation during cleanup, run cool water over the affected area. Also, if you experience irritation of the nose or throat, exit the vehicle for fresh air until the irritation ceases. If irritation continues, see a physician.**

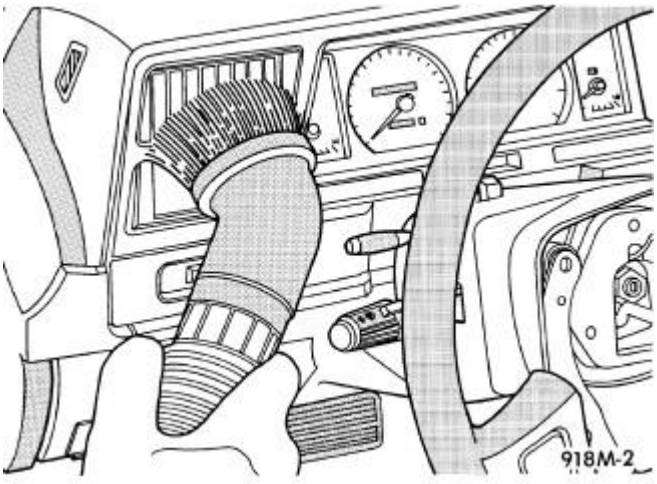

Fig. 3: Vacuum Cleaner
Courtesy of CHRYSLER GROUP, LLC

1. Begin the cleanup by using a vacuum cleaner to remove any residual powder from the vehicle interior. Clean from outside the vehicle and work your way inside, so that you avoid kneeling or sitting on a non-cleaned area.
2. Be certain to vacuum the heater and air conditioning outlets as well. Run the heater and air conditioner blower on the lowest speed setting and vacuum any powder expelled from the outlets.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to AIRBAG SQUIB STATUS heading within this information. All damaged, ineffective, or non-deployed Supplemental Restraint System (SRS) components which are replaced on vehicles are to be handled and disposed of properly. If an airbag or seat belt tensioner unit is ineffective or damaged and non-deployed, refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

3. Next, remove the deployed SRS components from the vehicle. Refer to the appropriate service removal procedures.
4. You may need to vacuum the interior of the vehicle a second time to recover all of the powder.

SUPPLEMENTAL RESTRAINT SYSTEM WIRING REPAIRS

It is important when repairing any Supplemental Restraint System (SRS) electrical circuits to use the

recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR Connector Web Site at the following address on the internet: (http://dto.vftis.com/mopar/disclaimer.asp).

This recommended procedure involves crimping the wires together with a splice band, soldering the crimped connection and, finally, sealing and protecting the repair. The crimp and solder ensure a strong mechanical bond that will always pass a pull test while also maintaining the conductivity and current carrying capacity of the circuit. The adhesive sealant and heat shrink tubing ensures the splice repair will perform as well or better than the original wire and be safe from potential corrosion or short circuits.

There is no limit to the number of splice repairs that can be made in one harness using this procedure. However, as has been past practice, multiple adjacent splices should be offset from each other. This wiring splice repair procedure is approved for harness side repairs only. Repairs and splices to pigtail wires on SRS components such as airbag units, seat belt tensioner units or clocksprings are not approved or recommended.

REPAIR PROCEDURE

CAUTION: If additional wire is needed when making a splice repair to any wire, it is important that the same or next larger size wire gauge be used. Refer to the appropriate wiring diagram for the original wire gauge size.

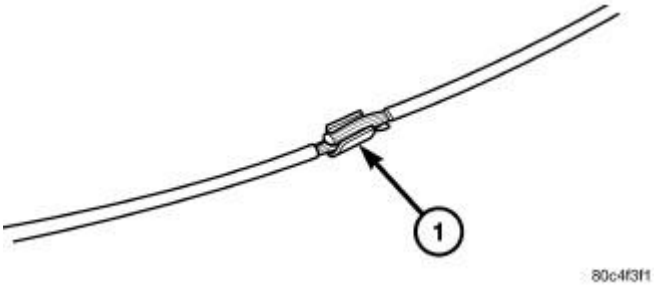

Fig. 4: Splice Band
Courtesy of CHRYSLER GROUP, LLC

1. Remove 13 millimeters (0.50 inch) of insulation from each wire that needs to be spliced.
2. Place a piece of adhesive sealant-lined heat shrink tubing (Part Number 04778570 or equivalent) over the wire on one side of the splice. Be certain the length of tubing will be sufficient to cover and seal the entire repair area.
3. Place the strands of the wires being spliced so that they are overlapping each other within the splice band (1).

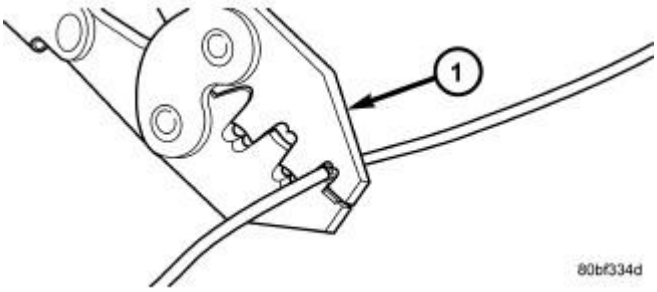

Fig. 5: Crimping Tool
Courtesy of CHRYSLER GROUP, LLC

4. Using a crimping tool (1) (MOPAR Part Number 05019912AA, Miller Special Tool Number (special tool #10042, Crimper, Wire/Terminal) or equivalent) crimp the splice band and wires together securely.

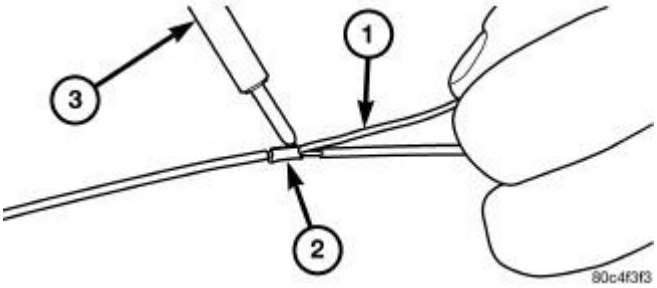

Fig. 6: Solder Splice
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never use acid core solder for electrical wiring repairs.

5. Using rosin core type solder (1) only and a suitable soldering iron (3), solder the wire and splice band connection (2) together.

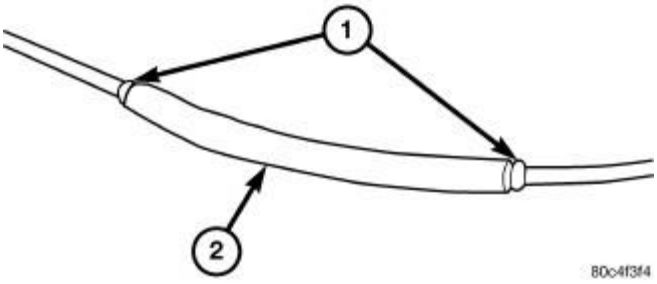

Fig. 7: Heat Shrink Tube
Courtesy of CHRYSLER GROUP, LLC

6. Center the heat shrink tubing (2) over the splice joint repair and heat using a suitable heat gun. Heat the joint until the tubing is tightly sealed and sealant (1) begins to ooze out of both ends of

the tubing.

SUPPLEMENTAL RESTRAINTS VERIFICATION TEST

NOTE: The following procedure should be performed using a diagnostic scan tool to verify proper Supplemental Restraint System (SRS) operation following the service or replacement of any SRS component. Refer to the appropriate diagnostic procedures.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

1. During the following test, the battery negative cable remains disconnected and isolated, as it was during the Supplemental Restraint System (SRS) component removal and installation procedures.
2. Be certain that the diagnostic scan tool contains the latest version of the proper diagnostic software. Connect the scan tool to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, near the steering column opening cover and outboard of the steering column.
3. Turn the ignition switch to the ON position and exit the vehicle with the scan tool.
4. Check to be certain that nobody is in the vehicle, then reconnect the battery negative cable.
5. Using the scan tool, read and record the active (current) Diagnostic Trouble Code (DTC) data.
6. Next, use the scan tool to read and record any stored (historical) DTC data.
7. If any DTC is found in 5 or6, refer to the appropriate diagnostic information.
8. Use the scan tool to erase the stored DTC data. If any problems remain, the stored DTC data will not erase. Refer to the appropriate diagnostic information to diagnose any stored DTC that will not erase. If the stored DTC information is successfully erased, go to9.
9. Turn the ignition switch to the OFF position for about 15 seconds, and then back to the ON position. Observe the airbag indicator in the instrument cluster. It should light from four to six seconds, and then go out. This indicates that the SRS is functioning normally and that the repairs are complete. If the airbag indicator fails to light, or lights and stays ON, there is still an active SRS fault or malfunction. Refer to the appropriate diagnostic information to diagnose the problem.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N-m	Ft. Lbs.	In. Lbs.
Curtain airbag inflator to C/D-pillar bolt	11	8	97
Curtain airbag roof side rail retaining screws	5	4	44
Driver airbag retaining bolts	10	7	89
Electronic Pedestrian Protection Actuator Screw	7.9	-	70
Front seat belt anchor nut	37	27.5	328
Front seat belt buckle retaining nut	43	31.5	381
Front seat belt guide retaining screw	3	2	27
Front seat belt height adjuster retaining bolts	32	23.5	283
Front seat belt retractor retaining bolt	32	23.5	283
Front seat belt turning loop retaining bolt	40	30	354
Impact sensor retaining screws	7	5	62
Left and right side passenger airbag mounting screws	3	2	27
Occupant restraint controller retaining screws	11	8	97
Passenger airbag mounting bolts	12	9	106
Rear center seat belt retractor anchor nut	34	25	301
Rear seat belt anchor bolt	32	23.5	283
Rear seat belt buckle retaining nut	34	25	301
Rear seat belt turning loop retaining bolt	40	29.5	354
Rear center seat belt retractor retaining nut	34	25	301
Rear seat belt retractor retaining bolt	32	23	283

SPECIAL TOOLS

SPECIAL TOOLS

	10042 - Crimper, Wire/Terminal (Originally Shipped In Kit Number(s) 10042.)

ACTUATOR, ELECTRONIC PEDESTRIAN PROTECTION HOOD HINGE

DESCRIPTION

DESCRIPTION

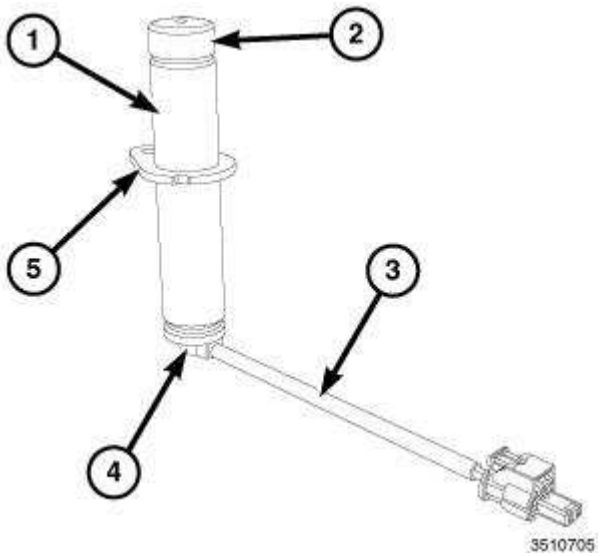

Fig. 8: Integral Bracket, Tubular Metal Housing, Metal Piston, Gas Generator & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

Active hood hinge actuators are found only in vehicles equipped with the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or Active Hood System), which is available only in vehicles manufactured for certain export markets. An EPP active hood hinge actuator is located on each hinge. The actuators are secured by a self-tapping screw through an integral bracket (5) to a mounting plate integral to the lower bracket on each active hood hinge.

The actuator consists primarily of a tubular metal housing (1) containing a metal piston (2) with a molded plastic cap and a small pyrotechnically activated gas generator (4). The actuators are controlled by the Occupant Restraint Controller (ORC). An actuator pigtail wire (3) and connector insulator are routed to a dedicated take out of the headlamp and dash wire harness and connected to the vehicle electrical system by a keyed and latching molded plastic connector insulator to ensure a secure connection.

The EPP active hood hinge actuators cannot be repaired and, if ineffective or damaged, the entire actuator unit must be replaced. The actuators are not intended for reuse and must be replaced following any EPP system deployment.

OPERATION

OPERATION

The Electronic Pedestrian Protection (EPP) active hood hinge actuators are deployed by a signal generated by the Occupant Restraint Controller (ORC) through the right and left hood actuator line 1 and line 2 (or squib) circuits. When the ORC sends the proper electrical signal to the actuators, the electrical energy generates enough heat to initiate a small pyrotechnic gas generator.

The gas generator is installed in one end of a steel cylinder tube where the piston is sealed to the inside circumference of the tube. As the gas expands, it pushes the piston up the tube, where it

actuates the leveraging mechanism of the active hood hinge that cuts the hinge shear rivet and raises the rear edge of the hood panel.

Raising the hood panel following a frontal impact of the vehicle creates additional clearance between the hood and the hard components within the engine compartment. This clearance helps to reduce the severity of injuries that a pedestrian might experience in these situations as a result of harmful contact with those hard parts found just beneath the hood panel within the engine compartment.

The ORC monitors the condition of the active hood hinge actuators through circuit resistance, and will register a Diagnostic Trouble Code (DTC) for any fault that is detected. The ORC will then request illumination of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC). Proper diagnosis of the active hood hinge actuator gas generator and squib circuits requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Electronic Pedestrian Protection (EPP) system active hood hinge actuator. If the actuator is ineffective or damaged, but not deployed, it should be handled in the same manner as is used when handling non-deployed supplemental restraints. Review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the actuator has been deployed, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. .

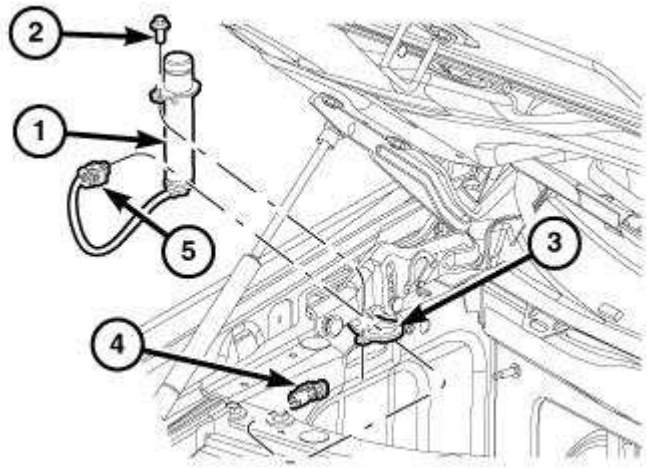

Fig. 9: Pigtail Wire Connector, Electronic Pedestrian Protection (EPP) Active Hood Hinge Actuator & Dash Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. With the ignition switch in the OFF position, disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Disconnect the pigtail wire connector (5) of the Electronic Pedestrian Protection (EPP) active hood hinge actuator (1) from the headlamp and dash wire harness connector (4).
3. Remove the screw (2) that secures the actuator bracket to the mount (3) on the hood hinge lower bracket.
4. Remove the actuator from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Electronic Pedestrian Protection (EPP) system active hood hinge actuator. If the actuator is ineffective or damaged, but not deployed, it should be handled in the same manner as is used when handling non-deployed supplemental restraints. Review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the actuator has been

deployed, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. .

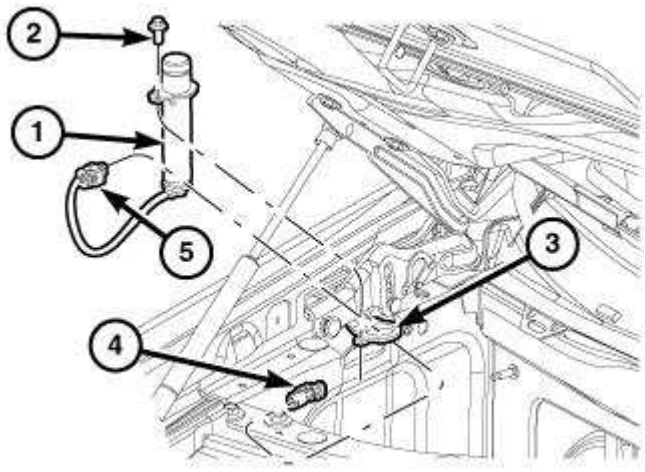

Fig. 10: Pigtail Wire Connector, Electronic Pedestrian Protection (EPP) Active Hood Hinge Actuator & Dash Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Guide the pigtail wire and connector (5) of the Electronic Pedestrian Protection (EPP) active hood hinge actuator (1) through the mount (3) on the hood hinge lower bracket while positioning the actuator to the hinge.
2. Align the hole in the actuator bracket with the hole in the hinge mount.
3. Install and tighten the screw (2) that secures the actuator to the hinge. Tighten the screw to 7.9 N.m (70 in. lbs.).
4. Reconnect the pigtail wire connector of the actuator to the headlamp and dash wire harness connector (4).
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any EPP system component. Refer to **STANDARD PROCEDURE**.

ADJUSTER, SEAT BELT TURNING LOOP, FRONT

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners.

Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

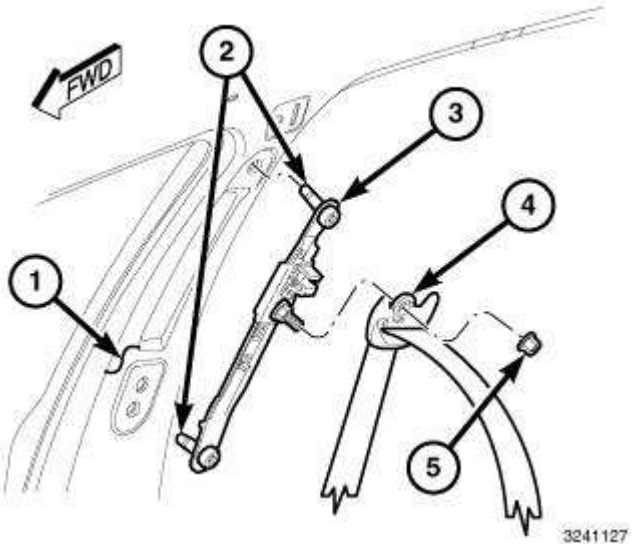

Fig. 11: Nut, Seat Belt Turning Loop, Height Adjuster & Two Screws
Courtesy of CHRYSLER GROUP, LLC

1. Remove the trim from the inside of the B-pillar (1). Refer to **PANEL, B-PILLAR TRIM, REMOVAL** .
2. Remove the nut (5) that secures the seat belt turning loop (4) to the stud on the height adjuster (3).
3. Remove the seat belt turning loop from the height adjuster.
4. Remove the two screws (2) that secure the height adjuster to the upper inner B-pillar.
5. Remove the seat belt turning loop adjuster from the B-pillar.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate.

Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

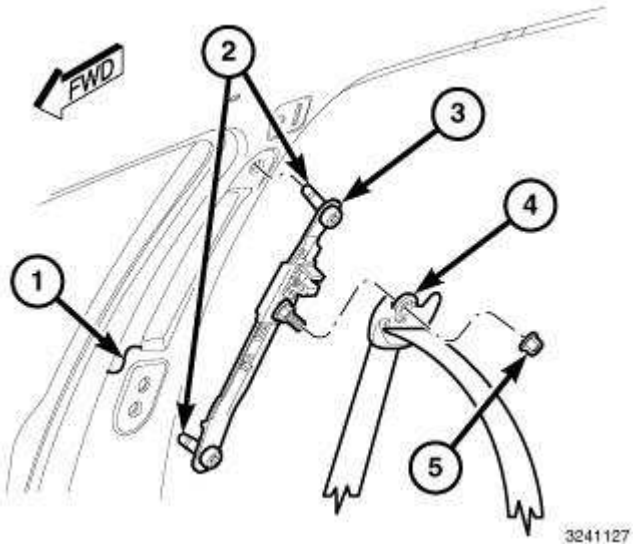

Fig. 12: Nut, Seat Belt Turning Loop, Height Adjuster & Two Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat belt turning loop height adjuster (3) to the inside of the upper inner B-pillar (1).
2. Install and tighten the two screws (2) that secure the adjuster to the B-pillar. Tighten the screws to 45 N.m (33 ft. lbs.).
3. Position the seat belt turning loop (4) onto the stud of the height adjuster on the B-pillar. Be certain that the seat belt webbing between the retractor and the turning loop is not twisted.
4. Install and tighten the nut (5) that secures the turning loop to the height adjuster. Tighten the nut to 45 N.m (33 ft. lbs.).
5. Reinstall the trim onto the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION** .

AIR BAG, DRIVER

DESCRIPTION

DESCRIPTION

Fig. 13: Except SRT
Courtesy of CHRYSLER GROUP, LLC

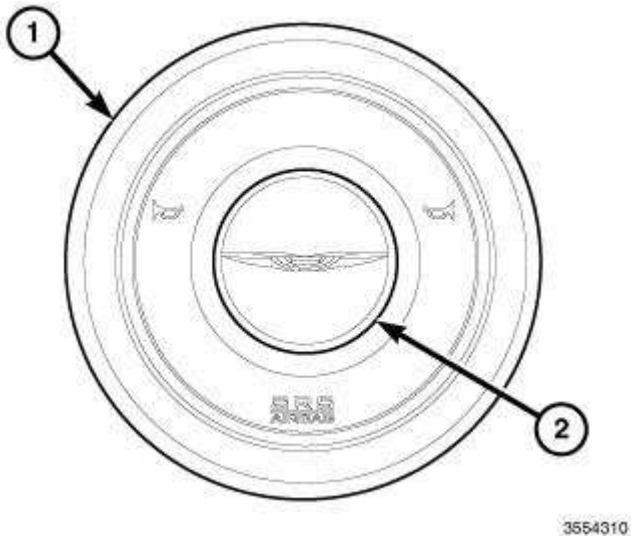

Fig. 14: SRT
Courtesy of CHRYSLER GROUP, LLC

The injection molded, thermoplastic driver airbag protective trim cover (1) is the most visible part of the Driver AirBag (DAB). The DAB is located in the center of the steering wheel, where it is secured with screws to the floating horn switch within the hub cavity of the three-spoke steering wheel. An injection molded, bright emblem with the Chrysler logo (2) is applied to the center of the trim cover.

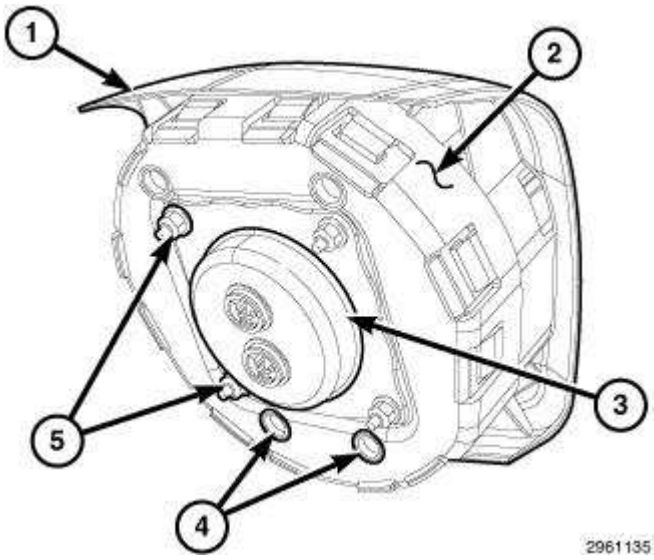

Fig. 15: Except SRT
Courtesy of CHRYSLER GROUP, LLC

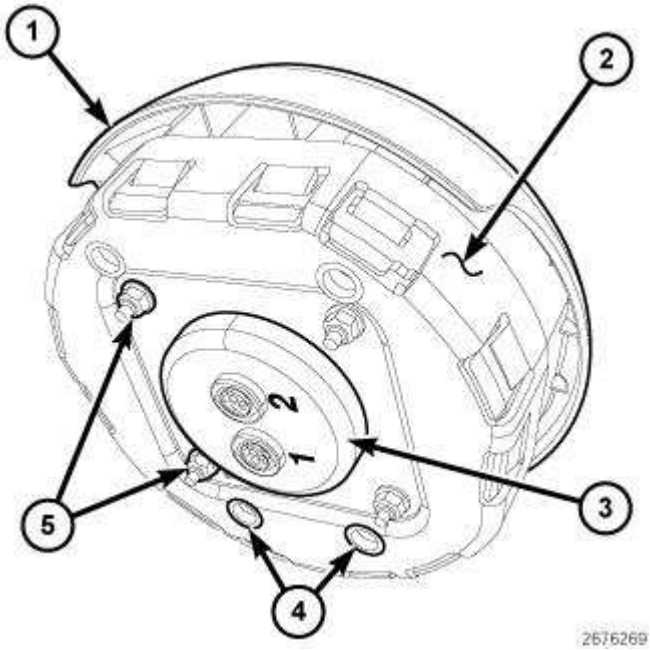

Fig. 16: SRT
Courtesy of CHRYSLER GROUP, LLC

Concealed beneath the DAB trim cover (1) are the folded airbag cushion, the airbag housing (2), the airbag inflator (3) and the retainers (5) that secure the inflator to the housing. The airbag cushion, housing and inflator are secured within an integral receptacle molded into the back of the trim cover. Except for SRT models, the vertical walls of this receptacle have numerous integral window features that are engaged by numerous hook features that are bent outward around the perimeter of the DAB housing. On SRT models, the vertical walls of this receptacle have numerous integral window features that are engaged by numerous tab features that are bent inward around the perimeter of the DAB housing. Once the SRT trim cover is fully seated in the housing, it can only be removed by

cutting it off, and will have to be replaced with a new trim cover. The DAB housing also has four well nuts (4) which are used to secure the floating horn switch to the back of the housing.

The DAB used in this vehicle is a multistage-type that complies with revised federal airbag standards to deploy with less force than those used in some prior vehicles. A radial deploying 67 centimeter (26.5 inch) diameter fabric airbag cushion with internal tethers is used. The airbag inflator is a dual-initiator, non-azide, pyrotechnic-type unit and is secured to the stamped metal airbag housing using four flanged hex nuts. Two keyed and color-coded connector receptacles on the DAB inflator connect the two inflator initiators to the vehicle electrical system through two jacketed, two-wire pigtail harnesses from the clockspring.

The DAB cannot be repaired, and must be replaced if deployed, ineffective or in any way damaged. The DAB trim cover and the floating horn switch are available for individual service replacement.

OPERATION

OPERATION

The multistage Driver AirBag (DAB) is deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the DAB squib 1 and squib 2 circuits to the two initiators in the airbag inflator. By using two initiators, the airbag can be deployed at multiple levels of force. The force level is controlled by the ORC to suit the monitored impact conditions by providing one of several delay intervals between the electrical signals provided to the two initiators. The longer the delay between these signals, the less forcefully the airbag will deploy.

When the ORC sends the proper electrical signals to each initiator, the electrical energy generates enough heat to initiate a small pyrotechnic charge which, in turn ignites chemical pellets within the inflator. Once ignited, these chemical pellets burn rapidly and produce a large quantity of inert gas. The inflator is sealed to the back of the DAB housing and a diffuser in the inflator directs all of the inert gas into the airbag cushion, causing the cushion to inflate. As the cushion inflates, the DAB trim cover will split at predetermined breakout lines, then fold back out of the way. Following a deployment, the airbag cushion quickly deflates by venting the inert gas towards the instrument panel through vent holes within the fabric used to construct the back (steering wheel side) panel of the airbag cushion.

Some of the chemicals used to create the inert gas may be considered hazardous while in their solid state before they are burned, but they are securely sealed within the airbag inflator. Typically, both initiators are used and all potentially hazardous chemicals are burned during an airbag deployment event. However, it is possible for only one initiator to be used during a deployment due to a Supplemental Restraint System (SRS) fault; therefore, it is necessary to always confirm that both initiators have been used in order to avoid the improper disposal of potentially live pyrotechnic or hazardous materials. Refer to **STANDARD PROCEDURE**.

The inert gas that is produced when the chemicals are burned during a deployment is harmless. However, a small amount of residue from the burned chemicals may cause some temporary discomfort if it contacts the skin, eyes or breathing passages. If skin or eye irritation is noted, rinse the affected area with plenty of cool, clean water. If breathing passages are irritated, move to another area where there is plenty of clean, fresh air to breath. If the irritation is not alleviated by these

actions, contact a physician.

Proper diagnosis of the DAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag cushion and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged Driver AirBag (DAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the DAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

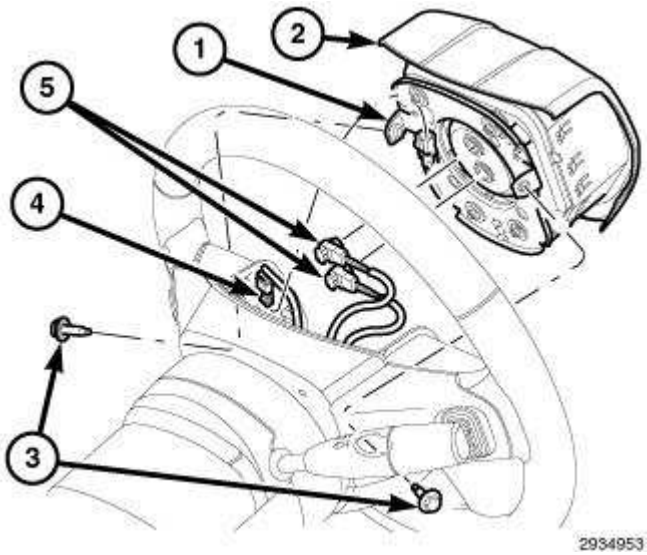

Fig. 17: Two Screws, Floating Horn Switch & Driver Airbag
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Working through the access holes in each side of the steering wheel rear trim cover, remove the two screws (3) that secure the floating horn switch (1) and Driver AirBag (DAB) (2) unit to the steering wheel armature.
3. Pull the DAB and floating horn switch unit away from the steering wheel far enough to access the electrical connections (3 and 4) at the back of the airbag housing and switch unit.
4. Disconnect the steering wheel wire harness connector (4) from the floating horn switch connector on the back of the switch.

CAUTION: Do not pull on the clockspring pigtail wires or pry on the connector insulators to disengage them from the Driver AirBag (DAB) inflator initiator connector receptacles. Improper removal of these pigtail wires and their connector insulators can result in damage to the airbag circuits or the connector insulators.

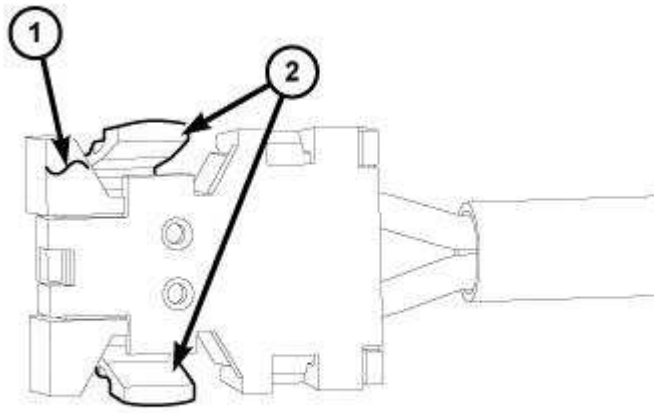

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Fig. 18: Airbag Pigtail Wire Connector Insulators & Integral Latches
Courtesy of CHRYSLER GROUP, LLC

5. The clockspring DAB pigtail wire connector insulators (1) are secured by integral latches (2) to the airbag inflator connector receptacles, which are located on the back of the DAB housing. Pinch both latches firmly, then pull the insulators straight out from the airbag inflator to disconnect them from the connector receptacles.
6. Remove the driver airbag from the steering wheel.
7. If the driver airbag has been deployed, the clockspring and the steering column must be replaced.

DISASSEMBLY

DISASSEMBLY

EXCEPT SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit.

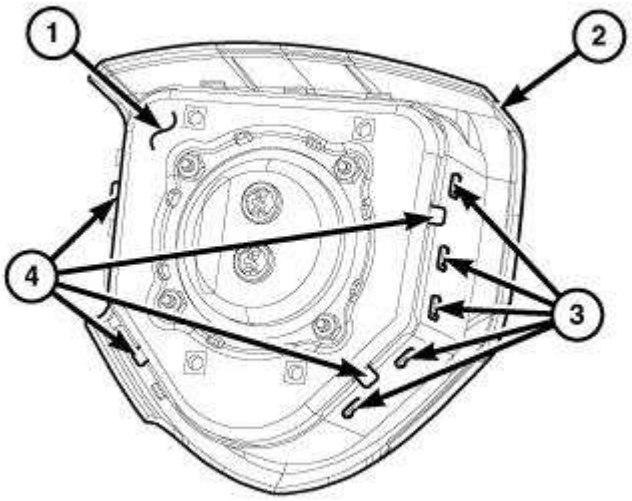

Fig. 19: Trim Cover, Thirteen Hooks, Airbag Housing & Tab
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the Driver AirBag (DAB) from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL**.
3. Place the driver airbag on a suitable clean and dry work surface with the trim cover (2) facing down. If the trim cover will be reused, be certain to take the proper precautions to prevent the trim cover from receiving cosmetic damage during the following procedures.
4. Disengage each of the thirteen hooks (3) of the airbag housing (1) from the thirteen windows in the vertical walls of the trim cover receptacle, one wall at a time. Start by disengaging the upper wall, then do each of the two side walls, and finish with the lower wall. To disengage the hooks, use hand pressure to push outward on the upper edge of the receptacle wall far enough to clear the locating tab (4) on the airbag housing, at the same time push the adjacent edge of the airbag housing firmly and evenly downward into the trim cover receptacle.
5. With all of the hooks disengaged, lift the housing, inflator, and cushion as a unit from the receptacle on the back of the driver airbag trim cover.

SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper

precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit. The trim cover will be irreparably damaged if it is removed from the DAB housing and MUST be replaced with a new trim cover.

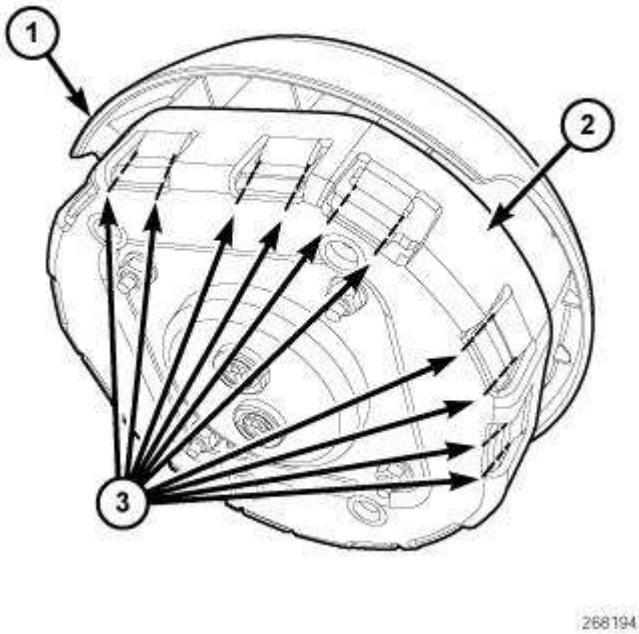

Fig. 20: Twelve Trim Cover, Cut Lines & Airbag Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the Driver AirBag (DAB) from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL**.
3. Place the DAB on a suitable clean and dry work surface.
4. Using a sharp utility knife, carefully cut through the lower edge of each of the twelve trim cover (1) windows at the cut lines (3) on each side of the twelve inward pointing hooks of the airbag housing (2). Use extreme care to prevent any scraps from entering and becoming lost within the airbag housing or cushion.
5. With all of the windows cut open, separate the remainder of the trim cover from the DAB housing by pulling it away from the top of the housing around the perimeter. Discard the removed trim cover.

ASSEMBLY

ASSEMBLY

EXCEPT SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: **The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit.**

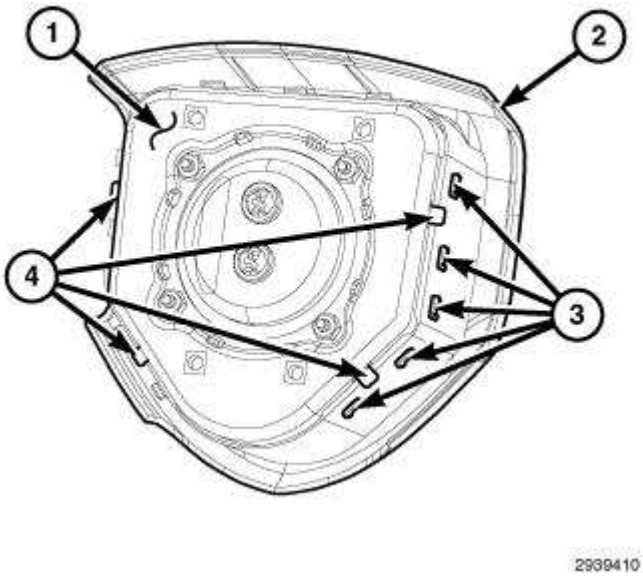

Fig. 21: Trim Cover, Thirteen Hooks, Airbag Housing & Tab
Courtesy of CHRYSLER GROUP, LLC

1. Place the driver airbag trim cover (2) on a suitable clean and dry work surface with the receptacle facing up. Be certain to take the proper precautions to prevent the trim cover from receiving cosmetic damage during the following procedures.
2. Position the driver airbag housing (1), inflator, and cushion as a unit over the trim cover receptacle.
3. Using hand pressure, push the airbag housing firmly and evenly down into the trim cover receptacle far enough that the hooks (3) of the housing are aligned with the windows in the vertical walls of the receptacle.
4. Work around the perimeter of the unit engaging each of the thirteen hooks on the driver airbag housing through the thirteen windows in the walls of the trim cover receptacle.
5. After the driver airbag has been assembled, try pulling the trim cover and the airbag housing away from each other. This action will fully seat the edges of the windows into the cradles of the hooks and the vertical walls of the receptacle beneath the locating tabs (4) of the housing.

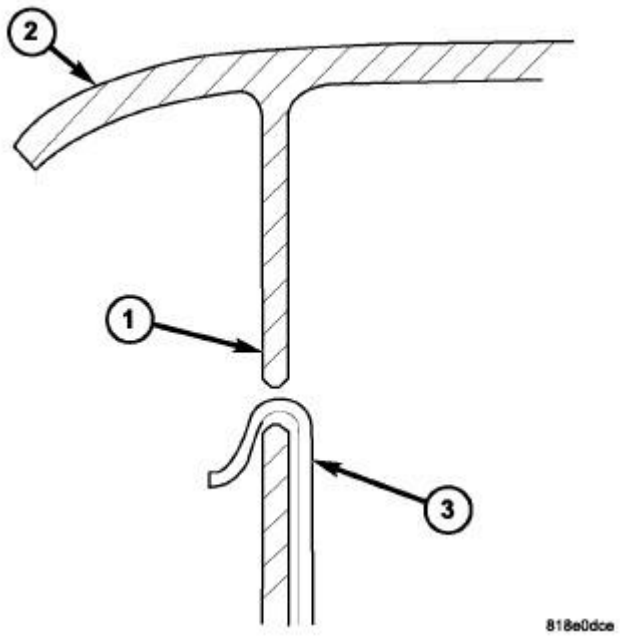

Fig. 22: Airbag Blocking Tab & Housing Hook
Courtesy of CHRYSLER GROUP, LLC

6. Before reinstalling the airbag onto the steering wheel, check that the blocking tab (1) in each of the trim cover (2) windows is oriented over the airbag housing hook (3) as shown in illustration.
7. Reinstall the driver airbag onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION**.

SRT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, service of this unit should be performed only by Chrysler-trained and authorized dealer service technicians. Failure to take the proper precautions or to follow the proper procedures could result in accidental, incomplete, or improper airbag deployment and possible occupant injuries.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped

between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the Driver AirBag (DAB) trim cover must never be painted. Replacement trim covers are serviced in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedures can be used to replace the Driver AirBag (DAB) trim cover for service of cosmetic damage issues. If the DAB is ineffective or deployed, the entire DAB and trim cover must be replaced as a unit. The trim cover will be irreparably damaged if it is removed from the DAB housing and MUST be replaced with a new trim cover.

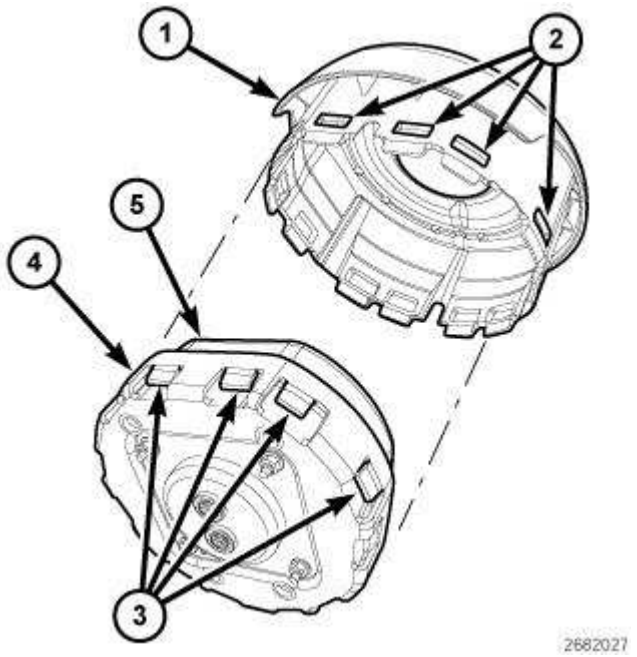

Fig. 23: Driver AirBag Housing, Cushion, DAB Trim Cover, Pointing Hooks & Twelve Windows
Courtesy of CHRYSLER GROUP, LLC

1. Place the Driver AirBag housing (4) on a suitable clean and dry work surface with the cushion (5) facing up.
2. Position the DAB trim cover (1) over the housing. Be certain that the twelve windows (2) of the trim cover are aligned with the twelve inward pointing hooks (3) of the airbag housing. All of the trim cover windows will align with all of the housing hooks correctly only in one position.
3. Insert the edges of the trim cover between the airbag cushion and the airbag housing. Be certain that the trim cover and housing are still properly aligned.
4. Using hand pressure, push the trim cover firmly and evenly down into the housing far enough that each of the inward pointing hooks of the housing is engage through a window in the trim

cover.

5. Inspect around the entire perimeter of the unit being certain each of the twelve hooks on the DAB housing is engaged through the appropriate window in the trim cover.
6. After the DAB has been assembled, try pulling the perimeters of the trim cover and the airbag housing away from each other. This action will fully seat the housing hooks into the trim cover windows.
7. Reinstall the driver airbag onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION**.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the driver airbag trim cover must never be painted. Replacement airbags are serviced with trim covers in the original colors. Paint may change the way in which the material of the trim cover responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Driver AirBag (DAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the DAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

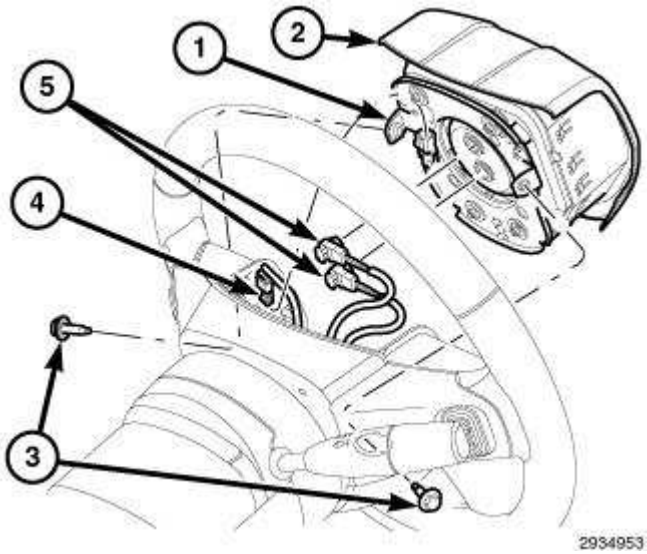

Fig. 24: Two Screws, Floating Horn Switch & Driver Airbag
Courtesy of CHRYSLER GROUP, LLC

1. Position the Driver AirBag (DAB) (2) and floating horn switch (1) unit close enough to the steering wheel to reconnect the electrical connections to the back of the airbag housing.
2. Reconnect the steering wheel wire harness connector (4) to the floating horn switch connector on the back of the switch.
3. Reconnect the wire connectors (5) to the airbag inflator connector receptacles by pressing straight in on the connector insulator. Be certain to engage each keyed and color-coded connector to the matching connector receptacle. You can be certain that each connector is fully engaged in its receptacle by listening carefully for a distinct, audible click as the connector latches snap into place.
4. Carefully position the DAB and floating horn switch unit into the steering wheel hub. Be certain that none of the steering wheel wiring is pinched between the airbag housing or the horn switch and the steering wheel armature.
5. Working through the access holes in each side of the steering wheel rear trim cover, install and tighten the two screws (3) that secure the floating horn switch and DAB unit to the steering wheel armature. Tighten the screws to 13 N.m (10 ft. lbs.).
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, KNEE BLOCKER

DESCRIPTION

DESCRIPTION

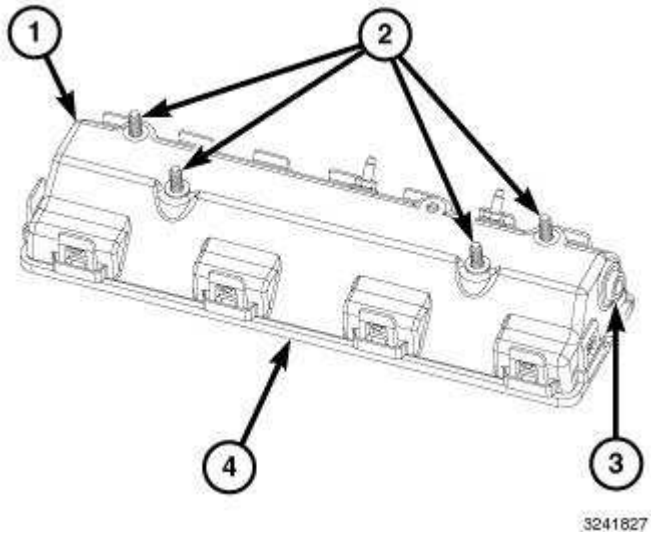

Fig. 25: Airbag Housing, Four Studs, Plastic Protective Cover & Inflator Initiator
Courtesy of CHRYSLER GROUP, LLC

A knee blocker airbag (also known as the Knee AirBag/KAB or the Inflatable Knee Blocker/IKB) is used on vehicles manufactured for domestic markets. These airbags are passive, inflatable, Supplemental Restraint System (SRS) components. Vehicles with this equipment may be readily identified by the **SRS - AIRBAG** logo located on the upper outboard corner of the instrument panel steering column opening cover.

The knee blocker airbag is concealed behind the steering column opening cover below the steering column on the driver side lower instrument panel. Located behind the steering column opening cover, the stamped metal airbag housing (1) is secured by four studs (2) with nuts to the stamped metal lower instrument panel reinforcement of the instrument panel support structure. A molded plastic protective cover (4) is secured over the folded airbag cushion by several hook formations stamped into the airbag housing that are engaged through window openings in tabs integral to the outer perimeter of the cover.

The airbag housing contains the airbag inflator and a heat shield. The airbag inflator is a single-initiator, non-azide hybrid-type unit that is secured to the housing by two studs with nuts and sealed within the airbag housing. The airbag is connected to the vehicle electrical system through a dedicated take out and connector insulator of the instrument panel wire harness that connects directly to the inflator initiator (3).

The knee blocker airbag cannot be repaired, and must be replaced if deployed, ineffective or in any way damaged. If the airbag is deployed, the knee blocker and the steering column opening cover must also be replaced.

OPERATION

OPERATION

The knee blocker airbag (also known as the Knee AirBag/KAB or the Inflatable Knee Blocker/IKB) is

deployed by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through a knee blocker line 1 and line 2 (or squib) circuits to the initiator in the airbag inflator. The hybrid-type inflator assembly for the airbag contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the airbag inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemical pellets burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator is sealed to the airbag cushion and a diffuser in the inflator directs all of the inert gas into the airbag cushion, causing the cushion to inflate. As the cushion inflates, the knee blocker airbag protective cover will split at predetermined tear seam lines concealed on the underside of the cover, then fold open and out of the way.

The cushion protects the lower extremities of the vehicle operator and helps to keep the seat occupant properly positioned for the Driver AirBag (DAB) deployment during a frontal impact collision. Following an airbag deployment, the knee blocker airbag cushion quickly deflates by venting the inert gas through the loose weave of the fabric used to construct the instrument panel side of the airbag cushion, and the deflated cushion hangs down loosely from the lower instrument panel.

Proper diagnosis of the knee blocker airbag inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag cushion and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged Inflatable Knee Blocker (IKB) airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the IKB airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

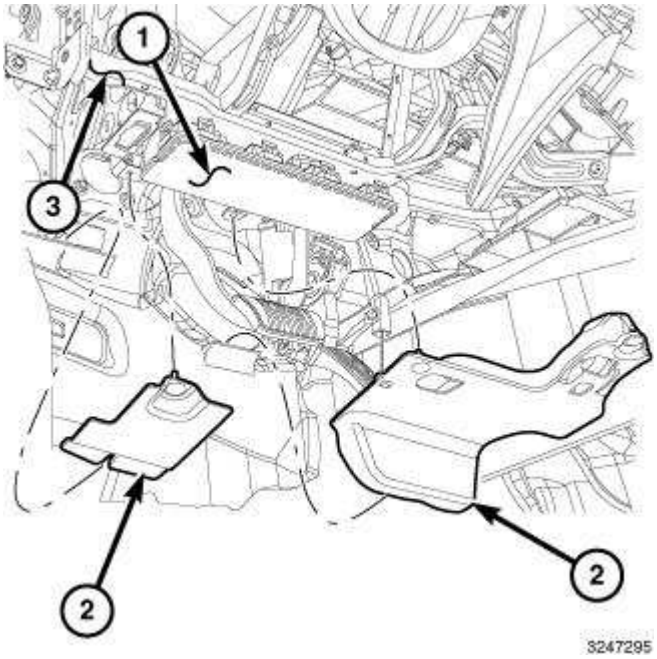

Fig. 26: Panels, Instrument Panel Lower Reinforcement & Knee AirBag (KAB) Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the close out panels (2) from under the driver side of the instrument panel lower reinforcement (3) and surrounding the Knee AirBag (KAB) cover (1) and housing.
3. Remove the steering column opening cover from the instrument panel. Refer to **COVER, INSTRUMENT PANEL, REMOVAL** .

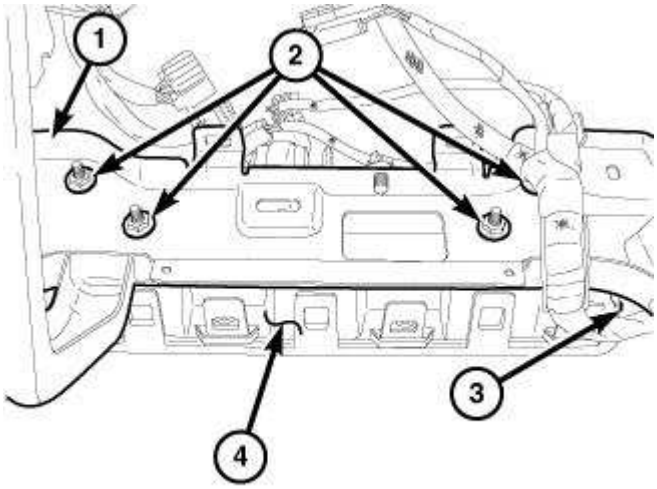

Fig. 27: Four Nuts, Studs, Wire Harness Connection & Instrument Panel Lower Reinforcement
Courtesy of CHRYSLER GROUP, LLC

4. Remove the four nuts (2) that secure the studs of the KAB (4) to the instrument panel lower reinforcement (1).
5. Rotate the outboard end of the KAB downward so that the instrument panel wire harness connection (3) to the KAB inflator faces upward.
6. Disconnect the electrical connection that is secured by integral latches to the KAB inflator initiator connector receptacle on the inboard end of the KAB housing. Depress the latches on each side of the connector insulator and pull the insulator straight out from the inflator initiator to disconnect it from the connector receptacle.
7. Remove the KAB from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Inflatable Knee Blocker (IKB) airbag, or becoming entrapped between the IKB airbag cushion and the IKB cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Inflatable Knee Blocker (IKB) airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the IKB airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

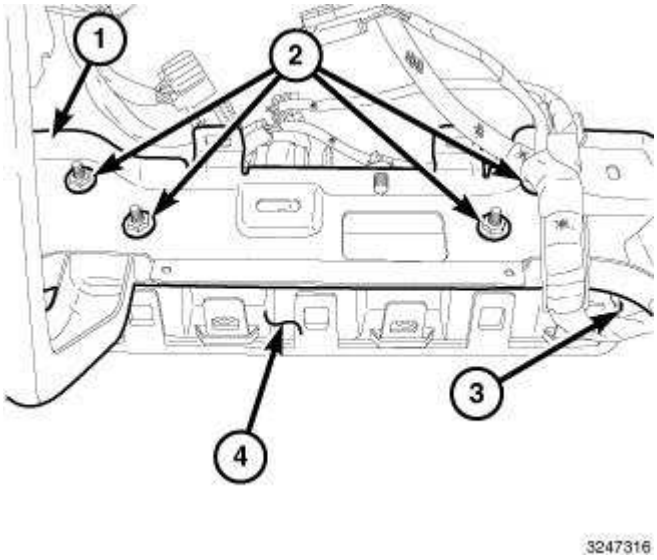

Fig. 28: Four Nuts, Studs, Wire Harness Connection & Instrument Panel Lower Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1. Position the Knee AirBag (KAB) (4) below the steering column opening of the instrument panel in a vertical orientation with the airbag inflator initiator connector receptacle (3) facing upward.
2. Reconnect the connector insulator of the instrument panel wire harness take out for the KAB to the airbag inflator initiator connector receptacle by pressing straight in on the connector. You can be certain that the connector is fully engaged in its receptacle by listening carefully for a distinct, audible click as the connector latches snap into place.
3. Carefully position the KAB to the instrument panel lower reinforcement (1).
4. Install and tighten the four nuts that secure the studs of the KAB to the instrument panel lower reinforcement. Tighten the nuts to 6 N.m (53 in. lbs.).
5. Reinstall the steering column opening cover onto the instrument panel. Refer to **COVER, INSTRUMENT PANEL, INSTALLATION** .

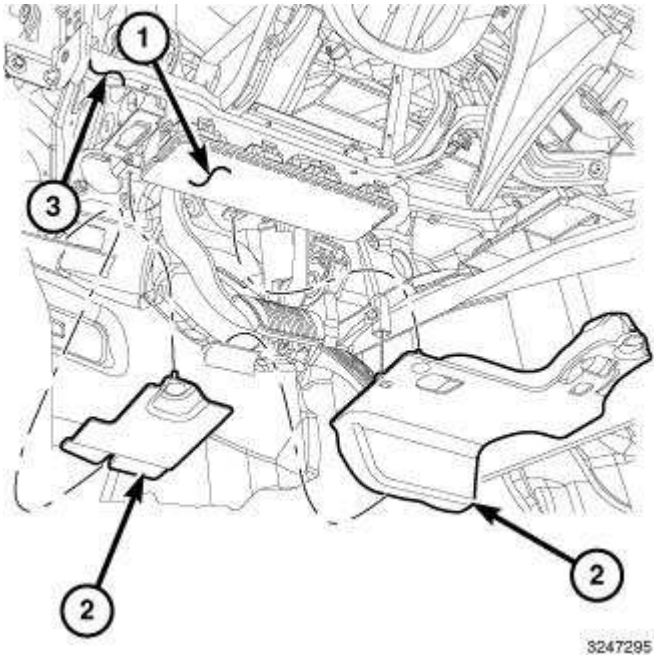

Fig. 29: Panels, Instrument Panel Lower Reinforcement & Knee AirBag (KAB) Cover
Courtesy of CHRYSLER GROUP, LLC

6. Reinstall the close out panels (2) under the driver side of the instrument panel lower reinforcement (3) and surrounding the KAB cover (1) and housing.
7. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, PASSENGER

DESCRIPTION

DESCRIPTION

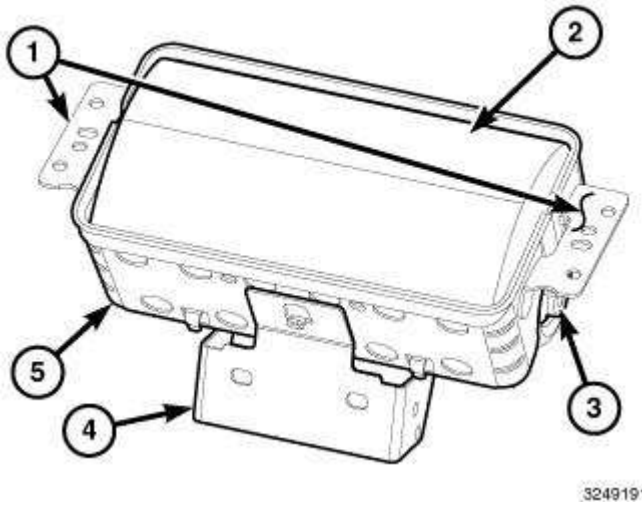

Fig. 30: Upper Bracket, Lower Mounting Bracket, Welded Metal Housing & Airbag Cushion
Courtesy of CHRYSLER GROUP, LLC

The horizontal surface of the instrument panel top pad above the glove box is the most visible part of the Passenger AirBag (PAB). The seamless PAB door is integral to the top of the instrument panel cover above the glove box opening on the instrument panel in front of the front seat passenger seating position. Located below the PAB door area of the instrument panel cover, the PAB retainer or chute is secured to the underside of the instrument panel cover substrate.

The retainer defines the PAB door breakout area of the cover and serves as the receptacle for the PAB cushion and housing. Two U-nuts on each side of the retainer secure the two screws that mount each upper bracket (1) of the PAB housing to the substrate. The PAB is also secured by two screws through a stamped lower mounting bracket (4) to the instrument panel support structure or armature.

The PAB unit used in this vehicle is a multistage type that complies with revised federal airbag standards to deploy with less force than those used in some prior vehicles. The PAB unit consists of a stamped and welded metal housing (5), the airbag cushion (2), and the airbag inflator. The airbag housing contains the airbag inflator and the folded airbag cushion. A rectangular fabric cushion is used.

The passenger airbag used in this vehicle is a multistage type that complies with revised federal airbag standards to deploy with less force than those used in some prior models. The PAB unit consists passenger airbag consists of a stamped and welded metal housing, the airbag cushion, the airbag inflator, and a stamped metal airbag cushion retainer plate that is secured to the airbag housing.

The airbag housing contains the airbag inflator and the folded airbag cushion. The airbag inflator is a non-azide, pyrotechnic-type unit that is secured to and sealed within the airbag housing. A dedicated takeout with keyed and color coded connector insulators directly connects the two inflator initiators (3) to the vehicle electrical system through the instrument panel wire harness. A rectangular fabric cushion is used.

The PAB cannot be repaired and must be replaced if deployed, ineffective or in any way damaged. The PAB door and retainer are serviced only as a unit with the instrument panel cover. If the PAB is deployed, the instrument panel cover must also be replaced.

OPERATION

OPERATION

The multistage Passenger AirBag (PAB) is deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the PAB squib 1 and squib 2 circuits to the two initiators in the airbag inflator. By using two initiators, the PAB can be deployed at multiple levels of force. The force level is controlled by the ORC to suit the monitored impact conditions by providing one of several delay intervals between the electrical signals provided to the two initiators. The longer the delay between these signals, the less forcefully the airbag cushion will deploy.

When the ORC sends the proper electrical signals to each initiator, the electrical energy generates enough heat to initiate a small pyrotechnic charge which, in turn, ignites chemical pellets within the inflator. Once ignited, these chemical pellets burn rapidly and produce a large quantity of inert gas. The inflator is sealed to the airbag cushion and a diffuser in the inflator directs all of the inert gas into the cushion, causing the cushion to inflate. As the cushion inflates, the PAB door area of the instrument panel cover will split at predetermined tear seam lines concealed on the underside of the cover, then the door will pivot up over the top of the instrument panel and out of the way. Following a deployment, the airbag cushion quickly deflates by venting the inert gas through vent holes within the fabric used to construct the back (windshield side) of the cushion.

Typically, both initiators are used during a PAB deployment event. However, it is possible for only one initiator to be used during a deployment due to an airbag system fault; therefore, it is necessary to always confirm that both initiators have been used in order to avoid the improper disposal of potentially live pyrotechnic materials. Refer to **STANDARD PROCEDURE**.

Proper diagnosis of the PAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged passenger airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the passenger airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

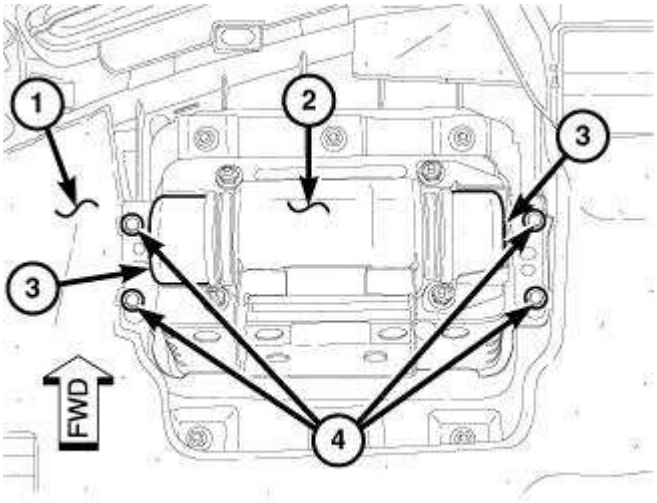

Fig. 31: Two PAB Initiators, Passenger AirBag (PAB), Instrument Panel Cover & Four Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the glove box from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Reach through the instrument panel glove box opening to access and remove the two screws that secure the PAB lower bracket to the instrument panel structural support.
4. Reach through the instrument panel glove box opening to access and disconnect the two instrument panel wire harness connectors from the two PAB initiators (3), one at each side of the PAB inflator canister.
5. Remove the Passenger AirBag (PAB) (2) and instrument panel cover (1) as a unit from the instrument panel support structure or armature. Refer to **COVER, INSTRUMENT PANEL, REMOVAL** .
6. Place the instrument panel cover and passenger airbag unit on a suitable work surface with the top of the cover facing down. If the cover will be reused, be certain to take the proper

precautions to prevent the cover from receiving cosmetic damage during the following procedures.

7. Remove the four screws (4) that secure the two upper airbag mounting brackets to the U-nuts on each side of the PAB retainer or chute (2) on the underside of the instrument panel cover.
8. Remove the PAB from the instrument panel cover.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the passenger airbag, or becoming entrapped between the passenger airbag cushion and the instrument panel top pad. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the instrument panel top pad must never be painted. Replacement top pads are serviced in the original colors. Paint may change the way in which the material of the top pad responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged passenger airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the passenger airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

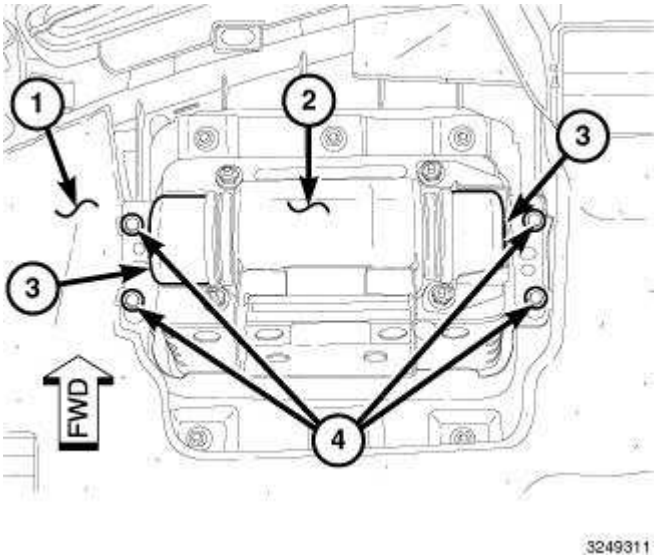

Fig. 32: Two PAB Initiators, Passenger AirBag (PAB), Instrument Panel Cover & Four Screws
Courtesy of CHRYSLER GROUP, LLC

1. Place the instrument panel cover (1) on a suitable work surface with the receptacle of the Passenger AirBag (PAB) retainer or chute facing up. Be certain to take the proper precautions to prevent the cover from receiving cosmetic damage during the following procedures.
2. Carefully position the PAB housing into the airbag retainer receptacle.
3. Install and tighten the four screws that secure the PAB upper mounting brackets to the U-nuts on the retainer. Tighten the screws to 2.8 N.m (25 in. lbs.).
4. Reinstall the PAB and instrument panel cover onto the instrument panel structural support or armature as a unit. Refer to **COVER, INSTRUMENT PANEL, INSTALLATION** .
5. Reach through the instrument panel glove box opening to access and reconnect the two instrument panel wire harness connectors to the two PAB initiators (3), one at each side of the PAB inflator canister. Be certain the connectors are each fully engaged and locked.
6. Reach through the instrument panel glove box opening to install and tighten the two screws that secure the PAB lower bracket to the instrument panel structural support. Tighten the screws to 11.6 N.m (103 in. lbs.).
7. Reinstall the glove box into the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
8. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, SEAT

DESCRIPTION

DESCRIPTION

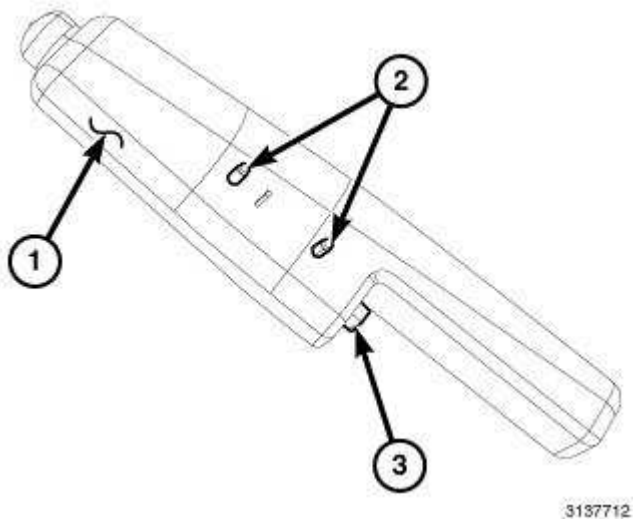

Fig. 33: Seat AirBags (SAB), Two Studs & Inflator Initiator
Courtesy of CHRYSLER GROUP, LLC

Seat AirBags (SAB) (1) (also known as thorax or pelvic airbags) are standard equipment on this model. These airbags are completely concealed beneath the seat back trim cover on the upper outboard sides of both front seat backs. The airbags are inserted into a molded thermoplastic chute on the outside of the seat back frame, then secured to the frame by nuts on two studs (2) on the SAB bracket on the inboard side of the inflator. The SAB is connected to the vehicle electrical system through a dedicated jumper wire harness with a connector insulator that connects directly to the inflator initiator (3). The connector insulators are uniquely keyed and color-coded to ensure they can only be connected to the initiator.

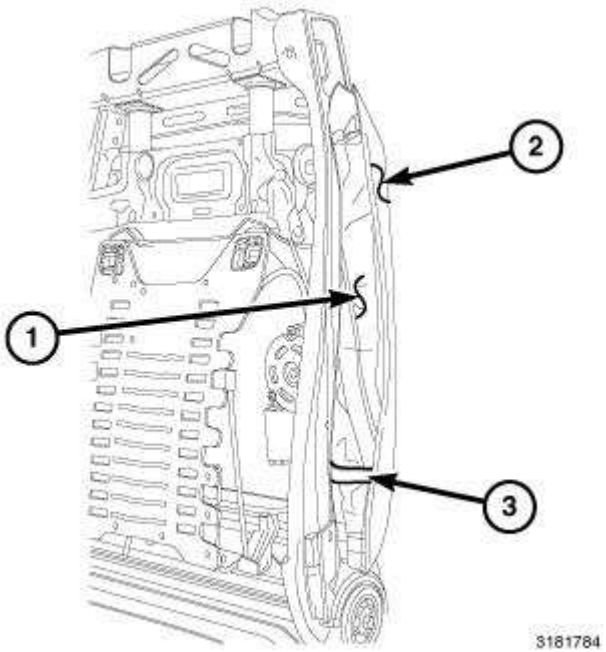

Fig. 34: Folded SAB Cushion, Chute & Fabric Strap
Courtesy of CHRYSLER GROUP, LLC

The folded SAB cushion (1) is contained within and protected by the chute (2). The cushion is constructed of a coated nylon fabric. The folded SAB cushion is tied to the airbag inflator with a fabric strap (3). The inflator consists of the airbag inflator and a high pressure cylinder filled with inert gas. The airbag inflator is a single-initiator, hybrid-type unit that is secured to the SAB bracket.

The SAB cannot be repaired, and must be replaced if deployed, ineffective, or in any way damaged. If the SAB is deployed the thermoplastic chute, the seat back frame, the seat back foam, the seat back trim cover and the seat airbag jumper wire harness must also be replaced.

OPERATION

OPERATION

Each Seat AirBag (SAB) is deployed individually by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through left or right SAB line 1 and line 2 (or squib) circuits. The hybrid-type inflator assembly for each airbag contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemicals burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator and inert gas canister are sealed and connected so that all of the released gas is directed into the folded SAB cushion, causing the cushion to inflate. As the cushion inflates it will split the fabric retainer strap and the thermoplastic chute will direct the expanding cushion through the outboard side of the seat back trim cover and into the area between the outboard side of the front seat and the front door to protect the front seat occupant during a side impact collision or a vehicle rollover incident.

Following the deployment, the SAB cushion slowly deflates by venting the inert gas through the loose weave of the cushion fabric, and the deflated cushion hangs down loosely from the outboard side of the front seat back.

Proper diagnosis of the SAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

NOTE: The following procedure is for replacement of an ineffective or damaged Seat AirBag (SAB). If the SAB is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the SAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

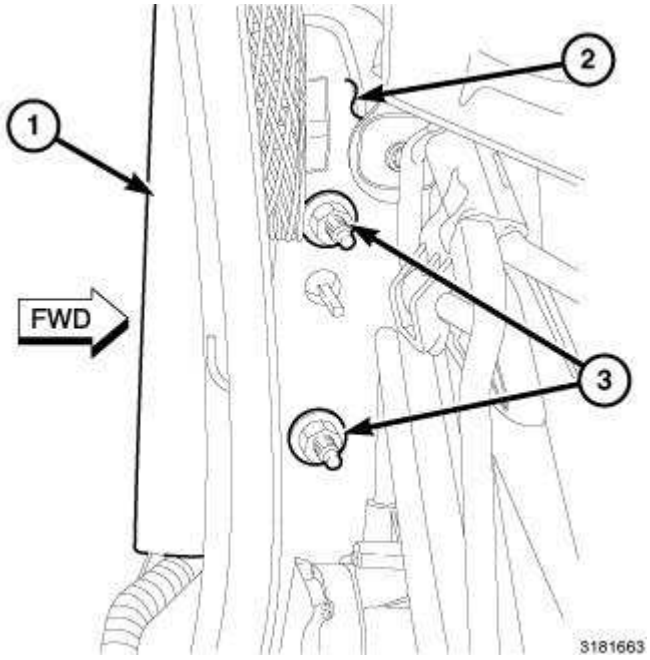

Fig. 35: Front Seat Back Frame, Two Nuts & Seat AirBag (SAB) And Thermoplastic Chute
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat to its most forward position for easiest access to the front seat mounting hardware.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Remove the trim from the front and back of the front seat back frame (2). Refer to **COVER, SEAT BACK, FRONT, REMOVAL** .
5. Remove the two nuts (3) that secure the Seat AirBag (SAB) and thermoplastic chute (1) to the outboard side of the seat back frame.

CAUTION: Do not pull on the Seat AirBag (SAB) jumper wire harness take out or pry on the connector insulator to disengage the connector from the

SAB inflator connector receptacle. Improper removal of this take out and its connector insulator can result in damage to the airbag circuits or the connector insulator.

6. Disengage the two SAB studs from the seat back frame and remove the SAB and chute from the seat back as a unit.

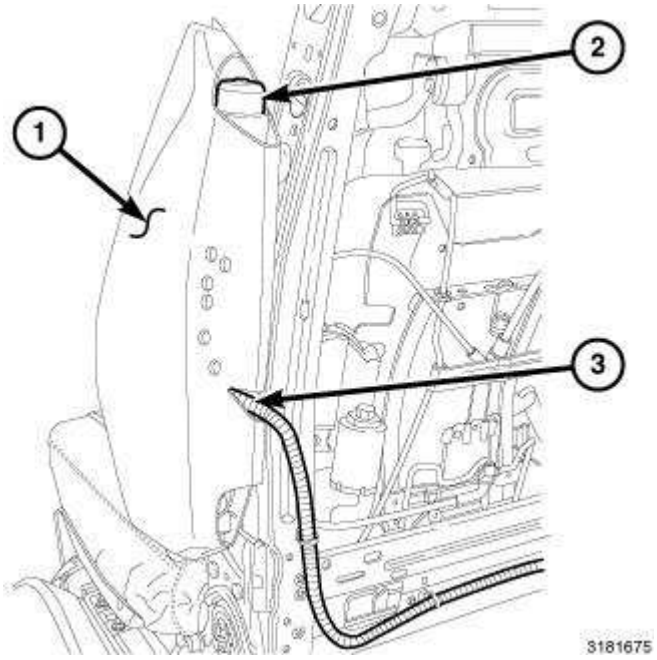

Fig. 36: SAB From The Chute, SAB Jumper Wire Harness & SAB Inflator
Courtesy of CHRYSLER GROUP, LLC

7. Disengage the SAB from the chute (1) to access and disconnect the SAB jumper wire harness (3) connector from the base of the SAB inflator (2). Pull the connector insulator straight out from the inflator to disconnect it from the connector receptacle.
8. Disengage the SAB jumper wire harness from the opening in the back of the chute.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: **The following procedure is for replacement of an ineffective or damaged Seat AirBag (SAB). If the SAB is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the SAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .**

CAUTION: The Seat AirBag (SAB) must be installed into the nylon pouch integral to the front seat back trim cover before the SAB or the trim cover are installed on the front seat back frame. Failure to do so will adversely affect the function of the SAB system.

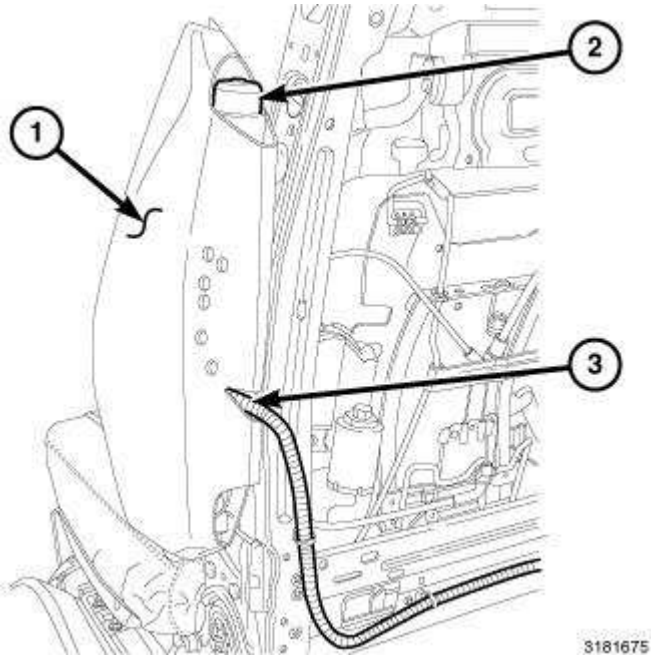

Fig. 37: SAB From The Chute, SAB Jumper Wire Harness & SAB Inflator
Courtesy of CHRYSLER GROUP, LLC

1. Engage the SAB jumper wire harness (3) through the opening in the back of the thermoplastic chute (1).
2. Reconnect the seat jumper wire harness connector to the connector receptacle at the base of the SAB inflator. Be certain that the connector latches and lock are fully engaged.
3. Carefully slide the Seat AirBag (SAB) and inflator (2) into the chute and engage the two SAB studs through the holes provided in the chute. Be certain not to tear or damage the chute.

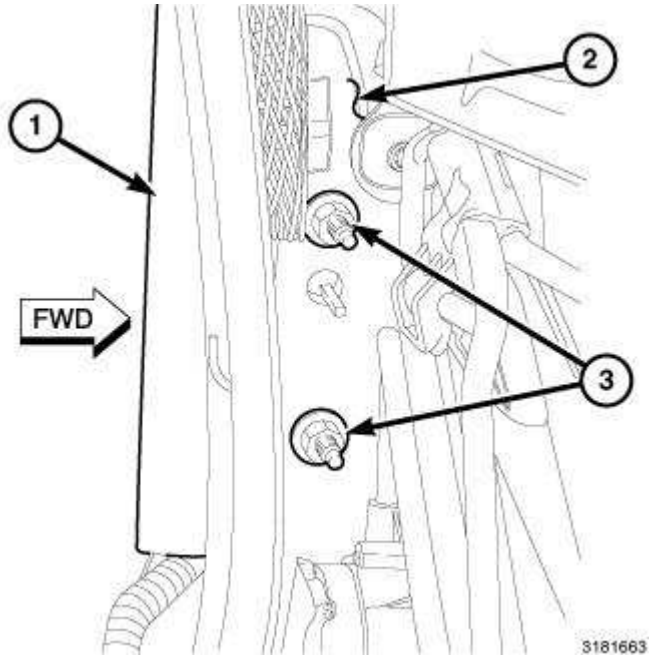

Fig. 38: Front Seat Back Frame, Two Nuts & Seat AirBag (SAB) And Thermoplastic Chute
Courtesy of CHRYSLER GROUP, LLC

4. Position the SAB and chute (1) as a unit to the outboard side of the seat back frame (2) and insert the SAB mounting studs through the mounting holes in the frame.
5. Install and tighten the two nuts (3) that secure the SAB to the outboard side of the seat back frame. Tighten the nuts to 8 N.m (71 in. lbs.).

CAUTION: Be certain that all of the trim is properly reinstalled on the front seat back frame. Failure to do so will adversely affect the function of the Seat AirBag (SAB) system.

6. Reinstall the trim onto the front and back of the front seat back frame. Refer to **COVER, SEAT BACK, FRONT, INSTALLATION** .
7. Reinstall the front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
8. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, SIDE CURTAIN

DESCRIPTION

DESCRIPTION

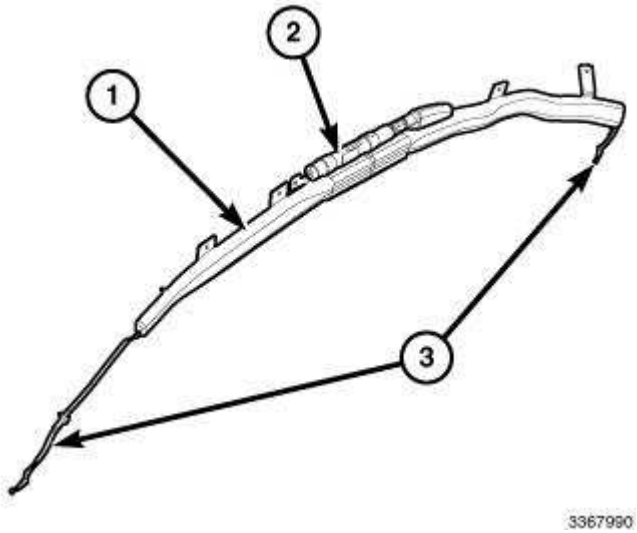

Fig. 39: Side AirBag Inflatable Curtains (SABIC), Tether & Hybrid-Type Inflator
Courtesy of CHRYSLER GROUP, LLC

Side AirBag Inflatable Curtains (SABIC) (1) are standard factory-installed equipment for this vehicle. These airbags are passive, inflatable, Supplemental Restraint System (SRS) components. The SABIC system is designed to reduce injuries to the vehicle occupants in the event of a side impact collision or a vehicle rollover incident. Each SABIC cushion provides full coverage of the side glass on the same side of the vehicle as the monitored impact.

Each vehicle is equipped with two individually controlled SABIC units. These SABIC units are concealed and mounted above the headliner where they are each secured to one of the roof side rails. Each folded airbag cushion is contained within a fabric wrap and extruded plastic channels that extend along the roof rail from the A-pillar at the front of the vehicle to the C-pillar at the rear of the vehicle.

A long tether (3) extends down the A-pillar from the front of the SABIC cushion, while a shorter tether extends back to over the C-pillar. The end of each tether is secured to a slot in the sheet metal with a metal T-hook, while an additional plastic push-in fastener secures the T-hook within the slot in the sheet metal of the pillar. A molded airbag support bracket is snapped into the roof rail above the C-pillar.

The hybrid-type inflator (2) for each SABIC is secured to the roof rail above the B-pillar and the front door opening, and is connected to the airbag cushion by a long tubular manifold. The inflator bracket and the extruded cushion channel are secured with both plastic push-in fasteners and a snap-in fastener to the roof rail. The inflator is initially hung from the roof rail by the snap-in fastener, then the push-in fasteners secure the body of the airbag cushion to the roof rail and the support bracket. Finally, the entire assembly is secured with five screws to the roof rail and the airbag support bracket.

The airbag inflator is connected to the vehicle electrical system through a dedicated take out and connector of the body wire harness near the top of the B-pillar. The body wire harness connects the SABIC unit to the Occupant Restraint Controller (ORC).

The SABIC units cannot be adjusted or repaired and must be replaced if deployed, ineffective, or in any way damaged. Once a SABIC has been deployed, the complete SABIC unit, the headliner, the upper A, B, and C-pillar trim as well as all other visibly damaged components must be replaced.

OPERATION

OPERATION

Each Side AirBag Inflatable Curtain (SABIC) is deployed individually by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through the left or right SABIC line 1 and line 2 (or squib) circuits. The hybrid-type inflator assembly for each airbag contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the airbag inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemicals burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator and inert gas canister are sealed and connected to a tubular manifold so that all of the released gas is directed into the folded airbag cushion, causing the cushion to inflate. As the cushion inflates it will drop down from the roof rail between the edge of the headliner and the side glass/body pillars to form a curtain-like cushion to protect the vehicle occupants during a side impact collision or a vehicle rollover incident. The cushion features large chambers that inflate adjacent to the head of each front and rear seat occupant.

The front and rear tethers keep the SABIC cushion taut to the side of the vehicle. In addition, ramps integral to the side trim of the interior and integral to the SABIC modules themselves guide the cushion into the proper deployment position. Following the deployment, the cushion slowly deflates by venting the inert gas through the loose weave of the cushion fabric and the deflated cushion hangs down loosely from the roof rail.

Proper diagnosis of the SABIC inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There

may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the side curtain airbag, or becoming entrapped between the side curtain airbag cushion and the headliner. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged side curtain airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the side curtain airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

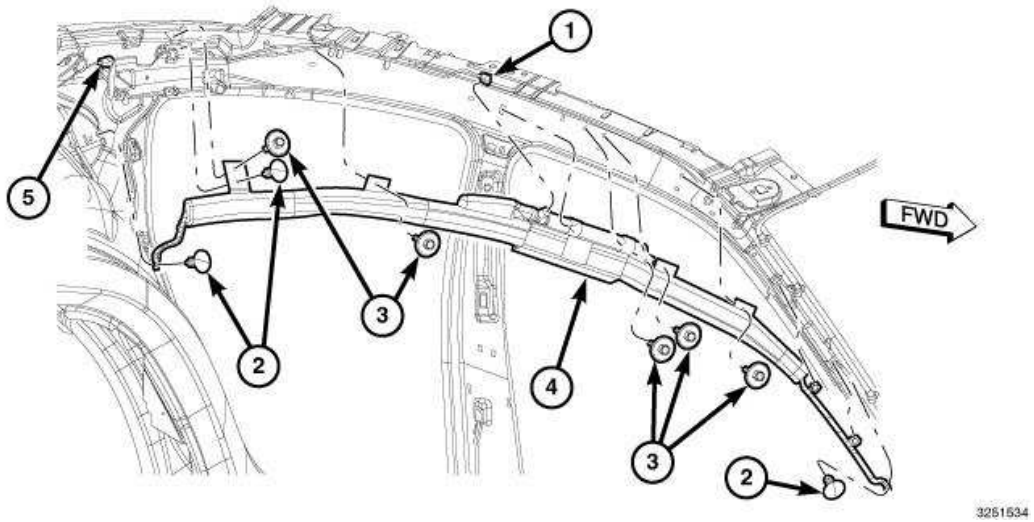

Fig. 40: Wire Harness Connector, Side Air Bag Inflatable Curtain (SABIC), Five Screws & Airbag Support Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the headliner from the vehicle. Refer to **HEADLINER, REMOVAL** .
3. Disconnect the body wire harness connector (1) for the Side Air Bag Inflatable Curtain (SABIC) (4) from the connector receptacle on the inflator on the inner roof rail above the B-pillar.
4. Remove the five screws (3) that secure the SABIC to the inner roof rail and the airbag support bracket (5).
5. Disengage the plastic push-in fasteners (2), then the T-hook that secures the end of each front and rear SABIC tether in the slots in the inner A-pillar and C-pillar sheet metal.

6. Disengage the remaining plastic push-in fasteners that secure the SABIC to the A-pillar, the inner roof rail and the airbag support bracket at the top of the C-pillar.
7. Grasp the SABIC inflator firmly and pull it away sharply to disengage the snap-in fastener from the inner roof rail above the B-pillar.
8. Remove the SABIC from the vehicle as a unit.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the side curtain airbag, or becoming entrapped between the side curtain airbag cushion and the headliner. Failure to observe this warning could result in occupant injuries upon airbag deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged side curtain airbag. If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the side curtain airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. .

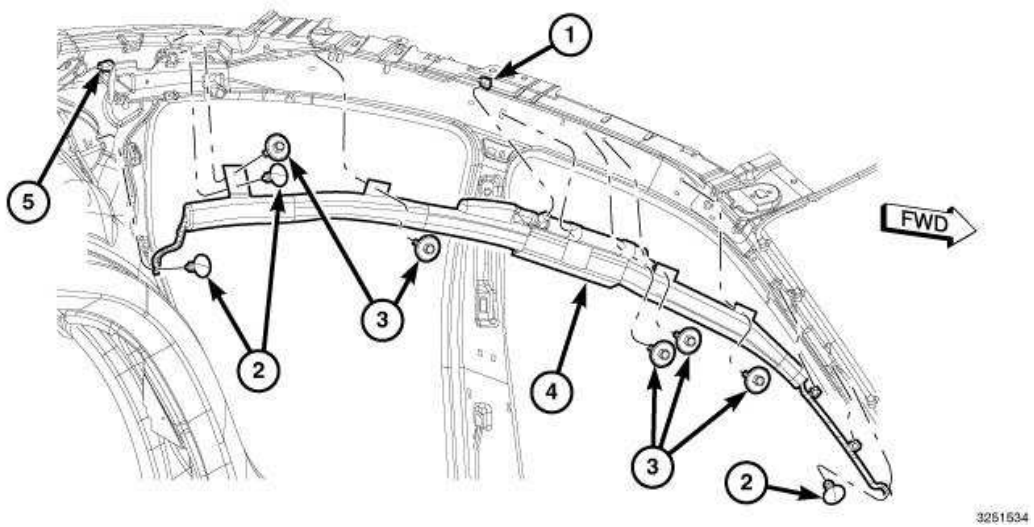

Fig. 41: Wire Harness Connector, Side Air Bag Inflatable Curtain (SABIC), Five Screws & Airbag Support Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain that the box nuts and the airbag support bracket (5) for the Side Air Bag Inflatable Curtain (SABIC) (4) are properly installed in the inner roof rail and that they are in good condition.
2. Position the SABIC into the vehicle as a unit.
3. Align the snap-in fastener on the back of the SABIC inflator with the hole in the inner roof rail above the B-pillar and push on the inflator firmly and evenly to snap it into place.
4. Engage the plastic push-in fasteners (2) that secure the airbag cushion to the inner roof rail and the airbag support bracket behind the inflator and the B-pillar.
5. Engage the T-hook that secures the end of each front and rear SABIC tether into the slots in their respective inner A-pillar or C-pillar sheet metal.
6. Engage the plastic push-in fasteners that secure the SABIC front tether to the holes in the inner A-pillar.
7. Engage the plastic push-in fasteners (2) that secure the front and rear SABIC tether T-hooks in their inner A-pillar or C-pillar slots.
8. Install and tighten the five screws (3) that secure the SABIC to the inner roof rail and the airbag support bracket. Tighten the screws to 9 N.m (80 in. lbs.).
9. Reconnect the body wire harness connector (1) to the SABIC inflator connector receptacle.
10. Reinstall the headliner into the vehicle. Refer to **HEADLINER, INSTALLATION** .
11. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

ANCHOR, CHILD SEAT

DESCRIPTION

DESCRIPTION

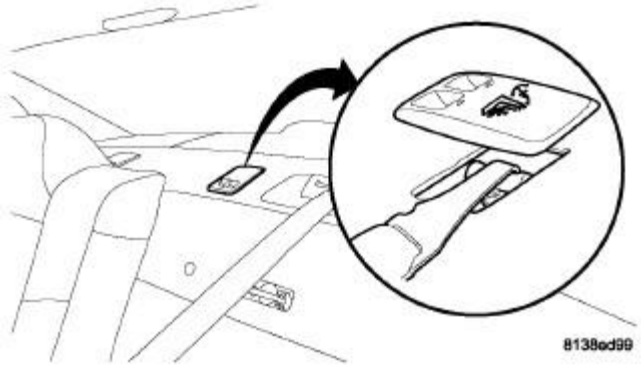

Fig. 42: Lower Anchor & Tether
Courtesy of CHRYSLER GROUP, LLC

This vehicle is equipped with a Lower Anchors and Tether for CHildren, or LATCH child restraint anchorage system for domestic markets. The LATCH system provides for the installation of suitable child restraints in certain seating positions without using the standard equipment seat belt provided for that seating position. The rear seats in these vehicles are equipped with a fixed-position child restraint upper tether anchor for both the center and the two outboard seating positions, and child restraint lower anchors (also known as ISOFIX anchors) for the two outboard seating positions only. Vehicles manufactured for export markets are not equipped with the upper tether anchors, but do have the ISOFIX lower anchors.

The three upper tether anchors are integral to the rear shelf panel. These anchors are each constructed of heavy-gauge steel reinforcement brackets integral to the rear shelf panel and are concealed beneath individual trim cover and bezel units that are integral to the rear shelf trim panel. These upper tether anchors cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced as a unit with the rear shelf panel. The upper tether anchor trim covers and bezels are serviced as a unit with the rear shelf trim panel.

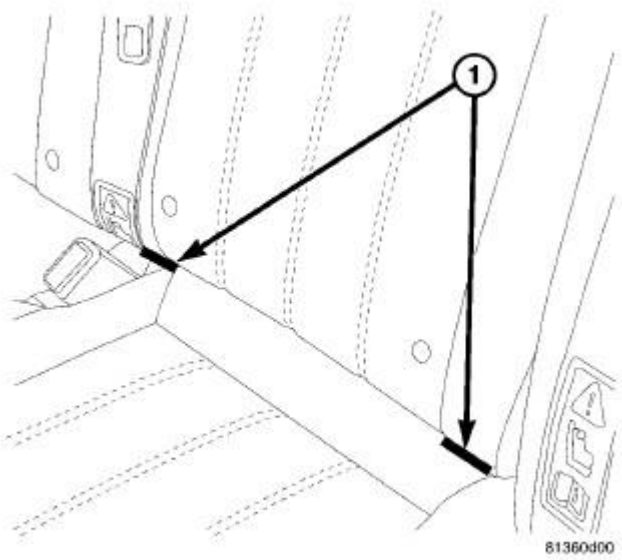

Fig. 43: Lower Anchors
Courtesy of CHRYSLER GROUP, LLC

The lower anchors for all vehicles are integral to an ISOFIX cross member that is permanently mounted to the center floor panel beneath the rear seat cushion. These anchors are constructed from heavy-gauge round steel bar stock that is formed into a U-shape, then securely welded at each end to the cross member.

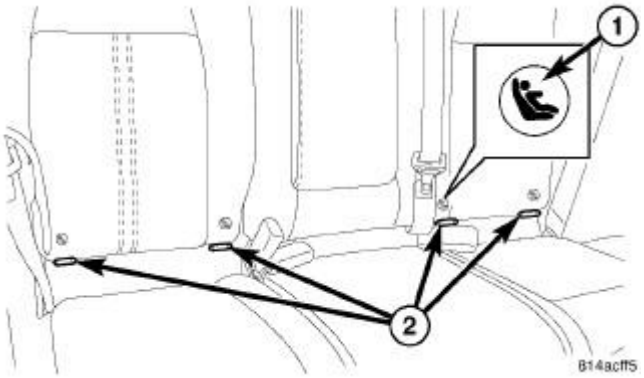

Fig. 44: Identifying Rear Seat Lower Anchors & Markers With An Imprinted Child Seat Icon
Courtesy of CHRYSLER GROUP, LLC

The rear seat lower anchors (2) are each accessed from the front of their respective seats, at each side where the seat back meets the seat cushion. Round markers (1) with an imprinted child seat icon help identify the anchor locations as they may be otherwise difficult to see with the seat back in the upright position. These lower anchors cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced as a unit with the isofix cross member of the center floor panel.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles,

mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

OPERATION

OPERATION

All vehicles manufactured for sale in the United States and Canada are required to be equipped with a Lower Anchors and Tether for CHildren, or LATCH child restraint anchorage system. The rear seats in this vehicle have two pairs of anchor provisions for installing a LATCH-compatible child seat. A single seat may be mounted in the center seating position, or one in each outboard seating position.

With LATCH, child seats are secured by direct attachment to the vehicle structure, rather than by the seat belts. With LATCH-compatible child seats, lower (also known as ISOFIX) anchors attach to the seat structure through heavy-gauge wire loops located at the intersection between the seat cushion and the seat back surfaces.

Three upper tether anchors are integral to the rear shelf panel to secure the top tether strap of child seats equipped with this feature. These upper tether anchors work with both LATCH-compatible and other child seats equipped with a top tether strap. Vehicles manufactured for export markets are equipped with only the ISOFIX lower anchors, and have no upper tether anchor provisions.

The owner's information packet in the vehicle glove box contains details and suggestions on the proper use of all of the factory-installed child restraint anchors.

BUCKLE, SEAT BELT

REMOVAL

FRONT SEAT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in

accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt buckle unit. The front seat belt buckle also includes a seat belt tensioner. If the front seat belt buckle is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

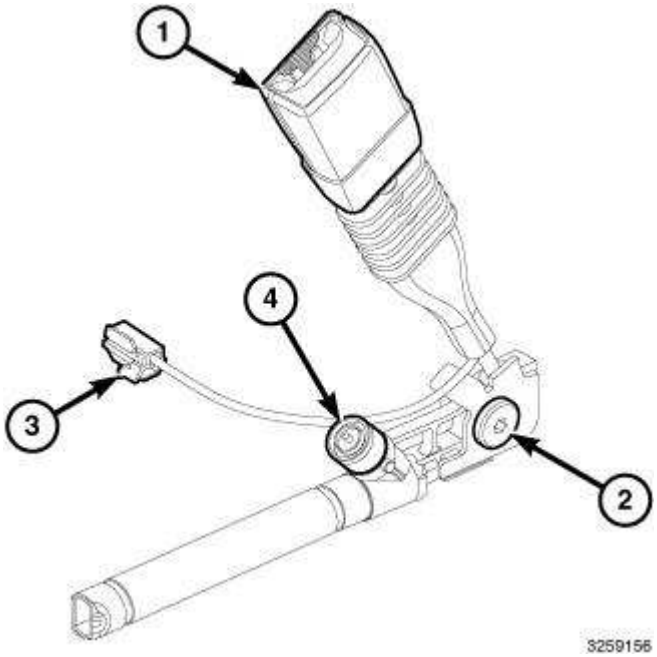

Fig. 45: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat for easiest access to the seat mounting hardware.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Disconnect the seat wire harness connector from the seat belt tensioner initiator (4).
5. Disconnect the seat belt switch pigtail wire connector (3) from the seat wire harness connector.
6. Remove the screw (2) that secures the front seat belt buckle lower anchor to the bracket at the back of the seat cushion frame.
7. Remove the buckle and tensioner (1) from the front seat as a unit.

REAR SEAT

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

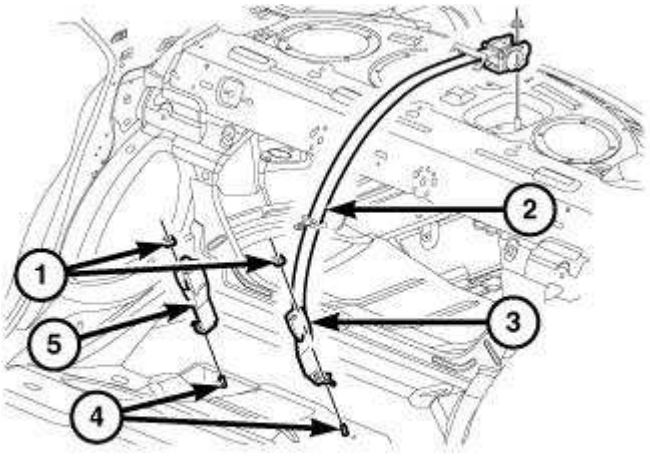

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Fig. 46: Center Rear Seating Position Buckles, Left Outboard Rear Seating Position Buckle & Center Rear Seating Position Seat Belt And Retractor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right outboard and center rear seating position buckles (5) are serviced

only as a unit. The left outboard rear seating position buckle (3) is integral to the center rear seating position seat belt and retractor (2) lower anchor. Refer to RETRACTOR, SEAT BELT, REMOVAL.

1. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, REMOVAL** .
2. Remove the nut (1) that secures the anchor plate of the right outboard and center rear seating position buckles (5) to the stud (4) on the center floor panel.
3. Remove the buckle unit from the vehicle.

INSTALLATION

FRONT SEAT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt buckle unit. The front seat belt buckle also includes a seat belt tensioner. If the front seat belt buckle is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

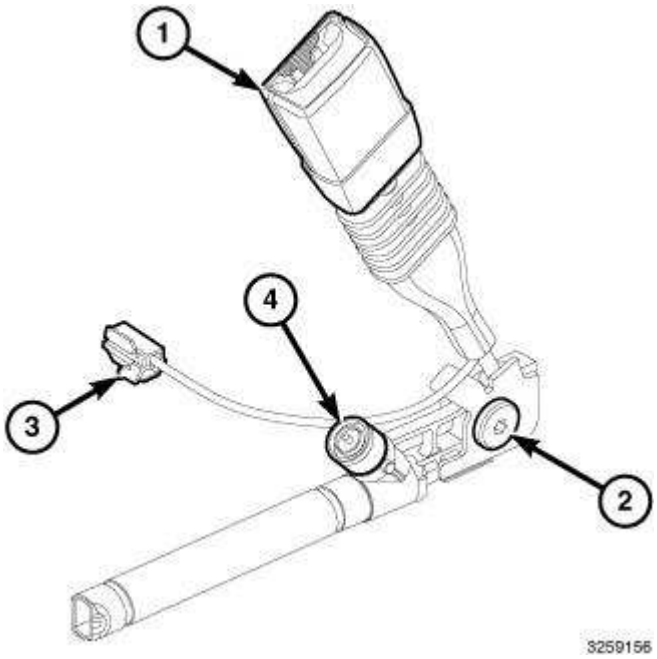

Fig. 47: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat belt buckle and tensioner (1) lower anchor to the bracket at the back of the seat cushion frame.
2. Install and tighten the screw (2) that secures the lower anchor to the seat cushion frame. Tighten the screw to 39 N.m (29 ft. lbs.).
3. Reconnect the seat belt switch pigtail wire connector (3) to the seat wire harness connector.
4. Reconnect the seat wire harness connector to the seat belt tensioner initiator (4).
5. Reinstall the front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

REAR SEAT

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and

unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

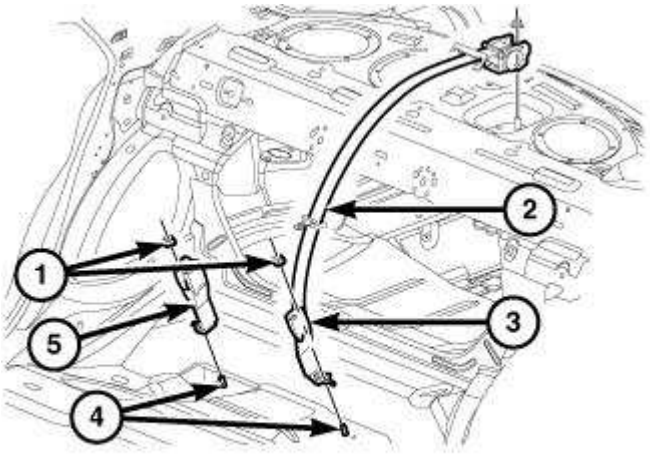

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Fig. 48: Center Rear Seating Position Buckles, Left Outboard Rear Seating Position Buckle & Center Rear Seating Position Seat Belt And Retractor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right outboard and center rear seating position buckles (5) are serviced only as a unit. The left outboard rear seating position buckle (3) is integral to the center rear seating position seat belt and retractor (2) lower anchor. Refer to RETRACTOR, SEAT BELT, INSTALLATION.

1. Position the anchor plate of the right outboard and center rear seating position buckles (5) onto the stud (4) on the center floor panel. Be certain to engage the anti-rotation tab of the anchor plate into the clearance hole in the floor panel.
2. Install and tighten the nut (1) that secures buckle anchor plate to the floor. Tighten the nut to 40 N.m (30 ft. lbs.).
3. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** .

CLOCKSPRING

DESCRIPTION

DESCRIPTION

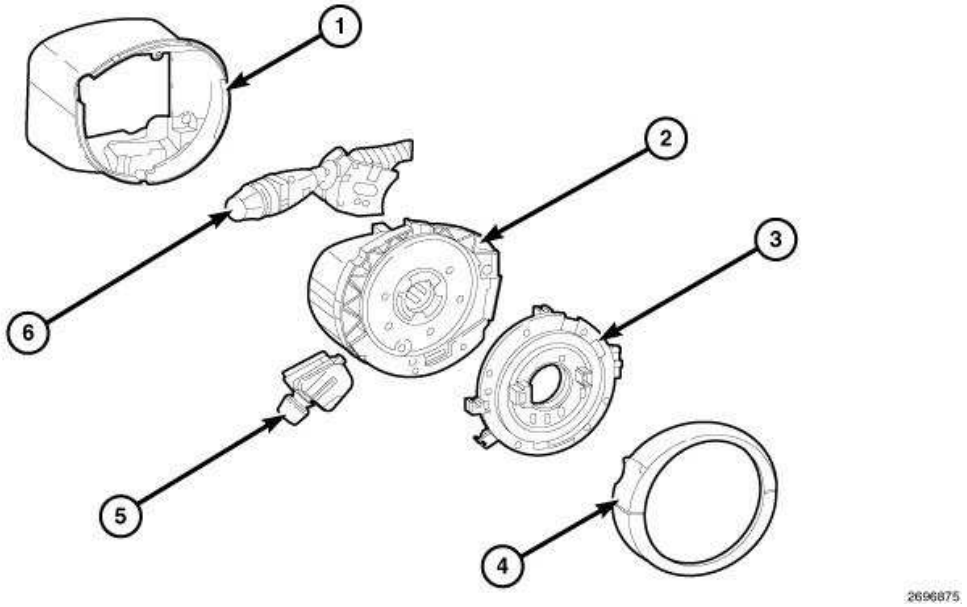

Fig. 49: Steering Column Shroud, Steering Angle Sensor (SAS), Clockspring, Telescope Switch & Trim Cover
Courtesy of CHRYSLER GROUP, LLC

The clockspring (3) for this vehicle is integral to the Steering Column Control Module (SCCM). The clockspring includes an integral, internal turn signal cancel cam. The SCCM is secured near the top of the steering column below the steering wheel. In addition to the clockspring the SCCM includes the steering column shroud (1), the Steering Angle Sensor (SAS) (2), the multi-function switch (6), a power adjustable steering column tilt and telescope switch (5) for vehicles so equipped and a trim cover (4).

Within the plastic clockspring case is a spool-like molded clear plastic rotor with an exposed hub. The upper surface of the rotor hub has a large center hole, two short pigtail wires with connectors, and two connector receptacles that face toward the steering wheel. The inner surface of the clockspring rotor hub has keyway features that are engaged by lug features on the outer circumference of the steering wheel hub. These interlocking features allow the steering wheel to drive the clockspring and SAS and also unlock the clockspring rotor when the steering wheel has been properly installed.

The SCCM includes an integral connector receptacle that faces toward the instrument panel and is connected to the vehicle electrical system through a single takeout and connector of the instrument panel wire harness. The instrument panel wire harness take out has been intentionally provided with additional length to facilitate service removal and installation of the SCCM. However, following SCCM installation, this additional length must be pulled back and secured to the instrument panel structure to prevent undesirable noises while driving.

Wound around the rotor spool within the clockspring case are long ribbon-like tapes that consist of several thin copper wire leads sandwiched between two thin plastic membranes. The outer end of the tapes terminate at the connector receptacle that faces the instrument panel, while the inner end of the tapes terminate at the pigtail wires and connector receptacles on the hub of the clockspring rotor that face the steering wheel. The outer surface of the rotor spool hub within the clockspring case also has the integral lobes of the turn signal cancel cam.

The clear plastic clockspring rotor has an outer band that has a translucent or frosted appearance except for a small, clear inspection window area in the lower right quadrant. The clockspring tape has several black squares that are only visible through the clear inspection window when the clockspring is properly centered. If these squares are not visible through the inspection window, clockspring centering has been compromised and the entire SCCM must be replaced with a new unit.

The service replacement SCCM is shipped with the clockspring pre-centered and with a red molded plastic locking tab installed. The locking tab secures the centered clockspring rotor to the clockspring case during shipment and handling, but must be removed after the SCCM is installed on the steering column and before the steering wheel can be installed. The clockspring cannot be repaired. If the clockspring is ineffective, damaged, if clockspring centering is compromised or if the Driver AirBag (DAB) has been deployed the entire SCCM unit must be replaced. Refer to **MODULE, STEERING COLUMN, REMOVAL** .

OPERATION

OPERATION

The clockspring is a mechanical electrical circuit component that is used to provide continuous electrical continuity between the fixed instrument panel wire harness and certain electrical components mounted on or in the rotating steering wheel. On this vehicle the rotating electrical components include the driver airbag, the horn switch, the speed control switch, the remote radio switches, the hands-free communication switches and the Electronic Vehicle Information Center (EVIC) control switches, if the vehicle is so equipped.

The clockspring is integral to the Steering Column Control Module (SCCM) positioned and secured near the top of the steering column. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** . The turn signal cancel cam is integral to the rim of the clockspring rotor hub spool within the clockspring case so it also moves with the rotation of the steering wheel. Two short, sleeved pigtail wires on the upper surface of the clockspring rotor connect the clockspring to the Driver AirBag (DAB), while a steering wheel wire harness connected to the connector receptacles on the upper surface of the clockspring rotor completes circuits for the various steering wheel-mounted switches and the heated steering wheel, if the vehicle is so equipped.

Like the clockspring in a timepiece, the clockspring tape and conductors have travel limits and can be damaged by being wound too tightly during full stop-to-stop steering wheel rotation. To prevent this from occurring, the clockspring is centered when it is installed on the steering column. Centering the clockspring indexes the clockspring tape to the movable steering components so that the tape can operate within its designed travel limits.

However, if the steering shaft is disconnected from the steering gear the clockspring rotor spool can change position relative to other movable steering components. Clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible in the inspection window, clockspring centering has been compromised and the entire SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN, INSTALLATION** .

Service replacement clocksprings are shipped pre-centered within the SCCM and with a plastic

locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the SCCM is installed on a steering column, clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible in the inspection window, the SCCM must be replaced with a new unit. Proper clockspring installation may also be confirmed by viewing the Steering Angle Sensor (SAS) data using a diagnostic scan tool.

The hard wired clockspring circuits to the SCCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SCCM, the Steering Control Module (SCM) or the electronic controls or communication between other modules and devices that provide some features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to SRS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

STANDARD PROCEDURE

STANDARD PROCEDURE - CLOCKSPRING CENTERING

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

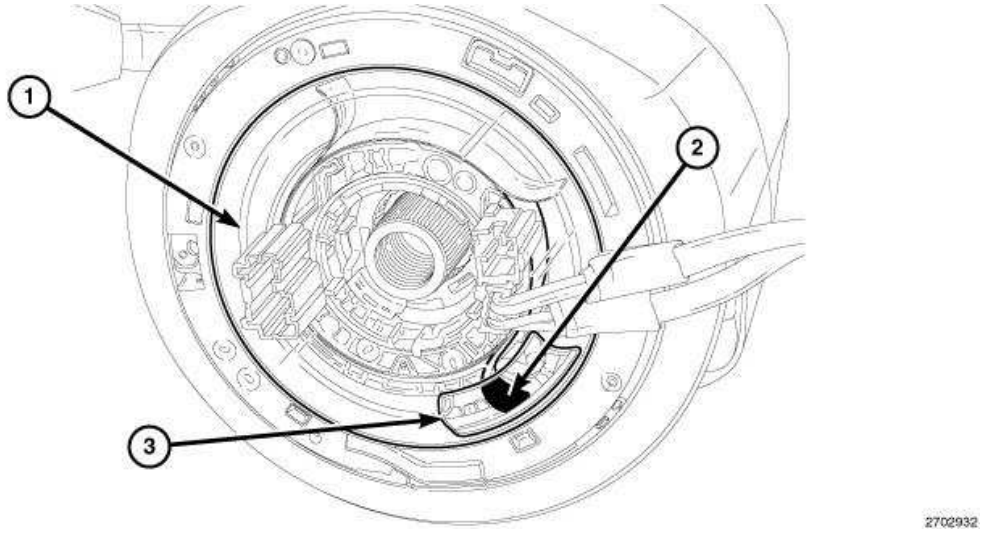

Fig. 50: Inspection Window, Clockspring Rotor & Black Squares
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always turn the steering wheel until the front wheels are in the straight-

ahead position. Then, prior to disconnecting the steering column from the steering gear, lock the steering wheel to the steering column. If clockspring centering has been compromised for ANY reason, the entire Steering Column Control Module (SCCM) and clockspring unit MUST be replaced with a new unit.

Like the clockspring in a timepiece, the clockspring tape has travel limits and can be damaged by being wound too tightly during full stop-to-stop steering wheel rotation. To prevent this from occurring, the clockspring is centered when it is installed on the steering column. Centering the clockspring indexes the clockspring tape to the movable steering components so that the tape can operate within its designed travel limits. However, if the steering shaft is disconnected from the steering gear, the clockspring rotor spool can change position relative to the fixed steering components.

Clockspring centering must always be confirmed by viewing the inspection window (3) on the clockspring rotor (1). If the black squares (2) on the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN, INSTALLATION** .

The service replacement SCCM is shipped with the clockspring pre-centered and with a red plastic locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the SCCM is installed on a steering column, clockspring centering must be confirmed by viewing the black squares on the clockspring tape through the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN, INSTALLATION** . Proper clockspring installation may also be confirmed by viewing the Steering Angle Sensor (SAS) data using a diagnostic scan tool.

MODULE, OCCUPANT RESTRAINT CONTROLLER

DESCRIPTION

DESCRIPTION

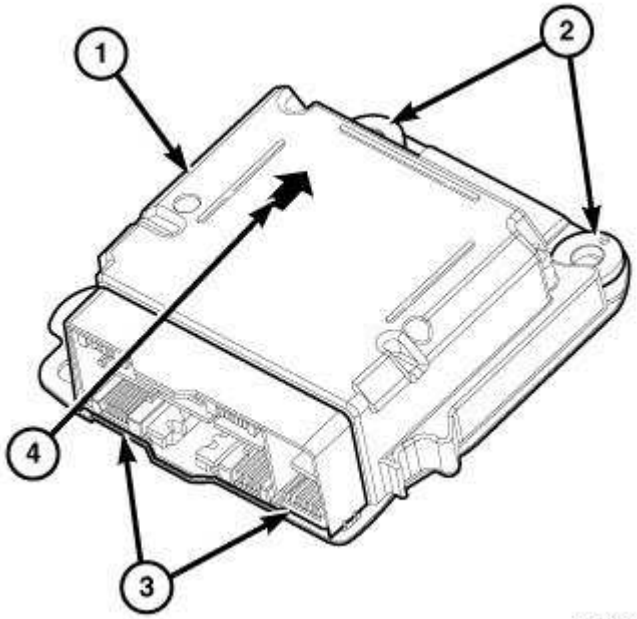

Fig. 51: Occupant Restraint Controller (ORC), Arrow, Integral Mounting Flanges & Electrical Connector Receptacles
Courtesy of CHRYSLER GROUP, LLC

The Occupant Restraint Controller (ORC) (1) is secured by three screws to a stamped steel mounting bracket on the top of the floor panel transmission tunnel near the dash panel and beneath the instrument panel center support in the passenger compartment of the vehicle. Concealed within a hollow in the center of the ORC housing is the electronic circuitry of the ORC which includes a microprocessor, an electronic impact sensor, an electronic safing sensor and an energy storage capacitor. A stamped metal cover plate is secured to the bottom of the ORC housing to enclose and protect the internal electronic circuitry and components.

An arrow (4) printed on the label on the top of the ORC housing provides a visual verification of the proper orientation of the unit, and should always be pointed toward the front of the vehicle. The ORC housing has integral mounting flanges (2) on the right and left front and the left rear corner. The stamped metal cover plate has two integral locating pins on its lower surface. Two molded plastic electrical connector receptacles (3) exit the rearward facing side of the ORC housing. These receptacles connect the ORC to the vehicle electrical system through two dedicated take outs and connectors, one from the instrument panel wire harness and the second from the body wire harness.

The impact sensor and safing sensor internal to the ORC are calibrated for the specific vehicle, and are only serviced as a unit with the ORC. In addition, there are unique versions of the ORC for vehicles with or without certain optional Supplemental Restraint System (SRS) components. The ORC cannot be repaired or adjusted and, if damaged or ineffective, it must be replaced.

PEDESTRIAN PROTECTION SYSTEM

The Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) is available only in vehicles manufactured for certain export markets. In vehicles so

equipped, a unique version of the ORC also serves as the EPP system control module.

OPERATION

OPERATION

The microprocessor in the Occupant Restraint Controller (ORC) contains the Supplemental Restraint System (SRS) logic circuits and controls all of the SRS components. The ORC uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the Controller Area Network (CAN) data bus. This method of communication is used for control of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for SRS diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The ORC microprocessor continuously monitors all of the SRS electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets an active and stored Diagnostic Trouble Code (DTC) and sends electronic messages to the IC over the CAN data bus to turn ON the airbag indicator. An active fault only remains for the duration of the fault, or in some cases for the duration of the current ignition cycle, while a stored fault causes a DTC to be stored in memory by the ORC. For some DTCs, if a fault does not recur for a number of ignition cycles, the ORC will automatically erase the stored DTC. For other internal faults, the stored DTC is latched forever.

The ORC receives battery current through two circuits; a fused ignition switch output (run) circuit through a fuse in the Body Control Module (BCM) (also known as the Common Body Controller/CBC) and a fused ignition switch output (run-start) circuit through a second fuse in the BCM. The ORC receives ground through a ground circuit and take out of the instrument panel wire harness that is secured by a ground screw to the body sheet metal. These connections allow the ORC to be operational whenever the ignition switch is in the START or ON positions.

The ORC also contains an energy-storage capacitor. When the ignition switch is in the START or ON positions, this capacitor is continually being charged with enough electrical energy to deploy the SRS components for up to one second following a battery disconnect or failure. The purpose of the capacitor is to provide backup SRS protection in case there is a loss of battery current supply to the ORC during an impact.

Various sensors within the ORC are continuously monitored by the ORC logic. These internal sensors, along with several external impact sensor inputs allow the ORC to determine both the severity of an impact and to verify the necessity for deployment of any SRS components. Two remote front impact sensors are located on the back of the right and left vertical members of the radiator support near the front of the vehicle. The electronic impact sensors are accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact.

The ORC also monitors inputs from an internal rollover sensor, seat track position sensors, seat belt switches and six additional remote side impact sensors located on the left and right front door module carriers, on the right and left lower B-pillars and on the right and left C-pillars near the belt line to control deployment of the side curtain airbag units and seat (also known as pelvic and thorax) airbags. On vehicles so equipped, the ORC also uses the passenger side seat belt switch input along

with an input from the Occupant Detection Sensor (ODS) in the passenger front seat cushion to support the passenger belt alert feature, and will send electronic messages to the IC to illuminate the seat belt indicator when appropriate.

The impact sensors within the ORC are electronic accelerometer sensors that provide an additional logic input to the ORC microprocessor. These sensors are used to verify the need for a SRS component deployment by detecting impact energy of a lesser magnitude than that of the primary electronic impact sensors, and must exceed a safing threshold in order for the SRS components to deploy. On vehicles equipped with side curtain airbags or seat airbags, a separate impact sensor within the ORC provides confirmation to the ORC microprocessor of side impact forces. This separate sensor is a bi-directional unit that detects impact forces from either side of the vehicle.

Pre-programmed decision algorithms in the ORC microprocessor determine when the deceleration rate as signaled by the impact sensors indicate an impact that is severe enough to require SRS protection and, based upon the severity of the monitored impact, determines the level of front airbag deployment force required for each front seating position. When the programmed conditions are met, the ORC sends the proper electrical signals to deploy the dual multistage front airbags at the programmed force levels, the front seat belt tensioners and, if the vehicle is so equipped, the seat airbags and either side curtain airbag unit.

The hard wired SRS inputs and outputs for the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ORC or the electronic controls or communication between other modules and devices that provide features of the SRS. The most reliable, efficient, and accurate means to diagnose the ORC or the electronic controls and communication related to SRS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PEDESTRIAN PROTECTION SYSTEM

In vehicles so equipped, a microcontroller within the ORC also contains the Electronic Pedestrian Protection (EPP) system (also known as the PedPro or the Active Hood System) logic circuits. The EPP system logic of the ORC continuously monitors the three dedicated EPP acceleration-type electronic impact sensors located behind the front bumper area of the fascia at the front of the vehicle. The impact sensors are accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact.

The ORC also monitors electronic **ignition status** , **vehicle speed** and **ambient temperature** message inputs received from other electronic modules over the CAN data bus. The EPP system logic of the ORC uses a pre-programmed decision algorithm to analyze all of these inputs, which allows the ORC to determine both the type and severity of an impact.

When the deceleration rate as signaled by the impact sensors indicate an impact that requires the deployment of the pyrotechnic EPP actuator located on each active hood hinge at the rear corners of the hood panel and all other programmed conditions are met, the ORC sends the proper electrical signals to deploy the actuators. As a safing function, the ORC requires confirming sensor inputs from at least two of the three EPP impact sensors before it will issue a deployment signal.

The ORC also contains an energy-storage capacitor. When the ignition switch is in the START or ON positions, this capacitor is continually being charged with enough electrical energy to deploy the active hood hinge actuators for up to one second following a battery disconnect or failure. The purpose of the capacitor is to provide backup EPP system protection in case there is a loss of battery current supply to the ORC during an impact event.

An Event Data Recorder (EDR) within the ORC stores EPP near-deployment event records. The ORC microcontroller continuously monitors all of the EPP system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it logs an active DTC. The ORC also stores a DTC after it has been resolved. When the ORC has logged a DTC, it sends electronic request messages over the CAN data bus to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to turn ON the airbag indicator.

The hard wired EPP inputs and outputs for the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ORC or the electronic controls or communication between other modules and devices that provide features of the EPP system. The most reliable, efficient, and accurate means to diagnose the ORC or the electronic controls and communication related to EPP system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Occupant

Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.

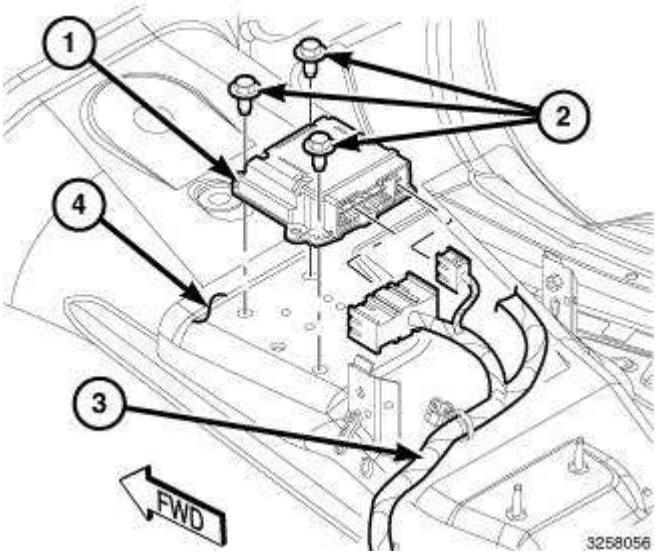

Fig. 52: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the center console from the top of the floor panel transmission tunnel (4). Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Remove the console floor duct from the floor panel transmission tunnel. Refer to **DUCT, FLOOR CONSOLE, REMOVAL** .

   NOTE: If equipped with a cable-type floor shifter, it is not necessary to disconnect the shift cable from the shifter.

4. If equipped with a floor shifter:
   1. Disconnect the wire harness connectors from the shifter.
   2. Remove the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel.
   3. Remove the shifter from the transmission tunnel. If it is a cable-type shifter, carefully position the shifter and cable out of the way over the right side of the transmission tunnel.
5. Remove the switch bank and bezel from the instrument panel center stack. Refer to **POD, SWITCH BANK, REMOVAL** .

6. Remove the Telematics Gateway Module (TGM) from the instrument panel center stack. Refer to **MODULE, TELEMATICS GATEWAY, REMOVAL** .
7. Disconnect the instrument panel and body wire harness (3) connectors from the Occupant Restraint Controller (ORC) (1) connector receptacles located on the rearward facing side of the module.
8. Reach through the instrument panel center stack openings to access and cut the sound deadening material along the right side of the ORC.
9. Reach around and behind the left side of the instrument panel center stack support structure to access and cut the sound deadening material along the forward-facing side of the ORC.
10. Pull the sound deadening material over the left side of the ORC far enough to access the mounting provisions.
11. Remove the three screws (2) that secure the ORC to the top of the floor panel transmission tunnel.
12. Remove the ORC from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be

scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.

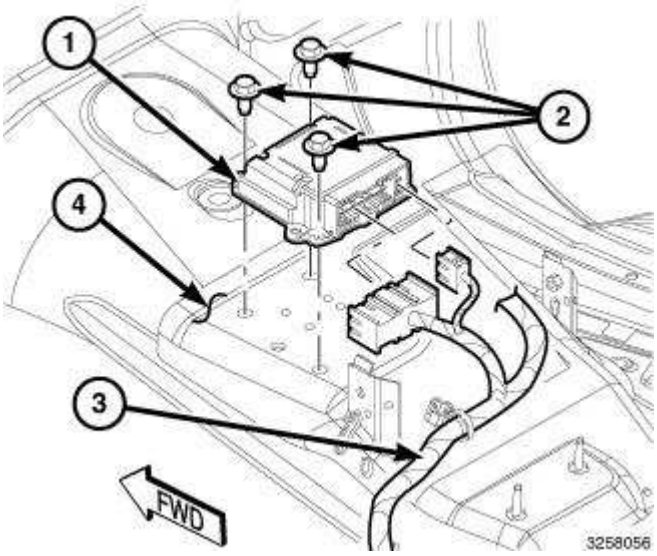

Fig. 53: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Carefully position the Occupant Restraint Controller (ORC) (1) onto the floor panel transmission tunnel (4). When the ORC is correctly positioned, the orientation arrow on the ORC label will be pointed forward in the vehicle.
2. Install and tighten the three screws (2) that secure the ORC to the floor panel transmission tunnel. Tighten the screws to 8 N.m (71 in. lbs.).
3. Restore the flap of sound deadening material that was cut during the removal procedure over and around the ORC.
4. Reconnect the instrument panel and body wire harness (3) connectors to the ORC connector receptacles located on the rearward facing side of the module. Be certain that the latches and the locks on both connectors are each fully engaged.
5. Reinstall the Telematics Gateway Module (TGM) into the instrument panel center stack. Refer to **MODULE, TELEMATICS GATEWAY, INSTALLATION** .
6. Reinstall the switch bank and bezel into the instrument panel center stack. Refer to **POD, SWITCH BANK, INSTALLATION** .
7. If equipped with a floor shifter:
    1. Position the shifter over the four weld studs on the top of the floor panel transmission tunnel.
    2. Install and tighten the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel. Tighten the nuts securely.
    3. Reconnect the wire harness connectors to the shifter.
8. Reinstall the console floor duct onto the floor panel transmission tunnel. Refer to **DUCT,**

FLOOR CONSOLE, INSTALLATION .

9. Reinstall the center console onto the top of the floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, INSTALLATION** .
10. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

RESTRAINT, ACTIVE HEAD

DESCRIPTION

DESCRIPTION

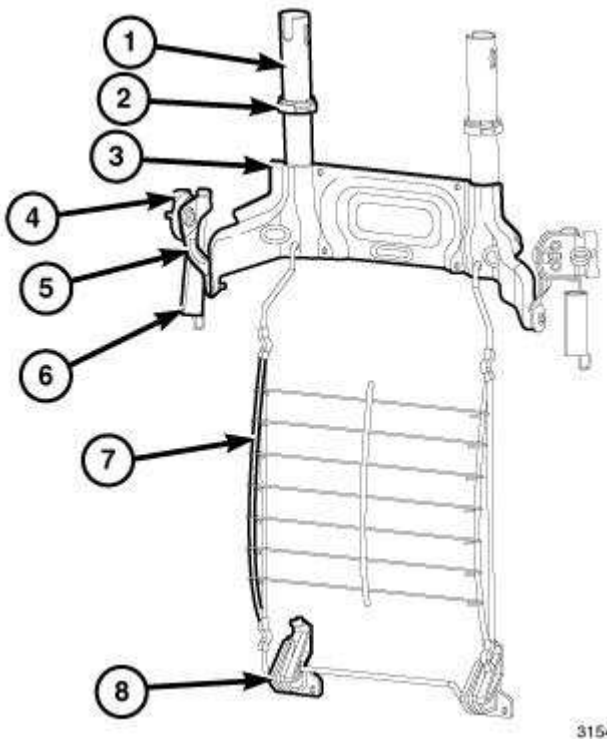

Fig. 54: Steel Headrest Guide Tubes, Fulcrum Bushing, Brackets, Steel Pivot Link, Spring & Static Lumbar Assembly
Courtesy of CHRYSLER GROUP, LLC

Active Head Restraint (AHR) units are standard equipment for both front seating positions in this vehicle. On vehicles so equipped, one inertia-activated AHR unit is located atop each front seat back. Outwardly, an inertia-activated AHR appears the same as a non-active head restraint. The mechanical components that articulate the inertia-activated AHR headrest pad are all concealed within the front seat back frame assembly.

At the top of the seat back frame are two stamped steel headrest guide tubes (1). The guide tubes are each inserted through a molded plastic fulcrum bushing (2) installed in the upper seat back frame member and are permanently fixed to a movable stamped steel armature bracket (3) located just

below the upper frame member near the top of the seat back. The armature bracket is secured to a stamped steel pivot link (5) at each side that pivots on a screw threaded into a mounting bracket (4) welded to each side member of the seat back frame. The pivot links are each have a spring (6) attached to a lever opposite the armature bracket attachment that is anchored to the seat back frame side member below, which provides the spring-loaded return action of the inertia mechanism.

The upper end of the static lumbar assembly (7) is secured at each side to the base of the armature bracket. Each side of the lower end of the lumbar assembly is engaged in a ramp bracket (8) riveted to the lower seat back frame member. The optional power lumbar assembly (not shown) is secured to the armature bracket at the top and the ramp brackets at the bottom in an identical manner as the standard equipment static lumbar assembly.

The inertia-activated AHR linkage cannot be repaired. If damaged or ineffective, it must be replaced as a unit with a new seat back frame unit. However, following an AHR deployment if no physical damage to the unit has occurred, unlike many other Supplemental Restraint System (SRS) components, the spring-loaded inertia-activated AHR linkage will reset itself for reuse.

OPERATION

OPERATION

The inertia-activated Active Head Restraint (AHR) units are deployed and reset automatically by the mechanism contained within each front seat back assembly. During a rear impact, inertia drives the seat occupant rearward into the seat back, loading the seat lumbar assembly. The ramp brackets at the base of the lumbar assembly translate this rearward travel into a vertical motion. The vertical motion of the lumbar assembly is then transmitted to the armature bracket.

Through the rotation of the pivot links at each side of the armature bracket, the vertical motion of the lumbar assembly is converted to a slightly forward and upward arc of the armature bracket, headrest guide tubes and headrest that is designed to reduce the space between the back of the head of the seat occupant and the head restraint pad. Closing this space catches the head of the seat occupant during a low speed rear impact collision event and is important in reducing or eliminating potentially debilitating cervical (also known as whiplash) injuries.

Unless damaged, following the rear impact, the return spring on the pivot link at each side of the armature bracket returns the mechanical components within the seat back and the headrest to their non-loaded positions.

RETRACTOR, SEAT BELT

DESCRIPTION

DESCRIPTION

Both front seating position seat belts are equipped with a Constant Force Retractor (CFR), while the seat belt retractors used in all seating positions include an inertia-type, Emergency Locking Retractor (ELR) mechanism as standard equipment. However, the ELR for all seating positions except the

driver side front are mechanically switchable from an ELR to an Automatic Locking Retractor (ALR).

The CFR, ELR and ALR features are all integral to the seat belt retractor unit mechanism that is concealed beneath a molded plastic cover located on one side of the retractor spool. The CFR, ELR and ALR features cannot be adjusted or repaired and, if ineffective or damaged, the entire seat belt and retractor must be replaced as a unit.

OPERATION

OPERATION

The Constant Force Retractors (CFR) used for both front seating positions provide a constant force load-limiting feature. This load-limiting feature helps to limit the maximum force on the belt webbing to help absorb the energy of the upper torso during an impact event. The CFR feature also helps to offset any extreme torso loading that might occur as the seat belt webbing is automatically retracted by deployment of the belt tensioners in conjunction with a front airbag deployment.

The primary function of the switchable Emergency Locking Retractor (ELR) to Automatic Locking Retractor (ALR) feature is to securely accommodate an infant or child booster seat in any seating position of the vehicle except the driver side front seat without the need for a self-cinching seat belt tip half latch plate unit or another supplemental device that would be required to prevent the seat belt webbing from unwinding freely from the retractor spool of an inertia-type ELR in situations where the minimum inertia locking threshold has not been achieved.

The locked mode of the ALR is engaged and the retractor is switched from operating as a standard inertia-type ELR by first buckling the combination lap and shoulder belt buckle. Then all of the shoulder belt webbing is pulled out from the retractor. Once all of the belt webbing is extracted from the retractor spool, the retractor will automatically become engaged in the pre-locked ALR mode and will make a light, audible clicking or ratcheting sound as the shoulder belt is allowed to retract onto the spool to provide an audible confirmation that the ALR mode is engaged. Once the ALR mode is engaged, the retractor will remain locked and the belt will remain tight around whatever it is restraining.

The retractor is returned to standard ELR (inertia) mode by unbuckling the combination lap and shoulder belt buckle and allowing the belt webbing to be almost fully retracted back onto the retractor spool. The ELR mode is confirmed by the absence of the light, audible clicking or ratcheting sound as the belt webbing retracts. This mode will allow the belt to unwind from and wind onto the retractor spool freely unless and until a predetermined inertia load threshold is sensed, or until the retractor is again switched to the ALR mode.

REMOVAL

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or

instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt and retractor unit. The front outboard retractors also include a seat belt tensioner. If the front seat belt or retractor is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

NOTE: All seat belt retractors except the driver side front retractor include a switchable automatic locking mechanism. Refer to RETRACTOR, SEAT BELT, DESCRIPTION.

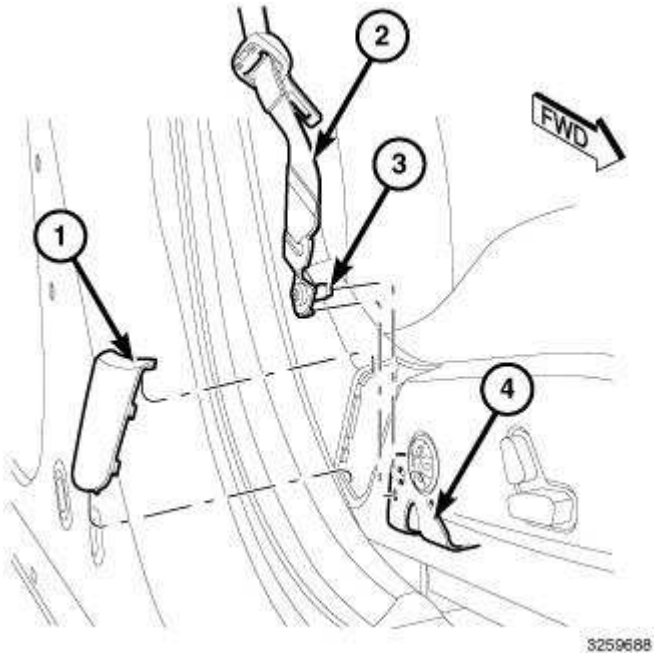

Fig. 55: Front Seat Belt Lower Anchor Cover, Screw, Seat Belt & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Adjust the front seat to its most forward position for easiest access to the front seat belt lower anchor cover (1) and the B-pillar trim.
2. Grasp the upper edge of the lower anchor cover and pull it carefully upward and outward to unsnap it from the front seat cushion outboard side shield.
3. Remove the screw (3) that secures the seat belt (2) lower anchor to the bracket (4) on the outboard side of the front seat cushion frame.
4. Remove the trim from the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, REMOVAL** .

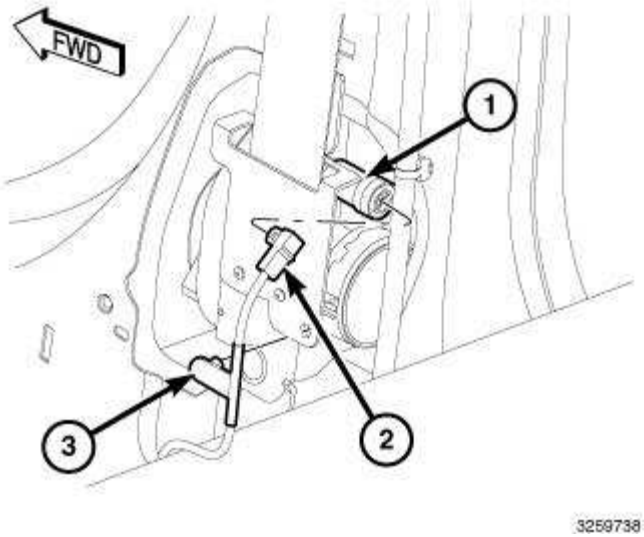

Fig. 56: Body Wire Harness Retainer, Yellow Connector & Seat Belt Tensioner Initiator
Courtesy of CHRYSLER GROUP, LLC

5. Disengage the body wire harness retainer (3) from the retractor bracket.
6. Disconnect the yellow connector (2) of the body wire harness from the seat belt tensioner initiator (1) on the retractor.

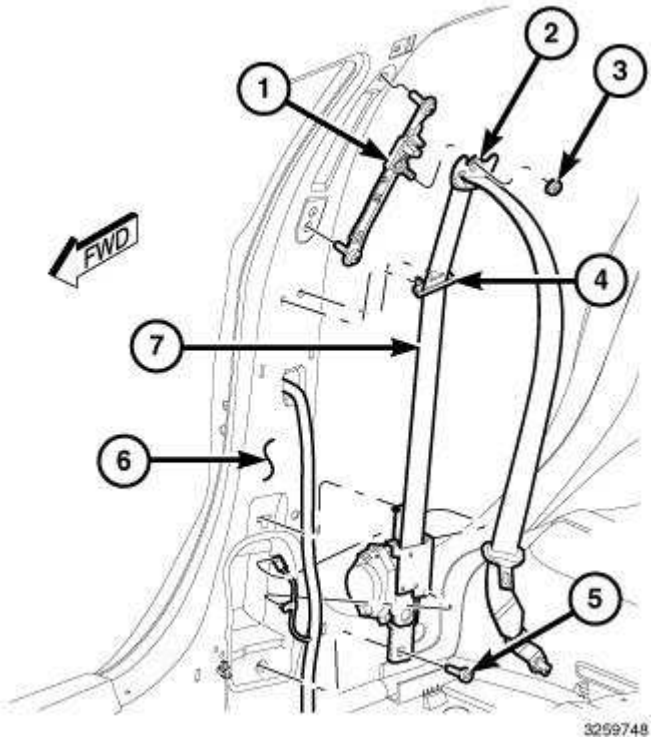

Fig. 57: Nut, Seat Belt Turning Loop, Belt Web Guide, Inner B-Pillar, Front Seat Belt, Screw & Height Adjuster
Courtesy of CHRYSLER GROUP, LLC

7. Remove the nut (3) that secures the seat belt turning loop (2) to the stud of the height adjuster (1) on the upper inner B-pillar.
8. Remove the seat belt turning loop from the height adjuster.
9. Disengage the two clips that secure the belt web guide (4) to the holes in the inner B-pillar (6).
10. Remove the screw (5) that secures the retractor bracket to the base of the inner B-pillar.
11. Disengage the T-tab on the upper retractor bracket from the T-slot in the inner B-pillar.
12. Remove the front seat belt (7) and retractor from the vehicle as a unit.

REAR CENTER

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate.

Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

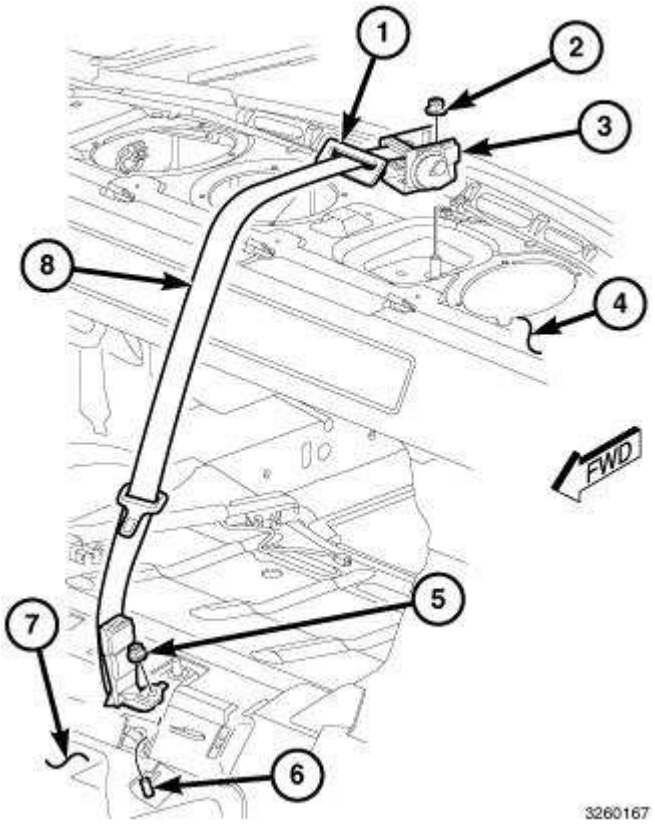

Fig. 58: Nut, Rear Center Seat Belt, Stud, Center Floor Panel, Seat Belt Trim Cover & Rear Shelf Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left outboard rear seating position buckle is integral to the center rear seating position seat belt and retractor lower anchor.

1. Disconnect and isolate the battery negative cable.
2. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, REMOVAL** .
3. Remove the nut (5) that secures the rear center seat belt (8) lower anchor and the left outboard seating position buckle anchor to the stud (6) on the center floor panel (7).
4. Remove the seat belt and buckle anchors from the stud.
5. Disengage the seat belt trim cover (1) from the rear shelf panel trim opening.
6. Remove the trim from the rear shelf panel (4). Refer to **PANEL, REAR SHELF, REMOVAL** .

7. Remove the nut (2) that secures the retractor (3) to the stud on the rear shelf panel.
8. Lift the retractor from the stud and disengage the T-tab on the retractor bracket from the T-slot in the rear shelf panel.
9. Remove the seat belt (8) and retractor from the vehicle as a unit.

REAR OUTBOARD

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

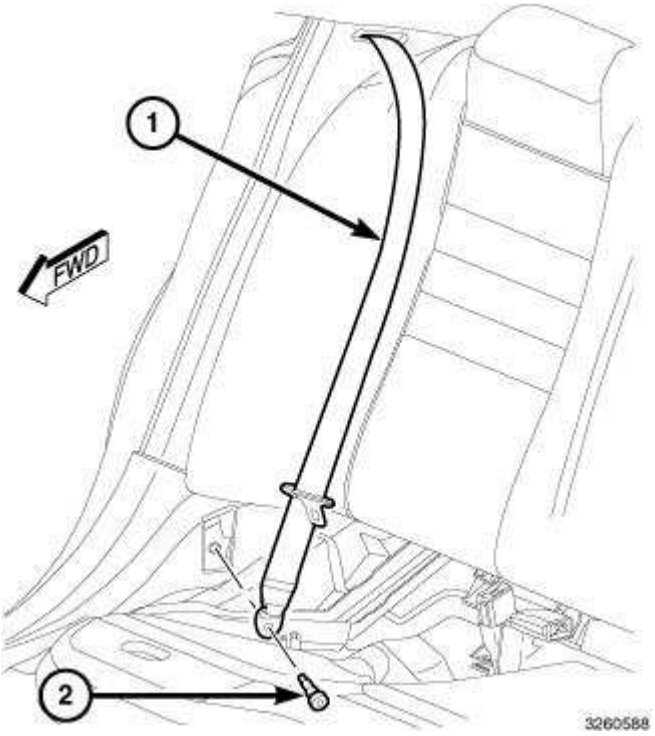

Fig. 59: Screw & Rear Outboard Seat Belt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, SECOND**

ROW, REMOVAL .

3. Remove the screw (2) that secures the rear outboard seat belt (1) to the lower inner C-pillar.

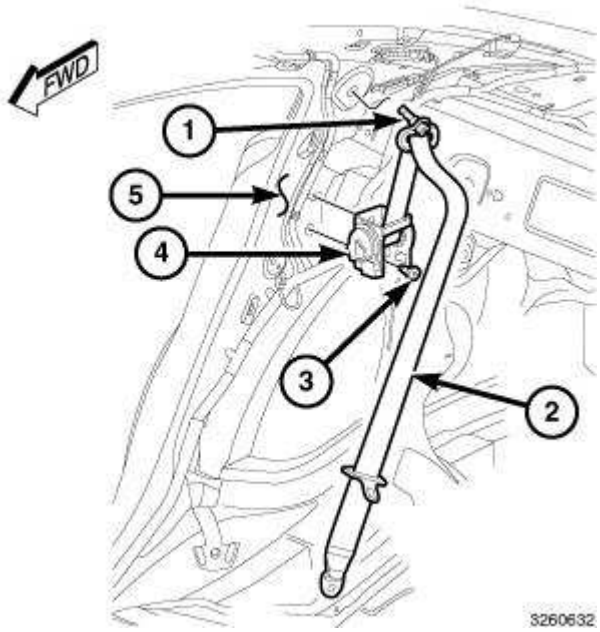

Fig. 60: Seat Belt Webbing, Screw, Seat Belt, Upper C-pillar & Retractor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the trim from the inside of the upper C-pillar (5). Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .
5. Disengage the seat belt webbing (2) and lower anchor from the seat belt opening in the upper C-pillar trim.
6. Remove the screw (1) that secures the seat belt turning loop to the upper inner C-pillar.
7. Remove the seat belt turning loop from the upper inner C-pillar.
8. Remove the screw (3) that secures the retractor (4) to the inner C-pillar.
9. Disengage the retractor T-tab from the T-slot in the inner C-pillar.
10. Remove the rear outboard seat belt and retractor from the inner C-pillar as a unit.

INSTALLATION

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper

precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt and retractor unit. The front outboard retractors also include a seat belt tensioner. If the front seat belt or retractor is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. .

NOTE: All seat belt retractors except the driver side front retractor include a switchable automatic locking mechanism. Refer to RETRACTOR, SEAT BELT, DESCRIPTION.

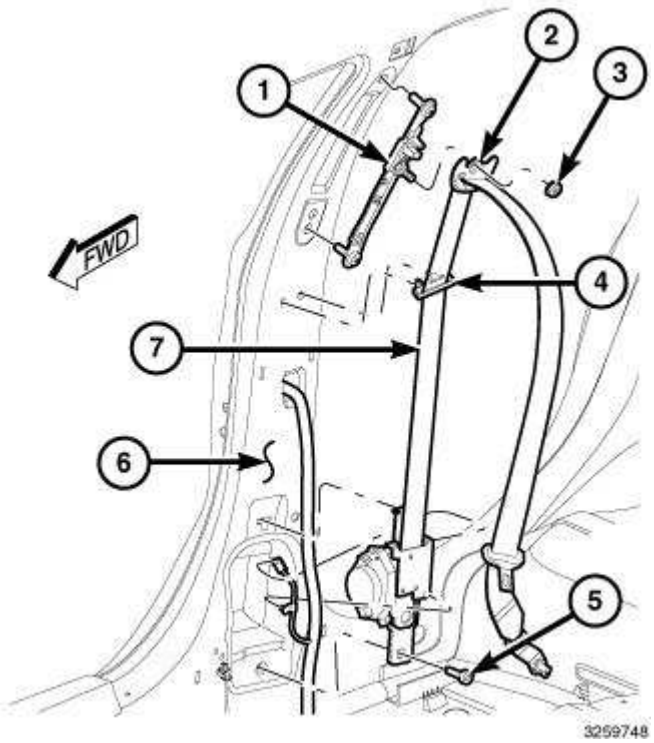

Fig. 61: Nut, Seat Belt Turning Loop, Belt Web Guide, Inner B-Pillar, Front Seat Belt, Screw & Height Adjuster
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat belt (7) and retractor into the vehicle as a unit.
2. Engage the T-tab on the upper retractor bracket into the T-slot in the inner B-pillar (6).
3. Install and tighten the screw (5) that secures the retractor bracket to the base of the inner B-pillar. Tighten the screw to 45 N.m (33 ft. lbs.).
4. Position the belt web guide (4) to the holes in the inner B-pillar and use hand pressure to press it firmly and evenly until the two clips that secure it snap into place. Be certain that the seat belt webbing between the retractor and the web guide is not twisted.
5. Position the seat belt turning loop (2) onto the stud of the height adjuster (1) on the upper inner B-pillar. Be certain that the seat belt webbing between the retractor and the turning loop is not twisted.
6. Install and tighten the nut (3) that secures the turning loop to the height adjuster. Tighten the nut to 45 N.m (33 ft. lbs.).

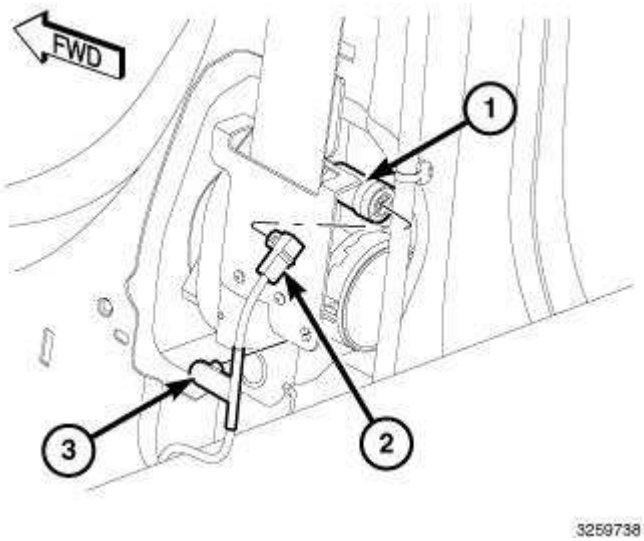

Fig. 62: Body Wire Harness Retainer, Yellow Connector & Seat Belt Tensioner Initiator
Courtesy of CHRYSLER GROUP, LLC

7. Reconnect the yellow connector (2) of the body wire harness to the seat belt tensioner initiator (1) on the retractor.
8. Engage the body wire harness retainer (3) to the retractor bracket.
9. Reinstall the trim onto the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION** .

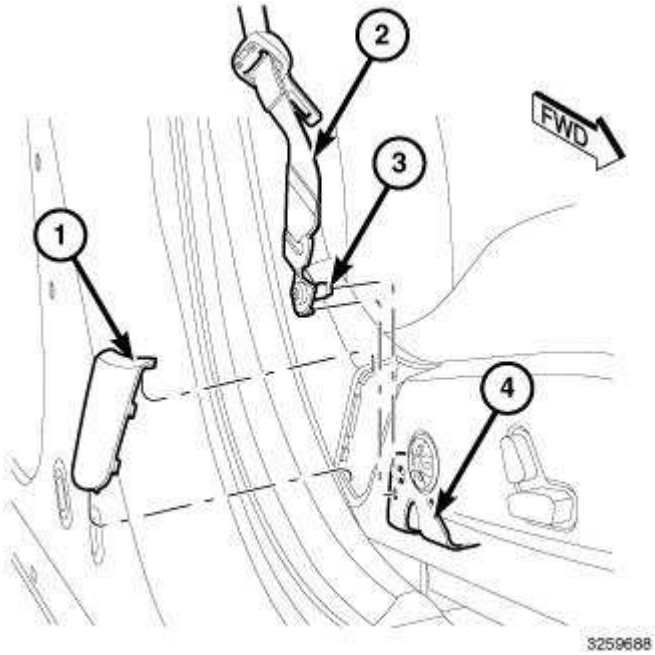

Fig. 63: Front Seat Belt Lower Anchor Cover, Screw, Seat Belt & Bracket
Courtesy of CHRYSLER GROUP, LLC

10. Position the seat belt lower anchor (2) to the mounting bracket (4) on the outboard side of the

front seat cushion frame. Be certain that the seat belt webbing between the turning loop and the lower anchor is not twisted.

11. Install and tighten the screw (3) that secures the lower anchor to the seat. Tighten the screw to 45 N.m (33 ft. lbs.).
12. Reinstall the lower anchor cover (1) onto the front seat cushion outboard side shield by seating the integral lower tab of the cover into position, then pushing inward using care to avoid breaking any of the cover tabs.
13. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

REAR CENTER

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

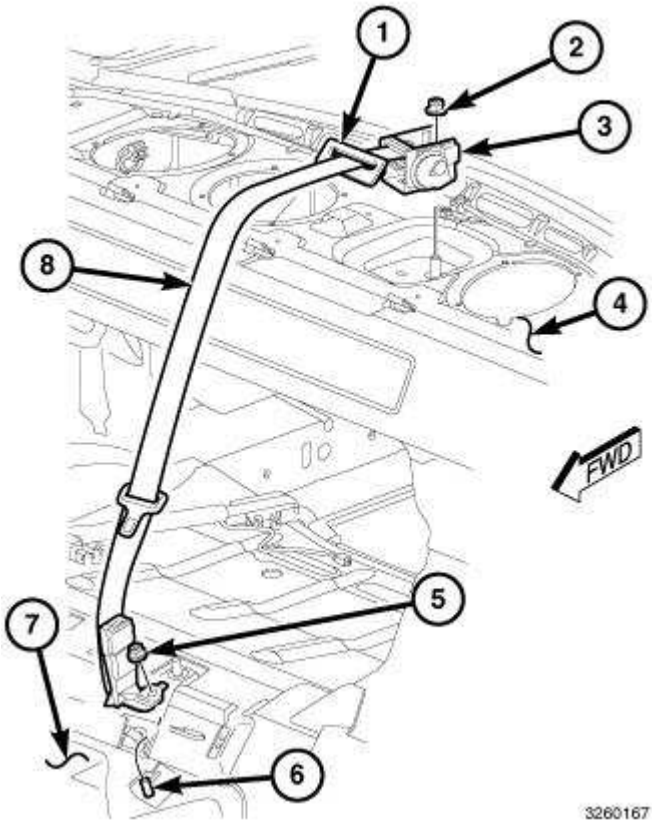

Fig. 64: Nut, Rear Center Seat Belt, Stud, Center Floor Panel, Seat Belt Trim Cover & Rear Shelf Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: The left outboard rear seating position buckle is integral to the center rear seating position seat belt and retractor lower anchor.

1. Position the center rear seat belt (8) and retractor (3) to the rear shelf panel (4) as a unit.
2. Engage the T-tab on the retractor bracket into the T-slot in the rear shelf panel and lower the retractor over the stud on the rear shelf panel.
3. Install and tighten the nut (2) that secures the retractor to the stud. Tighten the nut to 50 N.m (37 ft. lbs.).
4. Reinstall the trim onto the rear shelf panel. Refer to **PANEL, REAR SHELF, INSTALLATION** .
5. Engage the seat belt trim cover (1) into the rear shelf panel trim opening. Be certain the belt webbing is not twisted between the retractor and the trim cover.
6. Position the rear center seat belt and left outboard seating position buckle anchors over the stud (6) on the center floor panel (7).
7. Install and tighten the nut (5) that secures the seat belt and buckle anchors to the stud. Tighten the nut to 50 N.m (37 ft. lbs.).
8. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION** .

9. Reconnect the battery negative cable.

REAR OUTBOARD

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler Mopar® Parts Catalog.

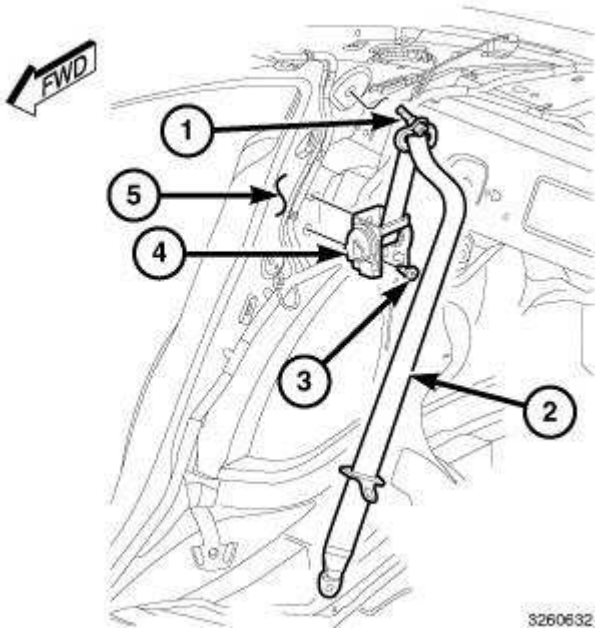

Fig. 65: Seat Belt Webbing, Screw, Seat Belt, Upper C-pillar & Retractor
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear outboard seat belt (2) and retractor (4) to the inner C-pillar (5) as a unit.
2. Engage the T-tab on the retractor bracket into the T-slot in the inner C-pillar.
3. Install and tighten the screw (3) that secures the retractor to the inner C-pillar. Tighten the screw to 32 N.m (24 ft. lbs.).
4. Position the seat belt turning loop to the inner C-pillar. Be certain the seat belt webbing between the retractor and the turning loop is not twisted.
5. Install and tighten the screw (1) that secures the seat belt turning loop to the inner C-pillar. Tighten the screw to 32 N.m (24 ft. lbs.).

6. Insert the seat belt webbing and lower anchor through the seat belt opening in the upper C-pillar trim.
7. Reinstall the trim onto the upper inner C-pillar. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION** .

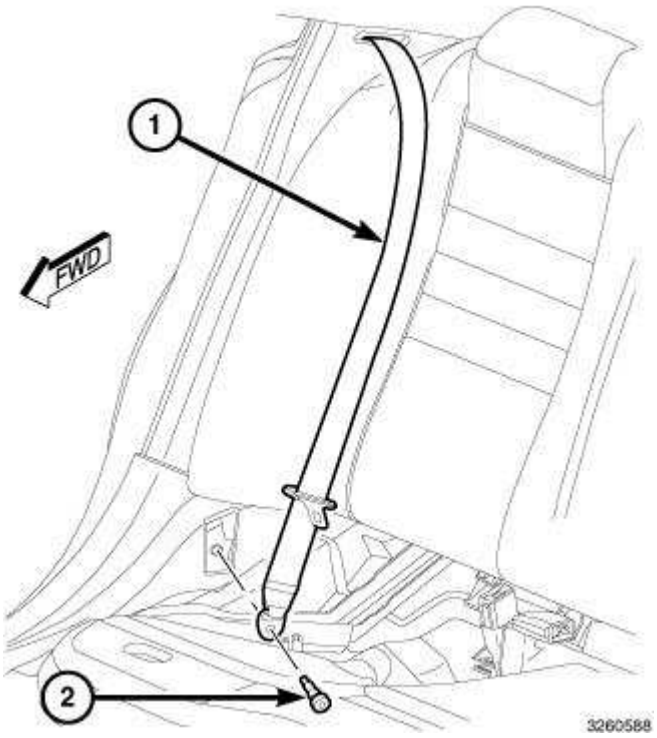

Fig. 66: Screw & Rear Outboard Seat Belt
Courtesy of CHRYSLER GROUP, LLC

8. Position the rear outboard seat belt (1) lower anchor to the lower inner C-pillar. Be certain the seat belt webbing between the turning loop and the lower anchor is not twisted.
9. Install and tighten the screw (2) that secures the seat belt lower anchor to the lower inner C-pillar. Tighten the screw to 45 N.m (33 ft. lbs.).
10. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, SECOND ROW, INSTALLATION** .
11. Reconnect the battery negative cable.

SENSOR, IMPACT

DESCRIPTION

ELECTRONIC PEDESTRIAN PROTECTION

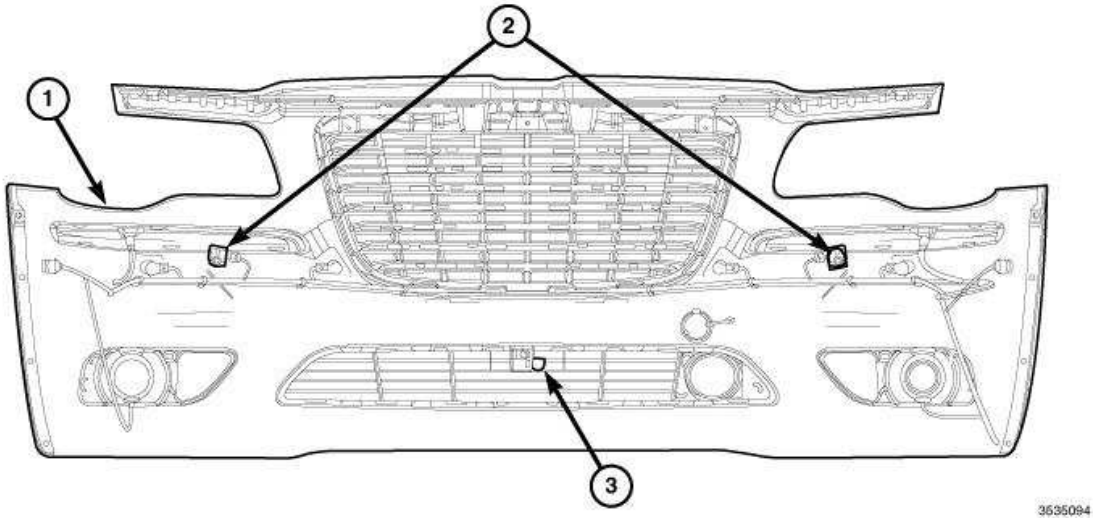

Fig. 67: Electronic Pedestrian Protection (EPP) Impact Sensors & Front Fascia
Courtesy of CHRYSLER GROUP, LLC

Electronic Pedestrian Protection (EPP) impact sensors (2 & 3) are found only in vehicles equipped with the EPP system (also known as the PedPro or Active Hood System), which is available only in vehicles manufactured for certain export markets. These sensors are mounted at the front of the vehicle to provide an additional logic input for use by the Occupant Restraint Controller (ORC) to control the pyrotechnic EPP active hood hinge actuators located on each hinge at the rear corners of the hood panel.

The EPP impact sensors are satellite acceleration-type sensors that are mounted to the back of the front fascia (1) in the front bumper area of the vehicle. The two outboard sensors are each secured by a screw to a U-nut within dedicated molded brackets integral to the back of the front fascia above the front bumper support beam. The center sensor is secured by a screw to a U-nut within a molded dedicated bracket integral to the back of the front fascia below the front bumper support beam. The sensors and the front bumper support beam are concealed behind the front fascia.

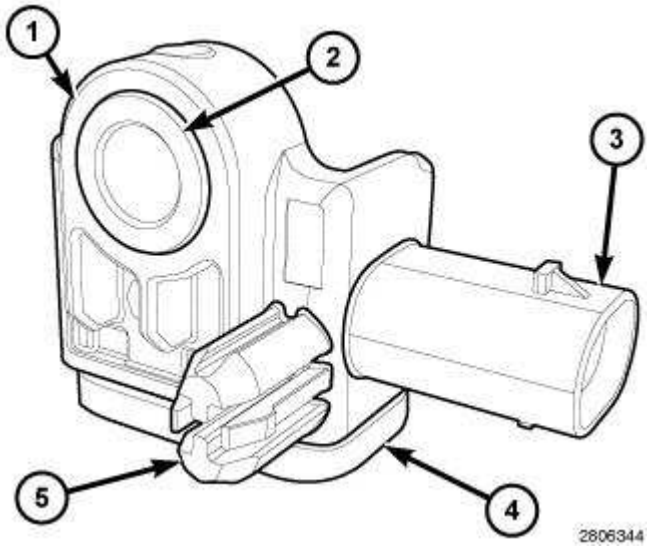

Fig. 68: Satellite Acceleration-Type Impact Sensors, Integral Connector Receptacle, Metal Sleeve & Molded Cover
Courtesy of CHRYSLER GROUP, LLC

Each sensor housing (1) has an integral connector receptacle (3), an integral locator pin with two latch features (5) and an integral mounting hole with a metal sleeve (2) to provide crush protection. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor which includes an electronic communication chip and an electronic acceleration sensor. Potting material fills the cavity and a molded cover (4) is laser welded over the cavity to seal and protect the internal electronic circuitry and components.

The EPP impact sensors are each connected to the vehicle electrical system through dedicated take outs and connectors of the headlamp and dash wire harness. These acceleration-type impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

OCCUPANT RESTRAINT

Remote or satellite impact sensors are mounted in various strategic locations of the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Sensors at the front of the vehicle provide an additional logic input for use by the Occupant Restraint Controller (ORC) to control the front airbags and the seat belt pretensioners. Sensors on each side of the vehicle provide an additional logic input for use by the ORC to control the side curtain airbags, seat airbags and the seat belt pretensioners. Two types of sensors are used in this vehicle. They are the acceleration-type and the pressure-type, which are described in further detail in the following paragraphs.

ACCELERATION TYPE

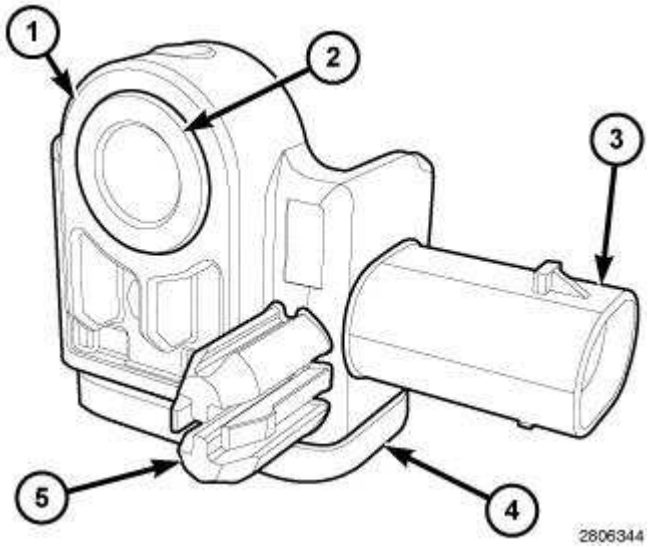

Fig. 69: Satellite Acceleration-Type Impact Sensors, Integral Connector Receptacle, Metal Sleeve & Molded Cover
Courtesy of CHRYSLER GROUP, LLC

Remote or satellite acceleration-type impact sensors (1) are mounted in various locations in the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Sensors at the front of the vehicle provide an additional logic input for use by the ORC to control the front airbags and the seat belt pretensioners. Sensors on each side of the vehicle provide an additional logic input for use by the ORC to control the side curtain airbags, the seat belt pretensioners and the seat (also known as pelvic and thorax) airbags.

Although the front and side acceleration-type impact sensors are similar in appearance and construction, they may not be interchangeable. The front impact sensors may monitor acceleration forces on a different axis than those monitored by the side impact sensors. Each sensor is secured with a single screw to its mounting location. The front sensors are located on the back of each vertical support member of the headlamp mounting cross member between the cooling module and the front lamp unit. A side sensor is located near the base of each inner B-pillar and near the belt line of each C-pillar and concealed behind the interior trim.

Each sensor housing has an integral connector receptacle (3), an integral locator pin with two latch features (5), and an integral mounting hole with a metal sleeve (2) to provide crush protection. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor which includes an electronic communication chip and an electronic acceleration sensor. Potting material fills the cavity and a molded cover (4) is laser welded over the cavity to seal and protect the internal electronic circuitry and components.

The front impact sensors are each connected to the vehicle electrical system through dedicated take outs and connectors of the headlamp and dash wire harness, while the side impact sensors are connected through dedicated take outs and connectors of the body wire harness.

The acceleration-type impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

PRESSURE TYPE

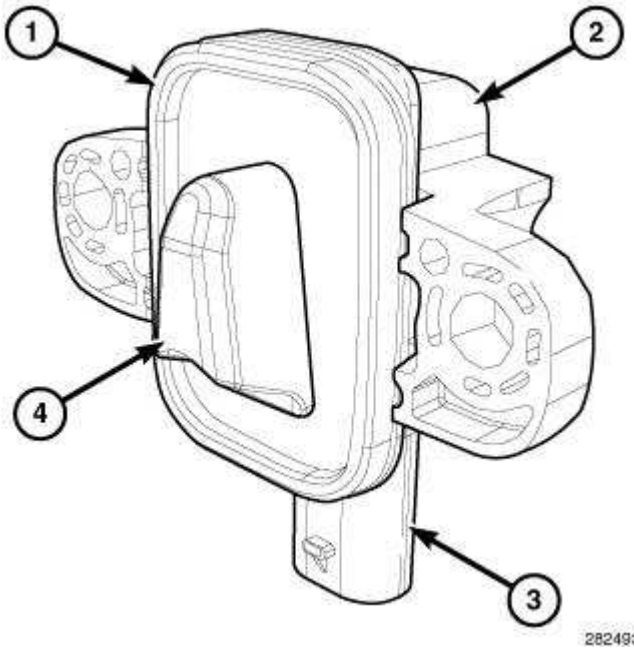

Fig. 70: Sensors, Resilient Gasket, Connector Receptacle & Water Shield
Courtesy of CHRYSLER GROUP, LLC

Two pressure-type front door side impact sensors (2) are used on this vehicle, one each for the left and right sides of the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Each side sensor is secured with two screws and is sealed by a resilient gasket (1) to the front door hardware module carrier on the front door inner panel. The sensors are concealed behind the front door trim panel within the passenger compartment.

The right and left front door side impact sensors are identical in construction and calibration. The impact sensor housing has an integral connector receptacle (3), two integral mounting tabs, and an integral hood-like water shield (4). The water shield extends through a hole in the front door module carrier into the interior of the door cavity and protects the sensor orifice from contamination. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor, which includes an electronic communication chip and the pressure sensor.

The housing cavity is filled with a potting material to seal and protect the internal electronic circuitry and components. A label on the sensor has a directional arrow and the word **down** imprinted upon it to provide verification of the correct sensor orientation in the vehicle. The pressure-type side impact sensors are each connected to the vehicle electrical system through a dedicated take out and connector of the front door wire harness.

These pressure-type front door side impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

OPERATION

ELECTRONIC PEDESTRIAN PROTECTION

The acceleration-type Electronic Pedestrian Protection (EPP) impact sensors are electronic accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microprocessor in the Occupant Restraint Controller (ORC).

The ORC microprocessor continuously monitors all of the EPP system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) then sends electronic messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to control the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through the dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the voltage in the sensor plus circuit.

The hard wired circuits between the acceleration-type EPP impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls or communication between other modules and devices that provide features of the EPP system. The most reliable, efficient, and accurate means to diagnose the impact sensors or the electronic controls and communication related to acceleration-type EPP impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

OCCUPANT RESTRAINT

ACCELERATION-TYPE

The acceleration-type impact sensors are electronic accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microprocessor in the Occupant Restraint Controller (ORC).

The ORC microprocessor continuously monitors all of the passive restraint system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) and controls the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the voltage in the sensor plus circuit.

The hard wired circuits between the impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls or communication between other modules and devices that provide some features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the acceleration-type impact sensors or the electronic controls and communication related to impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PRESSURE-TYPE

The pressure-type front door side impact sensors recognize a side impact in the front door area by monitoring changes in pressure within the front door cavity. A sudden pressure wave is created as the door collapses during an impact event. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microprocessor in the Occupant Restraint Controller (ORC).

The ORC microprocessor continuously monitors all of the passive restraint system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) and controls the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the current in the sensor plus circuit.

The hard wired circuits between the pressure-type front door side impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls or communication between other modules and devices that provide features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the pressure-type impact sensors or the electronic controls and communication related to impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

ELECTRONIC PEDESTRIAN PROTECTION

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Electronic Pedestrian Protection (EPP) system impact sensor, as it can damage the impact sensor or affect its calibration. The EPP impact sensor enables the system to deploy the EPP system active hood hinge actuators. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper EPP active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged

Electronic Pedestrian Protection (EPP) system impact sensor. Whether the EPP system has been deployed or the vehicle has had a front end collision without EPP system deployment, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.

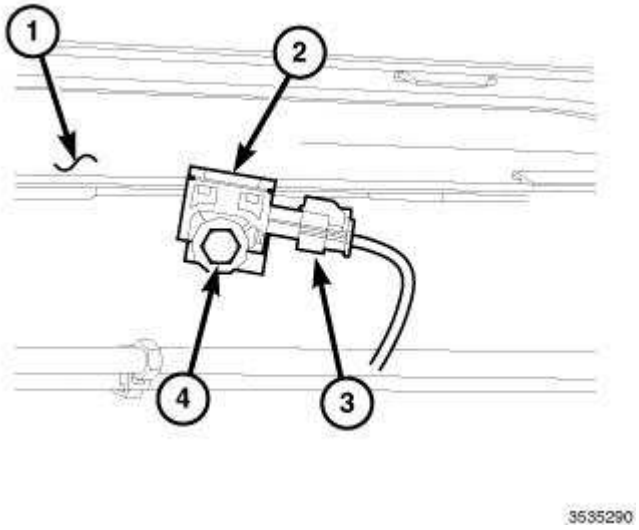

Fig. 71: Outboard Sensors
Courtesy of CHRYSLER GROUP, LLC

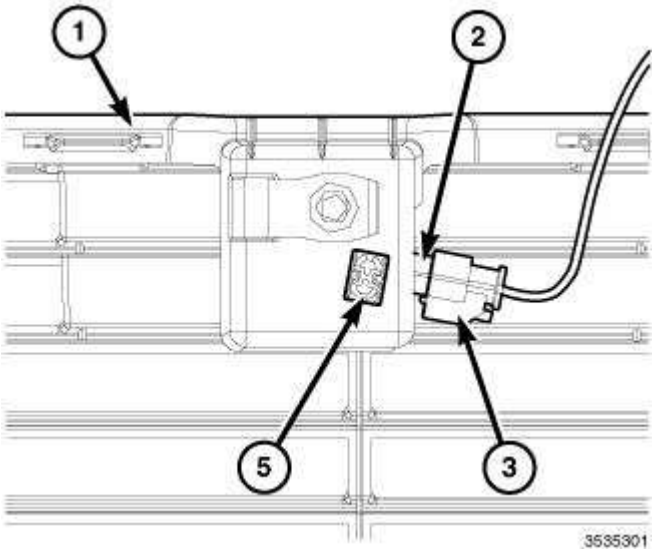

Fig. 72: Center Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the front fascia (1) from the vehicle. Refer to **FASCIA, FRONT, REMOVAL** .
3. Disconnect the front fascia wire harness connector (3) from the Electronic Pedestrian Protection

(EPP) center or outboard impact sensor (2) connector receptacle.

4. Remove the screw (4) that secures the EPP impact sensor to the U-nut within the molded bracket integral to the back of the fascia.
5. Disengage the latch features of the integral locator pin (5) on the EPP impact sensor from the locator hole in the fascia bracket.
6. Remove the EPP impact sensor from the front fascia.

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the front impact sensor, as it can damage the impact sensor or affect its calibration. The front impact sensor enables the system to deploy the front Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper front SRS component deployment.

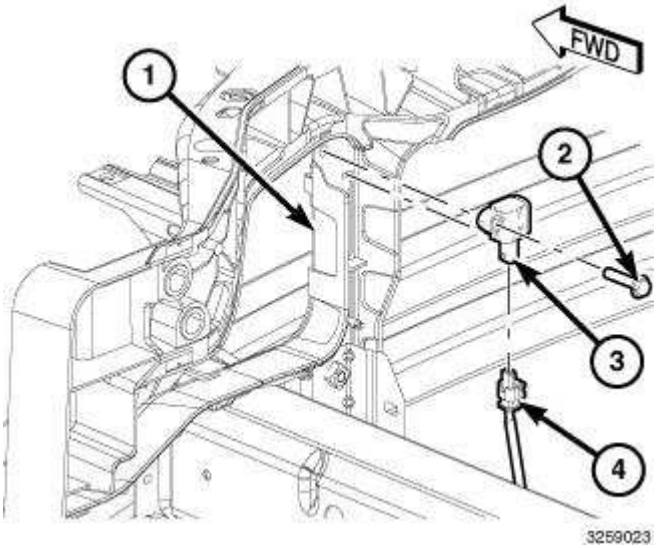

Fig. 73: Front End Module (FEM) Structural Support, Wire Harness Connector, Screw & Left Front Impact Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front and the side impact sensors are NOT interchangeable.

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. For the left hand side only, remove the fastener that secures the engine air cleaner assembly to the Front End Module (FEM) structural support (1) and move the air cleaner assembly far enough to access the impact sensor connector and fastener on the back of the vertical support member between the cooling module and the front lamp unit opening.
3. Disconnect the headlamp and dash wire harness connector (4) from the right or left front impact sensor (3) connector receptacle.
4. Remove the screw (2) that secures the sensor to the back of the FEM vertical support member.
5. Disengage the locating pin integral to the sensor from the locating hole in the FEM vertical support member.
6. Remove the right or left front impact sensor from the vehicle.

SIDE - B-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

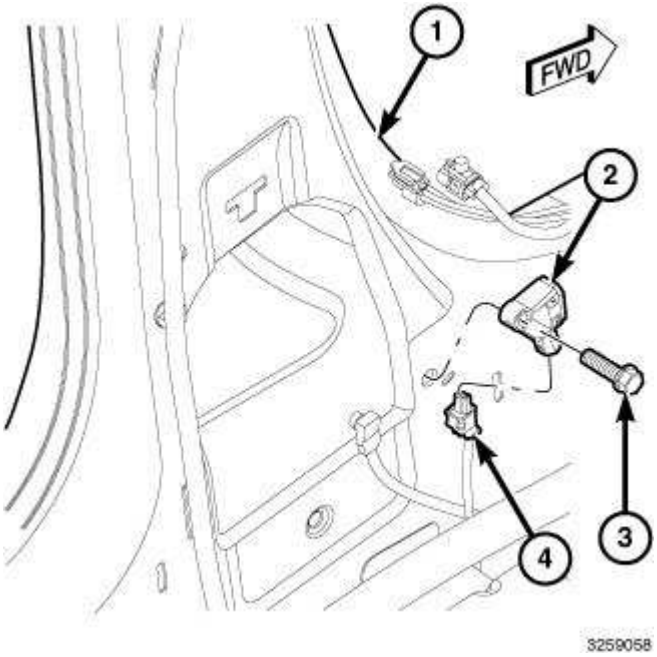

Fig. 74: Lower B-pillar, Body Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Adjust the driver or passenger side front seat to its most forward position for easiest access to the B-pillar trim.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the trim from the inside of the lower B-pillar (1). Refer to **PANEL, B-PILLAR TRIM, REMOVAL** .
4. Disconnect the body wire harness connector (4) from the side impact sensor (2) connector receptacle.
5. Remove the screw (3) that secures the sensor to the lower B-pillar.
6. Gently pry the sensor away from the inner B-pillar far enough to disengage the latch features of the locator pin from the locator hole.
7. Remove the sensor from the inner B-pillar.

