2009 ENGINE

5.7L - Service Information - Aspen & Durango

DESCRIPTION

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The 5.7L engine (348 CID) eight-cylinder engine is a 90° V-Type lightweight, deep skirt cast iron block, aluminum heads, single cam, overhead valve engine with hydraulic roller tappets. The heads incorporate splayed valves with a hemispherical style combustion chamber and dual spark plugs. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2.

DIAGNOSIS AND TESTING

INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either performance (e.g., engine idles rough and stalls) or mechanical (e.g., a strange noise).

See **PERFORMANCE** and **MECHANICAL** for possible causes and corrections of malfunctions.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that can not be isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following diagnosis:

- Cylinder Compression Pressure Test. See **CYLINDER COMPRESSION PRESSURE LEAKAGE**.
- Cylinder Combustion Pressure Leakage Test. See **CYLINDER COMBUSTION PRESSURE LEAKAGE**.
- Engine Cylinder Head Gasket Failure Diagnosis. See **Engine/Cylinder Head - Diagnosis and Testing**.
- Intake Manifold Leakage Diagnosis. See **Engine/Manifolds/MANIFOLD, Intake - Diagnosis and Testing**.

PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION	
ENGINE WILL NOT START	1. Weak battery.	1. Charge or replace as necessary.	
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of	

		light mineral grease to the terminals.	
	3. Faulty starter.	3. Refer to **Electrical/Starting - Diagnosis and Testing** .	
	4. Incorrect spark plug gap.	4. Refer to **Electrical/Ignition Control - Specifications** .	
	5. Dirt or water in fuel system.	5. Clean system and replace fuel filter.	
	6. Faulty fuel pump, relay or wiring.	6. See **Engine - Diagnosis and Testing**	
ENGINE STALLS OR ROUGH IDLE	1. Idle speed set to low.	1. See **Engine - Diagnosis and Testing**	
	2. Vacuum leak.	2. Inspect intake manifold and vacuum hoses, repair or replace as necessary.	-
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs.	1. Replace spark plugs.	
	2. Dirt or water in fuel system.	2. Clean system and replace fuel filter.	
	3. Blown cylinder head gasket.	3. Replace cylinder head gasket.	
	4. Low compression.	4. See **CYLINDER COMPRESSION PRESSURE LEAKAGE**.	
	5. Burned, warped or pitted valves.	5. Replace as necessary.	
	6. Plugged or restricted exhaust system.	6. Inspect and replace as necessary.	

CYLINDER COMPRESSION PRESSURE LEAKAGE

NOTE: The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

NOTE: Ensure the battery is completely charged and the engine starter motor is in

good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plugs and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Disable the fuel system and perform the fuel system pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the 3rd revolution. Continue the test for the remaining cylinders.

NOTE: The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.

7. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
8. If one or more cylinders have abnormally low compression pressures, repeat the compression test.

NOTE: If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question.

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. See **CYLINDER COMBUSTION PRESSURE LEAKAGE**.

CYLINDER COMBUSTION PRESSURE LEAKAGE

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
3. Remove the spark plugs.
4. Remove the oil filler cap.
5. Remove the air cleaner hose.

6. Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1,379 kPa (200 psi) maximum and 552 kPa (80 psi) recommended.
7. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set piston of cylinder to be tested at TDC compression. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with no more than 25% leakage.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART**.

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
AIR ESCAPES THROUGH THROTTLE BODY	Intake valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH TAILPIPE	Exhaust valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH RADIATOR	Head gasket leaking or cracked cylinder head or block	Remove cylinder head and inspect. Replace defective part.
MORE THAN 50% LEAKAGE FROM ADJACENT CYLINDERS	Head gasket leaking or crack in cylinder head or block between adjacent cylinders	Remove cylinder head and inspect. Replace gasket, head, or block as necessary.
MORE THAN 25% LEAKAGE AND AIR ESCAPES THROUGH OIL FILLER CAP OPENING ONLY	Stuck or broken piston rings; cracked piston; worn rings and/or cylinder wall	Inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary.

LUBRICATION

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-Rings.	1. Replace as necessary.
	a. Misaligned or damaged.	a. Replace as necessary.
	b. Loose fasteners, broken or porous metal parts.	b. Tighten fasteners, Repair or replace metal parts.
	2. Crankshaft rear seal.	2. Replace as necessary.
	3. Crankshaft seal flange. Scratched, nicked or grooved.	3. Polish or replace crankshaft.
	4. Oil pan flange cracked.	4. Replace oil pan.

	5. Front cover seal, damaged or misaligned.	5. Replace seal.
	6. Scratched or damaged vibration damper hub.	6. Polish or replace damper.
-	7. Crankshaft Rear Flange Microporosity.	7. Replace Crankshaft.
OIL PRESSURE DROP	1. Low oil level.	1. Check and correct oil level.
	2. Faulty oil pressure sending unit.	2. Replace sending unit.
	3. Low oil pressure.	3. Check pump and bearing clearance.
	4. Clogged oil filter.	4. Replace oil filter.
	5. Worn oil pump.	5. Replace as necessary.
	6. Thin or diluted oil.	6. Change oil and filter.
	7. Excessive bearing clearance.	7. Replace as necessary.
	8. Oil pump relief valve stuck.	8. Replace oil pump.
	9. Oil pickup tube loose or damaged.	9. Replace as necessary.
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings.	1. Hone cylinder bores and replace rings.
	2. Carbon in oil ring slots.	2. Replace rings.
	3. Incorrect ring size installed.	3. Replace rings.
	4. Worn valve guides.	4. Ream guides and replace valves.
	5. Leaking intake gasket(s).	5. Replace intake gasket(s).
	6. Leaking valve guide seals.	6. Replace valve guide seals.

MECHANICAL

ENGINE MECHANICAL DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase	1. Check for correct oil level. Adjust oil level by draining or adding as needed.
	2. Thin or diluted oil	2. Change oil. See **Engine/Lubrication/OIL - Standard Procedure**
	3. Low oil pressure	3. Check engine oil level. If OK, perform engine oil pressure test. See **Engine/Lubrication - Diagnosis and Testing**.
	4. Dirt in tappets/lash adjusters	4. Clean/replace hydraulic tappets/lash adjusters.
	5. Bent push rod(s)	5. Install new push rods.
	6. Worn rocker arms	6. Inspect oil supply to rocker arms and replace worn arms as needed.
	7. Worn tappets/lash adjusters	7. Install new hydraulic tappets/lash

		adjusters.
	8. Worn valve guides	8. Inspect all valve guides and replace as necessary.
	9. Excessive runout of valve seats or valve faces	9. Grind valves and seats.
CONNECTING ROD NOISE	1. Insufficient oil supply	1. Check engine oil level.
	2. Low oil pressure	2. Check engine oil level. If OK, Perform engine oil pressure test. See **Engine/Lubrication - Diagnosis and Testing**.
	3. Thin or diluted oil	3. Change oil to correct viscosity. See **Engine/Lubrication/OIL - Standard Procedure**.
	4. Excessive connecting rod bearing clearance	4. Measure bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Connecting rod journal out of round	5. Replace crankshaft or grind journals.
	6. Misaligned connecting rods	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply	1. Check engine oil level.
	2. Low oil pressure	2. Check engine oil level. If ok, Perform engine oil pressure test. See **Engine/Lubrication - Diagnosis and Testing**.
	3. Thin or diluted oil	3. Change oil to correct viscosity.
	4. Excessive main bearing clearance	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play	5. Check crankshaft thrust bearing for excessive wear on flanges.
	6. Crankshaft main journal out of round or worn	6. Grind journals or replace crankshaft.
	7. Loose flywheel or torque converter	7. Inspect crankshaft, flexplate/flywheel and bolts for damage. Tighten to correct torque.
LOW OIL PRESSURE	1. Low oil level	1. Check oil level and fill if necessary.
	2. Faulty oil pressure sending unit	2. Install new sending unit.
	3. Clogged oil filter	3. Install new oil filter.
	4. Worn oil pump	4. Replace oil pump assembly.
	5. Thin or diluted oil	5. Change oil to correct viscosity.
	6. Excessive bearing clearance	6. Measure bearings for correct clearance.
	7. Oil pump relief valve stuck	7. Remove valve to inspect, clean and reinstall.
	8. Oil pickup tube loose,	8. Inspect oil pickup tube and pump, and

	broken, bent or clogged 9. Oil pump cover warped or cracked	clean or replace if necessary. 9. Install new oil pump.
OIL LEAKS	1. Misaligned or deteriorated gaskets 2. Loose fastener, broken or porous metal part 3. Front or rear crankshaft oil seal leaking 4. Leaking oil gallery plug or cup plug	1. Replace gasket 2. Tighten, repair or replace the part. 3. Replace seal. 4. Remove and reseal threaded plug. Replace cup style plug.
EXCESSIVE OIL CONSUMPTION OR SPARK PLUGS OIL FOULED	1. Defective valve stem seal(s) 2. Worn or broken piston rings 3. Scuffed pistons/cylinder walls 4. Carbon in oil control ring groove 5. Worn valve guides 6. Piston rings fitted too tightly in grooves	1. Repair or replace seal(s). 2. Hone cylinder bores. Install new rings. 3. Hone cylinder bores and replace pistons as required. 4. Remove rings and de-carbon piston. 5. Inspect/replace valve guides as necessary. 6. Remove rings and check ring end gap and side clearance. Replace if necessary.

STANDARD PROCEDURE

REPAIR DAMAGED OR WORN THREADS

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

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

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

HYDROSTATIC LOCK

CAUTION: Do not attempt to run engine. Severe damage could occur.

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

1. Perform the Fuel Pressure Release Procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect the negative battery cable(s) from the battery.
3. Inspect air cleaner, induction system, and intake manifold to make sure the system is dry and clear of foreign material.
4. Place a shop towel around the spark plugs to catch any fluid that may possibly be under pressure in the cylinder head. Remove the spark plugs.
5. With all spark plugs removed, rotate the crankshaft using a breaker bar and socket.
6. Identify the fluid in the cylinders (coolant, fuel, oil).
7. Make sure all fluid has been removed from the cylinders.
8. Repair engine or components as necessary to prevent this problem from occurring again.
9. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This prevents damage on restart.
10. Install new spark plugs. Tighten the spark plugs to 41 N.m (30 ft. lbs.).
11. Drain engine oil. Remove and discard the oil filter.
12. Install the drain plug. Tighten the plug to 34 N.m (25 ft. lbs.).
13. Install a new oil filter.
14. Fill the engine crankcase with the specified amount and grade of oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
15. Connect the negative battery cable(s).
16. Start the engine and check for any leaks.

FORM-IN-PLACE GASKETS AND SEALERS

NOTE: All sealants mentioned below are not used on every engine, they are listed as general reference guide. See service information for specific sealer usage.

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin of a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. All sealing surfaces that use form-in-place gaskets and sealers must be free of grease or oil. Clean surfaces with Mopar® brake parts cleaner prior to sealer application. After the sealer is applied, assemble the parts within 10 minutes.

Numerous types of form-in-place gasket materials are used in the engine area. Mopar® Sealant RTV Silicone Rubber Adhesive, MOPAR® Silicone Rubber RTV, Mopar® ATF-RTV and Mopar® Gasket Maker gasket materials, each have different properties and cannot be used in place of the other.

MOPAR® SEALANT RTV SILICONE RUBBER ADHESIVE is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always

inspect the package for the expiration date before use.

MOPAR® SILICONE RUBBER RTV is used to seal components exposed to engine oil, gear lubricant, and coolant. This material is a specially designed gray silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil, gear lubricant and coolant. Excellent adhesion even on oily surfaces, withstands temperatures to 330°C (626°F). Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

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

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

MOPAR® GASKET SEALANT is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. It can be used on threaded and machined parts under all temperatures. This material also prevents corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or in a 4 oz. or 6 oz. can with applicator.

SEALER APPLICATION

Apply 1 mm (0.040 in.) diameter or less of Mopar® Gasket Maker material to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Tighten the components in place within 15 minutes. Use a locating dowel during assembly to prevent smearing material off the location.

Apply Mopar® RTV or ATF-RTV gasket material in a continuous bead approximately 3 mm (0.120 in.) in diameter. For corner sealing and "T-Joint" locations and waffle pad area, a 0.635 mm (0.025 in.) drop is placed in the center of the gasket contact area. Remove uncured sealant with a shop towel. Tighten the components in place while the sealant is still wet to the touch (within 10 minutes). Use a locating dowel during assembly to prevent smearing material off the location.

REMOVAL

REMOVAL

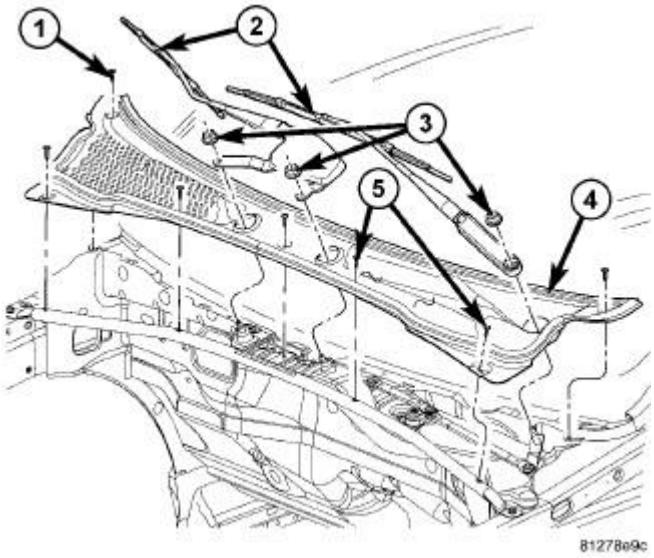

Fig. 1: Cowl Grille
Courtesy of CHRYSLER LLC

1. Remove the cowl grille (4), and cross bar beam. Refer to **Body/Exterior/COVER, Cowl Panel - Removal** .
2. Perform the Fuel System Pressure Release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .

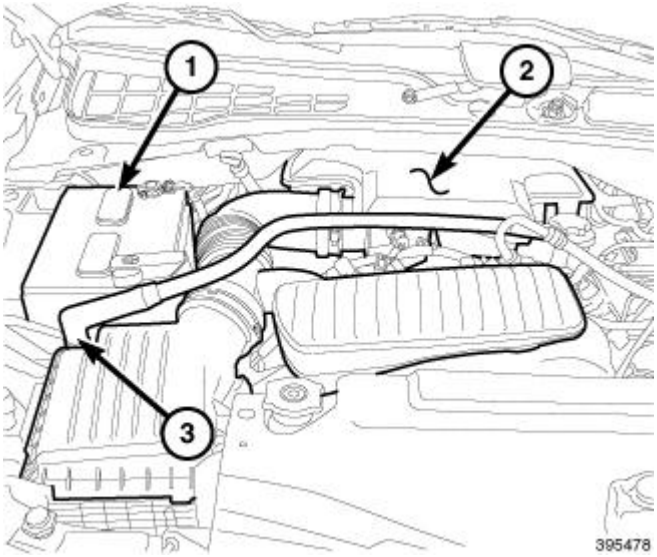

Fig. 2: Locating Battery
Courtesy of CHRYSLER LLC

3. Disconnect the battery (1) negative cable.
4. Remove the air cleaner resonator and duct work as an assembly.
5. Drain cooling system. Refer to **Cooling - Standard Procedure** .

6. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
7. Remove the viscous fan/drive. Refer to **Cooling/Engine/FAN, Cooling - Removal** .
8. Remove the upper crossmember and top core support.
9. Remove the condenser. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Removal** .
10. Remove radiator. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Removal** .

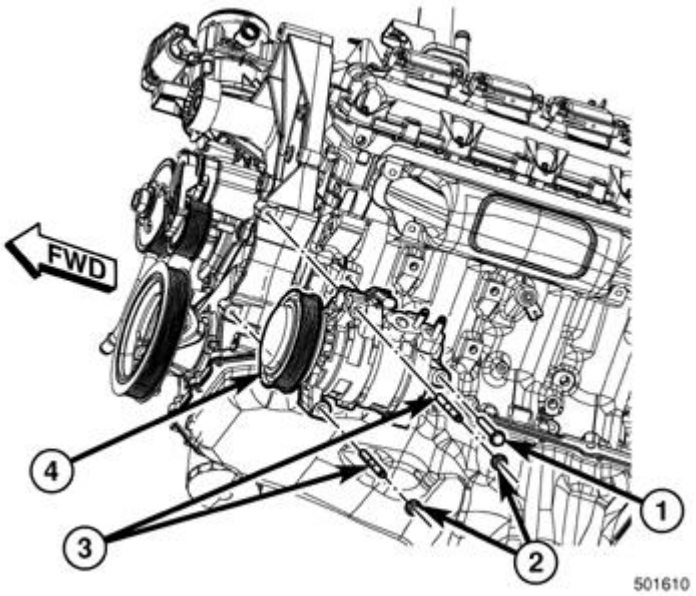

Fig. 3: A/C Compressor
Courtesy of CHRYSLER LLC

11. Evacuate the refrigerant. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
12. Remove the A/C compressor (4). Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal** .
13. Remove generator assembly (2). Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal** .
14. Remove the intake manifold and IAFM as an assembly. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

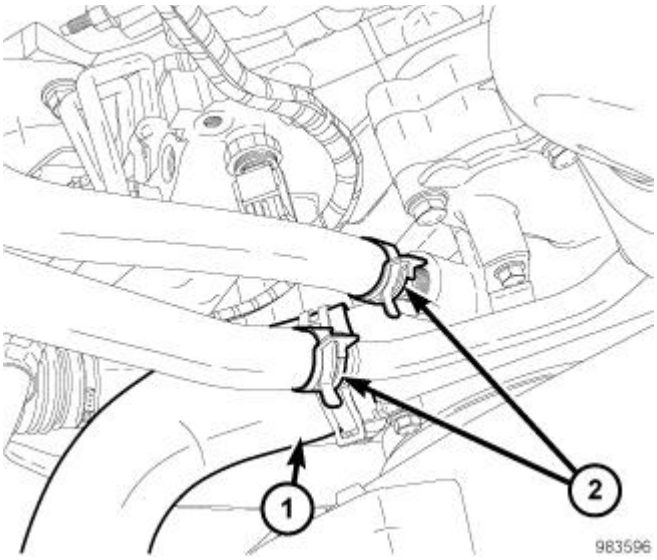

Fig. 4: Heater & Lower Radiator Hose
Courtesy of CHRYSLER LLC

15. Disconnect the heater hoses (2).

NOTE: It is not necessary to disconnect P/S hoses from pump, for P/S pump removal.

16. Remove the power steering pump and set aside.
17. Disconnect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
18. Raise and support the vehicle on a hoist and drain the engine oil.

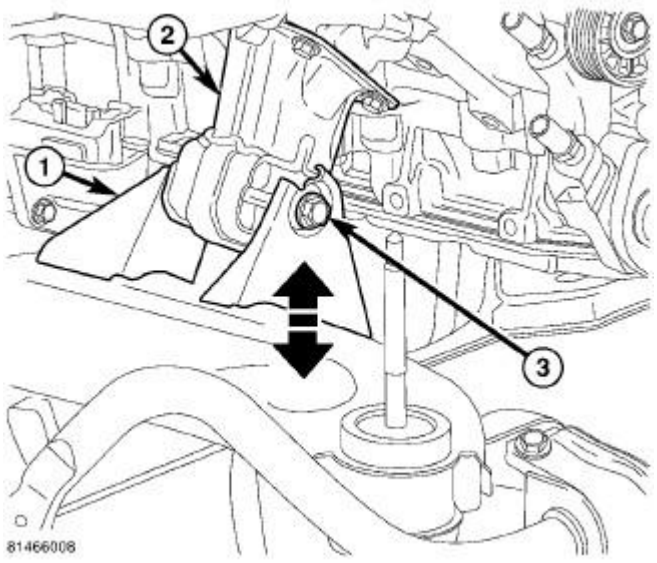

Fig. 5: Engine Mount Bolt

Courtesy of CHRYSLER LLC

19. Remove engine front mount through bolt nuts (3).
20. Disconnect the transmission oil cooler lines from their retainers at the oil pan bolts.
21. Disconnect exhaust pipe at manifolds.

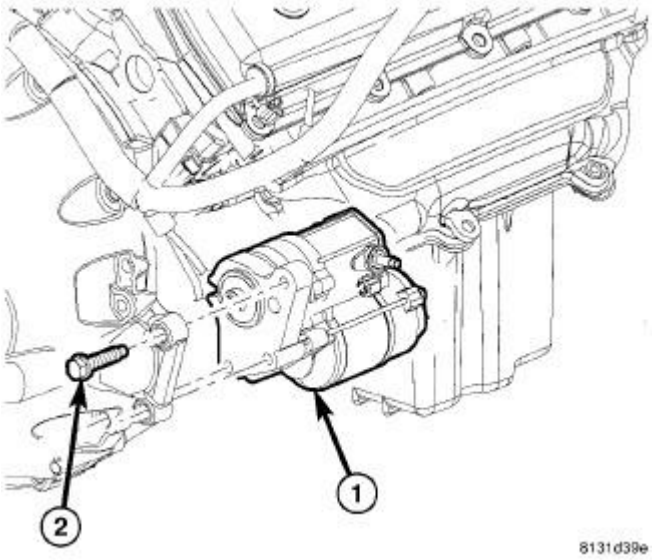

Fig. 6: Relocate Starter
Courtesy of CHRYSLER LLC

22. Disconnect the starter wires. Remove starter motor (1). Refer to **Electrical - Engine Systems/Starting/STARTER - Removal** .

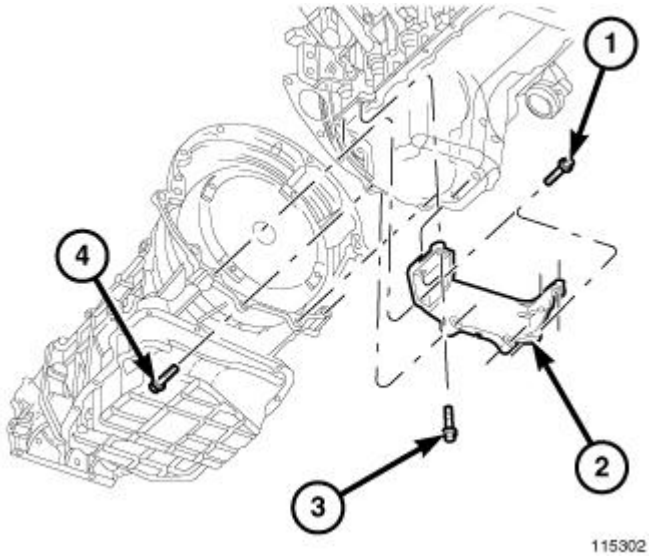

Fig. 7: Structural Cover
Courtesy of CHRYSLER LLC

23. Remove the structural dust cover and transmission inspection cover (2). See **Engine/Engine Block/COVER, Structural Dust - Removal**.

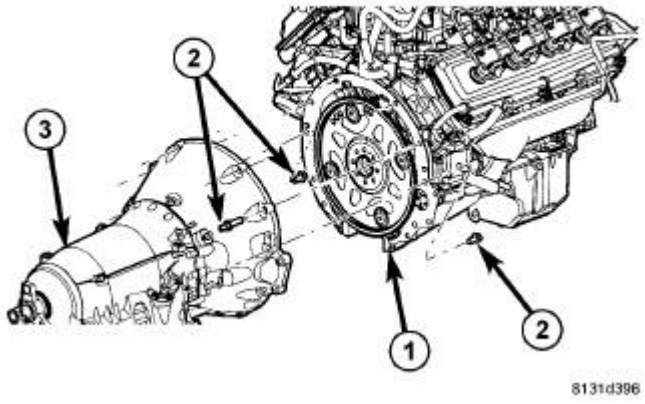

Fig. 8: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

24. Remove drive plate to converter bolts (Automatic transmission equipped vehicles).
25. Remove transmission bell housing to engine block bolts (2).
26. Remove the (OCV) oil control valve.

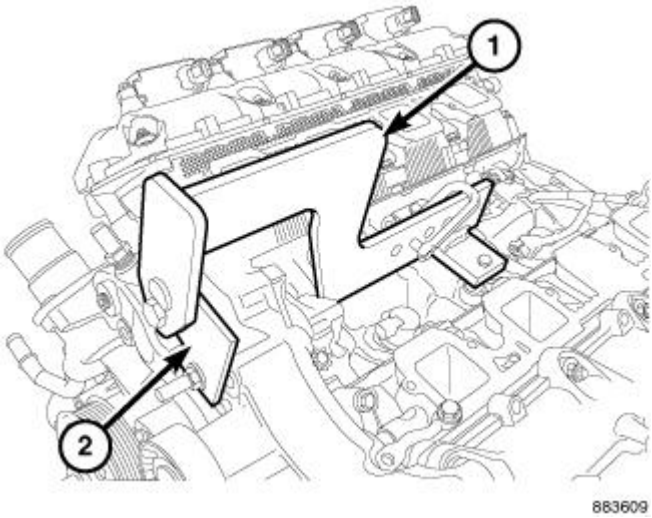

Fig. 9: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

NOTE: Do not use air tools to install Engine Lift Fixture and Adapter 8984A Eagle (1, 2) 8984A.

27. Install Engine Lift Fixture (1) 8984A and Adapter 8984A Eagle (2).

28. Separate engine from transmission, remove engine from vehicle, and install engine assembly on a repair stand.

INSTALLATION

INSTALLATION

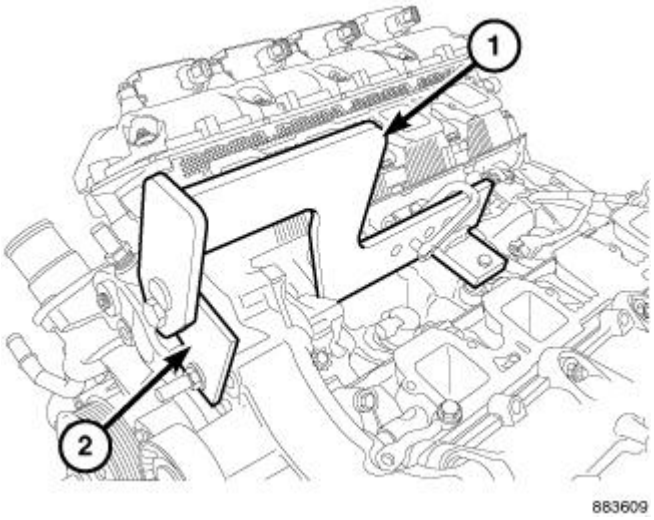

Fig. 10: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

NOTE: Do not use air tools to install Engine Lift Fixture and Adapter 8984A Eagle (1,2).

1. Install Engine Lift Fixture 8984A (1) and Adapter 8984A Eagle (2).
2. Position the engine in the engine compartment.

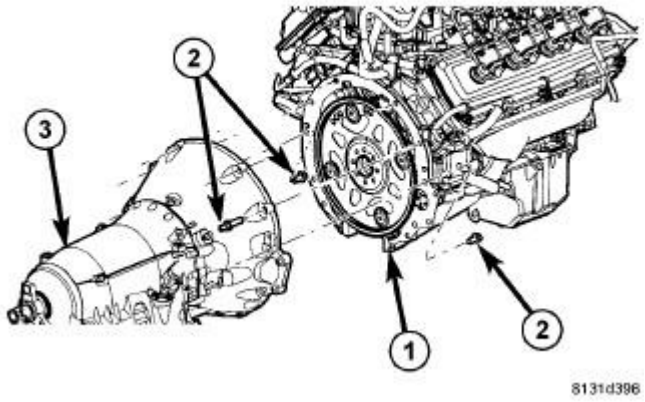

Fig. 11: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

3. Lower engine into compartment and align engine with transmission.
4. Lower engine assembly until engine mount through bolts rest in mount brackets.
5. Install the (OCV) Oil Control Valve.
6. Install remaining transmission to engine block mounting bolts (2)and tighten.

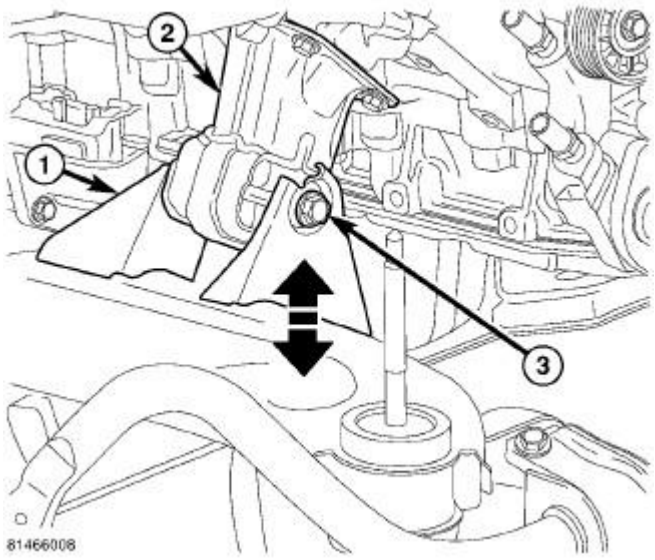

Fig. 12: Engine Mount Bolt
Courtesy of CHRYSLER LLC

7. Tighten engine mount thru bolts (3).
8. Install drive plate to torque converter bolts.

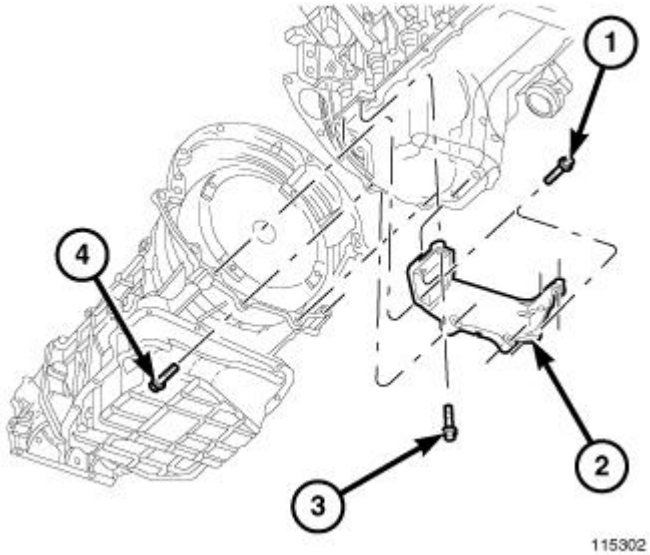

Fig. 13: Structural Cover
Courtesy of CHRYSLER LLC

9. Install the structural dust cover (2). See **Engine/Engine Block/COVER, Structural Dust - Installation**.

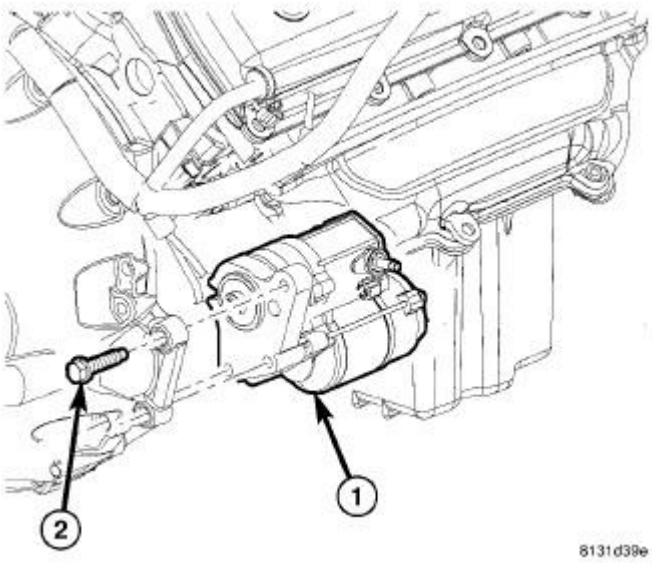

Fig. 14: Relocate Starter
Courtesy of CHRYSLER LLC

10. Install the starter (1) and connect the starter wires. Refer to **Electrical - Engine Systems/Starting/STARTER - Installation** .
11. Install exhaust pipe to manifold.

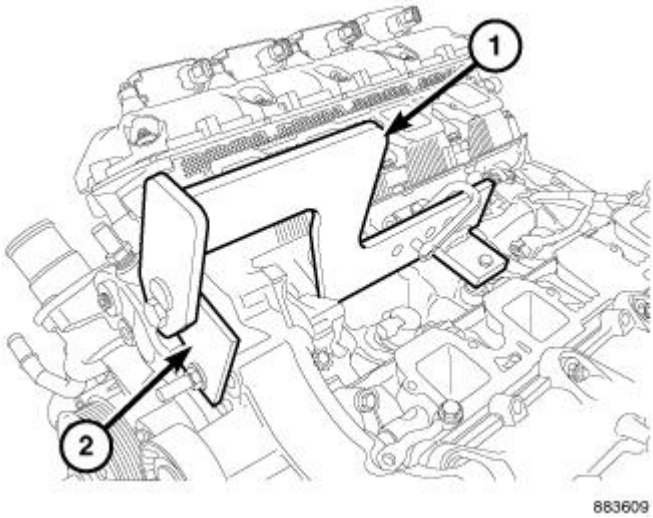

Fig. 15: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

12. Remove Engine Lift Fixture 8984A and Adapter 8984A Eagle (1,2).
13. Connect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect -**

Standard Procedure .

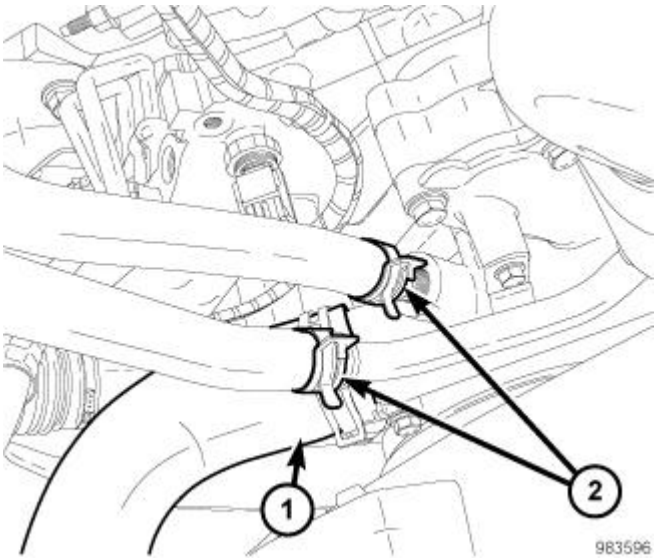

Fig. 16: Heater & Lower Radiator Hose
Courtesy of CHRYSLER LLC

14. Reinstall the power steering pump.
15. Connect the heater hoses (2).
16. Connect the radiator lower hose (1).
17. Install the intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
18. Install the generator (2) and wire connections. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Installation** .

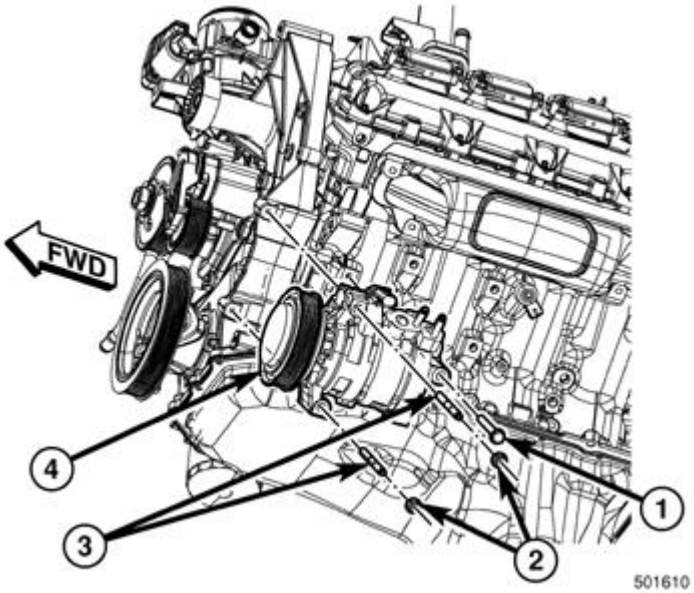

Fig. 17: A/C Compressor
Courtesy of CHRYSLER LLC

19. Install a/c compressor (4) and lines. Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation** .
20. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
21. Install radiator. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Installation** .
22. Connect the transmission oil cooler lines to the radiator.
23. Install the fan shroud.
24. Install the fan. Refer to **Cooling/Engine/FAN, Cooling - Installation** .
25. Connect the radiator upper hose.
26. Install the condenser. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Installation** .
27. Install upper radiator support crossmember.
28. Install the washer bottle.
29. Charge the A/C system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .

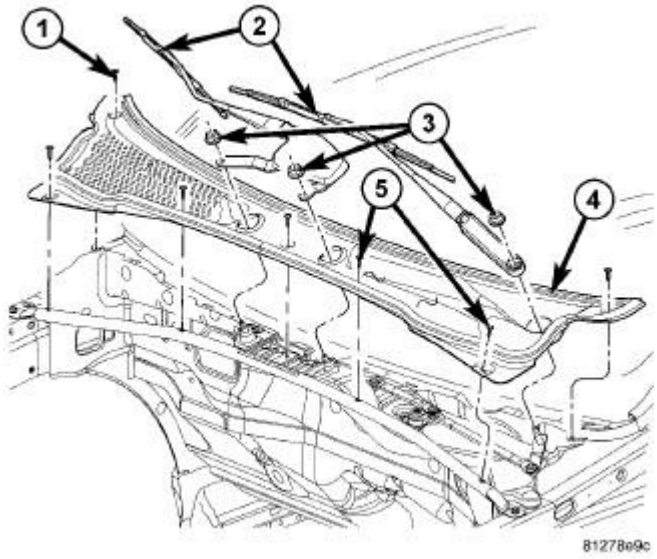

Fig. 18: Cowl Grille
Courtesy of CHRYSLER LLC

30. Install the cowl grille (4), and the cross bar beam. Refer to **Body/Exterior/COVER, Cowl Panel - Installation**
31. Install the air cleaner assembly.
32. Fill engine with oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
33. Fill cooling system. Refer to **Cooling - Standard Procedure** .
34. Connect battery negative cable.
35. Start engine and inspect for leaks.
36. Road test vehicle.

SPECIFICATIONS

SPECIFICATIONS

Eagle Engine - 90° V-8 OHV

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Displacement	5.7 Liters	348 CID
Bore	99.5 mm	3.92 in.
Stroke	90.9 mm	3.58 in.
Compression Ratio	10.5:1	
Max. Variation Between Cylinders	25%	
Firing Order	1-8-4-3-6-5-7-2	
Lubrication	Pressure Feed - Full Flow Filtration	
Cooling System	Liquid Cooled	
Cylinder Block	Cast Iron	
Cylinder Head	Aluminum	
Crankshaft	Nodular Iron	
Camshaft	Cast Iron	
Pistons	Aluminum Alloy	
Connecting Rods	Powdered Metal	

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Cylinder Bore Diameter	99.50 mm	3.92 in.
Out of Round (MAX)	0.0076 mm	0.0003 in.
Taper (MAX)	0.0127 mm	0.0005 in.
Lifter Bore Diameter	21.45 - 21.425 mm	0.8444 - 0.8435 in.

PISTONS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Clearance Measured at 38.0 mm (1.5 in.) Below Deck	- 0.031 - 0.058 mm	- 0.012 - 0.023 in.
Ring Groove Diameter	-	
Top Groove	90.4 - 90.6 mm	3.56 - 3.57 in.
Second Groove	88.4 - 88.7 mm	3.48 - 3.49 in.
Weight	413 grams	14.56 oz
Piston Length	53.3 mm	2.10 in.
Ring Groove Width	-	-

No. 1	1.23 - 1.26 mm	0.048 - 0.0496 in
No. 2	1.23 - 1.25 mm	0.048 - 0.0492 in.
No. 3	2.03 - 2.05 mm	0.079 - 0.080 in.

PISTON PINS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Clearance In Piston	0.005 - 0.014 mm	0.0001 - 0.0005 in.
Diameter	24.004 - 24.007 mm	0.945 - 0.9451 in.
Length	62.99 - 63.21 mm	2.47 - 2.48 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Ring Gap	-	
Top Compression Ring	0.40 - 0.55 mm	0.015 - 0.021 in.
Second Compression Ring	0.24 - 0.51 mm	0.009 - 0.020 in.
Oil Control Rails	0.15 - 0.66 mm	0.0059 - 0.0259 in.
Side Clearance	-	
Top Compression Ring	0.04 - 0.09 mm	0.001 - 0.0035 in.
Second Compression Ring	0.04 -.08 mm	0.001 - 0.0031 in.
Oil Control Rails	0.06 - 0.21 mm	0.002 - 0.008 in.
Ring Width	-	
Top Compression Ring	1.17 - 1.19 mm	0.0460 - 0.0468 in.
Second Compression Ring	1.17 - 1.19 mm	0.0460 - 0.0468 in.
Oil Control Rails	0.387 - 0.413 mm	0.015 - 0.016 in.

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Piston Pin Bore Diameter	24.014 - 24.024 mm	0.9454 - 0.9458 in.
Side Clearance	0.10 - 0.35 mm	0.003 - 0.0137 in.

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Main Bearing Journal Diameter	64.988 - 65.012 mm	2.5585 - 2.5595 in.
Bearing Clearance	0.023 - 0.051 mm	0.0009 - 0.002 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.
End Play	0.052 - 0.282 mm	0.002 - 0.011 in.

End Play (MAX)	0.282 mm	0.011 in.
Connecting Rod Journal Diameter	53.992 - 54.008 mm	2.126 in.
Bearing Clearance	0.020 - 0.060 mm	0.0007 - 0.0023 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.

CAMSHAFT

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Bearing Journal Diameter	-	
No. 1	58.2 mm	2.29 in.
No. 2	57.8 mm	2.28 in.
No. 3	57.4 mm	2.26 in.
No. 4	57.0 mm	2.24 in.
No. 5	43.633 mm	1.72 in.
Bearing To Journal Clearance Standard	-	
No. 1	0.040 - 0.080 mm	0015 -.003 in.
No. 2	0.050 -0.090 mm	0.0019 -.0035 in.
No. 3	0.040 - 0.080 mm	0015 -.003 in.
No. 4	0.050 - 0.090 mm	0.0019 -.0035 in.
No. 5	0.040 - 0.080 mm	0015 -.003 in.
Camshaft End Play	080 - 0.290 mm	0.0031 - 0.0114 in.

VALVE TIMING

DESCRIPTION	SPECIFICATION
Intake	-
Opens (BTDC)	28.2°
Closes (ATDC)	239.8°
Duration	268°
Exhaust	-
Opens (BTDC)	274.2°
Closes (ATDC)	15.8°
Duration	290°
Valve Overlap	44°

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Valve Seat Angle	44.5° - 45.0°	
Valve Seat Runout (MAX)	0.05 mm	0.0019 in.
Valve Seat Width (finish)	-	-

Intake	1.18 - 1.62 mm	0638 in.
Exhaust	1.48 - 1.92 mm	0.0583 - 0.0756 in.
Guide Bore Diameter (Std.)	7.975 - 8.00 mm	0.3134 - 0.315 in.

HYDRAULIC TAPPETS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Body Diameter	21.387 - 21.405 mm	0.8420 - 0.8427 in.
Clearance (to bore)	0.020 - 0.063 mm	0.0008 - 0.0025 in.
Dry Lash	3.0 mm (at the valve)	0.1181 in. (at the valve)

VALVES

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Face Angle	45.0° - 45.5°	
Head Diameter	-	
Intake	50.67 - 50.93 mm	1.99 - 2.01 in.
Exhaust	39.27 - 39.53 mm	1.55 - 1.56 in.
Length (overall)	-	
Intake	123.38 - 123.76 mm	4.857 - 4.872 in.
Exhaust	120.475 - 120.855 mm	4.743 - 4.758 in.
Stem Diameter	-	
Intake	7.935 - 7.953 mm	0.312 - 0.313 in.
Exhaust	7.932 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance	-	
Intake	0.022 - 0.065 mm	0.0008 - 0.0025 in.
Exhaust	0.025 - 0.065 mm	0.0009 - 0.0025 in.
Valve Lift (@ zero lash)	-	
Intake	12.0 mm	0.472 in.
Exhaust	11.70 mm	0.460 in.

VALVE SPRING

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Spring Force (valve closed)	435.0 N +/- 22.0 N @ 45 mm	97.8 lbs +/- 5.0 lbs. @ 1.771 in.
Spring Force (valve open)	1077.0 N +/- 48.0 N @ 32.6 mm.	242.0 lbs. +/- 11 lbs. @ 1.283 in.
Free Length (approx).	55.6 mm	2.189 in.
Number of Coils	7.95	
Wire Diameter	4.95 x 4.1 mm	0.194 - 0.161 in.
Installed Height (spring seat to bottom of retainer)	46.0 mm	1.81 in.

OIL PUMP

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Clearance Over Rotors (MAX)	0.095 mm	0.0038 in.
Outer Rotor to Pump Body Clearance (MAX)	235 mm	0.009 in.
Tip Clearance Between Rotors (MAX)	0.150 mm	0.006 in.

OIL PRESSURE

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
At Curb Idle Speed (MIN)*	25 kPa	4 psi
@ 3000 RPM	170 - 758 kPa	25 - 110 psi
*** CAUTION: If pressure is zero at curb idle, DO NOT run engine.**		

TORQUE

TORQUE CHART 5.7L ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Block Pipe Plugs			
(1/4 - 18 NPT) Oil Galley Plug	20	15	-
(1/4 - 18 NPT) Coolant Drain Plug	34	25	-
(3/8 NPT)	27	20	-
Camshaft Sprocket Bolt	122	90	-
Camshaft Tensioner Plate Bolts	28	21	-
Coil to Cylinder Head Cover Bolts	7	-	62
Timing Chain Case Cover Bolts	28	21	-
Lifting Stud	55	41	-
Connecting Rod Cap Bolts	21 plus 90° Turn	15 plus 90° Turn	-
Main Bearing Cap Bolts	See **Engine/Engine Block/CRANKSHAFT - Installation**.		
Cylinder Head Bolts	See **Engine/Cylinder Head - Installation**.		
Cylinder Head Cover Bolts	8	-	71
Exhaust Manifold-to-Cylinder Head	25	18	-
Flexplate-to-Crankshaft Bolts	95	70	-
Flywheel-to-Crankshaft Bolts	75	55	-
Front Insulator Through Bolt/Nut	95	70	-
Through Bolt/Nut (4WD)	102	75	-
Stud Nut (4WD)	41	30	-

Front Insulator-to-Block Bolts (2WD)	95	70	-
Intake Manifold Bolts	See **Engine/Manifolds/MANIFOLD, Intake - Installation**.		
Lifter Guide Holder	12	9	-
Oil Pan Bolts	12	9	-
Oil Dipstick Tube	12	9	-
Oil Pan Drain Plug	34	25	-
Oil Pump Attaching Bolts	28	21	-
Oil Pump Pickup Tube Bolt/Nut	28	21	-
Rear Seal Retainer Attaching Bolts	15	11	-
Rear Insulator-to-Bracket Bolt	68	50	-
Rear Insulator-to-Crossmember	41	30	-
Rear Insulator-to-Crossmember Bolt	68	50	-
Rear Insulator-to-Transmission Bolt	68	50	-
Rear Insulator Bracket Bolts	68	50	-
Rear Support Bracket Bolt	41	30	-
Rear Support Plate-to-Transfer Case Bolts	41	30	-
Rocker Arm Bolts	22	16	-
Thermostat Housing Bolts	28	21	-
Throttle Body Bolts	12	9	-
Transfer Case-to-Insulator Bolt	204	150	-
Transmission Support Bracket Bolt	68	50	-
Vibration Damper Bolt	176	130	-
Water Pump-to-Timing Chain Case Cover Bolts	28	21	-

SPECIAL TOOLS

SPECIAL TOOLS

Fig. 19: Bloc-Chek Kit - C-3685-A
Courtesy of CHRYSLER LLC

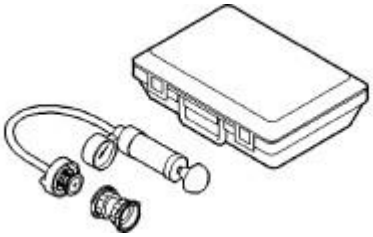

Fig. 20: Cooling System Tester - 7700-A
Courtesy of CHRYSLER LLC

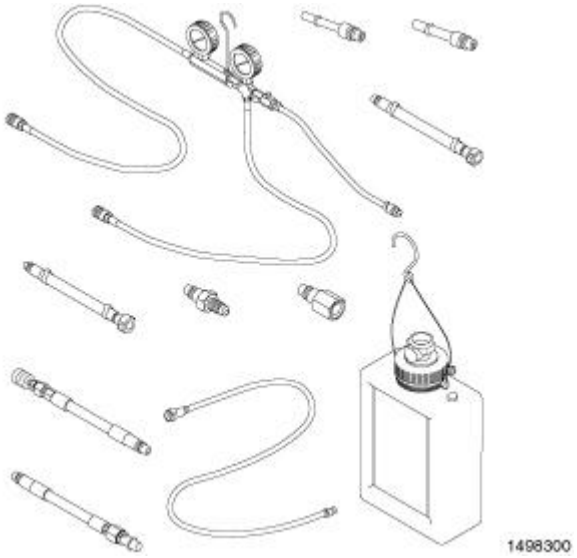

Fig. 21: Fuel Decay Tester - 8978A
Courtesy of CHRYSLER LLC

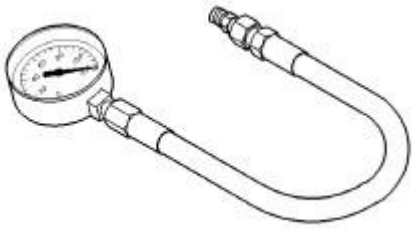

Fig. 22: Oil Pressure Gauge - C-3292A
Courtesy of CHRYSLER LLC

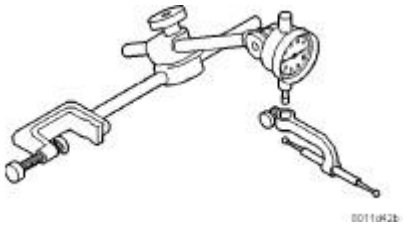

Fig. 23: Dial Indicator - C-3339A
Courtesy of CHRYSLER LLC

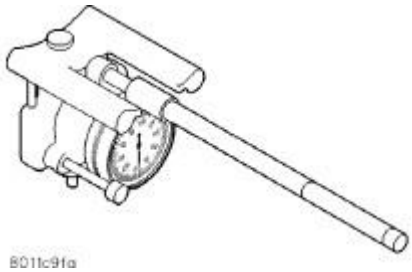

Fig. 24: Cylinder Indicator - C-119
Courtesy of CHRYSLER LLC

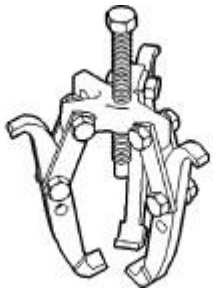

Fig. 25: Puller - 1023
Courtesy of CHRYSLER LLC

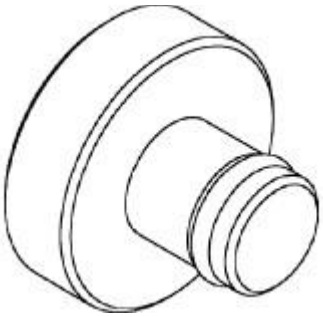

Fig. 26: Crankshaft Damper Removal Insert - 8513A
Courtesy of CHRYSLER LLC

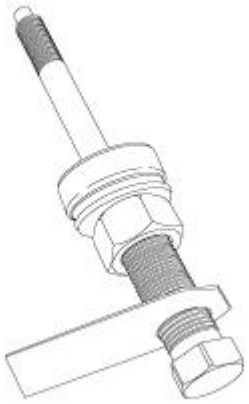

Fig. 27: Crankshaft Damper Installer - 8512A
Courtesy of CHRYSLER LLC

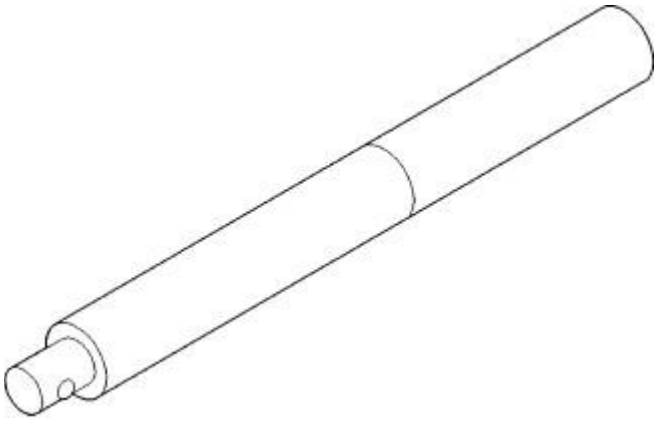

Fig. 28: Handle - C-4171
Courtesy of CHRYSLER LLC

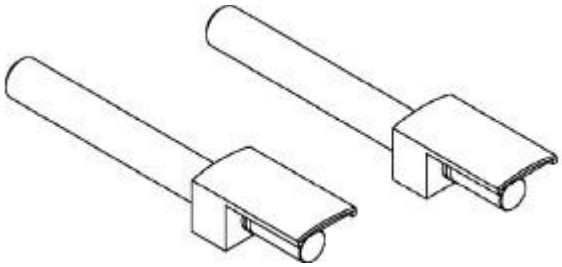

Fig. 29: Connecting Rod Guides - 8507
Courtesy of CHRYSLER LLC

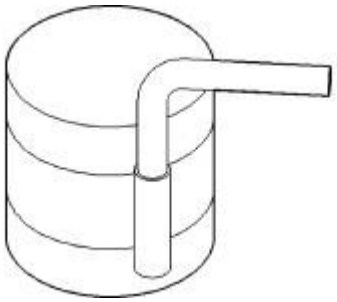

Fig. 30: Piston Ring Compressor - C-385
Courtesy of CHRYSLER LLC

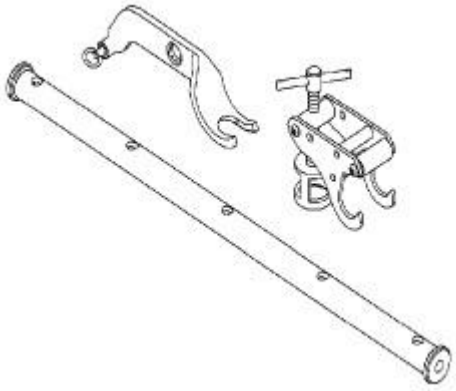

Fig. 31: Valve Spring Compressor - 9065A
Courtesy of CHRYSLER LLC

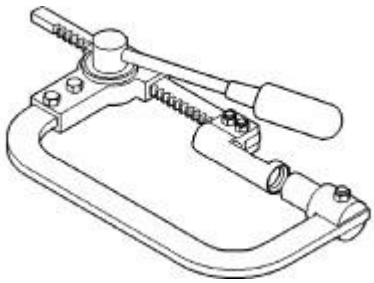

Fig. 32: Valve Spring Compressor - C-3422-D
Courtesy of CHRYSLER LLC

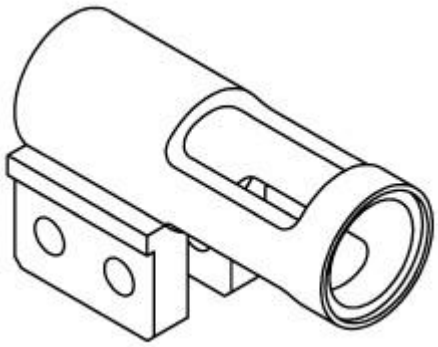

Fig. 33: Valve Spring Adapter - 8464
Courtesy of CHRYSLER LLC

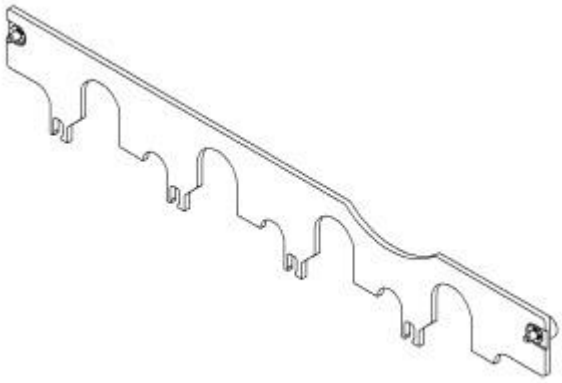

Fig. 34: Pushrod Retainer - 9070
Courtesy of CHRYSLER LLC

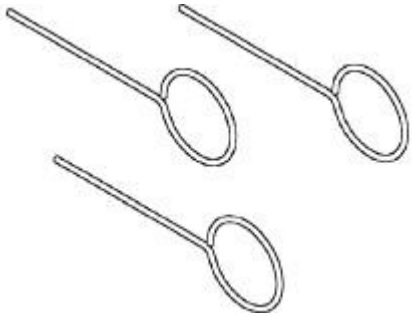

Fig. 35: Tensioner Pins - 8514
Courtesy of CHRYSLER LLC

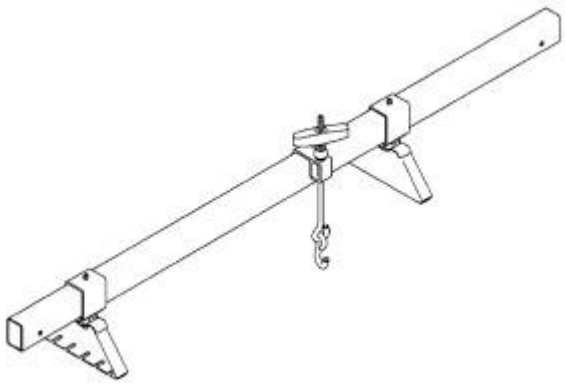

Fig. 36: Engine Support Fixture - 8534B
Courtesy of CHRYSLER LLC

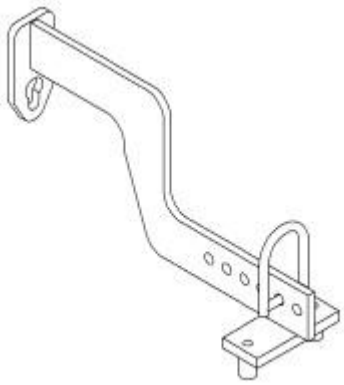

Fig. 37: Engine Lift Fixture - 8984A
Courtesy of CHRYSLER LLC

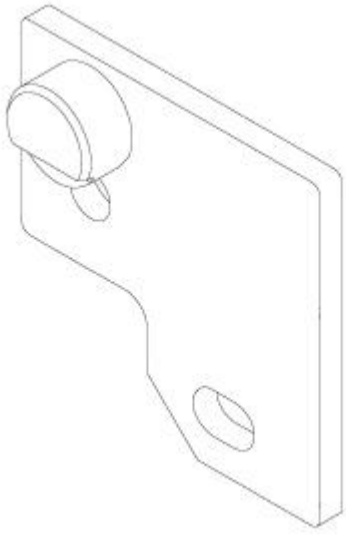

Fig. 38: Engine Lift Fixture Adapter - 8984-EAGLE
Courtesy of CHRYSLER LLC

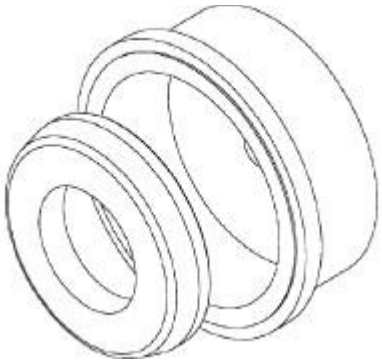

Fig. 39: Seal Installer - 8349
Courtesy of CHRYSLER LLC

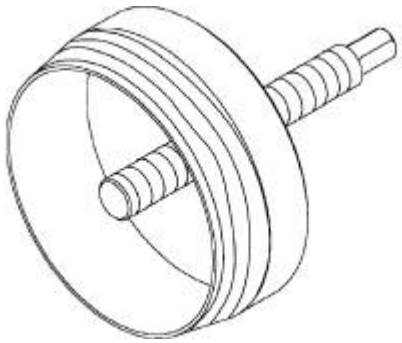

Fig. 40: Seal Remover - 8506
Courtesy of CHRYSLER LLC

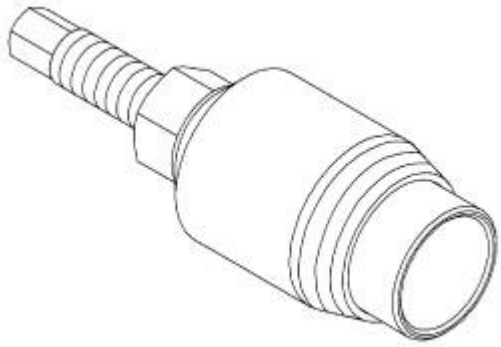

Fig. 41: Seal Remover - 9071
Courtesy of CHRYSLER LLC

Fig. 42: Seal Installer - 9072
Courtesy of CHRYSLER LLC

MDS SYSTEM

DESCRIPTION

DESCRIPTION

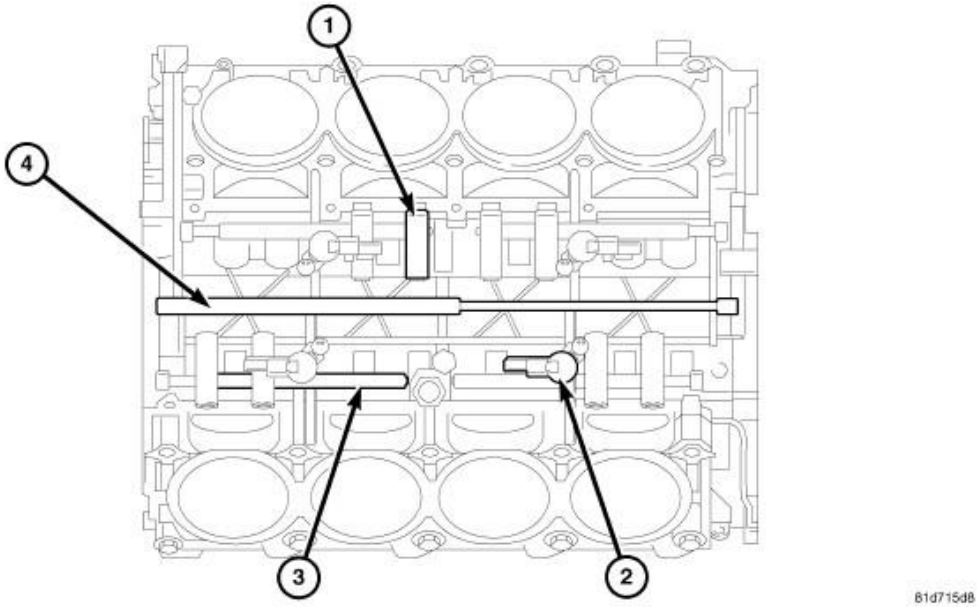

Fig. 43: MDS Cylinder View
Courtesy of CHRYSLER LLC

1 - DEACTIVATING LIFTERS
2 - SOLENOIDS
3 - LIFTER OIL GALLERY
4 - MAIN OIL GALLERY

The Multiple Displacement System (MDS) provides cylinder deactivation during steady-speed, low-

acceleration and shallow grade climbing conditions to increase fuel economy.

