2011 ENGINE

5.7L - Service Information - Grand Cherokee

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).

Refer to **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. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.
- Cylinder Combustion Pressure Leakage Test. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.
- Engine Cylinder Head Gasket Failure Diagnosis. Refer to **DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE**.
- Intake Manifold Leakage Diagnosis. Refer to **DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKAGE**.

PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION	
ENGINE WILL NOT START	1. Weak battery.	1. Charge or replace as necessary.	
	2. Corroded or	2. Clean and tighten	

	loose battery connections.	battery connections. Apply a coat of light mineral grease to the terminals.	
	3. Faulty starter.	3. Refer to **DIAGNOSIS AND TESTING** .	
	4. Incorrect spark plug gap.	4. Refer to **SPECIFICATIONS** .	
	5. Dirt or water in fuel system.	5. Clean system and replace fuel filter.	
	6. Faulty fuel pump, relay or wiring.	6. Refer to **FUEL SYSTEM** article.	
ENGINE STALLS OR ROUGH IDLE	1. Idle speed set to low.	1. Refer to **Engine - Diagnosis and Testing**.	
	2. Vacuum leak.	2. Inspect intake manifold and vacuum hoses, repair or replace as necessary.	
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs.	1. Replace spark plugs.	
	2. Dirt or water in fuel system.	2. Clean system and replace fuel filter.	
	3. Blown cylinder head gasket.	3. Replace cylinder head gasket.	
	4. Low compression.	4. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**.	
	5. Burned, warped or pitted valves.	5. Replace as necessary.	
	6. Plugged or restricted exhaust system.	6. Inspect and replace as necessary.	

CYLINDER COMPRESSION PRESSURE LEAKAGE

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

NOTE: Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may

not be valid for diagnosis purposes.

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plugs and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Disable the fuel system and perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
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. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.

CYLINDER COMBUSTION PRESSURE LEAKAGE

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

Combustion pressure leakage testing will detect:

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

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
3. Remove the spark plugs.
4. Remove the oil filler cap.
5. Remove the air cleaner hose.
6. Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should

maintain 483 kPa (70 psi) minimum, 1, 379 kPa (200 psi) maximum and 552 kPa (80 psi) recommended.

7. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set piston of cylinder to be tested at TDC compression, While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

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

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

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

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

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

LUBRICATION

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

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

MECHANICAL

ENGINE MECHANICAL DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase.	1. Check for correct oil level. Adjust the oil level by draining or adding as needed. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	2. Thin or diluted oil.	2. Change the engine oil. Refer to **Engine/Lubrication/OIL - Standard Procedure**.
	3. Low oil pressure.	3. Check the engine oil level. If ok, Perform oil pressure test. Refer to **CHECKING ENGINE OIL PRESSURE**.
	4. Dirt in tappets/lash adjusters.	4. Clean and/or replace the hydraulic tappets/lash adjusters. Refer to **LIFTER**

		(S), HYDRAULIC, ROLLER, DIAGNOSIS AND TESTING, 5.7L.
	5. Bent push rod(s).	5. Install new push rods. Refer to **SPRING(S), VALVE, REMOVAL, 5.7L**.
	6. Worn rocker arms	6. Inspect the oil supply to the rocker arms and replace worn rocker arms as needed. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.
	7. Worn tappets/lash adjusters.	7. Install new hydraulic tappets/lash adjusters. Refer to **LIFTER(S), HYDRAULIC, ROLLER, REMOVAL, 5.7L**.
	8. Worn valve guides.	8. Inspect the valve guides for 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. Refer to **Engine/Cylinder Head/VALVES, Intake and Exhaust - 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. Refer to **CHECKING ENGINE OIL PRESSURE**.
	3. Thin or diluted oil.	3. Change the engine oil to correct the viscosity. Refer to **Engine/Lubrication/OIL - 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. Refer to **CRANKSHAFT, REMOVAL, 5.7L**.
	6. Misaligned connecting rods.	6. Replace the bent connecting rods. Refer to **SPRING(S), VALVE, REMOVAL, 5.7L**.
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. Refer to **CHECKING ENGINE OIL PRESSURE**.
	3. Thin or diluted oil.	3. Change the engine oil to correct viscosity. Refer to **Engine/Lubrication/OIL - 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. Refer to **CAMSHAFT, ENGINE, INSPECTION, 5.7L**.
	6. Crankshaft main journal out of round or worn.	6. Replace the crankshaft. Refer to **CRANKSHAFT, REMOVAL, 5.7L**.
	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. Refer to **FILTER, ENGINE OIL, REMOVAL, 5.7L**.
	4. Worn oil pump.	4. Replace the oil pump assembly. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.
	5. Thin or diluted oil.	5. Change the engine oil to correct viscosity. Refer to **Engine/Lubrication/OIL - 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. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.
	8. Oil pickup tube loose, broken, bent or clogged.	8. Inspect the oil pickup tube and pump, and clean or replace as necessary. Refer to **PAN, OIL, REMOVAL, 5.7L**.
	9. Oil pump cover warped or cracked.	9. Install a new oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.
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. Refer to **SEAL, CRANKSHAFT OIL, FRONT, REMOVAL, 5.7L**. Refer to **SEAL, CRANKSHAFT OIL, REAR**.
	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 **DESCRIPTION** .
	2. Defective valve stem seal(s).	2. Repair or replace the seal(s). Refer to **SPRING(S), VALVE, REMOVAL, 5.7L**.
	3. Worn or broken piston rings.	3. Hone the cylinder bores and Install new rings. Refer to **ROD, PISTON AND CONNECTING, REMOVAL, 5.7L**.
	4. Scuffed pistons/cylinder walls.	4. Hone the cylinder bores and replace pistons as required. Refer to **ROD, PISTON AND CONNECTING, REMOVAL, 5.7L**.
	5. Carbon in oil control ring groove.	5. Remove the rings and de-carbon the piston. Refer to **Engine/Engine Block/RING(S), Piston - 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. Replace if necessary. Refer to **Engine/Engine Block/RING(S), Piston - Standard Procedure**.

OIL CONSUMPTION TEST AND DIAGNOSIS

DIAGNOSTIC PROCEDURES

The following diagnostic procedures are used to determine the source of excessive internal oil Consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: Engine oil consumption may be greater than normal during engine break-in. Repairs should be delayed until vehicle has been driven at least 7, 500 miles.

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, ensure no external engine oil leaks are present.

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and/or correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.
2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPAR® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.
4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, re-check for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a **CYLINDER COMPRESSION PRESSURE LEAKAGE** test and **CYLINDER-TO-CYLINDER LEAKAGE TEST** using the standard leak down gauge following manufacturers suggested best practices.

   NOTE: Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or valve guides are at fault.

3. If one or more cylinders have more than 15% leak down further engine tear down and inspection will be required.

TOP 19 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings, also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of "PCV "system**

   The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

   The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

   When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption;

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

    Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and/or ambient temperatures.

12. **Dirty Engine Oil**

    Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

    Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick in this incorrect position which will actually make the oil level too high. If the oil level is so high that the

lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

    A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

    Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

    Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

    There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

    Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption, an extremely dirty air filter would be one example of this situation.

19. **Intake Manifold port seals**

    Engines that have a "V" configuration and a "wet valley" could draw oil into the intake ports due to improper sealing between the intake manifold ports and cylinder head. Causes may include improper torque of intake manifold bolts, corrosion (aluminum intake manifold) and or warped sealing surface.

STANDARD PROCEDURE

DUST COVERS AND CAPS

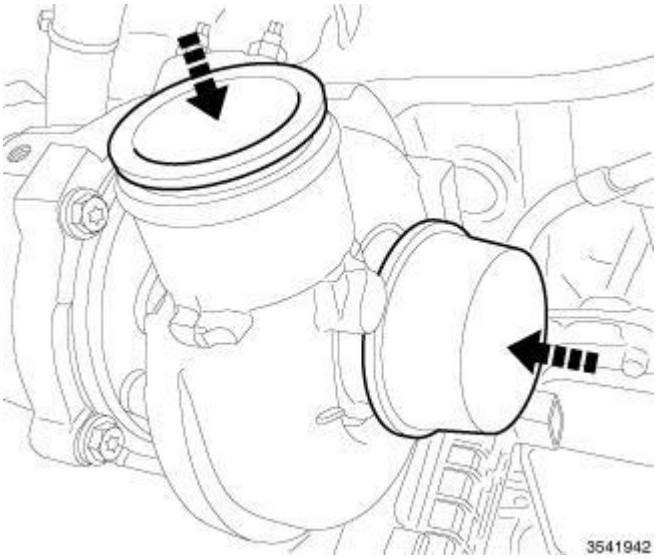


Fig. 1: Covers/Caps
Courtesy of CHRYSLER LLC

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

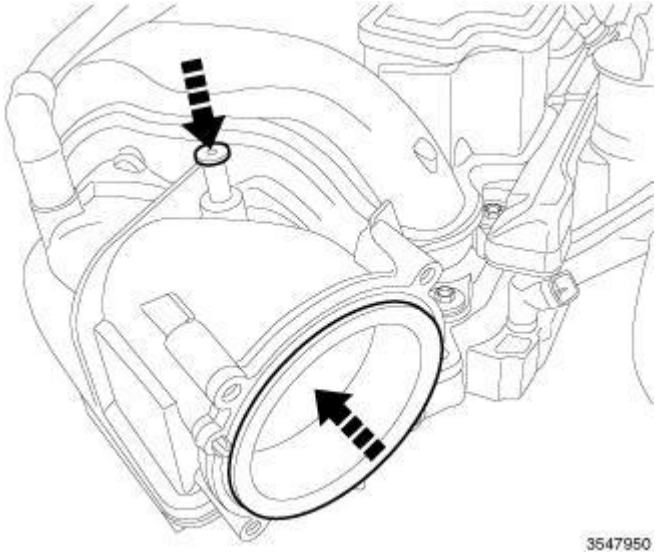


Fig. 2: Opening Cover
Courtesy of CHRYSLER LLC

Covers over openings will reduce any possibilities for foreign materials to enter the engine systems. Using miller tool (special tool #10368, Set, Universal Protective Cap), Select the appropriated cover needed to the 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 PRESSURE RELEASE** .
2. Disconnect the negative battery cable(s) from the battery.
3. Inspect air cleaner, induction system, and intake manifold to make sure the system is dry and clear of foreign material.
4. Place a shop towel around the spark plugs to catch any fluid that may possibly be under pressure in the cylinder head. Remove the spark plugs.
5. With all spark plugs removed, rotate the crankshaft using a breaker bar and socket.
6. Identify the fluid in the cylinders (coolant, fuel, oil).
7. Make sure all fluid has been removed from the cylinders.
8. Repair engine or components as necessary to prevent this problem from occurring again.
9. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This prevents damage on restart.
10. Install new spark plugs. Tighten the spark plugs to 41 N.m (30 ft. lbs.).
11. Drain engine oil. Remove and discard the oil filter.
12. Install the drain plug. Tighten the plug to 34 N.m (25 ft. lbs.).
13. Install a new oil filter.
14. Fill the engine crankcase with the specified amount and grade of oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
15. Connect the negative battery cable(s).
16. Start the engine and check for any leaks.

FORM-IN-PLACE GASKETS AND SEALERS

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

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

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

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

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

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

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

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

SEALER APPLICATION

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

Apply Mopar® RTV or ATF-RTV gasket material in a continuous bead approximately 3 mm (0.120 in.) in diameter. For corner sealing and "T-Joint" locations and waffle pad area, a 0.635 mm (0.025 in.) drop is placed in the center of the gasket contact area. Remove uncured sealant with a shop towel. Tighten the components in

place while the sealant is still wet to the touch (within 10 minutes). Use a locating dowel during assembly to prevent smearing material off the location.

SPECIFICATIONS

SPECIFICATIONS

ENGINE 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	
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

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 & PINS

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

PISTON RINGS

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

CONNECTING RODS

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

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

CAMSHAFT

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

VALVE TIMING

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

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

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

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Face Angle	45.0° - 45.5°	
Head Diameter		
Intake	50.67 - 50.93 mm	1.99 - 2.01 in.
Exhaust	39.27 - 39.53 mm	1.55 - 1.56 in.
Length (overall)		
Intake	123.38 - 123.76 mm	4.857 - 4.872 in.
Exhaust	120.475 - 120.855 mm	4.743 - 4.758 in.

Stem Diameter		
Intake	7.935 - 7.953 mm	0.312 - 0.313 in.
Exhaust	7.932 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance		
Intake	0.022 - 0.065 mm	0.0008 - 0.0025 in.
Exhaust	0.025 - 0.065 mm	0.0009 - 0.0025 in.
Valve Lift (@ zero lash)		
Intake	12.0 mm	0.472 in.
Exhaust	11.70 mm	0.460 in.

VALVE SPRING

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

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

OIL PRESSURE

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

TORQUE

TORQUE CHART 5.7L ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Block Pipe Plugs			
(1/4 - 18 NPT) Oil gallery Plug	20	15	-
(1/4 - 18 NPT) Coolant Drain Plug	34	25	-
(3/8 NPT)	27	20	-
Camshaft Sprocket Bolt	122	90	-
Camshaft Thrust Plate Bolts	12	-	106
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	Refer to **CRANKSHAFT, INSTALLATION, 5.7L**.		
Cylinder Head Bolts	Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.		
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	Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.		
Lifter Guide Holder	12	9	-
Oil Pan Bolts	12	9	-
Oil Dipstick Tube	12	9	-
Oil Pan Drain Plug	34	25	-
Oil Pump Attaching Bolts	28	21	-
Oil Pump Pickup Tube Bolt/Nut	28	21	-
Rear Seal Retainer Attaching Bolts	15	11	-
Rear Insulator-to-Bracket Bolt	68	50	-
Rear Insulator-to-Crossmember	41	30	-
Rear Insulator-to-Crossmember Bolt	68	50	-
Rear Insulator-to-Transmission Bolt	68	50	-

Rear Insulator Bracket Bolts	68	50	-
Rear Support Bracket Bolt	41	30	-
Rear Support Plate-to-Transfer Case Bolts	41	30	-
Rocker Arm Bolts	22	16	-
Thermostat Housing Bolts	28	21	-
Throttle Body Bolts	12	9	-
Transfer Case-to-Insulator Bolt	204	150	-
Transmission Support Bracket Bolt	68	50	-
Vibration Damper Bolt	176	130	-
Water Pump-to-Timing Chain Case Cover Bolts	28	21	-

REMOVAL

REMOVAL

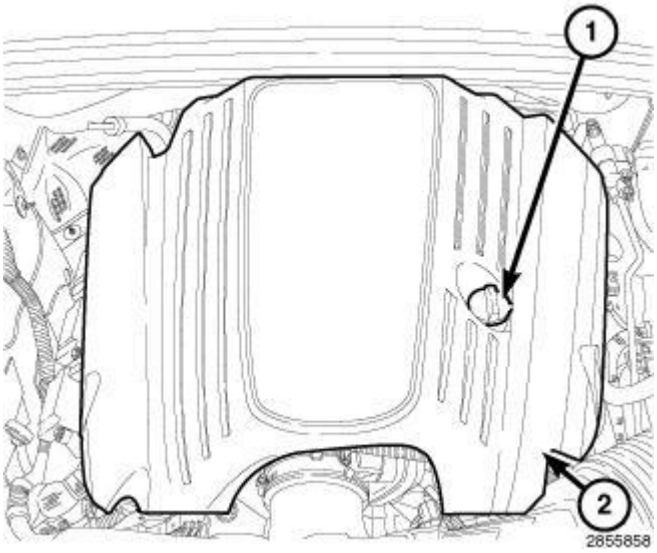


Fig. 3: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the hood. Refer to **HOOD, REMOVAL** .
2. Remove the oil fill cap (1).
3. Remove the engine cover (2).

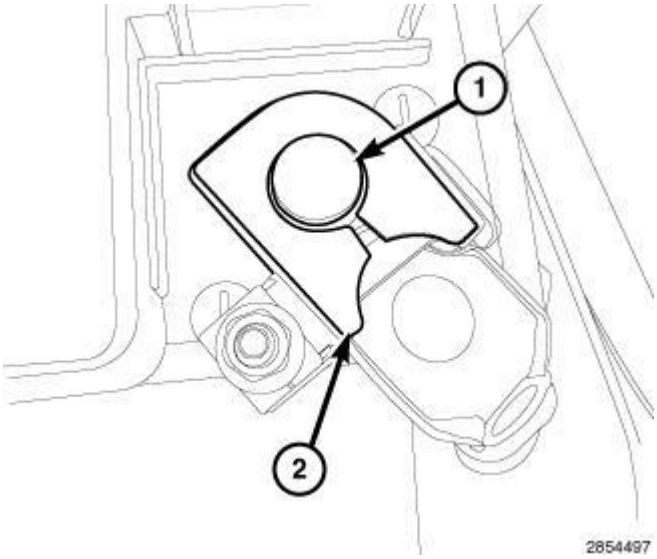


Fig. 4: Negative Battery Cable
Courtesy of CHRYSLER LLC

4. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
5. Disconnect and isolate the negative battery cable (2).
6. Remove the air cleaner and resonator assembly. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.

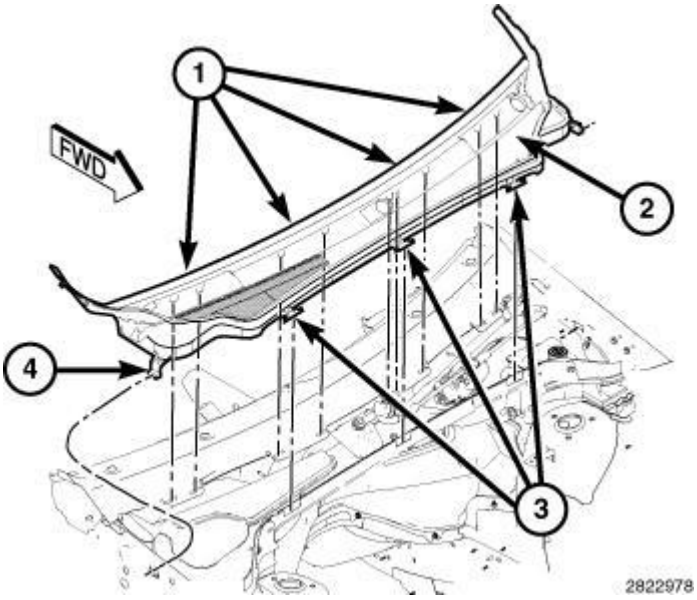


Fig. 5: Cowl Panel Cover & Fasteners
Courtesy of CHRYSLER LLC

7. Remove the cowl panel cover (2). Refer to **COVER, COWL PANEL, REMOVAL** .

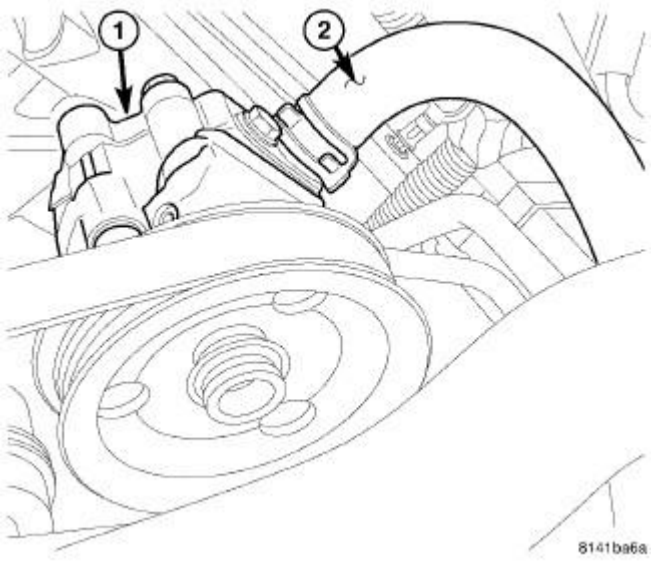


Fig. 6: Power Steering Pump & Return Hose
Courtesy of CHRYSLER LLC

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

8. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
9. Remove the power steering pump (1) and position aside. Refer to **PUMP, REMOVAL** .

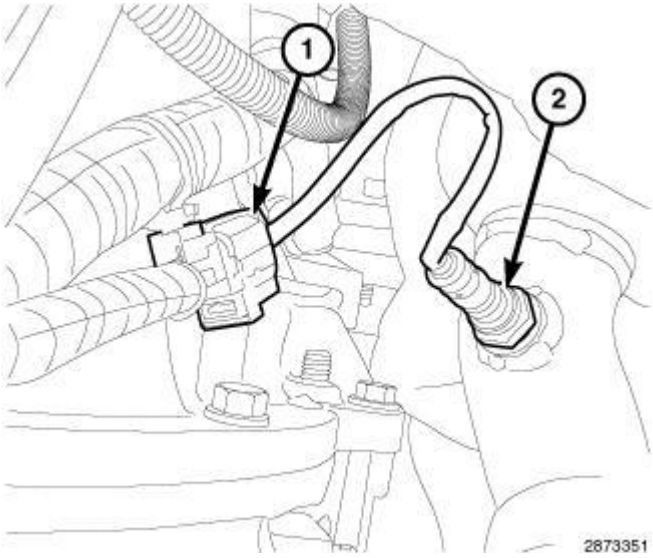


Fig. 7: Left Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

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.

10. Disconnect the left upstream O2 sensor electrical connector (1).

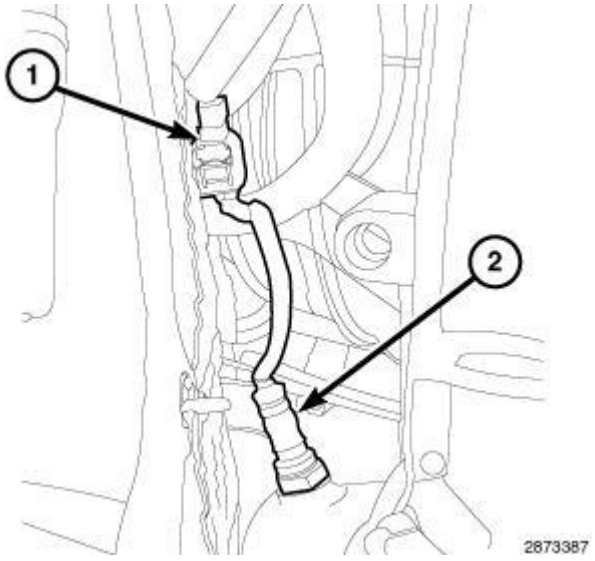


Fig. 8: Right Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

11. Disconnect the right upstream O2 sensor electrical connector (1).
12. Raise and support the vehicle.
13. Drain the cooling system.

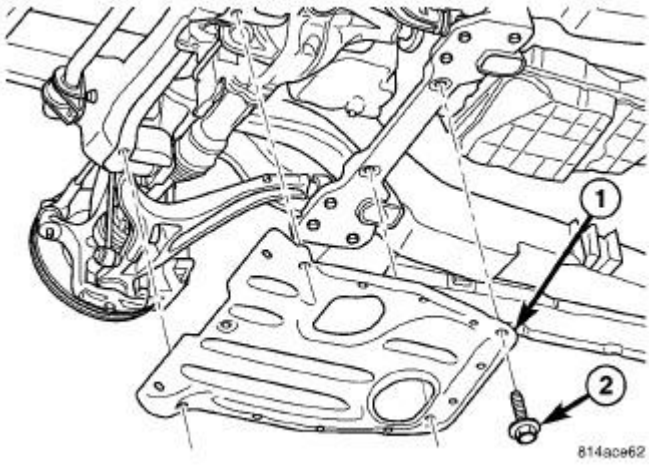


Fig. 9: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

14. If equipped, remove the skid plate four retaining bolts (2) and remove the skid plate (1).

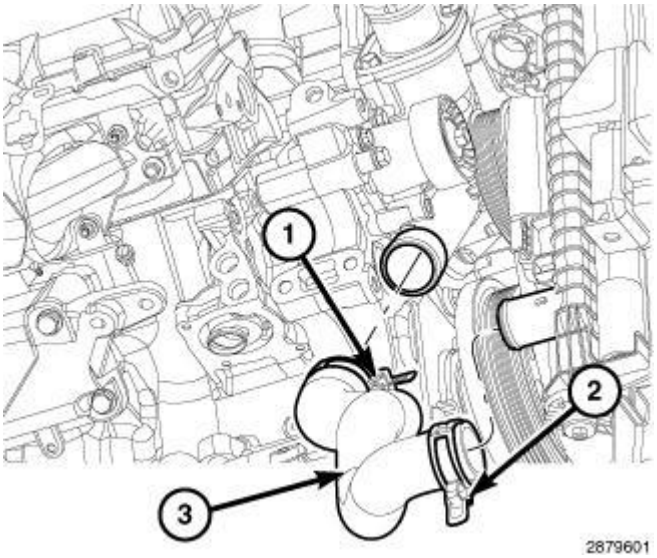


Fig. 10: Lower Radiator Hose & Clamps
Courtesy of CHRYSLER LLC

15. Remove the lower radiator hose clamp (1) at the water pump.
16. Remove the lower radiator hose clamp (2) at the radiator and remove the lower radiator hose (3).

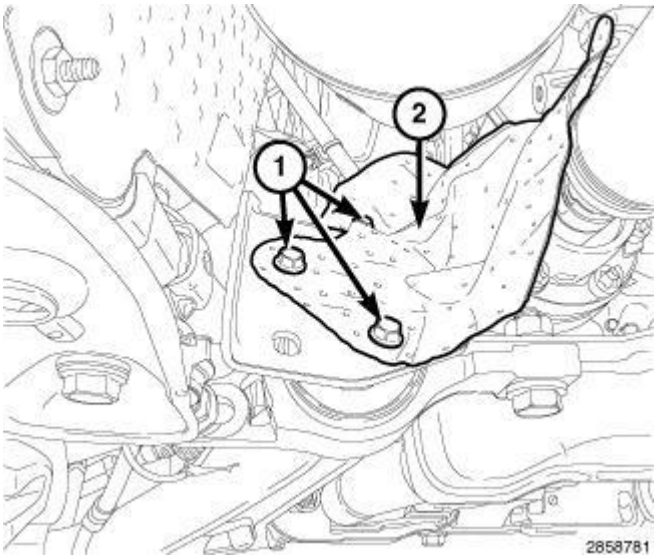


Fig. 11: Heat Shield & Retaining Bolts
Courtesy of CHRYSLER LLC

17. Remove the left catalytic converter heat shield retaining bolts (1) and remove the heat shield (2).
18. Remove both exhaust pipe/catalytic converters. Refer to **CONVERTER, CATALYTIC, REMOVAL** .

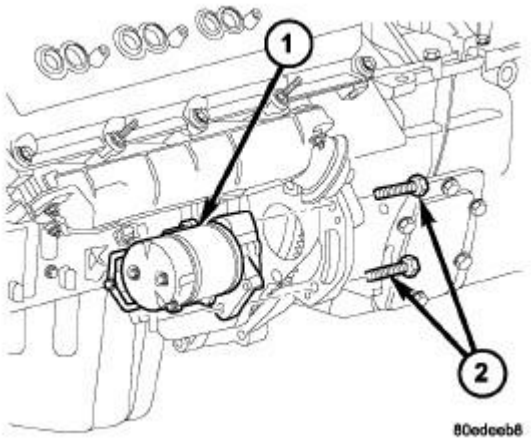


Fig. 12: Starter Motor & Bolts
Courtesy of CHRYSLER LLC

19. Remove the starter (1). Refer to **STARTER, REMOVAL** .

NOTE: It is not necessary to disconnect the refrigerant lines for A/C compressor removal.

20. Remove the A/C compressor from the engine block and position aside. Refer to **COMPRESSOR, A/C, REMOVAL** .

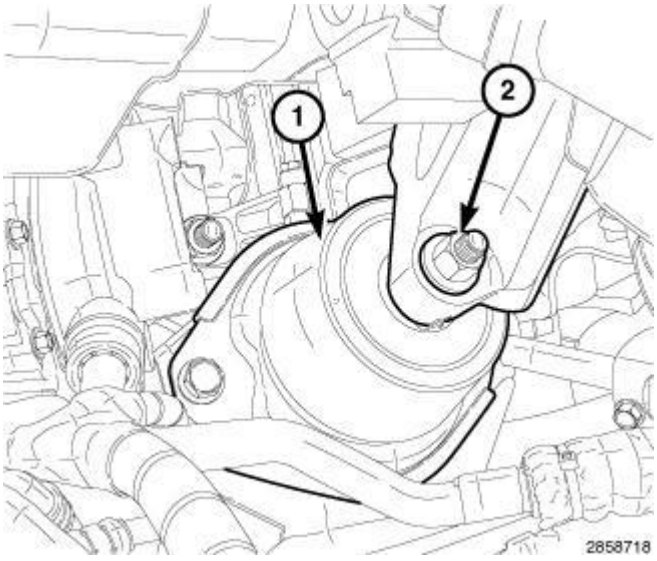


Fig. 13: Engine Mount & Retaining Nut
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

21. Remove both engine mount (1) retaining nuts (2).

22. Disconnect the transmission oil cooler lines from their retainer at the oil pan.

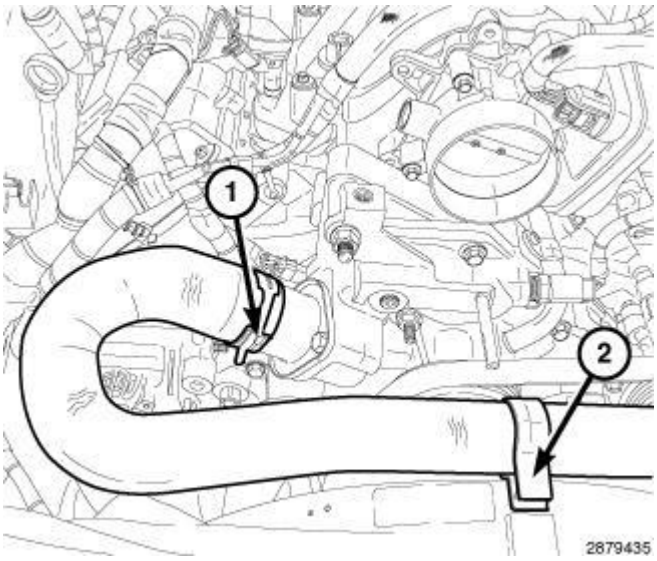


Fig. 14: Upper Radiator Hose Clamp & Retainer
Courtesy of CHRYSLER LLC

23. Lower the vehicle.
24. Remove the upper radiator hose clamp (1) at the thermostat housing and remove hose.
25. Remove the upper radiator hose retainer (2) at the fan shroud and position the radiator hose aside.

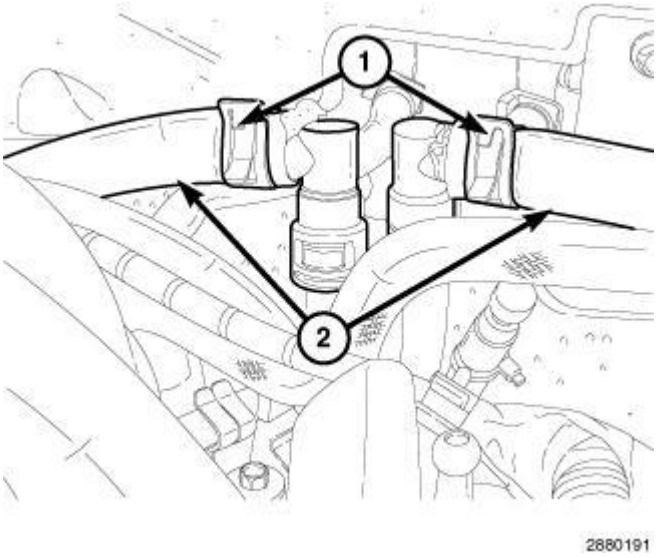


Fig. 15: Heater Hoses & Clamps
Courtesy of CHRYSLER LLC

26. Remove both heater hose clamps (1).
27. Remove both heater hoses (2) and position aside.

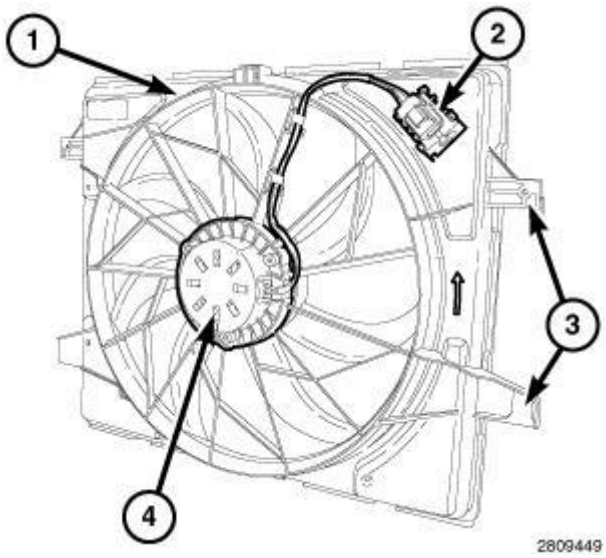


Fig. 16: Cooling Fan Module Components
Courtesy of CHRYSLER LLC

28. Remove the cooling fan module (1). Refer to **FAN, COOLING, REMOVAL** .
29. Remove the generator. Refer to **GENERATOR, REMOVAL** .

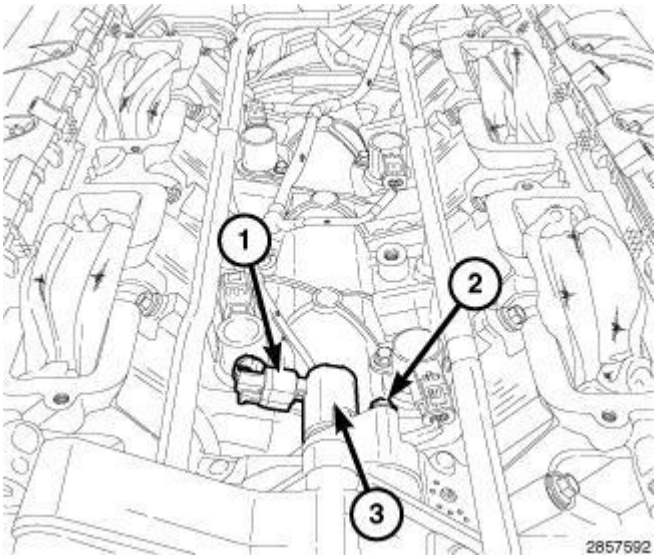


Fig. 17: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER LLC

30. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

NOTE: The engine must be at room temperature before removing the oil control valve.

31. Disconnect the oil control valve electrical connector (1).
32. Remove the oil control valve retaining bolt (2).

33. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.

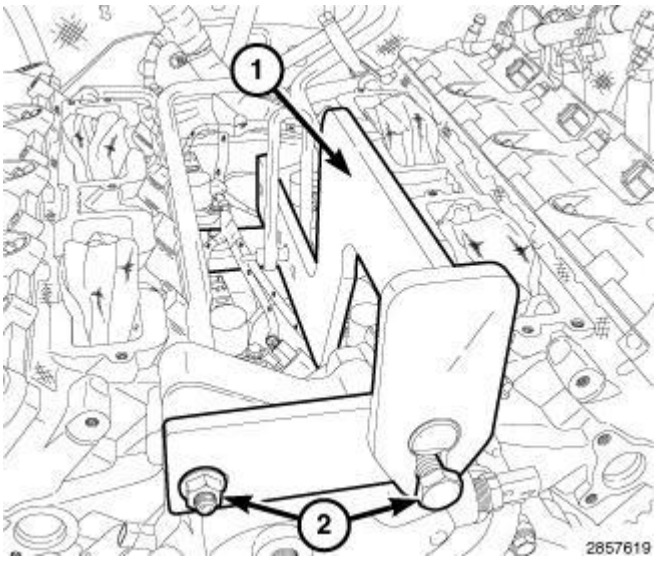


Fig. 18: Engine Lift Fixture & Mounting Bolts
Courtesy of CHRYSLER LLC

NOTE: Do not use air tools to install the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture).

34. Install the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).
35. Securely tighten lifting fixture mounting bolts (2).
36. Raise and support the vehicle.

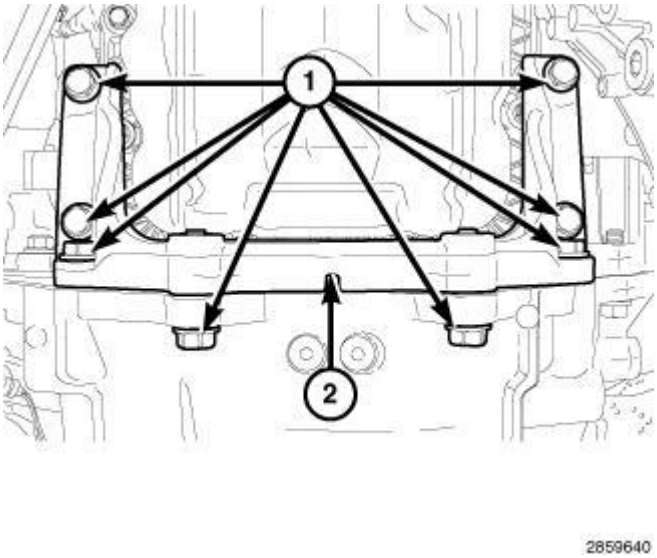


Fig. 19: Structural Dust Cover & Retaining Bolts
Courtesy of CHRYSLER LLC

37. Remove the structural dust cover retaining bolts (1).
38. Remove the structural dust cover (2).

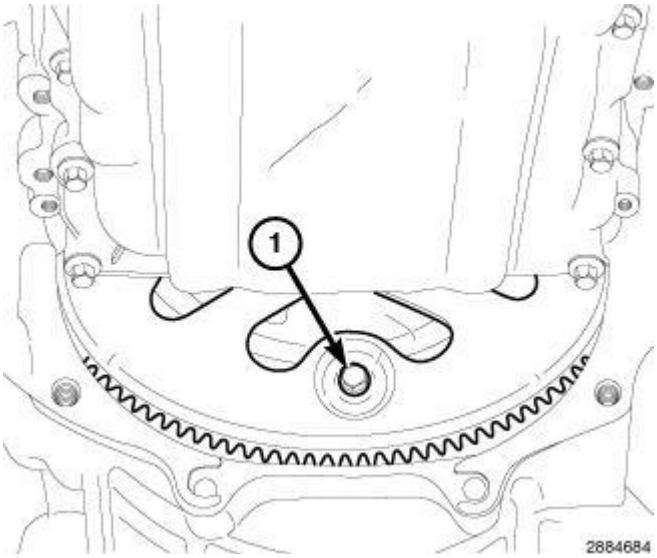


Fig. 20: Flexplate/Torque Converter Retaining Bolts
Courtesy of CHRYSLER LLC

39. Remove the flexplate-to-torque converter retaining bolts (1).

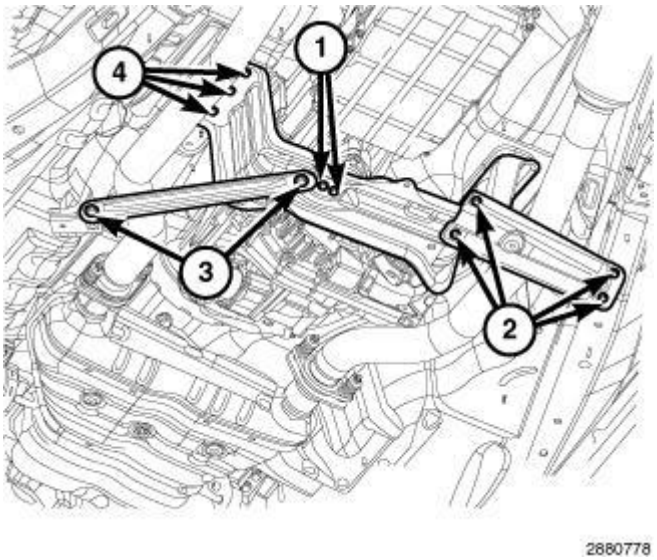


Fig. 21: Rear Engine Mount Isolator, Transmission Crossmember Support Brackets & Bolts
Courtesy of CHRYSLER LLC

4x4 rear engine mount isolator shown in illustration, 4x2 rear engine mount isolator similar.

40. Loosen but do not remove the rear engine mount isolator retaining bolts (1).
41. Using a suitable transmission hydraulic jack, slightly raise the transmission and support the front of the transmission using a block of wood between the transmission and engine cradle crossmember.

42. Remove the transmission hydraulic jack.

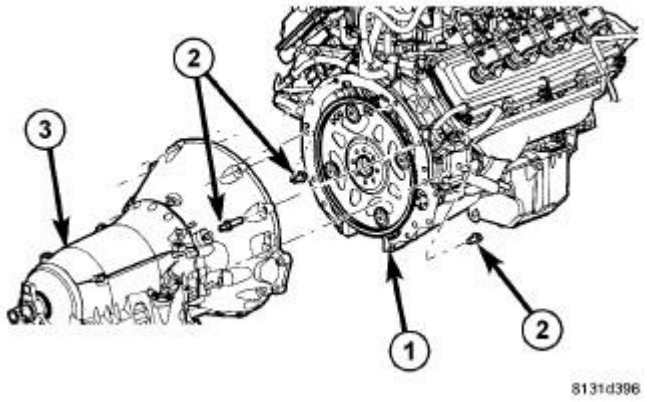


Fig. 22: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

43. Remove the transmission bell housing to engine block bolts (2).
44. Lower the vehicle.

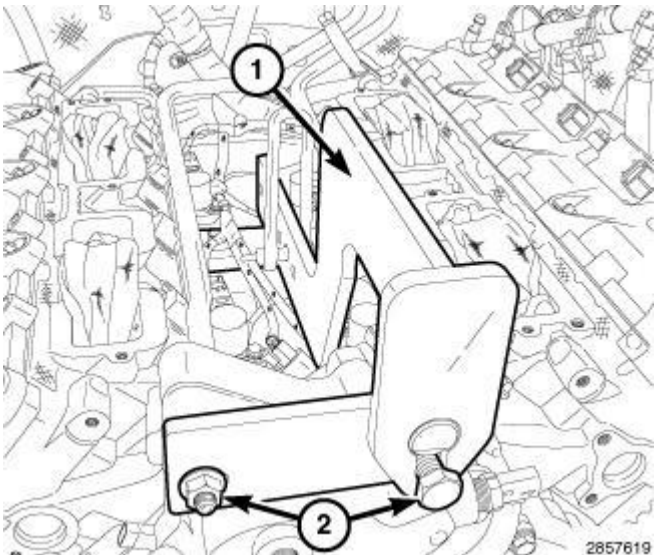


Fig. 23: Engine Lift Fixture & Mounting Bolts
Courtesy of CHRYSLER LLC

45. Disconnect all remaining left and right engine harness electrical connectors and position the harness over to the right side of vehicle.
46. Connect a suitable engine lifting devise to the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).
47. Separate the engine from the transmission (3) and remove the engine from the vehicle.

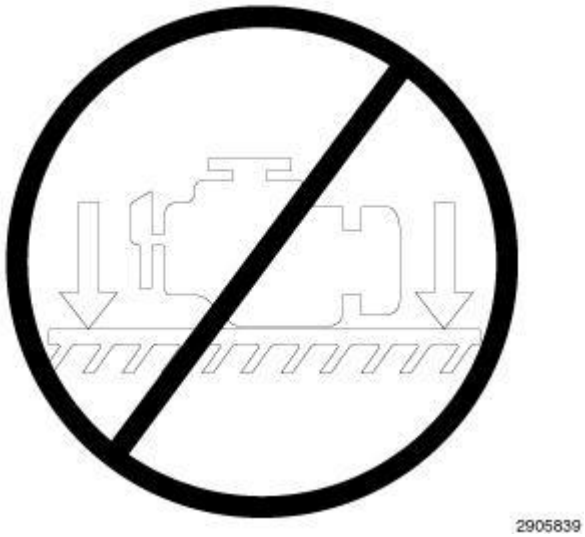


Fig. 24: Incorrect Engine Resting
Courtesy of CHRYSLER LLC

CAUTION: Do not allow the engine to rest on the oil pan, the composite oil pan will not support the weight of the engine, damage to the oil pan and/or engine assembly may occur.

48. Place the engine on a suitable engine stand.

INSTALLATION

INSTALLATION

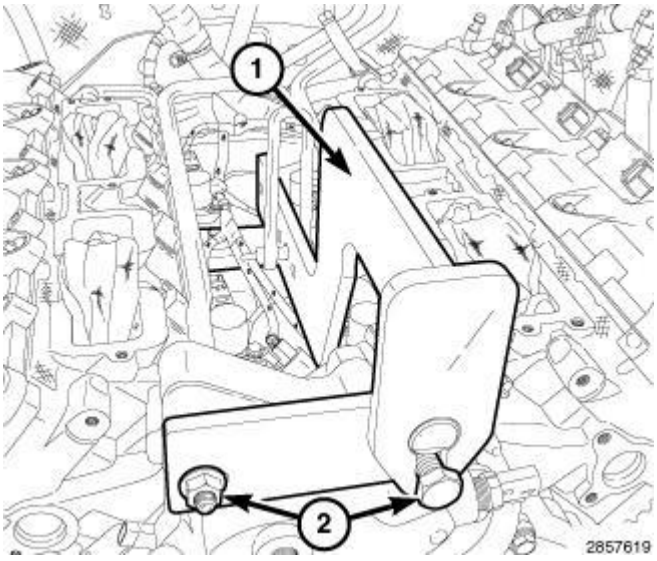


Fig. 25: Engine Lift Fixture & Mounting Bolts
Courtesy of CHRYSLER LLC

NOTE: Do not use air tools to install Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).

1. Install the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).
2. Connect a suitable engine lifting devise to the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).
3. Position the engine in the vehicle.

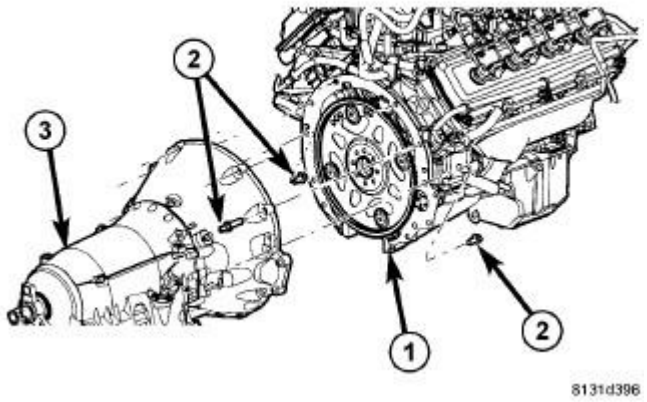


Fig. 26: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

4. Lower and align the engine (1) with the transmission (3).
5. Continue to lower the engine assembly until the engine mounting brackets lineup with the engine mounts.
6. Install two transmission to engine block mounting bolts (2) finger tight.
7. Remove the engine lifting devise.
8. Raise and support the vehicle.

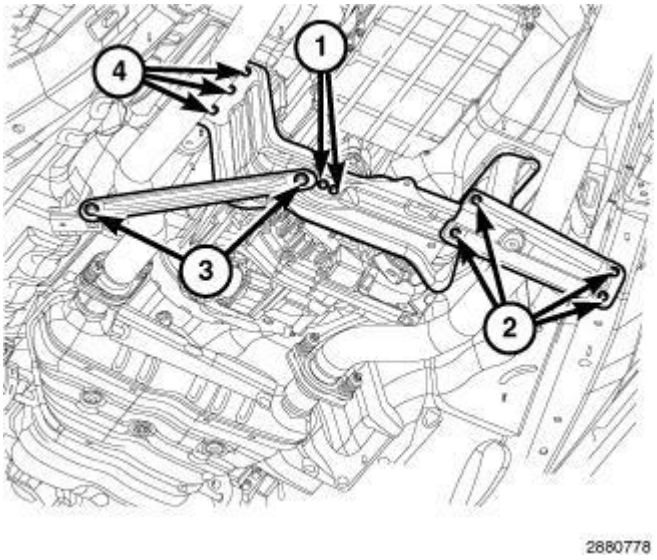


Fig. 27: Rear Engine Mount Isolator, Transmission Crossmember Support Brackets & Bolts
Courtesy of CHRYSLER LLC

4x4 rear engine mount isolator shown in illustration, 4x2 rear engine mount isolator similar.

9. Using a suitable transmission hydraulic jack, slightly raise the transmission and remove the block of wood between the transmission and engine cradle crossmember, lower the transmission and remove the jack.
10. Tighten the rear engine mount isolator retaining bolts (1) to 61 N.m (45 ft. lbs.).

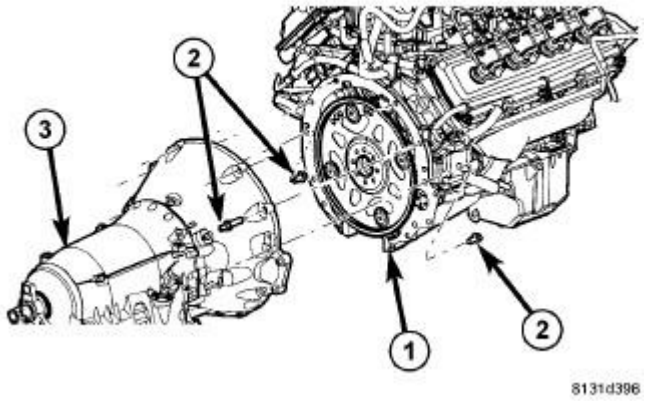


Fig. 28: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

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

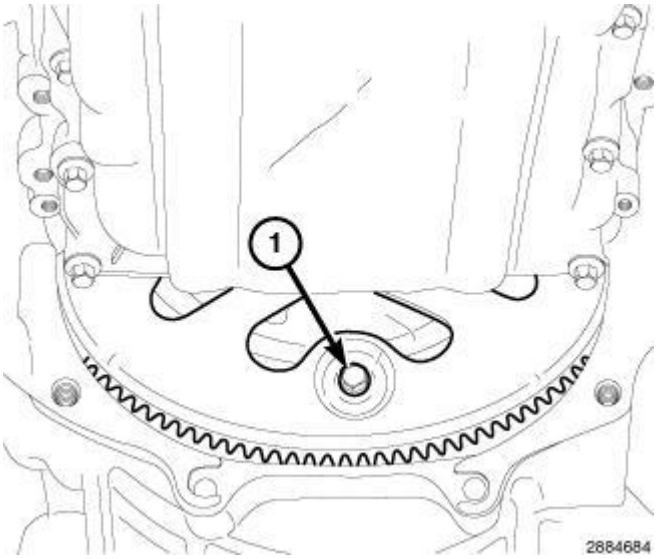


Fig. 29: Flexplate/Torque Converter Retaining Bolts
Courtesy of CHRYSLER LLC

12. Install all torque converter-to-flexplate bolts (1) finger tight.
13. Verify the torque converter is pulled flush to the flexplate and tighten bolts to 31 N.m (23 ft. lbs.).

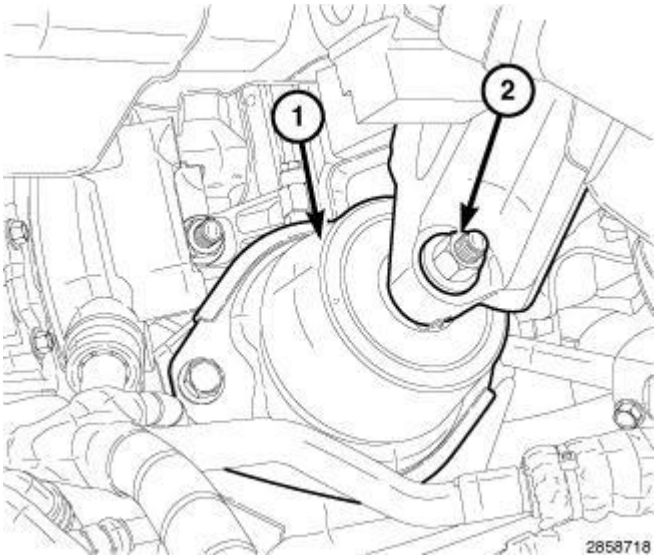


Fig. 30: Engine Mount & Retaining Nut
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

14. Install the engine mount retaining nuts (2) and tighten to 95 N.m (70 ft. lbs.).

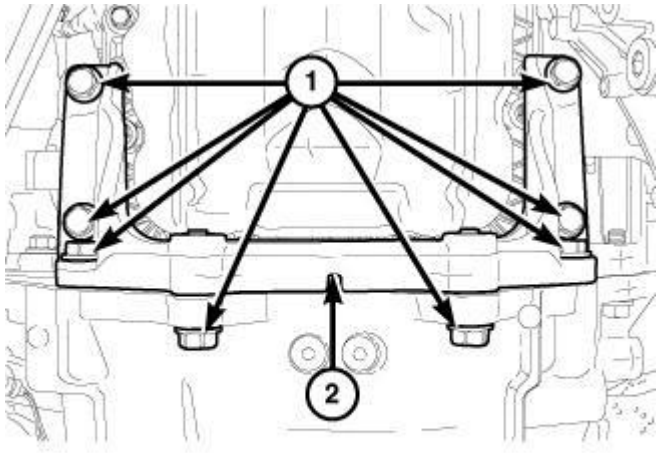


Fig. 31: Structural Dust Cover & Retaining Bolts
Courtesy of CHRYSLER LLC

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.

15. Position the structural cover (2) in the vehicle.
16. Install the structural dust cover bolts (1) to the engine block finger tight.
17. Install the structural dust cover bolts (1) to the transmission finger 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.

18. Tighten the structural dust cover bolts to the transmission to 9 N.m (80 in. lbs.).
19. Tighten the structural dust cover bolts to the engine block to 9 N.m (80 in. lbs.).
20. Again, tighten the structural dust cover bolts to the transmission to 54 N.m (40 ft. lbs.).
21. Again, tighten the structural dust cover bolts to the engine block to 54 N.m (40 ft. lbs.).

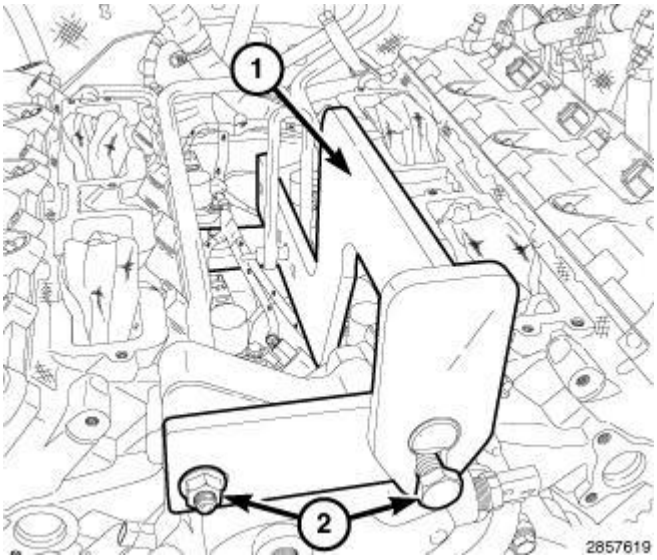


Fig. 32: Engine Lift Fixture & Mounting Bolts
Courtesy of CHRYSLER LLC

22. Lower the vehicle.
23. Remove the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).
24. Position the engine harness on both right and left sides of the vehicle.

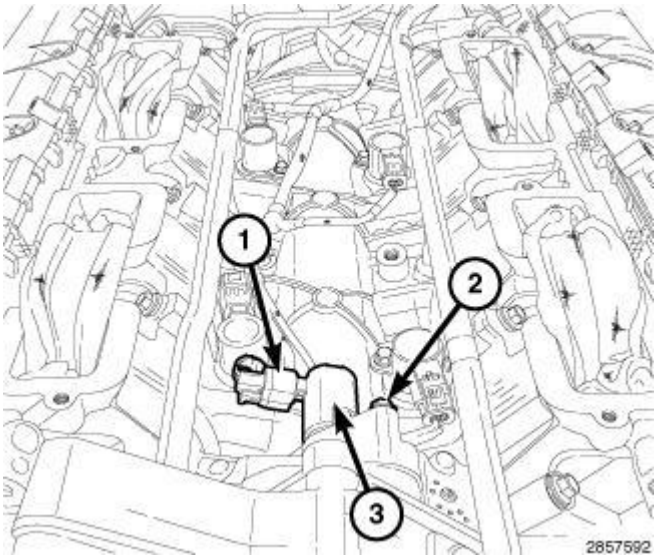


Fig. 33: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER LLC

NOTE: Ensure that the O-ring is fully seated into the cylinder block.

25. Position the oil control valve (3) into the cylinder block.
26. Securely tighten the oil control valve retaining bolt (2).
27. Connect the oil control valve electrical connector (1).

28. Install the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

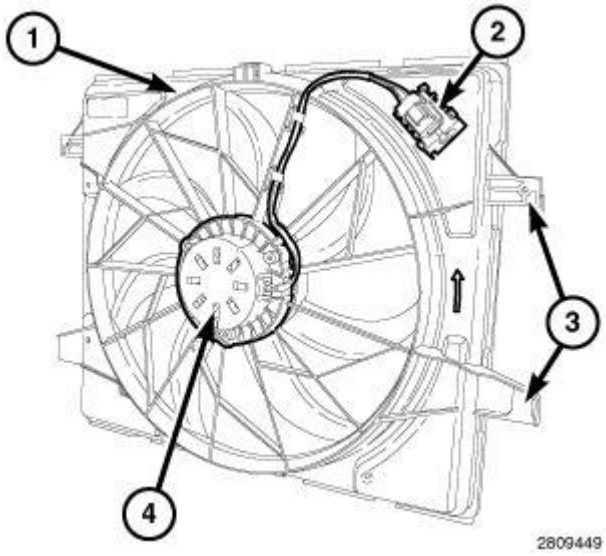


Fig. 34: Cooling Fan Module Components
Courtesy of CHRYSLER LLC

29. Install the generator. Refer to **GENERATOR, INSTALLATION** .
30. Install the cooling fan module (1). Refer to **FAN, COOLING, REMOVAL** .

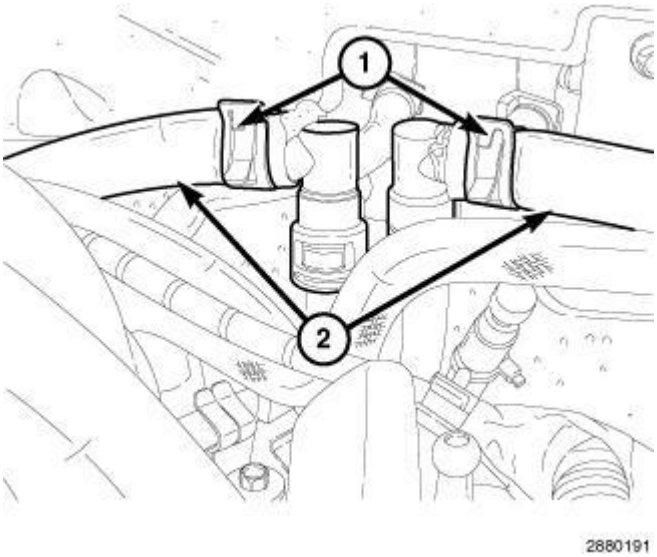


Fig. 35: Heater Hoses & Clamps
Courtesy of CHRYSLER LLC

31. Position both heater hoses (2).
32. Install both heater hose clamps (1).

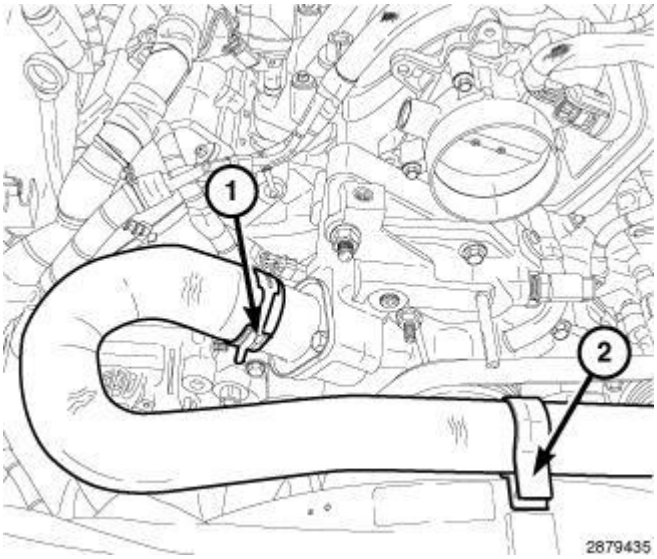


Fig. 36: Upper Radiator Hose Clamp & Retainer
Courtesy of CHRYSLER LLC

33. Position the upper radiator hose and secure the retainer (2) at the fan shroud.
34. Connect the upper radiator hose to the thermostat housing and install the hose clamp (1).
35. Raise and support the vehicle.

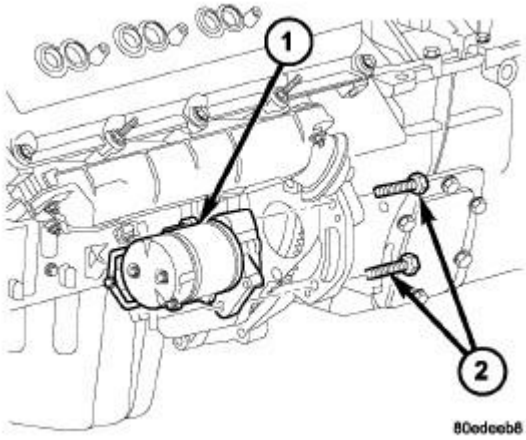


Fig. 37: Starter Motor & Bolts
Courtesy of CHRYSLER LLC

36. Install the starter (1). Refer to **STARTER, REMOVAL** .
37. Install the A/C compressor to the engine block. Refer to **COMPRESSOR, A/C, INSTALLATION** .
38. Connect the transmission oil cooler lines to their retainer at the oil pan.

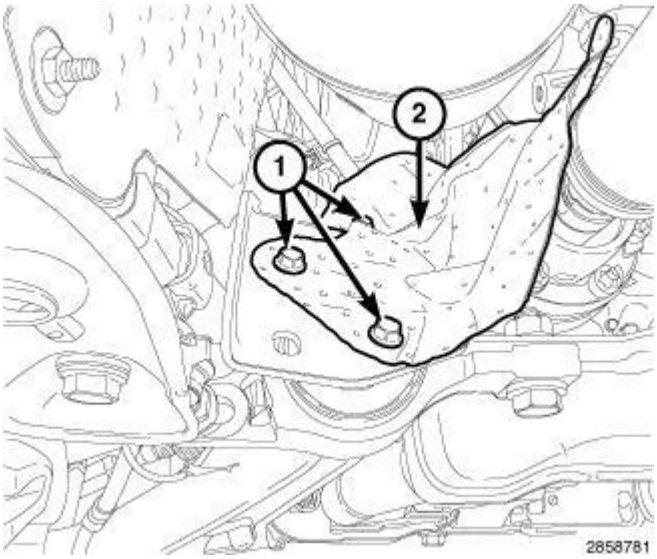


Fig. 38: Heat Shield & Retaining Bolts
Courtesy of CHRYSLER LLC

39. Install both exhaust pipe/catalytic converters. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .
40. Position the left catalytic converter heat shield (2) install the retaining bolts (1) and securely tighten.

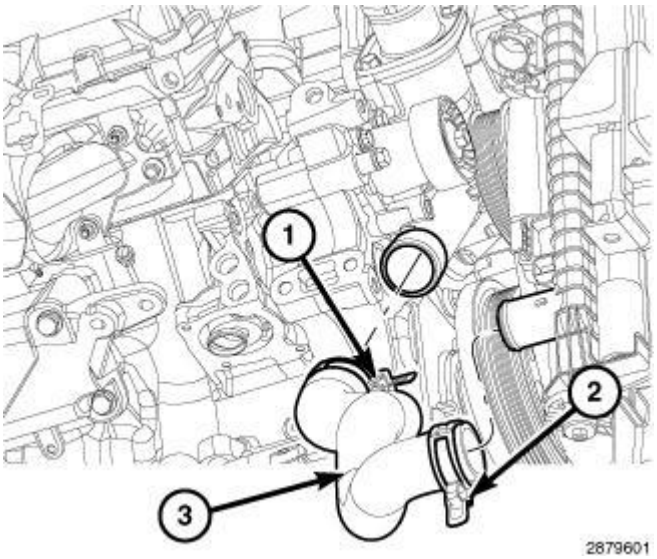


Fig. 39: Lower Radiator Hose & Clamps
Courtesy of CHRYSLER LLC

41. Connect the lower radiator hose (3) to the radiator and install the hose clamp (2).
42. Connect the lower radiator hose to the water pump and install hose clamp (1).

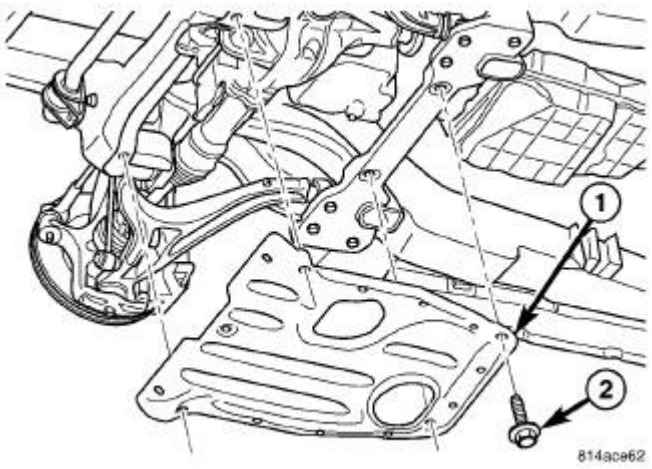


Fig. 40: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

43. If equipped, position the skid plate, install the four retaining bolts (2) and tighten to 28 N.m (21 ft. lbs.).
44. Lower the vehicle.

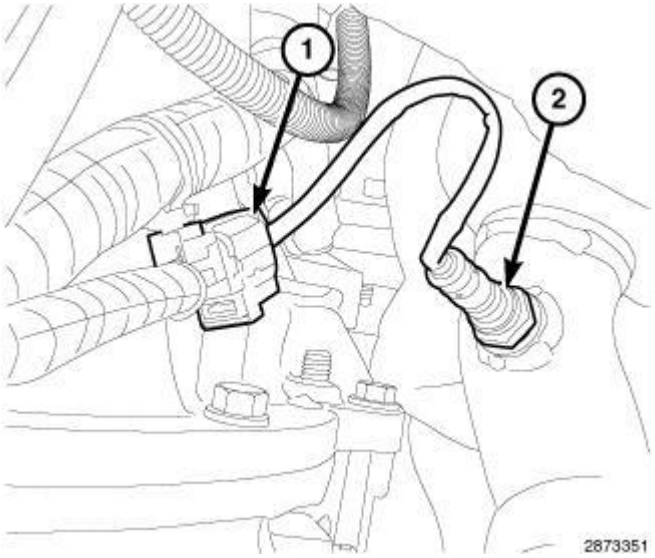


Fig. 41: Left Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

45. Connect the left upstream O2 sensor electrical connector (1).

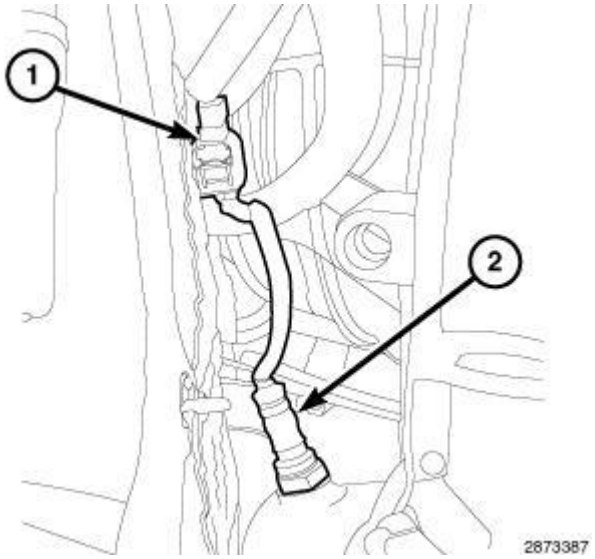


Fig. 42: Right Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

46. Connect the right upstream O2 sensor electrical connector (1).
47. Connect all remaining left and right engine harness electrical connectors.

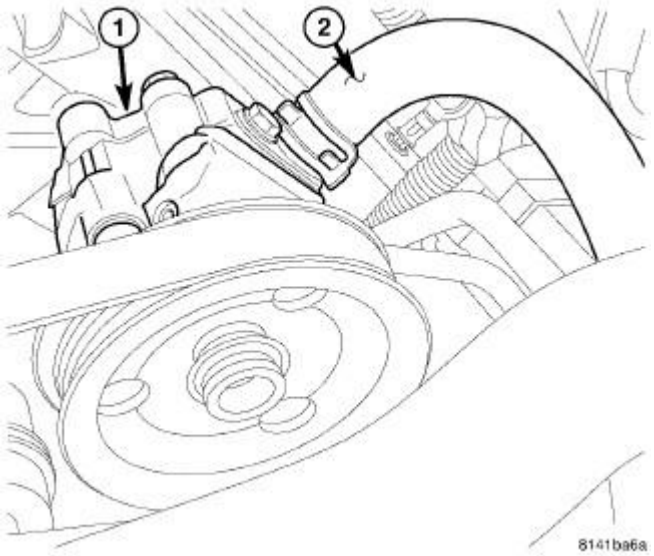


Fig. 43: Power Steering Pump & Return Hose
Courtesy of CHRYSLER LLC

48. Install the power steering pump (1). Refer to **PUMP, INSTALLATION** .
49. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

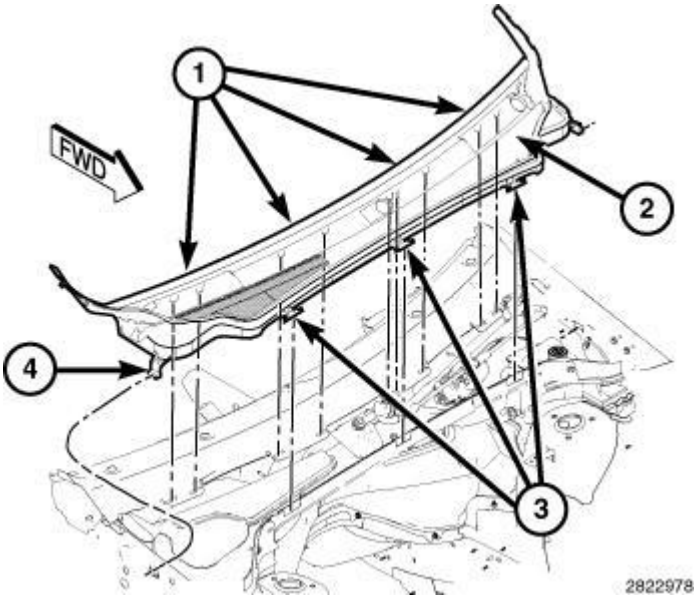


Fig. 44: Cowl Panel Cover & Fasteners
Courtesy of CHRYSLER LLC

50. Install the cowl panel cover (2). Refer to **COVER, COWL PANEL, INSTALLATION** .
51. Start the engine and inspect for leaks.
52. Install the air cleaner and resonator assembly. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.

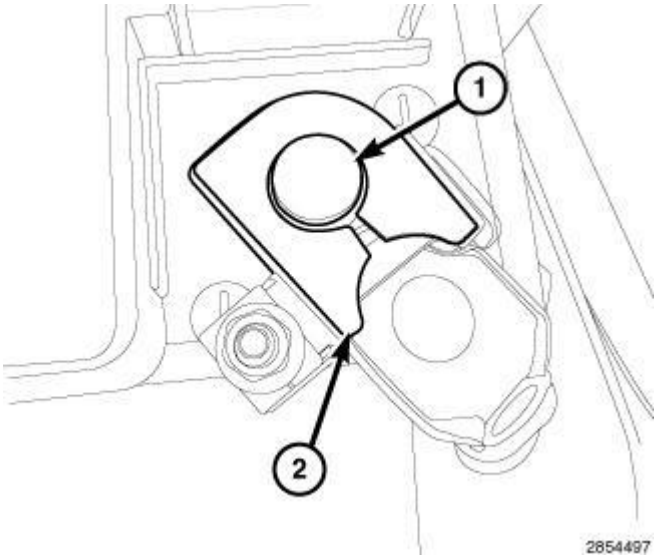


Fig. 45: Negative Battery Cable
Courtesy of CHRYSLER LLC

53. Fill the engine with oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
54. Fill the cooling system. Refer to **STANDARD PROCEDURE** .

55. Connect the negative battery cable (2).

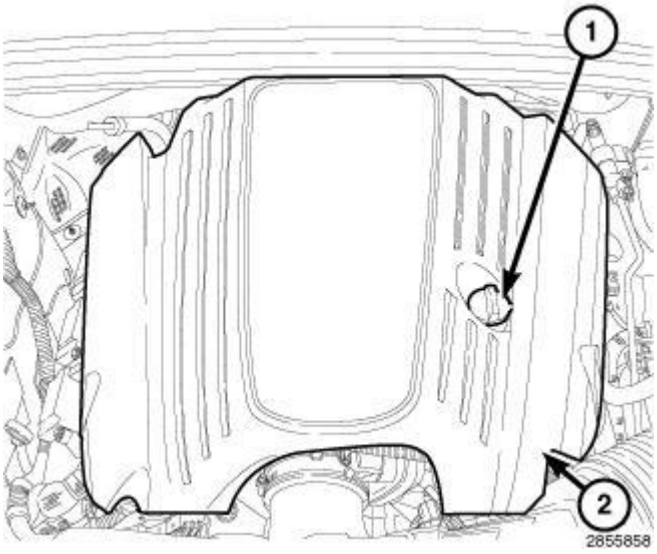


Fig. 46: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

56. Install the engine cover (2).
57. Install the oil fill cap (1).
58. Start the engine and check for leaks.
59. Road test vehicle.

SPECIAL TOOLS

SPECIAL TOOLS

	1023 - Puller (Originally Shipped In Kit Number(s) 8678.) 10368 - Set, Universal Protective Cap 10386 - Holder, Vibration Damper 10387 - Installer, Vibration Damper 6871 - Installer, A/C Hub (Originally Shipped In Kit Number(s) 6896.) 7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.) 8464 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 8664, 8665, 8665CC, 8702, 9577.) 8507 - Guides, Connecting Rod (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC.) 8512A - Installer, Damper (Originally Shipped In Kit Number(s) 8283, 8527, 8575, 8575CC, 8660, 8661.) 8514 - Pins, Tensioner

	(Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.) 8534B - Support Fixture, Engine (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.) 8984B - Engine Lift Fixture (Originally Shipped In Kit Number(s) 8849CC, 9329, 9515, 9516, 9518, 9519, 9540, 9541, 9577.) 9065B - Compressor, Valve Spring 9070 - Retainer, Push Rod (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.) 9071 - Remover, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.) 9072 - Installer, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577, 9975, 9976.) C-119 - Cylinder Indicator C-3292A - Gauge, Pressure C-3422-D - Compressor, Valve Spring C-3685-A - Bloc-Chek Kit

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

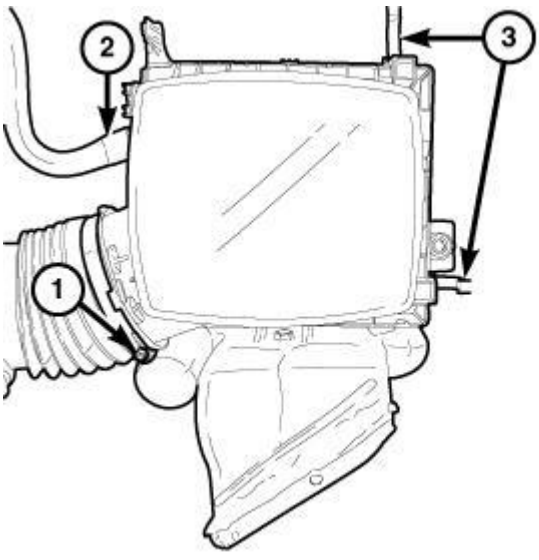


Fig. 47: Hose Clamp, Make Up Air Hose & Spring Clips
Courtesy of CHRYSLER LLC

1. Loosen the clean air hose clamp (1) at the air cleaner cover and disconnect the clean air hose.
2. Remove the make up air hose (2) at the air cleaner cover.

3. Release the 2 spring clips (3) 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

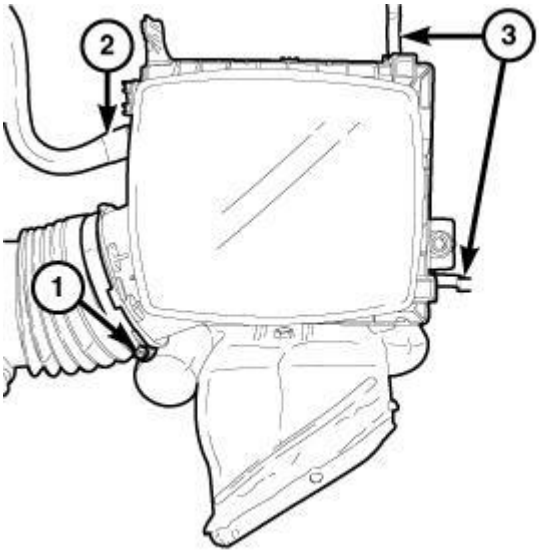


Fig. 48: Hose Clamp, Make Up Air Hose & Spring Clips
Courtesy of CHRYSLER LLC

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. Install the air cleaner cover onto the housing assembly locating tabs.
3. Latch the 2 spring clips (3) and lock the air cleaner cover to the housing assembly.
4. Connect the make up air hose (2) to the air cleaner cover.
5. Connect the clean air hose to the air cleaner cover and tighten clamp (1) to 5 N.m (44 in. lbs.).

