2009 ENGINE

5.7L - Service Information - Commander

DESCRIPTION

DESCRIPTION

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 **Diagnosis and Testing** .
- Intake Manifold Leakage Diagnosis. See **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	

 © 2011 Mitchell Repair Information Company, LLC.

		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 **Diagnosis and Testing**	
ENGINE STALLS OR ROUGH IDLE	1. Idle speed set to low.	1. See **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 **Diagnosis and Testing**	
	5. Burned, warped or pitted valves.	5. Replace as necessary.	
	6. Plugged or restricted exhaust system.	6. Inspect and replace as necessary.	

MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTIONS
NOISY VALVES	1. High or low oil level in crankcase.	1. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
	2. Thin or diluted oil.	2. Change oil and filter.
	3. Low oil pressure.	3. Check oil pump, if OK, check rod and main bearings for excessive wear.

© 2011 Mitchell Repair Information Company, LLC.

	4. Dirt in lash adjusters.	4. Replace as necessary.
	5. Worn rocker arms.	5. Replace as necessary.
	6. Worn lash adjusters	6. Replace as necessary.
	7. Worn valve guides.	7. Replace cylinder head.
	8. Excessive runout of valve seats on valve faces.	8. See **Description** .
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
	2. Low oil pressure.	2. Check oil pump, if OK, check rod and main bearings for excessive wear.
	3. Thin or diluted oil.	3. Change oil and filter.
	4. Excessive bearing clearance.	4. Replace as necessary.
	5. Connecting rod journal out-of-round.	5. Replace crankshaft.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
	2. Low oil pressure.	2. Check oil pump, if OK, check rod and main bearings for excessive wear.
	3. Thin or diluted oil.	3. Change oil and filter.
	4. Excessive bearing clearance.	4. Replace as necessary.
	5. Excessive end play.	5. Check thrust washers for wear.
	6. Crankshaft journal out-of round.	6. Replace crankshaft.
	7. Loose flywheel or torque converter.	7. Tighten to correct torque

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.

 © 2011 Mitchell Repair Information Company, LLC.

3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Disable the fuel system. Refer to **Fuel System/Fuel Delivery - Standard Procedure** and perform the fuel system pressure release 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.

 © 2011 Mitchell Repair Information Company, LLC.

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.

© 2011 Mitchell Repair Information Company, LLC.

OIL PRESSURE DROP	1. Low oil level. 2. Faulty oil pressure sending unit. 3. Low oil pressure. 4. Clogged oil filter. 5. Worn oil pump. 6. Thin or diluted oil. 7. Excessive bearing clearance. 8. Oil pump relief valve stuck. 9. Oil pickup tube loose or damaged.	1. Check and correct oil level. 2. Replace sending unit. 3. Check pump and bearing clearance. 4. Replace oil filter. 5. Replace as necessary. 6. Change oil and filter. 7. Replace as necessary. 8. Replace oil pump. 9. Replace as necessary.
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings. 2. Carbon in oil ring slots. 3. Incorrect ring size installed. 4. Worn valve guides. 5. Leaking intake gasket(s). 6. Leaking valve guide seals.	1. Hone cylinder bores and replace rings. 2. Replace rings. 3. Replace rings. 4. Ream guides and replace valves. 5. Replace intake gasket(s). 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. 2. Thin or diluted oil. 3. Low oil pressure. 4. Dirt in tappets/lash adjusters. 5. Bent push rod(s). 6. Worn rocker arms 7. Worn tappets/lash adjusters. 8. Worn valve guides.	1. Check for correct oil level. Adjust the oil level by draining or adding as needed. See **Standard Procedure**. 2. Change the engine oil. See **Standard Procedure**. 3. Check the engine oil level. If OK, perform oil pressure test. See **Diagnosis and Testing**. 4. Clean and/or replace the hydraulic tappets/lash adjusters. See **Diagnosis and Testing**. 5. Install new push rods. See **Removal**. 6. Inspect the oil supply to the rocker arms and replace worn rocker arms as needed. See **Removal**. 7. Install new hydraulic tappets/lash adjusters. See **Removal**. 8. Inspect the valve guides for

© 2011 Mitchell Repair Information Company, LLC.

		wear, cracks or looseness. If either condition exist, replace the cylinder head.
	9. Excessive runout of valve seats or valve faces.	9. Grind the valves and seats. See **Standard Procedure**.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check the engine oil level.
	2. Low oil pressure.	2. Check the engine oil level. If OK, perform the engine oil pressure test. See **Diagnosis and Testing**.
	3. Thin or diluted oil.	3. Change the engine oil to correct the viscosity. See **Standard Procedure**
	4. Excessive connecting rod bearing clearance.	4. Measure the bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Connecting rod journal out of round.	5. Replace the crankshaft. See **Removal**.
	6. Misaligned connecting rods.	6. Replace the bent connecting rods. See **Removal**.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check the engine oil level.
	2. Low oil pressure.	2. Check the engine oil level. If OK, perform the engine oil pressure test. See **Diagnosis and Testing**
	3. Thin or diluted oil.	3. Change the engine oil to correct viscosity. See **Standard Procedure**
	4. Excessive main bearing clearance.	4. Measure the bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Excessive end play.	5. Check the crankshaft thrust bearing for excessive wear on flanges. See **Engine/Engine Block/CAMSHAFT, Engine - Inspection**.
	6. Crankshaft main journal out of round or worn.	6. Replace the crankshaft. See **Removal**.
	7. Loose flywheel or torque converter.	7. Inspect the crankshaft, flexplate/flywheel and bolts for damage. Tighten to correct torque.
LOW OIL PRESSURE	1. Low oil level.	1. Check the oil level and fill if necessary.
	2. Faulty oil pressure sending unit.	2. Install a new sending unit.
	3. Clogged oil filter.	3. Install a new oil filter. See **Removal**.
	4. Worn oil pump.	4. Replace the oil pump assembly. See **Removal**.

© 2011 Mitchell Repair Information Company, LLC.

	5. Thin or diluted oil.	5. Change the engine oil to correct viscosity. See **Standard Procedure**.
	6. Excessive bearing clearance.	6. Measure the bearings for correct clearance with plasti-gage. Repair as necessary.
	7. Oil pump relief valve stuck.	7. 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. See **Removal**.
	8. Oil pickup tube loose, broken, bent or clogged.	8. Inspect the oil pickup tube and pump, and clean or replace as necessary. See **Removal**.
	9. Oil pump cover warped or cracked.	9. Install a new oil pump. See **Removal**.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket.
	2. Loose fastener, broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Front or rear crankshaft oil seal leaking.	3. Replace the front seal or rear seal. See **Removal**.
	4. Leaking oil gallery plug or cup plug.	4. Remove and reseal threaded plug. Replace the cup style plug.
EXCESSIVE OIL CONSUMPTION OR SPARK PLUGS OIL FOULED	1. CCV System malfunction.	1. Check for correct operation. Refer to **Emissions Control - Description** .
	2. Defective valve stem seal(s).	2. Repair or replace the seal(s). See **Removal**.
	3. Worn or broken piston rings.	3. Hone the cylinder bores and Install new rings. See **Removal**.
	4. Scuffed pistons/cylinder walls.	4. Hone the cylinder bores and replace pistons as required. See **Removal**.
	5. Carbon in oil control ring groove.	5. Remove the rings and de-carbon the piston. See **Standard Procedure**.
	6. Worn valve guides.	6. Inspect the valve guides for wear, cracks or looseness. If either condition exist, replace the cylinder head.
	7. Piston rings fitted too tightly in grooves.	7. Remove the rings and check the ring end gap and side clearance.

 © 2011 Mitchell Repair Information Company, LLC.

		Replace if necessary. See **Standard Procedure**.

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.

 © 2011 Mitchell Repair Information Company, LLC.

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

 © 2011 Mitchell Repair Information Company, LLC.

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

1. Remove the hood. Refer to **Body/Hood/HOOD - Removal** .
2. Perform the Fuel System Pressure Release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
3. Disconnect and isolate the negative battery cable.

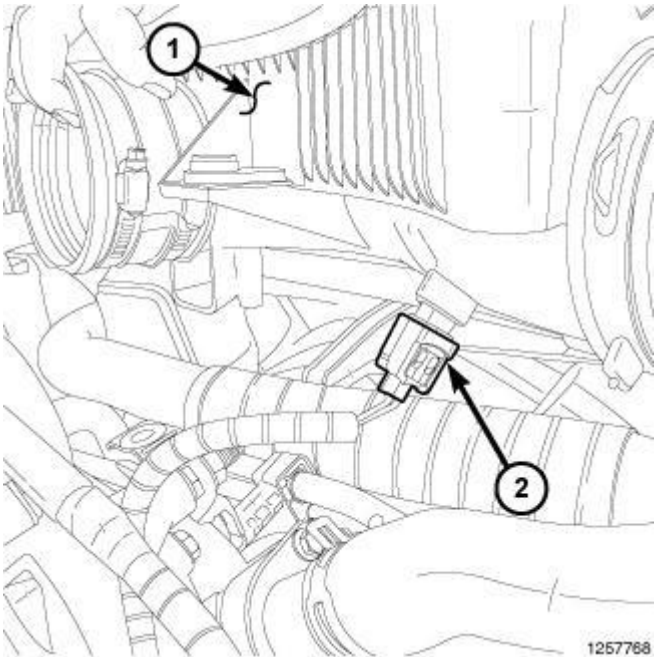


Fig. 1: IAT Sensor Electrical Connector
Courtesy of CHRYSLER LLC

4. Disconnect IAT sensor electrical connector (2).
5. Remove the air cleaner resonator and duct work as an assembly (1).

 © 2011 Mitchell Repair Information Company, LLC.

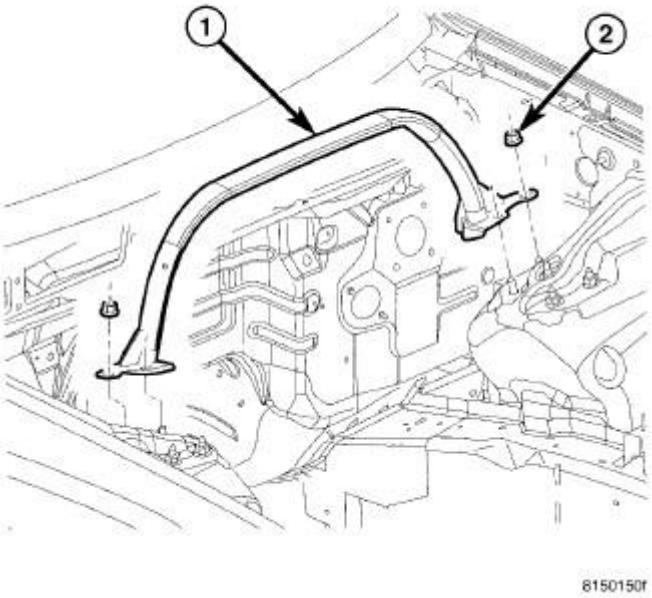


Fig. 2: Strut Tower Support
Courtesy of CHRYSLER LLC

6. Remove the strut tower support (1).

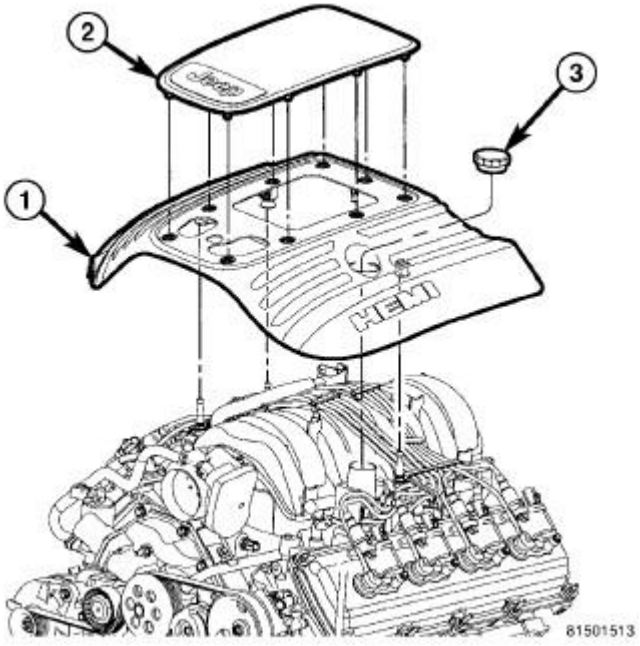


Fig. 3: Engine Cover
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

7. Remove the engine cover (1).
8. Raise and support the vehicle.
9. Drain the crankcase and remove the oil filter. See **Installation**.

WARNING: Do not remove the radiator pressure cap, cylinder block drain plugs or loosen the radiator draincock with the system hot and under pressure. Serious burns from coolant can occur.

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

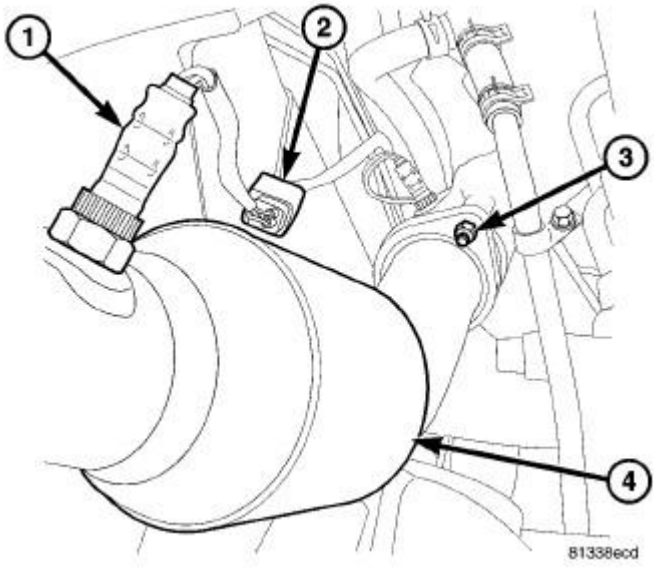


Fig. 4: Oxygen Sensor & Catalytic Converter
Courtesy of CHRYSLER LLC

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.

11. Disconnect the oxygen sensor connectors (2).
12. Saturate all exhaust bolts and nuts with Mopar® Rust Penetrant. Allow 5 minutes for penetration.
13. 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** .

 © 2011 Mitchell Repair Information Company, LLC.

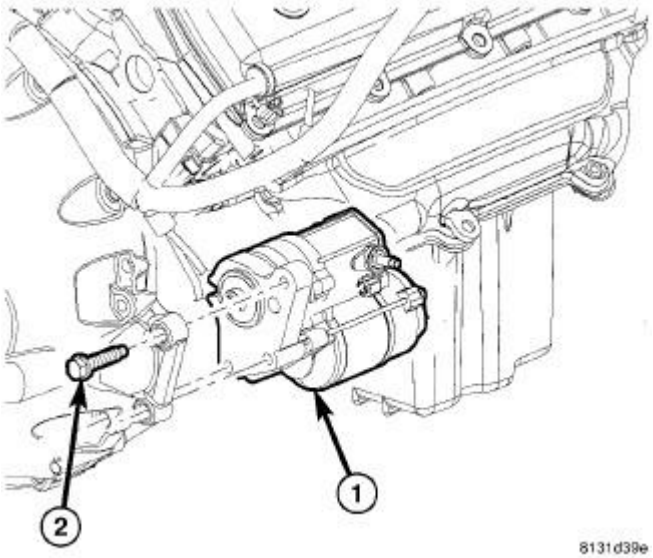


Fig. 5: Relocate Starter
Courtesy of CHRYSLER LLC

14. Disconnect the starter wires and remove starter motor (1). Refer to **Electrical/Starting/STARTER - Removal** .

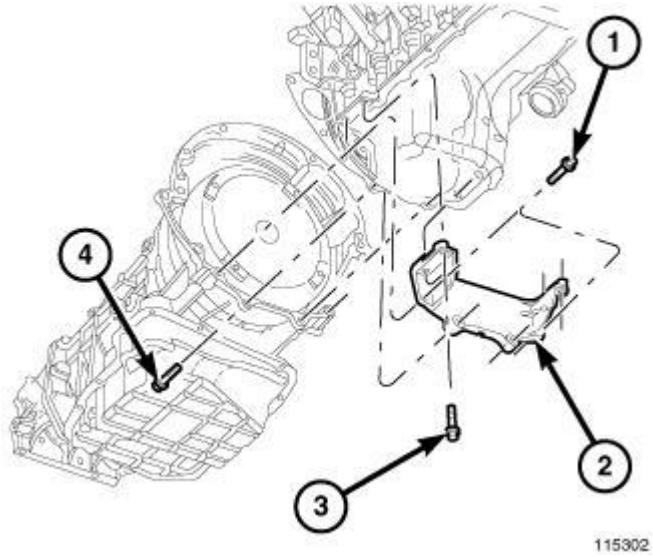


Fig. 6: Structural Cover
Courtesy of CHRYSLER LLC

15. Remove the structural dust cover (2) and transmission inspection cover. See **Removal**.

 © 2011 Mitchell Repair Information Company, LLC.

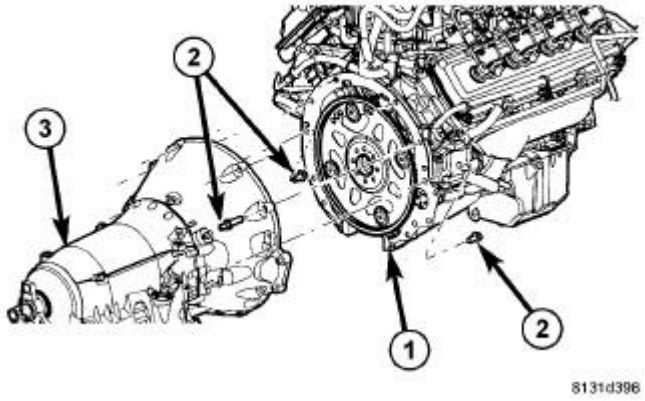


Fig. 7: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

16. Remove drive plate to converter bolts (Automatic transmission equipped vehicles).
17. Remove transmission bell housing to engine block bolts (2).

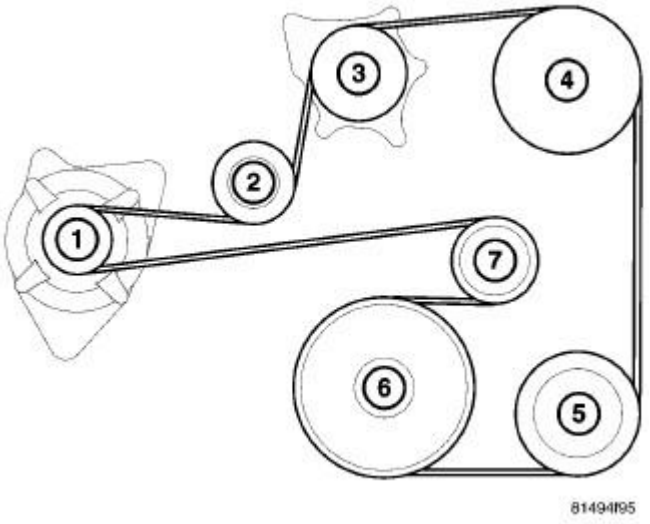


Fig. 8: Accessory Drive Belt Routing
Courtesy of CHRYSLER LLC

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

18. Lower the vehicle and remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
19. Disconnect the ground wires to the rear of each cylinder head.

 © 2011 Mitchell Repair Information Company, LLC.

20. Evacuate the refrigerant. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .

NOTE: The hydraulic fan drive is driven by the power steering pump. When removing lines or hoses from fan drive assembly use a drain pan to catch any power steering fluid that may exit the fan drive or the lines and hoses.

NOTE: When ever the high pressure line fittings are removed from the hydraulic fan drive the O-rings must be replaced.

21. Disconnect the two high pressure lines at the hydraulic fan drive, Remove and discard the O-rings from the line fittings. Refer to **Cooling/Engine/FAN, Cooling - Removal** .

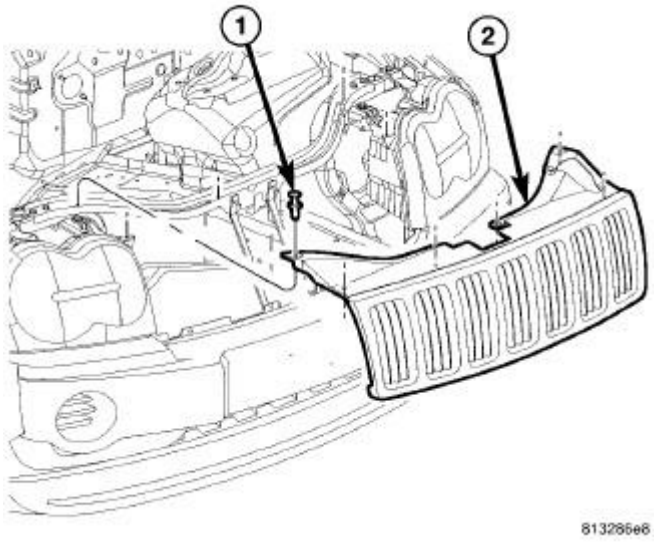


Fig. 9: Grille
Courtesy of CHRYSLER LLC

22. Remove the 6 upper push pins (1), tip the grill forward and remove the grill (2).

 © 2011 Mitchell Repair Information Company, LLC.

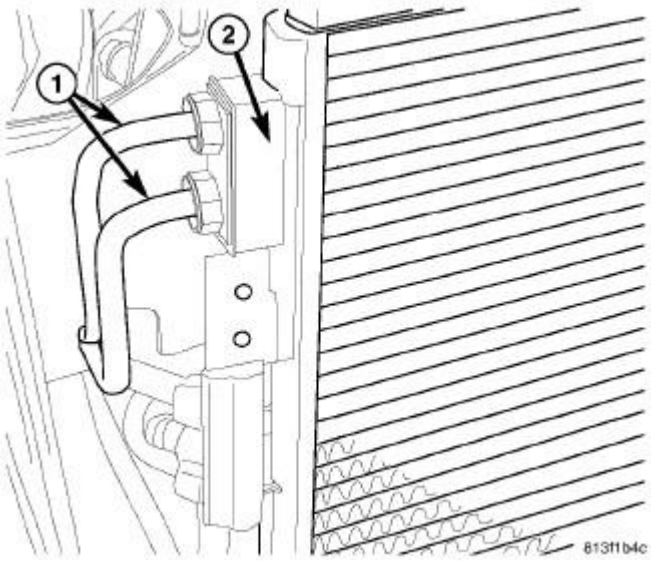


Fig. 10: A/C Condenser-Transmission Cooler Lines Removal/Installation
Courtesy of CHRYSLER LLC

23. Remove the refrigerant lines (1) to the A/C condenser. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Removal** and refer to **Heating and Air Conditioning/Plumbing/LINE, A/C Liquid - Removal** .

CAUTION: When removing the radiator or A/C condenser for any reason, note the location of all radiator-to-body and radiator-to-A/C condenser rubber air seals. These are used at the top, bottom and sides of the radiator and A/C condenser. To prevent overheating, these seals must be installed to their original positions.

24. Remove the upper crossmember and top core support.
25. Remove the condenser. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Removal** .

NOTE: The radiator and radiator cooling fan can be removed as an assembly. It is not necessary to remove the cooling fan before removing or installing the radiator.

26. Remove the radiator and cooling fan as an assembly. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

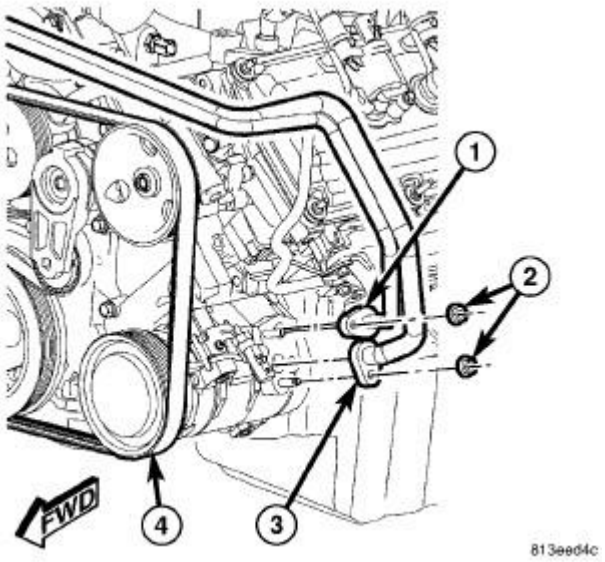


Fig. 11: Refrigerant Lines-Compressor Removal/Installation
Courtesy of CHRYSLER LLC

27. Remove the refrigerant lines (1,3) to the A/C compressor (4).
28. Remove the A/C compressor (4). Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal** .

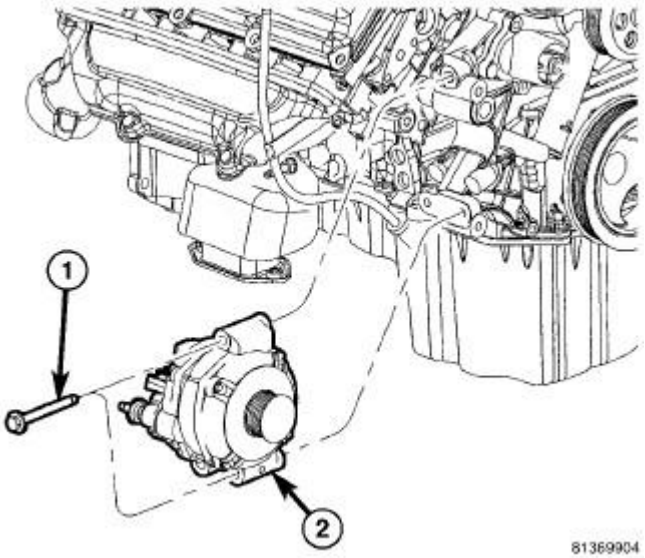


Fig. 12: Generator-5.7L
Courtesy of CHRYSLER LLC

29. Disconnect the generator wires and remove the generator assembly (2). Refer to **Electrical/Charging/GENERATOR - Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

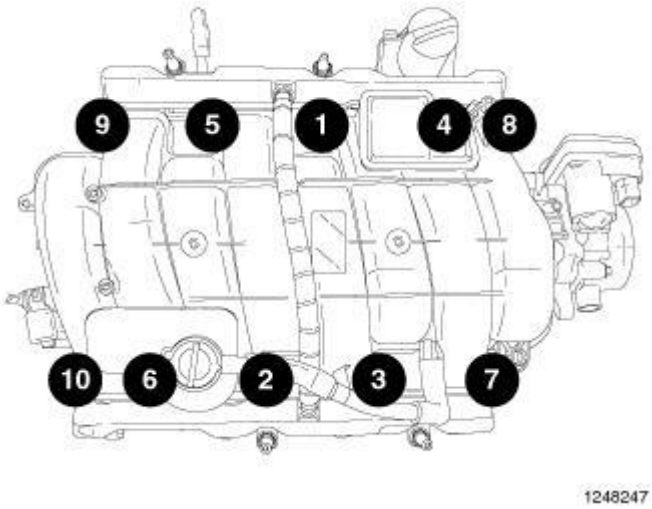


Fig. 13: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

30. Using the sequence shown in illustration, remove the intake manifold bolts and remove the intake manifold. See **Removal**.

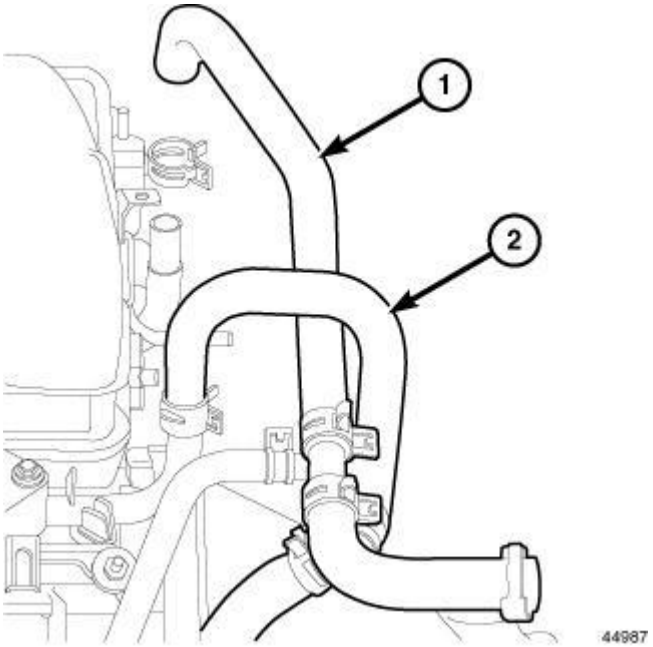


Fig. 14: Heater Hose Supply
Courtesy of CHRYSLER LLC

31. Disconnect the heater hoses (1,2).

 © 2011 Mitchell Repair Information Company, LLC.

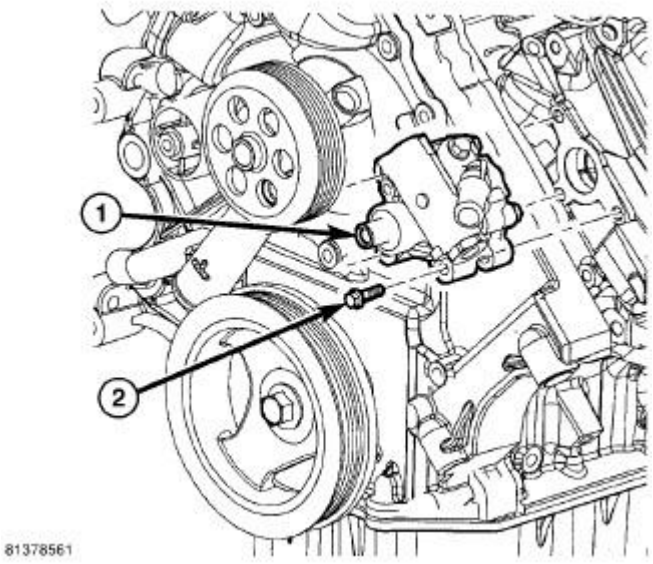


Fig. 15: Power Steering Pump
Courtesy of CHRYSLER LLC

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

32. Remove three power steering pump (1) mounting bolts (2) through the access holes in the pulley and secure out of the way.
33. Disconnect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .

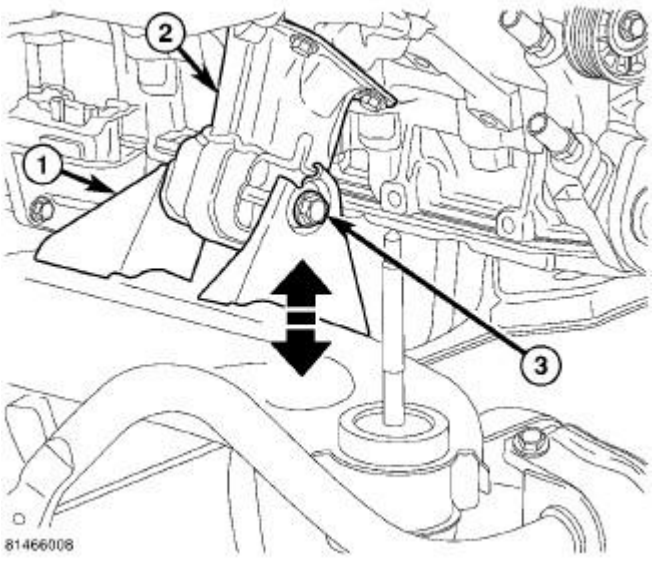


Fig. 16: Identifying Engine Mount Bolts
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

34. Remove the engine front mount through bolts and nuts (3).
35. Disconnect the transmission oil cooler lines from their retainers at the oil pan bolts.



Fig. 17: Engine Lift Stud
Courtesy of CHRYSLER LLC

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

36. Remove the engine lift stud (1).
37. Install the Engine Lift Fixture (3) 8984A and Adapter 8984-UPD (2) and install engine lifting stud (1).

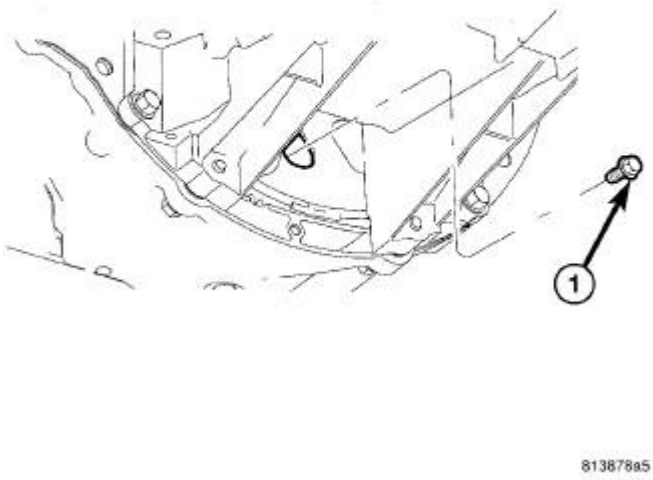


Fig. 18: Drive Plate Torque Converter Bolts
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

38. Remove the drive plate to converter bolts (1) (Automatic transmission equipped vehicles).

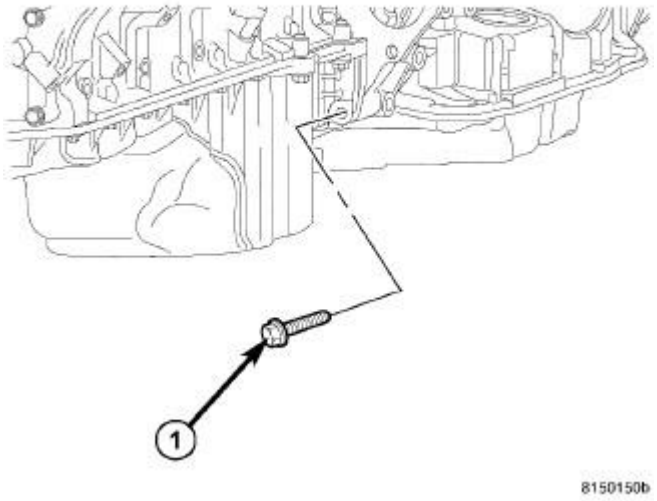


Fig. 19: Oil Pan To Transmission Bolts
Courtesy of CHRYSLER LLC

39. Remove both the left and right side oil pan to transmission bolts (1).

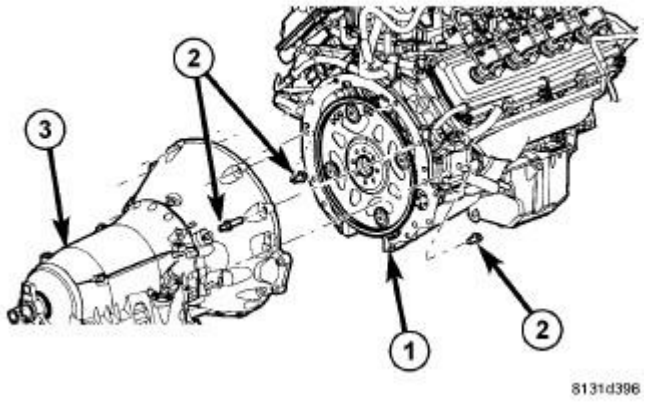


Fig. 20: Removing/Installing Transmission to Engine Bolts
Courtesy of CHRYSLER LLC

40. Remove the transmission bell housing to engine block bolts (2).
41. Separate the engine from the transmission (3), remove the engine from the vehicle.

 © 2011 Mitchell Repair Information Company, LLC.

INSTALLATION

INSTALLATION

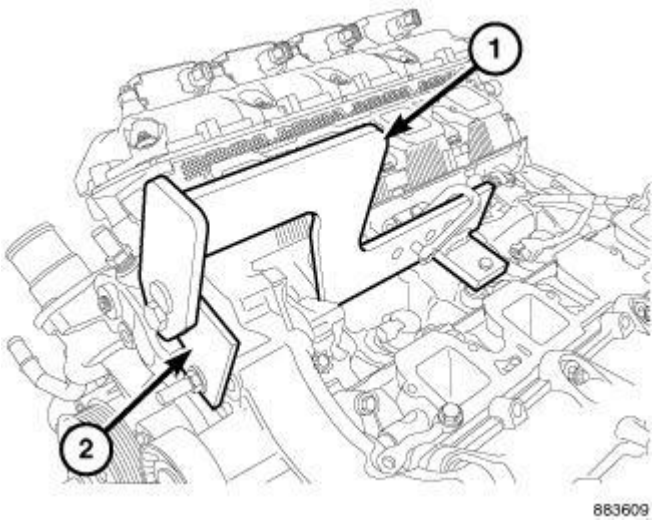


Fig. 21: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

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

1. Install engine lift fixture (1) Special tool 8984A and adapter (2) Special tool 8984-UPD.
2. Position engine in the engine compartment.

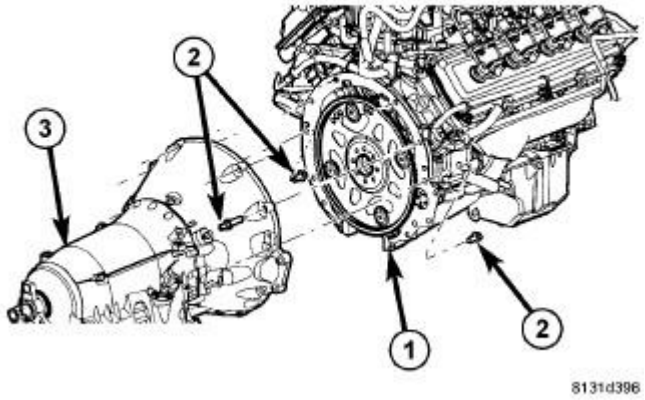


Fig. 22: Removing/Installing Transmission to Engine Bolts
Courtesy of CHRYSLER LLC

3. Lower and align engine (1) with the transmission (3).

 © 2011 Mitchell Repair Information Company, LLC.

4. Install two transmission to engine block mounting bolts (2) finger tight.

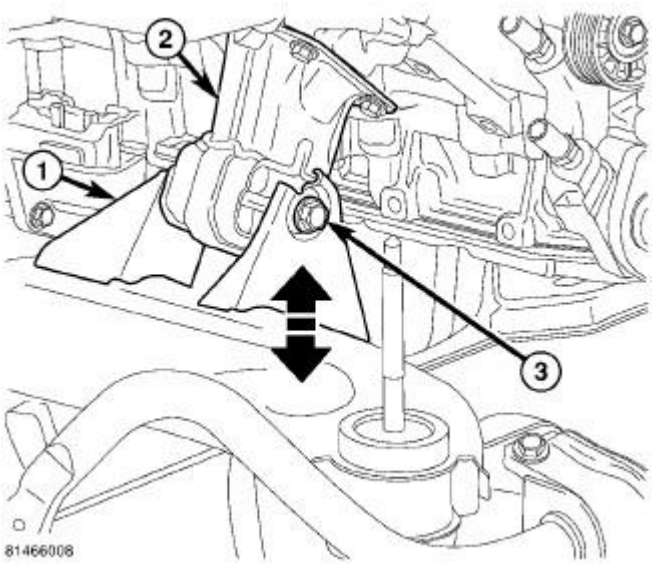


Fig. 23: Engine Mount Bolt
Courtesy of CHRYSLER LLC

5. Lower the engine assembly until the engine mounts (2) lineup in the frame brackets (1).

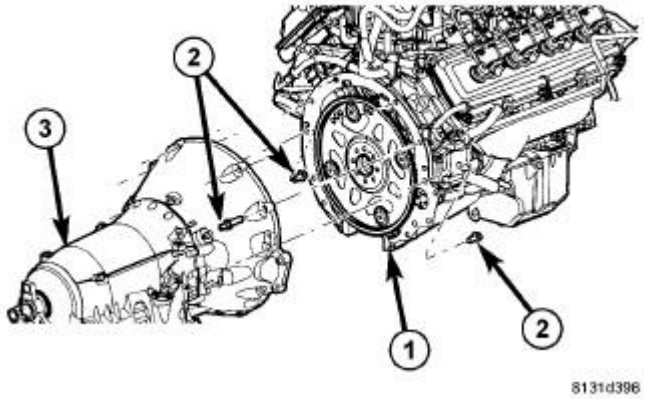


Fig. 24: Removing/Installing Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

6. Install the remaining transmission bell housing to engine block mounting bolts (2) and tighten to 68 N.m (50 ft. lbs.).

 © 2011 Mitchell Repair Information Company, LLC.

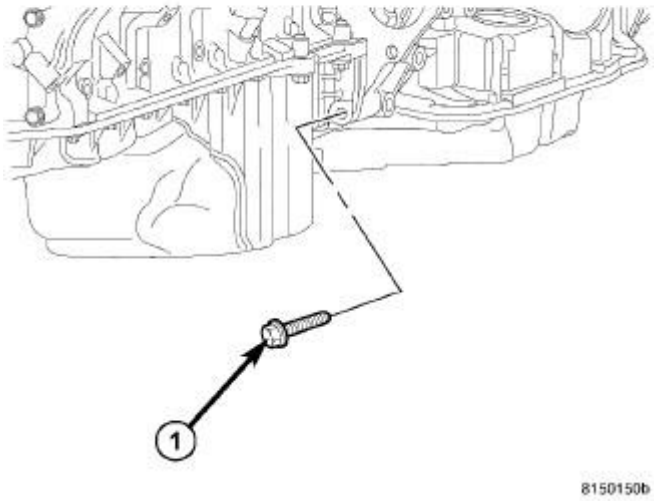


Fig. 25: Oil Pan To Transmission Bolts
Courtesy of CHRYSLER LLC

7. Install both the left and right side oil pan to transmission bolts (1) and tighten bolts to 54 N.m (40 ft. lbs.).

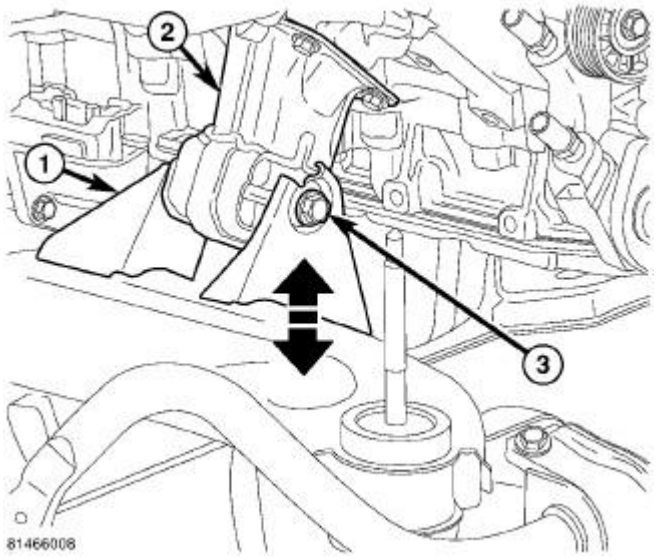


Fig. 26: Engine Mount Bolt
Courtesy of CHRYSLER LLC

8. Install engine mount through bolts (3) and nuts and tighten bolts to 95 N.m (70 ft. lbs.).

 © 2011 Mitchell Repair Information Company, LLC.

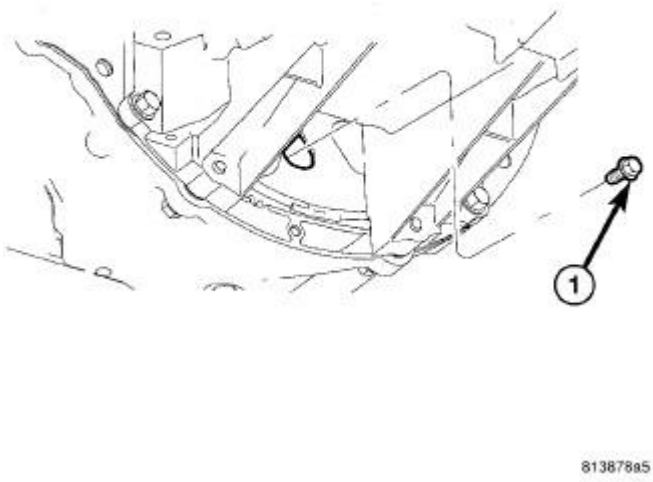


Fig. 27: Drive Plate Torque Converter Bolts
Courtesy of CHRYSLER LLC

9. Install all torque converter-to-driveplate bolts (1) by hand, verify the torque converter is pulled flush to the driveplate and tighten bolts to 31 N.m (270 in. lbs.).

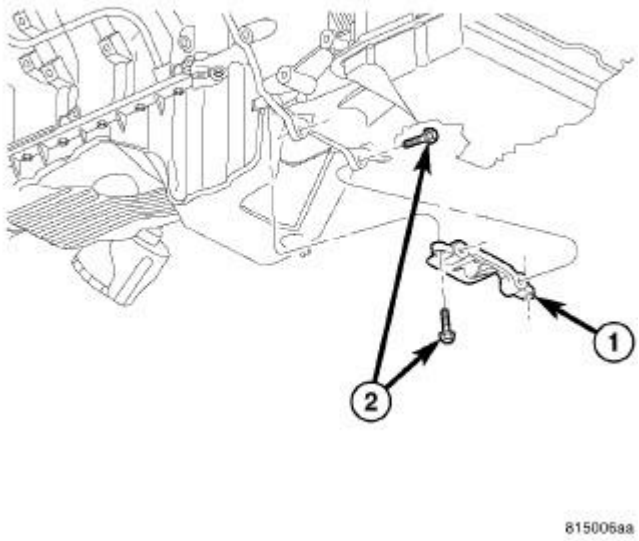


Fig. 28: Structural Dust Cover
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

CAUTION: The structural dust cover must be installed as described in the Structural Dust Cover installation procedure. Failure to do so will cause severe damage to the cover.

10. Install the structural dust cover (1). See **Installation**.

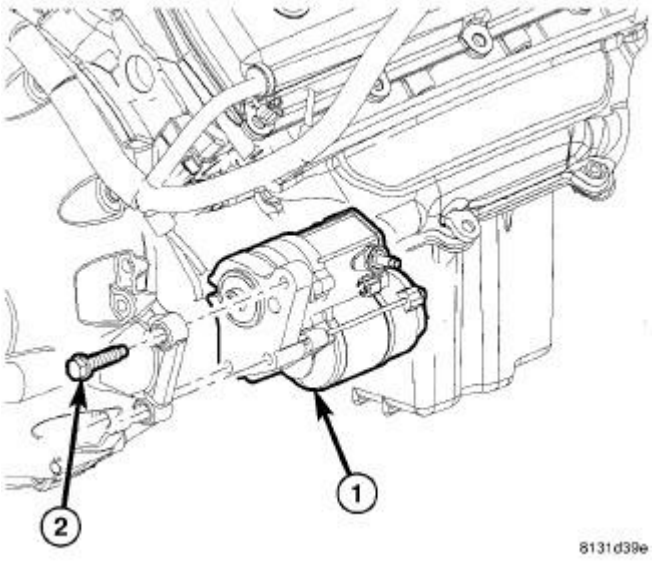


Fig. 29: Relocate Starter
Courtesy of CHRYSLER LLC

11. Install the starter (1) and connect the starter wires. Refer to **Electrical/Starting/STARTER - Installation** .

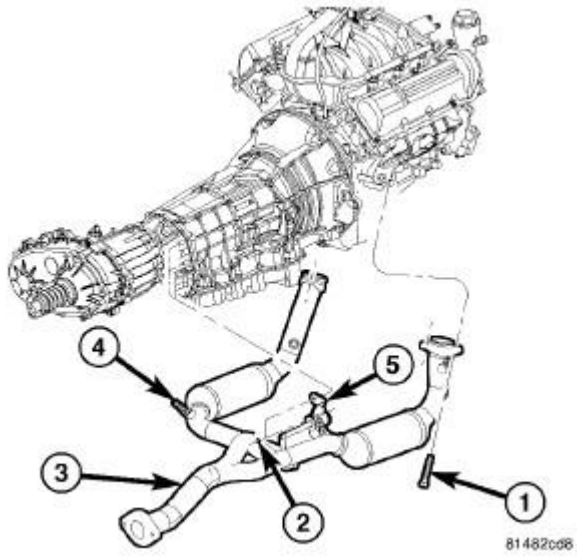


Fig. 30: 3.7L Catalytic Converter - Typical

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

12. Install the front exhaust pipe/catalytic converter assembly (3) to the exhaust manifold flange and tighten the bolts (2) and nuts (1) to 26 N.m (19 in. lbs.).

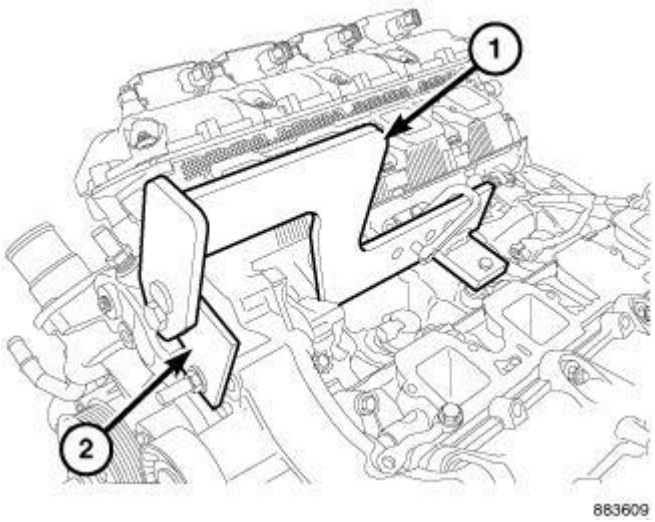


Fig. 31: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

13. Remove the engine lift fixture (1) 8984A and adapter (2) 8984-UPD.
14. Connect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
15. Install the power steering pump. Refer to **Steering/Pump - Installation** .
16. Connect the ground wires to the rear of each cylinder head.
17. Install the intake manifold. See **Installation**.

 © 2011 Mitchell Repair Information Company, LLC.

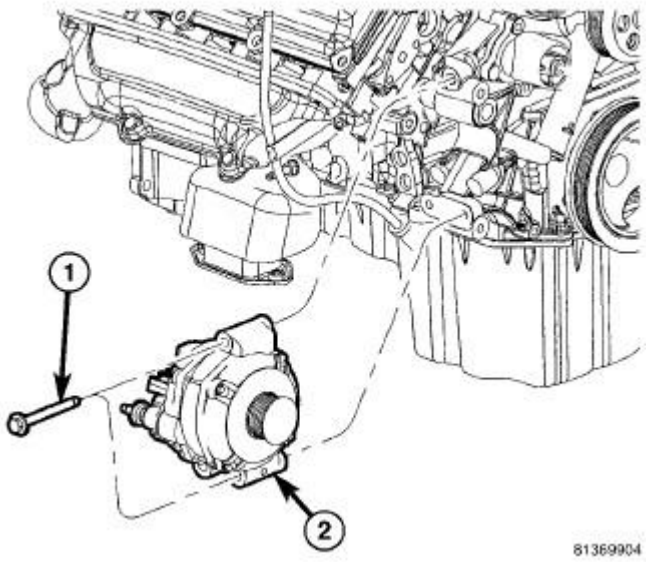


Fig. 32: Generator-5.7L
Courtesy of CHRYSLER LLC

18. Install the generator (2), and wire connections. Refer to **Electrical/Charging/GENERATOR - Installation** .

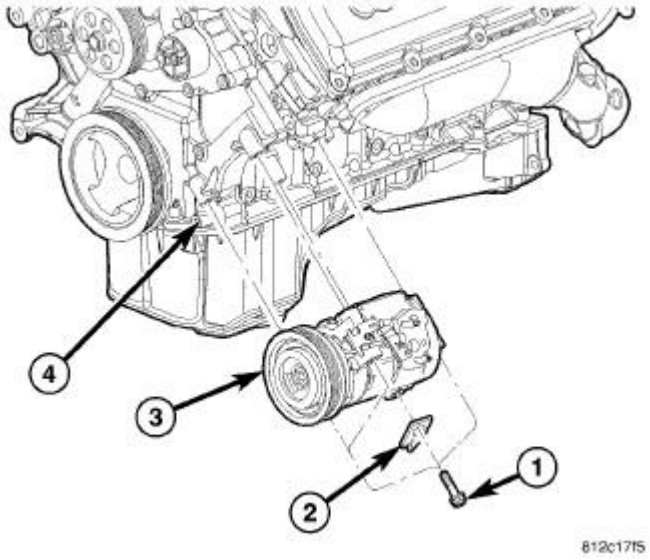


Fig. 33: A/C Compressor
Courtesy of CHRYSLER LLC

19. Install the a/c compressor (3). Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation** .

 © 2011 Mitchell Repair Information Company, LLC.