MDS can provide a 5-20 percent fuel economy benefit when operating in four-cylinder mode, depending on driving habits and vehicle usage. For EPA rating purposes, fuel economy is 8-15 percent higher than if the engine was operating on eight cylinders at all times.

MDS is integrated into the basic engine architecture, requiring a minimum of additional parts - four additional solenoids, an oil temperature sensor and a wire harness. Eight unique valve lifters and a modified camshaft are also required.

OPERATION

OPERATION

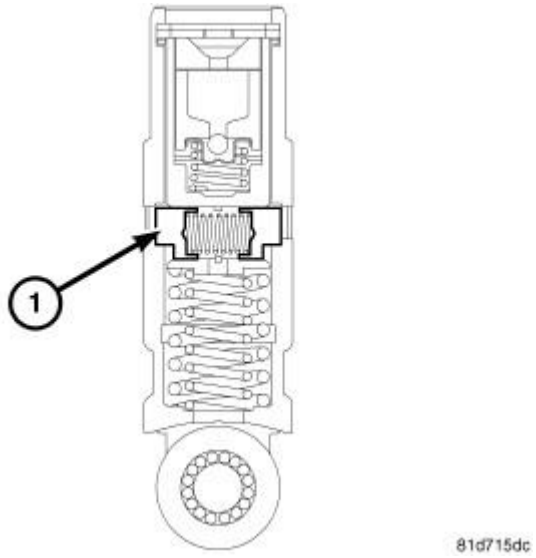

Fig. 44: MDS Lifter Cross Section
Courtesy of CHRYSLER LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals provide smooth operation. Two cylinders on each bank are active when the engine is in four-cylinder mode - every other cylinder in the firing order. All of the cylinders that are deactivated have unique hydraulic valve lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. It is delivered through special oil passages drilled into the cylinder block. Solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each valve lifter, which then becomes a "lost motion" link. Its base follows the camshaft, but its top remains stationary, held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: It is critical to use the recommended oil viscosity in 5.7L engines that use MDS.

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition then occurs, but the combustion products remain trapped in the cylinder under high pressure, because

the valves no longer open. No air enters or leaves. During subsequent piston strokes, this high-pressure gas is repeatedly compressed and expanded like an air spring, but fuel is not injected.

AIR INTAKE SYSTEM

AIR CLEANER

Removal

REMOVAL

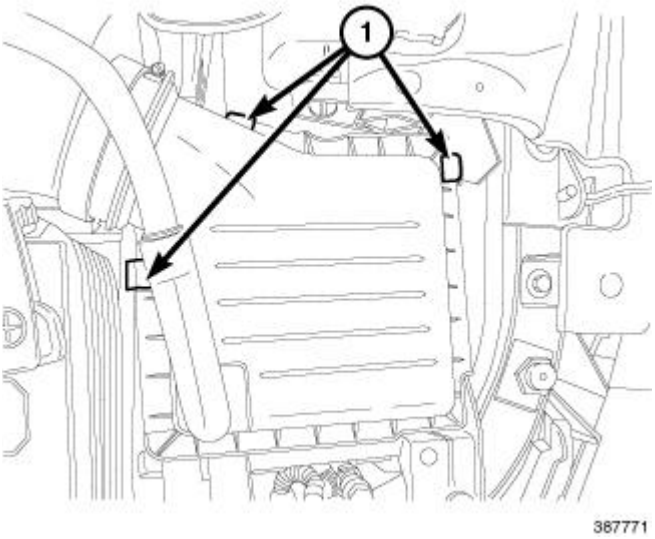

Fig. 45: Air Cleaner Housing Cover Retaining Clamps
Courtesy of CHRYSLER LLC

1. Release the air cleaner housing cover retaining clamps (1).

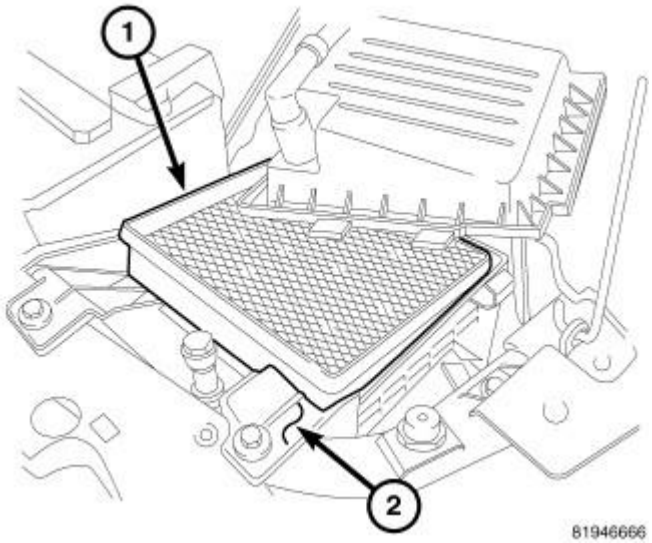

Fig. 46: Air Cleaner Element
Courtesy of CHRYSLER LLC

2. Lift and pull the air cleaner housing cover toward the engine to disengage the cover locating tabs from the air cleaner housing and position the cover out of the way.
3. Remove the air cleaner element (1) from the inside of the air cleaner housing (2).

Installation

INSTALLATION

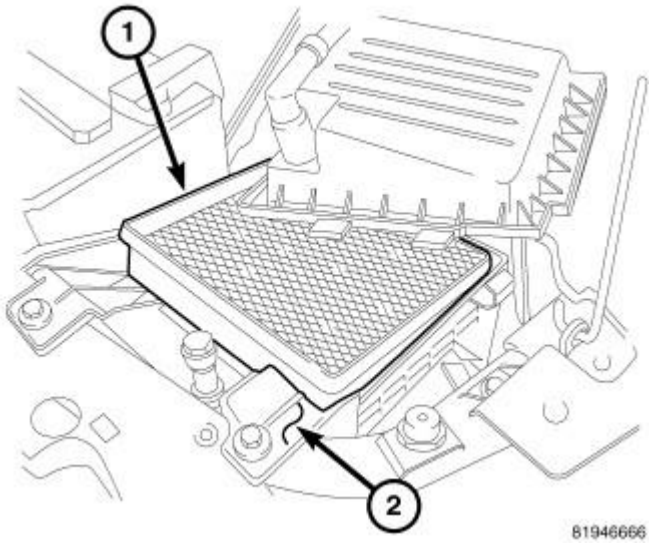

Fig. 47: Air Cleaner Element
Courtesy of CHRYSLER LLC

1. Clean any dirt or foreign matter from the inside of the air cleaner housing (2).
2. Install the air cleaner element (1) into air cleaner housing. Make sure the element is properly seated in the housing.

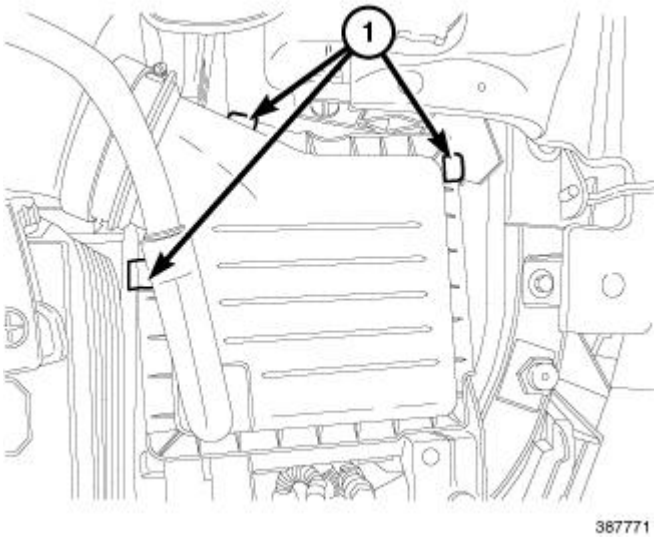

Fig. 48: Air Cleaner Housing Cover Retaining Clamps
Courtesy of CHRYSLER LLC

3. Position the air cleaner housing cover on the air cleaner housing and engage the cover locating tabs. Make sure the tabs are fully engaged.
4. Fully install the air cleaner housing cover to the air cleaner housing and engage the three retaining clamps (1). Make sure the clamps are fully engaged.

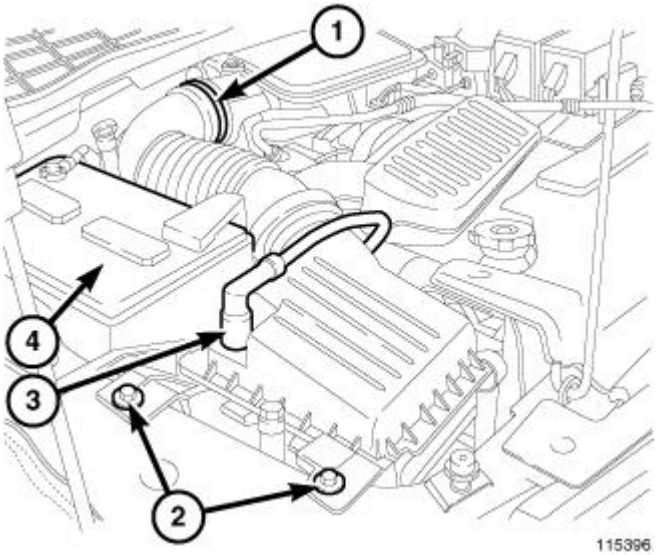

Fig. 49: Air Cleaner Housing Cover
Courtesy of CHRYSLER LLC

5. Install the air inlet hose (1).

BODY, AIR CLEANER

Removal

REMOVAL

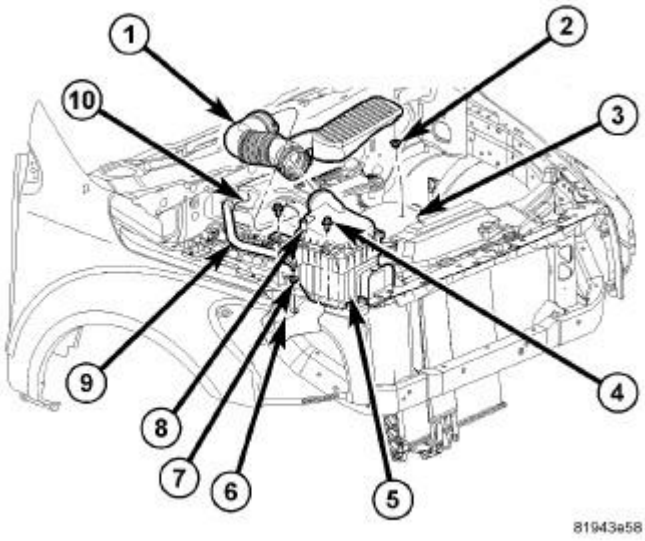

Fig. 50: Air Cleaner Housing
Courtesy of CHRYSLER LLC

NOTE: 5.7L engine shown in illustration.

1. Disconnect the make up air hose (9) from the air cleaner housing cover (8).
2. Loosen the clamps and disconnect the air inlet hose (1) from the resonator and the air cleaner housing cover.
3. Remove the two bolts (4) that secure the air cleaner housing (5) to the right inner fender.
4. Pull the air cleaner housing straight upward to disengage it from the grommet (7) located on the battery tray (6).
5. Rotate and tilt the air cleaner housing as necessary and remove the housing from the engine compartment.

Installation

INSTALLATION

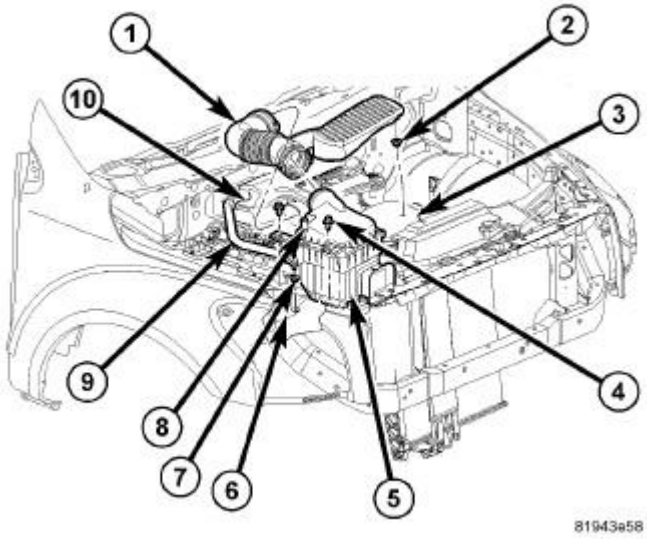

Fig. 51: Air Cleaner Housing
Courtesy of CHRYSLER LLC

NOTE: 5.7L engine shown in illustration. 3.7L/4.7L engines similar.

1. Position the air cleaner housing (5) into the engine compartment. Rotate and tilt the housing as necessary.
2. Engage the air cleaner housing to the grommet (7) located on the battery tray (6).
3. Install the two bolts (4) that secure the air cleaner housing to right inner fender. Tighten the bolts securely.
4. Connect the air inlet hose (1) to the resonator and to the air cleaner housing cover (8).
5. Tighten the clamps that secure the air inlet hose to the resonator and the air cleaner housing cover.
6. Connect the make up air hose (9) to the air cleaner housing cover.

RESONATOR, AIR CLEANER

Removal

REMOVAL

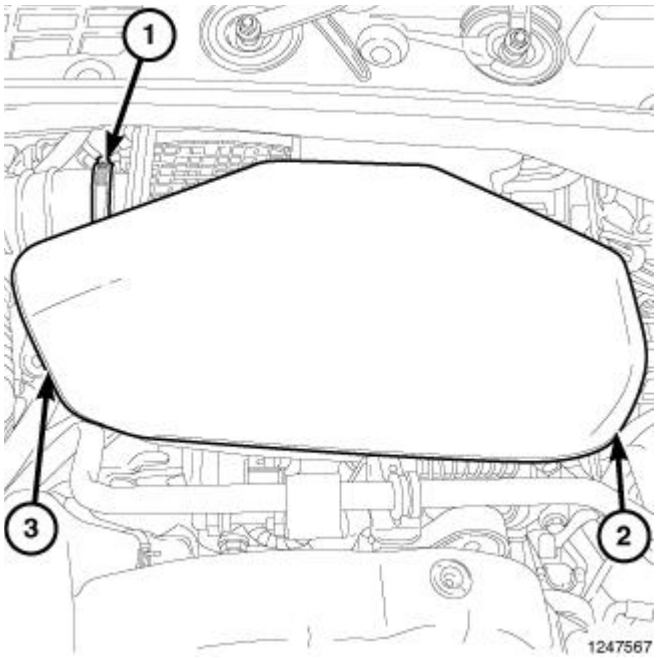

Fig. 52: Air Cleaner Resonator
Courtesy of CHRYSLER LLC

1. Disconnect the clean air hose (1).
2. Remove the two retaining screws (2, 3).
3. Lift the resonator upward to remove.

Installation

INSTALLATION

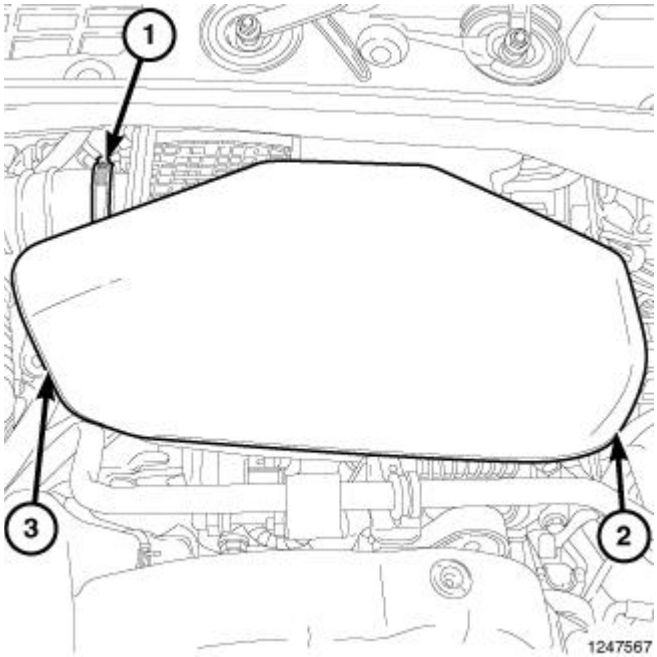

Fig. 53: Air Cleaner Resonator
Courtesy of CHRYSLER LLC

1. Position resonator over throttle body and push downward.
2. Install two retaining screws (2,3) and tighten.
3. Connect clean air hose (1).

CYLINDER HEAD

OPERATION

CYLINDER HEAD

The cylinder head closes the combustion chamber allowing the pistons to compress the air fuel mixture to the correct ratio for ignition. The valves located in the cylinder head open and close to either allow clean air into the combustion chamber or to allow the exhaust gases out, depending on the stroke of the engine.

DIAGNOSIS AND TESTING

CYLINDER HEAD GASKET FAILURE

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

- Possible indications of the cylinder head gasket leaking between adjacent cylinders are:
  - Loss of engine power
  - Engine misfiring
  - Poor fuel economy
- Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:
  - Engine overheating
  - Loss of coolant
  - Excessive steam (white smoke) emitting from exhaust
  - Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in the Cylinder Compression Pressure Test. See **CYLINDER COMPRESSION PRESSURE LEAKAGE**. An engine cylinder head gasket leaking between adjacent cylinders will results in approximately a 50 - 70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: Use extreme care when the engine is operating with the coolant pressure

cap removed. Failure to follow these instructions may result in possible serious or fatal injury.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

CAUTION: With the cooling system tester in place, pressure builds up fast. Excessive pressure built up by continuous engine operation must be released to a safe pressure point. Never permit pressure to exceed 138 kPa (20 psi).

Install the Cooling System Tester 7700 or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If the gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using the Bloc-Chek Kit C-3685-A or equivalent. Perform the test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

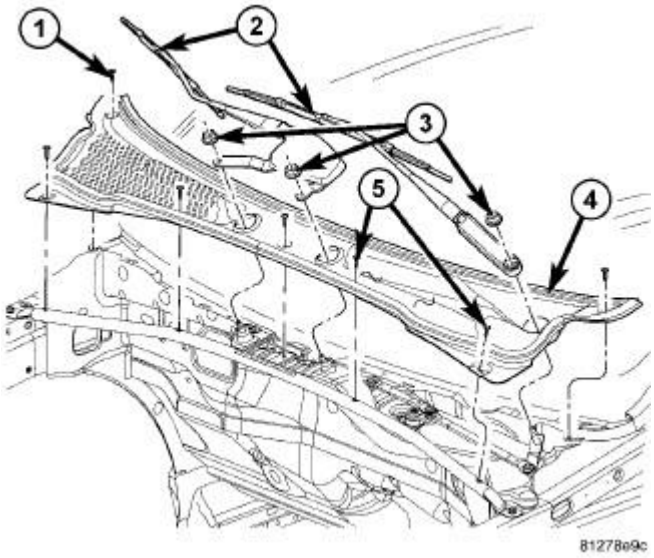

Fig. 54: Cowl Grille
Courtesy of CHRYSLER LLC

1. Remove cowl grille (4).

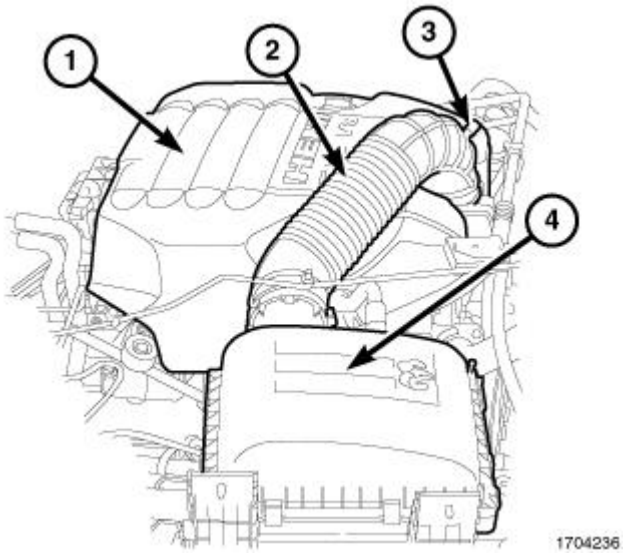

Fig. 55: Engine Cover
Courtesy of CHRYSLER LLC

2. Disconnect the IAT sensor electrical connector (3).
3. Remove the clean air tube (2) from the air cleaner assembly (4) and the throttle body.
4. Remove the engine cover (1).
5. Remove the air cleaner assembly (4). See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
6. Disconnect the evaporation control system.
7. Remove closed crankcase ventilation system.
8. Perform the Fuel System Pressure Release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
9. Disconnect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .

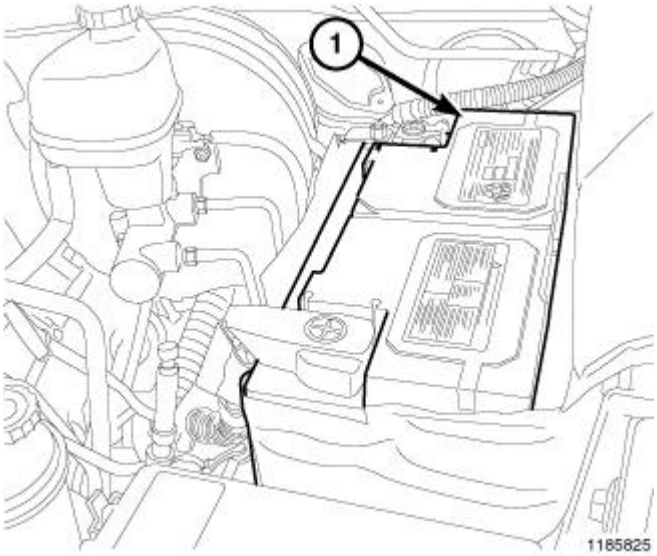

Fig. 56: Identifying Negative Battery Cable
Courtesy of CHRYSLER LLC

10. Disconnect the negative battery cable (1).
11. Raise and support the vehicle.

WARNING: Do not remove or loosen the radiator draincock with system hot and under pressure. Serious burns from coolant can occur.

12. Drain the cooling system. Refer to **Cooling - Standard Procedure**

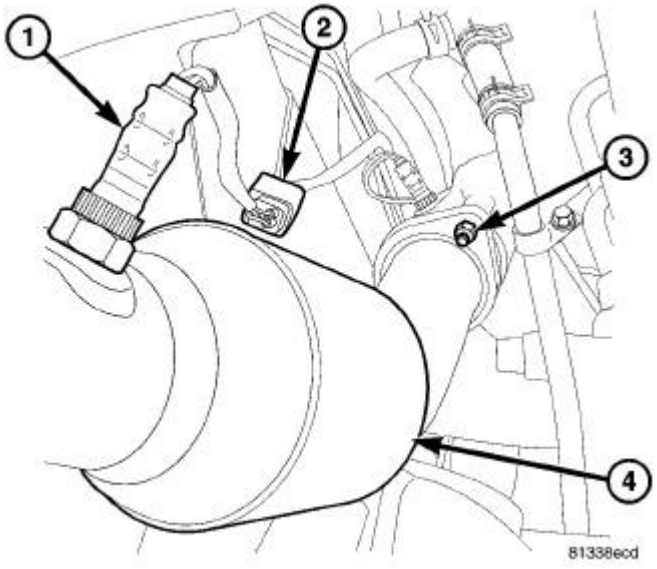

Fig. 57: Oxygen Sensor & Catalytic Converter
Courtesy of CHRYSLER LLC

CAUTION: When servicing or replacing exhaust system components, disconnect the oxygen sensor connector(s). Allowing the exhaust to hang by the oxygen sensor wires will damage the harness and/or sensor.

13. Disconnect the oxygen sensor connectors (2).
14. Saturate all exhaust bolts and nuts with Mopar® Rust Penetrant. Allow 5 minutes for penetration.
15. Remove the exhaust pipe to manifold bolts (3) (left side shown in illustration, right side similar) and disconnect the front exhaust pipe/catalytic converter assembly (4). Refer to **Exhaust System/CONVERTER, Catalytic - Removal** .

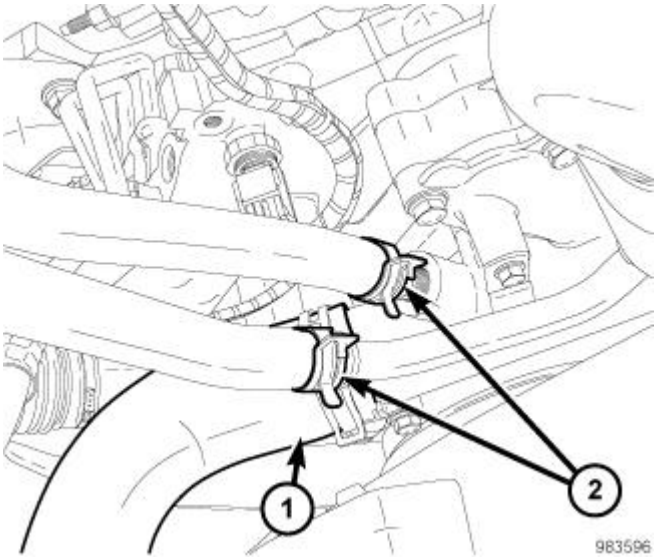

Fig. 58: Heater & Lower Radiator Hose
Courtesy of CHRYSLER LLC

16. Disconnect heater hoses (2).

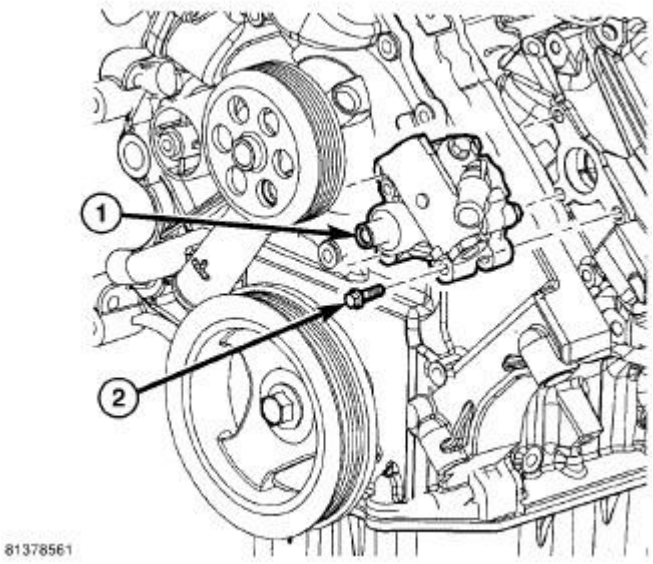

Fig. 59: Power Steering Pump
Courtesy of CHRYSLER LLC

NOTE: It is not necessary to disconnect the hoses from the power steering pump, for power steering pump removal.

17. Remove the three power steering pump (1) mounting bolts (2) through the access holes in the pulley and secure out of the way.

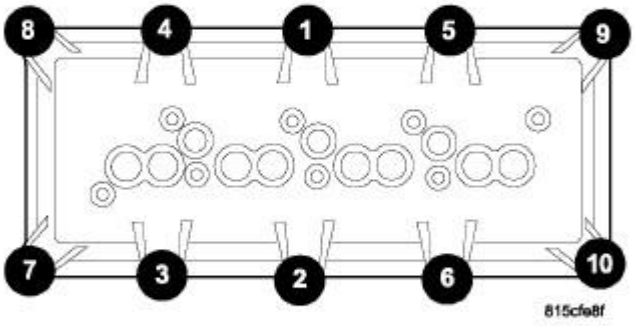

Fig. 60: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

18. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts and remove the cylinder head covers and gaskets. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
19. Remove the intake manifold and throttle body as an assembly. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

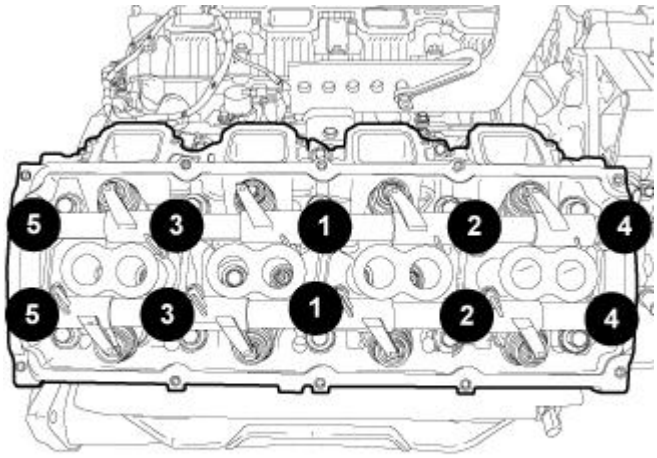

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Fig. 61: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

CAUTION: Rocker arm assemblies and pushrods must be installed in their original locations or engine damage could result.

20. Identify the original locations for assembly, remove rocker arm assemblies and pushrods. See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal**.

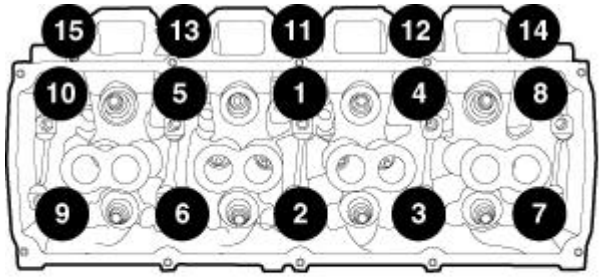

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Fig. 62: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

21. Using the sequence shown in illustration, remove the cylinder head bolts from each cylinder head and remove the cylinder head(s), discard the cylinder head gasket(s). See **Fig. 62**.

CLEANING

CLEANING

Clean all sealing surfaces of the cylinder block and cylinder heads using Mopar® Brake Parts Cleaner (or equivalent).

INSPECTION

INSPECTION

1. Inspect the cylinder head for out-of-flatness using a straightedge and a feeler gauge. If tolerances exceed 0.0508 mm (0.002 in.) replace the cylinder head.
2. Inspect the valve seats for damage. Service the valve seats as necessary.
3. Inspect the valve guides for wear, cracks or looseness. If either condition exist, replace the cylinder head.
4. Inspect the pushrods. Replace worn or bent pushrods.

INSTALLATION

INSTALLATION

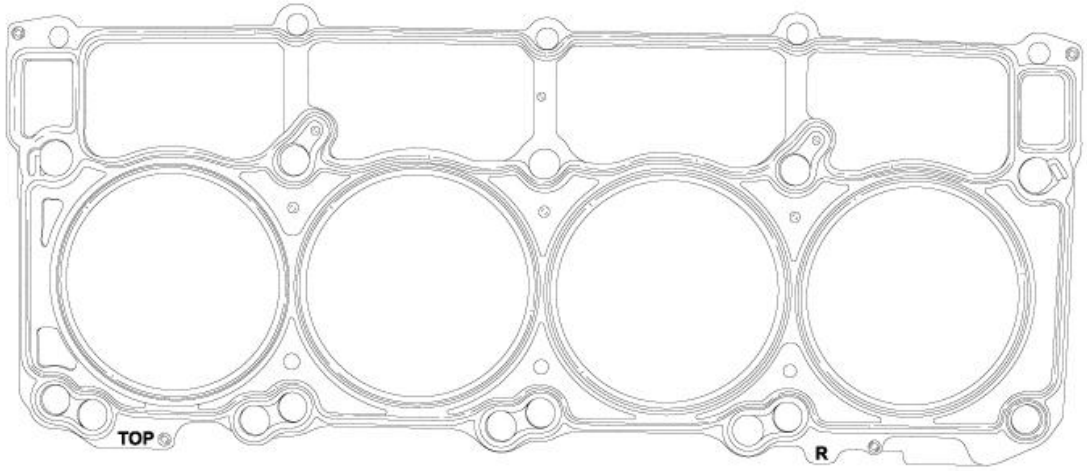

Fig. 63: Identifying Cylinder Head Gasket Marking
Courtesy of CHRYSLER LLC

1. Clean all surfaces of the cylinder block and the cylinder heads.

2. Clean the cylinder block front and rear gasket surfaces using a suitable solvent.

CAUTION: The cylinder head gaskets are not interchangeable between the left and right sides. They are marked with an "L" and "R" to indicate the left or right side and they are marked "TOP" to indicate which side goes up.

CAUTION: The head gaskets are marked "TOP" to indicate which side goes up.

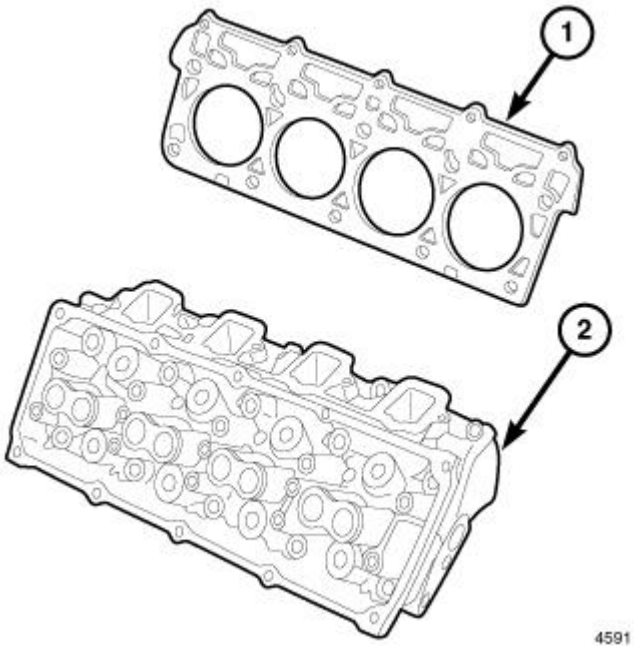

Fig. 64: Cylinder Head Components
Courtesy of CHRYSLER LLC

3. Position the new cylinder head gaskets (5) onto the cylinder block.
4. Position the cylinder heads (4) onto the head gaskets (5) and the cylinder block.

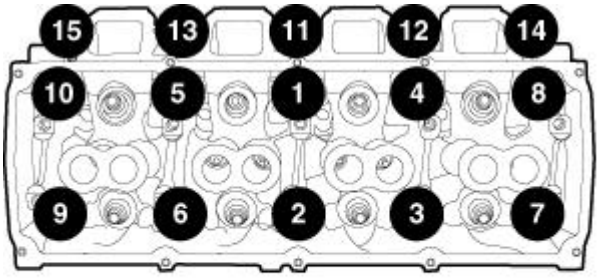

Fig. 65: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

5. Using the sequence shown in illustration, tighten cylinder head bolts 1 through 10 to 34 N.m (25 ft. lbs.).
6. Using the sequence shown in illustration, tighten cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
7. Using the sequence shown in illustration, tighten cylinder head bolts 1 through 10 to 54 N.m (40 ft. lbs.).
8. Using the sequence shown in illustration, tighten cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
9. Using the sequence shown in illustration, rotate the cylinder head bolts 1 through 10 90°.
10. Using the sequence shown in illustration, tighten cylinder head bolts 11 through 15 to 34 N.m (25 ft. lbs.).

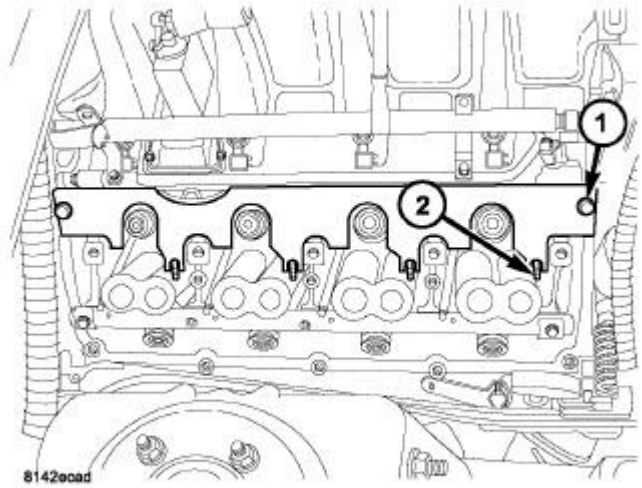

Fig. 66: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

11. Install the push rods and rocker arm assemblies in their original position, using Pushrod Retainer 9070 (1). See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**.
12. Install the intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.
13. Install the spark plugs.

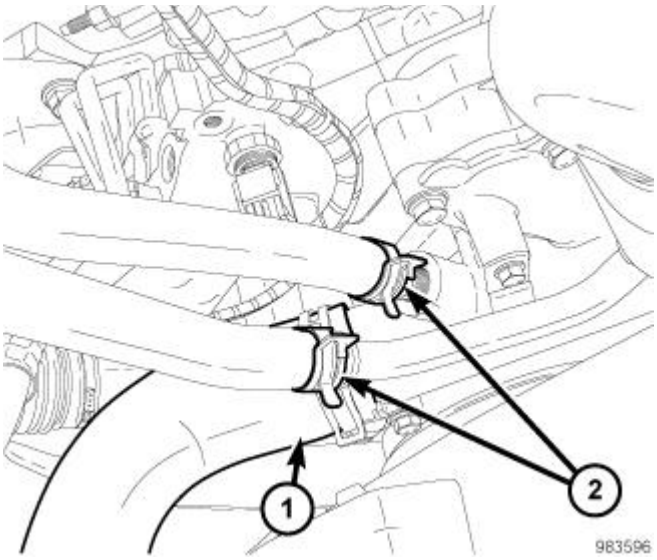

Fig. 67: Heater & Lower Radiator Hose
Courtesy of CHRYSLER LLC

14. Connect the heater hoses (2).
15. Connect the fuel supply line.

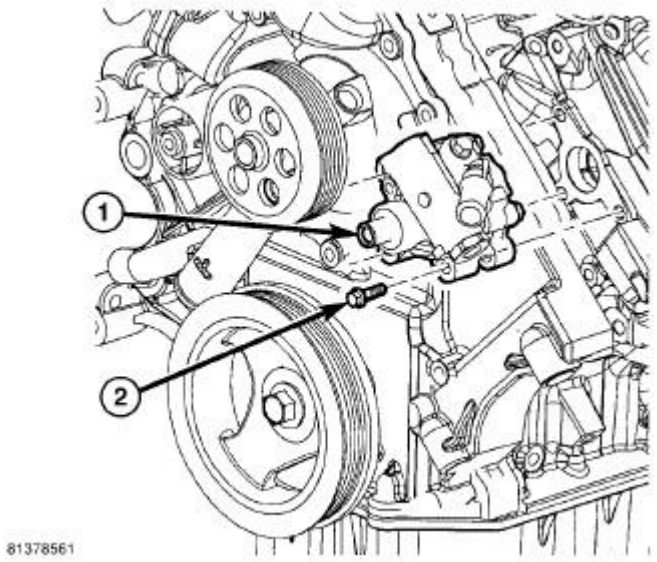

Fig. 68: Power Steering Pump
Courtesy of CHRYSLER LLC

16. Install the three power steering pump mounting bolts (2) through the access holes in the pulley and tighten bolts to 28 Nm (21 ft. lbs.).
17. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

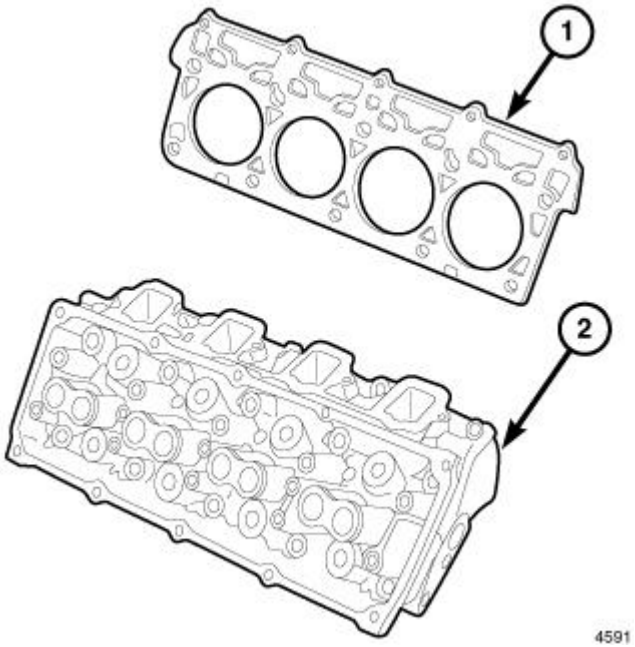

Fig. 69: Cylinder Head Components
Courtesy of CHRYSLER LLC

18. Install the cylinder head cover (1) and hand start all fasteners. Verify that all double ended studs (3) are in the correct location. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

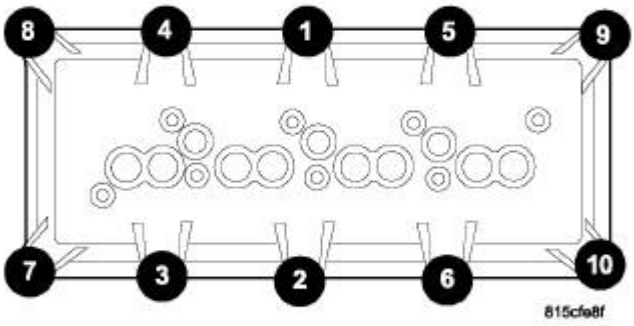

Fig. 70: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

19. Using the sequence shown in illustration, tighten the cylinder head cover bolts and double ended studs to

8 N.m (70 in. lbs.). See **Fig. 70**.

20. Connect the evaporation control system.
21. Install the air cleaner assembly.

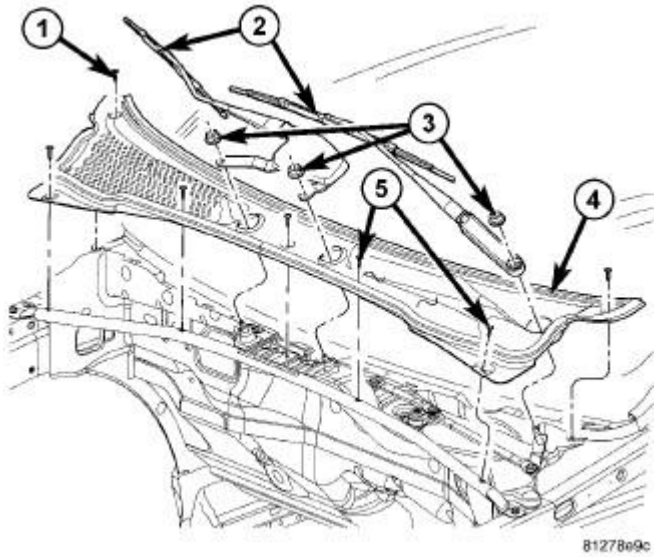

Fig. 71: Cowl Grille
Courtesy of CHRYSLER LLC

22. Install cowl grille (4).

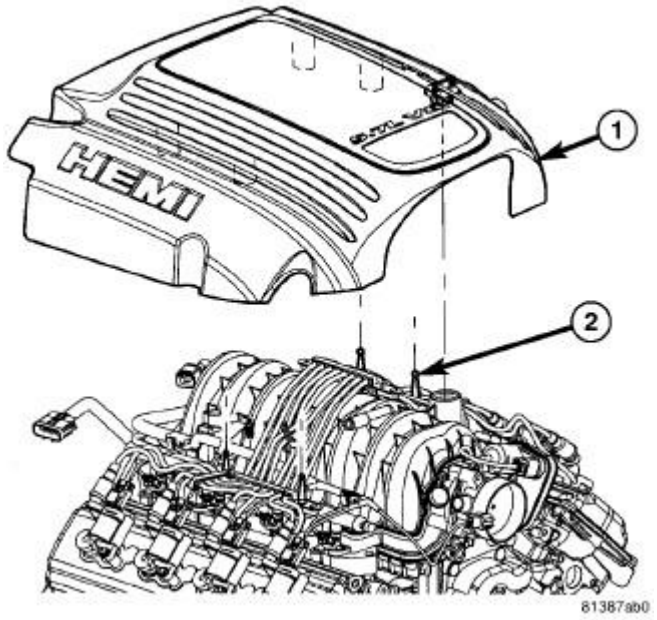

Fig. 72: Engine Cover
Courtesy of CHRYSLER LLC

23. Install the engine cover (1).
24. Fill cooling system. Refer to **Cooling - Standard Procedure** .
25. Drain and fill the engine with new oil.

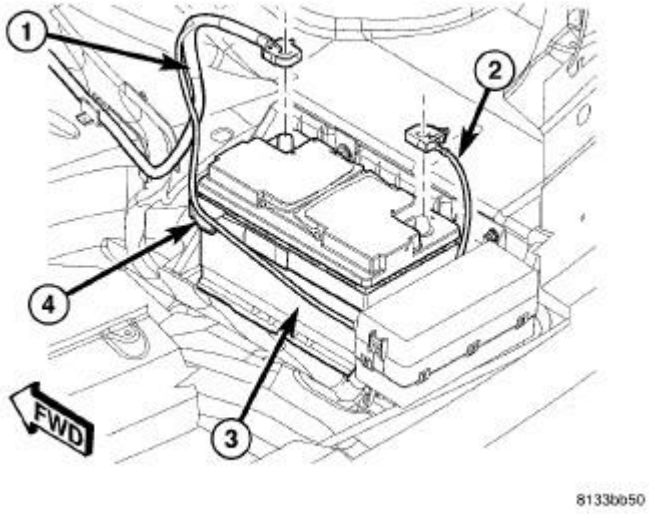

Fig. 73: Battery & Cables
Courtesy of CHRYSLER LLC

26. Connect the negative battery cable (2).
27. Start engine check for leaks.

COVER(S), CYLINDER HEAD

Removal

REMOVAL

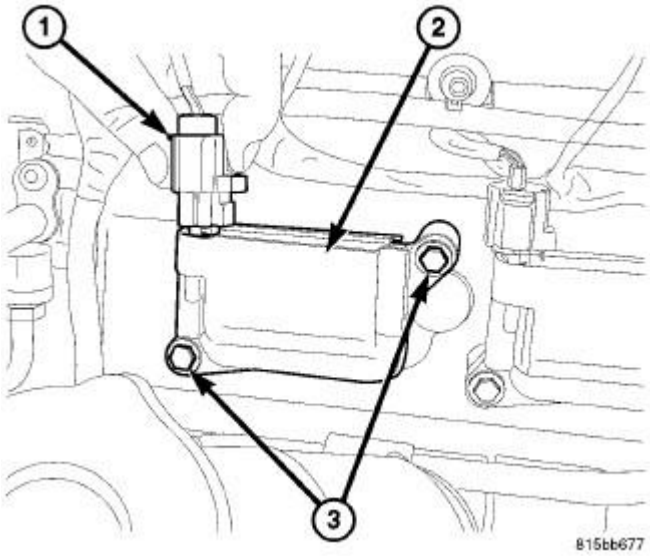

Fig. 74: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Disconnect ignition coil connector (1).
3. Remove ignition coil retaining bolts (3).

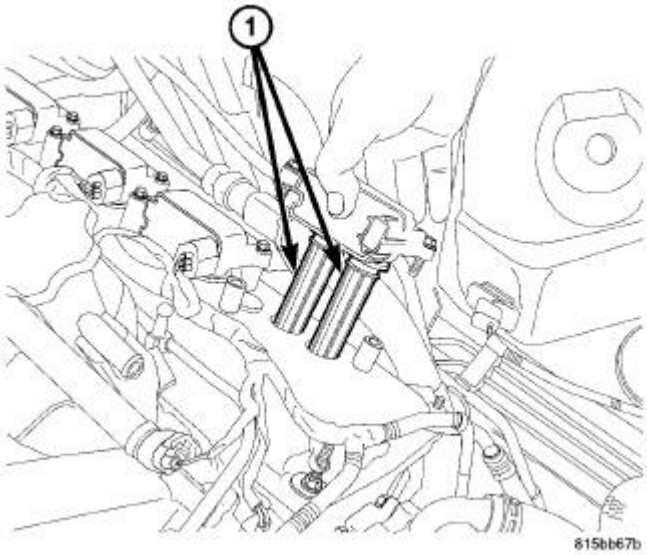

Fig. 75: Ignition Coil
Courtesy of CHRYSLER LLC

4. Remove ignition coil (1).

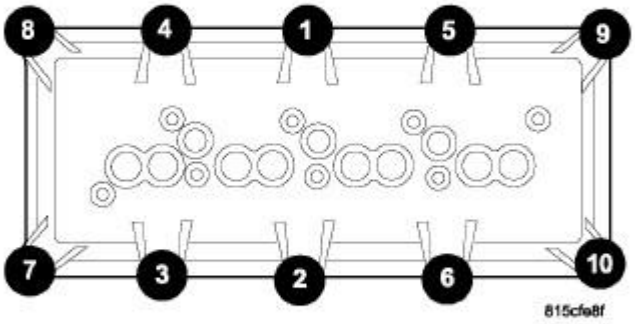

Fig. 76: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

5. Remove cylinder head cover retaining bolts.

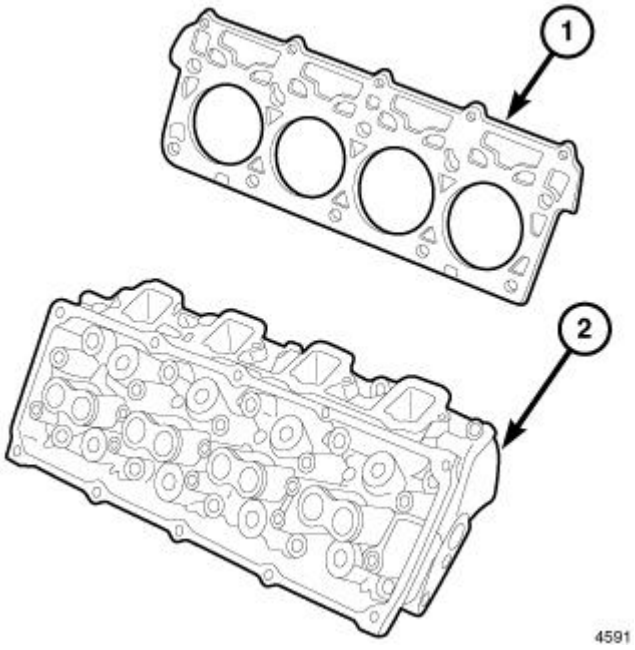

Fig. 77: Cylinder Head Components
Courtesy of CHRYSLER LLC

6. Remove cylinder head cover (1).

NOTE: The gasket (2) may be used again, provided no cuts, tears, or deformation have occurred.