BODY, AIR CLEANER

REMOVAL

REMOVAL

AIR CLEANER HOUSING

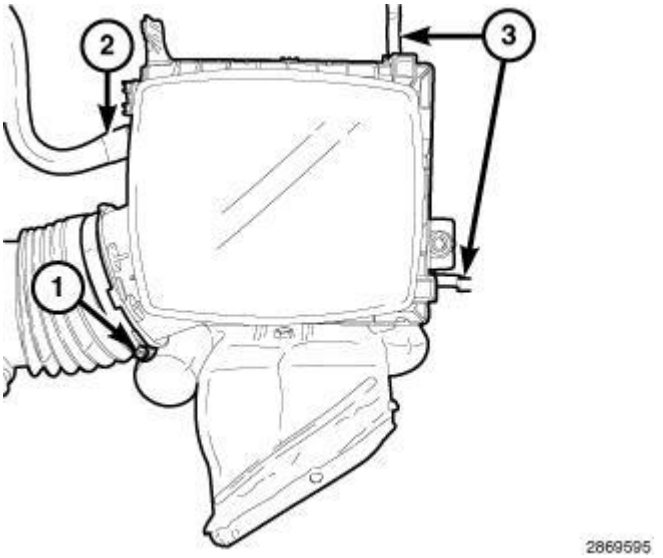


Fig. 49: Hose Clamp, Make Up Air Hose & Spring Clips
Courtesy of CHRYSLER LLC

1. Loosen the clean air hose clamp (1) at the air cleaner cover and disconnect the clean air hose.
2. Remove the make up air hose (2) at the air cleaner cover.
3. Release the 2 spring clips (3) 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.

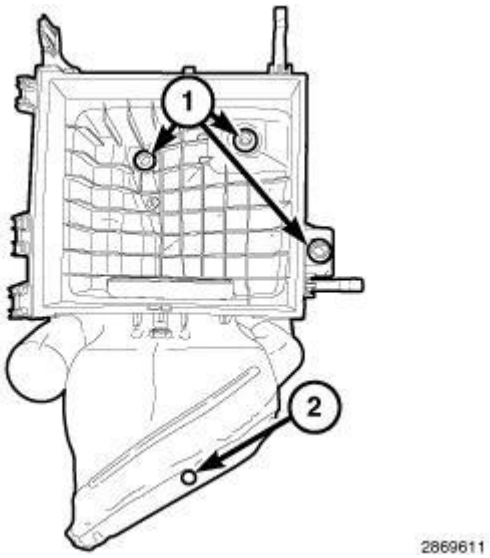


Fig. 50: Air Cleaner Housing Rubber Grommets & Push Pin Retainer
Courtesy of CHRYSLER LLC

6. Remove the push pin retainer (2) at the air cleaner housing duct.
7. Lift and separate the air cleaner housing rubber grommets (1) from the ball studs and remove the air cleaner housing.

RESONATOR ASSEMBLY

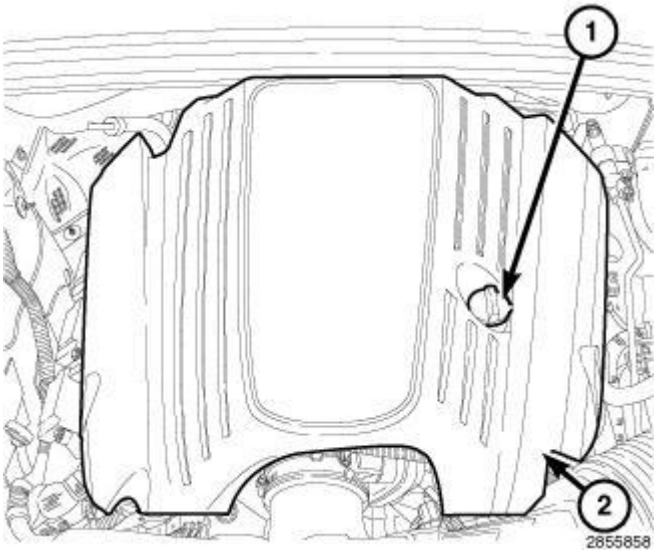


Fig. 51: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Lift and separate the engine cover retaining grommets from the ball studs and remove the engine cover (2).

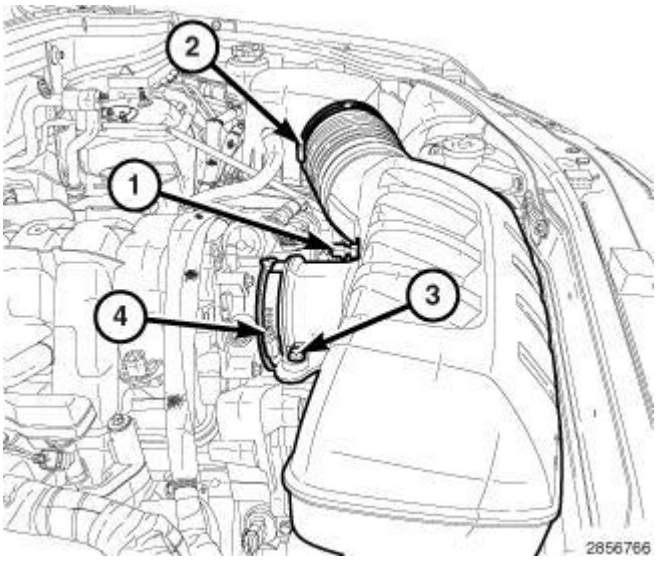


Fig. 52: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

3. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
4. Loosen the clean air hose clamp at the air cleaner housing (2).
5. Remove the resonator retaining bolt (3).

6. Loosen the resonator hose clamp at the throttle body (4) and remove the resonator.

INSTALLATION

INSTALLATION

AIR CLEANER HOUSING

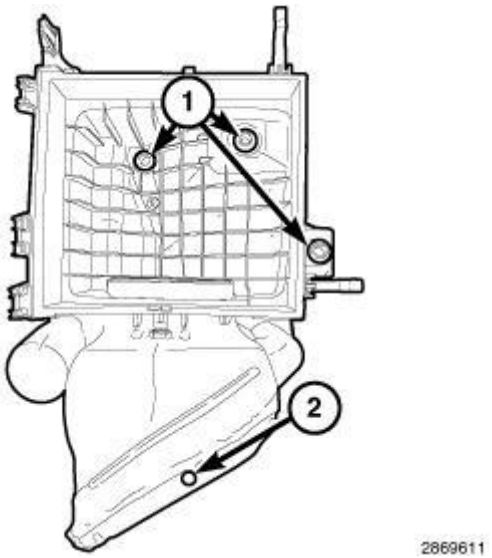


Fig. 53: Air Cleaner Housing Rubber Grommets & Push Pin Retainer
Courtesy of CHRYSLER LLC

1. Position the air cleaner housing and secure the air cleaner housing rubber grommets (1) to the ball studs.
2. Install the air cleaner housing duct push pin retainer (2).

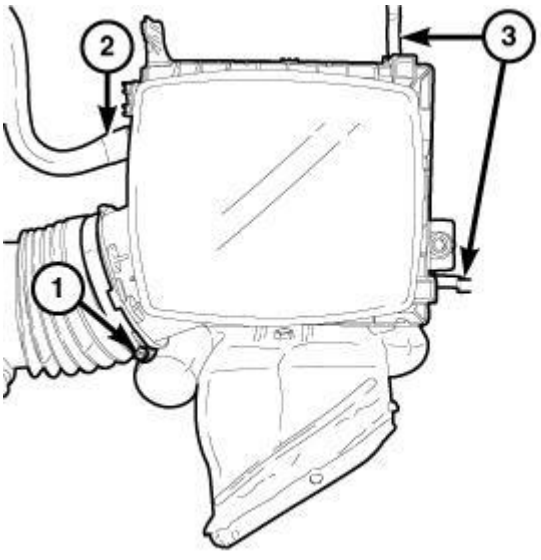


Fig. 54: Hose Clamp, Make Up Air Hose & Spring Clips
Courtesy of CHRYSLER LLC

3. Install the air filter element into the housing assembly.
4. Install the air cleaner cover onto the housing assembly locating tabs.
5. Latch the 2 spring clips (3) and lock the air cleaner cover to the housing assembly.
6. Connect the make up air hose (2) to the air cleaner cover.
7. Connect the clean air hose to the air cleaner cover and tighten clamp (1) to 5 N.m (44 in. lbs.).

RESONATOR ASSEMBLY

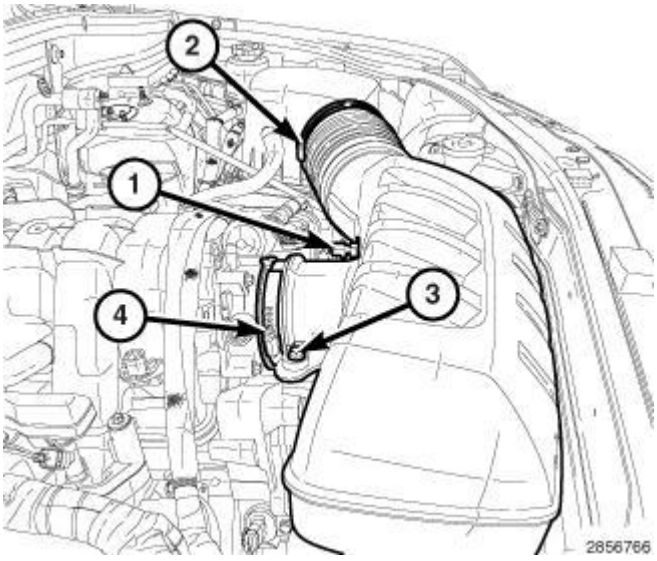


Fig. 55: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

1. Connect the resonator hose at the throttle body and tighten clamp (4) to 5 N.m (44 in. lbs.).
2. Install the resonator retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
3. Connect the clean air hose at the air cleaner housing and tighten clamp (2) to 5 N.m (44 in. lbs.).
4. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (1).

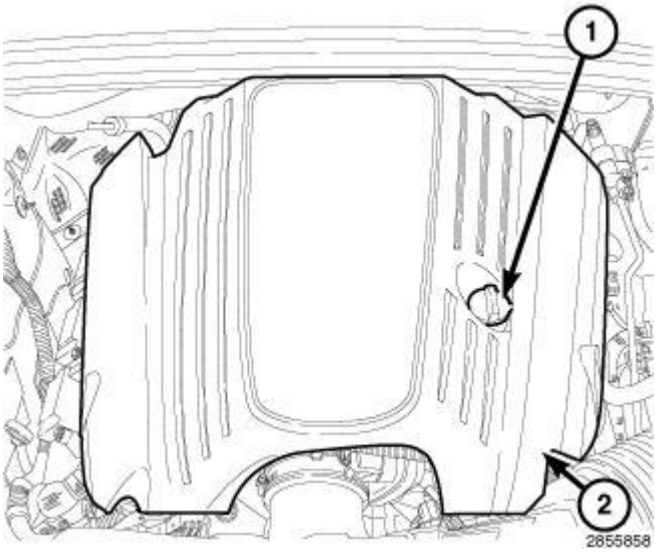


Fig. 56: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

5. Position the engine cover (2) and secure the retaining grommets to the ball studs.
6. Install the oil fill cap (1).

CYLINDER HEAD

OPERATION

OPERATION

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

DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE

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

- Possible indications of the cylinder head gasket leaking between adjacent cylinders are:
  - Loss of engine power
  - Engine misfiring
  - Poor fuel economy
- Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:
  - Engine overheating

- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in the **CYLINDER COMPRESSION PRESSURE LEAKAGE** Test in this information. 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 (special tool #7700, Tester, Cooling System) 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 (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform the test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL - LEFT CYLINDER HEAD

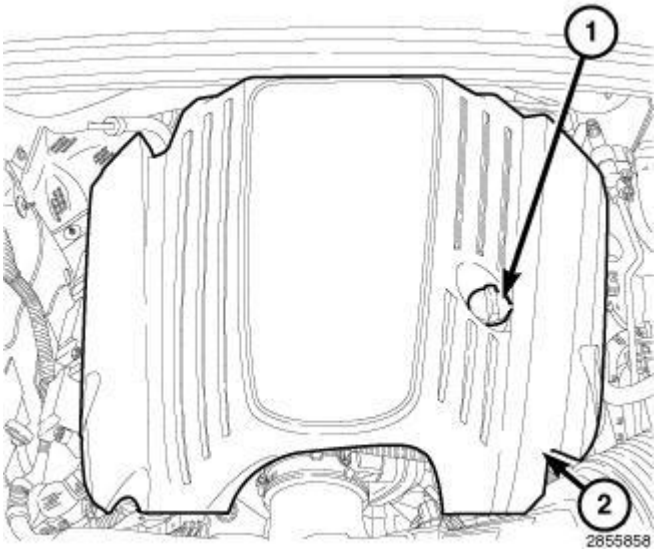


Fig. 57: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Remove the engine cover (2).

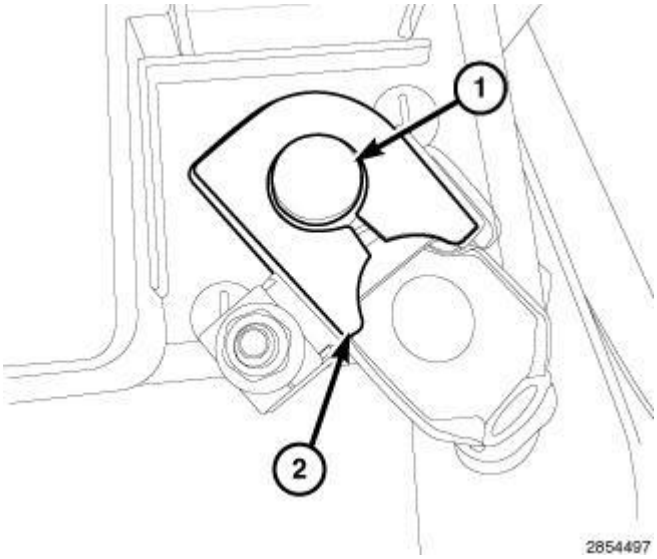


Fig. 58: Negative Battery Cable
Courtesy of CHRYSLER LLC

3. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
4. Disconnect and isolate the negative battery cable (2).

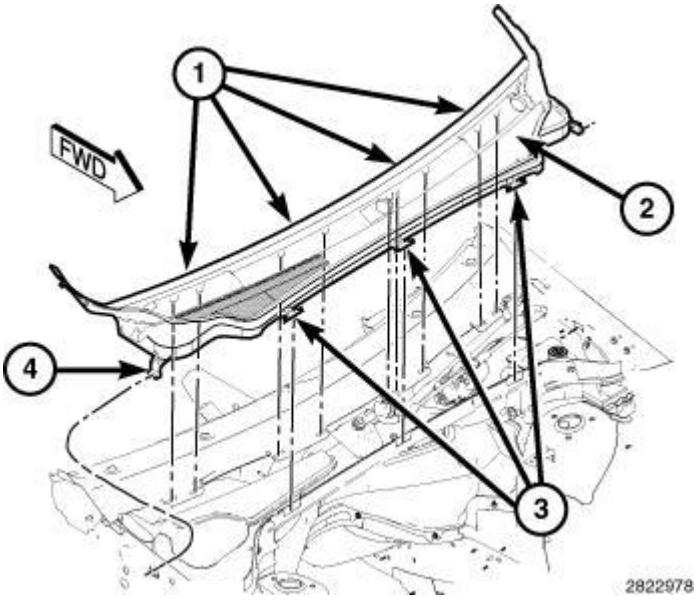


Fig. 59: Cowl Panel Cover & Fasteners
Courtesy of CHRYSLER LLC

5. Remove the cowl cover panel (2). Refer to **COVER, COWL PANEL, REMOVAL** .
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
7. Remove the air cleaner and resonator assembly. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.

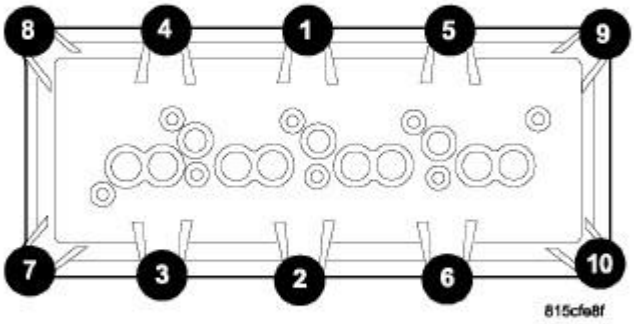


Fig. 60: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

8. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

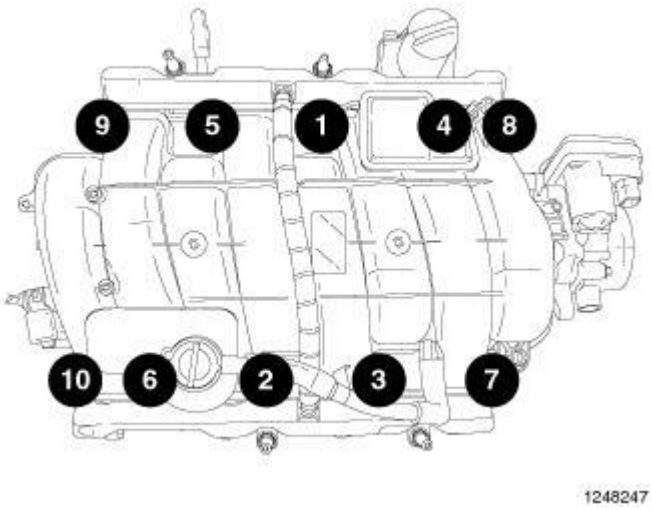


Fig. 61: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

9. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

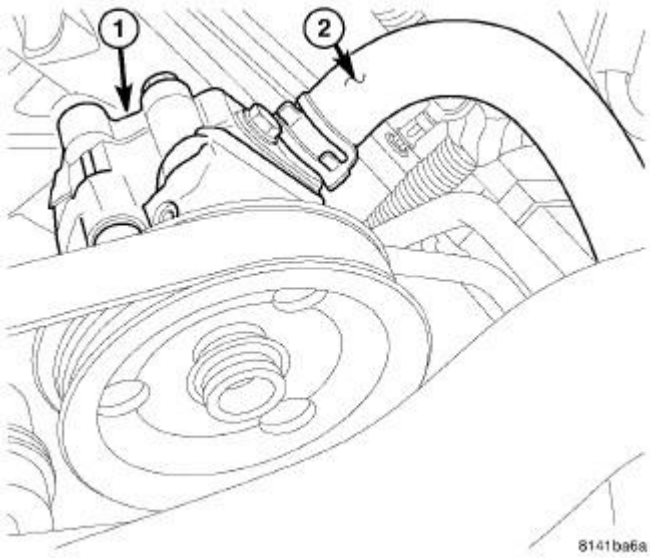
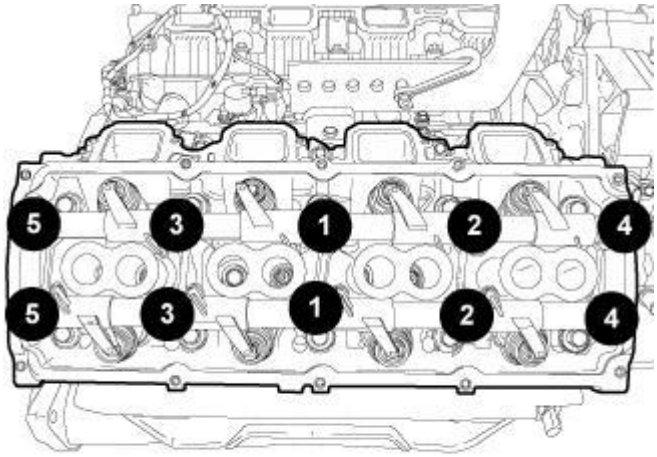


Fig. 62: Power Steering Pump & Return Hose
Courtesy of CHRYSLER LLC

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

10. Remove the power steering pump (1) and position aside. Refer to **PUMP, REMOVAL** .



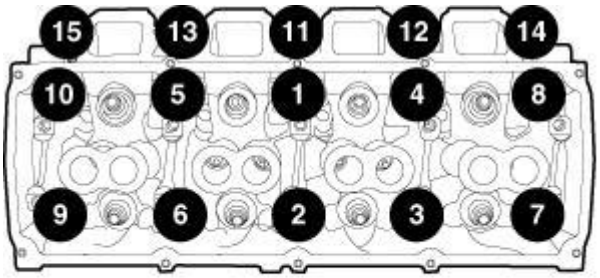
921225

Fig. 63: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

NOTE: The rocker arms and push rods must be installed in their original location as removed.

11. Remove the rocker arms and push rods. Note their location to ensure installation in their original locations as removed. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.



88745

Fig. 64: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

12. Using the sequence shown in illustration, remove the cylinder head bolts.
13. Remove the cylinder head and discard the cylinder head gasket.

REMOVAL - RIGHT CYLINDER HEAD

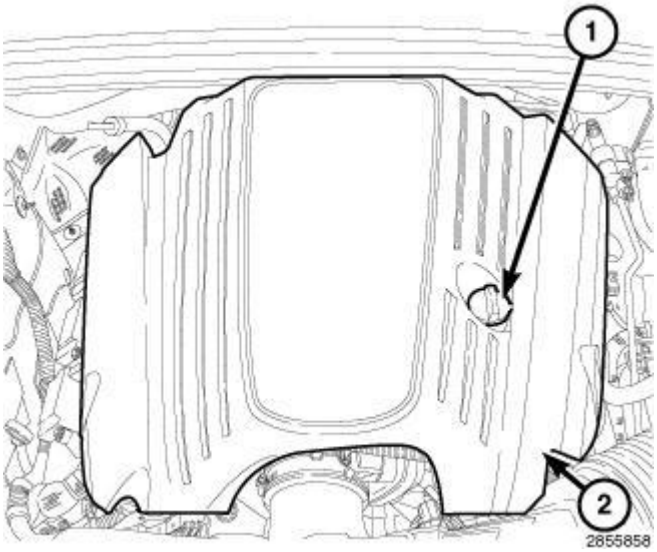


Fig. 65: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Remove the engine cover (2).

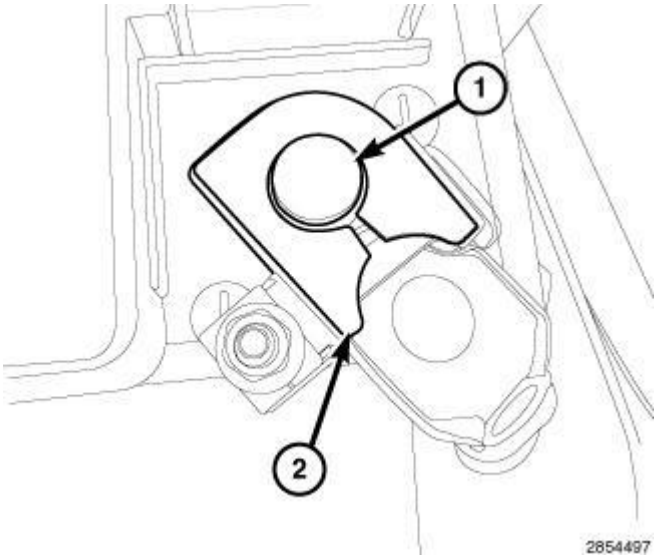


Fig. 66: Negative Battery Cable
Courtesy of CHRYSLER LLC

3. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
4. Disconnect and isolate the negative battery cable (2).

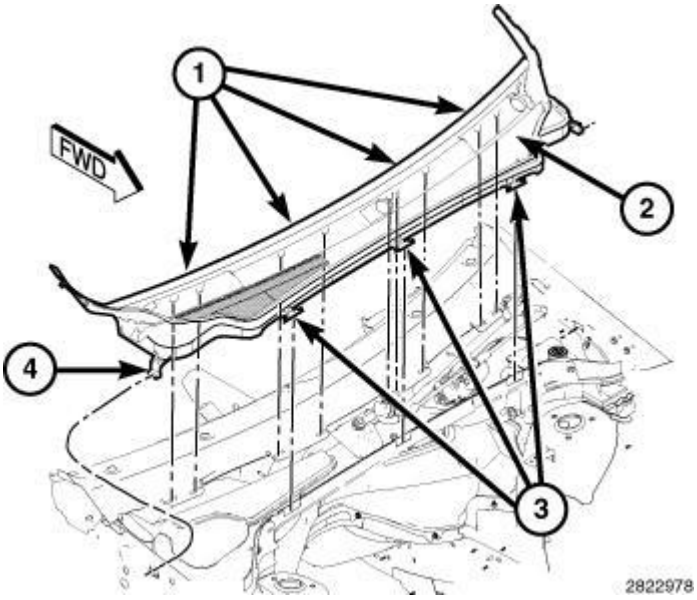


Fig. 67: Cowl Panel Cover & Fasteners
Courtesy of CHRYSLER LLC

5. Remove the cowl cover panel (2). Refer to **COVER, COWL PANEL, REMOVAL** .
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
7. Remove the air cleaner and resonator assembly. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.

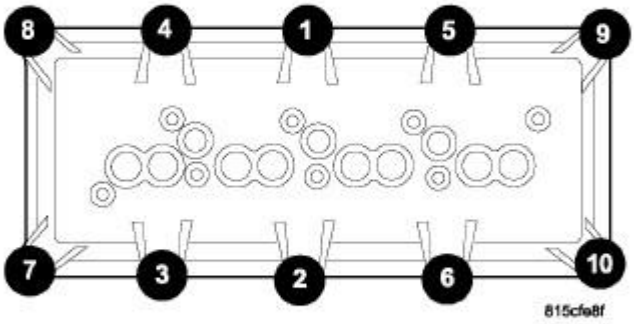


Fig. 68: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

8. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

9. Remove the engine oil indicator tube retaining nut at the exhaust manifold and remove the oil indicator tube.

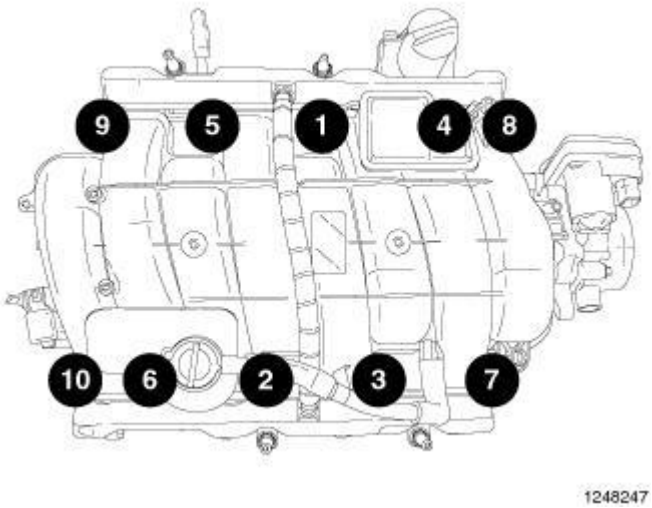


Fig. 69: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

10. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

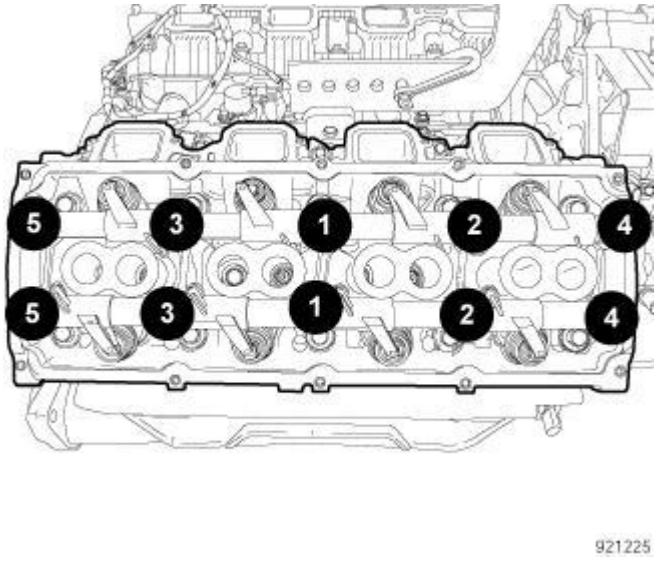


Fig. 70: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

NOTE: The rocker arms and push rods must be installed in their original location as removed.

11. Remove the rocker arms and push rods. Note their location to ensure installation in their original locations. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.

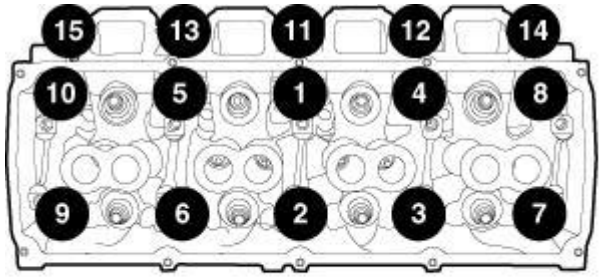


Fig. 71: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

12. Using the sequence shown in illustration, remove the cylinder head bolts.
13. Remove the cylinder head and discard the cylinder head gasket.

CLEANING

CLEANING

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

INSPECTION

INSPECTION

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

INSTALLATION

INSTALLATION - LEFT CYLINDER HEAD

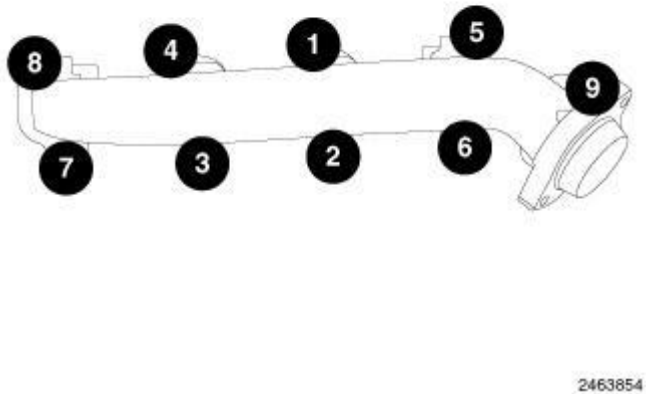


Fig. 72: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER LLC

1. If replacing the cylinder head, transfer the valves, valve seals and valve springs to the new cylinder head. Refer to **VALVES, INTAKE AND EXHAUST, INSTALLATION, 5.7L**. If valve refacing is necessary, refer to **Engine/Cylinder Head/VALVES, Intake and Exhaust - Standard Procedure**.
2. If replacing the cylinder head, transfer the exhaust manifold to the new cylinder head. Using the sequence shown in illustration, tighten the exhaust manifold bolts/studs to 25 N.m (18 ft. lbs.).
3. If replacing the cylinder head, transfer the spark plugs to the new cylinder head. Refer to **SPARK PLUG, INSTALLATION** .

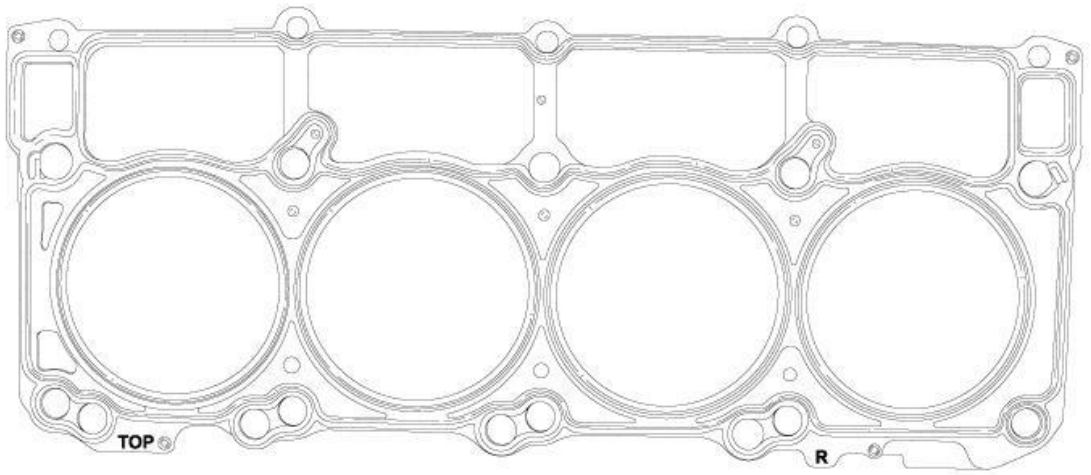


Fig. 73: Cylinder Head Gasket Markings
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

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.

4. Using a suitable solvent, clean all sealing surfaces of the cylinder block and cylinder heads.

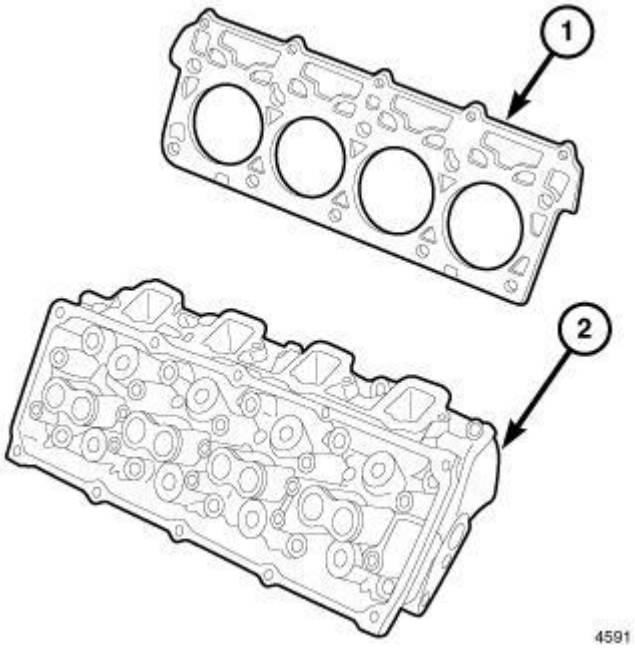


Fig. 74: Cylinder Head & Gasket
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

5. Position the new cylinder head gasket (1) onto the cylinder block.
6. Position the cylinder head (2) onto the cylinder head gasket (1) and cylinder block.

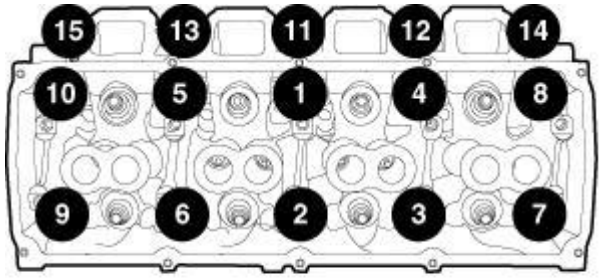


Fig. 75: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

7. Using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 34 N.m (25 ft. lbs.).
8. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).

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

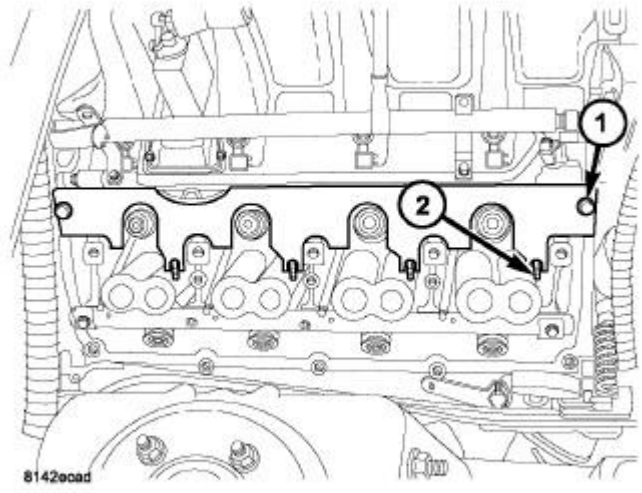


Fig. 76: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

13. Using Pushrod Retainer (special tool #9070, Retainer, Push Rod) (1), install the push rods and rocker arms in their original location as noted during removal. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.

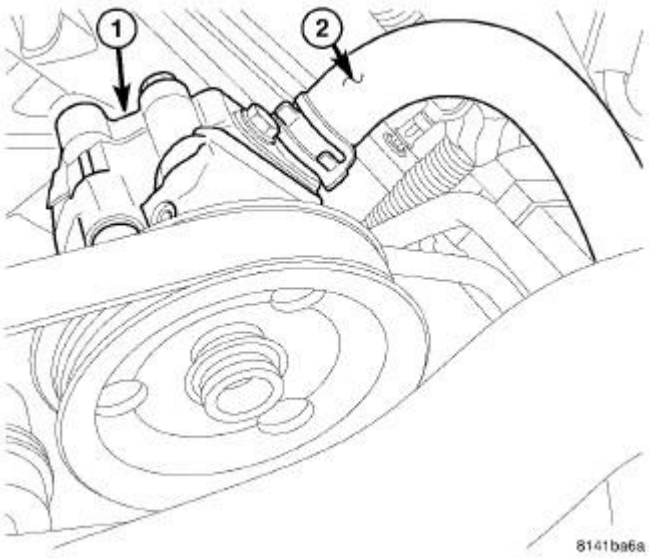


Fig. 77: Power Steering Pump & Return Hose
Courtesy of CHRYSLER LLC

14. Install the power steering pump (1). Refer to **PUMP, INSTALLATION** .

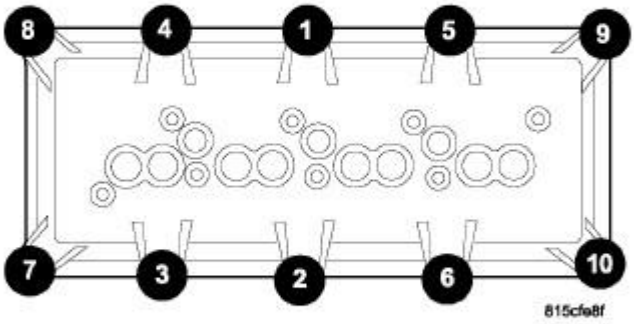


Fig. 78: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

Right side shown in illustration, left side similar.

15. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

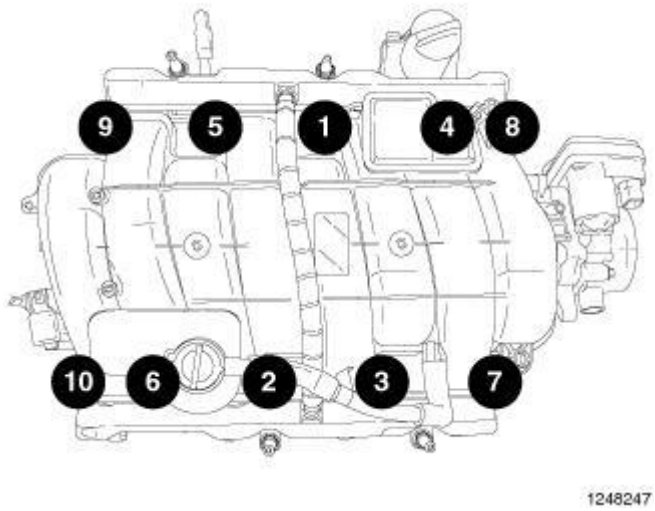


Fig. 79: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

16. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

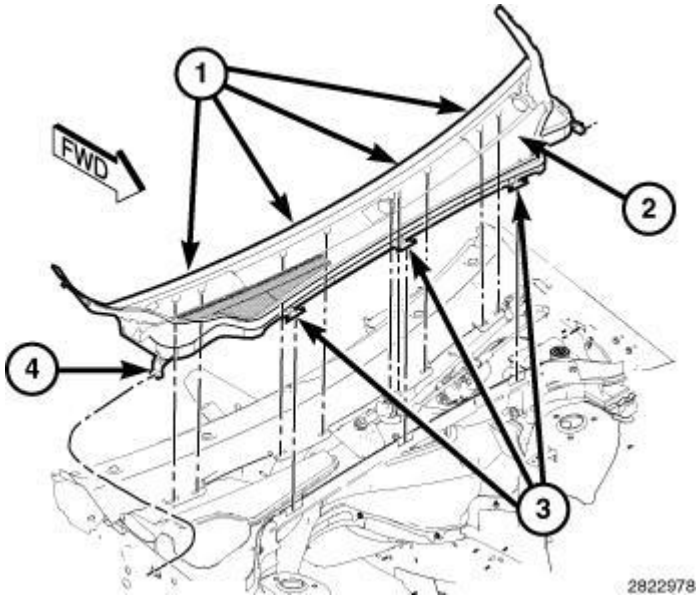


Fig. 80: Cowl Panel Cover & Fasteners
Courtesy of CHRYSLER LLC

17. Install the cowl cover panel. Refer to **COVER, COWL PANEL, INSTALLATION** .
18. Install the air cleaner and resonator assembly. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
19. Fill the cooling system. Refer to **STANDARD PROCEDURE** .

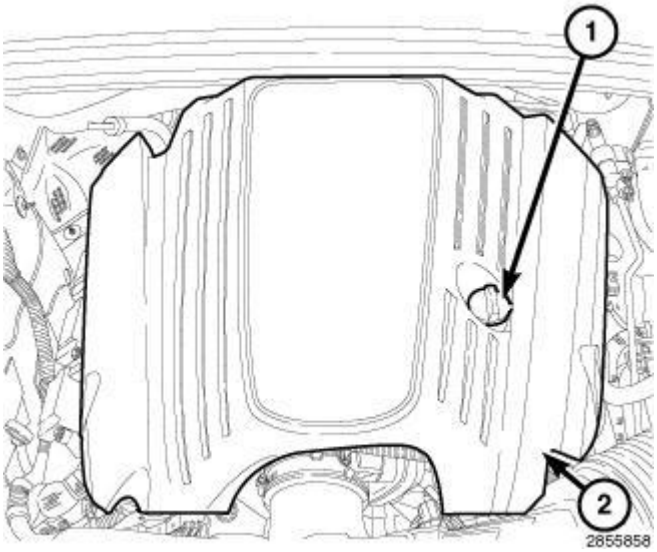


Fig. 81: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

20. Change the engine oil and engine oil filter. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
21. Install the engine cover (2).
22. Install the oil fill cap (1).
23. Connect the negative battery cable.

NOTE: This vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message will need to be reset after changing the engine oil and filter.

24. Reset the "Oil Change Required" indicator system. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, STANDARD PROCEDURE** .
25. Start the engine check for leaks.

INSTALLATION - RIGHT CYLINDER HEAD

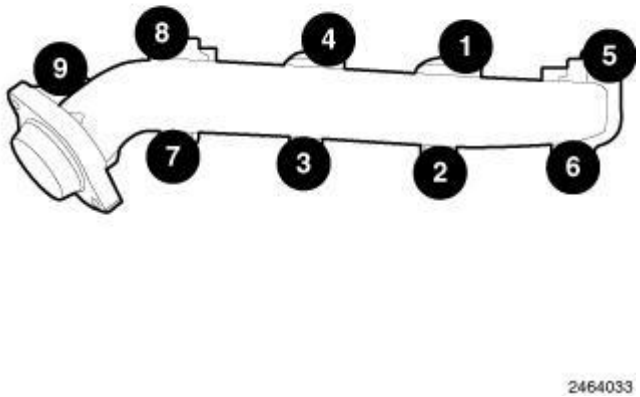


Fig. 82: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER LLC

1. If replacing the cylinder head, transfer the valves, valve seals and valve springs to the new cylinder head. Refer to **VALVES, INTAKE AND EXHAUST, INSTALLATION, 5.7L**. If valve refacing is necessary, refer to **Engine/Cylinder Head/VALVES, Intake and Exhaust - Standard Procedure**.
2. If replacing the cylinder head, transfer the exhaust manifold to the new cylinder head. Using the sequence shown in illustration, tighten the exhaust manifold bolts/studs to 25 N.m (18 ft. lbs.).
3. If replacing the cylinder head, transfer the spark plugs to the new cylinder head. Refer to **SPARK PLUG, INSTALLATION** .

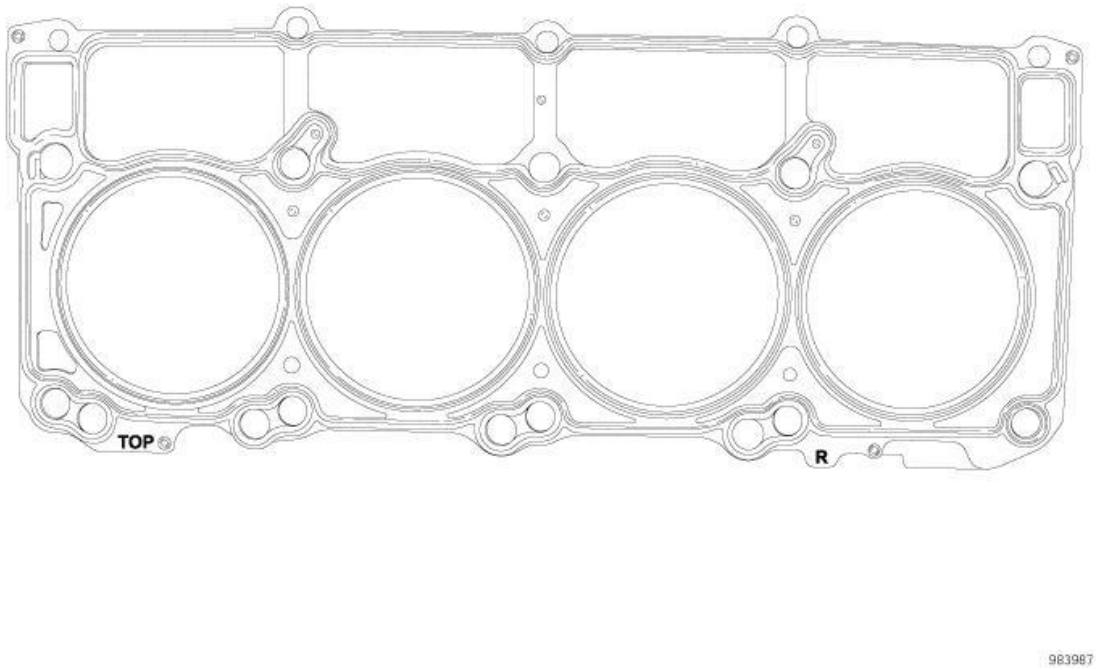


Fig. 83: Cylinder Head Gasket Markings
Courtesy of CHRYSLER LLC

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.

4. Using a suitable solvent, clean all sealing surfaces of the cylinder block and cylinder heads.

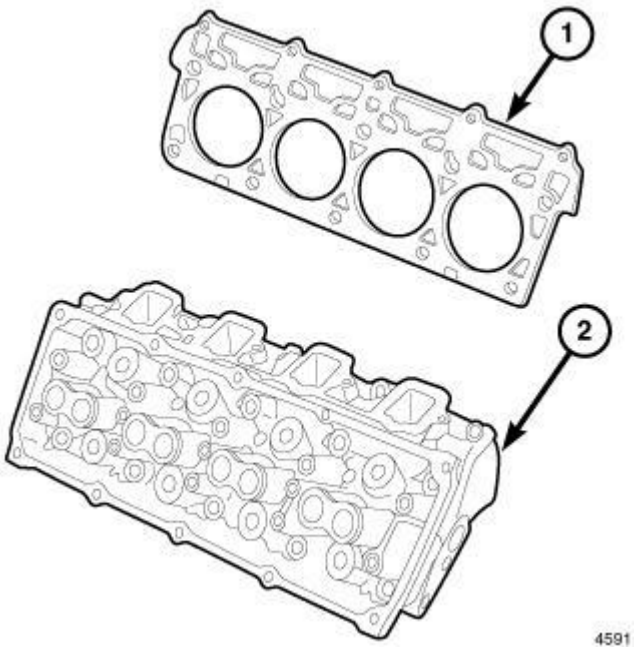


Fig. 84: Cylinder Head & Gasket
Courtesy of CHRYSLER LLC

5. Position the new cylinder head gasket (1) onto the cylinder block.
6. Position the cylinder head (2) onto the cylinder head gasket (1) and cylinder block.

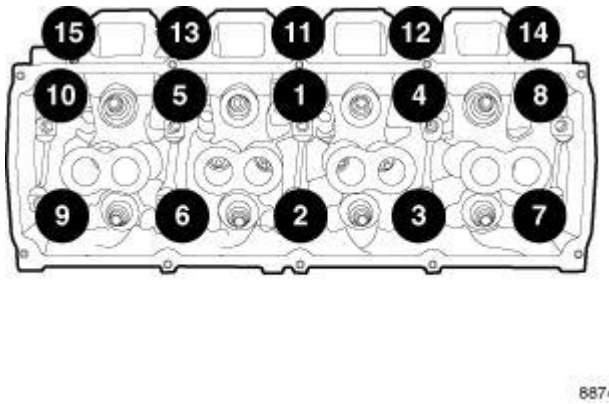


Fig. 85: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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

11. Again, using the sequence shown in illustration, rotate the cylinder head bolts 1 through 10 90°.
12. Again, using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 34 N.m (25 ft. lbs.).

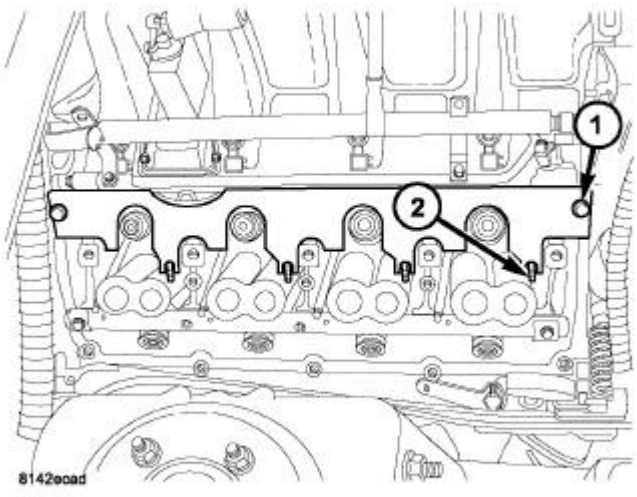


Fig. 86: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

13. Using Pushrod Retainer (special tool #9070, Retainer, Push Rod) (1), install the push rods and rocker arms in their original location as noted during removal. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.

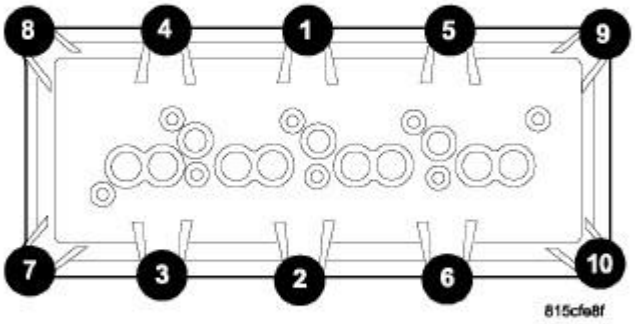


Fig. 87: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

14. Position the engine oil indicator tube, install the retaining nut at the exhaust manifold and tighten to 8 N.m (70 in. lbs.).
15. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

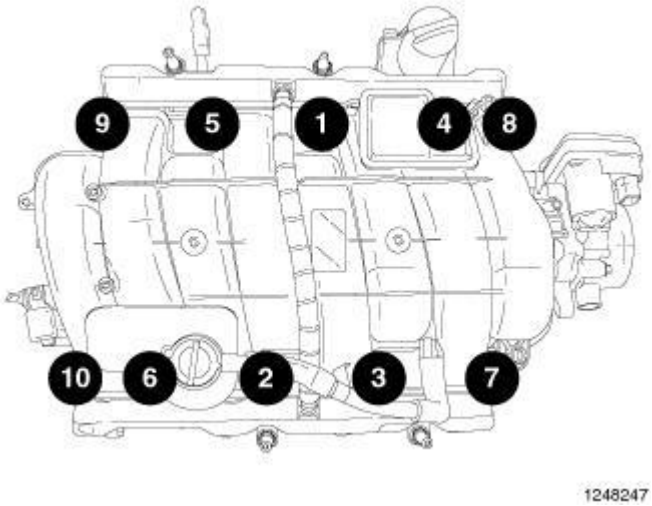


Fig. 88: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

16. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

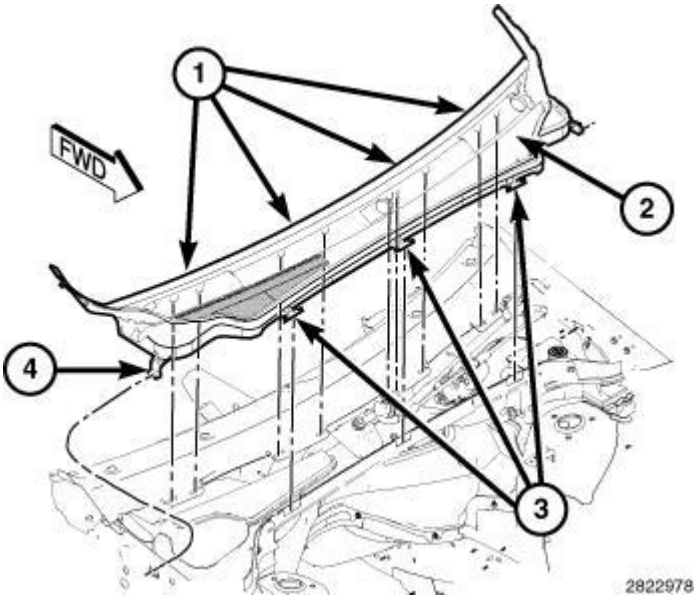


Fig. 89: Cowl Panel Cover & Fasteners
Courtesy of CHRYSLER LLC

17. Install the cowl cover panel. Refer to **COVER, COWL PANEL, INSTALLATION** .
18. Install the air cleaner and resonator assembly. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
19. Fill the cooling system. Refer to **STANDARD PROCEDURE** .

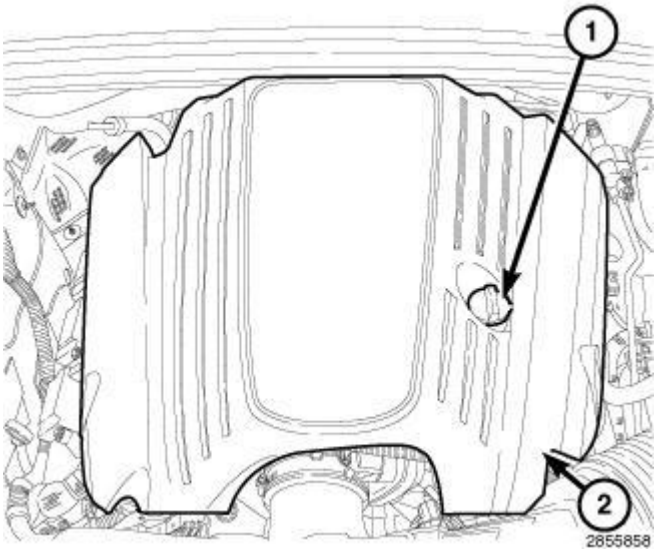


Fig. 90: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

20. Change the engine oil and engine oil filter. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
21. Install the engine cover (2).

22. Install the oil fill cap (1).
23. Connect the negative battery cable.

NOTE: This vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message will need to be reset after changing the engine oil and filter.

24. Reset the "Oil Change Required" indicator system. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, STANDARD PROCEDURE** .
25. Start the engine check for leaks.

COVER(S), CYLINDER HEAD

REMOVAL

REMOVAL

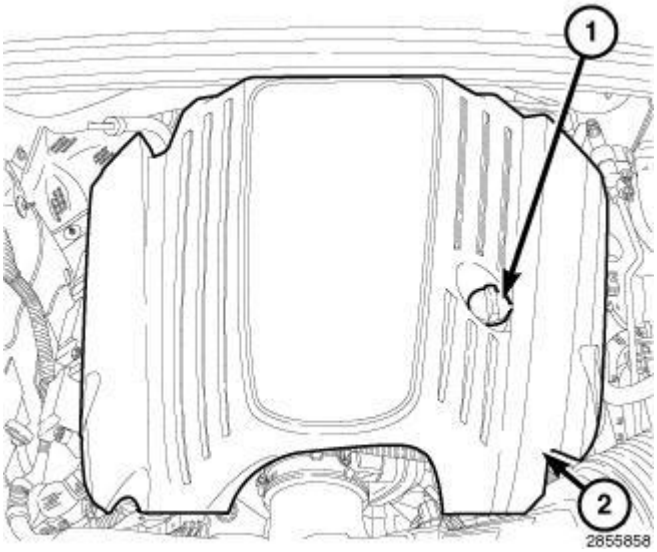


Fig. 91: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Remove the engine cover (2).

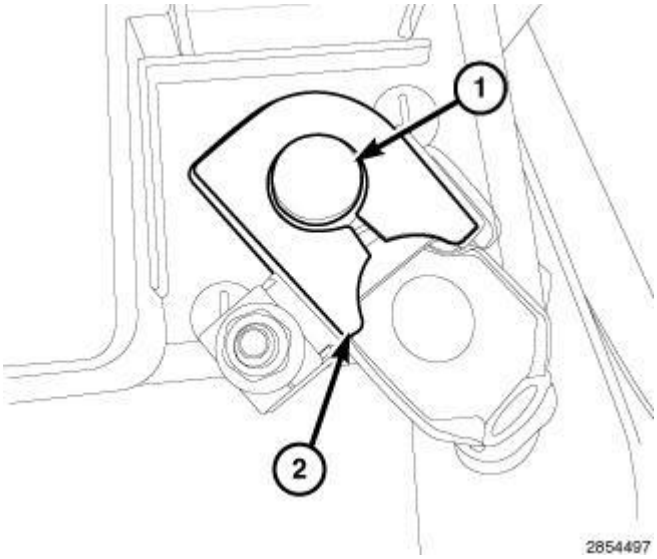


Fig. 92: Negative Battery Cable
Courtesy of CHRYSLER LLC

3. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
4. Disconnect and isolate the negative battery cable (2).

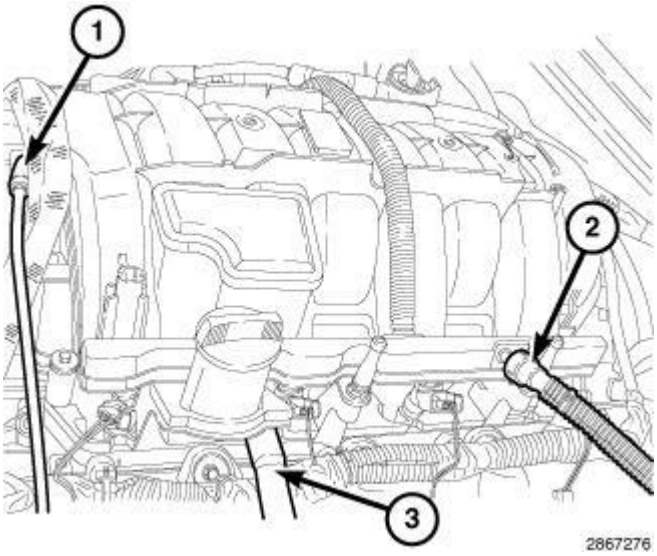


Fig. 93: EVAP Vacuum Line, Fuel Supply Line & Make Up Air Hose
Courtesy of CHRYSLER LLC

5. Disconnect the EVAP vacuum line (1) at the throttle body.
6. Disconnect the fuel supply line (2) at the fuel rail.
7. Disconnect the make up air hose (3) at the intake manifold.

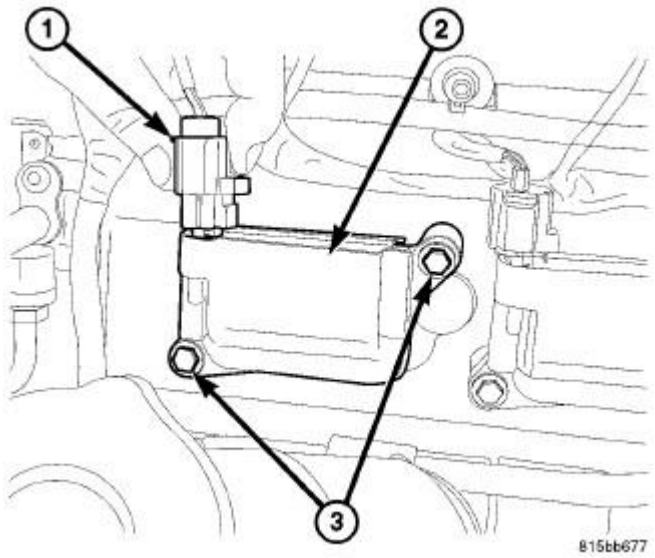


Fig. 94: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

8. Disconnect the ignition coil electrical connectors (1).
9. Remove the ignition coil retaining bolts (3).

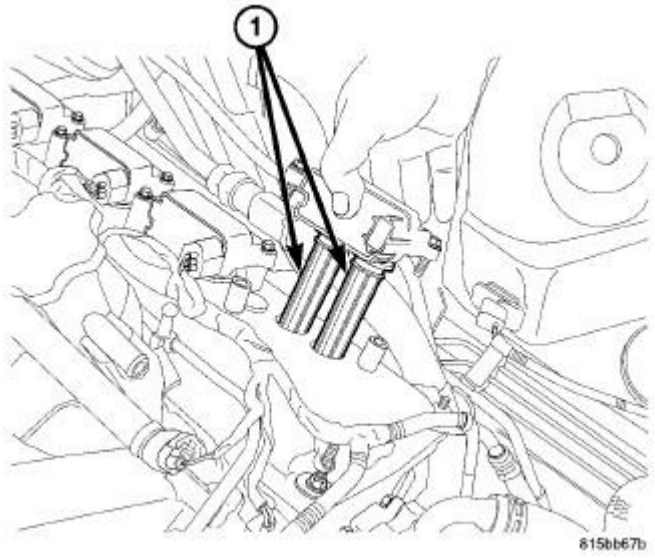


Fig. 95: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

10. Remove the ignition coils (1).
11. Remove the wiring harness retainers at the cylinder head cover and position wiring harness aside.

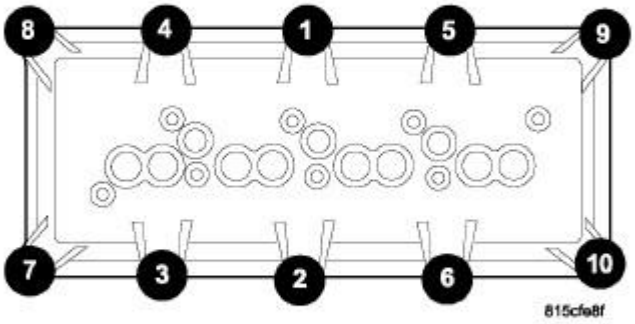


Fig. 96: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

12. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts.

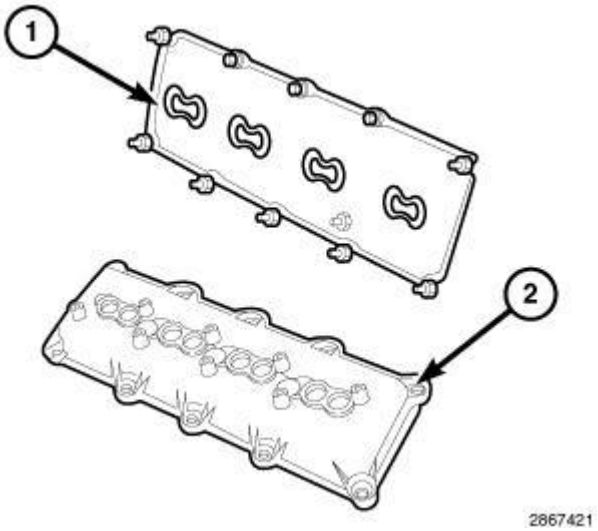


Fig. 97: Cylinder Head Cover Gasket & Cylinder Head Cover
Courtesy of CHRYSLER LLC

13. Remove the cylinder head cover (2).

NOTE: The cylinder head cover gasket (1) may be used again, provided no cuts, tears, or deformation have occurred.

14. Inspect the cylinder head cover gasket (1), replace if necessary.

INSTALLATION

INSTALLATION

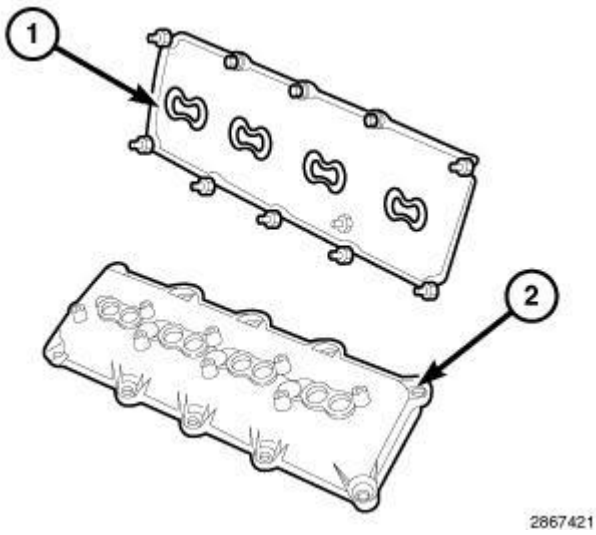


Fig. 98: Cylinder Head Cover Gasket & Cylinder Head Cover
Courtesy of CHRYSLER LLC

NOTE: The cylinder head cover gasket (1) may be used again, provided no cuts, tears, or deformation have occurred.

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

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

2. Clean the cylinder head cover (2) and the cylinder head sealing surface.
3. Apply Mopar® Lock & Seal Adhesive to the cylinder head cover bolts.
4. Position the cylinder head cover and hand tighten the bolts.

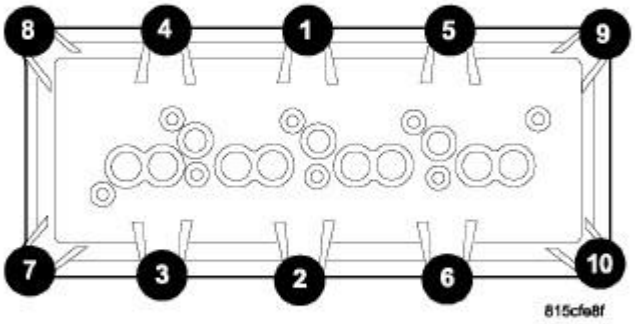


Fig. 99: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

5. Using the sequence shown in illustration, tighten the cylinder head cover bolts to 8 N.m (70 in. lbs.).

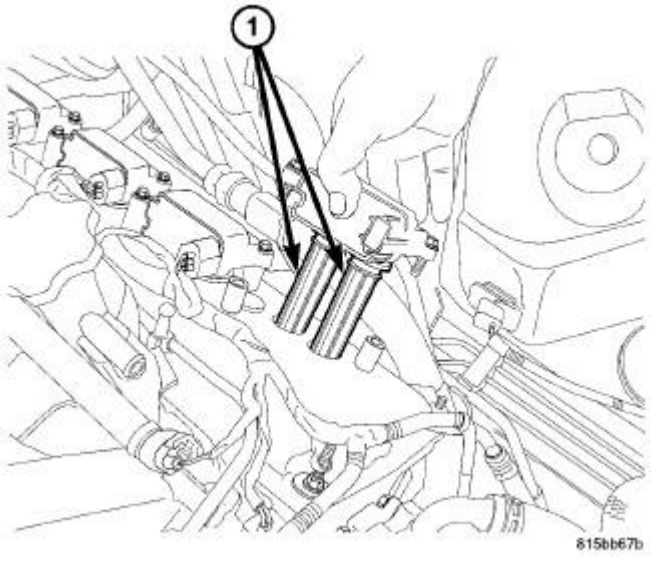


Fig. 100: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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.

6. Position the wiring harness and attach the retainers to the cylinder head cover.
7. Before installing the ignition coils, apply dielectric grease to the inside of the spark plug boots (1).
8. Install the ignition coils (1).

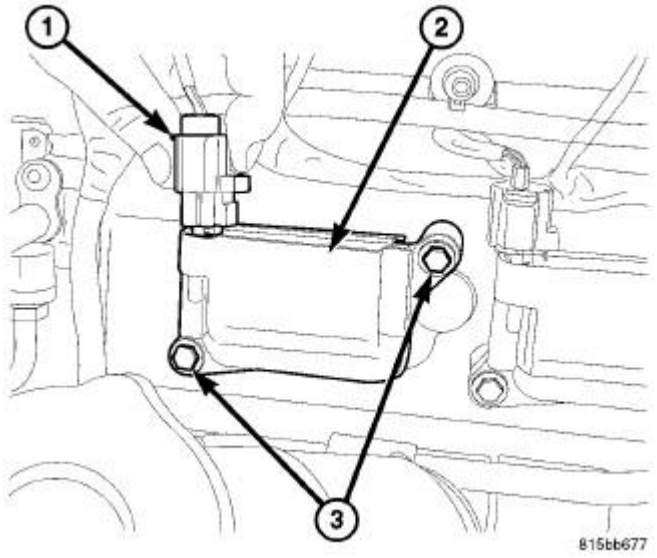


Fig. 101: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

9. Install the ignition coil retaining bolts (3) and tighten to 7 N.m (62 in. lbs.).
10. Connect the ignition coil electrical connectors (1).

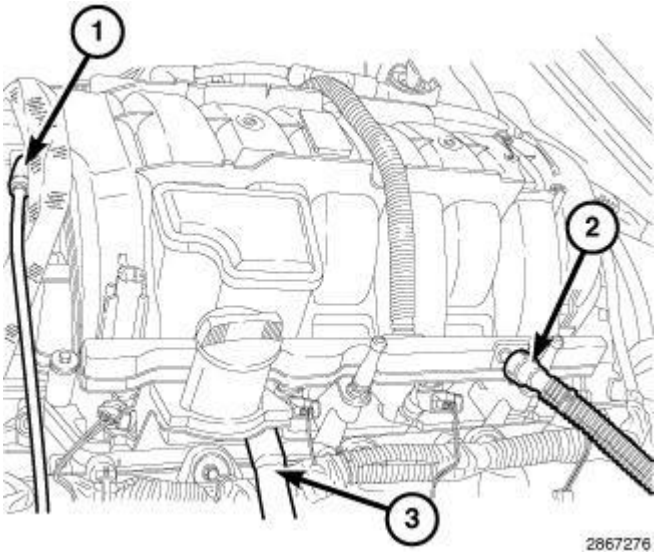


Fig. 102: EVAP Vacuum Line, Fuel Supply Line & Make Up Air Hose
Courtesy of CHRYSLER LLC

11. Connect the make up air hose (3) to the intake manifold.

12. Connect the fuel supply line (2) to the fuel rail.
13. Connect the EVAP vacuum line (1) to the throttle body.

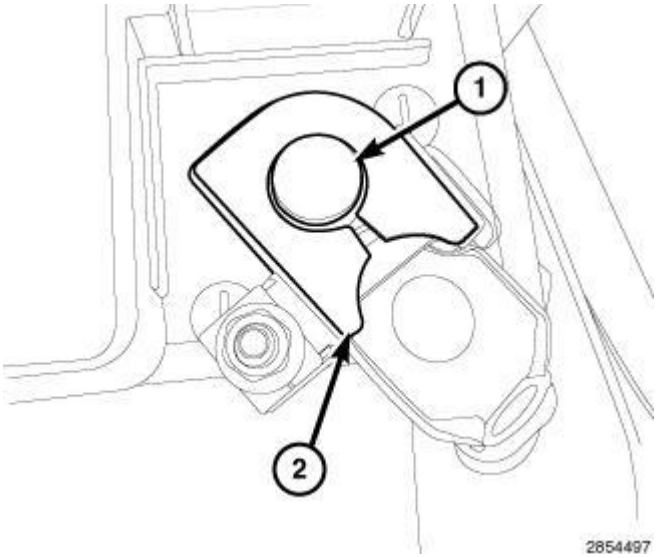


Fig. 103: Negative Battery Cable
Courtesy of CHRYSLER LLC

14. Connect the negative battery cable (2).

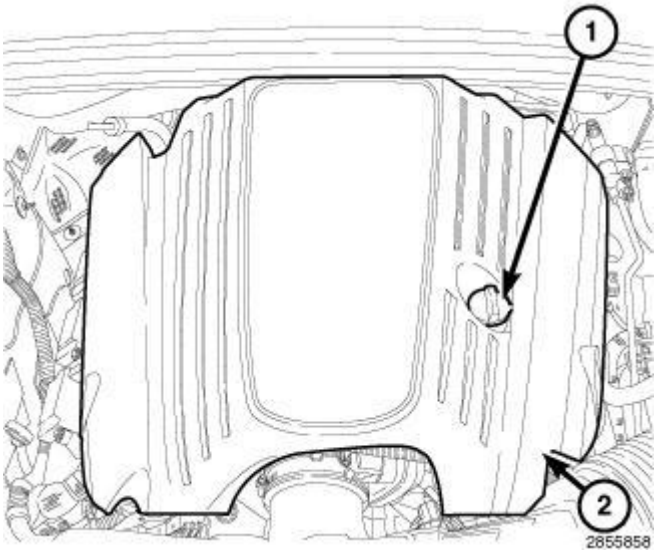


Fig. 104: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

15. Install the engine cover (2).
16. Install the oil fill cap (1).
17. Start the engine and check for leaks.

ROCKER ARM, VALVE

REMOVAL

REMOVAL

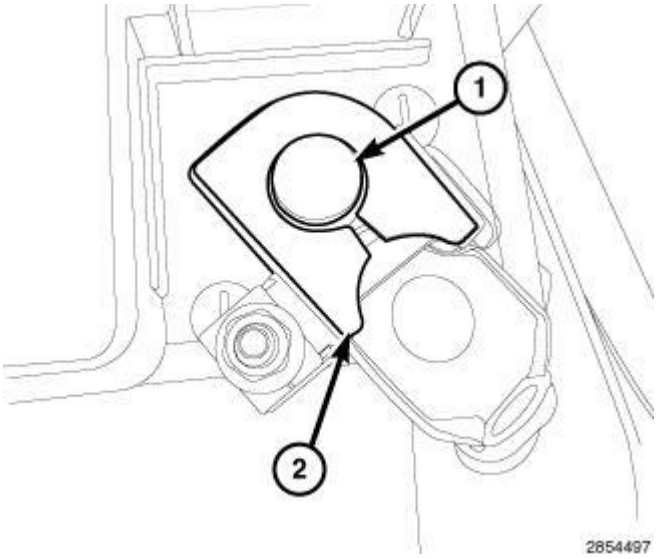


Fig. 105: Negative Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable (2).

