2014 ENGINE

5.7L - Service Information - Ram Pickup

DESCRIPTION

DESCRIPTION

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

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 loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to the terminals.
	3. Faulty starter.	3. Refer to **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 - 1500** .
ENGINE STALLS OR ROUGH IDLE	1. Idle speed set to low.	1. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE** .
	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: To perform a compression test on a MULTI-AIR equipped engine, the ignition MUST remain in the "key on" position. If the ignition is in the "off" position, the intake valves will not actuate and the result will be no compression.

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

NOTE: Be certain 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**

DELIVERY, GAS, STANDARD PROCEDURE .

5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the 3rd revolution. Continue the test for the remaining cylinders.

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

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

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

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. 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.

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.
3. Turn the engine OFF.
4. Remove the spark plugs.
5. Remove the oil filler cap.
6. Remove the air cleaner hose.
7. **Calibrate the tester according to the manufacturer's instructions.** The shop air source for testing should maintain a regulated air pressure at 552 kPa (80 psi).
8. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set the piston of the cylinder to be tested at TDC compression.
9. During the 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: Input air at 552 kPa (80 psi), the primary gauge factory set at 207 kPa (30 psi) input pressure. The secondary gauge should have no more than 176 kPa (25.5 psi) loss, when connected to 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
ENGINE NOISE	1. Worn accessory drive belt	1. Check for damage and/or alignment. Refer to **BELT, SERPENTINE, DIAGNOSIS AND TESTING** .
	2. Worn coolant pump	2. Check for possible coolant leak. If OK, Check the pulley and input shaft for wear. Replace as necessary.
	3. Worn generator	3. Check the pulley for wear. Spin the armature. Replace as necessary.
	4. Idler/Tensioner pulley	4. Check pulleys. Verify bearing noise. Replace as necessary.
	5. Power steering pump	5. Check the pulley and input shaft for wear. Replace as necessary.
	6. Flywheel/Flexplate	6. Check for wear or possible cracking. Check bolts. Repair as necessary.
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase	1. Check for correct oil level. Adjust oil level by draining or adding as needed.
	2. Thin or diluted oil	2. Change oil. Refer to **OIL** .
	3. Low oil pressure	3. Check engine oil level. If OK,

		perform engine oil pressure test. Refer to **CHECKING ENGINE OIL PRESSURE** .
	4. Debris in tappets/lash adjusters	4. Clean/replace hydraulic tappets/lash adjusters.
	5. Bent push rod(s)	5. Install new push rods.
	6. Worn rocker arms	6. Inspect oil supply to rocker arms and replace worn arms as needed.
	7. Worn tappets/lash adjusters	7. Install new hydraulic tappets/lash adjusters.
	8. Worn valve guides	8. Inspect all valve guides and replace as necessary.
	9. Excessive runout of valve seats or valve faces	9. Grind valves and seats.
CONNECTING ROD NOISE	1. Insufficient oil supply	1. Check engine oil level.
	2. Low oil pressure	2. Check engine oil level. If OK, Perform engine oil pressure test. Refer to **CHECKING ENGINE OIL PRESSURE** .
	3. Thin or diluted oil	3. Change oil to correct viscosity. Refer to **OIL** .
	4. Excessive connecting rod bearing clearance	4. Measure bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Connecting rod journal out of round	5. Replace crankshaft or grind journals.
	6. Misaligned connecting rods	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply	1. Check engine oil level.
	2. Low oil pressure	2. Check engine oil level. If OK, Perform engine oil pressure test. Refer to **CHECKING ENGINE OIL PRESSURE** .
	3. Thin or diluted oil	3. Change oil to correct viscosity.
	4. Excessive main bearing clearance	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play	5. Check crankshaft thrust bearing for excessive wear on flanges.
	6. Crankshaft main journal out of round or worn	6. Grind journals or replace crankshaft.
	7. Loose flywheel or torque converter	7. Inspect crankshaft, flexplate/flywheel and bolts for damage. Tighten to correct torque.

LOW OIL PRESSURE	1. Low oil level	1. Check oil level and fill if necessary.
	2. Faulty oil pressure sending unit	2. Install new sending unit.
	3. Clogged oil filter	3. Install new oil filter.
	4. Worn oil pump	4. Replace oil pump assembly.
	5. Thin or diluted oil	5. Change oil to correct viscosity.
	6. Excessive bearing clearance	6. Measure bearings for correct clearance.
	7. Oil pump relief valve stuck	7. Remove valve to inspect, clean and reinstall.
	8. Oil pickup tube loose, broken, bent or clogged	8. Inspect oil pickup tube and pump, and clean or replace if necessary.
	9. Oil pump cover warped or cracked	9. Install new oil pump.
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 seal.
	4. Leaking oil gallery plug or cup plug	4. Remove and reseal threaded plug. Replace cup style plug.
EXCESSIVE OIL CONSUMPTION OR SPARK PLUGS OIL FOULED	1. Defective valve stem seal(s)	1. Repair or replace seal(s).
	2. Worn or broken piston rings	2. Hone cylinder bores. Install new rings.
	3. Scuffed pistons/cylinder walls	3. Hone cylinder bores and replace pistons as required.
	4. Carbon in oil control ring groove	4. Remove rings and de-carbon piston.
	5. Worn valve guides	5. Inspect/replace valve guides as necessary.
	6. Piston rings fitted too tightly in grooves	6. Remove rings and check ring end gap and side clearance. Replace if necessary.

Lifter Purge Guideline

1. Warm engine to standard idle conditions.

NOTE: Engine noise may be in the form of a clicking, chatter, or clattering noise.

2. Listen to the engine for 30 to 60 seconds with the hood up and the engine cover removed.
3. If noise is present, de-aeration of the lifters is required.

4. Run the engine between 2000 and 3000 RPM for three to five minutes.
5. Return the engine to standard idle speed for 30 to 60 seconds.
6. Evaluate noise. If noise is present, repeat the run an additional 4 cycles.

NOTE: The standard drive cycle will be about 10 - 15 miles of non- stop, combined highway and city driving.

7. If noise is present, take the vehicle on a standard drive cycle.

NOTE: Use a feeler gauge to verify clearance is present between the lifter and cam base circle.

8. Evaluate the noise. If noise present, follow standard service procedure for lifter repairs or noise conditions.
9. Evaluate lifters for sponginess, check valve defects, and clearance.

OIL CONSUMPTION TEST AND DIAGNOSIS

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 test and cylinder leak down 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

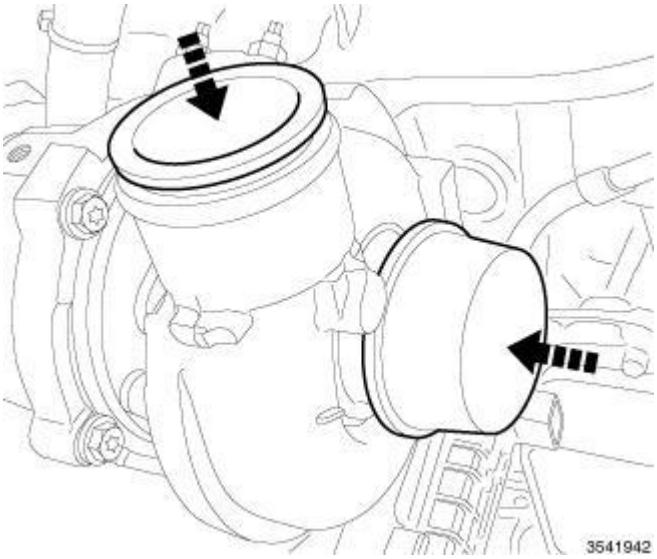


Fig. 1: Identifying Covers/Caps Applications
Courtesy of CHRYSLER GROUP, LLC

Due to the high amounts of failures caused 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.

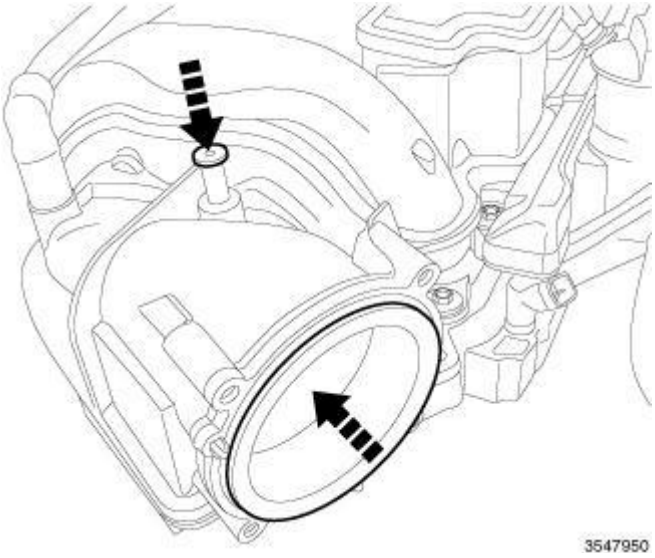


Fig. 2: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

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 DELIVERY, GAS, STANDARD**

PROCEDURE .

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

ENGINE SPECIFICATIONS

EAGLE ENGINE - 90° V-8 OHV SPECIFICATIONS

EAGLE ENGINE - 90° V-8 OHV

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Displacement	5.7 Liters	348 CID
Bore	99.5 mm	3.92 in.
Stroke	90.9 mm	3.58 in.

Compression Ratio	10.5:1
Max. Variation Between Cylinders	25%
Firing Order	1-8-4-3-6-5-7-2
Lubrication	Pressure Feed - Full Flow Filtration
Cooling System	Liquid Cooled
Cylinder Block	Cast Iron
Cylinder Head	Aluminum
Crankshaft	Nodular Iron
Camshaft	Cast Iron
Pistons	Aluminum Alloy
Connecting Rods	Powdered Metal

CYLINDER BLOCK SPECIFICATIONS

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 SPECIFICATIONS

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 SPECIFICATIONS

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 SPECIFICATIONS

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 SPECIFICATIONS

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 SPECIFICATIONS

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.
Duration	290°	
Valve Lift (@ zero lash)		
Intake	12.0 mm	0.472 in.
Exhaust	11.70 mm	0.460 in.

VALVE TIMING SPECIFICATIONS

VALVE TIMING

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

CYLINDER HEAD SPECIFICATIONS

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 SPECIFICATIONS

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 SPECIFICATIONS

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Face Angle	45.0° - 45.5°	
Head Diameter		
Intake	51.94 - 52.20 mm	2.04 - 2.06 in.
Exhaust	39.27 - 39.53 mm	1.55 - 1.56 in.
Length (overall)		
Intake	130.87 - 131.51 mm	5.152 - 5.178 in.
Exhaust	130.101 - 130.741 mm	5.122 - 5.147 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 - 0.062 mm	0.0009 - 0.0024 in.
Exhaust	0.025 - 0.058 mm	0.0010 - 0.0023 in.

VALVE SPRING SPECIFICATIONS

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 SPECIFICATIONS

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 SPECIFICATIONS

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 SPECIFICATIONS

5.7L ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Block Pipe Plugs			
(1/4 - 18 NPT) Oil Galley Plug	20	15	-
(1/4 - 18 NPT) Coolant Drain Plug	34	25	-
(3/8 NPT)	27	20	240
Camshaft Phaser Bolt	85	63	-
Timing Drive Tensioner Bolts	11	-	97
Timing Drive Guide Bolts	11	-	97
Camshaft Thrust Plate Bolts	12	-	106

Camshaft Sprocket Bolt	122	90	-
Coil to Cylinder Head Cover Bolts	7	-	62
Timing Chain Case Cover Bolts	28	21	-
Lifting Stud	55	41	-
Connecting Rod Cap Bolts	21 Plus 90° Turn	15 Plus 90° Turn	-
Main Bearing Cap Bolts	See Procedure. Refer to **CRANKSHAFT, INSTALLATION, 5.7L**.		
Cylinder Head Bolts	See Procedure. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.		
Cylinder Head Cover Bolts	8	-	71
Exhaust Manifold to Cylinder Head	25	18	220
Flexplate to Crankshaft Bolts	95	70	-
Flywheel to Crankshaft Bolts	75	55	-
Front Engine Mount Through Bolt and Nut	130	96	-
Front Engine Mount Heat Shield Nut	55	41	-
Front Engine Mount to Support Bracket			
Through Bolts to Axle Pinion Housing (4WD)	120	89	-
Through Bolts to Axle Housing (4WD)	110	81	-
Engine Mount Brackets to Block Bolts	64	47	-
Front Engine Mount to Block Bolts (2WD)	64	47	-
Generator Mounting Bolt	55	41	-
Intake Manifold Bolts	Refer to Procedure. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.		
Lifter Guide Holder	12	9	-
Oil Pan Bolts	12	9	-
Oil Dipstick Tube	12	9	-
Oil Filter Adapter	28	21	-
Oil Pan Drain Plug	34	25	-
Oil Pump Bolts	28	21	-
Oil Pump Pickup Tube Bolt and Nut	28	21	-
Rear Seal Retainer Bolts	15	11	-
Rear Insulator to Support Bracket Nut	61	45	-
Rear Insulator to Crossmember Nut	61	45	-
Support Bracket Bolt	64	47	-
Rear Support Bracket to Crossmember Flange Nuts Crossmember Flange Nuts	41	30	-
Rear Support Plate to Transfer Case Bolts Case Bolts	41	30	-
Rocker Arm Bolts	22	16	-
Thermostat Housing Bolts	28	21	-
Throttle Body Bolts	12	9	-

Transfer Case to Insulator Bolts Mounting Plate Nuts	204	150	-
Transmission Support Bracket Double Ended Stud (2WD)	42	31	-
Transmission Support Bracket Bolts (2WD)	68	50	-
Vibration Damper Bolt	180	133	-
Water Pump to Timing Chain Case Cover Bolts	28	21	-

REMOVAL

REMOVAL

CAUTION: If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.

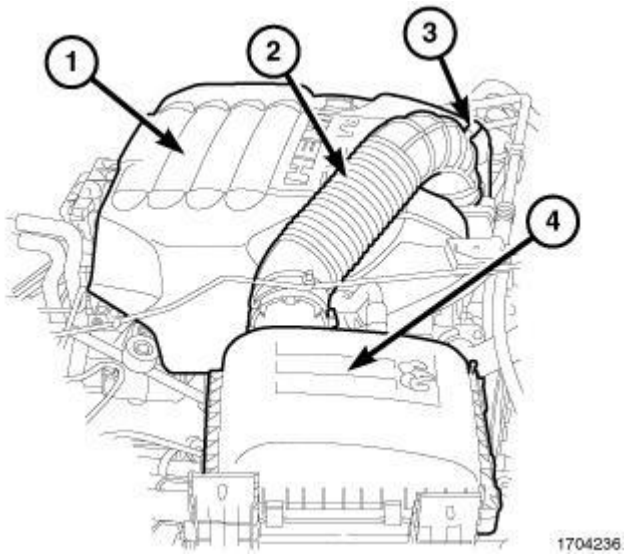


Fig. 3: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Remove the Hood. Refer to **HOOD, REMOVAL** .
2. Disconnect the intake air temperature (IAT) sensor electrical connector (3).
3. Remove the clean air hose (2).
4. Remove the engine cover (1). Refer to **COVER, ENGINE, REMOVAL, 5.7L**.
5. Remove the air cleaner housing (4)
6. Perform the Fuel System Pressure Release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .

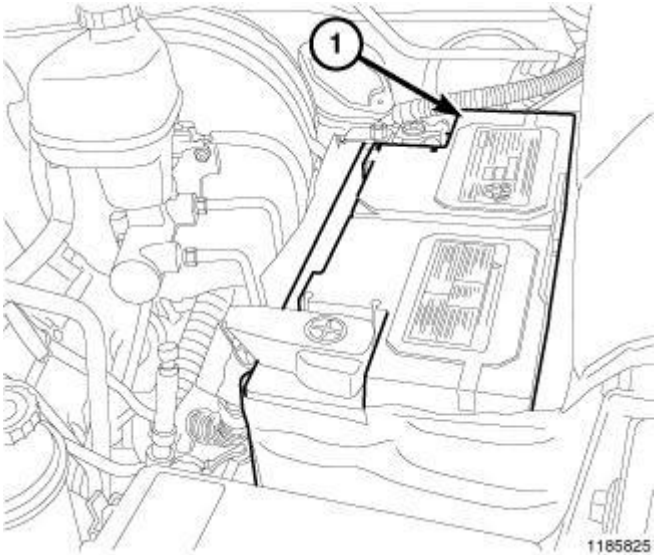


Fig. 4: Battery
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the negative battery cable (1).

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

8. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

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

9. Insert a suitable square drive ratchet into the square hole on the belt tensioner arm (7).
10. Release the belt tension by rotating the tensioner (7) clockwise until the accessory drive belt (4) can be removed from the generator pulley only.

CAUTION: Do not place the viscous fan drive in horizontal position. If stored horizontally, silicone fluid in the viscous fan drive could drain into its bearing assembly and contaminate lubricant.

11. If equipped, remove the viscous fan drive assembly. Refer to **FAN, COOLING, VISCOUS, REMOVAL** .
12. Recover the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE** .

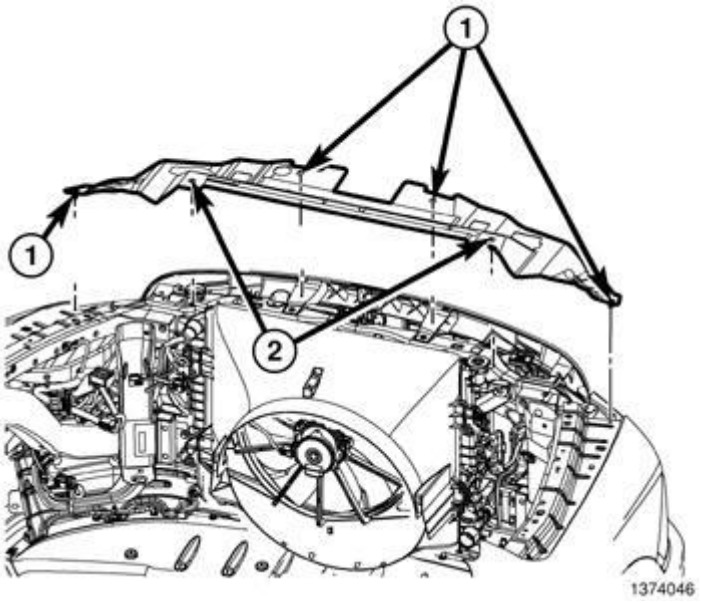


Fig. 5: Upper Radiator Seal
Courtesy of CHRYSLER GROUP, LLC

13. Remove the upper radiator seal four push pins (1).
14. Remove the two plastic rivets (2) and remove the upper radiator seal.
15. Remove the fan shroud mounting bolts and pull the shroud up and out of the radiator tank clips.
16. Remove the radiator and A/C condenser as an assembly from the vehicle. Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .

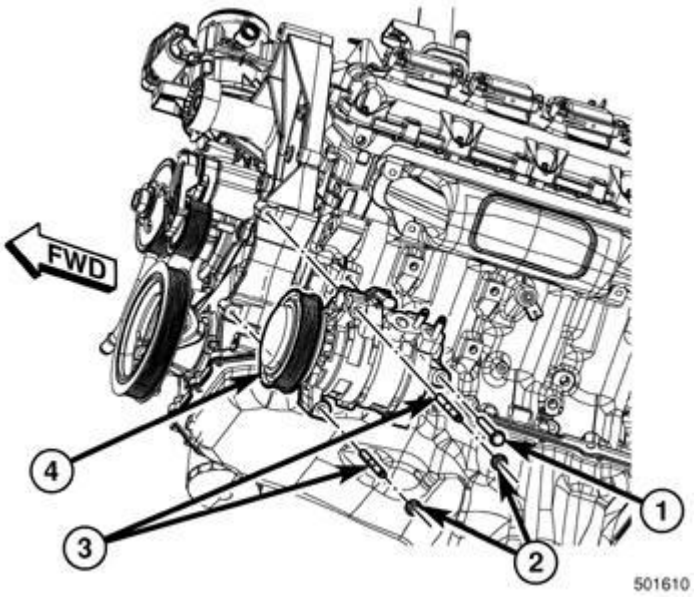


Fig. 6: A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

17. Remove the A/C compressor (4). Refer to **COMPRESSOR, A/C, REMOVAL** .

18. Disconnect the generator electrical connectors and remove the generator assembly (2). Refer to **GENERATOR, REMOVAL** .

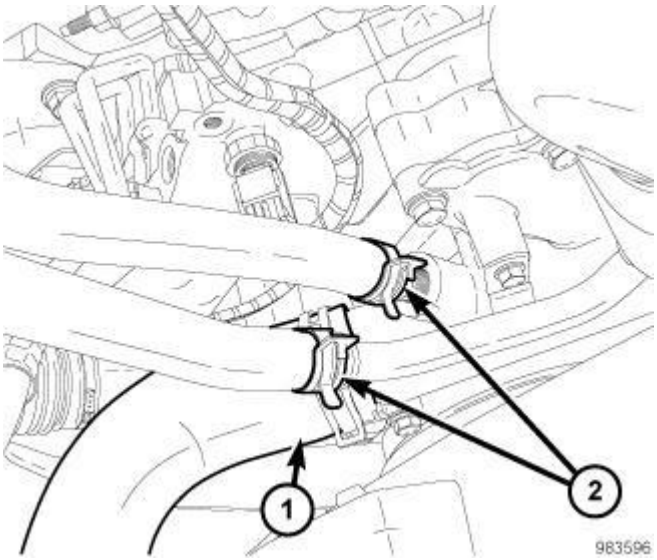


Fig. 7: Heater & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

19. Disconnect the heater hoses (2) and lower radiator hose (1).

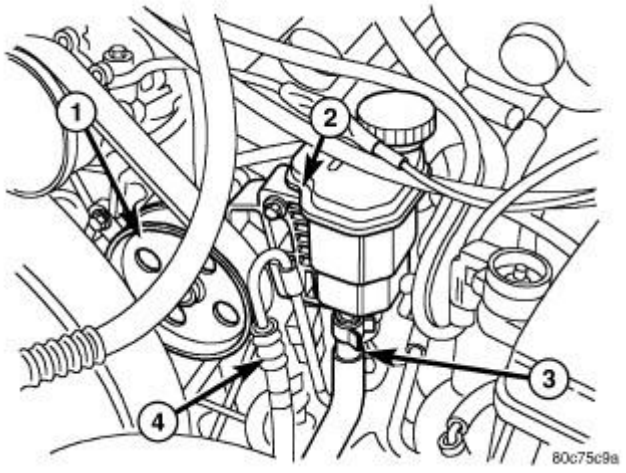


Fig. 8: Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

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

20. If equipped, remove the three bolts securing the power steering pump through the holes in the pulley (1) and secure the power steering pump out of the way.
21. Disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .

22. Raise and support the vehicle on a hoist and drain the engine oil.

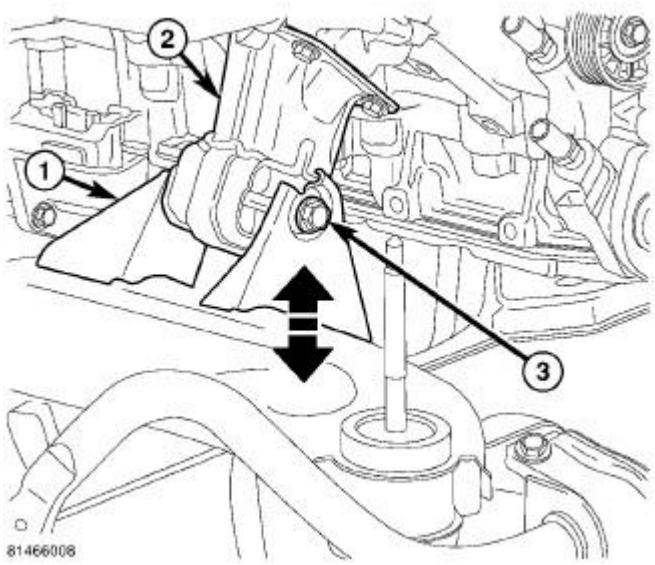


Fig. 9: Engine Mount Bolt
Courtesy of CHRYSLER GROUP, LLC

23. Remove the front engine mount through bolts (3).
24. Disconnect the transmission oil cooler lines from their retainers at the oil pan bolts.

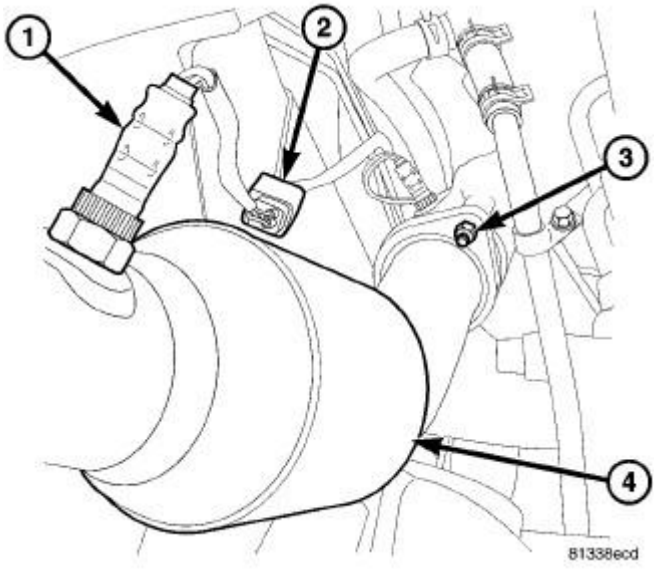


Fig. 10: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

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.

25. Disconnect the oxygen sensor electrical connectors (2).
26. Saturate all exhaust bolts and nuts with Mopar® Rust Penetrant. Allow 5 minutes for penetration.
27. Remove the exhaust pipe to manifold bolts (3) (left side shown in illustration, right side similar) and disconnect the front exhaust pipe/catalytic converter assembly (4) at the exhaust manifolds.

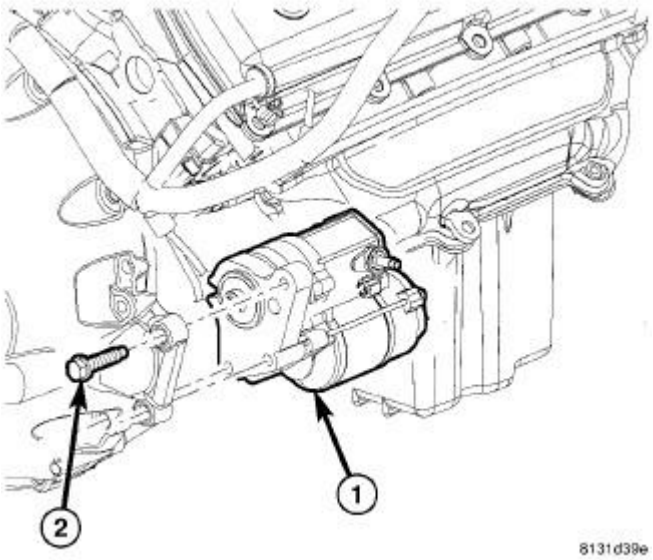


Fig. 11: Relocate Starter
Courtesy of CHRYSLER GROUP, LLC

28. Disconnect the starter wires and remove the starter (1). Refer to **STARTER, REMOVAL** .

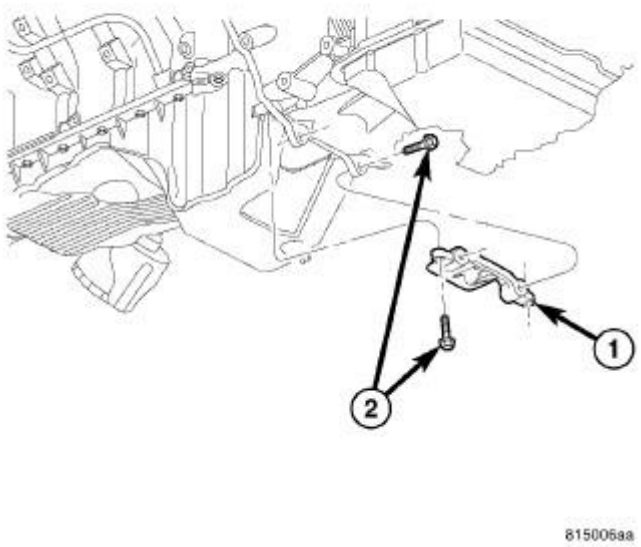


Fig. 12: Structural Dust Cover
Courtesy of CHRYSLER GROUP, LLC

29. Remove the transmission inspection and structural dust covers (2). Refer to **COVER, STRUCTURAL DUST, REMOVAL, 5.7L**.

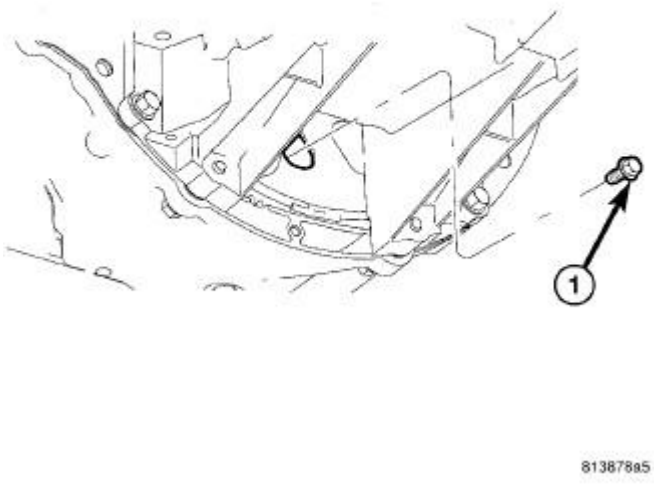


Fig. 13: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

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

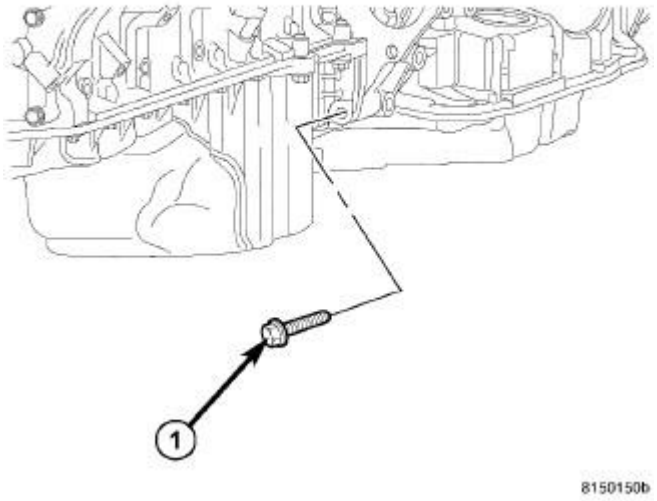


Fig. 14: 5.7L Wk Oil Pan To Trans Bolts
Courtesy of CHRYSLER GROUP, LLC

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

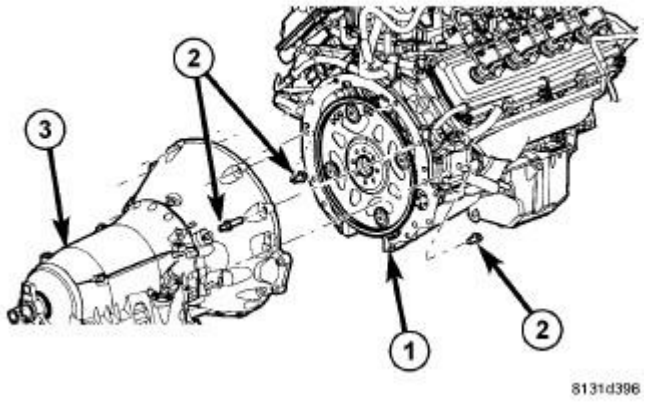


Fig. 15: Removing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

32. Remove the transmission bell housing to engine block bolts (2).
33. Lower the vehicle.
34. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

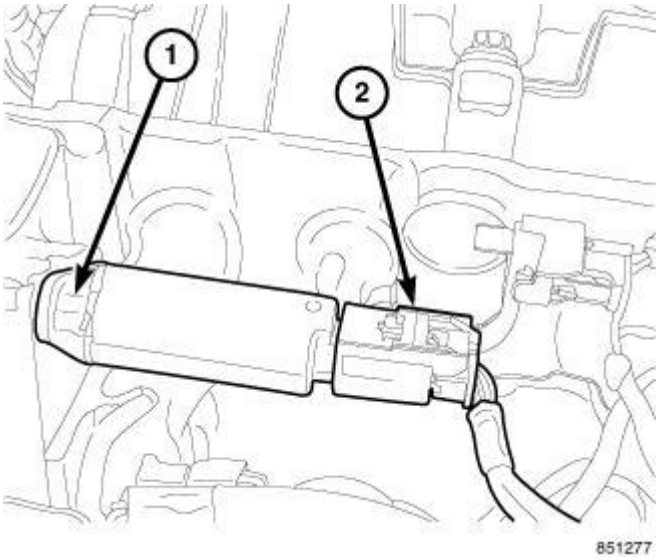


Fig. 16: Oil Control Valve
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove the VVTS, the engine must be at room temperature.

35. Remove the VVTS electrical connector (2).
36. Remove the VVTS retaining bolt (1).

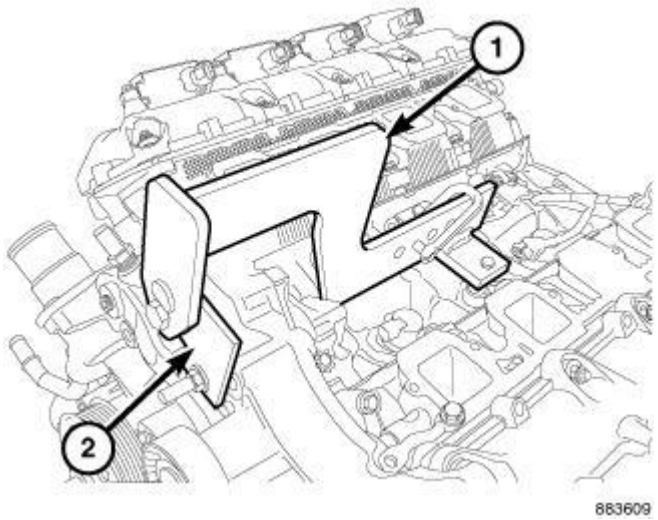


Fig. 17: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (1) and adapter (special tool #8984B, Fixture, Engine Lifting) Eagle (2).

37. Install the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (1) and adapter (special tool

#8984B, Fixture, Engine Lifting) Eagle (2).

38. Separate the engine from the transmission and remove engine from the vehicle.

INSTALLATION

INSTALLATION

CAUTION: If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.

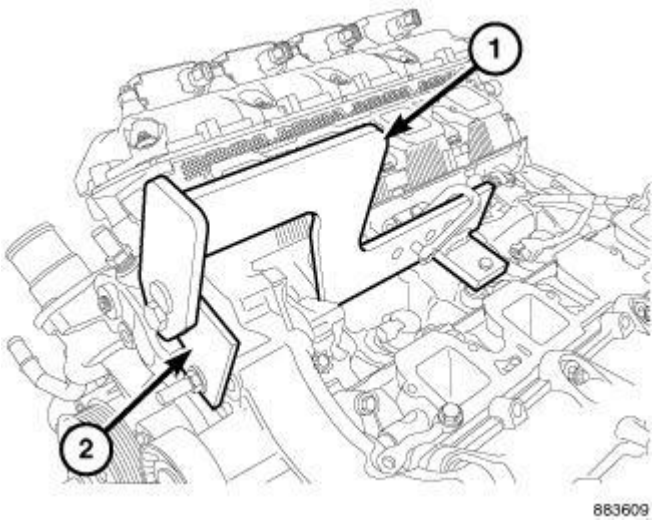


Fig. 18: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install (special tool #8984B, Fixture, Engine Lifting) Engine Lift Fixture (1) and Adapter (special tool #8984B, Fixture, Engine Lifting) Eagle (2).

1. Install the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (1) and adapter (special tool #8984B, Fixture, Engine Lifting) Eagle (2).
2. Position the engine in the engine compartment.

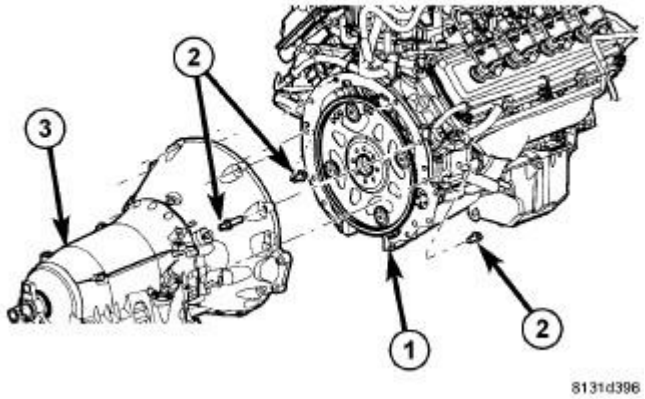


Fig. 19: Removing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Lower and align the engine (1) with the transmission (3).
4. Install two transmission bell housing to engine block mounting bolts (2) finger tight.

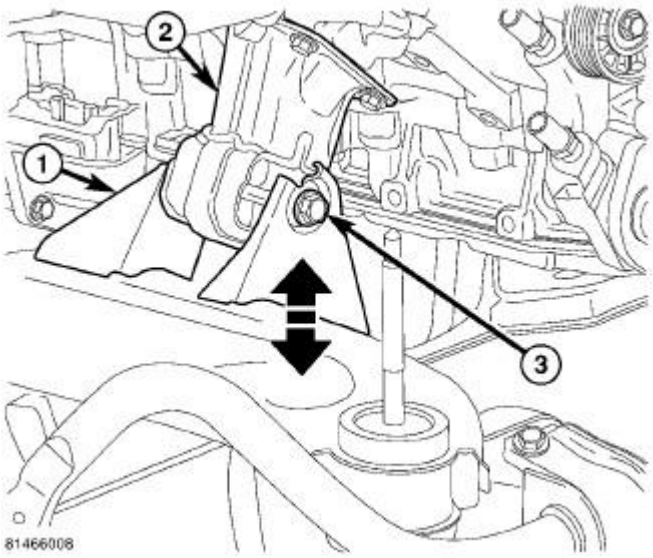


Fig. 20: Engine Mount Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Lower the engine assembly until the engine mount through bolts (3) line up in the frame brackets (1).
6. Raise and support the vehicle on a hoist.

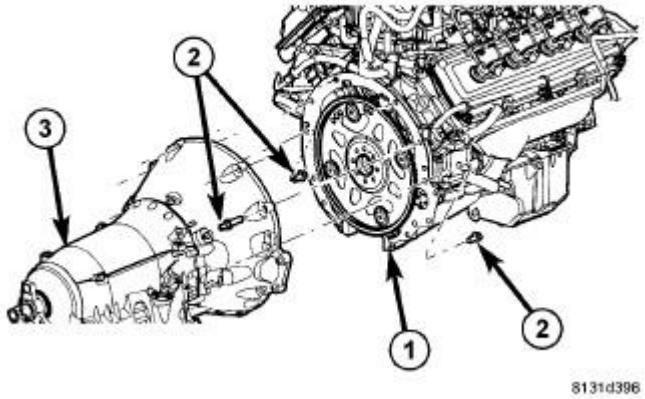


Fig. 21: Removing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

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

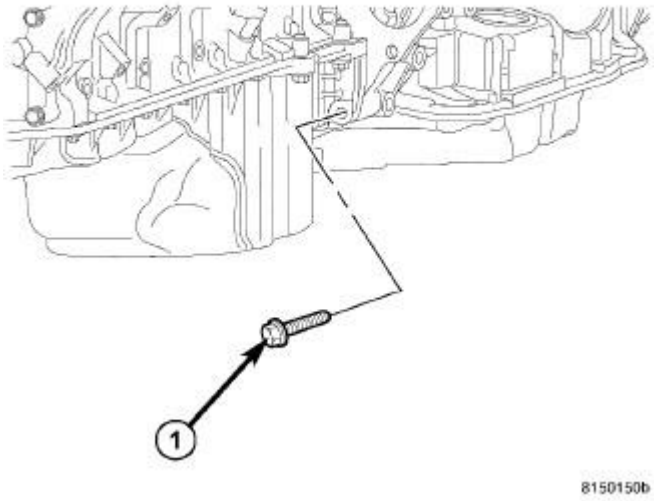


Fig. 22: 5.7L Wk Oil Pan To Trans Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install both the left and right side oil pan to transmission bolts (1) and tighten bolts to 54 N.m (40 ft. lbs.).
9. Connect the transmission oil cooler lines at the oil pan and tighten bolts to 12 N.m (9 ft. lbs.).

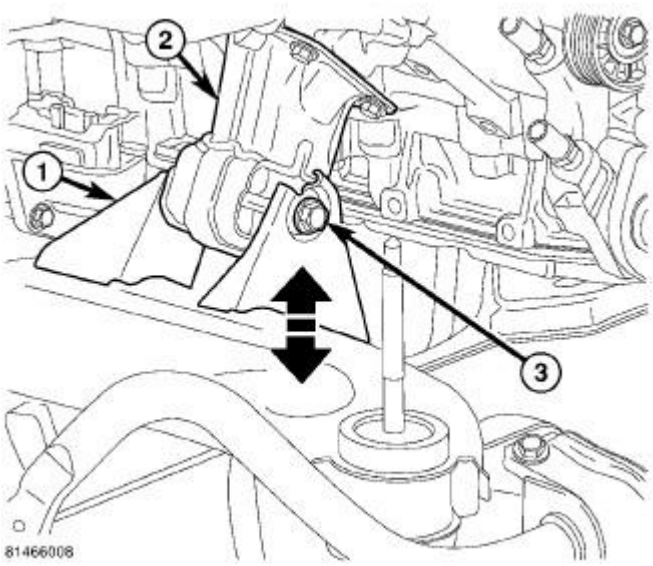


Fig. 23: Engine Mount Bolt
Courtesy of CHRYSLER GROUP, LLC

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

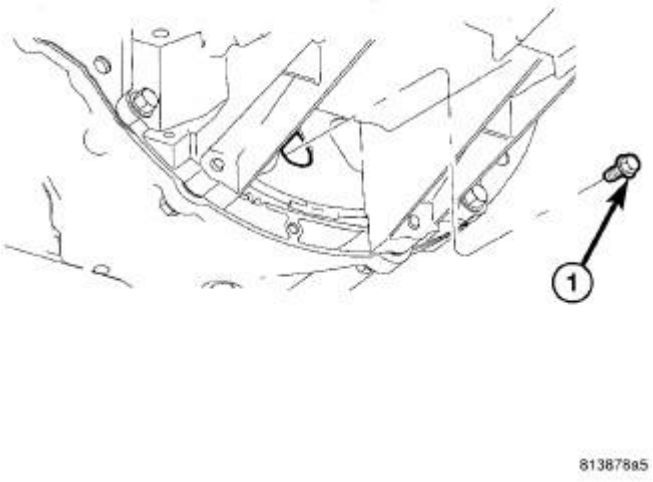


Fig. 24: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install all torque converter-to-driveplate bolts (1) by hand, verify the torque converter is pulled flush to the driveplate and tighten bolts to 31 N.m (23 ft. lbs.).

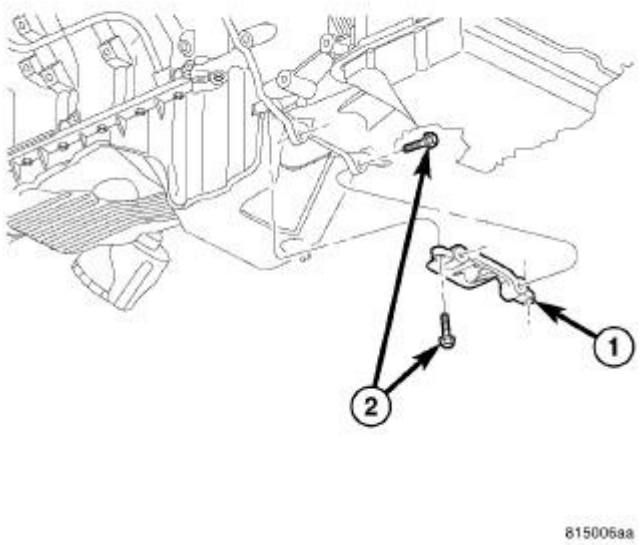


Fig. 25: Structural Dust Cover
Courtesy of CHRYSLER GROUP, LLC

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

12. Install the structural dust cover (1). Refer to **COVER, STRUCTURAL DUST, INSTALLATION, 5.7L**.

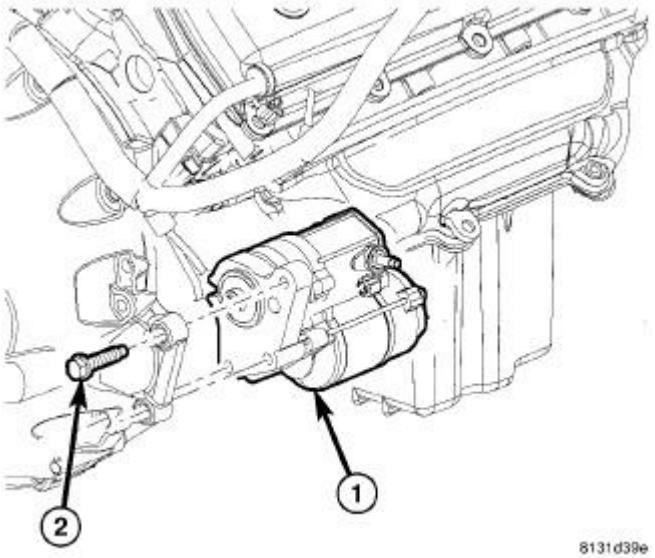


Fig. 26: Relocate Starter

Courtesy of CHRYSLER GROUP, LLC

13. Install the starter (1) and connect the starter wires. Refer to **STARTER, INSTALLATION** .

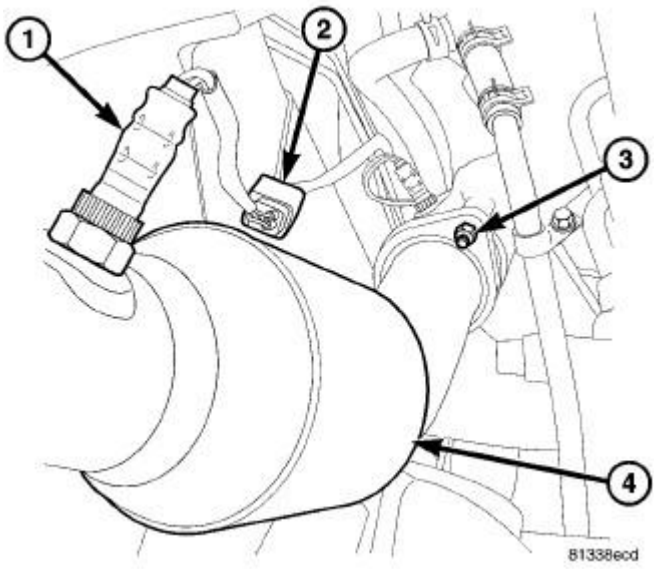


Fig. 27: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

14. Install the front exhaust pipe/catalytic converter assembly (4) to the exhaust manifold flange and tighten the bolts and nuts (3) to 26 N.m (19 ft. lbs.).
15. Lower the vehicle.

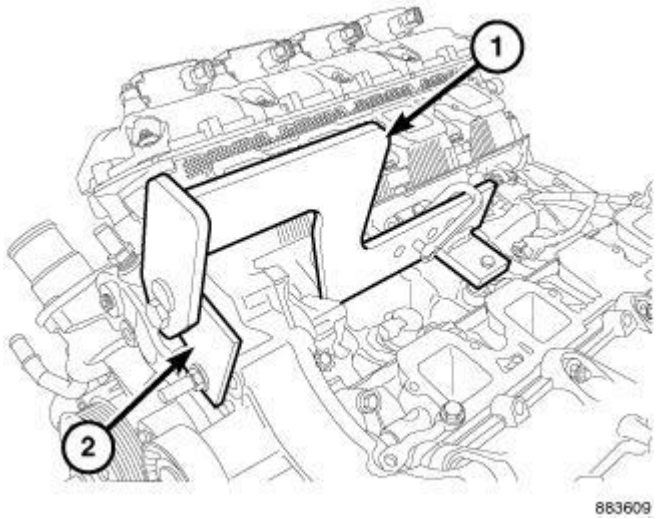


Fig. 28: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

16. Remove the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) and adapter (special tool

#8984B, Fixture, Engine Lifting) Eagle (1, 2).

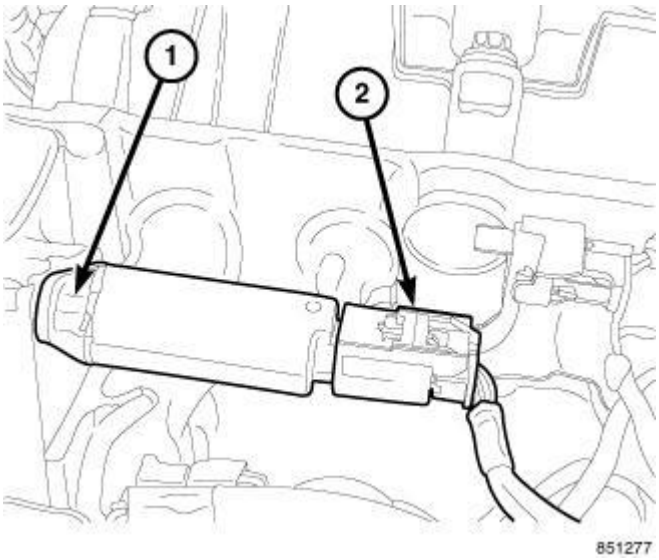


Fig. 29: Oil Control Valve
Courtesy of CHRYSLER GROUP, LLC

17. Install the VVTS and securely tighten fastener (1).
18. Connect the VVTS electrical connector (2).
19. Install the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.
20. Connect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .

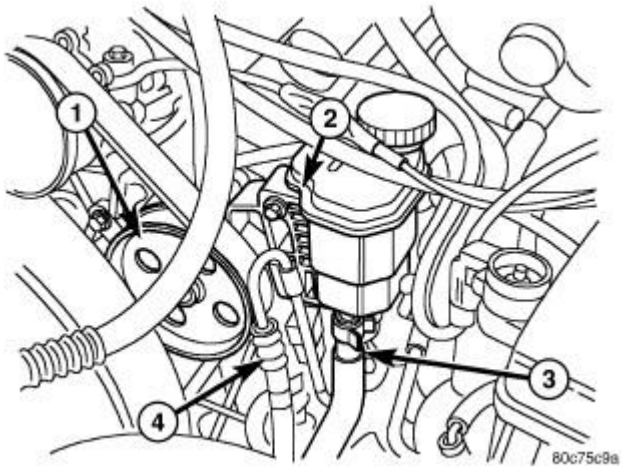


Fig. 30: Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

21. If equipped, install the three power steering pump mounting bolts through the access holes in the pulley (1) and tighten bolts to 28 N•m (21 ft. lbs.).

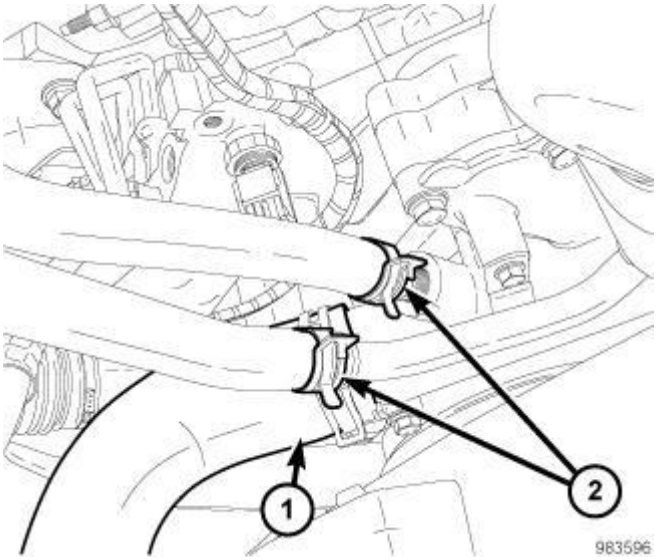


Fig. 31: Heater & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

22. Connect the heater hoses (2) and the lower radiator hose (1).

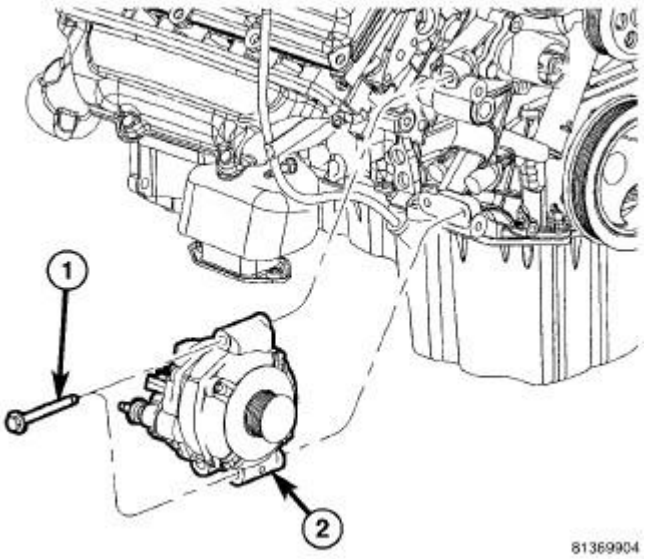


Fig. 32: Generator - 5.7L
Courtesy of CHRYSLER GROUP, LLC

23. Install the generator (2) and electrical connections. Refer to **GENERATOR, INSTALLATION** .

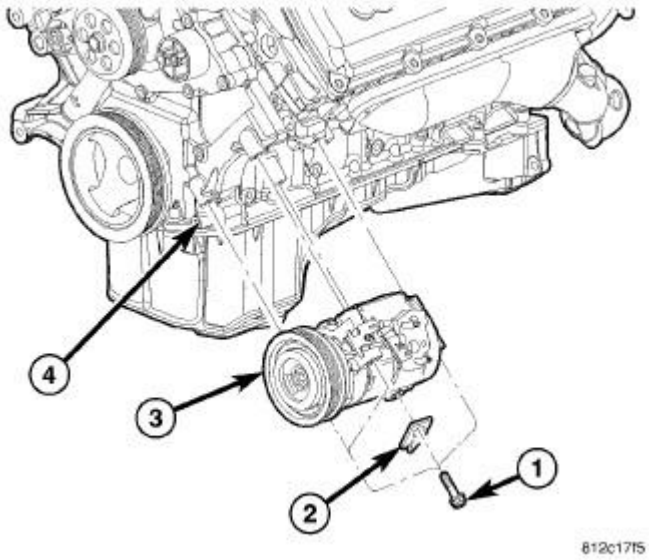


Fig. 33: Removing/Installing A/C Compressor - 5.7L
Courtesy of CHRYSLER GROUP, LLC

24. Install the A/C compressor (3). Refer to **COMPRESSOR, A/C, INSTALLATION** .

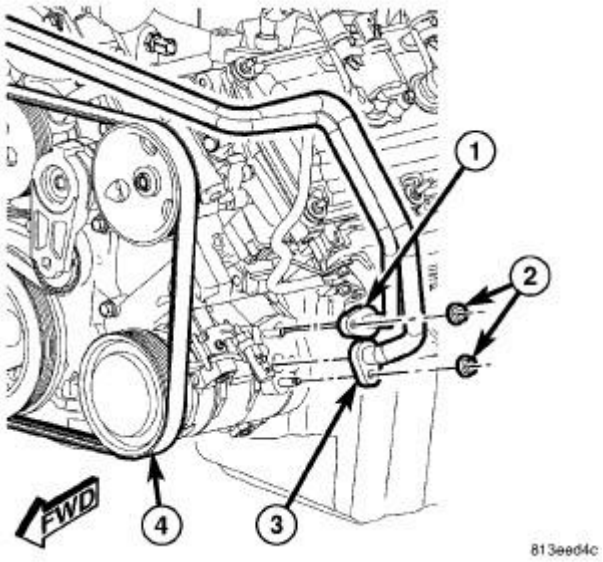


Fig. 34: Refrigerant Lines-Compressor - Removing/Installing
Courtesy of CHRYSLER GROUP, LLC

25. Connect the refrigerant lines (1, 3) to the A/C compressor (4) and tighten the nuts (2) to 20 N.m (15 ft. lbs.).
26. Install the viscous fan drive assembly. Refer to **FAN, COOLING, VISCOUS, INSTALLATION** .

CAUTION: Do not let the tensioner arm snap back to the freearm position,

severe damage may occur to the tensioner.

27. Insert a suitable square drive ratchet into the square hole on the belt tensioner arm (7).
28. Rotate the tensioner (7) counter-clockwise and install the accessory drive belt (4).
29. Install the radiator and A/C condenser as an assembly. Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** and **CONDENSER, A/C, INSTALLATION** .
30. Position the shroud in the radiator tank clips and Install the fan shroud mounting bolts.
31. Connect the radiator upper hose.

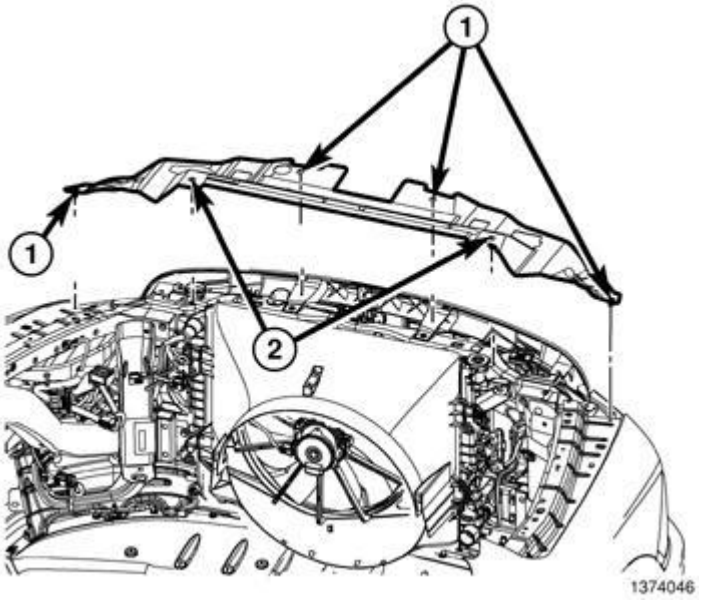


Fig. 35: Upper Radiator Seal
Courtesy of CHRYSLER GROUP, LLC

32. Position the upper radiator seal and install the two plastic rivets (2).
33. Install the four push pins (1).
34. Install the washer bottle.

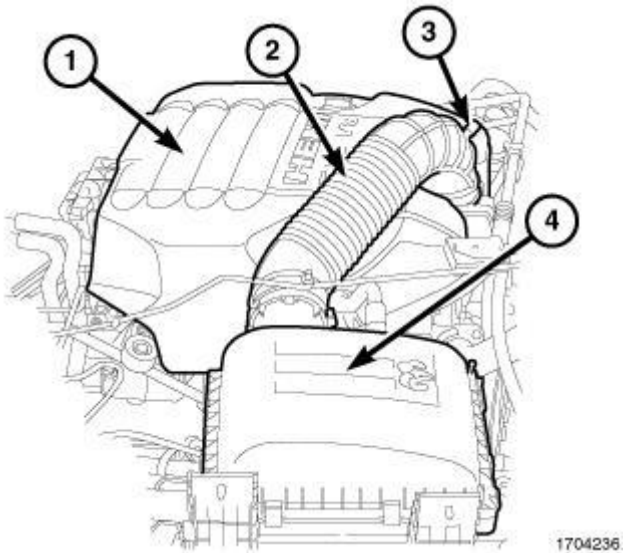


Fig. 36: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

35. Install the engine cover (1). Refer to **COVER, ENGINE, INSTALLATION, 5.7L**.
36. Install the air cleaner housing (4).
37. Install the clean air hose (2).
38. Connect the intake air temperature (IAT) sensor electrical connector (3).

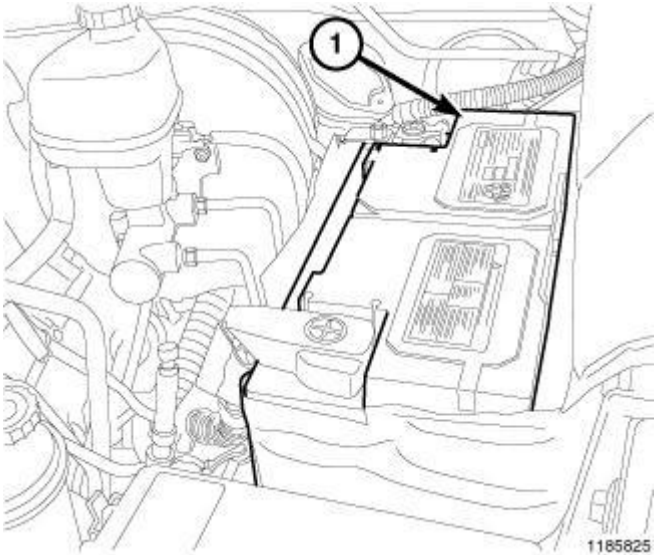


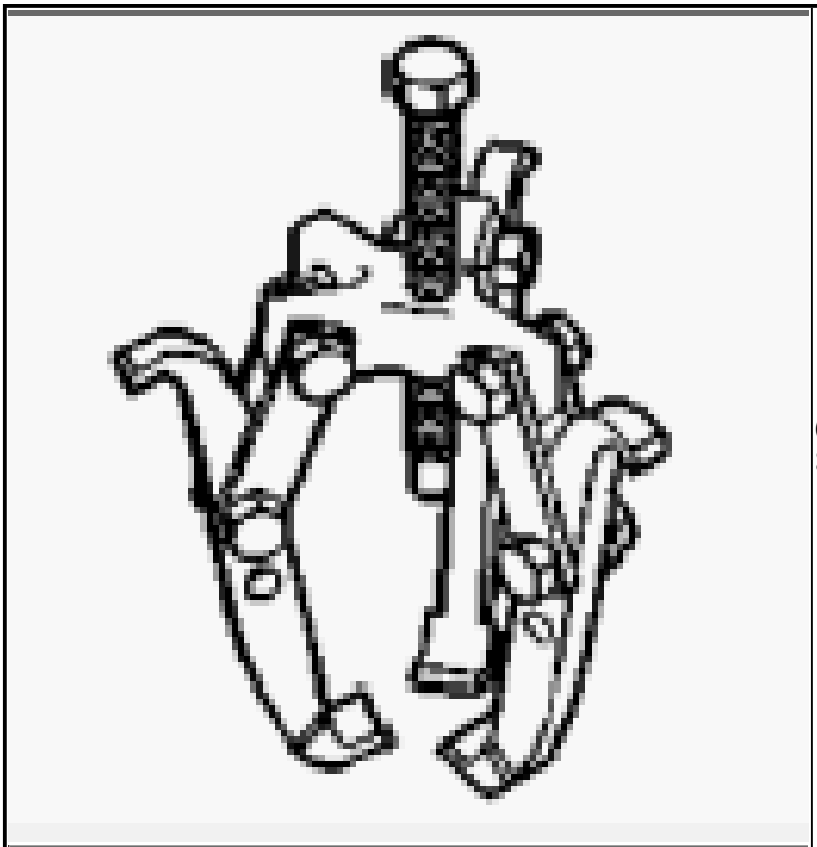
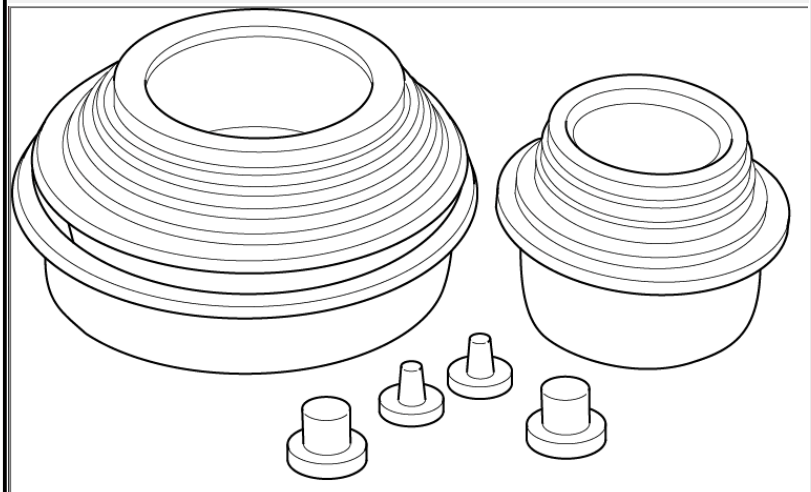
Fig. 37: Battery
Courtesy of CHRYSLER GROUP, LLC

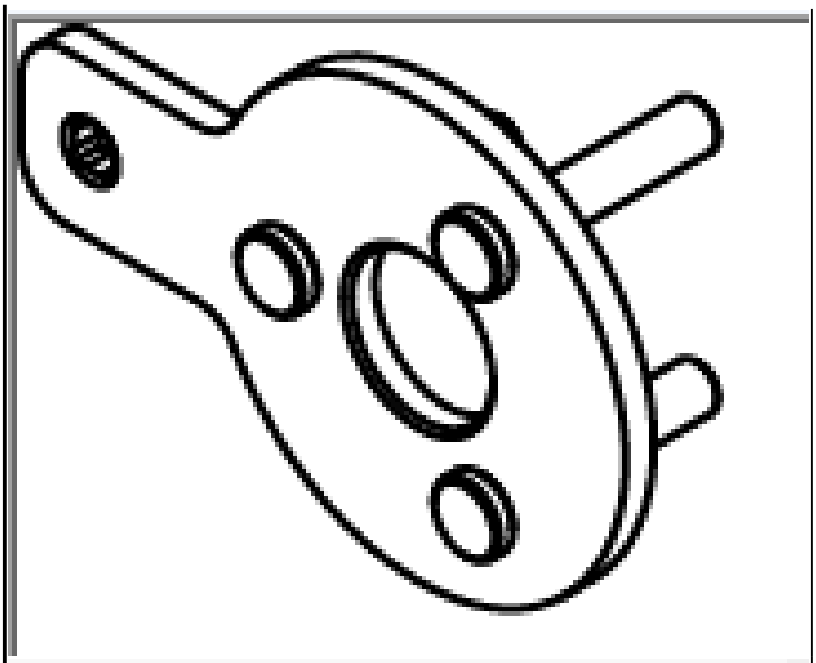
39. Fill the engine with oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
40. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
41. Connect the negative battery cable (1).

42. Start the engine and check for leaks.
43. Evacuate and Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE** .

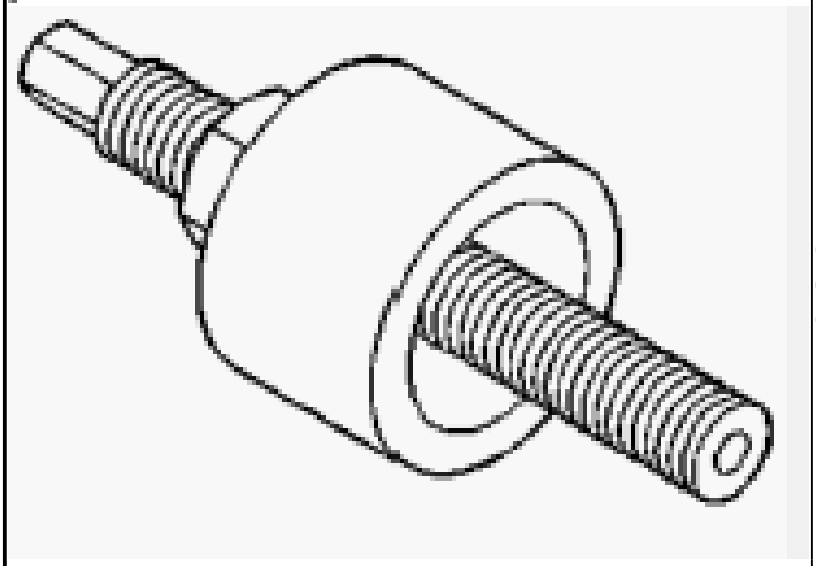
SPECIAL TOOLS

SPECIAL TOOLS

	1023 - Puller (Originally Shipped In Kit Number(s) 8678.)
	10368 - Set, Universal Protective Cap

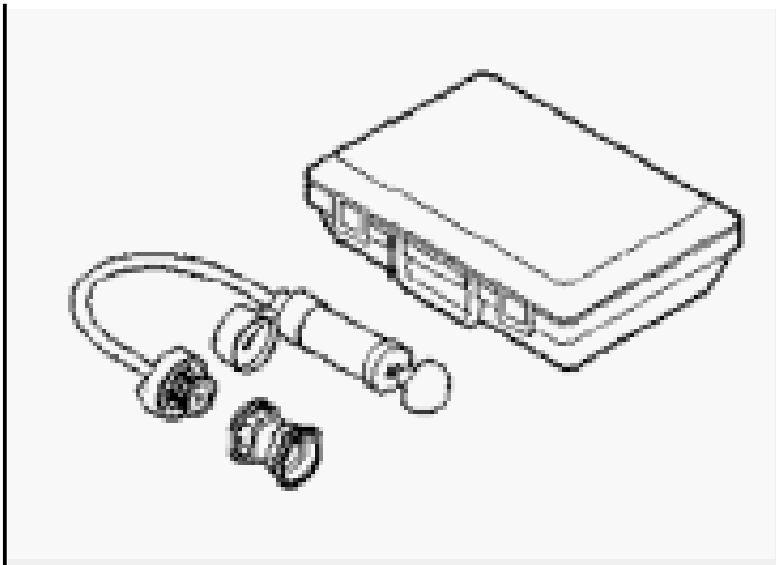


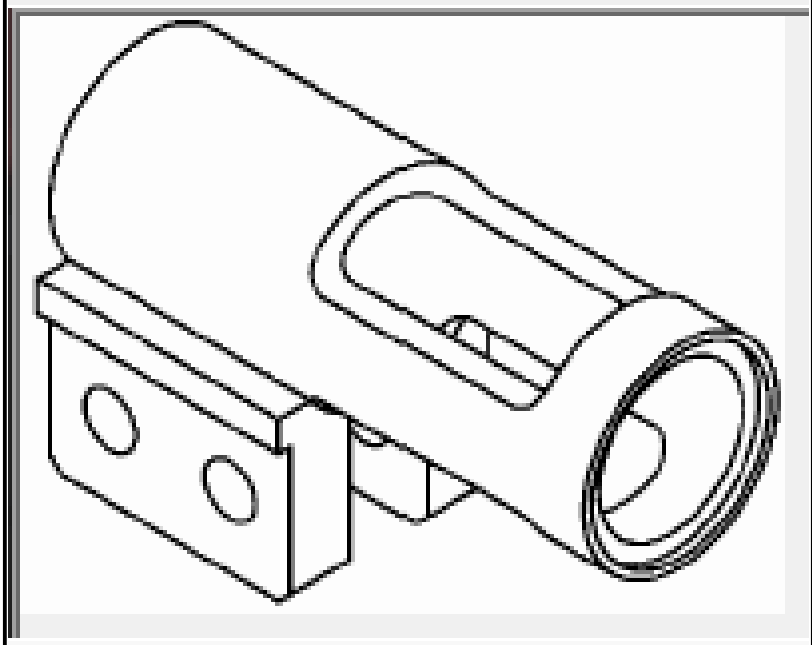
10386 - Holder, Vibration Damper



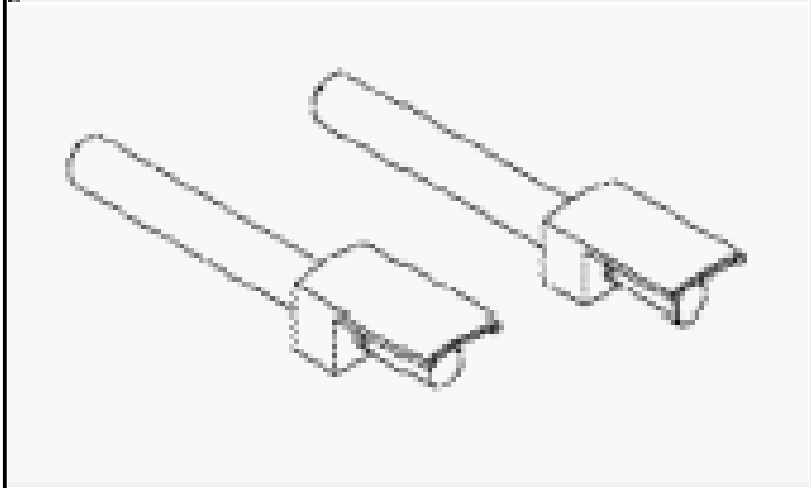
6871 - Installer, A/C Hub
(Originally Shipped In Kit Number(s) 6896.)