SIDE - C-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

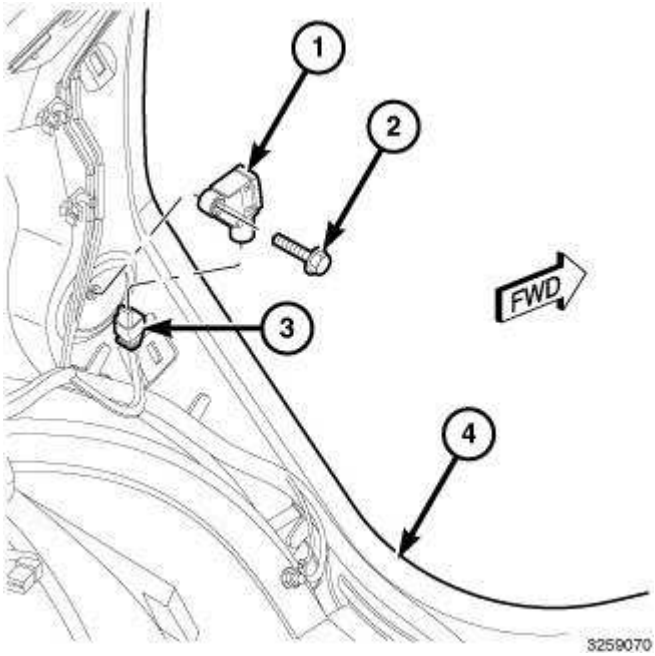

Fig. 75: Lower C-pillar, Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the trim from the inside of the lower C-pillar (4). Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .
3. Disconnect the body wire harness connector (3) from the side impact sensor (1) connector receptacle.
4. Remove the screw (2) that secures the sensor to the inner C-pillar.
5. Gently pry the sensor away from the inner C-pillar far enough to disengage the latch features of the locator pin from the locator hole.
6. Remove the sensor from the inner C-pillar.

SIDE - FRONT DOOR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or

instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

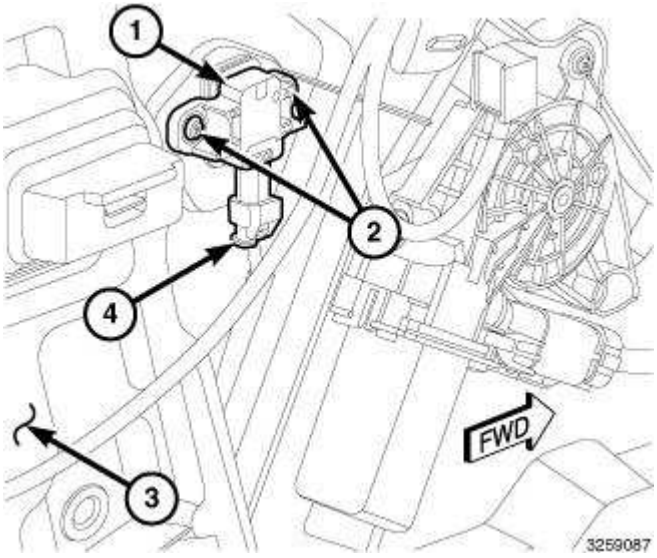

Fig. 76: Front Door Wire Harness Connector, Side Impact Sensor, Two Screws & Front Door Hardware Module Carrier Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the trim panel from the inside of the right or left front door. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Disconnect the front door wire harness connector (4) from the side impact sensor (1) connector receptacle.
4. Remove the two screws (2) that secure the side impact sensor to the front door hardware module carrier panel (3).
5. Remove the side impact sensor from the vehicle.

INSTALLATION

ELECTRONIC PEDESTRIAN PROTECTION

WARNING: To avoid serious or fatal injury on vehicles equipped with the Electronic Pedestrian Protection (EPP) system, disable the system before attempting any EPP system component diagnosis or service. With the ignition switch in the OFF position, disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the EPP system. Failure to take the proper precautions could result in accidental active hood hinge actuator deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Electronic Pedestrian Protection (EPP) system impact sensor, as it can damage the impact sensor or affect its calibration. The EPP impact sensor enables the system to deploy the EPP system active hood hinge actuators. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper EPP active hood hinge actuator deployment.

NOTE: The following procedure is for replacement of an ineffective or damaged Electronic Pedestrian Protection (EPP) system impact sensor. Whether the EPP system has been deployed or the vehicle has had a front end collision without EPP system deployment, review the recommended procedures for Service After A Pedestrian Protection Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.

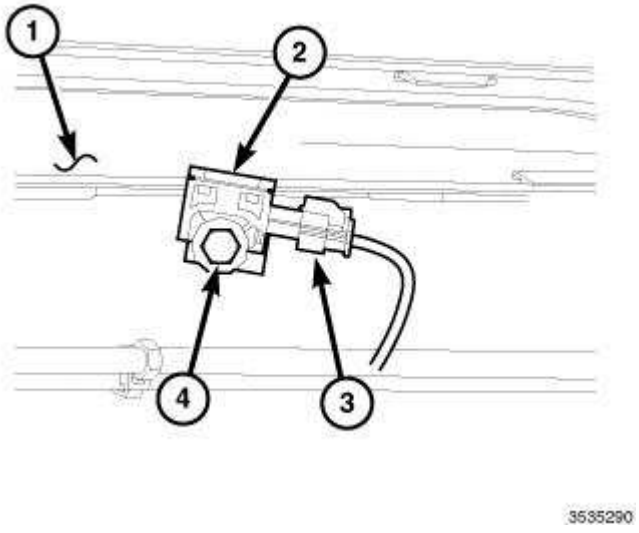

Fig. 77: Outboard Sensors
Courtesy of CHRYSLER GROUP, LLC

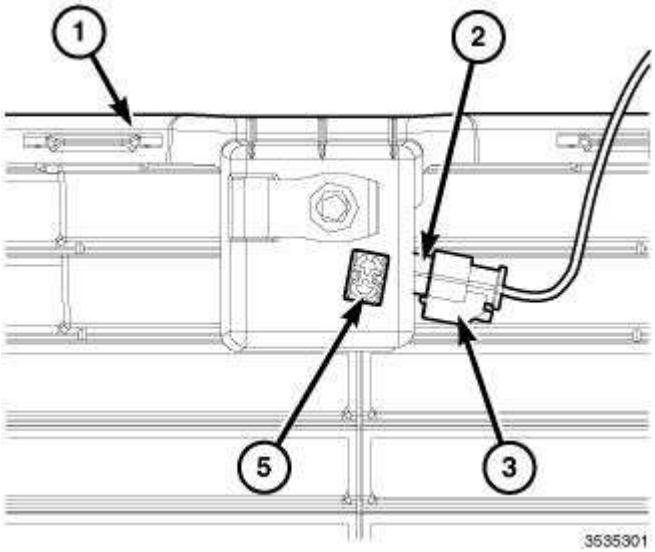

Fig. 78: Center Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Carefully inspect the U-nut for the center or outboard Electronic Pedestrian Protection (EPP) impact sensor to be certain it is good condition and is properly installed in the molded bracket integral to the back of the front fascia (1).
2. Carefully position the EPP impact sensor (2) to the molded bracket. Be certain that the latches of the anti-rotation pin on the back of the sensor are engaged in the clearance hole of the bracket.
3. Install and tighten the screw (4) that secures the sensor to the U-nut in the molded bracket. Tighten the screw to 8 N.m (70 in. lbs.).
4. Reconnect the front fascia wire harness connector (3) to the EPP impact sensor connector receptacle.
5. Reinstall the front fascia onto the vehicle. Refer to **FASCIA, FRONT, INSTALLATION** .
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any EPP system component. Refer to **STANDARD PROCEDURE**.

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the front impact

sensor, as it can damage the impact sensor or affect its calibration. The front impact sensor enables the system to deploy the front Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper front SRS component deployment.

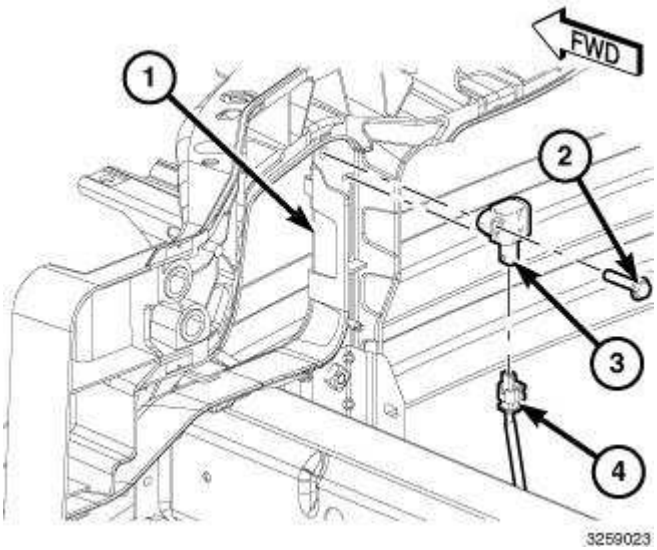

Fig. 79: Front End Module (FEM) Structural Support, Wire Harness Connector, Screw & Left Front Impact Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front and the side impact sensors are NOT interchangeable.

1. Position the right or left front impact sensor (3) to the back of the Front End Module (FEM) vertical support member (1) between the cooling module and the front lamp unit opening.
2. Be certain to engage the locating pin integral to the sensor into the locating hole in the FEM vertical support member.
3. Install and tighten the screw (2) that secures the sensor to the FEM vertical support member. Tighten the screw to 11 N.m (97 in. lbs.).
4. Reconnect the headlamp and dash wire harness connector (4) to the sensor connector receptacle.
5. For the left hand side only, position the engine air cleaner assembly to the FEM structural support and reinstall the fastener that secures the air cleaner assembly.
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SIDE - B-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable

the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

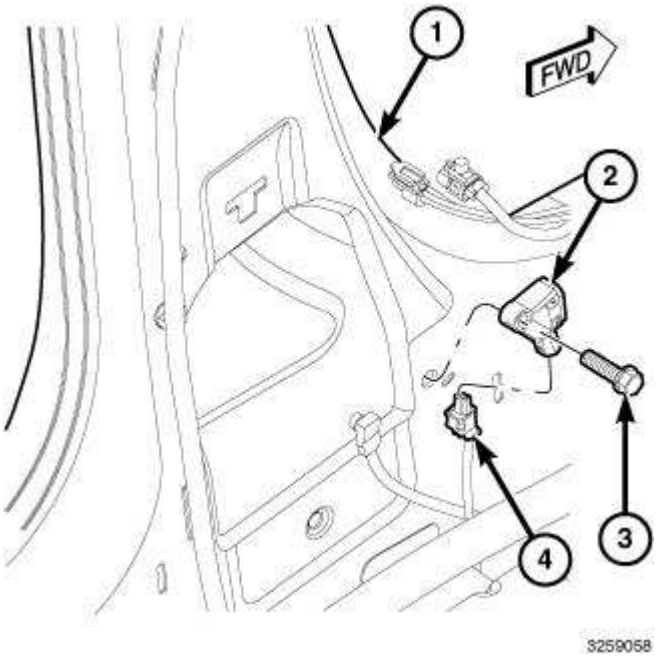

Fig. 80: Lower B-pillar, Body Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the side impact sensor (2) onto the inner B-pillar (1). Be certain that the locator pin on the sensor is fully engaged in the locator hole of the inner B-pillar.
2. Install and tighten the screw (3) that secures the sensor to the inner B-pillar. Tighten the screw to 11 N.m (97 in. lbs.).
3. Reconnect the body wire harness connector (4) to the sensor connector receptacle.
4. Reinstall the lower trim onto the inside of the B-pillar. Refer to **PANEL, B-PILLAR TRIM, INSTALLATION** .
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS

component. Refer to **STANDARD PROCEDURE**.

SIDE - C-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

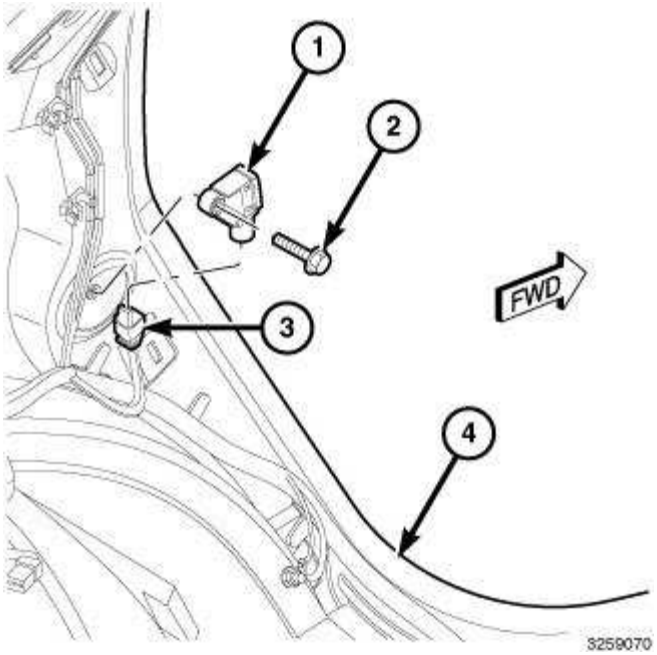

Fig. 81: Lower C-pillar, Wire Harness Connector, Side Impact Sensor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the side impact sensor (1) onto the inner C-pillar (4). Be certain that the locator pin on the sensor is fully engaged in the locator hole of the inner C-pillar.
2. Install and tighten the screw (2) that secures the sensor to the inner C-pillar. Tighten the screw to 11 N.m (97 in. lbs.).

3. Reconnect the body wire harness connector (3) to the sensor connector receptacle.
4. Reinstall the trim onto the inside of the C-pillar. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION** .
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SIDE - FRONT DOOR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

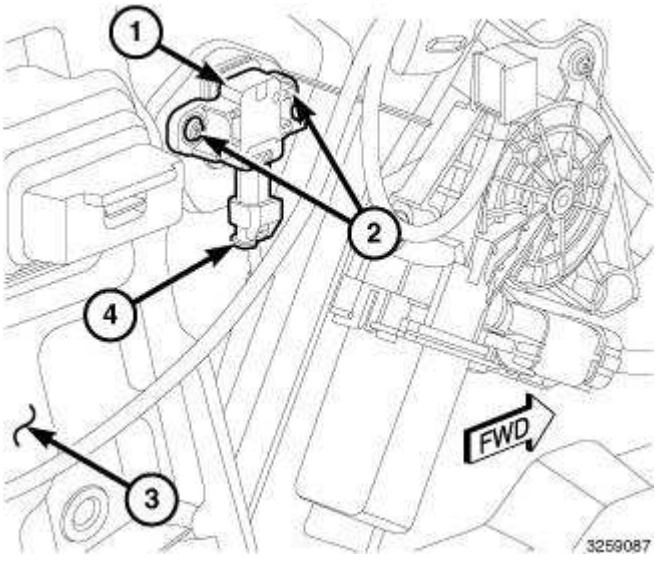

Fig. 82: Front Door Wire Harness Connector, Side Impact Sensor, Two Screws & Front Door Hardware Module Carrier Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Be certain that the gasket between the pressure-type side impact sensor and the front door hardware module carrier panel is in good condition and positioned on the back of the sensor. There MUST be a good seal between the sensor and the hardware module carrier panel for the sensor to operate properly. If the gasket is in poor condition, replace the sensor.**

1. Position the side impact sensor (1) to the right or left front door hardware module carrier panel (3). When the sensor is correctly positioned, the sensor connector receptacle will be pointed toward the bottom of the door.
2. Install and tighten the two screws (2) that secure the side impact sensor to the door hardware module carrier panel. Tighten the screws to 2.4 N.m (21 in. lbs.).
3. Reconnect the front door wire harness connector (4) to the sensor connector receptacle.
4. Reinstall the trim panel onto the inside of the right or left front door. Refer to **PANEL, DOOR TRIM, INSTALLATION** .
5. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SENSOR, OCCUPANT DETECTION

DESCRIPTION

DESCRIPTION

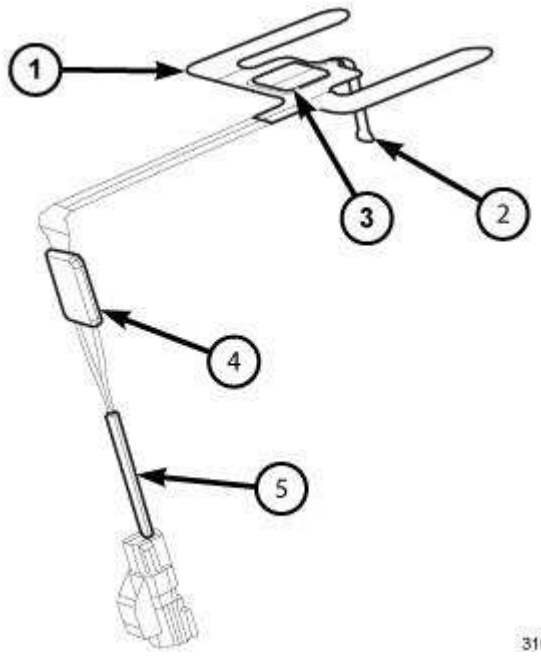

Fig. 83: Plastic Sensor Mat, Locator Tab, Adhesive Patch, Adhesive Block & Connector
Courtesy of CHRYSLER GROUP, LLC

An Occupant Detection Sensor (ODS) is located directly below the passenger side front seat cushion

trim cover. This sensor provides information to the Occupant Restraint Controller (ORC) used for control of the passenger belt alert feature.

The ODS consists of a flexible clear plastic sensor mat (1) containing several resistive membrane, force sensing resistor cells that is secured by either a locator tab (2) and an adhesive patch (3) or by just the adhesive patch to the top surface of the seat cushion foam. The locator tab is still present, but is not used on ventilated seat applications. The adhesive patches on either ODS are a one time only material and cannot be reactivated or reused if removed.

A short, two-conductor pigtail wire and connector (5) connect the sensor to the vehicle electrical system through a dedicated take out and connector of the seat wire harness. A hot melt adhesive block (4) encapsulates and protects the connections between the electrical conductors in the tail of the sensor mat and the pigtail wires as well as a diagnostic resistor.

The ODS cannot be adjusted or repaired, and must be replaced if damaged or ineffective.

OPERATION

OPERATION

The Occupant Detection Sensor (ODS) acts as a simple switch to detect loads placed upon the passenger side front seat cushion. The sensor circuits are connected to and monitored by the Occupant Restraint Controller (ORC) whenever the ignition switch is in the ON position. The ORC uses an algorithm logic in monitoring the changing states of the sensor input to determine whether the seat cushion load is static or dynamic.

The ORC microprocessor continuously monitors all of the Supplemental Restraint System (SRS) electrical circuits to determine the system status and readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC). However, because the ODS input is only used for control of the passenger belt alert feature, which has no effect on SRS component features or functions, the airbag indicator is **NOT** illuminated in response to a detected ODS circuit fault.

The ODS receives source current and a clean ground through dedicated sensor plus and minus circuits from the ORC. The ORC then sends the appropriate sensor status information to the Body Control Module (BCM) (also known as the Common Body Controller/CBC), which uses this information as an additional logic input used for control of the seat belt indicator and the passenger belt alert feature in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC).

The hard wired circuits between the ODS and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ODS or the electronic controls and communication between other modules and devices that provide some features of the passenger belt alert feature. The most reliable, efficient, and accurate means to diagnose the ODS or the electronic controls and communication related to passenger belt alert feature operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

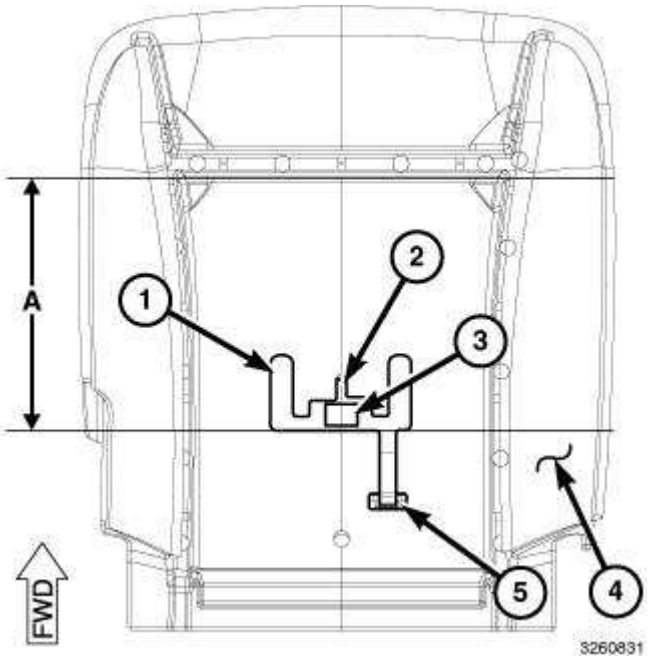

Fig. 84: Occupant Detection Sensor (ODS), Clearance Hole, Seat Cushion Foam, Locator Hole & Adhesive Patch
Courtesy of CHRYSLER GROUP, LLC

1. Position the passenger side front seat to its most forward position for easiest access to the front seat mounting hardware.
2. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the passenger side front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Remove the trim from the front seat cushion foam and frame. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** .
5. If the vehicle is so equipped, remove the heater mat from the seat cushion foam. Refer to **PAD, HEATER, REMOVAL** .
6. Reach under the back of the front seat cushion frame to access and disconnect the Occupant Detection Sensor (ODS) (1) pigtail wire connector from the seat wire harness.
7. Disengage the ODS hot melt block and pigtail wire from the clearance hole (5) near the back of

the seat cushion foam (4).

8. Except on vehicles with the ventilated seat option, disengage the ODS locator tab from the locator hole (2) near the center of the seat cushion foam.
9. Disengage the adhesive patch (3) of the ODS from the top surface of the seat cushion foam.
10. Remove the ODS from the seat cushion.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: When handling a new Occupant Detection Sensor (ODS), it should never be bent, creased, torn, cut or abraded. The ODS should not be handled with or come into contact with hard or sharp-edged tools or objects. Do not allow the ODS to drop more than 2 meters (6.5 feet). Prior to installation, do not sit on, stand on or place boxes, tools or any other foreign object on the ODS. If the ODS adhesive patches become inadvertently adhered to any seat materials or foreign objects prior to proper positioning on the seat cushion, the ODS must be scrapped and replaced with a new unit. Do not modify the seat foam or trim materials of a seat that contains an ODS. Failure to observe these cautions may result in an inoperative ODS, or an ODS that provides inaccurate inputs to the Occupant Restraint Controller (ORC).

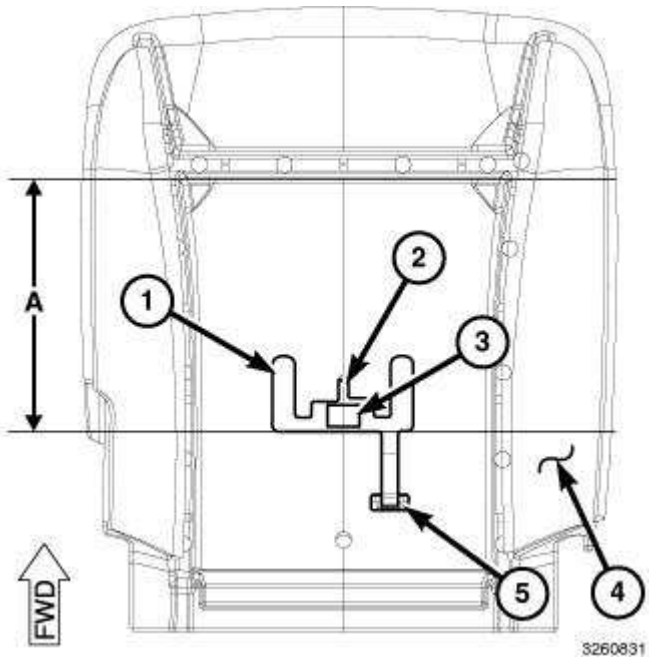

Fig. 85: Occupant Detection Sensor (ODS), Clearance Hole, Seat Cushion Foam, Locator Hole & Adhesive Patch
Courtesy of CHRYSLER GROUP, LLC

1. Except on vehicles equipped with the ventilated seat option, insert the locator tab of the Occupant Detection Sensor (ODS) mat (1) into the locator hole (2) near the center of the seat cushion foam (4) and push the tab all the way through the foam. On vehicles with the ventilated seat option, leave the locator tab flat on the seat cushion and pointed forward in the vehicle.
2. Position the sensor mat on the seat cushion with the two mat sensor cell branches aligned with the sides of the seat and the rear edge of the mat positioned 124 millimeters (4.88 inches) (Distance A) rearward from the back edge of the forward crimp channel in the seat cushion foam.

CAUTION: The adhesive used to secure the ODS to the seat is heat activated and requires that both the adhesive and the material it is applied to be ideally between 21° and 38° C (between 70° and 100° F). Application of the ODS to surfaces below 10° C (50° F) is not recommended as the adhesive becomes too firm to readily adhere. Do not touch or allow the adhesive patches to contact any foreign materials with the release paper removed. Do not attempt to add adhesive materials to the ODS.

3. Peel the release paper off of the adhesive patch (3) on the underside of the ODS mat.
4. Apply hand pressure (0.8 bar or 12 psi) over the adhesive patch of the ODS mat for at least four seconds to activate and adhere the adhesive to the seat cushion foam.
5. Route the ODS pigtail wires through the clearance hole (5) near the back of the seat cushion foam and insert the hot melt block into the recess.
6. Reach under the back of the front seat cushion frame to access, route and reconnect the ODS

pigtail wire and connector to the seat wire harness.

7. If the vehicle is so equipped, reinstall the heater mat onto the seat cushion foam. Refer to **PAD, HEATER, INSTALLATION** .
8. Reinstall the trim onto the front seat cushion foam and frame. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** .
9. Reinstall the passenger side front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
10. Reconnect the battery negative cable.

SENSOR, SEAT TRACK POSITION

DESCRIPTION

DESCRIPTION

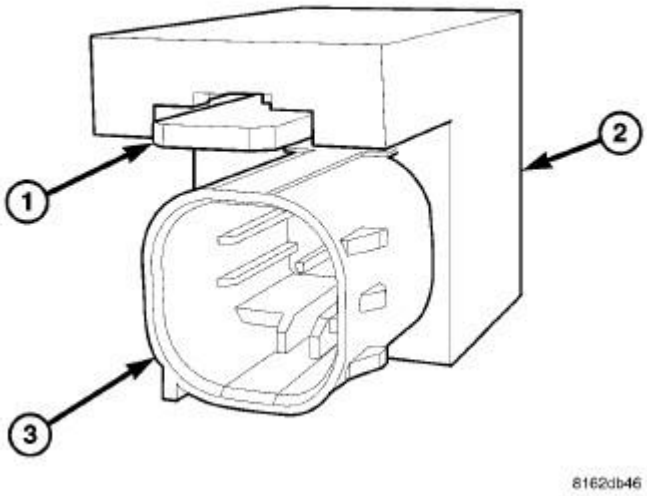

Fig. 86: Identifying Seat Track Position Sensor
Courtesy of CHRYSLER GROUP, LLC

The Seat Track Position Sensor (STPS) (2) is a Hall Effect-type sensor used on some vehicles. This sensor consists of a Hall Effect Integrated Circuit (IC) chip encased in potting material within a cavity of the molded plastic sensor housing.

The sensor housing has a mounting slot containing an integral latch feature (1) and slides and latches onto a stamped metal blade-type bracket located on the inboard side of one of the upper seat adjuster tracks near the rear of the driver side or passenger side front seat. A molded connector receptacle (3) integral to the sensor housing is connected to the vehicle electrical system through a connector and take out of the front seat wire harness beneath the front seat cushion frame.

The STPS cannot be adjusted or repaired and, if ineffective or damaged, the entire sensor must be

replaced.

OPERATION

OPERATION

The seat track position sensor is designed to provide a seat position data input to the Occupant Restraint Controller (ORC) indicating whether the driver or passenger side front seat is in a full forward or a not full forward position. The ORC uses this data as an additional logic input for use in determining the appropriate deployment force to be used when deploying the multistage driver or passenger airbag.

The seat track position sensor receives a nominal five volt supply from the ORC. The sensor communicates the seat position by modulating the voltage returned to the ORC on a sensor data circuit. The ORC also monitors the condition of the sensor circuits and will store a Diagnostic Trouble Code (DTC) for any fault that is detected. The ORC sends messages over the CAN data bus to control the illumination of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC).

The hard wired circuits between the seat track position sensor and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the seat track position sensor or the electronic controls and communication between other modules and devices that provide features of the Supplemental Restraint System (SRS). The most reliable, efficient, and accurate means to diagnose the seat track position sensor or the electronic controls and communication related to seat track position sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

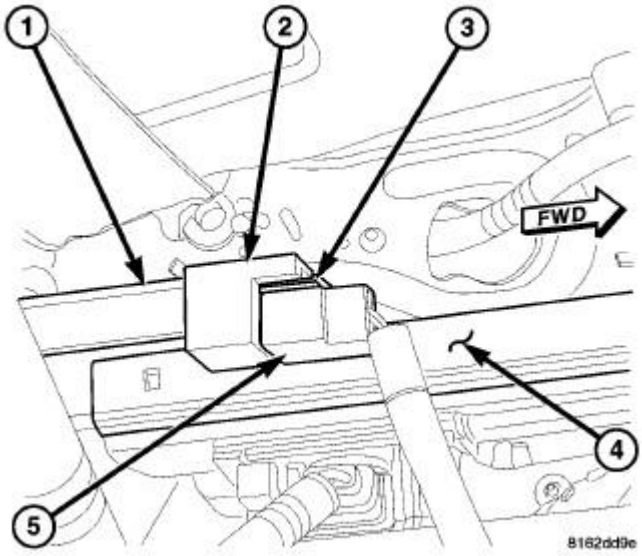

Fig. 87: Seat Track Position Sensor On Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable. Wait two minutes for the system capacitor to discharge before further service.
2. Reach under the rear edge of the front seat cushion to access the seat track position sensor (2) on a bracket (1) located on the inboard side near the rear of one of the upper seat tracks (4).
3. Using a small screwdriver, hold the latch feature (3) depressed while sliding the connector end of the sensor off of the bracket.
4. Disconnect the seat wire harness connector (5) from the sensor connector receptacle.
5. Remove the sensor from under the front seat.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

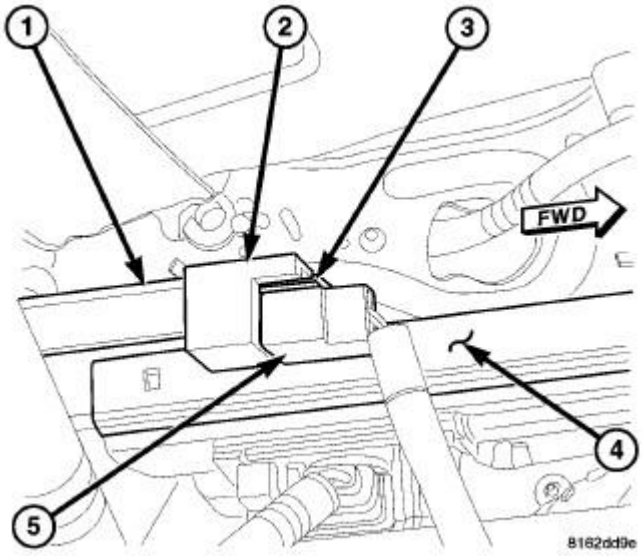

Fig. 88: Seat Track Position Sensor On Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Reach under the rear edge of the front seat cushion to reconnect the seat wire harness connector (5) to the seat track position sensor (2) connector receptacle. Be certain that the latch on the connector is fully engaged.
2. Align the open end of the sensor mounting slot to the blade of the sensor bracket (1) located on the inboard side near the rear of one of the upper seat tracks (4).
3. Push the sensor firmly onto the bracket until the latch feature (3) snaps into place with an audible click.
4. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SWITCH, SEAT BELT

DESCRIPTION

DESCRIPTION

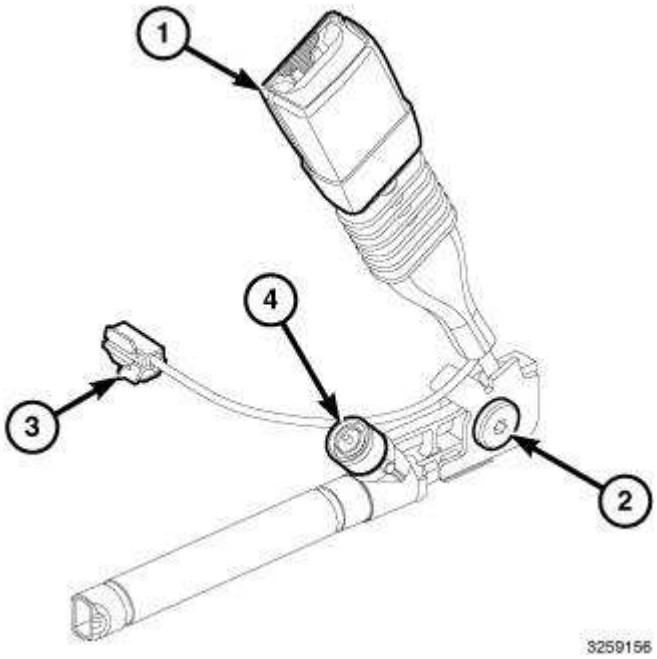

Fig. 89: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

The driver and passenger side front seat belt switches for this vehicle are actually Hall Effect-type sensors. These sensors consist of a fixed-position, Hall Effect Integrated Circuit (IC) chip and a small permanent magnet that is integral to each front seat belt buckle (1). The front seat belt buckles are located on a molded plastic scabbard and secured by a screw (2) to the inboard side of each front seat cushion frame so that the buckles travel with the seat.

The front seat belt switches are connected to the vehicle electrical system through a two-lead pigtail wire and connector (3) on the front seat belt buckle-half, which is connected to a wire harness connector and take out of the seat wire harness. A one kilohm diagnostic resistor is connected in parallel with the IC where the two pigtail wire leads connect to the IC pins.

The seat belt switches cannot be adjusted or repaired and, if ineffective or damaged, the entire front seat belt buckle-half unit must be replaced.

OPERATION

OPERATION

The front seat belt switches are designed to control a hard wired sense input to the Occupant Restraint Controller (ORC). A spring-loaded slide with a small window-like opening is integral to the buckle latch mechanism. When a seat belt tip-half is inserted and latched into the seat belt buckle, the slide is pushed downward and the window of the slide exposes the Hall Effect Integrated Circuit (IC) chip within the buckle. The field of the permanent magnet induces a current within the chip. The chip provides this induced current as an output to the ORC. When the seat belt is unbuckled, the spring-loaded slide moves upward and shields the IC from the field of the permanent magnet, causing

the output current from the seat belt switch to be reduced.

The seat belt switches receive a supply of current from the ORC, and the ORC senses the status of the front seat belt switches through its connection to the seat wire harness. The ORC provides electronic **seat belt switch status** messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) over the Controller Area Network (CAN) data bus. The IC uses these messages as an additional logic input for control of the seat belt indicator. The ORC monitors the condition of the seat belt switch circuits and will store a Diagnostic Trouble Code (DTC) for any fault that is detected.

The hard wired circuits between the seat belt switches and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the switches or the electronic controls or communication between other modules and devices that provide some features of the seat belt reminder system. The most reliable, efficient, and accurate means to diagnose the seat belt switches or the electronic controls and communication related to seat belt switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

TENSIONER, SEAT BELT

DESCRIPTION

DESCRIPTION

In vehicles manufactured for domestic markets, the front seat belt incorporates dual tensioners: one integral to the retractor, and one integral to the buckle.

RETRACTOR TENSIONER

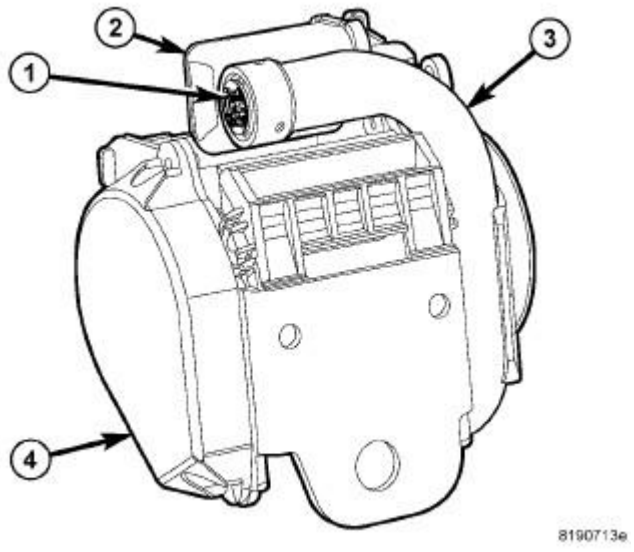

Fig. 90: Seat Belt Tensioner
Courtesy of CHRYSLER GROUP, LLC

Seat belt retractor tensioners supplement the dual front airbag system for all versions of this vehicle. These tensioners are integral to the front seat belt and retractor units (4), which are secured to the inner B-pillar on the right and left sides of the vehicle. The retractor is concealed beneath the molded plastic inner B-pillar trim. The seat belt tensioner consists primarily of a sprocket/pinion, a steel tube (3), a cast metal housing, numerous steel balls, a stamped metal ball trap (2), a torsion bar and a small pyrotechnically activated gas generator with a connector receptacle (1).

All of these components are located on one side of the retractor spool on the outside of the retractor housing except for the torsion bar, which serves as the spindle upon which the retractor spool rides. The seat belt tensioners are controlled by the Occupant Restraint Controller (ORC) and are connected to the vehicle electrical system through a dedicated take outs of the body wire harness by keyed and latching yellow molded plastic connector insulator to ensure a secure connection.

The retractor tensioners cannot be repaired and, if ineffective or damaged, the entire front seat belt and retractor unit must be replaced. If the front airbags have been deployed, the seat belt tensioners have also been deployed. The seat belt tensioners are not intended for reuse and must be replaced following any front airbag deployment. A growling or grinding sound while attempting to operate the seat belt retractor is a sure indication that the seat belt tensioner has been deployed and requires replacement. Refer to **RETRACTOR, SEAT BELT, REMOVAL**.

BUCKLE TENSIONER

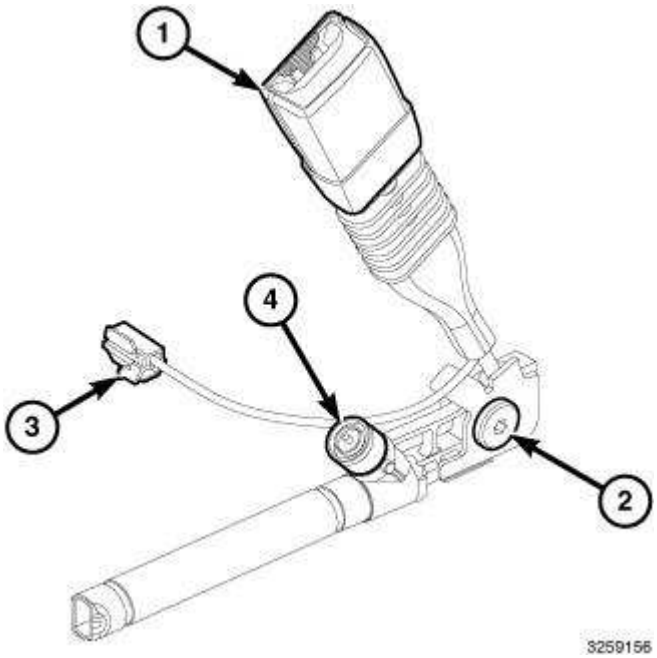

Fig. 91: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

A seat belt buckle tensioner supplements the dual front airbags for domestic market versions of this vehicle. This tensioner is integral to the front seat belt buckle unit, which is secured by a large screw to the outside of the inboard seat cushion frame of the front seat. The buckle tensioner consists

primarily of a buckle (1), a molded plastic scabbard, a cable and piston, a cable guide and bracket, a metal cylinder tube and a small pyrotechnically activated gas generator (4).

The buckle tensioner is controlled by the Occupant Restraint Controller (ORC) and is connected to the vehicle electrical system through a dedicated take out of the seat wire harness by a keyed and latching yellow molded plastic connector insulator to ensure a secure connection. The buckle tensioner has a single pigtail harness (3) for the integral seat belt switch.

The buckle tensioner cannot be repaired and, if ineffective or damaged, the entire front seat belt buckle unit must be replaced. If the front airbags have been deployed, the buckle tensioners have also been deployed. The buckle tensioners are not intended for reuse and must be replaced following any front airbag deployment. Refer to **BUCKLE, SEAT BELT, REMOVAL**.

OPERATION

OPERATION

The seat belt tensioners are deployed in conjunction with the dual front airbags by a signal generated by the Occupant Restraint Controller (ORC) through the driver or passenger seat belt tensioner line 1 and line 2 (or squib) circuits. When the ORC sends the proper electrical signal to the tensioners, the electrical energy generates enough heat to initiate a small pyrotechnic gas generator.

On the retractor tensioner, the gas generator is installed in one end of a steel tube that contains numerous steel balls. As the gas expands, it pushes the steel balls through the tube into a cast metal housing, where a ball guide directs the balls into engagement with the teeth of a sprocket that is geared to one end of the retractor spool. As the balls drive past the sprocket, the sprocket turns and drives the seat belt retractor spool causing the slack to be removed from the front seat belts. The ball trap captures the balls as they leave the sprocket and are expelled from the housing.

On the buckle tensioner, the gas generator is installed in one end of the tubular metal piston housing, which contains a piston secured to one end of a cable. The cable is routed around an integral guide to the buckle, which is secured to the opposite end of the cable. As the gas expands, it pushes the piston and the cable through the tube and pulls the buckle downward, causing the slack to be removed from the front seat belt.

Removing excess slack from the front seat belts not only keeps the occupants properly positioned for an airbag deployment following a frontal impact of the vehicle, but also helps to reduce injuries that the occupants of the front seats might experience in these situations as a result of harmful contact with the steering wheel, steering column, instrument panel or windshield. The seat belt retractor also has a torsion bar mechanism that is designed to deform in order to control the loading being applied to the occupants by the seat belts during a frontal impact, further reducing the potential for occupant injuries.

The ORC monitors the condition of the seat belt tensioners through circuit resistance, and will illuminate the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and store a Diagnostic Trouble Code (DTC) for any fault that is detected. Proper diagnosis of the seat belt tensioner gas generator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate

Load Tool Jumpers and Adapters. Refer to the appropriate diagnostic information.

COMMON SPECS & PROCEDURES

300 COMMON SPECS & PROCEDURES

System	Specification/Procedure
Air Conditioning	
Service	**A/C SYSTEM**
Torque	**FASTENER TORQUE**
Axle Nut/Hub Nut	
Front	
AWD	157 ft. lbs. (213 N.m)
RWD	184 ft. lbs. (250 N.m)
Rear	157 ft. lbs. (213 N.m)
Battery	**SPECIFICATIONS**
Brakes	
Bleeding Sequence	Except SRT8: **BASE BRAKE BLEEDING** , **BASE BRAKE BLEEDING - SRT8** , **STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING**
Disc Brakes	
Service Specifications	**SPECIFICATIONS**
Torque	**SPECIFICATIONS**
Drum Brakes	
Service Specifications	N/A
Torque	N/A
Charging	
Generator	**GENERATOR**
Torque	**TORQUE**
Drive Belts	
Adjustment	Serpentine belt used, not adjustable.
Drive Belt Routing	Refer to the appropriate "Drive Belt Routing" figure under **REMOVAL** .
Engine Cooling	
General Service Specifications	**SPECIFICATIONS**
Radiator Cap Pressure	16-20 psi (110-138 kPa)
Thermostat R & I	**THERMOSTAT**

Water Pump R & I	**PUMP, WATER**
Engine Mechanical	
3.0L	
Compression	**COMPRESSION TEST**
Oil Pressure	10 psi. (0.7 Bar) at Idle, 36 psi (2.5 Bar) at 3800 RPM
Overhaul	**ENGINE SPECIFICATIONS**
Torque	**TORQUE SPECIFICATIONS**
3.6L	
Compression	Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
Oil pressure	Refer to OIL PRESSURE table under **SPECIFICATIONS** .
Overhaul	**SPECIFICATIONS**
Torque	**TORQUE SPECIFICATIONS**
5.7L	
Compression	Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
Oil pressure	At Curb Idle Speed (MIN): 4 psi (25 kPa), @ 3000 RPM: 25-110 psi (170-758 kPa), If pressure is zero at curb idle, DO NOT run engine.
Overhaul	**ENGINE SPECIFICATIONS**
Torque	**TORQUE SPECIFICATIONS**
6.4L	
Compression	Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
Oil pressure	At Curb Idle Speed (MIN): 4 psi (25 kPa), @ 3000 RPM: 25-110 psi (170-758 kPa), If pressure is zero at curb idle, DO NOT run engine.
Overhaul	**SPECIFICATIONS**
Torque	**TORQUE SPECIFICATIONS**
Fluid Specifications	See FLUIDS under MAINTENANCE/FLUIDS tab. From within Manager or Service Writer, click the "30/60/90 Interval" or "Maint." button.
Flywheel/Flex Plate/Drive Plate Torque	
3.0L	For tightening sequence and torque specifications, refer to **INSTALLATION**
3.6L	70 ft. lbs. (95 N.m)
5.7L	70 ft. lbs. (95 N.m)
6.4L	70 ft. lbs. (95 N.m)
Fuel System	
Pressure Specification	
Diesel	As high as 1800 bar (26, 106 psi).

Gas	58 psi +/- 5 psi (400 kPa +/- 34 kPa)
Fuel Pressure Test Procedure	
Diesel	**CHECKING THE FUEL DELIVERY SYSTEM**
Gas	**CHECKING THE FUEL DELIVERY SYSTEM**
Fuel Filter Location	
Diesel	The fuel filter/water separator housing is located on the left side of the vehicle in front of the fuel tank.
Gas	Fuel filter is part of the fuel pump module.
Fuel Filter R & I	
Diesel	**FILTER, FUEL**
Gas	**MODULE, FUEL PUMP**
Ignition	
Firing Order & Cylinder Identification	**FIRING ORDER & CYLINDER IDENTIFICATION**
Ignition Wires (Resistance)	Coil On Plug
Ignition Wires (Routing)	Coil On Plug
Spark Plug	
3.6L	
Type	RER8ZWYCB4 (NGK)
Gap	0.040 in. (1.00 mm)
Torque	13 ft. lbs. (17.5 N.m)
5.7L	
Type	SPLZF R5C11 (NGK)
Gap	0.040 in. (1.00 mm)
Torque	18.5 - 22 ft. lbs. (25 - 30 N.m)
6.4L	
Type	LZTR6AP11EG (NGK)
Gap	0.040 in. (1.00 mm)
Torque	7.5 -15 ft. lbs. (10 - 20 N.m): Torque critical tapered design. Do not exceed 15 ft. lbs.
Starting	
Starter	**STARTER MOTOR**
Torque	**TORQUE**
Wheel Alignment	
Adjustment Specifications	**SPECIFICATIONS**
Torque	Front: **SPECIFICATIONS** Rear: **SPECIFICATIONS**
Wheel & Tire	
Wheel Lug Nut Torque	110 ft. lbs. (150 N.m)

ACCESSORIES AND EQUIPMENT

Speed Control - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

Two electronic speed control systems are available factory-installed equipment on this vehicle: a conventional system and an adaptive system. Additional details of these two systems and their components can be found under the subheadings and paragraphs that follow.

CONVENTIONAL SPEED CONTROL

The standard equipment conventional electronic speed control system includes the following major components, which are described in further detail elsewhere in this service information:

- **Antilock Brake Module** - An Antilock Brake Module (ABM) (also known as Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module) is located below the antilock brake Hydraulic Control Unit (HCU) in the engine compartment. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .
- **Brake Lamp Switch** - The brake (also known as stop) lamp switch in this vehicle is actually a brake pedal position sensor. This sensor is located on the brake pedal support bracket under the driver side of the instrument panel. Refer to **SWITCH, STOP LAMP, DESCRIPTION** .
- **Instrument Cluster** - A CRUISE indicator is located in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) that provides an indication to the vehicle operator when the speed control system is turned ON. Refer to **DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) is located in the engine compartment. The PCM contains the software and hardware that monitors all of the speed control system inputs and controls all of the speed control system outputs. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Speed Control Switches** - A speed control switch pod containing four momentary switch push buttons is located in the right horizontal spoke of the steering wheel.
- **Steering Control Module** - A Steering Control Module (SCM) is integral to the Steering Column Control Module (SCCM) located at the top of the steering column just below the steering wheel. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** .
- **Wheel Speed Sensors** - A wheel speed sensor is located on the knuckle of each front and rear wheel. Refer to **SENSOR, WHEEL SPEED, FRONT, DESCRIPTION** .

The ABM, the IC, the PCM and the SCM each contain a microprocessor and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the SCM to relay the status of the speed control switches to the PCM, and by the PCM for control of the CRUISE indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the conventional electronic speed control system components to the

electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the speed control system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

ADAPTIVE SPEED CONTROL

The optional equipment adaptive electronic speed control system includes the following major components, which are described in further detail elsewhere in this service information:

- **Adaptive Speed Control Sensor** - An adaptive speed control sensor (also known as the Adaptive Cruise Control/ACC sensor or module and the radar sensor or module) is located on a bracket secured near the right outboard end of the front bumper support member of the Front End Module (FEM) behind the front fascia. Refer to **SENSOR AND BRACKET, ADAPTIVE SPEED CONTROL, DESCRIPTION** .
- **Antilock Brake Module** - An Antilock Brake Module (ABM) (also known as Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module) is located below the antilock brake Hydraulic Control Unit (HCU) in the engine compartment. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .
- **Brake Lamp Switch** - The brake (also known as stop) lamp switch in this vehicle is actually a brake pedal position sensor. This sensor is located on the brake pedal support bracket under the driver side of the instrument panel. Refer to **SWITCH, STOP LAMP, DESCRIPTION** .
- **Instrument Cluster** - A CRUISE indicator is located in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) that provides an indication to the vehicle operator when the speed control system is turned ON. Refer to **DESCRIPTION** .
- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) is located in the Integrated Center Stack (ICS) and provides an interface to the vehicle operator for setting the adaptive speed control customer preferences as well as a display of the adaptive speed control and Forward Collision Warning (FCW) system status messages. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) is located in the engine compartment. The PCM contains the software and hardware that monitors all of the speed control system inputs and controls all of the speed control system outputs. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Speed Control Switches** - A speed control switch pod containing six momentary switch push buttons is located in the right horizontal spoke of the steering wheel.
- **Steering Control Module** - A Steering Control Module (SCM) is integral to the Steering Column Control Module (SCCM) located at the top of the steering column just below the steering wheel. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** .
- **Wheel Speed Sensors** - A wheel speed sensor is located on the knuckle of each front and rear wheel. Refer to **SENSOR, WHEEL SPEED, FRONT, DESCRIPTION** .

The ACC sensor, the ABM, the IC, the EVIC, the PCM and the SCM each contain a microprocessor and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ACC sensor to provide inputs to the ABM, the EVIC and the PCM, is used by the ABM to provide inputs to the PCM, is used by the SCM to relay the status of the speed control switches to the PCM and is used by the PCM for control of the indicators in the IC and the indications in the EVIC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the adaptive electronic speed control system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the speed control system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

CONVENTIONAL SPEED CONTROL

The vehicle operator controls all conventional speed control system features through the speed control switch pod on the face of the right horizontal spoke of the steering wheel. When a push button of the switch pod is depressed, it provides a hard wired resistor multiplexed analog input to the Steering Control Module (SCM).

The SCM reads the speed control switch input, then relays an electronic **speed control switch** status message to the Powertrain Control Module (PCM) over the Controller Area Network (CAN) data bus. The PCM software continually monitors these inputs as well as electronic **vehicle distance** message inputs from the Antilock Brake Module (ABM) (also known as the Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module) and numerous hard wired inputs, then provides the appropriate electronic message and hard wired outputs to invoke the requested electronic speed control features.

The PCM microprocessor continuously monitors all of the speed control system electrical circuits to determine the system readiness. If the PCM detects a monitored system fault, it sets and stores a Diagnostic Trouble Code (DTC). The PCM uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the CAN data bus. This method of communication is used for control of the Malfunction Indicator Lamp (MIL) (also known as the Check Engine lamp) in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The hard wired inputs and outputs for the PCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic

methods will not prove conclusive in the diagnosis of the PCM or the electronic controls or communication between other modules and devices that provide features of the conventional speed control system. The most reliable, efficient, and accurate means to diagnose the PCM or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ADAPTIVE SPEED CONTROL

The vehicle operator controls all adaptive speed control system features through the speed control switch pod on the face of the right horizontal spoke of the steering wheel. When a push button of the switch pod is depressed, it provides a hard wired resistor multiplexed analog input to the Steering Control Module (SCM).

The SCM reads the speed control switch input, then relays an electronic **speed control switch** status message to the Powertrain Control Module (PCM) and to the adaptive speed control sensor (also known as the Adaptive Cruise Control/ACC sensor or module, or the radar sensor or module) over the Controller Area Network (CAN) data bus. The PCM and ACC sensor microprocessors continually monitor these inputs as well as electronic **wheel speed** message inputs from the Antilock Brake Module (ABM) (also known as the Controller Antilock Brake/CAB, the Electronic Stability Control/ESC module or the Antilock Brake System/ABS module), electronic **gear selector** message inputs from the Transmission Control Module TCM and numerous hard wired inputs, then provides the appropriate electronic message and hard wired outputs to invoke the requested electronic speed control features.

Using the MODE push button of the speed control switch pod on the face of the right horizontal spoke of the steering wheel, the vehicle operator can choose between adaptive speed control and conventional speed control modes of operation. As the name implies, when in the conventional speed control mode the speed control system is used as and functions exactly like a conventional speed control system. When in the adaptive speed control mode, the vehicle operator can use the DISTANCE push button of the speed control switch pod to select from one of three distance settings for the adaptive cruise system to maintain. These settings equate to the time in seconds separating the vehicle from a preceding vehicle. The ACC sensor then uses electronic message outputs to the ABM, the TCM and the PCM to maintain the selected separation distance. The available distance settings are:

- **1** - 1.0 second
- **2** - 1.5 seconds
- **3** - 2.0 seconds

The PCM and ACC sensor microprocessors continuously monitor all of the speed control system electrical circuits to determine the system readiness. If the PCM or ACC sensor detects a monitored system fault, it sets and stores a Diagnostic Trouble Code (DTC). The PCM and ACC sensor use On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the CAN data bus. This method of communication is used for control of the Malfunction Indicator Lamp (MIL) (also known as the Check Engine lamp) in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of

the instrument panel.

The hard wired inputs and outputs for the PCM and the ACC sensor may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PCM, the ACC sensor or the electronic controls or communication between other modules and devices that provide features of the adaptive speed control system. The most reliable, efficient, and accurate means to diagnose the PCM, the ACC sensor or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, SPEED CONTROL

DESCRIPTION

DESCRIPTION

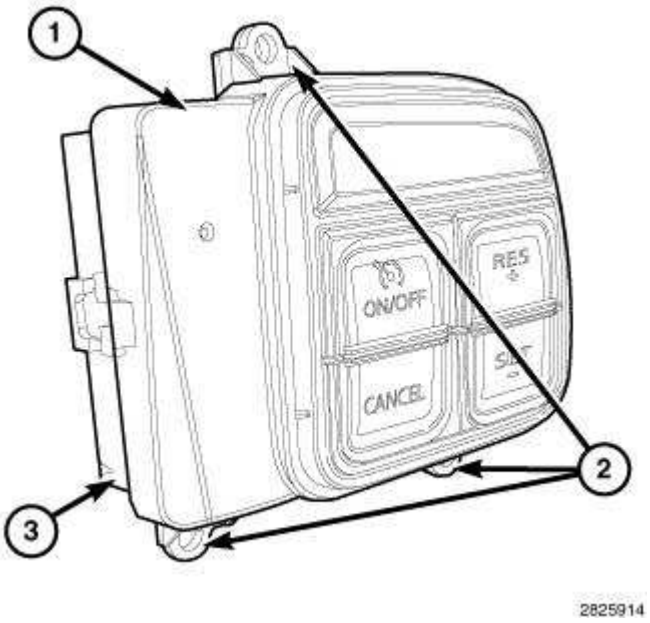

Fig. 1: Except Adaptive Speed Control
Courtesy of CHRYSLER GROUP, LLC

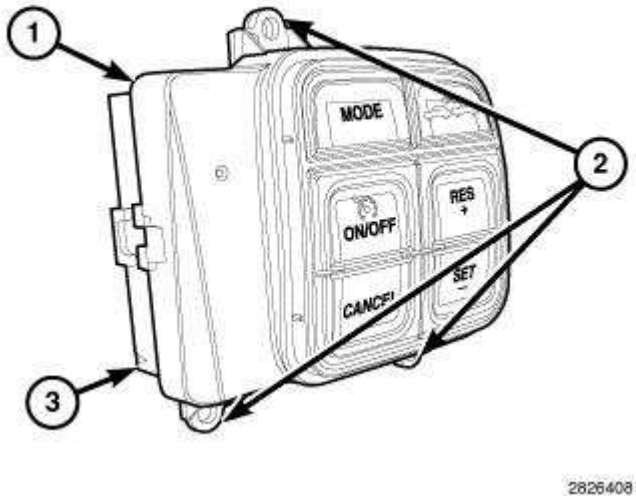

Fig. 2: With Adaptive Speed Control
Courtesy of CHRYSLER GROUP, LLC

The speed control switch pod (1) is located in the right spoke of the steering wheel spoke bezel. Two different switches are used. One switch has four buttons and is used on vehicles not equipped with the optional adaptive speed control (also known as the Adaptive Cruise Control/ACC) system. The other switch has six buttons and is used on vehicles equipped with the ACC system option. These switches are the primary control used by the vehicle operator to manage the particular speed control system installed in the vehicle. The only visible components of the switch pod are the switch push buttons and a decorative bezel around the push buttons, which stands slightly proud of the steering wheel spoke bezel. The remainder of the switch pod including its mounting provisions and its electrical connection are concealed beneath the spoke bezel.

The switch pod housing and push buttons are constructed of molded plastic. Each of the push buttons has white International Control and Display Symbol graphics or text applied to it, which clearly identify the function of each push button. The switch pod is secured through three integral mounting tabs (2) to mounting bosses on the back of the spoke bezel by three screws. A connector receptacle (3) integral to the inboard end of the switch pod housing connects the speed control switch and the Local Interface Network (LIN) slave node circuitry integral to the switch pod to the vehicle electrical system through a dedicated take out and connector of the steering wheel wire harness.

The speed control switch pod cannot be adjusted or repaired. If any function of the switch or the LIN slave node is ineffective or damaged, the entire switch pod unit must be replaced.

OPERATION

OPERATION

The speed control switch pod is a resistor multiplexed unit that provides hard wired inputs to the Steering Control Module (SCM) microprocessor integral to the Steering Column Control Module (SCCM). The speed control switch pod also contains the circuitry of a Local Interface Network (LIN) slave node, which provides source current for and communicates the switch or sensor states of the

Electronic Vehicle Information Center (EVIC) switches, the remote radio switches, the paddle shifter switches (if equipped), the horn switch and the heated steering wheel sensor (if equipped) over the LIN data bus to the SCM, which is the LIN master node.

The speed control switch pod for vehicles equipped with a conventional electronic speed control system and not equipped with the optional adaptive speed control (also known as the Adaptive Cruise Control/ACC) system contains four switch push buttons whose functions are:

- **On/Off** - This switch button enables or disables the speed control system and clears any previous speed control set speed from system memory.
- **Resume / +** - This switch button restores the vehicle to a previously stored set speed or accelerates the vehicle from an already attained set speed.
- **Cancel** - This switch button cancels the current speed control event, but does not turn the system OFF or clear the currently stored set speed.
- **Set / -** - This switch button sets the current vehicle speed as the stored set speed or decelerates (coasts) the vehicle to a speed that is slower than the already attained set speed.

The optional adaptive speed control switch pod for vehicles equipped with the ACC system option contains the same four switch push buttons as the conventional speed control switch pod, then adds two buttons whose functions are:

- **Mode** - This switch button toggles the speed control system between adaptive (ACC) or conventional (non-ACC) modes of operation.
- **Distance** - This switch button selects the separation or following distance (in seconds) that the ACC system maintains between this vehicle and any preceding vehicle. The three distance settings available are: **1** - about 1.0 second, **2** - about 1.5 seconds or **3** - about 2.0 seconds.

The SCM LIN master node provides a clean ground and fused B(+) current for all of the switches and sensors on the rotating steering wheel through the LIN slave node circuitry of the speed control switch pod as well as for the Light Emitting Diode (LED) back lighting of both the speed control and the EVIC switch pods. The SCM continually monitors all of the hard wired speed control switch circuits as well as the LIN bus data. The SCM will set a Diagnostic Trouble Code (DTC) for any problem it detects in the speed control switch circuits, and will store a Signal Not Available (SNA) code for any LIN bus input errors. The SCM also communicates with other electronic modules over the Controller Area Network (CAN) data bus. Therefore, any SCM DTC information can be retrieved using a diagnostic scan tool connected to the Data Link Connector (DLC).

The analog resistor multiplexed circuits of the speed control switch pod as well as the hard wired circuits between the switch pod and the SCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the LIN slave or master nodes, the SCM, the SCCM or the electronic controls and communication between

modules and other devices that provide some features of the speed control system. The most reliable, efficient, and accurate means to diagnose the speed control switch pod, the LIN slave or master nodes, the SCM or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SPEED CONTROL SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

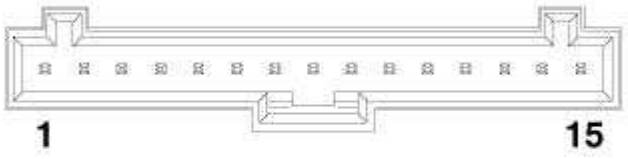

Fig. 3: Speed Control Switch Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: The following test confirms only correct speed control switch functions. It does not test or confirm any of the Local Interface Network (LIN) slave node inputs, outputs or functions. LIN slave node testing requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

1. Remove the speed control switch pod from the steering wheel. Refer to **SWITCH, SPEED CONTROL, REMOVAL**.
2. Disconnect the steering wheel wire harness connector from the back of the speed control switch pod.
3. Using an ohmmeter, test the resistance between the terminals of the switch as shown in the

Speed Control Switch Tests table.

SPEED CONTROL SWITCH TESTS	
SWITCH POSITION	**PINS (*RESISTANCE - OHMS)**
NO PUSH BUTTONS DEPRESSED	13 and 14 (20708) 14 and 15 (20591)
ON / OFF	13 and 14 (464) 14 and 15 (133)
CANCEL	13 and 14 (896) 14 and 15 (457)
DISTANCE (WITH ADAPTIVE SPEED CONTROL ONLY)	13 and 14 (1515) 14 and 15 (899)
MODE (WITH ADAPTIVE SPEED CONTROL ONLY)	13 and 14 (2468) 14 and 15 (1518)
SET / - (DECEL)	13 and 14 (4088) 14 and 15 (2471)
RESUME / + (ACCEL)	13 and 14 (7408) 14 and 15 (4091)
*All resistance values are plus or minus 5%.	

4. If the switch fails any of the tests, replace the ineffective speed control switch pod as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

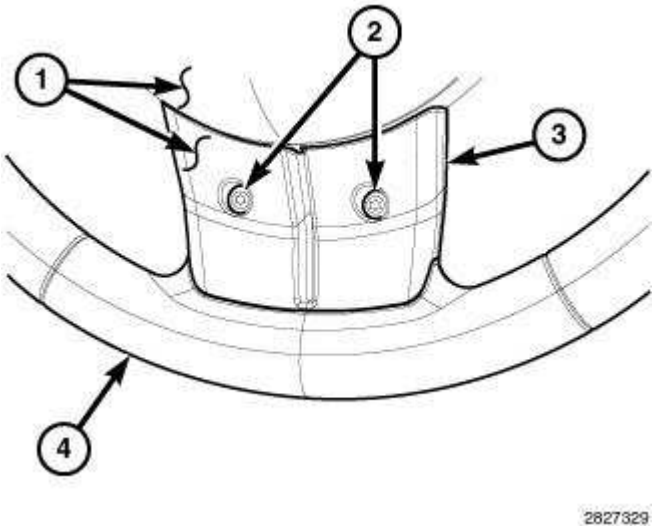

Fig. 4: Rear Cover, Two Screws, Steering Wheel Spoke Front Bezel & Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the driver airbag from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
3. From the back of the steering wheel (4), remove the two screws (2) that secure the center spoke of the rear cover (1) to the center spoke of the steering wheel spoke front bezel (3).

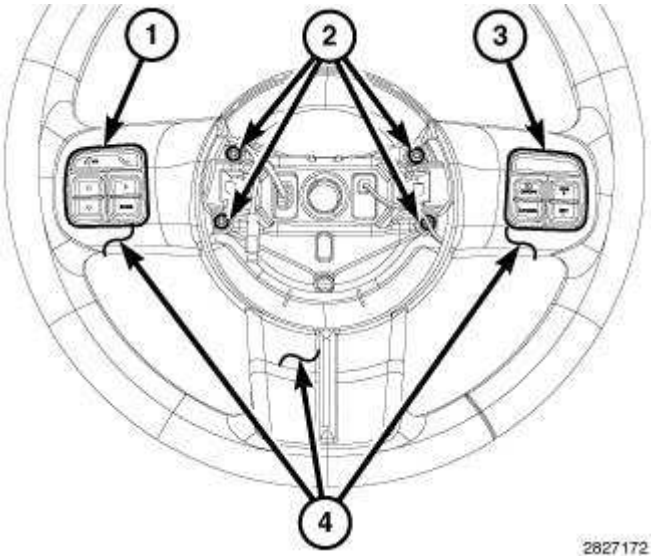

Fig. 5: EVIC Switch Pod, Speed Control Switch Pod, Four Screws & Front Spoke Bezel
Courtesy of CHRYSLER GROUP, LLC

4. From the face of the steering wheel, remove the four screws (2) that secure the front spoke bezel (4) to the steering wheel armature within the steering wheel hub cavity.
5. Using a trim stick or another suitable wide flat-bladed tool, carefully pry at the parting line between the front spoke bezel and the steering wheel rear cover enough to unsnap the two horizontal members of the bezel from those of the rear cover.

6. Pull the front spoke bezel away from the steering wheel far enough to access and disconnect the steering wheel wire harness connections from the Electronic Vehicle Information Center (EVIC) switch pod (1) and the speed control switch pod (3).

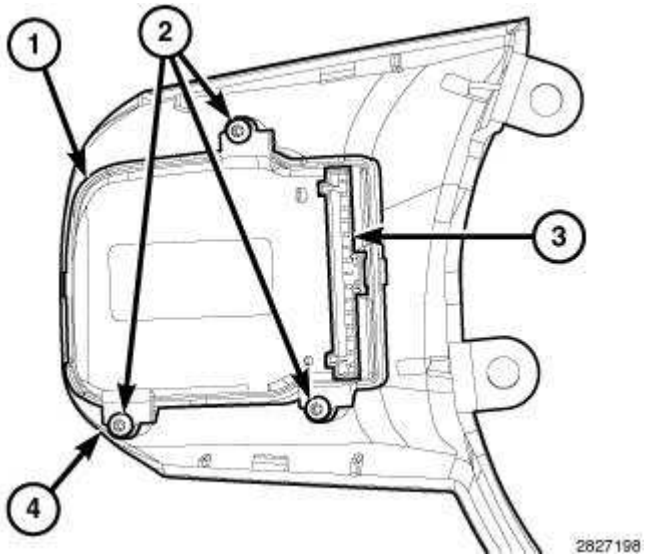

Fig. 6: Steering Wheel Spoke Front Bezel, Screws, Speed Control Switch Pod & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. From the back of the steering wheel spoke front bezel (4), remove the three screws (2) that secure the speed control switch pod (1) mounting tabs to the bezel.
8. Remove the switch from the bezel.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

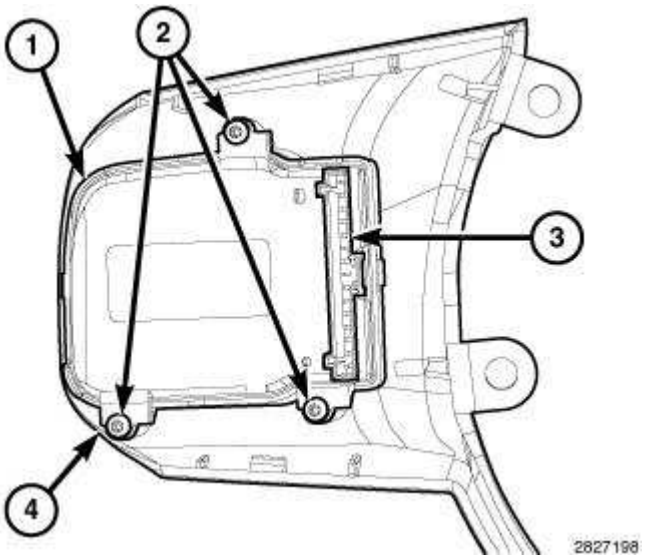

Fig. 7: Steering Wheel Spoke Front Bezel, Screws, Speed Control Switch Pod & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the speed control switch pod (1) to the back of the steering wheel spoke front bezel (4).
2. Install and tighten the three screws (2) that secure the switch mounting tabs to the bezel. Tighten the screws securely.
3. Position the front spoke bezel close enough to the steering wheel to reconnect the steering wheel wire harness connections to the Electronic Vehicle Information Center (EVIC) switch pod and the speed control switch pod connector receptacles (3).

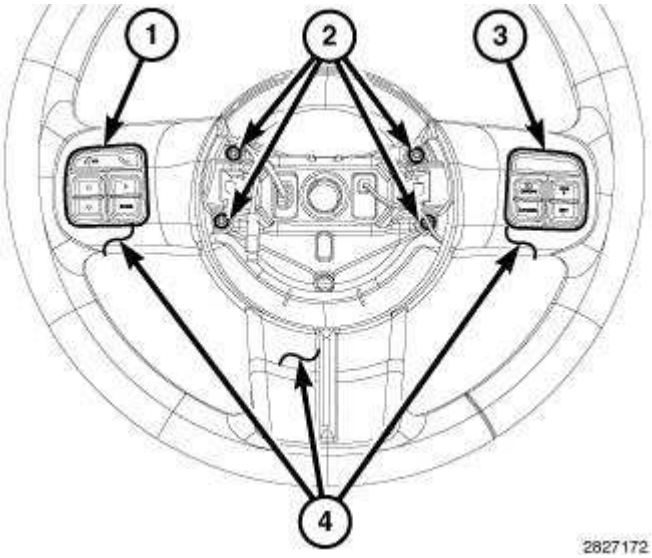

Fig. 8: EVIC Switch Pod, Speed Control Switch Pod, Four Screws & Front Spoke Bezel
Courtesy of CHRYSLER GROUP, LLC

4. Position the front spoke bezel (4), EVIC switch pod (1) and speed control switch pod (3) as a unit to the steering wheel. Be certain that the steering wheel wire harness is routed between the

lower or upper bezel stanchions and the inside circumference of the steering wheel hub cavity so that the wiring will not be pinched when the driver airbag is reinstalled.

5. Use hand pressure to squeeze the horizontal spokes of both the front spoke bezel and the steering wheel rear cover together until all of the snap features are fully engaged.
6. Install and tighten the four screws that secure the stanchions of the front spoke bezel to the steering wheel armature within the steering wheel hub cavity. Tighten the screws securely.

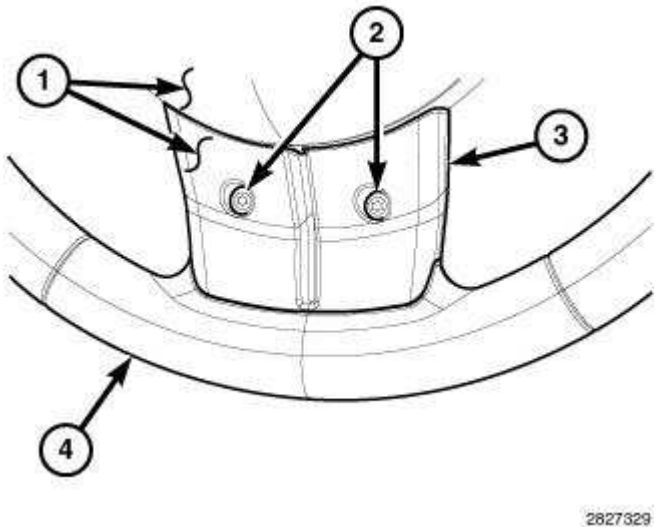

Fig. 9: Rear Cover, Two Screws, Steering Wheel Spoke Front Bezel & Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

7. From the back of the steering wheel (4), install and tighten the two screws (2) that secure the center spoke of the rear cover (1) to the center spoke of the steering wheel spoke front bezel (3). Tighten the screws securely.
8. Reinstall the driver airbag onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION** .
9. Reconnect the battery negative cable.

OPERATION

REMOTE START SYSTEM

REMOTE START OPERATING CONDITIONS

In order to operate remote start, the following conditions must be met:

- Key fob sequence must be operated within a 100 meter range of the vehicle.
- The vehicle must be in Park.
- Fobik is not in the vehicle.
- The hazard switch off.
- Vehicle Theft Alarm or Panic is not alarming.
- Doors and hood must be closed.
- The battery voltage is normal (11 to 15 volts).

REMOTE START SHUT DOWN/DEACTIVATE CONDITIONS

Engine will NOT start or will shut down/deactivate during any of the following conditions:

- Doors or hood are opened before remote unlock.
- Hazard Switch depressed.
- Panic or theft alarm active.
- Brake applied.
- A prior remote start cranked the engine, but failed to start the engine.
- Battery voltage NOT in the normal range.
- High (run away) or Low Idle (stall) RPM.
- MIL Active.
- High Engine Coolant Temperature.
- Low Engine Oil Pressure.

INITIATE REMOTE START

To Remote Start the vehicle:

1. Press remote button on the Key Fob twice within five (5) seconds.

NOTE: **Engine will run for 15 minutes after a remote start is initiated. After 15 minutes, the engine will shut off. The system allows for only two**

sequential remote starts without a key ignition cycle.

2. Unlock vehicle with Key Fob to enter the vehicle.
3. Put key in ignition, turn key to run position to exit remote start and enter a normal start without engine shut off.

IDENTIFICATION THAT REMOTE START IS ACTIVATED

To identify that Remote Start has been activated the following will occur:

- Horn will sound and lights will flash to acknowledge a start command was received.
- Park Lamps will turn on to indicate that the engine is running in remote start mode.

TERMINATE REMOTE START

To terminate Remote Start, press Remote Start button on the Key Fob once.

NOTE: **In order to avoid inadvertent shut downs, the one-time press to shut down the vehicle will be disabled for two seconds after receipt of a valid remote start request.**

STANDARD STARTING SYSTEM

When you press the Keyless Go button (KIN Button), a request is sent to RF-Hub via the private LIN. Once the RF-Hub receives the request from the KIN it then looks for the valid key via the Passive Entry Module (PEM) antennas. If the RF-Hub detects a valid key, then the RF-Hub sets the ignition position to START/CRANK. The BCM then turns the Ignition status to START/CRANK.

Then the BCM sends a command to turn the vehicle to the "RUN/CRANK" If conditions are correct to start, the PCM turn on the high side of the relay and holds the high side until the PCM turns off the signal allowing the engine to crank.

If the BCM is still in crank and the crank hold signal is true then the BCM turns on the Low side of the relay and the engine will start cranking.

Once the engine has started the PCM deactivates the double start over ride. The BCM will then deactivate the starter either when the engine starts or the maximum time has been reach for the tip start (10 sec for Gas and 25 sec for diesel).

At the same time the engine starts the RF-Hub will put the ignition from "Crank" to "RUN" if the start type is "TIP Start" or the 2 second time expires or the engine controller indicates the vehicle is not in park or neutral

The engine can be manually shut down by the driver with speeds over 5 MPH in any gear.

DIAGNOSIS AND TESTING

REMOTE START SYSTEM

Before attempting to diagnose a problem with the remote starting system, first be sure the starter motor and starter solenoid are working properly. The starter should operate with the use of the keyless go switch. Any starter or solenoid problems must be repaired first.

Also be sure the engine will easily start and run with the use of the keyless go switch. Any engine running, idling or driveability problems must be repaired first.

Also note that the remote start system will automatically be cancelled if any of the following occur:

- IF THE ENGINE STALLS OR RPM EXCEEDS 2500
- NORMAL TIME OUT RUN MODE (15 MINUTES)
- CUSTOMER MOVES IGNITION INTO RUN/START
- ANY VEHICLE DOOR AJAR
- TRUNK/LIFTGATE AJAR
- HOOD AJAR
- FUEL LEVEL LOW
- START COUNTER REACHED
- LOW RPM SHUTDOWN
- FOBIK IN VEHICLE
- BRAKE PRESSED
- THE HAZARD SWITCH IS PRESSED
- NOT IN PARK OR NEUTRAL
- VEHICLE SPEED HIGH
- VTA ALARM TRIGGERED
- PANIC MODE ACTIVATED
- BATTERY VOLTAGE HIGH
- BATTERY VOLTAGE LOW
- LOSS OF BATTERY VOLTAGE
- MIL ON
- LOW OIL PRESSURE
- COOLANT TEMPERATURE HIGH
- CRANK NO START
- RKE OFF MESSAGE
- VEHICLE NOT CONFIGURED
- HOOD SWITCH NOT INSTALLED OR INOPERATIVE
- NO AUTOMATIC TRANSMISSION
- IGNITION SNA

- IGNITION NOT IN LOCK
- VEHICLE IN SHIPPING MODE
- VEHICLE NOT PROGRAMMED

If all of the previous items checked OK, and the remote starting system will not operate. Refer to **DIAGNOSIS AND TESTING** .

STANDARD STARTING SYSTEM

DIAGNOSIS

The battery, starting, and charging systems operate in conjunction with one another, and must be tested as a complete system. For correct starting/charging system operation, all of the components involved in these three systems must perform within specifications.

Starting System Diagnosis		
CONDITION	**POSSIBLE CAUSE**	**CORRECTION**
STARTER FAILS TO OPERATE.	1. Battery discharged or faulty.	1. Refer to **BATTERY, DIAGNOSIS AND TESTING** . Charge or replace battery, if required.
	2. Starting circuit wiring faulty.	2. See Wiring Information. Test and repair starter feed and/or control circuits, if required.
	3. Starter relay faulty.	3. The starter relay is located within the front Power Distribution Center (PDC). See no crank condition. Refer to **DIAGNOSIS AND TESTING** .
	4. Park/Neutral position switch faulty or misadjusted.	4. Refer to appropriate service information for Park/Neutral Position Switch. Replace park/neutral position switch if required.
	5. Starter solenoid faulty.	5. Refer to **STARTER** Motor. Replace starter motor assembly if required.
	6. Starter motor faulty.	6. If all other starting system components and circuits test OK, replace starter motor.
STARTER ENGAGES, FAILS TO TURN ENGINE.	1. Battery discharged or faulty.	1. Refer to **BATTERY, DIAGNOSIS AND TESTING** . Charge or replace battery, if required.
	2. Starting circuit wiring	2. See Wiring Information. Test

	faulty.	and repair starter feed and/or control circuits if required.
	3. Starter motor faulty.	3. If all other starting system components and circuits test OK, replace starter motor assembly.
	4. Engine seized.	4. Refer to appropriate Engine Diagnosis information .
STARTER ENGAGES, SPINS OUT BEFORE ENGINE STARTS.	1. Starter ring gear faulty.	1. Refer to **STARTER** Removal and Installation. Remove starter motor to inspect starter ring gear. Replace starter ring gear if required.
	2. Starter motor faulty.	2. If all other starting system components and circuits test OK, replace starter motor assembly.
STARTER DOES NOT DISENGAGE.	1. Starter motor improperly installed.	1. Refer to **STARTER** Motor Removal and Installation. Tighten starter mounting hardware to correct torque specifications.
	2. Starter relay faulty.	3. The starter relay is located within the front PDC. See no crank condition. Refer to **DIAGNOSIS AND TESTING** .
	3. Ignition switch faulty.	4. Replace KIN module if required.
	4. Starter motor faulty.	4. If all other starting system components and circuits test OK, replace starter motor.

INSPECTION

For complete starter wiring circuit diagrams, refer to appropriate Wiring Diagrams. Before removing any unit from starting system for repair or diagnosis, perform the following inspections:

WARNING: On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE INFORMATION , before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury.

- **Battery** - Visually inspect battery for indications of physical damage and loose or corroded cable connections. Determine state-of-charge and cranking capacity of battery. Charge or replace battery if required. Refer to **INSPECTION** in **Battery** . **Note: If equipped with diesel engine, a dual battery system may be used, and both batteries must be inspected.**
- **Clutch Pedal Position Switch** - If equipped with manual transmission, visually inspect clutch pedal position switch for indications of physical damage and loose or corroded wire harness

connections. Refer to appropriate information for **Clutch Pedal Position Switch** .

- **Park/Neutral Position Switch** - If equipped with automatic transmission, visually inspect park/neutral position switch for indications of physical damage and loose or corroded wire harness connections. Refer to appropriate information for **Park/Neutral Position Switch** .
- **Starter Relay** - The starter relay is located within the front Power Distribution Center (PDC). Refer to **DIAGNOSIS AND TESTING** .
- **Starter Motor** - Visually inspect starter motor for indications of physical damage and loose or corroded wire harness connections.
- **Starter Solenoid** - Visually inspect starter solenoid for indications of physical damage and loose or corroded wire harness connections.
- **Wiring** - Visually inspect wire harnesses for damage. Repair or replace any faulty wiring, as required. Refer to appropriate Wiring Diagrams.

TESTING

COLD CRANKING TEST

NOTE: For complete starter wiring circuit diagrams, refer to appropriate Wiring Diagrams. The battery must be fully-charged and load-tested before proceeding. Refer to BATTERY SYSTEM - SERVICE INFORMATION .

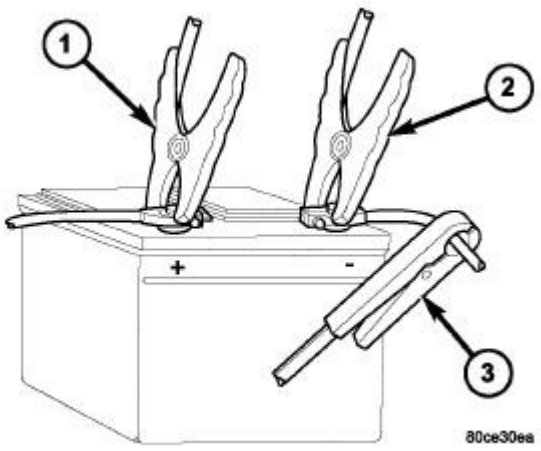

Fig. 1: Connecting Volt-Ampere Tester To Battery Terminals - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - POSITIVE CLAMP
2 - NEGATIVE CLAMP
3 - INDUCTION AMMETER CLAMP

1. Connect volt-ampere tester (1) and (2) to battery terminals. Refer to **Fig. 1**. See instructions provided by manufacturer of volt-ampere tester being used. **Note: Certain diesel equipped models use dual batteries. If equipped with dual battery system, tester should be**

connected to battery on left side of vehicle only. Also, tester current reading must be taken from positive battery cable lead that connects to starter motor.

2. Fully engage parking brake.
3. If equipped with manual transmission, place gearshift selector lever in Neutral position and block clutch pedal in fully depressed position. If equipped with automatic transmission, place gearshift selector lever in Park position.
4. Verify that all lamps and accessories are turned off.
5. To prevent a gasoline engine from starting, remove either the ignition run fuse, or the fuel pump control fuse.

WARNING: Attempt to start engine a few times before proceeding with following step.

NOTE: A cold engine will increase starter current (amperage) draw reading, and reduce battery voltage reading.

6. Press and hold the ignition in **Start** position. Note cranking voltage and current (amperage) draw readings shown on volt-ampere tester.
    1. If voltage reads below 9.6 volts, refer to **REMOTE START SYSTEMStarter Motor** in Diagnosis and Testing. If starter motor is OK, refer to appropriate **Engine Diagnosis** for further testing of engine. If starter motor is not OK, replace faulty starter motor.
    2. If voltage reads above 9.6 volts and current (amperage) draw reads below specifications, refer to **FEED CIRCUIT TEST** .
    3. If voltage reads 12.5 volts or greater and starter motor does not turn, refer to **CONTROL CIRCUIT TESTING** .
    4. If voltage reads 12.5 volts or greater and starter motor turns very slowly, refer to **FEED CIRCUIT TEST** .

FEED CIRCUIT TEST

The starter feed circuit test (voltage drop method) will determine if there is excessive resistance in high-amperage feed circuit. For complete starter wiring circuit diagrams, refer to Wiring Diagrams.

When performing these tests, it is important to remember that voltage drop is giving an indication of resistance between two points at which voltmeter probes are attached.

Example: When testing resistance of positive battery cable, touch voltmeter leads to positive battery cable clamp and cable connector at starter solenoid. If you probe positive battery terminal post and cable connector at starter solenoid, you are reading combined voltage drop in positive battery cable clamp-to-terminal post connection and positive battery cable.

The following operation will require a voltmeter accurate to 1/10 (0.10) volt. Before performing tests, be certain that following procedures are accomplished:

- Battery is fully-charged and load-tested. Refer to **BATTERY SYSTEM - SERVICE INFORMATION** .
- Fully engage parking brake.
- If equipped with manual transmission, place gearshift selector lever in Neutral position and block clutch pedal in fully depressed position. If equipped with automatic transmission, place gearshift selector lever in Park position.
- Verify that all lamps and accessories are turned off.
- To prevent a gasoline engine from starting, remove Automatic ShutDown (ASD) relay. These relays are located in front PDC. Refer to label on PDC cover for relay location.

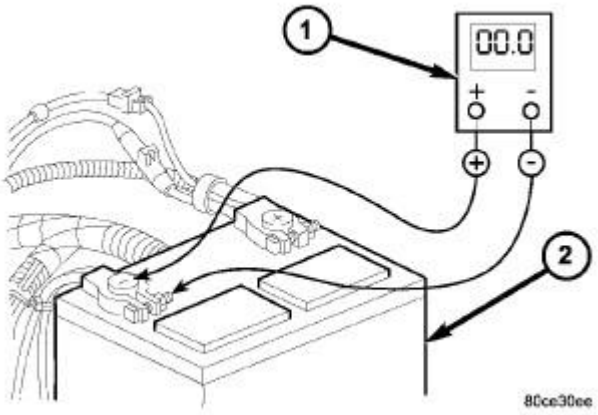

Fig. 2: Testing Battery Negative Connection Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - VOLTMETER
2 - BATTERY

1. Connect positive lead of voltmeter (1) to negative battery cable terminal post. Connect negative lead of voltmeter to negative battery cable clamp. Refer to **Fig. 2**. Press and hold the ignition in **Start** position. Observe voltmeter. If voltage is detected, correct poor contact between cable clamp and terminal post. **Note: Certain diesel equipped models use dual batteries. If equipped with dual battery system, procedure must be performed twice, once for each battery.**

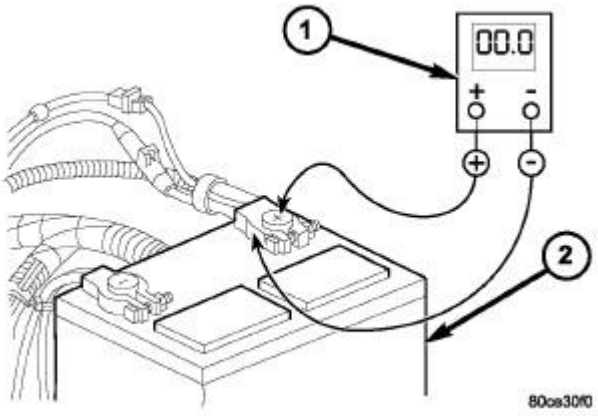

Fig. 3: Testing Battery Positive Connection Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - VOLTMETER
2 - BATTERY

2. Connect positive lead of voltmeter to positive battery terminal post. Connect negative lead of voltmeter to battery positive cable clamp. Refer to **Fig. 3**. Press and hold the ignition in **Start** position. Observe voltmeter. If voltage is detected, correct poor contact between cable clamp and terminal post. **Note: Certain diesel equipped models use dual batteries. If equipped with dual battery system, this procedure must be performed twice, once for each battery.**

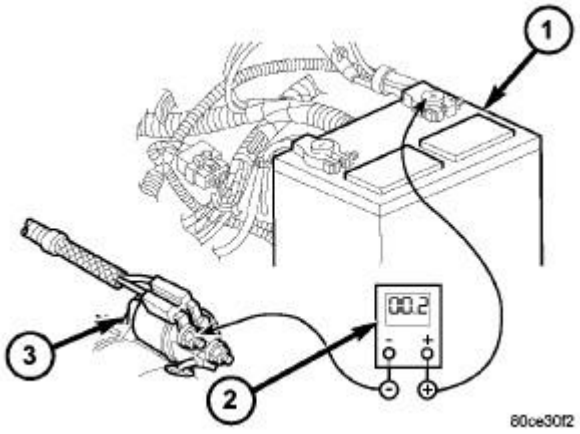

Fig. 4: Testing Battery Positive Cable Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - BATTERY
2 - VOLTMETER
3 - STARTER MOTOR

3. Connect voltmeter to measure between battery positive terminal post and starter solenoid battery terminal stud. Refer to **Fig. 4**. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, clean and tighten battery cable connection at solenoid. Repeat test. If reading is still above 0.2 volt, replace faulty positive battery cable. **Note: Certain diesel equipped models use dual batteries. If equipped with dual battery system, this procedure must be performed on driver side battery only.**

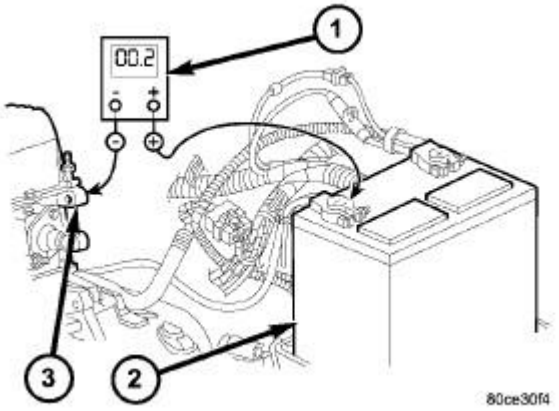

Fig. 5: Testing Ground Circuit Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - VOLTMETER
2 - BATTERY
3 - ENGINE GROUND

4. Connect voltmeter to measure between negative battery terminal post and a good clean ground on engine block. Refer to **Fig. 5**. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, clean and tighten negative battery cable attachment on engine block. Repeat test. If reading is still above 0.2 volt, replace faulty negative battery cable. **Note: Certain diesel equipped models use dual batteries. If equipped with dual battery system, this procedure must be performed twice, once for each battery.**

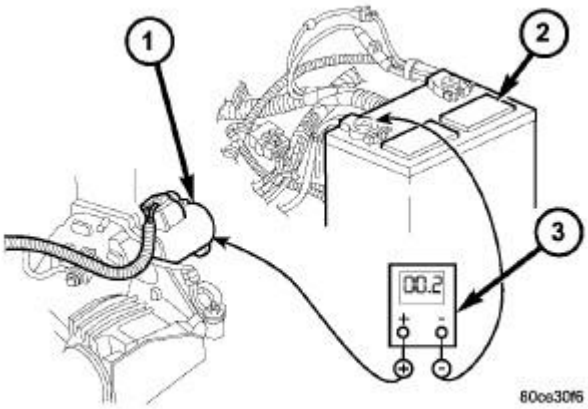

Fig. 6: Testing Starter Ground - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - STARTER MOTOR
2 - BATTERY
3 - VOLTMETER

5. Connect positive lead of voltmeter to starter housing. Connect negative lead of voltmeter to negative battery terminal post. Refer to **Fig. 6**. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, correct poor starter to engine block ground contact. **Note: Certain diesel equipped models use dual batteries. If equipped with dual battery system, this procedure must be performed on driver side battery only.**
6. If equipped with dual battery system (certain diesel equipped models), connect positive lead of voltmeter to positive battery cable clamp on battery located on left side of vehicle. Connect negative lead of voltmeter to positive battery terminal post on battery located on right side of vehicle. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, clean and tighten battery cables at both batteries. Repeat test. If reading is still above 0.2 volt, replace faulty positive battery cable.

   If resistance tests detect no feed circuit problems, refer to **STANDARD STARTING SYSTEM** in the Diagnosis and Testing.

CONTROL CIRCUIT TESTING

The starter control circuit components should be tested in the order in which they are listed, as follows:

- **Starter Relay** - Refer to **Starter Relay** The starter relay is located within the PDC. Refer to **DIAGNOSIS AND TESTING** .
- **Starter Solenoid** - Refer to **STANDARD STARTING SYSTEM** Diagnosis and Testing.
- **Ignition Switch** - Refer to **SWITCH, IGNITION**
- **Clutch Pedal Position Switch** - If equipped with manual transmission, refer to appropriate

information for **Clutch Pedal Position Switch** .

- **Park/Neutral Position Switch** - If equipped with automatic transmission, refer to appropriate transmission information .
- **Wire harnesses and connections** - Refer to appropriate Wiring Diagrams.

SPECIFICATIONS

STARTER MOTOR

Engine Application	Power Rating	Cranking Amperage Draw Test
3.6L	1.2 Kilowatt / 1.6 Horsepower	100 - 300 Amperes
5.7L	1.4 Kilowatt / 1.87 Horsepower	100 - 300 Amperes
* Test at operating temperature. Cold engine, tight (new) engine, or heavy oil will increase starter amperage draw. Starters are equipped with permanent magnets. Never strike the starter case to attempt to loosen a sticking/stuck armature as permanent magnets may crack or break.		

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Battery Cable Nut	5	-	45
Starter B+ Nut	11	-	97
Starter Mounting Bolts - 3.6L, 5.7L	55	40	-

ANTENNA, REMOTE START

DESCRIPTION

DESCRIPTION

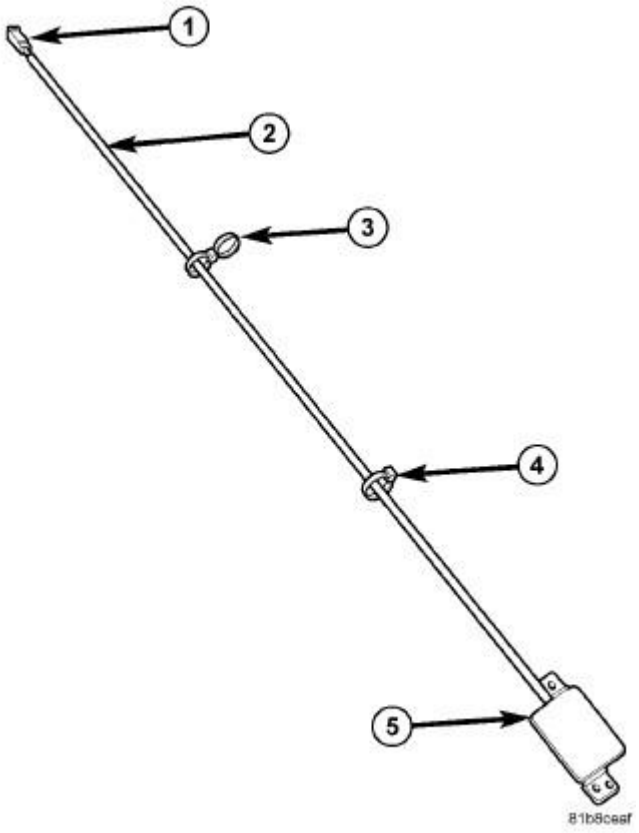

Fig. 7: Remote Start Antenna Module Assembly
Courtesy of CHRYSLER GROUP, LLC

The Remote Start Antenna Module Assembly consists of an electrical connection to the Radio Frequency (RF Hub) - RF Hub (1), a length of coaxial cable (2), two mounting clips (3) and (4), and a control module/antenna (5).

OPERATION

OPERATION

The remote start antenna is located on the roof structure rib above the rear windshield. The antenna interfaces with the Radio Frequency (RF Hub) module through a coaxial electrical cable and electrical connector. The antenna helps to amplify the signal for the Remote Keyless Entry (RKE) key FOBIK.

REMOVAL

REMOVAL

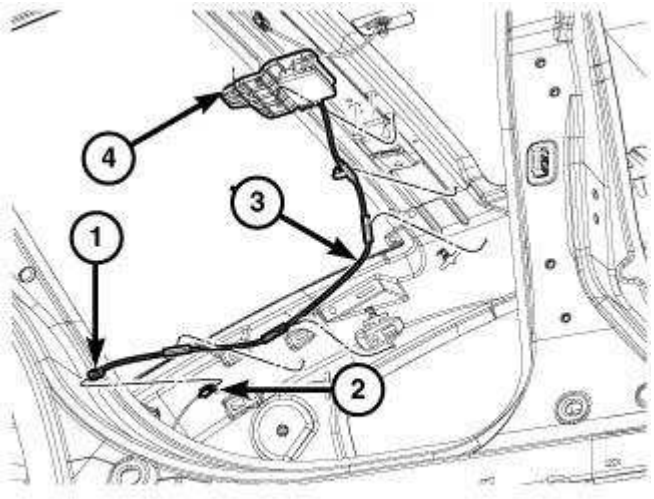

Fig. 8: Remote Start Antenna, RF Hub Module Jump Wire & Remote Start Harness
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the headliner. Refer to **HEADLINER, REMOVAL** .
3. Disconnect the remote start antenna (1) from the RF Hub module jump wire (2) located on the driver side D-pillar.
4. Remove the remote start harness (3) from the D-pillar.
5. Gently pull down on the antenna mounting bracket to remove from the structural support rib.
6. Remove the remote start antenna from the mounting bracket.

INSTALLATION

INSTALLATION

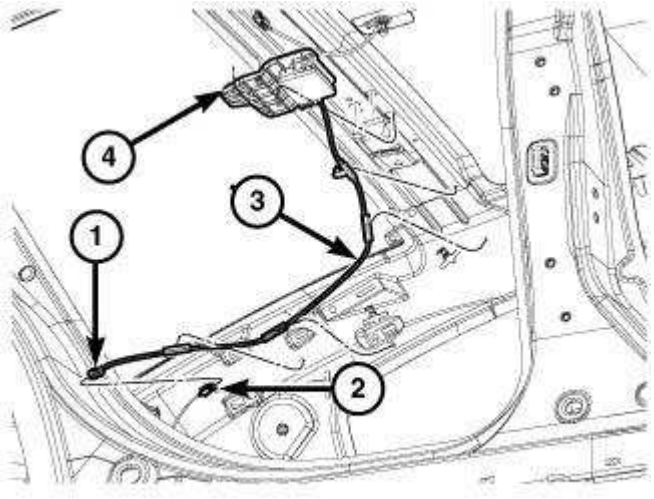

Fig. 9: Remote Start Antenna, RF Hub Module Jump Wire & Remote Start Harness
Courtesy of CHRYSLER GROUP, LLC

1. Mount the remote start antenna (4) to the mounting bracket.
2. Install the antenna and mounting bracket into the structural support rib.
3. Install the remote start harness (3) to the driver side D-pillar.
4. Connect the remote start antenna (1) to the RF Hub module jumper wire (2) located on the D-pillar.
5. Install the headliner. Refer to **HEADLINER, INSTALLATION** .
6. Connect the negative battery cable.

STARTER

REMOVAL

3.0L

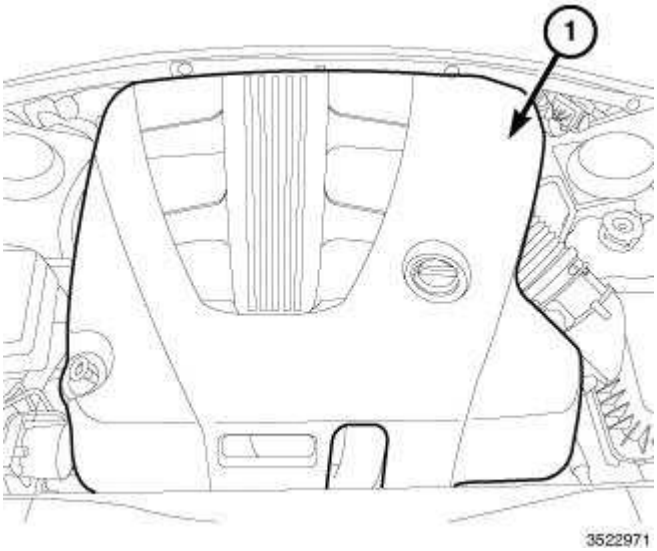

Fig. 10: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

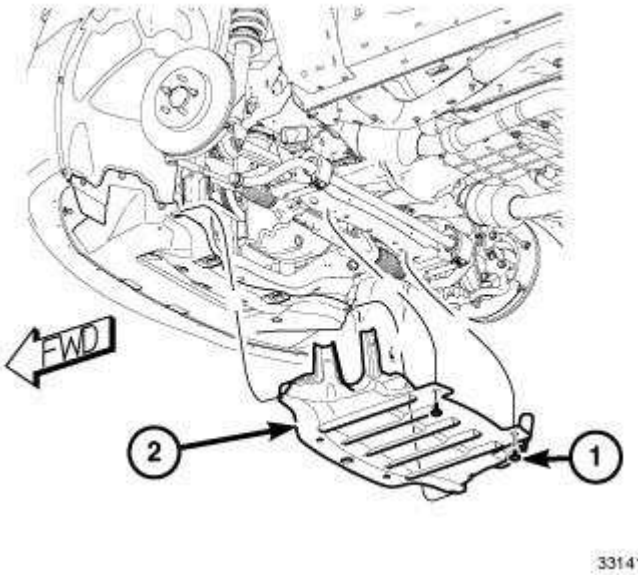

Fig. 11: Rear & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

3. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** .
4. Position aside the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .

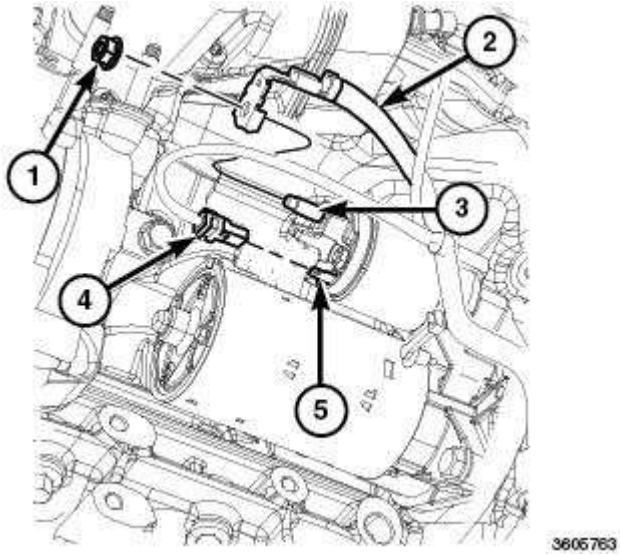

Fig. 12: Nut, B+ Cable, Stud, Wire Harness Connector & Terminal
Courtesy of CHRYSLER GROUP, LLC

5. Remove nut (1) and the B+ cable (2) from the stud (3) and position aside.
6. Disconnect the solenoid wire harness connector (4) from the terminal (5).

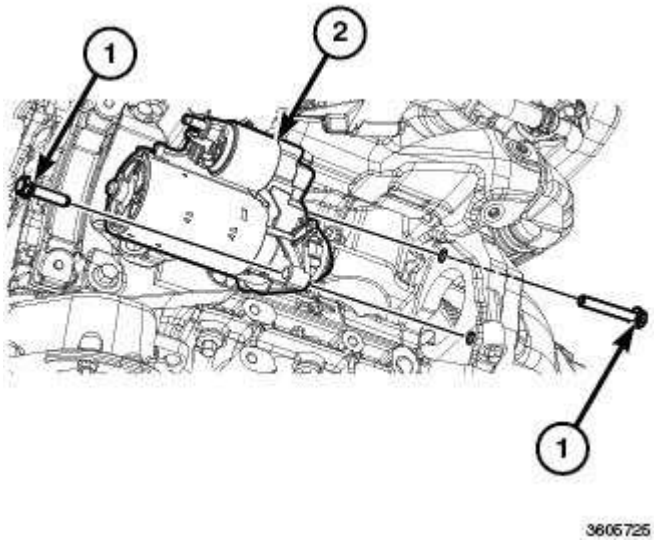

Fig. 13: Bolts & Starter
Courtesy of CHRYSLER GROUP, LLC

7. Remove bolts (1) the starter (2) from the vehicle.

3.6L

1. Disconnect and isolate the negative battery cable at the battery.

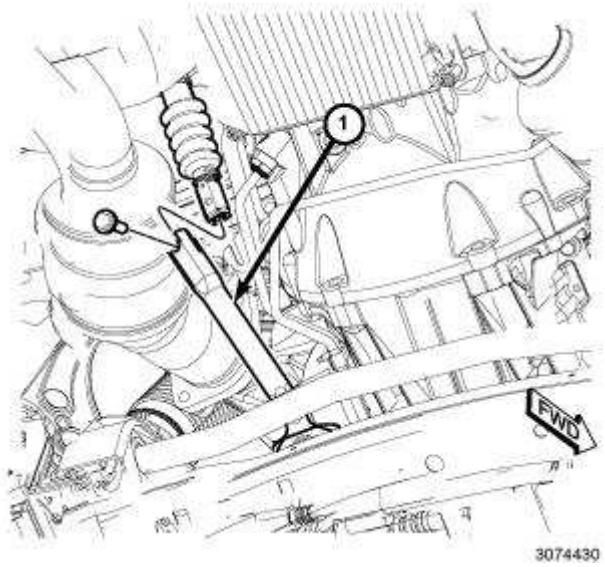

Fig. 14: Steering Gear Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

2. Secure the steering wheel.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Disconnect the steering gear intermediate shaft (1). Refer to **SHAFT, INTERMEDIATE,**

LOWER, REMOVAL or **SHAFT, INTERMEDIATE, UPPER, REMOVAL** .

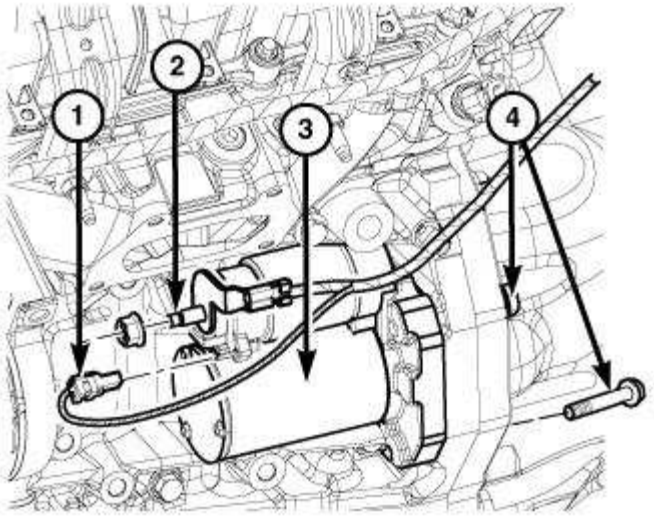

Fig. 15: Starter Solenoid Electrical Connector, Solenoid Stud, Starter Mounting Bolts & Starter Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove the starter solenoid heat shield.
6. Disconnect the starter solenoid electrical connector (1) from the starter solenoid terminal.
7. Remove the battery cable nut and battery cable from the solenoid stud (2).
8. Remove the starter mounting bolts (4), the electrical harness mounting bracket should remain in position.
9. Rotate and remove the starter assembly (3) from the transmission.

5.7L

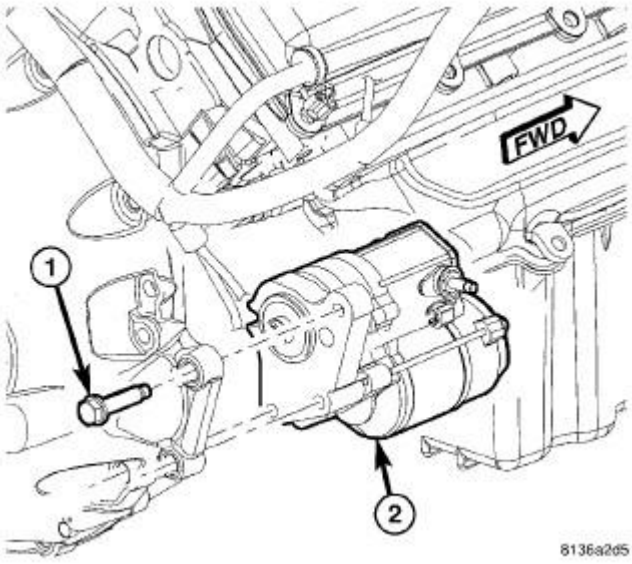

Fig. 16: Starter - 5.7L - RWD
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove the three starter mounting bolts (1).
4. Move the starter motor (2) towards front of vehicle far enough for nose of starter to clear. Always support starter motor (2) during this process. Do not let starter motor hang from wire harness.
5. Remove the battery cable-to-solenoid nut.
6. Remove the solenoid wire from solenoid stud.
7. Remove the starter motor.

5.7L ALL WHEEL DRIVE (AWD)

1. Disconnect and isolate negative battery cable.
2. Secure the steering wheel.
3. Raise and support vehicle.

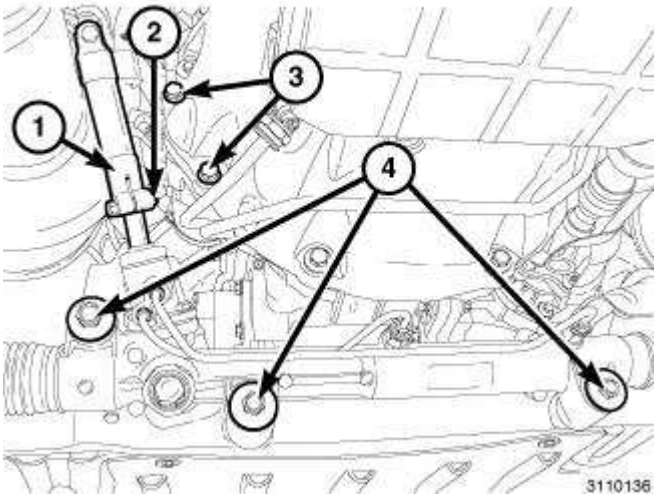

Fig. 17: Steering Gear Intermediate Shaft, Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

The steering gear assembly must be partially lowered to gain access to starter. Do not disconnect any hydraulic hoses or remove any steering linkage. Proceed.

4. Remove the steering gear intermediate shaft (1). Refer to **SHAFT, INTERMEDIATE, LOWER, REMOVAL** or **SHAFT, INTERMEDIATE, UPPER, REMOVAL** .
5. Remove the three steering gear mounting bolts (4) and slightly lower the steering gear. Temporarily support the steering gear.
6. Remove the steering gear heat-shield.

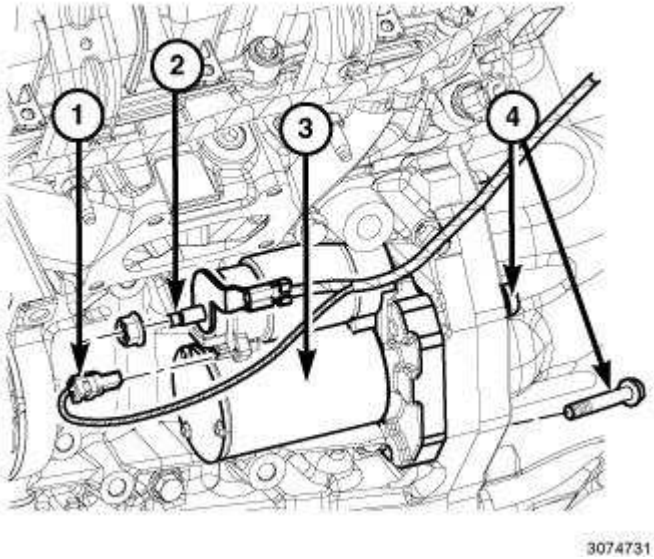

Fig. 18: Starter Solenoid Electrical Connector, Solenoid Stud, Starter Mounting Bolts & Starter Assembly

Courtesy of CHRYSLER GROUP, LLC

7. Remove two starter mounting bolts (4).
8. Move the starter motor (3) towards front of vehicle far enough for nose of starter to clear. Always support starter motor (3) during this process. Do not let starter motor hang from wire harness.
9. Remove battery cable-to-solenoid nut (2)
10. Disconnect the solenoid harness connector (1) from solenoid stud.
11. Remove the starter motor (3).

6.4L

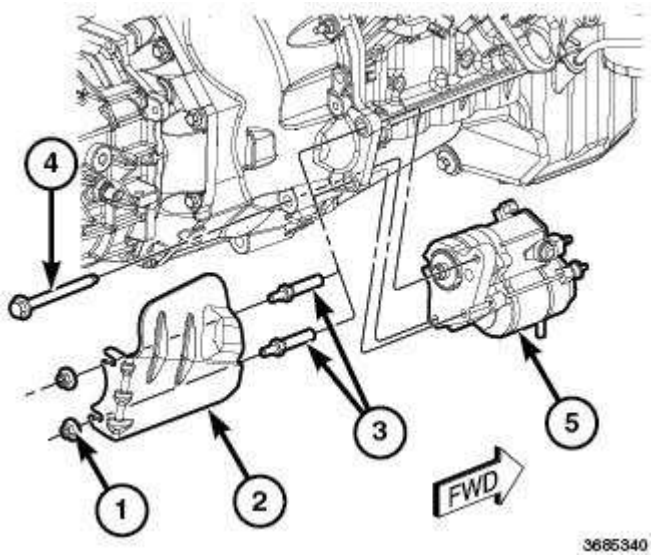

Fig. 19: Two Heat Shield Nuts, Heat Shield, Two Starter Stud Mounting Bolts, Lower Starter Mounting Bolt & Starter Motor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not let starter motor hang from wire harness.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove the two heat shield nuts (1).
4. Remove the heat shield (2).
5. Remove the two starter stud mounting bolts (3).
6. Remove the lower starter mounting bolt (4).
7. Move the starter motor (5) towards front of vehicle far enough for nose of starter to clear. Always support starter motor (5) during this process.
8. Remove the battery cable-to-solenoid nut.
9. Remove the solenoid wire from solenoid stud.

10. Remove the starter motor (5).

INSTALLATION

3.0L

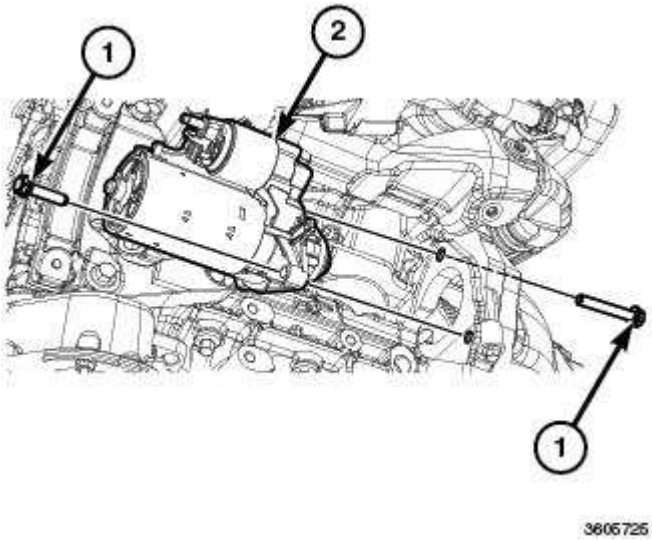

Fig. 20: Bolts & Starter
Courtesy of CHRYSLER GROUP, LLC

1. Install the stater (2). Tighten bolts (1) to 68 N.m (50 ft. lbs.)

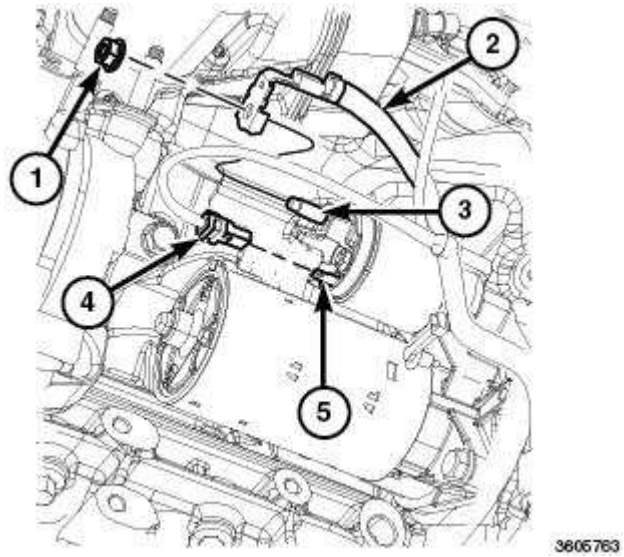

Fig. 21: Nut, B+ Cable, Stud, Wire Harness Connector & Terminal
Courtesy of CHRYSLER GROUP, LLC

2. Connect the solenoid wire harness connector (4) to the solenoid terminal (5).
3. Install the B+ cable (2) to the solenoid stud (3). Tighten nut (1) to 11 N.m (97 in. lbs.).

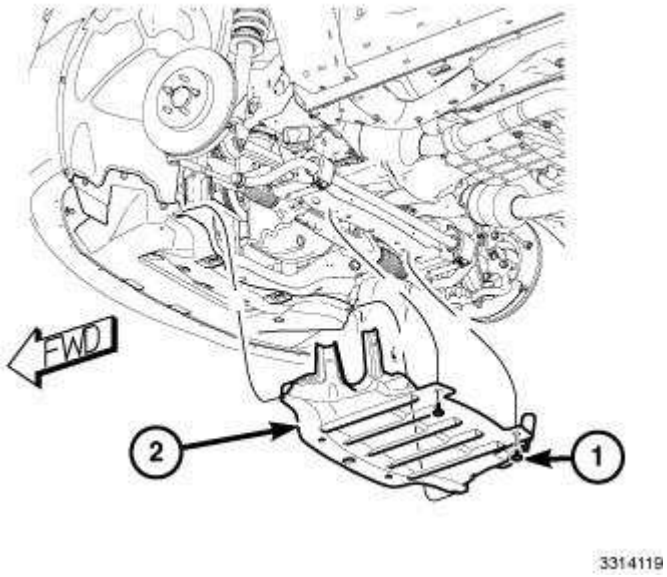

Fig. 22: Rear & Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

4. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .
5. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** .

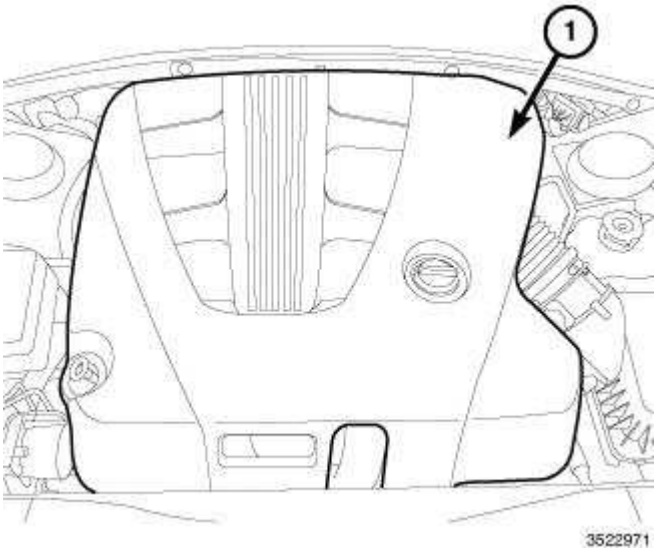

Fig. 23: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

6. Install the engine cover (1).
7. Connect the negative battery cable.

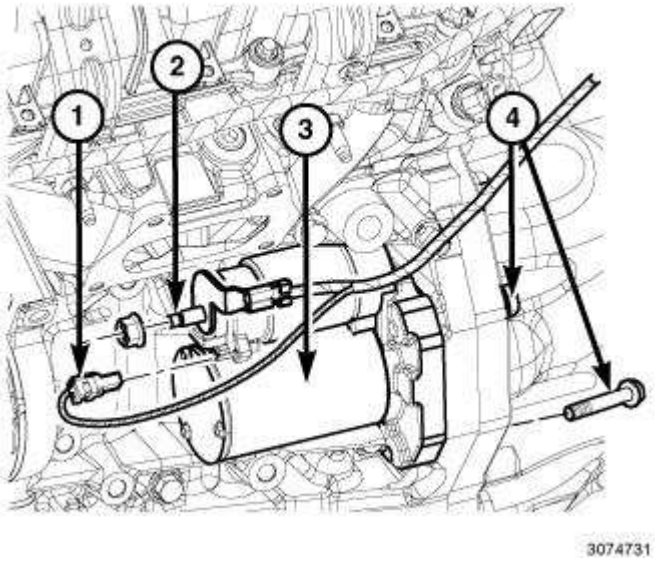

Fig. 24: Starter Solenoid Electrical Connector, Solenoid Stud, Starter Mounting Bolts & Starter Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Position the starter (3) inside the transmission.
2. Install the starter mounting bolts (4) and tighten to 55 N.m (41 ft. lbs.).
3. Connect the starter solenoid electrical connector (1) to starter solenoid terminal.
4. Install the battery cable and nut to the solenoid stud (2). Tighten the nut to 11 N.m (97 in. lbs.).
5. Install the starter solenoid heat shield.

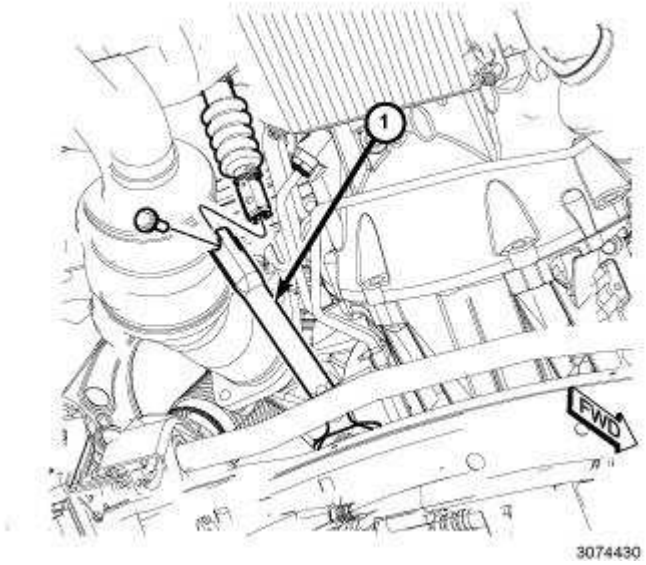

Fig. 25: Steering Gear Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

6. Install the steering gear lower intermediate shaft (1). Refer to **SHAFT, INTERMEDIATE, LOWER, INSTALLATION** or **SHAFT, INTERMEDIATE, UPPER, INSTALLATION** .
7. Remove the steering wheel holder.
8. Connect the negative battery cable and tighten nut to 5 N.m (4.5 in. lbs.).

5.7L

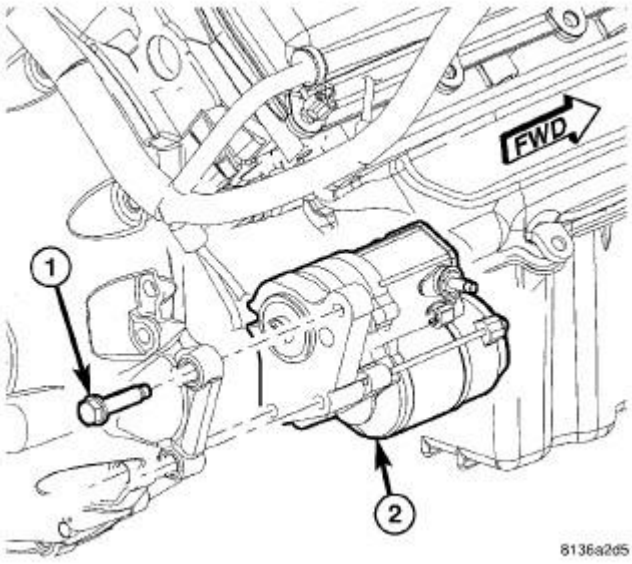

Fig. 26: Starter - 5.7L - RWD
Courtesy of CHRYSLER GROUP, LLC

1. Position the starter (2) into transmission but do not install bolts.
2. Connect the solenoid harness connector to starter motor (snaps on).
3. Position the battery cable to solenoid stud. Install and tighten the battery cable eyelet nut to 11 Nm (97 In.Lbs). Do not allow the starter motor to hang from wire harness.
4. Install and tighten three mounting bolts (1). Tighten the bolts to 54 Nm (40 Ft. Lbs).
5. Lower vehicle.
6. Connect negative battery cable.
7. Start the engine to verify the starter if functioning properly.
8. Turn the ignition off.

5.7L ALL WHEEL DRIVE (AWD)

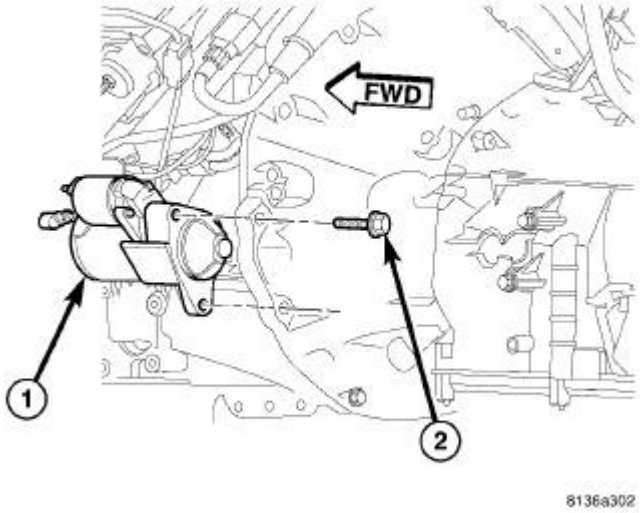

Fig. 27: Starter - 5.7L - AWD
Courtesy of CHRYSLER GROUP, LLC

1. Position starter (1) into transmission but do not install bolts (2).

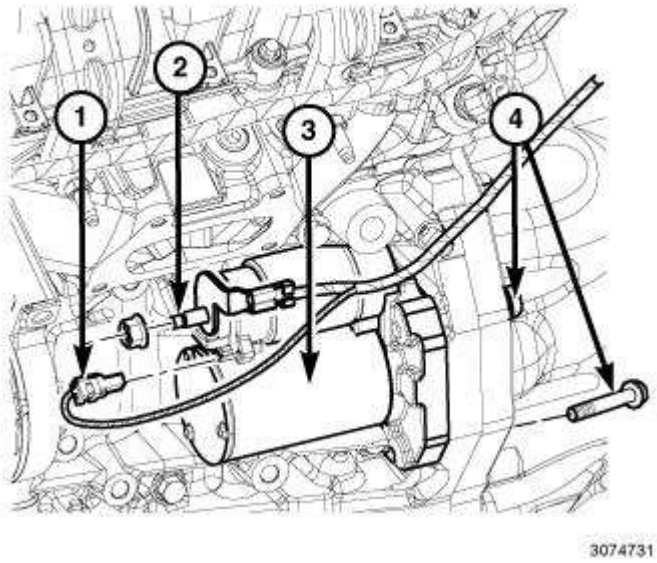

Fig. 28: Starter Solenoid Electrical Connector, Solenoid Stud, Starter Mounting Bolts & Starter Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Connect the solenoid harness connector (1) to starter motor (snaps on).
3. Position the battery cable to solenoid stud (2). Install and tighten battery cable eyelet nut to 11 Nm (97 In. Lbs). Do not allow starter motor to hang from wire harness.
4. Install and tighten both mounting bolts (4). Tighten the bolts to 54 Nm (40 Ft.Lbs).

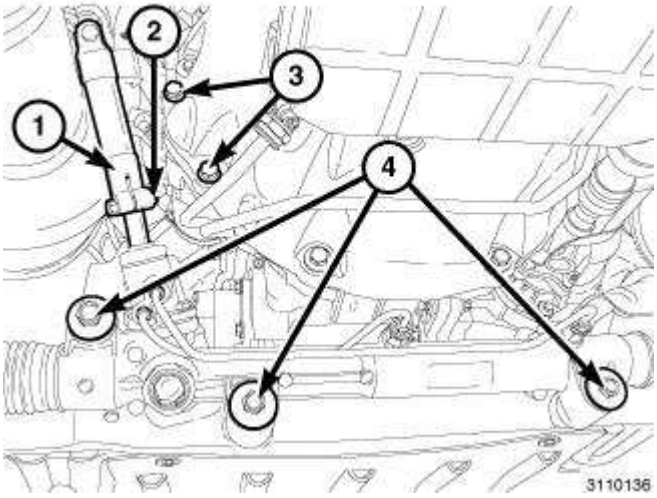

Fig. 29: Steering Gear Intermediate Shaft, Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install steering gear assembly and mounting bolts (4). for torque specifcations. Refer to **SPECIFICATIONS** .
6. Install the steering gear intermediate shaft (1). Refer to **SHAFT, INTERMEDIATE, LOWER, INSTALLATION** or **SHAFT, INTERMEDIATE, UPPER, INSTALLATION** .
7. Install steering gear heat-shield.
8. Lower the vehicle.
9. Connect the negative battery cable.
10. Start the engine to verify the starter is functioning properly.
11. Turn the ignition off.

6.4L

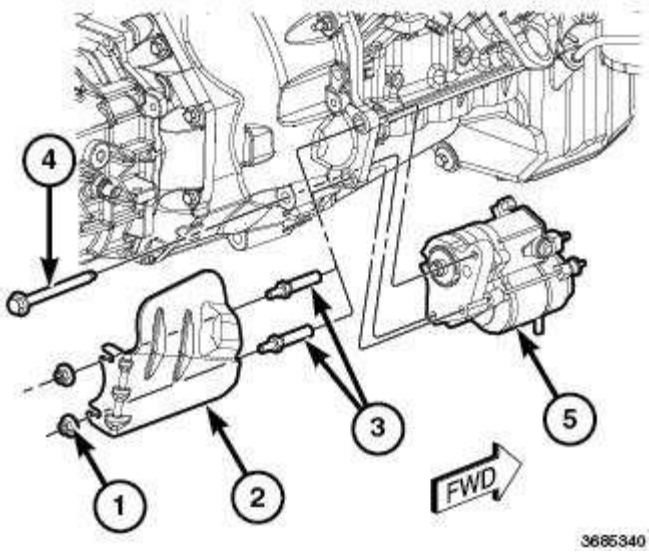

Fig. 30: Two Heat Shield Nuts, Heat Shield, Two Starter Stud Mounting Bolts, Lower Starter Mounting Bolt & Starter Motor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not allow the starter motor to hang from wire harness.

1. Position the starter (5) into transmission but do not install bolts.
2. Connect the solenoid harness connector to starter motor (snaps on).
3. Position the battery cable to solenoid stud and install the battery cable eyelet nut.

   Tighten to 11 N.m (8 ft. lbs.).

4. Install the lower starter mounting retainer (4).
5. Install the two starter stub mounting bolts (3).
6. Tighten all three starter mounting retainers (3) and (4) to 25 N.m (19 ft. lbs.)
7. Install the heat shield (2).
8. Install the shield nuts (1).

   Tighten to 18 N.m (13 ft. lbs.)

9. Lower the vehicle.
10. Connect negative battery cable.

STEERING

Steering System - Chrysler 300

WARNING

WARNING

WARNING: Power steering fluid, engine parts and exhaust system may be extremely hot if engine has been running. Do not start engine with any loose or disconnected hoses. Do not allow hoses to touch hot exhaust manifold or catalyst.

WARNING: Fluid level should be checked with the engine off to prevent personal injury from moving parts.

CAUTION

CAUTION

CAUTION: Anytime the battery has been disconnected and is reconnected it is important that this be performed properly. The vehicle may be equipped with systems that require special calibration processes.

CAUTION: When the power steering system is open, cap all open ends of the hoses, power steering pump fittings or power steering gear ports to prevent entry of foreign material into the components.

CAUTION: When servicing power steering components, do not pinch off power steering hoses in any way to stop fluid flow. Damage to hoses may result.

CAUTION: If the steering wheel is excessively off-center, outside of Chassis specifications, inadvertent ESC activations may occur on a vehicle so equipped.

DESCRIPTION

DESCRIPTION

NON SRT

Non SRT vehicles have a power steering system consisting of:

- Steering column

- Rack and pinion steering gear
- Electro Hydraulic Power Steering (EHPS) pump
- Return and Pressure Hoses
- Reservoir integrated with EHPS pump
- Inner and Outer tie rod ends

SRT

SRT vehicles have a power steering system consisting of:

- Steering column
- Rack and pinion steering gear
- Belt driven hydraulic steering pump with integrated reservoir
- Pump pressure, return and supply hoses
- Oil Cooler
- Inner and Outer tie rod ends

DIAGNOSIS AND TESTING

POWER STEERING FLOW AND PRESSURE TEST- NON SRT

The following procedure is used to test the operation of the power steering system on this vehicle. This test will provide the gallons per minute (GPM) or flow rate of the power steering pump along with the maximum relief pressure. Perform this test anytime a power steering system problem is present. This test will determine if the power steering pump or power steering gear is not functioning properly. The following test is performed using the Power Steering Analyzer Kit (special tool #6815, Kit, Power Steering) (with appropriate hoses), Adapters from Power Steering Analyzer Adapter Kit (special tool #6893A, Kit, Power Steering), and Power Steering Adapter (special tool #10250, Adapters, Power Steering). Refer to **SPECIAL TOOLS**.

1. Assemble Power Steering Analyzer as follows:
    1. Gauge end (inlet) of Flow Meter And Gauge (special tool #6800, Analyzer, Power Steering) - Hose (special tool #6905, Assembly, Hose), Adapter (special tool #10250-1, Adapters, Power Steering).
    2. Valve end (outlet) of Flow Meter And Gauge (special tool #6800, Analyzer, Power Steering) - Hose (special tool #6959, Assembly, Hose), Adapter (special tool #10250-2, Adapters, Power Steering).

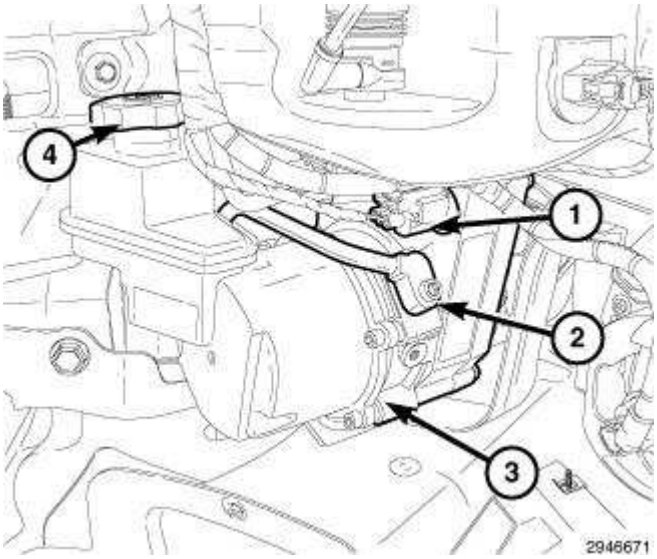

Fig. 1: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

Disconnect and isolate battery negative cable from battery post.

2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the right front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
4. Unthread pressure hose retaining bolt (1) at Electro Hydraulic Power Steering (EHPS) pump (3).
5. Connect Adapter (special tool #10250-1, Adapters, Power Steering) to pressure fitting on power steering pump. Tighten retaining bolt to 10 N.m (89 in. lbs.)
6. Connect power steering pressure hose to Adapter Fitting (special tool #10250-2, Adapters, Power Steering). Tighten retaining bolt to 10 N.m (89 in. lbs.).
7. Open Analyzer test valve completely.
8. Start engine and move the steering wheel back and forth several times to circulate power steering fluid through Analyzer flow meter and hoses.
9. Shut off engine and check fluid level; add fluid as necessary. Repeat 8 and 9until air is bled from system.
10. Start engine and allow to idle.
11. Check Analyzer gauge pressure. Initial pressure reading should be less than 862 kPa (125 psi). If pressure is higher, inspect hoses for restrictions and repair as necessary.

NOTE: Always test for and repair Diagnostic Trouble Codes (DTCs) prior to replacement of the EHPS pump. The EHPS pump will not vary output if there are communication DTCs.

12. Record the flow meter reading (GPM) at idle with no steering wheel movement, and again while turning the wheel as fast as possible. The readings should be within specifications. If the readings are below specifications, replace the power steering pump.

CAUTION: The following test procedure involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five seconds as the pump could be damaged.

13. Close valve fully three times and record highest pressure indicated each time. **All three readings must be above specifications and within 345 kPa (50 psi) of each other.**
    - Power steering pump pressures above specifications but not within 345 kPa (50 psi) of each other, replace pump.
    - Pressures within 345 kPa (50 psi) of each other but below specifications, replace pump.

CAUTION: Do not force the pump to operate against the stops for more than 2 to 4 seconds at a time because, pump damage will result.

14. Completely open the valve on the Power Steering Analyzer. Turn the steering wheel to the extreme left until the stop in the steering gear is met, then turn the steering wheel to the right until the right stop is met. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest recorded output pressure reading against one stop is not within 345 kPa (50 psi) of the highest recorded reading at the other stop, the steering gear is leaking internally and must be replaced.

PUMP SPECIFICATION

SYSTEM	RELIEF PRESSURE ± 75	FLOW RATE (GPM)
EHPS	11721 kPa (1700 psi) at idle with no steering wheel rotation.	1.0 - 2.1 GPM at idle with no steering wheel rotation.
EHPS	11721 kPa (1700 psi) turning steering wheel to wheel stops.	Momentarily raises to between 1.5 - 2.5 GPM at idle with rapid steering wheel rotation.

POWER STEERING FLOW AND PRESSURE TEST - SRT

The following procedure is used to test the operation of the power steering system on this vehicle. This test will provide the gallons per minute (GPM) or flow rate of the power steering pump along with the maximum relief pressure. Perform this test anytime a power steering system problem is present. This test will determine if the power steering pump or power steering gear is not functioning properly. The following test is performed using the Power Steering Analyzer Kit (special tool #6815, Kit, Power Steering) (with appropriate hoses) and Adapters from Power Steering Analyzer Adapter Kit (special tool #6893A, Kit, Power Steering). Refer to **SPECIAL TOOLS**.

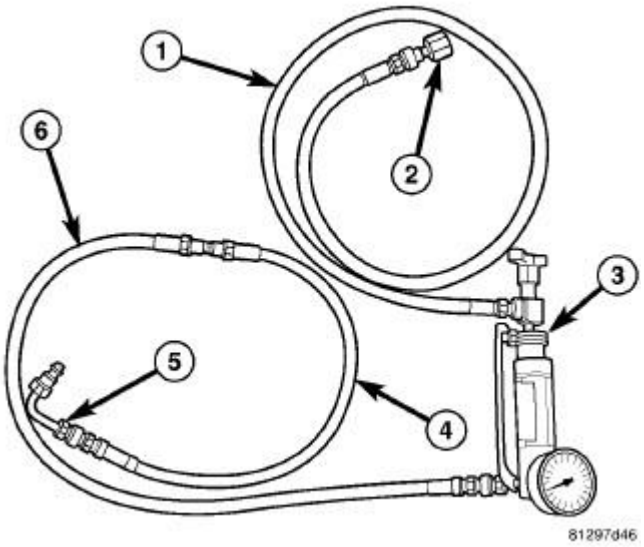

Fig. 2: Analyzer Setup To Test AT Pump
Courtesy of CHRYSLER GROUP, LLC

1. Check power steering belt to ensure it is in good condition and adjusted properly.
2. Assemble Power Steering Analyzer as follows:
    1. Gauge end (inlet) of Flow Meter And Gauge (special tool #6800, Analyzer, Power Steering) (3) - Hose (special tool #6905, Assembly, Hose) (6), Hose (special tool #6713, Hose, Power Steering) (4), Adapter Tube (special tool #6844, Adapter, Power Steering (Truck)) (5)
    2. Valve end (outlet) of Flow Meter And Gauge (special tool #6800, Analyzer, Power Steering) (3) - Hose (special tool #6959, Assembly, Hose) (1), Adapter Fitting (special tool #6826, Adapter, LH P/S Tester) (2)
3. Unthread pressure hose tube nut at power steering pump.
4. Connect Adapter Tube (special tool #6844, Adapter, Power Steering (Truck)) to pressure fitting on power steering pump. Tighten tube nut to specifications. Refer to **SPECIFICATIONS**.
5. Connect power steering pressure hose to Adapter Fitting (special tool #6826, Adapter, LH P/S Tester). Tighten tube nut to specifications. Refer to **SPECIFICATIONS**.
6. Open Analyzer test valve completely.
7. Start engine and allow to idle long enough to circulate power steering fluid through Analyzer flow meter and hoses.
8. Shut off engine and check fluid level; add fluid as necessary. Repeat 7 and 8 until air is bled from system.
9. Start engine and allow to idle.
10. Check Analyzer gauge (3) pressure. Initial pressure reading should be less than 1379 kPa (300 psi). If pressure is higher, inspect hoses for restrictions and repair as necessary.
11. Increase engine speed to 1, 200 RPM for SRT8 and read Analyzer Flow Meter. The reading should be 8.2 LPM (2.2 GPM) minimum. If flow reading is below specification, replace power

steering pump.

CAUTION: The following test procedure involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five seconds as the pump could be damaged.

12. Close valve fully three times and record highest pressure indicated each time. **All three readings must be above specifications and within 345 kPa (50 psi) of each other.**
    - Power steering pump pressures above specifications but not within 345 kPa (50 psi) of each other, replace pump.
    - Pressures within 345 kPa (50 psi) of each other but below specifications, replace pump.

CAUTION: Do not force the pump to operate against the stops for more than 2 to 4 seconds at a time because, pump damage will result.

13. Completely open the valve on the Power Steering Analyzer. Turn the steering wheel to the extreme left until the stop in the steering gear is met, then turn the steering wheel to the right until the right stop is met. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest recorded output pressure reading against one stop is not within 345 kPa (50 psi) of the highest recorded reading at the other stop, the steering gear is leaking internally and must be replaced.

PUMP SPECIFICATIONS

VEHICLE	RELIEF PRESSURE
SRT Vehicles	11307 to 11997 kPa (1640-1740 psi)

STEERING DIAGNOSIS CHARTS

NOTE: There are three diagnosis charts following that cover NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES, PERFORMANCE ISSUES, and FLUID ISSUES.

NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
OBJECTIONABLE HISS OR WHISTLE WHILE TURNING STEERING WHEEL WHEN STATIONARY OR MOVING SLOWLY*()	1. Damaged or mispositioned steering column shaft/coupling dash boot seal.	1. Check to ensure boot is properly installed and seals against sheet metal. Reposition or replace steering column shaft/coupling dash boot seal as necessary.
	2. Mis-routed power steering hose.	2. Check routing of power steering hoses. Ensure hoses do not come in unwanted contact with other components and objects.

	3. Restriction in pressure or return hose.	3. Using an electronic listening tool, determine if noise is coming from either pressure or return hose. Replace hose that noise is present within.
	4. Noisy valve in power steering gear.	4. For evaluation and correction. Refer to **GEAR, DIAGNOSIS AND TESTING**.
RATTLE OR EXCESSIVE CLUNK**()	1. Power steering gear loose on engine cradle/crossmember.	1. Check fastener torque and tighten to specifications. Replace as necessary. Check steering wheel center following repair.
	2. Loose strut assembly mounting fasteners at tower or knuckle.	2. Check fastener torque and tighten to specifications.
	3. Excessive play in outer tie rod.	3. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
	4. Engine cradle/crossmember mounting fasteners loose at frame or bushings worn.	4. Check fastener torque and tighten to specifications. Inspect bushings and repair as necessary.
	5. Wheel mounting (lug) nuts loose.	5. Inspect wheel mounting (lug) nuts and studs and repair as necessary. Tighten nuts to specifications.
	6. Power steering hose touching the body or frame of vehicle.	6. For evaluation and correction. Refer to **PUMP, DIAGNOSIS AND TESTING**.
	7. Stabilizer bar link joints worn (occurs with steering input only when moving, not stationary).	7. At park, jounce only one side of vehicle front to exercise stabilizer bar. Replace stabilizer bar link.
	8. Loose lower control arm or tension strut mounting bolts at engine cradle, frame or crossmember (occurs with steering input only when moving, not stationary).	8. Check control arm or tension strut mounting bolts and tighten to specified torque.
	9. Loose intermediate shaft or column.	9. Rotate intermediate (steering) shaft in relationship to gear, checking for free-play. Check column fasteners and tighten to specifications as necessary.
	10. Lower control arm pivot bushing worn (occurs with steering input only when moving, not stationary).	10. Inspect bushings for wear and replace lower control arm as necessary.
	11. Internal power steering	11. Drive vehicle on rough road, then

	gear noise.	steer rapidly back and forth when stopped. Replace power steering gear as necessary.
	12. Loose inner tie rod.	12. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
	13. Damaged engine cradle/crossmember.	13. Inspect the cradle/crossmember for cracks or other damage. Replace as necessary.
POPPING NOISE	1. Loose steering gear mounting fasteners.	1. Check fasteners for proper torque and retighten as necessary.
	2. Loose outer tie rod mounting nut or jam nut.	2. Check fastener torque. Replace nuts as necessary and tighten to specifications.
	3. Loose intermediate (steering) shaft coupling at gear input shaft.	3. Make sure coupling is fully seated on gear input shaft. Retighten or re-seat as necessary.
	4. Worn tie rod (outer or inner).	4. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
	5. Worn axle half-shaft.	5. For evaluation and correction. Refer to **FRONT HALF SHAFT** or **REAR HALF SHAFT** .
WHINE, GROWL, MOAN OR GROAN (POWER STEERING PUMP)***	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid).
	2. Air in power steering fluid.	2. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. Refer to **STANDARD PROCEDURE**.
	3. Power steering hose touching body or frame of vehicle.	3. For evaluation and correction. Refer to **PUMP, DIAGNOSIS AND TESTING**.
	4. Wear of power steering pump internal components.	4. For evaluation and correction. Refer to **PUMP, DIAGNOSIS AND TESTING**.
COLD START WHINE OR MOAN (POWER STEERING PUMP)***()	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid).
	2. Extremely low ambient temperature (near -18 C°(0 F°) or below).	2. Some noise is expected as pump attempts to pull cold, thick fluid. Noise should go away as vehicle warms up. Acceptable levels of excessive noise are

		one second at -18 C°(0 F°) and 15 seconds at -29 C° (-20 F°). If noise is excessive, look for poor sealing on the return hose or a possible fluid leak.
SQUEAKING OR RUBBING SOUND	1. Steering column shroud or shaft rubbing.	1. While turning the steering wheel, listen down column to locate. Check interference between moving components. Move or realign shrouds or shaft as necessary. Replace components if this does not correct problem.
	2. Clockspring inside steering column noisy.	2. Remove clockspring and reinstall steering wheel for testing. If noise is gone, replace clockspring.
	3. Boot/dash seal lubrication inadequate.	3. Remove boot seal and recheck for noise. Lubricate seal as necessary.
	4. Steering gear outer tie rod noisy.	4. While a helper turns the steering wheel, use an electronic listening tool to determine if noise is coming from either outer tie rod. Replace outer tie rods as necessary.
	5. Steering gear internally noisy.	5. Remove dash seal boot, then exercise the steering wheel. If noise is still present at gear, replace steering gear.
SCRUBBING OR KNOCKING SOUND	1. Incorrect tire or wheel size.	1. Replace incorrect size tire or wheel with original equipment size.
	2. Worn motor or transmission mount.	2. Drive vehicle, moving accelerator pedal rapidly up and down attempting to locate noise. Try in both forward and reverse. Replace mounts as necessary.
	3. Tires contacting wheel well.	3. Make sure wheel house is properly positioned. If not, reposition as necessary. If steering wheel is properly centered, check steering gear travel left to right by rotating the steering wheel to each stop. Steering wheel should rotate the same amount in both directions from center. If not, replace steering gear.
	4. Interference between moving steering components and other components.	4. Check for bent or misaligned components. Correct or replace as necessary.

NOTE: **() * There is some noise in all power steering systems. One of the most common is a hissing sound evident when turning the steering wheel when at**

a standstill or when parking and the steering wheel is at the end of its travel. Hiss is a very high frequency noise similar to that experienced while slowly closing a water tap. The noise is present in every valve and results when high velocity fluid passes valve orifice edges. There is no relationship between this noise and the performance of the steering system.

NOTE: **() ** A light clunk may be felt or heard during steering wheel reversal while vehicle is stationary. This results from internal steering gear rack movement at the bushings and in no way affects the performance of the steering system. This movement may be felt in the steering components during steering wheel reversal.**

NOTE: **() *** Power steering pump growl/moan/groan results from the development of high pressure fluid flow. Normally this noise level should not be high enough to be objectionable.**

PERFORMANCE ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
STEERING WHEEL OR COLUMN HAS FREE-PLAY/LASH/LOOSENESS (CLUNKING OR RATTLING)	1. Loose coupling pinch bolt at gear input shaft.	1. Check pinch bolt torque. Replace pinch bolt if equipped with thread locker patch and tighten to specifications.
	2. Power steering gear loose on cradle/crossmember.	2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications.
	3. Excessive free-play or noise from steering column bearings.	3. Replace steering column.
	4. Excessive intermediate (steering) shaft coupling U-joint free-play.	4. Rotate steering wheel back-and-forth while watching coupling. Observe for free-play. Replace intermediate shaft as necessary.
	5. Loose or worn outer tie rod.	5. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
	6. Lack of lubrication in lower ball joint or ball joint is damaged.	6. For evaluation. Refer to **BALL JOINT, SUSPENSION, LOWER, DIAGNOSIS AND TESTING** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
	7. Excessive lash inside	7. Disconnect intermediate shaft and

	steering gear.	turn steering gear input shaft. Observe for any movement without a corresponding tire movement. Replace steering gear as necessary.
STEERING WHEEL HAS FORE AND AFT LOOSENESS	1. Steering wheel retaining bolt loose.	1. Check steering wheel retaining bolt torque and tighten to specifications as necessary.
	2. Loose steering column to instrument panel fasteners.	2. Check steering column to instrument panel fastener torque and tighten to specifications as necessary.
	3. Steering column lower bearing spring retainer slipped on steering column shaft.	3. Pull steering wheel fore-and-aft while observing movement. Replace steering column as necessary.
STEERING WHEEL, DASH OR VEHICLE VIBRATES DURING STEERING MANEUVERS (ESPECIALLY AT LOW SPEED OR STANDSTILL)	1. Air in power steering fluid.	1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. Refer to **STANDARD PROCEDURE**.
	2. Tire(s) not properly inflated.	2. Check and inflate tires to the specified pressure.
	3. Excessive engine vibration.	3. Ensure that the engine is tuned properly.
	4. Loose tie rod end jam nut.	4. Check torque and tighten the inner to outer tie rod jam nut to specifications.
	5. Overcharged air conditioning (A/C) system.	5. Turn A/C off and verify issue goes away. Repair A/C as necessary.
	6. Grounded, damaged or loose engine mount.	6. Visually inspect for damaged or misaligned mounts. Check fastener torque. Replace, realign or retighten as necessary.
	7. Loose or worn outer tie rod. 8. Steering gear noisy.	7. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**. 8. During a parking event at 0 mph, verify there is vibration only with steering. Steer in both directions and verify that the noise follows the steering input. Check TSB's for any known issue. Replace steering gear as necessary.
STEERING CATCHES,	1. Low power steering	1. Check fluid level and fill to proper

SURGES OR STICKS IN CERTAIN POSITIONS OR IS DIFFICULT TO TURN	fluid level.	level as necessary. Check for leaks. Make sure all air is bled from system.
	2. Tire(s) not properly inflated.	2. Check and inflate tires to the specified pressure.
	3. Loose or slipping power steering/accessory drive belt.	3. Verify belt tension. Replace belt auto-tensioner and belt as necessary.
	4. Lack of lubrication in lower ball joint or ball joint is damaged.	4. For evaluation, refer to **BALL JOINT, SUSPENSION, LOWER, DIAGNOSIS AND TESTING** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
	5. Lack of lubrication in steering gear outer tie rod end(s).	5. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
	6. Faulty power steering pump.	6. Perform Power Steering Flow and Pressure Test. Refer to **DIAGNOSIS AND TESTING**. Look for low or erratic flow or pressure. Replace power steering pump as necessary.
	7. Excessive friction in intermediate shaft/coupler joint.	7. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler joint.
	8. Excessive friction in steering column.	8. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary.
	9. Worn or binding seat and bearing in front strut assembly.	9. Disconnect outer tie rod ends from knuckles, then turn tire and wheel assembly checking for smooth operation. Replace front strut assembly seat and bearing.
	10. Faulty steering gear.	10. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for

		smooth operation. Replace steering gear (only after all previous components have been checked).
STEERING WHEEL DOES NOT RETURN TO CENTER POSITION	1. Tire(s) not properly inflated.	1. Check and inflate tires to the specified pressure.
	2. Improper front wheel alignment.	2. Check and adjust wheel alignment as necessary.
	3. Lack of lubrication in lower ball joint or ball joint is damaged.	3. For evaluation. Refer to **BALL JOINT, SUSPENSION, LOWER, DIAGNOSIS AND TESTING** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
	4. Excessive friction in intermediate shaft/coupler joint.	4. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler joint.
	5. Excessive friction in steering column.	5. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary.
	6. Worn or binding seat and bearing in front strut assembly.	6. Disconnect steering gear outer tie rod ends at knuckles, then turn tire and wheel assembly in and out checking for smooth operation. Replace seat and bearing as necessary.
	7. Excessive friction in power steering gear.	7. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for smooth operation. Replace steering gear (only after all previous components have been checked).
EXCESSIVE STEERING WHEEL KICKBACK FROM ROAD INPUTS	1. Air in power steering fluid.	1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. Refer to

		STANDARD PROCEDURE.
	2. Power steering gear loose on cradle/crossmember.	2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications.
	3. Steering column, coupling or intermediate shaft worn or loose.	3. Rotate steering wheel back-and-forth while inspecting intermediate shaft going into steering gear. Look for excessive free-play. Retighten if loose bolt is found. Replace steering column, coupling or intermediate shaft if necessary.
	4. Power steering pump flow is too low.	4. Perform Power Steering Flow and Pressure Test. Refer to **DIAGNOSIS AND TESTING**. Look for low or erratic flow or pressure. Replace power steering pump as necessary.

FLUID ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
LOW FLUID LEVEL WITH VISIBLE LEAK	1. Loose power steering hose fittings or connections.	1. Check torque on all tube nuts (at gear and pump). Inspect clamps at all rubber hose connections for correct position, damage and tension. Tighten tube nuts as required. Reposition or replace clamps at hose connections. Clean joints and reinspect for leaks.
	2. Damaged or missing O-ring at power steering hose tube nuts.	2. Remove tube nut and inspect O-ring. If damaged or missing, replace O-ring. Clean joints and reinspect for leaks.
	3. Power steering line or hose failure.	3. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace hoses as necessary.
	4. Power steering component leaking (reservoir, pump, gear).	4. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace power steering component as necessary.
AERATED FLUID*	1. Low power steering fluid level.	1. Check fluid level and fill to proper level as necessary. Check for leaks. Make sure all air is bled from system.
	2. Air leak at power steering supply hose, reservoir or pump.	2. Inspect components. Place a hand vacuum pump with Adapter 9688 on reservoir and verify that system can sustain vacuum. System should not lose more than 1 psi (7 kPa) in 2 minutes (make sure vacuum pump is sealed well to the

		reservoir). Replace steering component as necessary.
RESERVOIR FLUID OVERFLOW OR FLUID THAT IS MILKY IN COLOR	1. Water contamination of power steering fluid.	1. Inspect fluid for milky appearance. Completely drain power steering fluid. Refill and bleed system. Refer to **STANDARD PROCEDURE**.

NOTE: *** Extremely cold temperatures may cause power steering fluid aeration. The air should work its way out of the system as the fluid warms.**

STANDARD PROCEDURE

STANDARD PROCEDURE

POWER STEERING SYSTEM BLEEDING

WARNING: Fluid level should be checked with the engine OFF to prevent personal injury from moving parts and to assure an accurate fluid level reading.

CAUTION: There is an Electro-Hydraulic Power Steering (EHPS) pump on some vehicles requiring a different fluid. Do not mix power steering fluid types. Damage may result to the power steering pump and system if any other fluid is used. The mechanical power steering pump systems on this vehicle require the use of Power Steering Fluid +4, which meets material specification MS-9602 or equivalent. The EHPS system uses fluid which meets material specification MS-11655 or equivalent. Do not overfill.

CAUTION: If the air is not purged from the power steering system correctly, pump failure could result.

NOTE: **Be sure the vacuum tool used in the following procedure is clean and free of any fluids.**

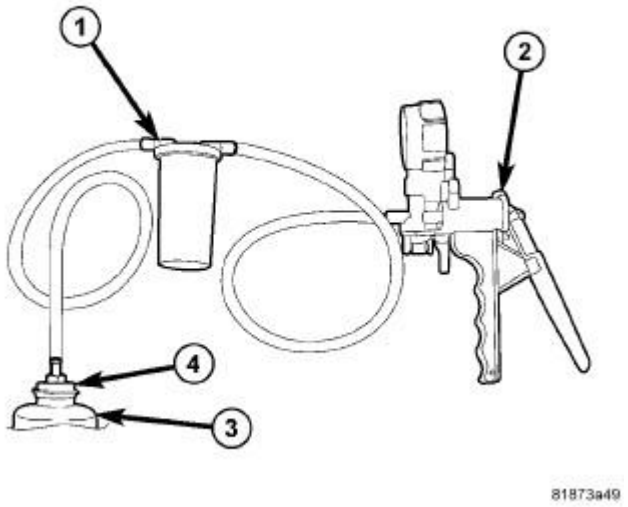

Fig. 3: Hand Vacuum Pump On Reservoir
Courtesy of CHRYSLER GROUP, LLC

1. Check the fluid level. When the fluid is at normal ambient temperature, approximately 21° - 27° C (70° - 80° F), the fluid level should read between the MAX and MIN markings. When the fluid is hot, fluid level is allowed to read up to the MAX line.

   CAUTION: Do not fill fluid beyond the MAX mark. Check cap seal for damage and replace if needed.

2. Remove the cap from the fluid reservoir and fill the power steering fluid reservoir up to the MAX marking with the correct power steering fluid as follows:
   - With a mechanical power steering pump - Mopar® Power Steering Fluid +4 or equivalent, which meets Chrysler Material Standard MS-9602.
   - With an Electro-Hydraulic Power Steering (EHPS) - Mopar® Hydraulic Power Steering Fluid or equivalent, which meets Chrysler Material Standard MS-11655.
3. Tightly insert the (special tool #9688A, Cap Adapter, Power Steering Pump) into the mouth of the reservoir (3).

   CAUTION: Failure to use a vacuum pump reservoir (1) may allow power steering fluid to be sucked into the hand vacuum pump.

4. Attach (special tool #C-4207-A, Vacuum Pump, Hand) (2) or equivalent, with reservoir (1) attached, to the Power Steering Cap Adaptor (4).

   CAUTION: Do not run the vehicle while vacuum is applied to the power steering system. Damage to the power steering pump can occur.

NOTE: **When performing the following step make sure the vacuum level is maintained during the entire time period.**

5. Using Hand Vacuum Pump (2), apply 68-85 kPa (20-25 in. Hg) of vacuum to the system for a minimum of three minutes.
6. Slowly release the vacuum and remove the special tools.
7. Adjust the fluid level as necessary. Refer to 1.
8. Repeat 1 through7 until the fluid no longer drops when vacuum is applied.
9. Start the engine and cycle the steering wheel lock-to-lock three times.

NOTE: **Do not hold the steering wheel at the stops.**

10. Stop the engine and check for leaks at all connections.
11. Check for any signs of air in the reservoir and check the fluid level. If air is present, repeat the procedure as necessary.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
DASH SEAL MOUNTING NUTS	7	-	62
GEAR MOUNTING BOLTS - AWD	102	75	-
GEAR MOUNTING BOLTS - RWD	95	70	-
HOSE TUBE NUTS	47	35	-
INNER TIE ROD NUT	88	65	-
OUTER TIE ROD BALL JOINT NUT	35 + 90° TURN	26 + 90° TURN	-
PRESSURE FITTING BOLT - ELECTRO HYDRAULIC POWER STEERING (EHPS) PUMP	10	--	89
EHPS PUMP TO FRONT BUMPER MOUNTING BOLTS AND NUT	12	9	108
EHPS PUMP TO FRAME MOUNTING BOLTS	50	37	-
LOWER INTERMEDIATE SHAFT PINCH BOLTS	45	33	-
UPPER INTERMEDIATE SHAFT PINCH BOLTS	45	33	-
TIE ROD HEAT SHIELD - AWD	10	7	89
TIE ROD JAM NUT	75	55	-

SPECIAL TOOLS

SPECIAL TOOLS

	10250 - Adapters, Power Steering 10250-1 - Adapters, Power Steering (Originally Shipped In Kit Number(s) 10250.) 10250-2 - Adapters, Power Steering (Originally Shipped In Kit Number(s) 10250.) 6713 - Hose, Power Steering 6800 - Analyzer, Power Steering 6815 - Kit, Power Steering (Originally Shipped In Kit Number(s) 6784, 6809, 6898.) 6826 - Adapter, LH P/S Tester (Originally Shipped In Kit Number(s) 6893A, 6894, 6895, 6897, 6898.) 6844 - Adapter, Power Steering (Truck) (Originally Shipped In Kit Number(s) 6896.) 6893A - Kit, Power Steering (Originally Shipped In Kit Number(s) 6896.) 6905 - Assembly, Hose (Originally Shipped In Kit Number(s) 6896.) 6936 - Spacer (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948.) 6959 - Assembly, Hose (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948, 6949.) 9360 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.) 9688A - Cap Adapter, Power Steering Pump (Originally Shipped In Kit Number(s) 10075A-DOD, 10075-CHRYSLER, 10075-DODGE.) 9962 - Puller, P/S Pulley (Originally Shipped In Kit Number(s) 9962.) 9962-2 - Collet, Half, Pulley Remover (Originally Shipped In Kit Number(s) 9962.) 9962-3 - Button, Thrust (Originally Shipped In Kit Number(s) 9962.) 9962-4 - Button, Thrust (Originally Shipped In Kit Number(s) 9962.) C-4063-2 - Forcing Screw (Originally Shipped In Kit Number(s) 9398, C-4063-2.) C-4063C - Installer, P/S Pulley C-4207-A - Vacuum Pump, Hand C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)

COLUMN

DESCRIPTION

DESCRIPTION

WARNING: The airbag system is a sensitive, complex electro-mechanical unit. Before attempting to diagnose, remove or install the airbag system components you must first disconnect and isolate the battery negative (ground) cable. Then wait two minutes for the system capacitor to discharge. Failure to do so could result in accidental deployment of the airbag and possible personal injury. The fasteners, screws, and bolts, originally used for the airbag components, have special coatings and are specifically designed for the airbag system. They must never be replaced with any substitutes. Anytime a new fastener is needed, replace with the correct fasteners provided in the service package or fasteners listed in the parts books.

CAUTION: Do not hammer on steering column shaft. This may cause damage to the column internally.

NOTE: When servicing the steering wheel after removing the old bolt, a NEW bolt must be used when installing.

NOTE: When servicing the steering coupler a NEW bolt must be used when installing.

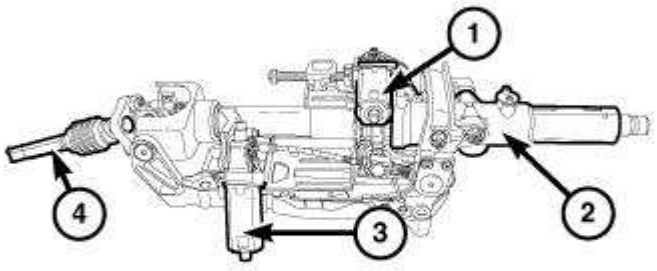

Fig. 4: Electronic Tilt/Telescope, Tilt Motor & Telescoping Motor
Courtesy of CHRYSLER GROUP, LLC

There are two types of columns available: electronic tilt/telescope (2) and manual tilt/telescope (not shown). Each type of column has been designed to be serviced as an assembly less wiring, switches,

steering wheel, etc.

The tilt motor (3) can be replaced separately from the column, but the telescoping motor (1) is serviced with the column. The upper intermediate shaft (4) can also be serviced separately from the column.

The electronic tilt and telescope column is operated by a switch on the column located below the multi-function switch. The movement of the column is controlled by the memory seat module. Refer to **MODULE, MEMORY, OPERATION** .

When servicing any component of the steering column, refer to Restraints and observe all WARNINGS and CAUTIONS. Refer to **WARNING** .

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - STEERING COLUMN

If the vehicle is involved in a front end collision or the air bag has deployed or both, the steering column must be replaced.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
DASH SEAL MOUNTING NUTS	7	-	62
STEERING COLUMN MOUNTING BOLTS	27	20	-
STEERING COLUMN MOUNTING NUTS	27	20	-
STEERING COUPLING PINCH BOLT - AT LOWER INTERMEDIATE SHAFT	45	33	-
STEERING COUPLING PINCH BOLT - AT UPPER INTERMEDIATE SHAFT	45	33	-
STEERING WHEEL RETAINER BOLT	75	55	-

REMOVAL

REMOVAL

WARNING: Before servicing the steering column the airbag system must be disarmed. Failure to do so may result in accidental deployment of the airbag and possible personal injury. Refer to AIR BAG, DRIVER, REMOVAL .

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and

locked/inhibited from rotating can result in steering column module damage. Refer to CLOCKSPRING, STANDARD PROCEDURE .

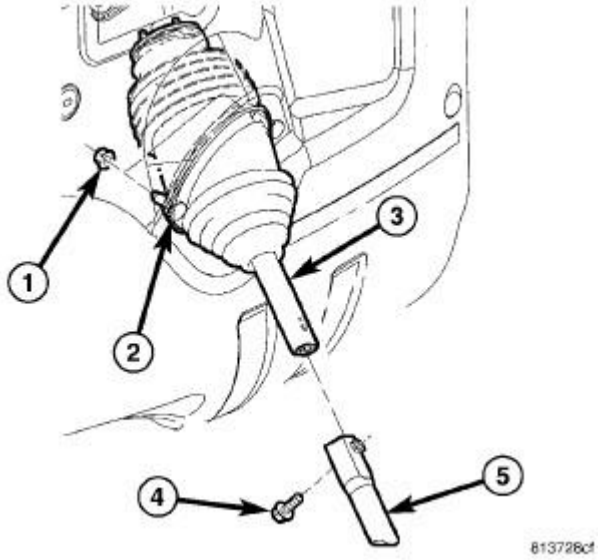

Fig. 5: Shaft Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Position front wheels straight ahead.
2. Fully extend the telescoping column.
3. Disconnect and isolate the negative (ground) cable from the battery.
4. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove the pinch bolt (4) connecting the upper intermediate shaft (3) to the lower intermediate shaft (5).
6. Separate the lower intermediate shaft (5) from the upper intermediate shaft (3).

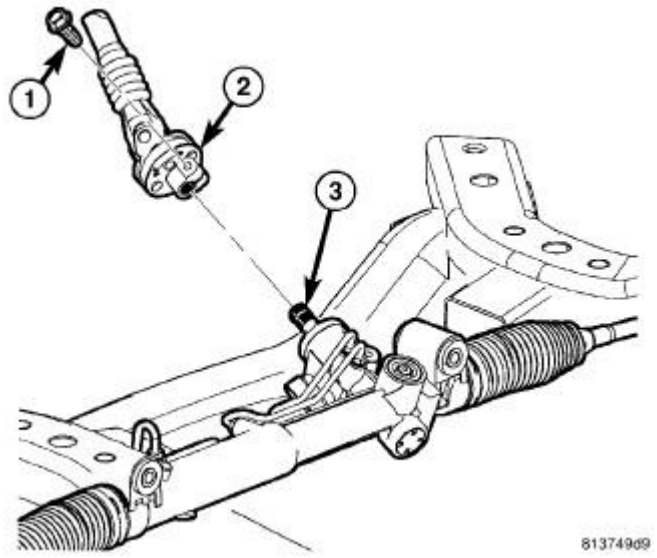

Fig. 6: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

7. Remove the pinch bolt (1) from the lower intermediate shaft (2) at the steering gear (3).
8. Carefully separate the intermediate shaft (2) from the steering gear (3).
9. Remove the intermediate shaft (2) from the vehicle.

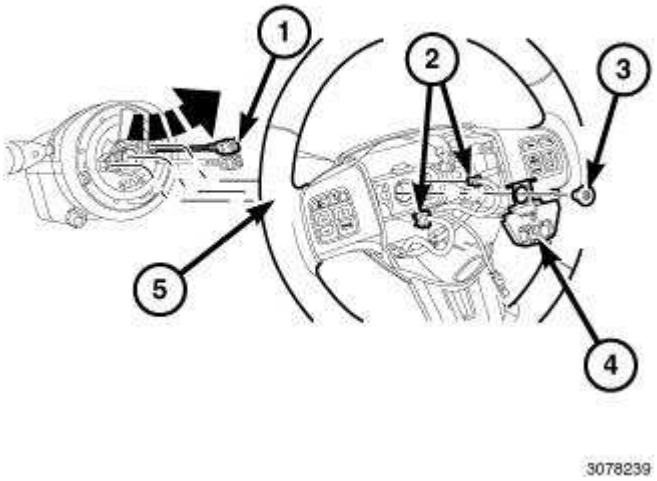

Fig. 7: Pinch Bolt, Steering Wheel Electrical Connectors, Steering Wheel Bolt & Wheel Damper
Courtesy of CHRYSLER GROUP, LLC

10. Lower the vehicle.
11. Remove the airbag. Refer to **AIR BAG, DRIVER, REMOVAL** .
12. Disconnect steering wheel electrical connectors (2) and remove the steering wheel bolt (3).

13. Remove the steering wheel damper (4) and slide the steering wheel (5) off the steering column assembly.
14. Inhibit rotation of the steering column with adhesive tape/or strap.

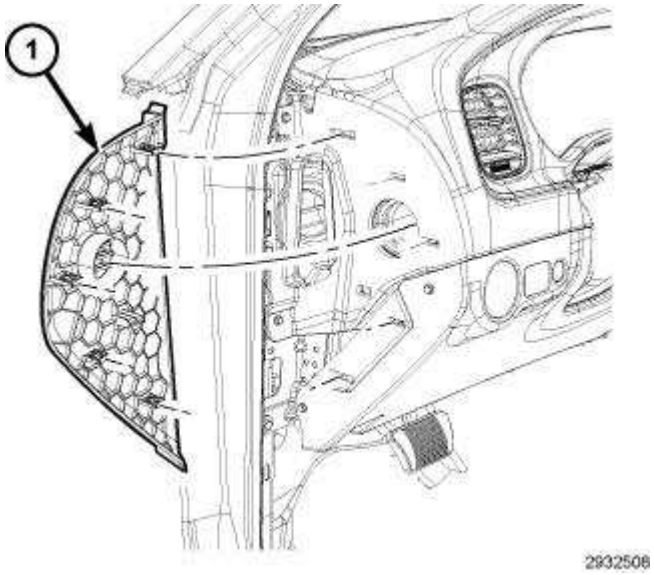

Fig. 8: End Cap
Courtesy of CHRYSLER GROUP, LLC

15. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, gently pry between the end cap (1) and the instrument panel to release the snap retainers that secure the end cap.

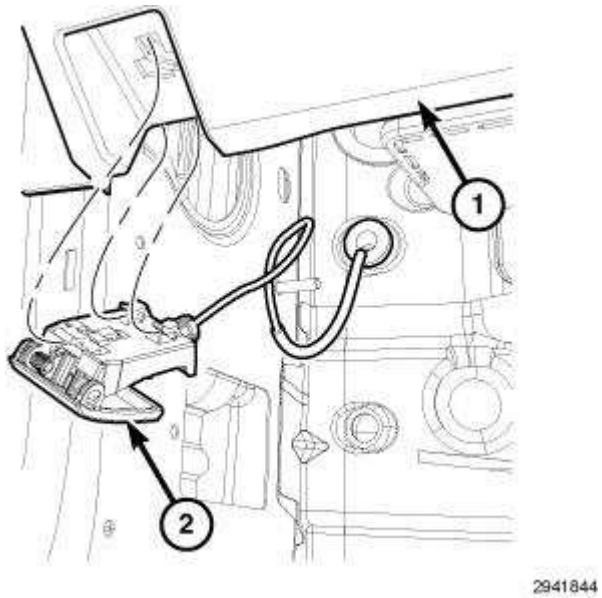

Fig. 9: Hood Release Handle
Courtesy of CHRYSLER GROUP, LLC

16. Remove the hood release handle (2) from the knee blocker trim by pushing down then pulling

out on the handle.

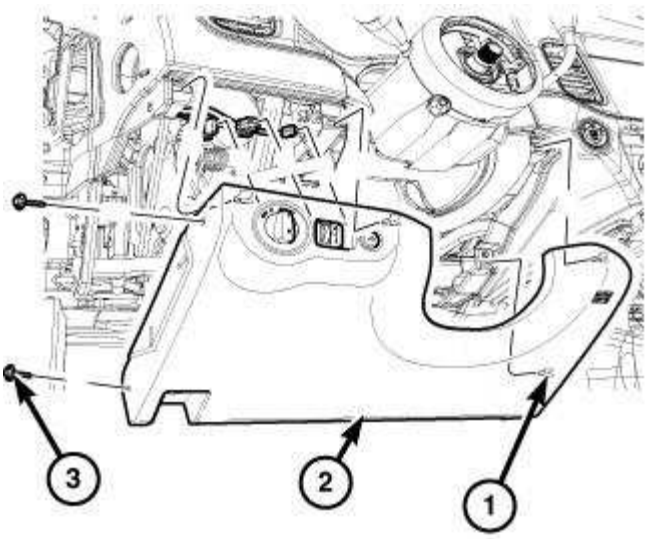

Fig. 10: Two Side Screws, Lower Screw & Knee Blocker Trim
Courtesy of CHRYSLER GROUP, LLC

17. Remove the two side screws (3) and the lower screw (1) securing the knee blocker trim (2) to the instrument panel.
18. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, partially remove the upper portion of the knee blocker trim (2) by gently prying between the knee blocker trim (2) and the instrument panel to release the upper snap retainers.**Do not remove the knee blocker trim or pull with excessive force.**
19. Remove the wood grain pieces of trim on either side of the column, if equipped.

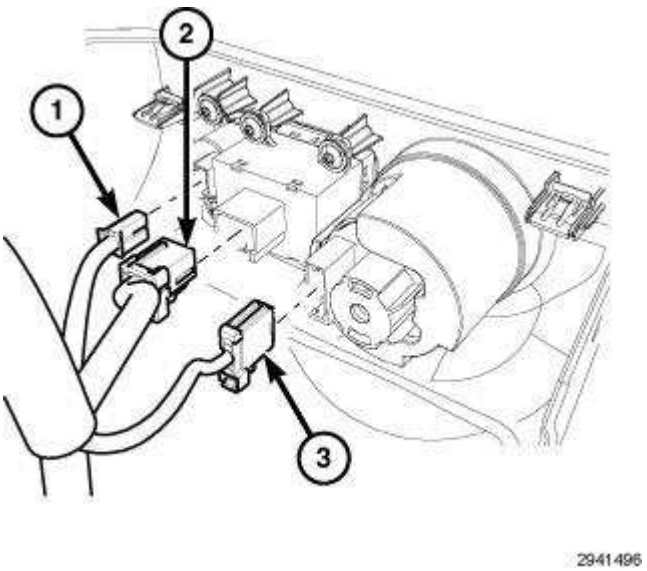

Fig. 11: Light Switch Harnesses

Courtesy of CHRYSLER GROUP, LLC

20. Disconnect the light switch harnesses (1, 2 & 3) from the switch and finish removing the knee blocker trim.

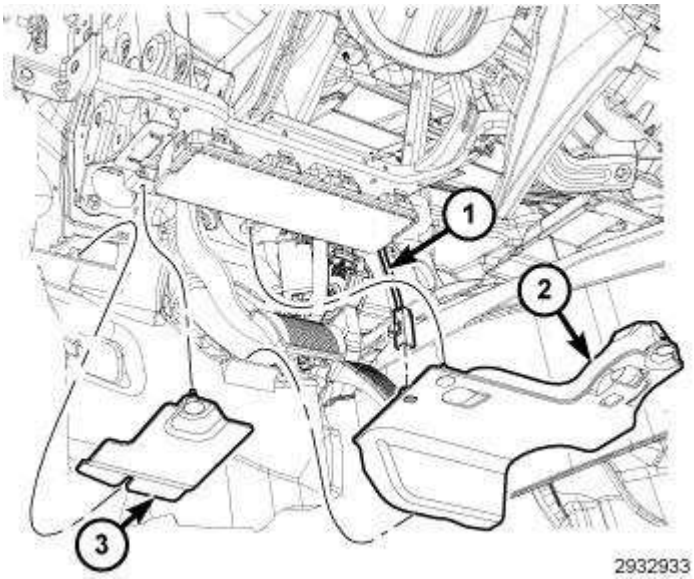

Fig. 12: LED Harness & Left Side Instrument Panel Silencers
Courtesy of CHRYSLER GROUP, LLC

21. Disconnect the LED harness (1) and remove the left side instrument panel silencers (2, 3).
22. Remove the knee blocker air bag (if equipped). Refer to **AIR BAG, KNEE BLOCKER, REMOVAL** .
23. Remove the steering column module. Refer to **MODULE, STEERING COLUMN, REMOVAL** .