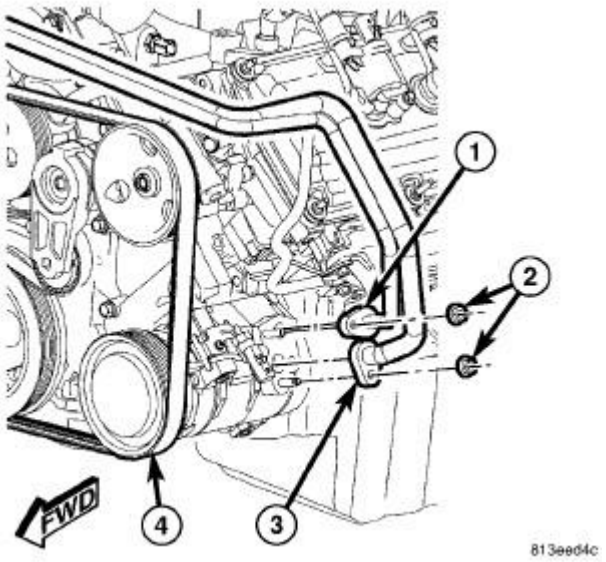


Fig. 34: Refrigerant Lines-Compressor Removal/Installation
Courtesy of CHRYSLER LLC

20. Connect the refrigerant lines (1,3) to the A/C compressor (4) and tighten the nuts (2) to 20 N.m (15 ft. lbs.).

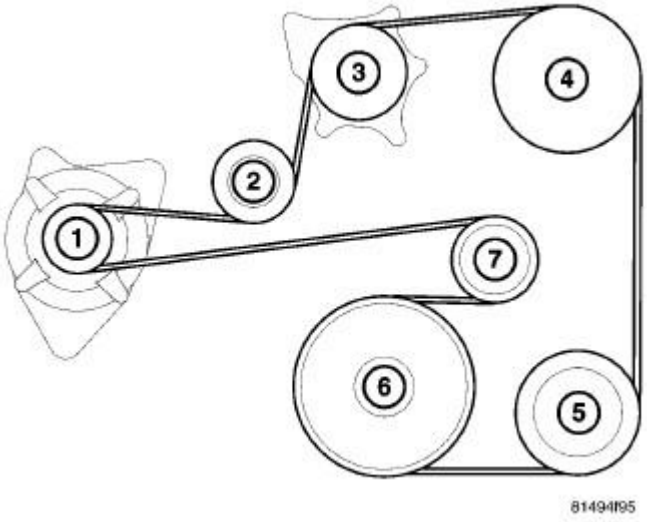


Fig. 35: Accessory Drive Belt Routing
Courtesy of CHRYSLER LLC

21. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

CAUTION: Before installing the radiator or A/C condenser, be sure the radiator-to-body and radiator-to-A/C condenser rubber air seals are properly

 © 2011 Mitchell Repair Information Company, LLC.

fastened to their original positions. These are used at the top, bottom and sides of the radiator and A/C condenser. To prevent overheating, these seals must be installed to their original positions.

22. Install the condenser. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Installation** .

NOTE: The lower part of radiator is equipped with two alignment dowel pins. They are located on the bottom of radiator tank and fit into rubber grommets. These rubber grommets are pressed into the radiator lower crossmember.

23. Install the radiator and cooling fan as an assembly. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Installation** .

NOTE: When ever the high pressure line fittings are removed from the hydraulic fan drive the O-rings must be replaced.

24. Lubricate the new O-rings on the fittings with power steering fluid then connect inlet and outlet high pressure lines to fan drive. Tighten inlet line to 49 N.m (36 ft. lbs.) tighten outlet line to 29 N.m (22 ft. lbs.). Refer to **Cooling/Engine/FAN, Cooling - Installation** .
25. Install the upper crossmember and top core support.

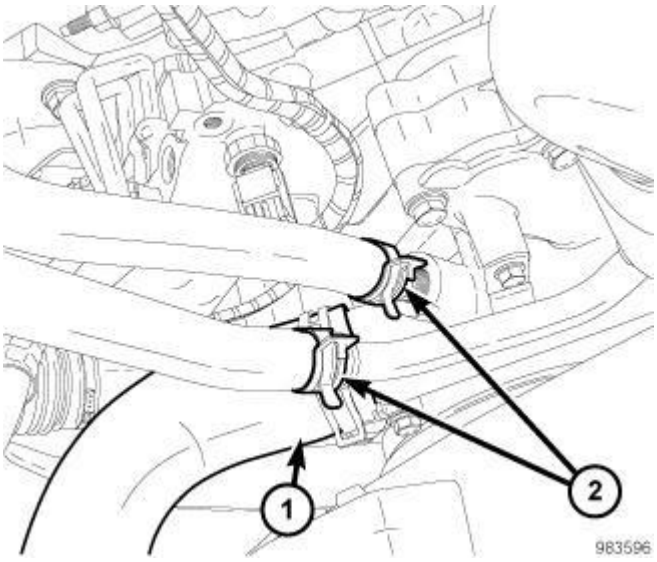


Fig. 36: Heater & Lower Radiator Hose
Courtesy of CHRYSLER LLC

26. Connect the heater hoses (2).
27. Connect the radiator hose (1).
28. Connect the transmission oil cooler lines.

 © 2011 Mitchell Repair Information Company, LLC.

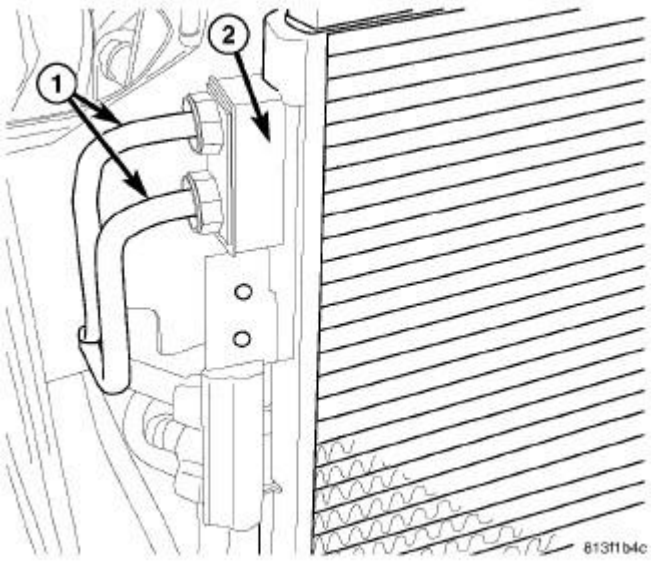
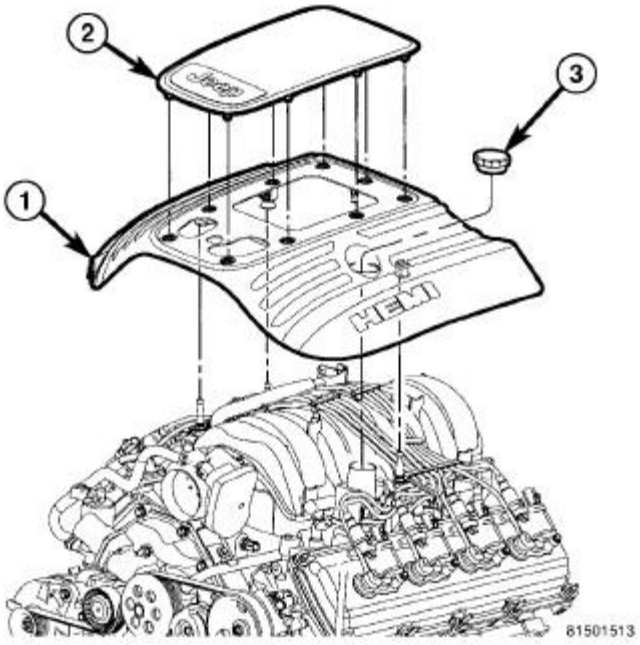


Fig. 37: A/C Condenser-Transmission Cooler Lines Removal/Installation
Courtesy of CHRYSLER LLC

29. Connect the refrigerant lines (1) to the A/C condenser. Refer to **Heating and Air Conditioning/Plumbing/LINE, A/C Discharge - Installation** and refer to **Heating and Air Conditioning/Plumbing/LINE, A/C Liquid - Installation** .
30. Connect the upper radiator hose.
31. Fill crankcase with engine oil and install new oil filter. See **Installation**.
32. Fill cooling system. Refer to **Cooling - Standard Procedure** .



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 38: Engine Cover
Courtesy of CHRYSLER LLC

33. Install the engine cover (1).

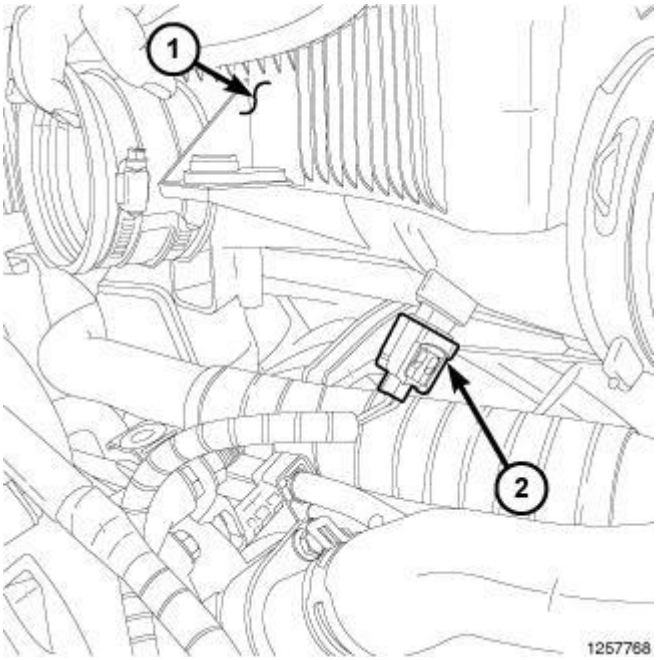


Fig. 39: IAT Sensor Electrical Connector
Courtesy of CHRYSLER LLC

34. Install the air cleaner resonator and duct work as an assembly (1).
35. Connect IAT sensor electrical connector (2).

 © 2011 Mitchell Repair Information Company, LLC.

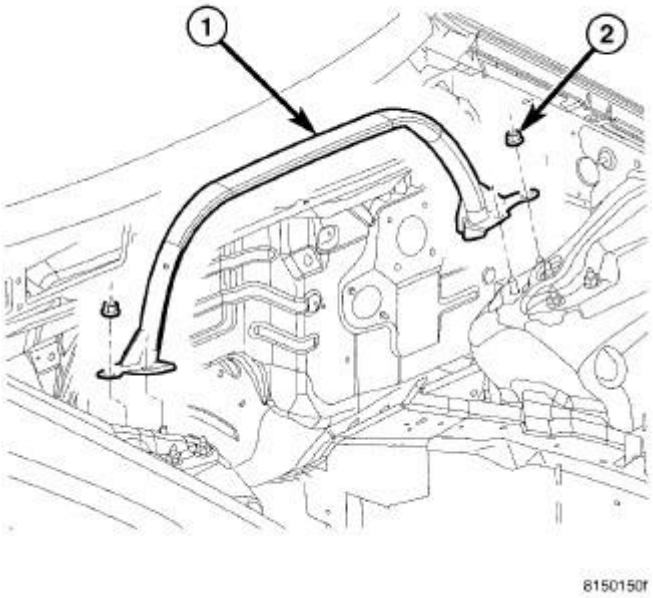


Fig. 40: Strut Tower Support
Courtesy of CHRYSLER LLC

36. Install the strut tower support (1).
37. Install the hood. Refer to **Body/Hood/HOOD - Installation** .
38. Connect the negative battery cable.
39. Charge the refrigerant system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
40. Start the engine and inspect for leaks.
41. Road test vehicle.

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Engine Type	90° V-8 OHV	
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	

© 2011 Mitchell Repair Information Company, LLC.

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

© 2011 Mitchell Repair Information Company, LLC.

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.

© 2011 Mitchell Repair Information Company, LLC.

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 - 0.290mm	0.0031 - 0.0114 in.

VALVE TIMING

DESCRIPTION	SPECIFICATION
Intake	-
Opens (BTDC)	5°
Closes (ATDC)	255°
Exhaust	-
Opens (BTDC)	236°
Closes (ATDC)	32°
Duration	269.3°
Valve Overlap	37°

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°	

 © 2011 Mitchell Repair Information Company, LLC.

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.**		

© 2011 Mitchell Repair Information Company, LLC.

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 **Installation**.		
Cylinder Head Bolts	See **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 **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	-

© 2011 Mitchell Repair Information Company, LLC.

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

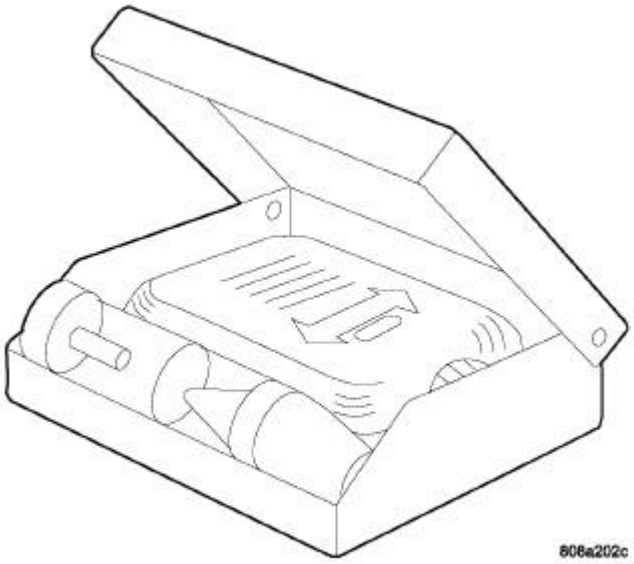


Fig. 41: Bloc-Chek Kit C-3685
Courtesy of CHRYSLER LLC

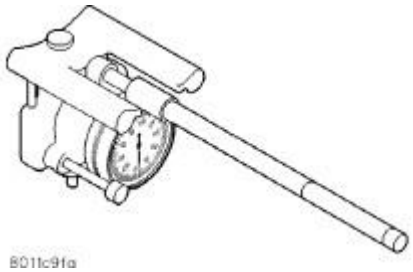


Fig. 42: Cylinder Indicator C-119
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

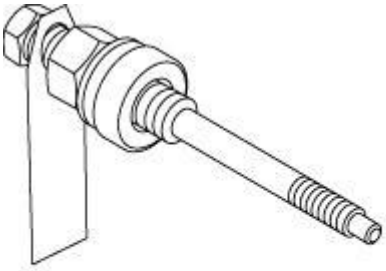


Fig. 43: Installer, Damper 8512A
Courtesy of CHRYSLER LLC

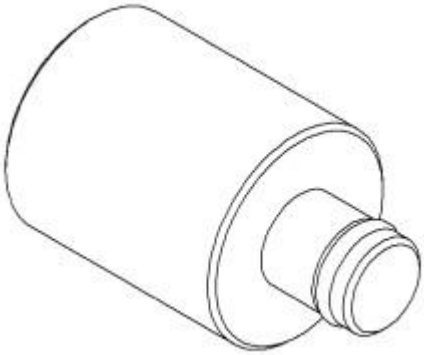


Fig. 44: Crankshaft Damper Remover Insert 8513-A
Courtesy of CHRYSLER LLC

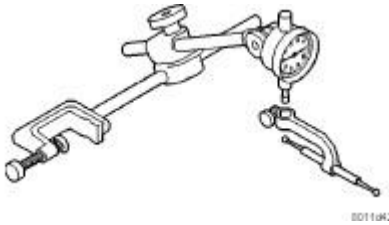


Fig. 45: Dial Indicator C-3339
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

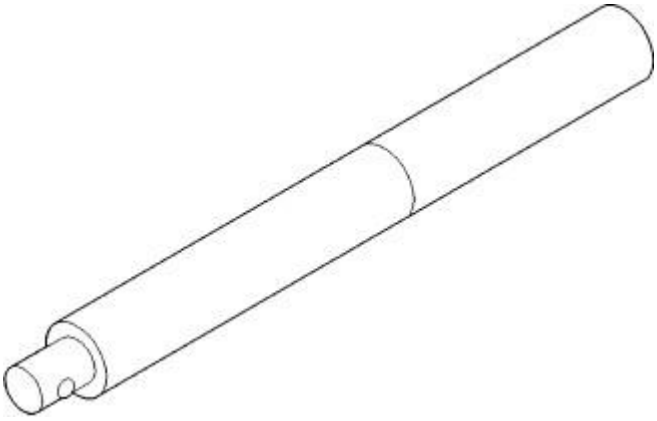


Fig. 46: Handle C-4171
Courtesy of CHRYSLER LLC

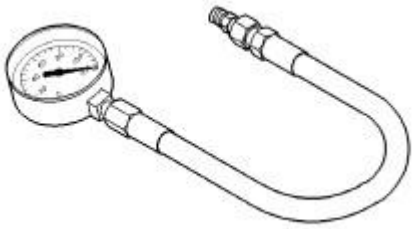


Fig. 47: Gauge, Oil Pressure C-3292
Courtesy of CHRYSLER LLC

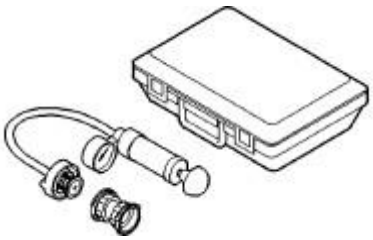


Fig. 48: Tester, Cooling System 7700-A
Courtesy of CHRYSLER LLC

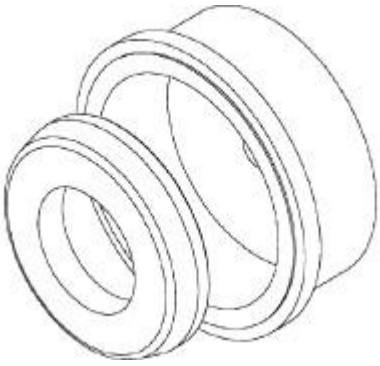


Fig. 49: Installer, Seal 8349
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

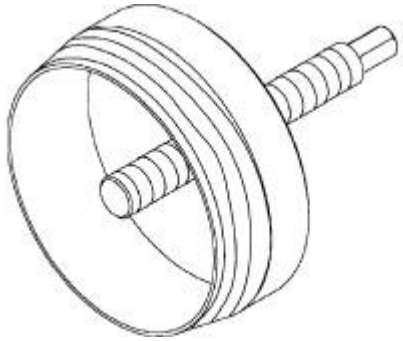


Fig. 50: Remover, Seal 8506
Courtesy of CHRYSLER LLC

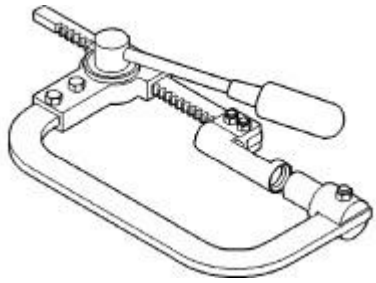


Fig. 51: Compressor, Valve Spring C-3422-B
Courtesy of CHRYSLER LLC

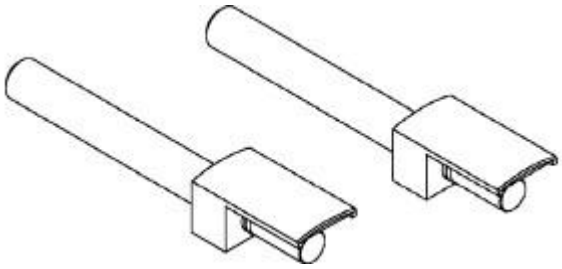


Fig. 52: Guides, Connecting Rod 8507
Courtesy of CHRYSLER LLC

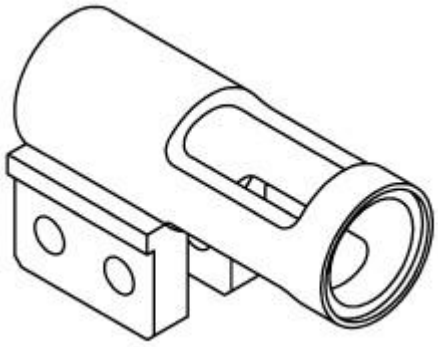


Fig. 53: Adapter, Valve Spring 8464
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

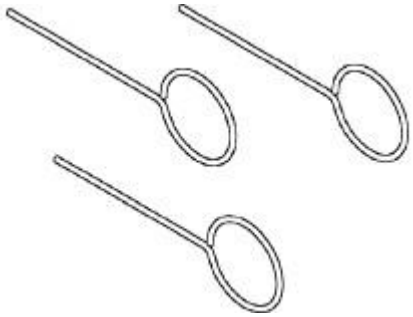


Fig. 54: Pins, Tensioner 8514
Courtesy of CHRYSLER LLC

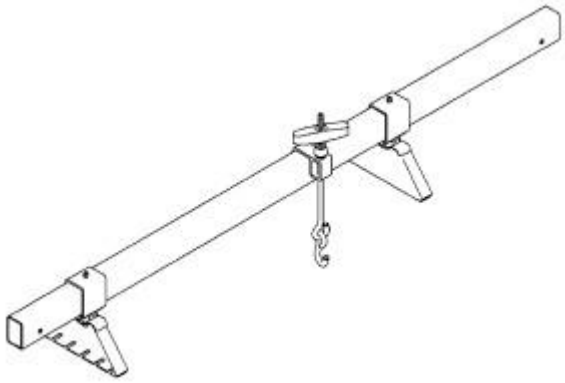


Fig. 55: Support Fixture, Engine 8534B
Courtesy of CHRYSLER LLC

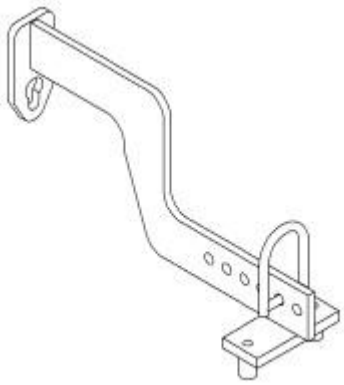


Fig. 56: Engine Lift Fixture 8984
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

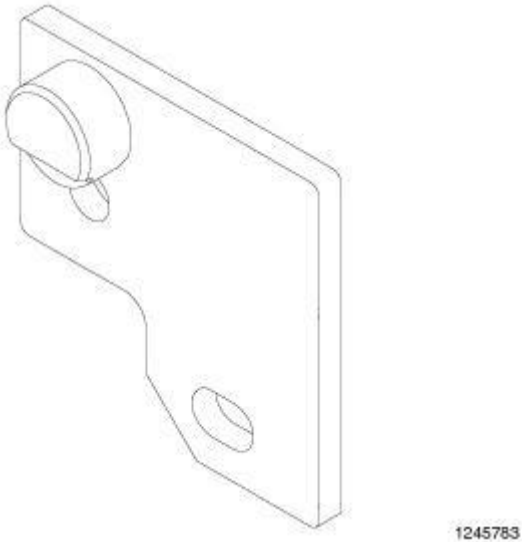


Fig. 57: Engine Lift Fixture Adapter - 8984-EAGLE
Courtesy of CHRYSLER LLC

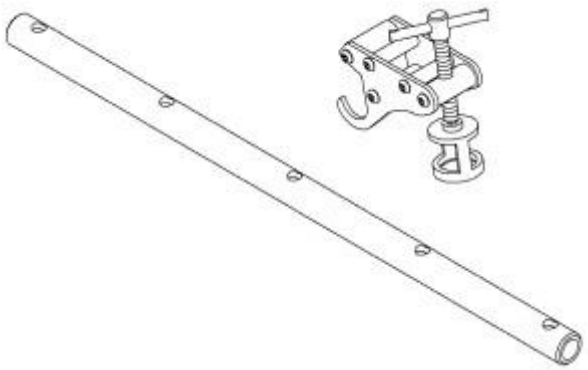


Fig. 58: Compressor, Valve Spring 9065
Courtesy of CHRYSLER LLC

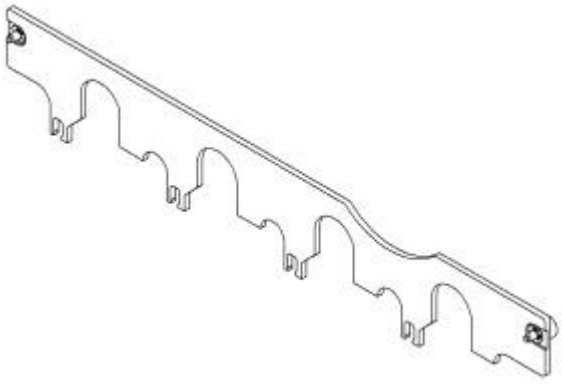


Fig. 59: Retainer, Pushrod 9070
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

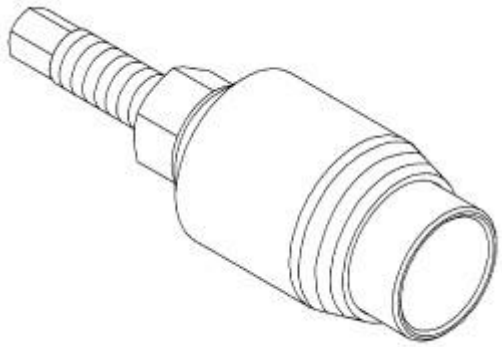


Fig. 60: Remover, Seal 9071
Courtesy of CHRYSLER LLC



Fig. 61: Installer, Seal 9072
Courtesy of CHRYSLER LLC

MDS SYSTEM

DESCRIPTION

DESCRIPTION

 © 2011 Mitchell Repair Information Company, LLC.

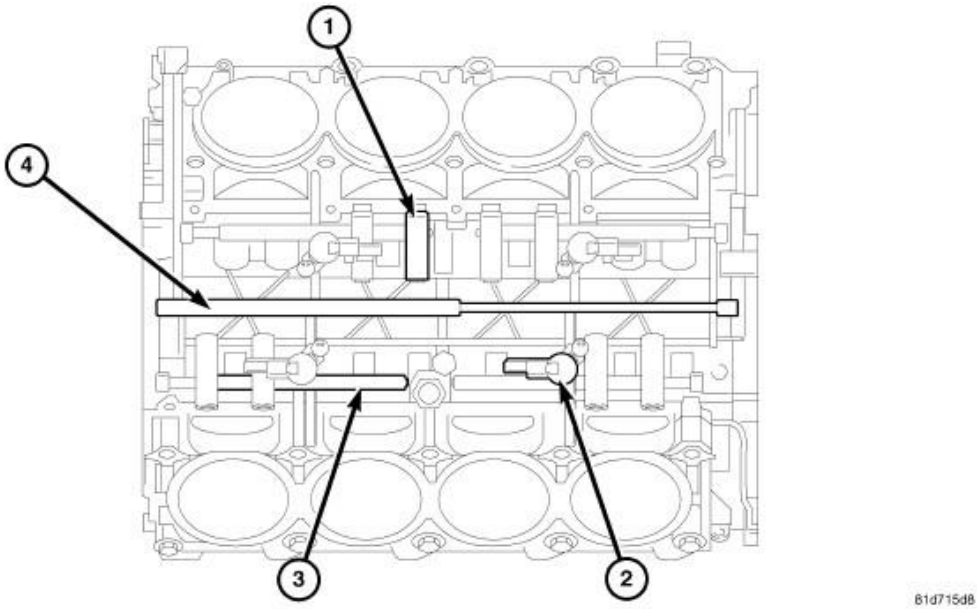


Fig. 62: Identifying Multiple Displacement System Components
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

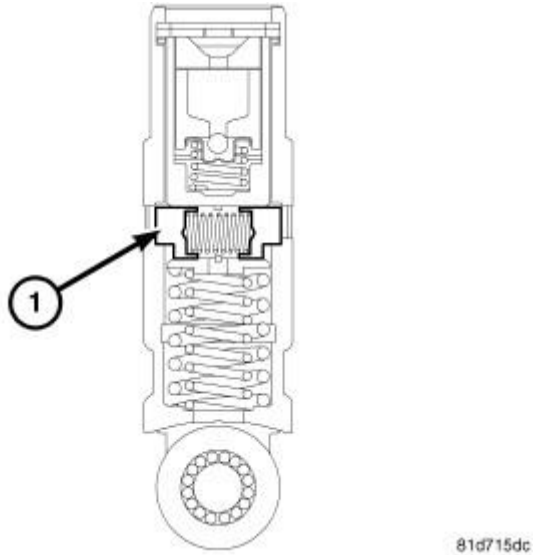


Fig. 63: MDS Lifter Cross Section
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

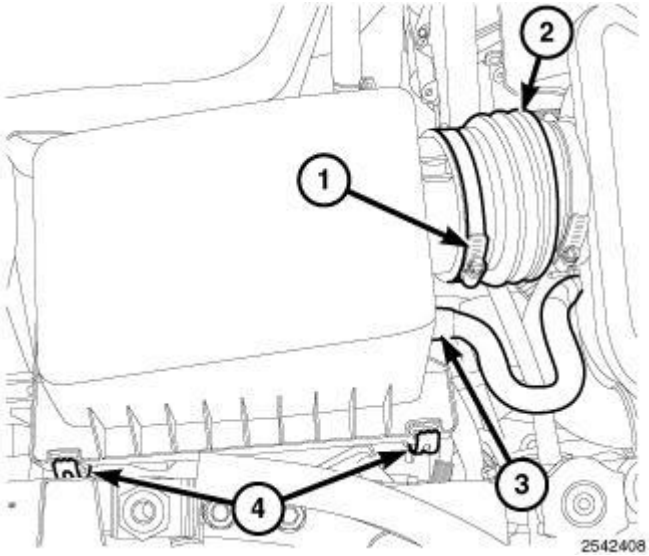


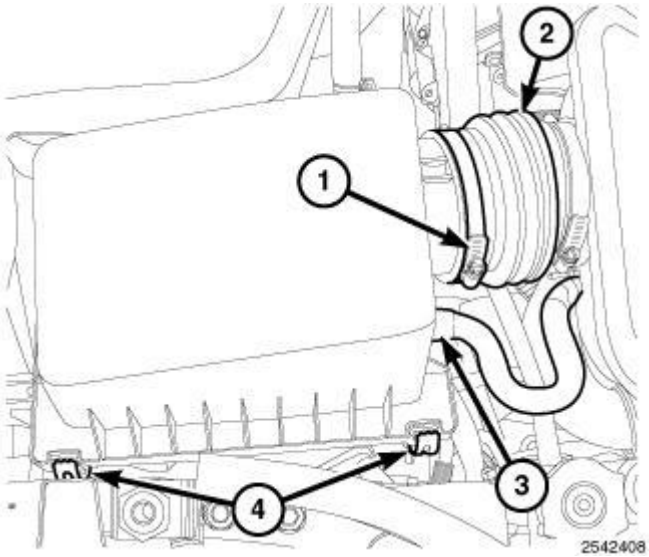
Fig. 64: Air Duct Clamp At Air Cleaner Cover
Courtesy of CHRYSLER LLC

NOTE: Air cleaner housing removal is not necessary for air filter element replacement.

1. Loosen the air duct clamp (1) at the air cleaner cover and disconnect the air duct (2).
2. Remove the make up air hose (3) at the air cleaner cover.
3. Release the 2 spring clips (4) from the air cleaner cover.
4. Remove the air cleaner cover from the housing assembly.
5. Remove the air filter element from the housing assembly.

Installation

INSTALLATION



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 65: Air Duct Clamp At Air Cleaner Cover
Courtesy of CHRYSLER LLC

NOTE: Clean the inside of air cleaner housing before replacing the air filter element.

1. Install the air filter element into the housing assembly.
2. Position the air cleaner cover onto the housing assembly locating tabs.
3. Latch the 2 spring clips (4) and lock the air cleaner cover to the housing assembly.
4. Connect the make up air hose (3) to the air cleaner cover.
5. Connect the air duct (2) to the air cleaner cover and tighten the air duct clamp (1) to 5 N.m (45 in. lbs.).

BODY, AIR CLEANER

Removal

REMOVAL

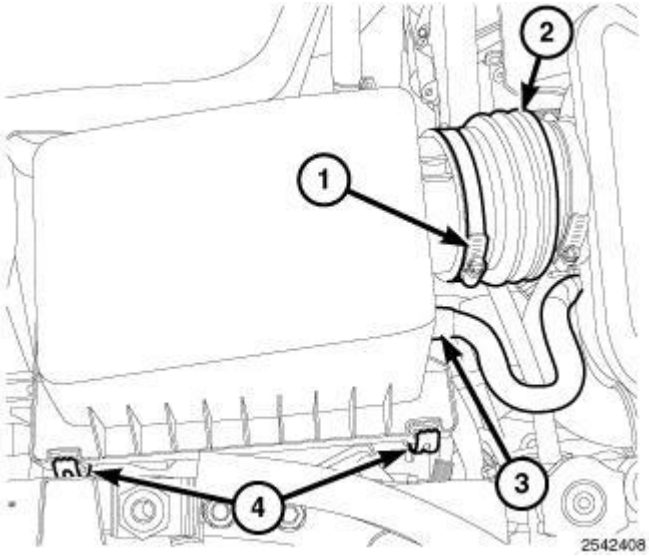


Fig. 66: Air Duct Clamp At Air Cleaner Cover
Courtesy of CHRYSLER LLC

1. Loosen the air duct clamp (1) at the air cleaner cover and disconnect the air duct (2).
2. Remove the make up air hose (3) at the air cleaner cover.
3. Release the 2 spring clips (4) from the air cleaner cover.
4. Remove the air cleaner cover from the housing assembly.
5. Remove the air filter element from the housing assembly.

 © 2011 Mitchell Repair Information Company, LLC.

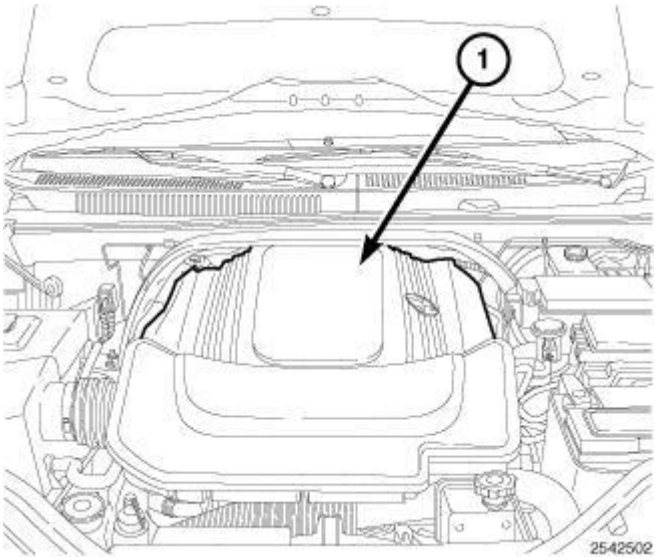


Fig. 67: Engine Cover
Courtesy of CHRYSLER LLC

6. Lift and separate the engine cover retaining grommets from the ball studs and position the engine cover (1) aside.

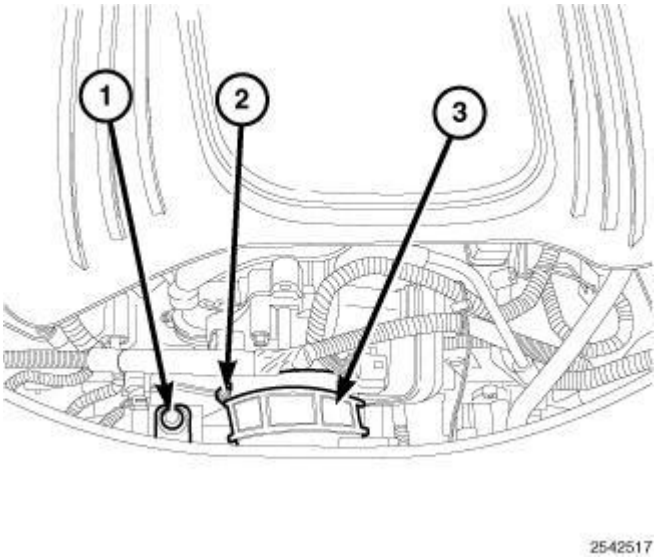


Fig. 68: Air Cleaner Resonator Air Duct Clamp
Courtesy of CHRYSLER LLC

7. Remove the air cleaner resonator retaining bolt (1).
8. Loosen the air cleaner resonator air duct clamp (2) at the throttle body and disconnect the air duct (3).

 © 2011 Mitchell Repair Information Company, LLC.

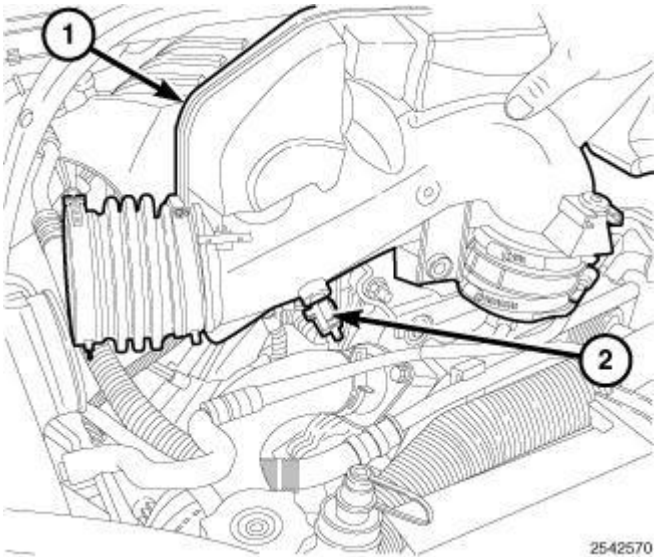


Fig. 69: Air Cleaner Resonator
Courtesy of CHRYSLER LLC

9. Carefully raise the air cleaner resonator (1) and disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (2).
10. Remove the air cleaner resonator (1).

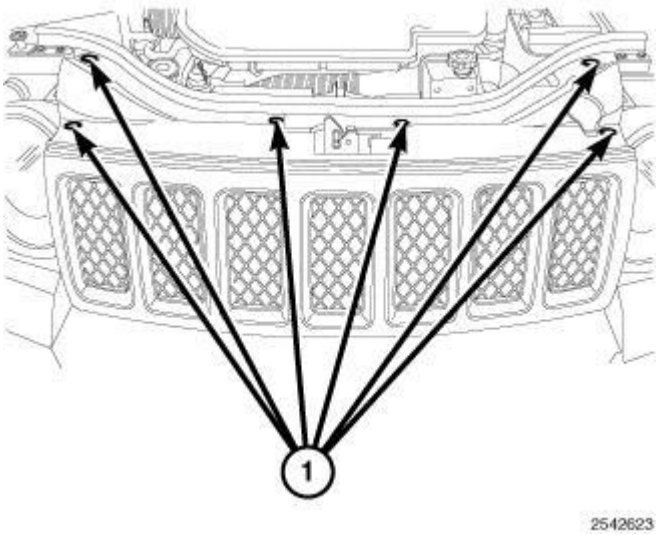


Fig. 70: Retaining Push Pins At Grille
Courtesy of CHRYSLER LLC

11. Remove the 6 retaining push pins (1), tilt the grille forward and remove the grille.

 © 2011 Mitchell Repair Information Company, LLC.

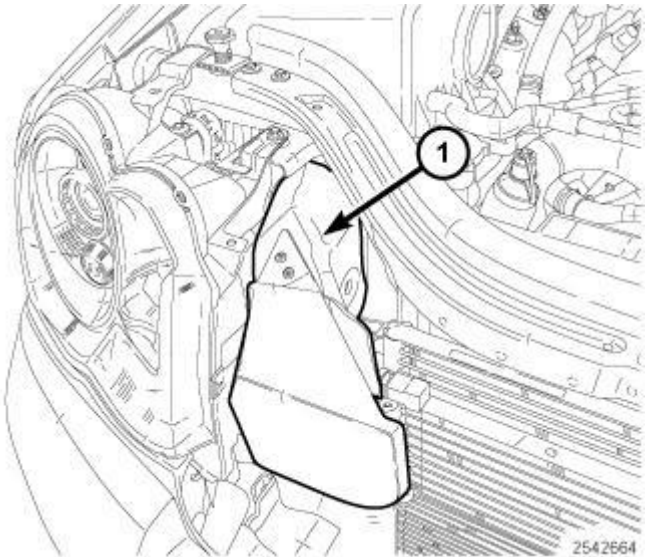


Fig. 71: Housing Assembly Clean Air Tube
Courtesy of CHRYSLER LLC

12. Remove the housing assembly clean air tube (1).

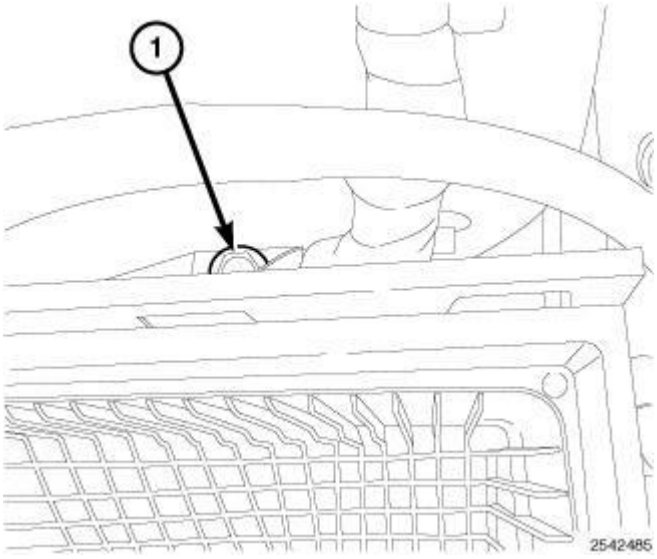


Fig. 72: Housing Assembly Retaining Bolt
Courtesy of CHRYSLER LLC

13. Remove the housing assembly retaining bolt (1) located at the back side of the housing near the strut tower.

 © 2011 Mitchell Repair Information Company, LLC.

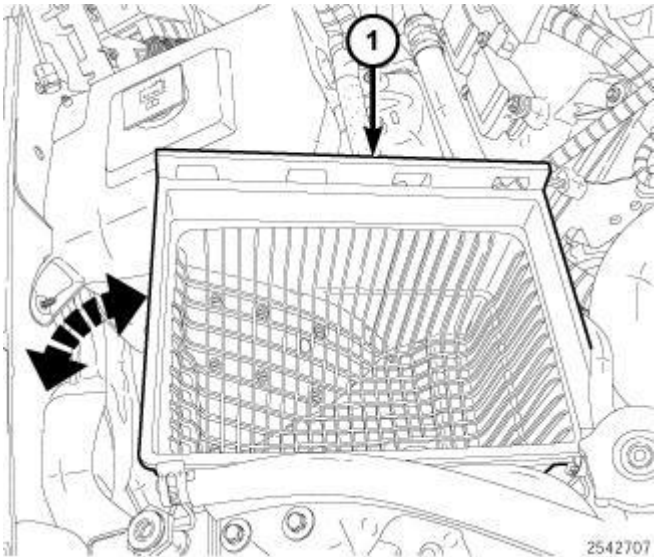


Fig. 73: Lifting Housing Assembly While Rotating Up Toward Engine
Courtesy of CHRYSLER LLC

14. Lift the housing assembly (1) while rotating up toward the engine and remove the housing.

Installation

INSTALLATION

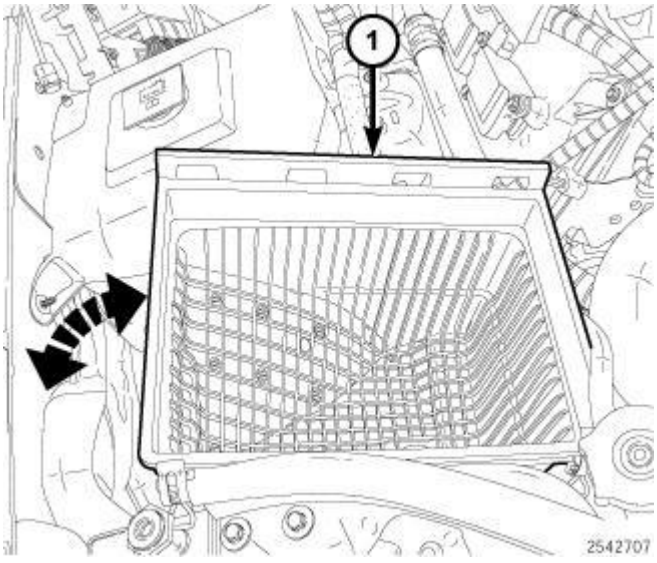


Fig. 74: Lifting Housing Assembly While Rotating Up Toward Engine
Courtesy of CHRYSLER LLC

1. Tilt the housing assembly (1) in the direction of the engine, lower and rotate toward the fender into position.

 © 2011 Mitchell Repair Information Company, LLC.

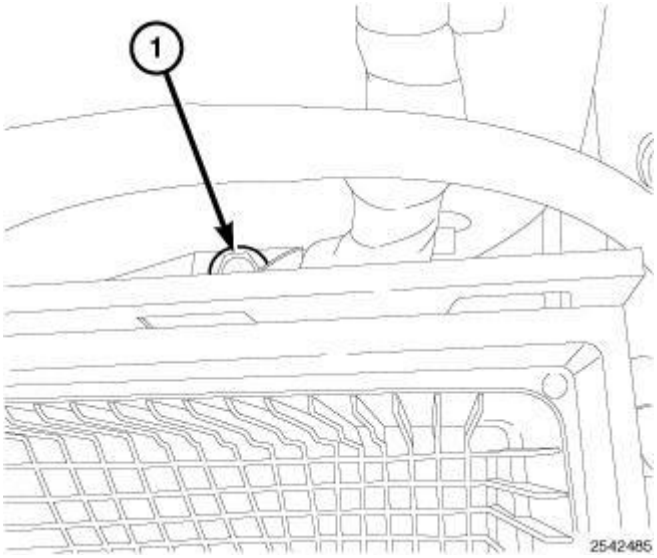


Fig. 75: Housing Assembly Retaining Bolt
Courtesy of CHRYSLER LLC

2. Install the housing assembly retaining bolt (1) located at the back side of the housing near the strut tower and tighten to 5 N.m (45 in. lbs.).

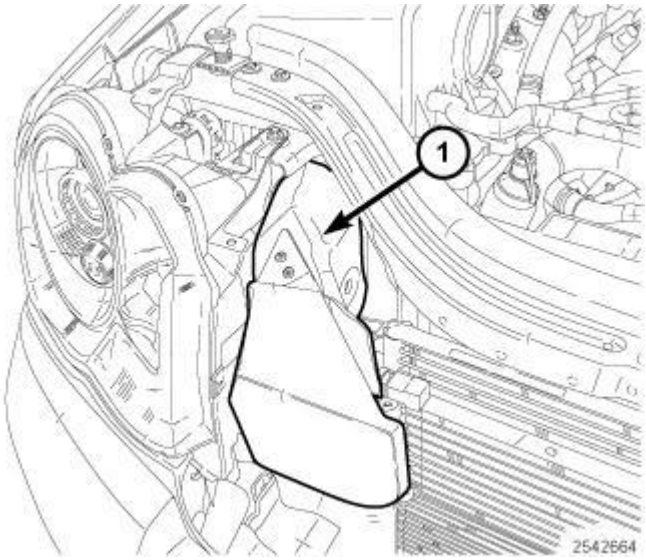


Fig. 76: Housing Assembly Clean Air Tube
Courtesy of CHRYSLER LLC

3. Install the housing assembly clean air tube (1).

 © 2011 Mitchell Repair Information Company, LLC.

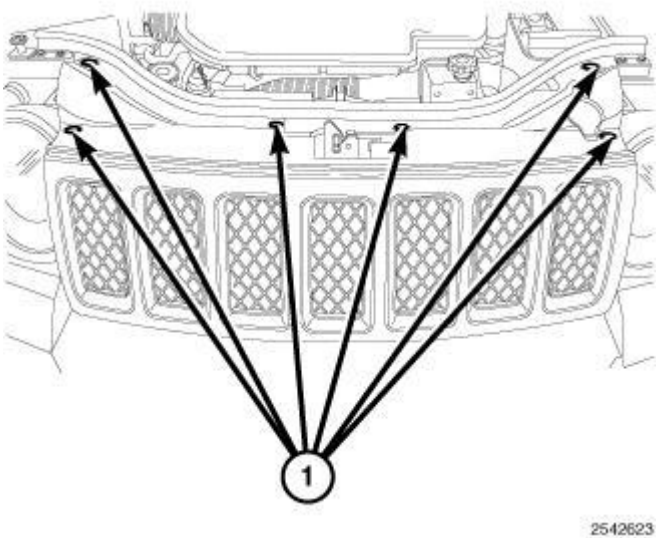


Fig. 77: Retaining Push Pins At Grille
Courtesy of CHRYSLER LLC

4. Position the grille into the lower locating tabs, tilt the grille back and install the 6 retaining push pins (1).

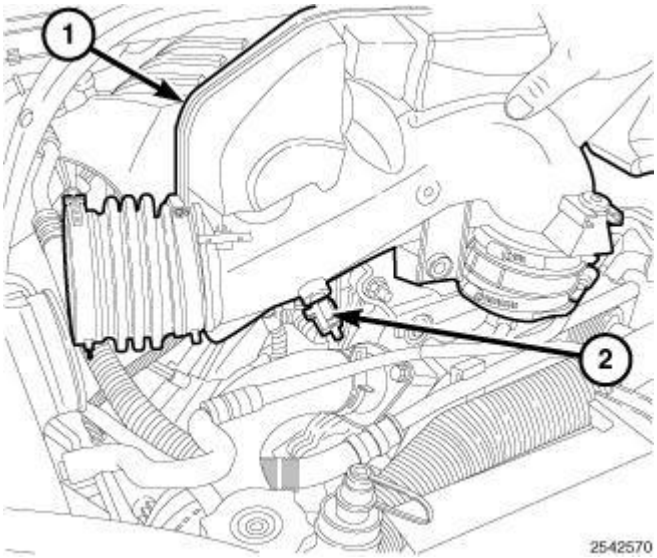


Fig. 78: Air Cleaner Resonator
Courtesy of CHRYSLER LLC

5. Carefully position the air cleaner resonator (1) and connect the electrical connector at the Intake Air Temperature (IAT) sensor (2).
6. Lower the air cleaner resonator (1) into position.

 © 2011 Mitchell Repair Information Company, LLC.

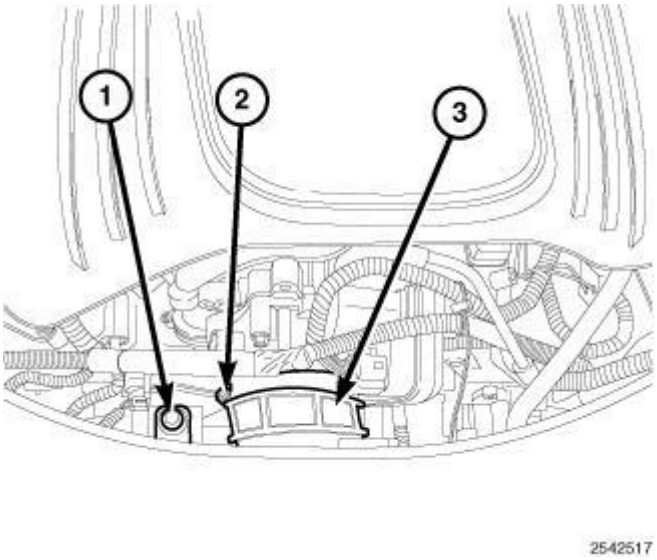


Fig. 79: Air Cleaner Resonator Air Duct Clamp
Courtesy of CHRYSLER LLC

7. Connect the air cleaner resonator air duct (3) onto the throttle body and tighten the air duct clamp (2) to 5 N.m (45 in. lbs.).
8. Install the air cleaner resonator retaining bolt (1) and tighten to 5 N.m (45 in. lbs.).

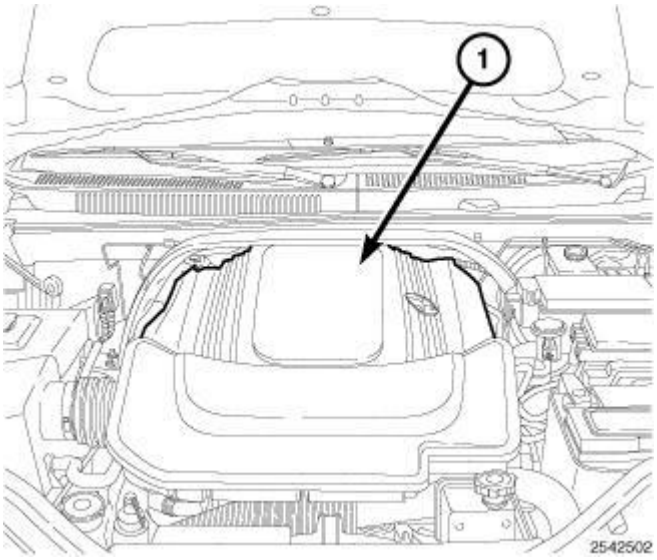


Fig. 80: Engine Cover
Courtesy of CHRYSLER LLC

9. Position the engine cover (1) and secure the retaining grommets to the ball studs.

 © 2011 Mitchell Repair Information Company, LLC.

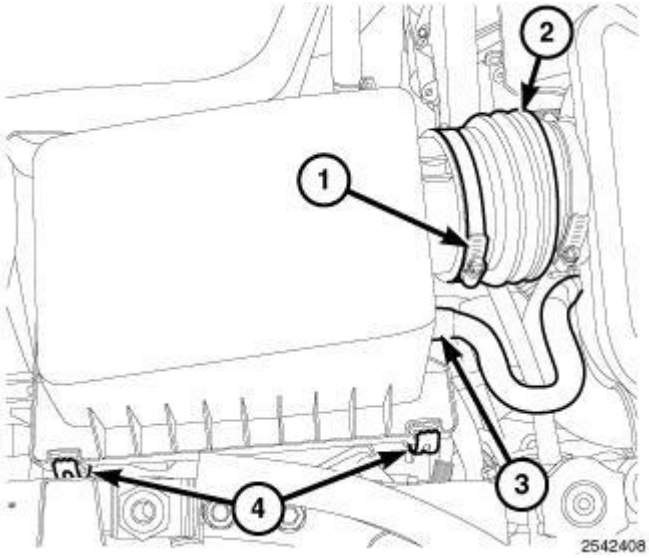


Fig. 81: Air Duct Clamp At Air Cleaner Cover
Courtesy of CHRYSLER LLC

NOTE: Clean the inside of air cleaner housing before replacing the air filter element.