Installation

INSTALLATION

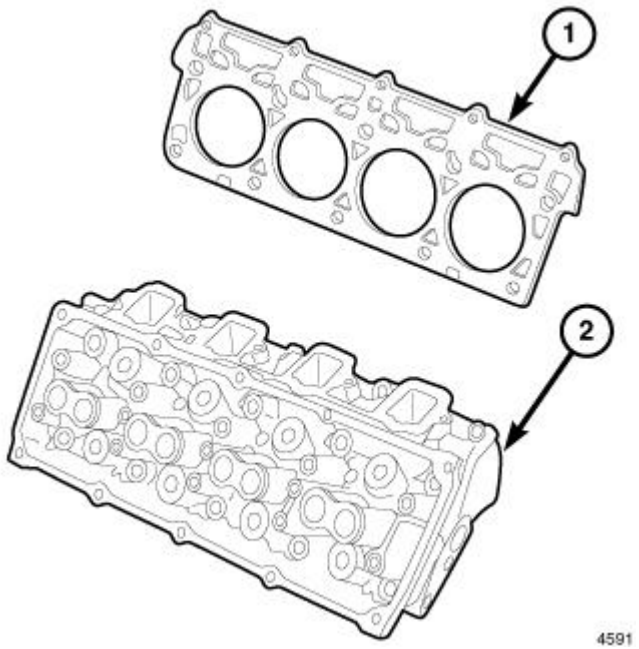

Fig. 78: Cylinder Head Components
Courtesy of CHRYSLER LLC

CAUTION: Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.

CAUTION: Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.

1. Clean cylinder head cover (1) and both sealing surface (4). Inspect and replace gasket (2) as necessary.
2. Install cylinder head cover and hand start all fasteners. Verify that all double ended studs (3) are in the correct location.

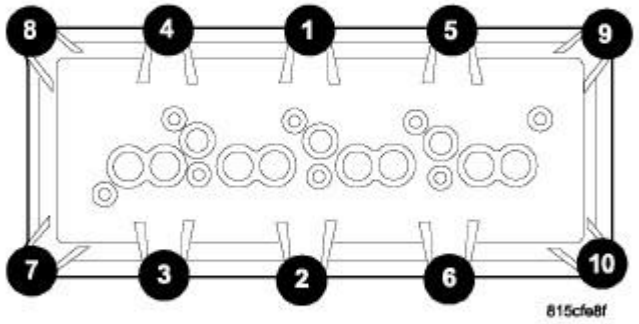

Fig. 79: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

3. Tighten cylinder head cover bolts and double ended studs to 8 N.m (70 in. lbs.) in the sequence shown. See **Fig. 79**.

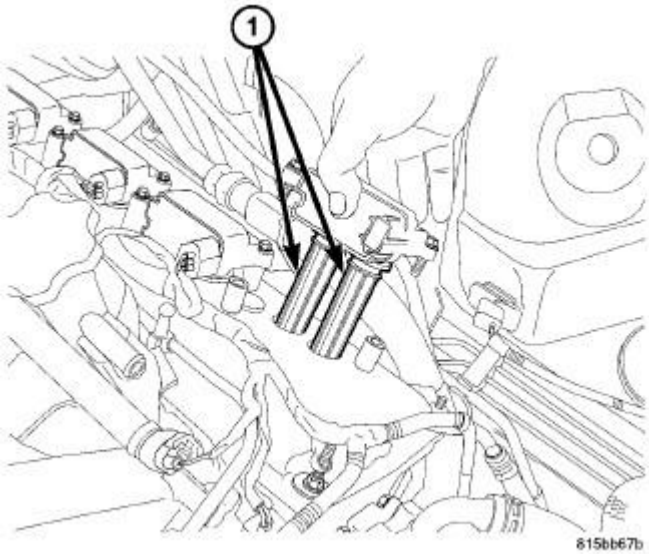

Fig. 80: Ignition Coil
Courtesy of CHRYSLER LLC

4. Before installing coil(s), apply dielectric grease to inside of spark plug boots (1).
5. Install ignition coils.

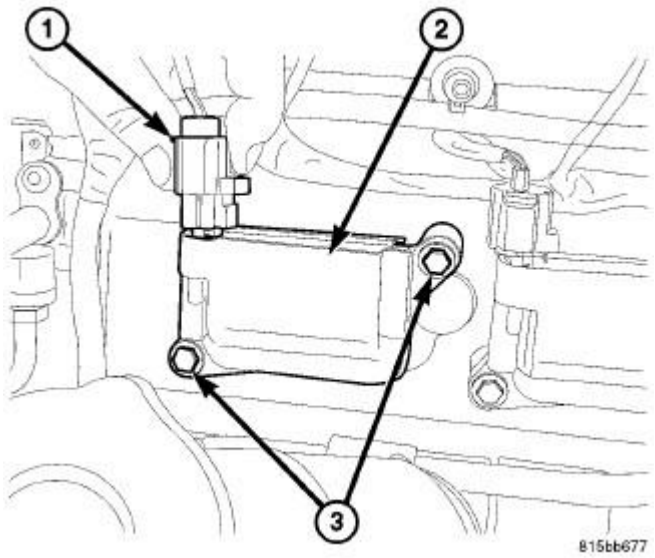

Fig. 81: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

6. Tighten fasteners (3) to 7 N.m (62 in. lbs.).
7. Connect ignition coil electrical connectors (1).
8. Install PCV hose.
9. Install the engine cover.
10. Connect the negative battery cable.

ROCKER ARM, VALVE

Removal

REMOVAL

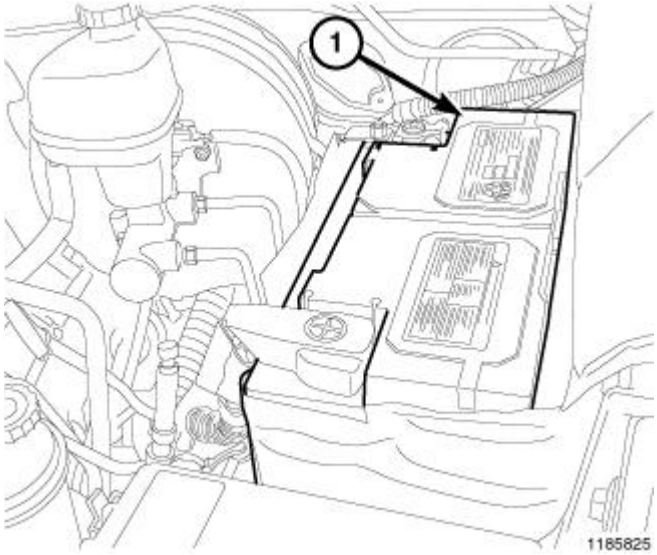

Fig. 82: Identifying Negative Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable (1).
2. Remove the engine cover. Refer to **COVER(S), CYLINDER HEAD**.

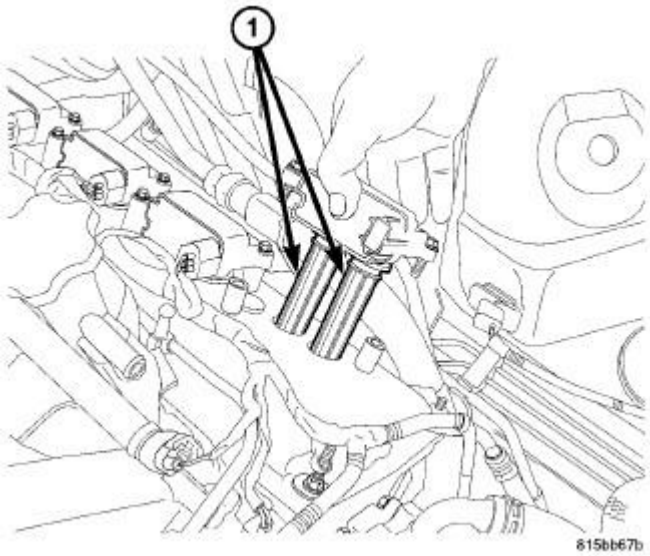

Fig. 83: Ignition Coil
Courtesy of CHRYSLER LLC

3. Remove the ignition coils (1). Refer to **Electrical/Ignition Control/COIL, Ignition - Removal** .

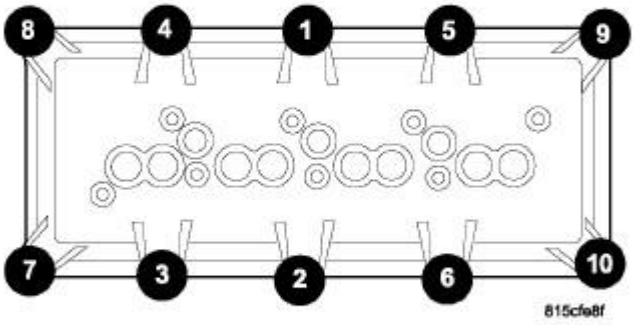

Fig. 84: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

4. Using the sequence shown in illustration, remove the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**. See **Fig. 84**.

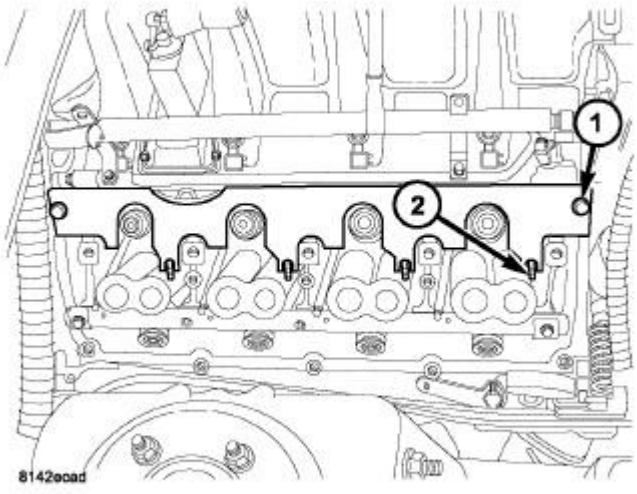

Fig. 85: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

5. Install the pushrod retainer 9070 (1).

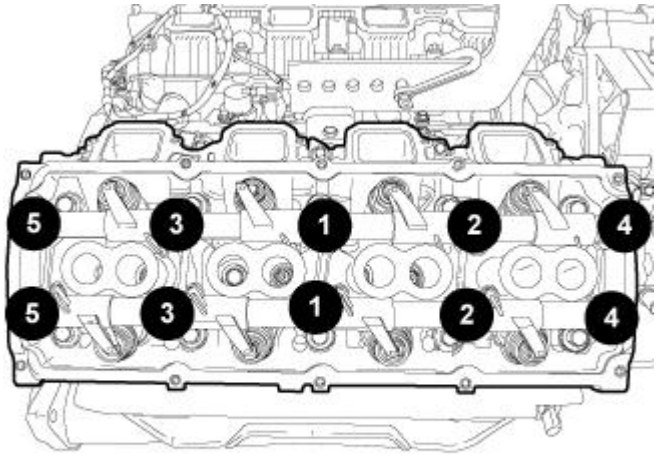

Fig. 86: Rocker Shafts Retaining Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER LLC

6. Using the sequence shown in illustration, loosen the rocker shafts retaining bolts. See **Fig. 86**.

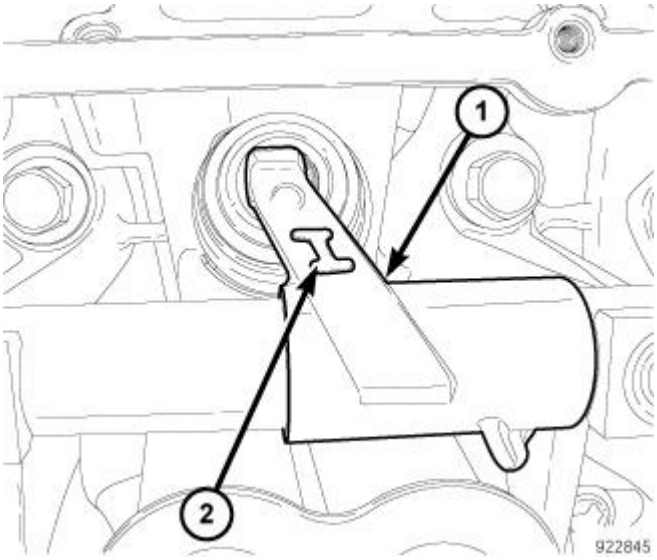

Fig. 87: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

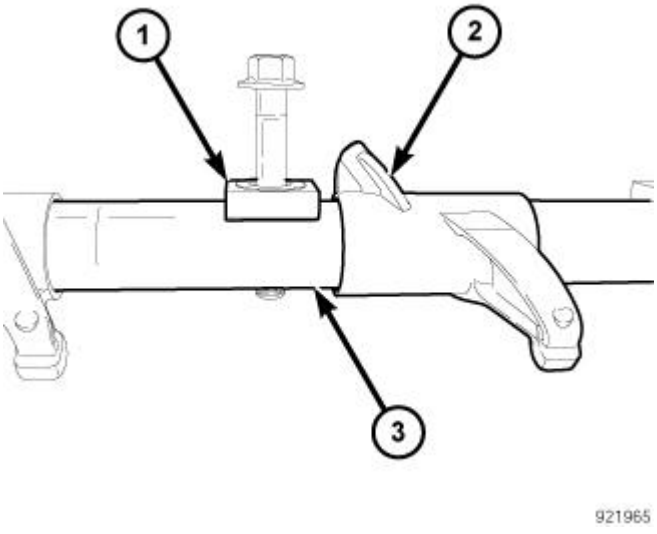

Fig. 88: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

CAUTION: Do not remove the retainers (1) from the rocker shaft (3).

7. Remove the rocker shaft (3). Note the rocker shaft location during removal.

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

8. Remove the pushrods. Note the pushrod location during removal.

Installation

INSTALLATION

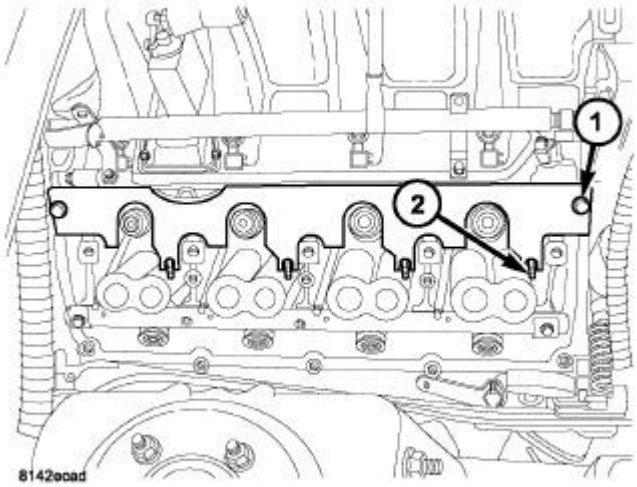

Fig. 89: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

1. Install the pushrods in the same order as removed.
2. Install the pushrod retainer 9070 (1).

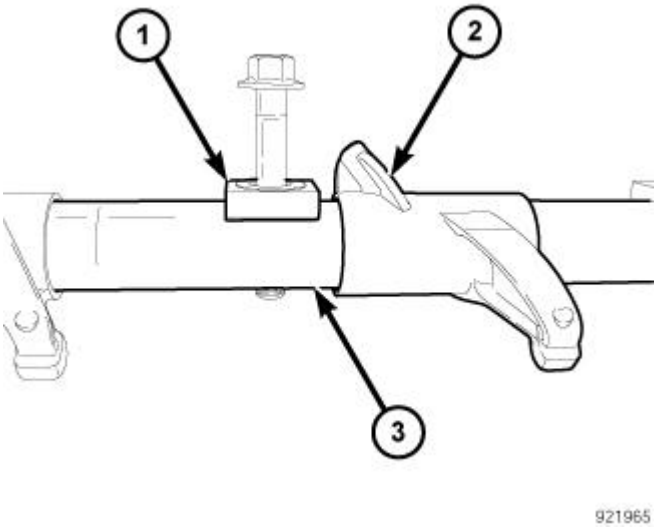

Fig. 90: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

CAUTION: Make sure that the retainers (1) and the rocker arms (2) are not overlapped when tightening bolts or engine damage could result.

CAUTION: Due to the changes in the pushrod clearance holes in the Eagle 5.7L cylinder heads, close attention must be given when installing the pushrod(s) into the tappet(s). Once the pushrod(s) have been installed, use a suitable light to look down through the pushrod hole (s). This will allow you to verify the pushrod(s) are centered properly in the tappet(s) and avoid engine damage. Recheck after the rocker shaft assembly has been installed and tightened to specification.

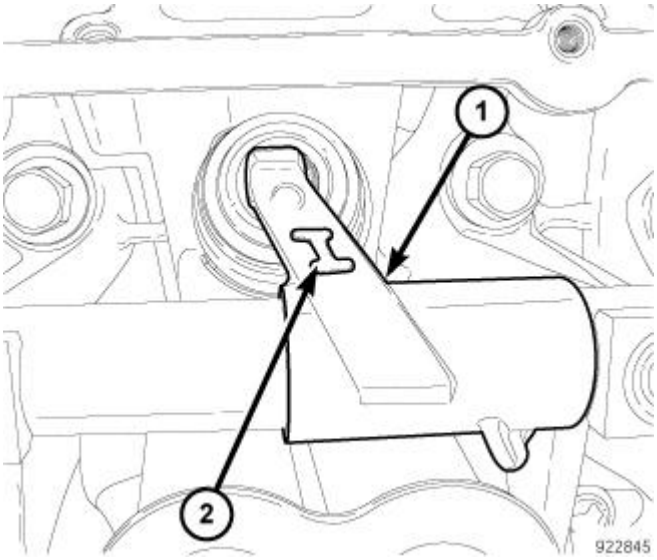

Fig. 91: Intake Rocker Arm Marking

Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

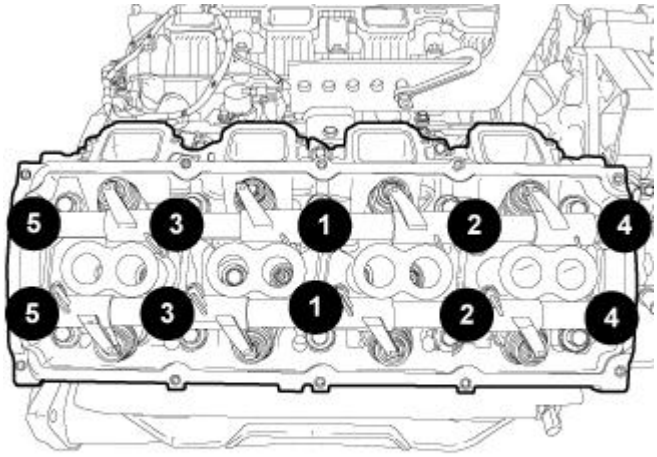

Fig. 92: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

3. Install the rocker shaft assemblies in the same order as removed.
4. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.). See **Fig. 92**.

CAUTION: Do Not rotate or crank the engine during or immediately after rocker arm installation. Allow the hydraulic roller tappets adequate time to bleed down (about five minutes).

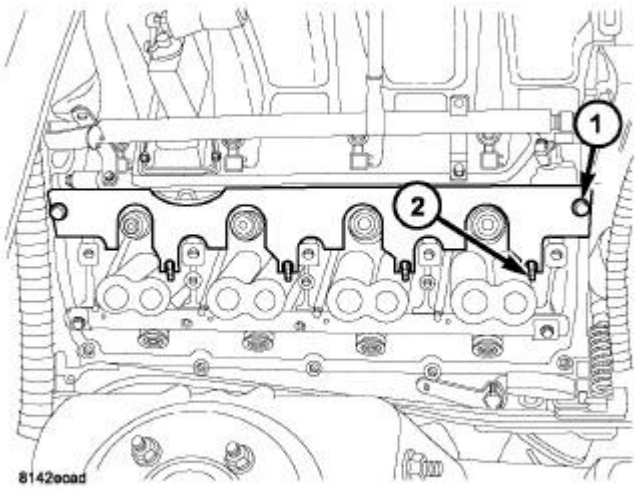

Fig. 93: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

5. Remove pushrod retainer 9070 (1).

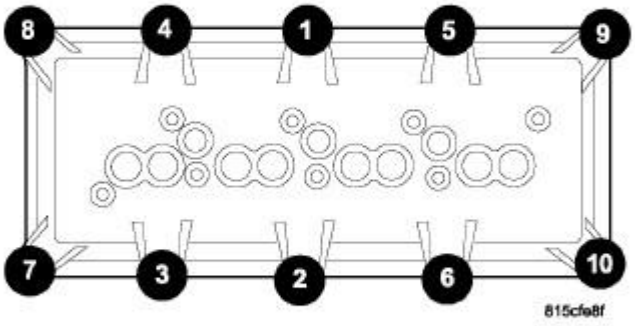

Fig. 94: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

6. Using the sequence shown in illustration, install the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**. See **Fig. 94**.

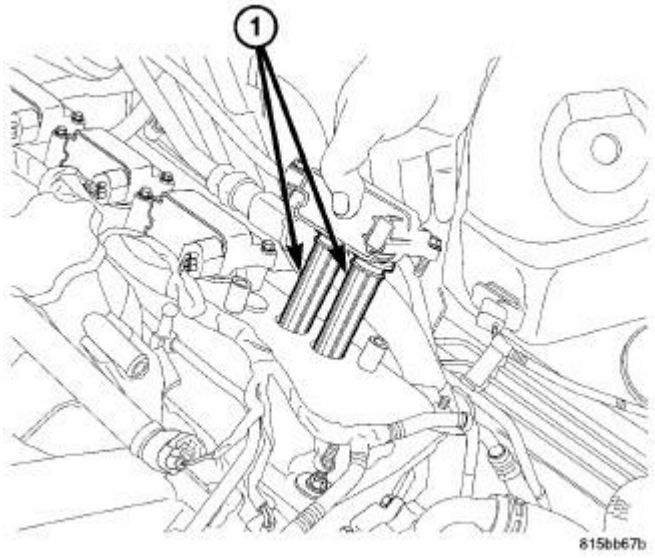

Fig. 95: Ignition Coil
Courtesy of CHRYSLER LLC

7. Install the ignition coils (1). Refer to **Electrical/Ignition Control/COIL, Ignition - Removal** .
8. Install the engine cover. Refer to **COVER(S), CYLINDER HEAD**.

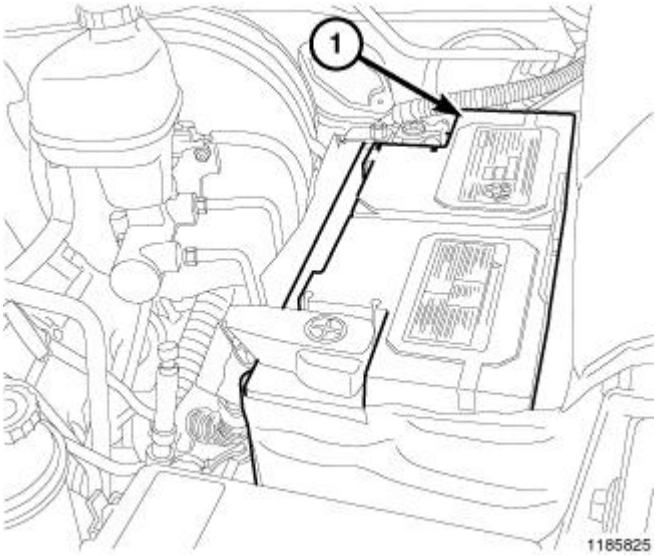

Fig. 96: Identifying Negative Battery Cable
Courtesy of CHRYSLER LLC

9. Connect the negative battery cable (1).

SEAL(S), VALVE GUIDE

Description

DESCRIPTION

The valve guide seals are made of rubber and incorporate an integral steel valve spring seat. The integral garter spring maintains consistent lubrication control to the valve stems.

Removal

REMOVAL

The valve stem seal is integral with the valve spring seat. For removal, see **Engine/Cylinder Head/SPRING (S), Valve - Removal**.

Installation

INSTALLATION

The valve stem seal is integral with the valve spring seat. For installation, see **Engine/Cylinder Head/SPRING (S), Valve - Installation**.

SPRING(S), VALVE

Removal

REMOVAL

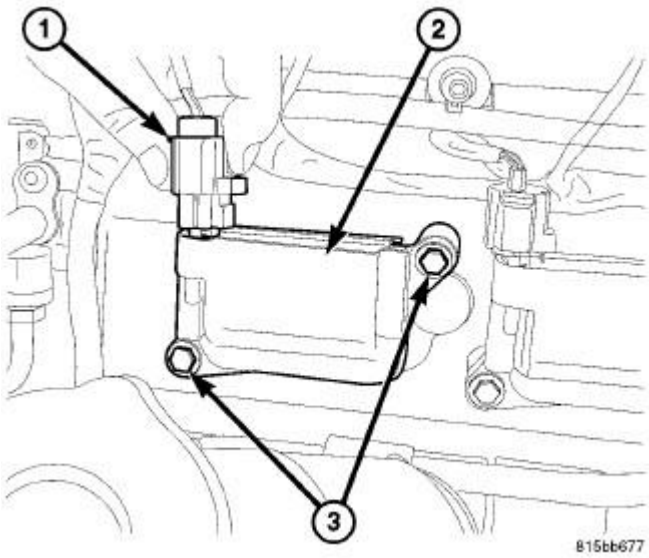

Fig. 97: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.

2. Remove the air cleaner assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**
3. Remove the air intake resonator. See **Engine/Air Intake System/RESONATOR, Air Cleaner - Removal**
4. Remove the ignition coil electrical connectors (1).
5. Remove the ignition coils (2).
6. Remove the spark plugs.

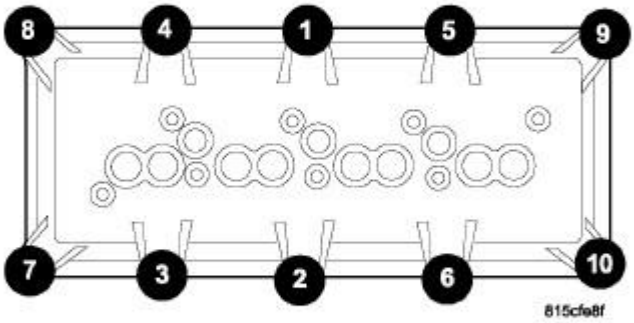

Fig. 98: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

7. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts and remove the cylinder head cover. See **Fig. 98**. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**

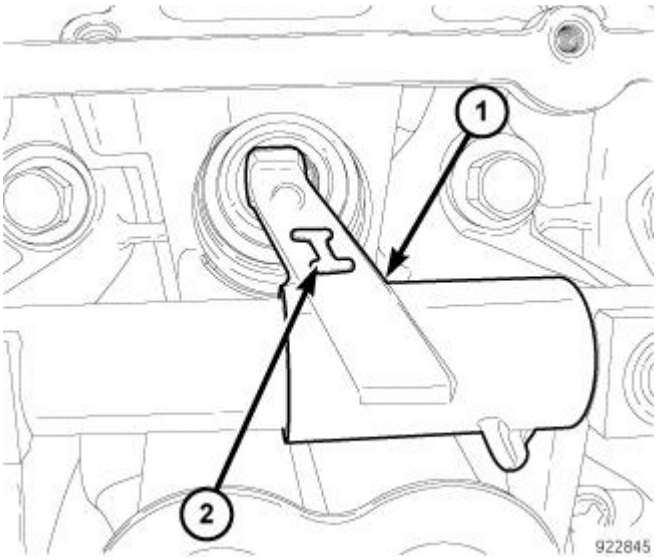

Fig. 99: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

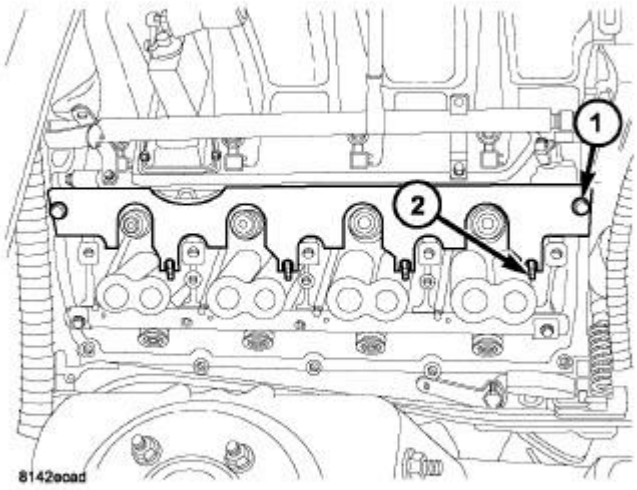

Fig. 100: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

CAUTION: The piston must be at TDC and both valves closed on the cylinder to

be serviced.

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

NOTE: Pushrods must be installed in the same order as removed.

NOTE: If removing the intake valve spring, install the pushrod retainer 9070 (1).

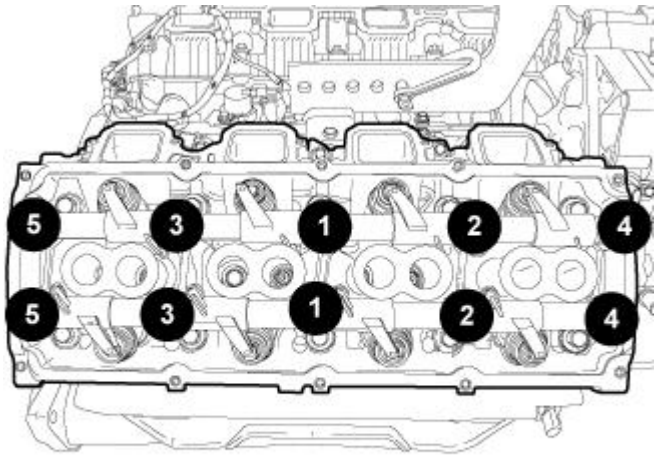

Fig. 101: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

8. Using the sequence shown in illustration, remove the exhaust/intake rocker arm shaft retaining bolts. See **Fig. 101**.

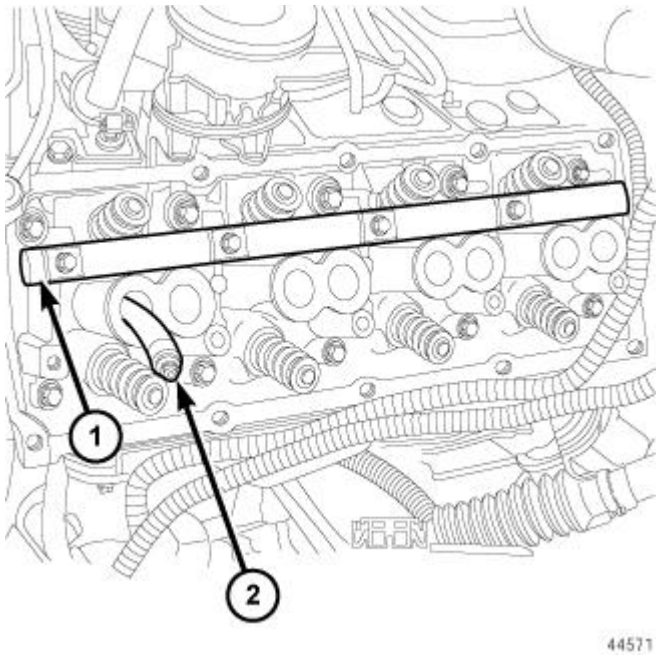

Fig. 102: Rocker Shaft
Courtesy of CHRYSLER LLC

NOTE: Tap the top of the valve spring retainer to loosen the spring retainers locks.

9. Install the rocker arm valve spring compressor shaft 9065A (1).
10. Install the spring compressor adapter arm 9065A if needed.
11. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

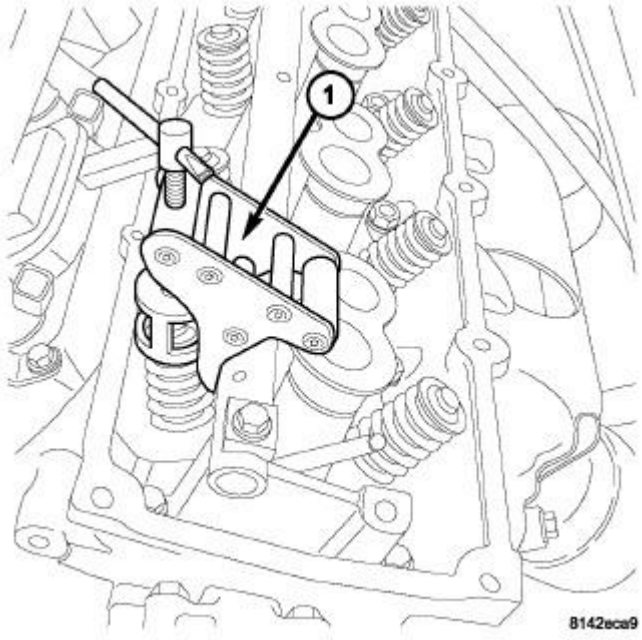

Fig. 103: Removing/Installing Valve Spring Intake
Courtesy of CHRYSLER LLC

NOTE: Tap the top of the valve spring retainer to loosen the spring retainers locks.

12. Compress the valve spring with valve spring compressor (1) and remove the valve retainer locks.
13. Release the spring compressor and remove valve spring.

NOTE: The valve springs are interchangeable between intake and exhaust.

14. Remove the valve seal.

NOTE: All valve springs and seals are removed in the same manner.

Installation

INSTALLATION

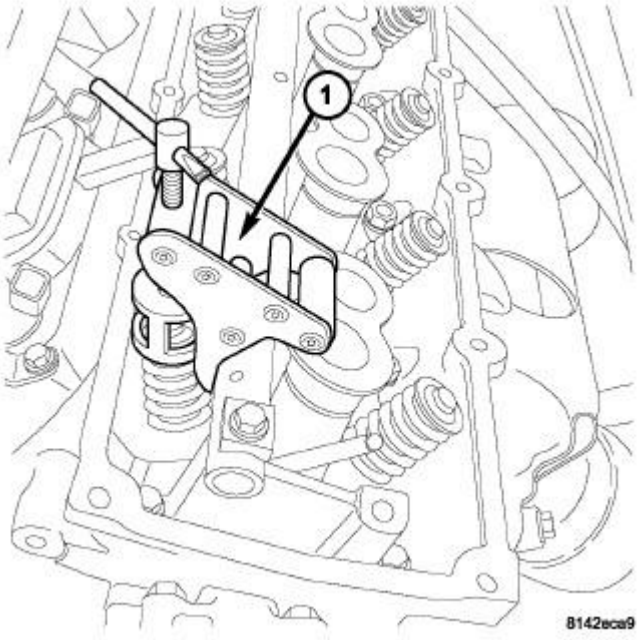

Fig. 104: Removing/Installing Valve Spring Intake
Courtesy of CHRYSLER LLC

1. Install the valve seal.
2. Install the valve spring.
3. Using the valve spring compressor 9065A (1), compress the valve spring and install the valve spring retainer and locks.
4. Remove the spring compressor.
5. Remove the air hose from the spark plug hole.

NOTE: All valve springs and seals are installed in the same manner.

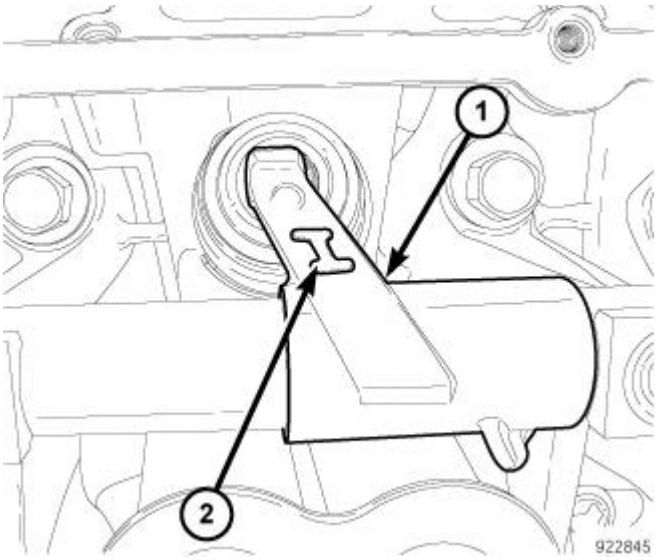

Fig. 105: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

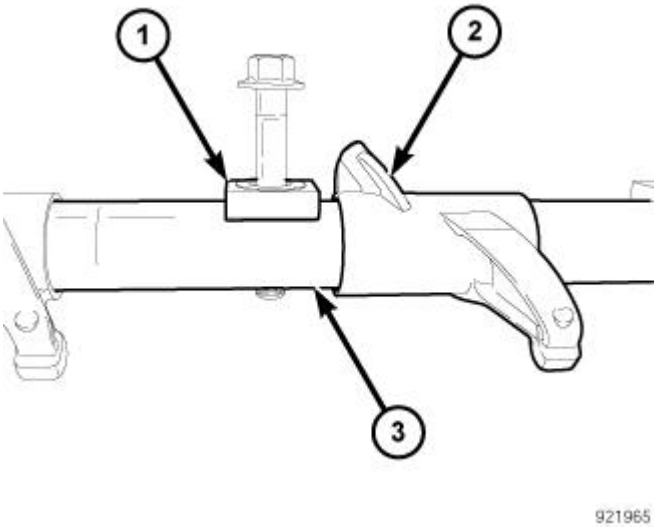

Fig. 106: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

CAUTION: Make sure that the retainers (1) and the rocker arms (2) are not overlapped when tightening bolts or engine damage could result.

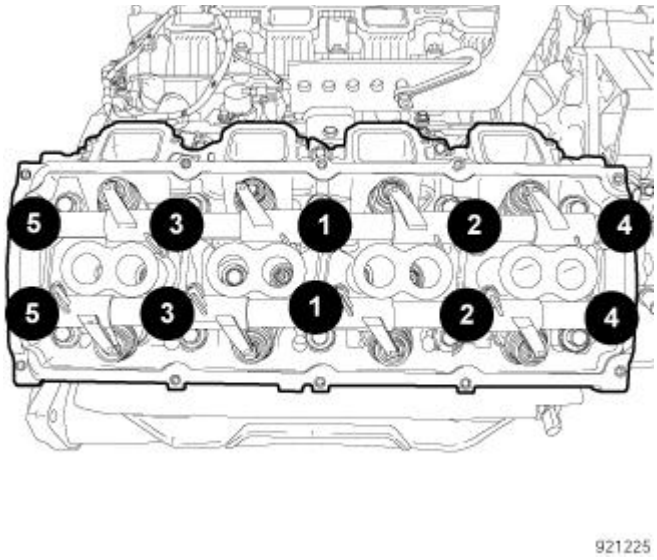

Fig. 107: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

CAUTION: Due to the changes in the pushrod clearance holes in the Eagle 5.7L cylinder heads, close attention must be given when installing the pushrod(s) into the tappet(s). Once the pushrod(s) have been installed, use a suitable light to look down through the pushrod hole (s). This will allow you to verify the pushrod(s) are centered properly in the tappet(s) and avoid engine damage. Recheck after the rocker shaft assembly has been installed and tightened to specification.

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

NOTE: Pushrods must be installed in the same order as removed.

6. Install the rocker arm shaft and pushrods. See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**
7. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.). See **Fig. 107**.

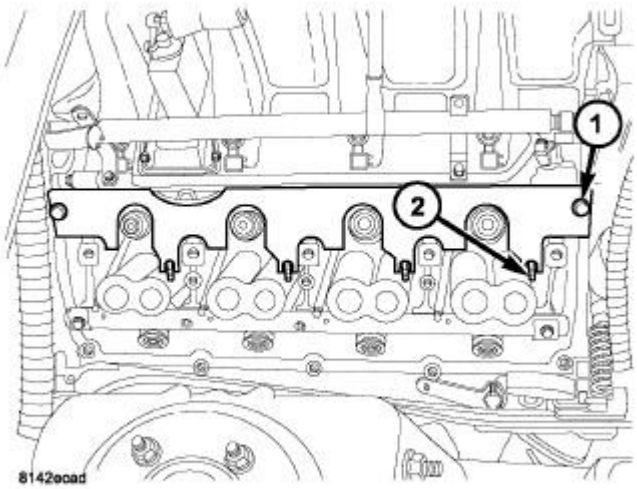

Fig. 108: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

8. If used, remove the pushrod retainer 9070 (1).

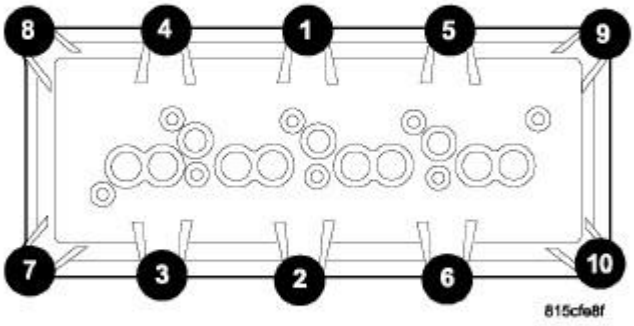

Fig. 109: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

CAUTION: Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.

CAUTION: Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.

9. Clean the cylinder head cover and both sealing surfaces, inspect and replace the gasket as necessary.
10. Install the cylinder head cover and hand start all fasteners. Verify that all double ended studs are in the correct location.
11. Using the sequence shown in illustration, tighten the cylinder head cover retaining bolts to 8 N.m (71 in. lbs.). See **Fig. 109**.
12. Install the spark plugs.

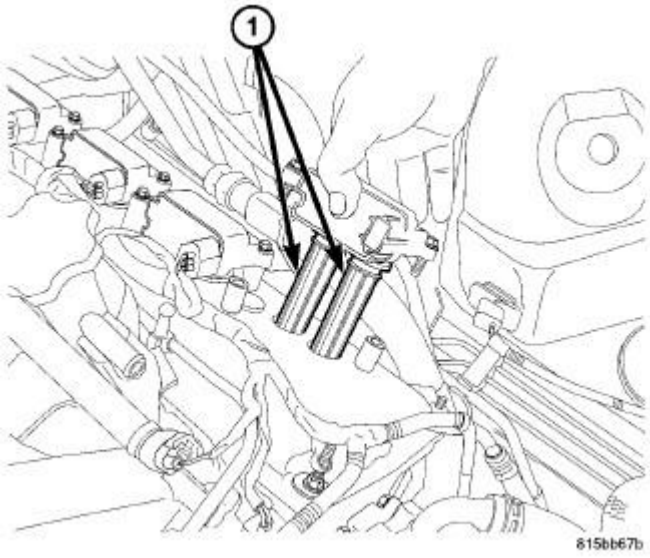

Fig. 110: Ignition Coil
Courtesy of CHRYSLER LLC

13. Before installing the ignition coils, apply dielectric grease to the inside of the spark plug boots.

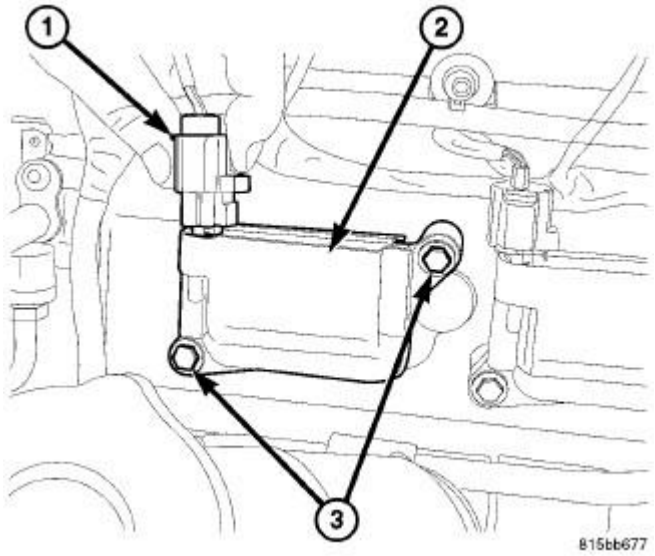

Fig. 111: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

14. Install the ignition coil (2) on the plugs and tighten the fasteners (3) to 7 N.m (62 in. lbs).
15. Connect the ignition coil electrical connectors (1).
16. Install the air cleaner assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
17. Install the air intake resonator. See **Engine/Air Intake System/RESONATOR, Air Cleaner - Installation**.
18. Connect the negative battery cable.

VALVES, INTAKE AND EXHAUST

Description

VALVE GUIDES

The valve guides are made of powdered metal and pressed into the cylinder head. The guides are not replaceable or serviceable, and valve guide reaming is not recommended. If the guides are worn beyond acceptable limits, replace the cylinder heads.

VALVES

Both the intake and the exhaust valves are made of steel. The intake valve is 50.93 mm (2.00 inches) in diameter and the exhaust valve is 39.53 mm (1.55 inches) in diameter. All valves use three-bead lock keepers to retain the springs and promote valve rotation.

Standard Procedure

REFACING

VALVE FACE AND VALVE SEAT ANGLE CHART

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Seat Width	-	
Intake	1.18 - 1.62 mm	0.0464 - 0.0637 in.
Exhaust	1.48 - 1.92 mm	0.058 - 0.075 in.
Face Angle	45° - 451/2°	
Seat Angle	441/2° - 45°	

NOTE: Valve seats that are worn or burned can be reworked, provided that correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.

NOTE: When refacing valves and valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

1. Using a suitable dial indicator, measure the center of the valve seat. Total run out must not exceed 0.051 mm (0.002 in).
2. Apply a small amount of Prussian Blue to the valve seat. Insert the valve into the cylinder head. Rotate valve while applying light pressure on the valve seat. Remove the valve and examine the valve face. If the blue is transferred below the top edge of the valve face, lower the valve seat using a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, raise the valve seat using a 65 degree stone.
3. When the seat is properly positioned the width of the intake seat must be 1.18 - 1.62 mm (0.0464 - 0.0637 in.) and the exhaust seat must be 1.48 - 1.92 mm (0.058 - 0.075 in.).
4. Check the valve spring installed height after refacing the valve and seat. The installed height for both intake and exhaust valve springs must not exceed 46.0 mm (1.81 in.).
5. The valve seat must maintain a seat angle of 441/2° - 45°.
6. The valve face must maintain a face angle of 45° - 451/2°.

Removal

REMOVAL

1. Remove the cylinder head. See **Engine/Cylinder Head - Removal**.
2. Compress valve springs using Valve Spring Compressor Tool C-3422-D and Adapter 8464.
3. Remove valve retaining locks, valve spring retainers, valve stem seals and valve springs.
4. Before removing valves, remove any burrs from valve stem lock grooves to prevent damage to the valve guides. Identify valves to ensure installation in original location.

Installation

INSTALLATION

1. Clean valves thoroughly. Discard burned, warped and cracked valves.
2. Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.
3. Measure valve stems for wear. If wear exceeds 0.051 mm (0.002 inch), replace the valve.
4. Coat valve stems with lubrication oil and insert them in cylinder head.
5. If valves or seats are reground, check valve stem height. If valve is too long, replace cylinder head.
6. Install new seals on all valve guides. Install valve springs and valve retainers.
7. Compress valve springs with Valve Spring Compressor Tool special tool # C- 3422 and adapter 8464, install locks and release tool. If valves and/or seats are ground, measure the installed height of springs. Make sure the measurement is taken from bottom of spring seat in cylinder head to the bottom surface of spring retainer.
8. Install cylinder head. See **Engine/Cylinder Head - Installation**.

ENGINE BLOCK

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean out:

- The galley at the oil filter adaptor hole.
- The front and rear oil galley holes.
- The MDS oil galley holes in the valley.
- The feed holes for the crankshaft main bearings.

Drill and tapped holes should be free of debris upon assembly.

Once the block has been completely cleaned, apply Loctite PST pipe sealant with Teflon 592 to the threads of the front and rear oil galley plugs, and coolant drain plugs. Tighten the oil galley 1/4 inch x 18 NPT plugs to 20 N.m (177 in. lbs.). Tighten the coolant drain 1/4 inch x 18 NPT plugs to 34N.m (300 in. lbs.). Tighten the 3/8 inch x 18 NPT plugs to 27 N.m (240 in. lbs.).

INSPECTION

INSPECTION

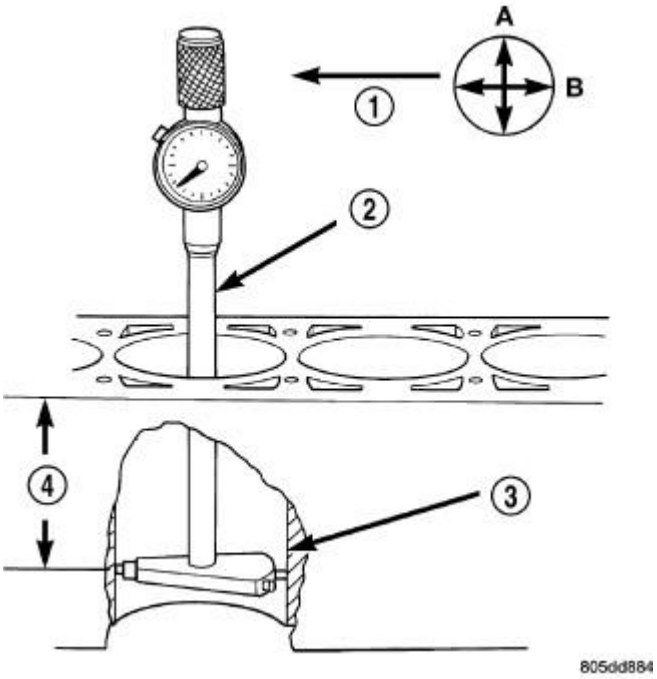

Fig. 112: Cylinder Bore Gauge - Typical
Courtesy of CHRYSLER LLC

1. It is mandatory to use a dial bore gauge to measure each cylinder bore diameter. To correctly select the proper size piston, a cylinder bore gauge, capable of reading in 0.003 mm (.0001 in.) increments is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at three levels below top of bore. Start perpendicular (across or at 90 degrees) to the axis of the crankshaft and then take two additional reading.
3. Measure the cylinder bore diameter crosswise to the cylinder block near the top of the bore. Repeat the measurement near the middle of the bore, then repeat the measurement near the bottom of the bore.
4. Determine taper by subtracting the smaller diameter from the larger diameter.
5. Rotate measuring device 90° and repeat steps above.
6. Determine out-of-roundness by comparing the difference between each measurement.
7. If cylinder bore taper does not exceed 0.025 mm (0.001 inch) and out-of-roundness does not exceed 0.015 mm (0.0006 inch), the cylinder bore can be honed. If the cylinder bore taper or out- of-round condition exceeds these maximum limits, the cylinder block must be replaced. A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.

ASSEMBLY, VARIABLE VALVE TIMING

Description

DESCRIPTION

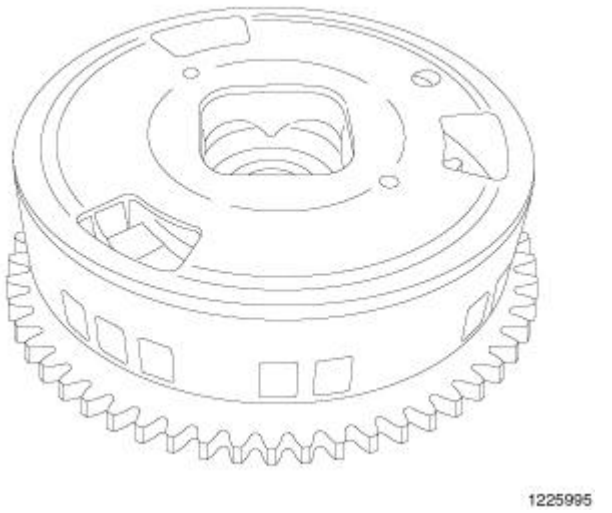

Fig. 113: Variable Cam Timing (VCT) Assembly
Courtesy of CHRYSLER LLC

The 5.7L Eagle engine is equipped with Variable Cam Timing (VCT). This system advances and/or retards the camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The VCT assembly is sometimes referred to as a camshaft phaser.

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

The VCT assembly consists of the camshaft sprocket and a timing phaser. The VCT phaser assembly bolts to the camshaft and is serviced as an assembly.

Operation

OPERATION

The Variable Cam Timing (VCT) assembly is actuated with engine oil pressure. The oil flow to the VCT assemblies are controlled by an Oil Control Valve (OCV). The OCV consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the OCV to control oil flow through the spool valve into the VCT assemblies. The VCT assembly consists of a rotor, stator, and sprocket. The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VCT assembly rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable cam timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

Removal

REMOVAL

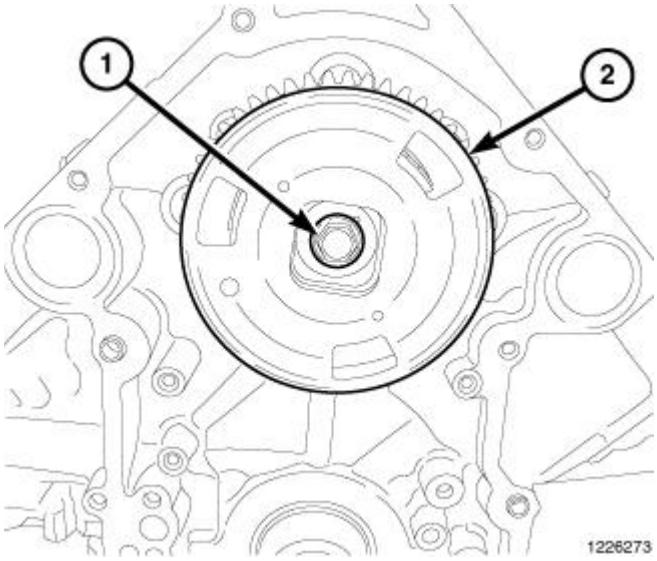

Fig. 114: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

1. Remove the timing chain and sprockets. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
2. Remove the camshaft phaser bolt (1).
3. Remove camshaft phaser (2).

Installation

INSTALLATION

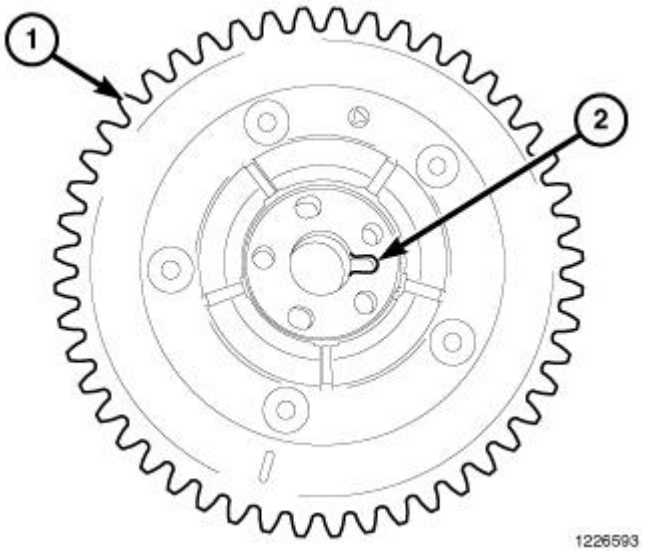

Fig. 115: Phaser Alignment Slot
Courtesy of CHRYSLER LLC

1. Align the slot (2) in the phaser (1) with the dowel on the camslhaft.

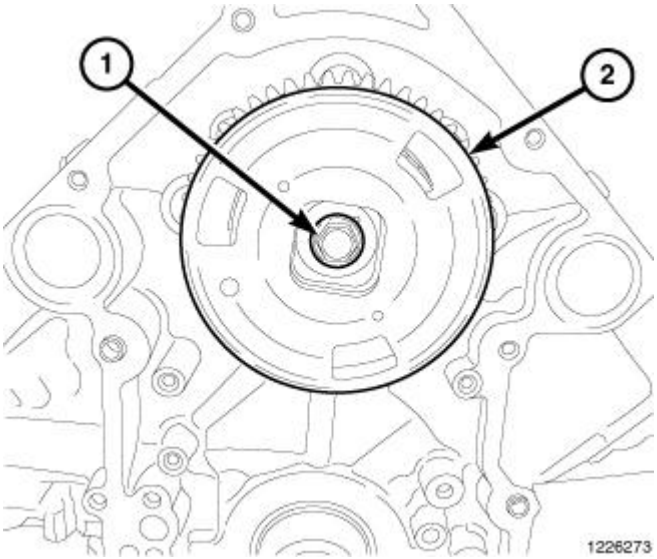

Fig. 116: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

2. Position the phaser (2) in place and install phaser retaining bolt (1) and tighten to 122 N.m (90 ft. lbs.).
3. Install the timing chain and sprockets. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.