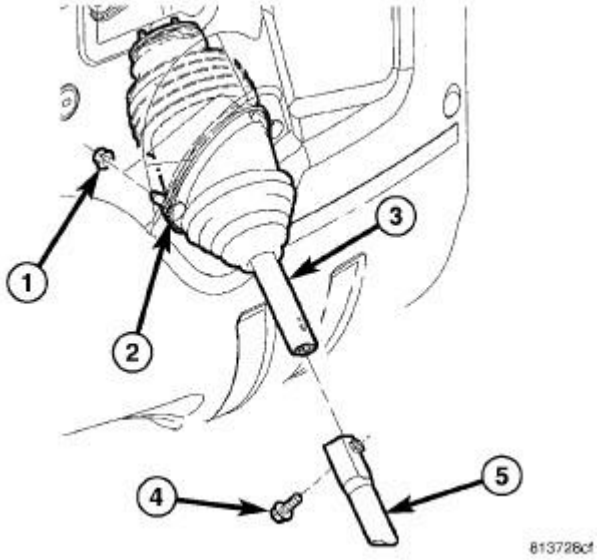

Fig. 13: Shaft Retaining Nuts

Courtesy of CHRYSLER GROUP, LLC

24. Remove two intermediate shaft boot retaining nuts (1) at the bulkhead (2).

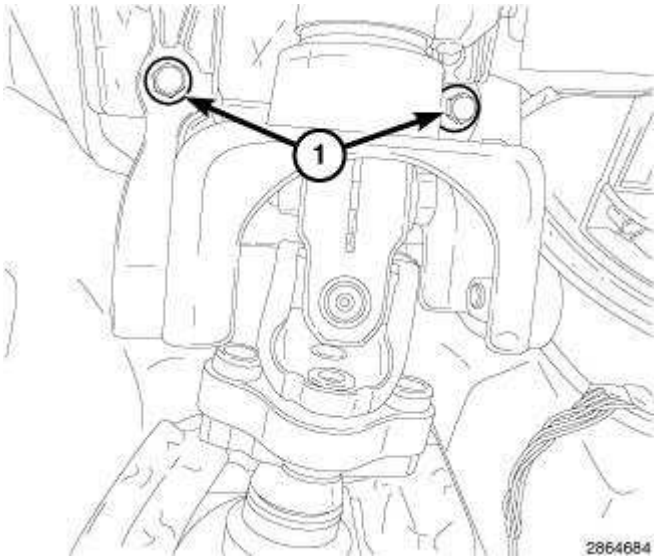

Fig. 14: Front Two Column Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

25. Disconnect electrical connectors for power tilt and telescope motors, if equipped.
26. Remove front two column mounting bolts (1).

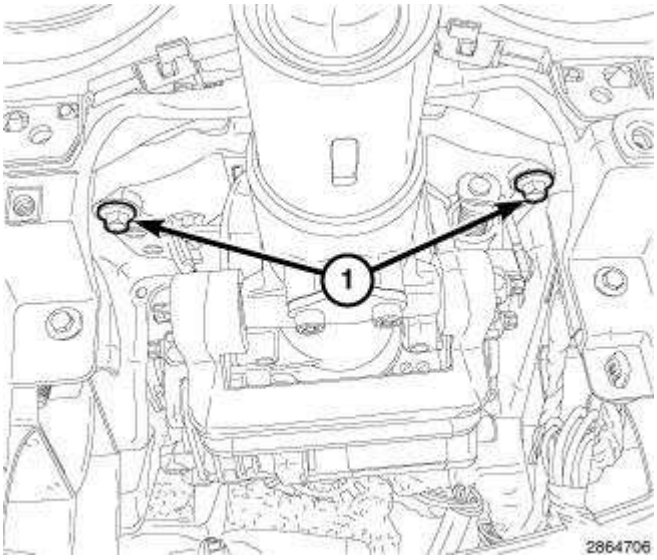

Fig. 15: Two Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

27. Support the column and remove the two mounting nuts (1).
28. Remove column from the vehicle.

INSTALLATION

INSTALLATION

WARNING: Before servicing the steering column the airbag system must be disarmed. Failure to do so may result in accidental deployment of the airbag and possible personal injury. Refer to AIR BAG, DRIVER, INSTALLATION .

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage. Refer to CLOCKSPRING, STANDARD PROCEDURE .

NOTE: Make sure the front wheels are still in the straight ahead position.

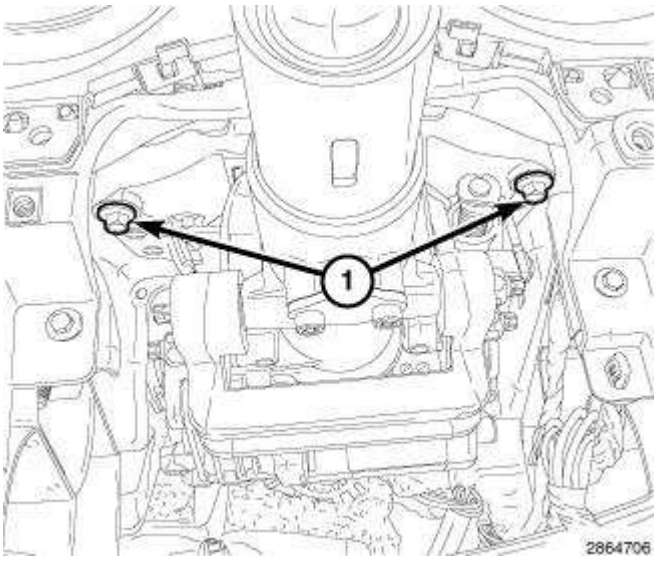

Fig. 16: Two Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Install the column into the vehicle and lift the column up into place. Loosely install the mounting nuts (1), do not tighten at this time.

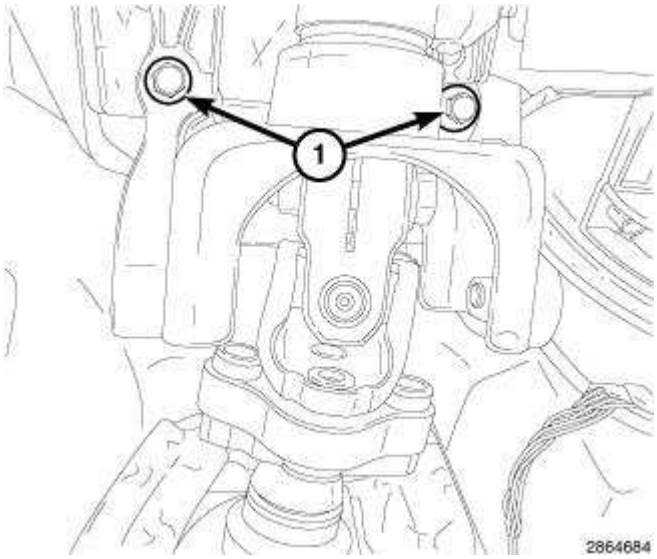

Fig. 17: Front Two Column Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the two mounting bolts (1) and tighten all four mounting fasteners to 27 N.m (20 ft.lbs.).
3. Connect electrical connectors to tilt and telescope motors, if equipped.

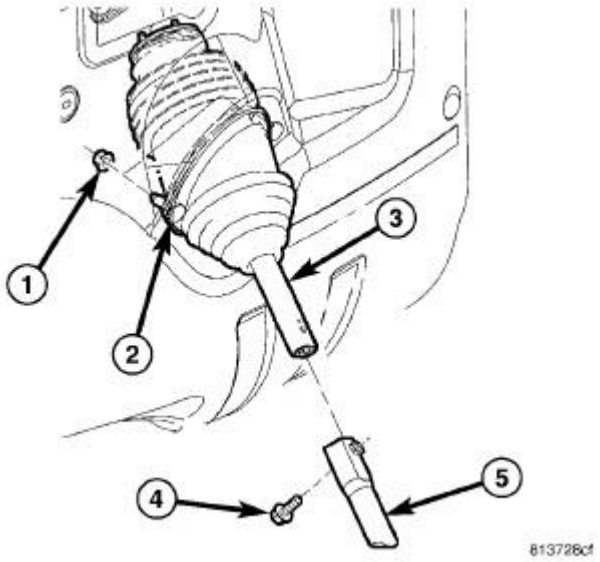

Fig. 18: Shaft Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Center the boot for the steering column at the bulkhead (2). Install and tighten the two mounting nuts (1) to 7 N.m (62 in. lbs.).

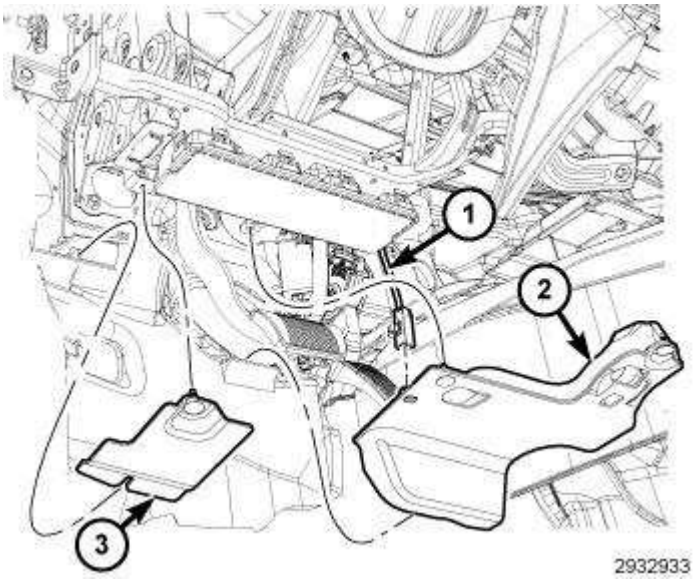

Fig. 19: LED Harness & Left Side Instrument Panel Silencers
Courtesy of CHRYSLER GROUP, LLC

5. Connect the LED harness (1) and install the left side instrument panel silencers (2, 3).

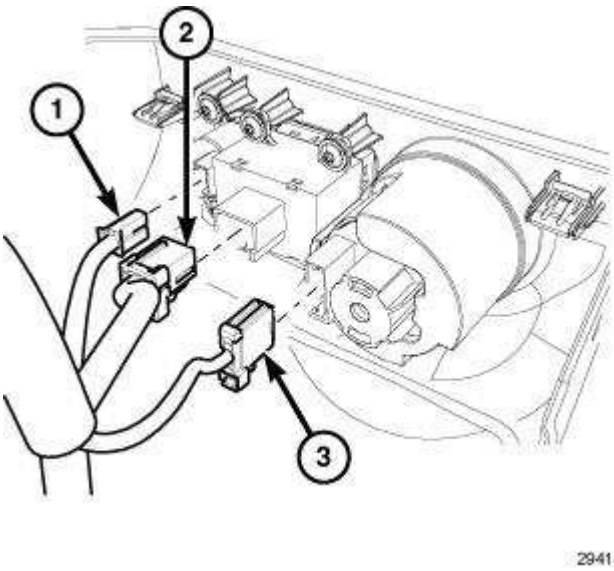

Fig. 20: Light Switch Harnesses
Courtesy of CHRYSLER GROUP, LLC

6. Connect the light switch harnesses (1, 2 & 3) to the switch located on the knee blocker trim.

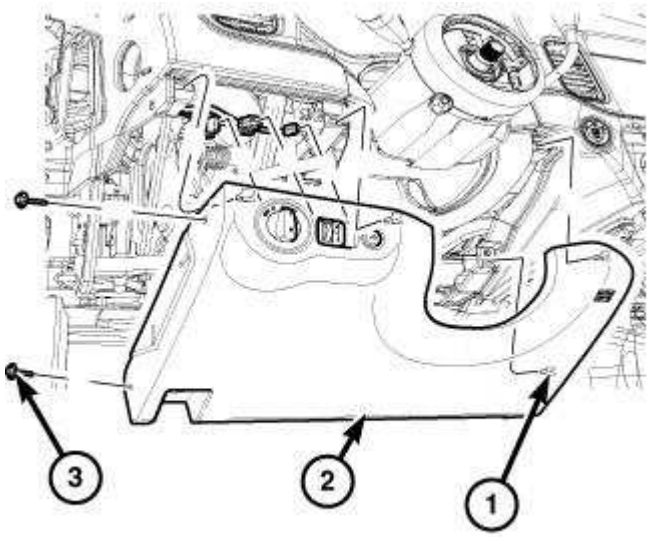

Fig. 21: Two Side Screws, Lower Screw & Knee Blocker Trim
Courtesy of CHRYSLER GROUP, LLC

7. Install the upper portion of the knee blocker trim (2) by pushing on the knee blocker trim (2) to engage the upper snap retainers.
8. Install the two side screws (3) and the lower screw (1) securing the knee blocker trim (2) to the instrument panel. Tighten the screws to 30 in-lbs.

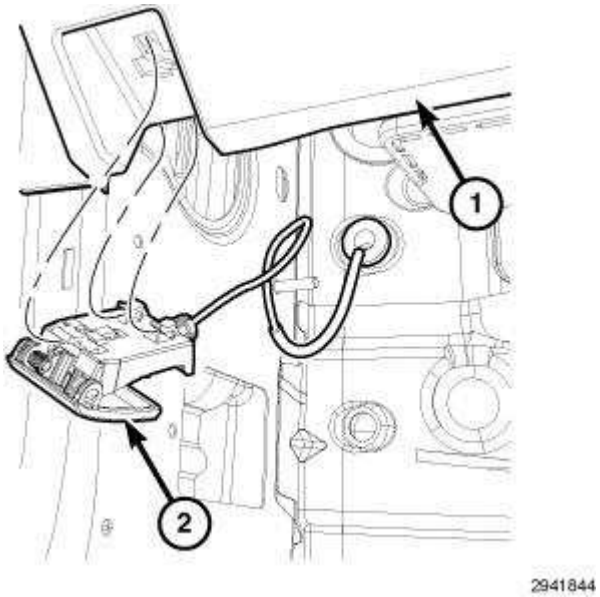

Fig. 22: Hood Release Handle
Courtesy of CHRYSLER GROUP, LLC

9. Install the hood release handle (2) to the knee blocker trim by aligning and pushing up.

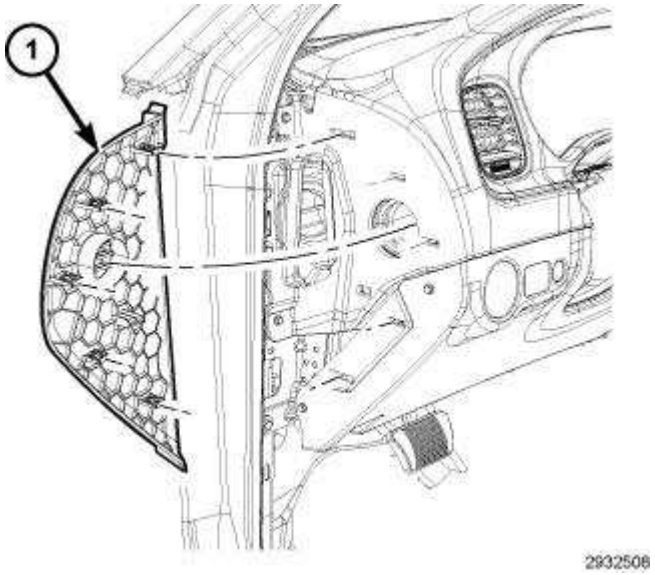

Fig. 23: End Cap
Courtesy of CHRYSLER GROUP, LLC

10. Install the end cap (1) to the instrument panel and engage the snap retainers that secure the end cap. Repeat on opposite side.

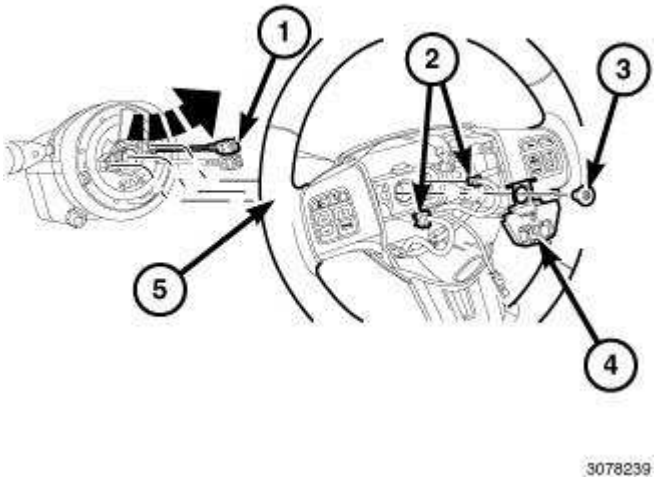

Fig. 24: Pinch Bolt, Steering Wheel Electrical Connectors, Steering Wheel Bolt & Wheel Damper
Courtesy of CHRYSLER GROUP, LLC

11. If removed, install the steering column module. Refer to **MODULE, STEERING COLUMN, INSTALLATION** .
12. Install wood grain trim panels on either side of column, if equipped.
13. Install the steering wheel (5) onto the steering column.
14. Install the steering wheel damper (4) and then install a new steering wheel mounting bolt (3)

and tighten to 75 N.m (55 ft. lbs.).

15. Connect all electrical connectors.
16. Install the drivers airbag. Refer to **AIR BAG, DRIVER, INSTALLATION** .

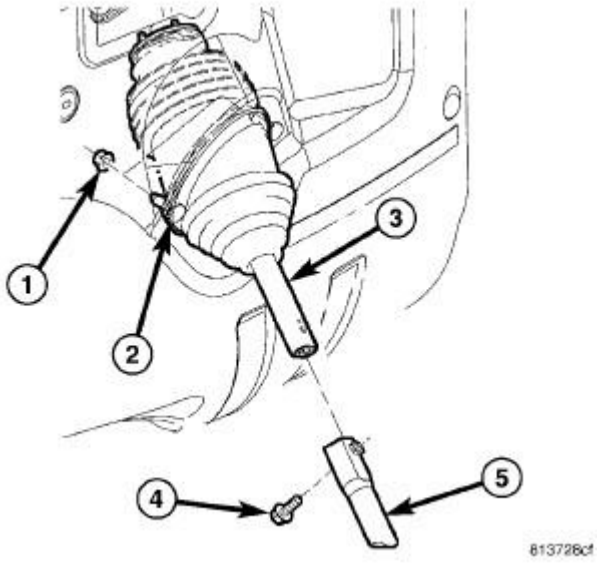

Fig. 25: Shaft Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

17. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
18. Slide the lower intermediate shaft (5) onto the upper intermediate shaft (3). Install a **new** pinch bolt (4) and tighten to 45 N.m (33 ft. lbs.).

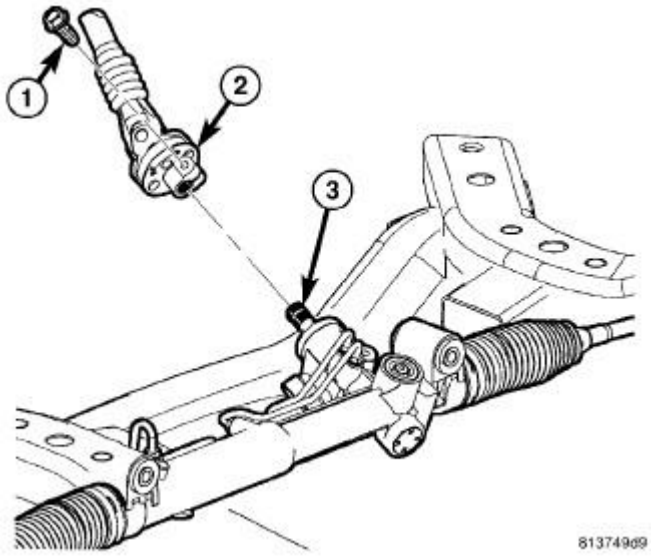

Fig. 26: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

19. Slide the coupler from the lower intermediate shaft (2) onto the steering gear shaft (3) and install a **new** pinch bolt (1). Tighten the pinch bolt to 45 N.m (33 ft. lbs.).
20. Lower the vehicle.
21. Connect the negative (ground) cable to the battery. It is important that this be performed correctly.

LEVER, GEARSHIFT

REMOVAL

REMOVAL

WARNING: Before servicing the steering column the airbag system must be disarmed. Refer to RESTRAINTS - SERVICE INFORMATION for service procedures. Failure to do so may result in accidental deployment of the airbag and possible personal injury.

1. Disconnect the negative (ground) cable from the battery.
2. Remove the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .

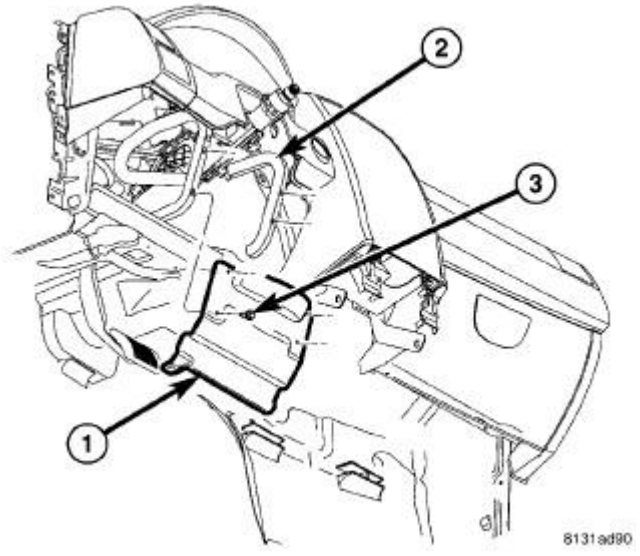

Fig. 27: Reinforcement I/P Steering Column
Courtesy of CHRYSLER GROUP, LLC

3. Remove the steering column opening reinforcement (1).

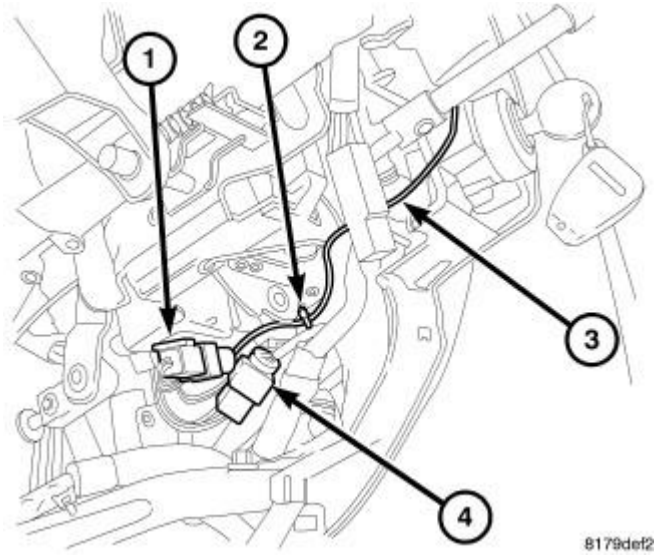

Fig. 28: Auto-Stick Wiring Connector
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the autostick wiring connector (1).
5. Remove the wiring tie strap (2) securing the autostick wiring to the column.

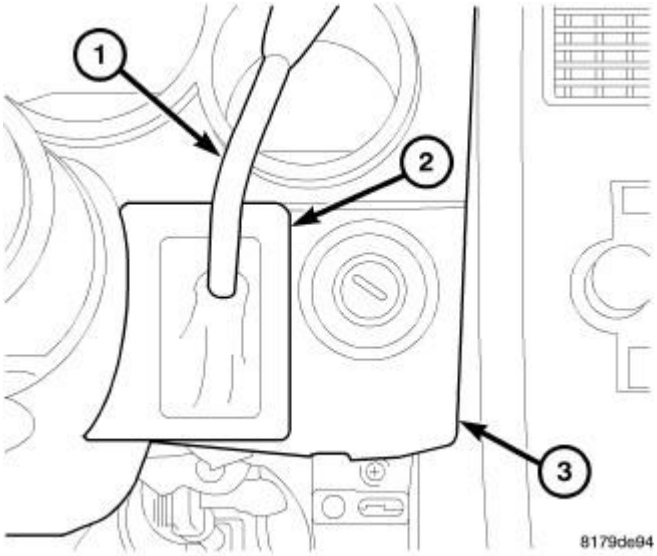

Fig. 29: Gear Shift Lever Boot
Courtesy of CHRYSLER GROUP, LLC

6. Unsnap the gear shift lever boot (2) from the cluster bezel (3). Slide the boot up the gear shift lever (1), away from the bezel.

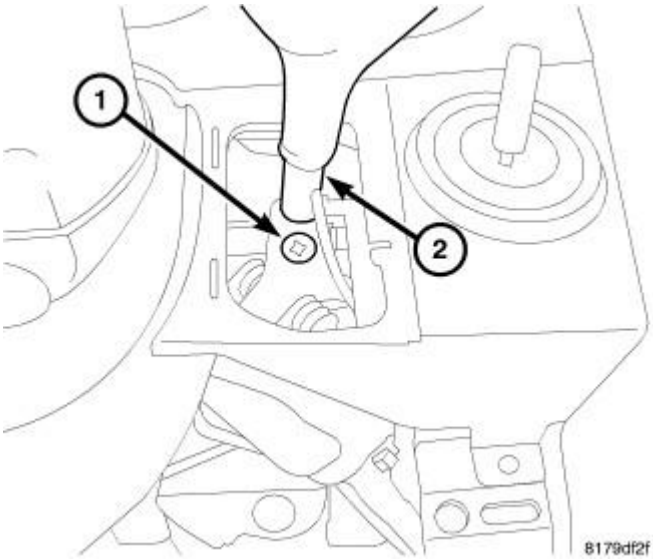

Fig. 30: Gear Shift Lever Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

7. Remove the gear shift lever mounting screw (1).
8. Slide the gear shift lever (2) out of the column shift mechanism and remove the lever with autostick wiring.

INSTALLATION

INSTALLATION

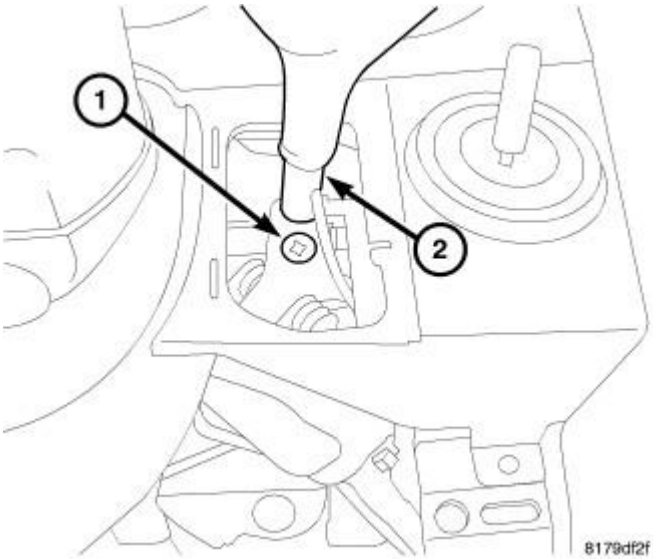

Fig. 31: Gear Shift Lever Mounting Screw
Courtesy of CHRYSLER GROUP, LLC

1. Feed the autostick wiring through the hole in the cluster bezel and slide the gear shift lever (2) into the column shift mechanism.

NOTE: **Before installing gear shift lever mounting screw, clean screw threads and apply Mopar® Lock AND Seal Adhesive.**

2. Line up the threaded hole in the lever with the hole in the shift mechanism and install the gear shift lever mounting screw (1). Tighten the screw to 12 N.m (106 in. lbs.).

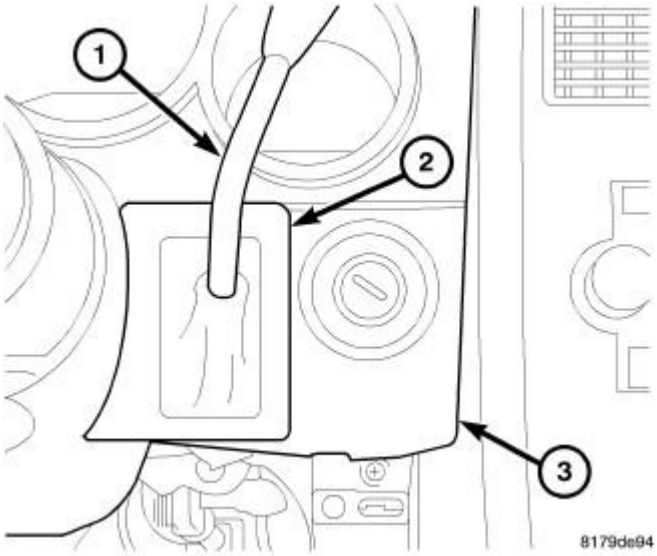

Fig. 32: Gear Shift Lever Boot
Courtesy of CHRYSLER GROUP, LLC

3. Slide the gear shift lever boot down gear shift lever (1) and snap it into place on the cluster bezel (3).

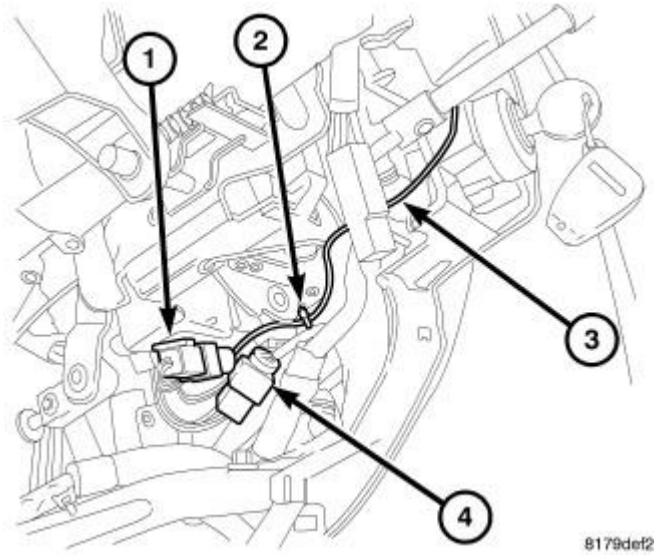

Fig. 33: Auto-Stick Wiring Connector
Courtesy of CHRYSLER GROUP, LLC

4. Route the autostick wiring (3) along the right side of the column gear shift mechanism and

install a wiring tie strap (2) securing the autostick wiring to the column.

5. Connect the autostick wiring connector (1).
6. Check autostick wiring (3), making sure it is routed away from movable portions of shift mechanism.

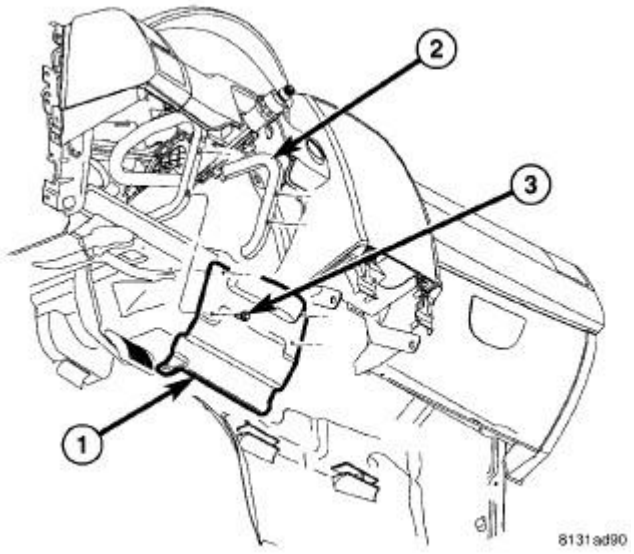

Fig. 34: Reinforcement I/P Steering Column
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the steering wheel is excessively off-center while driving, outside of Chassis specifications, inadvertent ESC activations may occur on a vehicle so equipped.

7. Install the steering column opening reinforcement (1).
8. Install the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
9. Install the negative battery terminal on the battery. It is important that this is performed properly.
10. Test the operation of the gear shift lever and autostick functions.

MOTOR, TILT

REMOVAL

REMOVAL

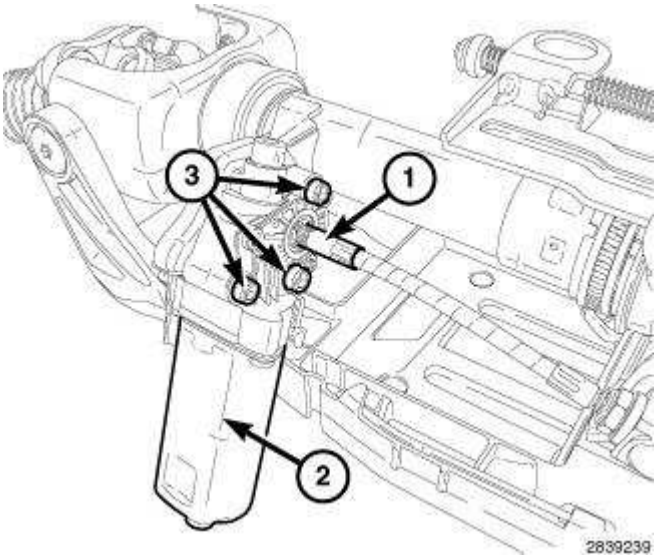

Fig. 35: Tilt Motor, Three Bolts & Flex Drive
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage. Refer to CLOCKSPRING, STANDARD PROCEDURE .

1. Remove the steering column from the vehicle. Refer to **COLUMN, REMOVAL**.
2. Place steering column on a flat bench, with the tilt motor (2) over the edge.
3. Remove the three bolts (3) that hold the tilt motor to the steering column assembly.
4. Pull the tilt motor (2) away from the steering column assembly and pull off of the flex drive (1).

INSTALLATION

INSTALLATION

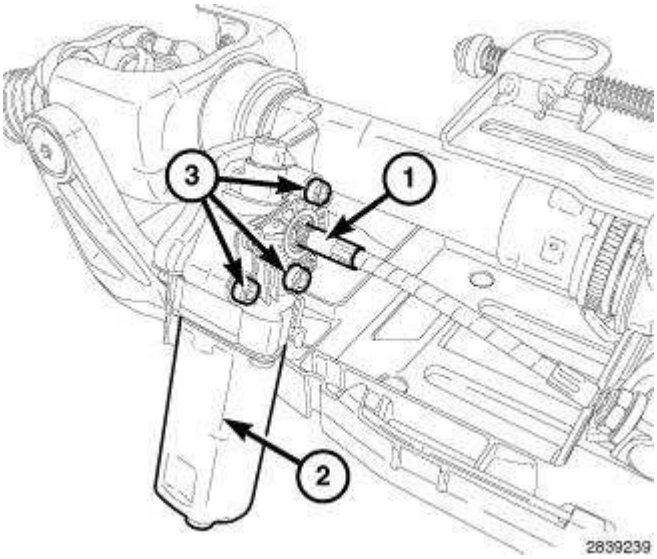

Fig. 36: Tilt Motor, Three Bolts & Flex Drive
Courtesy of CHRYSLER GROUP, LLC

1. With the steering column on a flat bench, insert the flex drive (1) into the tilt motor (2).
2. Rotate the tilt motor into position and install on the steering column assembly.
3. Install the three bolts (3) to attach the tilt motor (2) to the steering column assembly and tighten to 4 N.m (35 in. lbs.)
4. Install the steering column. Refer to **COLUMN, INSTALLATION**.
5. Perform the memory seat module standardization procedure. Refer to **STANDARD PROCEDURE** .

SHAFT, INTERMEDIATE, LOWER

REMOVAL

REMOVAL

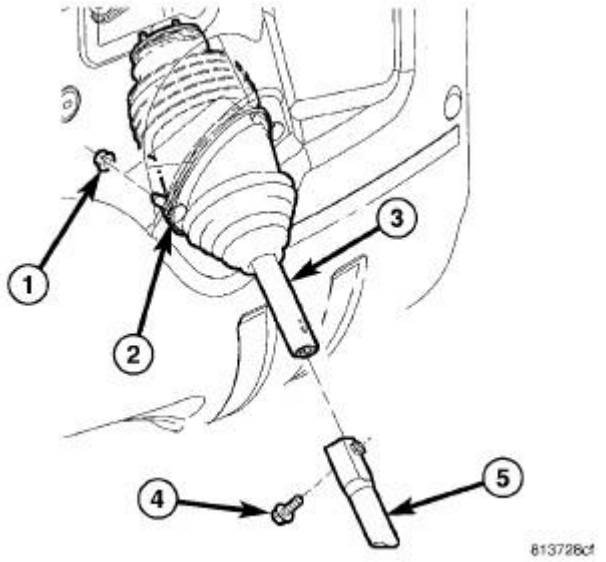

Fig. 37: Shaft Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage. Refer to CLOCKSPRING, STANDARD PROCEDURE .

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the pinch bolt (4) connecting the upper intermediate shaft (3) to the lower intermediate shaft (5).
3. Separate the lower intermediate shaft (5) from the upper intermediate shaft (3).

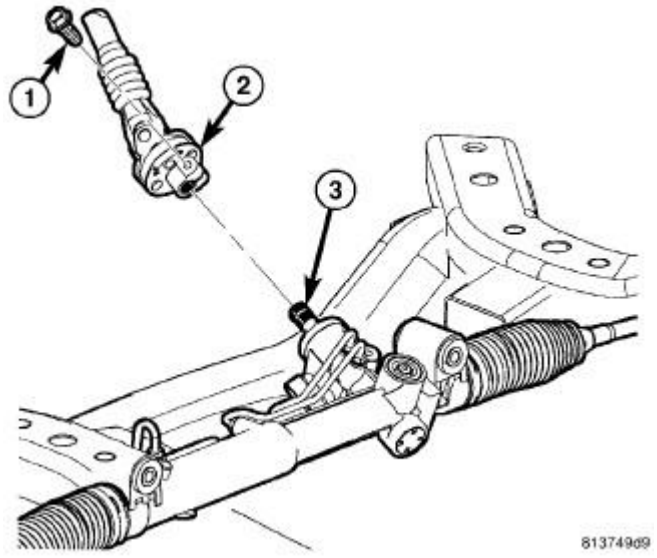

Fig. 38: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

4. Remove the pinch bolt (1) from the lower intermediate shaft (2) at the steering gear (3).
5. Carefully separate the intermediate shaft (2) from the steering gear (3).
6. Remove the lower intermediate shaft (2) from the vehicle.

INSTALLATION

INSTALLATION

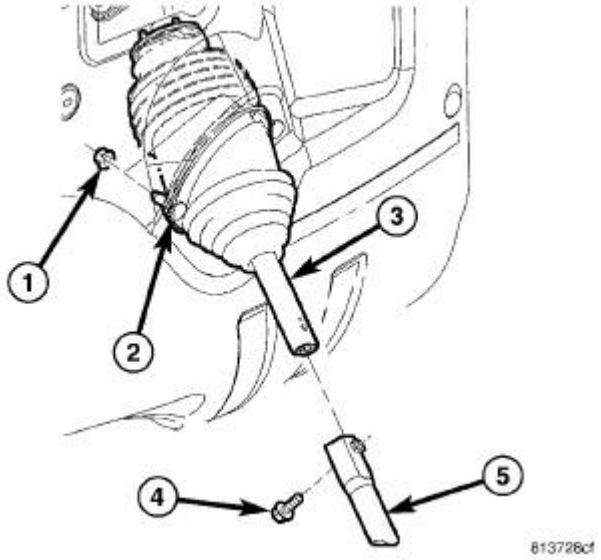

Fig. 39: Shaft Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage. Refer to CLOCKSPRING, STANDARD PROCEDURE .

1. Slide the lower intermediate shaft (5) onto the upper intermediate shaft (3). Install a **new** pinch bolt (4) and tighten to 45 N.m (33 ft. lbs.).

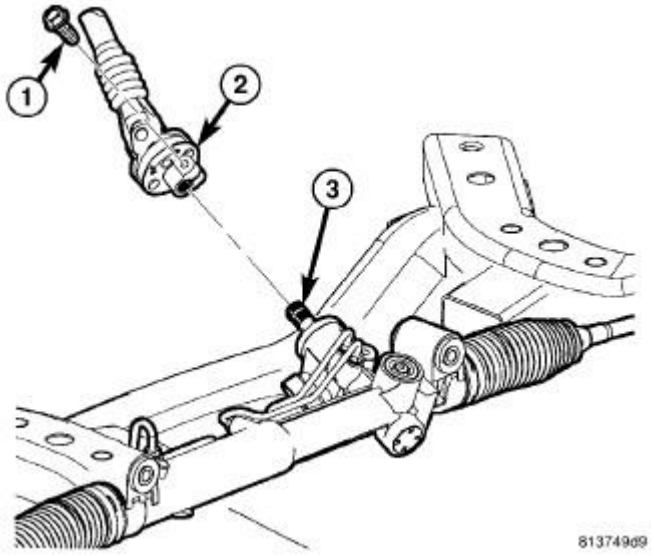

Fig. 40: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

2. Slide the coupler from the lower intermediate shaft (2) onto the steering gear shaft (3) and install a **new** pinch bolt (1). Tighten the pinch bolt to 45 N.m (33 ft. lbs.).
3. Lower the vehicle.
4. Connect the negative (ground) cable to the battery.

SHAFT, INTERMEDIATE, UPPER

REMOVAL

REMOVAL

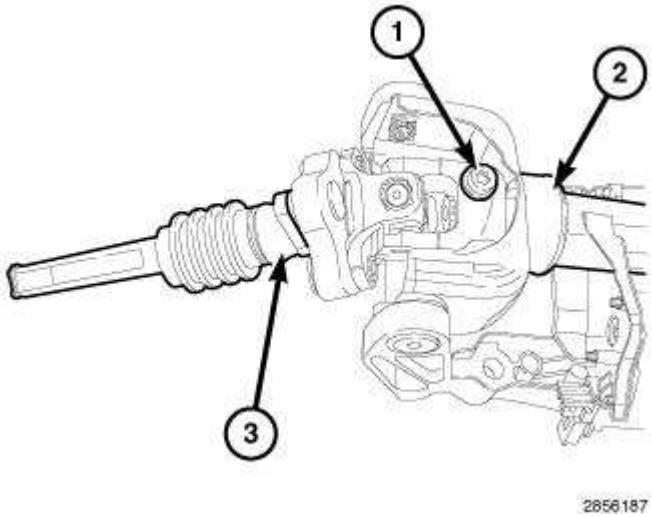

Fig. 41: Coupler Pinch Bolt & Upper Intermediate Shaft

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage. Refer to CLOCKSPRING, STANDARD PROCEDURE .

NOTE: When removing the column to service the upper intermediate shaft, it is not necessary to remove the steering wheel and Steering Column Control Module; the column can be removed as an assembly.

1. Remove the steering column from the vehicle. Refer to **COLUMN, REMOVAL**.
2. Remove the coupler pinch bolt (1).
3. Slide the upper intermediate shaft (3) off the splines of the steering column.

INSTALLATION

INSTALLATION

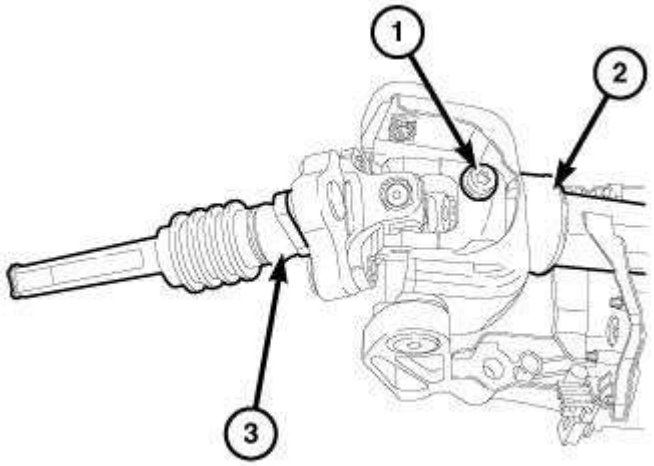

Fig. 42: Coupler Pinch Bolt & Upper Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage. Refer to CLOCKSPRING, STANDARD PROCEDURE .

NOTE: When removing and installing the column to service the upper intermediate shaft, it is not necessary to remove the steering wheel and Steering Column Control Module; the column can be removed and installed as an assembly.

1. Slide upper intermediate shaft (3) onto splines of steering wheel assembly (2).
2. Install coupler pinch bolt (1) and tighten to 45 N.m (33 ft. lbs.)
3. Install column in vehicle. Refer to **COLUMN, INSTALLATION**.

SHROUD, STEERING COLUMN

DESCRIPTION

DESCRIPTION

The steering column shroud is serviced with the steering column module. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** .

WHEEL, STEERING

REMOVAL

REMOVAL

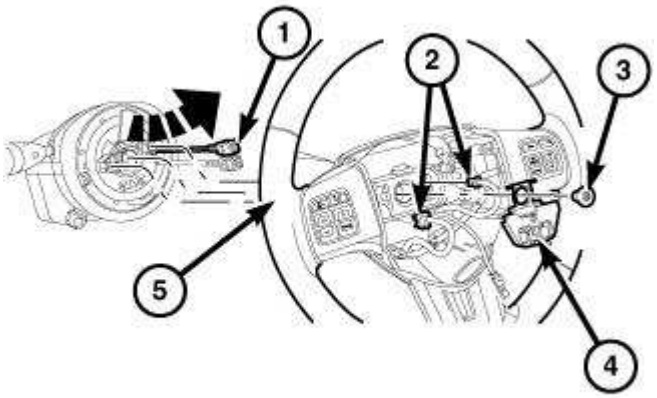

Fig. 43: Pinch Bolt, Steering Wheel Electrical Connectors, Steering Wheel Bolt & Wheel Damper
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before servicing the steering column the airbag system must be disarmed. Refer to RESTRAINTS - SERVICE INFORMATION for service procedures. Failure to do so may result in accidental deployment of the airbag and possible personal injury.

1. Position the front wheels **straight-ahead** .
2. Fully extend the adjustable steering column.
3. Disconnect the negative (ground) cable from the battery.

4. Remove the driver airbag. Refer to **AIR BAG, DRIVER, REMOVAL** .
5. Disconnect all electrical connectors (2).
6. Remove the steering wheel retainer bolt (3) and the steering wheel damper (4), then slide the steering wheel (5) off the shaft.
7. If wheel is being replaced, transfer attached components as necessary.

INSTALLATION

INSTALLATION

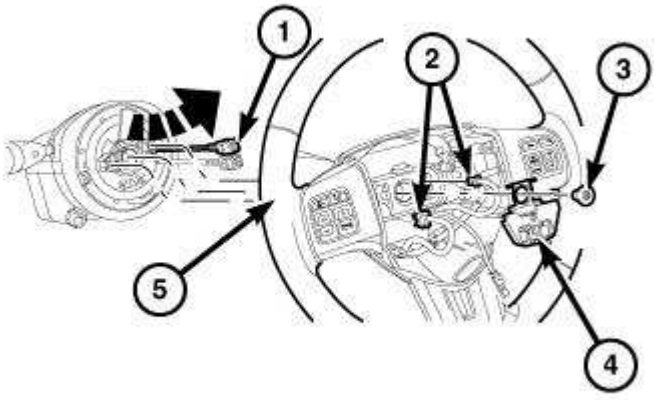

Fig. 44: Pinch Bolt, Steering Wheel Electrical Connectors, Steering Wheel Bolt & Wheel Damper
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the steering wheel is excessively off-center while driving, outside of Chassis specifications, inadvertent ESC activations may occur on a vehicle so equipped.

1. Align the spline on the steering wheel hub to the column shaft, then install the steering wheel (5).
2. Slide the steering wheel damper (4) over the shaft.
3. Install a **NEW** retainer bolt (3) and tighten to 75 N.m (55 ft. lbs.).
4. Connect all electrical connectors (2).
5. Install the airbag. Refer to **AIR BAG, DRIVER, INSTALLATION** .
6. Install the negative battery terminal on the battery. It is important that this is performed properly.
7. Test the operation of the horn, lights and any other functions that are steering column operated.

GEAR

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER STEERING GEAR

NOTE: This information is designed to be used in conjunction with the diagnostic charts at the beginning of the Steering information. Refer to DIAGNOSIS AND TESTING.

OBJECTIONABLE HISS OR WHISTLE POSSIBLY CAUSED BY A NOISY STEERING GEAR

1. Check and adjust power steering fluid level in the reservoir as necessary. Refer to **FLUID, STANDARD PROCEDURE**.
2. Start the vehicle and heat system by steering lock-to-lock 5 times with the engine running at 3000 RPM. Do not hold the gear against the stops for more than 15 seconds at a time.
3. Return the engine to idle speed.
4. Listen for the noise when turning the wheel slowly off center during a dry park maneuver.
5. Replace power steering gear if the hiss or whistle is present. Refer to **GEAR, REMOVAL**.

REMOVAL

ALL-WHEEL-DRIVE

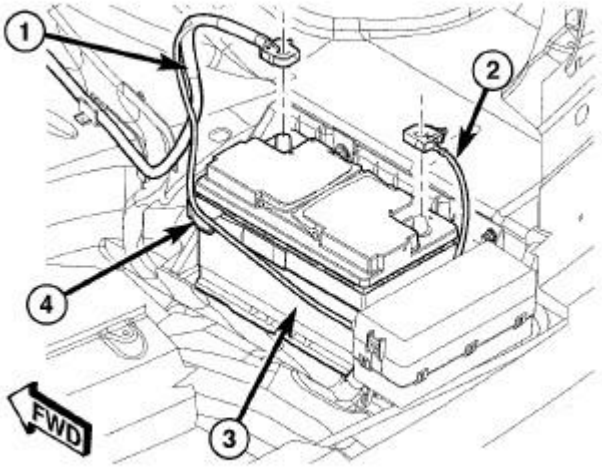

Fig. 45: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Siphon power steering fluid from pump reservoir.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

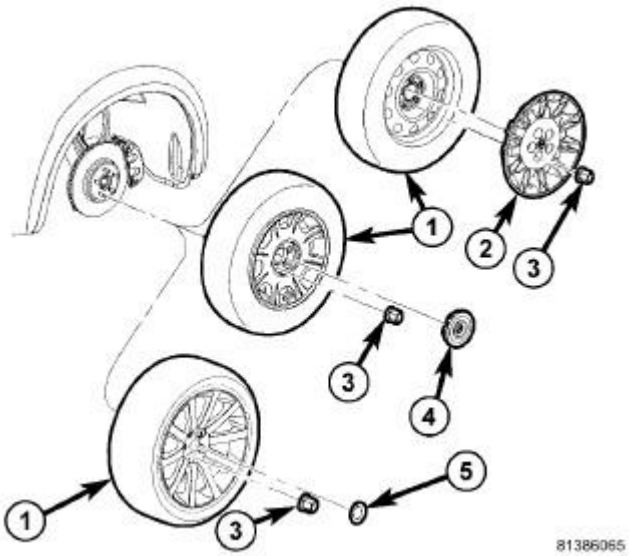

Fig. 46: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then both front tire and wheel assemblies (1).

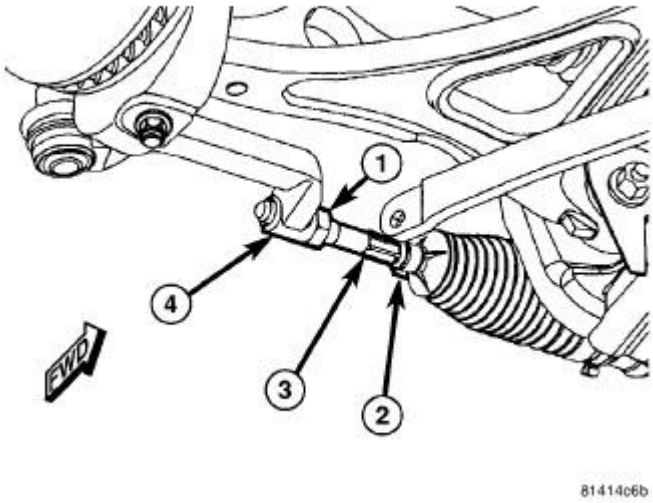

Fig. 47: Removing/Installing Tie Rods (AWD)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When loosening jam nut and rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp (2) at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

5. Loosen tie rod jam nut (1) at each outer tie rod (4).

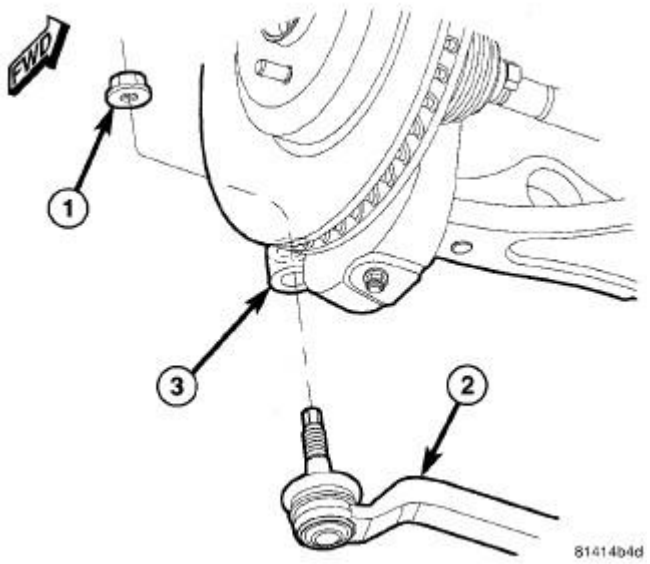

Fig. 48: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

6. Remove outer tie rod (2) end nut (1) at each knuckle (3).

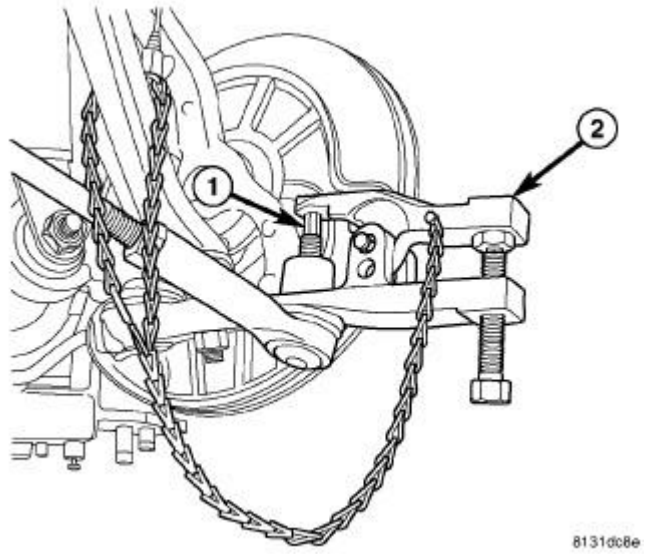

Fig. 49: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

7. Using Remover (special tool #9360, Remover, Ball Joint) (2), separate outer tie rod (1) from each knuckle.

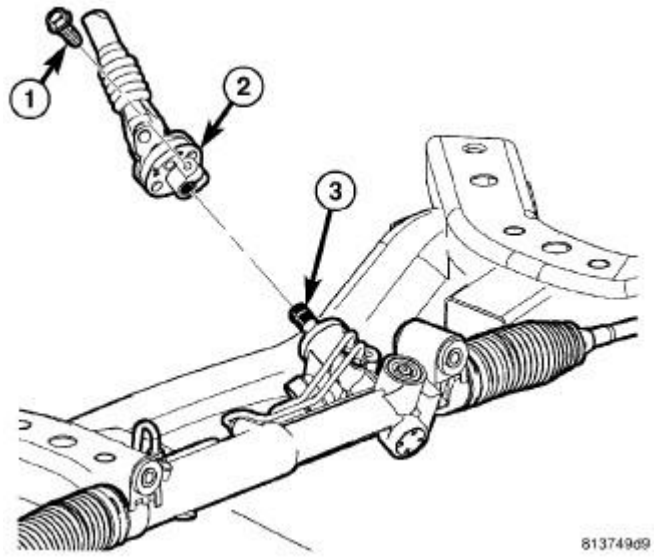

Fig. 50: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

8. Remove lower intermediate shaft coupling pinch bolt (1) at steering gear (3). Separate lower intermediate shaft (2) from steering gear shaft (3).

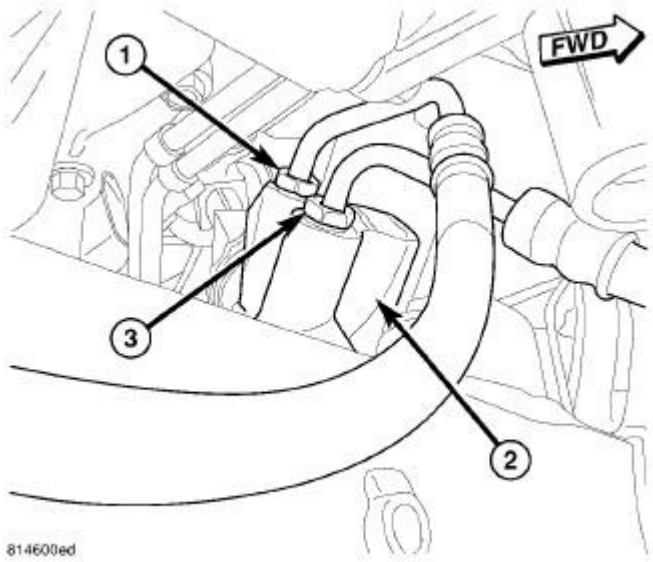

Fig. 51: Hoses AT AWD Gear
Courtesy of CHRYSLER GROUP, LLC

9. Unthread return hose tube nut (1) from steering gear (2). Remove return hose from steering gear.
10. Unthread pressure hose tube nut (3) from steering gear (2). Remove pressure hose from steering gear.

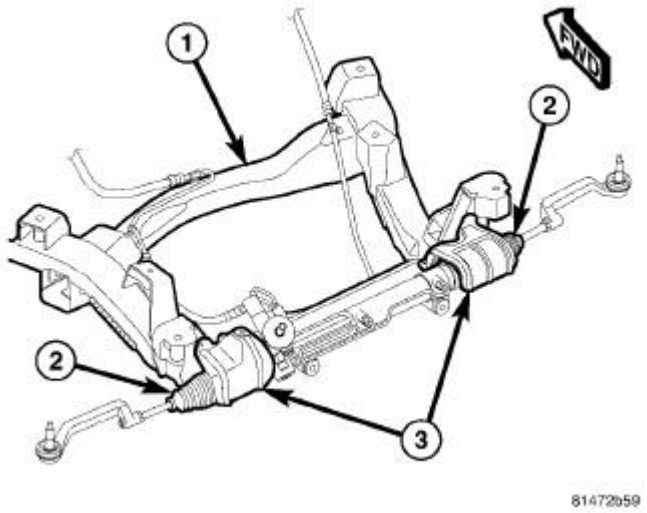

Fig. 52: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

11. Remove mounting screws, then heat shield (3) above each inner tie rod bellows (2).

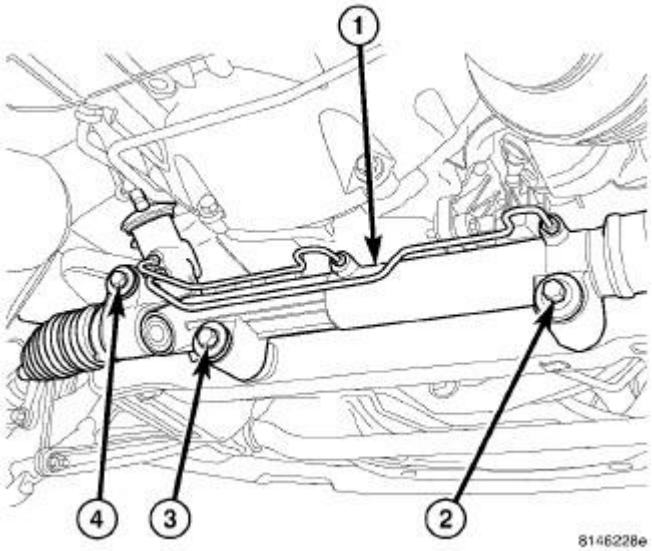

Fig. 53: Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove steering gear upper mounting bolt (4) and nut.
13. Remove steering gear lower mounting bolts (2 and 3).
14. Remove steering gear (1).
15. If necessary, remove outer tie rods from gear. Count number of revolutions off for each tie rod for reference upon installation to replacement gear.

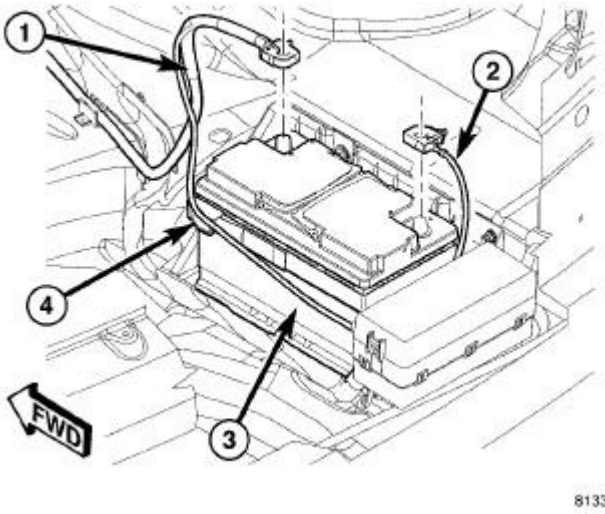

Fig. 54: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Siphon power steering fluid from pump reservoir.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

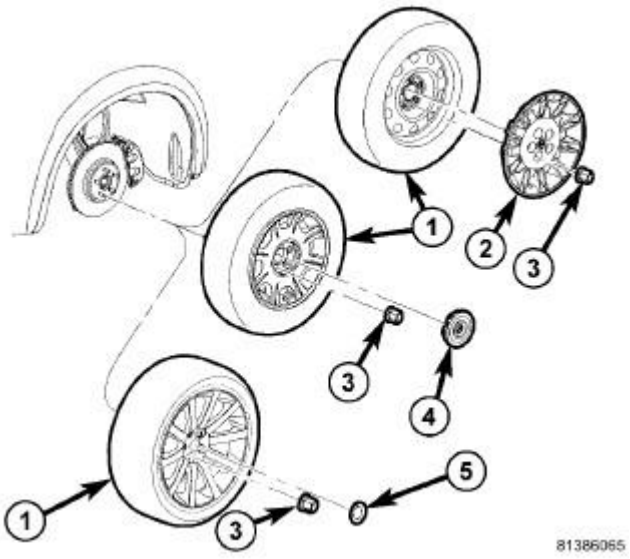

Fig. 55: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove wheel mounting nuts (3), then both front tire and wheel assemblies (1).

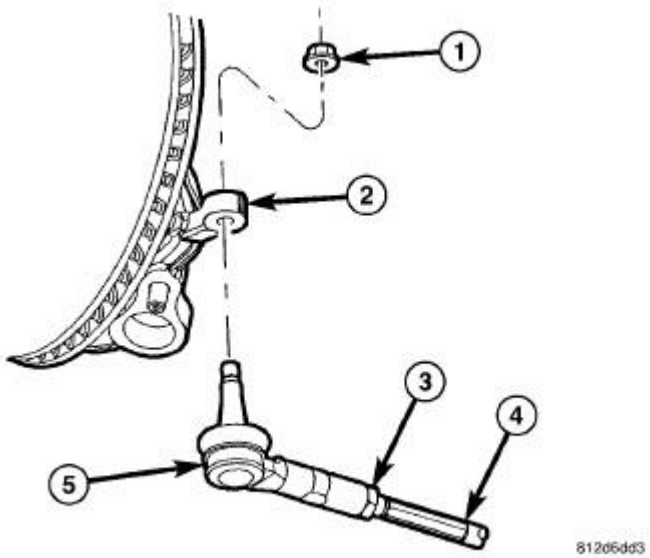

Fig. 56: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When loosening jam nut and rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

5. Loosen tie rod jam nut (3) at each outer tie rod (5).
6. Remove outer tie rod nut (1) at each knuckle (2).

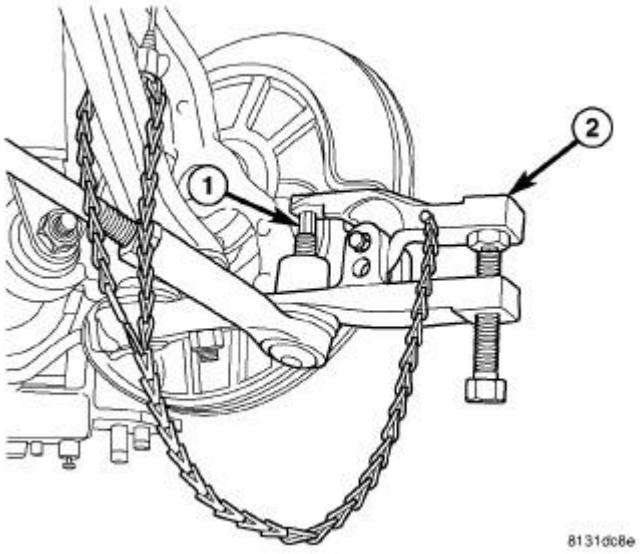

Fig. 57: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

7. Using Remover (special tool #9360, Remover, Ball Joint) (2), separate outer tie rod (1) from each knuckle.

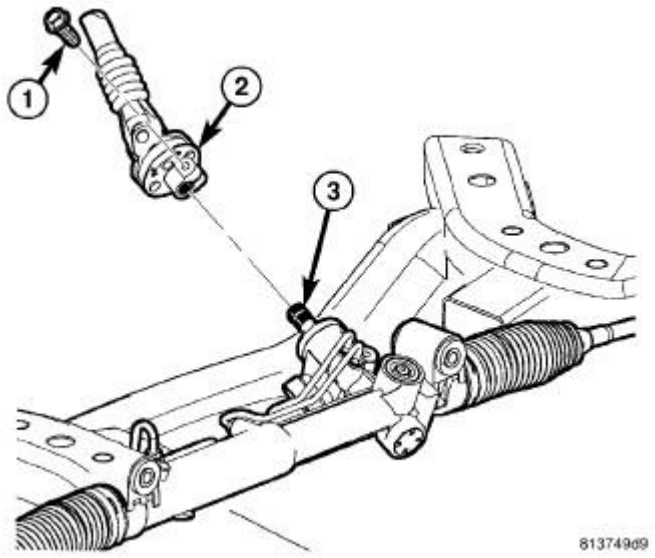

Fig. 58: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

8. Remove lower intermediate coupling pinch bolt (1) at steering gear (3). Separate lower intermediate shaft (2) from steering gear shaft (3).

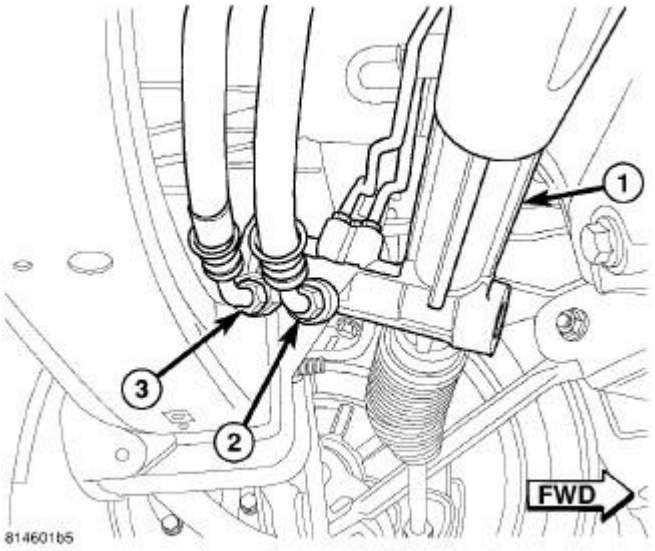

Fig. 59: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

9. Unthread pressure hose tube nut (2) from steering gear (1). Remove pressure hose from

steering gear.

10. Unthread return hose tube nut (3) from steering gear (1). Remove return hose from steering gear.

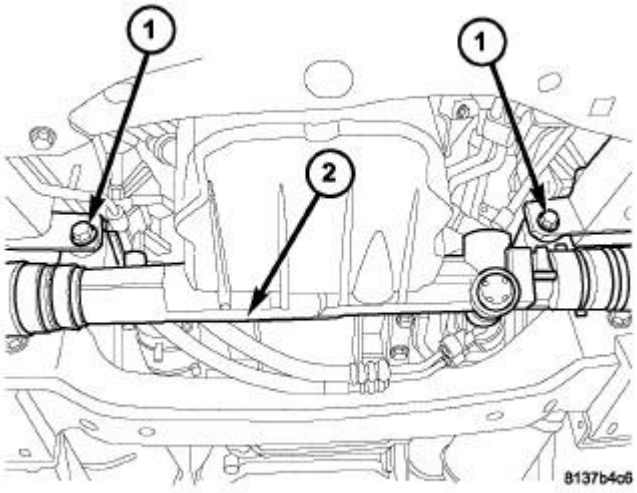

Fig. 60: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove steering gear mounting bolts (1).
12. If necessary, remove outer tie rods from gear. Count number of revolutions off for each tie rod for reference upon installation to replacement gear.

INSTALLATION

ALL-WHEEL-DRIVE

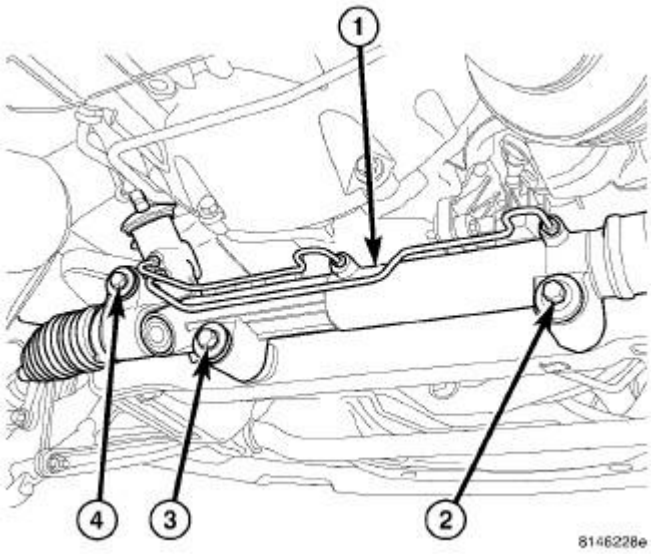

Fig. 61: Steering Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, install outer tie rods from original gear to replacement inner tie rods. Install each outer tie rod same amount of threads as it was installed on original gear. This will get toe setting close, saving some time when toe is set later in this procedure.
2. Lift steering gear (1) into mounted position and install steering gear lower mounting bolts (2 and 3). Install upper mounting bolt (4) and nut. Tighten all bolts to 102 N.m (75 ft. lbs.).

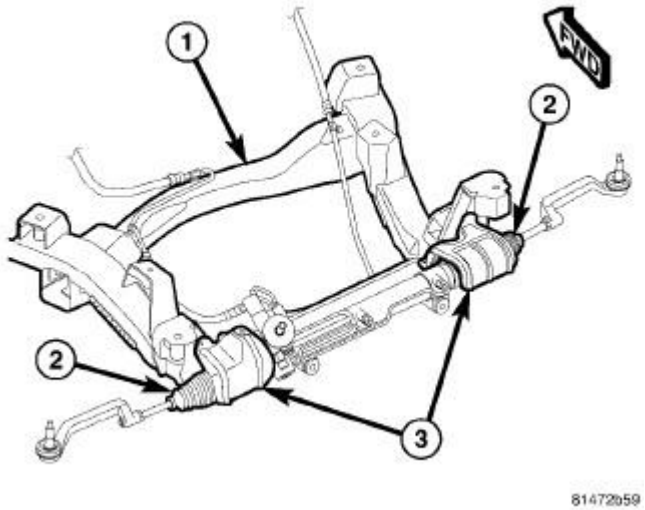

Fig. 62: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

3. Install heat shield (3) above each inner tie rod bellows (2). Tighten screws to 10 N.m (89 in. lbs.).

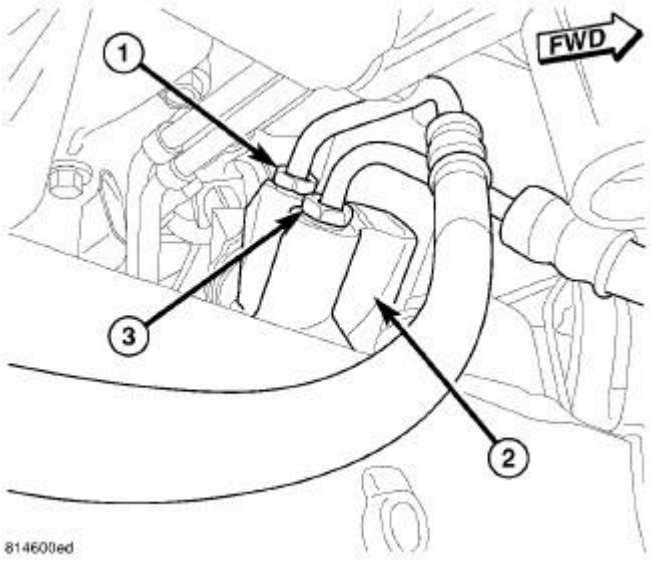

Fig. 63: Hoses AT AWD Gear
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the ends of the steering hoses.

4. Lubricate NEW O-ring on end of pressure hose with clean power steering fluid.
5. Install pressure hose (3) to steering gear (2). Tighten tube nut to 47 N.m (35 ft. lbs.).
6. Lubricate NEW O-ring on end of return hose with clean power steering fluid.
7. Install return hose (1) to steering gear (2). Tighten tube nut to 47 N.m (35 ft. lbs.).

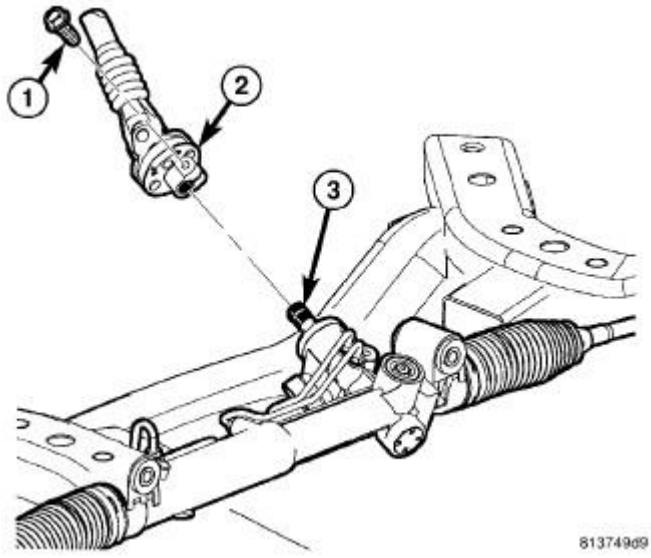

Fig. 64: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

8. Align splines and install lower intermediate shaft coupling (2) to steering gear shaft (3). Install **NEW** pinch bolt and tighten bolt to 45 N.m (33 ft. lbs.).

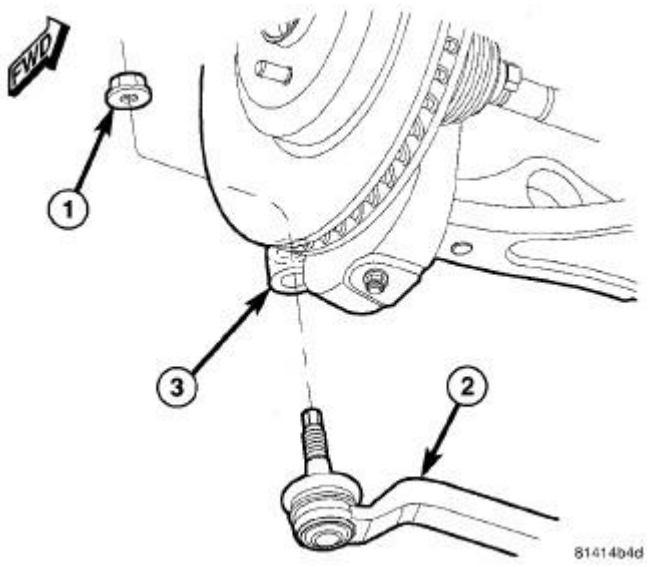

Fig. 65: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

9. Install each outer tie rod (2) end to its knuckle (3). Install nut (1) and tighten to 35 N.m + 90° turn (26 ft. lbs. + 90° turn).

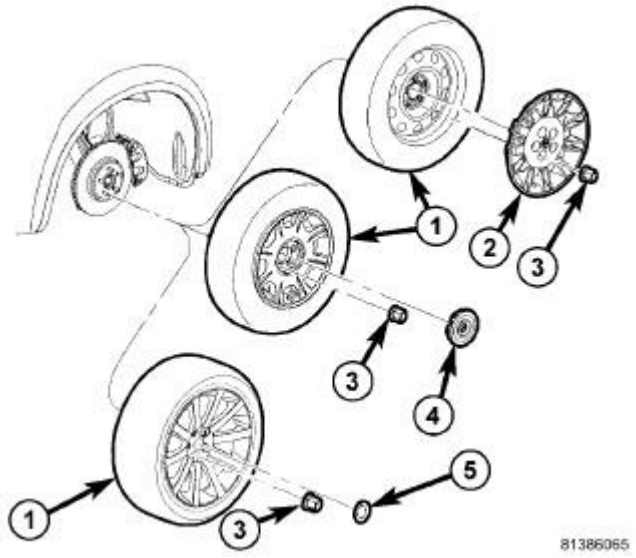

Fig. 66: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .

11. Lower vehicle.

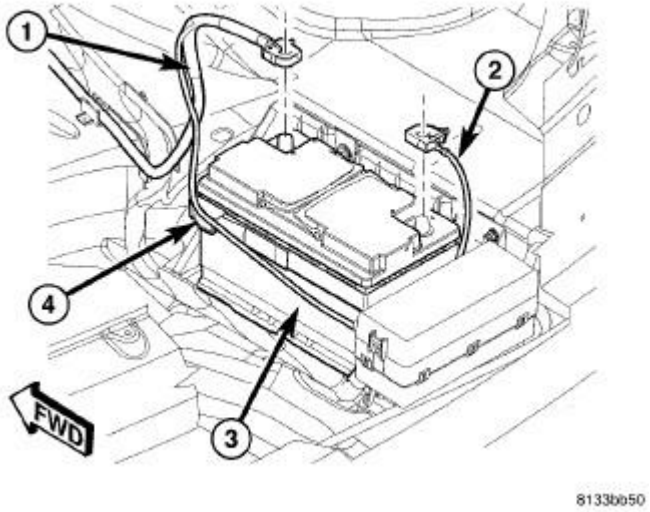

Fig. 67: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

12. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
13. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.
14. Perform wheel alignment setting toe to specifications. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

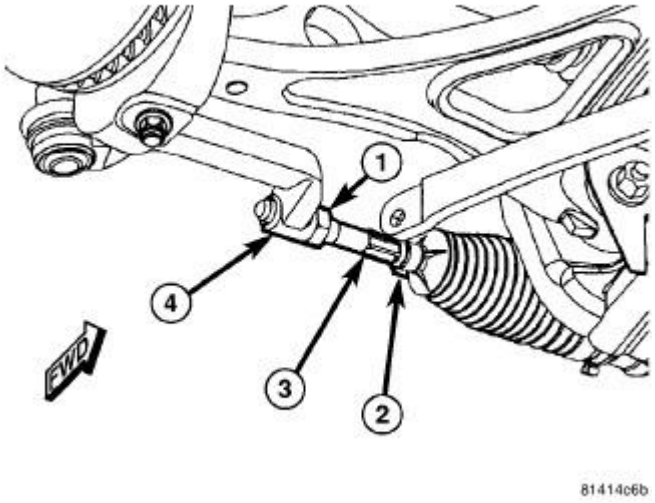

Fig. 68: Removing/Installing Tie Rods (AWD)
Courtesy of CHRYSLER GROUP, LLC

15. Tighten tie rod jam nuts (1) to 75 N.m (55 ft. lbs.).

REAR-WHEEL-DRIVE

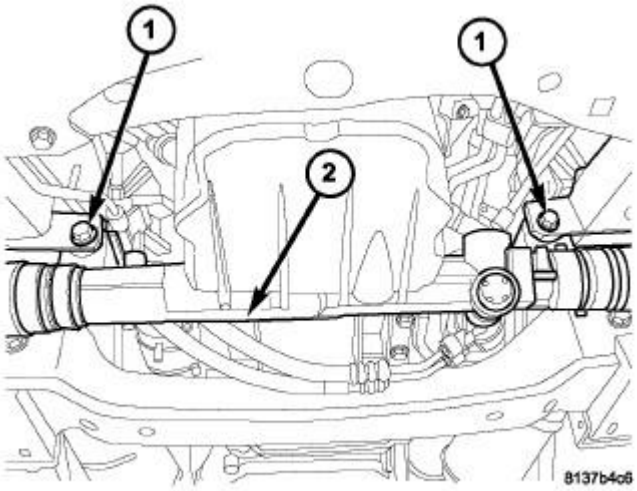

Fig. 69: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, install outer tie rods from original gear to replacement inner tie rods. Install each outer tie rod same amount of threads as it was installed on original gear. This will get toe setting close, saving some time when toe is set later in this procedure.
2. Lift steering gear (2) into mounted position and install steering gear mounting bolts (1). Tighten bolts to 95 N.m (70 ft. lbs.).

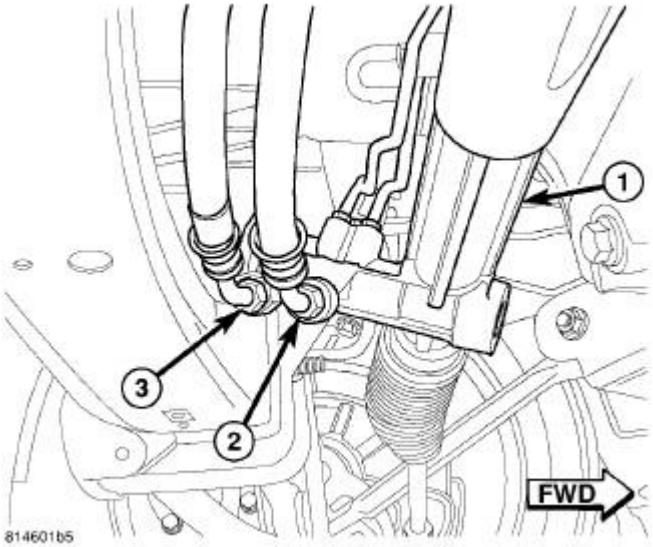

Fig. 70: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the ends of the steering hoses.

3. Lubricate NEW O-ring on end of return hose with clean power steering fluid.
4. Install return hose (3) to steering gear (1). Tighten tube nut to 47 N.m (35 ft. lbs.).
5. Lubricate NEW O-ring on end of pressure hose with clean power steering fluid.
6. Install pressure hose (2) to steering gear (1). Tighten tube nut to 47 N.m (35 ft. lbs.).

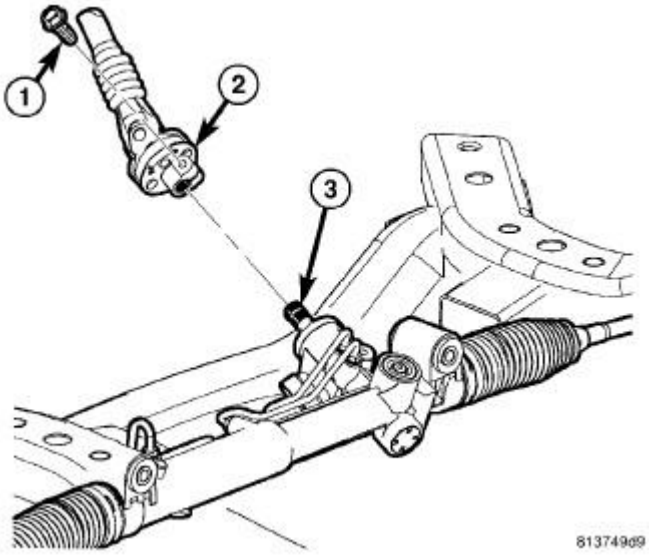

Fig. 71: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Prior to coupling installation, make sure gear is centered in its travel to match clockspring centering in steering column.

7. Align lower intermediate shaft (2) with input shaft (3) and install steering coupling. Install NEW pinch bolt and tighten to 45 N.m (33 ft. lbs.).

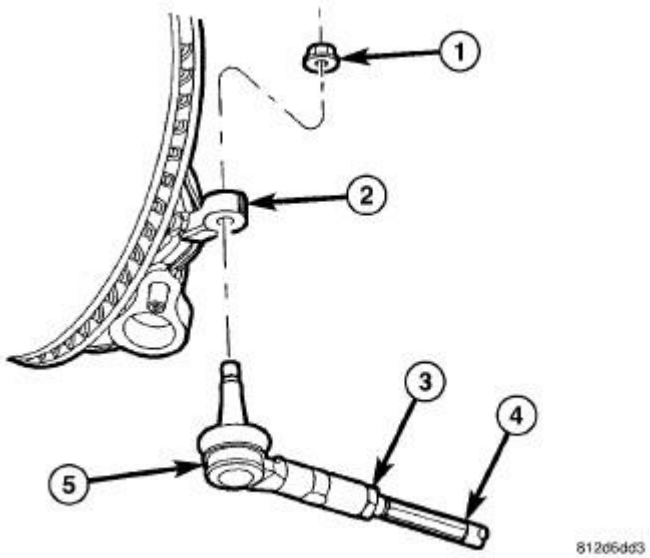

Fig. 72: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

8. Install each outer tie rod end (5) to its knuckle (2). Install nuts (1) and tighten to 35 N.m + 90° turn (26 ft. lbs. + 90° turn).

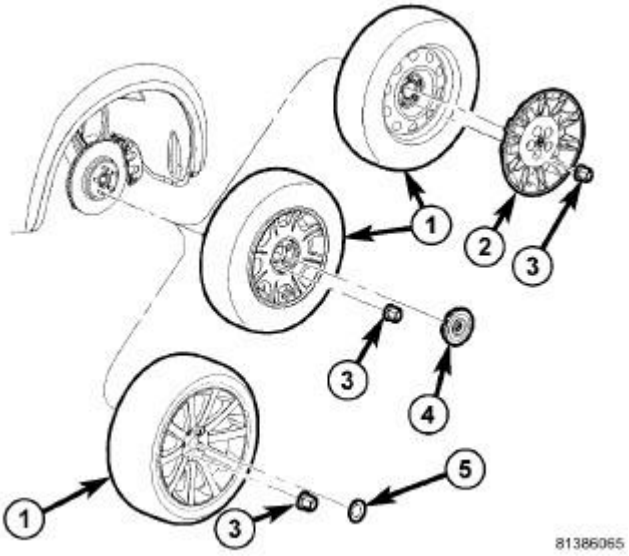

Fig. 73: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .
10. Lower vehicle.

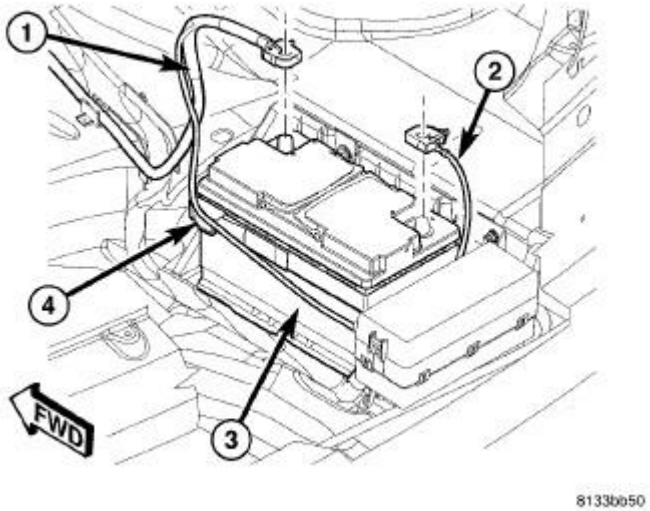

Fig. 74: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

11. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
12. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.
13. Perform wheel alignment setting toe to specifications. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

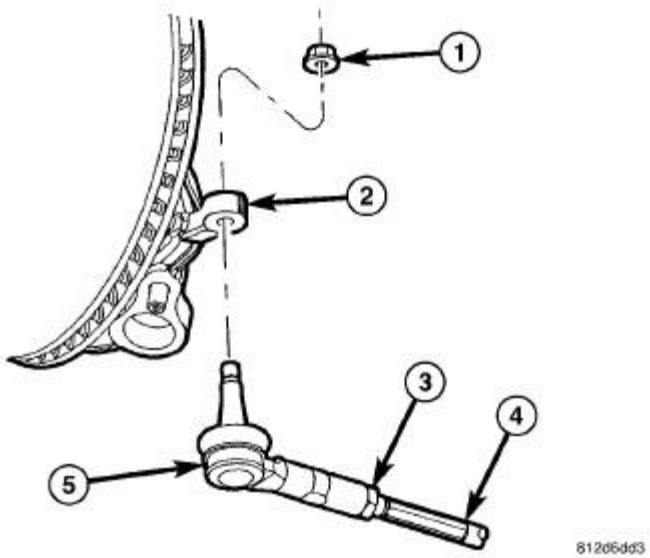

Fig. 75: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

14. Tighten both tie rod jam nuts (3) to 75 N.m (55 ft. lbs.).

TIE ROD, STEERING

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - TIE ROD

Tie rod free-play can be measured using the following methods:

OUTER TIE ROD

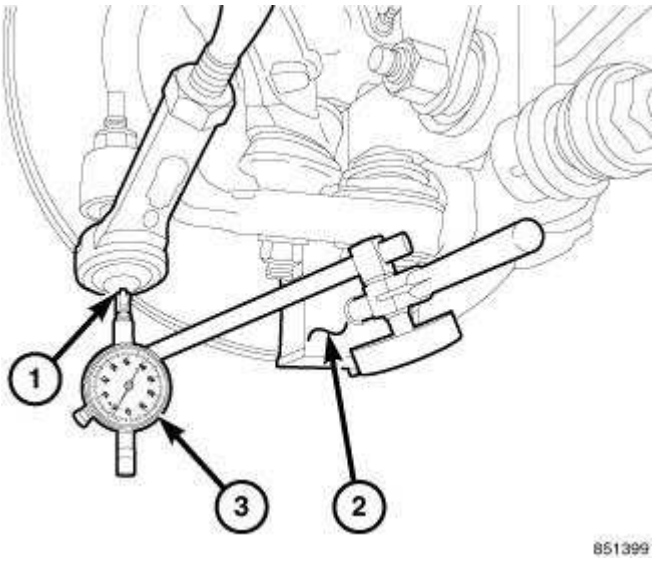

Fig. 76: Magnetic Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the front wheels. Refer to **REMOVAL** .
3. Install two standard wheel mounting nuts, flat side to rotor, diagonally opposite to each on the rotor.
4. Attach a magnetic dial indicator (2) to the inside of the brake rotor, then align dial indicator's contact pointer (1) with direction of stud axis and touch outer tie rod.
5. Zero dial indicator (3).

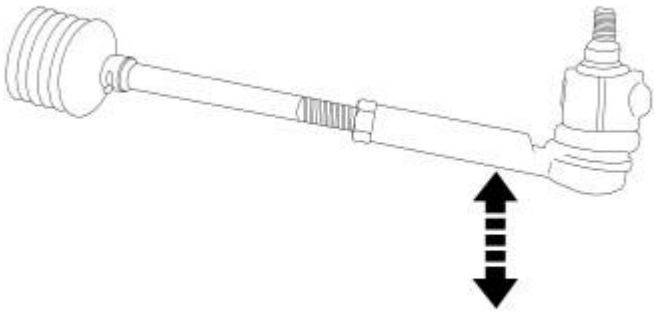

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Fig. 77: Checking Outer Tie Rod Free-Play
Courtesy of CHRYSLER GROUP, LLC

NOTE: When checking free-play, DO NOT rotate the tie rod. Just because a tie rod rotates easily does not mean that it is necessarily faulty. Using more than light hand pressure will result in a false reading.

6. Grasp the outer tie rod near the ball stud and attempt to move the tie rod straight up and down using light hand pressure. (Less than 10 lbs. of force.)
7. Measure and record any tie rod free-play movement.
8. Remove the magnetic dial indicator.
9. Remove the standard wheel mounting nuts from the two studs.
10. If the free-play in the tie rod exceeds 0.05 mm (.002 in.), replace the outer tie rod. Refer to **TIE ROD, STEERING, REMOVAL**. If the free-play is less than 0.05 mm (.002 in.) at the outer tie rod, check the inner tie rod for free-play. See the following procedure.

INNER TIE ROD

NOTE: Always check and repair (if necessary) outer tie rod free-play before checking inner tie rod free-play. False results can otherwise be obtained.

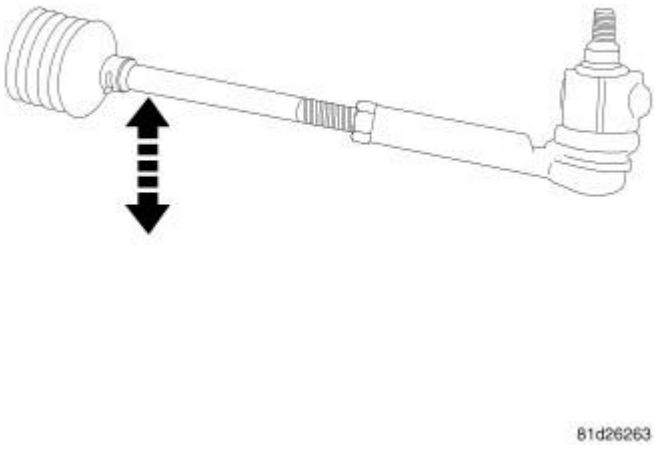

Fig. 78: Checking Inner Tie Rod Free-Play
Courtesy of CHRYSLER GROUP, LLC

1. Grasp the inner tie rod near the steering gear bellows and attempt to move the tie rod straight up and down. If any free-play is felt, replace the inner tie rod. Refer to **TIE ROD, STEERING, REMOVAL**.
2. If no free-play is felt, install the front wheels. Refer to **INSTALLATION** .
3. Remove support and lower the vehicle.

REMOVAL

INNER TIE ROD

1. Remove outer tie rod. Refer to **TIE ROD, STEERING, REMOVAL**.
2. Remove tie rod jam nut from inner tie rod.

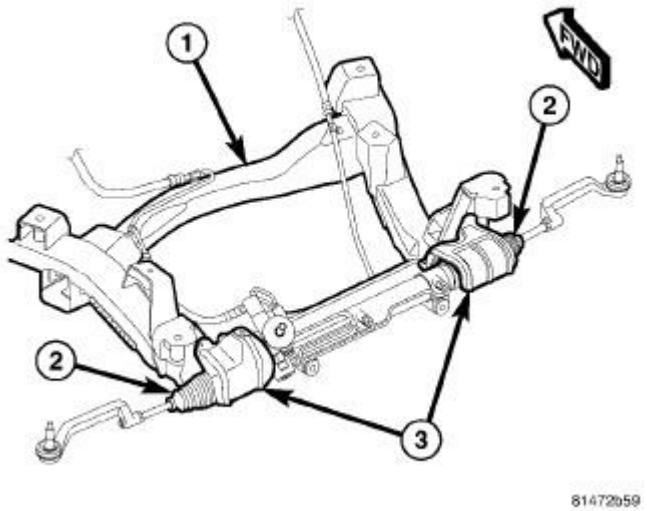

Fig. 79: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If equipped with All-Wheel-Drive, it may be necessary to remove heat shield (3) above inner tie rod bellows (2) to allow better access to bellows clamp.**

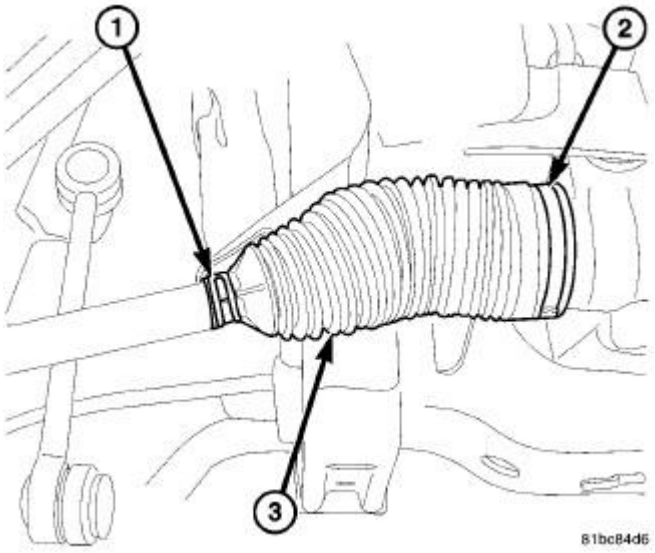

Fig. 80: Bellows Clamps
Courtesy of CHRYSLER GROUP, LLC

3. Remove clamp (1) securing bellows (3) to inner tie rod.
4. Remove clamp (2) securing bellows (3) to steering gear body.
5. Remove bellows (3).

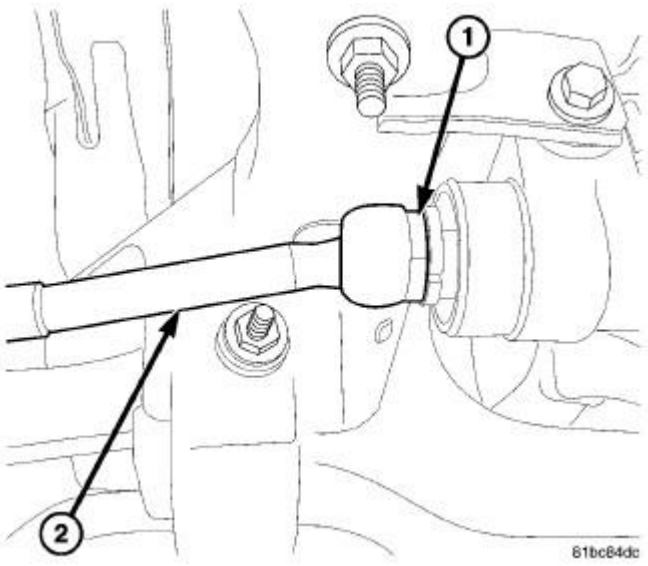

Fig. 81: Inner Tie Rod Hex
Courtesy of CHRYSLER GROUP, LLC

6. Install appropriate inner tie rod removal tool on inner tie rod hex (1).

CAUTION: If inner tie rod cannot be removed using specified tools, do not use a hammer or heat to loosen. Damage to steering gear will occur. Replace entire steering gear.

7. Unthread and remove inner tie rod (2).

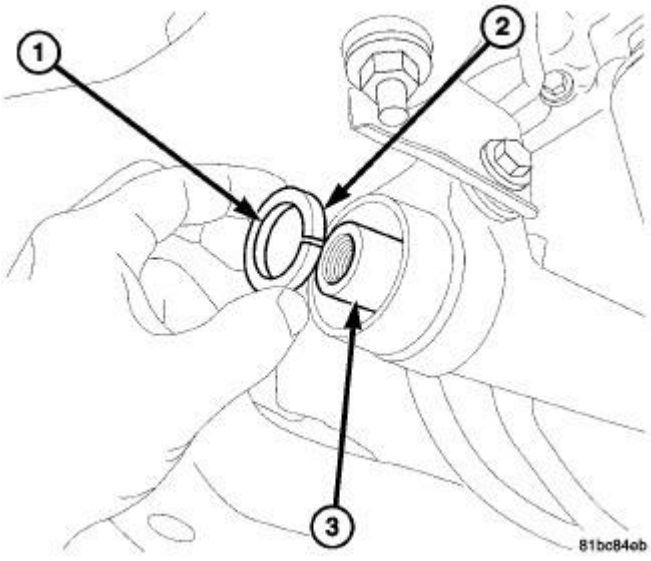

Fig. 82: Restrictor Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

8. Remove travel restrictor (2) from rack gear (3).

OUTER TIE ROD - ALL-WHEEL-DRIVE

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

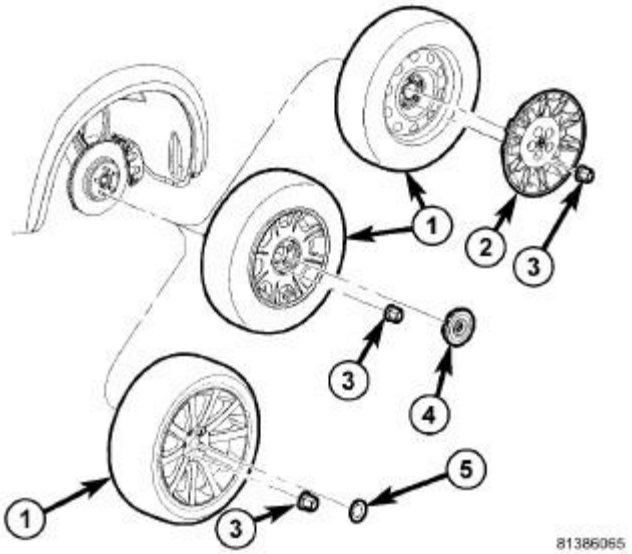

Fig. 83: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then front tire and wheel assembly (1).

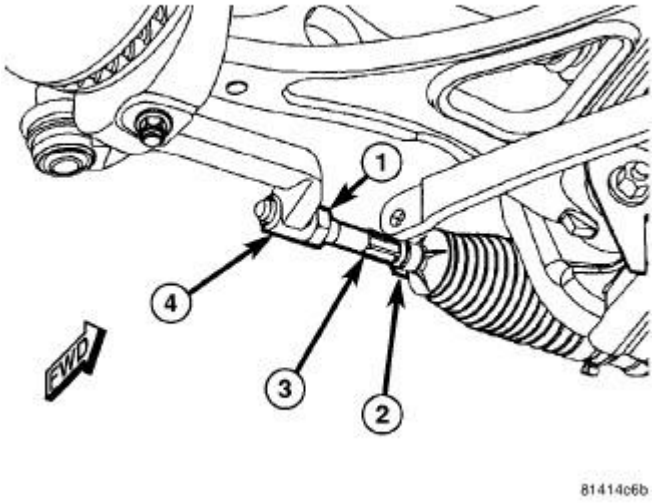

Fig. 84: Removing/Installing Tie Rods (AWD)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When loosening jam nut and rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp (2) at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

3. Loosen tie rod jam nut (1) at outer tie rod (4).

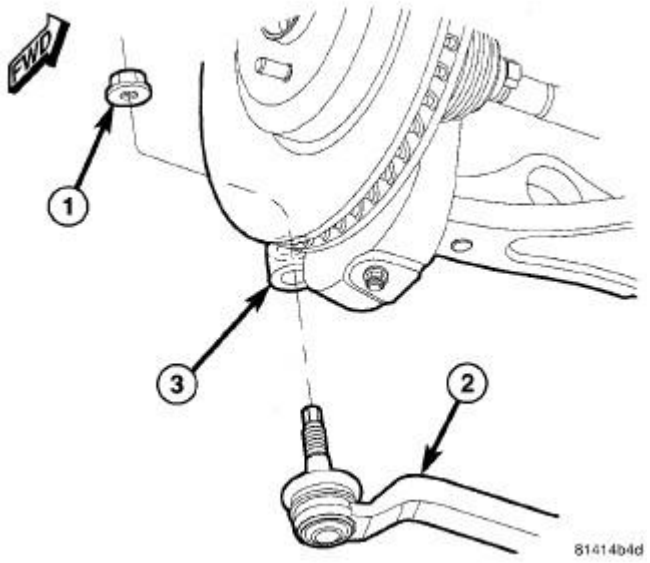

Fig. 85: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

4. Remove outer tie rod end nut (1) at knuckle (3).

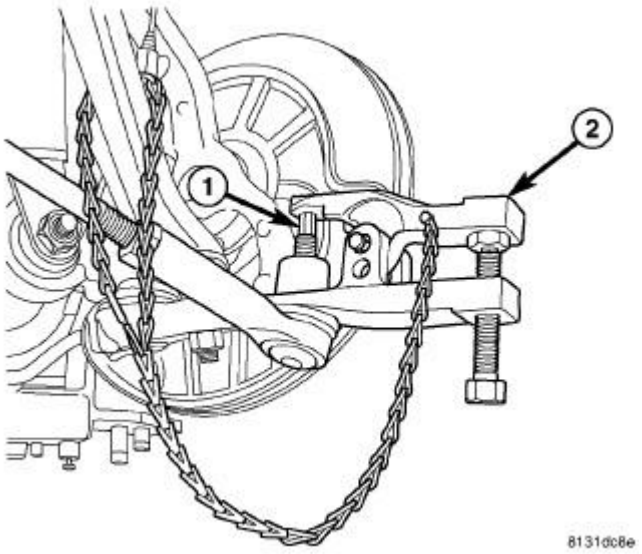

Fig. 86: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

5. Using Remover (special tool #9360, Remover, Ball Joint) (2), separate outer tie rod end (1) from knuckle.
6. Unthread outer tie rod from inner tie rod. **Count number of turns when removing outer tie rod. This will give a good starting point when reassembling and when setting toe.**

OUTER TIE ROD - REAR-WHEEL-DRIVE

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

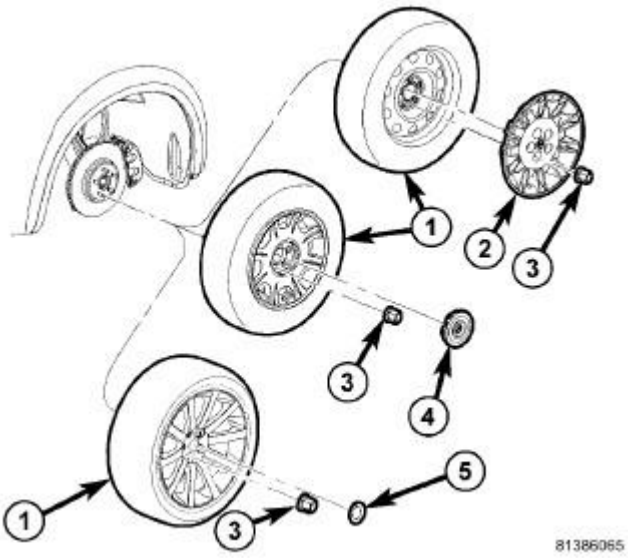

Fig. 87: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

2. Remove wheel mounting nuts (3), then front tire and wheel assembly (1).

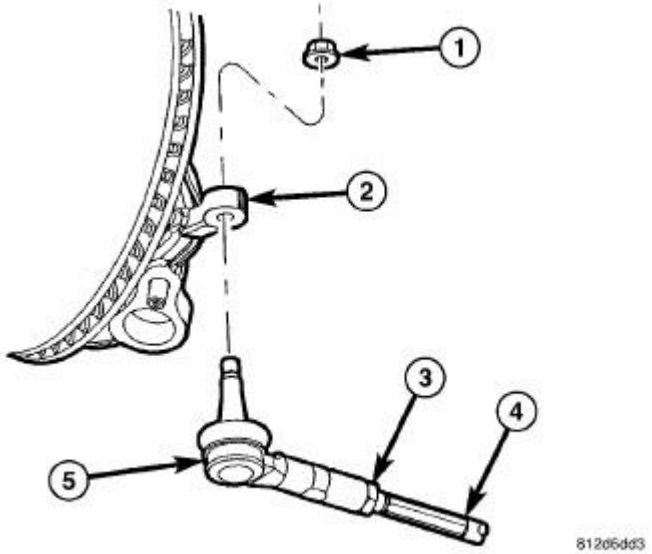

Fig. 88: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When loosening jam nut and rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

3. Loosen tie rod jam nut (3) at outer tie rod (5).
4. Remove outer tie rod end nut (1) at knuckle (2).

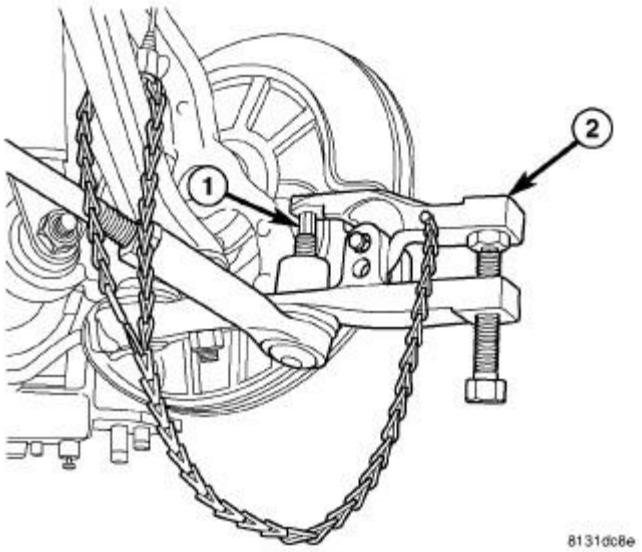

Fig. 89: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

5. Using Remover (special tool #9360, Remover, Ball Joint) (2), separate outer tie rod end (1) from knuckle.
6. Unthread outer tie rod from inner tie rod. **Count number of turns when removing outer tie rod. This will give a good starting point when reassembling and when setting toe.**

INSTALLATION

INNER TIE ROD

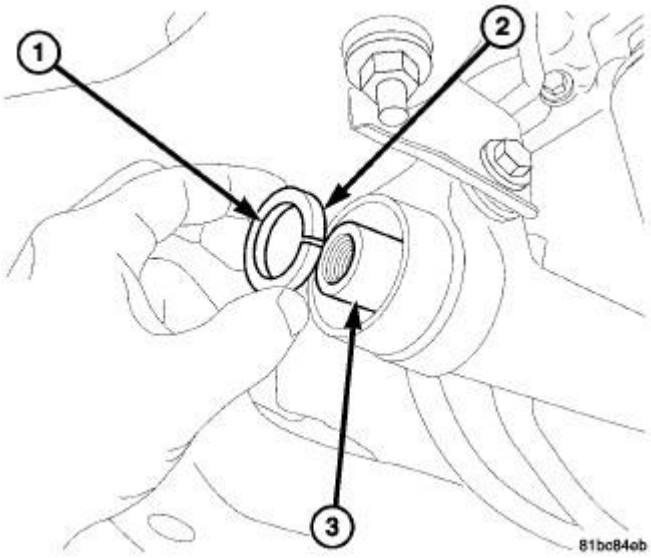

Fig. 90: Restrictor Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: The travel restrictor (2) has a beveled lip (1) on one end of its inside diameter to keep the restrictor from being install too far onto the rack gear. Install the restrictor with the beveled lip side outward (away from gear) to avoid misinstallation and restrictor damage.

1. Install travel restrictor (2), beveled lip (1) side outward, on end of rack gear (3). Once installed, restrictor will be flush with end of rack gear.
2. Apply Mopar® Lock AND Seal Adhesive or equivalent medium thread locker adhesive to inboard end threads of inner tie rod.

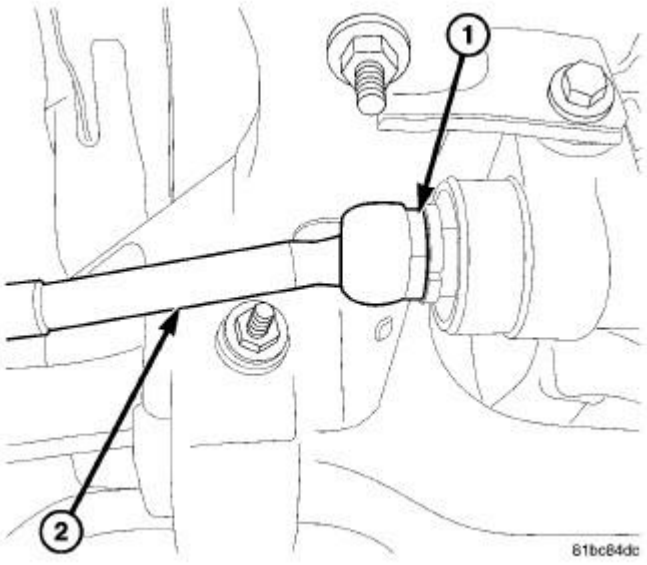

Fig. 91: Inner Tie Rod Hex
Courtesy of CHRYSLER GROUP, LLC

3. Install inner tie rod (2) onto gear using appropriate inner tie rod installer tool or crows foot wrench on hex (1). Tighten inner tie rod to 88 N.m. (65 ft. lbs.).
4. Loosely place new clamp over large end of bellows.

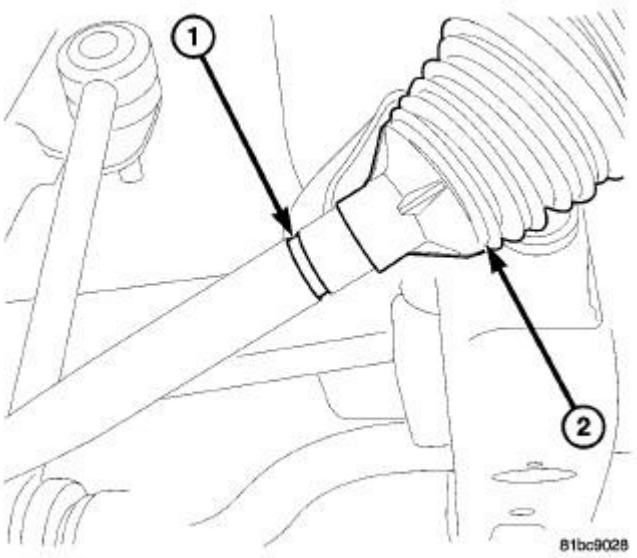

Fig. 92: Groove In Inner Tie Rod
Courtesy of CHRYSLER GROUP, LLC

5. Apply a small amount of Mopar® Lubriplate or equivalent uniformly to groove (1) in inner tie rod shaft. This allows for toe adjustment without twisting bellows.
6. Slide new bellows with clamp over end of inner tie rod and onto gear body.
7. Push small end of bellows (2) until ridge inside bellow engages groove (1) machined into inner tie rod.

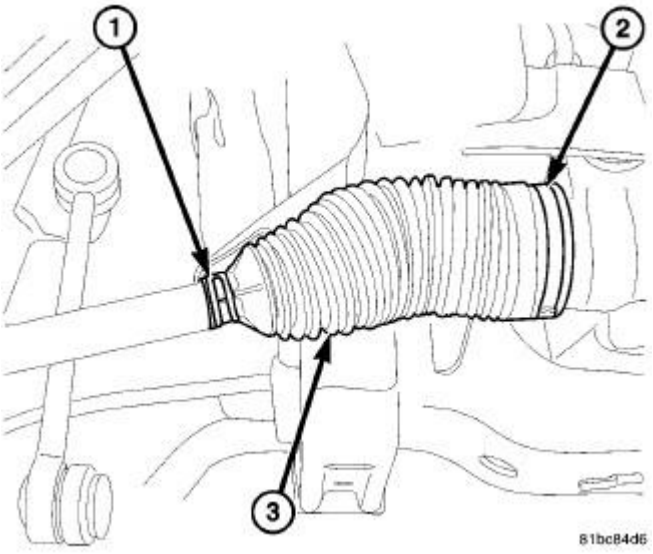

Fig. 93: Bellows Clamps
Courtesy of CHRYSLER GROUP, LLC

8. Install new clamp (1) over small end of bellows (3).

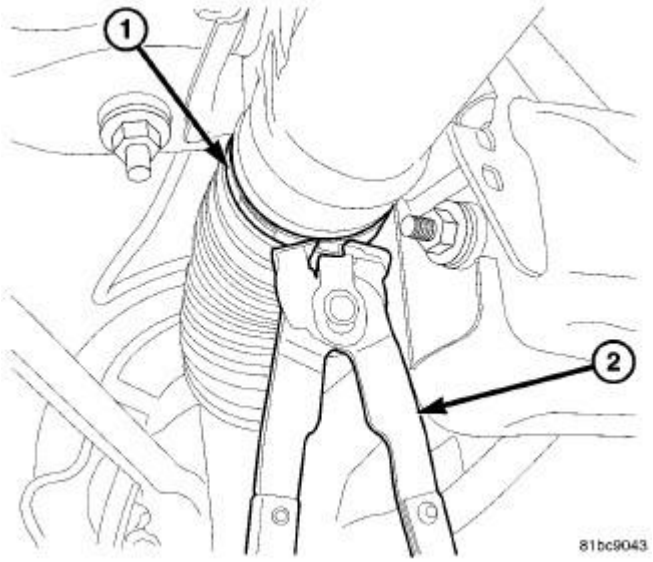

Fig. 94: Crimping Bellows Clamp
Courtesy of CHRYSLER GROUP, LLC

9. Using crimping pliers (2), crimp bellows clamp (1) at gear body.

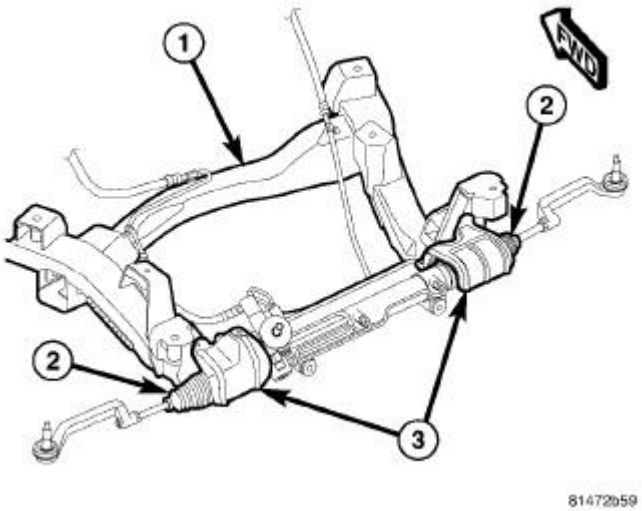

Fig. 95: Rack Assembly And Inner Tie Rod Bellows Heat Shields
Courtesy of CHRYSLER GROUP, LLC

10. If equipped with All-Wheel-Drive and heat shield was removed, install heat shield (3) above inner tie rod bellows (2). Tighten screws to 10 N.m (89 in. lbs.).
11. Thread tie rod jam nut onto inner tie rod far enough to install outer tie rod.
12. Install outer tie rod. Refer to **TIE ROD, STEERING, INSTALLATION**.

OUTER TIE ROD - ALL-WHEEL-DRIVE

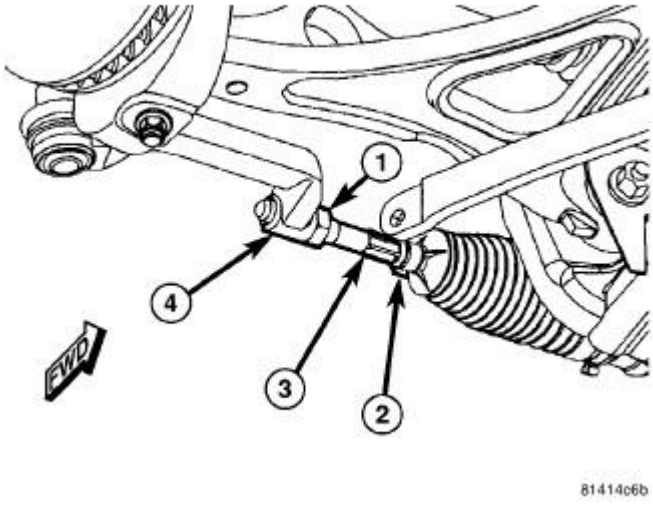

Fig. 96: Removing/Installing Tie Rods (AWD)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp (2) at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

1. Thread outer tie rod (4) onto inner tie rod (3). Install outer tie rod same number of turns as when removed.

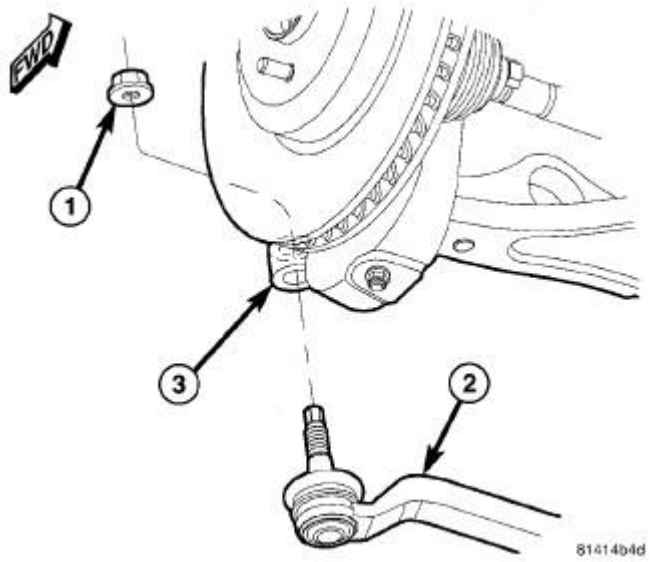

Fig. 97: Tie Rod Attachment AT Knuckle
Courtesy of CHRYSLER GROUP, LLC

2. Install outer tie rod end (2) into steering knuckle (3). Install and tighten nut (1) to 35 N.m + 90° turn (26 ft. lbs. + 90° turn).

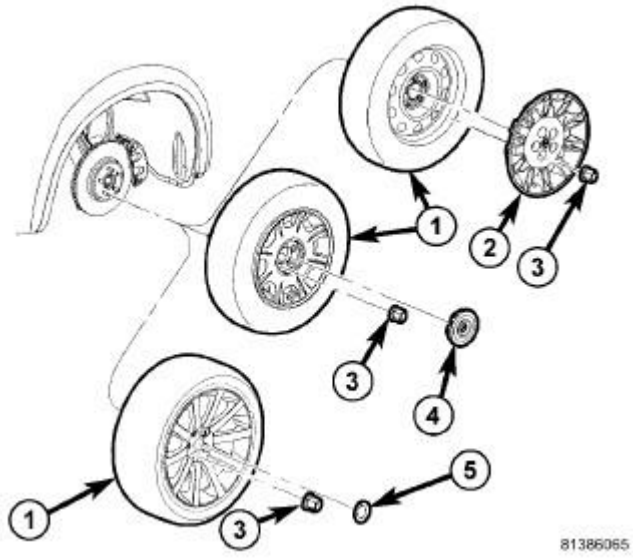

Fig. 98: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

3. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .
4. Lower vehicle.
5. Perform wheel alignment setting toe to specifications. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

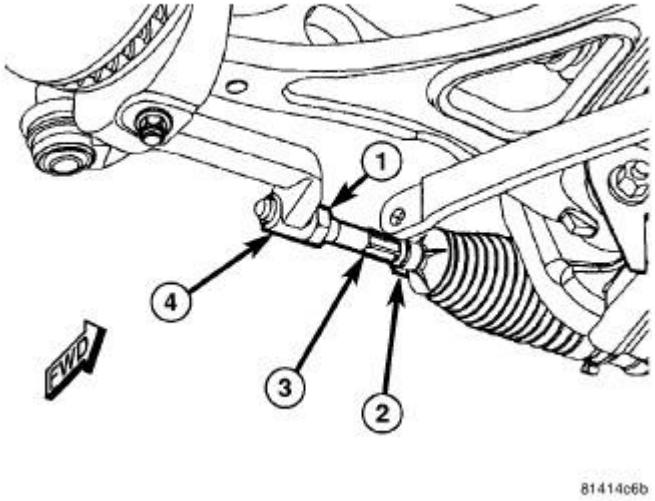

Fig. 99: Removing/Installing Tie Rods (AWD)
Courtesy of CHRYSLER GROUP, LLC

6. Tighten tie rod jam nut (1) to 75 N.m (55 ft. lbs.).

OUTER TIE ROD - REAR-WHEEL-DRIVE

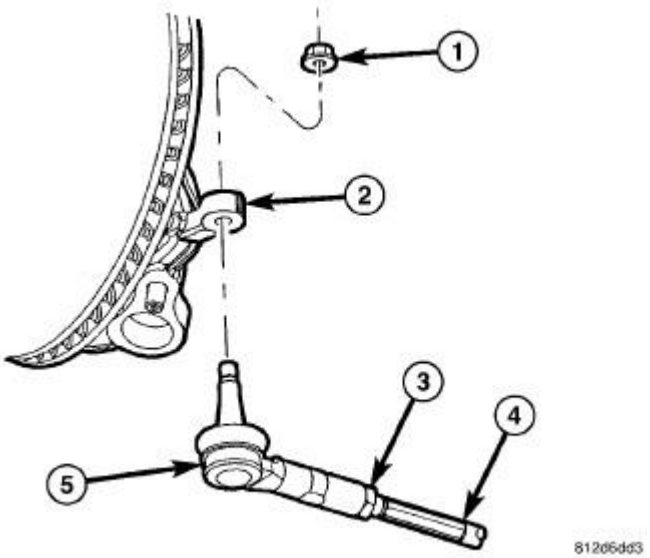

Fig. 100: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

1. Thread outer tie rod (5) onto inner tie rod (4), Install outer tie rod same number of turns as when removed.
2. Install outer tie rod end (5) into steering knuckle (2). Install and tighten nut (1) to 35 N.m + 90° turn (26 ft. lbs. + 90° turn).

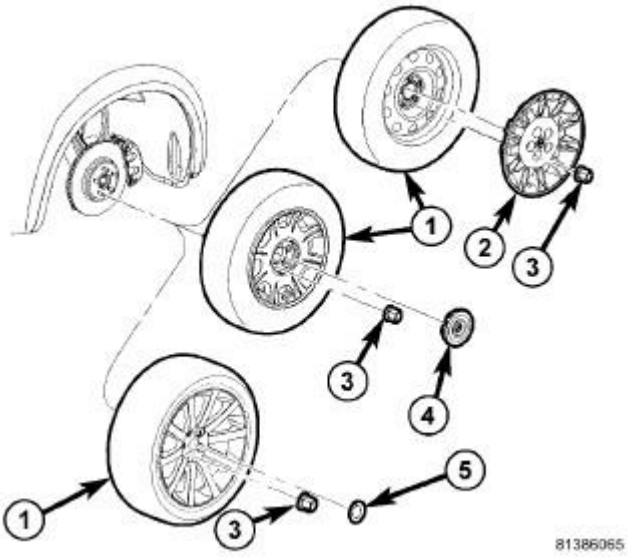

Fig. 101: Tire And Wheel Mounting

Courtesy of CHRYSLER GROUP, LLC

3. Install tire and wheel assemblies (1). Refer to **INSTALLATION** .
4. Lower vehicle.
5. Perform wheel alignment setting toe to specifications. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

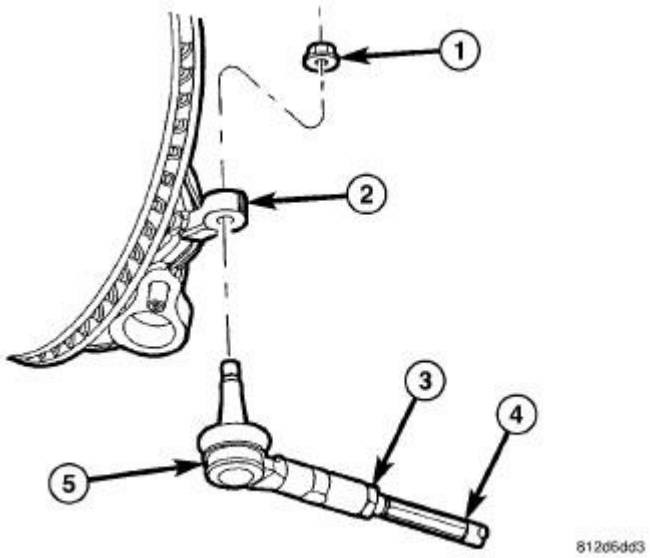

Fig. 102: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

6. Tighten tie rod jam nut (3) to 75 N.m (55 ft. lbs.).

PUMP

DESCRIPTION

NON SRT

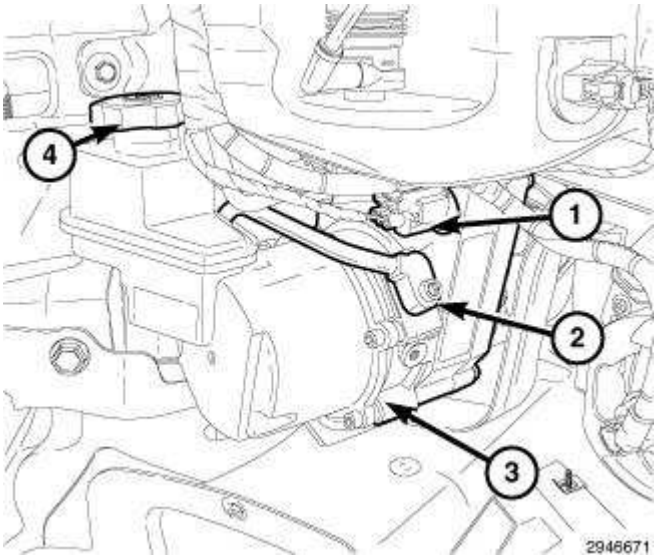

Fig. 103: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

Hydraulic pressure for operation of the power steering gear is provided by an Electro Hydraulic Power Steering (EHPS) pump (3). The EHPS pump is located in front of the right side tire and can be accessed by loosening and positioning aside the front wheelhouse splash shield.

SRT

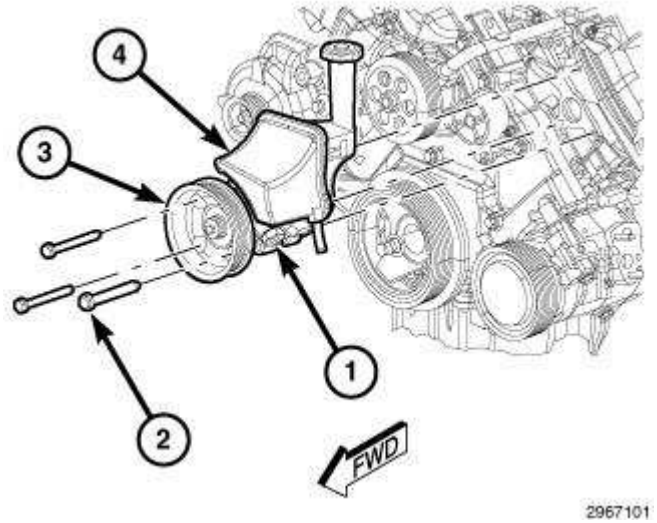

Fig. 104: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

Hydraulic pressure for operation of the power steering gear is provided by a belt-driven all-aluminum power steering pump. SRT vehicles use a constant displacement type pump that is mounted to the left front of engine. The power steering reservoir (4) is integrated with the power steering pump.

DIAGNOSIS AND TESTING

POWER STEERING PUMP AND HOSES

NOTE: This information is designed to be used in conjunction with the diagnostic charts at the beginning of the Steering information. Refer to DIAGNOSIS AND TESTING.

CHECKING FOR WEAR OF POWER STEERING PUMP INTERNAL COMPONENTS - SRT ONLY

1. Place gear selector in PARK (or NEUTRAL) with wheels chalked.
2. With the engine idling, have a helper turn the steering wheel.
3. Using an electronic listening tool, determine if noise is coming from the pump.
4. Increase the engine speed and have a helper turn the steering wheel. Does the noise change with load?
5. Replace the power steering pump if excessive noise is present. Refer to **PUMP, REMOVAL**.

CHECKING FOR POWER STEERING HOSES TOUCHING BODY OR FRAME OF VEHICLE

Check hoses and hose tubes as following:

- Inspect hoses and hose tubes for witness marks. If witness marks are present, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. Refer to **SPECIFICATIONS**. **Do not bend tubing to adjust.** Replace the hose assembly if damaged.
- Check fastener torque of hose mounting brackets and tube nuts. Refer to **SPECIFICATIONS**.
- Have a helper bump the steering gear off of the stops to induce pressure fluctuations which may move the hose. If hose contact is made, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. Refer to **SPECIFICATIONS**. **Do not bend tubing to adjust.** Replace the hose assembly if damaged.

PUMP LEAKAGE

The pump is serviced as an assembly and should not be disassembled.

Check for leaks in the following areas:

- Pump shaft seal behind the pulley - SRT only.
- Pressure and return lines
- Flow control valve fitting

REMOVAL

NON SRT

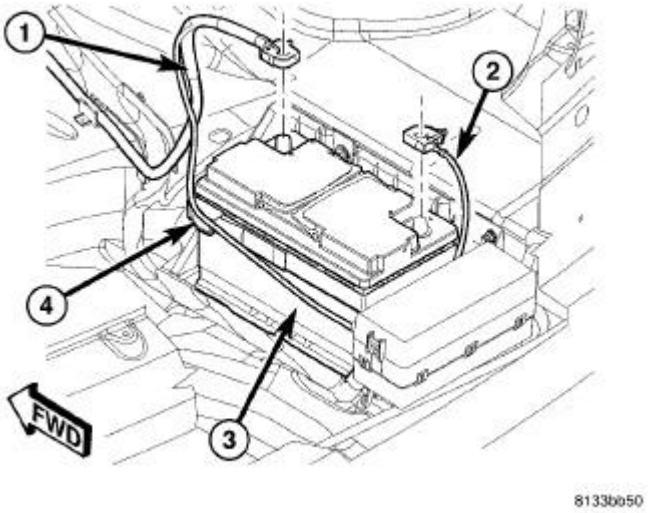

Fig. 105: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove right front wheel mounting nuts, then tire and wheel assembly.
4. Remove right front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .

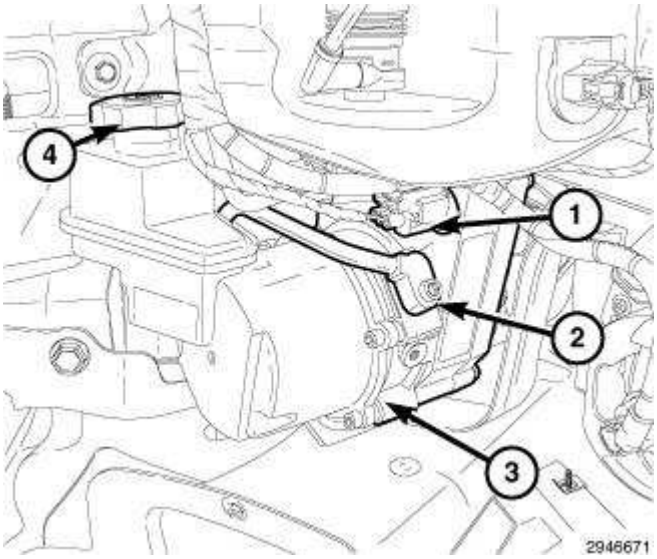

Fig. 106: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

5. Siphon power steering fluid from pump reservoir (4).
6. Disconnect electrical connectors (1) from Electro Hydraulic Power Steering (EHPS) pump body

(3).

7. Remove power steering pressure line bolt (2) and position the pressure line away from the EHPS pump.

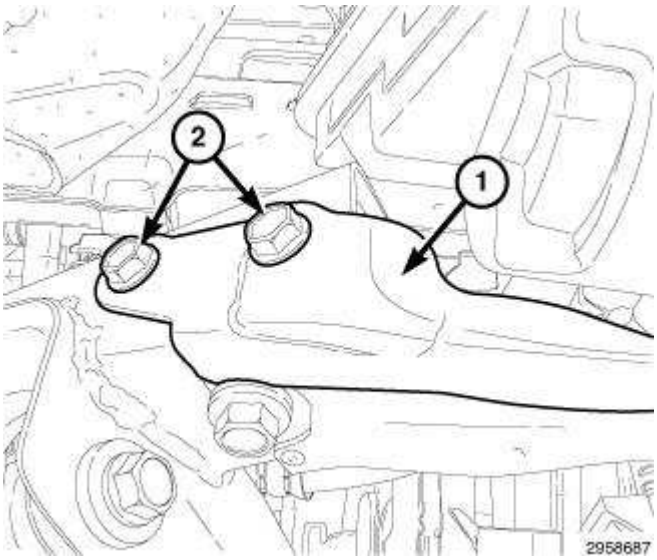

Fig. 107: Two Mounting Bolts & Electro Hydraulic Power Steering (EHPS) Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

8. Remove EHPS pump bracket (1) mounting bolts (2).

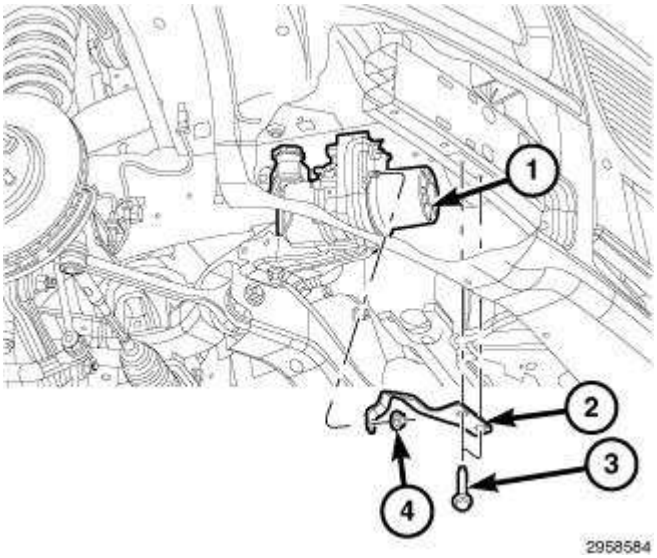

Fig. 108: EHPS Pump Bracket Retaining Nut & EHPS Pump
Courtesy of CHRYSLER GROUP, LLC

9. Remove EHPS pump bracket retaining nut (4) and remove the EHPS pump (1) from the vehicle.

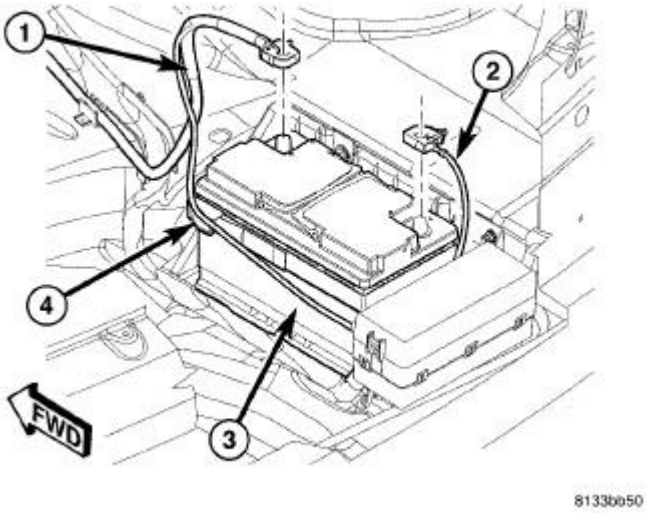

Fig. 109: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.
2. Siphon power steering fluid from pump reservoir.

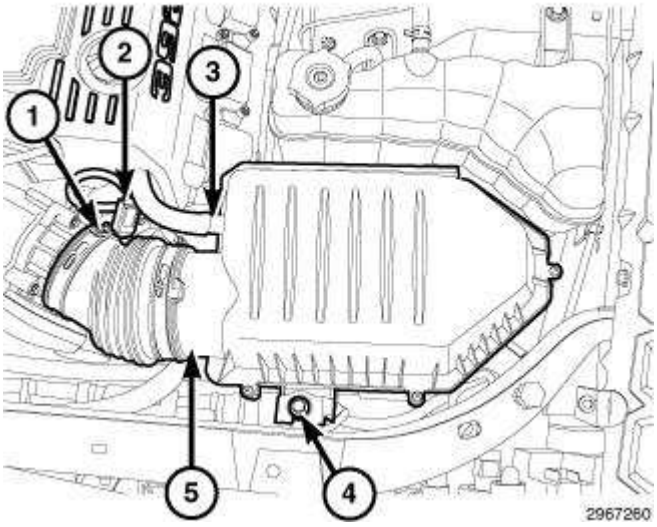

Fig. 110: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

3. Loosen the air duct retaining clamp (1) at the throttle body.
4. Disconnect the intake air temperature sensor electrical connector (2).
5. Remove the makeup air hose (3) at the air cleaner housing.
6. Remove the air cleaner housing retaining bolt (4).

7. While lifting up the air cleaner housing (5), slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.
8. Remove serpentine drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

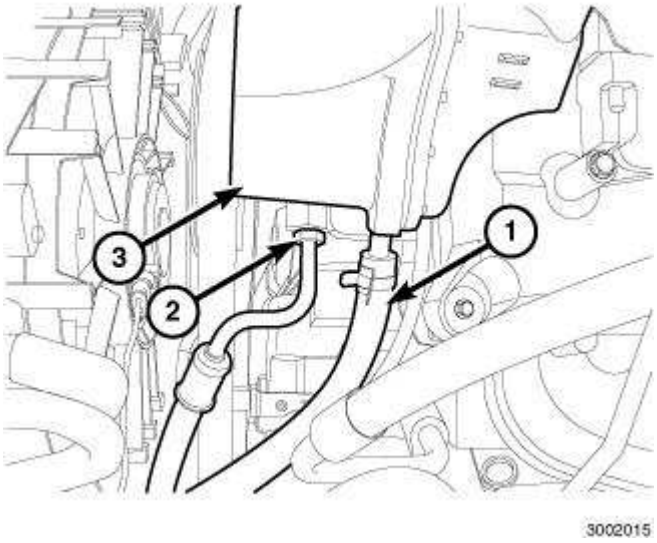

Fig. 111: Supply Hose, Pump, Remove Pressure Hose & Pump
Courtesy of CHRYSLER GROUP, LLC

9. Remove hose clamp, then supply hose (1) from pump (3).
10. Unthread tube nut, then remove pressure hose (2) from pump (3).

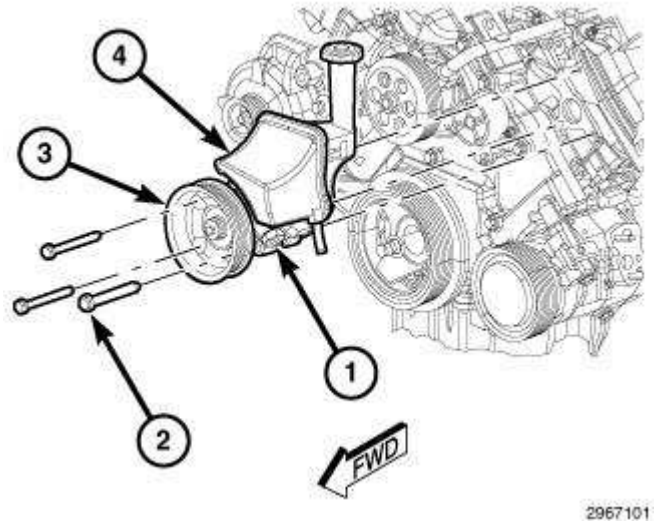

Fig. 112: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove three pump mounting bolts (2) through access holes in pulley (3).
12. Remove pump (1) from engine.

13. If pulley needs removal. Refer to **PULLEY, POWER STEERING PUMP, REMOVAL**.

INSTALLATION

NON SRT

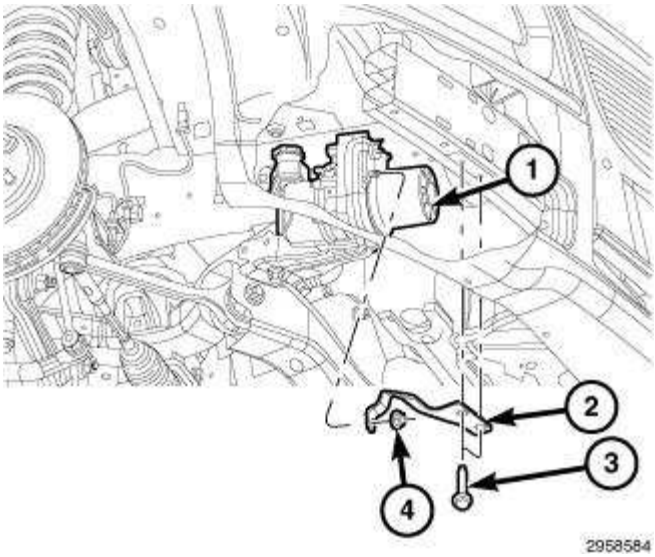

Fig. 113: EHPS Pump Bracket Retaining Nut & EHPS Pump
Courtesy of CHRYSLER GROUP, LLC

1. If Electro Hydraulic Power Steering (EHPS) pump bracket (2) has been removed, install the bracket to the vehicle and tighten fasteners to 12 N.m (9 ft. lbs.).
2. Install EHPS pump (1) into vehicle and install EHPS bracket retaining nut (4). Tighten retaining nut to 12 N.m (9 ft. lbs.).

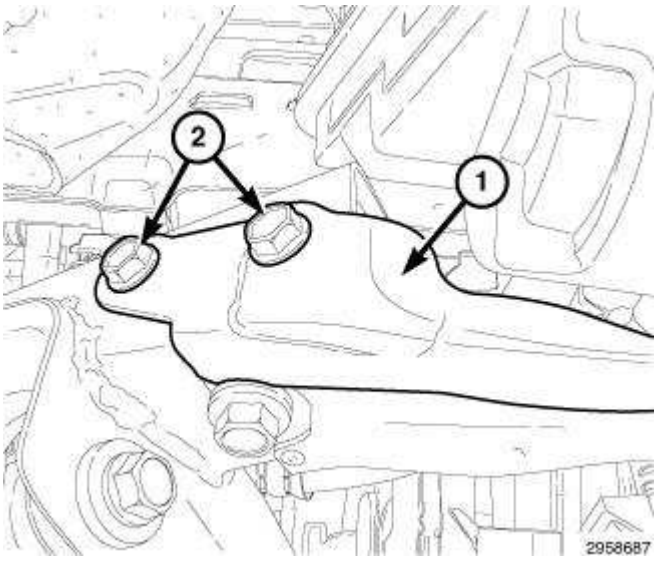

Fig. 114: Two Mounting Bolts & Electro Hydraulic Power Steering (EHPS) Mounting Bracket

Courtesy of CHRYSLER GROUP, LLC

3. Install EHPS pump bracket (1) mounting bolts (2) and tighten to 50 N.m (37 ft. lbs.).

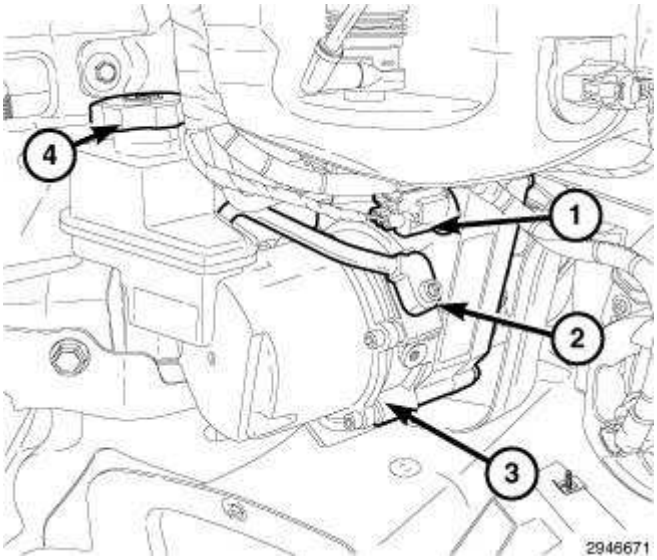

Fig. 115: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a new O-ring on the end of the pressure line.

4. Lubricate the new O-ring on the end of the pressure line with clean power steering fluid.
5. Install power steering pressure line to EHPS Pump (3).
6. Install pressure line retaining bolt (2) and tighten to 10 N.m (89 in. lbs.).
7. Install EHPS pump electrical connectors (1).

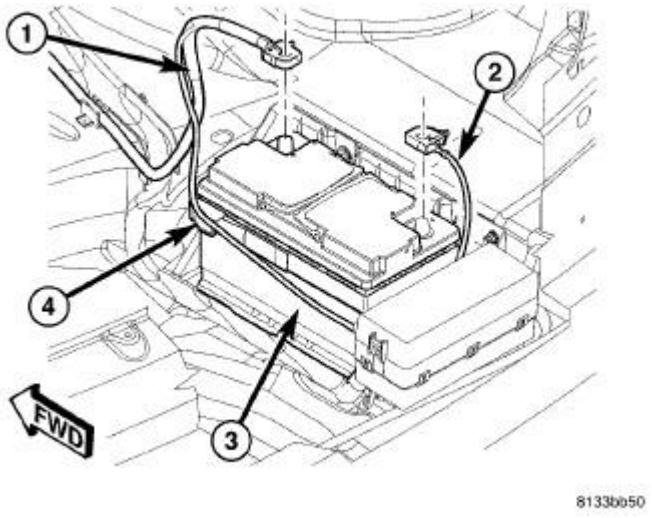

Fig. 116: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

8. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.
9. Install right front wheelhouse splash shield Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
10. Lower vehicle.
11. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

SRT

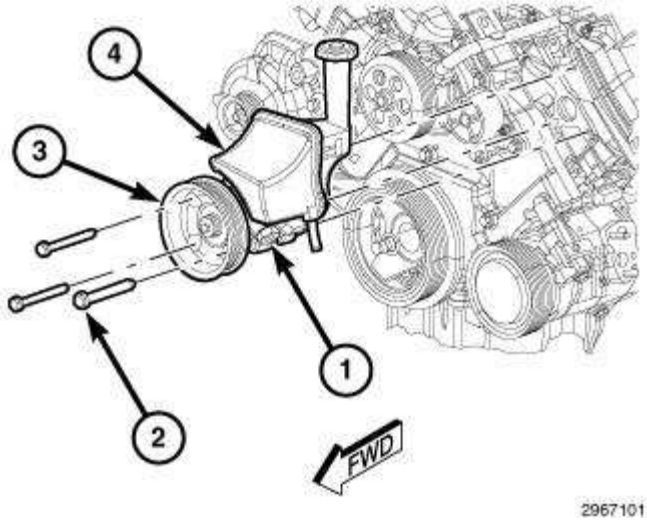

Fig. 117: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Align pump (1) with mounting holes on engine.
2. Install three pump mounting bolts (2) through access holes in pulley. Tighten bolts to 28 N.m (21 ft. lbs.).

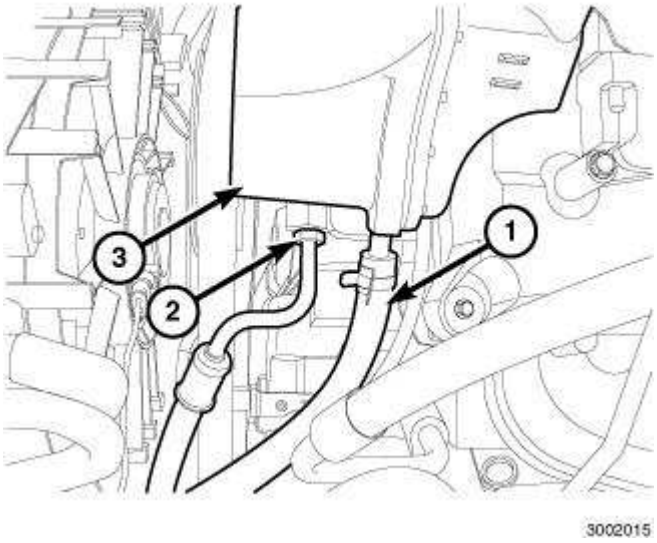

Fig. 118: Supply Hose, Pump, Remove Pressure Hose & Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the end of the pressure hose.

3. Lubricate NEW O-ring on end of pressure hose with clean power steering fluid.
4. Install pressure hose (2) to pump (3). Tighten pressure hose tube nut to 47 N.m (35 ft. lbs.).
5. Install return hose (1) to power steering pump (3) and install clamp securing hose in place.
6. Install serpentine drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

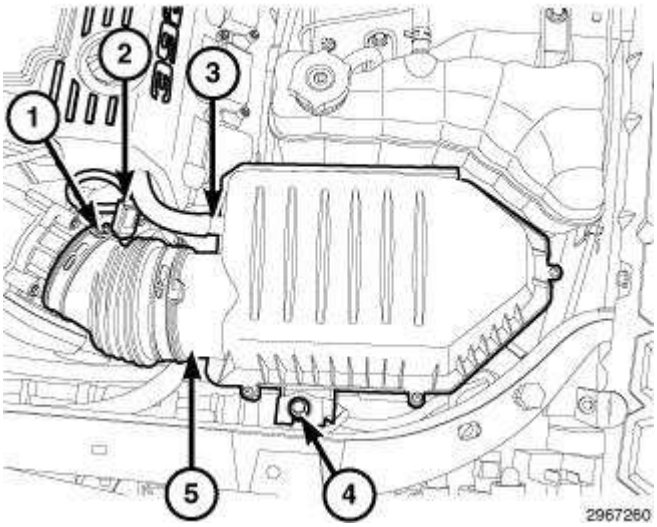

Fig. 119: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

7. While sliding the air duct onto the throttle body, lower the air cleaner housing (5) into position

and align the locating pin on the bottom of the housing.

8. Install the air cleaner housing retaining bolt (4) and tighten to 5 N.m (44 in. lbs.).
9. Install the makeup air hose (3) at the air cleaner housing.
10. Connect the intake air temperature sensor electrical connector (2).
11. Position the air duct retaining clamp (1) at the throttle body and tighten to 3 N.m (30 in. lbs.).

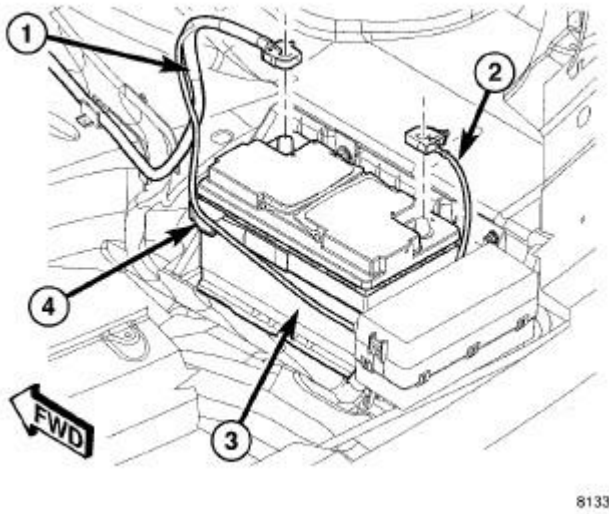

Fig. 120: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

12. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
13. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

COOLER, POWER STEERING

DESCRIPTION

DESCRIPTION

NON SRT

There is no power steering fluid cooler in the Electro Hydraulic Power Steering (EHPS) system.

SRT

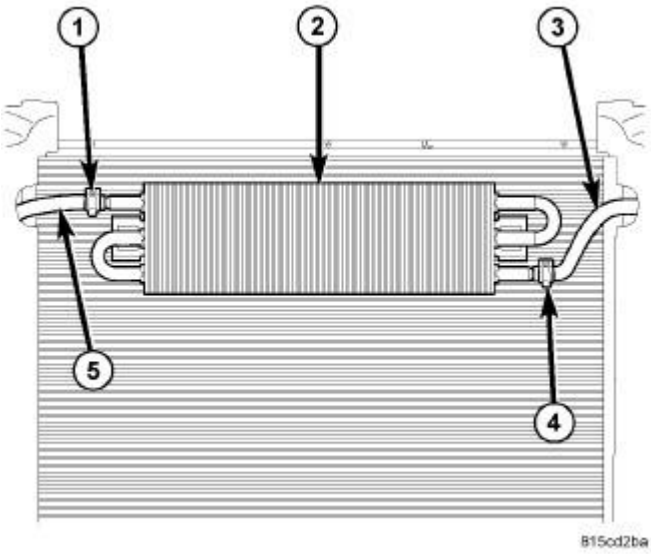

Fig. 121: SRT8 Fluid Cooler And Hoses
Courtesy of CHRYSLER GROUP, LLC

This vehicle uses a fluid-to-air type power steering fluid cooler (2) with external cooling fins. The cooler mounts to clips attached to the front of the cooling module.

REMOVAL

SRT

1. Disconnect and isolate battery negative cable from battery post.
2. Siphon power steering fluid from pump reservoir.
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .

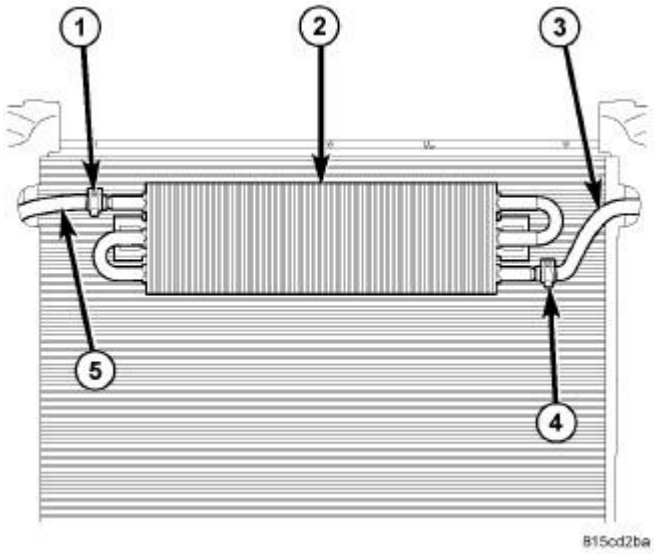

Fig. 122: SRT8 Fluid Cooler And Hoses
Courtesy of CHRYSLER GROUP, LLC

5. Remove hose clamp (1), then return hose (5) from steering gear at cooler (2).
6. Remove hose clamp (4), then return hose (3) to reservoir at cooler (2).

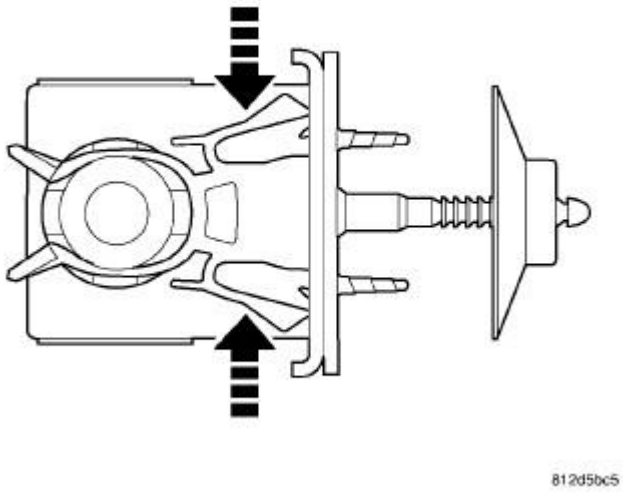

Fig. 123: Cooler Retainer Clips
Courtesy of CHRYSLER GROUP, LLC

7. Push in on cooler mounting clip tabs.
8. Remove cooler from clips mounted to cooling module.

INSTALLATION

SRT

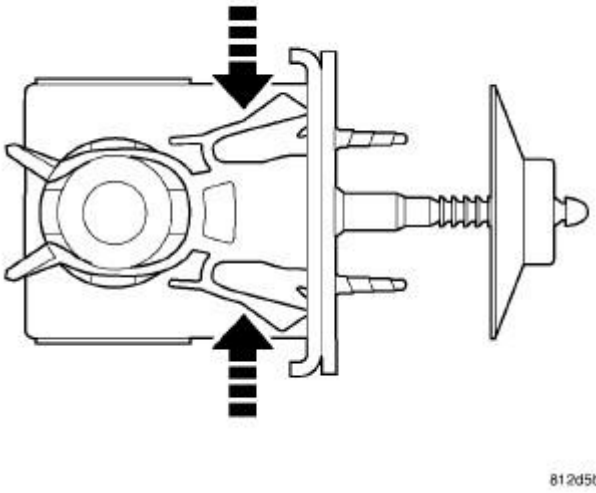

Fig. 124: Cooler Retainer Clips
Courtesy of CHRYSLER GROUP, LLC

1. Install center tube of cooler over mounting clips attached to cooling module. Push cooler past clip retaining tabs allowing it to lock into place.

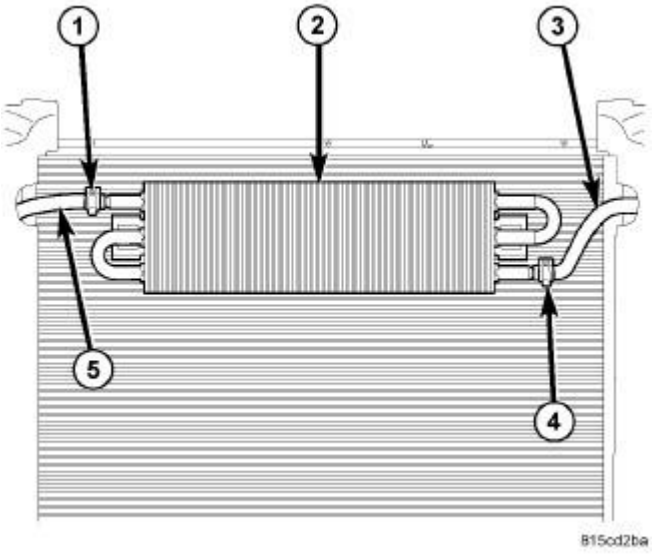

Fig. 125: SRT8 Fluid Cooler And Hoses
Courtesy of CHRYSLER GROUP, LLC

2. Slide return hose to reservoir (3) onto outlet of cooler (2). Install clamp (4) securing hose in place.
3. Slide return hose from gear (5) onto inlet of cooler (2). Install clamp (1) securing hose in place.

4. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .
5. Lower vehicle.

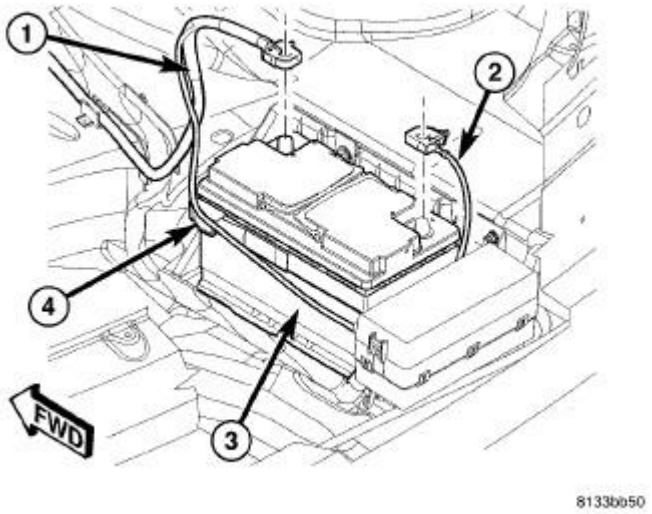

Fig. 126: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

6. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
7. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

FLUID

DESCRIPTION

DESCRIPTION

CAUTION: This vehicle features an Electro Hydraulic Power Steering (EHPS) pump which requires a different power steering fluid. Do not mix power steering fluid types. Damage may result to the power steering pump and system if any other fluid is used. The EHPS system uses fluid which meets material specification MS-11655 or equivalent.

NON SRT VEHICLES

Non-SRT vehicles are equipped with Electro Hydraulic Power Steering (EHPS) systems and require power steering fluid which meets material specification MS-11655 or equivalent.

SRT VEHICLES

The recommended fluid for the power steering system in SRT vehicles is Mopar® Power Steering fluid + 4 or Mopar® ATF+4 Automatic Transmission Fluid. Both fluids have the same material

standard specifications (MS-9602).

Mopar® ATF+4 (and Mopar® Power Steering fluid + 4), when new, is red in color. ATF+4 is dyed red so it can be identified from other fluids used in the vehicle such as engine oil or antifreeze. The red color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, ATF+4 will begin to look darker in color and may eventually become brown. **THIS IS NORMAL.** ATF+4 also has a unique odor that may change with age. Consequently, odor and color cannot be used to indicate the fluid condition or the need for a fluid change.

STANDARD PROCEDURE

NON-SRT POWER STEERING FLUID LEVEL CHECKING

WARNING: Fluid level should be checked with the engine OFF to prevent personal injury from moving parts and to assure an accurate fluid level reading.

CAUTION: This vehicle features an Electro Hydraulic Power Steering (EHPS) pump which requires a different power steering fluid. Do not mix power steering fluid types. Damage may result to the power steering pump and system if any other fluid is used. The EHPS system uses fluid which meets material specification MS-11655 or equivalent.

NOTE: Although not required at specific intervals, the fluid level may be checked periodically. Check the fluid level anytime there is a system noise or fluid leak suspected.

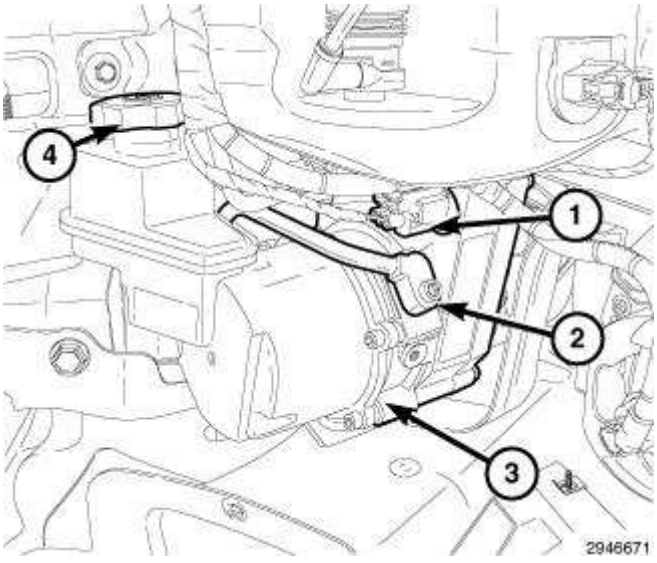

Fig. 127: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: The power steering fluid reservoir (4) is integrated with the Electro Hydraulic

Power Steering (EHPS) pump.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove right front wheel mounting nuts, then tire and wheel assembly.
3. Remove right front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
4. Ensure that the fluid is at the correct level in the power steering reservoir (4).

SRT POWER STEERING FLUID LEVEL CHECKING

WARNING: Fluid level should be checked with the engine OFF to prevent personal injury from moving parts and to assure an accurate fluid level reading.

CAUTION: Mopar® Power Steering Fluid + 4 or Mopar® ATF+4 Automatic Transmission Fluid is to be used in the power steering system. Both Fluids have the same material standard specifications (MS-9602). No other power steering or automatic transmission fluid is to be used in the system. Damage may result to the power steering pump and system if another fluid is used. Do not overfill the system.

NOTE: Although not required at specific intervals, the fluid level may be checked periodically. Check the fluid level anytime there is a system noise or fluid leak suspected.

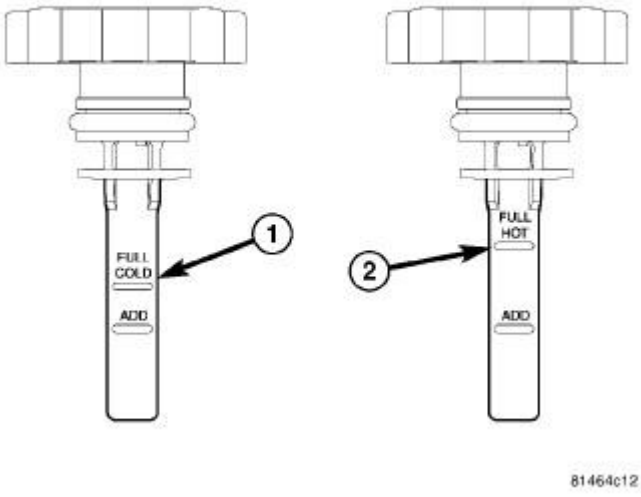

Fig. 128: Cold & Hot Sides Of Dipstick
Courtesy of CHRYSLER GROUP, LLC

The power steering fluid level can be viewed on the dipstick attached to the filler cap. There are two

sides to the dipstick, one is for checking the fluid when it is cold, the other is for checking the fluid when it is hot. Before opening the power steering system, wipe the reservoir filler cap free of dirt and debris. Remove the cap and check the fluid level on its dipstick.

Use the COLD side of the dipstick (1) to measure when the fluid is at normal ambient temperature, approximately 21°C to 27°C (70°F to 80°F). The fluid level should read between the ADD and FULL COLD lines.

Use the HOT side of the dipstick (2) to measure when the vehicle has been running and the fluid is hot. When the fluid is hot, the fluid level is allowed to read up to the FULL HOT line. **Only add fluid to the system when the vehicle is cold.**

Use only Mopar® Power Steering Fluid + 4 or Mopar® ATF+4 Automatic Transmission Fluid in the power steering system. Do not overfill the power steering system.

HOSE, POWER STEERING, PRESSURE

REMOVAL

ALL-WHEEL-DRIVE

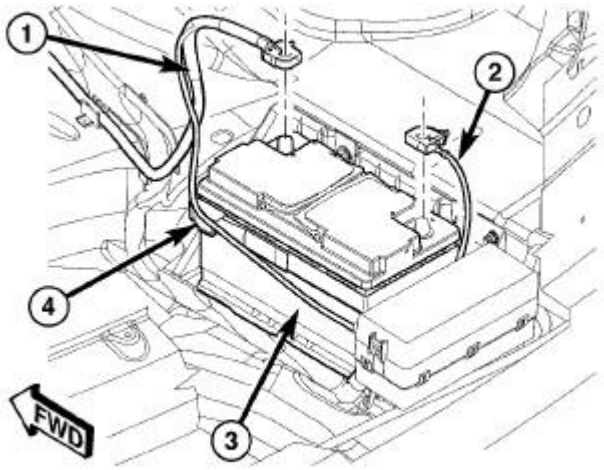

Fig. 129: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.

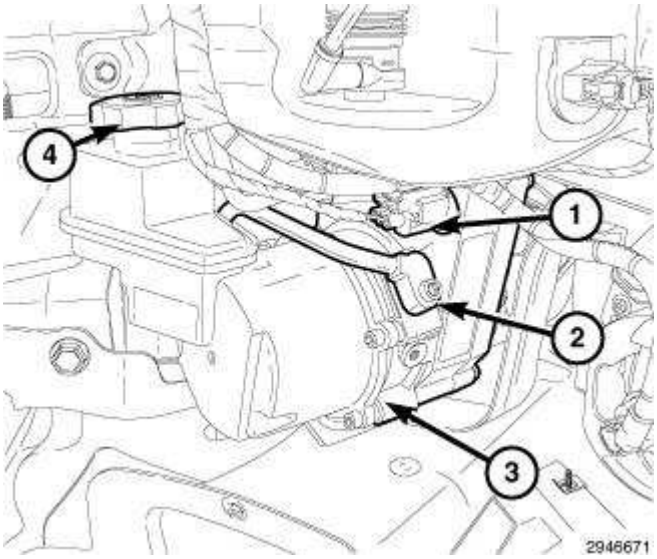

Fig. 130: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the right front wheel lug nuts, then remove the wheel and tire.
4. Remove the right front wheelhouse splash shield Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
5. Siphon power steering fluid from pump reservoir (4).
6. Remove power steering pressure line bolt (2) and separate power steering pressure line from Electro Hydraulic Power Steering (EHPS) pump.

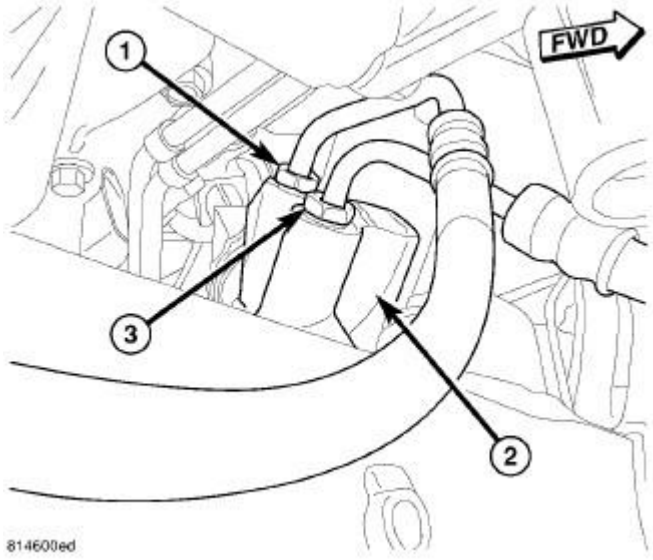

Fig. 131: Hoses AT AWD Gear
Courtesy of CHRYSLER GROUP, LLC

7. Remove the two bolts fastening the pressure hose routing clamps to the engine cradle.
8. Unthread pressure hose tube nut (3), then remove pressure hose from steering gear (2) and vehicle.

REAR-WHEEL-DRIVE

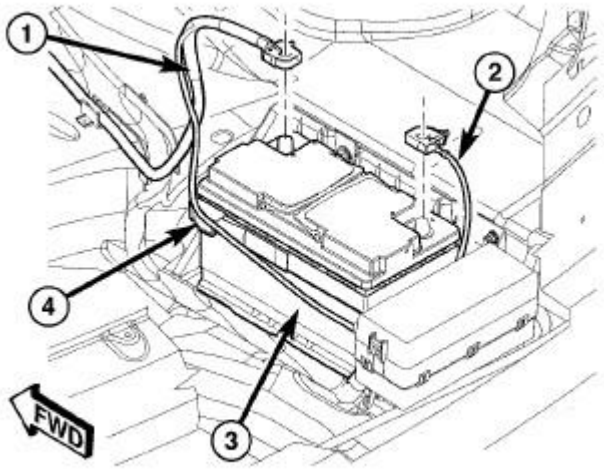

Fig. 132: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.

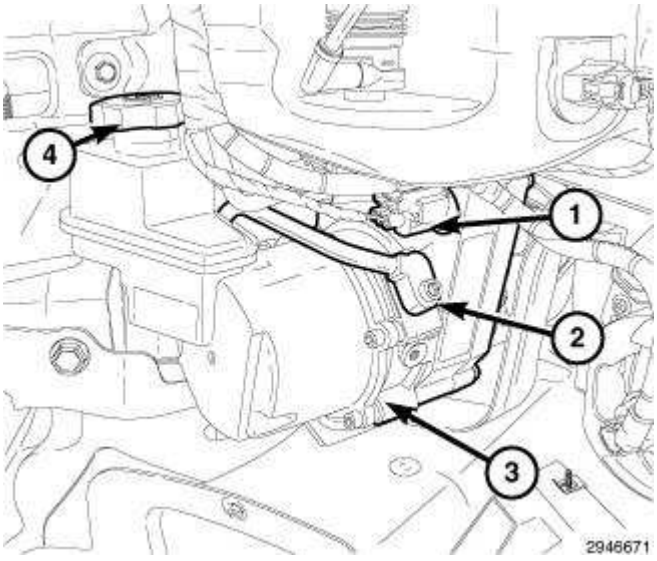

Fig. 133: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

3. Remove right front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
4. Siphon power steering fluid from pump reservoir (4).
5. Remove power steering pressure line retaining bolt (2) and separate pressure line from Electro Hydraulic Power Steering (EHPS) pump.

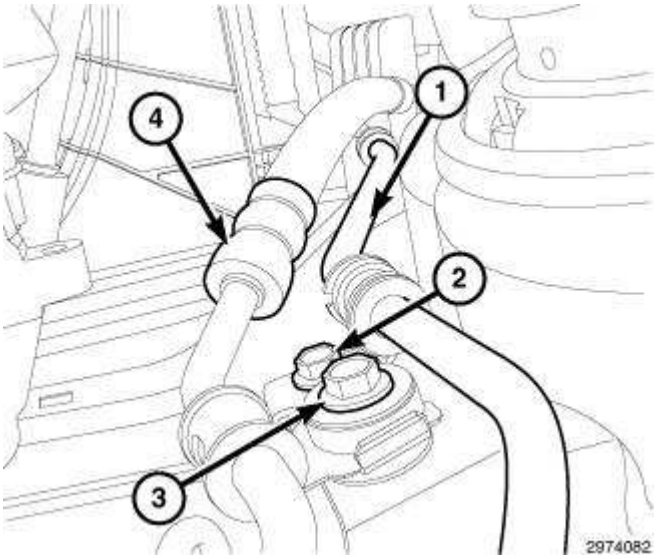

Fig. 134: Mounting Bolt & Pressure Line
Courtesy of CHRYSLER GROUP, LLC

6. Remove mounting bolt (3) and separate pressure line (4) from crossmember.

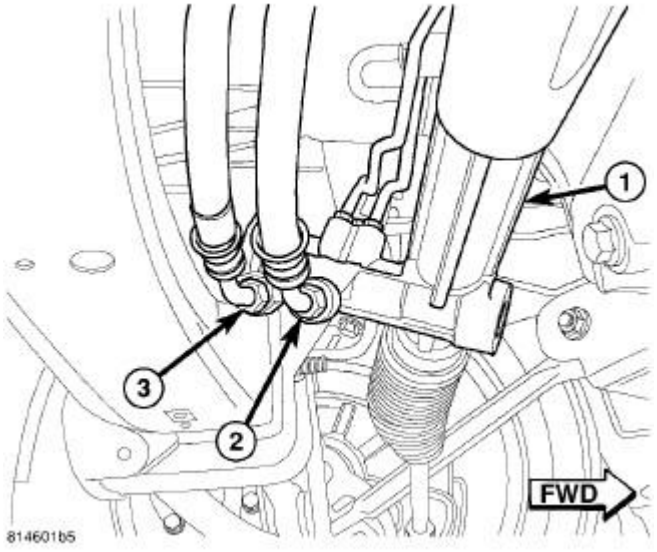

Fig. 135: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

7. Unthread pressure hose tube nut (2) from steering gear (1).
8. Remove pressure hose from vehicle.

SRT

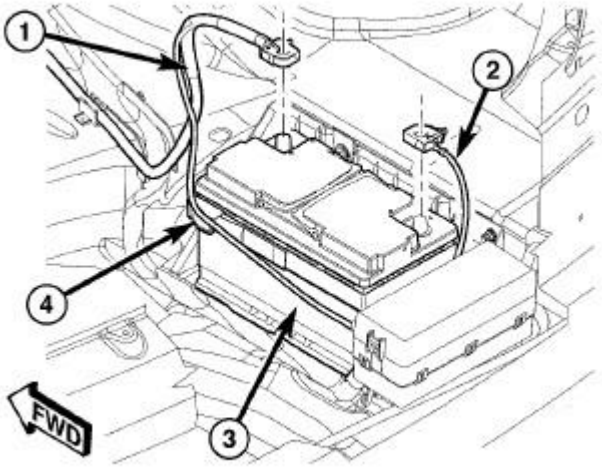

Fig. 136: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate negative battery cable (2) from battery post.
2. Siphon power steering fluid from pump reservoir.
3. Remove air cleaner housing and inlet tube to throttle body. Refer to **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL** or **BODY, AIR CLEANER, REMOVAL, 5.7L** or **BODY, AIR CLEANER, REMOVAL** .