7700 - Tester, Cooling System
(Originally Shipped In Kit Number(s) 7700-A.)

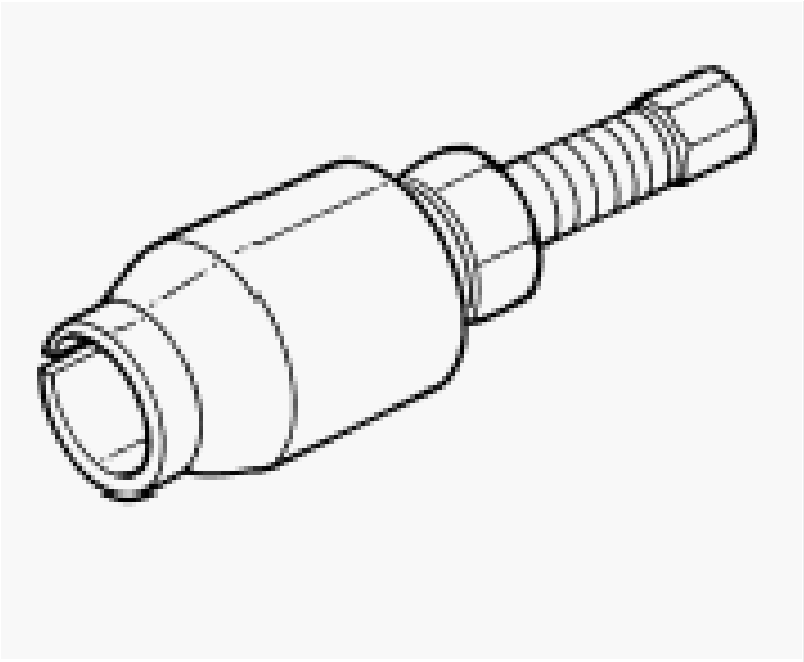




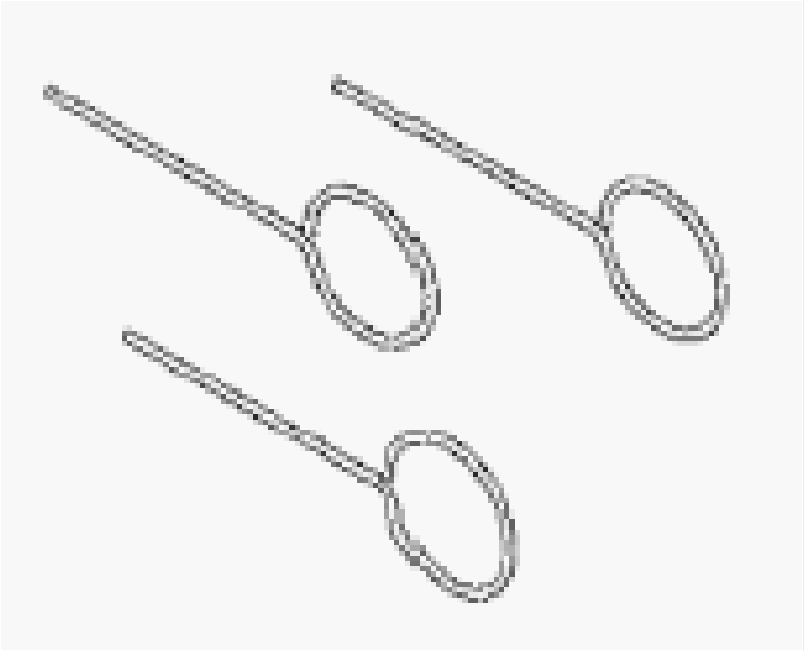
8464 - Adapter, Valve Spring
(Originally Shipped In Kit Number(s) 8664, 8665, 8665CC, 8702, 9577.)



8507 - Guides, Connecting Rod
(Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC.)

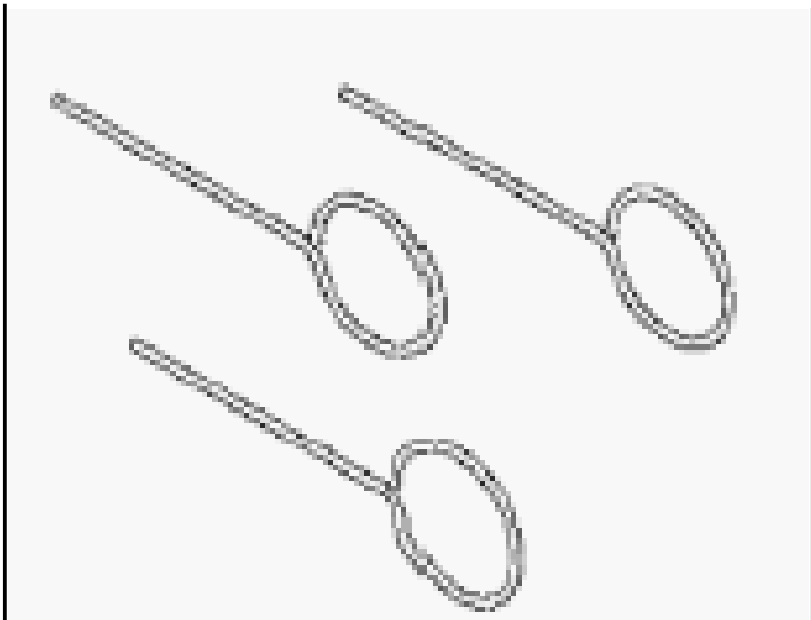


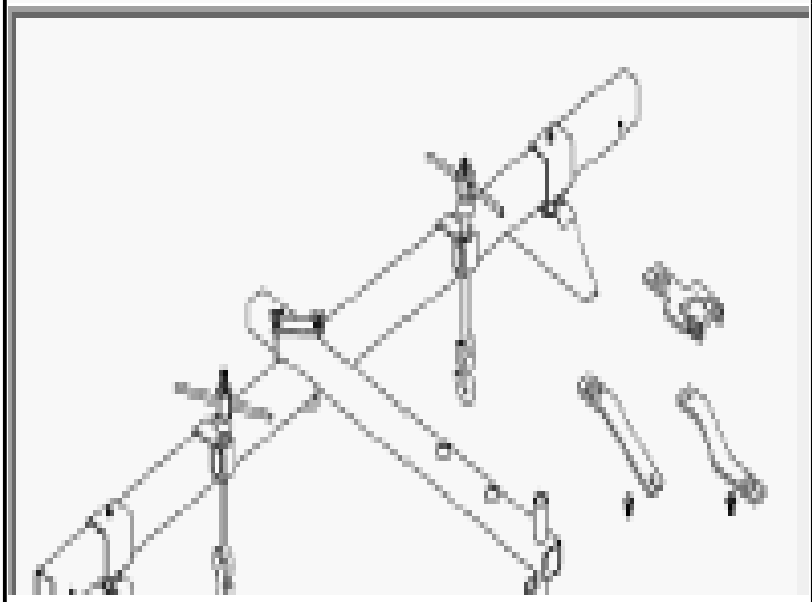
10387 - Installer, Damper
(Originally Shipped In Kit Number(s)
8283, 8527, 8575, 8575CC, 8660, 8661.)



8513A - Insert, Crankshaft
(Originally Shipped In Kit Number(s)
8283, 8527, 8575, 8999, 8999CC.)

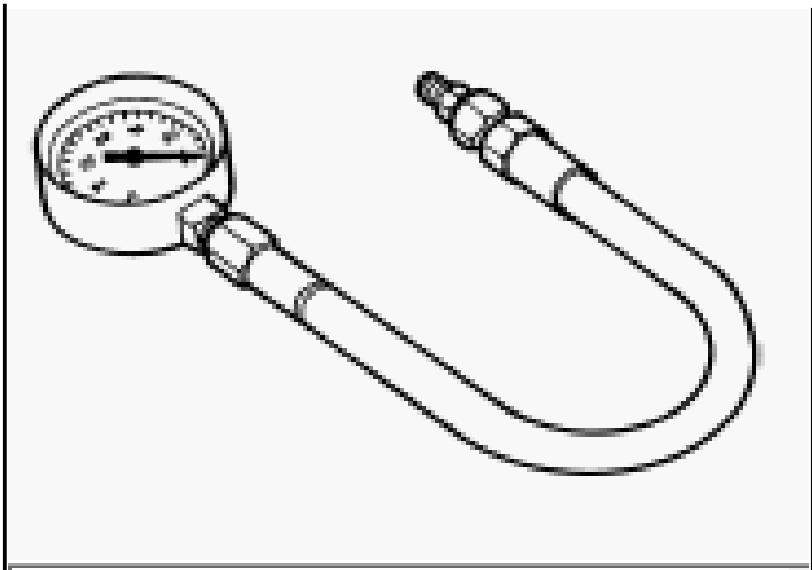
8514 - Pins, Tensioner
(Originally Shipped In Kit Number(s)
8283, 8283CC, 8527, 8527CC, 8575,
8575CC, 9975.)



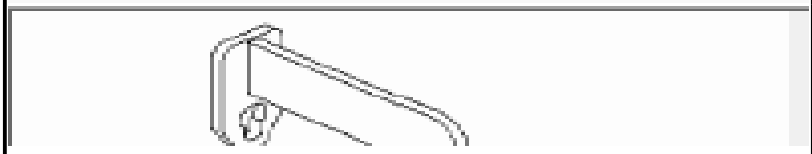


8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.)

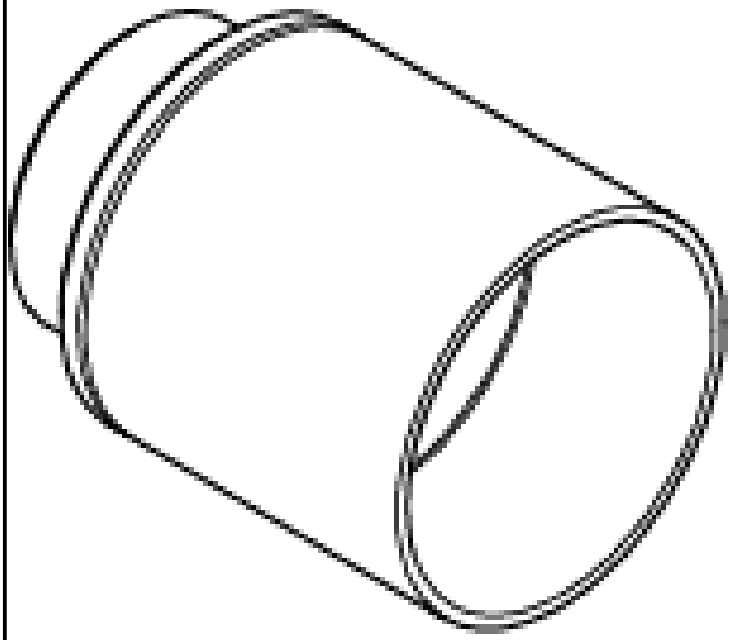
8984-UPD - Adapter, Engine Lift



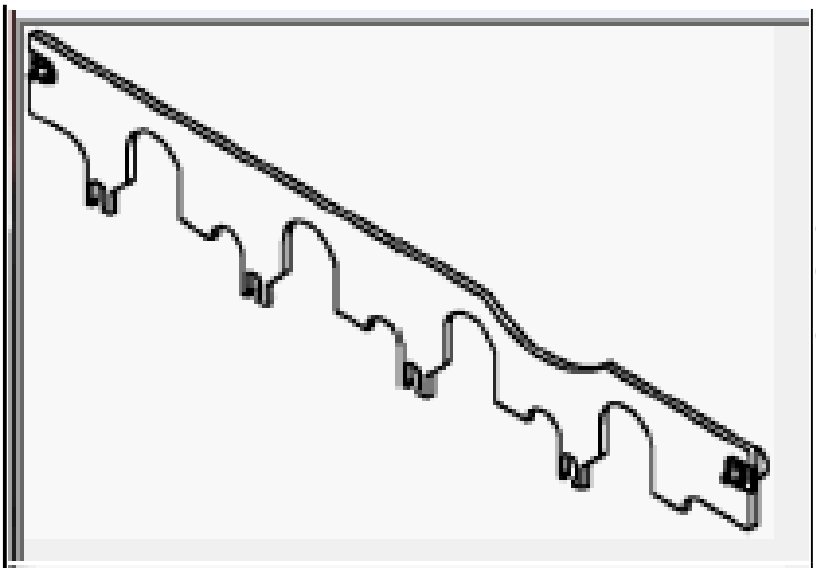
(Originally Shipped In Kit Number(s) 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519.)



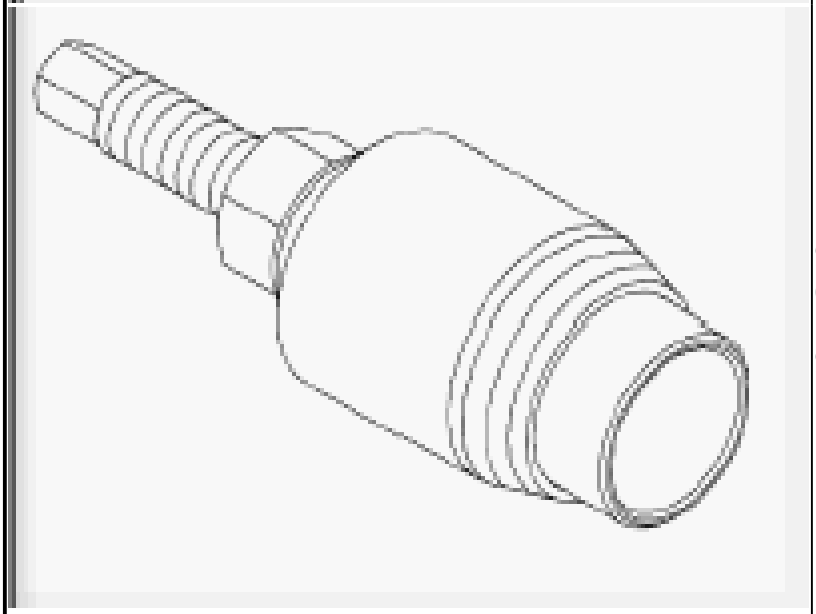
8984B - Fixture, Engine Lifting (Originally Shipped In Kit Number(s) 8849CC, 9329, 9515, 9516, 9518, 9519, 9540, 9541, 9577.)



9065C - Compressor, Valve Spring (Originally Shipped In Kit Number(s).)

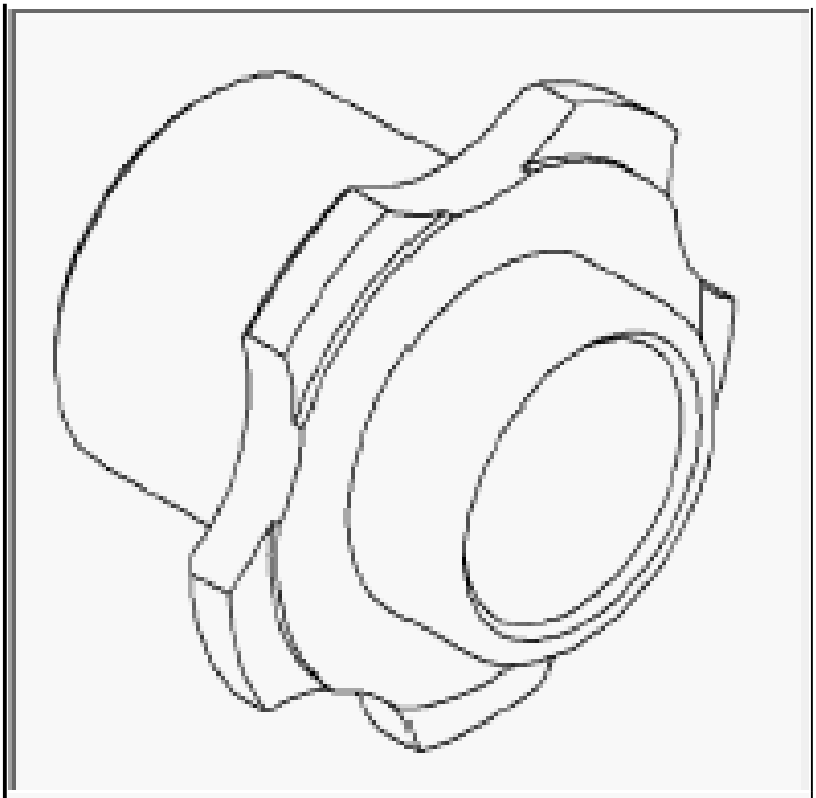


9070 - Retainer, Push Rod
(Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)



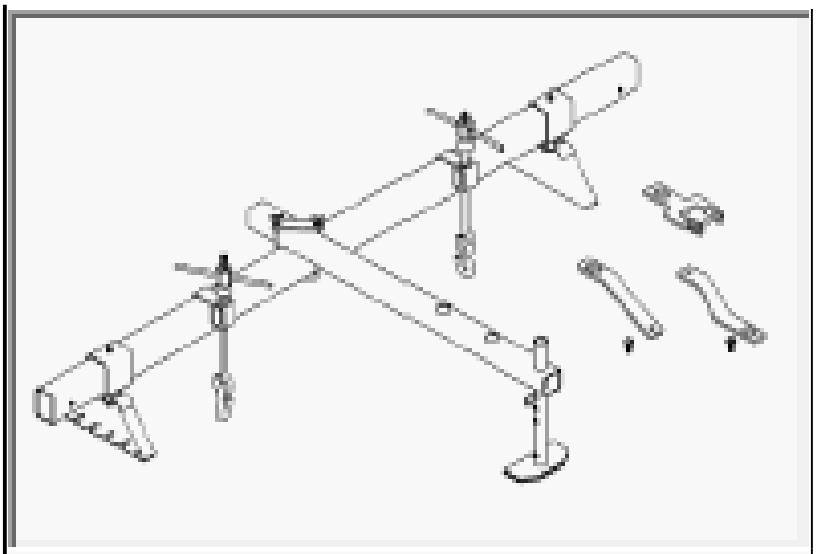
9071 - Remover, Seal
(Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)

9072 - Installer, Seal
(Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577, 9975, 9976.)

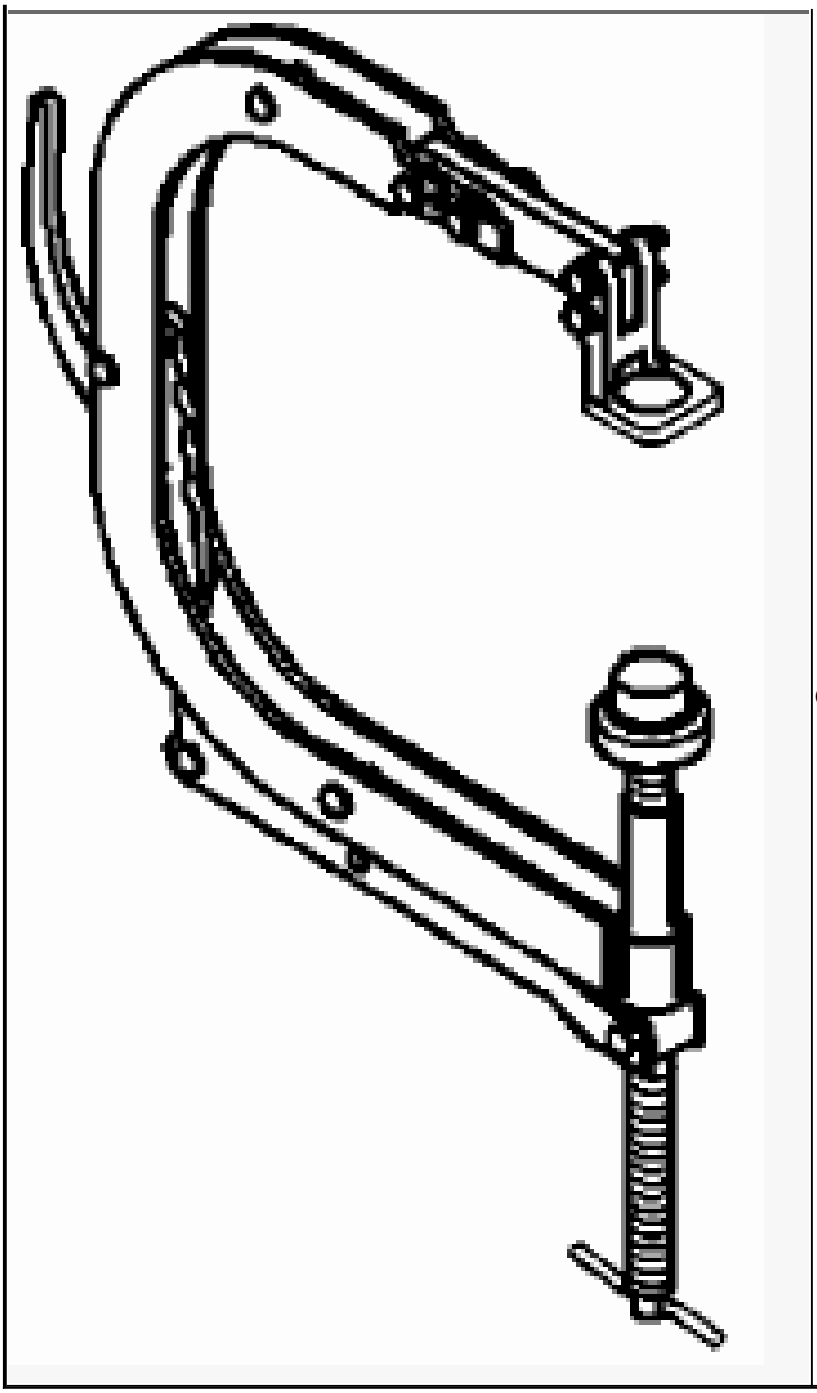


C-119 - Cylinder Indicator

C-3292A - Gauge, Pressure



C-3422-D - Compressor, Valve Spring



C-3685-A - Bloc-Chek Kit

COVER, ENGINE

DESCRIPTION

DESCRIPTION

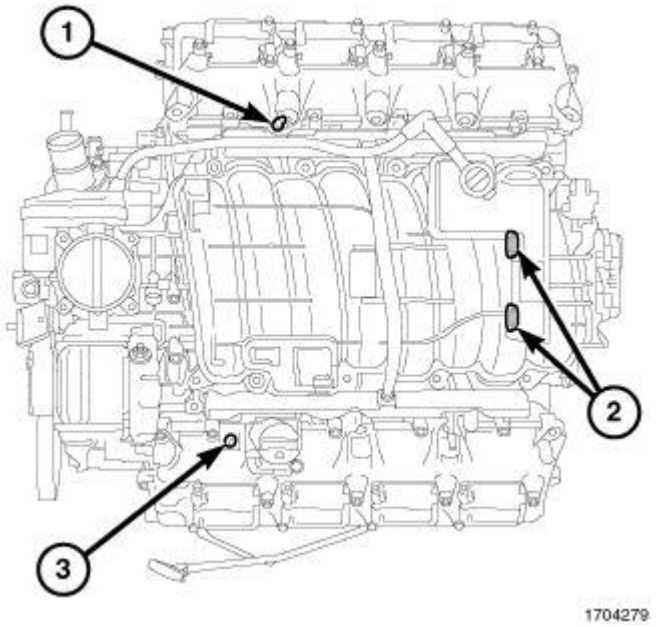


Fig. 38: Engine Cover Mounts
Courtesy of CHRYSLER GROUP, LLC

The engine cover mounts into grommets at the front and rear of the intake manifold.

The front grommets (1, 3) are a ball stud type mounts and the rear grommets (2) are a sliding peg design.

The engine cover rear pegs slide into the grommets (2) at the rear of the intake manifold and the engine cover front ball studs snap into the grommets (1, 3) at the front of the intake manifold.

REMOVAL

REMOVAL

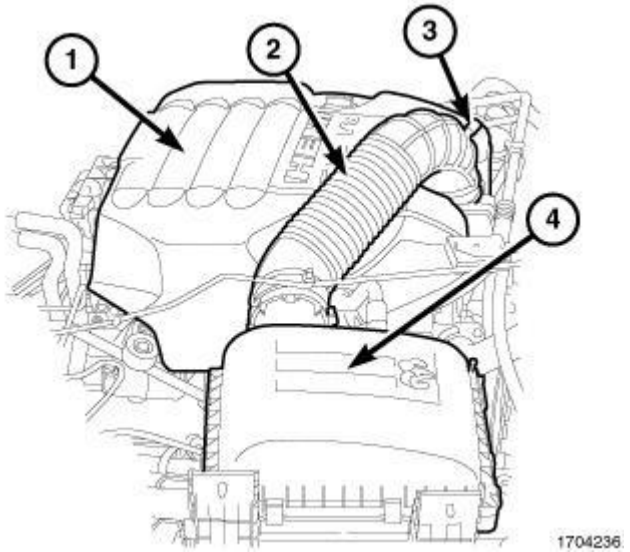


Fig. 39: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the IAT sensor electrical connector (3).
2. Remove the clean air tube (2) from the air cleaner housing (4) and the throttle body.

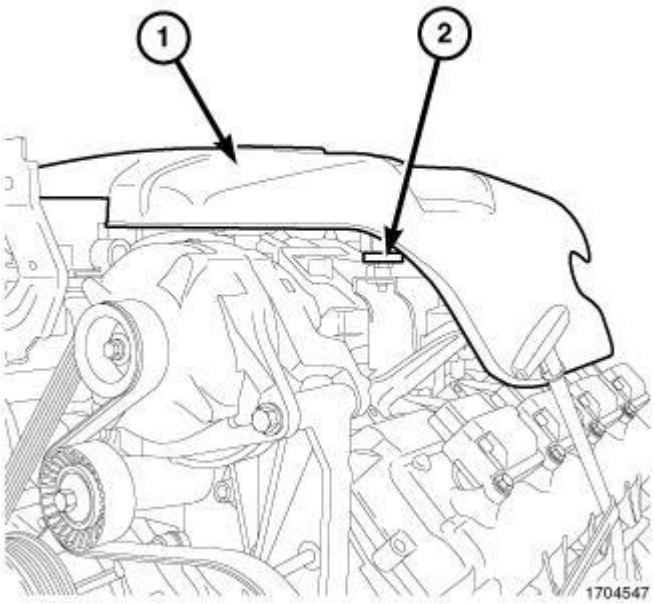


Fig. 40: Engine Cover & Grommets
Courtesy of CHRYSLER GROUP, LLC

3. Lift up the front of the engine cover (1) and separate the engine cover front grommets (2) from the ball studs on the intake manifold.

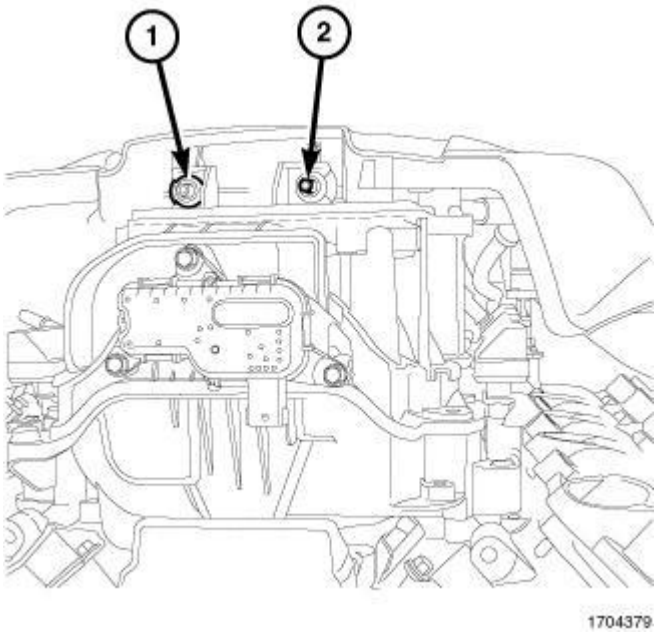


Fig. 41: Engine Cover Pegs & Grommets
Courtesy of CHRYSLER GROUP, LLC

4. Slightly raise the front of the engine cover and slide forward to remove the rear engine cover pegs (2) from the grommets (1) on the rear of the intake manifold.

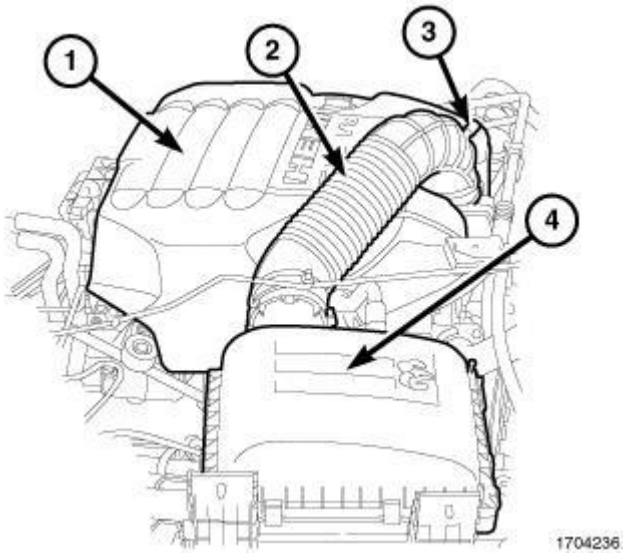


Fig. 42: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Remove the engine cover (1).

INSTALLATION

INSTALLATION

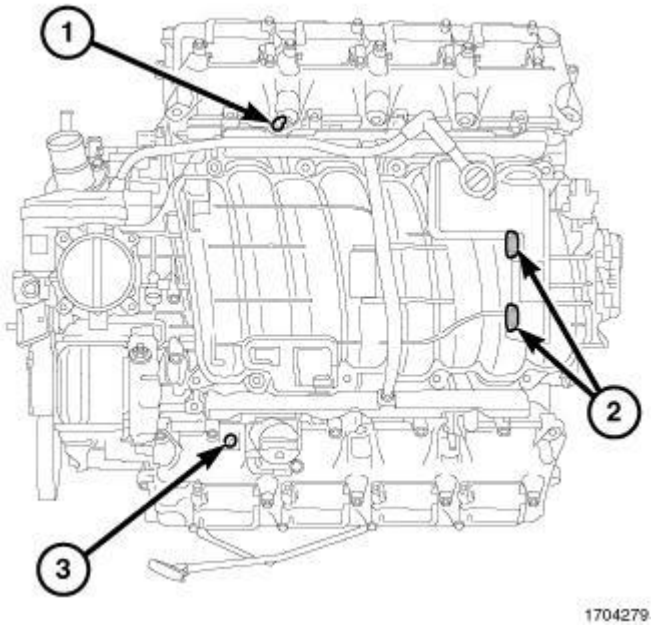


Fig. 43: Engine Cover Mounts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The front grommets (1, 3) are a ball stud type mount and the rear grommets (2) are a sliding peg design.

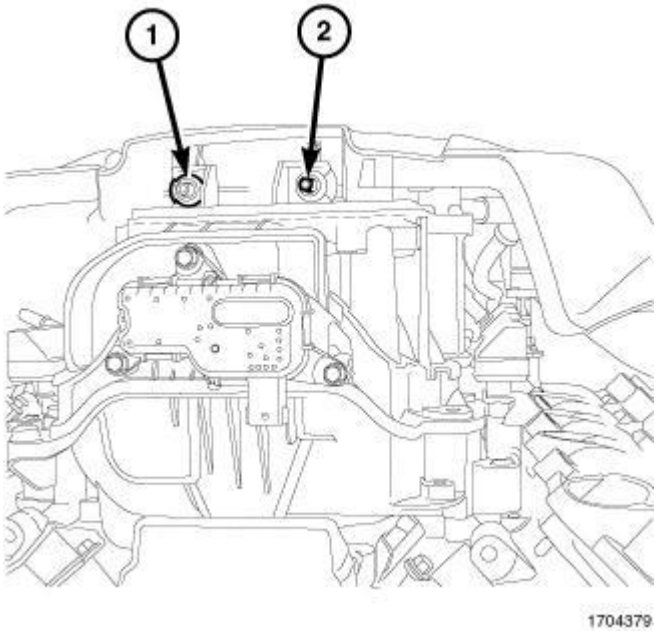


Fig. 44: Engine Cover Pegs & Grommets
Courtesy of CHRYSLER GROUP, LLC

1. Slightly tilt the rear of the engine cover and slide the rear engine cover pegs (2) into the grommets (1) on the rear of the intake manifold until the cover stops.

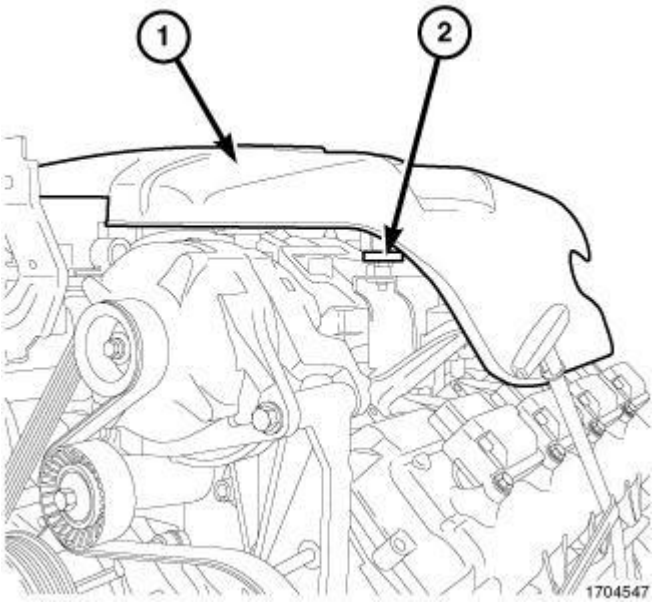


Fig. 45: Engine Cover & Grommets
Courtesy of CHRYSLER GROUP, LLC

NOTE: While installing the engine cover the front ball studs will make a popping or suction sound as the ball studs are inserted into the front grommets.

2. Lower the front of the engine cover (1) and line up the front ball studs with the grommets (2) on the front of the intake manifold and with a downward motion push the engine cover ball studs into the front grommets.
3. Lightly lift the front of the engine cover to insure the front ball studs are seated into the front grommets correctly.

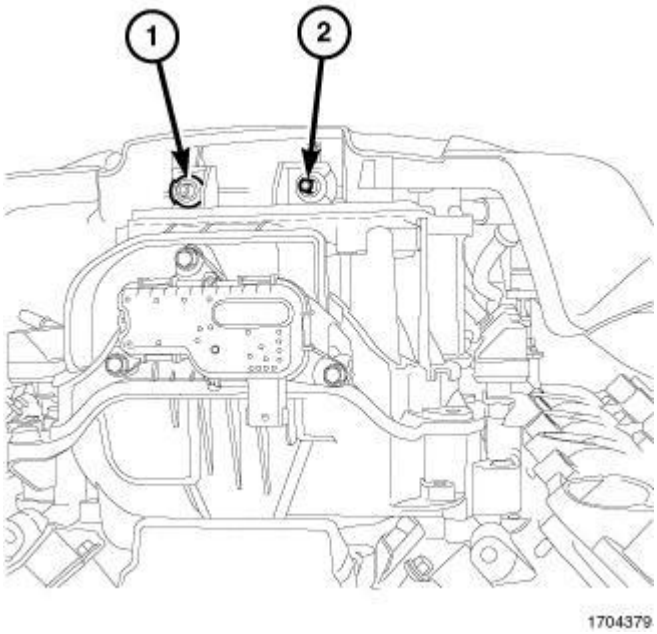


Fig. 46: Engine Cover Pegs & Grommets
Courtesy of CHRYSLER GROUP, LLC

4. Check to make sure the engine cover is installed properly by reaching behind the cover to verify that the pegs (2) are located in the grommets (1).

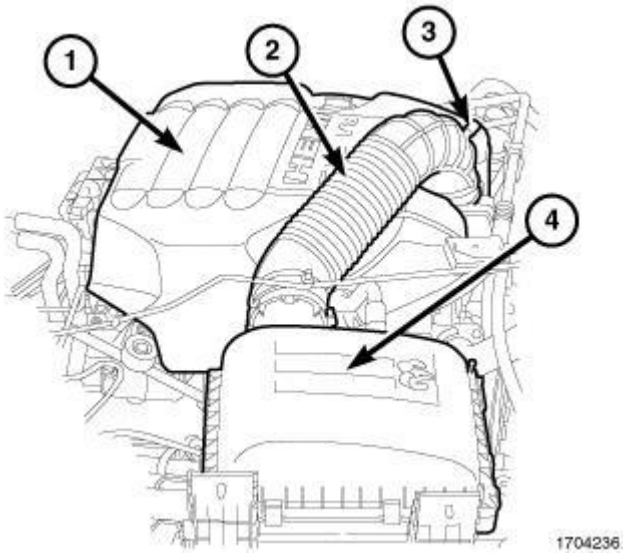


Fig. 47: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the clean air tube (2) onto the air cleaner housing (4) and the throttle body.
6. Connect the IAT sensor electrical connector (3).

MDS SYSTEM

DESCRIPTION

DESCRIPTION

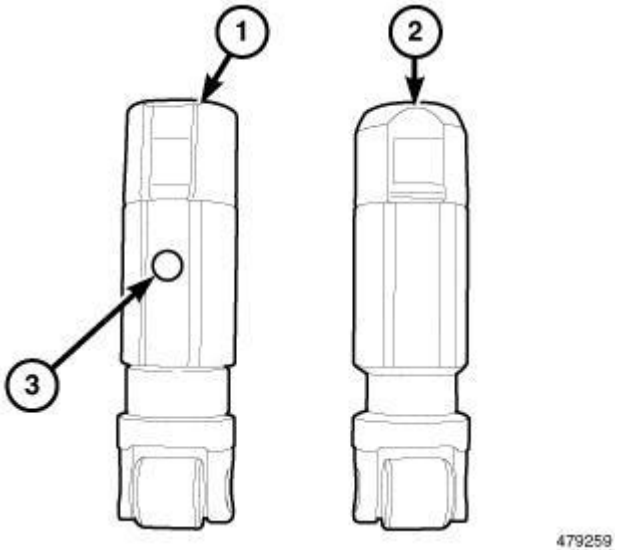


Fig. 48: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

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

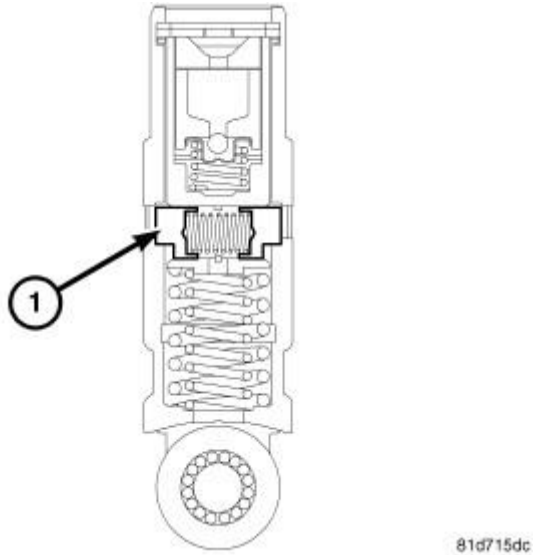


Fig. 49: MDS Lifter Cross-Section
Courtesy of CHRYSLER GROUP, LLC

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.

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

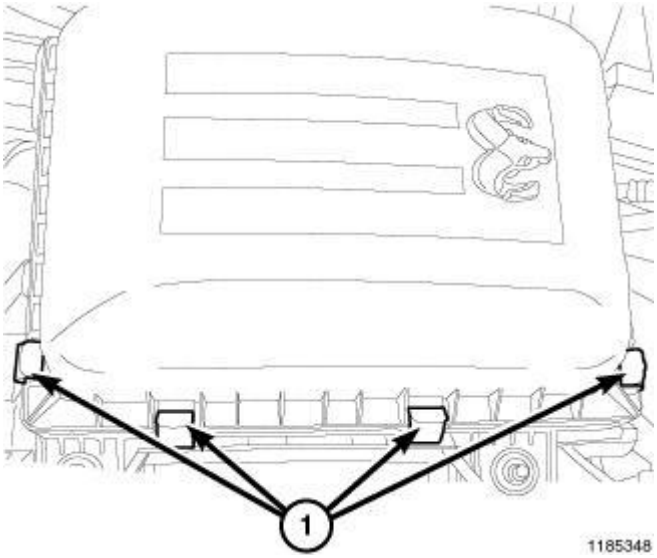


Fig. 50: Air Cleaner Body Cover Retaining Clamps
Courtesy of CHRYSLER GROUP, LLC

1. Disengage the retaining clamps (1) that secure the air cleaner body cover to air cleaner body.
2. Lift and push the air cleaner body cover toward the engine to disengage the cover locating tabs from the air cleaner body and position the cover out of the way.

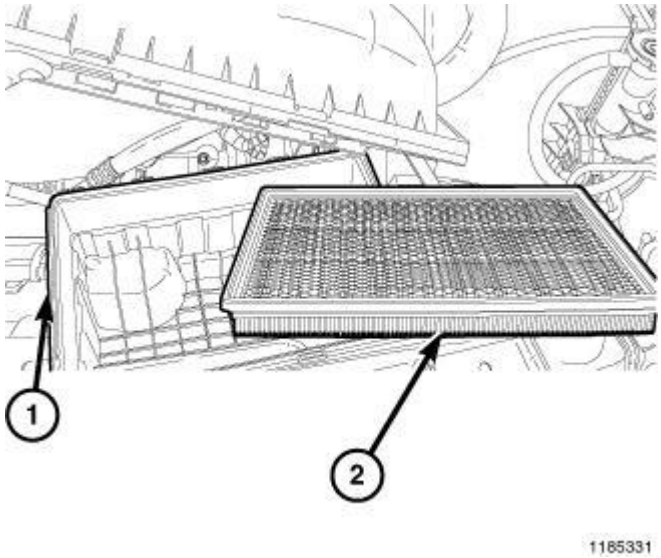


Fig. 51: Air Filter Element
Courtesy of CHRYSLER GROUP, LLC

3. Remove the air cleaner element (2) from the inside of the air cleaner body (1).
4. Clean out the inside of the air cleaner body (1).

INSTALLATION

INSTALLATION

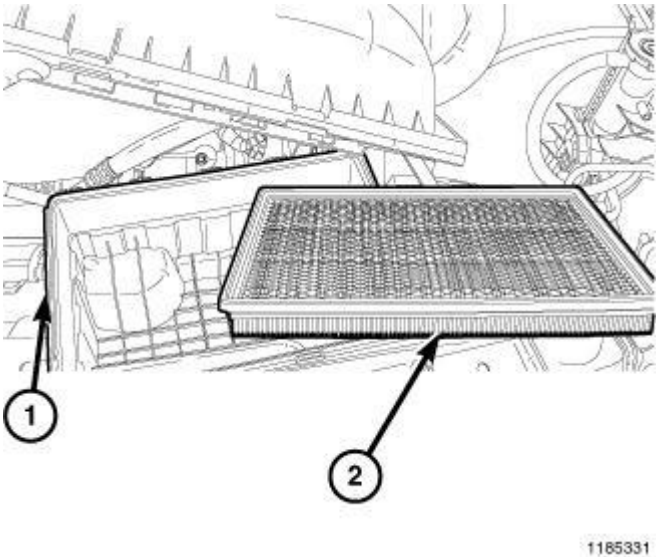


Fig. 52: Air Filter Element
Courtesy of CHRYSLER GROUP, LLC

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

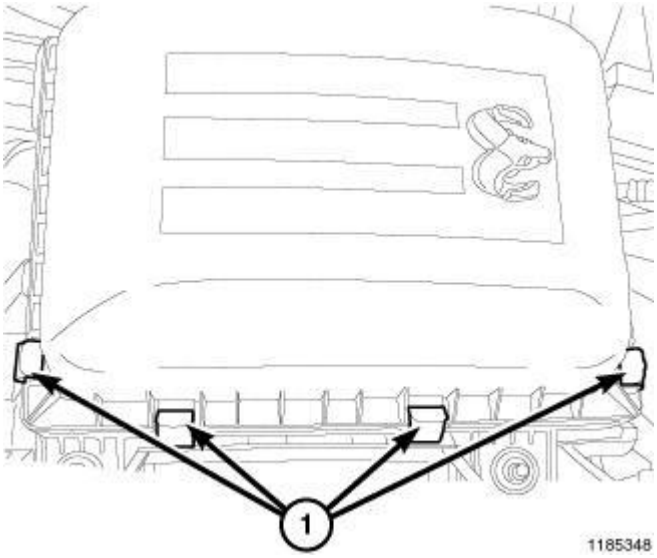


Fig. 53: Air Cleaner Body Cover Retaining Clamps
Courtesy of CHRYSLER GROUP, LLC

3. Position the air cleaner housing cover to the air cleaner housing and engage the cover locating tabs.
4. Fully install the air cleaner housing cover to the air cleaner housing and engage the four retaining clamps (1).

BODY, AIR CLEANER

REMOVAL

REMOVAL

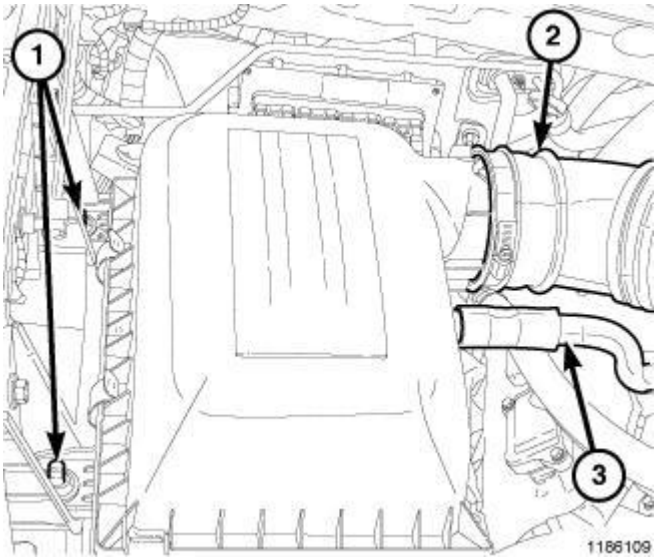


Fig. 54: Clean Air Tube To Air Cleaner
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the make up air hose (3).
2. Remove clean air tube from air cleaner housing (2).
3. Pull the air cleaner housing straight upward to disengage it from the grommets (1).

INSTALLATION

INSTALLATION

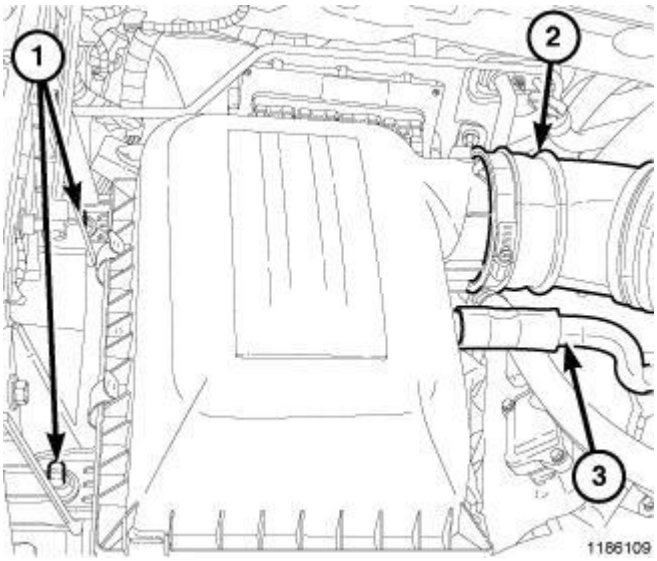


Fig. 55: Clean Air Tube To Air Cleaner

Courtesy of CHRYSLER GROUP, LLC

1. Position the air cleaner housing onto the grommets (1) and push downward.
2. Connect the clean air hose (2) to the air cleaner housing. Tighten the band clamps to 4 N.m (35 in. lbs.).
3. Connect make up air hose (3) to the air cleaner housing.

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 . 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

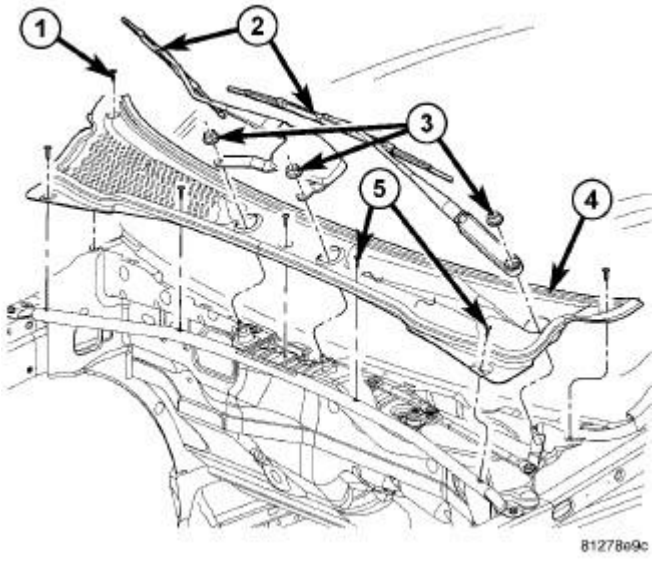


Fig. 56: Cowl Grille
Courtesy of CHRYSLER GROUP, LLC

1. Remove the cowl grille (4).

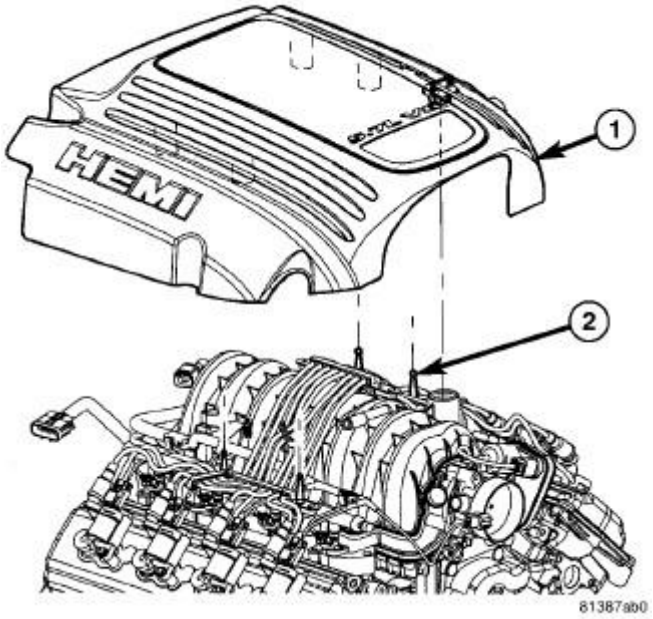


Fig. 57: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1). Refer to **COVER, ENGINE, INSTALLATION, 5.7L**.
3. Perform the Fuel System Pressure Release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
4. Disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT** .

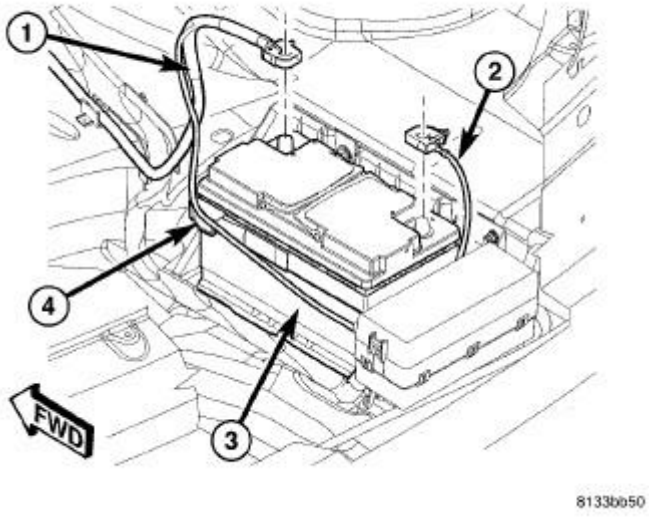


Fig. 58: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect and isolate the negative battery cable (2).
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
7. Remove the air cleaner assembly. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
8. Remove closed crankcase ventilation system.

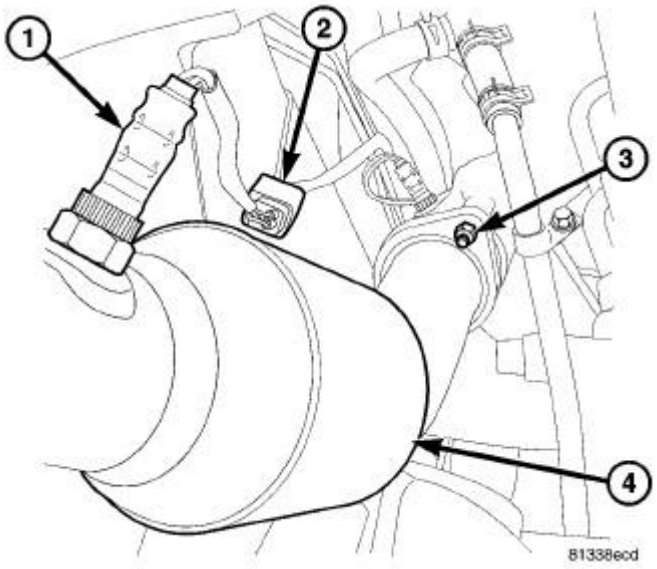


Fig. 59: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

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.

9. Disconnect the oxygen sensor connectors (2).
10. Saturate all exhaust bolts and nuts with Mopar® Rust Penetrant. Allow 5 minutes for penetration.
11. Remove the exhaust pipe to manifold bolts (3) (left side shown in illustration, right side similar) and disconnect the front exhaust pipe/catalytic converter assembly (4).
12. Disconnect the evaporation control system.

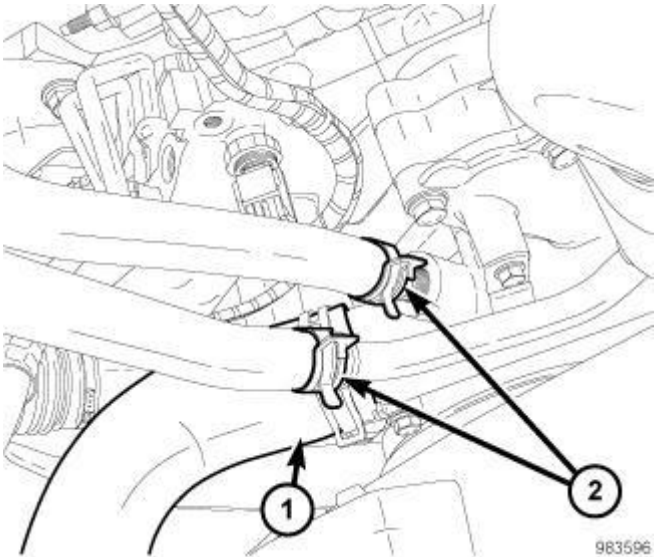


Fig. 60: Heater & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the heater hoses (2).

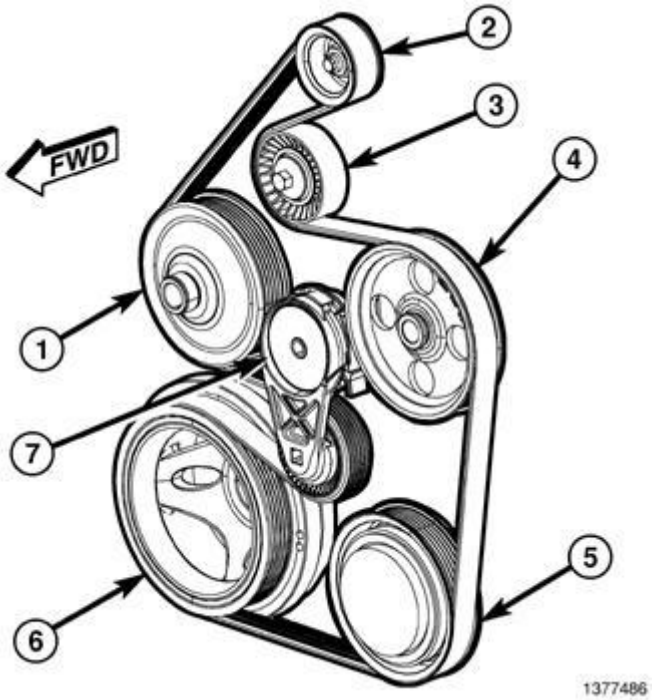


Fig. 61: Belt Routing (5.7L)
Courtesy of CHRYSLER GROUP, LLC

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

14. Insert a suitable square drive ratchet into the square hole on belt tensioner arm (7).

15. Release the belt tension by rotating the tensioner arm (7)**clockwise** . Rotate the belt tensioner arm (7) until the belt can be removed from the pulleys.
16. Remove the accessory drive belt.
17. Gently release the tensioner arm (7).

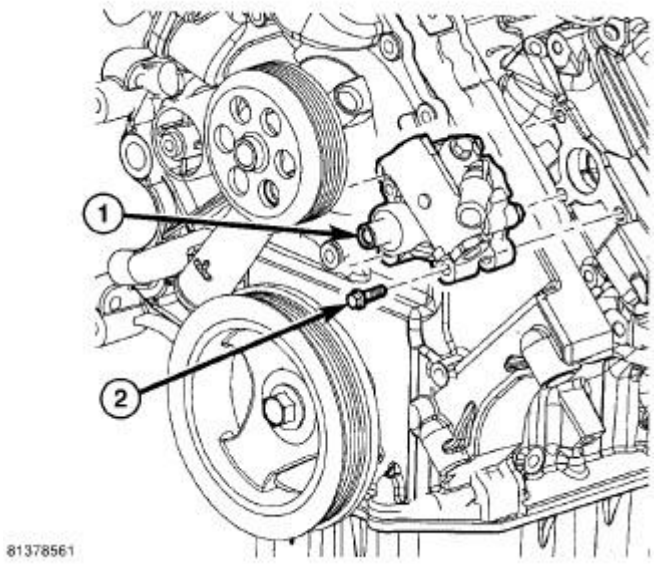


Fig. 62: Power Steering Pump - 5.7L
Courtesy of CHRYSLER GROUP, LLC

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

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

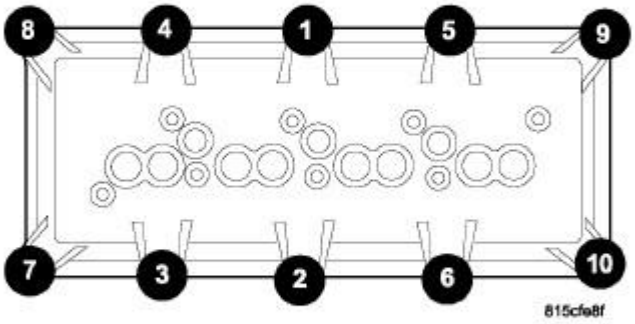


Fig. 63: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

19. Remove the cylinder head covers and gaskets. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

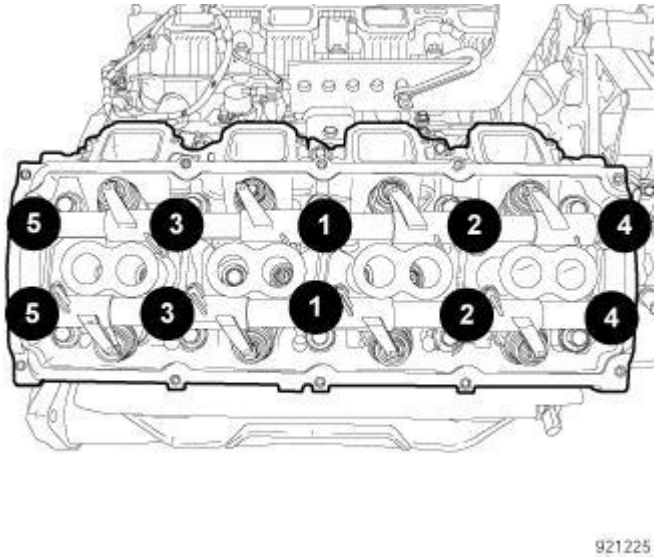


Fig. 64: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

20. Remove the intake manifold and throttle body as an assembly. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

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

21. Identify the original locations for assembly, remove rocker arm assemblies and pushrods. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.

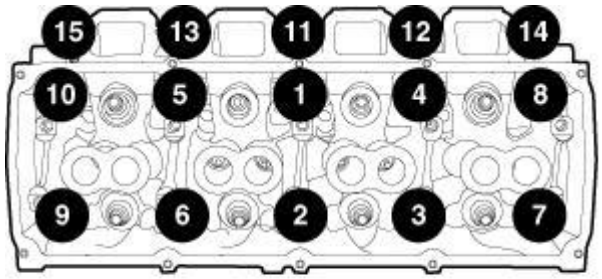


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Fig. 65: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

22. Using the sequence shown in illustration, remove the head bolts from each cylinder head. Remove the cylinder head and discard the cylinder head gasket.

CLEANING

CLEANING

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

INSPECTION

INSPECTION

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

INSTALLATION

INSTALLATION

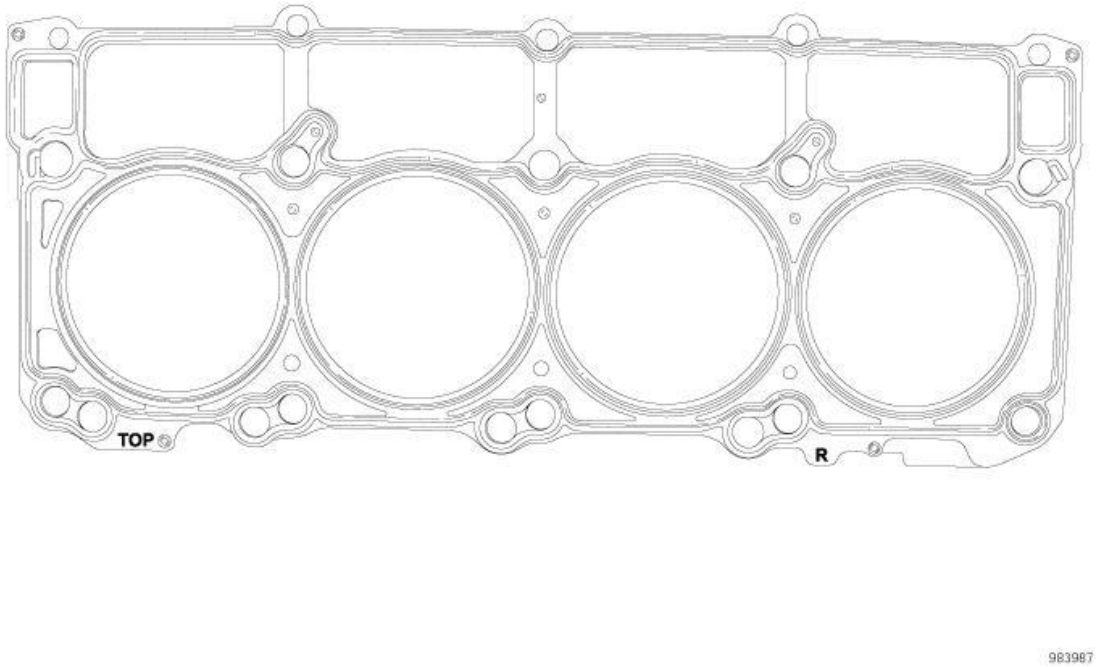


Fig. 66: Identifying Cylinder Head Gasket Marking
Courtesy of CHRYSLER GROUP, LLC

1. Clean all surfaces of cylinder block and cylinder heads.
2. Clean cylinder block front and rear gasket surfaces using a suitable solvent.

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

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

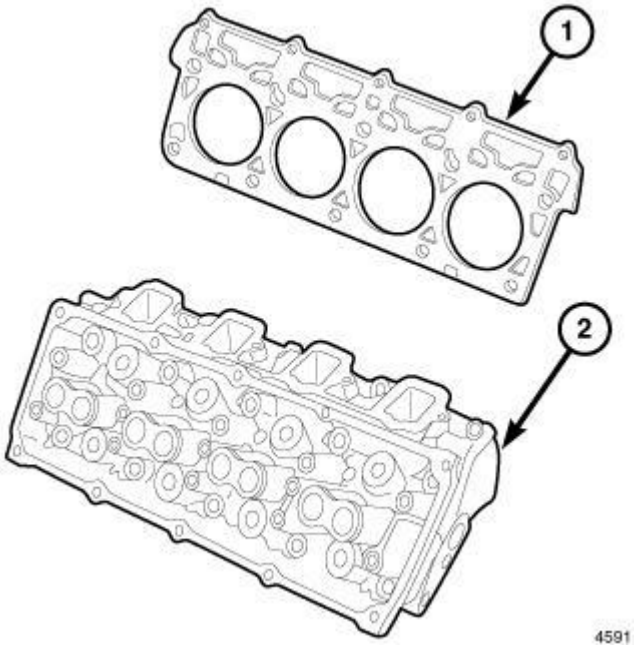


Fig. 67: 5.7L/6.1L Cylinder Head Components
Courtesy of CHRYSLER GROUP, LLC

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

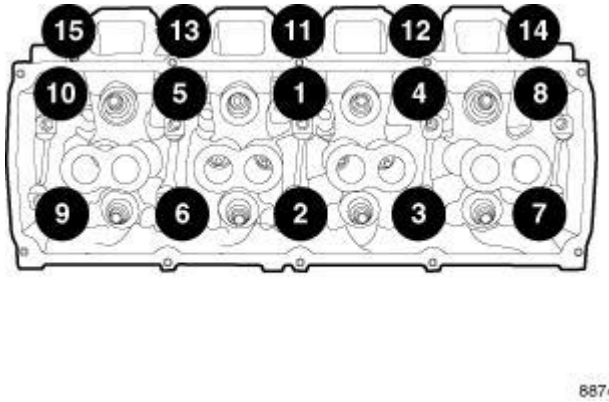


Fig. 68: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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

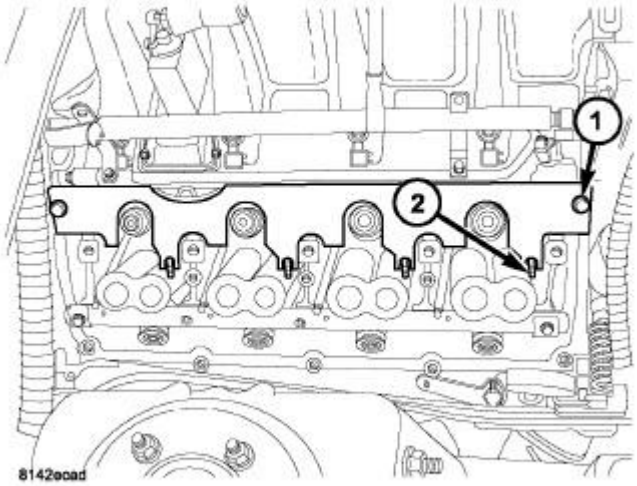


Fig. 69: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

11. Install the push rods and rocker arm assemblies in their original position, using Pushrod Retainer (special tool #9070, Retainer, Push Rod) (1). Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.
12. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.
13. Install the spark plugs.