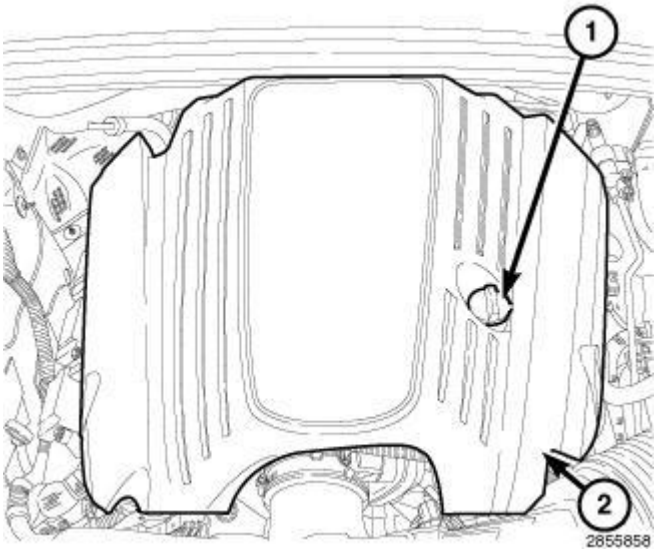


Fig. 106: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

2. Remove the oil fill cap (1).
3. Remove the engine cover (2).

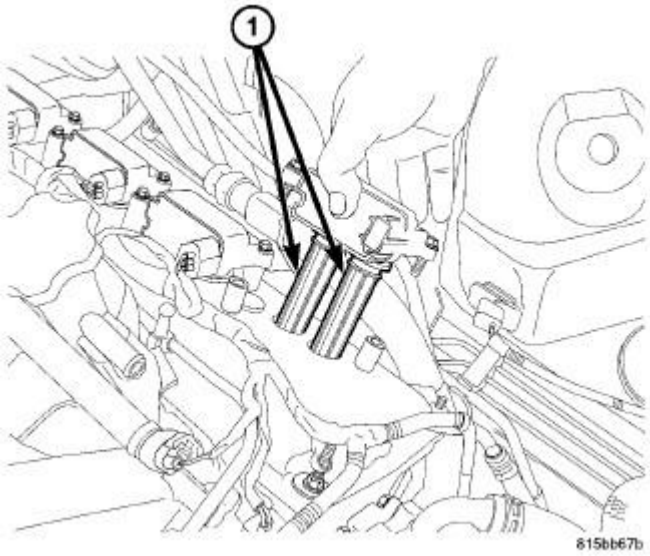


Fig. 107: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

4. Remove the ignition coils (1). Refer to **COIL, IGNITION, REMOVAL** .

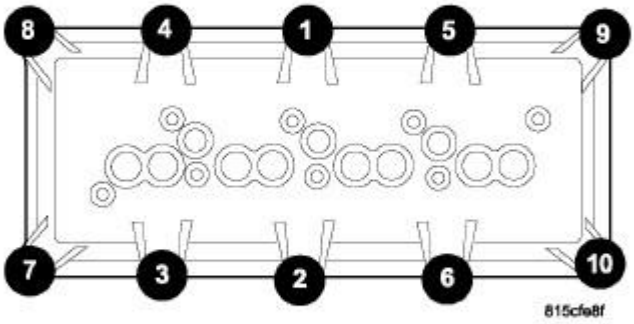


Fig. 108: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

5. Using the sequence shown in illustration, remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

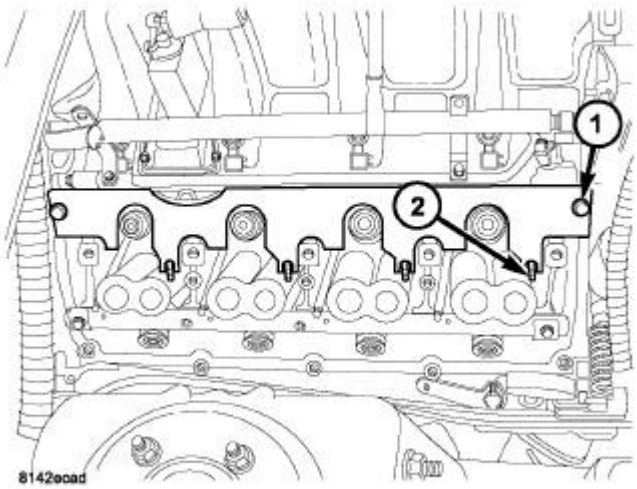


Fig. 109: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

6. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

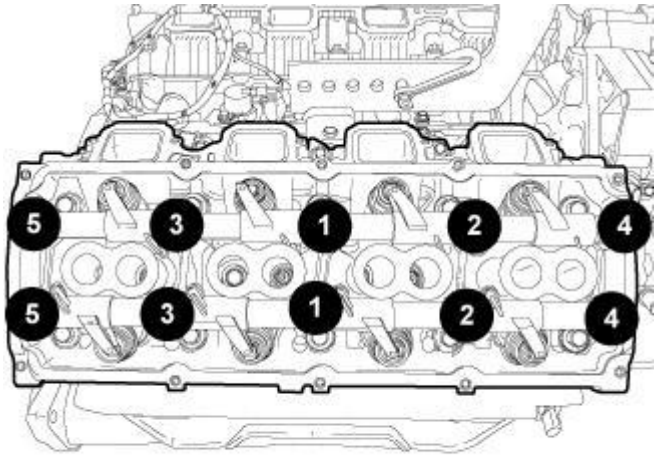


Fig. 110: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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

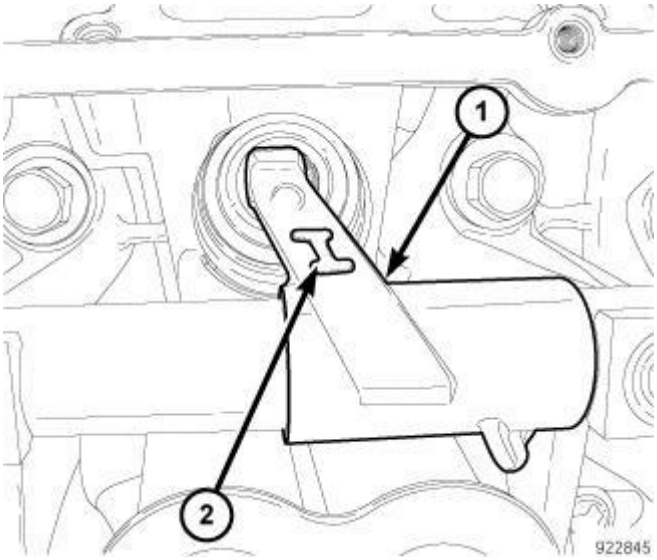


Fig. 111: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

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).

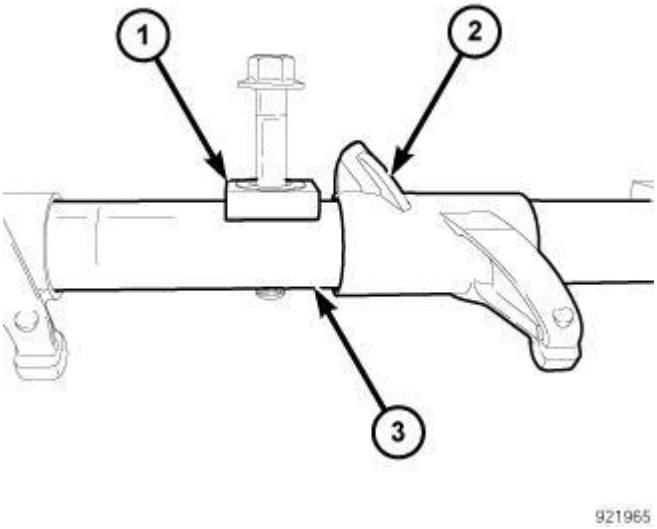


Fig. 112: Retainers, Rocker Arm & Rocker Shaft
Courtesy of CHRYSLER LLC

NOTE: The rocker arms and push rods must be installed in their original location as removed.

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

8. Remove the rocker shaft (3). Note the rocker arms and rocker shafts location to ensure installation in their original locations as removed.

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

9. Remove the pushrods. Note the pushrods location to ensure installation in their original locations as removed.

INSTALLATION

INSTALLATION

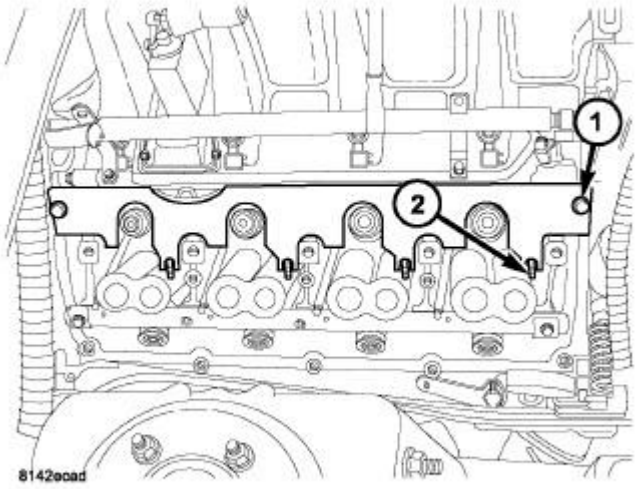


Fig. 113: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

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 noted during removal.
2. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

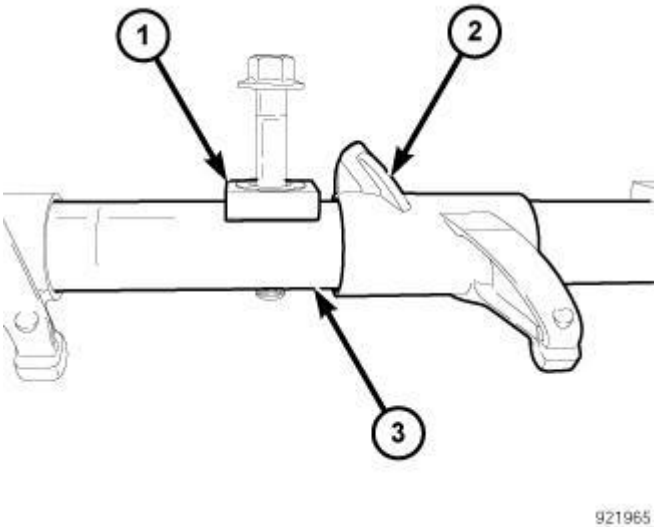


Fig. 114: Retainers, Rocker Arm & Rocker Shaft
Courtesy of CHRYSLER LLC

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

CAUTION: Verify the pushrod(s) are installed into the rocker arm(s) (2) and the tappet(s) correctly while installing the rocker shaft assembly (3) or engine damage could result. Recheck after the rocker shaft assembly has been tightened to specification.

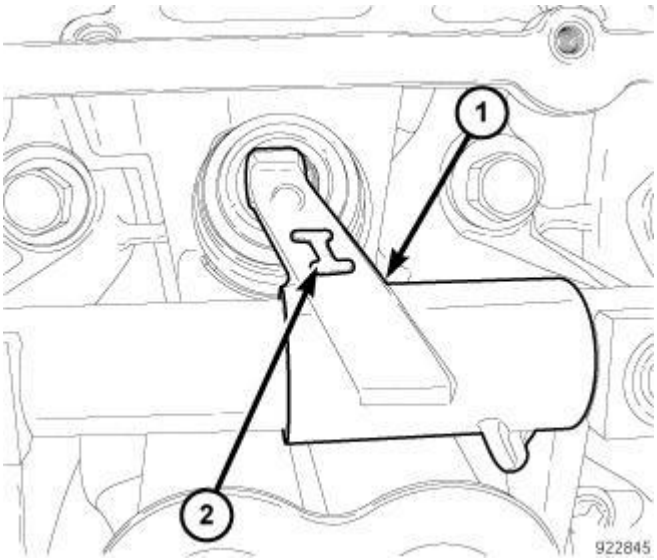


Fig. 115: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

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).

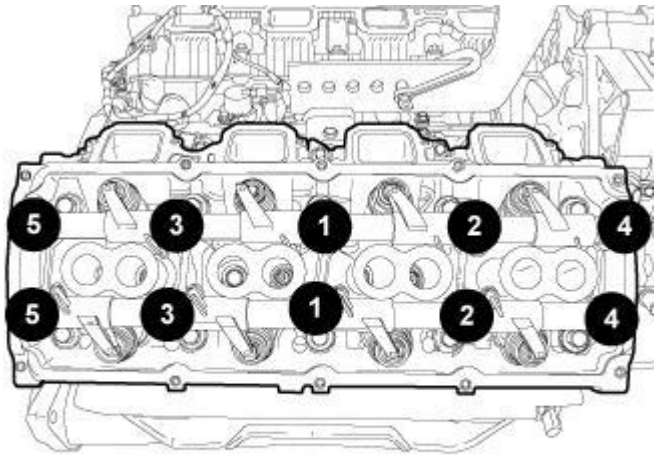


Fig. 116: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

3. Install the rocker shaft assemblies in the same location as noted during removal.
4. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

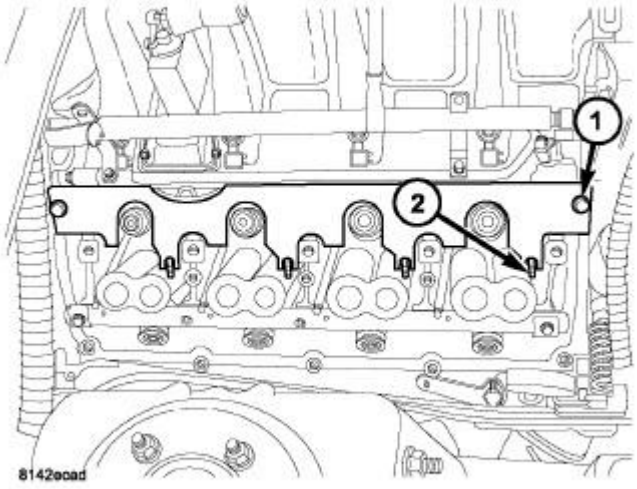


Fig. 117: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

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).

5. Remove pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

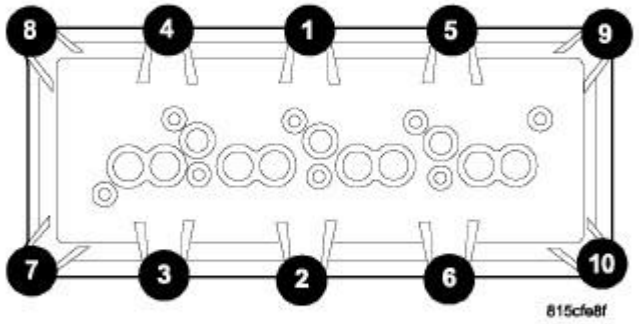


Fig. 118: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

6. Using the sequence shown in illustration, install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

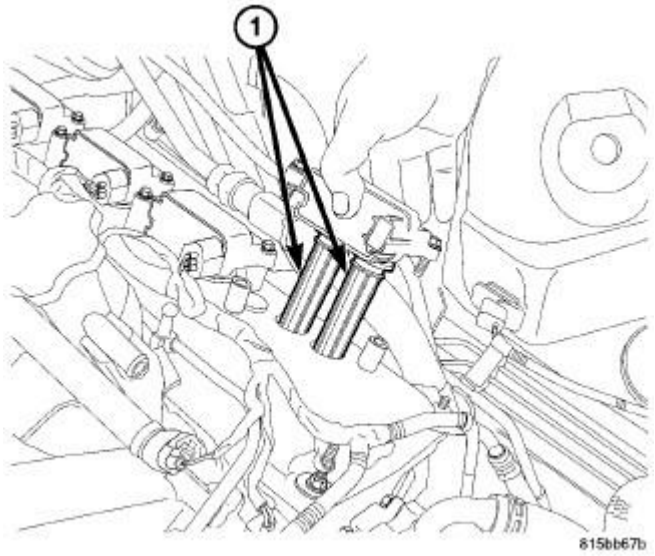


Fig. 119: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

7. Install the ignition coils (1). Refer to **COIL, IGNITION, REMOVAL** .

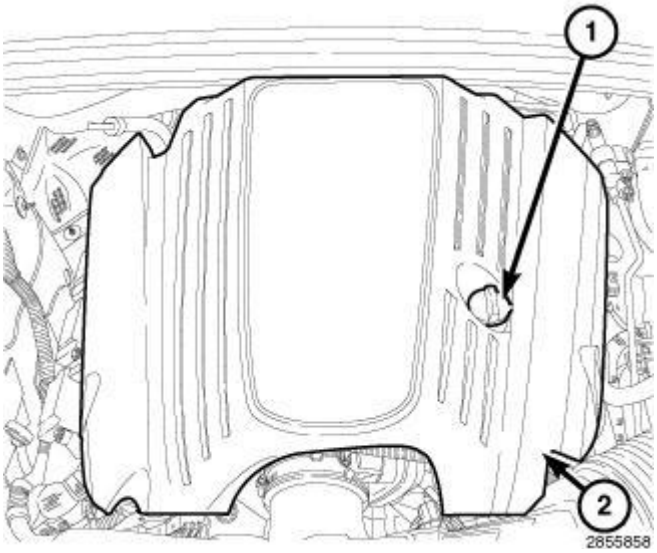


Fig. 120: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

8. Install the engine cover (2).
9. Install the oil fill cap (1).

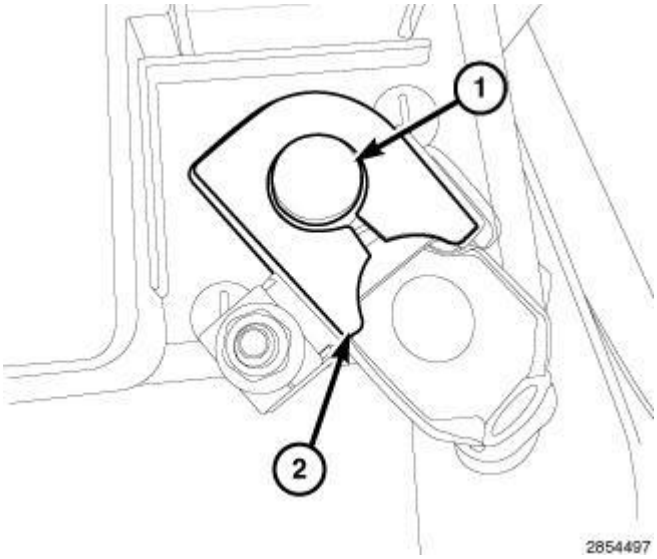


Fig. 121: Negative Battery Cable
Courtesy of CHRYSLER LLC

10. Connect the negative battery cable (2).

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

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

REMOVAL

REMOVAL

The valve stem seal is integral with the valve spring seat, for removal. Refer to **SPRING(S), VALVE, REMOVAL, 5.7L**.

INSTALLATION

INSTALLATION

The valve stem seal is integral with the valve spring seat, for installation. Refer to **SPRING(S), VALVE, INSTALLATION, 5.7L**.

SPRING(S), VALVE

REMOVAL

REMOVAL

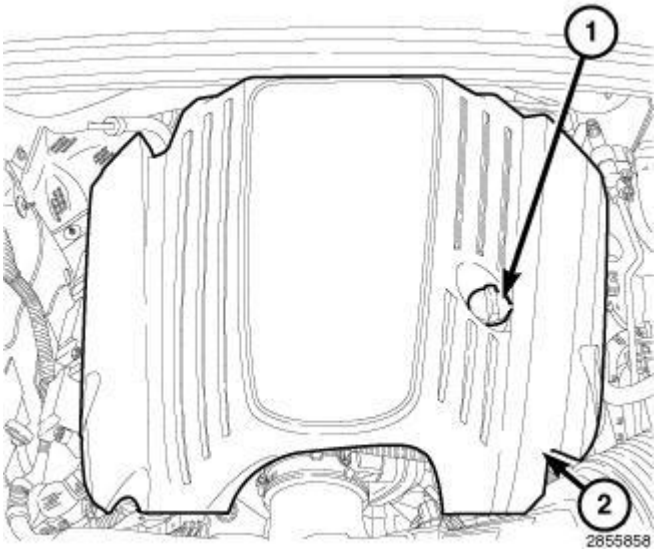


Fig. 122: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the oil fill cap (1).
3. Lift and separate the engine cover retaining grommets from the ball studs and remove the engine cover (2).

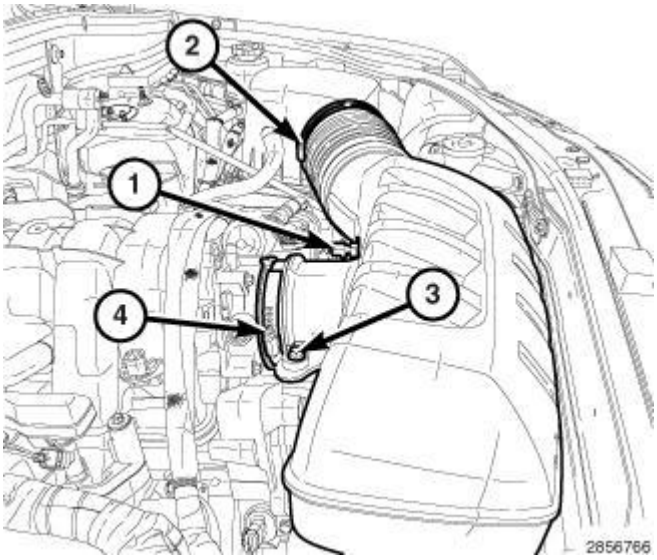


Fig. 123: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

4. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
5. Loosen the clean air hose clamp at the air cleaner housing (2).
6. Remove the resonator retaining bolt (3).

7. Loosen the resonator hose clamp at the throttle body (4) and remove the resonator.

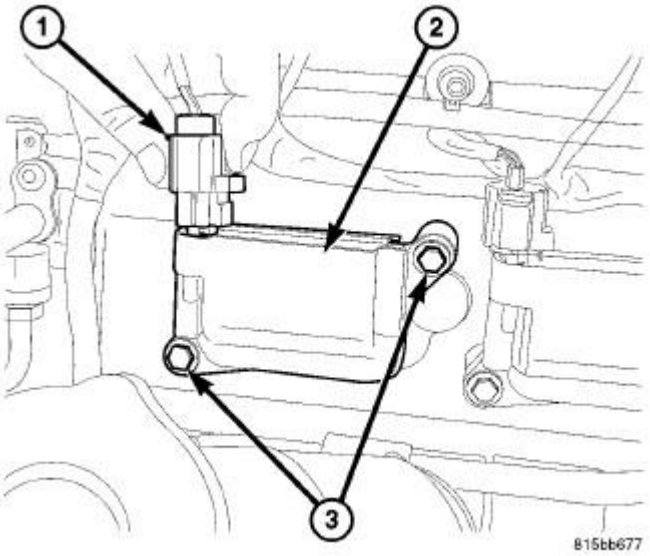


Fig. 124: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

8. Remove the ignition coil electrical connectors (1).
9. Remove the ignition coils (2).
10. Remove one spark plug.

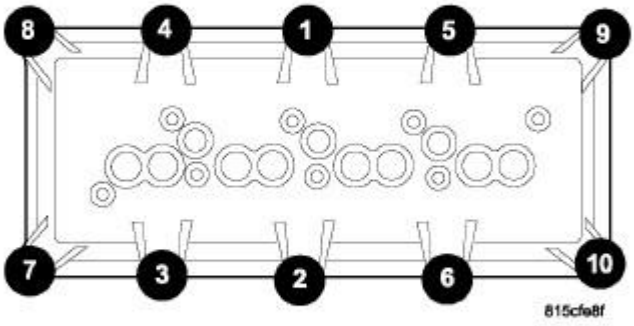


Fig. 125: Cylinder Head Cover Removal/Tightening Sequence

Courtesy of CHRYSLER LLC

11. Using the sequence shown in illustration, remove the cylinder head cover bolts and remove the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

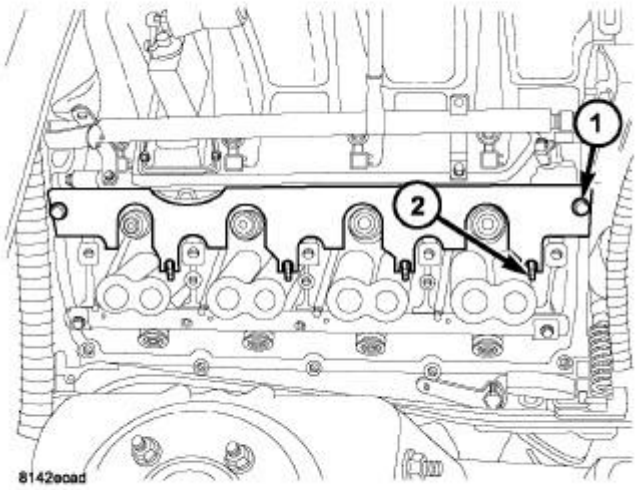


Fig. 126: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

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

NOTE: The intake push rods can fall into the engine and become lodged in the oil pan, if removing intake rocker arm shaft, install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1) to retain the intake push rods (2).

12. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1) on the cylinder head.
13. Clip the pushrods (2) into the pushrod retainer (1).

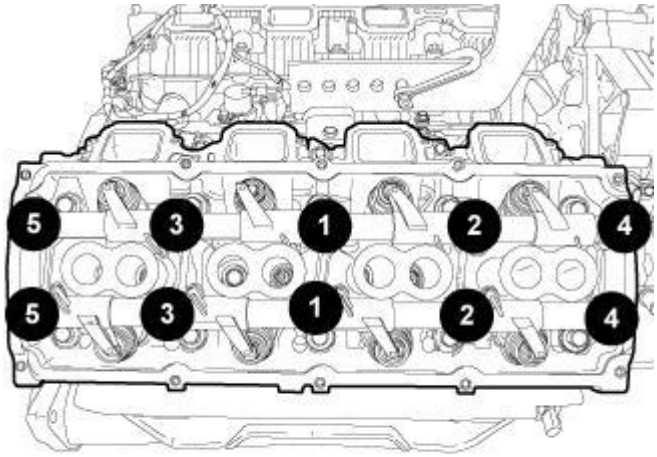


Fig. 127: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

14. Using the sequence shown in illustration, remove the rocker arm shaft bolts and remove the rocker arm shaft.

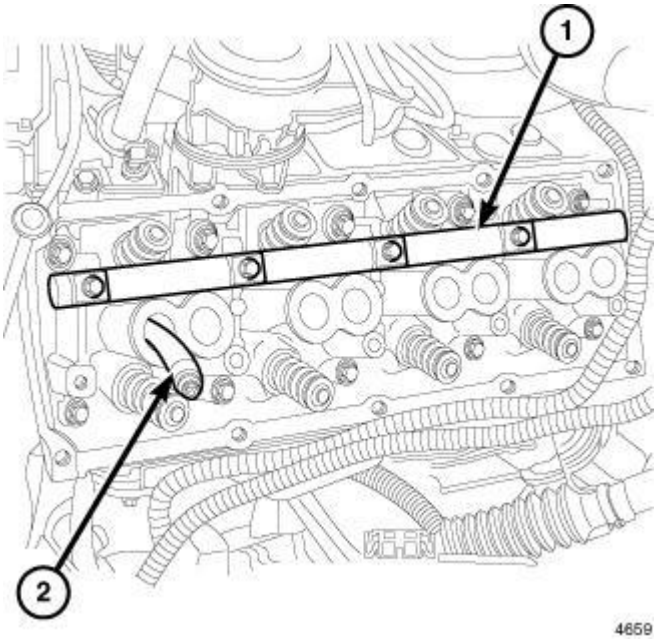


Fig. 128: Rocker Arm Shaft Adapter & Air Hose
Courtesy of CHRYSLER LLC

15. Install the rocker arm shaft adapter (special tool #9065B, Compressor, Valve Spring) (1).
16. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

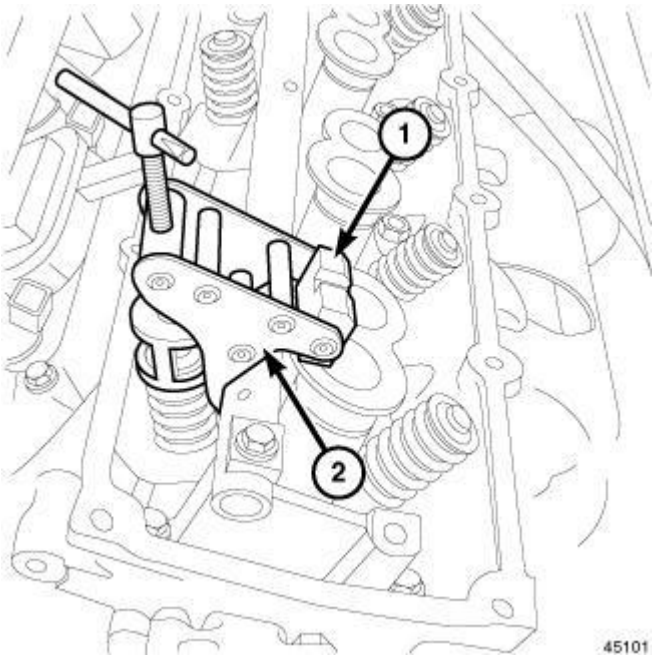


Fig. 129: Intake Valve Spring Removal/Installation
Courtesy of CHRYSLER LLC

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

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

17. Install Valve Spring Compressor (special tool #9065B, Compressor, Valve Spring) (1) and remove the intake valve retainer locks.
18. Release the valve spring compressor and remove the valve springs.

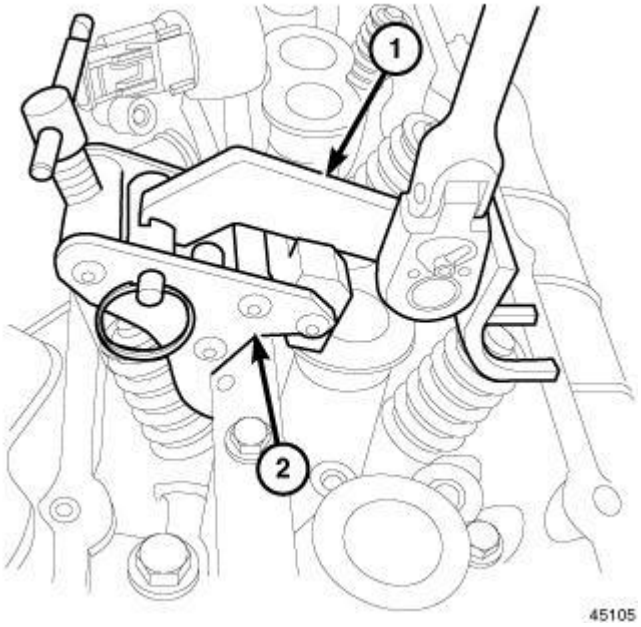


Fig. 130: Valve Spring Tool Adapter
Courtesy of CHRYSLER LLC

19. Install Valve Spring Compressor (special tool #9065B, Compressor, Valve Spring) (2) and the rocker arm Adapter (special tool #9065B, Compressor, Valve Spring) (1) and remove the exhaust valve retainer locks.
20. Release the valve spring compressor and remove the valve spring.

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

21. Remove the valve seal.

INSTALLATION

INSTALLATION

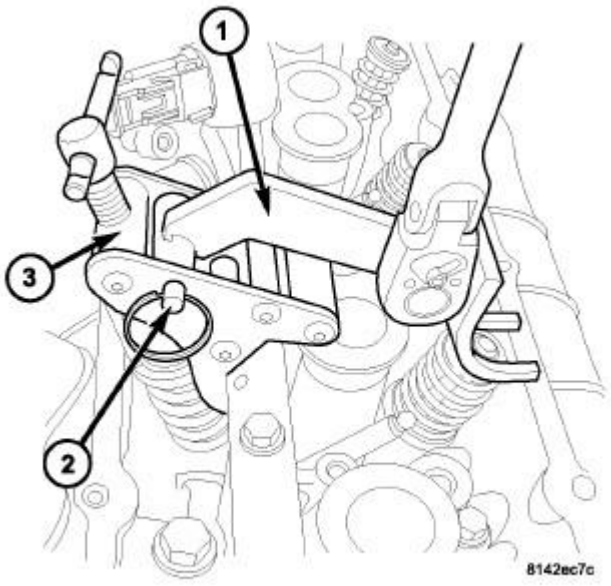


Fig. 131: Valve Spring Tool Adapter
Courtesy of CHRYSLER LLC

NOTE: The intake seal has a smaller spring seat diameter compared to the exhaust seal.

1. Install the valve seal.

NOTE: The intake spring damper has a longer free length compared to the exhaust spring damper.

2. Install the valve spring.
3. Using the valve spring compressor (special tool #9065B, Compressor, Valve Spring) (1, 3), compress the valve spring and install the valve spring retainer locks.

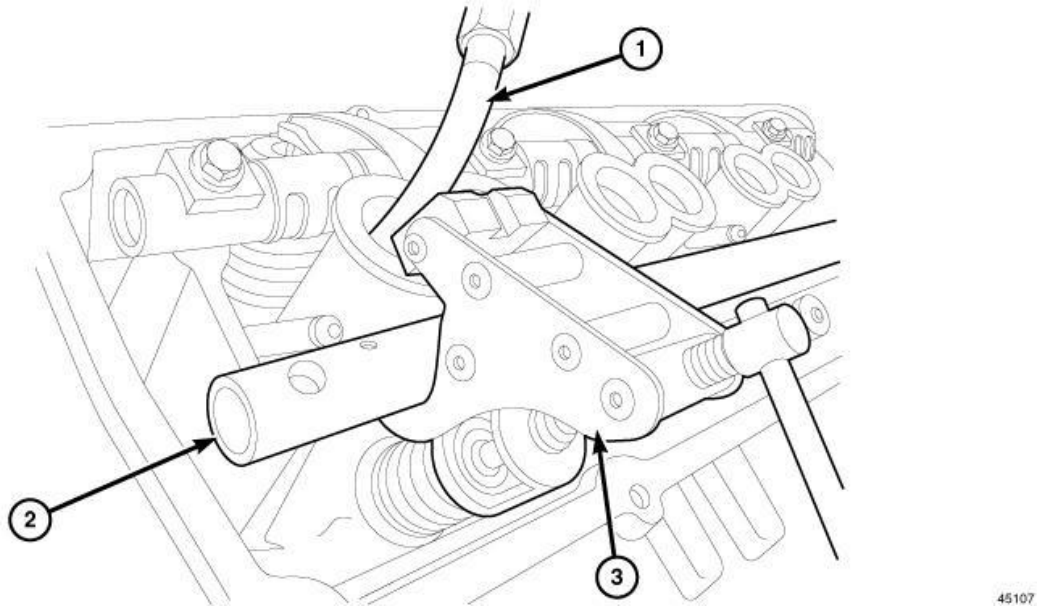


Fig. 132: Valve Spring Removal Tools
Courtesy of CHRYSLER LLC

4. Release the air charge (1) in the cylinder.
5. Remove the valve spring compressor (special tool #9065B, Compressor, Valve Spring) (3).

CAUTION: Verify that the pushrods are fully seated into the lifters and the rocker arms. Recheck after rocker arm shaft has been torqued to specification.

6. Install the rocker arm shaft and push rods. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.

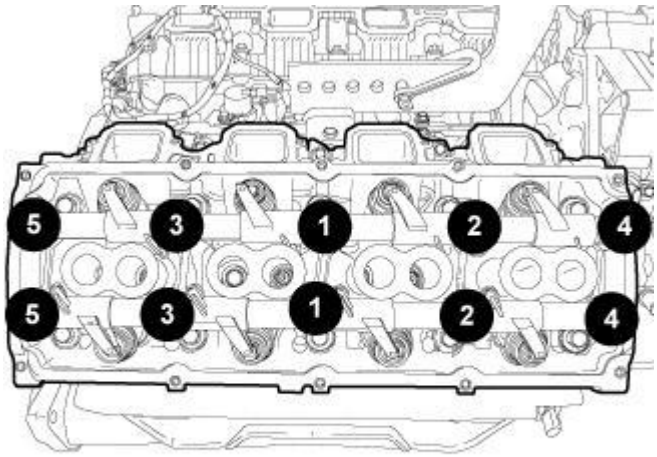


Fig. 133: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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

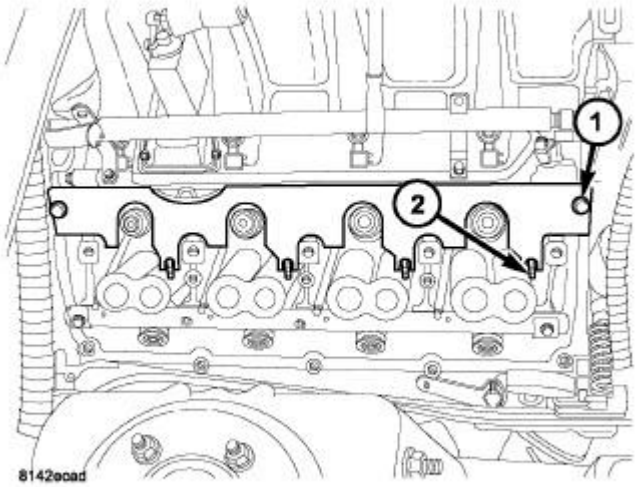


Fig. 134: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

8. Remove the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

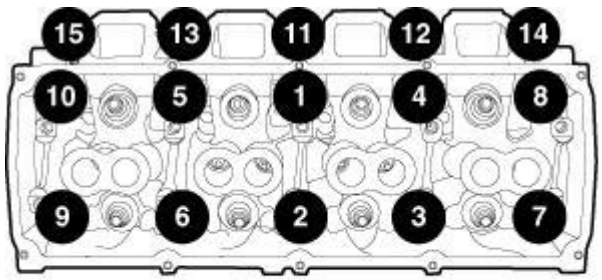


Fig. 135: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

9. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.

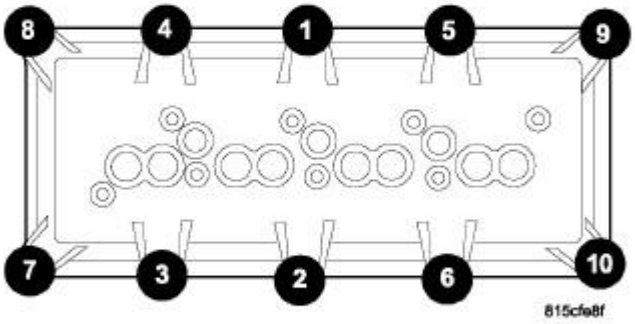


Fig. 136: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

10. Using the sequence shown in illustration, install the cylinder head cover bolts and tighten to 8 N.m (71 in. lbs.). Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.
11. Install the spark plug.

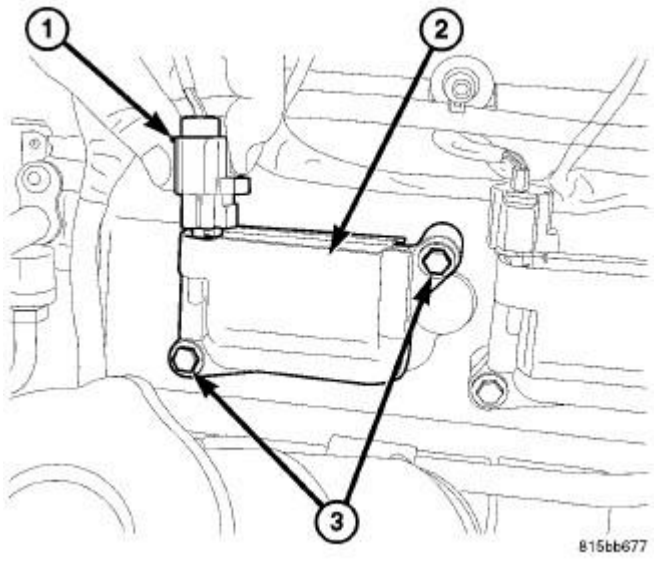


Fig. 137: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

12. Install the ignition coil (2) and tighten fasteners (3) to 12 N.m (9 ft. lbs.).

13. Connect the ignition coil electrical connectors (1).

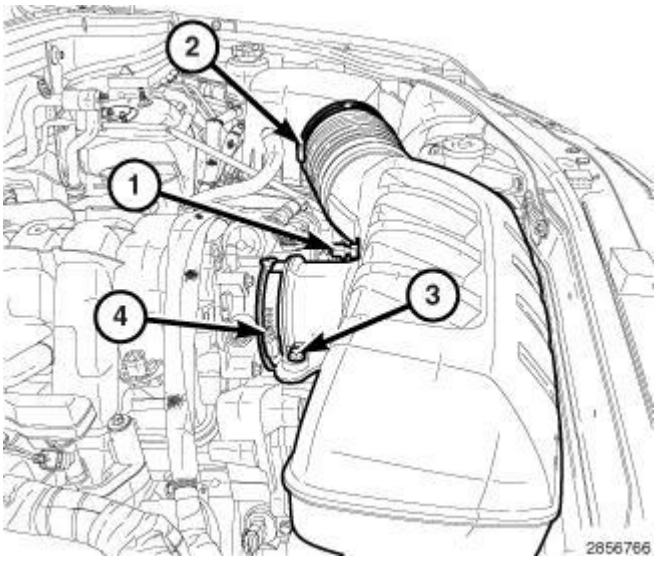


Fig. 138: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

14. Connect the resonator hose at the throttle body and tighten clamp (4) to 5 N.m (44 in. lbs.).
15. Install the resonator retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
16. Connect the clean air hose at the air cleaner housing and tighten clamp (2) to 5 N.m (44 in. lbs.).
17. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (1).

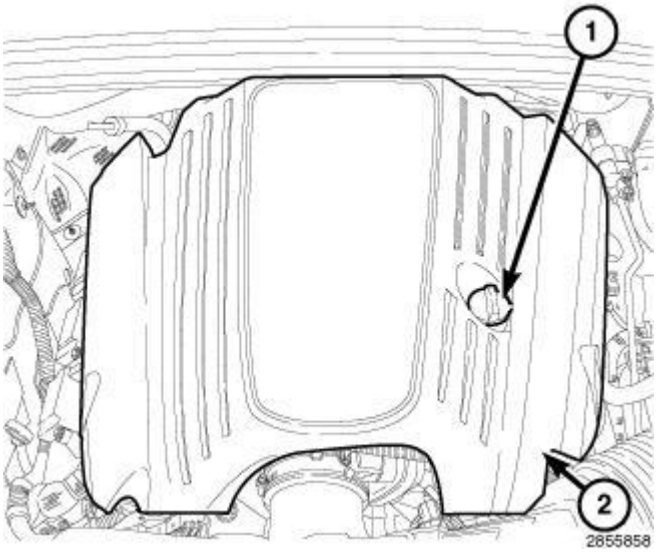


Fig. 139: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

18. Position the engine cover (2) and secure the retaining grommets to the ball studs.

19. Install the oil fill cap (1).
20. 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

STANDARD PROCEDURE - REFACING

VALVE FACE AND VALVE SEAT ANGLE CHART

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Seat Width		
Intake	1.18 - 1.62 mm	0.0464 - 0.0637 in.
Exhaust	1.48 - 1.92 mm	0.058 - 0.075 in.
Face Angle	45° - 45 1/2 °	
Seat Angle	44 1/2 ° - 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 44 1/2 ° - 45°.
6. The valve face must maintain a face angle of 45° - 45 1/2 °.

REMOVAL

REMOVAL

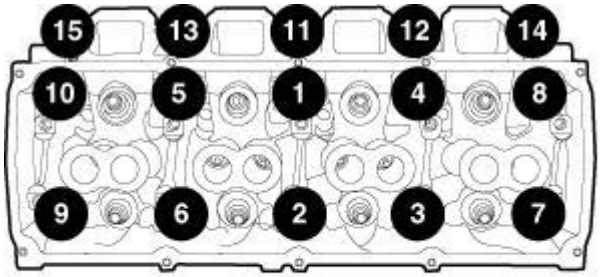


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Fig. 140: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

1. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.

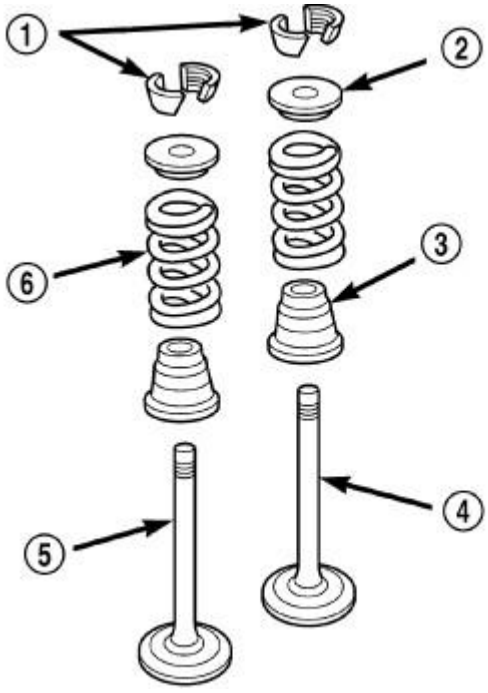

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Fig. 141: Valve Assembly Configuration
Courtesy of CHRYSLER LLC

2. Compress the valve springs using the valve spring compressor (special tool #C-3422-D, Compressor, Valve Spring) and adapter (special tool #8464, Adapter, Valve Spring).
3. Remove the valve retaining locks (1), valve spring retainers (2), valve stem seals (3) and valve springs (6).
4. Before removing the valves (4, 5), remove any burrs from the valve stem lock grooves to prevent damage to the valve guides. Identify the valves to ensure installation in original location.

INSTALLATION

INSTALLATION

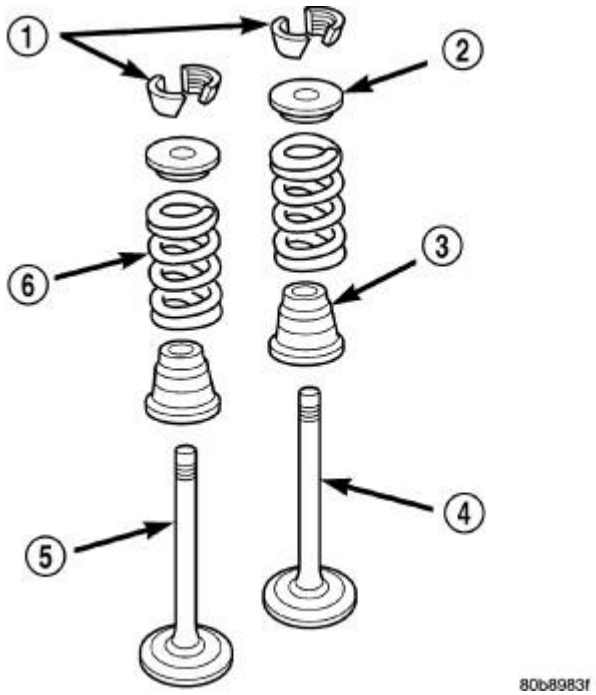

Fig. 142: Valve Assembly Configuration
Courtesy of CHRYSLER LLC

1. Clean the valves thoroughly. Discard burned, warped, and cracked valves.
2. Remove carbon and varnish deposits from inside the valve guides with a reliable guide cleaner.
3. Measure the valve stems for wear. If wear exceeds 0.051 mm (0.002 inch), replace the valve.
4. Coat the valve stems with clean engine oil and insert them into the cylinder head.
5. If the valves or seats are reground, check valve stem height. If the valve is too long, replace the cylinder head.
6. Install new seals (3) on all valve guides. Install the valve springs (6) and valve retainers (2).

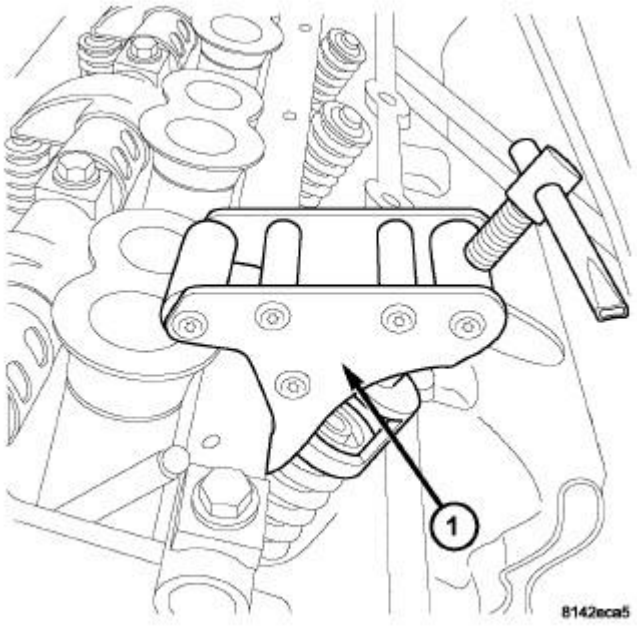

Fig. 143: Valve Spring Remove/Install
Courtesy of CHRYSLER LLC

7. Compress the valve springs with the valve spring compressor (special tool #C-3422-D, Compressor, Valve Spring) (1) and adapter (special tool #8464, Adapter, Valve Spring), install the locks and release the tool. If the valves and/or seats are ground, measure the installed height of the springs. Make sure the measurement is taken from the bottom of spring seat in the cylinder head to the bottom surface of spring retainer.

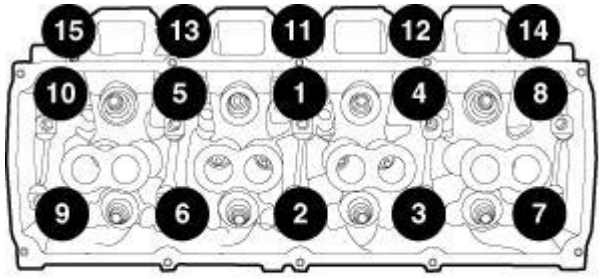

Fig. 144: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

8. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.

ENGINE BLOCK

STANDARD PROCEDURE

MEASURING BEARING CLEARANCE USING PLASTIGAGE

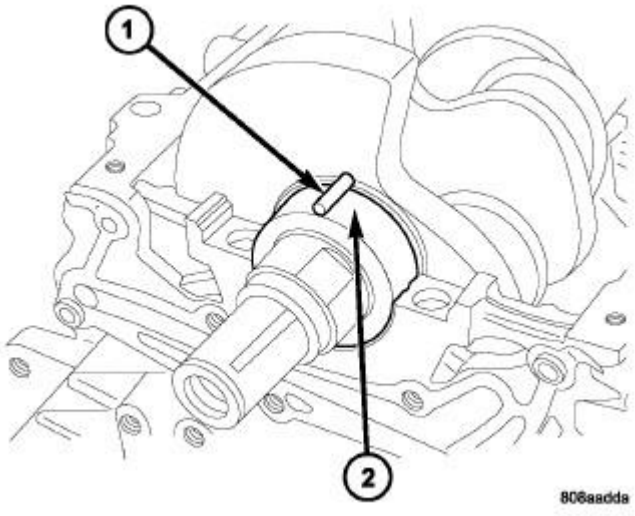

Fig. 145: Plastigage Placed In Lower Shell
Courtesy of CHRYSLER LLC

NOTE: Typical crankshaft journal shown in illustration.

Engine crankshaft and connecting rod bearing clearances can be determined by the use of Plastigage or equivalent. The following is the recommended procedure for the use of Plastigage:

1. Remove the oil film from surface to be checked. Plastigage is soluble in oil.
2. Place a piece of Plastigage (1) across the entire width of the journal (In addition, suspected areas can be checked by placing the Plastigage in the suspected area). Plastigage must not crumble in use. If brittle, obtain fresh stock.
3. Torque the bearing cap bolts of the bearing being checked to the proper specifications. Refer to **Engine - Specifications**.

NOTE: DO NOT rotate the crankshaft. Plastigage will smear, causing inaccurate results.

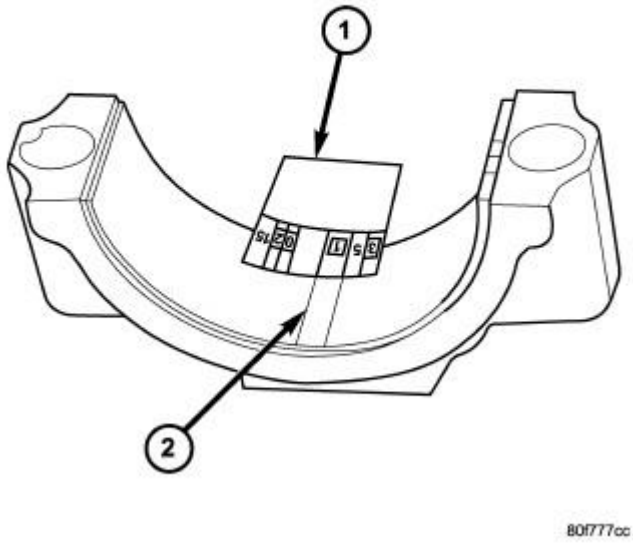

Fig. 146: Measuring Bearing Clearance With Plastigage
Courtesy of CHRYSLER LLC

NOTE: Typical connecting rod cap shown in illustration.

4. Remove the bearing cap and compare the width of the flattened Plastigage (2) with the scale provided on the package (1). Locate the band closest to the same width. This band shows the amount of clearance. Differences in readings between the ends indicate the amount of taper present or the possibility of foreign material trapped under the bearing insert.
5. Record all readings taken. Compare clearance measurements to specifications found in engine specifications. Refer to **Engine - Specifications**.

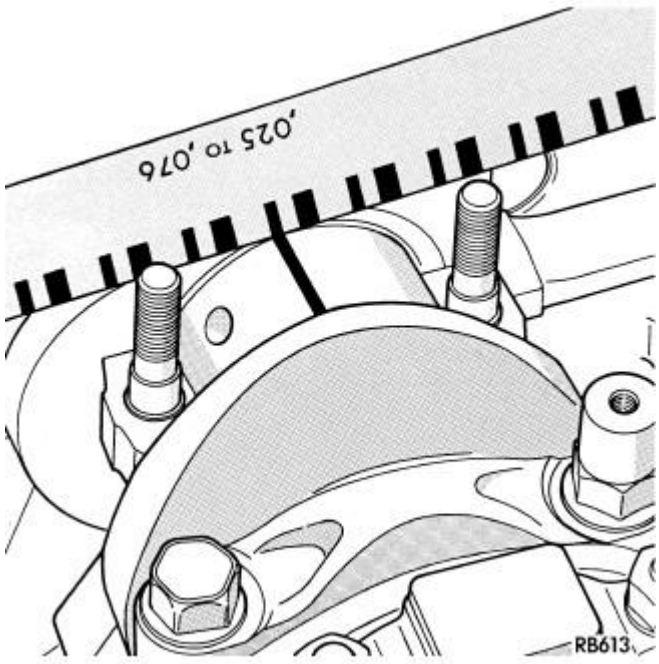

Fig. 147: Checking Connecting Rod Bearing Clearance With Plastigage
Courtesy of CHRYSLER LLC

NOTE: Typical connecting rod journal shown in illustration.

NOTE: Plastigage is available in a variety of clearance ranges. Use the most appropriate range for the specifications you are checking. Plastigage generally is accompanied by two scales. One scale is in inches, the other is a metric scale.

6. Install the proper bearings to achieve the specified bearing clearances.
7. Repeat the Plastigage measurement to verify your bearing selection prior to final assembly.

CYLINDER BORE HONING

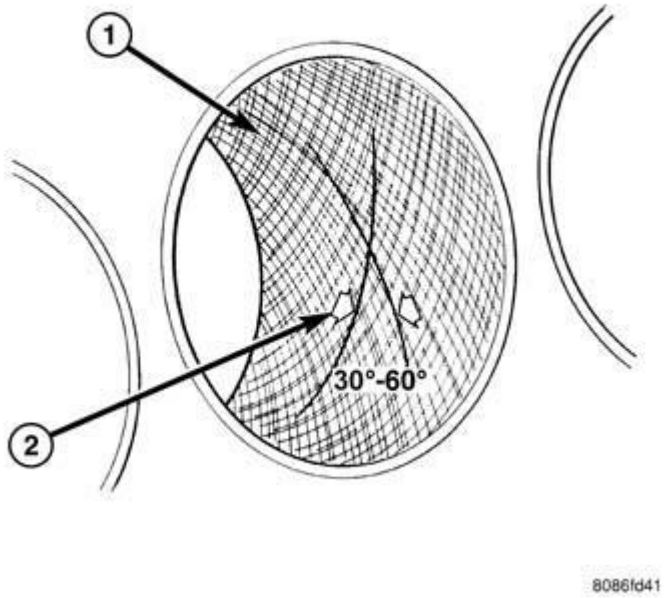

Fig. 148: Cylinder Bore Crosshatch Pattern
Courtesy of CHRYSLER LLC

Before honing, stuff plenty of clean shop towels under the bores and over the crankshaft to keep abrasive materials from entering the crankshaft area.

1. Used carefully, a cylinder bore sizing hone equipped with 220 grit stones, is the best tool for this job. In addition to deglazing, it will reduce taper and out-of-round, as well as removing light scuffing, scoring and scratches. Usually, a few strokes will clean up a bore and maintain the required limits.

CAUTION: DO NOT use rigid type hones to remove cylinder wall glaze.

2. Deglazing of the cylinder walls may be done if the cylinder bore is straight and round. Use of a cylinder surfacing hone equipped with 280 grit stones, about 20-60 strokes, depending on the bore condition, will be sufficient to provide a satisfactory surface. Use a light honing oil, available from major oil distributors.

CAUTION: DO NOT use engine or transmission oil, mineral spirits, or kerosene.

3. Honing should be done by moving the hone up and down fast enough to get a crosshatch pattern. The hone marks should INTERSECT at 50° to 60° for proper seating of rings.
4. A controlled hone motor speed between 200 and 300 RPM is necessary to obtain the proper crosshatch angle (1). The number of up and down strokes per minute can be regulated to get the desired 50° to 60° angle (2). Faster up and down strokes increase the crosshatch angle.
5. After honing, it is necessary that the block be cleaned to remove all traces of abrasive. Use a brush to

wash parts with a solution of hot water and detergent. Dry parts thoroughly. Use a clean, white, lint-free cloth to check that the bore is clean. Oil the bores after cleaning to prevent rusting.

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean:

- Gallery at the oil filter adaptor hole
- Front and rear oil gallery holes
- Multiple Displacement System (MDS) oil gallery holes in the valley
- Oil feed holes for the crankshaft main bearings

Drilled 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 gallery plugs and coolant drain plugs. Tighten the oil gallery 1/4 inch x 18 NPT plugs to 20 N.m (15 ft. lbs.). Tighten the coolant drain 1/4 inch x 18 NPT plugs to 34 N.m (25 ft. lbs.). Tighten the 3/8 inch x 18 NPT plugs to 27 N.m (20 ft. lbs.).

INSPECTION

INSPECTION

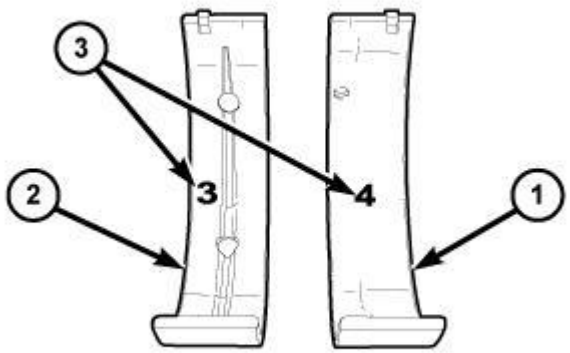

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Fig. 149: Main Bearing Inserts
Courtesy of CHRYSLER LLC

1. Wipe the main bearing inserts (1, 2) clean.

2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, wear or blueing.
6. Replace any bearing that shows abnormal wear.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the cylinder block main bearing bores show damage, replace the engine block.

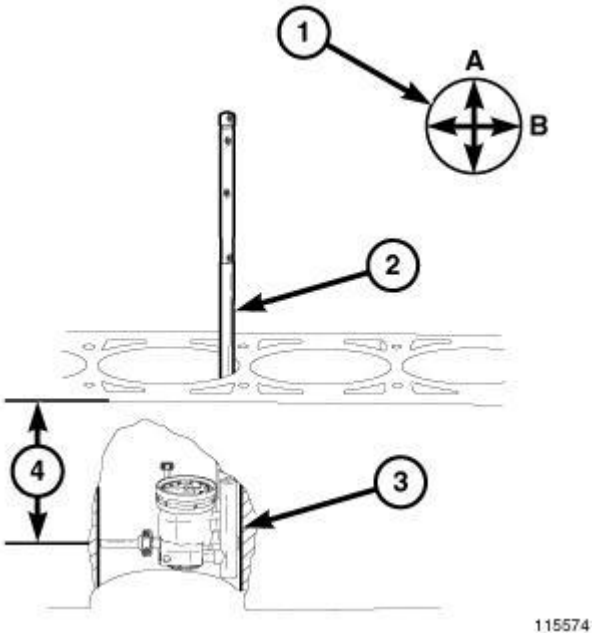

Fig. 150: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER LLC

9. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge 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.
10. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90°) to the axis of the crankshaft at point A (1).
11. Repeat the measurement near the middle of the bore then repeat the measurement near the bottom of the bore.
12. Determine the taper by subtracting the smaller diameter from the larger diameter.
13. Rotate the measuring device 90° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specifications.
14. Determine out-of-roundness by comparing the difference between each measurement.
15. If the 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) then the cylinder bore can be honed. If the cylinder bore taper or out- of-round condition exceeds the maximum limits, replace the cylinder block.

NOTE: A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.

ASSEMBLY, VARIABLE VALVE TIMING

DESCRIPTION

DESCRIPTION

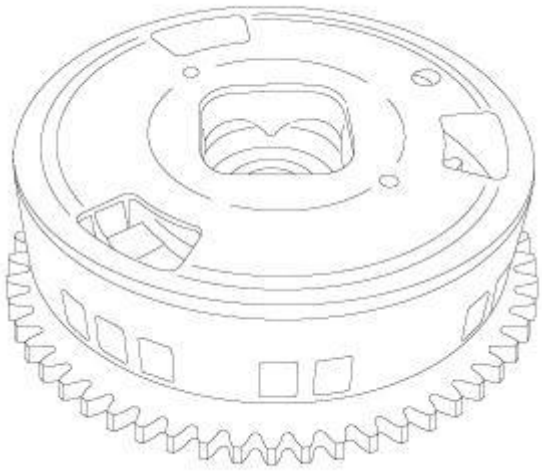

Fig. 151: Variable Cam Timing (VCT) Assembly
Courtesy of CHRYSLER LLC

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

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

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

OPERATION

OPERATION

The Variable Cam Timing (VCT) assembly is actuated with engine oil pressure. The oil flow to the VCT assemblies are controlled by an Oil Control Valve (OCV). The OCV consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the OCV to control oil flow through the spool valve into the VCT assemblies. The VCT assembly consists of a rotor, stator, and sprocket. The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VCT assembly

rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable cam timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

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

REMOVAL

REMOVAL

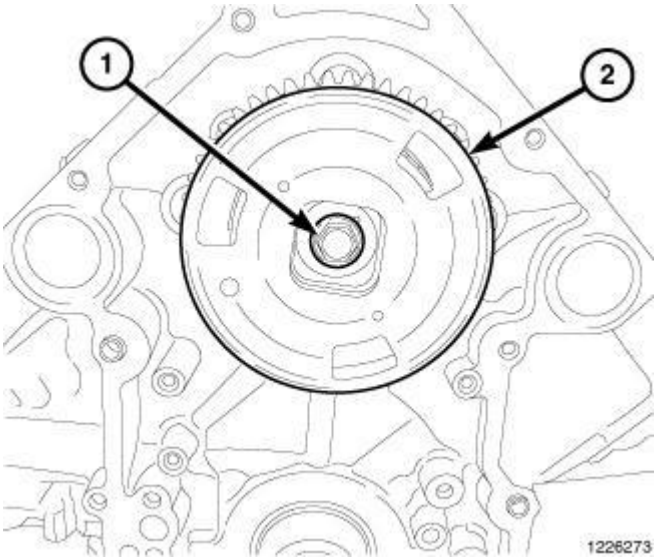

Fig. 152: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

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

1. Remove the timing chain and sprockets. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL, 5.7L**.
2. Remove the camshaft phaser bolt (1).
3. Remove camshaft phaser (2).

INSTALLATION

INSTALLATION

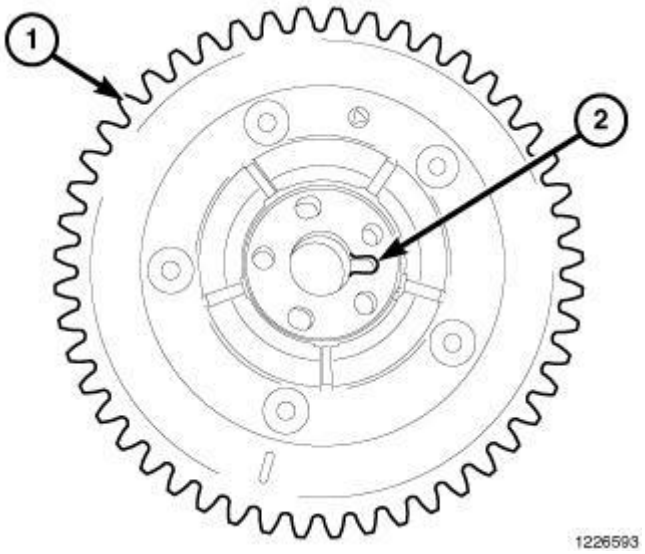

Fig. 153: Phaser Alignment Slot
Courtesy of CHRYSLER LLC

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

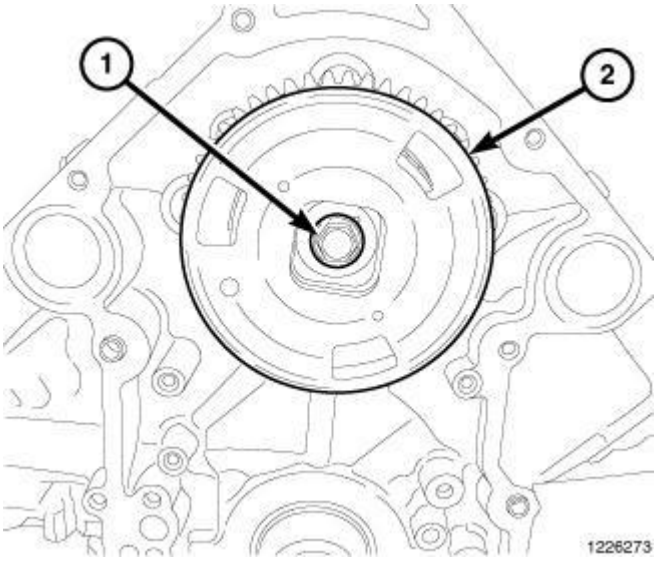

Fig. 154: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

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. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION, 5.7L**.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

STANDARD PROCEDURE - CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

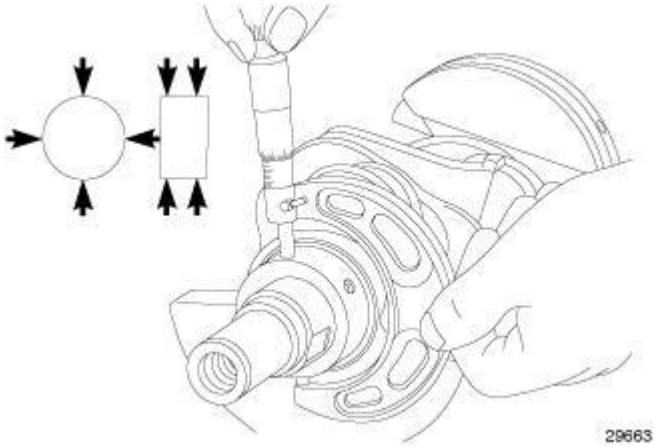

Fig. 155: Measuring Main Bearing Journal Diameter
Courtesy of CHRYSLER LLC

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

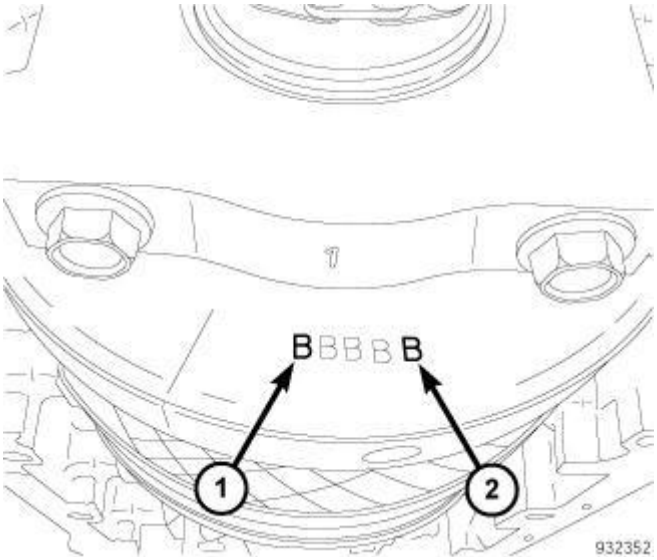

Fig. 156: Crankshaft Counterweight Stamped Grade Identification Marks
Courtesy of CHRYSLER LLC

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

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

MAIN BEARING SELECTION CHART - 5.7L

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

INSPECTION

INSPECTION

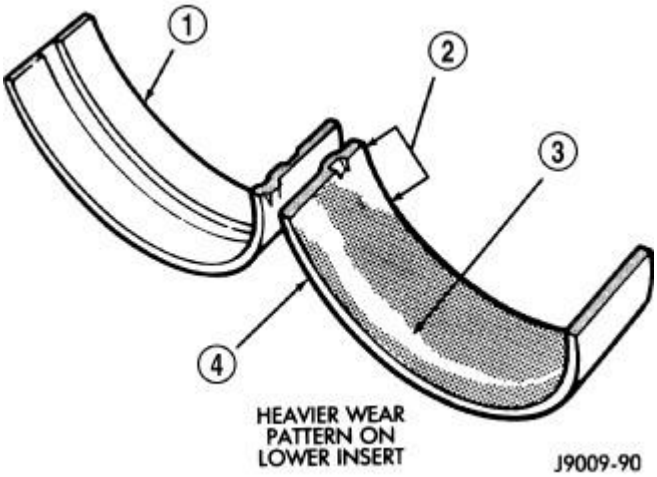

Fig. 157: Main Bearing Wear Patterns
Courtesy of CHRYSLER LLC

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

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

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

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

REMOVAL

CAMSHAFT CORE HOLE PLUG

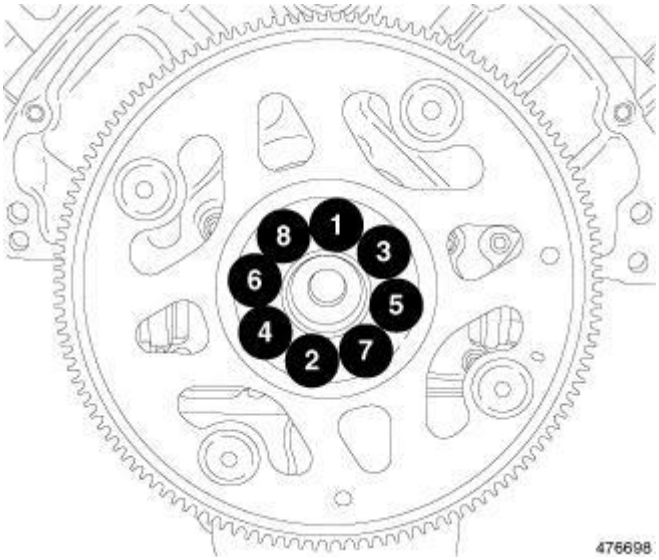

Fig. 158: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove the transmission. Refer to appropriate Transmission Service Information article.
3. Using the sequence shown in illustration, remove the flexplate retaining bolts.
4. Remove the flexplate.

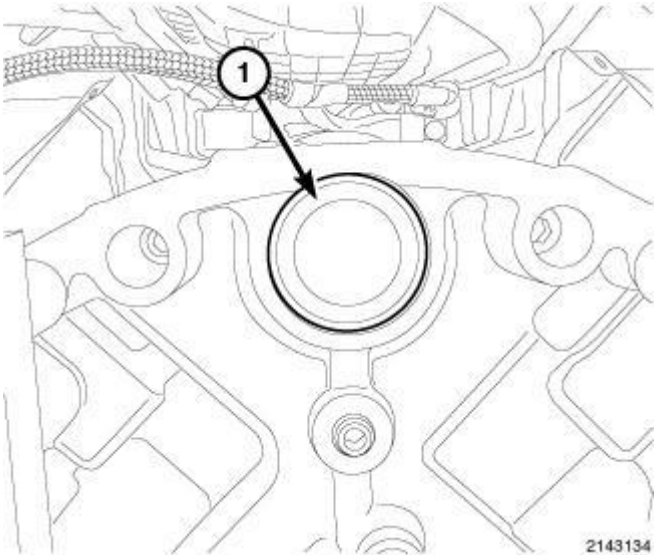

Fig. 159: Camshaft Core Hole Plug
Courtesy of CHRYSLER LLC

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

5. Using a suitable sharp punch, place a small hole into the camshaft core hole plug (1).

6. Insert a short sheet metal screw into the small hole in the camshaft core hole plug.
7. Using a suitable slide hammer puller, remove the rear camshaft core hole plug.

CAMSHAFT

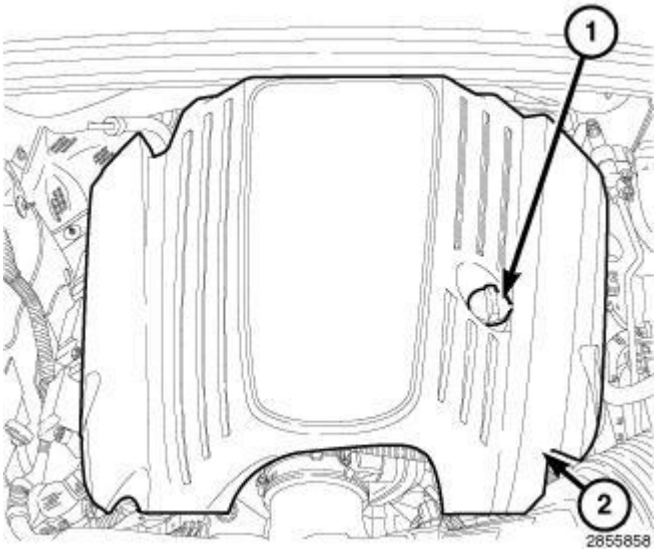

Fig. 160: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Remove the engine cover (2).

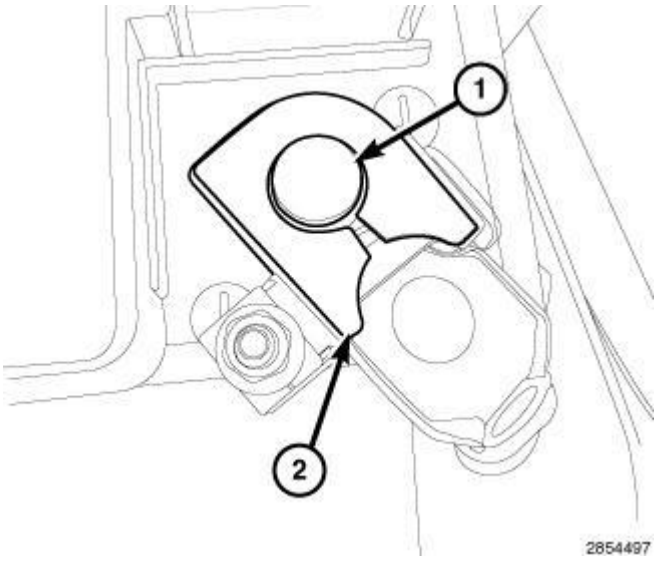

Fig. 161: Negative Battery Cable
Courtesy of CHRYSLER LLC

3. Disconnect and isolate the negative battery cable (3).
4. Remove the engine from the vehicle. Refer to **REMOVAL, 5.7L**.

5. Place the engine on a suitable engine stand.

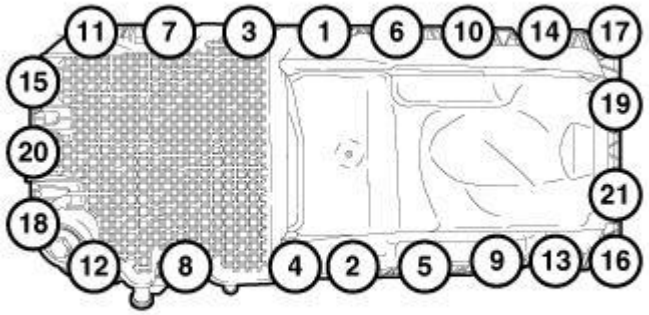

Fig. 162: Remove/Install Oil Pan Retaining Bolts
Courtesy of CHRYSLER LLC

NOTE: The oil pump pickup tube, windage tray and oil pan is one assembly. When the oil pan is removed, a new oil pan gasket and pickup tube O-ring must be installed. The old gasket and O-ring cannot be reused.

6. Remove the engine oil dipstick.
7. Using the sequence shown in illustration, remove the oil pan retaining bolts.
8. Remove the oil pan and discard the oil pan gasket and pickup tube O-ring.
9. Clean the sealing surfaces as necessary.

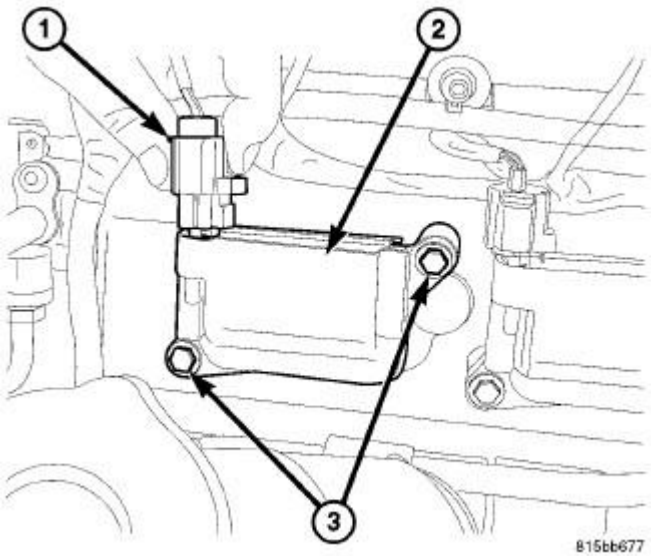

Fig. 163: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

10. Remove the ignition coil retaining bolts (3).
11. Remove the ignition coils (2).

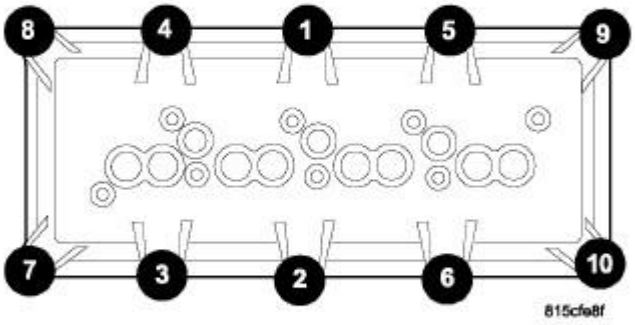

Fig. 164: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

12. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts.
13. Remove the cylinder head cover (2).

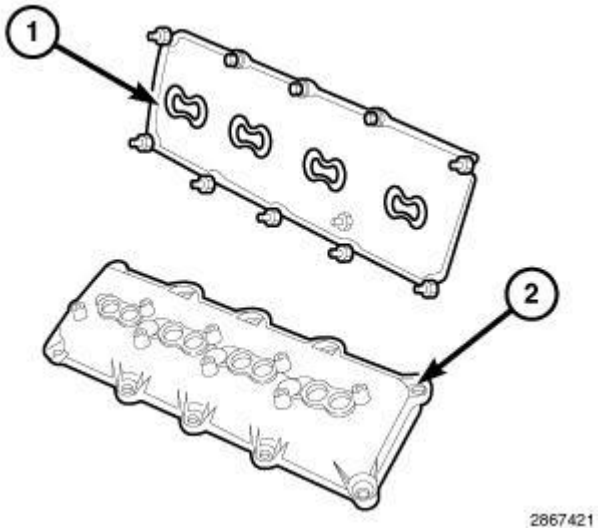

Fig. 165: Cylinder Head Cover Gasket & Cylinder Head Cover
Courtesy of CHRYSLER LLC

NOTE: The cylinder head cover gasket (1) may be used again, provided no cuts, tears, or deformation have occurred.