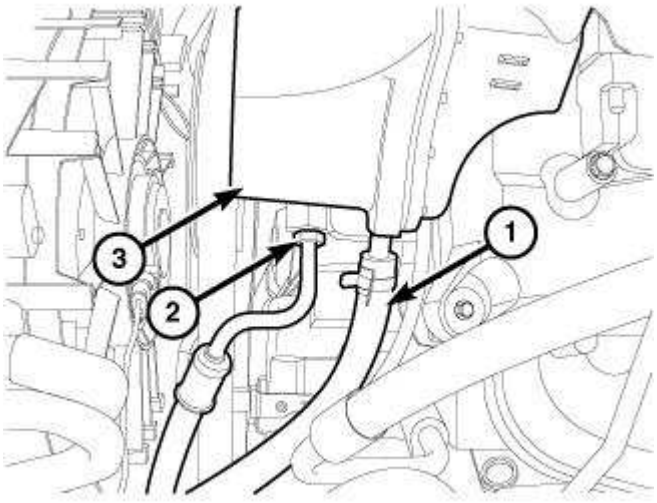

Fig. 137: Supply Hose, Pump, Remove Pressure Hose & Pump
Courtesy of CHRYSLER GROUP, LLC

4. Unthread tube nut, then remove pressure hose (2) from pump (3).
5. Raise and support vehicle. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .
6. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .

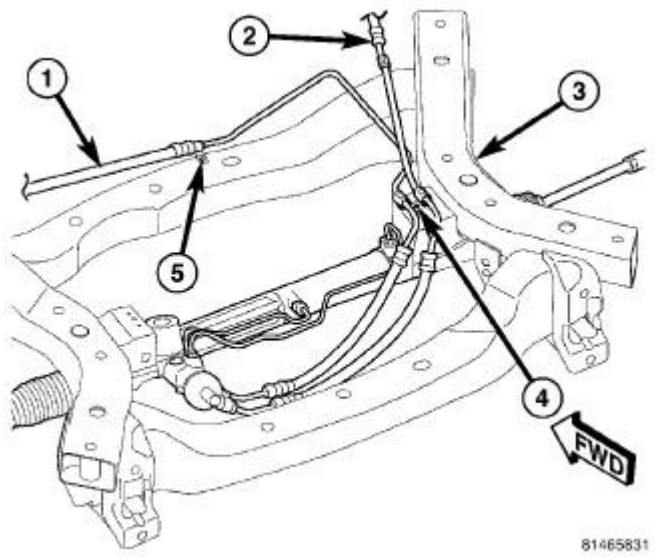

Fig. 138: Hose Routing Along Engine Cradle
Courtesy of CHRYSLER GROUP, LLC

7. Remove screw (5) securing pressure hose (1) routing clamp to front of engine cradle (3).
8. Remove screw (4) fastening routing clamps securing pressure (1) and return (2) hoses to right side of engine cradle (3).

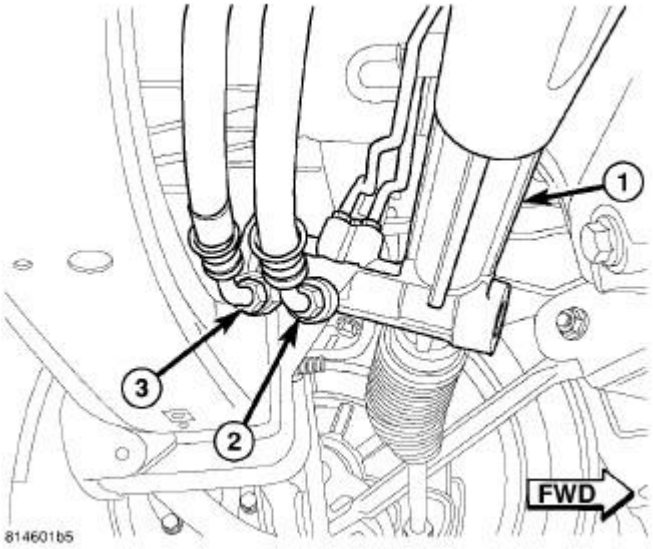

Fig. 139: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

9. Unthread pressure hose tube nut (2) from steering gear (1).
10. Remove pressure hose from vehicle.

INSTALLATION

ALL-WHEEL-DRIVE

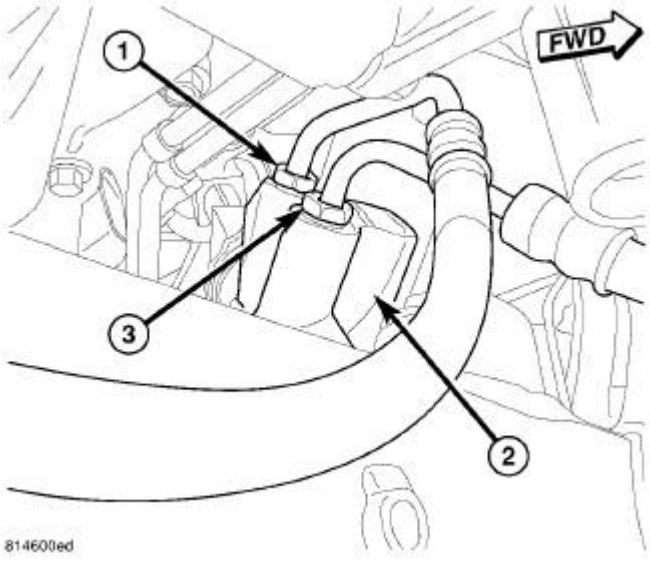

Fig. 140: Hoses AT AWD Gear
Courtesy of CHRYSLER GROUP, LLC

1. Install pressure hose in engine compartment from underneath.

NOTE: **Always use a NEW O-ring on the end of the pressure or return hose at the gear.**

2. Lubricate NEW O-ring on steering gear end of pressure hose with clean power steering fluid.
3. Insert pressure hose into steering gear (2) port and install tube nut (3). **Do not tighten tube nut at this time.**

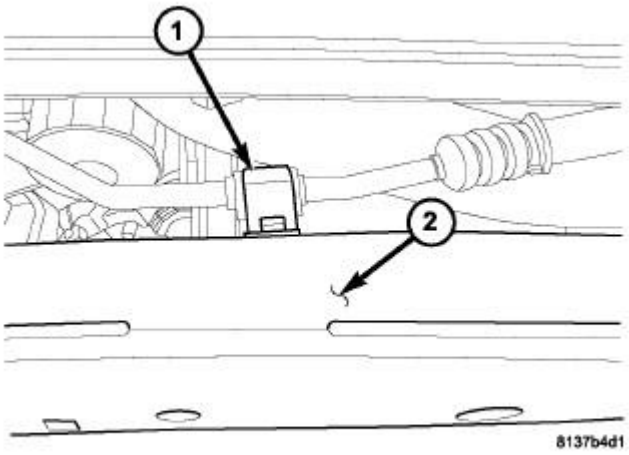

Fig. 141: Hose Mounting Bracket To Cradle
Courtesy of CHRYSLER GROUP, LLC

4. Route pressure hose along left side of engine cradle. Install screw through routing clamp and secure hose to left side of engine cradle.
5. Route pressure hose along front of engine cradle. Install screw through routing clamp (1) and secure hose to front of engine cradle (2).

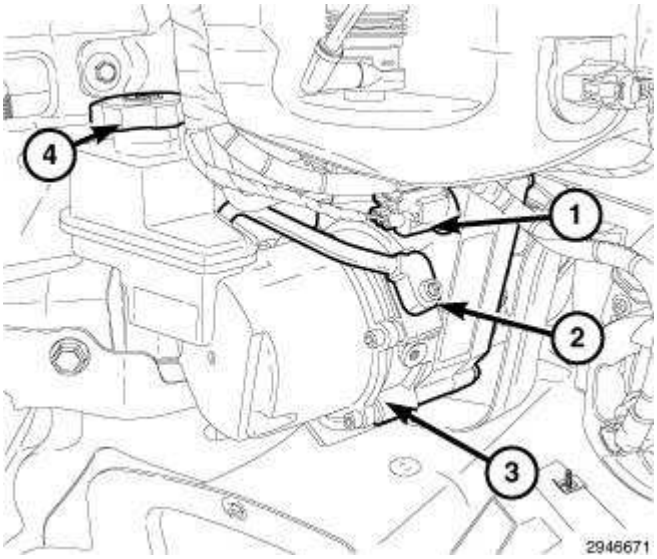

Fig. 142: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a new O-ring on the end of the pressure line.

6. Lubricate the new O-ring on the end of the pressure line with clean power steering fluid.
7. Install power steering pressure line to EHPS Pump (3).
8. Install pressure line retaining bolt (2) and tighten to 10 N.m (89 in. lbs.).

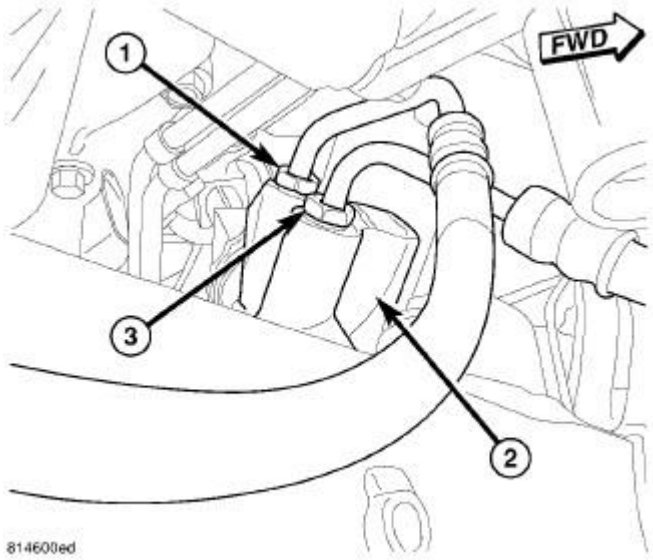

Fig. 143: Hoses AT AWD Gear
Courtesy of CHRYSLER GROUP, LLC

9. Tighten pressure (3) hose tube nut at steering gear (2) to 47 N.m (35 ft. lbs.).
10. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

11. Install right front wheel house splash shield.
12. Lower vehicle.

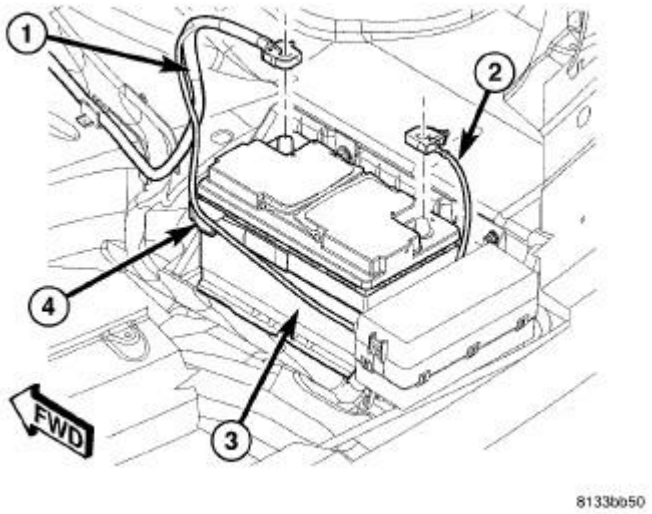

Fig. 144: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

13. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

REAR-WHEEL-DRIVE

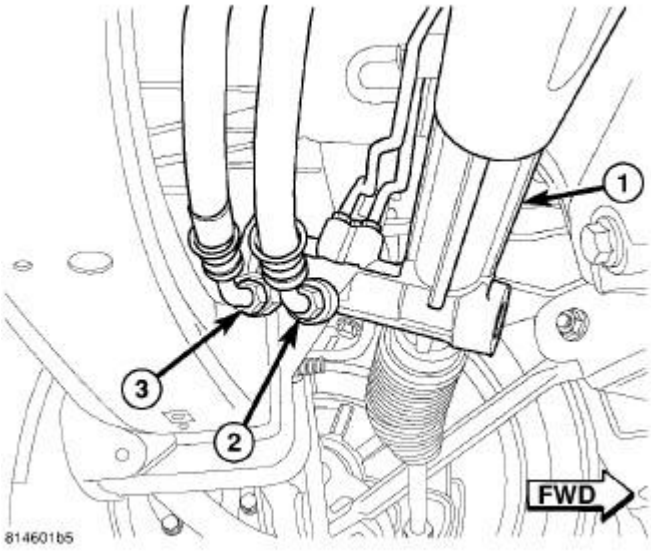

Fig. 145: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the end of the pressure hose.

1. Install pressure hose in engine compartment from underneath.
2. Lubricate NEW O-ring on steering gear end of pressure hose with clean power steering fluid.
3. Install pressure hose (2) to steering gear (1). **Do not tighten tube nut at this time.**

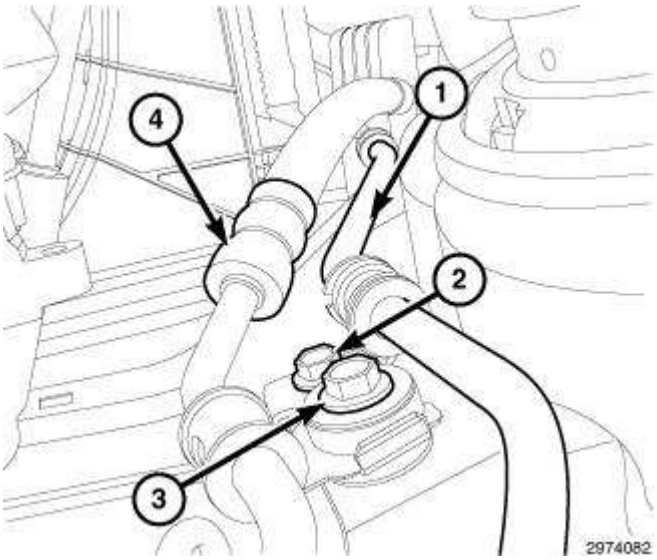

Fig. 146: Mounting Bolt & Pressure Line
Courtesy of CHRYSLER GROUP, LLC

4. Route pressure hose (4) along right side of engine cradle. Position pressure hose (4) routing clamp and install bolt (3) securing hose to the right side of engine cradle.

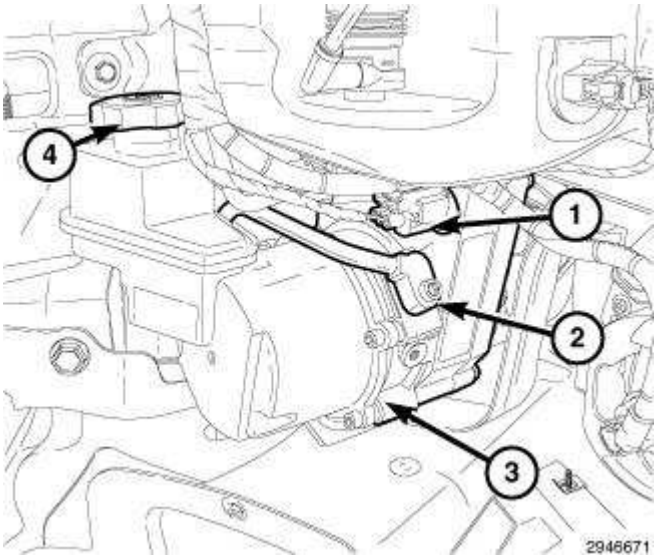

Fig. 147: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a new O-ring on the end of the pressure line.

5. Lubricate the new O-ring on the end of the pressure line with clean power steering fluid.
6. Install power steering pressure line to Electro Hydraulic Power Steering (EHPS) pump (3).
7. Install pressure line retaining bolt (2) and tighten to 10 N.m (89 in. lbs.).

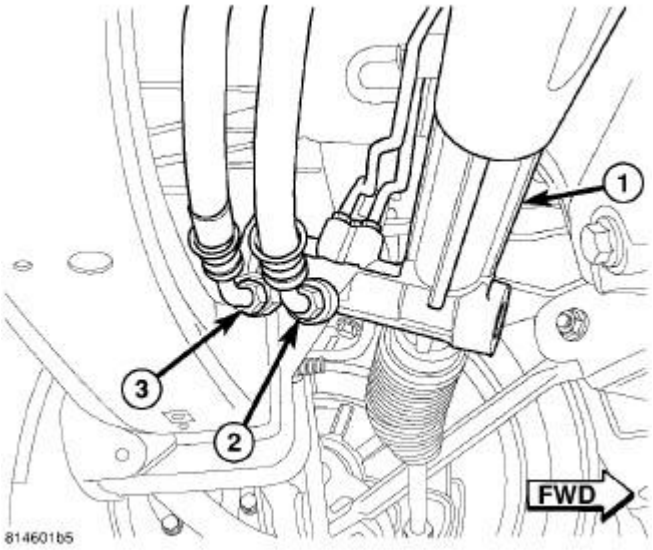

Fig. 148: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

8. Tighten pressure hose tube nut at steering gear to 47 N.m (35 ft. lbs.).
9. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.
10. Install right front wheel house splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
11. Lower vehicle.

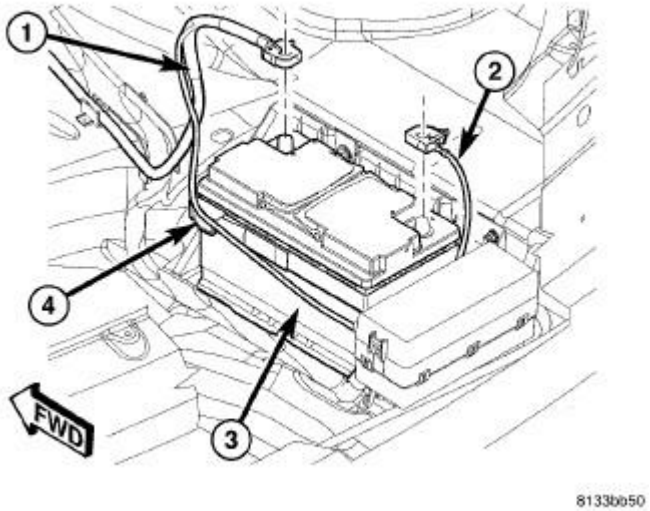

Fig. 149: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

12. Connect battery negative cable (2) to battery post. It is important that this is performed properly.

SRT

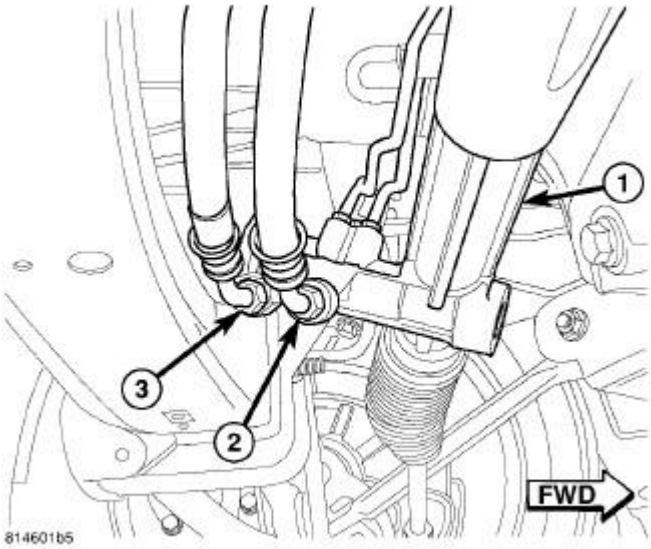

Fig. 150: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .
2. Install pressure hose in engine compartment from underneath.

NOTE: Always use a NEW O-ring on the end of the pressure hose.

3. Lubricate new O-ring on steering gear end of pressure hose with clean power steering fluid.
4. Install pressure hose (2) to steering gear (1). **Do not tighten tube nut at this time.**

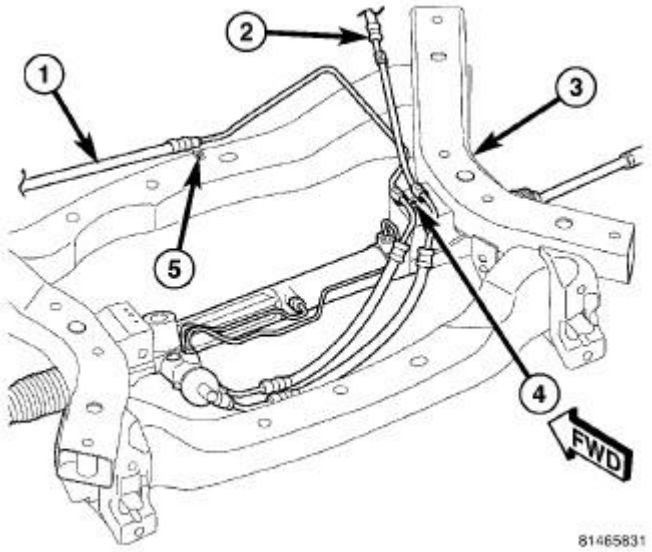

Fig. 151: Hose Routing Along Engine Cradle
Courtesy of CHRYSLER GROUP, LLC

5. Route pressure hose along right side of engine cradle. Position pressure hose (1) routing clamp over return hose (2) routing clamp, then install screw (4) securing hoses to right side of engine cradle (3).
6. Route pressure hose along front of engine cradle. Install screw (5) through routing clamp securing hose to front of engine cradle (3).

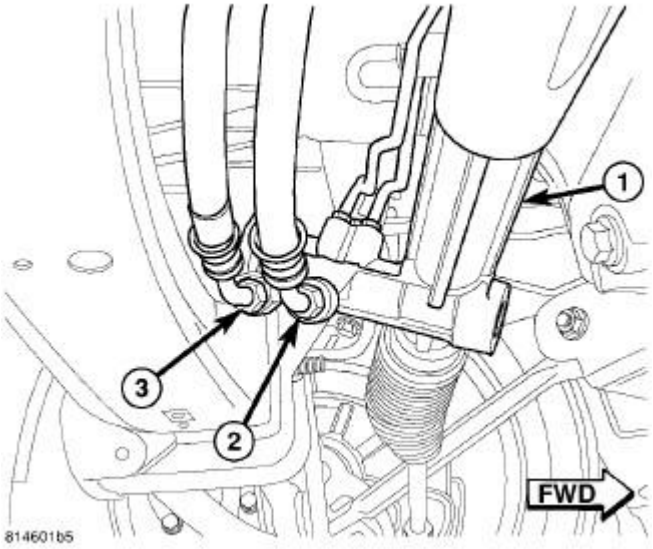

Fig. 152: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

7. Tighten pressure hose tube nut at steering gear to 47 N.m (35 ft. lbs.).
8. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .
9. Lower vehicle.

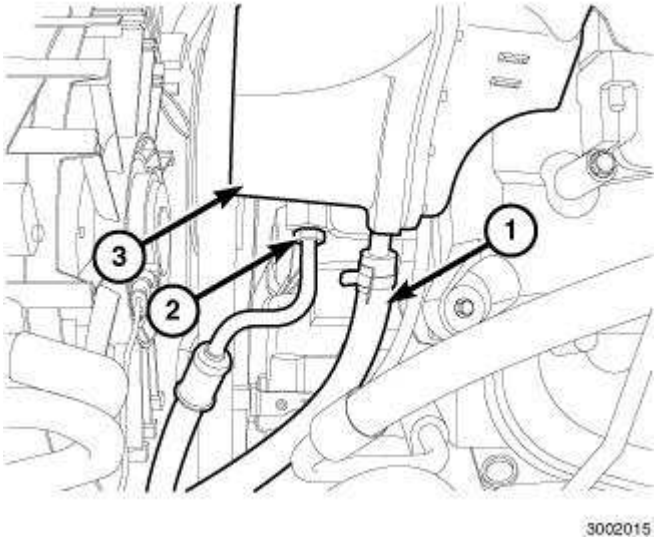

Fig. 153: Supply Hose, Pump, Remove Pressure Hose & Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the end of the pressure hose.

10. Lubricate new O-ring on power steering pump end of pressure hose with clean power steering fluid.

11. Install pressure hose (2) to pump (3). Tighten pressure hose tube nut to 47 N.m (35 ft. lbs.).

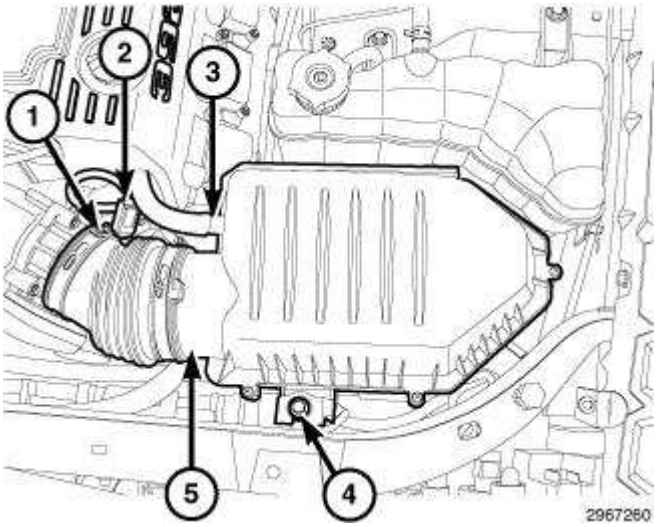

Fig. 154: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

12. While sliding the air duct onto the throttle body, lower the air cleaner housing (5) into position and align the locating pin on the bottom of the housing.
13. Install the air cleaner housing retaining bolt (4) and tighten to 5 N.m (44 in. lbs.).
14. Install the makeup air hose (3) at the air cleaner housing.
15. Connect the intake air temperature sensor electrical connector (2).
16. Position the air duct retaining clamp (1) at the throttle body and tighten to 3 N.m (30 in. lbs.).

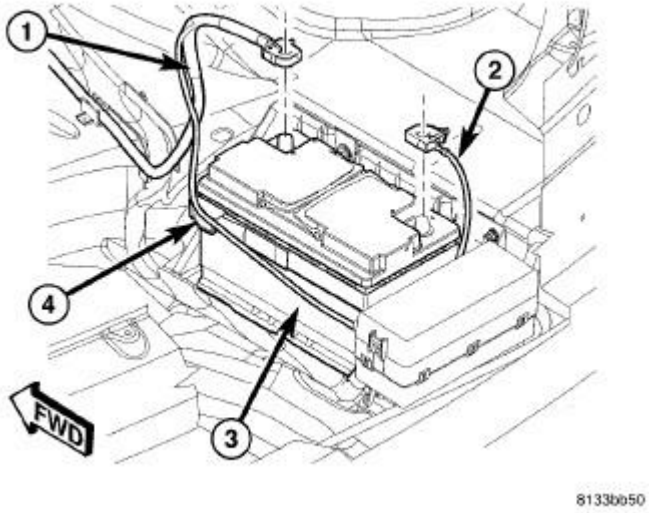

Fig. 155: Disconnecting/Connecting Battery Cables

Courtesy of CHRYSLER GROUP, LLC

17. Connect negative battery cable (2) to battery post. It is important that this is performed properly.
18. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

HOSE, POWER STEERING, RETURN

REMOVAL

COOLER TO RESERVOIR - SRT

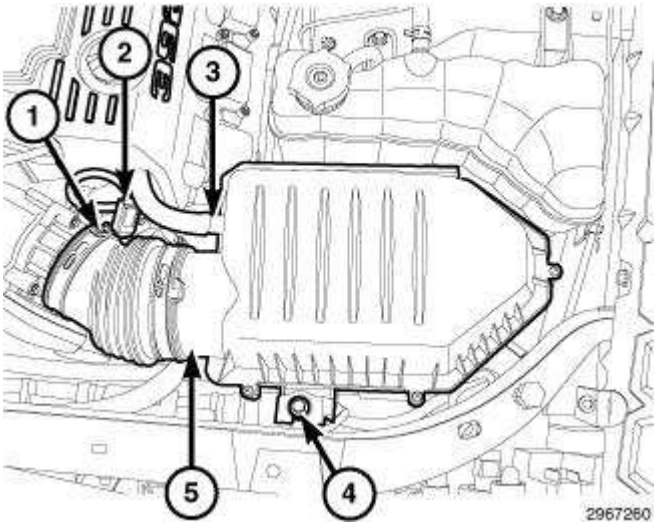

Fig. 156: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable from battery post.
2. Siphon power steering fluid from pump reservoir.
3. Loosen the air duct retaining clamp (1) at the throttle body.
4. Disconnect the intake air temperature sensor electrical connector (2).
5. Remove the makeup air hose (3) at the air cleaner housing.
6. Remove the air cleaner housing retaining bolt (4).
7. While lifting up the air cleaner housing (5), slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.

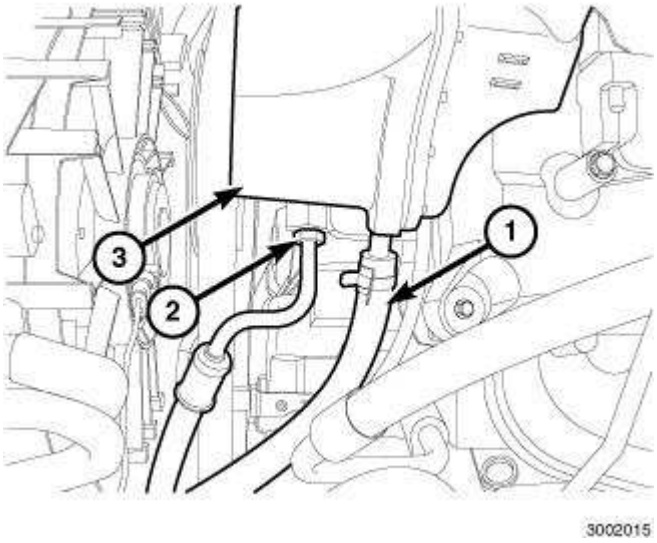

Fig. 157: Supply Hose, Pump, Remove Pressure Hose & Pump
Courtesy of CHRYSLER GROUP, LLC

8. Remove hose clamp, then return hose (1) at reservoir (3).
9. Remove upper radiator closeout panels.

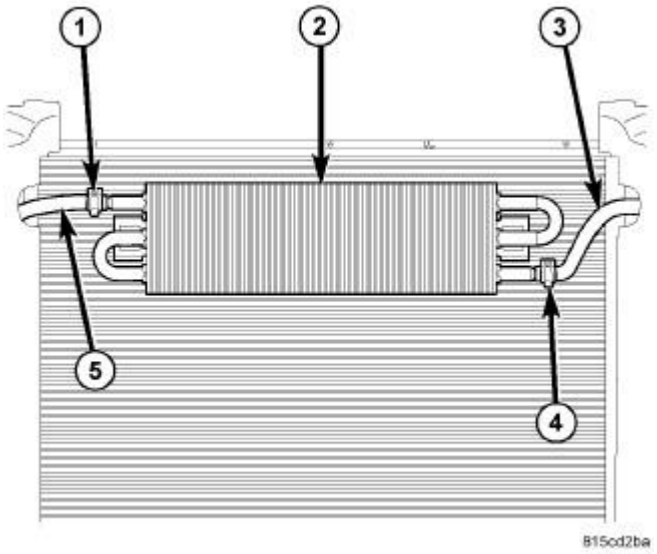

Fig. 158: SRT8 Fluid Cooler And Hoses
Courtesy of CHRYSLER GROUP, LLC

10. Remove hose clamp (4), then cooler end of return hose (3) at cooling module (2).
11. Remove return hose from routing clip on headlamp mounting crossmember.
12. Pull cooler end of return hose into engine compartment and remove hose from vehicle.

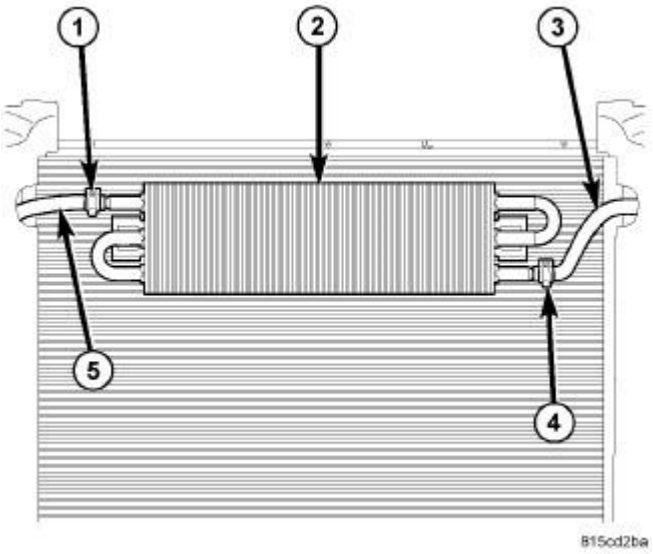

Fig. 159: SRT8 Fluid Cooler And Hoses
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate negative battery cable from battery post.
2. Remove the radiator closeout panels.
3. Remove hose clamp (1), then return hose (5) at cooling module (2).
4. Siphon power steering fluid from pump reservoir.

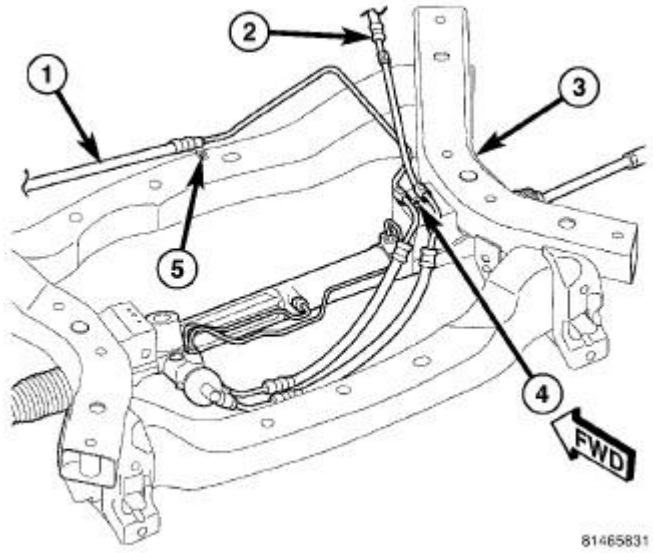

Fig. 160: Hose Routing Along Engine Cradle
Courtesy of CHRYSLER GROUP, LLC

5. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Remove belly pan. Refer to **BELLY PAN, REMOVAL** .

7. Remove screw (4) fastening routing clamps securing pressure (1) and return (2) hoses to right side of engine cradle (3).

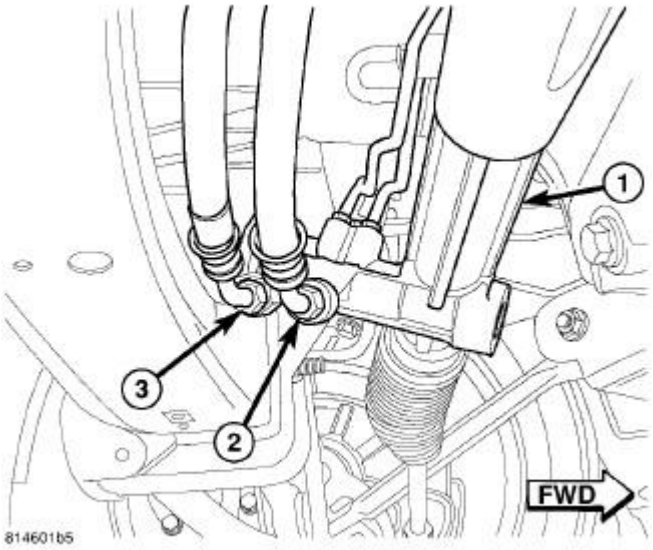

Fig. 161: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

8. Unthread return hose tube nut (3) from steering gear (1).
9. Remove return hose from vehicle.

NON SRT

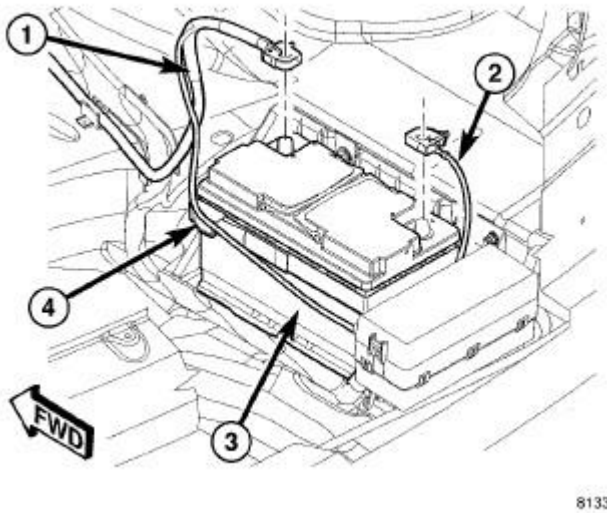

Fig. 162: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate battery negative cable (2) from battery post.

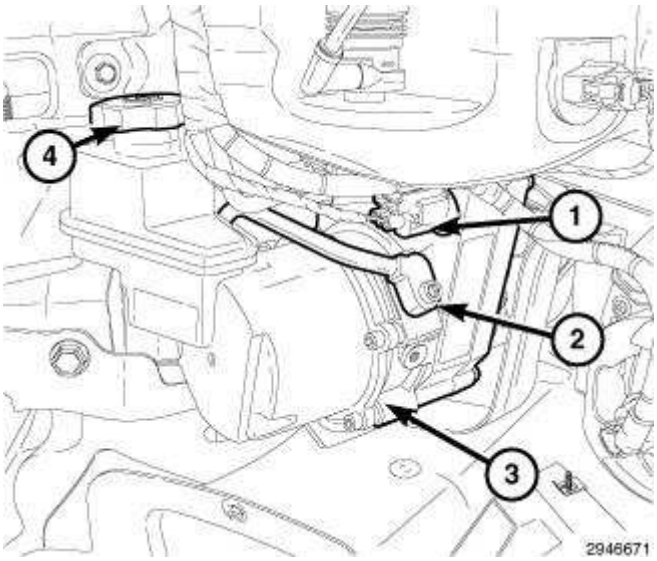

Fig. 163: Pressure Hose Retaining Bolt & (EHPS) Pump
Courtesy of CHRYSLER GROUP, LLC

2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the right front wheel mounting nuts and then remove the wheel and tire.
4. Remove right front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
5. Siphon power steering fluid from pump reservoir (4).

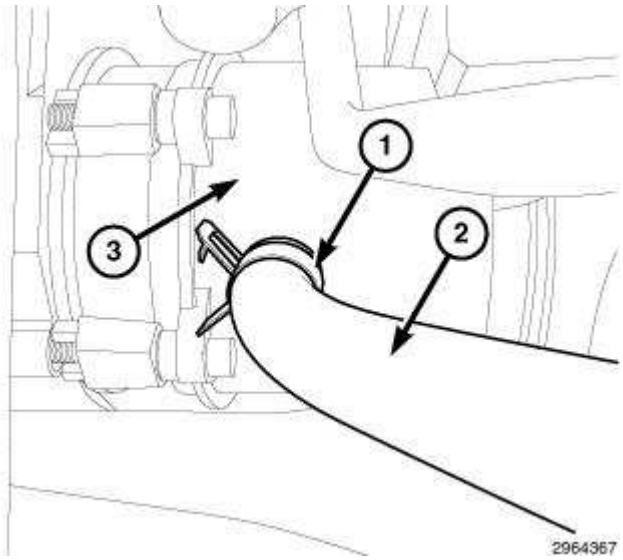

Fig. 164: Hose Clamp, Return Hose & (EHPS) Reservoir
Courtesy of CHRYSLER GROUP, LLC

6. Loosen the return hose clamp (1) and slide it down the return hose (2)

7. Separate the return hose (2) from the Electro Hydraulic Power Steering (EHPS) reservoir (3).

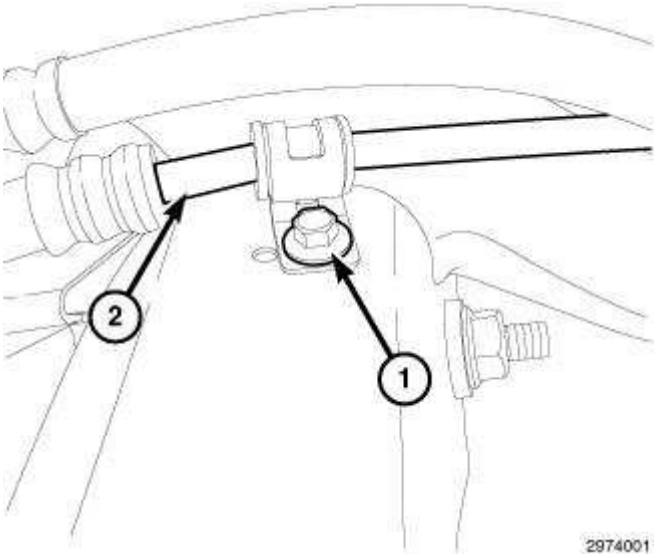

Fig. 165: Retaining Bolt & Return Line
Courtesy of CHRYSLER GROUP, LLC

8. Remove return line retaining bolt (1) and separate return line (2) from crossmember.

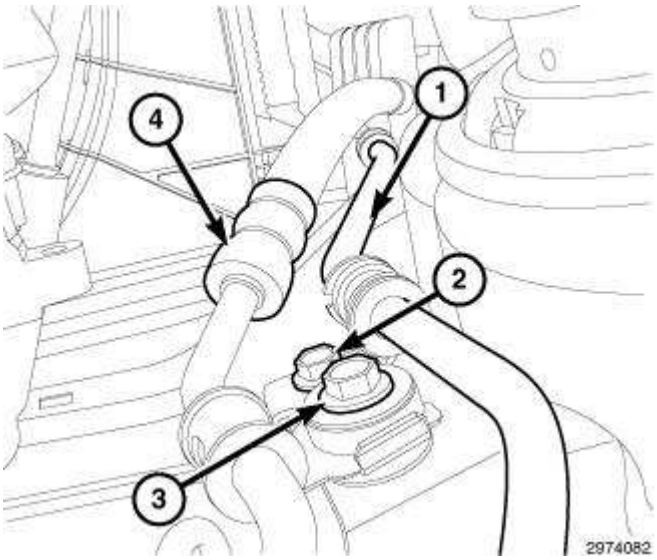

Fig. 166: Mounting Bolt & Pressure Line
Courtesy of CHRYSLER GROUP, LLC

9. Remove return line retaining bolt (2) and separate return line (1) from crossmember.

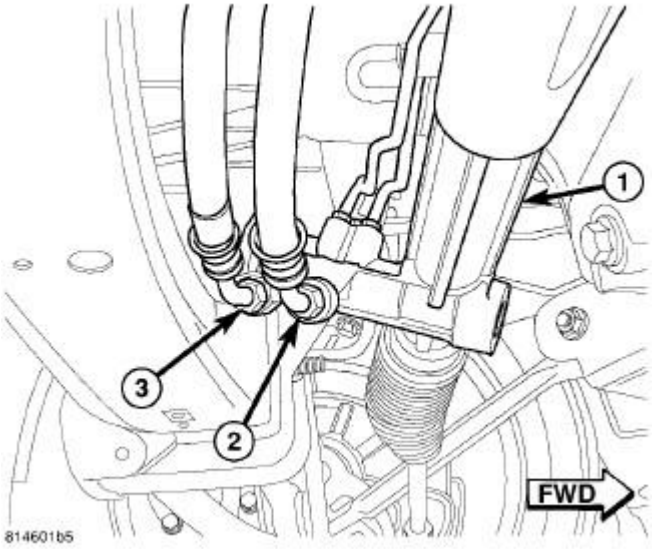

Fig. 167: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

10. Unthread return hose tube nut (3) from steering gear (1).
11. Remove return hose from vehicle.

INSTALLATION

COOLER TO RESERVOIR - SRT

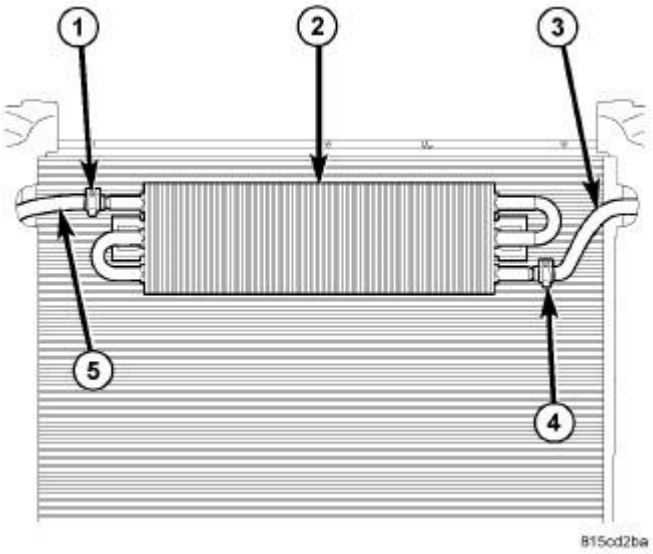

Fig. 168: SRT8 Fluid Cooler And Hoses
Courtesy of CHRYSLER GROUP, LLC

1. Slide return hose (3) onto fitting on the left side of the cooling module (2). Install clamp (4)

securing hose in place.

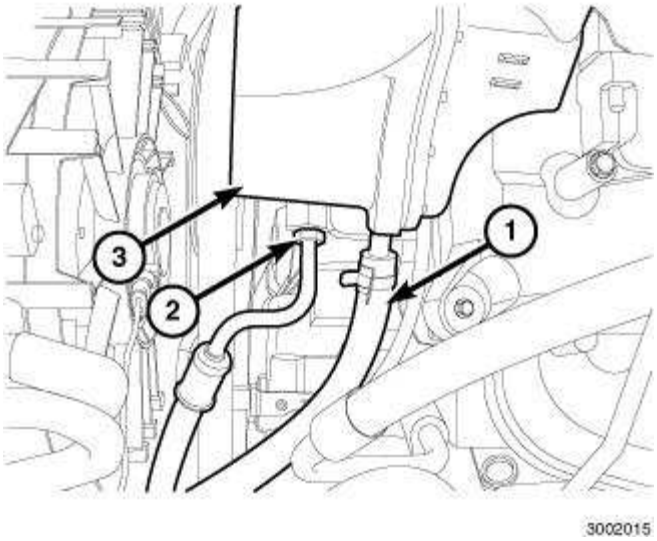

Fig. 169: Supply Hose, Pump, Remove Pressure Hose & Pump
Courtesy of CHRYSLER GROUP, LLC

2. Route hose through engine compartment.
3. Slide return hose (1) onto reservoir (3). Install clamp securing hose in place.
4. Install upper radiator closure panels.

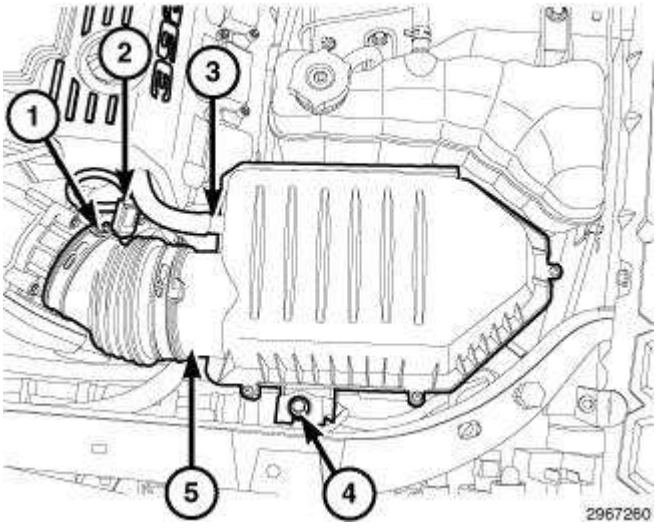

Fig. 170: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

5. While sliding the air duct onto the throttle body, lower the air cleaner housing (5) into position and align the locating pin on the bottom of the housing.
6. Install the air cleaner housing retaining bolt (4) and tighten to 5 N.m (44 in. lbs.).

7. Install the makeup air hose (3) at the air cleaner housing.
8. Connect the intake air temperature sensor electrical connector (2).
9. Position the air duct retaining clamp (1) at the throttle body and tighten to 3 N.m (30 in. lbs.).
10. Connect battery negative cable to battery post. It is important that this is performed properly.
11. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

GEAR TO COOLER - SRT

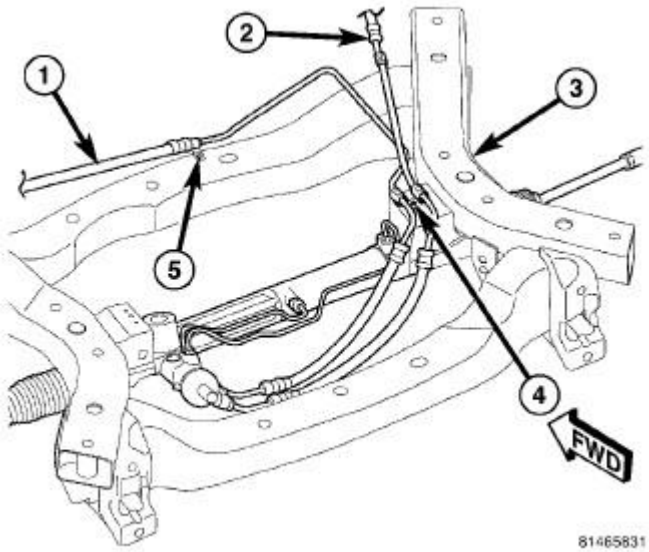

Fig. 171: Hose Routing Along Engine Cradle
Courtesy of CHRYSLER GROUP, LLC

1. Route cooler end of return hose (2) over steering gear from rear by reversing the steps used in removal.

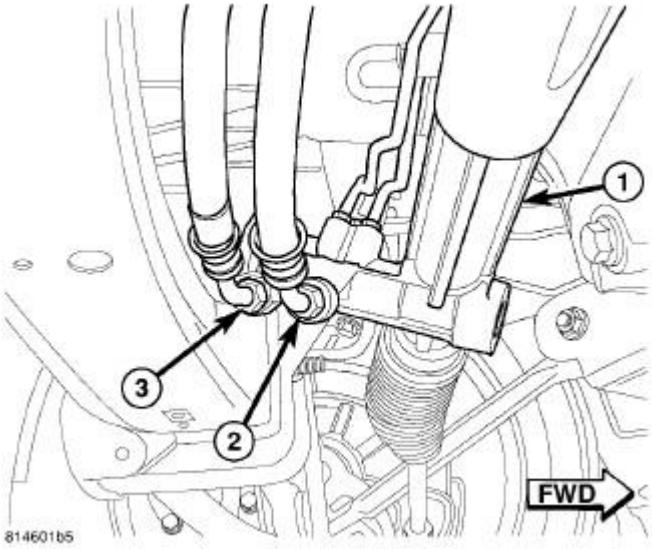

Fig. 172: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the end of the return hose at the steering gear.

2. Lubricate new O-ring on steering gear end of return hose with clean power steering fluid.
3. Lift gear end of return hose to return port on steering gear. Install return hose (2) to steering gear (1). **Do not tighten tube nut at this time.**

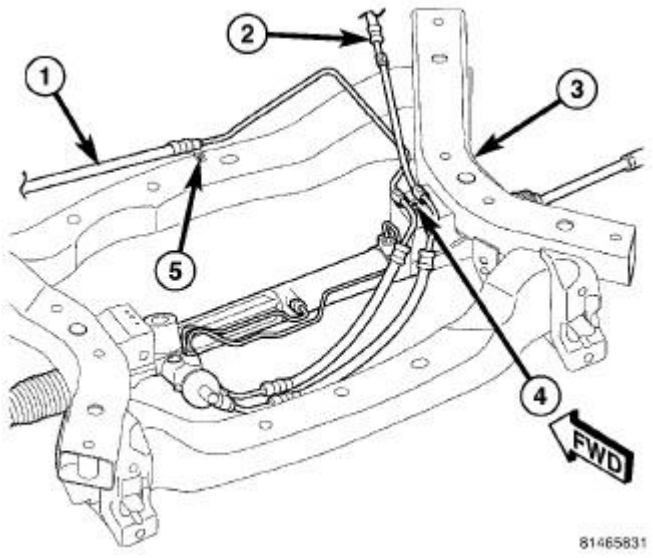

Fig. 173: Hose Routing Along Engine Cradle
Courtesy of CHRYSLER GROUP, LLC

4. Route return hose along right side of engine cradle as shown in illustration. Position pressure hose (1) routing clamp over return hose (2) routing clamp, then install screw (4) securing hoses to right side of engine cradle (3).

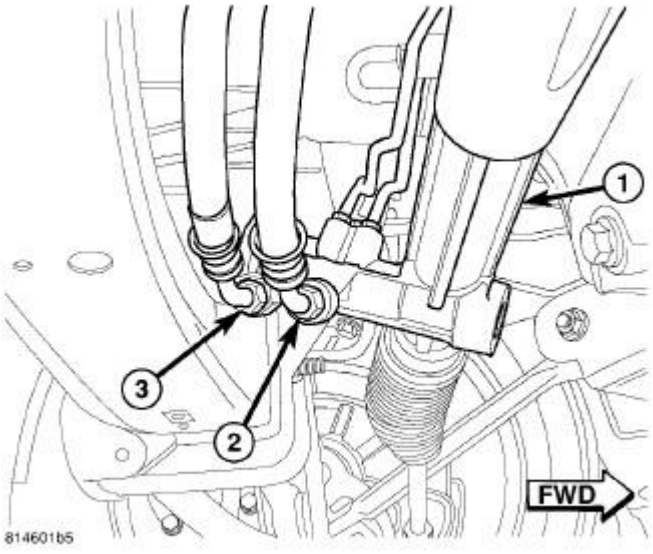

Fig. 174: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

5. Tighten return hose tube nut at steering gear to 47 N.m (35 ft. lbs.).
6. Install belly pan. Refer to **BELLY PAN, INSTALLATION** .
7. Lower vehicle.

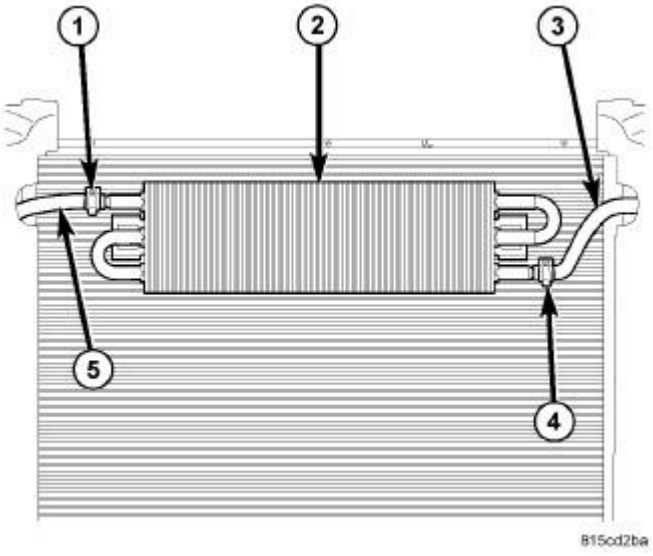

Fig. 175: SRT8 Fluid Cooler And Hoses
Courtesy of CHRYSLER GROUP, LLC

8. Slide return hose (5) onto fitting on the right side of the cooling module (2). Install clamp (1) securing hose in place.
9. Install radiator closeout panels.

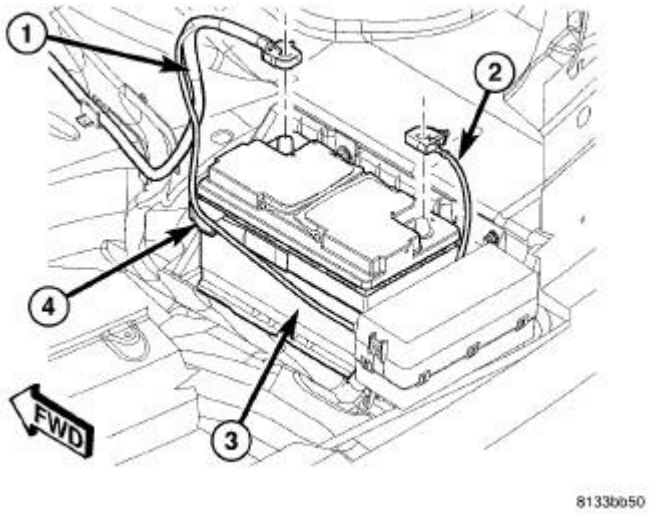

Fig. 176: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

10. Connect negative battery cable (2) to battery post. It is important that this is performed properly.
11. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

NON SRT

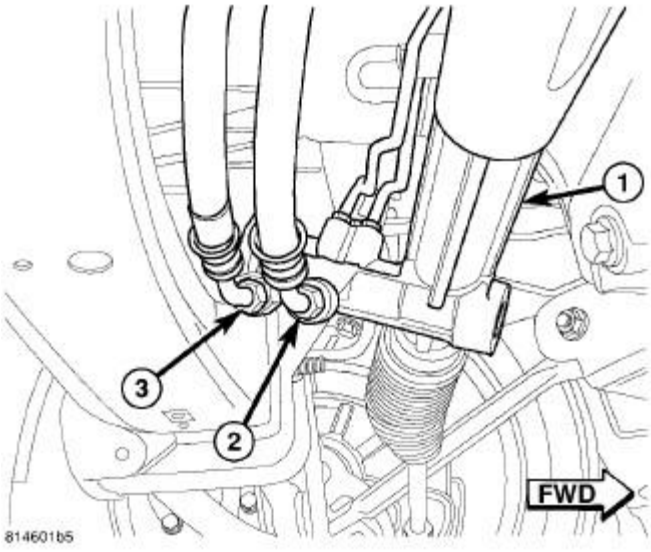

Fig. 177: Hoses AT RWD Steering Gear

Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the end of the return hose at the steering gear.

1. Lubricate NEW O-ring on steering gear end of return hose with clean power steering fluid.
2. Lift gear end of return hose to return port on steering gear. Install return hose (2) to steering gear (1). **Do not tighten tube nut at this time.**

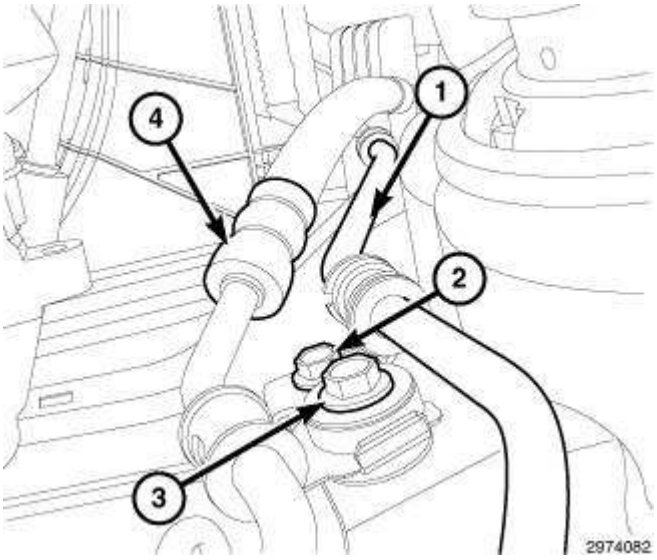

Fig. 178: Mounting Bolt & Pressure Line
Courtesy of CHRYSLER GROUP, LLC

3. Route return hose (1) along right side of engine cradle as shown in illustration and install retaining bolt (2). Tighten bolt to 19 N.m (14 ft. lbs.).

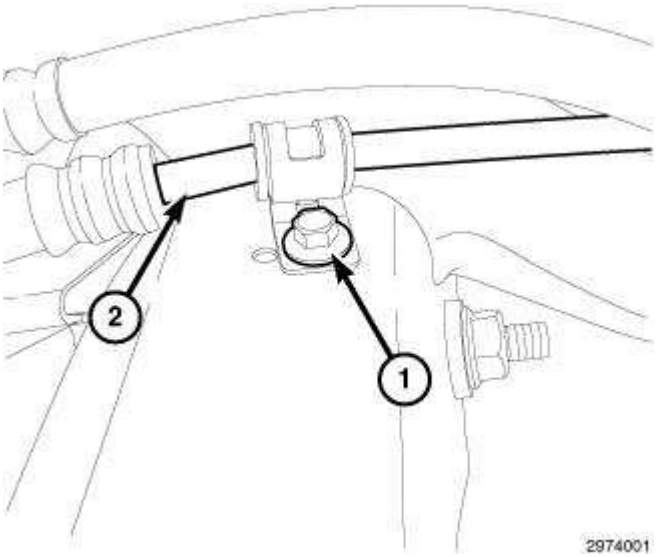

Fig. 179: Retaining Bolt & Return Line
Courtesy of CHRYSLER GROUP, LLC

4. Position return hose routing clamp, then install bolt (1) securing the return hose (2) to engine cradle. Tighten bolt to 19 N.m (14 ft. lbs.)

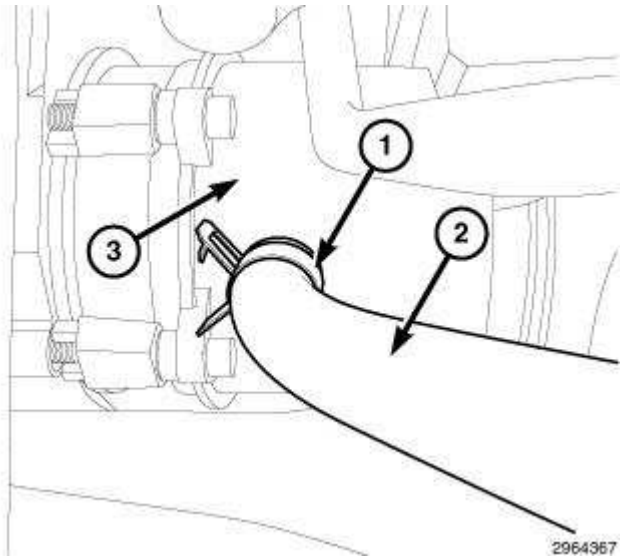

Fig. 180: Hose Clamp, Return Hose & (EHPS) Reservoir
Courtesy of CHRYSLER GROUP, LLC

5. Attach return hose (2) to Electro Hydraulic Power Steering (EHPS) pump (3), then secure retaining clamp (1) to EHPS pump.

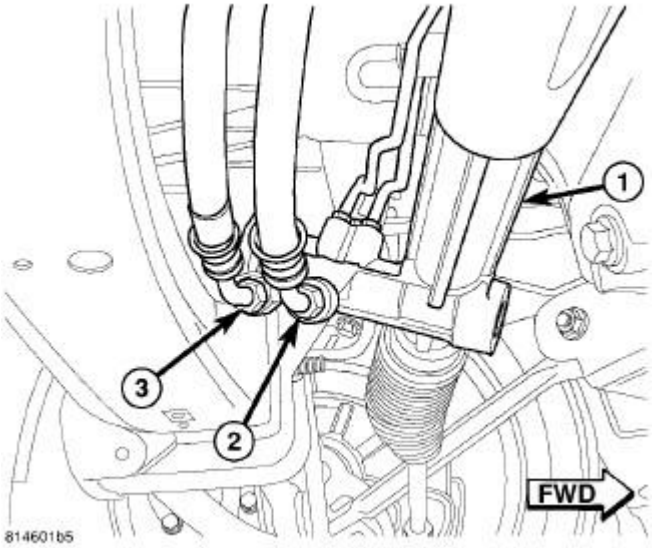

Fig. 181: Hoses AT RWD Steering Gear
Courtesy of CHRYSLER GROUP, LLC

6. Tighten return hose tube nut at steering gear to 47 N.m (35 ft. lbs.)
7. Install right front wheel house splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .

8. Lower vehicle.

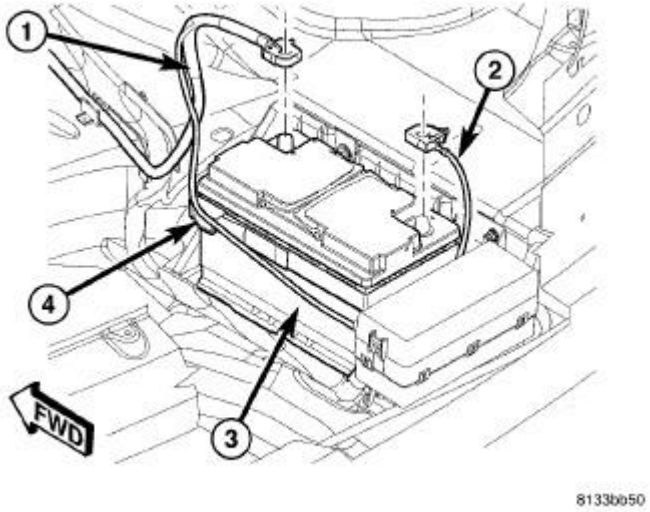

Fig. 182: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

9. Connect battery negative cable (2) to battery post. It is important that this is performed properly.
10. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

PULLEY, POWER STEERING PUMP

REMOVAL

NON SRT

Hydraulic pressure for operation of the power steering gear is provided by an Electro Hydraulic Power Steering (EHPS) pump and there is no power steering pulley.

SRT

CAUTION: Do not hammer on power steering pump pulley or shaft to remove power steering pump pulley. Damage to pulley and power steering pump will occur.

CAUTION: It is very important to use Puller (special tool #9962, Puller, P/S Pulley), to remove pulley from power steering pump shaft. Use of other pullers can damage or break pulley and pump shaft.

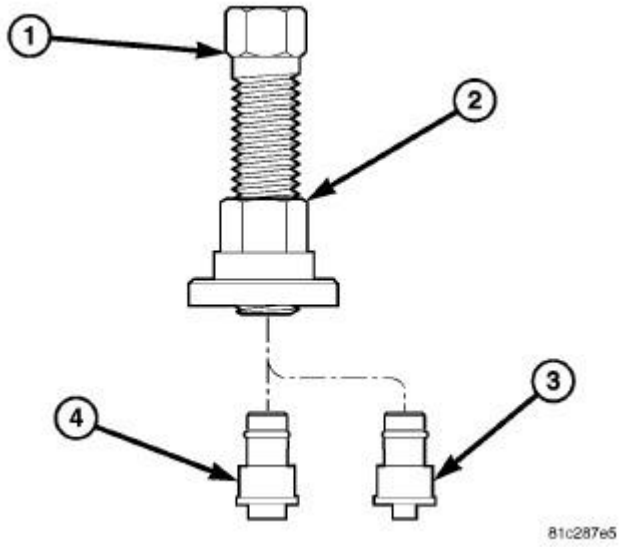

Fig. 183: Identifying Button Installation On Tool
Courtesy of CHRYSLER GROUP, LLC

1. Remove power steering pump from engine. Refer to **PUMP, REMOVAL**.
2. Coat Screw-Drive (1) with lubricant and thread into Puller Body (2).

NOTE: Two Buttons come with Puller kit ((special tool #9962-3, Button, Thrust) and (special tool #9962-4, Button, Thrust)). Be sure to use Button that best fits end of pump shaft to avoid damage to Button or pump shaft.

3. Insert Button (4) (special tool #9962-4, Button, Thrust), into end of Screw-Drive. Be sure not to misplace ball bearing that resides behind Button.

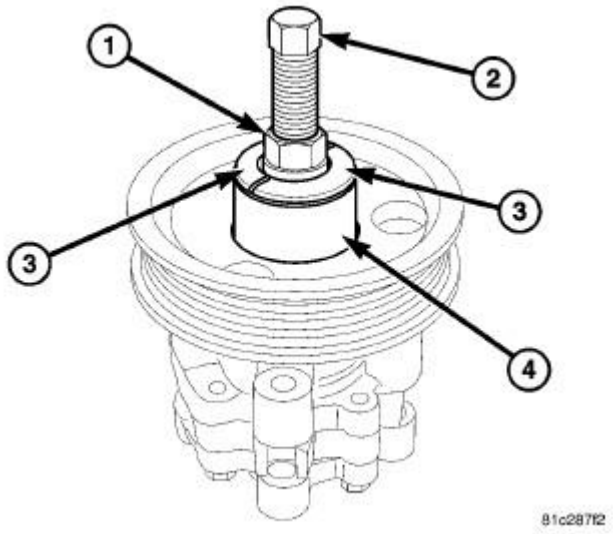

Fig. 184: Collets & Puller Body
Courtesy of CHRYSLER GROUP, LLC

4. Assemble Puller (special tool #9962, Puller, P/S Pulley), over end of pump shaft and pulley hub.
    1. Place Button on end of Screw-Drive against pump shaft.
    2. Assemble Collets (3) (special tool #9962-2, Collet, Half, Pulley Remover), surrounding Puller Body (1) and pulley hub flange, then slide the Collet Sleeve over the Collets.
    3. Hand tighten Screw-Drive (2) taking up any slack in Puller.
5. Hold Puller Body stationary while turning Screw-Drive until pulley is removed from power steering pump shaft.

NOTE: Inspect pulley. Replace if pulley is bent, cracked, or loose.

INSTALLATION

NON SRT

Hydraulic pressure for operation of the power steering gear is provided by an Electro Hydraulic Power Steering (EHPS) pump and there is no power steering pulley.

SRT

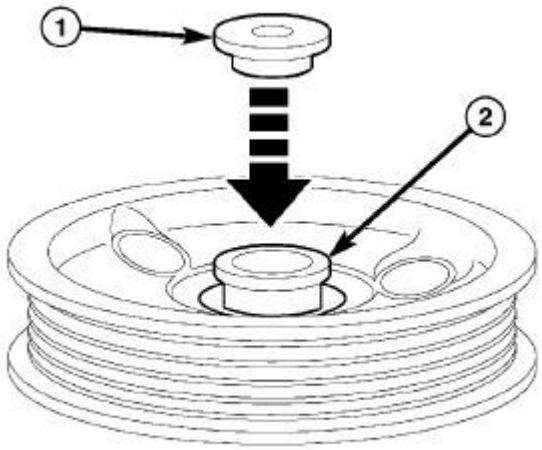

Fig. 185: Power Steering Pump Pulley & Installation Spacer
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not hammer on power steering pump pulley (2) or pump shaft to install pulley. This action will damage pulley and power steering pump.

1. Place power steering pump pulley (2) squarely on end of power steering pump shaft.

2. Place Installation Spacer (1) (special tool #6936, Spacer), on top of pump pulley (2).

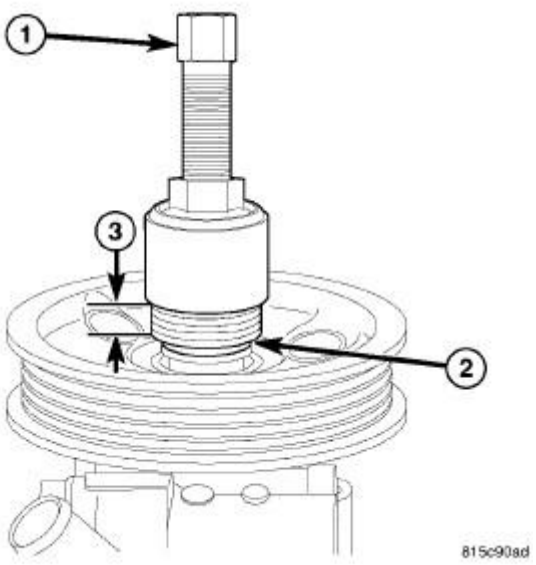

Fig. 186: Thickness, Spacer & Installer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Later build pumps feature a shaft with internal threads that are not as deep as earlier production, thus requiring a stack of washers, approximately 13 mm (0.5 in.) thickness (3), placed over Spacer (special tool #6936, Spacer) (2), before mounting Installer (special tool #C-4063C, Installer, P/S Pulley) (1) on the pump. To know if a replacement pump requires the stack of washers, measure the depth of the shaft hole. A later build pump will have a depth of 20 mm (0.78 in.) while an earlier build pump will have a depth of 32 mm (1.25 in.).

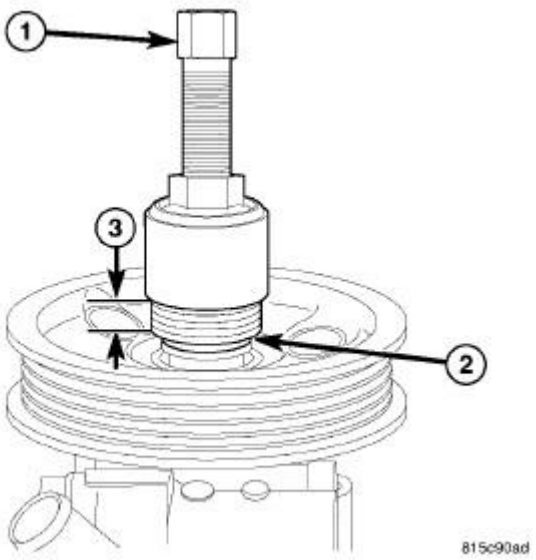

Fig. 187: Thickness, Spacer & Installer
Courtesy of CHRYSLER GROUP, LLC

3. As necessary (see above note), place a stack of washers approximately 13 mm (0.5 in.) thickness (3) over Spacer (special tool #6936, Spacer) (2).

NOTE: Installer (special tool #C-4063C, Installer, P/S Pulley), is a combination of Installer (special tool #C-4063C, Installer, P/S Pulley), and Forcing Screw (special tool #C-4063-2, Forcing Screw). It is important to use Forcing Screw (special tool #C-4063-2, Forcing Screw) when performing this procedure.

4. Thread Installer (1) (special tool #C-4063C, Installer, P/S Pulley), completely into internal threads of power steering pump shaft, then rotate Installer Nut down against washers (as necessary) and Spacer (2) on pump pulley.
5. Ensuring that special tools and pulley remain aligned with pump shaft, tighten Installer Nut, forcing pulley onto power steering pump shaft until Spacer (2) comes in contact with end of pump shaft. **When Spacer (2) is against shaft of power steering pump, Installer (1) Nut will no longer rotate.**
6. Install power steering pump on engine. Refer to **PUMP, INSTALLATION**.

RESERVOIR, POWER STEERING PUMP

REMOVAL

NON SRT

For the Electro Hydraulic Power Steering (EHPS) system, the power steering reservoir is integrated with the EHPS pump and is serviced as an assembly. Refer to **PUMP, REMOVAL**.

SRT

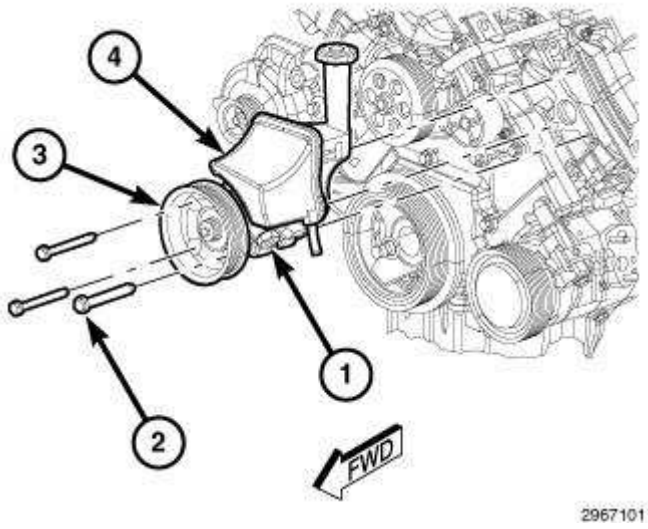

Fig. 188: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

For the SRT Power Steering System, the power steering reservoir (4) is integrated with the power steering pump (1). To remove, refer to **PUMP, REMOVAL**.

INSTALLATION

NON SRT

For the Electro Hydraulic Power Steering (EHPS) system, the power steering reservoir is integrated with the EHPS pump and is serviced as an assembly. Refer to **PUMP, INSTALLATION**.

SRT

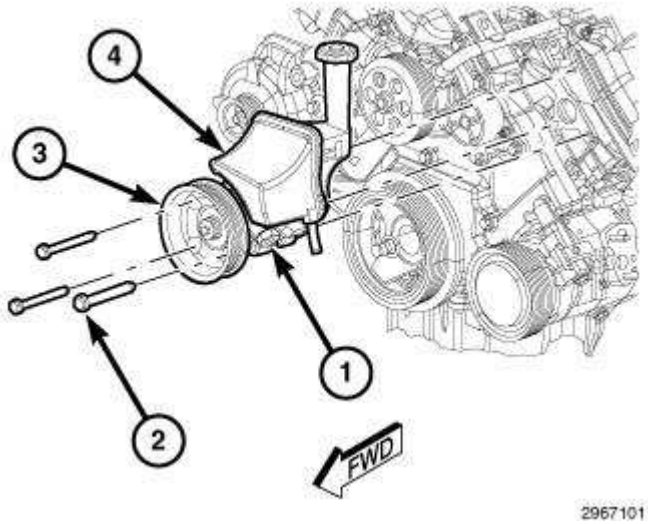

Fig. 189: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

For the SRT Power Steering System, the power steering reservoir (4) is integrated with the power steering pump (1). To install, refer to **PUMP, INSTALLATION**.

ACCESSORIES AND EQUIPMENT

Power Top/Sunroof - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

Two power operated sunroofs are available factory-installed optional equipment on this vehicle. One has a single sliding glass panel and is referred to as the Single Pane Sunroof. The other has two glass panels, one sliding and one fixed, and is referred to as the Dual Pane (also known as the CommandView®) Sunroof. The information and procedures cover only the electric motor and electronic module units and the switches used for these two sunroofs. The information covering the mechanical components of these two sunroof systems can be found in the Body article. Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .

SINGLE PANE SUNROOF

The single pane power sunroof system allows the sliding glass sunroof panel over the first row seating to be opened, closed or placed in a ventilation position electrically by actuating one of three switch push buttons located in the overhead console. The electronic controls integral to the sunroof motor and module unit provide an express (also known as one-touch) feature to simplify sunroof opening and closing while driving. The electronics also provide an Excess Force Limitation (EFL) feature, which detects obstacles trapped between the glass and the opening in the vehicle roof during closing.

The sunroof glass panel tilts upward at the rear for the ventilation position, or slides downward and rearward between the outer roof panel and the headliner for the open position. The glass panel seals flush with the roof in the closed position to eliminate wind noise, and an integrated mesh wind deflector reduces wind buffeting at low speeds with the sunroof open. The sunroof also includes a manual sliding sunshade to cover the deep tinted glass panel when closed.

The major components of the single pane power sunroof system include:

- **Frame and Mechanism** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .
- **Manual Sunshade** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .
- **Motor and Module Unit** - The single pane power sunroof motor and module unit is secured near the center of the front frame member of the sunroof, between the outer roof panel and the headliner.
- **Sliding Glass Panel** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .
- **Switch** - The single pane power sunroof switch unit is integral to the overhead console centered in the headliner between the windshield upper header and the front of the sunroof opening.
- **Wind Deflector** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .

Hard wired circuitry connects the single pane power sunroof system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are

routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the single pane power sunroof system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

DUAL PANE SUNROOF

The optional dual pane (also known as the CommandView®) sunroof has one movable deep tinted glass pane over the front row seating and one fixed deep tinted glass pane over the second row seating. This unit also features a power operated sunshade that extends over both the front and rear glass panes when closed. If one of the switch push buttons for the movable pane is actuated while the sunshade is extended over the front glass opening, the system will automatically retract the sunshade to behind the front glass opening before moving the sunroof glass pane. Therefore, the sunshade can never cover the movable glass pane opening unless the pane is in the fully closed position.

The dual pane power sunroof system allows the sliding glass sunroof panel to be opened, closed or placed in a ventilation position electrically by actuating one of three switch push buttons located in the overhead console. The electronic controls integral to the sunroof motor and module unit provide an express (also known as one-touch) feature to simplify sunroof opening and closing while driving. The electronics also provide an Excess Force Limitation (EFL) feature, which detects obstacles trapped between the glass and the opening in the vehicle roof panel during closing.

A second two push button switch in the overhead console provides separate express features for opening and closing the sunshade. The power operated sunshade electronics also provide an EFL feature, which detects obstacles trapped between the sunshade and the opening in the vehicle roof panel during closing.

The sliding sunroof glass panel tilts upward at the rear for the ventilation position, or slides downward and rearward beneath the fixed glass panel for the open position. The sliding glass panel seals flush with the roof in the closed position to eliminate wind noise, and an integrated mesh wind deflector reduces wind buffeting at low speeds with the sunroof open.

The major components of the dual pane power sunroof system include:

- **Fixed Glass Panel** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .
- **Frame and Mechanism** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .
- **Motor And Electronic Module Units** - The dual pane power sunroof and power sunshade motor and electronic module units are secured to each side of center on the front frame member of the sunroof, between the outer roof panel and the headliner.
- **Power Sunshade** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .
- **Sliding Glass Panel** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .
- **Switches** - The dual pane power sunroof and power sunshade switches are integral to the

overhead console centered in the headliner between the windshield upper header and the front of the sunroof opening.

- **Wind Deflector** - Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .

Hard wired circuitry connects the dual pane power sunroof system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the dual pane power sunroof system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

SINGLE PANE SUNROOF

The single pane sunroof receives battery feed through a fused B(+) circuit from the Power Distribution Center (PDC). However, the on-board electronic module of the sunroof motor monitors an input on a fused ignition (run - accessory) circuit and is configured to only allow the power sunroof to be operated with the switches in the overhead console when the ignition switch is in the ON or ACCESSORY positions, or using the accessory delay feature for a timed interval after the ignition is turned to the OFF position as long as neither front door has been opened.

The electric motor and electronic module unit of the sunroof moves the sliding glass panel through the use of mechanical drive cables as well as mechanical linkages and guides. See the Body service information for additional information on these components. Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .

The on-board electronic module of the power sunroof motor provides both express (also known as one touch) and manual opening and closing based upon module programming and the inputs received from the sunroof switches integral to the overhead console. The electronic module stores and recalls a sliding glass panel hard stop position, then counts the direction and number of motor rotations from that hard stop to enable the express open and close features. The hard stop must be learned by a service replacement motor and electronic module unit during an initialization procedure.

The electronic module also monitors the motor opening load through current draw, and the motor closing load through motor speed. Monitoring the motor load and speed is how the module logic is able to implement the obstacle detection (also known as Excess Force Limitation/EFL) feature. The EFL feature stops and reverses the sliding glass panel movement when an obstruction to sliding panel closing travel is encountered.

The power sunroof circuits and switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods

will not prove conclusive in the diagnosis of the on-board electronic module or the power sunroof motor. If there are no mechanical issues with the power sunroof assembly and the power sunroof switches and circuitry test okay, but the motor manual and express or EFL features are still ineffective following performance of the initialization procedure, the motor and electronic module unit must be replaced.

DUAL PANE SUNROOF AND SUNSHADE

The dual pane power sunroof sliding glass panel and power sunshade motors both receive battery feed through a fused B(+) circuit from the Power Distribution Center (PDC). However, the on-board electronic module of each sunroof or sunshade motor monitors an input on a fused ignition (run - accessory) circuit and is configured to only allow the power sunroof and the power sunshade to be operated with the switches in the overhead console when the ignition switch is in the ON or ACCESSORY positions, or using the accessory delay feature for a timed interval after the ignition is turned to the OFF position as long as neither front door has been opened.

The electric motor and electronic module unit of the sunroof or sunshade moves the sliding glass panel or the sunshade through the use of mechanical drive cables as well as mechanical linkages and guides. See the Body service information for additional information on these components. Refer to **SUNROOF, DUAL PANE, DESCRIPTION** .

The on-board electronic modules integral to the power sunroof and sunshade motors provide both express (also known as one-touch) and manual opening and closing for their respective motors based upon module programming and the inputs received from the sunroof and sunshade switches integral to the overhead console. The electronic modules store and recall a sliding glass panel or a power sunshade hard stop position, then counts the direction and number of motor rotations from that hard stop to enable the express open and close features. These hard stops must be learned by a service replacement motor and electronic module unit during an initialization procedure.

In addition, the electronic modules are programmed to move only one motor at a time. The two motors communicate switch input information as well as sunroof and sunshade position information with each other through a serial bus circuit, but do not communicate with any other electronic modules in the vehicle. The electronic modules are programmed to move the sunshade out of the way into a safe mid-open position automatically before allowing the sliding glass panel to move. Likewise, if the sunshade switch is depressed to close the sunshade while the sliding glass panel is in an open position, the electronic modules are programmed to automatically close the glass panel before closing the sunshade.

The electronic modules also provide an obstacle detection (also known as Excess Force Limitation/EFL) feature for both the sliding glass panel and the sunshade. The modules each monitor motor closing load through motor speed. When an obstacle is detected due to a significant decrease in motor speed, the module will stop the motor closing motion while limiting the forces applied to the obstacle, then reverse the motor direction to allow the obstacle to be removed.

The electronic modules provide a thermal protection feature to protect the motors from abuse or overheating. If the motor is cycled enough to cause overheating, the software will allow one final closing cycle before it stops responding to further switch inputs. Once a motor has cooled sufficiently, normal operation will be automatically restored. However, the ignition switch must remain in the ON

or ACCESSORY positions so that the module remains awake long enough to monitor the cool down of the motor.

The power sunroof and sunshade circuits and switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the on-board electronic modules or the power sunroof and power sunshade motors. If there are no issues with the power sunroof and sunshade mechanisms and the power sunroof or power sunshade switches and circuitry test okay, but the motor and express or EFL features are still ineffective following the initialization procedure, the motor and electronic module unit must be replaced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUNROOF SYSTEM

SINGLE PANE SUNROOF

The hard wired circuits between components related to the operation of the single pane power sunroof system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic module integral to the power sunroof motor. If the power sunroof switches, motors and circuitry test okay, but the express or Excess Force Limitation (EFL) features are still ineffective following the calibration and initialization procedures, the motor and module unit must be replaced.

NOTE: **If there is no sliding sunroof panel movement when the power sunroof switch OPEN or CLOSE push button is depressed, but there is movement when the VENT push button is depressed, the sunroof module requires calibration. Complete the Single Pane Sunroof Motor And Module Initialization procedure prior to performing any further sunroof diagnosis. Refer to MOTOR, SUNROOF, STANDARD PROCEDURE.**

CONDITION	POSSIBLE CAUSES	CORRECTION
POWER SUNROOF COMPLETELY INOPERATIVE	1. Ineffective ground circuit.	1. Test and repair the open sunroof motor ground circuit if required.
	2. Ineffective feed circuit.	2. Test and repair the open sunroof motor feed circuit if required.
	3. Ineffective sunroof switch.	3. Test and replace the sunroof switch (overhead console assembly) if required.
	4. Ineffective sunroof motor and module unit.	4. Replace the sunroof motor and module unit if required.
AUDIBLE WHINE WHEN	1. Binding drive cable.	1. Replace the binding drive cable if

POWER SUNROOF SWITCH IS ACTUATED		required.
	2. Ineffective sunroof motor and module unit.	2. Replace the sunroof motor and module unit if required.
AUDIBLE CLICKING OR RATCHETING WHEN POWER SUNROOF SWITCH IS ACTUATED	1. Improperly adjusted sliding glass panel.	1. Adjust the sunroof glass panel if required. Refer to **ADJUSTMENTS** or **ADJUSTMENTS** .
	2. Damaged or worn drive cable.	2. Replace the broken or worn drive cable if required.
	3. Damaged or worn motor drive gear.	3. Replace the sunroof motor and module unit if required.
POWER SUNROOF VENTS AND OPENS BUT DOES NOT CLOSE	1. Damaged or disengaged trough guide.	1. Replace or reinstall trough guide if required.
	2. Binding drive cable.	2. Replace the binding drive cable if required.
	3. Ineffective CLOSE circuit.	3. Repair the sunroof CLOSE circuit between the switch and the motor if required.
	4. Ineffective sunroof switch.	4. Test and replace the sunroof switch (overhead console assembly) if required.
	5. Ineffective sunroof motor and module unit.	5. Replace the sunroof motor and module unit if required.
POWER SUNROOF VENTS AND CLOSES BUT DOES NOT OPEN	1. Binding drive cable.	1. Replace the binding drive cable if required.
	2. Ineffective OPEN circuit.	2. Repair the sunroof OPEN circuit between the switch and the motor if required.
	3. Ineffective sunroof switch.	3. Test and replace the sunroof switch (overhead console assembly) if required.
	4. Ineffective sunroof motor and module unit.	4. Replace the sunroof motor and module unit if required.
POWER SUNROOF DOES NOT VENT	1. Binding drive cable.	1. Replace the binding drive cable if required.
	2. Ineffective VENT circuit.	2. Repair the sunroof VENT circuit between the switch and the motor if required.
	3. Ineffective sunroof switch.	3. Test and replace the sunroof switch (overhead console assembly) if required.
	4. Ineffective sunroof motor and module unit.	4. Replace the sunroof motor and module unit if required.
POWER SUNROOF GLASS MOVEMENT INCONSISTENT - NOT	1. Improperly adjusted sliding glass panel.	1. Adjust the sunroof glass panel if required. Refer to **ADJUSTMENTS** or

SMOOTH AND UNIFORM		**ADJUSTMENTS** .

DUAL PANE SUNROOF AND SUNSHADE

The hard wired circuits between components related to the operation of the dual pane power sunroof and sunshade system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic module integral to the power sunroof or power sunshade motor. If the power sunroof or power sunshade switches, motors and circuitry test okay, but the express or Excess Force Limitation (EFL) features are still ineffective following the initialization procedures, the motor and module unit must be replaced.

TEST PREPARATION

- **Check Electrical System Voltage** - There should be at least 12.5 volts when measured at the battery terminals.
- **Ignition Switch Position** - The ignition switch should be in the ON or ACCESSORY positions with the engine not running.
- **Note Power Sunroof Responses** - Depress each of the sunroof switch push buttons one at a time and note the system responses. Try both express (short press duration) and manual (long press duration) for each push button.
- **Note Power Sunshade Responses** - Depress each of the sunshade switch push buttons one at a time and note the system responses. Try both express (short press duration) and manual (long press duration) for each push button.

Match the noted system responses to the conditions listed in the diagnostic table to determine the possible causes and corrections for the condition.

CONDITION	POSSIBLE CAUSES	CORRECTION
POWER SUNROOF OR POWER SUNSHADE COMPLETELY	1. Thermal protection feature active.	1. Let vehicle sit for two minutes with ignition switch in the ON or ACCESSORY position to allow the motor(s) to cool and the thermal protection feature to become inactive, then test again.
	2. Ineffective ground circuit.	2. Test and repair the open sunroof or sunshade motor ground circuit if required.
	3. Ineffective fused B(+) circuit.	3. Test and repair the open sunroof or sunshade motor fused B(+) circuit if required.
		4. Test and repair the open sunroof

INOPERATIVE AND UNRESPONSIVE	4. Ineffective fused ignition (run - acc) circuit. 5. Ineffective sunroof or sunshade switch return circuit. 6. Ineffective sunroof or sunshade switch. 7. Ineffective sunroof or sunshade motor and module unit.	or sunshade motor fused ignition (run - acc) circuit if required. 5. Test and repair the open sunroof or sunshade switch return circuit if required. 6. Test and replace the sunroof or sunshade switch (overhead console assembly) if required. 7. Replace the sunroof or sunshade motor and module unit if required.*
SLIGHT SUNROOF OR SUNSHADE MOVEMENT OR AUDIBLE RELAY CLICKS BUT NO COMPLETE MOVEMENT EVENTS	1. Binding drive cable or blocked cable travel path. 2. Ineffective sunroof or sunshade motor and module unit.	1. Repair the blocked cable travel path or replace the binding drive cable if required. 2. Replace the sunroof or sunshade motor and module unit if required.*
MOTOR MOVES FREELY, BUT WHEN CLOSING IT SLOWS, STOPS AND REVERSES DIRECTION	1. Obstacle detection event.	1. Refer to **NUISANCE REVERSALS** topic following this table.
MOTOR STOPS RUNNING AND WILL NOT OPEN GLASS MORE THAN 8 INCHES OR WILL NOT OPEN SUNSHADE MORE THAN 12 INCHES	1. Motor is in manufacturing mode.	1. Replace the sunroof or sunshade motor and module unit if required.*
POWER SUNROOF VENTS AND CLOSES BUT DOES NOT OPEN, OR POWER SUNSHADE CLOSES BUT DOES NOT OPEN	1. Binding drive cable. 2. Ineffective OPEN circuit. 3. Ineffective sunroof or sunshade switch. 4. Ineffective sunroof or sunshade motor and module unit.	1. Replace the binding drive cable if required. 2. Repair the sunroof or sunshade OPEN circuit between the switch and the motor if required. 3. Test and replace the sunroof or sunshade switch (overhead console assembly) if required. 4. Replace the sunroof or sunshade motor and module unit if required.*
POWER SUNROOF VENTS AND OPENS BUT DOES NOT CLOSE, OR POWER SUNSHADE OPENS BUT DOES NOT	1. Binding drive cable. 2. Ineffective CLOSE circuit. 3. Ineffective sunroof or sunshade switch.	1. Replace the binding drive cable if required. 2. Repair the sunroof or sunshade CLOSE circuit between the switch and the motor if required. 3. Test and replace the sunroof or sunshade switch (overhead console assembly) if required.

CLOSE	4. Ineffective sunroof or sunshade motor and module unit.	4. Replace the sunroof or sunshade motor and module unit if required.*
POWER SUNROOF DOES NOT VENT	1. Binding drive cable. 2. Ineffective VENT circuit. 3. Ineffective sunroof switch. 4. Ineffective sunroof motor and module unit.	1. Replace the binding drive cable if required. 2. Repair the sunroof VENT circuit between the switch and the motor if required. 3. Test and replace the sunroof switch (overhead console assembly) if required. 4. Replace the sunroof motor and module unit if required.
POWER SUNROOF GLASS OR POWER SUNSHADE MOVES ONLY WHEN SWITCH IS PRESSED AND HELD (MANUAL MODE - LOSS OF ONE-TOUCH OR EXPRESS MODE)	1. Ineffective communication between sunroof and sunshade motor and module units.	1. Refer to **MOTOR COMMUNICATIONS CHECK** topic following this table.
POWER SUNROOF GLASS OR POWER SUNSHADE MOVEMENT INCONSISTENT - NOT SMOOTH AND UNIFORM	1. Improperly adjusted sliding glass panel or sunshade.	1. Adjust the sunroof glass panel or sunshade if required. Refer to **ADJUSTMENTS** or **ADJUSTMENTS** .
*The sliding glass and sunshade motor and module units are interchangeable. Swap the motor and module units to confirm whether a new replacement motor and module is required or another issue is causing the problem.		

NUISANCE REVERSALS

A nuisance reversal describes a condition where the obstacle detection feature (also known as the Excess Force Limitation/EFL feature) reverses sunroof glass or sunshade movement to protect for an obstacle, but no obvious obstacle exists. When the motor speed decreases beyond what the module has learned during previous cycles, it is interpreted by the module as an obstacle having been encountered. However, other conditions such as low ambient temperatures or low system voltage levels can slow sunroof or sunshade operation, which may be misinterpreted by the module as an obstacle resulting in a nuisance reversal.

To test for this condition, first verify that the system voltage of the vehicle is at or above 12.5 volts. Now, carefully observe and listen while the reversal occurs as the sunroof or sunshade is closed and proceed as follows.

- If the nuisance reversals always occur at the same point in the sunroof or sunshade travel, perform the DUAL PANE SUNROOF OR SUNSHADE OBSTACLE DETECTION REVERSAL OVERRIDE procedure. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE**. This will

force the motor to try to learn the new friction level during the override closing event.

- If the nuisance reversals continue to occur at the same point in the sunroof or sunshade travel following the performance of the override procedure, note the location where the reversal occurs and inspect that area for binding parts. If any noise is noted during the reversal, identify the source of the noise. For example, if the reversal always occurs in the last 7.6 centimeters (3 inches) of sunroof travel, observe the wind deflector for binding as it is pushed downward or examine the guides in that area of travel for debris in the tracks or damage to the cable track. It may be necessary to remove the sliding glass panel, the wind deflector or the drain channel to observe the sunroof mechanism in operation in order to identify the specific source of binding.
- Improper glass adjustment and glass fit to the roof sheet metal and the fixed glass panel can cause nuisance reversals to occur. In those cases, proper adjustment of the two glass panels may resolve the problem. Refer to **ADJUSTMENTS** or **ADJUSTMENTS** .
- If the nuisance reversals only occur while driving under rough road conditions, verify there are no localized bind points in the sunroof or sunshade travel. Striking a large enough bump or driving on washboard roads could be expected to cause an occasional nuisance reversal. The software is programmed to detect rough road events and minimize them, but can't completely eliminate them without disabling the obstacle detection feature.
- If the nuisance reversals only occur as the engine is being turned OFF or during the start or stall of another electric motor in the vehicle (power window or power seat motors) then a voltage drop or high current draw event may be reducing the electrical power available to the sunroof or sunshade motor. Check for loose connections or excessive resistance in the battery and ground circuits to the sunroof and sunshade motors. The software is programmed to compensate for voltage drop or high current draw events when proper wiring and connections are functional.
- If the nuisance reversals are intermittent, cannot be tracked to any specific position and are not resolved by performing the override procedure, replacement of the motor and module unit may be necessary. However, if proper motor and module unit replacement does not resolve the problem, the mechanical cause of the binding must be found and repaired to restore proper sunroof or sunshade operation.

MOTOR COMMUNICATIONS CHECK

Sunroof and sunshade operation must be synchronized. The two motor and module units share a communication circuit. This communication circuit is not connected to any other communications circuits in the vehicle. When the sunroof and sunshade communications is active and functioning properly, the express (also known as one-touch) mode of operation for both units is enabled. When the motor and module units cannot communicate, express mode is disabled for both units and only the manual mode of operation is enabled.

To test for proper motor communications, first verify that the system voltage of the vehicle is at or above 12.5 volts. Turn the ignition switch to the ON or ACCESSORY position and try to operate the sunroof and sunshade with their respective switches, carefully noting the results. Proceed as follows.

- Both the sunroof and the sunshade operate only in manual mode. Check the communications circuit between the two motor and module units for a short or open circuit. Refer to the appropriate wiring information. Repair the communications circuit if required. If the communications circuit checks okay, one or both motor and module units may have an internal

communications failure and may need to be replaced.

- The sunroof moves in manual mode, but the sunshade does not move. Check the ground, fused B(+), fused ignition (run - acc) and switch circuits at the sunshade motor. If the circuits check okay, replace the ineffective sunshade motor and module unit.
- The sunshade moves in manual mode, but the sunroof does not move. Check the ground, fused B(+), fused ignition (run - acc) and switch circuits at the sunroof motor. If the circuits check okay, replace the ineffective sunroof motor and module unit.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Dual Pane Sunroof Or Sunshade Motor And Module Mounting Screws	3.8	-	34
Single Pane Sunroof Motor And Module Mounting Screws	4	-	35

MOTOR, SUNROOF

DESCRIPTION

DESCRIPTION

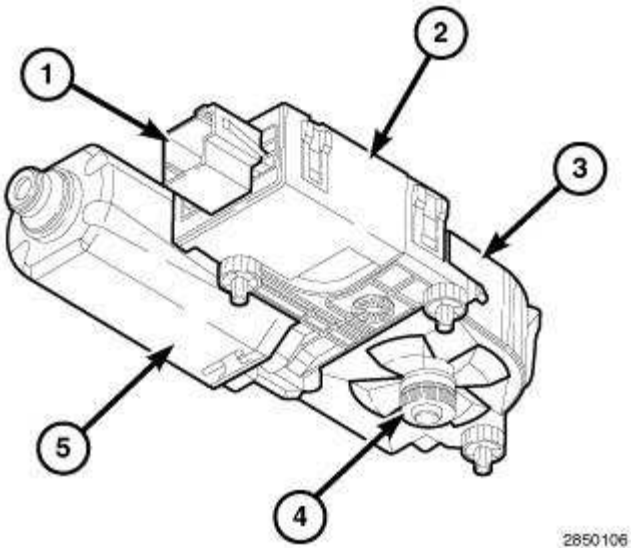

Fig. 1: Single Pane Sunroof Motor
Courtesy of CHRYSLER GROUP, LLC

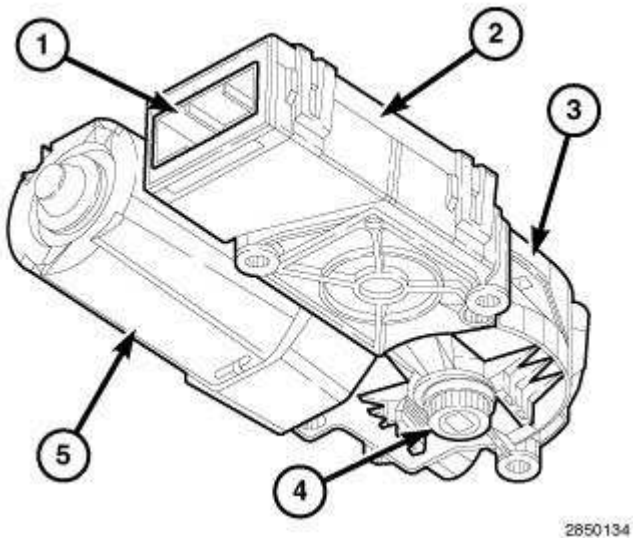

Fig. 2: Dual Pane Sunroof Or Sunshade Motor
Courtesy of CHRYSLER GROUP, LLC

The motor and electronic module units for both the single pane sunroof and the dual pane sunroof or sunshade are quite similar, but are not interchangeable. However, the dual pane sunroof and sunshade motor and module units are interchangeable and configure themselves to either sunroof or sunshade operation through a configuration pin in the sunshade connector of the sunroof wire harness. Each sunroof motor (5) is a reversible, 12-volt Direct Current (DC), permanent magnet motor with internal thermal protection.

The single panel sunroof has a single motor and electronic module unit secured by three screws near the center of the underside of the front sunroof frame member where it is concealed above the headliner. The dual pane sunroof has two motor and electronic modules, each secured by three screws to the underside of the front sunroof frame member and concealed above the headliner. The motor to the left of center operates the sliding glass mechanism, while the motor to the right of center operates the power sunshade mechanism.

Each motor is connected mechanically to the sunroof or sunshade drive gear (4) through a right angle drive, gear reduction transmission (3). Each motor also is connected electrically to an on-board electronic control unit (2) that has an integral connector receptacle (1) that connects the unit to the vehicle electrical system through a dedicated take out and connector of the sunroof wire harness.

The sunroof motor or sunshade motor and electronic module units cannot be repaired. If ineffective or damaged, the entire motor and module unit must be replaced.

OPERATION

OPERATION

The single pane and dual pane power sunroof and power sunshade motors are each completely controlled by the circuitry of their respective on-board electronic module. The module receives battery current on a fused B(+) circuit from the Totally Integrated Power Module (TIPM) and has a path to

ground at all times through a take out and eyelet terminal connector secured by a ground screw to the body sheet metal. These connections allow the module to function regardless of the ignition switch position.

However, the modules both monitor an input on a fused ignition switch output (run - accessory) circuit, and provide a source current to the sunroof and sunshade switches in the overhead console only when the ignition switch is in the ON or ACCESSORY positions, or while the accessory delay feature is active. The modules then monitor a separate input circuit for each switch position, which it uses to determine the proper outputs to the power sunroof or power sunshade motor. A positive and negative battery connection to the two motor brushes will cause the power sunroof or sunshade motor to rotate in one direction. Reversing the current through these same two brushes will cause the motor to rotate in the opposite direction.

The hard wired circuits of the power sunroof and power sunshade motors as well as those between the electronic modules and switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic module integral to the power sunroof and power sunshade motors. If the power sunroof or power sunshade switches and the hard wired circuitry test okay, but the motor or the express or Excess Force Limitation (EFL) features are still ineffective following the calibration and initialization procedures, the motor and module must be replaced as a unit.

STANDARD PROCEDURE

DUAL PANE SUNROOF OR SUNSHADE OVERRIDE POSITION CALIBRATION

SLIDING GLASS

The sliding glass panel motor stalls when the glass reaches the fully vented position and the electronic motor module learns that position (hard stop), then counts the number of motor rotations to know where the fully closed and fully open positions of the glass are located. The following procedure causes a previously calibrated and properly operating electronic motor module to relearn the fully vented motor stall position.

1. Be certain electrical system voltage is at or above 12.5 volts.
2. Be certain the key is in the ignition switch and the switch is in the ON position.
3. Be certain the power sunshade is open at least beyond the back of the sliding glass panel opening.
4. Depress and hold the VENT push button of the sunroof switch until the sliding glass panel is in the fully vented position or until the motor will not drive the glass any further towards the fully vented position.
5. Open the driver side front door.
6. Turn the ignition switch to the OFF position.
7. Within 2 seconds, turn the ignition switch back to the ON position.
8. Within 2 seconds, depress and hold the VENT push button of the sunroof switch for about ten seconds. At the end of ten seconds, the motor will try to drive the sliding glass panel to the fully

vented position. Once motor stall is detected the electronic module will write that stall position to memory as the new glass position.

9. Verify sliding glass panel motor operation by cycling the glass to fully opened, fully closed, fully vented, then fully closed again.

SUNSHADE

The sunshade motor stalls when the shade reaches the fully closed position and the electronic motor module learns that position (hard stop), then counts the number of motor rotations to know where the mid-opened and fully opened positions of the shade are located. The following procedure causes a previously calibrated and properly operating electronic motor module to relearn the fully closed motor stall position.

1. Be certain electrical system voltage is at or above 12.5 volts.
2. Be certain the key is in the ignition switch and the switch is in the ON position.
3. Be certain the sliding glass panel is in the fully closed position.
4. Depress and hold the CLOSE push button of the sunshade switch until the shade is in the fully closed position or until the motor will not drive the shade any further towards the fully closed position.
5. Open the driver side front door.
6. Turn the ignition switch to the OFF position.
7. Within 2 seconds, turn the ignition switch back to the ON position.
8. Within 2 seconds, depress and hold the CLOSE push button of the sunshade switch for about ten seconds. At the end of ten seconds, the motor will try to drive the shade to the fully closed position. Once motor stall is detected, the electronic module will write that stall position to memory as the new shade position.
9. Verify sunshade motor operation by cycling the shade to mid-opened, fully opened, then fully closed again.

DUAL PANE SUNROOF OR SUNSHADE OBSTACLE DETECTION UPDATE

The obstacle detection function (also known as Excessive Force Limitation/EFL) updates the sunroof sliding glass panel and sunshade closing profiles after each successful CLOSE event as long as temperature and voltage are within a normal range. Being certain that these parameters are within range and cycling the sliding glass panel and sunshade will update the obstacle detection settings in the electronic module software.

- Be certain electrical system voltage is at or above 12.5 volts.
- Be certain vehicle is in an area that is near room temperature - 20 to 25° C (68 to 77° F).
- Be certain the key is in the ignition switch and the switch is in the ON position.
- Be certain there are no physical binds or blockages to sliding glass panel or sunshade travel.

SLIDING GLASS

1. Be certain the power sunshade is in the fully open position.

2. Depress the VENT push button of the sunroof switch so that the sliding glass panel travels to the fully vented position.
3. Depress the CLOSE push button of the sunroof switch so that the sliding glass panel travels to the fully closed position.
4. Depress the OPEN push button of the sunroof switch so that the sliding glass panel travels to the fully opened position.
5. Depress the CLOSE push button of the sunroof switch so that the sliding glass panel travels to the fully closed position.
6. Repeat Steps 2 through 5 for at least 5 complete sliding glass panel cycles (VENT, CLOSE, OPEN, CLOSE).

SUNSHADE

1. Be certain the sunroof sliding glass is in the fully closed position.
2. Depress the OPEN push button of the sunshade switch so that the shade travels to the mid-open position.
3. Depress the OPEN push button of the sunshade switch again so that the shade travels to the fully opened position.
4. Depress the CLOSE push button of the sunshade switch so that the shade travels to the fully closed position.
5. Repeat Steps 2 through 4 for at least 5 complete sunshade panel cycles (MID-OPEN, FULL-OPEN, CLOSE).

SUNROOF MOTOR AND MODULE INITIALIZATION

SINGLE PANE SUNROOF

INITIALIZATION

A new motor is shipped uncalibrated with no vehicle cycles having been run. After installation and connection of the wire harness, the following steps must be taken to initialize the new motor and module unit.

NOTE: Verify that the battery is in good condition prior to performing this procedure. Do not leave the vehicle on a battery charger while performing this procedure. If the voltage at the sunroof motor and module unit drops below 11 volts or exceeds 15 volts at anytime while this procedure is being performed, the motor and module initialization procedure will not be properly completed.

NOTE: If at any point during the following procedure the sunroof does not respond as expected, restart the procedure at Step 1.

1. Depress and hold the CLOSE push button of the sunroof switch until the sunroof sliding glass panel moves to the fully closed hard stop and then back to the tilt (VENT) position.
2. Release the CLOSE push button of the sunroof switch, then depress and hold the CLOSE push

button again within 5 seconds.

3. As the CLOSE push button of the sunroof switch is held, the sunroof sliding glass panel will move to the fully closed position, then to the fully opened position and then fully closed again.
4. Initialization is complete. Release the sunroof switch push button.

REINITIALIZATION

The following procedure causes a previously calibrated and properly operating electronic motor module to relearn and update motor stall position and obstacle detection.

NOTE: If at any point during the following procedure the sunroof does not respond as expected, restart the procedure at Step 1.

1. Depress and hold the CLOSE push button of the sunroof switch until the sliding glass panel is fully closed.
2. Continue to hold the CLOSE push button of the sunroof switch. It will take at least 10 seconds for the initialization process to begin.
3. The sunroof sliding glass panel will move to the hard stop and then back to the tilt (VENT) position.
4. Release the CLOSE push button of the sunroof switch, then depress and hold the CLOSE push button again within 5 seconds.
5. As the CLOSE push button of the sunroof switch is held, the sunroof sliding glass panel will move to the fully closed position, then to the fully opened position and then fully closed again.
6. Initialization is complete. Release the sunroof switch push button.

DUAL PANE SUNROOF

A new motor is shipped uncalibrated with no vehicle cycles having been run. After installation and connection of the wire harness, the following steps must be taken to initialize the new motor and module unit.

NOTE: Verify that the battery is in good condition prior to performing this procedure. Do not leave the vehicle on a battery charger while performing this procedure. If the voltage at the sunroof motor and module unit drops below 11 volts or exceeds 15 volts at anytime while this procedure is being performed, the motor and module initialization procedure will not be properly completed.

SUNROOF

1. Turn the ignition switch to the ON position.
2. Depress and hold the VENT push button of the sunroof switch until the sliding glass panel has moved to the fully vented position.
3. Be certain that the sunshade has opened to at least beyond the back of the sliding glass panel opening before finishing the sunroof motor and module initialization.
4. Depress the VENT push button of the sunroof switch and release. The sliding glass panel

should travel to the fully vented position.

5. Depress the CLOSE push button of the sunroof switch and release. The sliding glass panel should travel past the fully closed position, then reverse direction back to fully closed to set the sunroof seal.
6. Depress the OPEN push button of the sunroof switch and release. The sliding glass panel should travel to the fully opened position.
7. Depress the CLOSE push button of the sunroof switch and release. The sliding glass panel should travel to the fully closed position.
8. Repeat Steps 4 through 7 for at least 5 complete sliding glass panel cycles (VENT, CLOSE, OPEN, CLOSE).

SUNSHADE

1. Turn the ignition switch to the ON position.
2. Depress and hold the CLOSE push button of the sunroof switch until the sliding sunshade panel has moved to the fully closed position.
3. Be certain that the sunroof sliding glass panel is in the fully closed position before finishing the sunshade motor and module initialization.
4. Depress the OPEN push button of the sunshade switch and release. The sunshade panel should travel to the mid-open position at least beyond the back of the sliding glass panel opening.
5. Depress the OPEN push button of the sunshade switch again and release. The sunshade panel should travel to the fully opened position.
6. Depress the CLOSE push button of the sunshade switch and release. The sunshade panel should travel to the fully closed position.
7. Repeat Steps 4 through 6 for at least 5 complete sunshade panel cycles (MID-OPEN, FULL-OPEN, CLOSE).

SUNROOF OR SUNSHADE OBSTACLE DETECTION REVERSAL OVERRIDE

SINGLE PANE

There are two methods for overriding the obstacle detection feature if the single pane sunroof sliding glass is unable to close due to a known blockage condition (ice, leaves, debris in track).

OVERRIDE - METHOD 1

Depress and hold the CLOSE push button of the sunroof switch during the close. The sunroof will be in override mode during the close.

OVERRIDE - METHOD 2

Once the sunroof encounters and reverses on an obstacle during express (one touch) closing three consecutive times, the sunroof will be in override mode. All push button commands will be in manual mode (no one-touch or express mode) while the obstacle detection feature is in override mode.

EXITING OVERRIDE MODE

Any sunroof obstacle detection override mode is exited by reaching the close position. Once the override has been exited, all normal operations will resume including the obstacle detection feature.

DUAL PANE

There are two methods for overriding the obstacle detection feature if the dual pane sunroof sliding glass panel or sunshade is unable to close due to a known blockage condition (ice, leaves, debris in track).

OVERRIDE - METHOD 1

Depress and hold the CLOSE push button of the sunroof or sunshade switch during the initial close, during the reversal and for 2 seconds after the reversal stops. If the CLOSE push button is released at any time between the initial close and the end of the 2 seconds after the reversal stops, the sunroof or sunshade will not enter override mode. Once the CLOSE push button has been held through these events, the sunroof or sunshade will be in primary override mode. All CLOSE push button commands will be in manual mode (no one-touch or express mode) while the obstacle detection feature is in primary override mode.

OVERRIDE - METHOD 2

Once the sunroof or sunshade encounters and reverses on an obstacle during closing three consecutive times with no other sunroof or sunshade push button switches being depressed, the fourth time the CLOSE push button is depressed, the sunroof or sunshade will be in override mode. All push button commands will be in manual mode (no one-touch or express mode) while the obstacle detection feature is in override mode.

EXITING OVERRIDE MODE

Any sunroof or sunshade obstacle detection override mode is exited by either reaching the close position or by depressing any sunroof or sunshade switch push button except CLOSE to remove the obstacle. Once the override has been exited, all normal operations will resume including the obstacle detection feature.

REMOVAL

REMOVAL

SINGLE PANE SUNROOF

WARNING: Do not attempt to move or reposition the sunroof glass panel or drive cables with the sunroof motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Motor And Module Initialization procedure must be completed any time a sunroof motor and module unit is replaced with a

new component. Failure to perform this procedure may result in damage to the vehicle, to the sunroof or in serious or fatal injuries. Refer to MOTOR, SUNROOF, STANDARD PROCEDURE.

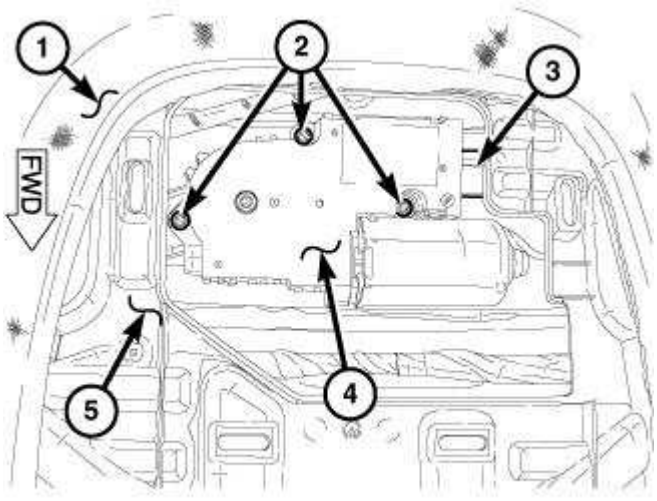

Fig. 3: Headliner, Bracket, Module Unit, Screws & Module Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the overhead console from the headliner (1). Refer to **CONSOLE, OVERHEAD, REMOVAL** .
3. Reach through the opening in the headliner bracket (5) for the overhead console to access the sunroof motor and module unit (4).
4. Remove the three screws (2) that secure the motor and module to the sunroof frame.
5. Lower the motor and module unit through the headliner bracket opening far enough to access and disconnect the sunroof wire harness connector from the motor and module connector receptacle (3).
6. Remove the sunroof motor and module unit from the vehicle.

DUAL PANE SUNROOF OR SUNSHADE

WARNING: Do not attempt to move or reposition the sunroof glass panel, the sunshade or the drive cables with the sunroof or sunshade motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Panel Calibration procedure and the Sunroof Motor And Module Initialization procedure must be completed any time a sunroof or sunshade motor and module unit is replaced with a new component. Failure to perform these procedures may result in damage to the vehicle, to the sunroof, to the sunshade or in serious or fatal injuries. Refer to

MOTOR, SUNROOF, STANDARD PROCEDURE.

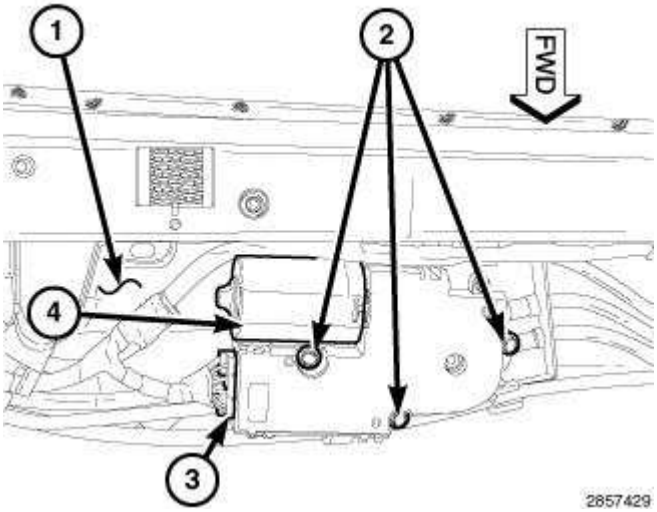

Fig. 4: Inner Roof Panel, Sunroof Wire Harness Connector, Screws & Module Unit
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Lower the headliner from the inner roof panel (1). Refer to **HEADLINER, REMOVAL** .
3. Disconnect the sunroof wire harness connector (3) from the sunroof or sunshade motor and module unit (4) connector receptacle (2).
4. Remove the three screws (2) that secure the motor and module unit to the sunroof frame.
5. Remove the sunroof or sunshade motor and module unit from the vehicle.

INSTALLATION

INSTALLATION

SINGLE PANE SUNROOF

WARNING: Do not attempt to move or reposition the sunroof glass panel or drive cables with the sunroof motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Motor And Module Initialization procedure must be completed any time a sunroof motor and module unit is replaced with a new component. Failure to perform this procedure may result in damage to the vehicle, to the sunroof or in serious or fatal injuries. Refer to MOTOR, SUNROOF, STANDARD PROCEDURE.

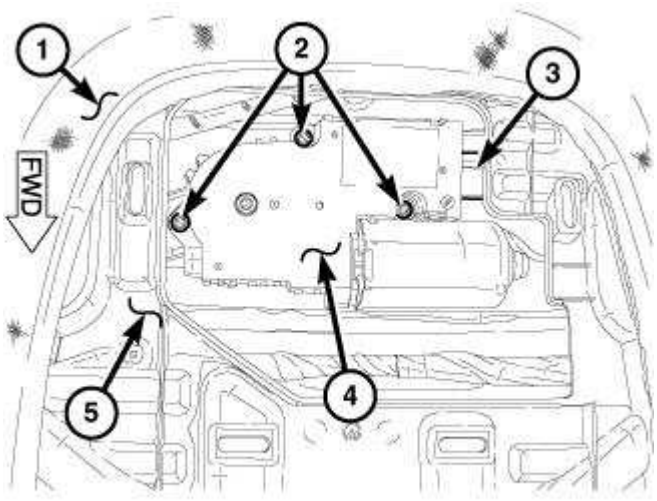

Fig. 5: Headliner, Bracket, Module Unit, Screws & Module Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Position the sunroof motor and module unit (4) close enough to the headliner bracket (5) for the overhead console to access and reconnect the overhead wire harness connector to the motor and module connector receptacle (3).
2. Position the motor and module through the headliner bracket opening and onto the sunroof frame.
3. Install and tighten the three screws (2) that secure the motor and module to the sunroof frame. Tighten the screws to 4 N.m (35 in. lbs.).
4. Reinstall the overhead console onto the headliner (1). Refer to **CONSOLE, OVERHEAD, INSTALLATION** .
5. Reconnect the battery negative cable.
6. Perform the Sunroof Motor And Module Initialization procedure. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE**.

DUAL PANE SUNROOF OR SUNSHADE

WARNING: Do not attempt to move or reposition the sunroof glass panel, the sunshade or the drive cables with the sunroof or sunshade motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Panel Calibration procedure and the Sunroof Motor And Module Initialization procedure must be completed any time a sunroof or sunshade motor and module unit is replaced with a new component. Failure to perform these procedures may result in damage to the vehicle, to the sunroof, to the sunshade or in serious or fatal injuries. Refer to MOTOR, SUNROOF, STANDARD PROCEDURE.

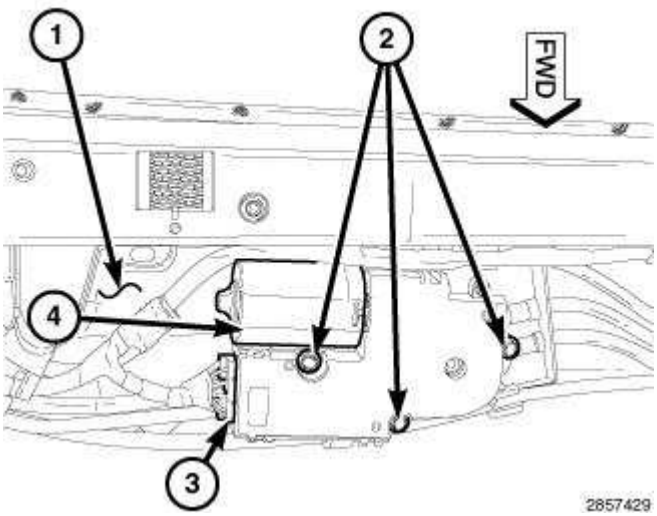

Fig. 6: Inner Roof Panel, Sunroof Wire Harness Connector, Screws & Module Unit
Courtesy of CHRYSLER GROUP, LLC

1. Position the sunroof or sunshade motor and module unit (4) to the sunroof frame.
2. Install and tighten the three screws (2) that secure the motor and module unit to the sunroof frame. Tighten the screws to 3.8 N.m (34 in. lbs.).
3. Reconnect the sunroof wire harness connector (3) to the motor and module unit connector receptacle.
4. Reinstall the headliner to the inner roof panel (1). Refer to **HEADLINER, INSTALLATION** .
5. Reconnect the battery negative cable.
6. If a previously initialized sunroof or sunshade motor and module unit has been reinstalled, perform the Dual Pane Sunroof Or Sunshade Override Position Calibration procedure. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE**.
7. If a new sunroof or sunshade motor and module unit has been installed, perform the Sunroof Motor And Module Initialization procedure. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE**.

SWITCH, SUNROOF

DESCRIPTION

DESCRIPTION

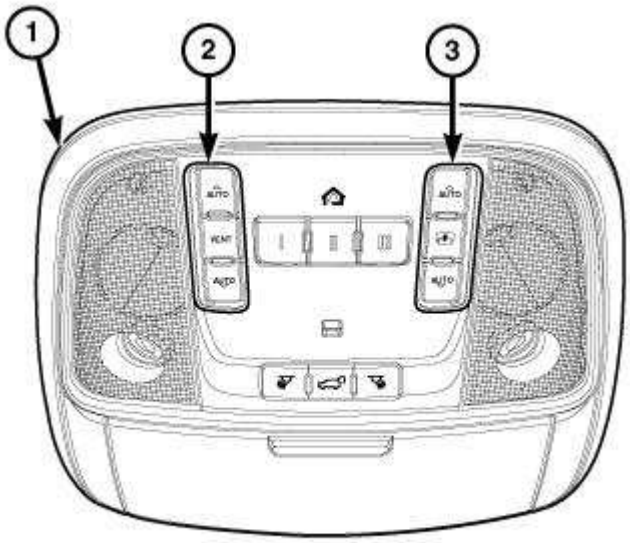

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Fig. 7: Power Sunroof Switch, Overhead Console & Power Sunshade Switch
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with a power sunroof have a power sunroof switch (2) integral to the overhead console (1) located in the headliner just forward of the sunroof opening. This switch has three momentary push buttons clearly identified by either text or icons indicating their functions. The three functions are from front-to-back: CLOSE, VENT, and OPEN. The switch push buttons also have instrument panel dimmer controlled Light Emitting Diode (LED) units that provide back lighting for visibility at night.

Vehicles with the optional dual pane (also known as CommandView®) sunroof also have a power sunshade switch (3) integral to the overhead console. This switch has two momentary push buttons that are also clearly identified by icons indicating their functions. The two functions are from front-to-back: CLOSE and OPEN. These switch push buttons are also back lit by LED units for visibility at night.

Both the power sunroof and (if equipped) the power sunshade switch are connected to the vehicle electrical system through the printed circuit board of the overhead console, which is connected to a dedicated take out and connector of the overhead wire harness. If either switch is ineffective or damaged, the entire overhead console must be replaced.

OPERATION

OPERATION

Both the power sunroof and (if equipped) the power sunshade switch are hard wired to the electronic module integral to their respective power sunroof or power sunshade motor. The electronic module provides the switch with a source current whenever the ignition switch is in the ON or ACCESSORY positions. When one of the switch push buttons is depressed, it sends a signal back to the electronic

module and the electronic module controls the motor to move the sunroof or sunshade panel to the appropriate position.

A short duration (less than 800 milliseconds) press of the switch push button is interpreted by the electronic module as an Express (also known as one touch) command, where the motor will automatically move the glass panel or sunshade to the fully open, fully closed or (sliding glass panel only) the ventilation position. A long duration (greater than 800 milliseconds) press of the push button is interpreted by the electronic module as a manual command, where the motor moves only as long as the push button is held in the depressed position. During an Express event, any new switch input will immediately stop an in-progress event which, as in the manual mode, allows the customer to stop the sliding glass panel or sunshade at any desired location.

The power sunroof and power sunshade switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUNROOF SWITCH

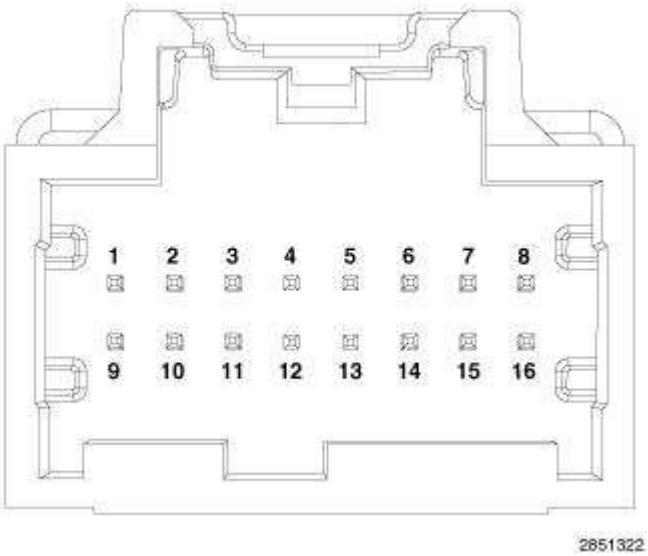


Fig. 8: Sunroof Switch
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the overhead console from the headliner. Refer to **CONSOLE, OVERHEAD, REMOVAL** .
3. Disconnect the overhead wire harness connector from the overhead console connector receptacle.
4. Using a multimeter, test the continuity between the terminals of the overhead console connector receptacle while actuating the power sunroof switch or power sunshade switch as shown in the Sunroof Switch Tests or Sunshade Switch Tests table.

SUNROOF SWITCH TESTS	
SWITCH POSITION	**CONTINUITY BETWEEN PINS**
OFF	NO CONTINUITY
OPEN	9 and 12
CLOSE	11 and 12
VENT	10 and 12

SUNSHADE SWITCH TESTS	
SWITCH POSITION	**CONTINUITY BETWEEN PINS**
OFF	NO CONTINUITY
OPEN	12 and 14
CLOSE	12 and 13

5. If either switch fails any of the tests, replace the overhead console and both switches as a unit as required.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - TIRE AND WHEEL VIBRATION

Tire and wheel imbalance, runout and tire road force variation can cause vehicles to exhibit steering wheel vibration and/or seat vibration.

VISUAL INSPECTION

Visual inspection of the vehicle is recommended prior to road testing or performing any other procedure. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

Inspect for the following:

- Verify correct (OEM) wheel and tire, as well as presence of wheel weights.
- Inspect tires and wheels for damage, mud packing and unusual wear; correct as necessary.
- Check and adjust tire air pressure to the pressure listed on the label attached to the driver's door opening.

ROAD TEST

NOTE: If a Noise & Vibration Analyzer is available, use it to diagnosis the issue during the road test.

NOTE: If the vehicle has been sitting for an extended period of time it is recommended to drive to warm the tires. This process could eliminate flat spots that can cause vibration.

Road test vehicle on a smooth road **at and near the designated speed** where legal speed limits allow. Lightly place hands on steering wheel at the 10:00 and 2:00 positions and observe for:

- Steering wheel oscillation: clockwise/counterclockwise
- Steering wheel high frequency movement: rapid vibration up and down
- Seat high frequency movement: rapid vibration up and down

To rule out vibrations due to brakes or powertrain:

- Lightly apply brakes at the designated speed; if vibration occurs or is enhanced, vibration is likely due to a brake concern.
- Shift transmission into neutral while vibration is occurring; if vibration is eliminated, vibration is likely due to a powertrain concern (Refer to appropriate DIFFERENTIAL AND DRIVELINE

information).

TIRE/WHEEL BALANCE AND ROAD FORCE VARIATION

NOTE: If wheel balance equipment is capable of testing tire road force variation and the tire/wheel assemblies are within specification, place the tires with the greater road force variation on the rear of the vehicle.

Balance the tire and wheel assemblies as necessary, and if wheel balance equipment is capable, also test for tire and wheel runout and road force variation following the wheel balancer manufacturer's instructions and using the information listed in Tire And Wheel Balance. Refer to **STANDARD PROCEDURE**. Repeat the road test above to verify the vibration is repaired.

STANDARD PROCEDURE

TIRE AND WHEEL BALANCE

NOTE: Always verify the wheel and tire balance before removing any wheel weights. If assembly is within specification and weights are not corroded or loose, do not remove weights. The process of removing and adding weight could damage wheel protective coating.

NOTE: Balance and road force variation equipment must be calibrated and maintained per equipment manufacturer's specifications.

NOTE: If a tire sealant & inflator kit was used to temporarily repair small punctures then the tire must be removed from wheel and all the sealant must be removed with a water damped cloth before repairing & balancing the assembly.

NOTE: Some wheels may not have an outer flange. Apply adhesive weights on midplane surface to balance.

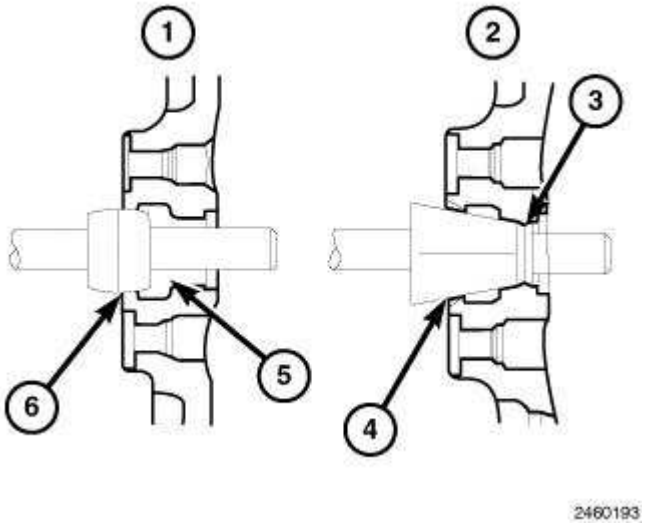


Fig. 1: Balancing Wheels Using Cone/Collet
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Balance equipment could read an incorrect balance result when measuring Chrome Clad wheels. This is caused by the equipments mounting cone/collet contacting the cladding or the cone/collet is not balanced. A dual-taper collet (1) type wheel centering tool is recommended as opposed to a high-taper cone (2) type wheel centering tool. Always use the manufacturer's recommended balance equipment.**

- **Dual-taper collet type (1)**
- **High-taper cone type (2)**
- **Possible obstruction (3)**
- **May not seat properly (4)**
- **No obstruction (5)**
- **Properly seated (6)**

NOTE: **If wheel balance equipment is capable of testing tire road force variation and the tire/wheel assemblies are within specification, place the tires with the greater road force variation on the rear of the vehicle.**

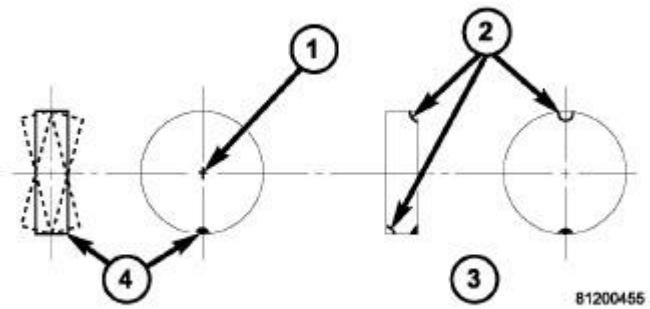


Fig. 2: Dynamic Balancing
Courtesy of CHRYSLER GROUP, LLC

For dynamic balancing (**recommended**), the balance equipment is designed to indicate the location and amount of weight to be applied to both the inner and outer rim flanges (2).

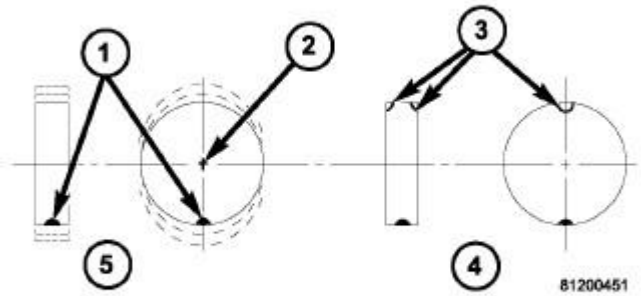


Fig. 3: Static Balancing
Courtesy of CHRYSLER GROUP, LLC

For static balancing (**not recommended**), find the location of the heavy spot causing the imbalance (1). Counter balance the wheel directly opposite the heavy spot. Determine weight required to counterbalance the area of imbalance. Place half of this weight on the **inner** rim flange and the other half on the **outer** rim flange (3) at the predetermined spots.

Aluminum wheels use a different type wheel weight than steel wheels. Be sure to use the correct wheel weight for the wheel type.

Always verify the balance. When using off-vehicle equipment, remount the tire and wheel assembly 180 degrees on the balancer spindle and recheck balance. Balance variation from one spot to the

other should not be more than 0.125 (1/8) ounce. If variation is more than 0.125 ounce, balancing equipment could be malfunctioning, or the wrong collet/cone may have been used.

If difficult to balance, break down the tire and wheel assembly and check for loose debris inside the tire. Prior to disassembly, mark (index) the tire at the valve stem. Use this mark in order to remount the tire in its original orientation with respect to the wheel.

TIRE AND WHEEL ROTATION

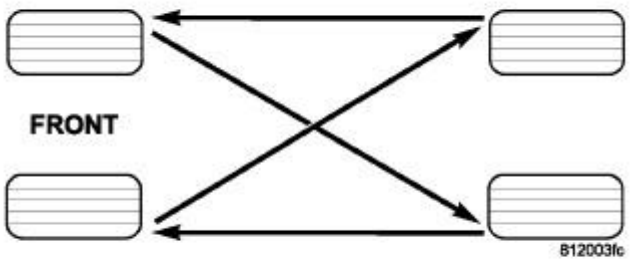


Fig. 4: Rotating Tires
Courtesy of CHRYSLER GROUP, LLC

Tires on the front and rear operate at different loads and perform different steering, driving, and braking functions. For these reasons they wear at unequal rates and tend to develop irregular wear patterns. These effects can be reduced by rotating the tires at regular intervals. The benefits of tire rotation are:

- Increase tread life
- Maintain traction levels
- A smooth, quiet ride

The suggested method of tire rotation is shown in graphic. Other rotation methods can be used, but they will not provide all the tire longevity benefits.

REMOVAL

TIRE AND WHEEL ASSEMBLY (ALUMINUM WHEEL)

1. Raise vehicle so tire and wheel assembly clears ground level.

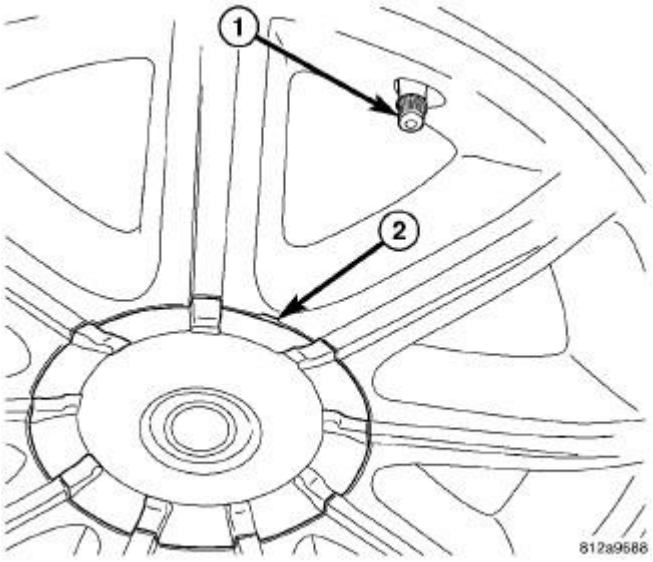


Fig. 5: Center Cap Removal Notch
Courtesy of CHRYSLER GROUP, LLC

2. If vehicle is equipped with wheel center caps covering wheel nuts, remove cap with appropriate removal tool utilizing notch formed into wheel (2) near valve stem (1). Use care not to damage wheel coating.

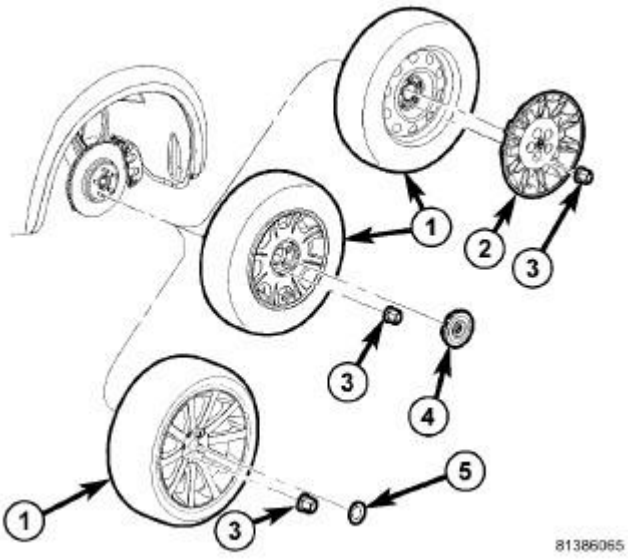


Fig. 6: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

3. Remove five wheel mounting (lug) nuts (3) from studs.
4. Remove tire and wheel assembly (1) from hub.

TIRE AND WHEEL ASSEMBLY (STEEL WHEEL)

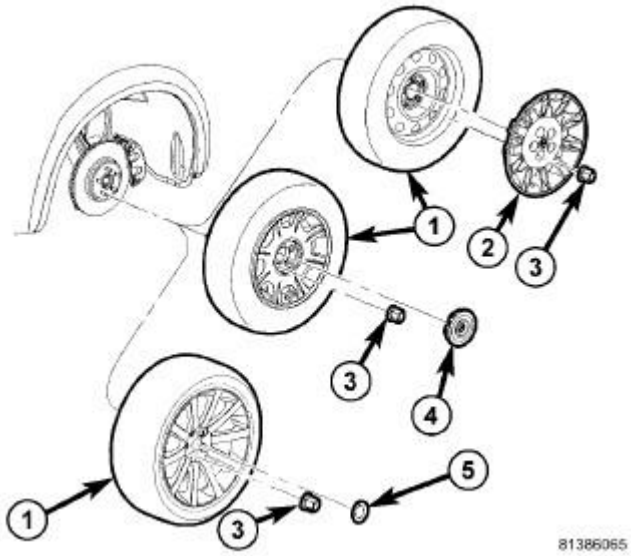


Fig. 7: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support vehicle so tire and wheel assembly clears ground level.

CAUTION: When removing the wheel cover, do not pry the wheel cover from the wheel. This can result in damage to the wheel cover. The wheel cover is attached using the wheel mounting nuts.

2. Remove five wheel mounting (lug) nuts (3) from studs.
3. Remove wheel cover (2) using care not to let tire and wheel assembly (1) fall off vehicle.
4. Remove tire and wheel assembly (1) from hub.

INSTALLATION

TIRE AND WHEEL ASSEMBLY (ALUMINUM WHEEL)

WARNING: Installing wheels without good metal-to-metal contact with the mounting surface could cause loosening of the wheel mounting (lug) nuts. This could adversely affect the safety and handling of the vehicle.

NOTE: Never use oil or grease on studs or wheel mounting (lug) nuts.

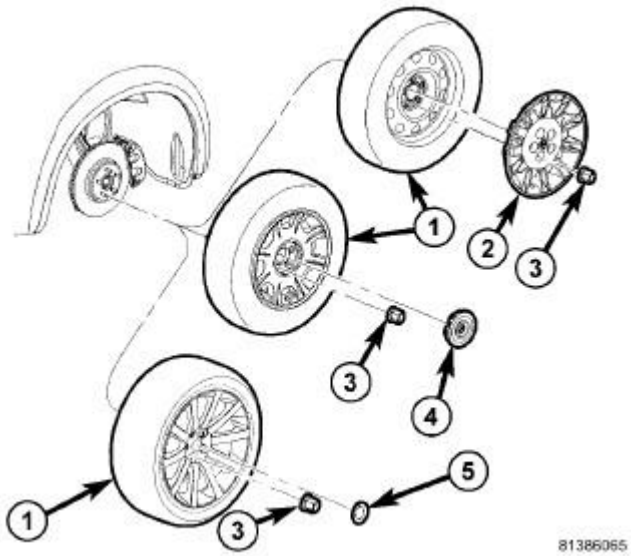


Fig. 8: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Clean wheel mounting surfaces, removing any build-up of corrosion. It is important to have good metal-to-metal contact between wheel and vehicle.
2. Position tire and wheel assembly (1) on wheel mounting studs using hub pilot as guide. Place and hold wheel flush up against mounting surface.

   NOTE: Always use the original (OEM) style wheel mounting (lug) nuts. Do not use replacement parts of lesser quality or substitute design.

3. Loosely install all five wheel mounting (lug) nuts (3).

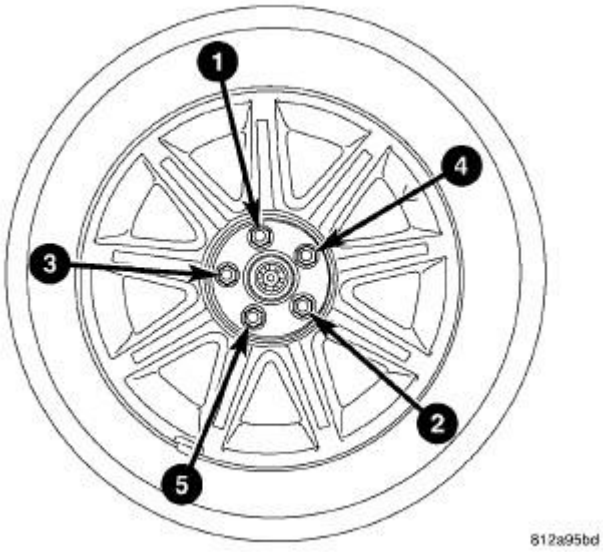


Fig. 9: Tightening Sequence - Aluminum Wheel
Courtesy of CHRYSLER GROUP, LLC

4. Lightly snug all wheel mounting nuts, then progressively tighten them in proper sequence shown in illustration. Tighten wheel mounting nuts to 150 N.m (110 ft. lbs.).

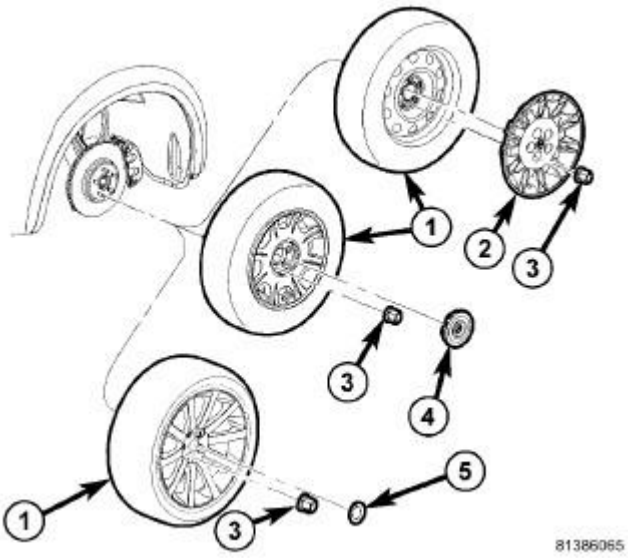


Fig. 10: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

5. If applicable, install wheel center cap (4).
6. Lower vehicle.

TIRE AND WHEEL ASSEMBLY (STEEL WHEEL)

WARNING: Installing wheels without good metal-to-metal contact with the mounting surface could cause loosening of the wheel mounting (lug) nuts. This could adversely affect the safety and handling of the vehicle.

NOTE: Never use oil or grease on studs or wheel mounting nuts.

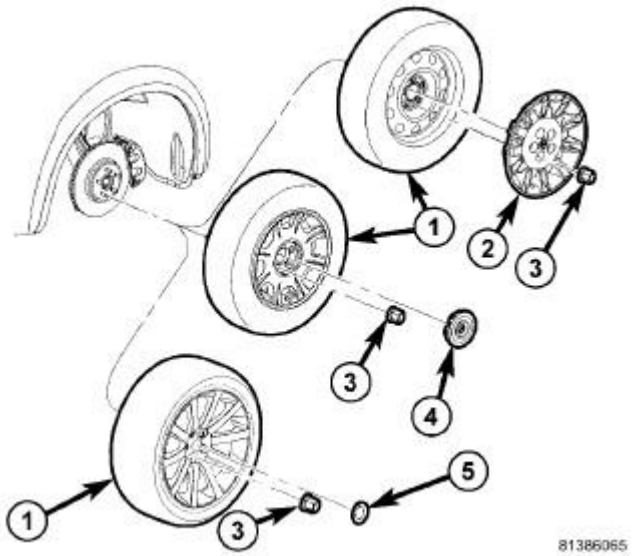


Fig. 11: Tire And Wheel Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Clean wheel mounting surfaces, removing any corrosion build-up. It is important to have good metal-to-metal contact between wheel and vehicle.
2. Position tire and wheel assembly (1) on wheel mounting studs using hub pilot as guide. Place and hold wheel flush up against mounting surface.

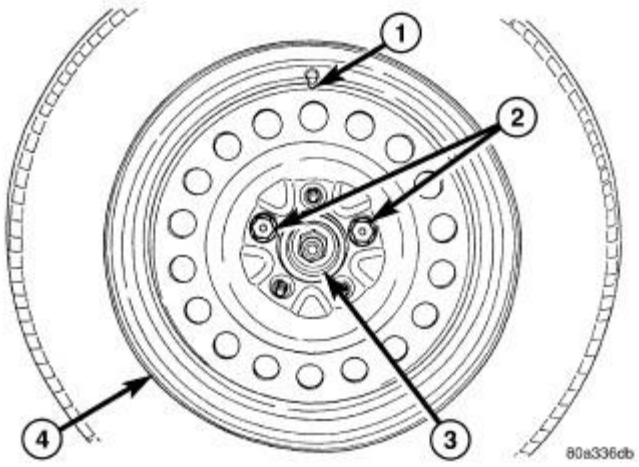


Fig. 12: Two Wheel Mounting Nuts Installed
Courtesy of CHRYSLER GROUP, LLC

1 - VALVE STEM
2 - NUTS
3 - HUB
4 - WHEEL

NOTE: Wheel mounting nuts must be installed on the studs as shown in illustration (2) to allow proper installation of the wheel cover.

3. Using valve stem as an index placed at 12 O'clock position (1), install and **lightly tighten** two wheel mounting nuts on studs located at 2 O'clock and 10 O'clock positions as shown in illustration (2).

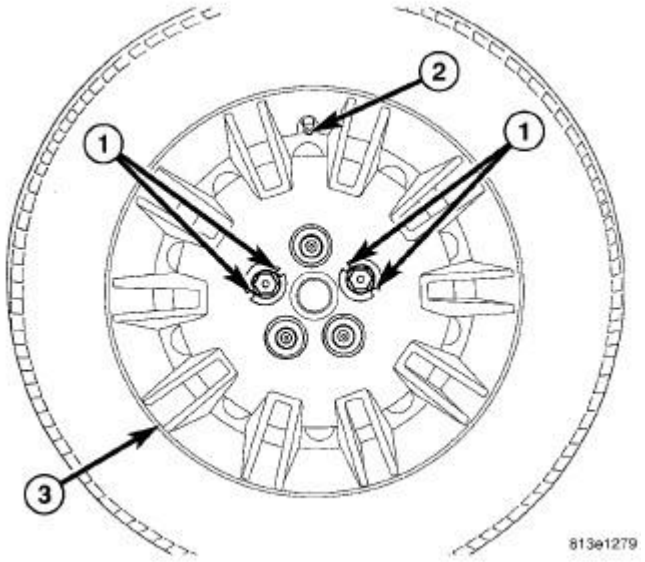


Fig. 13: Installing Cover Over Two Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Place wheel cover (3) on wheel in the following fashion:
    1. Align valve notch in wheel cover with valve stem on wheel (2).
    2. At same time, align two holes in wheel cover having retaining tabs (1) with two installed wheel nuts.
    3. Press in on center of wheel cover until wheel cover retaining tabs (1) push past and engage rear of previously installed wheel mounting nuts. This will hold wheel cover in place.

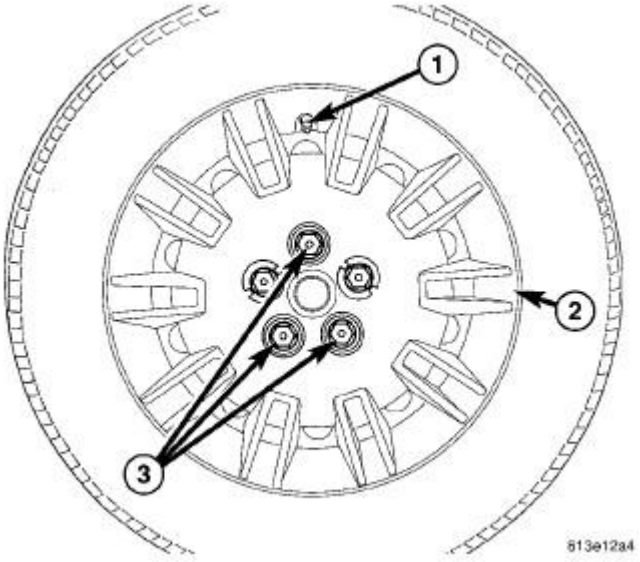


Fig. 14: Three Nuts Retaining Cover/Wheel
Courtesy of CHRYSLER GROUP, LLC

5. Install and **lightly tighten** three remaining wheel mounting nuts (3) securing wheel cover in place.

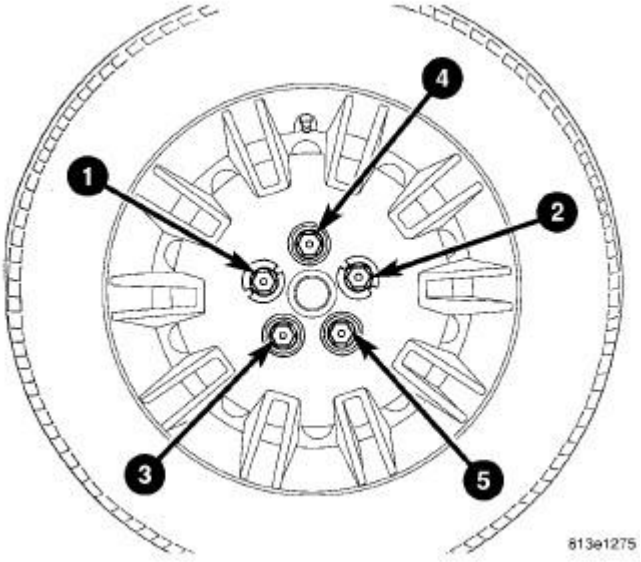


Fig. 15: Wheel Nut Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Progressively tighten all five wheel mounting nuts in proper sequence. Tighten wheel mounting nuts to 150 N.m (110 ft. lbs.).
7. Lower vehicle.

SPECIAL TOOLS

SPECIAL TOOLS

	C-3919 - Gauge, Brake Shoes C-4150A - Press, Ball Joint (Originally Shipped In Kit Number(s) 6672, 6745.)

TIRE PRESSURE MONITORING

DESCRIPTION

DESCRIPTION

The Tire Pressure Monitoring (TPM) system monitors air pressure in the four road tires (excludes spare). Pressure in the spare tire is not monitored.

There are two tire pressure monitoring systems available, a base system and a premium system. The base system does not specify how many tires are low or where they are located. The premium system does so.

The Base TPM system consists of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole, a central receiver module (Wireless Ignition Node (WIN)), and an indicator lamp.

The receiver circuit for the TPM system is integrated into the WIN. For non-remote start vehicles, the antenna is internal to the WIN. For factory installed remote start vehicles, the antenna is external to the WIN. The WIN can also include the Remote Keyless Entry (RKE) receiver, Remote Start (if equipped) and the Sentry Key Immobilizer (SKIM) receiver. All receivers share a number of common components. The WIN decodes the RF signals transmitted by each of the vehicle's tire pressure sensors. The decoded information is used to determine if "warning" or "fault" conditions exist within the TPM system.

Upon detection of a warning or fault condition, the WIN will send a request to the module that controls the indicator lamp (and the text display if equipped with the Premium system) via the vehicle bus system to illuminate or flash the indicator lamp. Also, upon detection of a warning or fault condition, the electronic display will send a request to sound the "chime".

The WIN will store all warning and fault conditions, placard pressure values and low-pressure threshold values (lamp ON and OFF) in memory that can be accessed through diagnostic communication. If new sensors are introduced to the vehicle, the data stored for the sensor being replaced will be deleted.

The WIN will store all wheel sensor ID's and locations and faults in memory that can be accessed through diagnostic communication. All other data values transmitted from each active wheel sensor (not the spare tire) shall be stored in the WIN memory.

The WIN automatically learns and stores the sensor IDs while driving "within 20 minutes continuously above 15 mph (24 km/h)" after a sensor has been replaced. The learning sequence will initiate when

the vehicle has been stopped for more than 20 minutes.

The Premium TPM system consists of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole and a TPM module. The receiver circuit for the TPM system is mounted in the right rear wheel well. The TPM module is fixed to a metal bracket mounted to the inner wheel well located behind the splash shield. The TPM module decodes the RF signals transmitted by each of the vehicle's tire pressure sensors. The decoded information is used to determine if "warning" or "fault" conditions exist within the TPM system.

Upon detection of a warning or fault condition, the TPM module will send a request to the module that controls the indicator lamp and the text display via the vehicle bus system to illuminate or flash the indicator lamp. Also, upon detection of a warning or fault condition, the electronic display will send a request to sound the "chime".

The TPM module will store all warning and fault conditions, placard pressure values and low pressure threshold values (lamp ON and OFF) in memory that can be accessed through diagnostic communication. If new sensors are introduced to the vehicle, the data stored for the sensor being replaced will be deleted once the new sensor id has been learned.

The TPM module will store all wheel sensor ID's and locations and faults in memory that can be accessed through diagnostic communication.

The TPM module automatically learns and stores the sensor IDs while driving "within 20 minutes continuously above 15 mph (24 km/h)" after a sensor has been replaced. The learning sequence will initiate when the vehicle has been stopped for more than 20 minutes.

NOTE: A new sensor ID can also be programmed directly into the WIN or TPM module by using a RKE-TPM Analyzer in conjunction with a Scan Tool. Once the new sensor ID has been programmed, the vehicle will need to be driven above 15 mph until the fault is no longer active (lamp extinguishes) and display is updated (for up to 20 minutes).

NOTE: Using a TPM-RKE Analyzer can take up to a minute to force a transmission from a sensor.

OPERATION

OPERATION

BASE TIRE PRESSURE MONITORING

The tire pressure monitoring system (TPMS) is designed to operate without loss of function for all OEM tire construction for this vehicle. Sensors, mounted to each road wheel as part of the valve stem, transmit an RF signal indicating their individual pressure to a receiver located in the Wireless Ignition Node (WIN). These transmissions occur approximately once every minute at speeds over 15 mph (24 km/h). For more information on sensors. Refer to **SENSOR, TIRE PRESSURE MONITORING (TPM), OPERATION**.

If the TPM system detects that the tire pressure in any road tire is going low, beyond the Low Pressure (lamp) ON threshold (see placard table below **TPM THRESHOLD PRESSURES**), the TPM system will continuously illuminate an indicator lamp. If a system fault is detected, the indicator lamp will flash on/off for 75 seconds, then remain on solid.

If the WIN detects a warning or fault condition at ignition key "ON" it will wait ten seconds +/- 10 % before sending the first request to illuminate the indicator lamp. This will assure that the display module has concluded its bulb check period. The display module will request a chime once per ignition cycle for each "warning" or "fault" condition detected. A "warning" or "fault" condition will remain enabled until the problem causing the condition is corrected and removed/reset.

The WIN shall continuously monitor for the receipt of tire pressure RF message transmissions from the wheel sensors during both the ignition key "ON" and key "OFF" cycles. The wheel sensor ID's and the location of each sensor (e.g. Tire 1, Tire 2 etc.) are learned by the WIN from the Front Control Module (FCM) configuration during the initial Manufacturing Plant Process, or during a service procedure, as required.

The TPM System will continue to warn the driver of low tire pressure as long as the condition exists, and will not turn off the indicator lamp until the tire pressure is at or above the Low Pressure (lamp) OFF threshold (see placard table below **TPM THRESHOLD PRESSURES**). The system will automatically update and the TPM indicator lamp will extinguish once the updated tire pressures have been received.

Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure (placard pressure). This is defined as the tire pressure after a vehicle has not been driven for more than 3 hours (and in outside ambient temperature). The tire pressure will also increase as the vehicle is driven; this is normal and there should be no adjustment for this increased pressure. For a system fault, the system will return to normal once the WIN receives a valid transmission from that sensor location.

PREMIUM TIRE PRESSURE MONITORING

The tire pressure monitoring (TPM) system is designed to operate without loss of function for all OEM tire construction for this vehicle. Sensors, mounted to each road wheel as part of the valve stem, transmit an RF signal indicating their individual pressure to a receiver located in the TPM module. These transmissions occur approximately once every minute at speeds over 15 mph (24 km/h). For more information on sensors. Refer to **SENSOR, TIRE PRESSURE MONITORING (TPM), OPERATION**.

If the TPM module detects that the tire pressure in any road tire is going low, beyond the Low Pressure (lamp) ON threshold (see placard table below **TPM THRESHOLD PRESSURES**), a chime will sound and the indicator lamp will turn on. In addition to the chime and lamp, a graphic display of the pressure value(s) and position of the low tire(s) will flash in the Electronic Vehicle Information Center (EVIC). Once pressure in the suspect tire(s) raises above the Low Pressure (lamp) OFF Threshold (see placard table below **TPM THRESHOLD PRESSURES**), and the TPM module receives a valid transmission from the sensor, the lamp will go out. If a system fault is detected due to a missing sensor signal, in addition to a chime and a indicator lamp flashing, a "Check TPM System"

text message will be displayed in the instrument cluster, and the tire pressure graphic display will have "- -" in place of the pressure value. After the flash sequence, the TPM indicator lamp will remain illuminated. The system will return to normal once the TPM module receives a valid transmission from that sensor location. If a system fault is detected, the indicator lamp will flash on/off for 75 seconds and then remain on solid.

If the TPM module detects a warning or fault condition at ignition key "ON" it will wait approximately ten seconds before sending the first request to illuminate the indicator lamp. This will assure that the display module has concluded its bulb check period. The display module will request a chime once per ignition cycle when a "warning" or "fault" condition is detected. A "warning" or "fault" condition will remain enabled until the problem causing the condition is corrected and reset.

The TPM module shall continuously monitor for the receipt of tire pressure RF message transmissions from the wheel sensors during the ignition key "ON" cycle. The wheel sensor ID's and the location of each sensor (e.g. Tire 1, Tire 2 etc.) are learned by the TPM control module using signal strength and direction of wheel rotation as received by the TPM module from each of the sensors, and updates the graphic display when necessary or during a service procedure, as required.

The TPM System will continue to warn the driver of low tire pressure as long as the condition exists, and will not turn off the indicator lamp until the tire pressure is at or above the Low Pressure (lamp) OFF threshold (see placard table below **TPM THRESHOLD PRESSURES**). The system will automatically update and the TPM indicator lamp will turn off once the updated tire pressures have been received.

Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure (placard pressure). This is defined as the tire pressure after a vehicle has not been driven for more than 3 hours (and in outside ambient temperature). The tire pressure will also increase as the vehicle is driven? this is normal and there should be no adjustment for this increased pressure. For a system fault, the system will return to normal once the TPM module receives a valid transmission from that sensor location.

For both the Premium and Base TPM, the recommended "Placard Pressure", "Low-pressure Threshold" (Low Pressure ON) and "Hysteresis Pressure" values for the tires installed on the vehicle, are learned by the WIN or the TPM module from the Front Control Module (FCM) configuration during the initial Manufacturing Plant Process, or during a service procedure, as required. The WIN upon learning the placard pressure via the bus (through a matrix within the WIN software) applies the appropriate "Low Pressure Threshold" and "Hysteresis Pressure" values.

To determine the pressure thresholds for a vehicle, refer to the Tire Inflation Pressure (Placard) Label, and then apply the placard pressure to the following table. The Low Pressure OFF Threshold is defined as the Low Pressure ON Threshold plus the Hysteresis Pressure value.

For further information, refer to the Owners Manual or the Appropriate Diagnostic Information.

TPM THRESHOLD PRESSURES

NOTE: **To determine the pressure thresholds for a vehicle, refer to the Tire Inflation Pressure (Placard) Label found on the Driver's B-Pillar, then apply the placard pressure to the following table.**

Placard Pressure (Cold) (PSI)	Low Pressure ON Threshold (PSI)	Low Pressure OFF Threshold (PSI)
28	22	26
29	23	27
30	24	28
31	25	29
32	25	29
33	26	30
34	27	31
35	28	32
36	29	33
37	29	34
38	30	35
39	31	36
40	32	37
41	33	38
42	34	39
43	35	40
44	36	41
45	36	41
46	37	43
47	38	44
48	38	45
49	39	45
50	40	47
51	41	48
55	44	52
60	48	57
65	52	62
70	56	67
75	60	72
80	64	77

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - TIRE PRESSURE MONITORING

When diagnosing a tire pressure issue, first check the Tire Pressure Monitoring (TPM) indicator lamp

in the instrument cluster during ignition key ON. From the OFF position, turn the key to ON and check the TPM indicator lamp to observe one of the following:

- If after 10 seconds the indicator lamp is illuminating continuously (not flashing), proceed to LOW PRESSURE below.
- If after 10 seconds the indicator lamp flashes on/off for 75 seconds, then remains on solid, there is a system fault detected. Proceed to **SYSTEM FAULT** .

LOW PRESSURE

NOTE: Tire pressure may increase from 2 to 6 psi (14 to 41 kPa) during normal driving conditions. Do NOT reduce this normal pressure build up.

NOTE: Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire pressure will also decrease. Tire pressure should always be set based on cold inflation tire pressure. For details, refer to TIRES, STANDARD PROCEDURE.

Check air pressure as necessary in all tires using a known accurate air gauge and adjust to the specification listed on the Tire Inflation Pressure Label (Placard) provided with the vehicle (usually applied to the driver side B-pillar). After adjusting air pressure in a tire on the vehicle, allow approximately two minutes for the message or indicator lamp to go out.

If air pressure in any tire is low, inspect **all** the tires for leaks. A water "dunk tank" or other water test may be used to check for a leak around the sensor as long as any water at the valve core is removed once the procedure is completed. The water can be easily expelled from the core area by pushing in on the core for several seconds, allowing escaping air to drive out any moisture. Reinflate the tire as necessary. Always make sure the original (special) valve stem cap is securely installed to keep moisture out of the sensor.

If the indicator lamp is still ON continuously, refer to the appropriate diagnostic information.

SYSTEM FAULT

If a system fault is detected, a chime will sound, and the TPM indicator (telltale) lamp will flash for 75 seconds, then remain on solid. For vehicles with the Premium TPM Systems, a "CHECK TPM SYSTEM" message will appear in the Electronic Vehicle Information Center (EVIC), followed by a graphic display. A system fault can occur by many scenarios, including the following:

- Signal interference due to electronic devices or driving next to facilities emitting the same Radio Frequencies as the TPM sensors.
- Installing some form of aftermarket window tinting that affects radio wave signals.
- Accumulation of snow or ice around the wheels or wheel housings.
- Using tire chains on the vehicle.
- Using wheels not equipped with TPM sensors.

Refer to the appropriate diagnostic information.

MODULE, TIRE PRESSURE MONITORING (TPM)

DESCRIPTION

DESCRIPTION

The TPM Module is a stand-alone receiver that is used to perform all TPM functionality in a Premium TPM System on this vehicle. The TPM is located in the right rear wheel well behind the splash shield and is mounted to the wheel house inner flange with a bracket. The TPM uses information transmitted from each of the sensors as well as the difference is the strength of the signal received to determine the location of each of the sensors. The TPM then transmits the required information directly to the CCN in order to update the lamp, chime and display as required.

OPERATION

OPERATION

The TPM receives information from each of the sensors in the form of RF signals. The information contained in each of the transmissions provides all the information necessary for the TPM to determine the pressure in each tire as well as the position of the sensor. This autolocating process only happens in the first 10 minutes of any drive cycle while traveling at speeds above 15mph (24 km/h) (The autolocating process will start again only if the vehicle has been shut off for approximately 20 minutes or longer).

REMOVAL

REMOVAL

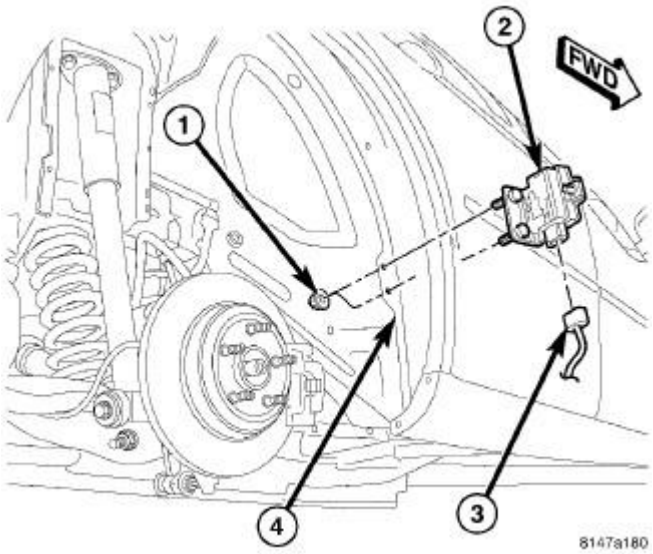


Fig. 16: Rear Transponder Mounting

Courtesy of CHRYSLER GROUP, LLC

1. Remove wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** or **SHIELD, SPLASH, REAR WHEELHOUSE, REMOVAL** .
2. Disconnect wiring harness connector (3) at the Tire Pressure Module (2).
3. Remove mounting nuts (1), then remove the Tire Pressure Module (2) from body seam flange (4).

INSTALLATION

INSTALLATION

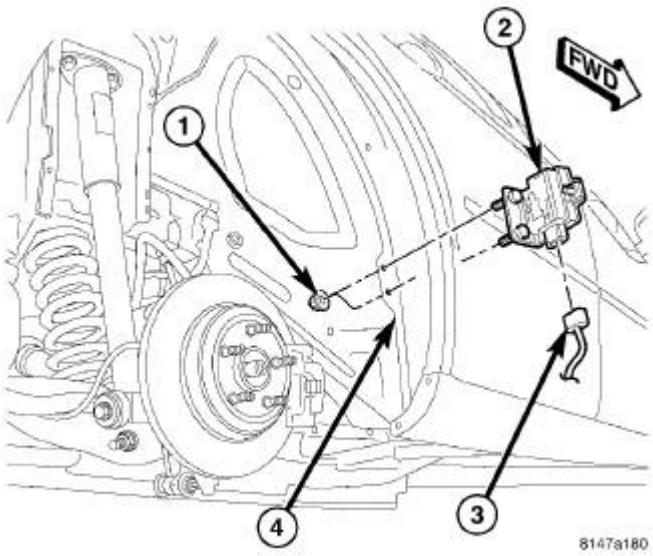


Fig. 17: Rear Transponder Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Position the Tire Pressure Module (2) on body seam flange (4) and install mounting nuts (1).
2. Connect wiring harness connector (3) at the Tire Pressure Module (2).
3. Install wheelhouse splash shield and all components removed to access it. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** or **SHIELD, SPLASH, REAR WHEELHOUSE, INSTALLATION** .
4. Perform one of the following to make the system learn the new sensor ID:
    1. Use the TPM-RKE Analyzer 9936, with the Scan Tool to program the TPM Module with the tire pressure sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .
    2. Once the vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 20 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .

SENSOR, TIRE PRESSURE MONITORING (TPM)

CAUTION

CAUTION

CAUTION: The use of tire sealants is not recommended for vehicles equipped with the Tire Pressure Monitoring system. Tire sealants may clog tire pressure sensors.

CAUTION: Tire pressure sensor valve stem caps and cores are specially designed for the sensors. Due to risk of corrosion, do not use a standard valve stem cap or core in a tire pressure sensor in place of the original equipment style sensor cap and core.

CAUTION: It is not recommended to install a tire pressure sensor in an aftermarket wheel. Use tire pressure sensors in original style factory wheels only.

CAUTION: Any time a sensor is to be reinstalled in a wheel, a new valve stem assembly must be installed to ensure air tight sealing.

NOTE: TPM thresholds have been established for the original tire size equipped on the vehicle. Use original size tires only to maintain system accuracy.

DESCRIPTION

NON SRT8

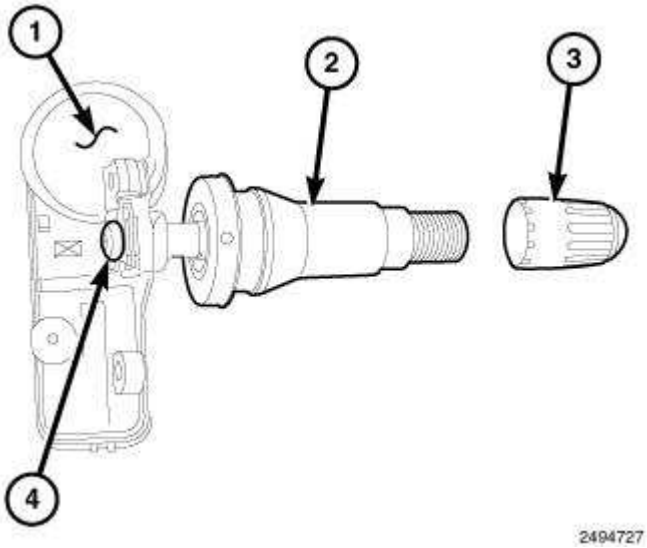


Fig. 18: Tire Pressure Monitoring Sensor Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Replace the valve stem assembly and tire pressure sensor mounting screw with each tire change.**

One tire pressure sensor (1) is mounted to a valve stem (2) specifically designed for mounting the pressure sensor (1) in each wheel in place of the traditional tire valve stem. Each sensor has an internal battery that lasts up to 10 years. The battery is not serviceable. At the time of battery failure, the sensor (1) must be replaced. The TPM system operates on a 433 MHz radio frequency. The tire pressure sensor valve stem (2) looks similar to a standard valve stem with the tire mounted on the wheel. To visually identify a tire pressure sensor/valve stem, the valve stem cap (3) is longer than a standard valve stem.

NOTE: **This vehicle uses the 433 MHz TPM sensor. Although 315 MHz and 433 MHz sensors are identical in size and shape, they are not interchangeable. Always make sure the correct sensor is being used. A RKE-TPM Analyzer can be used to determine the sensor's frequency without having to dismount the tire.**

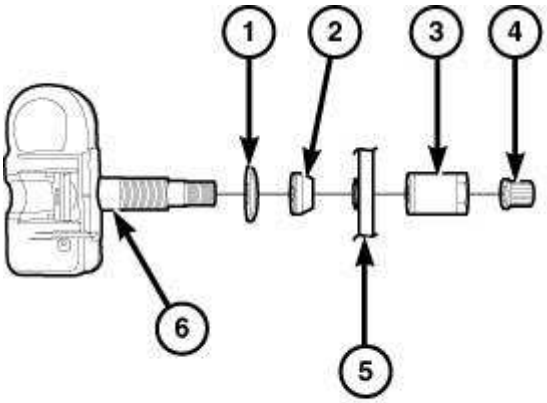
The TPM sensors are designed for original style factory wheels. It is not recommended to install a tire pressure sensor in an aftermarket wheel. (This could cause sealing and system performance issues.)

The serviceable components of the tire pressure sensor are:

- Tire pressure sensor (1), including all components below
- Valve stem (2), including screw (4), core, and cap (3)
- Valve stem core (not shown)
- Valve stem cap (3)

The valve stem caps and cores used are specifically designed for the tire pressure monitoring sensors. Although similar to standard valve stem caps and cores, they are different. The valve stem cap has a special seal inside to keep moisture and corrosion out. The valve stem core has a special nickel coating to protect from corrosion.

SRT8



300313

Fig. 19: Sensor Mounting - Exploded View
Courtesy of CHRYSLER GROUP, LLC

On vehicles equipped with Tire Pressure Monitoring (TPM), one tire pressure sensor (6) is mounted to each wheel in place of the traditional tire valve stem. Each sensor has an internal battery that lasts up to 10 years. The battery is not serviceable. At the time of battery failure, the sensor must be replaced.

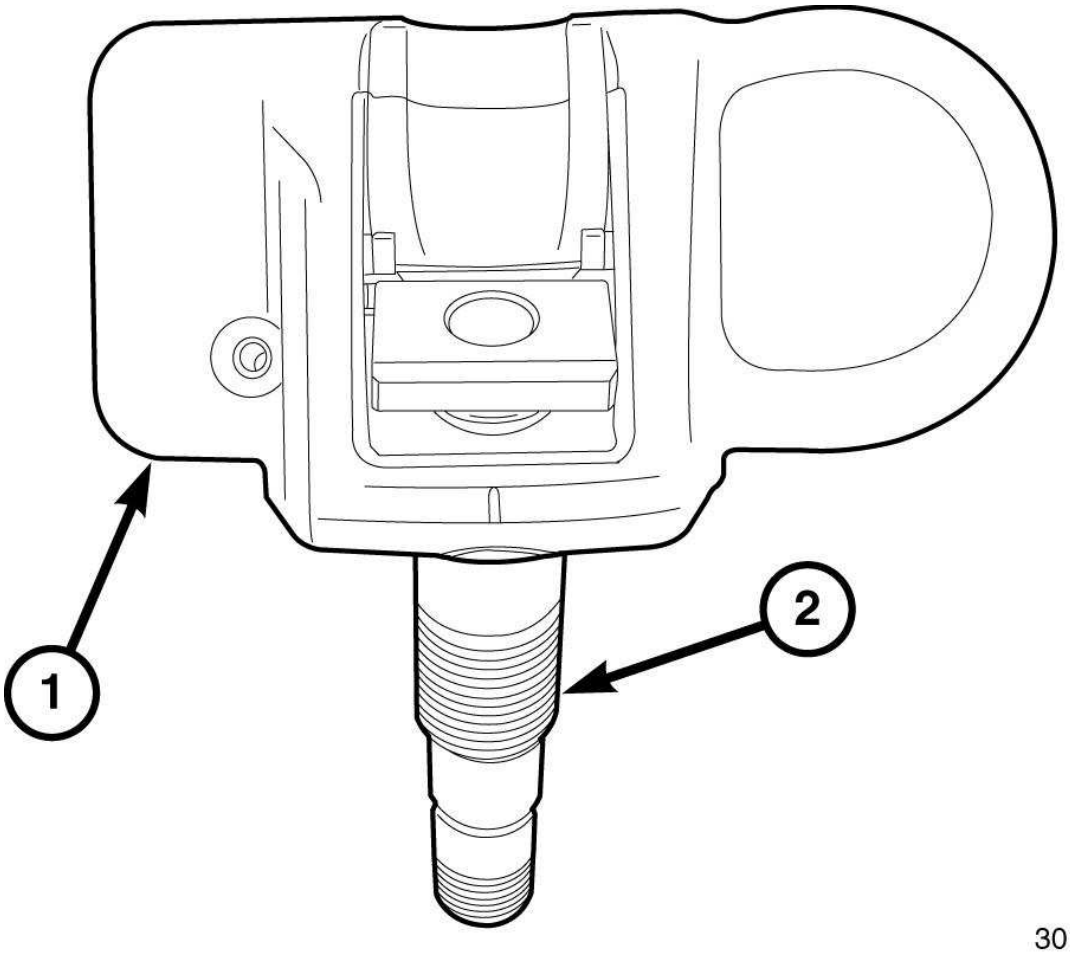


Fig. 20: Tire Pressure Monitoring Sensor
Courtesy of CHRYSLER GROUP, LLC

The TPM system operates on a 433 MHz radio frequency. The 433 MHz sensors (1) can be easily identified by the part number.

CAUTION: Although additional sensors operating at 433 MHz sensors are available and are used in other applications, they are not interchangeable. Always make sure the correct sensor is being used and be sure to replace the sensor with the correct part number.

NOTE: Once mounted inside a tire and wheel assembly you are not able to visually see

the difference between this sensor and other 315 MHz and 433 MHz sensors. At that point, the TPM/RKE Analyzer 9936, with the Scan Tool may be used to identify the sensor frequency or the tire can be dismounted allowing visual inspection of the sensor body and part number.