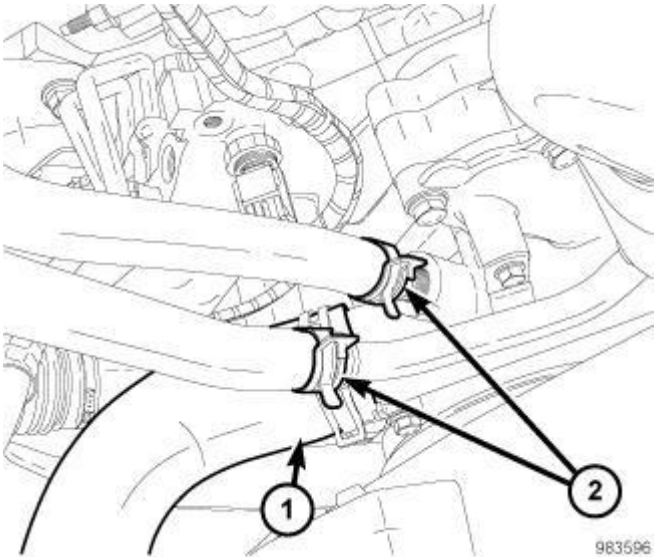


Fig. 70: Heater & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

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

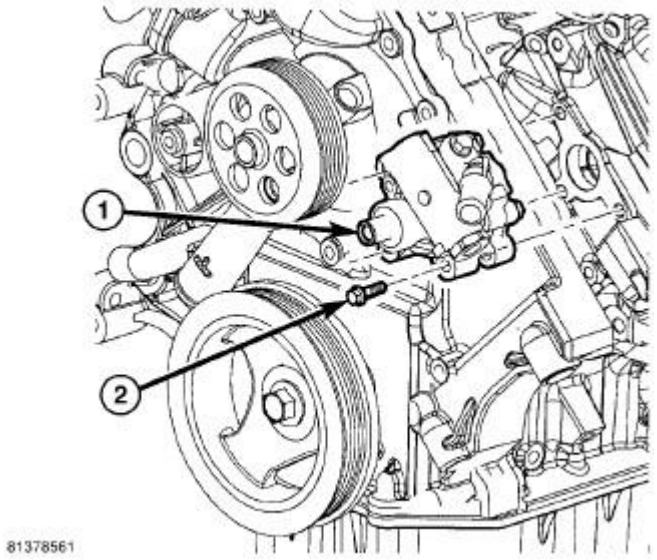


Fig. 71: Power Steering Pump - 5.7L
Courtesy of CHRYSLER GROUP, LLC

16. Install the three power steering pump mounting bolts (2) through the access holes in the pulley and tighten bolts to 28 N•m (21 ft. lbs.).
17. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

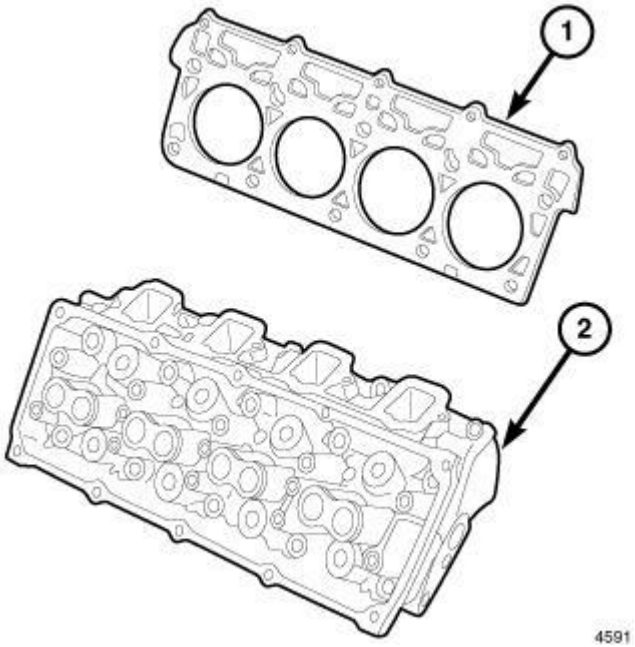


Fig. 72: 5.7L/6.1L Cylinder Head Components
Courtesy of CHRYSLER GROUP, LLC

18. Install the cylinder head cover (1) and hand start all fasteners. Verify that all double ended studs (3) are in the correct location. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

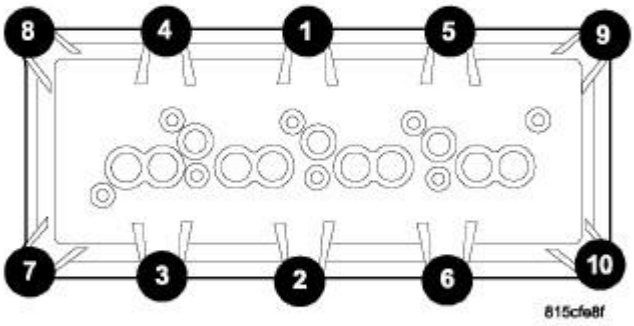


Fig. 73: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

8 N.m (70 in. lbs.).

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

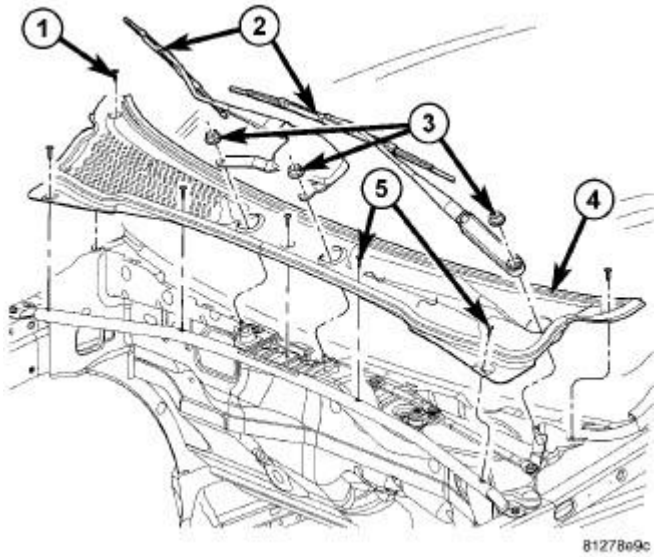


Fig. 74: Cowl Grille
Courtesy of CHRYSLER GROUP, LLC

22. Install cowl grille (4).

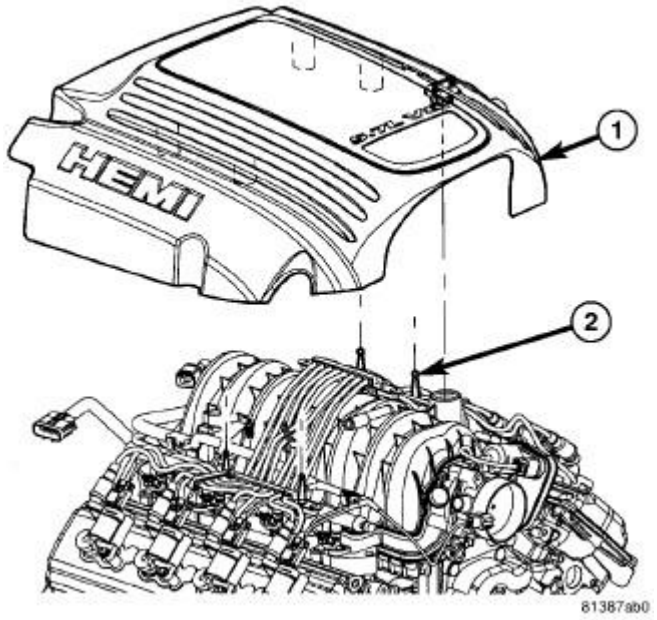


Fig. 75: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

23. Install the engine cover (1). Refer to **COVER, ENGINE, INSTALLATION** **COVER, ENGINE, INSTALLATION, 5.7L**.
24. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
25. Drain and fill the engine with new oil.

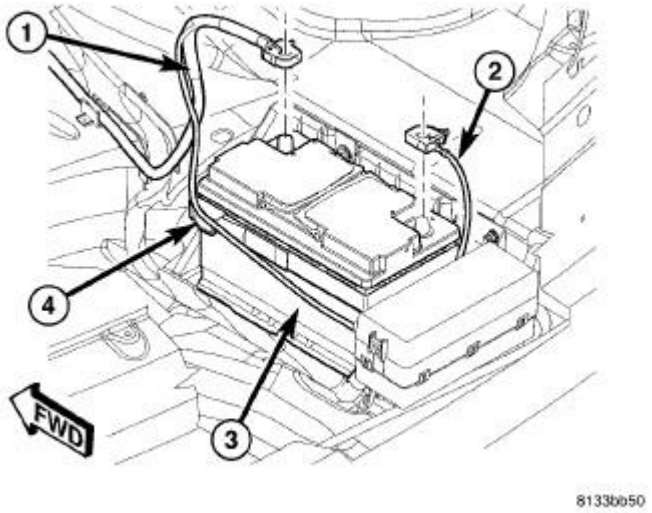


Fig. 76: Disconnecting/Connecting Battery Cables
Courtesy of CHRYSLER GROUP, LLC

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

COVER(S), CYLINDER HEAD

REMOVAL

LEFT

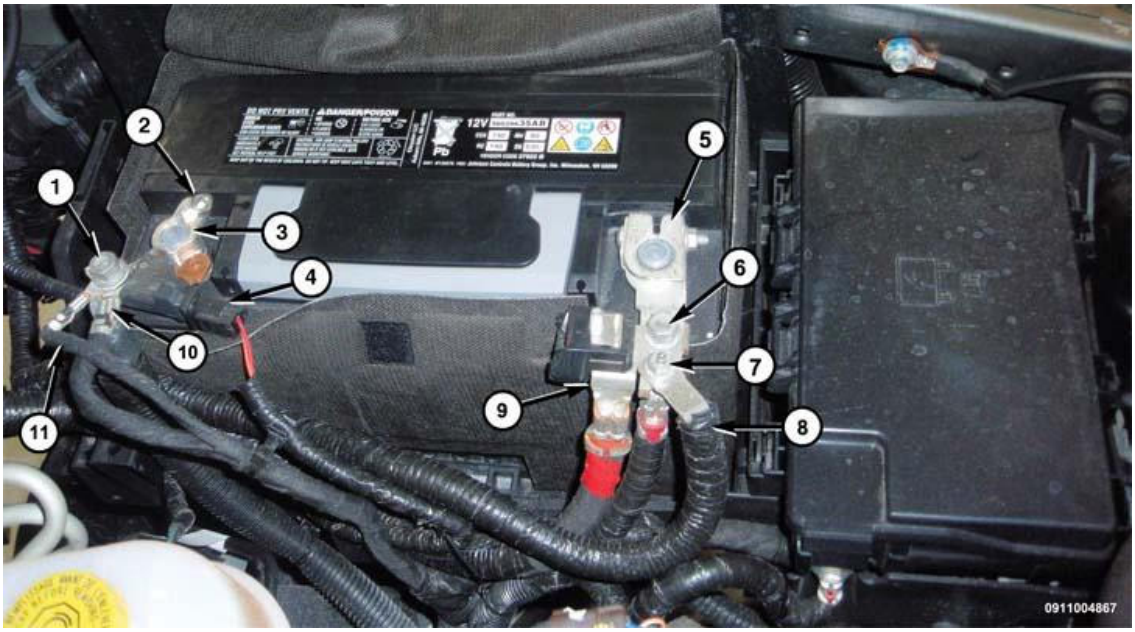


Fig. 77: Installing Battery Cables & Components
Courtesy of CHRYSLER GROUP, LLC

1. Remove the nut (1) and the negative battery cables (10, 11).

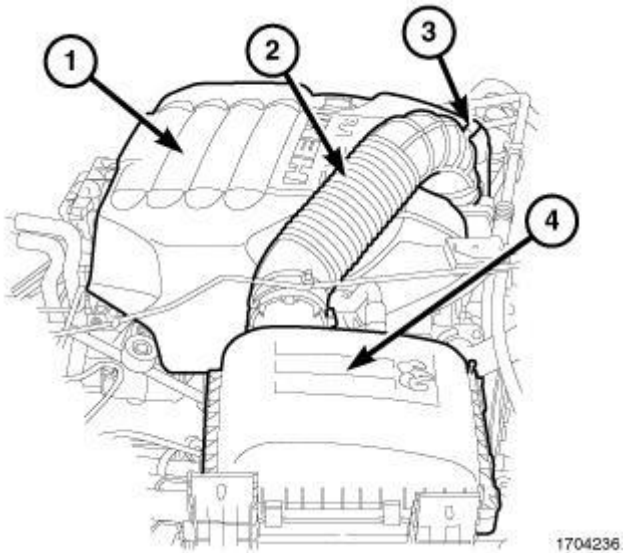


Fig. 78: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the clean air duct (2).
3. Remove the engine cover (1).
4. Remove the oil indicator tube bolt.

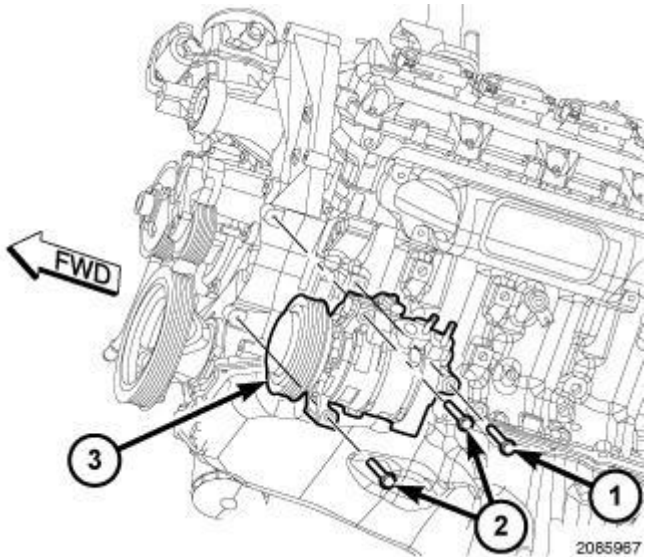


Fig. 79: A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

5. Remove the accessory drive belt.
6. Disconnect the A/C compressor harness connector.
7. Remove the A/C compressor (3) from the engine block.

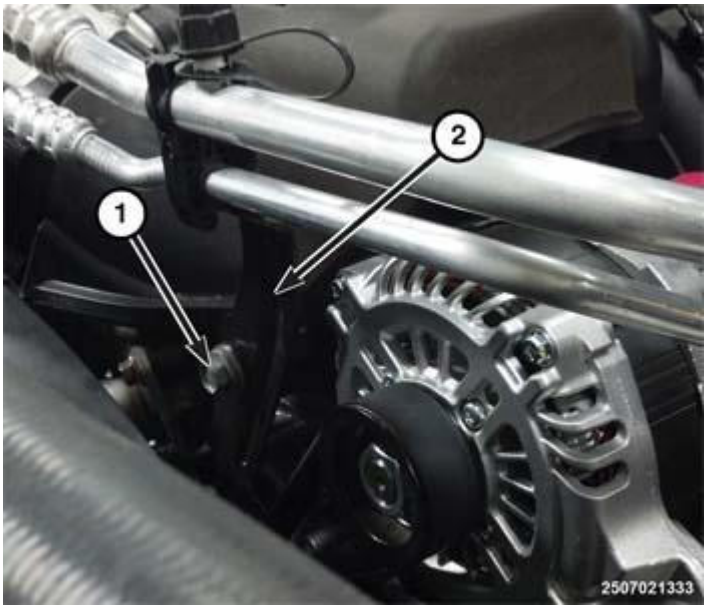


Fig. 80: A/C Line Support Bracket
Courtesy of CHRYSLER GROUP, LLC

8. Separate the A/C line support bracket (2).
9. Position the A/C compressor aside.

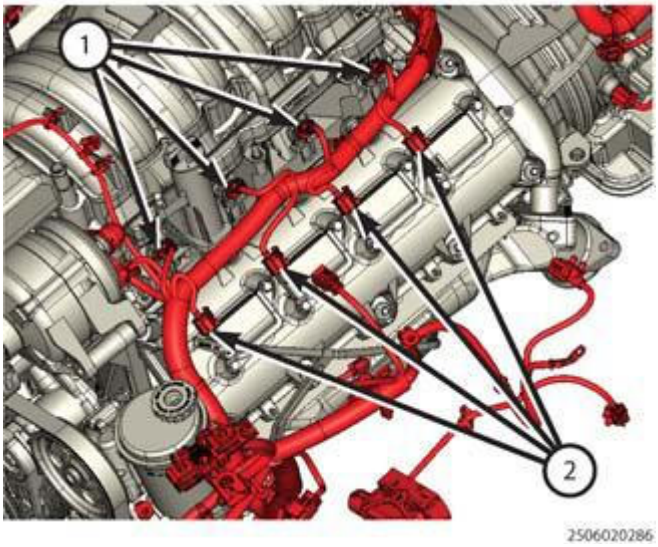


Fig. 81: Injectors Harness Connectors & Ignition Coil Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the ignition coil harness connectors (2).
11. Disconnect the fuel injectors harness connectors (1).
12. Position the electrical harness aside.

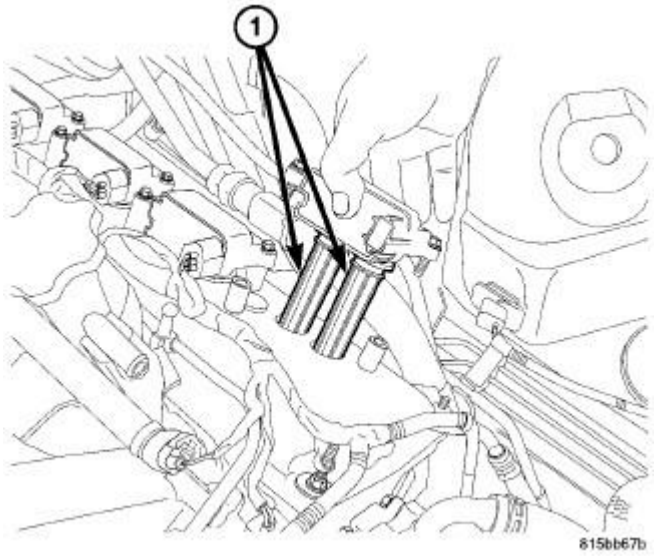


Fig. 82: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

13. Remove the ignition coil retaining bolts.
14. Remove the ignition coils (1).

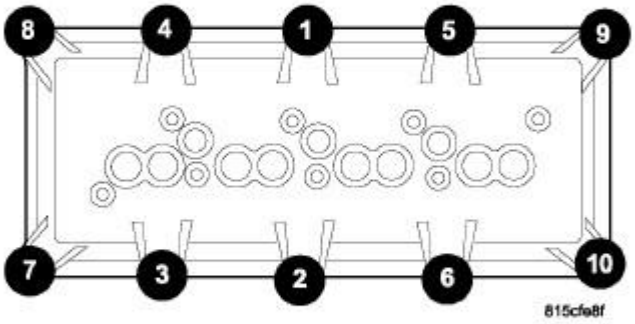


Fig. 83: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

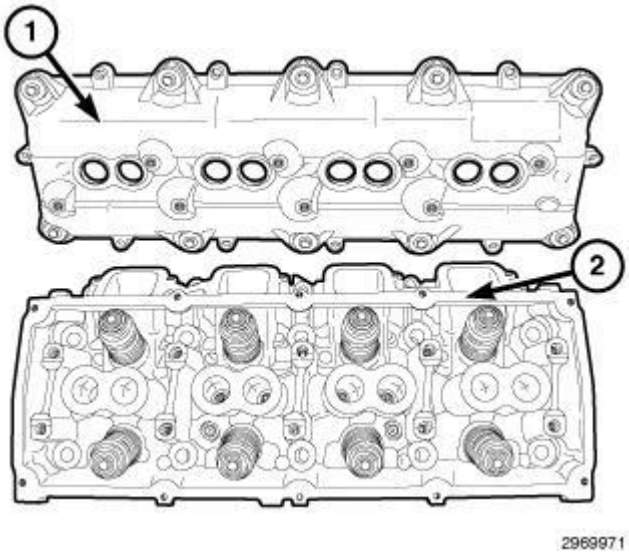


Fig. 84: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

16. Remove the cylinder head cover (1).
17. Clean the sealing surface of the cylinder head (2).

NOTE: The cylinder head cover gasket may be used again, provided no cuts, tears, or

deformation have occurred.

RIGHT

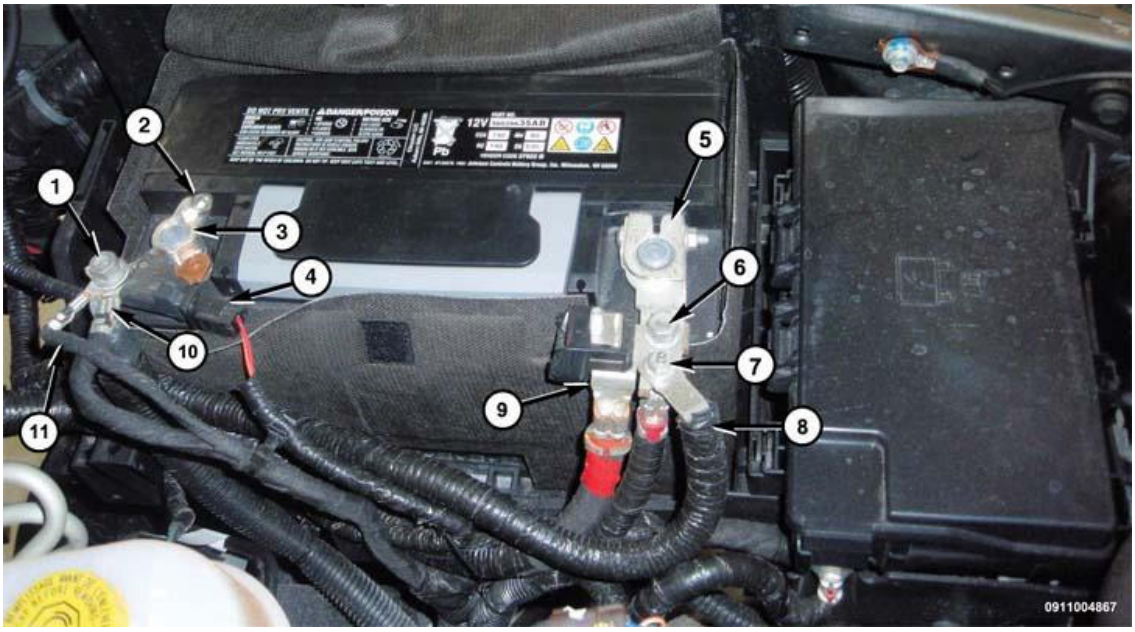


Fig. 85: Installing Battery Cables & Components
Courtesy of CHRYSLER GROUP, LLC

1. Remove the nut (1) and the negative battery cables (10, 11).

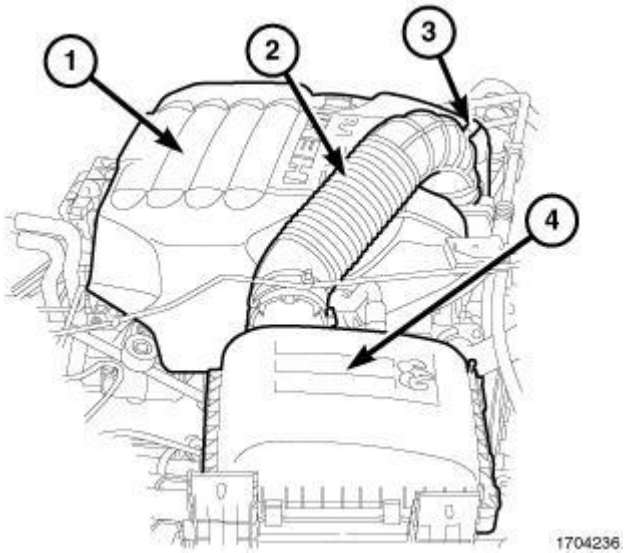


Fig. 86: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the air filter body (4). Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
3. Remove the clean air duct (2).

4. Remove the engine cover (1). Refer to **COVER, ENGINE, INSTALLATION** **COVER, ENGINE, INSTALLATION, 5.7L**.

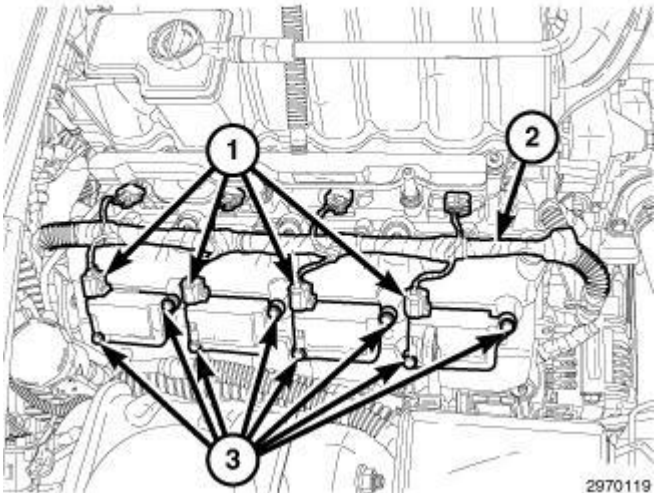


Fig. 87: Ignition Coil Electrical Connectors, Harness & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the ignition coil harness connectors (1).
6. Disconnect the fuel injectors harness connectors.
7. Position the engine harness (2) aside.
8. Remove the ignition coil retaining bolts (3) and remove the ignition coils.

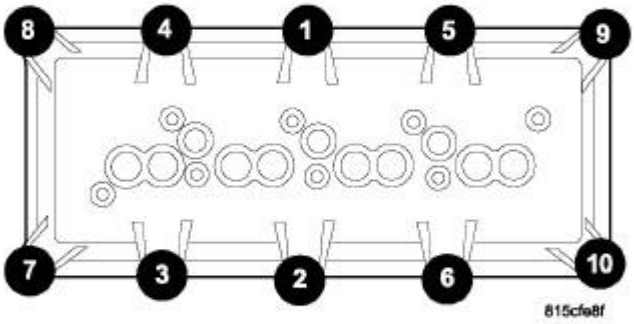


Fig. 88: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

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

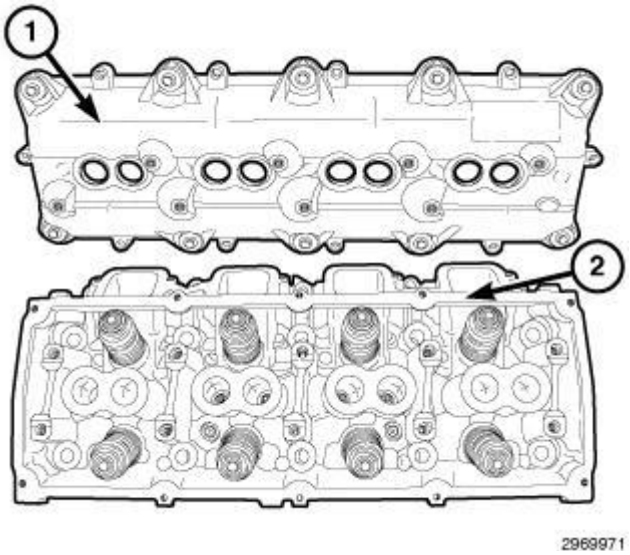


Fig. 89: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

10. Remove the cylinder head cover (1).
11. Clean the sealing surface of the cylinder head (2) and cover.

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

INSTALLATION

LEFT

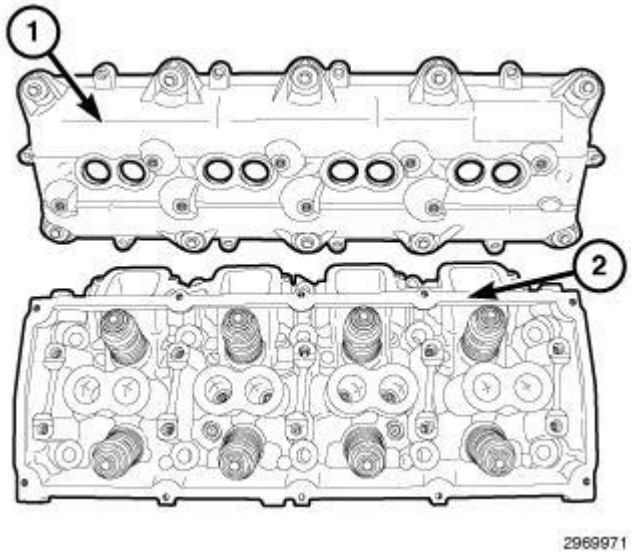


Fig. 90: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

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

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

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

1. Clean the cylinder head cover (1) and the sealing surface of the cylinder head (2). Inspect and replace gasket if necessary.
2. Install the cylinder head cover and hand start all fasteners.

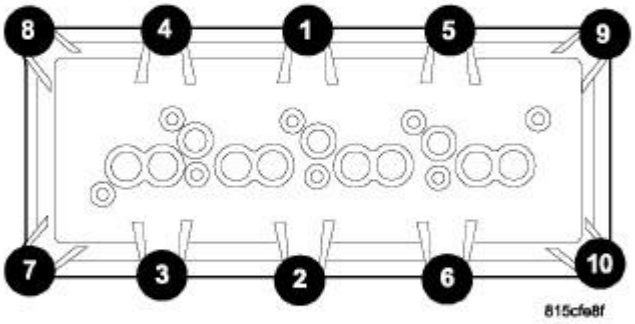


Fig. 91: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, tighten the cylinder head cover bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS** .

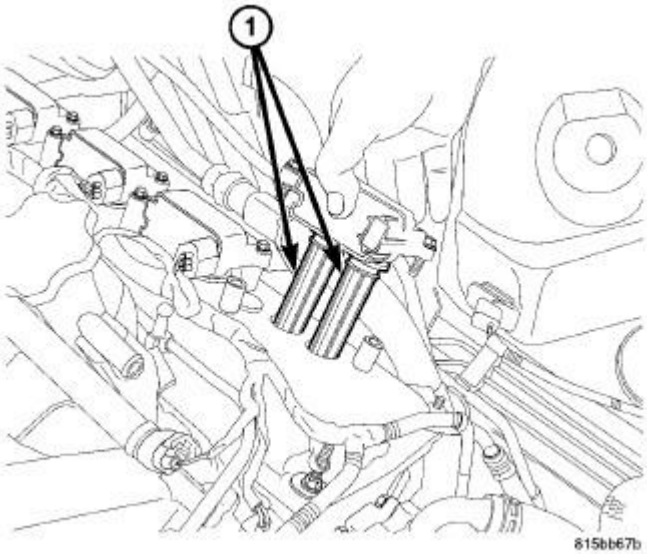


Fig. 92: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

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

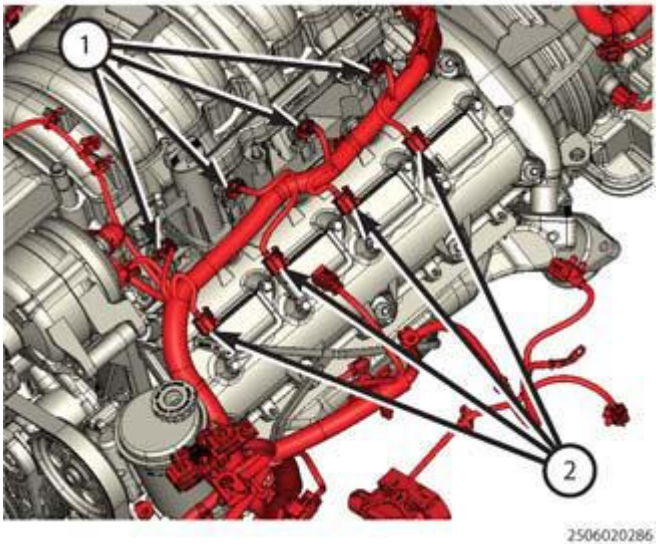


Fig. 93: Injectors Harness Connectors & Ignition Coil Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the ignition coil retaining bolts to the proper specification. Refer to **SPECIFICATIONS** .
7. Connect the fuel injector harness connectors (1).
8. Connect the ignition coil harness connectors (2).

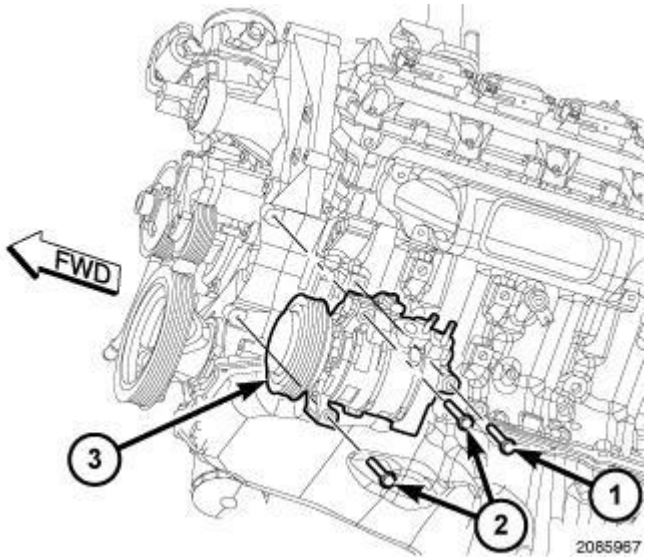


Fig. 94: A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

9. If removed, install studs that secure the A/C compressor to the engine.
10. Loosely install the bolts that secure the A/C compressor to the engine.
11. Tighten the bolt to 28 N.m (21 ft. lbs.) using the following sequence:
    - Upper and lower fasteners (2) at front of compressor.
    - Fastener (1) at rear of compressor.

12. Connect the A/C compressor harness connector.

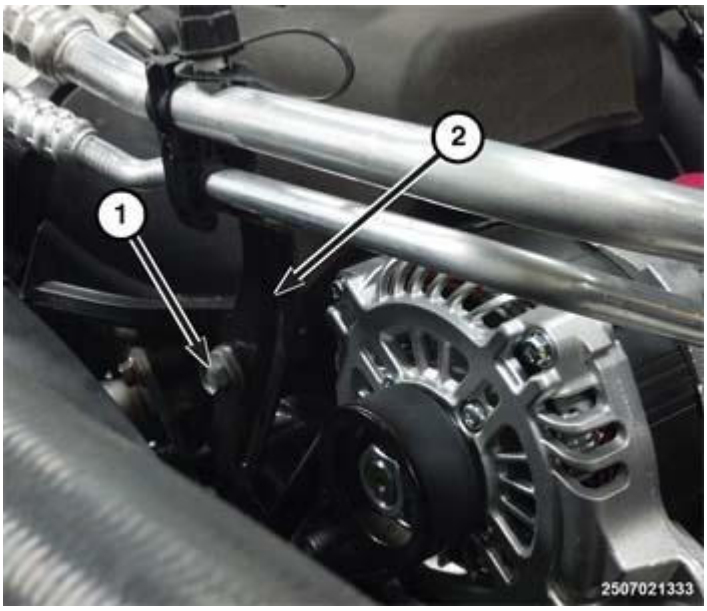


Fig. 95: A/C Line Support Bracket
Courtesy of CHRYSLER GROUP, LLC

13. Install the A/C support bracket (2) to the intake manifold. Torque the bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS** .
14. Install the accessory drive belt.
15. Position the oil indicator tube to the engine. Tighten the bolt to the proper specification. Refer to **TORQUE SPECIFICATIONS** .

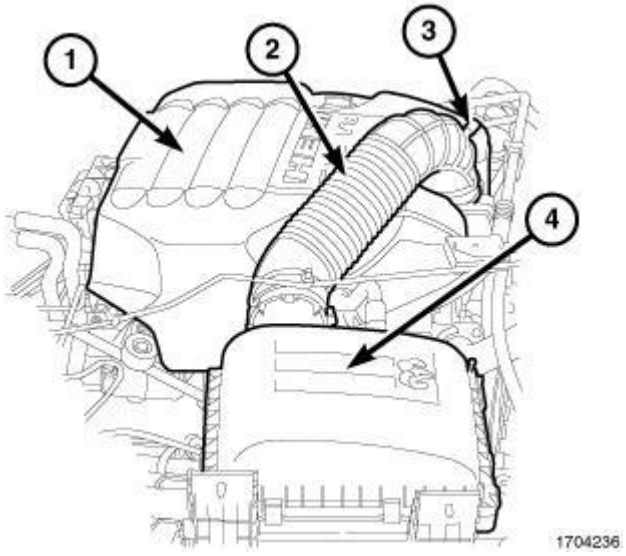


Fig. 96: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Install the engine cover (1).
17. Install the clean air duct (2).
18. Install the air filter body (4). Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.

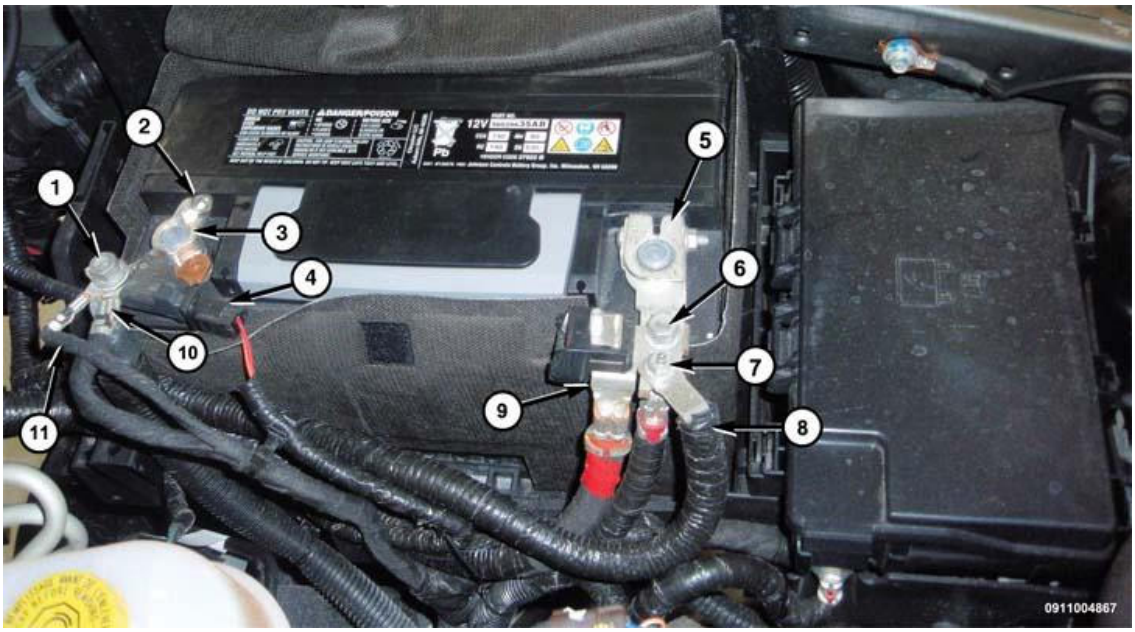


Fig. 97: Installing Battery Cables & Components
Courtesy of CHRYSLER GROUP, LLC

19. Connect the battery negative cables (10, 11). Tighten the nut (1) to the proper specification. Refer to **SPECIFICATIONS** .

RIGHT

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

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

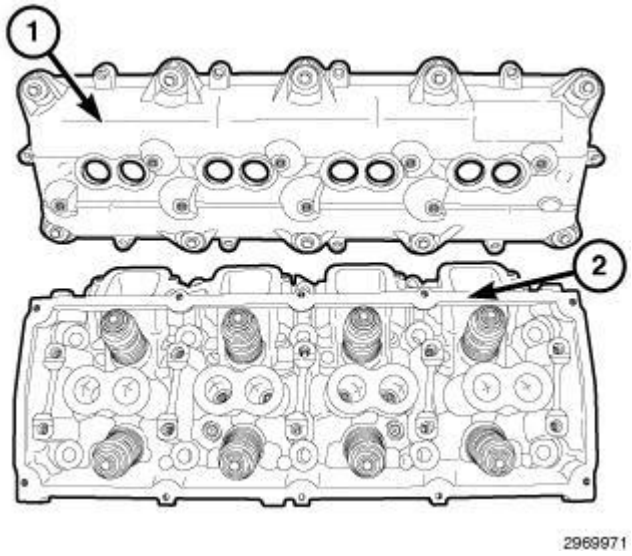


Fig. 98: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

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

1. Clean the cylinder head cover (1) and the sealing surface of the cylinder head (2). Inspect and replace gasket if necessary.
2. Install the cylinder head cover and hand start all fasteners.

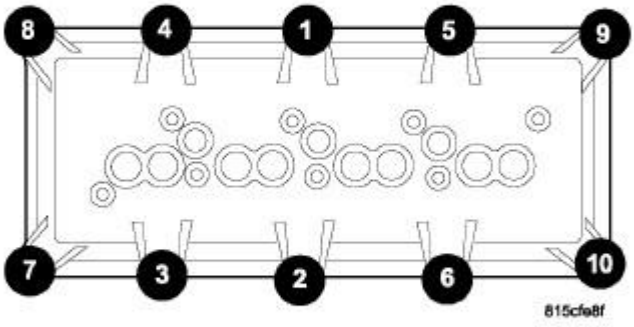


Fig. 99: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

Using the sequence shown in illustration, tighten the cylinder head cover bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS** .

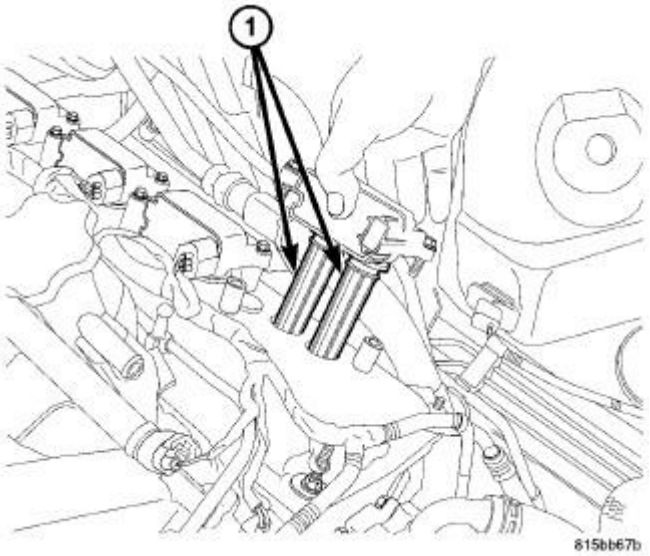


Fig. 100: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

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

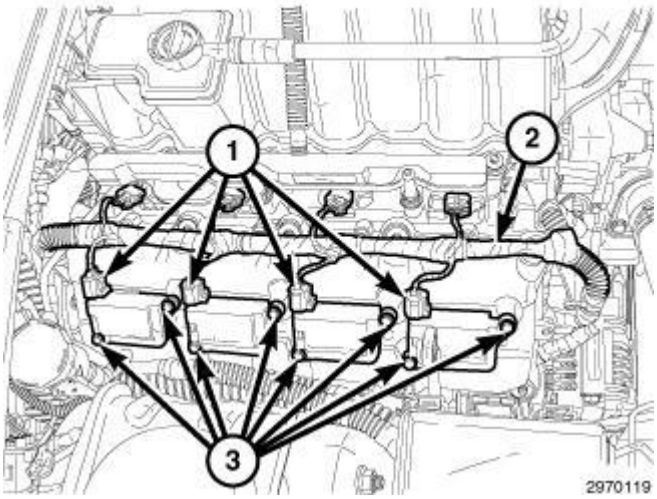


Fig. 101: Ignition Coil Electrical Connectors, Harness & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Tighten the ignition coil retaining bolts (3) to the proper specification. Refer to **SPECIFICATIONS** .
6. Connect the fuel injector harness connectors.

7. Connect the ignition coil harness connectors (1).

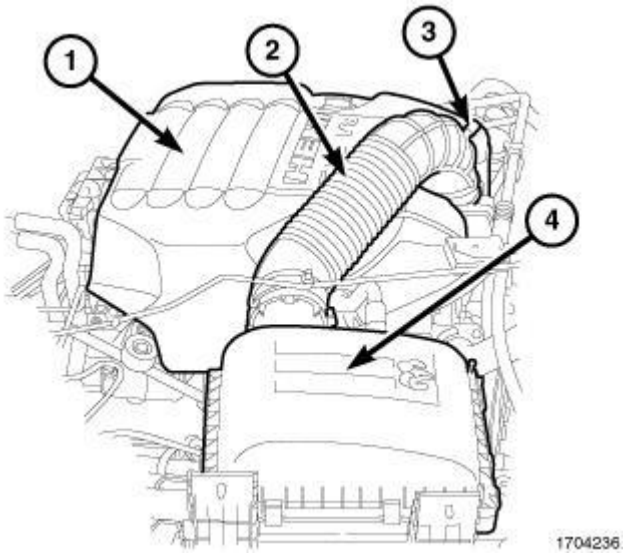


Fig. 102: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

8. Install the engine cover (1).
9. Install the air cleaner body (4). Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
10. Install the clean air duct (2).

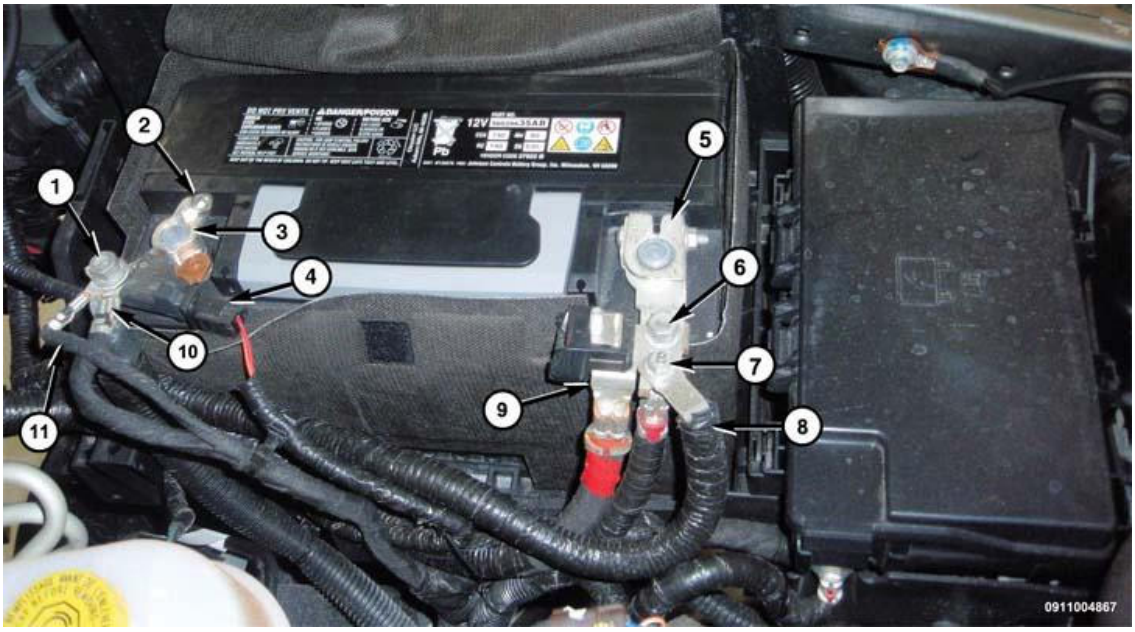


Fig. 103: Installing Battery Cables & Components
Courtesy of CHRYSLER GROUP, LLC

11. Connect the battery negative cables (10, 11). Tighten the nut (1) to the proper specification. Refer to **SPECIFICATIONS** .

ROCKER ARM, VALVE

REMOVAL

REMOVAL

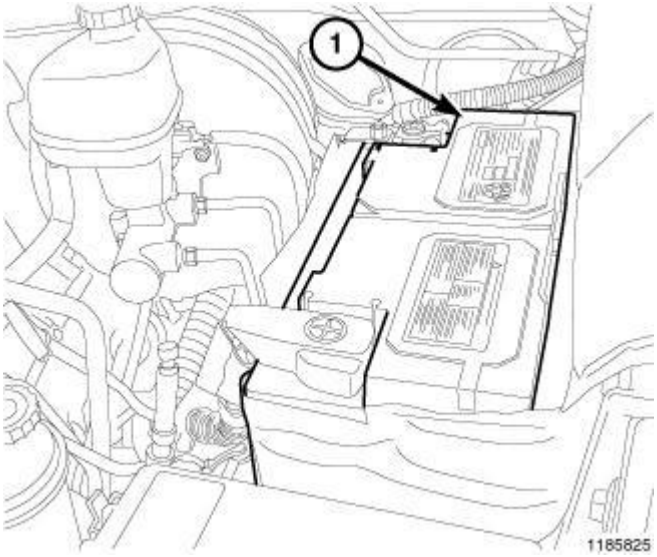


Fig. 104: Battery
Courtesy of CHRYSLER GROUP, LLC

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

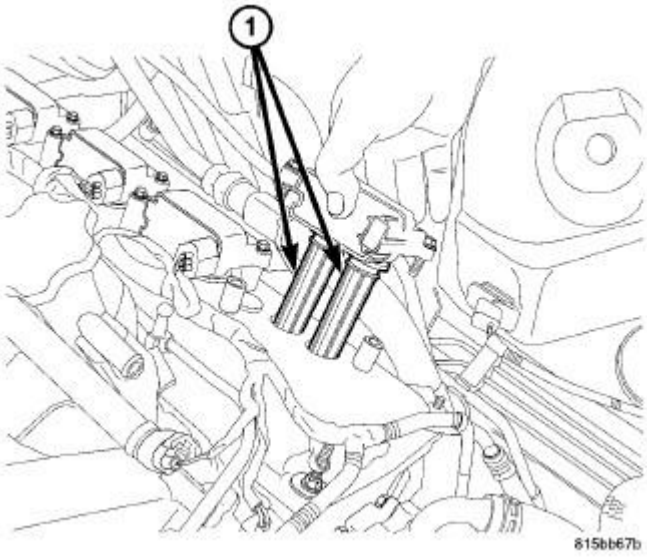


Fig. 105: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

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

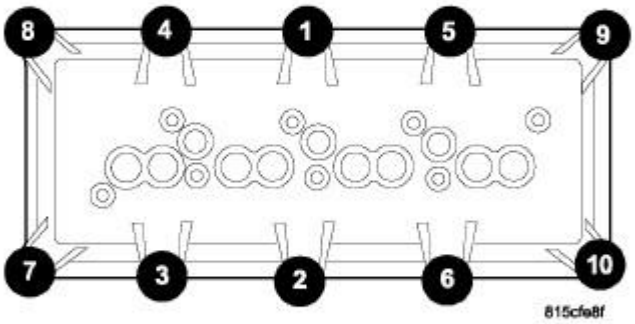


Fig. 106: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

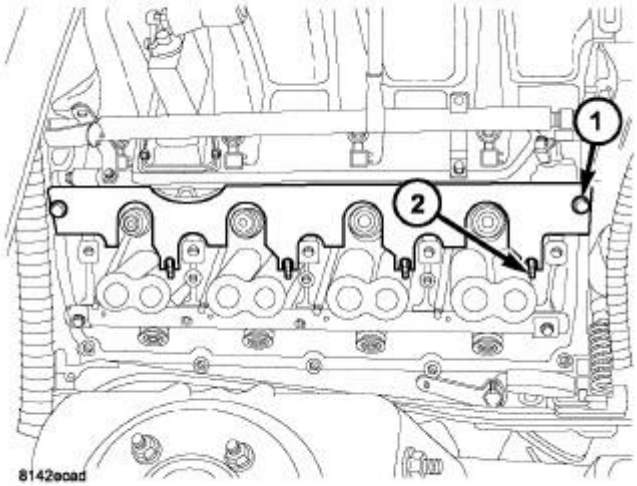


Fig. 107: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

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

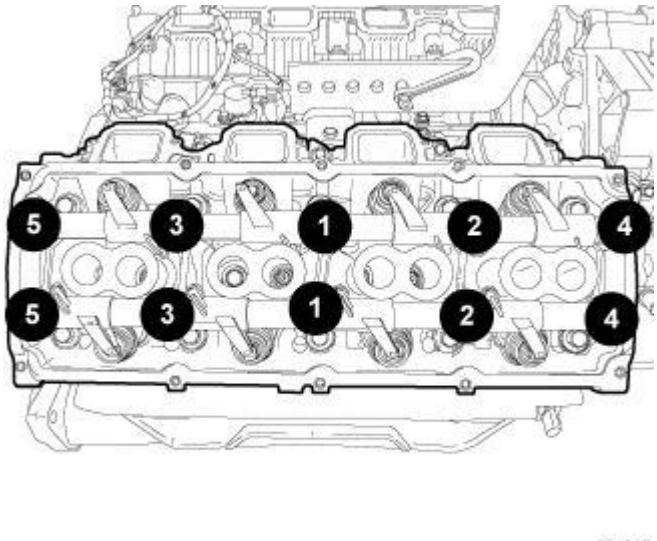


Fig. 108: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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

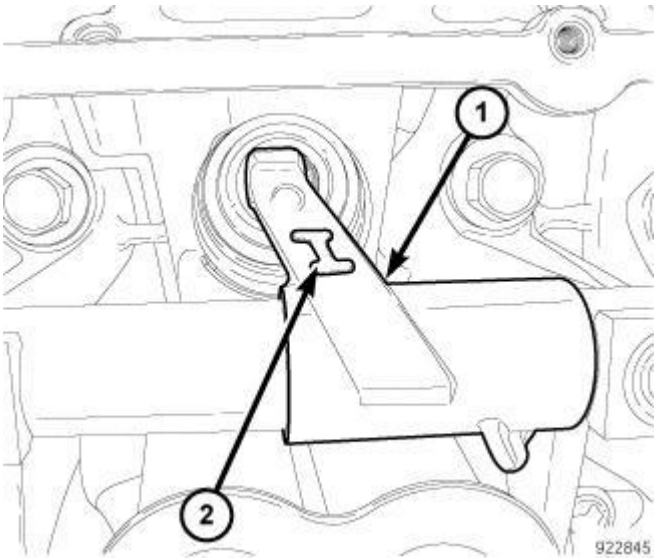


Fig. 109: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

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).

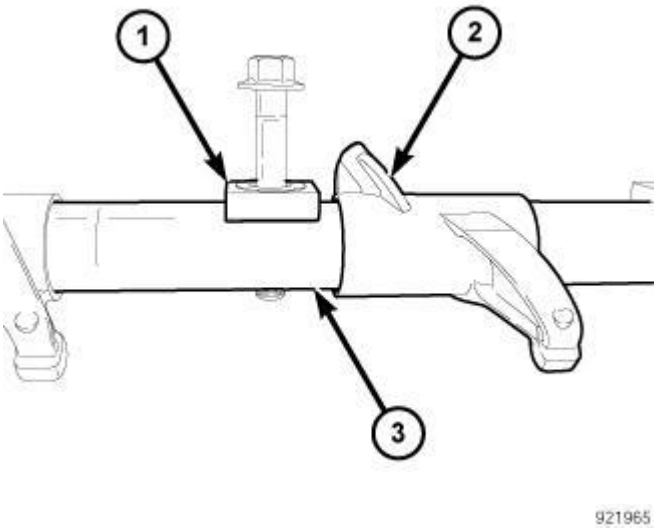


Fig. 110: Rocker Shaft Retainers
Courtesy of CHRYSLER GROUP, LLC

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

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

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

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

INSTALLATION

INSTALLATION

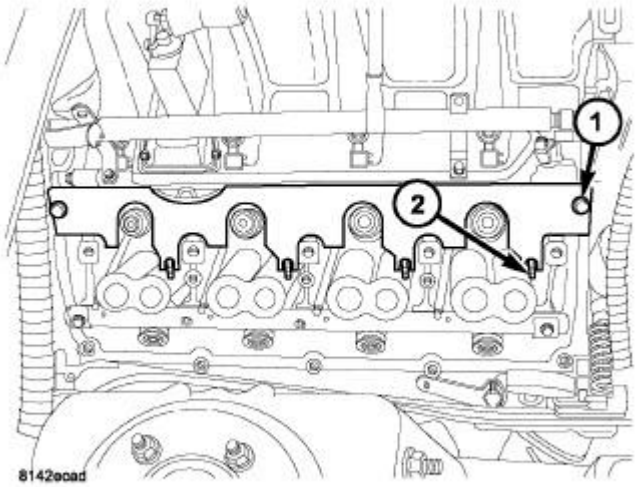


Fig. 111: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

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

1. Install the pushrods in the same order as removed.
2. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

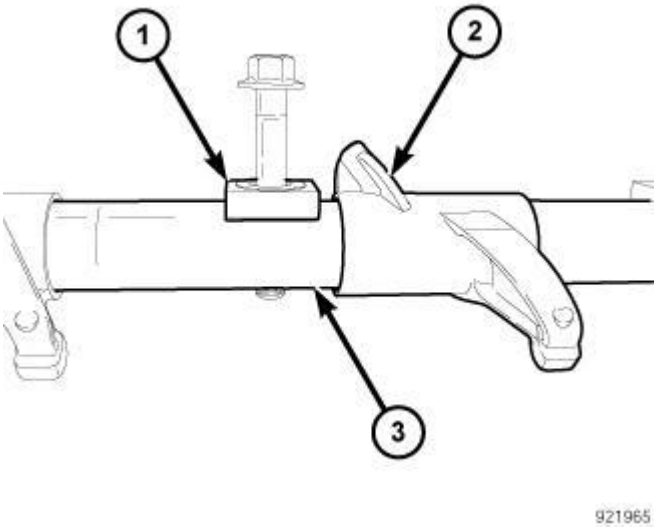


Fig. 112: Rocker Shaft Retainers
Courtesy of CHRYSLER GROUP, LLC

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

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

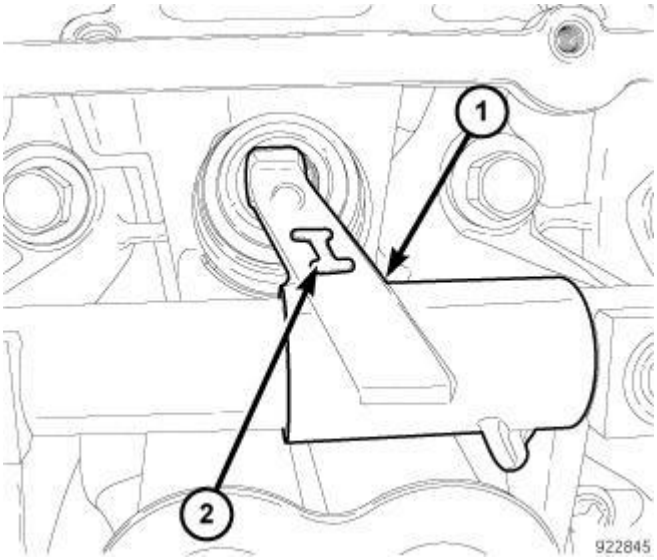


Fig. 113: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

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).

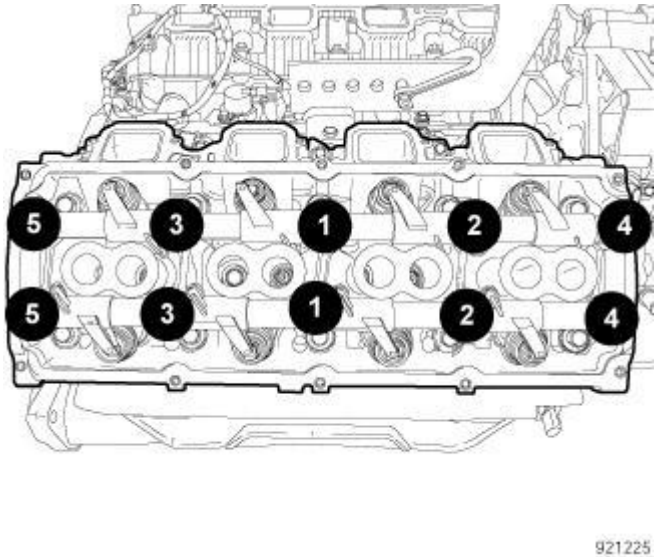


Fig. 114: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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

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

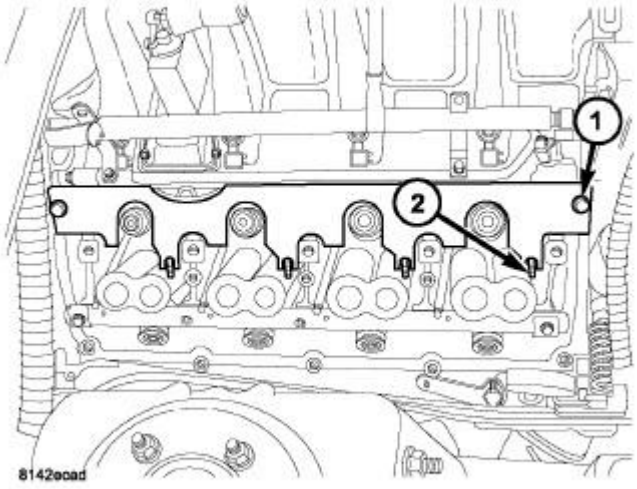


Fig. 115: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

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

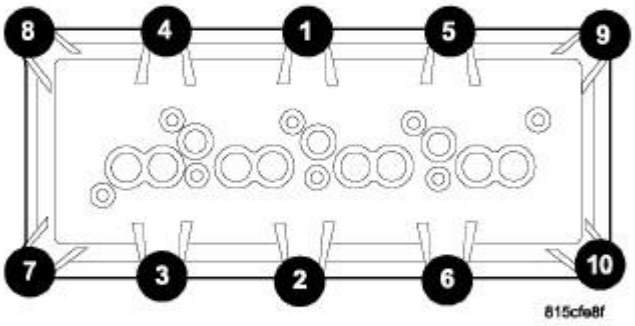


Fig. 116: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

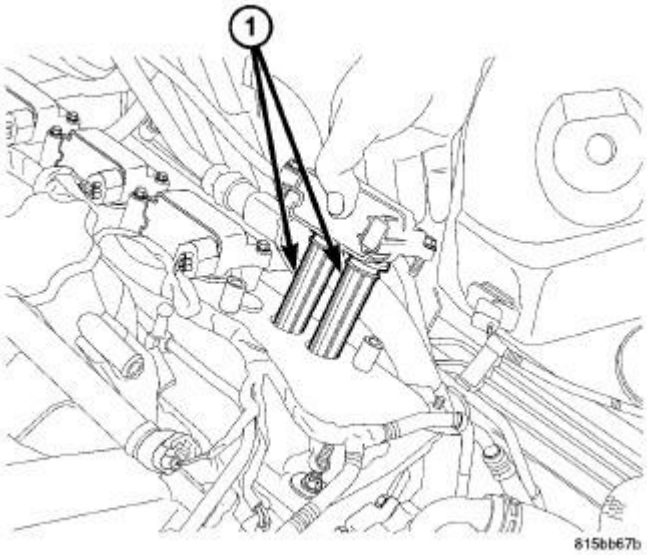


Fig. 117: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

7. Install the ignition coils (1). Refer to **COIL, IGNITION, INSTALLATION** .
8. Install the engine cover.

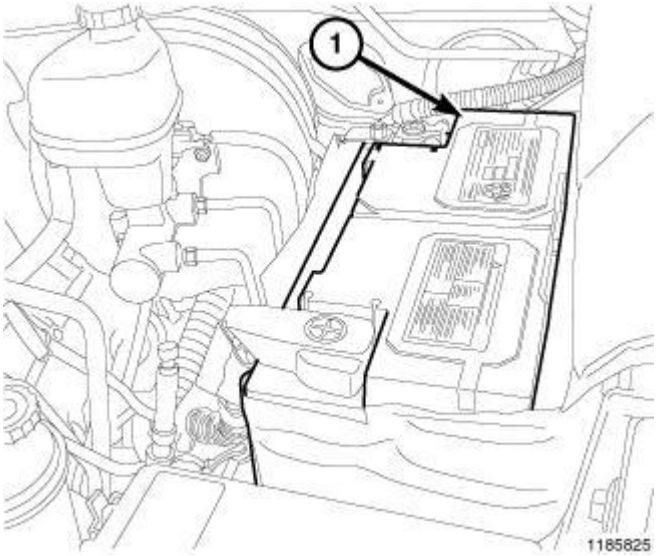


Fig. 118: Battery
Courtesy of CHRYSLER GROUP, LLC

9. Connect the negative battery cable (1).

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

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

REMOVAL

REMOVAL

The valve stem seal is integral with the valve spring seat, for removal. 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

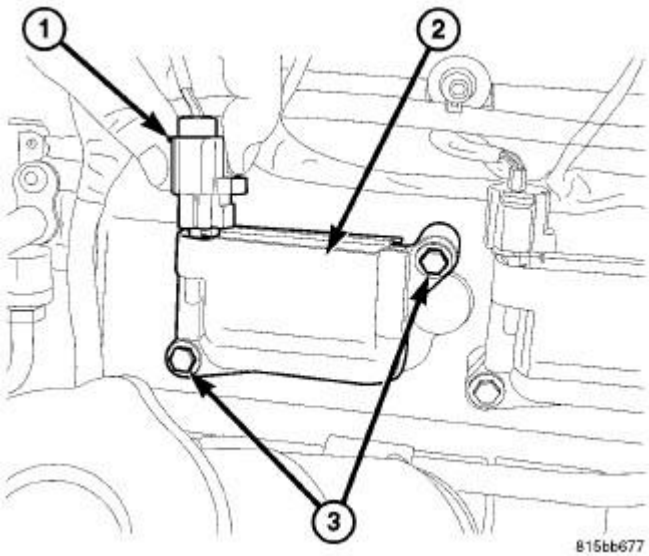


Fig. 119: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly and the air intake resonator. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
3. Remove the ignition coil electrical connectors (1).
4. Remove the ignition coils (2).
5. Remove the spark plugs.

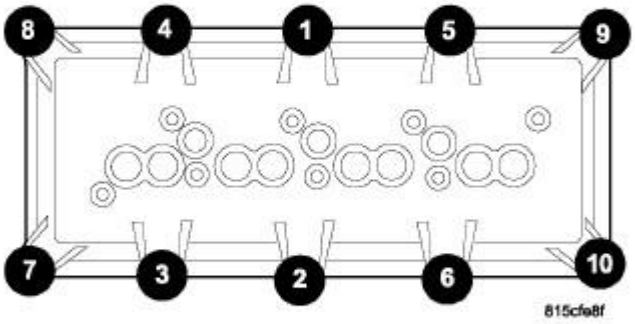


Fig. 120: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

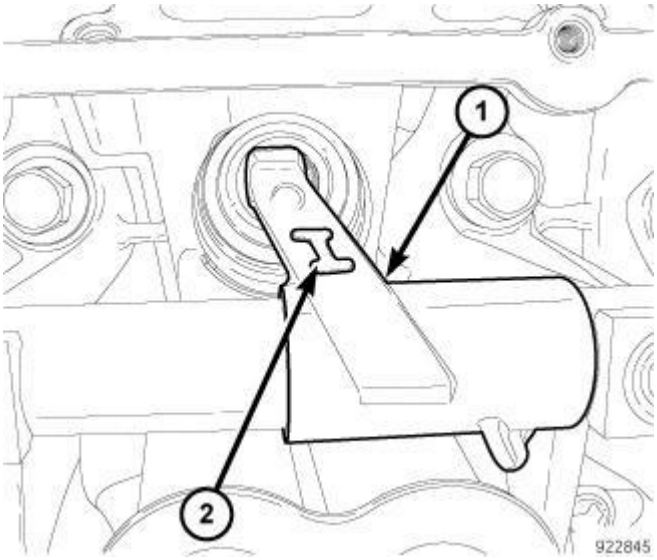


Fig. 121: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

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).

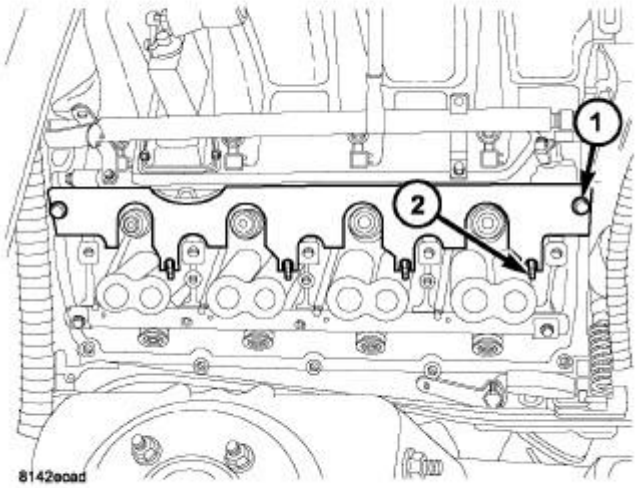


Fig. 122: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

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

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

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

NOTE: If removing the intake valve spring, install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

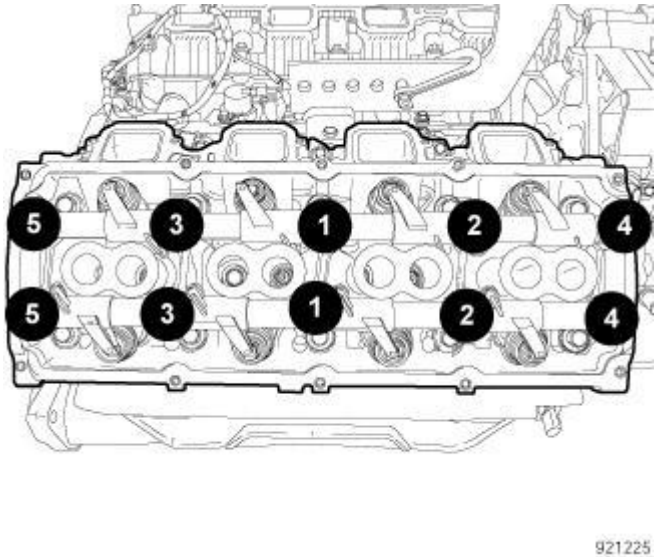


Fig. 123: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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

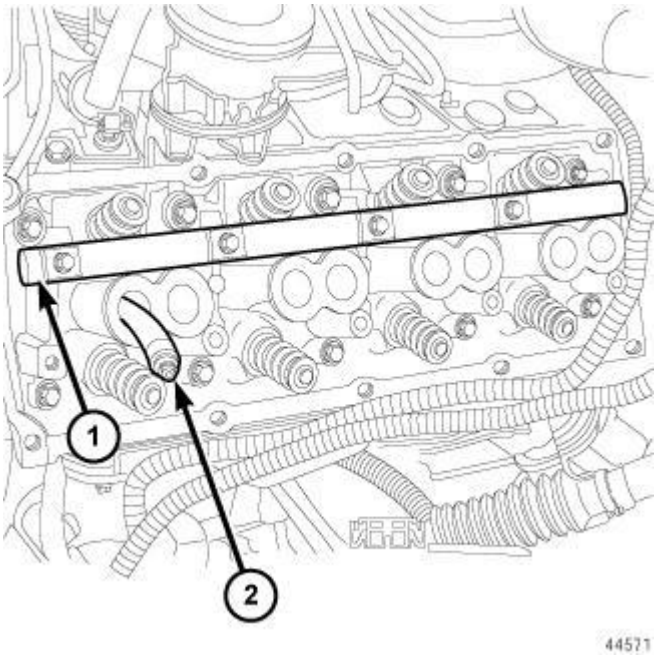


Fig. 124: Rocker Shaft
Courtesy of CHRYSLER GROUP, LLC

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

8. Install the rocker arm valve spring compressor shaft (special tool #9065C, Compressor, Valve Spring) (1).

9. Install the spring compressor adapter arm (special tool #9065C, Compressor, Valve Spring) if needed.
10. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

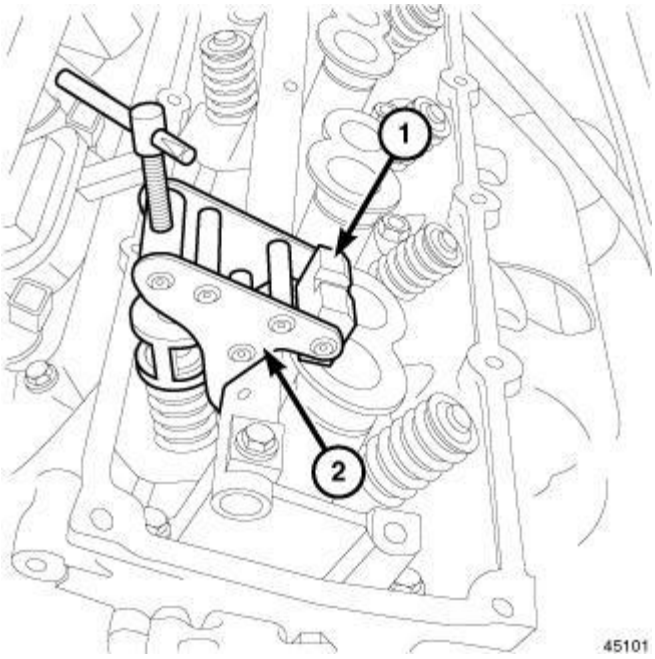


Fig. 125: Intake Valve Spring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: A fulcrum assembly (1) must be rotated to the appropriate setting as marked on the tool for proper valve spring alignment.

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

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

NOTE: All valve springs and seals are removed in the same manner and are interchangeable between intake and exhaust.

13. Remove the valve seal.

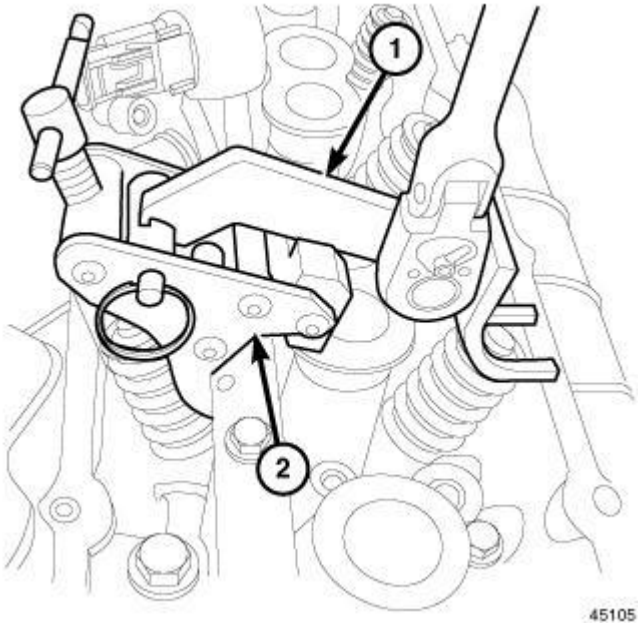


Fig. 126: Valve Spring Tool Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: When the exhaust spring, seal or valve needs servicing. The exhaust adapter arm (1) must be installed to the spring compressor clamp (3).

14. Install tool (special tool #9065C, Compressor, Valve Spring), exhaust adapter arm (1) to the spring compressor (3) for servicing the exhaust side.