BEARING(S), CRANKSHAFT, MAIN

Standard Procedure

CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

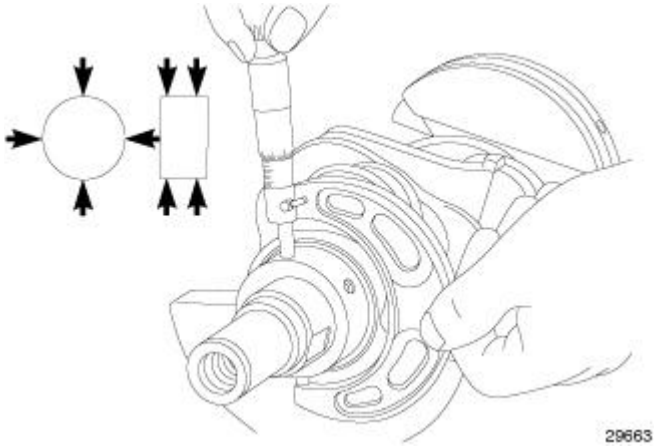

Fig. 117: Crankshaft Journal Measurements - Typical
Courtesy of CHRYSLER LLC

With the crankshaft removed from the cylinder block.

Clean the oil off the main bearing journal.

Determine the maximum diameter of the journal with a micrometer. Measure at two locations 90° apart at each end of the journal.

The maximum allowable taper is 0.008 mm (0.0004 inch.) and maximum out of round is 0.005 mm (0.0002 inch). Compare the measured diameter with the journal diameter specification (Main Bearing Fitting Chart). Select the inserts required to obtain the specified bearing-to-journal clearance.

CRANKSHAFT MAIN BEARING SELECTION

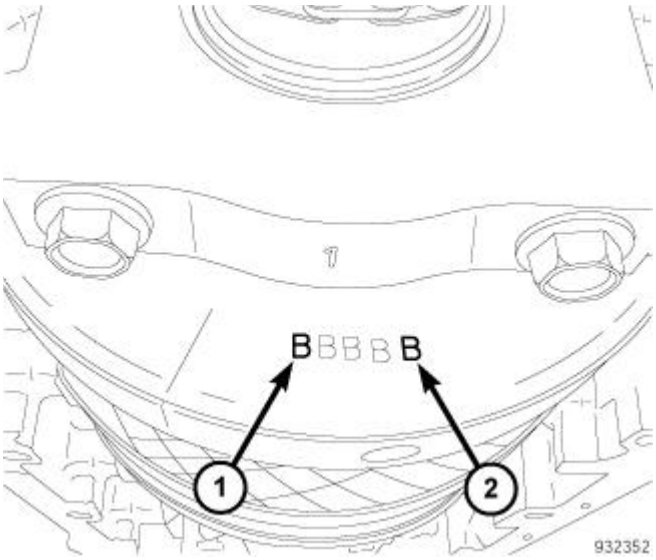

Fig. 118: Crankshaft Counterweight Stamped Grade Identification Marks
Courtesy of CHRYSLER LLC

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft counterweight has grade identification marks stamped into it. These marks are read from left to right. The left letter (1) refers to the number one main journal and the right letter (2) refers to the number 5 journal.

NOTE: Service main bearings are coded. These codes identify what size or grade of the bearing.

MAIN BEARING SELECTION CHART - 5.7L

GRADE MARKING	BEARING SIZE		FOR USE WITH JOURNAL SIZE	
-	METRIC	STANDARD	METRIC	STANDARD
A	0.008 mm U/S	0.0004 in. U/S	64.988 - 64.995 mm	2.5585 - 2.5588 in.
B	NOMINAL		64.996 - 65.004 mm	2.5588 - 2.5592 in.
C	0.008 mm O/S	0.0004 in. O/S	65.005 - 65.012 mm	2.5592 - 2.5595 in.

Inspection

INSPECTION

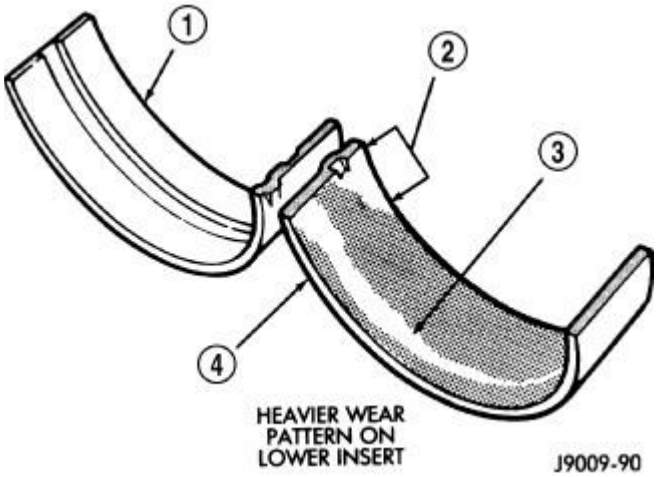

Fig. 119: Main Bearing Wear Patterns
Courtesy of CHRYSLER LLC

Wipe the inserts clean and inspect for abnormal wear patterns and for metal or other foreign material imbedded in the lining. Normal main bearing insert wear patterns are illustrated.

NOTE: If any crankshaft journals are scored, the crankshaft must be repaired or replaced.

Inspect the back of the inserts for fractures, scrapings or irregular wear patterns.

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

Removal

CAMSHAFT CORE HOLE PLUG

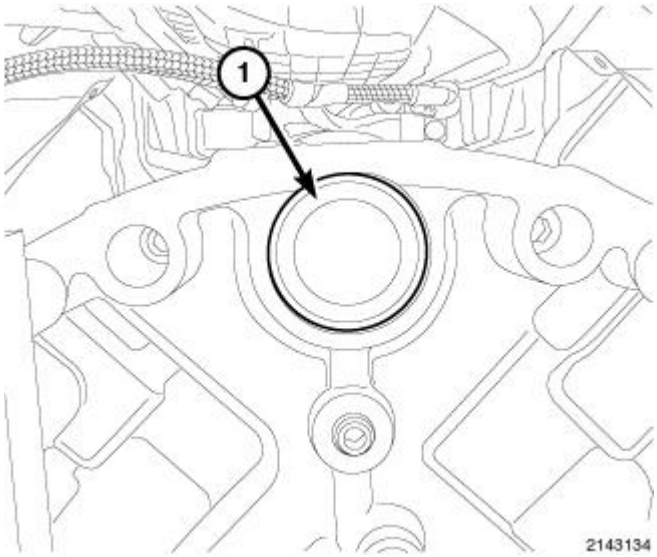

Fig. 120: Camshaft Core Hole Plug
Courtesy of CHRYSLER LLC

1. Perform the fuel system pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Remove the engine from the vehicle. See **Engine - Removal**.
3. Remove the flexplate. See **Engine/Engine Block/FLEXPLATE - Removal**.

CAUTION: Do not damage the rear surface of the camshaft or the core plug sealing surface, when removing the core plug.

4. Using a suitable sharp punch, punch a small hole in the camshaft core hole plug (1).
5. Insert a short sheet metal screw into the small hole in the camshaft core hole plug.
6. Using a suitable slide hammer puller, remove the rear camshaft core hole plug.

CAMSHAFT

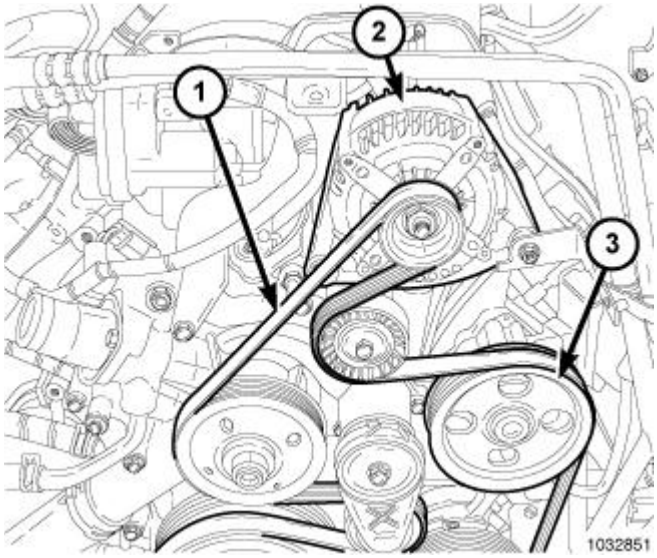

Fig. 121: Accessory Drive Belt Routing
Courtesy of CHRYSLER LLC

1. Remove the battery negative cable.
2. Remove the air cleaner assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
3. Drain coolant. Refer to **Cooling - Standard Procedure** .
4. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
5. Remove the left and right cylinder heads. See **Engine/Cylinder Head - Removal**.
6. Remove the radiator. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Removal** .
7. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
8. Remove timing case cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.

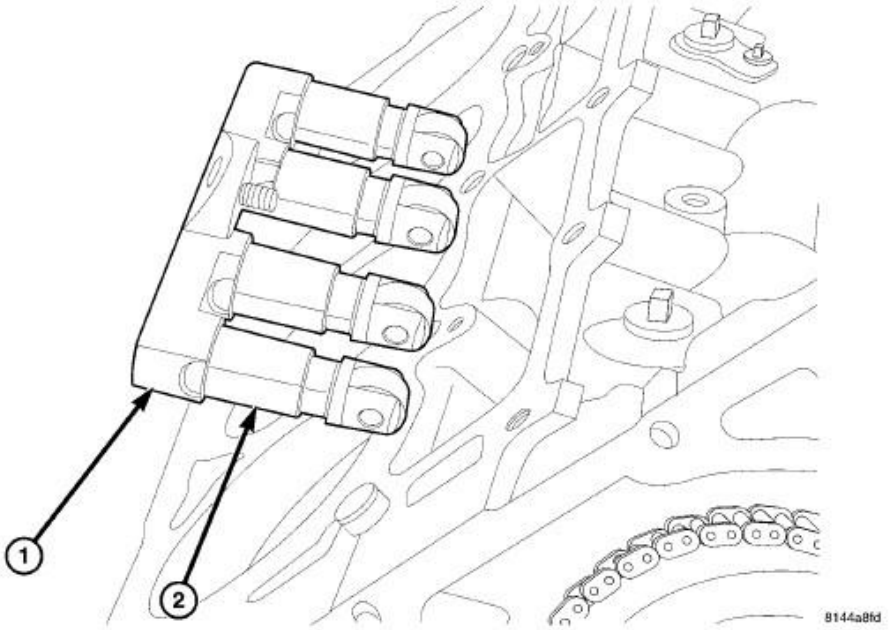

Fig. 122: Removing/Installing Hydraulic Roller Tappet
Courtesy of CHRYSLER LLC

NOTE: Identify lifters to ensure installation in original location.

9. Remove the tappets (2) and retainer (1) assembly.

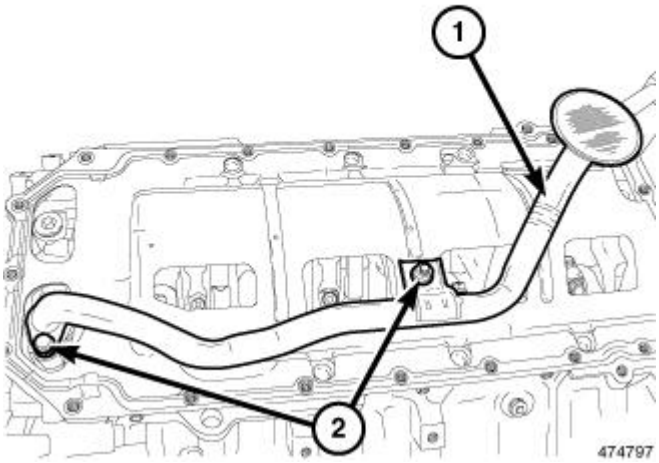

Fig. 123: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

10. Remove the oil pick up tube (1).

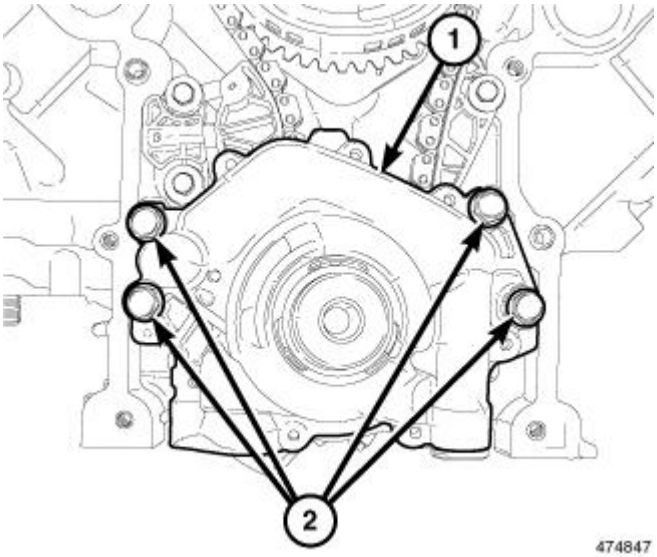

Fig. 124: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

11. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

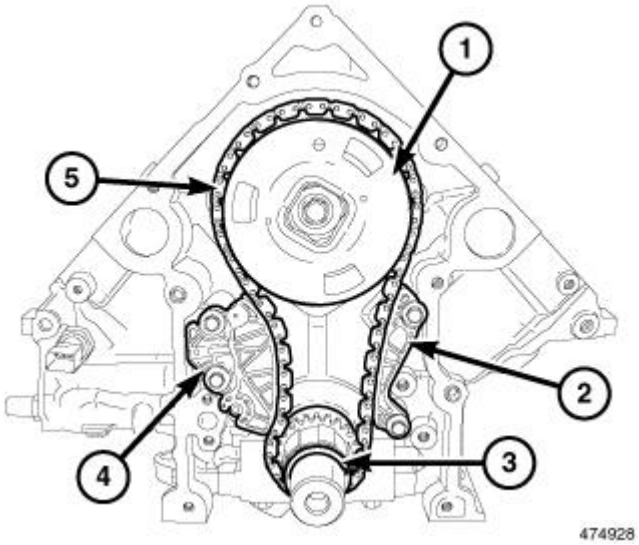

Fig. 125: Timing Chain
Courtesy of CHRYSLER LLC

12. Remove timing chain (5). See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.

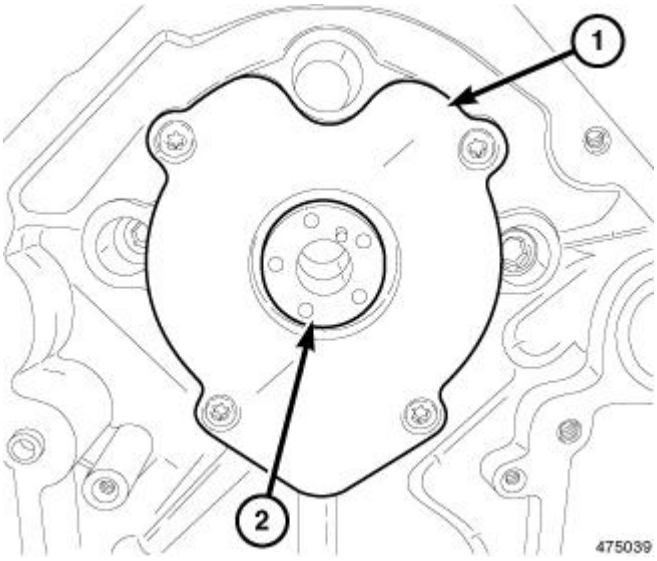

Fig. 126: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

13. Remove camshaft thrust plate (1).

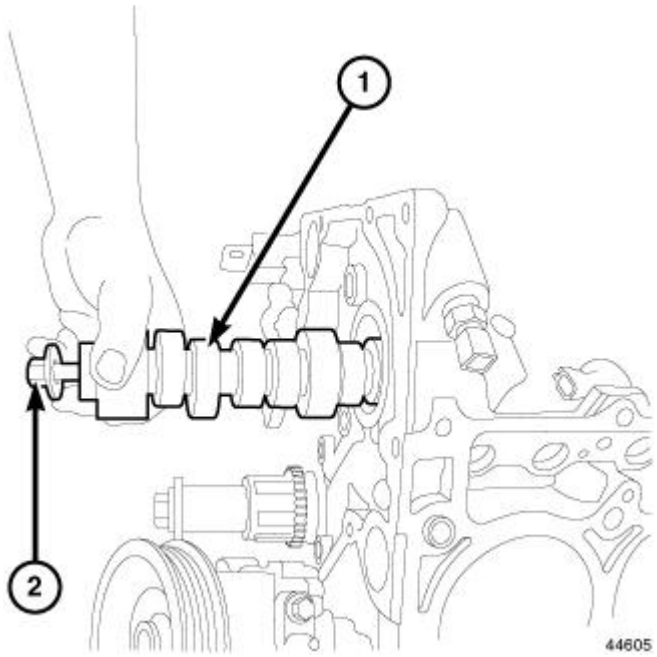

Fig. 127: Removing/Installing Camshaft
Courtesy of CHRYSLER LLC

NOTE: Slowly rotate the camshaft while pulling camshaft out.

14. Install a long bolt (2) into front of camshaft (1) to aid in removal of the camshaft. Remove camshaft, being careful not to damage cam bearings with the cam lobes.

Inspection

INSPECTION

The cam bearings are not serviceable. Do not attempt to replace cam bearings for any reason. If the cam bearings are damaged, the cylinder block must be replaced.

Installation

CAMSHAFT CORE HOLE PLUG

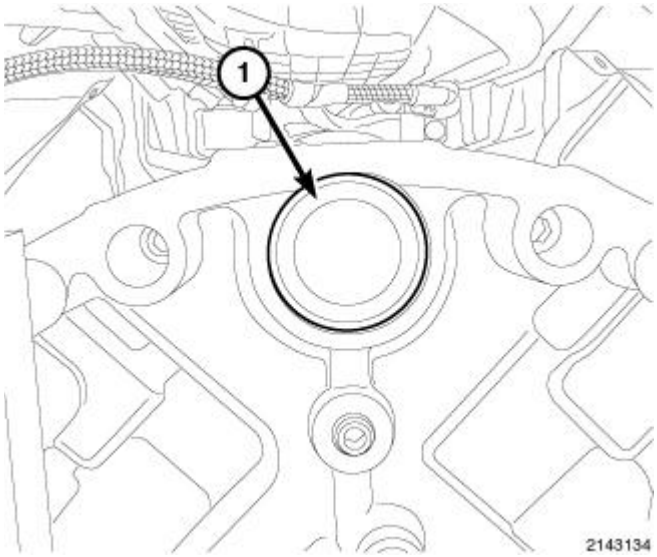

Fig. 128: Camshaft Core Hole Plug
Courtesy of CHRYSLER LLC

1. Clean the core hole in the cylinder block.

NOTE: Do not apply adhesive to the new camshaft core hole plug. A new plug has adhesive pre-applied.

2. Install a new camshaft core hole plug (1) located at the rear of cylinder block, using a suitable flat faced tool. The plug must be fully seated on the cylinder block shoulder.
3. Install the flexplate. See **Engine/Engine Block/FLEXPLATE - Installation**.
4. Install the engine. See **Engine - Installation**.

CAMSHAFT

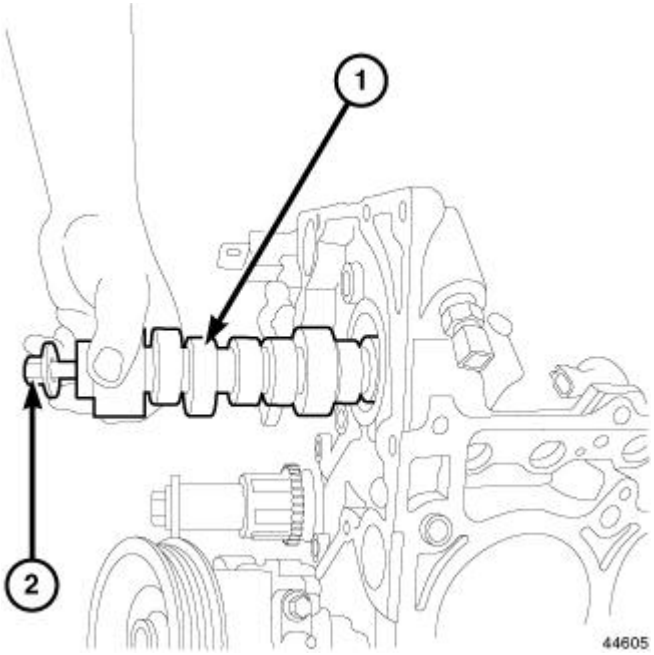

Fig. 129: Removing/Installing Camshaft
Courtesy of CHRYSLER LLC

1. Lubricate camshaft lobes and camshaft bearing journals and insert the camshaft (1).

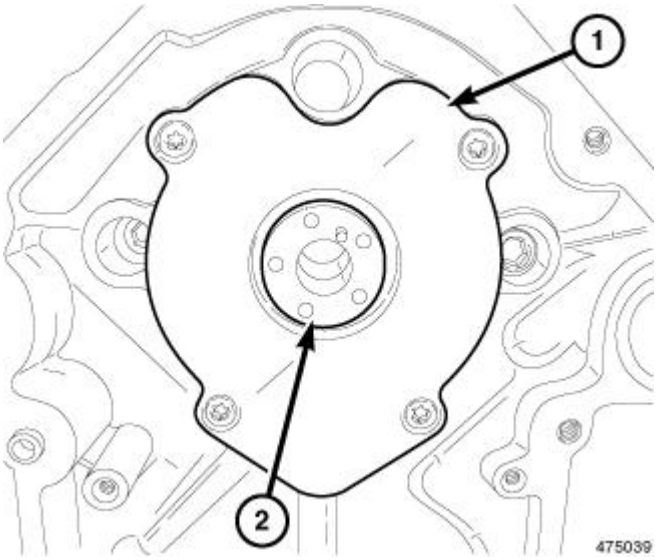

Fig. 130: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

2. Install camshaft thrust plate (1).

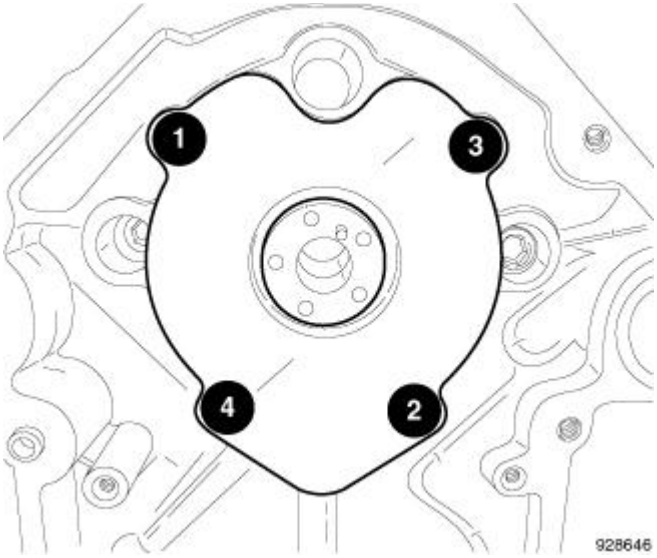

Fig. 131: Camshaft Thrust Plate Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

3. Tighten the bolts to 28 N.m (21 ft. lbs.) in the sequence shown. See **Fig. 131**.
4. Measure camshaft end play. See **Engine - Specifications**. If not within limits install a new thrust plate.

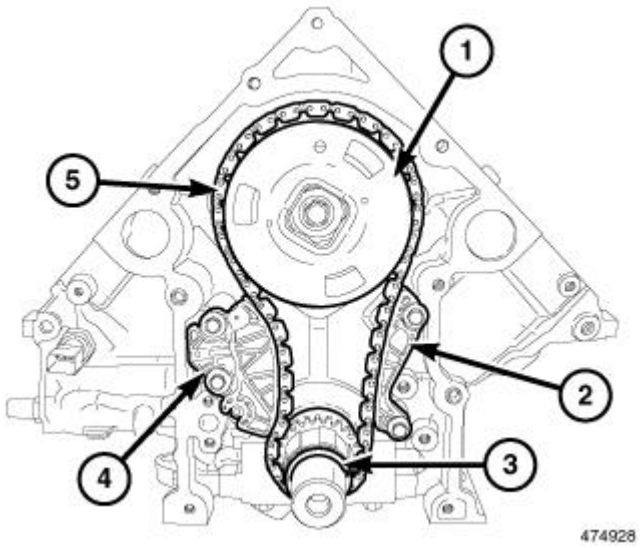

Fig. 132: Timing Chain
Courtesy of CHRYSLER LLC

5. Install timing chain (5) and sprockets (1,3). See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
6. Install timing chain tensioner (4) and guide (2).

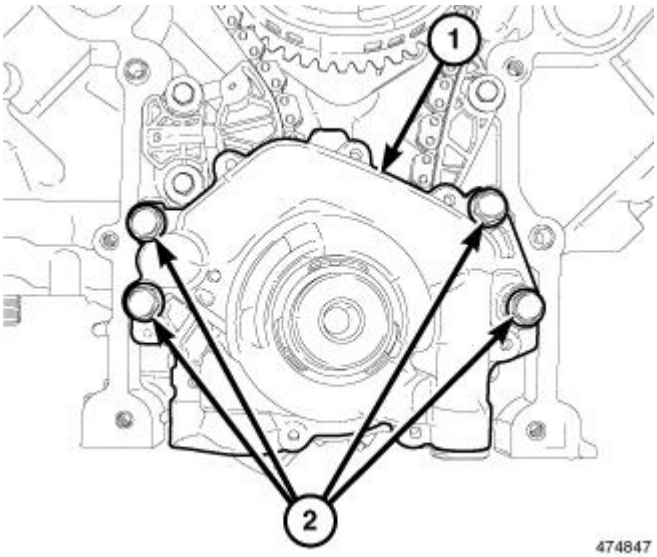

Fig. 133: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

7. Install the oil pump (1) and tighten bolts to 28 N.m (21 ft. lbs.). See **Engine/Lubrication/PUMP, Engine Oil - Installation**.

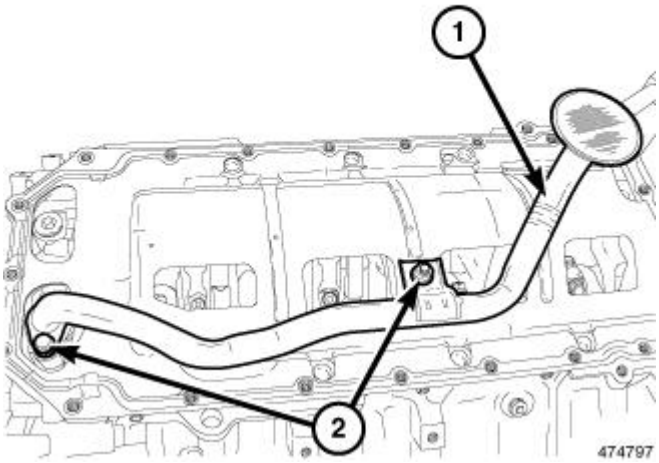

Fig. 134: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

8. Inspect oil pick up tube O-rings and replace as necessary.
9. Install the oil pick up tube (1) and tighten fasteners (2) to 28 N.m (21 ft. lbs.).
10. Install the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
11. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.

CAUTION: Engines equipped with MDS use both standard roller tappets (2) and

deactivating roller tappets (1). The deactivating roller tappets must be used in cylinders 1,4,6,7. The deactivating tappets can be identified by the two holes in the side of the tappet body (3), for the latching pins.

NOTE: Each tappet reused must be installed in the same position from which it was removed. When camshaft is replaced, all of the tappets must be replaced.

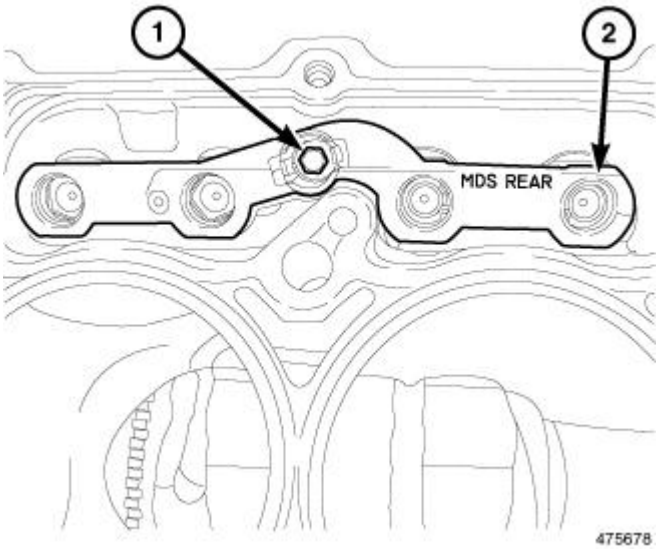

Fig. 135: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

12. Install the rear MDS lifter assembly (2) and tighten bolt (1) to 12 N.m (106 in. lbs.)

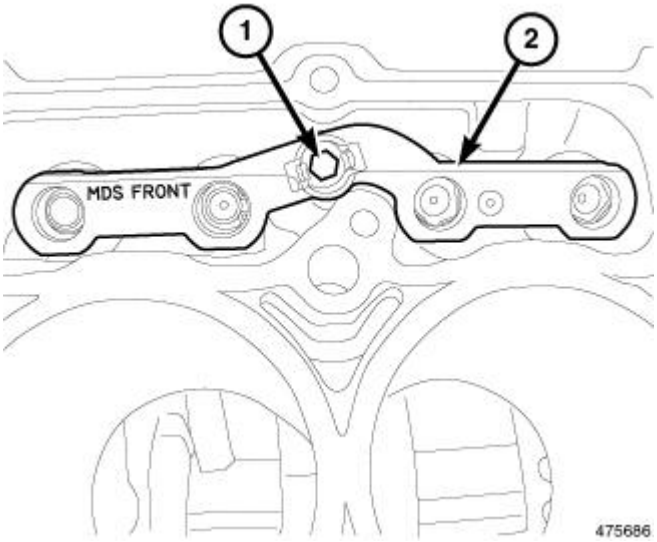

Fig. 136: Front MDS Lifter Assembly
Courtesy of CHRYSLER LLC

13. Install the front MDS lifter assembly (2) and tighten bolt (1) to 12 N.m (106 in. lbs.).

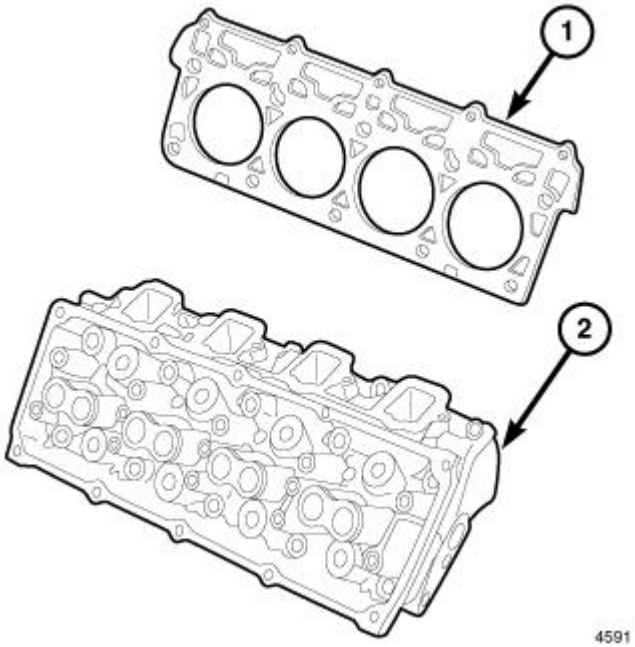

Fig. 137: Cylinder Head Components
Courtesy of CHRYSLER LLC

14. Install both the left and right cylinder heads (4). See **Engine/Cylinder Head - Installation**.
15. Install pushrods.
16. Install rocker arms. See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**.

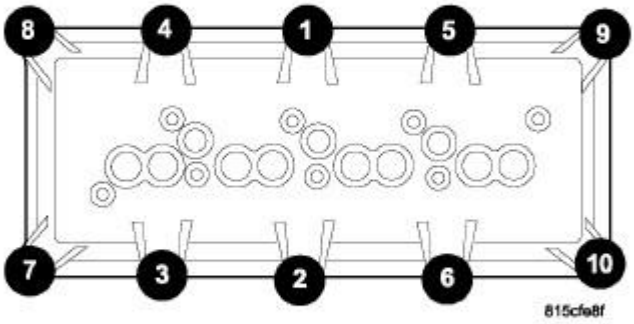

Fig. 138: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

17. Install cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

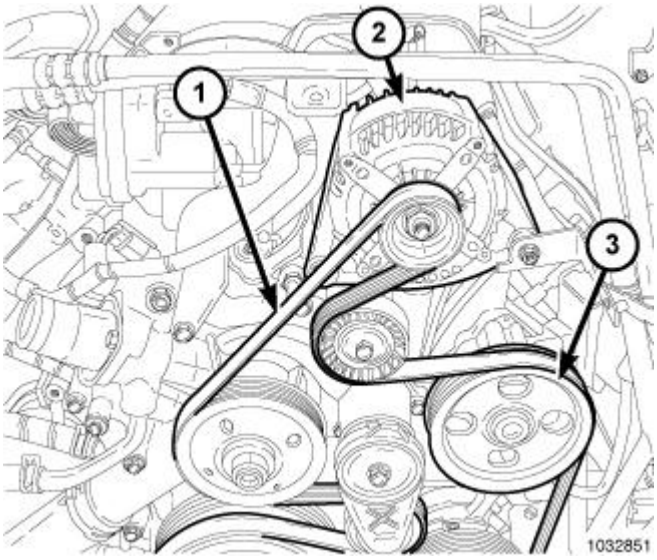

Fig. 139: Accessory Drive Belt Routing
Courtesy of CHRYSLER LLC

18. Install intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.
19. Install the generator (2).
20. Install the power steering pump (3).
21. Install the accessory drive belt (1). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
22. Install the radiator. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Installation** .
23. Install the air cleaner assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
24. Install the negative battery cable.
25. Fill coolant. Refer to **Cooling - Standard Procedure** .
26. Fill engine oil.
27. Start engine and check for leaks.

COVER, STRUCTURAL DUST

Description

DESCRIPTION

The structural dust cover is made of die cast aluminum and joins the lower half of the transmission bell housing to the engine.

Operation

OPERATION

The structural cover provides additional powertrain stiffness and reduces noise and vibration.

Removal

REMOVAL

1. Raise and support the vehicle.

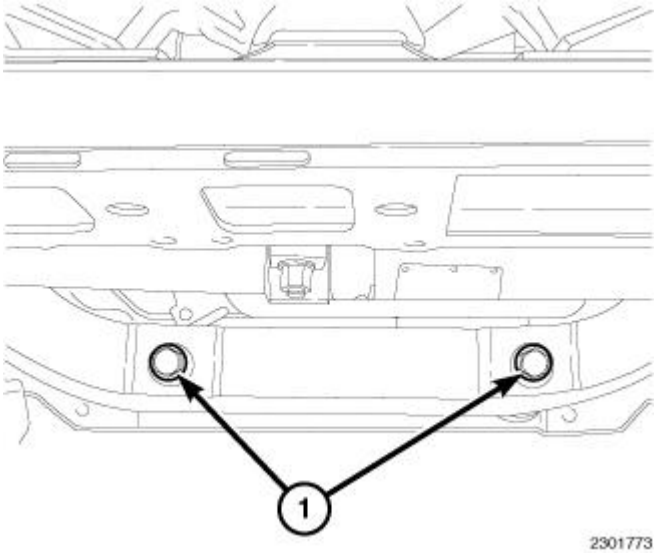

Fig. 140: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER LLC

2. Remove the steering rack to frame mounting bolts (1) and lower the steering rack enough to gain clearance for the structural dust cover removal.

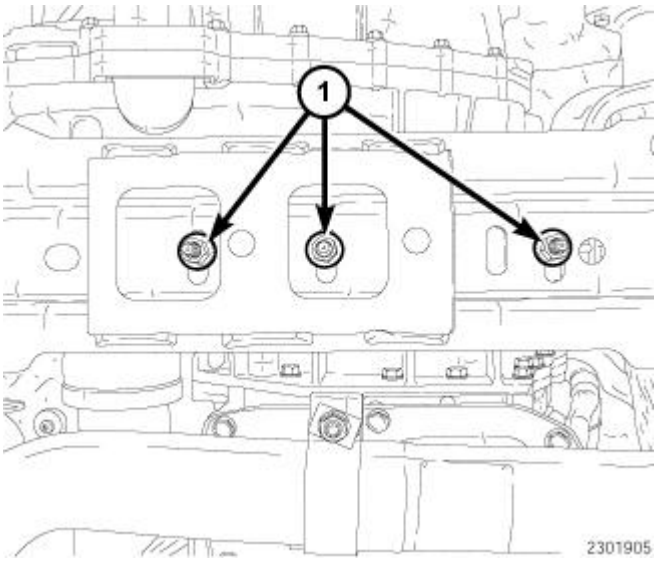

Fig. 141: Transmission Mount To Crossmember Retaining Nuts

Courtesy of CHRYSLER LLC

3. Remove the transmission mount to crossmember retaining nuts (1).
4. Using a suitable jack, lift the transmission enough to gain clearance for the structural dust cover removal.

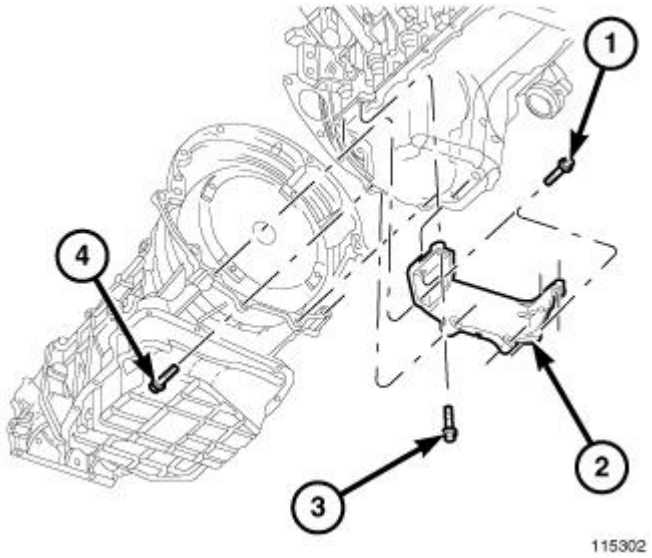

Fig. 142: Structural Cover
Courtesy of CHRYSLER LLC

5. Remove the structural dust cover retaining bolts (1,3 & 4).
6. Remove the structural dust cover (2).

Installation

INSTALLATION

CAUTION: The structural dust cover must be installed as described in the following steps. Failure to do so may cause severe damage to the cover.

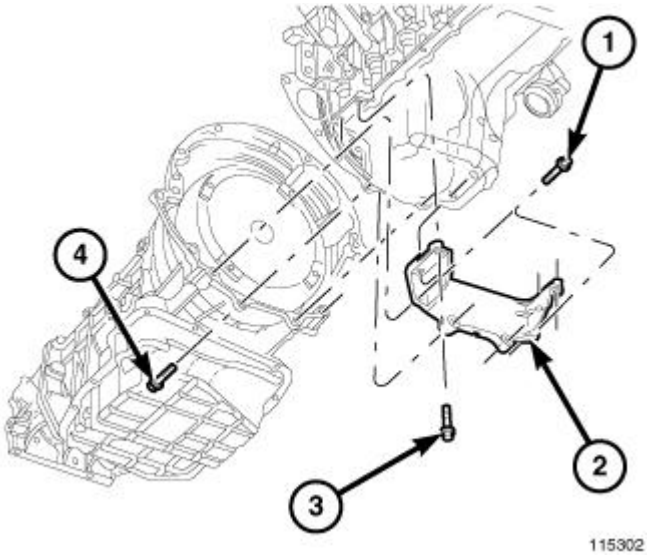

Fig. 143: Structural Cover
Courtesy of CHRYSLER LLC

1. Position the structural dust cover in the vehicle
2. Install all four bolts retaining the structural dust cover to the engine (3) hand tight.
3. Install the four cover to transmission bolts (1, 2 & 4) hand tight.

CAUTION: The structural dust cover must be held tightly against both the engine and the transmission bell housing during the tightening sequence. Failure to do so may cause severe damage to the cover.

4. Tighten the structural dust cover-to-transmission bolts (1, 2 & 4) to 9 N.m (80 in. lbs.).
5. Tighten the structural dust cover-to-engine block bolts (3) to 9 N.m (80 in. lbs.).
6. Retighten the structural dust cover-to-transmission bolts to 54 N.m (40 ft. lbs.).
7. Retighten the structural dust cover-to-engine block bolts to 54 N.m (40 ft. lbs.).

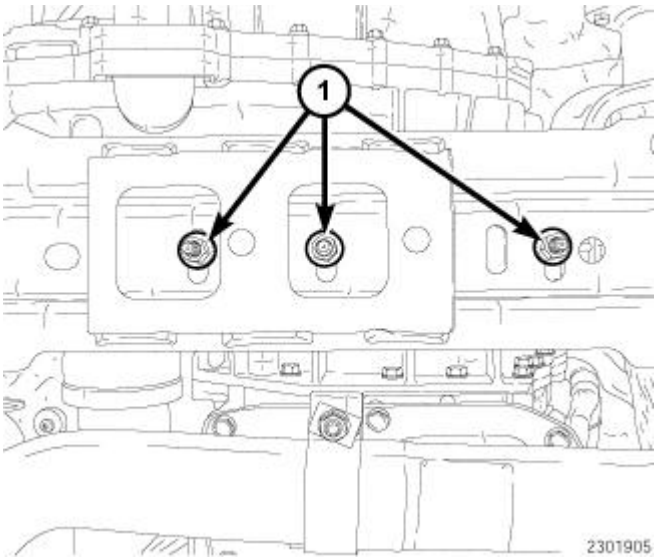

Fig. 144: Transmission Mount To Crossmember Retaining Nuts
Courtesy of CHRYSLER LLC

8. Lower the transmission onto the crossmember and remove the jack.
9. Install the transmission mount to crossmember retaining nuts (1) and tighten to 54 N.m (40 ft. lbs.).

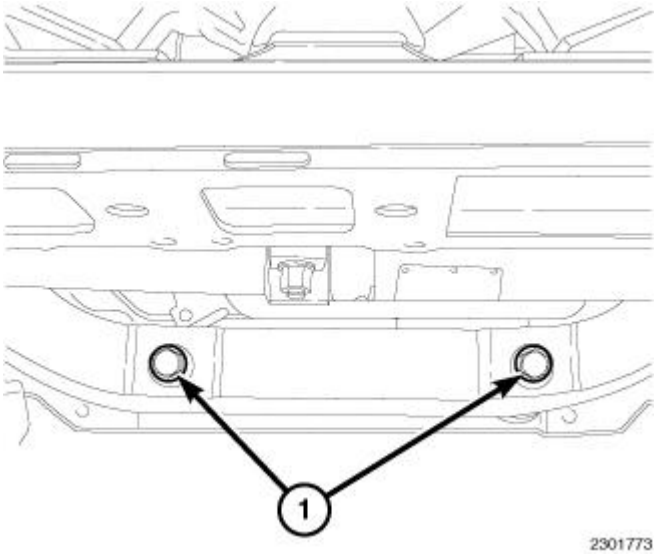

Fig. 145: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER LLC

10. Position the steering rack to the frame, install the bolts (1) and tighten bolts/nuts to 258 N.m (190 ft. lbs.).
11. Lower the vehicle.

CRANKSHAFT

Removal

REMOVAL

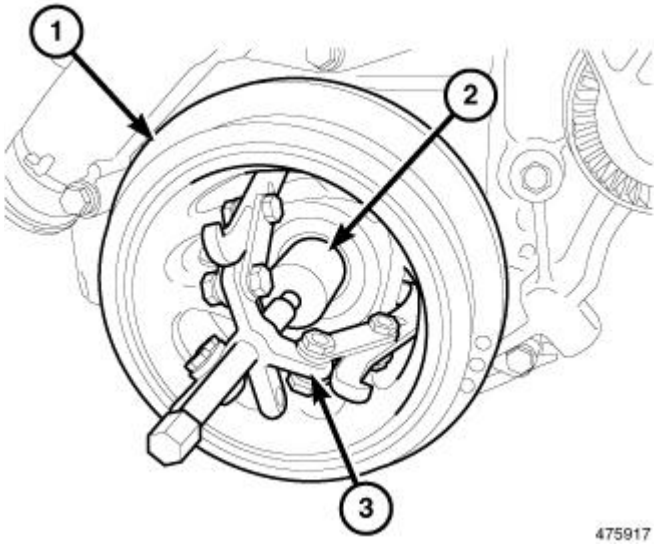

Fig. 146: Removing Vibration Damper
Courtesy of CHRYSLER LLC

1. Remove engine. See **Engine - Removal**.
2. Remove the vibration damper (1) using Crankshaft Insert 8513A (2) and Puller 1023 (3). See **Engine/Engine Block/DAMPER, Vibration - Removal**.

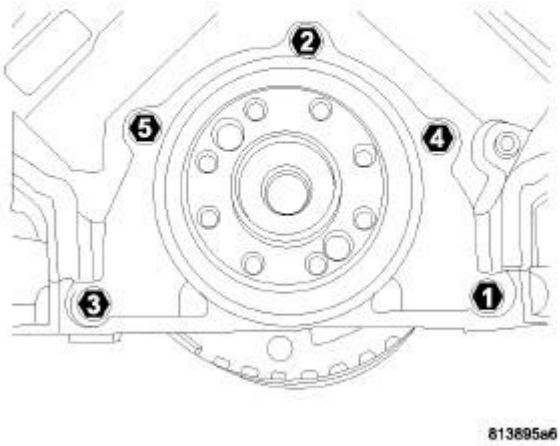

Fig. 147: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

3. Remove the rear oil seal retainer. See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Removal**.
4. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.

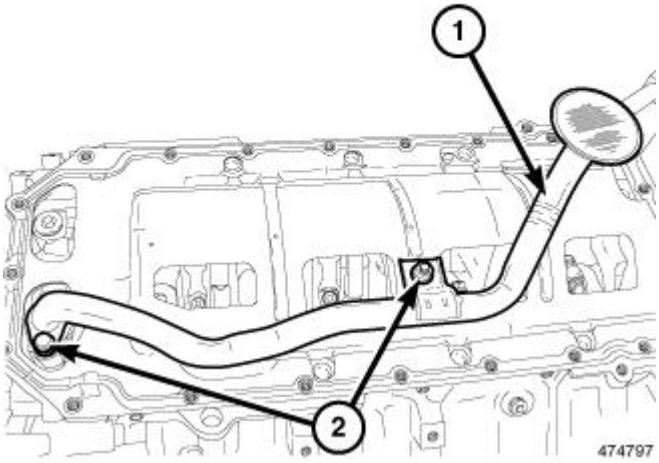

Fig. 148: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

5. Remove the oil pump pickup (1).
6. Remove the windage tray/oil pan gasket.
7. Remove the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.

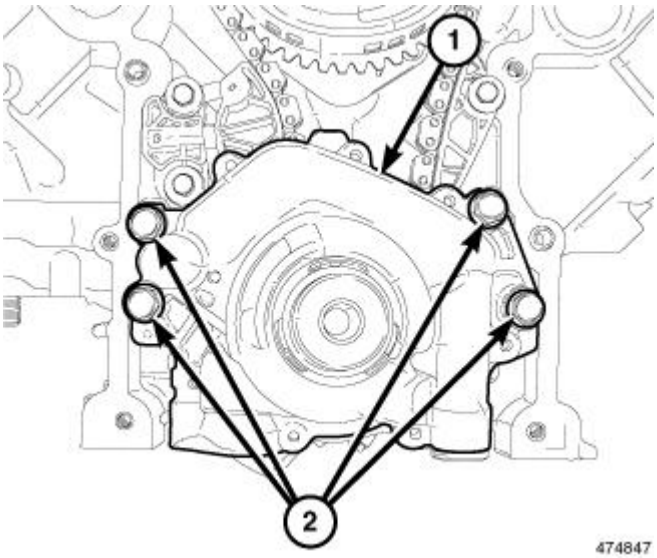

Fig. 149: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

8. Remove the oil pump (1). See **Engine/Lubrication/PUMP, Engine Oil - Removal**.

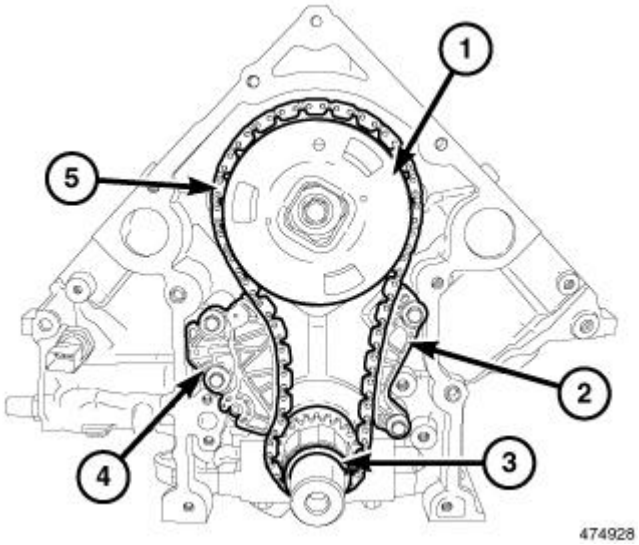

Fig. 150: Timing Chain
Courtesy of CHRYSLER LLC

9. Remove the timing chain (5) and sprockets (1,3). See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.

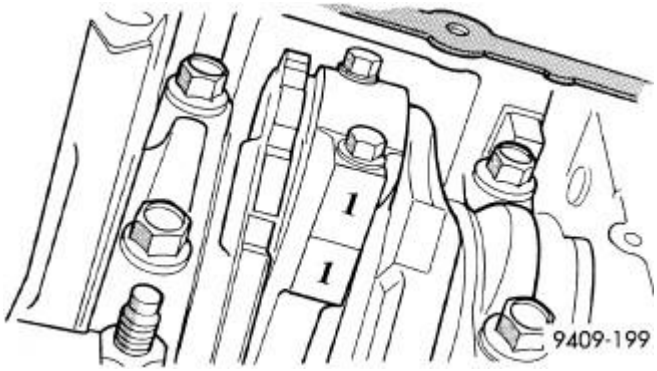

Fig. 151: Marking Connecting Rod & Bearing Cap Positions
Courtesy of CHRYSLER LLC

10. Identify rod bearing caps before removal. Remove rod bearing caps with bearings.

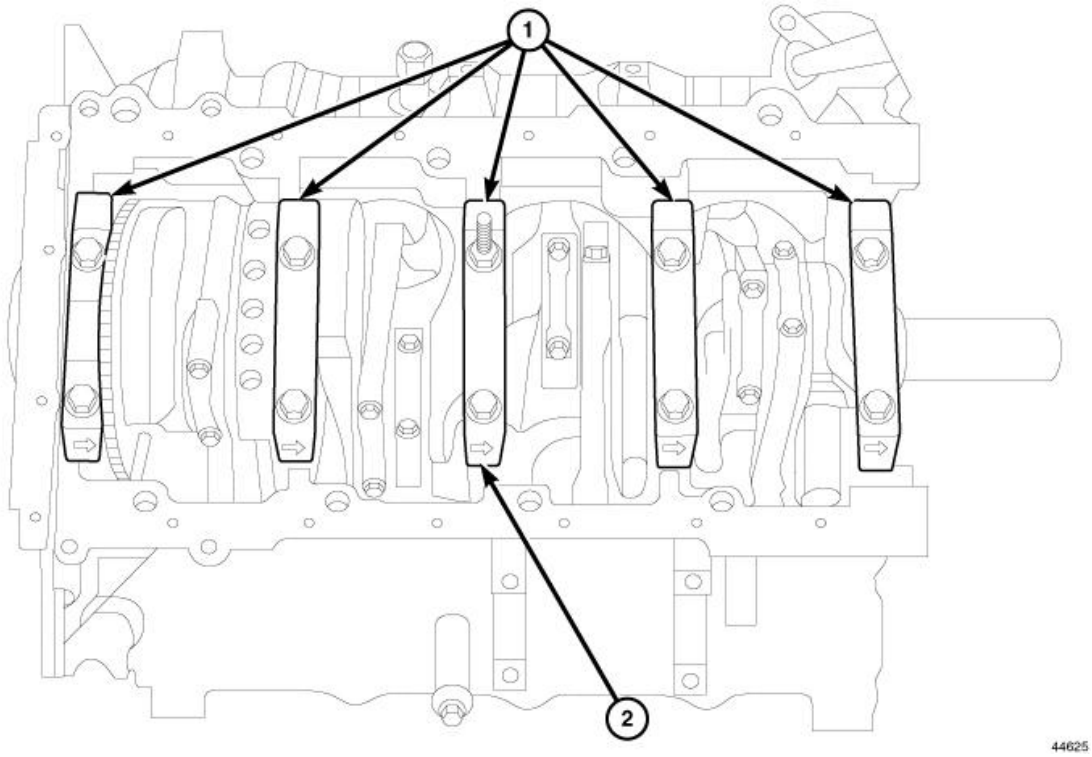

Fig. 152: Main Bearing Caps
Courtesy of CHRYSLER LLC

11. Identify main bearing caps (1) before removal.

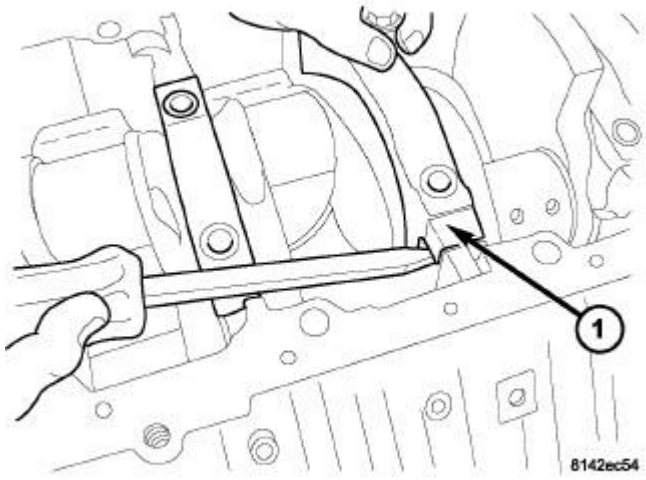

Fig. 153: Main Cap Removal

Courtesy of CHRYSLER LLC

12. Remove main bearing cap bolts.
13. Remove main bearing caps (1) and bearings one at a time.

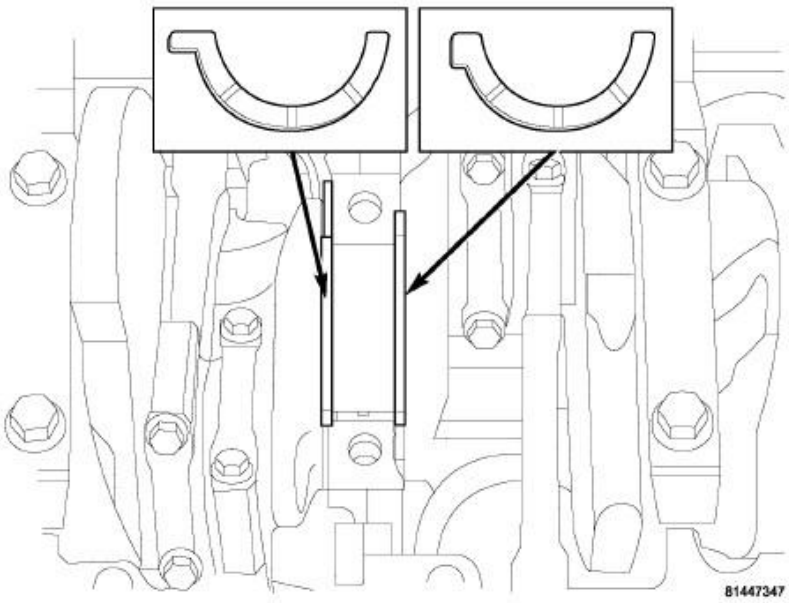

Fig. 154: Thrust Washer Location
Courtesy of CHRYSLER LLC

14. Remove the thrust washers.
15. Remove the crankshaft out of the block.

Installation

INSTALLATION

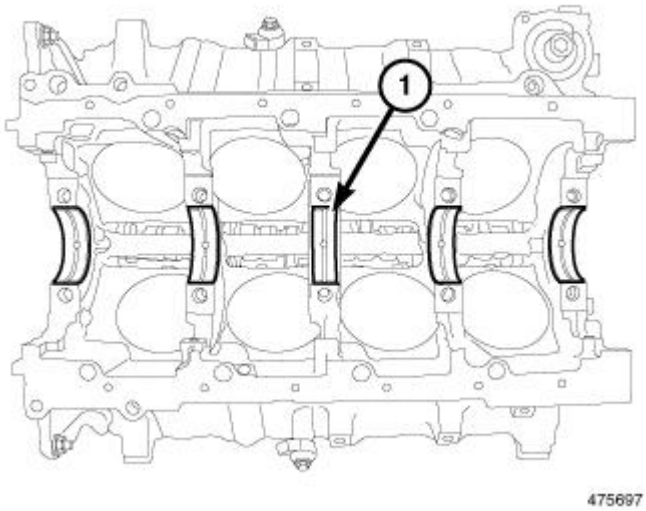

Fig. 155: Main Bearings
Courtesy of CHRYSLER LLC

1. Select the proper main bearings. See **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
2. Install main bearings in block (1).