10. Install the air filter element into the housing assembly.
11. Position the air cleaner cover onto the housing assembly locating tabs.
12. Latch the 2 spring clips (4) and lock the air cleaner cover to the housing assembly.
13. Connect the make up air hose (3) to the air cleaner cover.
14. Connect the air duct (2) to the air cleaner cover and tighten the air duct clamp (1) to 5 N.m (45 in. lbs.).

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:

 © 2011 Mitchell Repair Information Company, LLC.

- 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 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

 © 2011 Mitchell Repair Information Company, LLC.

REMOVAL

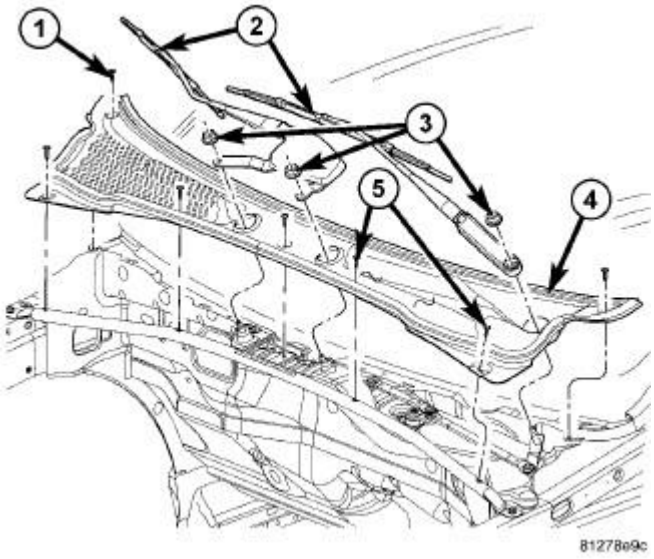


Fig. 82: Removing/Installing Cowl Grille
Courtesy of CHRYSLER LLC

1. Remove cowl grille (4).
2. Perform the Fuel System Pressure Release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** . Disconnect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
3. Disconnect the battery negative cable.
4. Drain cooling system. Refer to **Cooling - Standard Procedure** .
5. Remove the air cleaner assembly. See **Removal** .

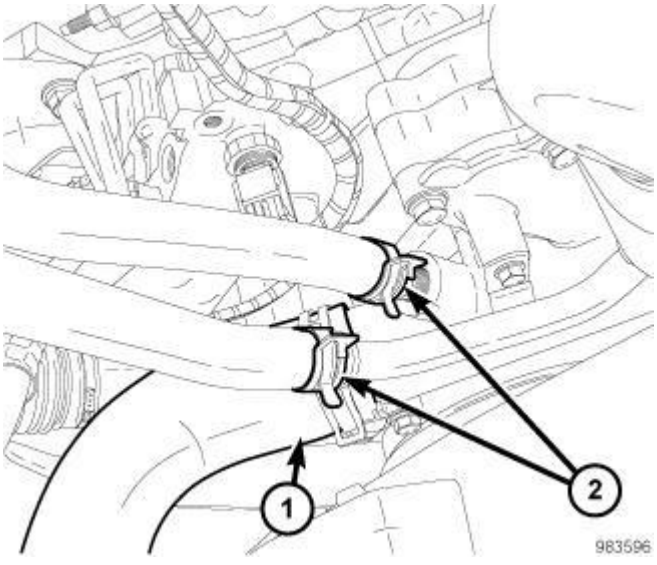


Fig. 83: Heater & Lower Radiator Hose

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

6. Remove closed crankcase ventilation system.
7. Disconnect the exhaust at the exhaust manifolds.
8. Disconnect the evaporation control system.
9. Disconnect heater hoses (2).

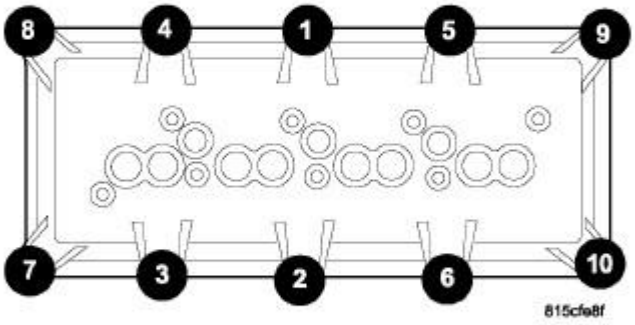


Fig. 84: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

10. Remove the power steering pump.
11. Remove cylinder head covers using the sequence provided, and gaskets. See **Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

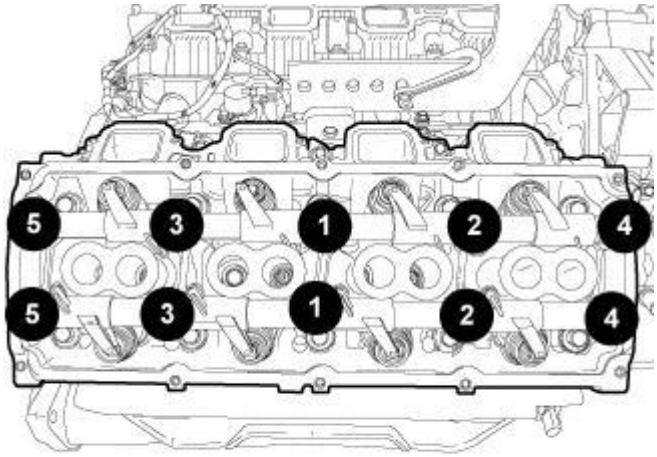


Fig. 85: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

12. Remove intake manifold and throttle body as an assembly. See **Removal** .
13. Remove rocker arm assemblies and push rods. Identify to ensure installation in original locations. See **Removal** .

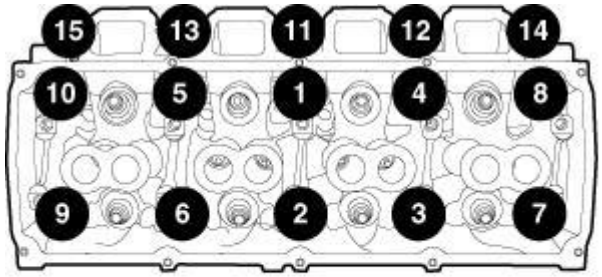


Fig. 86: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

14. Remove the head bolts from each cylinder head(s), using the sequence provided. Remove cylinder head (s) and discard the cylinder head gasket(s).

CLEANING

CLEANING

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

INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

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

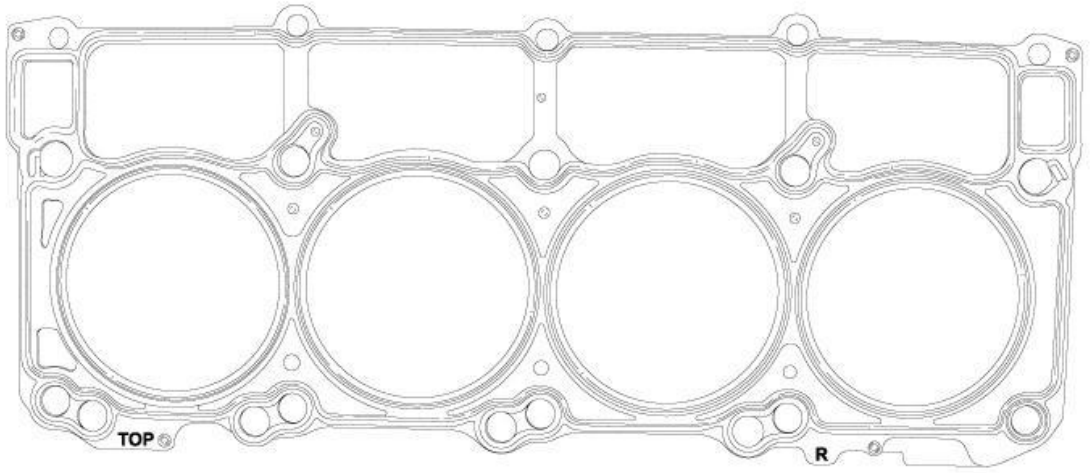


Fig. 87: Identifying Cylinder Head Gasket Marking
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

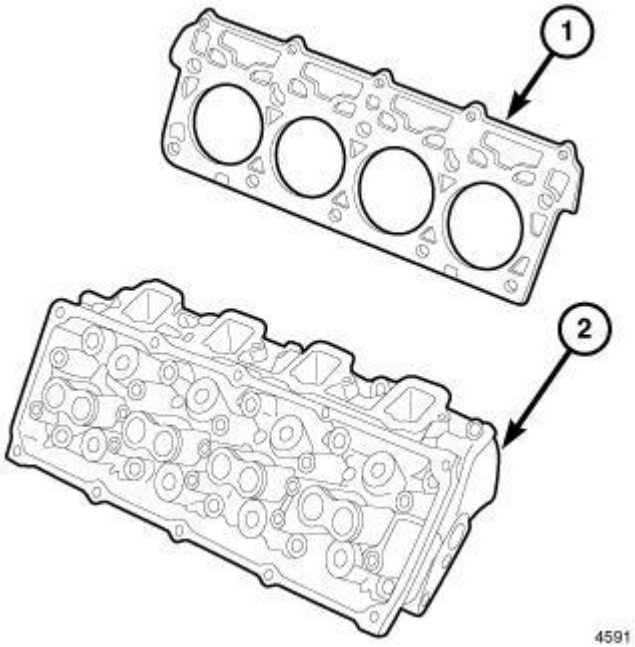


Fig. 88: Cylinder Head Components
Courtesy of CHRYSLER LLC

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

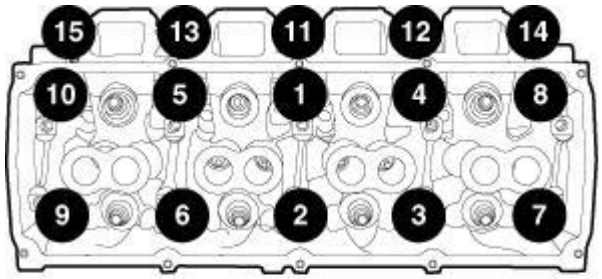


Fig. 89: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

10. Tighten cylinder head bolts 11 through 15 to 34 N.m (25 ft. lbs.) in the sequence shown in illustration.

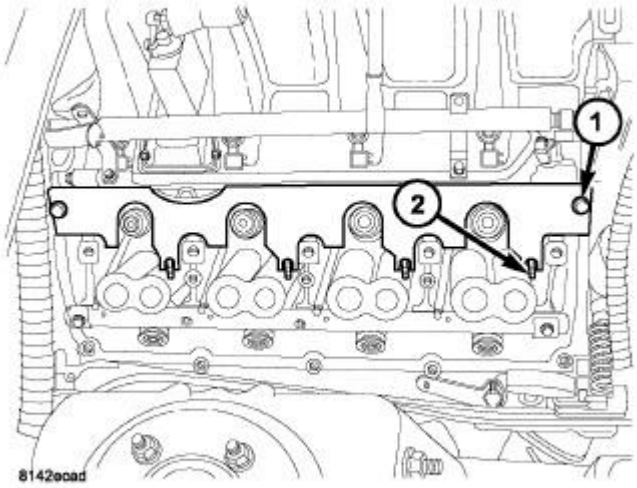


Fig. 90: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

11. Install push rods and rocker arm assemblies in their original position, using Pushrod Retainer 9070 (1). See **Installation** .
12. Install the intake manifold. See **Installation** .
13. Install the spark plugs.

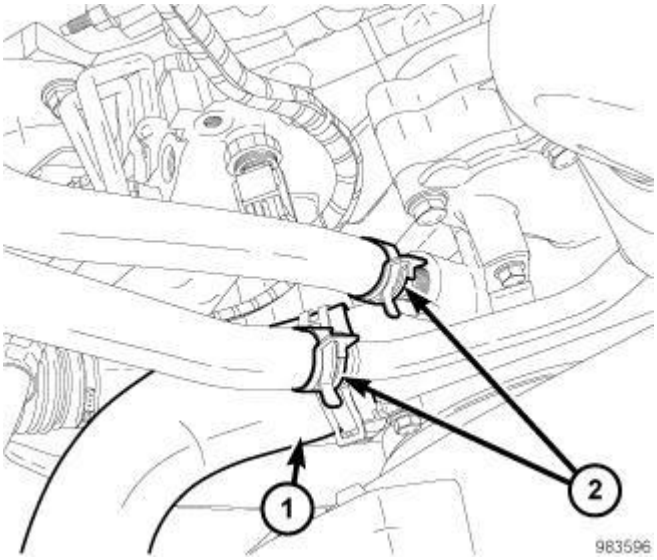


Fig. 91: Heater & Lower Radiator Hose

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

14. Connect the heater hoses (2).
15. Connect the fuel supply line.
16. Install the power steering pump.
17. Install the drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

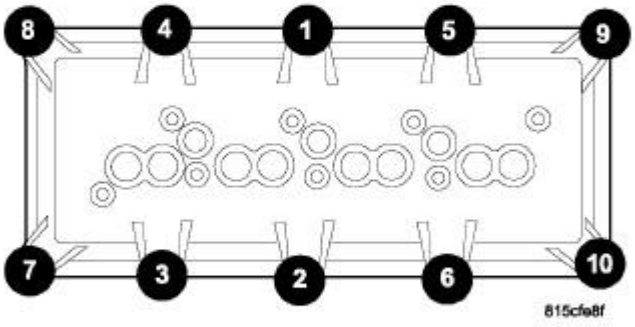


Fig. 92: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

18. Install cylinder head covers (1). See **Installation**.
19. Connect the evaporation control system.
20. Install the air cleaner.

 © 2011 Mitchell Repair Information Company, LLC.

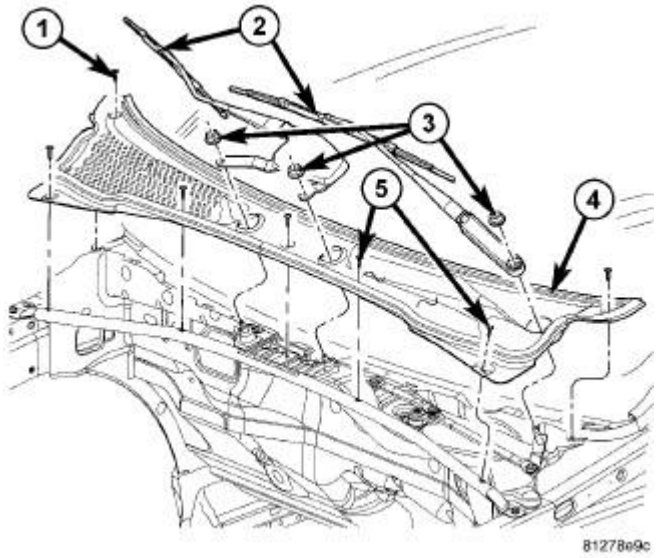


Fig. 93: Removing/Installing Cowl Grille
Courtesy of CHRYSLER LLC

21. Install cowl grille (4).
22. Fill cooling system. Refer to **Cooling - Standard Procedure** .
23. Drain engine oil.
24. Fill engine with new oil.
25. Connect the negative cable to the battery.
26. Start engine check for leaks.

COVER(S), CYLINDER HEAD

Removal

REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

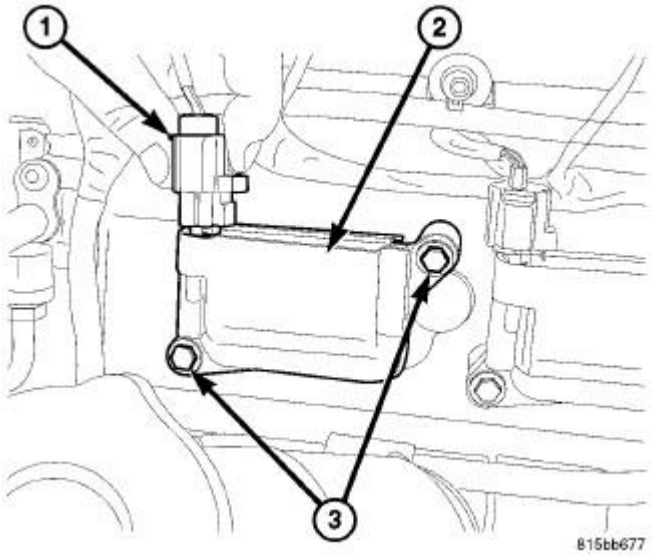


Fig. 94: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER LLC

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

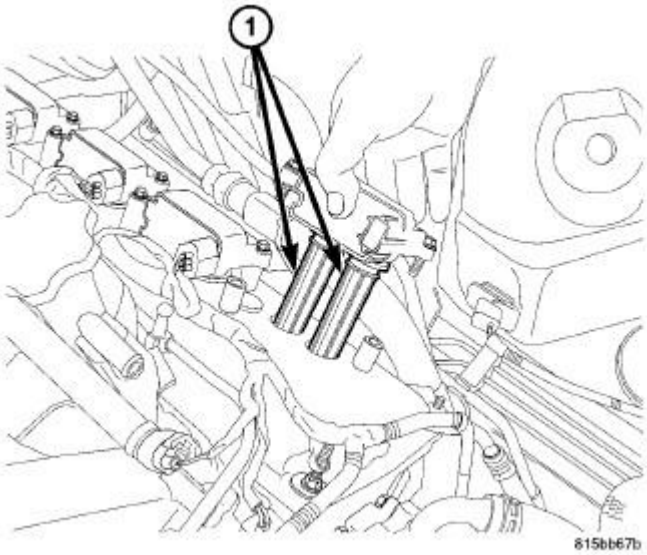


Fig. 95: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

4. Remove ignition coil (1).

 © 2011 Mitchell Repair Information Company, LLC.

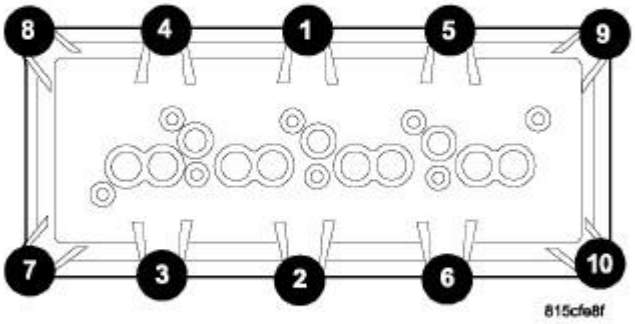


Fig. 96: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

5. Remove cylinder head cover retaining bolts.

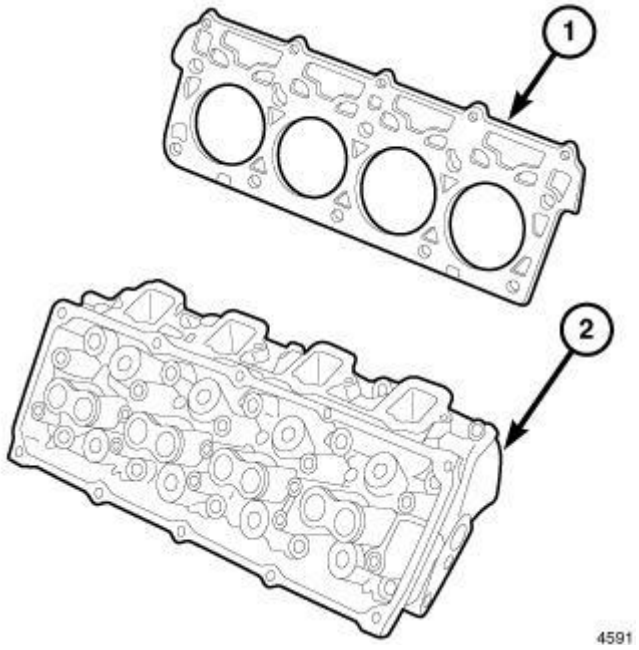


Fig. 97: Cylinder Head Components
Courtesy of CHRYSLER LLC

6. Remove cylinder head cover (1).

 © 2011 Mitchell Repair Information Company, LLC.

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

Installation

INSTALLATION

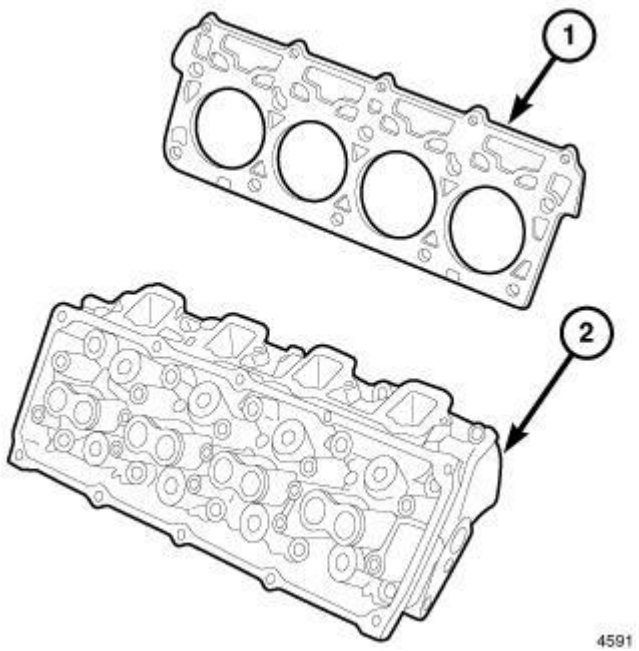


Fig. 98: Cylinder Head Components
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

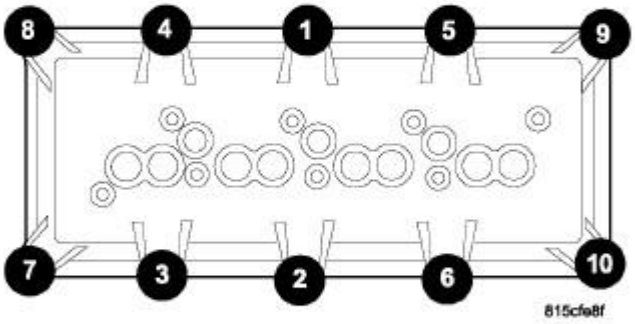


Fig. 99: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

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

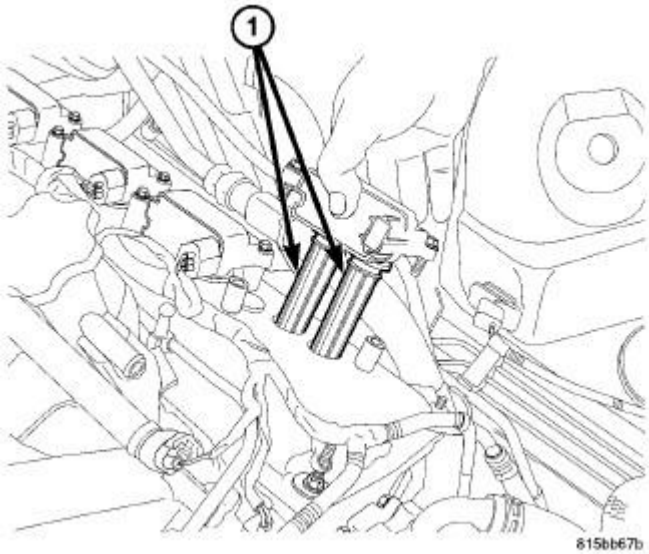


Fig. 100: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

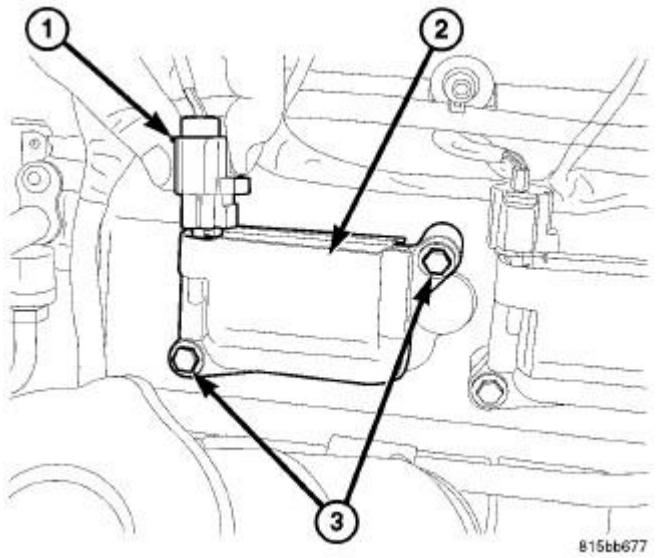


Fig. 101: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER LLC

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

ROCKER ARM, VALVE

Removal

REMOVAL

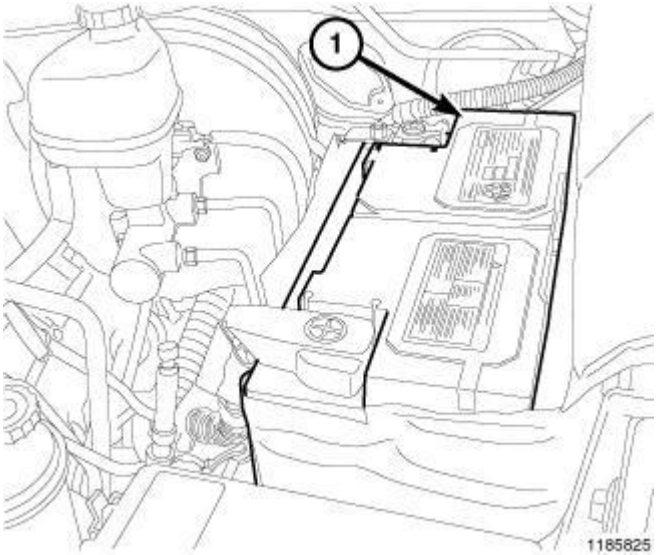


Fig. 102: Battery

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

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

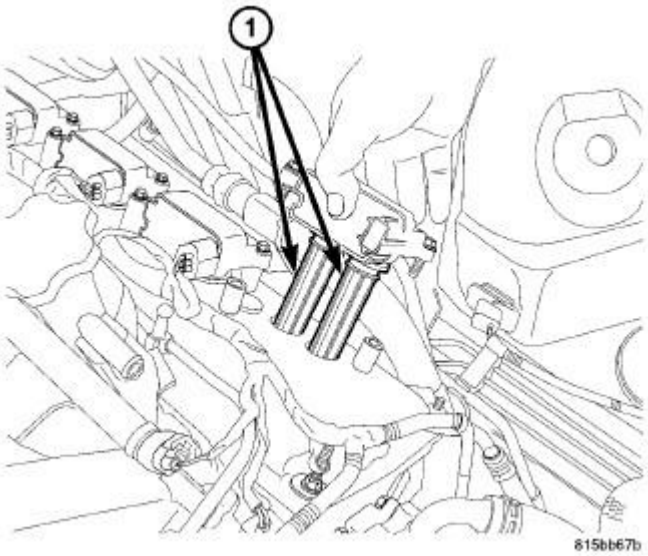


Fig. 103: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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

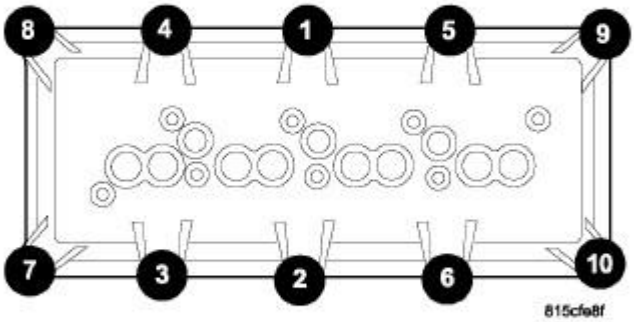


Fig. 104: Cylinder Head Cover Torque Sequence

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

4. Using the sequence shown in illustration, remove the cylinder head cover. See **Removal**.

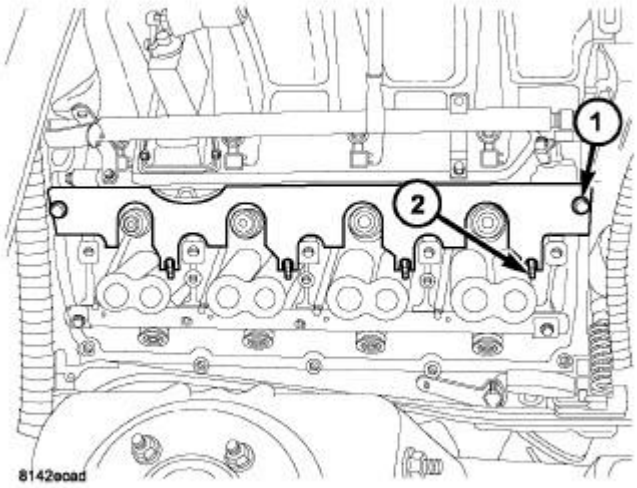


Fig. 105: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

5. Install the pushrod retainer 9070 (1).

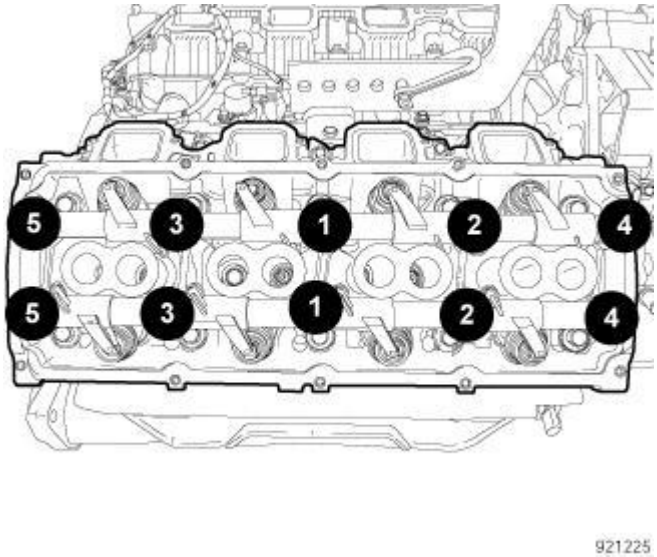


Fig. 106: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

6. Using the sequence shown in illustration, loosen the rocker shafts retaining bolts.

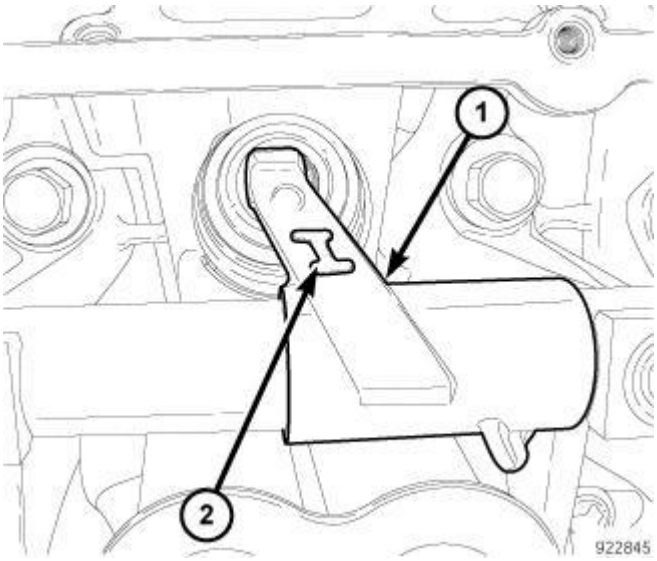


Fig. 107: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

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).

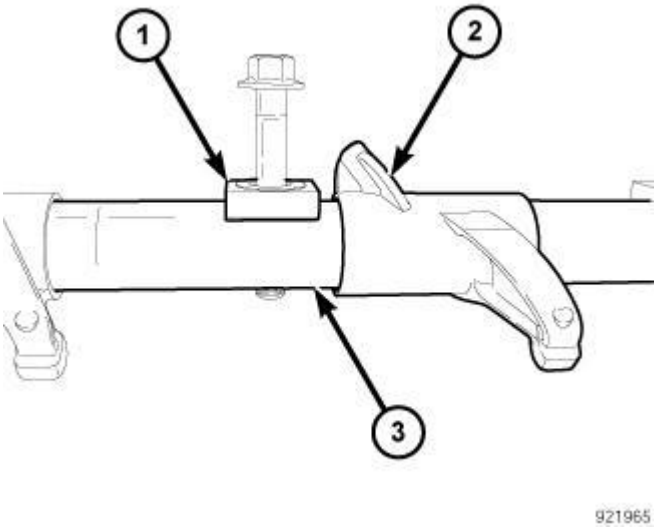


Fig. 108: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

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

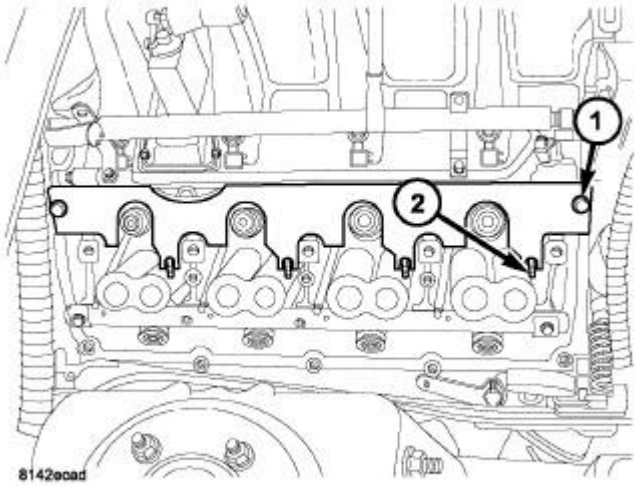


Fig. 109: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

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).

 © 2011 Mitchell Repair Information Company, LLC.

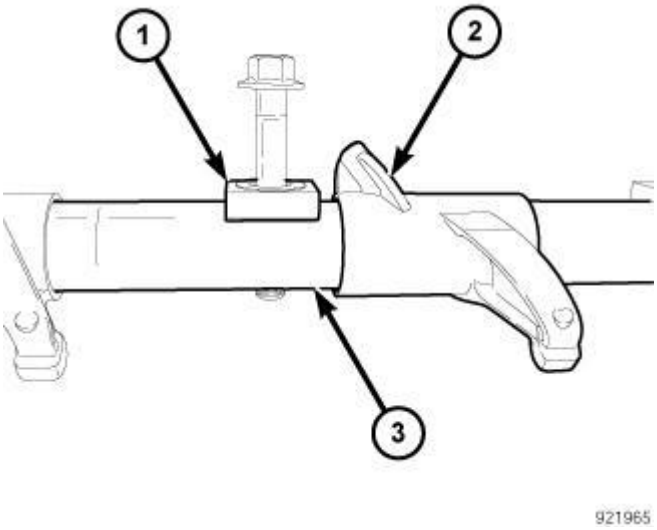


Fig. 110: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

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.

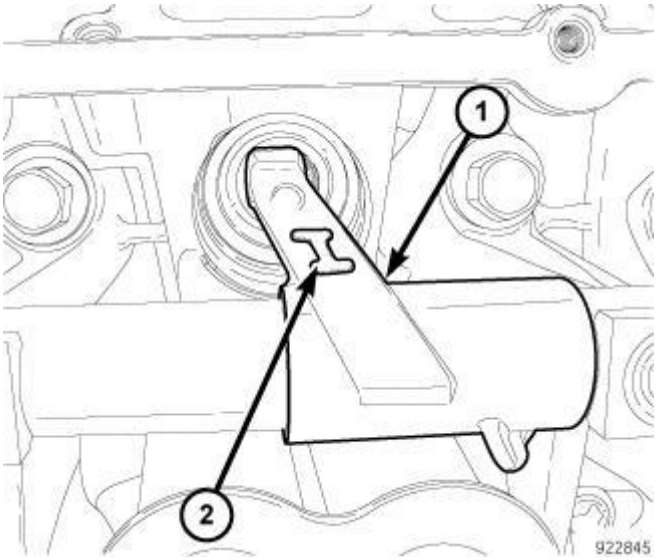


Fig. 111: Intake Rocker Arm Marking

 © 2011 Mitchell Repair Information Company, LLC.

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).

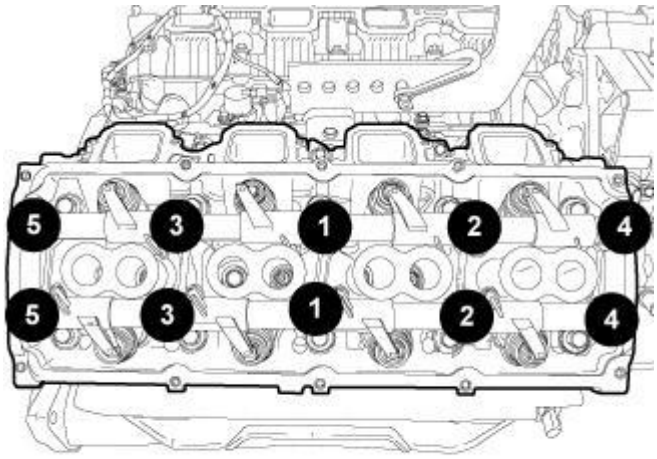


Fig. 112: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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.).

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).

 © 2011 Mitchell Repair Information Company, LLC.

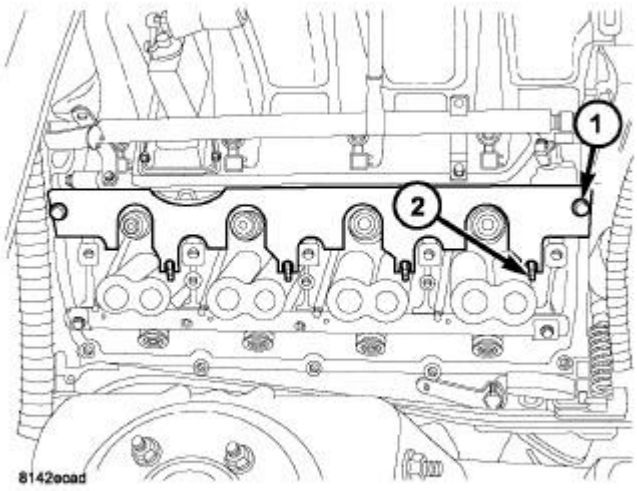


Fig. 113: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

5. Remove pushrod retainer 9070 (1).

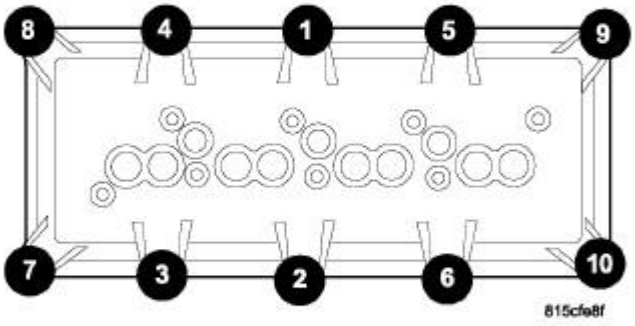


Fig. 114: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

6. Using the sequence shown in illustration, install the cylinder head cover. See **Installation**.

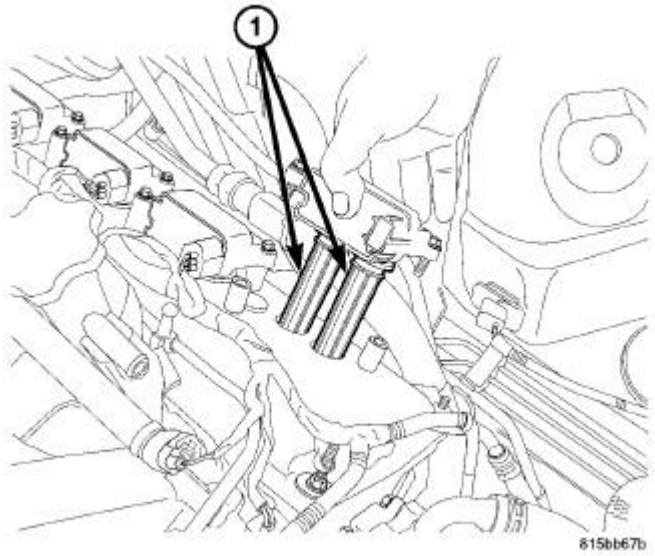


Fig. 115: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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

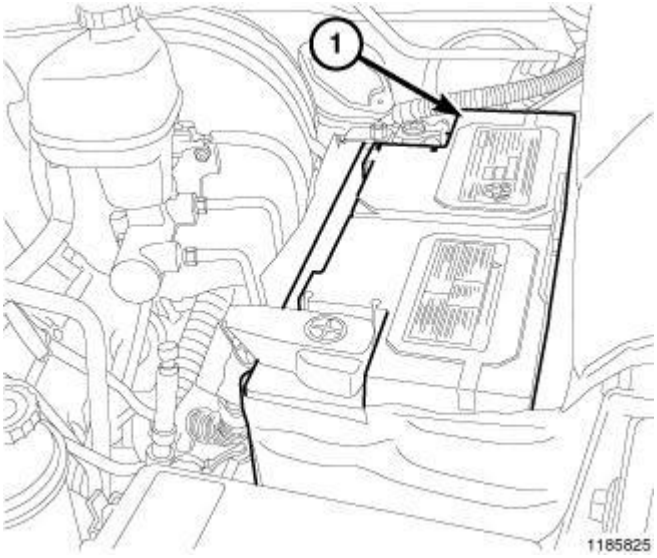


Fig. 116: Battery
Courtesy of CHRYSLER LLC

9. Connect the negative battery cable (1).

SEAL(S), VALVE GUIDE

 © 2011 Mitchell Repair Information Company, LLC.

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 **Removal**.

Installation

INSTALLATION

The valve stem seal is integral with the valve spring seat. For installation, see **Installation**

SPRING(S), VALVE

Removal

REMOVAL

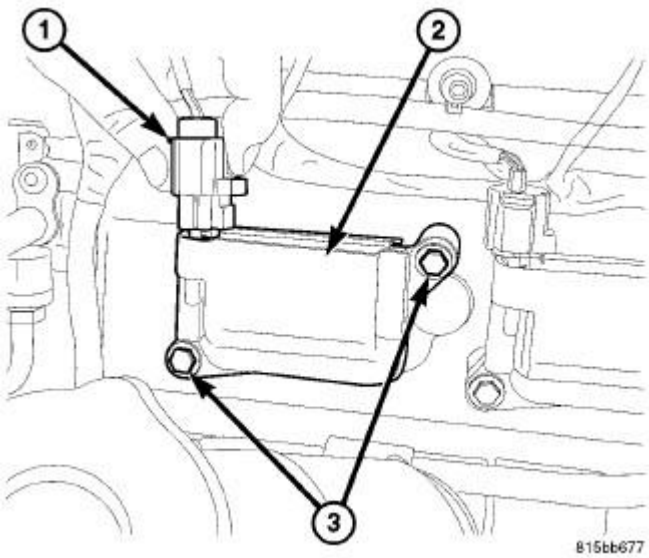


Fig. 117: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly. See **Removal**.
3. Remove the air intake resonator.

 © 2011 Mitchell Repair Information Company, LLC.

4. Remove the ignition coil electrical connectors (1).
5. Remove the ignition coils (2).
6. Remove the spark plugs.

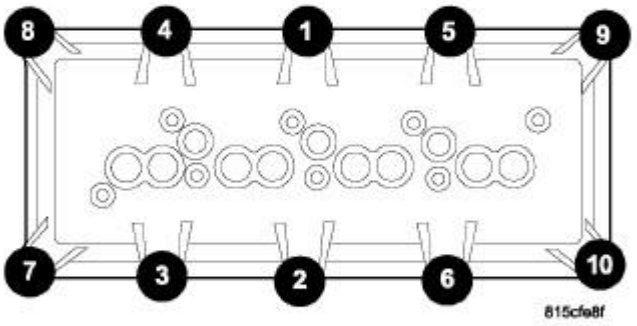


Fig. 118: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

7. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts and remove the cylinder head cover. See **Removal**.

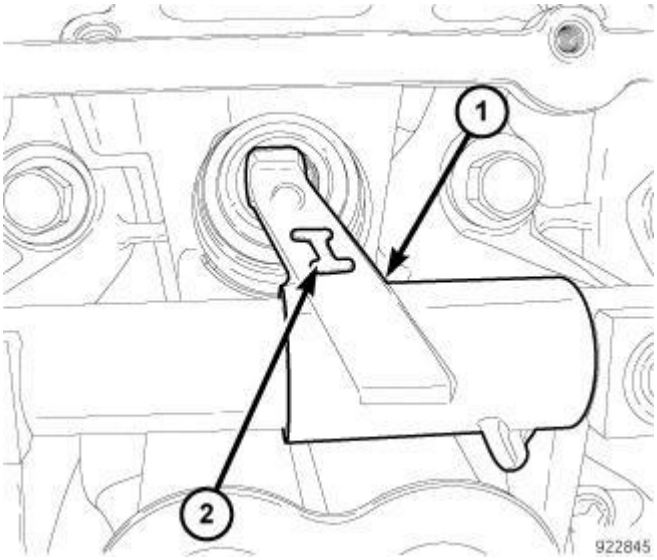


Fig. 119: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, 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).

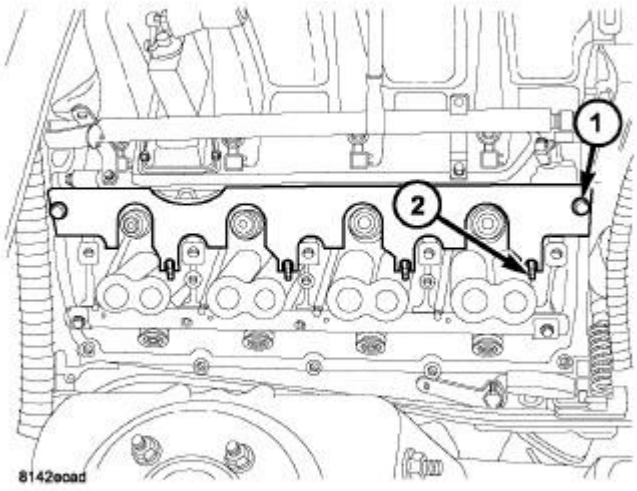


Fig. 120: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

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).

 © 2011 Mitchell Repair Information Company, LLC.

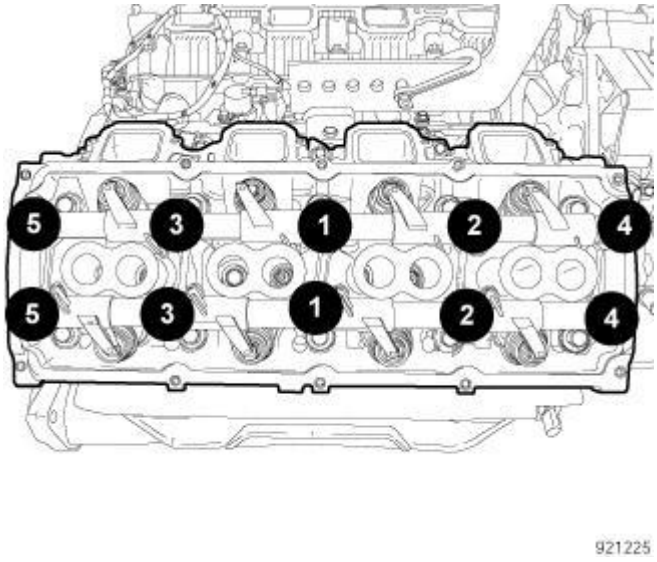


Fig. 121: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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

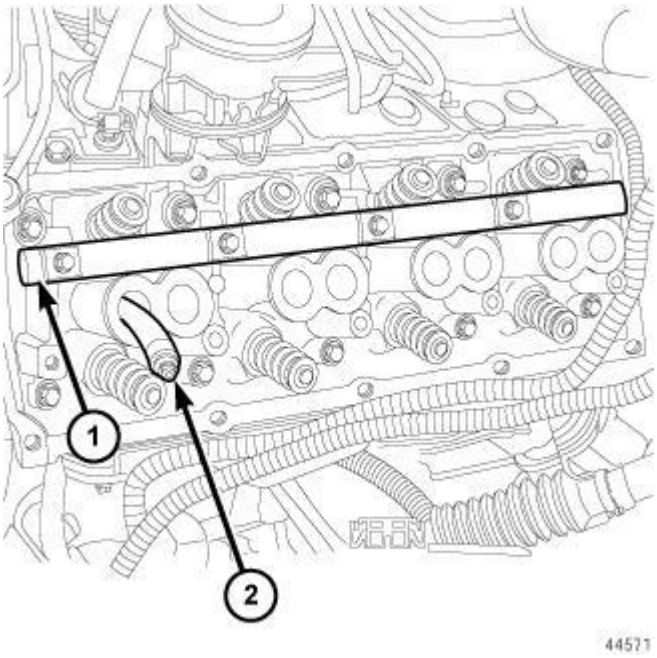


Fig. 122: Rocker Shaft
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

11. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

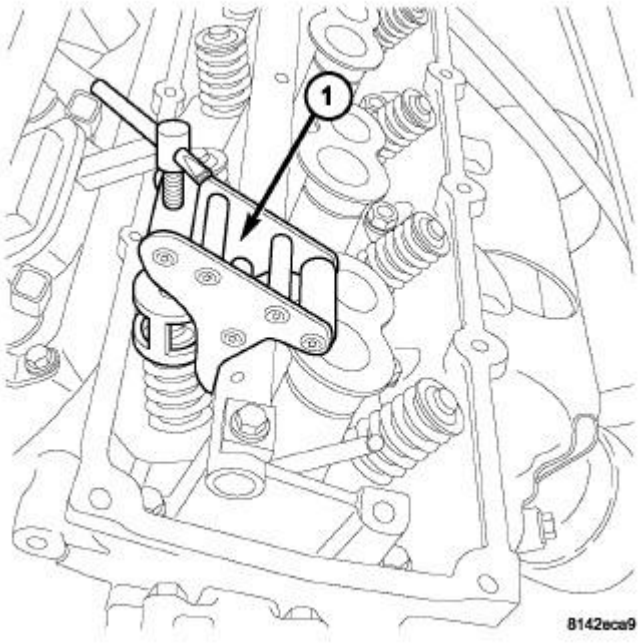


Fig. 123: Removing/Installing Valve Spring Intake
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

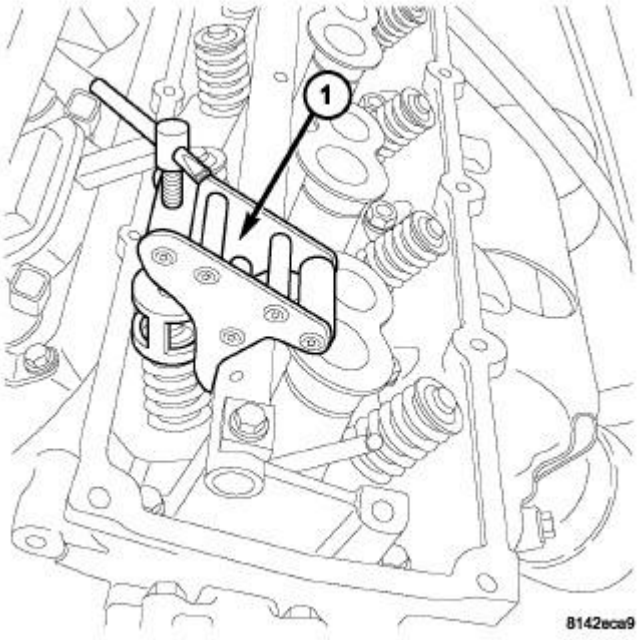


Fig. 124: Removing/Installing Valve Spring Intake
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

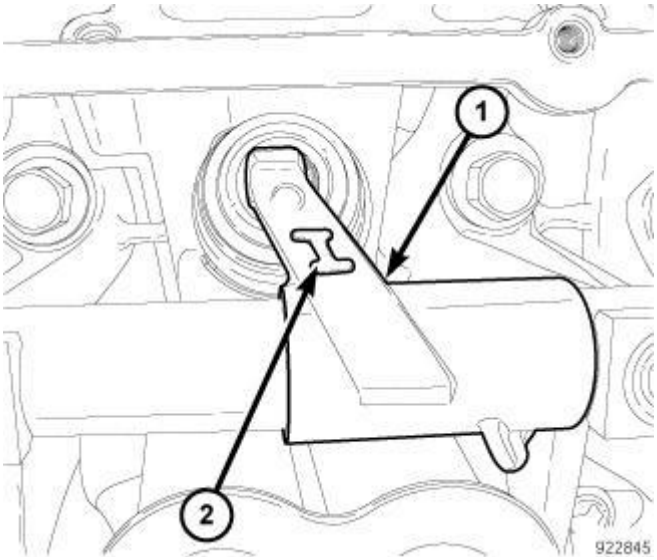


Fig. 125: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

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).

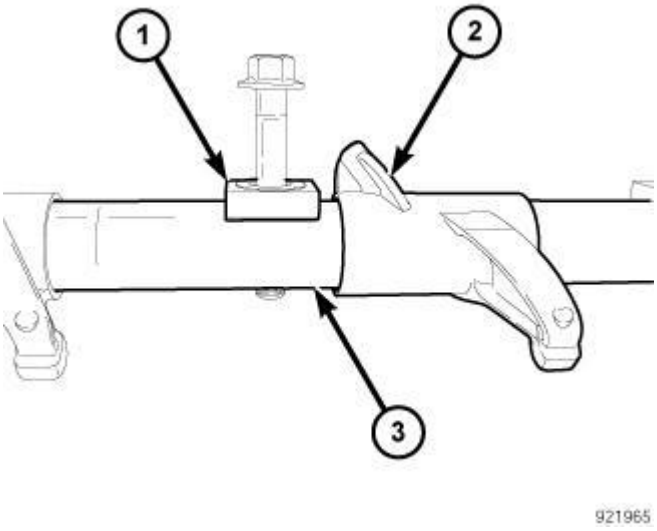


Fig. 126: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

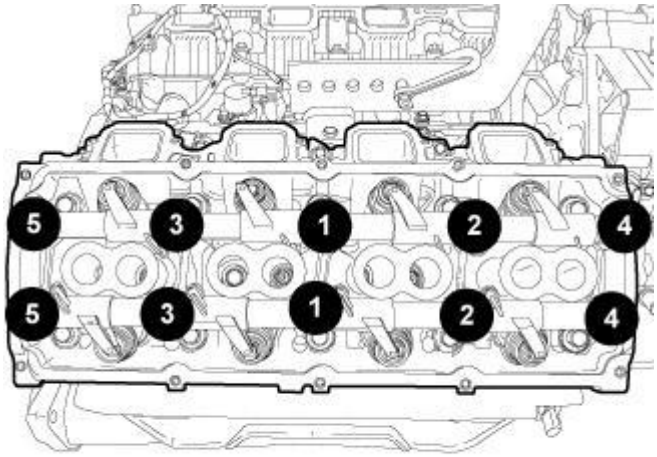


Fig. 127: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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 **Installation**.
7. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

 © 2011 Mitchell Repair Information Company, LLC.