INSTALLATION

INSTALLATION

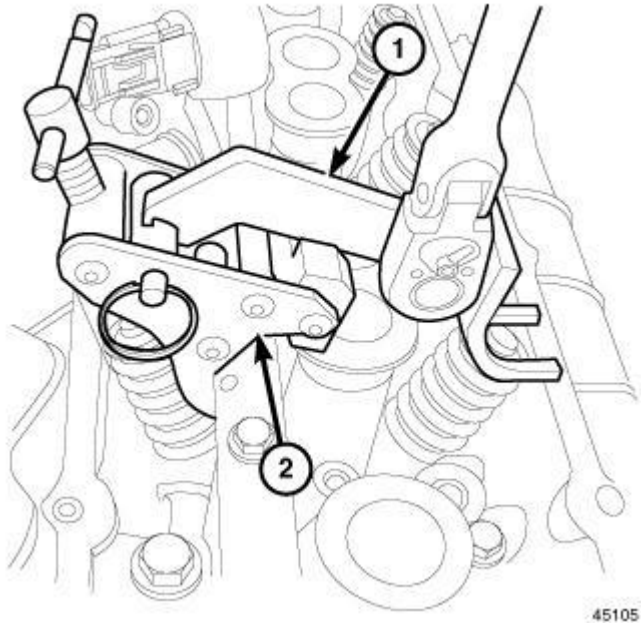


Fig. 127: Valve Spring Tool Adapter
Courtesy of CHRYSLER GROUP, LLC

1. Install the valve seal.
2. Install the valve spring.
3. Using the valve spring compressor (special tool #9065C, Compressor, Valve Spring) (1), compress the valve spring and install the valve spring retainer and locks.
4. Remove the exhaust extension arm (1).

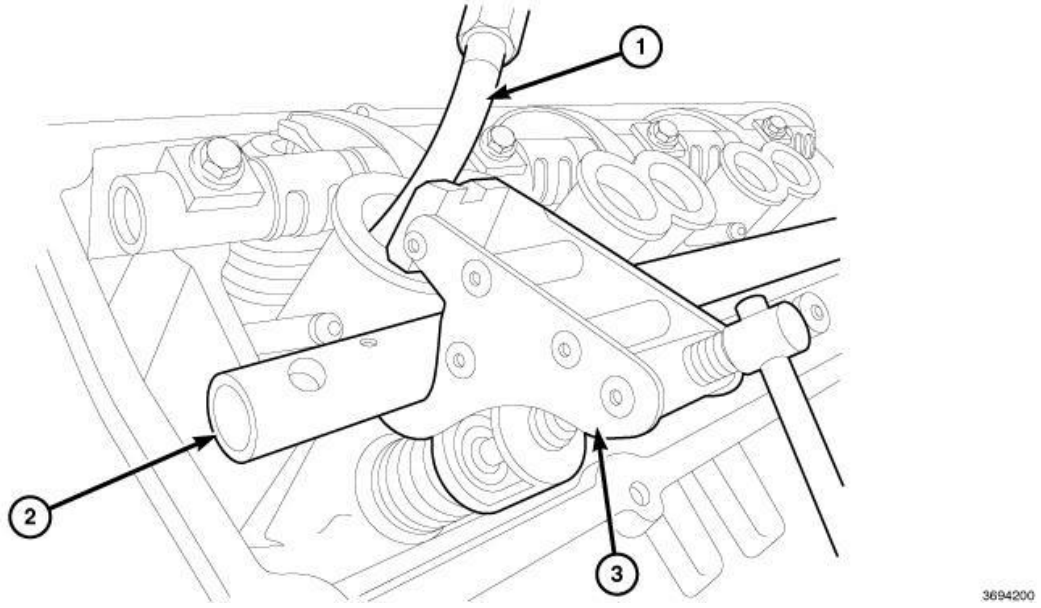


Fig. 128: Valve Spring Compressor
Courtesy of CHRYSLER GROUP, LLC

5. Remove the spring compressor (3).
6. Remove the air hose from the spark plug hole.

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

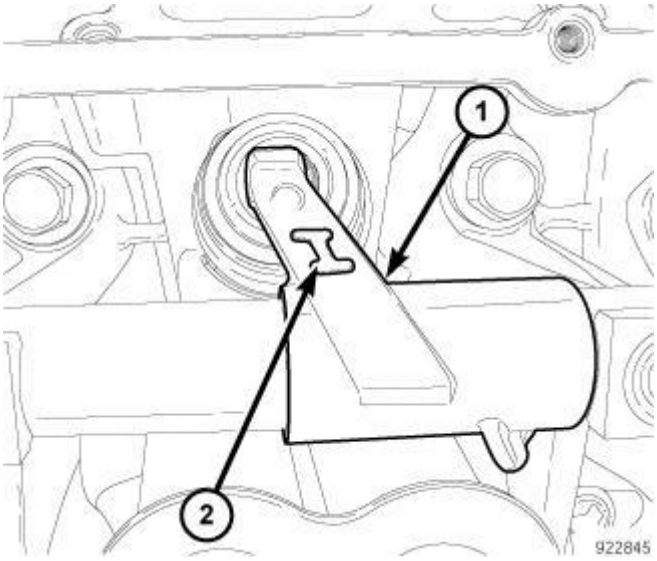


Fig. 129: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

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).

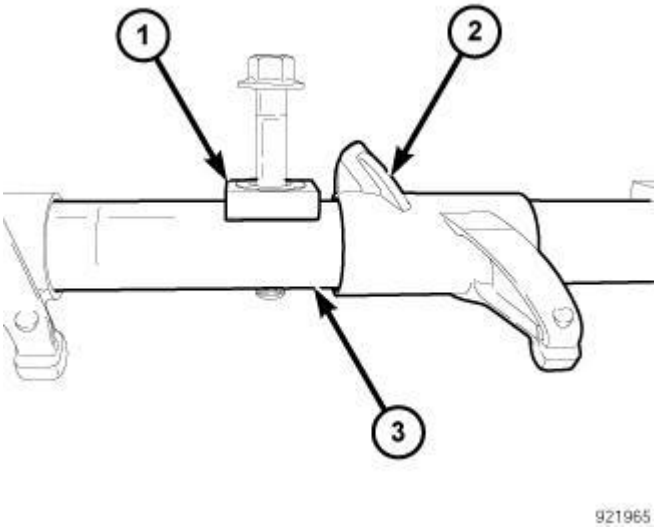


Fig. 130: Rocker Shaft Retainers
Courtesy of CHRYSLER GROUP, LLC

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

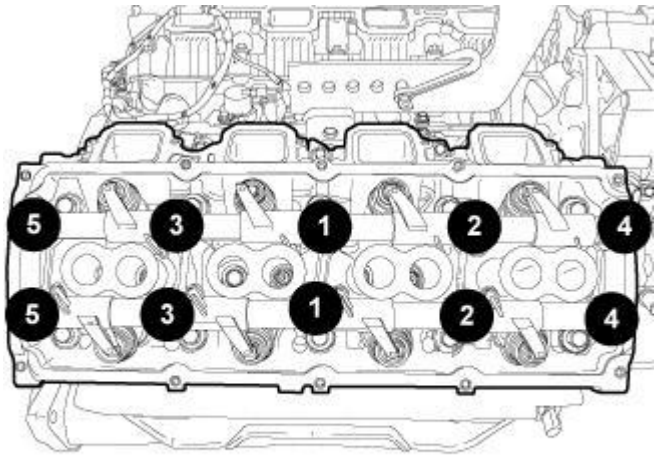


Fig. 131: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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

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

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

7. Install the rocker arm shaft and pushrods. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.
8. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

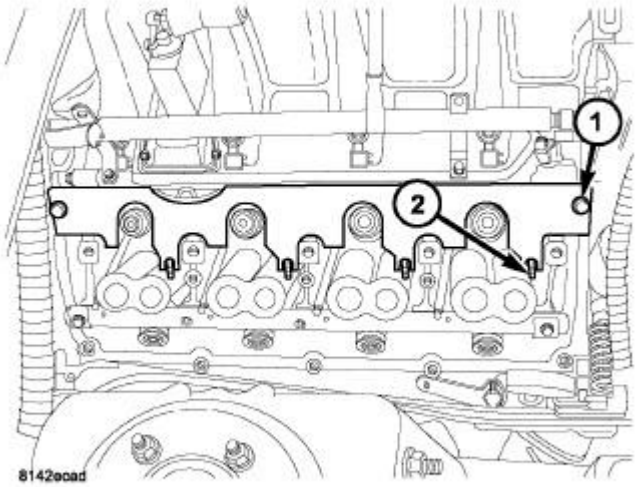


Fig. 132: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

9. If used, remove the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

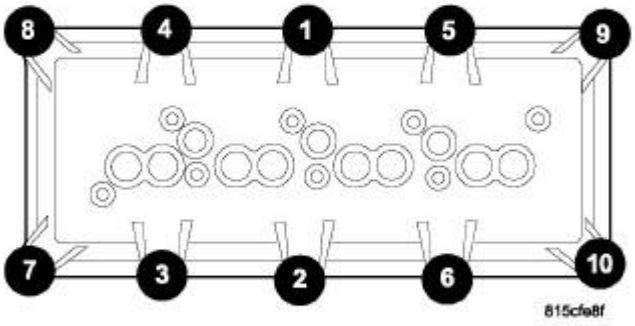


Fig. 133: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

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

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

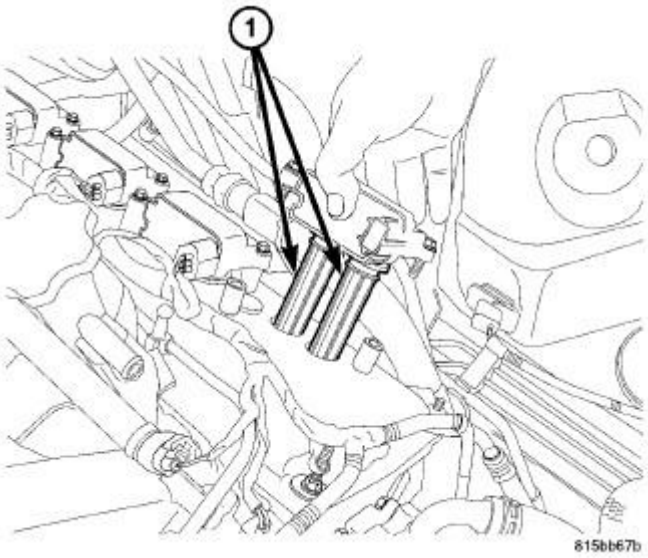


Fig. 134: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

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

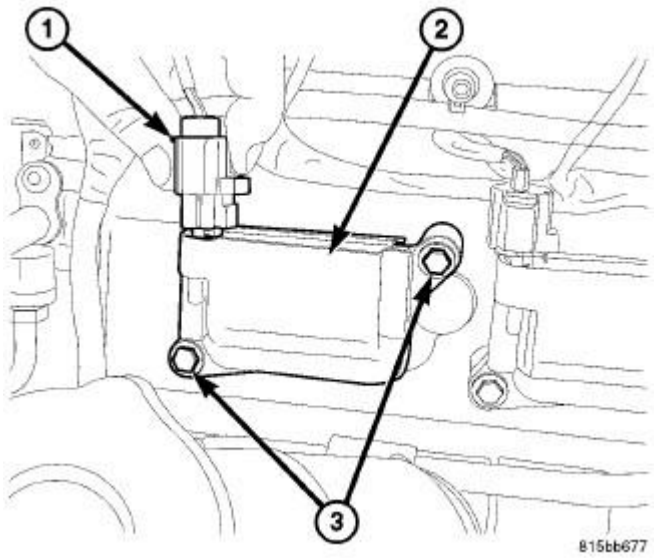


Fig. 135: Ignition Coil Mounting Bolts - 5.7L/6.1L
Courtesy of CHRYSLER GROUP, LLC

15. Install the ignition coil (2) on the plugs and tighten the fasteners (3) to 7 N.m (62 in. lbs).
16. Connect the ignition coil electrical connectors (1).
17. Install the air intake resonator and the air cleaner assembly. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
18. Connect the negative battery cable.

VALVES, INTAKE AND EXHAUST

DESCRIPTION

VALVE GUIDES

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

VALVES

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

STANDARD PROCEDURE

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

1. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.
2. Compress valve springs using Valve Spring Compressor Tool (special tool #C-3422-D, Compressor, Valve Spring) and Adapter (special tool #8464, Adapter, Valve Spring).
3. Remove valve retaining locks, valve spring retainers, valve stem seals and valve springs.
4. Before removing valves, remove any burrs from valve stem lock grooves to prevent damage to the valve guides. Identify valves to ensure installation in original location.

INSTALLATION

INSTALLATION

1. Clean valves thoroughly. Discard burned, warped and cracked valves.
2. Remove the carbon and varnish deposits from the inside of the valve guides with a reliable guide cleaner.
3. Measure the valve stems for wear. If the 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 ground, check the valve stem height. If the valve stem is too long, replace the cylinder head.
6. Install new seals on all valve guides. Install the valve springs and valve retainers.
7. Compress the valve springs with the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) and Valve Spring 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 the spring seat in the cylinder head to the bottom surface of the spring retainer.
8. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.

ENGINE BLOCK

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

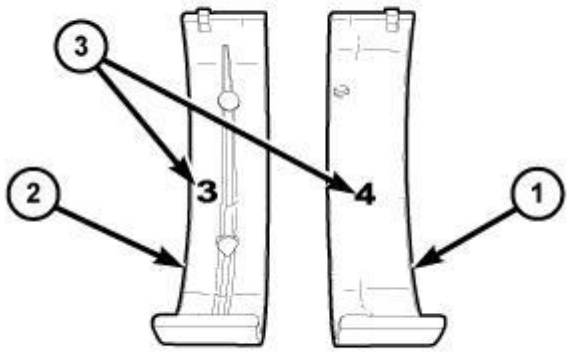


Fig. 136: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

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.

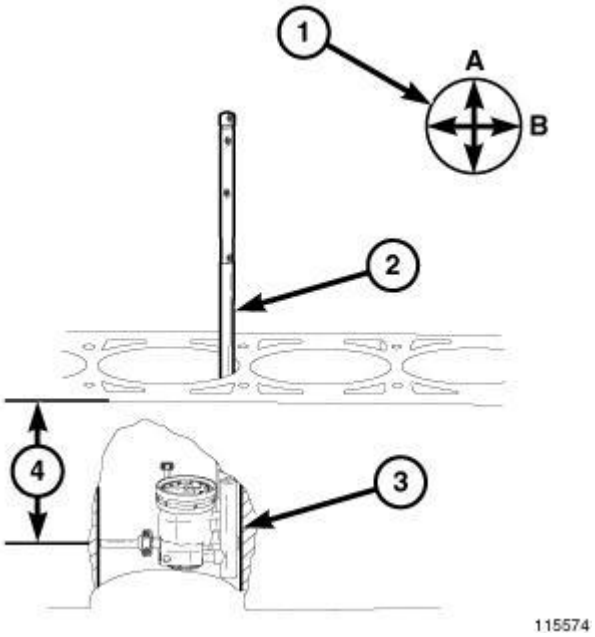


Fig. 137: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

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, 5.7L

DESCRIPTION

DESCRIPTION

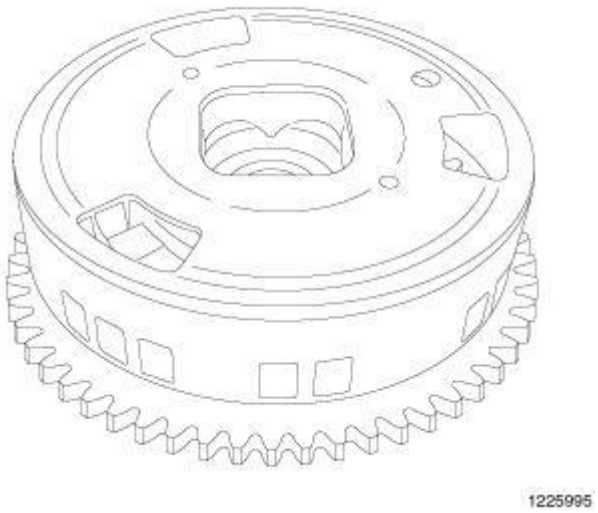


Fig. 138: Variable Cam Timing (Vct)
Courtesy of CHRYSLER GROUP, LLC

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

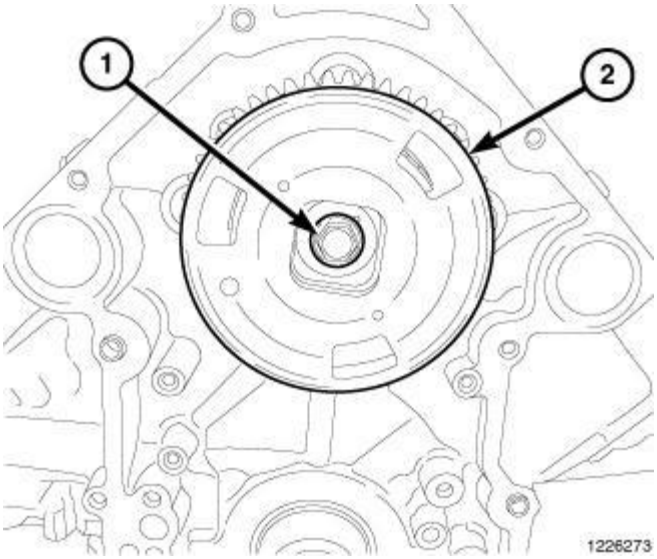


Fig. 139: Camshaft Phaser & Bolt
Courtesy of CHRYSLER GROUP, LLC

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

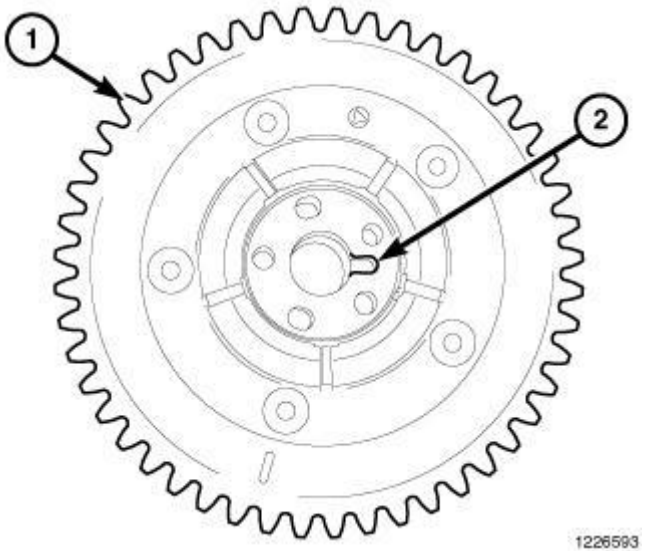


Fig. 140: Phaser Alignment Slot
Courtesy of CHRYSLER GROUP, LLC

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

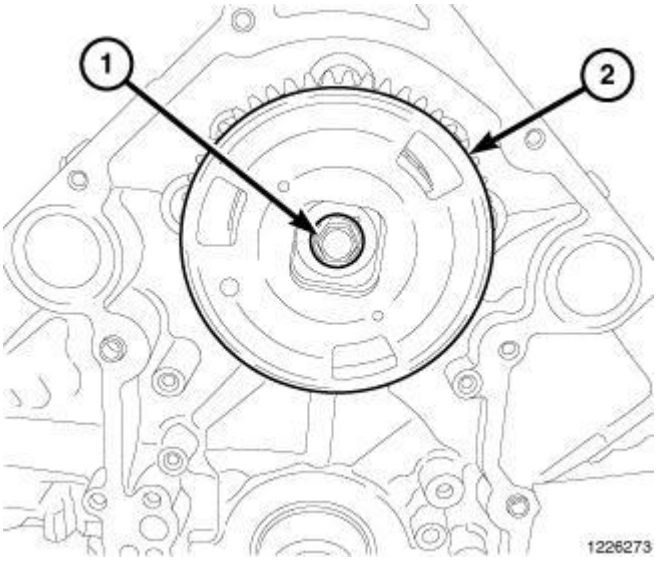


Fig. 141: Camshaft Phaser & Bolt
Courtesy of CHRYSLER GROUP, LLC

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)

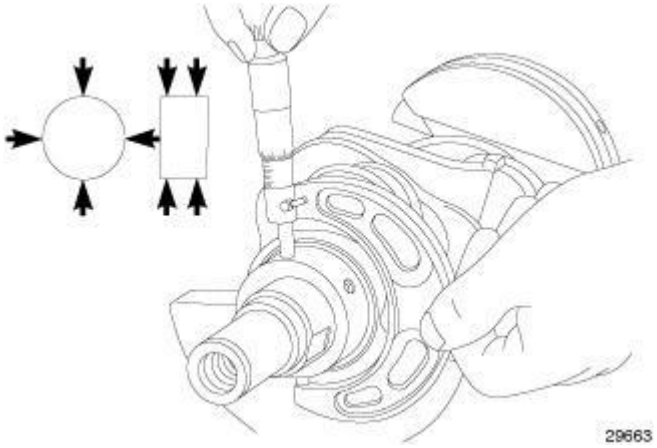


Fig. 142: Crankshaft Journal Measurements - Typical
Courtesy of CHRYSLER GROUP, LLC

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 0.008mm (0.0004 inch.) and maximum out of round is 0.005mm (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

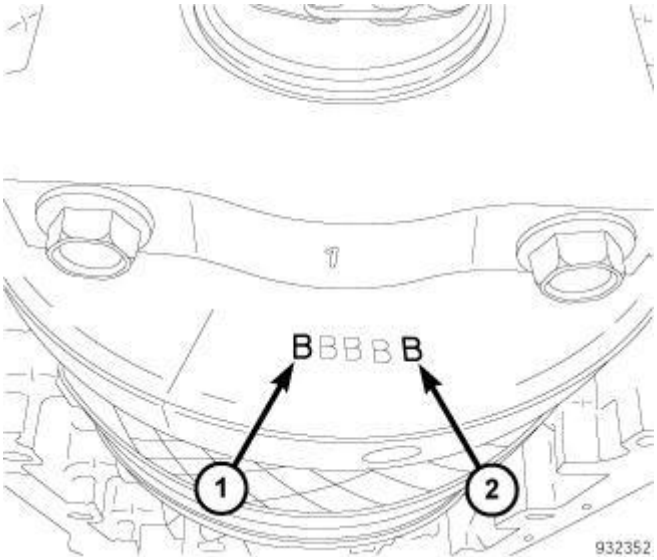


Fig. 143: Crankshaft Counterweight Stamped Grade Identification Marks
Courtesy of CHRYSLER GROUP, LLC

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 - 2.5588in.
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

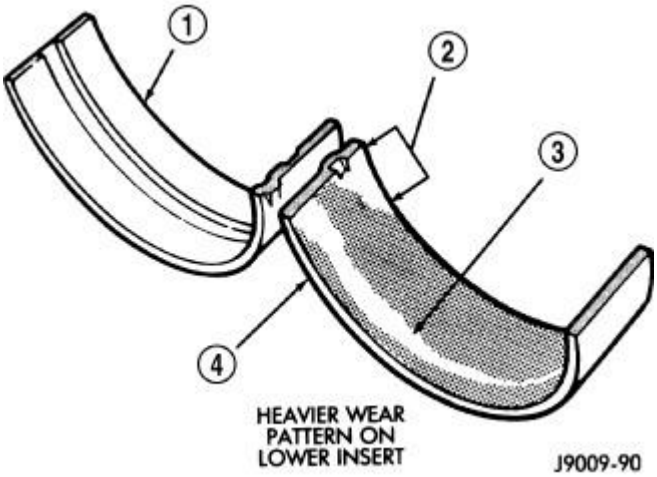


Fig. 144: Main Bearing Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

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

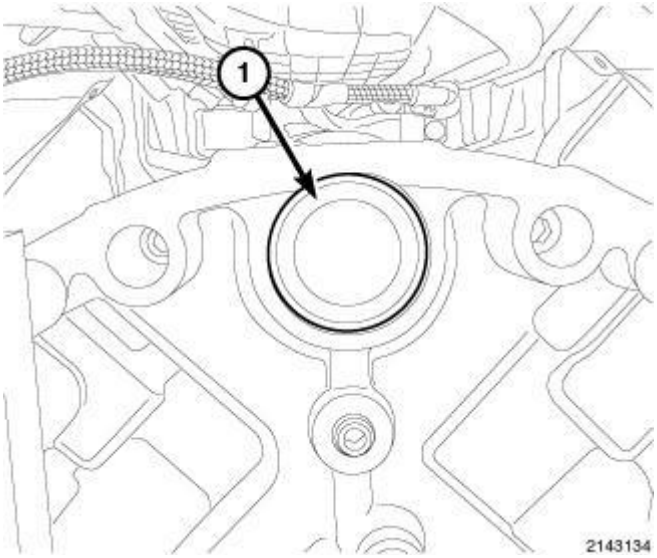


Fig. 145: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Remove the engine from the vehicle. Refer to **REMOVAL, 5.7L**.
3. Remove the flexplate. Refer to **FLEXPLATE, REMOVAL, 5.7L**.

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

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

CAMSHAFT

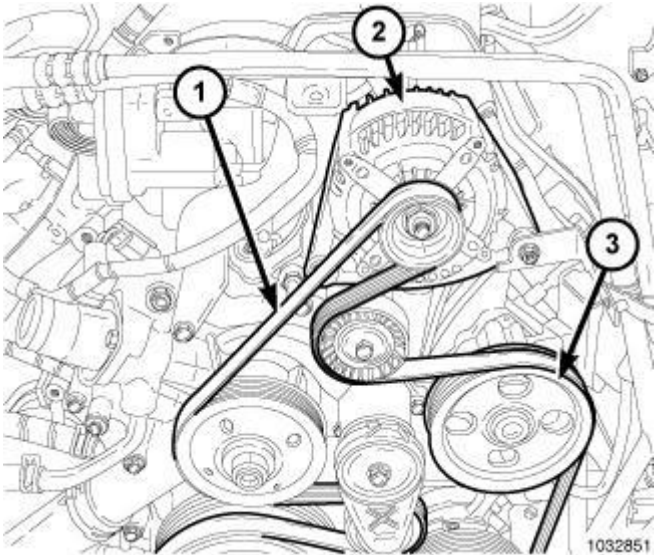


Fig. 146: Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the battery negative cable.
2. Remove the air cleaner assembly. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
3. Drain coolant. Refer to **STANDARD PROCEDURE** .
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. Remove the left and right cylinder heads. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.
6. Remove the radiator. Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .
7. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
8. Remove timing case cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.

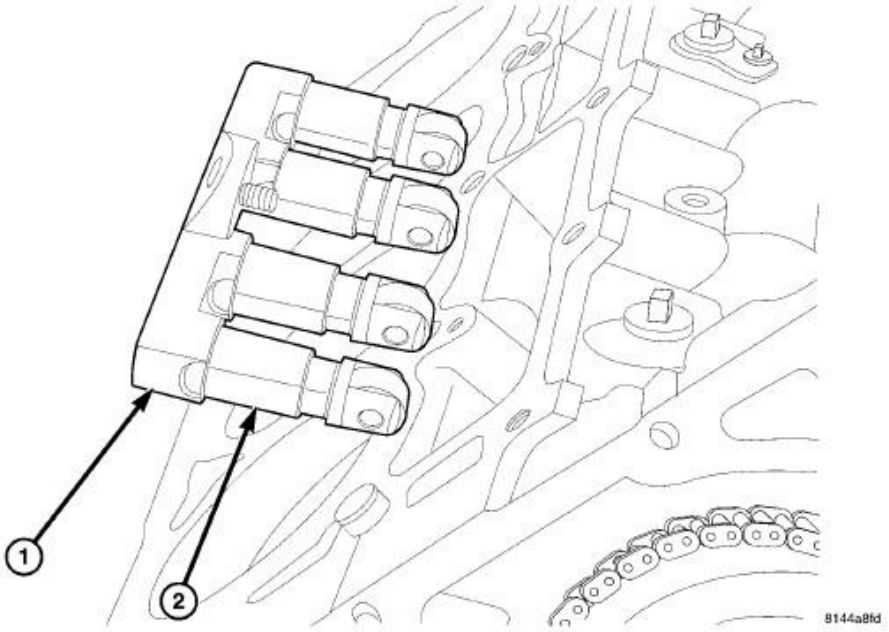


Fig. 147: Remove/Install Hydraulic Roller Tappet
Courtesy of CHRYSLER GROUP, LLC

NOTE: Identify lifters to ensure installation in original location.

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

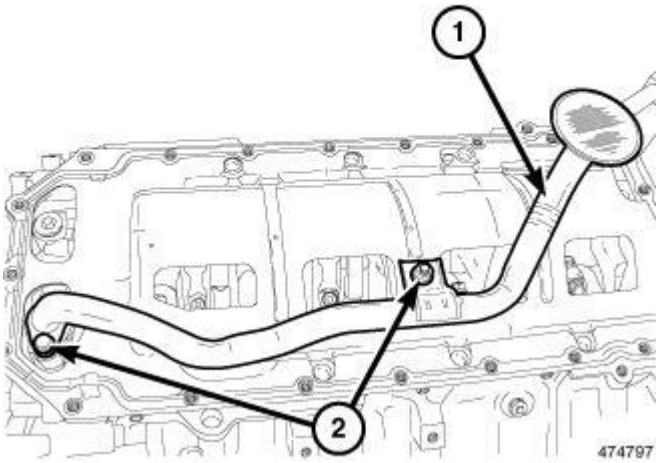


Fig. 148: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

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

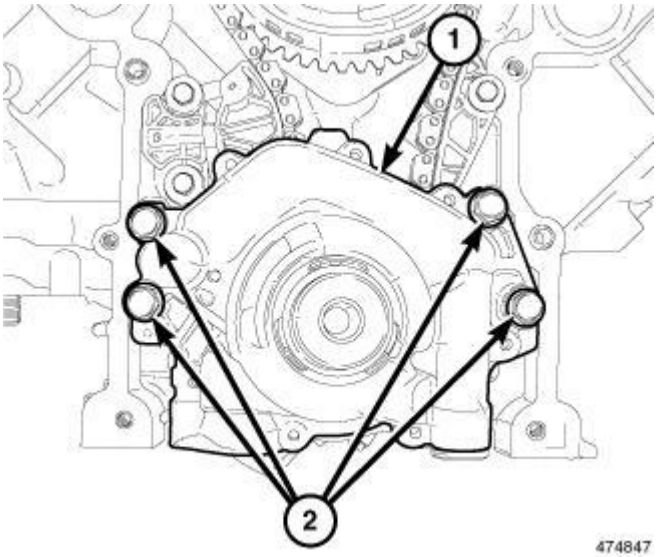


Fig. 149: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

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

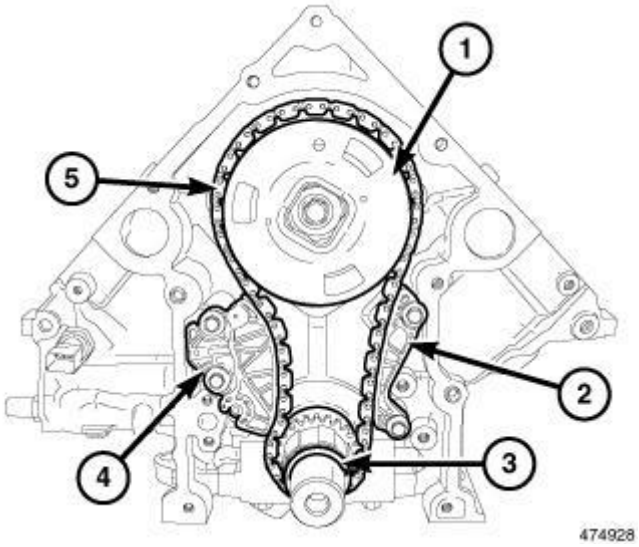


Fig. 150: Timing Chain
Courtesy of CHRYSLER GROUP, LLC

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

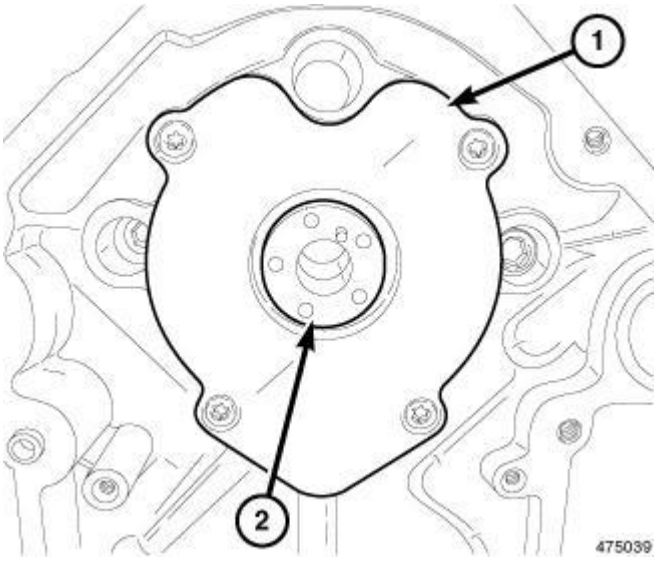


Fig. 151: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

13. Remove camshaft thrust plate (1).

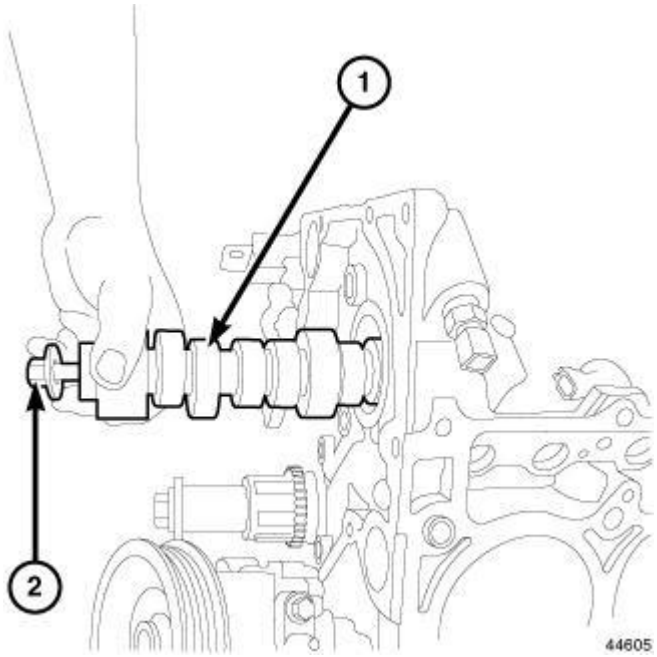


Fig. 152: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: Slowly rotate the camshaft while pulling camshaft out.

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

INSPECTION

INSPECTION

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

INSTALLATION

CAMSHAFT CORE HOLE PLUG

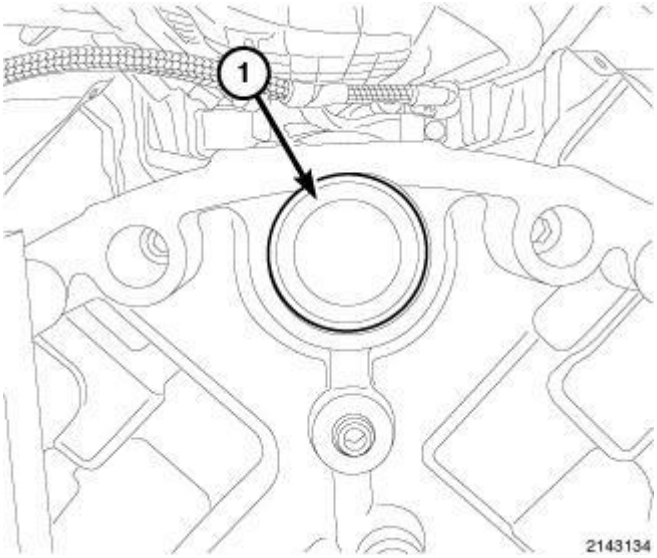


Fig. 153: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

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

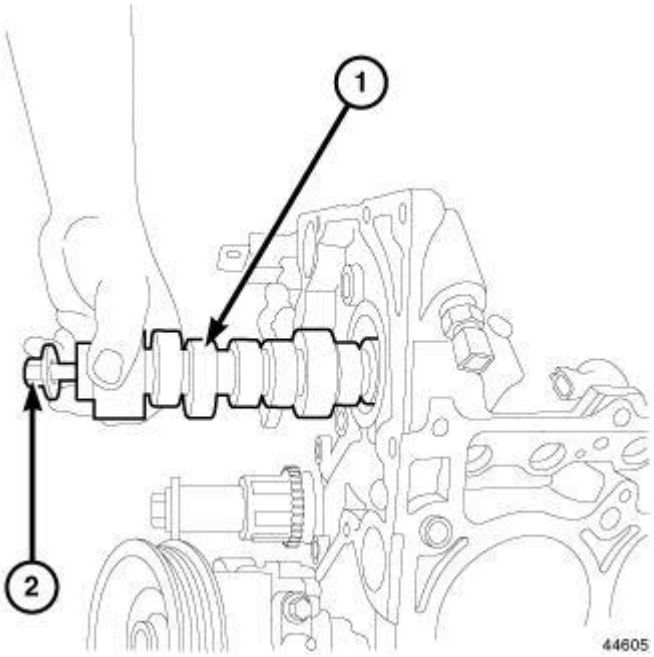


Fig. 154: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

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

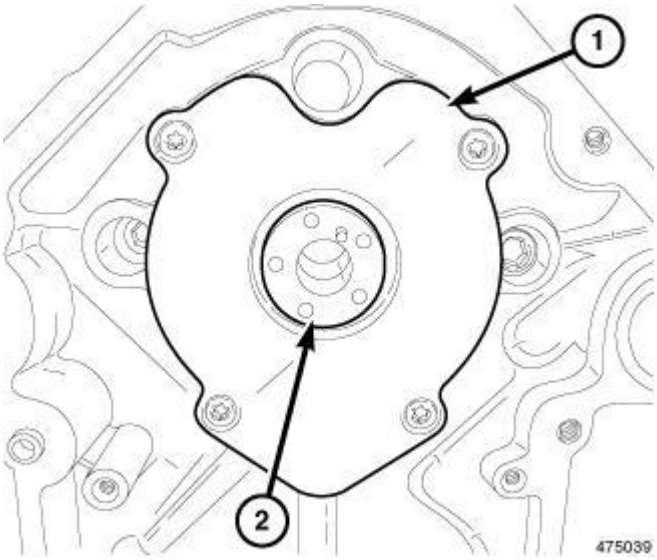


Fig. 155: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

NOTE: Ensure that the plate is installed on the correct side. The fasteners are flat head fasteners so the top of the head of the fastener should not stick above the front face of the plate after they are torqued. The plate has chamfered fastener holes and the chamfered side should be facing forward to ensure the fasteners are flush or below the front surface.

2. Install the camshaft thrust plate (1).

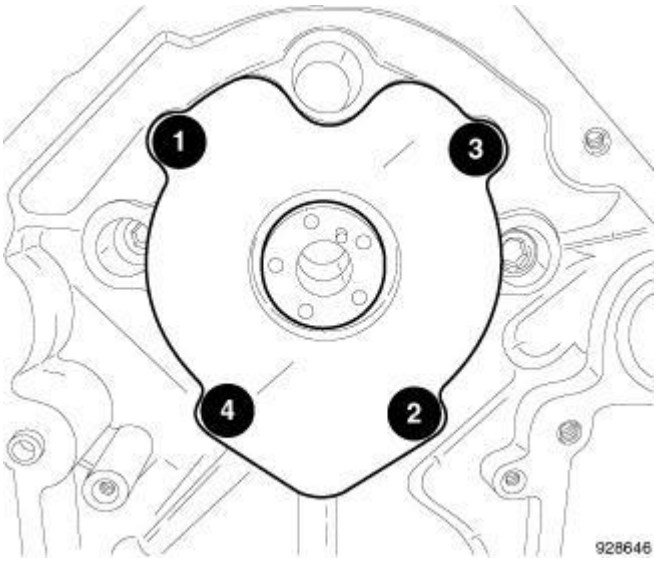


Fig. 156: Camshaft Thrust Plate Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, tighten the bolts to 12 N.m (9 ft. lbs.).

NOTE: The camshaft phaser must be installed before the camshaft end play can be measured.

4. Measure camshaft end play. Refer to **SPECIFICATIONS** .
5. If not within limits, disassemble, clean, and inspect for burrs or debris. Reassemble and measure end play again. If the end play is still out, then install a new thrust plate.

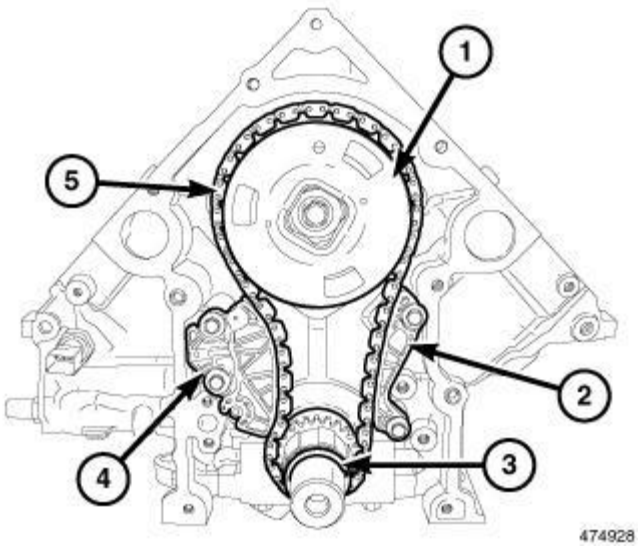


Fig. 157: Timing Chain

Courtesy of CHRYSLER GROUP, LLC

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

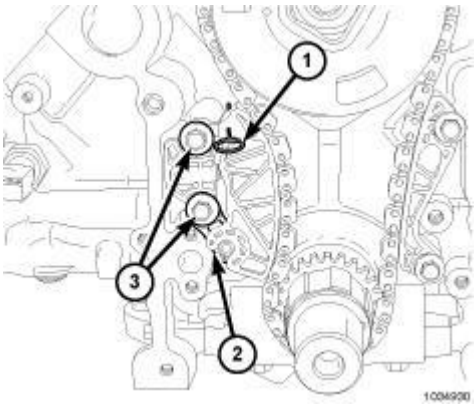


Fig. 158: Timing Chain Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

8. Remove the tensioner pin (special tool #8514, Pins, Tensioner) (1).

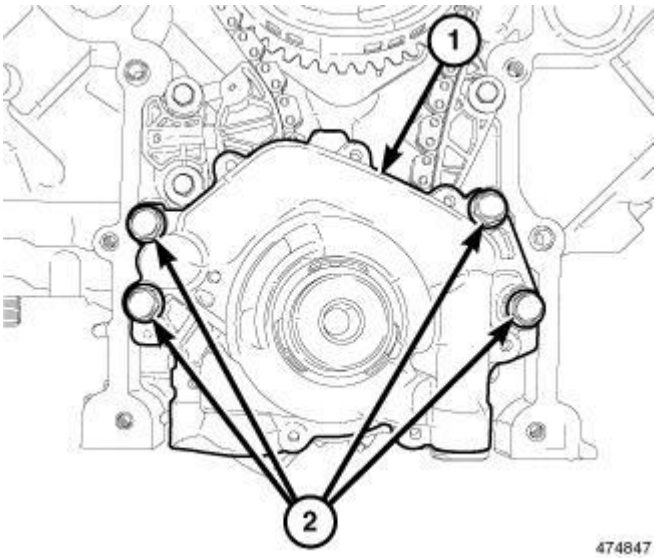


Fig. 159: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the oil pump (1) and tighten bolts to 28 N.m (21 ft. lbs.). Refer to **PUMP, ENGINE OIL, INSTALLATION, 5.7L**.

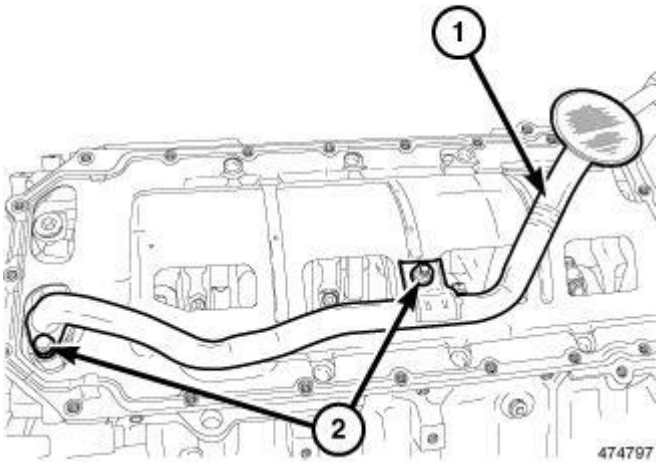


Fig. 160: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

10. Inspect the oil pick up tube O-rings and replace as necessary.
11. Install the oil pick up tube (1) and tighten fasteners (2) to 28 N.m (21 ft. lbs.).
12. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
13. 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: Each tappet reused must be installed in the same position from which it was removed. When camshaft is replaced, all of the tappets must be replaced.

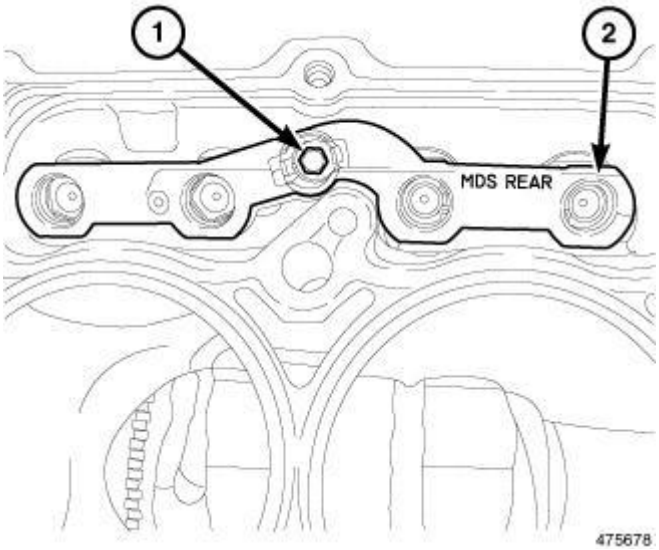


Fig. 161: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

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

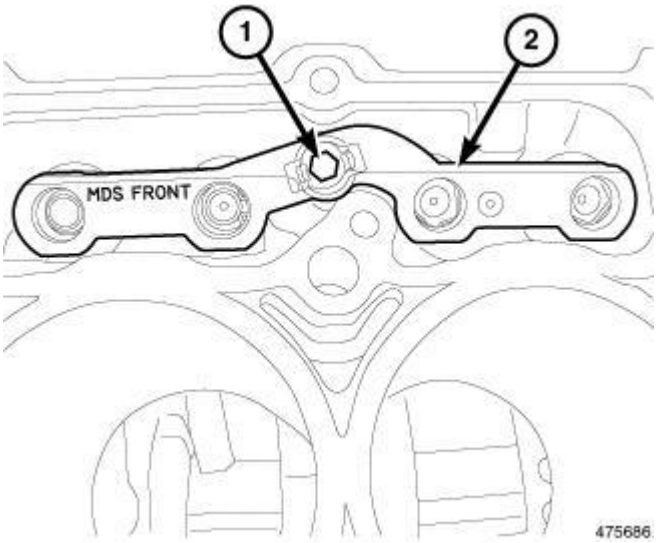


Fig. 162: Front MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

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

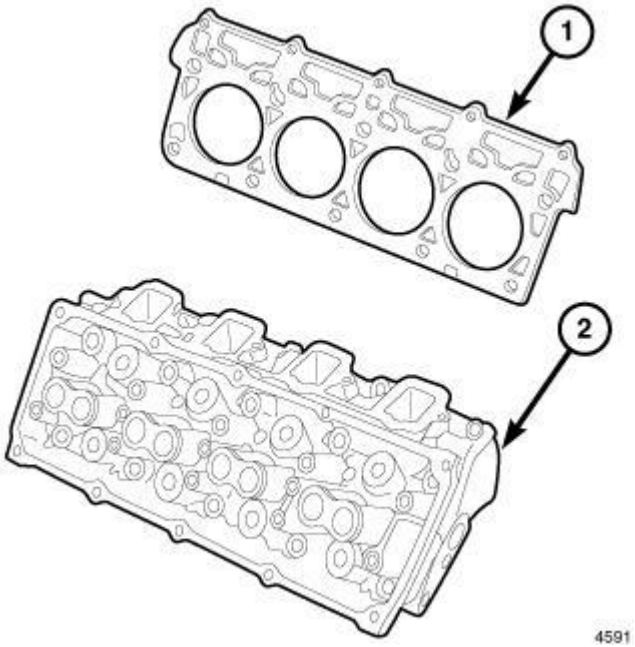


Fig. 163: 5.7L/6.1L Cylinder Head Components
Courtesy of CHRYSLER GROUP, LLC

16. Install both the left and right cylinder heads (4). Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.
17. Install pushrods.
18. Install rocker arms. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.

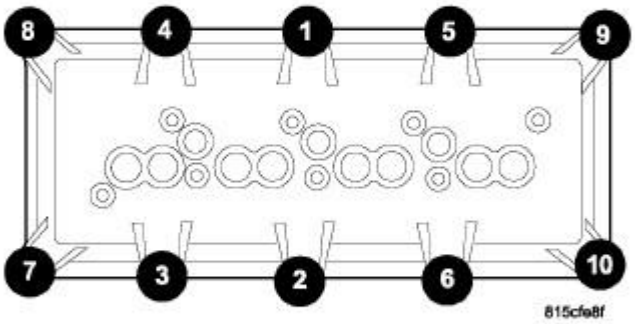


Fig. 164: 5.7L/6.1L Cover Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

19. Install cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

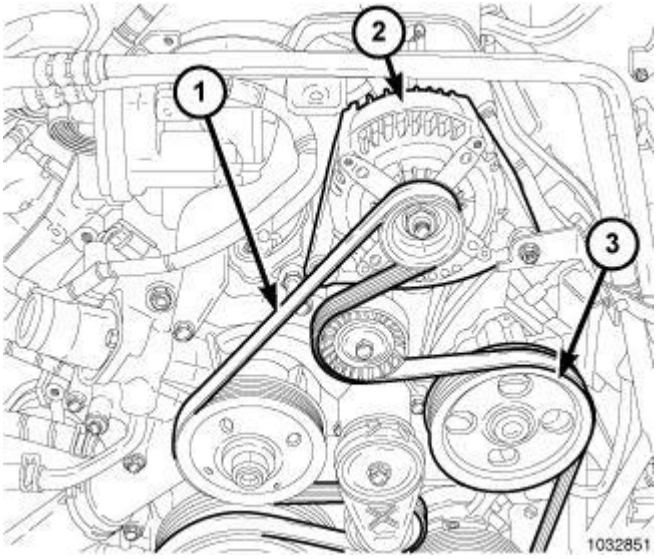


Fig. 165: Accessory Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

20. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.
21. Install the generator (2).
22. Install the power steering pump (3).
23. Install the accessory drive belt (1). Refer to **BELT, SERPENTINE, INSTALLATION** .
24. Install the radiator. Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** .
25. Install the air cleaner assembly. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
26. Install the negative battery cable.
27. Fill the radiator with coolant. Refer to **STANDARD PROCEDURE** .
28. Fill the engine with oil. Refer to **FILTER, ENGINE OIL, INSTALLATION, 5.7L**.
29. Start the engine and check for leaks.

COVER, STRUCTURAL DUST

REMOVAL

REMOVAL

1. Raise and support the vehicle.

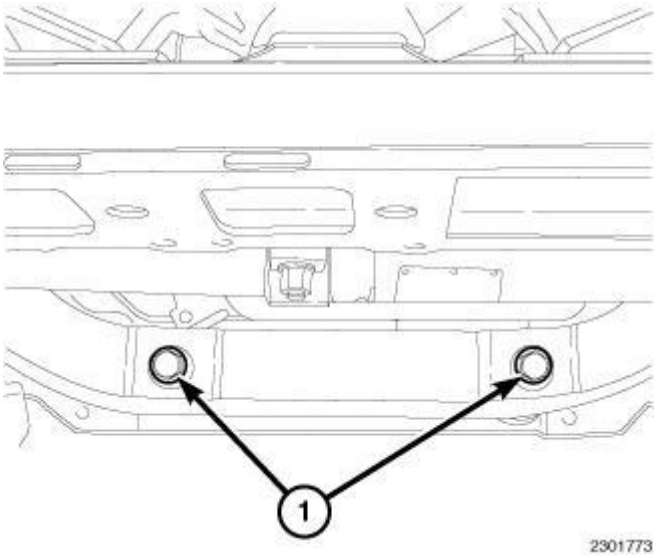


Fig. 166: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

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

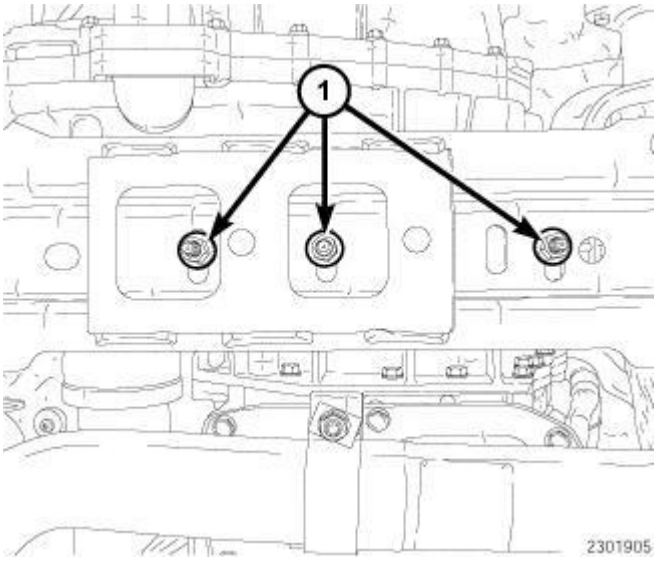


Fig. 167: Transmission Mount To Crossmember Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

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

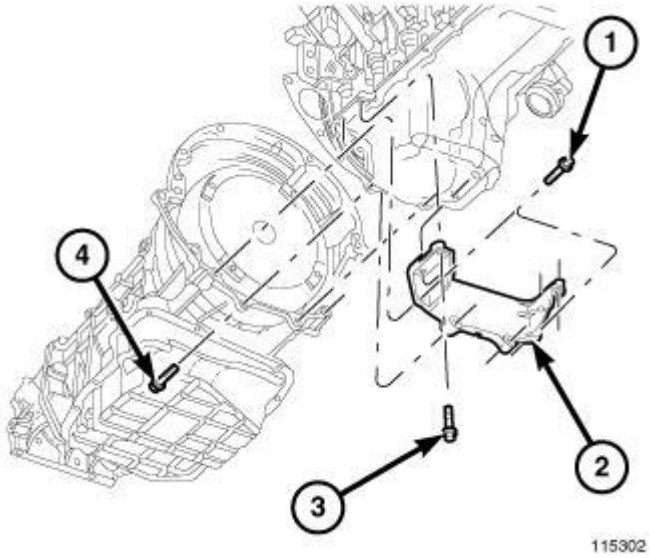


Fig. 168: Structural Cover
Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

INSTALLATION

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

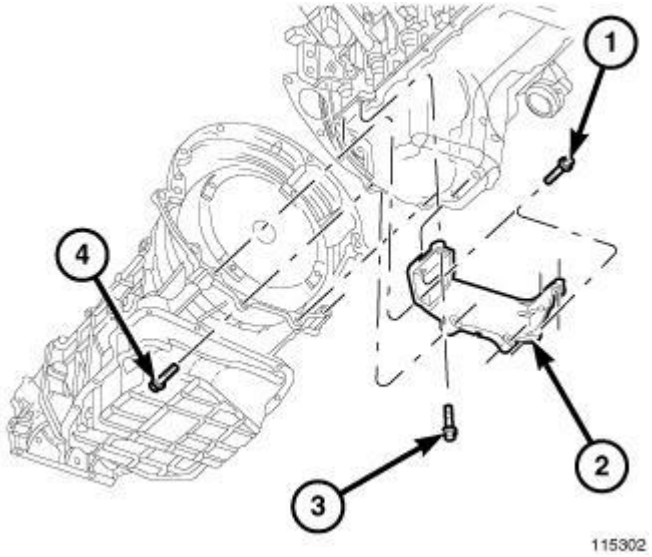


Fig. 169: Structural Cover
Courtesy of CHRYSLER GROUP, LLC

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

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

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

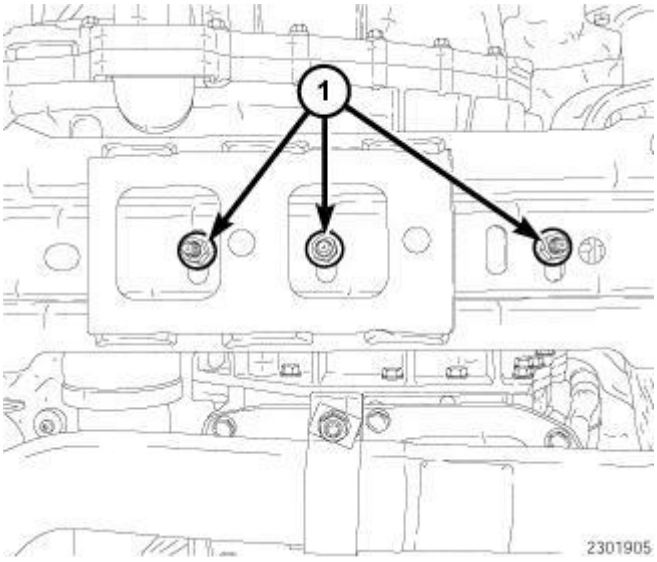


Fig. 170: Transmission Mount To Crossmember Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

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

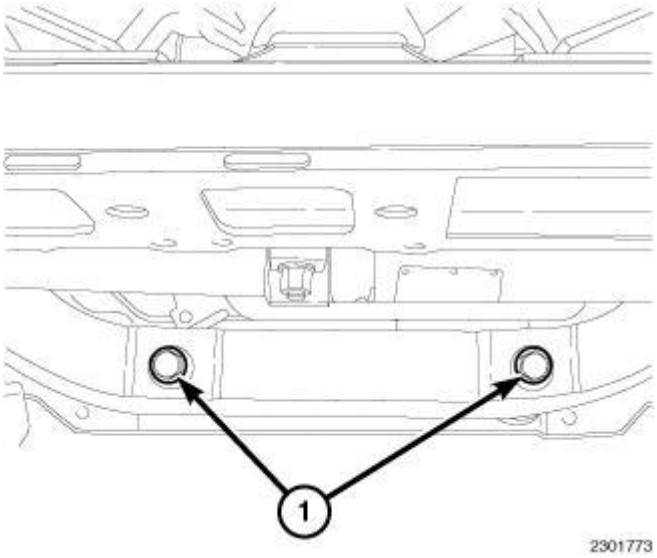


Fig. 171: Steering Rack To Frame Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

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

CRANKSHAFT

REMOVAL

REMOVAL

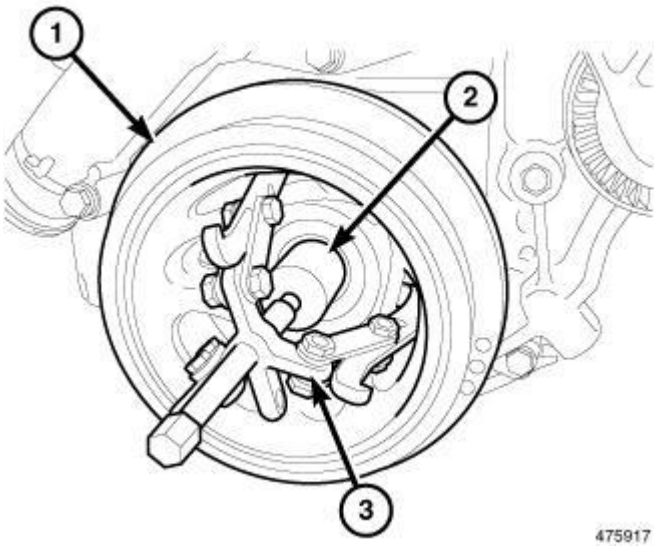


Fig. 172: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

1. Remove engine. Refer to **REMOVAL, 5.7L**.

2. Remove the vibration damper (1) using Crankshaft Insert (special tool #8513A, Insert, Crankshaft) (2) and Puller (special tool #1023, Puller) (3). Refer to **ENGINE/ENGINE BLOCK/DAMPER, VIBRATION, REMOVAL**.

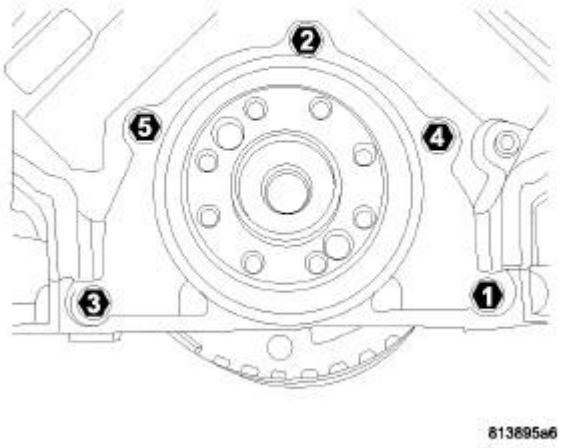


Fig. 173: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

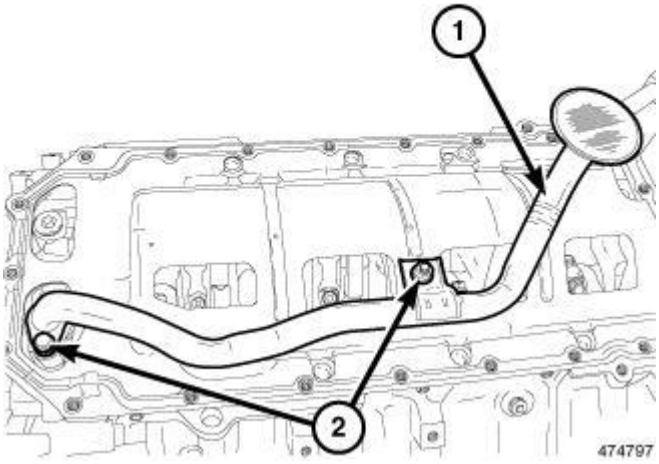


Fig. 174: Oil Pick Up Tube

Courtesy of CHRYSLER GROUP, LLC

5. Remove the oil pump pickup (1).
6. Remove the windage tray/oil pan gasket.
7. Remove the timing chain cover . Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.

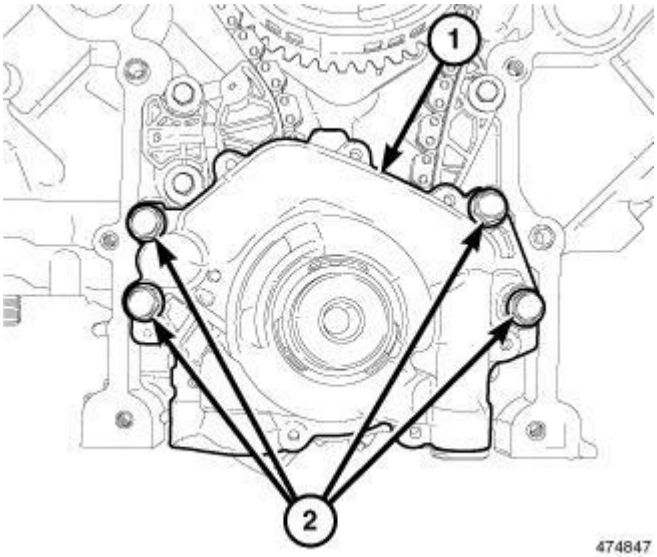


Fig. 175: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

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

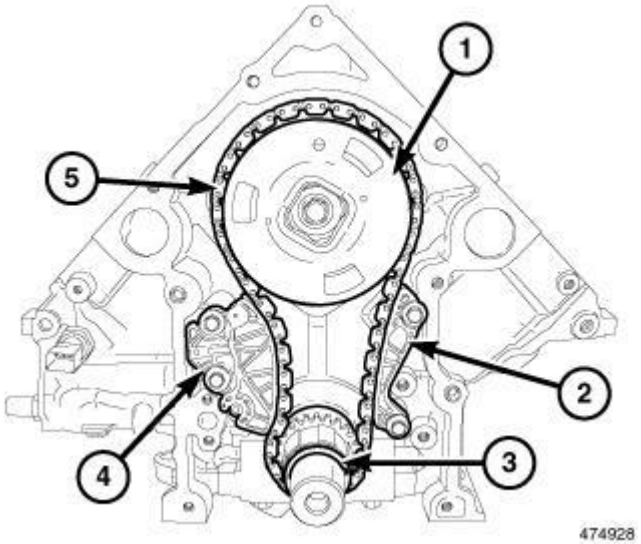


Fig. 176: Timing Chain
Courtesy of CHRYSLER GROUP, LLC

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

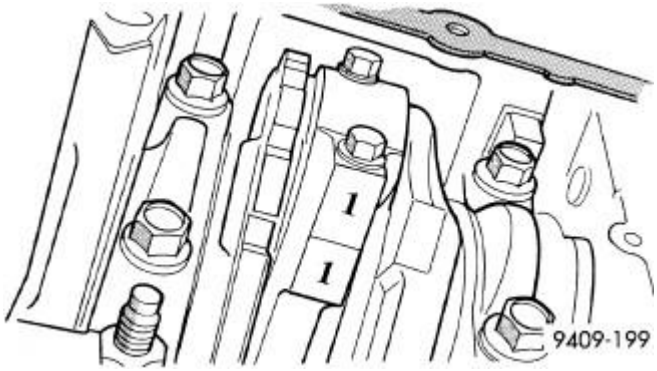


Fig. 177: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

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

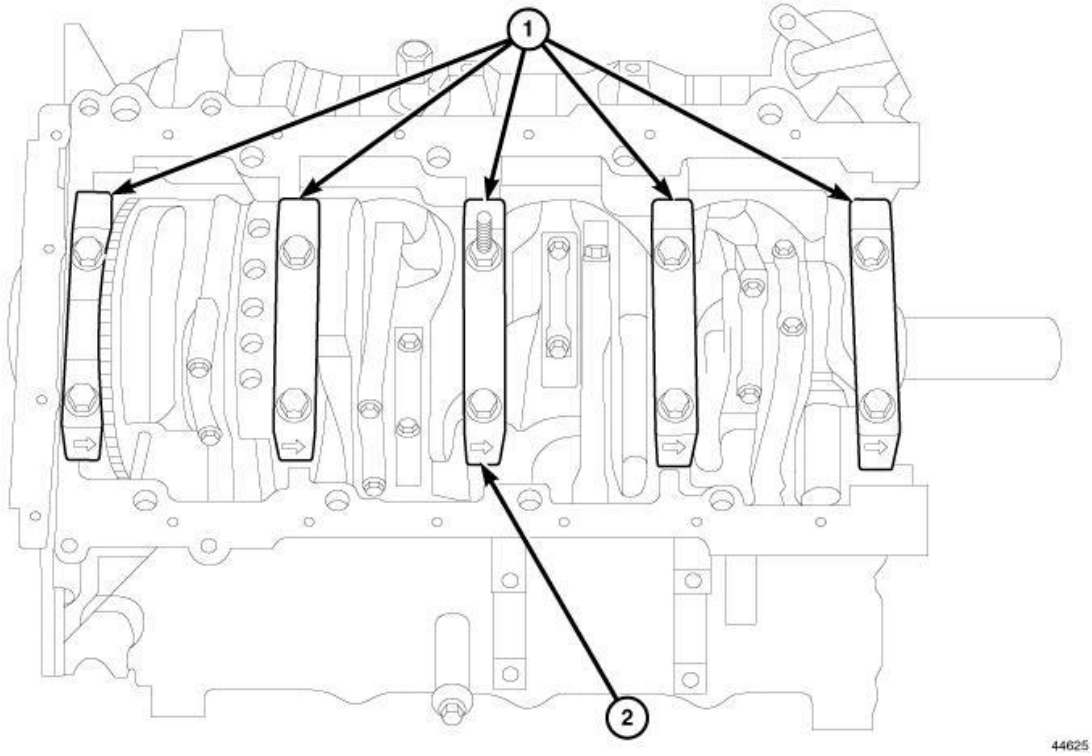


Fig. 178: Main Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

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

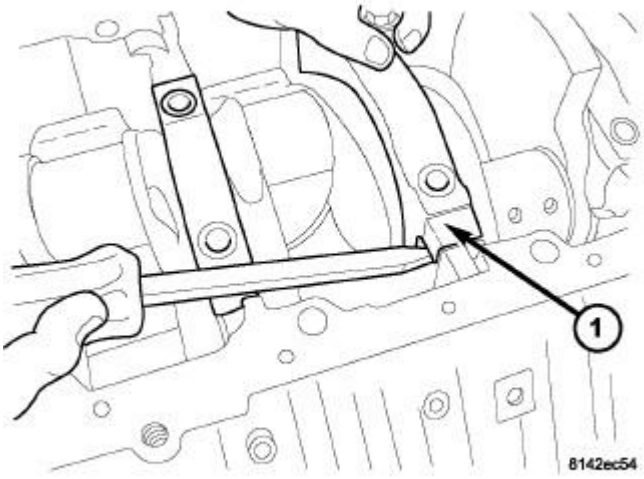


Fig. 179: Main Bearing Cap Removal
Courtesy of CHRYSLER GROUP, LLC

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

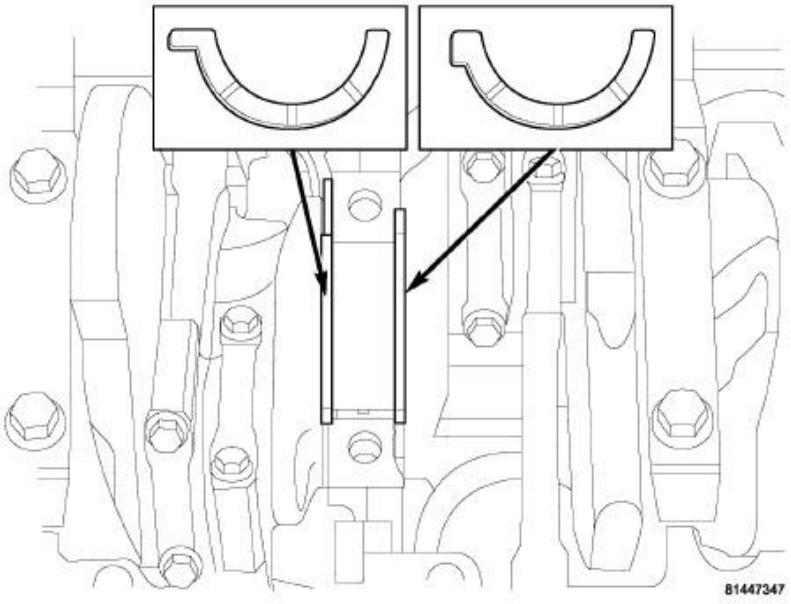


Fig. 180: Identifying Thrust Washer Locations
Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

INSTALLATION

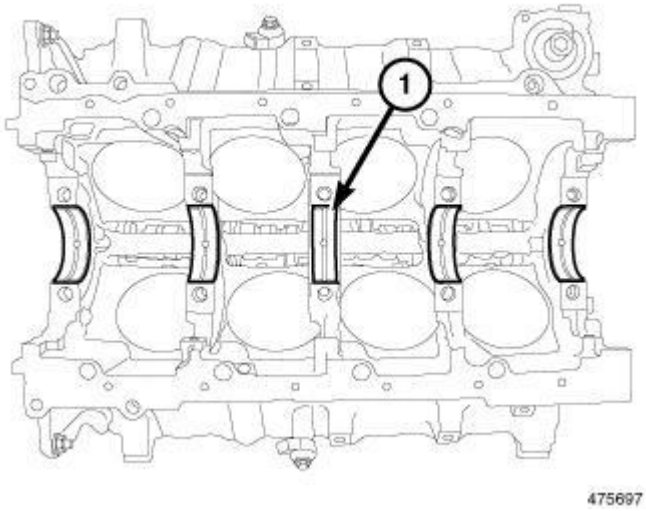


Fig. 181: Main Bearings
Courtesy of CHRYSLER GROUP, LLC

1. Select the proper main bearings. Refer to **ENGINE/ENGINE BLOCK/BEARING(S), CRANKSHAFT, STANDARD PROCEDURE** .
2. Install main bearings in block (1).