The TPM sensors are designed for original style factory wheels. It is not recommended to install a tire pressure sensor in an aftermarket wheel (This could cause sealing and system performance issues). **Do not attempt to install a tire pressure sensor in an aftermarket wheel. If aftermarket wheels are installed and do not contain tire pressure sensors, the system will not function properly and the driver will be continuously notified of a system malfunction.**

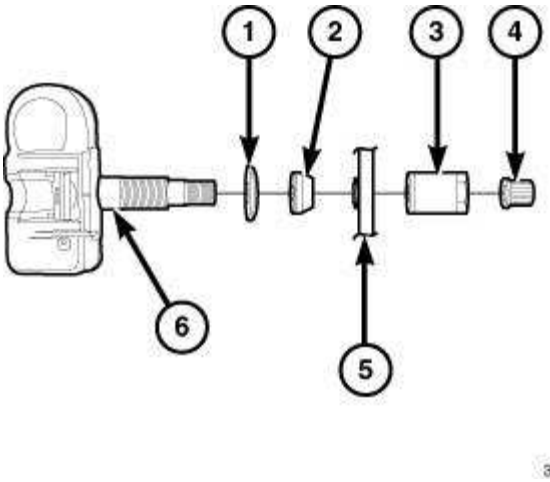


Fig. 21: Sensor Mounting - Exploded View
Courtesy of CHRYSLER GROUP, LLC

1 - METAL WASHER
2 - SEAL
3 - NUT (WITH PRESSED-IN WASHER)
4 - CAP (WITH SEAL)
5 - SECTIONAL CUTAWAY OF WHEEL
6 - TPM SENSOR

The serviceable components of the tire pressure sensor are:

- Sensor-To-Wheel Seal (2) and Metal Washer (1)
- Valve Stem Cap (4)
- Valve Stem Core
- Valve Stem Nut (with pressed-in washer) (3)

NOTE: **Any time a sensor is installed on a wheel, a new Sensor-To-Wheel Seal (2), Metal Washer (1) and Valve Stem Nut (3) must be installed to ensure air tight sealing. A service kit is available.**

The valve stem caps and cores are specifically designed for the tire pressure monitoring sensors. Although similar to standard valve stem caps and cores, they are different. The valve stem cap has a special seal inside to keep moisture and corrosion out. The valve stem core has a special nickel coating to protect from corrosion.

OPERATION

OPERATION

CAUTION: The TPMS has been optimized for the original equipment tires and wheels. TPMS pressures have been established for the tire size equipped on your vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, and/or style. After-market wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with a TPMS, as damage to the sensors may result.

CAUTION: After inspecting or adjusting the tire pressure always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Monitoring Sensor.

CAUTION: Tire pressure sensor valve stem caps and cores are specially designed for the sensors. Due to risk of corrosion, do not use a standard valve stem cap or core in a tire pressure sensor in place of the original equipment style sensor cap and core.

CAUTION: Any time a sensor is to be reinstalled in a wheel, a new valve stem assembly must be installed to ensure air tight sealing.

NOTE: TPM thresholds have been established for the original tire size equipped on the vehicle. Use original size tires only to maintain system accuracy.

The battery operated tire pressure sensor is both a transmitter and a receiver. The TPM sensor can be forced to transmit if using a special tool such as a TPM-RKE Analyzer. The TPM-RKE Analyzer has the ability to change the sensor mode and to diagnose a faulty TPM sensor. Using a TPM-RKE Analyzer can take up to a minute to force a transmission from a sensor.

Each sensor's (transmitter) broadcast is uniquely coded so that the module can monitor the state of each of the sensors on the four rotating road wheels. The module can automatically learn and store the sensor's ID while driving "within 10 minutes continuously above 15 m.p.h. (24 Km/h)" after a sensor has been replaced. The vehicle must be stationary for more then 20 minutes in order to initiate the learning sequence.

The sensor IDs can also be programmed using the TPM-RKE Analyzer Tool. Scan each TPM sensor at each road wheel, and store each Sensor ID in the correct location. (LEFT FRONT, LEFT REAR, RIGHT FRONT, and RIGHT REAR) Connect the TPM-RKE Analyzer Tool to the Scan Tool. Then

follow the programming steps outlined in the diagnostic Scan Tool for "Program Tire Pressure Sensor ID w/ TPM Tool".

REMOVAL

NON SRT8

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove tire and wheel assembly.

CAUTION: The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Do not substitute a regular valve stem cap in its place.

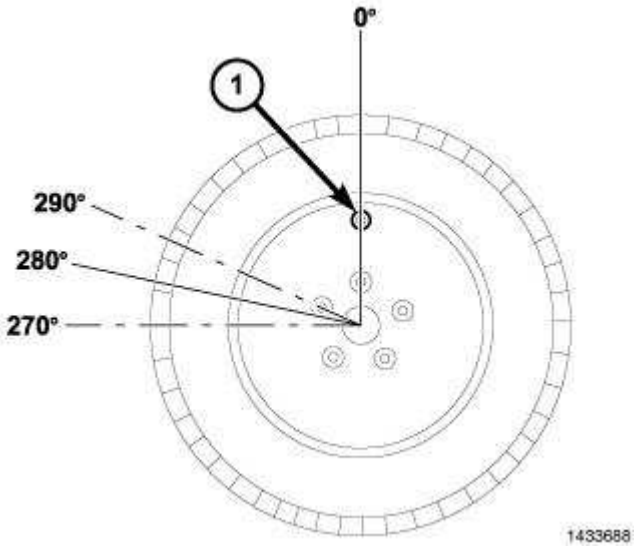


Fig. 22: Start Mount/Dismount Tool Within 10 Degrees Of Valve Stem
Courtesy of CHRYSLER GROUP, LLC

3. Dismount tire from wheel following tire changer manufacturers instructions while paying special attention to the following to avoid damaging the pressure sensor:
    1. When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor (1). That includes both outer and inner beads of the tire.
    2. When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280° from the valve stem ± 10°, then proceed to dismount the tire from the wheel. Use this process on both outer and inner tire beads.

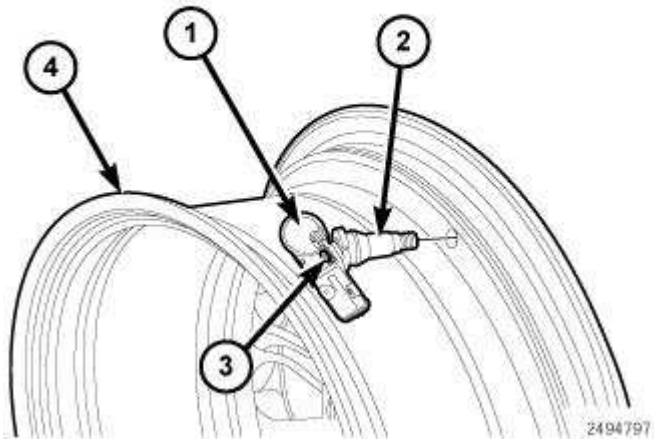


Fig. 23: Sensor Mounting To Wheel
Courtesy of CHRYSLER GROUP, LLC

4. Remove the sensor to valve stem retainer screw (3) and remove the sensor (1) from the valve stem (2).
5. Remove the valve stem (2) from the wheel (4).

SRT8

1. Raise and support vehicle.
2. Remove tire and wheel assembly.

CAUTION: The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Do not substitute a regular valve stem cap in its place.

CAUTION: The valve stem used on this vehicle is made of aluminum and the core is nickel plated brass. The original valve stem core must be reinstalled and not substituted with a valve stem core made of a different material. This is required to prevent corrosion in the valve stem caused by the different metals.

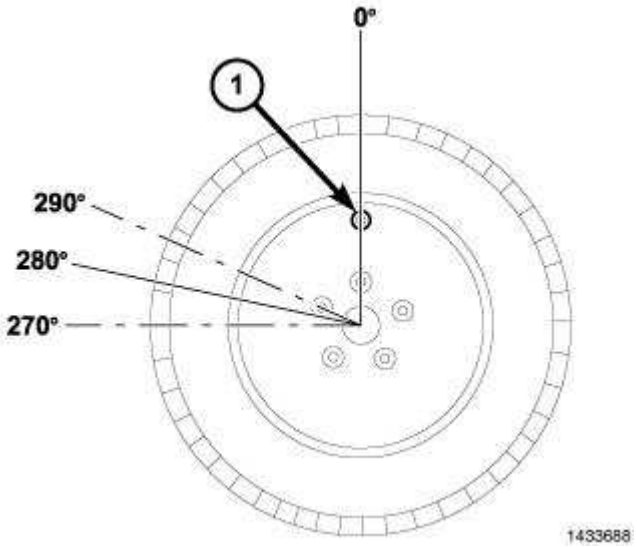


Fig. 24: Start Mount/Dismount Tool Within 10 Degrees Of Valve Stem
Courtesy of CHRYSLER GROUP, LLC

3. Dismount tire from wheel following tire changer manufacturers instructions while paying special attention to the following to avoid damaging the pressure sensor:
    1. When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor (1). That includes both outer and inner beads of the tire.
    2. When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280° from the valve stem ± 10°, then proceed to dismount the tire from the wheel. Use this process on both outer and inner tire beads.

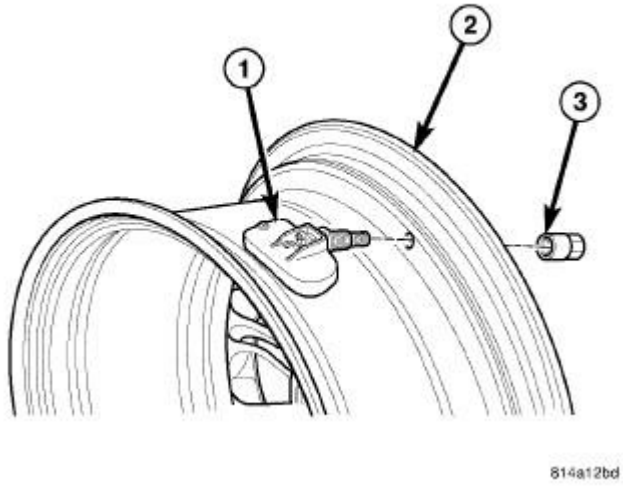


Fig. 25: Sensor Mounting To Wheel
Courtesy of CHRYSLER GROUP, LLC

4. Remove sensor nut (3) retaining sensor to wheel. While removing nut, hold pressure against

rear of metal valve stem to keep valve stem from pushing rearward, damaging antenna strap.

5. Remove sensor (1) from wheel (2).

INSTALLATION

NON SRT8

NOTE: If replacing tire pressure sensor, a new valve stem will be pre-mounted to the sensor as an assembly. Verify that the sensor is positioned properly before seating the valve stem. If replacing a valve stem only (using the existing tire pressure sensor), the new valve stem will include a new tire pressure sensor mounting screw. Always use a new mounting screw when attaching a sensor to a valve stem.

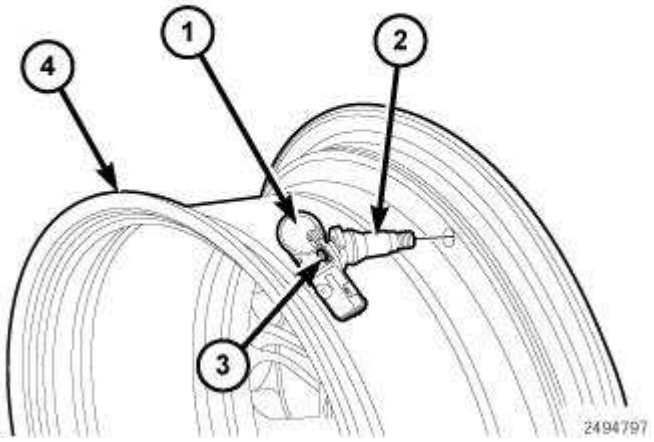


Fig. 26: Sensor Mounting To Wheel
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Any time a sensor is to be reinstalled in a wheel, a new valve stem assembly must be installed to ensure air tight sealing.

1. Wipe area clean around sensor/valve stem mounting hole in wheel (4). Make sure surface of wheel is not damaged.

NOTE: A new valve stem is pre-lubricated for proper installation with a standard tool.

NOTE: If replacing tire pressure sensor, a new valve stem will be pre-mounted to the sensor as an assembly. Verify that the sensor is positioned properly before seating the valve stem.

2. Insert valve stem (2) through wheel (4) and pull through to seat with standard valve stem installation tool.

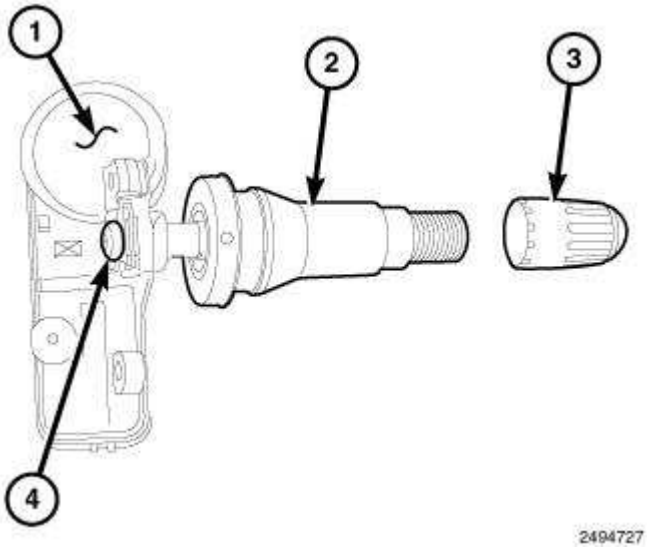


Fig. 27: Tire Pressure Monitoring Sensor Components
Courtesy of CHRYSLER GROUP, LLC

3. If replacing the valve stem (2) only (using the existing tire pressure sensor), verify that the flat sides of the brass extension on the bottom of the valve stem (2) are at a 90 degree angle with the wheel. Position the pressure sensor (1) over the brass extension, install the retainer screw (4) and tighten to 1.4 N.m (12 in. lbs.).
4. Mount tire on wheel following tire changer manufacturers instructions, paying special attention to the following to avoid damaging tire pressure sensor:

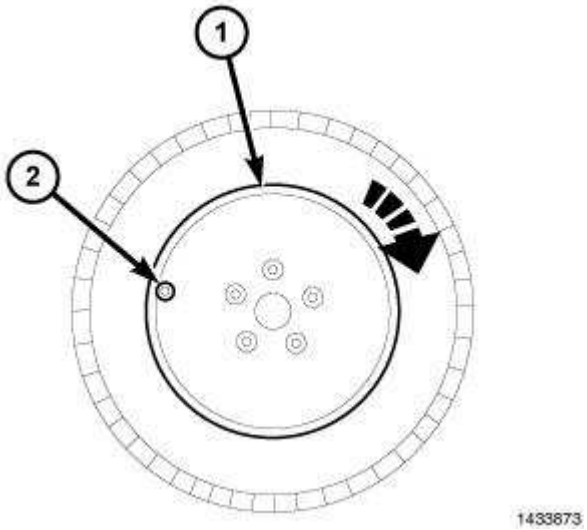


Fig. 28: Mounting Tire Using Rotating Wheel Machine
Courtesy of CHRYSLER GROUP, LLC

1 - HEAD OF CHANGER LOCATED HERE
2 - VALVE STEM

1.

Rotating Wheel Tire Changers - Once the wheel is mounted to the changer, position the sensor valve stem (2) approximately 280° from the head of the changer (located at 1) in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the outer and inner tire beads.

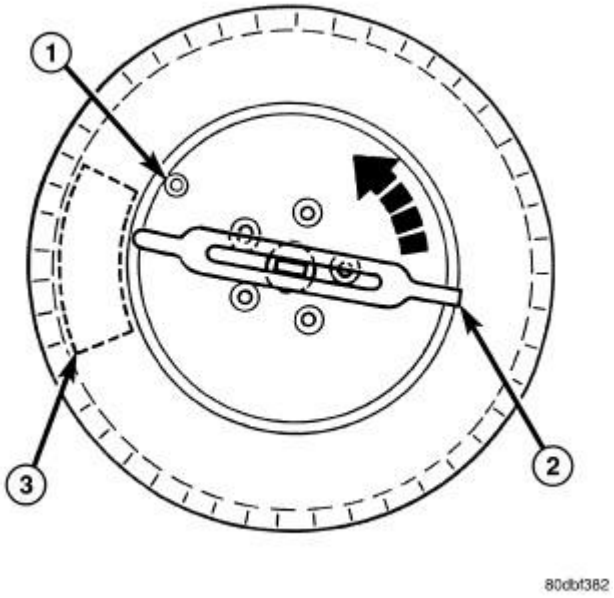


Fig. 29: Mounting Tire Using Rotating Tool Machine
Courtesy of CHRYSLER GROUP, LLC

1 - VALVE STEM
2 - INSTALLATION END OF MOUNTING/DISMOUNTING TOOL
3 - BEAD BREAKER (KEEP CLEAR OF SENSOR)

2.

Rotating Tool Tire Changers - Position the wheel on the changer so that the sensor valve stem (1) is located approximately 210° clockwise from the installation end of the mounting/dismounting tool (2) once the tool is mounted for tire installation. Make sure the sensor is clear of the lower bead breaker area (3) to avoid damaging the sensor when the breaker rises. Rotate the tool (2) in a counterclockwise direction to mount the tire. Use this procedure on both the outer and inner tire beads.

5. Adjust air pressure to that listed on Tire Inflation Pressure Label (Placard) provided with vehicle (usually applied to driver's side B-pillar). Make sure **original style** valve stem cap is securely installed to keep moisture out of sensor.

6. Install tire and wheel assembly on the vehicle.
7. Remove the support and lower the vehicle.
8. Perform one of the following to make the system learn the new sensor ID.
    1. Use the TPM-RKE Analyzer, 9936, with the Scan Tool to program the Tire Pressure Module (TPM) with the tire pressure sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .
    2. Once the vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 10 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .

NOTE: **If a sensor cannot be trained, refer to appropriate diagnostic information.**

SRT8

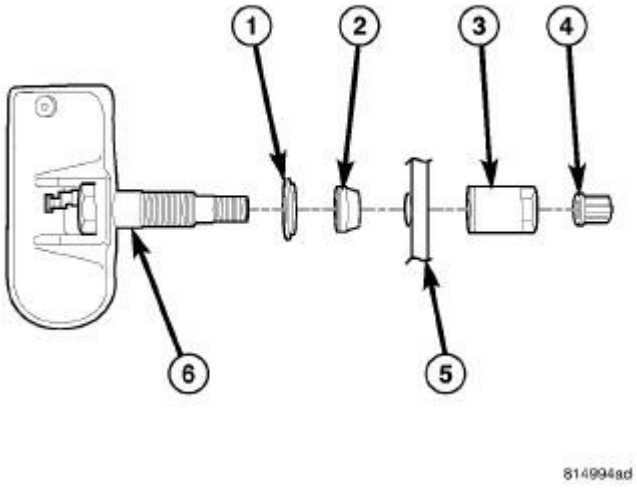


Fig. 30: Sensor Mounting - Exploded View
Courtesy of CHRYSLER GROUP, LLC

1 - METAL WASHER
2 - SEAL
3 - NUT (WITH PRESSED-IN WASHER)
4 - CAP (WITH SEAL)
5 - SECTIONAL CUTAWAY OF WHEEL
6 - TPM SENSOR

NOTE: **Before reinstalling an existing tire pressure sensor, replace seal (2) and metal washer (1) at base of sensor valve stem (6) to ensure proper sealing.**

1. Wipe area clean around sensor/valve stem mounting hole in wheel (5). Make sure surface of wheel is not damaged.

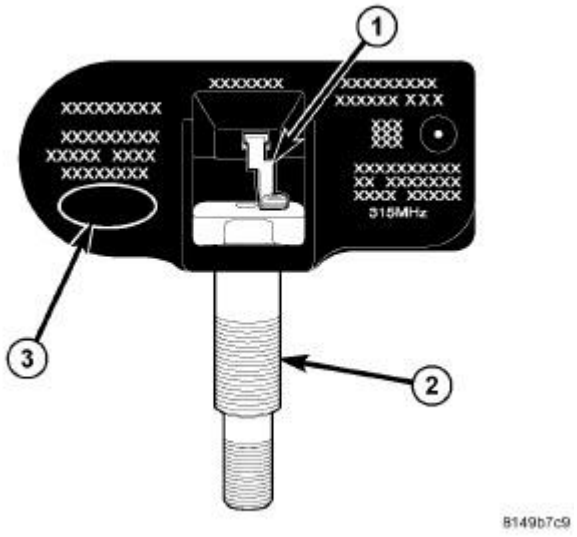


Fig. 31: Tire Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - ANTENNA STRAP
2 - VALVE STEM
3 - IDENTIFICATION INSIGNIA

CAUTION: To avoid damaging sensor antenna strap (1), if equipped, hold pressure against rear of metal valve stem (2) while sensor is inserted through wheel mounting hole and nut is installed.

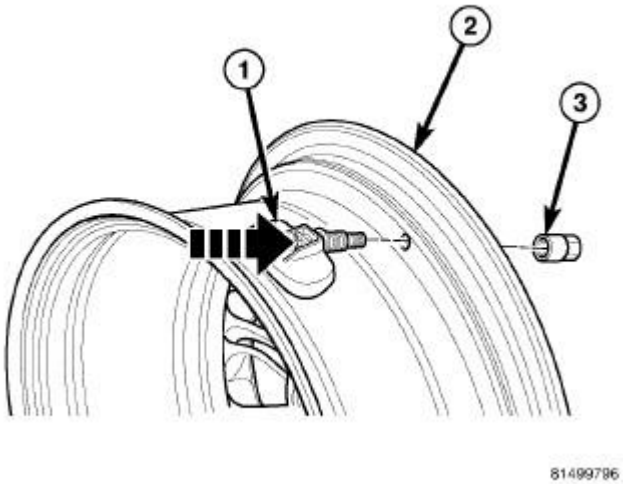


Fig. 32: Installing Sensor To Wheel
Courtesy of CHRYSLER GROUP, LLC

1 - TIRE PRESSURE SENSOR
2 - WHEEL
3 - NUT (WITH WASHER)

2. Insert sensor (1) through wheel (2) as shown in illustration keeping pressure against rear of metal valve stem (See Arrow**Fig. 32**). Potted side of sensor is to be positioned toward wheel. Do not attempt to mount sensor otherwise, damage may occur.
3. Install sensor nut (with pressed-in washer) (3) by hand.

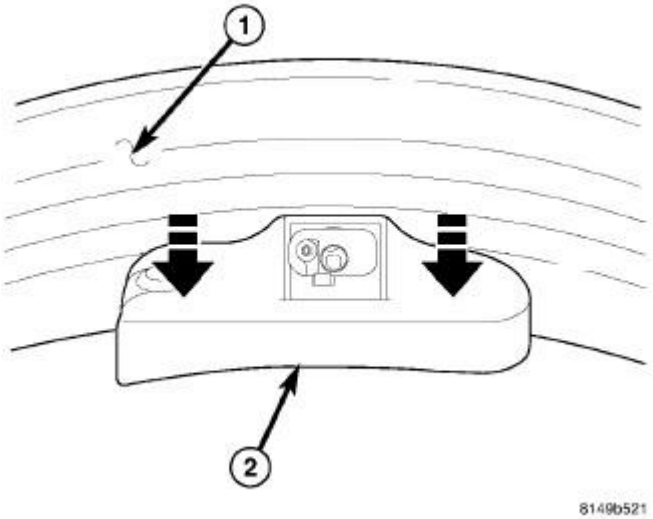


Fig. 33: Seat Sensor Against Wheel Interior

Courtesy of CHRYSLER GROUP, LLC

1 - WHEEL INTERIOR
2 - TIRE PRESSURE SENSOR

CAUTION: Over-torquing the sensor nut by as little as 12 N.m (106 in. lbs.) may result in sensor separation from the valve stem. Under this condition, the sensor may still function. However, the condition should be corrected immediately.

NOTE: Before tightening sensor nut, push downward on sensor housing (2) in an attempt to make it flush with interior contour of wheel (1).

4. While holding sensor in position, tighten sensor nut to 6 N.m (53 in. lbs.).
5. Mount tire on wheel following tire changer manufacturers instructions, paying special attention to the following to avoid damaging tire pressure sensor:

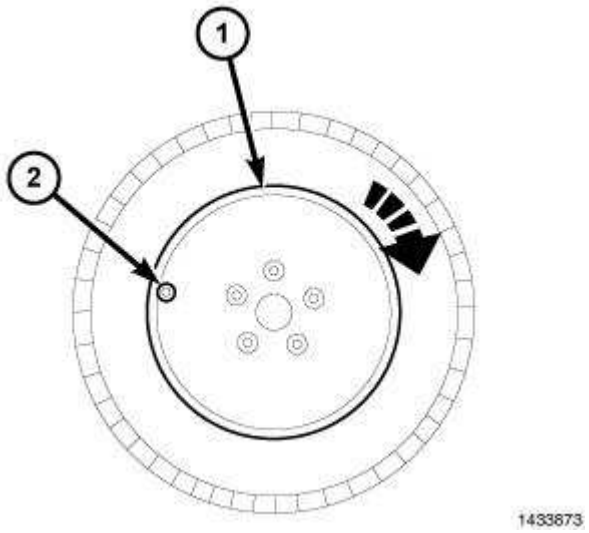


Fig. 34: Mounting Tire Using Rotating Wheel Machine
Courtesy of CHRYSLER GROUP, LLC

1 - HEAD OF CHANGER LOCATED HERE
2 - VALVE STEM

1.

Rotating Wheel Tire Changers - Once the wheel is mounted to the changer, position the sensor valve stem (2) approximately 280° from the head of the changer (located at 1) in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the outer and inner tire beads.

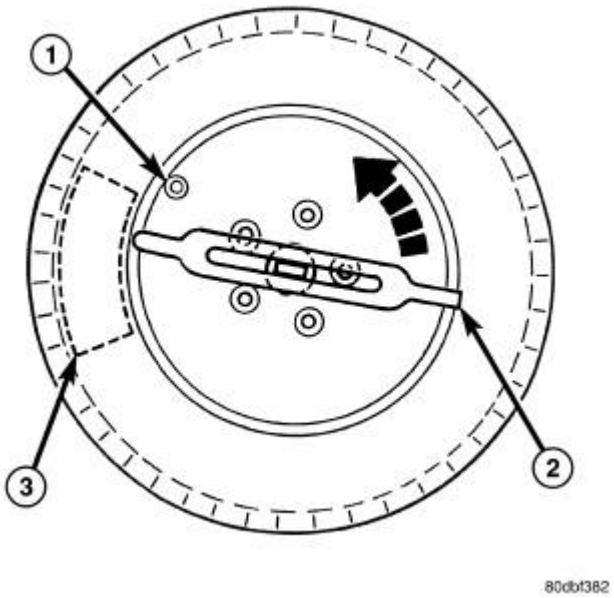


Fig. 35: Mounting Tire Using Rotating Tool Machine
Courtesy of CHRYSLER GROUP, LLC

1 - VALVE STEM
2 - INSTALLATION END OF MOUNTING/DISMOUNTING TOOL
3 - BEAD BREAKER (KEEP CLEAR OF SENSOR)

2. Rotating Tool Tire Changers - Position the wheel on the changer so that the sensor valve stem (1) is located approximately 210° clockwise from the installation end of the mounting/dismounting tool (2) once the tool is mounted for tire installation. Make sure the sensor is clear of the lower bead breaker area (3) to avoid damaging the sensor when the breaker rises. Rotate the tool (2) in a counterclockwise direction to mount the tire. Use this procedure on both the outer and inner tire beads.

6. Adjust air pressure to that listed on Tire Inflation Pressure Label (Placard) provided with vehicle (usually applied to driver's side B-pillar). Make sure **original style** valve stem cap is securely installed to keep moisture out of sensor.
7. Install tire and wheel assembly on vehicle.
8. Remove the support and lower the vehicle.
9. Perform one of the following to make the system learn the new sensor ID.
    1. Use the TPM-RKE Analyzer, 9936, with the Scan Tool to program the Tire Pressure Module (TPM) with the tire pressure sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .
    2. Once the vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 10 minutes while maintaining a continuous speed above 15 mph (24 km/h).

During this time, the system will learn the new sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .

NOTE: If a sensor cannot be trained, refer to appropriate diagnostic information.

TIRES

DESCRIPTION

TIRE

Tires are designed and engineered for each specific vehicle. They provide the best overall performance for normal operation. The ride and handling characteristics match the vehicle's requirements. With proper care they will give excellent reliability, traction, skid resistance, and tread life.

Driving habits have more effect on tire life than any other factor. Careful drivers will obtain, in most cases, much greater mileage than severe use or careless drivers. A few of the driving habits which will shorten the life of any tire are:

- Rapid acceleration
- Severe application of brakes
- High-speed driving
- Taking turns at excessive speeds
- Striking curbs and other obstacles
- Operating vehicle with over or under inflated tire pressures

Radial ply tires are more prone to irregular tread wear. It is important to follow the tire rotation interval shown in the information on Tire Rotation. This will help to achieve a greater tread-life potential.

TIRE IDENTIFICATION

Tire type, size, load index and speed rating are encoded in the letters and numbers imprinted on the side wall of the tire. Refer to the Tire Identification chart to decipher the code. For example purposes, the tire size P225/60 R 16 97 T is used in the chart. An All Season type tire will also have either M + S, M AND S, or M - S (indicating mud and snow traction) imprinted on the side wall. An Extra or Light Load marking "XL" or "LL" may also be listed on the sidewall. The absence of an "XL" or "LL" marking infers a standard load tire.

TIRE IDENTIFICATION

Reading Tire Codes		
P	TIRE TYPE (Not present on all tires)	P - Passenger
		T - Temporary
		C - Commercial
		LT - Light Truck

225	SECTIONAL WIDTH	SHOWN IN MILLIMETERS
60	ASPECT RATIO	SHOWN IN PERCENTAGE* ()
R	CONSTRUCTION TYPE	R - RADIAL
		B - BIAS BELTED
		D - DIAGONAL (BIAS)
16	WHEEL DIAMETER	SHOWN IN INCHES
97	LOAD INDEX	** ()
T	SPEED RATING	** ()

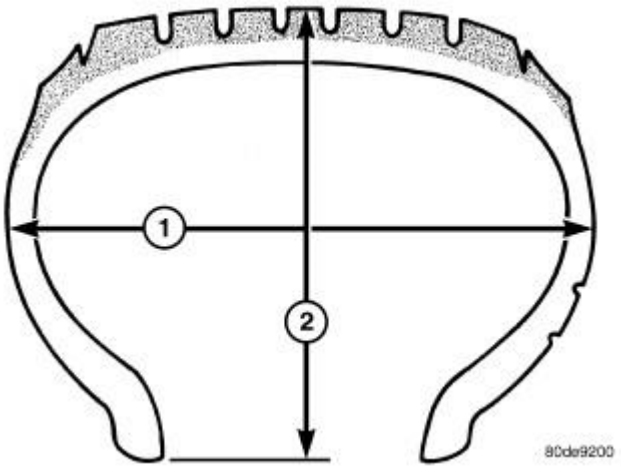


Fig. 36: Tire Aspect Ratio
Courtesy of CHRYSLER GROUP, LLC

1 - SECTIONAL WIDTH
2 - SECTIONAL HEIGHT

NOTE: **() * Height (2) ÷ Width (1) = Aspect Ratio.**

NOTE: **() ** Consult the tire manufacturer regarding any questions on tire specifications or capabilities.**

TIRE CHAINS

Refer to the owners manual supplied with the vehicle to determine whether the use of tire chains is permitted on this vehicle.

REPLACEMENT TIRES

WARNING: **Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure.**

WARNING: In order to maintain the speed capability of the vehicle, replacement tires must have speed ratings equal to or higher than those fitted to the vehicle as original equipment. If tires with lower speed ratings are fitted, the vehicle's handling may be affected and the speed capability of the vehicle may be lowered to the maximum speed capability of the replacement tires. To avoid an accident resulting in severe or fatal injury, consult the tire manufacturer in regards to maximum speed ratings.

It is recommended that tires equivalent to the original equipment tires be used when replacement is needed.

Failure to use equivalent replacement tires may adversely affect the safety and handling of the vehicle.

The original equipment tires provide a proper combination of many characteristics such as:

- Ride
- Noise
- Handling
- Durability
- Tread life
- Traction
- Rolling resistance
- Speed capability

The use of tires smaller than the minimum tire size approved for the vehicle can result in tire overloading and failure.

Use tires that have the approved load rating for the vehicle and never overload them. Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure and loss of vehicle control.

The use of oversize tires may cause interference with vehicle components. Under extremes of suspension and steering travel, interference with vehicle components may cause tire damage.

SPARE TIRE

A compact (temporary) spare tire and wheel assembly is standard equipment on most models of this vehicle. A full-size spare is not available on most models.

Select Export vehicles are equipped with the TIREFIT tire repair kit as standard equipment in place of a spare tire. It is to be used to repair small punctures in the tire as necessary. A compact spare tire is optional on select Export Vehicles. For additional information, refer to the Owners Manual.

The spare tire and wheel diameters and wheel offsets match those of the road wheels on the vehicle.

The compact (temporary) spare tire is designed for emergency use only. The original tire should be repaired or replaced at the first opportunity, then reinstalled. Do not exceed speeds of 80 km/h (50 mph) when using the compact (temporary) spare tire and wheel assembly. Refer to the Owner's Manual for complete details.

DIAGNOSIS AND TESTING

TIRE NOISE

Unusual tire noise can be associated with tire and wheel vibration or irregular tire wear. For vibration issues, refer to **DIAGNOSIS AND TESTING**. For irregular tire wear issues, refer to **TIRES, DIAGNOSIS AND TESTING**.

TIRE/VEHICLE LEAD

Refer to **WHEEL ALIGNMENT, DIAGNOSIS AND TESTING** .

TIRE WEAR PATTERNS

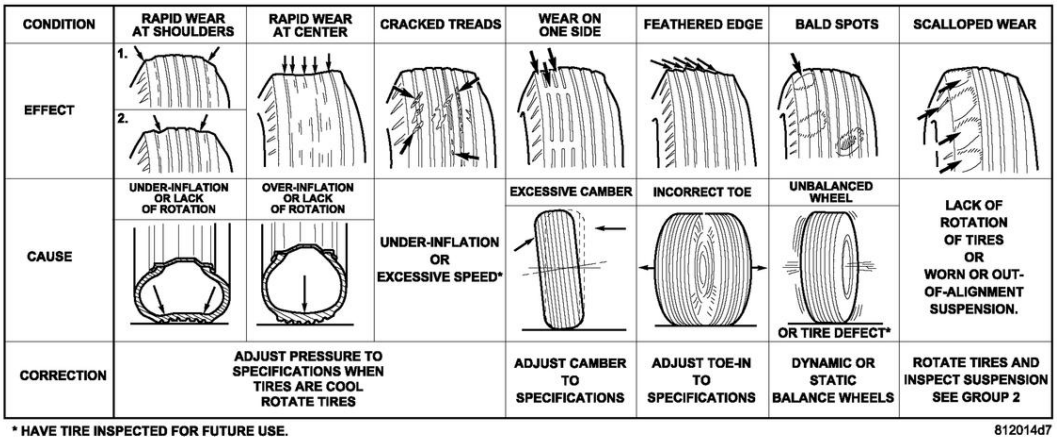


Fig. 37: Identifying Tire Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

Under inflation will cause wear on the shoulders of tire. Over inflation will cause wear at the center of tire.

Excessive camber causes the tire to run at an angle to the road. One side of tread is then worn more than the other.

Excessive toe-in or toe-out causes wear on the tread edges and a feathered effect across the tread.

TREAD WEAR INDICATORS

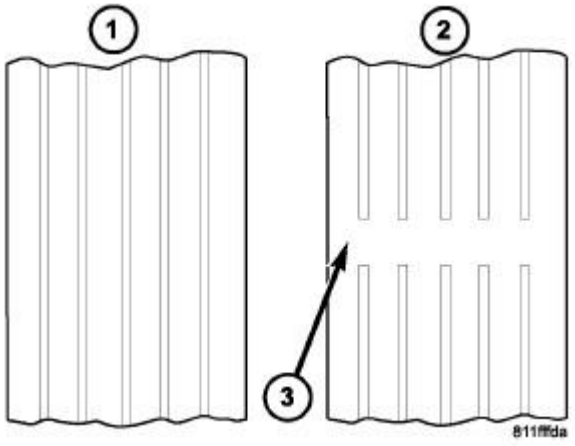


Fig. 38: Identifying Tread Wear Indicators
Courtesy of CHRYSLER GROUP, LLC

Tread wear indicators are molded into the bottom of the tread grooves. When tread depth is 1.6 mm (1/16 in.), the tread wear indicators will appear as a 13 mm (1/2 in.) band (3).

Tire replacement is necessary when indicators appear in two or more grooves or if localized balding occurs.

STANDARD PROCEDURE

TIRE INFLATION PRESSURES

The specified tire pressures have been chosen to provide safe operation, vehicle stability, and a smooth ride. The proper tire pressure specification can be found on the Tire And Loading Information Label provided with the vehicle (usually on the driver's door opening or B-pillar).

A quality air pressure gauge is recommended to check tire air pressure. Tire pressure should be checked cold once per month. Check tire pressure more frequently when the weather temperature varies widely. Tire pressure will decrease when the outdoor temperature drops. After checking the air pressure, replace valve cap finger tight.

Inflation pressures specified on the Tire Inflation Pressure Label are always the cold inflation pressure of the tire. Cold inflation pressure is obtained after the vehicle has not been operated for at least 3 hours, or the vehicle is driven less than one mile after being inoperative for 3 hours. Tire inflation pressures may increase from 2 to 6 pounds per square inch (psi) during operation. Do not reduce this normal pressure buildup.

Improper inflation can cause:

- Uneven wear patterns
- Reduced tread life
- Reduced fuel economy

- Unsatisfactory ride
- The vehicle to drift.

WARNING: Over or under inflated tires can affect vehicle handling. The tire can fail suddenly, resulting in loss of vehicle control.

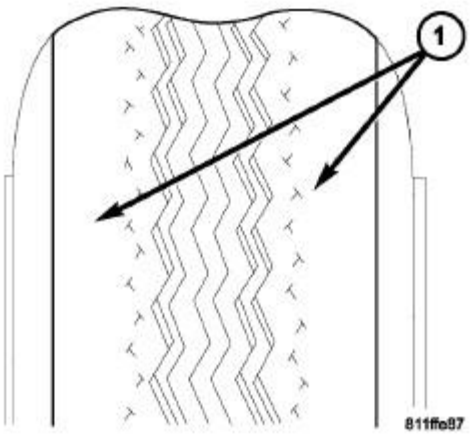


Fig. 39: Under Inflation
Courtesy of CHRYSLER GROUP, LLC

Under inflation causes rapid shoulder wear, tire flexing, and can result in tire failure (1).

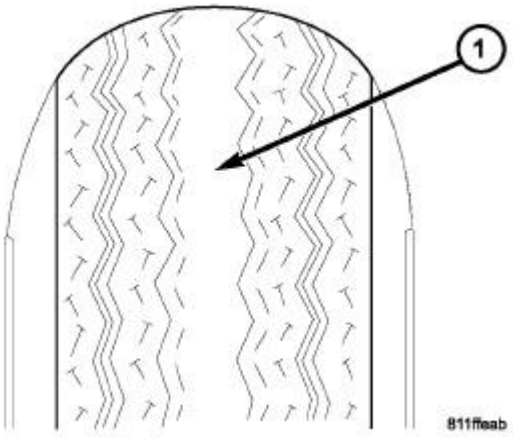


Fig. 40: Identifying Over Inflated Tire
Courtesy of CHRYSLER GROUP, LLC

Over inflation causes rapid center wear and loss of the tire's ability to cushion shocks (1).

TIRE LEAK REPAIRING

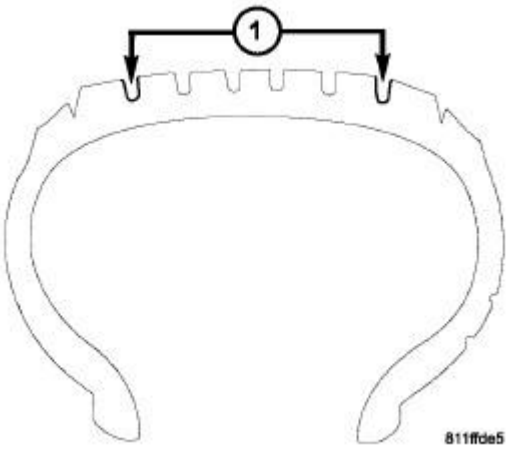


Fig. 41: Identifying Tire Repair Area
Courtesy of CHRYSLER GROUP, LLC

For proper repairing, a radial tire must be removed from the wheel. Repairs should only be made if the defect, or puncture, is in the tread area (1). The tire should be replaced if the puncture is located in the sidewall.

Deflate tire completely before attempting to dismount the tire from the wheel. **Use a lubricant such as a mild soap solution when dismounting or mounting tire.** Use tools free of burrs or sharp edges which could damage the tire or wheel rim.

Before mounting tire on wheel, make sure all rust is removed from the rim bead and repaint if necessary.

Install wheel on vehicle. Refer to **INSTALLATION**.

WHEELS

DESCRIPTION

WHEEL

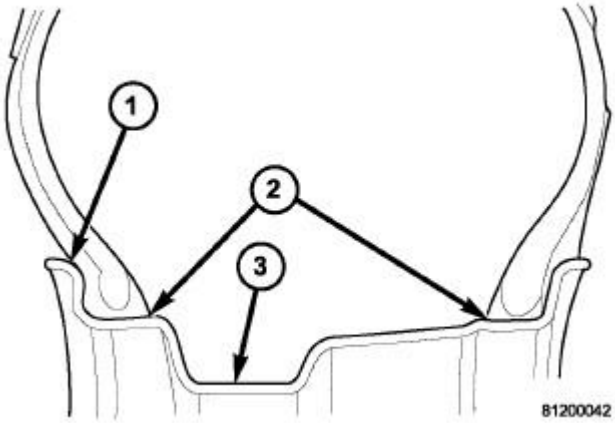


Fig. 42: Identifying Wheel/Rim Design
Courtesy of CHRYSLER GROUP, LLC

All vehicles use either steel or cast aluminum drop center wheels. The original equipment wheels are designed for proper operation at all loads up to the specified maximum vehicle capacity.

Every wheel has raised sections between the rim flanges (1) and drop well (3) called safety humps (2). In case of air loss, these raised sections help hold the tire in position on the wheel until the vehicle can be brought to a safe stop. When being installed on the wheel, initial inflation of the tire forces the tire bead over these raised sections into place.

The wheels used on All-Wheel-Drive (AWD) vehicles have a shallower dish (larger offset) than Rear-Wheel-Drive (RWD) wheels to accommodate the AWD suspension geometry and half shaft package, while maintaining the same track as RWD vehicles.

The wheel studs and nuts are designed for specific wheel applications and must be replaced with equivalent parts. Do not use replacement parts of lesser quality or of a substitute design. All aluminum and steel wheels have wheel stud nuts with an enlarged nose. This enlarged nose is necessary to ensure proper retention of the wheels.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WHEEL INSPECTION

Inspect wheels for:

- Excessive runout
- Dents, cracks or irregular bends
- Damaged wheel stud (lug) holes
- Air Leaks

NOTE: Do not attempt to repair a wheel by hammering, heating or welding.

If a wheel is damaged, an original equipment replacement wheel should be used. When obtaining replacement wheels, they should be equivalent in load carrying capacity. The diameter, width, offset, pilot hole and bolt circle of the wheel should be the same as the original wheel.

WARNING: Failure to use equivalent replacement wheels may adversely affect the safety and handling of the vehicle.

WARNING: Replacement with used wheels is not recommended. The service history of the wheel may have included severe treatment or very high mileage. The rim could fail without warning.

WARNING: Chrysler LLC does not recommend that customers use "reconditioned" wheels (wheels that have been damaged and repaired) because they can result in a sudden catastrophic wheel failure which could cause loss of control and result in injury or death. For clarification:

- **Cosmetic refinishing for the purpose of repairing a superficial flaw is an acceptable procedure providing it is limited to paint or clear coat only, the wheel is not modified in any way, and there is no exposure to paint curing heat over 200 degrees Fahrenheit (93 degrees Celsius).**
- **Damaged wheels are those which have been bent, broken, cracked or sustained some other physical damage which may have compromised the wheel structure.**
- **Repaired indicates that the wheel has been modified through bending, welding, heating, straightening, or material removal to rectify damage.**
- **Re-plating of chrome plated wheels is not an acceptable procedure nor is chrome plating of original equipment painted or polished wheels, as this may alter mechanical properties and affect fatigue life.**

SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Wheel Mounting (Lug) Nut Hex Size	21 mm
Wheel Mounting Stud Size	M14 x 1.5 mm

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
TPM Sensor Mounting Nut	8	-	71

Valve Core	0.5	-	4
Wheel Mounting (Lug) Nut	150	110	-

CLEANING

CLEANING

All wheels and wheel trim, especially aluminum and chrome plated, should be cleaned regularly using mild soap and water to maintain their luster and to prevent corrosion. Wash them with the same soap solution recommended for the body of the vehicle.

When cleaning extremely dirty wheels, care must be taken in the selection of tire and wheel cleaning chemicals and equipment to prevent damage to the wheels. Mopar® Wheel Treatment or Mopar® Chrome Cleaner is recommended. Any of the "DO NOT USE" items listed below can damage wheels and wheel trim.

DO NOT USE:

- Any abrasive cleaner
- Any abrasive cleaning pad (such as steel wool) or abrasive brush
- Any cleaner that contains an acid which can react with and discolor the chrome surface. **Many wheel cleaners contain acids that can harm the wheel surface.**
- Oven cleaner
- A car wash that uses carbide-tipped wheel cleaning brushes or acidic solutions.

STUD, WHEEL, FRONT

REMOVAL

REMOVAL

NOTE: Before proceeding. Refer to CAUTION and WARNING .

CAUTION: Wheel mounting studs MUST NOT be hammered out of hub flange of hub and bearing assembly. If a stud is removed by hammering it out, damage to hub and bearing assembly will occur leading to premature bearing failure.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove front wheel and tire assembly. Refer to **REMOVAL**.
3. Access and remove front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

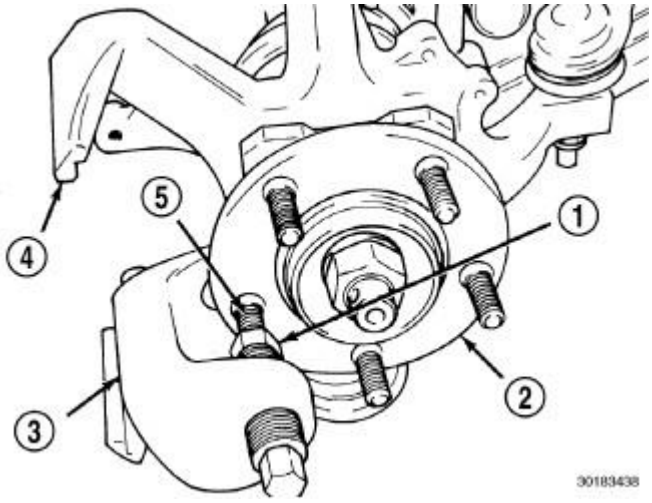


Fig. 43: Wheel Stud Removal (Typical)
Courtesy of CHRYSLER GROUP, LLC

1 - WHEEL MOUNTING (LUG) NUT
2 - HUB AND BEARING ASSEMBLY
3 - SPECIAL TOOL C-4150A
4 - STEERING KNUCKLE
5 - WHEEL STUD

4. On wheel mounting stud to be removed, install a wheel mounting (lug) nut (1) far enough so the threads on the stud are even with end of nut. Install Remover (special tool #C-4150A, Press, Ball Joint) (3), on hub and bearing flange and wheel stud (5).
5. Tighten screw on Remover, pushing wheel stud (5) out of hub flange. Once shoulder of wheel stud is past flange, remove special tool. Remove nut from stud and remove stud from hub flange.

INSTALLATION

INSTALLATION

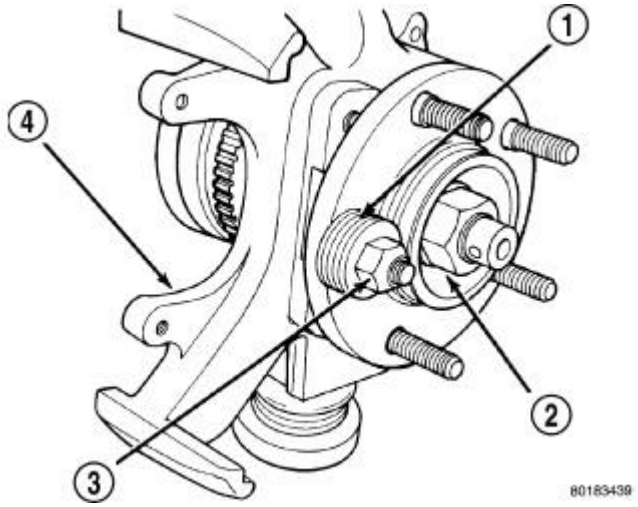


Fig. 44: Installing Wheel Stud (Typical)
Courtesy of CHRYSLER GROUP, LLC

1 - WASHERS
2 - HUB AND BEARING ASSEMBLY
3 - WHEEL MOUNTING (LUG) NUT
4 - STEERING KNUCKLE

1. Install replacement wheel stud into flange of hub and bearing from rear. Install stack of washers (1) on wheel stud, then install a standard type wheel mounting (lug) nut (3) on stud with flat side of lug nut against washers.
2. Tighten nut (3), pulling wheel stud into hub flange. Once head of stud is fully seated against rear of hub flange, remove nut and washers from stud.
3. Install brake rotor and caliper. Refer to **ROTOR, BRAKE, INSTALLATION** .
4. Install wheel and tire assembly. Refer to **INSTALLATION**.
5. Lower vehicle.
6. Road test vehicle to ensure proper operation of the brakes.

STUD, WHEEL, REAR

REMOVAL

REMOVAL

NOTE: Before proceeding. Refer to CAUTION and WARNING .

CAUTION: Wheel mounting studs MUST NOT be hammered out of hub flange of hub and bearing assembly. If a stud is removed by hammering it out, damage to hub and bearing assembly will occur leading to premature bearing failure.

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove rear wheel and tire assembly. Refer to **REMOVAL**.
3. Access and remove rear brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

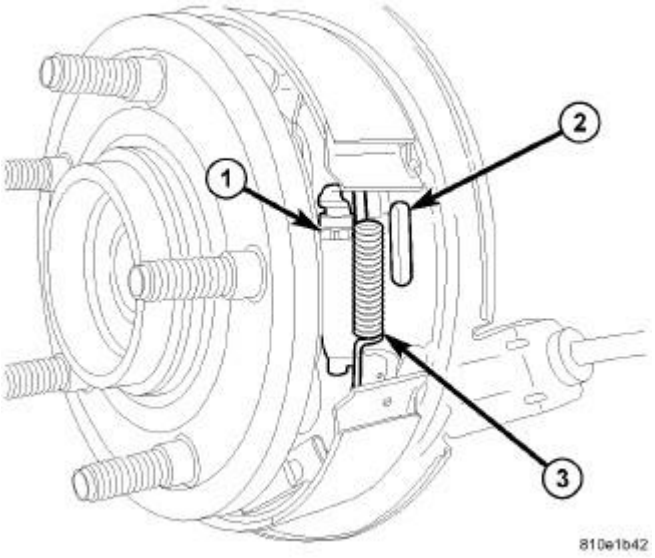


Fig. 45: Shoe Adjuster & Spring
Courtesy of CHRYSLER GROUP, LLC

1 - ADJUSTER STAR WHEEL
2 - ADJUSTER ACCESS HOLE IN SUPPORT PLATE
3 - SPRING

4. Back off shoe adjustment until adjuster (1) threads bottom.
5. Using appropriate tools, remove spring (3) at adjuster.
6. Pull upward on upper shoe near adjuster to provide enough slack to remove adjuster from shoes, then remove adjuster (1).

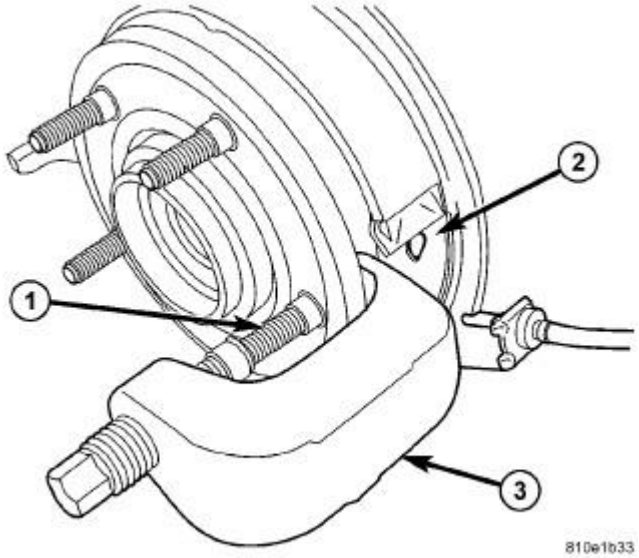


Fig. 46: Positioned For Stud Removal
Courtesy of CHRYSLER GROUP, LLC

1 - STUD
2 - OPEN AREA WHERE ADJUSTER WAS REMOVED
3 - REMOVER C-4150A

7. Install Remover (special tool #C-4150A, Press, Ball Joint) (3), on hub and bearing flange and wheel stud (1).
8. Tighten Remover forcing screw, pushing wheel stud (1) out of hub and bearing flange. Remove tool (3).
9. Remove stud from rear of hub flange. It may be necessary to rock hub flange back and forth to ease stud removal.

INSTALLATION

INSTALLATION

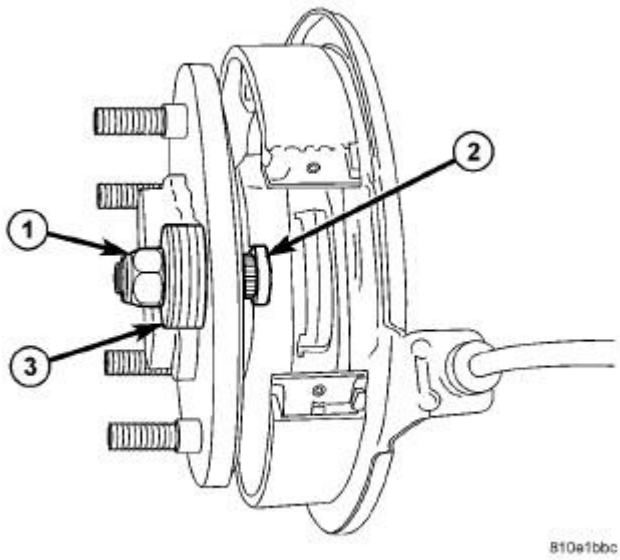


Fig. 47: Nut & Washers Installed On Stud
Courtesy of CHRYSLER GROUP, LLC

1 - STANDARD WHEEL NUT INSTALLED FLAT SIDE FIRST
2 - STUD
3 - STACK OF WASHERS

1. Install replacement wheel stud into flange of hub and bearing from rear (2). Install a stack of washers (3) (approximately 5, depending on thickness) over stud, then install a standard wheel mounting (lug) nut (1) on stud with flat side of nut against washers.
2. Tighten wheel mounting nut (1), pulling wheel stud into flange of hub and bearing. Once head of stud (2) is fully seated against rear of hub flange, remove nut and washers from wheel stud.

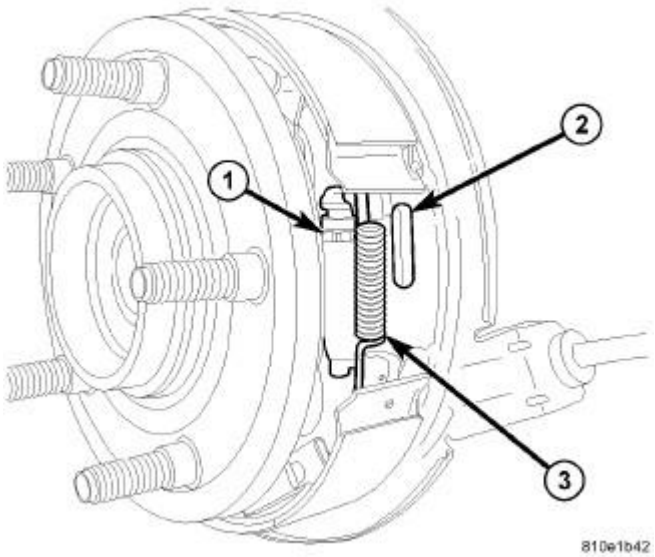


Fig. 48: Shoe Adjuster & Spring
Courtesy of CHRYSLER GROUP, LLC

1 - ADJUSTER STAR WHEEL
2 - ADJUSTER ACCESS HOLE IN SUPPORT PLATE
3 - SPRING

3. Install parking brake shoe adjuster (1) between upper and lower parking brake shoes. Position end of adjuster with star wheel upward. Once in place, slide upper shoe downward against adjuster mounting slot, taking up any slack between two pieces.
4. Using appropriate tools, install spring (3) at adjuster.

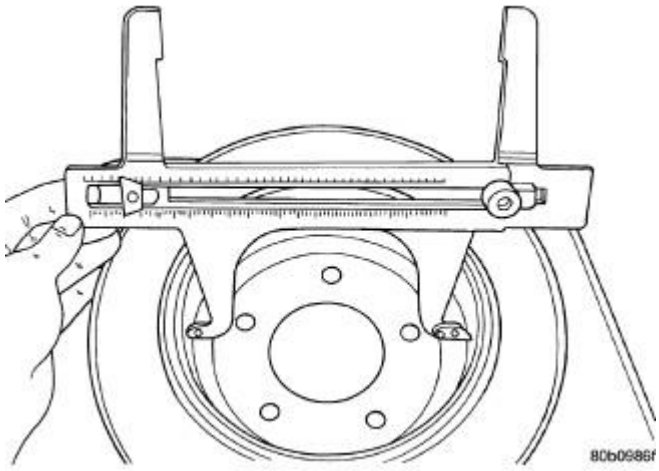


Fig. 49: Measuring Parking Brake Drum Diameter
Courtesy of CHRYSLER GROUP, LLC

NOTE: When measuring brake drum diameter, diameter should be measured in center of shoe contact surface area.

5. Using Brake Shoe Gauge (special tool #C-3919, Gauge, Brake Shoes), or equivalent, measure inside diameter of parking brake drum portion of rotor.

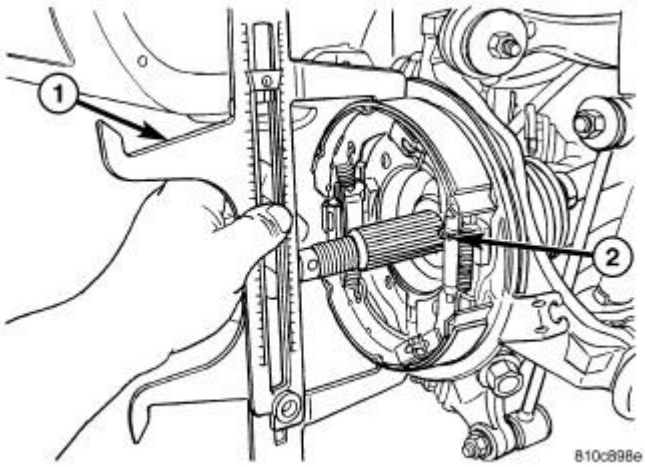


Fig. 50: Measuring Parking Brake Shoes
Courtesy of CHRYSLER GROUP, LLC

1 - BRAKE SHOE GAUGE
2 - ADJUSTER STAR WHEEL

6. Place Gauge (1) over parking brake shoes at widest point.
7. Using adjuster star wheel (2), adjust parking brake shoes until linings on both park brake shoes just touch jaws on gauge. This will give a good preliminary adjustment of parking brake shoes, before a final adjustment is made at end of this procedure.
8. Install brake rotor and components removed to access it. Refer to **ROTOR, BRAKE, INSTALLATION** .
9. Install wheel and tire assembly. Refer to **INSTALLATION**.
10. Adjust parking brake shoes. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .
11. Lower vehicle.
12. Road test vehicle to ensure proper operation of the brakes.

TIRE PRESSURE MONITOR SYSTEM

Chry - Chrysler - 300 - 2010-13

DESCRIPTION & OPERATION

NOTE: If a tire pressure sensor has been replaced, the tire pressure sensors must be retrained. See RESET PROCEDURES.

TIRE PRESSURE MONITOR (TPM) SYSTEM

The Tire Pressure Monitoring (TPM) system monitors air pressure in the four road tires (excludes spare). Pressure in the spare tire is not monitored. There are two tire pressure monitoring systems available, a base system and a premium system. The base system does not specify how many tires are low or where they are located. The premium system does so.

The Base TPM system consists of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole, a central receiver module Wireless Ignition Node (WIN), and an indicator lamp.

The Premium TPM system consists of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole, a TPM module, and a receiver circuit mounted in the right rear wheel well.

The TPM module decodes the RF signals transmitted by each of the vehicle's tire pressure sensors. The decoded information is used to determine if "warning" or "fault" conditions exist within the TPM system.

Upon detection of a warning or fault condition, the WIN will send a request to the module that controls the indicator lamp (and the text display if equipped with the Premium system) via the vehicle bus system to illuminate or flash the indicator lamp. Also, upon detection of a warning or fault condition, the electronic display will send a request to sound the "chime". The WIN will store all warning and fault conditions, placard pressure values and low-pressure threshold values (lamp ON and OFF) in memory that can be accessed through diagnostic communication. If new sensors are introduced to the vehicle, the data stored for the sensor being replaced will be deleted.

The WIN/TPM module will store all wheel sensor IDs and locations and faults in memory that can be accessed through diagnostic communication. All other data values transmitted from each active wheel sensor (not the spare tire) shall be stored in the WIN memory. After a sensor has been replaced, the WIN automatically learns and stores the sensor ID's while driving continuously above 15 mph (24 km/h) for 10 minutes. The learning sequence will initiate when the vehicle has been stopped for more than 20 minutes.

IMPORTANT: Under the following conditions, the system may not function properly:

- **The areas, facilities or devices that use similar radio wave frequencies are**

located in the vicinity of the vehicle.

- **A radio device of similar frequency is used near the vehicle.**
- **Installing some form of aftermarket window tinting that affects radio wave signals**
- **A lot of snow or ice is stuck to the vehicle, especially around the wheels or wheel housings.**
- **Using tire chains on the vehicle**
- **The battery of the sensor has been depleted (approximate 10-year life span).**
- **A spare tire is installed.**
- **A tire without tire pressure sensor is used.**
- **Wheels other than manufacturer factory wheels are used.**

TIRE PRESSURE MONITOR WARNING INDICATORS

The TPM warning light will illuminate in the instrument cluster, a "LOW TIRE" message will be displayed and a chime will sound when tire pressure is low in one or more of the four active road tires. In addition, the EVIC (if equipped) will display a "LOW TIRE" message and a graphic showing the pressure values of each tire with the low tire pressure values flashing. Once the system receives the updated tire pressures, the system will automatically update and the TPM warning light and "LOW TIRE" message will turn offupdate, the graphic display in the EVIC will stop flashing. The vehicle may need to be driven for up to 20 minutes above 15 mph (24 km/h) in order for the TPMS to receive this information.

If a system fault is detected, the TPM warning light will flash on and off for 75 seconds and then remain on solid. In addition, the EVIC (if equipped) will display a "SERVICE TPM SYSTEM" message for a minimum of five seconds and then display dashes (- -) in place of the pressure value to indicate which sensor is not being received. The system fault will also sound a chime. If the ignition switch is cycled, this sequence will repeat, providing the system fault still exists. Mounting the compact spare will also cause the system to indicate a system fault. The TPM warning light (and EVIC message) will turn off when the fault condition no longer exists.

The EVIC will also display a "SERVICE TPM SYSTEM" message for a minimum of five seconds when a system fault related to an incorrect sensor location fault is detected. In this case, the "SERVICE TPM SYSTEM" message is then followed with a graphic display with pressure values still shown. This indicates that the pressure values are still being received from the TPM sensors but they may not be located in the correct vehicle position. The system still needs to be serviced as long as the "SERVICE TPM SYSTEM" message is displayed.

RESET PROCEDURES

NOTE: **If a tire pressure sensor has been replaced, the tire pressure sensors must be retrained.**

The TPM Telltale Light will illuminate in the instrument cluster, a LOW TIRE message will be displayed and a chime will sound when tire pressure is low in one or more of the four active road tires. Iinflate each tire to the vehicles recommended pressure value. Once the system receives the updated tire pressures, the system will automatically update and the TPM Telltale Light and the LOW TIRE message will turn off. The vehicle may need to be driven for up to 20 minutes above 15 mph (24 km/h) in order for the TPMS to receive this information.

TIRE PRESSURE SENSOR RETRAINING

Using a RF signal, each sensor transmits tire pressure data approximately once every minute. Each sensor's (transmitter) broadcast is uniquely coded so that the WIN/TPM module can monitor the state of each of the sensors on the 4 rotating road wheels. The WIN/TPM module automatically learns and stores the sensor's ID while driving after a sensor has been replaced. There is no formal retraining procedure necessary.

After the vehicle has remained stationary for 20 minutes, drive vehicle for a minimum of 20 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

DISMOUNTING/MOUNTING PROCEDURES

CAUTION: The tire should be dismounted from the wheel using the tire changer manufacturer's instructions. Use the following information to avoid damage during the dismounting/mounting procedures.

CAUTION: The Tire Pressure Monitoring (TPM) system has been optimized for the original equipment tires and wheels. TPM system pressures have been established for the tire size equipped on the vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, or style. Aftermarket wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with TPM, as damage to the sensors may result.

NOTE: If a tire pressure sensor has been replaced, the tire pressure sensors must be retrained. See RESET PROCEDURES.

NOTE: Wheels and tires are match-mounted at the factory. Before dismounting a tire from its wheel, a reference mark should be placed on the tire at the valve stem location to ensure that it is remounted in the original position on the wheel. For match-mounting procedures, refer to appropriate manufacturer service information.

NOTE: Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire

pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure (placard pressure). This is defined as the tire pressure after a vehicle has not been driven for more than 3 hours (and in outside ambient temperature). The tire pressure will also increase as the vehicle is driven this is normal and there should be no adjustment for this increased pressure.

NOTE: If tires require leak-testing, a water test may be used to check for a leak around the sensor, as long as any water at the valve core is removed when procedure is completed. Water can be expelled from the core area by pushing in on the core for several seconds, allowing escaping air to drive out any moisture. Reinflate tire as necessary. Install original valve stem cap.

TIRE PRESSURE SENSOR (EXCEPT SRT8)

CAUTION: Although additional sensors operating at 433 MHz are available and are used in other applications, they are not interchangeable. Always make sure the correct sensor is being used and be sure to replace the sensor with the correct part number.

CAUTION: The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Retain this valve stem cap for reuse. Do not substitute a regular valve stem cap in its place.

CAUTION: Do not attempt to install a tire pressure sensor in an aftermarket wheel. Use tire pressure sensors in original style factory wheels only. If aftermarket wheels are installed, and therefore do not contain tire pressure sensors, the system will not function properly and the driver will be continuously notified of a system malfunction.

CAUTION: After inspecting or adjusting the tire pressure always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Sensor.

CAUTION: The valve stem used on this vehicle is made of aluminum and the core is nickel plated brass. The original valve stem core must be reinstalled and not substituted with a valve stem core made of a different material. This is required to prevent corrosion in the valve stem caused by the different metals.

CAUTION: DO NOT reuse sensor-to-wheel grommet. Always use a new grommet when installing a pressure sensor and properly torque the sensor nut.

Removal

1. Remove tire and wheel assembly from vehicle.
2. Dismount tire from wheel following tire changer manufacturer's instructions while paying special attention to the following to avoid damaging the pressure sensor:
    - When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor. That includes both front and rear beads of the tire.
    - When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280° +/- 10° from the valve stem, then proceed to dismount the tire from the wheel. Use this process on both the upper and lower tire beads.
3. Remove the sensor to valve stem retainer screw (4) and then remove the sensor (1) from the valve stem (2). See **Fig. 2**.
4. Remove valve stem from wheel. See **Fig. 2**.

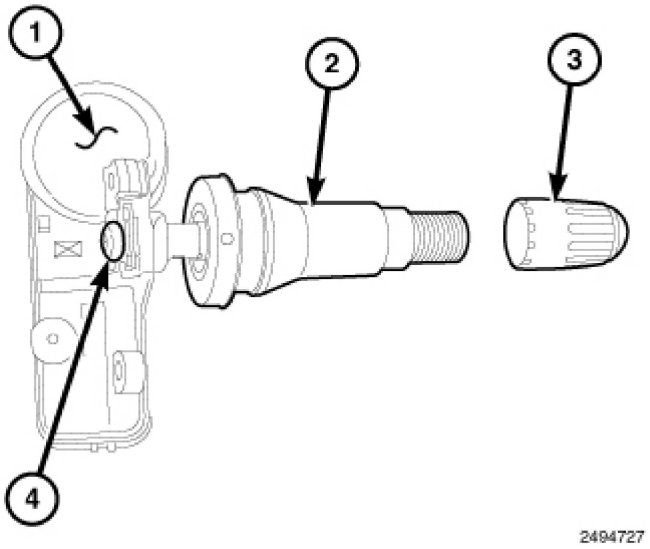


Fig. 1: Identifying Tire Pressure Sensor Components
Courtesy of CHRYSLER CORP.

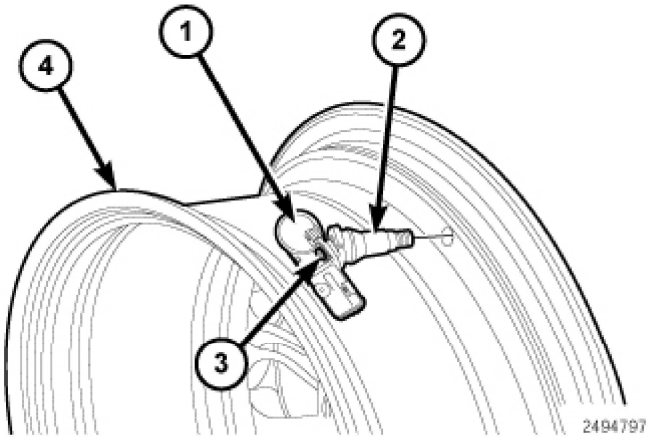


Fig. 2: Removing & Installing Tire Pressure Sensor
Courtesy of CHRYSLER CORP.

Installation

NOTE: If replacing the tire pressure sensor, a new valve stem may be pre-mounted to the sensor as an assembly. When reusing the tire pressure sensor the new valve stem may come with a mounting screw.

1. Wipe area clean around sensor/valve stem mounting hole in wheel. Make sure surface of wheel is not damaged.
2. Insert the new valve stem into the rim and pull through with a standard valve stem installation tool.
3. If replacing the valve stem only, verify that the flat sides of the brass extension on the bottom of the valve stem are at a 90 degree angle with the wheel. See **Fig. 1**
4. Position the pressure sensor over the brass extension.
5. Install the retainer screw and torque to 12 INCH lbs. (1.4 N.m)
6. Mount tire on wheel following tire changer manufacturer's instructions, paying special attention to the following to avoid damaging tire pressure sensor:

    - **Rotating Wheel Tire Changers**

      Once the wheel is mounted to the changer, position the sensor valve stem approximately 280° from the head of the changer in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the upper and lower tire beads. See **Fig. 8**.

    - **Rotating Tool Tire Changers**

      Position the wheel on the changer so that the sensor valve stem is approximately 210° from the head of the changer in a clockwise direction from the mounting end of the tool. See **Fig. 9**. Make sure the sensor is clear of the lower bead breaker area to avoid damaging the sensor when the breaker rises. Rotate the tool in a counterclockwise direction to mount the tire. Use this procedure on both the upper and lower tire beads.
7. Adjust air pressure to specification. Make sure original style valve stem cap is securely installed to keep moisture out of sensor. Install wheel and tire assembly on vehicle.
8. Drive vehicle for a minimum of 5 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

TIRE PRESSURE SENSOR (SRT8)

CAUTION: Although additional sensors operating at 433 MHz sensors are available and are used in other applications, they are not interchangeable. Always

make sure the correct sensor is being used and be sure to replace the sensor with the correct part number.

CAUTION: The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Retain this valve stem cap for reuse. Do not substitute a regular valve stem cap in its place.

CAUTION: Do not attempt to install a tire pressure sensor in an aftermarket wheel. Use tire pressure sensors in original style factory wheels only. If aftermarket wheels are installed, and therefore do not contain tire pressure sensors, the system will not function properly and the driver will be continuously notified of a system malfunction.

CAUTION: After inspecting or adjusting the tire pressure always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Sensor.

CAUTION: The valve stem used on this vehicle is made of aluminum and the core is nickel plated brass. The original valve stem core must be reinstalled and not substituted with a valve stem core made of a different material. This is required to prevent corrosion in the valve stem caused by the different metals.

CAUTION: Any time a sensor is to be installed in a wheel, it is necessary to install a new sensor-to-wheel seal, metal washer and valve stem nut, to ensure airtight sealing. See Fig. 3.

CAUTION: DO NOT reuse sensor-to-wheel grommet. Always use a new grommet when installing a pressure sensor and properly torque the sensor nut.

Removal

1. Remove tire and wheel assembly from vehicle.
2. Dismount tire from wheel following tire changer manufacturer's instructions while paying special attention to the following to avoid damaging the pressure sensor:
   - When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor. That includes both front and rear beads of the tire. See **Fig. 5**.
   - When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280° +/- 10° from the valve stem, then proceed to dismount the tire from the wheel. Use this process on both the upper and lower tire beads. See **Fig. 5**
3. Using a thin-walled socket, remove special nut retaining sensor to wheel. While removing nut, hold pressure against rear of metal valve stem to keep valve stem from pushing rearward, which could damage antenna strap. See **Fig. 4**.

4. Remove sensor from wheel. See **Fig. 6**.

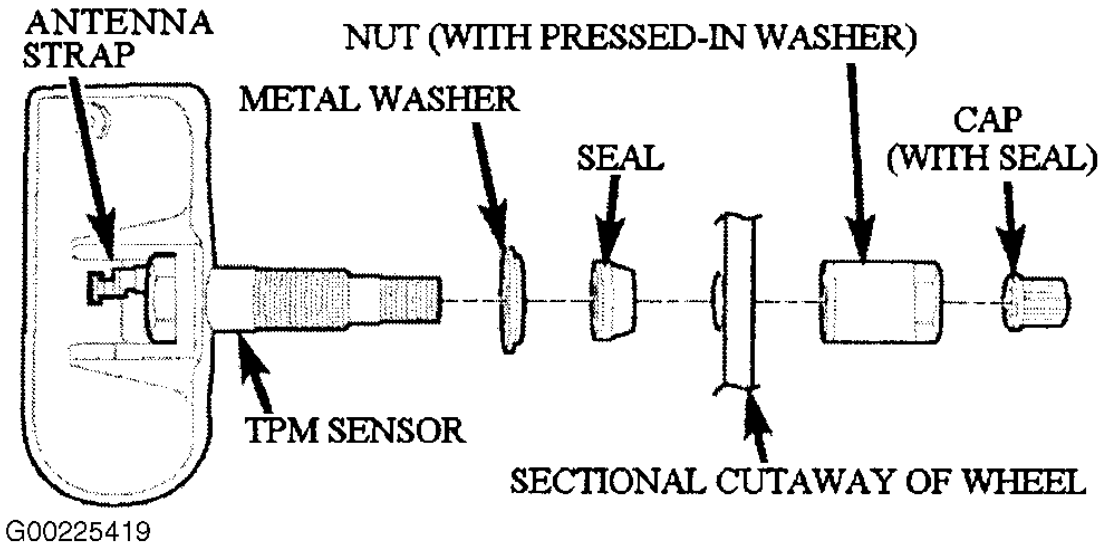


Fig. 3: Identifying Tire Pressure Sensor Components (1 Of 2)
Courtesy of CHRYSLER CORP.

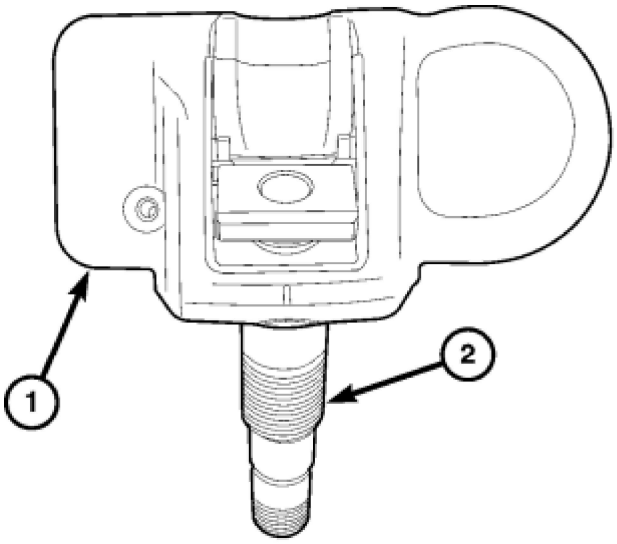


Fig. 4: Identifying Tire Pressure Sensor Components (2 Of 2)
Courtesy of CHRYSLER CORP.

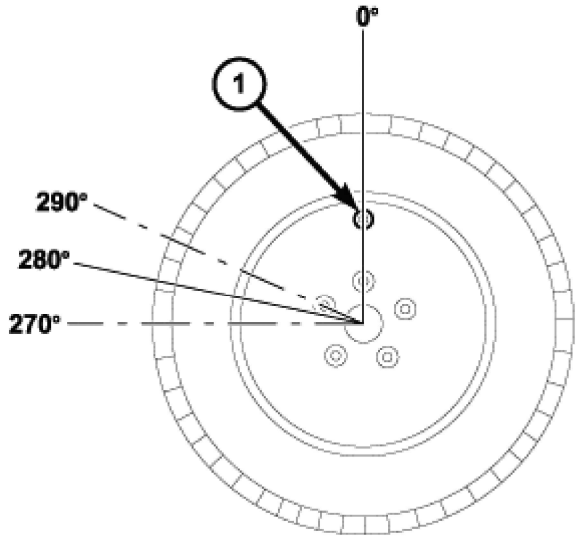


Fig. 5: Dismounting Tire With Tool
Courtesy of CHRYSLER CORP.

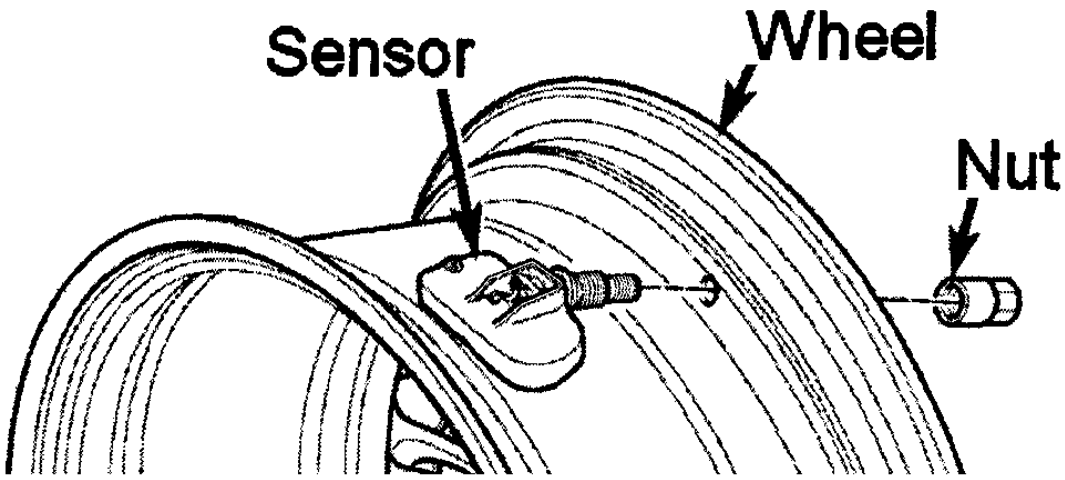


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Fig. 6: Removing & Installing Tire Pressure Sensor
Courtesy of CHRYSLER CORP.

Installation

NOTE: Before reinstalling an existing tire pressure sensor, replace seal and metal washer at base of valve stem to ensure proper sealing. See Fig. 3.

1. Wipe area clean around sensor/valve stem mounting hole in wheel. Make sure surface of wheel is not damaged.

CAUTION: To avoid damaging sensor antenna strap, hold pressure against rear of metal valve stem while sensor is inserted through wheel mounting

hole and nut is installed. See Fig. 4 and Fig. 6 .

2. Insert sensor through wheel as shown keeping pressure against rear of metal valve stem. Potted side of sensor is to be positioned toward wheel. Do not attempt to mount sensor otherwise, or damage may occur. Install sensor nut (with pressed-in washer) by hand. See **Fig. 6** and **Fig. 7** .

   NOTE: Before tightening sensor nut, push downward on sensor housing in an attempt to make it flush with interior contour of wheel.

3. Using a thin-walled socket, install sensor nut. While holding sensor in position, tighten sensor nut to 71 INCH lbs. (8 N.m).

   CAUTION: Over-torquing the sensor nut by as little as 106 INCH lbs. (12 N.m) may result in sensor separation from the valve stem. Under this condition, the sensor may still function; however, the condition should be corrected immediately.

4. Mount tire on wheel following tire changer manufacturer's instructions, paying special attention to the following to avoid damaging tire pressure sensor:

   - **Rotating Wheel Tire Changers**

     Once the wheel is mounted to the changer, position the sensor valve stem approximately 280° from the head of the changer in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the upper and lower tire beads. See **Fig. 8**.

   - **Rotating Tool Tire Changers**

     Position the wheel on the changer so that the sensor valve stem is approximately 210° from the head of the changer in a clockwise direction from the mounting end of the tool. See **Fig. 9**. Make sure the sensor is clear of the lower bead breaker area to avoid damaging the sensor when the breaker rises. Rotate the tool in a counterclockwise direction to mount the tire. Use this procedure on both the upper and lower tire beads.

5. Adjust air pressure to specification. Make sure original style valve stem cap is securely installed to keep moisture out of sensor. Install wheel and tire assembly on vehicle.
6. Drive vehicle for a minimum of 5 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

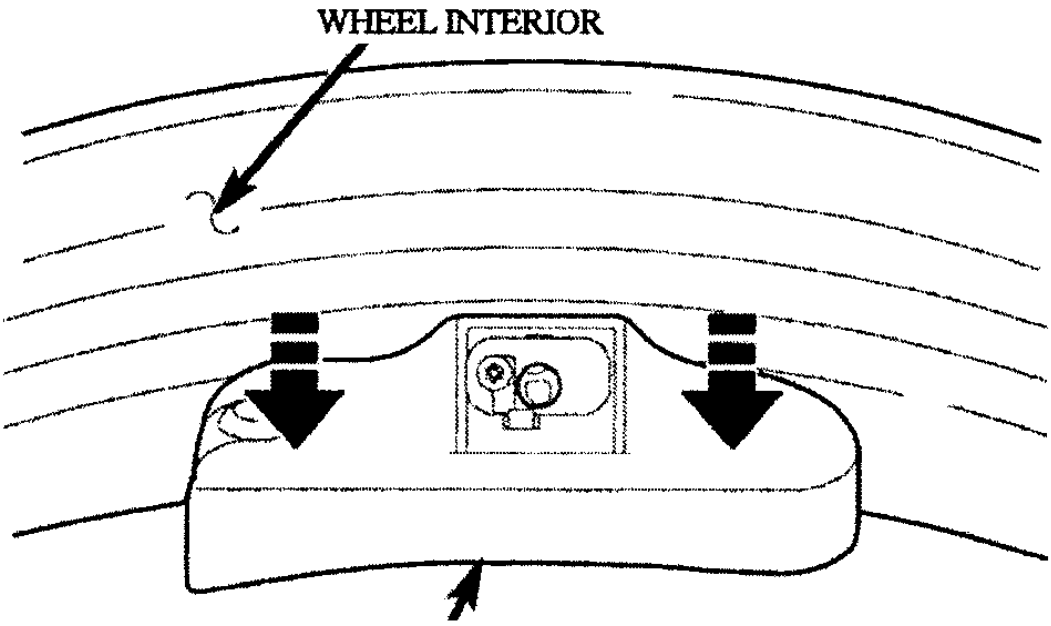

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Fig. 7: Installing Tire Pressure Sensor
Courtesy of CHRYSLER CORP.

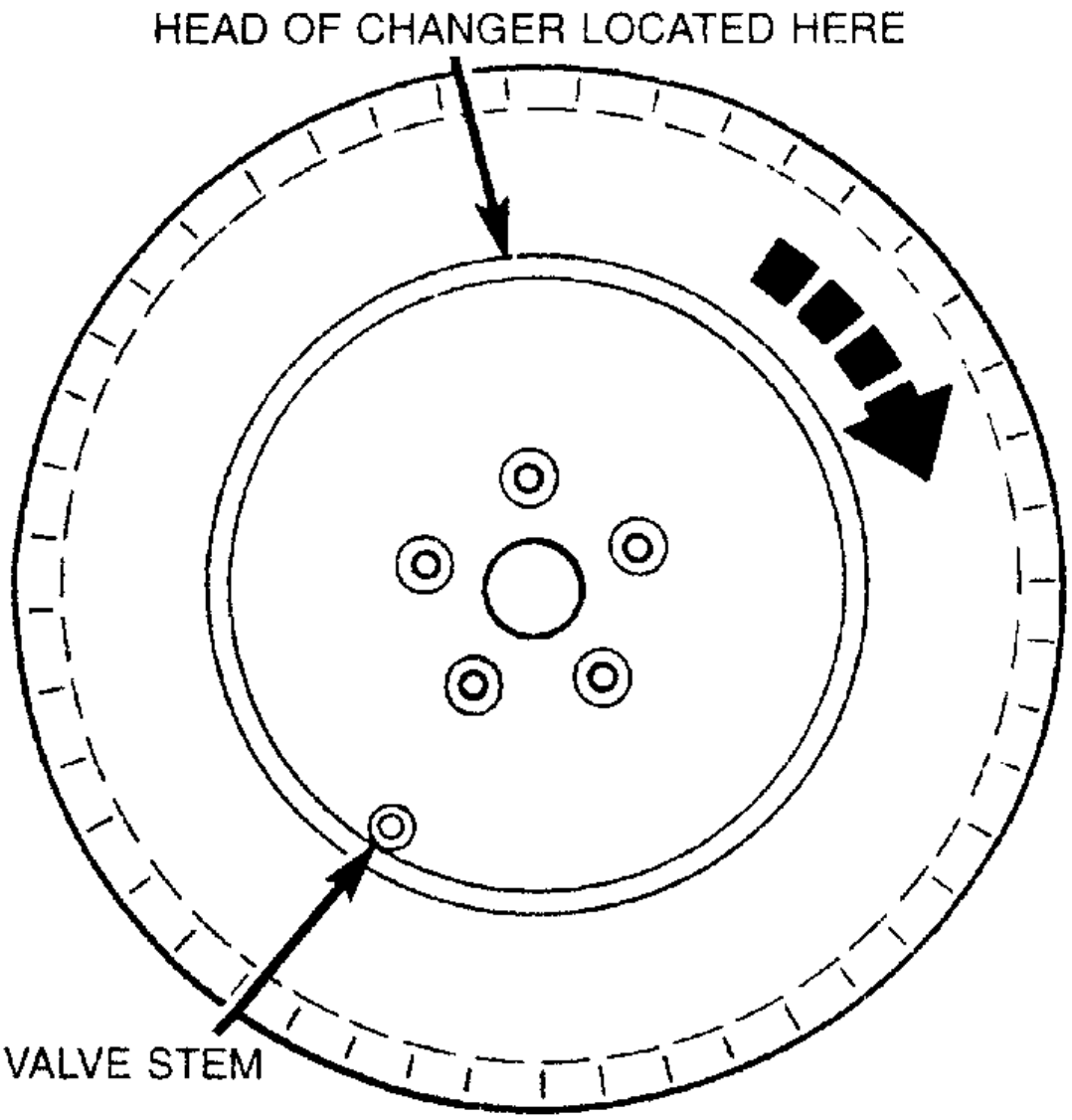

Fig. 8: Mounting Tire Using Rotating Wheel Machine
Courtesy of CHRYSLER CORP.

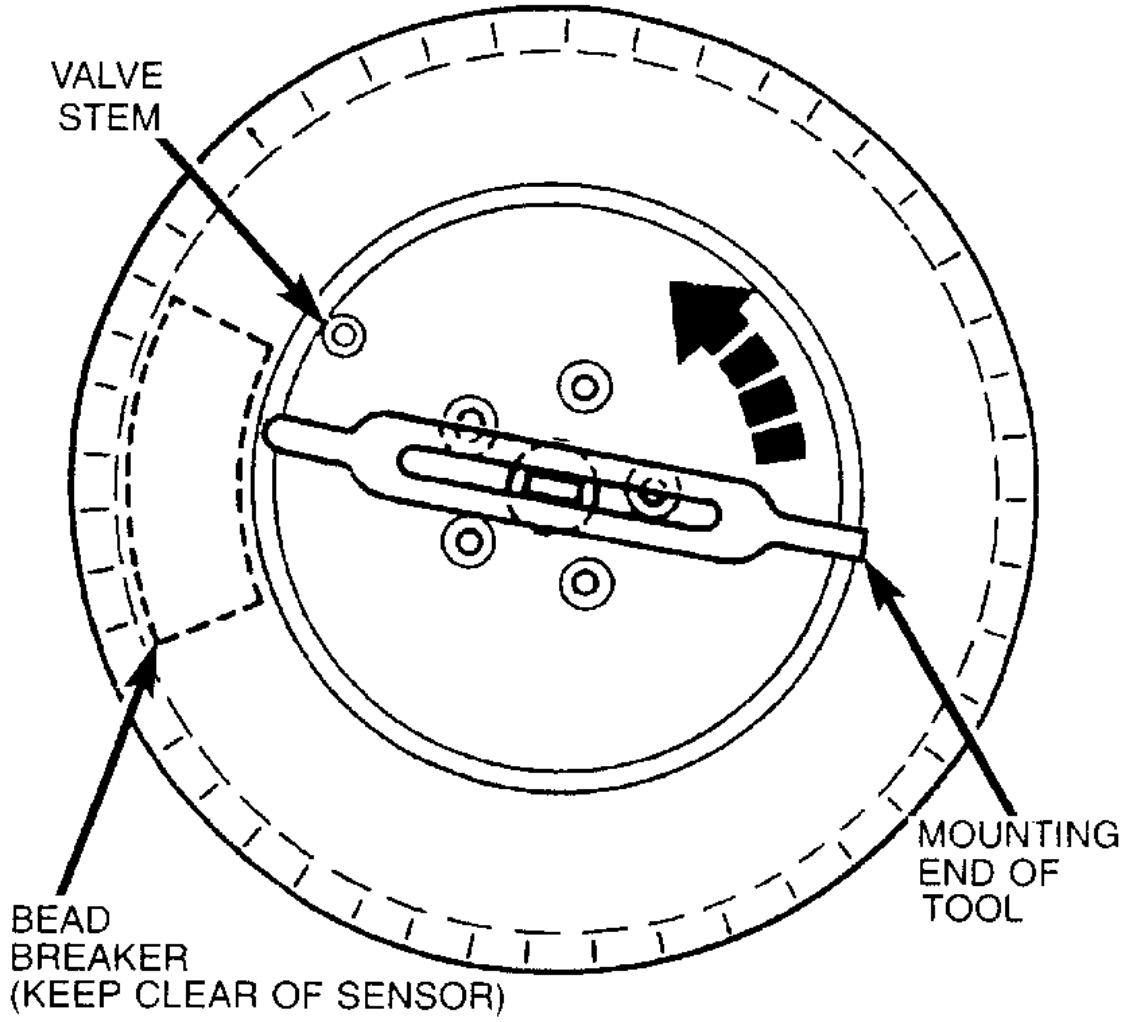

Fig. 9: Mounting Tire Using Rotating Tool Machine
Courtesy of CHRYSLER CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Component	Ft. Lbs. (N.m)
Wheel Nut	110 (150)
	INCH Lbs. (N.m)
Tire Pressure Sensor Nut	(1) 71 (8)

(1) Over-torquing the sensor nut by as little as 106 INCH lbs. (12 N.m) may result in sensor separation from the valve stem. Under this condition, the sensor may still function; however, the condition should be corrected immediately.

TRANSFER CASE

BW44-40 - Service Information - Chrysler 300

OPERATION

OPERATION

The Borg Warner 44-40 is a full time all-wheel drive transfer case with a fixed gear ratio. Depending on traction conditions, the PCM will modulate the electromagnetic clutch assembly to vary the amount of torque applied to the front axle. Torque is transmitted through the input shaft to the clutch and drive sprocket assembly, and is transferred directly to the rear propeller shaft, and to the output shaft and front propeller shaft by the drive chain. The oil pump circulates gear lube throughout the case to provide clutch cooling, and the PCM monitors the temperature of the transfer case with a temperature sensor.

ADJUSTMENTS

ADJUSTMENTS

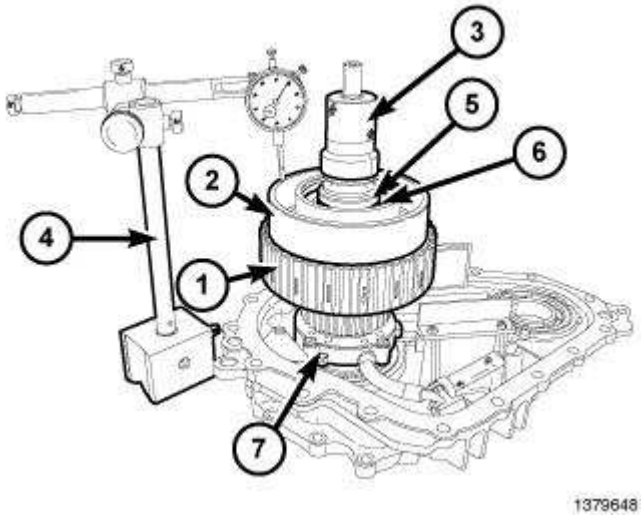

Fig. 1: Checking Clutch Clearance
Courtesy of CHRYSLER GROUP, LLC

1. Install the oil pump (7), the new clutch assembly (1), the rotor (2), the bearing (6), and the spacer (5) on the input shaft.
2. Install the clutch clearance tool (3) on the input shaft.
3. Set up a dial indicator (4) to measure the clearance between the rotor (2) and the top clutch disc inside the clutch housing (1).
4. Zero the dial indicator (4).
5. Push the rotor (2) downward evenly as close to the shaft as possible and record the highest

reading. Repeat this measurement in three more locations and calculate the average of all four measurements. This is the total amount of clutch clearance.

6. The total clutch clearance must be between 1.2 mm and 0.7 mm (0.047 in. and 0.028 in.). If the total clutch clearance is not within specifications, select a larger or smaller spacer as needed, and re-check clutch clearance.

SPECIFICATIONS

SPECIFICATIONS

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Case Bolts	31	23	-
Snubber Bolts	8	6	-
Oil Baffle Bolts	8	6	-
Drain Plug	23	17	-
Fill Plug	23	17	-
Clutch Coil Nuts	10	7	-
Rear Output Flange Nut	319	235	-

GENERAL SPECIFICATIONS

DESCRIPTION	Metric	Standard
Clutch Clearance	0.7 mm - 1.2 mm	0.028 in. - 0.047 in.
Clutch Coil Resistance @ 20° C (68° F)	2.85 - 3.15 ?	
Temperature Sensor Resistance @ 20° C (68° F)	2726 - 3603 ?	

REMOVAL

REMOVAL

1. Raise and support the vehicle.

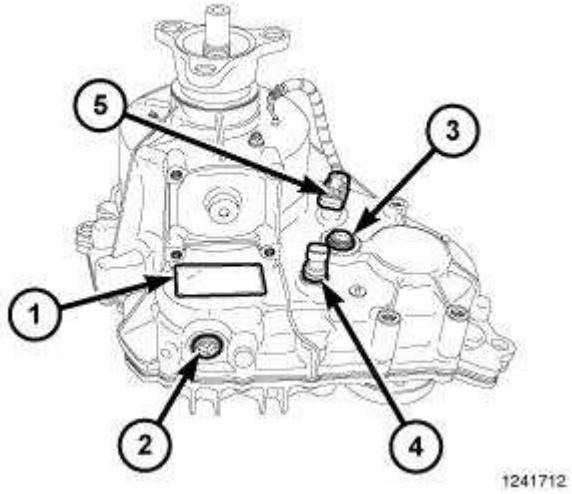

Fig. 2: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

2. Remove the transfer case drain plug (2) and allow the transfer case lubricant to drain into a suitable container.
3. Remove the exhaust. Refer to **MUFFLER, EXHAUST, REMOVAL** .
4. Remove the rear propeller shaft. Refer to **REMOVAL** .

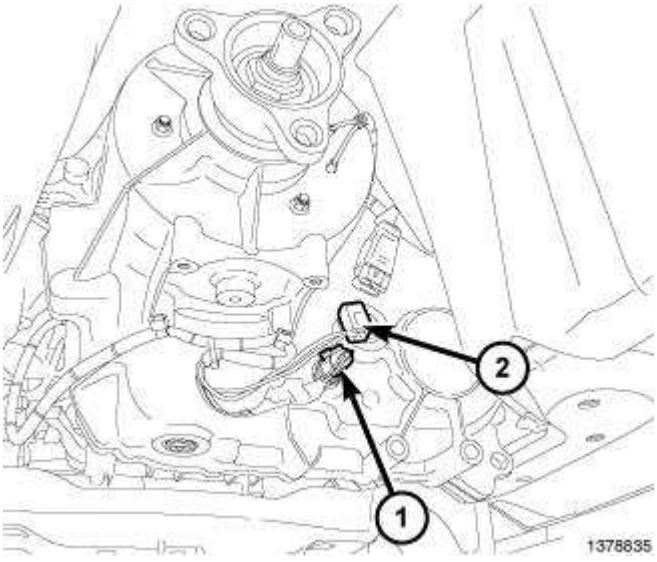

Fig. 3: Temperature Sensor Harness Connector And Clutch Coil Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the temperature sensor harness connector (1) and the clutch coil harness connector (2).
6. Raise transmission slightly with service jack to relieve load on crossmember and supports.

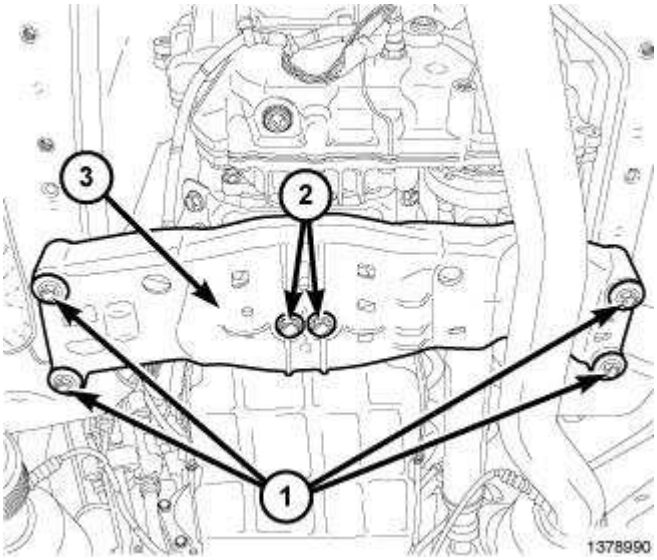

Fig. 4: Crossmember And Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove bolts (2) securing rear support and cushion to transmission crossmember (3).
8. Remove bolts attaching the crossmember (1) to frame and remove crossmember (3).
9. Remove the front propeller shaft. Refer to **REMOVAL** .

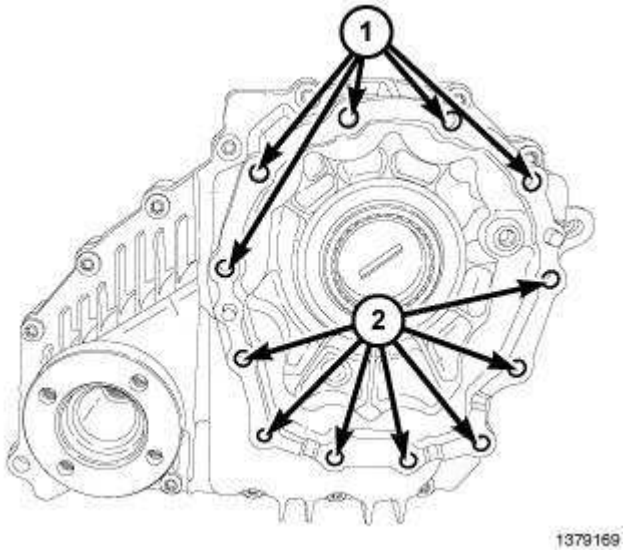

Fig. 5: Front (Transmission) Side Of PTU Case Flange
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front (transmission) side of the transfer case flange is shown in illustration for clarity.

10. Remove the lower transfer case-to-transmission bolts from the lower half of the transfer case flange (2).

11. Slightly lower the rear of the transmission to gain access to the upper transfer case to-transmission bolts.
12. Support the transfer case with a transmission jack
13. Remove the upper transfer case to transmission bolts from the upper half of the transfer case flange (1).
14. Remove the transfer case.

DISASSEMBLY

DISASSEMBLY

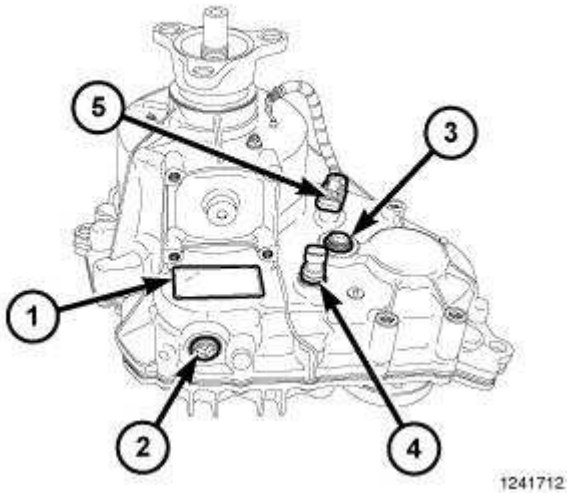

Fig. 6: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

NOTE: The vent hole is near the input shaft hub. If the unit is set on the mounting surface, oil will drain out through the vent.

1. Place the transfer case so that it can be drained of any remaining fluid and remove the drain plug (2).

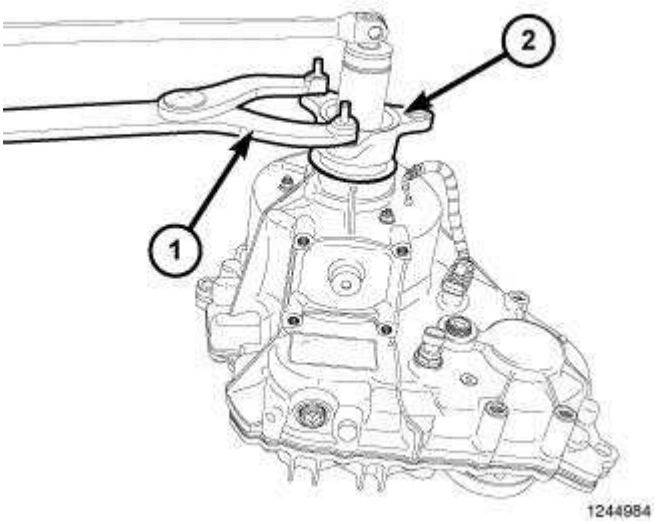

Fig. 7: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

2. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
3. Remove the rear output flange nut.

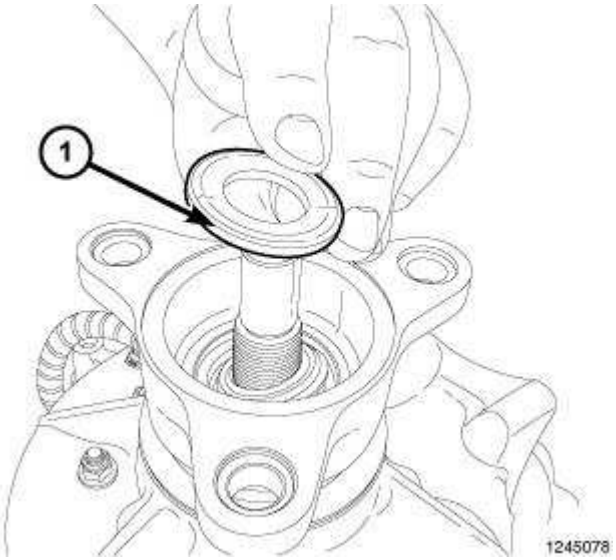

Fig. 8: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

4. Remove the rear output flange washer (1)

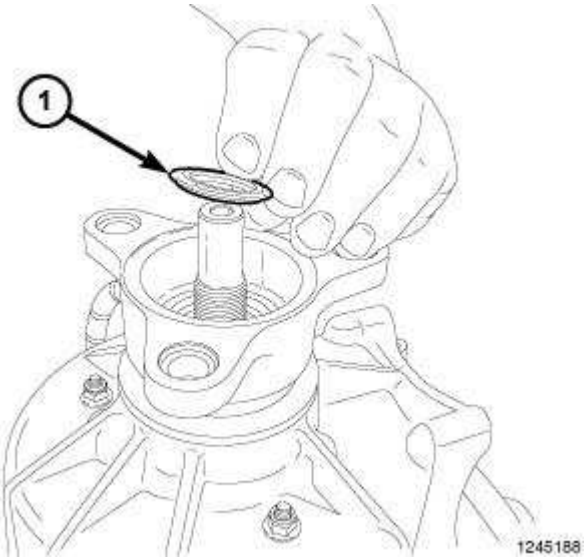

Fig. 9: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

5. Remove the outer rear output shaft seal (1)

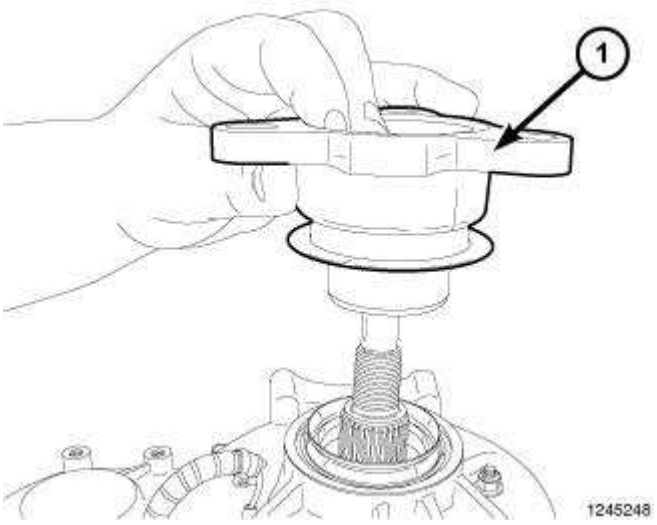

Fig. 10: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rear output flange (1).
7. Remove the case half bolts.

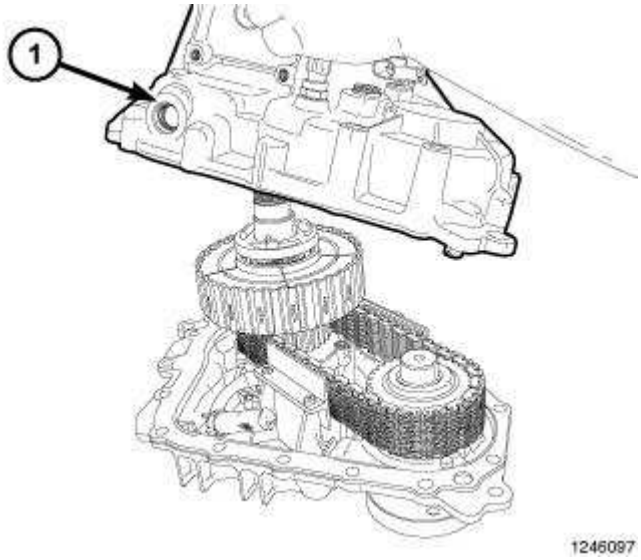

Fig. 11: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The clutch rotor might remain in the rear case half during removal.

8. Remove the rear cover (1)

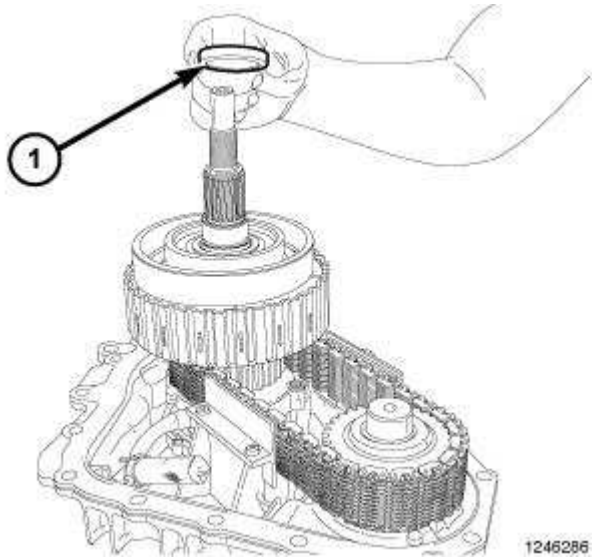

Fig. 12: Spacer
Courtesy of CHRYSLER GROUP, LLC

9. Remove the spacer (1)

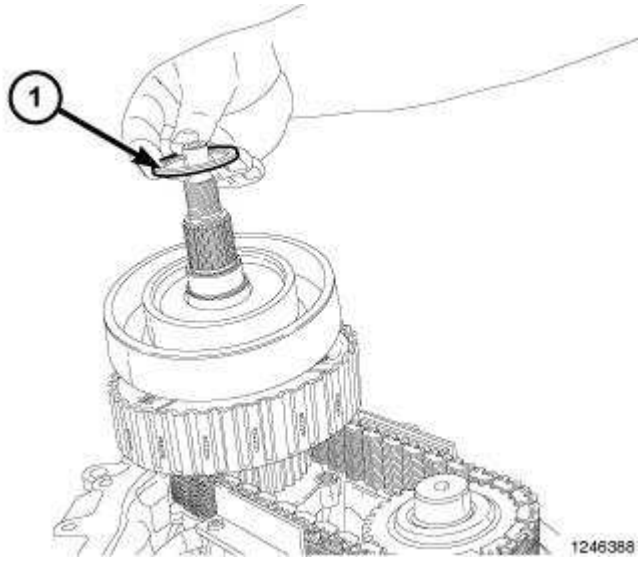

Fig. 13: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

10. Remove the bearing (1) from the input shaft.

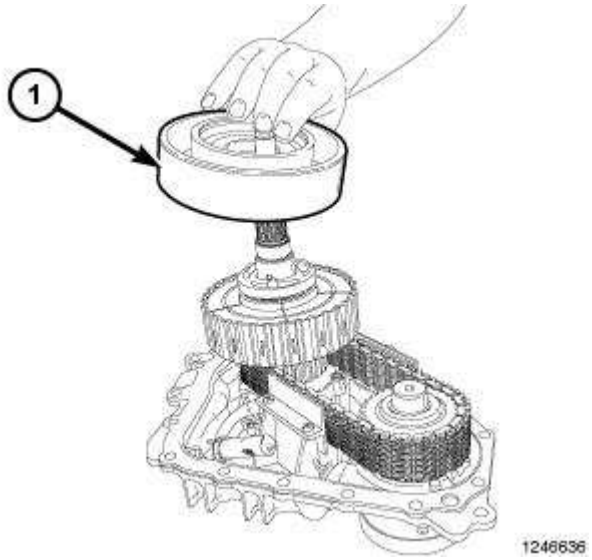

Fig. 14: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

11. Remove the clutch rotor (1) from the input shaft.

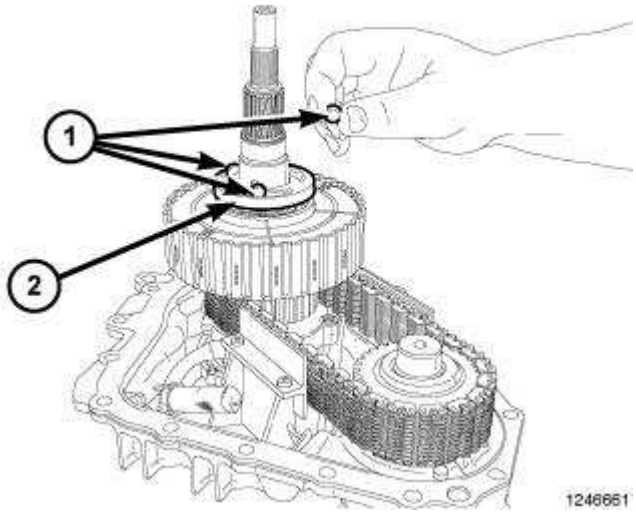

Fig. 15: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

12. Remove the ball bearings (1) from the apply cam (2).
13. Remove the apply cam (2)

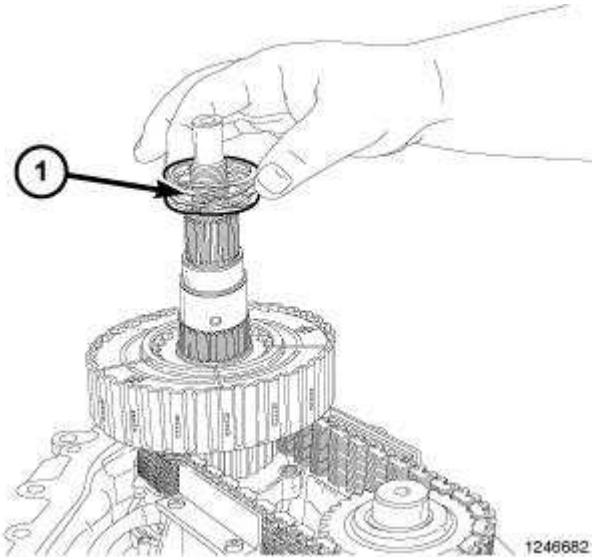

Fig. 16: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

14. Remove the wave spring (1) from the input shaft.

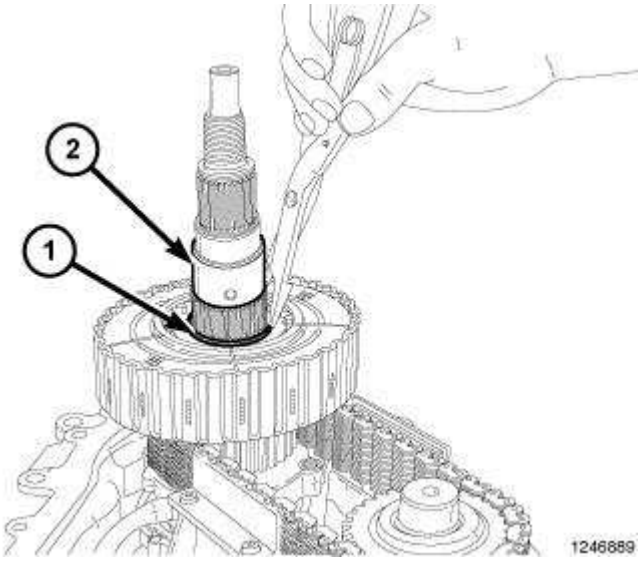

Fig. 17: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

15. Remove the snap ring (1) from the input shaft (2).

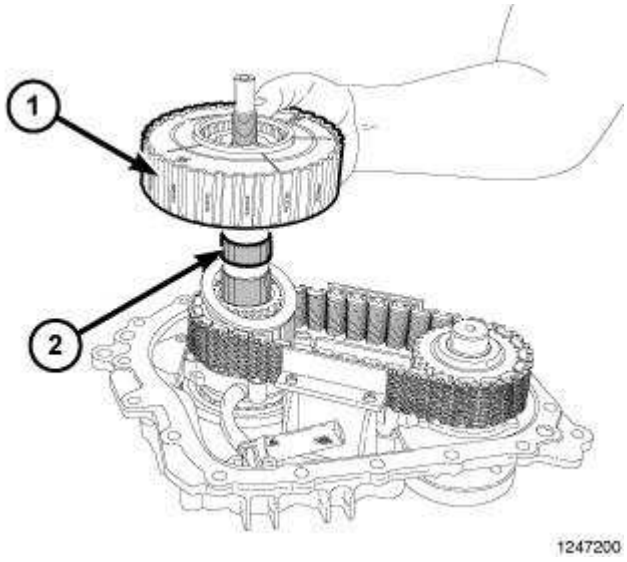

Fig. 18: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

16. Remove the clutch assembly (1) from the input shaft (2).

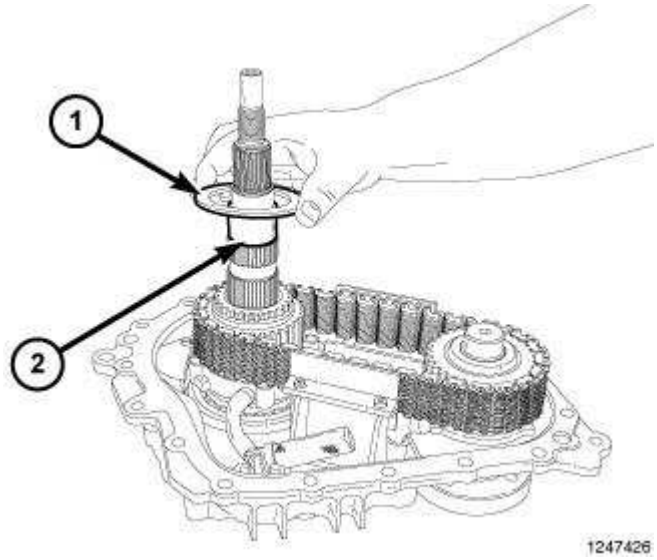

Fig. 19: Thrust Washer And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

17. Remove the thrust washer (1) from the input shaft (2).

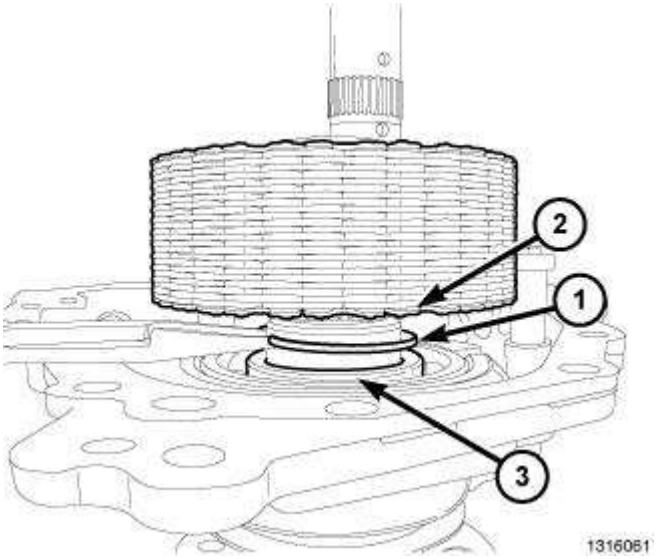

Fig. 20: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: The output shaft sprocket is pressed onto the output shaft.

18. Release the Snap Ring (1) from the Output Shaft and move it away from the Groove (3), toward the Output Shaft Sprocket (2).

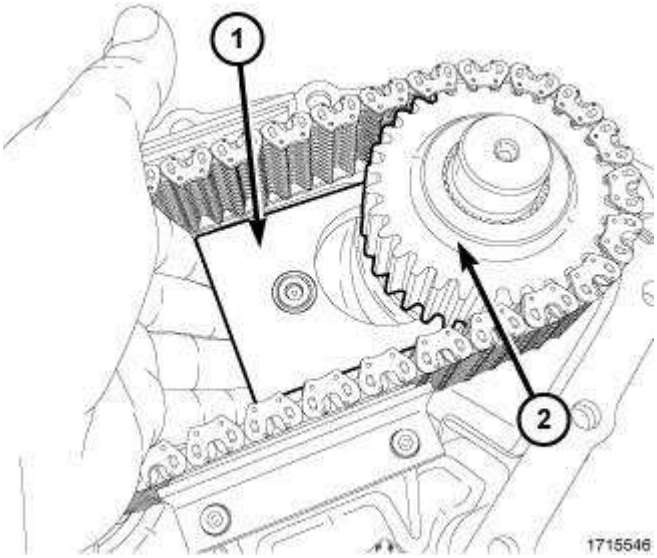

Fig. 21: Brace Plate And Input Shaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

19. Slide the (special tool #10176, Remover, Front Drive Sprocket) Brace Plate (1) in between the case and the input shaft sprocket (2).

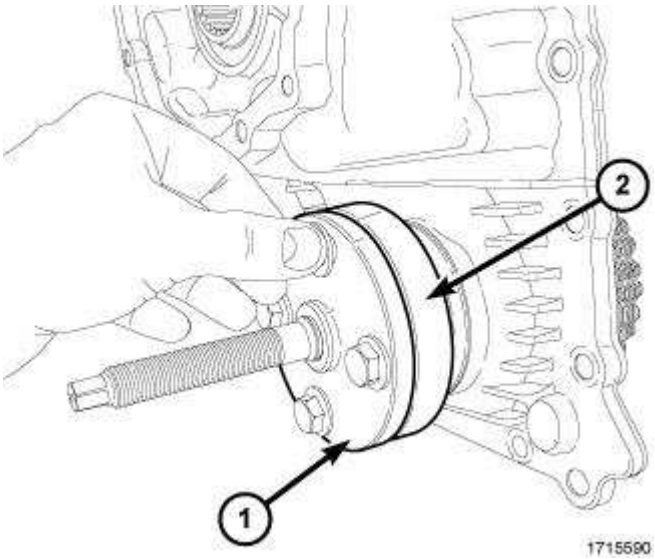

Fig. 22: Puller Plate And Output Shaft Flange
Courtesy of CHRYSLER GROUP, LLC

20. Align the holes on the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) with the bolt holes in the output shaft flange (2), then install the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) onto the output shaft flange (2).

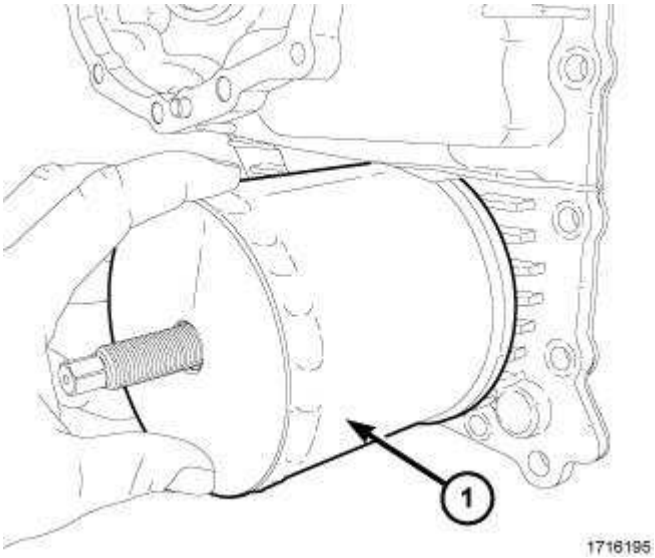

Fig. 23: Base
Courtesy of CHRYSLER GROUP, LLC

21. Install the (special tool #10176, Remover, Front Drive Sprocket) Base (1) onto the puller plate.

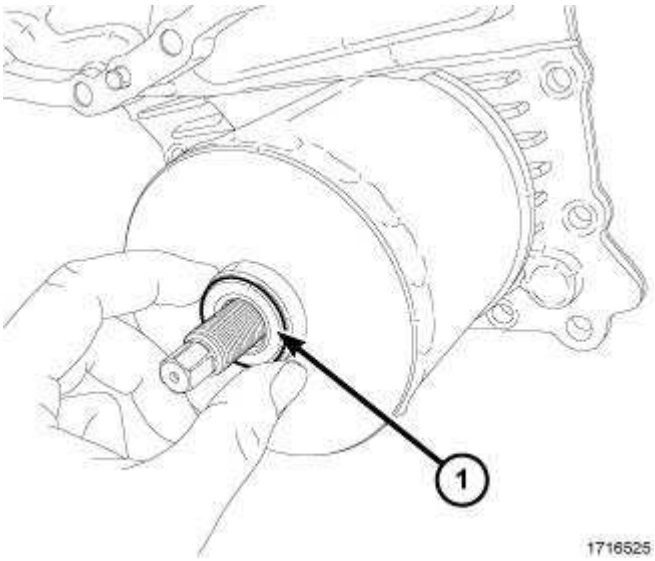

Fig. 24: Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1) so that the bearing flange is facing up.

22. Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1).

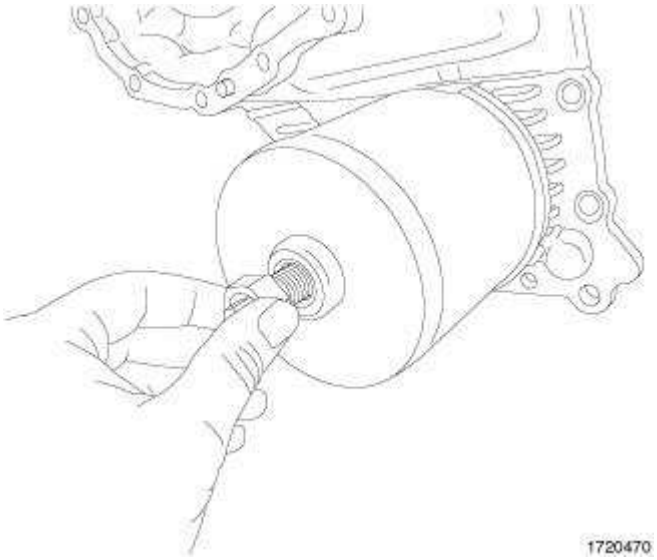

Fig. 25: Nut
Courtesy of CHRYSLER GROUP, LLC

23. Install the (special tool #10176, Remover, Front Drive Sprocket) Nut.

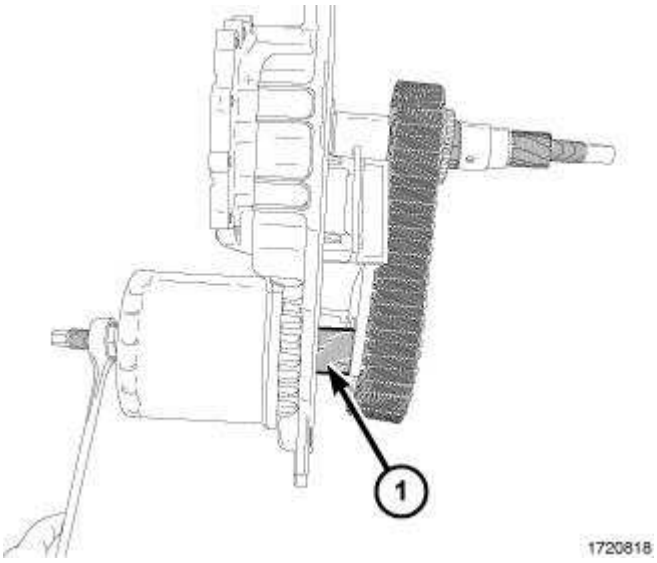

Fig. 26: Output Shaft
Courtesy of CHRYSLER GROUP, LLC

24. Tighten the nut until the Output Shaft (1) is pulled free of the output shaft sprocket.
25. Remove the Output Shaft Sprocket, the Drive Chain, and the Drive Sprocket as an assembly.

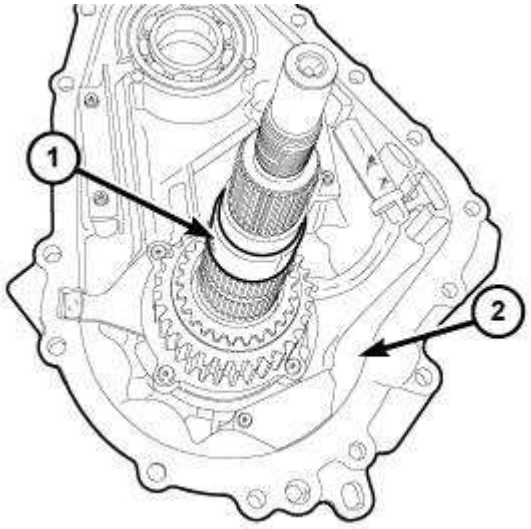

Fig. 27: Input Shaft Assembly And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

26. Remove the Input Shaft assembly (1) from the front case half (2).

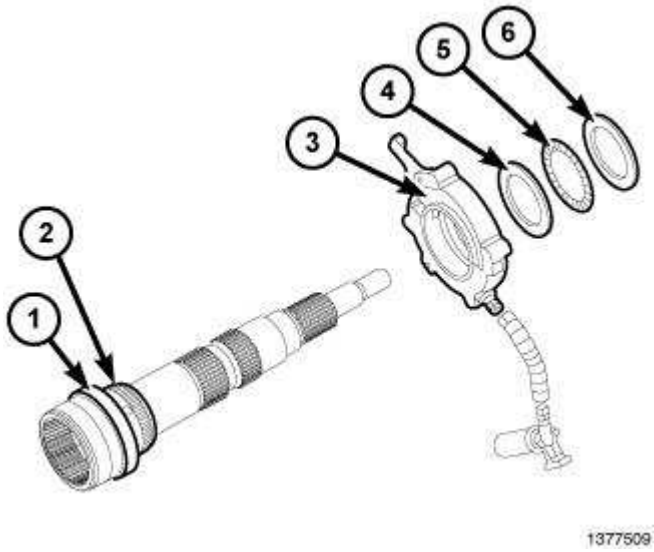

Fig. 28: Top Spacer, Bottom Spacer, Input Shaft, And Splines
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Top Spacer (6) might remain attached to the Drive Sprocket when it is removed from the Input Shaft (1).

27. Remove the Top Spacer (6) from the Input Shaft (1).

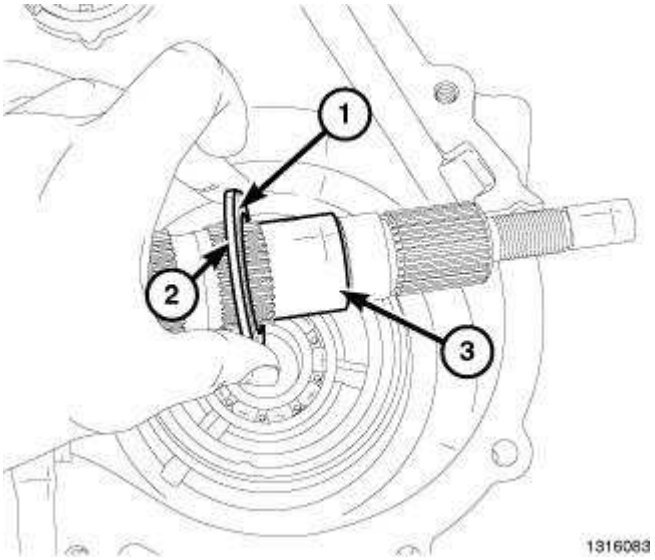

Fig. 29: Bearing, Bottom Spacer, And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

28. Remove the Bearing (1) and the Bottom Spacer (2) from the Input Shaft (3).

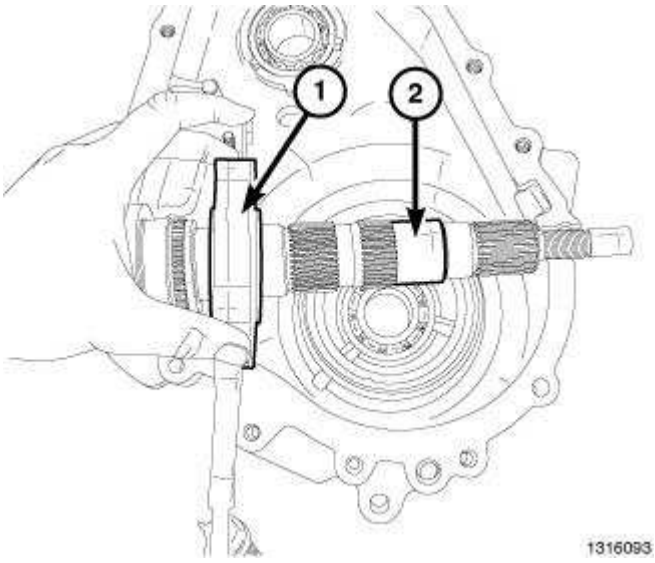

Fig. 30: Oil Pump Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

29. Remove the Oil Pump Assembly (1) from the Input Shaft (2).

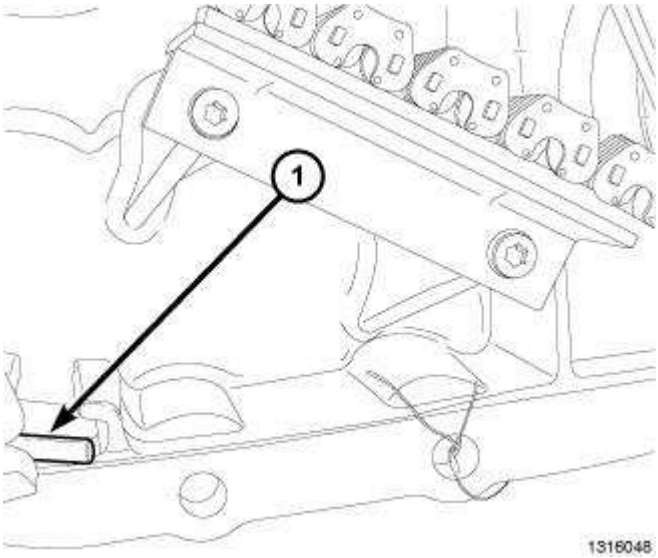

Fig. 31: Case Magnet
Courtesy of CHRYSLER GROUP, LLC

30. Remove the Case Magnet (1).

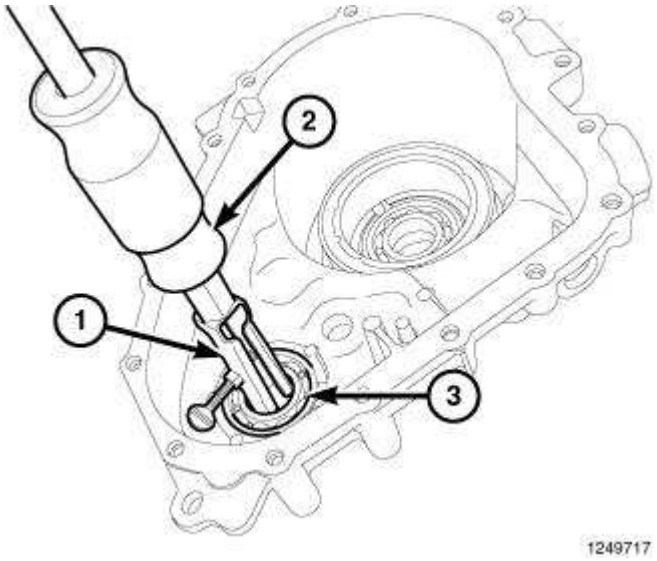

Fig. 32: Bearing Race Remover, Slide Hammer, And Output Shaft Bearing - Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

31. Use the (special tool #9585, Remover, Bearing Cup) Bearing Race Remover (1) and (special tool #C-637, Slide Hammer, Universal) Slide Hammer (2) to remove the output shaft bearing (3) from the rear case half.
32. Use the (special tool #9585, Remover, Bearing Cup) Bearing Race Remover (1) and (special tool #C-637, Slide Hammer, Universal) Slide Hammer (2) to remove the input shaft bearing from the rear case half.

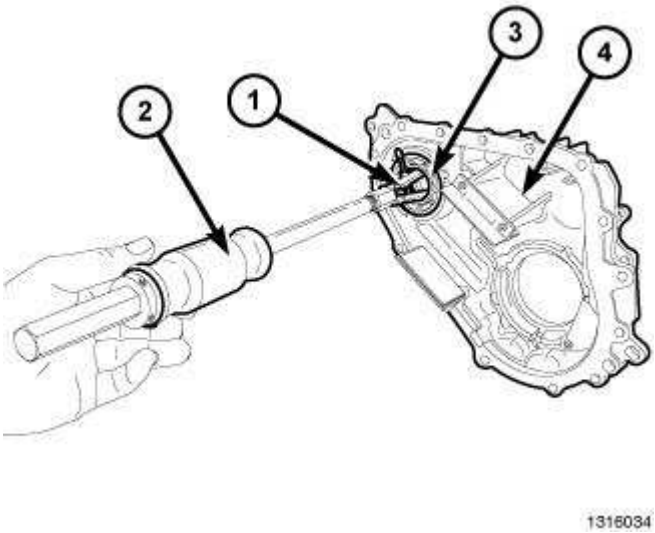

Fig. 33: Bearing Race Remover, Slide Hammer, And Output Shaft Bearing - Front Case Half
Courtesy of CHRYSLER GROUP, LLC

33. Use the (special tool #9585, Remover, Bearing Cup) Bearing Race Remover (1) and (special tool #C-637, Slide Hammer, Universal) Slide Hammer (2) to remove the Output Shaft Bearing (3) from the Front Case Half (4).
34. Use the (special tool #9664, Remover, Bearing Cup) Bearing Race Remover and (special tool #C-637, Slide Hammer, Universal) Slide Hammer to remove the Input Shaft Bearing from the Front Case Half.

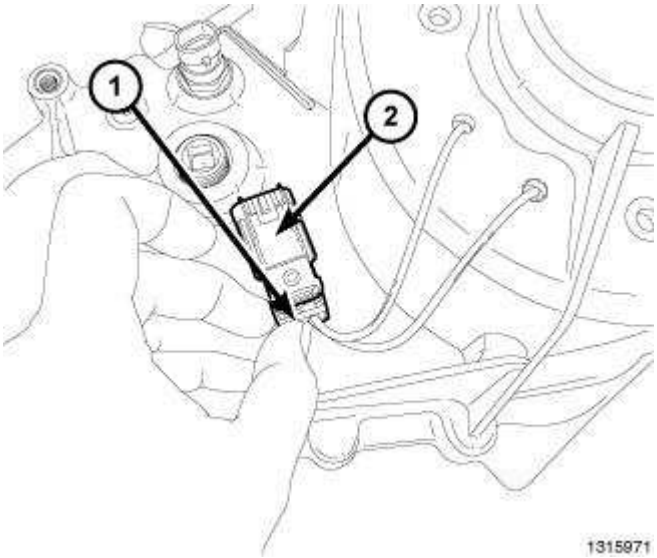

Fig. 34: Clutch Coil Harness Connector And Retainer
Courtesy of CHRYSLER GROUP, LLC

35. Remove the Tie Straps, and remove the Convoluted Sheath from the Clutch Coil Wires.
36. Remove the retainer (1) from the Clutch Coil Harness Connector (2).

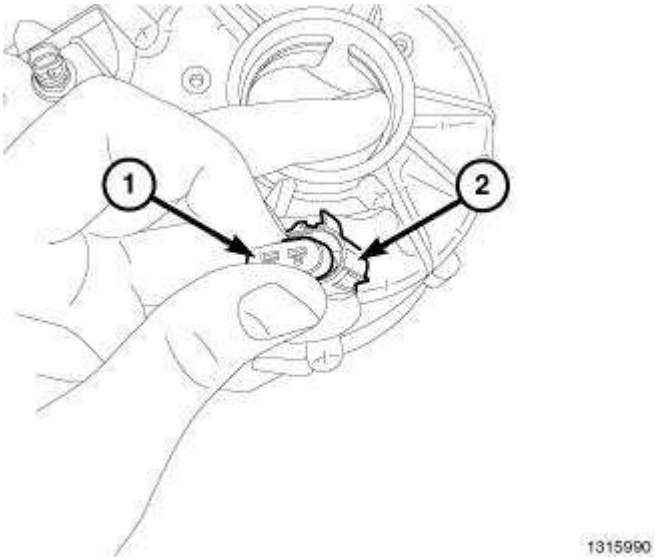

Fig. 35: Clutch Coil Harness Connector And Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The clutch coil wires are retained in the harness connector by tabs. The tabs must be released from the connector face to remove the wires from the harness connector.

37. Remove the Cover (1) from the Clutch Coil Harness Connector (2), release the tabs, and disconnect the Clutch Coil Terminal Ends from the Clutch Coil Harness Connector (2).

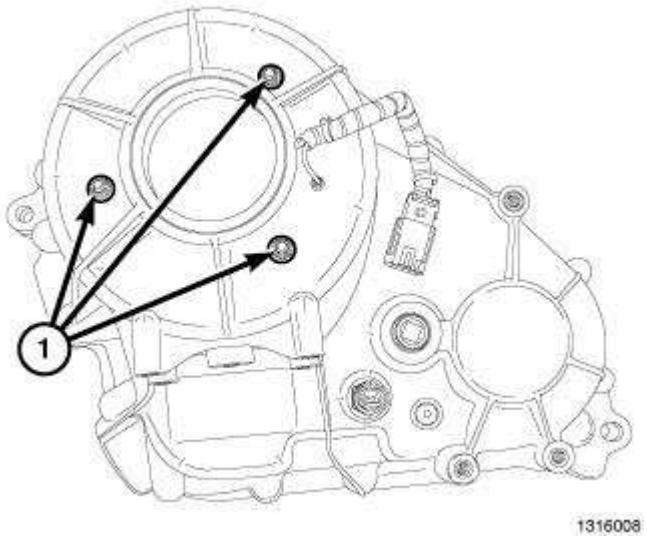

Fig. 36: Clutch Coil Retainers
Courtesy of CHRYSLER GROUP, LLC

38. Remove the Clutch Coil retainers (1).

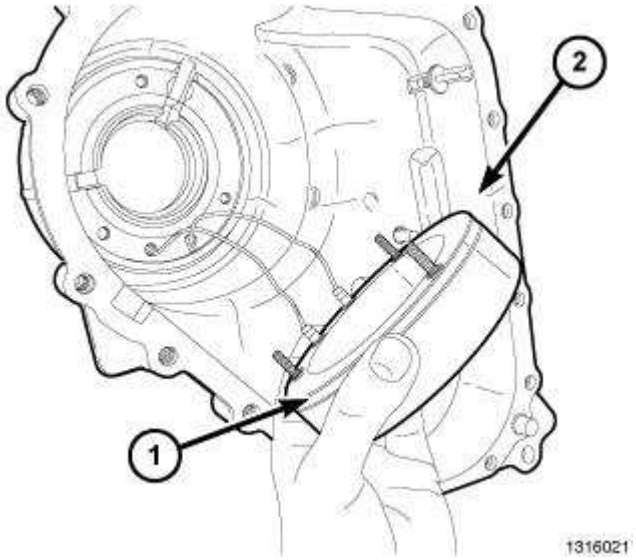

Fig. 37: Clutch Coil And Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

39. Remove the Clutch Coil (1) from the Rear Case Half (2).

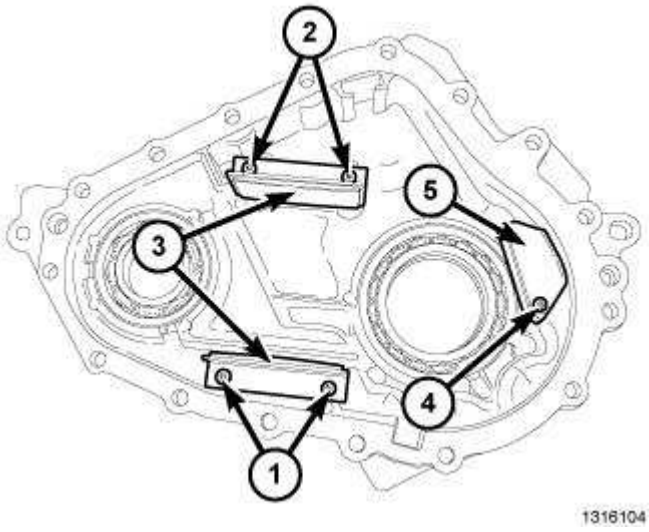

Fig. 38: Oil Baffle, Fasteners, And Snubbers
Courtesy of CHRYSLER GROUP, LLC

40. Remove the Fastener (4) and the Oil Baffle (5).
41. Remove the Fasteners (1) and (2) and the Snubbers (3).
42. Remove the input and output shaft seals from the front case half.
43. Remove the input shaft seal from the rear case half.

ASSEMBLY

ASSEMBLY

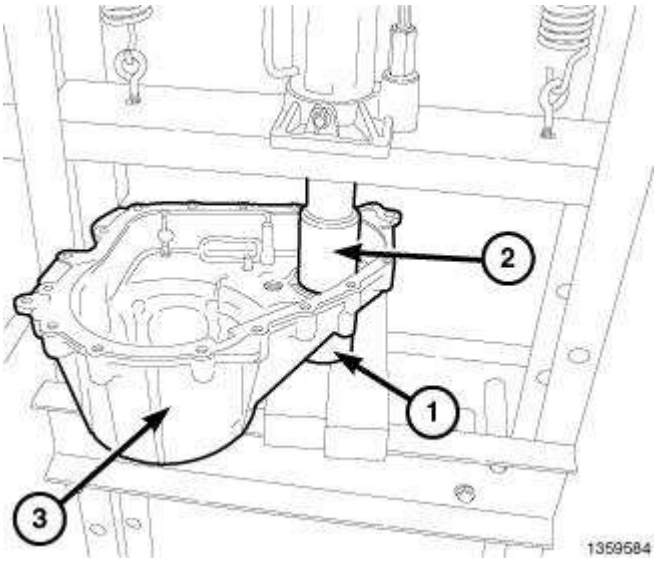

Fig. 39: Remover/Installer Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

1. Check the clearance for the new clutch pack, and select a new spacer if necessary. Refer to **ADJUSTMENTS**.
2. Position the Rear Case Half (3) on an Arbor Press, and position (special tool #8835-3, Receiver, Bushing) Remover/Installer (1) to support the Rear Case Half (3) from below in the area of the Output Shaft Bearing.
3. Use the (special tool #8441-2, Cup, Receiver) Installer (2) and an Arbor Press to install the Output Shaft Bearing into the Rear Case Half (3).

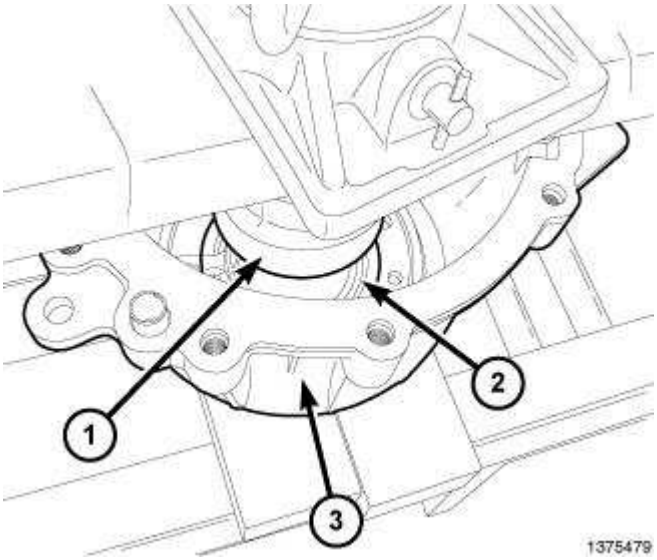

Fig. 40: Bearing Installer And an Arbor Press to install the Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

4. Use the (special tool #D-156, Installer, Bearing) Bearing Installer (1) and an Arbor Press to install the Input Shaft Bearing (2) into the rear case half (3).

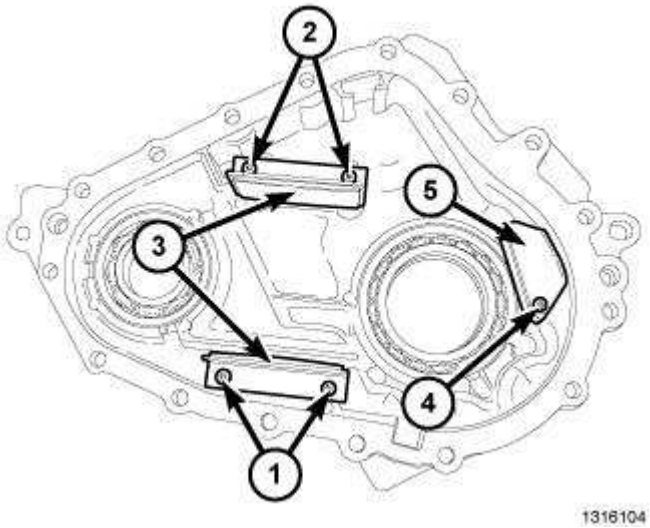

Fig. 41: Oil Baffle, Fasteners, And Snubbers
Courtesy of CHRYSLER GROUP, LLC

5. Install the Snubbers (3). Tighten the bolts (1) and (2) to 8 Nm (6 ft. lbs.).
6. Install the Oil Baffle (5). Tighten the Bolts (4) to 8 Nm (6 ft. lbs.).

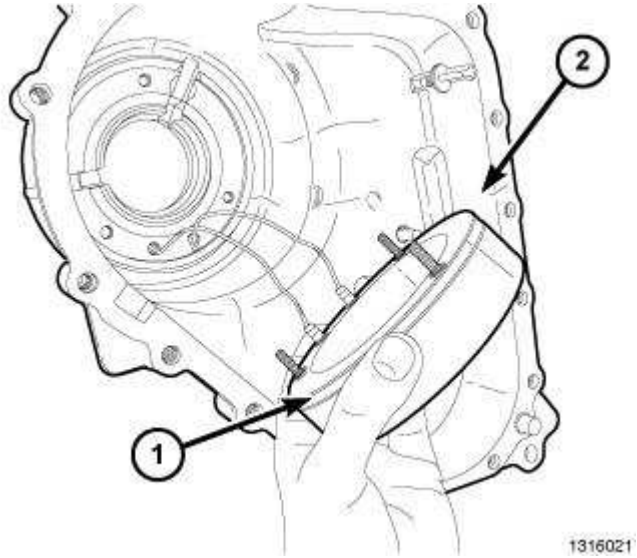

Fig. 42: Clutch Coil And Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

7. Route the wires through the Rear Case Half (2) and install the Clutch Coil (1) into the Rear Case Half (2).

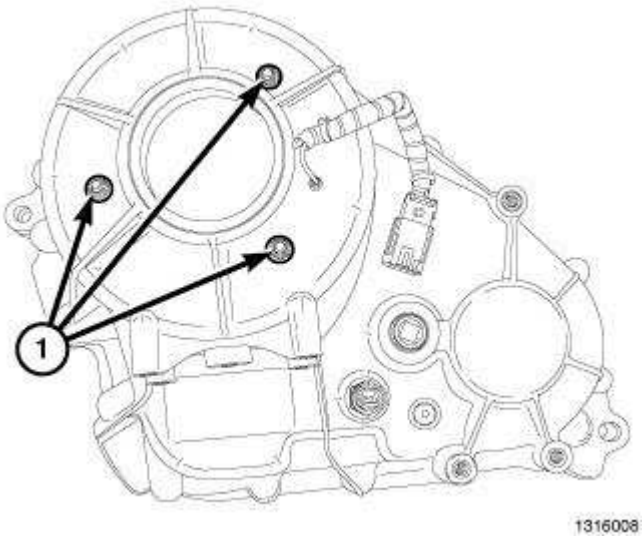

Fig. 43: Clutch Coil Retainers
Courtesy of CHRYSLER GROUP, LLC

8. Install the Clutch Coil retainers (1). Tighten to 10 Nm (7 ft. lbs.).

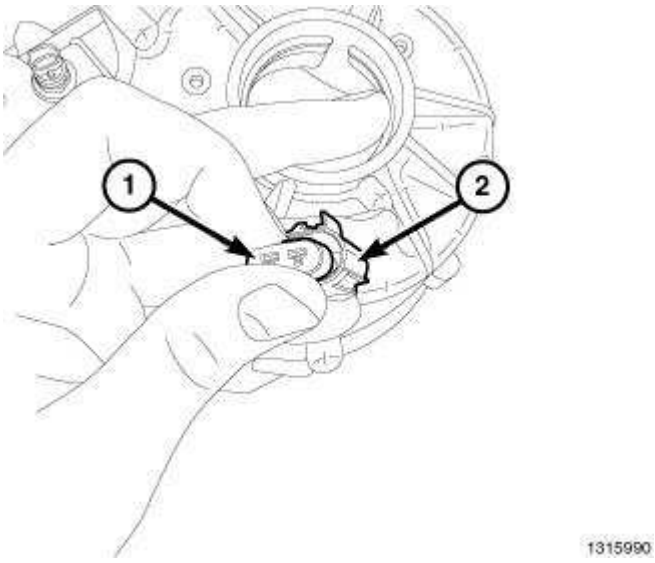

Fig. 44: Clutch Coil Harness Connector And Cover
Courtesy of CHRYSLER GROUP, LLC

9. Install Clutch Coil Wire Terminal Ends into the Clutch Coil Harness Connector (2), engage the Terminal Ends in the Tabs, then install the Cover (1).

NOTE: If the original convoluted sheath is damaged, install new convoluted sheath

10. Install the Convoluted Sheath and install new tie straps to secure it in position.

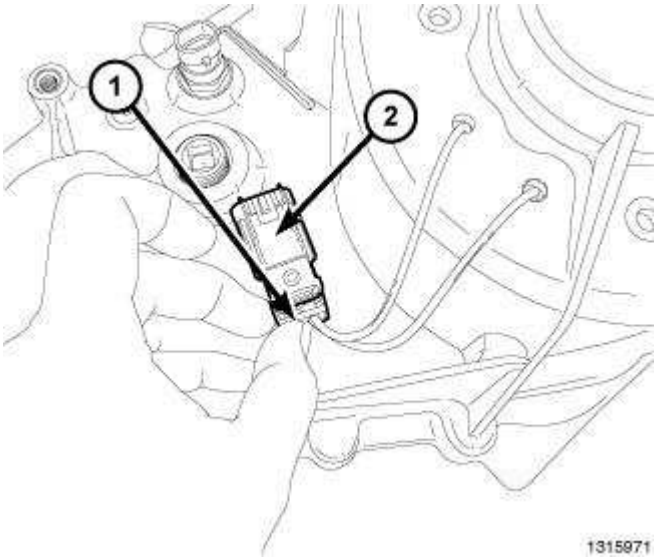

Fig. 45: Clutch Coil Harness Connector And Retainer
Courtesy of CHRYSLER GROUP, LLC

11. Install the Wire Retainer (1) on the back of the Clutch Coil Harness Connector (2).

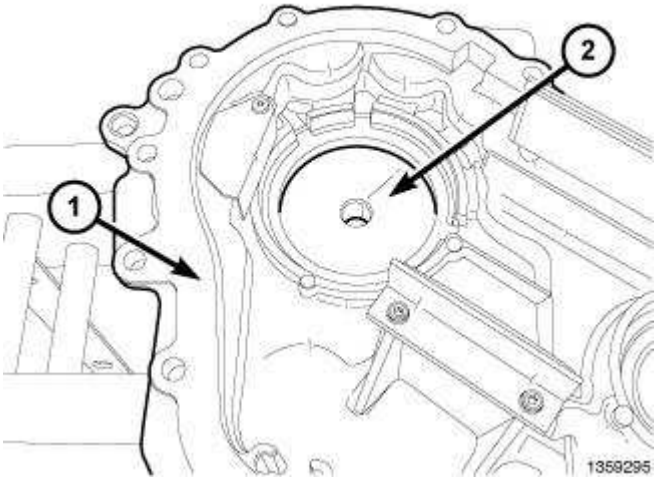

Fig. 46: Seal Installer And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

12. Position the Front Case Half (1) on an Arbor Press, and position (special tool #8149, Installer, Seal) Seal Installer (2) to support the Input Shaft Seal Flange from below.

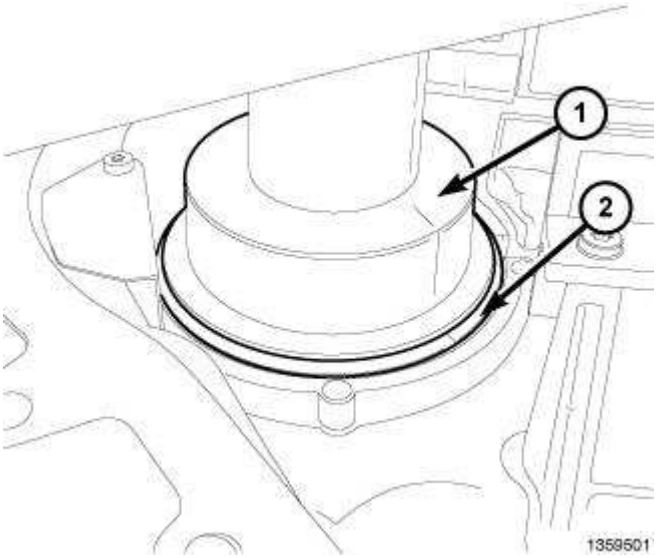

Fig. 47: Bearing Installer And Input Shaft Bearing - Front Case Half
Courtesy of CHRYSLER GROUP, LLC

13. Use (special tool #8153, Installer, Bearing Cup) Bearing Installer (1) and an Arbor Press to install the Input Shaft Bearing (2) into the Front Case Half.

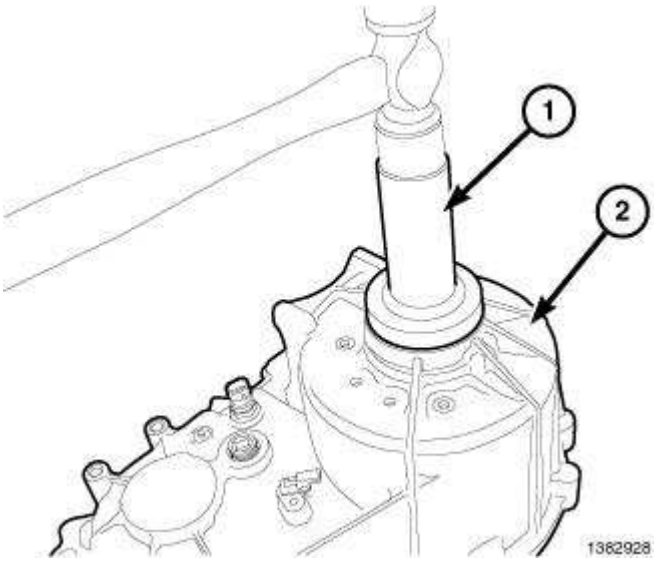

Fig. 48: Seal Installer And Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

14. Use (special tool #10174, Installer, Seal, Rear Output) Seal Installer to install the rear input shaft seal into the rear case half (2).

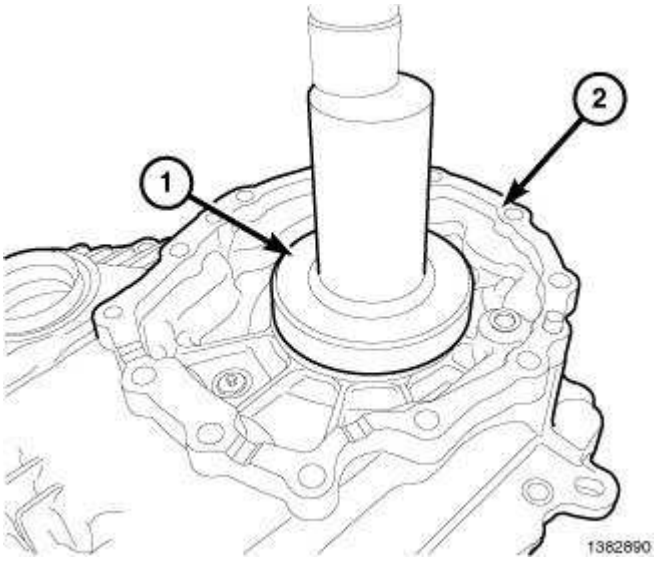

Fig. 49: Seal Installer And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

15. Use (special tool #10173, Installer, Input Shaft Seal) Seal Installer (1) to install the front input shaft seal into the front case half (2).
16. Use (special tool #10174, Installer, Seal, Rear Output) Seal Installer to install the rear output shaft seal into the front case half (2).

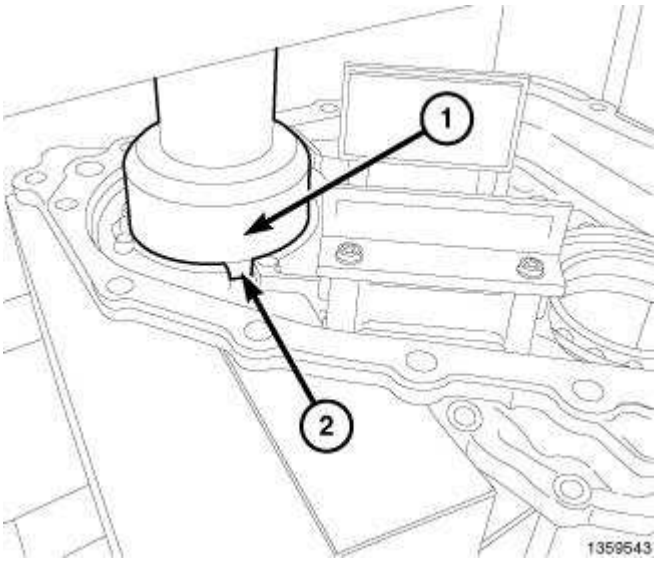

Fig. 50: Bearing Installer And Output Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

17. Use the (special tool #D-156, Installer, Bearing) Bearing Installer and an Arbor Press to install the Output Shaft Bearing into the Front Case Half.

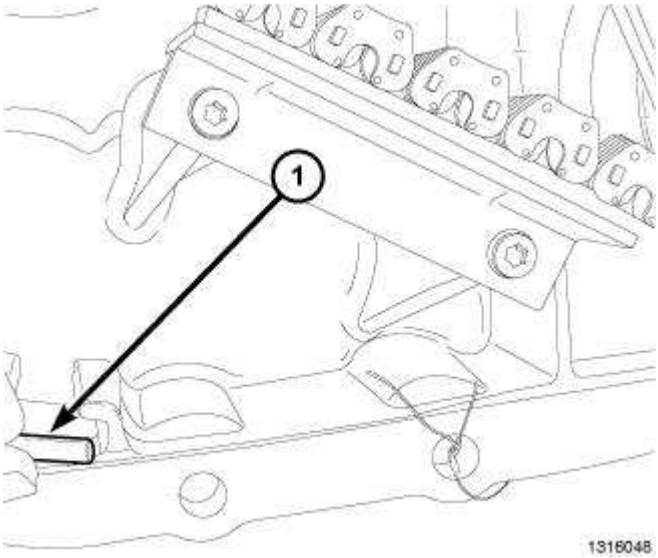

Fig. 51: Case Magnet
Courtesy of CHRYSLER GROUP, LLC

18. Install the Case Magnet (1).

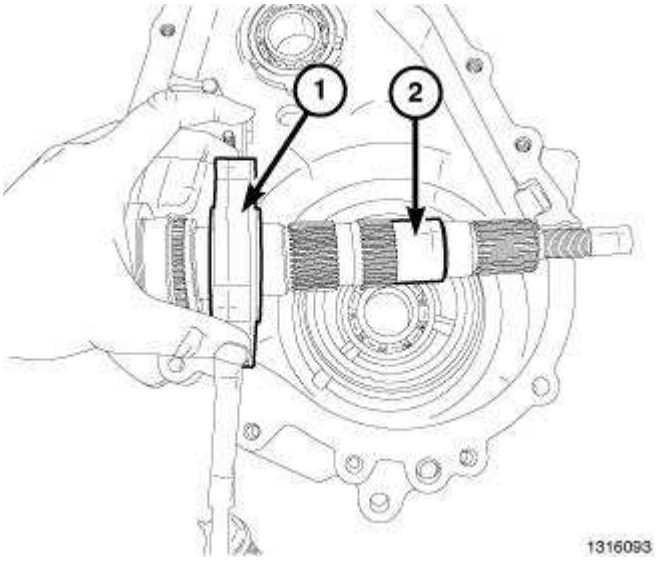

Fig. 52: Oil Pump Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

19. Position the Oil Pump Assembly (1) onto the Input Shaft (2).

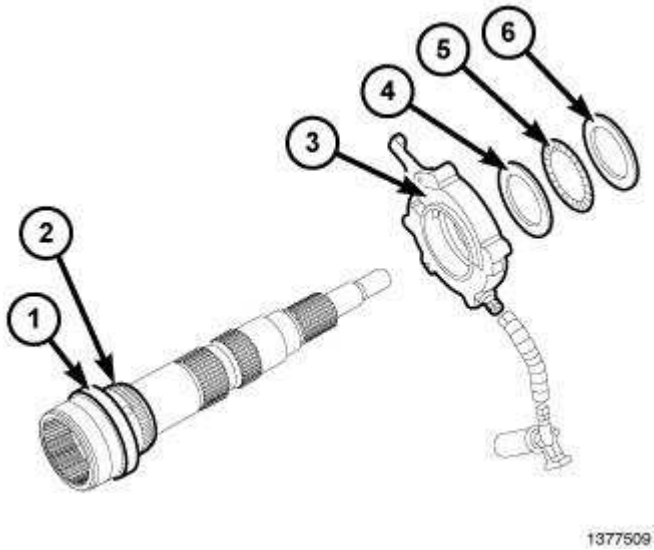

Fig. 53: Top Spacer, Bottom Spacer, Input Shaft, And Splines
Courtesy of CHRYSLER GROUP, LLC

20. Slide the Oil Pump down until it fully engages the Splines (2) on the Input Shaft (1).
21. Install the Bottom Spacer (4), the Bearing (5), and Top Spacer (6) onto the Input Shaft (1).

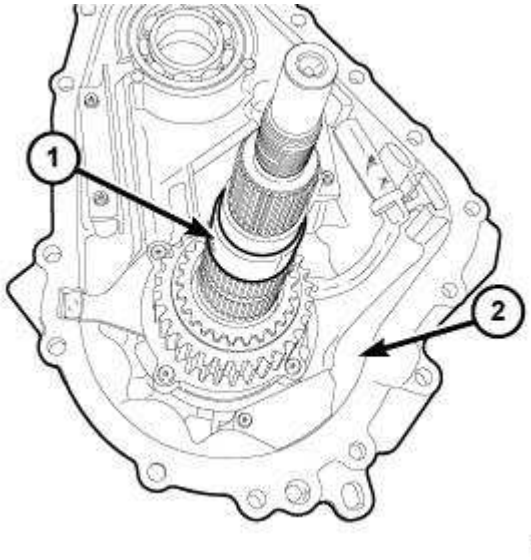

Fig. 54: Input Shaft Assembly And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

22. Install the Input Shaft assembly (1) into the Front Case Half (2).

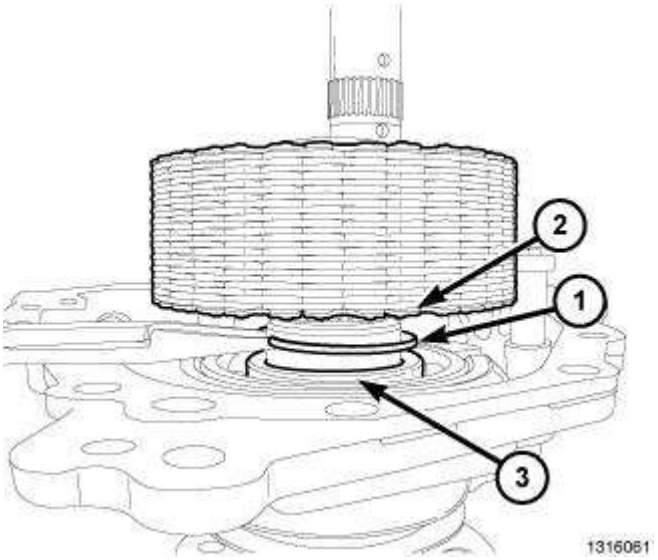

Fig. 55: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The output shaft sprocket is pressed onto the output shaft.**

NOTE: **If the Snap Ring (1) is temporarily installed too close to the top of the Output Shaft, it might not be possible to install it into the Bottom Groove on the Output Shaft after the Output Shaft Sprocket is pressed onto the Output Shaft.**

23. Temporarily install the Snap Ring (1) approximately 3 mm (0.12 in.) above the Groove (3) on the Output Shaft.
24. Install the Output Shaft Sprocket, the Drive Chain and the Drive Sprocket as an assembly.

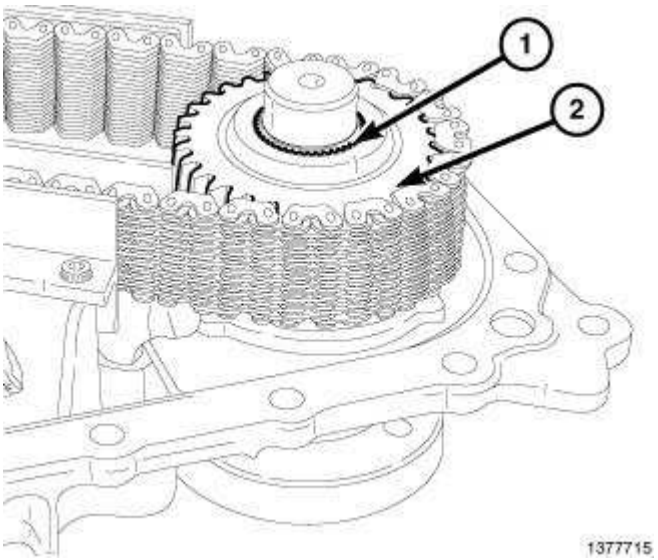

Fig. 56: Output Shaft Sprocket And Top Groove On Output Shaft

Courtesy of CHRYSLER GROUP, LLC

NOTE: When the Output Shaft Sprocket (2) is at the correct height, the Top Groove (1) on the Output Shaft will be visible.

25. Use the (special tool #8835-3, Receiver, Bushing) Installer and an arbor press to install the Output Shaft Sprocket (2) onto the Output Shaft. Press the sprocket until the Top Groove (1) on the Output Shaft is visible.

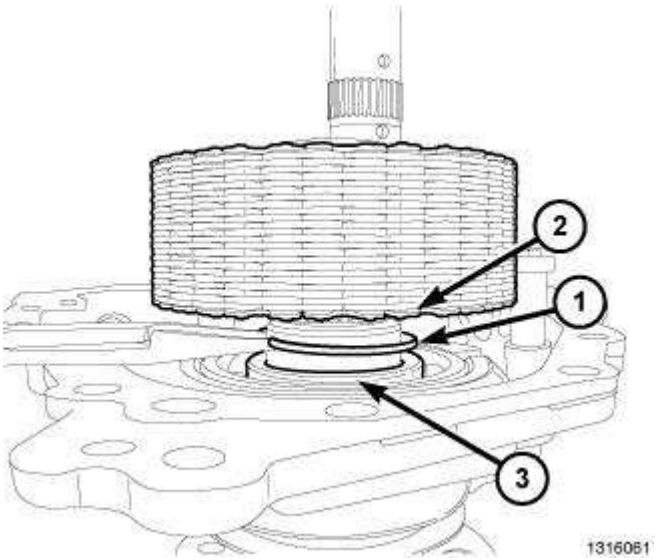

Fig. 57: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

26. Press the Output Shaft upward with the Output Shaft Flange, then install the Snap Ring (1) into the Groove (3) on the Output Shaft.

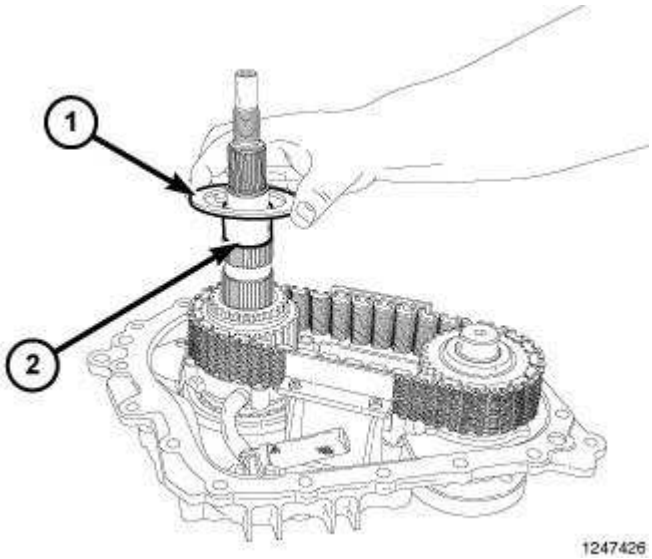

Fig. 58: Thrust Washer And Input Shaft

Courtesy of CHRYSLER GROUP, LLC

27. Install the thrust washer (1) onto the Input Shaft (2).

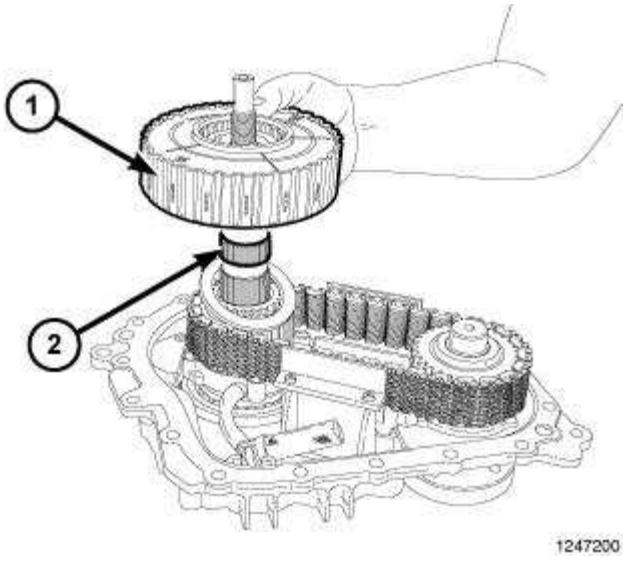

Fig. 59: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

28. Install a new Clutch Assembly (1) onto the input Shaft (2).

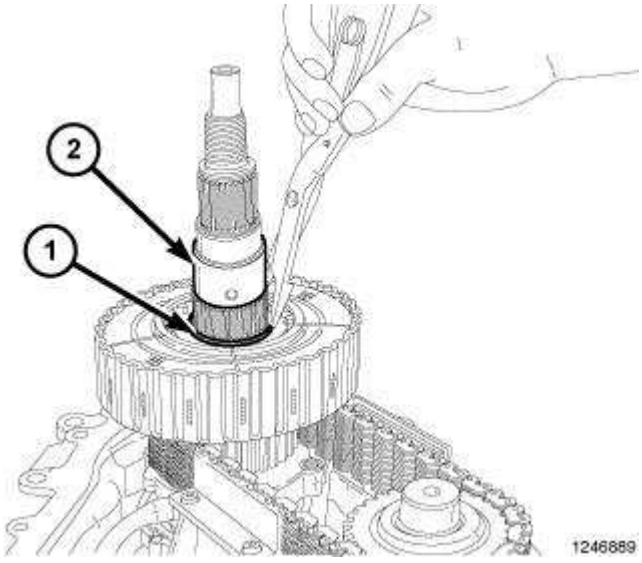

Fig. 60: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

29. Install the Snap Ring (1) onto the Input Shaft (2).

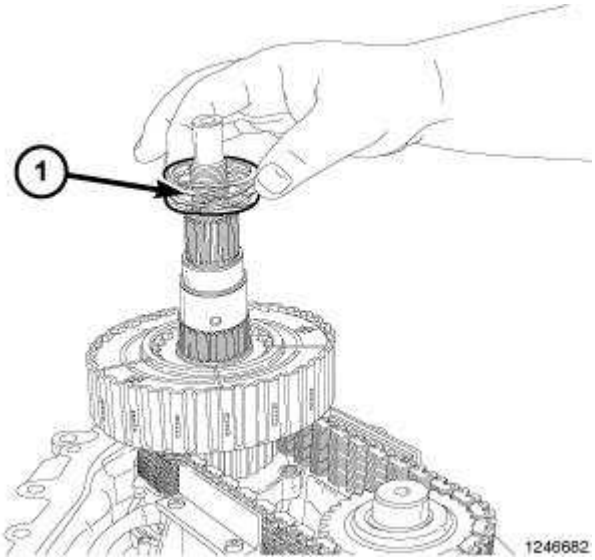

Fig. 61: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

30. Install the wave spring (1) onto the input shaft.

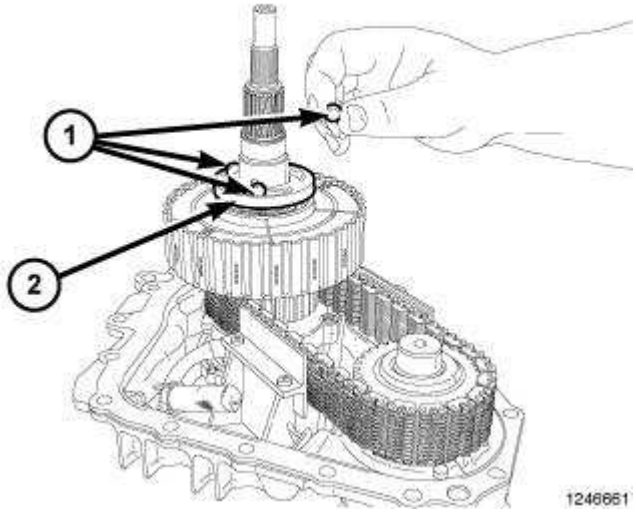

Fig. 62: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

31. Install the apply cam (2), and the ball bearings (1)

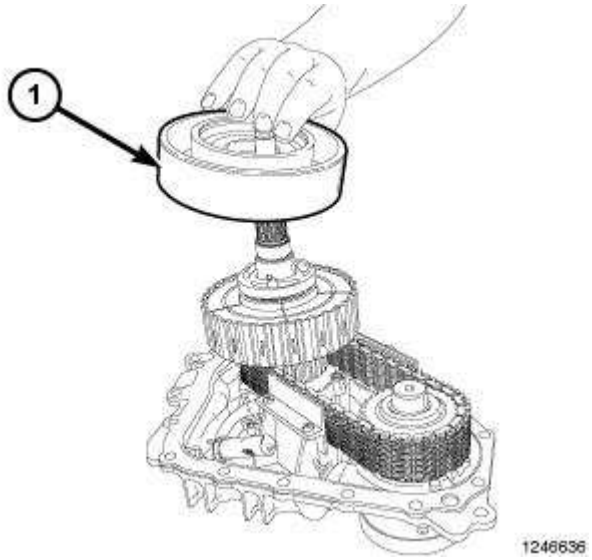

Fig. 63: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

32. Install the clutch rotor (1) onto the input shaft.

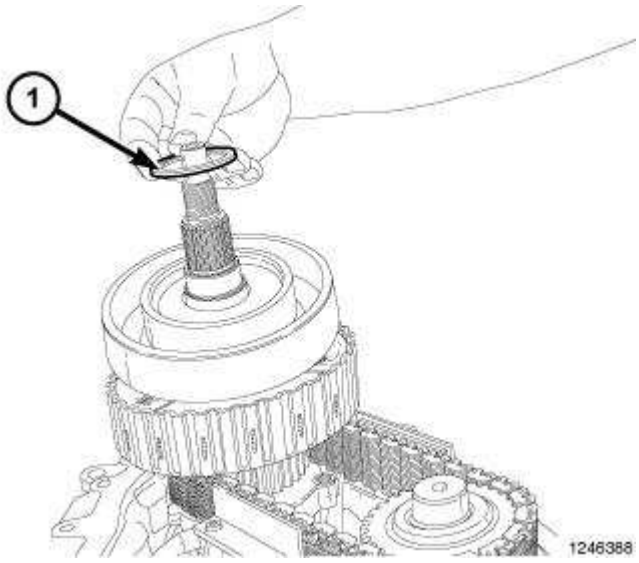

Fig. 64: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

33. Install the bearing (1) onto the input shaft.

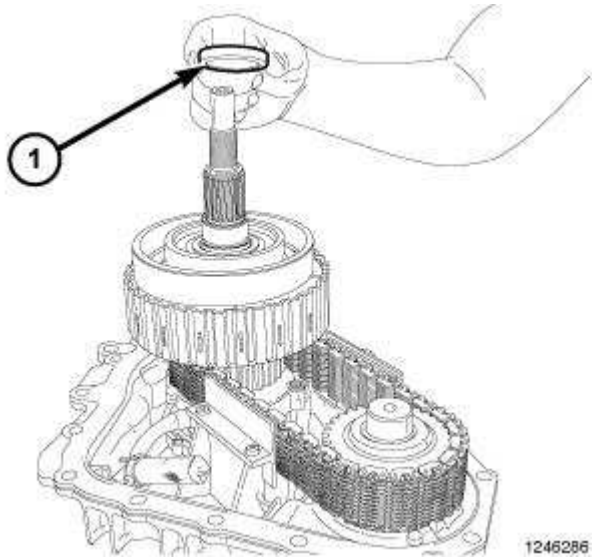

Fig. 65: Spacer
Courtesy of CHRYSLER GROUP, LLC

34. Install the spacer (1).

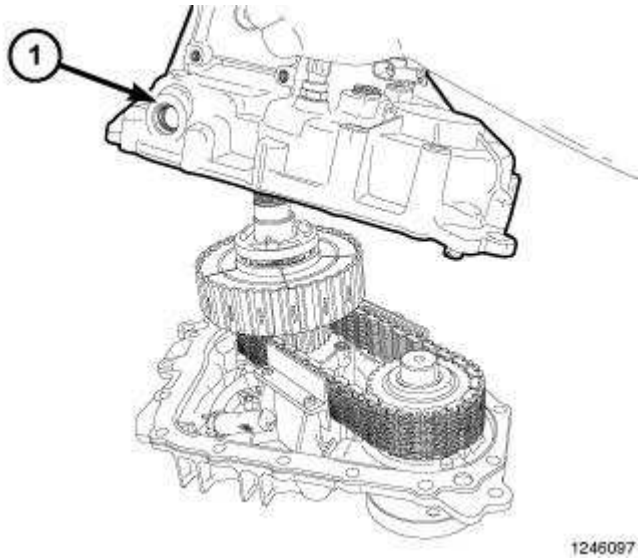

Fig. 66: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

35. Apply a bead of Loctite® 598 HB to the front case half sealing surface.
36. Install the rear cover (1). Tighten the case bolts to 31 Nm (23 ft. lbs).