14. Inspect the cylinder head cover gasket (1), replace if necessary.

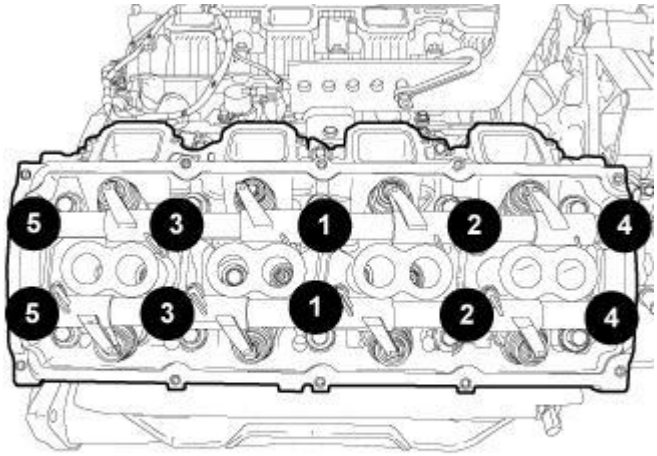

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Fig. 166: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

NOTE: The rocker arms and push rods must be installed in their original location as removed.

15. Remove the rocker arms and push rods. Note their location to ensure installation in their original locations as removed. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.

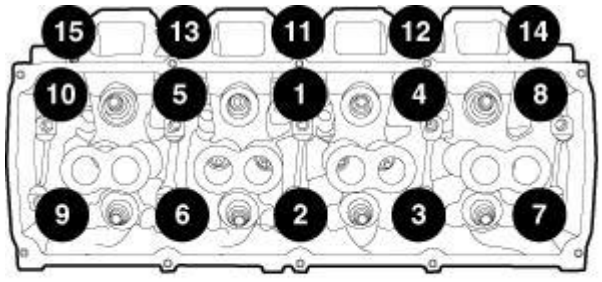

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Fig. 167: Cylinder Head Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

16. Using the sequence shown in illustration, remove the cylinder head bolts.
17. Remove the cylinder head(s) and discard the cylinder head gasket(s).
18. Remove timing case cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.

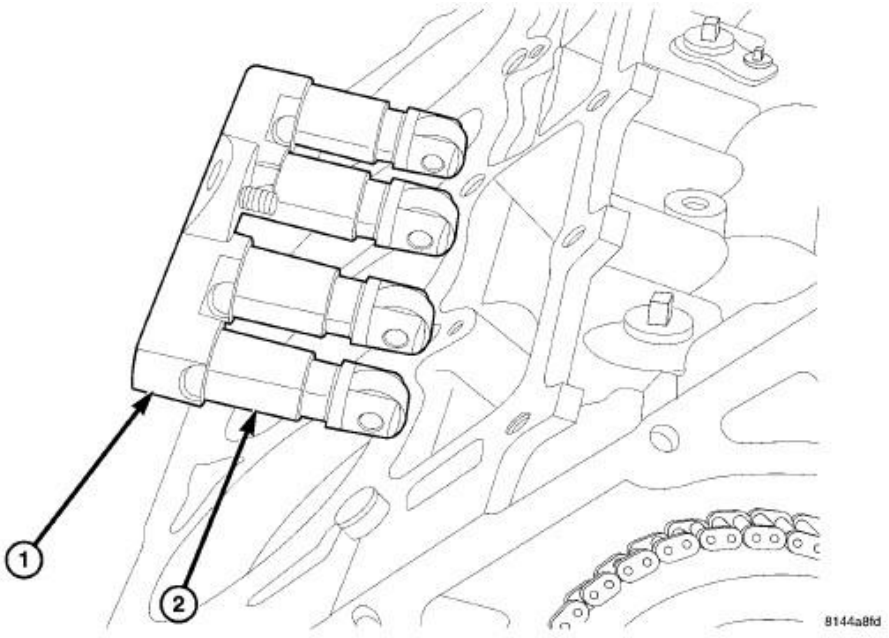

Fig. 168: Tappet Guide Holder Assembly
Courtesy of CHRYSLER LLC

NOTE: Identify lifters to ensure installation in original location.

19. Remove the lifters (2) and retainer (1) as an assembly.

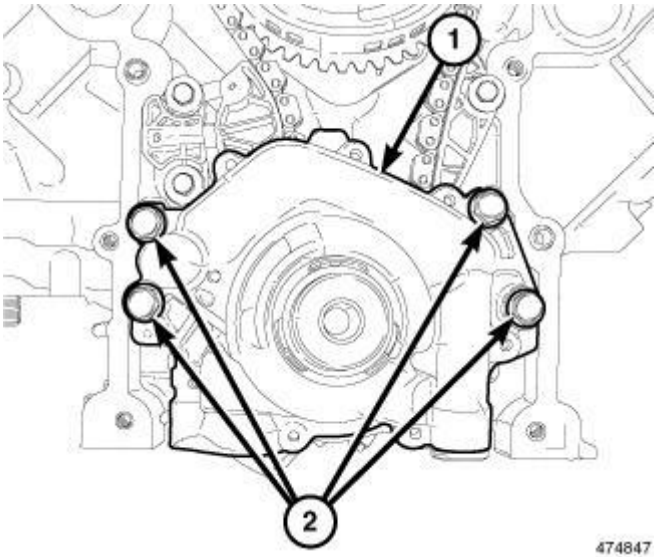

Fig. 169: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER LLC

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

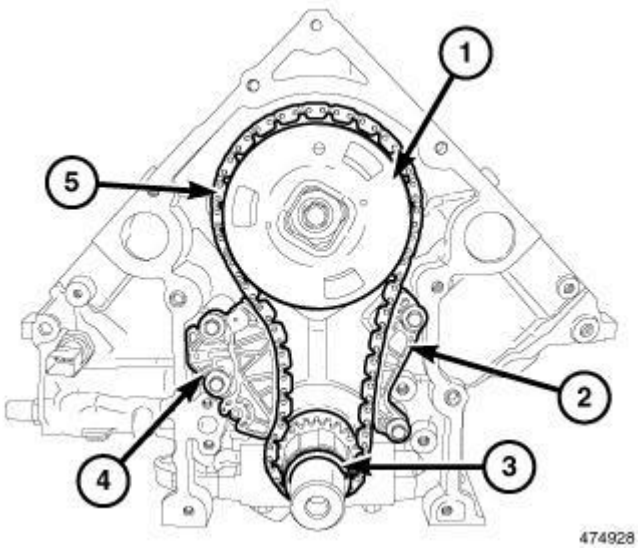

Fig. 170: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER LLC

21. Remove timing chain (5). Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL, 5.7L**.

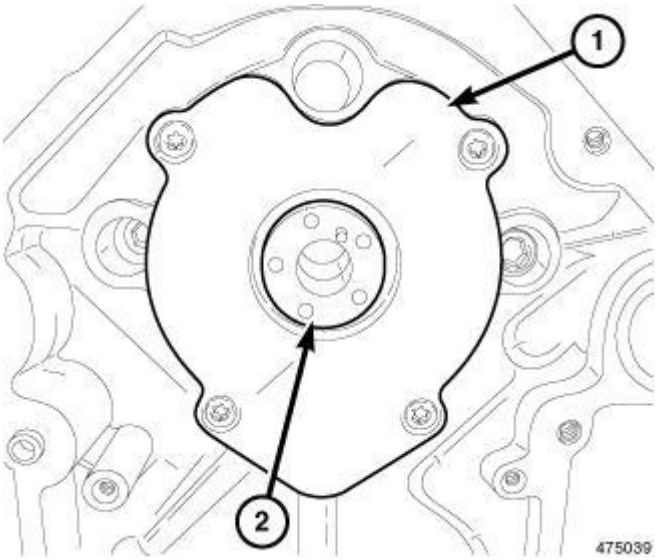

Fig. 171: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

22. Remove camshaft thrust plate (1).

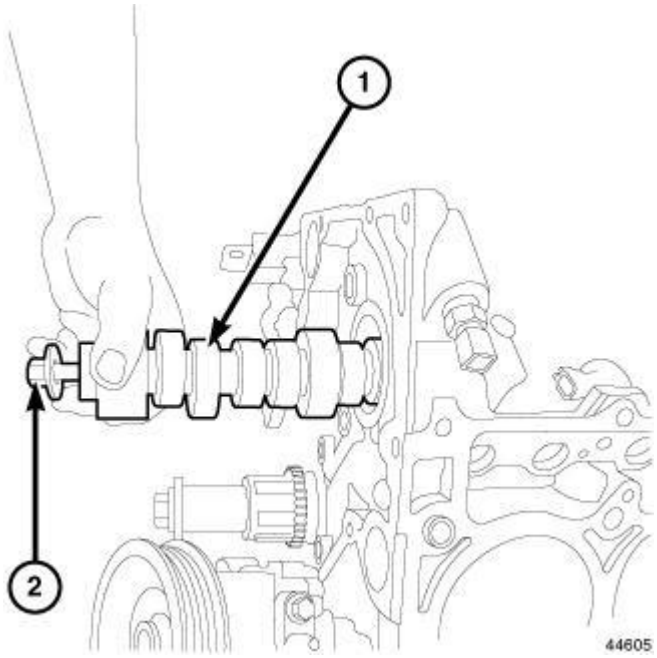

Fig. 172: Removing/Installing Camshaft
Courtesy of CHRYSLER LLC

NOTE: Slowly rotate the camshaft while pulling camshaft out.

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

INSPECTION

INSPECTION

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

INSTALLATION

CAMSHAFT CORE HOLE PLUG

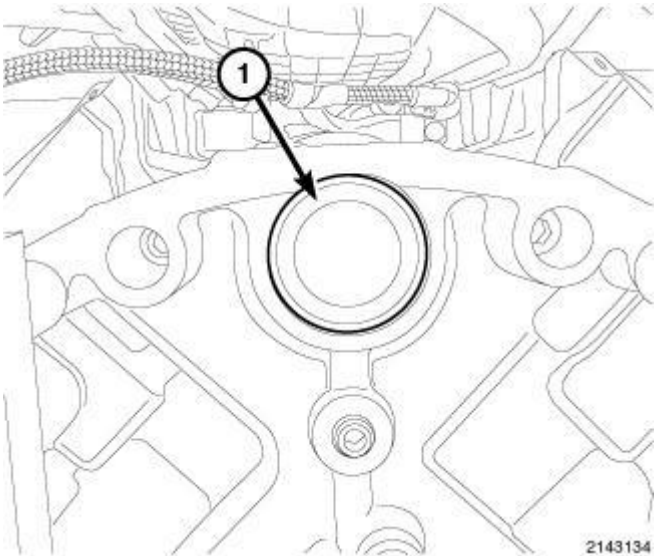

Fig. 173: Camshaft Core Hole Plug
Courtesy of CHRYSLER LLC

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. Refer to **FLEXPLATE, INSTALLATION, 5.7L**.
4. Install the engine. Refer to **INSTALLATION, 5.7L**.

CAMSHAFT

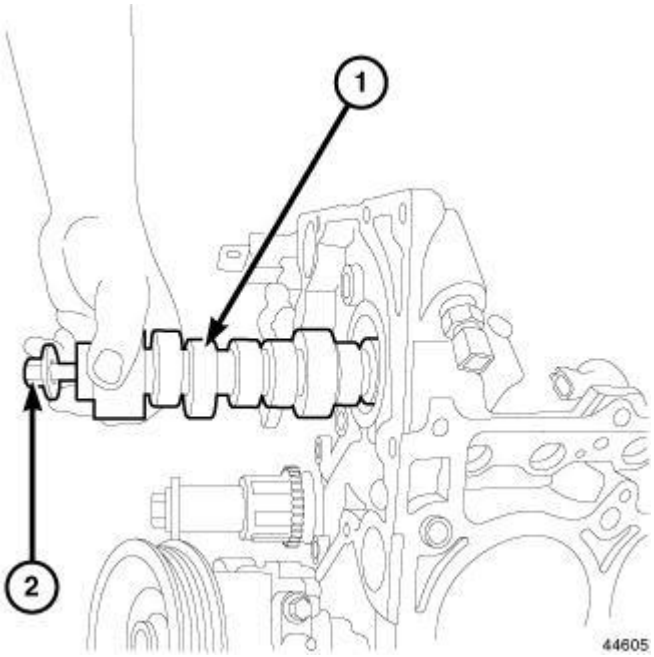

Fig. 174: Removing/Installing Camshaft
Courtesy of CHRYSLER LLC

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

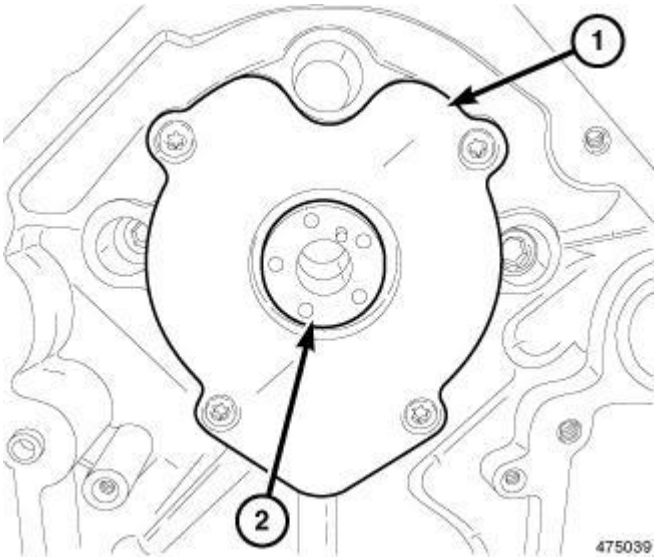

Fig. 175: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

2. Position the camshaft thrust plate (1) and install the retaining bolts finger tight.

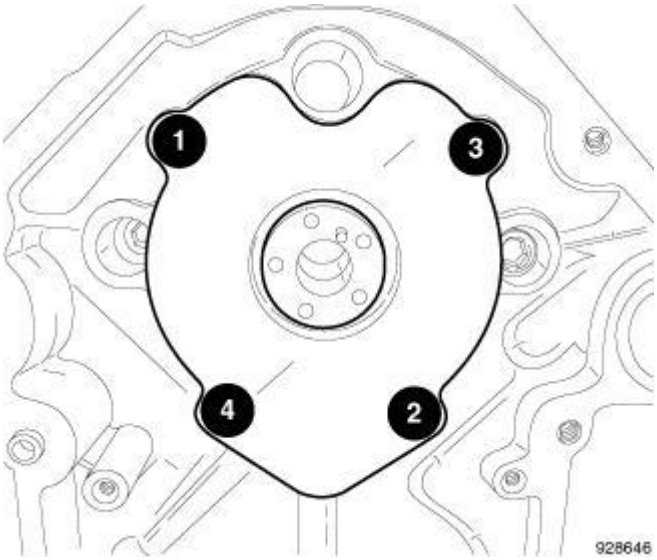

Fig. 176: Camshaft Thrust Plate Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

3. Using the sequence shown in illustration, tighten the camshaft thrust plate retaining bolts to 12 N.m (106 in. lbs.).
4. Measure camshaft end play. Refer to **Engine - Specifications**. If not within specifications install a new thrust plate.

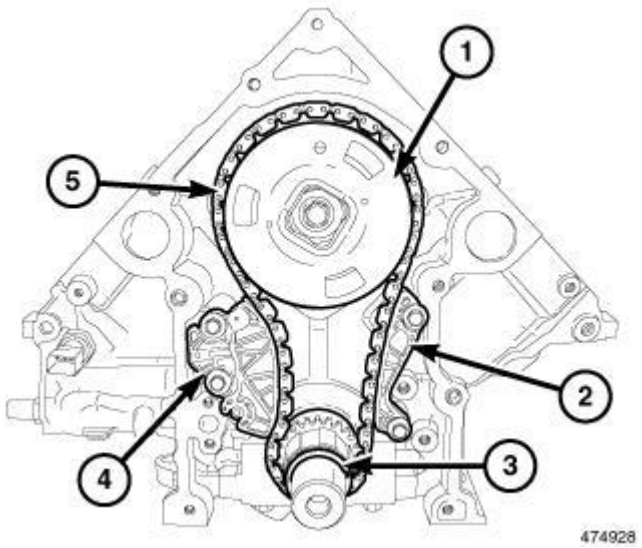

Fig. 177: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER LLC

5. Install the timing chain (5) and sprockets (1, 3). Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION, 5.7L**.
6. Install the timing chain tensioner (4) and guide (2).

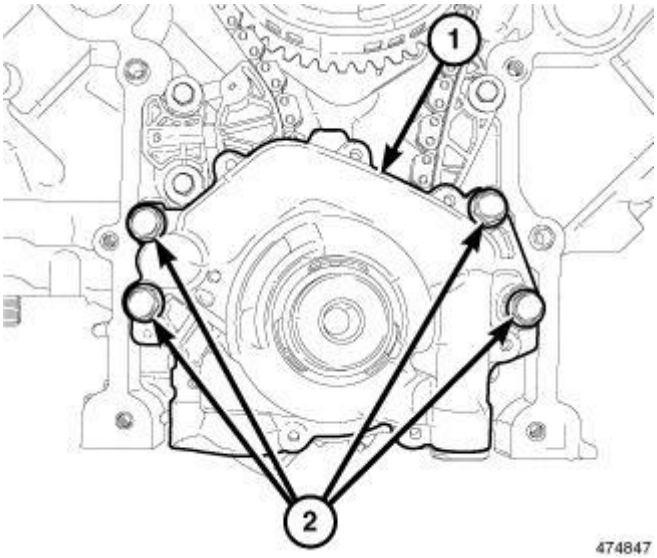

Fig. 178: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER LLC

7. Position the oil pump (1), install the retaining bolts and tighten to 28 N.m (21 ft. lbs.).
8. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
9. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.

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

NOTE: If camshaft replacement is necessary, all lifter and retainer assemblies must be replaced.

NOTE: The lifter and retainer assemblies must be installed in the same position as removed.

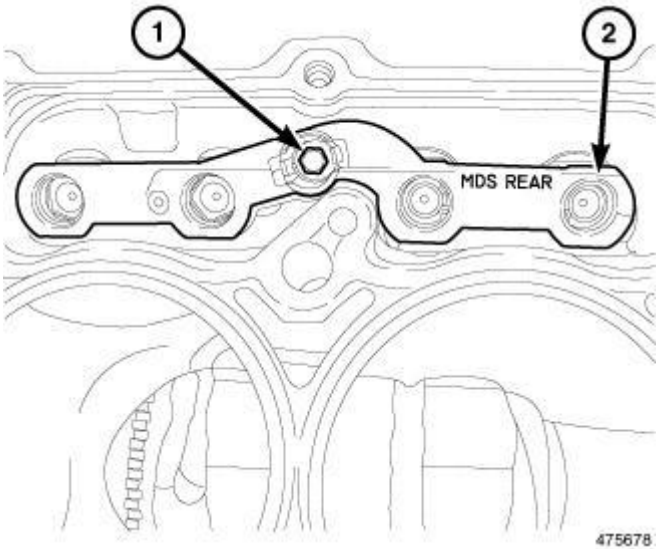

Fig. 179: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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

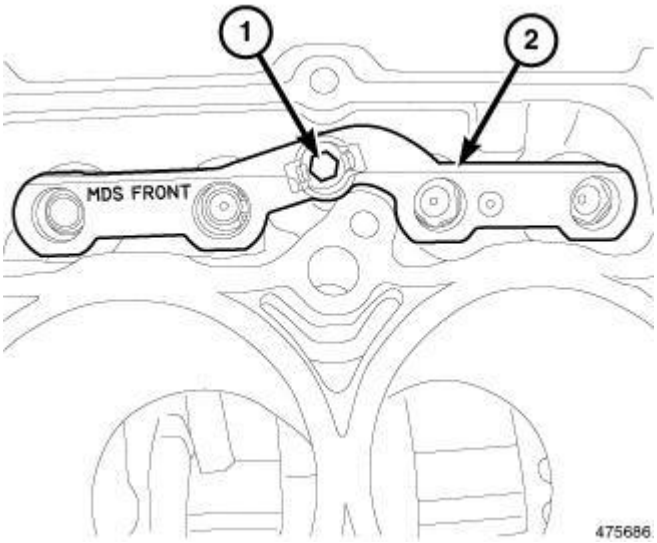

Fig. 180: Front MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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

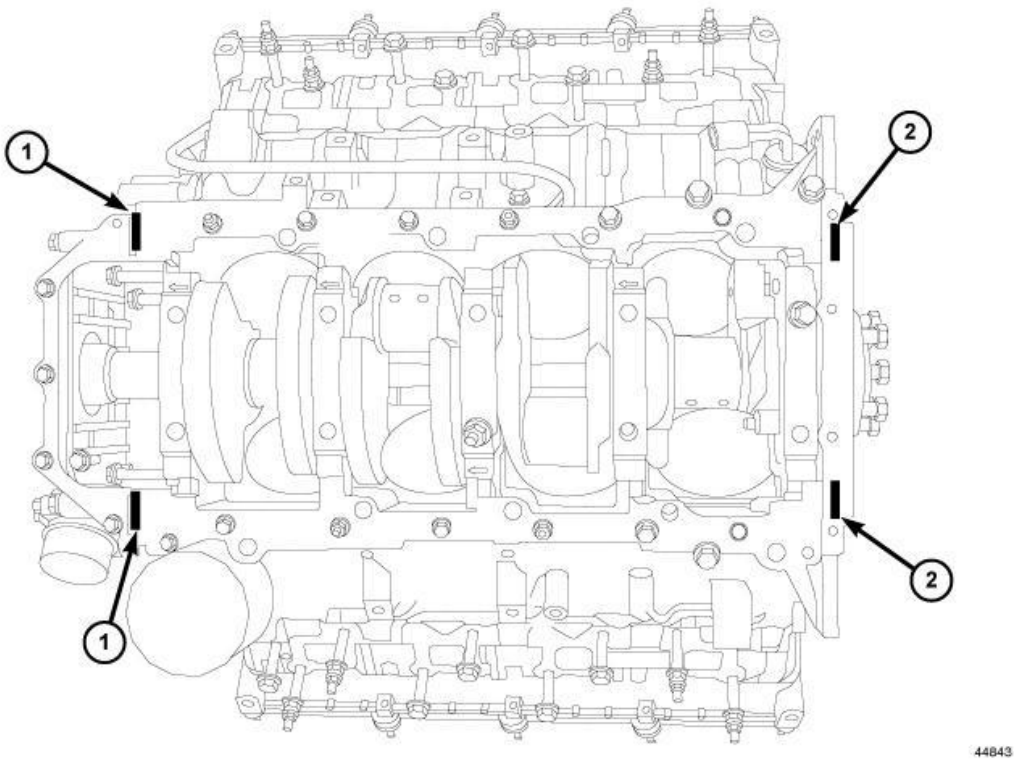

Fig. 181: T-Joint RTV Application
Courtesy of CHRYSLER LLC

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

NOTE: When the oil pan is removed, a new oil pan gasket and pickup tube O-ring must be installed. The old gasket and O-ring cannot be reused.

13. Install a new oil pan gasket and pickup tube O-ring.

NOTE: Mopar® Engine RTV must be applied to the 4 T-joints (1, 2) area where the front cover, rear retainer 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.

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

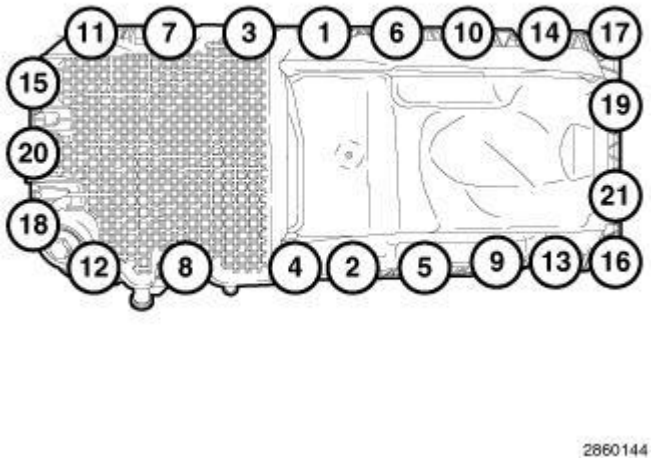

Fig. 182: Remove/Install Oil Pan Retaining Bolts
Courtesy of CHRYSLER LLC

15. Position the oil pan, install the mounting bolts and using the sequence shown in illustration, tighten to 12 N.m (9 ft. lbs.).
16. Install the engine oil dipstick.

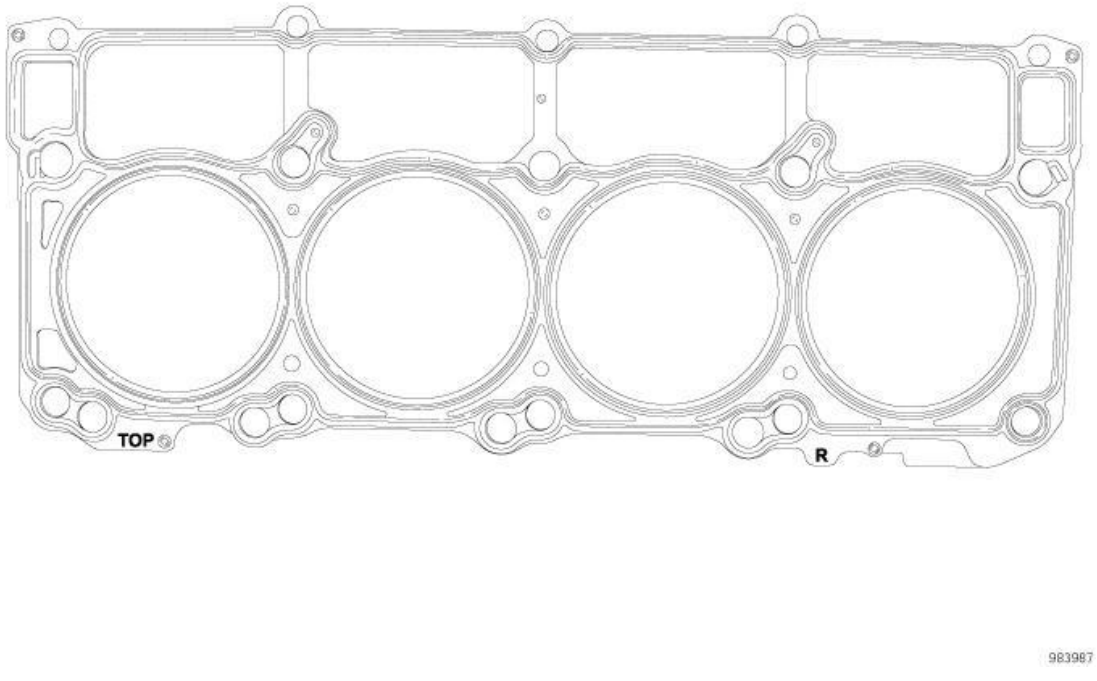

Fig. 183: Cylinder Head Gasket Markings
Courtesy of CHRYSLER LLC

Right cylinder head gasket shown in illustration, left cylinder head gasket similar.

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.

17. Using a suitable solvent, clean all sealing surfaces of the cylinder block and cylinder heads.
18. Position the new cylinder head gasket(s) (5) onto the cylinder block.
19. Position the cylinder head(s) (4) onto the cylinder head gasket (5) and cylinder block.

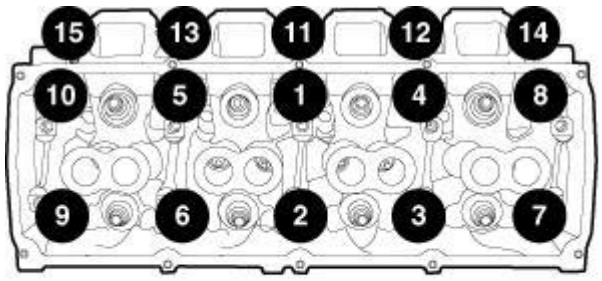

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Fig. 184: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

20. Using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 34 N.m (25 ft. lbs.).
21. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
22. Again using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 54 N.m (40 ft. lbs.).
23. Again using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
24. Again using the sequence shown in illustration, rotate the cylinder head bolts 1 through 10 90°.
25. Again using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 34 N.m (25 ft. lbs.).

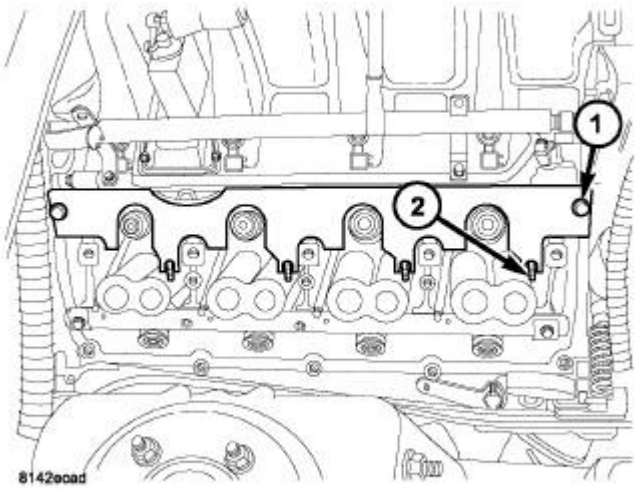


Fig. 185: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

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

26. Install the pushrods in the same position as noted during removal.
27. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

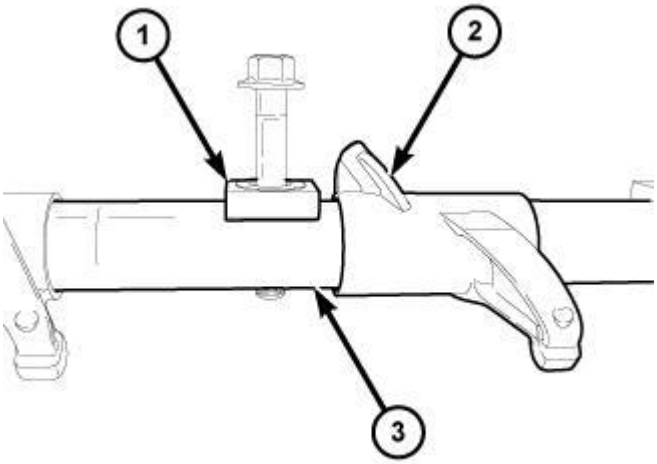


Fig. 186: Retainers, Rocker Arm & Rocker Shaft
Courtesy of CHRYSLER LLC

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

CAUTION: Verify the pushrod(s) are installed into the rocker arm(s) (2) and the tappet(s) correctly while installing the rocker shaft assembly (3) or engine damage could result. Recheck after the rocker shaft assembly has been tightened to specification.

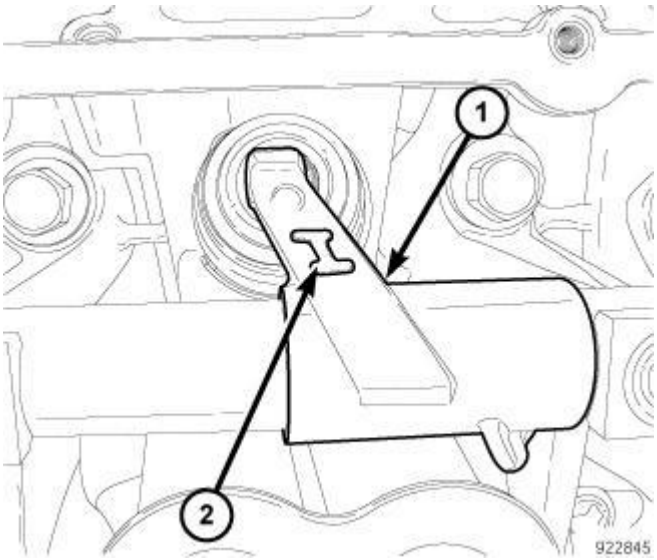


Fig. 187: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

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).

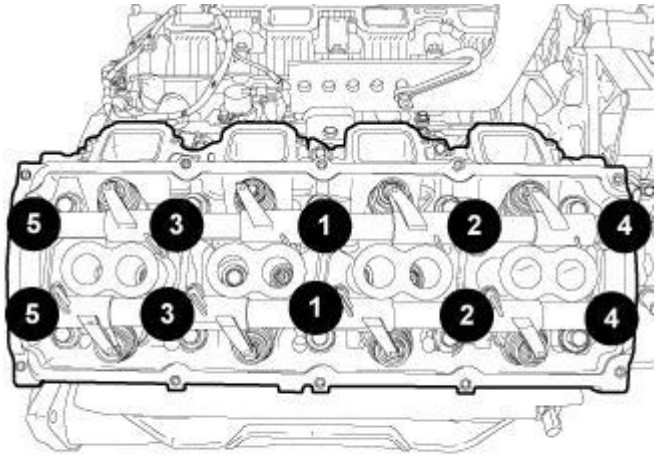


Fig. 188: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

28. Install the rocker shaft assemblies in the same position as noted during removal.
29. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

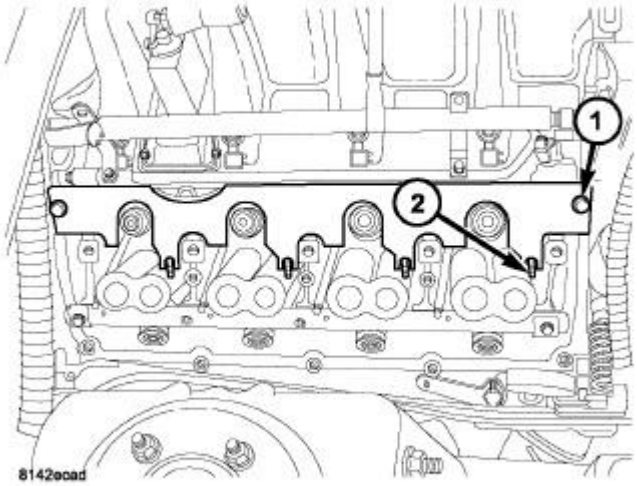


Fig. 189: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

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).

30. Remove the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

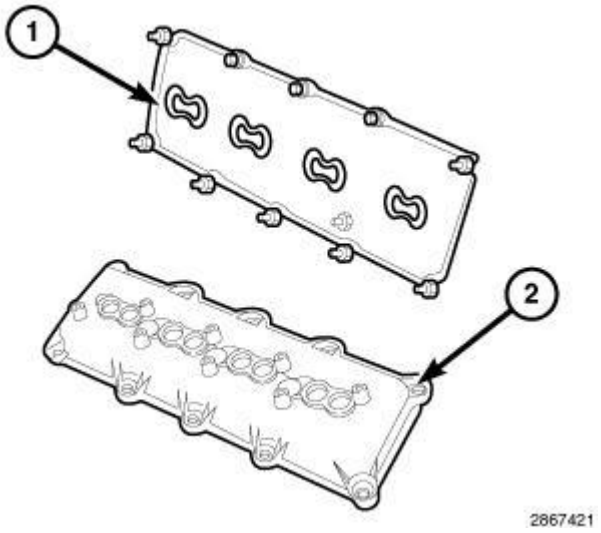


Fig. 190: Cylinder Head Cover Gasket & Cylinder Head Cover
Courtesy of CHRYSLER LLC

NOTE: The cylinder head cover gasket (1) may be used again, provided no cuts, tears, or deformation have occurred.

31. Inspect the cylinder head cover gasket (1), replace if necessary.

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

32. Clean the cylinder head cover (2) and the cylinder head sealing surface.
33. Apply Mopar® Lock & Seal Adhesive to the cylinder head cover bolts.
34. Position the cylinder head cover and gasket, install the retaining bolts finger tight.

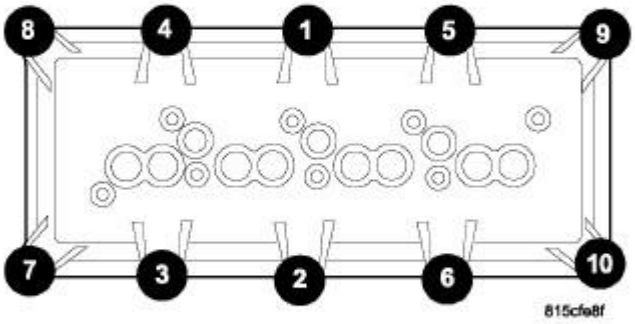


Fig. 191: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

35. Using the sequence shown in illustration, tighten the cylinder head cover bolts to 8 N.m (70 in. lbs.).

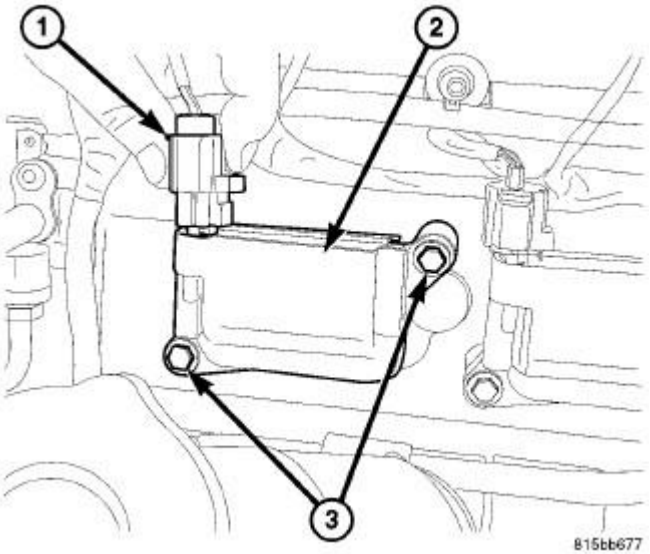


Fig. 192: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

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

36. Install the ignition coils (2).
37. Install the ignition coil retaining bolts (3) and tighten to 7 N.m (62 in. lbs.).
38. Install the engine into the vehicle. Refer to **INSTALLATION, 5.7L**.

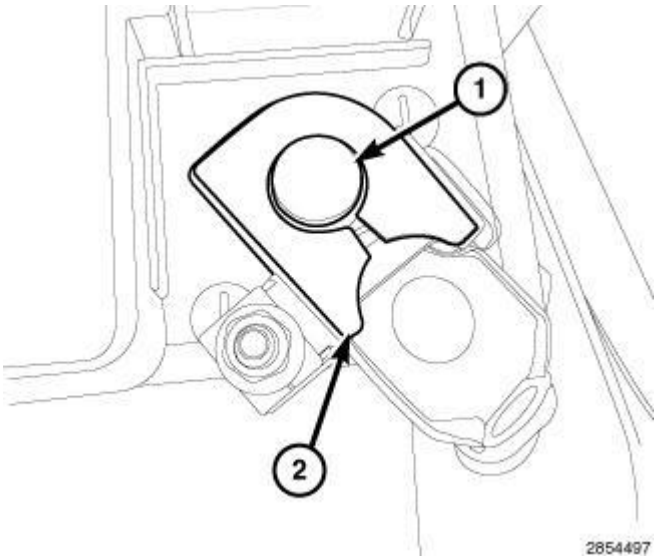


Fig. 193: Negative Battery Cable
Courtesy of CHRYSLER LLC

39. Connect negative battery cable (2).

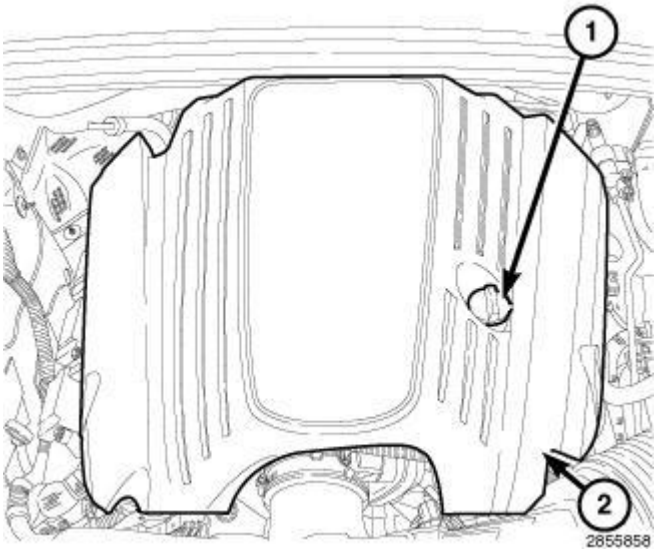


Fig. 194: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

40. Install the engine cover (2).
41. Fill the engine with the proper engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

42. Install the oil fill cap (1).
43. Fill the cooling system with the proper coolant. Refer to **STANDARD PROCEDURE** .
44. Start the engine and check for leaks.
45. Road test the vehicle.

COVER, STRUCTURAL DUST

DESCRIPTION

DESCRIPTION

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

OPERATION

OPERATION

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

REMOVAL

REMOVAL

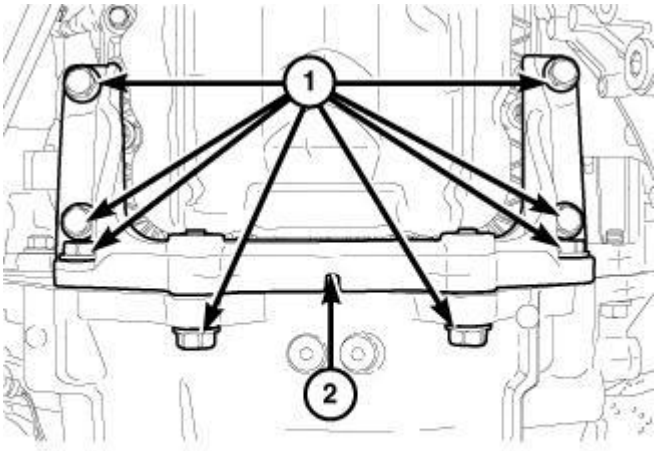


Fig. 195: Structural Dust Cover & Retaining Bolts
Courtesy of CHRYSLER LLC

1. Raise and support the vehicle.
2. Remove the structural dust cover retaining bolts (1).
3. Remove the structural dust cover (2).

INSTALLATION

INSTALLATION

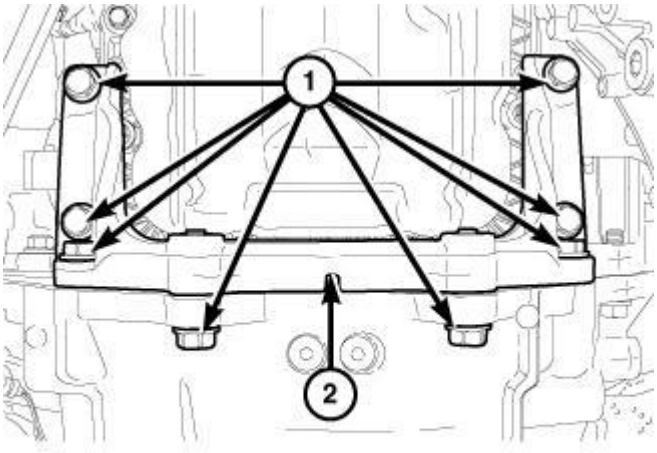


Fig. 196: Structural Dust Cover & Retaining Bolts
Courtesy of CHRYSLER LLC

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.

1. Position the structural cover (2) in the vehicle.
2. Install the structural dust cover bolts (1) to the engine block finger tight.
3. Install the structural dust cover bolts (1) to the transmission finger 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 bolts to the transmission to 9 N.m (80 in. lbs.).
5. Tighten the structural dust cover bolts to the engine block to 9 N.m (80 in. lbs.).
6. Again, tighten the structural dust cover bolts to the transmission to 54 N.m (40 ft. lbs.).
7. Again, tighten the structural dust cover bolts to the engine block to 54 N.m (40 ft. lbs.).
8. Lower the vehicle.

CRANKSHAFT

REMOVAL

REMOVAL

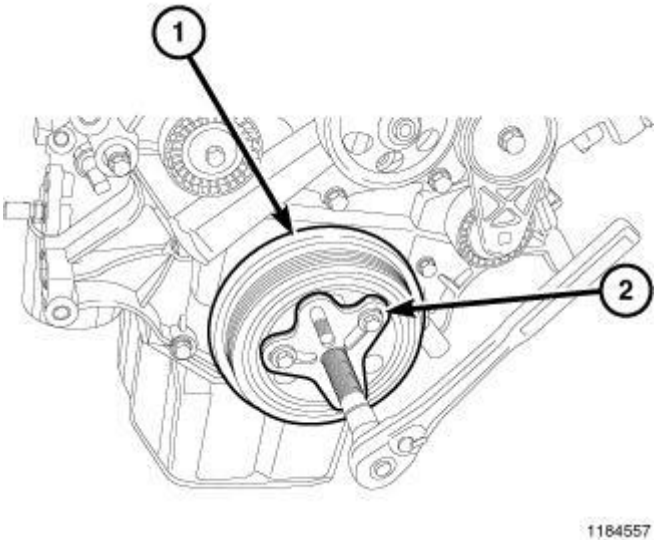


Fig. 197: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER LLC

1. Remove the engine. Refer to **REMOVAL, 5.7L**.
2. Secure the engine to a suitable engine stand.
3. Remove the vibration damper (1). Refer to **DAMPER, VIBRATION, REMOVAL, 5.7L**.

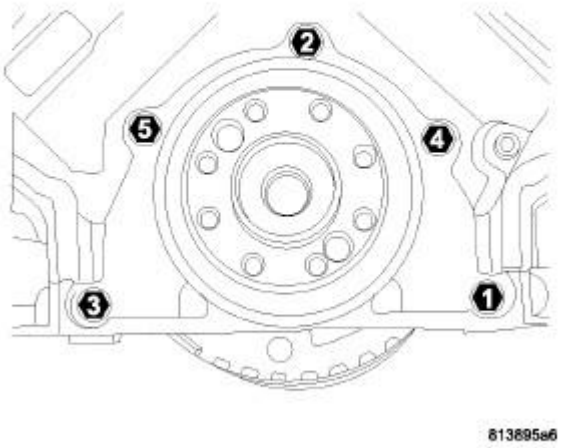


Fig. 198: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

4. Remove the rear oil seal retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.

5. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
6. Remove the timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.

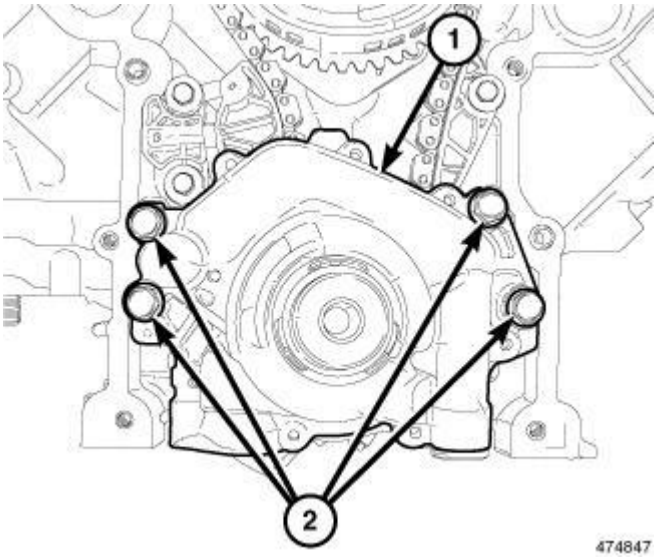


Fig. 199: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER LLC

7. Remove the oil pump (1). Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.

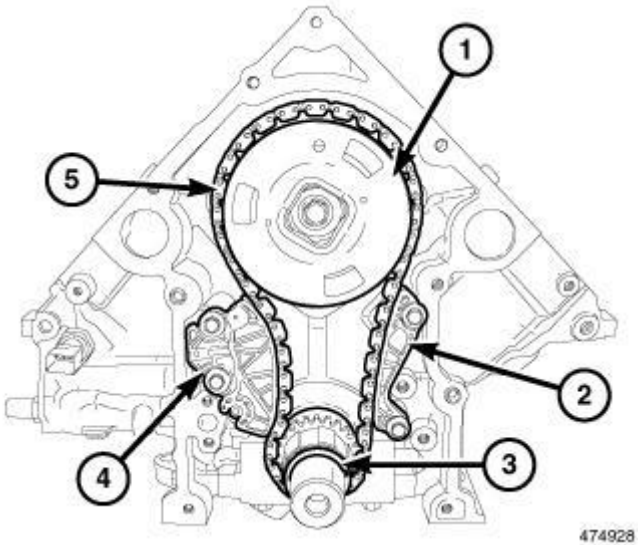


Fig. 200: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER LLC

8. Remove the timing chain (5) and sprockets (1, 3). Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL, 5.7L**.

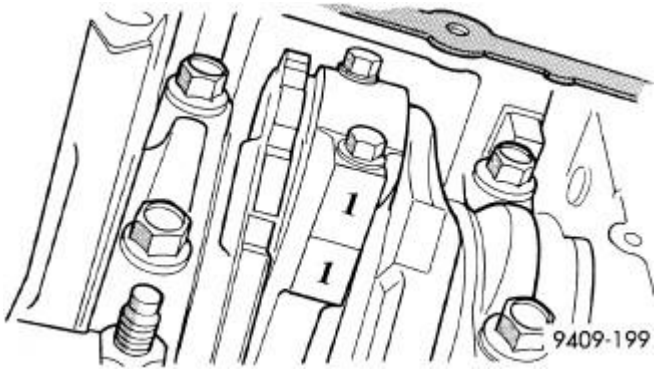


Fig. 201: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER LLC

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

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

9. Mark the connecting rod and bearing cap positions using a permanent ink marker or scribe tool.
10. Remove the rod bearing caps and bearings.

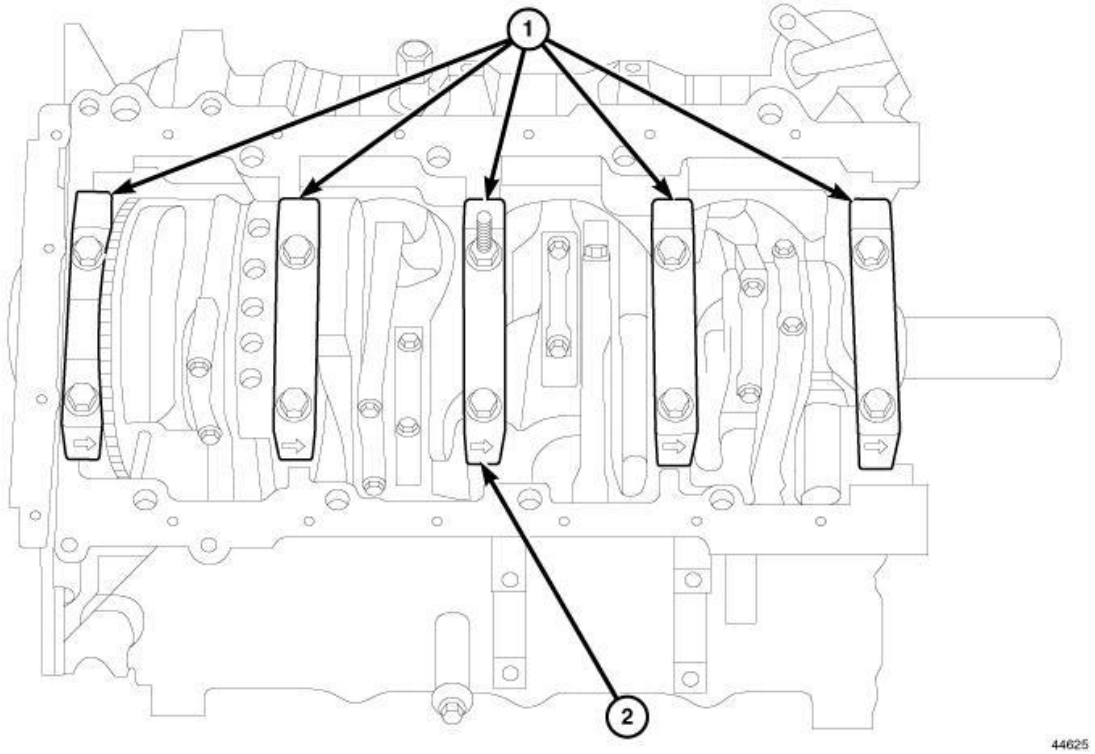


Fig. 202: Main Bearing Caps & Arrows
Courtesy of CHRYSLER LLC

CAUTION: Do not use a number stamp or a punch to mark main bearing caps as damage to bearing caps and/or bearings could occur.

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

11. Mark the main bearing caps (1) using a permanent ink marker or scribe tool.

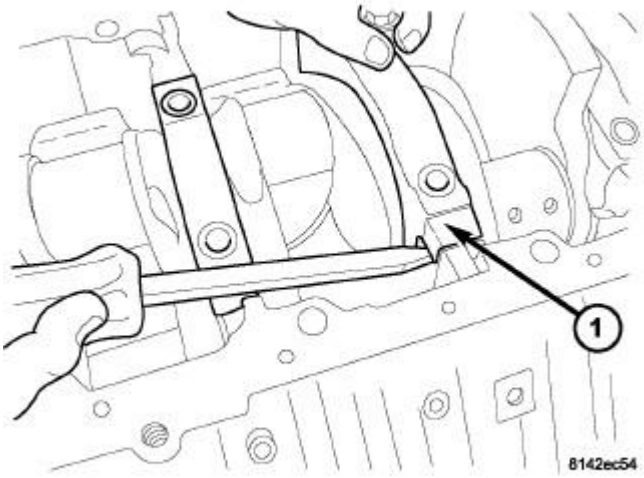


Fig. 203: Main Bearing Cap Removal
Courtesy of CHRYSLER LLC

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

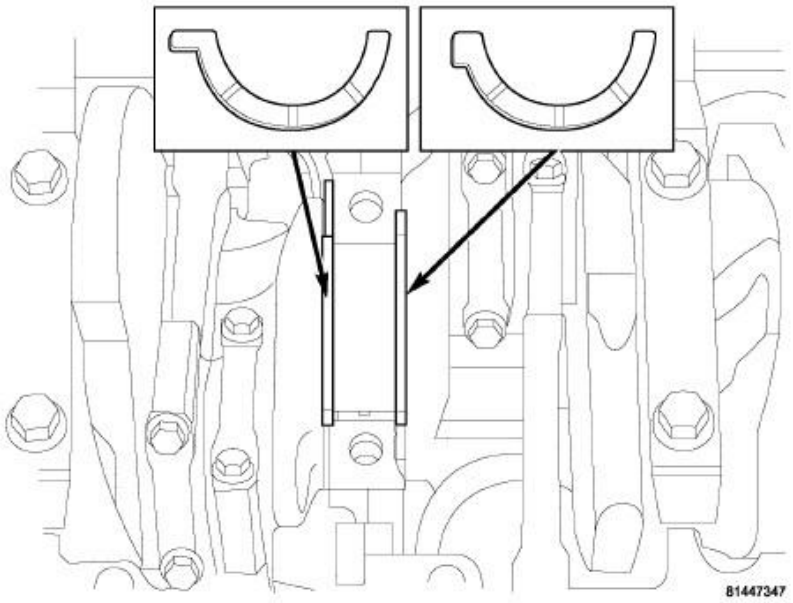


Fig. 204: Thrust Washer Location
Courtesy of CHRYSLER LLC

15. Remove the thrust washers.
16. Remove the crankshaft out of the engine block.

INSTALLATION

INSTALLATION

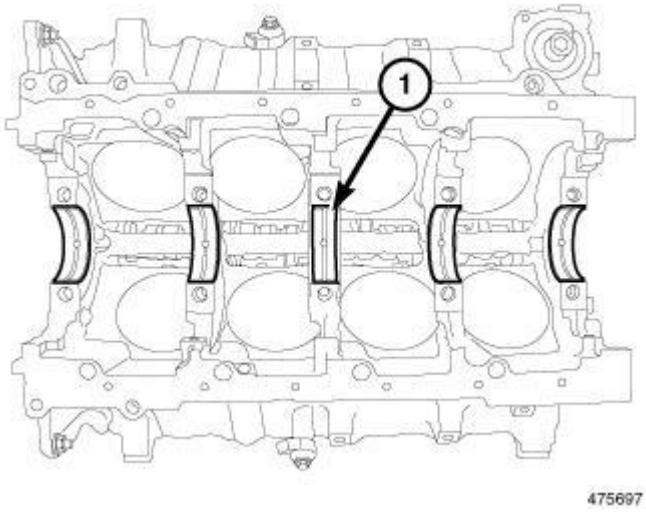


Fig. 205: Main Bearings
Courtesy of CHRYSLER LLC

1. Select the proper main bearings. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard**

Procedure.

2. Install the main bearings in the engine block (1).

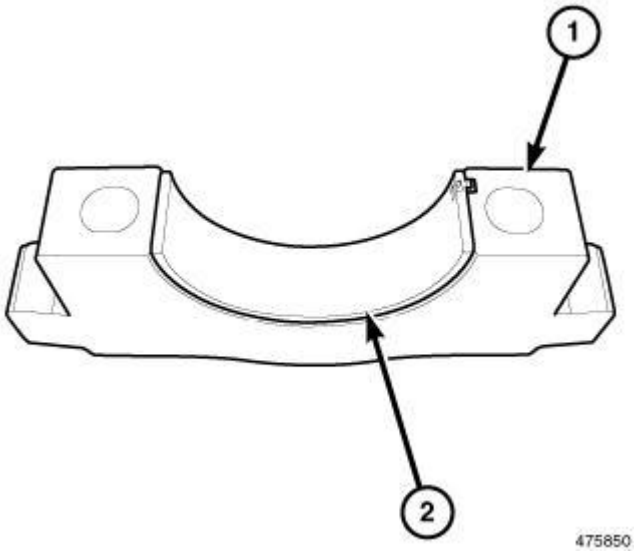


Fig. 206: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER LLC

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

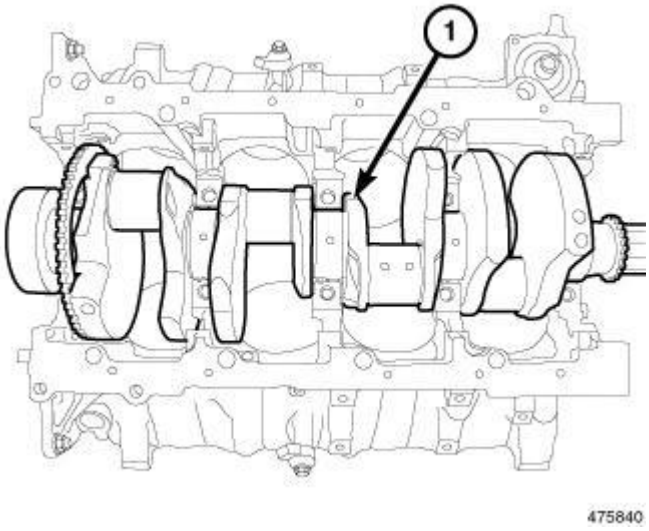


Fig. 207: Crankshaft
Courtesy of CHRYSLER LLC

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

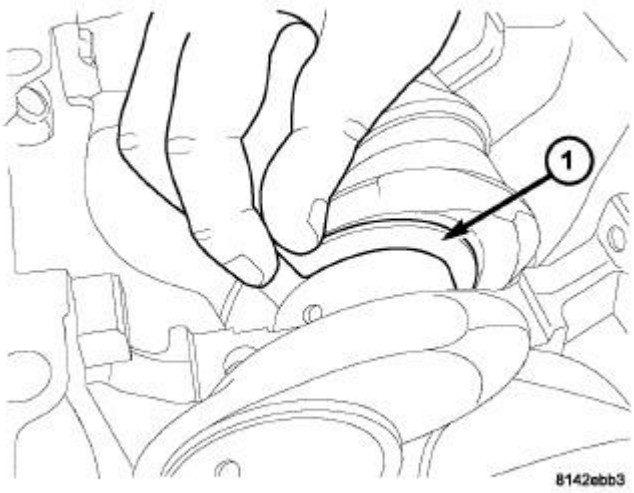


Fig. 208: Removing/Installing Thrust Washer
Courtesy of CHRYSLER LLC

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

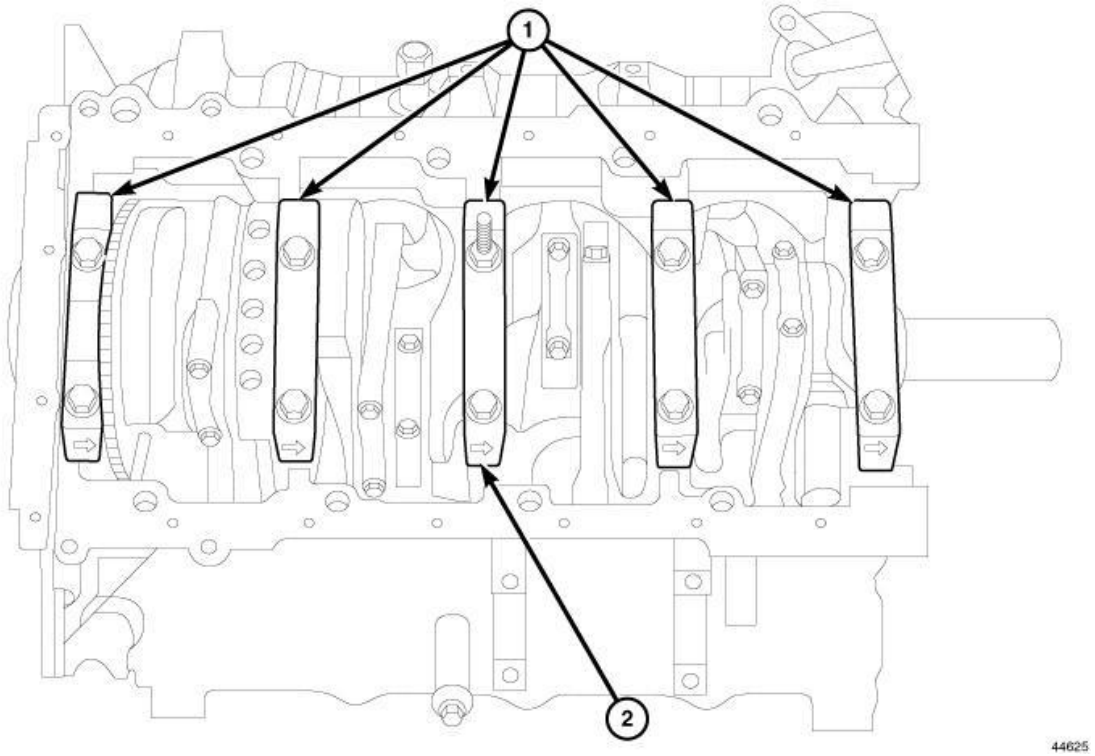


Fig. 209: Main Bearing Caps & Arrows

Courtesy of CHRYSLER LLC

7. Install all main bearing caps (1) in the location as noted during removal making sure the arrow (2) faces forward.

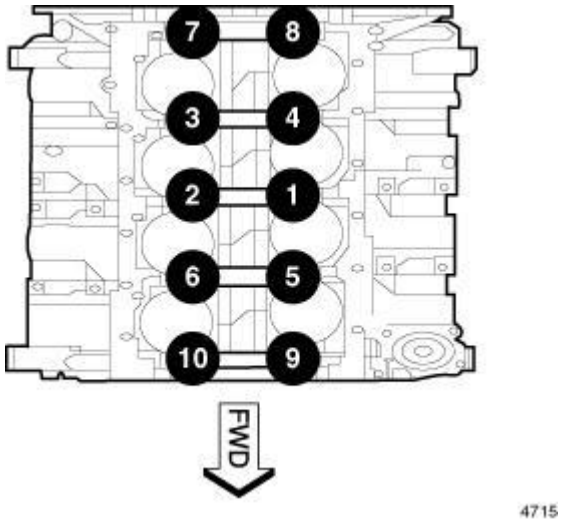


Fig. 210: Main Bearing Cap Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

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

8. Clean and oil all cap bolts and install finger tight.
9. Using the sequence shown in illustration, tighten the main bearing cap bolts to 13 N.m (10 ft. lbs.).
10. Again, using the sequence shown in illustration, tighten the main bearing cap bolts to 27 N.m (20 ft. lbs.).
11. Rotate the bearing main cap bolts an additional 90° in the sequence shown in illustration.

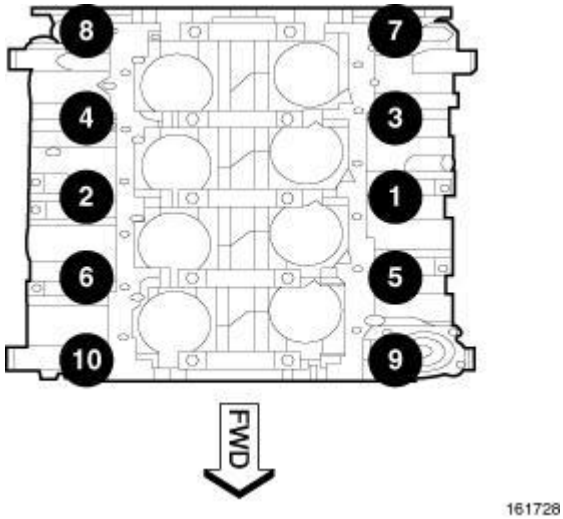


Fig. 211: Crossbolt Tightening Sequence

Courtesy of CHRYSLER LLC

12. Install the crossbolts with new seal washer finger tight
13. Using the sequence shown in illustration, tighten the crossbolts to 28 N.m (21 ft. lbs.).
14. Again, using the sequence shown in illustration, repeat the crossbolt tightening procedure.
15. Measure the crankshaft end play. Refer to **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.

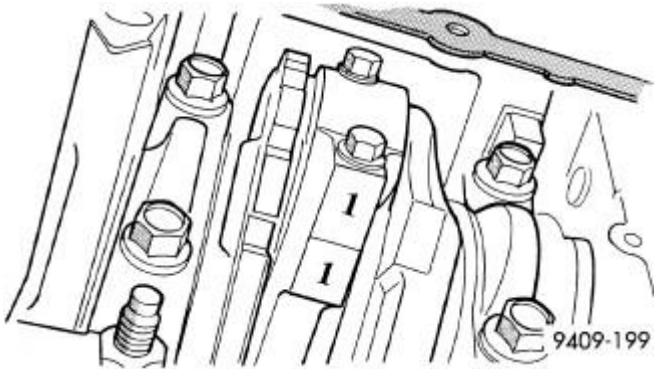


Fig. 212: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER LLC

16. Wipe the connecting rod caps clean and install the rod bearings.

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

17. Lubricate the bearing surfaces with clean engine oil and install the bearings and connecting rod caps onto the connecting rod journals in the same location as noted during removal.
18. Lubricate the new connecting rod bolts with clean engine oil and install the bolts finger tight.
19. Tighten the connecting rod bolts to 21 N.m (15 ft. lbs.) plus a 90° turn.

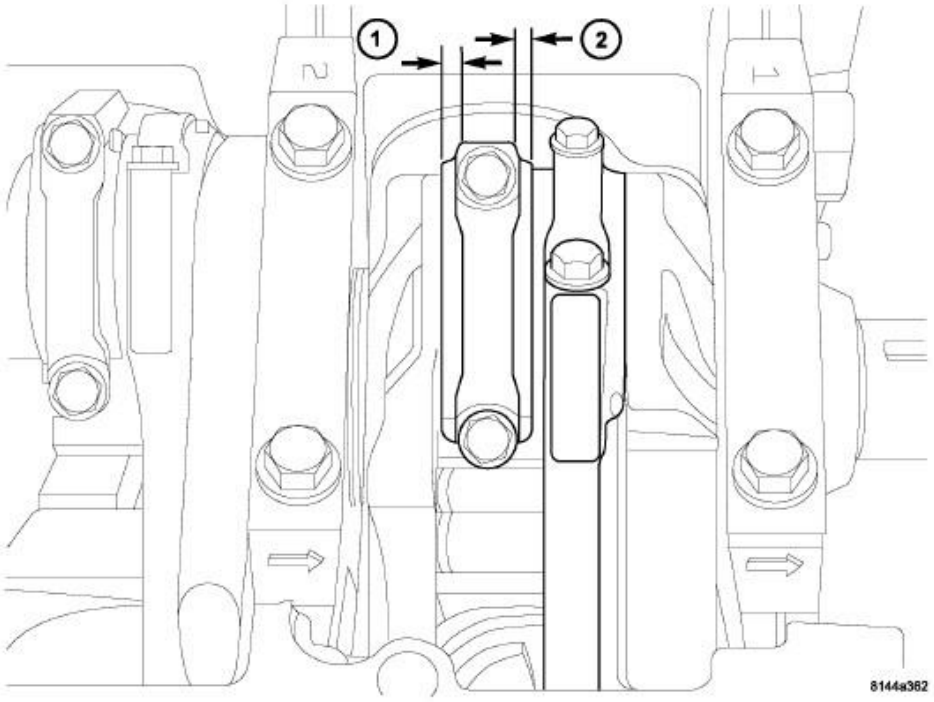


Fig. 213: Connecting Rod Proper Installation
Courtesy of CHRYSLER LLC

20. If required, measure the connecting rod side clearance. Refer to **Engine - Specifications**.

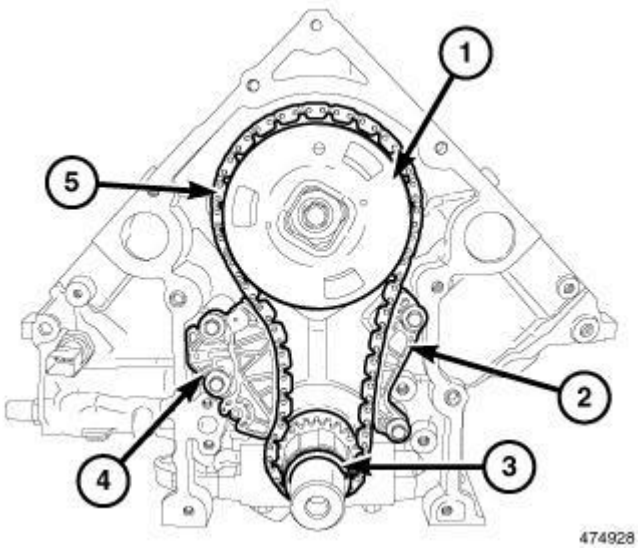


Fig. 214: Timing Chain, Sprockets, Timing Chain Tensioner & Guide
Courtesy of CHRYSLER LLC

21. Install the timing chain (5) and sprockets (1, 3). Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION, 5.7L**.

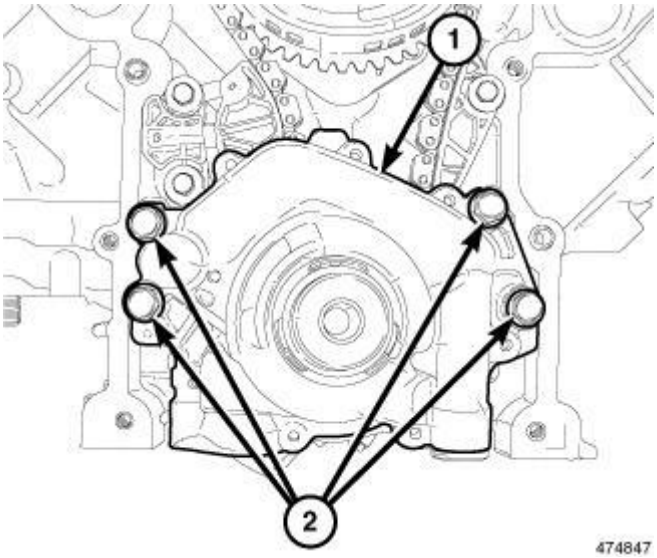


Fig. 215: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER LLC

22. Install the oil pump (1). Refer to **PUMP, ENGINE OIL, INSTALLATION, 5.7L**.
23. Install the timing chain case cover (1). Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.

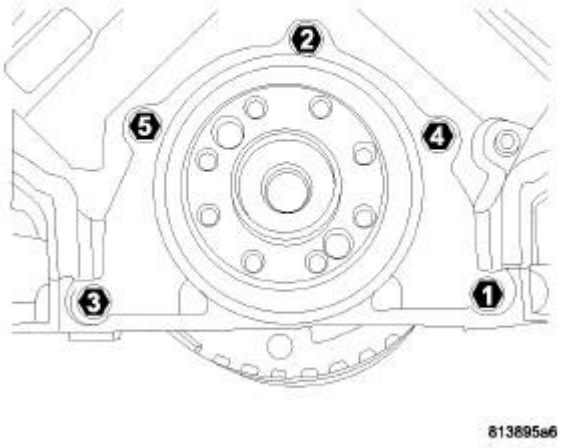


Fig. 216: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

24. Install the rear main seal and retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION, 5.7L**.

25. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
26. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.
27. Install the engine. Refer to **INSTALLATION, 5.7L**.
28. Start the engine and check for leaks.
29. Road test the vehicle.

DAMPER, VIBRATION

DESCRIPTION

DESCRIPTION

The crankshaft damper is used to control the resonance that is produced by the engine. The Noise, Vibration, and Harshness (NVH) created from the crankshaft can be controlled by dissipating the torque energy through the damper.

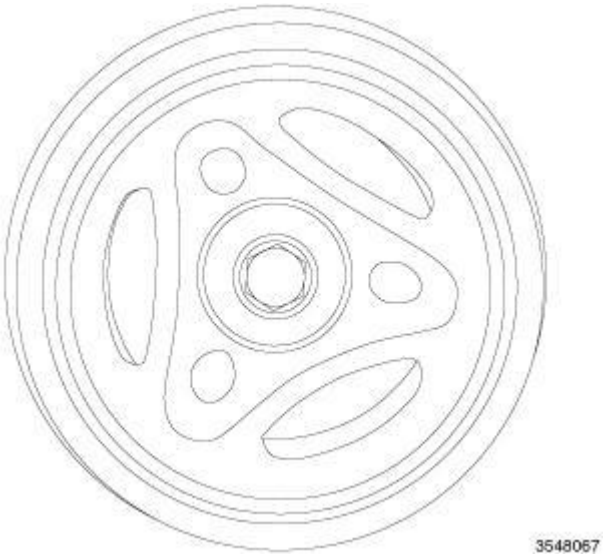


Fig. 217: Crankshaft Damper & Harden Steel Bolt
Courtesy of CHRYSLER LLC

The crankshaft damper on the engines is held to the crankshaft by means of a harden steel bolt. The damper is pressed onto a specific machined surface of the crankshaft.

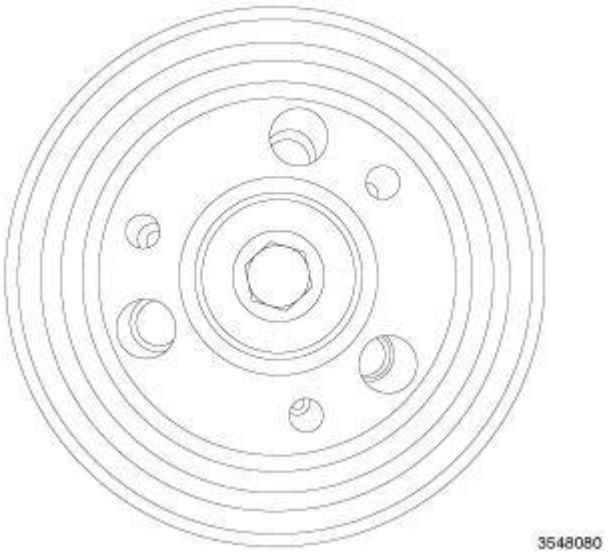


Fig. 218: HEMI® Engine Crankshaft Damper
Courtesy of CHRYSLER LLC

The HEMI® Engines incorporate various crankshaft vibration dampers depending on the engine application. And can be removed depending on the application used.

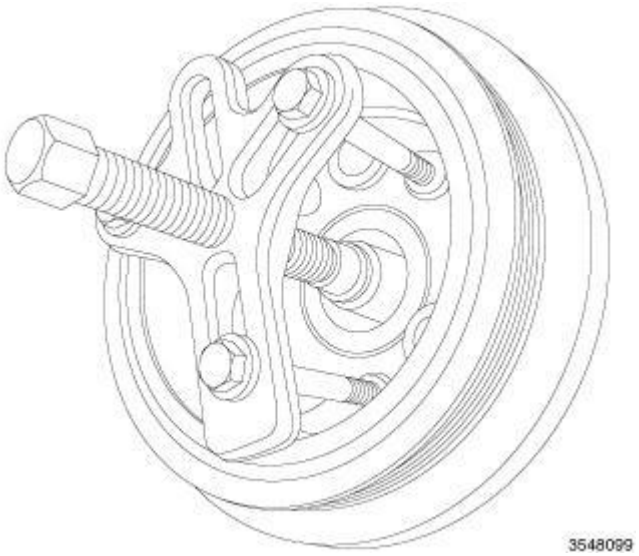


Fig. 219: Removing Vibration Damper
Courtesy of CHRYSLER LLC

Finding the proper puller for the application will ensure no damage will come to the damper. The flange puller is used by installing 3 bolts into the pre-tapped holes in the damper.