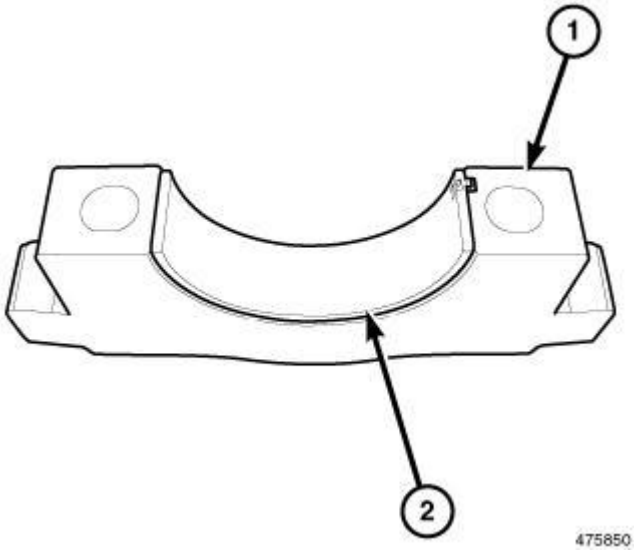


Fig. 182: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

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

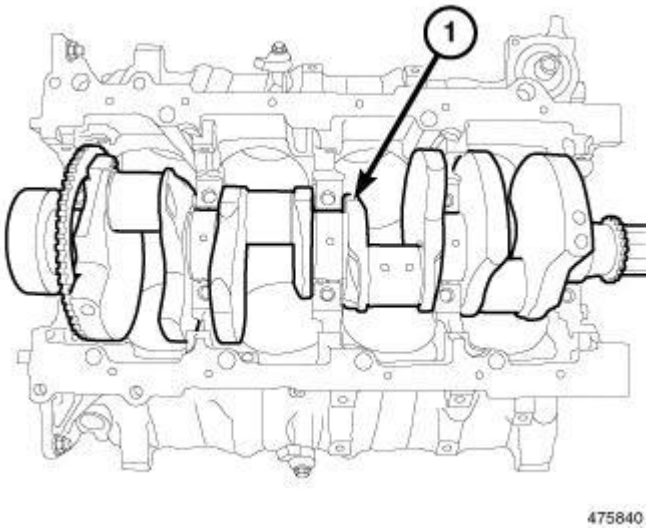


Fig. 183: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

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

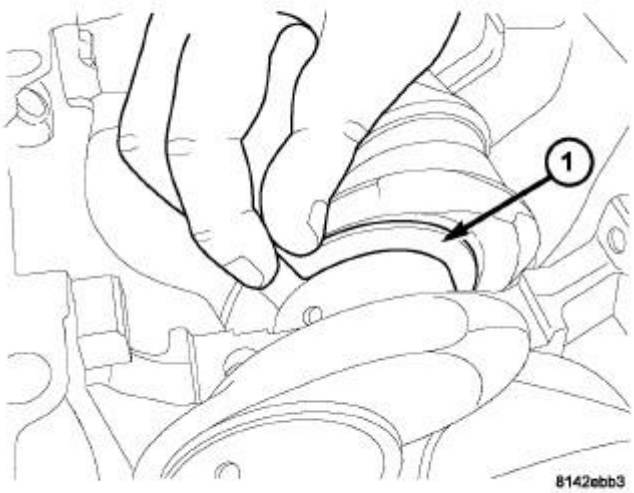


Fig. 184: Removing/Installing Thrust Washer
Courtesy of CHRYSLER GROUP, LLC

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

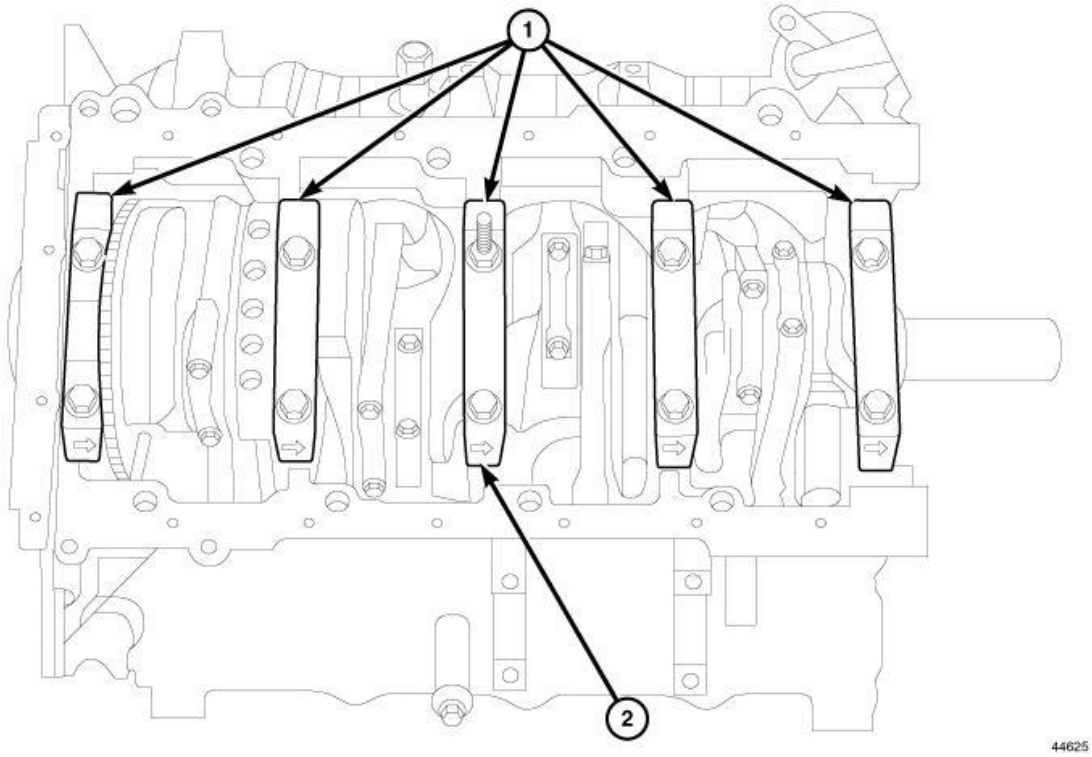


Fig. 185: Main Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

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

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

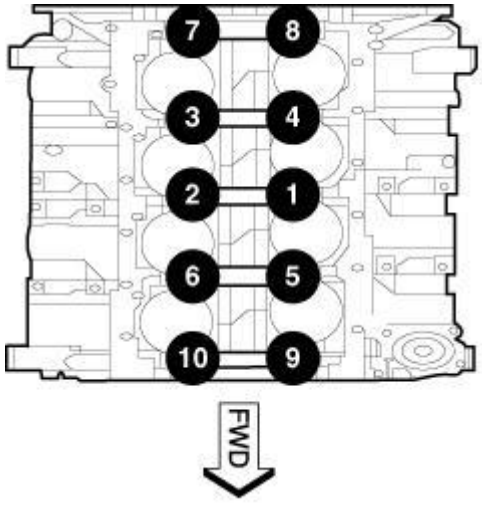


Fig. 186: Main Bearing Cap Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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

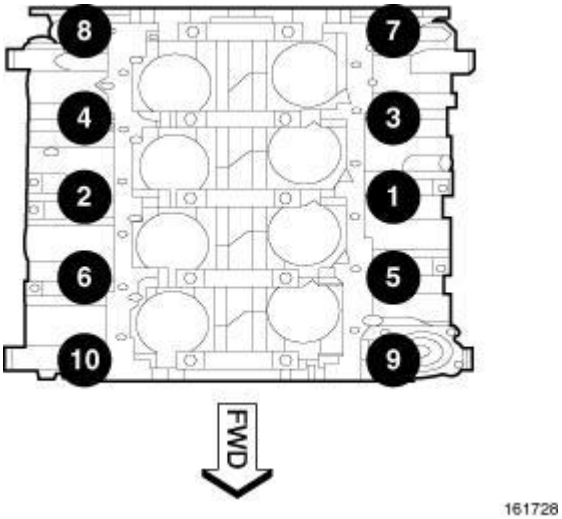


Fig. 187: Crossbolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

11. Install the crossbolts with new seal washer. Starting with crossbolt A,
12. Tighten crossbolt to 28 N.m (21 ft. lbs.).
13. Repeat crossbolt tightening procedure.
14. Measure crankshaft end play. Refer to **ENGINE/ENGINE BLOCK/BEARING(S), CRANKSHAFT, STANDARD PROCEDURE** .
15. Position the connecting rods onto the crankshaft and install the rod bearing caps. Refer to **ROD, PISTON AND CONNECTING, INSTALLATION, 5.7L**.

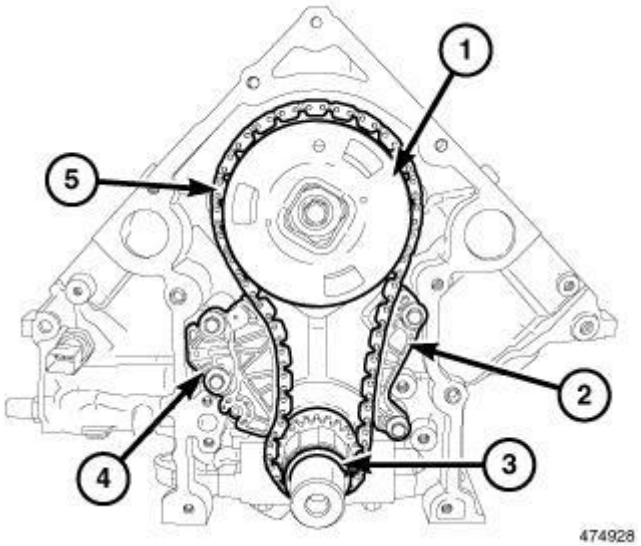


Fig. 188: Timing Chain

Courtesy of CHRYSLER GROUP, LLC

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

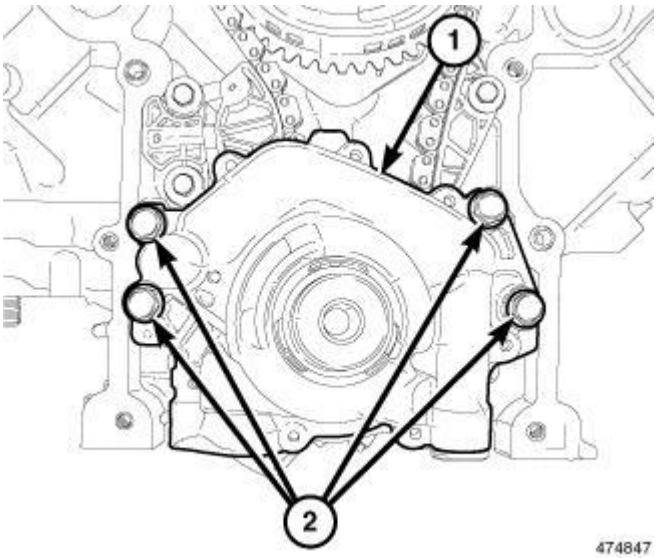


Fig. 189: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

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

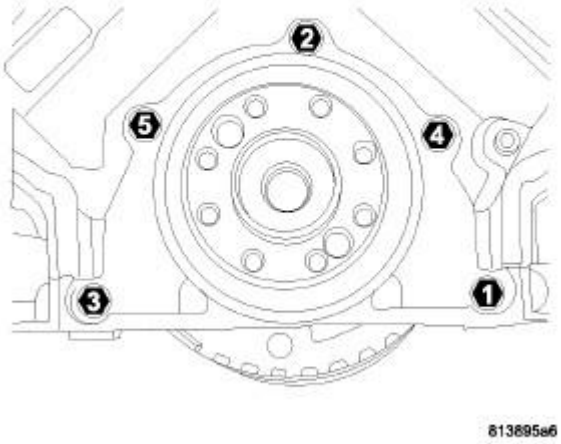


Fig. 190: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

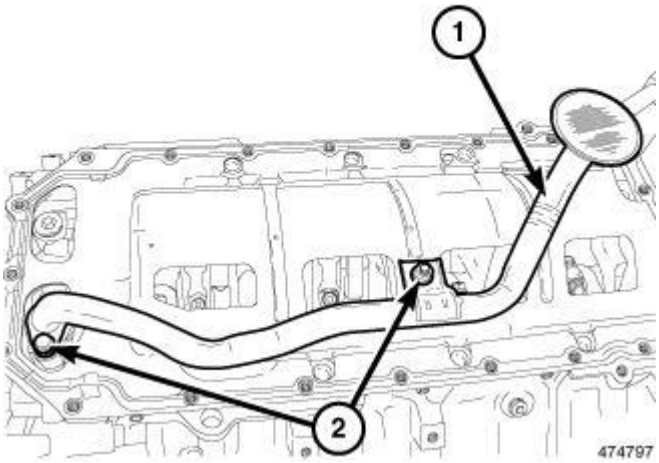


Fig. 191: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

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

24. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
25. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.
26. Install the engine. Refer to **INSTALLATION, 5.7L**.

DAMPER, VIBRATION

REMOVAL

REMOVAL

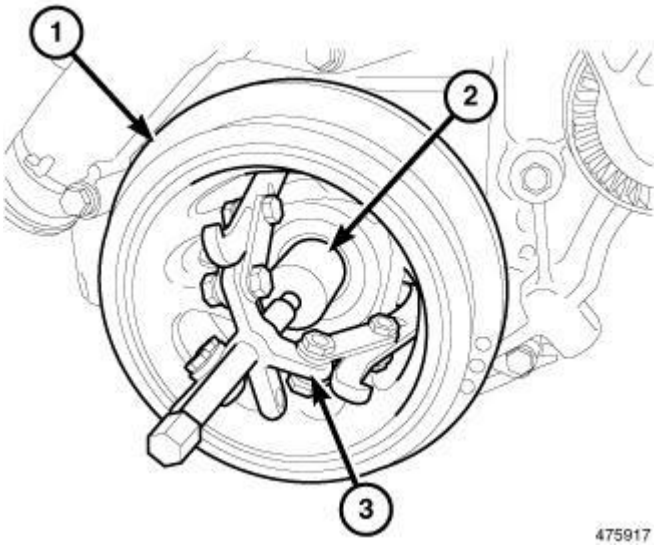


Fig. 192: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative cable from battery.
2. Remove accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Drain cooling system. Refer to **STANDARD PROCEDURE** .
4. Remove radiator upper hose.
5. Remove fan shroud. Refer to **FAN, COOLING, ELECTRIC, REMOVAL** or **FAN, COOLING, VISCOUS, REMOVAL** .
6. Remove crankshaft damper bolt.
7. Remove damper (1) using Crankshaft Insert (special tool #8513A, Insert, Crankshaft) (2) and Three Jaw Puller (special tool #1023, Puller) (3).

INSTALLATION

INSTALLATION

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

1. Position the damper onto crankshaft.
2. Assemble the damper installer (special tool #10387, Installer, Vibration Damper) (special tool #6871, Installer, A/C Hub)
3. Using the damper installer (special tool #10387, Installer, Vibration Damper) (special tool #6871, Installer, A/C Hub)

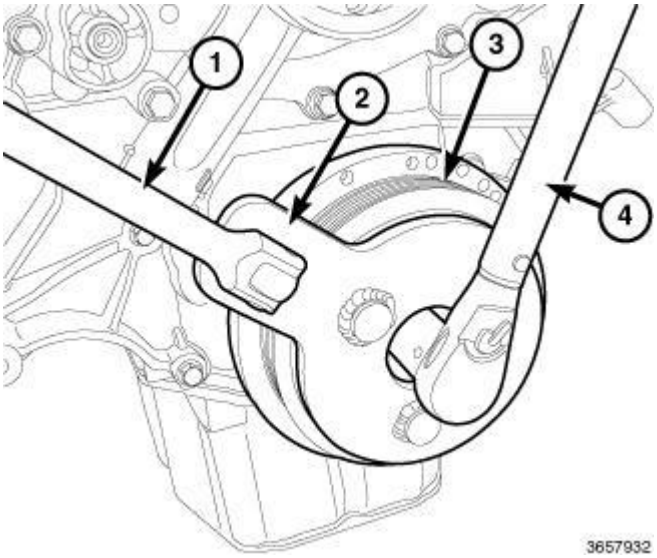


Fig. 193: Installing Vibration Damper Onto Vibration Pulley
Courtesy of CHRYSLER GROUP, LLC

4. Install the crankshaft damper bolt.
5. Position the (special tool #10386, Holder, Vibration Damper) (2), onto the vibration damper (3).
6. Tighten the bolt to the proper specification. Refer to **TORQUE SPECIFICATIONS** .
7. Install the cooling fan.
8. Install the radiator upper shroud and tighten the fasteners to the proper specification. Refer to **SPECIFICATIONS** .
9. Install the radiator upper hose.
10. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
11. Refill the cooling system. Refer to **STANDARD PROCEDURE** .
12. Connect the battery negative cable. Tighten the nut to the proper specification. Refer to **SPECIFICATIONS** .

FLEXPLATE

REMOVAL

REMOVAL

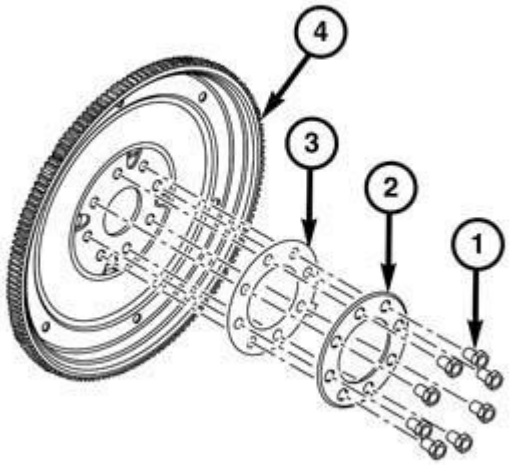


Fig. 194: Removing Flex Plate
Courtesy of CHRYSLER GROUP, LLC

NOTE: A new clamping ring and bolts must be used anytime the flexplate or flywheel adapter is removed.

1. On 4X4 models, remove the transfer case (Refer to appropriate TRANSFER CASE article).
2. Remove the transmission (Refer to appropriate AUTOMATIC TRANSMISSION article).
3. Paint mark the flex plate hub to flex plate relation.
4. Remove bolts (1), clamping ring (2), friction shim (3), and the flex plate (4).
5. Inspect flex plate for damage.

INSTALLATION

INSTALLATION

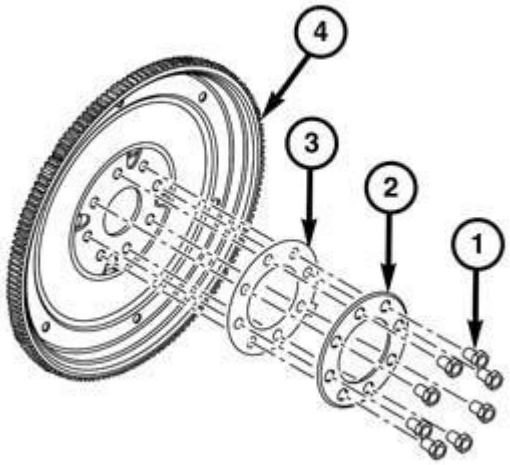


Fig. 195: Removing Flex Plate
Courtesy of CHRYSLER GROUP, LLC

NOTE: A new clamping ring and bolts must be used anytime the flexplate or flywheel adapter is removed. Do not lubricate new bolts as they are already coated with an anti-scuff treatment.

NOTE: Align the flex plate to hub paint marks, where applicable.

1. Install the flex plate (4), friction shim (3), clamping ring (2) and tighten bolts (1) finger tight.
2. Use a crisscross pattern to tighten bolts to 137 N.m (100 ft. lbs.).
3. Install the transmission (Refer to appropriate AUTOMATIC TRANSMISSION article).
4. On 4X4 models, Install the transfer case (Refer to appropriate TRANSFER CASE article).

LIFTER(S), HYDRAULIC, ROLLER

DESCRIPTION

DESCRIPTION

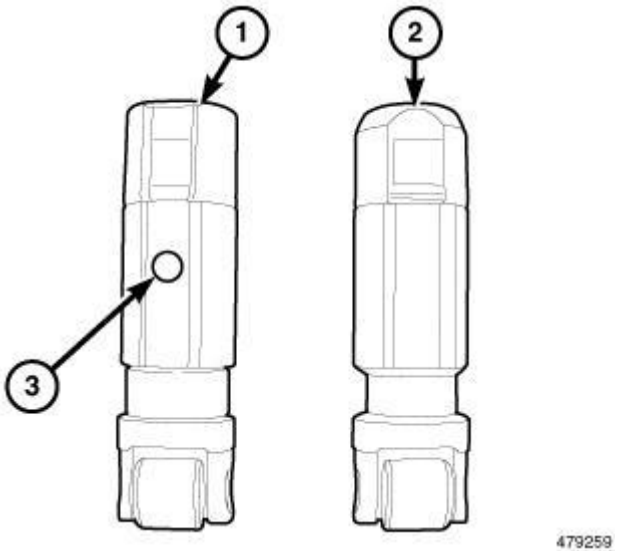


Fig. 196: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

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

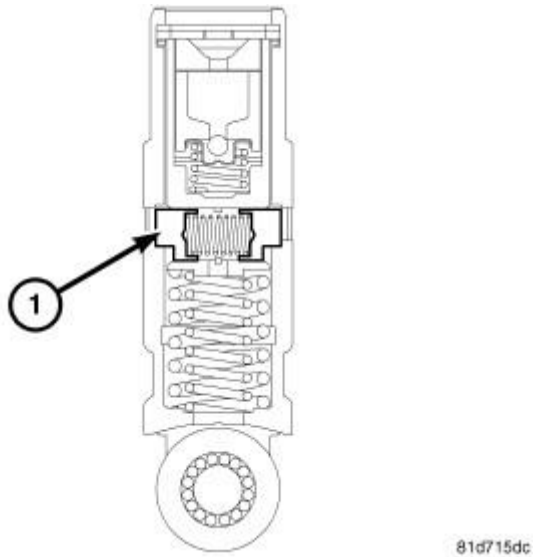


Fig. 197: MDS Lifter Cross-Section
Courtesy of CHRYSLER GROUP, LLC

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**.

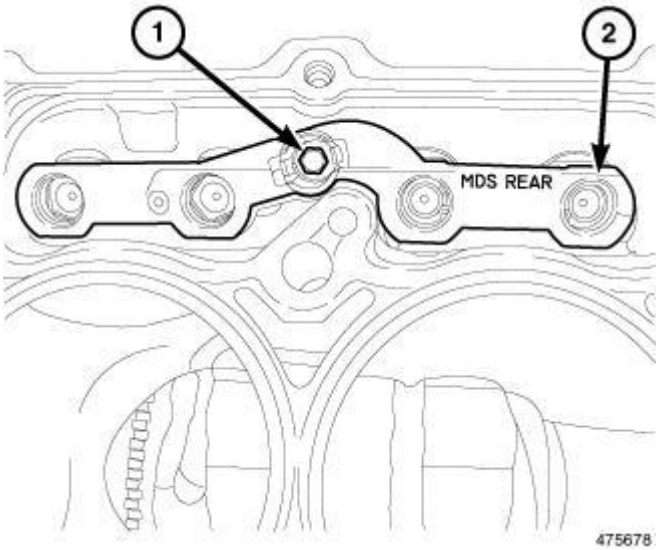


Fig. 198: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

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

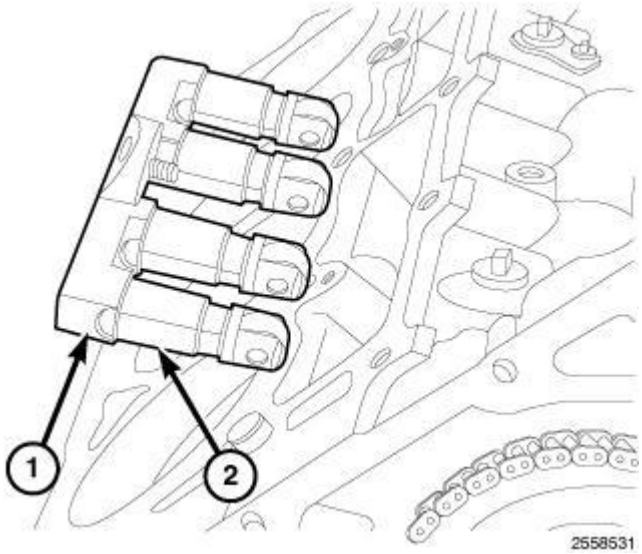


Fig. 199: Tappet Guide Holder Assembly
Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

INSTALLATION

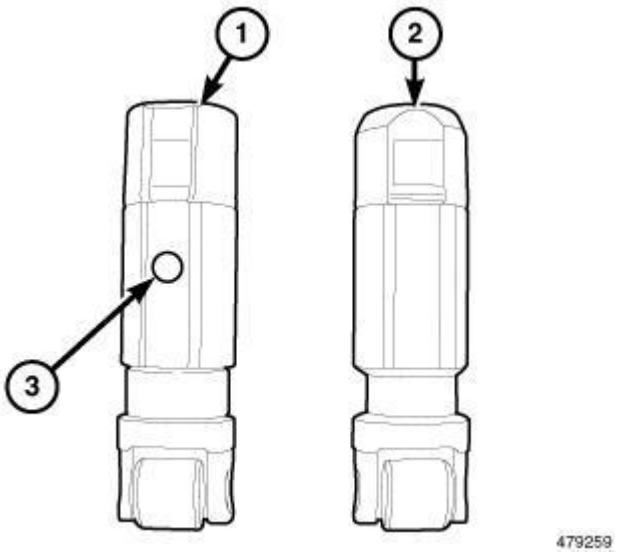


Fig. 200: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

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.

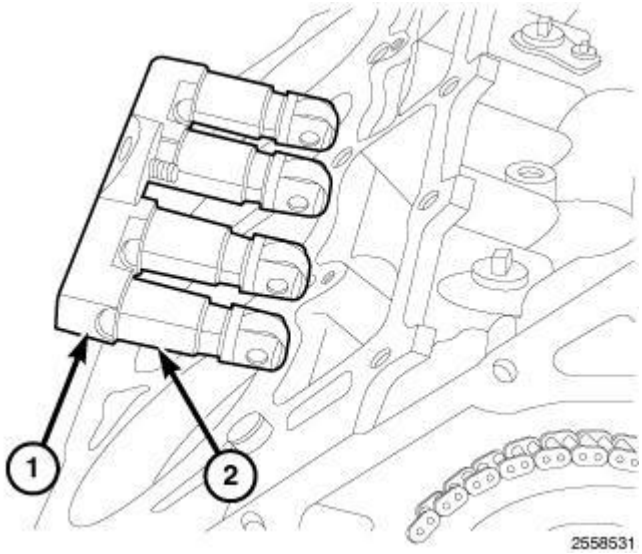


Fig. 201: Tappet Guide Holder Assembly
Courtesy of CHRYSLER GROUP, LLC

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

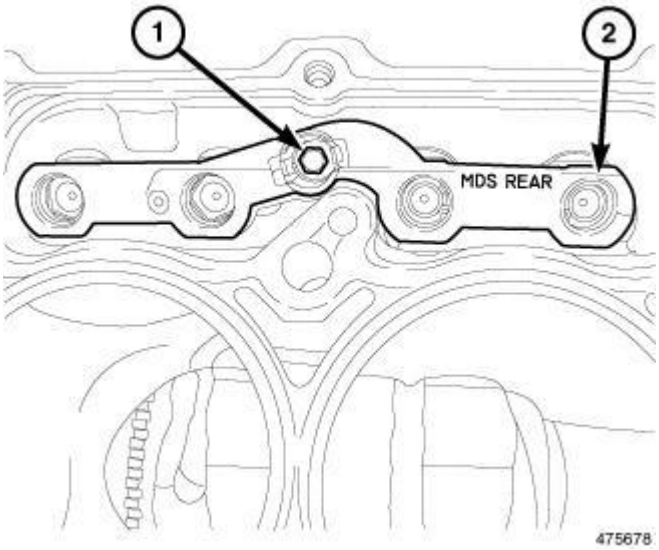


Fig. 202: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

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

2. Install the tappet guide holder (2) and tappets.
3. Tighten the tappet retainer bolt (1) to 12 N.m (9 ft. lbs.).
4. Install the cylinder head. 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 Information , for proper repair procedures of these components.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**

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

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

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

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.

REMOVAL

REMOVAL

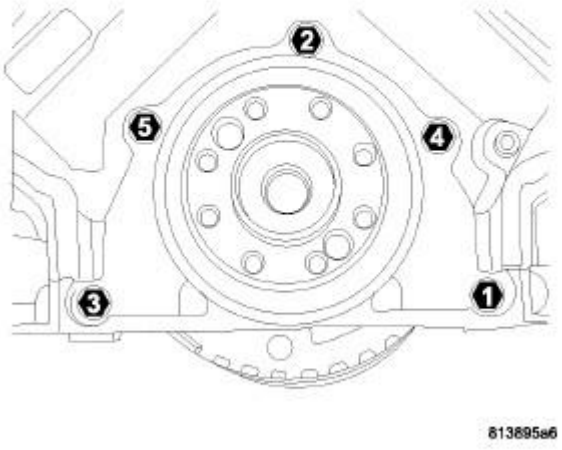


Fig. 203: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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 AUTOMATIC TRANSMISSION 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

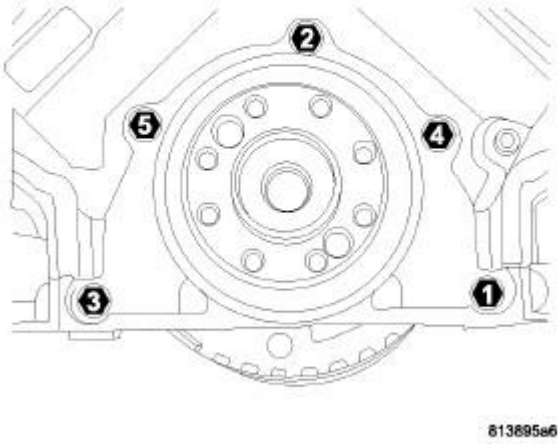


Fig. 204: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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 13 N.m (10 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 AUTOMATIC TRANSMISSION 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

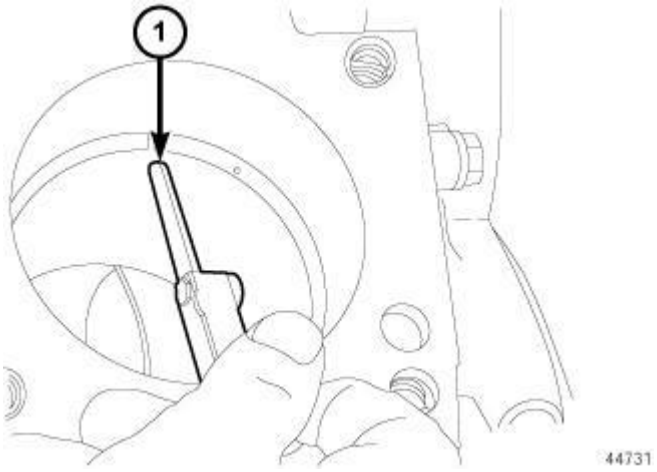


Fig. 205: Ring
Courtesy of CHRYSLER GROUP, LLC

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.

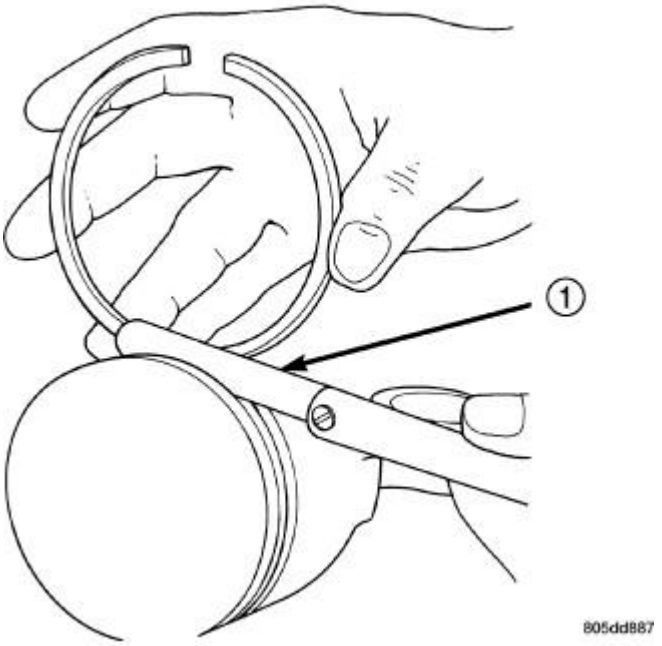


Fig. 206: Checking Piston Ring Grooves Clearances
Courtesy of CHRYSLER GROUP, LLC

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. 207: Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, 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.

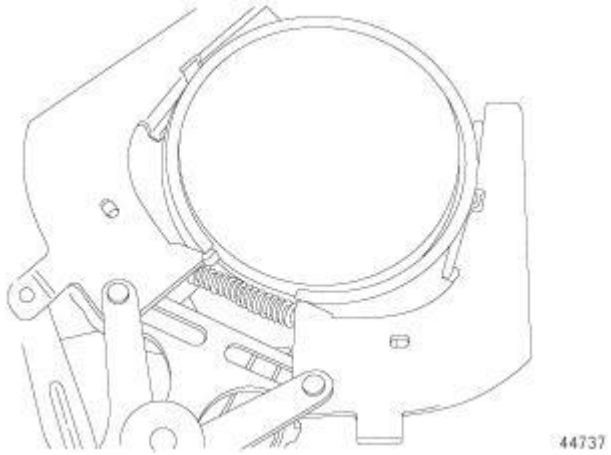


Fig. 208: Upper And Intermediate Rings
Courtesy of CHRYSLER GROUP, LLC

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

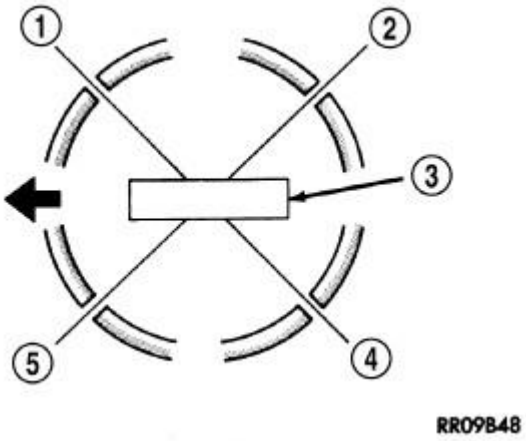


Fig. 209: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

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

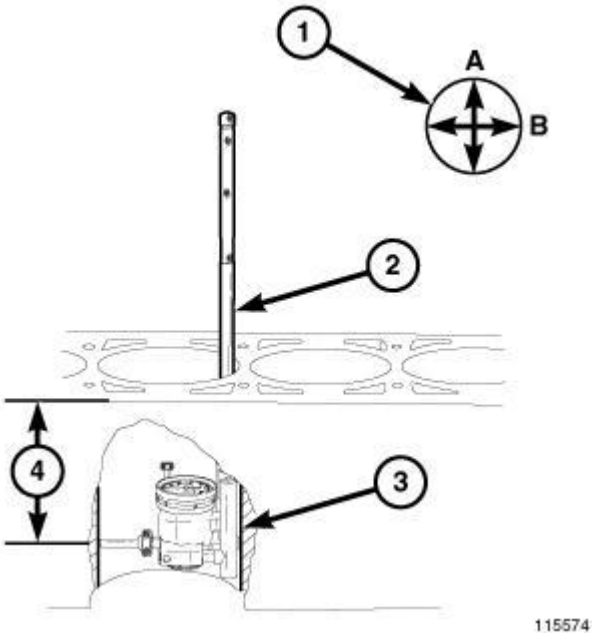


Fig. 210: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

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.

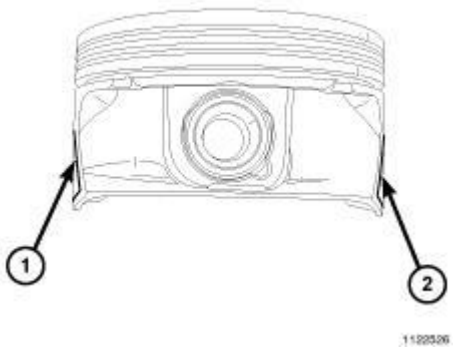


Fig. 211: Piston Diameter Measuring Points
Courtesy of CHRYSLER GROUP, LLC

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

REMOVAL

REMOVAL

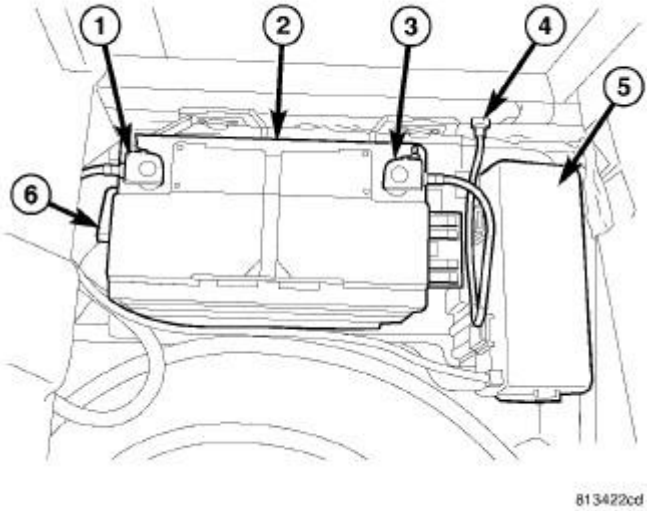


Fig. 212: Battery System Components And PDC Cover
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable (3).

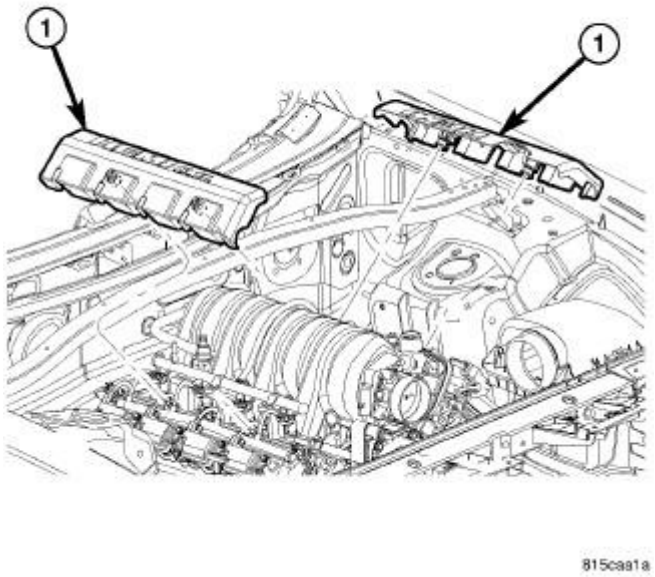


Fig. 213: Removing/Installing Engine Covers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine covers (1).

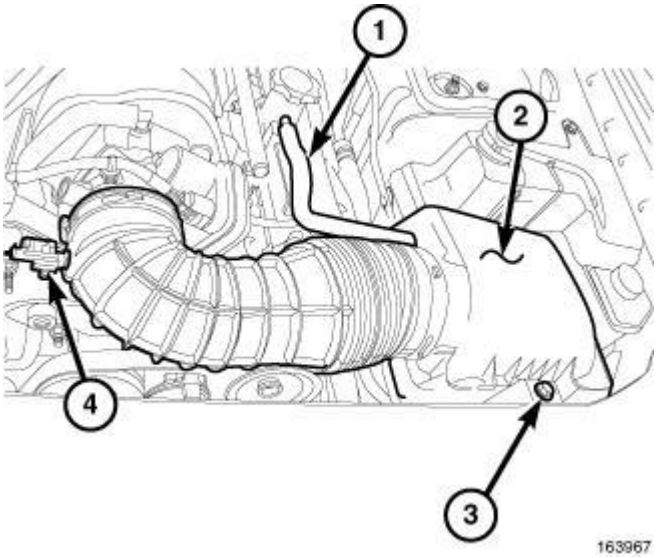


Fig. 214: Air Duct To Throttle Body
Courtesy of CHRYSLER GROUP, LLC

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

8. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.
9. Raise and support the vehicle.

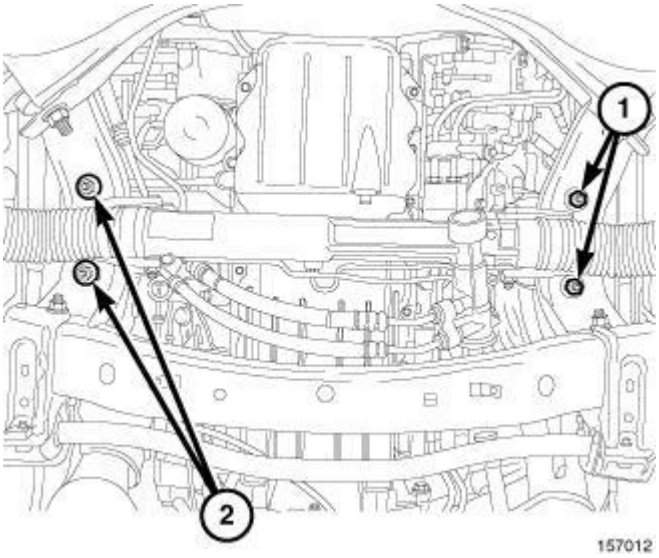


Fig. 215: Engine Mount Nuts
Courtesy of CHRYSLER GROUP, LLC

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

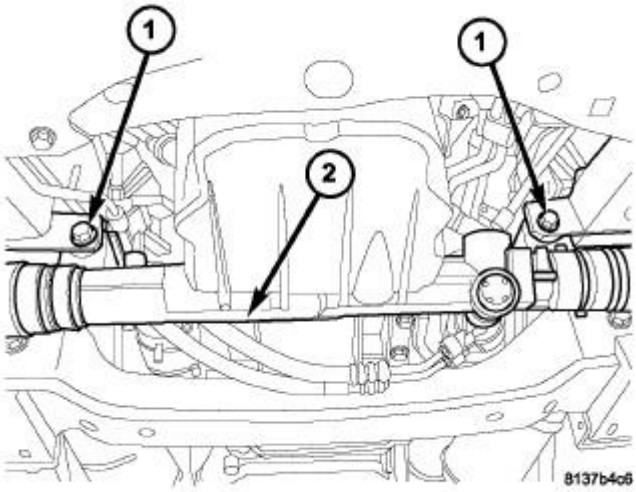


Fig. 216: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

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

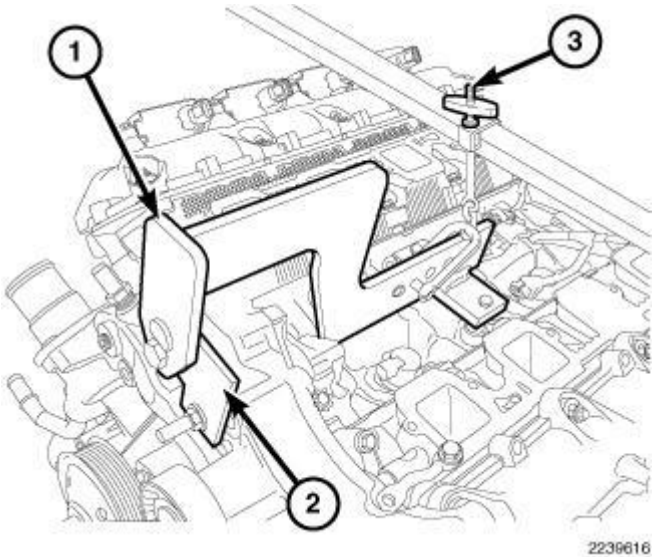


Fig. 217: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

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

14. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
15. Raise the engine to provide clearance to remove the oil pan.
16. Raise and support the vehicle.
17. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
18. Lower the vehicle.
19. Remove the timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.
20. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing the pistons from the cylinder block. **Be sure to keep the tops of the pistons covered during this operation.**

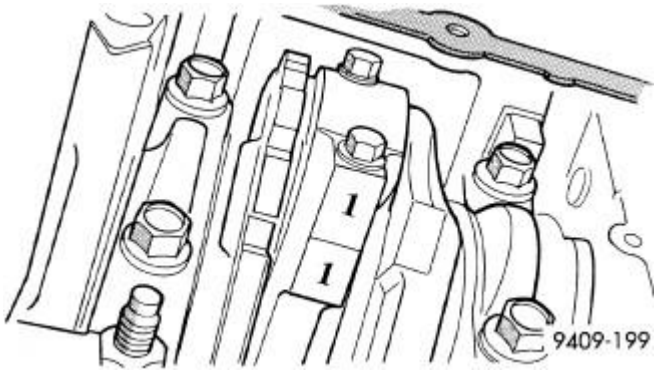


Fig. 218: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

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

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

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

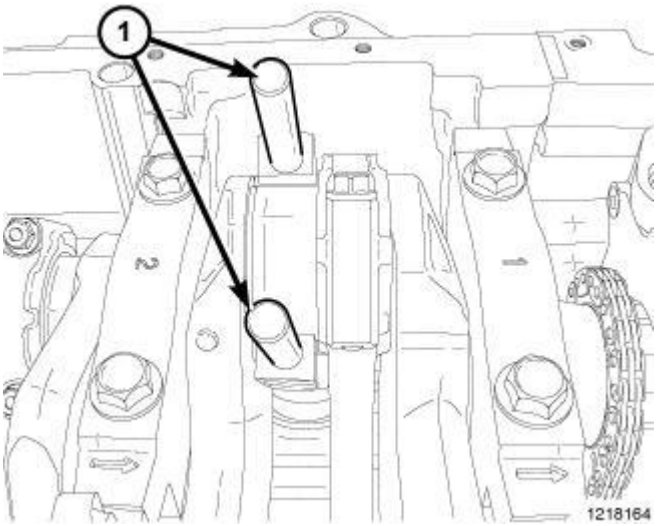


Fig. 219: Connecting Rod Guides
Courtesy of CHRYSLER GROUP, LLC

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

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

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

23. Remove the connecting rod cap, install the Connecting Rod Guides (special tool #8507, Guides, Connecting Rod) (1) and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
24. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.

25. Carefully remove the piston rings from the piston(s), starting from the top ring down.

CLEANING

CLEANING

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

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

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

INSPECTION

INSPECTION

Check the connecting rod journal for excessive wear, taper and scoring. 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

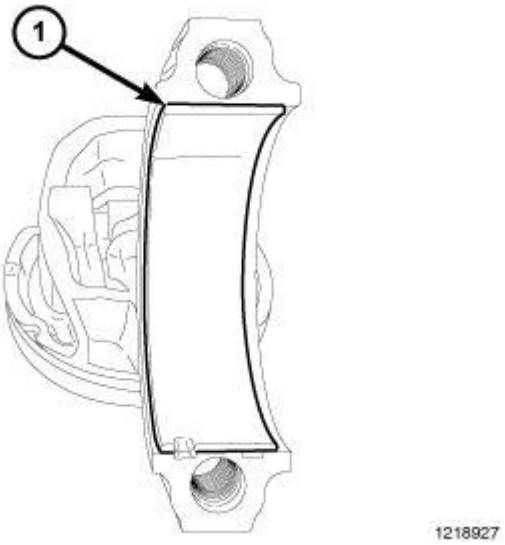


Fig. 220: Rod Bearing
Courtesy of CHRYSLER GROUP, LLC

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

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

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

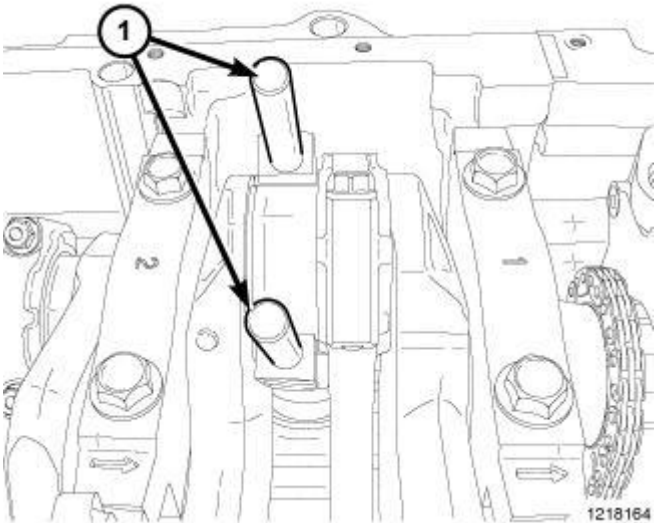


Fig. 221: Connecting Rod Guides
Courtesy of CHRYSLER GROUP, LLC

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

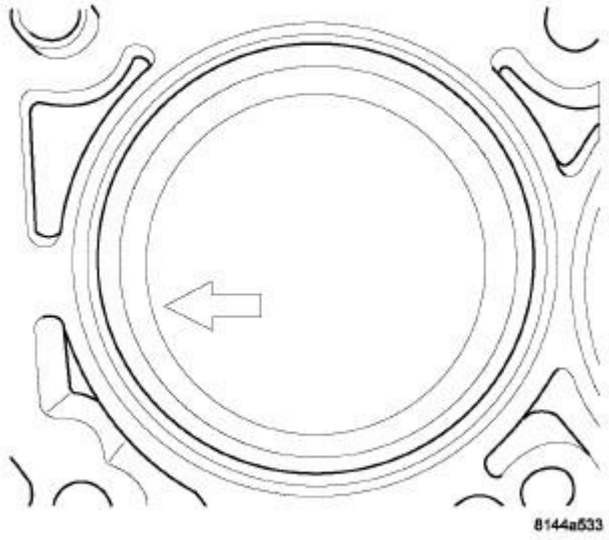


Fig. 222: Piston Direction Arrow
Courtesy of CHRYSLER GROUP, LLC

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

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

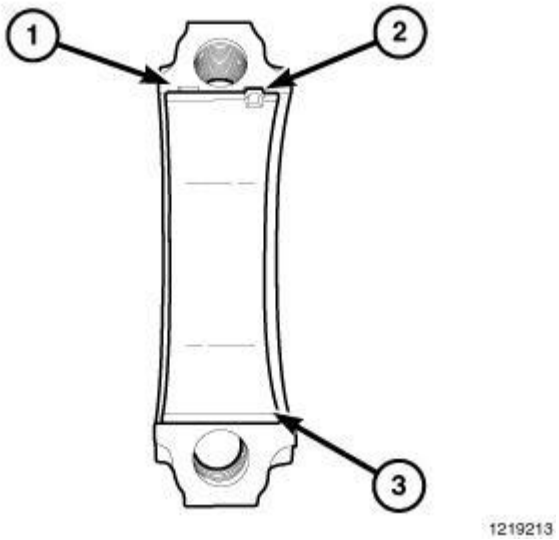


Fig. 223: Connecting Rod Cap
Courtesy of CHRYSLER GROUP, LLC

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

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

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

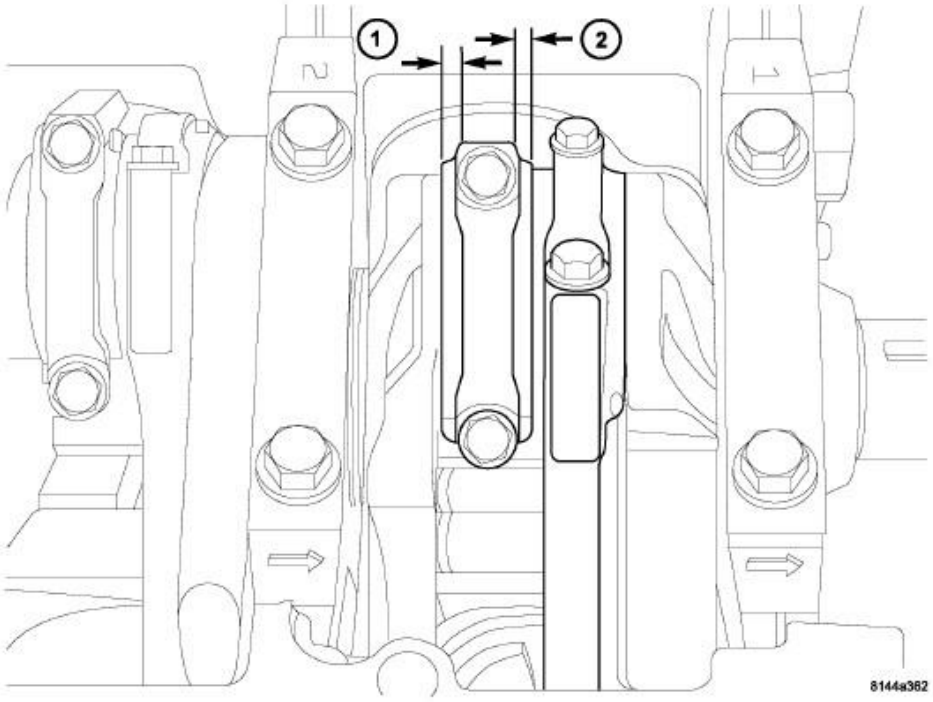


Fig. 224: Identifying Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing the connecting rods, make sure the wide side of the connecting rod faces the crankshaft and the narrow sides face each other.

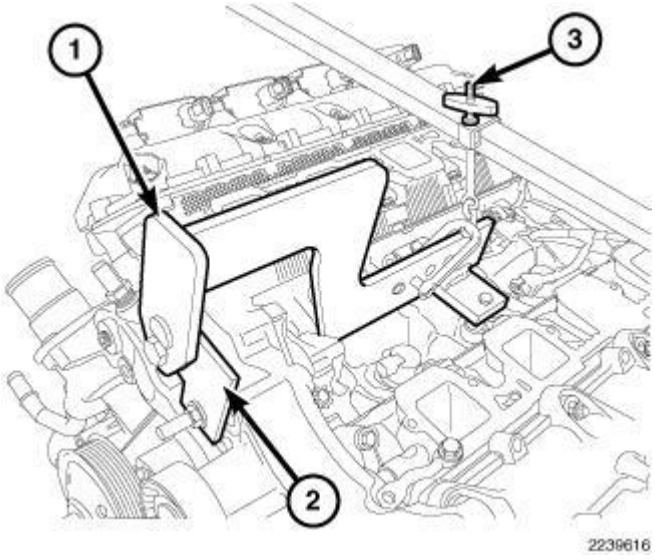


Fig. 225: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always replace the connecting rod bolts whenever they are loosened or removed.

14. Lubricate the new rod cap bolts with clean engine oil, install and tighten to 21 N.m (15 ft. lbs.) plus 90°.
15. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
16. Install the new oil pan gasket/windage tray and oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
17. Install the engine oil dipstick tube and dipstick.
18. Lower the vehicle.
19. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) lower the engine into position and remove.
20. Raise and support the vehicle.

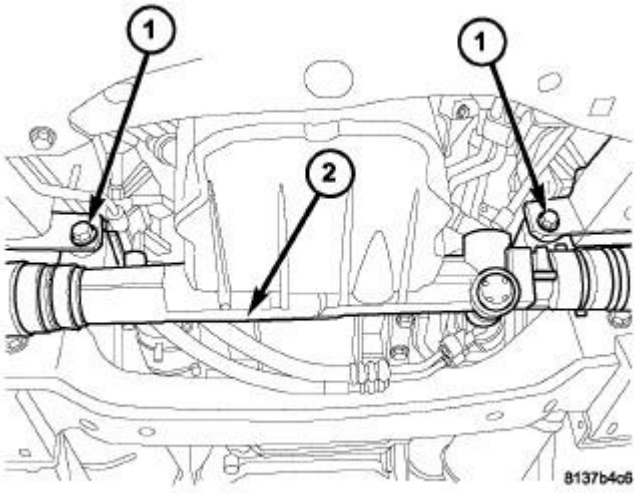


Fig. 226: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

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

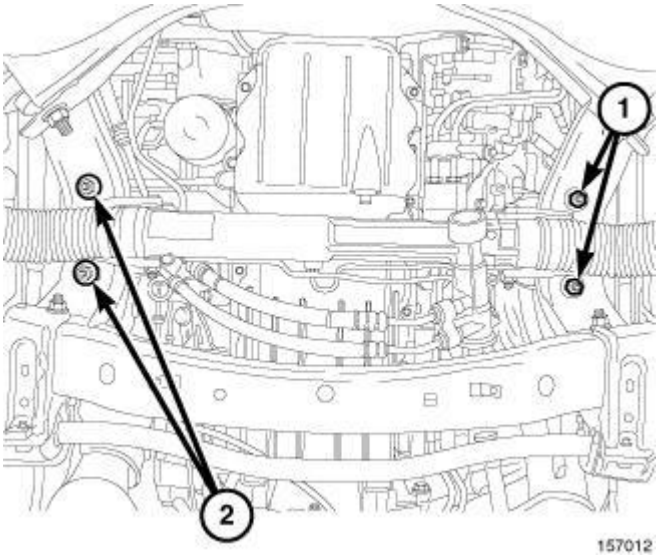


Fig. 227: Engine Mount Nuts
Courtesy of CHRYSLER GROUP, LLC

22. Install the engine mount nuts (1, 2) and tighten to 95 N.m (70 ft. lbs.).
23. Lower the vehicle.
24. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.

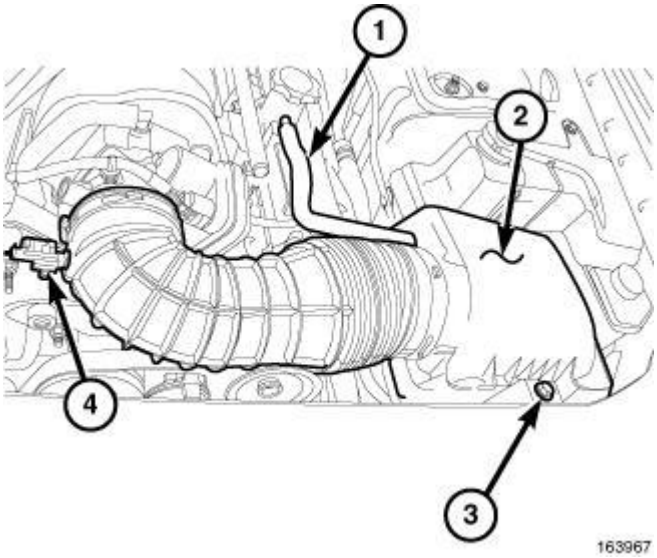


Fig. 228: Air Duct To Throttle Body
Courtesy of CHRYSLER GROUP, LLC

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

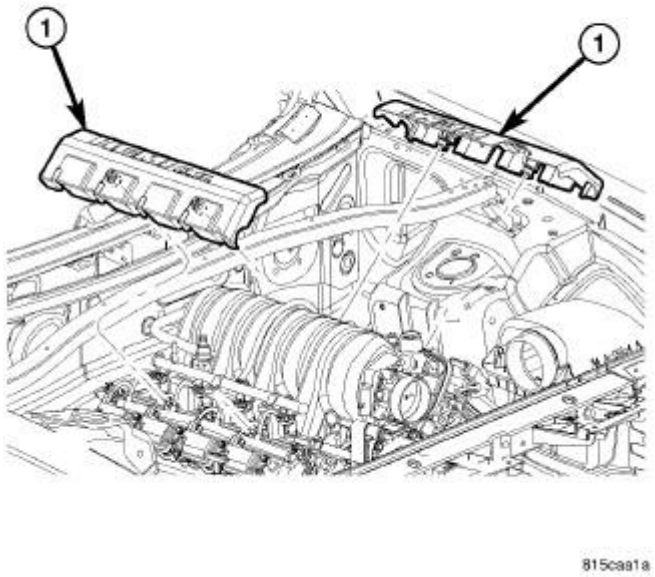


Fig. 229: Removing/Installing Engine Covers
Courtesy of CHRYSLER GROUP, LLC

30. Install the engine covers (1).

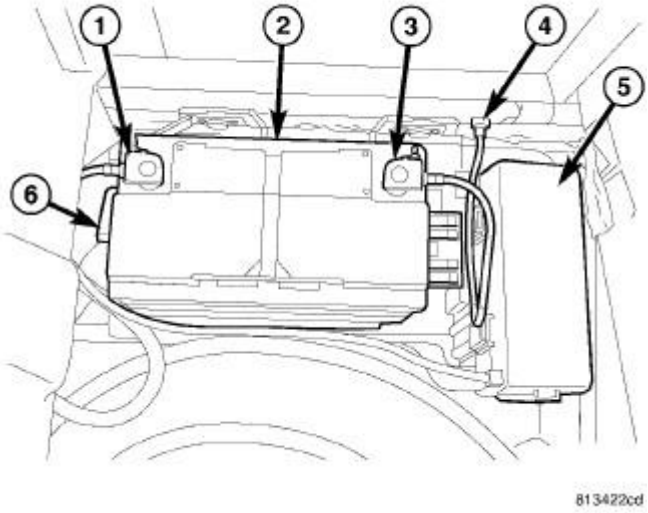


Fig. 230: Battery System Components And PDC Cover
Courtesy of CHRYSLER GROUP, LLC

31. Connect the negative battery cable (3).

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

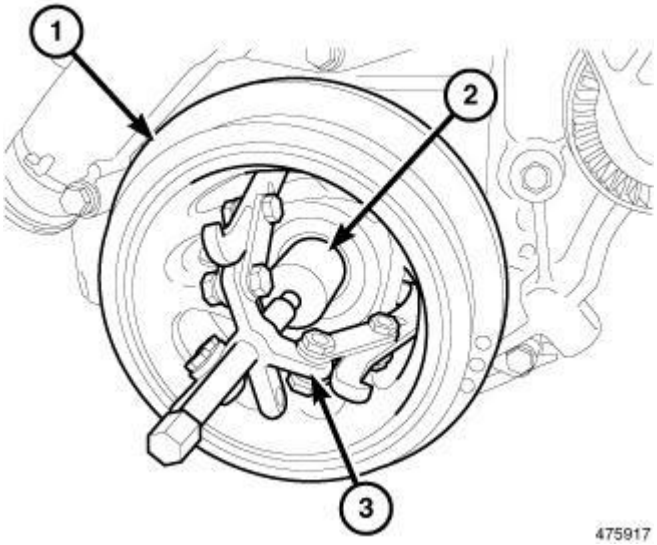


Fig. 231: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative cable from battery.
2. Remove accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Drain cooling system. Refer to **STANDARD PROCEDURE** .
4. Remove upper radiator hose.
5. Remove radiator shroud attaching fasteners.
6. Remove radiator cooling fan and shroud. Refer to **FAN, COOLING, ELECTRIC, REMOVAL** or **FAN, COOLING, VISCOUS, REMOVAL** .
7. Remove crankshaft damper bolt.
8. Remove damper using Crankshaft Insert (special tool #8513A, Insert, Crankshaft) (2) and Three Jaw Puller (special tool #1023, Puller) (1). Refer to **ENGINE/ENGINE BLOCK/DAMPER, VIBRATION, REMOVAL**

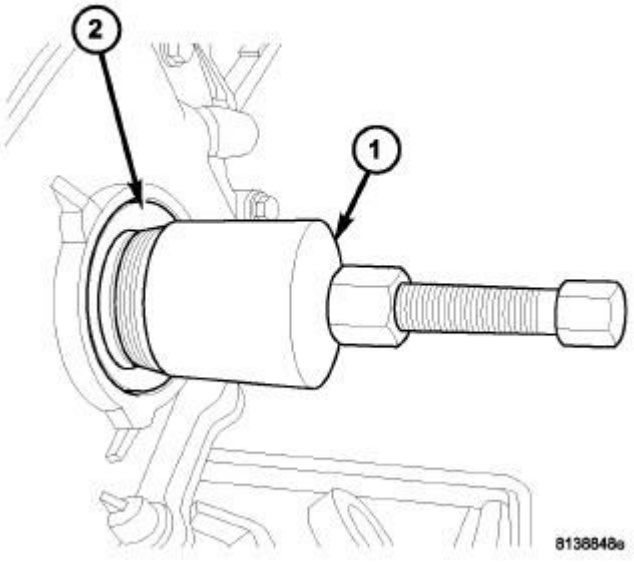


Fig. 232: Front Crankshaft Seal Removal
Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

INSTALLATION

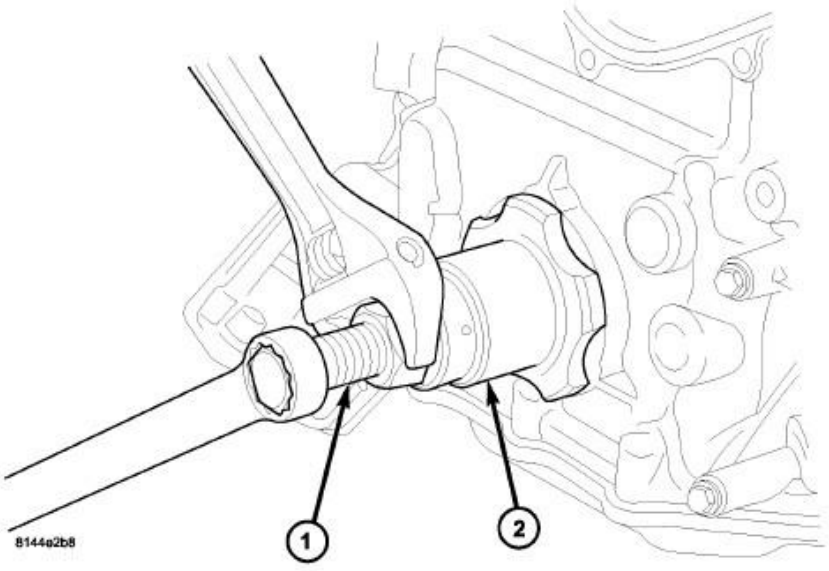


Fig. 233: Front Seal Installation

Courtesy of CHRYSLER GROUP, LLC

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

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

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

2. Install vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.
3. Install radiator cooling fan and shroud. Refer to **FAN, COOLING, ELECTRIC, INSTALLATION** or **FAN, COOLING, VISCOUS, INSTALLATION** .
4. Install upper radiator hose.
5. Install accessory drive belt. Refer. Refer to **BELT, SERPENTINE, INSTALLATION** .
6. Refill cooling system. Refer to **STANDARD PROCEDURE** .
7. Connect negative cable to battery.

SEAL, CRANKSHAFT OIL, REAR

DESCRIPTION

DESCRIPTION

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

- **Diagnosis and Testing** . 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

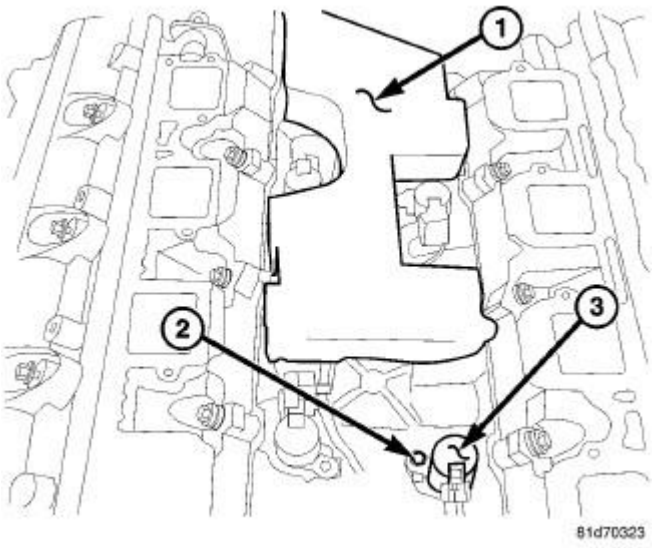


Fig. 234: MDS Solenoids
Courtesy of CHRYSLER GROUP, LLC

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).

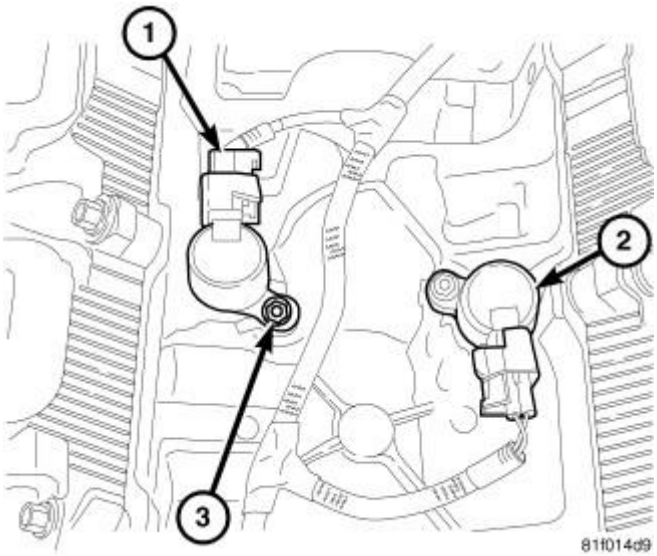


Fig. 235: MDS Solenoid Connector
Courtesy of CHRYSLER GROUP, LLC

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

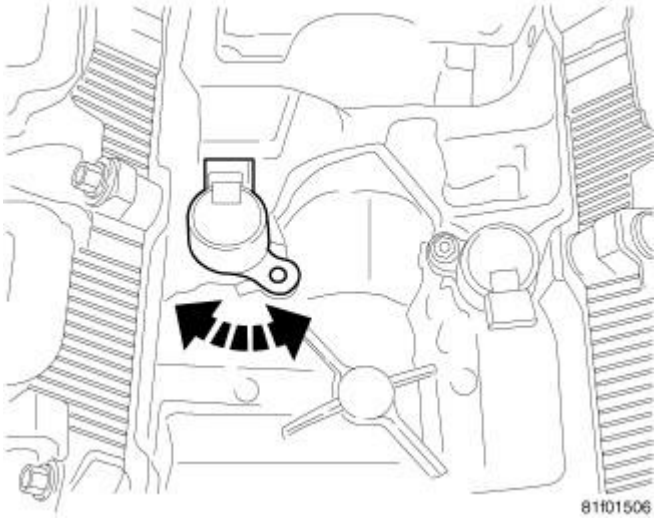


Fig. 236: MDS Solenoid Removal
Courtesy of CHRYSLER GROUP, LLC

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

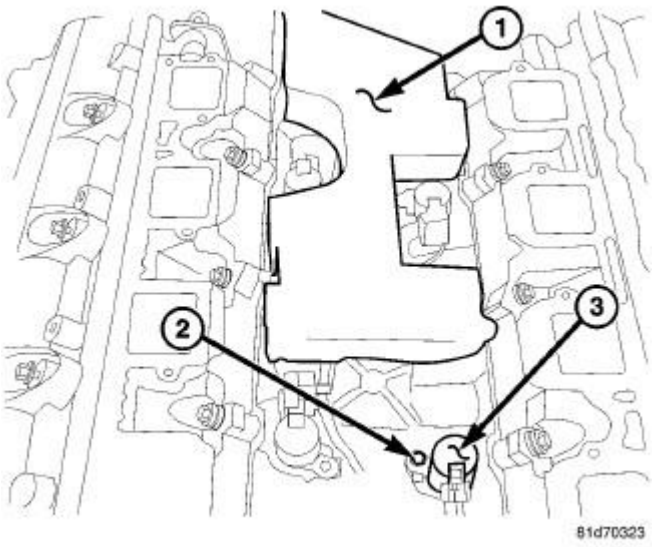


Fig. 237: MDS Solenoids
Courtesy of CHRYSLER GROUP, LLC

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, REAR (TRANSMISSION)

REMOVAL

REMOVAL

REMOVAL

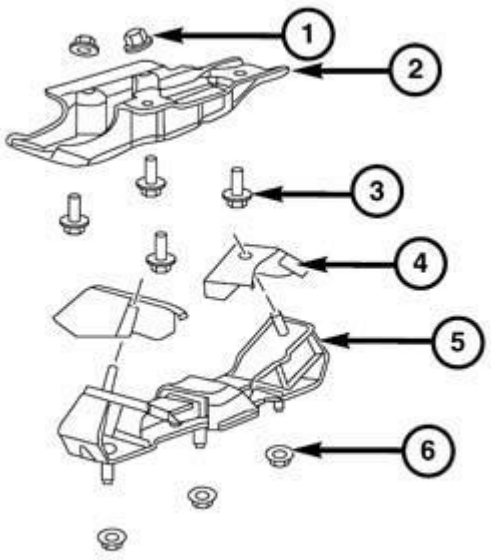


Fig. 238: Transmission Mount Nuts, Upper Mount Bracket, Bolts, Heat Shields, Mount & Lower Nuts
Courtesy of CHRYSLER GROUP, LLC

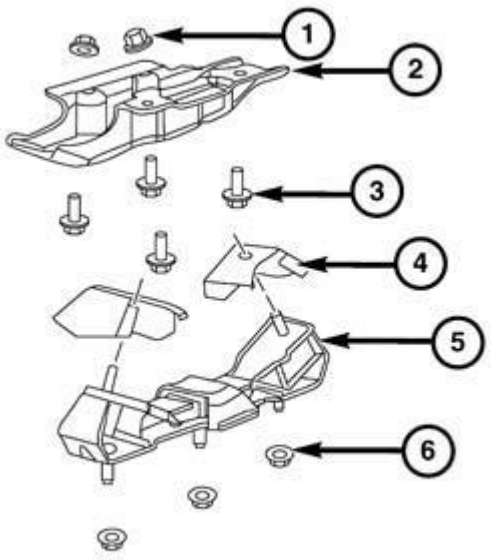
NOTE: 4WD mount shown in illustration. 4WD mount similar.