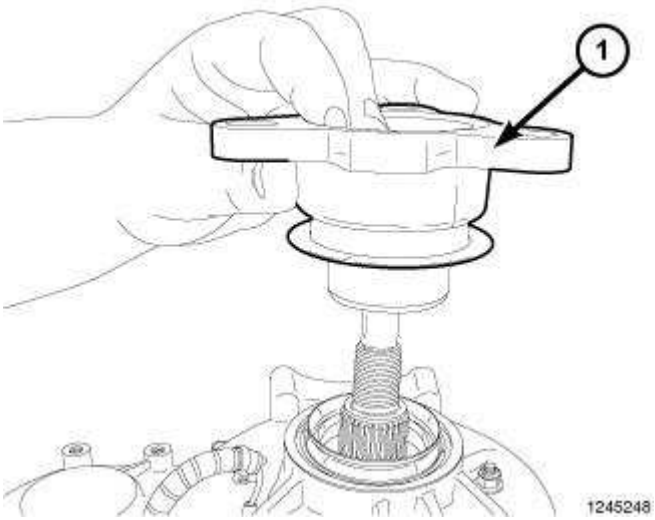

Fig. 67: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

37. Install the rear output flange (1)

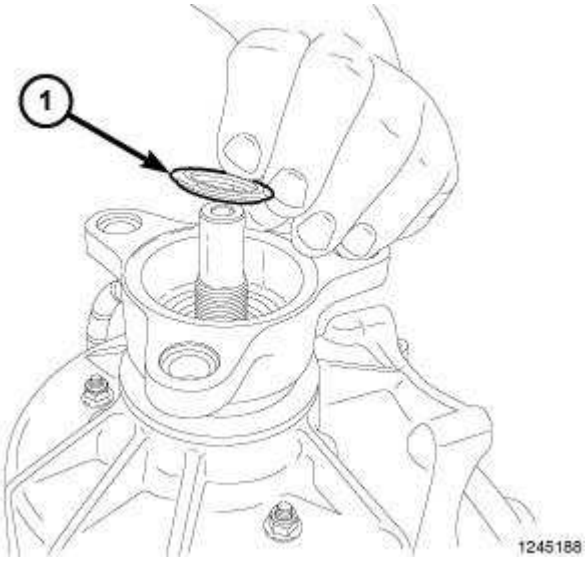

Fig. 68: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

38. Install a new outer rear output shaft seal (1)

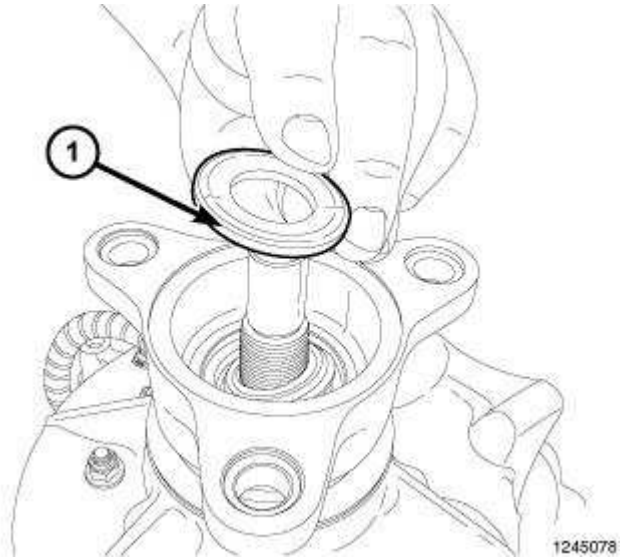

Fig. 69: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

39. Install the rear output flange washer (1)

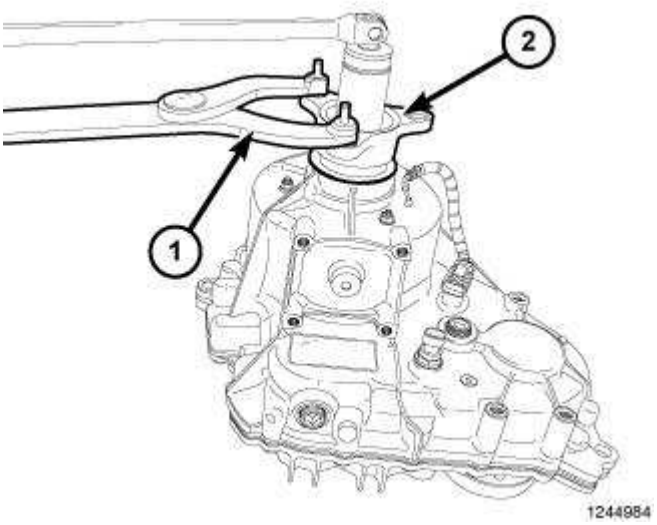

Fig. 70: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

40. Install the rear output flange nut.
41. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2). Tighten the rear output flange nut to 319 Nm (235 ft. lbs.).

INSTALLATION

INSTALLATION

1. Place the transfer case on a transmission jack, and raise the transfer case up to the rear transmission flange.
2. Align the transfer case dowel pins with the holes in the rear transmission flange.

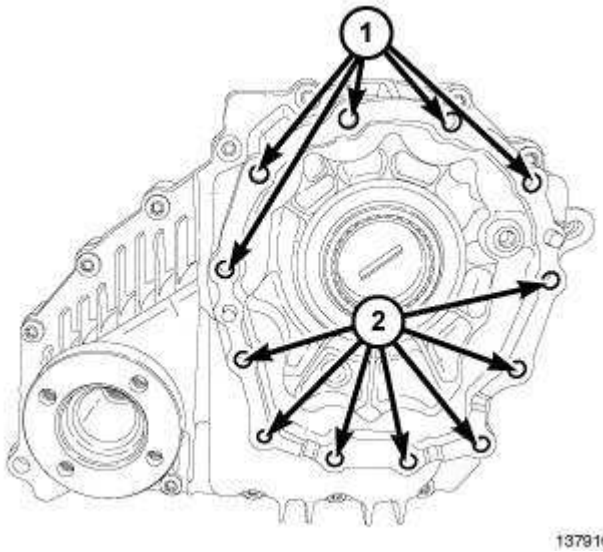

Fig. 71: Front (Transmission) Side Of PTU Case Flange
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front (transmission) side of the transfer case flange is shown in illustration for clarity.

3. Install the upper and lower transfer case to transmission bolts into the upper (1) and lower (2) halves half of the transfer case flange. Tighten the transfer case to transmission bolts to 55 Nm (41 ft. lb.).
4. Raise the transfer case and transmission up into position, and support with a suitable service jack. Remove the transmission jack.
5. Install the front propeller shaft. Refer to **INSTALLATION** .

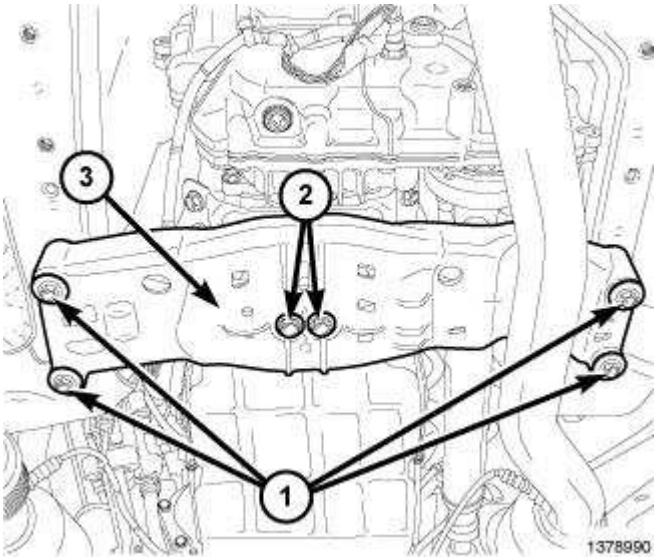

Fig. 72: Crossmember And Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the crossmember (3) and install the bolts attaching the crossmember (1) to frame.
7. Lower transmission with service jack onto crossmember and supports.
8. Install the bolts (2) securing rear support and cushion to transmission crossmember (3).

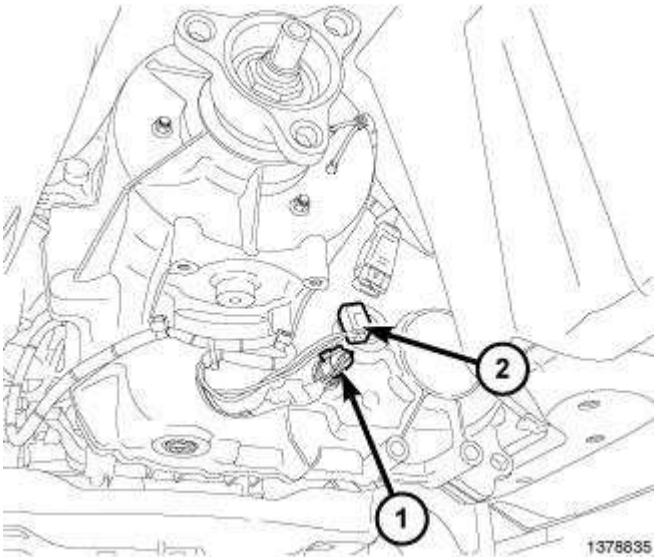

Fig. 73: Temperature Sensor Harness Connector And Clutch Coil Harness Connector
Courtesy of CHRYSLER GROUP, LLC

9. Connect the temperature sensor harness connector (1) and the clutch coil harness connector (2).
10. Install the rear propeller shaft. Refer to **INSTALLATION** .
11. Install the exhaust. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
12. If the fluid was drained, fill the transfer case with 1.0L +/- 0.5L (2.11 pint +/- 0.11pint.) of fluid.

Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

SPECIAL TOOLS

SPECIAL TOOLS

	10173 - Installer, Input Shaft Seal (Originally Shipped In Kit Number(s) 10175.) 10174 - Installer, Seal, Rear Output (Originally Shipped In Kit Number(s) 10175.) 10176 - Remover, Front Drive Sprocket (Originally Shipped In Kit Number(s) 10175.) 6958 - Wrench, Spanner (Originally Shipped In Kit Number(s) 6947, 6949, 6966, 8204, 8204CC, 8667.) 8149 - Installer, Seal (Originally Shipped In Kit Number(s) 8104A.) 8153 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 8104.) 8441-2 - Cup, Receiver (Originally Shipped In Kit Number(s) 8665, 8665CC, 8702.) 8835-3 - Receiver, Bushing (Originally Shipped In Kit Number(s) 8715, 8719.) 9585 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9691.) 9664 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9675, 9685, 9695.) C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.) D-156 - Installer, Bearing (Originally Shipped In Kit Number(s) 8207, 8418.)

CHAIN

REMOVAL

REMOVAL

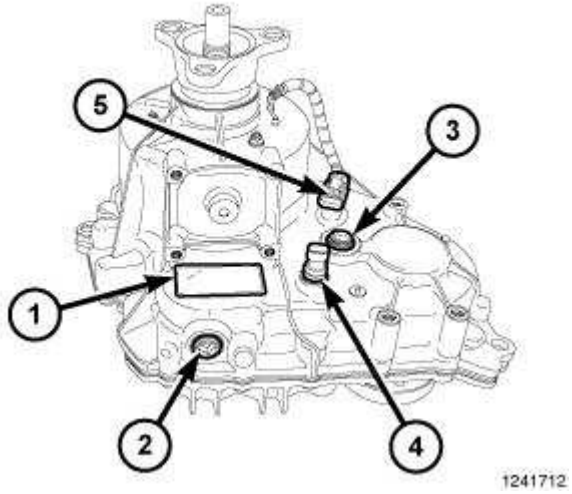

Fig. 74: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transfer case from the vehicle. Refer to **REMOVAL**.

   NOTE: The vent hole is near the input shaft hub. If the unit is set on the mounting surface, oil will drain out through the vent.

2. Place the transfer case so that it can be drained of any remaining fluid and remove the drain plug (2).

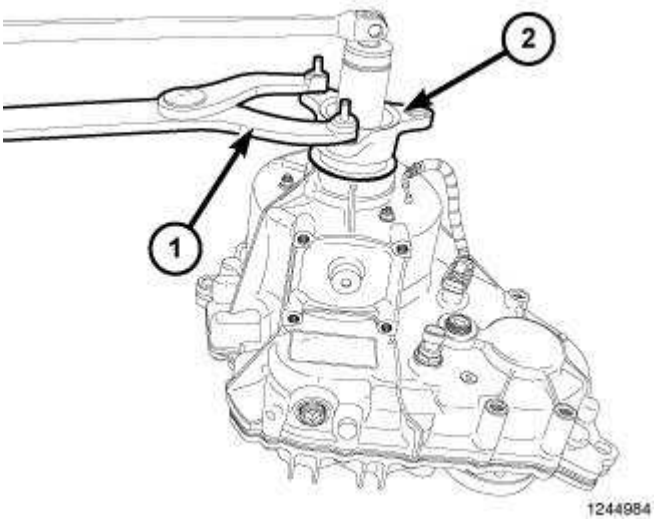

Fig. 75: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

3. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
4. Remove the rear output flange nut.

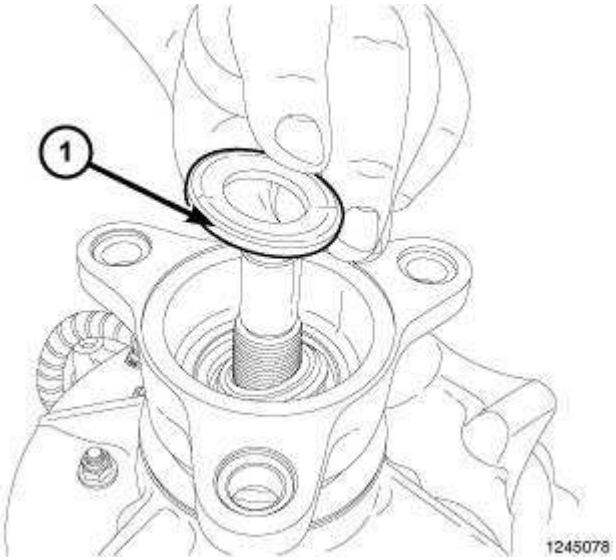

Fig. 76: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear output flange washer (1)

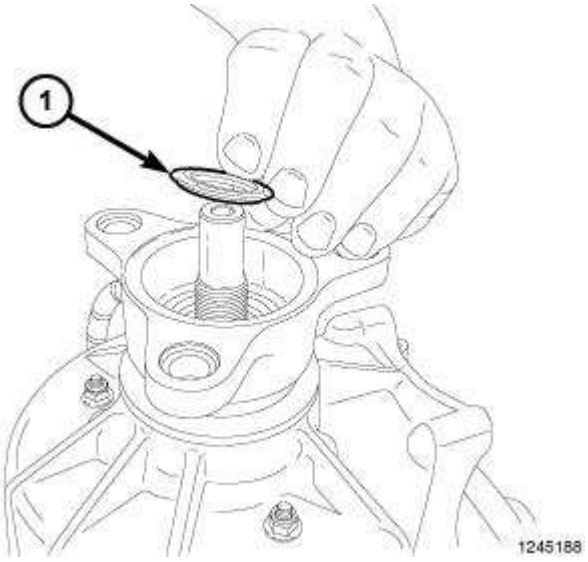

Fig. 77: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

6. Remove the outer rear output shaft seal (1)

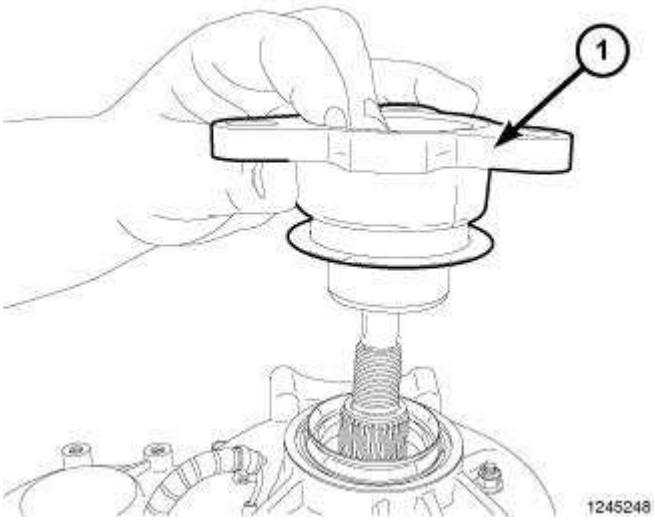

Fig. 78: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

7. Remove the rear output flange (1)

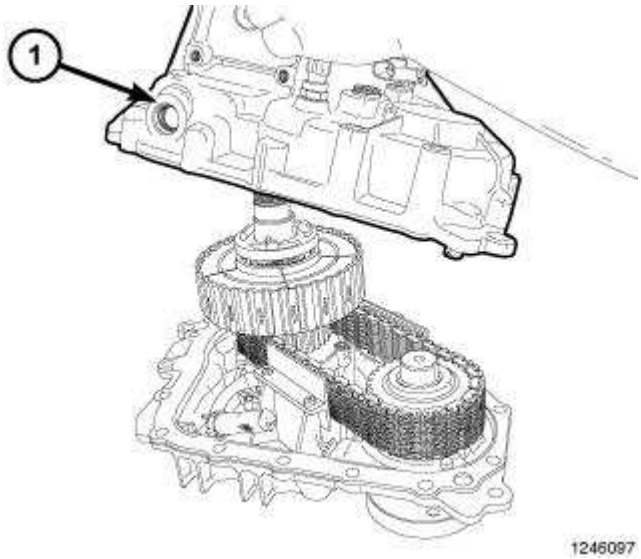

Fig. 79: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

8. Remove the case half bolts.

NOTE: The clutch rotor might remain in the rear case half during removal.

9. Remove the rear cover (1)

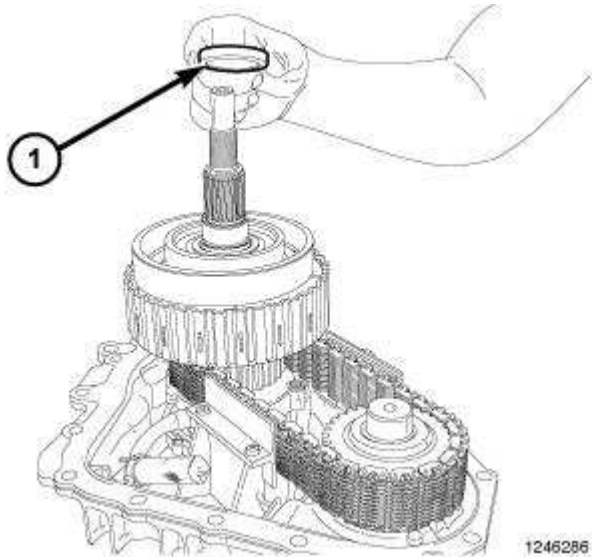

Fig. 80: Spacer
Courtesy of CHRYSLER GROUP, LLC

10. Remove the spacer (1)

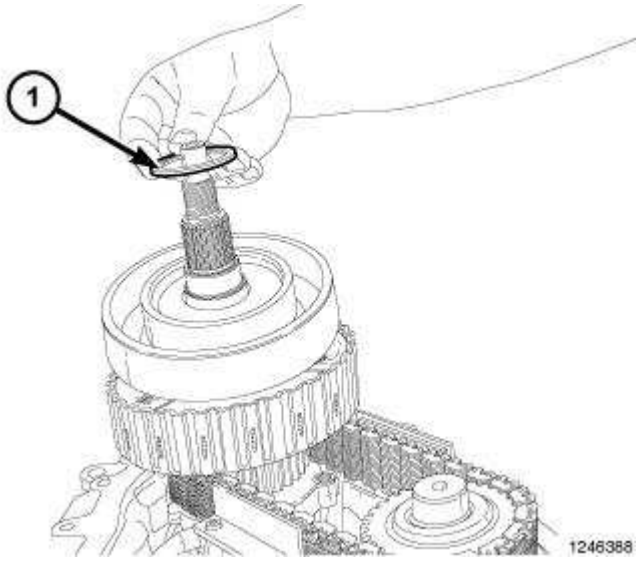

Fig. 81: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

11. Remove the bearing (1) from the input shaft.

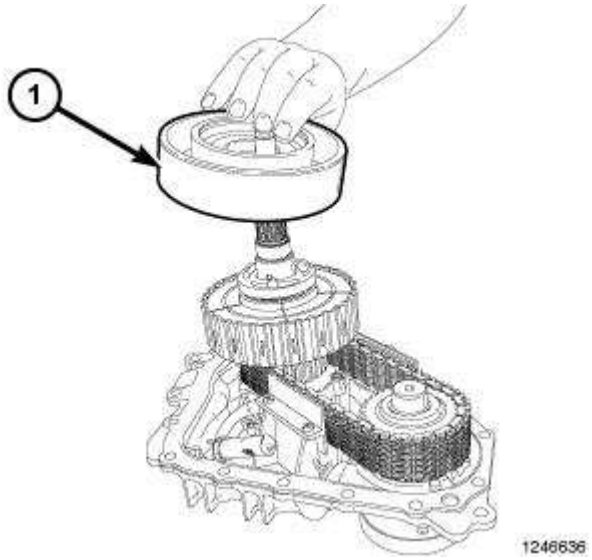

Fig. 82: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

12. Remove the clutch rotor (1) from the input shaft.

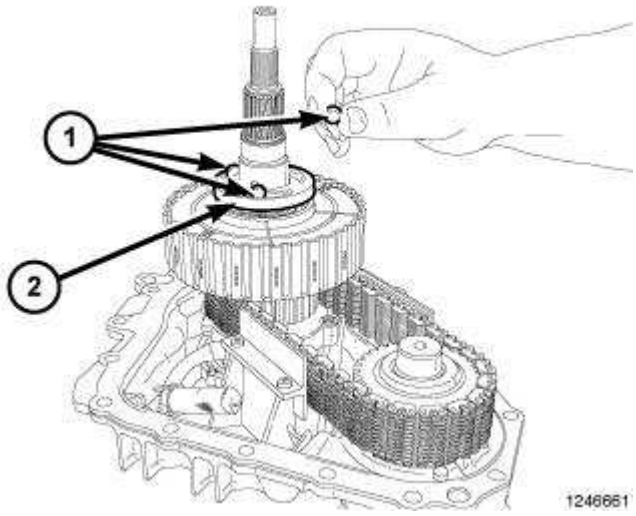

Fig. 83: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

13. Remove the ball bearings (1) from the apply cam (2).
14. Remove the apply cam (2).

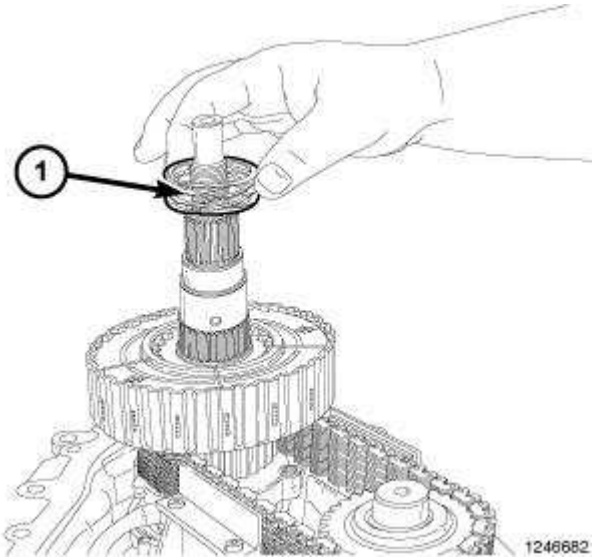

Fig. 84: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

15. Remove the wave spring (1) from the input shaft.

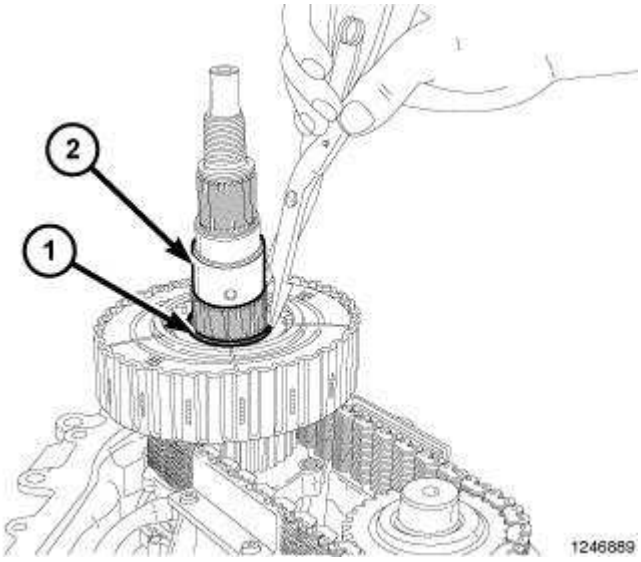

Fig. 85: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

16. Remove the snap ring (1) from the input shaft (2).

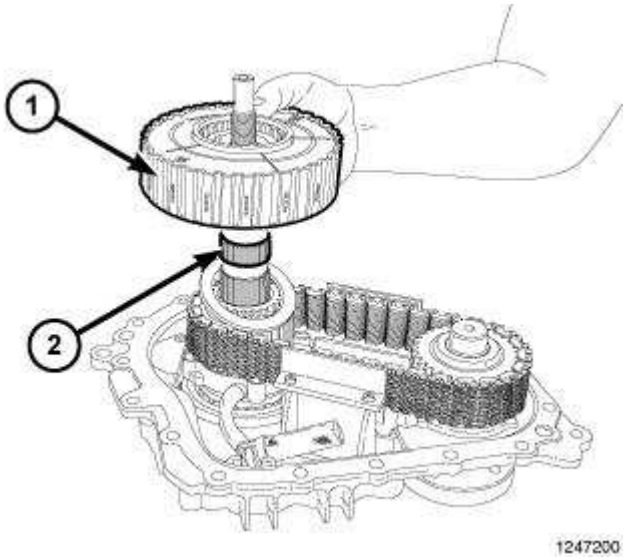

Fig. 86: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

17. Remove the clutch assembly (1) from the input shaft (2).

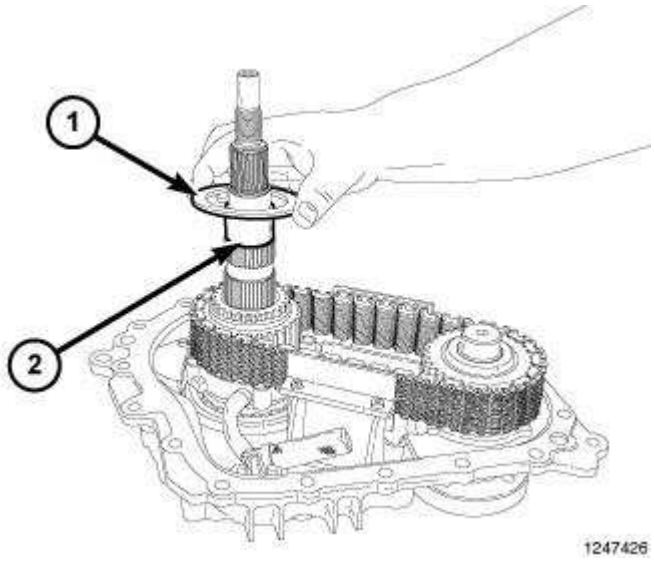

Fig. 87: Thrust Washer And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

18. Remove the thrust washer (1) from the input shaft (2).

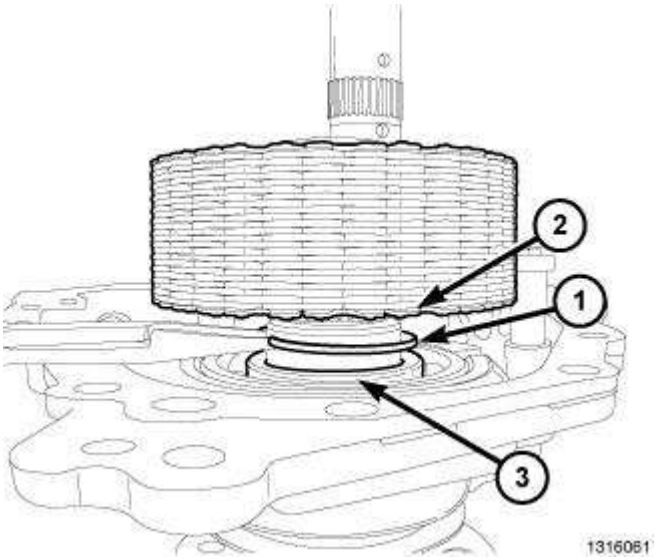

Fig. 88: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: The output shaft sprocket is pressed onto the output shaft.

19. Release the Snap Ring (1) from the Output Shaft and move it away from the Groove (3), toward the Output Shaft Sprocket (2).

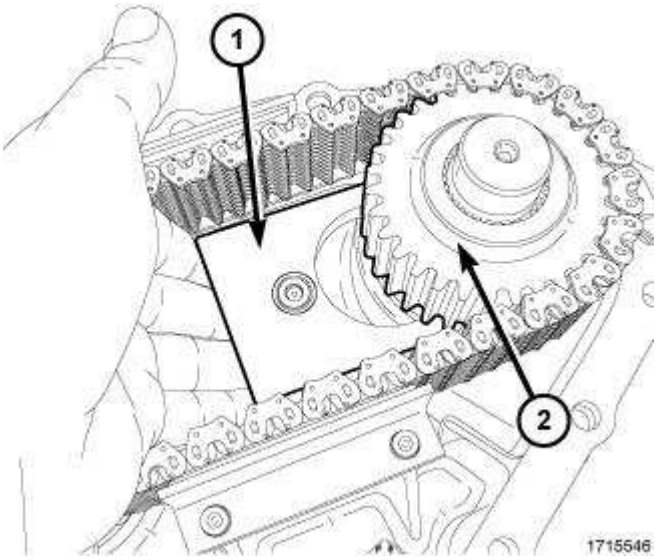

Fig. 89: Brace Plate And Input Shaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

20. Slide the (special tool #10176, Remover, Front Drive Sprocket) Brace Plate (1) in between the case and the input shaft sprocket (2).

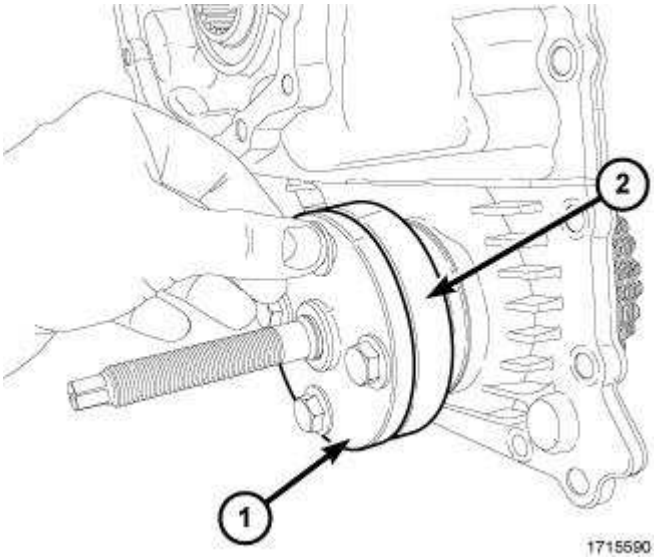

Fig. 90: Puller Plate And Output Shaft Flange
Courtesy of CHRYSLER GROUP, LLC

21. Align the holes on the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) with the bolt holes in the output shaft flange (2), then install the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) onto the output shaft flange (2).

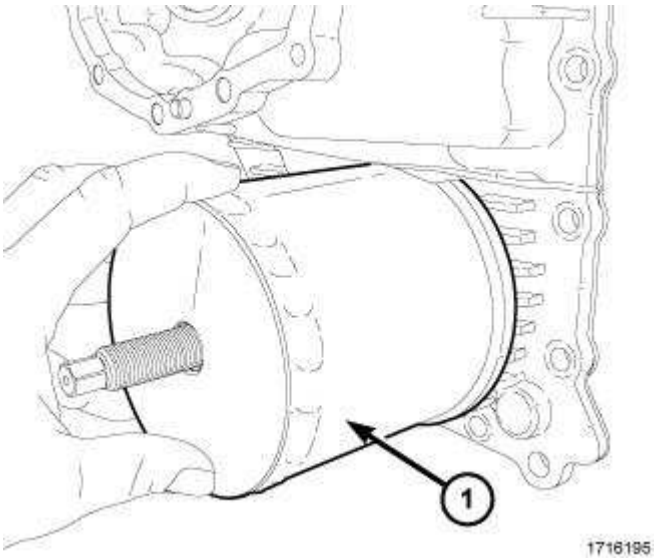

Fig. 91: Base
Courtesy of CHRYSLER GROUP, LLC

22. Install the (special tool #10176, Remover, Front Drive Sprocket) Base (1) onto the puller plate.

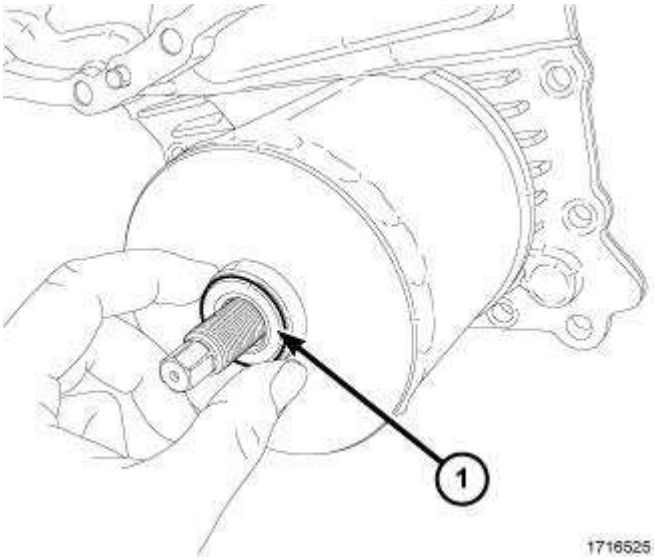

Fig. 92: Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1) so that the bearing flange is facing up.

23. Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1).

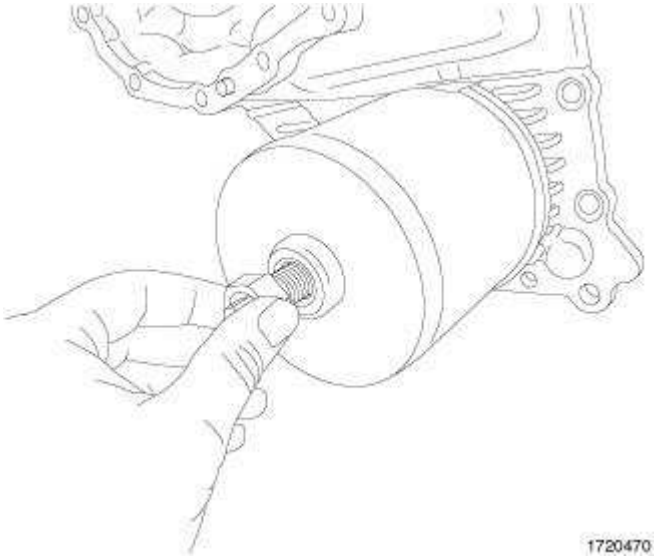

Fig. 93: Nut
Courtesy of CHRYSLER GROUP, LLC

24. Install the (special tool #10176, Remover, Front Drive Sprocket) Nut (1).

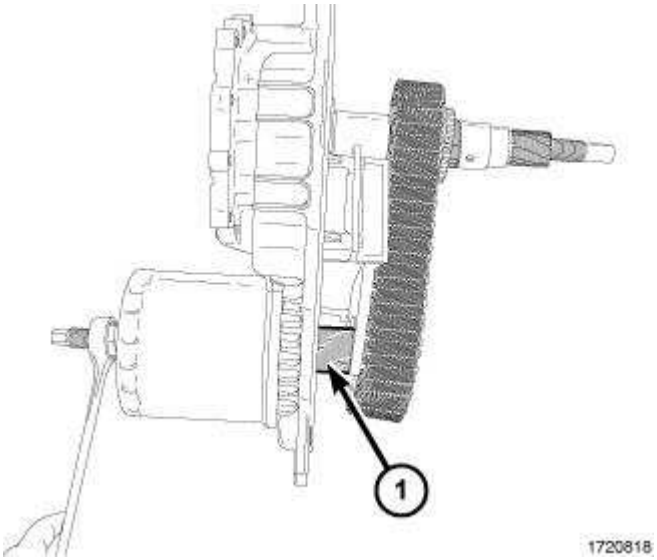

Fig. 94: Output Shaft
Courtesy of CHRYSLER GROUP, LLC

25. Tighten the nut until the Output Shaft (1) is pulled free of the output shaft sprocket.
26. Remove the Output Shaft Sprocket, the Drive Chain, and the Drive Sprocket as an assembly.

INSTALLATION

INSTALLATION

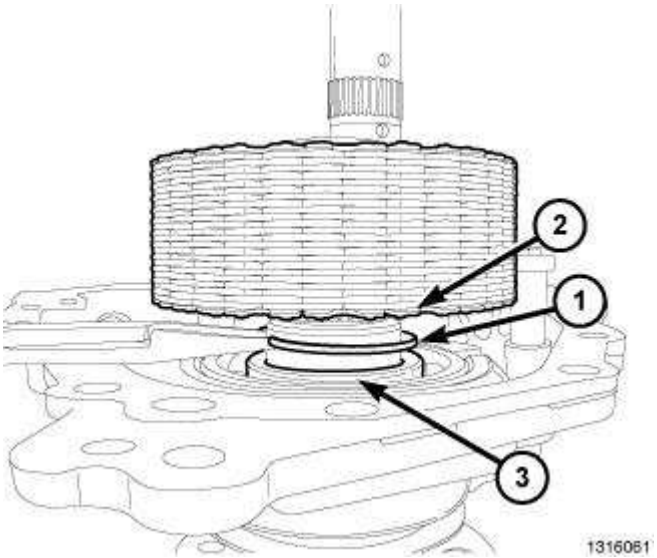

Fig. 95: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: The output shaft sprocket is pressed onto the output shaft.

NOTE: **If the Snap Ring (1) is temporarily installed too close to the top of the Output Shaft, it might not be possible to install it into the Bottom Groove on the Output Shaft after the Output Shaft Sprocket is pressed onto the Output Shaft.**

1. Temporarily install the Snap Ring (1) approximately 3 mm (0.12 in.) above the Groove (3) on the Output Shaft.
2. Install the Output Shaft Sprocket, the Drive Chain and the Drive Sprocket as an assembly.

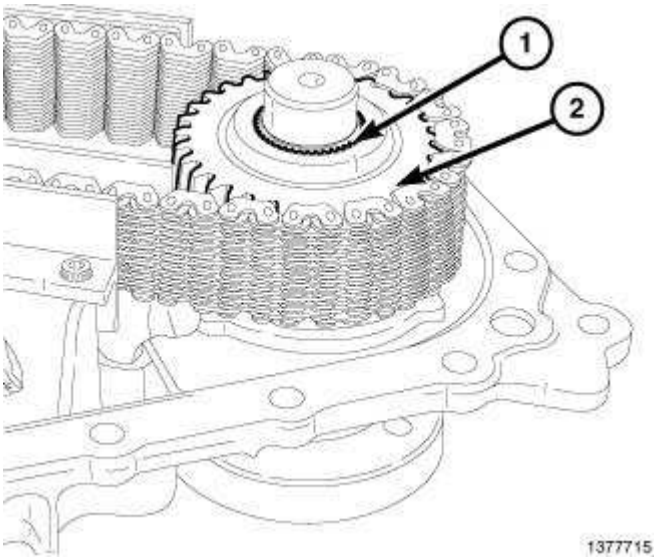

Fig. 96: Output Shaft Sprocket And Top Groove On Output Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When the Output Shaft Sprocket (2) is at the correct height, the Top Groove (1) on the Output Shaft will be visible.**

3. Use the (special tool #8835-3, Receiver, Bushing) Installer and an arbor press to install the Output Shaft Sprocket (2) onto the Output Shaft. Press the sprocket until the Top Groove (1) on the Output Shaft is visible.

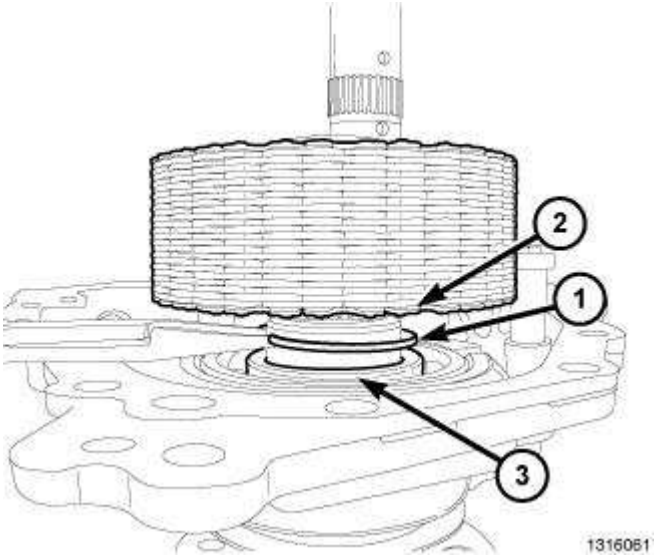

Fig. 97: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

4. Press the Output Shaft upward with the Output Shaft Flange, then install the Snap Ring (1) into the Groove (3) on the Output Shaft.

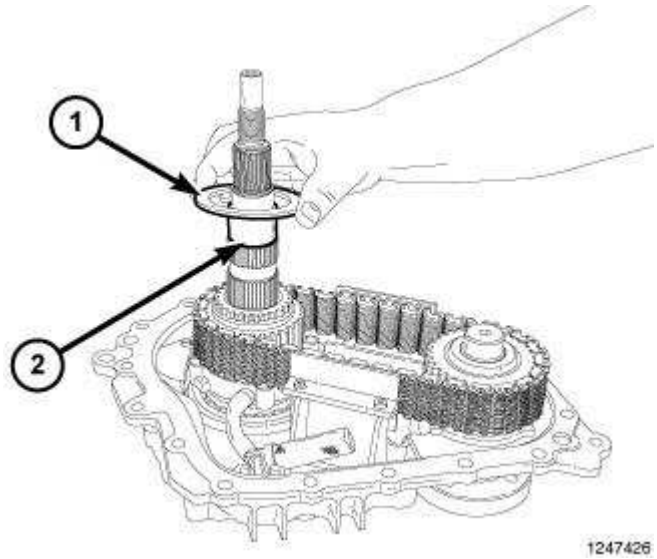

Fig. 98: Thrust Washer And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

5. Install the thrust washer (1) onto the Input Shaft (2).

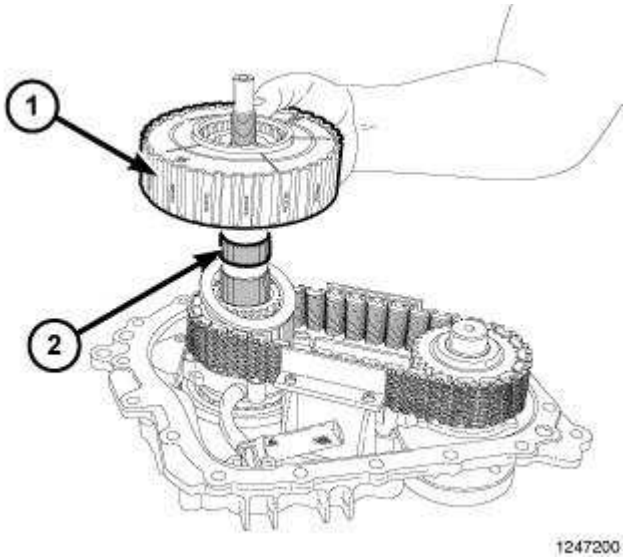

Fig. 99: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

6. Install a new Clutch Assembly (1) onto the input Shaft (2).

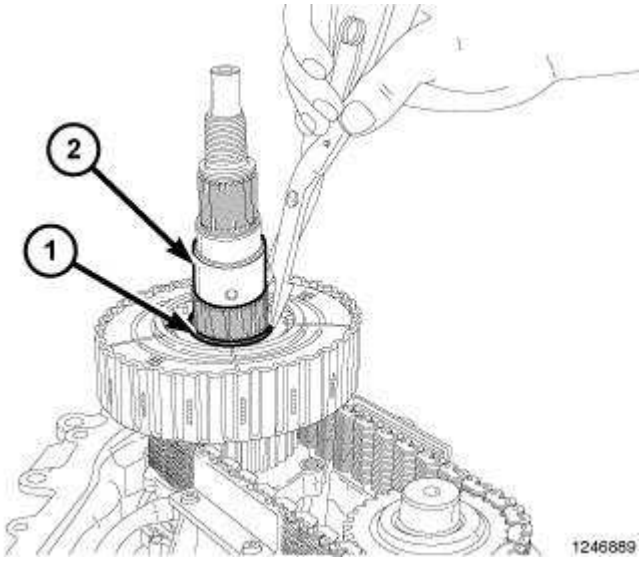

Fig. 100: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

7. Install the Snap Ring (1) onto the Input Shaft (2).

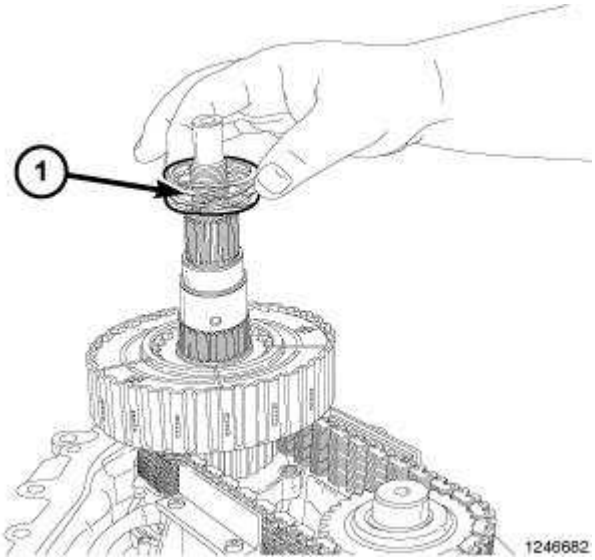

Fig. 101: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

8. Install the wave spring (1) onto the input shaft.

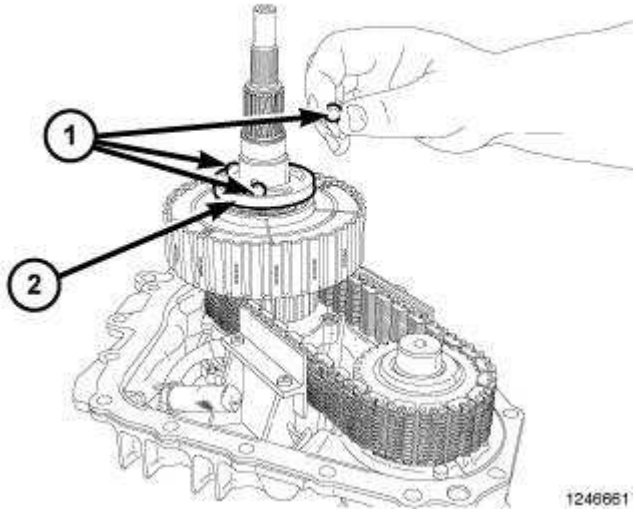

Fig. 102: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

9. Install the apply cam (2), and the ball bearings (1)

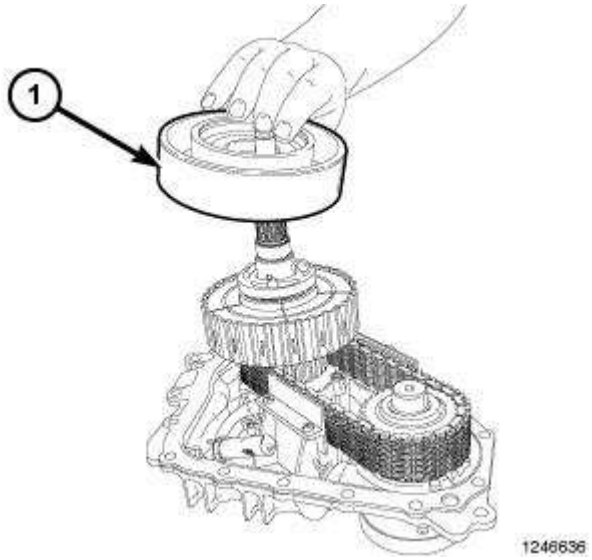

Fig. 103: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

10. Install the clutch rotor (1) onto the input shaft.

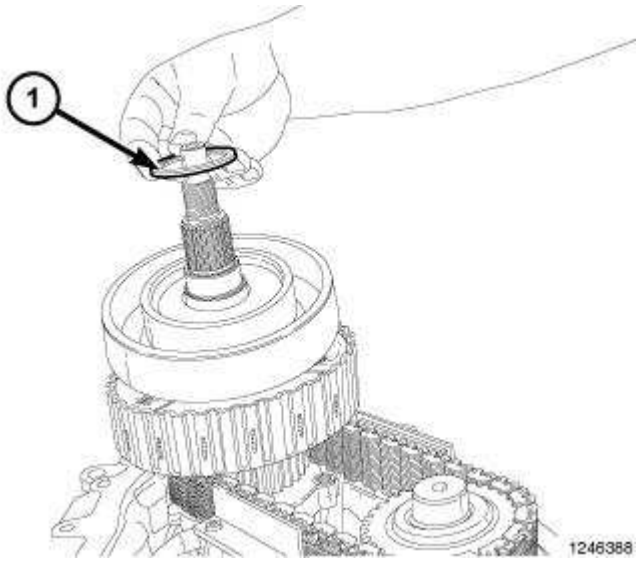

Fig. 104: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

11. Install the bearing (1) onto the input shaft.

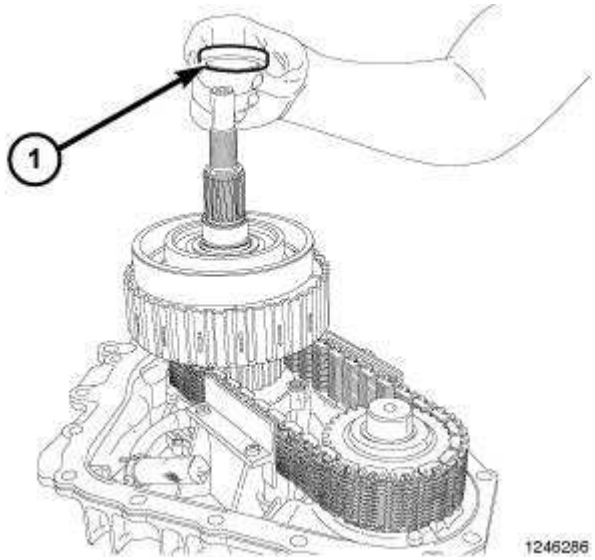

Fig. 105: Spacer
Courtesy of CHRYSLER GROUP, LLC

12. Install the spacer (1)

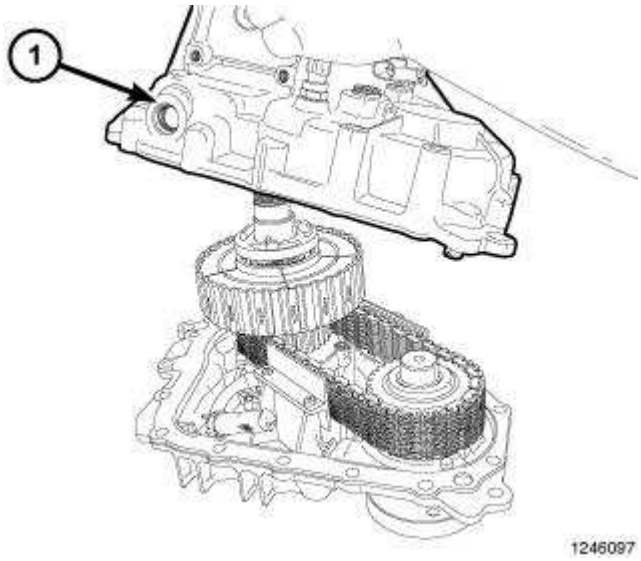

Fig. 106: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

13. Apply a bead of Loctite® 598 HB to the front case half sealing surface.
14. Install the rear cover (1). Tighten the case bolts to 31 Nm (23 ft. lbs).

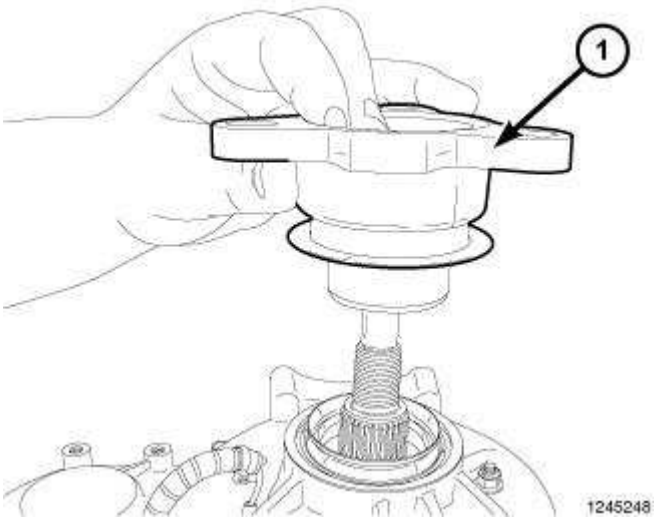

Fig. 107: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

15. Install the rear output flange (1)

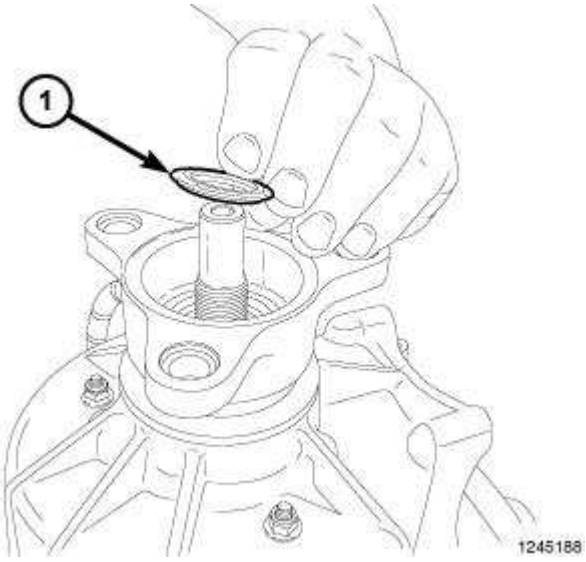

Fig. 108: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

16. Install a new outer rear output shaft seal (1)

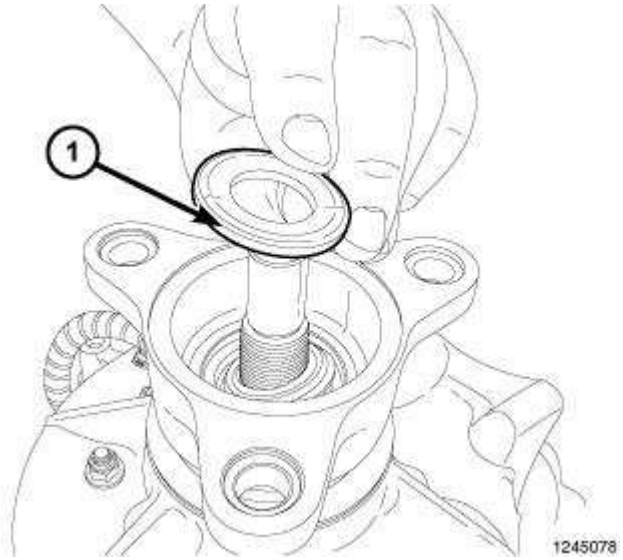

Fig. 109: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

17. Install the rear output flange washer (1)

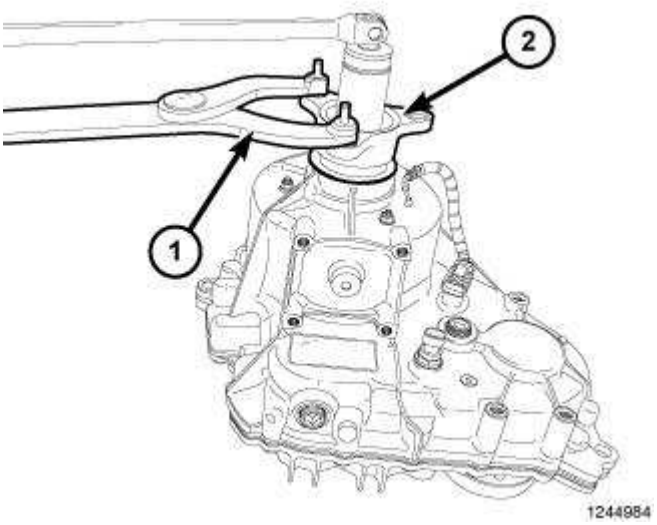

Fig. 110: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

18. Install the rear output flange nut.
19. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2). Tighten the rear output flange nut to 319 Nm (235 ft. lbs.).
20. Install the transfer case. Refer to **INSTALLATION**.

CLUTCH

REMOVAL

REMOVAL

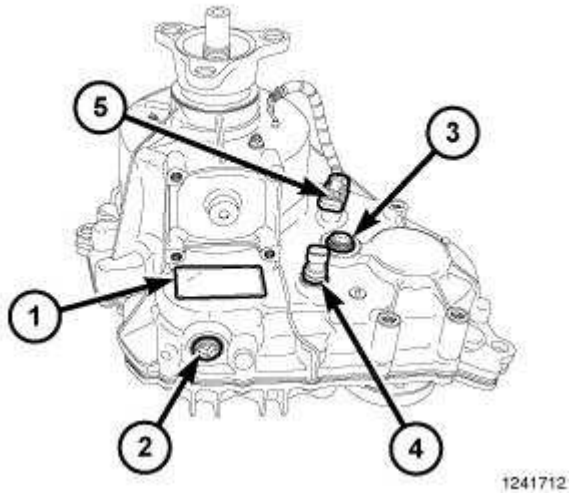

Fig. 111: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

NOTE: The vent hole is near the input shaft hub. If the unit is set on the mounting surface, oil will drain out through the vent.

1. Place the transfer case so that it can be drained of any remaining fluid and remove the drain plug (2).

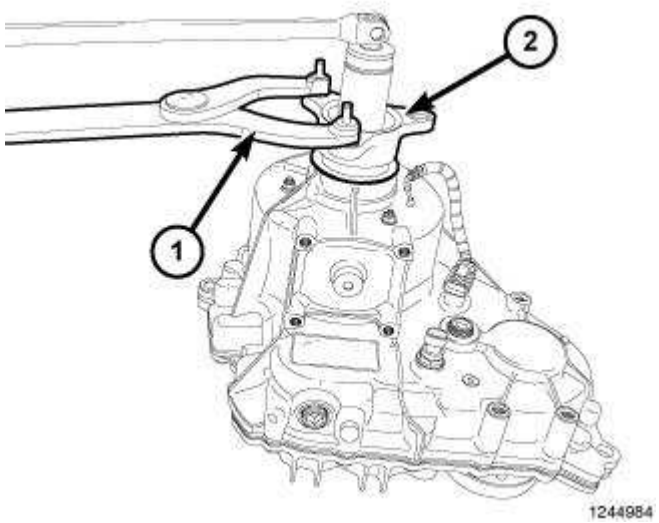

Fig. 112: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

2. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
3. Remove the rear output flange nut.

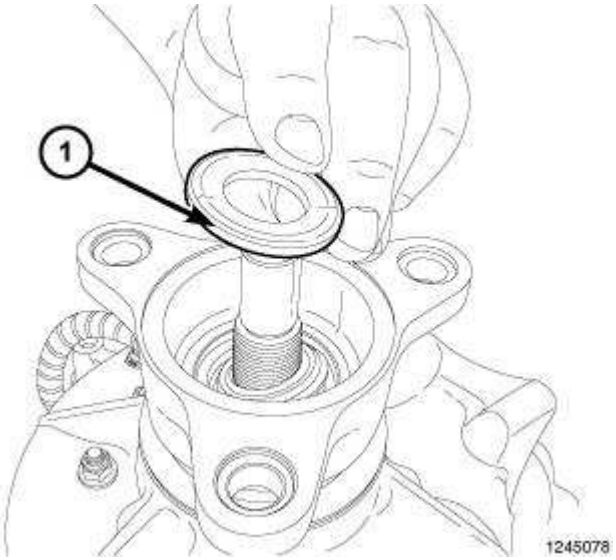

Fig. 113: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

4. Remove the rear output flange washer (1).

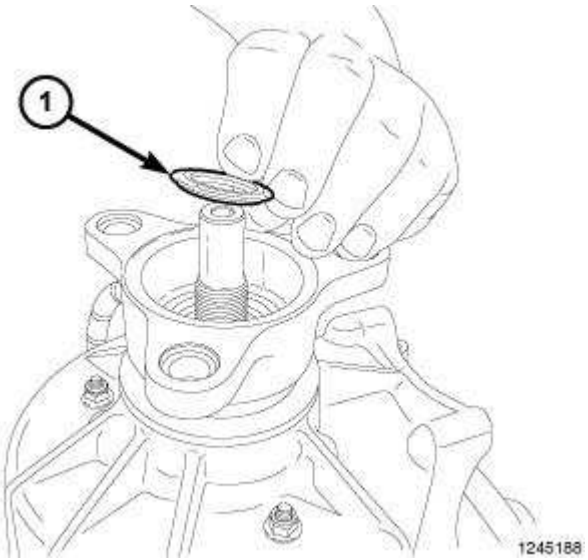

Fig. 114: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

5. Remove the outer rear output shaft seal (1).

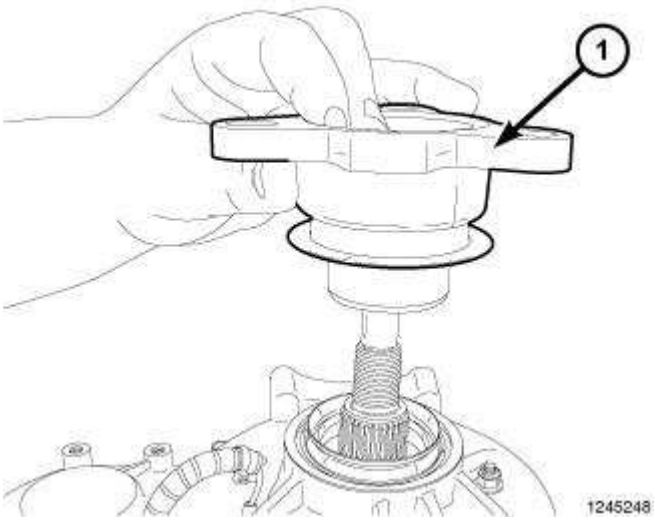

Fig. 115: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rear output flange (1).
7. Remove the case half bolts.

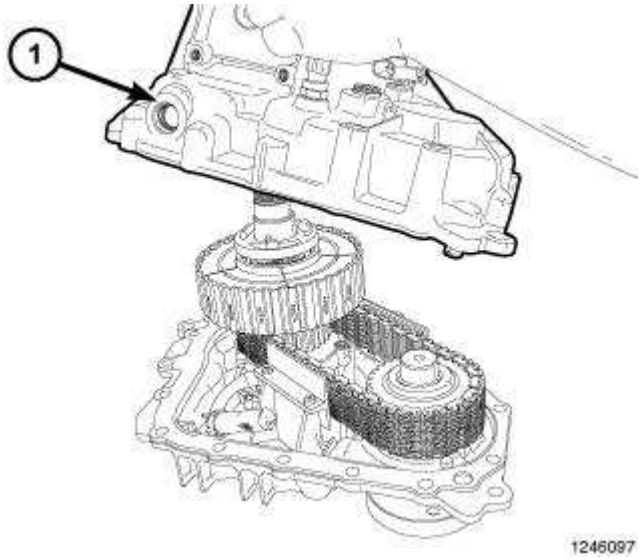

Fig. 116: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

8. Remove the rear cover (1).

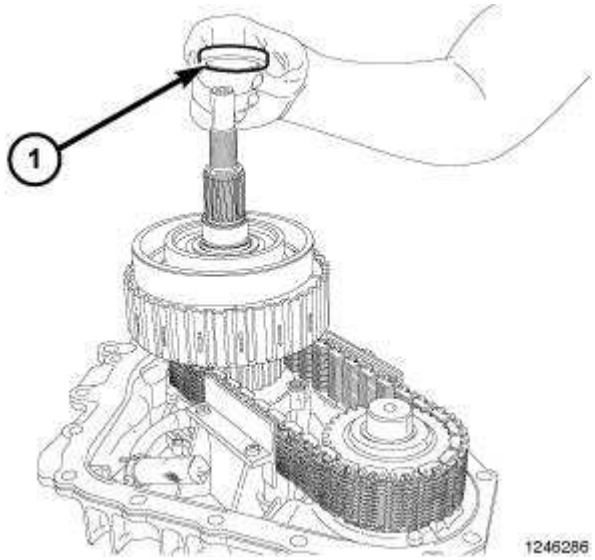

Fig. 117: Spacer
Courtesy of CHRYSLER GROUP, LLC

NOTE: The clutch rotor might remain in the rear case half during removal.

9. Remove the spacer (1).

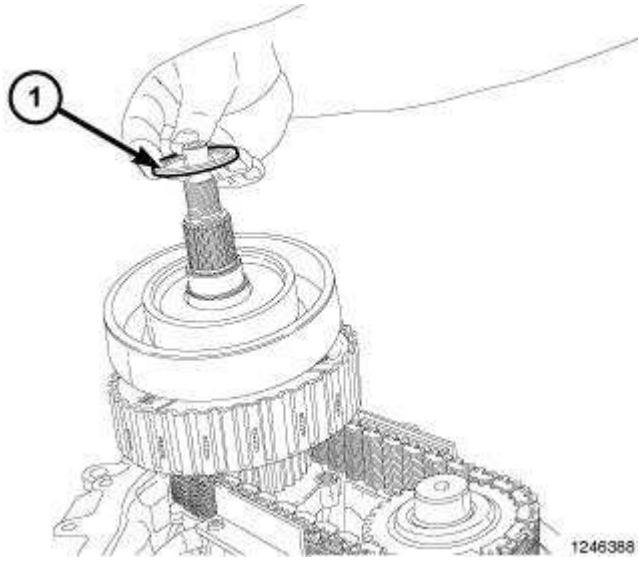

Fig. 118: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

10. Remove the bearing (1) from the input shaft.

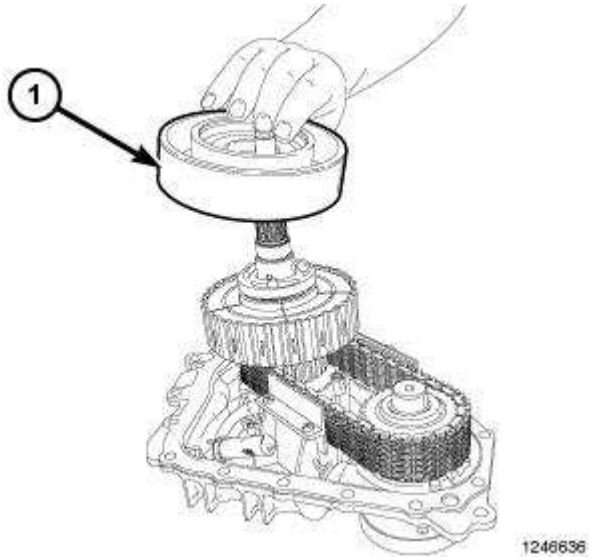

Fig. 119: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

11. Remove the clutch rotor (1) from the input shaft.

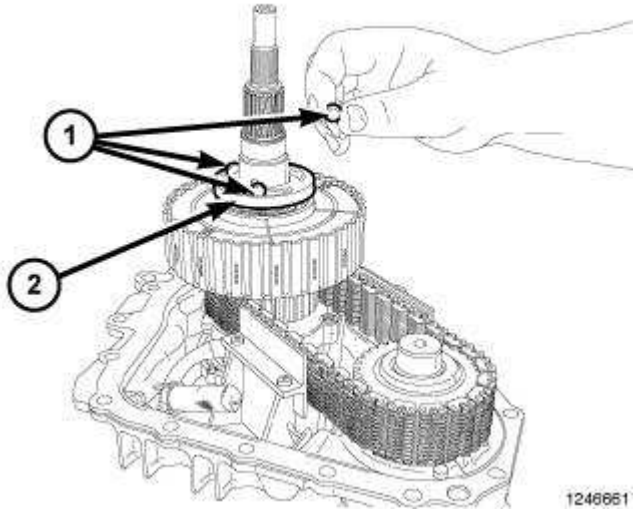

Fig. 120: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

12. Remove the ball bearings (1) from the apply cam (2).
13. Remove the apply cam (2).

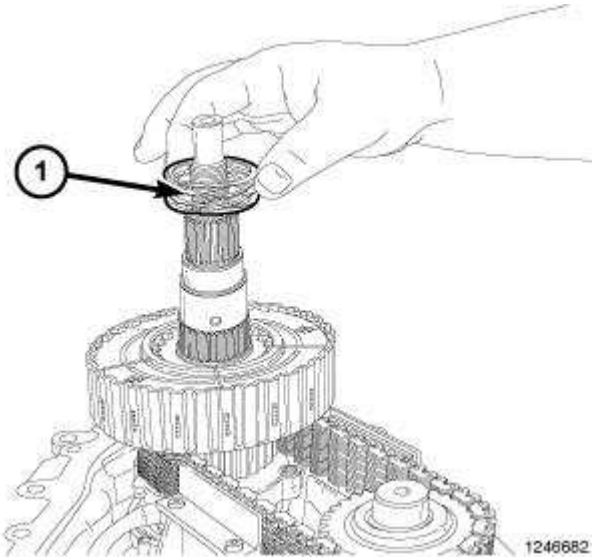

Fig. 121: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

14. Remove the wave spring (1) from the input shaft.

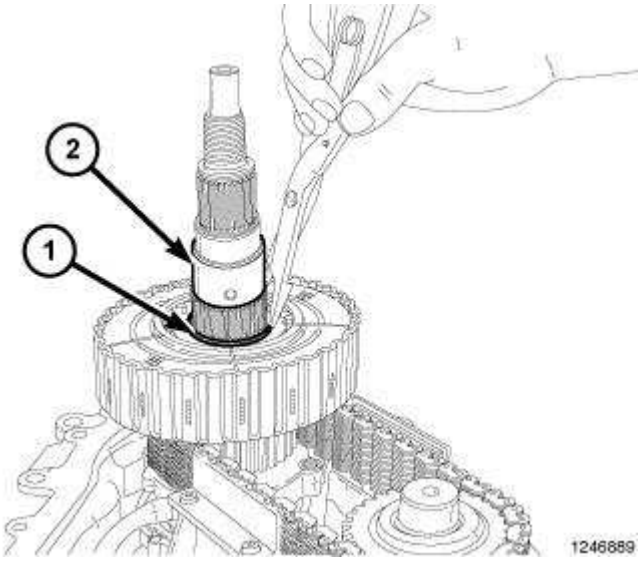

Fig. 122: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

15. Remove the snap ring (1) from the input shaft (2).

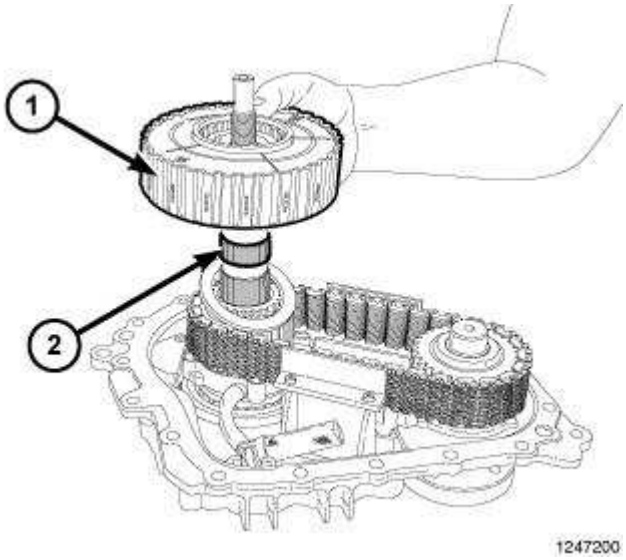

Fig. 123: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

16. Remove the clutch assembly (1) from the input shaft (2).

INSTALLATION

INSTALLATION

1. If installing a new clutch pack, check the clutch pack clearance, and select a new spacer if necessary. Refer to **ADJUSTMENTS**.

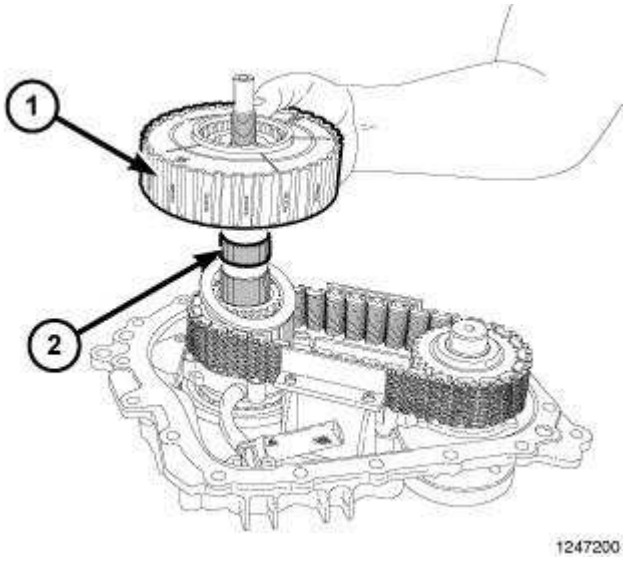

Fig. 124: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

2. Install the Clutch Assembly (1) onto the input Shaft (2).

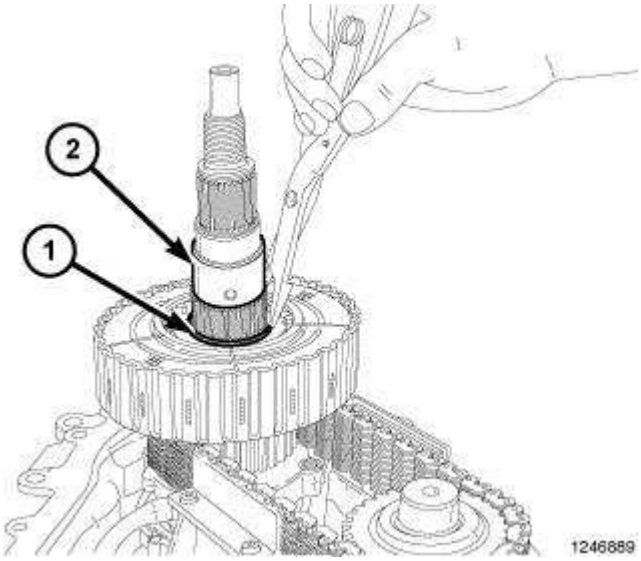

Fig. 125: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

3. Install the Snap Ring (1) onto the Input Shaft (2).

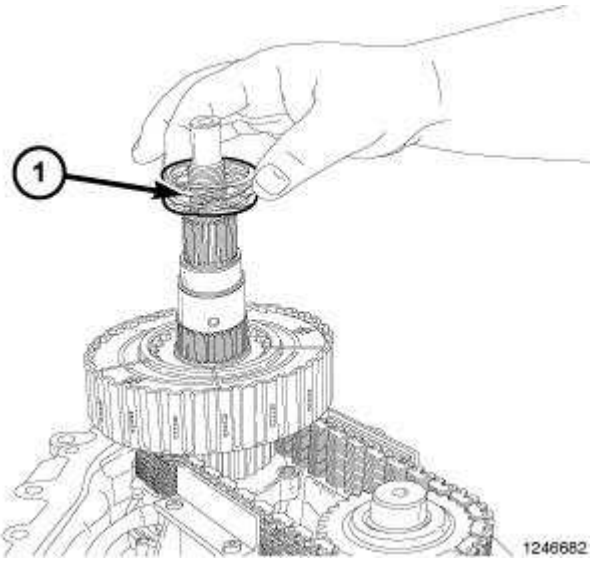

Fig. 126: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

4. Install the wave spring (1) onto the input shaft.

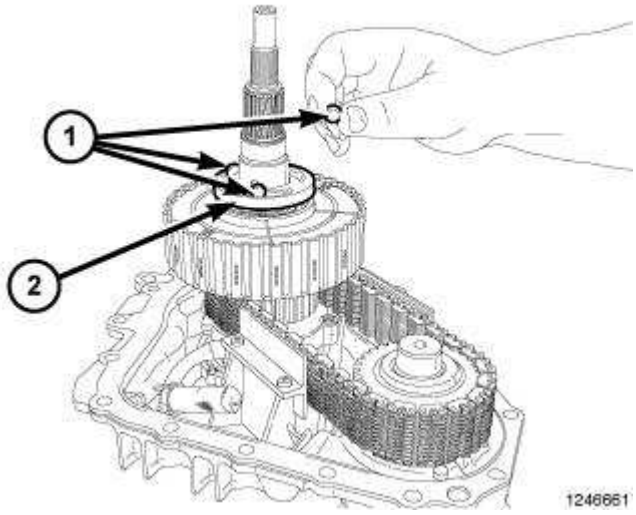

Fig. 127: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

5. Install the apply cam (2), and the ball bearings (1).

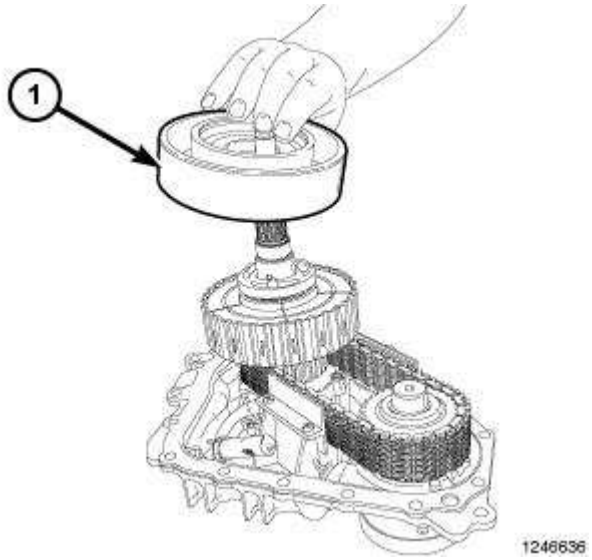

Fig. 128: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

6. Install the clutch rotor (1) onto the input shaft.

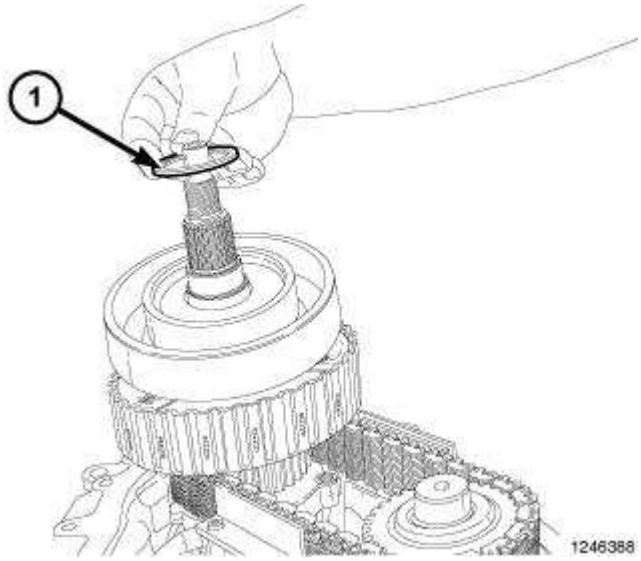

Fig. 129: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

7. Install the bearing (1) onto the input shaft.

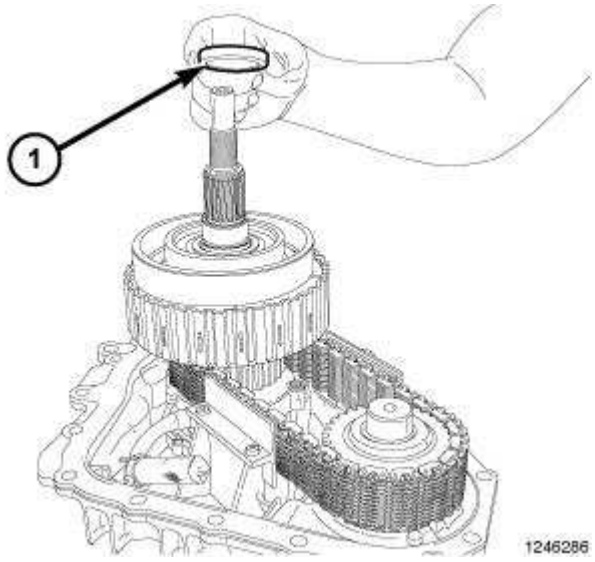

Fig. 130: Spacer
Courtesy of CHRYSLER GROUP, LLC

8. Install the spacer (1).
9. Apply a bead of Loctite® 598 HB to the front case half sealing surface.

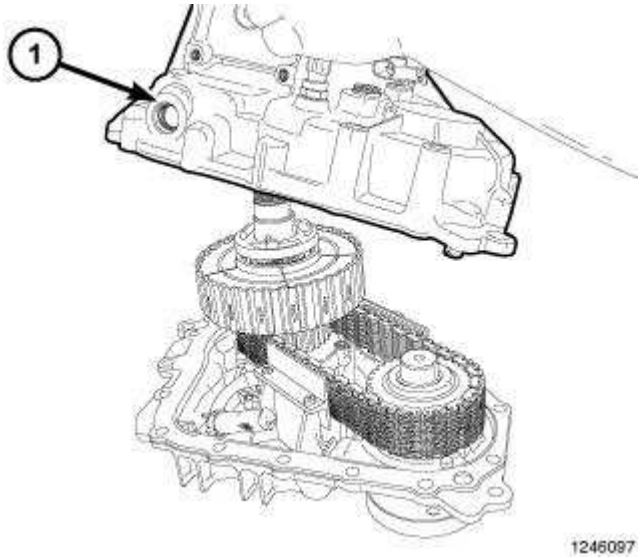

Fig. 131: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

10. Install the rear cover (1). Tighten the case bolts to 31 Nm (23 ft. lbs).

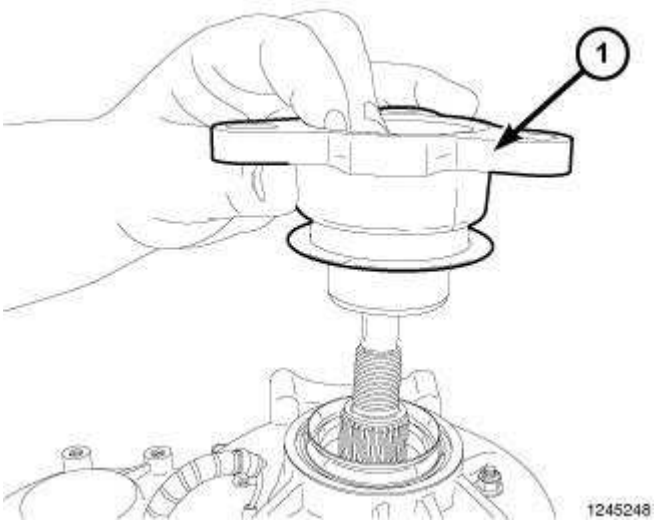

Fig. 132: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

11. Install the rear output flange (1).

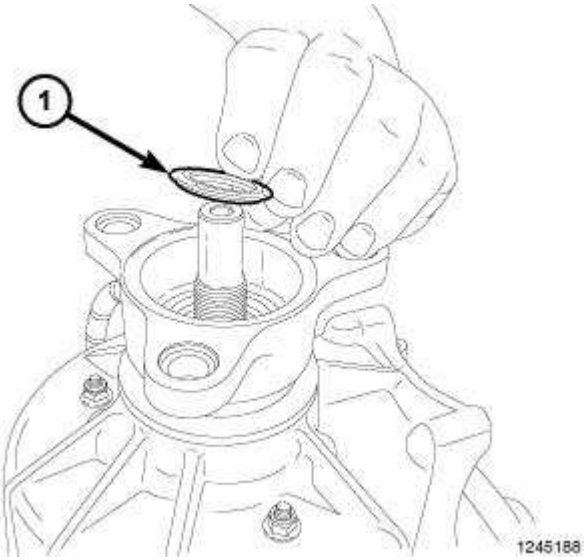

Fig. 133: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

12. Install a new outer rear output shaft seal (1).

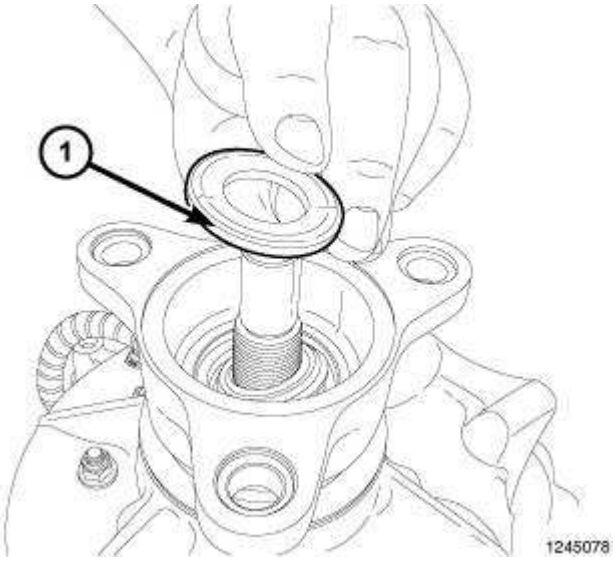

Fig. 134: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

13. Install the rear output flange washer (1).
14. Install the rear output flange nut.

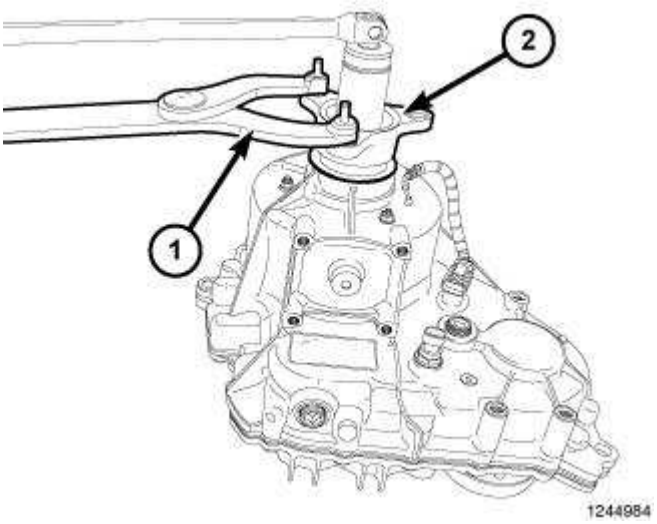

Fig. 135: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

15. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2). Tighten the rear output flange nut to 319 Nm (235 ft. lbs.).

COIL, CLUTCH

REMOVAL

REMOVAL

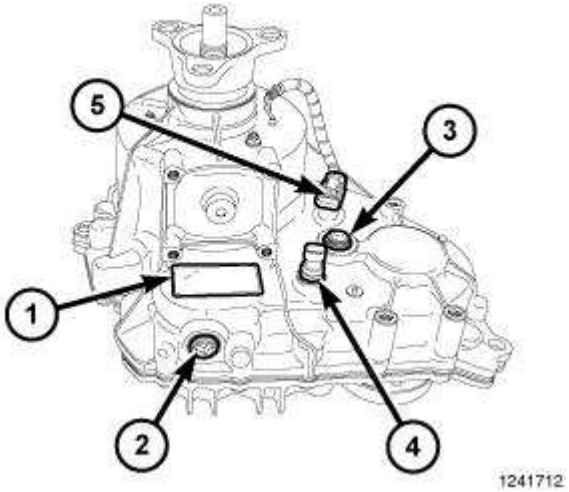

Fig. 136: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transfer case. Refer to **REMOVAL**.

NOTE: **The vent hole is near the input shaft hub. If the unit is set on the mounting surface, oil will drain out through the vent.**

2. Place the transfer case so that it can be drained of any remaining fluid and remove the drain plug (2).

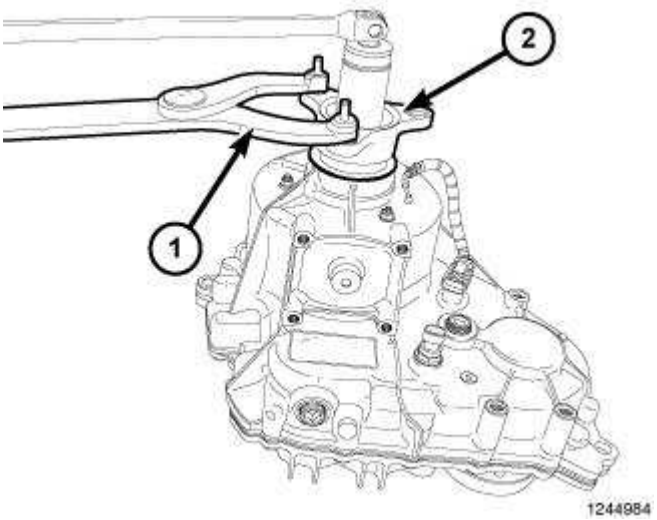

Fig. 137: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

3. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
4. Remove the rear output flange nut.

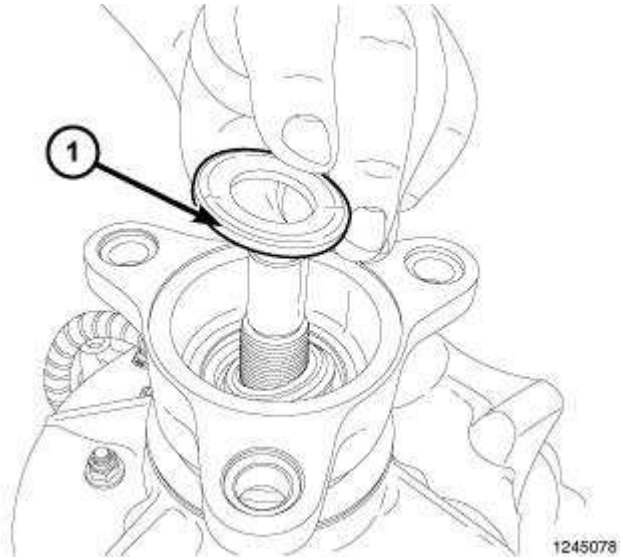

Fig. 138: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear output flange washer (1)

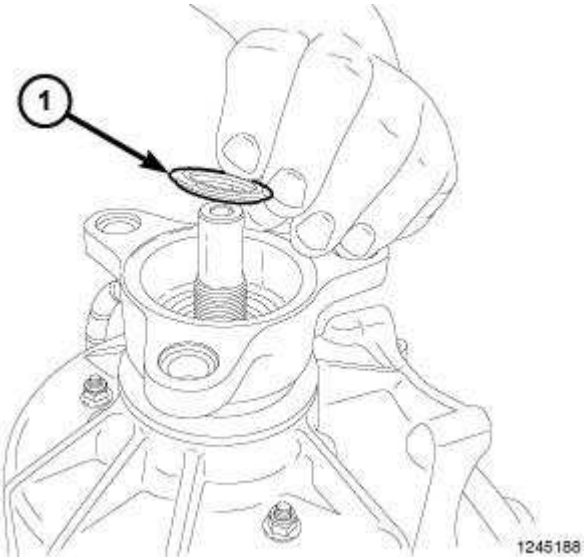

Fig. 139: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

6. Remove the outer rear output shaft seal (1)

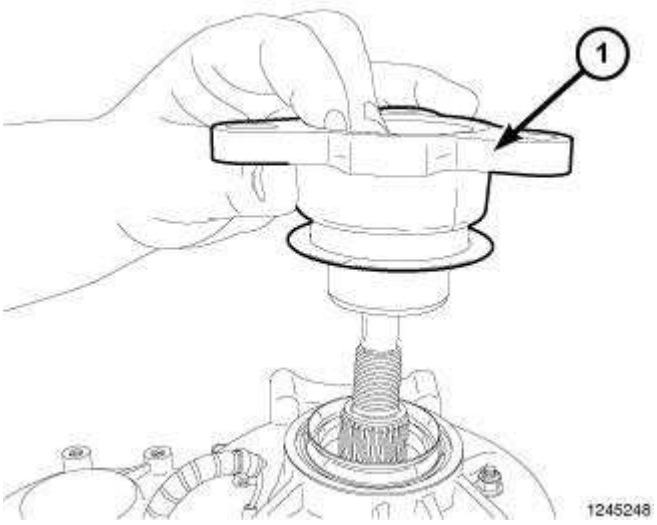

Fig. 140: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

7. Remove the rear output flange (1)

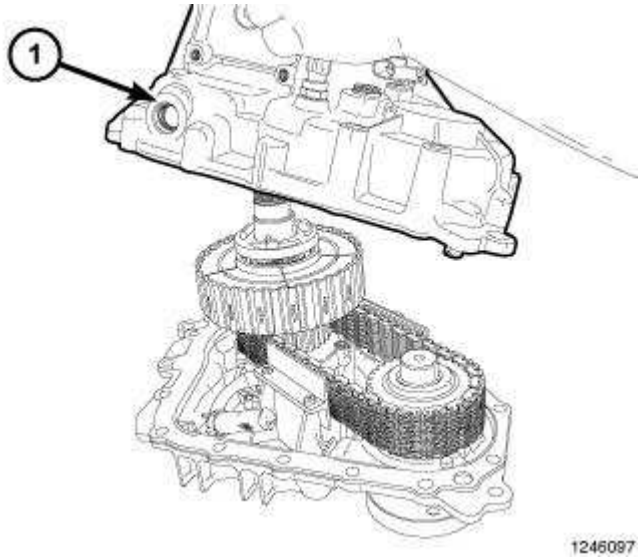

Fig. 141: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

8. Remove the case half bolts.
9. Remove the rear cover (1)

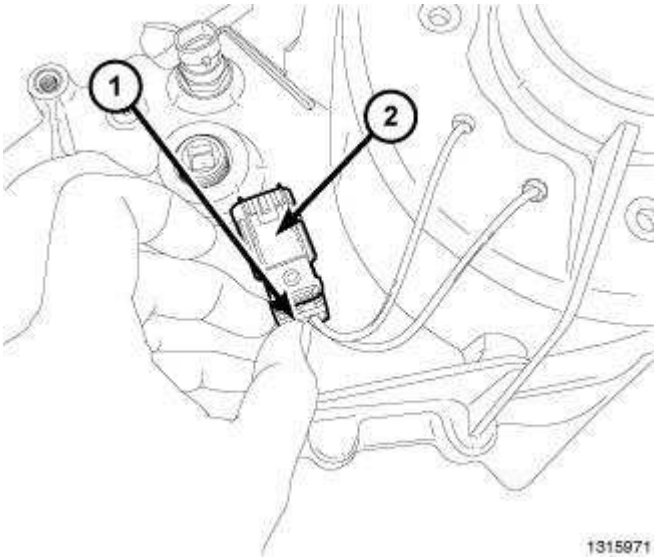

Fig. 142: Clutch Coil Harness Connector And Retainer
Courtesy of CHRYSLER GROUP, LLC

10. Remove the Tie Straps, and remove the Convoluted Sheath from the Clutch Coil Wires.
11. Remove the retainer (1) from the Clutch Coil Harness Connector (2).

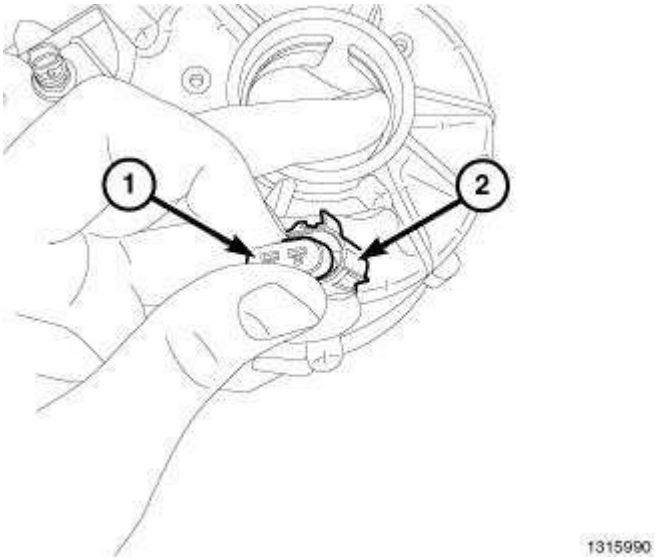

Fig. 143: Clutch Coil Harness Connector And Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: The clutch coil wires are retained in the harness connector by tabs. The tabs must be released from the connector face to remove the wires from the harness connector.

12. Remove the Cover (1) from the Clutch Coil Harness Connector (2), release the tabs, and disconnect the Clutch Coil Terminal Ends from the Clutch Coil Harness Connector (2).

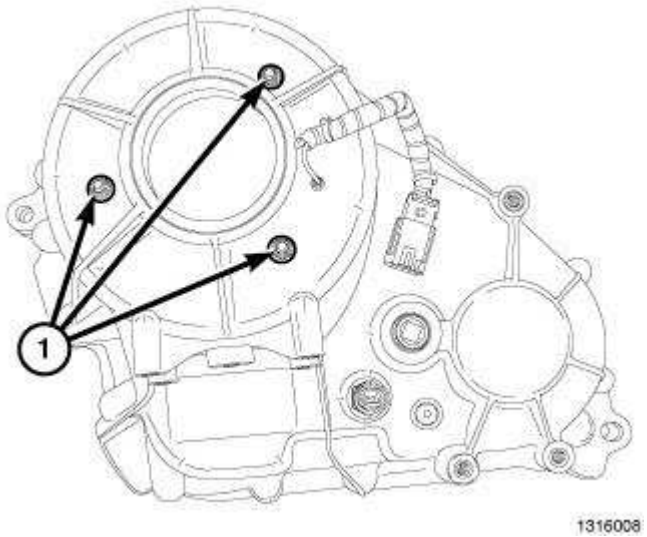

Fig. 144: Clutch Coil Retainers
Courtesy of CHRYSLER GROUP, LLC

13. Remove the Clutch Coil retainers (1).

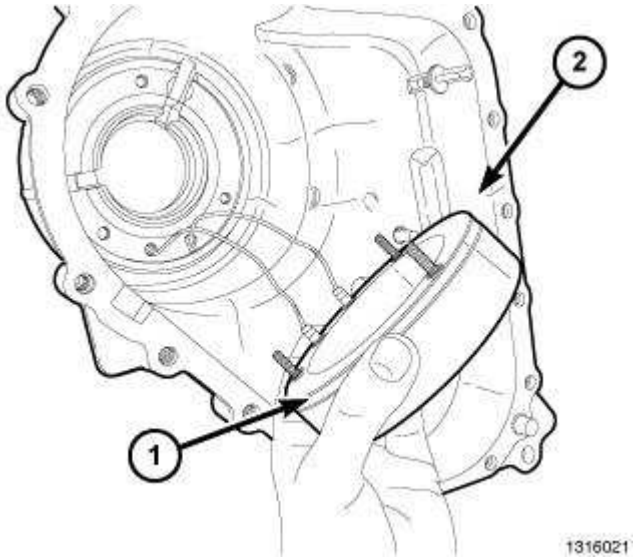

Fig. 145: Clutch Coil And Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

14. Remove the Clutch Coil (1) from the Rear Case Half (2).

INSTALLATION

INSTALLATION

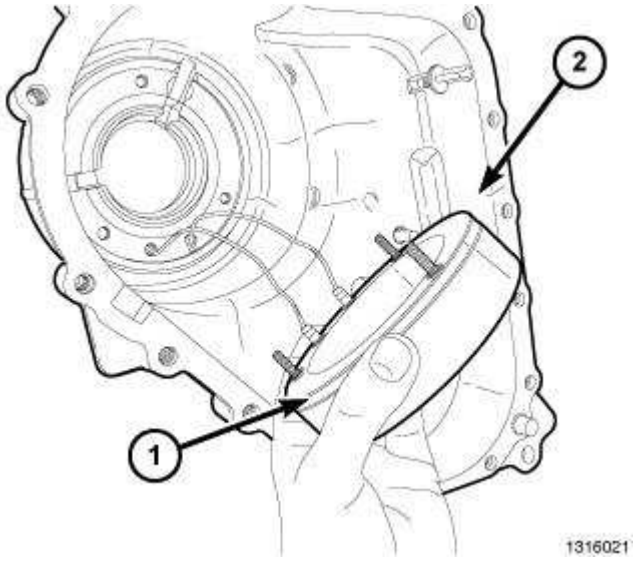

Fig. 146: Clutch Coil And Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

1. Route the wires through the Rear Case Half (2) and install the Clutch Coil (1) into the Rear Case Half.

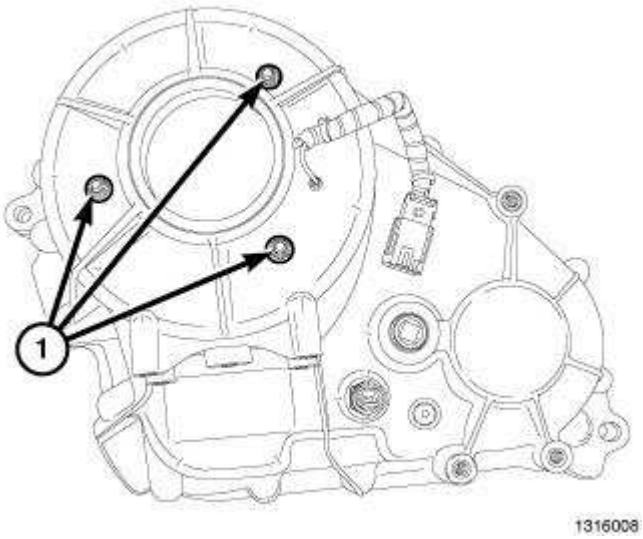

Fig. 147: Clutch Coil Retainers
Courtesy of CHRYSLER GROUP, LLC

2. Install the Clutch Coil retainers (1). Tighten to 10 Nm (7 ft. lbs.).

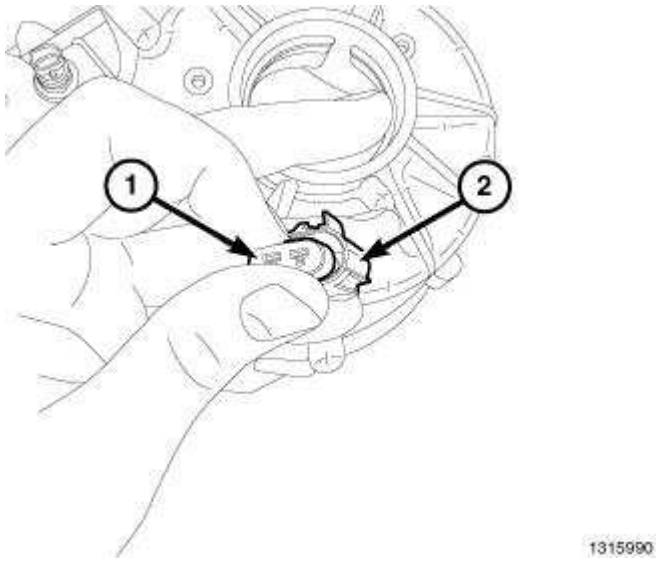

Fig. 148: Clutch Coil Harness Connector And Cover
Courtesy of CHRYSLER GROUP, LLC

3. Install Clutch Coil Wire Terminal Ends into the Clutch Coil Harness Connector (2), engage the Terminal Ends in the Tabs, then install the Cover (1).

NOTE: If the original convoluted sheath is damaged, install new convoluted sheath

4. Install the Convoluted Sheath and install new tie straps to secure it in position.

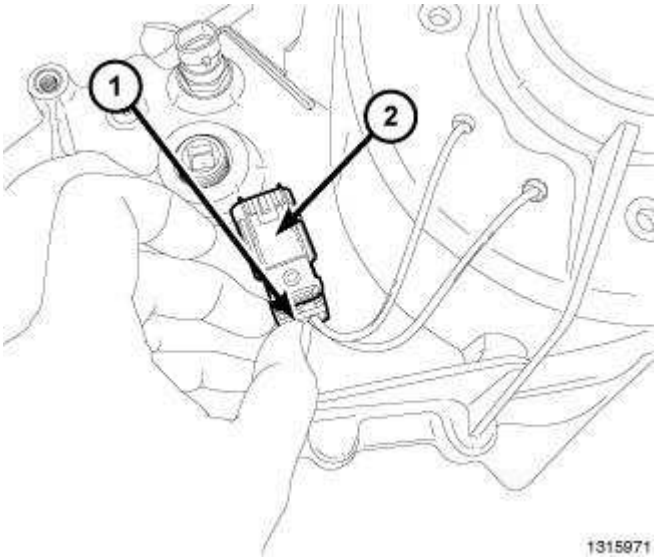

Fig. 149: Clutch Coil Harness Connector And Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Install the Wire Retainer (1) on the back of the Clutch Coil Harness Connector (2).

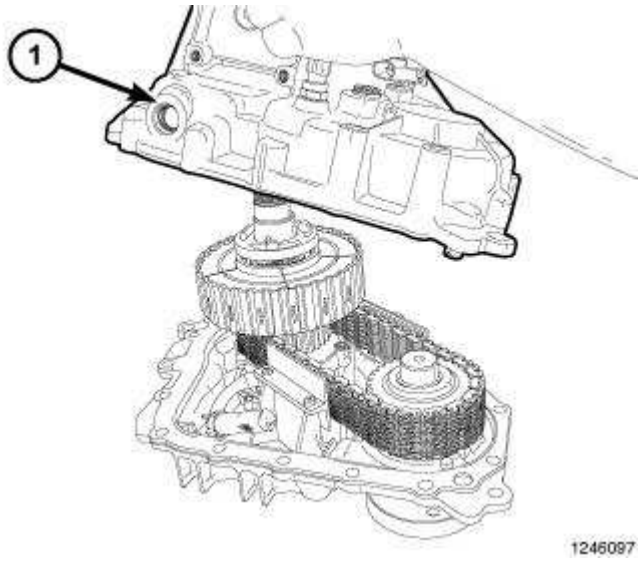

Fig. 150: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

6. Install the rear cover (1)
7. Install the case half bolts.

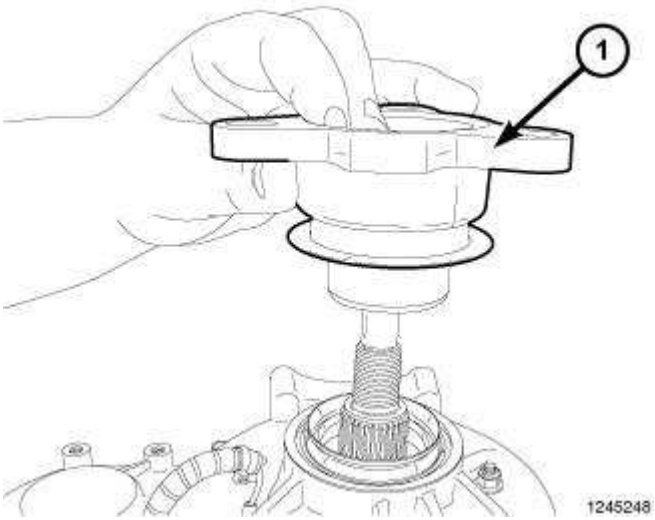

Fig. 151: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

8. Install the rear output flange (1)

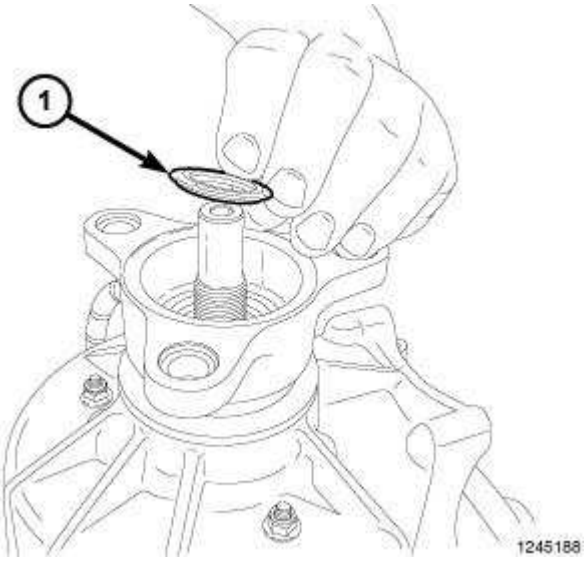

Fig. 152: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

9. Install the outer rear output shaft seal (1)

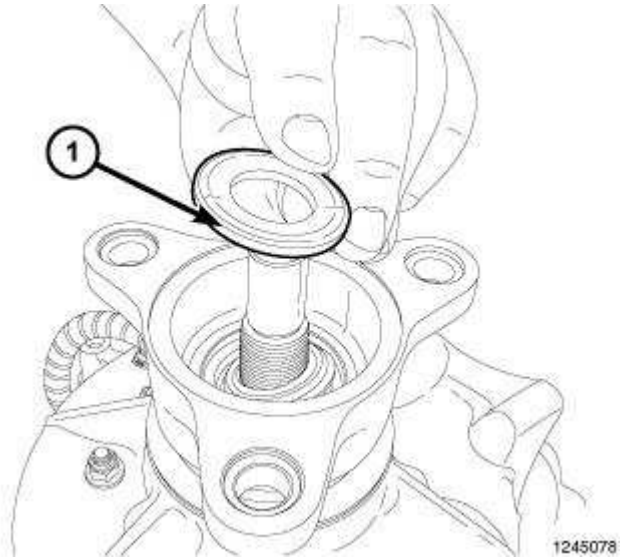

Fig. 153: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

10. Install the rear output flange washer (1)
11. Install the rear output flange nut.

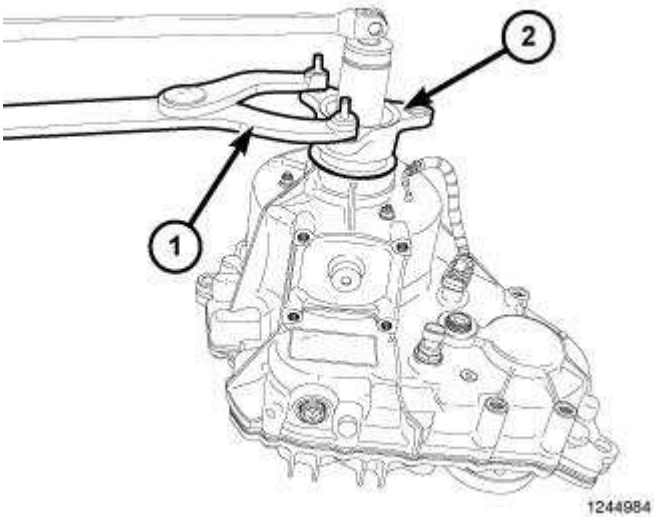

Fig. 154: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

12. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
13. Install the transfer case, and refill it. Refer to **INSTALLATION** & **FLUID, STANDARD PROCEDURE**.

FLUID

STANDARD PROCEDURE

STANDARD PROCEDURE - FLUID CHECK

1. Raise and support vehicle.

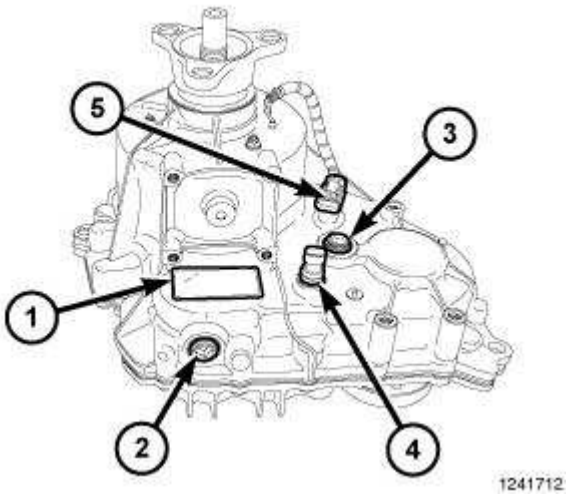

Fig. 155: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

2. Clean the area around the transfer case plugs (2) and (3).

NOTE: Inspect all the transfer case plug seals and replace as necessary.

3. Remove the transfer case fill plug (3).
4. Remove the transfer case drain plug (2) and allow the transfer case lubricant to drain into a suitable container.
5. When the fluid has stopped draining, install the drain plug (2) and tighten to 23 Nm (17 ft. lbs.).
6. Using the fill hole (3), fill the transfer case with 1.0 L +/- 0.05 L (2.11 pint +/- 0.11 pint) of fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
7. Install the fill plug (3) and tighten to 23 Nm (17 ft. lbs).

PUMP, TRANSMISSION OIL

REMOVAL

REMOVAL

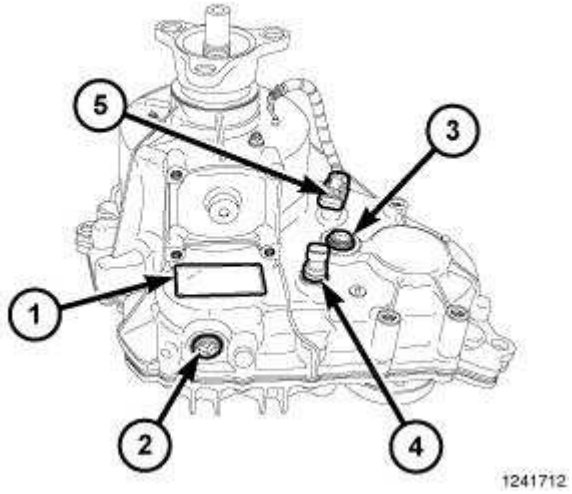

Fig. 156: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transfer case. Refer to **REMOVAL**.

   NOTE: The vent hole is near the input shaft hub. If the unit is set on the mounting surface, oil will drain out through the vent.

2. Place the transfer case so that it can be drained of any remaining fluid and remove the drain plug (2).

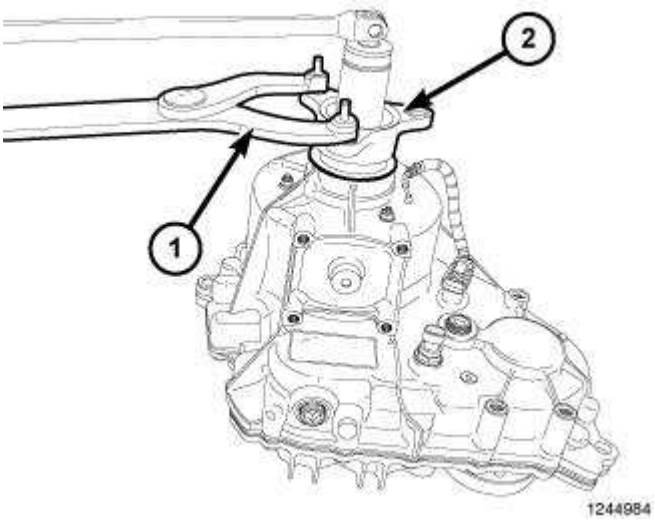

Fig. 157: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

3. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
4. Remove the rear output flange nut.

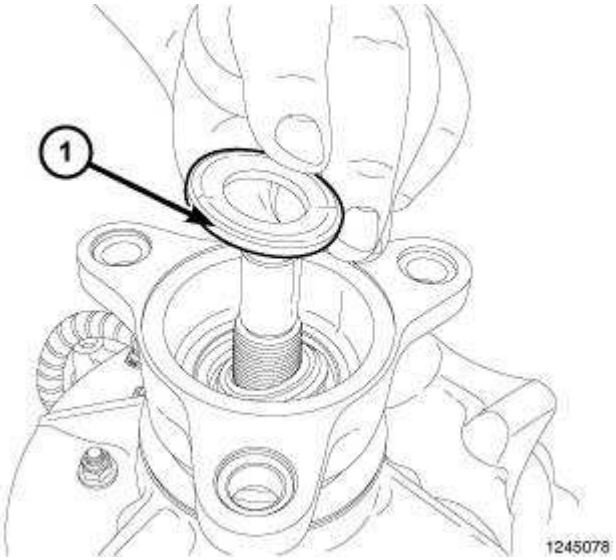

Fig. 158: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear output flange washer (1)

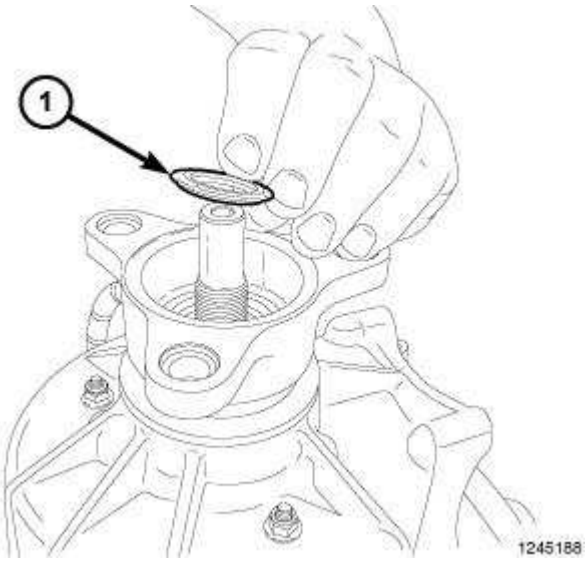

Fig. 159: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

6. Remove the outer rear output shaft seal (1)

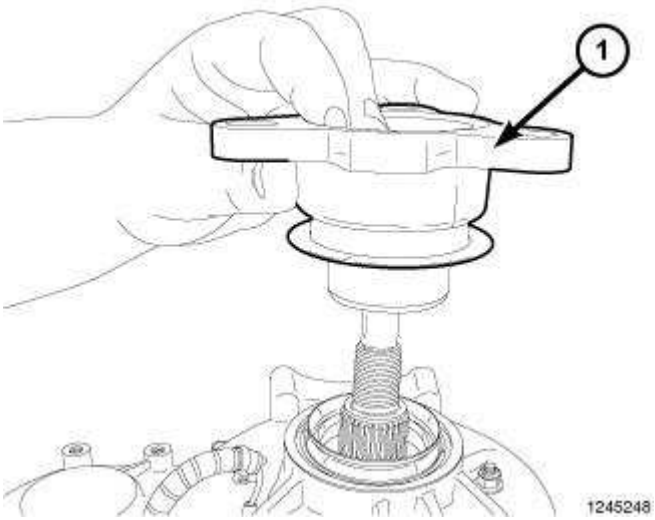

Fig. 160: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

7. Remove the rear output flange (1)

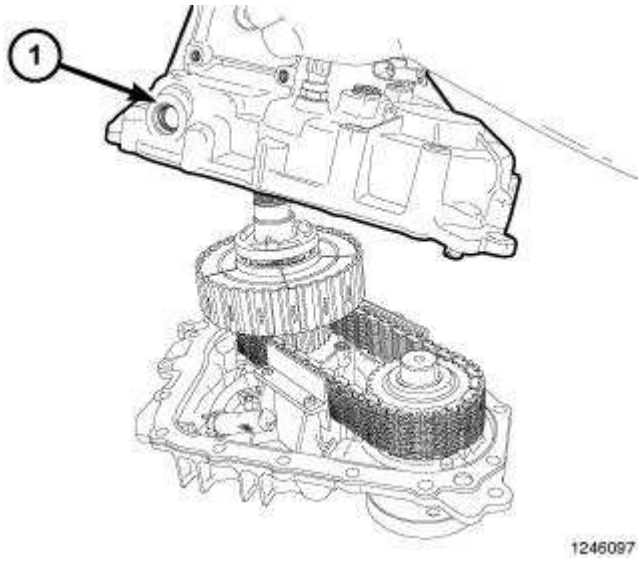

Fig. 161: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

8. Remove the case half bolts.

NOTE: The clutch rotor might remain in the rear case half during removal.

9. Remove the rear cover (1)

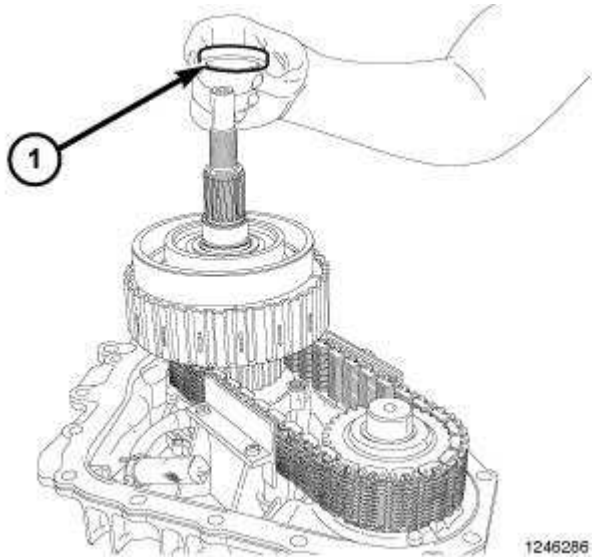

Fig. 162: Spacer
Courtesy of CHRYSLER GROUP, LLC

10. Remove the spacer (1)

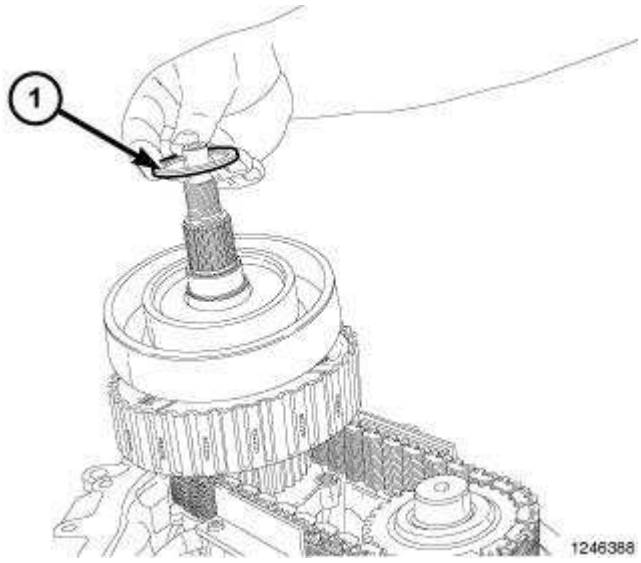

Fig. 163: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

11. Remove the bearing (1) from the input shaft.

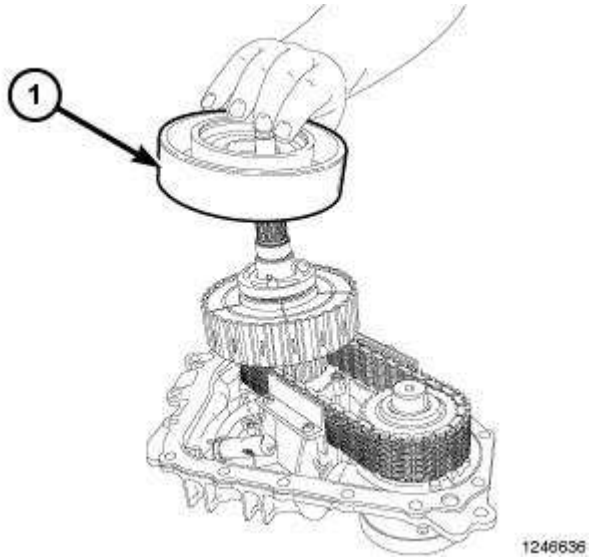

Fig. 164: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

12. Remove the clutch rotor (1) from the input shaft.

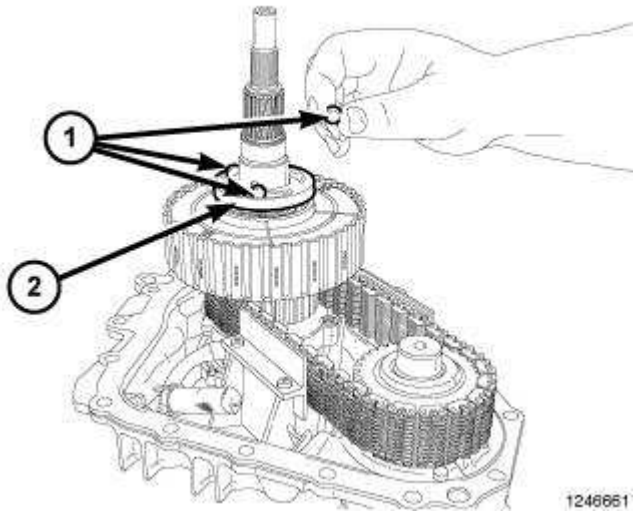

Fig. 165: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

13. Remove the ball bearings (1) from the apply cam (2).
14. Remove the apply cam (2)

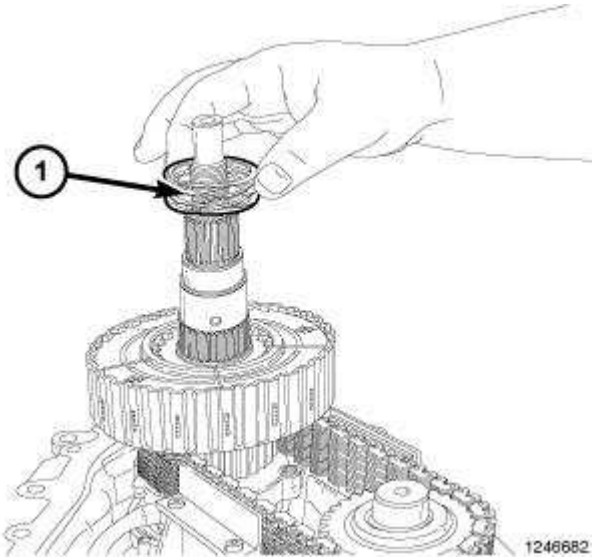

Fig. 166: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

15. Remove the wave spring (1) from the input shaft.

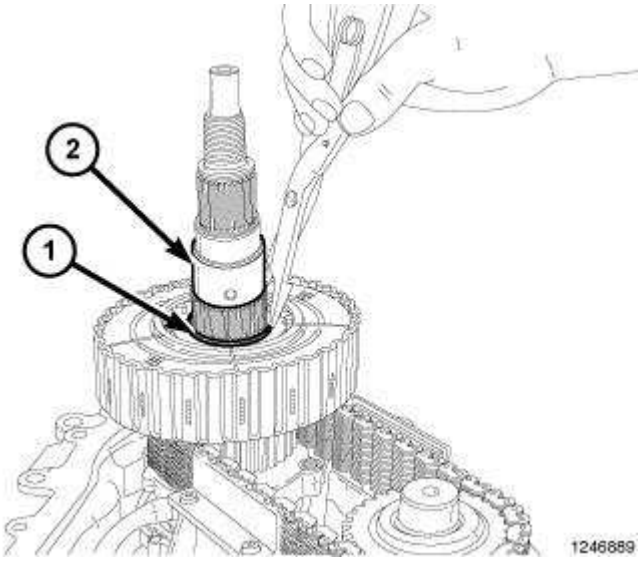

Fig. 167: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

16. Remove the snap ring (1) from the input shaft (2).

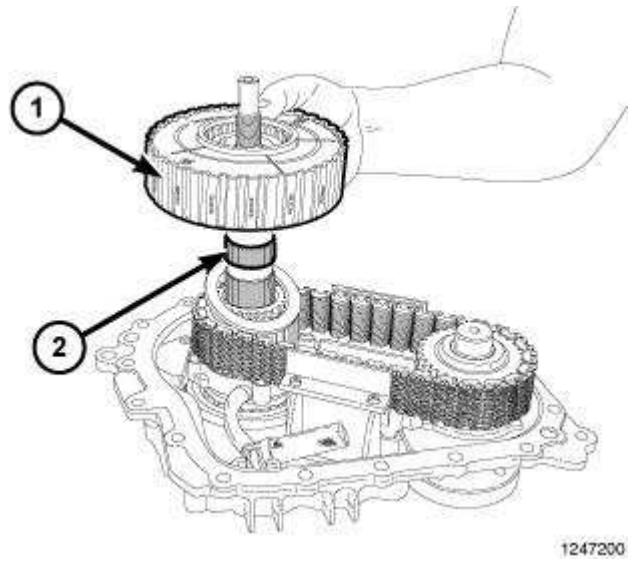

Fig. 168: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

17. Remove the clutch assembly (1) from the input shaft (2).

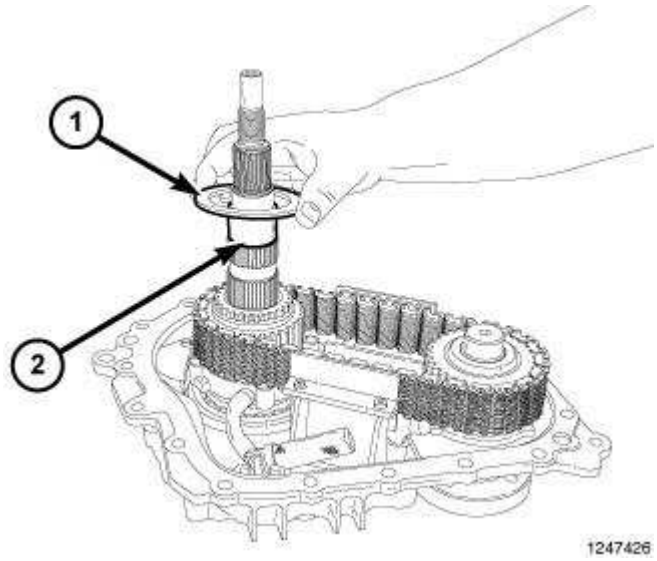

Fig. 169: Thrust Washer And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

18. Remove the thrust washer (1) from the input shaft (2).

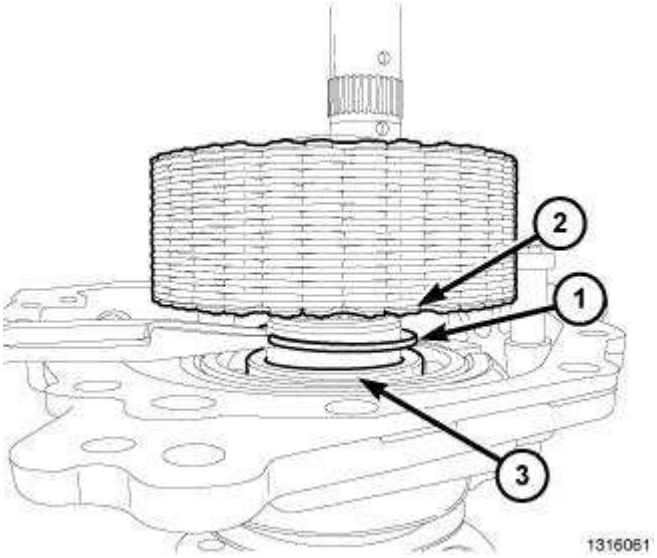

Fig. 170: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: The output shaft sprocket is pressed onto the output shaft.

19. Release the Snap Ring (1) from the Output Shaft and move it away from the Groove (3), toward the Output Shaft Sprocket (2).

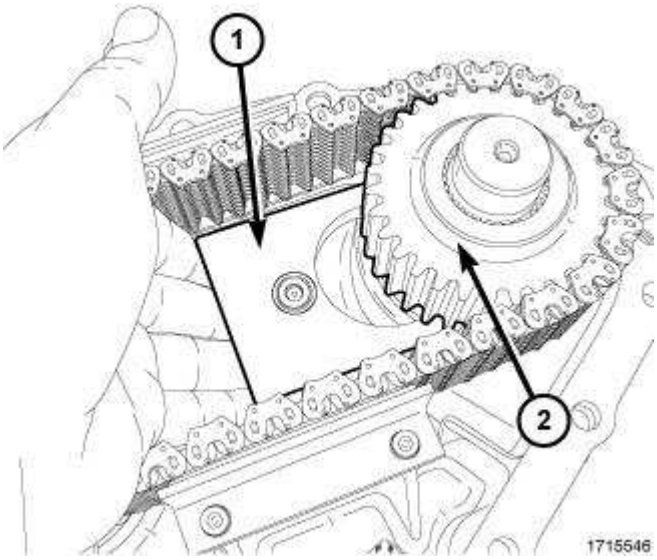

Fig. 171: Brace Plate And Input Shaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

20. Slide the (special tool #10176, Remover, Front Drive Sprocket) Brace Plate (1) in between the case and the input shaft sprocket (2).

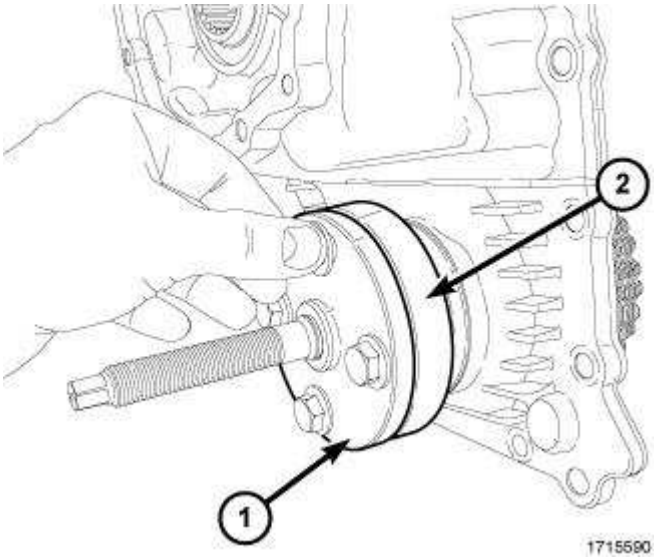

Fig. 172: Puller Plate And Output Shaft Flange
Courtesy of CHRYSLER GROUP, LLC

21. Align the holes on the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) with the bolt holes in the output shaft flange (2), then install the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) onto the output shaft flange (2).

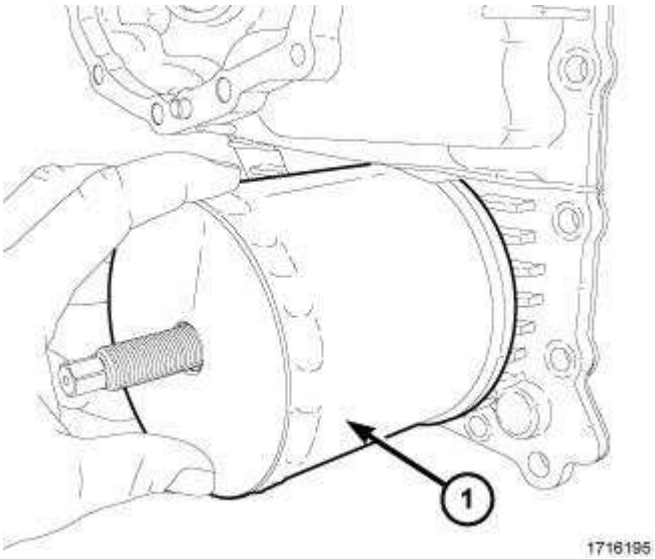

Fig. 173: Base
Courtesy of CHRYSLER GROUP, LLC

22. Install the (special tool #10176, Remover, Front Drive Sprocket) Base (1) onto the puller plate.

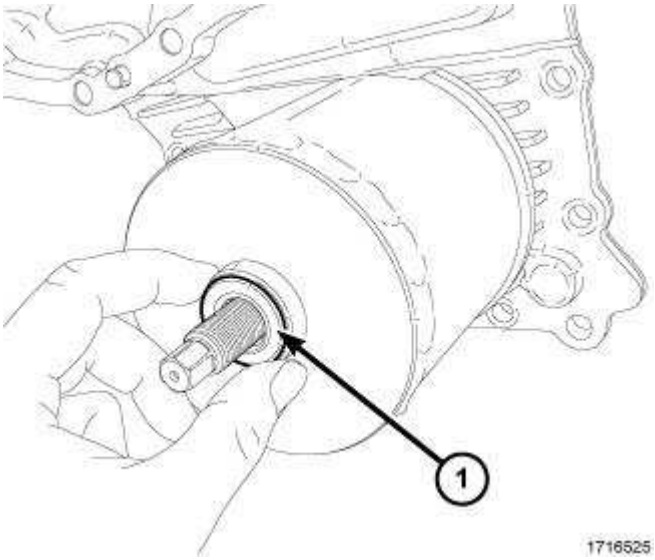

Fig. 174: Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1) so that the bearing flange is facing up.

23. Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1).

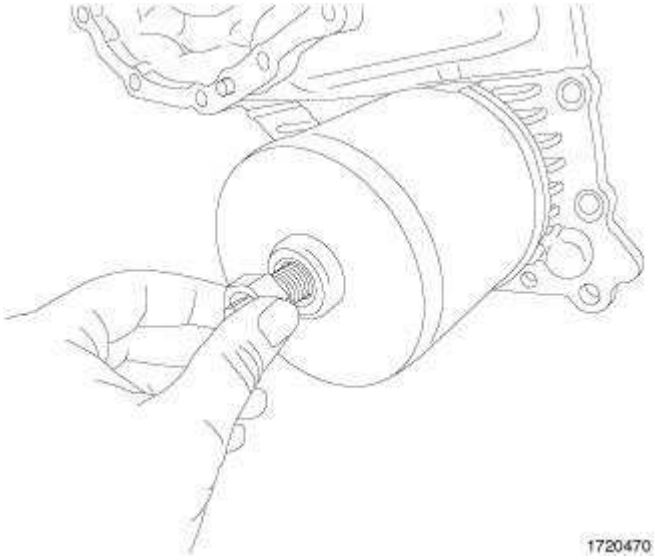

Fig. 175: Nut
Courtesy of CHRYSLER GROUP, LLC

24. Install the (special tool #10176, Remover, Front Drive Sprocket) Nut (1).

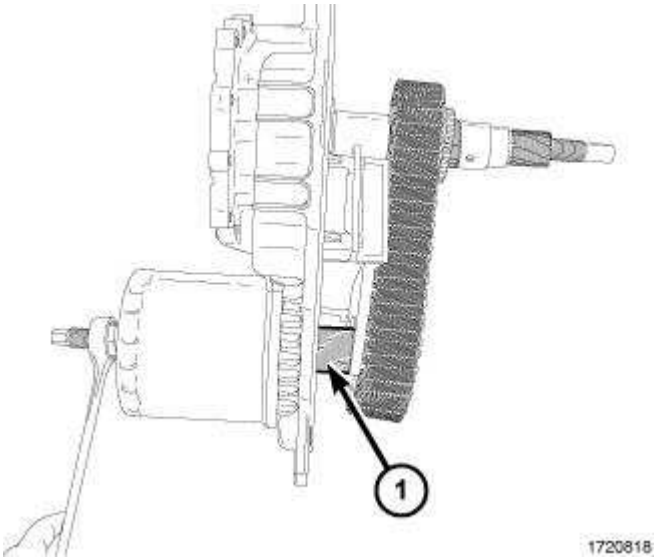

Fig. 176: Output Shaft
Courtesy of CHRYSLER GROUP, LLC

25. Tighten the nut until the Output Shaft (1) is pulled free of the output shaft sprocket.
26. Remove the Output Shaft Sprocket, the Drive Chain, and the Drive Sprocket as an assembly.

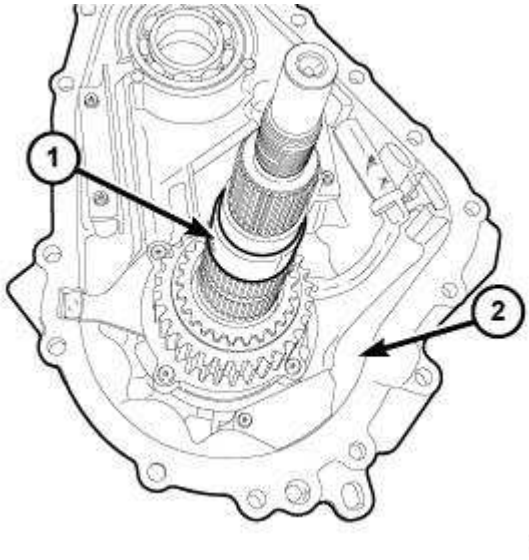

Fig. 177: Input Shaft Assembly And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

27. Remove the Input Shaft assembly (1) from the front case half (2).

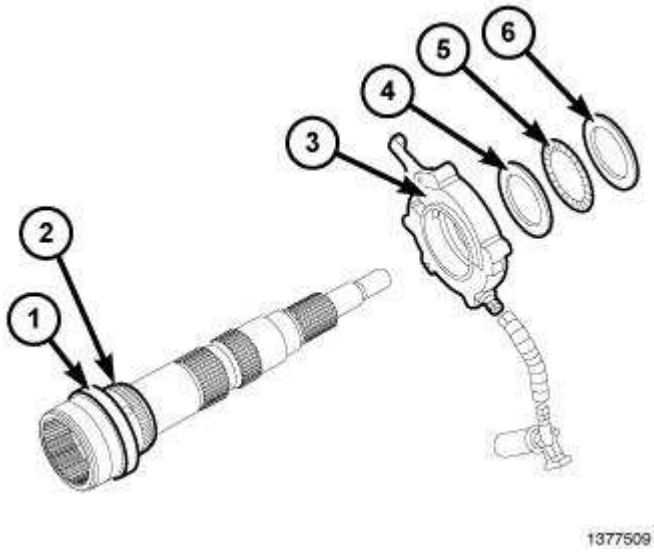

Fig. 178: Top Spacer, Bottom Spacer, Input Shaft, And Splines
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Top Spacer (6) might remain attached to the Drive Sprocket when it is removed from the Input Shaft (1).

28. Remove the Top Spacer (6) from the Input Shaft (1).

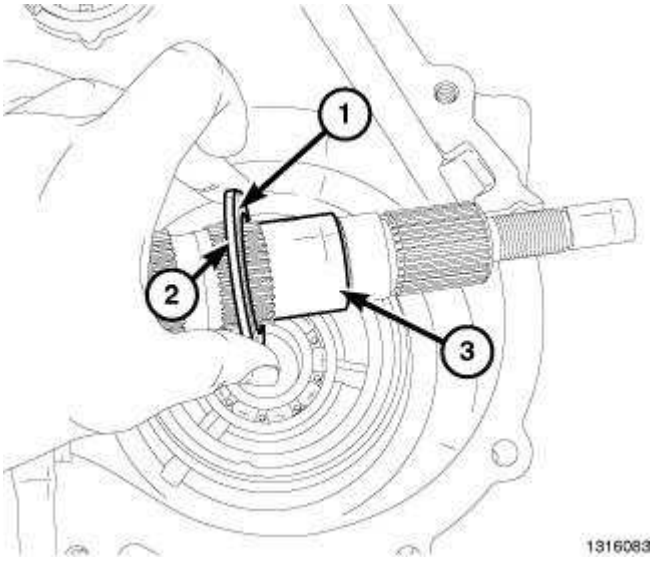

Fig. 179: Bearing, Bottom Spacer, And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

29. Remove the Bearing (1) and the Bottom Spacer (2) from the Input Shaft (3).

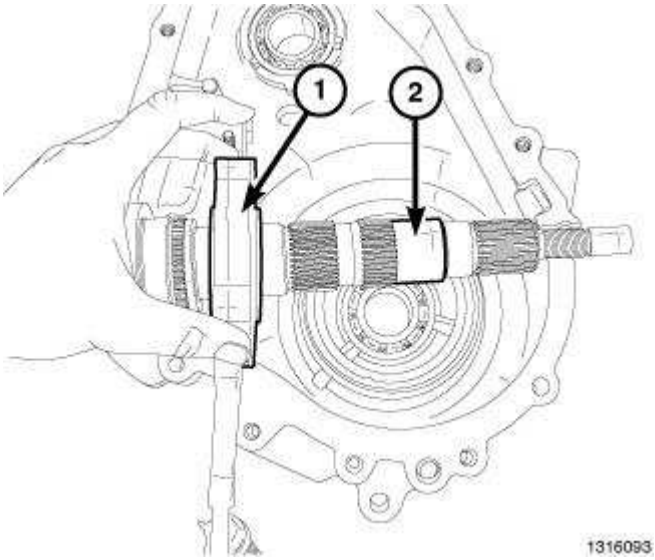

Fig. 180: Oil Pump Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

30. Remove the Oil Pump Assembly (1) from the Input Shaft (2).

INSTALLATION

INSTALLATION

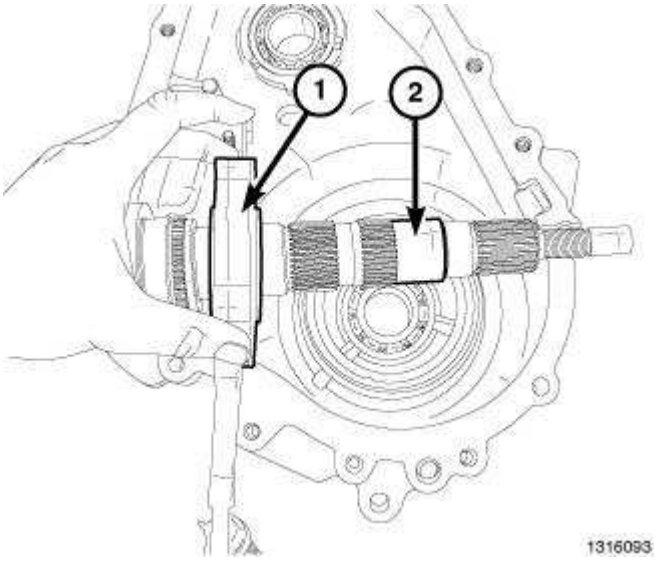

Fig. 181: Oil Pump Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

1. Position the Oil Pump Assembly (1) onto the Input Shaft (2).

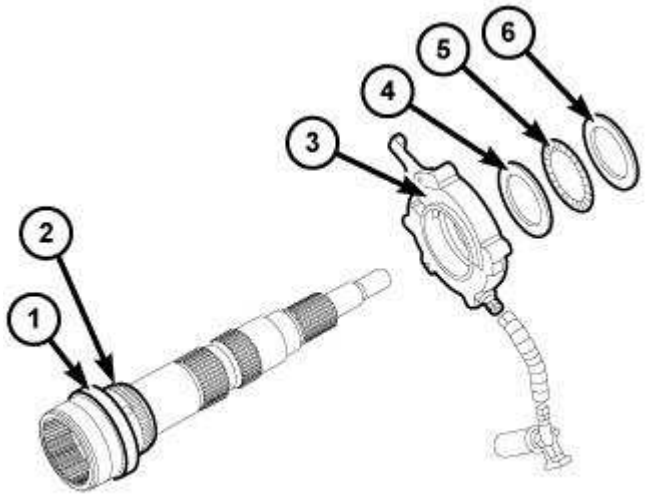

Fig. 182: Top Spacer, Bottom Spacer, Input Shaft, And Splines
Courtesy of CHRYSLER GROUP, LLC

2. Slide the Oil Pump down until it fully engages the Splines (2) on the Input Shaft (1).
3. Install the Bottom Spacer (4), the Bearing (5), and Top Spacer (6) onto the Input Shaft (1).

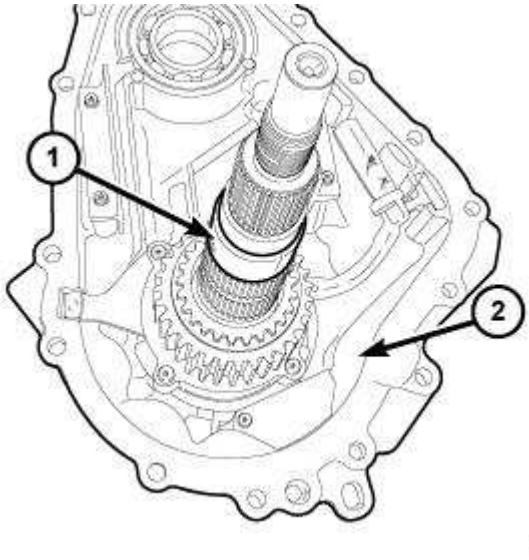

Fig. 183: Input Shaft Assembly And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

4. Install the Input Shaft assembly (1) into the Front Case Half (2).

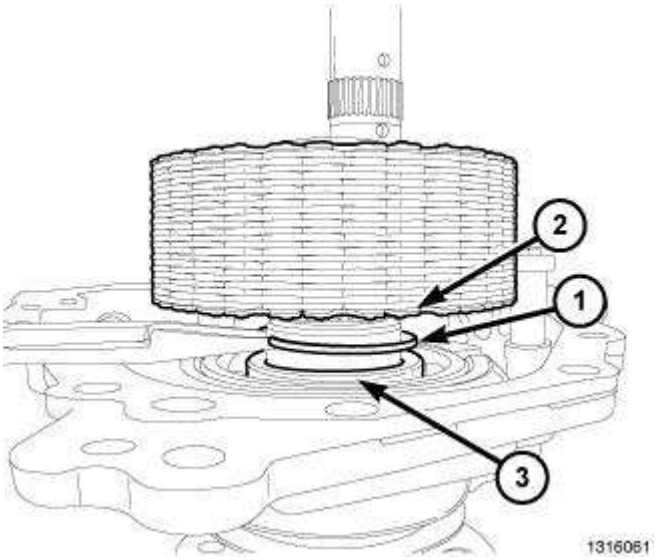

Fig. 184: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The output shaft sprocket is pressed onto the output shaft.**

NOTE: **If the Snap Ring (1) is temporarily installed too close to the top of the Output Shaft, it might not be possible to install it into the Bottom Groove on the Output Shaft after the Output Shaft Sprocket is pressed onto the Output Shaft.**

5. Temporarily install the Snap Ring (1) approximately 3 mm (0.12 in.) above the Groove (3) on the Output Shaft.

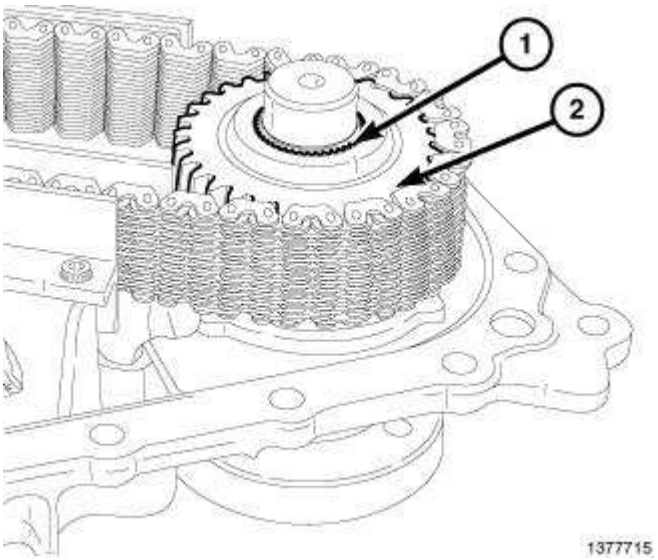

Fig. 185: Output Shaft Sprocket And Top Groove On Output Shaft
Courtesy of CHRYSLER GROUP, LLC

6. Install the Output Shaft Sprocket, the Drive Chain and the Drive Sprocket as an assembly.

NOTE: When the Output Shaft Sprocket (2) is at the correct height, the Top Groove (1) on the Output Shaft will be visible.

7. Use the (special tool #8835-3, Receiver, Bushing) Installer and an arbor press to install the Output Shaft Sprocket (2) onto the Output Shaft. Press the sprocket until the Top Groove (1) on the Output Shaft is visible.

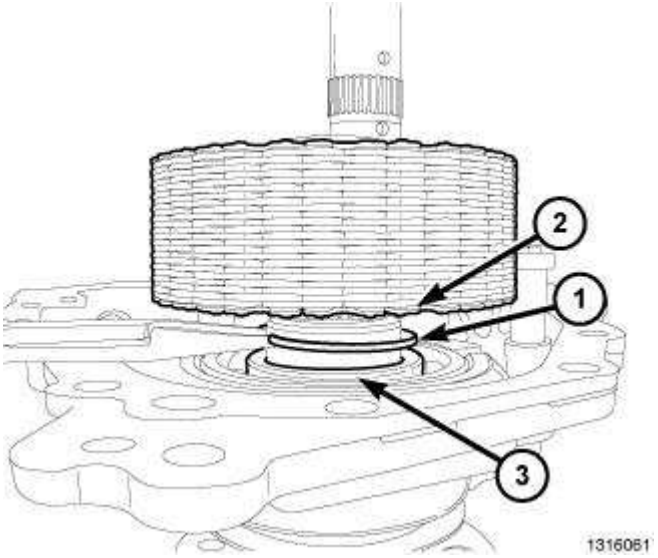

Fig. 186: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

8. Press the Output Shaft upward with the Output Shaft Flange, then install the Snap Ring (1) into the Groove (3) on the Output Shaft.

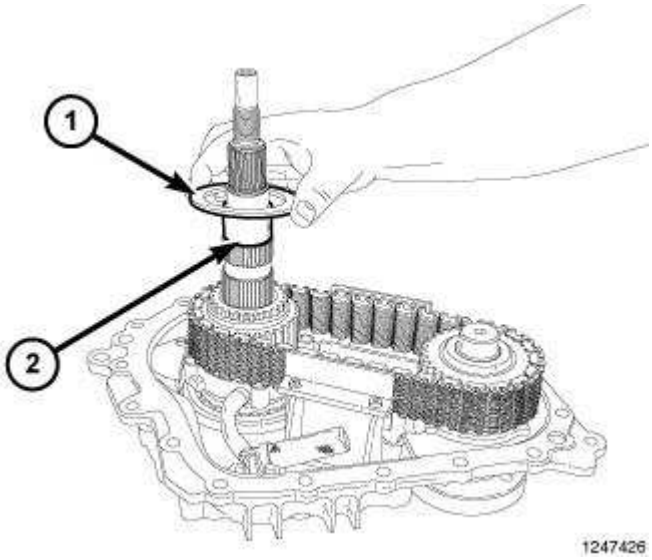

Fig. 187: Thrust Washer And Input Shaft

Courtesy of CHRYSLER GROUP, LLC

9. Install the thrust washer (1) onto the Input Shaft (2).

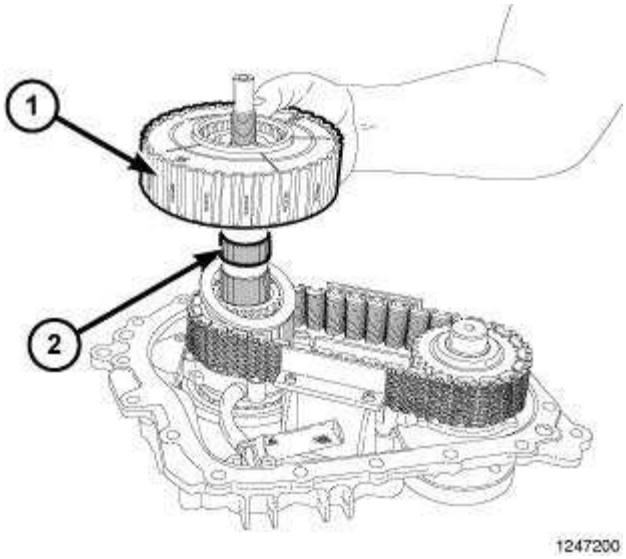

Fig. 188: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

10. Install the Clutch Assembly (1) onto the input Shaft (2).

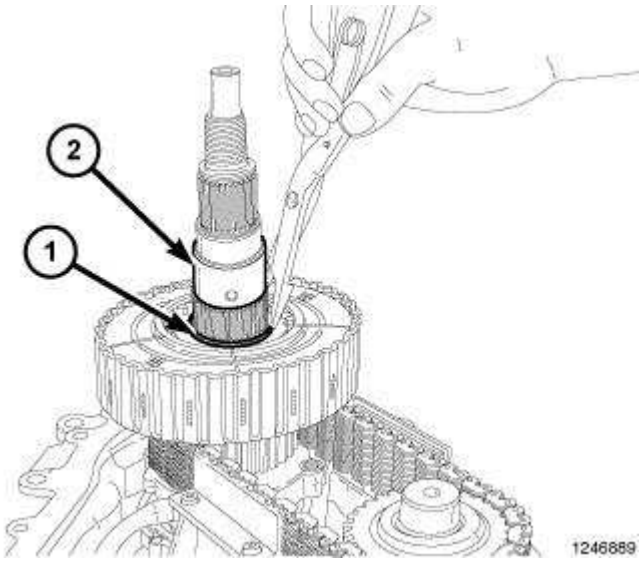

Fig. 189: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

11. Install the Snap Ring (1) onto the Input Shaft (2).

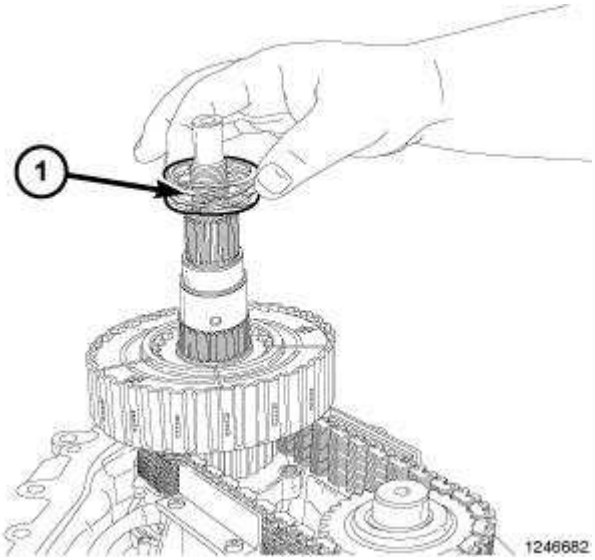

Fig. 190: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

12. Install the wave spring (1) onto the input shaft.

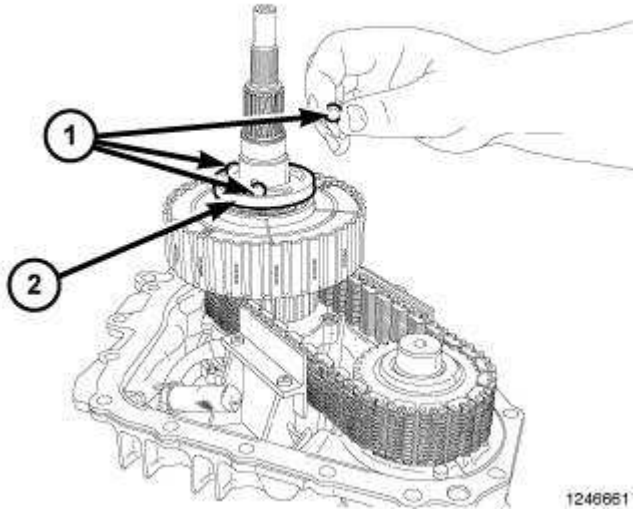

Fig. 191: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

13. Install the apply cam (2), and the ball bearings (1)

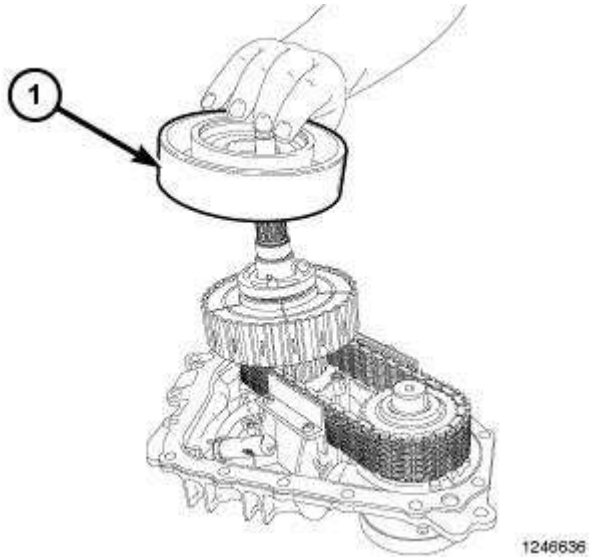

Fig. 192: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

14. Install the clutch rotor (1) onto the input shaft.

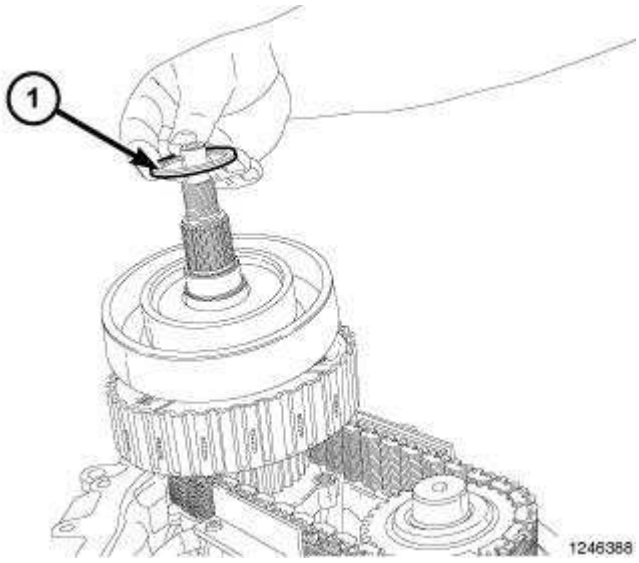

Fig. 193: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

15. Install the bearing (1) onto the input shaft.

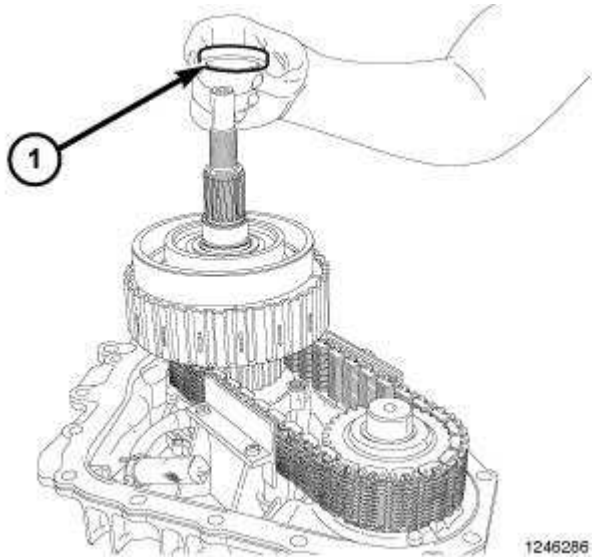

Fig. 194: Spacer
Courtesy of CHRYSLER GROUP, LLC

16. Install the spacer (1)

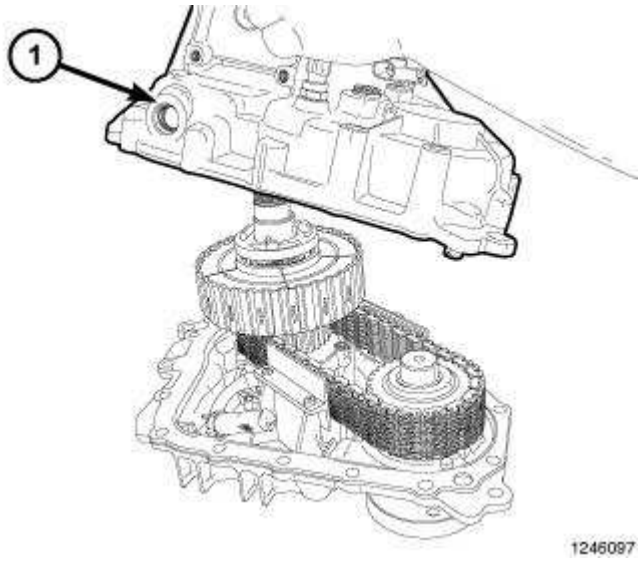

Fig. 195: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

17. Apply a bead of Loctite® 598 HB to the front case half sealing surface.
18. Install the rear cover (1). Tighten the case bolts to 31 Nm (23 ft. lbs).

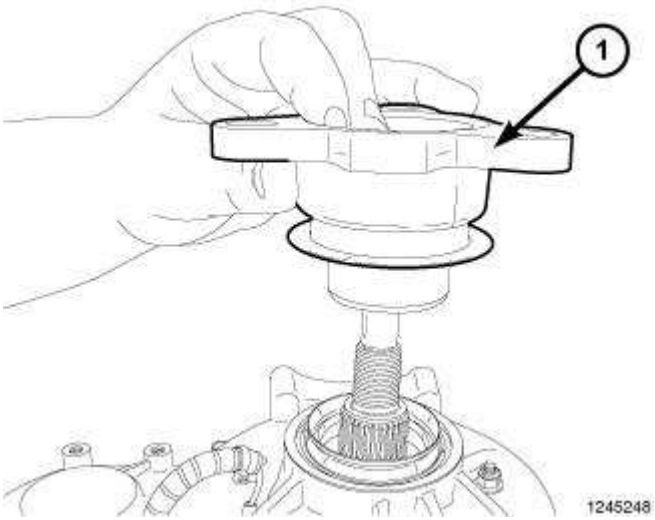

Fig. 196: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

19. Install the rear output flange (1)

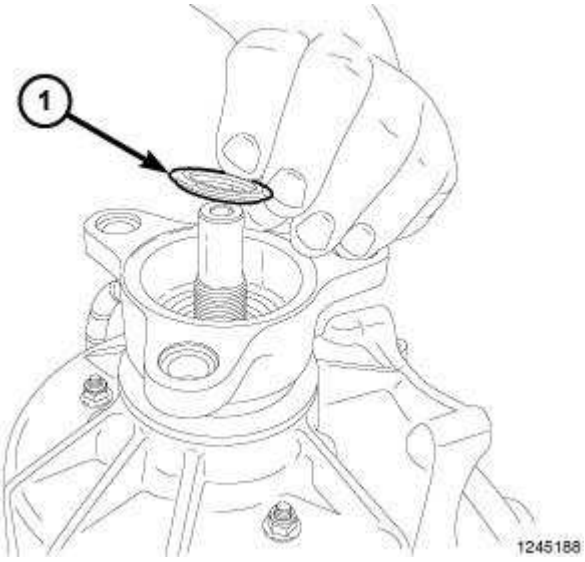

Fig. 197: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

20. Install a new outer rear output shaft seal (1)

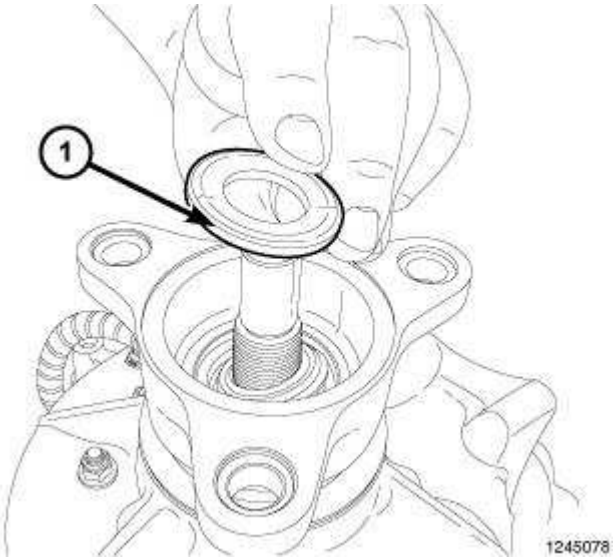

Fig. 198: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

21. Install the rear output flange washer (1)

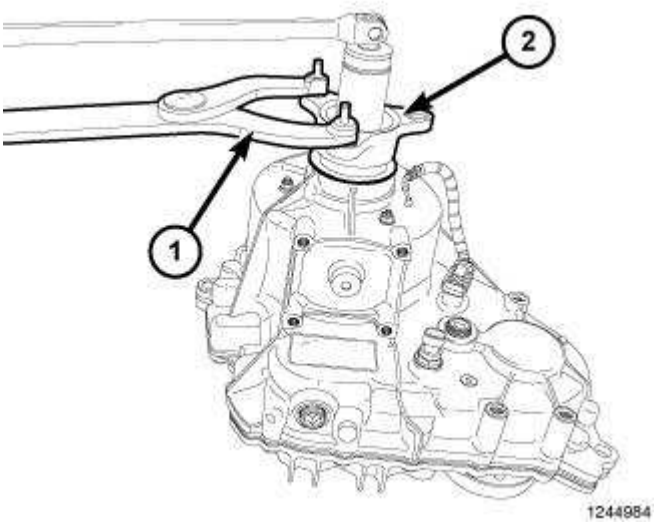

Fig. 199: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

22. Install the rear output flange nut.
23. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2). Tighten the rear output flange nut to 319 Nm (235 ft. lbs.).
24. Install the transfer case. Refer to **INSTALLATION**.

SEAL, INPUT SHAFT

REMOVAL

FRONT

1. Remove the transfer case. Refer to **REMOVAL**.
2. Remove the front input shaft seal.

REAR

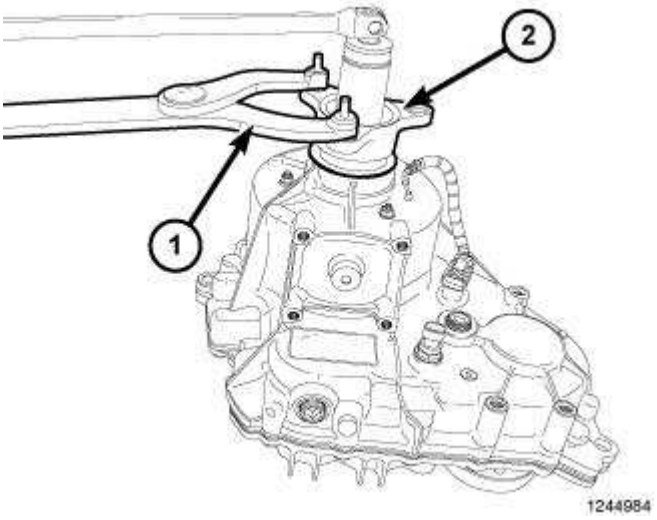

Fig. 200: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear propeller shaft. Refer to **REMOVAL** .
2. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
3. Remove the rear output flange nut from the input shaft.

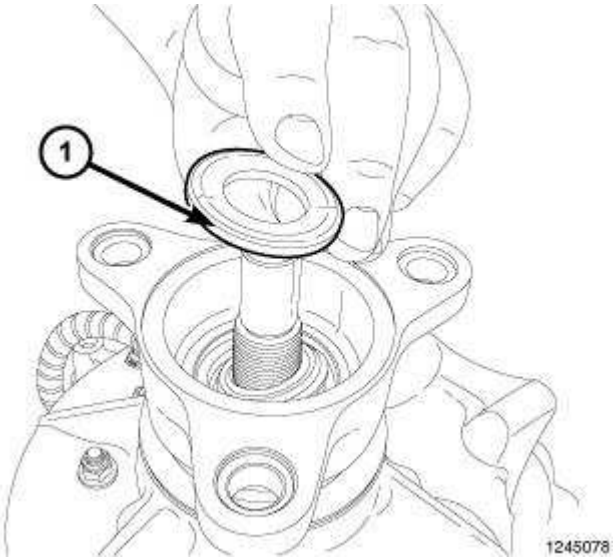

Fig. 201: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

4. Remove the rear output flange washer (1)

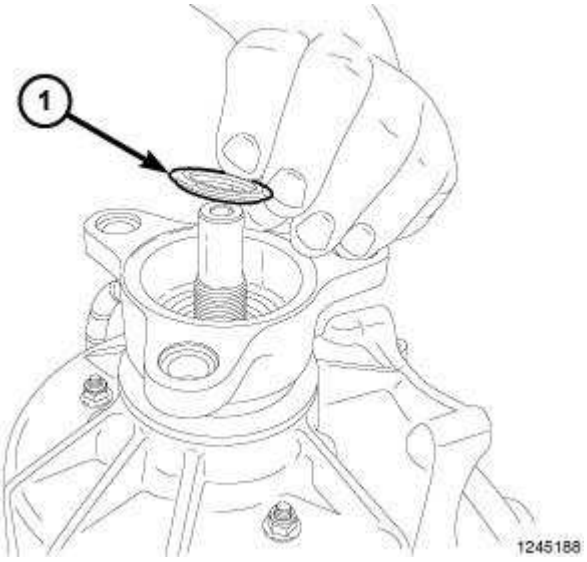

Fig. 202: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

5. Remove the outer rear input shaft seal (1)

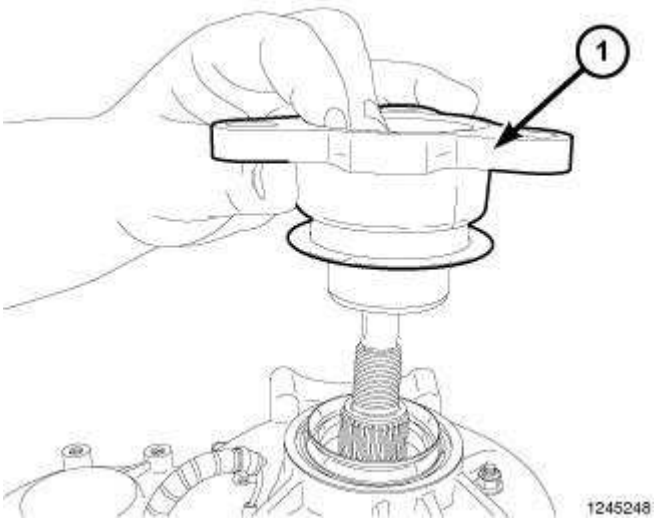

Fig. 203: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rear output flange (1) from the input shaft.
7. Remove the inner rear input shaft seal.