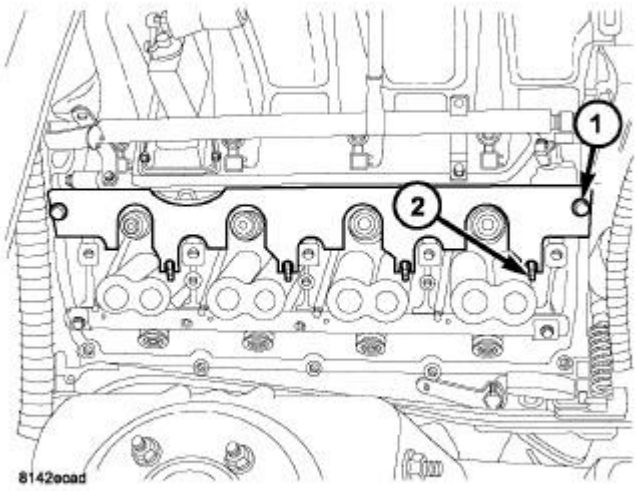


Fig. 128: Push Rod Retainer 9070
Courtesy of CHRYSLER LLC

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

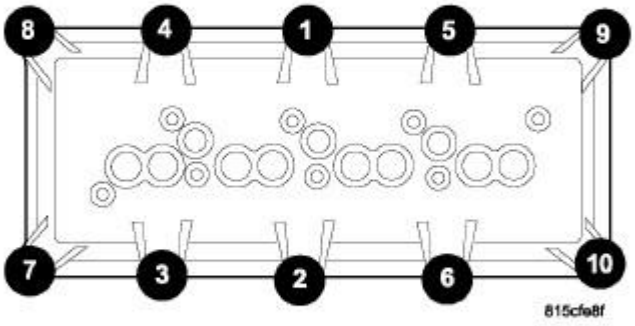


Fig. 129: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, 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.).
12. Install the spark plugs.

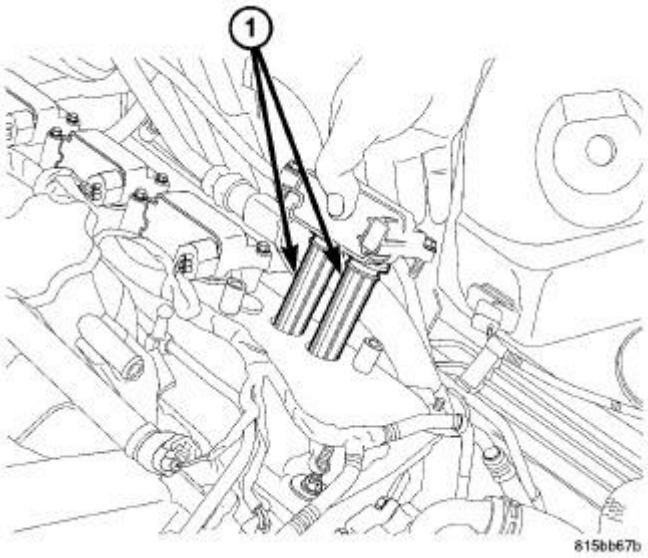


Fig. 130: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

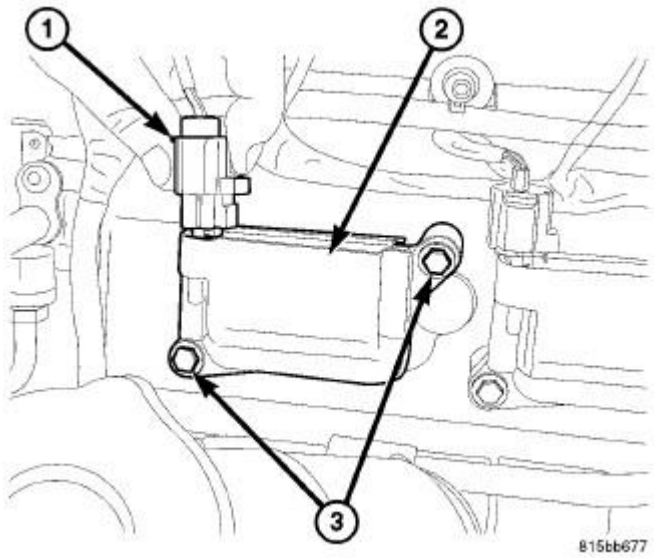


Fig. 131: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER LLC

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 **Installation**.
17. Install the air intake resonator.
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

 © 2011 Mitchell Repair Information Company, LLC.

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 **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.

© 2011 Mitchell Repair Information Company, LLC.

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 **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 34 N.m (300 in. lbs.). Tighten the 3/8 inch x 18 NPT plugs to 27 N.m (240 in. lbs.).

INSPECTION

INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

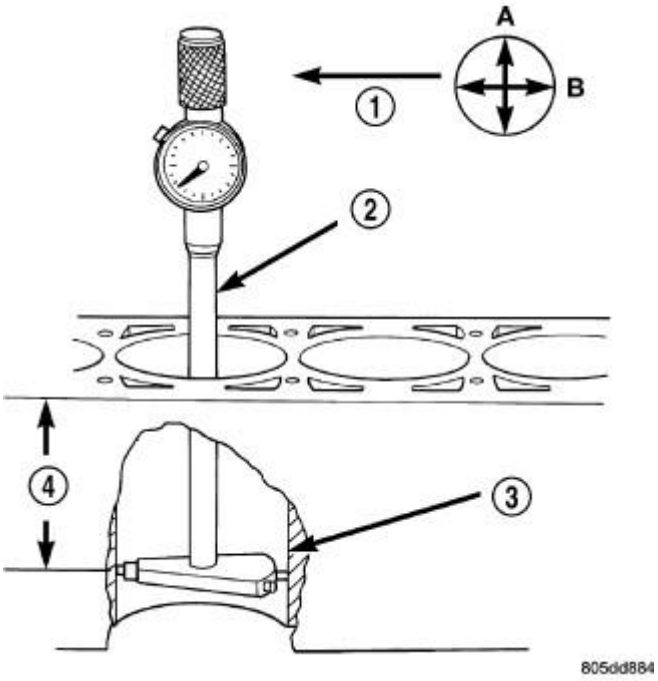


Fig. 132: Bore Gauge - Typical
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

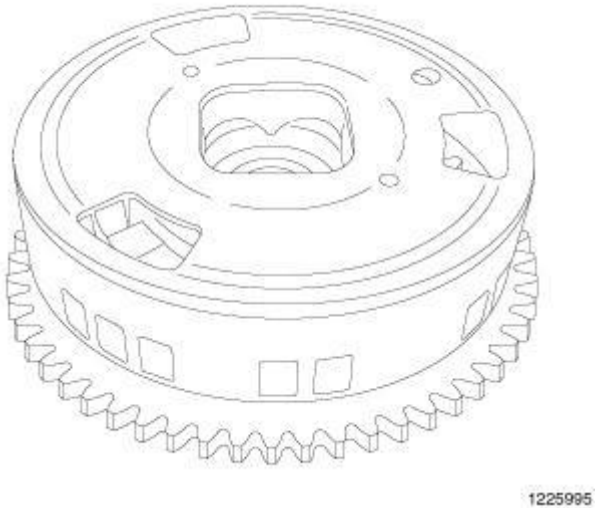


Fig. 133: Variable Cam Timing (VCT)
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

REMOVAL

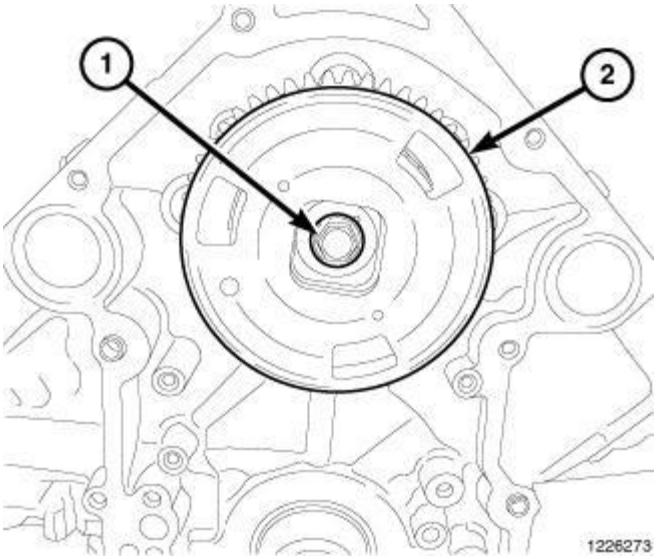


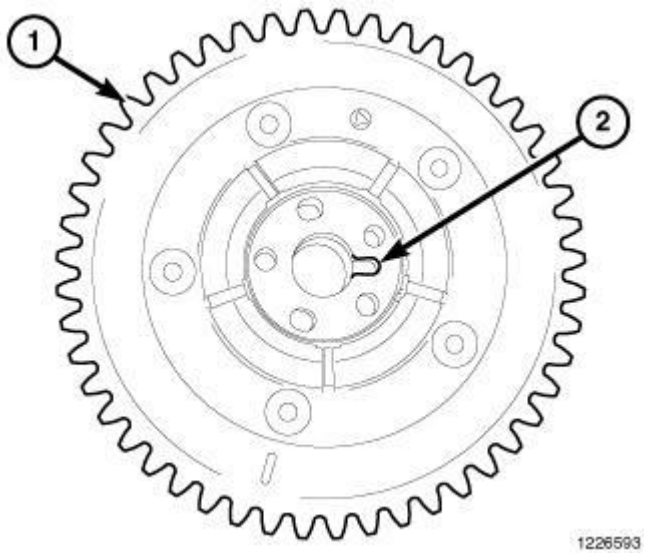
Fig. 134: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

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

1. Remove the timing chain and sprockets. See **Removal**.
2. Remove the camshaft phaser bolt (1).
3. Remove camshaft phaser (2).

Installation

INSTALLATION



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 135: Phaser Alignment Slot
Courtesy of CHRYSLER LLC

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

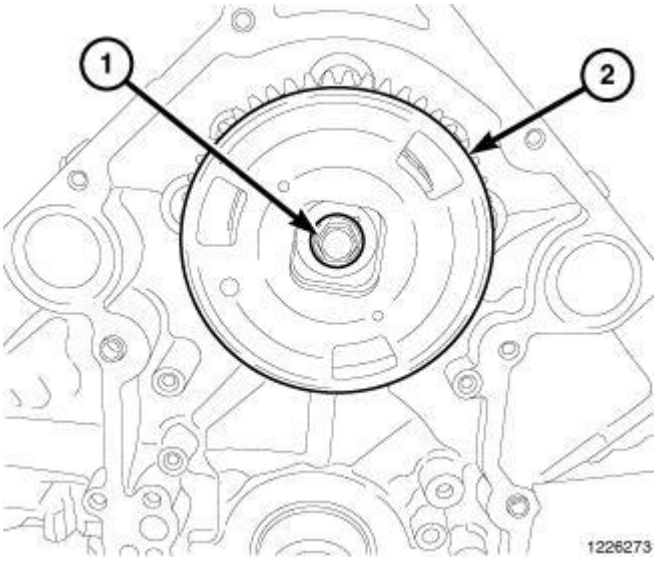


Fig. 136: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

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 **Installation**.

BEARING(S), CRANKSHAFT, MAIN

Standard Procedure

CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

 © 2011 Mitchell Repair Information Company, LLC.

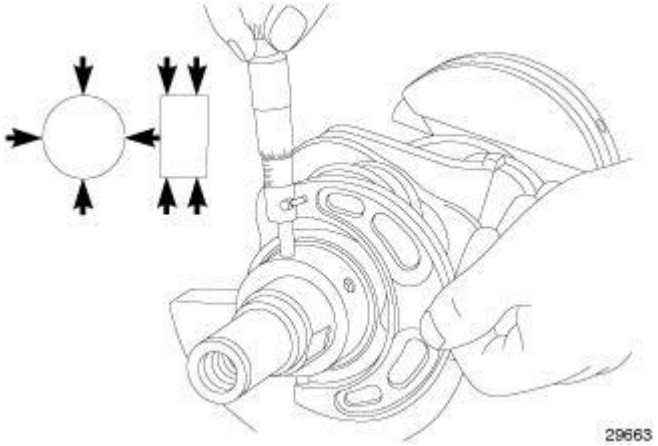


Fig. 137: Crankshaft Journal Measurements - Typical
Courtesy of CHRYSLER LLC

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

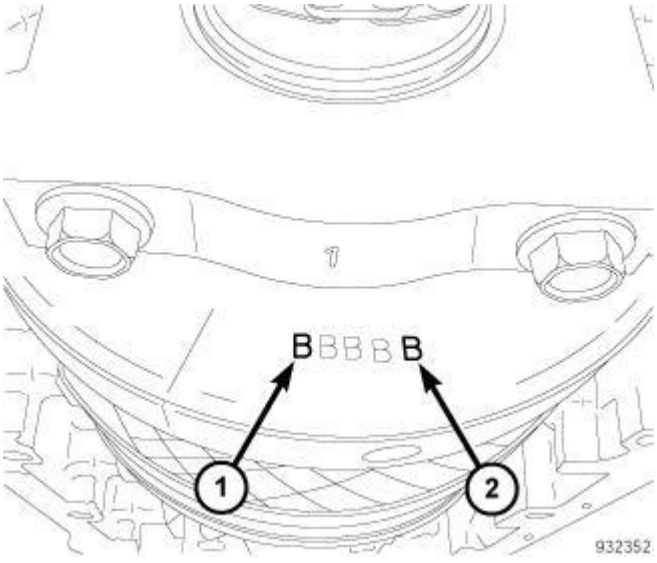


Fig. 138: Crankshaft Counterweight Stamped Grade Identification Marks
Courtesy of CHRYSLER LLC

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft

 © 2011 Mitchell Repair Information Company, LLC.

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

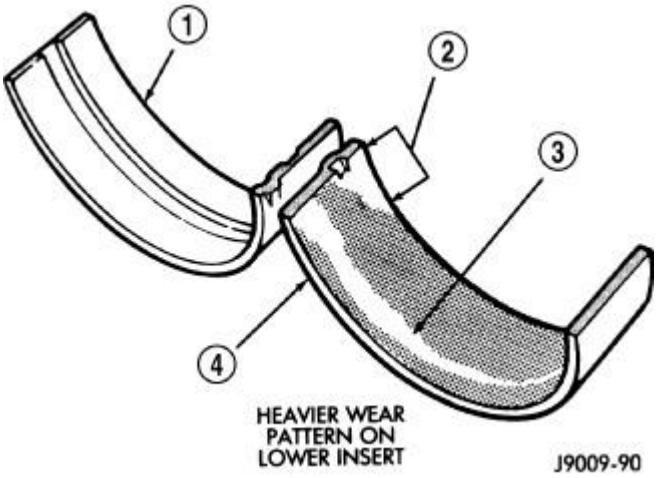


Fig. 139: Main Bearing Wear Patterns
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

Removal

CAMSHAFT CORE HOLE PLUG

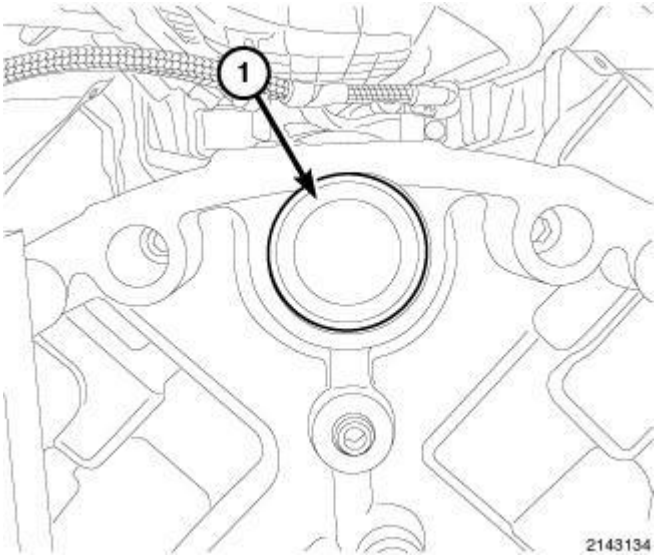


Fig. 140: Camshaft Core Hole Plug
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

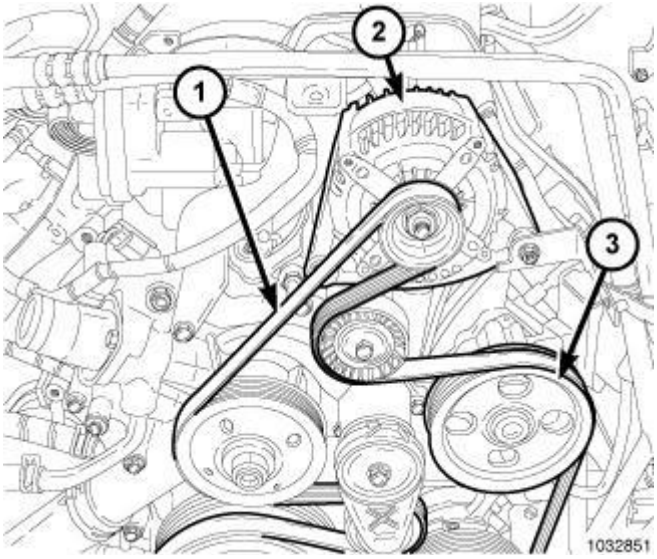
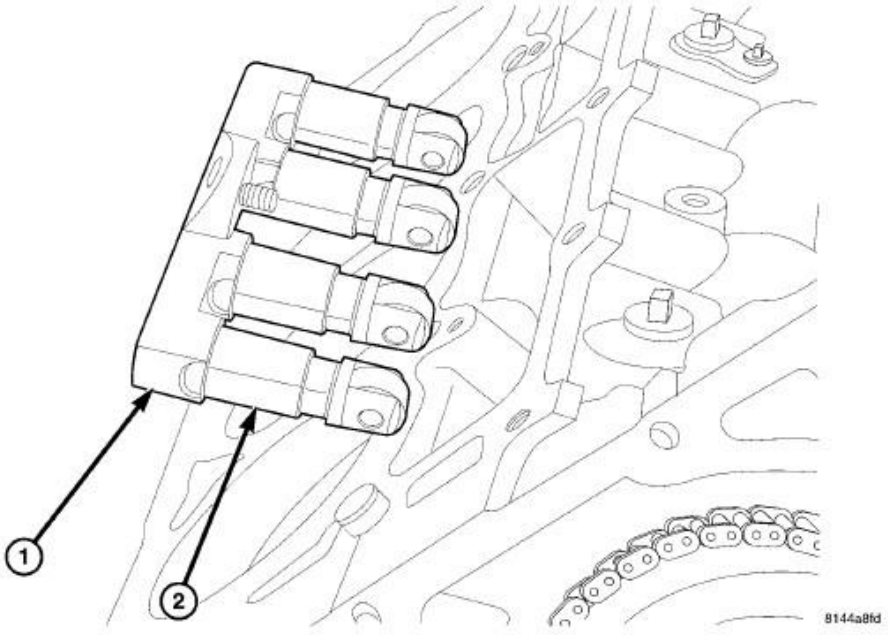


Fig. 141: Accessory Drive Belt Routing
Courtesy of CHRYSLER LLC

1. Remove the battery negative cable.
2. Remove the air cleaner assembly. See **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 **Removal** .
6. Remove the radiator. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Removal** .
7. Remove the oil pan. See **Removal** .
8. Remove timing case cover. See **Removal** .



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 142: 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.

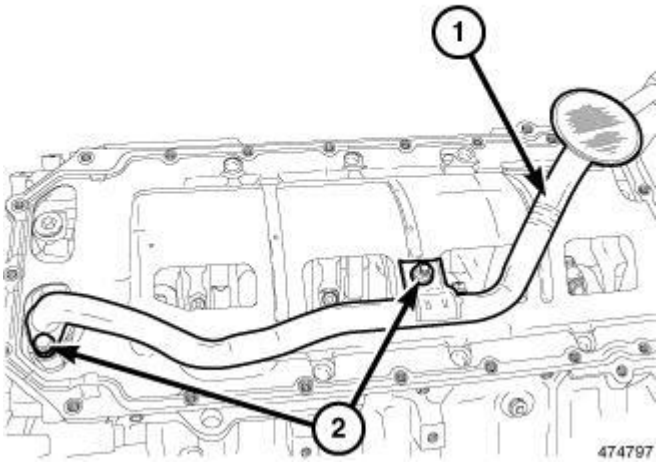


Fig. 143: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

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

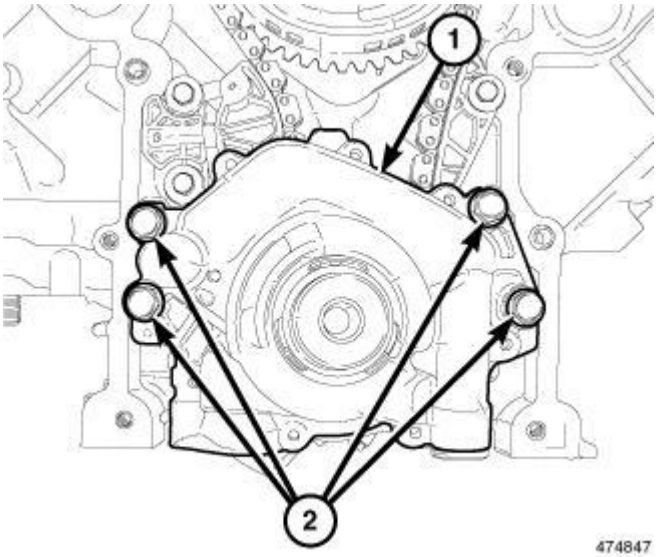


Fig. 144: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

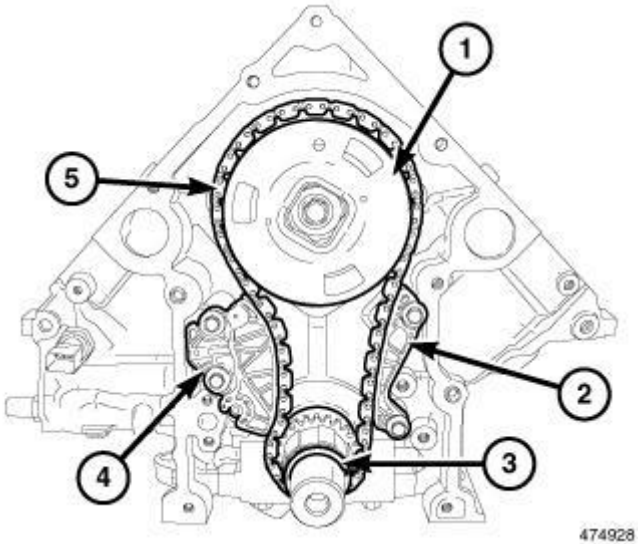


Fig. 145: Timing Chain
Courtesy of CHRYSLER LLC

12. Remove timing chain (5).

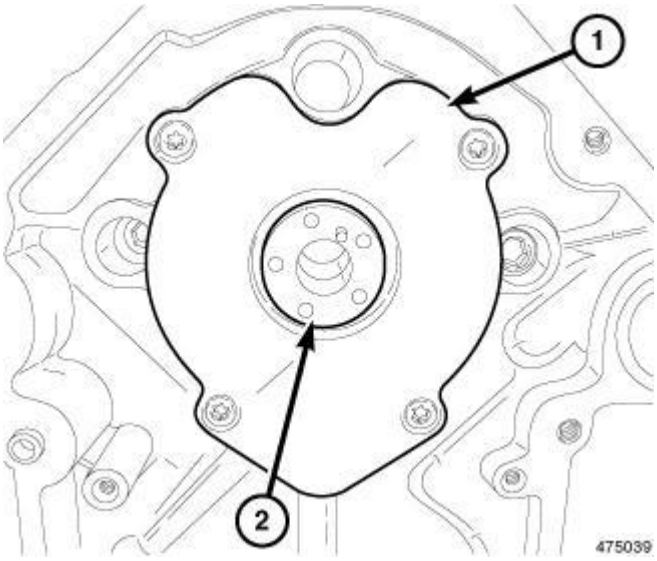


Fig. 146: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

13. Remove camshaft thrust plate (1).

 © 2011 Mitchell Repair Information Company, LLC.

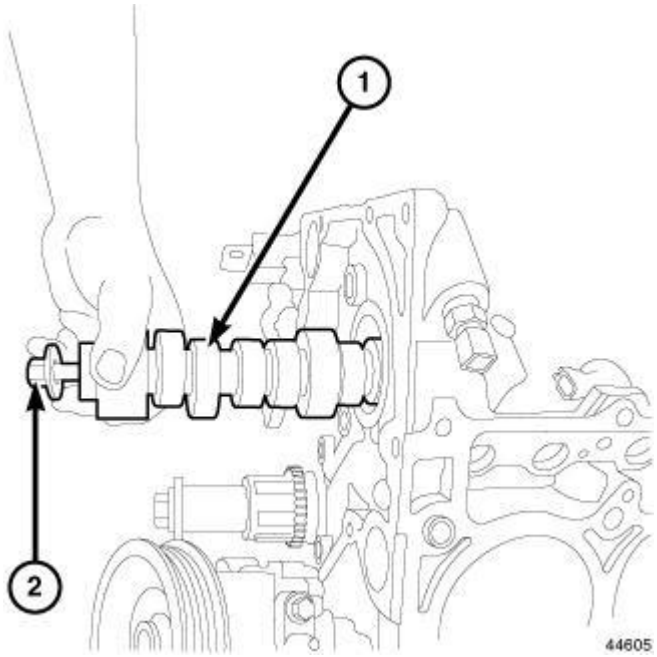


Fig. 147: Removing/Installing Camshaft
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

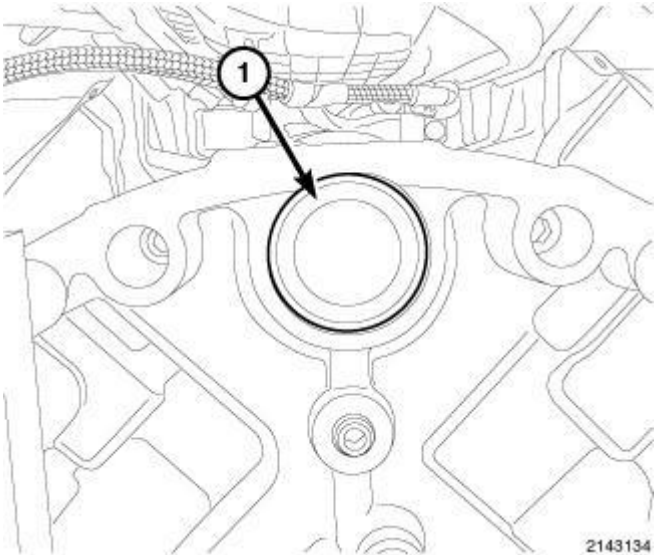


Fig. 148: Camshaft Core Hole Plug
Courtesy of CHRYSLER LLC

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 **Installation** .
4. Install the engine. See **Installation** .

CAMSHAFT

 © 2011 Mitchell Repair Information Company, LLC.

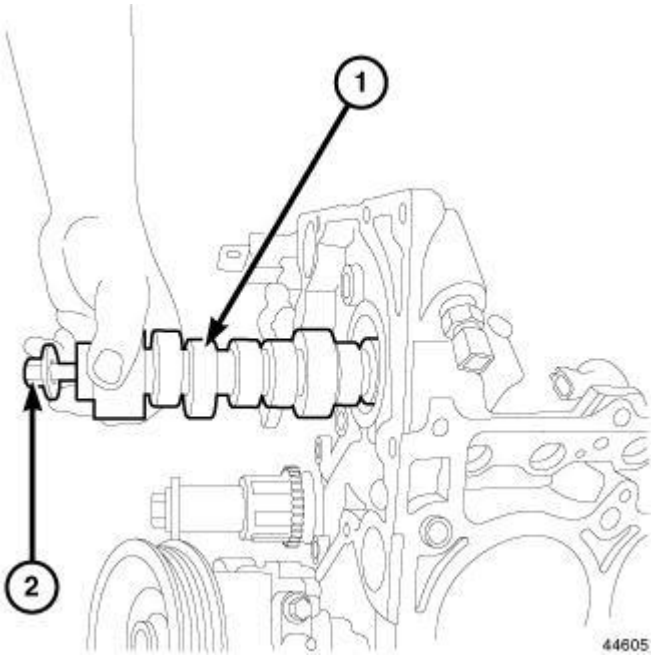


Fig. 149: Removing/Installing Camshaft
Courtesy of CHRYSLER LLC

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

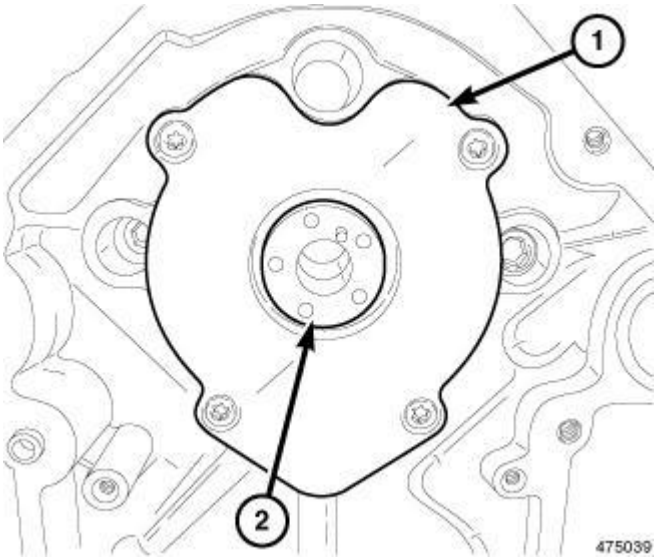


Fig. 150: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

2. Install camshaft thrust plate (1).

 © 2011 Mitchell Repair Information Company, LLC.

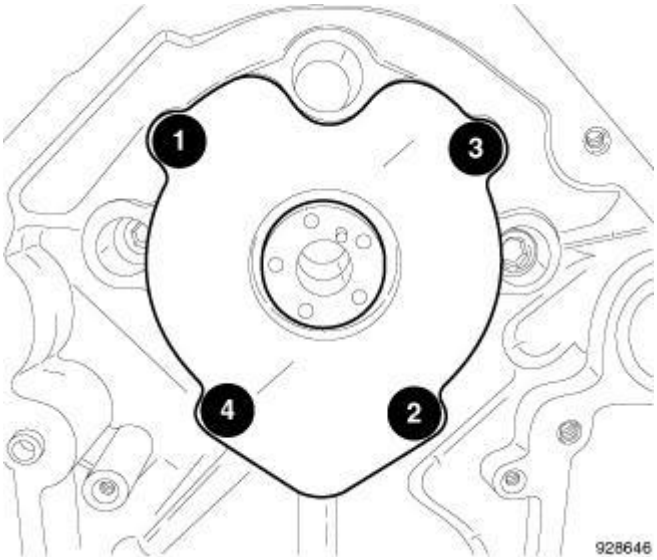


Fig. 151: Camshaft Thrust Plate Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

3. Tighten the bolts to 28 N.m (250 in. lbs.) in the sequence shown in illustration.
4. Measure camshaft end play. See **Specifications** . If not within limits install a new thrust plate.

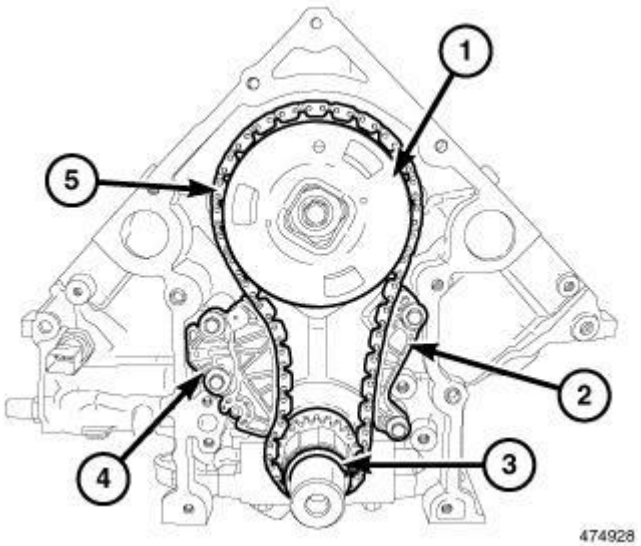


Fig. 152: Timing Chain
Courtesy of CHRYSLER LLC

5. Install timing chain (5) and sprockets (1, 3). See **Installation**
6. Install timing chain tensioner (4) and guide (2).

 © 2011 Mitchell Repair Information Company, LLC.

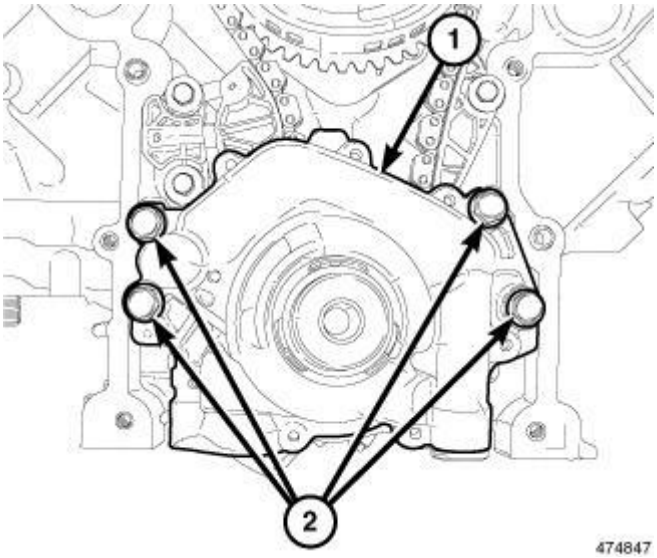


Fig. 153: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

7. Install the oil pump (1) and tighten bolts to 28 N.m (248 in. lbs.). See **Installation** .

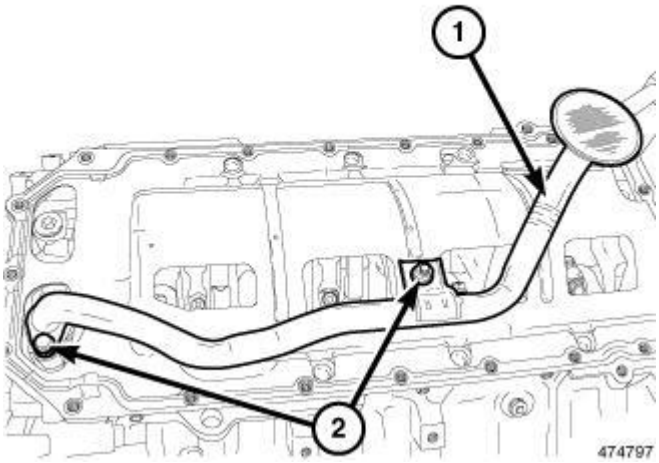


Fig. 154: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

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 (248 in. lbs.).
10. Install the timing chain cover. See **Installation** .
11. Install the oil pan. See **Installation** .

CAUTION: Engines equipped with MDS use both standard roller tappets (2) and deactivating roller tappets (1). The deactivating roller tappets must be

 © 2011 Mitchell Repair Information Company, LLC.

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.

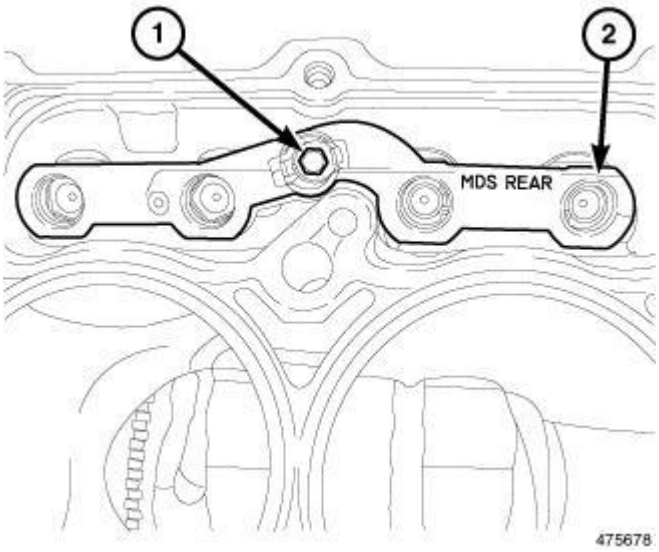


Fig. 155: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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

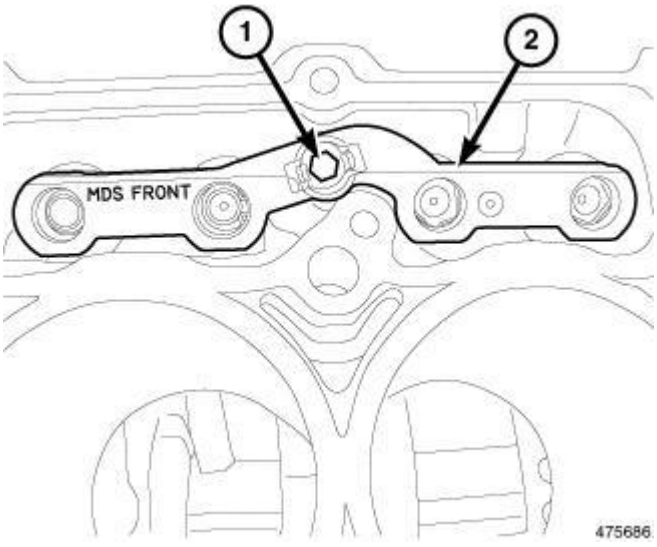


Fig. 156: Front MDS Lifter Assembly
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

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

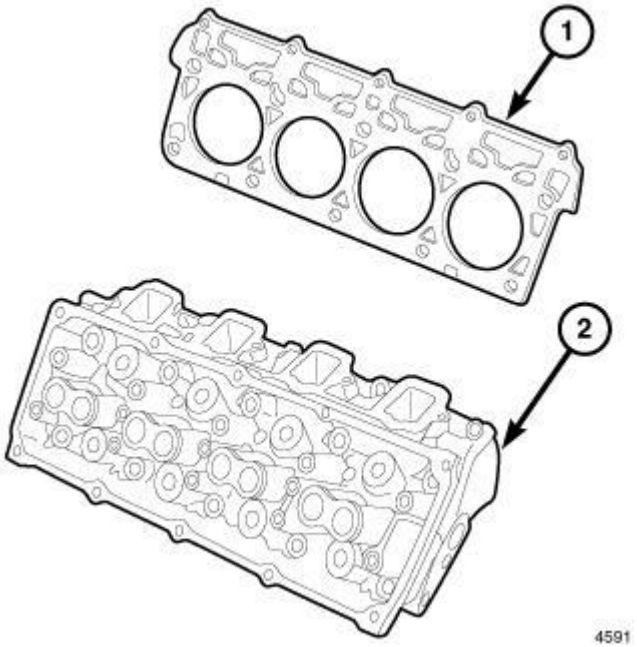
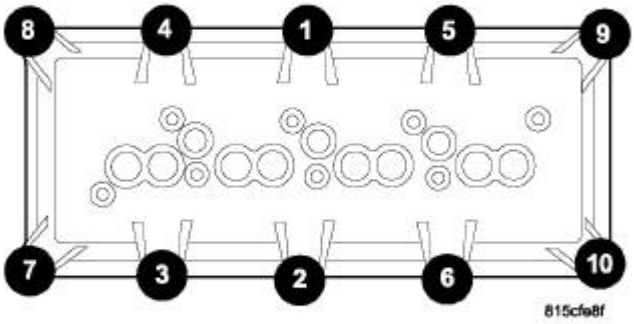


Fig. 157: Cylinder Head Components
Courtesy of CHRYSLER LLC

14. Install both left and right cylinder heads (4). See **Installation** .
15. Install pushrods.
16. Install rocker arms. See **Installation** .



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 158: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

17. Install cylinder head covers. See **Installation** .

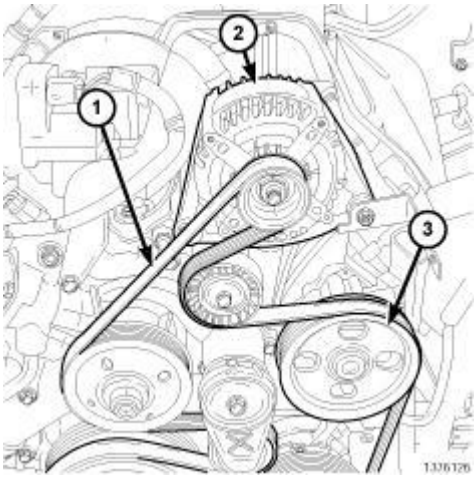


Fig. 159: Generator & Power Steering Pump
Courtesy of CHRYSLER LLC

18. Install intake manifold. See **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 **Installation** .
24. Install the battery negative cable.
25. Refill coolant. Refer to **Cooling - Standard Procedure** .
26. Refill 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

 © 2011 Mitchell Repair Information Company, LLC.

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

Removal

REMOVAL

1. Raise and support the vehicle.

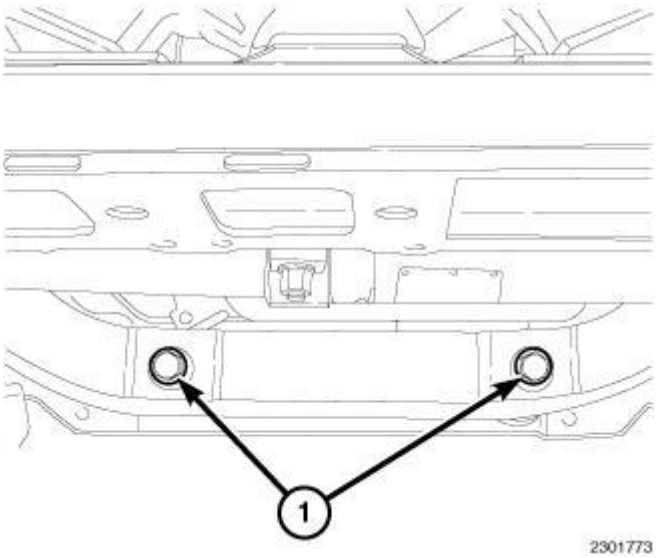


Fig. 160: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER LLC

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.

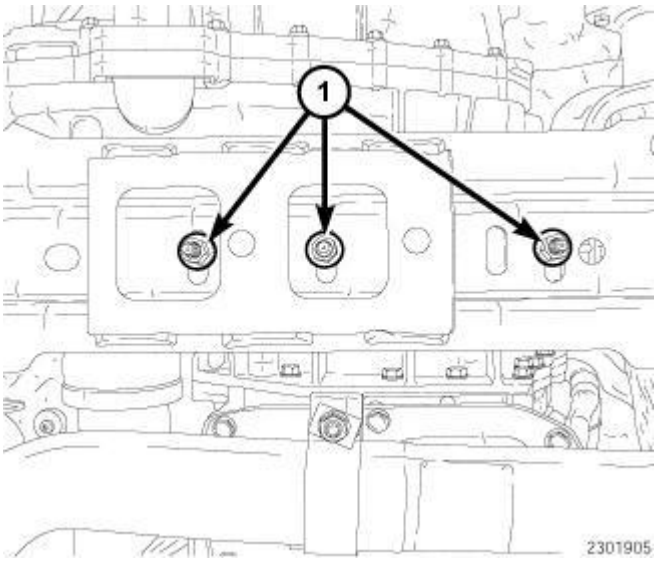


Fig. 161: Transmission Mount To Crossmember Retaining Nuts
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, 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.

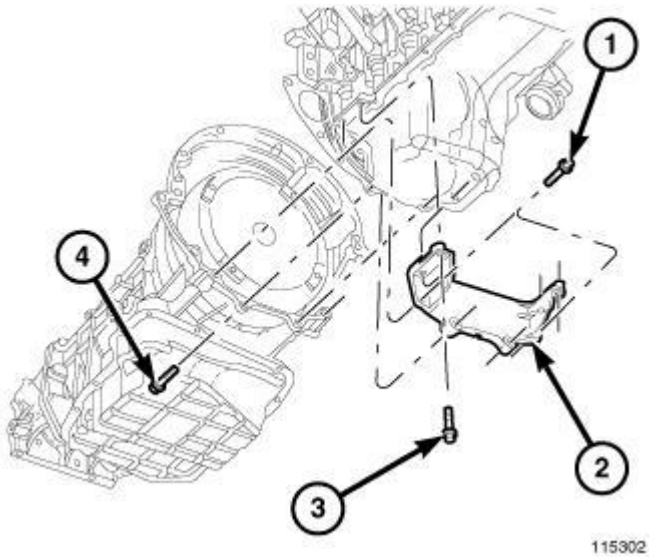


Fig. 162: Structural Cover
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

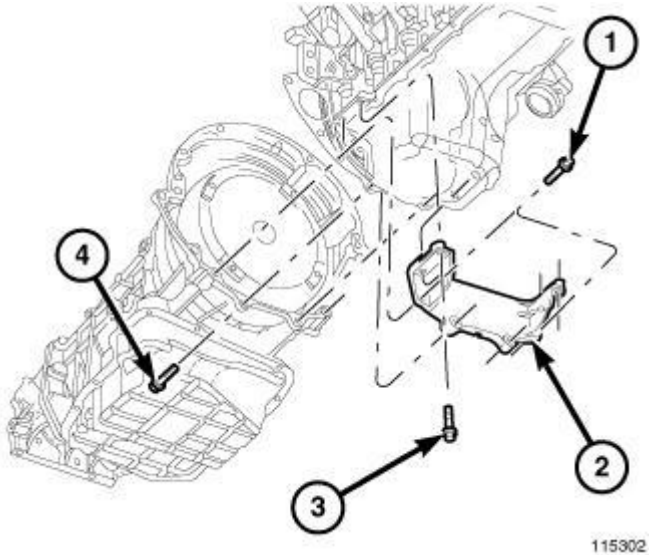


Fig. 163: Structural Cover
Courtesy of CHRYSLER LLC

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.).

 © 2011 Mitchell Repair Information Company, LLC.

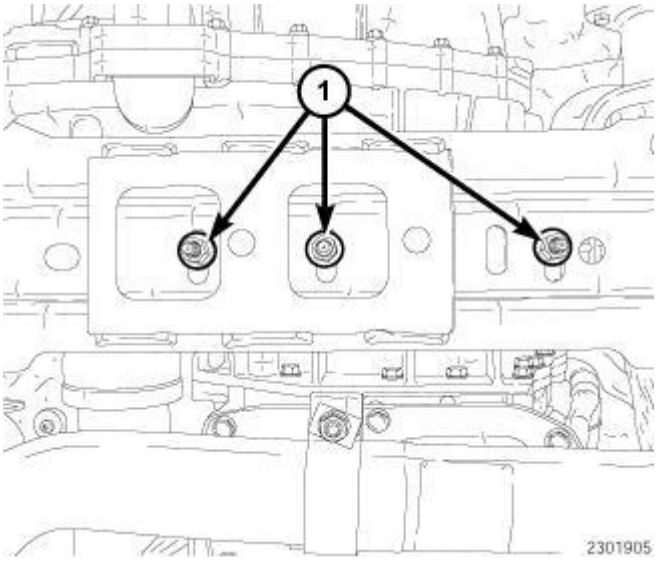


Fig. 164: Transmission Mount To Crossmember Retaining Nuts
Courtesy of CHRYSLER LLC

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.).

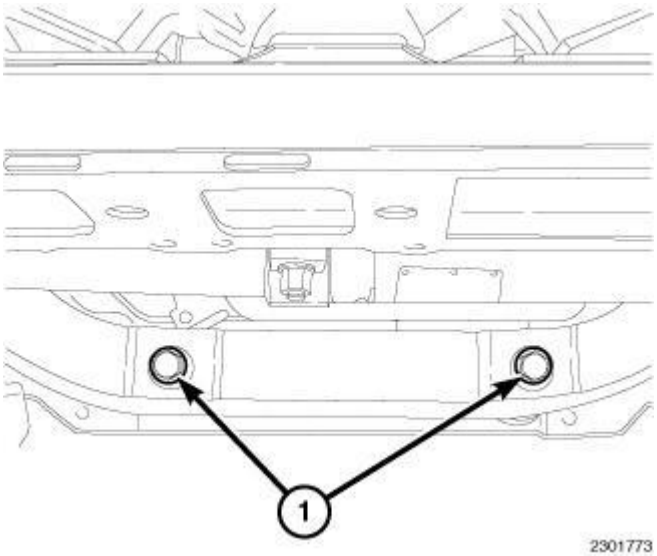


Fig. 165: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER LLC

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

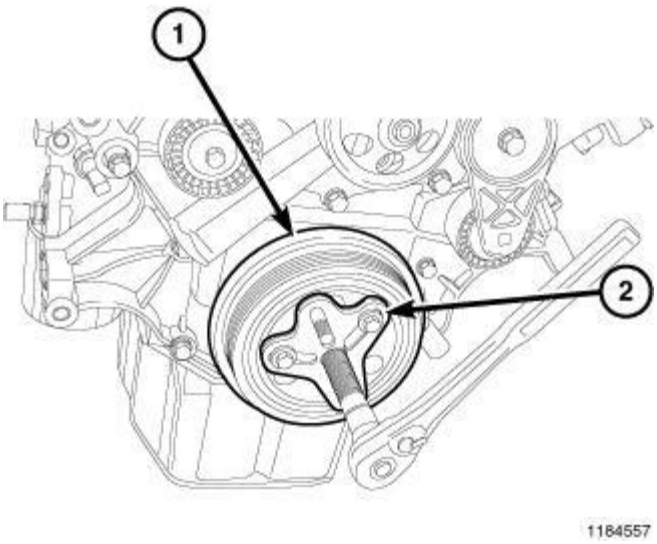


Fig. 166: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER LLC

1. Remove engine. See **Removal** .
2. Remove the vibration damper (1) using a bolt grip puller (2). See **Removal** .

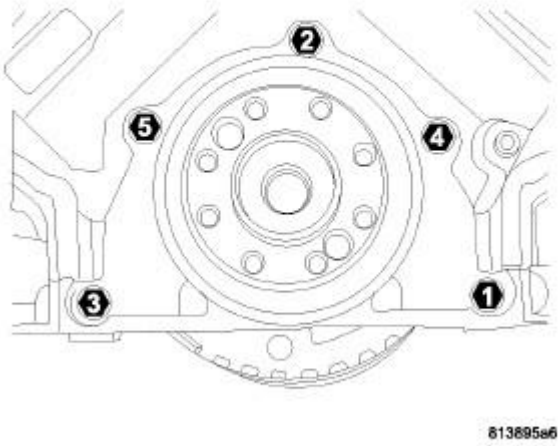


Fig. 167: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

3. Remove the rear oil seal retainer. See **Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

4. Remove the oil pan. See **Removal** .

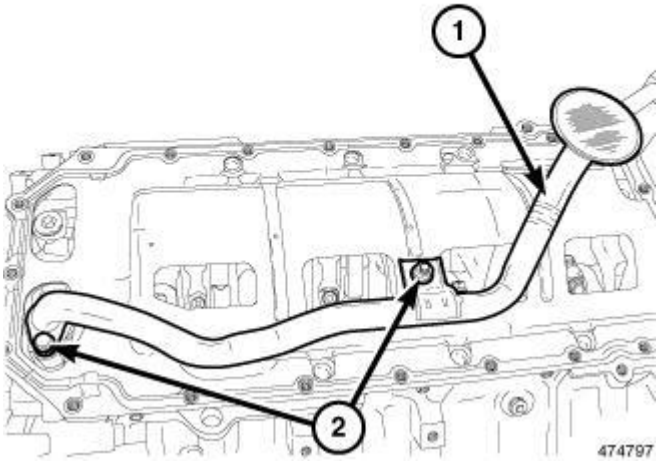


Fig. 168: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

5. Remove the oil pump pickup (1).
6. Remove the windage tray/oil pan gasket.
7. Remove the timing chain cover. See **Removal** .