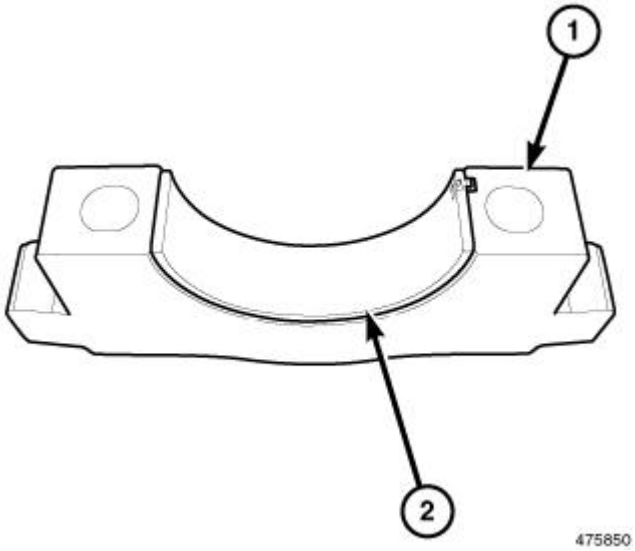

Fig. 156: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER LLC

3. Install main bearing shells (2) in the bearing caps (1).

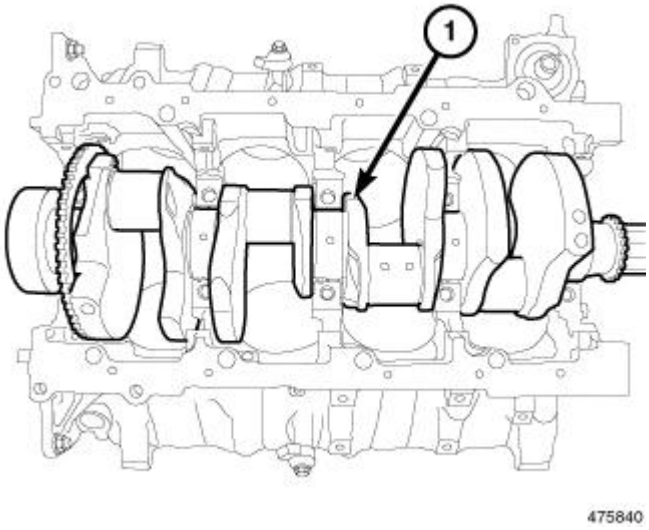

Fig. 157: Crankshaft
Courtesy of CHRYSLER LLC

4. Lubricate the main bearing shells with clean engine oil.
5. Position the crankshaft (1) into the cylinder block.

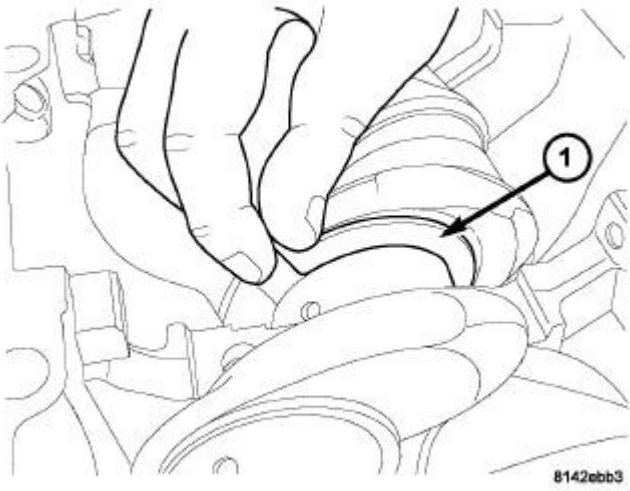

Fig. 158: Removing/Installing Thrust Washer
Courtesy of CHRYSLER LLC

6. Lubricate and install the thrust bearings (1).

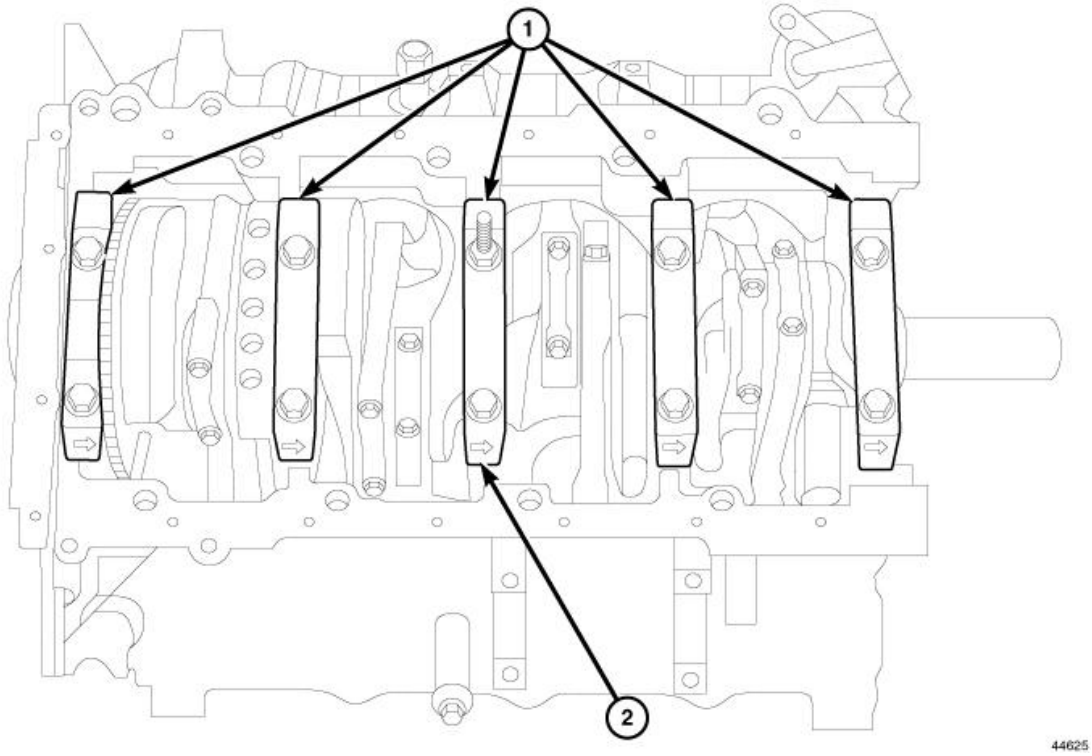

Fig. 159: Main Bearing Caps
Courtesy of CHRYSLER LLC

NOTE: The main cap cross bolts are torqued after final torque of the main cap bolts. Always use a new washer/seal on cross bolts.

7. Clean and oil all cap bolts. Install all main bearing caps (1) making sure the arrow (2) faces forward.

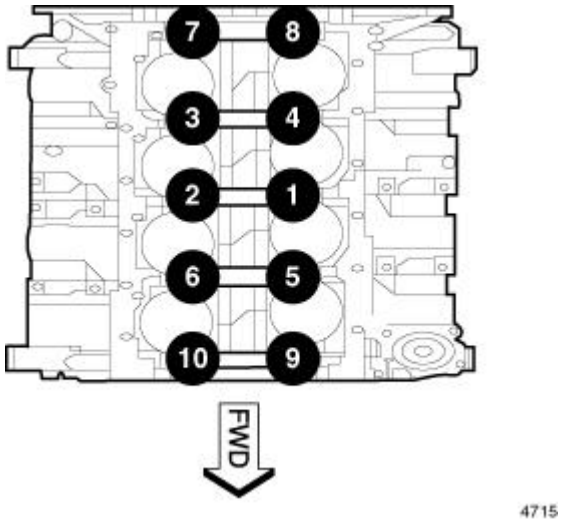

Fig. 160: Main Bearing Cap Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

8. Tighten main bearing cap bolts to 13 N.m (10 ft. lbs.) in the sequence shown. See **Fig. 160**.
9. Tighten main bearing cap bolts to 27 N.m (20 ft. lbs.) in the sequence shown in illustration.
10. Rotate main cap bolts an additional 90° in the sequence shown in illustration.

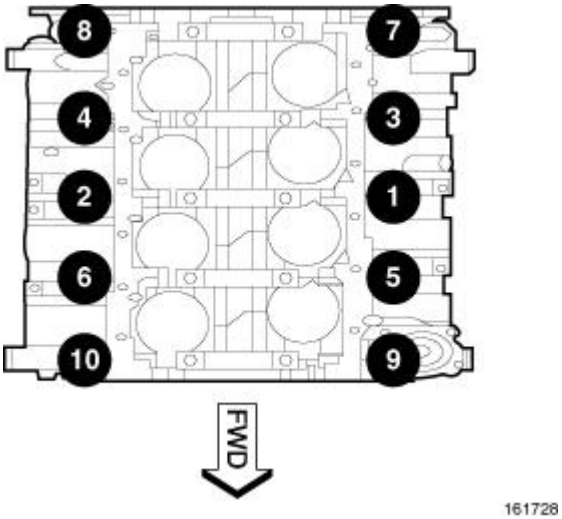

Fig. 161: Crossbolt Tightening Sequence
Courtesy of CHRYSLER LLC

11. Install the crossbolts with new seal washer. Starting with crossbolt A,
12. Tighten crossbolt to 28 N.m (21 ft. lbs.).
13. Repeat crossbolt tightening procedure.
14. Measure crankshaft end play. See **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
15. Position the connecting rods onto the crankshaft and install the rod bearing caps. See **Engine/Engine Block/ROD, Piston and Connecting - Installation**.

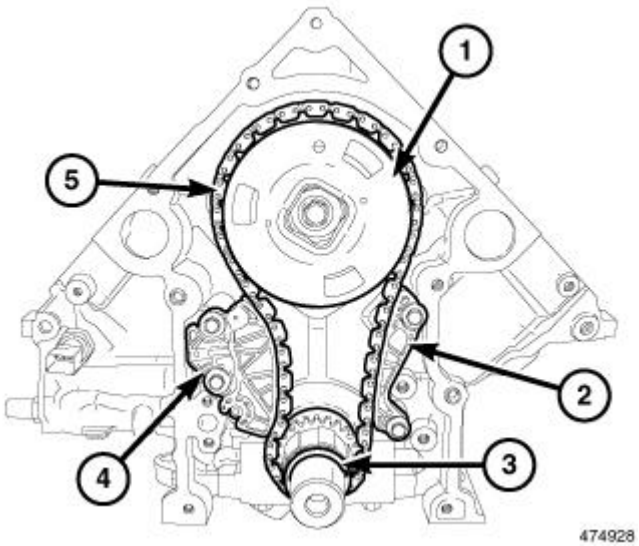

Fig. 162: Timing Chain

Courtesy of CHRYSLER LLC

16. Install timing chain (5) and sprockets (1,3). See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
17. Install the timing chain tensioner (4) and guide (2).

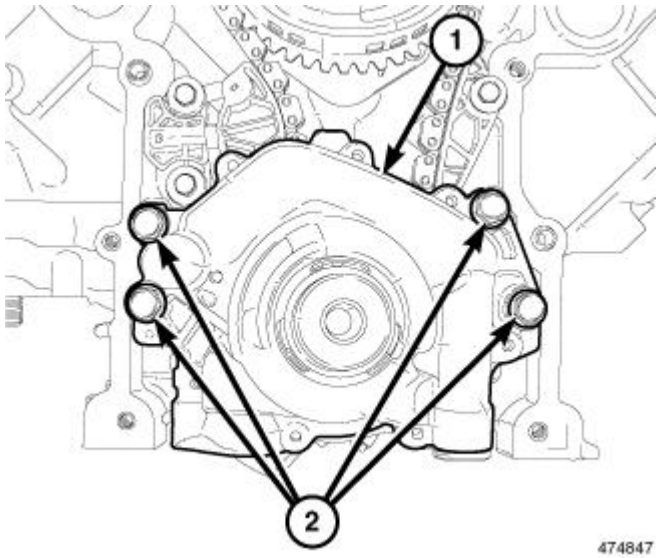

Fig. 163: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

18. Install the oil pump (1). See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
19. Install the timing chain case cover (1). See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

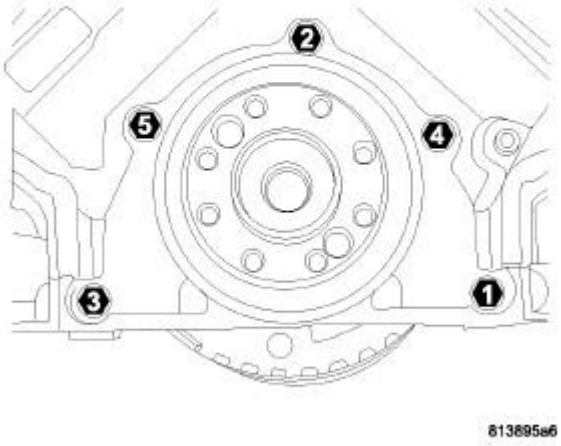

Fig. 164: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

20. Install the rear main seal and retainer. See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Installation**.

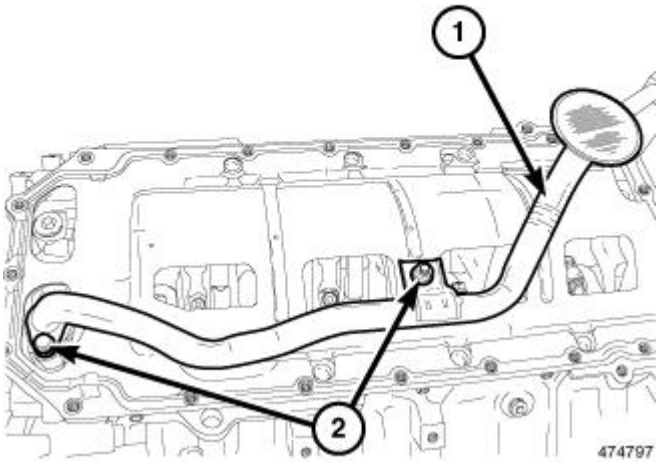

Fig. 165: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

21. Install the windage tray/oil pan gasket.
22. Inspect oil pick up tube O-rings, replace as necessary.
23. Install the oil pick up tube (1) and tighten fasteners (2) to 28 Nm (248 in. lbs.).

24. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
25. Install the vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.
26. Install the engine. See **Engine - Installation**.

DAMPER, VIBRATION

Removal

REMOVAL

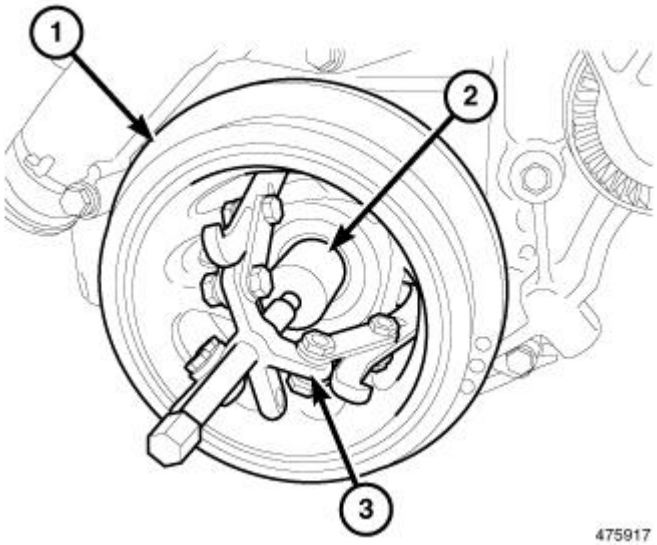

Fig. 166: Removing Vibration Damper
Courtesy of CHRYSLER LLC

1. Disconnect negative cable from battery.
2. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
3. Drain cooling system. Refer to **Cooling - Standard Procedure** .
4. Remove radiator upper hose.
5. Remove fan shroud. Refer to **Cooling/Engine/FAN, Cooling - Removal** .
6. Remove crankshaft damper bolt.
7. Remove damper (1) using Crankshaft Insert 8513A (2) and Three Jaw Puller 1023 (3).

Installation

INSTALLATION

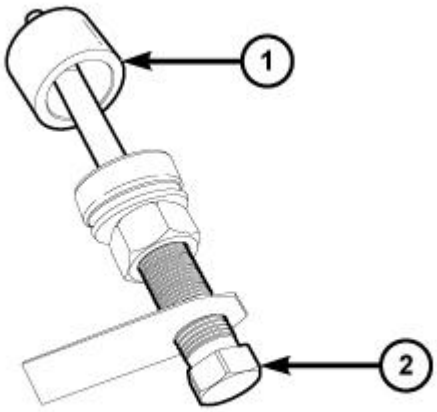

Fig. 167: Identifying Damper Installer & A/C Hub Installer Cup
Courtesy of CHRYSLER LLC

CAUTION: To prevent severe damage to the crankshaft, damper, and damper installer 8512A, thoroughly clean the damper bore and the crankshaft nose before installing damper.

1. Position the damper onto crankshaft.
2. Assemble the damper installer 8512A (2) , and the pressing cup (1) from A/C hub installer 6871.
3. Using the damper installer 8512A (2), and the pressing cup (1) from the A/C hub installer 6871, press the damper onto crankshaft.
4. Install the crankshaft damper bolt and tighten to 176 N.m (130 ft. lbs.).
5. Install the cooling fan.

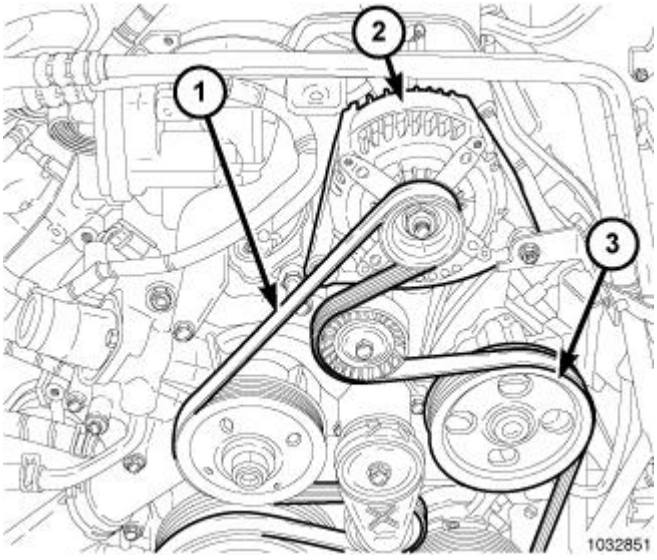

Fig. 168: Accessory Drive Belt Routing

Courtesy of CHRYSLER LLC

6. Install the radiator upper shroud and tighten the fasteners to 11 N.m (95 in. lbs.).
7. Install the radiator upper hose.
8. Install the accessory drive belt (1). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
9. Refill the cooling system. Refer to **Cooling - Standard Procedure** .
10. Connect the negative cable to battery.

FLEXPLATE

Removal

REMOVAL

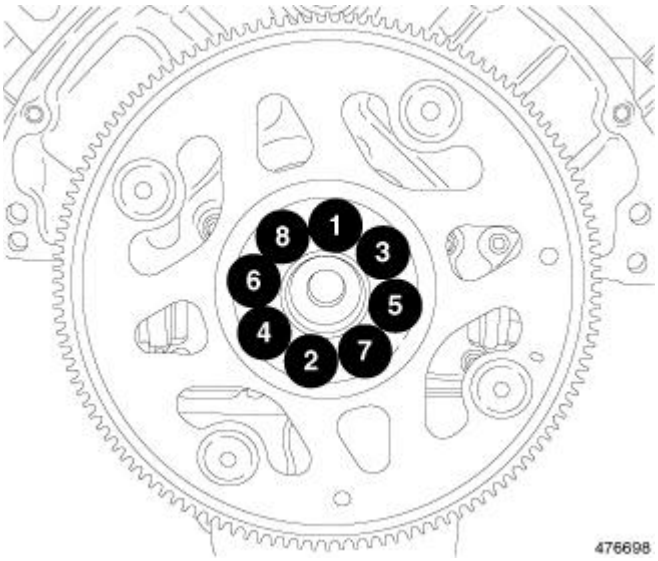

Fig. 169: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

1. Remove the transmission. Refer to **Transmission and Transfer Case/Automatic - 45RFE/545RFE - Removal** .
2. Using the sequence shown in illustration, remove the flexplate retaining bolts. See **Fig. 169**.
3. Remove the flexplate.

Installation

INSTALLATION

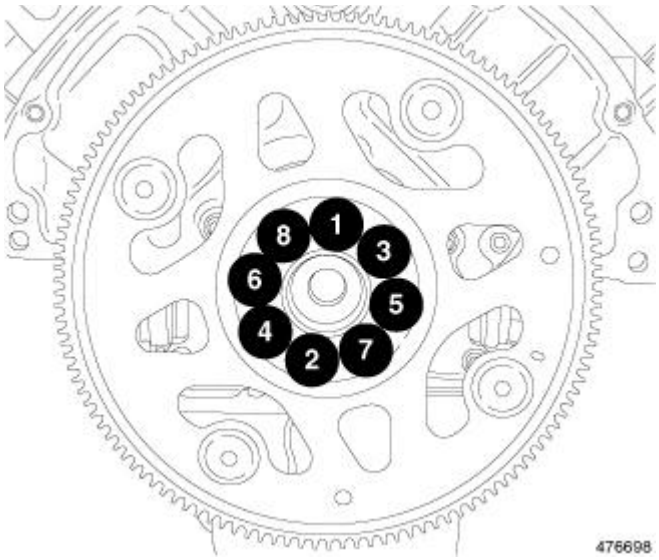

Fig. 170: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

1. Position the flexplate onto the crankshaft and install the retaining bolts hand tight.
2. Using the sequence shown in illustration, tighten the flexplate retaining bolts to 95 N.m (70 ft. lbs.). See **Fig. 170**.
3. Install the transmission. Refer to **Transmission and Transfer Case/Automatic - 45RFE/545RFE - Installation** .

LIFTER(S), HYDRAULIC, ROLLER

Description

DESCRIPTION

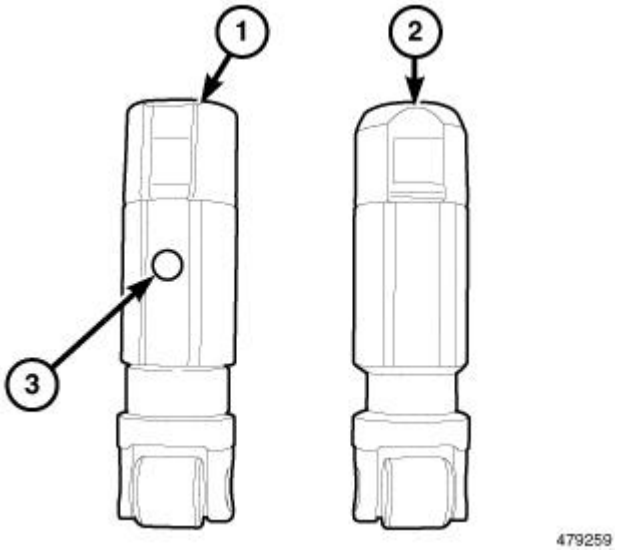

Fig. 171: MDS Lifter

Courtesy of CHRYSLER LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

The MDS can provide a 5 to 20 percent fuel economy benefit when operating in four-cylinder mode. Depending on driving habits and vehicle usage. Fuel economy is 8 to 15 percent higher than if the engine was operating on eight-cylinders at all times.

MDS is integrated into the basic engine architecture, requiring a minimum of additional parts - four additional solenoids, an oil temperature sensor, a wire harness, eight unique valve lifters (1), and a modified camshaft.

The MDS lifter (1) can be identified by the disconnecting pin (3) on the side of the lifter.

Operation

OPERATION

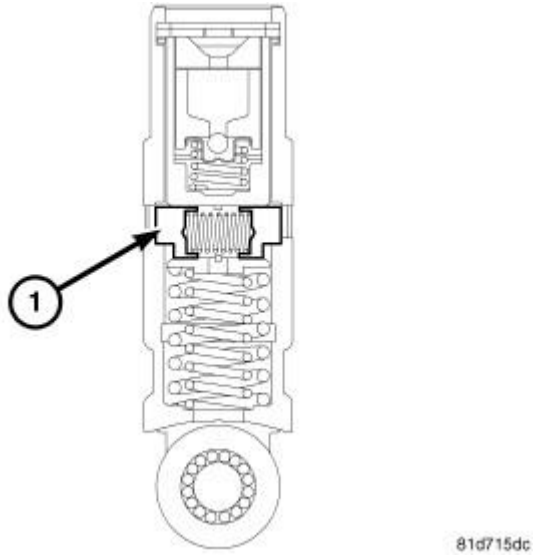

Fig. 172: MDS Lifter Cross Section
Courtesy of CHRYSLER LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals provide smooth operation. Two cylinders on each bank are active when the engine is in four-cylinder mode - every other cylinder in the firing order. All of the cylinders that are deactivated have unique hydraulic valve lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. It is delivered through special oil passages drilled into the cylinder block. Solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each valve lifter, which then becomes a "lost motion" link. Its base follows the camshaft, but its top remains stationary, held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: It is critical to use the recommended oil viscosity in 5.7L engines that use MDS.

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition then occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No air enters or leaves. During subsequent piston strokes, this high-pressure gas is repeatedly compressed and expanded like an air spring, but fuel is not injected.

Diagnosis and Testing

HYDRAULIC TAPPETS

Check the oil pressure before disassembling any part of the engine to correct tappet noise. If vehicle has no oil pressure gauge, install a reliable gauge at the pressure sending-unit. The pressure should be between 207-552 kPa (30-80 psi) at 3,000 RPM.

Check the oil level after the engine reaches normal operating temperature. Allow five minutes for the oil level to stabilize before checking the oil level. The oil level in the pan should never be above the FULL mark or below the ADD OIL mark on the dipstick. Either of these two conditions could be responsible for noisy tappets.

OIL LEVEL - HIGH

If the oil level is above the FULL mark, it is possible for the connecting rods to dip into the oil. With the engine running, this condition could create foam in the oil pan. Foam in the oil pan would be fed to the hydraulic tappets by the oil pump causing them to lose length and allow the valves to seat noisily.

OIL LEVEL - LOW

Low oil level may allow the oil pump to take in air. When air is fed to the tappets, they lose length, which allows valves to seat noisily. Any leaks on the intake side of the oil pump through which air can be drawn creates the same tappet action. Check the lubrication system from the intake strainer to the pump cover, including the relief valve retainer cap. When tappet noise is due to aeration, it may be intermittent or constant, and usually more than one tappet will be noisy. When the oil level and leaks have been corrected, operate the engine at fast idle. Run the engine for a sufficient amount of time to allow all of the air inside the tappets to be bleed out.

TAPPET NOISE DIAGNOSIS

1. To determine the source of tappet noise, crank the engine over with the cylinder head covers removed.
2. Feel each valve spring or rocker arm to detect the noisy tappet. The noisy tappet will cause the affected spring and/or rocker arm to vibrate or feel rough in operation.

NOTE: Worn valve guides or cocked springs are sometimes mistaken for noisy tappets. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not appreciably reduced, it can be assumed the noise is in the tappet. Inspect the rocker arm pushrod sockets and pushrod ends for wear.

3. Valve tappet noise ranges from light noise to a heavy click. A light noise is usually caused by excessive leak-down around the unit plunger, or by the plunger partially sticking in the tappet body cylinder. The tappet should be replaced. A heavy click is caused by a tappet check valve not seating, or by foreign particles wedged between the plunger and the tappet body. This will cause the plunger to stick in the down position. This heavy click will be accompanied by excessive clearance between the valve stem and rocker arm as valve closes. In either case, tappet assembly should be removed for inspection and cleaning.
4. The valve train generates a noise very much like a light tappet noise during normal operation. Care must be taken to ensure that tappets are making the noise. If more than one tappet seems to be noisy, it's probably not the tappets.

Removal

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. See **Engine/Cylinder Head - Removal**

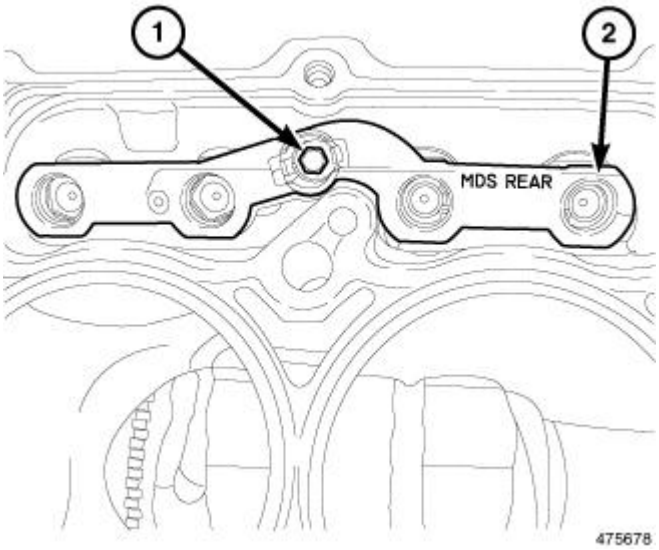

Fig. 173: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

3. Remove the tappet guide holder retaining bolt (1) from the tappet guide holder assembly (2).

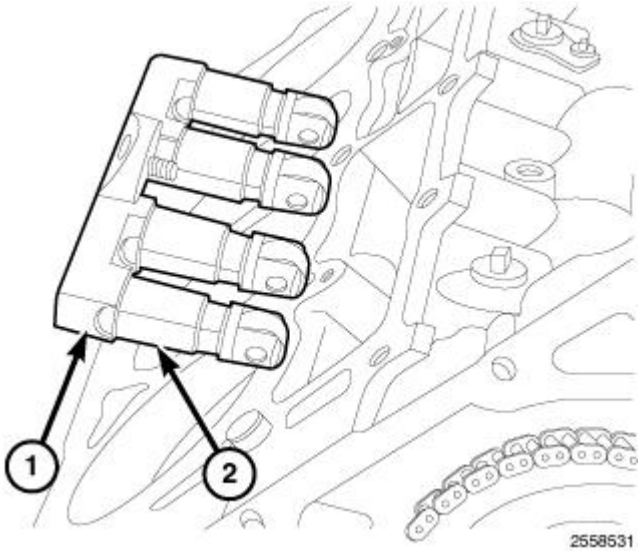

Fig. 174: Tappet Guide Holder Assembly
Courtesy of CHRYSLER LLC

CAUTION: The tappets and guide holder assembly must be installed as an assembly and in their original locations or engine damage could result.

CAUTION: If the tappets and guide holder assembly are to be reused, identify tappets to ensure installation in their original location.

4. Remove the tappet guide holder (1) and tappets (2) as an assembly.
5. Check the camshaft lobes for abnormal wear.

Installation

INSTALLATION

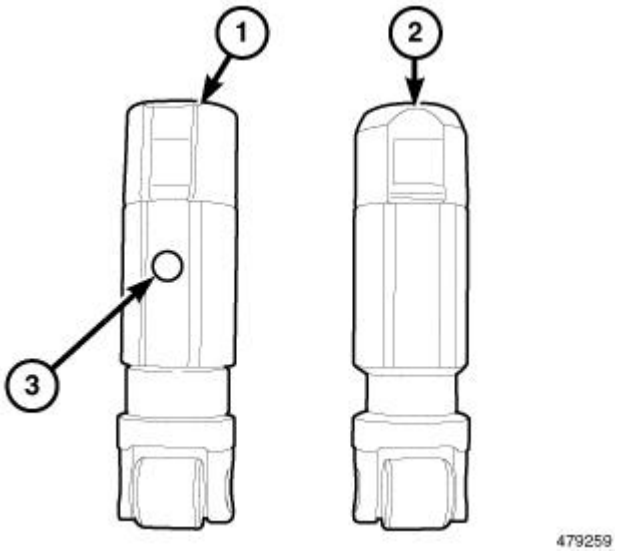

Fig. 175: MDS Lifter
Courtesy of CHRYSLER LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

CAUTION: Engines equipped with MDS use both standard roller tappets (2) and deactivating roller tappets (1). The deactivating roller tappets must be used in cylinders 1,4,6,7. The deactivating tappets can be identified by the two holes in the side of the tappet body (3), for the latching pins.

CAUTION: The tappets and guide holder assembly must be installed as an assembly and in their original locations or engine damage could result.

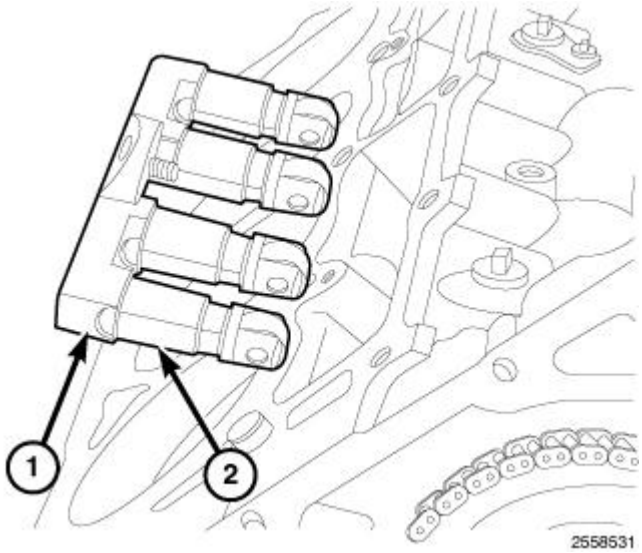

Fig. 176: Tappet Guide Holder Assembly

Courtesy of CHRYSLER LLC

1. Lubricate the tappet guide holder (1) and tappets (2).

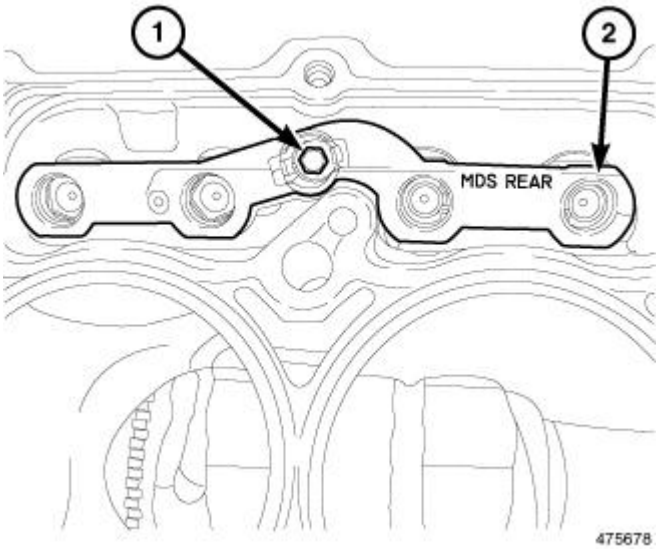

Fig. 177: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

CAUTION: If the tappets and guide holder assembly are to be reused, they must me installed in their original location.

2. Install the tappet guide holder (2) and tappets.
3. Tighten the tappet retainer bolt (1) to 12 N.m (9 ft. lbs.).
4. Install the cylinder head. See **Engine/Cylinder Head - Installation**.
5. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic tappets have filled with oil and have become quiet.

6. Start the engine and check for leaks.
7. Road test the vehicle.

RETAINER, CRANKSHAFT REAR OIL SEAL

Diagnosis and Testing

REAR SEAL AREA LEAKS

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and cannot be serviced separately.

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Raise and support the vehicle.
2. Remove the structural dust cover. See **Engine/Engine Block/COVER, Structural Dust - Removal**.
3. Inspect the rear of the cylinder block for evidence of oil leakage, note the following:
   - Circular spray pattern generally indicates seal leakage or crankshaft damage.
   - Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil galley pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces. See **ENGINE BLOCK** for proper repair procedures of these items.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

   CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out using an emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Removal**.

Removal

REMOVAL

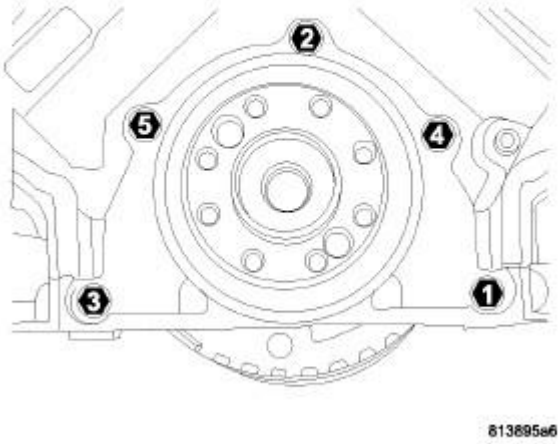

Fig. 178: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

NOTE: This procedure can be performed in vehicle.

1. Disconnect the negative battery cable.
2. Remove the transmission. Refer to **42RLE - SERVICE INFORMATION** or **45RFE/545RFE - SERVICE INFORMATION** .
3. Remove the flexplate. See **Engine/Engine Block/FLEXPLATE - Removal**.
4. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
5. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts. See **Fig. 178**.
6. Carefully remove the retainer from the engine block.

Installation

INSTALLATION

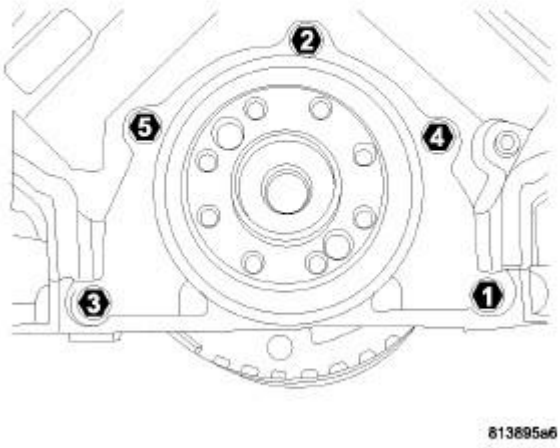

Fig. 179: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

1. Thoroughly clean all gasket residue from the engine block.
2. Position the gasket onto the new crankshaft rear oil seal retainer.
3. Position the crankshaft rear oil seal retainer onto the engine block.
4. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to 15 N.m (11 ft. lbs.). See **Fig. 179**.
5. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
6. Install the flexplate. See **Engine/Engine Block/FLEXPLATE - Installation**.
7. Install the transmission. Refer to **42RLE - SERVICE INFORMATION** or **45RFE/545RFE - SERVICE INFORMATION** .
8. Fill the engine with oil.
9. Start the engine and check for leaks.

RING(S), PISTON

Standard Procedure

PISTON RING FITTING

PISTON RING END GAP

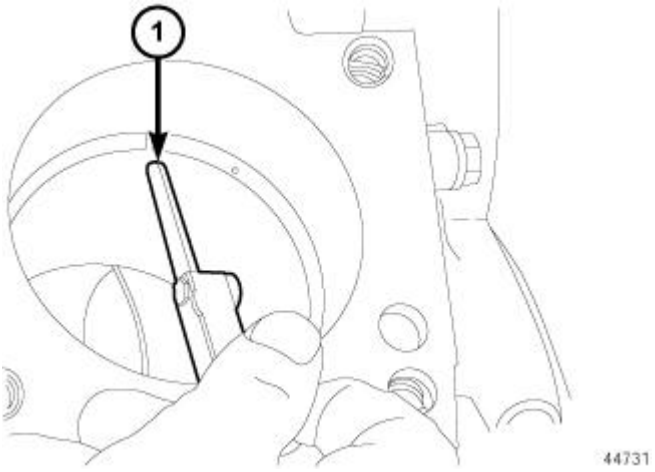

Fig. 180: Ring
Courtesy of CHRYSLER LLC

NOTE: Before reinstalling used rings or installing new rings, the ring clearances must be checked.

1. Wipe the cylinder bore clean.
2. Insert the ring in the cylinder bore.

NOTE: The ring gap measurement must be made with the ring positioned at least 12 mm (0.50 inch.) from bottom of cylinder bore.

3. Using a piston, to ensure that the ring is squared in the cylinder bore, slide the ring downward into the cylinder.
4. Using a feeler gauge check the ring end gap. Replace any rings not within specification.

PISTON RING SIDE CLEARANCE

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

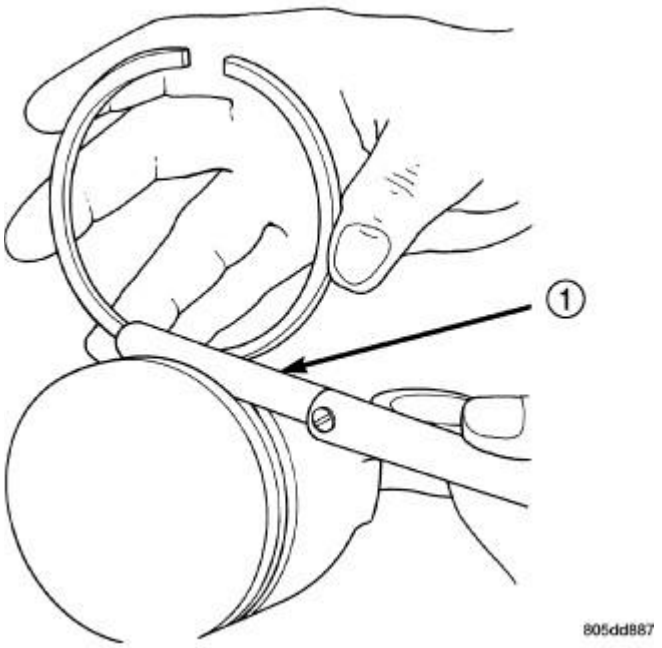

Fig. 181: Measuring Piston Ring Side Clearance
Courtesy of CHRYSLER LLC

1. Measure the ring side clearance as shown in illustration. Make sure the feeler gauge (1) fits snugly between the ring land and the ring. See **Fig. 181**. Replace any ring not within specification.
2. Rotate the ring around the piston, the ring must rotate in the groove with out binding.

PISTON RING SPECIFICATION CHART

Piston Ring Position	Piston Ring Side Clearance	Maximum Clearance
Upper Ring	-	-
Metric	0.04 - 0.09 mm	0.11 mm
Standard	0.0015 - 0.0035 in.	0.004 in.
Intermediate Ring	-	-
Metric	0.04 - 0.08 mm	0.10 mm
Standard	0.0015 - 0.0031 in.	0.004 in.
Piston Ring Position	**Piston Ring End Gap**	**Wear Limit**
Upper Ring	-	-
Metric	0.40 - 0.55 mm	0.43 mm
Standard	0.0157 - 0.0216 in.	0.017 in.
Intermediate Ring	-	-
Metric	0.24 - 0.51 mm	0.74 mm
Standard	0.0094 - 0.0200 in.	0.029 in.
Oil Control Ring (Steel Rail)	-	-
Metric	0.015 - 0.66 mm	0.76 mm
Standard	0.0059 - 0.0259 in.	0.030 in.

PISTON RING INSTALLATION

Fig. 182: Side Rail - Installation
Courtesy of CHRYSLER LLC

NOTE: The No. 1 and No. 2 piston rings have a different cross section. Ensure No. 2 ring is installed with manufacturers I.D. mark (Dot) facing up, towards top of the piston.

NOTE: Piston rings are installed in the following order:

- **Oil ring expander.**
- **Lower oil ring side rail.**
- **Upper oil ring side rail.**
- **No. 2 Intermediate piston ring.**
- **No. 1 Upper piston ring.**

1. Install the oil ring expander.
2. Install upper side rail by placing one end between the piston ring groove and the expander ring. Hold end firmly and press down the portion to be installed until side rail is in position. Repeat this step for the lower side rail.

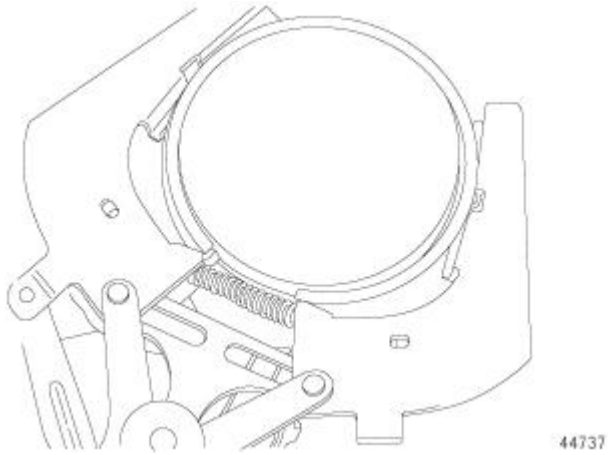

Fig. 183: Upper And Intermediate Rings
Courtesy of CHRYSLER LLC

3. Install No. 2 intermediate piston ring using a piston ring installer.
4. Install No. 1 upper piston ring using a piston ring installer.

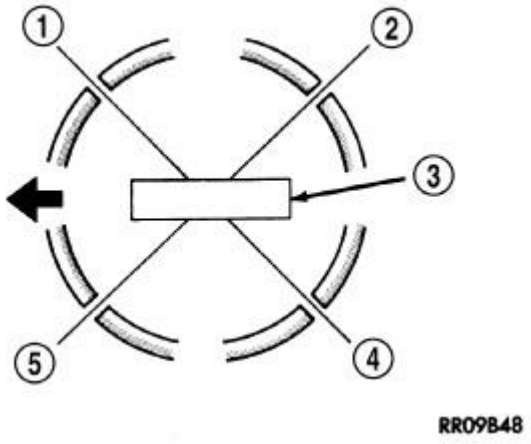

Fig. 184: Piston Ring End Gap Position
Courtesy of CHRYSLER LLC

NOTE: Install the piston rings so the gaps positioned as indicated with the piston viewed from the top.

NOTE: Staggering ring gap is important for oil control.

5. Install the oil expander so the ring gap is located in the (1) position.
6. Install the oil ring rails so the ring gap is located in the (2,4) position.
7. Install the second compression ring so the ring gap is located in the (3) position.
8. Install the top compression so the ring gap is located in the (1) position.

ROD, PISTON AND CONNECTING

Description

DESCRIPTION

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are made of a high strength aluminum alloy. Piston skirts are coated with a solid lubricant (Molykote®) to reduce friction and provide scuff resistance. The piston top ring groove and land is anodized. The connecting rods are made of forged powdered metal, with a fractured cap design.

Standard Procedure

PISTON FITTING

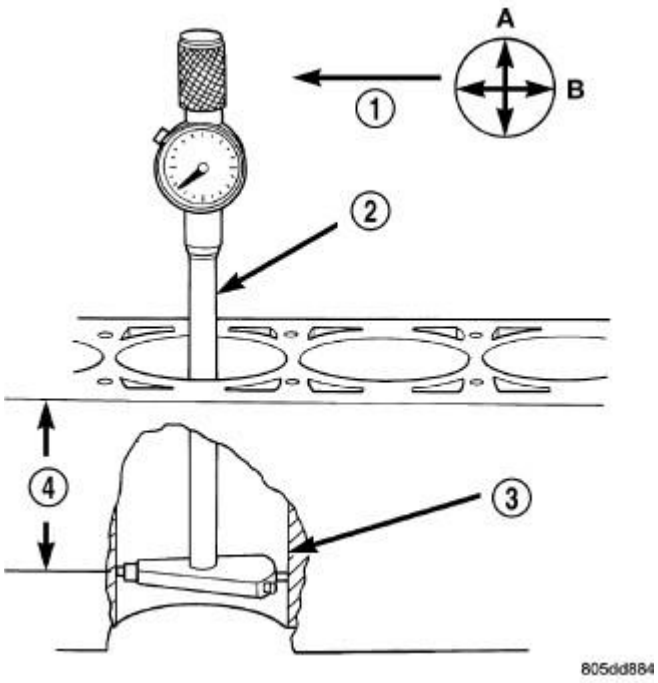

Fig. 185: Dial Bore Gauge - Typical
Courtesy of CHRYSLER LLC

1. To correctly select the proper size piston, a cylinder bore gauge (2), capable of reading in 0.003 mm (0.0001 in.) INCREMENTS is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at a point 38.0 mm (1.5 inches) below top of bore (4). Start perpendicular (across or at 90 degrees) to the axis of the crankshaft at point A (1) and then take an additional bore reading 90 degrees to that at point B (1).
3. The coated pistons will be serviced with the piston pin and connecting rod pre-assembled. The piston-rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder bank (even

numbered) and must not be interchanged.

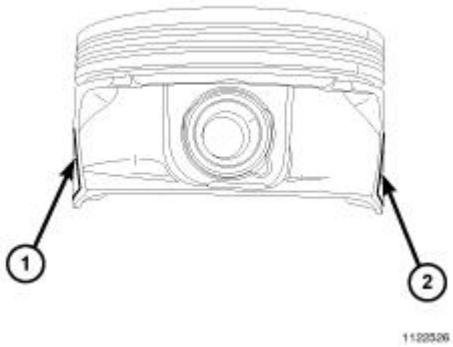

Fig. 186: Piston Diameter Measuring Points
Courtesy of CHRYSLER LLC

4. Measure the piston diameter with a micrometer at points (1,2).

Removal

REMOVAL

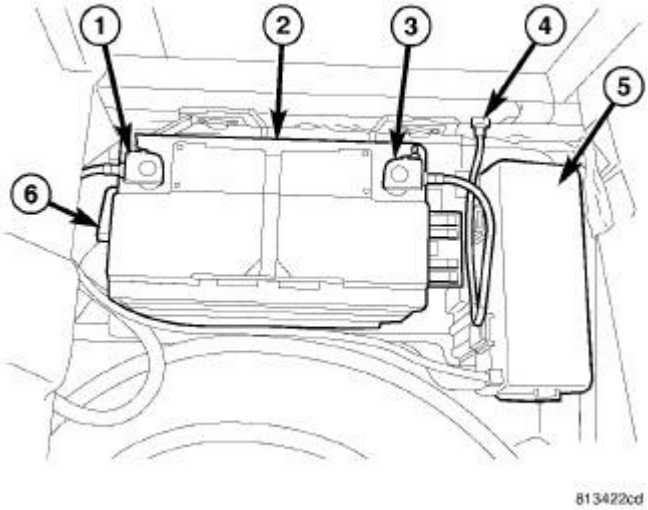

Fig. 187: Battery System Components And PDC Cover
Courtesy of CHRYSLER LLC

1. Perform the fuel system pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect and isolate the negative battery cable (3).

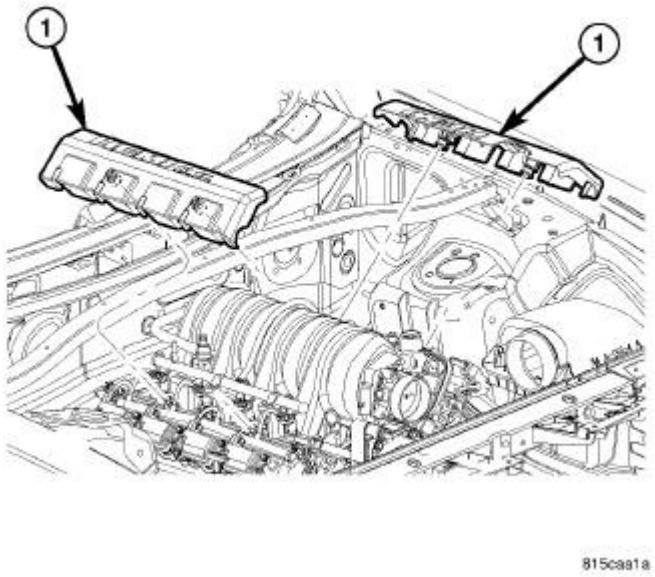

Fig. 188: Engine Covers
Courtesy of CHRYSLER LLC

3. Remove the engine covers (1).

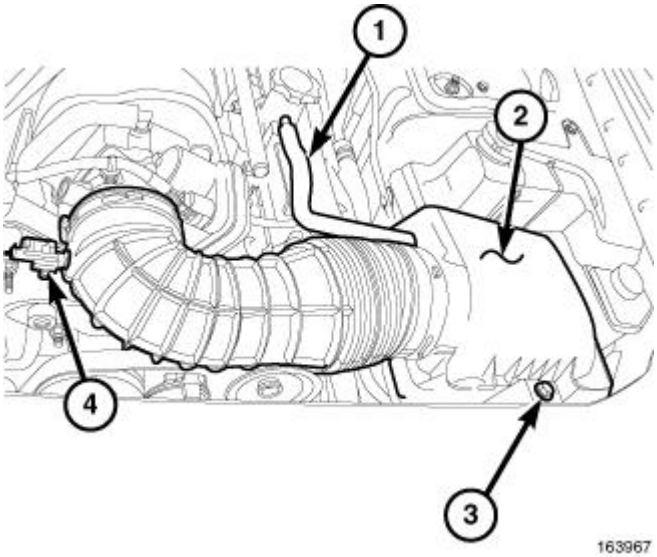

Fig. 189: Air Duct To Throttle Body
Courtesy of CHRYSLER LLC

4. Loosen clamp and disconnect the air duct at throttle body.
5. Disconnect the intake air temperature sensor (4) electrical connector.
6. Remove the makeup air hose (1).
7. Remove the air cleaner housing retaining bolt (3) and remove the air cleaner housing (2).

8. Remove the cylinder head(s). See **Engine/Cylinder Head - Removal**.
9. Raise and support the vehicle.

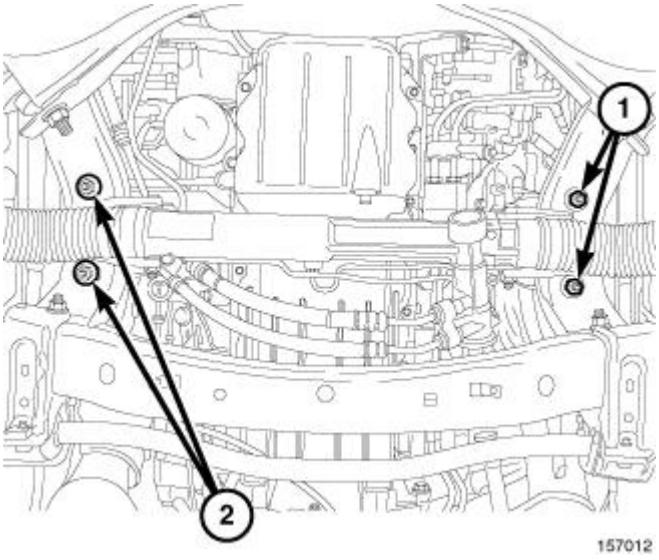

Fig. 190: Engine Mount Nuts
Courtesy of CHRYSLER LLC

10. Remove the engine mount nuts (1,2).

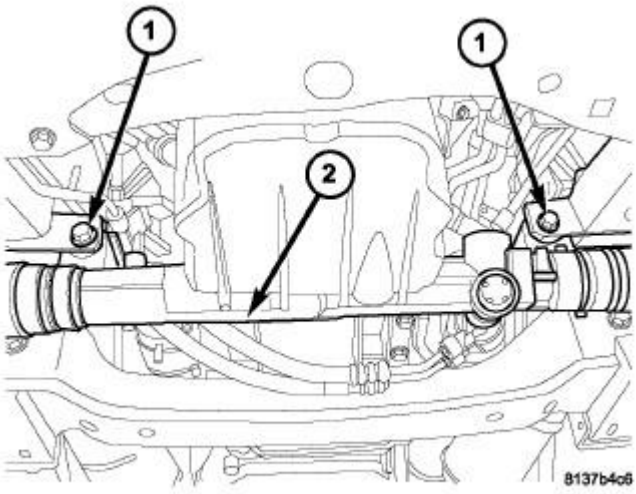

Fig. 191: Gear Mounting Bolts
Courtesy of CHRYSLER LLC

11. Remove the steering gear mounting bolts (1) and position the steering gear (2) aside.
12. Remove the engine oil dipstick and tube from the oil pan.
13. Lower the vehicle.