INSTALLATION

FRONT

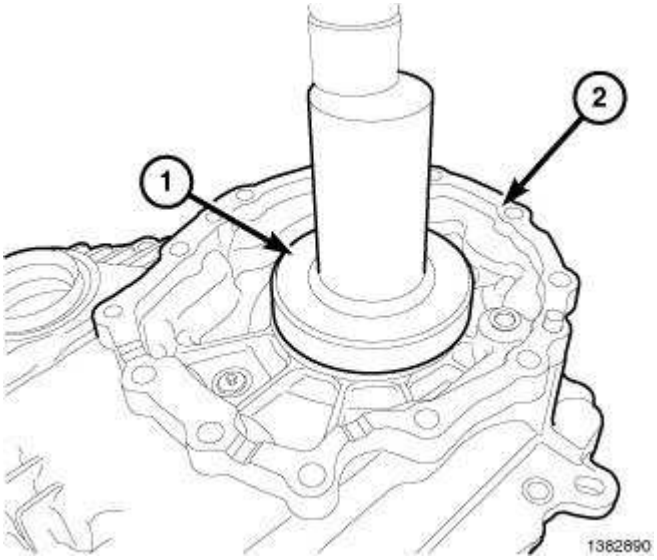

Fig. 204: Seal Installer And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

1. Use (special tool #10173, Installer, Input Shaft Seal) Seal Installer (1) to install the front input shaft seal into the front case half (2).
2. Install the transfer case. Refer to **INSTALLATION**.

REAR

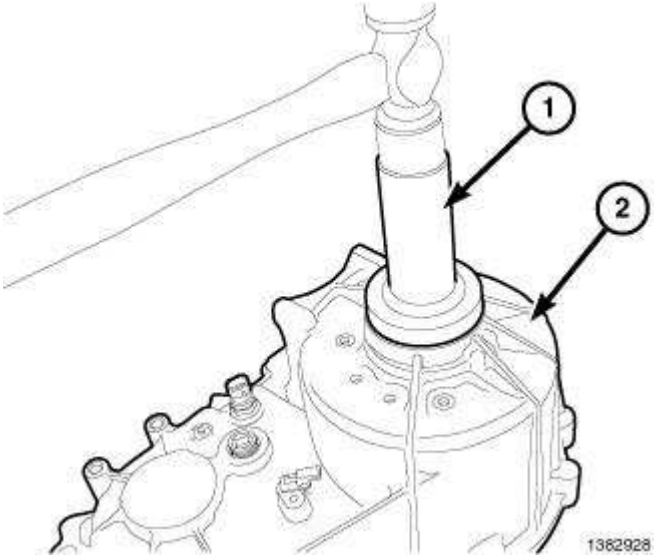

Fig. 205: Seal Installer And Rear Case Half
Courtesy of CHRYSLER GROUP, LLC

1. Use (special tool #10174, Installer, Seal, Rear Output) Seal Installer to install the rear input shaft seal into the rear case half (2).

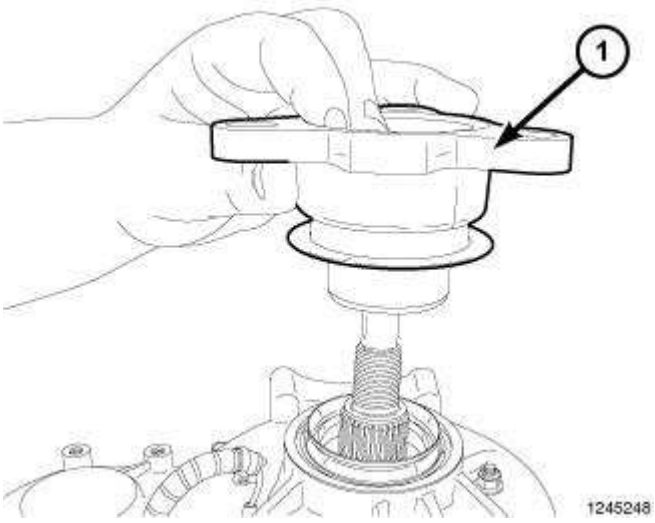

Fig. 206: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear output flange (1).

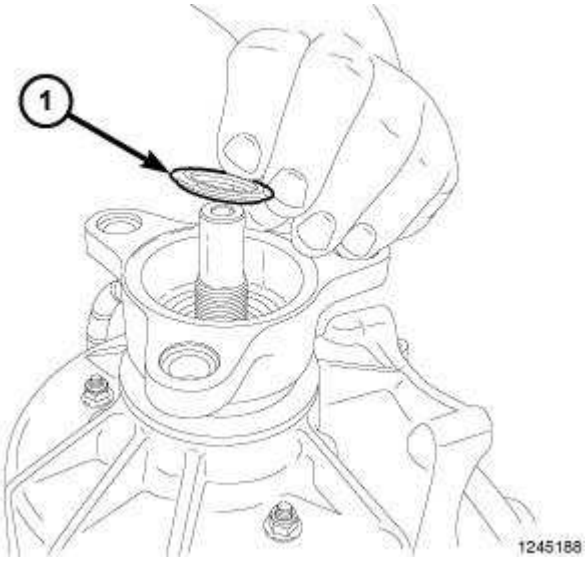

Fig. 207: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

3. Install a new outer rear input shaft seal (1)

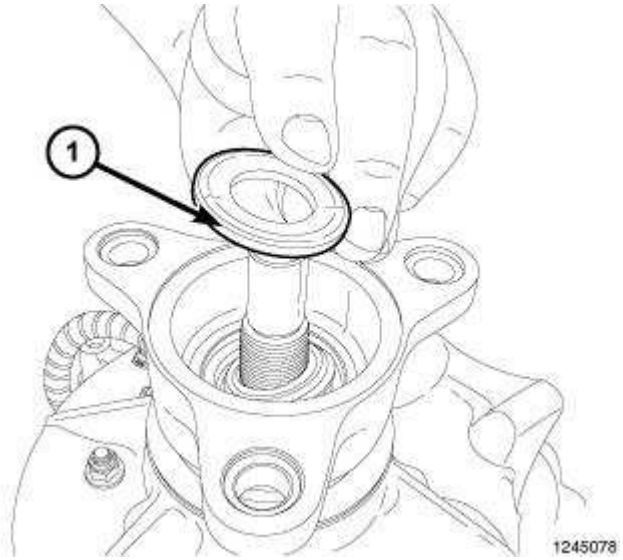

Fig. 208: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

4. Install the rear output flange washer (1)

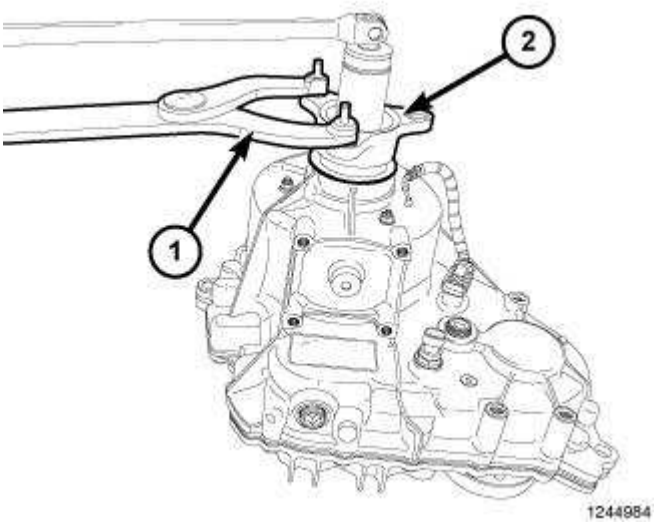

Fig. 209: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

5. Install the rear output flange nut.
6. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2). Tighten the rear output flange nut to 319 Nm (235 ft. lbs.).
7. Install the rear propeller shaft. Refer to **INSTALLATION** .

SEAL, OUTPUT SHAFT

REMOVAL

REMOVAL

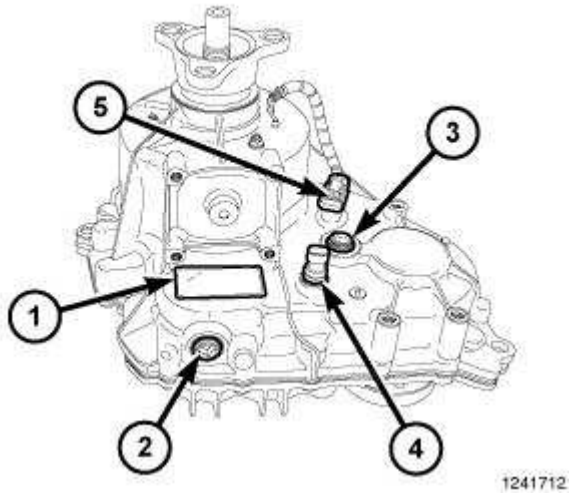

Fig. 210: Transfer Case And Drain Plug
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transfer case. Refer to **REMOVAL**.

   NOTE: The vent hole is near the input shaft hub. If the unit is set on the mounting surface, oil will drain out through the vent.

2. Place the transfer case so that it can be drained of any remaining fluid and remove the drain plug (2).

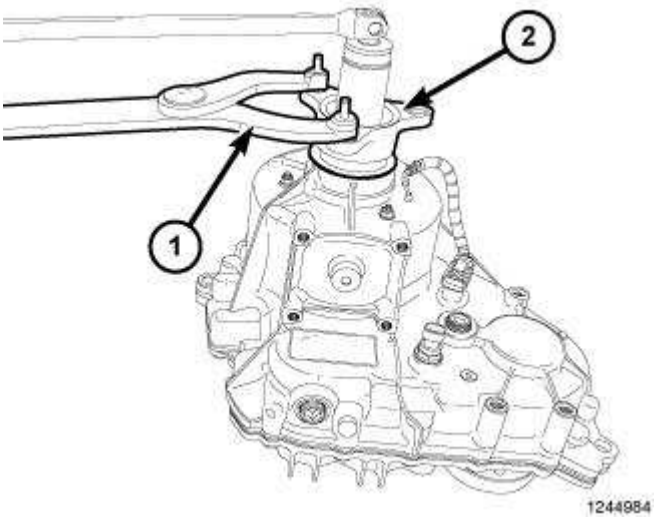

Fig. 211: Holder And Rear Output Flange

Courtesy of CHRYSLER GROUP, LLC

3. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2).
4. Remove the rear output flange nut.

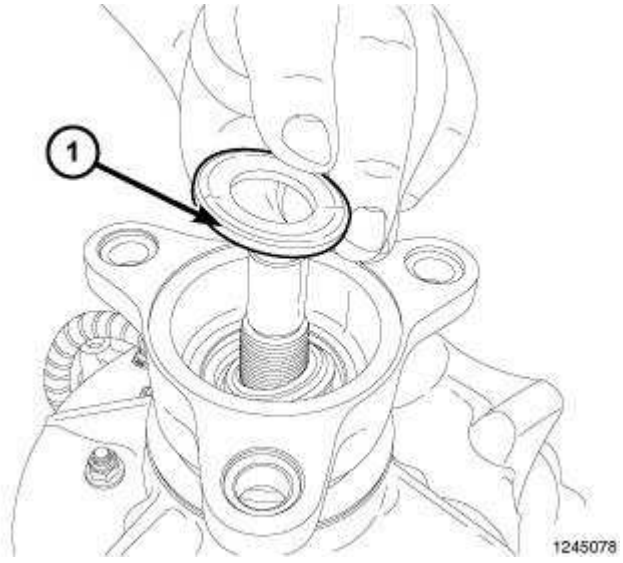

Fig. 212: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear output flange washer (1)

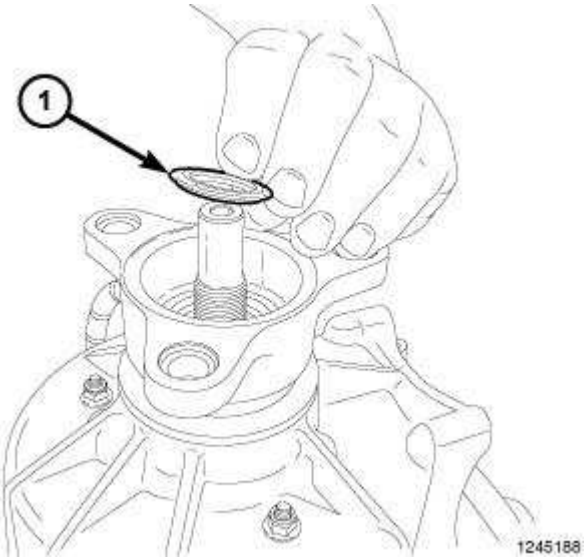

Fig. 213: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

6. Remove the outer rear output shaft seal (1)

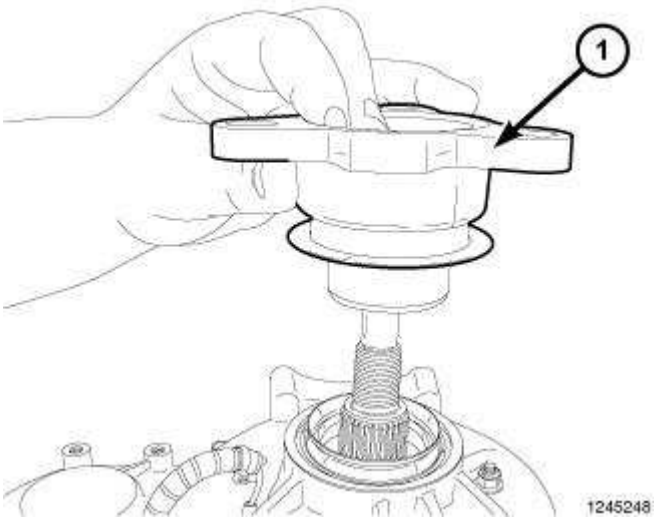

Fig. 214: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

7. Remove the rear output flange (1)

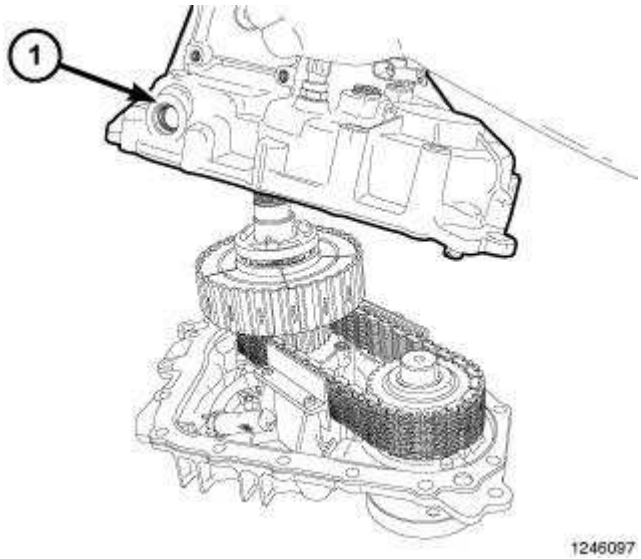

Fig. 215: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

8. Remove the case half bolts.

NOTE: The clutch rotor might remain in the rear case half during removal.

9. Remove the rear cover (1)

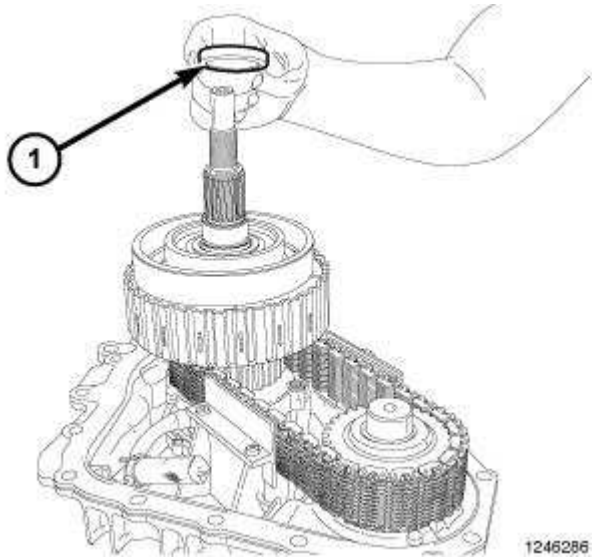

Fig. 216: Spacer
Courtesy of CHRYSLER GROUP, LLC

10. Remove the spacer (1)

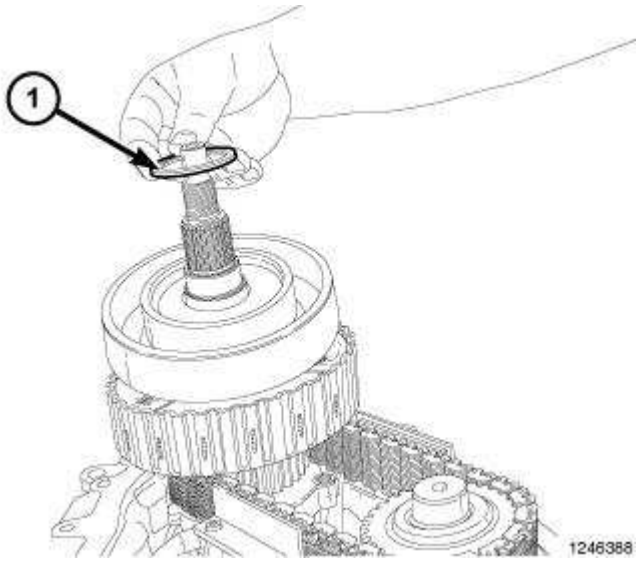

Fig. 217: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

11. Remove the bearing (1) from the input shaft.

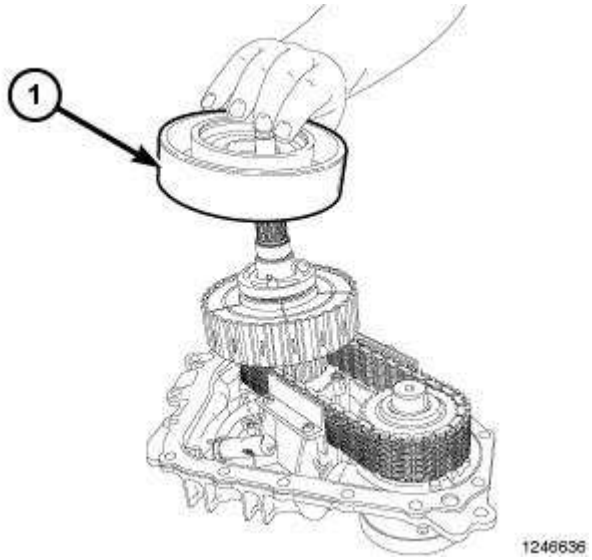

Fig. 218: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

12. Remove the clutch rotor (1) from the input shaft.

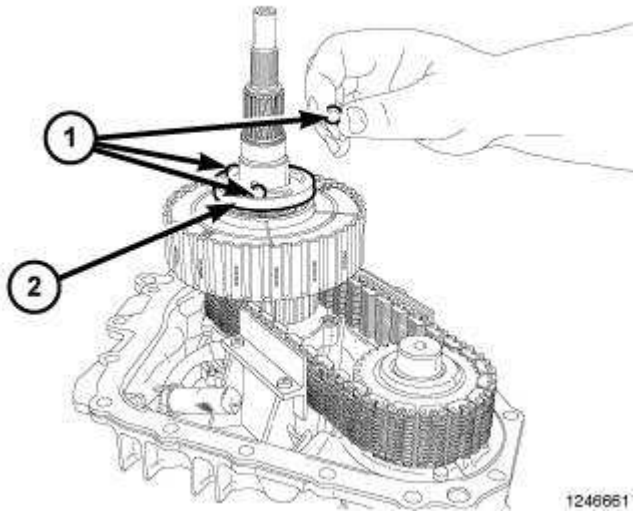

Fig. 219: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

13. Remove the ball bearings (1) from the apply cam (2).
14. Remove the apply cam (2)

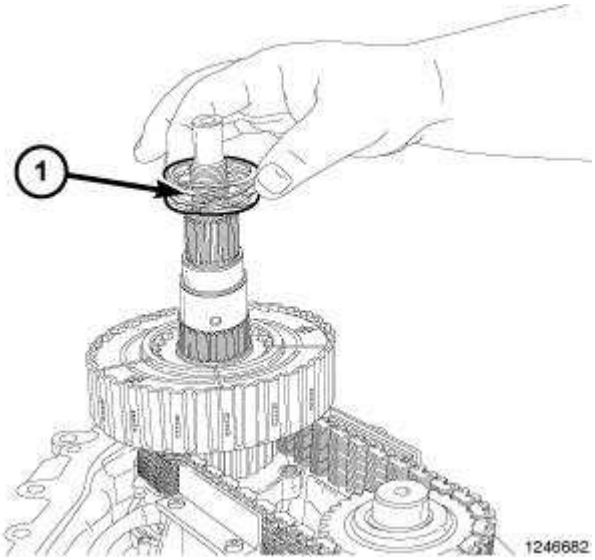

Fig. 220: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

15. Remove the wave spring (1) from the input shaft.

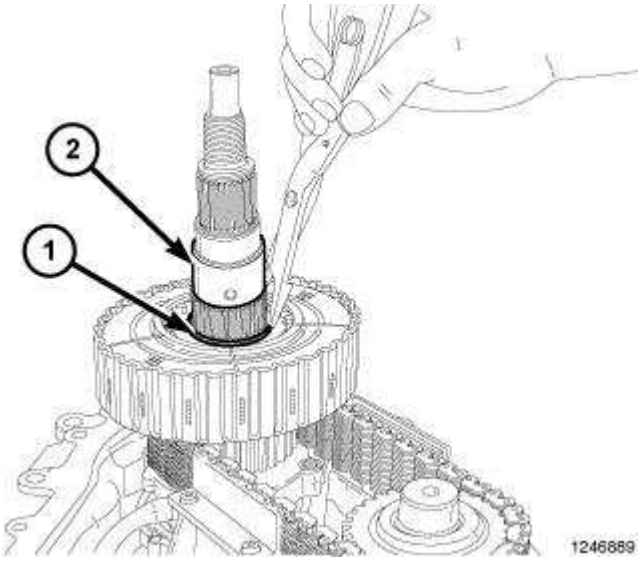

Fig. 221: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

16. Remove the snap ring (1) from the input shaft (2).

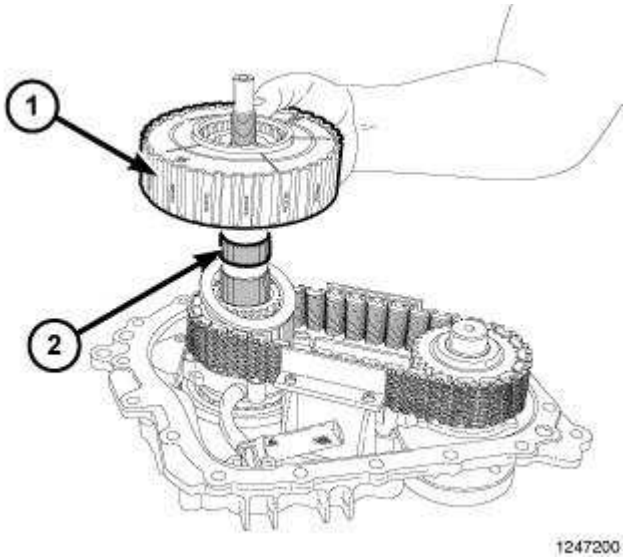

Fig. 222: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

17. Remove the clutch assembly (1) from the input shaft (2).

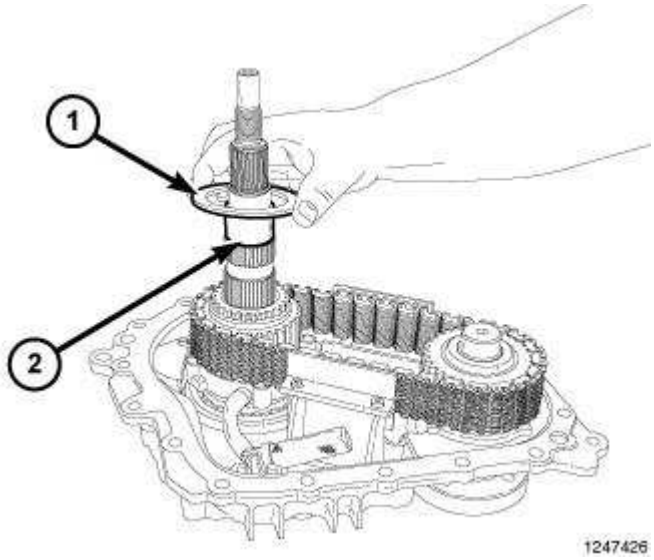

Fig. 223: Thrust Washer And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

18. Remove the thrust washer (1) from the input shaft (2).

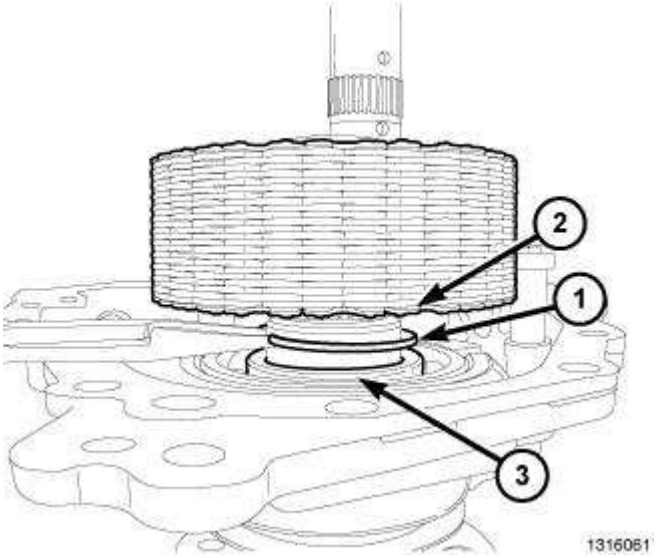

Fig. 224: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: The output shaft sprocket is pressed onto the output shaft.

19. Release the Snap Ring (1) from the Output Shaft and move it away from the Groove (3), toward the Output Shaft Sprocket (2).

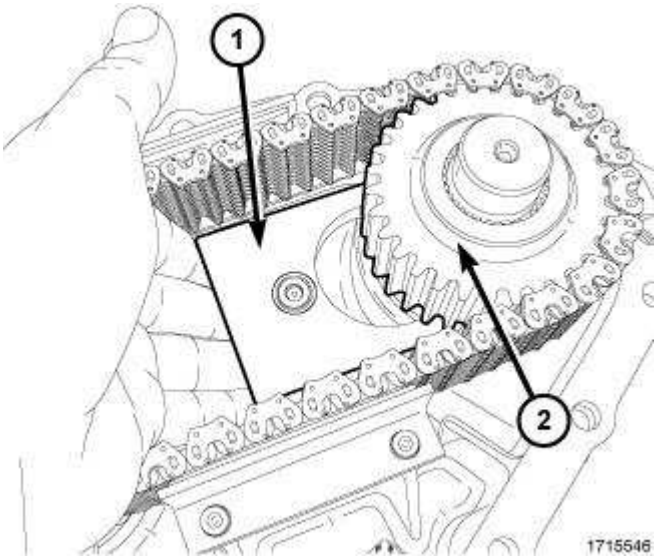

Fig. 225: Brace Plate And Input Shaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

20. Slide the (special tool #10176, Remover, Front Drive Sprocket) Brace Plate (1) in between the case and the input shaft sprocket (2).

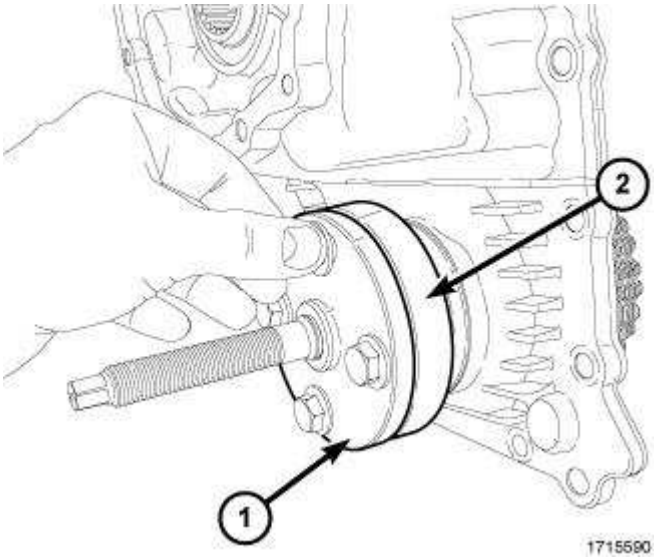

Fig. 226: Puller Plate And Output Shaft Flange
Courtesy of CHRYSLER GROUP, LLC

21. Align the holes on the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) with the bolt holes in the output shaft flange (2), then install the (special tool #10176, Remover, Front Drive Sprocket) Puller Plate (1) onto the output shaft flange (2).

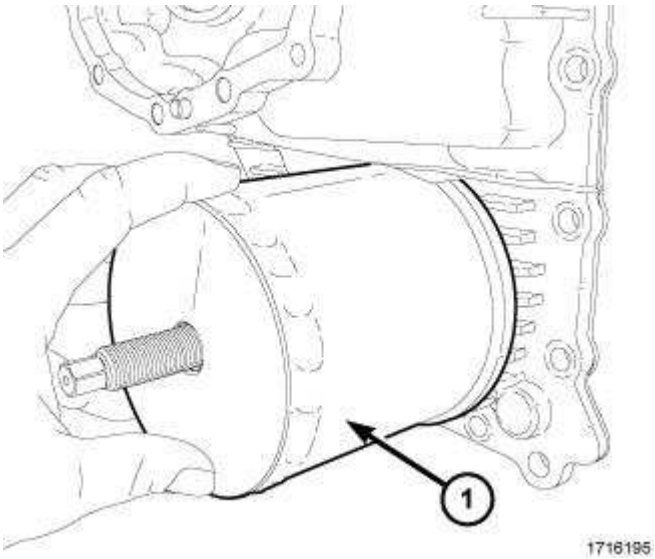

Fig. 227: Base
Courtesy of CHRYSLER GROUP, LLC

22. Install the (special tool #10176, Remover, Front Drive Sprocket) Base (1) onto the puller plate.

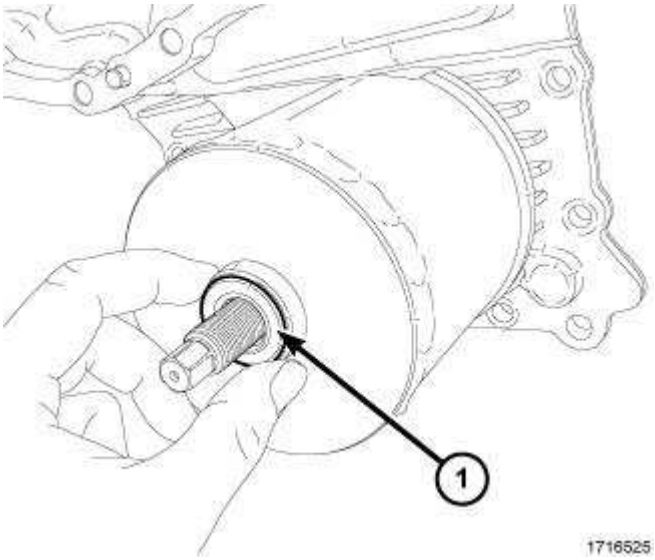

Fig. 228: Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1) so that the bearing flange is facing up.

23. Install the (special tool #10176, Remover, Front Drive Sprocket) Bearing (1).

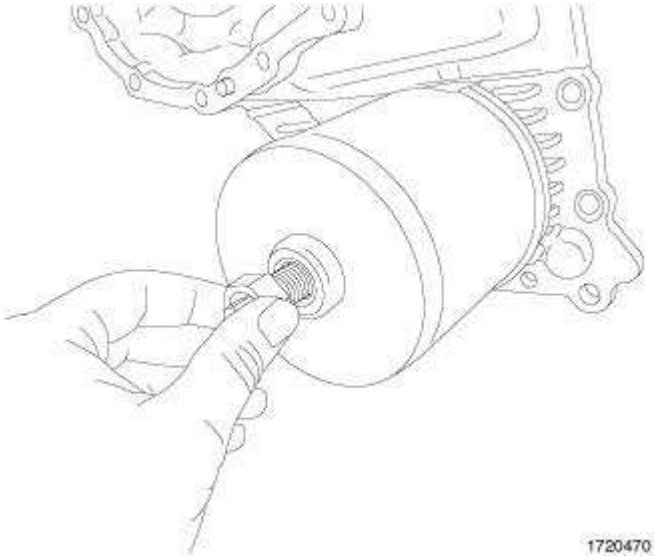

Fig. 229: Nut
Courtesy of CHRYSLER GROUP, LLC

24. Install the (special tool #10176, Remover, Front Drive Sprocket) Nut (1).

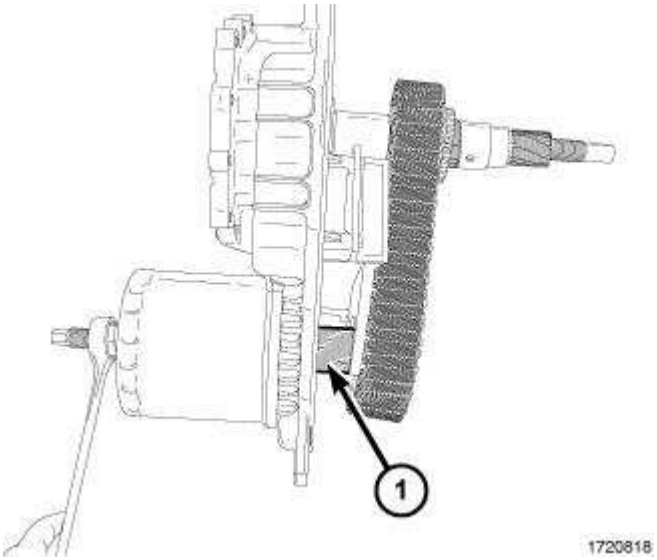

Fig. 230: Output Shaft
Courtesy of CHRYSLER GROUP, LLC

25. Tighten the nut until the Output Shaft (1) is pulled free of the output shaft sprocket.
26. Remove the Output Shaft Sprocket, the Drive Chain, and the Drive Sprocket as an assembly.

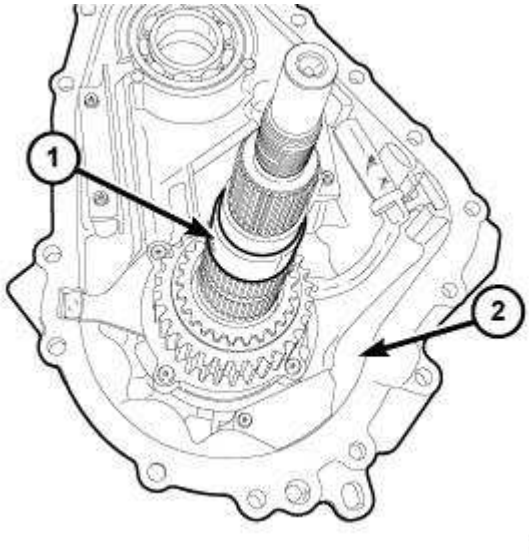

Fig. 231: Input Shaft Assembly And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

27. Remove the Input Shaft assembly (1) from the front case half (2).
28. Remove the output shaft seal.

INSTALLATION

INSTALLATION

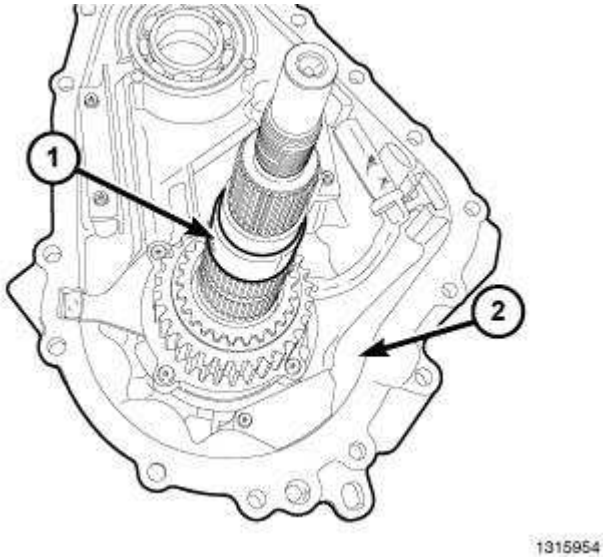

Fig. 232: Input Shaft Assembly And Front Case Half
Courtesy of CHRYSLER GROUP, LLC

1. Use the (special tool #10174, Installer, Seal, Rear Output) Seal Installer to install the output shaft seal into the front case half.
2. Install the Input Shaft assembly (1) into the Front Case Half (2).

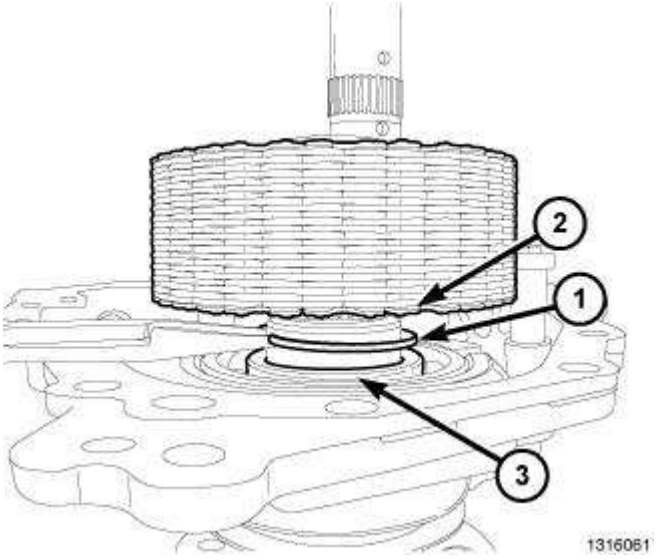

Fig. 233: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: The output shaft sprocket is pressed onto the output shaft.

NOTE: If the Snap Ring (1) is temporarily installed too close to the top of the Output Shaft, it might not be possible to install it into the Bottom Groove on the Output Shaft after the Output Shaft Sprocket is pressed onto the

Output Shaft.

3. Temporarily install the Snap Ring (1) approximately 3 mm (0.12 in.) above the Groove (3) on the Output Shaft.
4. Install the Output Shaft Sprocket, the Drive Chain and the Drive Sprocket as an assembly.

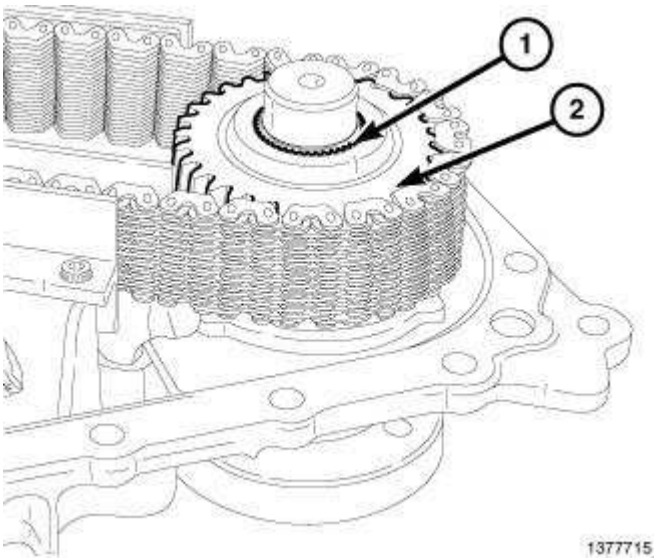

Fig. 234: Output Shaft Sprocket And Top Groove On Output Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the Output Shaft Sprocket (2) is at the correct height, the Top Groove (1) on the Output Shaft will be visible.

5. Use the (special tool #8835-3, Receiver, Bushing) Installer and an arbor press to install the Output Shaft Sprocket (2) onto the Output Shaft. Press the sprocket until the Top Groove (1) on the Output Shaft is visible.

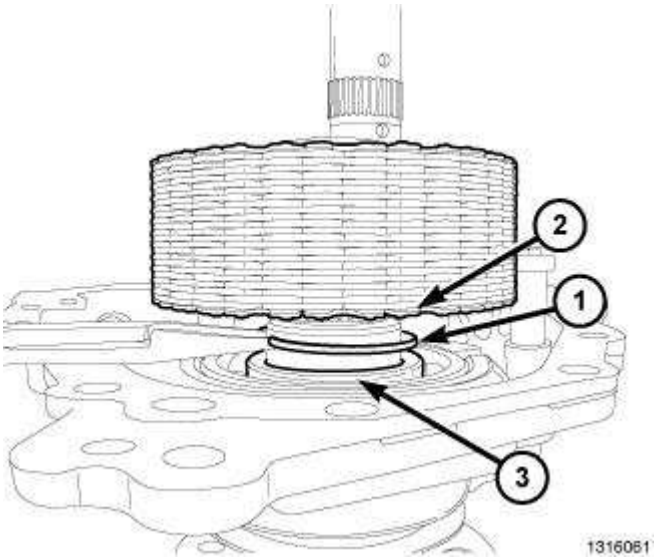

Fig. 235: Locating Snap Ring
Courtesy of CHRYSLER GROUP, LLC

6. Press the Output Shaft upward with the Output Shaft Flange, then install the Snap Ring (1) into the Groove (3) on the Output Shaft.

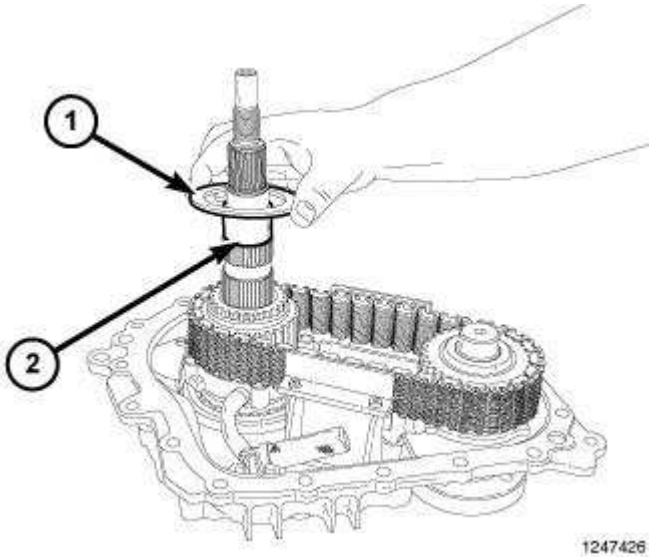

Fig. 236: Thrust Washer And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

7. Install the thrust washer (1) onto the Input Shaft (2).

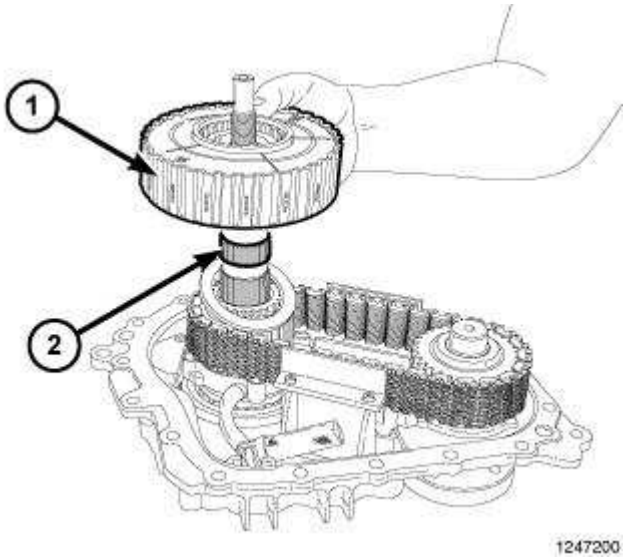

Fig. 237: Clutch Assembly And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

8. Install the Clutch Assembly (1) onto the input Shaft (2).

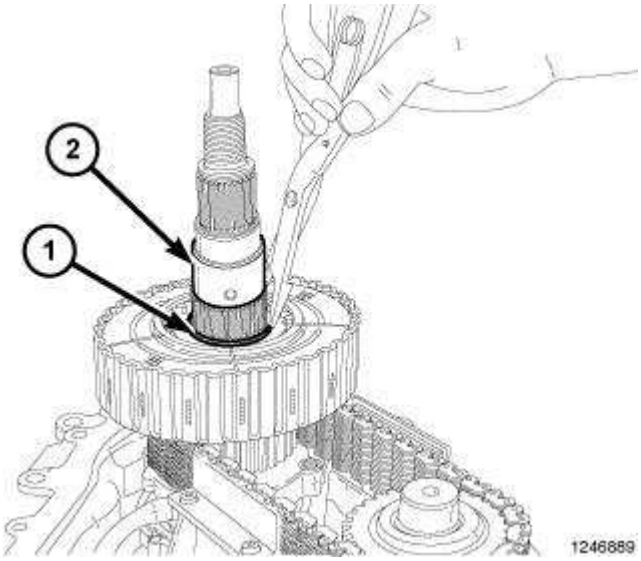

Fig. 238: Snap Ring And Input Shaft
Courtesy of CHRYSLER GROUP, LLC

9. Install the Snap Ring (1) onto the Input Shaft (2).

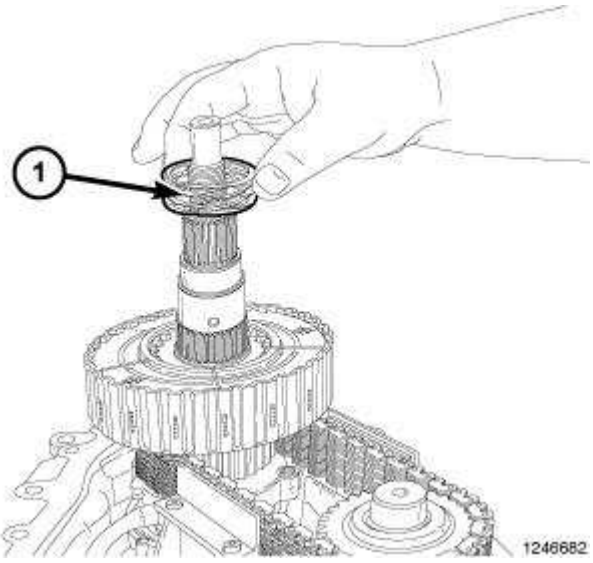

Fig. 239: Input Shaft Wave Spring
Courtesy of CHRYSLER GROUP, LLC

10. Install the wave spring (1) onto the input shaft.

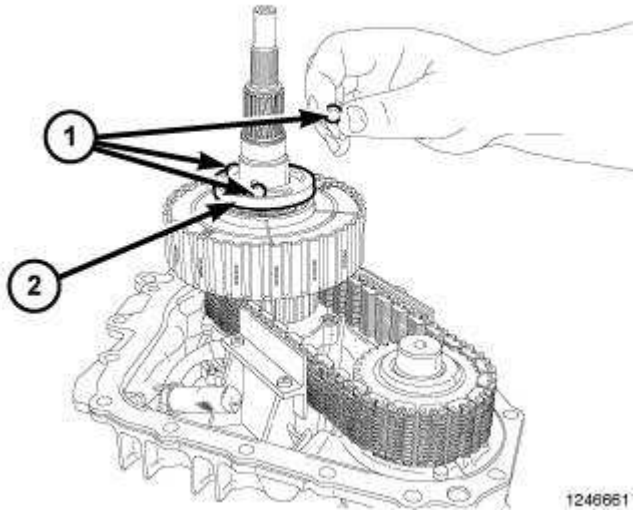

Fig. 240: Ball Bearings And Apply Cam
Courtesy of CHRYSLER GROUP, LLC

11. Install the apply cam (2), and the ball bearings (1)

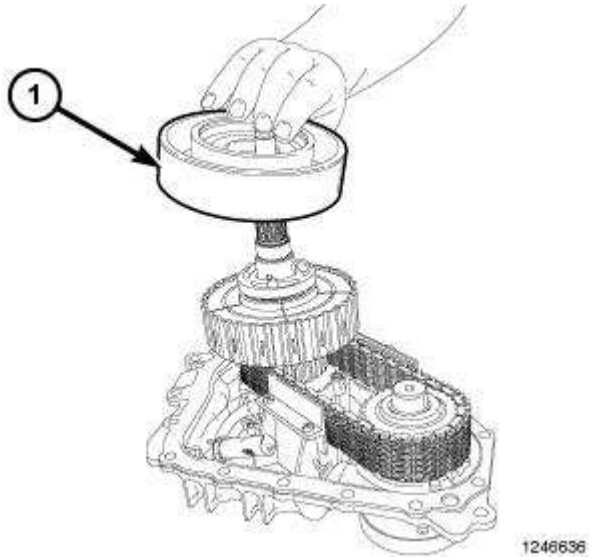

Fig. 241: Clutch Rotor
Courtesy of CHRYSLER GROUP, LLC

12. Install the clutch rotor (1) onto the input shaft.

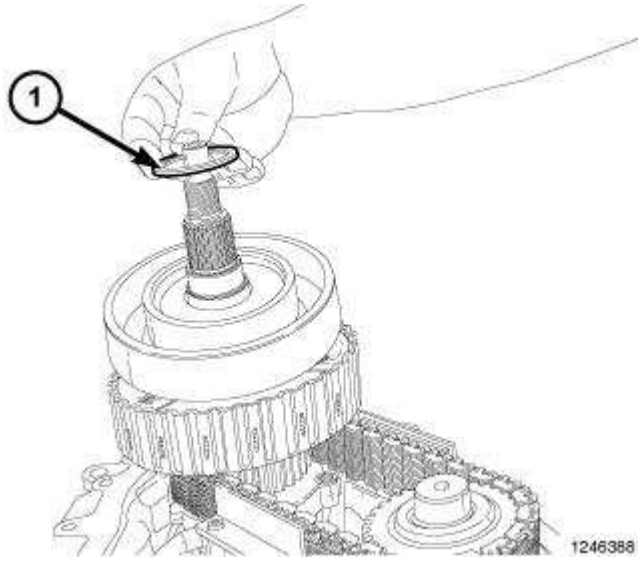

Fig. 242: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

13. Install the bearing (1) onto the input shaft.

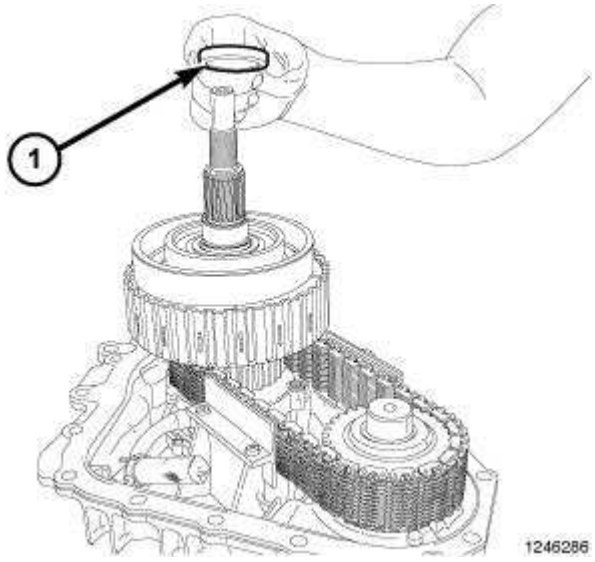

Fig. 243: Spacer
Courtesy of CHRYSLER GROUP, LLC

14. Install the spacer (1).

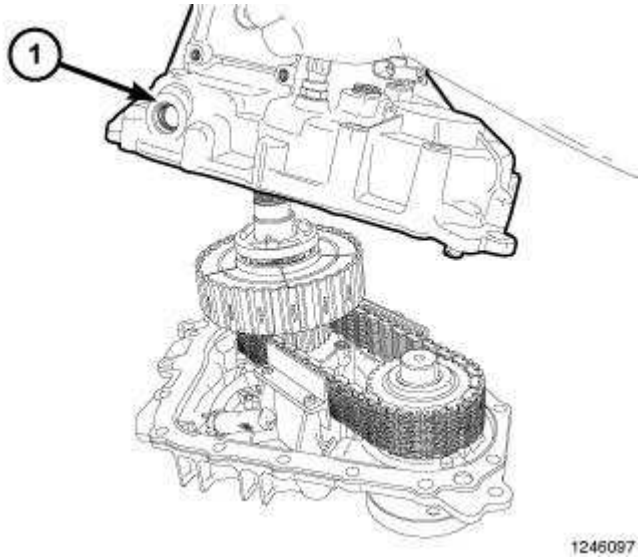

Fig. 244: Transfer Case Rear Cover
Courtesy of CHRYSLER GROUP, LLC

15. Apply a bead of Loctite® 598 HB to the front case half sealing surface.
16. Install the rear cover (1). Tighten the case bolts to 31 Nm (23 ft. lbs).

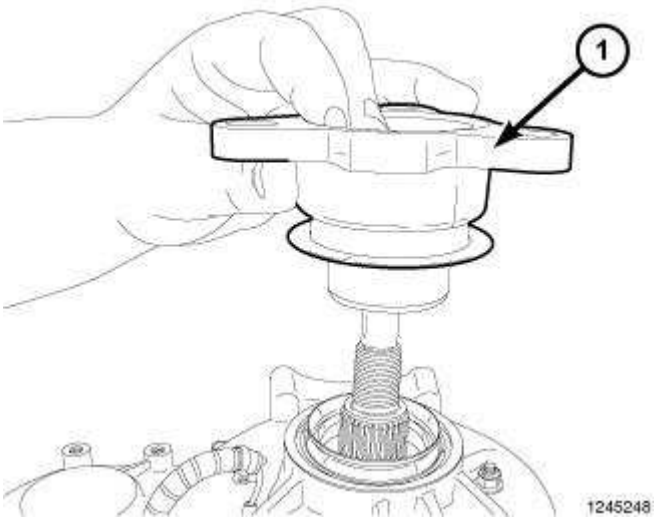

Fig. 245: Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

17. Install the rear output flange (1)

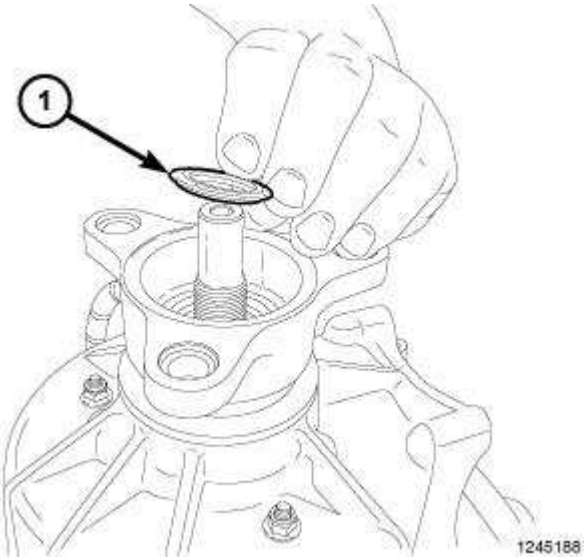

Fig. 246: Outer Rear Output Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

18. Install a new outer rear output shaft seal (1)

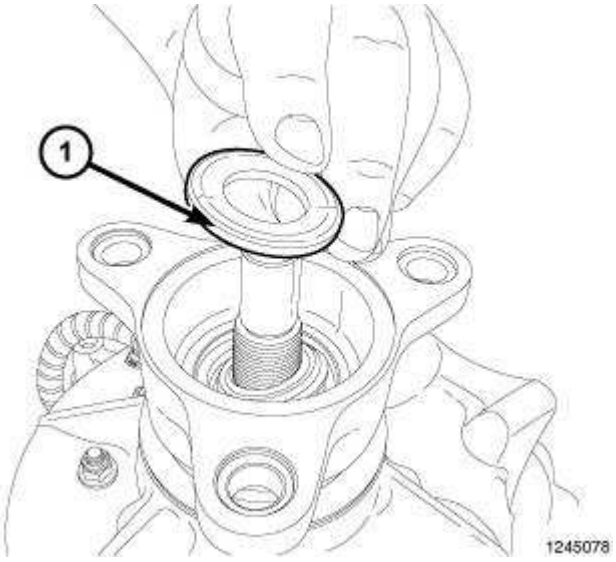

Fig. 247: Rear Output Flange Washer
Courtesy of CHRYSLER GROUP, LLC

19. Install the rear output flange washer (1)

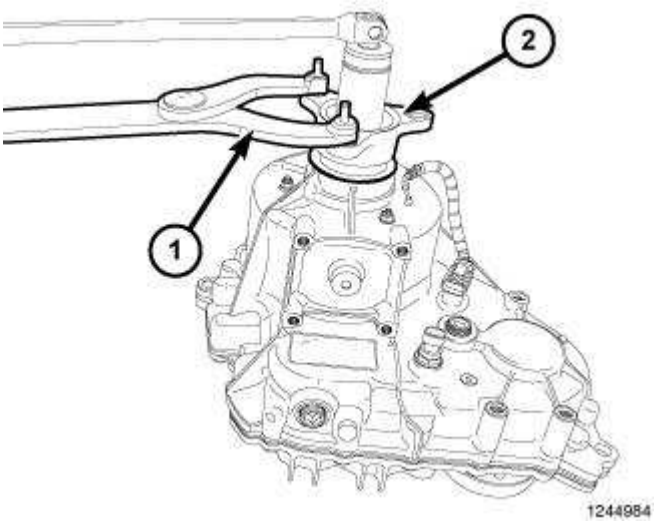

Fig. 248: Holder And Rear Output Flange
Courtesy of CHRYSLER GROUP, LLC

20. Install the rear output flange nut.
21. Install Holder (special tool #6958, Wrench, Spanner) (1) onto the rear output flange (2). Tighten the rear output flange nut to 319 Nm (235 ft. lbs.).
22. Install the transfer case. Refer to **INSTALLATION**.

ACCESSORIES AND EQUIPMENT

Universal Transmitter - Chrysler 300

DESCRIPTION

DESCRIPTION

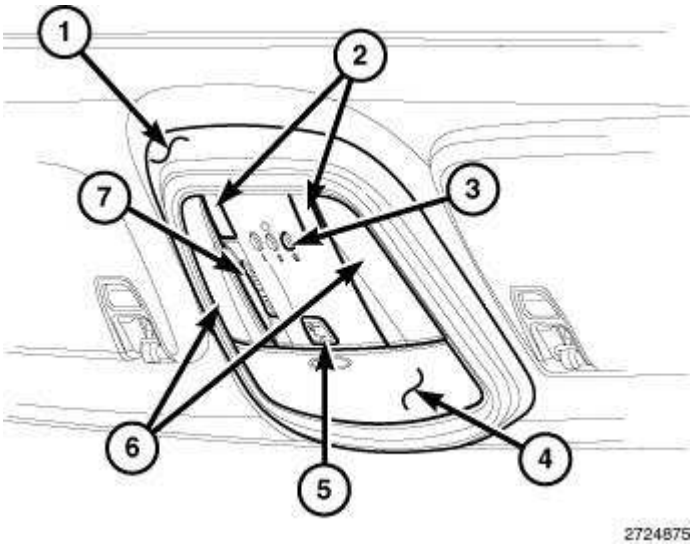

Fig. 1: View Of Overhead Console Transmitter Push Buttons
Courtesy of CHRYSLER GROUP, LLC

The HomeLink® transceiver for this vehicle is located within the overhead console (1). The only visible component of the universal transmitter are the three transmitter push buttons (3) at the front of the overhead console. The buttons are marked with one, two or three illuminated dots, respectively, for identification of each channel.

Each of the three transmitter push buttons controls an independent radio transmitter channel. Each of these three channels can be trained to transmit a different radio frequency signal for the remote operation of garage door openers, motorized gate openers, home or office lighting, security systems or just about any other device that can be equipped with a radio receiver in the 286 to 399 Megahertz (MHz) frequency range for remote operation. The transmitter is capable of operating systems using either rolling code or non-rolling code technology. The system will not transmit operating signals if the Vehicle Theft Security System is armed.

The HomeLink® transceiver cannot be repaired, and is only available for service with the overhead console. If any part of the component is inoperative or damaged, the complete overhead console assembly must be replaced. Refer to **CONSOLE, OVERHEAD, REMOVAL** .

OPERATION

OPERATION

The HomeLink® transceiver operates on a non-switched source of battery current so the unit will remain functional, regardless of the ignition switch position. For more information on the features, programming procedures and operation of the HomeLink® transceiver, see the owner's manual in the vehicle glove box.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HOMELINK® TRANSCEIVER

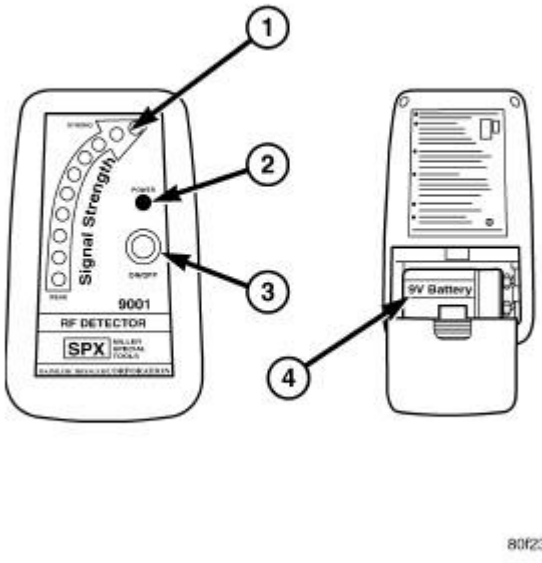

Fig. 2: Identifying Radio Frequency Detector
Courtesy of CHRYSLER GROUP, LLC

If the HomeLink® transceiver is inoperative, retrain the transceiver with a known good transmitter. Refer to **STANDARD PROCEDURE**. Test the universal transmitter operation again. If the unit is still inoperative, test the universal transmitter with Radio Frequency Detector special tool as described below:

1. Turn the Radio Frequency (RF) Detector ON (3). A "chirp" will sound and the green power Light Emitting Diode (LED) will light (2). If the green LED does not light, replace the battery (4).
2. Hold the RF detector within one inch of the TRAINED universal transmitter and press any of the transmitters buttons.
3. The red signal detection LEDs (1) will light and the tool will beep if a radio signal is detected. Repeat this test for all three transmitter buttons. If the tool does not detect a radio signal for any of the three buttons, replace the inoperative HomeLink® transceiver assembly. The HomeLink® transceiver is only available for service with the overhead console. If any part of the component is inoperative or damaged, the complete overhead console assembly must be replaced.

STANDARD PROCEDURE

ERASING HOMELINK® TRANSCEIVER CODES

NOTE: Individual channels cannot be erased. Erasing the HomeLink® transceiver codes will erase ALL programmed codes.

To erase programming from all three buttons (individual buttons cannot be erased but can be reprogrammed), press and hold the two outer HomeLink® transceiver buttons until the indicator light begins to flash after about 20 seconds. Release both buttons. Do not hold for longer that 30 seconds. HomeLink® is now in the train (or learning) mode and can be programmed at any time beginning with Programming. Refer to **STANDARD PROCEDURE**.

PROGRAMMING HOMELINK® TRANSCEIVER CODES

WARNING: Vehicle exhaust contains carbon monoxide, a dangerous gas. Do not run the engine while training the universal transmitter. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: Your motorized door or gate may open and close while you are training the universal transmitter if the vehicle is in range of the motorized device. Do not train the universal transmitter if people or pets are in the path of the door or gate. A moving door or gate can cause serious injury or death to people and pets or damage to objects.

NOTE: When programming a garage door opener, it is advised to park outside the garage. It is also recommended that a new battery be placed in the hand-held transmitter of the device being programmed to the HomeLink® transceiver for quicker training and accurate transmission of the radio-frequency signal.

NOTE: If programing the HomeLink® transceiver is unsuccessful using the following procedure, refer to the Owner's Manual for the current customer assistance phone number.

PROGRAMMING PROCEDURE

1. Press and hold the two outer HomeLink® transceiver buttons, and release only when the indicator light begins to flash (after 20 seconds). **Do not** hold the buttons for longer than 30 seconds and **do not** repeat step one to program a second and/or third hand-held transmitter to the remaining two HomeLink® transceiver buttons.
2. Position the end of your hand-held transmitter 3-8 cm (1-3 inches) away from the HomeLink® transceiver buttons while keeping the indicator light in view.
3. Simultaneously press and hold both the HomeLink® transceiver button that you want to train and the hand-held transmitter button. **Do not release the buttons until step 4 has been completed.**

NOTE: **Some gate operators and garage door openers may require you to replace this Programming Step 3 with procedures noted in the "Gate Operator/Canadian Programming" information.**

4. The HomeLink® transceiver indicator light will flash slowly and then rapidly after HomeLink® successfully receives the frequency signal from the hand-held transmitter. Release both buttons after the indicator light changes from the slow to rapid flash.
5. Press and hold the just trained HomeLink® transceiver button and observe the indicator light. If the indicator light **stays on constantly, programming is complete** and your device should activate when the button is pressed and released.

NOTE: **To program the remaining two buttons, begin with "Programming" step 2. Do not repeat step 1.**

If the indicator light blinks rapidly for two seconds and then turns to a constant light, continue with "Programming" steps 6-8 to complete the programming of a rolling code equipped device (most commonly a garage door opener).

6. At the garage door opener receiver (motor-head unit) in the garage, locate the "learn" or "smart" button. This can usually be found where the hanging antenna wire is attached to the motor-head unit.
7. Firmly press and release the "learn" or "smart" button. (The name and color of the button may vary by manufacturer.)

NOTE: **There are 30 seconds in which to initiate step 8.**

8. Return to the vehicle and firmly **press, hold for two seconds and release** the programmed HomeLink® transceiver button. Repeat the **"press/hold/release"** sequence a second time, and, depending on the brand of the garage door opener (or other rolling code equipped device), repeat this sequence a third time to complete the programming.

   The HomeLink® transceiver should now activate your rolling code equipped device.

NOTE: **To program the remaining two HomeLink® transceiver buttons, begin with "Programming" step 2. Do not repeat step 1.**

CANADIAN PROGRAMMING/GATE PROGRAMMING

Canadian radio-frequency laws require transmitter signals to "time-out" (or quit) after several seconds of transmission which may not be long enough for the HomeLink® transceiver to pick up the signal during programming. Similar to this Canadian law, some U.S. gate operators are designed to "time-out" in the same manner.

If you live in Canada or you are having difficulties programming a gate operator by using the "Programming" procedures (regardless of where you live), **replace "Programming HomeLink®**

Transceiver Codes" step 3 with the following:

NOTE: **When programming a garage door opener or gate operator, it is advised to unplug the device or move the vehicle out of range during the "cycling" process to prevent possible overheating.**

3. Continue to press and hold the HomeLink® transceiver button while you **press and release every two seconds** ("cycle") your hand-held transmitter until the frequency signal has successfully been accepted. The indicator light will flash slowly and then rapidly. Proceed with "Programming" step 4 to complete.

REPROGRAMMING HOMELINK® TRANSCEIVER CODES

WARNING: **Vehicle exhaust contains carbon monoxide, a dangerous gas. Do not run the engine while training the universal transmitter. Failure to follow these instructions may result in possible serious or fatal injury.**

WARNING: **Your motorized door or gate may open and close while you are training the HomeLink® transceiver if the vehicle is in range of the motorized device. Do not train the HomeLink® transceiver if people or pets are in the path of the door or gate. A moving door or gate can cause serious injury or death to people and pets or damage to objects.**

NOTE: **If programing the HomeLink® transceiver is unsuccessful using the following procedure, refer to the Owner's Manual for the current customer assistance phone number.**

PROGRAMMING PROCEDURE

To program a device to the HomeLink® transceiver using a button previously trained, follow these steps:

1. Press and hold the desired HomeLink® transceiver button. **DO NOT** release the button. The indicator light will begin to flash after 20 seconds. Without releasing the HomeLink® transceiver button, proceed to step 2.
2. Position the end of your hand-held transmitter 3-8 cm (1-3 inches) away from the HomeLink® transceiver button while keeping the indicator light in view.
3. Simultaneously press and hold both the HomeLink® transceiver button that you want to train and the hand-held transmitter buttons. **Do not release the buttons until step 4 has been completed.**

NOTE: **Some gate operators and garage door openers may require you to replace this Reprogramming Step 3 with procedures noted in the "Gate Operator/Canadian Programming" information.**

4. The HomeLink® transceiver indicator light will flash slowly and then rapidly after it successfully receives the frequency signal from the hand-held transmitter. Release both buttons after the indicator light changes from the slow to the rapid flash.
5. Press and hold the just trained HomeLink® transceiver button and observe the indicator light. If the indicator light **stays on constantly, reprogramming is complete** and your device should activate when the button is pressed and released.

   NOTE: If the indicator light blinks rapidly for two seconds and then turns to a constant light, continue with "Reprogramming" steps 6-8 to complete the programming of a rolling code equipped device (most commonly a garage door opener).

6. At the garage door opener receiver (motor-head unit) in the garage, locate the "learn" or "smart" button. This can usually be found where the hanging antenna wire is attached to the motor-head unit.
7. Firmly press and release the "learn" or "smart" button. (The name and color of the button may vary by manufacturer.)

   NOTE: There are 30 seconds in which to initiate step 8.

8. Return to the vehicle and firmly **press, hold for two seconds and release** the reprogrammed HomeLink® transceiver button. Repeat the **"press/hold/release"** sequence a second time, and, depending on the brand of the garage door opener (or other rolling code equipped device), repeat this sequence a third time to complete the reprogramming.

   The HomeLink® transceiver should now activate your rolling code equipped device.

CANADIAN PROGRAMMING/GATE PROGRAMMING

Canadian radio-frequency laws require transmitter signals to "time-out" (or quit) after several seconds of transmission which may not be long enough for the HomeLink® transceiver to pick up the signal during programming. Similar to this Canadian law, some U.S. gate operators are designed to "time-out" in the same manner.

If you live in Canada or you are having difficulties programming a gate operator by using the "Programming" procedures (regardless of where you live), **replace "Reprogramming HomeLink® Transceiver Codes" step 3** with the following:

NOTE: When programming a garage door opener or gate operator, it is advised to unplug the device or move the vehicle out of range during the "cycling" process to prevent possible overheating.

3. Continue to press and hold the HomeLink® transceiver button while you **press and release every two seconds** ("cycle") your hand-held transmitter until the frequency signal has successfully been accepted. The indicator light will flash slowly and then rapidly. Proceed with "Programming" step 4 to complete.

CAPACITIES AND RECOMMENDED FLUIDS

DESCRIPTION

LUBRICANT RECOMMENDATIONS

SPECIALIZED LUBRICANTS AND OILS

Some maintenance or repair procedures may require the use of specialized lubricants or oils. Consult the appropriate articles in this information for the correct application of these lubricants.

CHASSIS

Component	Fluid, Lubricant, or Genuine Part
Steering Gear AND Linkage, Ball Joints, Prop Shafts AND Yokes, Wheel Bearings	Mopar® Multi-Purpose Lubricant NLGI Grade 2 EP, GC-LB

BODY

Component	Fluid, Lubricant, and Genuine Part
Hinges:	
Door AND Hood	Mopar® Engine Oil
Swing Gate	Mopar® Multi-Purpose Lube NLGI Grade 2 EP, GC-LB
Latches: Door, Hood/Safety Catch, Swing Gate	Mopar® Multi-Purpose Lube NLGI Grade 2 EP, GC-LB
Seat Regulator AND Track	Mopar® Multi-Purpose Lube NLGI Grade 2 EP, GC-LB
Lock Cylinders	Mopar® Lock Cylinder Lube

FLUID TYPES

When service is required, Chrysler recommends that only Mopar® brand parts, lubricants and chemicals be used. Mopar® provides the best engineered products for servicing Chrysler vehicles.

LUBRICANTS BEARING DESIGNATIONS

Only lubricants bearing designations defined by the following organization should be used to service a Chrysler vehicle:

- Society of Automotive Engineers (SAE)
- American Petroleum Institute (API). Refer to**Fig. 1**.
- National Lubricating Grease Institute (NLGI)

- European Automobile Manufacturers Association (ACEA)

API QUALITY CLASSIFICATION

9400-9

Fig. 1: Identifying American Petroleum Institute Certified Symbol
Courtesy of CHRYSLER GROUP, LLC

This symbol on the front of an oil container means that the oil has been certified by the American Petroleum Institute (API) to meet all the lubrication requirements specified by Chrysler.

GEAR LUBRICANTS

SAE ratings also apply to multigrade gear lubricants. In addition, API classification defines the lubricant's usage, such as API GL-5 and SAE 75W-90.

DESCRIPTION

ASSOCIATION DES CONSTRUCTEURS EUROP E ENS D' AUTOMOBILES (EUROPEAN AUTOMOBILE MANUFACTURERS ASSOCIATION) (ACEA)

For countries that use the ACEA european oil categories for service fill oils, use engine oils with the appropriate viscosity based on local ambient temperatures that meet the requirements of ACEA C3 and that are approved to MB 229.31 or MB 229.51.

AUTOMATIC TRANSMISSION FLUID

8HP45 TRANSMISSIONS

CAUTION: A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid

see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS.

NOTE: Refer to FLUIDS, LUBRICANTS AND GENUINE PARTS Service Procedures for fluid level checking procedures.

P/N 68157995AA Automatic Transmission Fluid is the recommended fluid for the **8HP45** Chrysler automatic transmissions.

FLUID ADDITIVES - WITH 8HP45

Chrysler strongly recommends against the addition of any fluids to the 8HP45 transmission other than the automatic transmission fluid listed above. **Special dyes MUST NOT BE USED in the 8HP45 transmission** .

Various "special" additives and supplements exist that claim to improve shift feel and/or quality. These additives and others also claim to improve converter clutch operation and inhibit overheating, oxidation, varnish, and sludge. These claims have not been supported to the satisfaction of Chrysler and **these additives must not be used.** The use of transmission "sealers" should also be avoided, since they may adversely affect the integrity of transmission seals.

AUTOMATIC TRANSMISSIONS - WITHOUT 8HP45

NOTE: Refer to FLUIDS, LUBRICANTS AND GENUINE PARTS for fluid level checking procedures.

Mopar® ATF +4, Automatic Transmission Fluid is the recommended fluid for Chrysler automatic transmissions.

Dexron II fluid IS NOT recommended. Clutch chatter can result from the use of improper fluid.

Mopar® ATF +4, Automatic Transmission Fluid when new is red in color. The ATF is dyed red so it can be identified from other fluids used in the vehicle such as engine oil or antifreeze. The red color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, the ATF will begin to look darker in color and may eventually become brown. **This is normal.** ATF+4 also has a unique odor that may change with age. Consequently, odor and color cannot be used to indicate the fluid condition or the need for a fluid change.

FLUID ADDITIVES - WITHOUT 8HP45

Chrysler strongly recommends against the addition of any fluids to the transmission, other than those automatic transmission fluids listed above. Exceptions to this policy are the use of special dyes to aid in detecting fluid leaks.

Various "special" additives and supplements exist that claim to improve shift feel and/or quality. These additives and others also claim to improve converter clutch operation and inhibit overheating,

oxidation, varnish, and sludge. These claims have not been supported to the satisfaction of Chrysler and **these additives must not be used.** The use of transmission "sealers" should also be avoided, since they may adversely affect the integrity of transmission seals.

ENGINE OIL

WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.

When service is required, Chrysler recommends that only Mopar® brand parts, lubricants and chemicals be used. Mopar® provides the best engineered products for servicing Chrysler vehicles.

LUBRICANTS BEARING DESIGNATIONS

Only lubricants bearing designations defined by the following organization should be used.

- Society of Automotive Engineers (SAE)
- American Petroleum Institute (API)
- National Lubricating Grease Institute (NLGI)
- Association des Constructeurs Europ e ens d' Automobiles (European Automobile Manufacturers Association) (ACEA)

API SERVICE GRADE CERTIFIED

9400-9

Fig. 2: Identifying American Petroleum Institute Certified Symbol

Courtesy of CHRYSLER GROUP, LLC

Use an engine oil that is API Certified. Mopar® provides engine oils, meeting Material Standard MS-6395, that meet or exceed this requirement.

SAE VISCOSITY

Vehicles with 5.7L engines equipped with Multiple Displacement System (MDS) must use SAE 5W-20 oil. Failure to do so may result in improper operation of the Multiple Displacement System (MDS). Refer to Multi Displacement System under Starting and Operating. Refer to owners manual for details. Refer to the engine oil filler cap for the recommend engine oil viscosity for each vehicle. An SAE viscosity grade is used to specify the viscosity of engine oil. Use only engine oils with multiple viscosities such as 5W-20 or 5W-30. These are specified with a dual SAE viscosity grade which indicates the cold-to-hot temperature viscosity range.

NOTE: **6.4L engines. For best performance and maximum protection under all types of operating conditions, the manufacturer only recommends full synthetic engine oils SAE 0W-40 that meet the American Petroleum Institute (API) categories of SM or SM/CF. meeting the requirements of Chrysler Group LLC Material Standard MS-10725.**

ACEA CATEGORIES

For countries that use the ACEA European Oil Categories for Service Fill Oils, use engine oils that meet the requirements of ACEA A1/B1, A2/B2, or A3/B3.

ENERGY CONSERVING OIL

An Energy Conserving type oil is recommended for gasoline engines. The designation of ENERGY CONSERVING is located on the label of an engine oil container.

CONTAINER IDENTIFICATION

9400-9

Fig. 3: Identifying American Petroleum Institute Certified Symbol
Courtesy of CHRYSLER GROUP, LLC

Standard engine oil identification notations have been adopted to aid in the proper selection of engine oil. The identifying notations are located on the front label of engine oil plastic bottles and the top of engine oil cans.

This symbol means that the oil has been certified by the American Petroleum Institute (API). Chrysler only recommend API Certified engine oils that meet the requirements of Material Standard MS-6395. Use Mopar® or an equivalent oil meeting the specification MS-6395.

SYNTHETIC ENGINE OILS

9400-9

Fig. 4: Identifying American Petroleum Institute Certified Symbol

Courtesy of CHRYSLER GROUP, LLC

There are a number of engine oils being promoted as either synthetic or semi-synthetic. If you chose to use such a product, use **only** those oils that meet the American Petroleum Institute (API) and SAE viscosity standard. Follow the service schedule that describes your driving type.

ENGINE OIL ADDITIVES/SUPPLEMENTS

The manufacturer **does not recommend** the addition of any engine oil additives/supplements to the specified engine oil. Engine oil additives/supplements should not be used to enhance engine oil performance. Engine oil additives/supplements should not be used to extend engine oil change intervals. No additive is known to be safe for engine durability and can degrade emission components. Additives can contain undesirable materials that harm the long term durability of engines by:

- Doubling the level of Phosphorus in the engine oil. The ILSAC (International Lubricant Standard Approval Committee) GF-2 and GF-3 standards require that engine oil contain no more than 0.10% Phosphorus to protect the vehicles emissions performance. Addition of engine oil additives/supplements can poison, from the added sulfur and phosphorus, catalysts and hinder efforts to guarantee emissions performance to 80, 000 miles.
- Altering the viscosity characteristics of the engine oil so that it no longer meets the requirements of the specified viscosity grade.
- Creating potential for an undesirable additive compatibility interaction in the engine crankcase. Generally it is not desirable to mix additive packages from different suppliers in the crankcase; there have been reports of low temperature engine failures caused by additive package incompatibility with such mixtures.

ENGINE OIL - DIESEL ENGINES

> **WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.**

When service is required, Chrysler recommends that only Mopar® brand parts, lubricants and chemicals be used. Mopar® provides the best engineered products for servicing Chrysler vehicles.

LUBRICANTS BEARING DESIGNATIONS

Only lubricants bearing designations defined by the following organization should be used.

- Society of Automotive Engineers (SAE)
- American Petroleum Institute (API)

- National Lubricating Grease Institute (NLGI)
- Association des Constructeurs Europ e ens d' Automobiles (European Automobile Manufacturers Association) (ACEA)

API SERVICE GRADE CERTIFIED

Use an engine oil that is API Certified. MOPAR® provides engine oils, that meet or exceed this requirement.

SAE VISCOSITY GRADE

An SAE engine oil that conforms to ACEA A3/B4/C3 that is approved to MB 229.31 is recommended for all operating temperatures. This engine oil is a low ash product that improves low temperature starting and vehicle fuel economy.

DISPOSING OF USED ENGINE OIL

Care should be taken in disposing of the used engine oil from your vehicle. Used oil, indiscriminately discarded, can present a problem to the environment. Contact your local authorized dealer, service station, or governmental agency for advice on how and where used oil can be safely discarded in your area.

ENGINE OIL ADDITIVES/SUPPLEMENTS

The manufacturer **does not recommend** the addition of any engine oil additives/supplements to the specified engine oil. Engine oil additives/supplements should not be used to enhance engine oil performance. Engine oil additives/supplements should not be used to extend engine oil change intervals. No additive is known to be safe for engine durability and can degrade emission components. Additives can contain undesirable materials that harm the long term durability of engines by:

- Doubling the level of Phosphorus in the engine oil. The ILSAC (International Lubricant Standard Approval Committee) GF-2 and GF-3 standards require that engine oil contain no more than 0.10% Phosphorus to protect the vehicles emissions performance. Addition of engine oil additives/supplements can poison, from the added sulfur and phosphorus, catalysts and hinder efforts to guarantee emissions performance to 80, 000 miles.
- Altering the viscosity characteristics of the engine oil so that it no longer meets the requirements of the specified viscosity grade.
- Creating potential for an undesirable additive compatibility interaction in the engine crankcase. Generally it is not desirable to mix additive packages from different suppliers in the crankcase; there have been reports of low temperature engine failures caused by additive package incompatibility with such mixtures.

ENGINE COOLANT

WARNING: Antifreeze is an ethylene-glycol base coolant and is harmful if swallowed or inhaled. If swallowed, drink two glasses of water and induce vomiting.

If inhaled, move to fresh air area. Seek medical attention immediately. Do not store in open or unmarked containers. Wash skin and clothing thoroughly after coming in contact with ethylene-glycol. Keep out of reach of children. Dispose of glycol base coolant properly, contact your dealer or government agency for location of collection center in your area. Do not open a cooling system when the engine is at operating temperature or hot under pressure, personal injury can result. Avoid radiator cooling fan when engine compartment related service is performed, personal injury can result.

CAUTION: Use of Propylene-Glycol based coolants is not recommended, as they provide less freeze protection and less corrosion protection.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Mopar® Antifreeze/Coolant, 5 Year/100, 000 Mile Formula (MS-9769), or the equivalent ethylene-glycol base coolant with organic corrosion inhibitors (called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% ethylene-glycol and 50% distilled water to obtain a freeze point of -37°C (-35° F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

CAUTION: Mopar® Antifreeze/Coolant, 5 Year/100, 000 Mile Formula (MS-9769) may not be mixed with any other type of antifreeze. Mixing of coolants other than specified (non-HOAT or other HOAT) may result in engine damage that may not be covered under the new vehicle warranty, and decreased corrosion protection.

COOLANT PERFORMANCE

The required ethylene-glycol and water mixture depends upon climate and vehicle operating conditions. The coolant performance of various mixtures follows:

Pure Water- Water can absorb more heat than a mixture of water and ethylene-glycol. This is for purpose of heat transfer only. Water also freezes at a higher temperature and allows corrosion.

100 percent Ethylene-Glycol - The corrosion inhibiting additives in ethylene-glycol need the presence of water to dissolve. Without water, additives form deposits in system. These act as insulation causing temperature to rise to as high as 149°C (300°F). This temperature is hot enough to melt plastic. The increased temperature can result in sever engine damage. In addition, 100 percent ethylene-glycol freezes at -22°C (-8°F).

50/50 Ethylene-Glycol and Water - Is the recommended mixture, it provides protection against

freezing to -37°C (-34°F). The antifreeze concentration **must always** be a minimum of 44 percent, year-round in all climates. If percentage is lower, engine parts may be eroded by cavitation. Maximum protection against freezing is provided with a 68 percent antifreeze concentration, which prevents freezing down to -67.7°C (-90°F). A higher percentage will freeze at a warmer temperature. Also, a higher percentage of antifreeze can cause the engine to overheat because specific heat of antifreeze is lower than that of water.

CAUTION: Richer antifreeze mixtures cannot be measured with normal field equipment and can cause problems associated with 100 percent ethylene-glycol.

TRANSFER CASE

Recommended lubricant for the BW 44-40 transfer case is MOPAR ® (P/N 68049954AA) BW 44-40 Transfer Case Lubricant.

BRAKE FLUID

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards. No other type of brake fluid is recommended or approved for usage in the vehicle brake system. Use only Mopar® Brake Fluid or equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from a container which has been left open. An open container of brake fluid will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

BRAKE FLUID - EXPORT

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards. If DOT 3 brake fluid is not available, brake fluid conforming to DOT 4 specifications may be used in its place. The fluids are compatible, but DOT 4 usage may require additional fluid maintenance. No other type of brake fluid is recommended or approved for usage in the vehicle brake system. Use only Mopar® Brake Fluid or equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from an container which has been left open. An open container of brake fluid will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle

brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

POWER STEERING FLUID

NON SRT VEHICLES

Non-SRT vehicles are equipped with Electro Hydraulic Power Steering (EHPS) systems and require power steering fluid which meets material specification MS-11655 or equivalent.

SRT VEHICLES

The recommended fluid for the power steering system for SRT vehicles is Mopar® Power Steering fluid + 4 or Mopar® ATF+4 Automatic Transmission Fluid. Both fluids have the same material standard specifications (MS-9602).

Mopar® ATF+4 (and Mopar® Power Steering fluid + 4), when new, is red in color. ATF+4 is dyed red so it can be identified from other fluids used in the vehicle such as engine oil or antifreeze. The red color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, ATF+4 will begin to look darker in color and may eventually become brown. **THIS IS NORMAL.** ATF+4 also has a unique odor that may change with age. Consequently, odor and color cannot be used to indicate the fluid condition or the need for a fluid change.

DIESEL FUEL

Diesel fuels are available from most reputable fuel marketers. Fuel with a calculated Cetane Index of 45 or higher must be used. See your authorized dealer or distributor for further information regarding fuels availability.

In areas where diesel fuel is below the recommended quality levels (high levels of sulfur and water) it is critical to monitor the fuel filter for contamination and the "Water-In-Fuel" message in the Electronic Vehicle Information Center (EVIC). Failure to properly service the fuel system for these items can significantly reduce engine life and lead to major engine repair. More frequent service intervals of the fuel filter/water separator unit may be required under these conditions than those shown in "Maintenance Schedule A or B."

A/C REFRIGERANT

The refrigerant used in this air conditioning system is a HydroFluoroCarbon (HFC), type R-134a. Unlike R-12, which is a ChloroFluoroCarbon (CFC), R-134a refrigerant does not contain ozone-depleting chlorine. R-134a refrigerant is a nontoxic, nonflammable, clear and colorless liquefied gas.

CAUTION: R-134a refrigerant is not compatible with R-12 refrigerant in an A/C system. Even a small amount of R-12 refrigerant added to an R-134a refrigerant system will cause A/C compressor failure.

The A/C refrigerant system is filled-for-life at the factory and requires no regular maintenance. Although not required at specific intervals, the charge level should be checked if system performance deteriorates or if a noise or leak is suspected. Refer to **DIAGNOSIS AND TESTING** .

OPERATION

OPERATION

The automatic transmission fluid is selected based upon several qualities. The fluid must provide a high level of protection for the internal components by providing a lubricating film between adjacent metal components. The fluid must also be thermally stable so that it can maintain a consistent viscosity through a large temperature range. If the viscosity stays constant through the temperature range of operation, transmission operation and shift feel will remain consistent. Transmission fluid must also be a good conductor of heat. The fluid must absorb heat from the internal transmission components and transfer that heat to the transmission case.

SPECIFICATIONS

FLUIDS, LUBRICANTS AND GENUINE PARTS

ENGINE

Description	Type	Part Number	Capacities	
			U.S.	Metric
Cooling System				
? Engine Coolant (3.0L Diesel Engines) (1)	MOPAR® Antifreeze/Coolant 5 Year/100, 000 Mile Formula HOAT (Hybrid Organic Additive Technology)	1 Gallon - 05066386AA	12.7 Quarts	12 Liters
? Engine Coolant (3.6L Engine) (1)	MOPAR® Antifreeze/Coolant 5 Year/100, 000 Mile Formula HOAT (Hybrid Organic Additive Technology)	1 Gallon - 5066 386AA	10 Quarts	9.5 Liters
? Engine Coolant (5.7L Engine)	MOPAR® Antifreeze/Coolant 5 Year/100, 000 Mile Formula HOAT (Hybrid Organic Additive Technology)	1 Gallon - 5066 386AA	14.7 Quarts	13.9 Liters
? Engine Coolant (6.4L Engine)(1)	MOPAR® Antifreeze/Coolant 5 Year/100, 000 Mile Formula HOAT (Hybrid Organic Additive Technology)	1 Gallon - 5066 386AA	14.5 Quarts	13.7 Liters
Engine Oil with Filter				
Engine Oil (3.0L Diesel Engine)	MOBIL 1® SAE 5W-30 Low Ash Fully Synthetic oil, meeting the requirements of ACEA C3	1 Quart - 05166241AA	9.7 Quarts	9.2 Liters
Engine Oil (3.6L Engines)	MOPAR® API Certified SAE 5W-30 engine oil, meeting the requirements of Chrysler Group LLC Material Standard MS-6395.	1 Quart - 4761 838AB 1 Gallon- 4761 844AB	6 Quarts	5.6 Liters

Engine Oil (5.7L Engines)	MOPAR® API Certified SAE 5W-20 engine oil, meeting the requirements of Chrysler Group LLC Material Standard MS-6395.	1 Quart - 4761 872MA 1 Gallon - 4761 851AF	7 Quarts	6.6 Liters
Engine Oil (6.4L Engine)	MOPAR® API Certified SAE Full Synthetic engine oil 0W-40, meeting the requirements of Chrysler Group LLC Material Standard MS-10725.	1 Quart - 05037645AB	7 Quarts	6.6 Liters
Engine Oil Filter (3.0L Diesel Engine)	MOPAR® Engine Oil Filter Kit	68109834AA	N/A	N/A
Engine Oil Filter (3.6L Engines)	MOPAR® Engine Oil Filter	68079 744AA	N/A	N/A
Engine Oil Filter (5.7L and 6.4L Engines)	MOPAR® Engine Oil Filter	4884 899AB	N/A	N/A
Fuel (approximate)				
Fuel Selection (3.0L Diesel Engine)	Use good quality diesel fuel from a reputable supplier in your vehicle. The manufacturer requires that you must fuel this vehicle with Ultra Low Sulfur Highway Diesel fuel (15 ppm Sulfur maximum) and prohibits the use of Low Sulfur Highway Diesel fuel (500 ppm Sulfur maximum) to avoid damage to the emissions control system. For most year-round service, No. 2 diesel fuel meeting ASTM specification D-975 Grade S15 will provide good performance. If the vehicle is exposed to extreme cold (below 20F or -7C), or is required to operate at colder-than-normal conditions for prolonged periods, use climatized No. 2 diesel fuel or dilute the No. 2 diesel fuel with 50% No. 1 diesel fuel. This will provide better protection from fuel gelling or wax-plugging of the fuel filters. This vehicle is fully compatible with biodiesel blends up to 5% biodiesel meeting ASTM specification D-975.	N/A	19 Gallons	72 Liters
Fuel Selection (3.6L Engine)	87 Octane Acceptable - 89 Octane Recommended	N/A	19 Gallons	72 Liters
Fuel Selection (5.7L Engine)	87 Octane Acceptable - 89 Octane Recommended	N/A	19 Gallons	72 Liters
Fuel Selection (6.4L Engine)	91 Octane Only or higher	N/A	19 Gallons	72 Liters

A/C Refrigerant System				
A/C Refrigerant System	R-134a	82300101AB	1.56 Pounds	709 Grams

(1) ? System fill capacity includes heater and coolant recovery bottle filled to MAX level.

CAUTION:

Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.

SPARK PLUGS

Description	Type	Part Number	Gap	
			U.S.	Metric
Spark Plugs (3.6L Engine)	Champion®	SP149125AD (RER8ZWYCB4)	0.040 in	1.00 mm
Spark Plugs (5.7L Engine)	NGK® Yttrium	05149177AB (LZFR5C-11G)	0.040 in	1.00 mm
Spark Plugs (6.4L Engine)	NGK® Single Platinum	05149212AC (LZTR6AP11EG)	0.040 in	1.00 mm

TRANSMISSION

Description	Type	Part Number	Capacities	
			U.S.	Metric
Automatic				
NAG 1 - Service Fill	MOPAR® ATF+4 Automatic Transmission Fluid	1 Quart - 05013457AA 1 Gallon - 05013458AA	5.3 Quarts	5.0 Liters
? NAG 1 - Overhaul Fill (1)	MOPAR® ATF+4 Automatic Transmission Fluid	1 Quart - 05013457AA 1 Gallon - 05013458AA	8.1 Quarts	7.7 Liters
? 8HP45 (1)	MOPAR® ATF	1 Quart - 68157995AA	9.5 Quarts	9.0 Liters

(1) ? Dry fill capacity. Depending on type and size of internal cooler, length and inside diameter of cooler lines, or use of an auxiliary cooler, these figures may vary. Refer to the appropriate service information for the correct procedures.

For the 8HP45 see to the fluid checking standard procedure prior to checking or adding fluid to this transmission. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

CAUTION:

A unique transmission fluid has been developed for the 8HP45 transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this

unique fluid see FLUIDS, LUBRICANTS AND GENUINE PARTS. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS.

CAUTION:

Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.

TRANSFER CASE

Description	Type	Part Number	Capacities	
			U.S.	Metric
BW 44-40	MOPAR® Transfer Case Lubricant	1 Quart - 68049954AA	2.11 Pints	1.0 Liters

CAUTION:

Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.

CHASSIS

Description	Type	Part Number	Capacities	
			U.S.	Metric
Axles (Front)				
175mm FIA Front Axle	MOPAR® Synthetic Gear Lubricant SAE 75W-90	1 Quart - 05010320AA	1.26 Pints	0.6 Liters
Axles (Rear)				
200mm RII Rear Axle	MOPAR® Synthetic Gear Lubricant SAE 75W-140	1 Quart - 04874469	1.2 Quarts	1.1 Liters
215mm RII Rear Axle	MOPAR® Synthetic Gear Lubricant SAE 75W-140	1 Quart - 04874469	1.3 Quarts	1.2 Liters
? 226mm RII Rear Axle (1)	MOPAR® Synthetic Gear Lubricant SAE 75W-90	1 Quart - 05010320AA	1.4 Quarts	1.3 Liters
Chassis Systems				
?? Brake Master Cylinder (2)	MOPAR® Brake Fluid DOT 3, SAE J1703.	12 oz. Bottle - 04318080AB 32 oz. Bottle - 04318081AB	N/A	N/A
??? Power Steering Reservoir (Belt Driven Pump) (3)	MOPAR® Power Steering Fluid +4	1 Quart - 05013457AA	N/A	N/A
???? Electro Hydraulic Power Steering (EHPS) (4)	Hydraulic Power Steering Fluid meeting	1 Quart - 68088485AA or 05127381AB	N/A	N/A

	MS-11655			

(1) ? Limited-Slip Rear Axles require the addition of 118 ml (4 oz.) MOPAR® Limited Slip Additive.

(2) ?? If MOPAR® Brake Fluid DOT 3 is not available, then MOPAR® Brake and Clutch Fluid DOT 4 (P/N 04549625AC), is acceptable

.

(3) ??? If MOPAR® Power Steering Fluid +4 is not available, then MOPAR® ATF +4 Automatic Transmission Fluid (P/N 05166226AA), is acceptable.

(4) ????

CAUTION:

There is an Electro Hydraulic Power Steering (EHPS) pump on Non-SRT vehicles which requires a different power steering fluid. Do not mix power steering fluid types. Damage may result to the power steering pump and system if any other fluid is used. The EHPS system uses fluid which meets material specification MS-11655 or equivalent. The mechanical power steering pump systems on SRT vehicles require the use of Power Steering Fluid +4, which meets material specification MS-9602 or equivalent. Do not overfill.

CAUTION:

Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.

FUSE LOCATIONS AND TYPES

SPECIFICATIONS

SPECIFICATIONS

FRONT POWER DISTRIBUTION CENTER FUSES

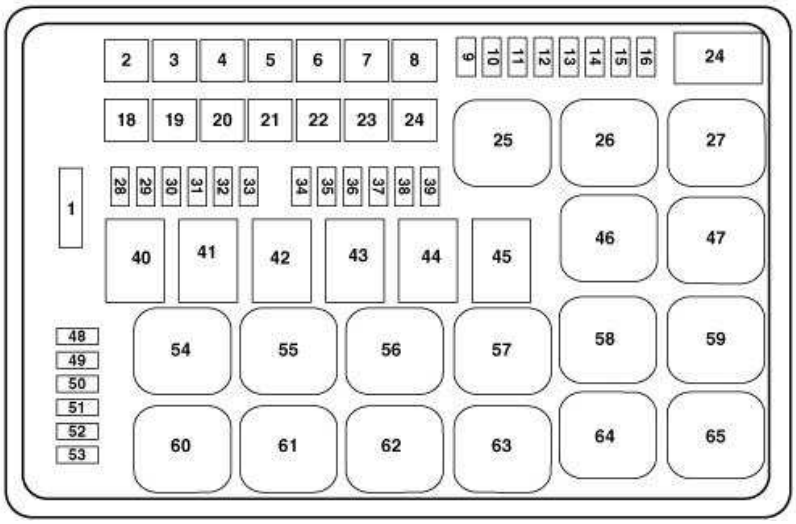

Fig. 5: Integrated Power Module (IPM)
Courtesy of CHRYSLER GROUP, LLC

The Integrated Power Module (IPM) is located in the engine compartment. This module contains fuses and relays.

CAUTION:

- **When installing the Power Distribution Center cover, it is important to ensure the cover is properly positioned and fully latched. Failure to do so may allow water to get into the Power Distribution Center, and possibly result in an electrical system failure.**
- **When replacing a blown fuse, it is important to use only a fuse having the correct amperage rating. The use of a fuse with a rating other than indicated may result in a dangerous electrical system overload. If a properly rated fuse continues to blow, it indicates a problem in the circuit that must be corrected.**

CAVITY	CARTRIDGE FUSE	MINI-FUSE	DESCRIPTION
1	-	-	Fuse - Spare
2	40 Amp Green	-	Radiator Fan #1
3	50 Amp Red	-	Power Steering #1
4	30 Amp Pink	-	Starter
5	40 Amp Green	-	Anti-Lock Brakes
6	-	-	Fuse - Spare
7	-	-	Fuse - Spare
8	-	-	Fuse - Spare
9	-	20 Amp Yellow	All-Wheel Drive Module - If Equipped
10	-	10 Amp Red	Security
11	-	20 Amp Yellow	Horns
12	-	10 Amp Red	Air Conditioning Clutch
13	-	-	Fuse - Spare
14	-	25 Amp Natural	Anti-Lock Brakes
15	-	25 Amp Natural	Transmission
16	-	-	Fuse - Spare
18	50 Amp Red	-	Radiator Fan #2
19	50 Amp Red	-	Power Steering #2
20	30 Amp Pink	-	Wiper Motor
21	30 Amp Pink	-	Headlamp Washers
22	-	-	Fuse - Spare
23	-	-	Fuse - Spare
24	-	-	Fuse - Spare

28	-	25 Amp Natural	Fuel Pump
29	-	15 Amp Blue	Transmission/Shifter
30	-	-	Fuse - Spare
31	-	25 Amp Natural	Engine Module
32	-	-	Fuse - Spare
33	-	-	Fuse - Spare
34	-	25 Amp Natural	Powertrain #1
35	-	25 Amp Natural	Powertrain #2
36	-	10 Amp Red	Anti-Lock Brake Module
37	-	10 Amp Red	Engine Controller/Rad Fan Relays
38	-	10 Amp Red	Airbag Module
39	-	10 Amp Red	Power Steering Module/AC Clutch Relay
48	-	10 Amp Red	AWD Module/Front Axle Disconnect
49	-	-	Fuse - Spare
50	-	-	Fuse - Spare
51	-	20 Amp Yellow	Vacuum Pump
52	-	-	Fuse - Spare
53	-	-	Fuse - Spare

RELAYS

CAVITY	DESCRIPTION
25	Vacuum Pump
26	Spare
27	Starter
40	Spare/Front Axle Disconnect
41	Horns
42	Front Wiper #1
43	A/C Clutch
44	Transmission
45	Front Wiper #2
46	Spare
47	Radiator Fan #1
54	Fuel Pump
55	Spare
56	Spare
57	Radiator Fan #2
58	Radiator Fan #3
59	Ignition Run/Start

60	Headlamp Washers
61	Spare
62	Spare
63	Automatic Shut Down (ASD) Relay #1
64	Spare
65	Spare

REAR POWER DISTRIBUTION CENTER FUSES

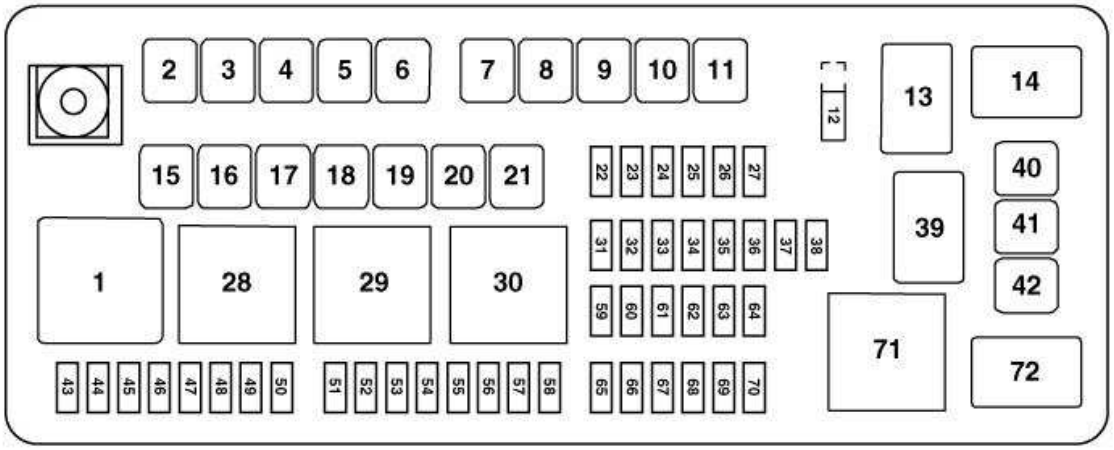

Fig. 6: Power Distribution Center
Courtesy of CHRYSLER GROUP, LLC

There is also a power distribution center located in the trunk under the spare tire access panel. This center contains fuses and relays.

CAUTION:

- **When installing the Power Distribution Center cover, it is important to ensure the cover is properly positioned and fully latched. Failure to do so may allow water to get into the Power Distribution Center, and possibly result in an electrical system failure.**
- **When replacing a blown fuse, it is important to use only a fuse having the correct amperage rating. The use of a fuse with a rating other than indicated may result in a dangerous electrical system overload. If a properly rated fuse continues to blow, it indicates a problem in the circuit that must be corrected.**

Cavity	Cartridge Fuse	Mini-Fuse	Description
2	60 Amp Yellow	-	Front PDC Feed #1

3	-	-	Fuse - Spare
4	60 Amp Yellow	-	Front PDC Feed #2
5	30 Amp Pink	-	Sunroof
6	40 Amp Green	-	Exterior Lighting #1
7	40 Amp Green	-	Exterior Lighting #2
8	30 Amp Pink	-	Interior Lighting/Washer Pump
9	30 Amp Pink	-	Power Locks
10	30 Amp Pink	-	Driver Door
11	30 Amp Pink	-	Passenger Door
12	-	20 Amp Yellow	Cigar Lighters, Instrument Panel & Power Outlet Console Rear
15	40 Amp Green	-	HVAC Blower
16	-	-	Fuse - Spare
17	-	-	Fuse - Spare
18	-	-	Fuse - Spare
19	-	-	Fuse - Spare
20	-	-	Fuse - Spare
21	-	-	Fuse - Spare
22	-	-	Fuse - Spare
23	-	10 Amp Red	Fuel Door/Diagnostic Port
24	-	15 Amp Blue	Radio Screen
25	-	10 Amp Red	Tire Pressure Monitor
26	-	-	Fuse - Spare
27	-	25 Amp Natural	Amplifier
31	-	25 Amp Natural	Power Seats
32	-	15 Amp Blue	HVAC Module/Cluster
33	-	15 Amp Blue	Ignition Switch/Wireless Module
34	-	10 Amp Red	Steering Column Module/Clock
35	-	10 Amp Red	Battery Sensor
36	-	-	Fuse - Spare
37	-	15 Amp Blue	Radio
38	-	20 Amp Yellow	Power Outlet Inside Arm Rest
40	-	-	Fuse - Spare
41	-	-	Fuse - Spare
42	30 Amp Pink	-	Rear Defrost
43	-	25 Amp Natural	Rear Heated Seats/Steering Wheel
44	-	10 Amp Red	Park Assist/Blind Spot/Camera
45	-	15 Amp Blue	Cluster/Rearview Mirror/Compass
46	-	10 Amp Red	Adaptive Cruise Control
47	-	10 Amp Red	Adaptive Front Lighting
48	-	20 Amp Yellow	Active Suspension

49	-	-	Fuse - Spare
50	-	-	Fuse - Spare
51	-	20 Amp Yellow	Front Heated Seats
52	-	10 Amp Red	Heated Cupholders/Rear Heated Seat Switches
53	-	10 Amp Red	HVAC Module/In Car Temperature Sensor
54	-	-	Fuse - Spare
55	-	-	Fuse - Spare
56	-	-	Fuse - Spare
57	-	-	Fuse - Spare
58	-	10 Amp Red	Airbag Module
59	-	-	Fuse - Spare
60	-	-	Fuse - Spare
61	-	-	Fuse - Spare
62	-	-	Fuse - Spare
63	-	-	Fuse - Spare
64	-	25 Amp Natural	Rear Windows
65	-	10 Amp Red	Airbag Module
66	-	-	Fuse - Spare
67	-	15 Amp Blue	Run Sense
68	-	15 Amp Blue	Illumination/Rear Sunshade
69	-	-	Fuse - Spare
70	-	-	Fuse - Spare

RELAYS

CAVITY	DESCRIPTION
1	Ignition Run
13	Spare
14	Spare
28	Rear Defrost
29	Rear Windows/Run Sense/Rear Sunshade
30	Cigar Lighters
39	Spare
71	HVAC Blower
72	Spare

HOISTING

STANDARD PROCEDURE

STANDARD PROCEDURE - HOISTING

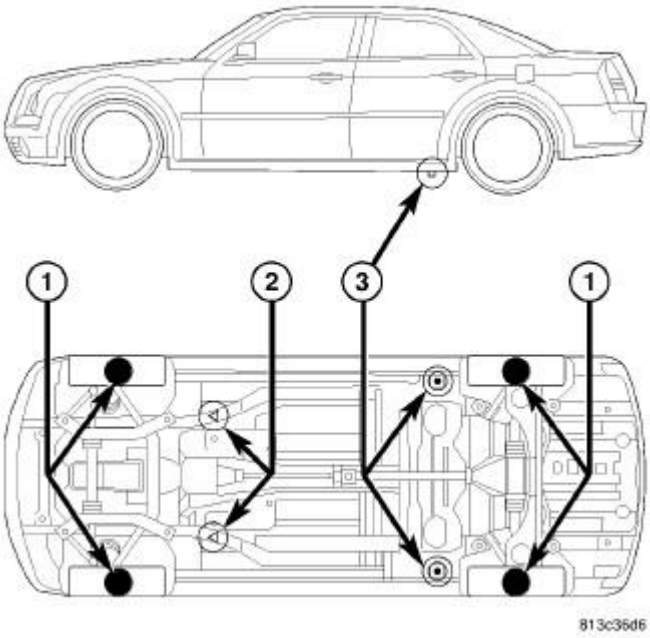

Fig. 7: Lifting Points
Courtesy of CHRYSLER GROUP, LLC

1 - DRIVE ON LIFT
2 - SAE HOISTING SYMBOLS
2 - FRAME CONTACT LIFT (SINGLE POST)
2 - CHASSIS LIFT (DUAL LIFT)
2 - OUTBOARD LIFT (DUAL LIFT)
2 - FLOOR JACK
3 - HOISTING PADS
3 - FRAME CONTACT LIFT (SINGLE POST)
3 - CHASSIS LIFT (DUAL LIFT)
3 - OUTBOARD LIFT (DUAL LIFT)
3 - FLOOR JACK

Refer to Owner's Manual provided with vehicle for proper emergency jacking procedures.

WARNING: The hoisting and jack lifting points provided are for a complete vehicle. When the engine or rear suspension is removed from a vehicle, the center of gravity is altered making some hoisting conditions unstable. Properly support or secure vehicle to hoisting device when these conditions exist. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: Do not position hoisting device on any suspension component, including the front or rear suspension crossmembers. Do not hoist on the front and

rear bumpers, the lower radiator crossmember, or the front engine mount.

Do not attempt to raise one entire side of the vehicle by placing a floor jack midway between the front and rear wheels. This practice may result in permanent damage to the body.

When properly positioned, a floor jack can be used to lift the vehicle and support the raised vehicle with jack stands.

A floor jack or any lifting device must never be used on any part of the underbody other than the described areas.

JUMP STARTING

STANDARD PROCEDURE

STANDARD PROCEDURE - JUMP STARTING

WARNING: Review all safety precautions and warnings in the battery system service information. Refer to BATTERY, STANDARD PROCEDURE .

- **Take care to avoid the radiator cooling fan whenever the hood is raised. It can start anytime the ignition switch is ON. You can be hurt by the fan.**
- **Do not attempt to push or tow your vehicle to get it started. Vehicles equipped with an automatic transmission cannot be started this way. Unburned fuel could enter the catalytic converter and once the engine has started, ignite and damage the converter and vehicle. If the vehicle has a discharged battery, booster cables may be used to obtain a start from another vehicle. This type of start can be dangerous if done improperly, so follow this procedure carefully.**
- **Battery fluid is a corrosive acid solution; do not allow battery fluid to contact eyes, skin, or clothing. Don't lean over battery when attaching clamps or allow the clamps to touch each other. If acid splashes in eyes or on skin, flush contaminated area immediately with large quantities of water.**
- **A battery generates hydrogen gas, which is flammable and explosive. Keep flame or spark away from the vent holes.**
- **Do not use a booster battery or any other booster source with an output that exceeds 12 Volts.**
- **The battery in this vehicle has a vent hose that should not be disconnected and should only be replaced with a battery of the same type (vented).**

Failure to follow these instructions may result in serious or fatal injury.

CAUTION: When using another vehicle as a booster, do not allow vehicles to touch. Electrical systems can be damaged on either vehicle.

NOTE: The battery is stored under an access cover in the trunk. Remote battery terminals are located in the engine compartment for jump starting.

TO JUMP START A DISABLED VEHICLE:

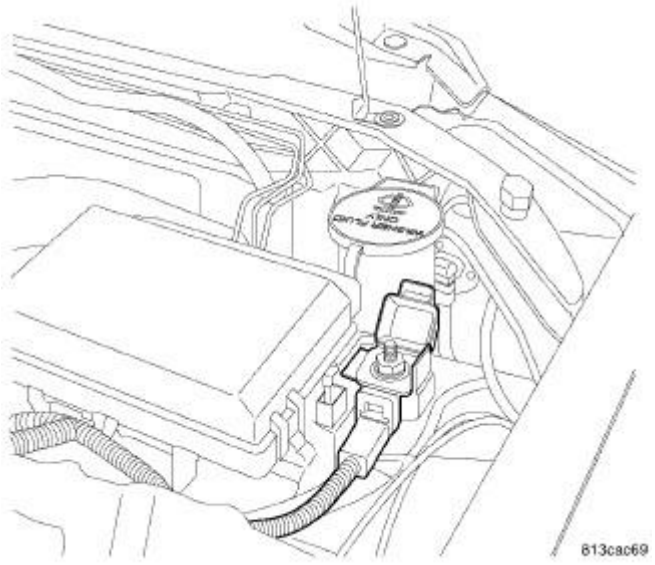

Fig. 8: Positive Jumper Start Attachment
Courtesy of CHRYSLER GROUP, LLC

1. Wear eye protection and remove any metal jewelry, such as watchbands or bracelets, that might make an inadvertent electrical contact.
2. When boost is provided by a battery in another vehicle, park that vehicle within booster cable reach, but do not allow the vehicles to touch one another.
3. Set the parking brake, place the automatic transmission in PARK, and turn the ignition switch to the LOCK position on both vehicles.
4. Turn off the heater, radio, and all unnecessary electrical loads.
5. Connect one end of the jumper cable to the remote jump-start positive battery post (+) in the engine compartment. Connect the other end of the same cable to the positive terminal of the booster battery. Refer to the following illustration for jump-starting connections.
6. Connect the other cable, first to the negative terminal of the booster battery and then to the engine ground (-) of the vehicle with the discharged battery. Make sure you have a good contact on the engine ground. Refer to the following illustration for jump-starting connections.
7. Start the engine in the vehicle that has the booster battery. Let the engine idle a few minutes. Then, start the engine in the vehicle with the discharged battery.

NOTE: if the ESP/BAS light (in the instrument cluster) remains on continuously

after starting the engine of the vehicle with the discharged battery. Refer to STANDARD PROCEDURE .

8. When removing the jumper cables, reverse the above sequence exactly. Be careful of the moving belts and fan.

WARNING:

- **You should not try to start your vehicle by pushing or towing.**
- **Do not connect the cable to the negative post of the discharged battery. The resulting electrical spark could cause the battery to explode.**
- **During cold weather when temperatures are below the freezing point, electrolyte in a discharged battery may freeze. Do not attempt jump-starting because the battery could rupture or explode. The battery temperature must be brought above the freezing point before attempting jump-start.**
- **Failure to follow these instructions may result in serious or fatal injury.**

MAINTENANCE SCHEDULES

DESCRIPTION

MAINTENANCE SCHEDULES - NAFTA

OIL CHANGE INDICATOR SYSTEM

The Scheduled Maintenance services listed in this information must be done at the times or mileages specified to protect your vehicle warranty and ensure the best vehicle performance and reliability. More frequent maintenance may be needed for vehicles in severe operating conditions, such as dusty areas and very short trip driving. Inspection and service should also be done anytime a malfunction is suspected.

The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance.

On Electronic Vehicle Information Center (EVIC) equipped vehicles, "Oil Change Required" will be displayed in the EVIC and a single chime will sound, indicating that an oil change is necessary.

On Non-EVIC equipped vehicles, "Change Oil" will flash in the instrument cluster odometer and a single chime will sound, indicating that an oil change is necessary.

Based on engine operation conditions, the oil change indicator message will illuminate. This means that service is required for your vehicle. Have your vehicle serviced as soon as possible, within the next 500 miles (805 km).

NOTE:

- **The oil change indicator message will not monitor the time since the last oil change. Change your vehicle's oil if it has been six months since your last oil change, even if the oil change indicator message is NOT illuminated.**
- **Change your engine oil more often if you drive your vehicle off-road for an extended period of time.**
- **Under no circumstances should oil change intervals exceed 8, 000 miles (13, 000 km) or six months, whichever comes first.**

OIL CHANGE INDICATOR- RESET

The vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message flashes in the EVIC display for approximately ten seconds after a single chime has sounded, to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate depending upon your personal driving style.

Unless reset, this message continues to display each time you turn the ignition switch to the ON/RUN position. To turn off the message temporarily, press and release the Menu button. To reset the oil change indicator system (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the "ON" position. Do not start the engine.
2. Fully press the accelerator pedal slowly three times within ten seconds.
3. Turn the ignition switch to the "LOCK" position.

NOTE: **If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure.**

At Each Stop for Fuel

- Check the engine oil level.
- Check the windshield washer solvent and add if required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery, and clean and tighten the terminals as required.
- Check the fluid levels of coolant reservoir, brake master cylinder, power steering, and transmission, and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change the engine oil filter.

- Inspect the brake hoses and lines.

CAUTION: Failure to perform the required maintenance items may result in damage to the vehicle.

REQUIRED MAINTENANCE INTERVALS

Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)			Maintenance Items
Miles	**Kilometers**	**Months**	
8000	13000	6	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 8, 000 miles (13 000 km).
16000	26000	12	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 16, 000 miles (26 000 km). • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, replace if necessary. • Inspect exhaust system. Perform the first inspection at 16, 000 miles (26 000 km) or 12 months. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
24000	39000	18	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 24, 000 miles (39 000 km). • Inspect the CV joints. • Inspect exhaust system. • Inspect the rear axle fluid. Inspect the front axle fluid - All Wheel Drive (AWD).
32000	52000	24	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of

			irregular wear, even if it occurs before 32, 000 miles (52 000 km). • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Replace the spark plugs (5.7L Engine). • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the brake linings, replace if necessary. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Inspect the transfer case fluid - All Wheel Drive (AWD).
40000	65000	30	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 40, 000 miles (65 000 km).
48000	78000	36	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 48, 000 miles (78 000 km). • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, replace if necessary. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the rear axle fluid and on models equipped with All Wheel Drive (AWD) change the front axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing.
56000	91000	42	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 56, 000

			miles (91 000 km).
64000	104000	48	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 64, 000 miles (104 000 km). • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Replace the spark plugs (5.7L Engine). • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Change the automatic transmission fluid and filter if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing (five-speed transmission only). • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the transfer case fluid if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing - All Wheel Drive (AWD).
72000	117000	54	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 72, 000 miles (117 000 km). • Inspect the CV joints. • Inspect exhaust system. • Inspect the rear axle fluid. Inspect the front axle fluid - All Wheel Drive (AWD).
80000	130000	60	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 80, 000 miles (130 000 km). • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Flush and replace the engine coolant if not done at 104, 000 miles (169 000 km).

			• Inspect the brake linings, replace if necessary. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
88000	143000	66	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 88, 000 miles (143 000 km).
96000	156000	72	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 96, 000 miles (156 000 km). • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Replace the spark plugs (3.6L Engine). • Replace the spark plugs (5.7L Engine). • Inspect and replace PCV valve if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the brake linings, replace if necessary. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the rear axle fluid and on models equipped with All Wheel Drive (AWD) change the front axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the transfer case fluid - All Wheel Drive (AWD).
104000	169000	78	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 104, 000 miles (169 000 km). • Flush and replace engine coolant at 104, 000 miles (169, 00 km) or 60 months (whichever occurs first).

112000	182000	84	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 112, 000 miles (182 000 km). • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, replace if necessary. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
120000	195000	90	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 120, 000 miles (195 000 km). • Inspect the CV joints. • Inspect exhaust system. • Change the automatic transmission fluid and filter (five-speed transmission only). • Replace the accessory drive belt(s). • Inspect the rear axle fluid. Inspect the front axle fluid - All Wheel Drive (AWD).
128000	208000	96	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 128, 000 miles (208 000 km). • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Replace the spark plugs (5.7L Engine). • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the brake linings, replace if necessary. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the transfer case fluid if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing - All Wheel Drive

			(AWD).
136000	221000	102	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 136, 000 miles (221 000 km).
144000	234000	108	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 144, 000 miles (234 000 km). • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, replace if necessary. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the rear axle fluid and on models equipped with All Wheel Drive (AWD) change the front axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing.
152000	247000	114	• Change the engine oil and engine oil filter. • Rotate the tires, rotate at the first sign of irregular wear, even if it occurs before 152, 000 miles (247 000 km).

WARNING:

- **You can be badly injured working on or around a motor vehicle. Do only service work for which you have the knowledge and the right equipment. If you have any doubt about your ability to perform a service job, take your vehicle to a competent mechanic.**
- **Failure to properly inspect and maintain your vehicle could result in a component malfunction and effect vehicle handling and performance. This could cause an accident**

Failure to follow these instructions may result in possible serious or fatal injury.

OIL CHANGE INDICATOR SYSTEM

The Scheduled Maintenance services listed in this information must be done at the times or mileages specified to protect your vehicle warranty and ensure the best vehicle performance and reliability. More frequent maintenance may be needed for vehicles in severe operating conditions, such as dusty areas and very short trip driving. Inspection and service should also be done anytime a malfunction is suspected.

The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance.

On Electronic Vehicle Information Center (EVIC) equipped vehicles, "Oil Change Required" will be displayed in the EVIC and a single chime will sound, indicating that an oil change is necessary.

On Non-EVIC equipped vehicles, "Change Oil" will flash in the instrument cluster odometer and a single chime will sound, indicating that an oil change is necessary.

The oil change indicator message will illuminate approximately 7, 000 miles (11 200 km) after the most recent oil change was performed. Have your vehicle serviced as soon as possible, within 500 miles (800 km). However, an earlier oil change at 3, 000 miles (5 000 km) may be required if the vehicle is operated under "Severe Duty Conditions" later in this information.

NOTE:

- **The oil change indicator message will not monitor the time since the last oil change. Change your vehicle's oil if it has been six months since your last oil change, even if the oil change indicator message is NOT illuminated.**
- **Change your engine oil more often if you drive your vehicle off-road for an extended period of time.**
- **Under no circumstances should oil change intervals exceed 6, 000 miles (10 000 km) or six months, whichever comes first.**

OIL CHANGE INDICATOR- RESET

The vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message flashes in the EVIC display for approximately ten seconds after a single chime has sounded, to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate depending upon your personal driving style.

Unless reset, this message continues to display each time you turn the ignition switch to the ON/RUN position. To turn off the message temporarily, press and release the Menu button. To reset the oil change indicator system (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the "ON" position. Do not start the engine.
2. Fully press the accelerator pedal slowly three times within ten seconds.

3. Turn the ignition switch to the "LOCK" position.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure.

At Each Stop for Fuel

- Check the engine oil level.
- Check the windshield washer solvent and add if required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery, and clean and tighten the terminals as required.
- Check the fluid levels of coolant reservoir, brake master cylinder, power steering, and transmission, and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change the engine oil filter.
- Inspect the brake hoses and lines.

CAUTION: Failure to perform the required maintenance items may result in damage to the vehicle.

REQUIRED MAINTENANCE INTERVALS

Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)			Maintenance Items
Miles	**Kilometers**	**Months**	
6000	10000	6	• Change the engine oil and engine oil filter. • Rotate tires.
12000	20000	12	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary.

			• Inspect the CV joints. Perform the first inspection at 12, 000 miles (20 000 km) or 12 months. • Inspect the exhaust system. Perform the first inspection at 12, 000 miles (20 000 km) or 12 months. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
18000	30000	18	• Change the engine oil and engine oil filter. • Rotate tires. • Inspect the rear axle fluid.
24000	40000	24	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Inspect the CV joints. • Inspect the exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
30000	50000	30	• Change the engine oil and engine oil filter. • Rotate tires. • Replace the engine air cleaner filter. • Adjust parking brake on vehicles equipped with four-wheel disc brakes.
36000	60000	36	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary.

			• Inspect the CV joints. • Inspect the exhaust system. • Inspect the rear axle fluid. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
42000	70000	42	• Change the engine oil and engine oil filter. • Rotate tires.
48000	80000	48	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Inspect the CV joints. • Inspect the exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing.
54000	90000	54	• Change the engine oil and engine oil filter. • Rotate tires. • Inspect the rear axle fluid.
60000	100000	60	• Change the engine oil and engine oil filter. • Rotate tires. • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the CV joints. • Inspect the exhaust system.

			• Change the automatic transmission fluid and filter if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing. • Flush and replace the engine coolant at 60 months if not done at 102, 000 miles (170 000 km). • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
66000	110000	66	• Change the engine oil and engine oil filter. • Rotate tires.
72000	120000	72	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Inspect the rear axle fluid. • Inspect the CV joints. • Inspect the exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
78000	130000	78	• Change the engine oil and engine oil filter. • Rotate tires.
84000	140000	84	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Inspect the CV joints. • Inspect the exhaust system.

			• Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
90000	150000	90	• Change the engine oil and engine oil filter. • Rotate tires. • Replace the engine air cleaner filter. • Inspect and replace the PCV Valve if necessary. • Inspect the rear axle fluid. • Adjust parking brake on vehicles equipped with four-wheel disc brakes.
96000	160000	96	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the spark plugs. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Inspect the CV joints. • Inspect the exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing.
102000	170000	102	• Change the engine oil and engine oil filter. • Rotate tires. • Flush and replace the engine coolant if not done at 60 months.
108000	180000	108	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter.

			• Inspect the brake linings, and replace if necessary. • Inspect the CV joints. • Inspect the exhaust system. • Inspect the rear axle fluid. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
114000	190000	114	• Change the engine oil and engine oil filter. • Rotate tires.
120000	200000	120	• Change the engine oil and engine oil filter. • Rotate tires. • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the CV joints. • Inspect the exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the automatic transmission fluid and filter.
126000	210000	126	• Change the engine oil and engine oil filter. • Rotate tires. • Inspect the rear axle fluid.
132000	220000	132	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Inspect the CV joints.

			• Inspect the exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.
138000	230000	138	• Change the engine oil and engine oil filter. • Rotate tires.
144000	240000	144	• Change the engine oil and engine oil filter. • Rotate tires. • If you are using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, and replace if necessary. • Inspect the CV joints. • Inspect the exhaust system. • Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing.
150000	250000	150	• Change the engine oil and engine oil filter. • Rotate tires. • Replace the engine air cleaner filter. • Adjust parking brake on vehicles equipped with four-wheel disc brakes.

WARNING:

- **You can be badly injured working on or around a motor vehicle. Do only service work for which you have the knowledge and the right equipment. If you have any doubt about your ability to perform a service job, take your vehicle to a competent mechanic.**
- **Failure to properly inspect and maintain your vehicle could result in a component malfunction and effect vehicle handling and performance. This could cause an accident**

Failure to follow these instructions may result in possible serious or fatal injury.

MAINTENANCE SCHEDULES - EUROPE

MAINTENANCE SCHEDULE - GASOLINE ENGINE

The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance.

On Electronic Vehicle Information Center (EVIC) equipped vehicles, "Oil Change Required" will be displayed in the EVIC and a single chime will sound, indicating that an oil change is necessary.

On Non-EVIC equipped vehicles, "Change Oil" will flash in the instrument cluster odometer and a single chime will sound, indicating that an oil change is necessary.

The oil change indicator message will illuminate approximately 7, 000 miles (11 200 km) after the most recent oil change was performed. Have your vehicle serviced as soon as possible, within 500 miles (800 km). However, an earlier oil change at 3, 000 miles (5, 000 km) may be required if the vehicle is operated under "Severe Duty Conditions" later in this information.

NOTE:

- **The oil change indicator message will not monitor the time since the last oil change. Change your vehicles oil if it has been 6 months since your last oil change even if the oil change indicator message is NOT illuminated.**
- **Change your engine oil more often if you drive your vehicle off-road for an extended period of time.**
- **Under no circumstances should oil change intervals exceed 7, 500 miles (12 000 km) or 6 months, whichever comes first.**

OIL CHANGE INDICATOR - RESET

The vehicle is equipped with an engine oil change indicator system. The Oil Change Due message will display in the EVIC for five seconds after a single chime has sounded at the start of each ignition that an oil change is due. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon personal driving style.

Unless reset, this message will continue to display each time you cycle the ignition to the ON/RUN position. To turn off the message temporarily, press and release the MENU button. To reset the oil change indicator system (after performing the scheduled maintenance), perform the following procedure:

1. Without pressing the brake pedal, push the ENGINE START/STOP button and cycle the ignition to the ON/ RUN position (Do not start the engine.)
2. Fully depress the accelerator pedal, slowly, three times within 10 seconds.
3. Without pressing the brake pedal, push the ENGINE START/STOP button once to return the ignition to the OFF/LOCK position.

NOTE: **If the indicator message illuminates when you start the vehicle, the oil change**

indicator system did not reset. If necessary, repeat this procedure.

At Each Stop for Fuel

- Check the engine oil level about 5 minutes after a fully warmed engine is shut off. Checking the oil level while the vehicle is on level ground will improve the accuracy of the oil level reading. Add oil only when the level is at or below the ADD or MIN mark.
- Check the windshield washer solvent and add if required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery and clean and tighten the terminals as required.
- Check the fluid levels of the coolant reservoir, brake master cylinder, power steering and transmission (4.7L and 5.7L only) and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change the engine oil filter.
- Inspect the brake hoses and lines.

CAUTION:

- **Failure to perform the required maintenance items may result in damage to the vehicle.**

REQUIRED MAINTENANCE INTERVALS

SEVERE DUTY CONDITIONS

() ++ Change the engine oil and engine oil filter at every 3, 000 miles (5 000 km) or 3 months if using your vehicle under any of the following severe duty conditions:

- Stop and go driving.
- Driving in dusty conditions.
- Short trips of less than 10 miles (16 km).
- Trailer towing.
- Taxi, police, or delivery service (commercial service).
- Off-road or desert operation.

Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)			Maintenance Items
Miles	Kilometers	Months	

7500	12000	6	• Change the engine oil and engine oil filter.++() • Rotate tires.
15000	24000	12	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Inspect the CV joints. Perform the first inspection at 15, 000 miles (24 000 km) or 12 months. • Inspect exhaust system. Perform the first inspection at 15, 000 miles (24 000 km) or 12 months. • Inspect the rear axle fluid.
22500	36000	18	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
30000	48000	24	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • **Replace the spark plugs (5.7L Engine).** • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid.
37500	60000	30	• Change the engine oil and engine oil filter.++ () • Rotate tires.
45000	72000	36	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary.

			• Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
52500	84000	42	• Change the engine oil and engine oil filter.++ () • Rotate tires.
60000	96000	48	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • **Replace the spark plugs (5.7L Engine).** • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the automatic transmission fluid and filter if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid.
67500	108000	54	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
75000	120000	60	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Inspect the rear axle fluid.

			• Flush and replace the engine coolant at 60 months if not done at 105, 000 miles (168 000 km).
82500	132000	66	• Change the engine oil and engine oil filter.++ () • Rotate tires.
90000	144000	72	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • **Replace the spark plugs (5.7L Engine).** • **Inspect and replace PCV valve if necessary. +()** • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
97500	156000	78	• Change the engine oil and engine oil filter.++ () • Rotate tires.
105000	168000	84	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • **Replace the spark plugs (2.7L and 3.5L Engines).** • **Replace the timing belt (3.5L Engine).** • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Inspect the rear axle fluid. • Flush and replace the engine coolant.
112500	180000	90	• Change the engine oil and engine oil filter.++ () • Rotate tires.

			• Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
120000	192000	96	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • **Replace the spark plugs (5.7L Engine).** • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the automatic transmission fluid and filter. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid. • Replace the accessory drive belt(s) (2.7L, 3.5L, and 5.7L Engines).
127500	204000	102	• Change the engine oil and engine oil filter.++ () • Rotate tires.
135000	216000	108	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
142500	228000	114	• Change the engine oil and engine oil filter.++ () • Rotate tires.
150000	240000	120	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter.

			• **Replace the spark plugs (5.7L Engine).** • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid.

() + This maintenance is recommended by the manufacturer to the owner, but is not required to maintain emissions warranty.

WARNING:

- **Failure to properly inspect and maintain the vehicle could result in a component malfunction and effect vehicle handling and performance. This could cause an accident and may result in possible serious or fatal injury.**

MAINTENANCE SCHEDULE - DIESEL ENGINE

To help have the best driving experience possible, the manufacturer has identified the specific vehicle maintenance service intervals that are required to keep the vehicle operating properly and safely.

The manufacturer recommends that these maintenance intervals be performed at your selling dealer. The technicians at your dealership know your vehicle best, and have access to factory trained information, genuine MOPAR® parts, and specially designed electronic and mechanical tools that can help prevent future costly repairs.

The maintenance intervals shown should be performed as indicated in this information.

NOTE: Under no circumstances should oil change intervals exceed 12, 500 miles (20 000 km) or 12 months, whichever comes first.

OIL CHANGE INDICATOR - RESET

The vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message will flash in the EVIC display for approximately 10 seconds after a single chime has sounded to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon your personal driving style.

Unless reset, this message will continue to display each time you turn the ignition switch to the ON/RUN position. To turn off the message temporarily, press and release the Menu button. To reset the oil change indicator system (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the "ON" position (Do not start the engine).

2. Fully depress the accelerator pedal and keep it fully pressed for at least 30 seconds.
3. Press and release the brake pedal six times while holding the accelerator pedal pressed.

At Each Stop for Fuel

- Check the engine oil level about 15 minutes after a fully warmed engine is shut off. Checking the oil level while the vehicle is on level ground will improve the accuracy of the oil level reading. Add oil only when the level is at or below the ADD or MIN mark.
- Check the windshield washer solvent and add if required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery and clean and tighten the terminals as required.
- Check the fluid levels of the coolant reservoir, brake master cylinder, and power steering and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change the engine oil filter.
- Inspect the brake hoses and lines.
- Inspect for the presence of water in the fuel filter/water separator unit.

CAUTION:

- **Failure to perform the required maintenance items may result in damage to the vehicle.**

Refer to the Maintenance Schedules on the following pages for the required maintenance intervals.

Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)			**Maintenance Items**
Miles	**Kilometers**	**Months**	
6250	10000	6	• Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary.
12500	20000	12	• Change the engine oil and engine oil filter. • Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary.

			• Replace the air conditioning filter. • Inspect the brake linings, replace if necessary. • Inspect exhaust system. Perform the first inspection at 12, 500 miles (20 000 km) or 12 months. • Inspect the CV joints. Perform the first inspection at 12, 500 miles (20 000 km) or 12 months.
18750	30000	18	• Rotate tires. • Replace engine air cleaner filter.
25000	40000	24	• Change the engine oil and engine oil filter. • Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Replace the fuel filter/water separator unit. • Inspect the front suspension, tie rod ends and boot seals, replace if necessary. • Inspect the brake linings, replace if necessary. • Inspect exhaust system. • Inspect the CV joints. • Adjust the parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid. Change if using your vehicle for police, taxi, fleet, or frequent trailer towing.
31250	50000	30	• Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary.
37500	60000	36	• Change the engine oil and engine oil filter. • Rotate tires. • Replace engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings, replace if necessary.
43750	70000	42	• Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter,

			and replace if necessary.
50000	80000	48	• Change the engine oil and engine oil filter. • Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Replace the fuel filter/water separator unit. • Inspect the front suspension, tie rod ends and boot seals, replace if necessary. • Inspect the brake linings, replace if necessary. • Inspect exhaust system. • Inspect the CV joints. • Inspect the transfer case fluid. • Adjust the parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid. Change if using your vehicle for police, taxi, fleet, or frequent trailer towing.
56250	90000	54	• Rotate tires. • Replace engine air cleaner filter.
62500	100000	60	• Change the engine oil and engine oil filter. • Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, replace if necessary. • Change the automatic transmission fluid and filter if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing.
68750	110000	66	• Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary.
75000	120000	72	• Change the engine oil and engine oil filter. • Rotate tires. • Replace engine air cleaner filter.

			• Replace the air conditioning filter. • Replace the fuel filter/water separator unit. • Inspect the front suspension, tie rod ends and boot seals, replace if necessary. • Inspect the brake linings, replace if necessary. • Inspect exhaust system. • Inspect the CV joints. • Adjust the parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid. Change if using your vehicle for police, taxi, fleet, or frequent trailer towing.
81250	130000	78	• Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary.
87500	140000	84	• Change the engine oil and engine oil filter. • Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings, replace if necessary.
93750	150000	90	• Rotate tires. • Replace engine air cleaner filter.
100000	160000	96	• Change the engine oil and engine oil filter. • Rotate tires. • If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary. • Replace the air conditioning filter. • Replace the fuel filter/water separator unit. • Inspect the front suspension, tie rod ends and boot seals, replace if necessary. • Inspect the brake linings, replace if necessary. • Inspect exhaust system. • Inspect the CV joints. • Change the automatic transmission fluid and filter.

			• Flush and replace the engine coolant (antifreeze). • Replace accessory drive belt(s). • Adjust the parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid. Change if using your vehicle for police, taxi, fleet, or frequent trailer towing.

WARNING:

- **Failure to properly inspect and maintain the vehicle could result in a component malfunction and effect vehicle handling and performance. This could cause an accident and may result in possible serious or fatal injury.**

MAINTENANCE SCHEDULES - MIDDLE EAST

MAINTENANCE SCHEDULE - GASOLINE ENGINE

The Scheduled Maintenance services listed in this information must be done at the times or mileages specified to protect your vehicle warranty and ensure the best vehicle performance and reliability. More frequent maintenance may be needed for vehicles in severe operating conditions, such as dusty areas and very short trip driving. Inspection and service should also be done anytime a malfunction is suspected.

The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance.

On Electronic Vehicle Information Center (EVIC) equipped vehicles, "Oil Change Required" will be displayed in the EVIC and a single chime will sound, indicating that an oil change is necessary.

The oil change indicator message will illuminate approximately 7, 000 miles (11 200 km) after the most recent oil change was performed. Have your vehicle serviced as soon as possible, within 500 miles (800 km). However, an earlier oil change at 3, 000 miles (5 000 km) may be required if the vehicle is operated under "Severe Duty Conditions" later in this information.

NOTE:

- **The oil change indicator message will not monitor the time since the last oil change. Change your vehicles oil if it has been 6 months since your last oil change even if the oil change indicator message is NOT illuminated.**
- **Change your engine oil more often if you drive your vehicle off-road for an extended period of time.**
- **Under no circumstances should oil change intervals exceed 7, 500 miles (12 000 km) or 6 months, whichever comes first.**

OIL CHANGE INDICATOR - RESET

The vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message will flash in the EVIC display for approximately 10 seconds after a single chime has sounded to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon your personal driving style.

Unless reset, this message will continue to display each time you turn the ignition switch to the ON/RUN position. To turn off the message temporarily, press and release the Menu button. To reset the oil change indicator system (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the "ON" position (Do not start the engine).
2. Fully depress the accelerator pedal slowly three times within 10 seconds.
3. Turn the ignition switch to the "LOCK" position.

NOTE: **If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary repeat this procedure.**

At Each Stop for Fuel

- Check the engine oil level about 5 minutes after a fully warmed engine is shut off. Checking the oil level while the vehicle is on level ground will improve the accuracy of the oil level reading. Add oil only when the level is at or below the ADD or MIN mark.
- Check the windshield washer solvent and add if required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery and clean and tighten the terminals as required.
- Check the fluid levels of the coolant reservoir, brake master cylinder, power steering and transmission (4.7L and 5.7L only) and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change the engine oil filter.
- Inspect the brake hoses and lines.

CAUTION:

- **Failure to perform the required maintenance items may result in damage to the vehicle.**

REQUIRED MAINTENANCE INTERVALS

SEVERE DUTY CONDITIONS

() ++ Change the engine oil and engine oil filter at every 3, 000 miles (5 000 km) or 3 months if using your vehicle under any of the following severe duty conditions:

- Stop and go driving.
- Driving in dusty conditions.
- Short trips of less than 10 miles (16 km).
- Trailer towing.
- Taxi, police, or delivery service (commercial service).
- Off-road or desert operation.

Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)			Maintenance Items
Miles	Kilometers	Months	
7500	12000	6	• Change the engine oil and engine oil filter.++ () • Rotate tires.
15000	24000	12	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Inspect exhaust system. Perform the first inspection at 15, 000 miles (24 000 km) or 12 months.
22500	36000	18	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary. • Inspect the rear axle fluid.
30000	48000	24	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the spark plugs (5.7L Engine). • Replace the air conditioning filter (if equipped)

			• Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes.
37500	60000	30	• Change the engine oil and engine oil filter.++ () • Rotate tires.
45000	72000	36	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
52500	84000	42	• Change the engine oil and engine oil filter.++ () • Rotate tires.
60000	96000	48	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the spark plugs (5.7L Engine). • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the automatic transmission fluid and filter if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing (five-speed transmission only). • Adjust parking brake on vehicles equipped with four-wheel disc brakes.
67500	108000	54	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and

			boot seals; replace if necessary. • Inspect the rear axle fluid.
75000	120000	60	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Inspect the rear axle fluid. • Flush and replace the engine coolant at 60 months if not done at 105, 000 miles (168 000 km).
82500	132000	66	• Change the engine oil and engine oil filter.++ () • Rotate tires.
90000	144000	72	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the spark plugs (5.7L Engine). • Inspect and replace PCV valve if necessary. + () • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
97500	156000	78	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the spark plugs (3.6L Engine).
105000	168000	84	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine

			air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Flush and replace the engine coolant.
112500	180000	90	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary. • Inspect the rear axle fluid.
120000	192000	96	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the spark plugs (5.7L Engine). • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the automatic transmission fluid and filter (five-speed transmission only). • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Replace the accessory drive belt (5.7L Engine).
127500	204000	102	• Change the engine oil and engine oil filter.++ () • Rotate tires.
135000	216000	108	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.

142500	228000	114	• Change the engine oil and engine oil filter.++ () • Rotate tires.
150000	240000	120	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the spark plugs (5.7L Engine). • Replace the air conditioning filter (if equipped) • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes.

() + This maintenance is recommended by the manufacturer to the owner, but is not required to maintain emissions warranty.

WARNING:

- **Failure to properly inspect and maintain the vehicle could result in a component malfunction and effect vehicle handling and performance. This could cause an accident and may result in possible serious or fatal injury.**

MAINTENANCE SCHEDULES - MIDDLE EAST - SRT8

MAINTENANCE SCHEDULE - GASOLINE ENGINE - SRT8

The Scheduled Maintenance services listed in this information must be done at the times or mileages specified to protect your vehicle warranty and ensure the best vehicle performance and reliability. More frequent maintenance may be needed for vehicles in severe operating conditions, such as dusty areas and very short trip driving. Inspection and service should also be done anytime a malfunction is suspected.

The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance.

On Electronic Vehicle Information Center (EVIC) equipped vehicles, "Oil Change Required" will be displayed in the EVIC and a single chime will sound, indicating that an oil change is necessary.

The oil change indicator message will illuminate approximately 7, 000 miles (11 200 km) after the most recent oil change was performed. Have your vehicle serviced as soon as possible, within 500 miles (800 km). However, an earlier oil change at 3, 000 miles (5 000 km) may be required if the vehicle is operated under "Severe Duty Conditions" later in this information.

NOTE:

- **The oil change indicator message will not monitor the time since the last oil change. Change your vehicles oil if it has been 6 months since your last oil change even if the oil change indicator message is NOT**

illuminated.

- **Change your engine oil more often if you drive your vehicle off-road for an extended period of time.**
- **Under no circumstances should oil change intervals exceed 7, 500 miles (12 000 km) or 6 months, whichever comes first.**

OIL CHANGE INDICATOR - RESET

The vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message will flash in the EVIC display for approximately 10 seconds after a single chime has sounded to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon your personal driving style.

Unless reset, this message will continue to display each time you turn the ignition switch to the ON/RUN position. To turn off the message temporarily, press and release the Menu button. To reset the oil change indicator system (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the "ON" position (Do not start the engine).
2. Fully depress the accelerator pedal slowly three times within 10 seconds.
3. Turn the ignition switch to the "LOCK" position.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary repeat this procedure.

At Each Stop for Fuel

- Check the engine oil level about 5 minutes after a fully warmed engine is shut off. Checking the oil level while the vehicle is on level ground will improve the accuracy of the oil level reading. Add oil only when the level is at or below the ADD or MIN mark.
- Check the windshield washer solvent and add if required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery and clean and tighten the terminals as required.
- Check the fluid levels of the coolant reservoir, brake master cylinder, power steering and transmission (4.7L and 5.7L only) and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change the engine oil filter.
- Inspect the brake hoses and lines.

CAUTION:

- **Failure to perform the required maintenance items may result in damage to the vehicle.**

REQUIRED MAINTENANCE INTERVALS

SEVERE DUTY CONDITIONS

() ++ Change the engine oil and engine oil filter at every 3, 000 miles (5 000 km) or 3 months if using your vehicle under any of the following severe duty conditions:

- Stop and go driving.
- Driving in dusty conditions.
- Short trips of less than 10 miles (16 km).
- Trailer towing.
- Taxi, police, or delivery service (commercial service).
- Off-road or desert operation.

Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)			Maintenance Items
Miles	**Kilometers**	**Months**	
7500	12000	6	• Change the engine oil and engine oil filter.++ () • Rotate tires.
15000	24000	12	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Inspect the CV joints. Perform the first inspection at 15, 000 miles (24 000 km) or 12 months. • Inspect exhaust system. Perform the first inspection at 15, 000 miles (24 000 km) or 12 months. • Inspect the rear axle fluid.
22500	36000	18	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints.

			• Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
30000	48000	24	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid.
37500	60000	30	• Change the engine oil and engine oil filter.++ () • Rotate tires.
45000	72000	36	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
52500	84000	42	• Change the engine oil and engine oil filter.++ () • Rotate tires.
60000	96000	48	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Change the automatic transmission fluid and filter if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing.

			• Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid.
67500	108000	54	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
75000	120000	60	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Inspect the rear axle fluid. • Flush and replace the engine coolant at 60 months if not done at 105, 000 miles (168 000 km).
82500	132000	66	• Change the engine oil and engine oil filter.++ () • Rotate tires.
90000	144000	72	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • **Inspect and replace PCV valve if necessary. +()** • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.

97500	156000	78	• Change the engine oil and engine oil filter.++ () • Rotate tires.
105000	168000	84	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • **Replace the spark plugs.** • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Inspect the rear axle fluid. • Flush and replace the engine coolant.
112500	180000	90	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
120000	192000	96	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Change the automatic transmission fluid and filter. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid.
127500	204000	102	• Change the engine oil and engine oil filter.++ () • Rotate tires.
135000	216000	108	• Change the engine oil and engine oil filter.++ () • Rotate tires. • If using your vehicle for any of the following: Dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary.

			• Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing. • Inspect the CV joints. • Inspect exhaust system. • Inspect the front suspension, tie rod ends and boot seals; replace if necessary.
142500	228000	114	• Change the engine oil and engine oil filter.++ () • Rotate tires.
150000	240000	120	• Change the engine oil and engine oil filter.++ () • Rotate tires. • Replace the engine air cleaner filter. • Replace the air conditioning filter. • Inspect the brake linings; replace if necessary. • Adjust parking brake on vehicles equipped with four-wheel disc brakes. • Inspect the rear axle fluid.

() + This maintenance is recommended by the manufacturer to the owner, but is not required to maintain emissions warranty.

WARNING:

- **Failure to properly inspect and maintain the vehicle could result in a component malfunction and effect vehicle handling and performance. This could cause an accident and may result in possible serious or fatal injury.**

INSPECTION

INSPECTION

The following steps outline the dealer inspection procedure required every 5 years for vehicles covered under the terms of the Lifetime Powertrain Warranty. Refer to the appropriate warranty information for additional terms and coverages applicable to the Lifetime Powertrain Warranty.

1. Lift the vehicle on a suitable hoist.
2. Check all Powertrain components for leaks or physical damage. Note any concerns.
3. Lower the vehicle and check the level and condition of the engine oil.
4. Connect a diagnostic scan tool and check for any Diagnostic Trouble Codes (DTC).

NEW VEHICLE PREPARATION INSTRUCTIONS

STANDARD PROCEDURE

STANDARD PROCEDURE - NEW VEHICLE PREPARATION

NEW VEHICLE PREP INSTRUCTIONS	
VEHICLE READINESS	
DESCRIPTION	**ACTION**
Keep All Protective Transit Film and Wheel Covers & Films on vehicle until sold, or up to 180 Days	Keep All Protective Transit Film and Wheel Covers & Films on vehicle until sold, or up to 180 Days.
Install Ignition Off Draw (IOD) Fuse	Locate and install/connect Ignition Off Draw fuse or connector.
Place vehicle into Customer Mode (if no IOD fuse)	Simultaneously press the "Front Defrost" and "List/Enter" buttons and hold for five (5) seconds. The EVIC display will update once the vehicle goes into customer mode.
Inflate tire pressure to maximum side wall pressure (except heavy duty trucks)	Increase the tire pressure to maximum sidewall pressure if vehicle is going into lot storage.
Install all "Shipped Loose" items	Install all "Shipped Loose" items
Install Front License Plate Bracket (if required)	Install Front License Plate Bracket
Install Roof Rack	Install Roof Rack
Install Antenna	Install Antenna
Install Wheel Center Caps	Install Wheel Center Caps
Reset Tire Pressure Light Load Switch (if equipped)	If vehicle is going into storage and tire pressure is being set to maximum, switch the tire pressure light load setting to "maximum load" using the button on the instrument panel.
UNDERHOOD	
DESCRIPTION	**ACTION**
Hood Latch and Safety Catch - Adjust as Needed	Verify the operation of the hood release system including the inside hood release lever and the outside hood secondary safety catch. Adjust if necessary. The safety catch prevents the hood from going to the full open position until it is manually released. To test the safety catch, unlatch the hood with the interior hood release lever and attempt to raise the hood without operating the safety catch.
Battery State-of-Charge - document voltage	Check the battery state of charge by connecting a digital voltmeter at the jump-start locations. The battery voltage should be at least 12.4 volts. If charging is necessary, follow the service information procedures and recharge the battery. Record voltage on New Vehicle Prep (NVP) form.
	Inspect the following for routing, loose attachments,

Loose Attachments, Routing and Clearance	connections, and clearance. Reroute and tighten as required: Brake Lines, Fuel Lines, Power Steering Hoses, Vacuum Hoses, Clutch Lines, Refrigerant Lines, Wiring, Belts.
All Fluid Levels	Refer to the owner's manual or service information for proper fluid level inspection locations.
No Fluid Leaks present	Visually inspect the underhood area to make sure absence of fluid leaks. Check clamps for tightness an full engagement.
UNDER VEHICLE	
DESCRIPTION	**ACTION**
No Fluid Leaks present	Raise the vehicle on an appropriate hoist and check the following: Loose Attachments, Routing Clearance and Damage, Absence of Fluid Leaks. Refer to Service Information for proper lift points. Check clamps for tightness and full engagement.
Loose Attachments, Routing, Clearance, Damage	Raise the vehicle on an appropriate hoist and check the following: Loose Attachments, Routing Clearance and Damage, Absence of Fluid Leaks. Refer to Service Information for proper lift points. Check clamps for tightness and full engagement.
ROAD TEST	
DESCRIPTION	**ACTION**
Perform Road Test, Mileage: Before _____ After _____	Record mileage before and after road test.
Engine Starts with All Keys	Start vehicle with all sets of keys.
All Warning Lights and Gauges / No DTCs	Verify all warning lights and gauges are operating properly, and no fault codes exist.
Keyless Go	Make sure vehicle starts with push button, when key is inside vehicle.
Engine Starts Only in Park & Neutral	Verify engine will only start while automatic transmission is in park or neutral.
Engine Starts Only with Clutch Depressed	Verify engine will only start when clutch is depressed on manual transmission vehicles.
Service and Parking Brakes	Apply the service brakes while the car is in motion. Be sure the brake operation is smooth and positive. Make sure the vehicle stops in a straight line and without pulling to one side. Make sure there is no shudder or vibration when braking. Make sure that the parking brake is easy to operate. Make sure the parking brake does not drag.
Brake Transmission Shift Interlock	Make sure that the vehicle will only start when the brake is depressed on vehicles with automatic transmission.
	Check for smooth shifting. Make sure shift lever

Clutch / Manual Transmission Shifting	operates easily and smoothly. Check for proper synchronization. The gears should not grind.
Automatic Transmission Shifting	Make sure that the park lock mechanism holds the vehicle. With the vehicle on a grade, put the automatic transmission in park and slowly release the service brake to check the operation of the park mechanism. Make sure the shift lever operates easily and smoothly. Check for smooth shifting. Check for proper upshifting and downshifting.
Autostick	Verify that Autostick feature allows proper shifting through the gears.
	ROAD TEST
DESCRIPTION	**ACTION**
Engine Performance - Cold	The engine should: start properly, idle smoothly and at proper speed, be free from stumbling or hesitation, produce sufficient power, be free of unusual noises, operate within the proper temperature range, and stop when the ignition key is shut off or stop button is depressed.
Engine Performance - Warm	The engine should: start properly, idle smoothly and at proper speed, be free from stumbling or hesitation, produce sufficient power, be free of unusual noises, operate within the proper temperature range, and stop when the ignition key is shut off or stop button is depressed.
Steering and Handling	Check that the power assist works properly. Make sure that the steering wheel does not vibrate abnormally at idle or road speed. Make sure that the steering wheel is centered when traveling in a straight line. Check that the vehicle does not drift to either side on flat road surfaces. Make sure that the vehicle does not vibrate or shake abnormally.
Noise, Vibration, Squeaks, or Rattles	Check that the vehicle is free of noise, vibrations, squeaks, or rattles. Tighten any loose fasteners.
Heater / Defrost - Front	Check the heater operation after the vehicle has reached operating temperature. Operate blower motor at all speeds. Operate the system in all modes. Check for hot air at all appropriate outlets. Check for temperature control operation.
Air Conditioning	Make sure that the A/C system cools properly. Operate blower motor at all speeds. Check for cool air at all temperature outlets. Operate the system in all modes.
Rear Heater and Air Conditioning	Check the rear heater and A/C for proper operation.
Defrost - Rear	Make sure that the electric heated rear defroster operates correctly. Turn on and feel for warmth.

Blindspot Monitoring System (if equipped)	While on road test, verify that the visual warning indicators located on the side view mirrors are operating properly when an object is within the detection zone.
Cruise Control (if equipped)	Check the "on/off" switch. Check the "set" operation. Check the "resume" function. Check the "accelerate" and "decelerate" function. Check the "cancel" button. Check the brake/clutch release function. If equipped, verify operation of Adaptive Cruise Control function.
Set Compass Variance / Calculation (if equipped)	Refer to the service information on TechCONNECT for information regarding compass setting procedures.
ROAD TEST	
DESCRIPTION	**ACTION**
Electronic Sway Bar Disconnect (if equipped)	With vehicle in four wheel drive, press the sway bar switch to activate the system. Verify that the "Sway Bar Indicator Light" is illuminated. **WARNING:** **Do not exceed 18 MPH / 29 KMPH while the front sway bar is disconnected. Failure to follow these instructions may result in possible serious or fatal injury.**
Transfer Case (if equipped)	Shift the transfer case through all ranges to make sure all shifting is smooth and operates properly.
Load Leveling Air Suspension (if equipped)	Use the terrain select switch to change the ride height during normal driving conditions. Cycle through each selection and verify proper operation of the air suspension system.
Tire Pressure Monitoring System	Verify that Tire Pressure Monitoring Indicator Light is not illuminated when tires are above minimum inflation recommendations. Make sure that indicator lamp is not flashing/chiming.
Park Assist (if equipped)	Put vehicle in reverse and slowly back up toward an object. Verify that Park Assist warning icon, lights and chimes operate properly as object is approached.
Back-Up Camera (if equipped)	Put vehicle in reverse, verify that screen provides a clear and visible image from rear of vehicle.
INTERIOR	
DESCRIPTION	**ACTION**
Visually Inspect Interior Parts for Damage, Fit, etc.	From the interior of the vehicle, open and close all doors to make sure ease of operation. Fully open and close the glove box to make sure proper operation. Fully open and close the console door to make sure proper operation. Check interior panels for proper fit and free from damage.
	Operate and visually inspect all interior lights and

All Interior Lamps and Horn	switches, including: Dome/Map lamps, and if equipped the following: vanity mirror lamps, glove box lamps, ash tray lamp, cigar lighter lamp, radio lamps, door mounted lamps, illuminated entry system. Make sure that the horn operates properly.
Rear View Mirror	Check that the rearview mirror's day/night function Is operating properly.
Front and Rear Wipers and Washers	Activate front windshield wipers, and if equipped, rear window wipers and check for proper operation at all speeds. Activate the front and if equipped, the rear washer. Check the spray pattern for proper operation and aim. Check the intermittent wipe feature for proper operation.
All interior Door Locks including Child Locks	Check all interior door locks for proper operation, including rear child safety door locks if equipped. Place in the unlocked position.
INTERIOR	
DESCRIPTION	**ACTION**
Steering Wheel Mounted Controls	Check all steering wheel controls for proper operation.
Memory Mirror / Seat	Verify the proper operation of the memory mirror and seat system.
Cigar Lighter	Check cigar lighter for proper operation.
Power Windows and Window Lock Switch	Fully open and close all power windows to make sure proper operation and sealing. Make sure that the windows operate properly at each door. Verify that window lock button is operating properly.
Power Adjustable Pedals (if equipped)	Check the adjustable pedals for proper operation by pressing the switch on the steering column.
Outside Power Mirrors	Check power mirrors for proper operation.
Heated Mirrors (if equipped)	Check power heated mirrors for proper operation.
Power Folding Mirrors (if equipped)	Check power folding mirrors for proper operation.
Seats and Seat Belts - All Adjustments	Check for correct installation and operation of seat and shoulder belts, and retractors. Check that the restraint system safety labels regarding the use of seatbelts and airbags are in place. Fully cycle the seats for proper adjustments and verify that each seat is securely mounted. Fold down and latch the rear seats. Pull forward to check that the latches operate correctly. Check for proper head restraint operation.
Convertible Top (If equipped)	Cycle the convertible top. Check and adjust alignment as required. In cold weather, allow the top to reach room temperature before cycling.
FIAT Cabrio Top (if equipped)	Cycle the convertible top. Check and adjust alignment as required. In cold weather, allow the top to reach room temperature before cycling.

Skyslider (if equipped)	Cycle the Skyslider roof. Check and adjust alignment as required.
Power Sunroof (if equipped)	Cycle sunroof. Make sure that the sunroof opens and closes easily. Verify proper operation of one touch open/close feature if equipped.
Set Clock(s)	Set all clocks to correct time. Refer to Owner's Manual for information regarding clock setting procedures.
Audio System	Turn the radio on and check reception in both AM and FM modes. Check that the CD player operates properly. Check for good sound quality from all speakers.
Satellite Radio (if equipped)	Turn on satellite radio and verify reception.
Disable Front Seat Video (if equipped)	Use the scantool to disable front seat video while vehicle not in park.
Video System (if equipped)	Test the DVD player to make sure that a DVD will load properly and display on the screen.
Satellite Streaming Video (if equipped)	Satellite Streaming Video.
Wireless Headphones / Video Remote (if equipped)	Check for proper operation of the Wireless Headphones / Video Remote.
INTERIOR	
DESCRIPTION	**ACTION**
Heated Steering Wheel (if equipped)	Verify that heated steering wheel is functioning properly.
Rear Sliding Window (if equipped)	Check for proper operation of the information or power rear sliding window.
Power Outlet(s)	Check all power outlets for proper operation.
Integrated Child Seat / Belt	Check the child restraints and child seats for proper operation.
Place tire changing instruction sheet in left rear quarter panel storage compartment (RT only)	Place tire changing instruction sheet in left rear quarter panel storage compartment (RT only).
Storage bins properly seated around the spare tire (WK only)	Verify that storage bins are properly seated.
Power folding Headrests (if equipped)	Verify proper operation of power folding third row head restraints by pressing the power folding switch located on the instrument panel switch bank.
Heated Seats (if equipped)	Check for proper operation of heated seats on all power levels, on all equipped seats.
Power Cooled Seats (if equipped)	Check for proper operation of ventilated seats on all power levels, on all equipped seats.
Heated / Cooled Cup Holders (if equipped)	Check for proper operation of the heated and cooled and cooled cupholders.
Cargo Compartment Cover (if equipped)	Check the rear cargo compartment cover is operating properly.

Vinyl Floor Covering (if equipped)	Verify properly equipped.
EXTERIOR	
DESCRIPTION	**ACTION**
Inspect Body and Paint for Damage and Fit/ Finish	Inspect the body exterior for damage, loose or missing items. During the inspection, make sure that no vehicle damage occurred from the time the vehicle was received and the beginning of the New Vehicle Preparation.
Exterior Lamps - Headlamps, Turn Signals, Hazards, Park/Tail/License Plate, Trunk Lights, etc.	Operate and visually inspect the following: Headlamps (High/Low Beams), turn signals, hazard warning flashers, parking/tail/license plate lamps, reverse/back up lamps, fog lamps, stop lamps including center mounted stop lamp, daytime running lamps (if equipped), clearance lamps, cargo bed lamps, any other lamps.
Lock and Unlock all doors with all mechanical keys	Verify all doors lock and unlock with all mechanical keys.
EXTERIOR	
DESCRIPTION	**ACTION**
Doors, Liftgate and Tailgate - Adjust Strikers as Needed	Open each door/liftgate/tailgate from the outside to check outside door handle operation. Check the door detent. Partially close all doors to check the open-door detent. Close all doors/liftgates/tailgates to check the operation of latches and strikers. Adjust strikers as required. Verify liftgate/tailgate ease of operation.
Power Liftgate - Inspect for fit and operation (if equipped)	Verify all modes of operation of the power liftgate, including operating the liftgate using the inside switches and the Remote Keyless Entry transmitter.
Power Sliding Door - Inspect for Fit and Operation (if equipped)	Verify all modes of operation of the power sliding door, including operating the sliding door using the inside switches and the Remote Keyless Entry transmitter.
Security Alarm Test (if equipped)	Lock doors using the Remote Keyless Entry Transmitter. Verify the operation of the Vehicle Security System warning lamp.
Passive Entry (if equipped)	Verify that the Keyless Enter-N-Go feature is operating properly, by grabbing the door handle of the locked vehicle, while the Remote Keyless Entry transmitter key is within 5 feet of the vehicle. The door should unlock automatically.
Remote Keyless Entry (if equipped)	Verify that doors unlock properly using all key FOBS.
Remote Start (if equipped)	Verify that engine starts with all keys when using Remote Keyless Entry Transmitter.
Top (Wrangler)	For Wrangler equipped with soft top, verify opening and closing operation. For Hard/Soft Top, verify top

	fits and is seated properly.
VEHICLE STORAGE	
DESCRIPTION	**ACTION**
Keep all protective transit film, wheel covers and films on vehicle until sold	Keep all protective transit film, wheel covers and films on vehicle until sold.
Inflate tire pressure to maximum side wall pressure	Inflate tire pressure to maximum side wall pressure (except heavy duty trucks.)
Put Vehicle into Ship Mode (if no IOD fuse)	Simultaneously press the "Front Defrost" and "List/Enter" buttons and hold for five (5) seconds. The EVIC display will update once the vehicle goes into ship mode.
Remove ignition off draw (IOD) Fuse	Remove fuse before storing vehicle to conserve battery.
FINAL DETAIL & INSPECTION	
DESCRIPTION	**ACTION**
Perform all incomplete recalls and RRTs	Perform all incomplete recalls and RRTs.
Remove interior and exterior Transportation Protective Covers	Remove exterior protective coatings/coverings from vehicle, remove interior protective covers, grease markings on door jambs, unnecessary labels, etc.
Inspect paint and body, touch up as needed	Make sure that the body is free from paint chips or scratches. Touch up any chips/scratches using thin layers of paint. Make sure that the body is free from dings and dents.
Install IOD Fuse or put vehicle into Customer Mode	Install fuse or place vehicle into customer mode prior to delivery.
Test and record battery state of charge	Check the battery state of charge by connecting a digital voltmeter at the jump-start locations. The battery voltage should be at least 12.4 volts. If charging is necessary, follow the service information procedures and recharge the battery. Record voltage on New Vehicle Prep (NVP) form.
Adjust tire pressures including spare to door placard	Adjust tire pressures including spare to door placard.
Reset Tire Pressure Light Load Switch (if equipped)	Reset the Tire Pressure Light Load Switch back to the "Light Load" setting using the switch on the instrument panel.
Top off Diesel Exhaust Fluid reservoir	Fill the Diesel Exhaust Fluid Reservoir located behind the cab on the driver's side of truck (clearly marked in blue) with Mopar Diesel Exhaust Fluid prior to customer delivery.
Wash and clean vehicle exterior	Wash the entire vehicle. Clean the tire sidewalls and wheel/wheel covers (use non - acidic wheel cleaner). Clean exterior/interior glass surfaces.
Clean vehicle interior	Inspect the interior trim, seats, carpeting, and moldings. Clean as necessary.

Fill Fuel Tank with specified grade	Fill fuel tank with the specified grade of fuel. Refer to owner's manual or information tag behind the fuel filler.

TOWING

STANDARD PROCEDURE

STANDARD PROCEDURE - VEHICLE TOWING

WARNINGS AND CAUTIONS

WARNING: Do not allow towing attachment devices to contact the fuel tank or lines, fuel leak can result.

Do not lift or tow vehicle by front or rear bumper.

Do not go under a lifted vehicle if not supported properly on safety stands.

Do not allow passengers to ride in a towed vehicle.

Use a safety chain that is independent from the towing attachment device. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: Do not damage brake lines, exhaust system, shock absorbers, sway bars, or any other under vehicle components when attaching towing device to vehicle.

Do not secure vehicle to towing device by the use of front or rear suspension or steering components.

Remove or secure loose or protruding objects from a damaged vehicle before towing.

Refer to state and local rules and regulations before towing a vehicle.

Do not allow weight of towed vehicle to bear on lower fascia, air dams, or spoilers.

RECOMMENDED TOWING EQUIPMENT

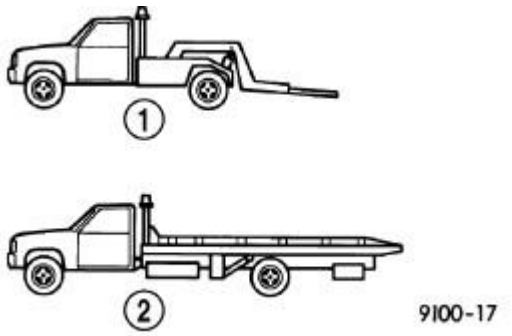

Fig. 9: Recommended Towing Devices
Courtesy of CHRYSLER GROUP, LLC

1 - WHEEL LIFT
2 - FLAT BED CARRIER

- RWD vehicles, a flat bed towing device is recommended.
- AWD vehicles, a flat bed towing device is recommended.

CAUTION:
- **Do not attempt to tow this vehicle from the front with sling type towing equipment. Damage to the front fascia and air dams will result.**
- **The only approved method of towing is with a flat bed truck.**
- **Do not tow the vehicle from the rear. Damage to the rear sheet metal, liftgate and fascia will occur.**
- **Do not push or tow this vehicle with another vehicle as damage to the bumper fascia and transmission may result.**

GROUND CLEARANCE

CAUTION: If vehicle is towed with wheels removed, install lug nuts to retain brake drums or rotors.

be sure the has at least 100 mm (4 in.) ground clearance. If minimum ground clearance cannot be reached, use a towing dolly. If a flat bed device is used, the approach angle should not exceed 15 degrees.

If using a wheel lift towing device, the disabled vehicle should be raised until the lifted wheels are a minimum 100 mm (4 in.) from the ground. Be sure there is at least 100 mm (4 in.) clearance between the tail pipe and the ground. If necessary, remove the wheels from the front end of the vehicle and lower the front end closer to the ground, to increase the ground clearance at the rear of the vehicle. Install lug nuts on wheel attaching studs to retain brake rotors.

LOCKED VEHICLE TOWING

When a locked vehicle must be towed with the front wheels on the ground, use a towing dolly or flat bed hauler.

FLAT BED TOWING TIE DOWNS

CAUTION: Do not tie vehicle down by attaching chains or cables to suspension components or engine mounts, damage to vehicle can result.

The vehicle can be tied to a flat bed device using the pair of front transportation slots on the bottom surface of the rails, behind the front wheels. The rear transportation slots are on the bottom of the left bumper extension and in the bracket extending inboard of the right bumper extension.

WITHOUT THE IGNITION KEY

Special care must be taken when the vehicle is towed with the ignition in the LOCK position. The only approved method of towing with out the ignition key is with a flat bed truck. Proper towing equipment is necessary to prevent damage to the vehicle.

TOWING THIS VEHICLE BEHIND ANOTHER VEHICLE (FLAT TOWING WITH ALL FOUR WHEELS ON THE GROUND)

Your vehicle may be towed under the following conditions: The gear selector must be in NEUTRAL, the distance to be traveled must not exceed 48 km (30) miles, and the towing speed must not exceed 48 km/h (30 mph). Exceeding these towing limits may cause a transmission geartrain failure. If the transmission is not operative, or if the vehicle is to be towed more than 48 km (30) miles, the vehicle must be transported using a flat bed or the drive shaft disconnected at the rear axle drive flange.

TOWING THIS VEHICLE BEHIND ANOTHER VEHICLE WITH A TOW DOLLEY

The manufacture **does not recommend** that you tow this vehicle on a tow dolley. Vehicle damage may occur.

ACCESSORIES AND EQUIPMENT

Vehicle Theft Security - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

The Vehicle Theft Security System (VTSS) is an available factory-installed option on this vehicle. The VTSS is comprised of two primary subsystems: Vehicle Theft Alarm (VTA) and Sentry Key Immobilizer System (SKIS). The VTA is an active system that provides visual and audible responses as deterrents to and warnings of unauthorized vehicle tampering. The SKIS is a passive system that effectively immobilizes the vehicle against unauthorized operation. Following are paragraphs, which describe these subsystems of the VTSS.

Certain functions and features of the VTSS rely upon resources shared with or controlled by other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Other modules that may affect VTSS operation are:

- **Body Control Module (BCM)** - The BCM is located in the interior compartment in the right kick panel. The BCM provides the VTA system logic, driver and passenger door ajar switch status, hood ajar (export) and power lock switch status. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Instrument Cluster** - The Instrument Cluster (IC) is also known as the Cab Compartment Node (CCN). The IC/CCN is located in the instrument panel above the steering column opening, directly in front of the driver. The IC provides the security indicator. Refer to **DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PYGMY) provides the SKIS engine control logic. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Radio Frequency Hub (RF-Hub)** - The Radio Frequency Hub (RF-Hub) provides ignition switch status by way of the Keyless Ignition Node (KIN). The RF-Hub broadcasts that message over the CAN Bus network. The Remote Start logic is contained in the RF-Hub and the Remote Start Antenna is connected directly to it. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

Except for the Sentry Key transponders integral to the FOB with Integrated Key (FOBIK) which rely upon Low Frequency (LF) communication, hard-wired circuitry connects the VTA and SKIS components to the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the SKIS components through a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices, and grounds.

VEHICLE THEFT ALARM

The VTA is available in three different configurations for this vehicle: One configuration is designed for vehicles manufactured for sale in North America; while, the other two configurations are designed for vehicles manufactured for sale in markets outside of North America, also referred to as export markets within the context of this service information. All vehicles equipped with VTA are also equipped with the Remote Keyless Entry (RKE) system and the Sentry Key Immobilizer System (SKIS), regardless of their market destination.

The North American and export base version of the VTA system provide perimeter vehicle protection by monitoring the vehicle doors, the ignition switch, the liftgate, and the hood for vehicles built for certain markets where it is required equipment. On the premium export version it also monitors vehicle tilt and motion. If unauthorized vehicle use or tampering is detected, these systems respond by pulsing the vehicle horn. The premium export version will sound a siren. The siren is located in the left front corner on the radiator support. This produces an audible deterrent. Both of these systems will also flash certain exterior lamps which produces a visual deterrent.

The VTA includes the following major components, which are described in further detail elsewhere in this service information:

- **Door Ajar Switches** - A door ajar switch is integral to the door latch mechanism of each front and rear door.
- **Hood Ajar Switch** - A hood ajar switch is located in a bracket on the right inner fender side shield of vehicles built for sale in certain export markets where it is required equipment.
- **Liftgate Ajar Switch** - A liftgate ajar switch is integral to the latch for the liftgate in the vehicle. Refer to **LATCH, REMOVAL** .
- **Security Indicator** - A security indicator is integral to the Instrument Cluster (IC) (also known as the Cab Compartment Node/CCN). Refer to **DESCRIPTION** .

SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) is standard on all vehicles equipped with the Radio Frequency Hub. The SKIS provides passive vehicle protection by preventing the engine from operating unless a valid electronically encoded FOBIK is detected in the vehicle interior.

The SKIS includes the following major components, which are described in further detail elsewhere in this service information:

- **Security Indicator** - A security indicator is integral to the Instrument Cluster (IC) (also known as the Cab Compartment Node/CCN). Refer to **DESCRIPTION** .
- **Sentry Key Transponder** - The Sentry Key transponder is integral to the FOB with Integrated Key (FOBIK), which also includes an integral Remote Keyless Entry (RKE) transmitter and an integral mechanical valet key. Refer to **KEY, TRANSPONDER, DESCRIPTION**.
- **Radio Frequency Hub** - The Radio Frequency Hub (RF-Hub) is located above the headliner at the liftgate opening. The RF-Hub is hardwired to the Keyless Ignition Node (KIN). The RF-Hub performs all of the same functions performed by a Wireless Control Module (WCM) or a Wireless Ignition Node (WIN) and the Passive Entry Module used on other vehicles. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

- **Powertrain Control Module** - The Powertrain Control Module (PYGMY) provides the SKIS engine control logic. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Body Control Module (BCM)** - The BCM is located in the interior compartment in the right kick panel. The BCM provides the VTA system logic, driver and passenger door ajar switch status, hood ajar (export) and power lock switch status. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .

OPERATION

OPERATION

The Vehicle Theft Security System (VTSS) is divided into two basic subsystems: Vehicle Theft Alarm (VTA) and Sentry Key Immobilizer System (SKIS). Following are paragraphs that briefly describe the operation of each of these two subsystems.

VEHICLE THEFT ALARM

The Body Control Module (BCM) and the Radio Frequency Hub (RF-Hub) are used on this vehicle to control and integrate many of the functions and features included in the Vehicle Theft Alarm (VTA/VTS) system. In the VTA system, the BCM receives inputs indicating the status of the door ajar switches, the liftgate ajar switch, and the power lock switches. In vehicles built for certain export markets where it is required, the hood ajar switch provides a hard-wired input to the BCM. The BCM processes the information from all of these inputs and sends the appropriate electronic messages over the CAN data bus. The BCM internally controls the output to the hazard warning lamps and sends a control output to energize or de-energize the horn relay as appropriate. The RF-Hub sends out the ignition switch status and all the commands from the FOBIK.

The hard-wired circuits between the components related to the VTA system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, details of wire harness routing and retention, connector pin-out information, and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the VTA system or the electronic controls or communication between modules and devices that provide some features of the VTA system. The most reliable, efficient, and accurate means to diagnose the VTA system or the electronic controls and communication related to VTA system operation requires the use of a diagnostic scan tool. Select the modules that are used with the VTA system and monitor the status of the appropriate components. Refer to the appropriate diagnostic information for any Diagnostic Trouble Codes (DTCs) procedures.

For Body Control Module DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Radio Frequency Hub DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Powertrain Control Module DTCs: Refer to appropriate diagnostic information .

Following are paragraphs that briefly describe the operation of each of the VTA features. See the

owner's manual in the vehicle glove box for arming and disarming procedures, use, and operation of the VTA.

ARMING

Passive arming of the VTA occurs when the vehicle is exited with the FOB with Integrated Key (FOBIK), the headlamps are turned OFF, and the doors are locked while they are open using the power lock switch. Active arming occurs when the LOCK button on the FOBIK is pressed to lock the vehicle. For active arming to occur, the doors, and the liftgate must be closed and the Keyless Ignition Node (KIN) must be in the OFF position when the FOBIK LOCK button or the LOCK button on the passive entry handle is pressed. The power lock switches will not function if the FOBIK is in the vehicle interior.

Pre-arming of the VTA is initiated when a door or the liftgate is open when the vehicle is locked using a power door lock switch or when the FOBIK LOCK button is pressed. Pre-arming will not occur if the FOBIK is in the vehicle interior. When the VTA is pre-armed, the arming sequence is delayed until all of the doors and the liftgate have been closed. The VTA will remain in pre-armed mode for up to 16 seconds after all doors and the liftgate have been closed.

Once the VTA begins the passive or active arming sequence, the security indicator in the instrument cluster will flash rapidly for about 16 seconds. This indicates that VTA arming is in progress. If the ignition is turned to the ON position, if a door or the liftgate is unlocked and opened by any means, or the RKE PANIC button (if equipped) is depressed during the 16 second arming process, the security indicator will stop flashing and the arming process will abort. Once the arming sequence is successfully completed, the security indicator will flash at a slower rate, indicating that the VTA is armed.

On vehicles equipped with the hood ajar switch, the VTA arming sequence will occur regardless of whether the hood is open or closed, but the underhood area will not be protected unless the hood is closed when the VTA arming sequence begins. Also, if the status of the hood ajar switch changes from open to closed during the 16 second arming process, the security indicator will stop flashing and the VTA arming sequence will abort. Once the arming process is successfully completed, the security indicator will flash at a slower rate, indicating that the VTA is armed.

DISARMING

Press the FOBIK UNLOCK button or with one of the valid FOBIKs located outside the vehicle and within 1.5m (5 ft.) of the drivers or passenger front door handles, grab the Passive Entry handle and enter the vehicle, then press the Start/Stop/Button (SSB) to ON (requires at least one valid FOBIK in the vehicle).

POWER-UP MODE

When the armed VTA senses that the battery has been disconnected and reconnected, it enters its power-up mode. In the power-up mode, the alarm system remains armed following a battery failure or disconnect. If the VTA was armed prior to a battery disconnect or failure, the technician, or vehicle operator will have to actively or passively disarm the alarm system after the battery is reconnected. The power-up mode will also apply if the battery goes dead while the system is armed, and battery

jump-starting is attempted. The VTA will be armed until the technician or vehicle operator has actively or passively disarmed the alarm system. If the VTA is in the disarmed mode prior to a battery disconnect or failure, it will remain disarmed after the battery is reconnected or replaced, or if jump-starting is attempted.

ALARM

The VTA alarm output varies by the version of the VTA with which the vehicle is equipped. In all cases, the alarm provides both visual and audible outputs; however, the time intervals of these outputs vary by the requirements of the market for which the vehicle is manufactured. In all cases, the visual output will be a flashing ON and OFF of the exterior lamps. For vehicles equipped with the North American or the export base version of the VTA, the audible output will be a pulsing of the horn. See the owner's manual in the vehicle glove box for details of the alarm output requirements of the specific market for which the vehicle was manufactured. The inputs that will trigger the alarm include the door ajar switches, the liftgate ajar switch, and in vehicles built for certain markets where required, the hood ajar switch.

TAMPER ALERT

If the VTA alarm was triggered, the VTA tamper alert feature will give the message "REMOTE START DISABLED - START VEHICLE TO RESET" in the Electronic Vehicle Information Center (EVIC) and the horn will beep three short beeps. This message will display once the vehicle is properly disarmed by unlocking the vehicle with a valid FOBIK. This message can also display if the alarm has since timed out or if the battery has been disconnected and reconnected. This feature alerts the vehicle operator that the VTA alarm was activated while the vehicle was unattended.

SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) is designed to provide passive protection against unauthorized vehicle use by disabling the engine whenever any method other than a valid FOBIK is used to start the vehicle. The SKIS is considered a passive protection system, because it is always active when the ignition system is energized and it does not require any customer intervention. The SKIS uses Low Frequency (LF) communication to obtain confirmation that the FOBIK in the interior of the vehicle is valid for operating the vehicle. The microprocessor-based SKIS hardware and software also uses electronic messages to communicate with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, OPERATION** .

Two pre-programmed FOBIK transponders are provided with the vehicle from the factory. Each RF-Hub will recognize a maximum of eight FOBIK transponders. If the customer would like additional FOBIKs, other than those provided with the vehicle, they may be purchased from any authorized dealer. These additional FOBIKs must be programmed to the RF-Hub in the vehicle in order for the system to recognize them as valid. This can be done by the dealer using a diagnostic scan tool. All FOBIKs used on that particular vehicle must be in the vehicle when programming takes place.

The RF-Hub performs a self-test of the SKIS each time the ignition is pressed to the ON position, and will store fault information in the form of a Diagnostic Trouble Code (DTC) if a system malfunction is detected. The WIN will also send an electronic message to the instrument cluster if a fault is detected, and the instrument cluster illuminates the security indicator.

The hard-wired circuits between components related to the SKIS may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SKIS or the electronic controls or communication between other modules and devices that provide some features of the SKIS. The most reliable, efficient, and accurate means to diagnose the SKIS or the electronic controls and communication related to SKIS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information for any Diagnostic Trouble Code (DTC) procedures.

For Body Control Module DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Radio Frequency Hub DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Powertrain Control Module DTCs: Refer to appropriate diagnostic information .

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - VEHICLE THEFT SECURITY SYSTEM

The Vehicle Theft Security System (VTSS) is divided into two basic subsystems: Vehicle Theft Alarm (VTA) and Sentry Key Immobilizer System (SKIS). Following are the recommended procedures for diagnosis of each of these two subsystems.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

VEHICLE THEFT ALARM

The hard-wired circuits between components related to the VTA system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the VTA system or the electronic controls or communication between modules and devices that provide some features of the VTA system. The most reliable, efficient, and accurate means to diagnose the VTA

system or the electronic controls and communication related to VTA system operation requires the use of a diagnostic scan tool. Select the modules that are used with the VTA system and monitor the status of the appropriate components. Refer to the appropriate diagnostic information for any Diagnostic Trouble Codes (DTCs) procedures.

For Body Control Module DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Radio Frequency Hub DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Powertrain Control Module DTCs: Refer to appropriate diagnostic information .

For diagnosing an intermittent false trip of the alarm, using a scan tool select: "BCM", "System Test" and "View Last VTA Trigger Cause Data" The scan tool will display the last four "Triggers" that the Body Control Module has stored. If the alarm will not set, the scan tool can be helpful by showing the status of each component presently. Select "View VTA Enable Data" under "System Tests".

SENTRY KEY IMMOBILIZER SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard-wired circuits between components related to the SKIS may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the VTA system or the electronic controls or communication between modules and devices that provide some features of the VTA system. The most reliable, efficient, and accurate means to diagnose the VTA system or the electronic controls and communication related to VTA system operation requires the use of a diagnostic scan tool. Select the modules that are used with the VTA system and monitor the status of the appropriate components. Refer to the appropriate diagnostic information for any Diagnostic Trouble Codes (DTCs) procedures.

For Body Control Module DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Radio Frequency Hub DTCs: Refer to **DIAGNOSIS AND TESTING** .

For Powertrain Control Module DTCs: Refer to appropriate diagnostic information .

STANDARD PROCEDURE

FOBIK PROGRAMMING

The Radio Frequency Hub (RF-Hub) may be programmed to recognize up to a total of eight FOBIKs. When replacing or adding a FOBIK, the integrated key must be cut to match the door lock cylinder in the vehicle for which it will be used. Once an additional or new key has been cut, the RF-Hub must be programmed to recognize it as a valid FOBIK. When programming a FOBIK it may be necessary to have the vehicle PIN. Follow the instructions on the scan tool screen.

Programming

NOTE: All FOBICs that are to be used in this vehicle must remain on the front seat near the center console but behind the shifter.

NOTE: Do not put a Laptop or any wireless device (cell phone, audio device, etc.) on top of or near the center console. The RF Antenna is below the console.

1. Turn the ignition on.
2. With the scan tool select RFH.
3. Turn the ignition to the off/lock position. The ignition must be left off throughout this procedure on vehicles equipped with the RF-Hub.
4. With the scan tool select; "Misc. Functions" "Program Ignition FOBIKs".

   NOTE: When programming a FOBIK, hold it near or on the center console top.

   NOTE: When you are instructed to "Press the Unlock button" it is important that you do not hold the button. Press it One time quickly.

5. Press "Continue" and follow the instructions on the screen.

RF-HUB INITIALIZATION - EXPORT WITH COLUMN LOCK MODULE

CAUTION: On vehicles equipped with the optional export premium Vehicle Theft System, when either the Radio Frequency Hub RF-Hub) or the shaft lock module (also known as Elektrische Lenksaulen Verriegelung/ELV or Electric Steering Column Lock/ESCL) is replaced with a new unit, the existing RF-Hub or ELV/ESCL MUST also be replaced with a new unit. In other words, any time either the RF-Hub or the ELV/ESCL is replaced with a new unit, BOTH the RF-Hub and the ELV/ESCL MUST be replaced with new units, WITHOUT EXCEPTION. Following replacement of BOTH the RF-Hub and the column lock module/ELV/ESCL, the two modules MUST be initialized using diagnostic scan tool routines in the EXACT SEQUENCE that follows. Failure to follow this sequence may result in BOTH the new RF-Hub and the new ELV/ESCL being rendered unusable, requiring BOTH

units to be replaced a second time.

NOTE: Do not put a laptop or any wireless device (cell phones, audio devices etc.) near the top of the center console (the RKE antenna is located below the center console).

1. After both the RF-Hub and the ELV/ESCL have been replaced with new units, connect the diagnostic scan tool to the Data Link Connector (DLC).
2. Turn the ignition ON
3. Navigate to the RF-Hub in the ECU View of the diagnostic scan tool.
4. Turn the ignition OFF
5. Put all the FOBICs used in this vehicle on the front seat away from the console.
6. With the scan tool select: "Program ignition FOBIKs" in the Miscellaneous Functions menu and follow the instructions on the screen.

NOTE: When programming a FOBIK, have it in your hand resting on the console.

7. After all the FOBIKs have been programmed, run the "RF-Hub Replace" routine.
8. Turn the ignition on.
9. Run the ELV Replaced routine, also found under the Miscellaneous Functions menu item of the RF-Hub in the ECU View of the diagnostic scan tool.
10. Turn the ignition to the OFF position, wait 30 seconds, then cycle the ignition back to the ON/RUN position.
11. Verify that the ELV Locks the steering column when the ignition is turned off and Unlocks the steering column when the ignition is turned On.

KEY, TRANSPONDER

DESCRIPTION

DESCRIPTION

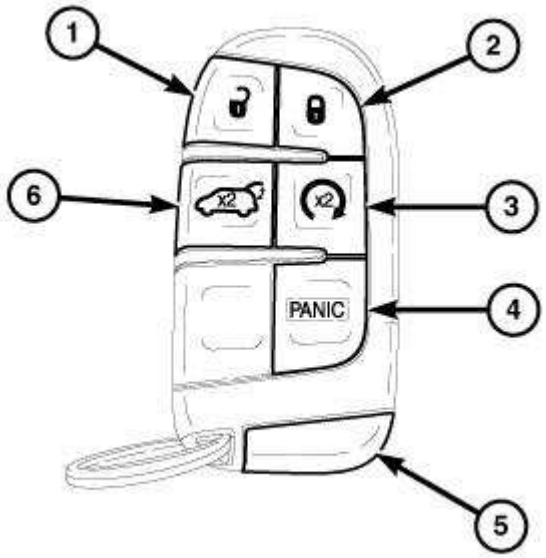

Fig. 1: FOB with Integrated Key (FOBIK) Remote Keyless Entry (RKE) Transmitters
Courtesy of CHRYSLER GROUP, LLC

Vehicles are shipped from the factory with two FOB with Integrated Key (FOBIK) Remote Keyless Entry (RKE) transmitters programmed to the vehicle as standard equipment. The FOBIK circuitry is contained and protected within a molded black plastic case with a black soft rubber touch pad on the face divided into six sections. The rearward end of the FOBIK case houses a mechanical, metal, coded emergency key (5) that is released by sliding a latch button on the back of the FOBIK case.

Depending upon vehicle equipment, each FOBIK has at least three and no more than five functional resistive membrane switches located beneath the six touch pad sections. Each functional touch pad section is clearly identified by white icons or white text and icons identifying the specific function obtained by pushing that button. Domestic market vehicles also include a touch pad section on the FOBIK with the red text **PANIC** applied to it. Not counting the **PANIC** touch pad (4), the available switches include:

- **Unlock (1)**

  - Standard equipment.

- **Lock (2)** - Standard equipment.
- **Remote Start (3)** - Only for vehicles equipped with the factory-installed remote start system.
- **Liftgate/Decklid (6)** - Standard equipment.

The FOBIK RKE transmitter is the primary customer active interface for remotely operating the power lock system, the RKE system, and the remote start system components and features. However, the FOBIK also has an important passive role in each of the following vehicle systems:

- **Keyless Go System**

- **Passive Entry System**
- **Sentry Key® Theft Deterrent System**
- **Vehicle Theft Security System (VTSS)**

Other than battery replacement, the FOBIK cannot be adjusted or repaired. If damaged or ineffective, the FOBIK must be replaced with a new unit. A new and unused FOBIK unit must be properly programmed in order to function properly with the systems of the vehicle. The mechanical emergency key of the new FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

Programming FOBIKs

For FOBIK Programming, refer to **STANDARD PROCEDURE** .

OPERATION

OPERATION

The FOB with Integrated Key (FOBIK) incorporates many useful functions into a single, compact unit. The transducer on the internal circuit board of the FOBIK uses low frequency Radio Frequency (RF) communication to ensure vehicle security through an electronic validation or handshake process that is performed with the Radio Frequency Hub (RF Hub) each time the engine is started.

When any one of the Remote Keyless Entry (RKE), liftgate/decklid or remote start buttons of the FOBIK is depressed, the on-board transmitter of the FOBIK generates a high frequency RF request signal that is received and validated by the RF Hub. If the RF Hub determines the RF signal was generated by a FOBIK that is valid for the vehicle, the RF Hub relays electronic request messages to the appropriate electronic modules in the vehicle over the Controller Area Network (CAN) data bus to invoke the functions or features associated with the request.

Each vehicle owner is provided with a four-digit Personal Identification Number (PIN) by the dealer at the time of vehicle purchase. This number is required along with a diagnostic scan tool for the dealer to program an additional or replacement FOBIK into the electronics of the vehicle. The emergency key included with a new additional or replacement blank FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

Diagnosis of a FOBIK transmitter requires the use of a Radio Frequency Detector such as (special tool #9001, RF Detector) or (special tool #CH9936, Analyzer, TPM/RKE). Refer to the appropriate diagnostic information. Refer to **DIAGNOSIS AND TESTING** .

EMERGENCY STARTING

The integrated mechanical key of the FOBIK provides emergency access to the vehicle in case the battery in the vehicle or the transmitter becomes discharged.

In the event that the battery in the FOBIK is low or there is a Low Frequency Antenna problem:

- Hold the FOBIK with the key ring away from the Keyless Ignition Node (KIN).

- With the "Lock/Unlock" button end of the FOBIK, press the Start/Stop Button (SSB).
- Push gently to prevent scratching the KIN's surface.

Programming FOBIKs

For FOBIK Programming. Refer to **STANDARD PROCEDURE** .

MODULE, INTRUSION

DESCRIPTION

DESCRIPTION

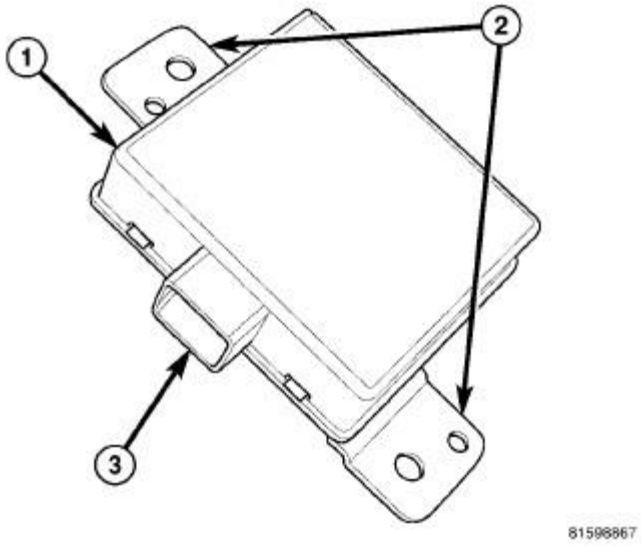

Fig. 2: Identifying Intrusion Module Components
Courtesy of CHRYSLER GROUP, LLC

An intrusion module (1) is part of the premium version of the Vehicle Theft Alarm (VTA) in the Vehicle Theft Security System (VTSS). The premium version of the VTA is only available in vehicles built for certain markets, where the additional features offered by this system are required. The intrusion module is located in the passenger compartment. This unit is designed to work in conjunction with the intrusion sensor transmitter and intrusion sensor receiver to provide interior motion detection and serves as the interface between the Totally Integrated Power Module (TIPM), the Cab Compartment Node (CCN) and the alarm siren.

The intrusion module has two integral mounts (2) that are secured by nuts to two weld studs on the right quarter inner panel just behind the right rear wheel house. The module is concealed beneath the quarter inner trim panel. Concealed within the molded plastic housing is the circuitry of the module, which includes a microprocessor. The module is connected through an integral connector receptacle (3) to the vehicle electrical system by a take out and connector of the body wire harness.

The intrusion module unit cannot be adjusted or repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

The microprocessor in the intrusion module contains the motion detection logic circuits and controls all of the features of the premium version of the Vehicle Theft Alarm (VTA). The module uses On-Board Diagnostics (OBD) and can communicate with other modules in the vehicle as well as with a diagnostic scan tool using the Controller Area Network (CAN) data bus. This method of communication is used by the module to communicate with the Front Control Module (FCM) and the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN). The module also communicates with the alarm siren over a dedicated serial bus circuit.

The intrusion module microprocessor continuously monitors inputs from the intrusion sensor transmitter and receiver as well as inputs from the EMIC and the alarm siren module. The module energizes the intrusion sensor transmitter, which transmits ultrasonic signals into the vehicle cabin through a transmit transducer, then monitors the current draw of the transmitter to detect problems with the transmitter and transmitter circuits. The module also energizes the intrusion sensor receiver, which listens to the ultrasonic signals through a receive transducer as they bounce off of objects in the vehicle interior, then monitors the current draw of the receiver for data signals and to detect problems with the receiver and receiver circuits. If an object is moving in the interior, a detection circuit in the module senses this movement through the modulation of the returning data signals from the receiver.

If movement is detected, the intrusion module sends an electronic message to the FCM over the CAN data bus to flash the exterior lighting and sends another message to the alarm siren module over the dedicated serial bus line to sound the siren. When the EMIC or FCM detect a breach in the perimeter protection through a door, liftgate, flip-up glass, or hood ajar switch input, they send an electronic message to the intrusion module and the module sends a message to the FCM to flash the exterior lighting and a message to the alarm siren module to sound the siren. The module also monitors message inputs from the alarm siren module for siren battery or siren input/output circuit tamper alerts, and siren battery condition alerts, then sets active and stored Diagnostic Trouble Codes (DTC) for any monitored system faults it detects. An active fault only remains for the current ignition switch cycle, while a stored fault causes a DTC to be stored in memory by the module. If a fault does not recur for 50 ignition cycles, the module will automatically erase the stored DTC.

The intrusion module receives battery voltage on a fused B(+) circuit through a fuse in the Junction Block (JB), and is grounded at all times through a hard wired remote ground point. These connections allow the module to remain operational, regardless of the ignition switch position.

The hard wired circuits of the intrusion module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the intrusion module or the electronic controls or communication between modules and other devices that provide some features of the VTA. The most reliable, efficient, and accurate means to diagnose the intrusion module or the electronic controls and communication related to intrusion module operation requires the use of a diagnostic scan tool. Refer

to the appropriate diagnostic information.

REMOVAL

REMOVAL

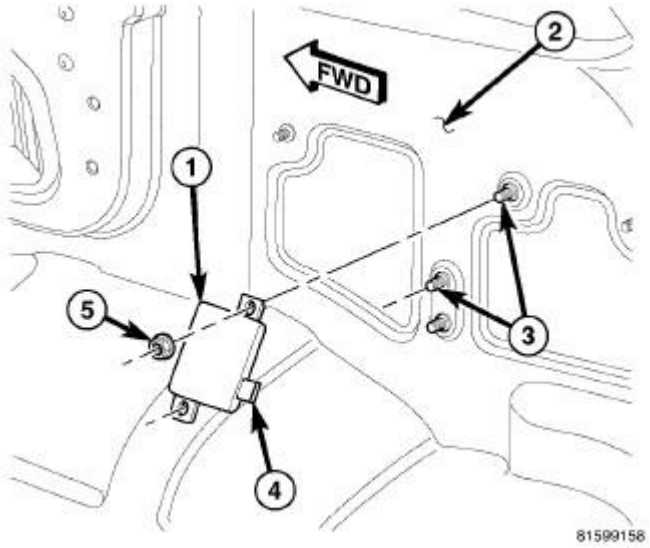

Fig. 3: Removing/Installing Intrusion Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trim from the inside of the right quarter inner panel (2). Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .
3. Disconnect the take out of the body wire harness from the connector receptacle (4) on the rearward side of the intrusion module (1).
4. Remove the two nuts (5) that secure the module to the studs (3) on the quarter inner panel.
5. Remove the module from the studs on the quarter inner panel.

INSTALLATION

INSTALLATION

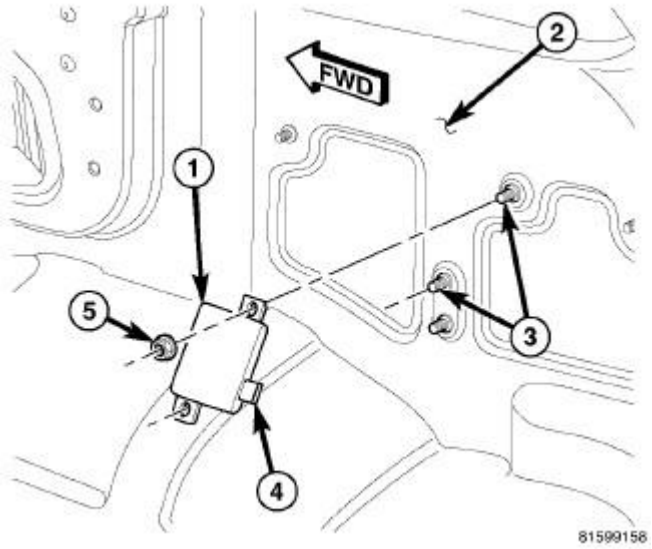

Fig. 4: Removing/Installing Intrusion Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the intrusion module (1) onto the two studs (3) on the right quarter inner panel (2).
2. Install and tighten the two nuts (5) that secure the module to the studs on the quarter inner panel. Tighten the nuts to 2 N.m (20 in. lbs.).
3. Reconnect the take out of the body wire harness to the connector receptacle (4) on the rearward side of the module.
4. Reinstall the trim onto the inside of the right quarter inner panel. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION** .
5. Reconnect the battery negative cable.

MODULE, SHAFT LOCK

DESCRIPTION

DESCRIPTION

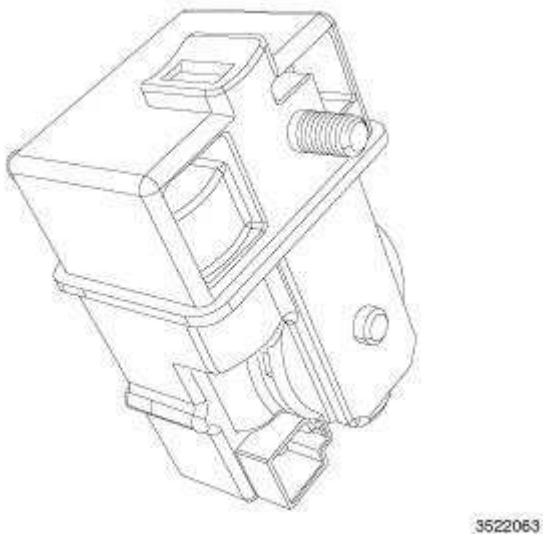

Fig. 5: Shaft Lock Module
Courtesy of CHRYSLER GROUP, LLC

A shaft lock module (1) is part of the premium version of the Sentry Key Immobilizer System (SKIS) in the Vehicle Theft Security System (VTSS). The premium version of the SKIS is only available in vehicles built for certain markets, where the additional features offered by this system are required. The shaft lock module is located in a bracket integral to the lower end of the steering column housing casting below the instrument panel. This unit is designed to work in conjunction with the Radio frequency Hub (RF-Hub), to control a locking bolt (2) that engages a machined slot in the steering shaft to prevent shaft rotation whenever the ignition is in the LOCK position. It can only be unlocked by the presence of a valid FOBIK in the vehicle and the Keyless Ignition Node (KIN) in the RUN/START position.

Concealed within the module is the electronic circuitry of the module, and a bi-directional electric motor that actuates the locking bolt. The module is connected to the vehicle electrical system through the instrument panel wire harness and the headliner harness.

The mounting provisions for the shaft lock module are designed to resist unauthorized tampering. The module cannot be removed from the steering column while the steering column is installed in the vehicle. The shaft lock module cannot be adjusted or repaired and, if ineffective or damaged, must be replaced. Whenever a shaft lock module is replaced the Radio Frequency Hub must also be replaced. To remove a shaft lock module. Refer to **MODULE, SHAFT LOCK, REMOVAL**.

OPERATION

OPERATION

The electronic circuitry within the shaft lock module contains all of the logic circuits and components to monitor and control the operation of the shaft locking bolt. The module uses a serial data bus for bi-directional communication with the Radio Frequency Hub (RF-Hub). If the module detects a problem with the positioning or operation of the locking bolt, it sends an error message to the RF-Hub. The RF-Hub then sets and stores a Diagnostic Trouble Code (DTC) and sends an electronic error

message over the Controller Area Network (CAN) data bus to other modules.

The shaft lock module continuously monitors inputs from the RF-Hub and energizes the electric motor to move the locking bolt to the locked or unlocked position based upon that input. If the RF-Hub indicates that the FOBIK present in the vehicle is invalid, the locking bolt remains in the locked position. When the RF-Hub indicates that a valid FOBIK is present in the vehicle and the Keyless Ignition Node (KIN) is in the On/Start position, the shaft lock module operates a motor to move the locking bolt to the unlocked position. However, to prevent inadvertent column locking due to a failure while the vehicle is being operated, the module cannot move the locking bolt from the unlocked position to the locked position as long as the KIN remains in the RUN/START position and other data from the RF-Hub.

The shaft lock module receives ground at all times through a hard wired remote ground point. The module receives battery voltage to operate and to move the locking bolt in the unlocked direction on a B(+) circuit, and receives battery voltage to operate the locking bolt in the locked direction only when the KIN is in the OFF position and other data from the RF-Hub allows it.

For added system security, the shaft lock module learns a unique Secret Key code from the RF-Hub over the serial data bus upon initialization. This code is stored in the memory of the module and cannot be changed. Therefore, if the RF-Hub requires service replacement, a new shaft lock module will also be required. Another security code, called a PIN, is used to gain access to the RF-Hub Secured Access Mode. The Secured Access Mode is required during service to initialize a new shaft lock module. Before replacing the shaft lock module or the RF-Hub see the "RF-Hub Replacement and Programming Order Guide" for the proper sequence. Refer to **STANDARD PROCEDURE** .

For the shaft Lock replacement procedure. Refer to **MODULE, SHAFT LOCK, REMOVAL**.

REMOVAL

MODULE UNLOCKED

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: If a NEW column lock module has been installed, a new Radio Frequency Hub (RF Hub) must also be installed.

NOTE: Before attempting service, the ignition key must be inside the vehicle near or on the center console for the entire length of the procedure.

NOTE: **Before disconnecting the battery, check that the steering wheel can rotate back and forth verifying the steering column is unlocked.**

NOTE: **When replacing any module(s) follow the "RF-Hub, BCM, PCM FOBik and ELV Replacement and Programming Order Guide" for replacement and programming order. Refer to STANDARD PROCEDURE .**

NOTE: **For additional information programming the ELV/ESCL. Refer to STANDARD PROCEDURE.**

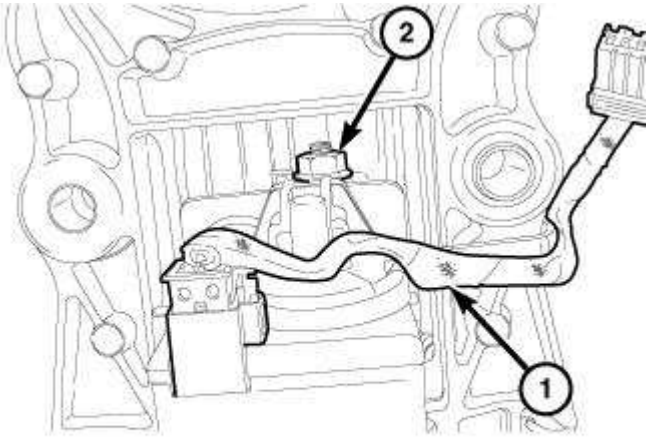

Fig. 6: Steering Column Lock Module Retainer & Steering Column Lock Module Jumper Harness
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the Intelligent Battery Sensor (IBS) from the battery.
2. Remove the steering column. Refer to **COLUMN, REMOVAL** .
3. Remove the steering column lock module retainer (2).
4. Disconnect the steering column lock module jumper harness (1) from the steering column lock module.

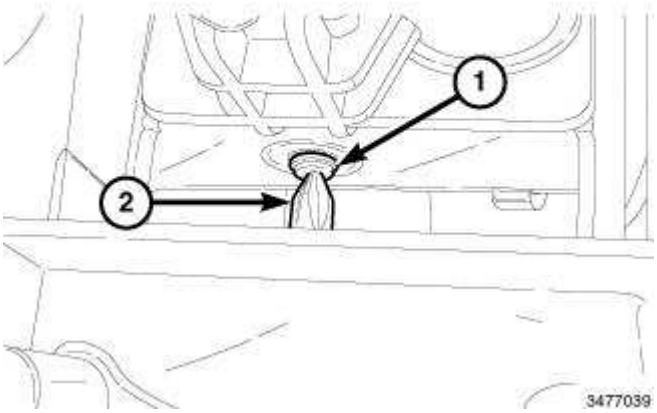

Fig. 7: Screw Driver & Threaded Stud
Courtesy of CHRYSLER GROUP, LLC

5. Using a pocket screw driver (2) or equivalent, push in the threaded stud (1) and remove the steering column lock module.

MODULE LOCKED

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: Before starting this procedure refer to the MODULE/PROGRAMMING ORDER REPLACEMENT GUIDE chart for the correct order in which to replace and program the modules. Refer to STANDARD PROCEDURE .

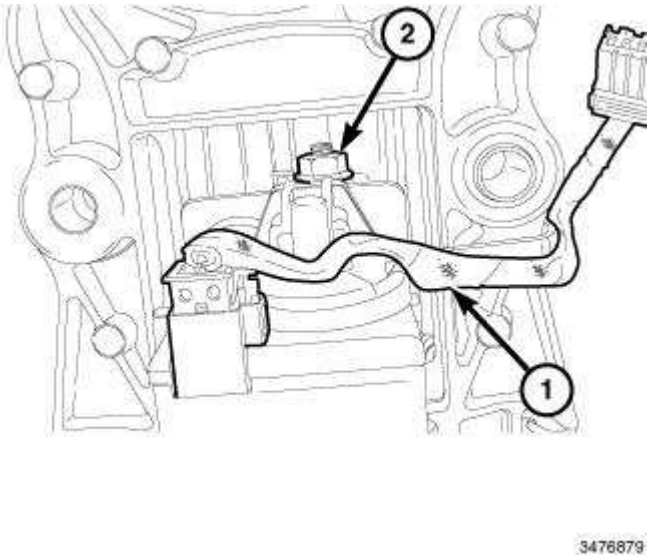

Fig. 8: Steering Column Lock Module Retainer & Steering Column Lock Module Jumper Harness
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the steering column. Refer to **COLUMN, REMOVAL** .
3. Remove the steering column lock module retainer (2).
4. Remove the steering column lock module jumper harness (1).

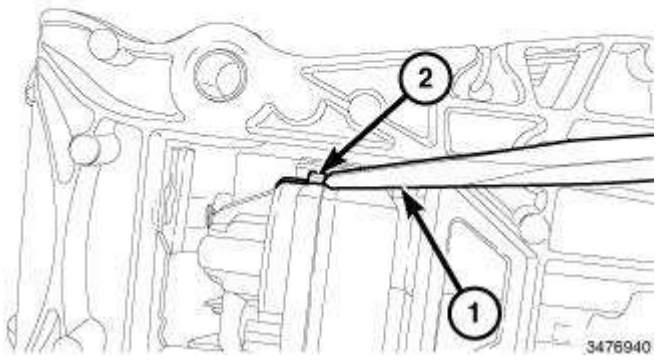

Fig. 9: Cold Chisel & Access Door
Courtesy of CHRYSLER GROUP, LLC

NOTE: When knocking the access door off it is important that you are parallel to the module to prevent damage to the internal gears.

5. Using a cold chisel (1) or equivalent knock the access door (2) off of the steering column lock module.

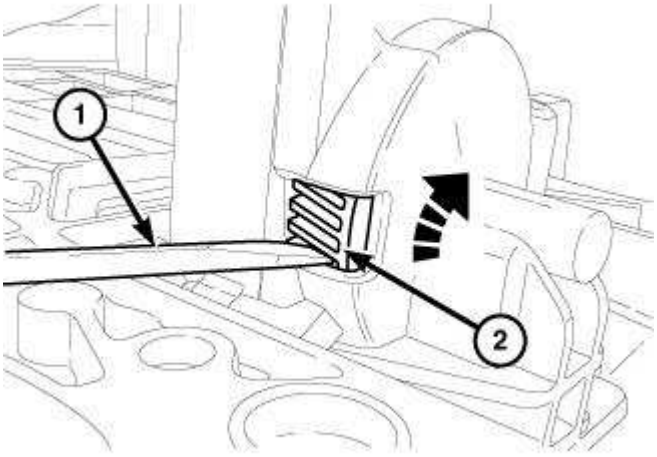

Fig. 10: Screw Driver & Rotate The Gear
Courtesy of CHRYSLER GROUP, LLC

NOTE: Rotate the gear until it stops.

6. Using a pocket screw driver (1) or equivalent rotate the gear (2) away from the steering column to unlock the module.

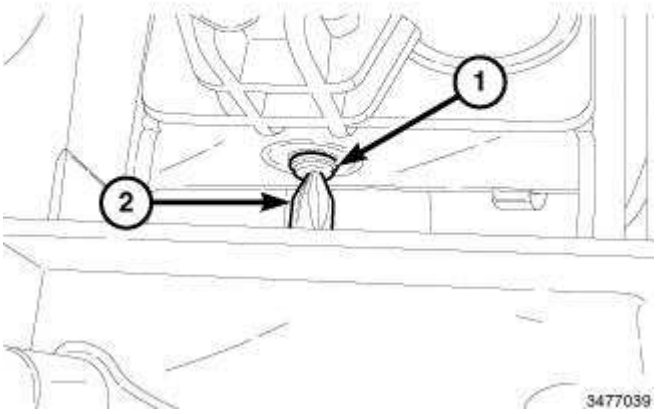

Fig. 11: Screw Driver & Threaded Stud
Courtesy of CHRYSLER GROUP, LLC

7. Using a pocket screw driver (2) or equivalent push in the threaded stud (1).

8. Remove the steering column lock module.

INSTALLATION

INSTALLATION

NOTE: Before attempting service, the ignition key must be inside the vehicle near or on the center console for the entire length of the procedure.

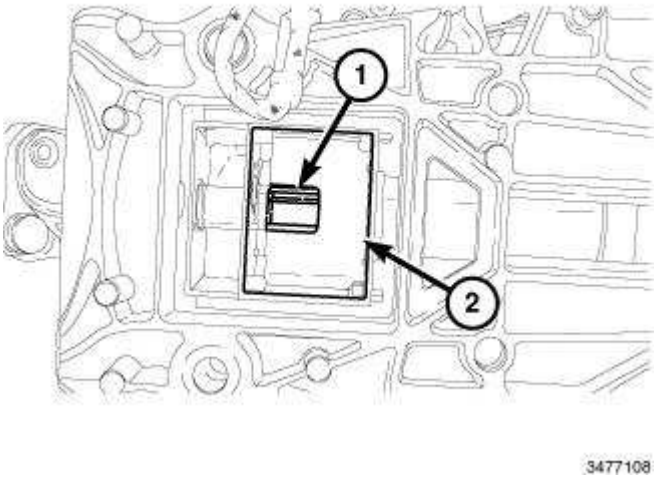

Fig. 12: Module Area & Column Lock Shaft Area
Courtesy of CHRYSLER GROUP, LLC

1. Check and remove any debris found the column lock shaft area (1).
2. Check the rest of the module area (2) for debris that will prevent the column lock module from function properly.
3. Push in the threaded stud on the steering column lock module and install the steering column lock module into the steering column.

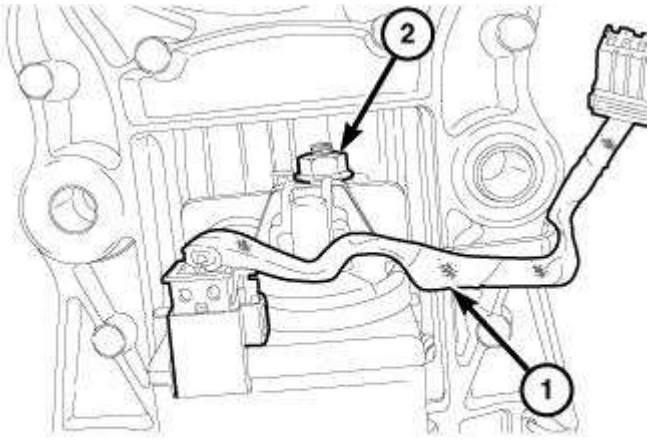

Fig. 13: Steering Column Lock Module Retainer & Steering Column Lock Module Jumper Harness
Courtesy of CHRYSLER GROUP, LLC

4. Install the steering column lock module jumper harness (1).
5. Install the steering column lock module retainer (2).

   Tighten to 6 N.m (53 in. lbs.).

6. Install the steering column. Refer to **COLUMN, INSTALLATION** .
7. Connect the negative battery cable/IBS to the battery.

NOTE: If a NEW column lock module has been installed, a new Radio Frequency Hub (RF Hub) must also be installed.

NOTE: Program the modules as described in the "RF-Hub, BCM, PCM FOBik and ELV Replacement and Programming Order Guide". Refer to STANDARD PROCEDURE .

NOTE: For additional information programming the ELV/ESCL. Refer to STANDARD PROCEDURE.

SENSOR, INTRUSION MODULE

DESCRIPTION

DESCRIPTION

The Intrusion Module, sometimes referred to as Intrusion Transceiver Module (ITM), is used on some export vehicles only. Its function is to sense any interior movement while the vehicle is parked and

secured. Besides having two exterior sensors it also has an internal sensor that senses the tilt and motion of the sensor itself. This protects against tire theft and tow away. When interior movement or module motion is detected, it will trip the Vehicle Theft Alarm (VTA) and sound the equipped siren. When tripped it will also send a CAN Bus message to the Body Control Module and the Radio Frequency Hub to actuate their respective actions such as flash the lamps and immobilize the engine etc.

The Intrusion Module is mounted in the headliner near the 2nd row overhead lamp assembly. There is one sensor in the snap plate of the second row lamp assembly, and one sensor in the snap plate of the third row lamp assembly. The sensor harness is glued to the underside of the headliner.

REMOVAL

REMOVAL

SECOND ROW INTRUSION SENSOR

1. The second row intrusion sensor is attached to the second row overhead lamp assembly and is available separately.
2. Remove the Intrusion Module. Refer to **MODULE, INTRUSION, REMOVAL**.
3. Disconnect and remove the intrusion sensor.

THIRD ROW INTRUSION SENSOR

1. Disconnect the negative battery cable.
2. Remove the third row dome lamp assembly.
3. Disconnect the intrusion sensor.
4. Remove intrusion sensor from the dome lamp bezel.

INSTALLATION

INSTALLATION

SECOND ROW INTRUSION SENSOR

The second row intrusion sensor is in the snap plate of the second row lamp assembly. Refer to **MODULE, INTRUSION, INSTALLATION**.

THIRD ROW INTRUSION SENSOR

1. Install the intrusion sensor into the dome lamp assembly.
2. Connect the intrusion sensor.
3. Install the third row dome lamp.
4. Connect the negative battery cable.

SENSOR HARNESS

1. Lower the headliner to gain access to the sensor harness which is glued to the top of the headliner. Refer to **HEADLINER, REMOVAL** .
2. Overlay the new harness near the old one and secure it with tape.
3. Cut off the old connectors but leave the old harness. It is safer to leave it because removing it may damage the headliner.
4. Raise the headliner as necessary to install and connect the sensors.
5. Finish installing the headliner. Refer to **HEADLINER, INSTALLATION** .

SIREN

REMOVAL

REMOVAL

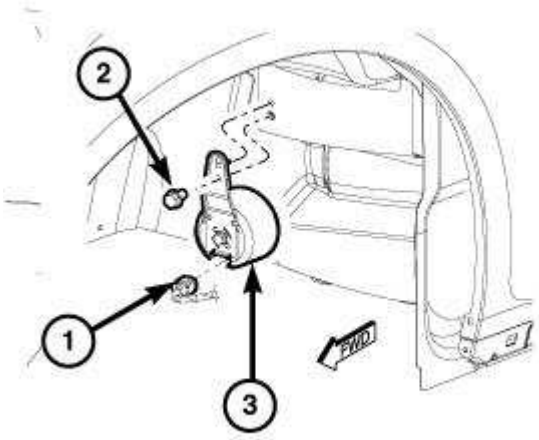

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Fig. 14: Siren Electrical Connector & Siren Mounting Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the left front splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
3. Disconnect the siren electrical connector (1).
4. Remove the siren mounting retainer (2).
5. Remove the siren from the vehicle.

INSTALLATION

INSTALLATION

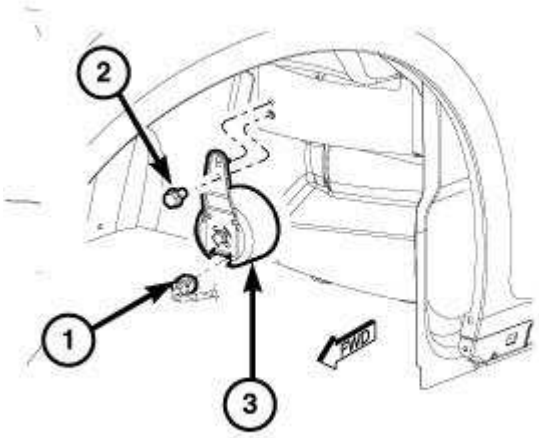

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Fig. 15: Siren Electrical Connector & Siren Mounting Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Position the siren (3) to the vehicle.
2. Install the siren mounting retainer (2).
3. Connect the siren electrical connector (1).
4. Install the left front splash shield Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
5. Connect the negative battery cable.

SUSPENSION

CHRYSLER WHEEL ALIGNMENT SPECIFICATIONS

WHEEL ALIGNMENT SPECIFICATIONS

200

200 2.4L WITH 62TE

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	2	3	4
Right Front Caster (°)	2	3	4
Left Front Camber (°)	-1.17	-0.62	-0.07
Right Front Camber (°)	-1.17	-0.62	-0.07
Front Toe (°)	-0.1	0.2	0.5
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-1.43	-0.78	-0.13
Right Rear Camber (°)	-1.43	-0.78	-0.13
Rear Toe (°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

200 All Except 2.4 with 62TE

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	2	3	4
Right Front Caster (°)	2	3	4
Left Front Camber (°)	-1.17	-0.62	-0.07
Right Front Camber (°)	-1.17	-0.62	-0.07
Front Toe (°)	-0.1	0.2	0.5
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-1.43	-0.78	-0.13
Right Rear Camber (°)	-1.43	-0.78	-0.13
Rear Toe (°)	-0.1	0.2	0.5

Thrust Angle	0.15	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

300 C

300 C All Wheel Drive

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	4.4	5.4	6.4
Right Front Caster (°)	4.4	5.4	6.4
Left Front Camber (°)	-0.55	0	0.55
Right Front Camber (°)	-0.95	-0.4	0.15
Front Toe (°)	-0.1	0.1	0.3
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-1.3	-0.75	-0.2
Right Rear Camber (°)	-1.3	-0.75	-0.2
Rear Toe (°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

300 C Rear Wheel Drive Non SRT-8 With 17" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	7	8	9
Right Front Caster (°)	7.7	8.7	9.7
Left Front Camber (°)	-1.4	-0.85	-0.3
Right Front Camber (°)	-1.8	-1.25	-0.7
Front Toe (°)	0	0.2	0.4

Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-2.3	-1.75	-1.2
Right Rear Camber (°)	-2.3	-1.75	-1.2
Rear Toe (°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

300 C Rear Wheel Drive Non SRT-8 With 18" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	7	8	9
Right Front Caster (°)	7.7	8.7	9.7
Left Front Camber (°)	-1.4	-0.85	-0.3
Right Front Camber (°)	-1.8	-1.25	-0.7
Front Toe (°)	0	0.2	0.4
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-2.3	-1.75	-1.2
Right Rear Camber (°)	-2.3	-1.75	-1.2
Rear Toe (°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

300 C Rear Wheel Drive Non SRT-8 With 20" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	7	8	9
Right Front Caster (°)	7.7	8.7	9.7

Left Front Camber (°)	-1.4	-0.85	-0.3
Right Front Camber (°)	-1.8	-1.25	-0.7
Front Toe (°)	0	0.2	0.4
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-2.3	-1.75	-1.2
Right Rear Camber (°)	-2.3	-1.75	-1.2
Rear Toe (°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

300 C SRT-8

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	7.3	8.3	9.3
Right Front Caster (°)	8	9	10
Left Front Camber (°)	-1.6	-1.05	-0.5
Right Front Camber (°)	-1.9	-1.35	-0.8
Front Toe (°)	0	0.2	0.4
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-1.3	-0.75	-0.2
Right Rear Camber (°)	-1.3	-0.75	-0.2
Rear Toe (°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

TOWN & COUNTRY

TOWN & COUNTRY All With 16" Wheels FWD

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	1.5	2.5	3.5
Right Front Caster (°)	1.5	2.5	3.5
Left Front Camber (°)	-0.5	-0.1	0.3
Right Front Camber (°)	-0.8	-0.4	0
Front Toe (°)	0.06	0.26	0.46
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-0.36	-0.06	0.34
Right Rear Camber (°)	-0.36	-0.06	0.34
Rear Toe (°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0
Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

TOWN & COUNTRY All With 17" Wheels FWD

Measurement	Minimum	Preferred	Maximum
Left Front Caster (°)	1.5	2.5	3.5
Right Front Caster (°)	1.5	2.5	3.5
Left Front Camber (°)	-0.5	-0.1	0.3
Right Front Camber (°)	-0.8	-0.4	0
Front Toe (°)	0.06	0.26	0.46
Left SAI (°)	0	0	0
Right SAI (°)	0	0	0
Left Rear Camber (°)	-0.36	-0.06	0.34
Right Rear Camber (°)	-0.36	-0.06	0.34
Rear Toe (°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (°)	0	0	0
Right Toe Out, Inward (°)	0	0	0
Left Toe Out, Outward (°)	0	0	0
Right Toe Out, Outward (°)	0	0	0
Left Max Turn, Inward (°)	0	0	0
Right Max Turn, Inward (°)	0	0	0

Left Max Turn, Outward (°)	0	0	0
Right Max Turn, Outward (°)	0	-	-

ACCESSORIES AND EQUIPMENT

Power Windows - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

The power window system allows each of the door windows to be raised and lowered electrically by actuating a switch on the trim panel of each respective door. A master switch on the driver side front door trim panel allows the driver to raise or lower each of the passenger door windows and to lock out the individual switches on the passenger doors from operation. The power window system receives battery feed through a circuit breaker, only when the ignition switch is in the On position.

The power window system includes the power window switches on each door trim panel, the circuit breaker, and the power window motors inside each door. The power switches are all similar in design and function with exception of the drivers side power switch module however, they are all serviced in the same manner. The power motors are similar as well and can be serviced separately from the window regulators.

OPERATION

OPERATION

POWER WINDOW SWITCH

The power windows are controlled by a window/lock switch on the trim panel of each front door. Switches in the driver door window/lock switch allows the driver to control the passenger windows.

The power window switch for the driver side front door window has a second detent position beyond the normal Down position that provides an automatic one-touch window down feature. This feature is controlled by the window/lock switch.

The power window switches control the battery and ground feeds to the power window motors. All of the passenger door power window switches receive their battery and ground feeds through the circuitry of the window/lock switch. When the power window lockout switch is in the Lock position, the battery feed for the individual passenger door power window switches is interrupted.

POWER WINDOW MOTOR

A permanent magnet reversible motor moves the window regulator through an integral gearbox mechanism. A positive and negative battery connection to the two motor terminals will cause the motor to rotate in one direction. Reversing the current through these same two connections will cause the motor to rotate in the opposite direction.

In addition, each power window motor is equipped with an integral self-resetting circuit breaker to protect the motor from overloads. The power window motor and gearbox assembly cannot be

adjusted or repaired. If damaged or ineffective, the entire unit must be replaced.

EXPRESS DOWN WINDOW FEATURE

This feature allows you to remotely lower both front door windows at the same time. To use this feature, press and release the UNLOCK button on the RKE transmitter and then immediately press and hold the UNLOCK button until the windows lower to the desired level or until they lower completely.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER WINDOWS

For complete circuit diagrams, refer to the appropriate wiring information.

ALL WINDOWS INOPERATIVE

1. Check the circuit breaker. If OK, go to 2. If not OK, replace the inoperative circuit breaker.
2. Disconnect and isolate the battery negative cable. Remove the window/lock switch from the driver side front door trim panel. Unplug the wire harness connector.
3. Check for continuity between the ground circuit cavity of the door module wire harness connector and a good ground. If OK, go to 4. If not OK, repair the circuit to ground as required.
4. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity of the window/lock switch wire harness connector. If OK, refer to **SWITCH, LOCK, DIAGNOSIS AND TESTING** . If not OK, repair the circuit as required.

ONE WINDOW INOPERATIVE

The window glass must be free to slide up and down for the power window motor to function properly. If the glass is not free to move up and down, the motor will overload and trip the integral circuit breaker. To determine if the glass is free, disconnect the regulator from the glass. Then slide the window up and down by hand.

There is an alternate method to check if the glass is free. Position the glass between the up and down stops. Then, shake the glass in the door. Check that the glass can be moved slightly from side to side, front to rear, and up and down. Then check that the glass is not bound tight in the tracks. If the glass is free, proceed with the diagnosis that follows. If the glass is not free, determine the cause of the condition.

If the only inoperative window is in the driver or passenger side front door and the preceding checks have not identified a problem. Refer to **MOTOR, WINDOW REGULATOR, DIAGNOSIS AND TESTING**. If the problem being diagnosed involves only the Auto-down feature for the driver side front door window, but all of the power windows are operational, replace the driver's side window/lock switch. For diagnosis of the window/lock switch. Refer to **SWITCH, LOCK, DIAGNOSIS AND TESTING** . For a rear power window problem proceed with the following:

1. Disconnect and isolate the battery negative cable. Unplug the wire harness connector from the power window switch unit on the door with the inoperative power window. Check for continuity between the ground circuit cavity of the power window switch wire harness connector and a good ground. There should be continuity. If OK, go to 2. If not OK, repair the open circuit to the power window and door lock master switch as required.
2. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity in the body half of the power window switch unit wire harness connector. If OK, go to 3. If not OK, repair the open circuit to the power window and door lock master switch as required.
3. Test the power window switch continuity. Refer to **SWITCH, POWER WINDOW, DIAGNOSIS AND TESTING**. If OK, go to 4. If not OK, replace the power window switch.
4. Check the continuity in each circuit between the inoperative power window switch wire harness connector cavities and the corresponding power window motor wire harness connector cavities. If OK, refer to **MOTOR, WINDOW REGULATOR, DIAGNOSIS AND TESTING**. If not OK, repair the open circuit(s) as required.

NOTE: All passenger door power window switches receive their battery and ground feed for operating the passenger door power window motors through the driver side power window and lock master switch and wire harness connector.

STANDARD PROCEDURE

STANDARD PROCEDURE -

CLEAR/RELEARN

NOTE: The battery must be fully charged or the vehicle running for proper calibration of the front door module.

NOTE: The following procedure must be performed anytime the power window system has been serviced in either front door or, there is a possible concern with a door module calibration.

Express-up / Express-down possible concerns.

- Glass will not lower all the way down flush to the belt-line.
- Glass will not raise fully; wind noise / water leak.
- Glass will not raise automatically (Expess-up) after lifting the switch to the second detent and releasing.

To clear/denormalize the door module memory, perform the following procedure:

CLEAR/DENORMALIZE

CLEAR/DENORMALIZE

1. Check and repair any door module Diagnostic Trouble Code (DTC) (s) before proceeding.
2. Using a scan tool, under the miscellaneous functions menu select (Denormalize Window/Reset ECU), and follow the directions to clear/denormalize the door module memory.

To relearn/normalize the door module memory, perform the following procedure:

MOTOR, WINDOW REGULATOR

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WINDOW MOTOR

For complete circuit diagrams, refer to the appropriate wiring information.

1. Disconnect and isolate the battery negative cable. Remove the trim panel from the door with the inoperative power window.
2. Unplug the power window motor wire harness connector. Apply 12 volts across the motor terminals to check its operation in one direction. Reverse the connections across the motor terminals to check the operation in the other direction. If the window is in the full up or full down position, the motor will not operate in that direction by design. If OK, repair the circuits from the power window motor to the power window switch as required. If not OK, replace the inoperative motor.
3. If the motor operates in both directions, check the operation of the window glass and lift mechanism through its complete up and down travel. There should be no binding or sticking of the window glass or lift mechanism through the entire travel range. If not OK, check the window glass, tracks, and regulator for sticking, binding, or improper adjustment.

REMOVAL

REMOVAL

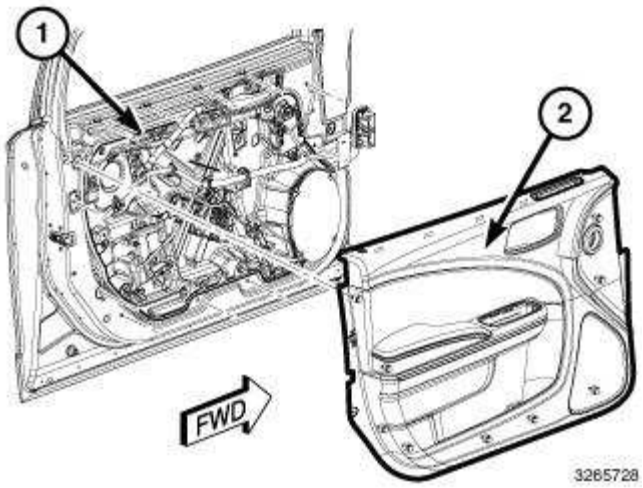

Fig. 1: Motor And Gear Assembly & Interior Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Partially raise or lower the door glass to relieve tension on motor and cables where possible. Secure the glass as necessary.
2. Disconnect and isolate the negative battery cable.
3. Remove the door interior trim panel (2). Refer to **PANEL, DOOR TRIM, REMOVAL** or **PANEL, REAR DOOR TRIM, INSTALLATION** for the appropriate procedure.

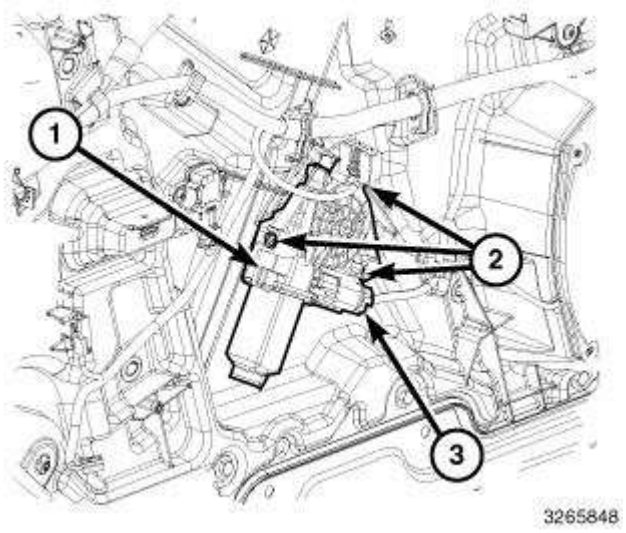

Fig. 2: Window Motor
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the power window motor electrical connector (3) from the motor electrical connector receptacle.
5. Remove the three fasteners (2) that secure the power window motor and gear assembly (1) to the carrier plate.

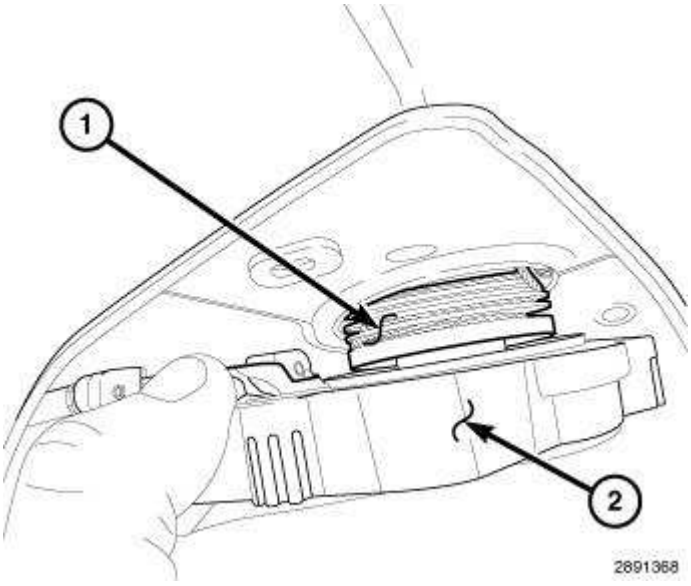

Fig. 3: Identifying Cable Drive And Motor
Courtesy of CHRYSLER GROUP, LLC

6. Using a suitable flat bladed tool, lightly pry the cable drive (1) away from the motor (2) and remove the motor and gear assembly.

INSTALLATION

INSTALLATION

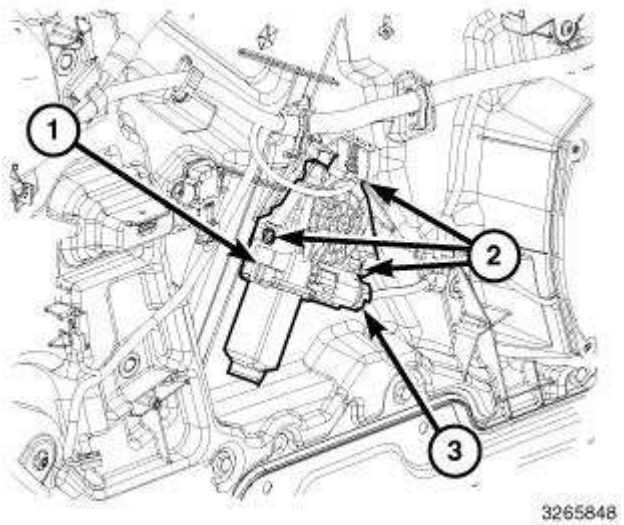

Fig. 4: Window Motor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The power window motor may need to actuated momentarily to line up the gear in the drive assembly with the regulator.

1. Connect the power window motor electrical connector (3) to the motor electrical connector receptacle.
2. Position the power window motor and gear assembly (1) on the carrier plate, aligning the drive gear with the regulator.
3. If necessary, temporarily connect the window switch assembly and battery to actuate the motor.
4. Install and tighten the three fasteners (2) that secure the power window motor and gear assembly to the carrier plate.

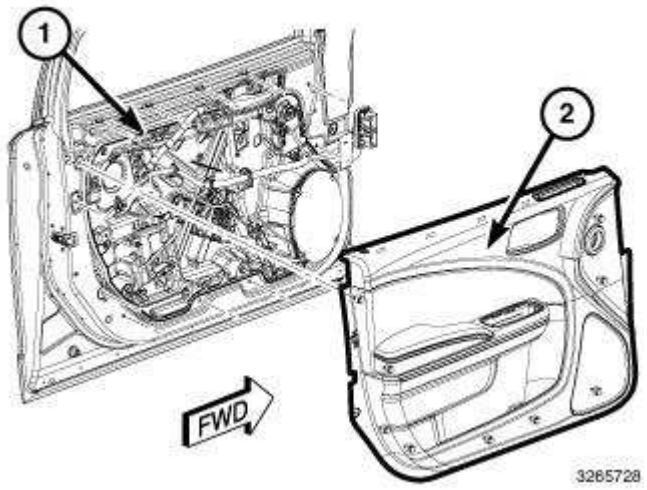

Fig. 5: Motor And Gear Assembly & Interior Trim Panel
Courtesy of CHRYSLER GROUP, LLC

5. Reinstall the door interior trim panel (2), refer to **PANEL, DOOR TRIM, INSTALLATION** or **PANEL, REAR DOOR TRIM, INSTALLATION** for the appropriate procedure.
6. Connect the negative battery cable.
7. Perform the Clear/Relearn procedure. Refer to **STANDARD PROCEDURE**.

SWITCH, POWER WINDOW

DESCRIPTION

DESCRIPTION

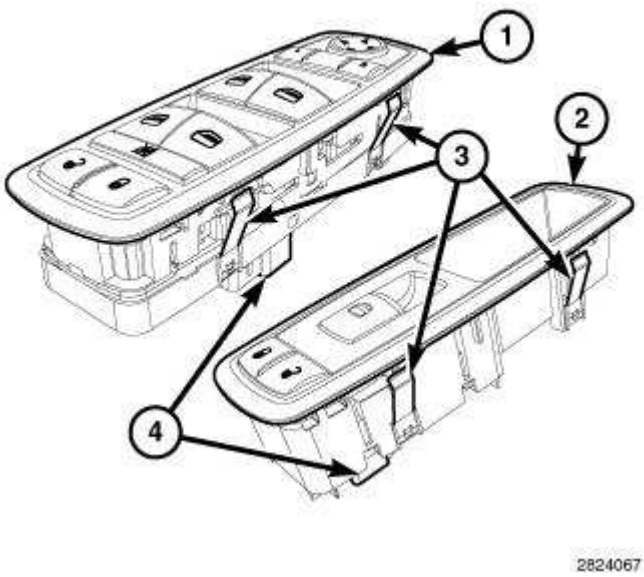

Fig. 6: Driver Side Module, Passenger Side Module, Four Spring Clip Retainers & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

A front door power switch module and bezel unit is located near the forward end of the arm rest of each front door trim panel. Two different modules are used: a driver side module (1), and a passenger side module (2). Each switch button in both modules is identified with either an International Control and Display Symbol icon or text that clearly identifies the switch function, and each switch button has a Light Emitting Diode (LED) unit soldered to the switch circuit board that provides back lighting of the icon or text for night visibility.

Each switch module housing is secured within the trim panel armrest by four spring clip retainers (3), two on each side of the switch module housing. The passenger side switch module includes a small cubby bin. A connector receptacle (4) integral to the switch module housing connect the switches to the vehicle electrical system through dedicated take outs and connectors of the door wire harness.

The front door power switch modules include the following switches:

- **Power Lock Switch** - A momentary switch button to control the **Lock** function of the power lock system.
- **Power Unlock Switch** - A momentary switch button to control the **Unlock** function of the power lock system.
- **Power Mirror Selector Switch (Driver Side Switch Only)** - Three mirror selector switch buttons choose the power mirror to be adjusted, **R** (right), **L** (left) or a power fold position (both mirrors).
- **Power Mirror Direction Control Switch (Driver Side Switch Only)** - After a power mirror is selected, pressing down on one of the arrows on the momentary mirror direction switch will move the selected mirror in that direction for as long as it is held down until the limit of the mirror

travel is reached.

- **Power Window Lockout Switch (Driver Side Switch Only)** - A latching push-button power window lockout switch allows the vehicle operator to lock out the power window switches on each front and rear passenger door so that those windows may be operated only from the driver side front door master switches. When the lockout switch is engaged, the LED back lighting for each front and rear passenger door power window switch is extinguished.
- **Power Window Switches** - A single two-way, momentary power window switch with a push-to-open and a lift-to-close tab is provide for each passenger door window while the driver side switch module contains four of these power window switches, one switch dedicated to each door window. The switch tab for the driver side front door power window has a second detent in the down direction which is used to activate the **Auto-Down** (also known as express down or one-touch down) feature. A second detent in the up direction on both front door power window switches activates the **Express-Up** feature.

The front door power switch modules cannot be adjusted or repaired. If damaged or ineffective, the entire driver side or passenger side front door switch module must be replaced as a unit.

OPERATION

OPERATION

The driver side front door power switch module combines a power lock switch, a power window switch for each of the four door windows including auto-down (also known as one-touch down or express down) and express up features for both front door windows, a power window lockout switch, a power mirror selector switch, and a power mirror adjustment switch in a single unit. The passenger side power door switch module combines a power lock switch and a passenger side front door power window switch with the auto-down and express up features.

The driver side front door power switch module provides resistor multiplexed outputs to the driver door module indicating the power lock switch selection, hard wired analog outputs indicating the power mirror selector switch and adjustment switch selections, and electronic message outputs over a Local Interface Network (LIN) data bus connection indicating the power window switch selections. The passenger side front door power switch module provides resistor multiplexed outputs to the passenger door module indicating both the power lock and power window switch selections.

The hard-wired circuits between the driver side front door power switch module and the driver side door module or the rear door power window switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between the switch module and the door module or in the diagnosis of the electronic controls and communication between other modules and the door module that provide some features of the power lock, power mirror or power window systems. The most reliable, efficient, and accurate means to diagnose the driver side power switch module or the electronic controls and communication related to power lock, power mirror or power window system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

The hard-wired circuits between the passenger side front door power switch module and the

passenger side door module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and the door module that provide some features of the power lock or power window systems. The most reliable, efficient, and accurate means to diagnose the power switch module or the electronic controls and communication related to power lock or power window system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER WINDOW SWITCH

The front door power window switches are included in the window/lock switch . Refer to **SWITCH, LOCK, DIAGNOSIS AND TESTING** .

The Light-Emitting Diode (LED) illumination lamps for all of the power window switches receive battery current through the power window circuit breaker in the junction block. If all of the LEDs are inoperative in the power window switch and the power windows are inoperative. Refer to **DIAGNOSIS AND TESTING** . If the power windows operate, but any or all of the LEDs are inoperative, the power window and lock switch units with the inoperative LED(s) must be replaced. For complete circuit diagrams, refer to the appropriate wiring information.

REMOVAL

REMOVAL

FRONT SWITCH MODULE

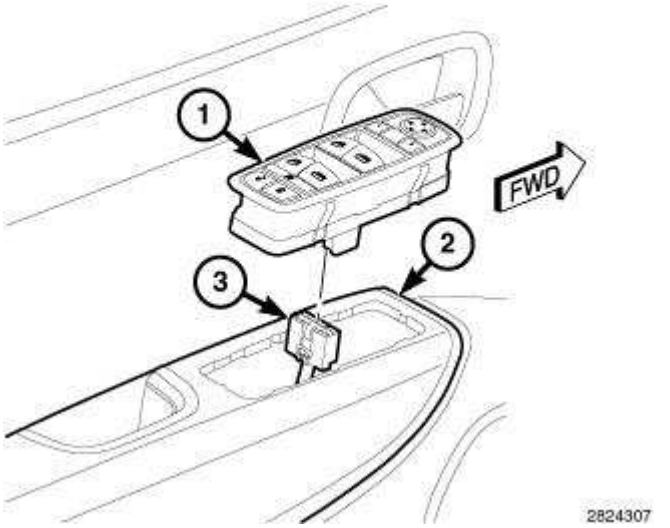

Fig. 7: Switch Module, Arm Rest & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable wide flat-bladed tool, pry the bezel of the front door switch module (1) up and away from the front door trim panel arm rest (2) far enough to disengage the four spring steel retainers of the switch from the arm rest opening.
3. Pull the switch module away from the mounting hold of the arm rest far enough to access and disconnect the door wire harness connector (3) from the switch connector receptacle.
4. Remove the switch module from the vehicle.

REAR SWITCH ASSEMBLY

NOTE: The passenger rear window switches for this vehicle are serviced in the same manner as the front switch module.

1. Refer to1.

INSTALLATION

INSTALLATION

FRONT SWITCH MODULE

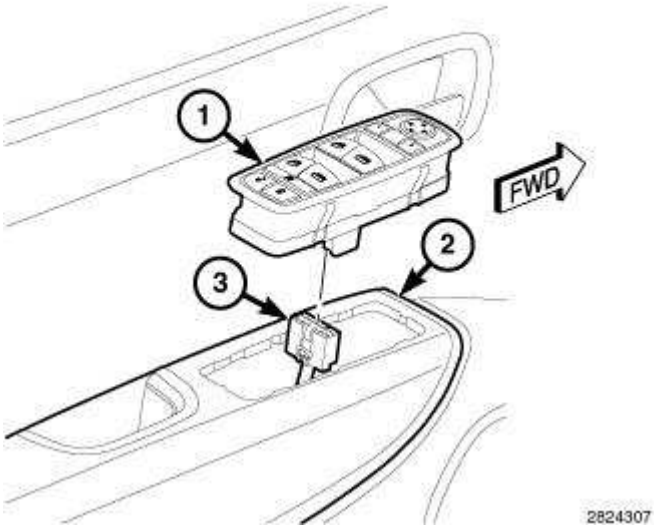

Fig. 8: Switch Module, Arm Rest & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the front door switch module (1) close enough to the mounting hole in the arm rest (2) of the front door trim panel to access and reconnect the front door wire harness connector (3) to the switch connector receptacle.
2. Align the switch module to the arm rest mounting hole.

3. Using hand pressure, press the switch module firmly and evenly into the mounting hole until the four spring steel retainers of the switch are fully engaged and the switch bezel is fully seated against the arm rest.
4. Connect the battery negative cable.

REAR SWITCH ASSEMBLY

NOTE: The passenger rear window switches for this vehicle are serviced in the same manner as the front switch module.

1. Refer to1.

ACCESSORIES AND EQUIPMENT

Wiper System & Washer System - Service Information - Chrysler 300

DESCRIPTION

DESCRIPTION

An electrically operated intermittent wiper and washer system is standard factory-installed safety equipment on this vehicle. The wiper and washer system includes the following major components, which are described in further detail elsewhere in this service information:

- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located beneath the instrument panel on the passenger side of the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Light Rain Sensor Module** - A Light Rain Sensor Module (LRSM) (also known as the Light Sensor Module/LSM or the Rain Sensor Module/RSM) is used on vehicles equipped with the optional automatic wiper feature. The LRSM is located on a bracket bonded to the inside surface of the windshield glass, near the inside rear view mirror mount.
- **Multi-Function Switch** - The multi-function switch is integral to the Steering Column Control Module (SCCM) along with the clockspring and the Steering Control Module (SCM) on the top of the steering column just below the steering wheel. The multi-function switch is connected to the SCM. Only the switch control stalk extending from the left side of the steering column is visible, while the remainder of the switch is concealed beneath the steering column shrouds. The multi-function switch provides all of the driver controls for the wiper and washer systems.
- **Steering Control Module** - The Steering Control Module (SCM) is integral to the Steering Column Control Module (SCCM) along with the multi-function switch and the clockspring on the top of the steering column just below the steering wheel. The SCM is completely concealed beneath the steering column shrouds. Refer to **MODULE, STEERING COLUMN, DESCRIPTION** .
- **Washer Fluid Level Switch** - The washer fluid level switch is located in a dedicated hole on the lower, outboard side of the washer reservoir, ahead of the right front wheel house splash shield.
- **Washer Nozzle** - Two fluidic washer nozzles with integral check valves are secured by latch features to dedicated openings in the hood panel near the base of the windshield.
- **Washer Plumbing** - The plumbing for the washer system consists of rubber hoses, hard plastic tubes and molded rubber or plastic fittings. The plumbing is routed to the dash panel from the washer reservoir along the outboard side of the right front load beam. The washer hose is routed along the right hood hinge to the hood, then across the underside of the hood panel to the washer nozzles.
- **Washer Pump/Motor** - The electric washer pump/motor unit is located in a dedicated hole in a sump area on the lower, outboard side of the washer reservoir, ahead of the right front wheel house splash shield.
- **Washer Reservoir** - The washer reservoir is concealed between the right inner fender shield and the right outer fender panel, ahead of the right front wheel house splash shield. The filler neck and cap are the only visible components of the reservoir and, can be easily accessed from

the right front corner of the engine compartment.

- **Wiper Arms And Blades** - The two wiper arms are secured with nuts to the threaded ends of the two wiper pivot shafts, which extend through the cowl plenum cover/grille panel located near the base of the windshield. The two wiper blades are each secured to their wiper arm with an integral latch, and are parked on the glass near the bottom of the windshield when the wiper system is not in operation. The left and right wiper arms and wiper blades are unique and are not interchangeable.
- **Wiper Module** - The wiper pivot shafts are the only visible components of the wiper module. The remainder of the module is concealed beneath the cowl plenum cover/grille panel. The wiper module includes the wiper module bracket, three rubber-isolated wiper module mounts, the wiper motor, the wiper motor crank arm, the two wiper drive links and the two wiper pivots.

Hard wired circuitry connects the wiper and washer system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the wiper and washer system components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

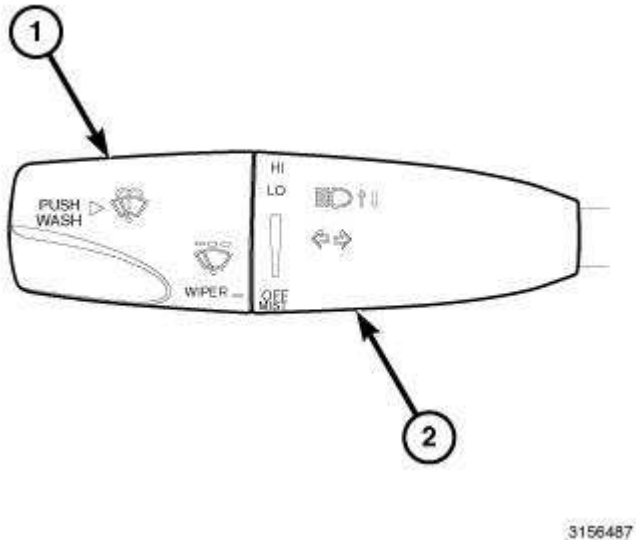

Fig. 1: Control Knob & Control Stalk
Courtesy of CHRYSLER GROUP, LLC

The wiper and washer system is designed to provide the vehicle operator with a convenient, safe and reliable means of maintaining visibility through the windshield glass. The various components of this

system are designed to convert electrical energy produced by the vehicle electrical system into the mechanical action of the wiper blades to wipe the outside surface of the glass, as well as into the hydraulic action of the washer system to apply washer fluid stored in an on-board reservoir to the area of the glass to be wiped. When combined, these components provide the means to effectively maintain clear visibility for the vehicle operator by removing excess accumulations of rain, snow, bugs, mud or other minor debris from the outer surface of the windshield glass that might be encountered while driving the vehicle under numerous types of inclement operating conditions.

The vehicle operator initiates all wiper and washer system functions with the control knob (1) on the control stalk (2) of the multi-function switch that extends from the left side of the steering column, just below the steering wheel. Rotating the control knob on the end of the control stalk, selects the OFF, DELAY (except with the optional automatic wiper system), AUTO (with the optional automatic wiper system only), LOW or HIGH wiper system operating modes. In the DELAY mode, the control knob also allows the vehicle operator to select from one of four intermittent wipe DELAY intervals. In the AUTO mode, the control knob allows the vehicle operator to select from one of four automatic wiper sensitivity levels.

Depressing the control knob towards the steering column actuates the momentary washer system switch, which selects the WASH and WIPE-AFTER-WASH modes depending upon when and how long the switch is held closed. Rotating the control knob downward actuates another momentary switch and selects the MIST mode, which cycles the wiper blades for as long as the switch is held closed then completes the current cycle and parks the blades at the base of the windshield after the control knob is released.

The multi-function switch provides hard wired analog and resistor multiplexed inputs to the Steering Control Module (SCM) internal to the Steering Column Control Module (SCCM) for all of the wiper and washer system functions. The SCM then sends electronic **wiper switch** and **washer switch** status messages to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus requesting the appropriate wiper and washer system operating modes.

Wiper and washer system operation is completely controlled by the SCM and BCM logic circuits, and that logic will only allow these systems to operate when the ignition switch is in the ACCESSORY or ON positions. The BCM uses intelligent, high current, self-protected high side switches to control integrated wiper relays that control wiper system operation by energizing or de-energizing the wiper motor low and high speed brushes. The multi-function switch circuitry receives battery current and a clean ground output from the SCM, then provides analog and multiplexed inputs to the SCM to indicate the selected wiper and washer system mode.

The hard wired circuits and components of the wiper and washer system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the wiper and washer system. The most reliable, efficient, and accurate means to diagnose the wiper and washer system or the electronic controls and communication related to wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

OPERATING MODES

Following are paragraphs that briefly describe the operation of each of the wiper and washer system operating modes.

AUTOMATIC WIPE MODE

If the vehicle is equipped with the optional automatic wiper system and it is enabled, when the control knob on the control stalk of the multi-function switch is moved to one of the four sensitivity positions, the SCM sends an electronic **wiper switch sensitivity** message to the BCM over the CAN data bus. The BCM, which is also a Local Interface Network (LIN) data bus master, relays the **wiper switch sensitivity** message to the Light Rain Sensor Module (LRSM) (also known as the Light Sensor Module/LSM or Rain Sensor Module/RSM), which is a LIN slave, over the LIN data bus.

The LRSM monitors an area within the wipe pattern of the windshield glass for the accumulation of moisture. Based upon internal programming and the selected sensitivity level, when sufficient moisture has accumulated the LRSM sends the appropriate electronic **wipe command** messages back to the BCM over the LIN data bus. Then the BCM operates the wiper system accordingly.

As the sensitivity level is set higher, the LRSM is more sensitive to moisture accumulation and will send **wipe commands** more frequently. The third (middle) sensitivity position of the control knob is designed to provide optimal wiper performance for most typical driving requirements. The BCM logic is also programmed to provide an immediate wipe cycle each time the control knob on the control stalk of the multi-function switch is moved from the OFF position to one of the four sensitivity positions, and another immediate wipe cycle each time the control knob is moved from a lower sensitivity position to a higher sensitivity position.

Also, if a vehicle is equipped with automatic wipers but the feature has been disabled using the customer programmable features function, when any sensitivity position is selected with the control knob the system will respond in the same manner as in the intermittent wipe mode. The automatic wiper system also has features designed to protect the mechanical components of the wiper system, and will not allow automatic wiper operation under the following conditions:

- **Low Ambient Temperature** - When the ambient temperature is below 0° C (32° F), the automatic wipers will not operate during a new ignition cycle until the wiper switch has been moved to a different position than that which was selected at the moment the current ignition cycle began, or until a vehicle speed input is detected.
- **Transmission In Neutral** - When the transmission gear selector is placed in the NEUTRAL position with the ignition switch in the ON position, the automatic wipers will not operate during the current ignition cycle until the wiper switch has been moved to a different position than that which was selected at the moment the NEUTRAL position was selected, until the vehicle speed is greater than 8 kilometers-per-hour (5 miles-per-hour) or until the transmission gear selector is moved out of the NEUTRAL position, whichever occurs first.

CONTINUOUS WIPE MODE

When the LOW position of the control knob on the control stalk of the multi-function switch is selected the SCM sends an electronic **wiper switch low** status message to the BCM over the CAN data bus. The BCM then directs battery current to the low speed brush of the wiper motor, causing the wipers to cycle at low speed.

When the HIGH position of the control knob is selected the SCM sends an electronic **wiper switch high** status message to the BCM. The BCM then directs battery current to the high speed brush of the wiper motor, causing the wipers to cycle at high speed.

When the OFF position of the multi-function switch control knob is selected, the SCM sends an electronic **wiper switch off** status message to the BCM, then one of two events will occur. The event that occurs depends upon the position of the wiper blades on the windshield at the moment that the control knob OFF position is selected.

If the wiper blades are in the down position on the windshield when the OFF position is selected, the park switch that is integral to the wiper motor is closed to ground, which provides a hard wired park switch sense input to the BCM. The BCM then de-energizes the wiper motor and the wiper motor ceases to operate. If the wiper blades are not in the down position on the windshield at the moment the OFF position is selected, the park switch is an open circuit and the BCM continues running the wiper motor at low speed until the wiper blades are in the down position on the windshield and the park switch input to the BCM is again closed to ground.

HEADLAMPS ON WITH WIPERS MODE

The circuitry of the BCM provides an automatic HEADLAMPS ON WITH WIPERS mode for vehicles equipped with the optional automatic headlamps. This is a customer programmable feature that can be enabled or disabled through the Electronic Vehicle Information Center (EVIC). If this feature is enabled, when the headlamp switch is in the AUTO position, the headlamps will turn ON automatically whenever the windshield wipers are turned ON; and, if the headlamps were turned ON automatically when the wipers were turned ON, they will also turn OFF automatically when the wipers are turned OFF.

If this feature is enabled in vehicles equipped with the optional automatic wiper feature, when the automatic wiper mode is selected the headlamps will turn ON automatically only after the wipers complete three automatic wipe cycles within about 30 seconds, and they will turn OFF automatically after 3 minutes elapse without any automatic wipe cycles unless ambient light conditions dictate otherwise.

INTERMITTENT WIPE MODE

The following applies to vehicles not equipped with the optional automatic wiper system, or to vehicles equipped with the automatic wiper system that have been disabled using the customer programmable features function.

When the control knob on the control stalk of the multi-function switch is moved to one of the four DELAY interval positions the SCM sends an electronic **wiper switch delay interval** status message to the BCM. Then the BCM electronic intermittent wipe logic circuit responds by calculating the correct length of time between wiper sweeps based upon the selected delay interval input.

The BCM monitors the changing state of the wiper motor park switch through a hard wired park switch sense input. This input allows the BCM to determine the proper intervals at which to energize and de-energize the wiper motor low speed brush to operate the wiper motor intermittently for one low speed cycle at a time.

The BCM logic is also programmed to provide vehicle speed sensitivity to the selected intermittent wipe delay intervals. In order to provide this feature, the BCM monitors electronic **vehicle speed** messages from the Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM, the Antilock Brake System/ABS module or the Electronic Stability Control/ESC module) and doubles the selected delay interval whenever the vehicle speed is about 16 kilometers-per-hour (10 miles-per-hour) or less.

MIST WIPE MODE

When the control knob of the multi-function switch is rotated downward to the momentary MIST position, the SCM sends an electronic **wiper mist mode** status message to the BCM. The BCM then energizes the low speed brush of the wiper motor for as long as the switch is held closed, then de-energizes the motor when the state of the switch changes to open, parking the wiper blades near the base of the windshield. The BCM can operate the wiper motor in this mode for only one low speed cycle at a time, or for an indefinite number of sequential low speed cycles, depending upon how long the switch is held closed.

WASH MODE

When the control knob of the multi-function switch is depressed toward the steering column to the momentary WASH position for more than about one-half second with the wiper system operating, the SCM sends an electronic **washer switch** status message to the BCM. Then the BCM directs battery current and ground to the washer pump/motor. This will cause the washer pump/motor to be energized for as long as the switch is held closed (up to approximately 10 seconds) and to be de-energized when the control knob is released.

When the control knob is depressed to the momentary WASH position while the wiper system is operating in one of the DELAY interval (or sensitivity level with automatic wipers) positions, the washer pump/motor operation is the same. However, the BCM logic also overrides the selected delay interval or sensitivity level and operates the wiper motor in a continuous low speed mode for as long as the control knob is held in the momentary WASH position, then reverts to the selected delay interval or sensitivity level several wipe cycles after the control knob is released. If the WASH switch is held closed for more than about 10 seconds, the BCM will suspend washer pump/motor operation until the control knob is released for about 2 seconds, then cycled back to the WASH position.

WIPE-AFTER-WASH MODE

When the control knob of the multi-function switch is depressed toward the steering column to the momentary WASH position for more than about one-half second while the wiper system is not operating, the SCM sends an electronic **washer switch** status message to the BCM. Then the BCM directs battery current and ground to operate the washer pump/motor and energizes the wiper motor in a continuous low speed mode for as long as the switch is held closed (up to approximately 10 seconds). When the control knob is released, the BCM de-energizes the washer pump/motor immediately, but allows the wiper motor to operate for two or three additional wipe cycles before it de-energizes the wiper motor and parks the wiper blades near the base of the windshield.

If the control knob is held inward for more than about 10 seconds, the BCM will suspend washer pump/motor operation until the knob is released for about 2 seconds and then cycled back to the

WASH position; however, the wipers will continue to operate for as long as the switch is held closed. The BCM monitors the changing state of the wiper motor park switch through a hard wired wiper park switch sense circuit input. This input allows the BCM to count the number of wipe cycles that occur after the control knob is released, and to determine the proper interval at which to de-energize the wiper motor to complete the WIPE-AFTER-WASH mode cycle.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WIPER MOTOR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

If the wiper motor operates, but the wipers do not move on the windshield, replace the ineffective wiper motor or wiper linkage module. If the washer pump/motor operates, but no washer fluid is dispensed on the glass; or, if the wipers operate, but chatter, lift, or do not clear the glass, clean and inspect the wiper and washer system components as required. Refer to **CLEANING** and **INSPECTION**.

The hard wired wiper and washer system circuits and components may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the wiper and washer system or the electronic controls or communication between other modules and devices that provide some features of the wiper and washer system. The most reliable, efficient, and accurate means to diagnose the wiper and washer system or the electronic controls and communication related to wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

NOTE: The wiper and washer switches are integral to the multi-function switch in the Steering Column Control Module (SCCM). The multi-function switch communicates with the Steering Control Module (SCM), which is also integral to the SCCM. The SCM communicates with the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus. Before performing any of the following tests, determine whether the other functions of the multi-function switch are operational. If other multi-function switch functions are ineffective, diagnose and repair that problem before attempting to repair the Wiper and Washer System.

CONDITION	POSSIBLE CAUSES	CORRECTION
WIPER MOTOR DOES NOT OPERATE IN ANY SWITCH POSITION	1. Ineffective motor ground circuit.	1. Test and repair open wiper motor ground circuit if required.
	2. Ineffective motor feed circuits.	2. Test and repair low speed and high speed feed circuits between BCM and wiper motor if required.
	3. Ineffective SCM inputs or outputs.	3. Use a diagnostic scan tool and the appropriate diagnostic information for further SCM diagnosis.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
	5. Ineffective wiper motor.	5. Test and replace open or shorted wiper motor as required.
WIPERS DO NOT PARK CORRECTLY	1. Ineffective wiper motor park switch input circuit.	1. Test and repair wiper park switch input circuit between BCM and wiper motor if required.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
	3. Ineffective wiper motor park switch.	3. Test and replace wiper motor if required.
WIPER MOTOR OPERATES SLOWLY IN ALL SWITCH POSITIONS	1. Ineffective wiper motor.	1. Check amperage draw with linkage disconnected from wiper motor output shaft. Correct draw should be about 6 amperes. If incorrect, refer to the appropriate Possible Cause that follows:
	2. Amperage draw too low.	2. Test and repair shorted low and high speed feed circuits if required.
	3. Amperage draw too high.	3. With linkage disconnected from wiper motor output shaft, check linkage and pivots for binding. If binding is detected, repair or replace wiper linkage module if required. If no linkage binding detected, replace the wiper motor if required.
WIPERS RUN AT HIGH SPEED WITH SWITCH LOW SPEED SELECTED OR AT LOW SPEED WITH SWITCH HIGH SPEED SELECTED	1. Ineffective motor feed circuit wiring.	1. Test and repair low speed and high speed feed circuits between BCM and wiper motor if required.

WASHER PUMP DOES NOT OPERATE	1. Ineffective washer pump ground circuit.	1. Test and repair open washer pump ground circuit if required.
	2. Ineffective washer pump feed circuits.	2. Test and repair washer pump feed circuits between BCM and washer pump if required.
	3. Ineffective SCM inputs or outputs.	3. Use a diagnostic scan tool and the appropriate diagnostic information for further SCM diagnosis.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
	5. Ineffective washer pump.	5. Test and replace open or shorted washer pump if required.

FALSE WIPES (AUTOMATIC WIPER ONLY)

False wipes are unnecessary wipes that occur when the control knob of the multi-function switch is in one of the four automatic wiper sensitivity positions and no rain or moisture is apparent within the wipe pattern on the windshield glass. Because this system is designed to operate whenever it detects moisture, if the switch is in one of the automatic wiper sensitivity positions any road spray, bug splatters, or mist from passing cars or trucks may occasionally cause the wipers to cycle. These are normal characteristics of this system and are not false wipes.

False wipes generally are the result of foreign material or flaws that interfere with the system optics. The optics for this system allow the Light Rain Sensor Module (LRSM) (also known as the Light Sensor Module/LSM or Rain Sensor Module/RSM) to precisely transmit several InfraRed (IR) light beams and precisely monitor the intensity of these beams reflected from the outer surface of the windshield glass to determine the presence of moisture. The sensitivity of this system is such that anything that distorts the focus or intensity of the IR light beams or affects the ability of the photo diodes within the LRSM to see and accurately measure these light beams can result in the LRSM logic misinterpreting the resulting input data as moisture on the windshield. The optics for this system include the lenses of the LRSM, the lens of the LRSM bracket, the adhesive pad layer that bonds the LRSM bracket to the inside of the windshield, and the windshield glass.

The following procedure should only be used if false wipe occurrences are frequent and persistent. Perform diagnosis of the wiper system, the multi-function switch, the Steering Control Module (SCM) and the LRSM using a diagnostic scan tool and the appropriate diagnostic procedures before performing the following:

NOTE: The Light Rain Sensor Module (LRSM) mounting bracket is serviced as a unit with the windshield glass. If either the bracket or the glass is ineffective or damaged, the entire LRSM bracket and windshield glass unit must be replaced.

1. Carefully inspect the outer surface of the windshield glass for physical damage, including scratches, cracks or chips in the vicinity of the LRSM mounting bracket lenses. **Scratches,**

cracks or chips in the windshield glass outside the area of the LRSM mounting bracket lenses will not cause false wipes. If OK, go to Step 2. If not OK, replace the damaged windshield.

2. From the outside of the windshield glass, carefully inspect the adhesive layer between the windshield glass and the LRSM bracket for any large voids. If an adhesive void greater than about 1 millimeter (0.04 inch) is observed, replace the flawed LRSM mounting bracket and windshield unit. If OK, go to Step 3.
3. Lightly pull the LRSM away from the windshield bracket to confirm that both sides of the spring steel LRSM mounting band are fully engaged with the mounting bracket on the inside of the windshield glass. If OK, go to Step 4. If not OK, reinstall the LRSM onto the bracket as required.
4. Remove the LRSM from the mounting bracket. Inspect the LRSM lenses and the mounting bracket lens for contamination. If OK, go to Step 5. If not OK, clean any foreign material from each of these lenses using rubbing alcohol and a lint-free cloth.
5. Carefully inspect the LRSM for any physical damage, including scratches on the LRSM lenses. If OK, go to Step 6. If not OK, replace the damaged LRSM.
6. Carefully inspect the LRSM mounting bracket for any physical damage, including scratches on the LRSM bracket lens. If not OK, replace the damaged LRSM bracket and windshield as a unit.

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Wiper Arm Mounting Nuts	18	13	-
Wiper Linkage Module Mounting Screws	8	-	71
Wiper Motor Mounting Screws	7.5	-	66

CLEANING

CLEANING

WIPER SYSTEM

CAUTION: Protect the rubber squeegees of the wiper blades from any petroleum-based cleaners, solvents, or contaminants. These products can rapidly deteriorate the rubber squeegees.

The squeegees of wiper blades exposed to the elements for a long time tend to lose their wiping effectiveness. Periodic cleaning of the squeegees is suggested to remove any deposits of salt or road film. The wiper blades, arms and windshield glass should only be cleaned using a sponge or soft cloth and windshield washer fluid, a mild detergent or a non-abrasive cleaner. If the wiper blades continue to leave streaks, smears, hazing or beading on the glass after thorough cleaning of the

squeegees and the glass, the entire wiper blade assembly must be replaced.

WASHER SYSTEM

CAUTION: Never introduce petroleum-based cleaners, solvents, or contaminants into the washer system. These products can rapidly deteriorate the rubber seals and hoses of the washer system, as well as the rubber squeegees of the wiper blades.

CAUTION: Never use compressed air to flush the washer system plumbing. Compressed air pressures are too great for the washer system plumbing components and will result in further system damage. Never use sharp instruments to clear a plugged washer nozzle or damage to the nozzle orifice and improper nozzle spray patterns will result.

If the washer system is contaminated with foreign material, drain the washer reservoir by removing the washer pump/motor unit from the reservoir. Clean foreign material from the inside of the washer pump inlet filter screen and the washer reservoir using clean washer fluid, a mild detergent or a non-abrasive cleaner. Flush foreign material from the washer system plumbing by first disconnecting the washer hoses from the washer nozzles, then running the washer pump/motor to run clean washer fluid or water through the system. Plugged or restricted washer nozzles cannot be back-flushed due to the integral check valve mechanism. If the washer nozzle obstruction cannot be cleared, replace the washer nozzle.

INSPECTION

INSPECTION

WIPER SYSTEM

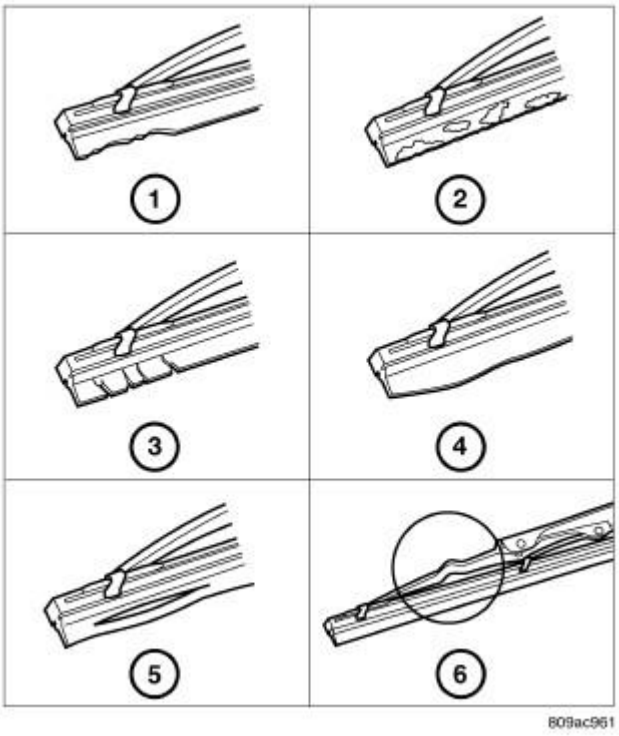

Fig. 2: Wiper Blades And Wiper Arms
Courtesy of CHRYSLER GROUP, LLC

The wiper blades and wiper arms should be inspected periodically, not just when wiper performance problems are experienced. This inspection should include the following points:

1. Carefully inspect the wiper blades for any indications of worn or uneven edges (1), foreign material deposits (2), hardening or cracking (3), deformation or fatigue (4) or splitting (5). Inspect the wiper blade support components and the wiper arms for damage (6) or corrosion. If the wiper arms and blades are contaminated with any foreign material, clean them and the glass as required. Refer to **CLEANING**. If a wiper blade or arm is damaged, or if corrosion is evident, replace the affected wiper arm or blade with a new unit. Do not attempt to repair a wiper arm or blade that is damaged or corroded.
2. Carefully lift the wiper blade off of the glass. Note the action of the wiper arm hinge. The wiper arm should pivot freely at the hinge, but with no lateral looseness evident. If there is any binding evident in the wiper arm hinge, or if there is evident lateral play in the wiper arm hinge, replace the wiper arm.

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

3. Once proper hinge action of the wiper arm is confirmed, check the hinge for proper spring tension. Remove the wiper blade from the wiper arm. Either place a small postal scale between the blade end of the wiper arm and the glass, or carefully lift the blade end of the arm away from

the glass using a small fish scale. On vehicles with unequal wiper arm lengths, be certain that measurements on both arms are taken at a point an equal distance from their wiper arm hinge pins. Compare the scale readings between the right and left wiper arms. Replace a wiper arm if it has comparatively lower spring tension, as evidenced by a significantly lower scale reading.

4. After cleaning and inspecting the wiper components and the glass, if the wiper blade still fails to clear the glass without smearing, streaking, chattering, hazing or beading, replace the wiper blade.

WASHER SYSTEM

The washer system components should be inspected periodically, not just when washer performance problems are experienced. This inspection should include the following points:

1. Check for ice or other foreign material in the washer reservoir. If contaminated, clean and flush the washer system. Refer to **CLEANING**.
2. Inspect the washer plumbing for pinched, leaking, deteriorated or incorrectly routed hoses and damaged or disconnected hose fittings. Replace damaged or deteriorated hoses and hose fittings. Leaking washer hoses can sometimes be repaired by cutting the hose at the leak and splicing it back together using an in-line connector fitting. Similarly, sections of deteriorated hose can be cut out and replaced by splicing in new sections of hose using in-line connector fittings. Whenever routing a washer hose or a wire harness containing a washer hose, it must be routed away from hot, sharp, or moving parts. Also, sharp bends that might pinch the washer hose must be avoided.

ARM, WIPER

DESCRIPTION

DESCRIPTION

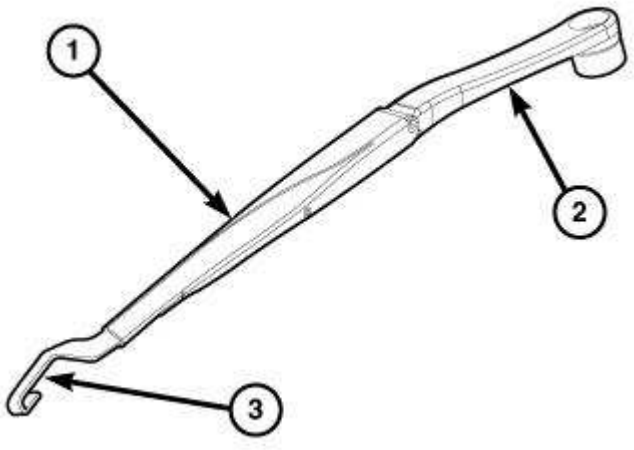

Fig. 3: Stamped Steel Channel, Aluminum Pivot End & Stamped Steel Strap

Courtesy of CHRYSLER GROUP, LLC

The wiper arms are the rigid members located between the wiper pivots that protrude from the cowl plenum cover/grille panel near the base of the windshield and the wiper blades on the windshield glass. These wiper arms have a somewhat sculpted appearance that actually has a functional purpose. The sculpting is designed to reduce wind buffeting, which helps to reduce wind noise within the passenger compartment of the vehicle.

These wiper arms include an over-center hinge design that allows easy access to the windshield glass for cleaning. The wiper arm has a die cast aluminum pivot end (2) with a large, internally tapered mounting boss at one end. A molded black plastic cap snaps over the pivot end to conceal the wiper arm retaining nut and the mounting hole following wiper arm installation.

The wide end of a tapered, stamped steel channel (1) hinges on and is secured with a hinge pin to the blade end of the wiper arm pivot end. One end of a stamped steel strap (3), is secured within the narrow end of the stamped steel channel. The tip of the wiper blade end of this strap is bent back under itself to form a small hook. The entire wiper arm has a satin black finish applied to all of its visible surfaces.

Concealed within the stamped steel channel is a long tension spring which is engaged with a formed wire link hooked over a metal dowel pin that passes through the underside of the pivot end. The opposite end of the spring is hooked over another metal dowel pin that passes through the underside of the steel channel.

The driver and passenger side wiper arms are not interchangeable. These arms have a letter **D** (Driver) or **P** (Passenger) cast into the surface of the pivot end to identify their proper locations. A wiper arm cannot be adjusted or repaired. If damaged or ineffective, the entire wiper arm unit must be replaced.

OPERATION

OPERATION

The wiper arms are designed to mechanically transmit the motion from the wiper pivots to the wiper blades. The wiper arm must be properly indexed to the wiper pivot in order to maintain the proper wiper blade travel on the glass. The tapered mounting hole in the wiper arm pivot end interlocks with the serrations on the tapered outer circumference of the wiper pivot shaft, allowing positive engagement and finite adjustment of this connection.

The mounting nuts lock the wiper arms to the threaded studs of the wiper pivot shafts. The spring-loaded wiper arm hinge controls the down-force applied through the tip of the wiper arm to the wiper blade on the glass. The hook formation on the tip of the wiper arm provides a cradle for securing and latching the wiper blade pivot block to the wiper arm.

REMOVAL

REMOVAL

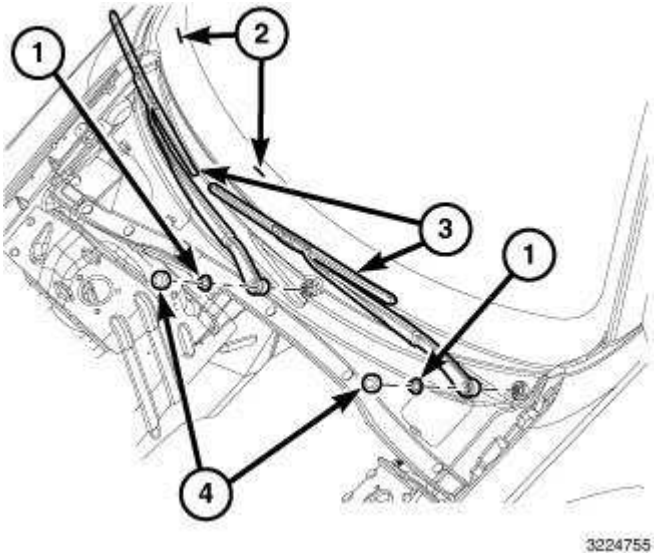

Fig. 4: Wiper Arm And Blade, Plastic Nut Cap & Nut
Courtesy of CHRYSLER GROUP, LLC

1. Lift the wiper arm and blade (3) to its over-center position to hold the wiper blade off of the glass and relieve the spring tension on the wiper arm to pivot shaft connection.
2. Carefully pry the plastic nut cap (4) off of the nut (1) on the pivot end of the wiper arm.
3. Remove the nut that secures the wiper arm to the wiper pivot shaft.

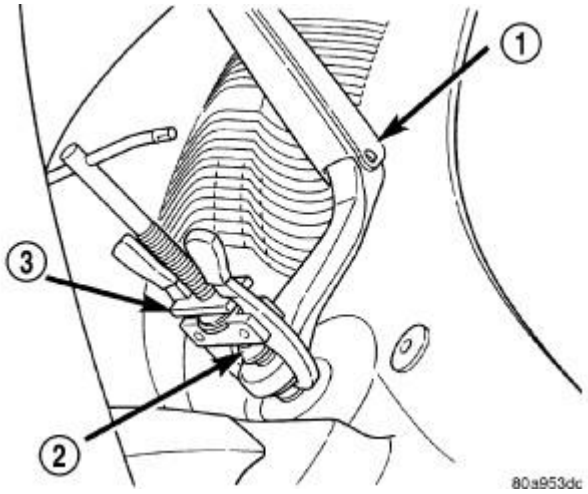

Fig. 5: Disengaging Wiper Arm From Pivot Shaft
Courtesy of CHRYSLER GROUP, LLC

4. If necessary, use a suitable battery terminal puller (3) to disengage the wiper arm (1) from the wiper pivot shaft (2).
5. Remove the wiper arm pivot end from the wiper pivot shaft.

INSTALLATION

INSTALLATION

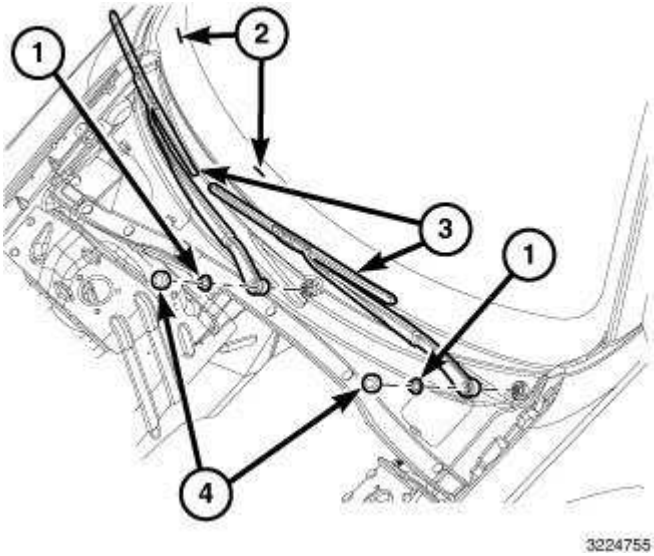

Fig. 6: Wiper Arm And Blade, Plastic Nut Cap & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Be certain that the wiper motor is in the park position before attempting to install the wiper arms. Turn the ignition switch to the ON position and move the multi-function switch control knob to turn the wiper motor ON, then turn it back to the OFF position. Wait until the wiper pivot shafts stop moving, then turn the ignition switch back to the OFF position. The wiper motor is now in the park position.

NOTE: The right and left wiper arms are not interchangeable. The right wiper arm pivot end is identified with a letter P (Passenger) and the left is identified with a letter D (Driver). Be certain that each wiper arm is installed on the proper wiper pivot.

1. The wiper arm and blade (3) must be indexed to the pivot shaft with the wiper motor in the park position to be properly installed. Loosely position the wiper arm pivot end onto the wiper pivot shaft so that the wiper blade is aligned with the appropriate wiper alignment line (2), which is a mark located just below the upper margin of the lower windshield blackout area.
2. Once the wiper blade is aligned, push the pivot end of the arm down firmly and evenly over the pivot shaft until it is fully engaged.
3. Install and tighten the nut (1) that secures the wiper arm to the pivot shaft. Tighten the nut to 18 N.m (13 ft. lbs.).
4. Wet the windshield glass, then operate the wipers. Turn the wiper switch to the OFF position, then check for correct wiper blade alignment and readjust as required.
5. Reinstall the plastic nut cap (4) onto the wiper arm mounting nut.

BLADE, WIPER

DESCRIPTION

DESCRIPTION

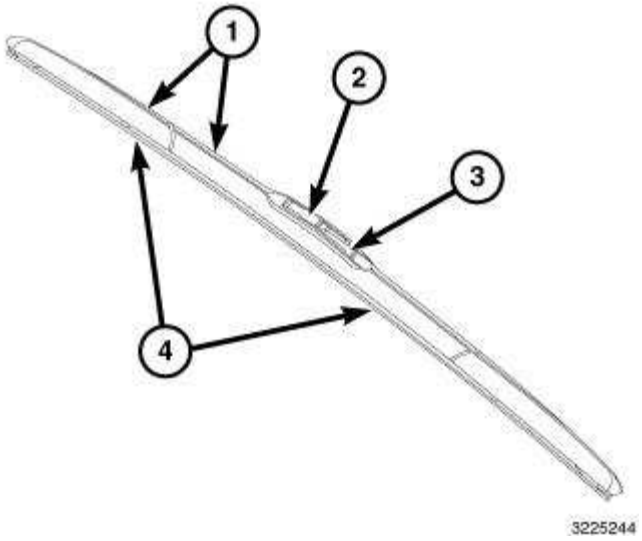

Fig. 7: Blade Covers, Integral Latch & Pivot Block
Courtesy of CHRYSLER GROUP, LLC

Each front wiper blade is secured by an integral latch (2) and an integral pivot block (3) to the hook formation on the tip of each wiper arm, and rests on the glass near the base of the windshield when the wipers are not in operation. These wiper blades have a somewhat sculpted appearance that actually has a functional purpose. The sculpted appearance is due to molded plastic blade covers (1) securely fastened over the bridges and links of the wiper blade. This sculpting is designed to reduce wind buffeting, which helps to reduce wind noise within the passenger compartment of the vehicle.

The wiper blade consists of the following components:

- **Blade Covers** - The molded plastic blade covers shield the wiper superstructure and elements to reduce wind buffeting.
- **Element (4)** - The wiper element or squeegee is the resilient rubber member of the wiper blade that contacts the glass.
- **Flexor** - The flexor is a rigid metal component running along the length of each side of the wiper element where it is gripped by the claws of the superstructure.
- **Superstructure** - The superstructure includes several stamped steel bridges and links with claw formations that grip the wiper blade element. Also included in this unit is the latching, molded plastic pivot block that secures the superstructure to the wiper arm. All of the metal components of the wiper blade have a satin black finish applied.

The passenger side wiper blades are 52.50 centimeters (20.67 inches) long. The driver side wiper blades are 60.00 centimeters (23.62 inches) long. They have non-replaceable rubber elements (squeegees). The wiper blades cannot be adjusted or repaired. If ineffective, worn, or damaged the entire wiper blade unit must be replaced.

OPERATION

OPERATION

The wiper blades are moved back and forth across the glass by the wiper arms when the wipers are being operated. The wiper blade superstructure is the flexible frame that grips the wiper blade element and evenly distributes the force of the spring-loaded wiper arm along the length of the element. The combination of the wiper arm force and the flexibility of the superstructure makes the element conform to and maintain proper contact with the glass, even as the blade is moved over the varied curvature that may be encountered across the glass surface.

The wiper element flexor provides the claws of the blade superstructure with a rigid, yet flexible component on the element which can be gripped. The rubber element is designed to be stiff enough to maintain an even cleaning edge as it is drawn across the glass, yet resilient enough to conform to the glass surface and flip from one cleaning edge to the other each time the wiper blade changes directions.

REMOVAL

REMOVAL

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

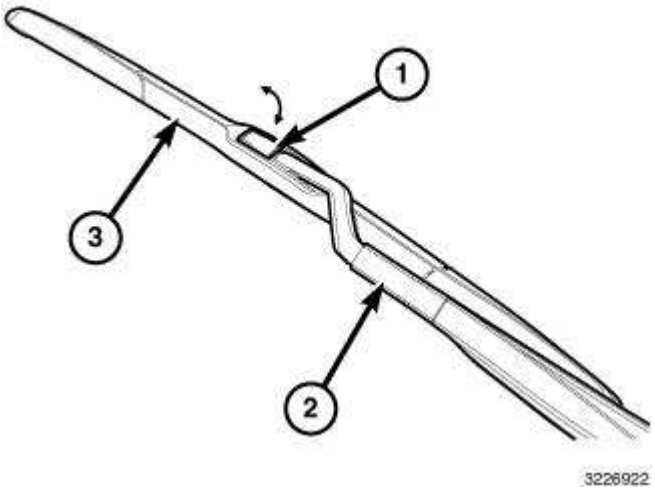

Fig. 8: Tab, Wiper Arm & Element
Courtesy of CHRYSLER GROUP, LLC

NOTE: The notched end of the wiper element flexor should always be oriented towards the end of the wiper blade that is nearest to the wiper pivot.

1. Lift the wiper arm (2) to raise the wiper blade and element (3) off of the glass, until the wiper arm hinge is in its over-center position.
2. To remove the blade from the arm, lift or gently pry the latch release tab (1) located just in front

of the pivot block at the tip of the arm upward until it stands perpendicular to the wiper arm.

3. Rotate the lower end of the blade slightly downward (toward the wiper element and away from the wiper arm), then slide the blade away from the tip towards the pivot end of the arm far enough to disengage the pivot block from the hook formation on the end of the arm.
4. Extract the hook formation on the tip of the wiper arm through the opening in the wiper blade superstructure between the latch and the pivot block.
5. Gently lower the tip of the wiper arm onto the glass.

INSTALLATION

INSTALLATION

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

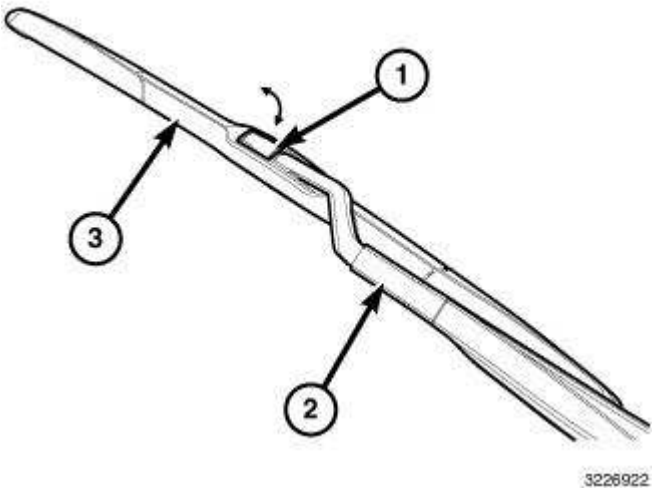

Fig. 9: Tab, Wiper Arm & Element
Courtesy of CHRYSLER GROUP, LLC

NOTE: The notched end of the wiper element flexor should always be oriented towards the end of the wiper blade that is nearest to the wiper pivot.

1. Lift the wiper arm (2) off of the windshield glass, until the wiper arm hinge is in its over-center position.
2. Position the wiper blade and element unit (3) near the hook formation on the tip of the arm with the notched end of the wiper element flexor oriented towards the end of the wiper arm that is nearest to the wiper pivot.
3. Insert the hook formation on the tip of the arm through the opening in the blade superstructure between the latch (1) and the pivot block far enough to engage the pivot block into the hook.
4. Slide the pivot block up into the hook formation on the tip of the wiper arm until it is fully

engaged.

5. Rotate the latch release tab down into the blade until it snaps into its locked position. Latch engagement will be accompanied by an audible click.
6. Gently lower the wiper blade and element onto the glass.

HOSES AND TUBES, WASHER

DESCRIPTION

DESCRIPTION

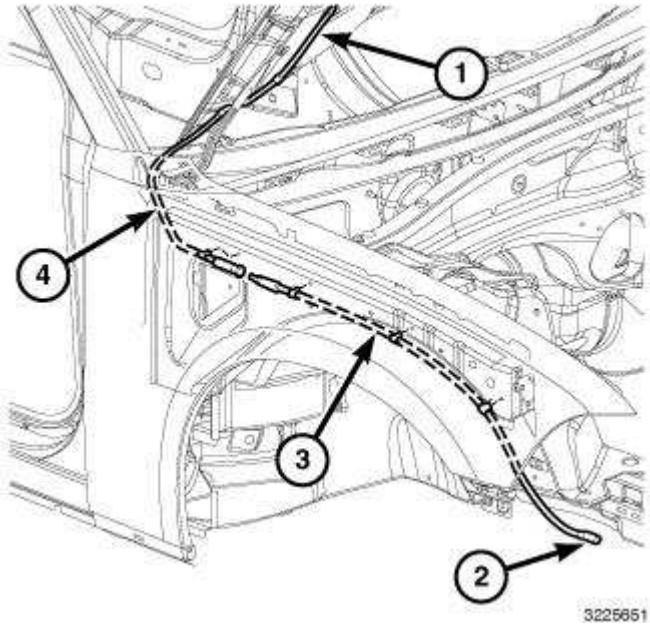

Fig. 10: Hood Panel & Front Hose
Courtesy of CHRYSLER GROUP, LLC

The washer plumbing consists of small diameter rubber hose or hard plastic tubing that is routed from the washer reservoir located on the outside of the right frame rail ahead of the right front wheel house near the right front corner of the engine compartment to the two washer nozzles mounted at the back of the hood panel. The front hose (2) is attached to the outlet nipple of the washer pump/motor unit near the bottom of the reservoir.

The front hose is routed from the washer pump to the outboard side of the right load beam. The front and rear (4) hoses are connected by a molded plastic quick-connect fitting above the wheel house. The rear hose is routed to the right side of the dash panel, then up to the right hood hinge. The rear washer hose is routed around the right hood hinge to the underside of the hood panel (1), then between the hood reinforcement and the hood silencer pad to the two washer nozzles.

Molded rubber fittings provide the connections to the nipples of the washer nozzles. Several plastic push-in type retainers secure the washer hose at regular intervals along its path from the washer

pump to the washer nozzles.

Washer hose or tube is available for service only as roll stock, which must then be cut to length. The molded plastic and rubber washer hose fittings cannot be repaired. If these fittings are ineffective or damaged, they must be replaced.

OPERATION

OPERATION

Washer fluid in the washer reservoir is pressurized and fed by the washer pump/motor unit through the washer system plumbing and fittings to the two washer nozzles. Whenever routing the washer hose or a wire harness containing a washer hose, it must be routed away from hot, sharp or moving parts; and, sharp bends that might pinch the hose must be avoided.

STANDARD PROCEDURE

STANDARD PROCEDURE - DISCONNECTING WASHER HOSE QUICK-CONNECT FITTINGS

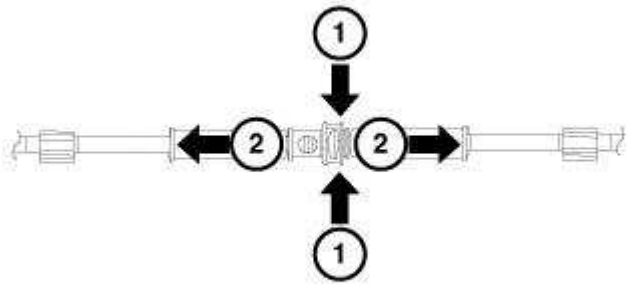

Fig. 11: Molded Plastic Quick-Connect & Washer Hose Tubes
Courtesy of CHRYSLER GROUP, LLC

A molded plastic quick-connect fitting joins the front and rear sections of the washer hose tubes. To disconnect this fitting:

1. Squeeze the two solid sides (not the open sides) of the female half of the quick-connect fitting at the outer edge.
2. While still squeezing the female half of the fitting, pull the two washer hose tubes away from each other.

LINKAGE, WIPER ARM

DESCRIPTION

DESCRIPTION

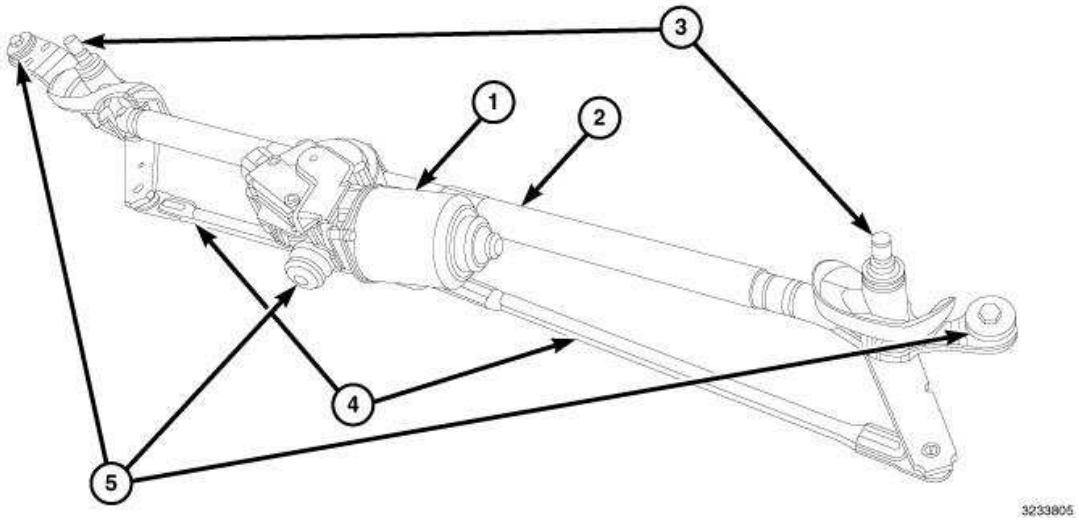

Fig. 12: Bracket, Insulators, Wiper Motor, Wiper Pivots & Steel Drive Links
Courtesy of CHRYSLER GROUP, LLC

The wiper linkage module is secured within the cowl plenum panel beneath the cowl plenum cover/grille panel. The ends of the wiper pivot shafts protrude through dedicated openings in the cowl plenum cover/grille panel to drive the wiper arms and blades and are the only visible components of the wiper linkage module.

The wiper linkage module consists of the following major components:

- **Bracket** - The wiper linkage module bracket (2) consists of a long tubular steel main member that has a die cast pivot bracket formation near each end where the two wiper pivots are secured. The wiper linkage module bracket is secured within the cowl plenum by two screws through two rubber insulators (5).
- **Crank Arm** - The wiper motor crank arm is a stamped steel unit with a slotted hole on the driven end that is secured to the wiper motor output shaft with a nut, and has a long double ball stud secured to the drive end.
- **Linkage** - Two stamped steel drive links (4) connect the wiper motor crank arm to the two wiper pivot lever arms. The passenger side link has a plastic socket-type bushing on each end, while the driver side link has a socket-type bushing on the pivot end and a sleeve-type bushing on the crank arm end. The bushing on the pivot end of each link is snap-fit over a ball stud on the pivot lever arm. The sleeve-type bushing on the driver side link is snap fit over the inner ball formation of a double ball stud on the crank arm, then the socket-type bushing of the passenger side drive link is snapped over the outer ball formation.
- **Motor** - The wiper motor (1) is secured by a bracket integral to the motor transmission housing with two screws and nuts near the center of the wiper linkage module bracket. A knob-like rubber insulator (5) on a stud integral to the motor transmission housing is engaged in a slot in a stamped bracket on the front shock tower brace. The two-speed permanent magnet wiper motor

features an integral transmission, an internal park switch, and an internal automatic resetting circuit breaker. An integral connector receptacle connects the motor to the vehicle electrical system.

- **Pivots** - The two front wiper pivots (3) are secured to the ends of the wiper module bracket. The lever arms that extend from the bottom of the pivot shafts each have ball studs that engage the bushings of the drive links. The upper end of each pivot shaft where the wiper arms will be fastened each is tapered and serrated with a threaded stud formation at the tip.

The wiper motor and crank arm unit is available for separate service replacement. Any other component of the wiper linkage module cannot be adjusted or repaired. If any component of the module other than the motor is ineffective or damaged, the entire wiper linkage module unit must be replaced.

OPERATION

OPERATION

The wiper linkage module operation is controlled by the battery current inputs received by the wiper motor through the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The wiper motor speed is controlled by current flow to either the low speed or the high speed set of brushes. The park switch is a single pole, single throw, momentary switch within the wiper motor that is mechanically actuated by the wiper motor transmission components. The park switch alternately closes the wiper park switch sense circuit to ground or to battery current, depending upon the position of the wipers on the glass. This feature allows the motor to complete its current wipe cycle after the wiper system has been turned OFF, and to park the wiper blades in the lowest portion of the wipe pattern. The automatic resetting circuit breaker protects the motor from overloads.

The wiper motor crank arm, the two wiper linkage members and the two wiper pivots mechanically convert the rotary output of the wiper motor to the back and forth wiping motion of the wiper arms and blades on the glass.

The hard wired inputs and outputs of the wiper motor may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the wiper motor or the electronic controls or communication between other modules and devices that provide some features of the wiper and washer system. The most reliable, efficient, and accurate means to diagnose the wiper motor or the electronic controls and communication related to wiper motor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

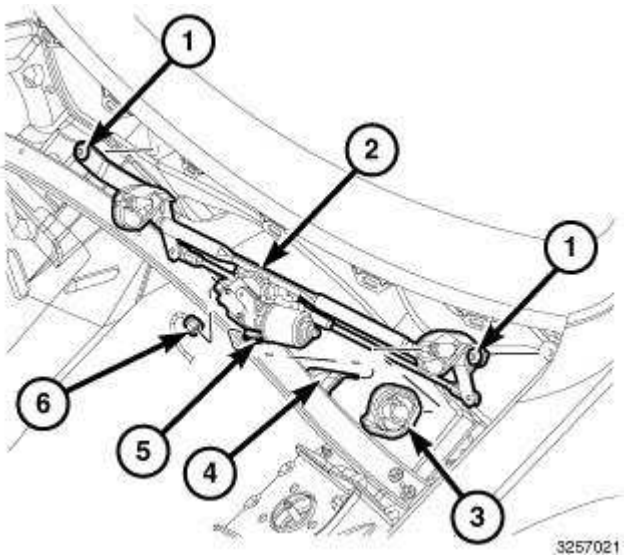

Fig. 13: Two Screws, Wiper Module, Foam Mucket, Rubber Isolator & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: The wiper motor can be removed from the wiper linkage module and is serviced independently from the remainder of the wiper linkage module for this vehicle. Refer to MOTOR, WIPER, REMOVAL.

1. Disconnect and isolate the battery negative cable.
2. Remove both wiper arms from the wiper pivots. Refer to **ARM, WIPER, REMOVAL**.
3. Remove the cowl plenum cover/grille panel from over the wiper module (2). Refer to **COVER, COWL PANEL, REMOVAL** .
4. Remove the foam mucket (3) from the left wiper pivot cup.
5. Disconnect the wire harness connector (6) from the connector receptacle for the wiper motor.
6. Remove the two screws (1) that secure the module bracket to the cowl.
7. Pull the wiper linkage module toward the outboard side of the vehicle far enough to disengage the knob-like rubber isolator (5) from the slotted bracket (4) on the front shock tower brace.
8. Remove the wiper linkage module from the cowl as a unit.

INSTALLATION

INSTALLATION

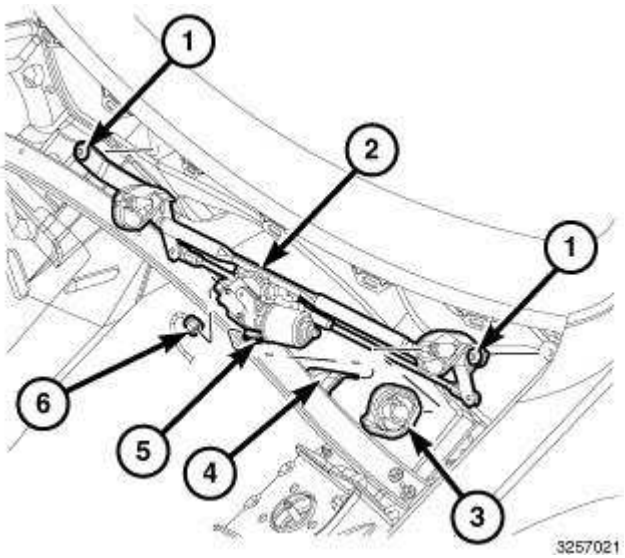

Fig. 14: Two Screws, Wiper Module, Foam Mucket, Rubber Isolator & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: The wiper motor can be removed from the wiper linkage module and is serviced independently from the remainder of the wiper linkage module for this vehicle. Refer to MOTOR, WIPER, REMOVAL.

1. Position the wiper linkage module (2) to the cowl as a unit.
2. Position the knob-like rubber isolator (5) into the slotted bracket (4) on the front shock tower brace and push the module inboard far enough to seat the isolator in the bracket.
3. Starting on the outboard side, install and tighten the two screws (1) that secure the wiper linkage module to the cowl. Tighten the screws to 8 N.m (71 in. lbs.).
4. Reconnect the wire harness connector (6) to the connector receptacle for the wiper motor. Be certain connector is fully engaged and locked.
5. Reinstall the foam mucket (3) onto the left wiper pivot cup.
6. Reinstall the cowl plenum cover/grille panel over the wiper linkage module. Refer to **COVER, COWL PANEL, INSTALLATION** .
7. Reinstall both wiper arms onto the wiper pivots. Refer to **ARM, WIPER, INSTALLATION**.
8. Reconnect the battery negative cable.

MODULE, LIGHT RAIN SENSOR (LRSM)

DESCRIPTION

DESCRIPTION

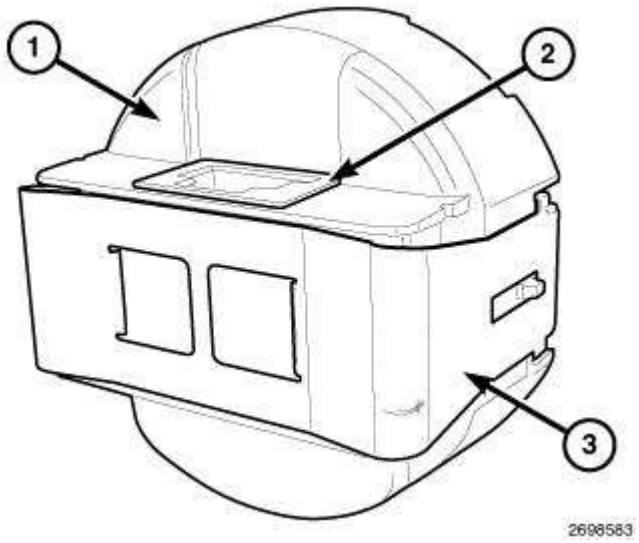

Fig. 15: Light Rain Sensor Module
Courtesy of CHRYSLER GROUP, LLC

The Light Rain Sensor Module (LRSM) (1) is the primary component of the automatic wiper system. In some vehicle applications the LRSM is also capable of performing an ambient light sensor function; and, therefore, is alternately referred to as the Light Sensor Module (LSM) or the Rain Sensor Module (RSM). The LRSM is located on the inside of the windshield just below and to the right of the inside rear view mirror mounting button. The LRSM is concealed from view within the vehicle interior by a molded plastic inside rear view mirror bracket trim cover that fits over the top of the LRSM housing and the LRSM mounting bracket, but the LRSM is visible through the windshield glass from the exterior of the vehicle.

The molded black plastic LRSM housing has an integral connector receptacle (2) at the top with provisions for up to four terminal pins. These terminal pins connect the LRSM to the vehicle electrical system through a dedicated take out and connector of the overhead wire harness that extends from above the headliner. Openings on the windshield side of the housing are fitted with four convex clear plastic lenses. A spring steel retaining strap (3) extends forward on each side of the housing to latch the LRSM to a molded black plastic mounting bracket, which is permanently bonded to the inside of the windshield glass.

Concealed and protected within the LRSM housing is the electronic circuitry of the module, which includes two InfraRed (IR) diodes, two photocells, and a microprocessor. The LRSM is a Local Interface Network (LIN) slave and communicates over a single LIN bus circuit with the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM is a LIN master and a gateway to the Controller Area Network (CAN) data bus. The BCM controls the exchange of electronic messages back and forth between the LRSM and other electronic modules in the vehicle.

The LRSM cannot be adjusted or repaired. If ineffective or damaged, the entire module must be replaced. The LRSM mounting bracket is serviced only as a unit with the windshield glass.

OPERATION

OPERATION

The microprocessor-based Light Rain Sensor Module (LRSM) (also known as the Light Sensor Module/LSM or the Rain Sensor Module/RSM) senses moisture in the wipe pattern on the outside of the windshield glass and sends electronic messages to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Local Interface Network (LIN) data bus. The BCM relays messages back and forth between the LRSM and other electronic modules in the vehicle.

Two InfraRed (IR) diodes within the LRSM generate infrared light beams that are aimed by two of the convex optical lenses of the sensor through the windshield glass. Two additional convex optical lenses of the sensor are focused on the infrared light beams reflected back from the windshield glass and allow the two photocells within the sensor to sense changes in the intensity of these infrared light beams. When sufficient moisture accumulates within the wipe pattern on the windshield glass, less of the infrared light is reflected back and the sensor detects a change in the monitored infrared light beam intensity.

The internal programming of the LRSM then sends the appropriate electronic **wipe command** messages to the BCM over the LIN data bus. The BCM then responds by activating or deactivating the wiper system. Similarly, in some vehicle applications the photocells within the LRSM are capable of sensing ambient light levels through the windshield glass and providing electronic **light level** messages to other modules in the vehicle.

The Steering Control Module (SCM) sends electronic **wiper switch status** and **sensitivity level** messages over the CAN data bus to the BCM based upon the driver-selected settings of the control knob on the control stalk of the multi-function switch. The BCM receives electronic messages from other electronic modules in the vehicle over the CAN data bus, and the BCM relays the messages to the LRSM over the LIN bus.

The higher the selected sensitivity setting the more sensitive the LRSM is to the accumulated moisture on the windshield glass, and the more frequently the LRSM will send **wipe commands** to the BCM to operate the wiper system. The third (middle) sensitivity setting is set up for optimal operation of the automatic wipers under most typical driving conditions.

The LRSM operates on battery current received through a fused ignition switch output (run/accessory) circuit controlled by the run-accessory relay. The LRSM receives ground at all times through a take out of the body wire harness with an eyelet terminal that is secured by a ground screw to the body sheet metal. Therefore, the LRSM is operational only when the ignition switch is in the ON or ACCESSORY positions.

It is important to note that the default operation of the automatic wiper system is low speed continuous wipe. Therefore, if no message is received by the BCM from the LRSM for more than about five seconds when the AUTOMATIC wipe mode is selected, the wipers will default to the low speed continuous wipe operation. It is also noteworthy that the BCM must be properly configured for the automatic wipers option for the automatic wipers to function.

The hard wired circuits of the LRSM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the LRSM or the electronic controls or communication

between other modules and devices that provide some features of the automatic wiper system. The most reliable, efficient, and accurate means to diagnose the LRSM or the electronic controls and communication related to LRSM operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

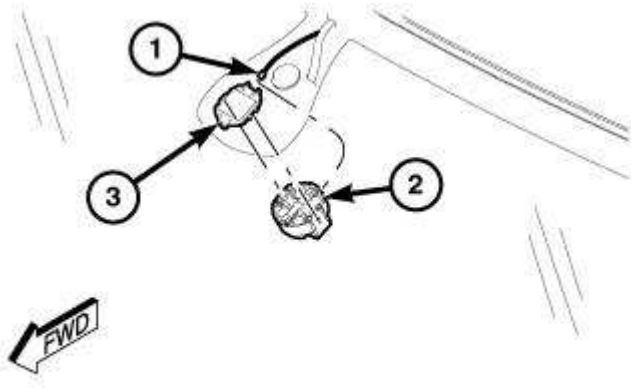

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Fig. 16: Wire Harness Connector, LRSM & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trim cover from the inside rear view mirror mounting bracket. Refer to **MIRROR, REARVIEW, REMOVAL** .
3. Disconnect the wire harness connector (1) from the LRSM (2).
4. Depress one side of the spring steel retaining strap on the LRSM towards the windshield while lightly prying the end of the strap closest to the glass away from the tab of the mounting bracket (3) on the windshield. Now rotate the loose side of the LRSM away from the glass far enough to disengage the other side of the strap from the mounting bracket tab.
5. Remove the LRSM from the mounting bracket.

INSTALLATION

INSTALLATION

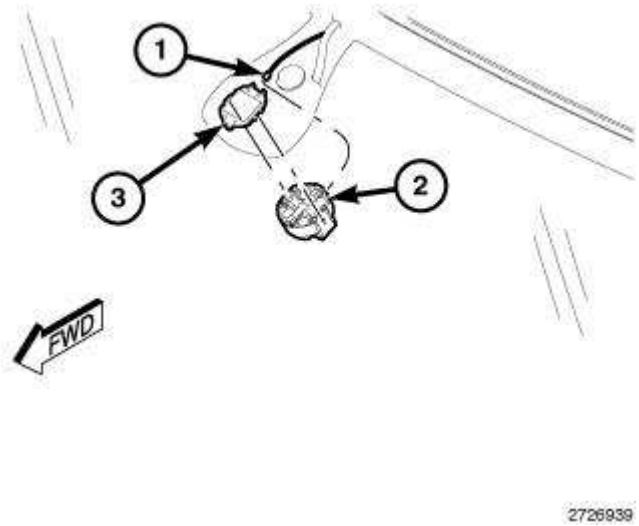

Fig. 17: Wire Harness Connector, LRSM & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

CAUTION: During installation be certain not to touch or contaminate the optical lenses of the Light Rain Sensor Module (LRSM) or the glass through which the LRSM optics are focused. Contaminated optics will negatively impact LRSM performance.

1. Position the Light Rain Sensor Module (LRSM) (2) to the center of the mounting bracket (3) on the inside of the windshield near the inside rear view mirror.
2. Depress both sides of the spring steel retaining strap on the LRSM simultaneously until the hooks of the strap engage the tabs of the mounting bracket on the windshield.
3. Reconnect the wire harness connector (1) to the LRSM.
4. Reinstall the inside rear view mirror mounting bracket trim cover. Refer to **MIRROR, REARVIEW, INSTALLATION** .
5. Reconnect the battery negative cable.

MOTOR, WIPER

DESCRIPTION

DESCRIPTION

The wiper motor is packaged with the wiper linkage module in this vehicle. Refer to **LINKAGE, WIPER ARM, DESCRIPTION**.

OPERATION

OPERATION

The wiper motor is packaged with the wiper linkage module in this vehicle. Refer to **LINKAGE, WIPER ARM, OPERATION**.

REMOVAL

REMOVAL

CAUTION: Do not apply pressure to, or pry on the plastic drive link bushings. When removing a drive link from, or installing a drive link onto the ball stud on the wiper motor crank arm apply pressure to, or pry on only the metal portions of the drive link around the bushing. If the bushing is damaged, the entire wiper linkage module MUST be replaced.

CAUTION: Do not remove the crank arm nut from the wiper motor output shaft. The crank arm is indexed to the output shaft with the motor in the park position during the manufacturing process, but there are no provisions made for correctly indexing this connection in the field. If the crank arm to output shaft indexing is incorrect, the entire wiper motor and crank arm unit MUST be replaced.

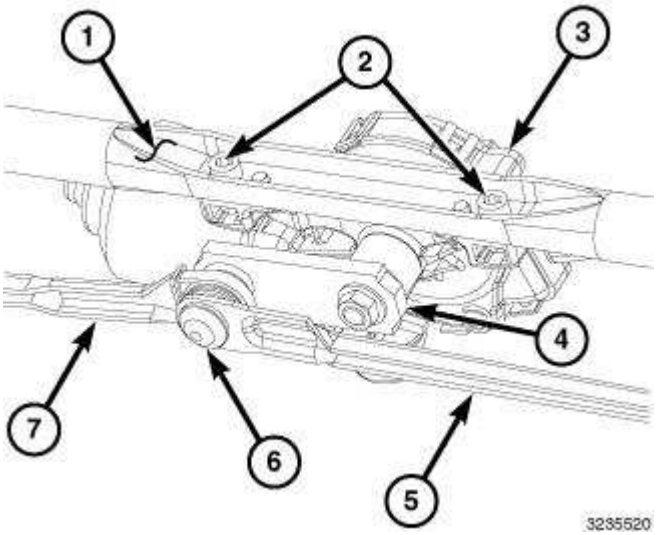

Fig. 18: Module Bracket, Two Screws, Motor, Crank Arm, Drive Link, Bushing & Wiper Drive Link
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the wiper linkage module from the vehicle and place it on a suitable work surface. Refer to **LINKAGE, WIPER ARM, REMOVAL**.
3. Disengage the socket bushing (6) of the right wiper drive link (5) from the double ball stud on the wiper motor crank arm (4) using two large screwdrivers, one on each side of the double ball stud. Pry firmly and evenly between the crank arm and the metal portion of the drive link until the socket unsnaps from the ball.

4. Disengage the sleeve bushing of the left wiper drive link (7) from the double ball stud on the wiper motor crank arm.
5. Remove the two screws (2) that secure the motor (3) bracket to the module bracket (1).
6. Remove the wiper motor and crank arm as a unit from the underside of the module bracket.

INSTALLATION

INSTALLATION

CAUTION: Do not apply pressure to, or pry on the plastic drive link bushings. When removing a drive link from, or installing a drive link onto the ball stud on the wiper motor crank arm apply pressure to, or pry on only the metal portions of the drive link around the bushing. If the bushing is damaged, the entire wiper linkage module MUST be replaced.

CAUTION: Do not remove the crank arm nut from the wiper motor output shaft. The crank arm is indexed to the output shaft with the motor in the park position during the manufacturing process, but there are no provisions made for correctly indexing this connection in the field. If the crank arm to output shaft indexing is incorrect, the entire wiper motor and crank arm unit MUST be replaced.

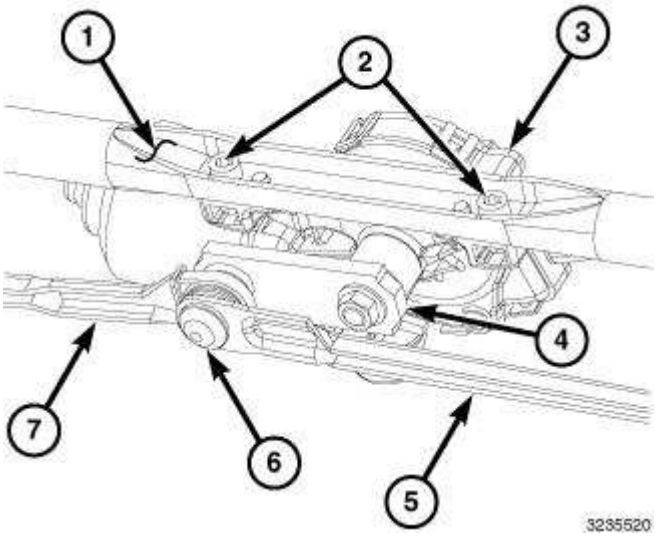

Fig. 19: Module Bracket, Two Screws, Motor, Crank Arm, Drive Link, Bushing & Wiper Drive Link
Courtesy of CHRYSLER GROUP, LLC

1. Be certain that the two nuts are positioned properly within the pockets of the wiper motor (3) bracket.
2. Position the wiper motor and crank arm as a unit to the underside of the wiper module bracket (1).

3. Install and tighten the two screws (2) into the two nuts that secure the motor bracket to the module bracket. Tighten the screws to 7.5 N.m (66 in. lbs.).
4. Position the sleeve bushing of the left wiper drive link (7) onto the double ball stud on the end of the motor crank arm (4).
5. Position the socket bushing (6) of the right wiper drive link (5) over the double ball stud on the crank arm.
6. Place a short 19 millimeter or 3/4 inch socket over the domed cap side of the socket bushing as an installation tool. Use large channel-lock pliers to firmly and evenly apply enough pressure between the back of the crank arm and the top of the socket installation tool to snap the bushing onto the ball stud. **Do not apply pressure directly to the plastic bushings.**

NOTE: Be certain to turn the ignition switch to the ON position, then turn the wiper switch ON and OFF again to cycle the wiper motor and linkage to their natural park position before reinstalling the wiper arms onto the wiper pivots.

7. Reinstall the wiper linkage module into the vehicle. Refer to **LINKAGE, WIPER ARM, INSTALLATION**.
8. Reconnect the battery negative cable.

NOZZLE, WASHER

DESCRIPTION

DESCRIPTION

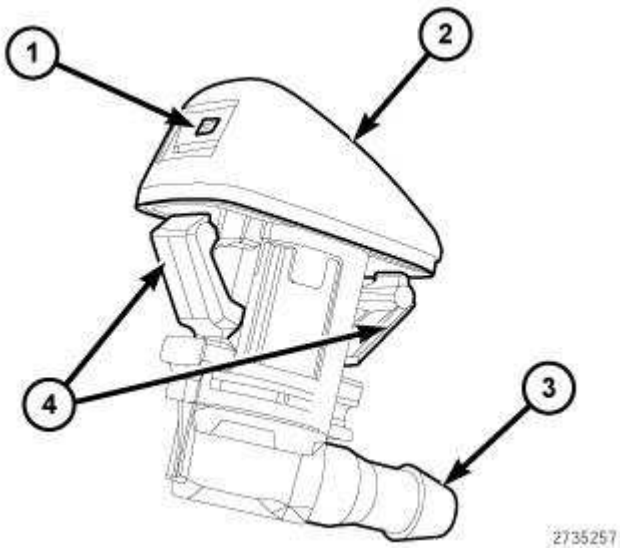

Fig. 20: Washer Nozzles, Two Integral Latches, Nozzle Orifices & Washer Plumbing Fittings
Courtesy of CHRYSLER GROUP, LLC

The fluidic washer nozzles (2) are constructed of molded plastic and include an integral check valve.

Each nozzle has two integral latches (4) that secure them in dedicated holes in the hood panel near the base of the windshield. The domed upper surface of the washer nozzle is visible on the outside of the hood panel and the nozzle orifices (1) is oriented towards the windshield glass.

An integral diaphragm type check valve is contained within the body of each nozzle. The washer plumbing fittings (3) for the washer nozzles extend below the hood panel and are accessible from the engine compartment.

The washer nozzles cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced.

OPERATION

OPERATION

The two washer nozzles are designed to dispense washer fluid into the wiper pattern area on the outside of the windshield glass. Pressurized washer fluid is fed to each nozzle from the washer reservoir by the washer pump/motor unit through a single hose, which is attached to a barbed nipple on each washer nozzle below the hood panel. A fluidic matrix within the washer nozzle causes the pressurized washer fluid to be emitted from the nozzle orifice as an oscillating stream to more effectively cover a larger area of the glass to be cleaned.

The integral check valve in each nozzle prevents washer fluid from draining out of the washer supply hoses back to the washer reservoir. This drain-back would result in a lengthy delay after the washer switch is actuated until washer fluid was dispensed through the nozzles, because the washer pump would have to refill the washer plumbing from the reservoir to the nozzles. Such a drain-back condition could also result in water, dirt, or other outside contaminants being siphoned into the washer system through the washer nozzle orifice. This water could subsequently freeze and plug the nozzle, while other contaminants could interfere with proper nozzle operation and cause improper nozzle spray patterns. In addition, the check valve prevents washer fluid from siphoning through the washer nozzles after the washer system is turned OFF.

When the washer pump pressurizes and pumps washer fluid from the reservoir through the washer plumbing, the fluid pressure unseats a diaphragm from over a sump well within the nozzle by overriding the spring pressure applied to it by a piston. With the diaphragm unseated, washer fluid is allowed to flow toward the nozzle orifice. When the washer pump stops operating, the spring pressure on the piston seats the diaphragm over the sump well in the nozzle and fluid flow in either direction within the washer plumbing is prevented.

REMOVAL

REMOVAL

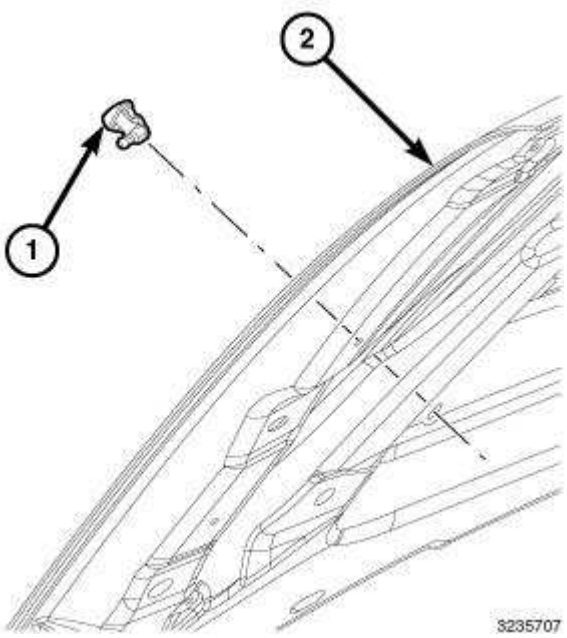

Fig. 21: Hood & Washer Nozzle
Courtesy of CHRYSLER GROUP, LLC

1. From the underside of the hood (2), remove the push-in retainers that secure the rear edge of the hood silencer pad to the inner hood reinforcement as necessary to access the washer nozzle (1) hose connections.
2. From the underside of the hood, disconnect the washer nozzle hose fitting from the barbed nipple of the washer nozzle.
3. From the underside of the hood, release the integral latch features of the washer nozzle and push the nozzle out through the mounting hole toward the top side of the hood.
4. Remove the washer nozzle from the top of the hood panel.

INSTALLATION

INSTALLATION

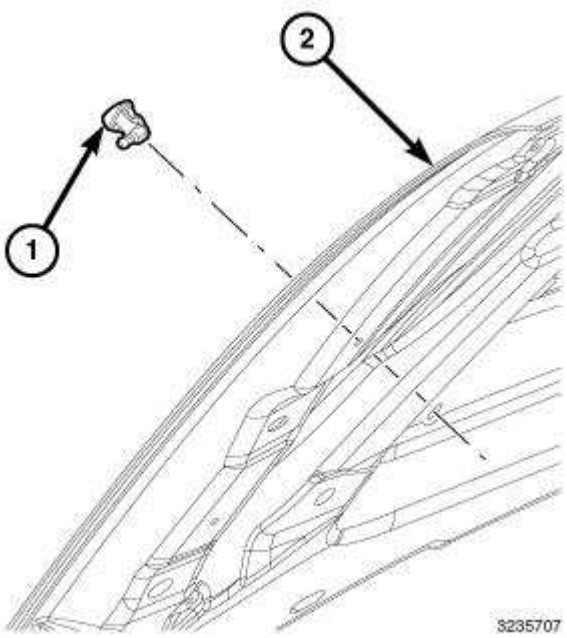

Fig. 22: Hood & Washer Nozzle
Courtesy of CHRYSLER GROUP, LLC

1. Position the washer nozzle (1) to the mounting hole on the outside of the hood panel (2).
2. Align the anti-rotation tabs of the nozzle with the anti-rotation notches in the mounting hole.
3. Using hand pressure, push firmly and evenly on the top of the washer nozzle until the integral latch features lock into place on the underside of the hood.
4. From the underside of the hood, reconnect the washer hose fitting to the barbed nipple of the nozzle.
5. Reinstall the push-in retainers that secure the rear edge of the hood silencer pad to the inner hood reinforcement.

PUMP, WINDSHIELD WASHER

DESCRIPTION

DESCRIPTION

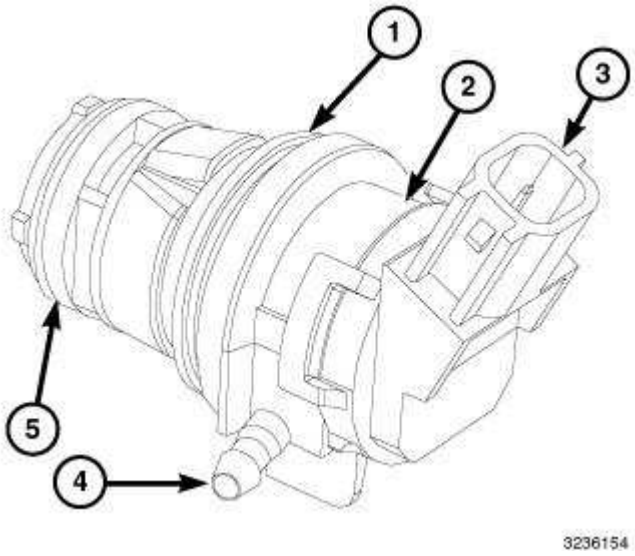

Fig. 23: Washer Pump/Motor Unit, Inlet Nipple, Grommet Seal, Barbed Outlet Nipple & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

The washer pump/motor unit (2) is located in a sump area on the outboard facing side of the washer reservoir on the right frame rail, ahead of the right front wheel house. A small permanently lubricated and sealed electric motor is coupled to the rotor-type washer pump.

An inlet nipple (5) on the end of the pump housing passes through a rubber grommet seal (1) installed in a dedicated mounting hole in the sump area at the base of the washer reservoir. When the pump is installed in the reservoir, a barbed outlet nipple (4) on the pump housing connects the unit to the front washer hose.

The washer pump/motor unit is retained on the reservoir by the interference fit between the pump inlet nipple and the grommet seal, which is a light press fit. An integral connector receptacle (3) on the top of the motor housing connects the unit to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness.

The washer pump/motor unit cannot be repaired. If ineffective or damaged, the entire washer pump/motor unit must be replaced.

OPERATION

OPERATION

The washer pump/motor unit features a small Direct Current (DC) electric motor. The motor is connected to the vehicle electrical system through a single take out and two-cavity connector of the headlamp and dash wire harness. The motor is grounded at all times through another take out of the headlamp and dash wire harness with a single eyelet terminal connector that is secured by a screw to the body sheet metal in the engine compartment.

The Body Control Module (BCM) (also known as the Common Body Controller/CBC) controls the

washer pump/motor control circuit through a high side driver based upon electronic **washer request** messages received over the Controller Area Network (CAN) data bus from the Steering Control Module (SCM). The SCM monitors hard wired analog and multiplex inputs from the washer switch circuitry contained within the multi-function switch to determine the proper electronic messages to send.

Washer fluid is drawn through the pump inlet nipple from the washer reservoir to the inlet port of the washer pump housing. A filter screen integral to the pump inlet port prevents most debris from entering the pump housing. When the pump motor is energized, the motor spins the rotor within the washer pump. The spinning pump rotor pressurizes the washer fluid and forces it through the pump outlet nipple, the washer plumbing, and the washer nozzles onto the windshield glass.

The washer pump/motor unit and the hard wired circuits connected to the unit may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide many features of the wiper and washer system. The most reliable, efficient, and accurate means to diagnose the washer pump/motor unit or the electronic controls and communication related to washer pump/motor unit operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

NOTE: The washer pump/motor unit may be removed from the washer reservoir without removing the reservoir from the vehicle.

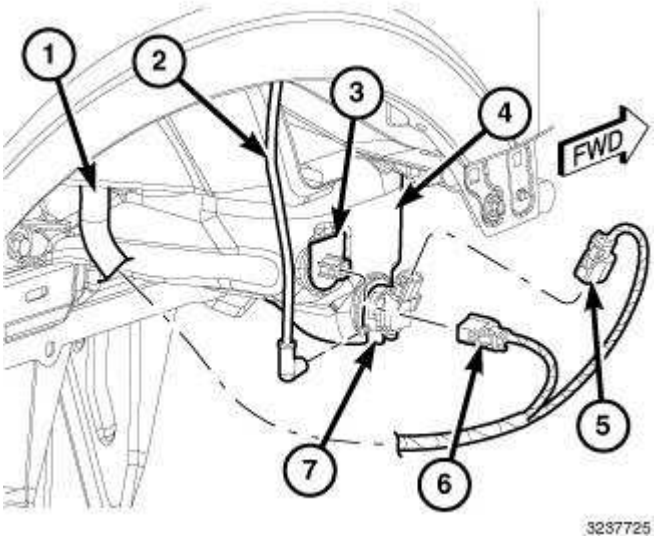

Fig. 24: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.

2. Turn the steering wheel to move the front wheels to the full right turn position.
3. Raise and support the vehicle.
4. Remove the fasteners that secure the forward end of the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
5. Pull the forward end of the splash shield away from the inner fender panel and front fascia far enough to access the washer pump/motor unit (7) on the washer reservoir (4) on the outboard side of the right frame rail.
6. Disconnect the headlamp and dash wire harness (1) connector for the washer pump motor (5) from the motor connector receptacle.
7. Disconnect the washer hose (2) from the barbed outlet nipple of the washer pump and allow the washer fluid to drain into a clean container for reuse.
8. Using hand pressure, firmly grasp and pull the washer pump outward far enough to disengage the pump inlet nipple from the rubber grommet seal in the reservoir. Care must be taken not to damage the reservoir.
9. Remove the washer pump/motor unit from the washer reservoir.
10. Remove the rubber grommet seal from the washer pump mounting hole in the reservoir and discard.

INSTALLATION

INSTALLATION

NOTE: The washer pump/motor unit may be removed from the washer reservoir without removing the reservoir from the vehicle.

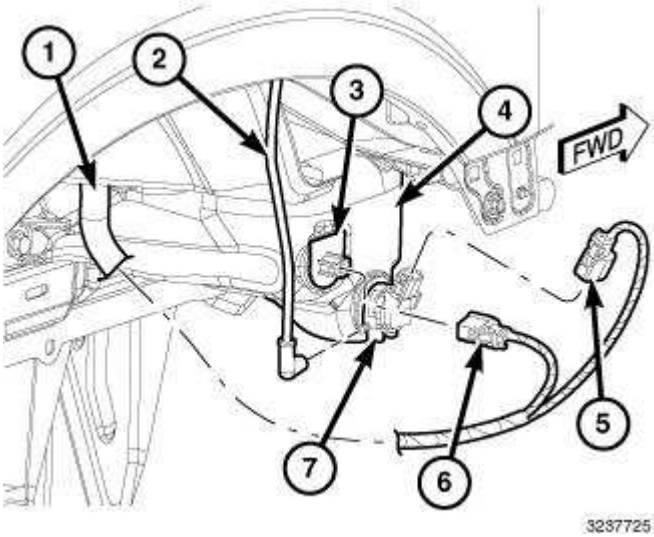

Fig. 25: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate a new rubber grommet seal with clean washer fluid and install it into the washer pump mounting hole in the washer reservoir (4). Always use a new rubber grommet seal on the reservoir.
2. Position the inlet nipple at the base of the pump housing of the washer pump/motor unit (7) to the rubber grommet seal in the reservoir.
3. Using hand pressure, press firmly and evenly on the washer pump/motor unit until the inlet nipple is fully seated in the rubber grommet seal in the pump mounting hole of the reservoir.
4. Reconnect the washer hose (2) to the barbed outlet nipple of the washer pump.
5. Reconnect the headlamp and dash wire harness (1) connector for the washer pump/motor unit (5) to the connector receptacle on the top of the pump motor.
6. Reinstall the fasteners that secure the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
7. Lower the vehicle.
8. Reconnect the battery negative cable.
9. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.

RESERVOIR, WINDSHIELD WASHER

DESCRIPTION

DESCRIPTION

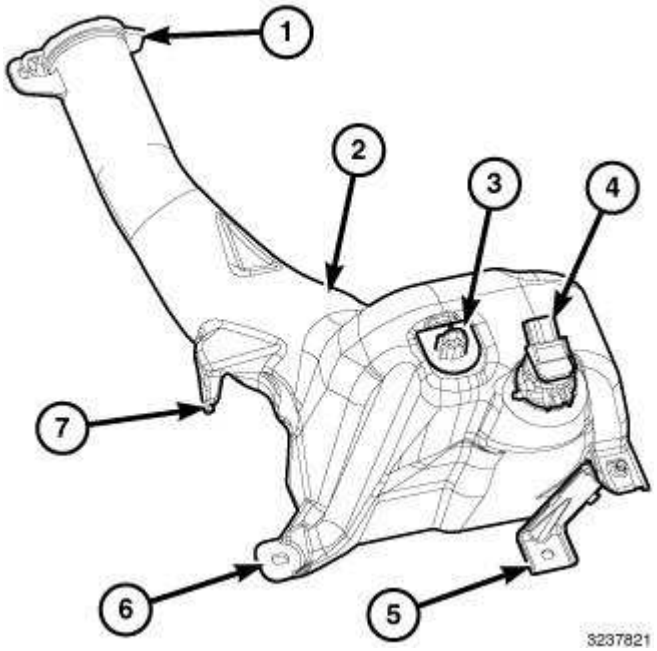

Fig. 26: Fluid Reservoir, Filler Neck And Cap Unit, Washer Pump/Motor Unit, Switch, Locating Post, Mounting Tab & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

The molded plastic washer fluid reservoir (2) is mounted on the outboard side of the right frame rail, ahead the right front wheel, where it is concealed by the right front wheel house splash shield. The only visible component of the washer reservoir is the filler neck and cap unit (1), which extends upward into the engine compartment just forward of the right strut tower. A bright yellow plastic filler cap with a rubber seal and an International Control and Display Symbol icon for **Windshield Washer** and the text **Washer Fluid Only** molded into it snaps over the open end of the filler neck. The cap hinges on and is secured to a molded-in hook formation on the rear of the reservoir filler neck.

There are separate, dedicated holes on the outboard side of the reservoir provided for the washer pump/motor unit (4) and the washer fluid level switch (3). The rear inboard side of the washer reservoir has an integral locating post (7) and an integral mounting tab (6), while the front outboard corner has a mounting tab that includes a stamped steel mounting bracket (5). The rear mounting tab and front mounting bracket are secured to the frame rail by screws. The right front fender wheel house splash shield must be removed to access the washer reservoir for service.

The washer reservoir cannot be repaired and, if ineffective or damaged, it must be replaced. The washer reservoir, rubber grommet seals for the washer pump/motor unit and the washer fluid level switch as well as the filler cap are each available for individual service replacement.

OPERATION

OPERATION

The washer fluid reservoir provides a secure, on-vehicle storage location for a large reserve of washer fluid for operation of the washer system. The washer reservoir filler neck provides a clearly marked and readily accessible point from which to add washer fluid to the reservoir.

The washer pump/motor unit is located in a sump area near the bottom on the outboard side of the reservoir to be certain that washer fluid will be available to the pump as the fluid level in the reservoir becomes depleted. The washer pump/motor unit is mounted in the lowest position in the sump. The washer fluid level switch is mounted just above the sump area of the reservoir so that there will be adequate warning to the vehicle operator that the washer fluid level is low, before the washer system will no longer operate.

REMOVAL

REMOVAL

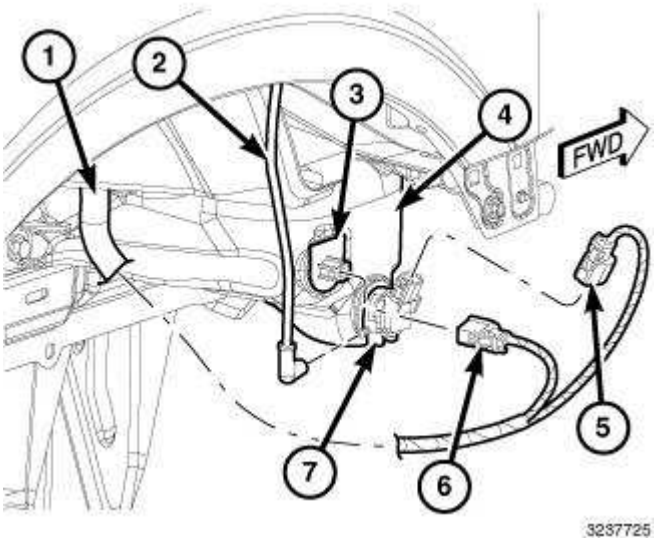

Fig. 27: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the ElectroHydraulic Power Steering (EHPS) pump from the outboard side of the right frame rail. Refer to **PUMP, REMOVAL** .
3. Disconnect the headlamp and dash wire harness (1) connector for the washer pump (5) from the washer pump motor (7) connector receptacle.
4. Disconnect the headlamp and dash wire harness connector for the washer fluid level switch (6) from the switch (3) connector receptacle.
5. Disconnect the washer hose (2) from the barbed outlet nipple of the washer pump and allow the washer fluid to drain into a clean container for reuse.

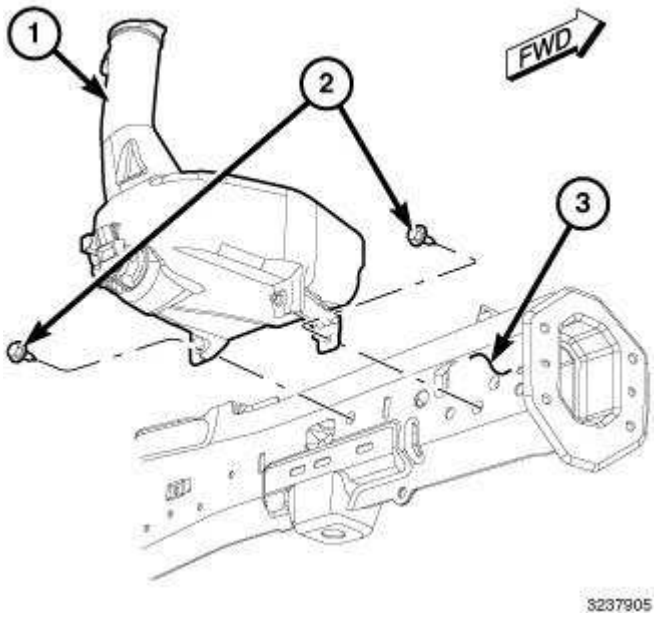

Fig. 28: Two Screws, Washer Reservoir & Right Frame Rail
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two screws (2) that secure the washer reservoir (1) to the outboard side of the right frame rail (3).
7. Lower the washer reservoir from the vehicle, rotating it as necessary for clearance.

INSTALLATION

INSTALLATION

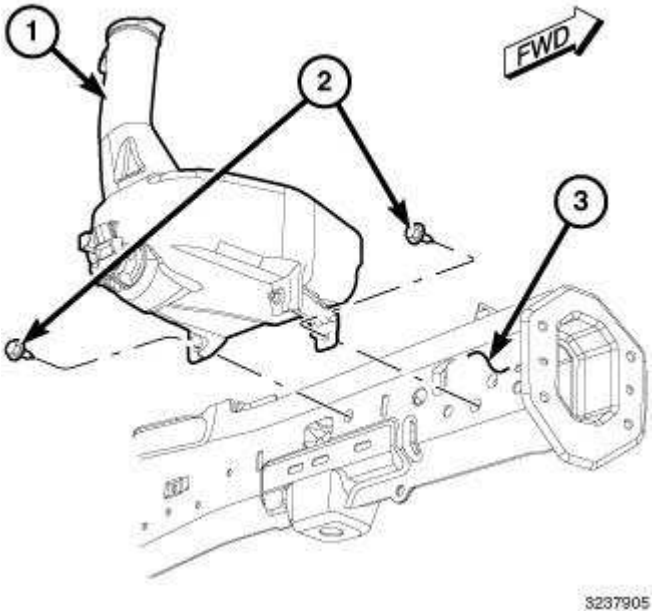

Fig. 29: Two Screws, Washer Reservoir & Right Frame Rail
Courtesy of CHRYSLER GROUP, LLC

1. Lift the washer reservoir (1) up into the vehicle and position it to the outboard side of the right frame rail (3).
2. Install and tighten the two screws (2) that secure the reservoir to the frame rail. Tighten the screws securely.

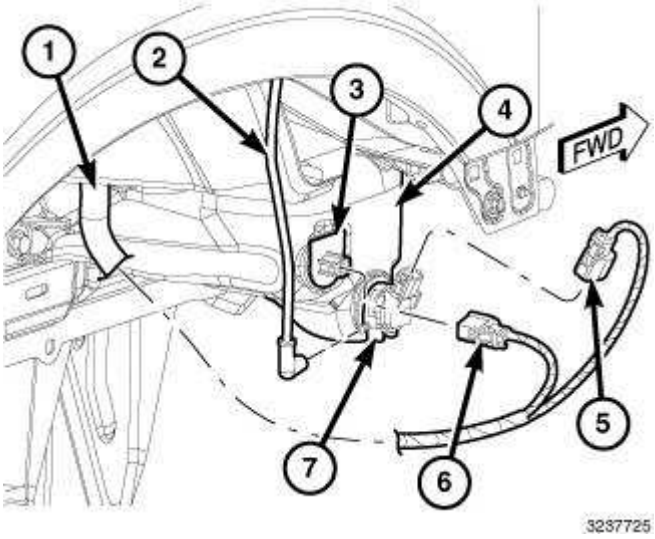

Fig. 30: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

3. Reconnect the washer hose (2) to the barbed outlet nipple of the washer pump (7).
4. Reconnect the headlamp and dash wire harness (1) connector for the washer pump/motor unit (5) to the connector receptacle on the top of the pump motor.
5. Reconnect the headlamp and dash wire harness connector for the washer fluid level switch (6) to the connector receptacle for the switch (3).
6. Reinstall the ElectroHydraulic Power Steering (EHPS) pump onto the outboard side of the right frame rail. Refer to **PUMP, INSTALLATION** .
7. Reconnect the battery negative cable.
8. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.

SWITCH, WASHER FLUID LEVEL

DESCRIPTION

DESCRIPTION

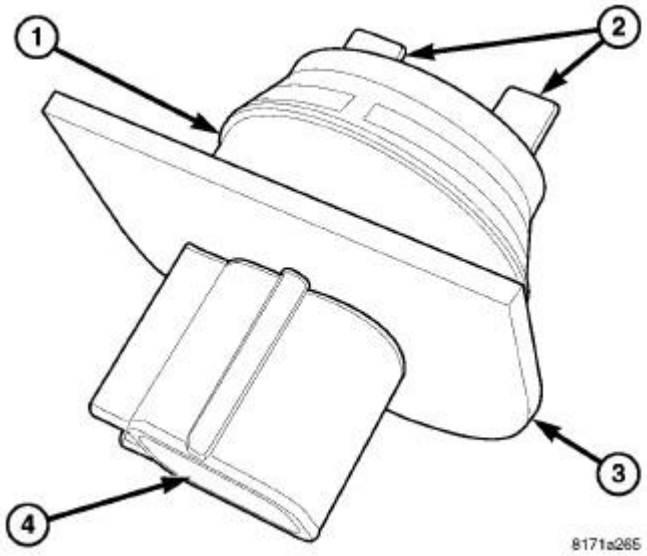

Fig. 31: Washer Fluid Level Switch
Courtesy of CHRYSLER GROUP, LLC

The washer fluid level switch (3) is a two-pin conductivity sensor with no moving parts mounted on the outboard facing side of the washer reservoir on the right frame rail, ahead of the left front wheel opening. Only the molded plastic switch mounting flange and the integral connector receptacle (4) are visible when the switch is installed in the reservoir.

A short nipple formation (1) extends from the inner surface of the switch mounting flange, and a barb on the nipple is pressed through a rubber grommet seal installed in the mounting hole of the reservoir. Two over-molded pins or electrodes (2) extend from the back of the nipple formation. The switch is connected to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness.

The washer fluid level switch cannot be adjusted or repaired. If ineffective or damaged, the switch must be replaced.

OPERATION

OPERATION

The washer fluid level switch uses fluid conductivity to monitor the level of the washer fluid in the washer reservoir. Electricity is conducted between the two switch pins or electrodes only when they are immersed in the washer fluid, which closes the switch circuit. When the fluid level in the washer reservoir falls below the pins, electrical current cannot be conducted and the switch becomes an open circuit, which signals a low fluid condition.

In order to prevent an electrical charge from accumulating in the electrical leads of the switch, the switch receives current that is pulsed from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) located in the passenger compartment. The BCM monitors the switch return signal and is programmed to respond to three consecutive open switch readings by sending an

electronic **washer fluid indicator lamp-ON request** message to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) over the Controller Area Network (CAN) data bus. The IC responds to this message by illuminating the washer fluid indicator and by sounding an audible chime tone warning.

The washer fluid level switch is connected to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness. The switch is connected in series between a sensor return circuit and the washer fluid switch sense input to the BCM.

The washer fluid level switch and the hard wired circuits between the switch and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the washer fluid level indicator or the electronic controls or communication between other modules and devices that provide some features of the washer system. The most reliable, efficient, and accurate means to diagnose the washer fluid level indicator or the electronic controls and communication related to washer fluid level switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

NOTE: The washer fluid level switch may be removed from the washer reservoir without removing the reservoir from the vehicle.

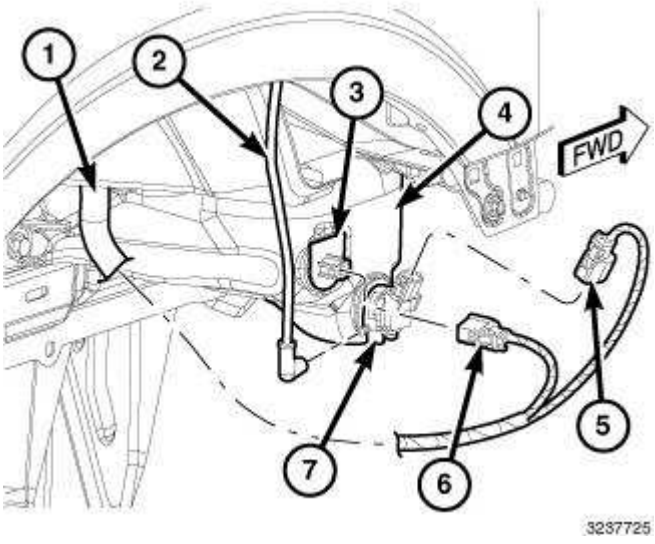

Fig. 32: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Turn the steering wheel to move the front wheels to the full right turn position.

3. Raise and support the vehicle.
4. Remove the fasteners that secure the forward end of the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
5. Pull the forward end of the splash shield away from the inner fender panel and front fascia far enough to access the washer fluid level switch (3) on the washer reservoir (4) on the outboard side of the right frame rail.
6. Disconnect the headlamp and dash wire harness (1) connector for the washer fluid level switch (6) from the switch connector receptacle.
7. Disconnect the washer hose (2) from the barbed outlet nipple of the washer pump and allow the washer fluid to drain into a clean container for reuse.
8. Using hand pressure, firmly grasp and pull the washer fluid level switch outward far enough to disengage the barbed switch nipple from the rubber grommet seal in the reservoir. Care must be taken not to damage the reservoir.
9. Remove the washer fluid level switch from the washer reservoir.
10. Remove the rubber grommet seal from the washer fluid level switch mounting hole in the reservoir and discard.

INSTALLATION

INSTALLATION

NOTE: The washer fluid level switch may be removed from the washer reservoir without removing the reservoir from the vehicle.

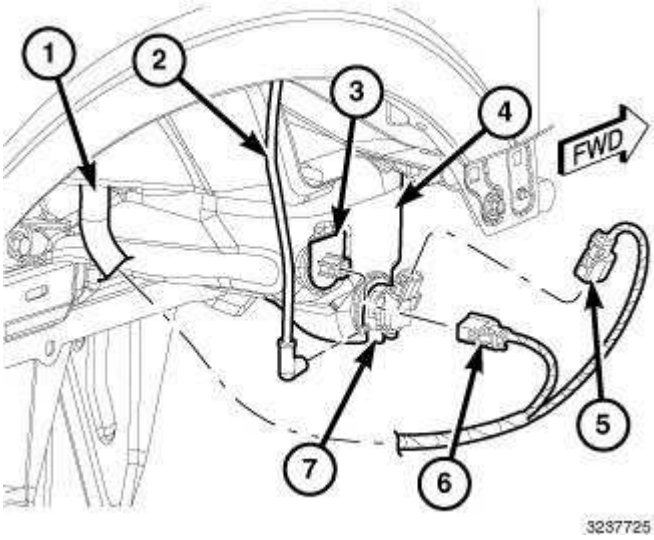

Fig. 33: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate a new rubber grommet seal with clean washer fluid and install it into the washer fluid

level switch mounting hole in the washer reservoir (4). Always use a new rubber grommet seal on the reservoir.

2. Position the barbed nipple of the of the washer fluid level switch (3) to the rubber grommet seal in the reservoir.
3. Using hand pressure, press firmly and evenly on the washer fluid level switch until the barbed nipple is fully seated in the rubber grommet seal in the switch mounting hole of the reservoir.
4. Reconnect the washer hose (2) to the barbed outlet nipple of the washer pump.
5. Reconnect the headlamp and dash wire harness (1) connector for the washer fluid level switch (6) to the connector receptacle for the switch.
6. Reinstall the fasteners that secure the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
7. Lower the vehicle.
8. Reconnect the battery negative cable.
9. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.

SYSTEM WIRING DIAGRAMS

Chrysler - 300

AIR CONDITIONING

Fig. 1: Automatic A/C Circuit (1 of 3)

Fig. 2: Automatic A/C Circuit (2 of 3)

Fig. 3: Automatic A/C Circuit (3 of 3)

ANTI-LOCK BRAKES

Fig. 4: Anti-lock Brakes Circuit (1 of 2)

Fig. 5: Anti-lock Brakes Circuit (2 of 2)

ANTI-THEFT

Fig. 6: Forced Entry Circuit

Fig. 7: Passive Entry Circuit

BODY CONTROL MODULES

Fig. 8: Body Control Modules Circuit (1 of 2)

Fig. 9: Body Control Modules Circuit (2 of 2)

COMPUTER DATA LINES

Fig. 10: Computer Data Lines Circuit (1 of 3)

Fig. 11: Computer Data Lines Circuit (2 of 3)

Fig. 12: Computer Data Lines Circuit (3 of 3)

COOLING FAN

Fig. 13: Cooling Fan Circuit

CRUISE CONTROL

Fig. 14: Cruise Control Circuit

DEFOGGERS

Fig. 15: Defoggers Circuit

ELECTRONIC POWER STEERING

Fig. 16: Electronic Power Steering Circuit

ELECTRONIC SUSPENSION

Fig. 17: Electronic Suspension Circuit

ENGINE PERFORMANCE

3.6L

Fig. 18: 3.6L, Engine Performance Circuit (1 of 5)

Fig. 19: 3.6L, Engine Performance Circuit (2 of 5)

Fig. 20: 3.6L, Engine Performance Circuit (3 of 5)

Fig. 21: 3.6L, Engine Performance Circuit (4 of 5)

Fig. 22: 3.6L, Engine Performance Circuit (5 of 5)

5.7L

Fig. 23: 5.7L, Engine Performance Circuit (1 of 5)

Fig. 24: 5.7L, Engine Performance Circuit (2 of 5)

Fig. 25: 5.7L, Engine Performance Circuit (3 of 5)

Fig. 26: 5.7L, Engine Performance Circuit (4 of 5)

Fig. 27: 5.7L, Engine Performance Circuit (5 of 5)

6.4L

Fig. 28: 6.4L, Engine Performance Circuit (1 of 5)

Fig. 29: 6.4L, Engine Performance Circuit (2 of 5)

Fig. 30: 6.4L, Engine Performance Circuit (3 of 5)

Fig. 31: 6.4L, Engine Performance Circuit (4 of 5)

Fig. 32: 6.4L, Engine Performance Circuit (5 of 5)

EXTERIOR LIGHTS

Fig. 33: Backup Lamps Circuit

Fig. 34: Exterior Lamps Circuit (1 of 2)

Fig. 35: Exterior Lamps Circuit (2 of 2)

GROUND DISTRIBUTION

Fig. 36: Ground Distribution Circuit (1 of 5)

Fig. 37: Ground Distribution Circuit (2 of 5)

Fig. 38: Ground Distribution Circuit (3 of 5)

Fig. 39: Ground Distribution Circuit (4 of 5)

Fig. 40: Ground Distribution Circuit (5 of 5)

HEADLIGHTS

Fig. 41: Headlamps Circuit

Fig. 42: Headlamps Leveling Circuit

HORN

Fig. 43: Horn Circuit

INSTRUMENT CLUSTER

Fig. 44: Instrument Cluster Circuit (1 of 2)

Fig. 45: Instrument Cluster Circuit (2 of 2)

INTERIOR LIGHTS

Fig. 46: Courtesy Lamps Circuit (1 of 3)

Fig. 47: Courtesy Lamps Circuit (2 of 3)

Fig. 48: Courtesy Lamps Circuit (3 of 3)

Fig. 49: Instrument Illumination Circuit (1 of 2)

Fig. 50: Instrument Illumination Circuit (2 of 2)

MEMORY SYSTEMS

Fig. 51: Memory Mirrors Circuit (1 of 2)

Fig. 52: Memory Mirrors Circuit (2 of 2)

Fig. 53: Memory Seat Circuit

NAVIGATION

Fig. 54: Blind Spot Monitoring Circuit

Fig. 55: Parking Assistant Circuit

Fig. 56: Rear Camera Circuit

POWER DISTRIBUTION

Fig. 57: Power Distribution Circuit (1 of 4)

Fig. 58: Power Distribution Circuit (2 of 4)

Fig. 59: Power Distribution Circuit (3 of 4)

Fig. 60: Power Distribution Circuit (4 of 4)

POWER DOOR LOCKS

Fig. 61: Power Door Locks Circuit

POWER MIRRORS

Fig. 62: Automatic Day/Night Mirror Circuit

Fig. 63: Power Mirrors Circuit

POWER SEATS

Fig. 64: Adjustable Pedal Circuit

Fig. 65: Driver Power Seat Circuit

Fig. 66: Driver"s Lumbar Circuit

Fig. 67: Heated Seats Circuit (1 of 2)

Fig. 68: Heated Seats Circuit (2 of 2)

Fig. 69: Heated Steering Wheel Circuit

Fig. 70: Passenger Power Seat Circuit

Fig. 71: Passenger"s Lumbar Circuit

POWER TOP/SUNROOF

Fig. 72: Power Top/Sunroof Circuit

POWER WINDOWS

Fig. 73: Power Windows Circuit

Fig. 74: Rear Window Sun Shade Circuit

RADIO

Fig. 75: Hands Free Module Circuit

Fig. 76: Radio Circuit, Base

Fig. 77: Radio Circuit, Premium (1 of 3)

Fig. 78: Radio Circuit, Premium (2 of 3)

Fig. 79: Radio Circuit, Premium (3 of 3)

SHIFT INTERLOCK

Fig. 80: Shift Interlock Circuit, 5 Speed A/T

Fig. 81: Shift Interlock Circuit, 8 Speed A/T

STARTING/CHARGING

Fig. 82: Charging Circuit

Fig. 83: Starting Circuit

SUPPLEMENTAL RESTRAINTS

Fig. 84: Supplemental Restraints Circuit (1 of 3)

Fig. 85: Supplemental Restraints Circuit (2 of 3)

Fig. 86: Supplemental Restraints Circuit (3 of 3)

TRANSMISSION

Fig. 87: A/T Circuit, 5 Speed

Fig. 88: A/T Circuit, 8 speed

Fig. 89: AWD Circuit

TRUNK, TAILGATE, FUEL DOOR

Fig. 90: Deck Lid Release Circuit

Fig. 91: Fuel Door Release Circuit

WARNING SYSTEMS

Fig. 92: Chime Circuit

Fig. 93: Tire Pressure Monitoring Circuit

WIPER/WASHER

Fig. 94: Wiper/Washer Circuit