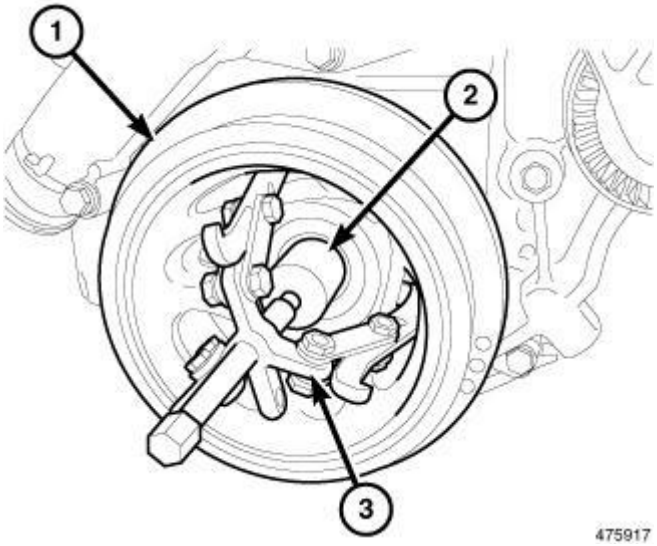


Fig. 220: Removing Vibration Damper
Courtesy of CHRYSLER LLC

Some pulleys that do not have bolt holes can be removed with a three jaw style (special tool #1023, Puller).

REMOVAL

REMOVAL

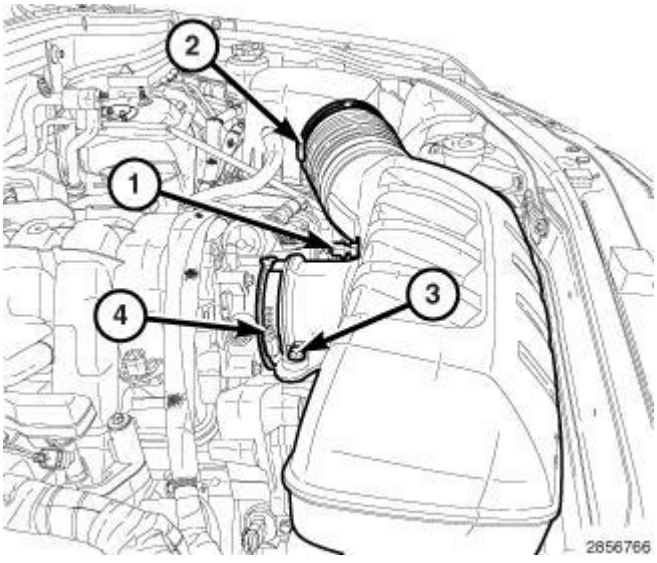


Fig. 221: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
3. Loosen the clean air hose clamp at the air cleaner housing (2).

4. Remove the resonator retaining bolt (3).
5. Loosen the resonator hose clamp at the throttle body (4) and remove the resonator.

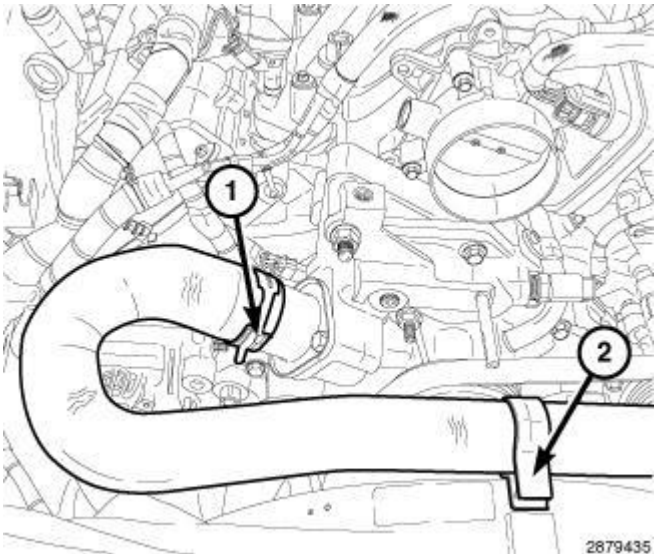


Fig. 222: Upper Radiator Hose Clamp & Retainer
Courtesy of CHRYSLER LLC

6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
7. Remove the upper radiator hose clamp (1) at the thermostat housing.
8. Remove the upper radiator hose retainer (2) at the fan shroud and position the radiator hose aside.

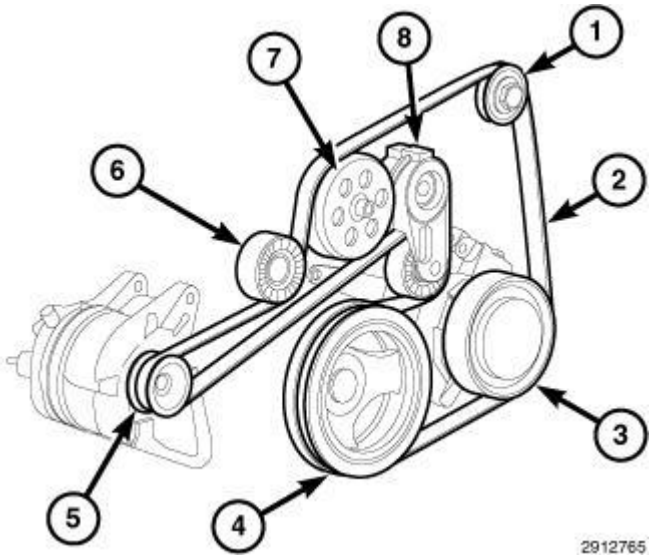


Fig. 223: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER LLC

9. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .

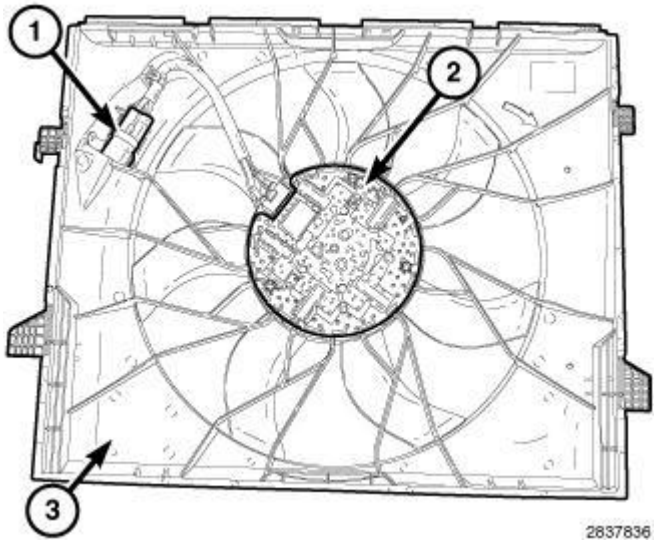


Fig. 224: Cooling Fan Motor Assembly
Courtesy of CHRYSLER LLC

10. Remove the cooling fan module. Refer to **FAN, COOLING, REMOVAL** .

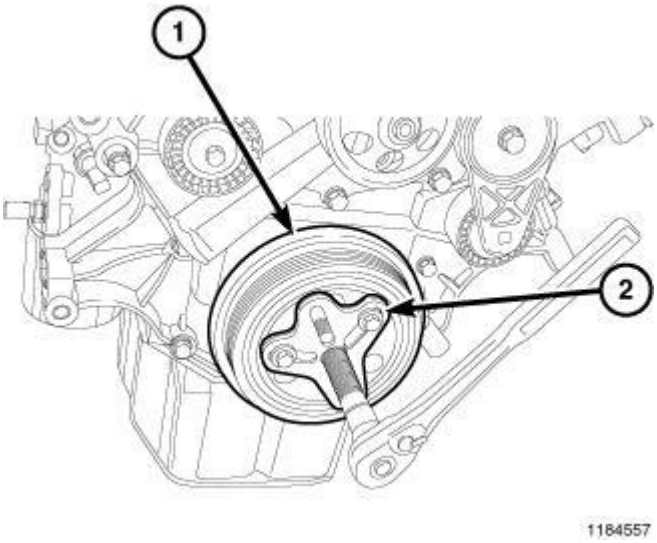


Fig. 225: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER LLC

11. Remove the crankshaft damper bolt.

NOTE: When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.

12. Install puller tool (2) and remove the crankshaft damper (1).

INSTALLATION

INSTALLATION

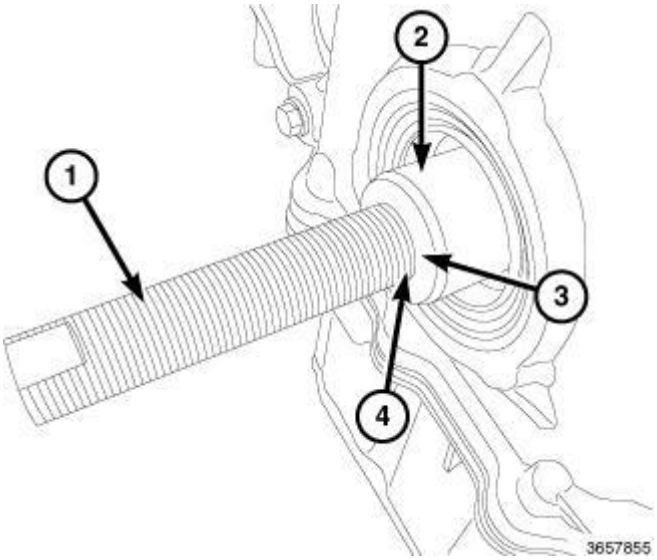


Fig. 226: Installing Vibration Damper Onto Crankshaft Using Special Tool
Courtesy of CHRYSLER LLC

1. Using (special tool #10387, Installer, Vibration Damper). Install the threaded rod (1) into the face of the crankshaft (3) till the face of the rod (4) bottoms out.

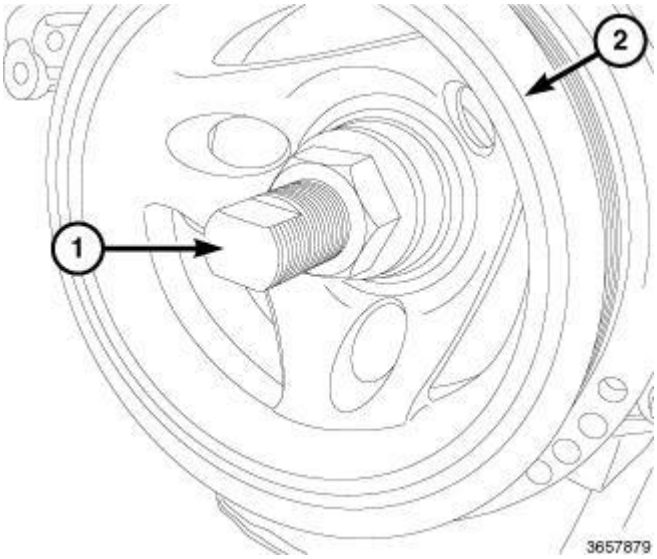


Fig. 227: Installing Vibration Damper
Courtesy of CHRYSLER LLC

2. Position the vibration damper (2) on the crankshaft.
3. Using Damper Installer (1) and a deep well socket, press the damper onto the crankshaft till seated.
4. Remove the Damper Installer tool (1) and install the crankshaft damper bolt. Tighten the bolt to 176 N.m (129 ft. lbs.).

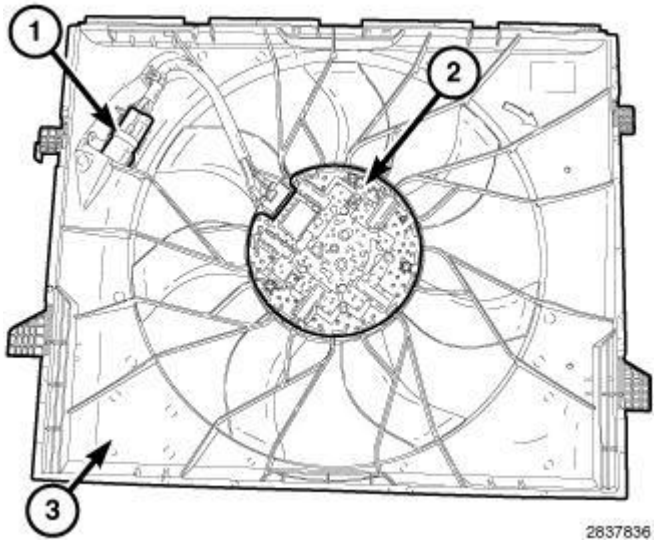


Fig. 228: Cooling Fan Motor Assembly
Courtesy of CHRYSLER LLC

5. Install the cooling fan module. Refer to **FAN, COOLING, INSTALLATION** .

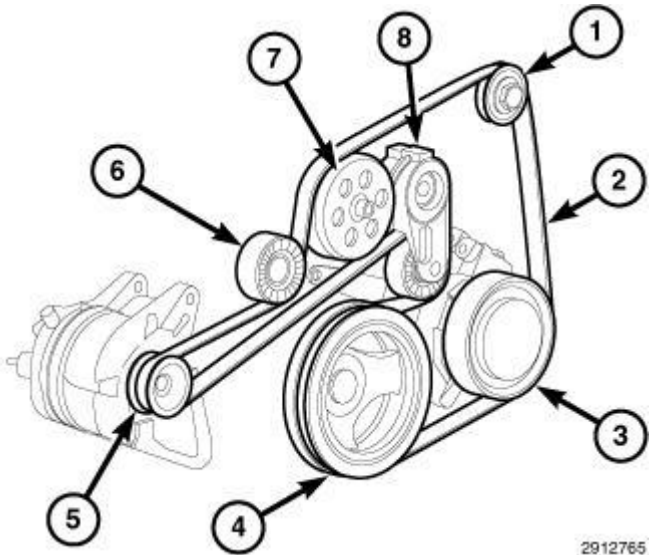


Fig. 229: Drive Belt Tensioners & Assembly With Drive Belt Routing
Courtesy of CHRYSLER LLC

6. Install serpentine belt (1). Refer to **BELT, SERPENTINE, INSTALLATION** .

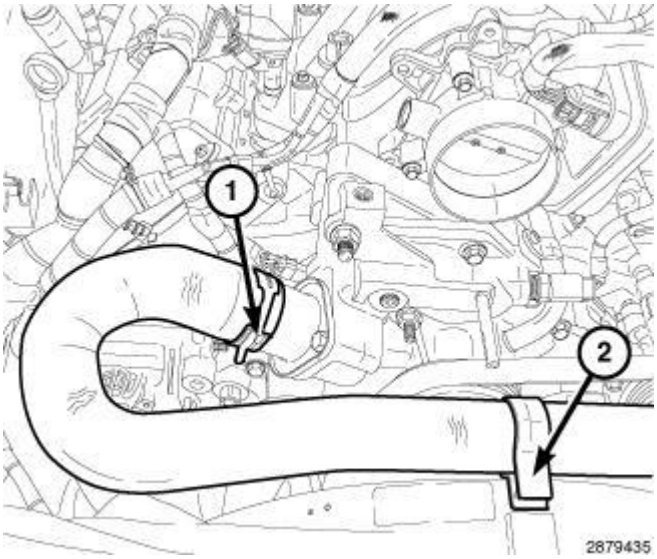


Fig. 230: Upper Radiator Hose Clamp & Retainer
Courtesy of CHRYSLER LLC

7. Position the upper radiator hose and secure retainer (2) at the fan shroud.
8. Install the upper radiator hose at the thermostat housing and secure hose clamp (1).
9. Install the air cleaner resonator support bracket at the water pump.

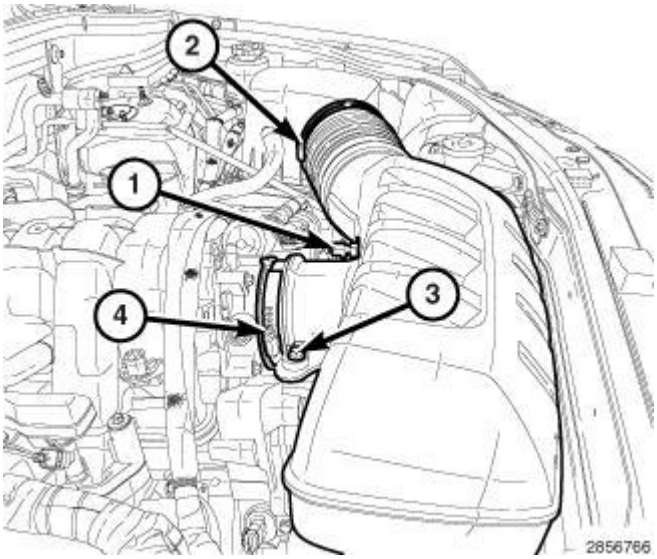


Fig. 231: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

10. Connect the resonator hose at the throttle body and tighten clamp (4) to 5 N.m (44 in. lbs.).
11. Install the resonator retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
12. Connect the clean air hose at the air cleaner housing and tighten clamp (2) to 5 N.m (44 in. lbs.).
13. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (1).

14. Refill the cooling system. Refer to **STANDARD PROCEDURE** .
15. Connect the negative battery cable.

FLEXPLATE

REMOVAL

REMOVAL

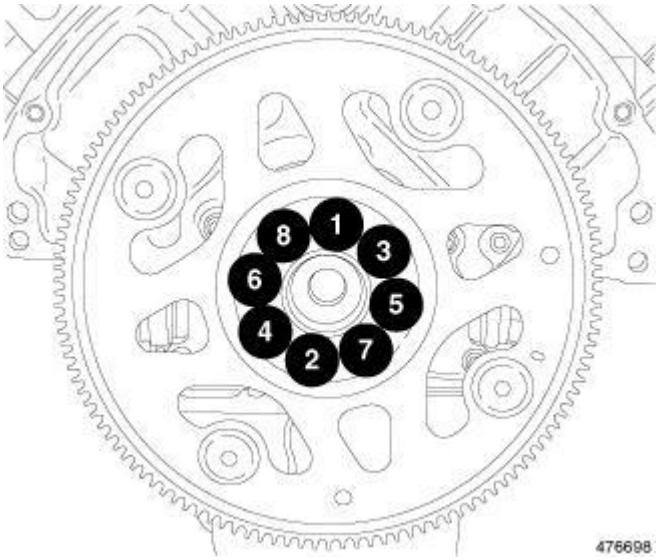


Fig. 232: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Using the sequence shown in illustration, remove the flexplate retaining bolts.
3. Remove the flexplate.

INSTALLATION

INSTALLATION

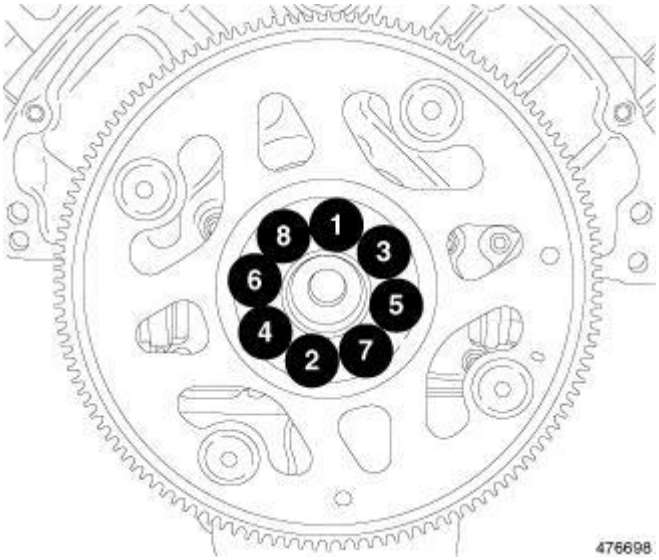


Fig. 233: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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 **INSTALLATION** .

LIFTER(S), HYDRAULIC, ROLLER

DESCRIPTION

DESCRIPTION

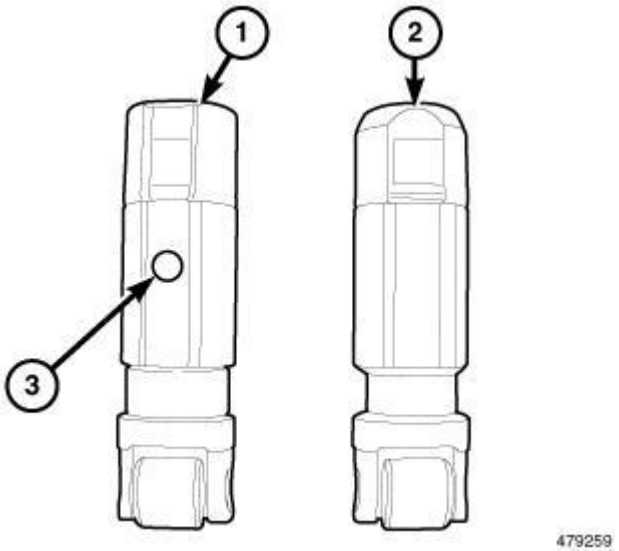


Fig. 234: MDS Lifter
Courtesy of CHRYSLER LLC

The Multiple Displacement System (MDS) selectively deactivates cylinders 1, 4, 6 and 7 during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

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

The MDS deactivating lifter (1) can be distinguished from the non-MDS lifter (2) by the disconnecting pin (3) on the side of the MDS lifter.

MDS is integrated into the basic engine architecture requiring these additional components:

- Unique MDS camshaft
- 8 deactivating roller lifters
- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

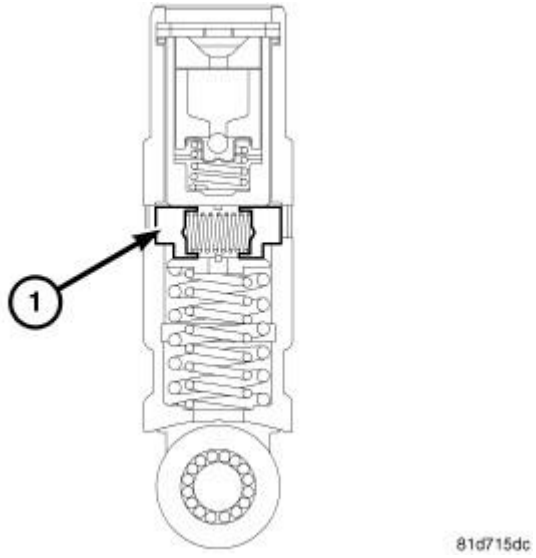


Fig. 235: MDS Lifter Cross Section
Courtesy of CHRYSLER LLC

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 to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages drilled into the cylinder block. The MDS solenoid valves control

the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is 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 engines that use MDS.

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No fuel/air enters or leaves during subsequent piston strokes, this high pressure gas is repeatedly compressed and expanded like an air spring.

DIAGNOSIS AND TESTING

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.

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.

LOW

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

TAPPET NOISE DIAGNOSIS

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

NOTE: Worn valve guides or cocked springs are sometimes mistaken for noisy

tappets. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not appreciably reduced, it can be assumed the noise is in the tappet. Inspect the rocker arm pushrod sockets and pushrod ends for wear.

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

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.

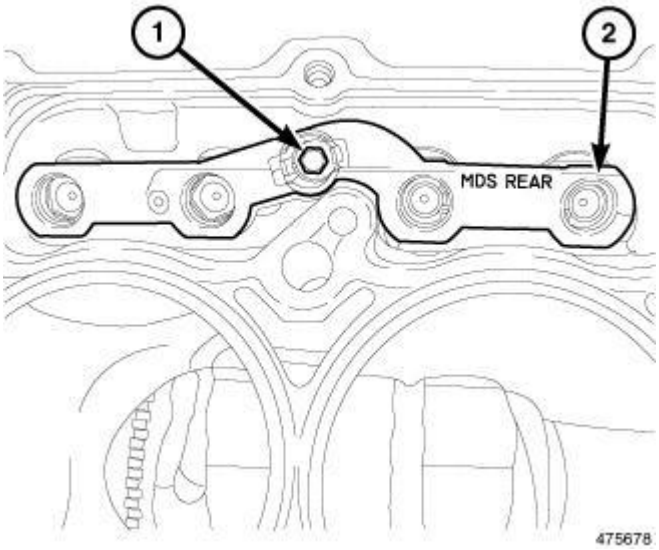


Fig. 236: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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

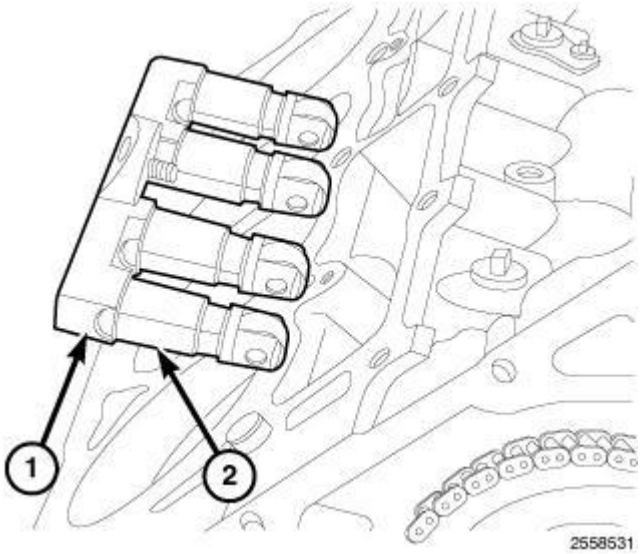


Fig. 237: Tappet Guide Holder Assembly
Courtesy of CHRYSLER LLC

CAUTION: The lifter and retainer assembly must be installed as a unit.

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

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

INSTALLATION

INSTALLATION

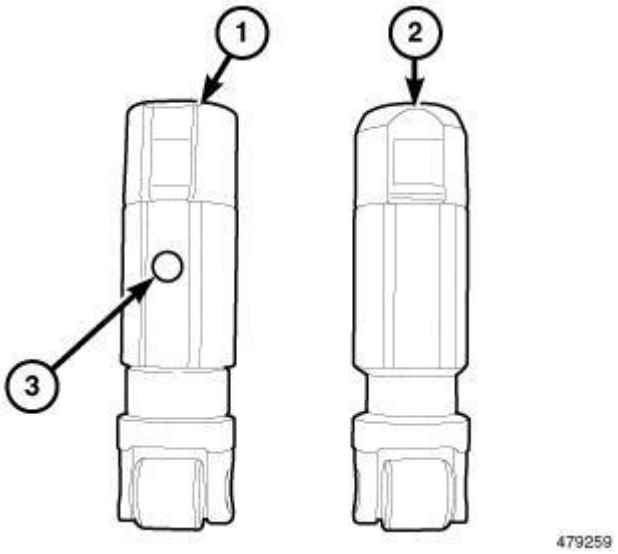


Fig. 238: MDS Lifter
Courtesy of CHRYSLER LLC

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 lifters (2) and deactivating roller lifters (1). The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body (3), for the latching pins.

CAUTION: The lifter and retainer assembly must be installed as a unit.

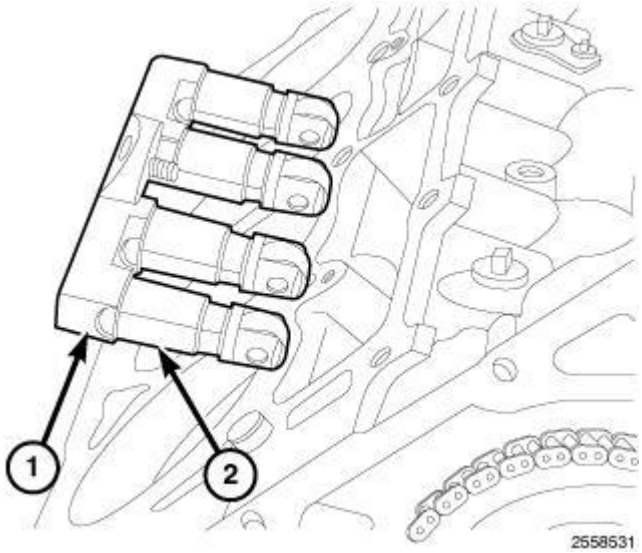


Fig. 239: Tappet Guide Holder Assembly

Courtesy of CHRYSLER LLC

1. Lubricate the lifter guide holder (1) and lifters (2).

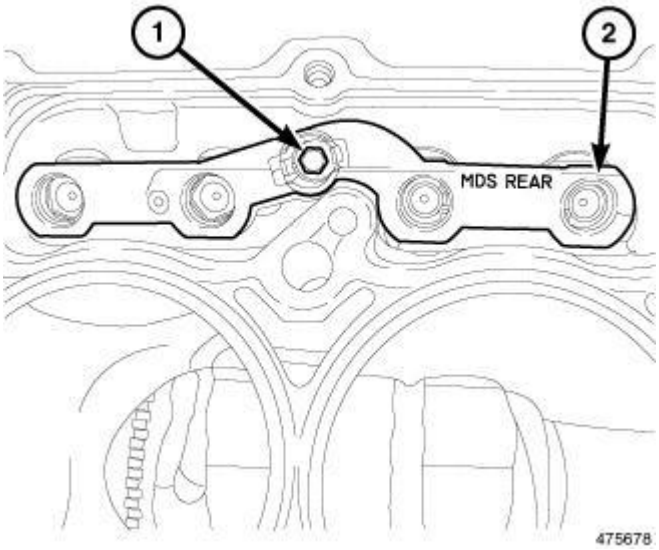


Fig. 240: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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

2. Install the lifter guide holder (2) and lifters.
3. Tighten the lifter guide holder retaining bolt (1) to 12 N.m (9 ft. lbs.).
4. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.
5. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic lifters 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

DIAGNOSIS AND TESTING - REAR SEAL AREA LEAKS

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

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

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

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
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 Engine Components service information for proper repair procedures of these items.
4. If no leaks are detected, pressurize the crankcase as outlined **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. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.

REMOVAL

REMOVAL

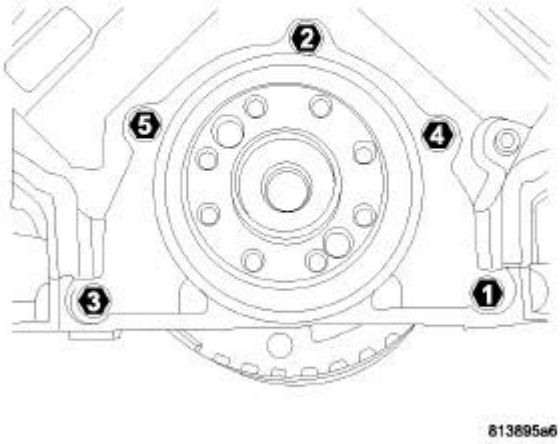


Fig. 241: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

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 appropriate Transmission Service Information article.
3. Remove the flexplate. Refer to **FLEXPLATE, REMOVAL, 5.7L**.
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
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

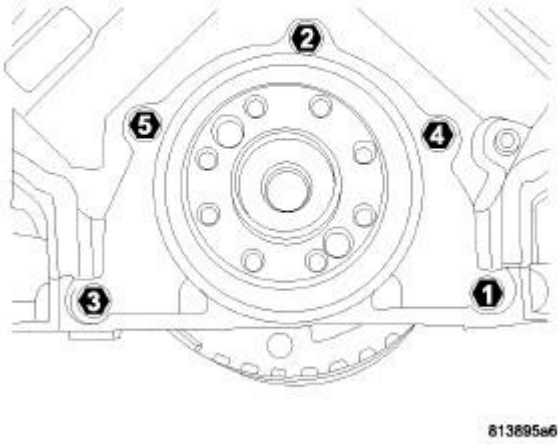


Fig. 242: Rear Seal Retainer Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

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. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
6. Install the flexplate. Refer to **FLEXPLATE, INSTALLATION, 5.7L**.
7. Install the transmission. Refer to appropriate Transmission Service Information article.
8. Fill the engine with oil.
9. Start the engine and check for leaks.

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON RING FITTING

PISTON RING END GAP

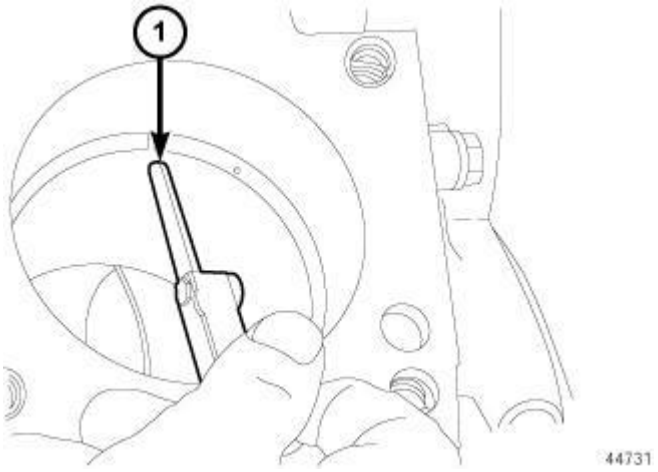


Fig. 243: Checking Piston Ring End Gap Using Feeler Gauge
Courtesy of CHRYSLER LLC

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.

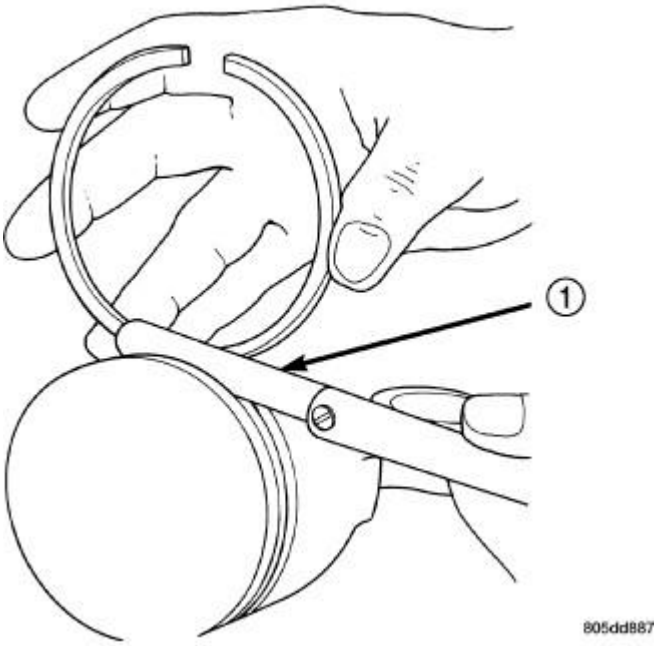


Fig. 244: Measuring Piston Ring Side Clearance
Courtesy of CHRYSLER LLC

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.

PISTON RING INSTALLATION

Fig. 245: Installing Piston 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.

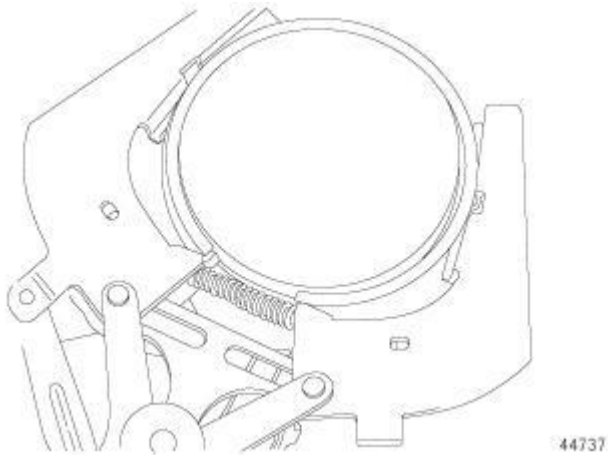


Fig. 246: Installing Upper & Intermediate Rings
Courtesy of CHRYSLER LLC

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

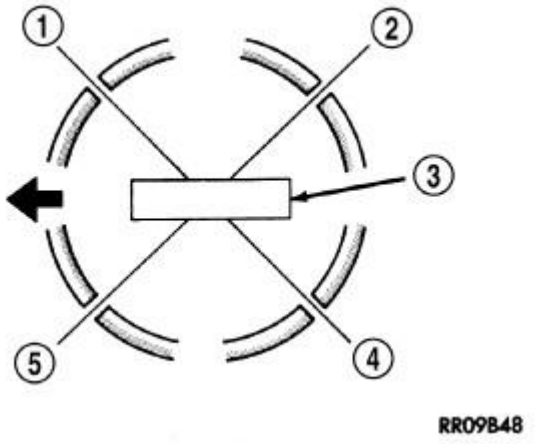


Fig. 247: Piston Ring End Gap Position
Courtesy of CHRYSLER LLC

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

NOTE: Staggering ring gap is important for oil control.

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

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

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

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

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON FITTING

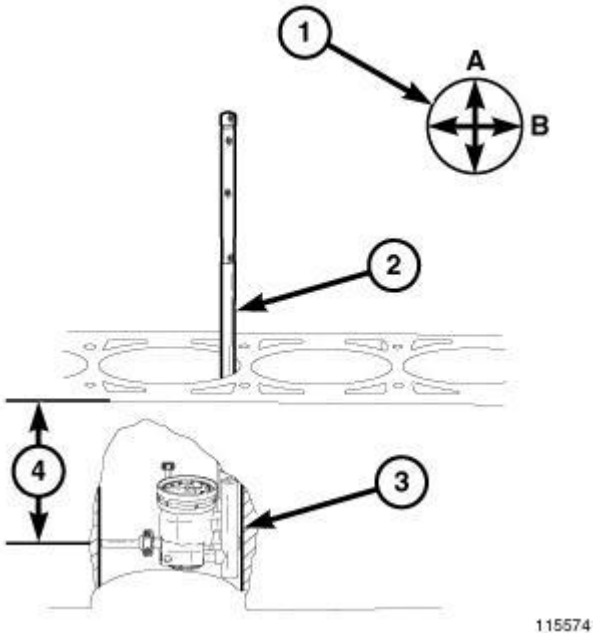


Fig. 248: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER LLC

1. To correctly select the proper size piston, use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to measure the inside diameter of the cylinder bore (3). A cylinder bore gauge 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 the top of bore (4). Start perpendicular (across or at 90°) to the axis of the crankshaft at point A (1) and then take an additional bore reading 90° at point B (1).
3. The coated pistons will be serviced with the piston pin and connecting rod pre-assembled. The piston-rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder bank (even

numbered) and must not be interchanged.

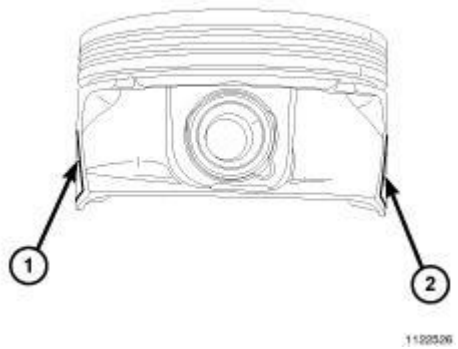


Fig. 249: Piston Diameter Measuring Points
Courtesy of CHRYSLER LLC

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

REMOVAL

REMOVAL

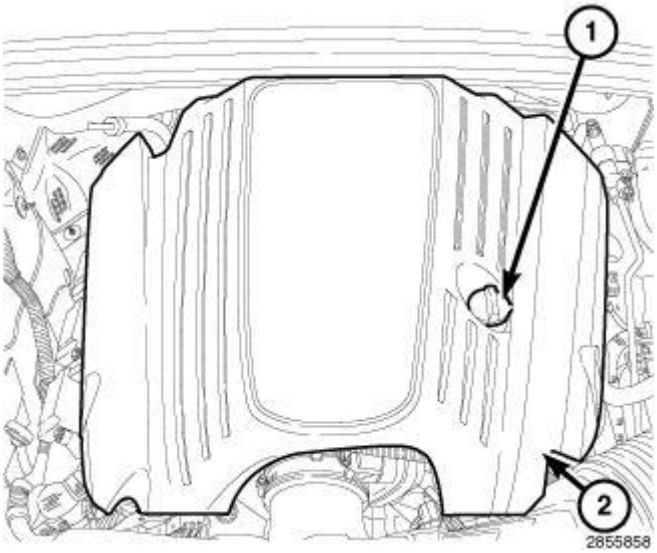


Fig. 250: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Remove the engine cover (2).

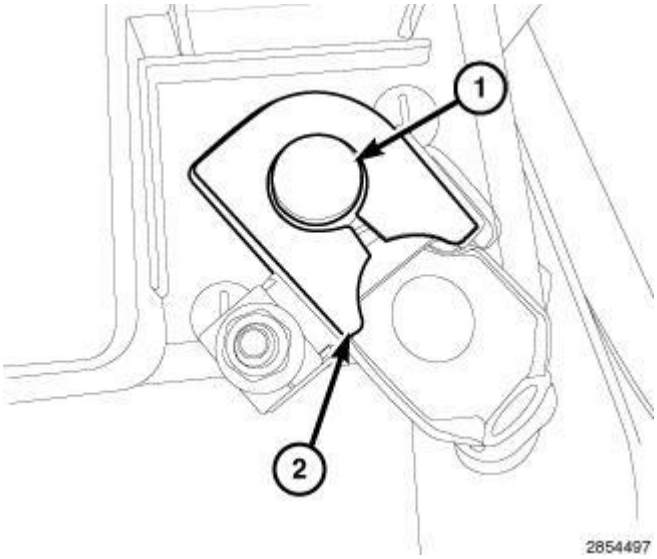


Fig. 251: Negative Battery Cable
Courtesy of CHRYSLER LLC

3. Disconnect and isolate the negative battery cable (3).
4. Remove the engine from the vehicle. Refer to **REMOVAL, 5.7L**.
5. Place the engine on a suitable engine stand.

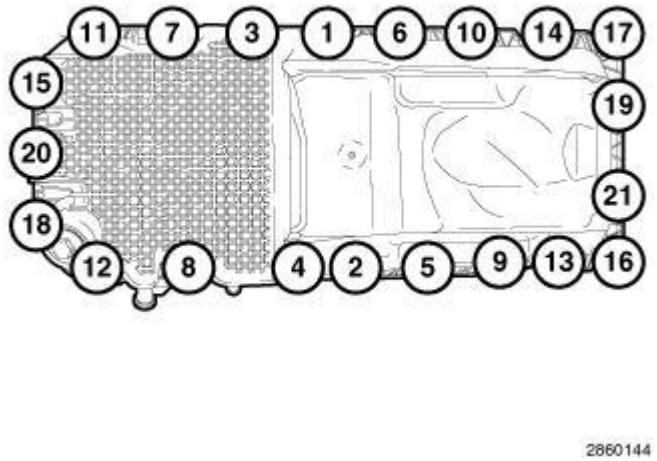


Fig. 252: Remove/Install Oil Pan Retaining Bolts
Courtesy of CHRYSLER LLC

NOTE: The oil pump pickup tube, windage tray and oil pan is one assembly. When the oil pan is removed, a new oil pan gasket and pickup tube O-ring must be installed. The old gasket and O-ring cannot be reused.

6. Remove the engine oil dipstick.

7. Using the sequence shown in illustration, remove the oil pan retaining bolts.
8. Remove the oil pan and discard the oil pan gasket and pickup tube O-ring.
9. Clean the sealing surfaces as necessary.

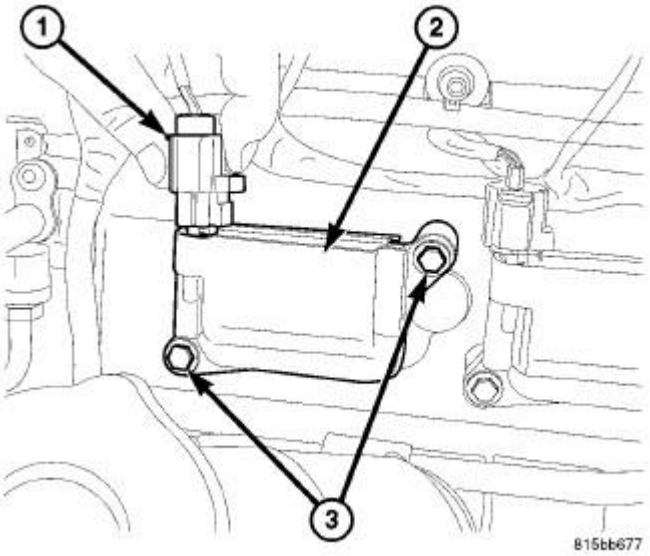


Fig. 253: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

10. Remove the ignition coil retaining bolts (3).
11. Remove the ignition coils (2).

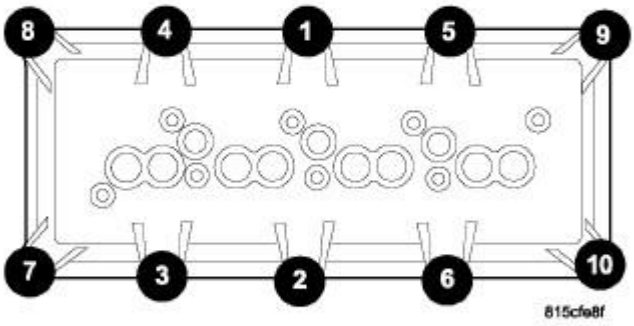


Fig. 254: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

12. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts.
13. Remove the cylinder head cover (2).

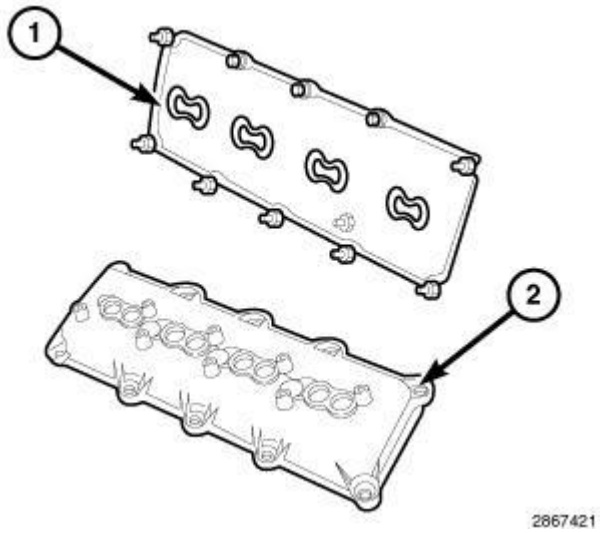


Fig. 255: Cylinder Head Cover Gasket & Cylinder Head Cover
Courtesy of CHRYSLER LLC

NOTE: The cylinder head cover gasket (1) may be used again, provided no cuts, tears, or deformation have occurred.

14. Inspect the cylinder head cover gasket (1), replace if necessary.

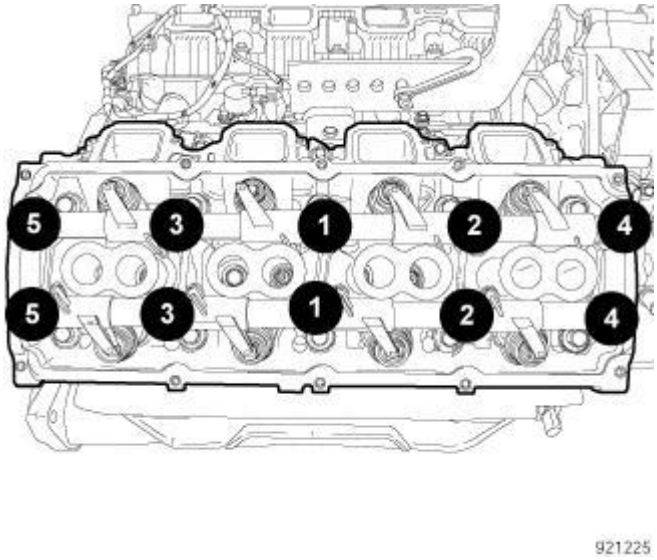


Fig. 256: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

NOTE: The rocker arms and push rods must be installed in their original location as removed.

15. Remove the rocker arms and push rods. Note their location to ensure installation in their original locations as removed. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.

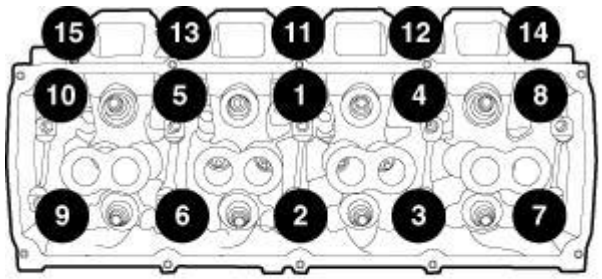


Fig. 257: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

16. Using the sequence shown in illustration, remove the cylinder head bolts.
17. Remove the cylinder head(s) and discard the cylinder head gasket(s).
18. 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.**

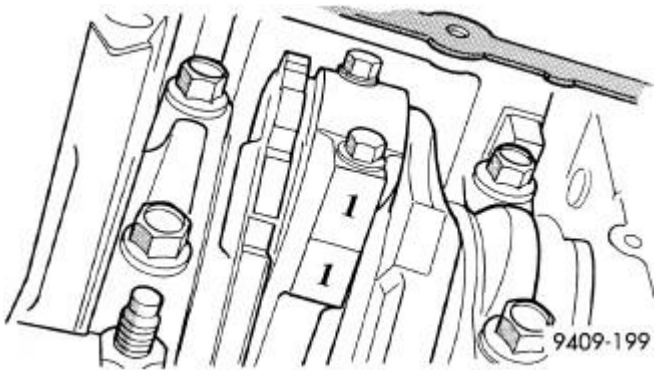


Fig. 258: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER LLC

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

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

19. Mark the connecting rod and bearing cap positions using a permanent ink marker or scribe tool.

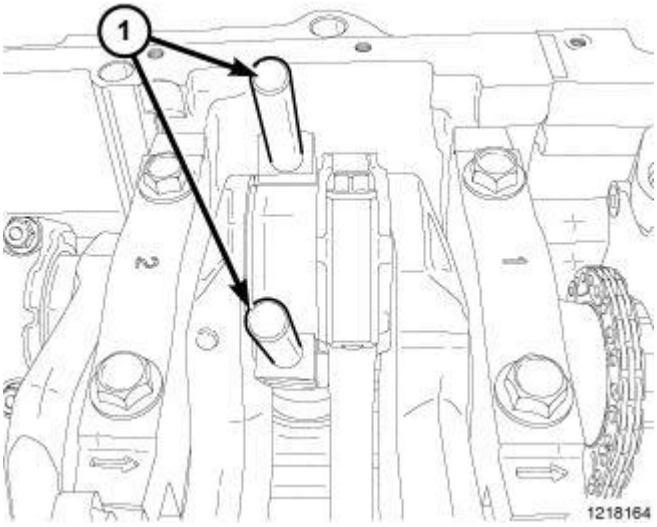


Fig. 259: Connecting Rod Guides
Courtesy of CHRYSLER LLC

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 rod 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.

20. Perform the measure bearing clearance procedure. Refer to **Engine/Engine Block - Standard Procedure**.
21. Remove the connecting rod cap, install the Connecting Rod Guides (special tool #8507, Guides, Connecting Rod) (1) and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.

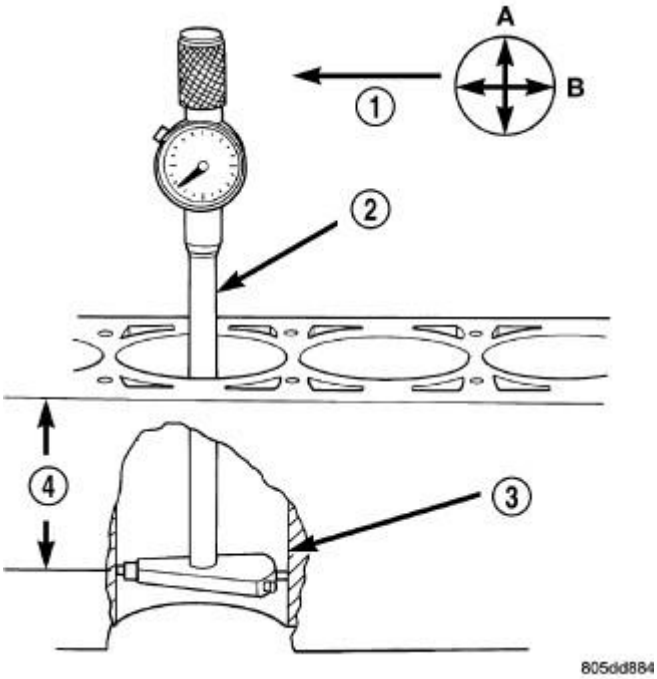


Fig. 260: Measuring Cylinder Bore Diameter Using Dial Bore Gauge
Courtesy of CHRYSLER LLC

22. 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.
23. Perform the piston and connecting rod inspection. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Inspection**.
24. Perform the piston fitting procedure. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.
25. Carefully remove the piston rings from the piston(s), starting from the top ring down.
26. Perform the cylinder bore honing procedure. Refer to **Engine/Engine Block - Standard Procedure**.

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. Refer to **Engine/Engine Block/ROD, Piston and Connecting - Standard Procedure**.

Check the connecting rod for signs of twist or bending.

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

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

INSTALLATION

INSTALLATION

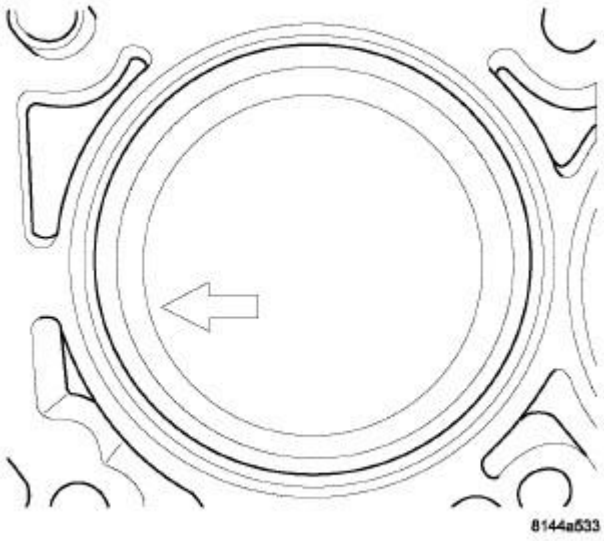


Fig. 261: Piston Direction Arrow
Courtesy of CHRYSLER LLC

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

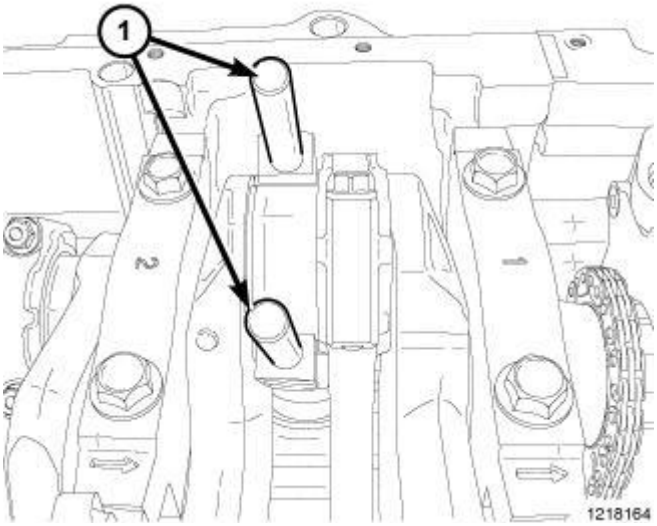


Fig. 262: Connecting Rod Guides
Courtesy of CHRYSLER LLC

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

4. Install Connecting Rod Guides (special tool #8507, Guides, Connecting Rod) (1) into the connecting rod bolt threads.

NOTE: The pistons are marked on the piston pin bore surface with an raised "F" or an arrow on top of piston indicating installation position. This mark must be pointing toward the front of engine on both cylinder banks.

5. Wipe the cylinder bore clean and lubricate with clean engine oil.
6. Rotate the crankshaft until the connecting rod journal is on the center of cylinder bore. Insert rod and piston assembly into the cylinder bore and carefully position connecting rod guides over crankshaft journal.
7. Tap the piston down into the cylinder bore using a hammer handle. While guiding the connecting rod into position on the rod journal.
8. Remove the connecting rod guides.

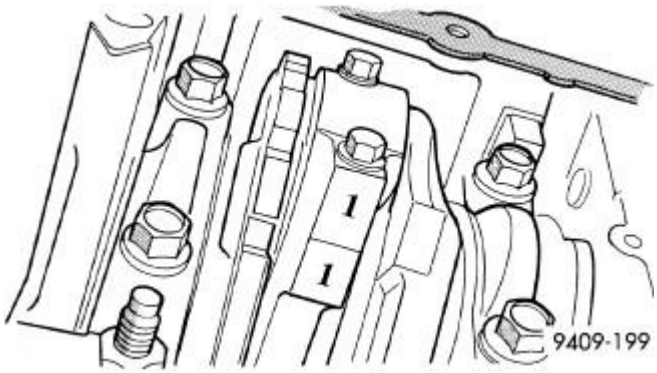


Fig. 263: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER LLC

9. Wipe the connecting rod cap clean and install the rod bearing.

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

10. Lubricate the bearing surfaces with clean engine oil and install the bearing and connecting rod cap onto the connecting rod journal in the same position as noted during removal.
11. Lubricate the new connecting rod bolts with clean engine oil and install the bolts finger tight.
12. Tighten the connecting rod bolts to 21 N.m (15 ft. lbs.) plus a 90° turn.

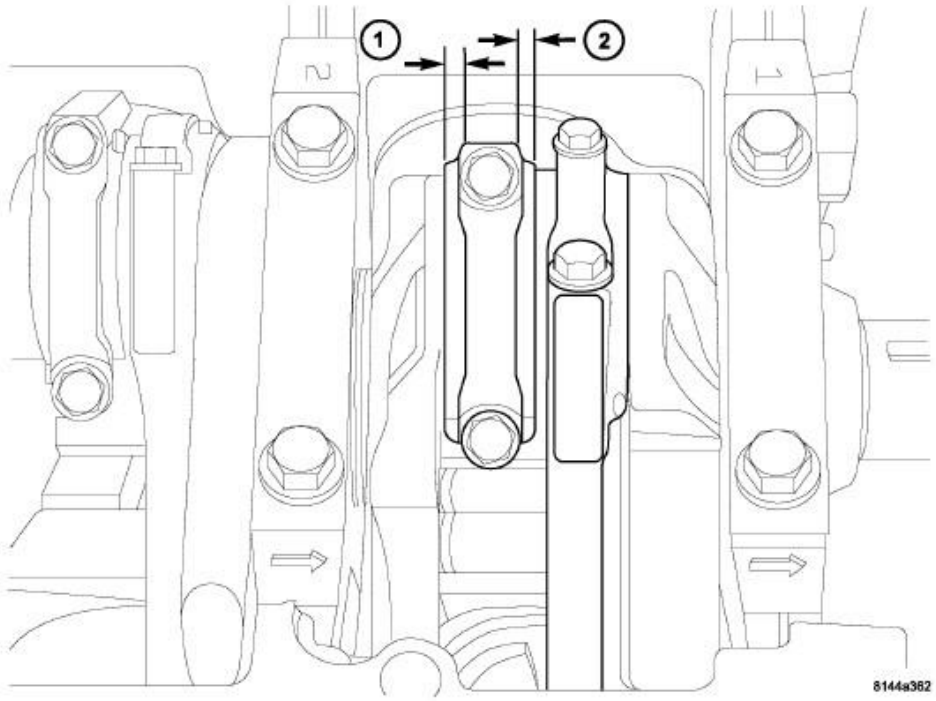


Fig. 264: Connecting Rod Proper Installation

Courtesy of CHRYSLER LLC

13. If required, measure the connecting rod side clearance. Refer to **Engine - Specifications**.
14. Repeat the previous steps for each piston and connecting rod assembly being installed.

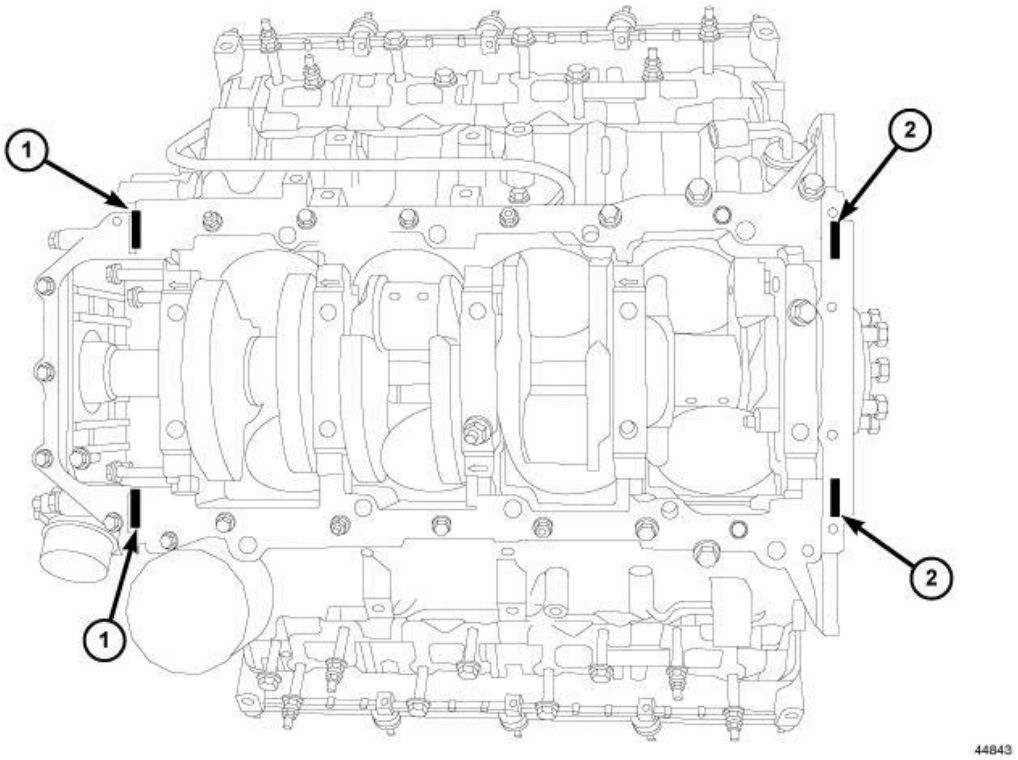


Fig. 265: T-Joint RTV Application
Courtesy of CHRYSLER LLC

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

NOTE: When the oil pan is removed, a new oil pan gasket and pickup tube O-ring must be installed. The old gasket and O-ring cannot be reused.

16. Install a new oil pan gasket and pickup tube O-ring.

NOTE: Mopar® Engine RTV must be applied to the 4 T-joints (1, 2) area where the front cover, rear retainer 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.

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

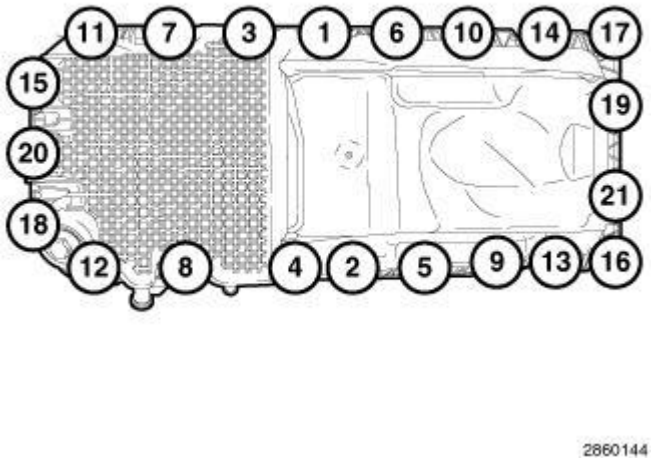


Fig. 266: Remove/Install Oil Pan Retaining Bolts
Courtesy of CHRYSLER LLC

18. Position the oil pan, install the mounting bolts and using the sequence shown in illustration, tighten to 12 N.m (9 ft. lbs.).
19. Install the engine oil dipstick.

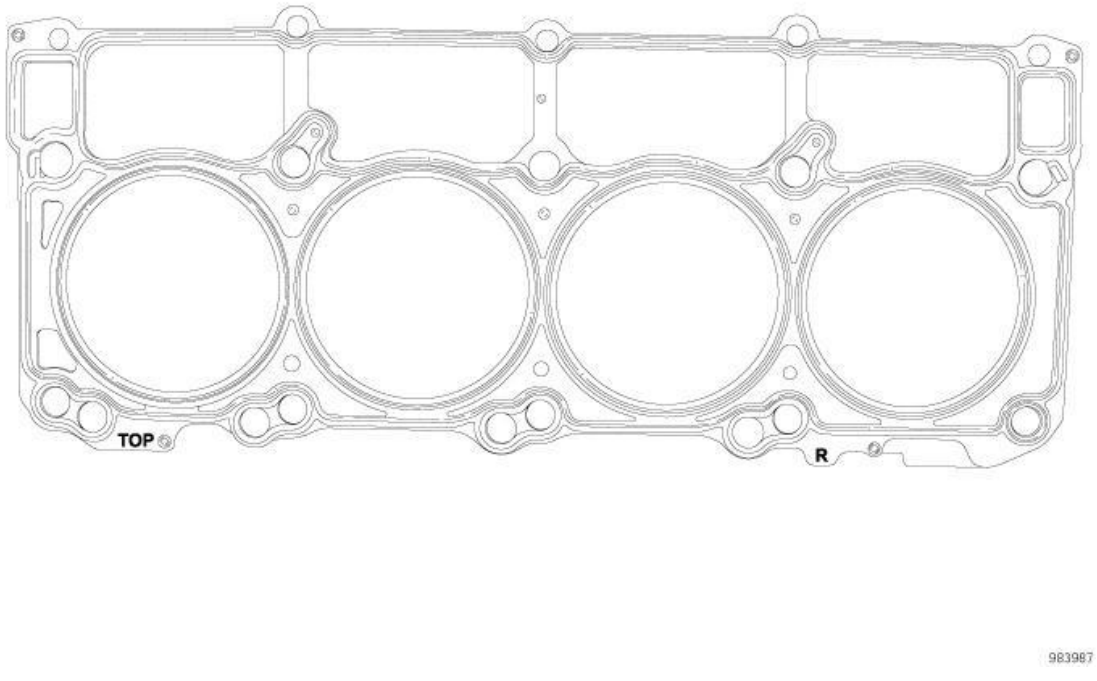
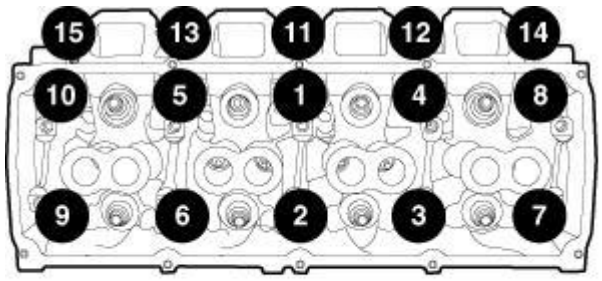


Fig. 267: Cylinder Head Gasket Markings
Courtesy of CHRYSLER LLC

Right cylinder head gasket shown in illustration, left cylinder head gasket similar.

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.

20. Using a suitable solvent, clean all sealing surfaces of the cylinder block and cylinder heads.
21. Position the new cylinder head gasket(s) (5) onto the cylinder block.
22. Position the cylinder head(s) (4) onto the cylinder head gasket (5) and cylinder block.



88745

Fig. 268: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

23. Using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 34 N.m (25 ft. lbs.).
24. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
25. Again using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 54 N.m (40 ft. lbs.).
26. Again using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (15 ft. lbs.).
27. Again using the sequence shown in illustration, rotate the cylinder head bolts 1 through 10 90°.
28. Again using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 34 N.m (25 ft. lbs.).

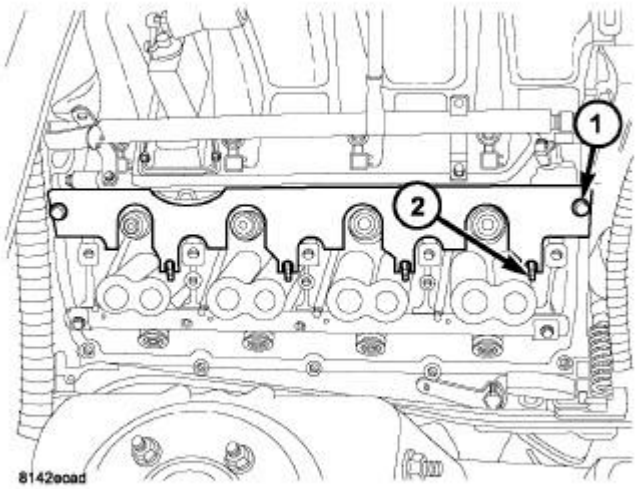


Fig. 269: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

Right cylinder head shown in illustration, left cylinder head similar.

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

29. Install the pushrods in the same position as noted during removal.
30. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

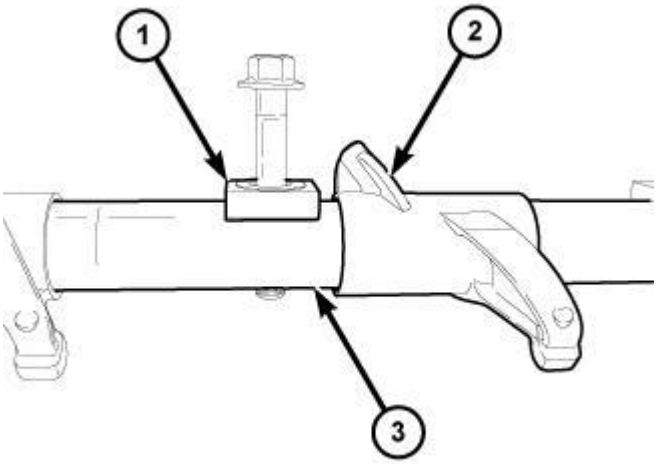


Fig. 270: Retainers, Rocker Arm & Rocker Shaft
Courtesy of CHRYSLER LLC

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

CAUTION: Verify the pushrod(s) are installed into the rocker arm(s) (2) and the tappet(s) correctly while installing the rocker shaft assembly (3) or engine damage could result. Recheck after the rocker shaft assembly has been tightened to specification.

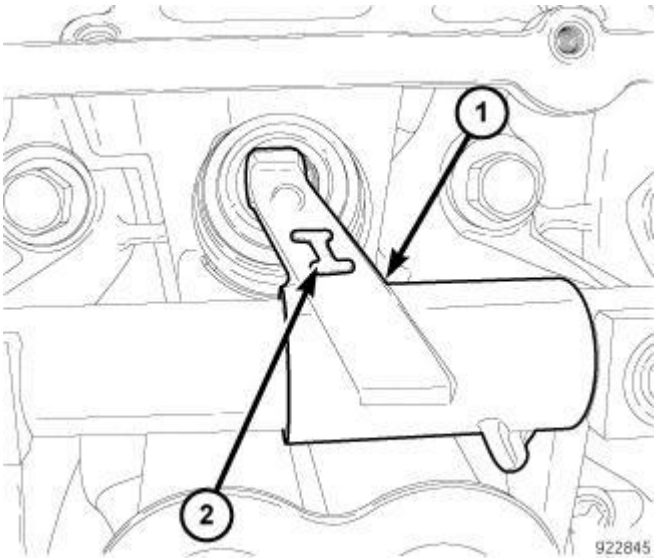


Fig. 271: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

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).

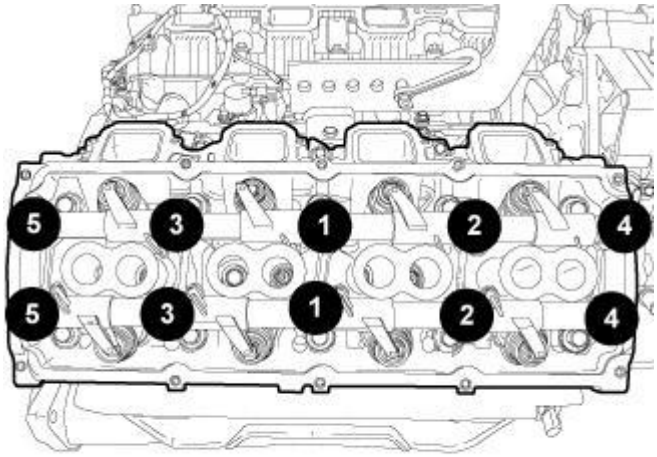


Fig. 272: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

31. Install the rocker shaft assemblies in the same position as noted during removal.
32. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

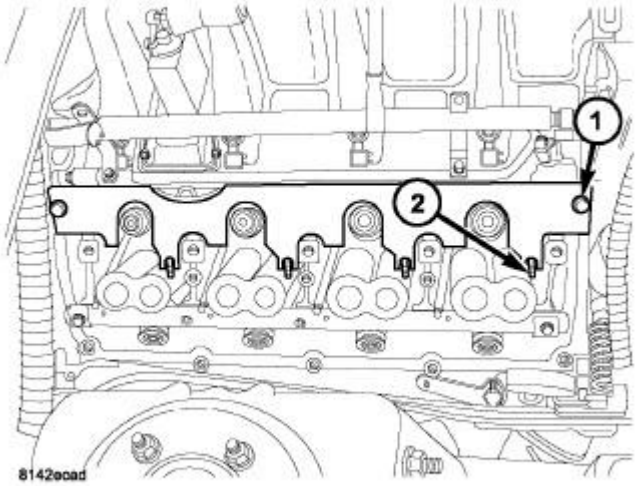


Fig. 273: Pushrod Retaining Plate
Courtesy of CHRYSLER LLC

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).

33. Remove the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

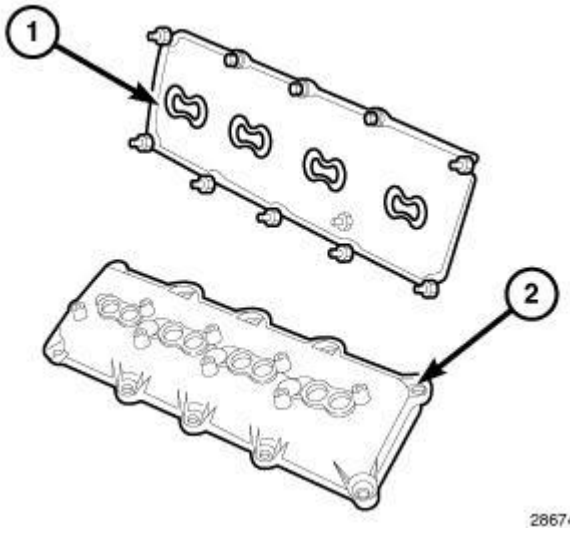


Fig. 274: Cylinder Head Cover Gasket & Cylinder Head Cover
Courtesy of CHRYSLER LLC

NOTE: The cylinder head cover gasket (1) may be used again, provided no cuts, tears, or deformation have occurred.

34. Inspect the cylinder head cover gasket (1), replace if necessary.

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

35. Clean the cylinder head cover (2) and the cylinder head sealing surface.
36. Apply Mopar® Lock & Seal Adhesive to the cylinder head cover bolts.
37. Position the cylinder head cover and gasket, install the retaining bolts finger tight.

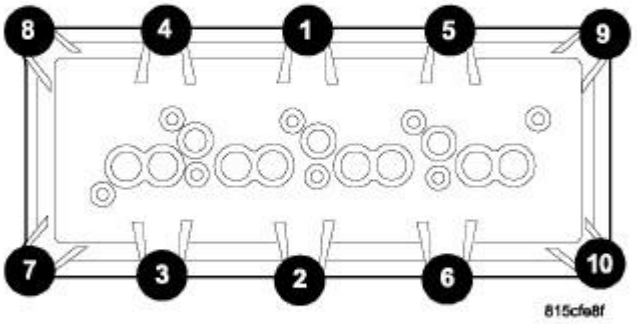


Fig. 275: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER LLC

38. Using the sequence shown in illustration, tighten the cylinder head cover bolts to 8 N.m (70 in. lbs.).

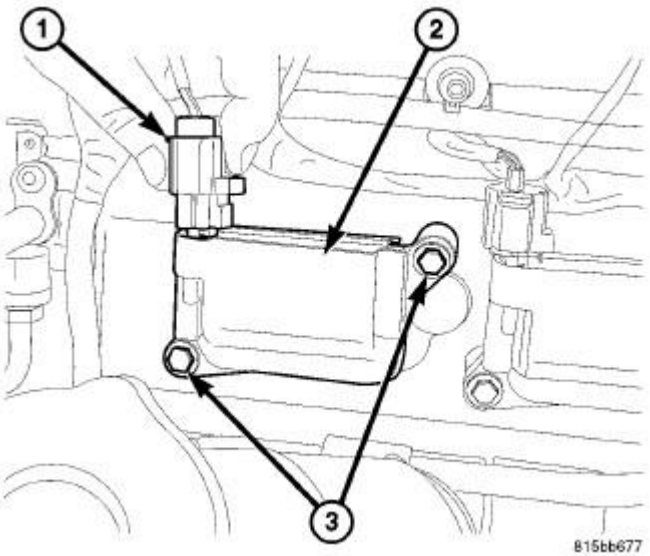


Fig. 276: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER LLC

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

39. Install the ignition coils (2).
40. Install the ignition coil retaining bolts (3) and tighten to 7 N.m (62 in. lbs.).
41. Install the engine into the vehicle. Refer to **INSTALLATION, 5.7L**.