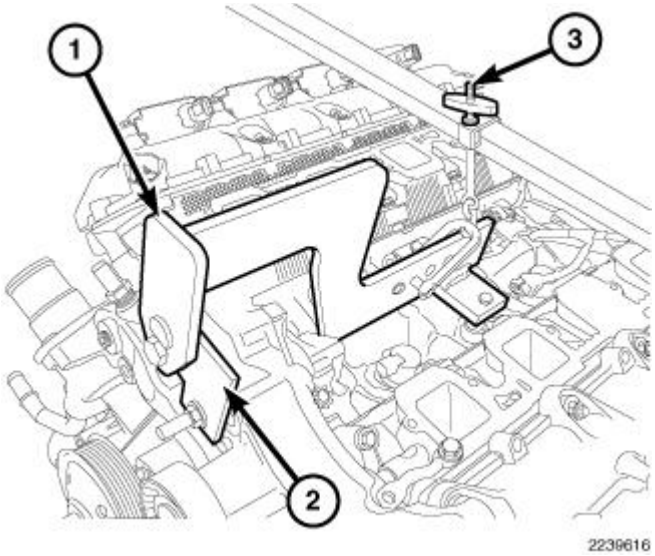

Fig. 192: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

NOTE: Do not use air tools to install engine lift fixture.

14. Install the Engine Lift Fixture 8984A (1), Engine Lift Adapter 8984-UPD (2) and the Engine Support Fixture 8534B (3).
15. Raise the engine to provide clearance to remove the oil pan.
16. Raise and support the vehicle.
17. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
18. Lower the vehicle.
19. Remove the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
20. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing the pistons from the cylinder block. **Be sure to keep the tops of the pistons covered during this operation.**

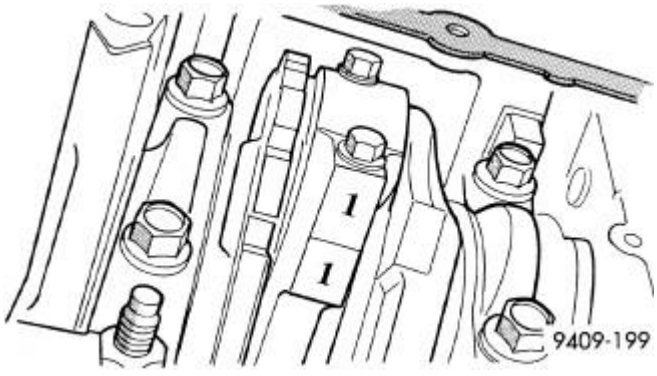

Fig. 193: Marking Connecting Rod & Bearing Cap Positions
Courtesy of CHRYSLER LLC

CAUTION: Do Not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.

21. Raise and support the vehicle.
22. Mark the connecting rod and bearing cap positions using a permanent ink marker or scribe tool.

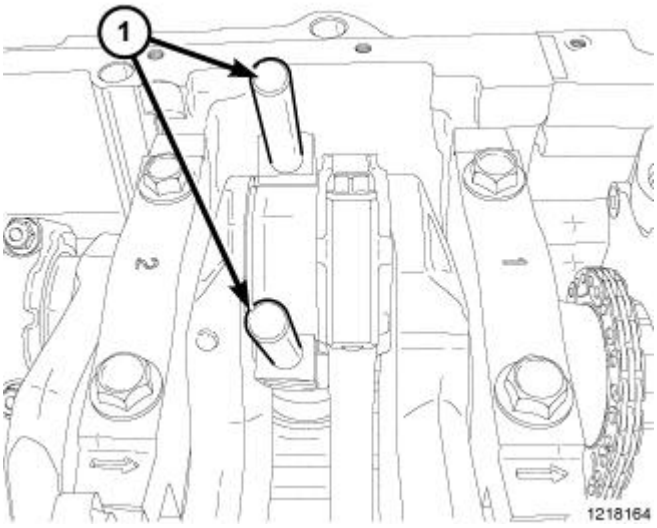

Fig. 194: Connecting Rod Guides
Courtesy of CHRYSLER LLC

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

NOTE: Pistons and connecting rods assemblies must be removed from the top of cylinder block. When removing the piston and connecting rod assemblies from the engine, rotate the crankshaft so each connecting rod is centered in the cylinder bore.

23. Remove the connecting rod cap, install the Connecting Rod Guides 8507 (1) and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
24. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
25. Carefully remove the piston rings from the piston(s), starting from the top ring down.

Cleaning

CLEANING

CAUTION: Do not use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a moly coating, this coating must not be damaged.

1. Using a suitable cleaning solvent, clean the pistons in warm water and towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

CAUTION: Do not remove the piston pin from the piston and connecting rod assembly.

Inspection

INSPECTION

Check the connecting rod journal for excessive wear, taper and scoring. See **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.

Check the connecting rod for signs of twist or bending.

Check the piston for taper and elliptical shape before it is fitted into the cylinder bore. See **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.

Check the piston for scoring or scraping marks in the piston skirts. Check the ring lands for cracks and/or deterioration.

Installation

INSTALLATION

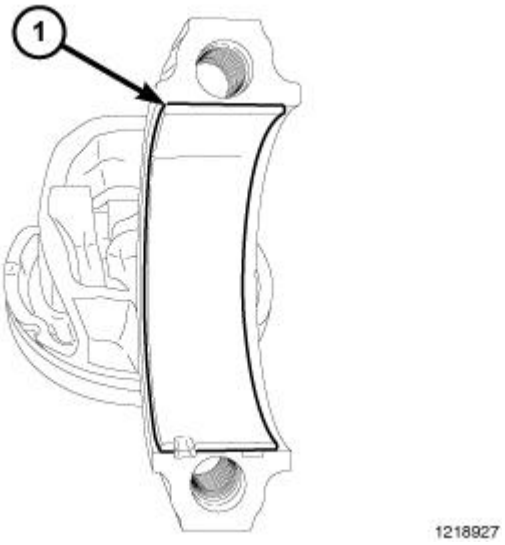

Fig. 195: Rod Bearing
Courtesy of CHRYSLER LLC

NOTE: Before reinstalling used rings or installing new rings, the ring clearances must be checked.

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

1. Check piston ring clearance. See **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
2. Before installing piston and connecting rod assemblies into the bore, install the piston rings. See **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
3. Immerse the piston head and rings in clean engine oil and position a ring compressor over the piston and rings and tighten the ring compressor. **Ensure the position of rings do not change during this operation.**
4. Position the rod bearing (1) onto the connecting rod and lubricate bearing surface with clean engine oil.

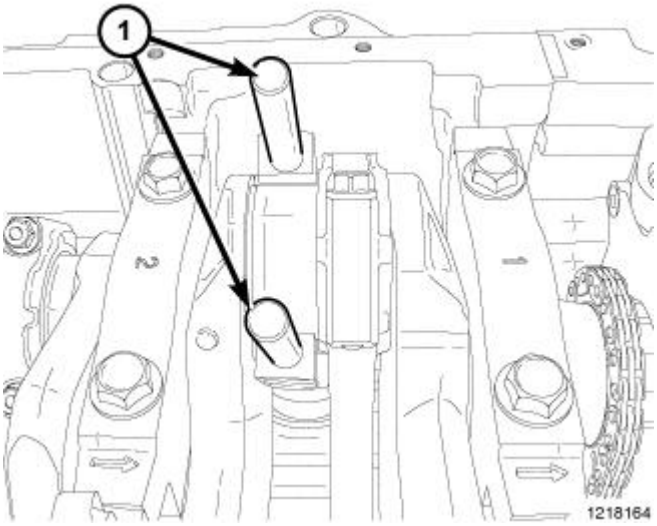

Fig. 196: Connecting Rod Guides
Courtesy of CHRYSLER LLC

5. Install Connecting Rod Guides 8507 (1) into the connecting rod bolt threads.

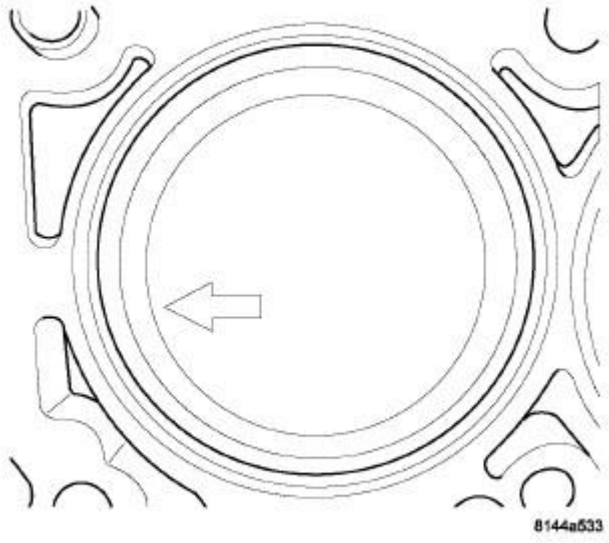

Fig. 197: Piston Direction Arrow
Courtesy of CHRYSLER LLC

6. The pistons are marked on the piston pin bore surface with an raised "F" or arrow on top of piston indicating installation position. This mark must be pointing toward the front of engine on both cylinder banks.
7. Wipe cylinder bore clean and lubricate with clean engine oil.

8. Rotate the crankshaft until the connecting rod journal is centered with the cylinder bore.
9. Insert the piston and rod assembly into the cylinder bore and carefully position the connecting rod over the crankshaft journal.
10. Tap the piston down into the cylinder bore using a hammer handle while guiding the connecting rod into position on the rod journal.

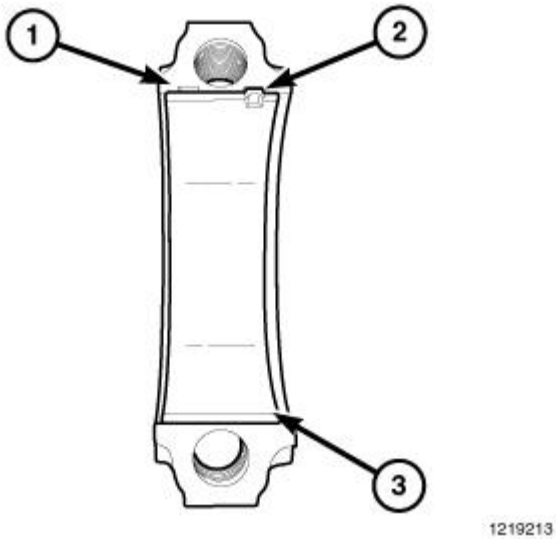

Fig. 198: Connecting Rod Cap
Courtesy of CHRYSLER LLC

11. Remove the Connecting Rod Guides 8507.
12. Wipe the connecting rod cap (1) clean and lubricate with clean engine oil and install the bearing (3).

NOTE: The connecting rods and bearing caps are not interchangeable, line up the previously marked bearing caps and connecting rods to ensure assembly to their original location.

13. Lubricate the bearing surfaces with clean engine oil and position the rod cap in place.

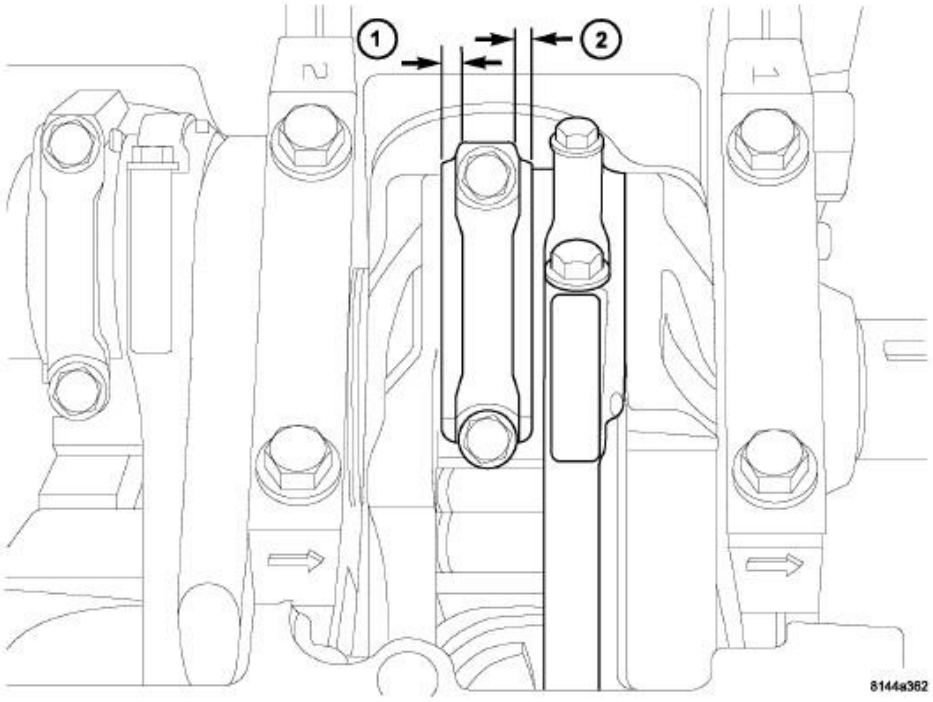

Fig. 199: Removing/Installing Connecting Rod
Courtesy of CHRYSLER LLC

CAUTION: When installing connecting rods, make sure the wide side (1) is towards the crankshaft and narrow sides (2) face each other.

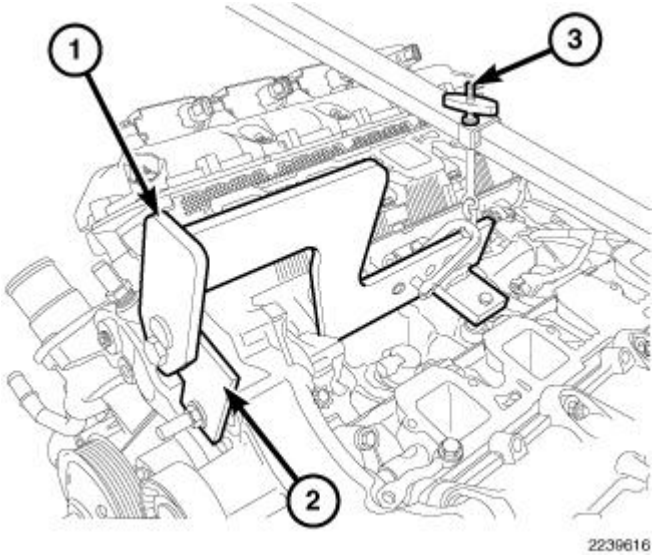

Fig. 200: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

CAUTION: Always replace the Rod Bolts whenever they are loosened or removed.

14. Lubricate the new rod cap bolts with clean engine oil, install and tighten to 21 N.m (15 ft. lbs.) plus 90°.
15. Install the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
16. Install the new oil pan gasket/windage tray and oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
17. Install the engine oil dipstick tube and dipstick.
18. Lower the vehicle.
19. Using the Engine Lift Fixture 8984A (1), Engine Lift Adapter 8984-UPD (2) and the Engine Support Fixture 8534B (3) lower the engine into position and remove.
20. Raise and support the vehicle.

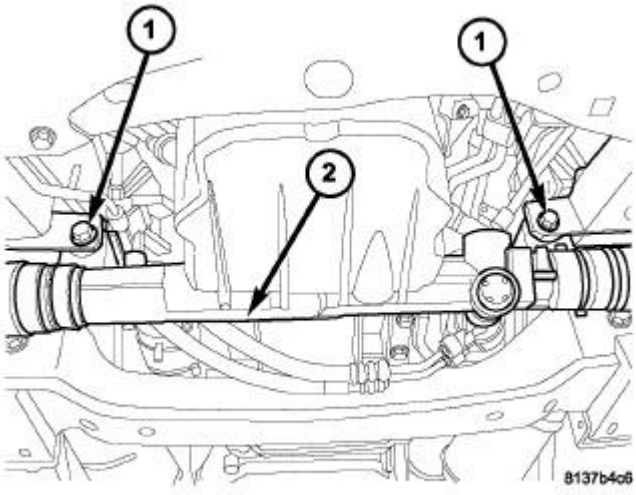

Fig. 201: Gear Mounting Bolts
Courtesy of CHRYSLER LLC

21. Position the steering gear (2), install mounting bolts (1) and tighten to 95 N.m (70 ft. lbs.).

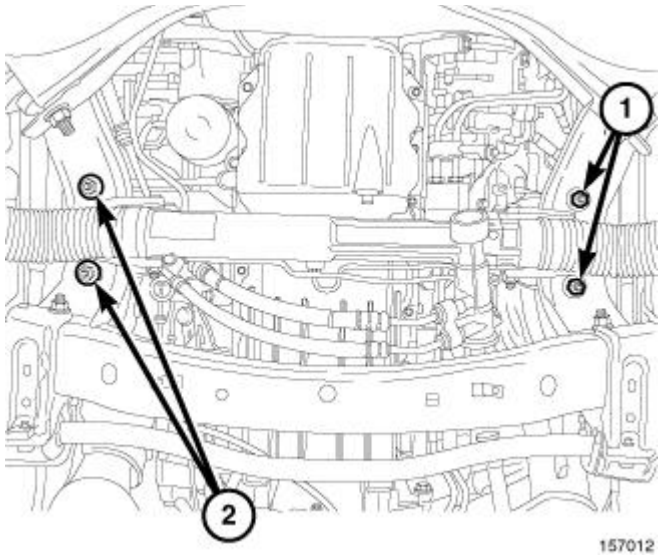

Fig. 202: Engine Mount Nuts
Courtesy of CHRYSLER LLC

22. Install the engine mount nuts (1,2) and tighten to 95 N.m (70 ft. lbs.).
23. Lower the vehicle.
24. Install the cylinder head(s). See **Engine/Cylinder Head - Installation**.

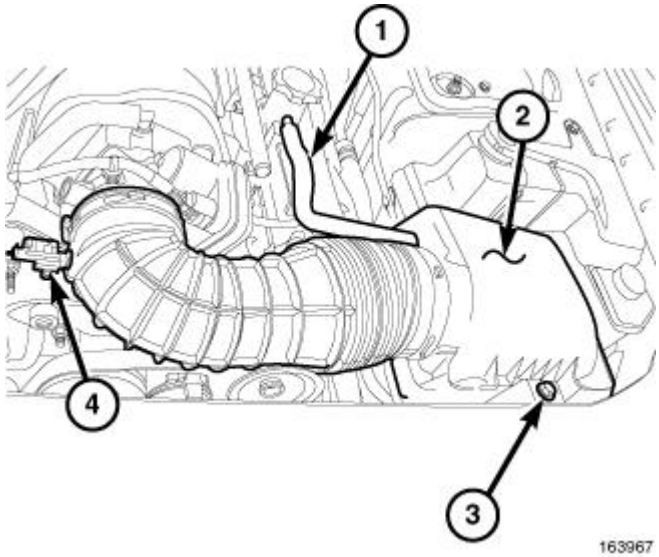

Fig. 203: Air Duct To Throttle Body
Courtesy of CHRYSLER LLC

25. Position the air cleaner housing (2), install the air cleaner housing retaining bolt (3) and securely tighten.
26. Connect the makeup air hose (1).
27. Connect the intake air temperature sensor (4) electrical connector.
28. Connect the air duct to the throttle body and tighten clamp to 3 N.m (30 in. lbs.).
29. Fill the engine with oil. See **Engine/Lubrication/OIL - Standard Procedure**.

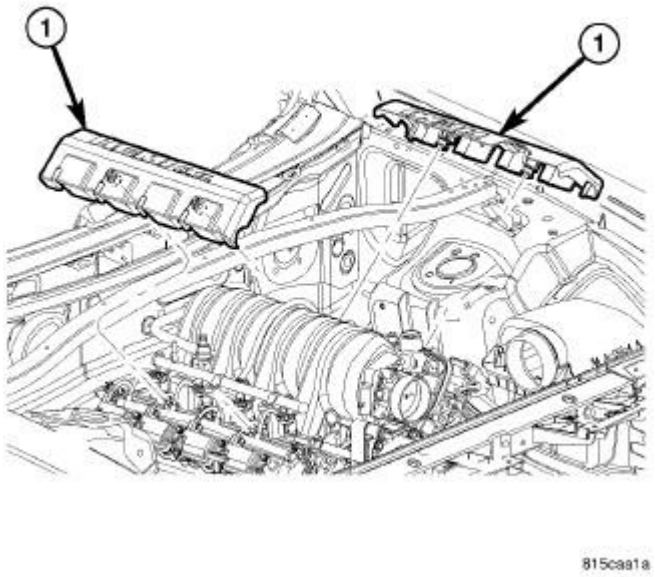

Fig. 204: Engine Covers
Courtesy of CHRYSLER LLC

30. Install the engine covers (1).

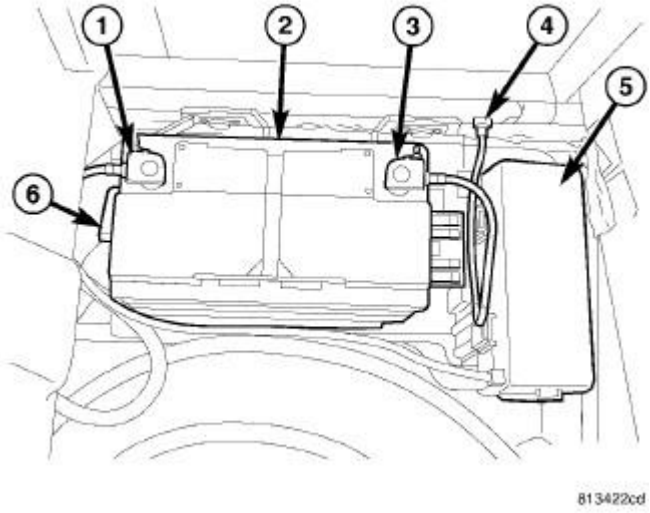

Fig. 205: Battery System Components And PDC Cover
Courtesy of CHRYSLER LLC

31. Connect the negative battery cable (3).

SEAL, CRANKSHAFT OIL, FRONT

Removal

REMOVAL

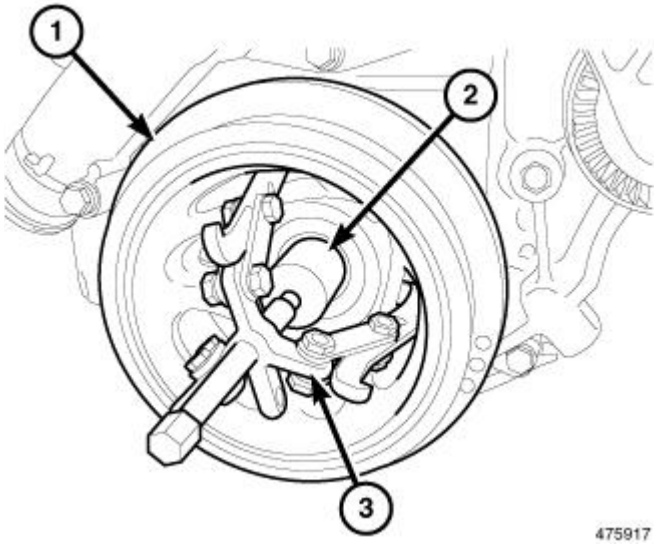

Fig. 206: Removing Vibration Damper
Courtesy of CHRYSLER LLC

1. Disconnect negative cable from battery.
2. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
3. Drain cooling system. Refer to **Cooling - Standard Procedure** .
4. Remove upper radiator hose.
5. Remove radiator shroud attaching fasteners.
6. Remove radiator cooling fan and shroud. Refer to **Cooling/Engine/FAN, Cooling - Removal** .
7. Remove crankshaft damper bolt.
8. Remove damper using Crankshaft Insert 8513A (2) and Three Jaw Puller 1023 (1). See **Engine/Engine Block/DAMPER, Vibration - Removal**.

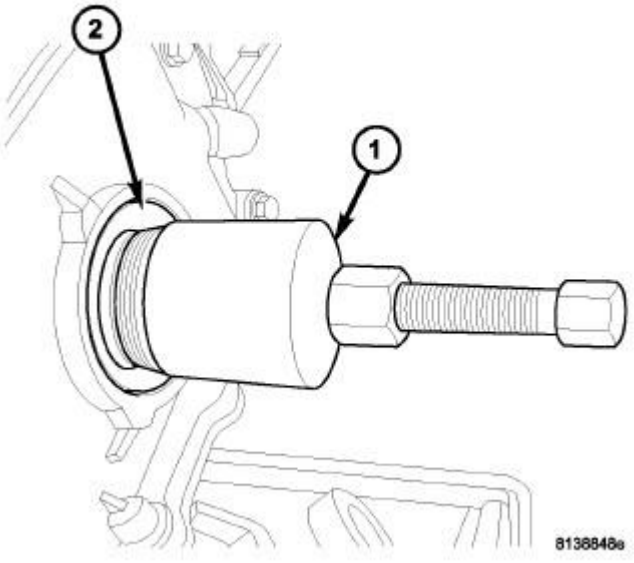

Fig. 207: Front Crankshaft Seal Removal
Courtesy of CHRYSLER LLC

9. Using Seal Remover 9071 (1), remove crankshaft front seal (2).

Installation

INSTALLATION

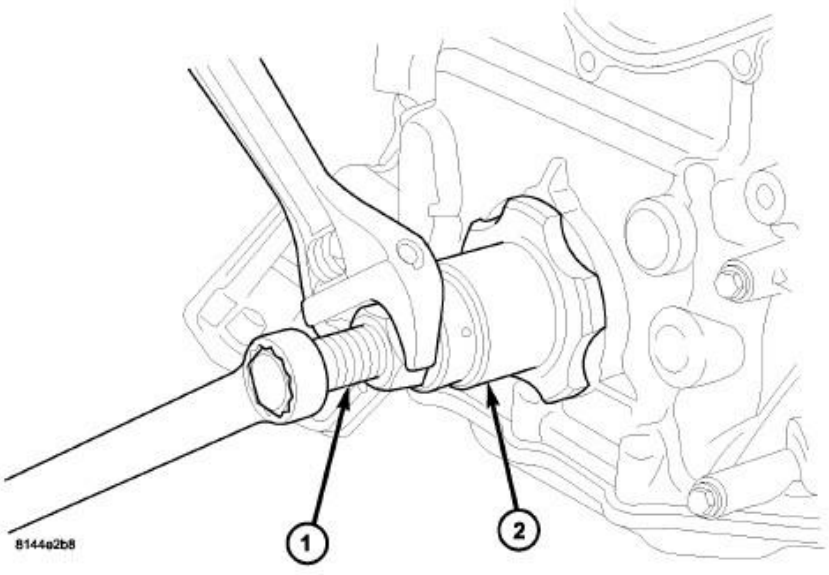

Fig. 208: Front Seal Installation

Courtesy of CHRYSLER LLC

CAUTION: The front crankshaft seal must be installed dry. Do not apply lubricant to the sealing lip or the outer edge.

1. Using Crankshaft Front Oil Seal Installer 9072 (2) and Damper Installer 8512A (1), install crankshaft front seal.

CAUTION: To prevent severe damage to the crankshaft or damper, thoroughly clean the damper bore and the crankshaft nose before installing damper.

2. Install vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.
3. Install radiator cooling fan and shroud. Refer to **Cooling/Engine/FAN, Cooling - Installation** .
4. Install upper radiator hose.
5. Install accessory drive belt refer. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
6. Refill cooling system. Refer to **Cooling - Standard Procedure** .
7. Connect negative cable to battery.

SEAL, CRANKSHAFT OIL, REAR

Description

DESCRIPTION

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer, for more information refer to the following;

- **Diagnosis and Testing** . See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Diagnosis and Testing**.
- **Removal** . See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Removal**.
- **Installation** . See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Installation**.

SOLENOID, MULTIPLE DISPLACEMENT

Description

DESCRIPTION

The Multi Displacement System selectively deactivates cylinders 1,4,6, and 7, to improve fuel economy. It has two modes of operation:

- 8 cylinders for acceleration and heavy loads.
- 4 cylinders for cruising and city traffic.

The main components of the Multi Displacement System are:

- Unique MDS camshaft.
- Deactivating roller tappets.
- 4 control valves/solenoids.
- control valve/solenoid wiring harness.
- oil temp sensor.

Operation

OPERATION

Cylinder Deactivation

- Trap an exhaust charge from a normal combustion event
- Normal combustion event
- Don't open the exhaust valve
- Don't open the intake valve
- Piston is an air spring
- Cylinders deactivated in firing sequence

Cylinder Reactivation

- Open the exhaust valve
- Empty the cylinder
- Open the intake valve
- Normal combustion event
- Cylinders reactivated in firing sequence

Diagnosis and Testing

MDS SOLENOID

The Multi-Displacement System (MDS) has the following detectable issues:

- solenoid circuit
- fail to deactivate a cylinder(s)
- fail to reactivate a cylinder(s)
- low oil pressure

CONDITION	POSSIBLE CAUSES	CORRECTION
MDS does not activate	1. Low oil pressure. 2. Bad oil temperature sensor.	1. Check for proper oil pressure. 2. Replace the oil temperature sensor.

-	3. Malfunctioning MDS solenoid.	3. Replace the solenoid.
-	4. Malfunctioning MDS tappet.	4. Replace tappet (s).
MDS does not deactivate	1. Low oil pressure.	1. Check or proper oil pressure.
	2. Bad oil temperature sensor.	2. Replace the oil temp sensor.
-	3. Malfunctioning MDS solenoid.	3. Replace the solenoid.
-	4. Malfunctioning MDS tappet.	4. Replace tappet(s).

Removal

REMOVAL

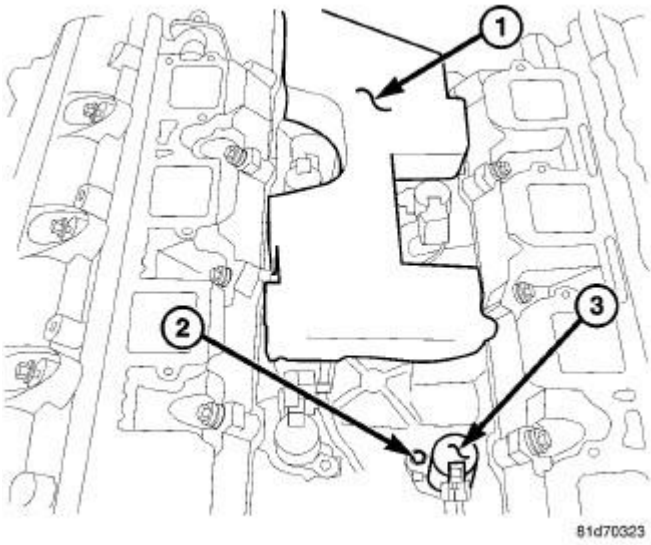

Fig. 209: MDS Solenoids
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
3. Remove foam insulator pad (1).

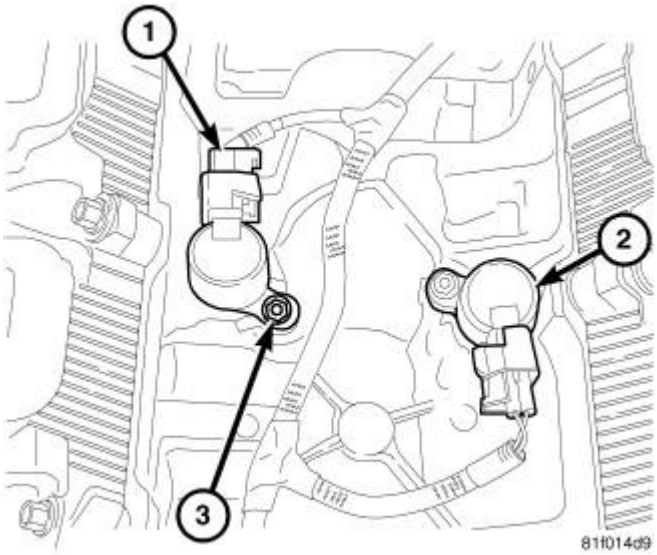

Fig. 210: MDS Solenoid Connector
Courtesy of CHRYSLER LLC

4. Remove wiring harness connectors (1) from the MDS solenoid(s) (2) that require removal.
5. Remove hold down bolt (3) from MDS solenoid(s) (2).

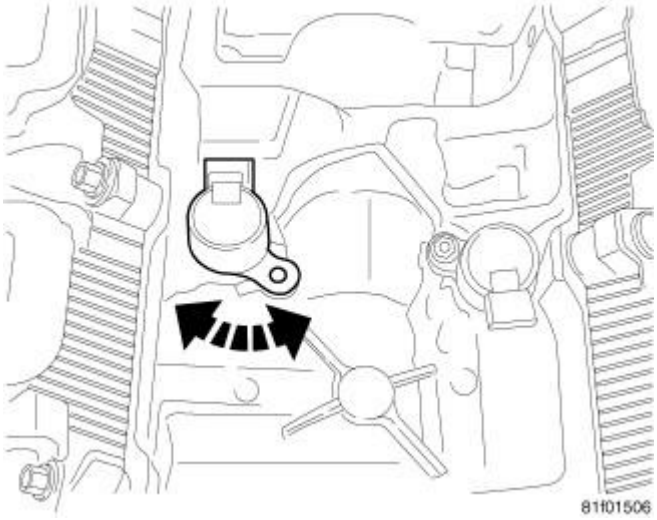

Fig. 211: MDS Solenoid Removal
Courtesy of CHRYSLER LLC

CAUTION: Do not try to pry the solenoid out. This could lead to breakage and contamination of the lubrication system.

6. Lightly tap on solenoid with a rubber mallet. Wiggle solenoid from side to side.
7. Remove MDS solenoid(s).

Installation

INSTALLATION

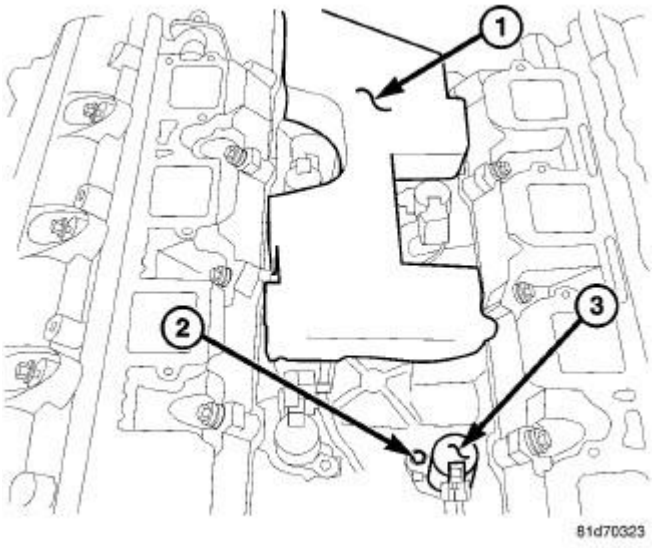

Fig. 212: MDS Solenoids
Courtesy of CHRYSLER LLC

1. Verify that MDS bores are free of debris, before solenoid installation.
2. Install MDS solenoid(s) (3) fully into block.
3. Install hold down bolt (2) and tighten to 11 N.m (97 in. lbs.).
4. Reconnect the MDS wiring harness to the solenoid(s) (3).
5. Install foam insulator pad (1) if removed.
6. Install the intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, REAR

Removal

REMOVAL

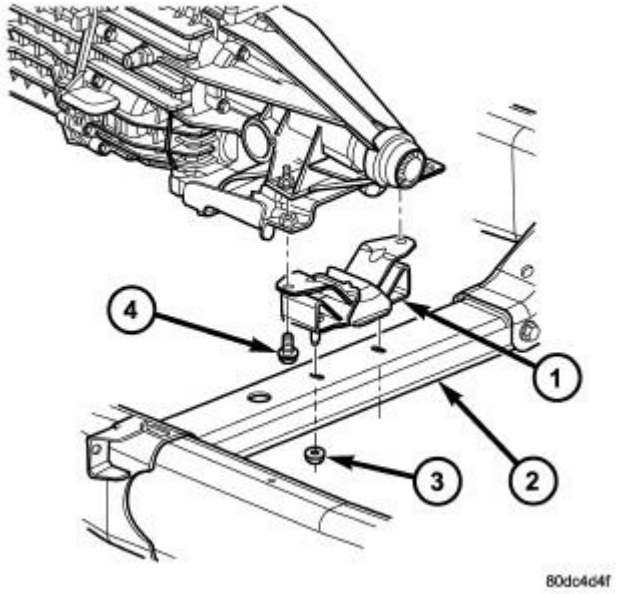

Fig. 213: Transmission Mount
Courtesy of CHRYSLER LLC

1. Raise the vehicle on a hoist.
2. Using a suitable jack, support transmission.
3. Remove the nuts (3) from the transmission mount.
4. Remove the transmission to mount bolts (4).
5. Raise the transmission enough to remove the rear mount (1).
6. Remove the mount (1).

Installation

INSTALLATION

NOTE: Threadlocking compound must be applied to the bolts before installation.

1. Install the two bolts that attach the transmission mount to the transmission bracket.
2. Tighten the bolts to 61N.m (45 ft. lbs.) torque.
3. Lower the transmission so the transmission mount rests on the crossmember, and the studs of the transmission mount are aligned in the slots in the crossmember.
4. Install the nuts onto the transmission mount studs through the crossmember access slot.
5. Tighten the nuts to 54N.m (40 ft. lbs.).

INSULATOR, ENGINE MOUNT, FRONT

Removal

REMOVAL

2WD

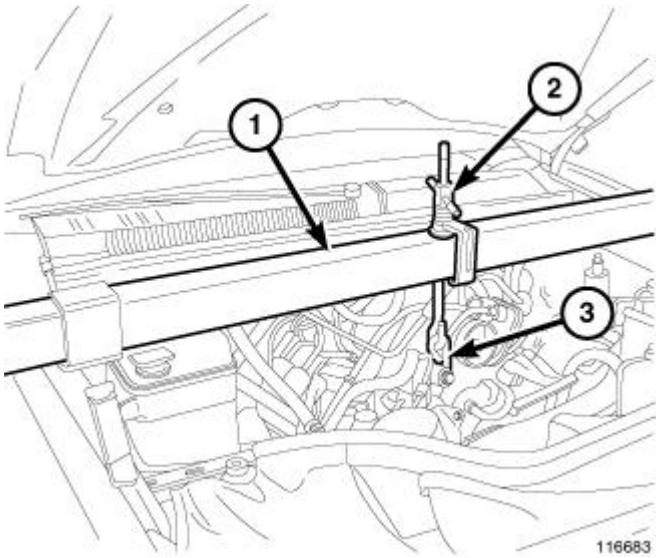

Fig. 214: Engine Support Tool
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Raise vehicle.
3. Remove engine mount through bolts.
4. Raise engine using engine support fixture (1) special tool 8534B.
5. Remove engine mount to insulator bolts.
6. Remove insulator from engine.

4WD

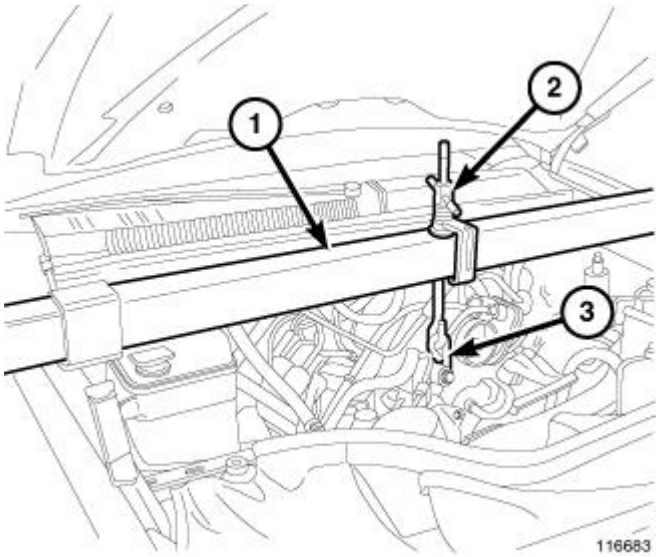

Fig. 215: Engine Support Tool
Courtesy of CHRYSLER LLC

1. Disconnect the negative cable from the battery.
2. Raise the vehicle.
3. Remove the skid plate.
4. Remove the front crossmember.
5. Remove the engine oil filter.
6. Support the engine using engine support fixture 8534B (1).
7. Support the front axle with a suitable jack.
8. Remove the (4) bolts that attach the engine mounts to the front axle.
9. Remove the (3) bolts that attach the front axle to the left engine bracket.
10. Lower the front axle.
11. Remove the (6) through bolts
12. Raise the engine far enough to be able to remove the left and right engine mounts.
13. Remove the engine mounts.

Installation

INSTALLATION

2WD

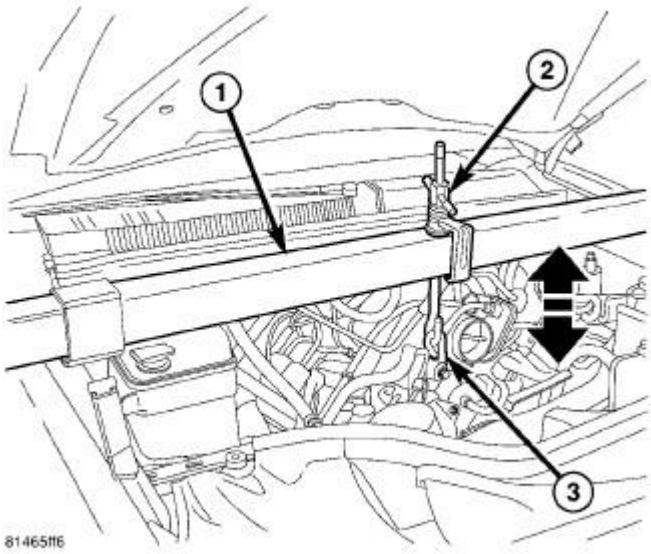

Fig. 216: Engine Support Tool
Courtesy of CHRYSLER LLC

1. Install mount on the engine.

NOTE: For mount to engine block and left engine bracket to front axle bolts, apply Mopar® Lock and Seal Adhesive, Medium Strength Threadlocker.

2. Install upper and lower mount mounting bolts. Tighten bolts to 61 N.m (45 ft. lbs.).
3. Lower the engine using engine support fixture 8534B (1).
4. Install mount thru bolts.
5. Tighten through bolts on both sides to 61 N.m (45 ft. lbs.).
6. Lower vehicle.
7. Connect negative battery cable.

4WD

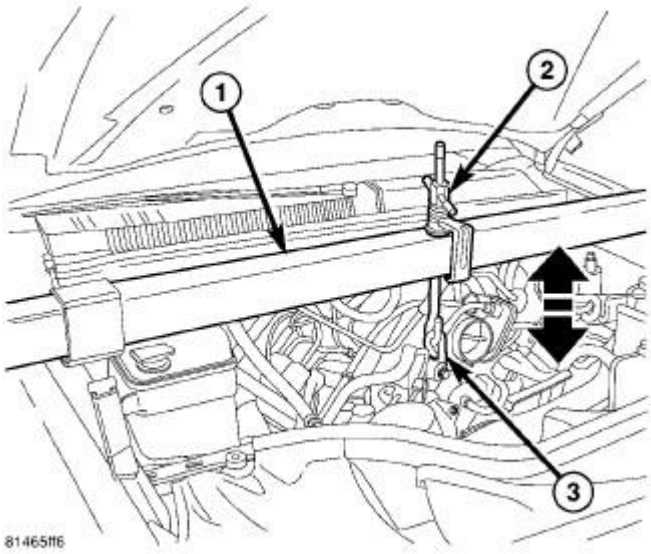

Fig. 217: Engine Support Tool
Courtesy of CHRYSLER LLC

NOTE: For mount to engine block and left engine bracket to front axle bolts, apply Mopar® Lock and Seal Adhesive, Medium Strength Threadlocker.

1. Install the right and left side engine mounts to the front axle. Tighten nuts to 94 N.m (70 ft. lbs.).
2. Raise the front axle into the frame and install the left and right side through bolts. Tighten nuts to 94 N.m (70 ft. lbs.).
3. Insert the two upper through bolts into the right and left side engine mounts and loose assemble the two nuts onto the through bolts.
4. Lower the engine using engine support fixture 8534B (1), until the left and right side engine brackets rest on the thru bolts, and the lower engine bracket through holes align with the engine mounts, and the left engine bracket holes align with the front axle slots.
5. Loose assemble the bolts that attach the front axle to the left engine bracket.
6. Loose assemble the lower through bolts.
7. Tighten the nuts for the through bolts to 101 N.m (75 ft. lbs.).
8. Tighten the bolts that attach the front axle to the left engine bracket to 101 N.m (75 ft. lbs.).
9. Install the engine oil filter, if removed.
10. Install the front crossmember.
11. Install the skid plate.
12. Lower the vehicle.
13. Reconnect the negative battery cable.

LUBRICATION

DESCRIPTION

DESCRIPTION

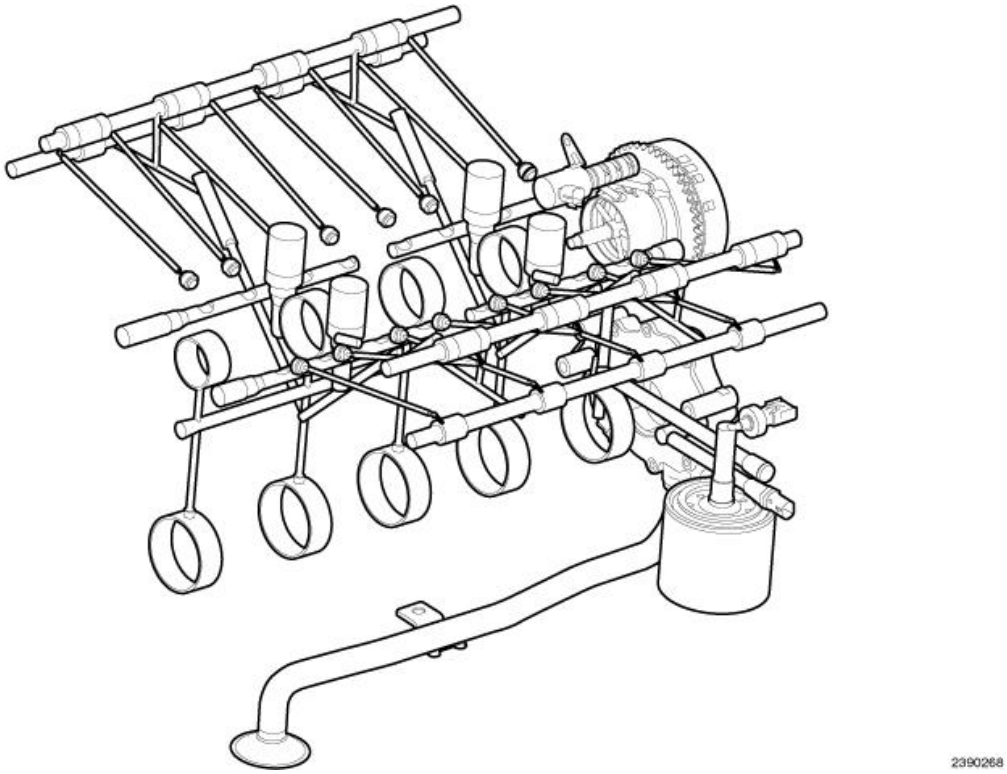

Fig. 218: 5.7L MDS Lubrication System
Courtesy of CHRYSLER LLC

The 5.7L MDS lubrication system is a full flow filtration pressure feed type.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove the oil pressure sending unit and install gauge assembly C-3292A.
2. Run the engine until thermostat opens.
3. Oil Pressure:
   - Curb Idle - 25 kPa (4 psi) minimum
   - 3000 RPM - 170-758 kPa (25-110 psi)
4. If oil pressure is 0 at idle, shut off engine. Check for a clogged oil pick-up screen or a pressure relief valve stuck open.

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell,

temporarily stopping the leak.

2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of the oil leak. If the oil leak is found and identified, repair per service instructions.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

If the oil leak source is not positively identified at this time , proceed with the AIR LEAK DETECTION TEST METHOD.

AIR LEAK DETECTION TEST METHOD

1. Remove the PCV valve from the IAFM. Cap or plug the PCV valve grommet.
2. Attach an air hose with a pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service procedures.
4. If the leakage occurs at the rear oil seal area, refer to **INSPECTION FOR REAR SEAL AREA LEAKS**.
5. If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve.
6. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect the battery.
2. Raise the vehicle.
3. Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak:
    a. Circular spray pattern generally indicates seal leakage or crankshaft damage.
    b. Where leakage tends to run straight down, possible causes are a porous block, distributor seal, camshaft bore cup plugs oil galley pipe plugs, oil filter runoff, and main bearing cap to cylinder

block mating surfaces.

4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

CONTROL VALVE, OIL INTAKE

Operation

OPERATION

The Variable Valve Timing (VVT) assembly is actuated with engine oil pressure. The oil flow to the VVT assemblies are controlled by an Oil Control Valve (OCV). The OCV consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the OCV to control oil flow through the spool valve into the VVT assemblies. The VVT assembly consists of a rotor, stator, and sprocket. The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VVT assembly rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable valve timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

Description

DESCRIPTION

The 5.7L engine is equipped with Variable Valve Timing (VVT). This system uses an oil control valve to direct oil pressure into the camshaft phaser assembly. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The oil control valve is located under the intake manifold.

Installation

INSTALLATION

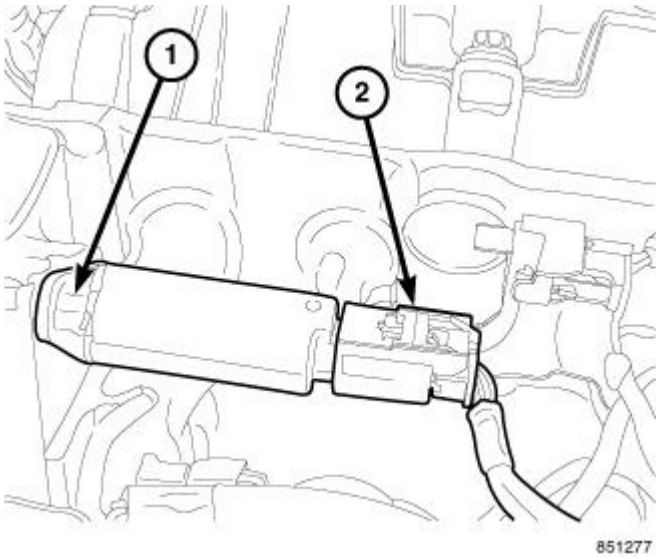

Fig. 219: Oil Control Valve
Courtesy of CHRYSLER LLC

1. Install oil control valve.
2. Tighten oil control valve fastener (1).
3. Connect oil control valve electrical connector (2).
4. Install intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

Removal

REMOVAL

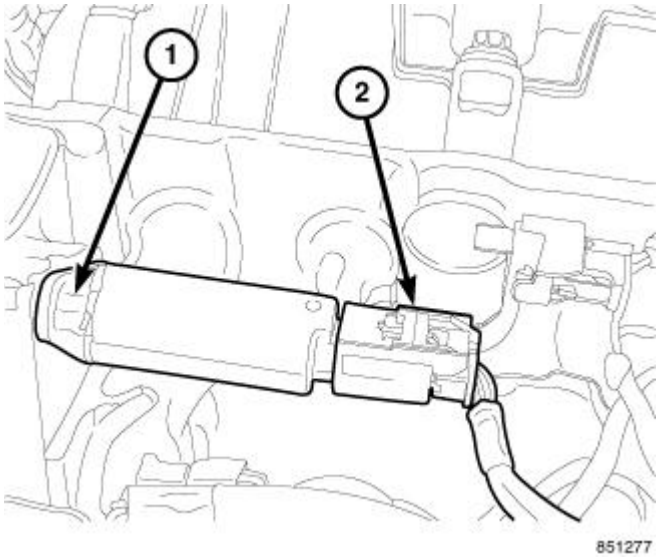

Fig. 220: Oil Control Valve
Courtesy of CHRYSLER LLC

1. Remove intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

2. Disconnect oil control valve electrical connector (2).
3. Remove oil control valve fastener (1).

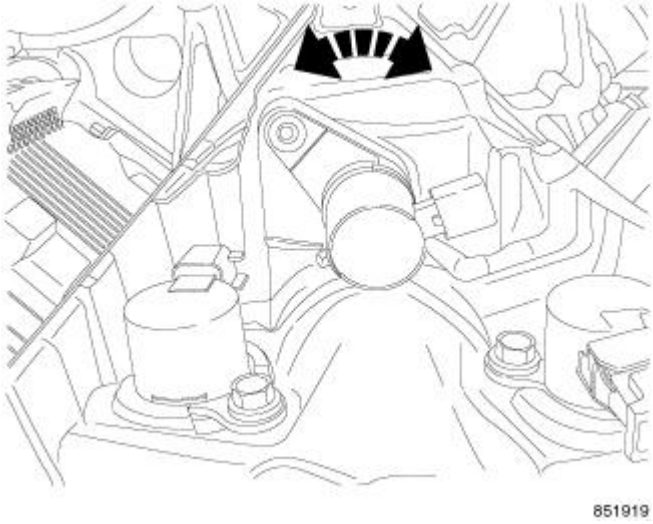

Fig. 221: Oil Control Valve
Courtesy of CHRYSLER LLC

NOTE: To remove the oil control valve, the engine must be at room temperature.

4. Rotate the oil control valve to break the seal. Pull the oil control valve out.

FILTER, ENGINE OIL

Removal

REMOVAL

All engines are equipped with a high quality full-flow, disposable type oil filter. Chrysler Corporation recommends a Mopar® or equivalent oil filter be used.

1. Position a drain pan under the oil filter.
2. Using a suitable oil filter wrench loosen filter.
3. Rotate the oil filter counterclockwise to remove it from the cylinder block oil filter boss.
4. When filter separates from cylinder block oil filter boss, tip gasket end upward to minimize oil spill. Remove filter from vehicle.

NOTE: Make sure filter gasket was removed with filter.

5. With a wiping cloth, clean the gasket sealing surface of oil and grime.

Installation

INSTALLATION

1. Lightly lubricate oil filter gasket with engine oil.

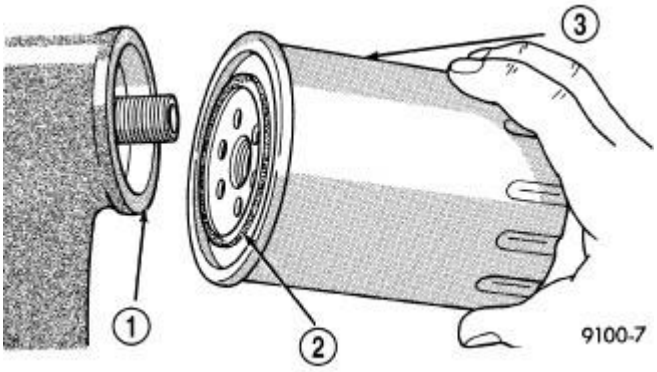

Fig. 222: Oil Filter Sealing Surface - Typical
Courtesy of CHRYSLER LLC

1 - SEALING SURFACE
2 - RUBBER GASKET
3 - OIL FILTER

2. Thread filter onto adapter nipple. When gasket makes contact with sealing surface, hand tighten filter one half turn, or 180°. Do not over tighten. See **Fig. 222**.
3. Add oil, verify crankcase oil level and start engine. Inspect for oil leaks.

OIL

Standard Procedure

ENGINE OIL SERVICE

The engine oil level indicator is located at the left hand of the engine on the 5.7L engines.

CRANKCASE OIL LEVEL INSPECTION

CAUTION: Do not overfill crankcase with engine oil, pressure loss or oil foaming can result.

Inspect engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about ten minutes before checking oil level. Checking engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil dipstick.

1. Position vehicle on level surface.
2. With engine OFF, allow approximately five minutes for oil to settle to bottom of crankcase, remove engine oil dipstick.
3. Wipe dipstick clean.
4. Install dipstick and verify it is seated in the tube.
5. Remove dipstick, with handle held above the tip, take oil level reading.
6. Add oil only if level is below the ADD mark on dipstick.

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in Maintenance Schedules. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** .

Run engine until achieving normal operating temperature.

1. Position the vehicle on a level surface and turn engine off.
2. Hoist and support vehicle on safety stands.
3. Remove oil fill cap.
4. Place a suitable drain pan under crankcase drain.
5. Remove drain plug from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug if damaged.
6. Install drain plug in crankcase. Torque to 34 N.m (25 ft. lbs.).
7. Lower vehicle and fill crankcase with specified type and amount of engine oil described in this article.
8. Install oil fill cap.
9. Start engine and inspect for leaks.
10. Stop engine and inspect oil level.

NOTE: Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine.