1. Raise the vehicle on a hoist.
2. Remove the lower nuts (6) from the transmission mount (5).
3. Using a suitable jack. Raise the transmission off the crossmember.
4. Remove the bolts (3) that secure the upper transmission mount bracket (2) to the transmission.
5. Remove the rear mount assembly from vehicle.
6. Remove the transmission mount nuts (1) from the upper transmission mount bracket.
7. Separate the insulator from the transmission mounting bracket.
8. Remove the transmission mount heat shields (4).

INSTALLATION

INSTALLATION

INSTALLATION



0912002986

Fig. 239: Transmission Mount Nuts, Upper Mount Bracket, Bolts, Heat Shields, Mount & Lower Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: 4WD mount shown in illustration. 4WD mount similar.

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

1. If removed, position the heat shields (4) onto the insulator (5).
2. Position the insulator to the upper transmission mount bracket (2). Tighten the nuts (1) to 61 N.m (45 ft. lbs.).
3. Align the transmission mount to the transmission.
4. Install the bolts (3) that attach the transmission bracket to the transmission. Tighten the bolts to 64 N.m (47 ft. lbs.).
5. Lower the transmission so the transmission mount rest on the crossmember and the studs of the transmission mount are aligned in the slots in the crossmember.
6. Install the nuts (6) onto the transmission mount studs through the crossmember access slot.
7. Tighten the nuts to 61 N.m (45 ft. lbs.).
8. Lower the vehicle.

INSULATOR, ENGINE MOUNT, FRONT

REMOVAL

INSULATOR, LEFT

2WD

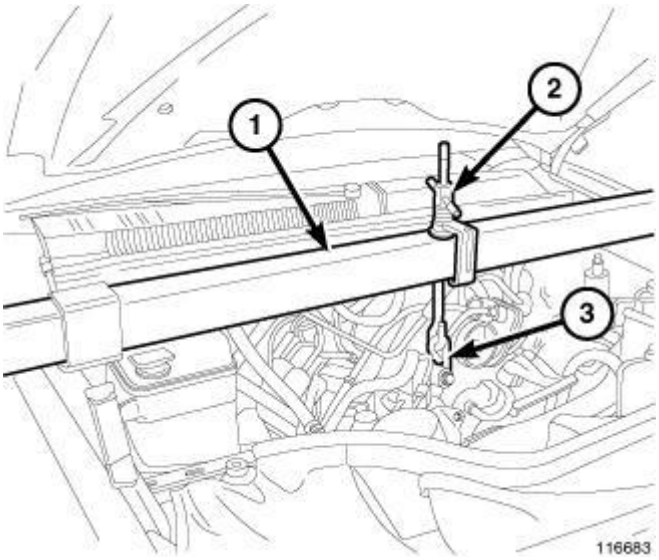


Fig. 240: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Install the (special tool #8534B, Fixture, Driveline Support) (1).
3. Using the handle (2), tighten the lift rod (3) so that the engine will be supported.
4. Raise the vehicle.

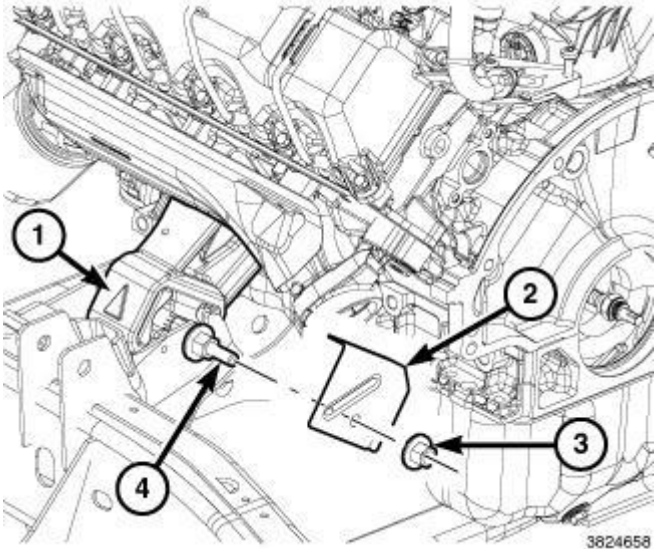


Fig. 241: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Loosening of both front engine mount through bolts will be required for lifting of the engine.

5. Remove the engine mount heat shield nuts (3).

6. Remove the heat shield (2) from the engine mount through bolts (4).
7. Loosen the nut from engine mount through bolts.
8. Lower the vehicle.
9. Tighten the handle for the engine lift so that the engine clears the engine mount to frame bracket.
10. Raise the vehicle.

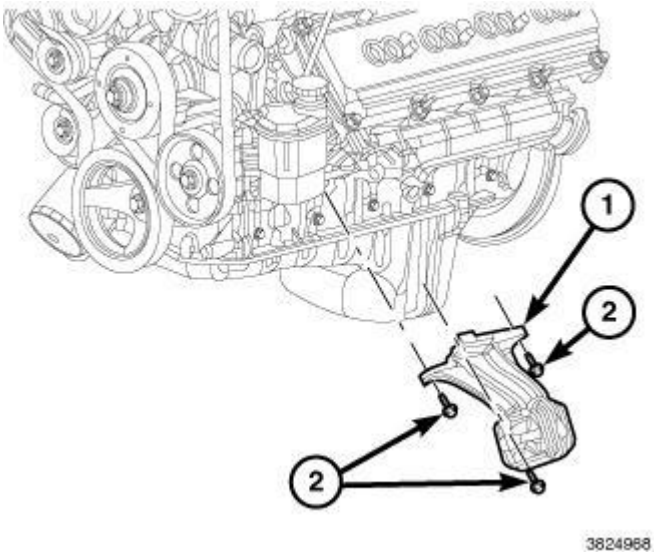


Fig. 242: Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove the bolts (2) that secure the engine mount (1) to the engine block.
12. Remove insulator from engine.

4WD WITH INDEPENDENT SUSPENSION

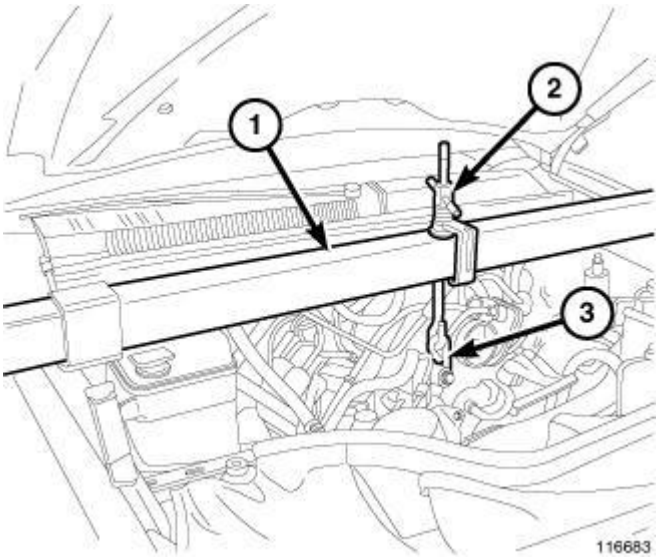


Fig. 243: Engine Support Tool

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative cable from the battery.
2. Install the (special tool #8534B, Fixture, Driveline Support) (1).
3. Using the handle (2), tighten the lift rod (3) so that the engine will be supported.
4. Raise the vehicle.

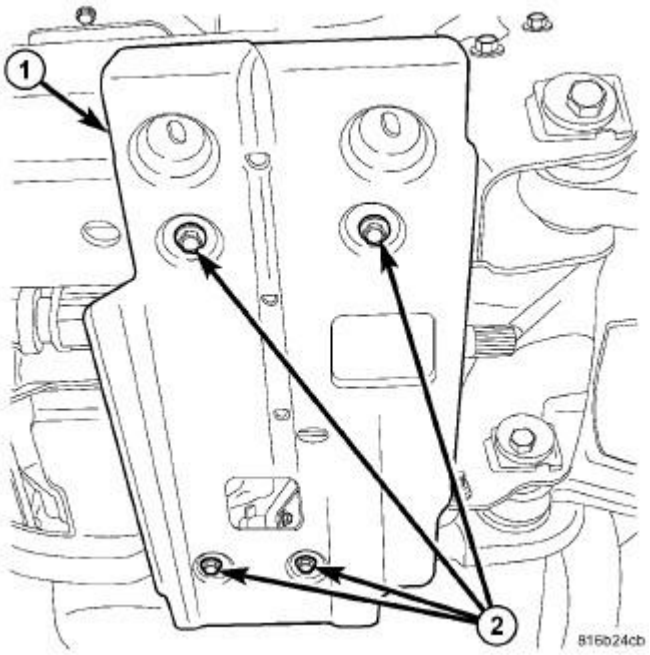


Fig. 244: Identifying Skid Plate And Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the skid plate.

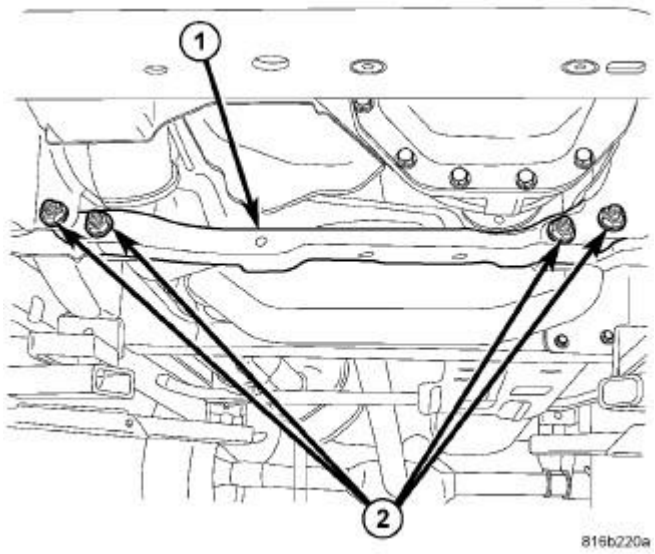


Fig. 245: Identifying Suspension Crossmember
Courtesy of CHRYSLER GROUP, LLC

6. Remove the front crossmember.

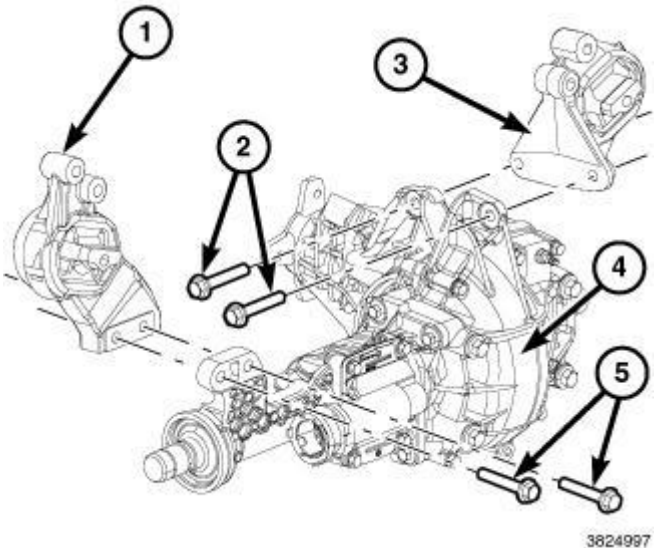


Fig. 246: Engine Mounts, Front Axle & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Support the front axle (4) with a suitable jack.
8. Remove the bolts (2 and 5) that attach the engine mounts (1 and 3) to the front axle.

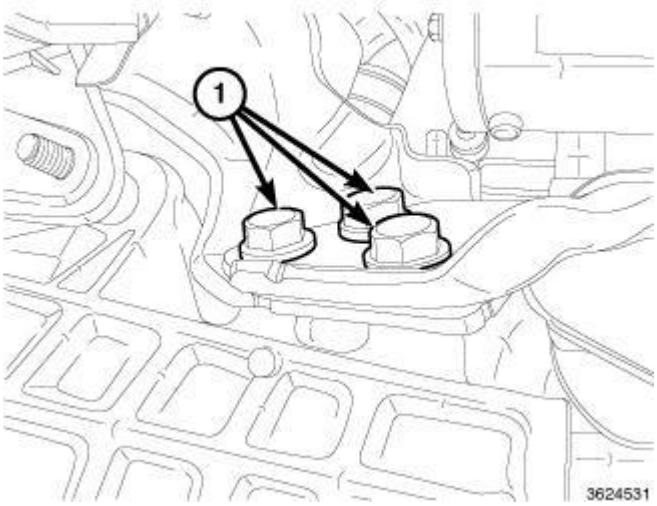


Fig. 247: Pinion Nose Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolts (1) that attach the front axle pinion housing to the left engine bracket.
10. Lower the front axle.

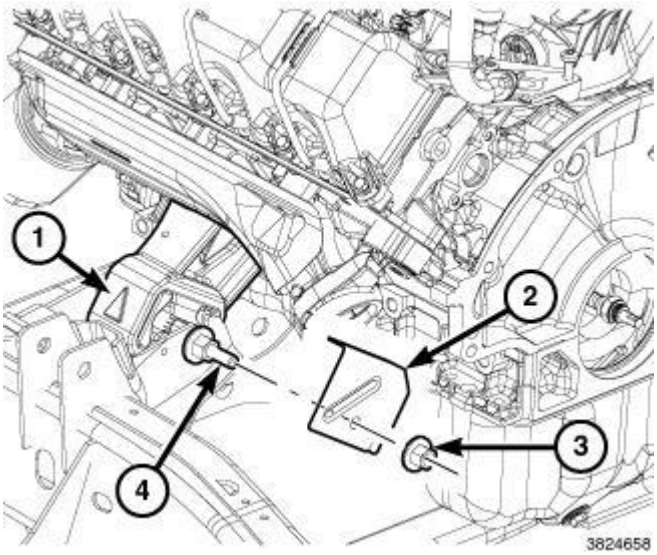


Fig. 248: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Remove the engine mount heat shield nut (3).
12. Remove the heat shield (2) from the engine mount insulator bolts.
13. Remove the nut and through bolt (4) from engine mount insulator bolts.

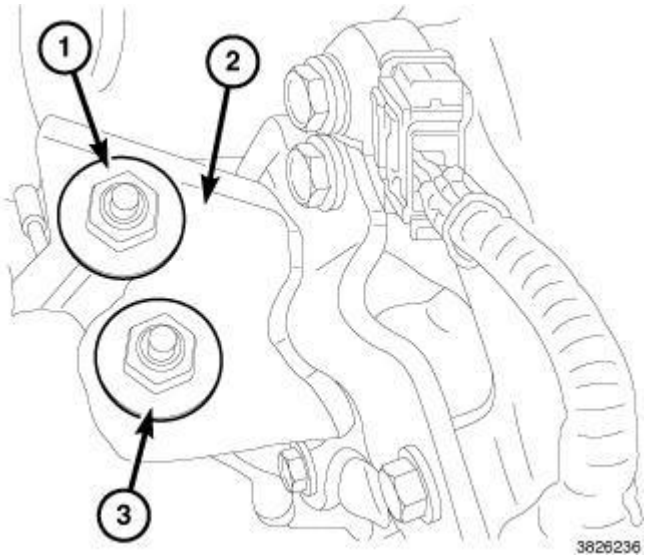


Fig. 249: Upper Engine Bracket, Mount & Bolts - Left
Courtesy of CHRYSLER GROUP, LLC

14. From the upper engine mount bracket (2). Remove the upper engine mount through bolt (3).
15. Remove the upper engine bracket to mount guide bolt (1).
16. Remove the engine mounts from below the vehicle.

INSULATOR, RIGHT

2WD

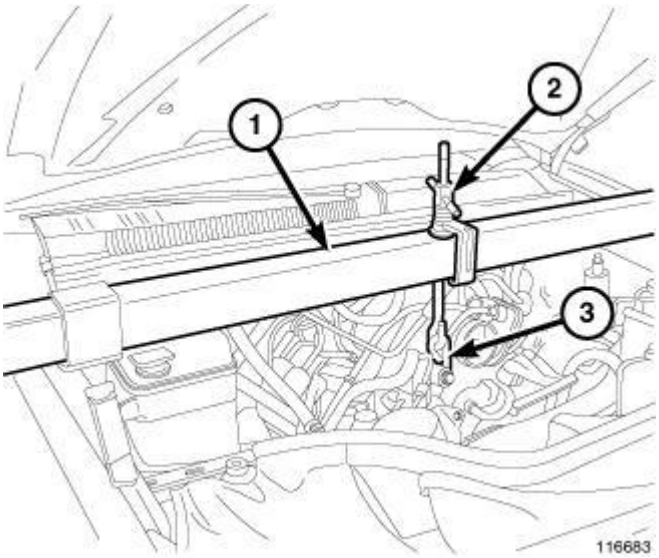


Fig. 250: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Install the (special tool #8534B, Fixture, Driveline Support) (1).

3. Using the handle (2), tighten the lift rod (3) so that the engine will be supported.
4. Raise the vehicle.

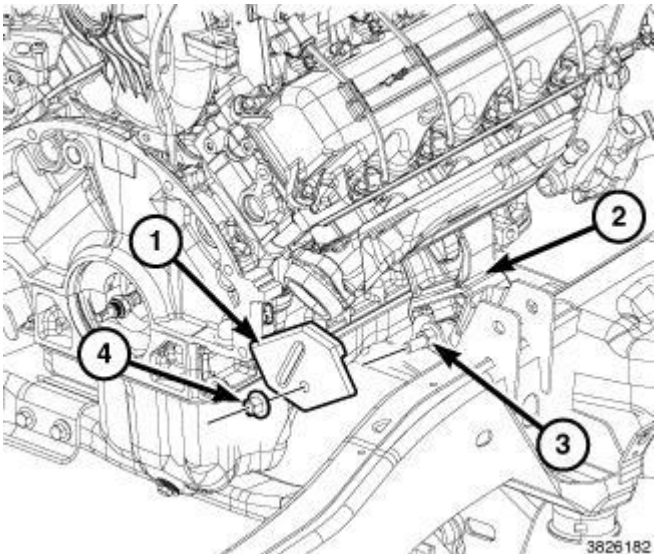


Fig. 251: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: Loosening of both front engine mount through bolts will be required for lifting of the engine.

5. Remove the engine mount heat shield nuts (4).
6. Remove the heat shields (1) from the engine mounts through bolts.
7. Loosen the nut (3) from engine mount through bolts.
8. Lower the vehicle.
9. Tighten the handle for the engine lift so that the engine clears the engine mount to frame bracket.
10. Raise the vehicle.

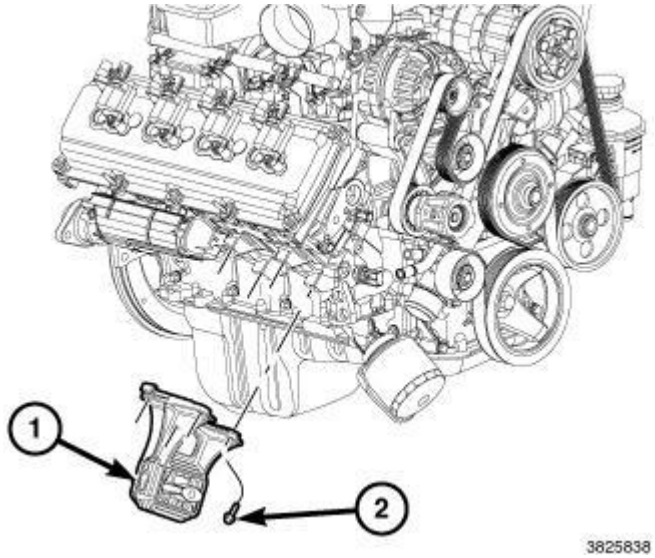


Fig. 252: Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove the bolts (2) that secure the engine mount (1) to the engine block.
12. Remove insulator from below the vehicle.

4WD WITH INDEPENDENT SUSPENSION

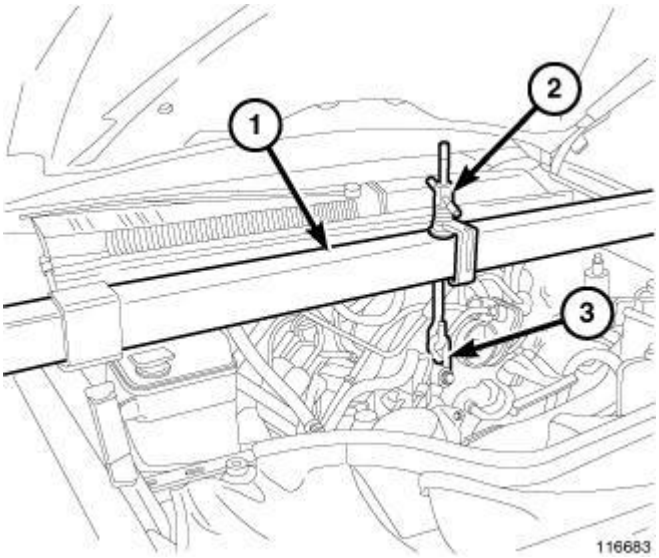


Fig. 253: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative cable from the battery.
2. Install the (special tool #8534B, Fixture, Driveline Support) (1).
3. Using the handle (2), tighten the lift rod (3) so that the engine will be supported.
4. Raise the vehicle.

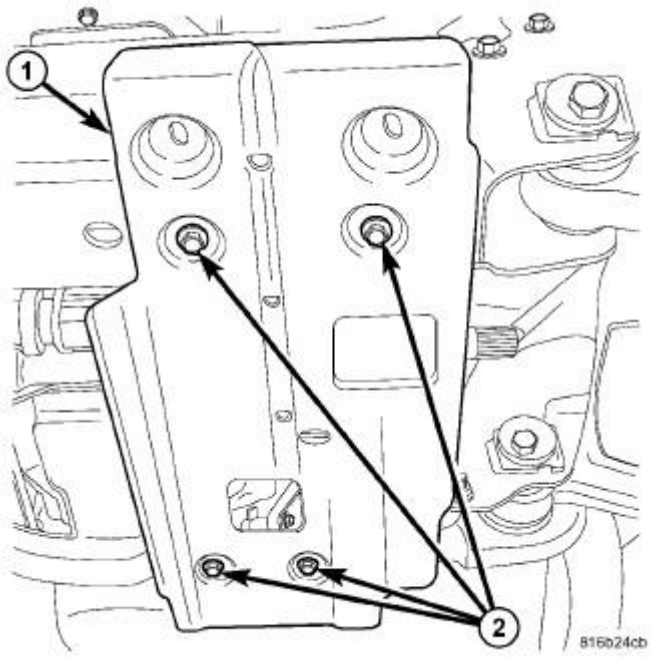


Fig. 254: Identifying Skid Plate And Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the skid plate.

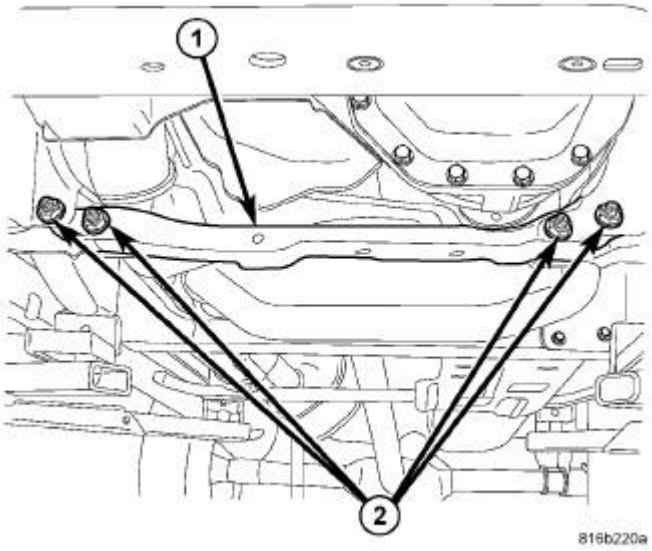


Fig. 255: Identifying Suspension Crossmember
Courtesy of CHRYSLER GROUP, LLC

6. Remove the front crossmember.

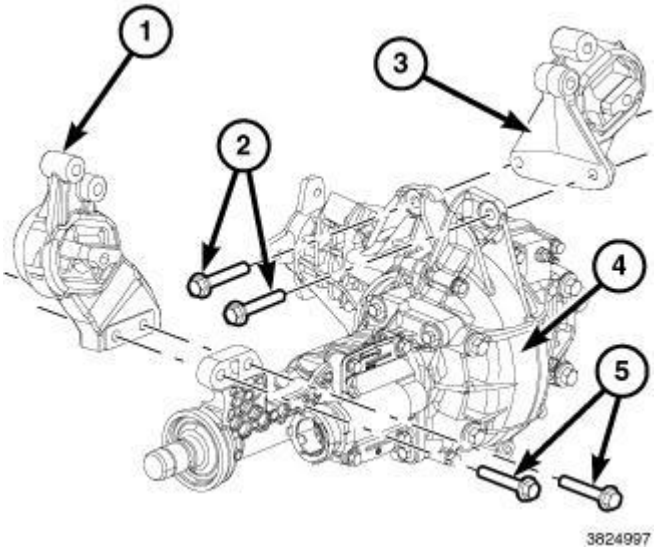


Fig. 256: Engine Mounts, Front Axle & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Support the front axle (4) with a suitable jack.
8. Remove the bolts (2 and 5) that attach the engine mounts (1 and 3) to the front axle.

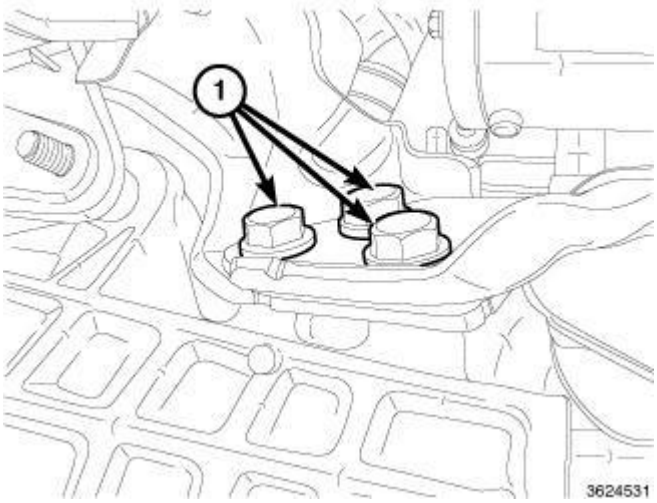


Fig. 257: Pinion Nose Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolts (1) that attach the front axle pinion housing to the left engine bracket.
10. Lower the front axle.

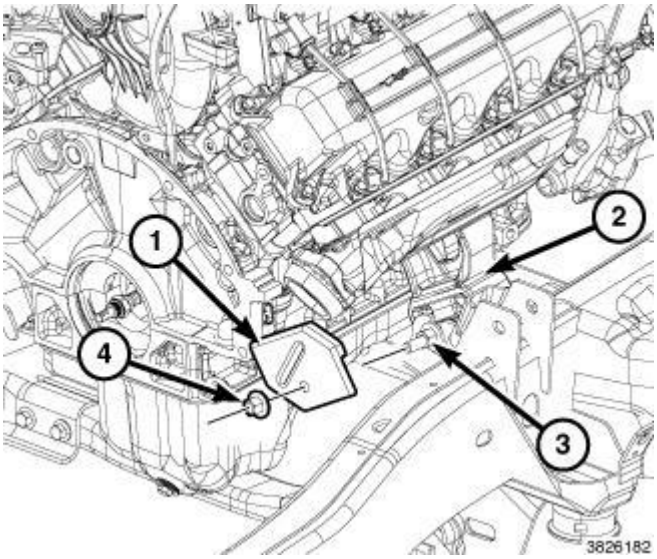


Fig. 258: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Remove the engine mount heat shield nut (4).
12. Remove the heat shield (1).
13. Remove the nut (3) and through bolt from engine mount.

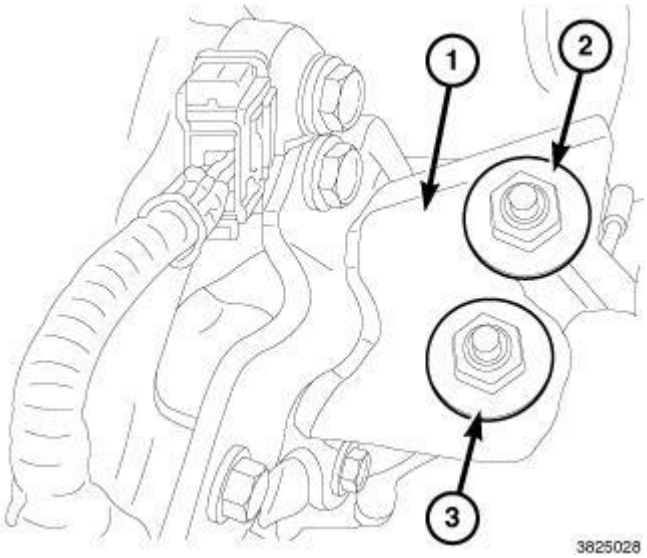


Fig. 259: Upper Engine Bracket, Mount & Bolts - Right
Courtesy of CHRYSLER GROUP, LLC

14. Remove the upper engine bracket (1) to mount through bolt (3).
15. Remove the upper engine bracket to mount guide bolt (2).
16. Remove the engine mount from below the vehicle.

INSTALLATION

INSULATOR, LEFT

2WD

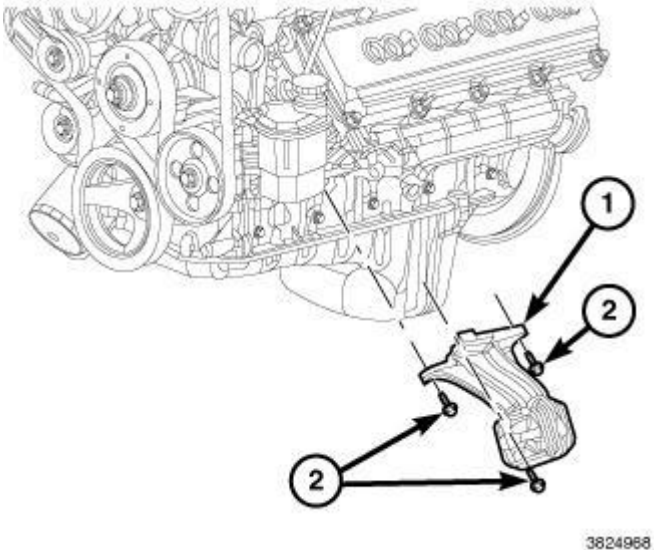


Fig. 260: Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. With the vehicle raised. Position the engine mount (1) on the engine.
2. Install upper and lower mount mounting bolts (2). Tighten bolts to 64 N.m (47 ft. lbs.).
3. Center the engine mount through bolt.
4. Lower the vehicle.

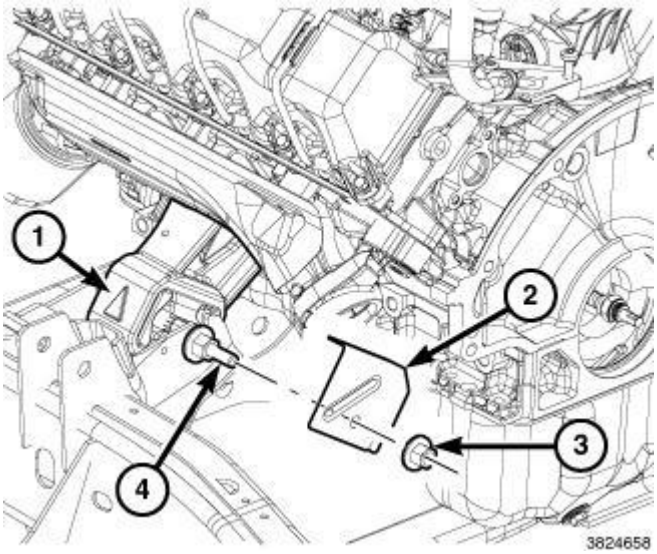


Fig. 261: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Lower the engine into position onto the frame.

6. Raise vehicle.
7. Install the nut to the engine mount through bolt (4). Tighten the bolt to 130 N.m (96 ft. lbs.).
8. Install the engine mount heat shield (2). Tighten the nut (3) to 55 N.m (41 ft. lbs.).
9. Lower the vehicle.

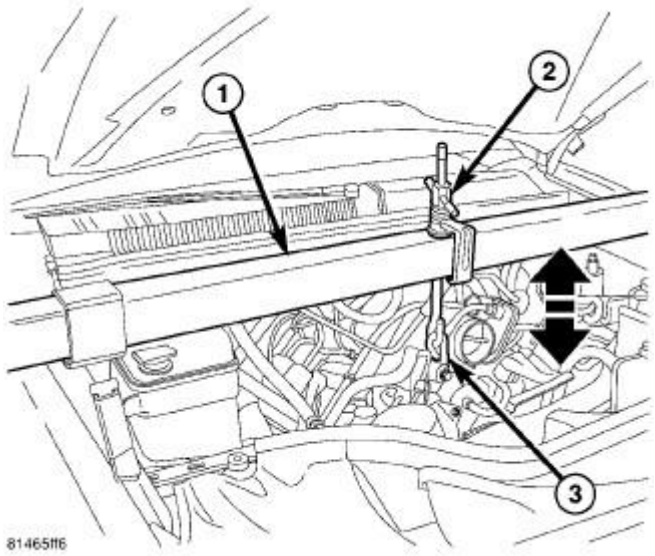


Fig. 262: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

10. Remove the (special tool #8534B, Fixture, Driveline Support).
11. Connect negative battery cable.

4WD WITH INDEPENDENT SUSPENSION

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

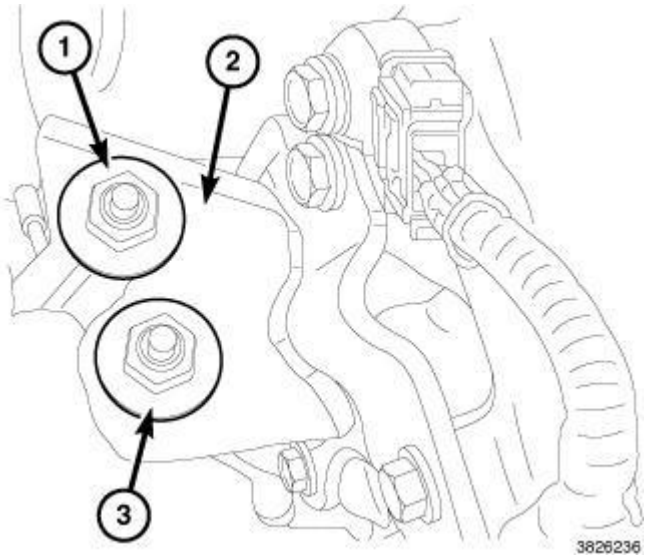


Fig. 263: Upper Engine Bracket, Mount & Bolts - Left
Courtesy of CHRYSLER GROUP, LLC

1. Position the engine mount to the engine bracket (2).
2. Install the upper engine mount to the engine bracket (3) through bolt.
3. Install the upper engine bracket to mount guide bolt (1).
4. Install the engine mount to frame through bolt.
5. Tighten the upper fasteners (1 and 3) to 108 N.m (80 ft. lbs.).

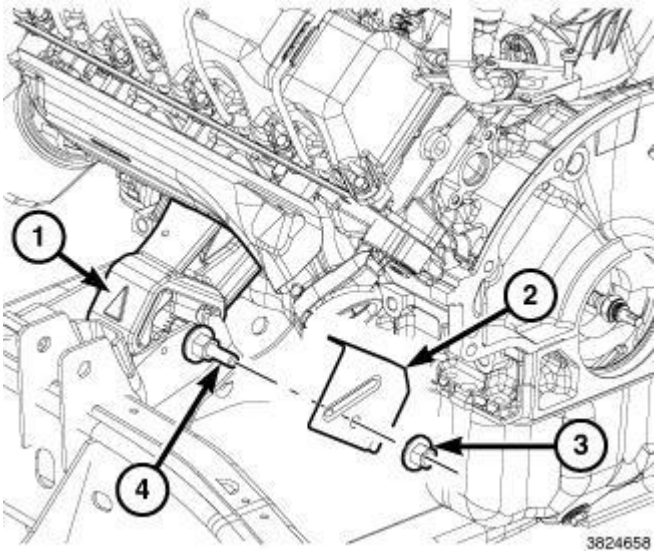


Fig. 264: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Install the engine mount (1) through bolt nut. Tighten to 130 N.m (96 ft. lbs.).
7. Position the heat shield (2) onto the engine mount through bolt (4). Tighten the nut (3) to 55 N.m (41 ft. lbs.).

NOTE: Removing the stabilizer bar mounts and positioning the stabilizer bar below the frame will provide adequate room for torquing the front upper axle bolt.

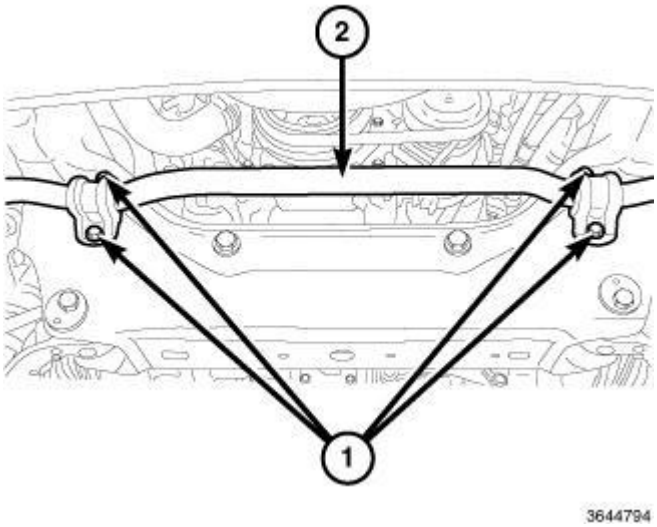


Fig. 265: Stabilizer Bar & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove stabilizer bar bolts (1) and position stabilizer bar (2) below crossmember.

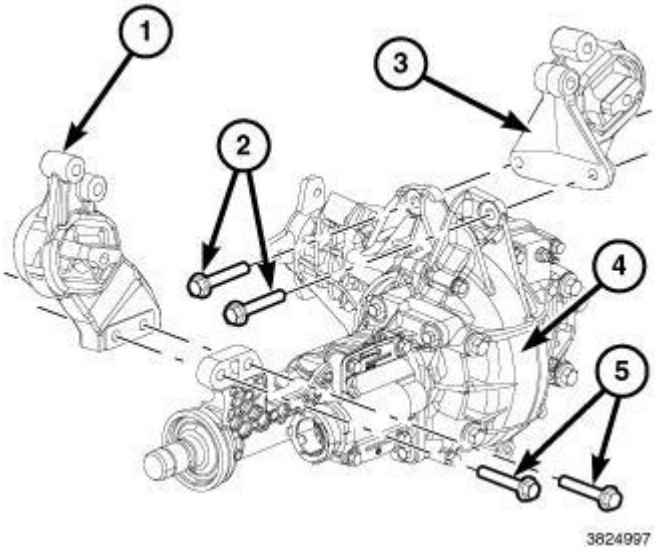


Fig. 266: Engine Mounts, Front Axle & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Align the axle assembly (4) to the engine mounts.
10. Install the bolts (2 and 5) that secure the axle to the engine mount (1 and 3). Tighten bolts to 110 N.m (81 ft. lbs.).
11. Position the stabilizer bar to the crossmember. Tighten the bolts to 59 N.m (44 ft. lbs.).

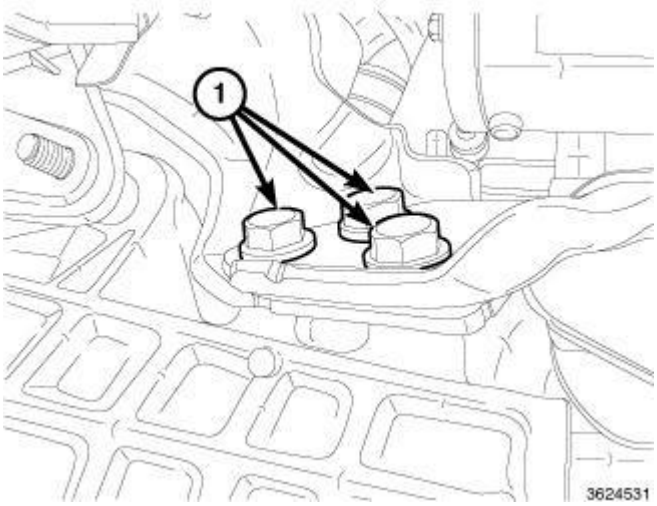


Fig. 267: Pinion Nose Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the pinion housing to engine bracket bolts (1). Tighten bolts to 120 N.m (89 ft. lbs.).

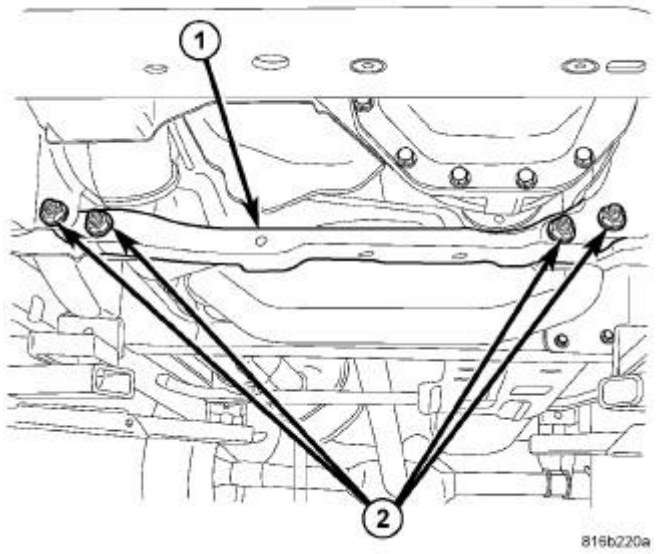


Fig. 268: Identifying Suspension Crossmember
Courtesy of CHRYSLER GROUP, LLC

13. Install the crossmember. Refer to **CROSSMEMBER, LOWER CONTROL ARM, INSTALLATION** or **CROSSMEMBER, TRANSMISSION, INSTALLATION** .

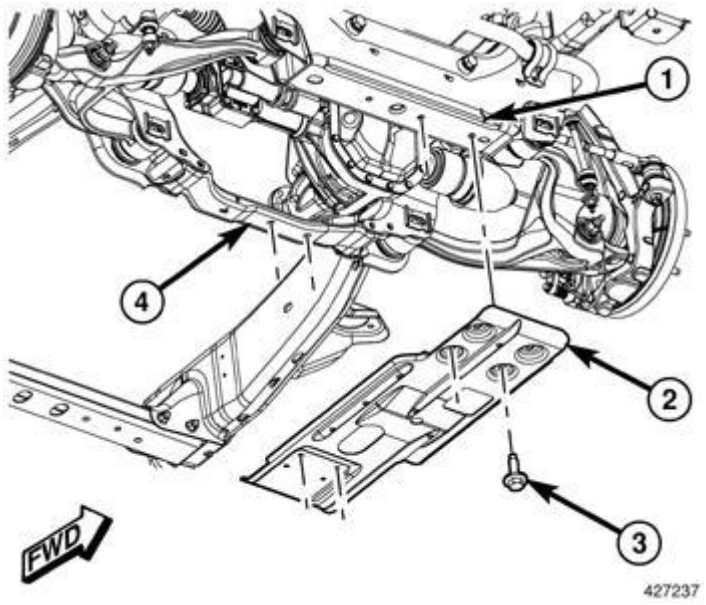


Fig. 269: Removing/Installing Front Skid Plate
Courtesy of CHRYSLER GROUP, LLC

14. Install the front skid plate. Install the bolts (3) and tighten to 18 N.m (13 ft. lbs.).
15. Lower the vehicle.

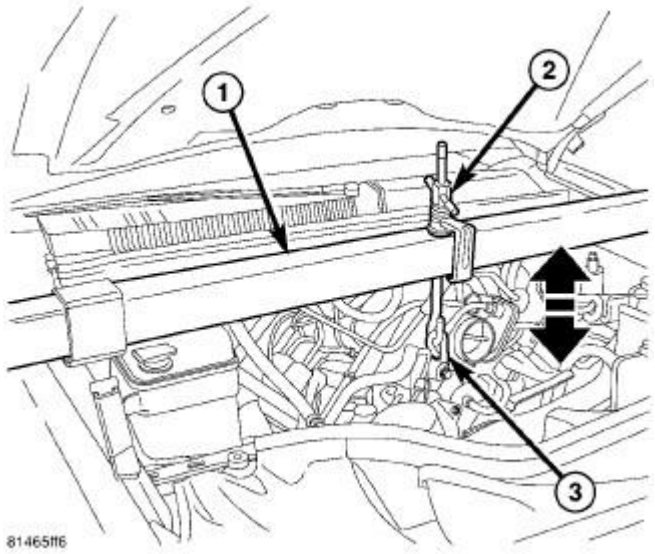


Fig. 270: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

16. Remove the (special tool #8534B, Fixture, Driveline Support).
17. Connect the negative battery cable.

INSULATOR, RIGHT

2WD

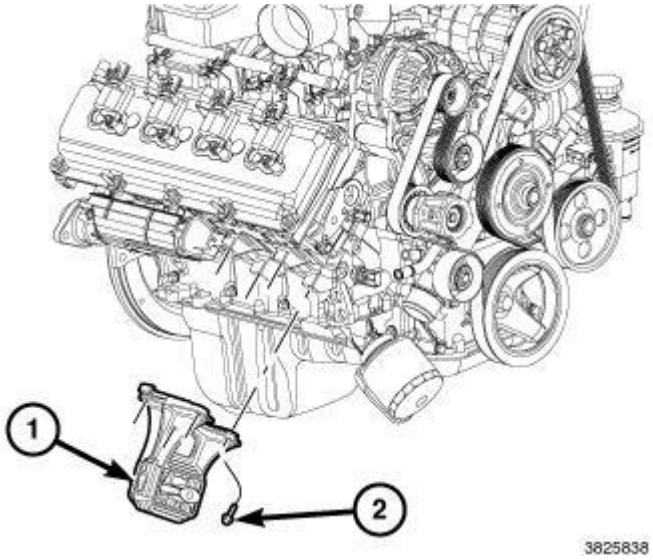


Fig. 271: Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. With the vehicle raised. Position the engine mount (1) on the engine.
2. Install upper and lower mount mounting bolts (2). Tighten bolts to 64 N.m (47 ft. lbs.).
3. Center the engine mount through bolt.
4. Lower the vehicle.

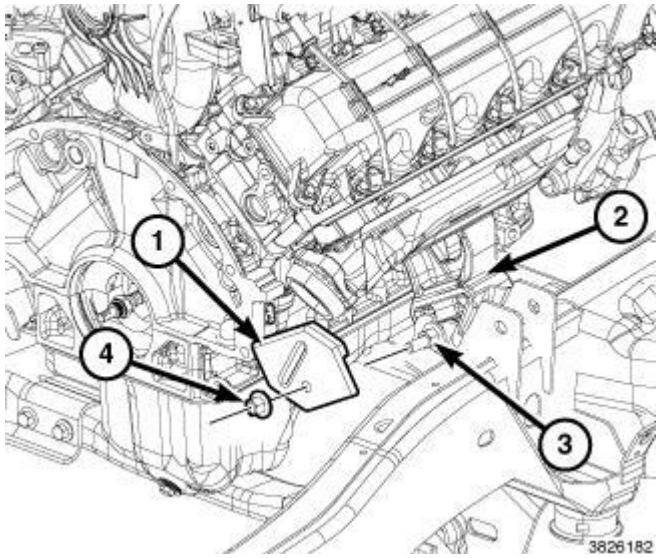


Fig. 272: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Lower the engine into position onto the frame.
6. Raise vehicle.

7. Install the nut to the engine mount through bolt (3). Tighten the bolt to 130 N.m (96 ft. lbs.).
8. Install the engine mount heat shield (1). Tighten the nut (4) to 55 N.m (41 ft. lbs.).
9. Lower the vehicle.

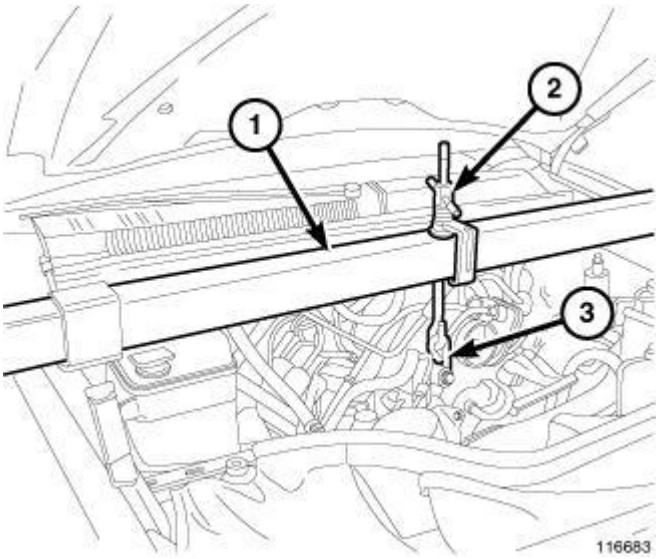


Fig. 273: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

10. Remove the (special tool #8534B, Fixture, Driveline Support).
11. Connect negative battery cable.

4WD WITH INDEPENDENT SUSPENSION

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

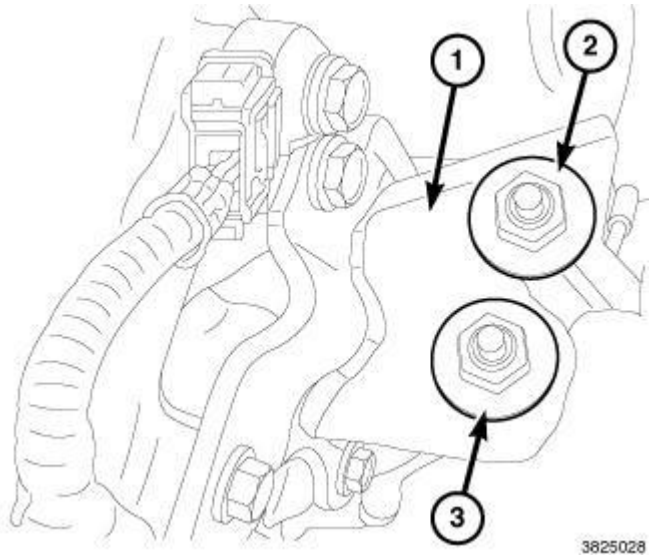


Fig. 274: Upper Engine Bracket, Mount & Bolts - Right
Courtesy of CHRYSLER GROUP, LLC

1. Position the engine mount to the engine bracket (1).
2. Install the upper engine mount to the engine bracket through bolt (3).
3. Install the upper engine bracket to mount guide bolt (2) through the engine mount.
4. Tighten the upper fasteners (2 and 3) to 108 N.m (80 ft. lbs.).

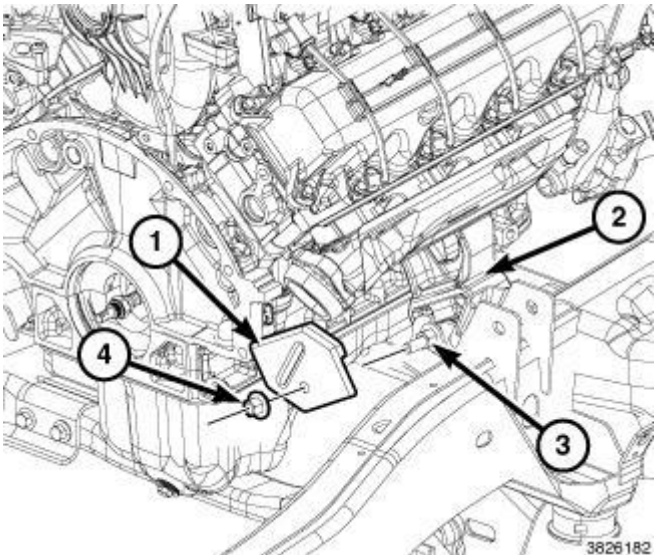


Fig. 275: Engine Mount, Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine mount through bolt. Tighten the nut (3) for through bolt to 130 N.m (96 ft. lbs.).
6. Position the heat shield (1) onto the engine mount through bolt. Tighten the nut (4) to 55 N.m (41 ft. lbs.).

NOTE: Removing the stabilizer bar mounts and positioning the stabilizer bar below the frame will provide adequate room for torquing the front upper axle bolt.

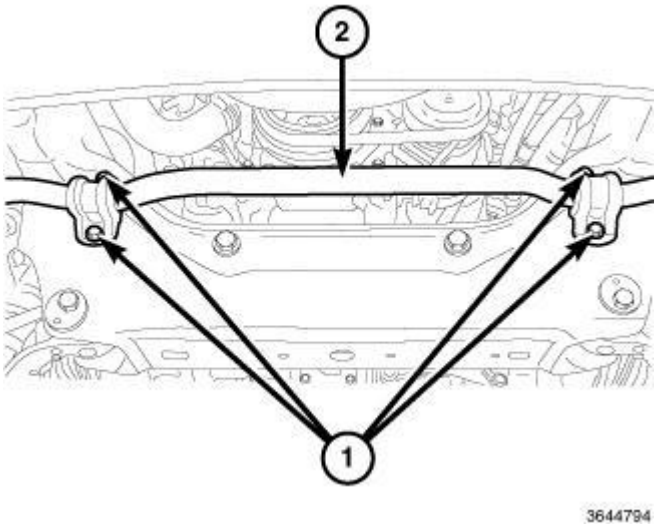


Fig. 276: Stabilizer Bar & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove stabilizer bar bolts (1) and position stabilizer bar (2) below crossmember.

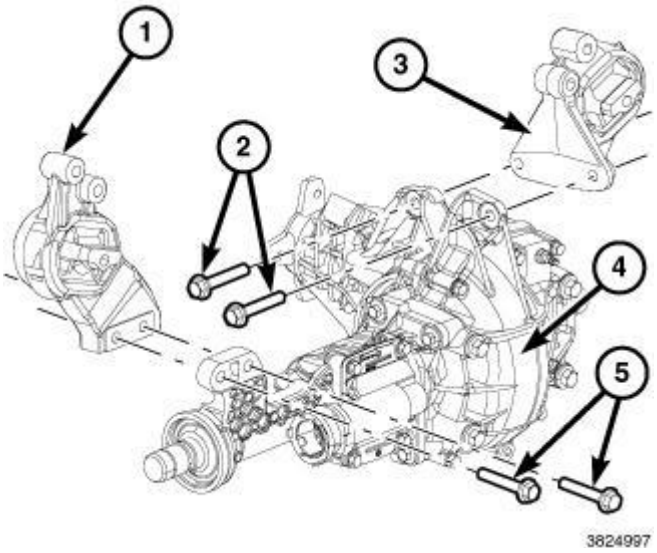


Fig. 277: Engine Mounts, Front Axle & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Align the axle assembly (4) to the engine mounts.
9. Install the bolts (2 and 5) that secure the axle to the engine mounts (1 and 3). Tighten bolts to 110 N.m (81 ft. lbs.).
10. Position the stabilizer bar to the crossmember. Tighten the bolts to 59 N.m (44 ft. lbs.).

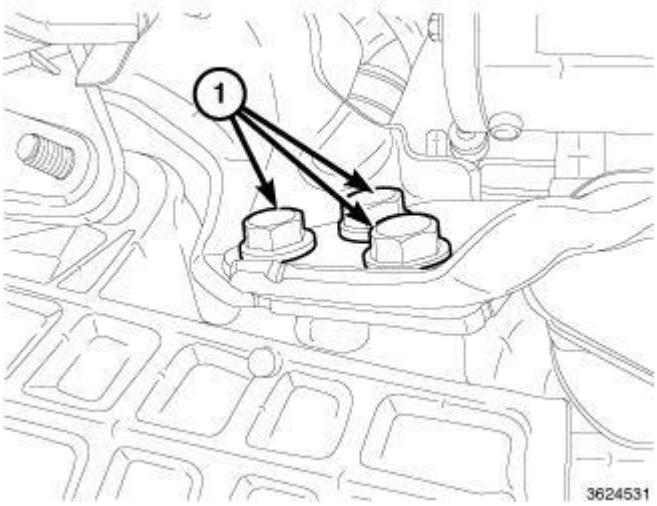


Fig. 278: Pinion Nose Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the pinion housing to engine bracket bolts (1). Tighten bolts to 120 N.m (89 ft. lbs.).

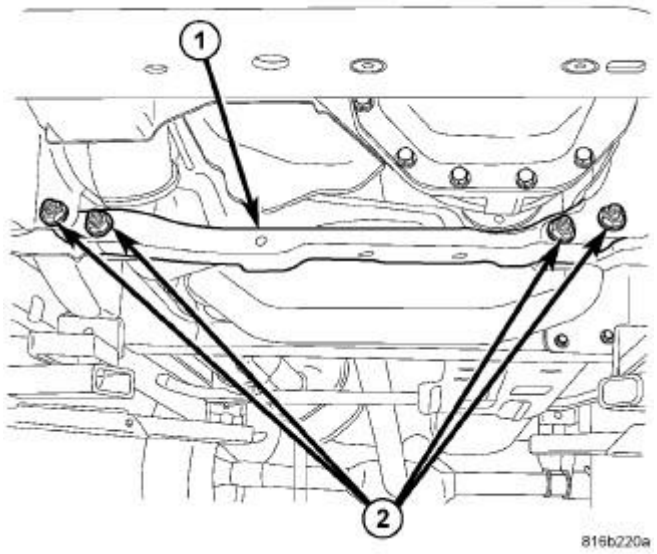


Fig. 279: Identifying Suspension Crossmember
Courtesy of CHRYSLER GROUP, LLC

12. Install the crossmember. Refer to **CROSSMEMBER, LOWER CONTROL ARM, INSTALLATION** or **CROSSMEMBER, TRANSMISSION, INSTALLATION** .

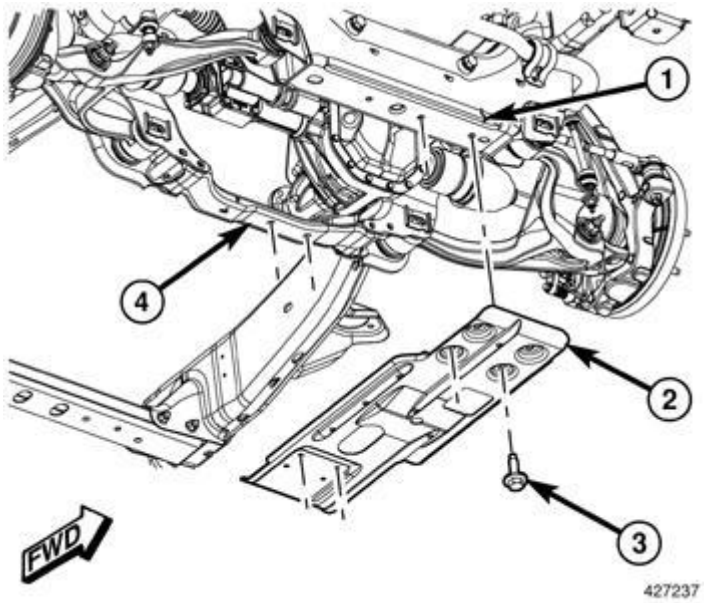


Fig. 280: Removing/Installing Front Skid Plate
Courtesy of CHRYSLER GROUP, LLC

13. Install the front skid plate. Install the bolts (3) and tighten to 18 N.m (13 ft. lbs.).
14. Lower the vehicle.

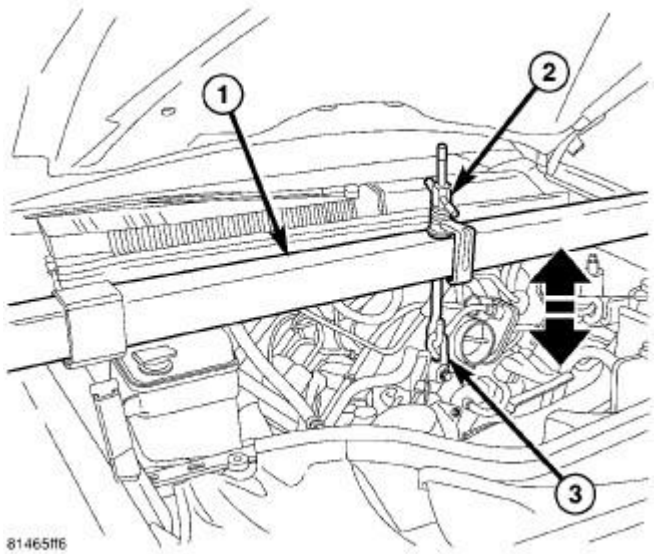


Fig. 281: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

15. Remove the engine lift tool.
16. Reconnect the negative battery cable.

LUBRICATION

DESCRIPTION

DESCRIPTION

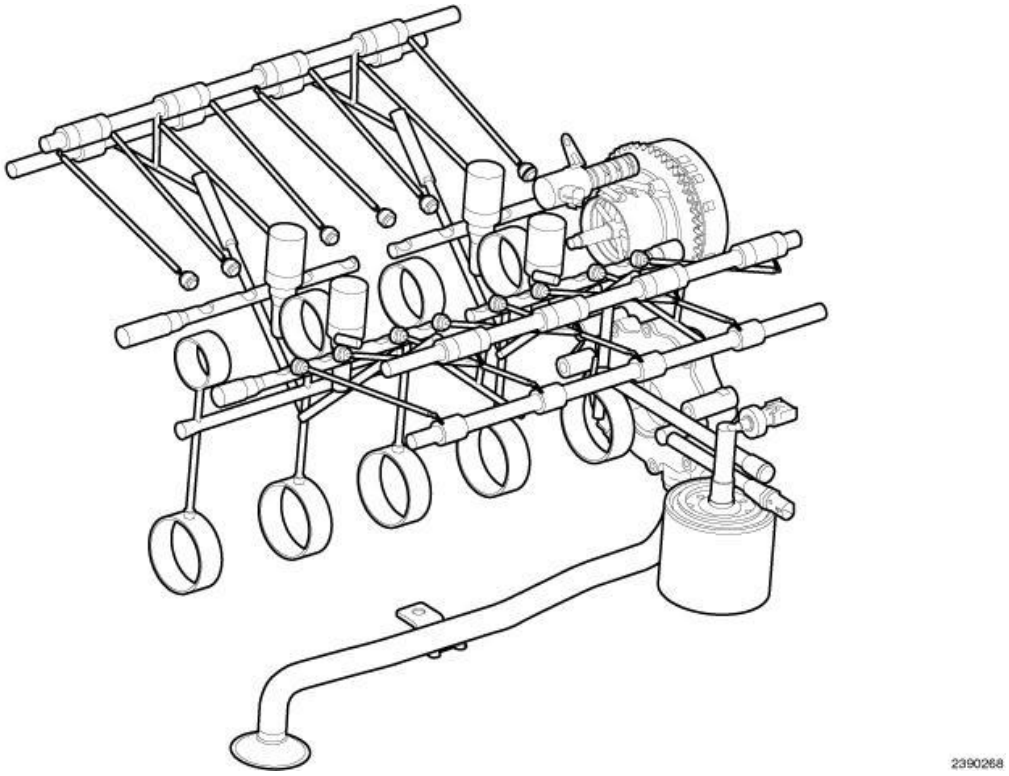


Fig. 282: 5.7L MDS Lubrication System
Courtesy of CHRYSLER GROUP, LLC

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.

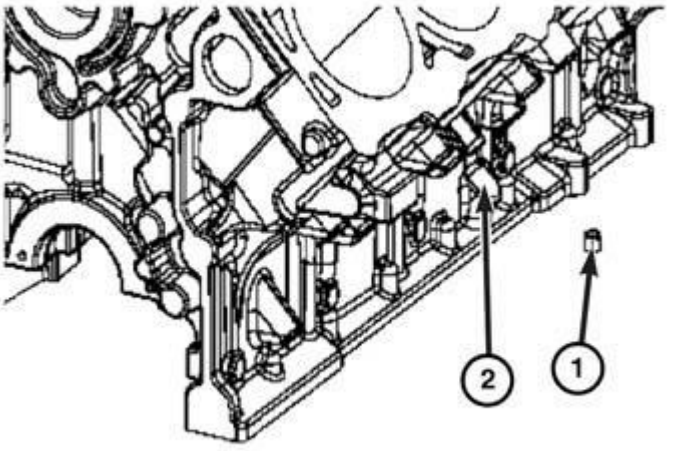


Fig. 283: Engine Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the oil indicator tube is located in the engine oil pan. A plug (1) is inserted into the hole on the engine block (2). Validation of the plug is required when the engine block has been replaced.

AIR LEAK DETECTION TEST METHOD

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

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

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint

the leak source. If the oil leak is detected and identified, repair per Service Information procedures.

4. If the leakage occurs at the rear oil seal area, refer to **INSPECTION FOR REAR SEAL AREA LEAKS** .
5. If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve.
6. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

INSPECTION FOR REAR SEAL AREA LEAKS

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

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

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

SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST

DESCRIPTION

DESCRIPTION

The 5.7L engine is equipped with Variable Cam Timing (VCT). This system uses an variable valve timing solenoid 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 VVTS is located under the intake manifold.

OPERATION

OPERATION

The Variable Cam Timing (VCT) assembly is actuated with engine oil pressure. The oil flow to the VCT assembly is controlled by an Variable Valve Timing Solenoid (VVTS). The VVTS consists of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the VVTS to control oil flow through the spool valve into the VCT assembly. The VCT assembly consists of a rotor and a stator/sprocket. The stator/sprocket is connected to the timing chain. The rotor is connected to the camshaft. Oil flow into the VCT assembly rotates the rotor with respect to the stator, thus rotating the camshaft with respect to the stator/sprocket. This will rotate both the intake and exhaust lobes on the camshaft by the same amount. The intake and exhaust lobes can not be individually controlled with this VCT system. An infinitely variable valve timing position can be achieved within the limits of the hardware. The camshaft position sensor monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

REMOVAL

REMOVAL

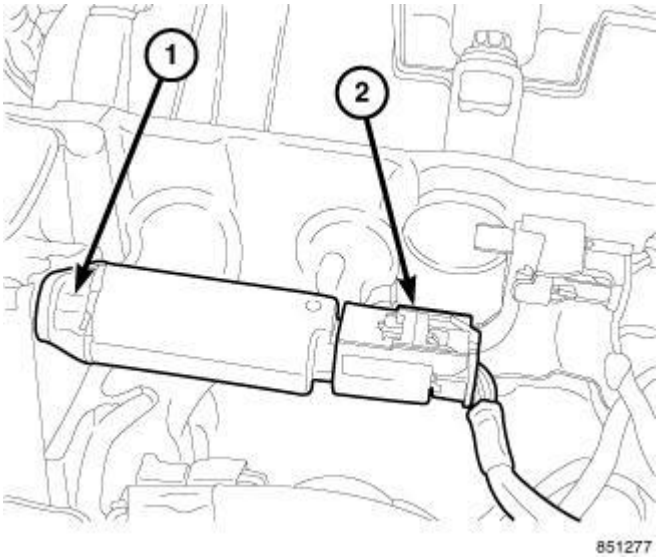


Fig. 284: Oil Control Valve
Courtesy of CHRYSLER GROUP, LLC

1. Remove intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.
2. Disconnect VVTS electrical connector (2).
3. Remove VVTS fastener (1).

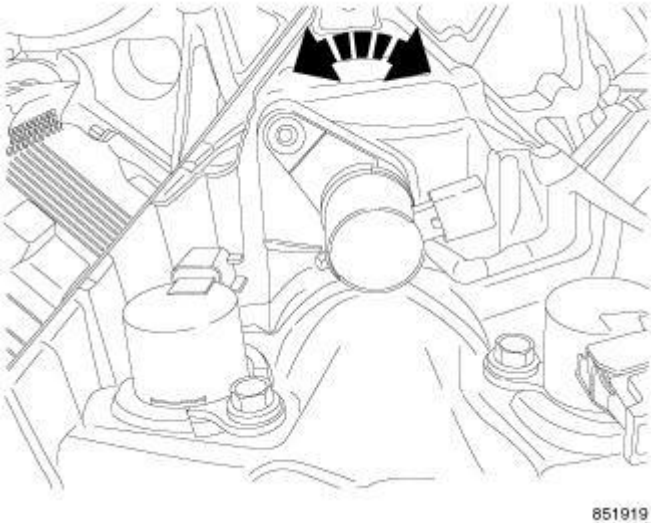


Fig. 285: Oil Control Valve
Courtesy of CHRYSLER GROUP, LLC

NOTE: To remove the VVTS, the engine must be at room temperature.

4. Rotate and pull the VVTS out.

INSTALLATION

INSTALLATION

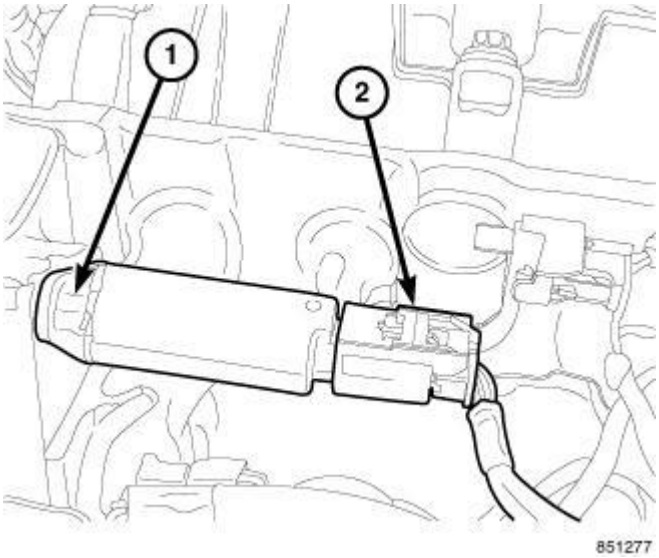


Fig. 286: Oil Control Valve
Courtesy of CHRYSLER GROUP, LLC

1. Install the VVTS.
2. Ensure that the O-ring is fully seated into the cylinder block.

3. Securely tighten the VVTS fastener (1).
4. Connect the VVTS electrical connector (2).
5. Install the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 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 the oil filter gasket (2) with engine oil.