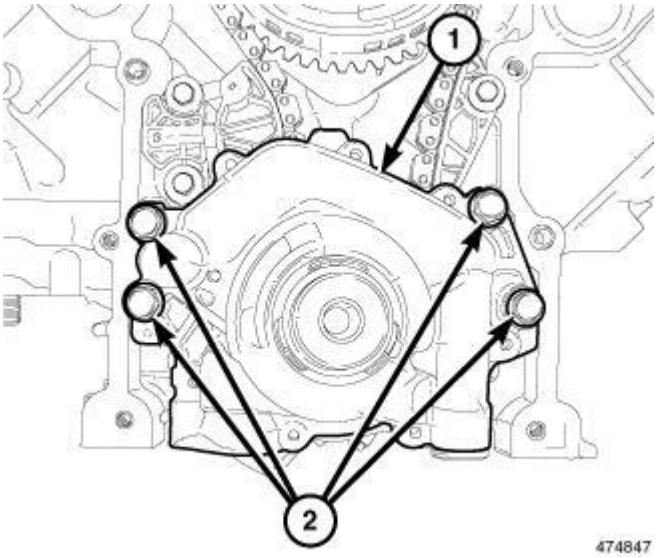


Fig. 169: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

8. Remove the oil pump (1). See **Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

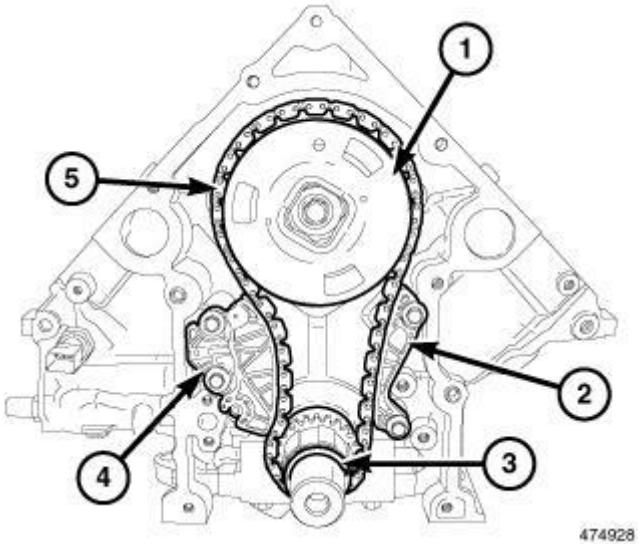


Fig. 170: Timing Chain
Courtesy of CHRYSLER LLC

9. Remove the timing chain (5) and sprockets (1, 3). See **Removal** .

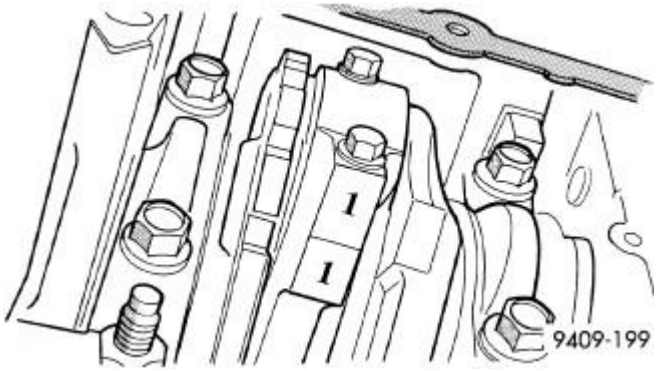


Fig. 171: Identifying Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

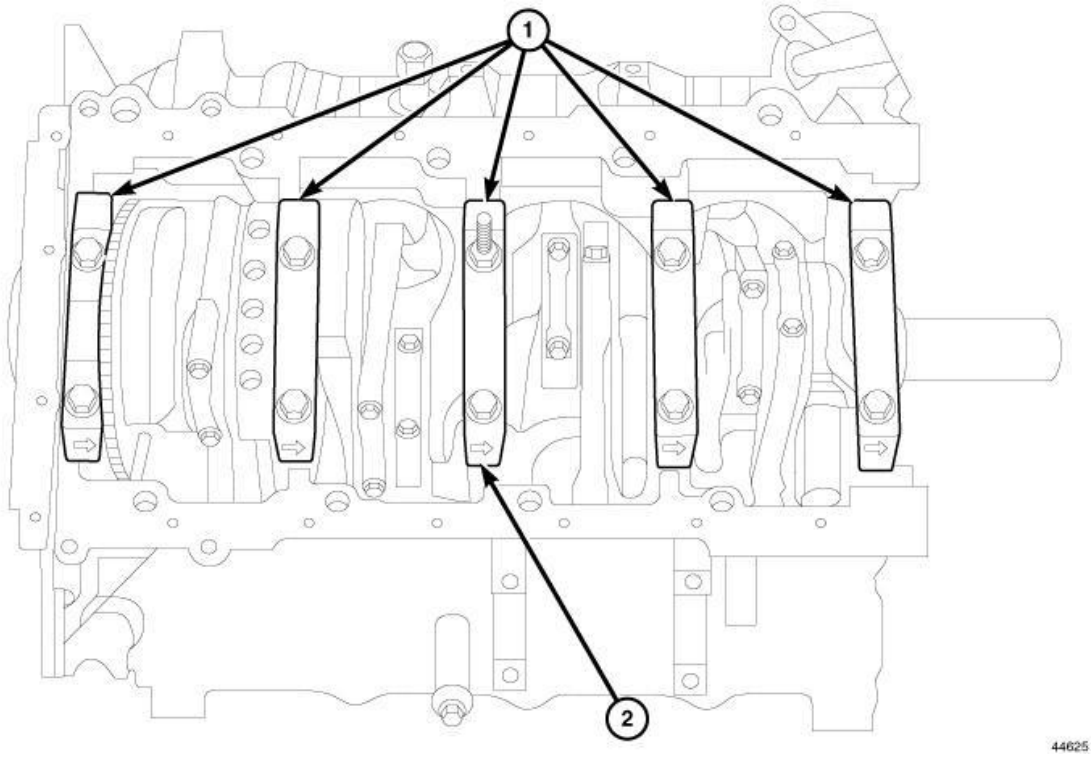


Fig. 172: Main Bearing Caps
Courtesy of CHRYSLER LLC

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

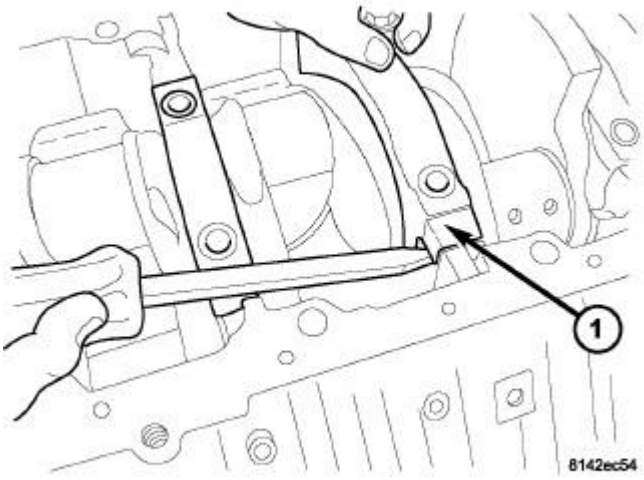


Fig. 173: Removing/Installing Main Cap

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

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

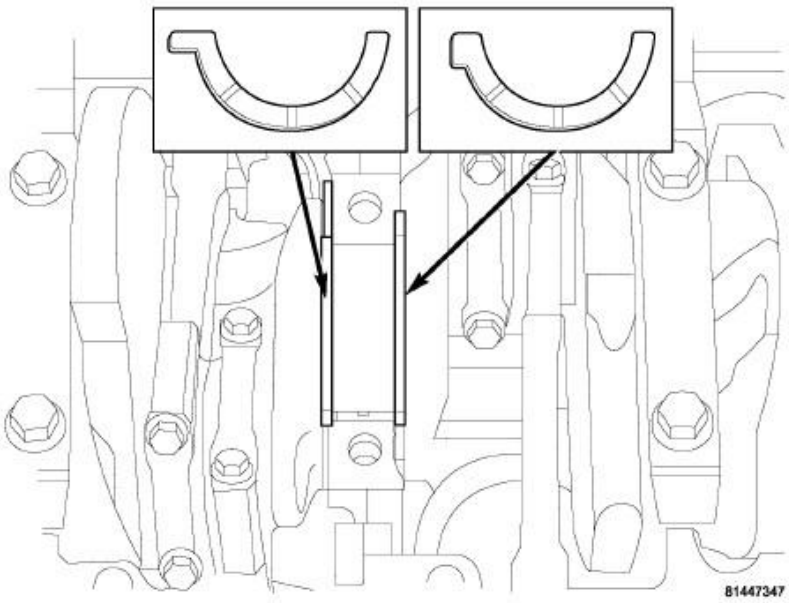


Fig. 174: Identifying Thrust Washers
Courtesy of CHRYSLER LLC

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

Installation

INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

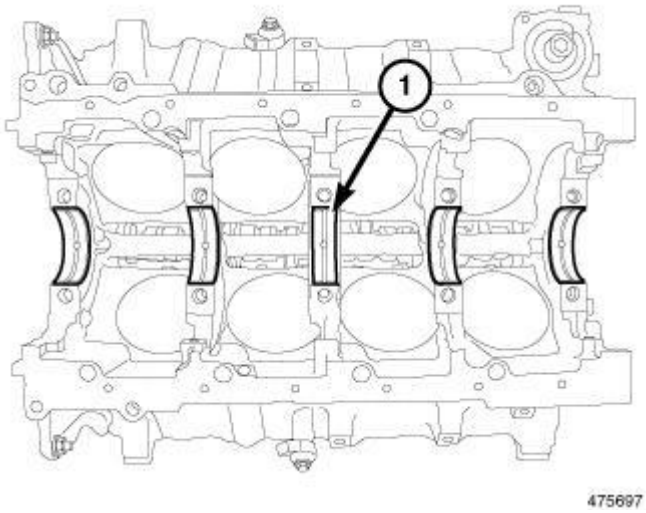


Fig. 175: Main Bearings
Courtesy of CHRYSLER LLC

1. Select the proper main bearings. See **Standard Procedure** .
2. Install main bearings in block (1).

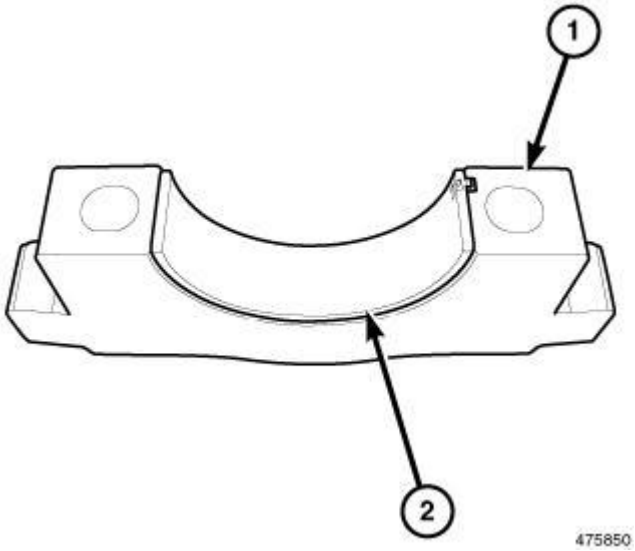


Fig. 176: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

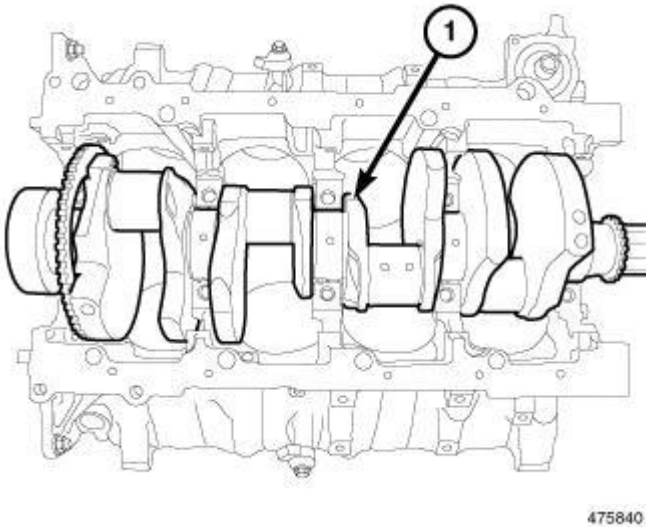


Fig. 177: Crankshaft
Courtesy of CHRYSLER LLC

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

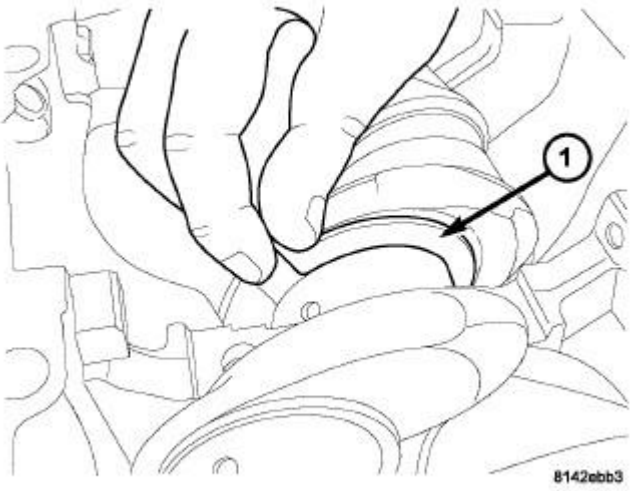


Fig. 178: Removing/Installing Thrust Washer
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

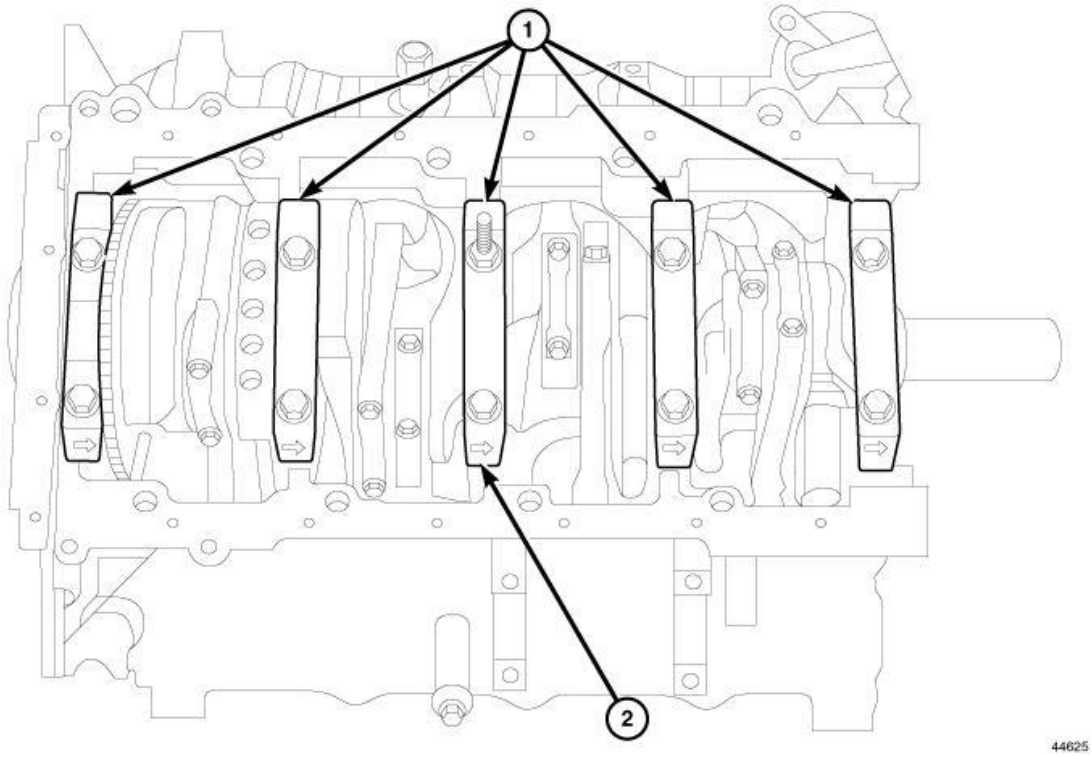


Fig. 179: Main Bearing Caps
Courtesy of CHRYSLER LLC

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.

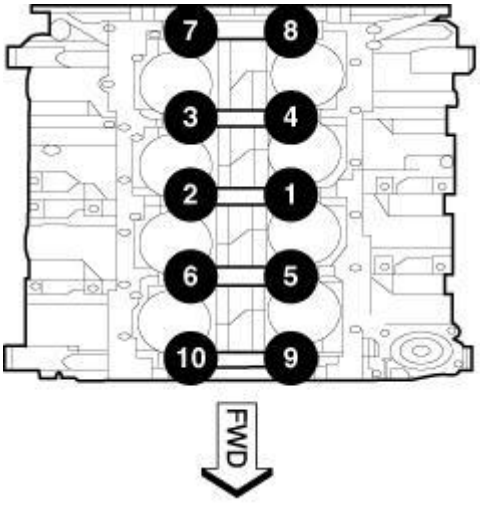


Fig. 180: Main Bearing Cap Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

8. Tighten main bearing cap bolts to 13 N.m (10 ft. lbs.) in the sequence shown in illustration.
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.

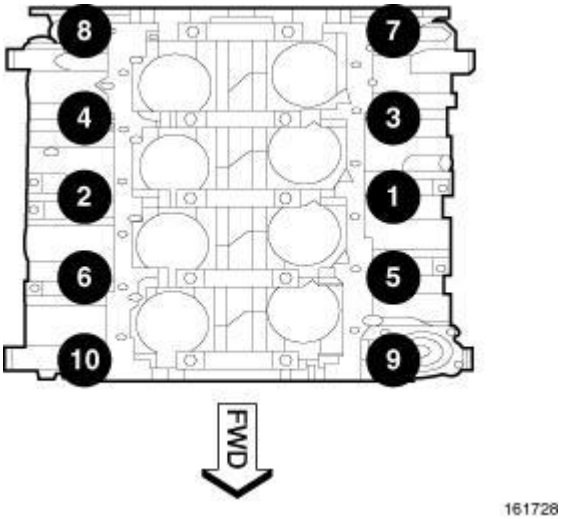


Fig. 181: Crossbolt Tightening Sequence
Courtesy of CHRYSLER LLC

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 **Standard Procedure** .
15. Position the connecting rods onto the crankshaft and install the rod bearing caps. See **Installation** .

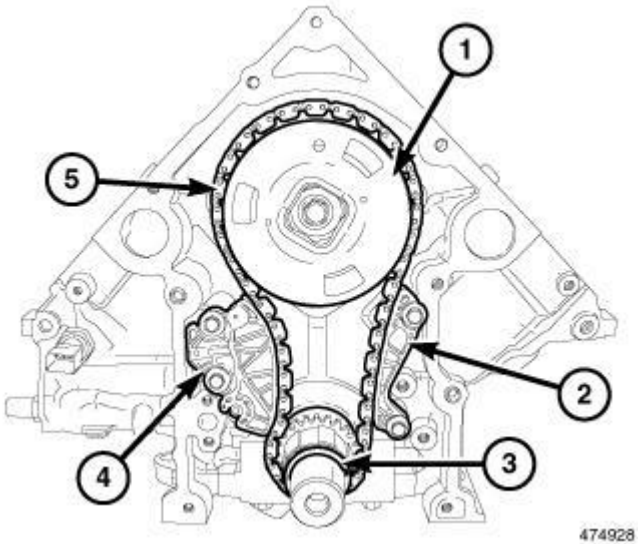


Fig. 182: Timing Chain
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

16. Install timing chain (5) and sprockets (1, 3). See **Installation** .
17. Install the timing chain tensioner (4) and guide (2).

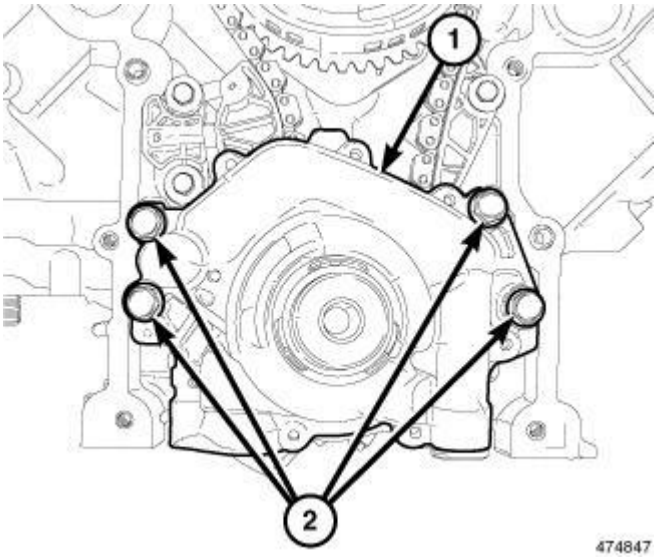


Fig. 183: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

18. Install the oil pump (1). See **Installation** .
19. Install the timing chain case cover (1). See **Installation** .

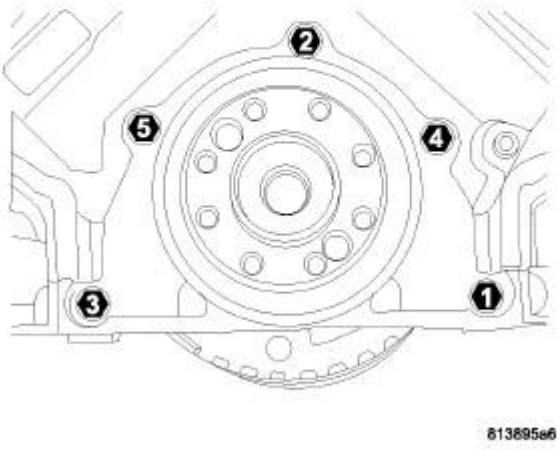


Fig. 184: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

20. Install the rear main seal and retainer. See **Installation** .

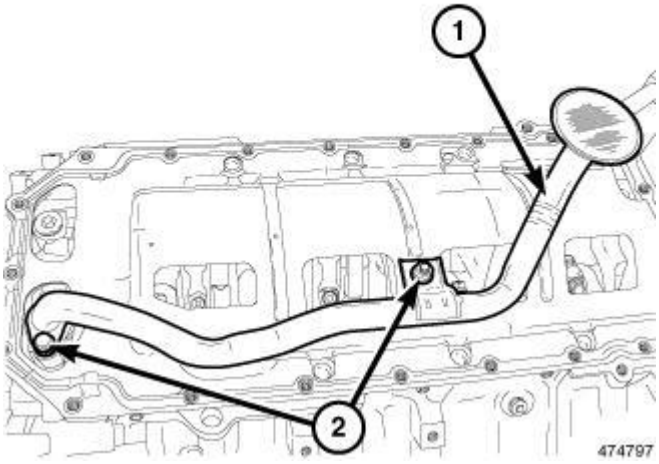


Fig. 185: Oil Pick Up Tube
Courtesy of CHRYSLER LLC

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 N.m (248 in. lbs.).
24. Install the oil pan. See **Installation** .
25. Install the vibration damper. See **Installation** .
26. Install the engine. See **Installation** .

DAMPER, VIBRATION

Removal

REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

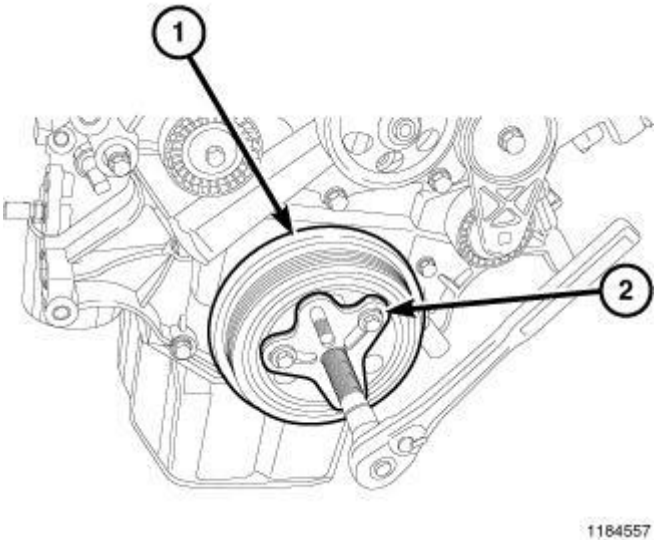


Fig. 186: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER LLC

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. Install puller (2) and remove damper (1).

Installation

INSTALLATION

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.

 © 2011 Mitchell Repair Information Company, LLC.

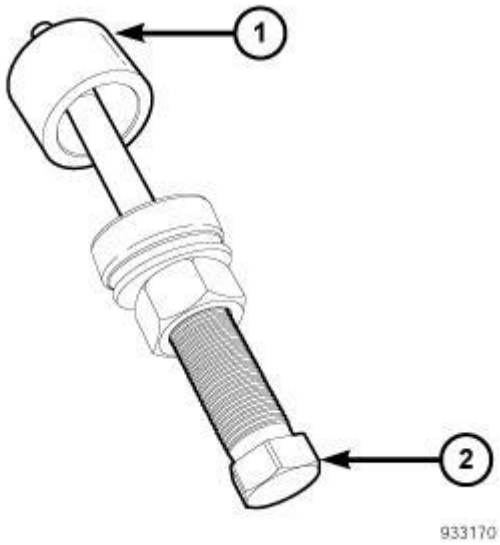


Fig. 187: Removing/Installing Crankshaft Damper Bolt
Courtesy of CHRYSLER LLC

1. Position damper onto crankshaft.
2. Assemble Damper Installer 8512A (2) , and the Pressing Cup (1) from A/C Hub Installer 6871.

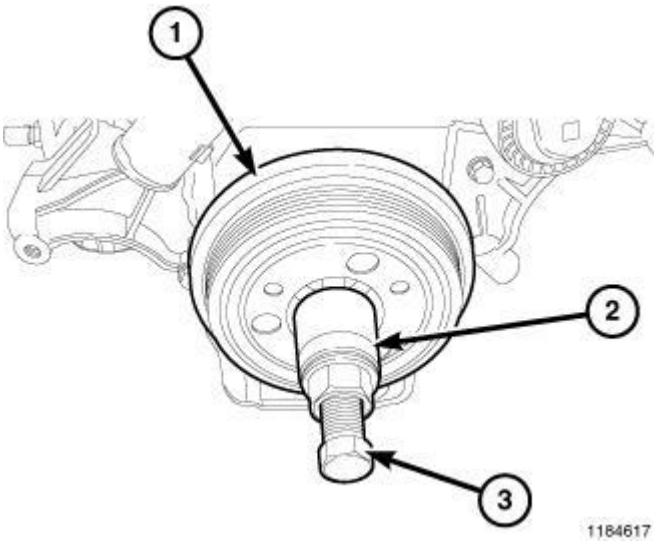


Fig. 188: Accessory Drive Belt
Courtesy of CHRYSLER LLC

3. Using Damper Installer 8512A (3), and the pressing cup (2) from A/C hub installer 6871 press damper (1) onto crankshaft.
4. Install and tighten crankshaft damper bolt to 176 N.m (129 ft. lbs.).
5. Install cooling fan.
6. Install radiator upper shroud and tighten fasteners to 11 N.m (95 in. lbs.).
7. Install radiator upper hose.

 © 2011 Mitchell Repair Information Company, LLC.

8. Install accessory drive belt (1). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
9. Refill cooling system. Refer to **Cooling - Standard Procedure** .
10. Connect negative cable to battery.

FLEXPLATE

Removal

REMOVAL

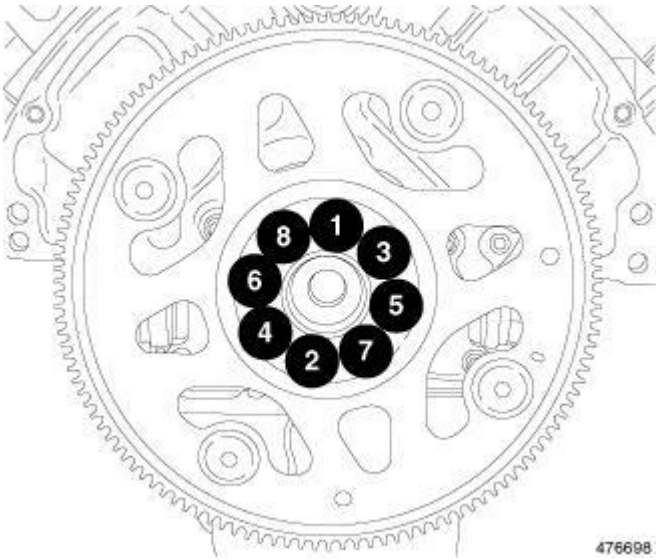


Fig. 189: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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.
3. Remove the flexplate.

Installation

INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

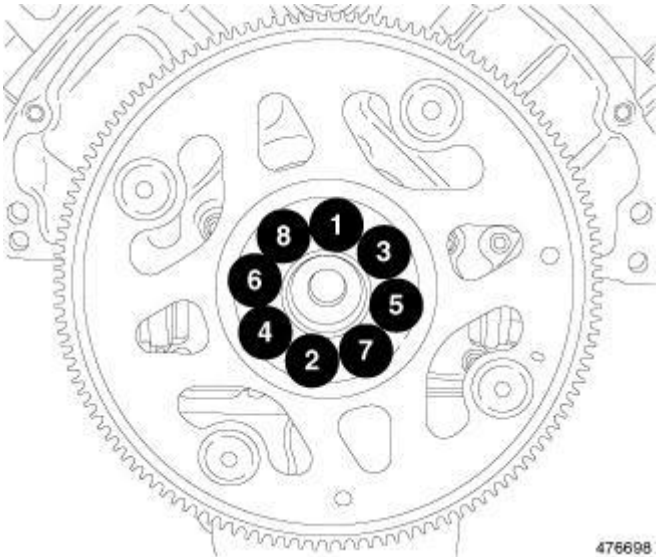


Fig. 190: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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.).
3. Install the transmission. Refer to **Transmission and Transfer Case/Automatic - 45RFE/545RFE - Installation** .

LIFTER(S), HYDRAULIC, ROLLER

Description

DESCRIPTION

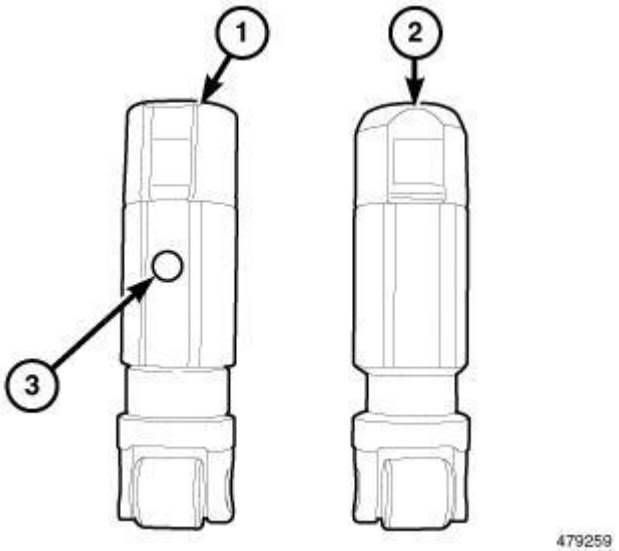


Fig. 191: MDS Lifter
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, 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

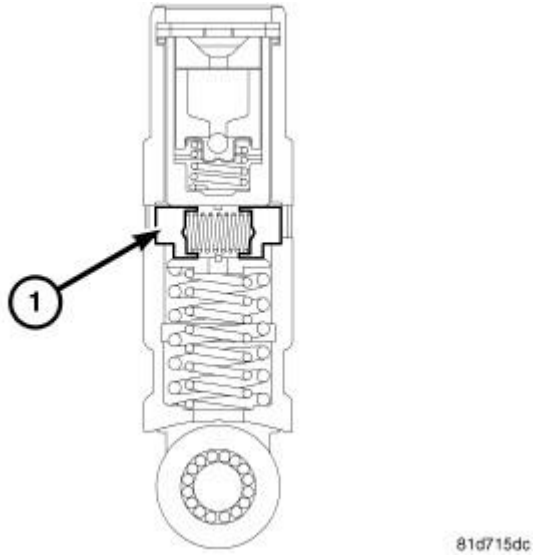


Fig. 192: MDS Lifter Cross Section
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

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

 © 2011 Mitchell Repair Information Company, LLC.

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 **Removal**

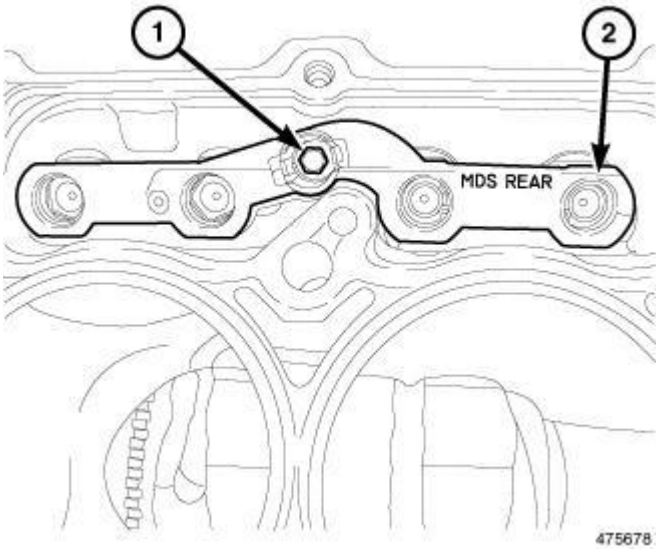


Fig. 193: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

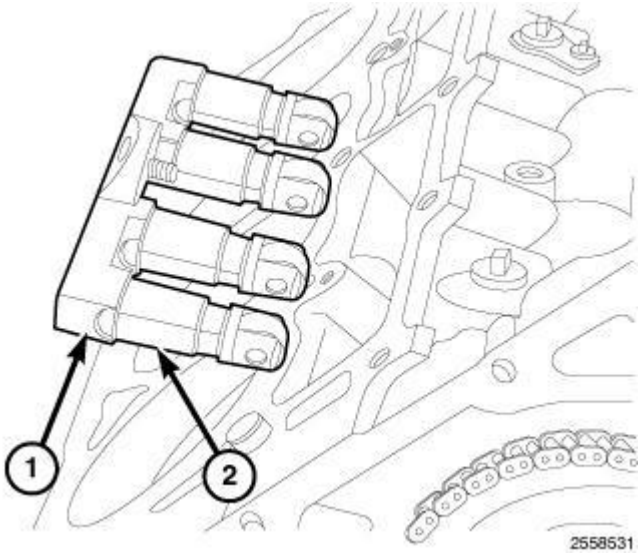


Fig. 194: Tappet Guide Holder Assembly
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

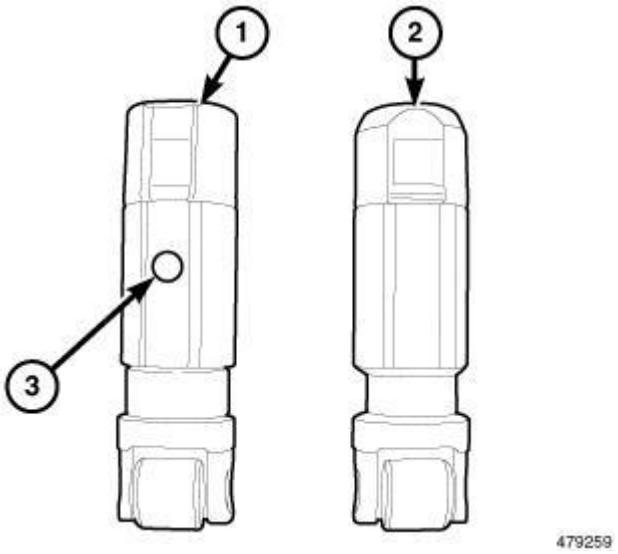


Fig. 195: MDS Lifter
Courtesy of CHRYSLER LLC

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.

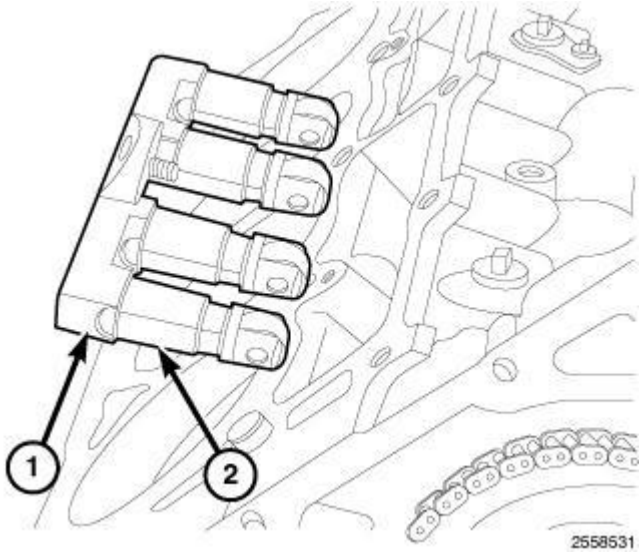


Fig. 196: Tappet Guide Holder Assembly

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

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

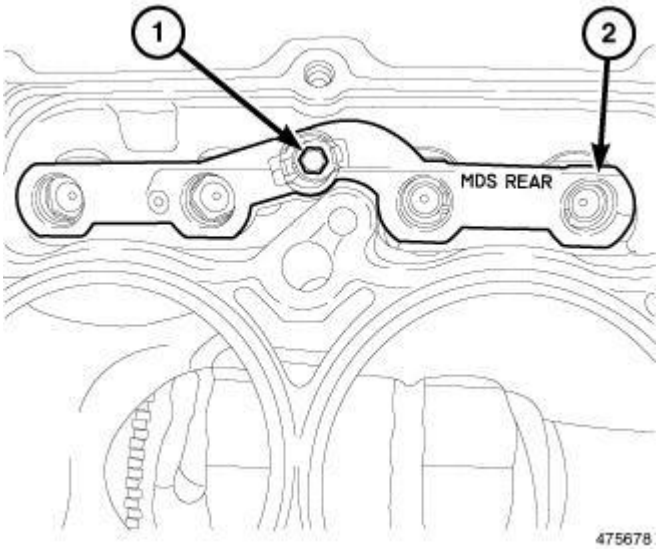


Fig. 197: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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 **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.

 © 2011 Mitchell Repair Information Company, LLC.

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 **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 appropriate component service information 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 **Removal**.

Removal

REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

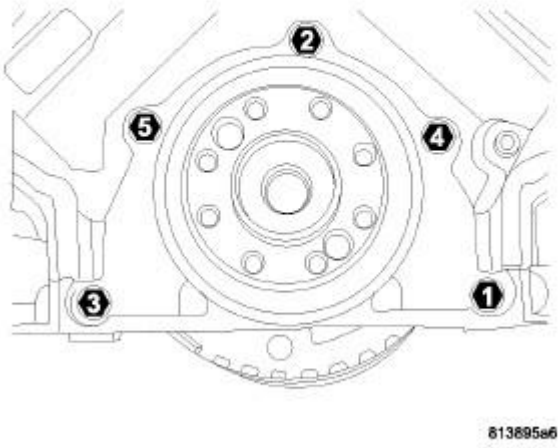


Fig. 198: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

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 **REMOVAL**).
3. Remove the flexplate. See **Removal**.
4. Remove the oil pan. See **Removal**.
5. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.
6. Carefully remove the retainer from the engine block.

Installation

INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

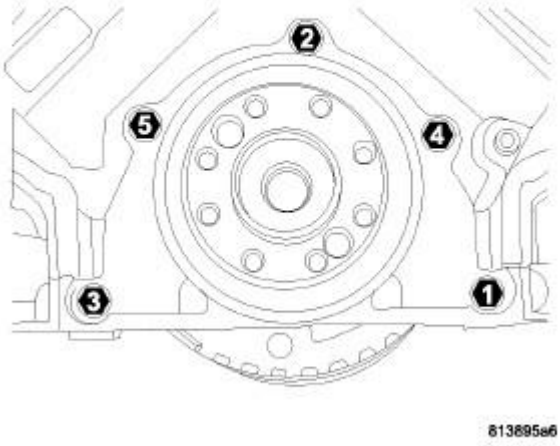


Fig. 199: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER LLC

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.).
5. Install the oil pan. See **Installation**.
6. Install the flexplate. See **Installation**.
7. Install the transmission (Refer to **INSTALLATION**).
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

 © 2011 Mitchell Repair Information Company, LLC.

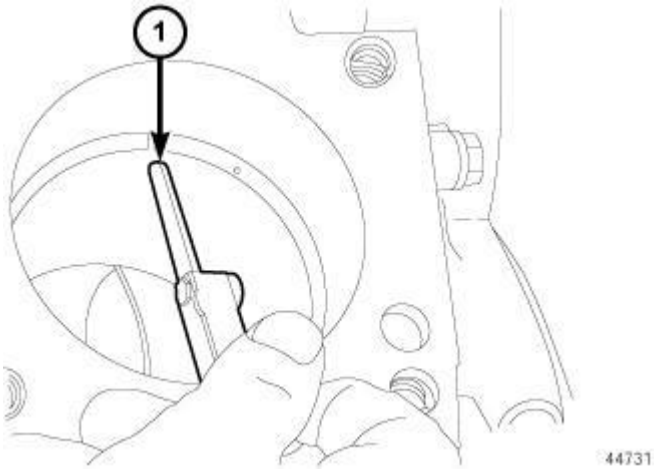


Fig. 200: Checking Piston Ring End Gap Using Feeler Gauge
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

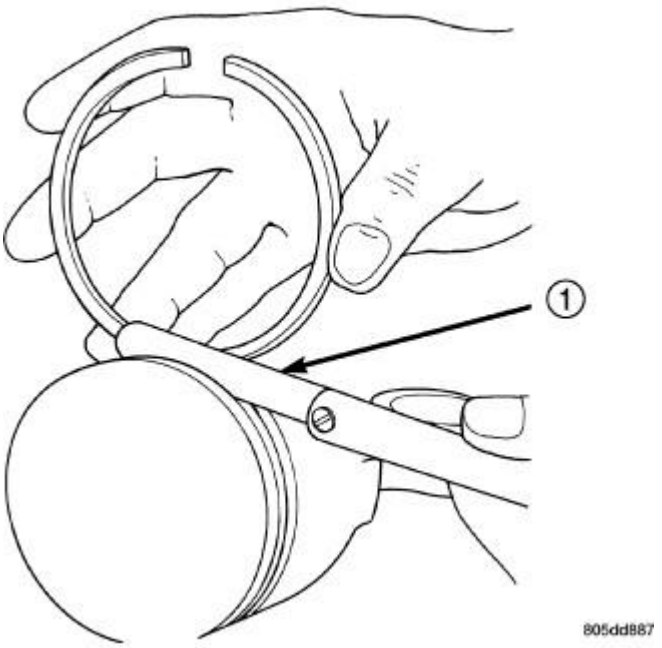


Fig. 201: Measuring Piston Ring Side Clearance
Courtesy of CHRYSLER LLC

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. 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.

 © 2011 Mitchell Repair Information Company, LLC.

PISTON RING INSTALLATION



Fig. 202: Identifying Oil Ring Side Rail
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.

 © 2011 Mitchell Repair Information Company, LLC.

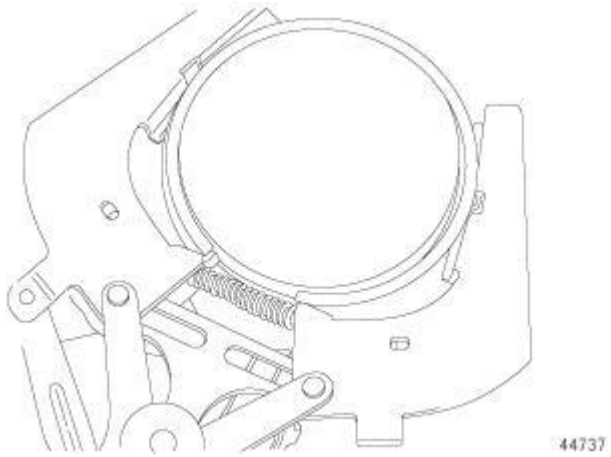


Fig. 203: Upper And Intermediate Rings
Courtesy of CHRYSLER LLC

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

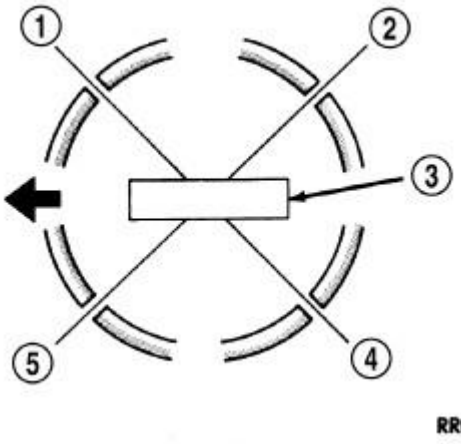


Fig. 204: Identifying Piston Ring End Gap Positions
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

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

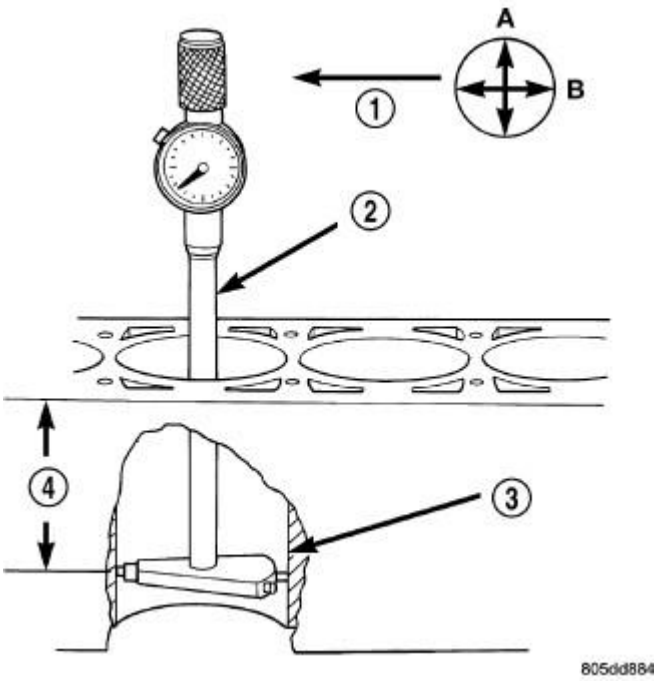


Fig. 205: Measuring Inside Diameter Of Cylinder Bore Using Dial Bore Gauge
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

numbered) and must not be interchanged.

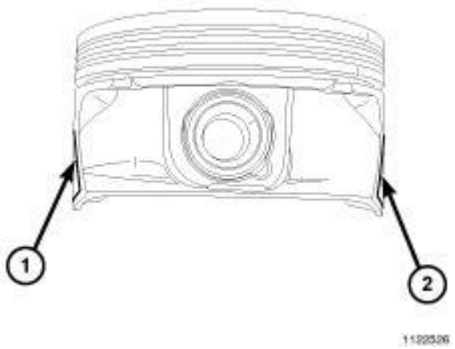


Fig. 206: Piston Diameter Measuring Points
Courtesy of CHRYSLER LLC

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

Removal

REMOVAL

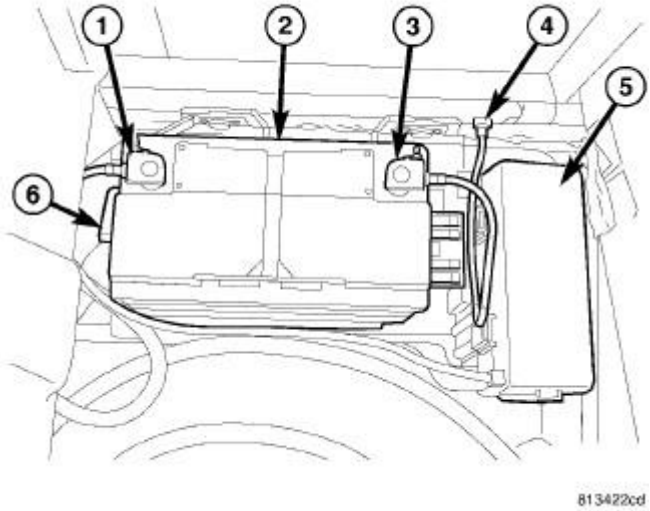


Fig. 207: Battery System Components And PDC Cover
Courtesy of CHRYSLER LLC

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).

 © 2011 Mitchell Repair Information Company, LLC.

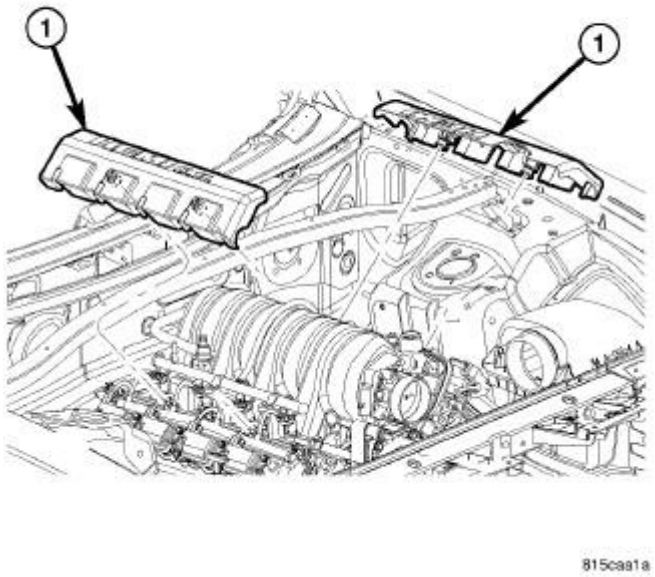


Fig. 208: Removing/Installing Engine Covers
Courtesy of CHRYSLER LLC

3. Remove the engine covers (1).

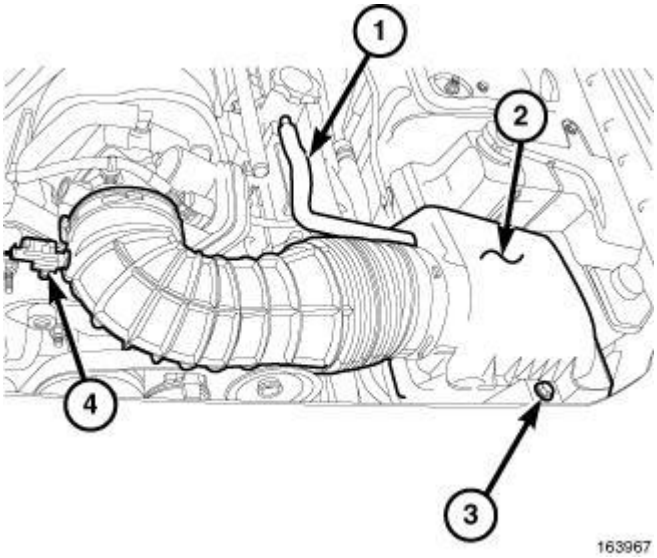


Fig. 209: Air Duct To Throttle Body
Courtesy of CHRYSLER LLC

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).

 © 2011 Mitchell Repair Information Company, LLC.

8. Remove the cylinder head(s). See **Removal** .
9. Raise and support the vehicle.

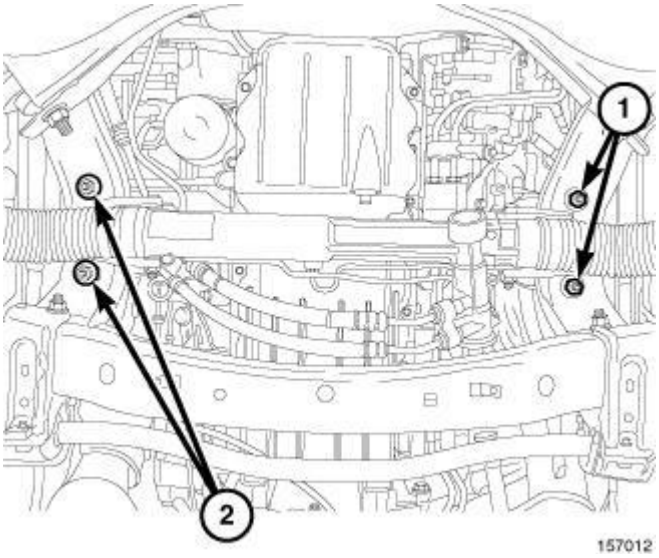


Fig. 210: Engine Mount Nuts
Courtesy of CHRYSLER LLC

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

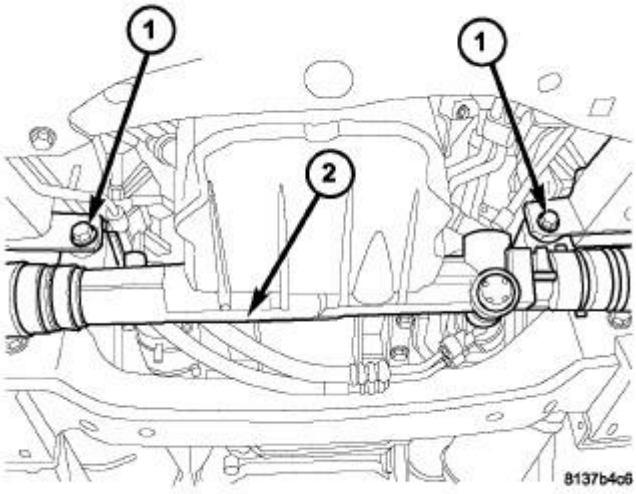


Fig. 211: Gear Mounting Bolts
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

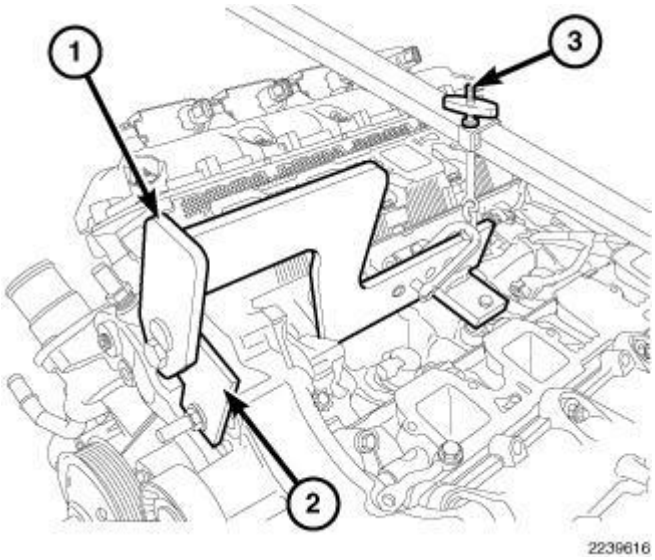


Fig. 212: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

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 **Removal** .
18. Lower the vehicle.
19. Remove the timing chain cover. See **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.**

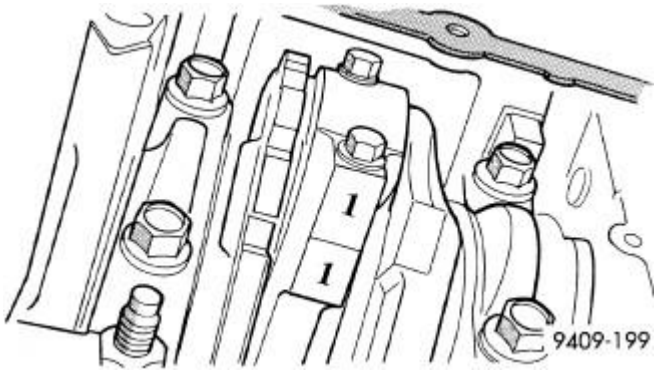


Fig. 213: Identifying Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, 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.