PAN, OIL

Removal

REMOVAL

4X2

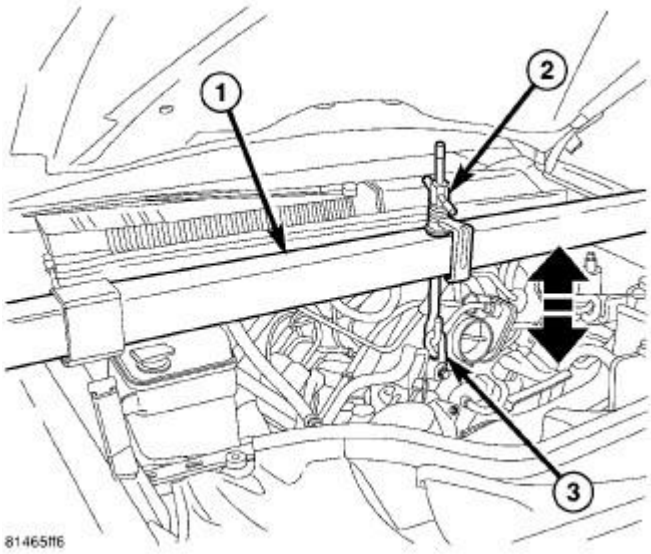

Fig. 223: Engine Support Tool
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Loosen both the left and right side engine mount through bolts. Do not remove bolts.
3. Install Engine Support Fixture 8534B (1). **Do not raise engine at this time.**

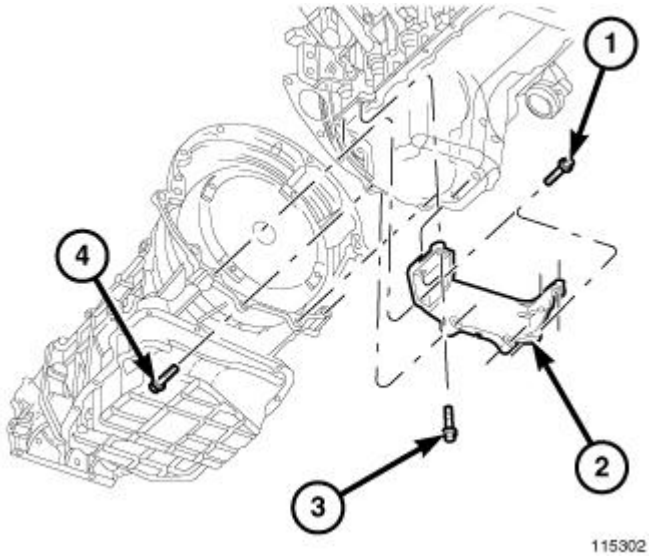

Fig. 224: Structural Cover
Courtesy of CHRYSLER LLC

4. Remove the structural dust cover (2). See **Engine/Engine Block/COVER, Structural Dust - Removal**.
5. Remove the fan and the fan shroud.
6. Drain engine oil.
7. Disconnect transmission fluid cooler lines at radiator, transmission fittings and clips.

NOTE: When disconnecting the transmission oil cooler lines, it is necessary to replace the line clip that is located on the oil pan stud. The retention force of the clip is severely degraded upon removal.

8. Remove the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

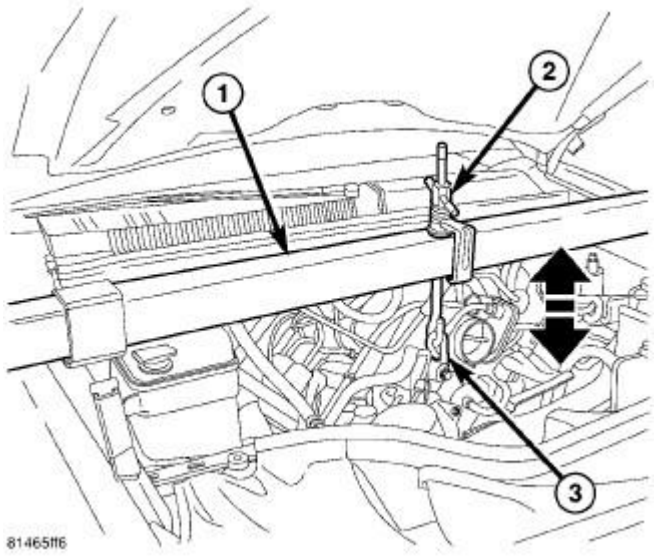

Fig. 225: Engine Support Tool
Courtesy of CHRYSLER LLC

9. Raise engine using Engine Support Fixture 8534B (1) to provide clearance to remove oil pan.

NOTE: Do not pry on oil pan or oil pan gasket. The gasket is integral to engine windage tray and does not come out with oil pan.

NOTE: If more clearance is needed to remove oil pan the transmission mount can be removed, and the transmission can be raised to gain clearance.

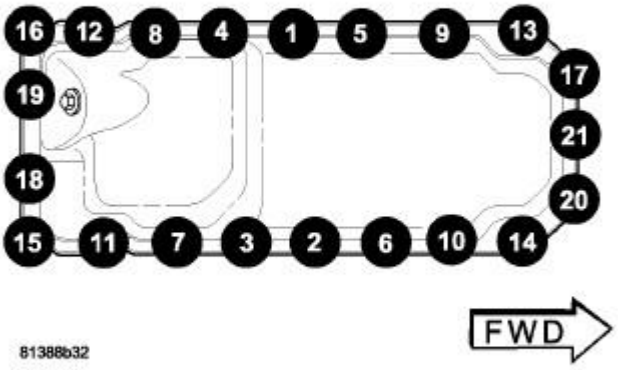

Fig. 226: Oil Pan Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: The double ended oil pan studs must be installed in the same location that they were removed from.

10. Remove the oil pan mounting bolts using the sequence provided.
11. Unbolt oil pump pickup tube and remove tube.

NOTE: When the oil pan is removed, a new integral windage tray and gasket assembly must be installed. The old gasket cannot be reused.

12. Discard the integral windage tray and gasket and replace.

4X4

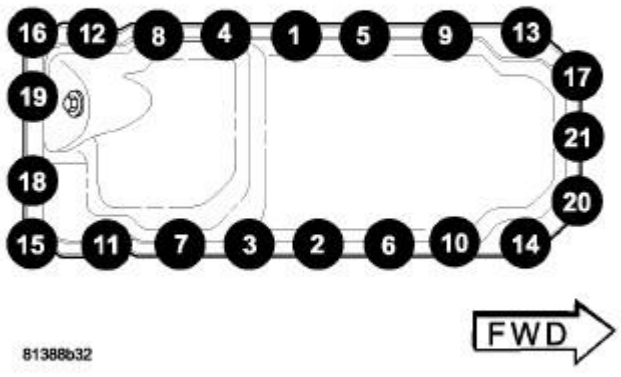

Fig. 227: Oil Pan Torque Sequence
Courtesy of CHRYSLER LLC

1. Follow all steps for 4X2 removal.
2. Unbolt and lower the steering rack, without disconnecting the lines.

NOTE: The front axle must be lowered to remove the oil pan on 4X4 vehicles.

3. Remove the front driveshaft at the axle. Mark for reassembly.
4. Support the front axle.
5. Remove the right and left axle to mount bolts.
6. Lower axle.
7. Remove the oil pan mounting bolts and oil pan.
8. Unbolt oil pump pickup tube and remove tube.

NOTE: When the oil pan is removed, a new integral windage tray and gasket assembly must be installed. The old gasket cannot be reused.

9. Discard the integral windage tray and gasket and replace.

Installation

INSTALLATION

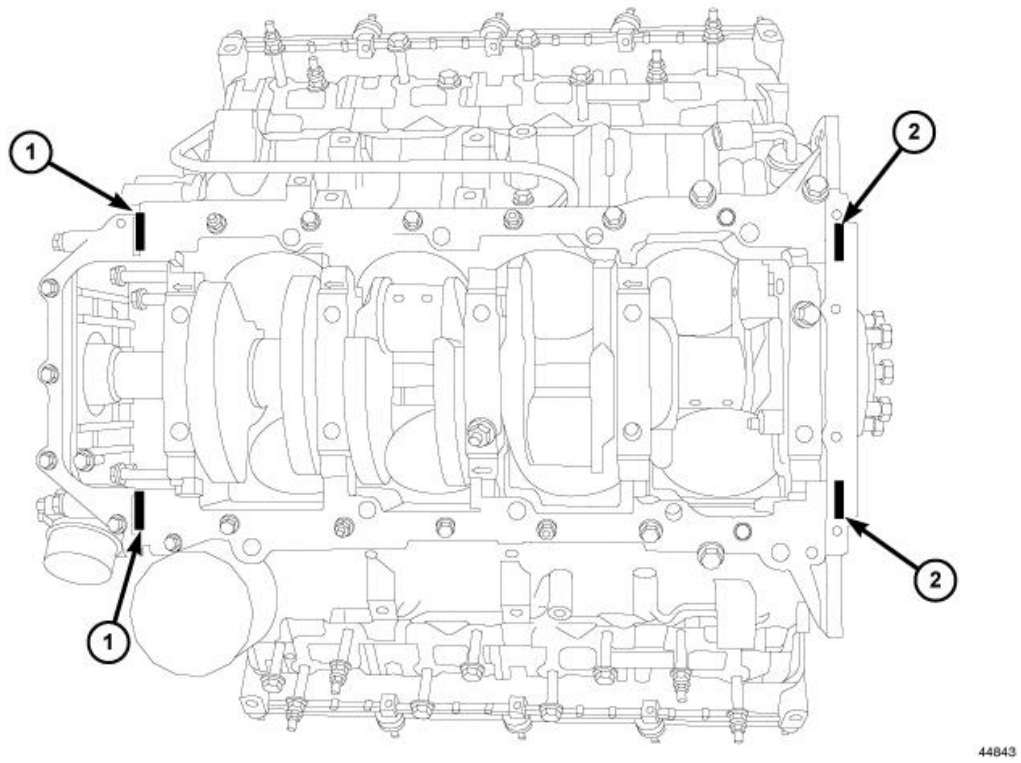

Fig. 228: T-Joint RTV Application
Courtesy of CHRYSLER LLC

1. Clean the oil pan gasket mating surface of the block and oil pan.

NOTE: **Mopar® Engine RTV must be applied to the four T-joints (1, 2). The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the four T-joint locations.**

2. Apply Mopar® Engine RTV at the T- joints (1, 2).

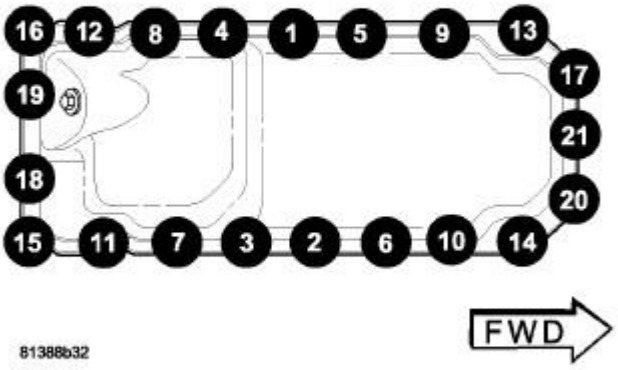

Fig. 229: Oil Pan Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: When the oil pan is removed, a new integral windage tray and gasket assembly must be installed. The old gasket cannot be reused.

3. Install a new integral windage tray and gasket.
4. Reinstall the oil pump pickup tube with new O-rings. Tighten tube to pump fasteners to 28 N.m (21 ft. lbs.).

NOTE: The double ended oil pan studs must be installed in the same location that they were removed from.

5. Position the oil pan and install the mounting bolts and studs. Tighten the mounting bolts to 12 N.m (105 in. lbs.).

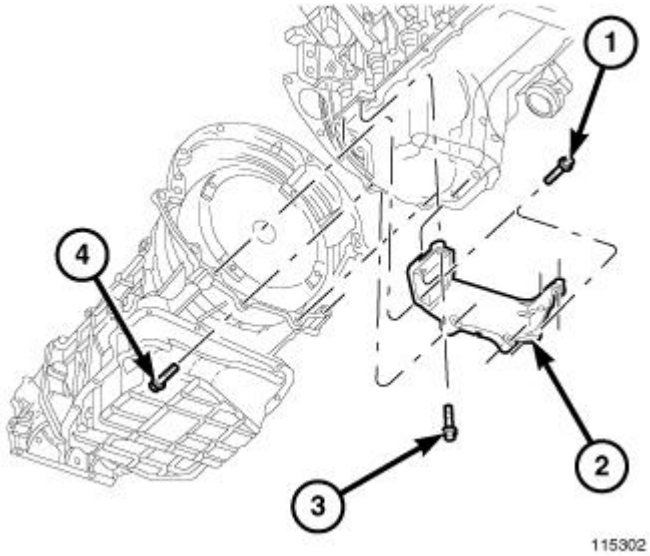

Fig. 230: Structural Cover
Courtesy of CHRYSLER LLC

6. Connect cooler lines to radiator, transmission and clips.

NOTE: When connecting the transmission oil cooler lines, it is necessary to replace the line clip that is located on the oil pan stud. The retention force of the clip is severely degraded upon removal.

7. Install the structural cover (2). See **Engine/Engine Block/COVER, Structural Dust - Installation**.

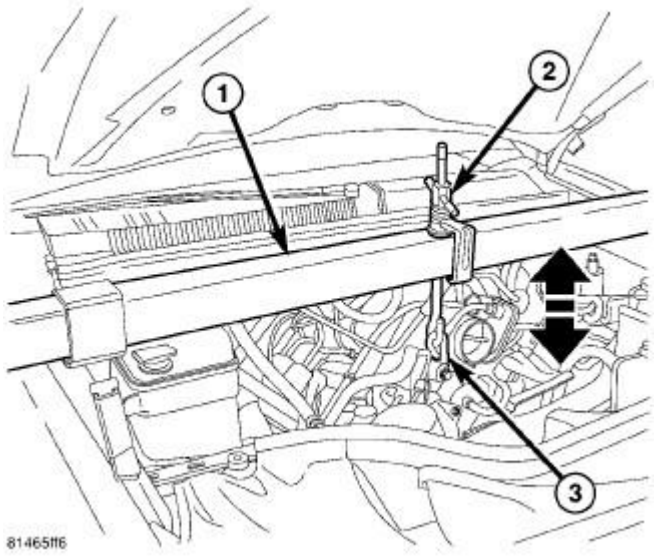

Fig. 231: Engine Support Fixture
Courtesy of CHRYSLER LLC

8. Lower the engine into mounts using Engine Support Fixture 8534B (1).

9. Install both the left and right side engine mount through bolts. Tighten the nuts to 68 N.m (50 ft. lbs.).
10. Reinstall the front axle, if removed.
11. Install the steering rack, if removed.
12. Install the rear transmission mount, if removed.
13. Remove Engine Support Fixture 8534B (1).
14. Install the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
15. Install the fan shroud and fan.
16. Fill engine oil.
17. Connect the negative battery cable.
18. Start engine and check for leaks.

PUMP, ENGINE OIL

Removal

REMOVAL

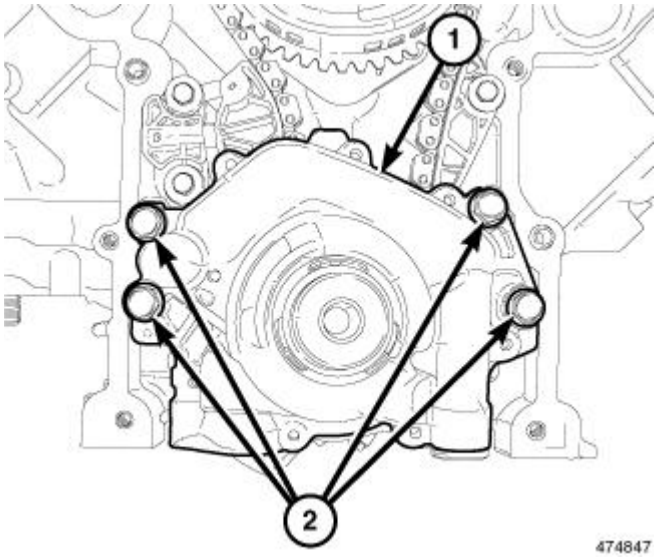

Fig. 232: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

1. Remove the oil pan and pick-up tube. See **Engine/Lubrication/PAN, Oil - Removal**.
2. Remove the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
3. Remove the four bolts (2) and the oil pump (1).

Cleaning

CLEANING

1. Wash all parts in a suitable solvent.

Inspection

INSPECTION

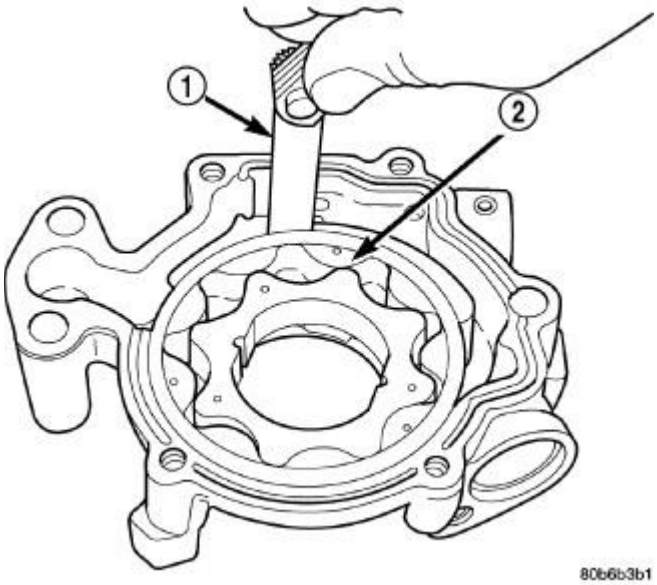

Fig. 233: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER LLC

CAUTION: The oil pump pressure relief valve and spring should not be removed from the oil pump. If these components are disassembled and or removed from the pump the entire oil pump assembly must be replaced.

1. Remove the pump cover.
2. Clean all parts thoroughly. Mating surface of the oil pump housing should be smooth. If the pump cover is scratched or grooved the oil pump assembly should be replaced.
3. Slide outer rotor into the body of the oil pump. Press the outer rotor to one side of the oil pump body and measure clearance between the outer rotor (2) and the body. If the measurement is 0.235mm (0.009 in.) or more the oil pump assembly must be replaced.

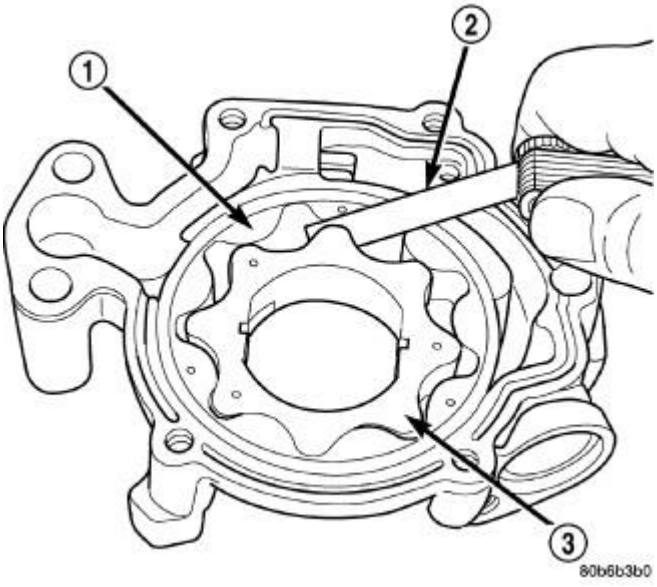

Fig. 234: Measuring Clearance Between Rotors
Courtesy of CHRYSLER LLC

4. Install the inner rotor into the oil pump body. Measure the clearance between the inner (3) and outer rotors (1). If the clearance between the rotors is 0.150 mm (0.006 in.) or more the oil pump assembly must be replaced.

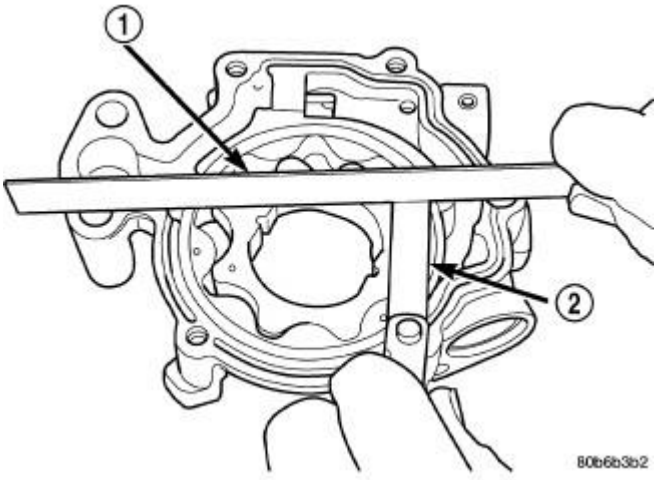

Fig. 235: Measuring Clearance Over Rotors
Courtesy of CHRYSLER LLC

5. Place a straight edge (1) across the body of the oil pump (between the bolt holes), if a feeler gauge (2) of 0.095 mm (0.0038 in.) or greater can be inserted between the straightedge and the rotors, the pump must be replaced.
6. Reinstall the pump cover. Tighten fasteners to 15 N.m (132 in. lbs.).

NOTE: The 5.7 Oil pump is serviced as an assembly. In the event the oil pump is not functioning or out of specification, it must be replaced as an assembly.

Installation

INSTALLATION

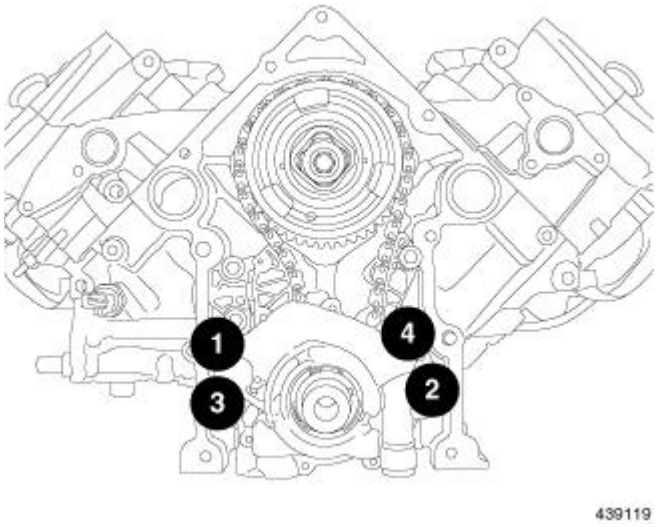

Fig. 236: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

1. Position the oil pump onto the crankshaft and install the 4 oil pump retaining bolts.
2. Tighten the oil pump retaining bolts to 28 N.m (250 in. lbs.) in the sequence shown. See **Fig. 236**.
3. Install the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
4. Install the pick-up tube and oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.

SENSOR, OIL PRESSURE

Description

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit through the PCM
- 5 volt reference circuit from the PCM

The oil pressure sensor returns a voltage signal back to the PCM with reference to oil pressure. Ground for the sensor is supplied by the PCM.

The oil pressure sensor is located on the right side of the engine block. The sensor screws into the engines main

oil gallery.

Removal

REMOVAL

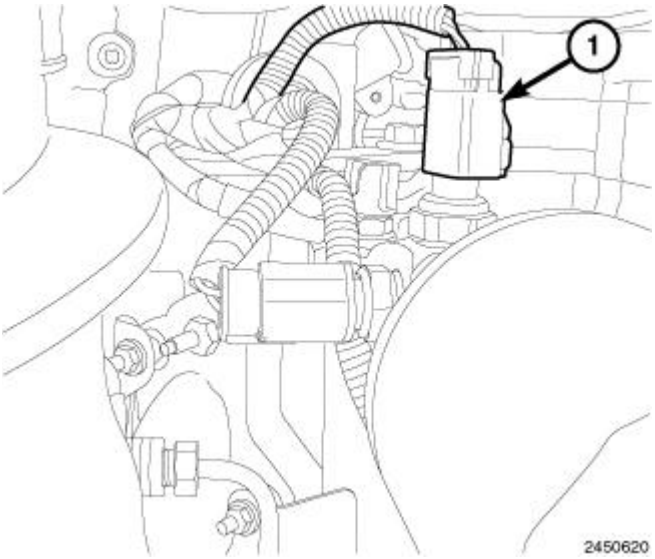

Fig. 237: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Disconnect the oil pressure sensor electrical connector (1).

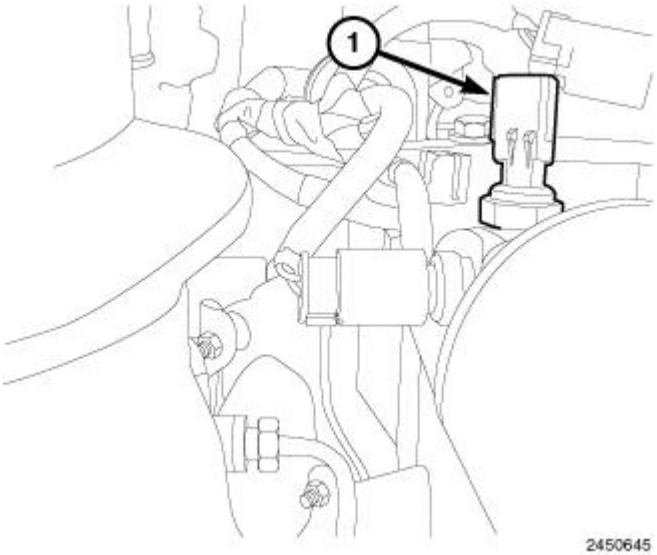

Fig. 238: Oil Pressure Sensor
Courtesy of CHRYSLER LLC

4. Remove the oil pressure sensor (1).

Installation

INSTALLATION

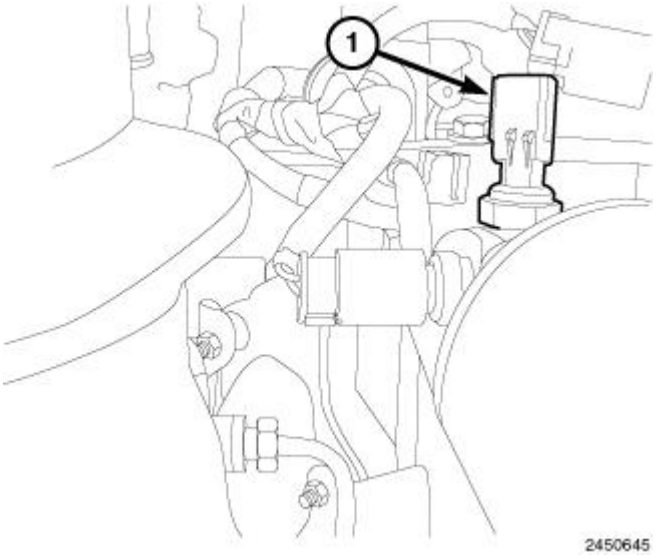

Fig. 239: Oil Pressure Sensor
Courtesy of CHRYSLER LLC

NOTE: Apply Mopar® Thread Sealant with PTFE to the sensor threads before installing into the engine block.

1. Install the oil pressure sensor (1).

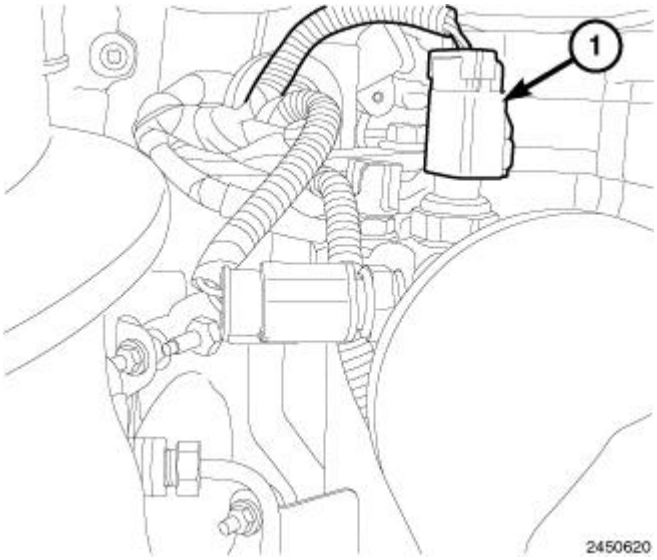

Fig. 240: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER LLC

2. Connect the oil pressure sensor electrical connector (1).
3. Lower the vehicle.
4. Connect the negative battery cable.

SENSOR, OIL TEMPERATURE

Description

DESCRIPTION

The oil temperature sensor uses the following two circuits:

- Signal circuit to the PCM
- Ground circuit from the PCM

The oil temperature sensor is a Negative Thermal Coefficient sensor. The resistance of the sensor changes as oil temperature changes. This results in different output voltages back to the PCM.

The oil temperature sensor is located on the right side of the engine block.

Removal

REMOVAL

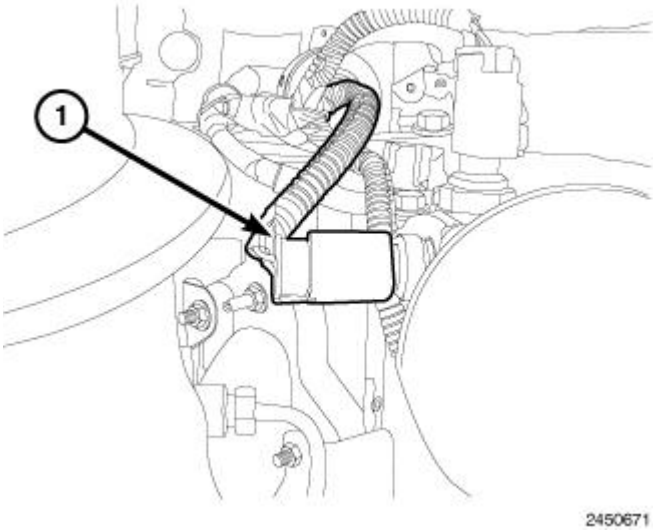

Fig. 241: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Disconnect the oil temperature sensor electrical connector (1).

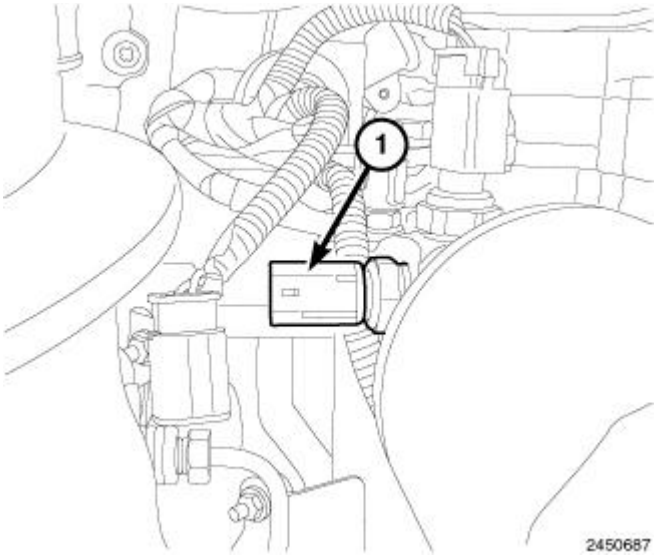

Fig. 242: Oil Temperature Sensor
Courtesy of CHRYSLER LLC

4. Remove the oil temperature sensor (1).

Installation

INSTALLATION

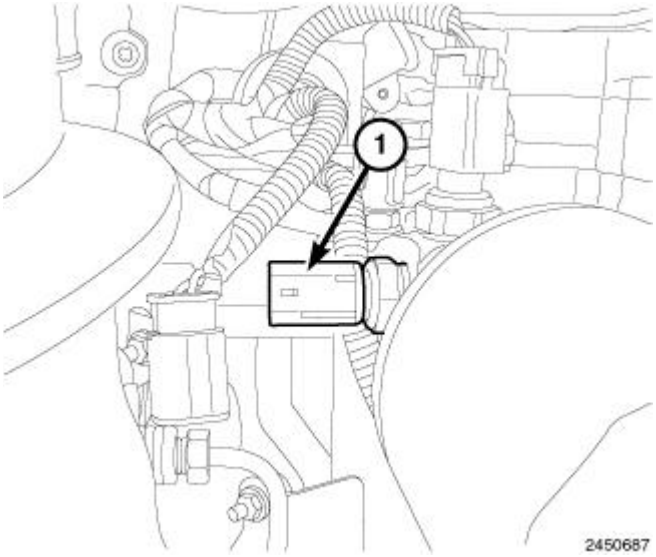

Fig. 243: Oil Temperature Sensor
Courtesy of CHRYSLER LLC

NOTE: Apply Mopar® Thread Sealant with PTFE to the sensor threads before installing into the engine block.

1. Install the oil temperature sensor (1).

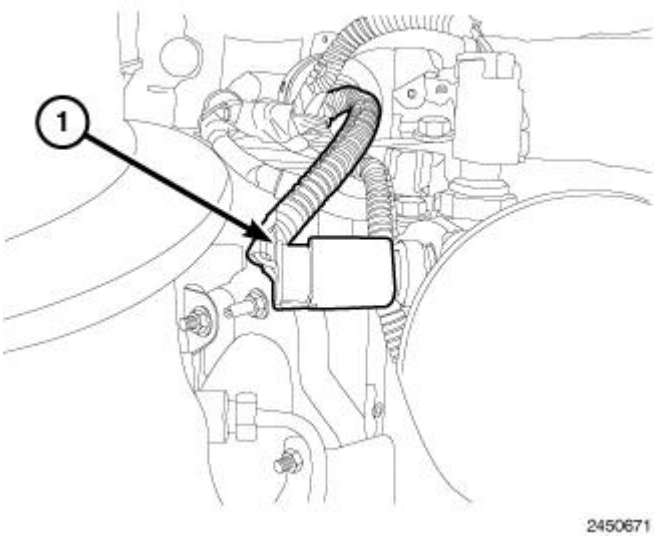

Fig. 244: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

2. Connect the oil temperature sensor electrical connector (1).
3. Lower the vehicle.
4. Connect the negative battery cable.

MANIFOLDS

MANIFOLD, EXHAUST

Description

DESCRIPTION

The exhaust manifolds are log style with a patented flow enhancing design to maximize performance. The exhaust manifolds are made of high silicon molybdenum cast iron. A multi-layer stainless steel exhaust manifold gasket is used to improve sealing to the cylinder head. The exhaust manifolds are covered by a three layer laminated heat shield for thermal protection and noise reduction. The heat shields are fastened with a torque prevailing nut that is backed off slightly to allow for the thermal expansion of the exhaust manifold, with the exception of the nut, which also secures the oil dipstick tube bracket. That nut should not be backed off.

Operation

OPERATION

The exhaust manifolds collect the engine exhaust exiting the combustion chambers, then channels the exhaust gases to the exhaust pipes attached to the manifolds.

Removal

REMOVAL

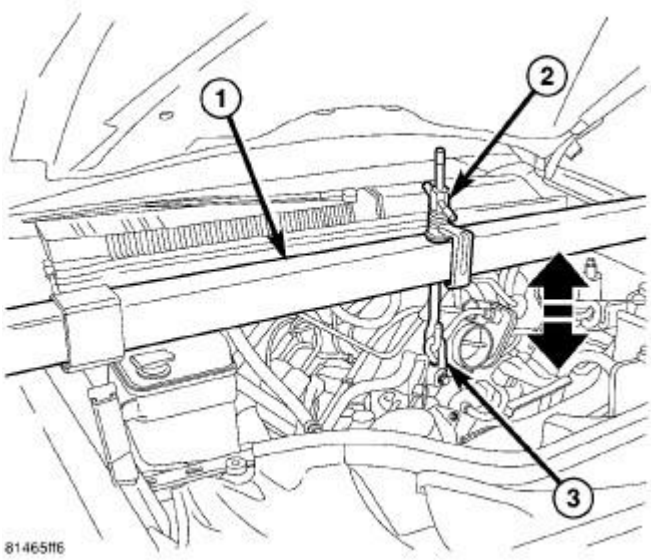

Fig. 245: Engine Support Tool
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Raise vehicle.
3. Remove exhaust pipe to manifold bolts.
4. Remove engine mount through bolts.
5. Lower vehicle.
6. Install Engine Support Fixture 8534B (1).
7. Raise engine enough to remove manifolds.

CAUTION: Do not damage engine harness while raising the engine.

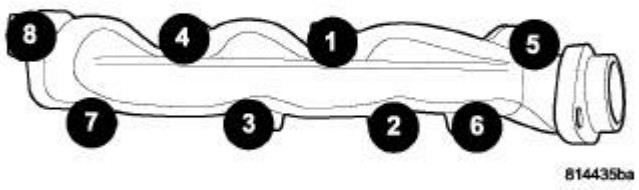

Fig. 246: Exhaust Manifold Bolt Tightening Sequence - Left
Courtesy of CHRYSLER LLC

8. Remove heat shield.
9. Remove manifold bolts.
10. Remove manifold and gasket.

Cleaning

CLEANING

Clean mating surfaces on cylinder head and manifold. Wash with solvent and blow dry with compressed air.

Inspection

INSPECTION

Inspect manifold for cracks.

Inspect mating surfaces of manifold for flatness with a straight edge. Gasket surfaces must be flat within 0.2 mm per 300 mm (0.008 inch per foot).

Installation

INSTALLATION

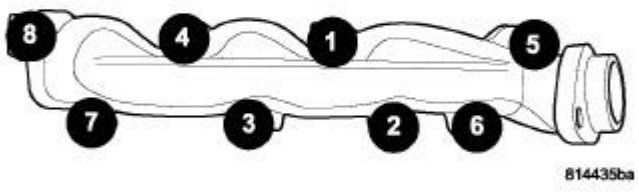

Fig. 247: Exhaust Manifold Bolt Tightening Sequence - Left
Courtesy of CHRYSLER LLC

1. Install manifold gasket and manifold.
2. Install manifold bolts and tighten to 25 N.m (18 ft. lbs.) in the sequence shown. See **Fig. 247**.
3. Install heat shield and tighten nuts to 8 N.m (70 in. lbs.).

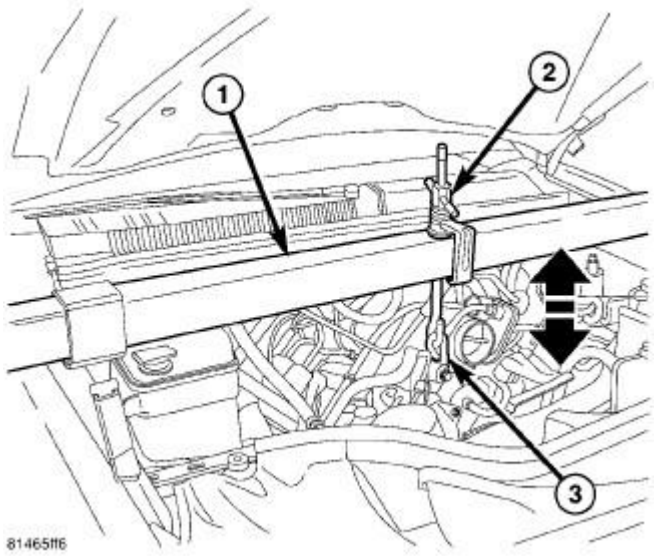

Fig. 248: Engine Support Tool
Courtesy of CHRYSLER LLC

4. Lower engine.

CAUTION: Do not damage engine harness while lowering the engine.

5. Remove Engine Support Fixture 8534B from engine.
6. Raise vehicle.
7. Install and tighten right and left side engine mount through bolts.
8. Install exhaust flange to pipe bolts.
9. Lower vehicle.
10. Connect negative battery cable.

MANIFOLD, INTAKE

Description

DESCRIPTION

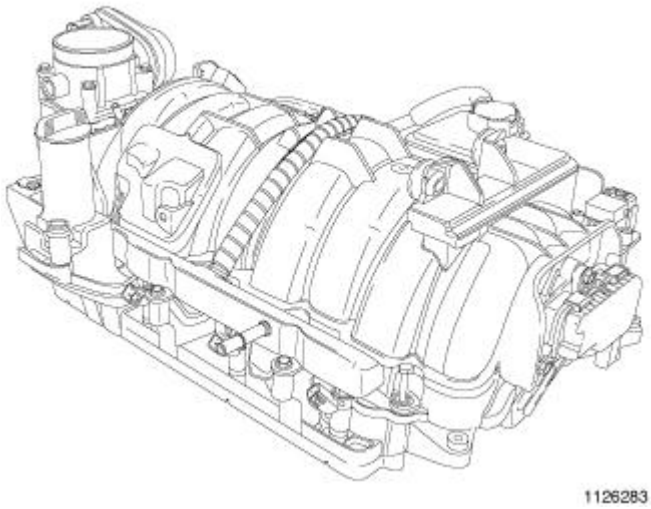

Fig. 249: Intake Manifold
Courtesy of CHRYSLER LLC

The intake manifold is made of a composite material and features a dual shaft Short Runner Valve (SRV) system to maximize both low end torque and peak power. The SRV is bolted to the rear of the intake manifold and can be service separately from the manifold. The manifold uses a single plane sealing system with individual port seals and a separate PCV port seal to prevent leaks.

Diagnosis and Testing

INTAKE MANIFOLD LEAKAGE

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Start the engine.
2. Spray a small stream of water at the suspected leak area.
3. If a change in RPM is observed the area of the suspected leak has been found.
4. Repair as required.

Removal

REMOVAL

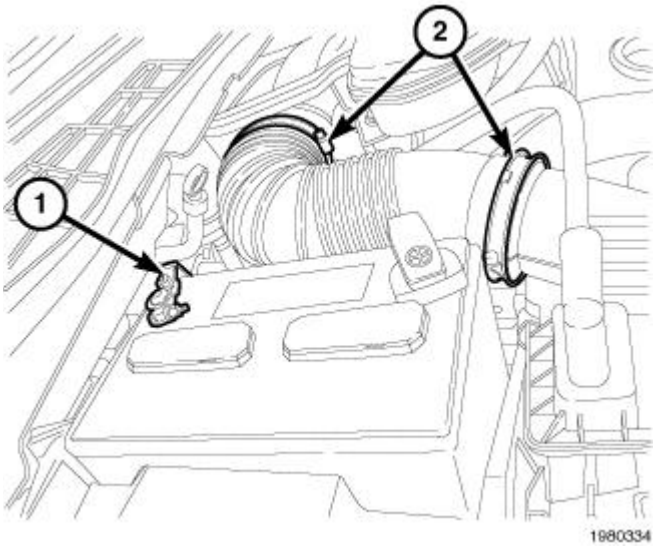

Fig. 250: Negative Battery Cable
Courtesy of CHRYSLER LLC

1. Perform the Fuel Pressure Release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect the negative battery cable (1).
3. Loosen both clamps (2) on the clean air tube and remove the tube from the air cleaner housing and the resonator.

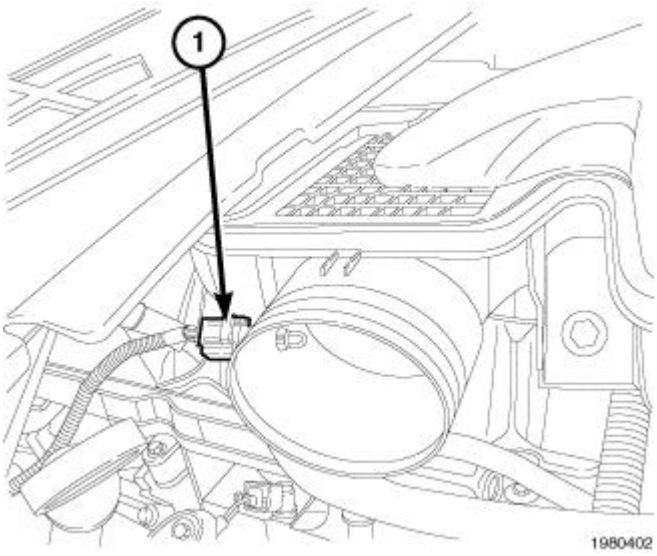

Fig. 251: Intake Air Temperature Sensor Connector
Courtesy of CHRYSLER LLC

4. Disconnect the intake air temperature sensor (IAT) connector.

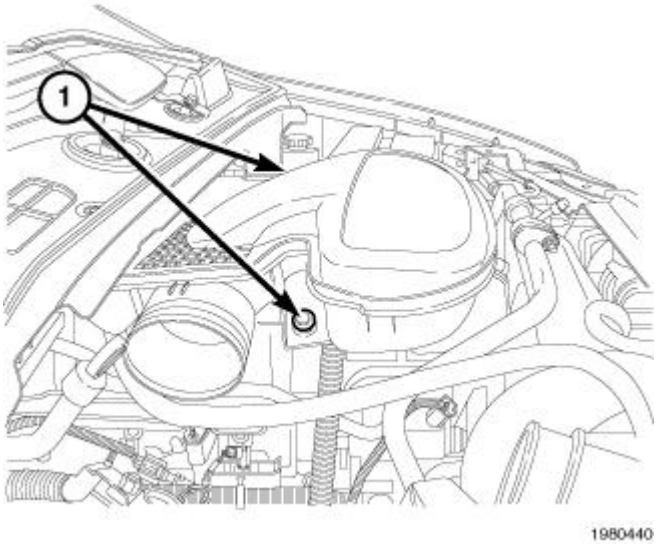

Fig. 252: Resonator Retaining Bolts
Courtesy of CHRYSLER LLC

5. Remove the two resonator retaining bolts (1).

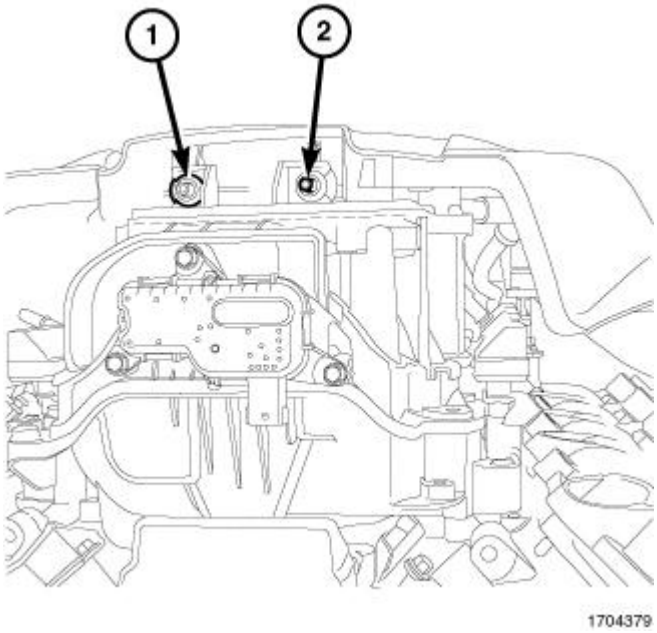

Fig. 253: Engine Cover Pegs & Grommets
Courtesy of CHRYSLER LLC

6. Slightly raise the front of the resonator up off the throttle body and then slide forward to remove the rear resonator pegs (2) from the grommets (1) on the rear of the intake manifold.

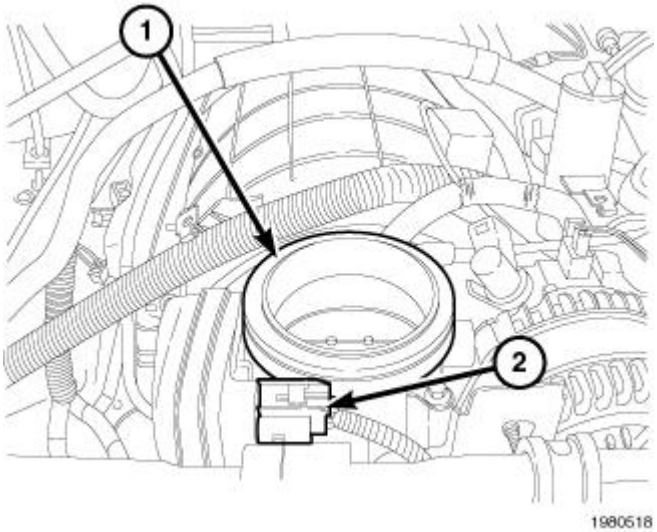

Fig. 254: Throttle Body Seal & Electrical Connector
Courtesy of CHRYSLER LLC

7. Remove the throttle body seal (1).
8. Disconnect the throttle body electrical connector (2).

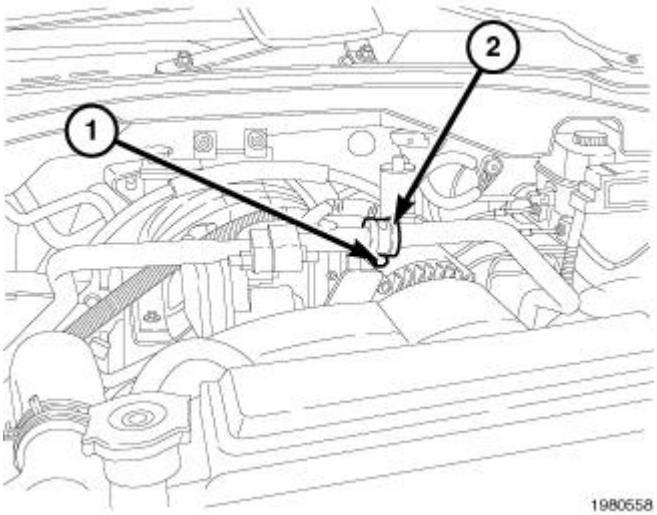

Fig. 255: A/C Line P-Clip & Retaining Bolt
Courtesy of CHRYSLER LLC

9. Remove the A/C line P-Clip retaining bolt (1) from the throttle body bracket and remove the P-Clip.
10. Remove the throttle body bracket retaining bolt from the intake manifold and the retaining nut from the front cover and remove the bracket.
11. Secure the A/C line out of the way.

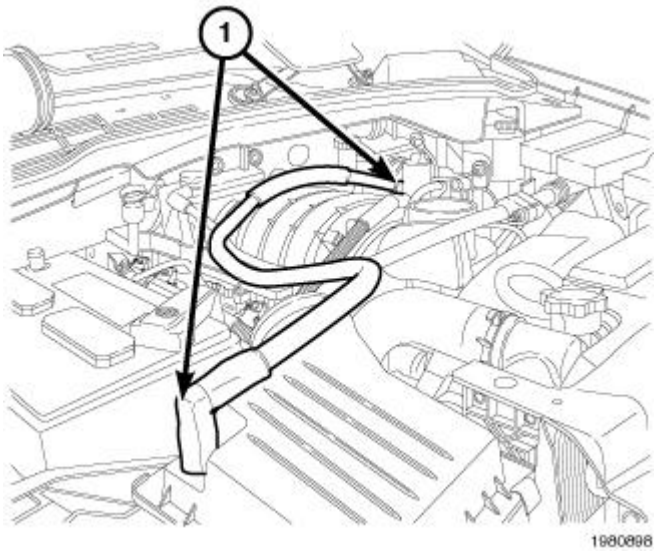

Fig. 256: PCV Fresh Air Hose
Courtesy of CHRYSLER LLC

12. Disconnect the PCV fresh air hose (1) from the air cleaner assembly and the left side of the intake manifold and remove the hose.

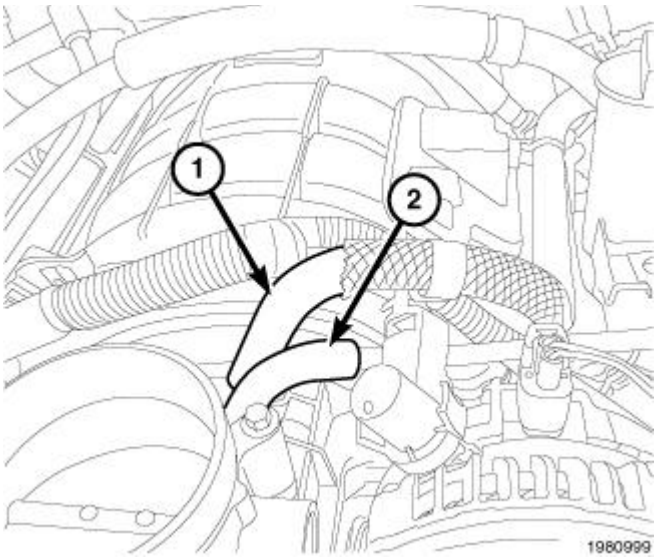

Fig. 257: Brake Booster Hose & Vapor Purge Hose
Courtesy of CHRYSLER LLC

13. Disconnect the brake booster hose (1) and the vapor purge hose (2) and position out of the way.

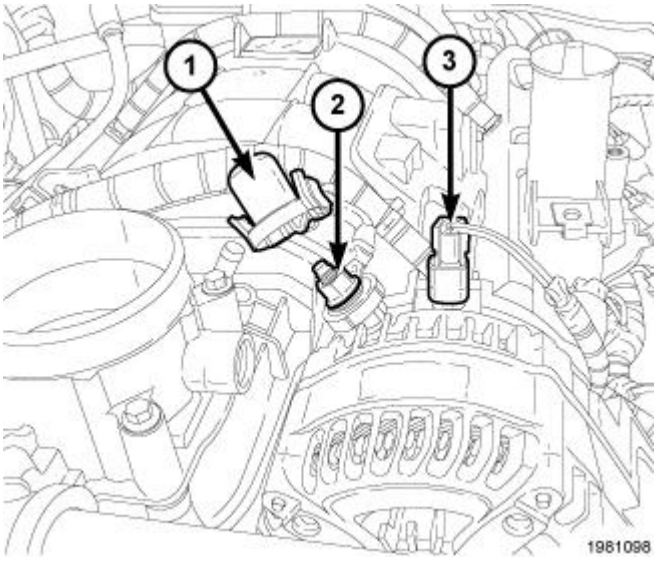

Fig. 258: B+ Output Terminal
Courtesy of CHRYSLER LLC

14. Unsnap the plastic insulator cap (1) from the B+ output terminal.
15. Remove the B+ terminal retaining nut (2) and disconnect the B+ terminal eyelet from the generator output stud.
16. Disconnect the field wire electrical connector (3) by pushing on the connector tab.

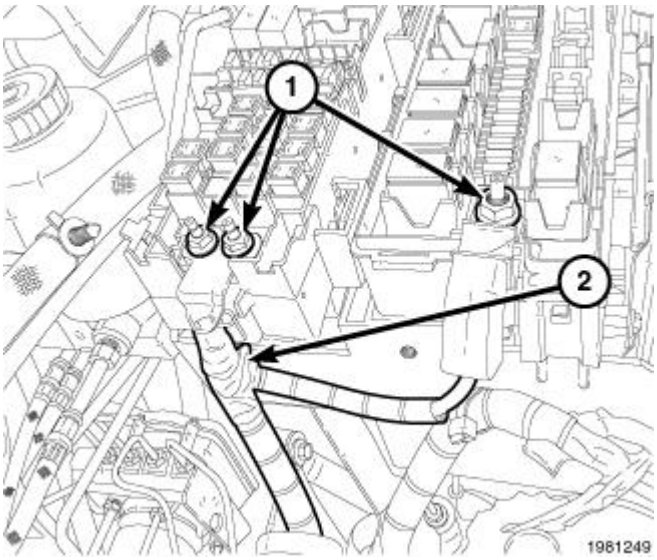

Fig. 259: Power Distribution Center (PDC) Fuse Block Wiring Harness
Courtesy of CHRYSLER LLC

17. Disconnect the power distribution center (PDC) fuse block electrical connectors (1) and reposition the wire harness (2) out of the way.

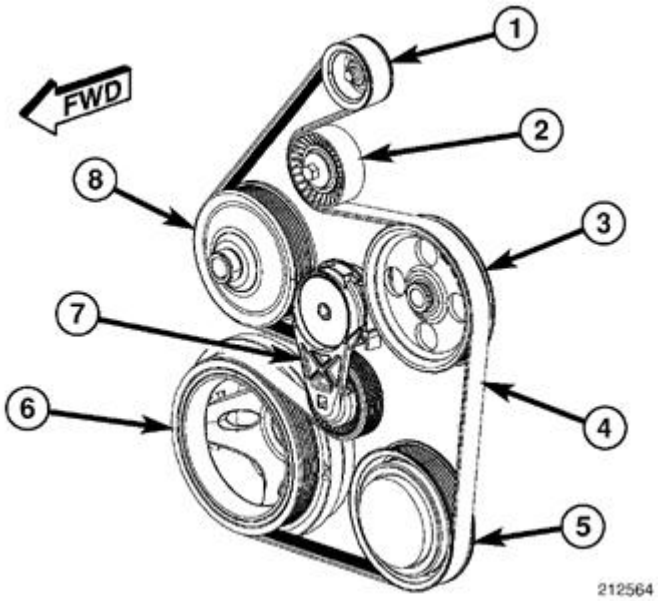

Fig. 260: Identifying Accessory Drive Belt Routing - 5.7L
Courtesy of CHRYSLER LLC

CAUTION: Do not let the tensioner arm snap back to the free arm position, severe damage may occur to the tensioner.

18. Insert a suitable square drive ratchet into the square hole on the belt tensioner arm (7).
19. Release the belt tension by rotating the tensioner (7) clockwise until the accessory drive belt (4) can be

removed from the generator pulley only.