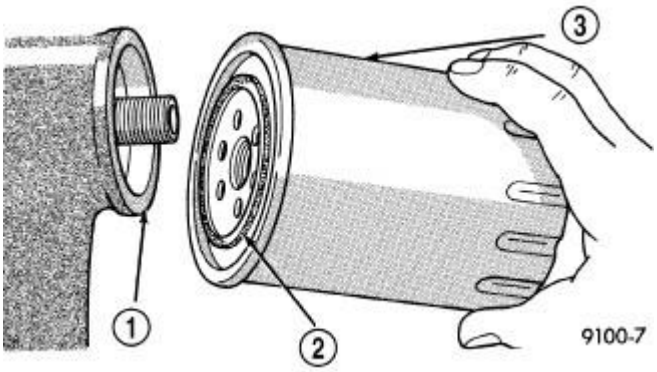


Fig. 287: Installing Engine Oil Filter
Courtesy of CHRYSLER GROUP, LLC

2. Thread the oil filter (3) onto adapter nipple and when the gasket makes contact with sealing surface (1), rotate the filter 360° or one full turn, do not over tighten.
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.

It is recommended that the engine oil level should be checked when the engine is at operating temperature.

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. Verify the oil level to be at the top of the "SAFE" range +/- 1/4 of the total distance of the range.
7. 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 Service 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 applicable disposal laws.

PAN, OIL

REMOVAL

REMOVAL

4X2

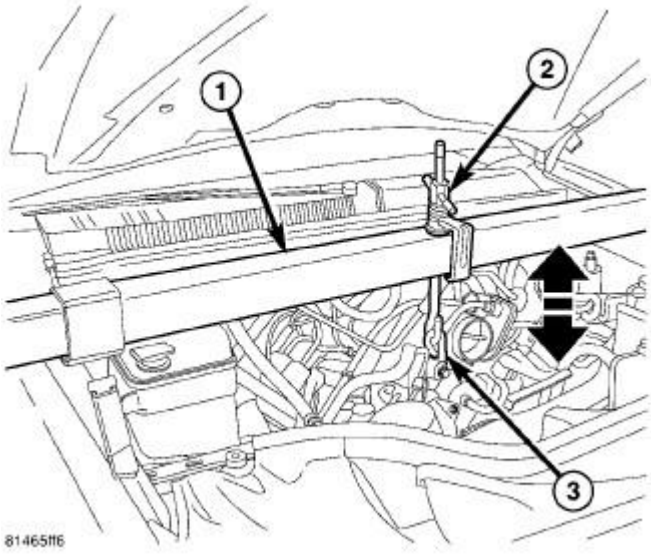


Fig. 288: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

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

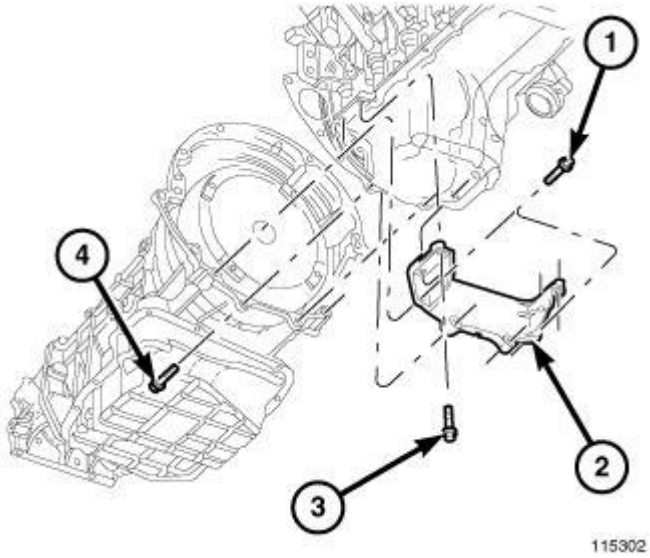


Fig. 289: Structural Cover
Courtesy of CHRYSLER GROUP, LLC

4. Remove the structural dust cover (2). Refer to **COVER, STRUCTURAL DUST, REMOVAL, 5.7L**.
5. Remove the fan and the fan shroud.
6. Drain engine oil.
7. Disconnect transmission fluid cooler lines at radiator, transmission fittings and clips.

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

8. Remove the front crossmember. Refer to **CROSSMEMBER, LOWER CONTROL ARM, REMOVAL** or **CROSSMEMBER, TRANSMISSION, REMOVAL** .

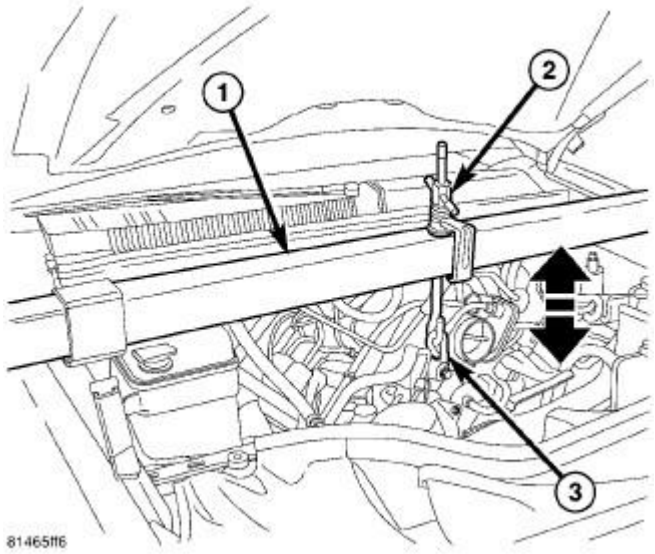


Fig. 290: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

9. Raise engine using Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (1) to provide clearance to remove oil pan.

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

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

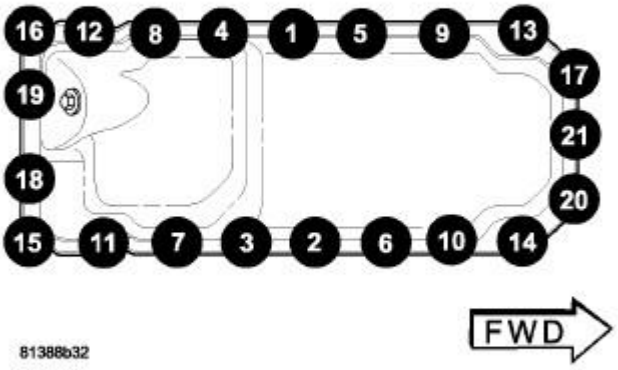


Fig. 291: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

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

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

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

4X4

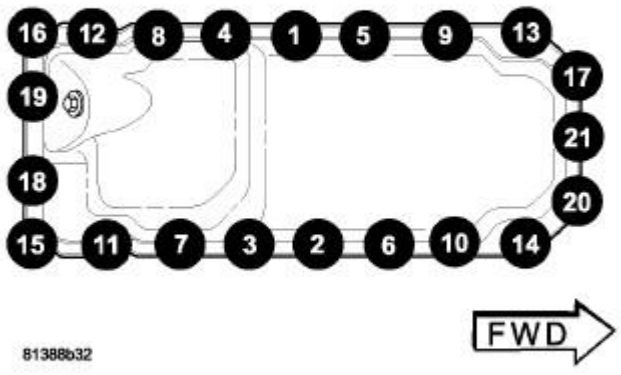


Fig. 292: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

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

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

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

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

INSTALLATION

INSTALLATION

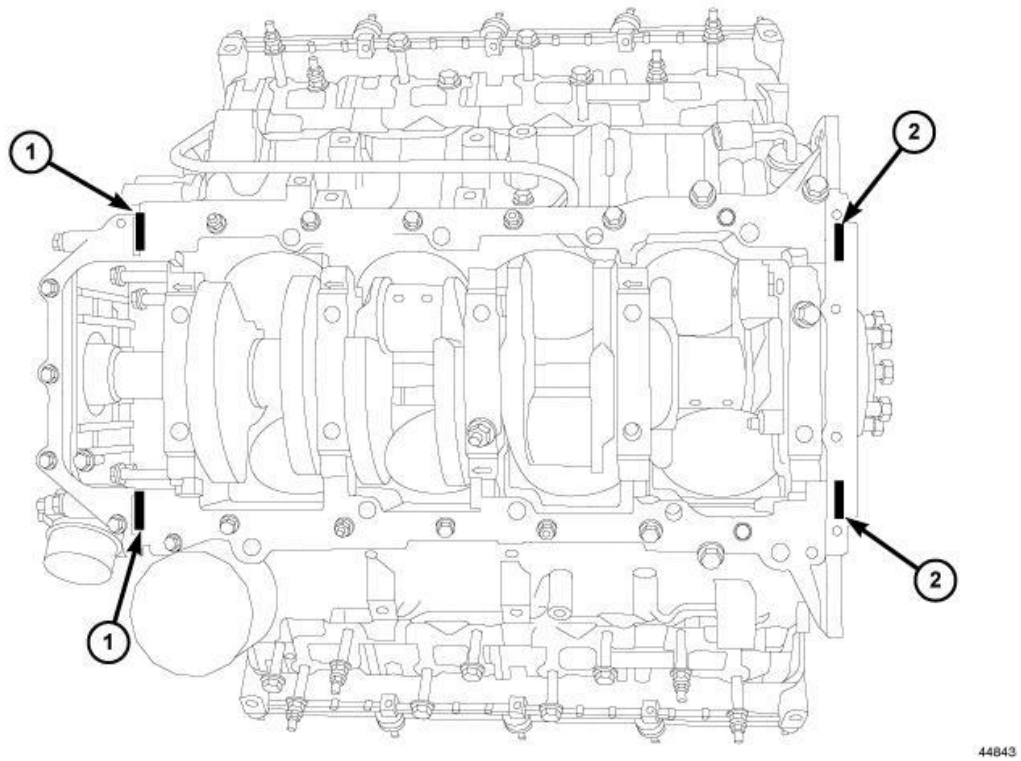


Fig. 293: T-Joint RTV Application
Courtesy of CHRYSLER GROUP, LLC

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

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

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

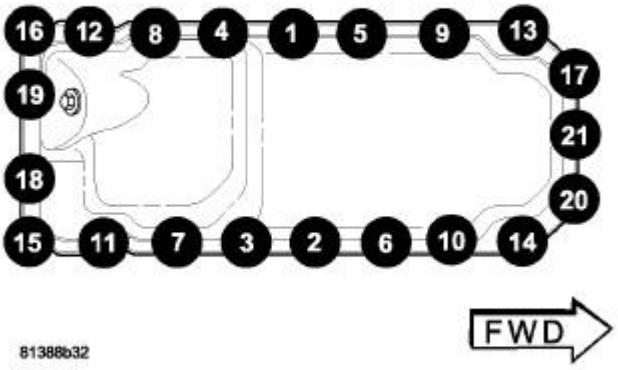


Fig. 294: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

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

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

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

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

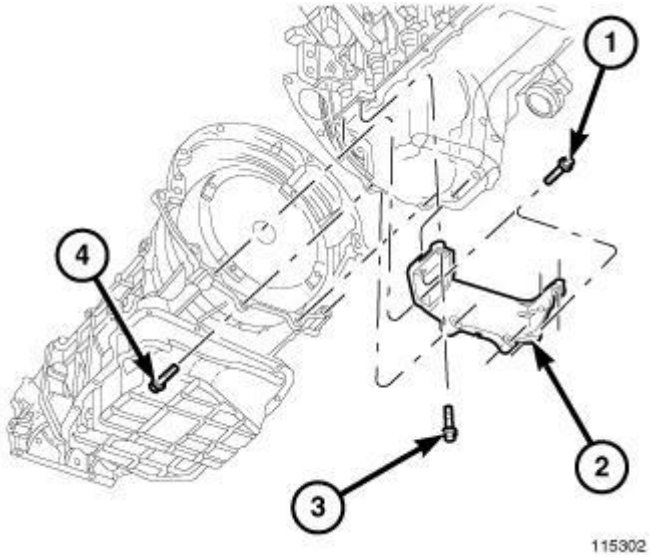


Fig. 295: Structural Cover
Courtesy of CHRYSLER GROUP, LLC

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

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

7. Install the structural cover (2). Refer to **COVER, STRUCTURAL DUST, INSTALLATION, 5.7L**.

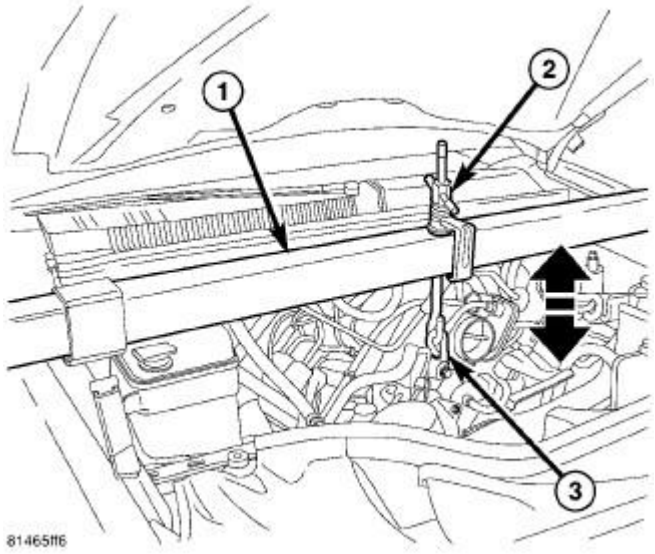


Fig. 296: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

8. Lower the engine into mounts using Engine Support Fixture (special tool #8534B, Fixture, Driveline

Support) (1).

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

PUMP, ENGINE OIL

REMOVAL

REMOVAL

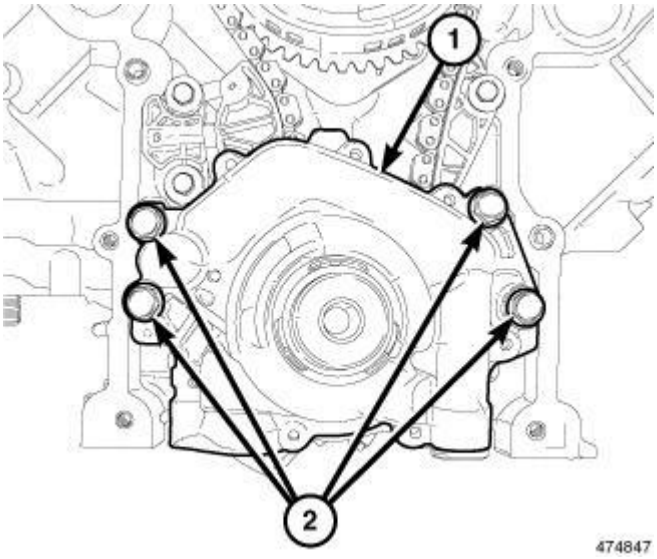


Fig. 297: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

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

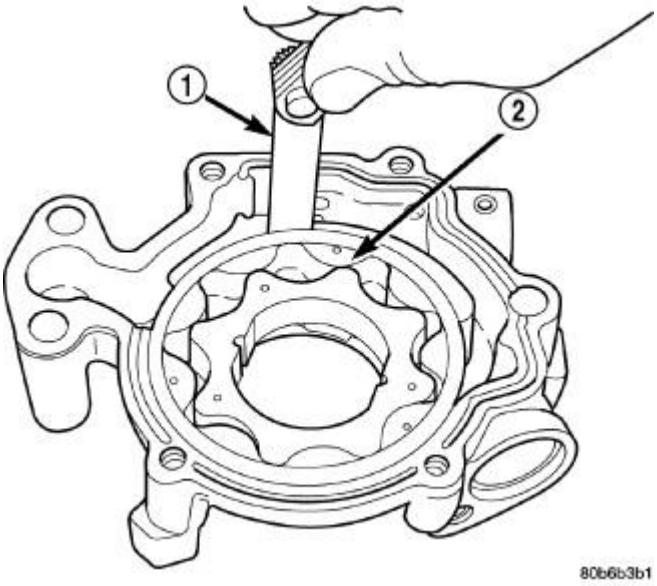


Fig. 298: Checking Clearance
Courtesy of CHRYSLER GROUP, LLC

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

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

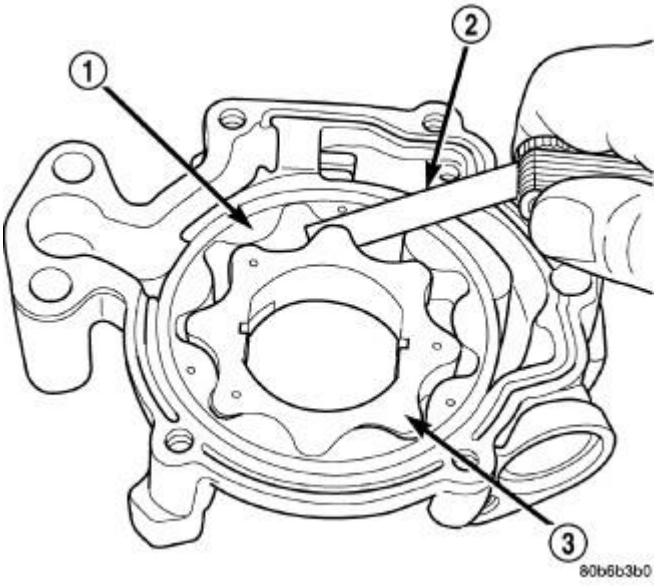


Fig. 299: Fixture 8483
Courtesy of CHRYSLER GROUP, LLC

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.

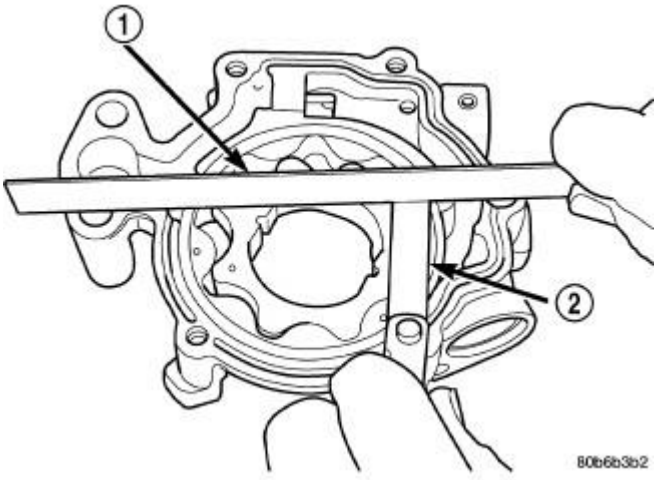


Fig. 300: Measuring Clearance Between Outer Rotor And Body
Courtesy of CHRYSLER GROUP, LLC

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

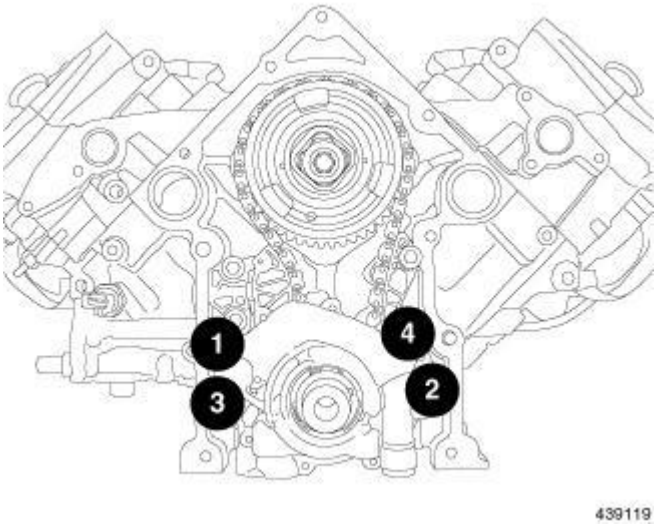


Fig. 301: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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**.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit from the PCM
- 5 volt. Reference circuit from the PCM

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

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

oil gallery.

REMOVAL

REMOVAL

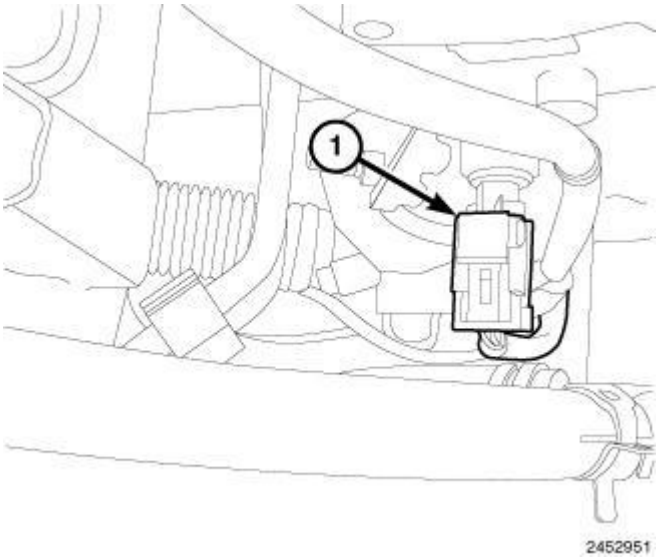


Fig. 302: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

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

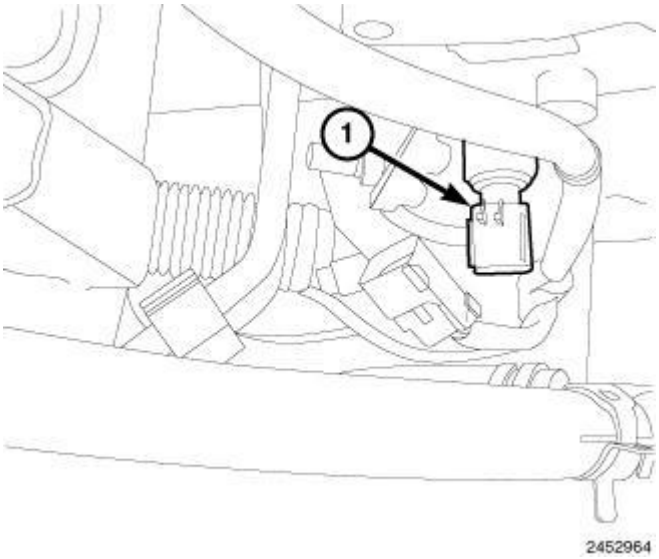


Fig. 303: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil pressure sensor (1).

INSTALLATION

INSTALLATION

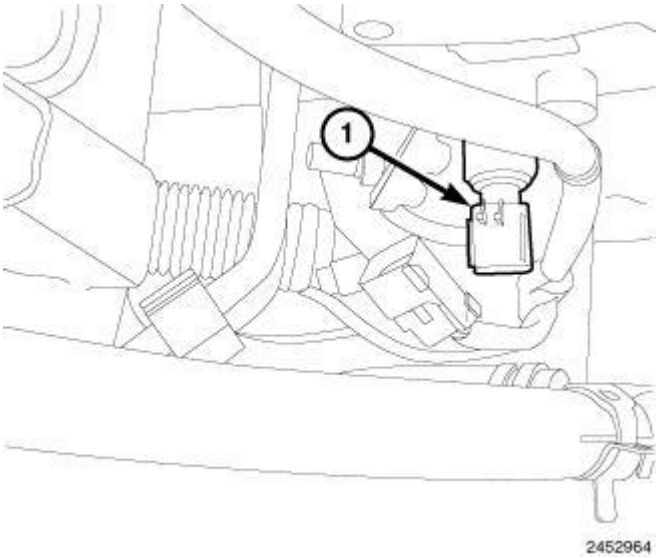


Fig. 304: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

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

1. Install the oil pressure sensor (1).

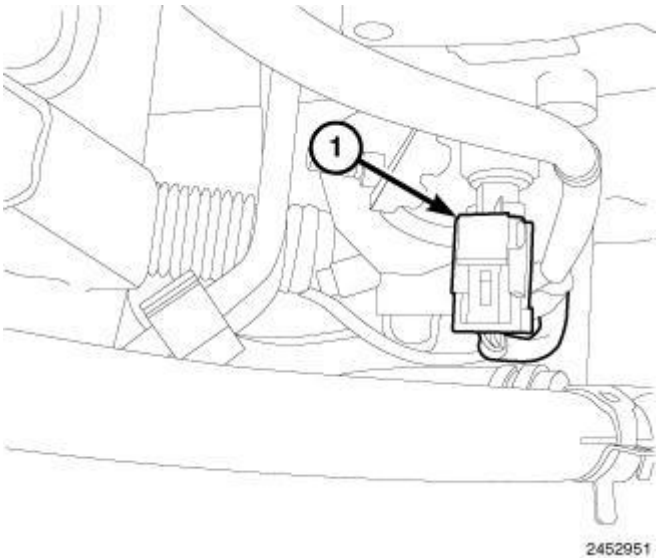


Fig. 305: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

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

3. Connect the negative battery cable.

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

The oil temperature sensor uses the following two circuits:

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

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

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

REMOVAL

REMOVAL

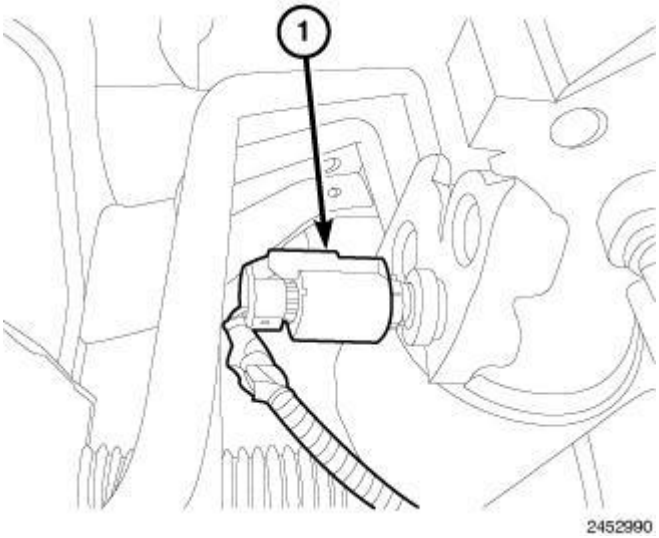


Fig. 306: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

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

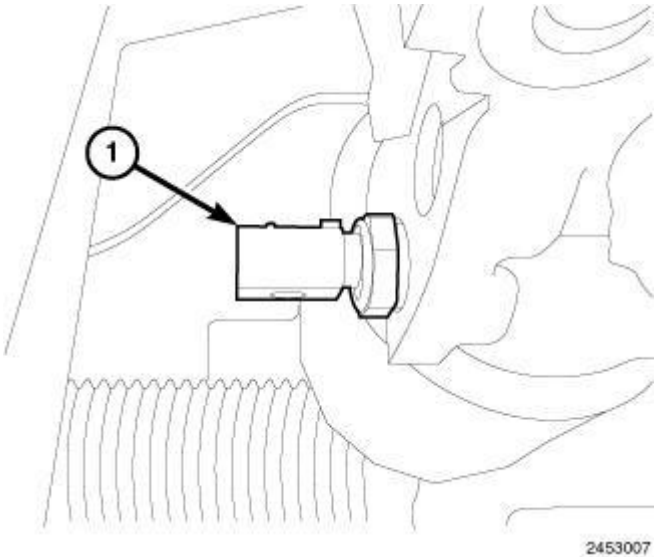


Fig. 307: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil temperature sensor (1).

INSTALLATION

INSTALLATION

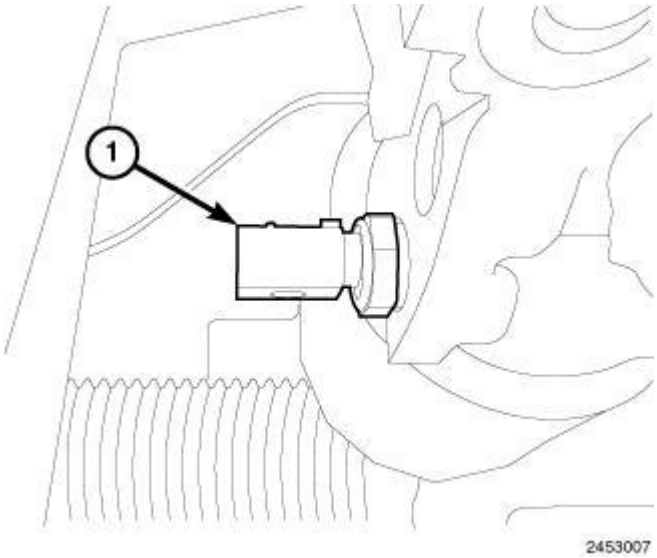


Fig. 308: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

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

1. Install the oil temperature sensor (1).

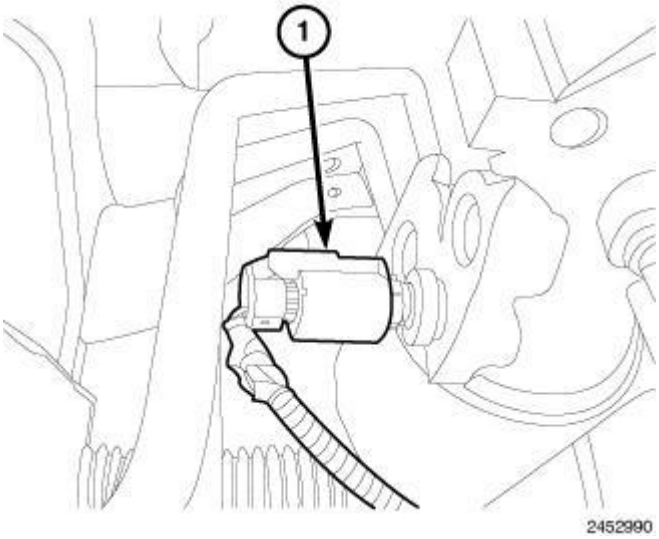


Fig. 309: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

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

MANIFOLDS

MANIFOLD, EXHAUST

REMOVAL

REMOVAL

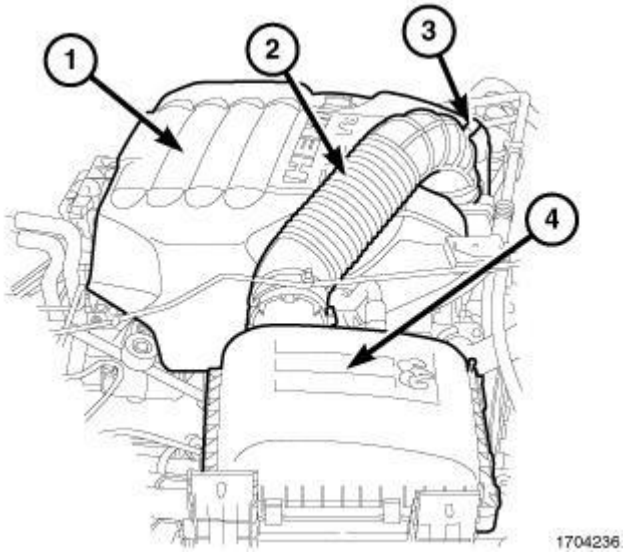


Fig. 310: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the intake air temperature (IAT) sensor electrical connector (3).
2. Remove the clean air hose (2).
3. Remove the air cleaner housing (4).
4. Remove the engine cover (1).

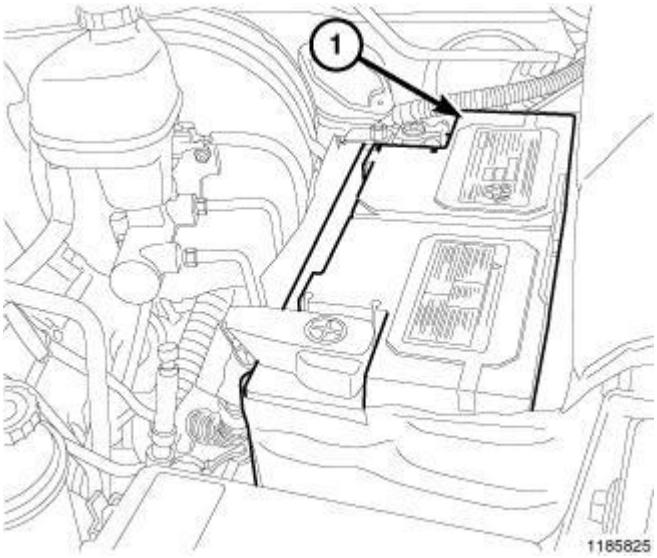


Fig. 311: Battery
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the negative battery cable (1).

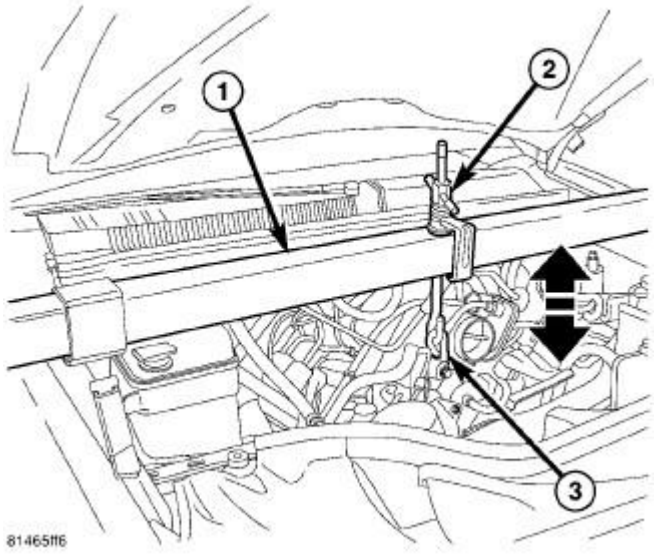


Fig. 312: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

6. Install Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (1).

7. Raise and support the vehicle.

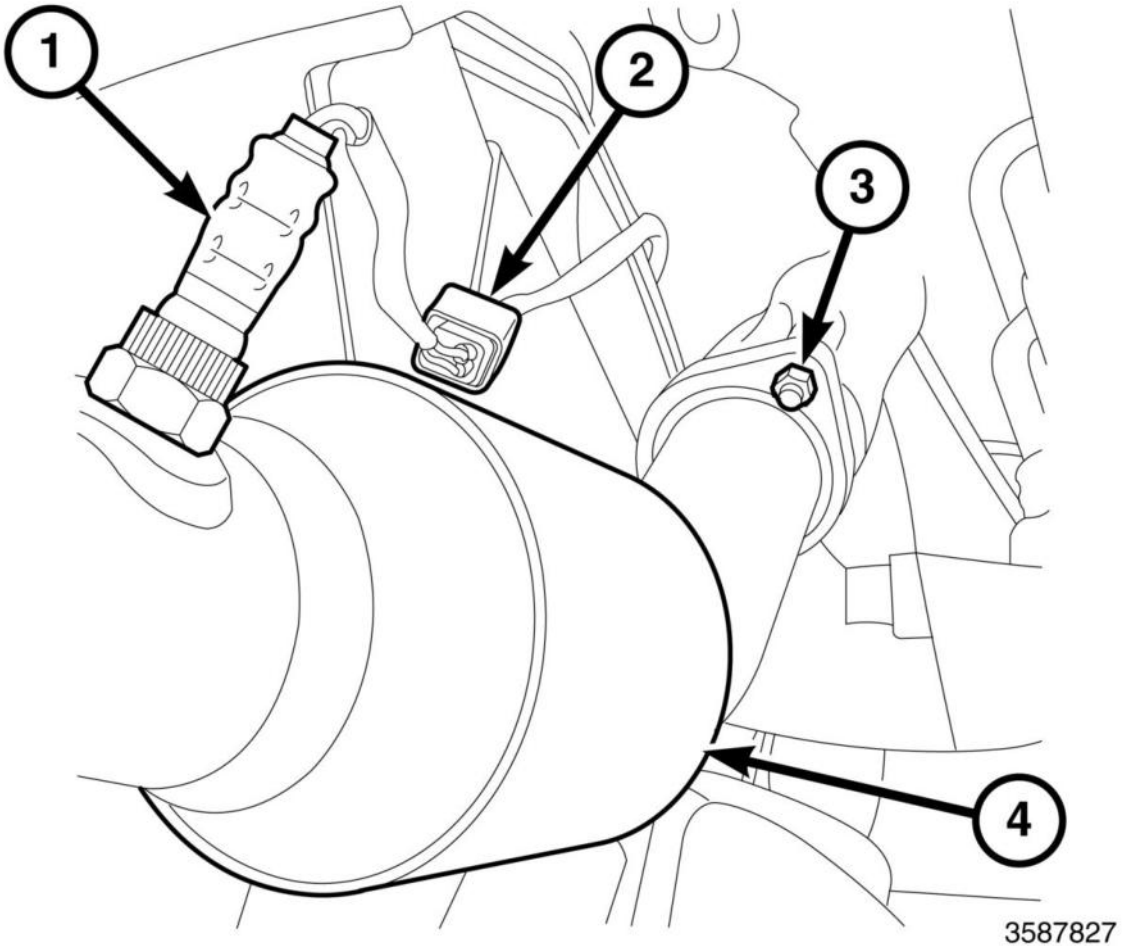


Fig. 313: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

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.

8. Disconnect the oxygen sensor electrical connectors (2).
9. Saturate the front exhaust pipe/catalytic converter retaining bolts and nuts with Mopar® Rust Penetrant or equivalent and allow 5 minutes for penetration.
10. Remove the right and left exhaust pipe/catalytic converter assembly.

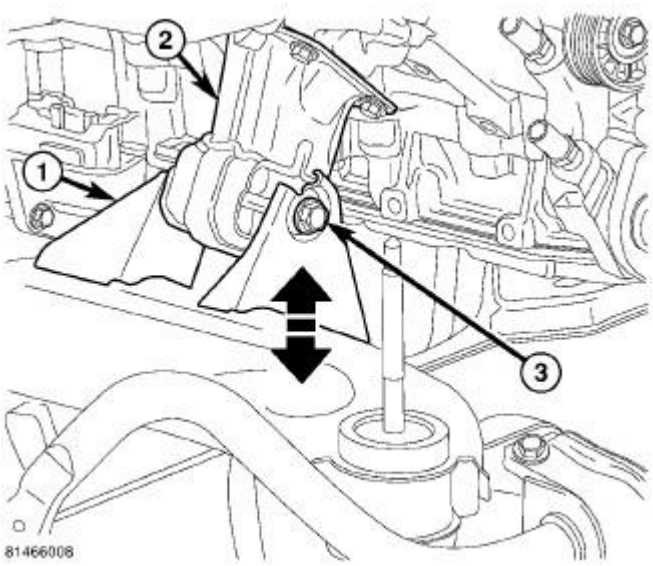


Fig. 314: Engine Mount Bolt
Courtesy of CHRYSLER GROUP, LLC

Right side shown in illustration, left side similar.

11. Remove the right and left engine mount through bolts (3).
12. Lower the vehicle.

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

13. Using the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support), raise the engine enough to gain access to the exhaust manifold retaining bolts.
14. Remove the exhaust manifold heat shield.

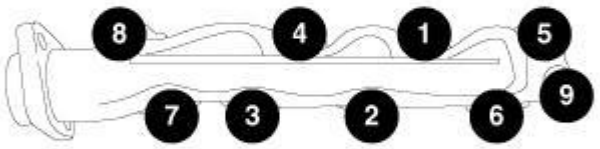


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Fig. 315: Exhaust Manifold Bolt Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

NOTE: The bolts used to secure the exhaust manifold are stainless steel at locations 7 and 8. All bolts removed must be installed in the same location were they were removed from.

15. **Right Side:** Using the sequence shown in illustration, remove the exhaust manifold retaining bolts.

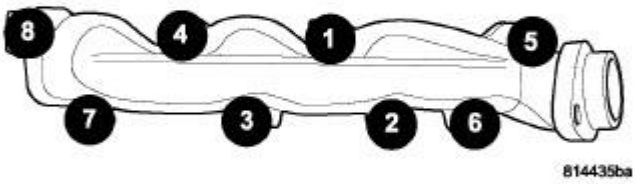

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Fig. 316: Exhaust Manifold Bolt Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

NOTE: The bolts used to secure the exhaust manifold are stainless steel at locations 5 and 6. All bolts removed must be installed in the same location were they were removed from.

16. **Left Side:** Using the sequence shown in illustration, remove the exhaust manifold retaining bolts.

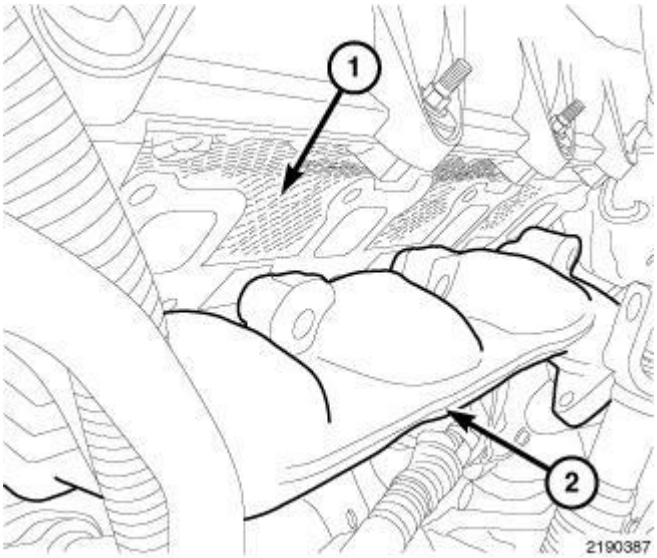

Fig. 317: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

Left side shown in illustration, right similar.

17. Remove the exhaust manifold (2) and gasket.
18. Inspect the exhaust manifold for any damage. Refer to **MANIFOLD, EXHAUST, INSPECTION, 5.7L**.
19. 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

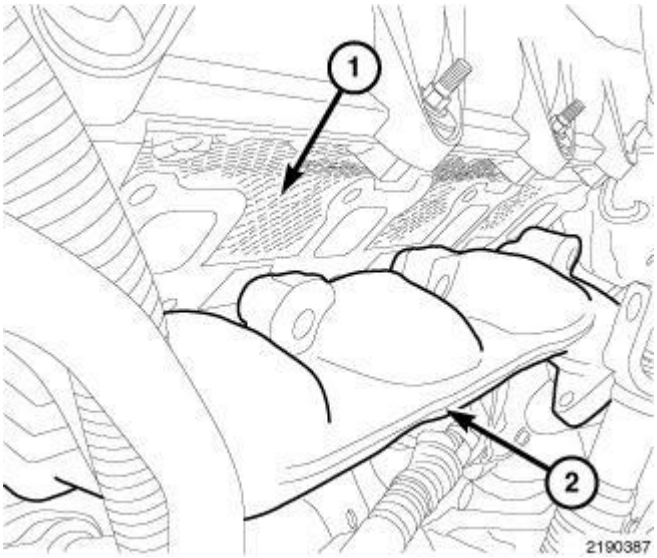

Fig. 318: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

Left side shown in illustration, right similar.

1. Prior to installation, make sure all gasket mating surfaces (1, 2) are clean and free of any debris.
2. Position the exhaust manifold gasket and manifold.

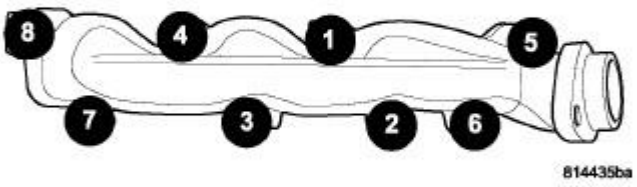

Fig. 319: Exhaust Manifold Bolt Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

NOTE: The bolts used to secure the exhaust manifold are stainless steel at locations 6 and 9. All bolts removed must be installed in the same location were they were removed from.

3. **Left Side:** Using the sequence shown in illustration, Install the exhaust manifold retaining bolts and pre-tighten to 25 N.m (18 ft. lbs.) allowing the gasket to seat to the exhaust manifold and cylinder head.
4. Re-check the torque at 25 N.m (18 ft. lbs.) using the sequence shown in illustration.
5. Install the heat shield and tighten nuts to 8 N.m (70 in. lbs.).

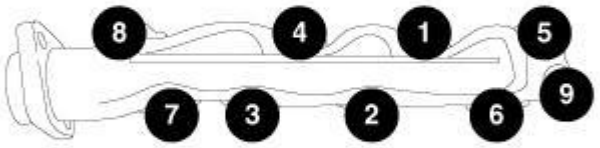

Fig. 320: Exhaust Manifold Bolt Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

NOTE: The bolts used to secure the exhaust manifold are stainless steel at locations 7 and 8. All bolts removed must be installed in the same location were they were removed from.

6. **Right Side:** Using the sequence shown in illustration, install the exhaust manifold retaining bolts and tighten to 25 N.m (18 ft. lbs.) allowing the gasket to seat to the exhaust manifold and cylinder head.
7. Re-check the torque at 25 N.m (18 ft. lbs.) using the sequence shown in illustration.
8. Install the heat shield and tighten nuts to 8 N.m (70 in. lbs.).

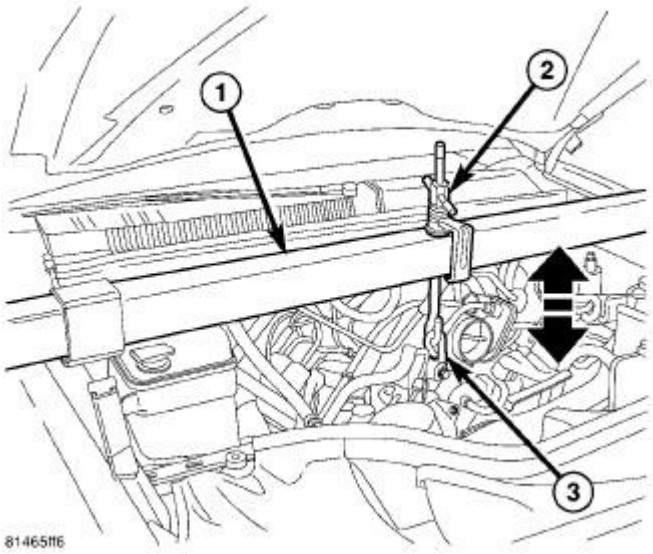

Fig. 321: Engine Support Tool
Courtesy of CHRYSLER GROUP, LLC

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

9. Using the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support), lower the engine into position.
10. Raise and support the vehicle.

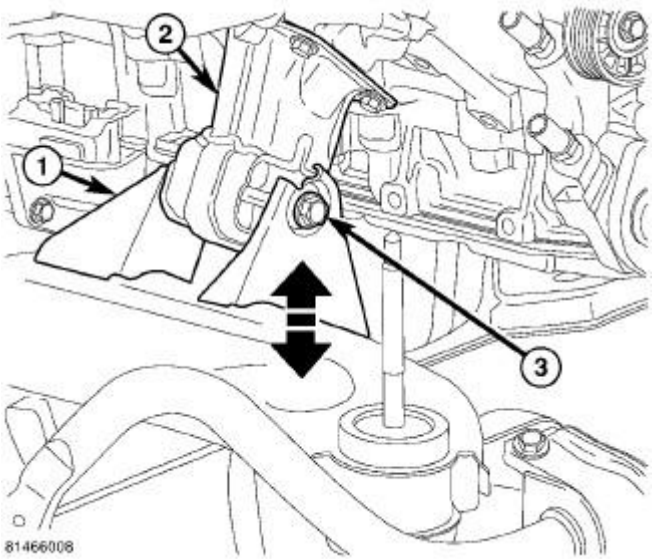

Fig. 322: Engine Mount Bolt
Courtesy of CHRYSLER GROUP, LLC

Right side shown in illustration, left side similar.

11. Install the right and left engine mount through bolts (3) and tighten to 100 N.m (74 ft. lbs.).

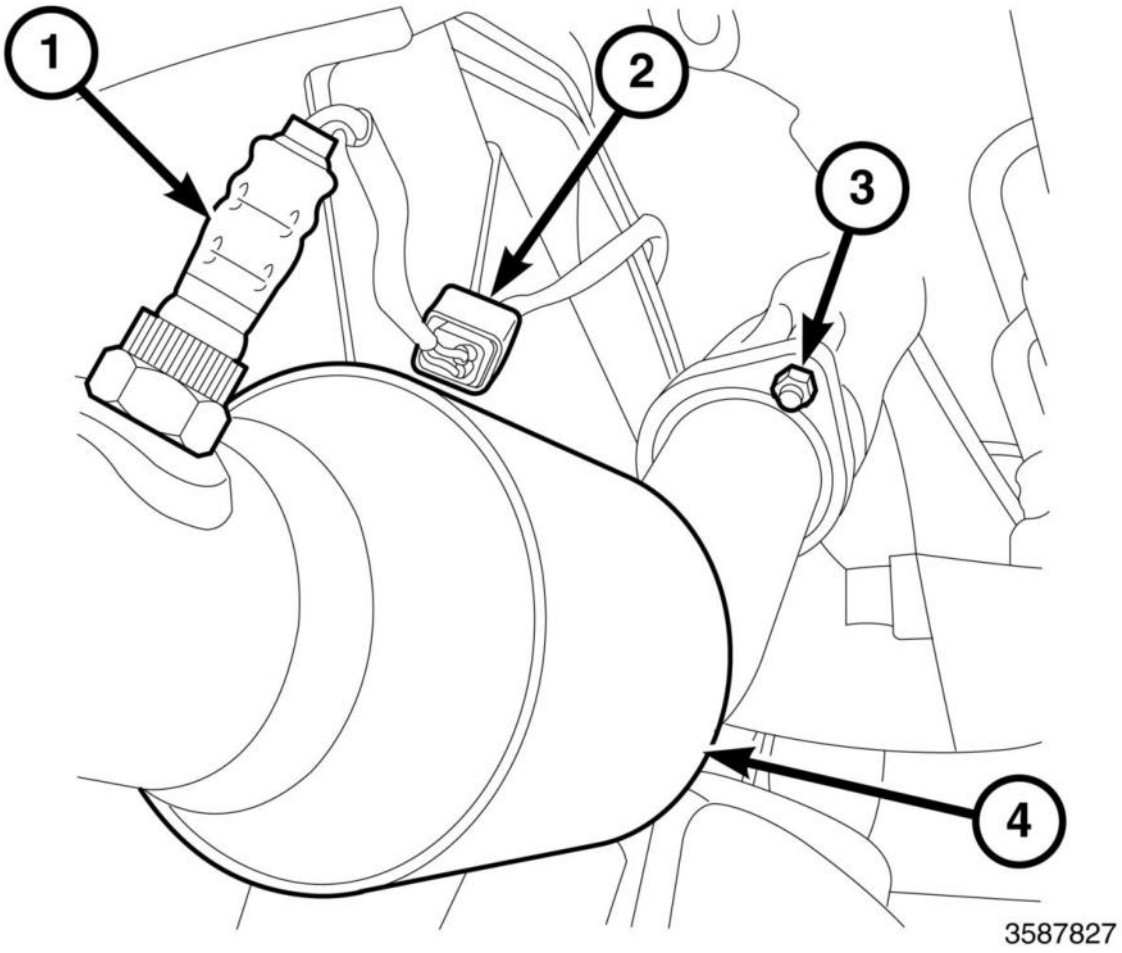

Fig. 323: Oxygen Sensor, Oxygen Sensor Connector, Ball Flange Nut & LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

12. Install the right and left exhaust pipe/catalytic converter assembly.
13. Connect the oxygen sensor electrical connectors (2).
14. Lower the vehicle.
15. Remove Engine Support Fixture (special tool #8534B, Fixture, Driveline Support).

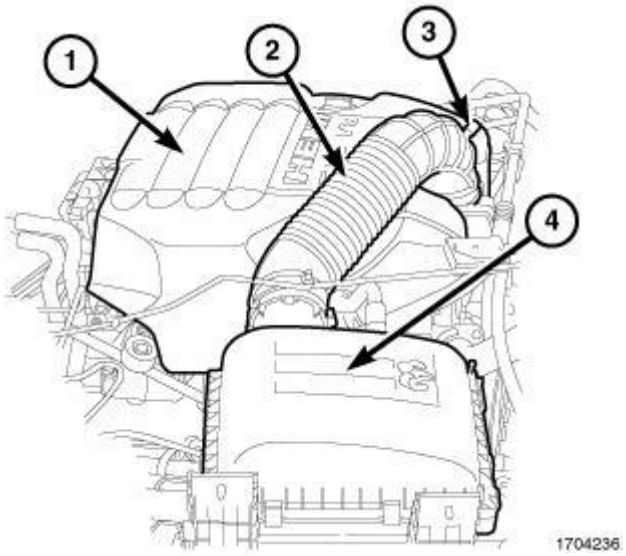

Fig. 324: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Install the air cleaner housing (4).
17. Install the clean air hose (2).
18. Connect the intake air temperature (IAT) sensor electrical connector (3).
19. Install the engine cover (1).

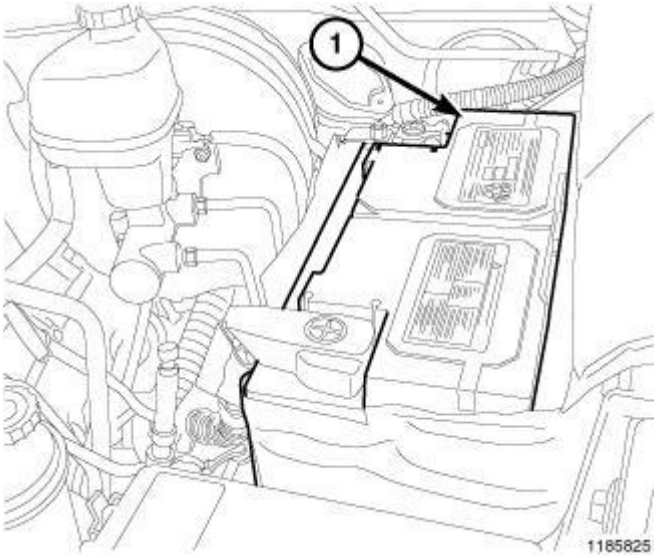

Fig. 325: Battery
Courtesy of CHRYSLER GROUP, LLC

20. Connect the negative battery cable (1).
21. Start the engine and check for leaks.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

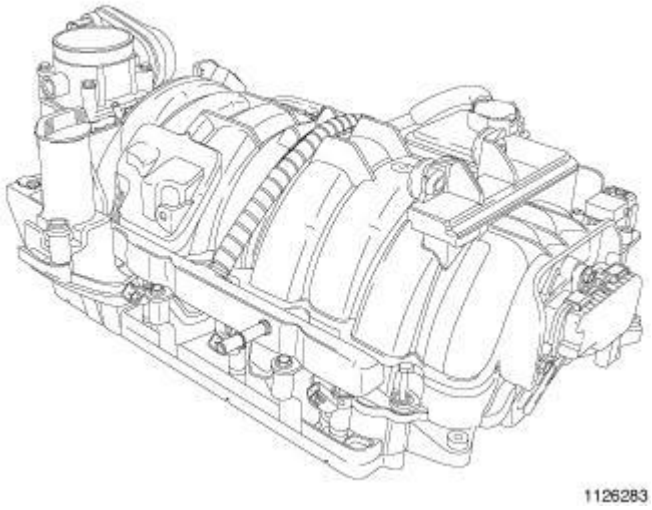

Fig. 326: Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

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 seperately 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

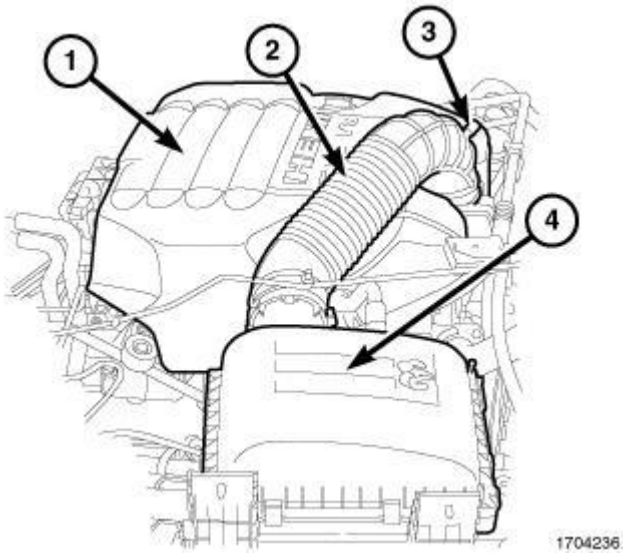

Fig. 327: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the intake air temperature (IAT) sensor electrical connector (3).
2. Remove the clean air tube (2) from the air cleaner housing (4) and the throttle body.
3. Disconnect the makeup air hose.
4. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.

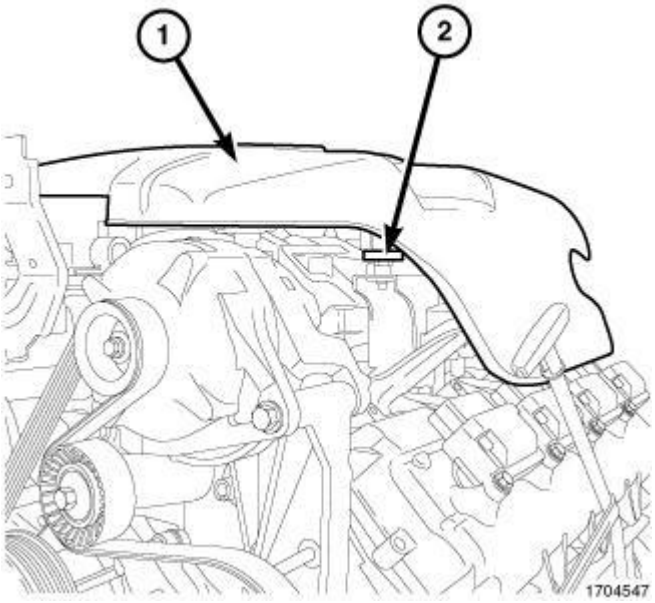

Fig. 328: Engine Cover & Grommets

Courtesy of CHRYSLER GROUP, LLC

5. Lift up the front of the engine cover (1) and separate the engine cover front grommets (2) from the ball studs on the intake manifold.

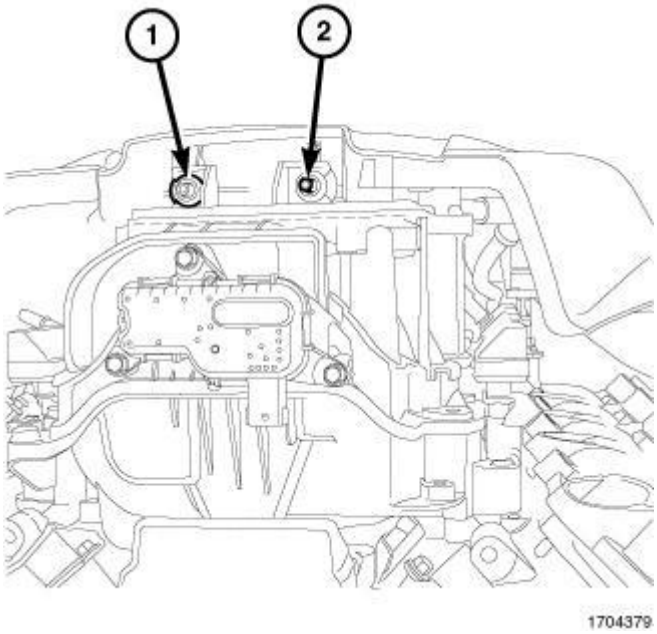

Fig. 329: Engine Cover Pegs & Grommets
Courtesy of CHRYSLER GROUP, LLC

6. Slightly raise the front of the engine cover and slide forward to remove the rear engine cover pegs (2) from the grommets (1) on the rear of the intake manifold.
7. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .

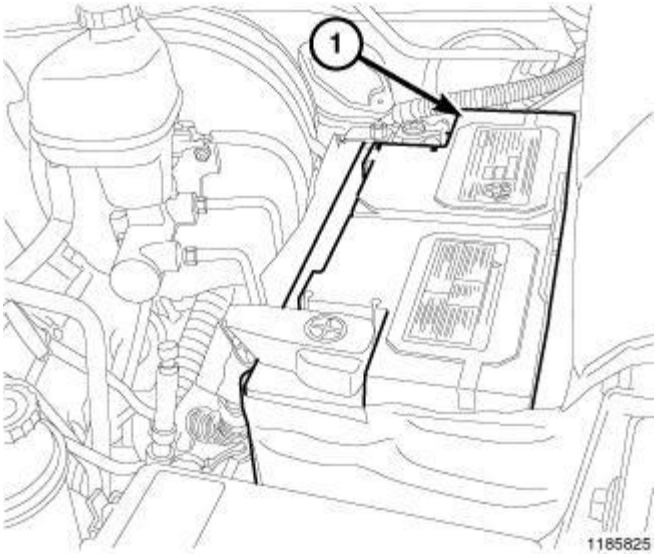

Fig. 330: Battery
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the negative battery cable (1).

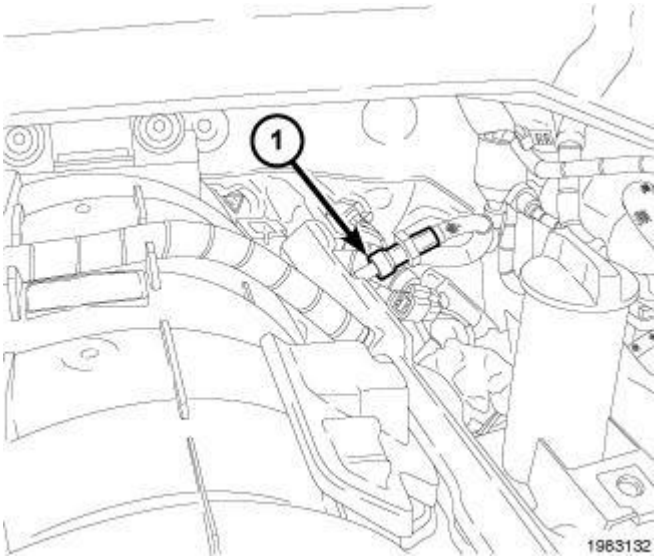

Fig. 331: Fuel Supply Line Quick Connect Fitting AT Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

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

9. Disconnect the fuel supply line quick connect fitting at the fuel rail (1) and plug the fuel supply line with a shipping cap to prevent spillage. Refer to **FITTING, QUICK CONNECT** .

NOTE: The factory fuel injection electrical harness is numerically tagged (INJ 1, INJ 2, etc.) for injector position identification. If the harness was not tagged, note the electrical connector's location during removal.

10. Disconnect the electrical connectors to all fuel injectors and position the fuel injector electrical harness aside.
11. Remove the main engine electrical harness support strap at the rear of the intake manifold and position harness aside.

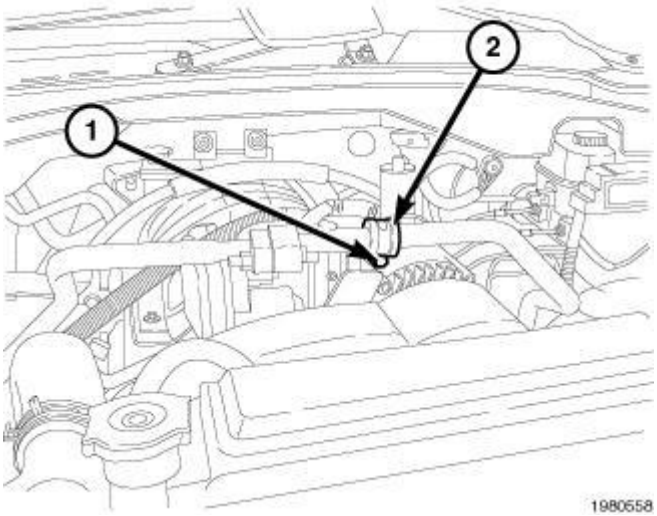

Fig. 332: A/C Line P-Clip & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Remove the A/C line P-Clip retaining bolt (1) from the throttle body bracket and remove the P-Clip (2).
13. Secure the A/C line out of the way.
14. Remove the generator. Refer to **GENERATOR, REMOVAL** .
15. Remove the throttle body bracket retaining bolt from the intake manifold and remove the bracket.
16. Disconnect the electrical connector at the throttle body and reposition the harness.
17. Disconnect the brake booster vacuum hose, and the vacuum lines.

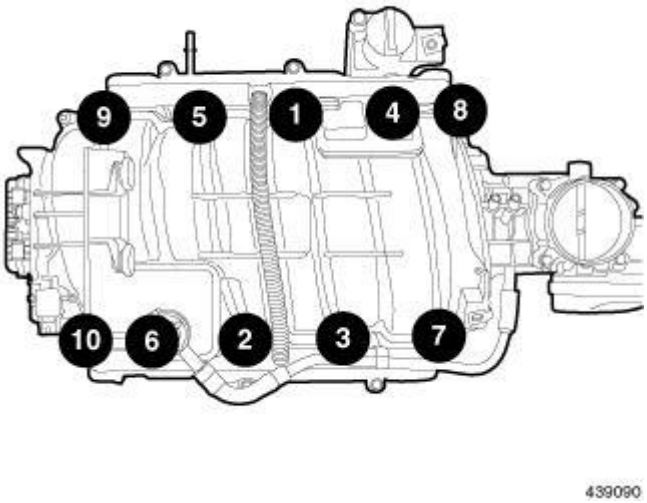

Fig. 333: Intake Manifold Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

18. Using the sequence shown in illustration, remove the intake manifold retaining bolts.

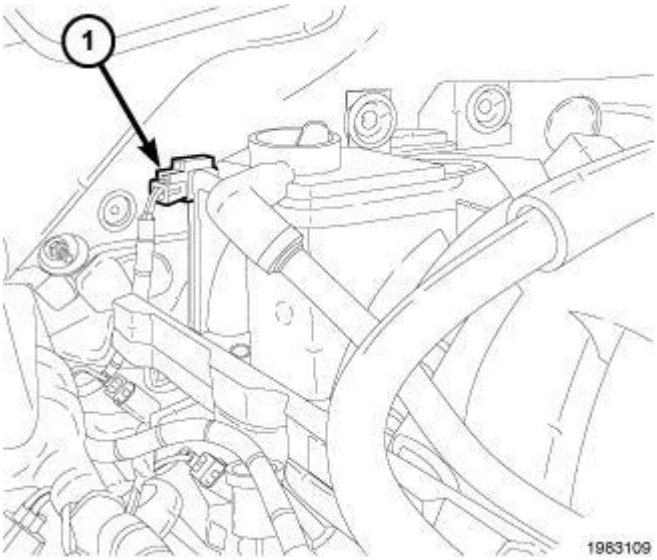

Fig. 334: MAP Sensor
Courtesy of CHRYSLER GROUP, LLC

19. Slide the intake manifold forward and disconnect both the manifold air pressure (MAP) sensor (1) and the short runner valve (SRV) connectors located at the rear of the intake manifold.
20. Remove the intake manifold and throttle body as an assembly.

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

INSTALLATION

INSTALLATION

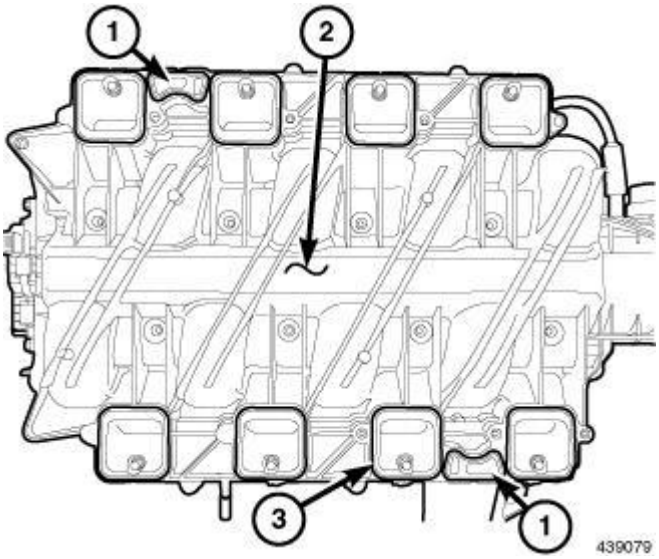

Fig. 335: Intake Manifold & PCV Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: If reinstalling the original manifold apply Mopar® Lock & Seal Adhesive to the intake manifold bolts. Not required when installing a new manifold.

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

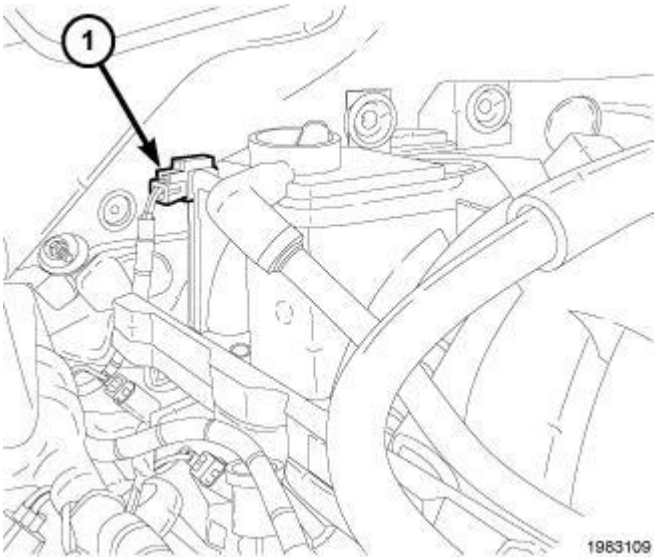

Fig. 336: MAP Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Connect both the manifold air pressure (MAP) sensor (1) and the short runner valve (SRV) electrical connectors located at the rear of the intake manifold as you position the intake manifold in place.

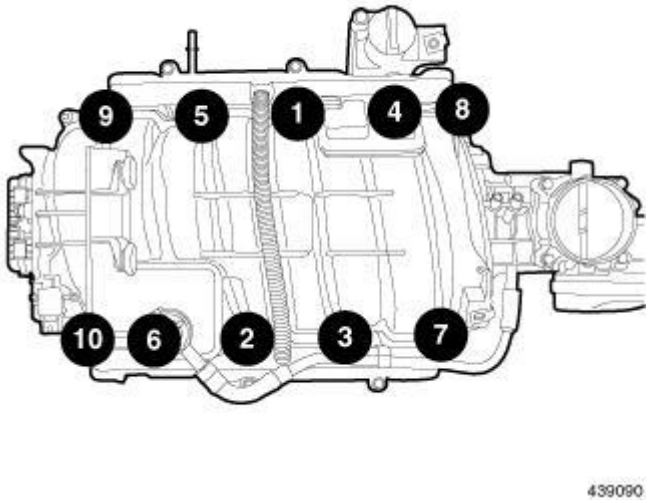

Fig. 337: Intake Manifold Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, tighten the intake manifold bolts to 12 N.m (9 ft. lbs.).
5. Position the main engine electrical harness at the rear of the intake manifold and install the support strap.