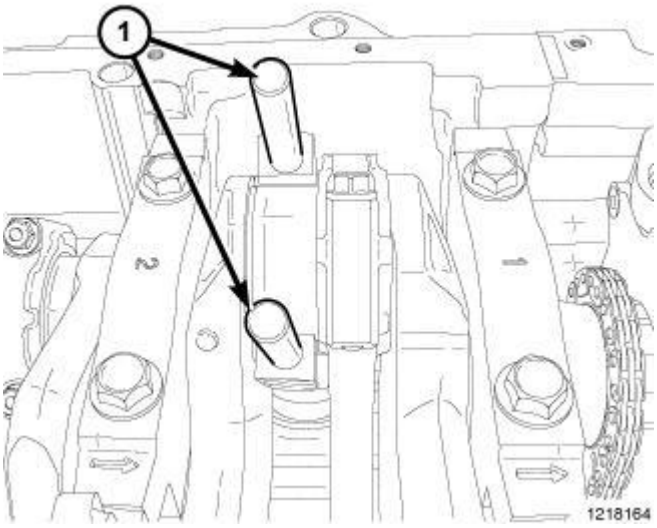


Fig. 214: Connecting Rod Guides
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

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 **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 **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

 © 2011 Mitchell Repair Information Company, LLC.

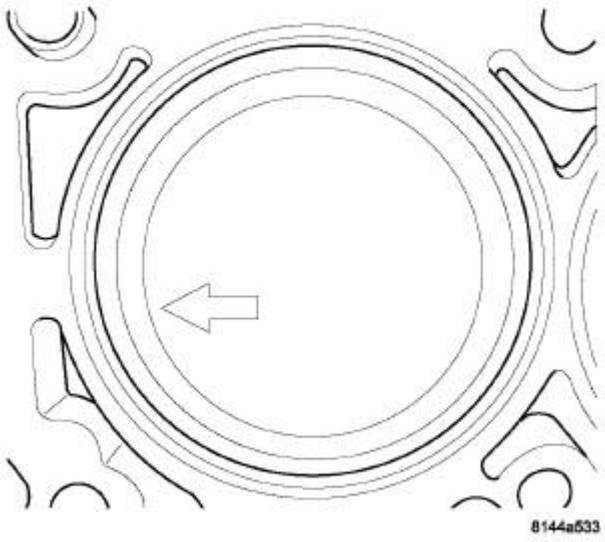


Fig. 215: Piston Direction Arrow
Courtesy of CHRYSLER LLC

1. Before installing piston and connecting rod assemblies into the bore, install the piston rings. See **Standard Procedure** .
2. Immerse the piston head and rings in clean engine oil. Position a ring compressor over the piston and rings. Tighten ring compressor. **Make sure the position of the rings do not change during this operation.**
3. Position bearing onto connecting rod. Lubricate bearing surface with clean engine oil.
4. Install Connecting Rod Guides 8507 into connecting rod bolt threads.
5. 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.
6. Wipe cylinder bore clean and lubricate with engine oil.
7. Rotate crankshaft until connecting rod journal is on the center of cylinder bore. Insert rod and piston into cylinder bore and carefully position connecting rod guides over crankshaft journal.
8. Tap piston down in cylinder bore using a hammer handle. While guiding the connecting rod into position on rod journal.

 © 2011 Mitchell Repair Information Company, LLC.

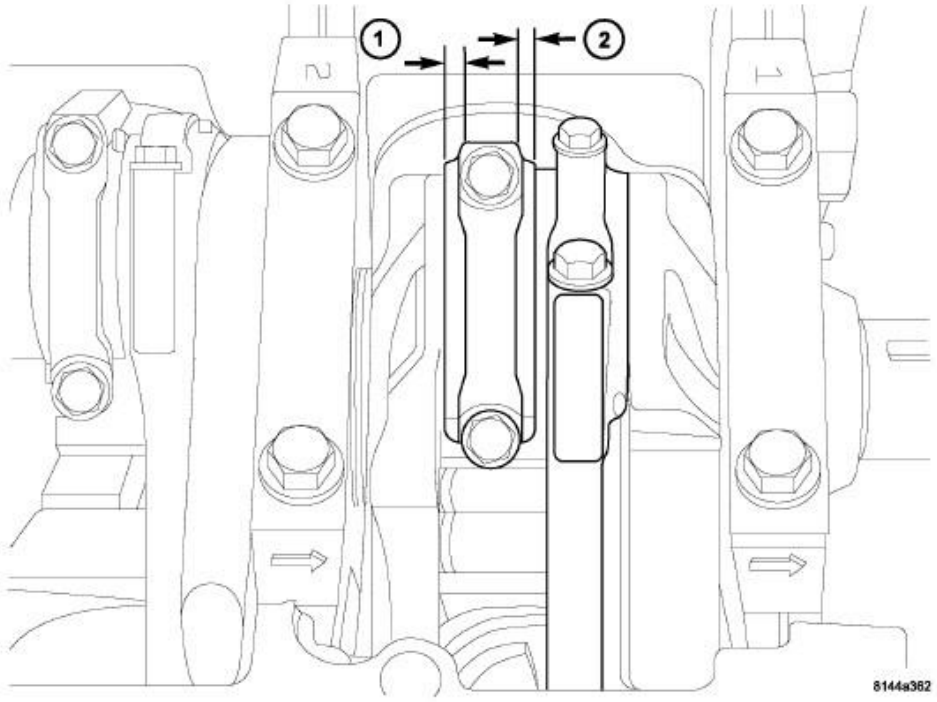


Fig. 216: Removing/Installing Connecting Rod
Courtesy of CHRYSLER LLC

CAUTION: The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.

9. Wipe connecting rod cap clean and install bearing.
10. Lubricate with clean engine oil and install **new** rod bolts.
11. Lubricate bearing surfaces with clean engine oil. Tighten bolts to 21 N.m (15 ft. lbs.) plus a 90° turn.
12. Cylinder head(s). See **Installation** .
13. Cylinder head covers. See **Installation** .
14. Install the intake manifold.
15. Oil pan and gasket/windage tray. See **Installation** .
16. Fill crankcase with proper engine oil to correct level.
17. Connect negative cable to battery.

SEAL, CRANKSHAFT OIL, FRONT

Removal

REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

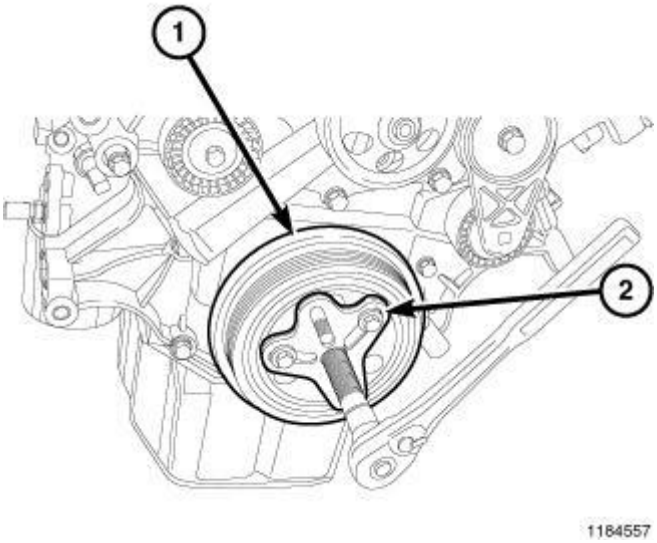


Fig. 217: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER LLC

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 (1) using bolt grip type puller (2). See **Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

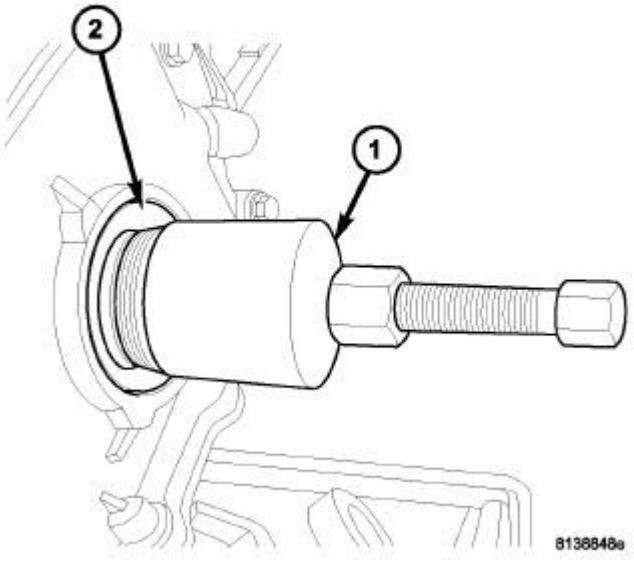


Fig. 218: Front Crankshaft Seal Removal
Courtesy of CHRYSLER LLC

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

Installation

INSTALLATION

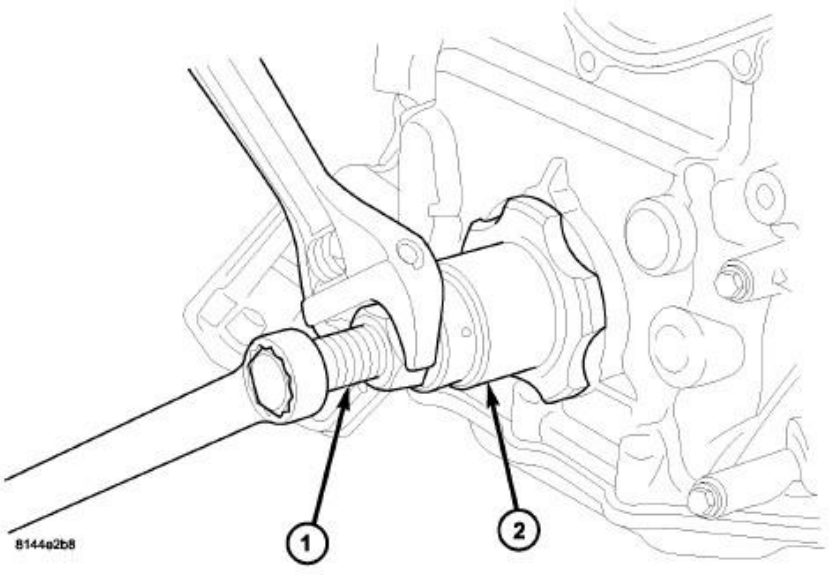


Fig. 219: Front Seal Installation

 © 2011 Mitchell Repair Information Company, LLC.

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 **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 **Diagnosis and Testing**.
- **Removal** . See **Removal**.
- **Installation** . See **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:

 © 2011 Mitchell Repair Information Company, LLC.

- 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.	1. Check for proper oil pressure.
	2. Bad oil temperature sensor.	2. Replace the oil temperature sensor.
-	3. Malfunctioning MDS solenoid.	3. Replace the solenoid.
-	4. Malfunctioning MDS tappet.	4. Replace tappet (s).

 © 2011 Mitchell Repair Information Company, LLC.

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

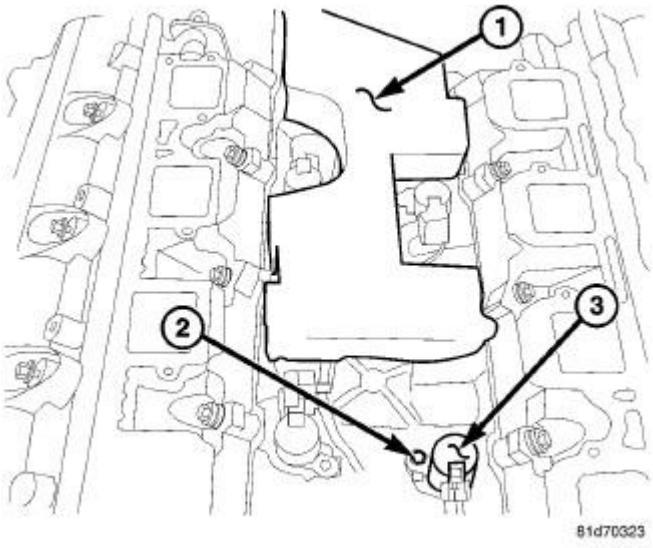


Fig. 220: MDS Solenoids
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the intake manifold. See **Removal**.
3. Remove foam insulator pad (1).

 © 2011 Mitchell Repair Information Company, LLC.

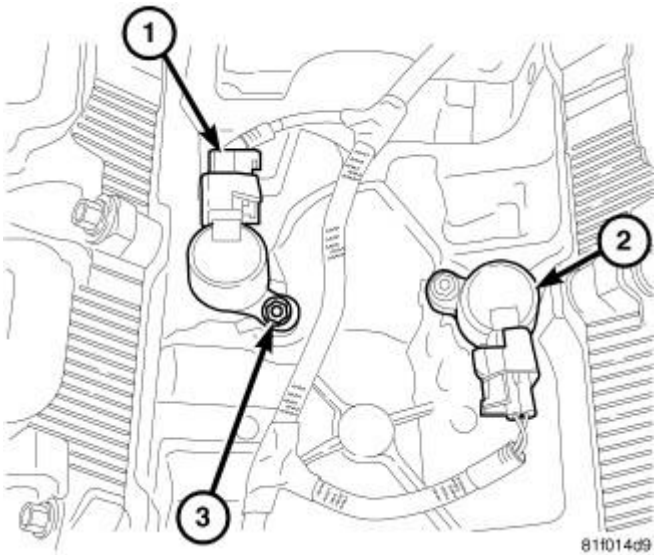


Fig. 221: MDS Solenoid Connector
Courtesy of CHRYSLER LLC

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).

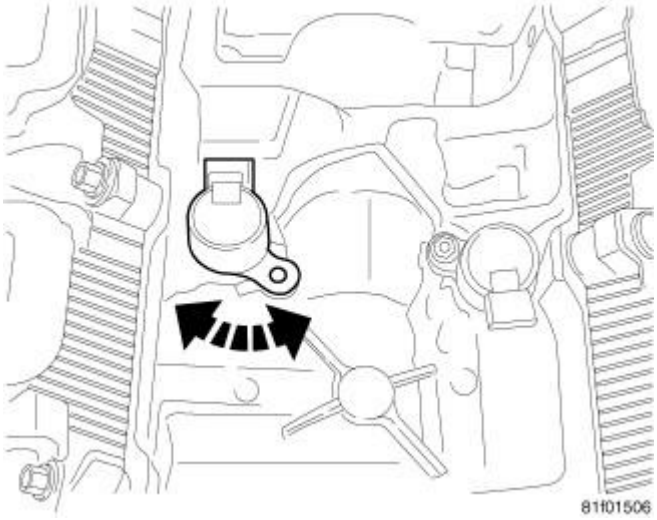


Fig. 222: MDS Solenoid Removal
Courtesy of CHRYSLER LLC

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).

 © 2011 Mitchell Repair Information Company, LLC.

Installation

INSTALLATION

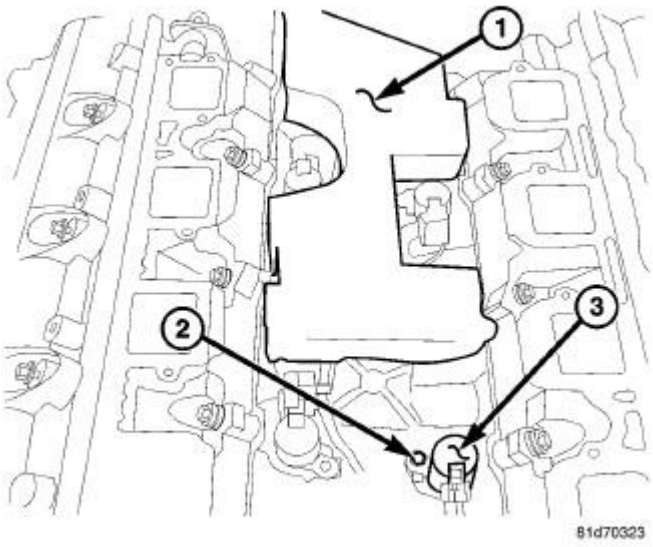


Fig. 223: MDS Solenoids
Courtesy of CHRYSLER LLC

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 **Installation**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, FRONT

Removal

REMOVAL

2WD

 © 2011 Mitchell Repair Information Company, LLC.

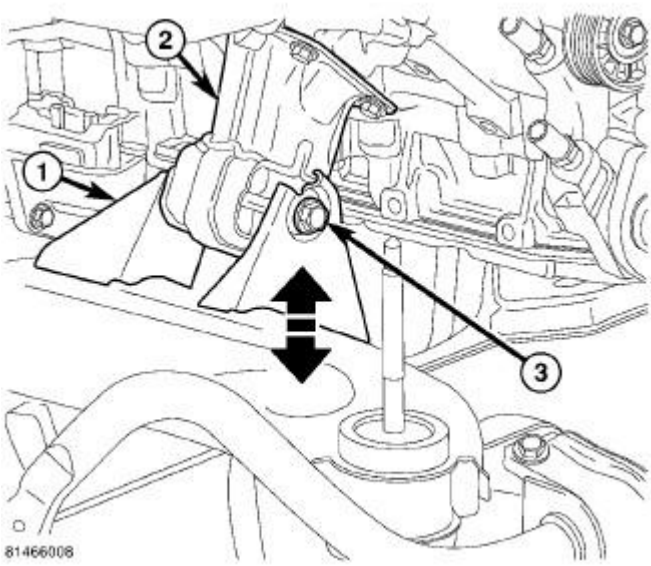


Fig. 224: Identifying Engine Mount Bolts
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the engine mount through bolts (3).

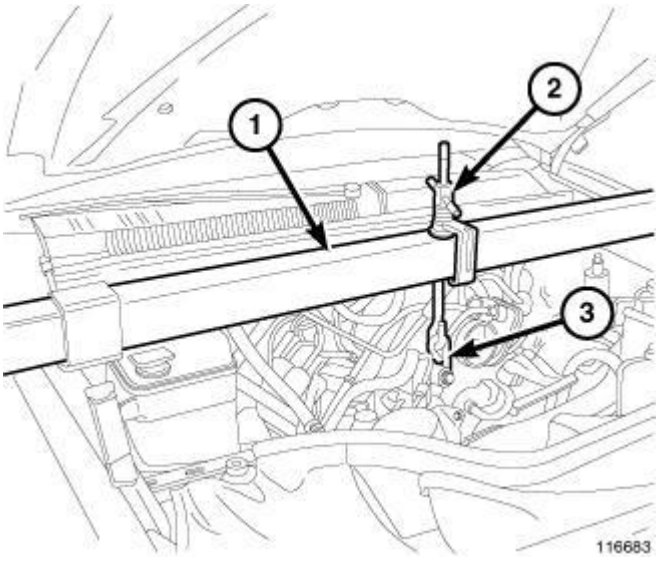


Fig. 225: Identifying Engine Support Fixture 8534B
Courtesy of CHRYSLER LLC

4. Raise the engine using the engine support fixture (1) special tool 8534B.

 © 2011 Mitchell Repair Information Company, LLC.

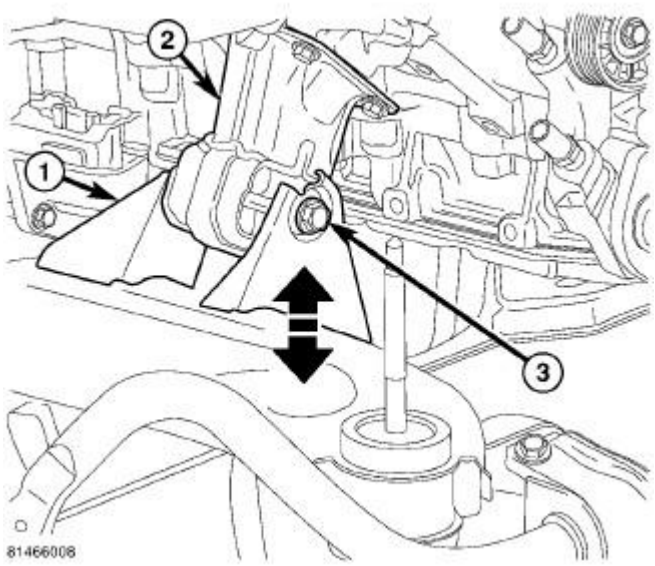


Fig. 226: Identifying Engine Mount Bolts
Courtesy of CHRYSLER LLC

5. Remove the engine mount to insulator bolts.
6. Remove the insulator from the engine (2).

4WD

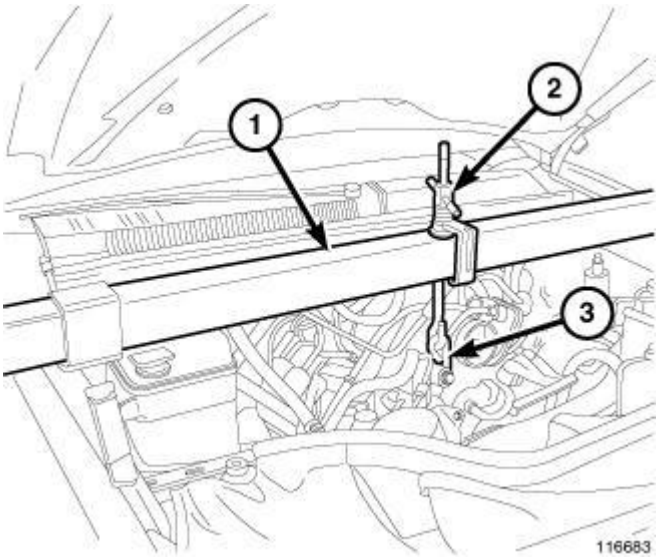


Fig. 227: Identifying Engine Support Fixture 8534B
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the skid plate.

 © 2011 Mitchell Repair Information Company, LLC.

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 bolts that attach the engine mounts to the front axle.
9. Remove the bolts that attach the front axle to the left engine bracket.
10. Lower the front axle.

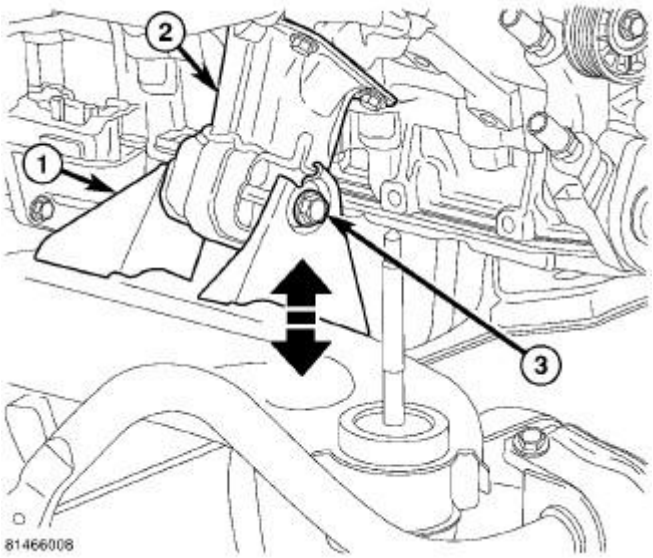


Fig. 228: Identifying Engine Mount Bolts
Courtesy of CHRYSLER LLC

11. Remove the engine mount through bolts (3).
12. Raise the engine far enough to be able to remove the left and right engine mounts.
13. Remove the engine mounts (2).

Installation

INSTALLATION

2WD

 © 2011 Mitchell Repair Information Company, LLC.

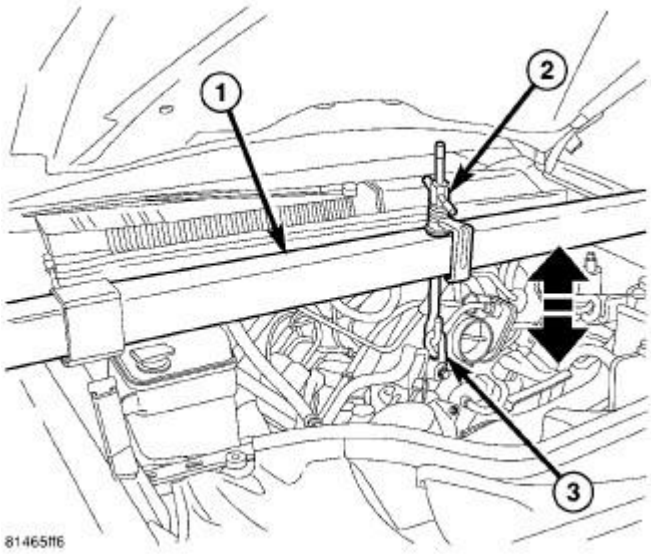


Fig. 229: Engine Support Tool
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

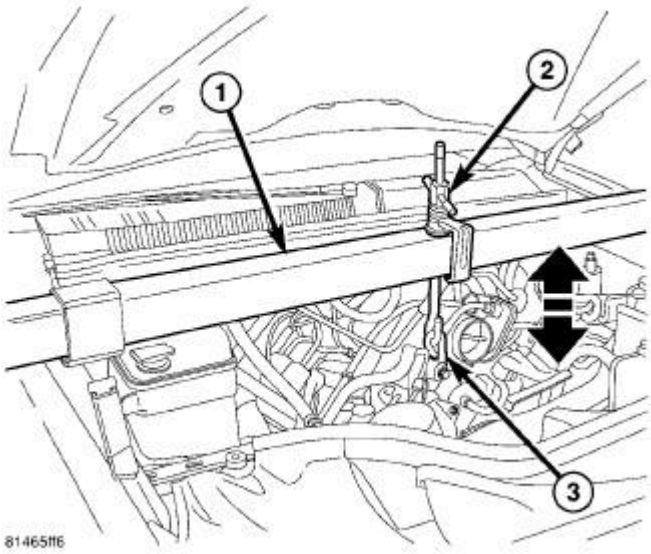


Fig. 230: Engine Support Tool
Courtesy of CHRYSLER LLC

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.

INSULATOR, ENGINE MOUNT, REAR

Removal

 © 2011 Mitchell Repair Information Company, LLC.

REMOVAL

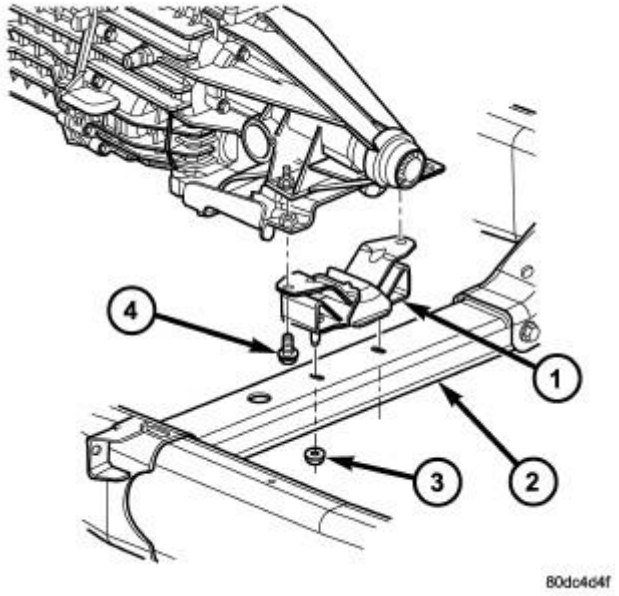


Fig. 231: Removing/Installing Transmission Mount
Courtesy of CHRYSLER LLC

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 61 N.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 54 N.m (40 ft. lbs.).

 © 2011 Mitchell Repair Information Company, LLC.

LUBRICATION

DESCRIPTION

DESCRIPTION

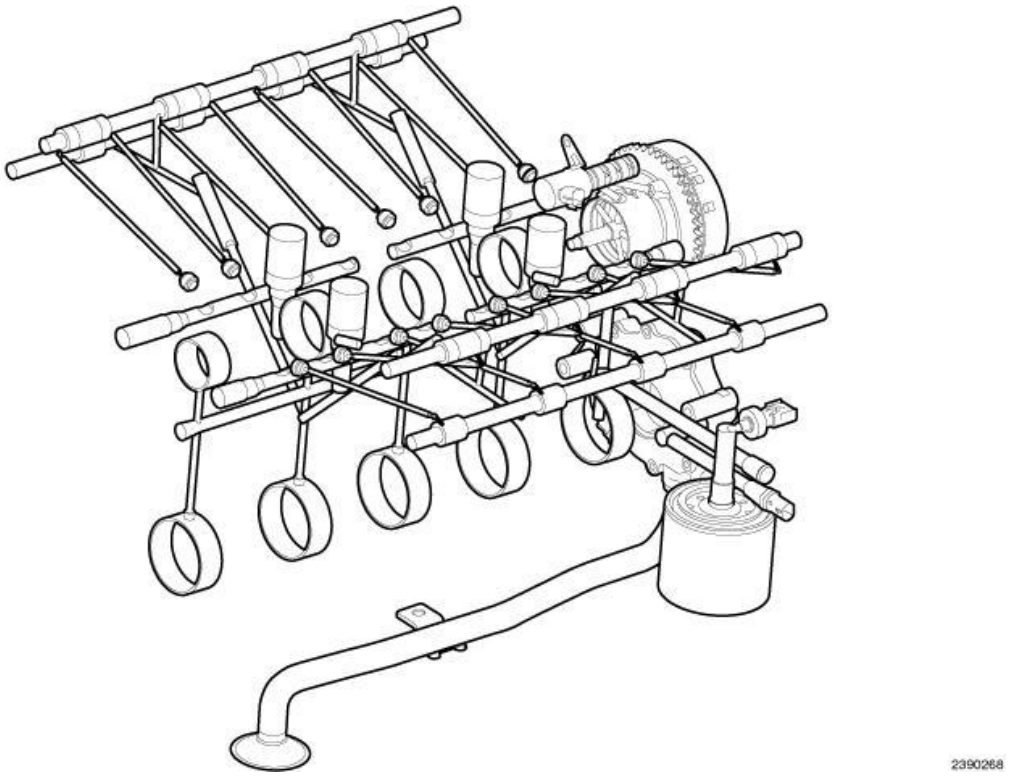


Fig. 232: 5.7L MDS Lubrication System
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

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 information 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 information 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:

 © 2011 Mitchell Repair Information Company, LLC.

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.

 © 2011 Mitchell Repair Information Company, LLC.

Installation

INSTALLATION

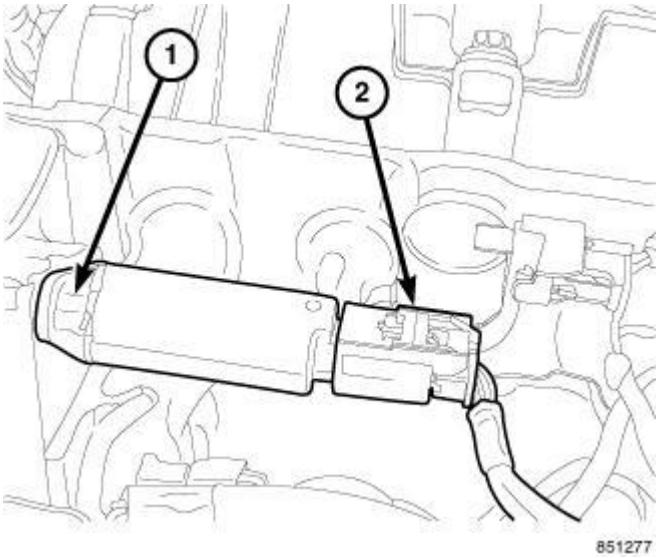
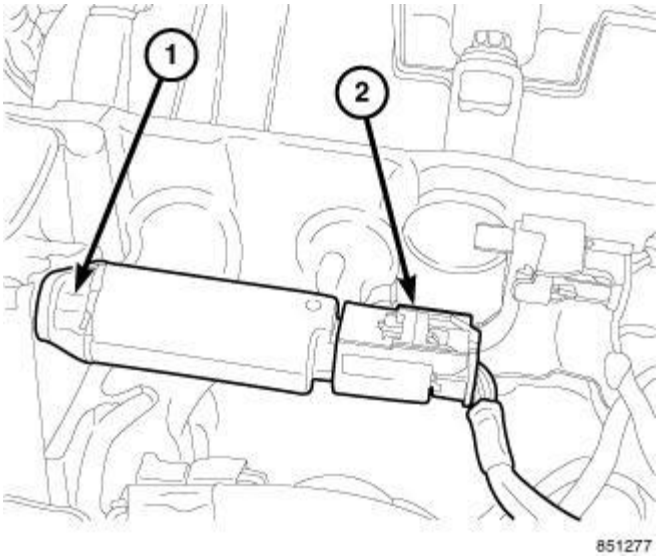


Fig. 233: Oil Control Valve
Courtesy of CHRYSLER LLC

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 **Removal**. .

Removal

REMOVAL



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 234: Oil Control Valve
Courtesy of CHRYSLER LLC

1. Remove intake manifold. See **Removal**. .
2. Disconnect oil control valve electrical connector (2).
3. Remove oil control valve fastener (1).

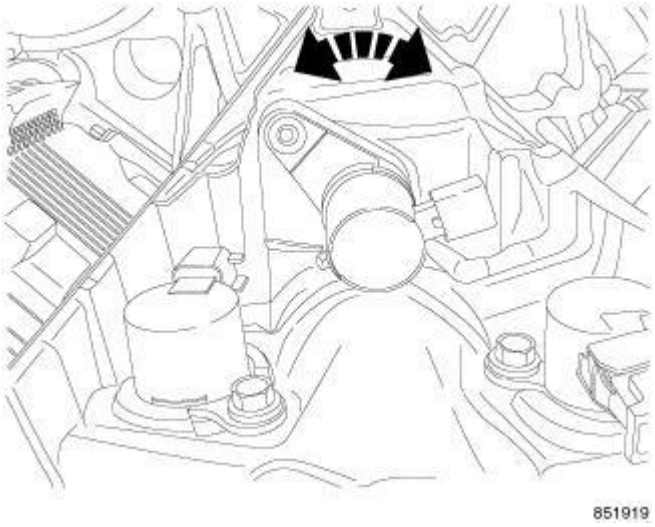


Fig. 235: Oil Control Valve
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

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.

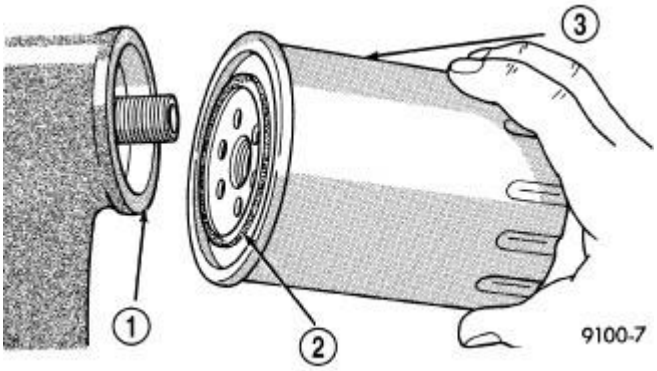


Fig. 236: Oil Filter Sealing Surface - Typical
Courtesy of CHRYSLER LLC

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.
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.

 © 2011 Mitchell Repair Information Company, LLC.

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 part.
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. Refer to the WARNING at CYLINDER-TO-WATER JACKET LEAKAGE TEST .

PAN, OIL

Removal

REMOVAL

4X2

 © 2011 Mitchell Repair Information Company, LLC.

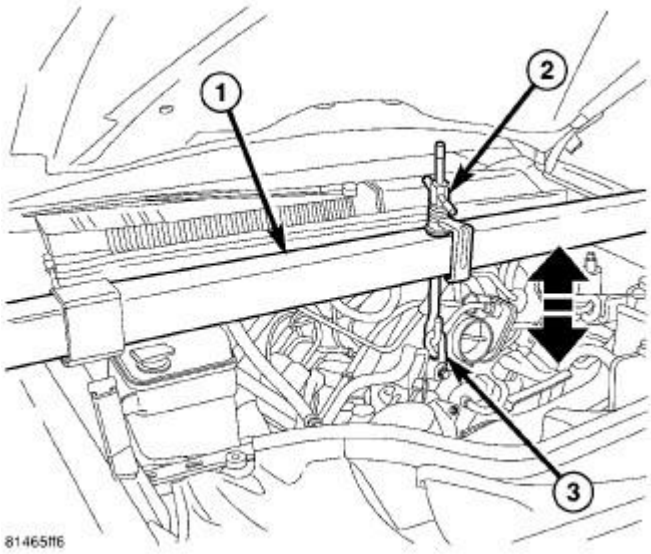


Fig. 237: Engine Support Tool
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Loosen both 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.**

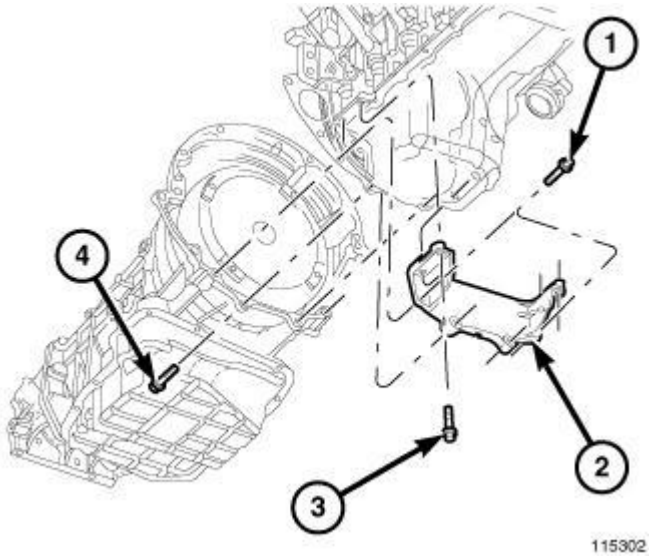


Fig. 238: Structural Cover
Courtesy of CHRYSLER LLC

4. Remove the structural dust cover. See **Removal** .
5. Remove fan and fan shroud.
6. Drain engine oil.
7. Remove the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

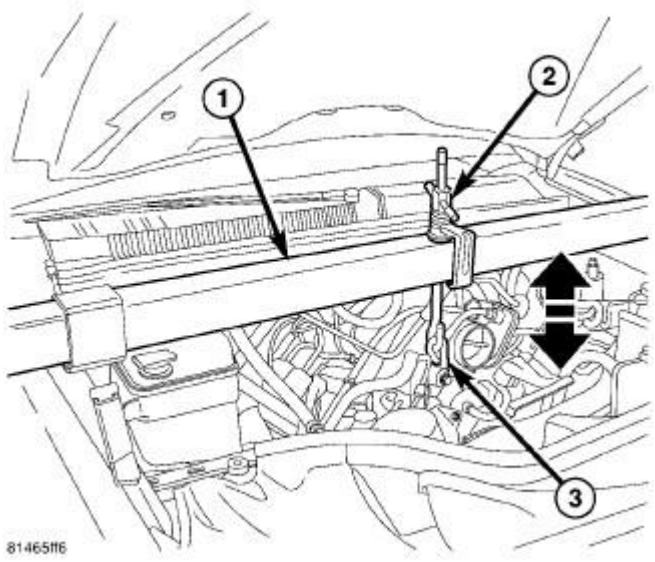
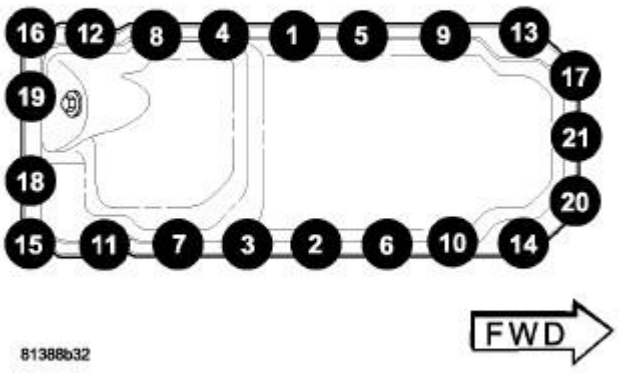


Fig. 239: Engine Support Tool
Courtesy of CHRYSLER LLC

8. 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. 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 raised to gain clearance.**



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 240: Oil Pan Bolts - 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.

9. Remove the oil pan mounting bolts using the sequence provided.
10. 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.

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

4X4

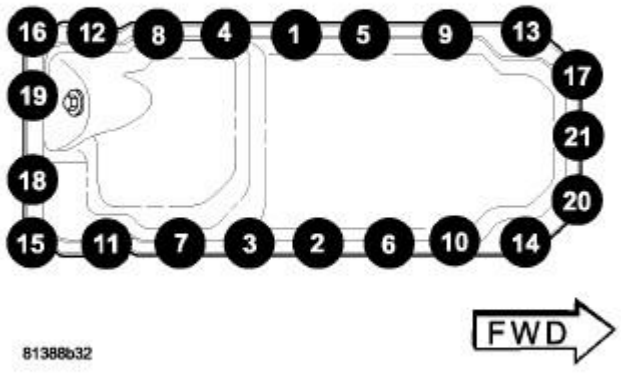


Fig. 241: Oil Pan Bolts - Torque Sequence
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.

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

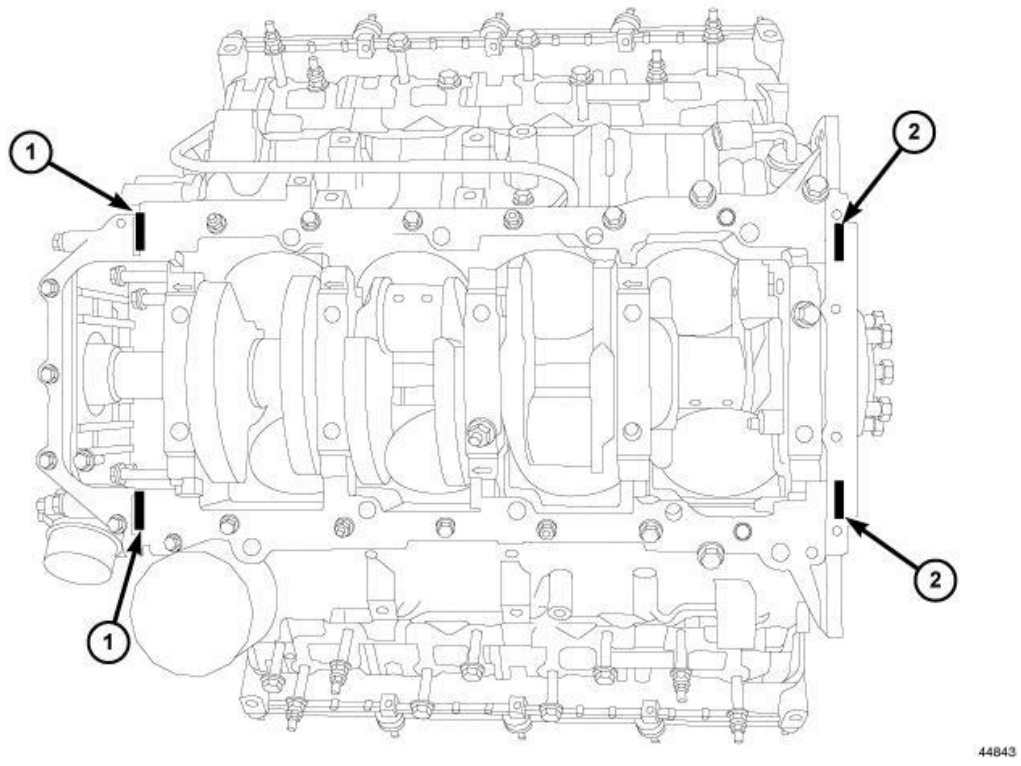


Fig. 242: Locating T-Joints
Courtesy of CHRYSLER LLC

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

NOTE: Mopar® Engine RTV must be applied to the 4 T-joints (1,2), (area where front cover, rear retainer, block, and oil pan gasket meet). 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 4 T-joint locations.

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

 © 2011 Mitchell Repair Information Company, LLC.

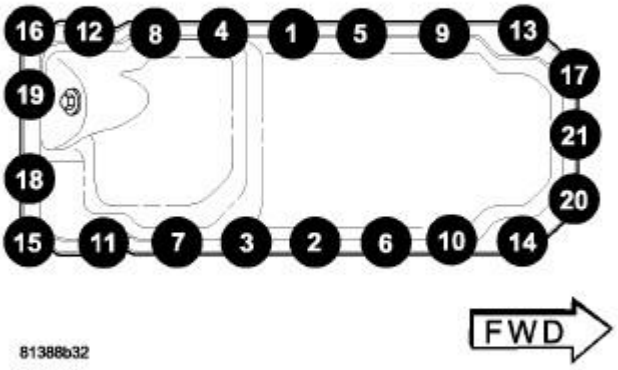


Fig. 243: Oil Pan Bolts - Torque Sequence
Courtesy of CHRYSLER LLC

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 (250 in. 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.).

 © 2011 Mitchell Repair Information Company, LLC.

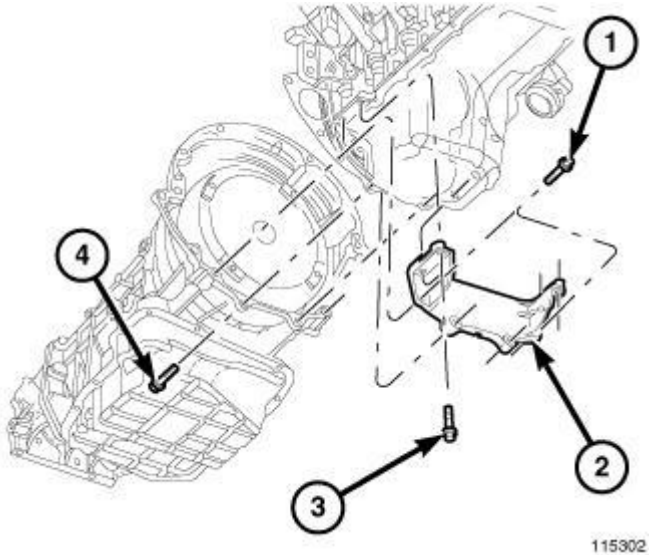


Fig. 244: Structural Cover
Courtesy of CHRYSLER LLC

6. Install the structural cover. See **Installation** .

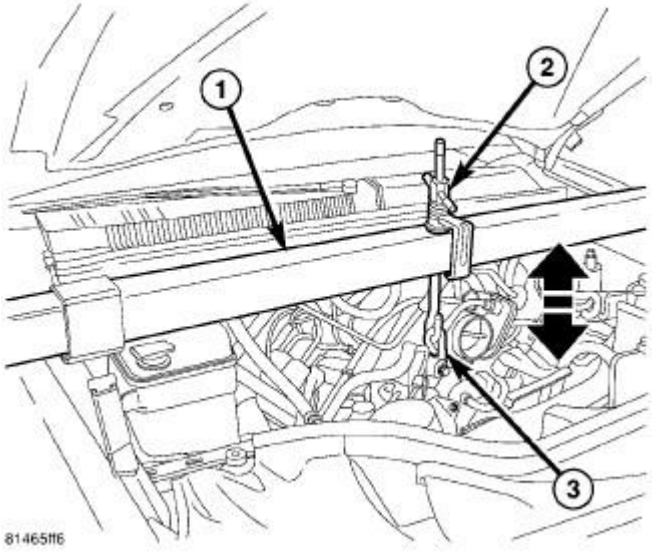


Fig. 245: Engine Support Fixture
Courtesy of CHRYSLER LLC

7. Lower the engine into mounts using Engine Support Fixture 8534B (1).
8. Install both the left and right side engine mount through bolts. Tighten the nuts to 68 N.m (50 ft. lbs.).
9. Reinstall the front axle, if removed.
10. Install the steering rack, if removed.
11. Install the rear transmission mount, if removed.

 © 2011 Mitchell Repair Information Company, LLC.

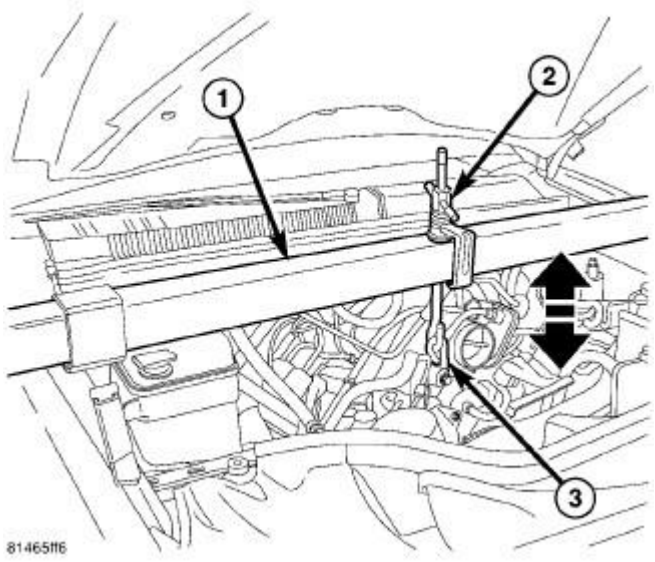


Fig. 246: Engine Support Fixture
Courtesy of CHRYSLER LLC

12. Remove Engine Support Fixture 8534B (1).
13. Install the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
14. Install the fan shroud and fan.
15. Fill engine oil.
16. Connect the negative battery cable.
17. Start engine and check for leaks.

PUMP, ENGINE OIL

Inspection

INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

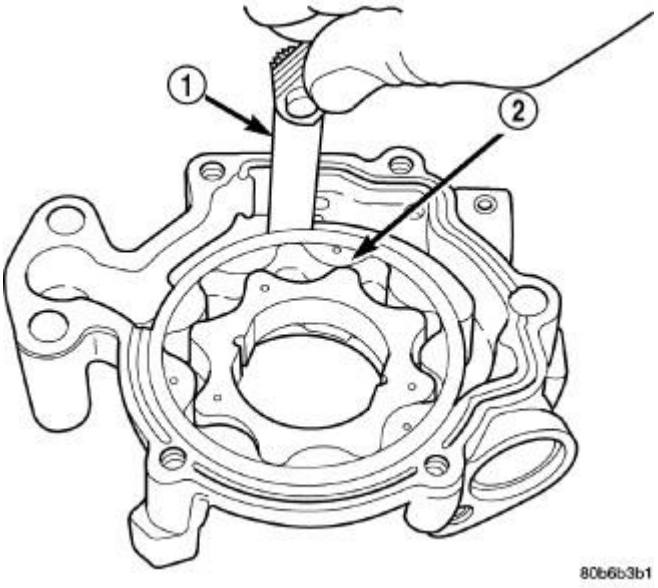


Fig. 247: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER LLC

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 0.235 mm (0.009 in.) or more the oil pump assembly must be replaced.

 © 2011 Mitchell Repair Information Company, LLC.

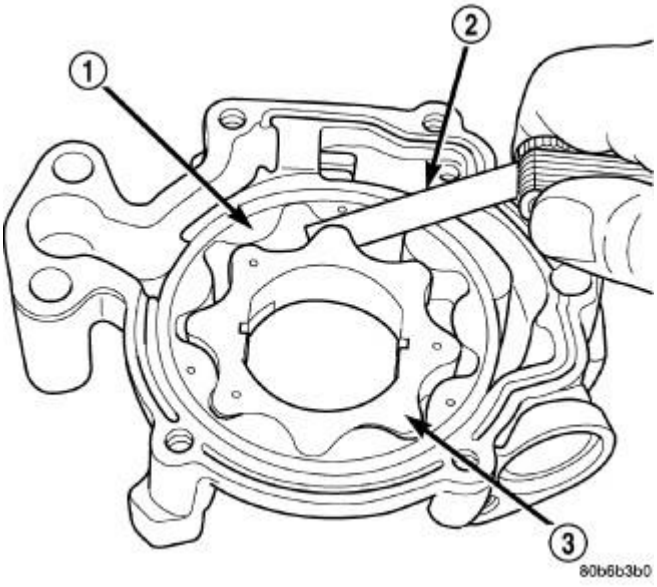


Fig. 248: Measuring Clearance Between Rotors
Courtesy of CHRYSLER LLC

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.