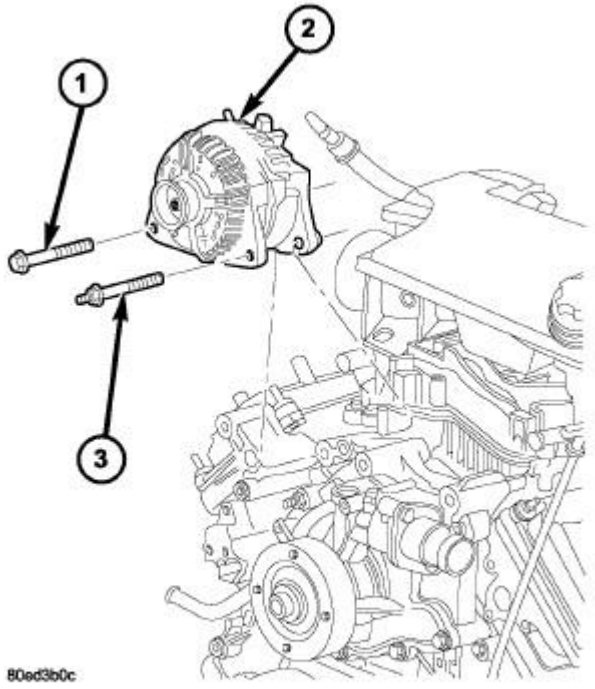

Fig. 261: Generator - 5.7L
Courtesy of CHRYSLER LLC

20. Remove the two generator mounting bolts (1, 3) and remove the generator (2).

NOTE: The factory fuel injection wiring harness is numerically tagged (INJ 1, INJ 2, etc.) for injector position identification. If the harness is not tagged, note wiring location before removal.

21. Disconnect all fuel injector electrical connectors and reposition harness out of the way.

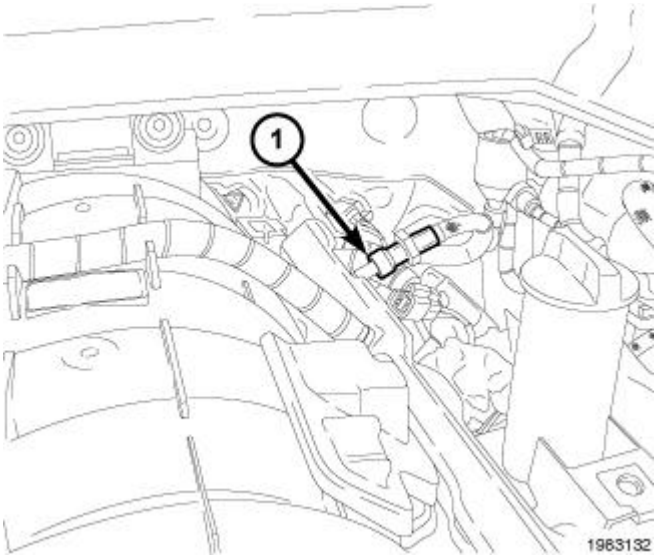

Fig. 262: Fuel Supply Line Quick Connect Fitting At Fuel Rail
Courtesy of CHRYSLER LLC

NOTE: Excessive fuel spillage onto the gaskets can cause gaskets to expand and dislodge from gasket groove.

22. Disconnect the fuel supply line quick connect fitting at the fuel rail (1) and plug with a shipping cap to prevent spillage.
23. Using compressed air, blow out the area around the intake manifold to cylinder heads to remove any debris.

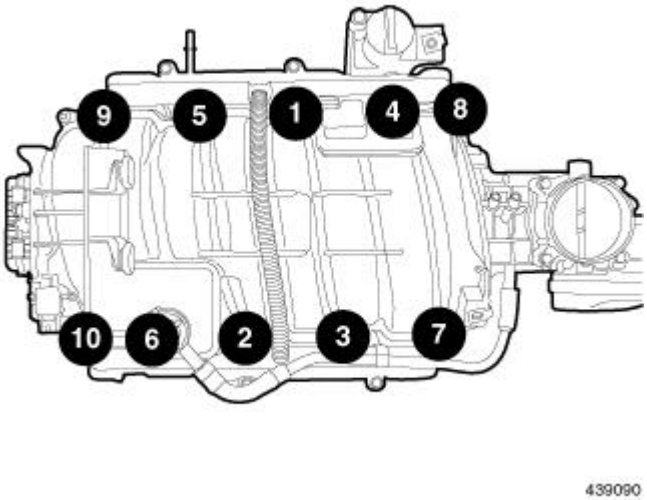

Fig. 263: Intake Manifold Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

24. Using the sequence shown in illustration, loosen the intake manifold retaining fasteners (10 fasteners). See **Fig. 263**.

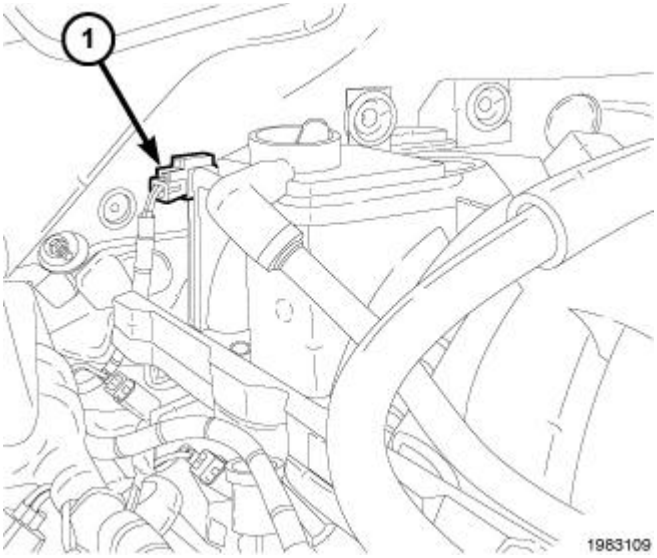

Fig. 264: MAP Sensor
Courtesy of CHRYSLER LLC

25. Slide the intake manifold forward and disconnect the short runner valve (SRV) and the manifold air pressure (MAP) sensor (1) connectors located at the back of the intake manifold.
26. Remove the intake manifold and throttle body out of the vehicle as an assembly.
27. Inspect the intake sealing surfaces for cracks, nicks and distortion.

Cleaning

CLEANING

NOTE: There is NO approved repair procedure for the intake manifold. If severe damage is found during inspection, the intake manifold must be replaced.

Before installing the intake manifold thoroughly clean the mating surfaces. Use a suitable cleaning solvent, then air dry.

Inspection

INSPECTION

1. Inspect the intake sealing surface for cracks, nicks and distortion.
2. Inspect the intake manifold vacuum hose fittings for looseness or blockage.

Installation

INSTALLATION

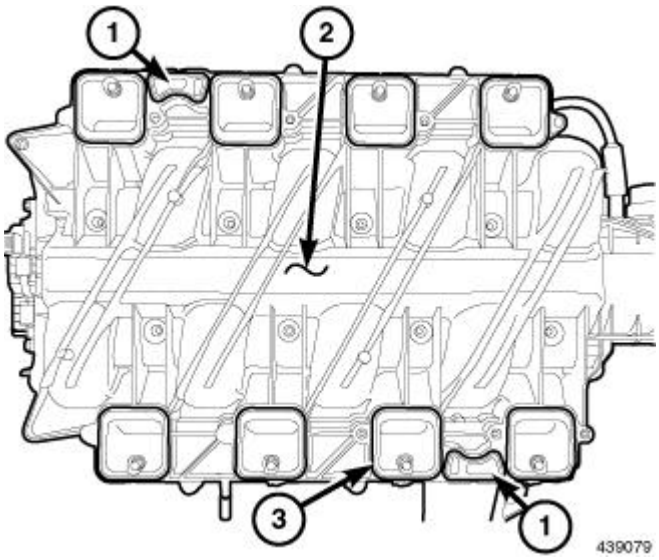

Fig. 265: Intake Manifold & PCV Seals
Courtesy of CHRYSLER LLC

1. Apply Mopar® Lock & Seal Adhesive to the intake manifold bolts.
2. Install the intake manifold seals (3) and the positive crankcase ventilation (PCV) seals (1).

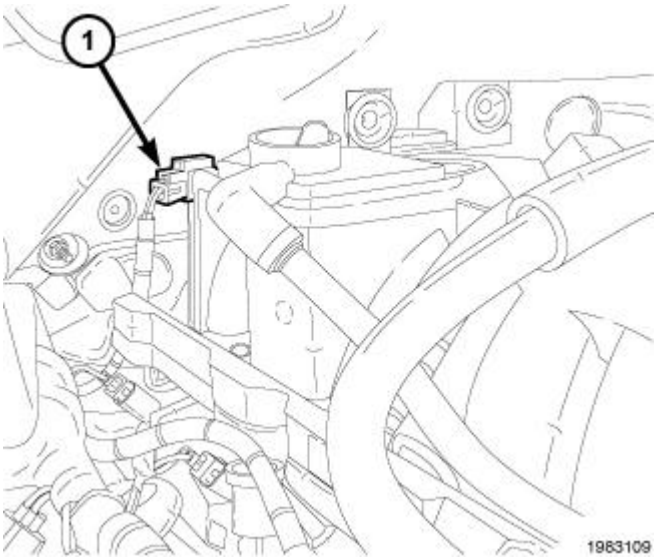

Fig. 266: MAP Sensor
Courtesy of CHRYSLER LLC

3. Connect the short runner valve (SRV) and the manifold air pressure (MAP) sensor (1) connectors as you position the intake manifold in place.
4. Position the intake manifold in place.

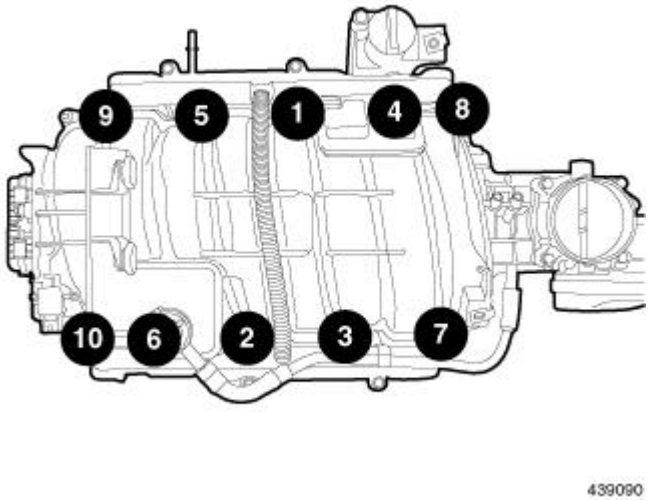

Fig. 267: Intake Manifold Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

5. Using the sequence shown in illustration, tighten the intake manifold bolts to 12 N.m (9 ft. lbs.). See **Fig. 267**.

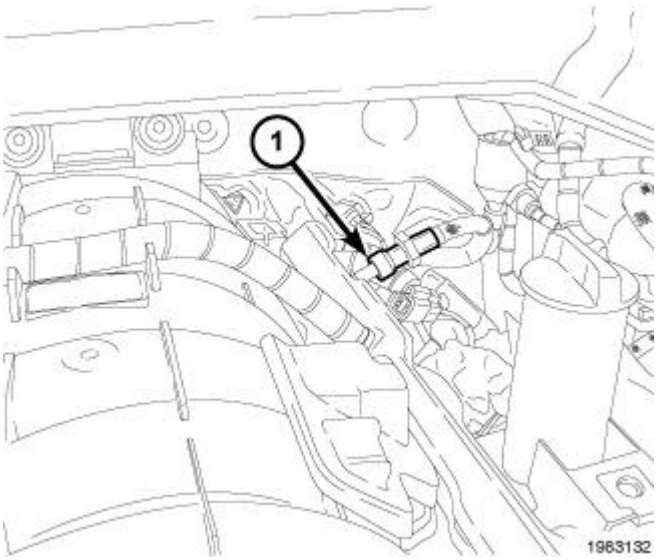

Fig. 268: Fuel Supply Line Quick Connect Fitting At Fuel Rail
Courtesy of CHRYSLER LLC

6. Connect the fuel supply line quick connect fitting (1) at the fuel rail (1) and install the safety retainer clip.

NOTE: The factory fuel injection wiring harness is numerically tagged (INJ 1, INJ 2, etc.) for injector position identification. If the harness was not tagged, note the wiring location previously marked before removal.

7. Connect all fuel injector electrical connectors.

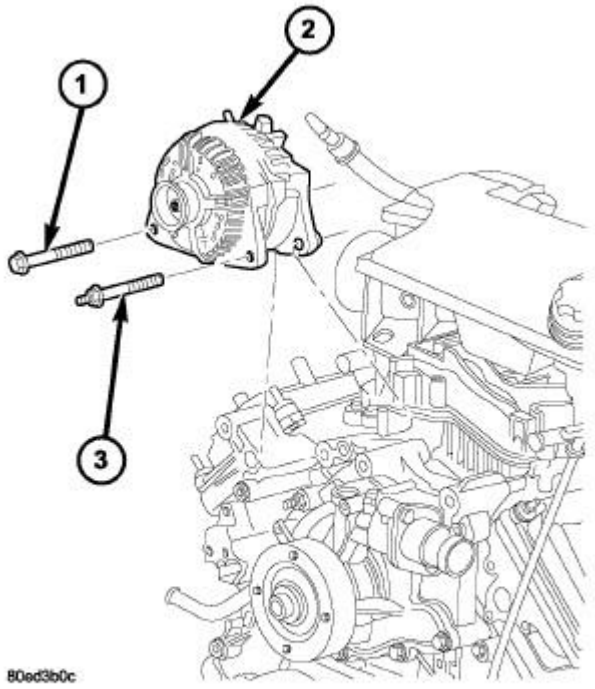

Fig. 269: Generator - 5.7L
Courtesy of CHRYSLER LLC

8. Position the generator (2) and install the two generator mounting bolts (1, 3) and tighten to 41 N.m (30 ft. lbs.).

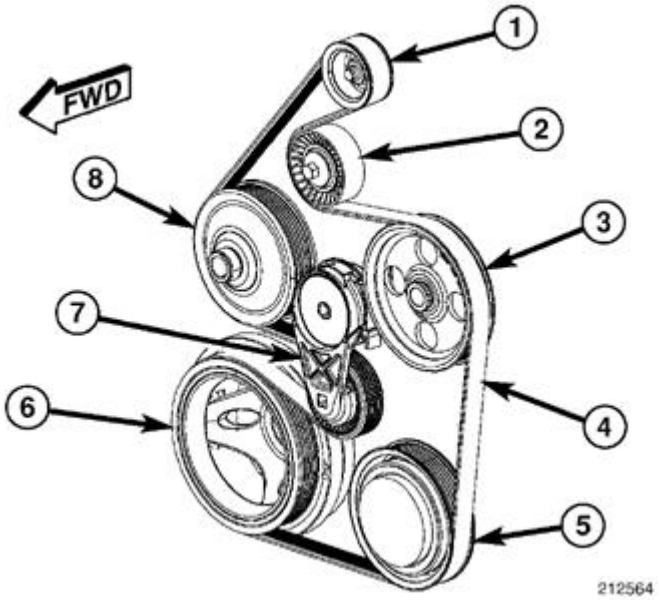

Fig. 270: Identifying Accessory Drive Belt Routing - 5.7L
Courtesy of CHRYSLER LLC

CAUTION: Do not let the tensioner arm snap back to the free arm position, severe damage may occur to the tensioner.

9. Insert a suitable square drive ratchet into the square hole on the belt tensioner arm (7).
10. Rotate the tensioner (7) clockwise until the accessory drive belt (4) can be installed onto the generator pulley.

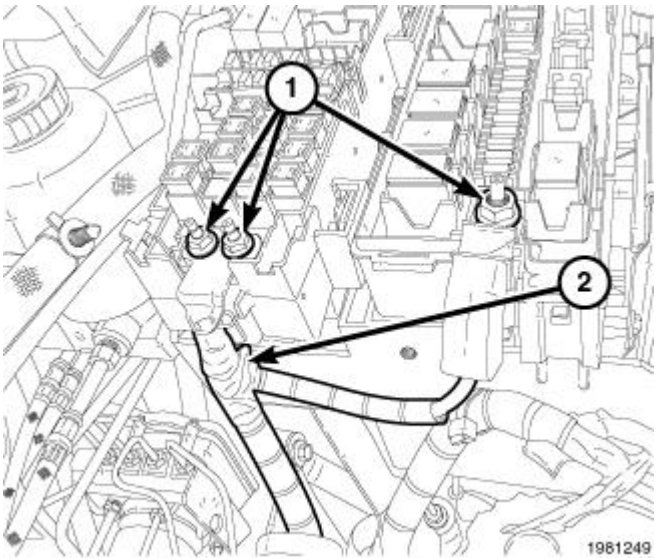

Fig. 271: Power Distribution Center (PDC) Fuse Block Wiring Harness
Courtesy of CHRYSLER LLC

11. Reposition the power distribution center (PDC) fuse block wiring harness (2) and connect the electrical connectors (1) and tighten to 12 N.m (9 ft. lbs.).

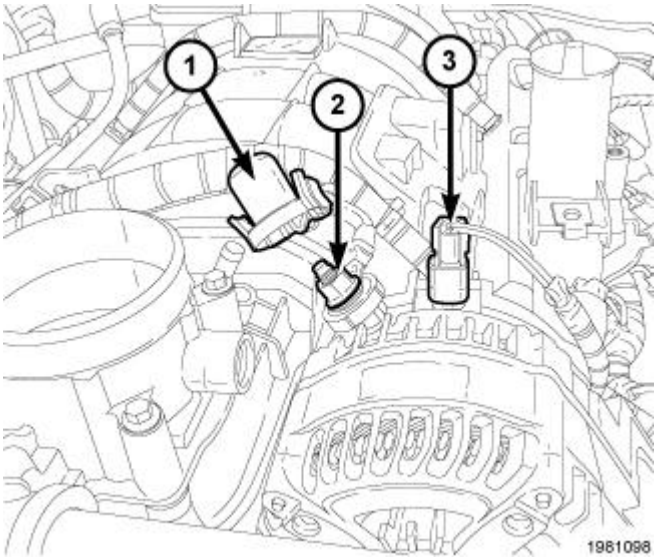

Fig. 272: B+ Output Terminal
Courtesy of CHRYSLER LLC

12. Connect the B+ terminal eyelet to the generator output stud and install the B+ terminal retaining nut (2) and tighten to 12 N.m (9 ft. lbs.).
13. Snap the plastic insulator cap (1) onto the B+ output terminal.
14. Connect the generator field wire electrical connector (3).

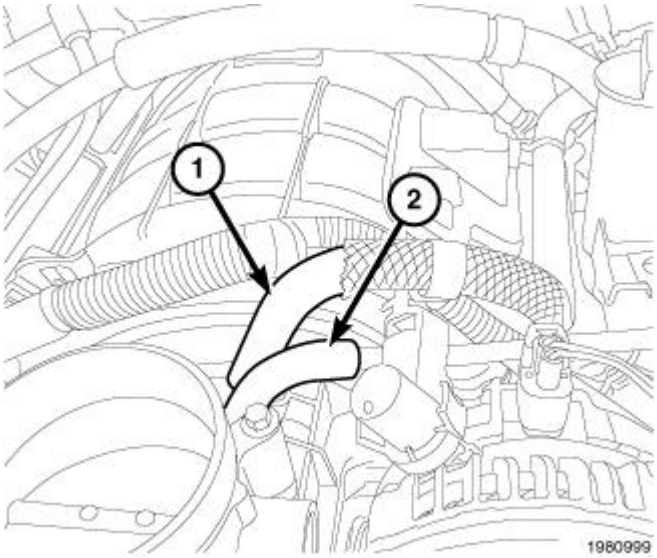

Fig. 273: Brake Booster Hose & Vapor Purge Hose
Courtesy of CHRYSLER LLC

15. Connect the brake booster hose (1) and the vapor purge hose (2).

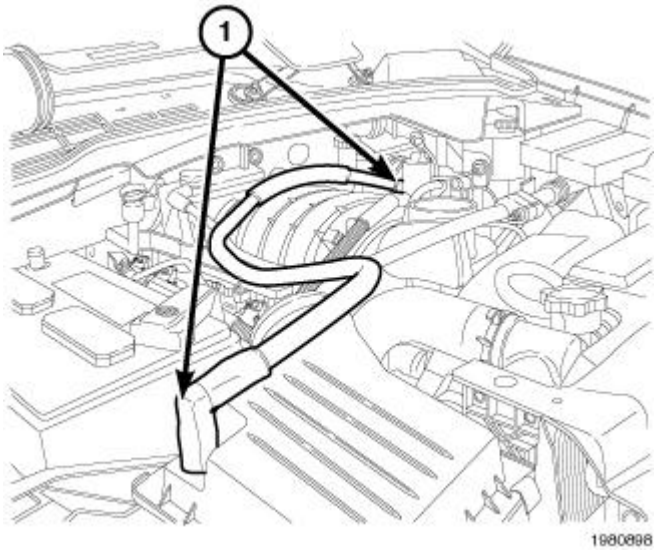

Fig. 274: PCV Fresh Air Hose
Courtesy of CHRYSLER LLC

16. Connect the PCV fresh air hose (1) to the air cleaner assembly and the left side of the intake manifold.

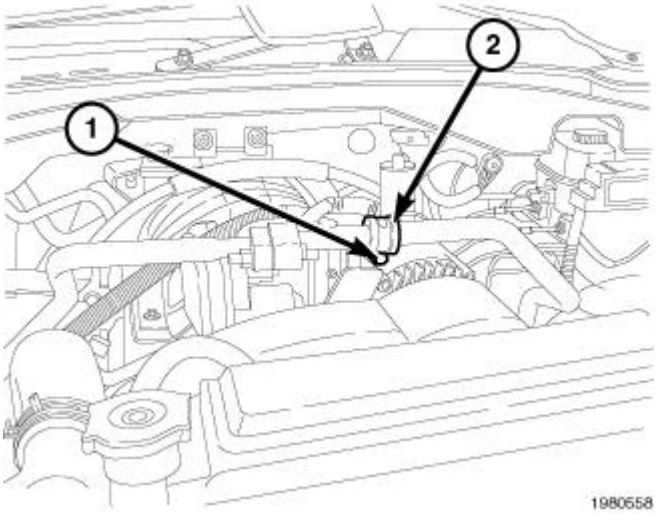

Fig. 275: A/C Line P-Clip & Retaining Bolt
Courtesy of CHRYSLER LLC

17. Position the throttle body bracket and install the retaining bolt to the intake manifold and tighten to 4 N.m (35 in. lbs.).
18. Install the throttle body bracket retaining nut to the front cover and tighten to 18 N.m (13 ft. lbs.).
19. Position the A/C line and install the P-Clip (2).
20. Install the A/C line P-Clip retaining bolt (1) and securely tighten.

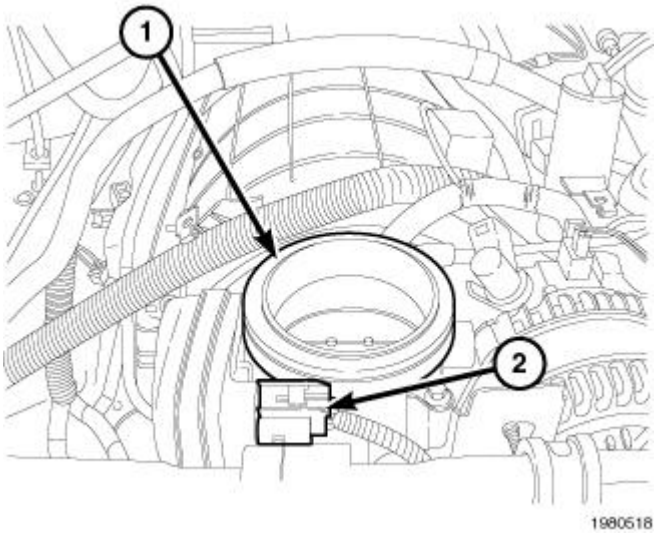

Fig. 276: Throttle Body Seal & Electrical Connector
Courtesy of CHRYSLER LLC

21. Connect the throttle body electrical connector (2).

22. Install the throttle body seal (1).

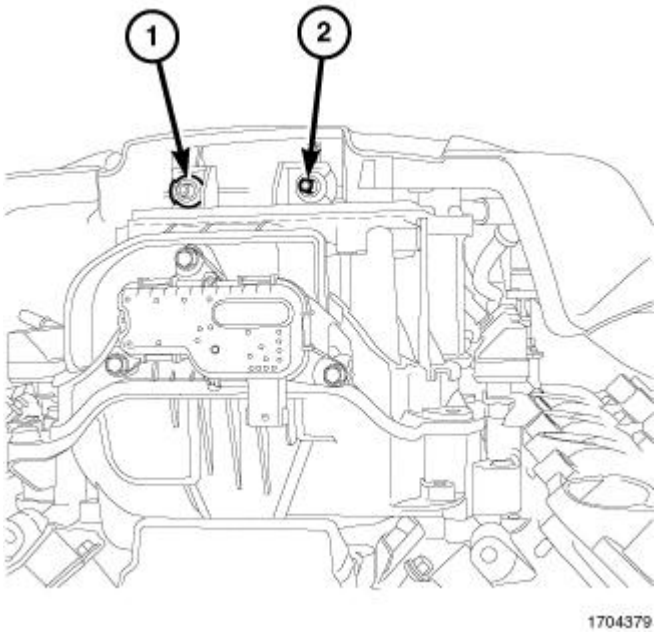

Fig. 277: Engine Cover Pegs & Grommets
Courtesy of CHRYSLER LLC

23. Slide the rear resonator pegs (2) into the grommets (1) on the rear of the intake manifold and lower the front of the resonator onto the throttle body.

NOTE: Verify the resonator is installed properly in the rear grommets by reaching around the left rear corner of the resonator and feeling for the pegs protruding through the rubber grommets. If the plastic pegs cannot be felt, the resonator will need to be reinstalled.

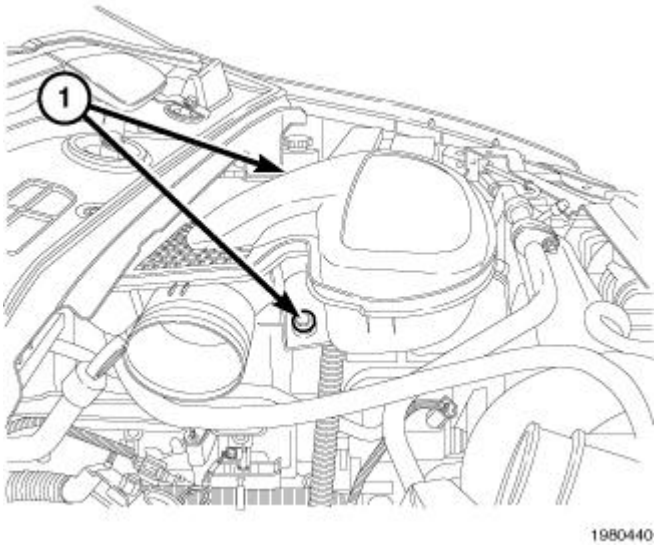

Fig. 278: Resonator Retaining Bolts
Courtesy of CHRYSLER LLC

24. Install the two resonator retaining bolts (1) and tighten to 4 N.m (35 in. lbs.).

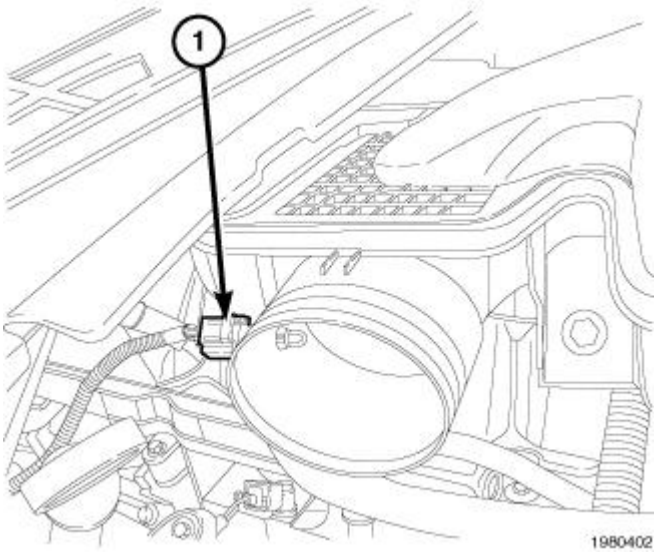

Fig. 279: Intake Air Temperature Sensor Connector
Courtesy of CHRYSLER LLC

25. Connect the intake air temperature sensor (IAT) connector.

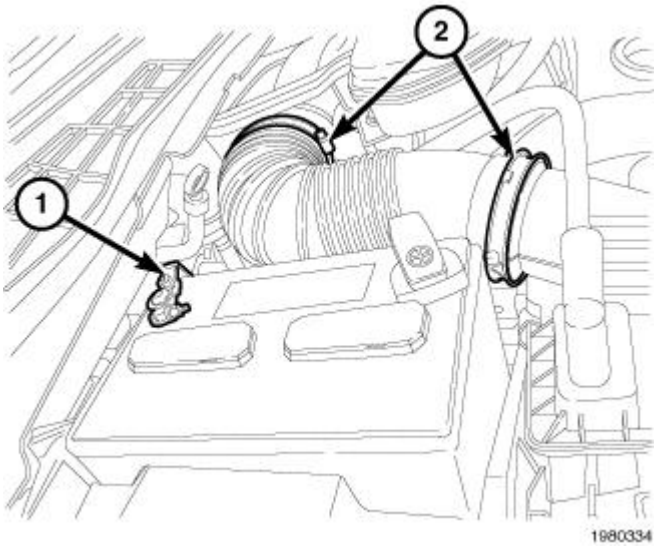

Fig. 280: Negative Battery Cable
Courtesy of CHRYSLER LLC

26. Install the clean air tube to the air cleaner housing and the resonator and securely tighten both clamps (2).
27. Connect the negative battery cable (1) tighten to 5 N.m (44 in. lbs.).

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

Removal

REMOVAL

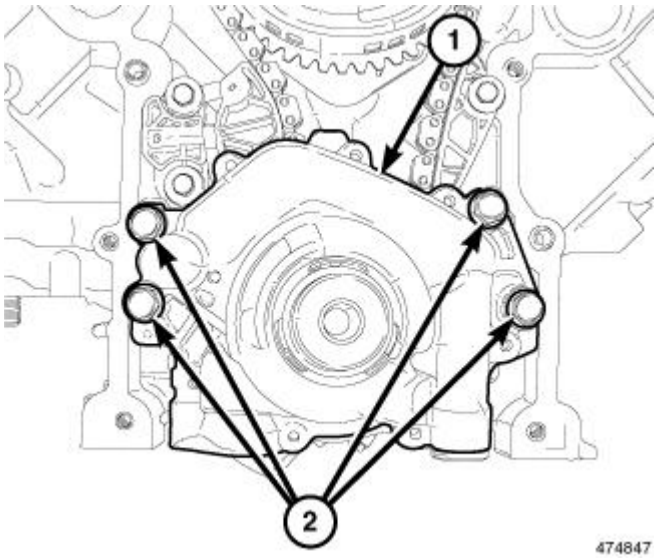

Fig. 281: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Drain the engine oil.
3. Drain the cooling system.
4. Remove the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
5. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

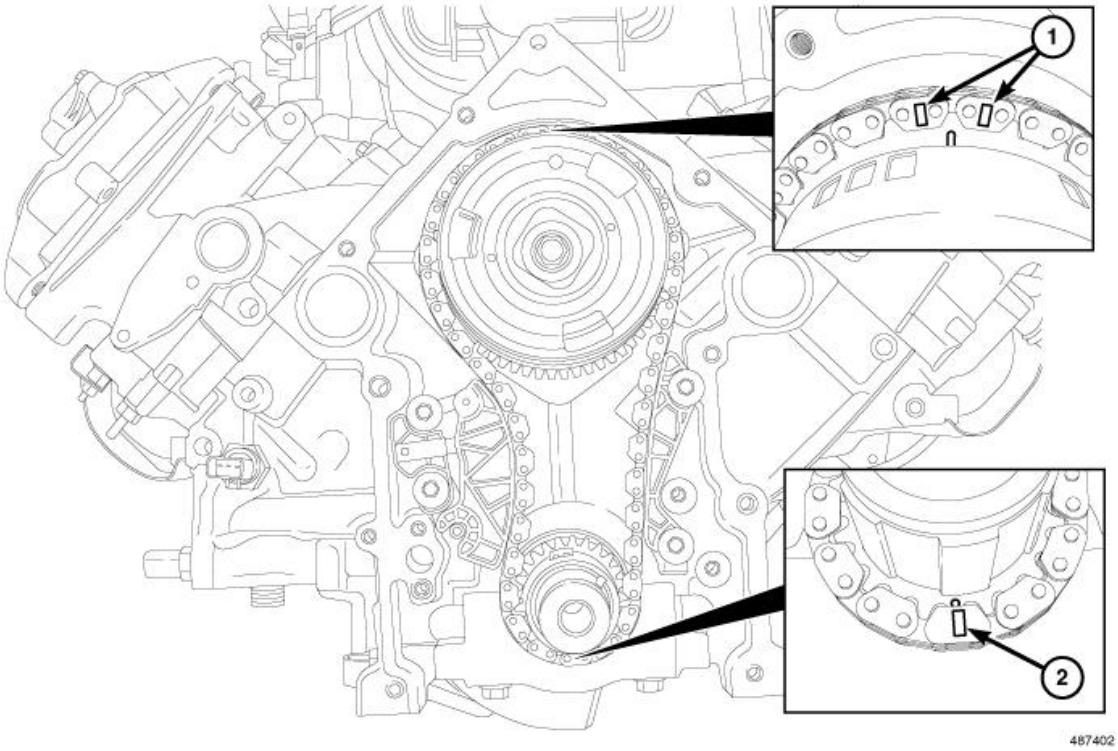

Fig. 282: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER LLC

6. Install the vibration damper bolt finger tight. Using a suitable socket and breaker bar, rotate the crankshaft to align the timing marks on the chain and sprockets as shown. See **Fig. 282**.

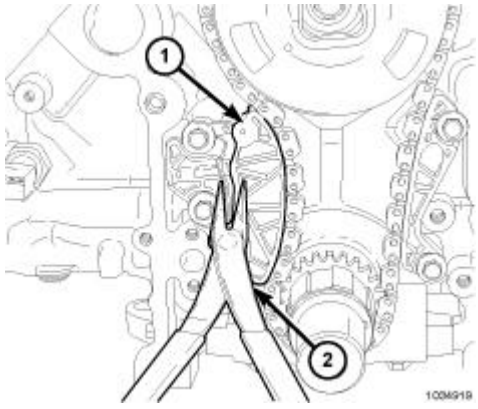

Fig. 283: Chain Tensioner Arm
Courtesy of CHRYSLER LLC

7. Retract the tensioner shoe (1) until the hole in the shoe lines up with the hole in the bracket.

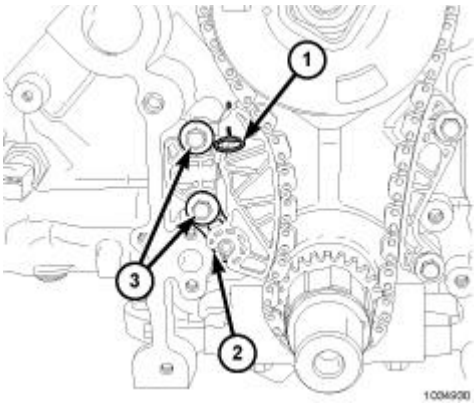

Fig. 284: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

8. Install the timing chain Tensioner Pin 8514 (1) into the holes.
9. Remove the timing chain tensioner retaining bolts (3) and remove the timing chain tensioner.
10. Inspect the timing chain tensioner and replace as necessary.

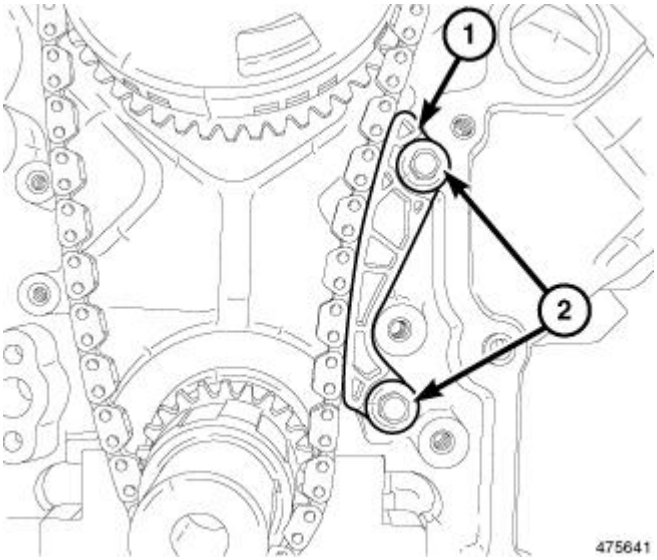

Fig. 285: Timing Chain Guide
Courtesy of CHRYSLER LLC

11. Remove the timing chain guide (1) retaining bolts (2) and remove the timing chain guide.
12. Inspect the timing chain guide and replace as necessary.

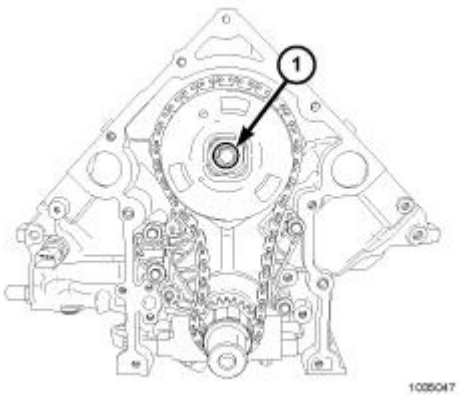

Fig. 286: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

13. Remove the camshaft sprocket retaining bolt (1) and remove the timing chain with the camshaft and crankshaft sprockets.
14. Inspect the timing chain, camshaft and crankshaft sprockets and replace as necessary.

Installation

INSTALLATION

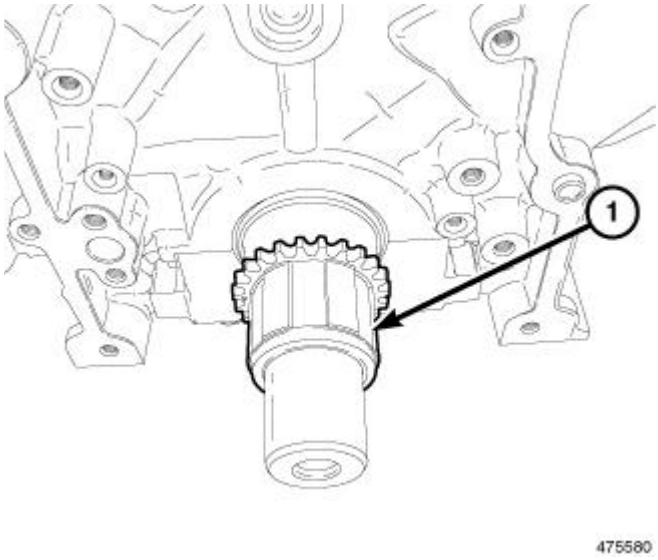

Fig. 287: Crankshaft Sprocket
Courtesy of CHRYSLER LLC

1. Slide the crankshaft sprocket (1) on the crankshaft.

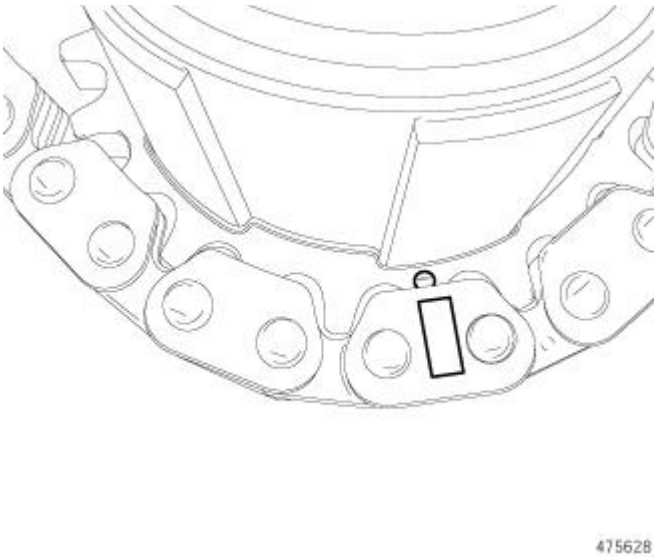

Fig. 288: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER LLC

2. Position the timing chain onto the crankshaft sprocket and align the timing marks.

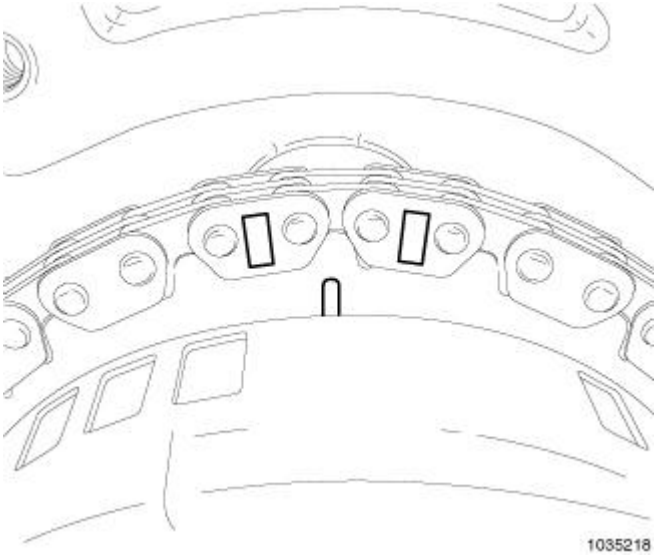

Fig. 289: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER LLC

3. Position the timing chain onto the camshaft sprocket and align the camshaft timing marks and install the camshaft sprocket on the camshaft.
4. Install the camshaft retaining bolt finger tight.

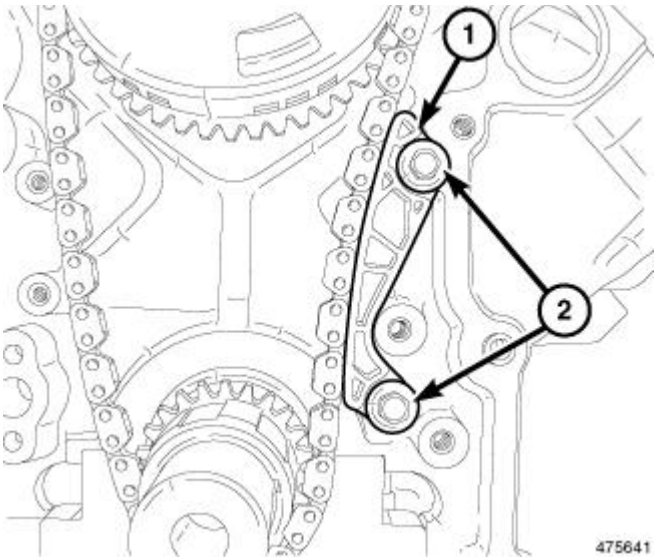

Fig. 290: Timing Chain Guide
Courtesy of CHRYSLER LLC

5. Install the timing chain guide (1) and tighten bolts (2) to 12 N.m (9 ft. lbs.).

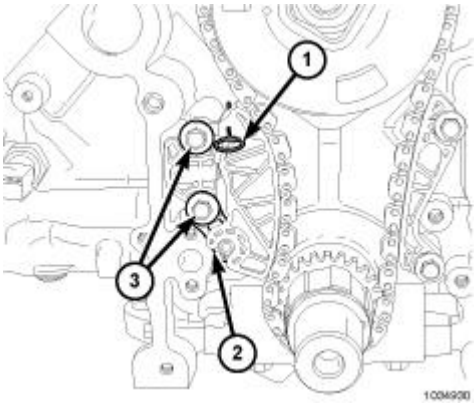

Fig. 291: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

6. Install the timing chain tensioner (2) and tighten bolts (3) 12 N.m (9 ft. lbs.).

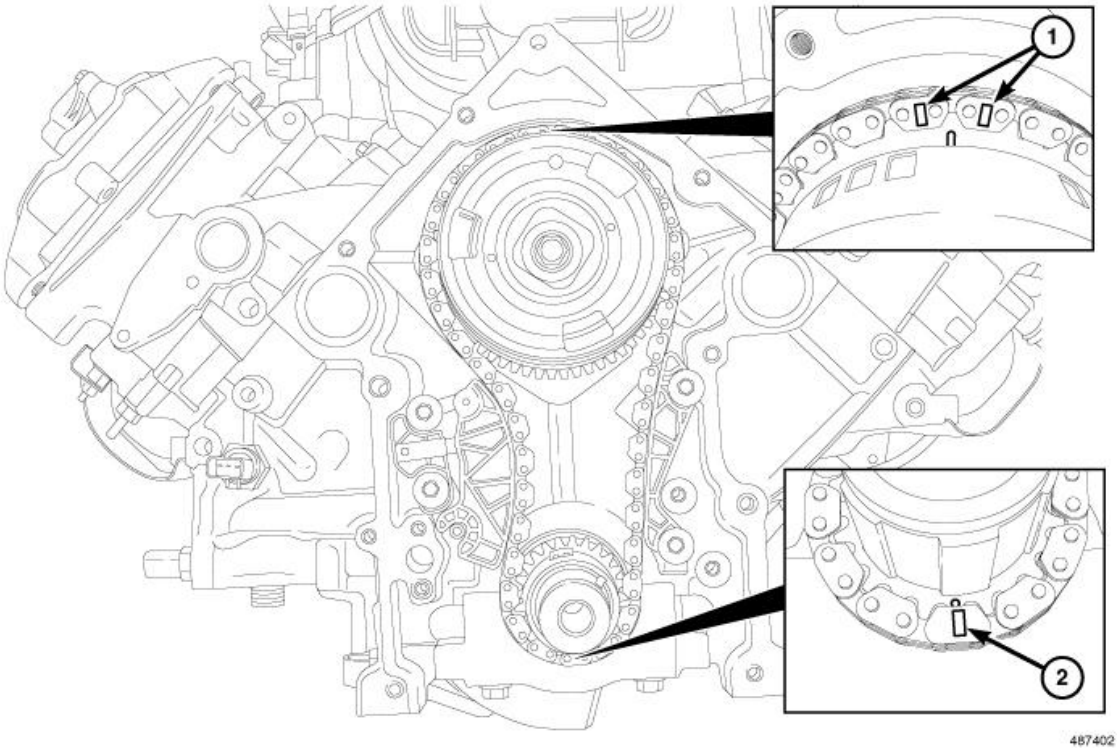

Fig. 292: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER LLC

7. Verify the timing marks (1, 2) are aligned correctly.

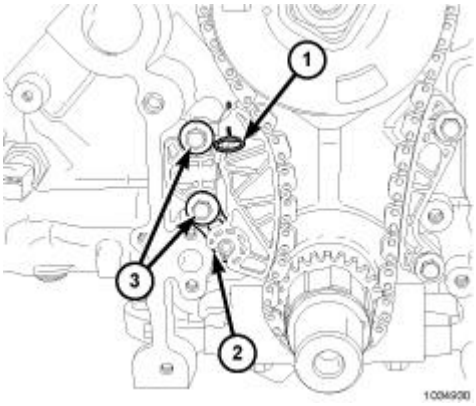

Fig. 293: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

8. Remove the timing chain Tensioner Pin 8514 (1).

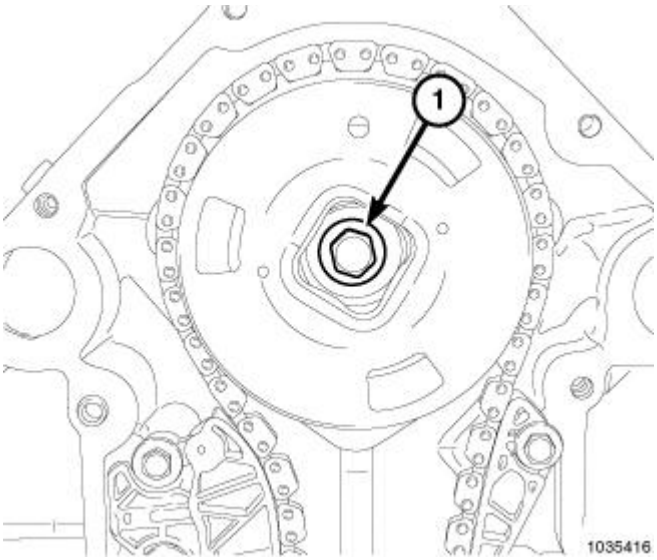

Fig. 294: Camshaft Phaser Bolt
Courtesy of CHRYSLER LLC

9. Tighten the camshaft sprocket bolt (1) to 122 N.m (90 ft. lbs.).

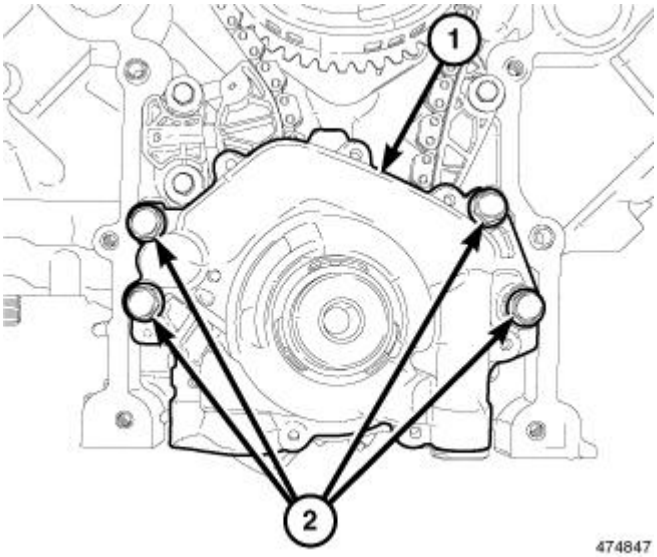

Fig. 295: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

10. Install the oil pump (1). See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
11. Install the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
12. Fill the engine with oil.
13. Fill the cooling system. Refer to **Cooling - Standard Procedure**
14. Connect the negative battery cable.
15. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

Removal

REMOVAL

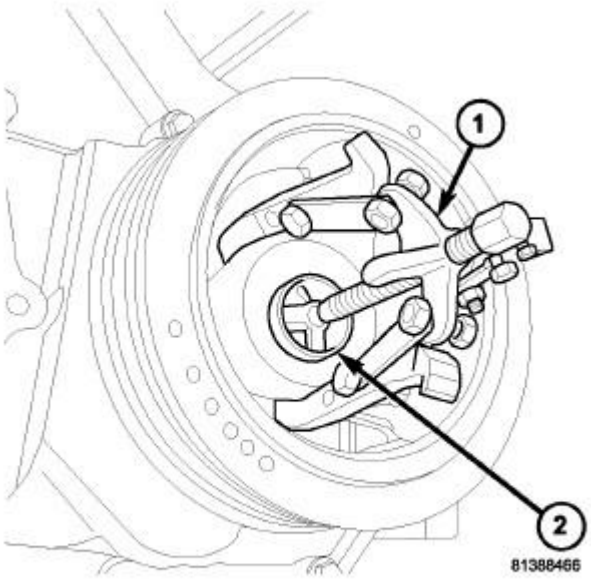

Fig. 296: Crankshaft Damper Removal
Courtesy of CHRYSLER LLC

1 - 3 - Jaw Puller 1023 2 - Crankshaft Insert 8513A

1. Disconnect the battery negative cable.
2. Remove the engine cover.
3. Remove air cleaner assembly.
4. Drain cooling system.
5. Remove accessory drive belt.
6. Remove fan and fan drive assembly.
7. Remove coolant bottle and washer bottle.
8. Remove fan shroud.

NOTE: It is not necessary to disconnect A/C lines or discharge refrigerant.

9. Remove A/C compressor and set aside.
10. Remove the generator.

11. Remove upper radiator hose.
12. Disconnect both heater hoses at timing cover.
13. Disconnect lower radiator hose at engine.
14. Remove accessory drive belt tensioner and both idler pulleys.
15. Remove crankshaft damper (2). See **Engine/Engine Block/DAMPER, Vibration - Removal**.

NOTE: Do not remove the hoses from the power steering pump.

16. Remove power steering pump and set aside.

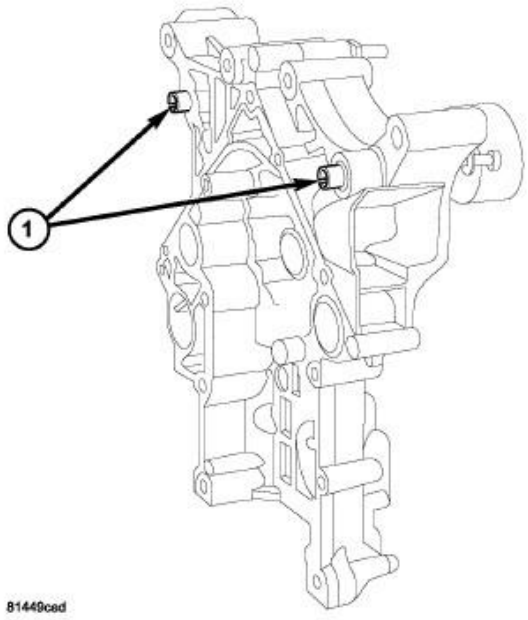

Fig. 297: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

17. Remove the dipstick support bolt.
18. Drain the engine oil.
19. Remove the oil pan and pick up tube. See **Engine/Lubrication/PAN, Oil - Removal**.

NOTE: It is not necessary to remove water pump for timing cover removal.

20. Remove timing cover bolts and remove cover.
21. Verify that timing cover slide bushings (1) are located in timing cover.

Installation

INSTALLATION

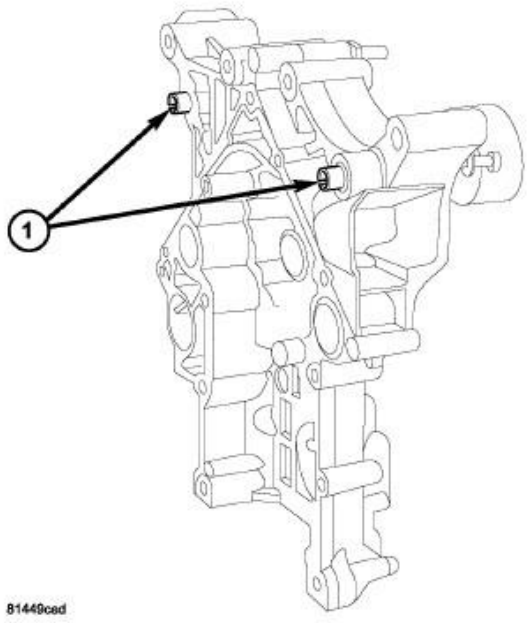

Fig. 298: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

1. Clean timing chain cover and block surface.

NOTE: Always install a new gasket on timing cover.

2. Verify that the slide bushings (1) are installed in timing cover.
3. Install cover and new gasket. Tighten fasteners to 28 N.m (250 in. lbs.).

NOTE: The large lifting stud is tightened to 55 N.m (40 ft. lbs.).

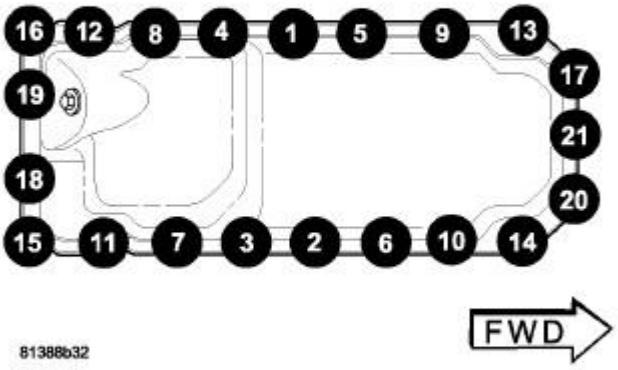

Fig. 299: Oil Pan Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

4. Install the oil pan and pick up tube. See **Engine/Lubrication/PAN, Oil - Installation**.
5. Install the A/C compressor.
6. Install the generator.
7. Install power steering pump.
8. Install the dipstick support bolt.
9. Install the thermostat housing.
10. Install crankshaft damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.
11. Install accessory drive belt tensioner assembly and both idler pulleys.
12. Install radiator lower hose.
13. Install both heater hoses.
14. Install the cooling module.
15. Install the accessory drive belt.
16. Install the coolant bottle and washer bottle.
17. Install the upper radiator hose.
18. Install the air cleaner assembly.
19. Fill cooling system.
20. Refill engine oil.
21. Connect the battery negative cable.

TENSIONER, ENGINE TIMING

Description

DESCRIPTION

Fig. 300: Timing Chain Tensioner
Courtesy of CHRYSLER LLC

The timing chain tensioner is a spring loaded design. It consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to keep tension on the chain.

Operation

OPERATION

The timing chain tension is maintained by routing the timing chain through the tensioner assembly. A nylon shoe presses on the timing chain maintaining the correct chain tension.