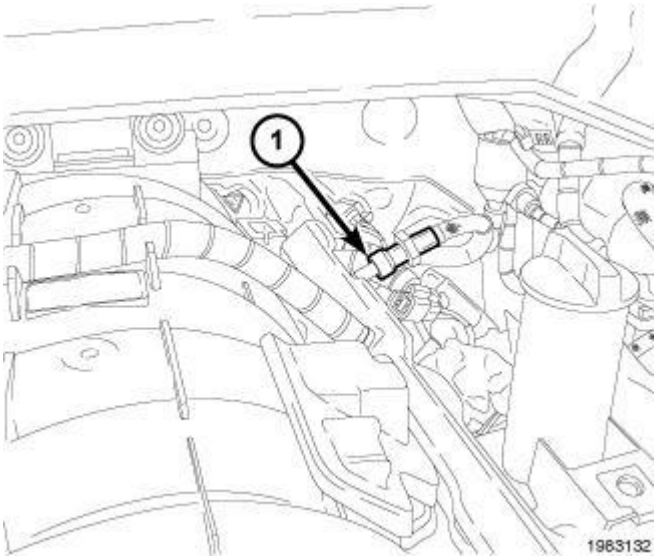

Fig. 338: Fuel Supply Line Quick Connect Fitting AT Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

6. Connect the fuel supply line quick connect fitting at the fuel rail (1).

NOTE: The factory fuel injection electrical harness is numerically tagged (INJ 1, INJ 2, etc.) for injector position identification. If the harness was not tagged, use the noted the electrical connector's location during removal.

7. Position the fuel injector electrical harness and connect the electrical connectors to all fuel injectors.

8. Connect the brake booster vacuum hose, and the vacuum lines.
9. Install the throttle body bracket and securely tighten the retaining bolt.
10. Install the generator. Refer to **GENERATOR, INSTALLATION** .

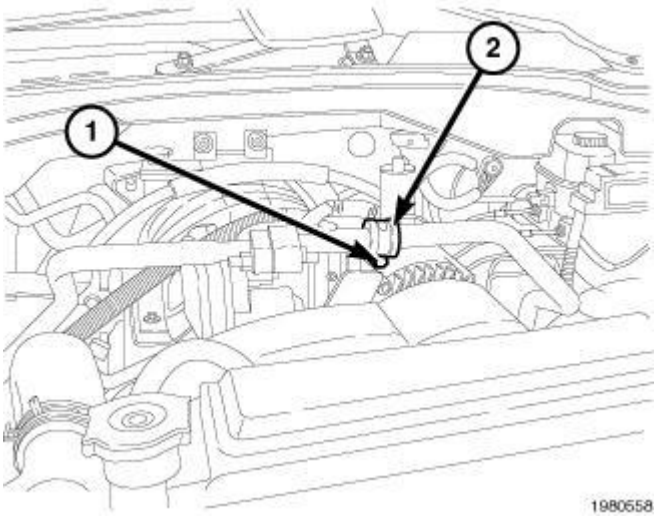

Fig. 339: A/C Line P-Clip & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Position the A/C lines, install the A/C line P-Clip (2) and tighten P-Clip retaining bolt (1) to 4 N.m (35 in. lbs.).
12. Position the wiring harness and connect the electrical connector at the throttle body.

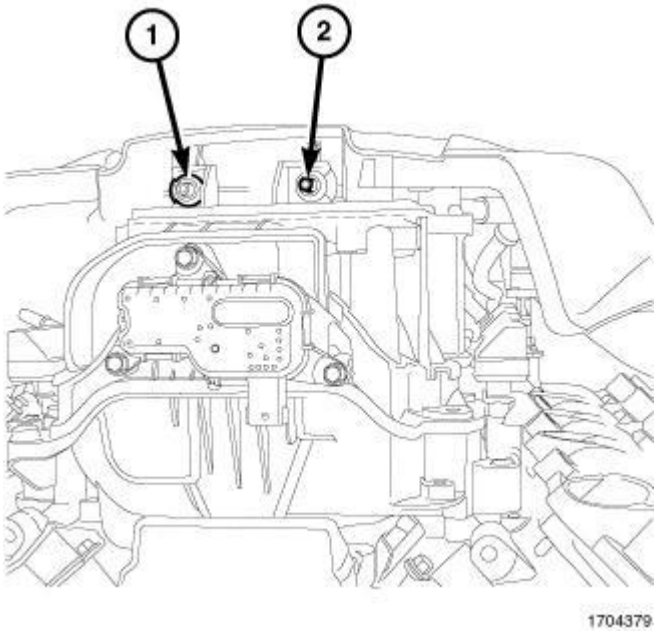

Fig. 340: Engine Cover Pegs & Grommets
Courtesy of CHRYSLER GROUP, LLC

13. Slightly tilt the rear of the engine cover and slide the rear engine cover pegs (2) into the grommets (1) on the rear of the intake manifold until the cover stops.

NOTE: Check to make sure the engine cover is installed properly by reaching behind the cover to verify that the pegs (2) are located in the rear grommets (1).

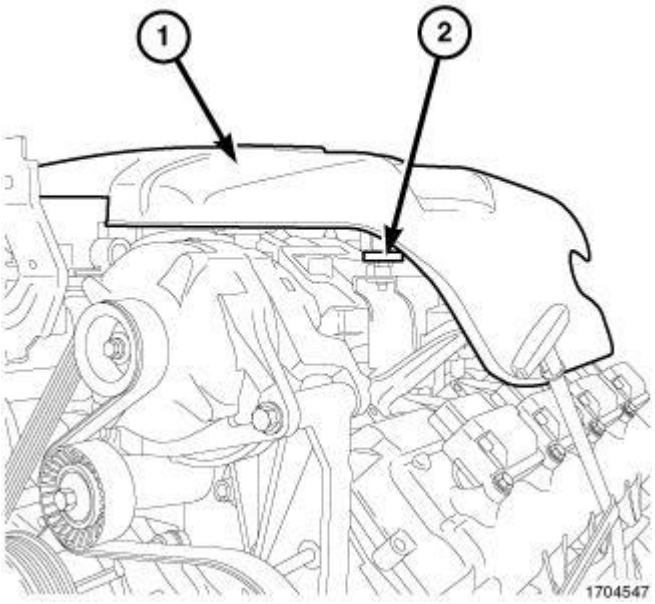

Fig. 341: Engine Cover & Grommets
Courtesy of CHRYSLER GROUP, LLC

NOTE: While installing the engine cover the front ball studs will make a popping or suction sound as the ball studs are inserted into the front grommets.

14. Lower the front of the engine cover (1) and line up the front grommets (2) with the ball studs on the front of the intake manifold and with a downward motion push the engine cover front grommets onto the ball studs.

NOTE: Lightly lift the front of the engine cover to insure the front ball studs are seated into the front grommets correctly.

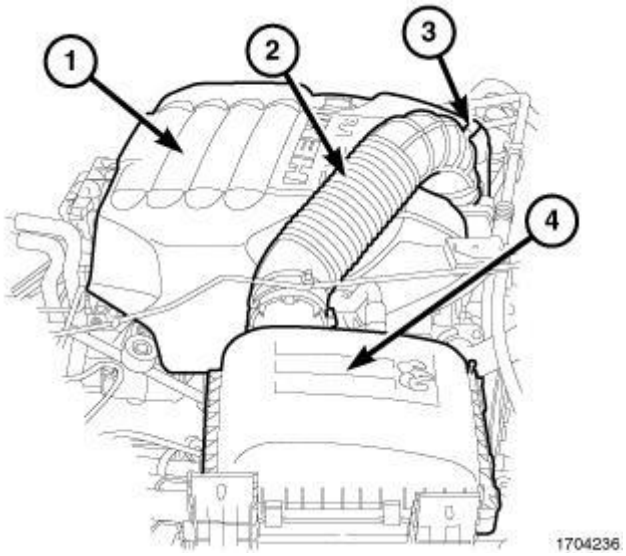

Fig. 342: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

15. Install the air cleaner assembly (4)
16. Connect the clean air tube (2) to the air cleaner assembly (4) and the throttle body.
17. Connect the makeup air hose.
18. Connect the IAT sensor electrical connector (3).

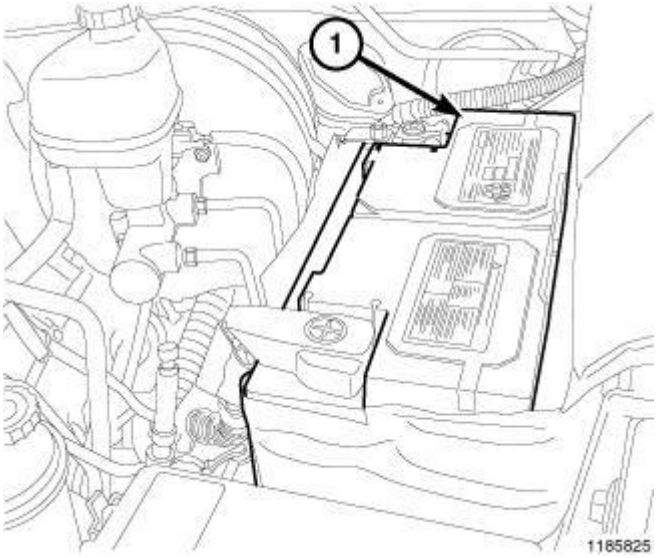

Fig. 343: Battery
Courtesy of CHRYSLER GROUP, LLC

19. Connect the negative battery cable (1).

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

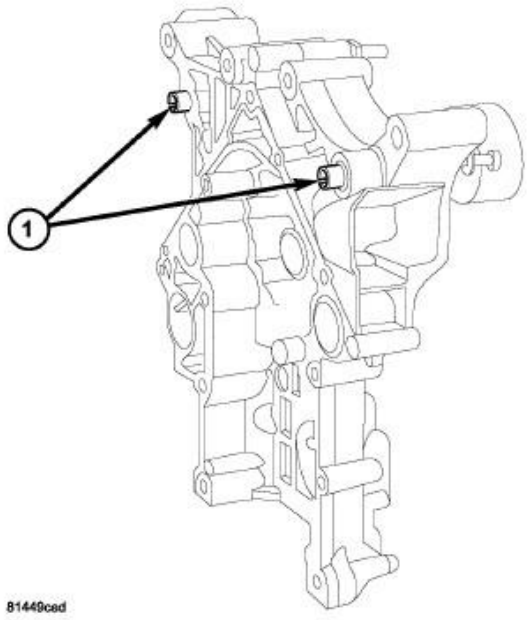

Fig. 344: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

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.

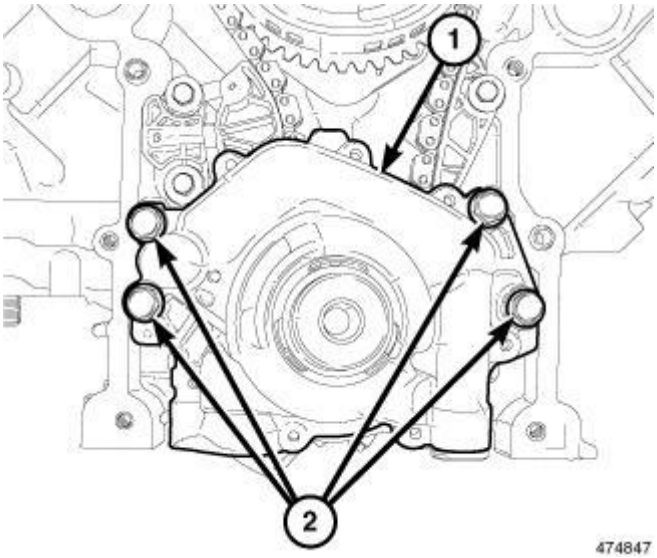

Fig. 345: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

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

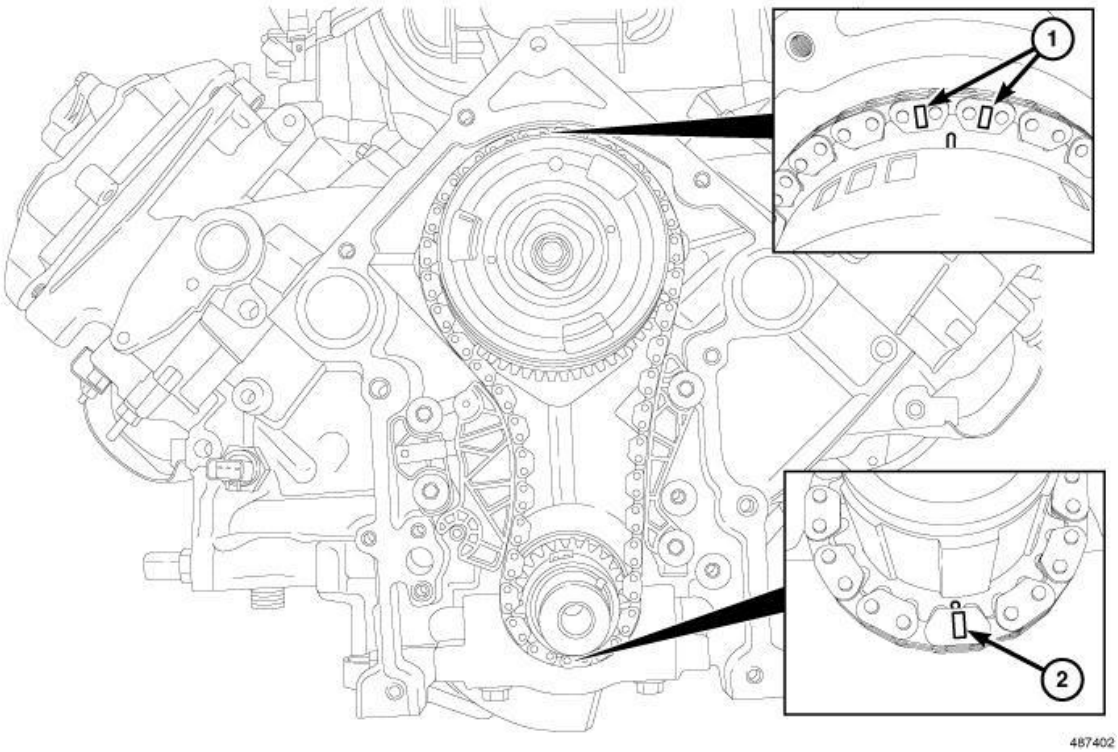

Fig. 346: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

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).

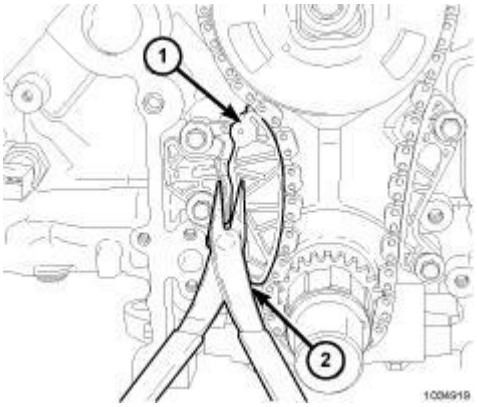

Fig. 347: Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

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

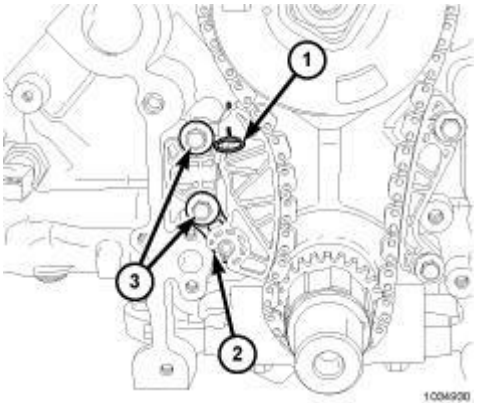

Fig. 348: Timing Chain Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

8. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the chain tensioner holes.

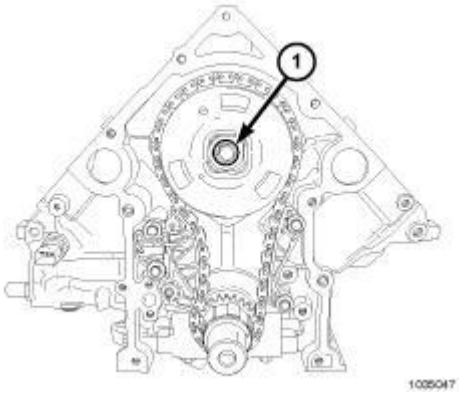

Fig. 349: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

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.

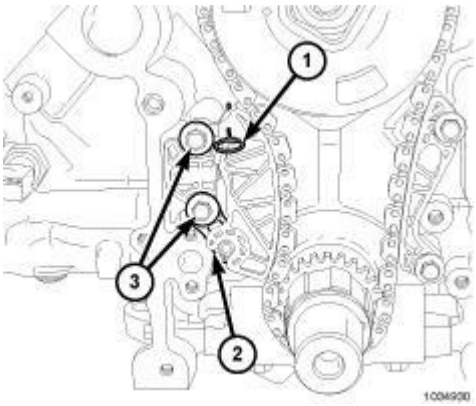

Fig. 350: Timing Chain Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

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).

CAUTION: Do not rotate the crankshaft more than a few degrees independently of the camshafts. Piston to valve contact could occur resulting in possible valve damage. If the crankshaft needs to be rotated more than a few degrees, first remove the camshafts.

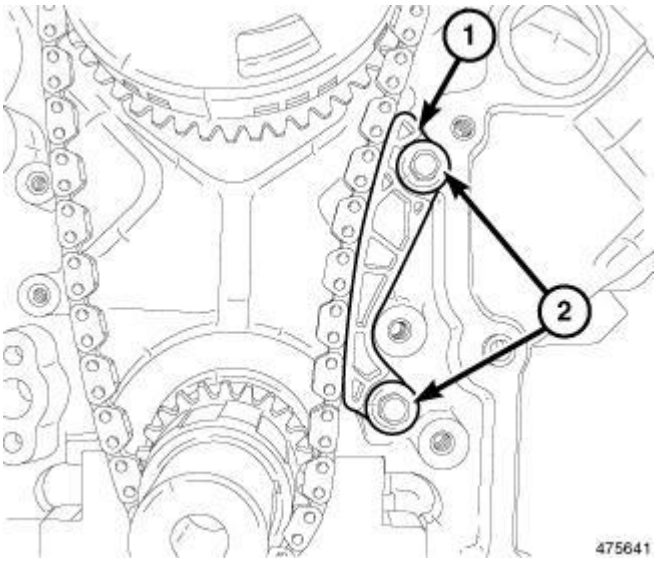

Fig. 351: Timing Chain Guide
Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

INSTALLATION

CAUTION: This is a Zero-Tolerance engine. Failure to properly align the timing chain to the timing gears will cause severe engine damage. It is imperative that the Timing Marks shown in illustration in the subsequent steps be properly aligned during assembly.

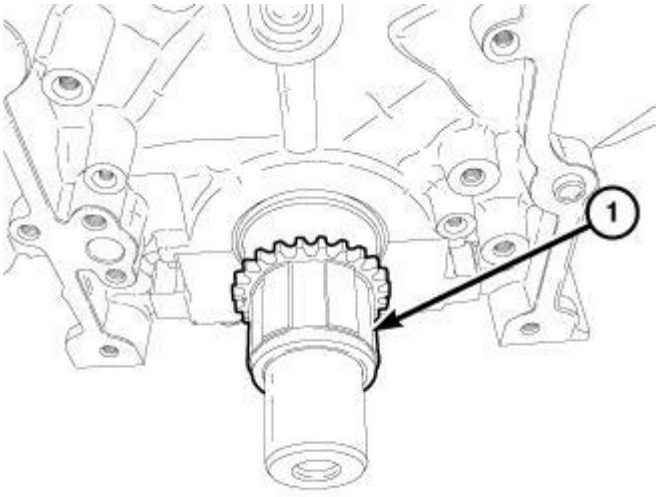

Fig. 352: Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the camshaft more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshaft need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30°before-top-dead-center. Once the camshaft is returned to their top-dead-center position, rotate the crankshaft clockwise to return the crankshaft to top-dead-center.

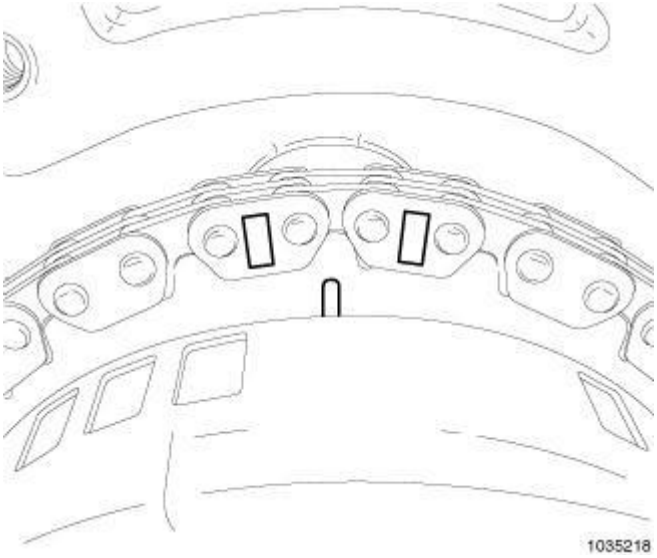

Fig. 353: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER GROUP, LLC

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

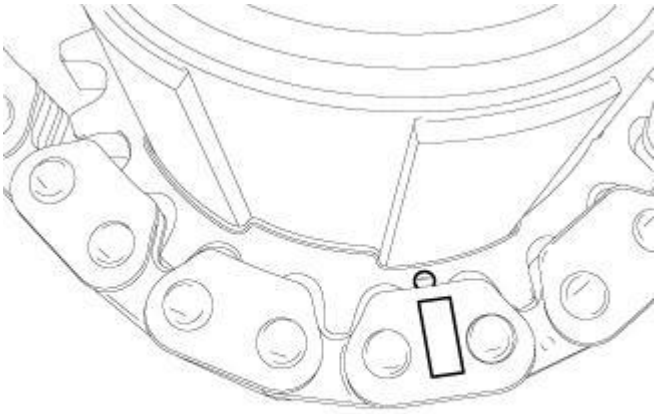

Fig. 354: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER GROUP, LLC

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.
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.

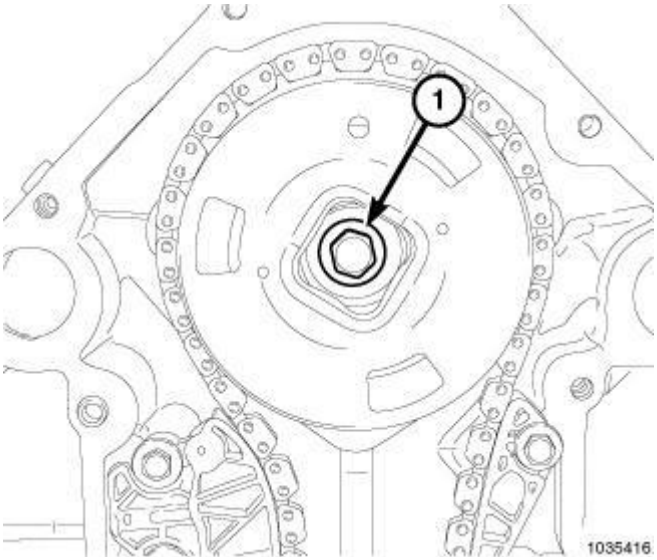

Fig. 355: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Install the camshaft phaser retaining bolt (1) finger tight.

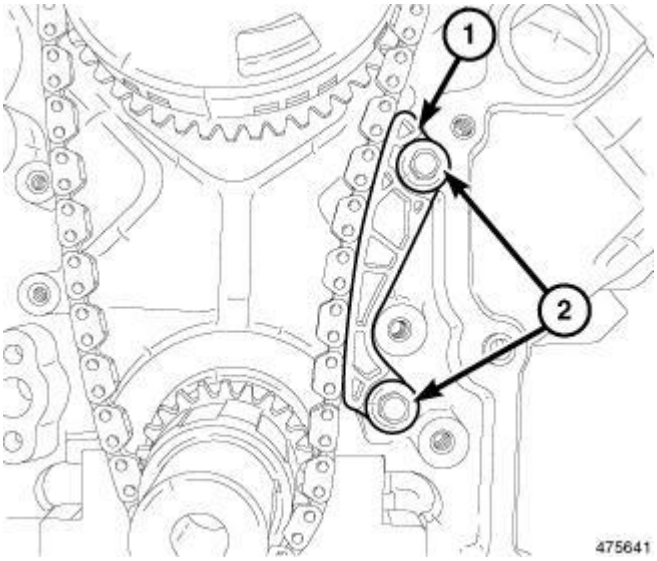

Fig. 356: Timing Chain Guide
Courtesy of CHRYSLER GROUP, LLC

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

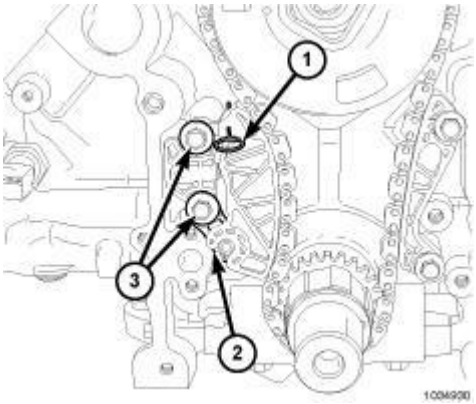

Fig. 357: Timing Chain Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

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).

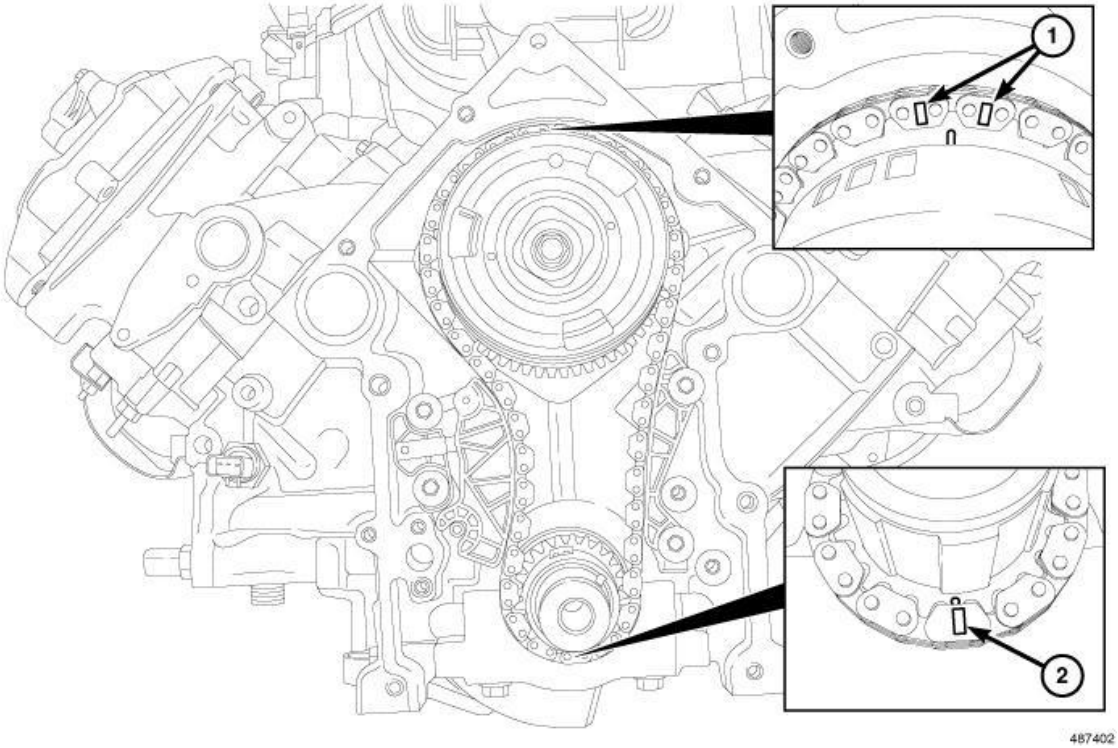

Fig. 358: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

NOTE: The timing mark located on the camshaft phaser must be properly centered between the dual marks on the timing chain while at the 12 O'clock position (1). The timing mark located on the crankshaft must be properly aligned with the single mark on the timing chain while at the 6 O'clock position (2).

9.

10. Verify that the chains are operating smoothly. The chain must be replaced if:
    - Any kinks
    - Signs of binding
    - Damage to the links
    - Signs of wear or stretching

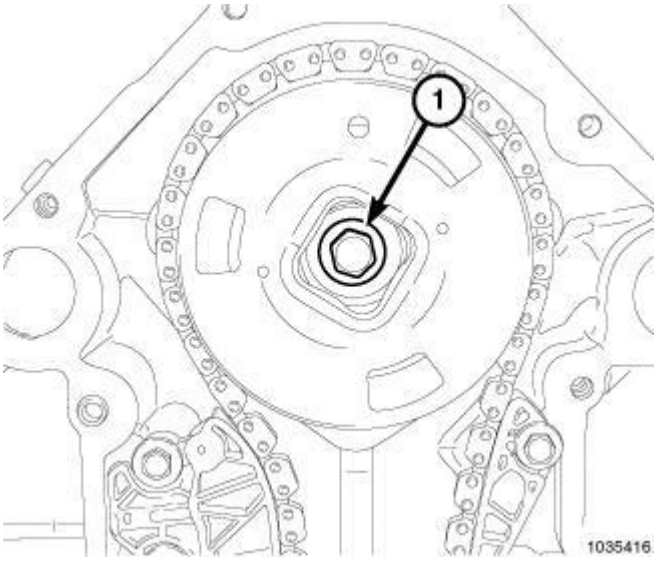

Fig. 359: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Tighten the camshaft phaser bolt (1) to 98 N.m (72 ft. lbs.).

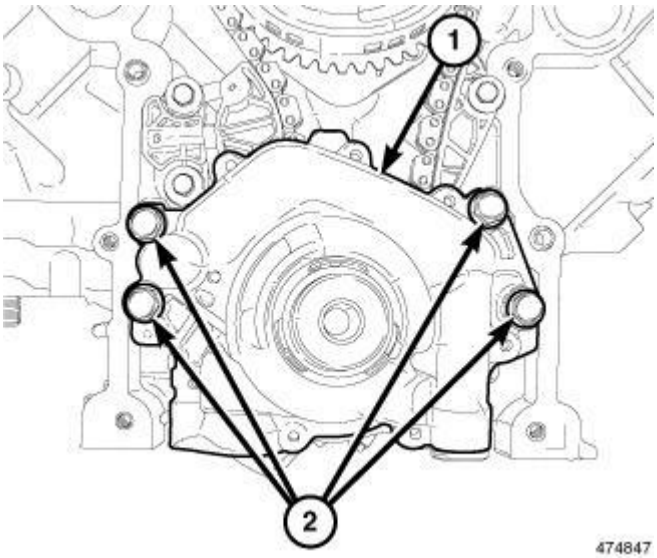

Fig. 360: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

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

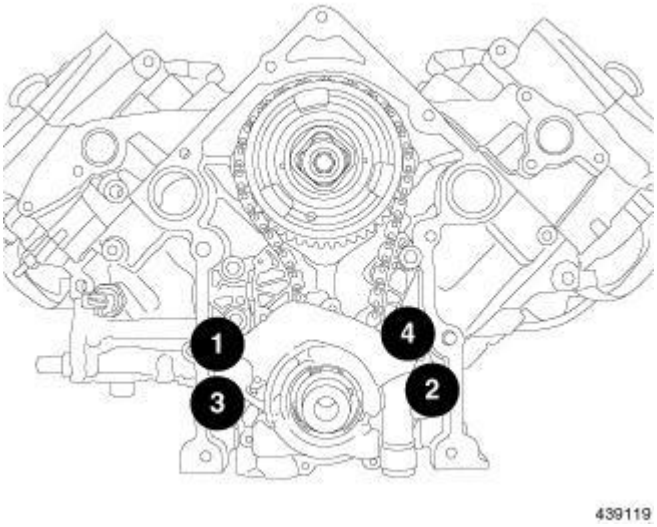

Fig. 361: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

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

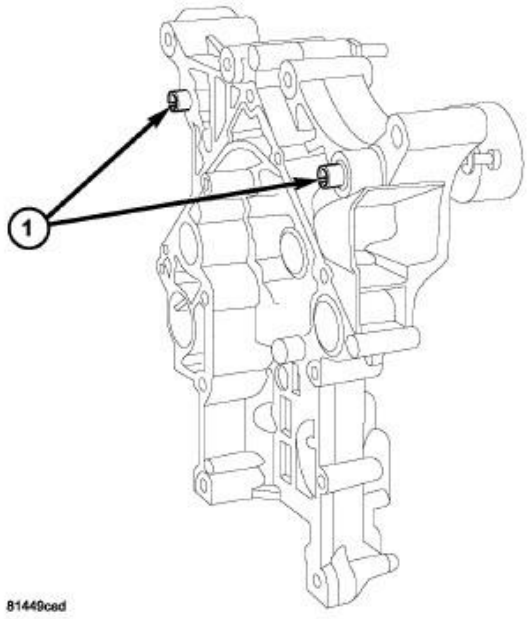

Fig. 362: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

14. Verify the slide bushings (1) are installed in the timing chain cover.
15. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
16. Fill the engine with oil.

17. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
18. Connect the negative battery cable.
19. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

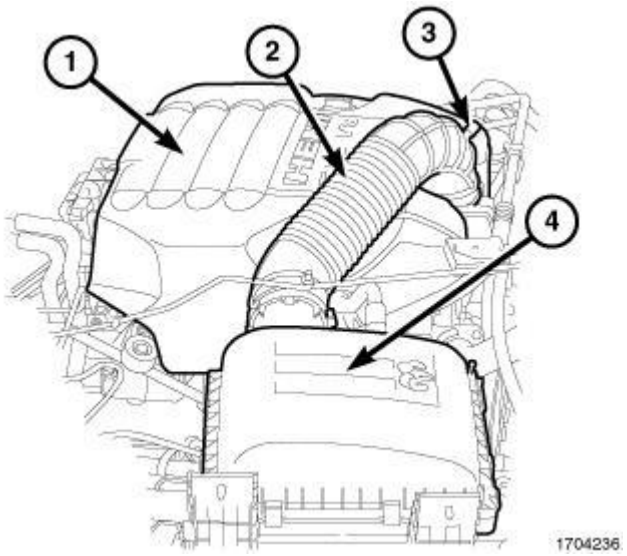

Fig. 363: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the battery negative cable.
2. Remove air cleaner assembly (2, 4).
3. Remove the engine cover (1).

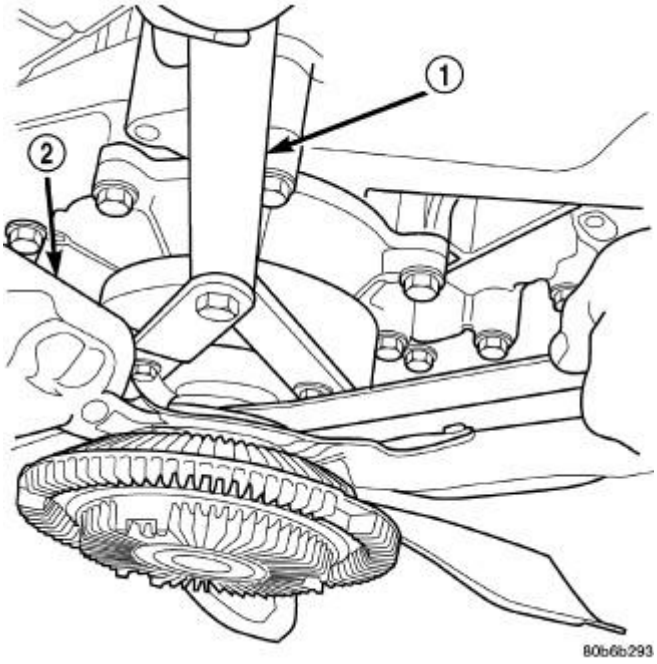

Fig. 364: Identifying Adapter Pins (8346) And Fan/Viscous Fan Drive Assembly
Courtesy of CHRYSLER GROUP, LLC

4. Drain cooling system.
5. Remove the fan drive assembly.

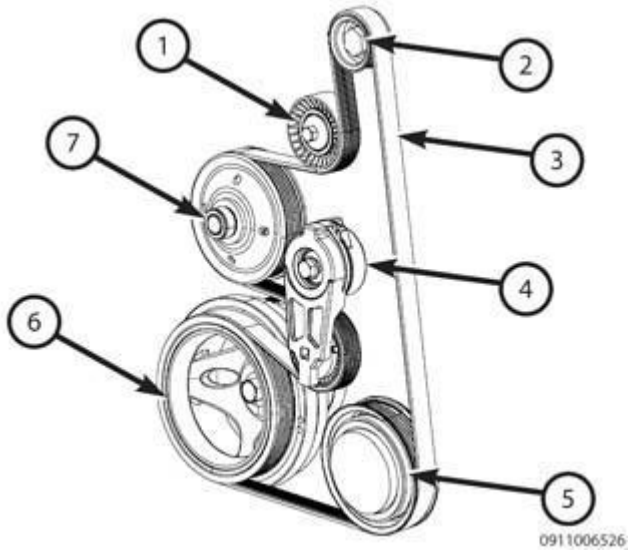

Fig. 365: Belt Routing (5.7L Engine)
Courtesy of CHRYSLER GROUP, LLC

6. Remove accessory drive belt (3).
7. Remove fan shroud.

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

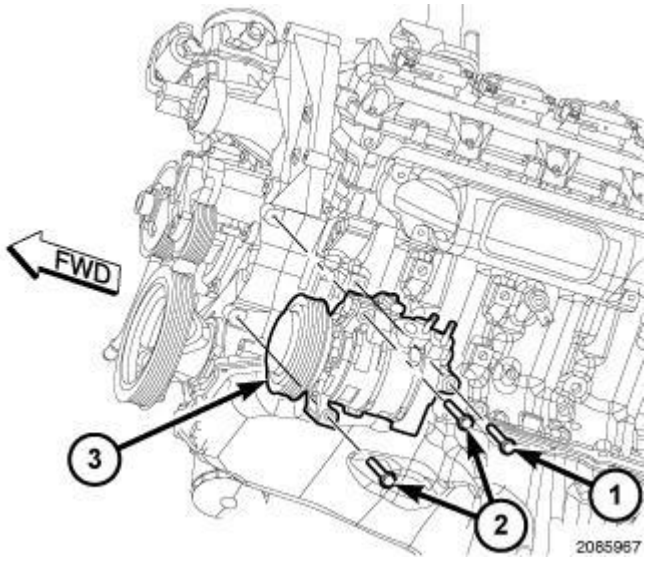

Fig. 366: A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

8. Remove A/C compressor and position aside.

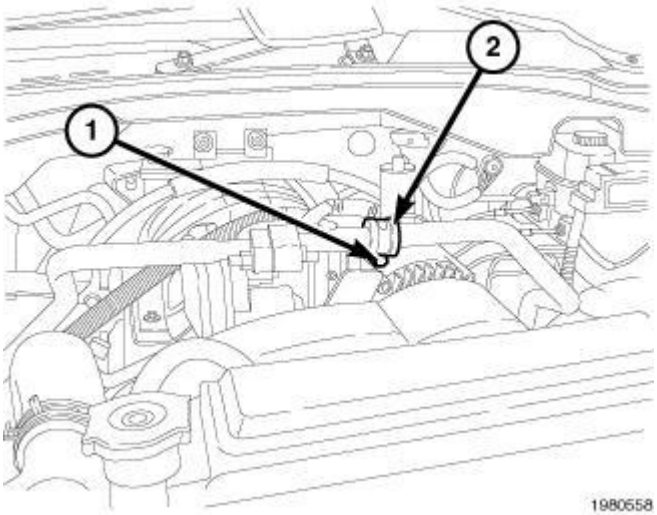

Fig. 367: A/C Line P-Clip & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove the A/C line support brace (2).

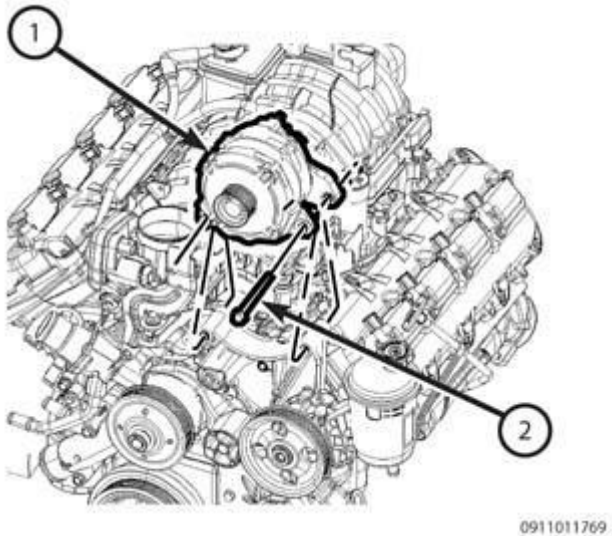

Fig. 368: Remove/Install Generator
Courtesy of CHRYSLER GROUP, LLC

10. Remove the generator and position aside.

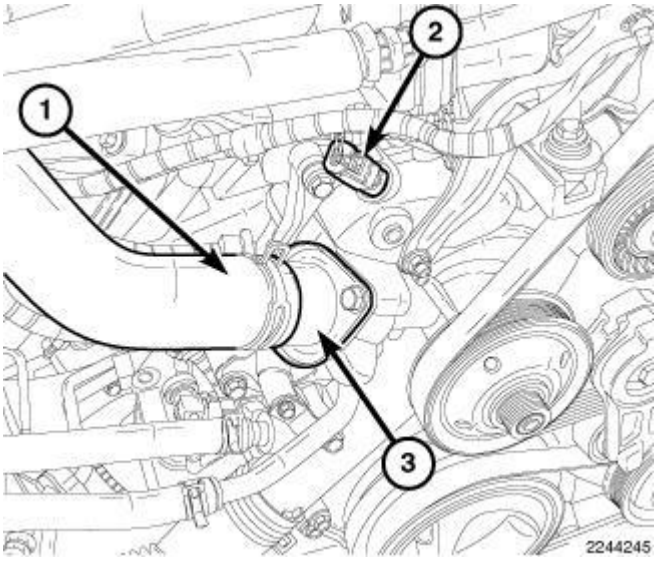

Fig. 369: Engine Coolant Temperature (ECT) Sensor & Thermostat
Courtesy of CHRYSLER GROUP, LLC

11. Remove upper radiator hose (1) at the thermostat housing (3).
12. Disconnect the temperature sensor electrical connector (2).

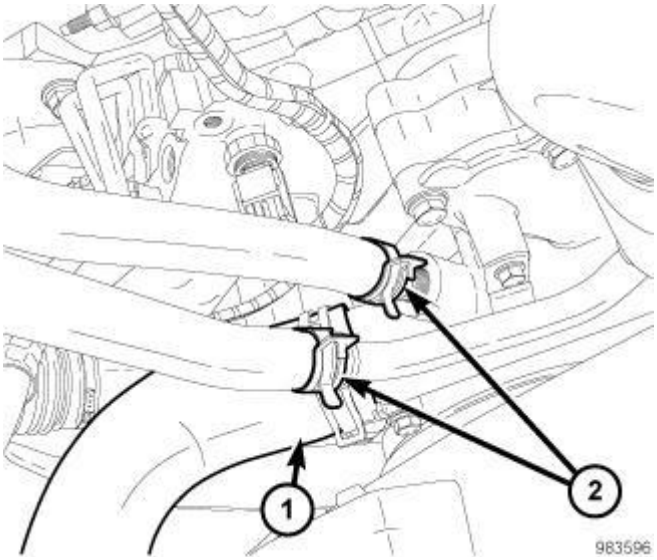

Fig. 370: Heater & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect both heater hoses (2) at timing cover.
14. Disconnect lower radiator hose (1) at the water pump.

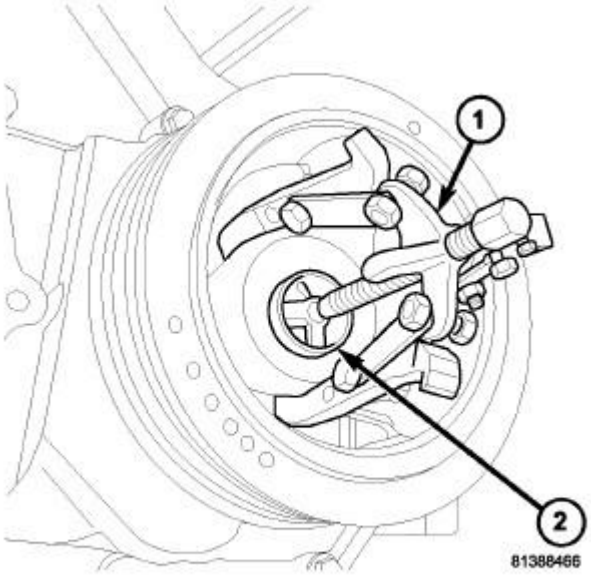

Fig. 371: Crankshaft Damper Removal
Courtesy of CHRYSLER GROUP, LLC

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

15. Remove accessory drive belt tensioner and both idler pulleys.
16. Remove crankshaft damper (2). Refer to **DAMPER, VIBRATION, REMOVAL, 5.7L**.
17. If equipped, remove power steering pump and set aside.
18. Raise the vehicle.

NOTE: If equipped with 4WD. The front axle housing requires to be lowered but does not require removal from the vehicle.

19. Drain the engine oil.

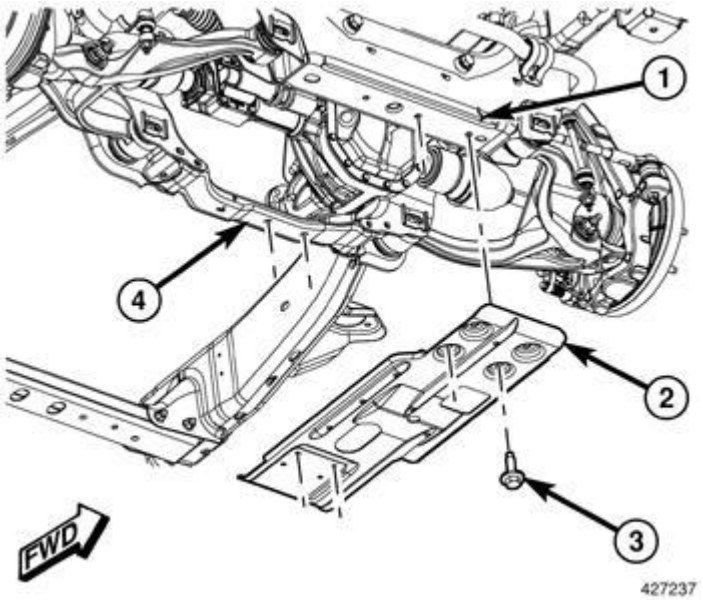

Fig. 372: Removing/Installing Front Skid Plate
Courtesy of CHRYSLER GROUP, LLC

20. If equipped, remove the front skid plate (2).

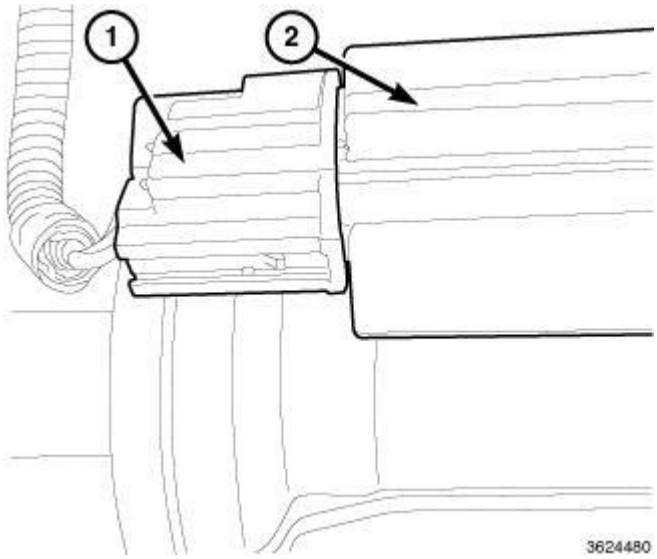

Fig. 373: Actuator & Connector
Courtesy of CHRYSLER GROUP, LLC

21. Disconnect and position aside the axle disconnect actuator (2) wiring connector (1).

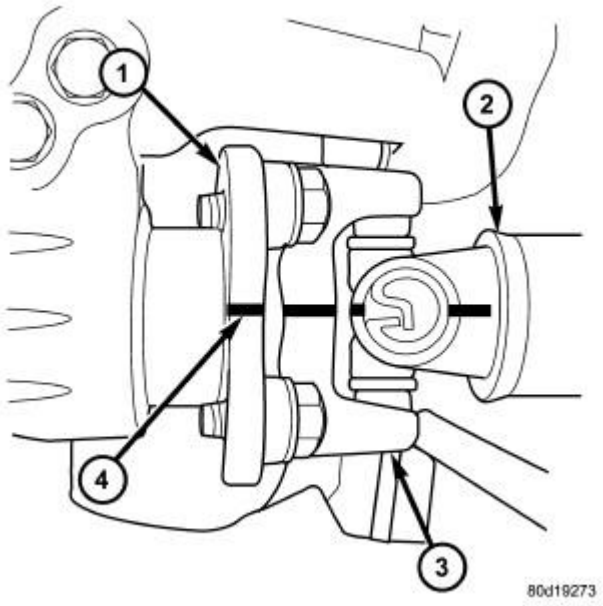

Fig. 374: Propeller Shaft & Pinion Flange. Reference Mark
Courtesy of CHRYSLER GROUP, LLC

22. Mark (4) and remove the front drive shaft (2) at the front axle flange (1).

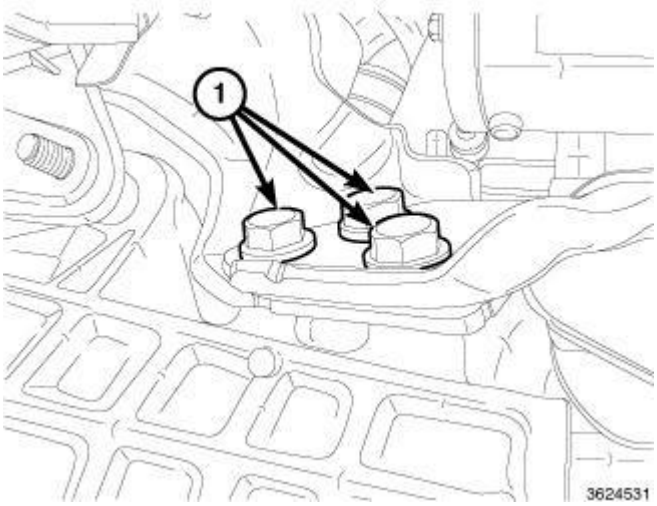

Fig. 375: Pinion Nose Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

23. Remove the bolts (1) that support the axle pinion to the transmission.

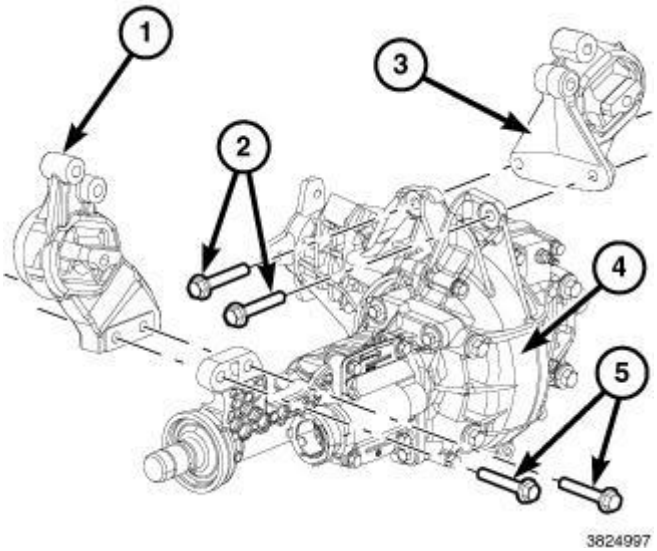

Fig. 376: Engine Mounts, Front Axle & Bolts
Courtesy of CHRYSLER GROUP, LLC

24. Using a suitable jack. Support the axle.
25. Remove the axle support bolts (2, 5).
26. Lower the axle.

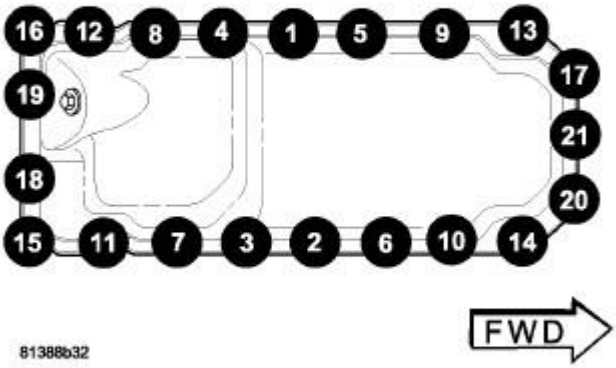

Fig. 377: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

27. Remove the oil pan.

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

28. Lower the vehicle.

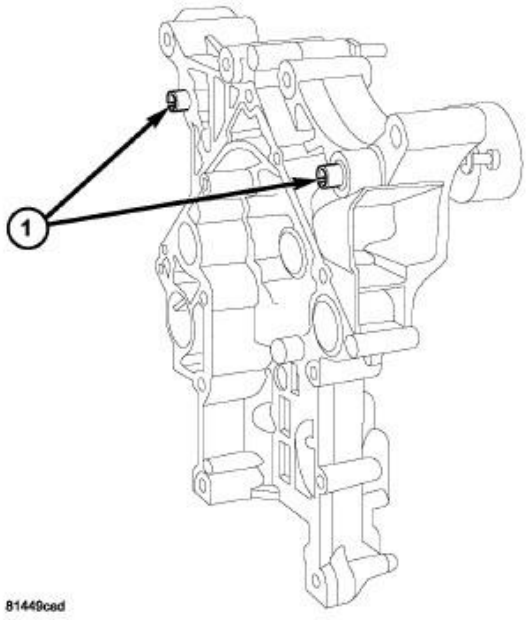

Fig. 378: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

INSTALLATION

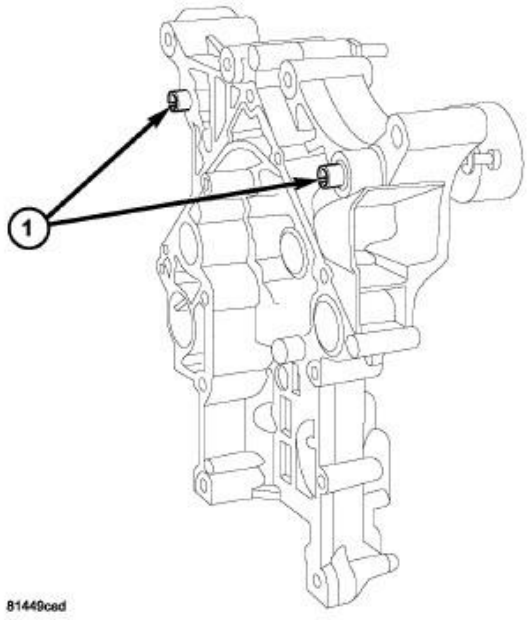

Fig. 379: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

1. Clean timing chain cover and block surface.

NOTE: Always install a new gasket on timing cover.

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

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

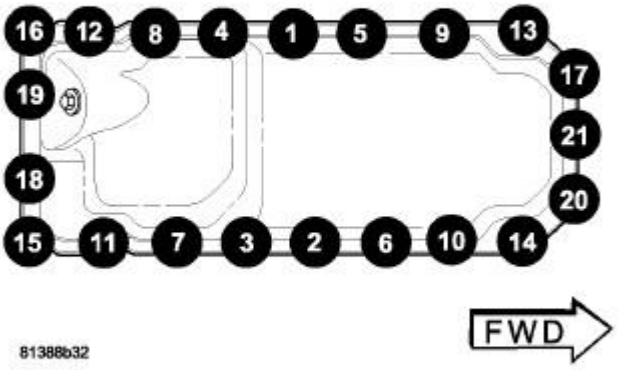

Fig. 380: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.

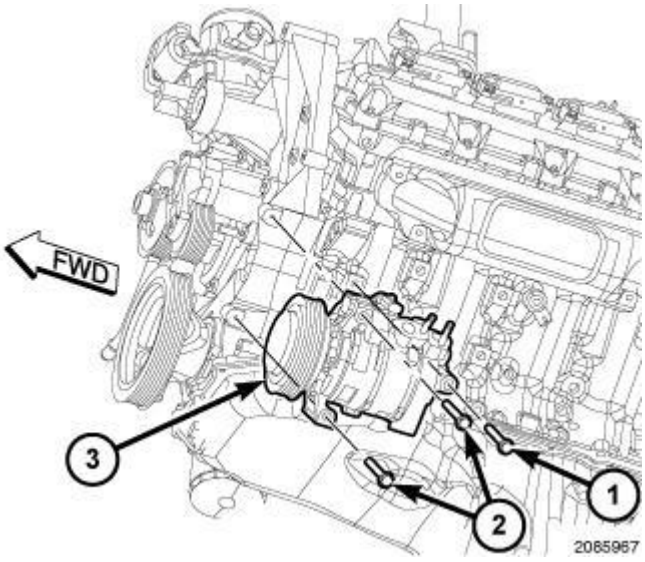

Fig. 381: A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

5. Install the A/C compressor (2). Tighten each of the bolts to 28 N.m (21 ft. lbs.) using the following sequence:
   - Upper bolt at front of compressor.
   - Lower bolt at front of compressor.

- Bolt at rear of compressor (1).

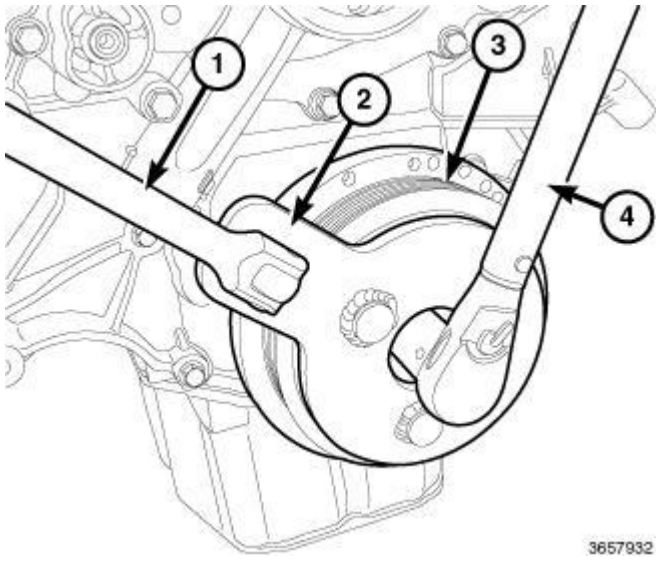

Fig. 382: Installing Vibration Damper Onto Vibration Pulley
Courtesy of CHRYSLER GROUP, LLC

6. Install crankshaft damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.
7. Install accessory drive belt tensioner assembly and both idler pulleys.

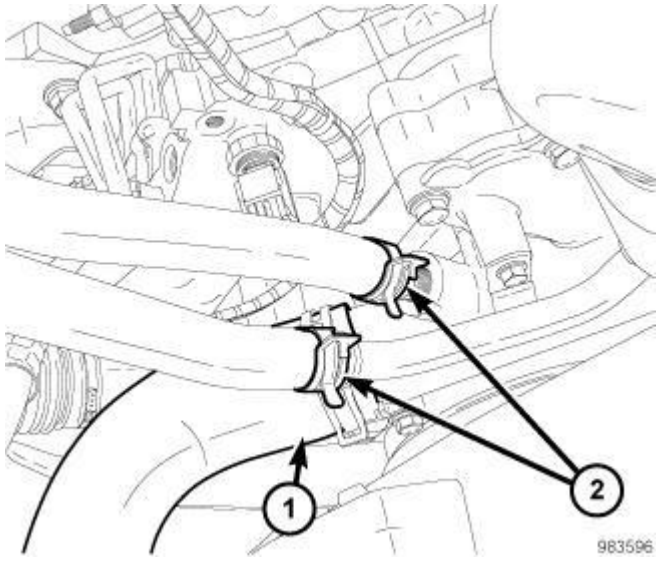

Fig. 383: Heater & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

8. Install radiator lower hose (1).
9. Install both heater hoses (2).

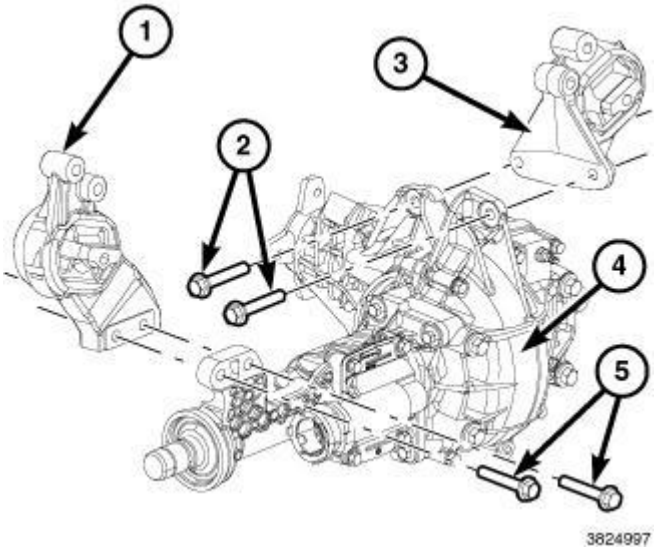

Fig. 384: Engine Mounts, Front Axle & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. If removed. Install the axle assembly.).
11. Lower the vehicle.

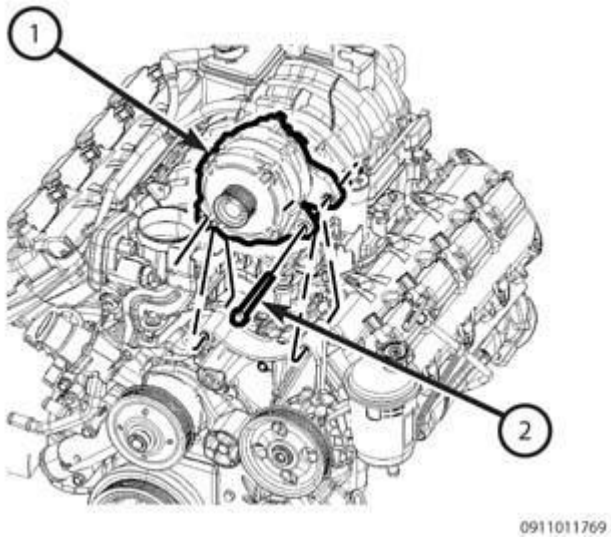

Fig. 385: Remove/Install Generator
Courtesy of CHRYSLER GROUP, LLC

12. Install the generator (2). Tighten the bolts (2) to 50 N.m (37 ft. lbs.).

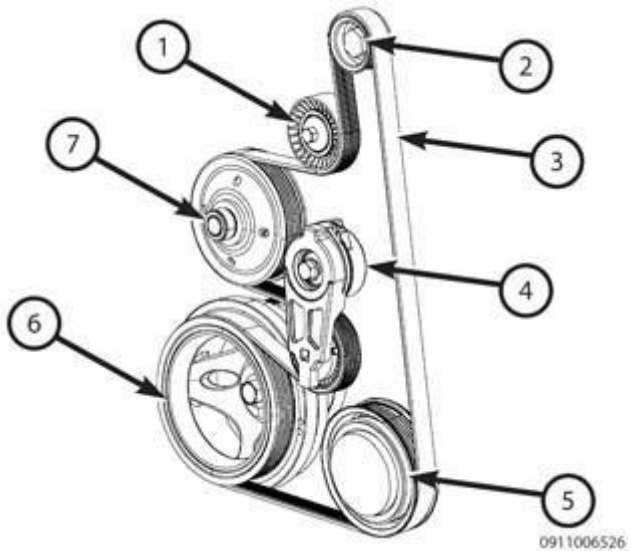

Fig. 386: Belt Routing (5.7L Engine)
Courtesy of CHRYSLER GROUP, LLC

13. Install the accessory drive belt.

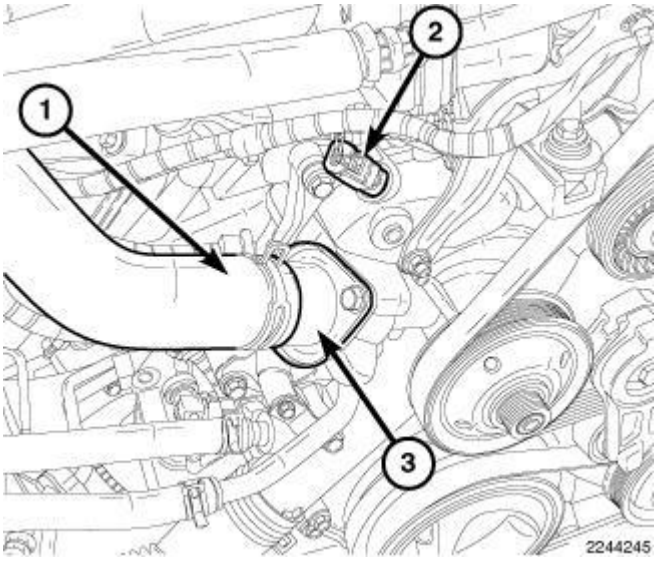

Fig. 387: Engine Coolant Temperature (ECT) Sensor & Thermostat
Courtesy of CHRYSLER GROUP, LLC

14. Install the upper radiator hose (1).
15. Connect the temperature sensor (2).

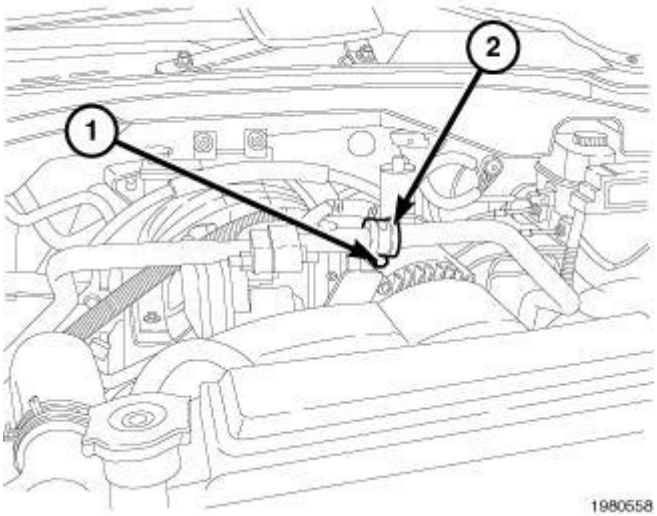

Fig. 388: A/C Line P-Clip & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

16. Install the A/C line support brace (2).

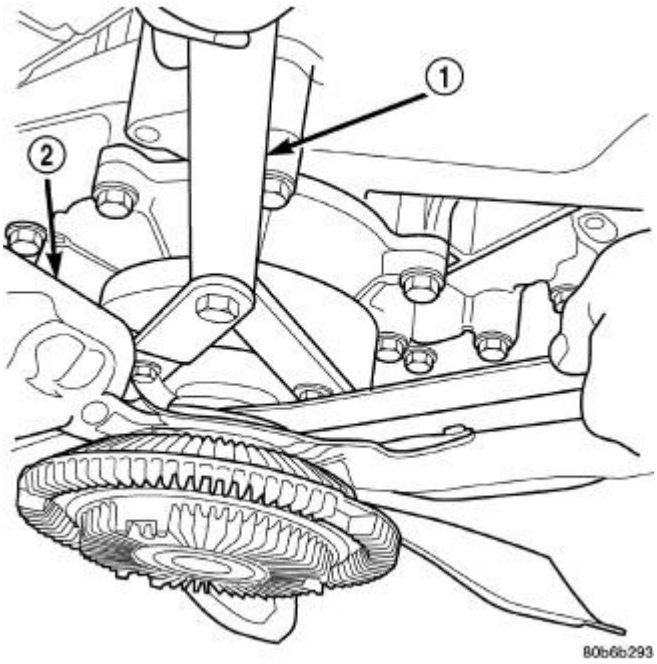

Fig. 389: Identifying Adapter Pins (8346) And Fan/Viscous Fan Drive Assembly
Courtesy of CHRYSLER GROUP, LLC

17. Install the fan shroud.
18. Install the fan drive assembly.

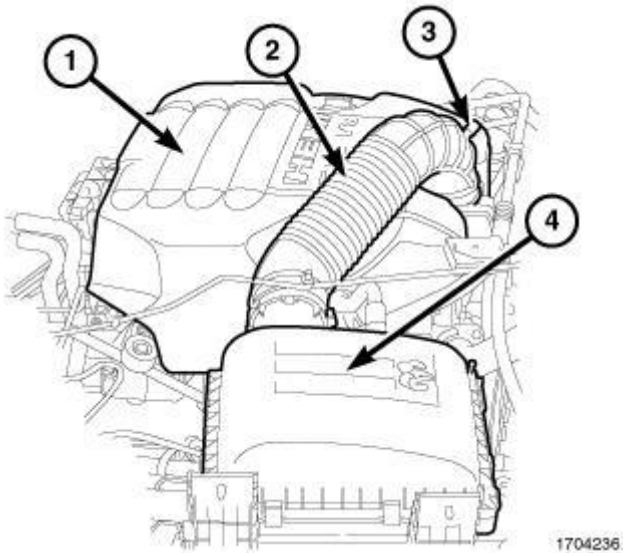

Fig. 390: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

19. Install the engine cover (1).
20. Install the air cleaner assembly (2, 4).
21. Fill cooling system.
22. Refill engine oil.
23. Connect the battery negative cable.

TENSIONER, ENGINE TIMING

STANDARD PROCEDURE

STANDARD PROCEDURE - RESETTING TIMING CHAIN TENSIONER

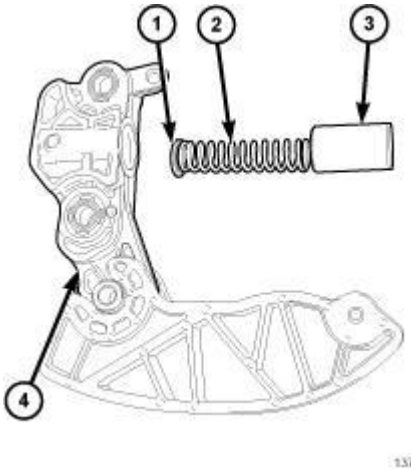

Fig. 391: Tensioner Body, Washer, Spring & Plunger
Courtesy of CHRYSLER GROUP, LLC

NOTE: Verify that the tensioner is assembled correctly.

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

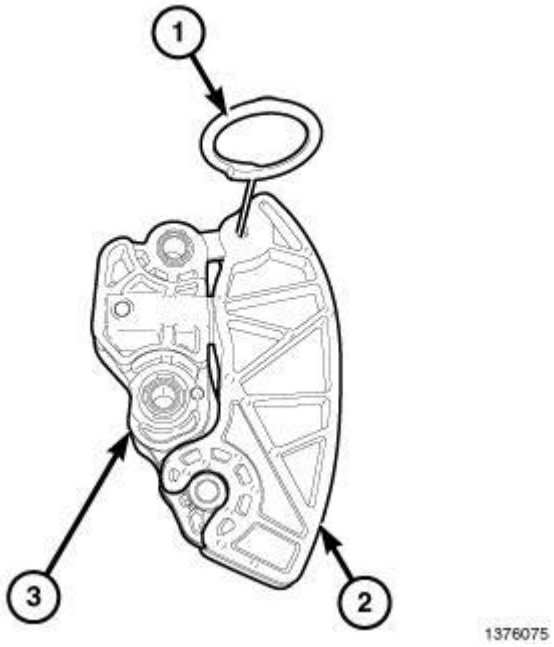

Fig. 392: Tensioner Pin, Guide Shoe & Tensioner Body
Courtesy of CHRYSLER GROUP, LLC

2. Squeeze the tensioner body (3) and movable guide shoe (2) together and install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