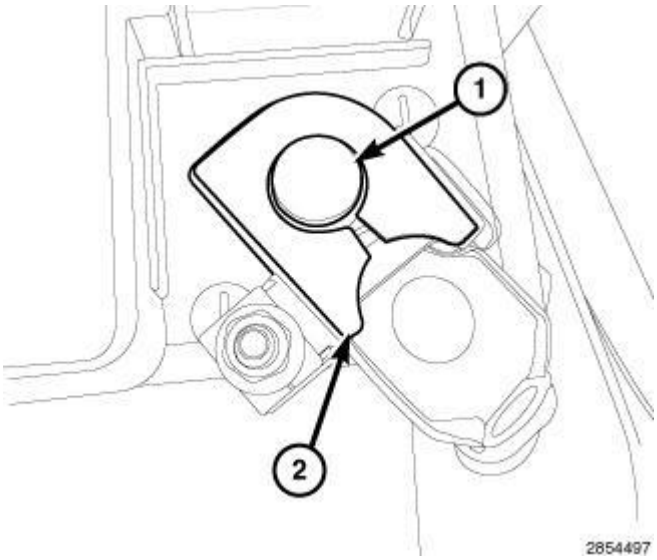


Fig. 277: Negative Battery Cable
Courtesy of CHRYSLER LLC

42. Connect negative cable to battery.

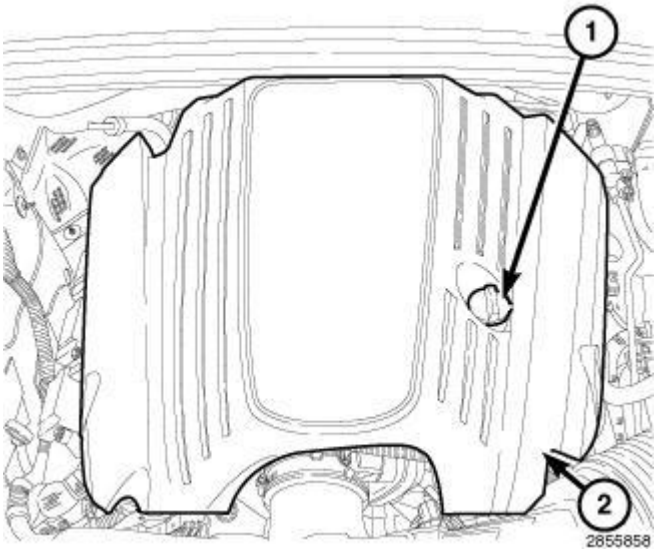


Fig. 278: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

43. Install the engine cover (2).
44. Fill the engine with the proper engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

45. Install the oil fill cap (1).
46. Fill the cooling system with the proper coolant. Refer to **STANDARD PROCEDURE** .
47. Start the engine and check for leaks.
48. Road test the vehicle.

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

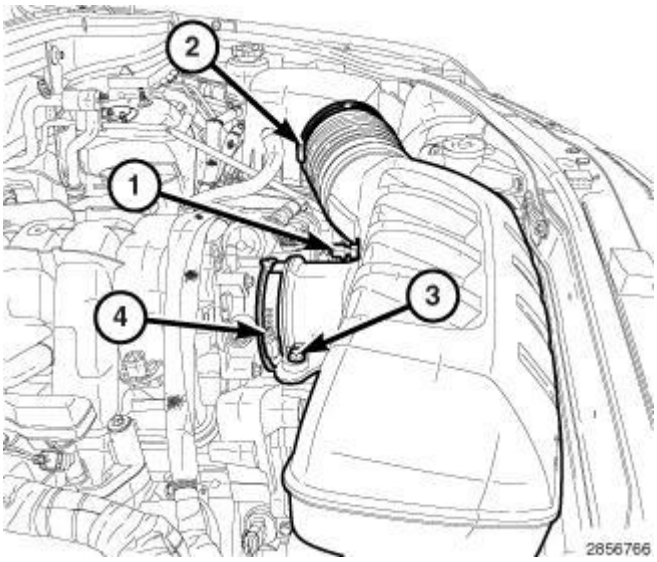


Fig. 279: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
3. Loosen the clean air hose clamp at the air cleaner housing (2).
4. Remove the resonator retaining bolt (3).
5. Loosen the resonator hose clamp at the throttle body (4) and remove the resonator.

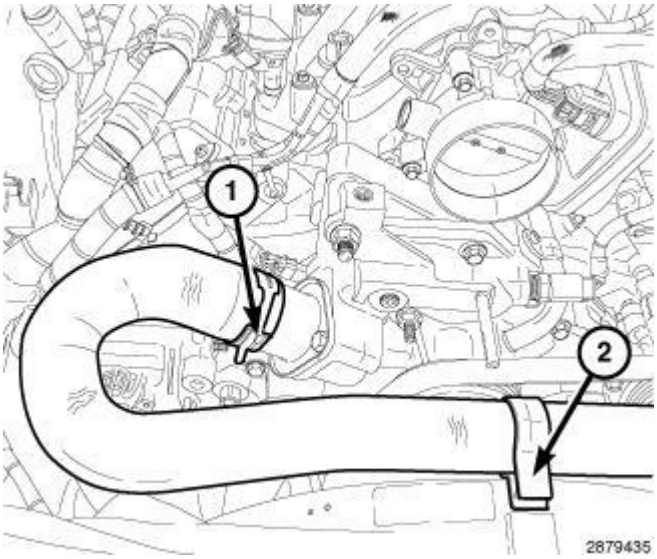


Fig. 280: Upper Radiator Hose Clamp & Retainer
Courtesy of CHRYSLER LLC

6. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
7. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
8. Remove the upper radiator hose clamp (1) at the thermostat housing.
9. Remove the upper radiator hose retainer (2) at the fan shroud and position the radiator hose aside.
10. Remove the cooling fan module. Refer to **FAN, COOLING, REMOVAL** .

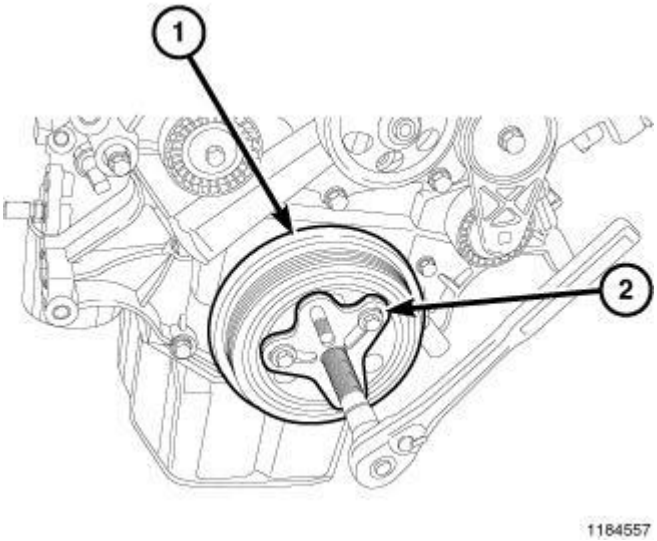


Fig. 281: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER LLC

11. Remove the crankshaft damper bolt.

NOTE: When installing the puller tool, ensure the bolts are fully threaded through

the entire crankshaft damper.

12. Install puller tool (2) and remove the crankshaft damper (1).

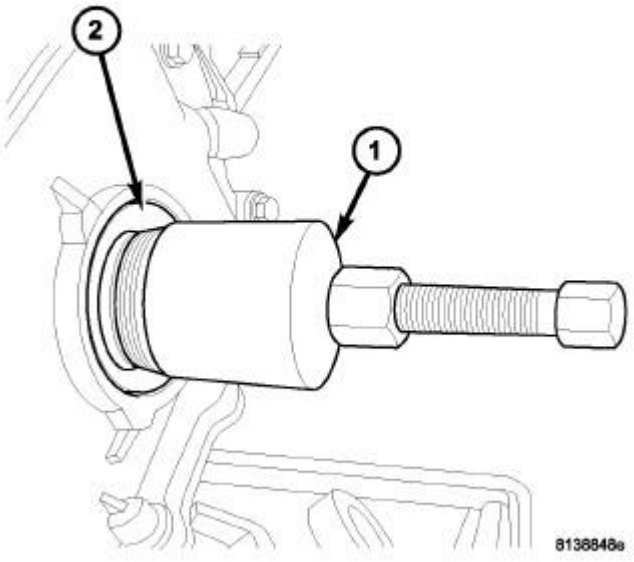


Fig. 282: Front Crankshaft Seal Removal
Courtesy of CHRYSLER LLC

13. Using Seal Remover (special tool #9071, Remover, Seal) (1), remove crankshaft front seal (2).

INSTALLATION

INSTALLATION

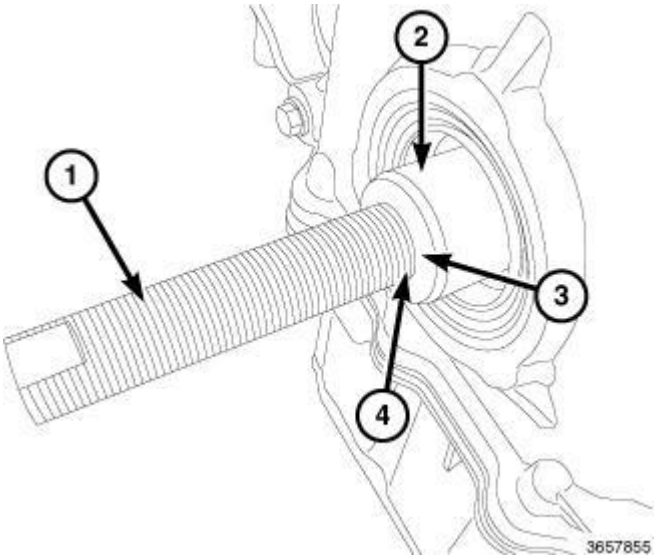


Fig. 283: Installing Vibration Damper Onto Crankshaft Using Special Tool
Courtesy of CHRYSLER LLC

1. Install the (special tool #10387, Installer, Vibration Damper) threaded rod (1) onto the crankshaft (2).

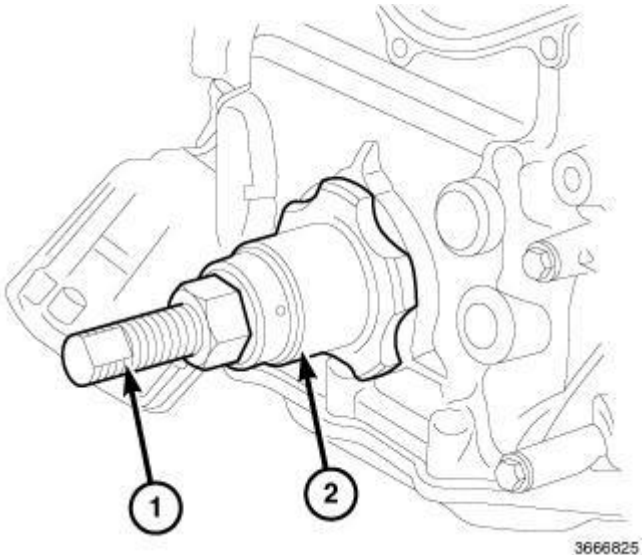


Fig. 284: Front Seal Installation
Courtesy of CHRYSLER LLC

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

2. Using Crankshaft Front Oil Seal Installer (special tool #9072, Installer, Seal) (2) and (special tool #10387, Installer, Vibration Damper) (1), install the crankshaft front seal.

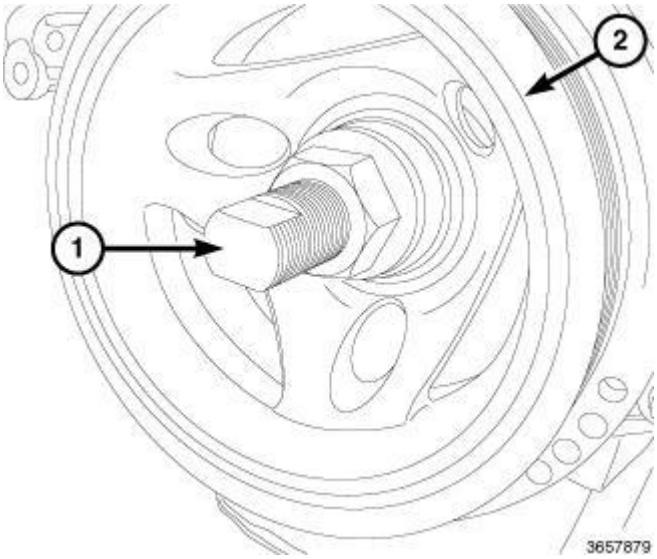


Fig. 285: Installing Vibration Damper
Courtesy of CHRYSLER LLC

3. Position the damper (2) onto the crankshaft.
4. Using the (special tool #10387, Installer, Vibration Damper) (1), press the damper onto the crankshaft.
5. Install the crankshaft damper bolt and tighten to 176 N.m (129 ft. lbs.).

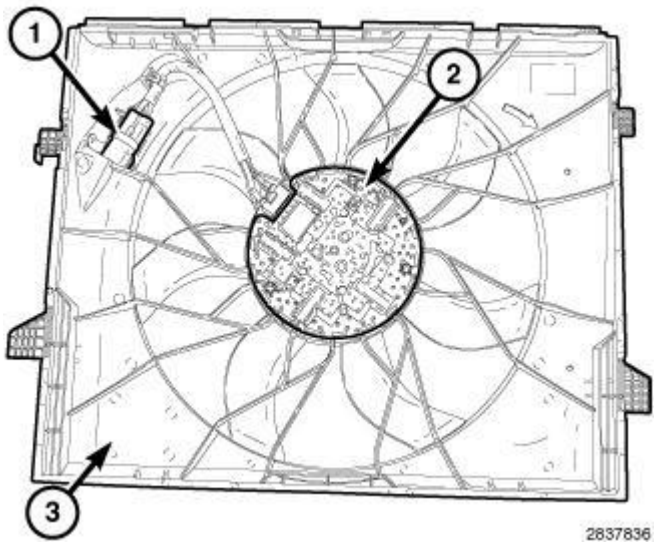


Fig. 286: Cooling Fan Motor Assembly
Courtesy of CHRYSLER LLC

6. Install the cooling fan module (3). Refer to **FAN, COOLING, INSTALLATION** .

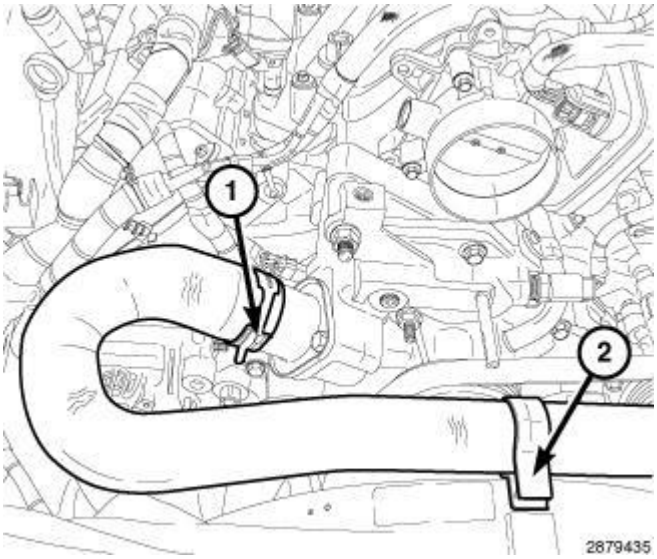


Fig. 287: Upper Radiator Hose Clamp & Retainer
Courtesy of CHRYSLER LLC

7. Position the upper radiator hose and secure retainer (2) at the fan shroud.
8. Install the upper radiator hose at the thermostat housing and secure hose clamp (1).
9. Install the air cleaner resonator support bracket at the water pump.
10. Install serpentine belt (1). Refer to **BELT, SERPENTINE, INSTALLATION** .

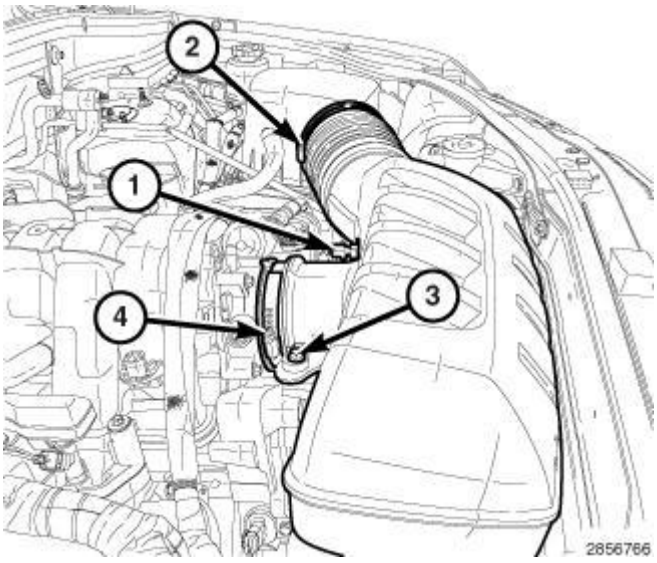


Fig. 288: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

11. Connect the resonator hose at the throttle body and tighten clamp (4) to 5 N.m (44 in. lbs.).
12. Install the resonator retaining bolt (3) and tighten to 5 N.m (44 in. lbs.).
13. Connect the clean air hose at the air cleaner housing and tighten clamp (2) to 5 N.m (44 in. lbs.).

14. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
15. Refill the cooling system. Refer to **STANDARD PROCEDURE** .
16. Connect the negative battery cable.

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** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, DIAGNOSIS AND TESTING, 5.7L**.
- **Removal** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.
- **Installation** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION, 5.7L**.

SOLENOID, MULTIPLE DISPLACEMENT

DESCRIPTION

DESCRIPTION

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

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

The main components of the Multi Displacement System are:

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

OPERATION

OPERATION

Cylinder Deactivation

- Trap an exhaust charge from a normal combustion event

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

Cylinder Reactivation

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

DIAGNOSIS AND TESTING

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).
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

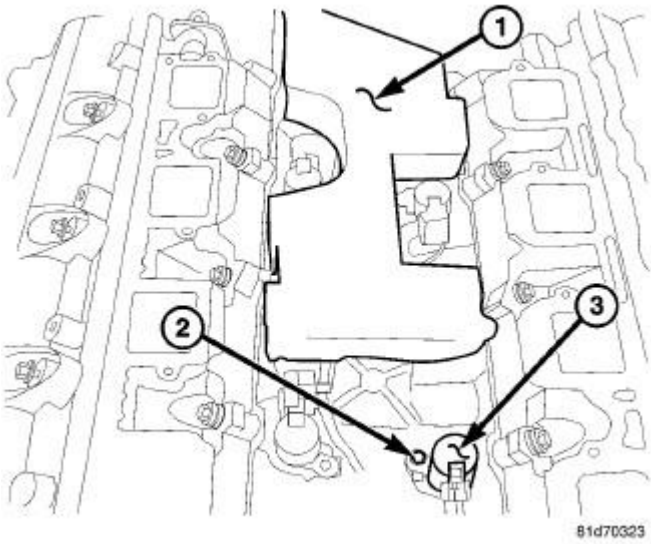


Fig. 289: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.
3. Remove foam insulator pad (1).

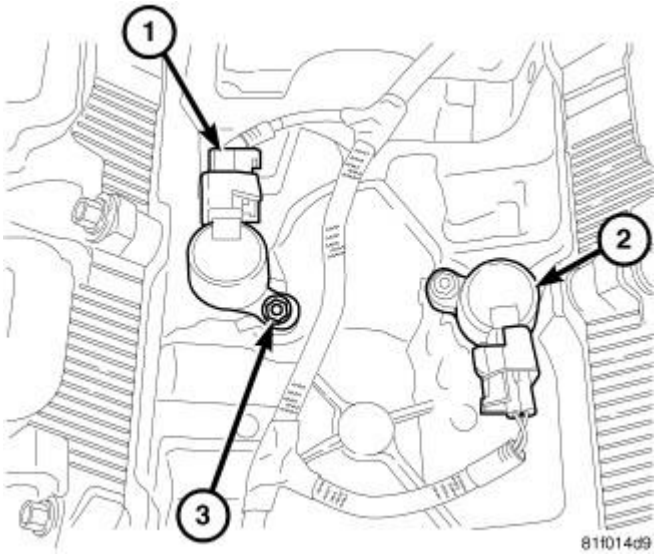


Fig. 290: MDS Solenoids, Electrical Connectors & Retaining Bolts
Courtesy of CHRYSLER LLC

4. Remove the Multiple Displacement Solenoid (MDS) (2) electrical connector(s) (1).
5. Remove the MDS solenoid (2) retaining bolt(s) (3).

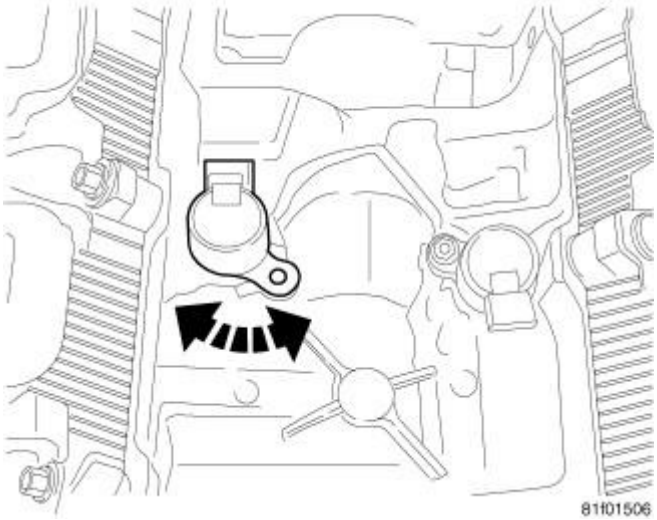


Fig. 291: MDS Solenoid Removal
Courtesy of CHRYSLER LLC

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

6. Lightly tap on the MDS solenoid(s) with a rubber mallet. Rotate the MDS solenoid(s) from side to side to break the seal.
7. Remove the MDS solenoid(s).

INSTALLATION

INSTALLATION

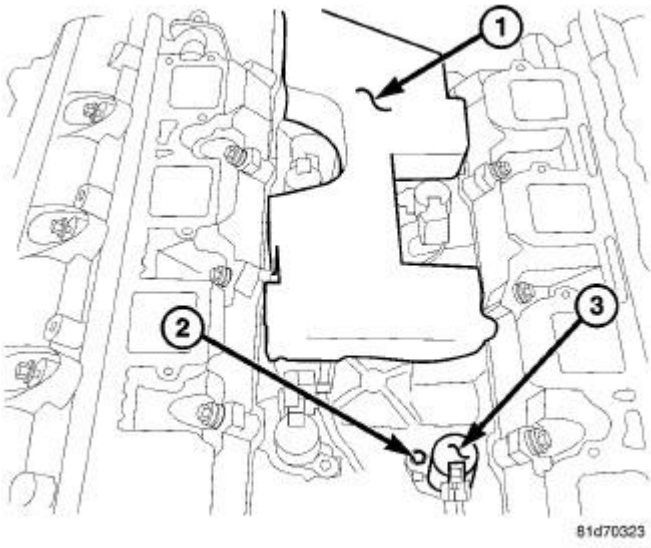


Fig. 292: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER LLC

1. Verify the MDS solenoid bores are free of debris before installing the MDS solenoid into the engine block.
2. Install the MDS solenoid(s) (3), ensure the seal is fully seated into the engine block.
3. Install the retaining bolt(s) (2) and tighten to 11 N.m (8 ft. lbs.).
4. Connect the MDS electrical connector to the solenoid(s) (3).
5. Install the foam insulator pad (1).
6. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, FRONT

REMOVAL

REMOVAL

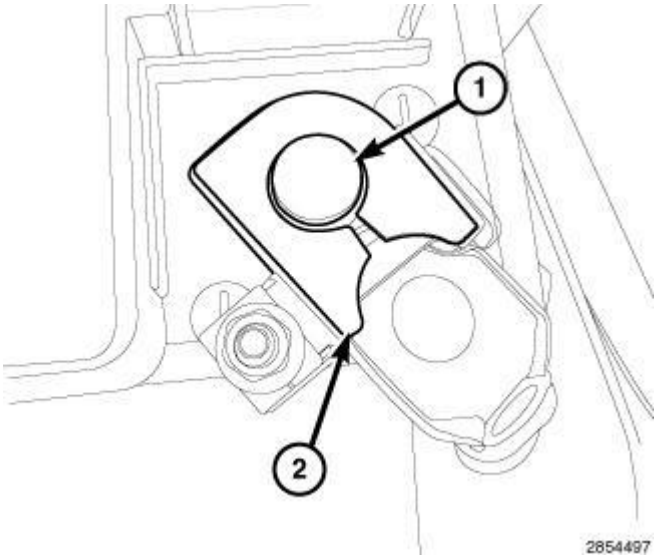


Fig. 293: Negative Battery Cable
Courtesy of CHRYSLER LLC

1. Perform fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the negative battery cable (2).

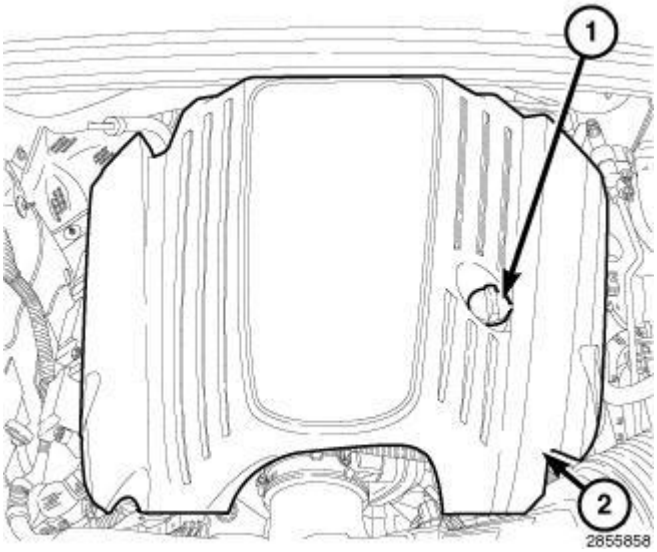


Fig. 294: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

3. Remove the oil fill cap (1).
4. Remove the engine cover (2).

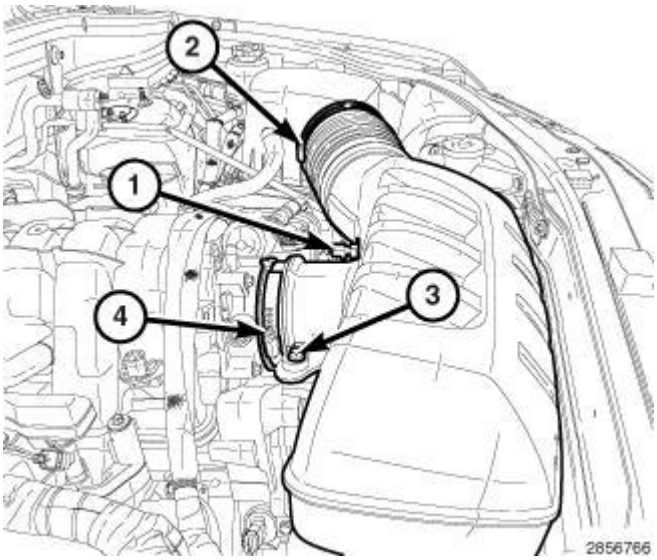


Fig. 295: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

5. Disconnect the electrical connector (1) at the Intake Air Temperature (IAT) sensor.
6. Loosen the hose clamp at the air cleaner housing (2).
7. Remove the resonator retaining bolt (3).
8. Loosen the hose clamp at the throttle body (4) and remove the resonator.
9. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

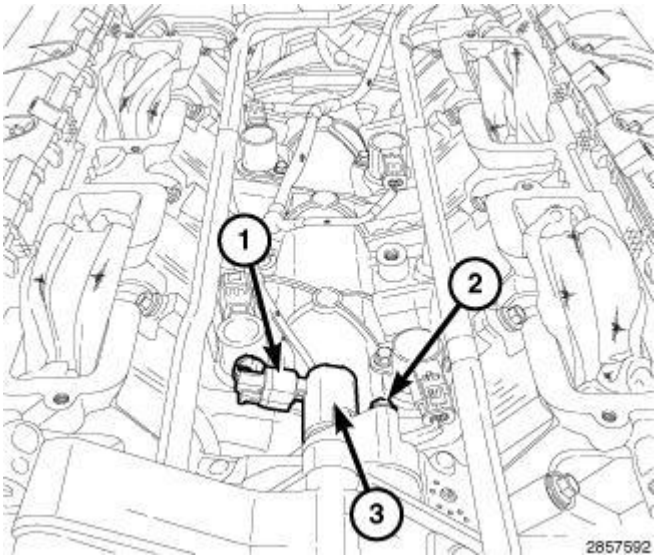


Fig. 296: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER LLC

NOTE: The engine must be at room temperature for oil control valve removal.

10. Disconnect the oil control valve electrical connector (1).
11. Remove the oil control valve fastener (2).
12. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.

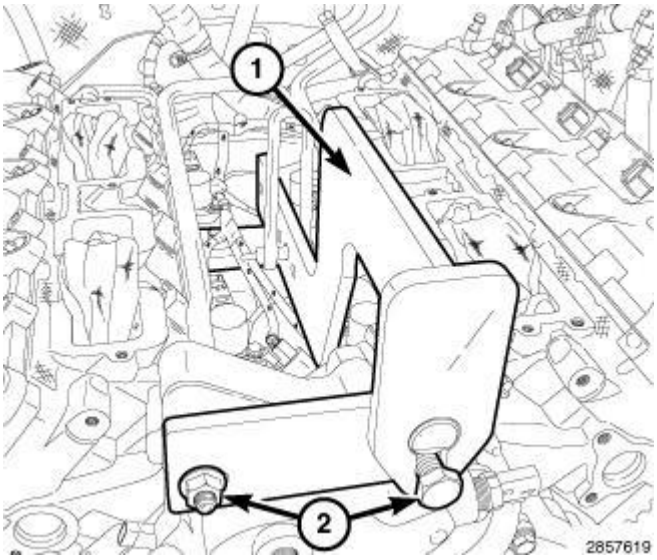


Fig. 297: Engine Lift Fixture & Mounting Bolts
Courtesy of CHRYSLER LLC

NOTE: Do not use air tools to install the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture).

13. Install the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).
14. Securely tighten lifting fixture mounting bolts (2).

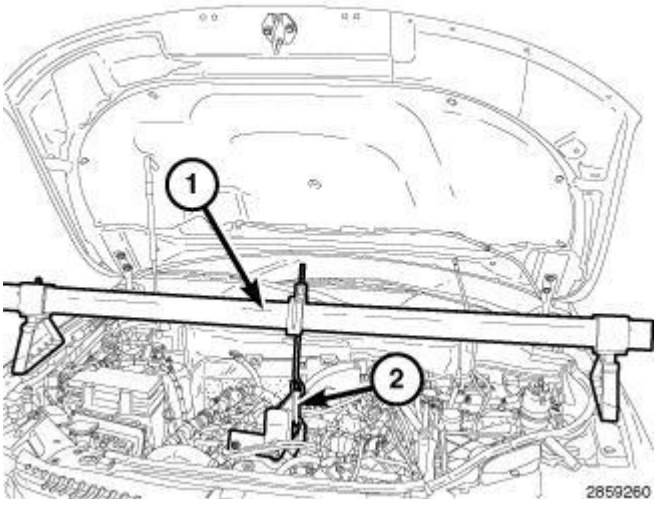


Fig. 298: Engine Support & Engine Lift Fixture
Courtesy of CHRYSLER LLC

15. Position the Engine Support Fixture (special tool #8534B, Support Fixture, Engine) (1).
16. Connect the Engine Support Fixture (special tool #8534B, Support Fixture, Engine) (1) to the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (2) and tighten to support the engine.
17. Raise and support vehicle.

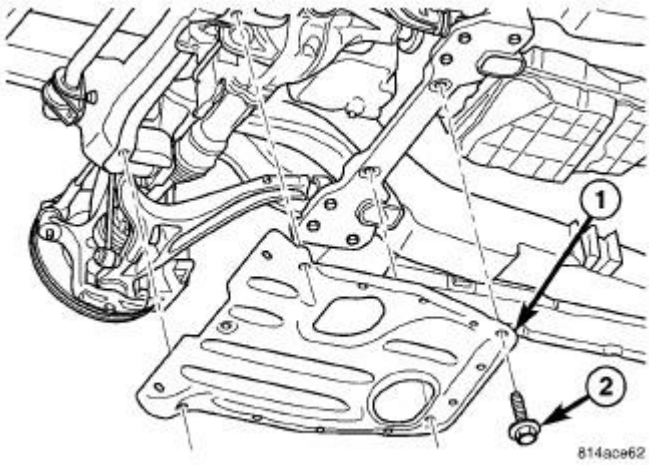


Fig. 299: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

18. If equipped, remove the skid plate (1) four retaining bolts (2) and remove the skid plate.

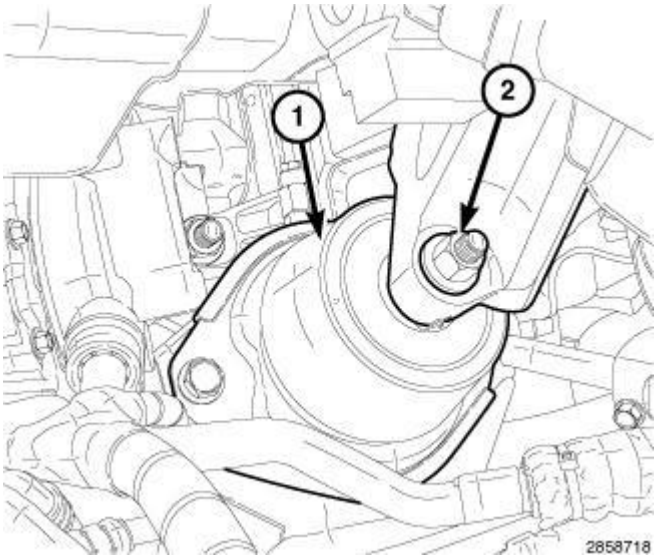


Fig. 300: Engine Mount & Retaining Nut
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

19. Remove both engine mount (1) retaining nuts (2),
20. Lower the vehicle.
21. Using the Engine Support Fixture (special tool #8534B, Support Fixture, Engine), raise the engine enough to gain clearance to remove the engine mount (1).

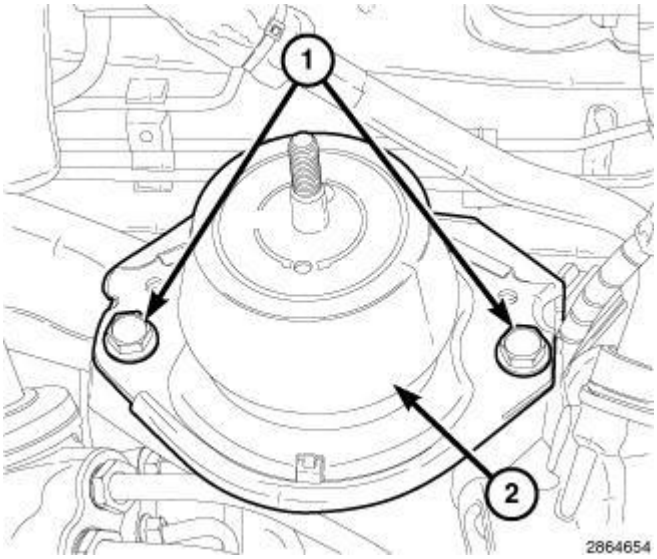


Fig. 301: Engine Mount & Fasteners
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

22. Raise and support the vehicle.

23. Remove the engine mount retaining bolts/nuts (1) and remove the engine mount (2).

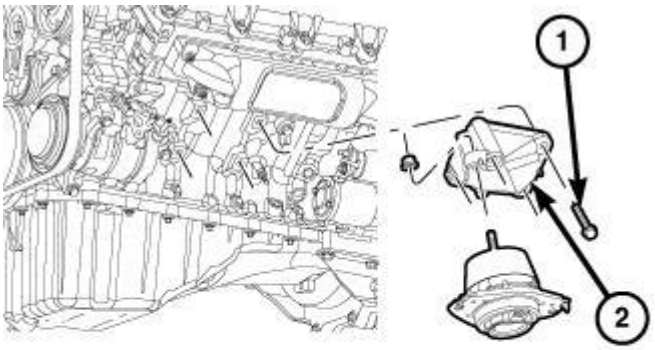


Fig. 302: Engine Mount Bracket & Retaining Bolts
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

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

INSTALLATION

INSTALLATION

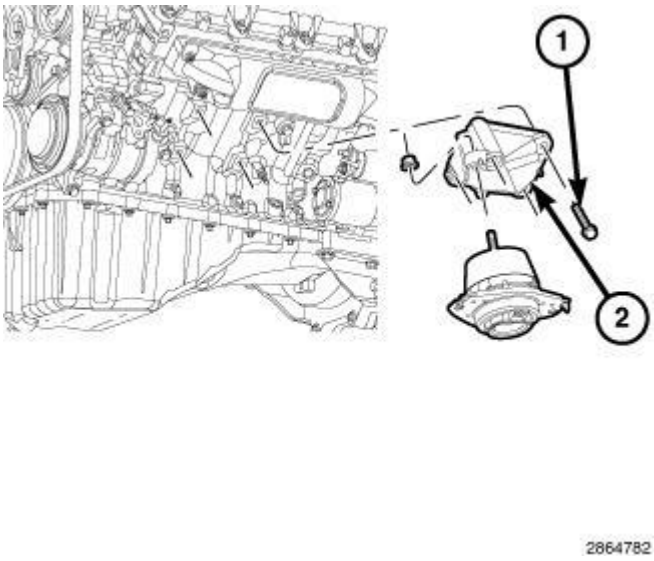


Fig. 303: Engine Mount Bracket & Retaining Bolts
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

NOTE: Apply Mopar® Lock and Seal Adhesive, Medium Strength Threadlocker to the engine mount bracket to engine block bolts.

1. If removed, position the engine mount bracket (2) to the engine block, install the retaining bolts (1) and tighten to 95 N.m (70 ft. lbs.).

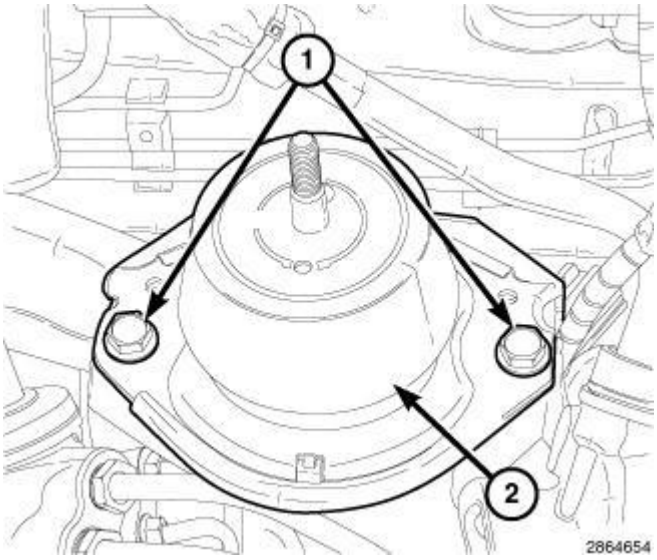


Fig. 304: Engine Mount & Fasteners
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

2. Position the engine mount (2), install the retaining bolts/nuts (1) and tighten to 95 N.m (70 ft. lbs.).

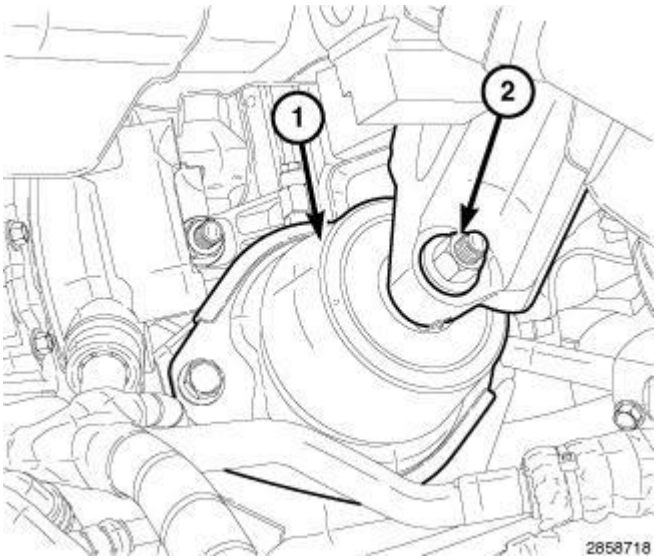


Fig. 305: Engine Mount & Retaining Nut

Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

3. Lower the vehicle.
4. Using the Engine Support Fixture (special tool #8534B, Support Fixture, Engine), lower the engine onto the engine mounts (1).
5. Raise and support the vehicle.
6. Install both engine mount retaining nuts (2) and tighten to 95 N.m (70 ft. lbs.).

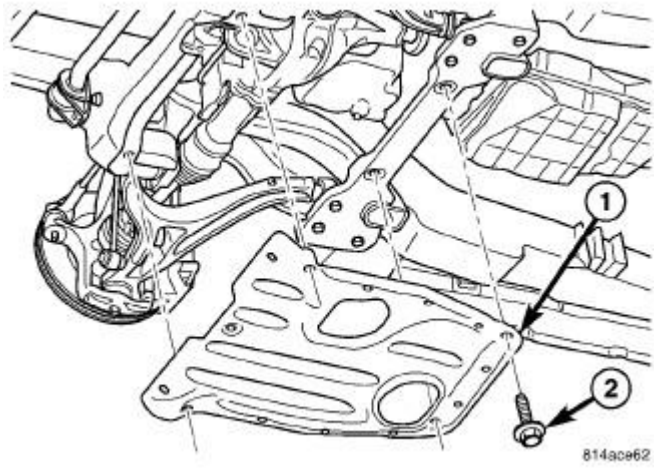


Fig. 306: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

7. If equipped, position the skid plate (1), install the skid plate four retaining bolts (2) and tighten to 28 N.m (21 ft. lbs.).

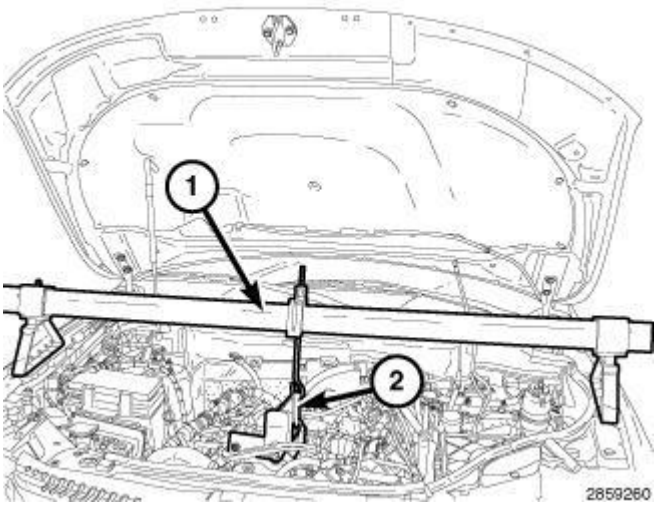


Fig. 307: Engine Support & Engine Lift Fixture

Courtesy of CHRYSLER LLC

8. Lower the vehicle.
9. Remove the Engine Support Fixture (special tool #8534B, Support Fixture, Engine) (1).
10. Remove the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (2).

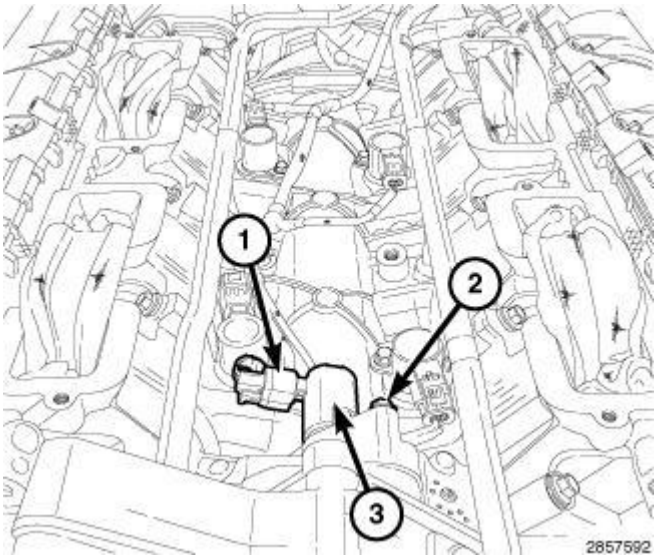


Fig. 308: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER LLC

11. Install the oil control valve (3) into the cylinder block.
12. Ensure that the O-ring is fully seated into the cylinder block.
13. Securely tighten the oil control valve retaining bolt (2).
14. Connect the oil control valve electrical connector (1).
15. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

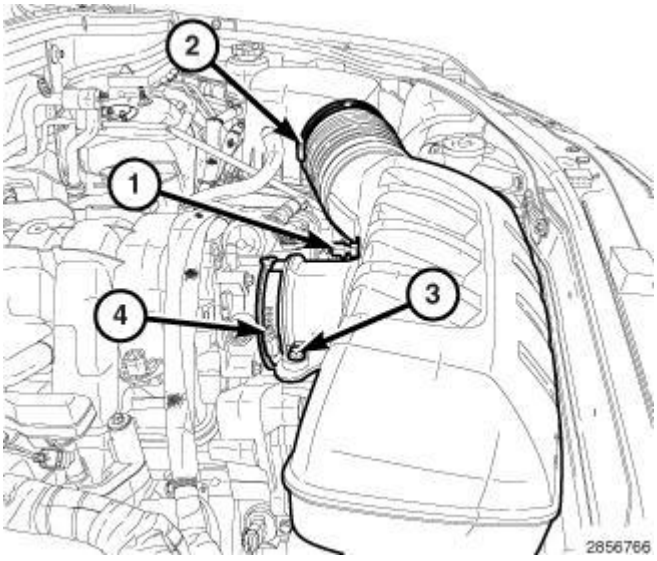


Fig. 309: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

16. Position the resonator hose onto the throttle body and tighten hose clamp (4) to 5 N.m (45 in. lbs.).
17. Install the resonator retaining bolt (3) and tighten to 5 N.m (45 in. lbs.).
18. Install the fresh air hose onto air cleaner housing and tighten hose clamp (2) to 5 N.m (45 in. lbs.).
19. Connect the electrical connector (1) at the Intake Air Temperature (IAT) sensor.

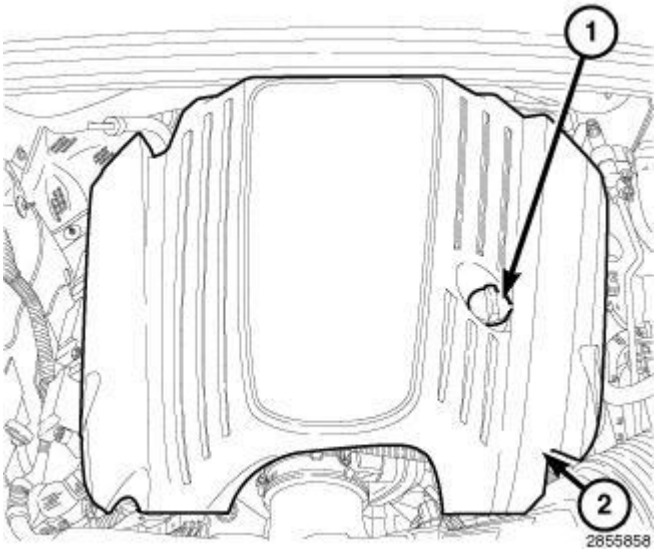


Fig. 310: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

20. Install the engine cover (2).
21. Install the oil fill cap (1).

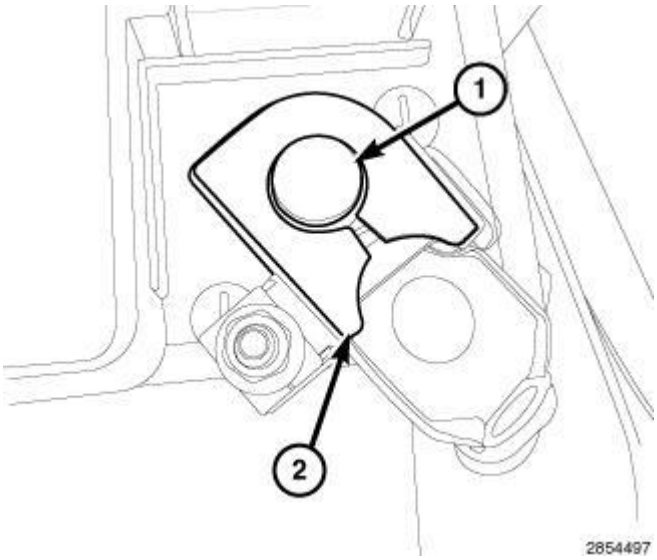


Fig. 311: Negative Battery Cable
Courtesy of CHRYSLER LLC

22. Connect the negative battery cable (2).
23. Start the engine and check for leaks.

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

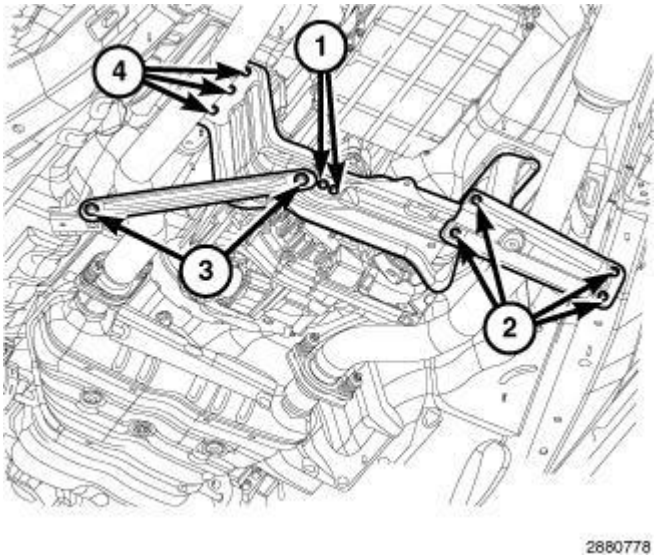


Fig. 312: Rear Engine Mount Isolator, Transmission Crossmember Support Brackets & Bolts
Courtesy of CHRYSLER LLC

4x4 rear engine mount isolator shown in illustration, 4x2 rear engine mount isolator similar.

1. Raise and support the vehicle.
2. Using a suitable jack, support transmission.
3. Remove the rear engine mount isolator retaining bolts (1).
4. Using a suitable jack, slightly raise the transmission to relieve the load on the crossmember.
5. Remove the both transmission crossmember support bracket retaining bolts (2, 3) and remove support brackets.

   Right side crossmember retaining bolts shown in illustration, left side crossmember retaining bolts similar.

6. Remove the transmission crossmember retaining bolts (4) and remove the crossmember.

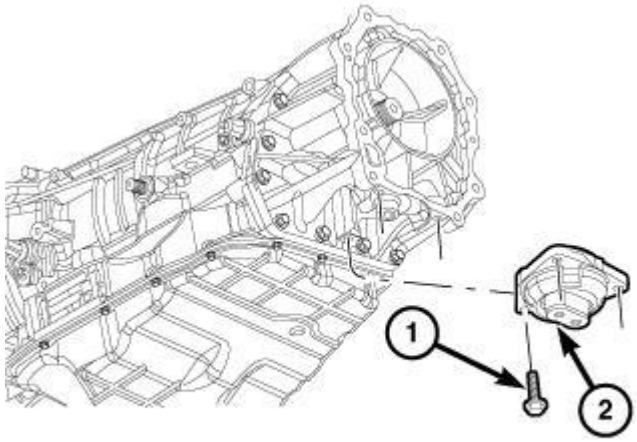


Fig. 313: Rear Engine Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER LLC

4x4 rear engine mount isolator shown in illustration, 4x2 rear engine mount isolator similar.

7. Remove the rear engine mount isolator retaining bolts (1)
8. Remove the rear engine mount isolator (2).

INSTALLATION

INSTALLATION

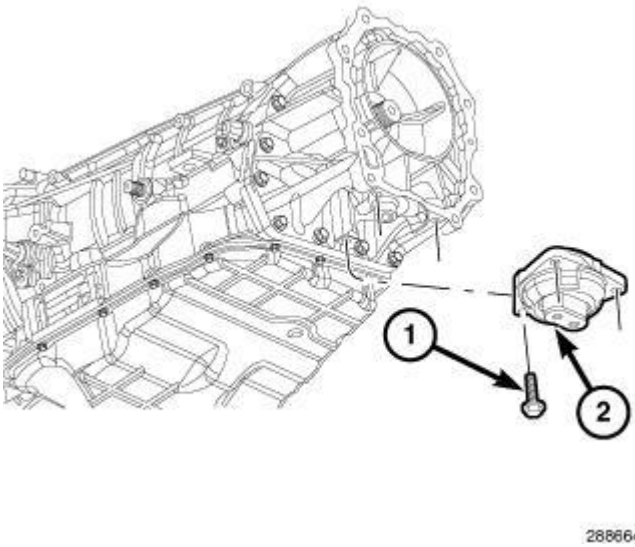


Fig. 314: Rear Engine Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER LLC

4x4 rear engine mount isolator shown in illustration, 4x2 rear engine mount isolator similar.

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

1. Position the rear engine mount isolator, install the retaining bolts and tighten to 61 N.m (45 ft. lbs.).

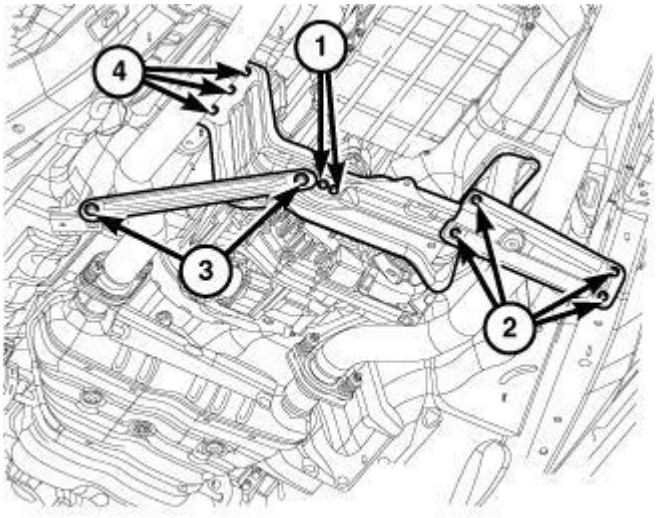


Fig. 315: Rear Engine Mount Isolator, Transmission Crossmember Support Brackets & Bolts
Courtesy of CHRYSLER LLC

4x4 rear engine mount isolator shown in illustration, 4x2 rear engine mount isolator similar.

Right side crossmember retaining bolts shown in illustration, left side crossmember retaining bolts similar.

2. Position the transmission crossmember, install the retaining bolts (4) and tighten to 54 N.m (40 ft. lbs.).
3. Position both transmission crossmember support brackets, install the retaining bolts (2, 3) and tighten to 54 N.m (40 ft. lbs.).
4. Using a suitable jack, lower the transmission into position, install the rear engine mount isolator retaining bolts (1) finger tight.
5. Remove the jack supporting the transmission.
6. Tighten the rear engine mount isolator retaining bolts (1) to 54 N.m (40 ft. lbs.).

LUBRICATION

DESCRIPTION

DESCRIPTION

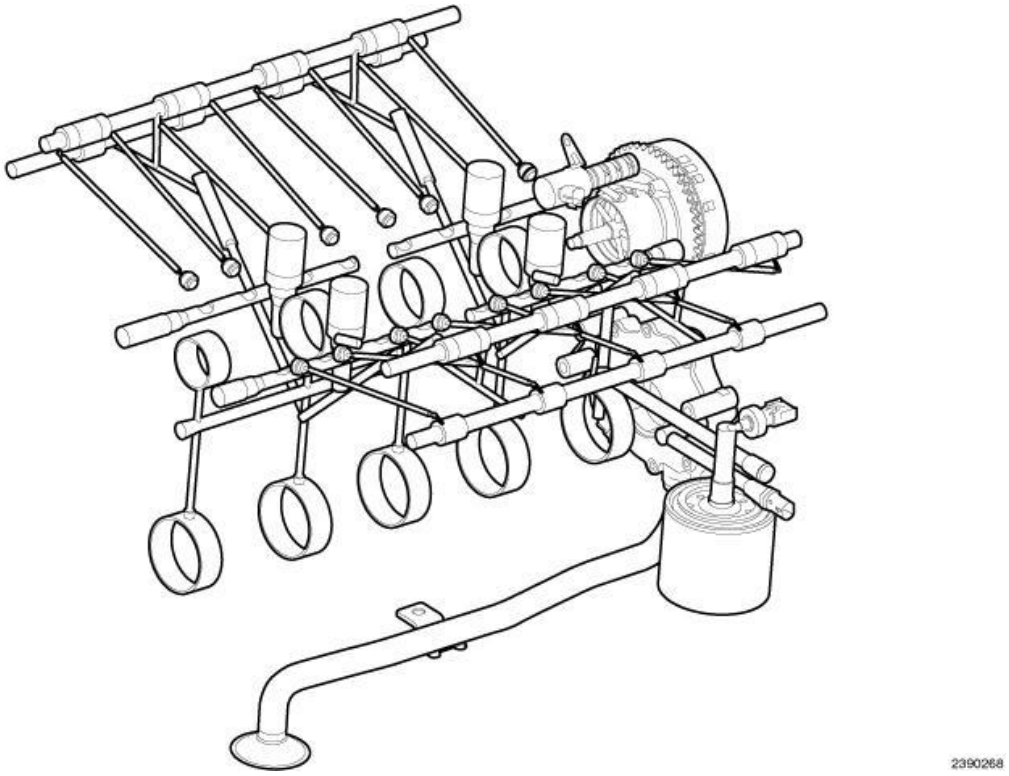


Fig. 316: 5.7L MDS Lubrication System
Courtesy of CHRYSLER LLC

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 (special tool #C-3292A, Gauge, Pressure).
2. Run the engine until thermostat opens.
3. Oil Pressure:
   - Curb Idle-25 kPa (4 psi) minimum
   - 3000 rpm-170 - 758 kPa (25 - 110 psi)
4. If oil pressure is 0 at idle, shut off engine. Check for a clogged oil pick-up screen or a pressure relief valve stuck open.

ENGINE OIL LEAK

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

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

2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of the oil leak. If the oil leak is found and identified, repair per service 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 below.

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 LEAK below.
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:
   1. Circular spray pattern generally indicates seal leakage or crankshaft damage.
   2. Where leakage tends to run straight down, possible causes are a porous block, distributor seal, camshaft bore cup plugs oil gallery 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

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.

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.

REMOVAL

REMOVAL

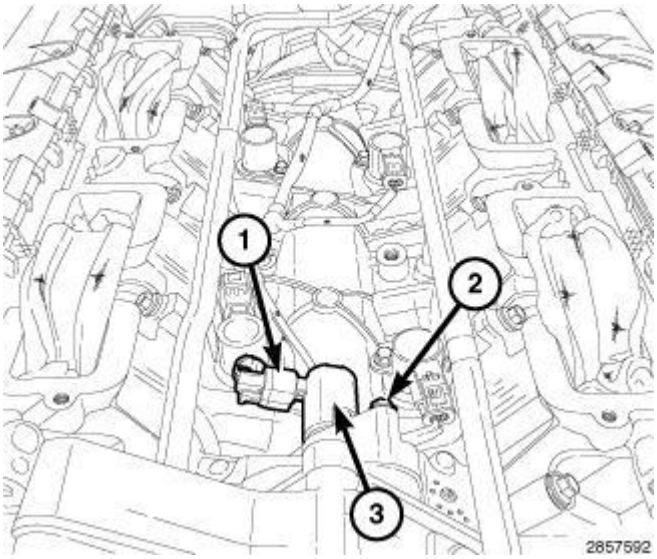


Fig. 317: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER LLC

1. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

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

2. Disconnect the oil control valve electrical connector (1).
3. Remove the oil control valve fastener (2).
4. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.

INSTALLATION

INSTALLATION

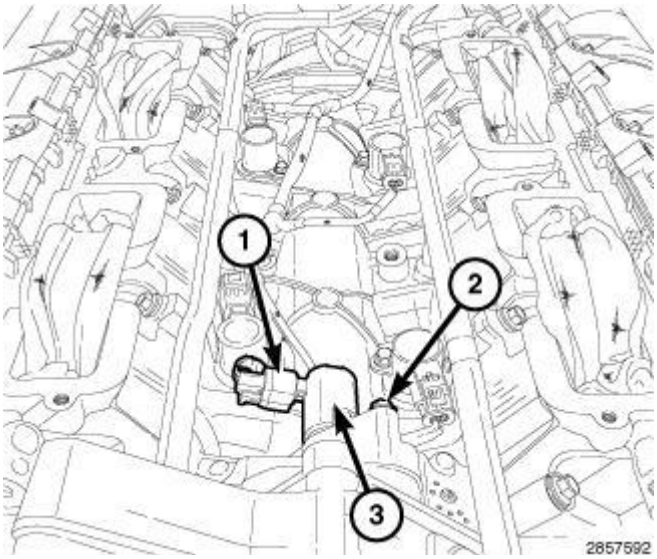


Fig. 318: Oil Control Valve, Electrical Connector & Retaining Bolt

Courtesy of CHRYSLER LLC

NOTE: Ensure that the O-ring is fully seated into the cylinder block.

1. Position the oil control valve (3) into the cylinder block.
2. Securely tighten the oil control valve retaining bolt (2).
3. Connect the oil control valve electrical connector (1).
4. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

FILTER, ENGINE OIL

REMOVAL

REMOVAL

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

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

NOTE: Make sure filter gasket was removed with filter.

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

INSTALLATION

INSTALLATION

1. Lightly lubricate oil filter gasket with engine oil.

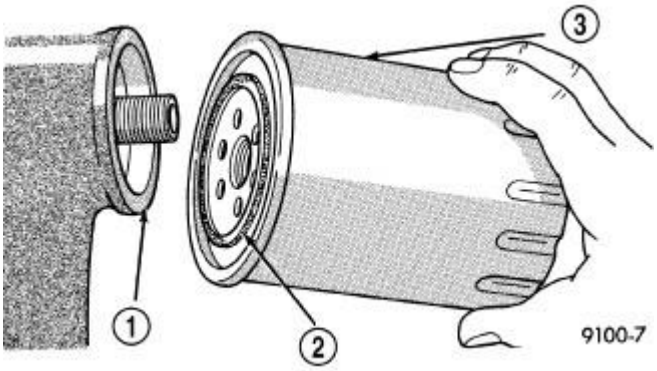


Fig. 319: Installing Engine Oil Filter

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. Refer to **Fig. 319**.
3. Add oil, verify crankcase oil level and start engine. Inspect for oil leaks.

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL SERVICE

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

CRANKCASE OIL LEVEL INSPECTION

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

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

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

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

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in Maintenance Schedules. Refer to **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 information.
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 beginning of this information.

PAN, OIL

REMOVAL

REMOVAL

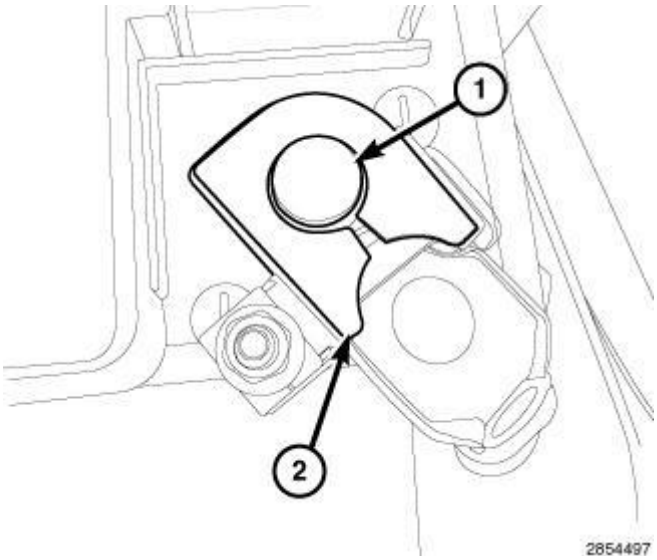


Fig. 320: Negative Battery Cable
Courtesy of CHRYSLER LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the negative battery cable (2).

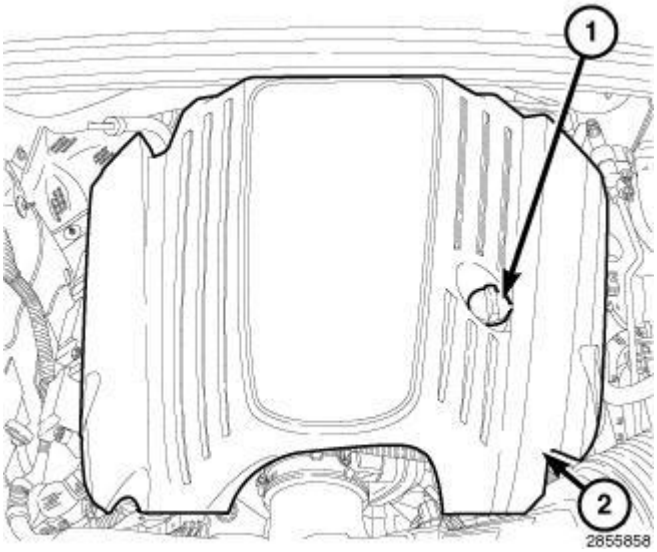


Fig. 321: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

3. Remove the oil fill cap (1).
4. Remove the engine cover (2).
5. Remove the engine oil dipstick.

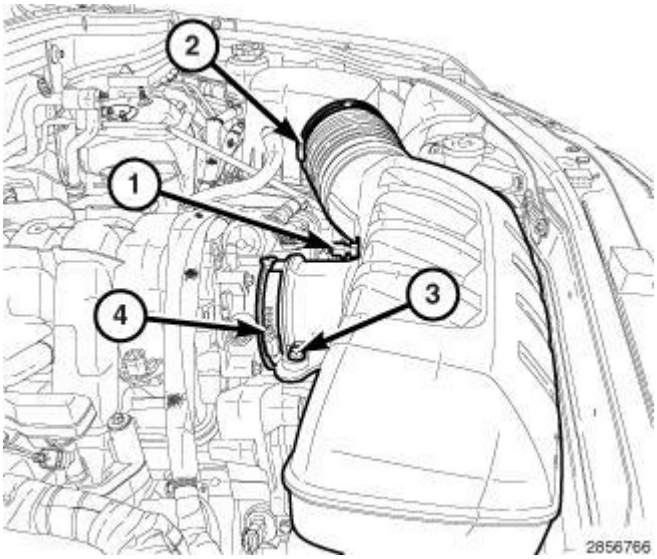


Fig. 322: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

6. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
7. Loosen the fresh air hose clamp at the air cleaner housing (2).
8. Remove the resonator retaining bolt (3).
9. Loosen the resonator hose clamp (4) at the throttle body and remove the resonator.

10. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

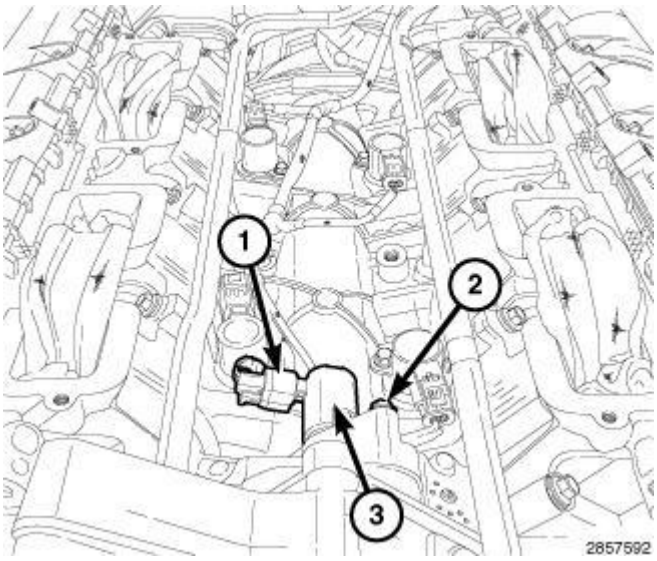


Fig. 323: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER LLC

NOTE: The engine must be at room temperature before removing the oil control valve.

11. Disconnect the oil control valve electrical connector (1).
12. Remove the oil control valve fastener (2).
13. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.

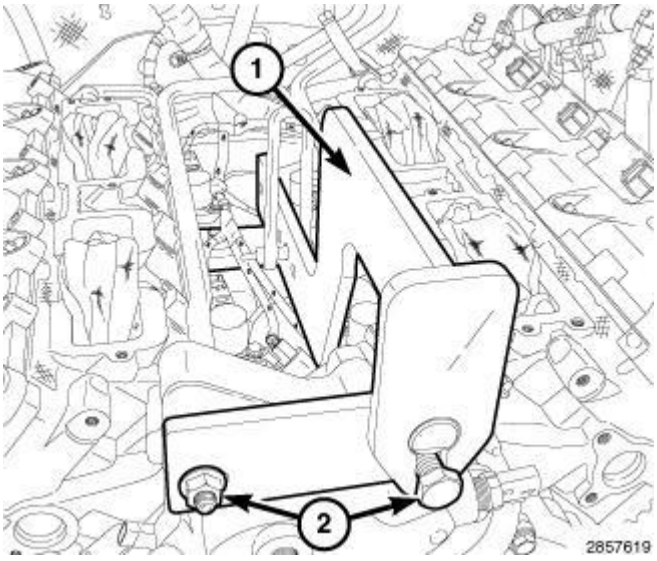


Fig. 324: Engine Lift Fixture & Mounting Bolts
Courtesy of CHRYSLER LLC

NOTE: Do not use air tools to install the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture).

14. Install the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).
15. Securely tighten lifting fixture mounting bolts (2).

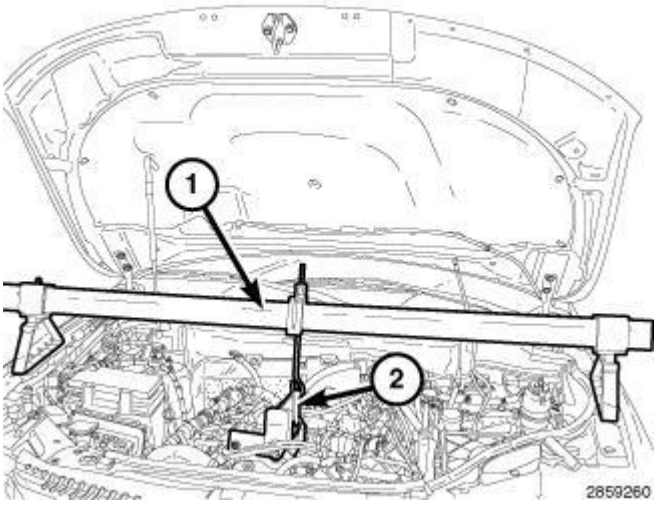


Fig. 325: Engine Support & Engine Lift Fixture
Courtesy of CHRYSLER LLC

16. Position the Engine Support Fixture (special tool #8534B, Support Fixture, Engine) (1).
17. Connect the Engine Support Fixture (special tool #8534B, Support Fixture, Engine) (1) to the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (2) and tighten to support the engine.
18. Raise and support the vehicle.
19. Drain the engine oil.
20. Remove both front wheels and tires.

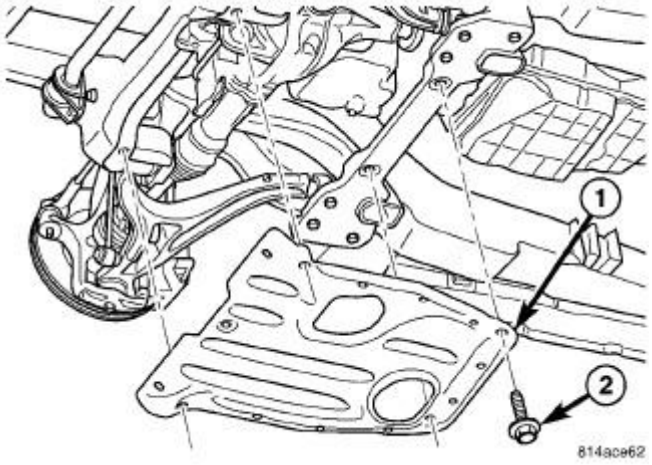


Fig. 326: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

21. If equipped, remove the skid plate four retaining bolts (2) and remove the skid plate (1).

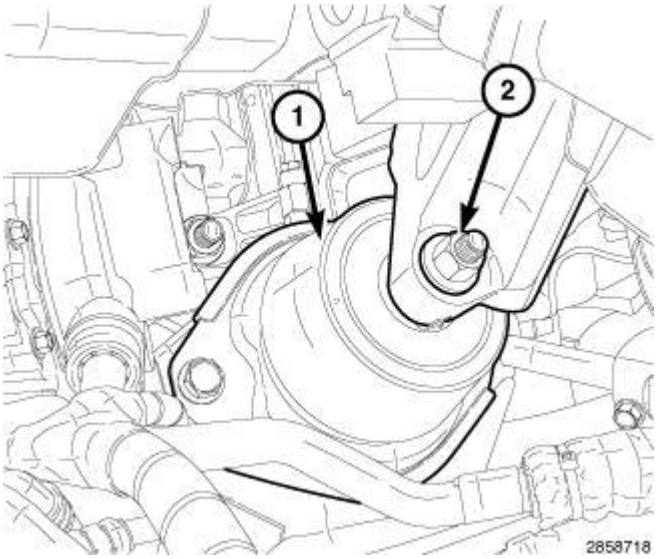


Fig. 327: Engine Mount & Retaining Nut
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

22. Remove both engine mount (1) retaining nuts (2).

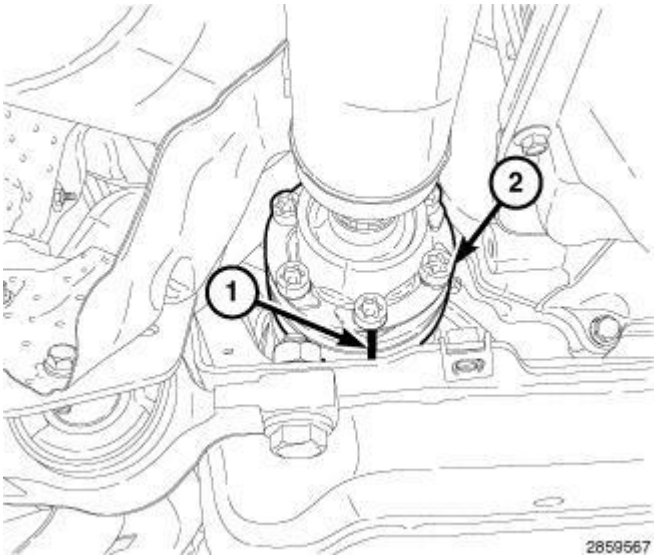


Fig. 328: C/V Joint Retaining Bolts & Reference Line
Courtesy of CHRYSLER LLC

23. If equipped, mark a line (1) across the C/V joint to companion flange for installation reference.

24. If equipped, remove the C/V joint retaining bolts (2) and separate the C/V joint from the companion flange.

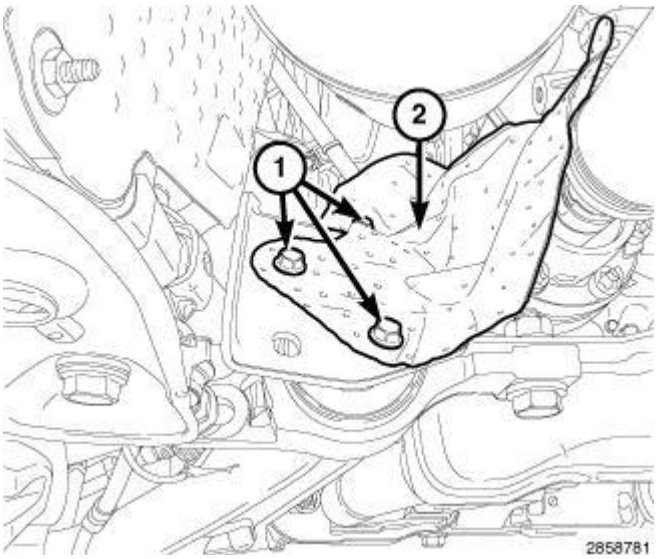


Fig. 329: Heat Shield & Retaining Bolts
Courtesy of CHRYSLER LLC

25. Remove the left catalytic converter heat shield retaining bolts (1) and remove the heat shield (2).

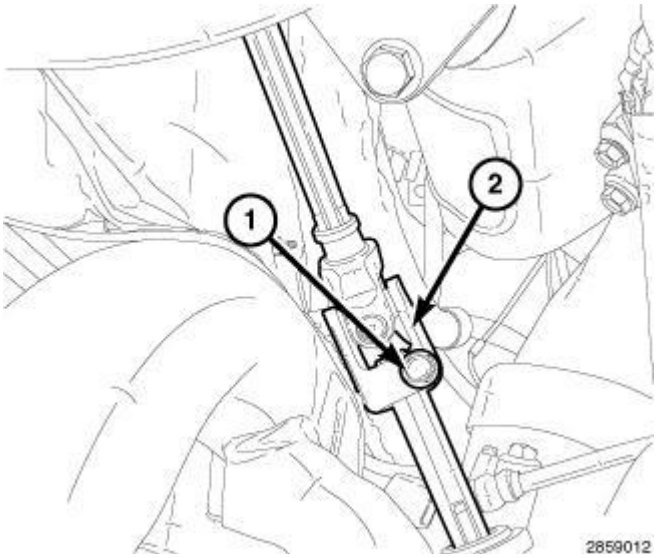


Fig. 330: Lower Steering Shaft Coupler & Pinch Bolt
Courtesy of CHRYSLER LLC

CAUTION: The steering column module is centered to the vehicles 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 CLOCKSPRING, STANDARD PROCEDURE .