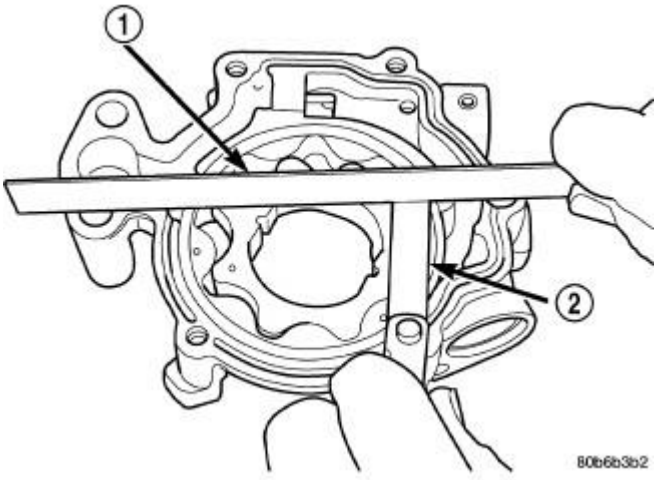


Fig. 249: Measuring Clearance Over Rotors
Courtesy of CHRYSLER LLC

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.).

 © 2011 Mitchell Repair Information Company, LLC.

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.

Cleaning

CLEANING

1. Wash all parts in a suitable solvent.

Removal

REMOVAL

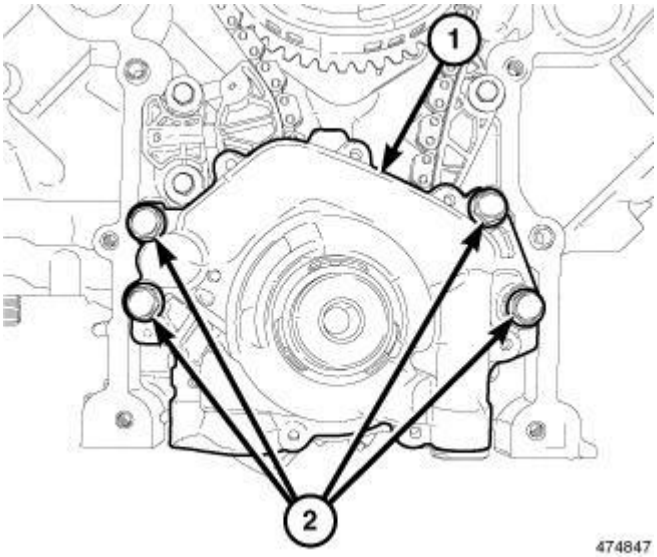


Fig. 250: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

1. Remove the oil pan and pick-up tube. See **Removal** .
2. Remove the timing chain cover. See **Removal** .
3. Remove the four bolts (2) and the oil pump (1).

Installation

INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

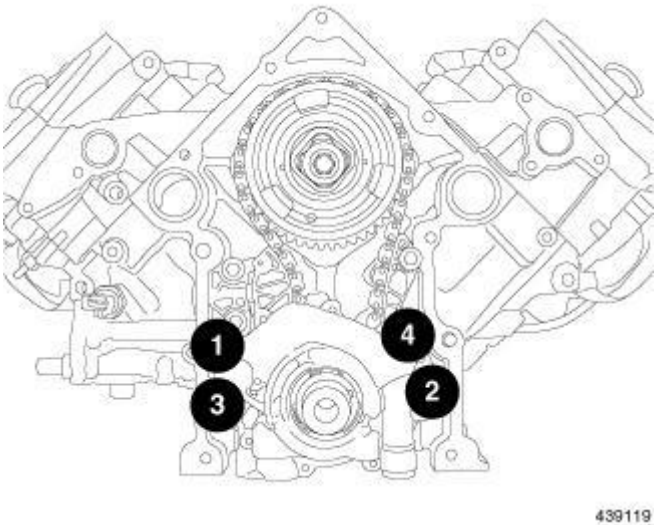


Fig. 251: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

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 in illustration.
3. Install the timing chain cover. See **Installation** .
4. Install the pick-up tube and oil pan. See **Installation** .

SENSOR, OIL PRESSURE

Description

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit from 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

 © 2011 Mitchell Repair Information Company, LLC.

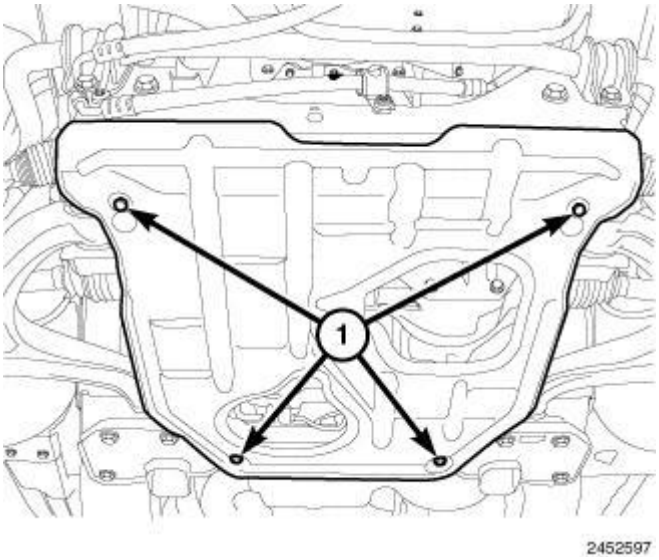


Fig. 252: Lower Splash Shield Retaining Bolts
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove the lower splash shield retaining bolts (1) and the splash shield.

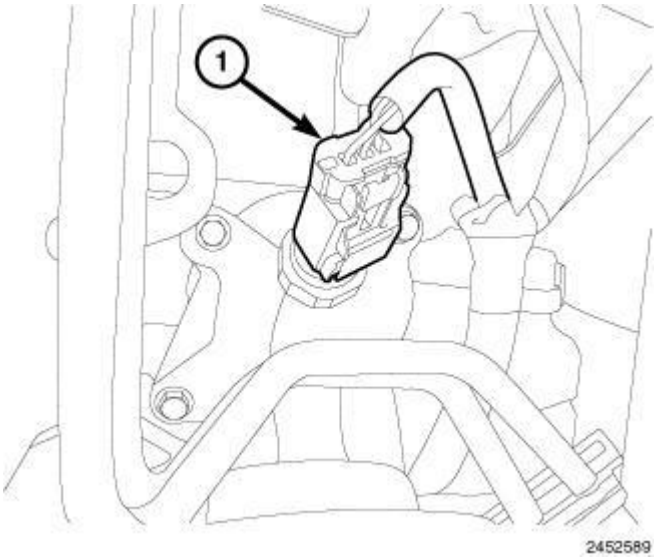


Fig. 253: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER LLC

4. Disconnect the oil pressure sensor electrical connector (1).

 © 2011 Mitchell Repair Information Company, LLC.

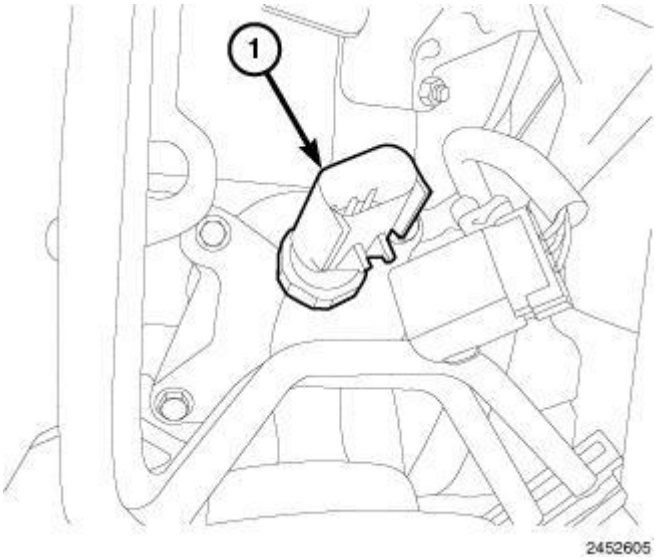


Fig. 254: Oil Pressure Sensor
Courtesy of CHRYSLER LLC

5. Remove the oil pressure sensor (1).

Installation

INSTALLATION

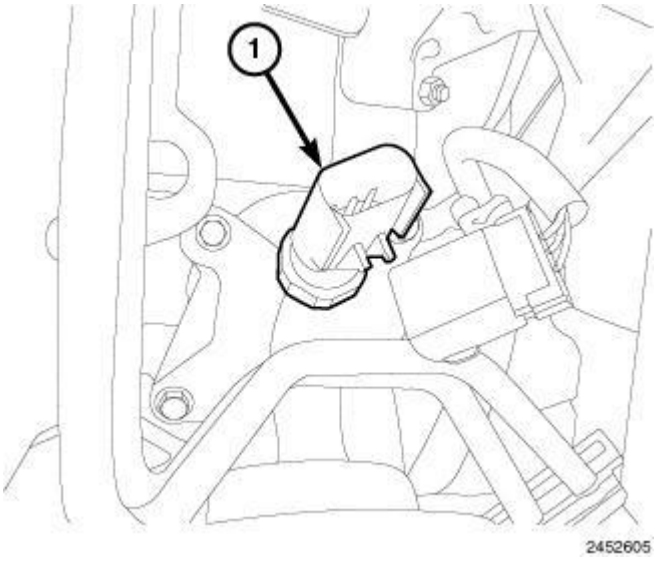


Fig. 255: Oil Pressure Sensor
Courtesy of CHRYSLER LLC

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

1. Install the oil pressure sensor (1).

 © 2011 Mitchell Repair Information Company, LLC.

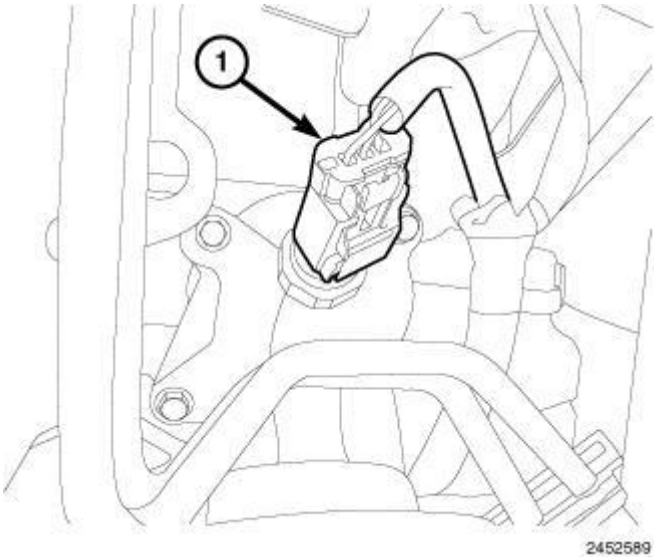


Fig. 256: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER LLC

2. Connect the oil pressure sensor electrical connector (1).

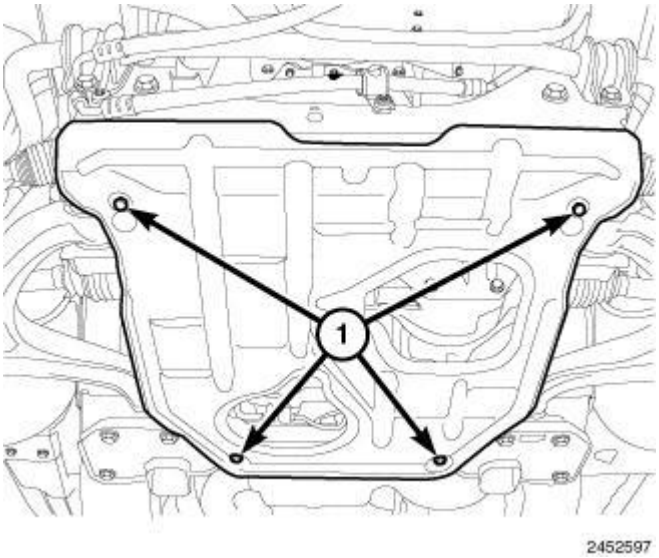


Fig. 257: Lower Splash Shield Retaining Bolts
Courtesy of CHRYSLER LLC

3. Position the lower splash shield and install the retaining bolts (1).
4. Lower the vehicle
5. Connect the negative battery cable.

SENSOR, OIL TEMPERATURE

Description

 © 2011 Mitchell Repair Information Company, LLC.

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

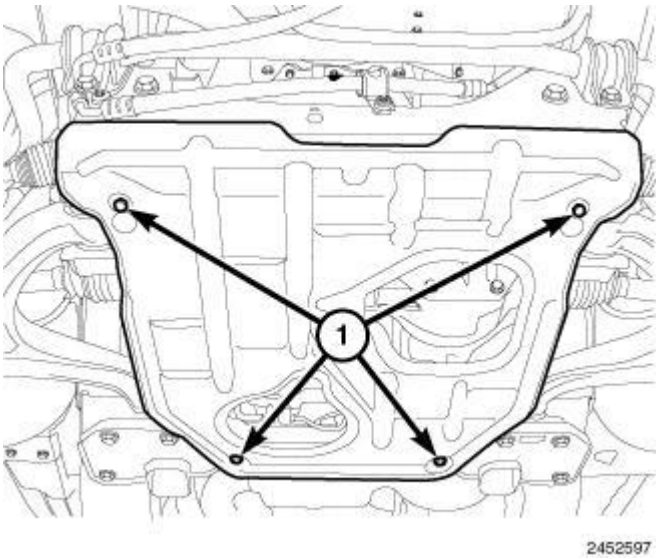


Fig. 258: Lower Splash Shield Retaining Bolts
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove the lower splash shield retaining bolts (1) and the splash shield.

 © 2011 Mitchell Repair Information Company, LLC.

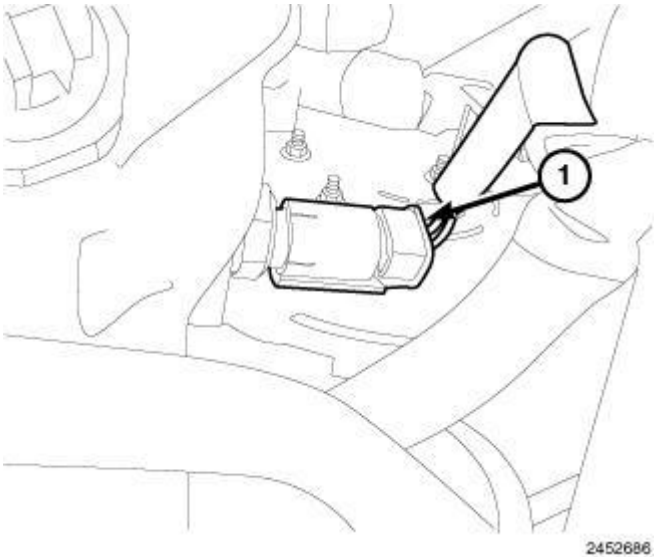


Fig. 259: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

4. Disconnect the oil temperature sensor electrical connector (1).

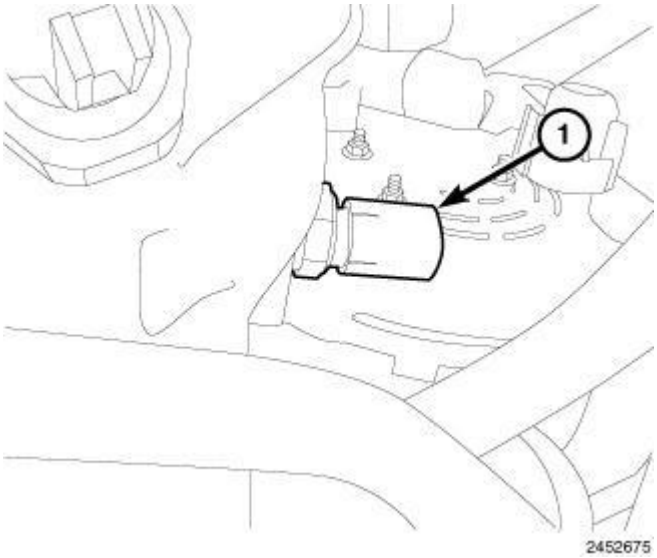


Fig. 260: Oil Temperature Sensor
Courtesy of CHRYSLER LLC

5. Remove the oil temperature sensor (1).

Installation

INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

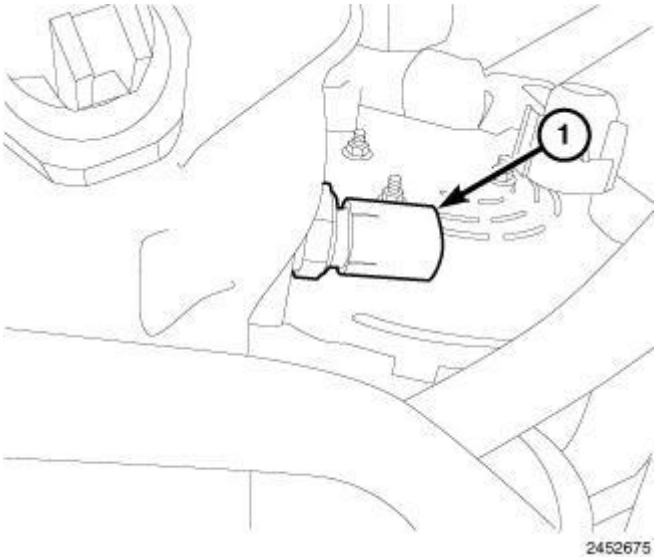


Fig. 261: Oil Temperature Sensor
Courtesy of CHRYSLER LLC

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

1. Install the oil temperature sensor (1).

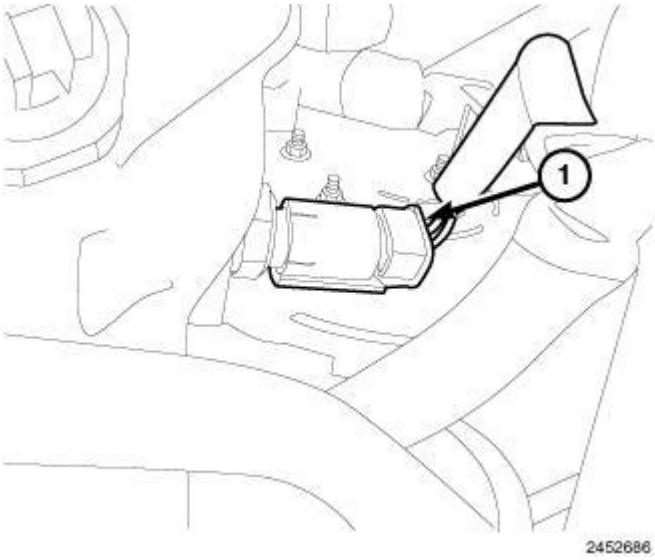


Fig. 262: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

2. Connect the oil temperature sensor electrical connector (1).

 © 2011 Mitchell Repair Information Company, LLC.

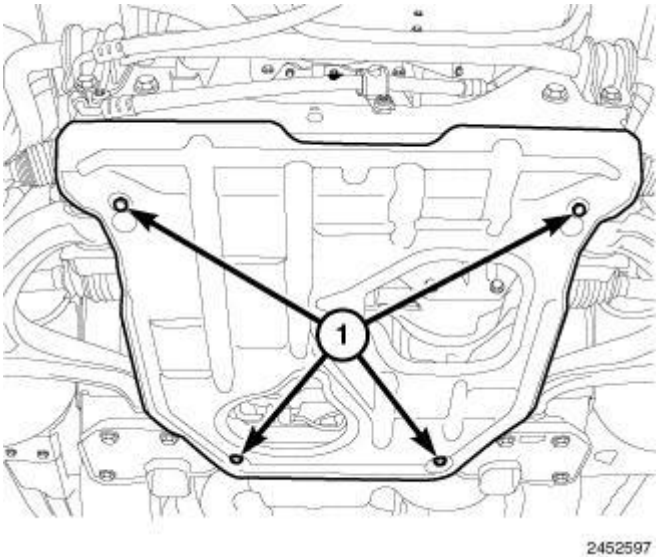


Fig. 263: Lower Splash Shield Retaining Bolts
Courtesy of CHRYSLER LLC

3. Position the lower splash shield and install the retaining bolts (1).
4. Lower the vehicle.
5. 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

 © 2011 Mitchell Repair Information Company, LLC.

EXHAUST MANIFOLD - LEFT SIDE

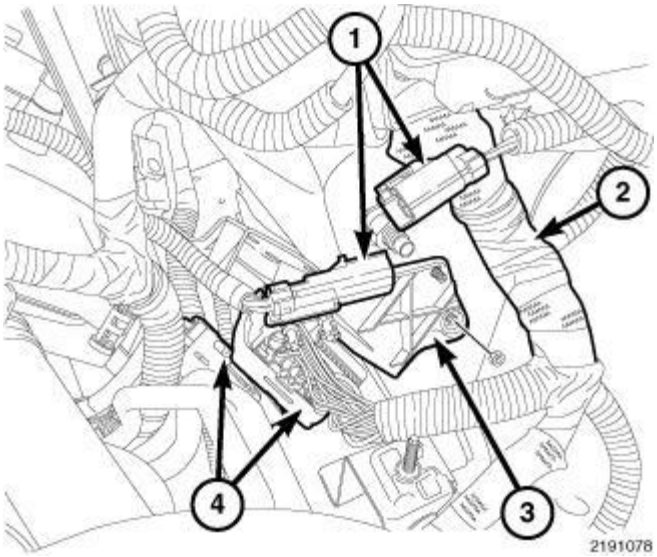


Fig. 264: Bulk Connector Retaining Bracket
Courtesy of CHRYSLER LLC

1. Lock the steering wheel in the center position.

CAUTION: Steering column module is centered to the vehicle's steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage. Refer to Restraints/CLOCKSPRING - Standard Procedure .

2. Remove the engine cover.
3. Disconnect the battery terminals.
4. Remove the battery and battery tray. Refer to **Electrical/Battery System/TRAY, Battery - Removal** .

CAUTION: USE CAUTION WHEN CONNECTING, DISCONNECTING OR REPOSITIONING ANY WIRING HARNESS. DAMAGE COULD OCCUR TO THE WIRING HARNESS DUE TO VEHICLE MILEAGE, VEHICLE AGE AND ENVIRONMENTAL CONDITIONS.

5. Disconnect the bulk connector (4).
6. Disconnect the tail lamp harness.
7. Remove the nut from the bulk connector retaining bracket (3) and reposition the bracket.
8. Disconnect the power steering switch (1) and reposition the harness.
9. Disconnect power distribution center (PDC) connector and reposition harness.

 © 2011 Mitchell Repair Information Company, LLC.

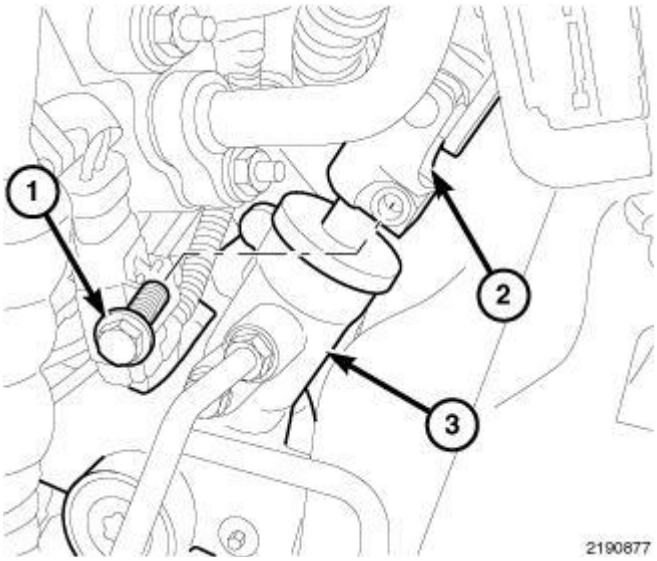


Fig. 265: Intermediate Steering Shaft
Courtesy of CHRYSLER LLC

10. Remove the lower coupling pinch bolt (1) from the intermediate steering shaft (2) at the rack and pinion assembly (3).
11. Remove upper mounting bolt from dipstick tube.
12. Remove the two left front exhaust manifold heat shield nuts.
13. Lift and secure the vehicle.
14. Remove any skid plates (if equipped).
15. Remove the front propeller shaft (4 X 4 equipped vehicles). Refer to **Differential and Driveline/Propeller Shaft/SHAFT, Drive - Removal** .
16. Remove the front left side tire and wheel.
17. Remove the front left side wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
18. Reposition any harnesses as needed.

 © 2011 Mitchell Repair Information Company, LLC.

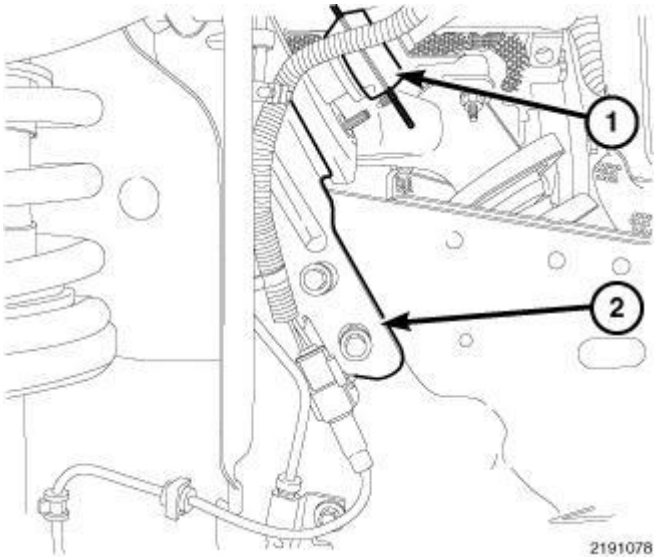


Fig. 266: Intermediate Steering Shaft Support Bracket
Courtesy of CHRYSLER LLC

19. Remove the two bolts and two nuts from the intermediate steering shaft support bracket (2).
20. Remove the intermediate steering shaft support bracket (2).

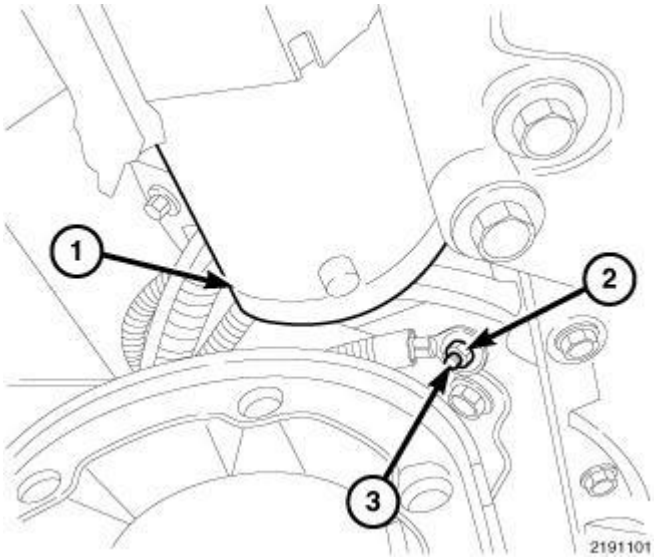


Fig. 267: Starter Nut
Courtesy of CHRYSLER LLC

21. Remove the nut (2) from the battery ground harness, located in front of the starter (1).
22. Remove the battery ground harness.
23. Remove the lower stud/bolt (3) from the dipstick tube.
24. Remove the two left rear exhaust manifold heat shield nuts.
25. Saturate the front exhaust pipe/catalytic converter assembly bolts and nuts with heat valve lubricant. Allow 5 minutes for penetration.

 © 2011 Mitchell Repair Information Company, LLC.

26. Remove the bolts from the front left exhaust pipe/catalytic converter assembly.
27. Loosen the bolts from the front right exhaust pipe/catalytic converter assembly.**Do not remove the bolts.**
.
28. Lower the vehicle.

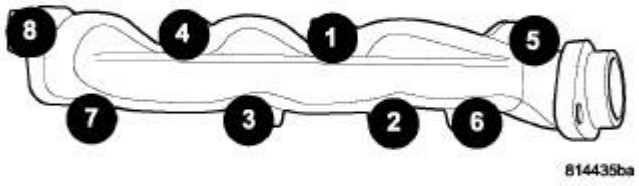


Fig. 268: Exhaust Manifold Bolt Tightening Sequence - Left
Courtesy of CHRYSLER LLC

29. Remove the eight bolts/studs from the exhaust manifold using the sequence provided.

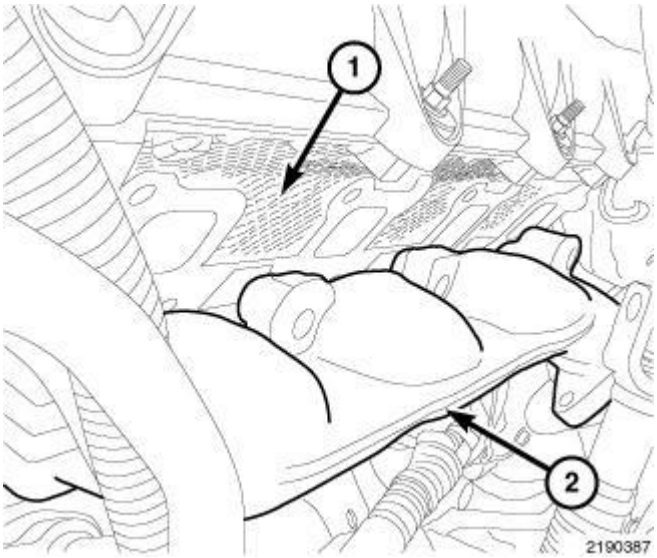


Fig. 269: Exhaust Manifold & Gasket From Front Of Vehicle
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

30. Remove the exhaust manifold (2) and gasket from the front of the vehicle.
31. Inspect the exhaust manifold (2) for any damage. See **Inspection**
32. Clean the mating surfaces (1, 2).

EXHAUST MANIFOLD - RIGHT SIDE

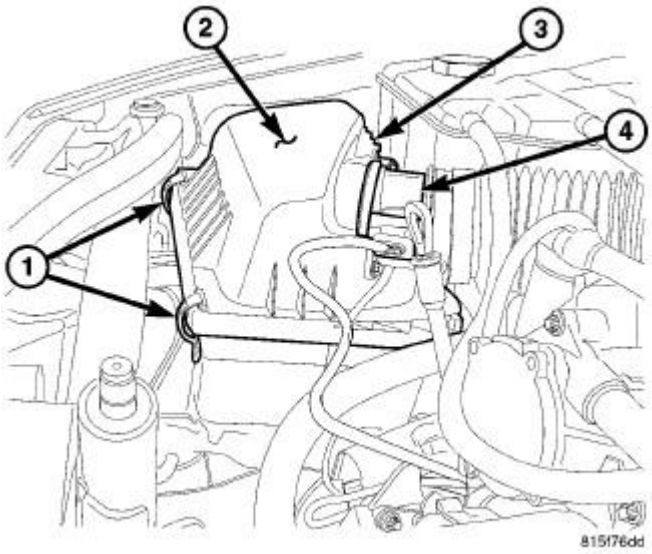


Fig. 270: Air Cleaner Cover
Courtesy of CHRYSLER LLC

1. Partially drain the engine coolant. Refer to **Cooling - Standard Procedure** .
2. Remove the engine cover.
3. Disconnect the negative battery terminal.
4. Remove the air box assembly (2).

 © 2011 Mitchell Repair Information Company, LLC.

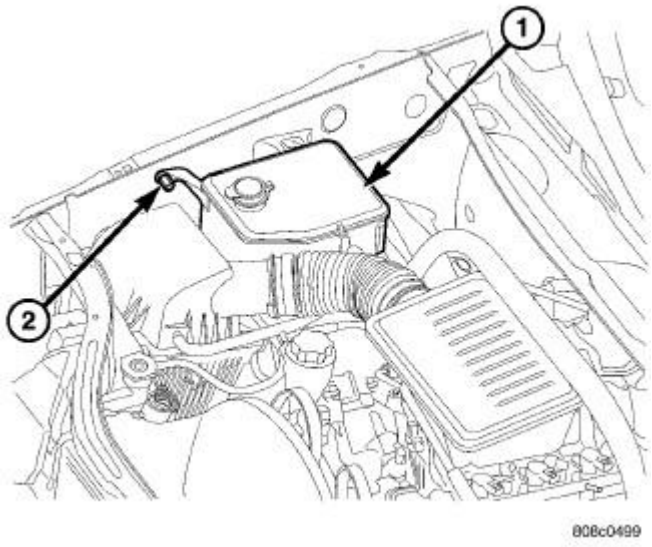


Fig. 271: Coolant Reservoir/Overflow Tank
Courtesy of CHRYSLER LLC

5. Remove the coolant recovery bottle (1). Refer to **Cooling/Engine/BOTTLE, Pressurized Coolant - Removal** .
6. Disconnect and re-position the upper right side engine harness.

CAUTION: USE CAUTION WHEN CONNECTING, DISCONNECTING OR REPOSITIONING ANY WIRING HARNESS. DAMAGE COULD OCCUR TO THE WIRING HARNESS DUE TO VEHICLE MILEAGE, VEHICLE AGE AND ENVIRONMENTAL CONDITIONS.

7. If required, disconnect and re-position the heater hoses from the heater core tubes in the engine compartment.
8. Raise and secure the vehicle.
9. Remove any skid plates (if equipped).
10. Saturate the front exhaust pipe/catalytic converter assembly bolts and nuts with heat valve lubricant. Allow 5 minutes for penetration.
11. Disconnect and remove the upstream O2 sensor from the exhaust pipe/catalytic converter assembly. Refer to **Fuel System/Fuel Injection/SENSOR, Oxygen - Removal** .
12. Remove the bolts from the front right exhaust pipe/catalytic converter assembly.
13. Loosen the bolts from the front left exhaust pipe/catalytic converter assembly.**Do not remove the bolts.** .
14. Remove the front right tire and wheel assembly.
15. Remove the front right side wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
16. Lower the vehicle.
17. Remove the right side exhaust manifold heat shield.

 © 2011 Mitchell Repair Information Company, LLC.

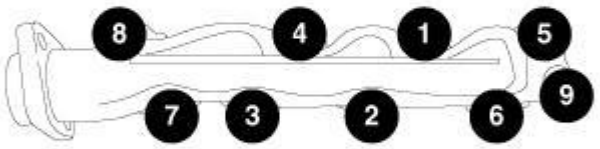


Fig. 272: Exhaust Manifold Torque RH
Courtesy of CHRYSLER LLC

18. Remove the eight bolts/studs from the exhaust manifold using the sequence provided.
19. Remove the exhaust manifold and gasket from the front of the vehicle.
20. Inspect the exhaust manifold for any damage. See **Inspection**.
21. Clean the mating surfaces.

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

EXHAUST MANIFOLD - LEFT SIDE

 © 2011 Mitchell Repair Information Company, LLC.

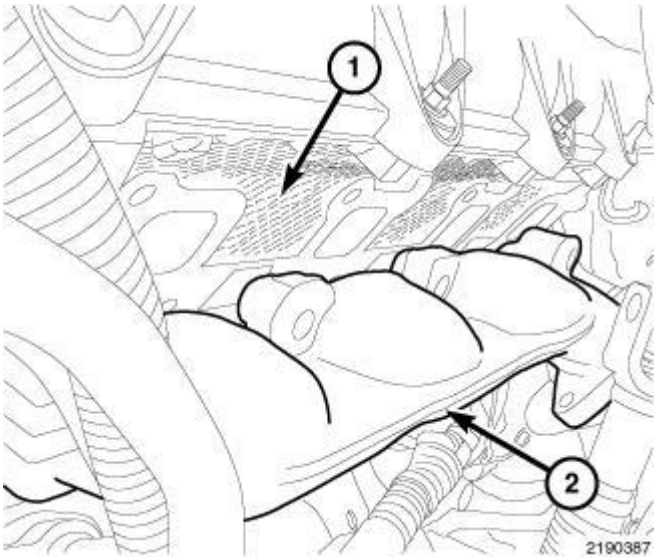


Fig. 273: Exhaust Manifold & Gasket From Front Of Vehicle
Courtesy of CHRYSLER LLC

1. Prior to installation, make sure all gasket mating surfaces (1, 2) are clean and free of any debris.
2. Inspect the exhaust manifold (2) for any damage. See **Inspection**.
3. Install manifold gasket and manifold (2) through the front of the vehicle.

NOTE: Make sure gasket is properly seated before tightening the manifold stud/bolts.

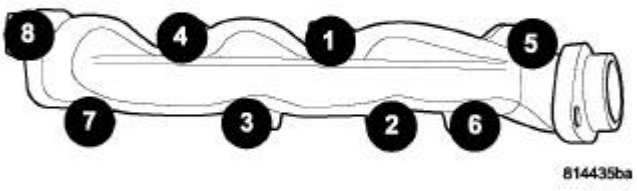


Fig. 274: Exhaust Manifold Bolt Tightening Sequence - Left

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

4. Install the exhaust manifold heat shield. Tighten the nuts to 8 N.m (71 in. lbs.).
5. Install the dipstick tube upper mounting bolt. Tighten the bolt to 12 N.m (9 ft. lbs.).
6. Raise and secure the vehicle.
7. Install the bolts and nuts at the left front exhaust pipe/catalytic converter assembly to exhaust manifold flange. Do not tighten.
8. Position the exhaust pipe for proper clearance with the frame and underbody parts. A minimum clearance of 25.4 mm (1.0 in.) is required.
9. Once properly aligned, tighten the left front exhaust pipe/catalytic converter assembly to exhaust manifold bolts (2) to 26 N.m (19 in. lbs.).
10. Tighten the right front exhaust pipe/catalytic converter assembly to the exhaust manifold bolts to 26 N.m (19 in. lbs.).

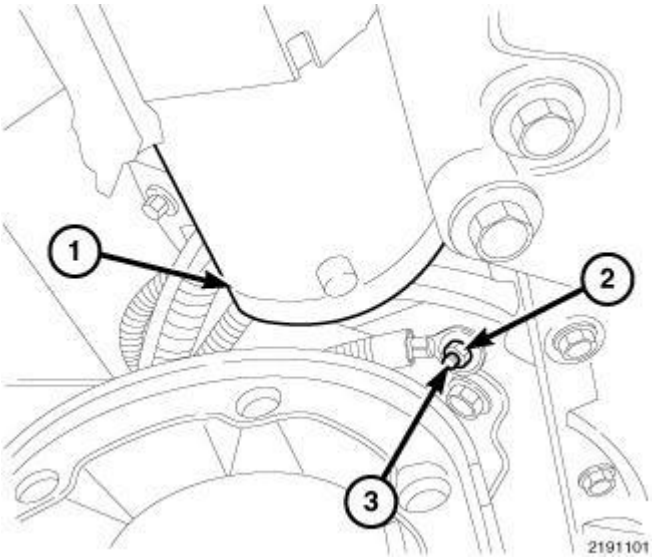


Fig. 275: Starter Nut
Courtesy of CHRYSLER LLC

11. Install the lower dipstick stud/bolt (3) located in front of the starter (1). Tighten the stud/bolt (3) to 12 N.m (9 ft. lbs.)
12. Install the battery ground harness to the lower dipstick stud/bolt (3). Tighten the nut (2) to 11 N.m (8 ft. lbs.).
13. Install the front propeller shaft (4 X 4 equipped vehicles). Refer to **Differential and Driveline/Propeller Shaft/SHAFT, Drive - Installation** .

 © 2011 Mitchell Repair Information Company, LLC.

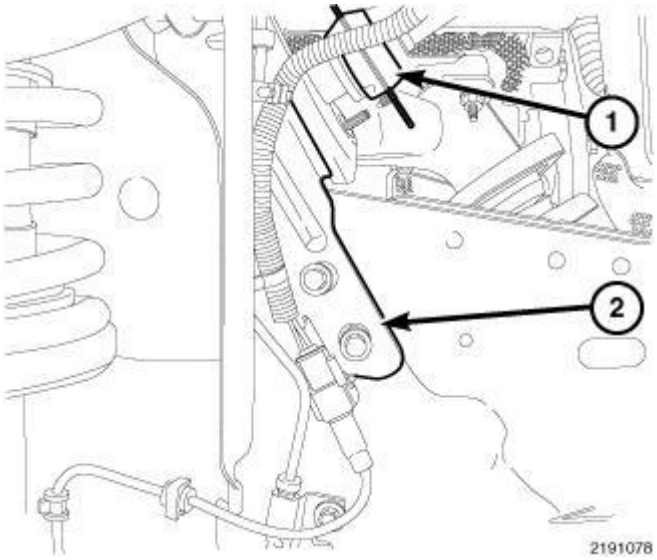


Fig. 276: Intermediate Steering Shaft Support Bracket
Courtesy of CHRYSLER LLC

14. Install the two bolts and two nuts from the intermediate steering shaft support bracket (2) to the frame. Tighten the bolts to 12 N.m (9 ft. lbs.).
15. Install the front left side wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
16. Install any skid plates (if equipped). Refer to **Frame and Bumpers/Frame/PLATE, Skid - Installation** .
17. Install the front tire and wheel.
18. Lower the vehicle.

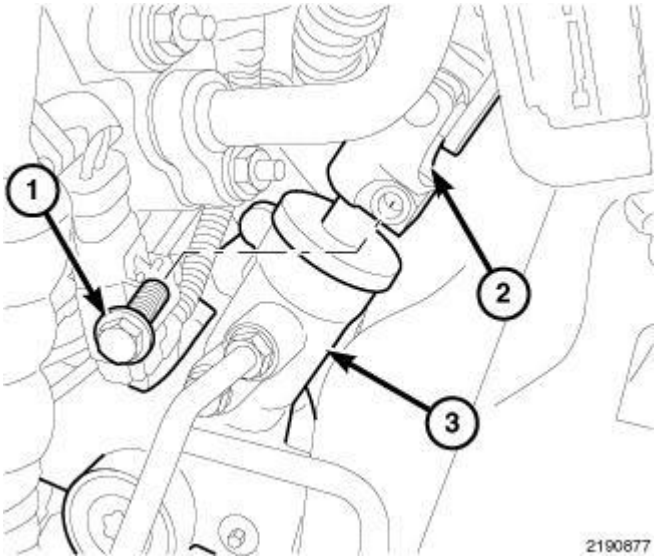


Fig. 277: Intermediate Steering Shaft
Courtesy of CHRYSLER LLC

19. Install the lower coupling pinch bolt (1) through the intermediate steering shaft (2) to the rack and pinion

 © 2011 Mitchell Repair Information Company, LLC.

assembly (3). Tighten the bolt (1) to 49 N.m (36 ft. lbs.)

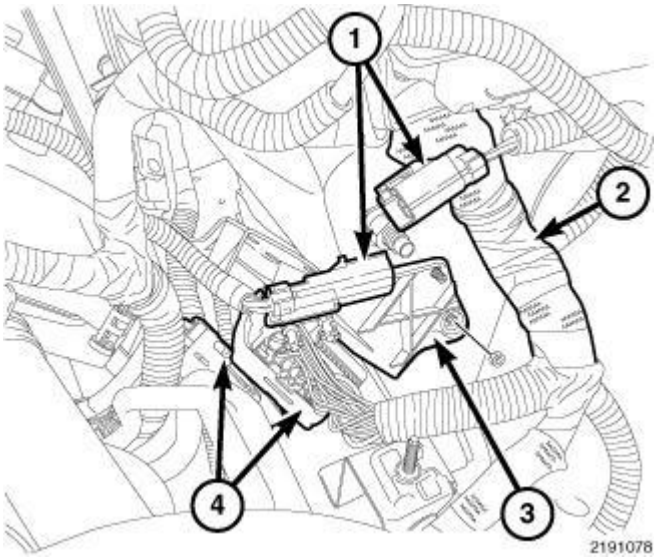


Fig. 278: Bulk Connector Retaining Bracket
Courtesy of CHRYSLER LLC

CAUTION: USE CAUTION WHEN CONNECTING, DISCONNECTING OR REPOSITIONING ANY WIRING HARNESS. DAMAGE COULD OCCUR TO THE WIRING HARNESS DUE TO VEHICLE MILEAGE, VEHICLE AGE AND ENVIRONMENTAL CONDITIONS.

20. Connect the power distribution center (PDC) connector and position the harness.
21. Connect the power steering switch and position the harness.
22. Position the bulk connector retaining bracket (3) and install the nut. Tighten the nut to 5 N.m (44 in. lbs.).
23. Connect the tail lamp harness (1).
24. Connect the bulk connector (4).
25. Install the battery tray. Refer to **Electrical - Engine Systems/Battery System/TRAY, Battery - Installation** .
26. Install the battery. Refer to **Electrical - Engine Systems/Battery System/BATTERY - Installation** .
27. Install the engine cover.
28. Start the engine and check for any leaks.

EXHAUST MANIFOLD - RIGHT SIDE

 © 2011 Mitchell Repair Information Company, LLC.

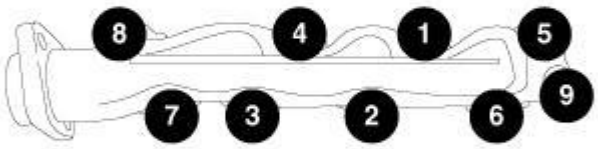


Fig. 279: Exhaust Manifold Torque RH
Courtesy of CHRYSLER LLC

1. Prior to installation, make sure all gasket mating surfaces are clean and free of any debris.
2. Inspect the exhaust manifold for any damage. See **Inspection**.
3. Install manifold gasket and manifold through the front of the vehicle.

NOTE: Make sure gasket is properly seated before tightening the manifold stud/bolts.

4. Install the eight manifold studs/bolts using the sequence provided. Tighten the studs/bolts to 25 N.m (18 ft. lbs.).
5. Install the exhaust manifold heat shield. Tighten the nuts to 8 N.m (71 in. lbs.).
6. Raise and secure the vehicle.
7. Install the bolts and nuts at the right front exhaust pipe/catalytic converter assembly to exhaust manifold flange. Do not tighten.
8. Position the exhaust pipe for proper clearance with the frame and underbody parts. A minimum clearance of 25.4 mm (1.0 in.) is required.
9. Once properly aligned, tighten the right front exhaust pipe/catalytic converter assembly to exhaust manifold bolts to 26 N.m (19 in. lbs.).
10. Tighten the left front exhaust pipe/catalytic converter assembly to the exhaust manifold bolts to 26 N.m (19 in. lbs.).
11. Connect and install the upstream O2 sensor to the exhaust pipe/catalytic converter assembly. Refer to **Fuel System/Fuel Injection/SENSOR, Oxygen - Installation** .
12. Install the front right side wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .

 © 2011 Mitchell Repair Information Company, LLC.

13. Install any skid plates (if equipped). Refer to **Frame and Bumpers/Frame/PLATE, Skid - Installation** .
14. Install the front tire and wheel.
15. Lower the vehicle.

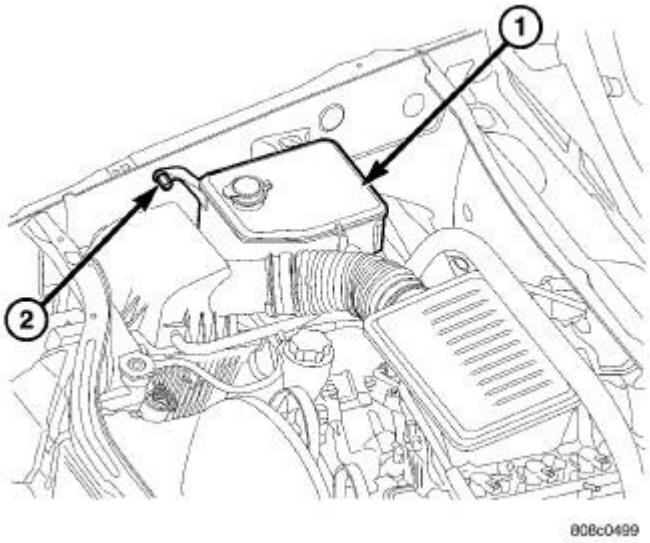


Fig. 280: Coolant Reservoir/Overflow Tank
Courtesy of CHRYSLER LLC

16. If required, connect and position the heater hoses from the heater core tubes in the engine compartment.

CAUTION: USE CAUTION WHEN CONNECTING, DISCONNECTING OR REPOSITIONING ANY WIRING HARNESS. DAMAGE COULD OCCUR TO THE WIRING HARNESS DUE TO VEHICLE MILEAGE, VEHICLE AGE AND ENVIRONMENTAL CONDITIONS.

17. Connect and position the upper right side engine harness.
18. Install the coolant recovery bottle (1). Refer to **Cooling/Engine/BOTTLE, Pressurized Coolant - Installation** .

 © 2011 Mitchell Repair Information Company, LLC.

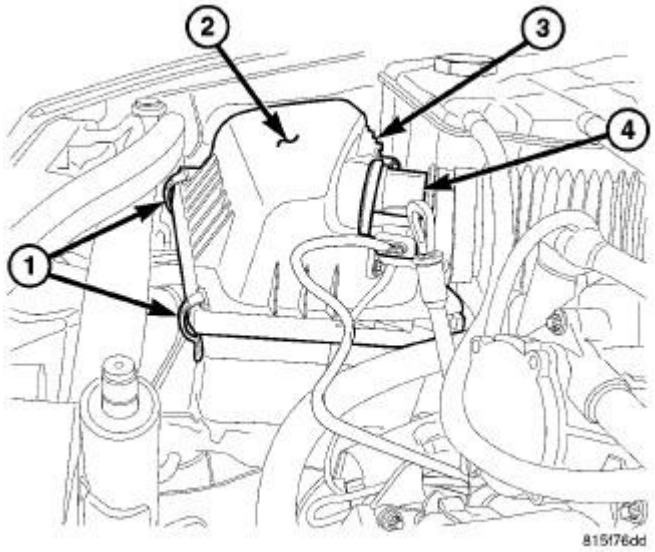


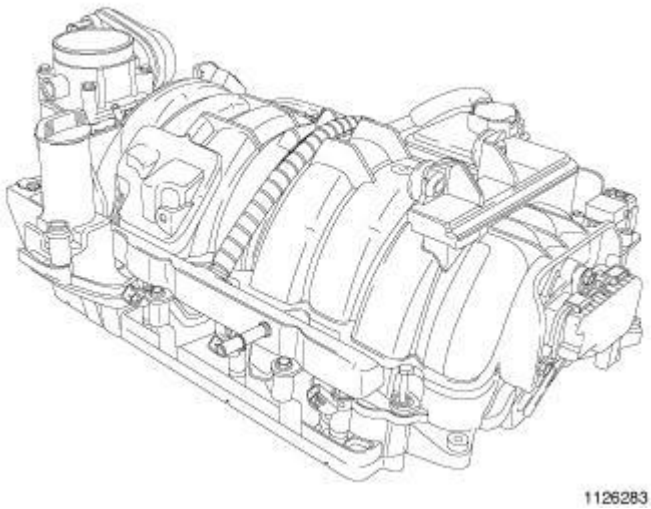
Fig. 281: Air Cleaner Cover
Courtesy of CHRYSLER LLC

19. Install the air box assembly (2).
20. Fill the engine coolant. Refer to **Cooling - Standard Procedure** .
21. Connect the negative battery terminal.
22. Install the engine cover.
23. Start the engine and check for any leaks.

MANIFOLD, INTAKE

Description

DESCRIPTION



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 282: 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

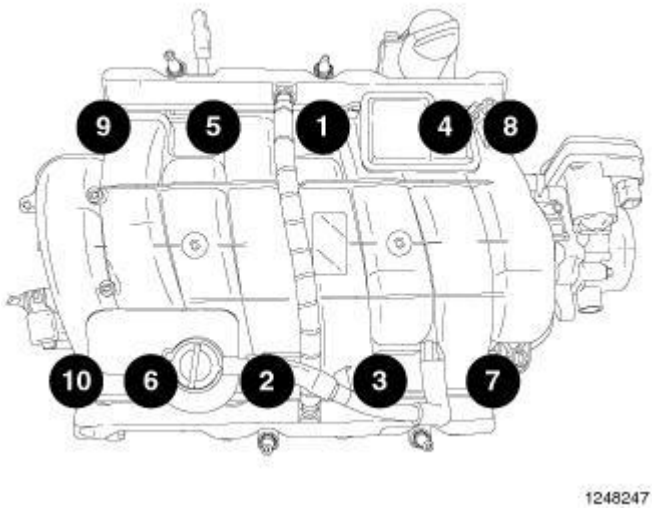


Fig. 283: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

1. Disconnect negative cable from battery (4).
2. Remove air cleaner assembly. See **Removal** .
3. Disconnect electrical connectors and reposition harness.
4. Disconnect vacuum lines.
5. Perform fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
6. Remove intake manifold retaining fasteners.
7. Remove intake manifold.