26. Remove the lower steering shaft coupler pinch bolt (1).
27. Remove the lower steering shaft coupler (2) from the steering gear.

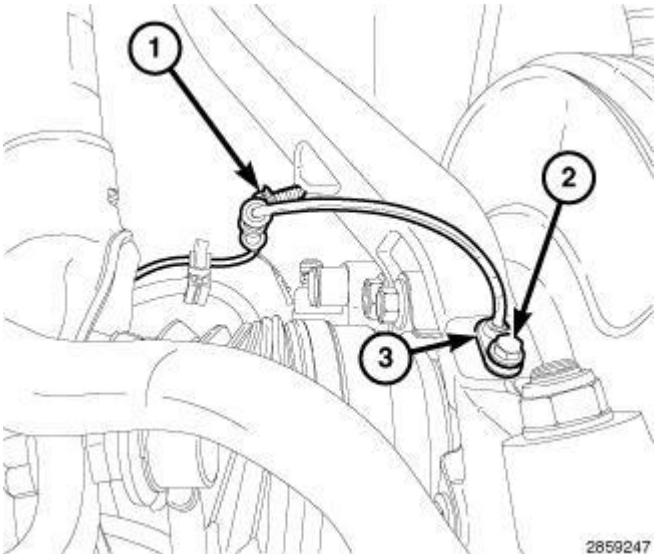


Fig. 331: Front Wheel Speed Sensor, Retainers & Bolts
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

28. Disconnect both front wheel speed sensor wire harness retainers (1) from the steering knuckles.
29. Remove both front wheel speed sensor retaining bolts (2).
30. Remove both front wheel speed sensors (3) from the steering knuckles and position aside.

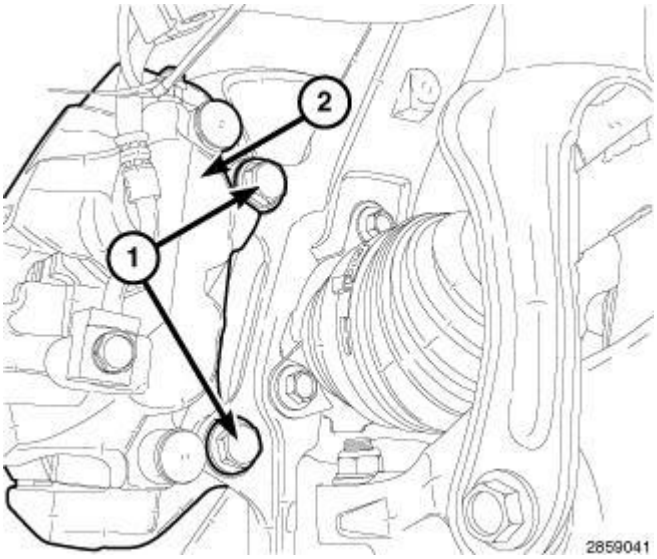


Fig. 332: Front Brake Caliper & Mounting Bolts
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

CAUTION: Never allow the disc brake caliper to hang from the brake hose. Damage to the brake hose will result. Provide a suitable support to hang the caliper securely.

31. Remove both front brake caliper adapter mounting bolts (1) and using bungee cords or bailing wire, secure the brake calipers (2) aside.

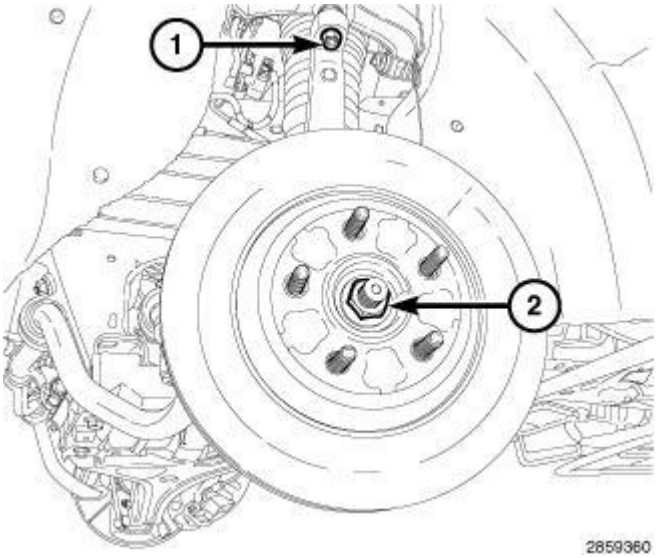


Fig. 333: Upper Ball Joint Nut & Half Shaft Hub Bearing Nut
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

32. Remove both upper ball joint nuts (1).
33. If equipped, remove both half shaft hub bearing nuts (2).

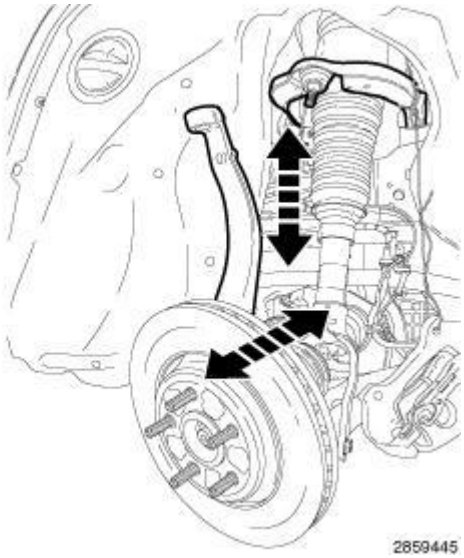


Fig. 334: Removing/Installing Axle Shaft & Steering Knuckle Assembly
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

34. Separate both steering knuckles from the ball joints.
35. If equipped, slightly slide both axle shafts inward while tilting the hub bearing and steering knuckle assembly outward (do not remove).

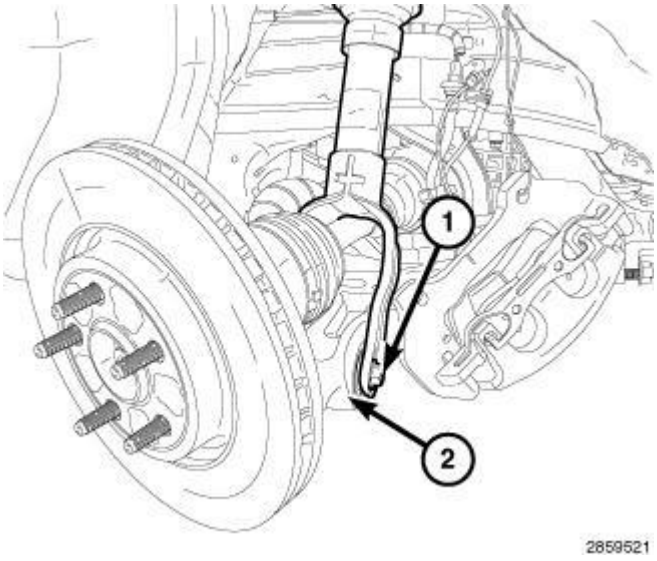


Fig. 335: Lower Control Arm & Lower Clevis Bolts
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

36. Remove both lower clevis bolts (1) at the lower control arms (2).

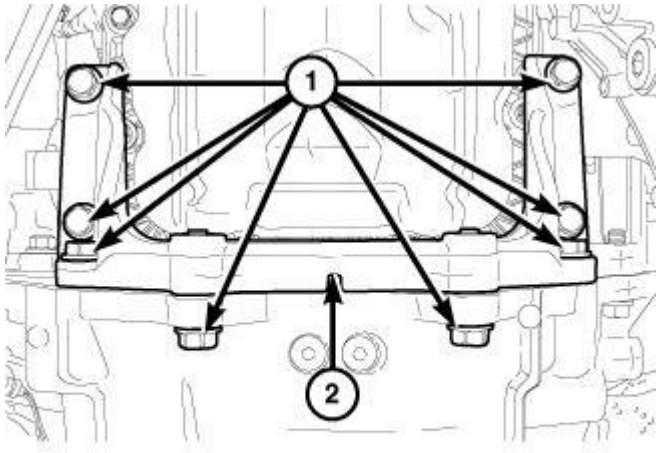


Fig. 336: Structural Dust Cover & Retaining Bolts
Courtesy of CHRYSLER LLC

37. Remove the structural dust cover retaining bolts (1).
38. Remove the structural dust cover (2).

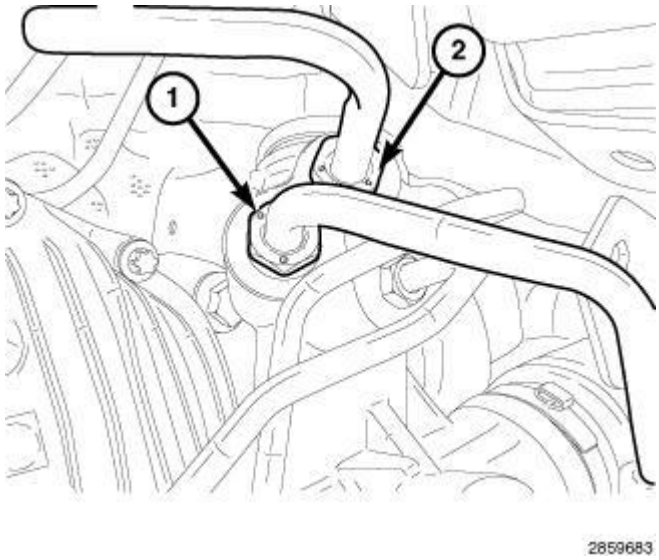


Fig. 337: Pressure Line & Return Line
Courtesy of CHRYSLER LLC

39. Remove the pressure line (1) at the steering gear.
40. Remove the return line (2) at the steering gear.

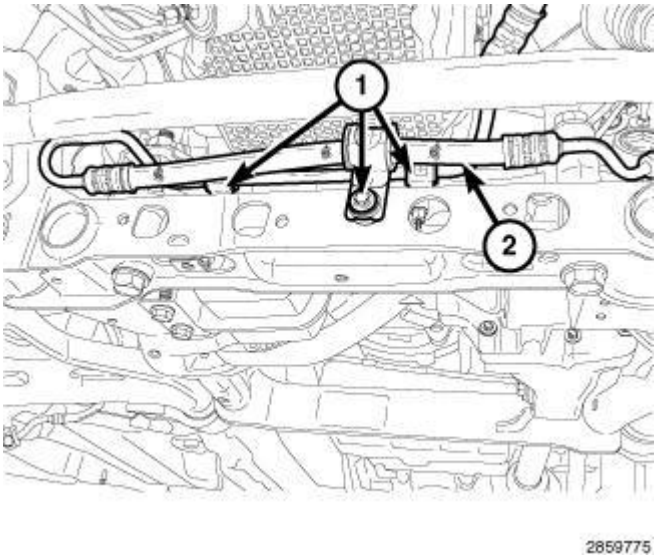


Fig. 338: Steering Gear Pressure Line Retainers & Pressure Line
Courtesy of CHRYSLER LLC

41. Remove the steering gear pressure line retainers (1) at the engine cradle crossmember and position the pressure line (2) aside.

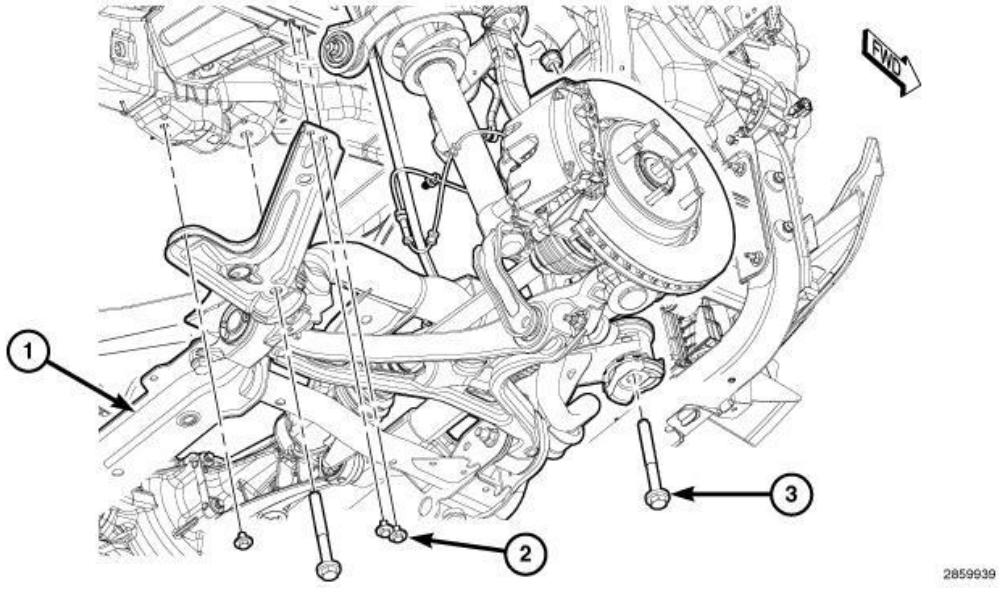


Fig. 339: Cradle, Brace Bolts & Cradle Bolts
Courtesy of CHRYSLER LLC

42. Remove the engine cradle crossmember. Refer to **CROSSMEMBER, CRADLE, ENGINE AND SUSPENSION, REMOVAL** .

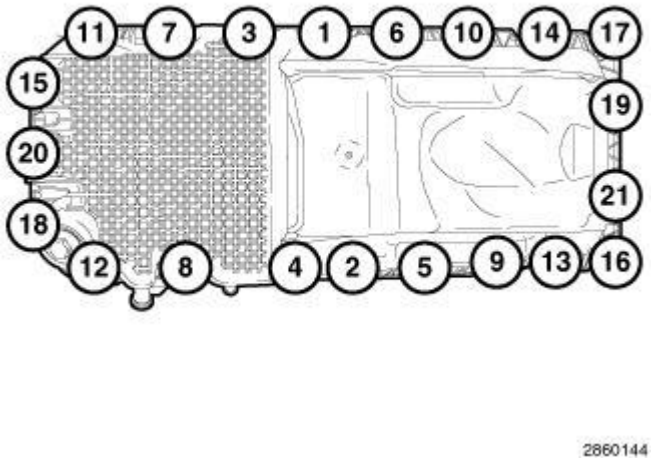


Fig. 340: Remove/Install Oil Pan Retaining Bolts
Courtesy of CHRYSLER LLC

NOTE: The oil pump pickup tube, windage tray and oil pan is one assembly. When the oil pan is removed, a new oil pan gasket and pickup tube O-ring must be installed. The old gasket and O-ring cannot be reused.

43. Remove the transmission line retaining bracket at the oil pan.
44. Using the sequence shown in illustration, remove the oil pan retaining bolts.
45. Remove the oil pan and discard the oil pan gasket and pickup tube O-ring.
46. Clean the sealing surfaces as necessary.

INSTALLATION

INSTALLATION

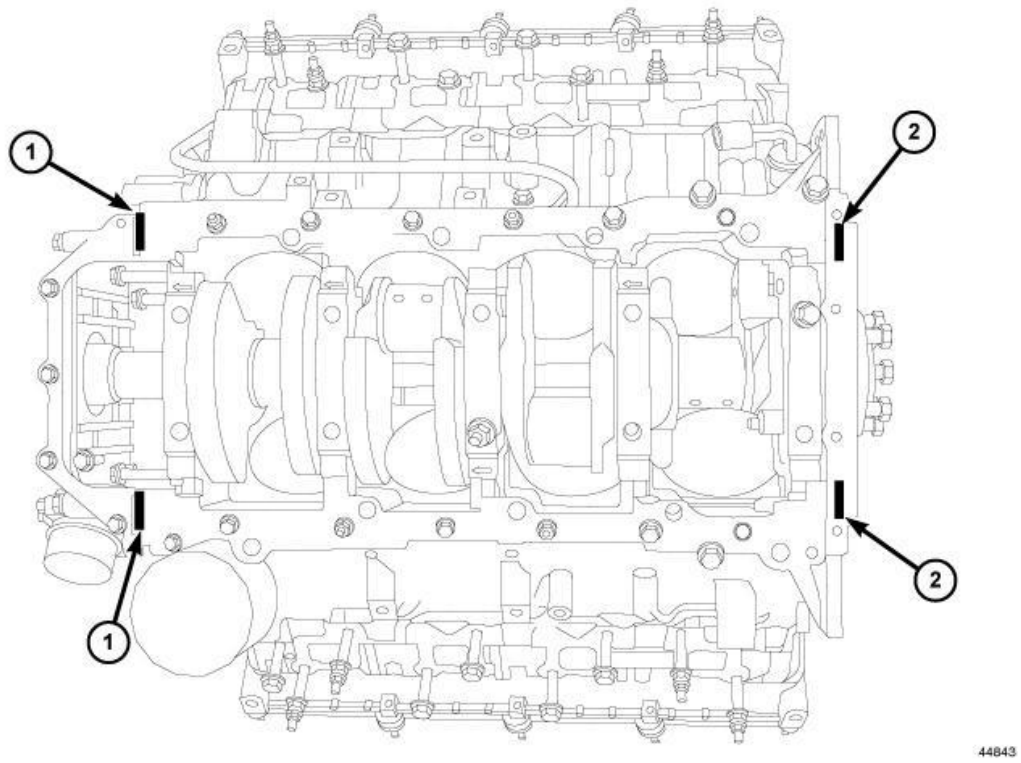


Fig. 341: T-Joint RTV Application
Courtesy of CHRYSLER LLC

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

NOTE: When the oil pan is removed, a new oil pan gasket and pickup tube O-ring must be installed. The old gasket and O-ring cannot be reused.

2. Install a new oil pan gasket and pickup tube O-ring.

NOTE: Mopar® Engine RTV must be applied to the 4 T-joints (1, 2) area where the front cover, rear retainer 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.

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

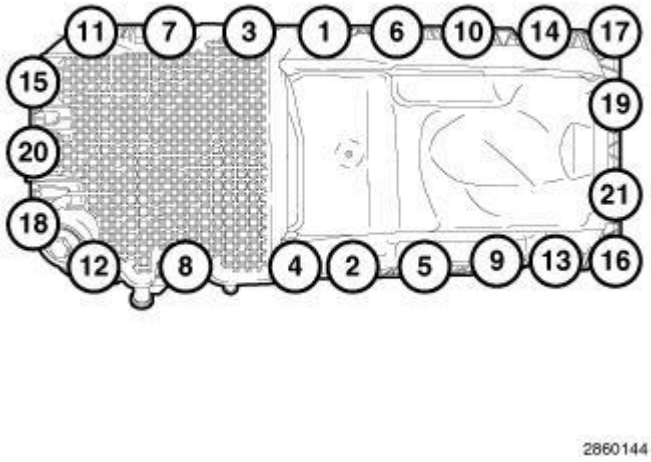


Fig. 342: Remove/Install Oil Pan Retaining Bolts
Courtesy of CHRYSLER LLC

4. Position the oil pan, install the mounting bolts and using the sequence shown in illustration, tighten to 12 N.m (9 ft. lbs.).
5. Install the transmission line retaining bracket at the oil pan.

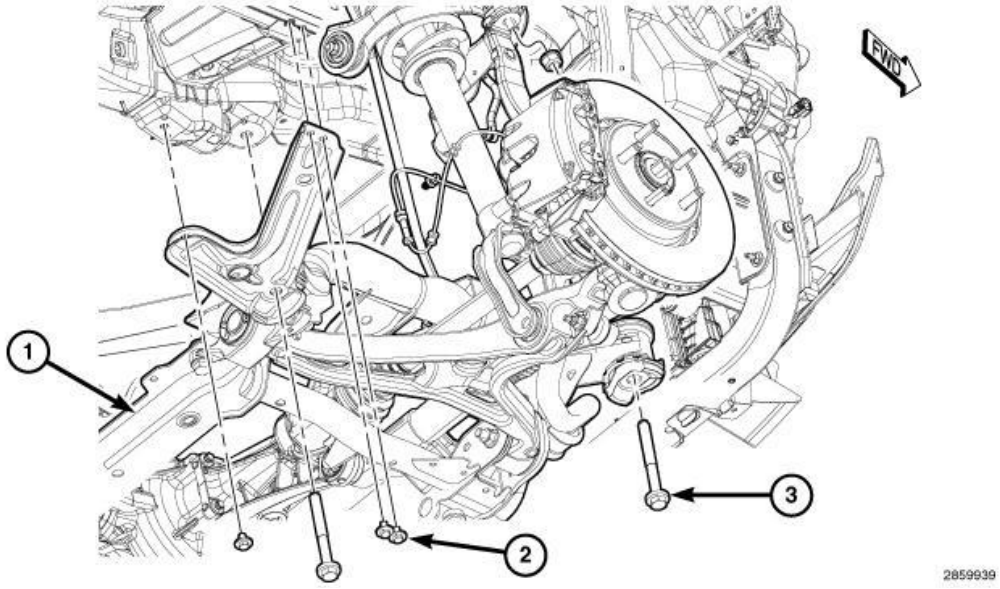


Fig. 343: Cradle, Brace Bolts & Cradle Bolts
Courtesy of CHRYSLER LLC

6. Install the engine cradle crossmember. Refer to **CROSSMEMBER, CRADLE, ENGINE AND SUSPENSION, INSTALLATION** .

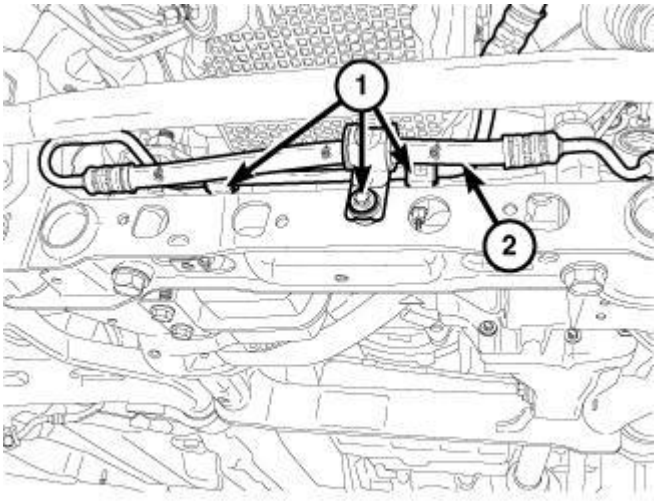


Fig. 344: Steering Gear Pressure Line Retainers & Pressure Line
Courtesy of CHRYSLER LLC

7. Position the steering gear pressure line and Install the retainers (1) to the engine cradle crossmember.

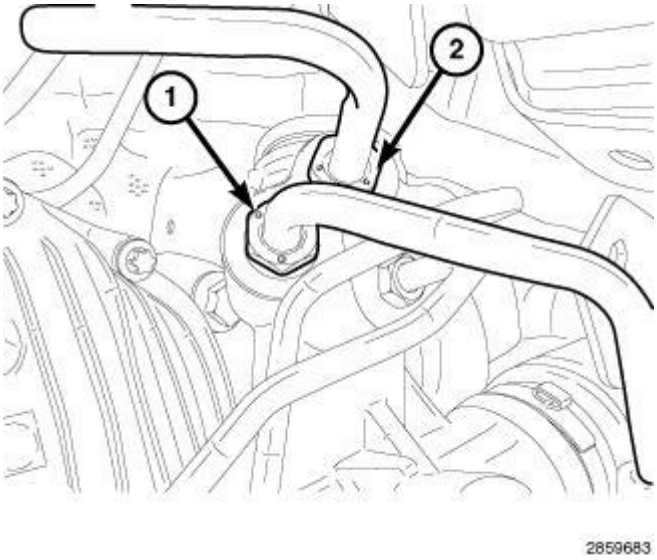


Fig. 345: Pressure Line & Return Line
Courtesy of CHRYSLER LLC

8. Install the return line (2) at the steering gear.
9. Install the pressure line (1) at the steering gear.

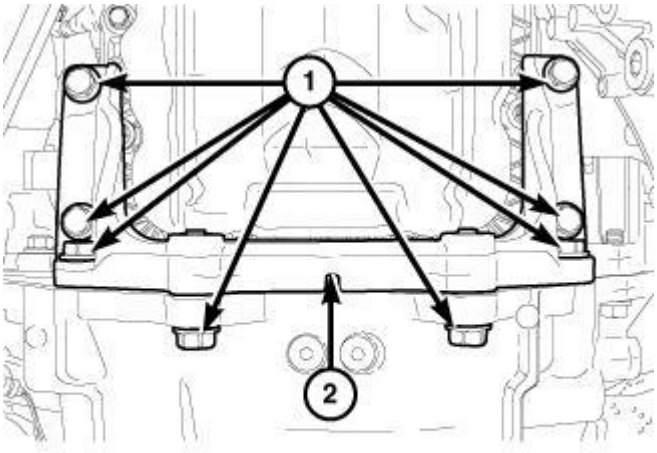


Fig. 346: Structural Dust Cover & Retaining Bolts
Courtesy of CHRYSLER LLC

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.

10. Position the structural dust cover (2).
11. Install the structural dust cover retaining bolts (1) hand tight.
12. Tighten the structural dust cover-to-transmission bolts to 9 N.m (80 in. lbs.).
13. Tighten the structural dust cover-to-engine bolts to 9 N.m (80 in. lbs.).
14. Retighten the structural dust cover-to-transmission bolts to 54 N.m (40 ft. lbs.).
15. Retighten the structural dust cover-to-engine bolts to 54 N.m (40 ft. lbs.).

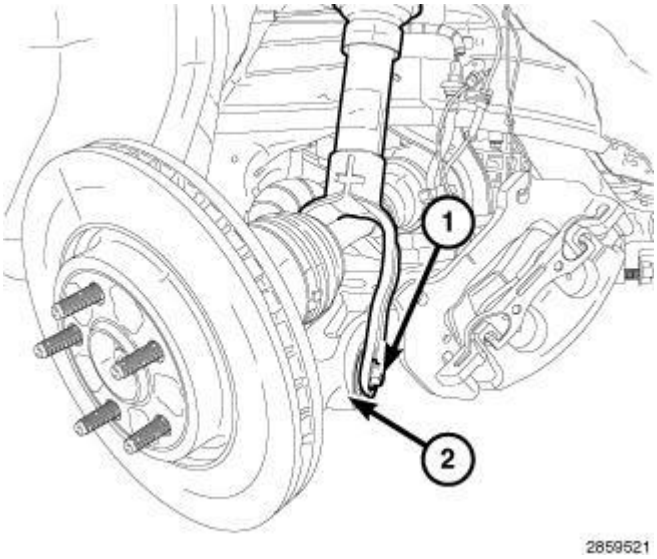


Fig. 347: Lower Control Arm & Lower Clevis Bolts

Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

16. Install both lower clevis bolts (1) at the lower control arms (2) and tighten to 169 N.m (125 ft. lbs.).

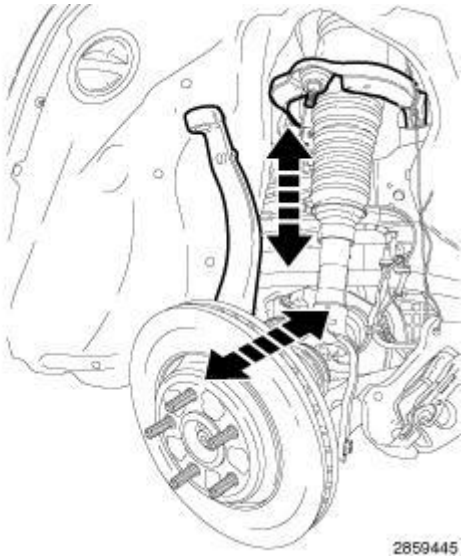


Fig. 348: Removing/Installing Axle Shaft & Steering Knuckle Assembly
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

17. If equipped, slide both axle shafts into the hub bearing.
18. Position both steering knuckle assemblies onto the ball joint studs.

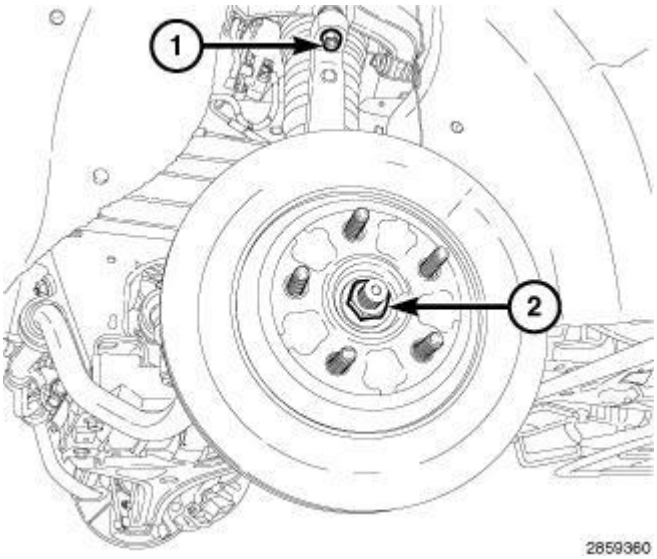


Fig. 349: Upper Ball Joint Nut & Half Shaft Hub Bearing Nut
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

19. If equipped, install both half shaft hub bearing nuts (2) and tighten to 135 N.m (100 ft. lbs.).
20. Install both upper ball joint nuts (1) and tighten to 95 N.m (70 ft. lbs.).

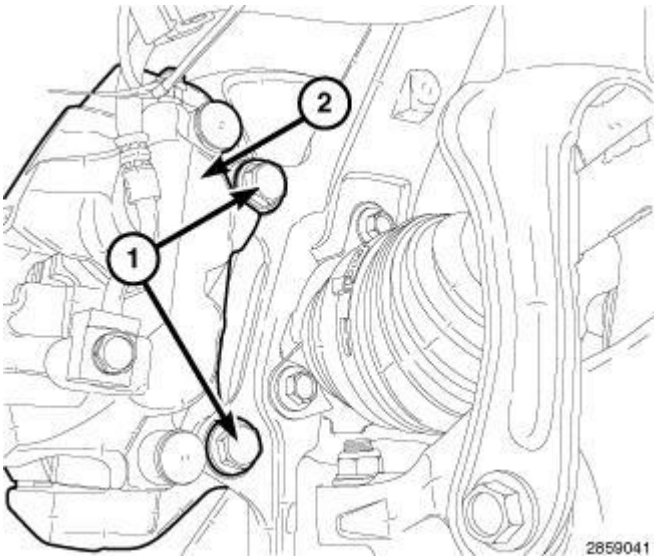


Fig. 350: Front Brake Caliper & Mounting Bolts
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

21. Position the front brake calipers (2), install the caliper adapter mounting bolts (1) and tighten to 169 N.m (125 ft. lbs.).

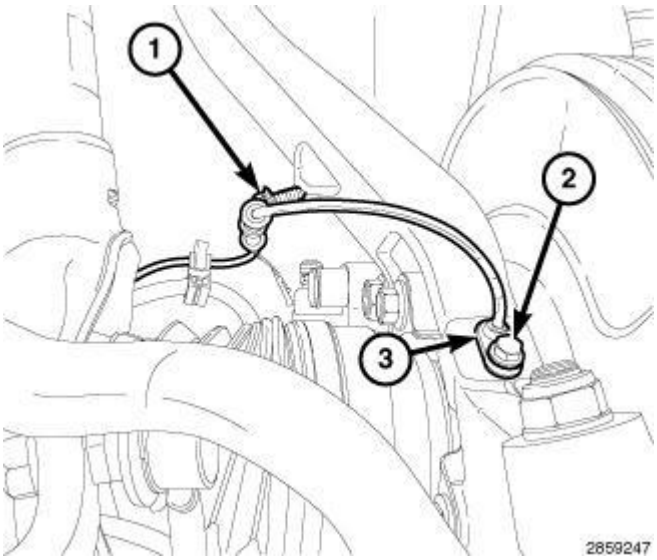


Fig. 351: Front Wheel Speed Sensor, Retainers & Bolts
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

22. Position both front wheel speed sensors (3) into the steering knuckle.
23. Install both front wheel speed sensor retaining bolts (2) and tighten to 14 N.m (10 ft. lbs.).
24. Connect both front wheel speed sensor wire harness retainers (1) to the steering knuckles.

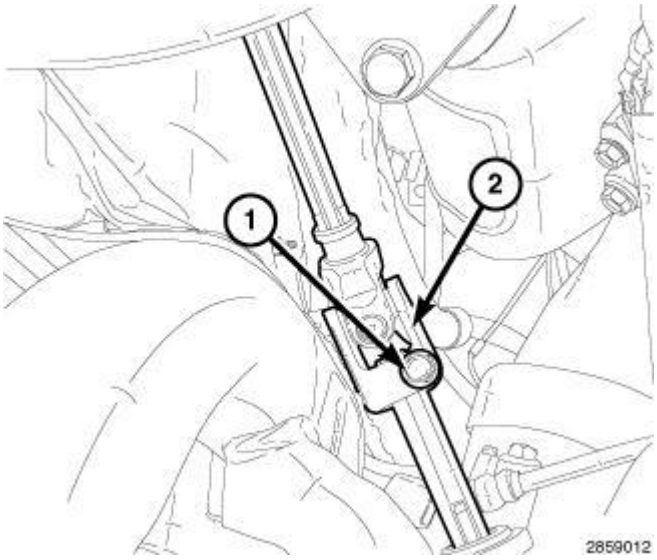


Fig. 352: Lower Steering Shaft Coupler & Pinch Bolt
Courtesy of CHRYSLER LLC

CAUTION: The steering gear must be centered prior to installing the coupler to prevent clockspring damage.

25. Position the lower steering shaft coupler (2) onto the steering gear.
26. Install the a new lower steering shaft coupler pinch bolt (1) and tighten to 49 N.m (36 ft. lbs.).

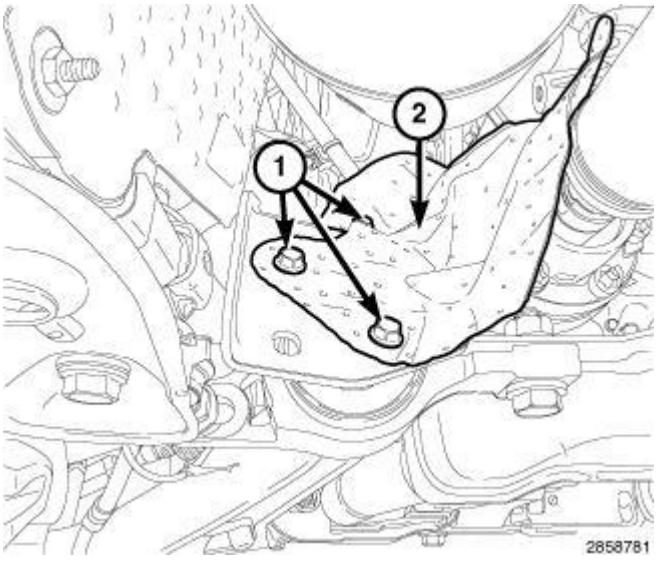


Fig. 353: Heat Shield & Retaining Bolts
Courtesy of CHRYSLER LLC

27. Position the left catalytic converter heat shield (2), install the retaining bolts (1) and securely tighten bolts.

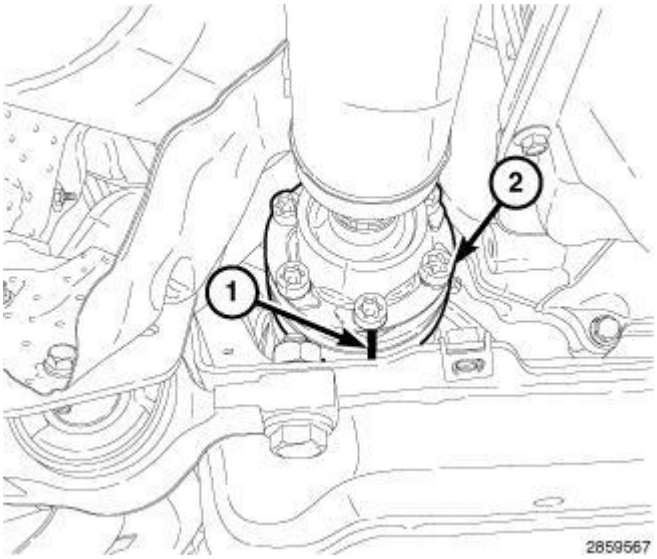


Fig. 354: C/V Joint Retaining Bolts & Reference Line
Courtesy of CHRYSLER LLC

28. If equipped, position the C/V joint onto the companion flange making sure to align the reference mark (1) made during removal.

NOTE: Clean all propeller shaft bolts and apply Mopar® Lock and Seal Adhesive, Medium Strength Thread locker or equivalent to the threads before installation.

29. Install the bolts (2) to the axle flange and tighten to 32 N.m (24 ft. lbs.).

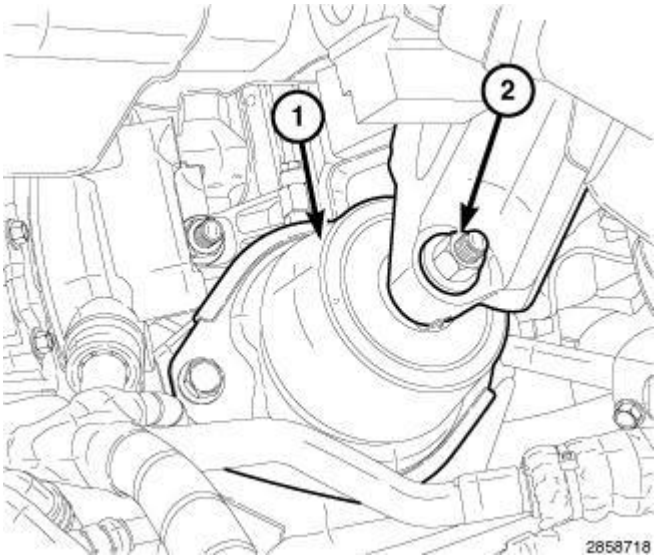


Fig. 355: Engine Mount & Retaining Nut
Courtesy of CHRYSLER LLC

Left side shown in illustration, right side similar.

NOTE: For engine mount retaining nuts, apply Mopar® Lock and Seal Adhesive, Medium Strength Thread locker or equivalent to the threads before installation.

30. Install both engine mount (1) retaining nuts (2) and tighten to 75 N.m (55 ft. lbs.).

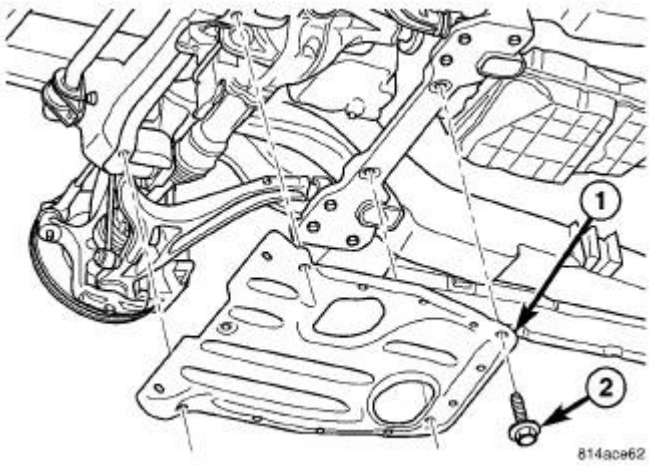


Fig. 356: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

31. If equipped, position the front skid plate (1), install the four retaining bolts (2) and tighten to 28 N.m (21 ft. lbs.).
32. Install both front wheels and tires.

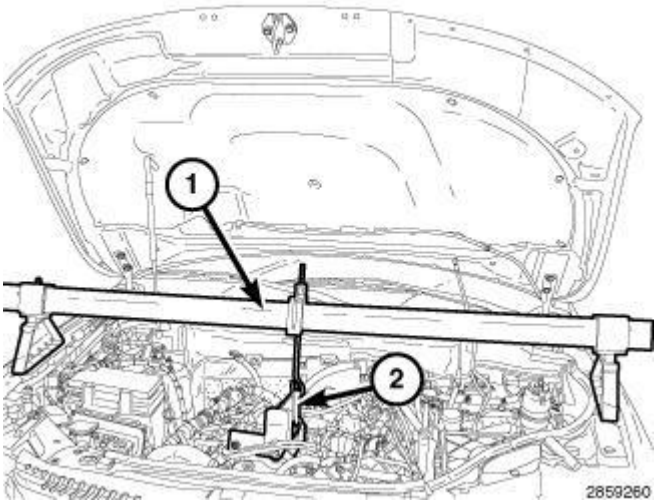


Fig. 357: Engine Support & Engine Lift Fixture
Courtesy of CHRYSLER LLC

33. Lower the vehicle.
34. Remove the Engine Support Fixture (special tool #8534B, Support Fixture, Engine) (1).

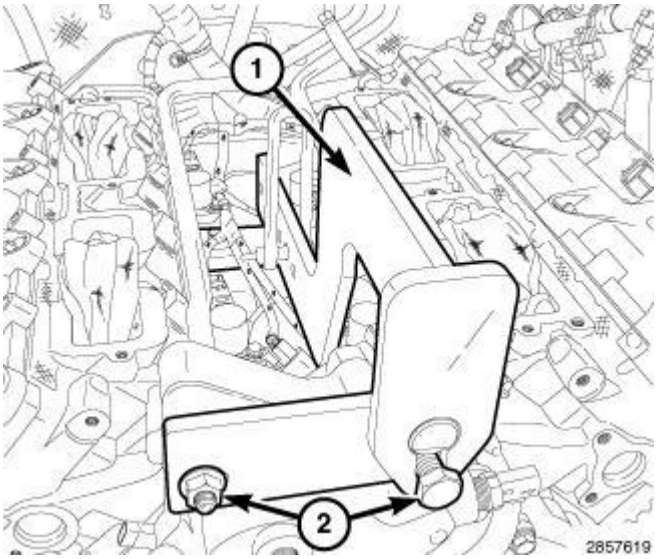


Fig. 358: Engine Lift Fixture & Mounting Bolts
Courtesy of CHRYSLER LLC

35. Remove the Engine Lift Fixture (special tool #8984B, Engine Lift Fixture) (1).

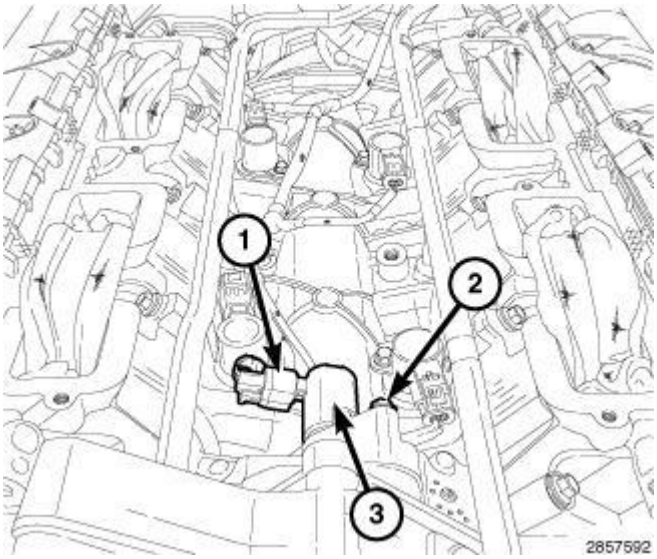


Fig. 359: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER LLC

36. Install the oil control valve (3).
37. Ensure that the O-ring is fully seated into the cylinder block.
38. Securely tighten the oil control valve retaining bolt (2).
39. Connect the oil control valve electrical connector (1).
40. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

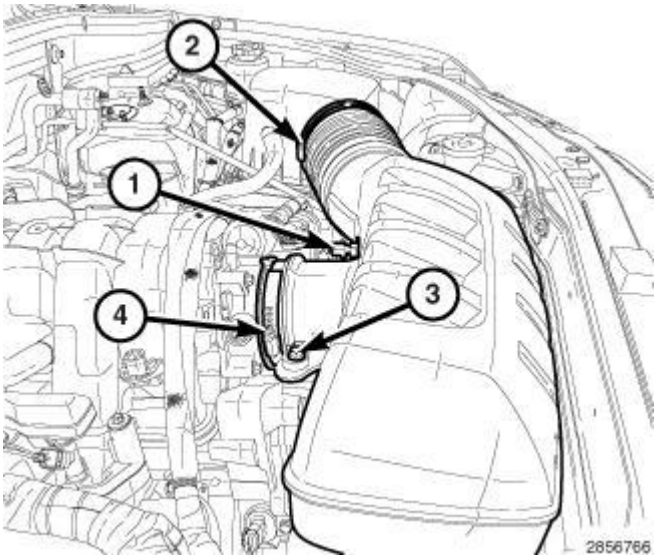


Fig. 360: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

41. Position the resonator hose onto the throttle body and tighten hose clamp (4) to 5 N.m (45 in. lbs.).
42. Install the resonator retaining bolt (3) and tighten to 5 N.m (45 in. lbs.).

43. Install the fresh air hose to the air cleaner housing and tighten hose clamp (2) to 5 N.m (45 in. lbs.).
44. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (1).

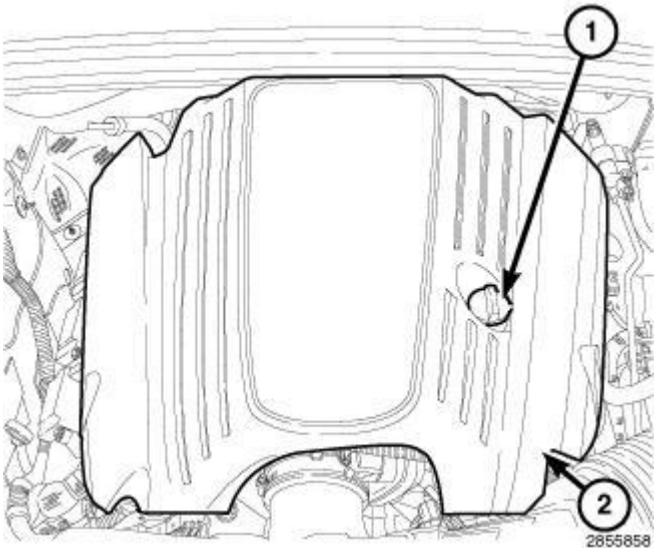


Fig. 361: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

45. Install the engine oil dipstick.
46. Install the engine cover (2).
47. Install the oil fill cap (1).

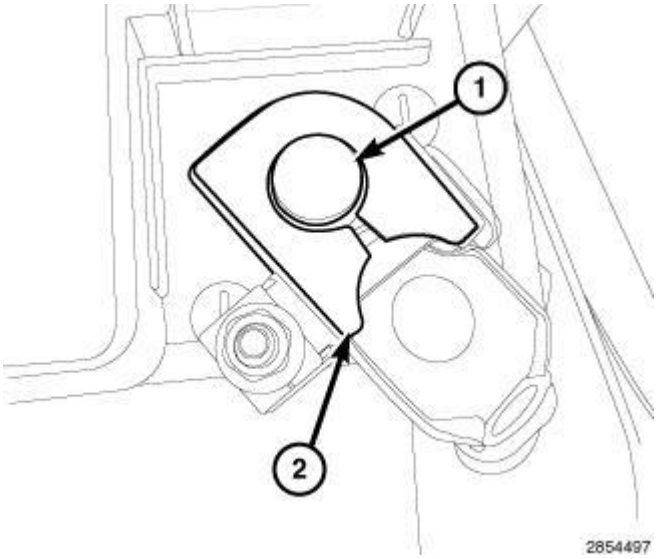


Fig. 362: Negative Battery Cable
Courtesy of CHRYSLER LLC

48. Fill the engine with clean oil.
49. Connect the negative battery cable (2).

50. Start the engine and check for leaks.

PUMP, ENGINE OIL

REMOVAL

REMOVAL

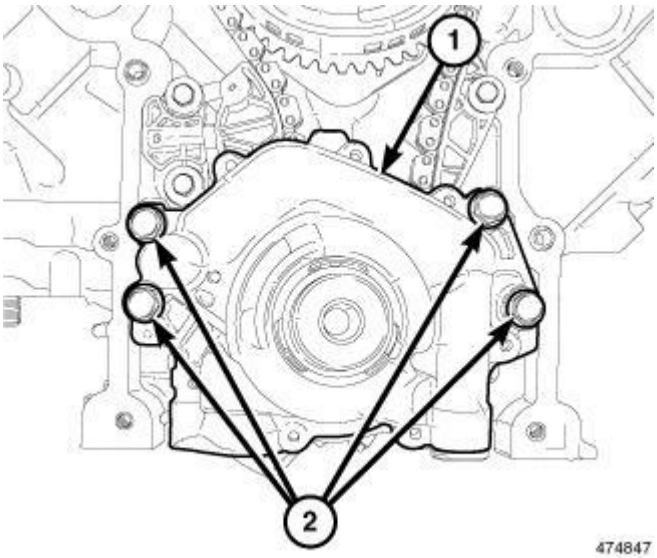


Fig. 363: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER LLC

1. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
2. Remove the timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.
3. Remove the four bolts (2) and the oil pump (1).

CLEANING

CLEANING

1. Wash all parts in a suitable solvent.

INSPECTION

INSPECTION

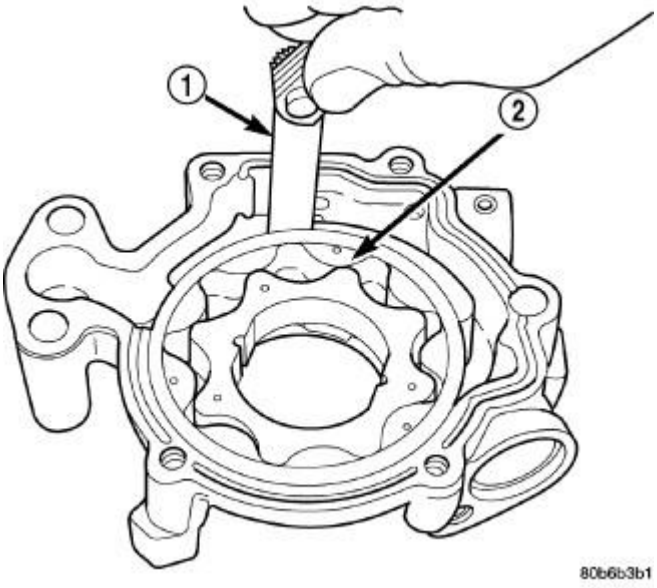


Fig. 364: Measuring Outer Rotor Clearance In Housing
Courtesy of CHRYSLER LLC

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.

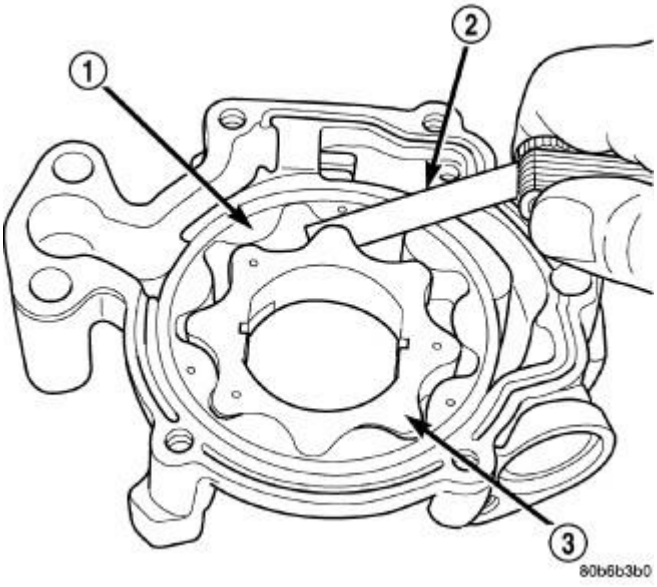


Fig. 365: Measuring Clearance Between Rotors
Courtesy of CHRYSLER LLC

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.

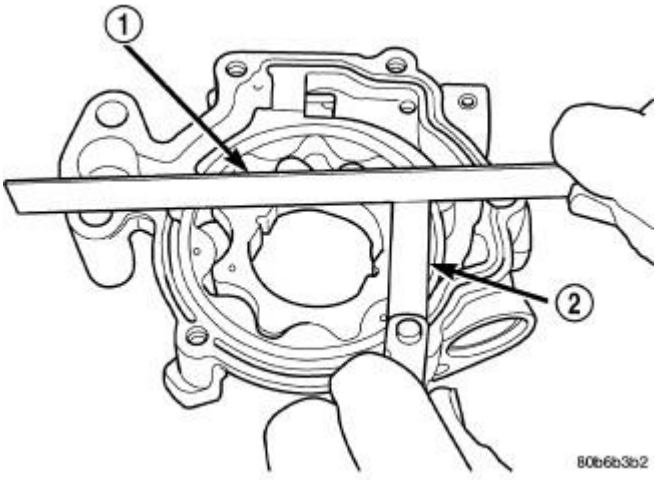


Fig. 366: Measuring Clearance Over Rotors
Courtesy of CHRYSLER LLC

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

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

INSTALLATION

INSTALLATION

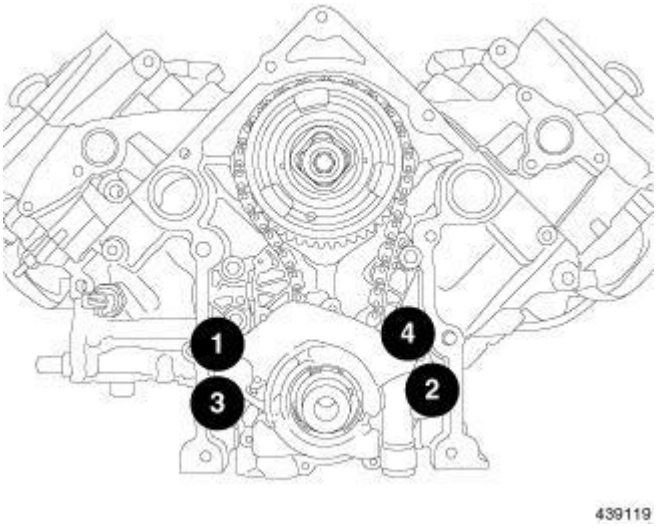


Fig. 367: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

1. Position the oil pump on the crankshaft and install the oil pump retaining bolts finger tight.
2. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).
3. Install the timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
4. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.

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

EXHAUST MANIFOLD - LEFT SIDE

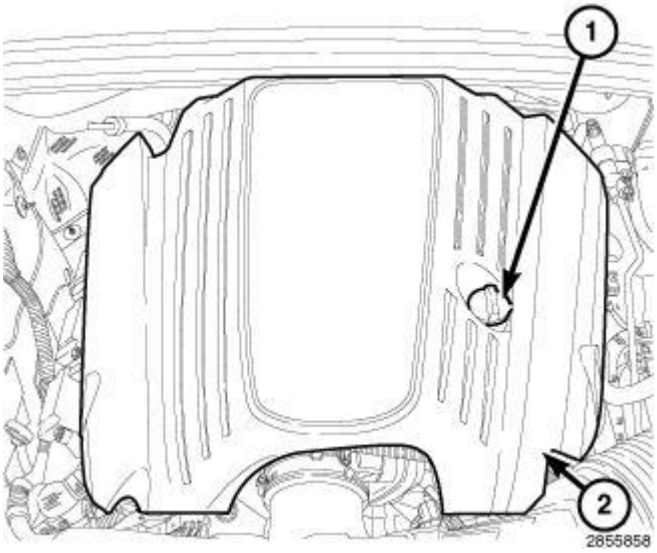


Fig. 368: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Remove the engine cover (2).

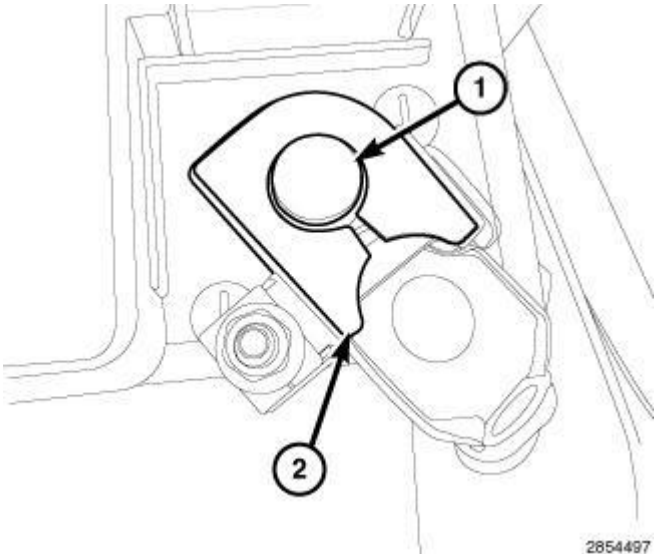


Fig. 369: Negative Battery Cable
Courtesy of CHRYSLER LLC

3. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
4. Disconnect and isolate the negative battery cable (2).
5. Remove the air cleaner assembly. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.

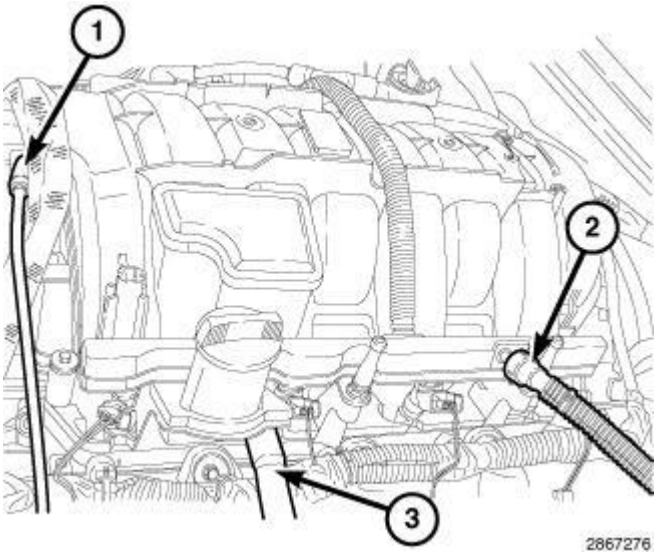


Fig. 370: EVAP Vacuum Line, Fuel Supply Line & Make Up Air Hose
Courtesy of CHRYSLER LLC

6. Disconnect the EVAP vacuum line (1) at the throttle body.
7. Disconnect the fuel supply line (2) at the fuel rail.
8. Disconnect the make up air hose (3) at the intake manifold.
9. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .

NOTE: It is not necessary to disconnect the refrigerant lines for A/C compressor removal.

10. Remove the A/C compressor from the engine block and position aside. Refer to **COMPRESSOR, A/C, REMOVAL** .

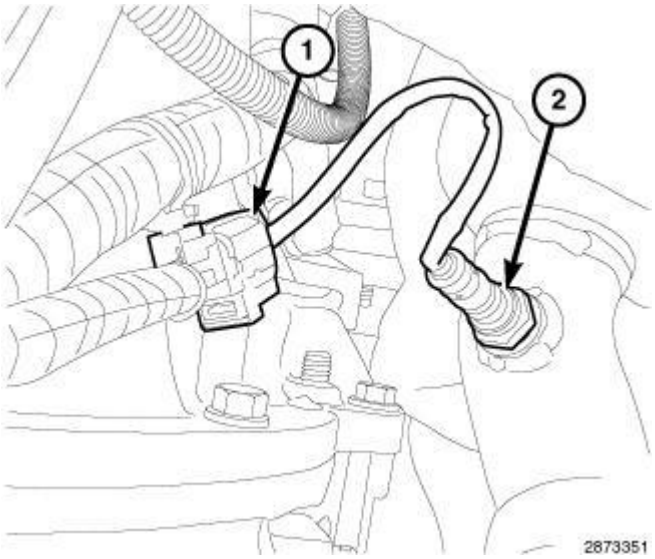


Fig. 371: Left Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

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 left upstream O2 sensor electrical connector (1).
12. Remove the exhaust manifold heat shield front retaining nuts.

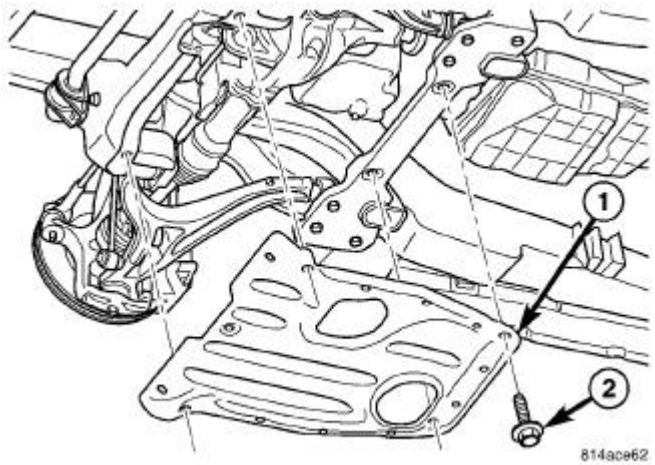


Fig. 372: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

13. Raise and support the vehicle.
14. If equipped, remove the skid plate (1) four retaining bolts (2) and remove the skid plate.
15. Disconnect the left exhaust pipe/catalytic converter. Refer to **CONVERTER, CATALYTIC,**

REMOVAL .

16. Remove the exhaust manifold heat shield rear retaining nuts and remove the heat shield.

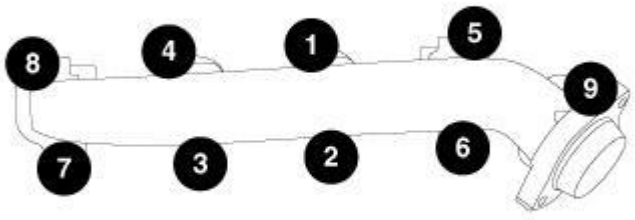


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Fig. 373: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER LLC

17. Remove the lower exhaust manifold retaining bolts.
18. Lower the vehicle.
19. Remove the upper exhaust manifold retaining bolts.

NOTE: The left exhaust manifold is removed from below the engine and out through the front of the engine compartment.

20. Raise and support the vehicle.
21. Remove the left exhaust manifold and gasket from below the engine and out through the front of the engine compartment.
22. Inspect the exhaust manifold for any damage. Refer to **MANIFOLD, EXHAUST, INSPECTION, 5.7L**.
23. Clean the mating surfaces.

EXHAUST MANIFOLD - RIGHT SIDE

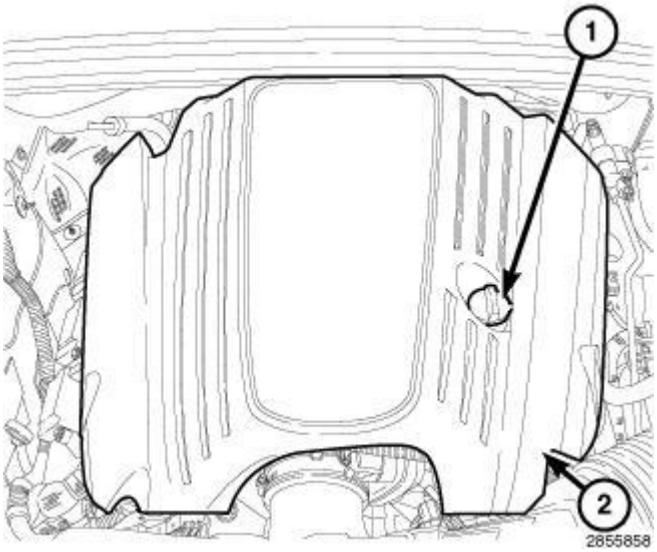

Fig. 374: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

1. Remove the oil fill cap (1).
2. Remove the engine cover (2).

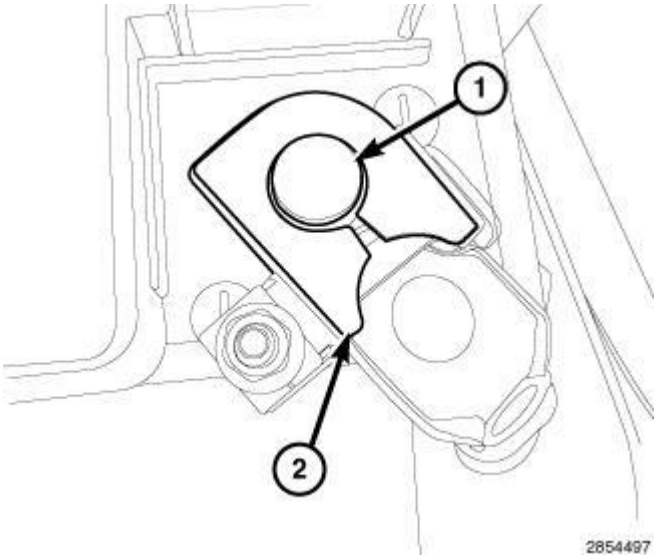

Fig. 375: Negative Battery Cable
Courtesy of CHRYSLER LLC

3. Disconnect and isolate the negative battery cable (2).

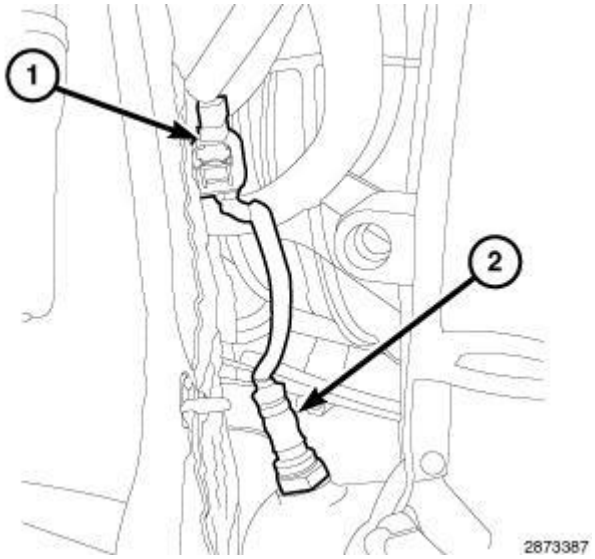

Fig. 376: Right Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

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.

4. Disconnect the right upstream O2 sensor electrical connector (1).
5. Remove the exhaust manifold heat shield front retaining nuts.

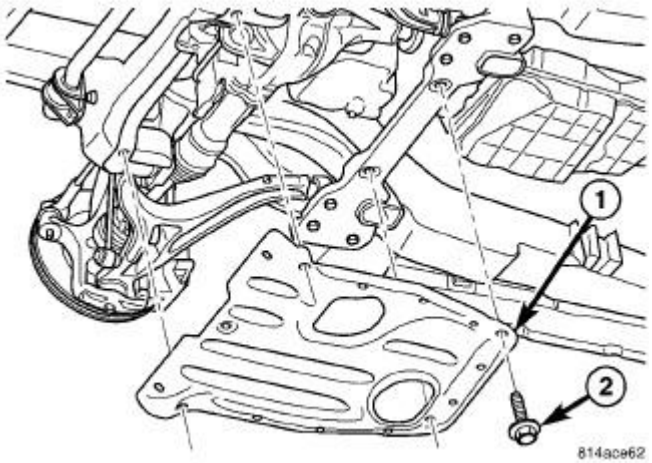

Fig. 377: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

6. Raise and support the vehicle.
7. If equipped, remove the skid plate (1) four retaining bolts (2) and remove the skid plate.
8. Disconnect the right exhaust pipe/catalytic converter. Refer to **CONVERTER, CATALYTIC,**

REMOVAL .

9. Remove the exhaust manifold heat shield rear retaining nuts and remove the heat shield.

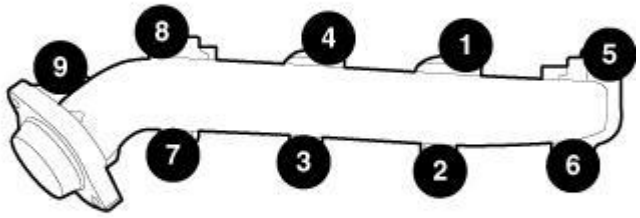

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Fig. 378: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER LLC

10. Using the sequence shown in illustration, remove the exhaust manifold retaining bolts.

NOTE: The right exhaust manifold is removed from below the engine and out through the rear of the engine compartment.

11. Remove the right exhaust manifold and gasket from below the engine and out through the rear of the engine compartment.
12. Inspect the exhaust manifold for any damage. Refer to **MANIFOLD, EXHAUST, INSPECTION, 5.7L**.
13. 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

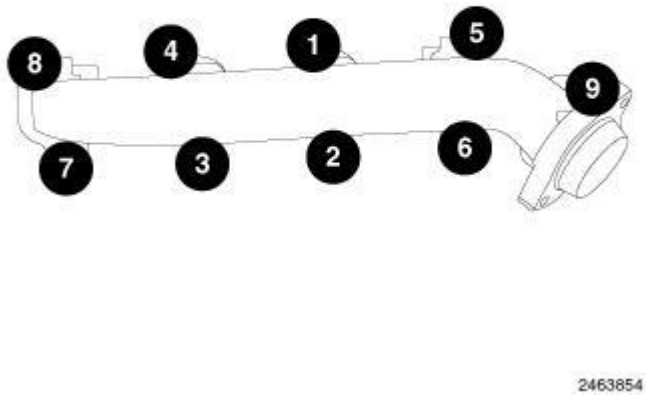

Fig. 379: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER LLC

1. Prior to installation, make sure all gasket mating surfaces are clean and free of any debris.

NOTE: Install the left exhaust manifold and gasket from below the engine and through the front of the engine compartment. Make sure the gasket is properly seated before installing the manifold bolts/studs.

2. Position the exhaust manifold and gasket and install the bolts/studs hand tight.
3. Using the sequence shown in illustration, tighten the exhaust manifold bolts/studs to 25 N.m (18 ft. lbs.).
4. Position the exhaust manifold heat shield, install the rear heat shield retaining nuts and tighten to 8 N.m (71 in. lbs.).
5. Install the left exhaust pipe/catalytic converter. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .

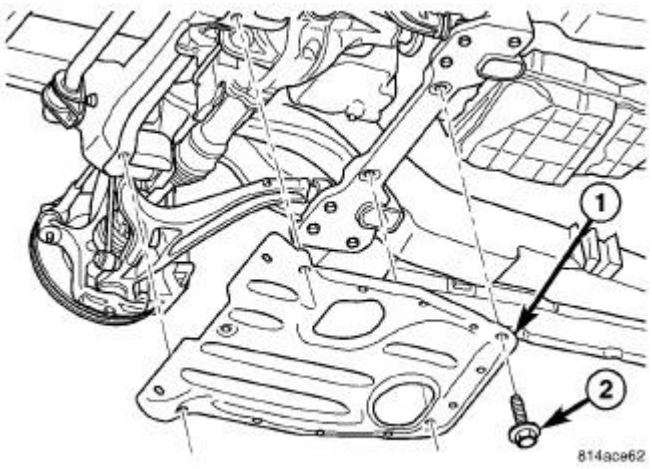

Fig. 380: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

6. If equipped, position the skid plate (1), install the skid plate four retaining bolts (2) and tighten to 28 N.m (21 ft. lbs.).
7. Lower the vehicle.

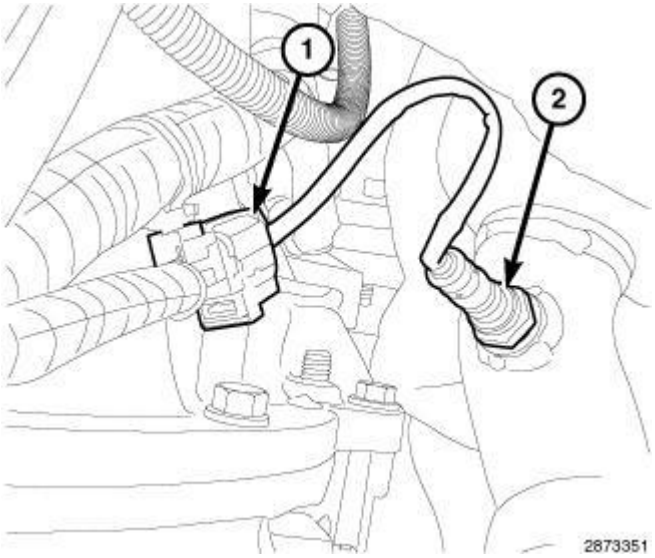

Fig. 381: Left Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

8. Install the front heat shield retaining nuts and tighten to 8 N.m (71 in. lbs.).
9. Connect the left upstream O2 sensor electrical connector (1).
10. Install the A/C compressor onto the engine block. Refer to **COMPRESSOR, A/C, INSTALLATION** .
11. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

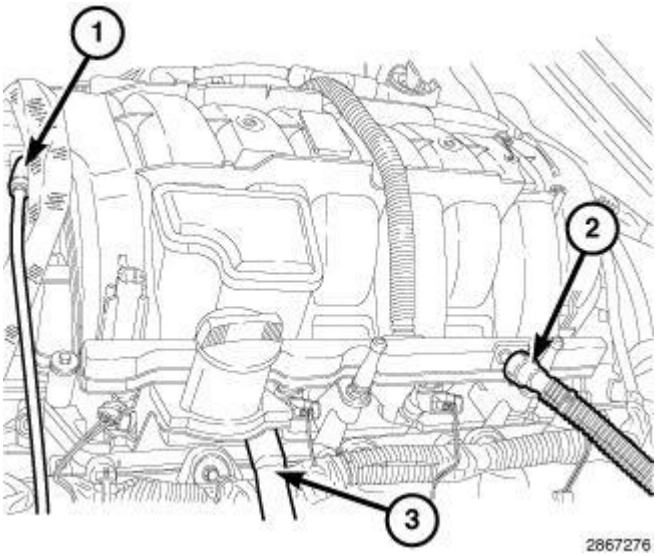

Fig. 382: EVAP Vacuum Line, Fuel Supply Line & Make Up Air Hose
Courtesy of CHRYSLER LLC

12. Connect the make up air hose (3) at the intake manifold.
13. Connect the fuel supply line (2) at the fuel rail.
14. Connect the EVAP vacuum line (1) at the throttle body.
15. Install the air cleaner assembly. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.

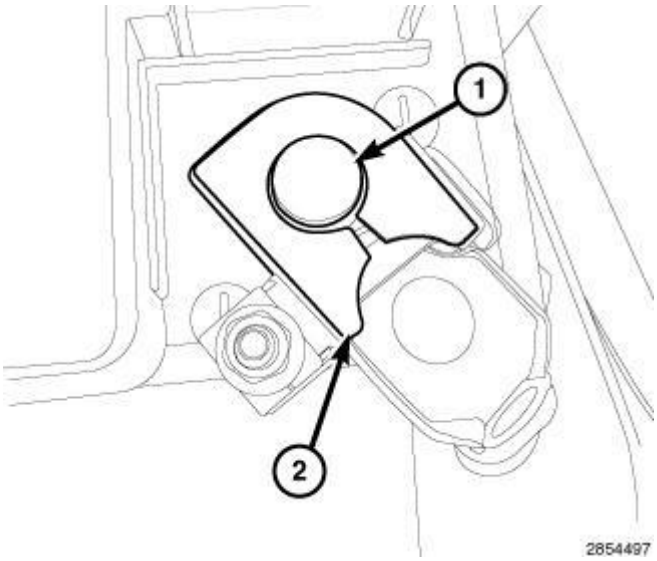

Fig. 383: Negative Battery Cable
Courtesy of CHRYSLER LLC

16. Connect the negative battery cable (2).

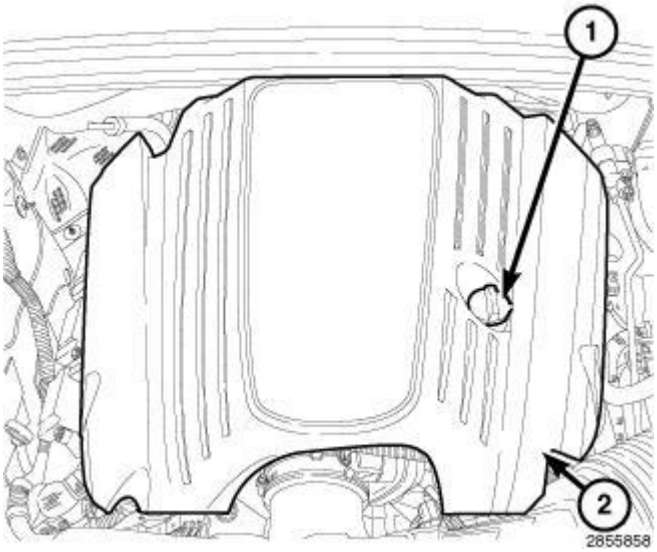

Fig. 384: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

17. Install the engine cover (2).
18. Install the oil fill cap (1).
19. Start the engine and check for leaks.

EXHAUST MANIFOLD - RIGHT SIDE

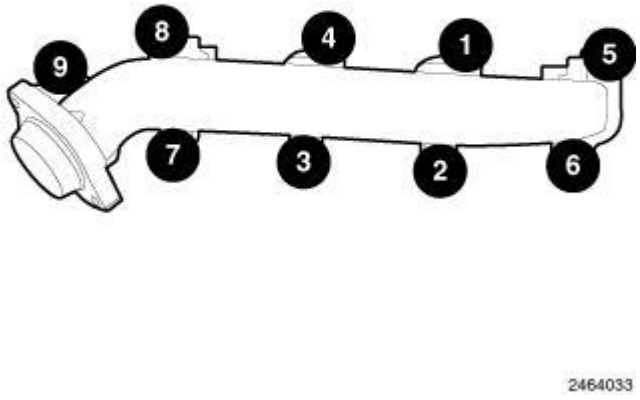

Fig. 385: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER LLC

1. Prior to installation, make sure all gasket mating surfaces are clean and free of any debris.

NOTE: Install the right exhaust manifold and gasket from below the engine and through the rear of the engine compartment. Make sure the gasket is

properly seated before installing the manifold bolts/studs.

2. Position the exhaust manifold and gasket and install the bolts/studs hand tight.
3. Using the sequence shown in illustration, tighten the exhaust manifold bolts/studs to 25 N.m (18 ft. lbs.).
4. Position the exhaust manifold heat shield, install the rear heat shield retaining nuts and tighten to 8 N.m (71 in. lbs.).
5. Install the right exhaust pipe/catalytic converter. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .

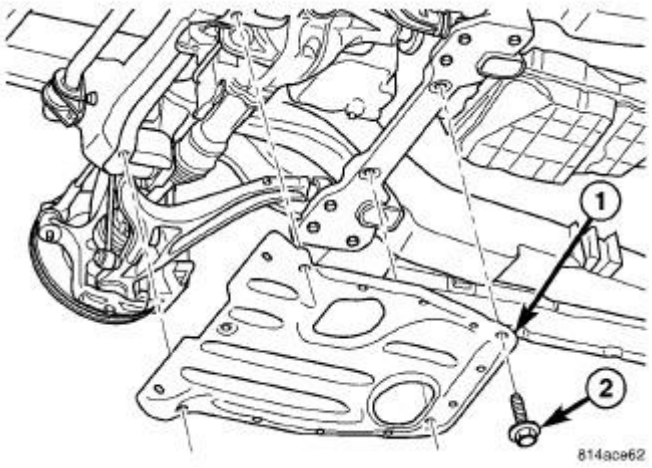

Fig. 386: Skid Plate & Retaining Bolts
Courtesy of CHRYSLER LLC

6. If equipped, position the skid plate (1), install the skid plate four retaining bolts (2) and tighten to 28 N.m (21 ft. lbs.).
7. Lower the vehicle.

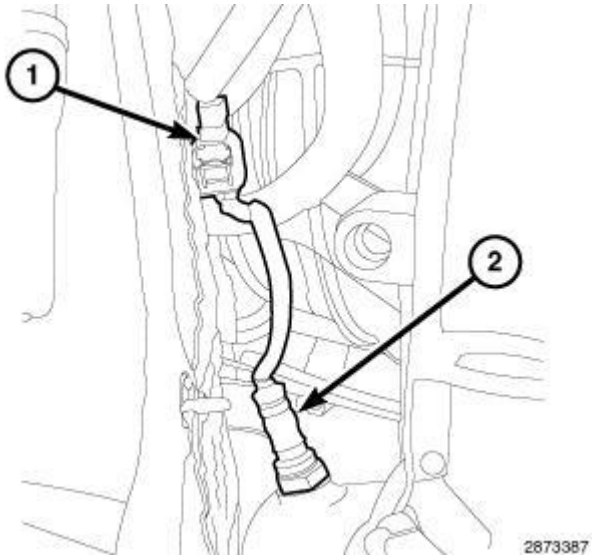

Fig. 387: Right Upstream O2 Sensor & Electrical Connector
Courtesy of CHRYSLER LLC

8. Install the exhaust manifold heat shield front retaining nuts and tighten to 8 N.m (71 in. lbs.).
9. Connect the right upstream O2 sensor electrical connector (1).

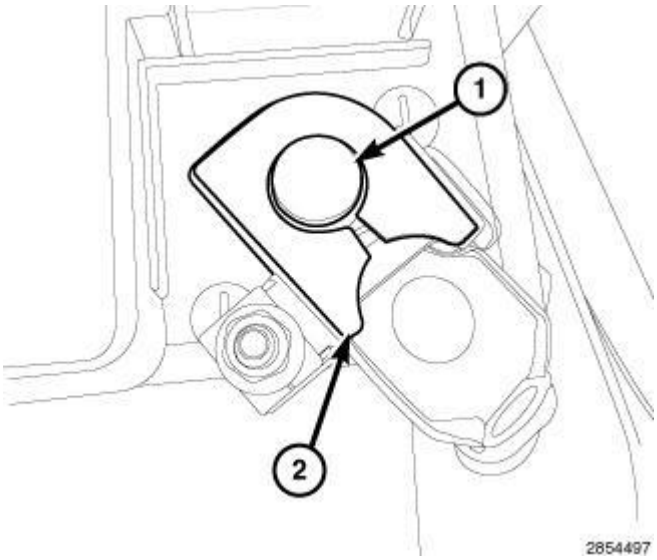

Fig. 388: Negative Battery Cable
Courtesy of CHRYSLER LLC

10. Connect the negative battery cable (2).

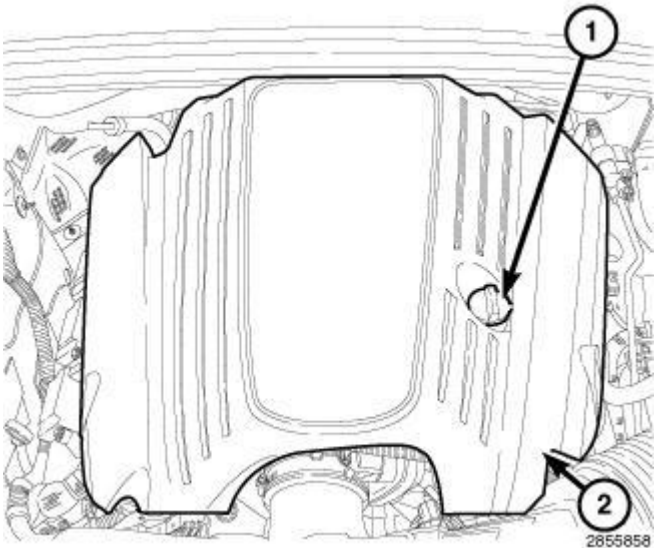

Fig. 389: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

11. Install the engine cover (2).
12. Install the oil fill cap (1).

13. Start the engine and check for leaks.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

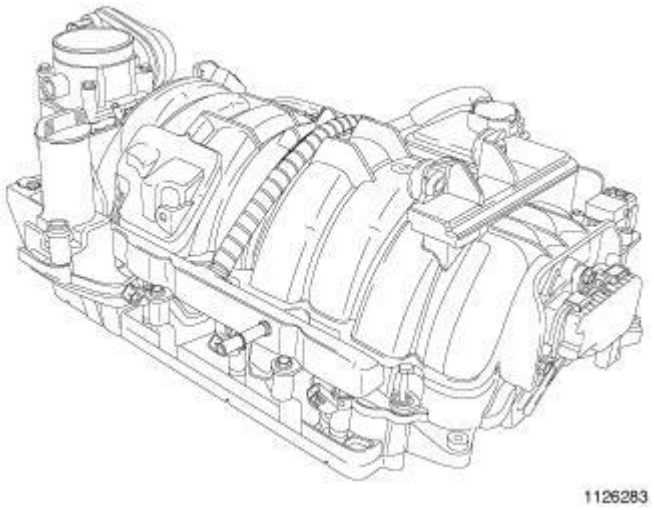

Fig. 390: Intake Manifold
Courtesy of CHRYSLER LLC

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

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

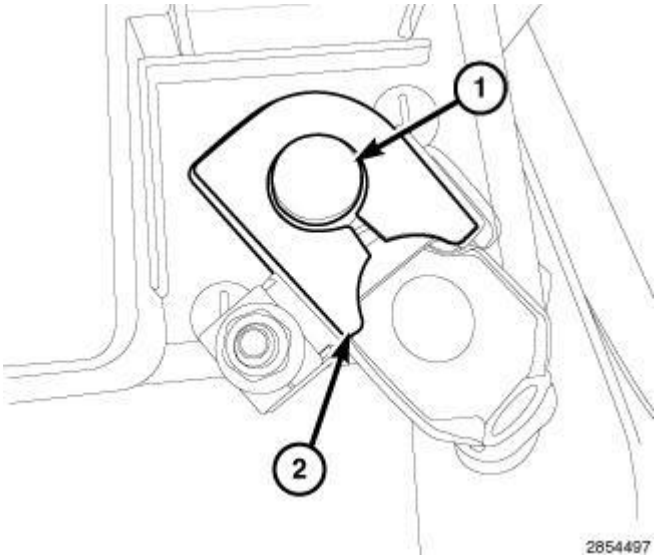

Fig. 391: Negative Battery Cable
Courtesy of CHRYSLER LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the negative battery cable (2).

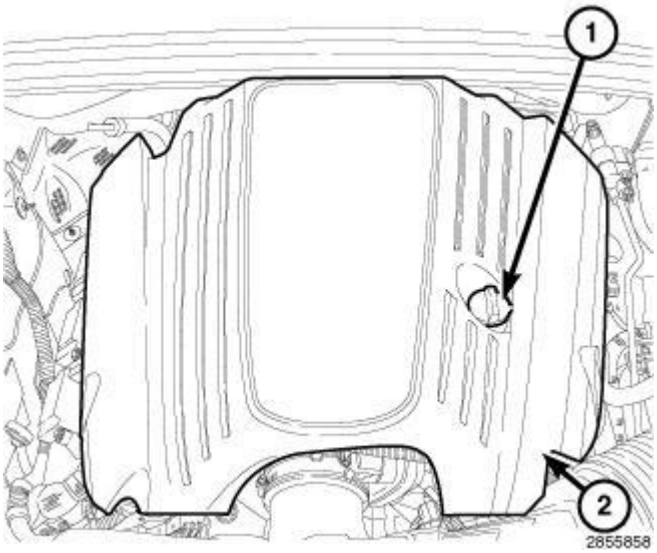

Fig. 392: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

3. Remove the oil fill cap (1).

4. Remove the engine cover (2).

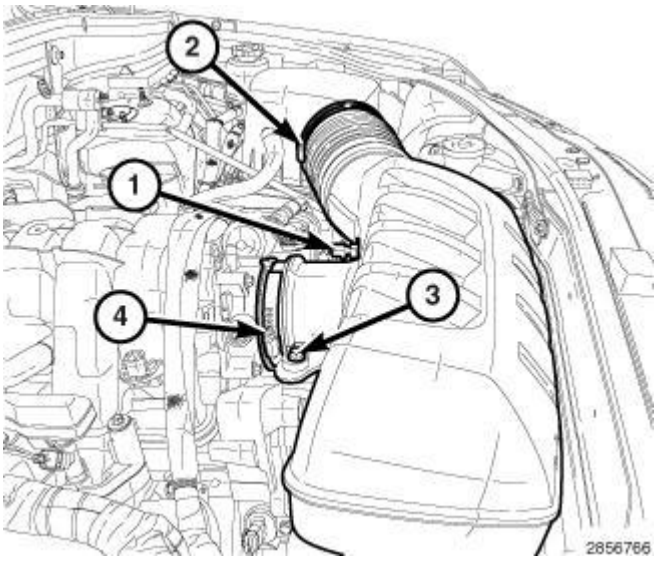

Fig. 393: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

5. Disconnect the electrical connector at the Intake Air Temperature (IAT) sensor (1).
6. Loosen the hose clamp at the air cleaner housing (2).
7. Remove the resonator retaining bolt (3).
8. Loosen the hose clamp at the throttle body (4) and remove the resonator.

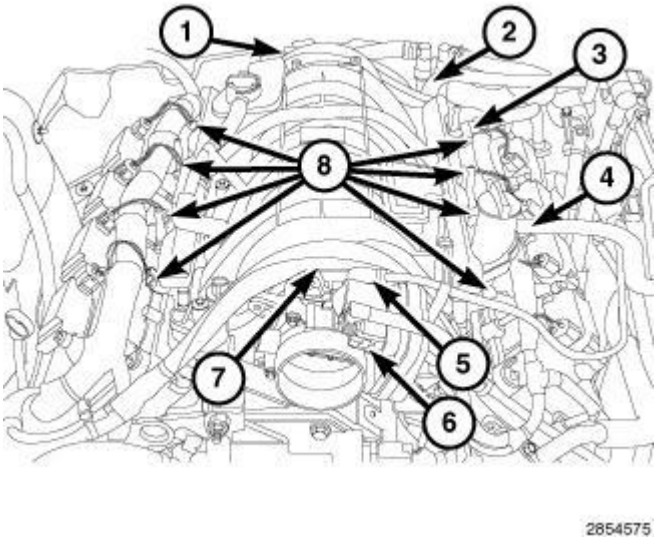

Fig. 394: Map Sensor, Brake Booster Vacuum Hose, Fuel Supply Line, Make Up Air Hose, EVAP Vacuum Purge Hose, Electrical Connector & Electrical Harness
Courtesy of CHRYSLER LLC

9. Disconnect the MAP sensor (1) electrical connector at the rear of the intake manifold.
10. Disconnect the brake booster vacuum hose (2) at the rear of the intake manifold.
11. Disconnect the fuel supply line (3) at the fuel rail.
12. Disconnect the make up air hose (4) at the intake manifold.
13. Disconnect the EVAP vacuum purge hose (5) at the throttle body.
14. Disconnect the electrical connector (6) at the throttle body.
15. Reposition the electrical harness (7).

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

16. Disconnect the fuel injector electrical connectors (8) and position aside.

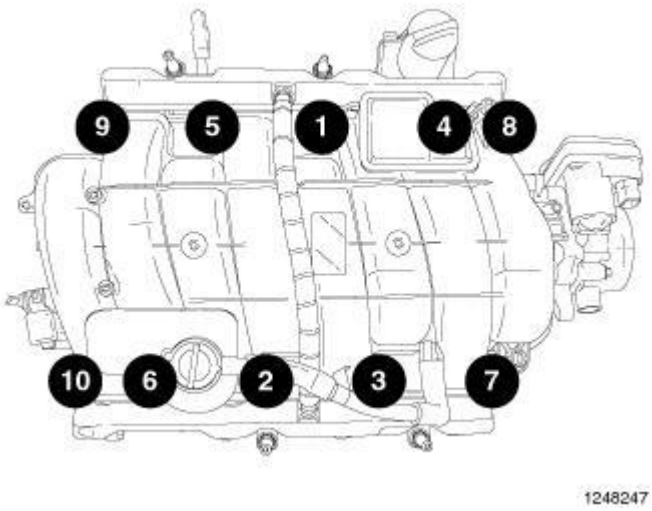

Fig. 395: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

17. Using the sequence shown in illustration, remove the intake manifold retaining bolts.
18. Remove the 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

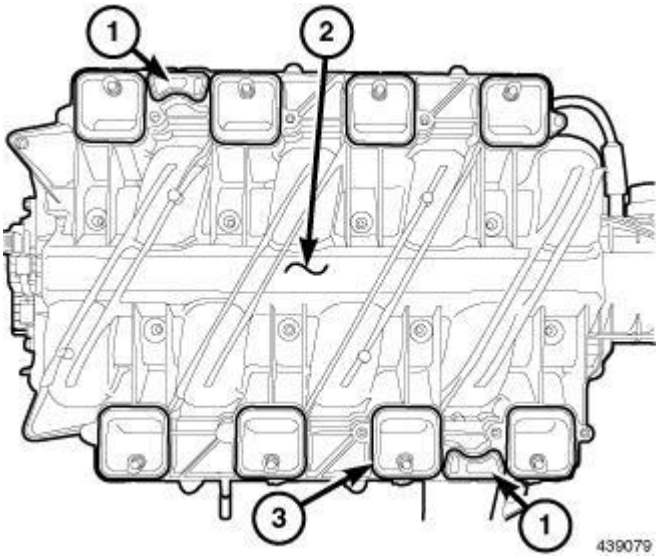

Fig. 396: Intake Manifold & PCV Seals
Courtesy of CHRYSLER LLC

NOTE: The intake manifold seals (1, 3) may be used again, provided no cuts, tears, or deformation have occurred.

1. Inspect the intake manifold seals and replace as necessary.
2. Install the intake manifold seals (1, 3).
3. Position the intake manifold (2) in place.

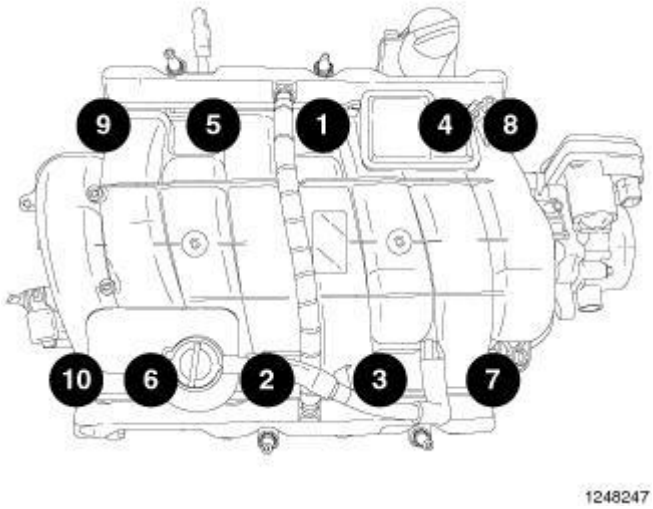

Fig. 397: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

NOTE: If reinstalling the original manifold apply Mopar® Lock & Seal Adhesive to the intake manifold bolts. Not required when installing a new manifold.

4. Apply Mopar® Lock & Seal Adhesive to the intake manifold bolts.
5. Using the sequence shown in illustration, install the intake manifold bolts and tighten to 12 N.m (9 ft. lbs.).

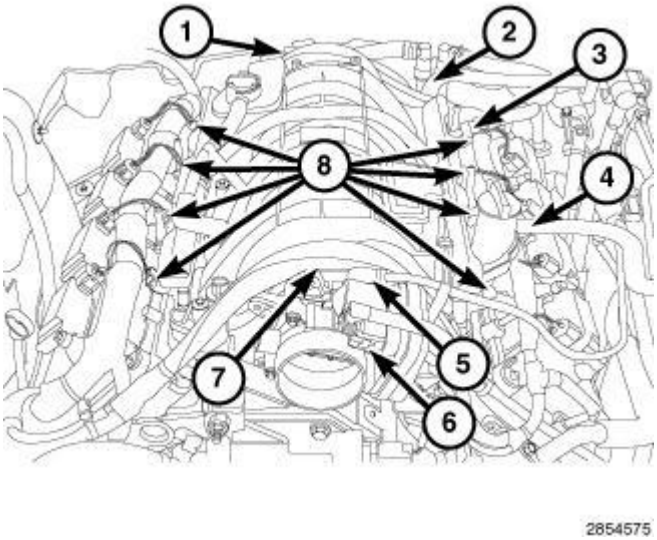

Fig. 398: Map Sensor, Brake Booster Vacuum Hose, Fuel Supply Line, Make Up Air Hose, EVAP Vacuum Purge Hose, Electrical Connector & Electrical Harness
Courtesy of CHRYSLER LLC

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

use the noted electrical connector's location during removal.

6. Connect the fuel injector electrical connectors (8).
7. Position the electrical harness (7) as shown in illustration.
8. Connect the electrical connector (6) at the throttle body.
9. Connect the EVAP vacuum purge hose (5).
10. Connect the make up air hose (4) at the intake manifold.
11. Connect the fuel supply line (3) at the fuel rail.
12. Connect the brake booster vacuum hose (2) at the rear of the intake manifold.
13. Connect the MAP sensor (1) electrical connector at the rear of the intake manifold.

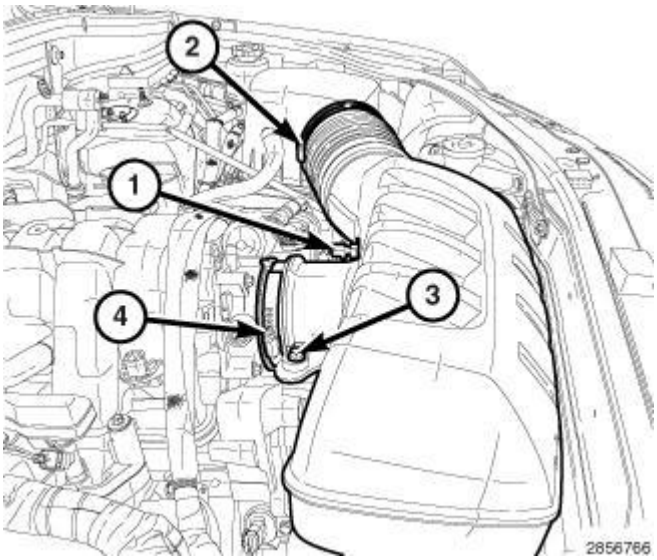

Fig. 399: Intake Air Temperature (IAT) Sensor, Air Cleaner Housing, Resonator Retaining Bolt & Hose Clamp
Courtesy of CHRYSLER LLC

14. Position the resonator onto the throttle body and air cleaner housing.
15. Tighten the hose clamp at the throttle body (4) to 5 N.m (45 in. lbs.).
16. Install the resonator retaining bolt (3) and tighten to 5 N.m (45 in. lbs.).
17. Tighten the hose clamp at the air cleaner housing (2) to 5 N.m (45 in. lbs.).
18. Connect the electrical connector at the Intake Air Temperature (IAT) sensor (1).

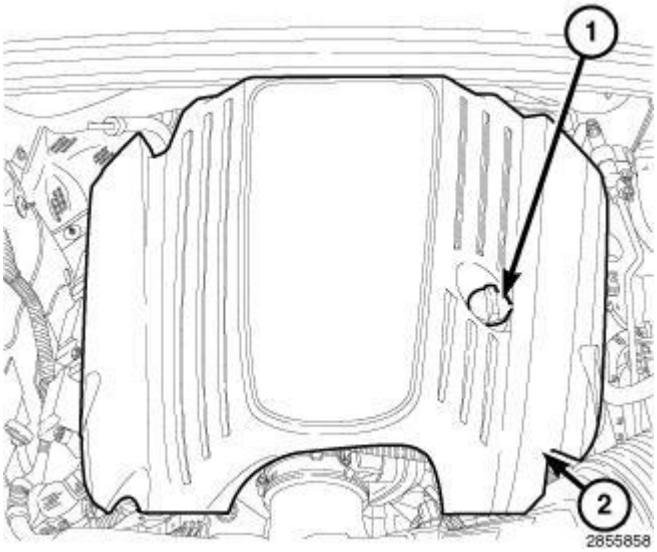

Fig. 400: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER LLC

19. Install the engine cover (2).
20. Install the oil fill cap (1).

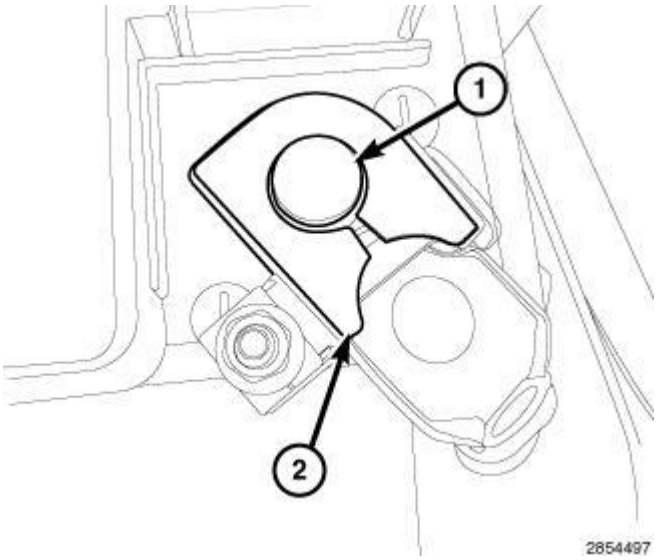

Fig. 401: Negative Battery Cable
Courtesy of CHRYSLER LLC

21. Connect the negative battery cable (2).
22. Start the engine and check for leaks.

MDS SYSTEM

DESCRIPTION

DESCRIPTION

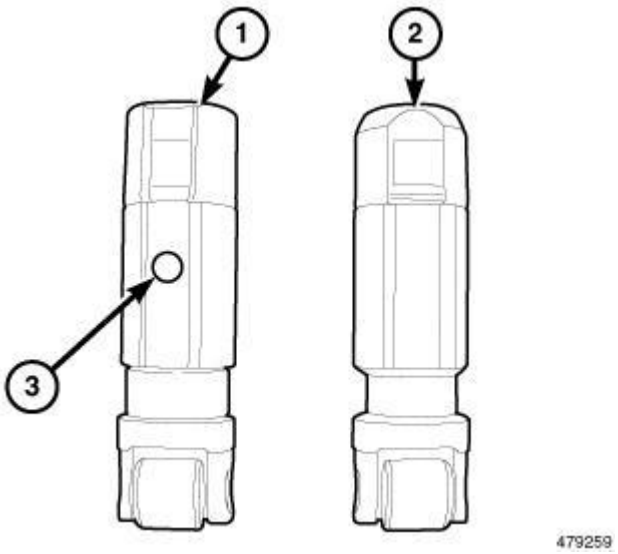

Fig. 402: MDS Lifter
Courtesy of CHRYSLER LLC

The Multiple Displacement System (MDS) selectively deactivates cylinders 1, 4, 6 and 7 during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

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

The MDS deactivating lifter (1) can be distinguished from the non-MDS lifter (2) by the disconnecting pin (3) on the side of the MDS lifter.

MDS is integrated into the basic engine architecture requiring these additional components:

- Unique MDS camshaft
- 8 deactivating roller lifters
- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

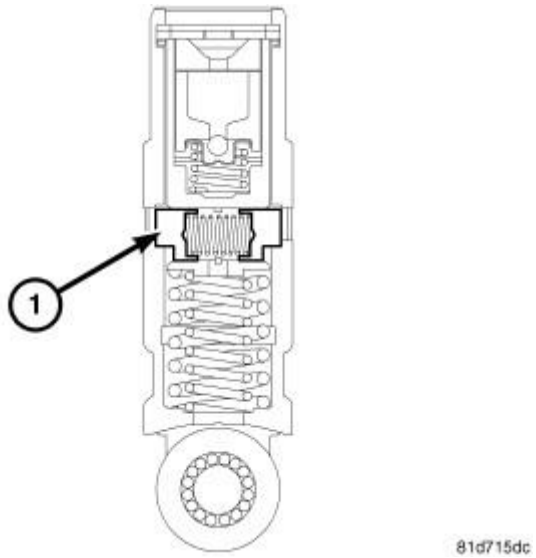

Fig. 403: MDS Lifter Cross Section
Courtesy of CHRYSLER LLC

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 to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages drilled into the cylinder block. The MDS solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is 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 engines that use MDS.

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No fuel/air enters or leaves during subsequent piston strokes, this high pressure gas is repeatedly compressed and expanded like an air spring.

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

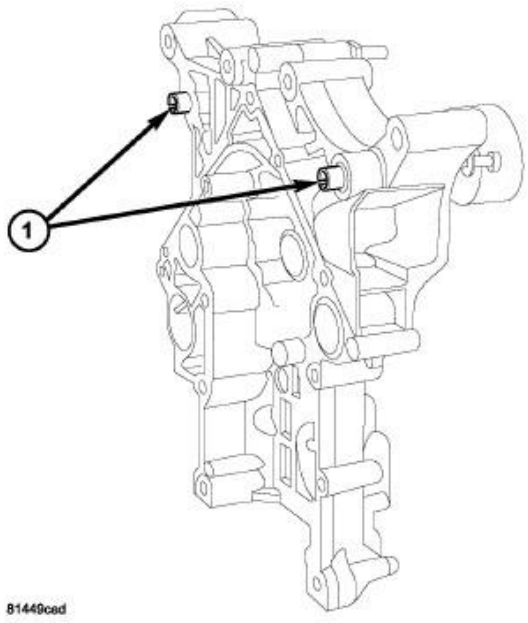

Fig. 404: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

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

3. Remove the timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.
4. Verify the slide bushings (1) remain installed in the timing chain cover during removal.

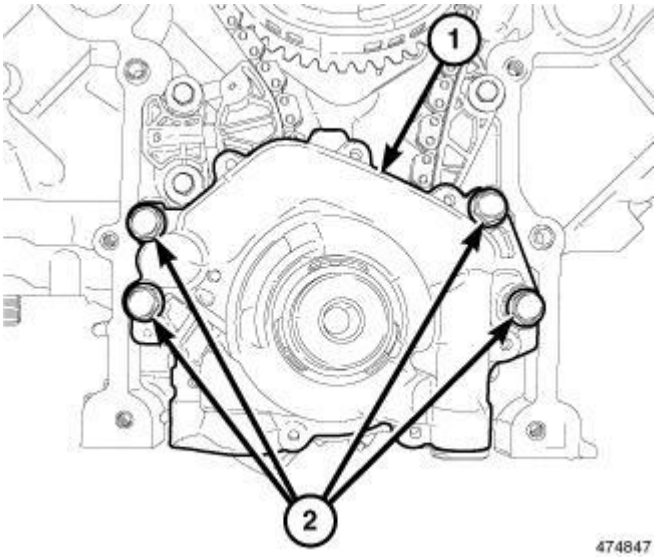

Fig. 405: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER LLC

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

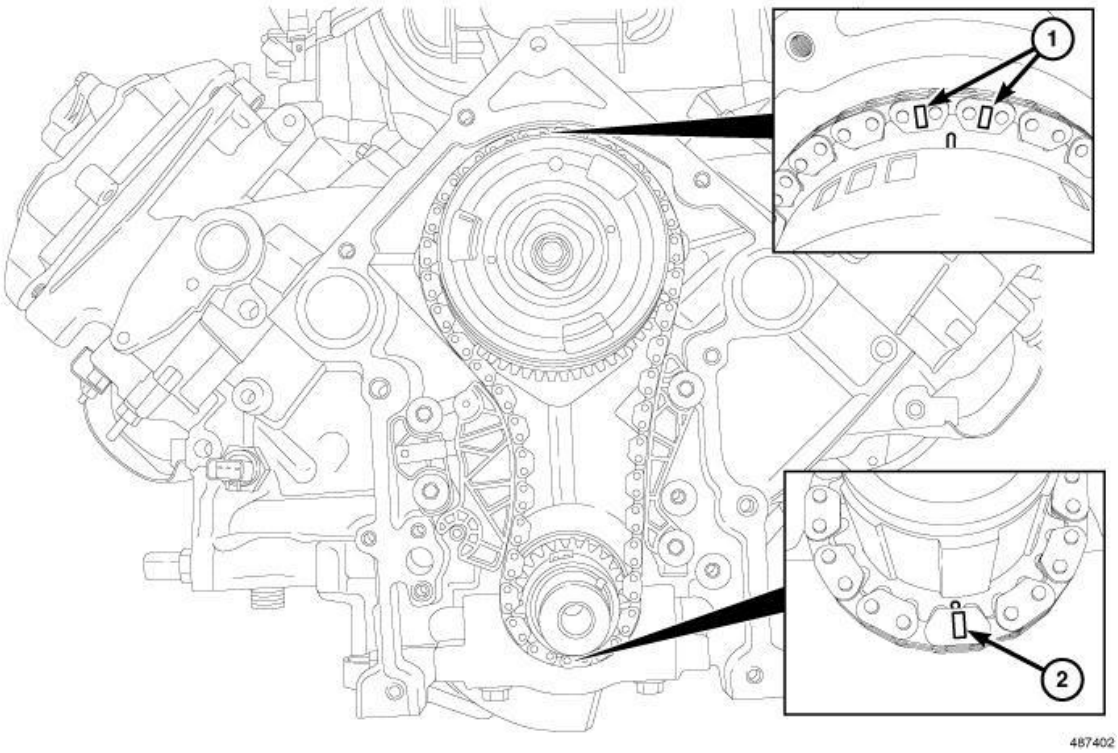

Fig. 406: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER LLC

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).

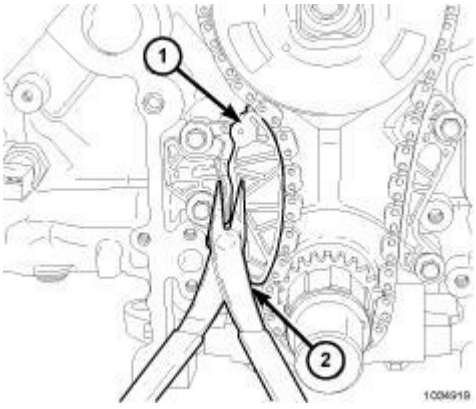

Fig. 407: Chain Tensioner Arm
Courtesy of CHRYSLER LLC

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

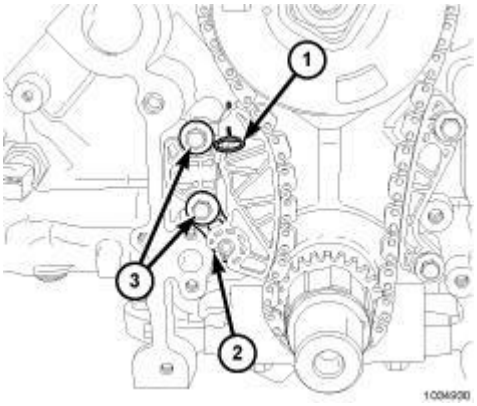

Fig. 408: Timing Chain Tensioner Pin & Bolts
Courtesy of CHRYSLER LLC

8. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the chain tensioner holes.

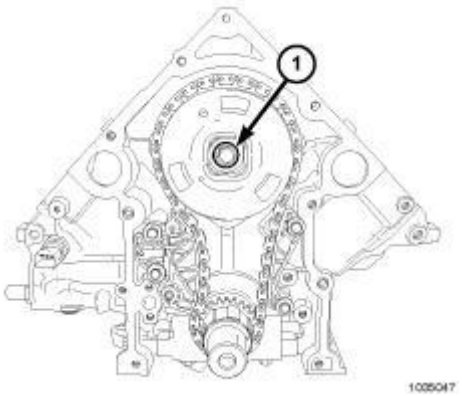

Fig. 409: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

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.

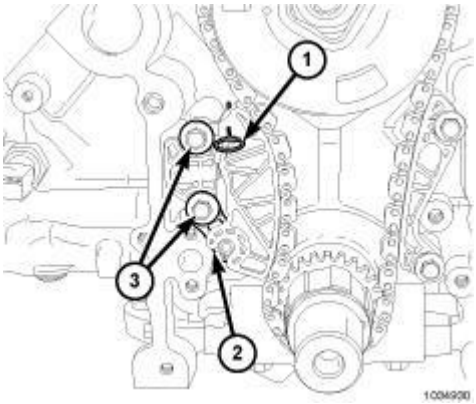

Fig. 410: Timing Chain Tensioner Pin & Bolts
Courtesy of CHRYSLER LLC

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).

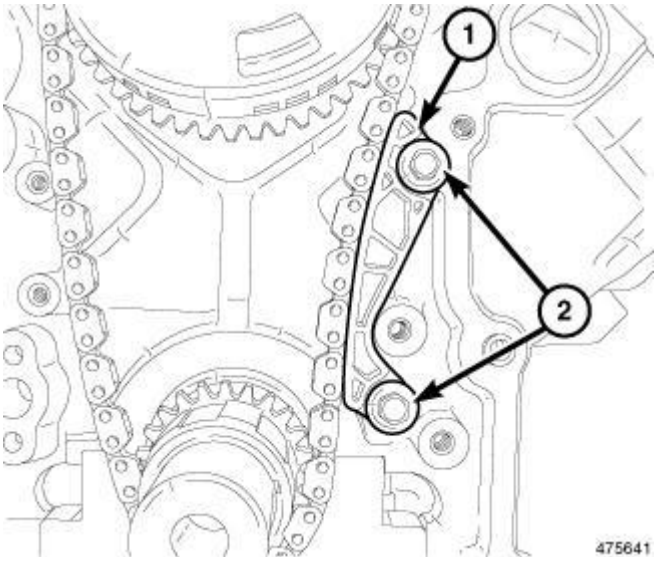

Fig. 411: Timing Chain Guide & Bolts
Courtesy of CHRYSLER LLC

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

INSTALLATION

INSTALLATION

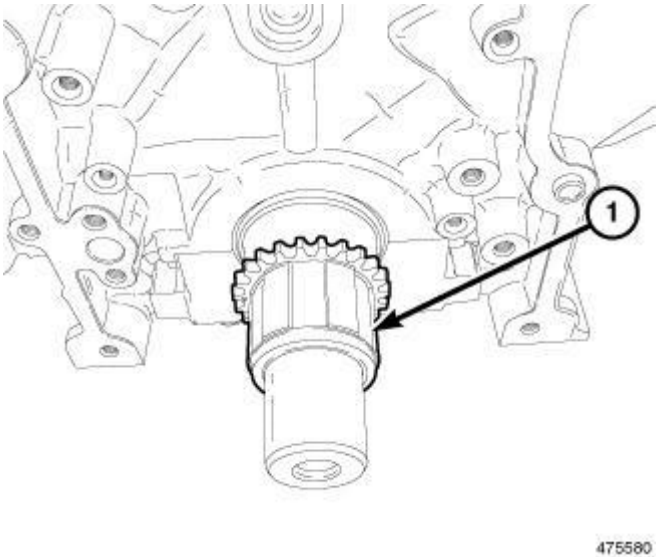

Fig. 412: Crankshaft Sprocket
Courtesy of CHRYSLER LLC

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

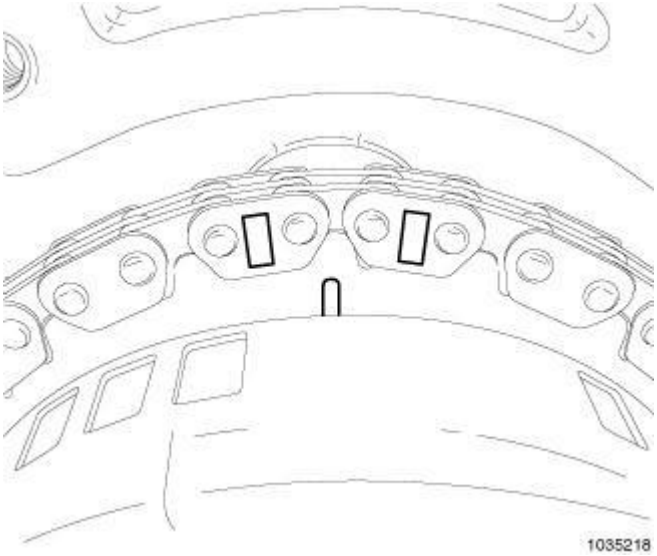

Fig. 413: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER LLC

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.

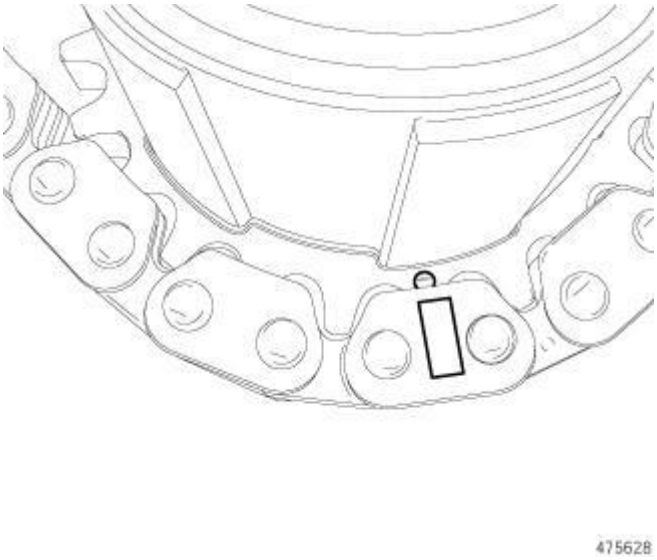

Fig. 414: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER LLC

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.

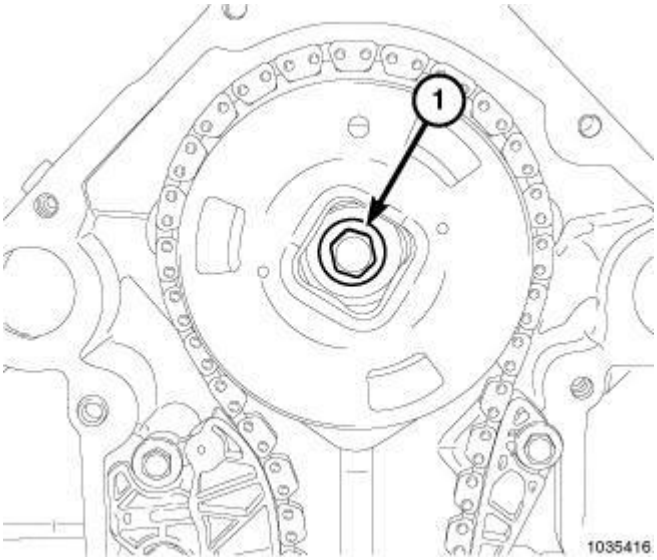

Fig. 415: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

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.

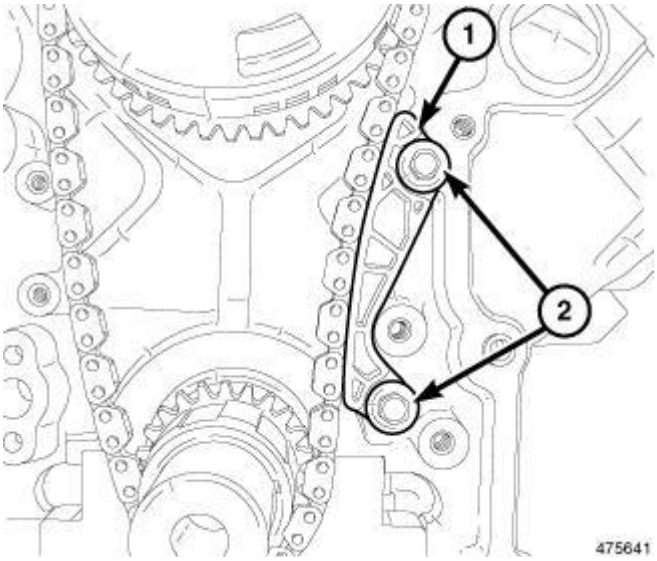

Fig. 416: Timing Chain Guide & Bolts
Courtesy of CHRYSLER LLC

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

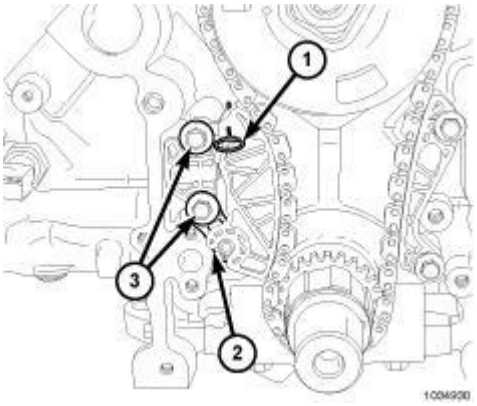

Fig. 417: Timing Chain Tensioner Pin & Bolts
Courtesy of CHRYSLER LLC

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 (special tool #8514, Pins, Tensioner) (1).

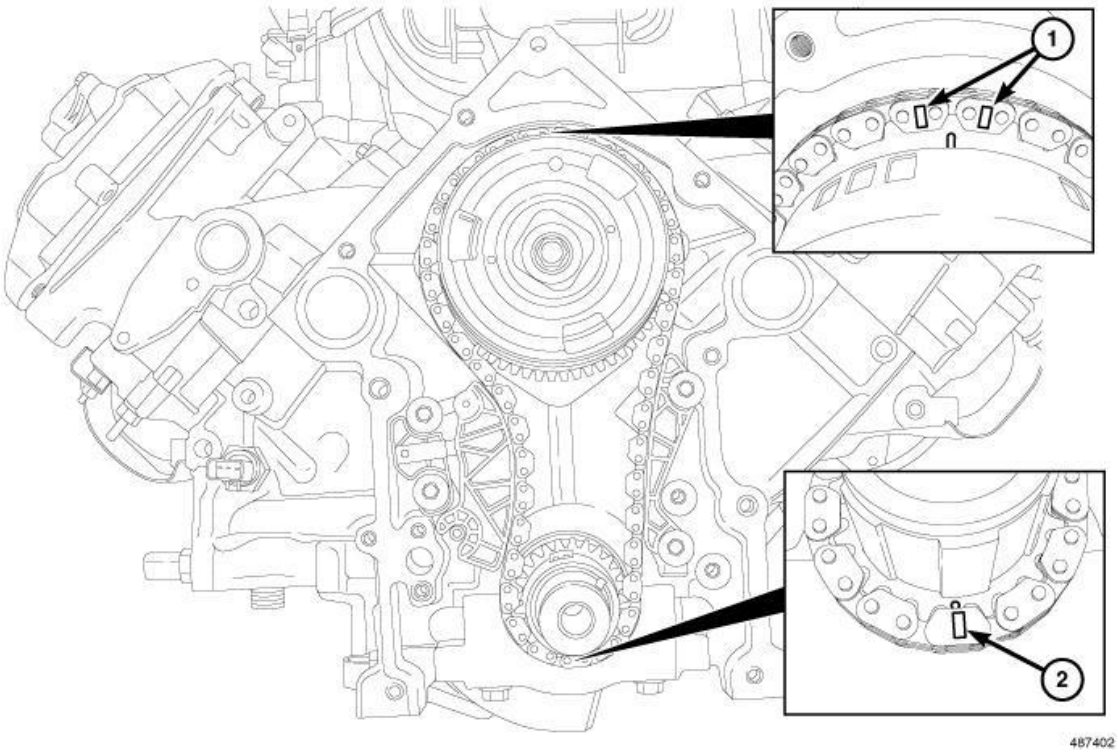

Fig. 418: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER LLC

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.

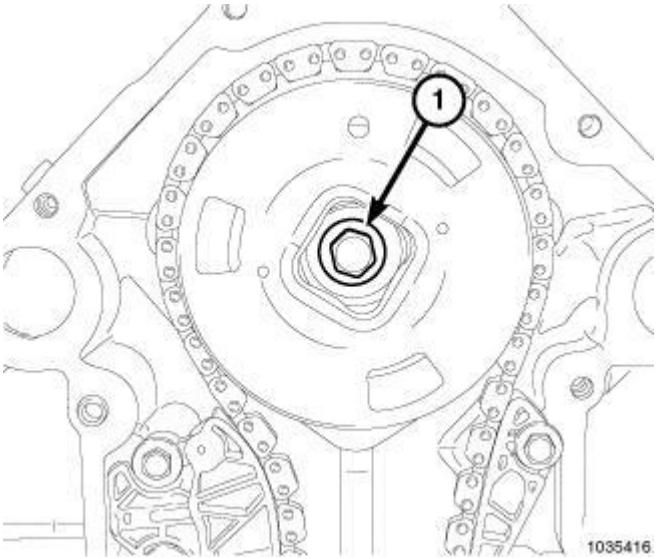

Fig. 419: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

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

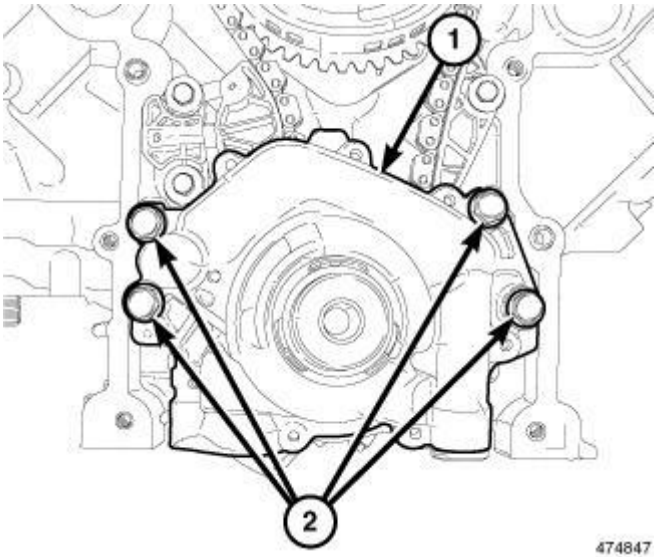

Fig. 420: Oil Pump & Retaining Bolts
Courtesy of CHRYSLER LLC

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

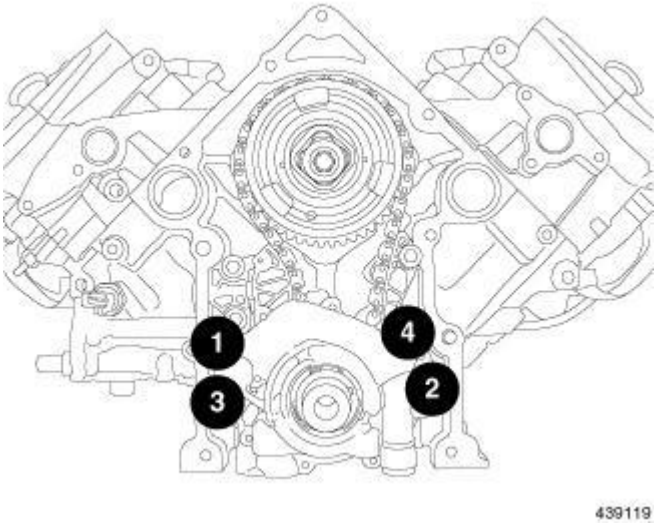

Fig. 421: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

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

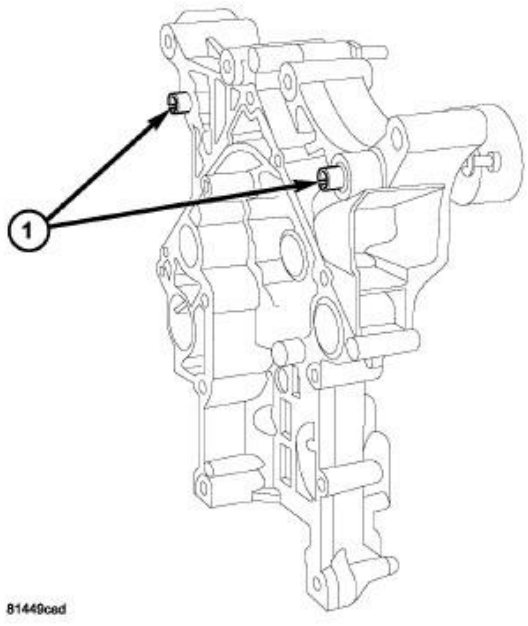

Fig. 422: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

13. Verify the slide bushings (1) are installed in the timing chain cover.
14. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
15. Fill the engine with oil.
16. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
17. Connect the negative battery cable.
18. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

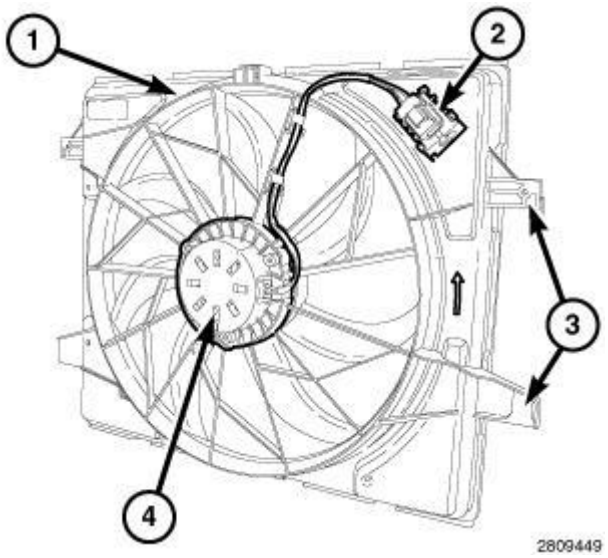

Fig. 423: Cooling Fan Module Components
Courtesy of CHRYSLER LLC

1. Remove the cooling fan module (1). Refer to **FAN, COOLING, REMOVAL** .
2. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .

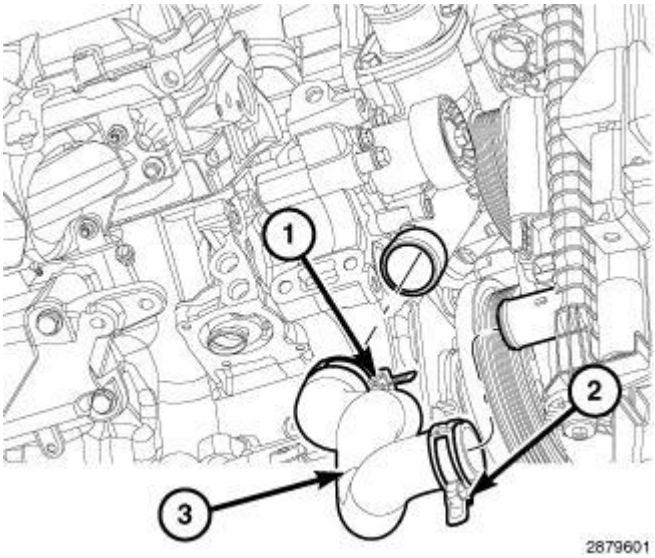

Fig. 424: Lower Radiator Hose & Clamps
Courtesy of CHRYSLER LLC

3. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
4. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
5. Remove the lower radiator hose clamp (1) at the water pump.
6. Remove the lower radiator hose clamp (2) at the radiator and remove the lower radiator hose (3).

NOTE: It is not necessary to disconnect the refrigerant lines for A/C compressor

removal.

7. Remove the A/C compressor from the engine block and position aside. Refer to **COMPRESSOR, A/C, REMOVAL** .

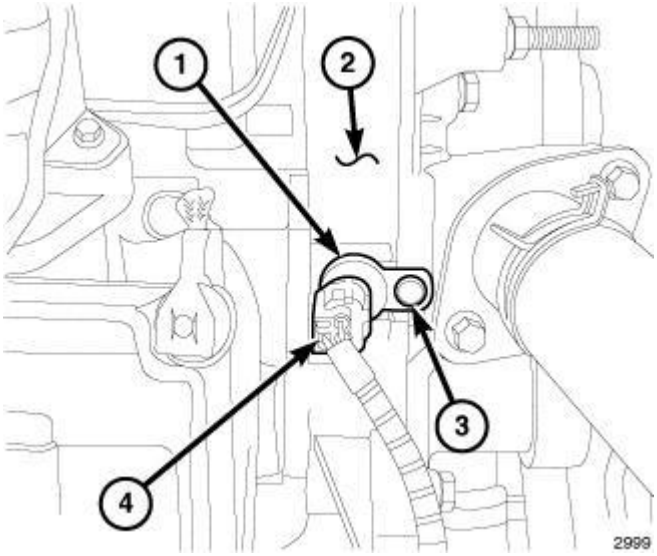

Fig. 425: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER LLC

8. Lower the vehicle.
9. Disconnect the CMP sensor electrical connector (4).
10. Remove CMP sensor mounting bolt (3).
11. Using a slight rocking motion, carefully remove the CMP sensor (1) from the timing cover (2).
12. Check the condition of the CMP sensor O-ring, replace as necessary.

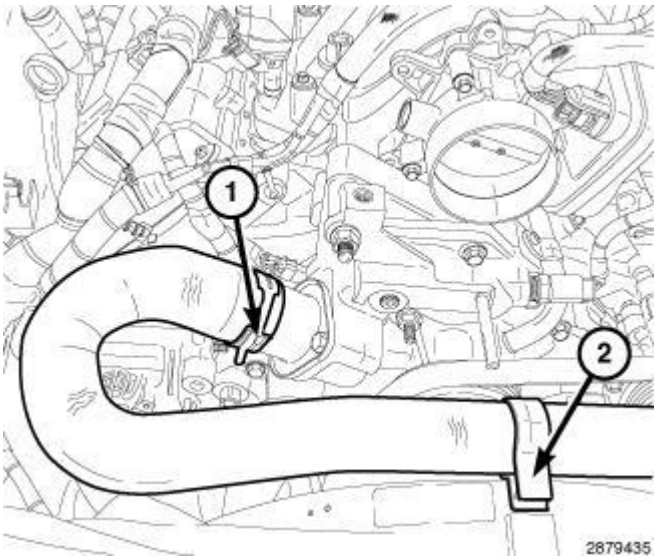

Fig. 426: Upper Radiator Hose Clamp & Retainer

Courtesy of CHRYSLER LLC

13. Remove the upper radiator hose clamp (1) at the thermostat housing.
14. Remove the upper radiator hose retainer (2) at the fan shroud and position the radiator hose aside.
15. Remove the air cleaner resonator support bracket at the water pump.

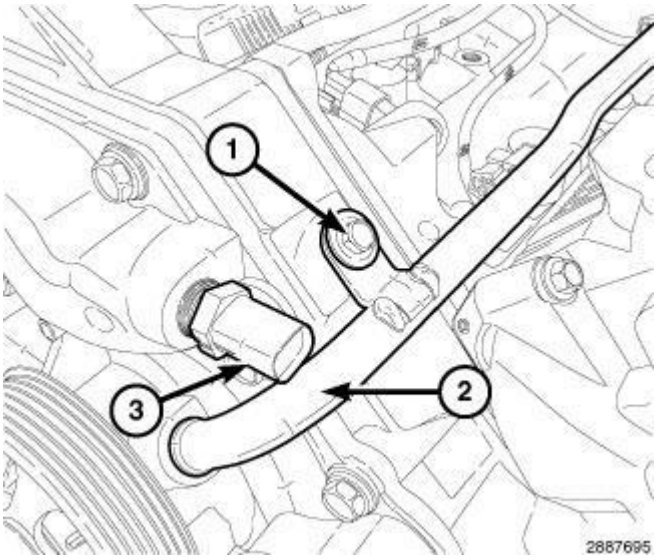

Fig. 427: Coolant Temperature Sensor, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER LLC

16. Disconnect the electrical connector to the coolant temperature sensor (3).
17. Remove the heater tube retaining bolt (1).
18. Lift the heater tube (2) out of the water pump.
19. Check condition of heater tube O-ring, replace as necessary.

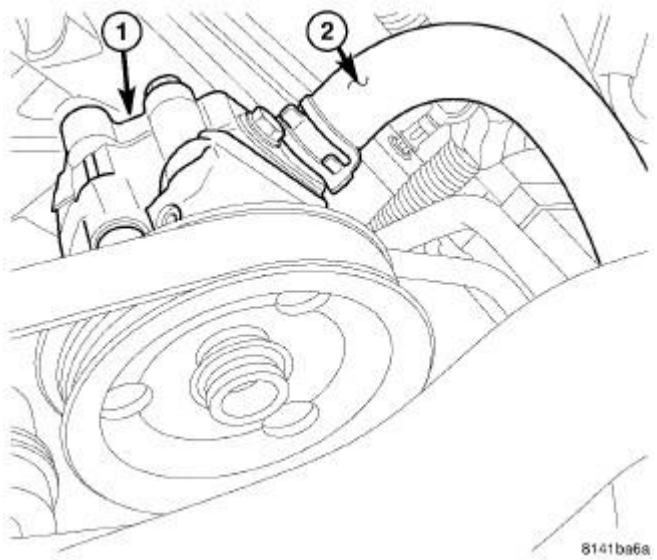

Fig. 428: Power Steering Pump & Return Hose
Courtesy of CHRYSLER LLC

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

20. Remove the power steering pump (1) and position aside. Refer to **PUMP, REMOVAL** .
21. Remove the generator. Refer to **GENERATOR, REMOVAL** .

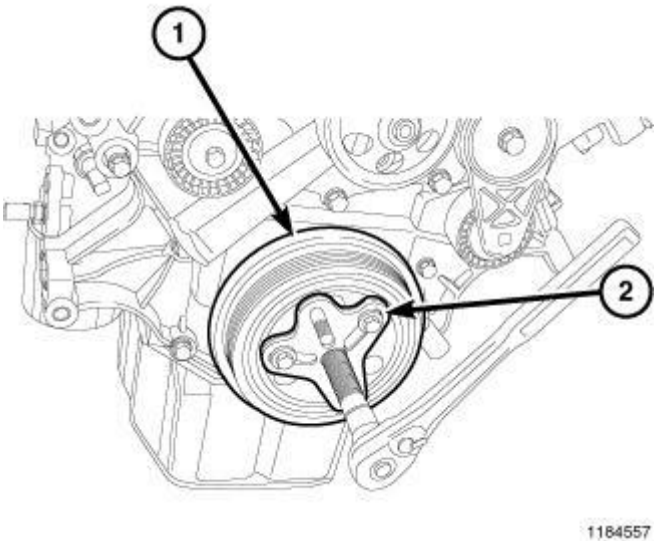

Fig. 429: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER LLC

NOTE: When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.

22. Remove the crankshaft damper bolt.
23. Install puller tool (2) and remove the crankshaft damper (1).

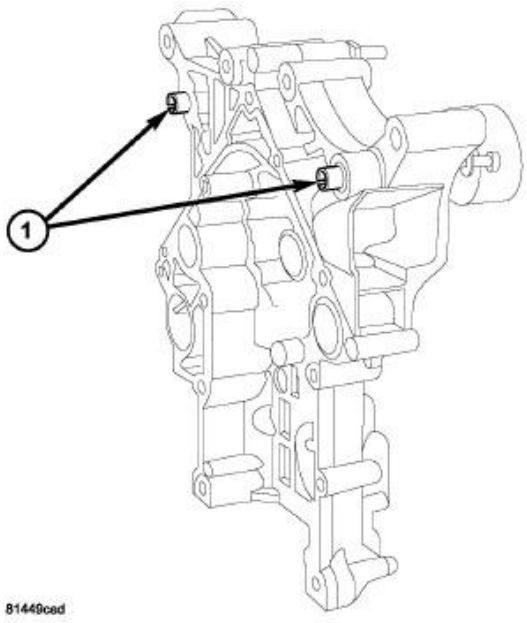

Fig. 430: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

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

24. Remove the timing cover bolts and remove the timing cover.
25. Verify the timing cover slide bushings (1) remain located in the timing cover.
26. Clean the sealing surfaces as necessary.

INSTALLATION

INSTALLATION

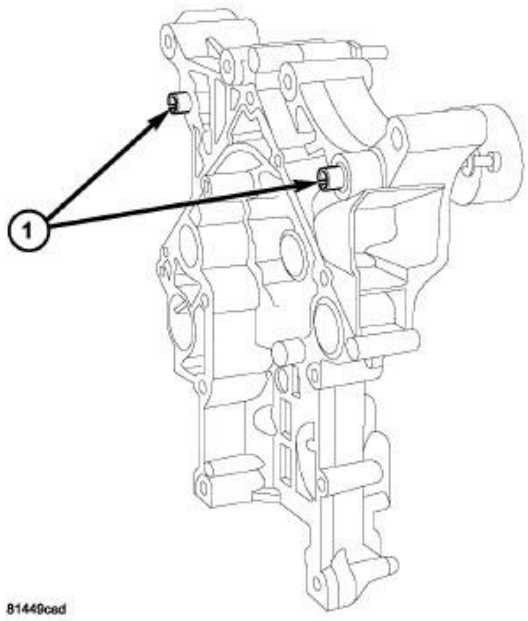

Fig. 431: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

NOTE: Always install a new timing cover gasket.

1. Clean the timing cover and engine block sealing surfaces.
2. Verify that the slide bushings (1) are installed in the timing cover.
3. Using a new gasket, position the timing cover, install the retaining bolts and tighten to 28 N.m (21 ft. lbs.).

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

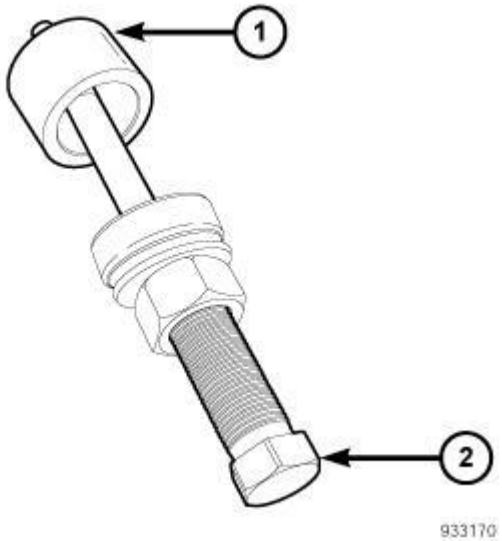

Fig. 432: Pressing Cup & Damper Installer

Courtesy of CHRYSLER LLC

CAUTION: To prevent severe damage to the crankshaft, damper, and damper installer (special tool #8512A, Installer, Damper), thoroughly clean the damper bore and the crankshaft nose before installing damper.

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

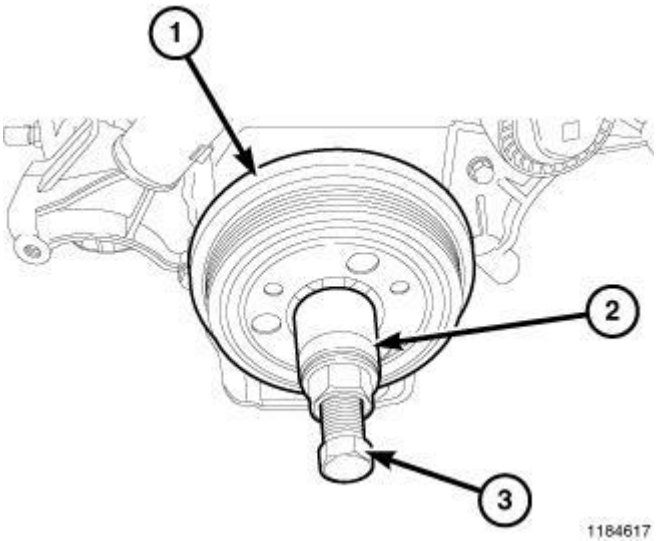

Fig. 433: Pressing Damper Onto Crankshaft
Courtesy of CHRYSLER LLC

6. Using the Damper Installer (special tool #8512A, Installer, Damper) and Hub Install (special tool #6871, Installer, A/C Hub), press the damper (1) onto the crankshaft.
7. Install the crankshaft damper bolt and tighten to 176 N.m (129 ft. lbs.).

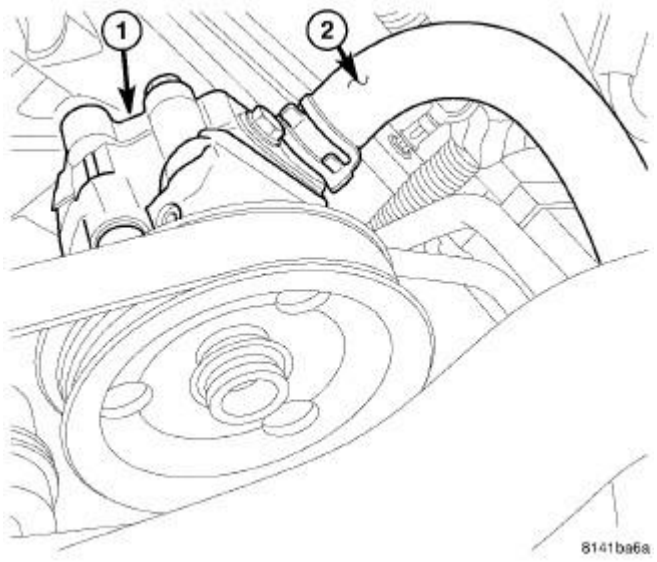

Fig. 434: Power Steering Pump & Return Hose
Courtesy of CHRYSLER LLC

8. Install the generator. Refer to **GENERATOR, INSTALLATION** .
9. Install the power steering pump (1). Refer to **PUMP, INSTALLATION** .

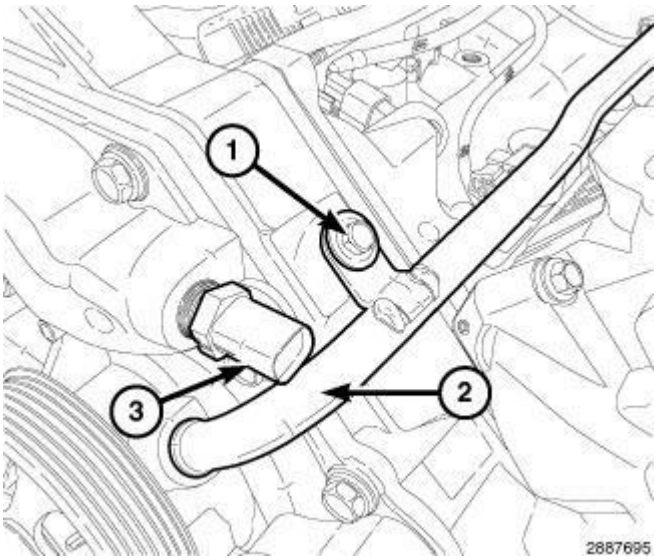

Fig. 435: Coolant Temperature Sensor, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER LLC

10. Install the heater tube (2) into the water pump.
11. Install the heater tube retaining bolt (1) and tighten to 12 N.m (9 ft. lbs.).
12. Connect the electrical connector to the coolant temperature sensor (3).

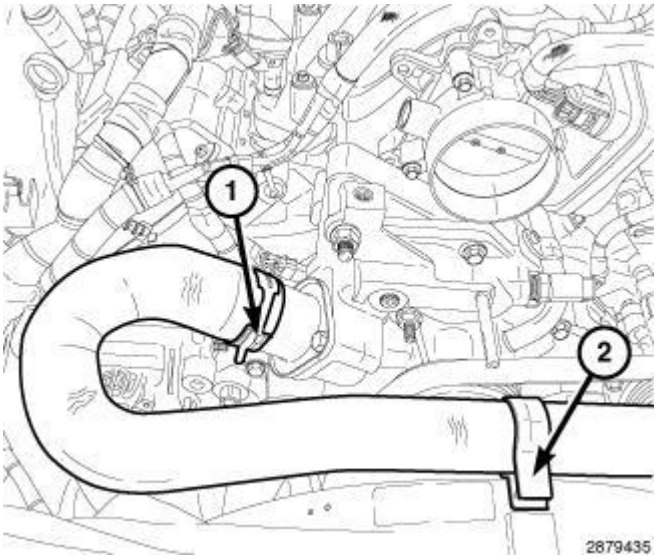

Fig. 436: Upper Radiator Hose Clamp & Retainer
Courtesy of CHRYSLER LLC

13. Position the upper radiator hose and secure retainer (2) at the fan shroud.
14. Install the upper radiator hose at the thermostat housing and secure hose clamp (1).
15. Install the air cleaner resonator support bracket at the water pump.

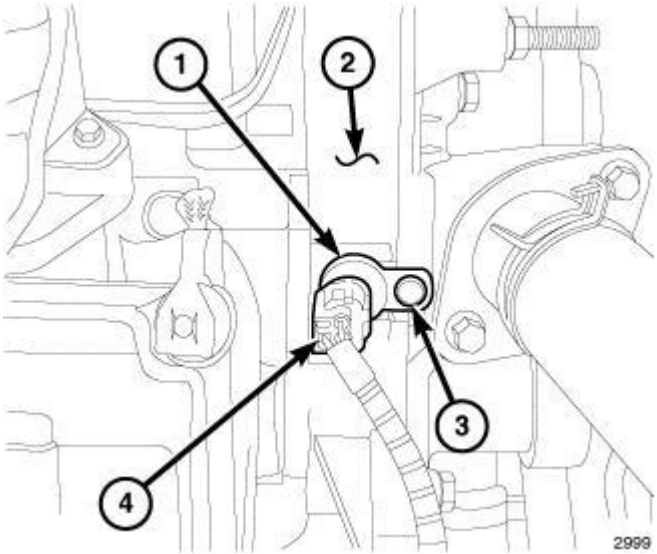

Fig. 437: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER LLC

16. Clean out the machined hole in the timing cover (2).
17. Install the CMP sensor (1) into the timing cover with a slight rocking motion. Do not the twist sensor into position as damage to O-ring may result.

CAUTION: Before tightening sensor retaining bolt, be sure the sensor is

completely flush to the timing cover. If the sensor is not flush, damage to the sensor mounting tang may result.

18. Install the CMP sensor retaining bolt (3) and tighten to 12 N.m (9 ft. lbs.).
19. Connect the CMP sensor electrical connector (4).

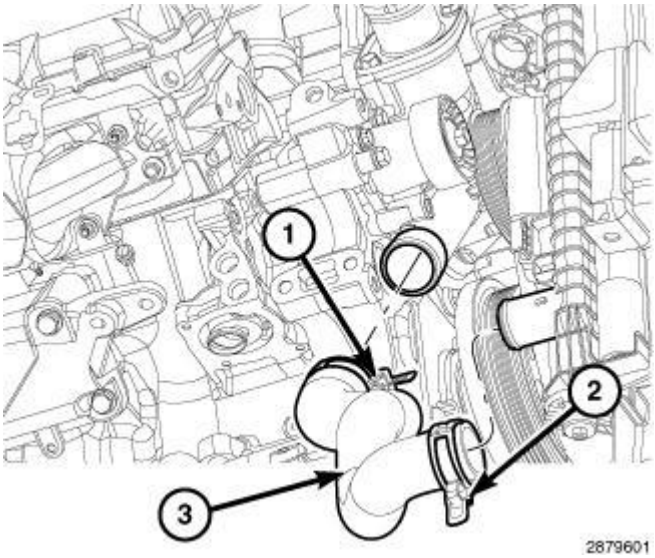

Fig. 438: Lower Radiator Hose & Clamps
Courtesy of CHRYSLER LLC

20. Raise and support the vehicle.

    Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.

21. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .
22. Connect the lower radiator hose (3) to the radiator and secure the hose clamp (2).
23. Connect the lower radiator hose to the water pump and secure hose clamp (1).

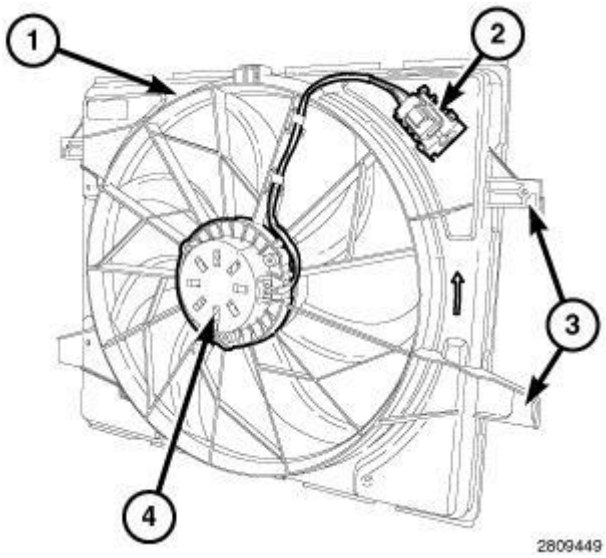

Fig. 439: Cooling Fan Module Components
Courtesy of CHRYSLER LLC

24. Lower the vehicle.
25. Install the cooling fan module (1). Refer to **FAN, COOLING, INSTALLATION** .
26. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
27. Fill the cooling system with the proper coolant. Refer to **STANDARD PROCEDURE** .
28. Fill the engine with the proper engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
29. Connect the battery negative cable.
30. Start the engine and check for leaks.

TENSIONER, ENGINE TIMING

DESCRIPTION

DESCRIPTION

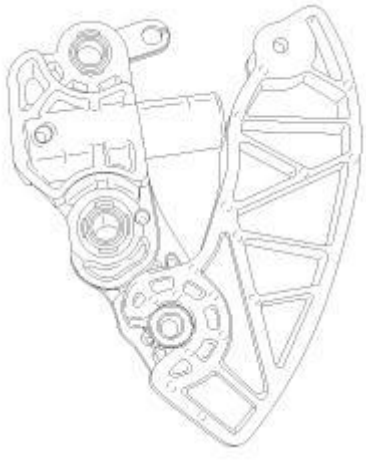

Fig. 440: Timing Chain Tensioner Arm
Courtesy of CHRYSLER LLC

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.

STANDARD PROCEDURE

RESETTING TIMING CHAIN TENSIONER

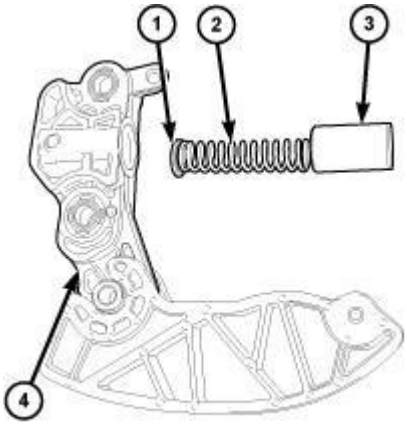

Fig. 441: Tensioner Body, Washer, Spring & Plunger
Courtesy of CHRYSLER LLC

NOTE: Verify that the tensioner is assembled correctly.

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

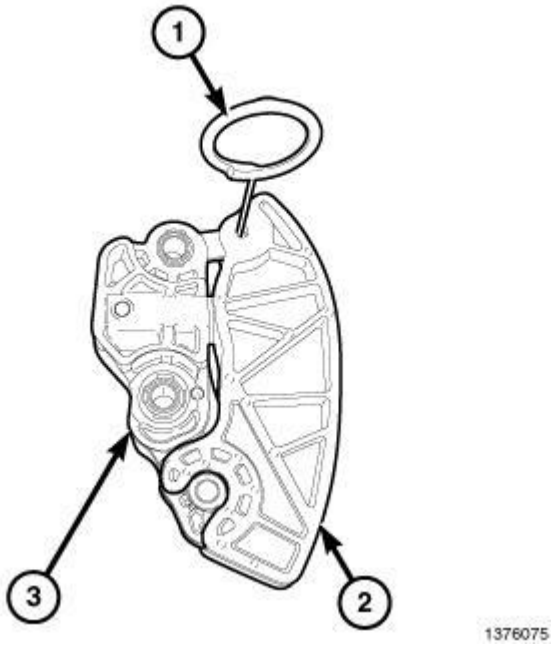

Fig. 442: Tensioner Pin, Guide Shoe & Tensioner Body
Courtesy of CHRYSLER LLC

2. Squeeze the tensioner body (3) and movable guide shoe (2) together and install Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