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

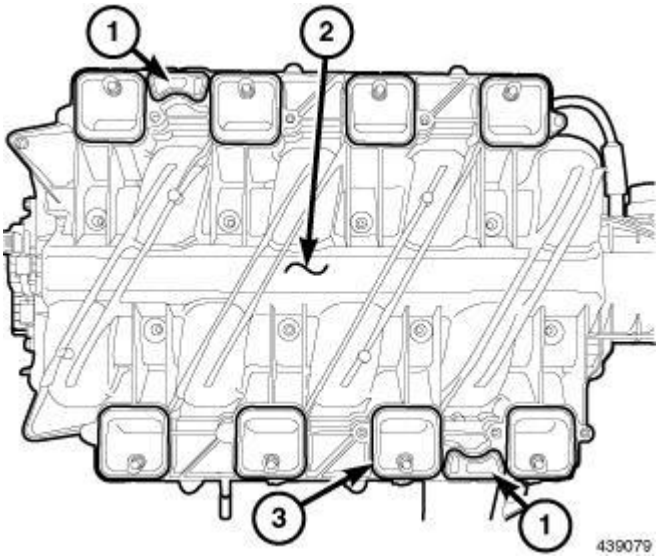


Fig. 284: Intake Manifold & PCV Seals

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of CHRYSLER LLC

1. Install intake manifold seals (1,3).
2. Position intake manifold (2) in place.

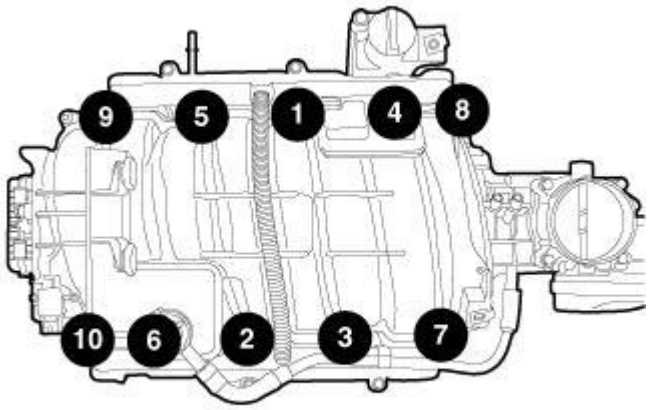


Fig. 285: Intake Manifold Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

3. Apply Mopar® Lock & Seal Adhesive to intake manifold bolts.
4. Install intake manifold bolts and tighten to 12 N.m (105 in. lbs.) in the sequence shown in illustration.
5. Position wiring harness in place and connect electrical connectors.
6. Connect fuel line.
7. Connect brake booster and vacuum hoses.
8. Install air cleaner assembly. See **Installation** .
9. Connect negative battery cable.

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

Removal

REMOVAL

1. Disconnect the negative battery cable.
2. Drain the cooling system. Refer to **Cooling - Standard Procedure** .

 © 2011 Mitchell Repair Information Company, LLC.

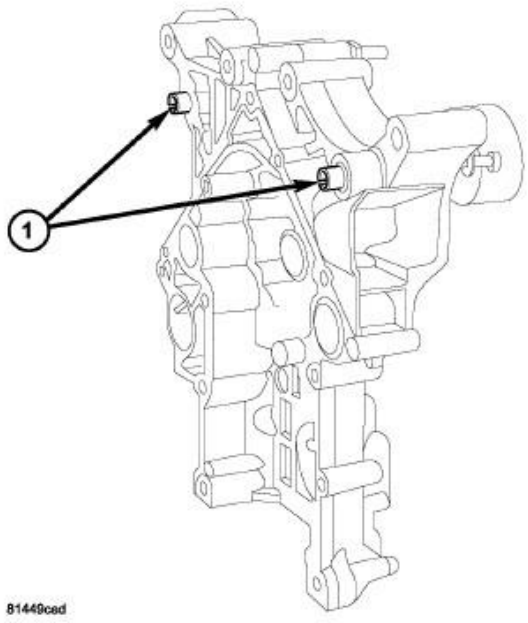


Fig. 286: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

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

3. Remove the timing chain cover. See **Removal**.
4. Verify the slide bushings (1) remain installed in the timing chain cover during removal.

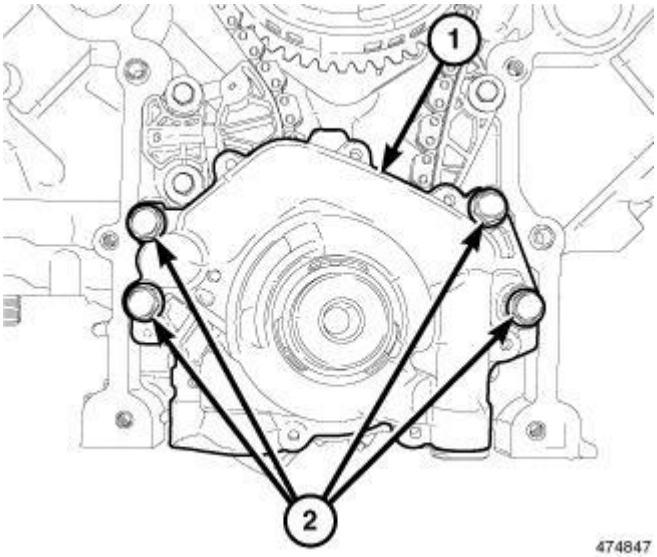


Fig. 287: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

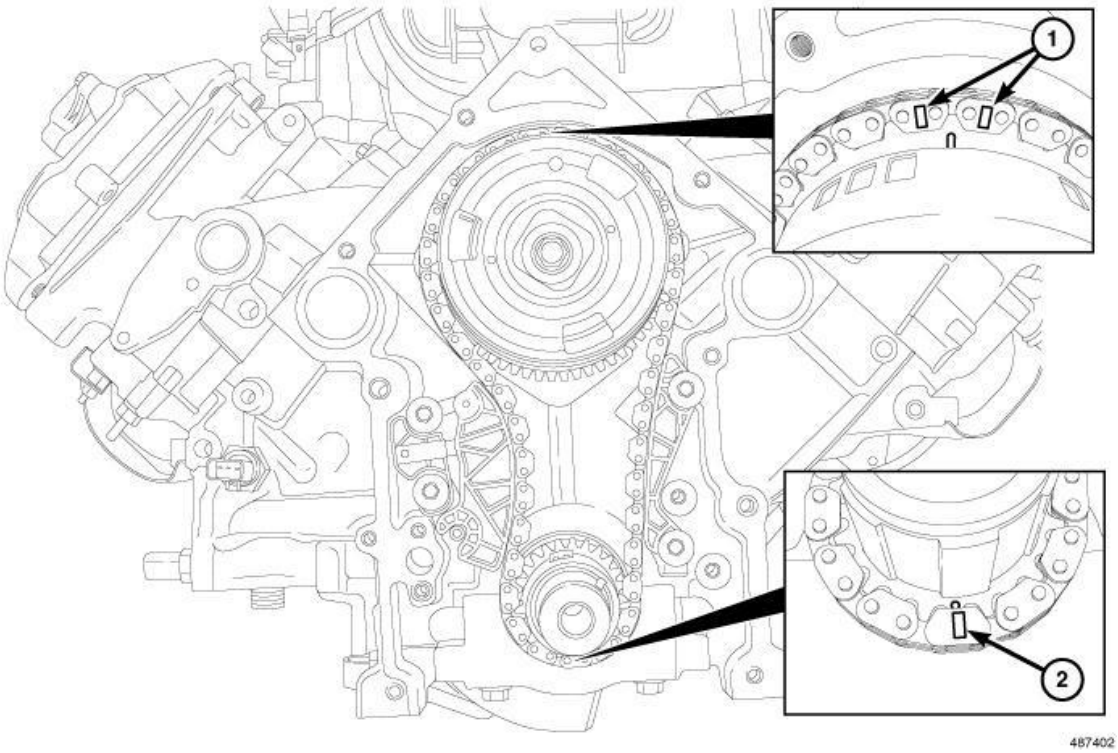


Fig. 288: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER LLC

6. Install the vibration damper bolt finger tight. Using a suitable socket and breaker bar, rotate the crankshaft to align the timing marks with the timing chain sprockets (1, 2).

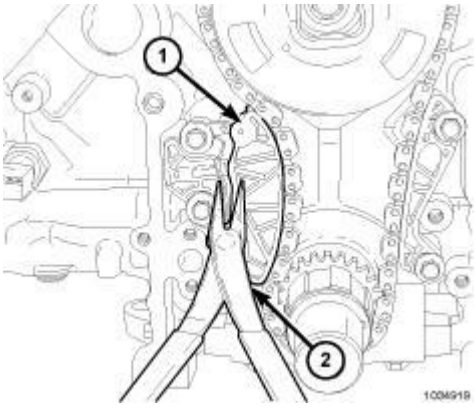


Fig. 289: Chain Tensioner Arm
Courtesy of CHRYSLER LLC

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

 © 2011 Mitchell Repair Information Company, LLC.

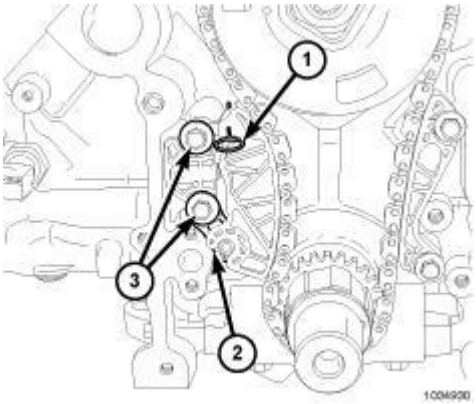


Fig. 290: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

8. Install the Tensioner Pin 8514 (1) into the chain tensioner holes.

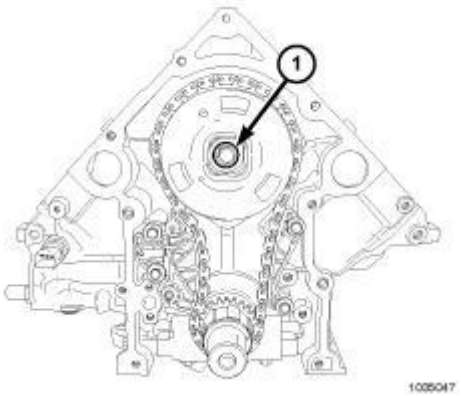


Fig. 291: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

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

9. Remove the camshaft phaser retaining bolt (1) and remove the timing chain with the camshaft phaser and crankshaft sprocket.

 © 2011 Mitchell Repair Information Company, LLC.

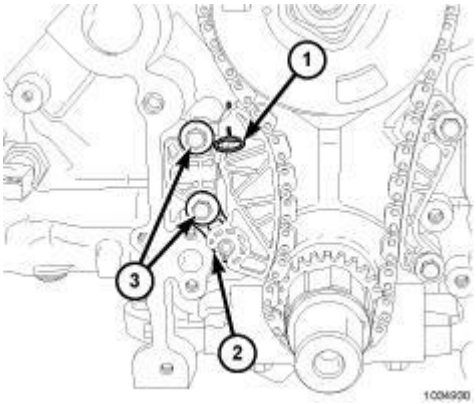


Fig. 292: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

NOTE: Inspect the timing chain tensioner and timing chain guide shoes for wear and replace as necessary.

10. If the timing chain tensioner is being replaced, remove the retaining bolts (3) and remove the timing chain tensioner (2).

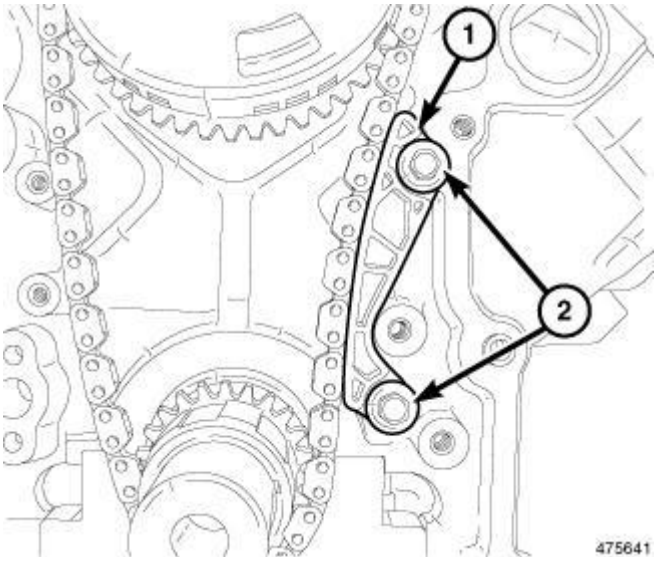


Fig. 293: Timing Chain Guide
Courtesy of CHRYSLER LLC

11. If the timing chain guide (1) is being replaced, remove the retaining bolts (2) and remove the timing chain guide.

Installation

INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

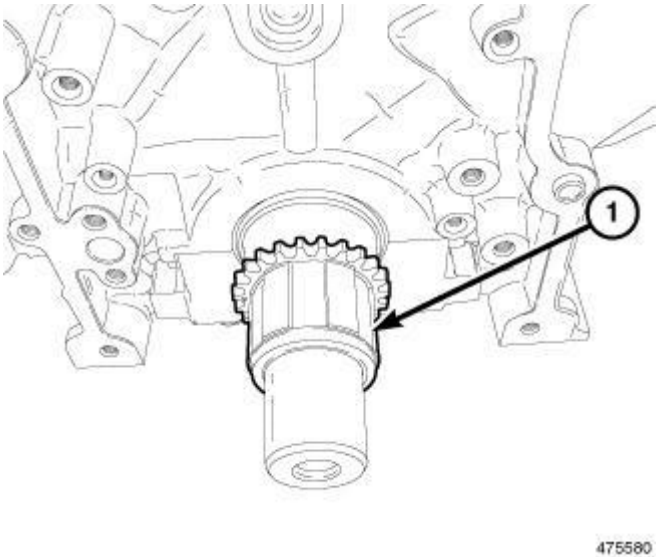


Fig. 294: Crankshaft Sprocket
Courtesy of CHRYSLER LLC

1. Install the crankshaft sprocket (1) and position halfway onto the crankshaft.

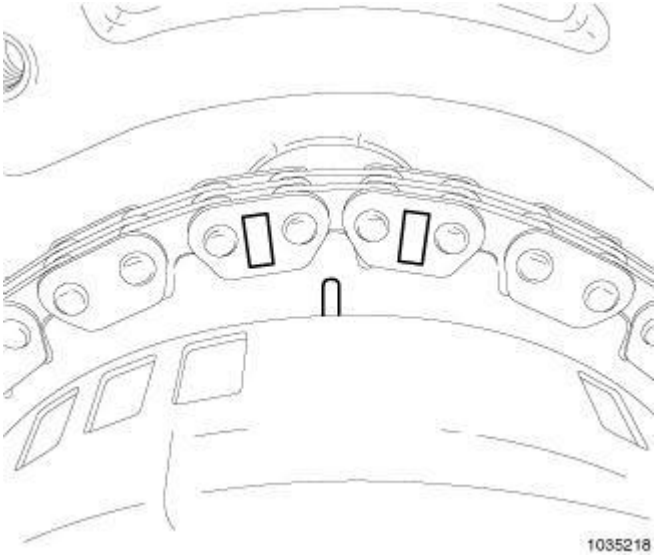


Fig. 295: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER LLC

2. While holding the camshaft phaser in hand, position the timing chain on the camshaft phaser and align the timing marks as shown in illustration.

 © 2011 Mitchell Repair Information Company, LLC.

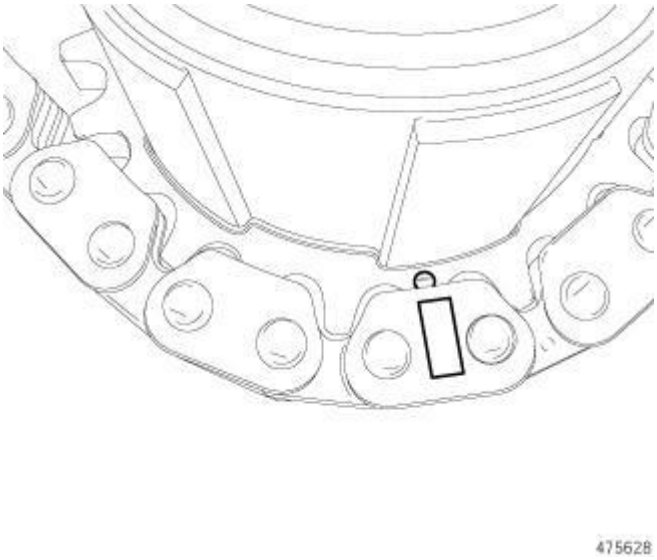


Fig. 296: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER LLC

3. While holding the camshaft phaser and timing chain in hand, position the timing chain on the crankshaft sprocket and align the timing mark as shown in illustration.

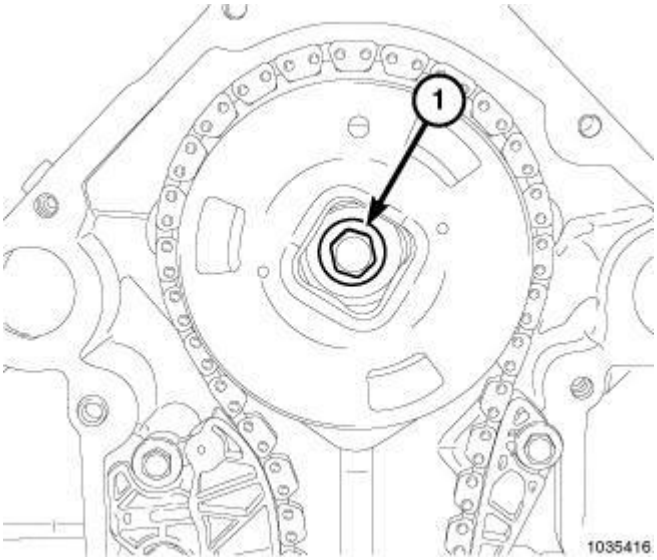


Fig. 297: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

4. Align the slot in the camshaft phaser with the dowel on the camshaft and position the camshaft phaser on the camshaft while sliding the crankshaft sprocket into position.
5. Install the camshaft phaser retaining bolt (1) finger tight.

 © 2011 Mitchell Repair Information Company, LLC.

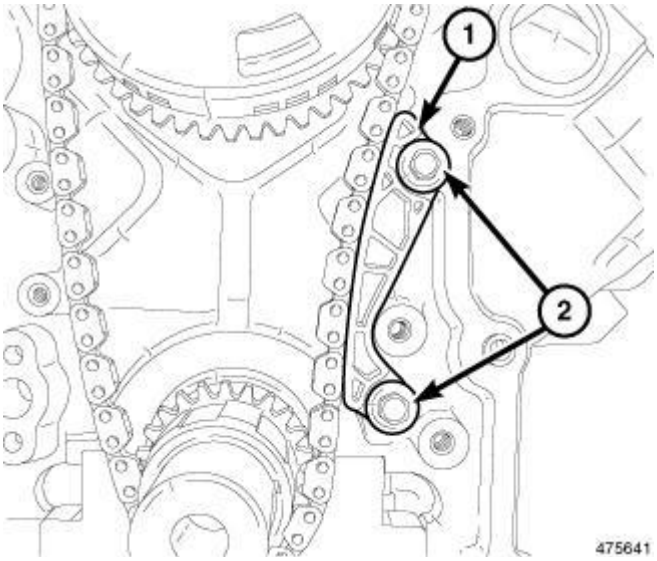


Fig. 298: Timing Chain Guide
Courtesy of CHRYSLER LLC

6. If removed, install the timing chain guide (1) and tighten the bolts (2) to 11 N.m (8 ft. lbs.).

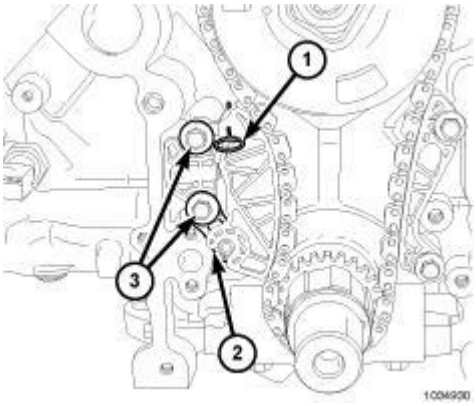


Fig. 299: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

7. If removed, install the timing chain tensioner (2) and tighten the bolts (3) to 11 N.m (8 ft. lbs.).
8. Remove the tensioner pin 8514 (1).

 © 2011 Mitchell Repair Information Company, LLC.

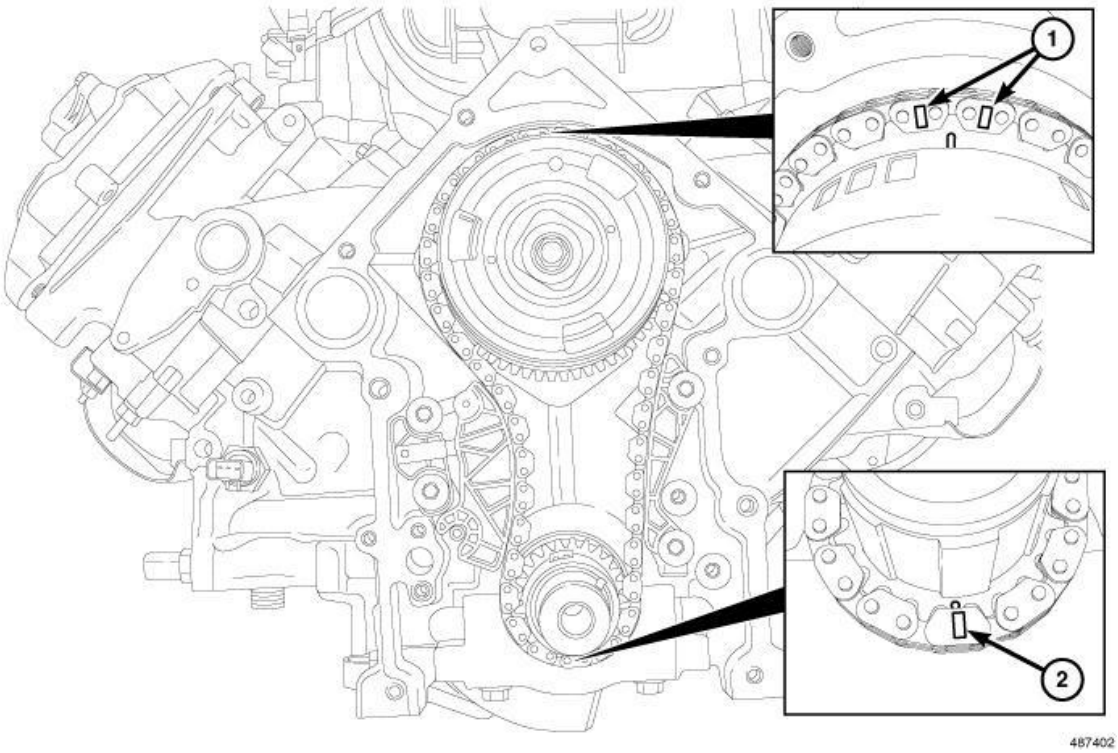


Fig. 300: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER LLC

9. Rotate the crankshaft two revolutions and verify the alignment of the timing marks (1, 2). If the timing marks do not line up, remove the camshaft sprocket and realign.

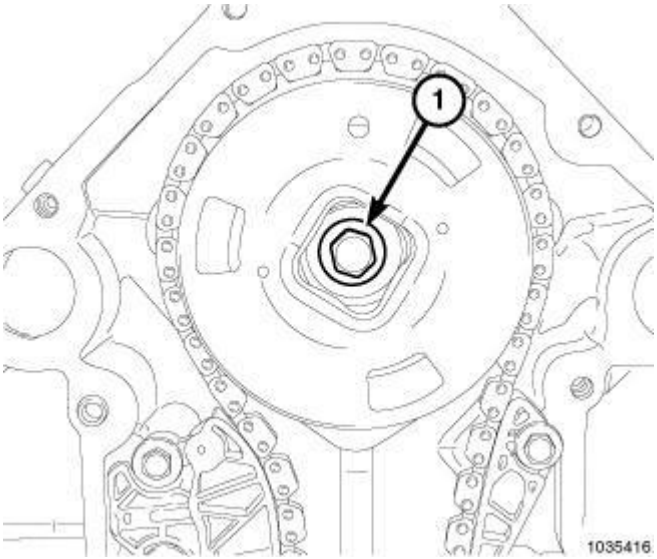


Fig. 301: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

10. Tighten the camshaft phaser bolt (1) to 85 N.m (63 ft. lbs.).

 © 2011 Mitchell Repair Information Company, LLC.

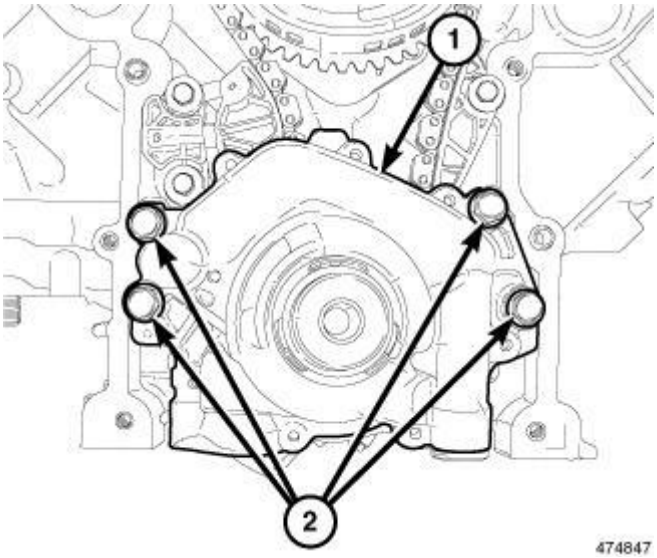


Fig. 302: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

11. Position the oil pump (1) onto the crankshaft and install the oil pump retaining bolts (2) finger tight.

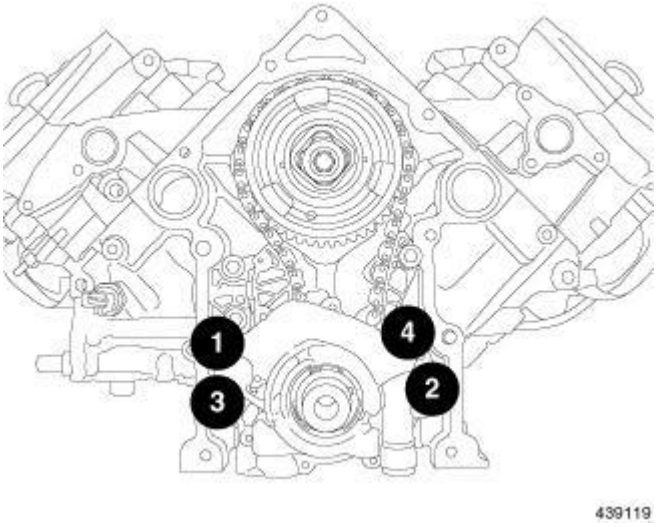


Fig. 303: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

12. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).

 © 2011 Mitchell Repair Information Company, LLC.

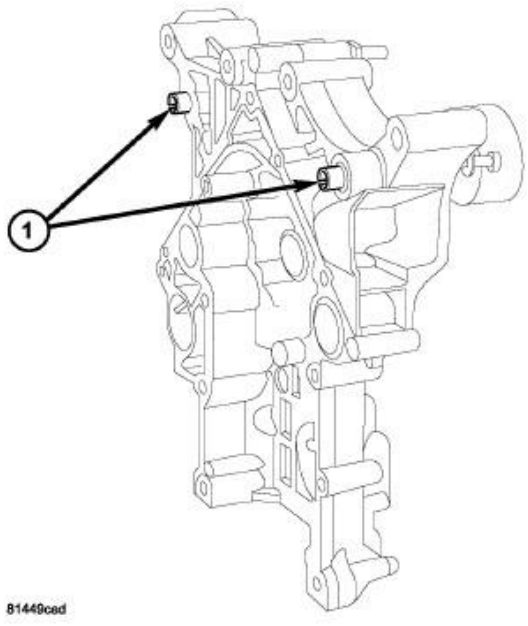


Fig. 304: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

13. Verify the slide bushings (1) are installed in the timing chain cover.
14. Install the timing chain cover. See **Installation**.
15. Fill the engine with oil.
16. Fill the cooling system. Refer to **Cooling - Standard Procedure** .
17. Connect the negative battery cable.
18. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

Removal

REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

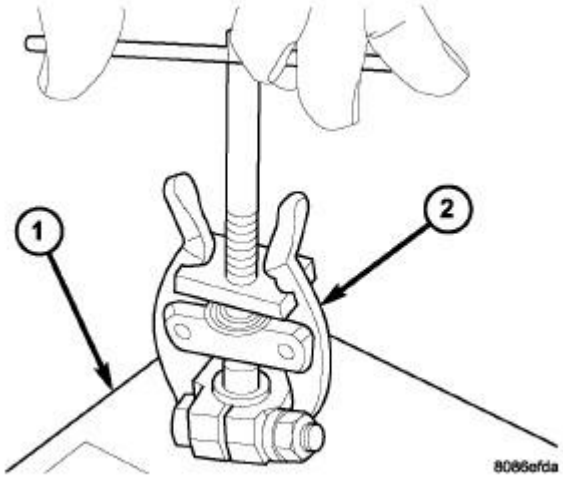


Fig. 305: Removing Battery Terminal Using Puller
Courtesy of CHRYSLER LLC

NOTE: It may be necessary to use a battery terminal puller (2) if the battery cable terminal clamps are seized on to the battery posts.

1. Disconnect and isolate the negative battery cable.

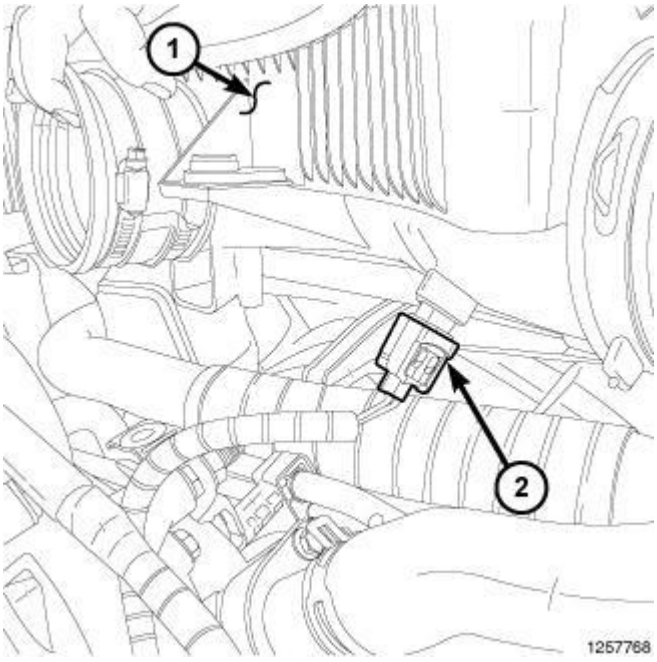


Fig. 306: IAT Sensor Electrical Connector
Courtesy of CHRYSLER LLC

2. Disconnect IAT sensor electrical connector (2).

 © 2011 Mitchell Repair Information Company, LLC.

3. Remove the air cleaner resonator and duct work as an assembly (1).

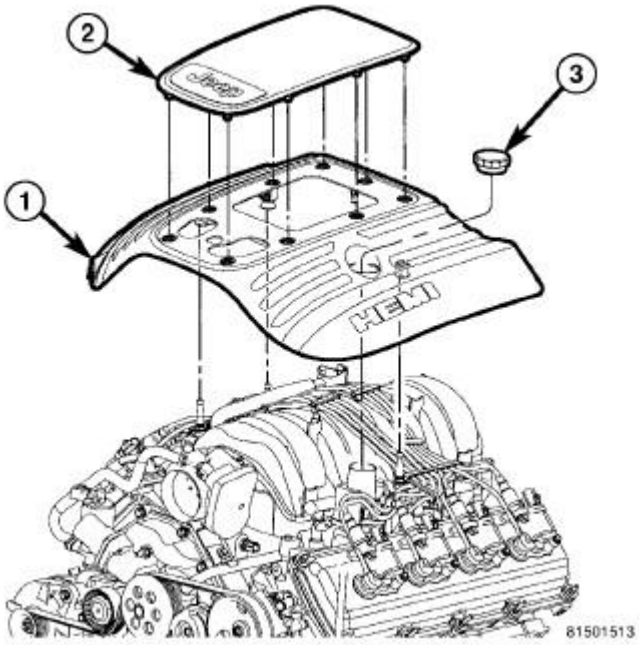


Fig. 307: Engine Cover
Courtesy of CHRYSLER LLC

4. Remove the engine cover (1).

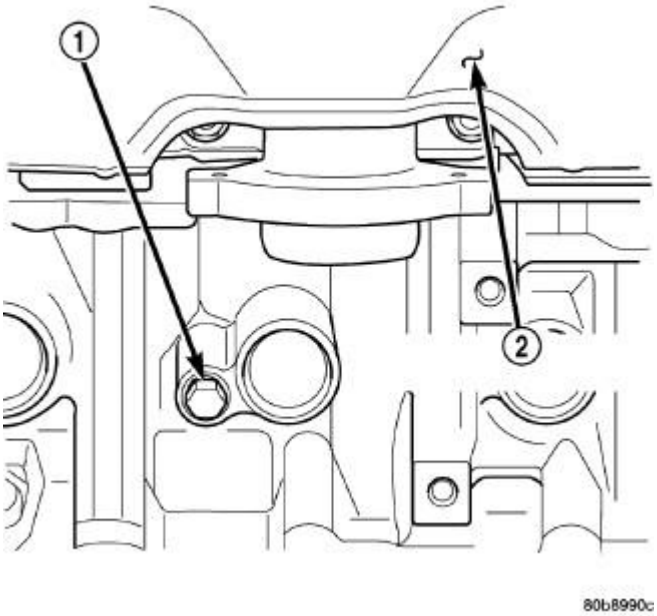


Fig. 308: Drain Plug - 3.7L/4.7L Engine
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

WARNING: Do not remove the radiator pressure cap, cylinder block drain plugs or loosen the radiator draincock with the system hot and under pressure. Serious burns from coolant can occur.

NOTE: Radiator draincock is located on the right/lower side of radiator facing to rear of vehicle.

5. With the engine cold, raise the vehicle on a hoist and locate the radiator draincock.
6. Attach one end of a hose to the draincock. Put the other end into a clean container. Open draincock and drain coolant from radiator.
7. Drain the engine oil.
8. Remove the lower radiator hose.

NOTE: The lower fan shroud mounting bolts can only be accessed from under the vehicle.

9. Remove the two lower mounting bolts from the fan shroud.

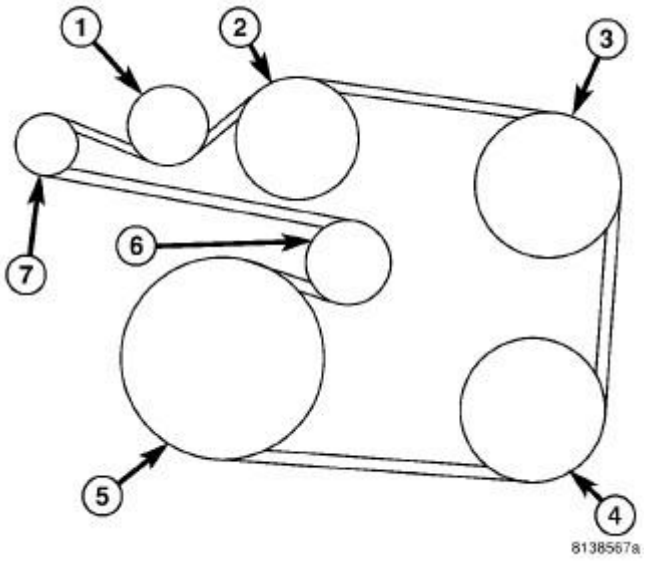


Fig. 309: 5.7L/6.1L Engine Accessory Drive Belt Routing
Courtesy of CHRYSLER LLC

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

10. Lower the vehicle and rotate the accessory drive belt tensioner (6) counterclockwise until it contacts it's stop. Remove the accessory drive belt, then slowly rotate the tensioner into the free arm position. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

 © 2011 Mitchell Repair Information Company, LLC.

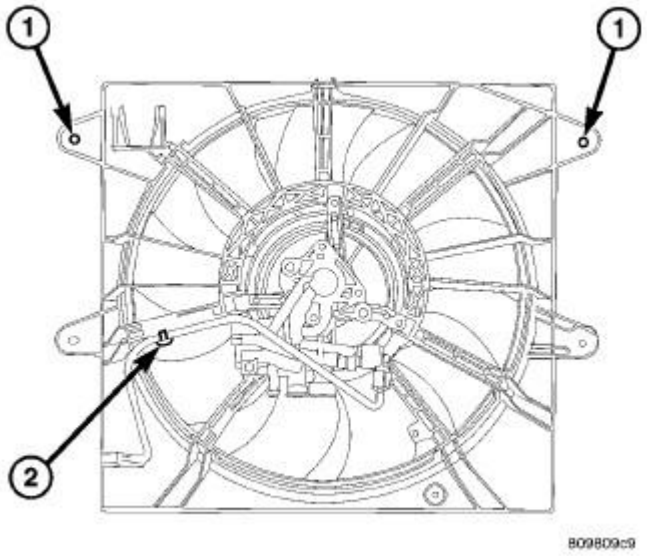


Fig. 310: Fan Shroud Mounting Bolt Locations
Courtesy of CHRYSLER LLC

11. Remove the two upper mounting bolts (1) and the wire harness retainer (2) from the shroud and remove the fan and fan drive assembly. Refer to **Cooling/Engine/FAN, Cooling - Removal** .

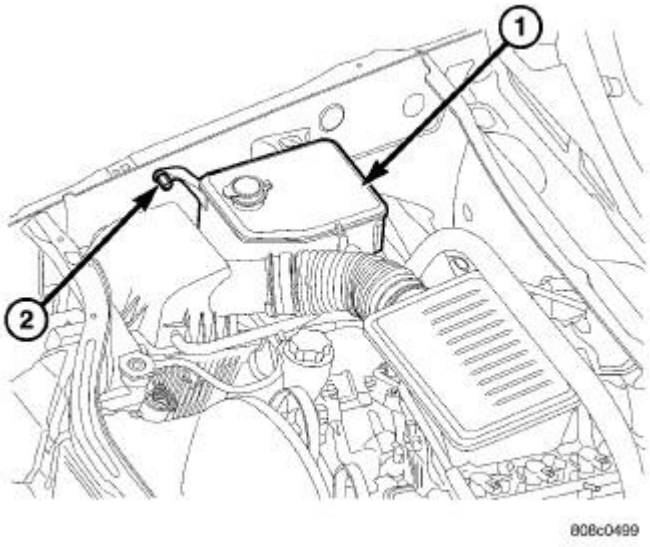


Fig. 311: Coolant Reservoir/Overflow Tank - Gas
Courtesy of CHRYSLER LLC

12. Disconnect the coolant bottle overflow hose.
13. Remove the two mounting bolts (2).
14. Remove the coolant bottle reservoir/overflow tank (1).

 © 2011 Mitchell Repair Information Company, LLC.

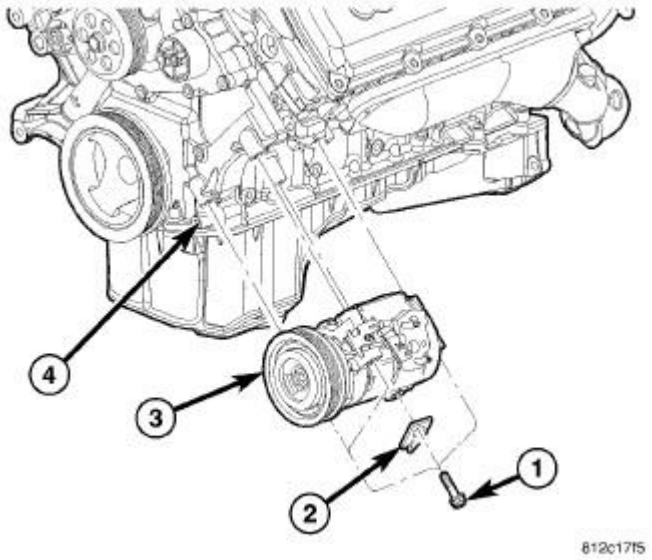


Fig. 312: A/C Compressor
Courtesy of CHRYSLER LLC

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

15. Remove the A/C compressor (3) with the lines attached and secure compressor out of the way.

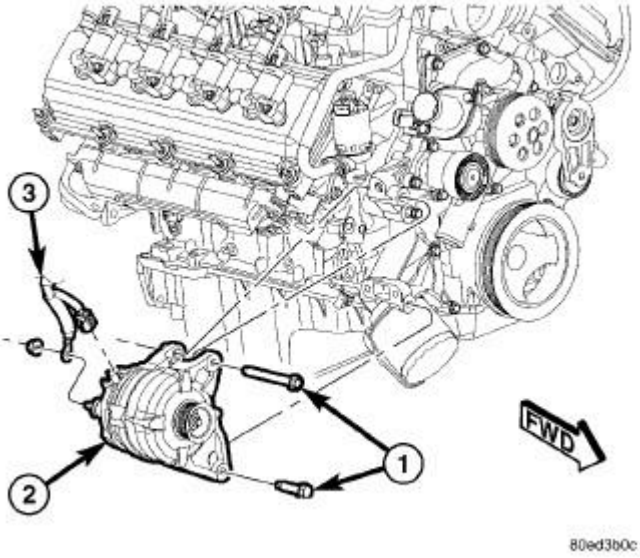


Fig. 313: Removing / Installing Generator - 5.7L
Courtesy of CHRYSLER LLC

WARNING: Disconnect the negative cable from the battery before removing the battery output wire (B+ wire) from the generator. Failure to do so can result in injury or damage to the electrical system.

 © 2011 Mitchell Repair Information Company, LLC.

16. Unsnap the plastic insulator cap from B+ output terminal.
17. Remove the B+ terminal mounting nut at rear of generator and disconnect the terminal from the generator.
18. Disconnect the field wire connector (3) at rear of the generator by pushing on the connector tab.
19. Remove the both generator mounting bolts (1).
20. Remove the generator (2) from vehicle.

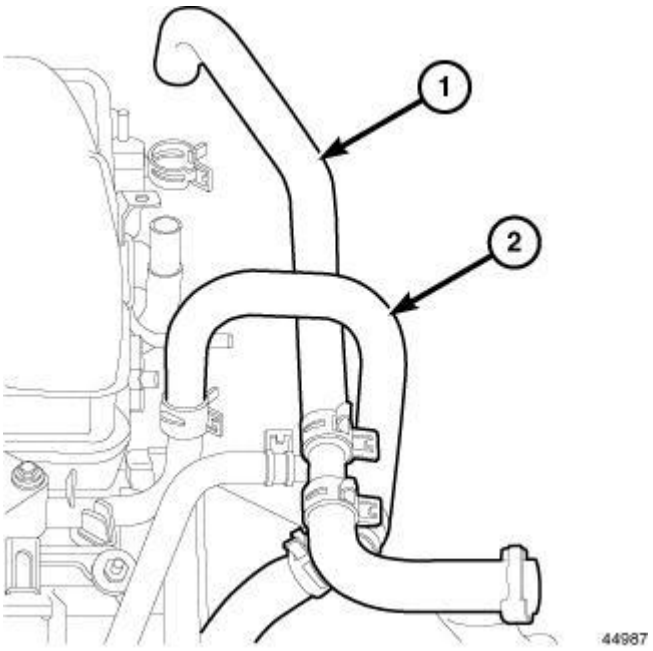


Fig. 314: Heater Hose Supply
Courtesy of CHRYSLER LLC

21. Remove the upper radiator hose.
22. Disconnect both heater hoses (1,2).

 © 2011 Mitchell Repair Information Company, LLC.

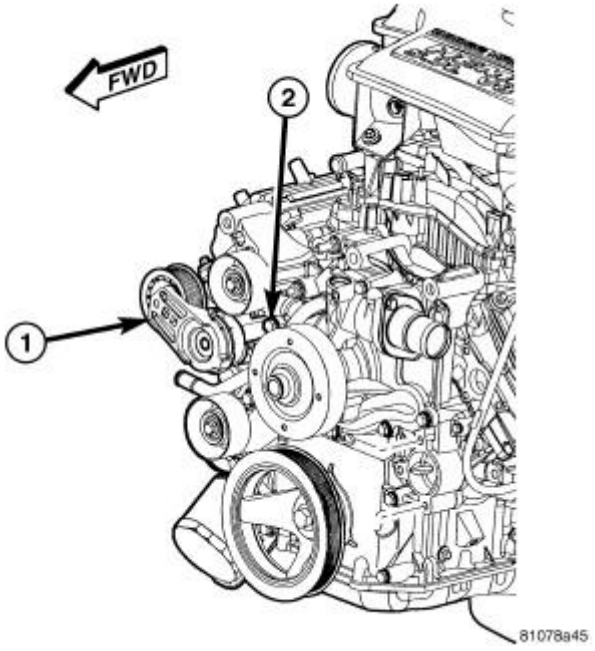


Fig. 315: Automatic Belt Tensioner
Courtesy of CHRYSLER LLC

23. Remove the bolt (2) and accessory drive belt tensioner (1).
24. Remove both idler pulley bolts and remove the pulleys.

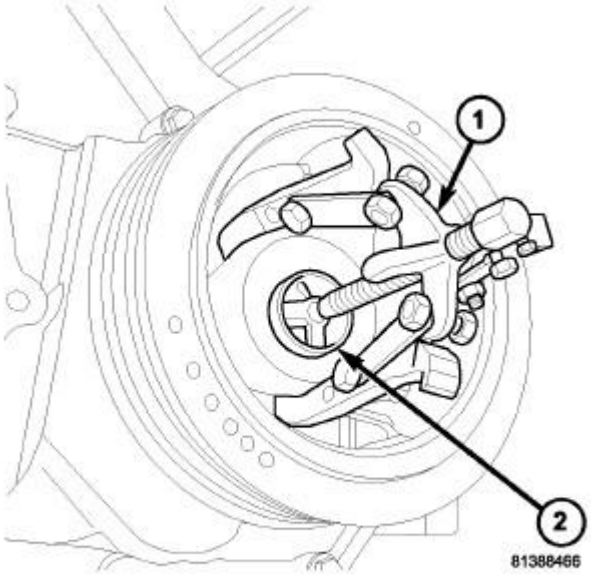


Fig. 316: Crankshaft Damper Removal
Courtesy of CHRYSLER LLC

 © 2011 Mitchell Repair Information Company, LLC.

25. Remove the crankshaft damper using crankshaft insert 8513A and three jaw puller 1023. See **Removal**.

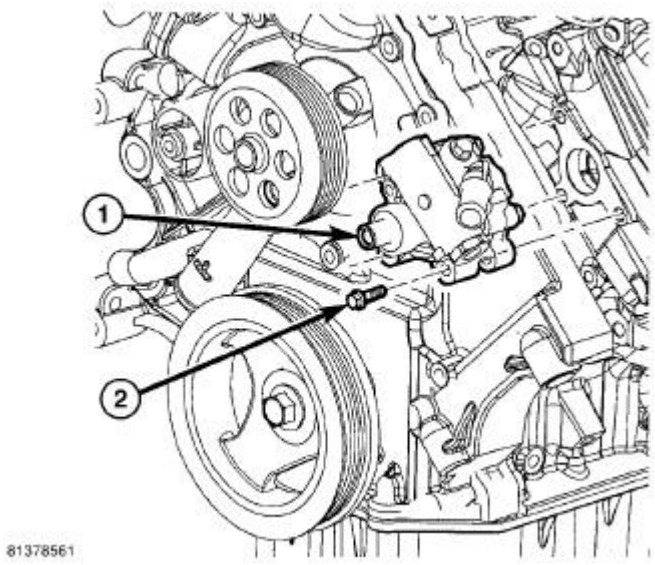


Fig. 317: Power Steering Pump
Courtesy of CHRYSLER LLC

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

26. Remove the three power steering pump retainer bolts (2) through the access holes in the pulley and secure power steering pump out of the way.
27. Remove the dipstick support bolt.
28. Remove the oil pan and pick up tube. See **Removal**.

 © 2011 Mitchell Repair Information Company, LLC.

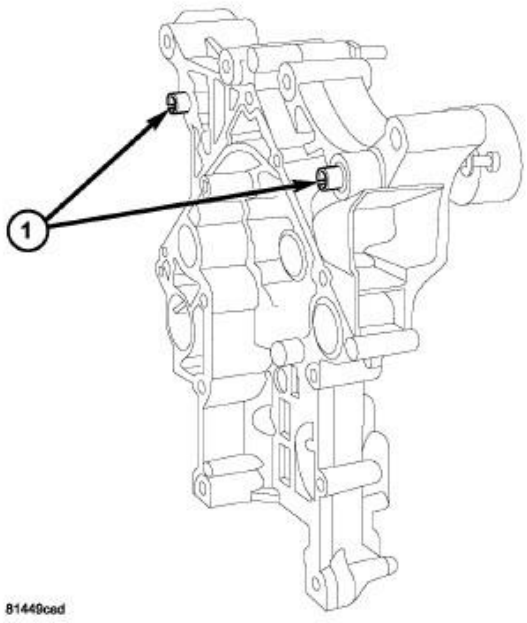


Fig. 318: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

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

29. Remove the timing cover bolts and remove cover.
30. Verify that the timing cover slide bushings (1) are located in timing cover.

Installation

INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

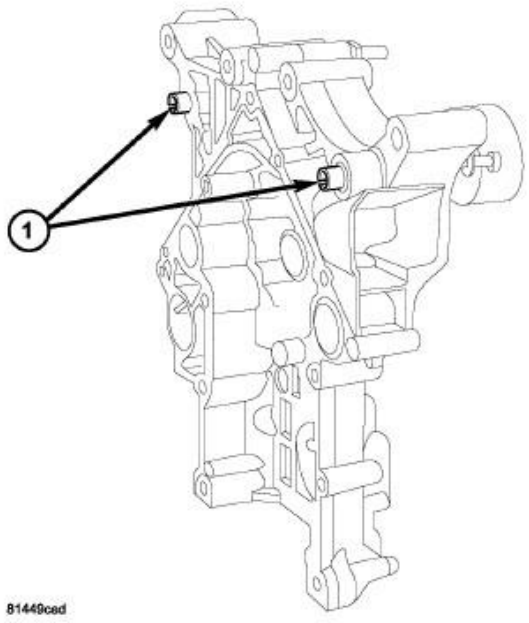


Fig. 319: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

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.).

 © 2011 Mitchell Repair Information Company, LLC.

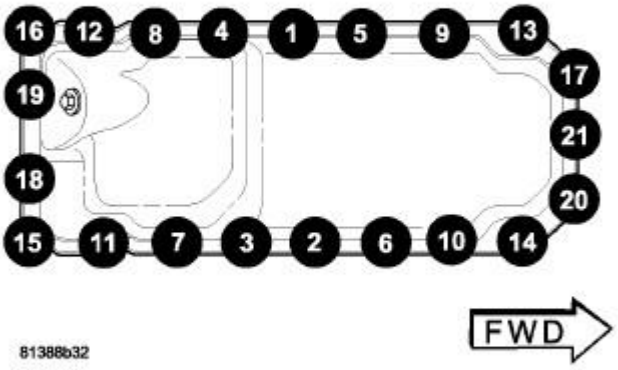


Fig. 320: Oil Pan Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

4. Install the oil pan and pick up tube. See **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 **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

 © 2011 Mitchell Repair Information Company, LLC.

Standard Procedure

RESETTING TIMING CHAIN TENSIONER

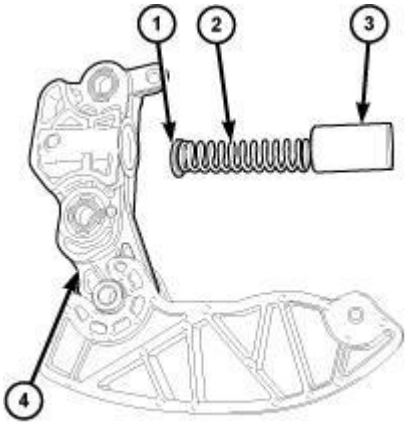


Fig. 321: Tensioner Body, Washer, Spring & Plunger
Courtesy of CHRYSLER LLC

NOTE: Verify that the tensioner is assembled correctly.

1. Install the washer (1), spring (2), and plunger (3) inside the tensioner body (4).

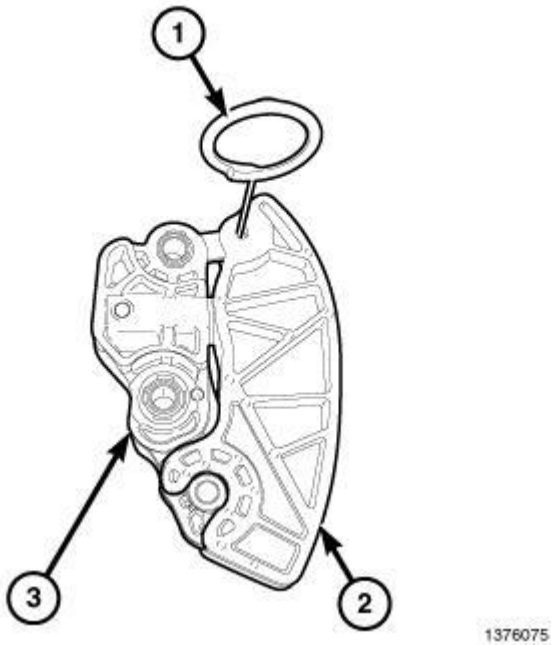


Fig. 322: Installing Tensioner Pin
Courtesy of CHRYSLER LLC

2. Squeeze the tensioner body (3) and movable guide shoe (2) together and install Tensioner Pin 8514 (1).

 © 2011 Mitchell Repair Information Company, LLC.

Description

DESCRIPTION

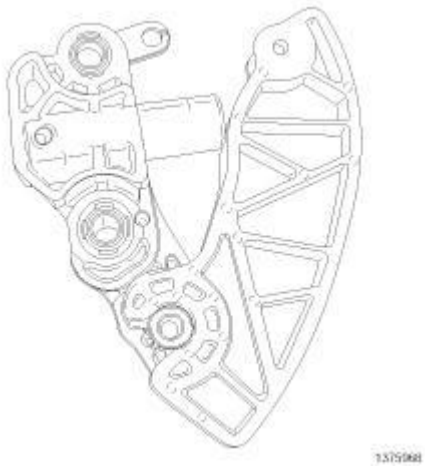


Fig. 323: Timing Chain Tensioner Arm
Courtesy of CHRYSLER LLC

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.

 © 2011 Mitchell Repair Information Company, LLC.